Operational and Performance Testing of the Ocean Signal ATA 100 Class A Transceiver In accordance with IEC 61993-2 Edition 3.0

Prepared for: Ocean Signal
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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Authorised Signatory	Matthew Russell	31 January 2020	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD document control rules.

EXECUTIVE SUMMARY
A sample of this product was tested and found to be in compliance with IEC 61993-2 Edition 3.0

TÜV SÜD is a trading name of TUV SUD Limited which is a member of the TÜV SÜD Group
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Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	31 January 2020

Table 1

1.2 Introduction

Applicant	Ocean Signal
Manufacturer	Ocean Signal
Model Number(s)	ATA100
Serial Number(s)	TA010
Hardware Version(s)	Refer to section 1.7
Software Version(s)	Refer to section 1.7
Number of Samples Tested	1
Test Specification/Issue/Date	IEC 61993-2 Edition 3.0
Test Plan/Issue/Date	None
Order Number	3123-00
Date	31-October-2016
Date of Receipt of EUT	11-December-2017
Start of Test	11-December-2017
Finish of Test	05-December-2019
Name of Engineer(s)	Nic Forsyth Finlay Orr

1.3 Brief Summary of Results

Section	Specification Clause	Test Description	Mod State	Result
2.1	14.1.1.1	Transmit position reports	3	Pass
	14.1.1.2	Receive position reports	3	Pass
	14.1.2	Assigned mode	7	Pass
	14.1.3.1	Transmit an interrogation	5	Pass
	14.1.3.2	Interrogation response	8	Pass
	14.1.4.1	Transmit an addressed message	7	Pass
	14.1.4.2	Receive addressed message	5	Pass
	14.1.5.1	Transmit a broadcast message	7	Pass
	14.1.5.2	Receive broadcast message	5	Pass
	14.1.6.1	3 slot messages	5	Pass
	14.1.6.2	Longer messages	5	Pass
2.2	14.2	Manuals, marking and identification	14	Pass
2.3	14.3.1	Information provided by the AIS	5	Pass
	14.3.2.1	Speed and course change	6	Pass
	14.3.2.2	Change of navigational status	3	Pass
	14.3.2.3	Assigned reporting intervals	8	Pass
	14.3.2.4	Static data reporting intervals	6	Pass
2.4	14.4	Event Log	5	Pass
2.5	14.5	Software update	5	Pass
2.6	14.6	Initialization period	1	Pass
2.7	14.7.1	Channel selection	16	Pass
	14.7.2	Transceiver protection	3	Pass
	14.7.3	Automatic power setting	5	Pass
2.8	14.8.1	Loss of power supply	3	Pass
	14.8.2.1	Tx malfunction	6	Pass
	14.8.2.2	Antenna VSWR	6	Pass
	14.8.2.3	Rx malfunction	14	Pass
	14.8.2.4	Loss of UTC	5	Pass
	14.8.2.5	Remote MKD disconnection, when so configured.	-	N/A
	14.8.2.6	Legacy translation of alerts	6	Pass
	14.8.2.7	BAM alerts	15	Pass
	14.8.2.8	Status query	5	Pass
	14.8.2.9	Version information query	6	Pass
	14.8.3.1	Priority of position sensors	18	Pass
	14.8.3.2	Multiple Message 17 from different DGNSS reference stations	8	Pass
	14.8.3.3	Heading sensor	6	Pass
	14.8.3.4	Speed sensors	3	Pass
	14.8.3.5	GNSS position mismatch	9	Pass
	14.8.3.6	Incorrect NavStatus	10	Pass
	14.8.3.7	Auto detection of type of electronic position fixing device	13	Pass
2.9	14.9.1	Data input/output facilities	14	Pass
	14.9.2	Initiate message transmission	7	Pass
	14.9.3	Communication test	13	Pass
	14.9.4	System control	6	Pass
	14.9.5	Display of received targets	16	Pass
	14.9.6	Display of position quality	8	Pass
	14.9.7	Display of targets if optional filter is implemented	-	N/A
	14.9.8	Display of received safety related messages	13	Pass
	14.9.9	Presentation of navigation information	18	Pass
2.10	16.1.1	Synchronisation test using UTC	8	Pass
	16.1.2	Synchronisation test using UTC with repeated messages	8	Pass
	16.1.3	Synchronisation test without UTC, semaphore	13	Pass
	16.1.4	Synchronisation test without UTC	8	Pass
	16.1.5	Reception of un-synchronised messages	3	Pass
2.11	16.2	Time division (frame format)	3	Pass
2.12	16.3	Synchronisation jitter	9	Pass
2.13	16.4	Data encoding (bit stuffing)	3	Pass
2.14	16.5	Frame check sequence	3	Pass
2.15	16.6.1	Network entry	3	Pass
	16.6.2	Autonomous scheduled transmissions (SOTDMA)	14	Pass
	16.6.3	Autonomous scheduled transmissions (ITDMA)	13	Pass

Section	Specification Clause	Test Description	Mod State	Result
	16.6.4	Safety related/binary message transmission	13	Pass
	16.6.5	Transmission of Message 5 (ITDMA)	8	Pass
	16.6.6.1	Assigned mode using reporting rates	11	Pass
	16.6.6.2	Receiving test	9	Pass
	16.6.6.3	Slot assignment to FATDMA reserved slots	9	Pass
	16.6.7.1	Assignment priority	13	Pass
	16.6.7.2	Increased reporting interval assignment	12	Pass
	16.6.7.3	Entering interval assignment	12	Pass
	16.6.7.4	Assignment by region	11	Pass
	16.6.7.5	Assignment by station type	12	Pass
	16.6.7.6	Addressing by ship and cargo type	12	Pass
	16.6.7.7	Reverting from interval assignment	13	Pass
	16.6.8	Fixed allocated transmissions (FATDMA)	8	Pass
	16.6.9	Randomisation of message transmissions	8	Pass
2.16	16.7.1	Received messages	8	Pass
	16.7.2	Transmitted messages	10	Pass
2.17	17.1	Dual channel operation – Alternate transmissions	8	Pass
2.18	17.2	Regional area designation by VDL message	13	Pass
2.19	17.3	Regional area designation by serial message	14	Pass
2.20	17.4	Regional area designation with lost position	8	Pass
2.21	17.5	Power setting	10	Pass
2.22	17.6	Message priority handling	16	Pass
2.23	17.7	Slot reuse and FATDMA reservations	13	Pass
2.24	17.8.1	Test for replacement or erasure of dated or remote regional operating settings	13	Pass
	17.8.2	Test of correct input via presentation interface or MKD	18	Pass
	17.8.3	Test of addressed telecommand	8	Pass
	17.8.4	Test for invalid regional operating areas	8	Pass
2.25	17.9	Continuation of autonomous mode reporting interval	8	Pass
2.26	18.1.1	Transmission	8	Pass
	18.1.2	Acknowledgement	8	Pass
	18.1.3	Transmission retry	11	Pass
	18.1.4	Acknowledgement of addressed safety related messages	10	Pass
	18.1.5	Behaviour of NavStatus 14 reception	16	Pass
2.27	18.2	Interrogation responses	8	Pass
2.28	19.1	General	8	Pass
2.29	19.2	Check of the manufacturer's documentation	8	Pass
2.30	19.3	Electrical test	19	Pass
2.31	19.4	Test of input sensor interface performance	10	Pass
2.32	19.5.1	Test of GNS input	9	Pass
	19.5.2	Test of RMC input	8	Pass
	19.5.3	Test of DTM input	10	Pass
	19.5.4	Test of GBS input	11	Pass
	19.5.5	Test of VBW input	11	Pass
	19.5.6	Test of VTG input	10	Pass
	19.5.7	Test of HDT/THS input	8	Pass
	19.5.8	Test of ROT input	11	Pass
	19.5.9	Test of different inputs	11	Pass
	19.5.10	Test of multiple inputs	16	Pass
2.33	19.6	Test of high speed output	8	Pass
2.34	19.7	High speed output interface performance	18	Pass
2.35	19.8	Output of undefined VDL messages	10	Pass
2.36	19.9.1	General	-	N/A
	19.9.2	Test of VSD input sentence	11	Pass
	19.9.3	Test of SSD input sentence	15	Pass
	19.9.4	Test of EPV input sentence	15	Pass
	19.9.5	Test of the pilot port access level	15	Pass
	20.1.1	LR interrogation	13	Pass
	20.1.2	LR "all ships" interrogation	13	Pass
	20.1.3	Consecutive LR ”all ships” interrogations	13	Pass
	20.2.1	Long-range broadcast	15	Pass
	20.2.2	Multiple assignment operation	15	Pass

Table 2 - A brief summary of the tests carried out in accordance with IEC 61993-2 Edition 3.0

1.4 Application Form

EQUIPMENT DESCRIPTION	
Model Name/Number	ATA100
Part Number	760S-02697
Hardware Version	900S-02698
Software Version	TBD
Technical Description (Please provide a brief description of the intended use of the equipment)	Class A AIS transponder

EXTREME TEMPERATURE RANGE (over which equipment is to be type tested)
☐ Not Applicable (no extreme temperature testing required)
☒ Category I (General)
☐ Category II (Portable equipments)
☐ Other (please specify):

TYPE OF EQUIPMENT			
☐ Fixed Station	☐ Transmitter	☐ Simplex	☐ Integral Antenna
	☐ Receiver	☐ Duplex	☒ Single Antenna
			Connector
☒ Mobile Station	☒ Transceiver		☐ Two Antenna Connector
			☐ Multiple Antenna Connectors No.
☐ Portable Station	☐		
☐ Transponder (Tag)	☒ Active	☐ Passive	

TRANSMITTER TECHNICAL CHARACTERISTICS		
FREQUENCY CHARACTERISTICS		
Transmitter frequency alignment range	to	MHz
Transmitter channel switching frequency range	156.025 to 162.025	MHz

TRANSMITTER RF POWER CHARACTERISTICS					
Maximum rated transmitter output power as stated by manufacturer (if applicable)					
12.5	W	At transmitter permanent external 50 Ω RF output connector			
and/or					
	W	Effective radiated power (for equipment with integral antenna)			
Minimum rated transmitter output power as stated by manufacturer (if applicable)					
1	W	At transmitter permanent external 50 Ω RF output connector			
and/or					
	W	Effective radiated power (for equipment with integral antenna)			
Is transmitter intended for :					
Continuous duty			☐	Yes	☒ No
Intermittent duty only			☒	Yes	☐ No
If intermittent duty state DUTY CYCLE					
Transmitter ON	0.026	Seconds	Transmitter OFF		Seconds

TRANSMITTER - MODULATION			
Amplitude	☐	Other	☒
Frequency	☐	Details :	GMSK
Phase	☐	Channel Spacing	25kHz
Can the transmitter be operated without modulation? * See definition below		☐ Yes	☒ No

RECEIVER TECHNICAL CHARACTERISTICS	
FREQUENCY CHARACTERISTICS	
Receiver frequency alignment range	to
Receiver channel switching frequency range	156.025 to 162.025
Channel Separation (if applicable)	25kHz
State the maximum number of channels over which the equipment can operate:	

POWER SOURCE			
☐ AC mains		State voltage	
AC supply frequency	(Hz)		
VAC			
Max Current			
Hz			
☐ Single phase		☐ Three phase	
And / Or			
☒ External DC supply			
Nominal voltage	V	Max Current	6 A
Extreme upper voltage	31.2 V		
Extreme lower voltage	10.8 V		
Battery			
☐ Nickel Cadmium		☐ Lead acid (Vehicle regulated)	
☐ Alkaline		☐ Leclanche	
☐ Lithium		☐ Other Details :	
Volts nominal.			
End point voltage as quoted by equipment manufacturer	10.8 V		

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
☐ Applies	V cut-off voltage
☒ Does not apply	

CHANNEL IDENTIFICATION

Each equipment, whether one or more submitted for tests shall carry clear identification (such as a serial number), together with the frequencies associated with the channel identification displayed on the equipment.

Equipment Identification eg Serial Number	Channel No.	Transmit Nominal Freq MHz	Receive Nominal Freq MHz

I hereby declare that that the information supplied is correct and complete.

Name: David Sheekey Position held: Type Approval Manager

Date: 28/3/2018

1.5 Product Information

1.5.1 Technical Description

The Ocean Signal ATA100 Class A AIS Transceiver is a VHF transceiver used by ships to relay voyage and identification data to other vessels.

1.6 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification Fitted to the EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable
1	The user can now change the unit's MMSI, the IMO number is no longer limited to 9 digits and also appears in the EUT's Message 5. NavStatus selection menu now includes all options and when the maximum draught is changed, Message 5 now transmits the updated value. True heading is no longer transmitted incorrectly by a factor of 10, VDM's are output to the pilot port and the ECDIS now outputs data.	N Forsyth	12/01/2018
2	Alarm 001 is now output when the MMSI is 0, and there is a fix for the bug where the EUT would output alarms 001 and 002 while transmitting. The alarm message menu is no longer blank and TXT034 sentence is now output to the pilot port.	N Forsyth	09/03/2018
3	Fixes for the destination field being blank in transmitted Message 5, the ETA can now be entered via the voyage menu, NavStatus is now labelled in the voyage menu and now reports correctly in position reports. Message 5 is now transmitted when changing the GNSS source and the EUT responds to AIS interrogation requests.	N Forsyth	19/03/2018
4	Added 4 x 1uF capacitor from SKT2 chassis to 0V (SKT2 is a PCB mounted SMB socket and is used to connect to the external SO239 antenna port). Added 22pf decoupling capacitor from IC 42 Pin 42 to 0V - SPI data line (Signal RF_MOSI). Added 22pf decoupling capacitor from IC 42 Pin 43 to 0V - SPI data line (Signal RF_MISO).	N Forsyth	13/05/2018
5	When sending a BBM in multiple parts, the EUTY now sends Message 8. When changing reporting rates, the EUT no longer drops one or two messages in the first frame. EUT no longer responds to AIS interrogation requests with only Message 3. SSD and VSD can now be used to set values, EUT responds to query for TRL and there is now an indicator for when the EUT is in low power mode. Fix for channel management messages not being processed and the EUT outputting a TXT sentence every time the heading is changed.	N Forsyth	15/05/2019
6	Fix for unstructured Message 25 being encoded incorrectly and Message 25 being mistakenly transmitted as a Message 26. Targets are now removed from the display after 7 minutes and the EUT no longer stops transmitting at the end of assigned mode. The alarm with ID 009 is now output when there is a position mismatch of 100m< for 15 minutes and there is a fix for reporting rates decreasing too early. BBM's applied to channel A were sometimes being transmitted on channel B but the VDO was stating A. Message 5 is no longer sent when sending SSD with unchanged data, and Message 5 is now sent when changing VSD fields. ALC total number of sentences now reads 01, fix for the VHF antenna VSWR text alert. EUT now transmits V,V alarm when here are no alarms active and the appropriate TXT sentence is output when the heading sentence is reapplied.	N Forsyth	28/05/2019

Modification State	Description of Modification Fitted to the EUT	Modification Fitted By	Date Modification Fitted
7	Channels can now be set manually, the user is prompted when the NavStatus is incorrect, Message 16 is now being transmitted in the correct slot and structured ABM's and BBM's are being transmitted correctly. Updated also fixes heading sensor offset alert being constantly raised, and the freezing issue encountered by changing the comms test selection. AtoNs now have a unique name identifier, admin and user passwords now have different priorities, '^' characters do not take up 2 characters, all value for ship and cargo type are accessible via the MKD. Large draughts are now displayed correctly in Message 5, the ETA saves correctly and the EUT does not lock up when pressing 'Setup' on the ETA screen. There is no longer a warning displayed when the DTE flag = 0, the correct reporting interval is used in assigned mode, NavStatus alarms are clearing correctly and position quality updates more frequently.	N Forsyth	24/06/2019
8	Structured Message 25's and 26's are encoded correctly, EUT can sync to a base station or other mobile station with UTC and there is a fix to enable the EUT to use Message 17.	N Forsyth	01/07/2019
9	When using internal GNSS, the EUT no longer reports the type of EPFS as '1' in Message 5. The extra space in the ALC sentence number field has been removed and BIIT 9 is now output after 15 minutes. LC, IN and GX no longer result in the type of EPFS field being reported as '15'. Class B CS and base station are no longer available to select in the comms test menu. Message 12 is now displayed on the MKD / addressed message list and sensor 3 can now be configured to RTCM data or 61162 sentences via the MKD. VTG sentences no longer cause the COG/SOG to alternate between N/A and the values in the VTG sentences. Providing a mode indicator of E, M, S or N now reports the correct external position value and time stamp.	F Orr	25/07/2019
10	Fix for the EUT MKD freezing when in sync state 3, the EUT now retries to send Message 6, the power level is now 1W when sending Message 22 with power = '1'. When RTCM + DTM are applied and local datum changed to other, external data is no longer used. The values of COG and SOG are now being calculated from HDT and VBW sentences. There is now a fix for negative ROT being rejected by the EUT, and ROT sentences are now being relayed to the pilot port, along with HDT. There is a fix for sentence 32-64 not being output to the PI, the draught is no longer out by a factor of 10 in the VSD sentence and the user can set the ETA using VSD sentences. The DTE flag can now be set using the SSD sentence without a preceding SSDA sentence, Message 27's are now being transmitted and the bug for incorrect NavStatus being sent after 3.5 hours has been corrected.	F Orr	06/08/2019
11	Fixes for the incorrect ROT value when the talker ID = HE, the time to revert from semaphore is too long, regions were being deleted by age and not distance, the re-transmit flag was not being set for re-tries, when transverse ground speed is null and status = A- the SOG and COG are not default. The EUT would freeze when initiating message 1, region size was not checked, alert function for locating devices could not previously be set, leading zeros missing on date in VSD and millisecond field weren't 00, the special manoeuvre indicator was not being set in VSD sentence and the DTE flag set in SSD sentence was not the same as being encoded in Message 5.	F Orr	13/08/2019
12	The EUT no longer ignores Message 23, Message 8 can now be sent using ITDMA and Message 3 slot interval conforms to ±20% tolerance. Message 8 now broadcasts within 4 seconds and class B CS targets are not included in the number of received stations. There is a fix for the SSD sentence being accepted regardless of a preceding SSA sentence if the DTE flag was valid.	F Orr	20/08/2019
13	The number of slots in Message 3 commstate has been corrected, the EUT now changes to Message 2 if it's in Tx/Rx mode 1 and base station MMSI's do not appear in the manual comms test menu if there are only 2 targets. LC and IN no longer result in type of EPFS = 0 in Message 5. The time to revert from semaphores has been shortened, the EUT no longer freezes when initiating Message 12 and regional operating areas are now checked their sides are within the acceptable	F Orr	04/09/2019

Modification State	Description of Modification Fitted to the EUT	Modification Fitted By	Date Modification Fitted
	bounds. Operating regions are now removed after 24 hours. There is a fix for Message 14 being displayed over Message 12, ITDMA transmissions now declare the correct slot increments and the EUT now accepts addressed Message 22's.		
14	There is now guidance given to the user when changing the NavStatus to 12, the EUT does not output SOG/COG when no EPFS is in use and the EUT no longed uses slots that contain loading with Message 26. When the position sensor and external EPFS is removed, the 'Type of EPFS' field in Message 5 is now being updated. The minimum safe compass distance has been corrected in the installation manual.	F Orr	21/10/2019
15	Static data for Class B's and airborne AIS targets is now being retained after 7 minutes. When long-range response fields are marked to not auto-reply, they are no longer rejected regardless of if a user selects 'Accept' on the MKD. NAK sentence, with reason code 5, is now being output when an invalid SSA hash is sent with an SSD sentence. BAM alert compliancy issues have been addressed and reserved characters are now encoded correctly when setting call sign via the PI.	F Orr	28/10/2019
16	Operating regions can now be sent using addressed Message 22's. Class B CS targets now update after the 7-minute timeout with static data. MOB TEST targets are no longer displayed when the enable testing option is not checked. When different heading data is applied to different sensor ports, the EUT no longer switches between them. Acknowledging the alert for an active MOB device now acknowledges the alarm successfully. Fixed the bug where entering a string of '^24' as the EUT's callsign would cause the EUT to brick. The VSD data returned from the VSD query no longer returns the destination before the sentence.	F Orr	31/10/2019
17	Creating a new region via the MKD that does not overlap and existing region no longer overwrites the existing region.	F Orr	06/11/2019
18	Presentation of navigation information is now in accordance with IEC 62288 and CPA/TCPA collision alerts now trigger when the EUT is brought inside the CPA/TCPA boundary. External data was not previously using external data when the talker ID was SN. The latency between PI and pilot port / ECDIS port is now sub-200 ms. Broadcasting a Message 22 that contains the EUT no longer freezes the GUI by removing the default region. Applying a Message 17 with a beacon RX input no longer causes the EUT to freeze.	F Orr	08/11/2019
19	The internal GNSS receiver firmware was updated, enabling the EUT to use RTCM sentences applied to sensor port 3.	F Orr	27/11/2019

Table 3

1.8 Test Location

TÜV SÜD conducted the following tests at our Fareham Test Laboratory.

Section	Specification Clause	Test Description	Name of Engineer	Accreditation
2.1	14.1.1.1	Transmit position reports	N Forsyth	UKAS
	14.1.1.2	Receive position reports	N Forsyth	UKAS
	14.1.2	Assigned mode	N Forsyth	UKAS
	14.1.3.1	Transmit an interrogation	N Forsyth	UKAS
	14.1.3.2	Interrogation response	N Forsyth	UKAS
	14.1.4.1	Transmit an addressed message	N Forsyth	UKAS
	14.1.4.2	Receive addressed message	N Forsyth	UKAS
	14.1.5.1	Transmit a broadcast message	N Forsyth	UKAS
	14.1.5.2	Receive broadcast message	N Forsyth	UKAS
	14.1.6.1	3 slot messages	N Forsyth	UKAS
	14.1.6.2	Longer messages	N Forsyth	UKAS

Section	Specification Clause	Test Description	Name of Engineer	Accreditation
2.2	14.2	Manuals, marking and identification	F Orr	UKAS
2.3	14.3.1	Information provided by the AIS	N Forsyth	UKAS
	14.3.2.1	Speed and course change	N Forsyth	UKAS
	14.3.2.2	Change of navigational status	N Forsyth	UKAS
	14.3.2.3	Assigned reporting intervals	N Forsyth	UKAS
	14.3.2.4	Static data reporting intervals	N Forsyth	UKAS
2.4	14.4	Event Log	N Forsyth	UKAS
2.5	14.5	Software update	N Forsyth	UKAS
2.6	14.6	Initialization period	N Forsyth	UKAS
2.7	14.7.1	Channel selection	F Orr	UKAS
	14.7.2	Transceiver protection	N Forsyth	UKAS
	14.7.3	Automatic power setting	N Forsyth	UKAS
2.8	14.8.1	Loss of power supply	N Forsyth	UKAS
	14.8.2.1	Tx malfunction	N Forsyth	UKAS
	14.8.2.2	Antenna VSWR	N Forsyth	UKAS
	14.8.2.3	Rx malfunction	F Orr	UKAS
	14.8.2.4	Loss of UTC	N Forsyth	UKAS
	14.8.2.5	Remote MKD disconnection, when so configured.	N/A	UKAS
	14.8.2.6	Legacy translation of alerts	N Forsyth	UKAS
	14.8.2.7	BAM alerts	F Orr	UKAS
	14.8.2.8	Status query	N Forsyth	UKAS
	14.8.2.9	Version information query	N Forsyth	UKAS
	14.8.3.1	Priority of position sensors	F Orr	UKAS
	14.8.3.2	Multiple Message 17 from different DGNSS reference stations	N Forsyth	UKAS
	14.8.3.3	Heading sensor	N Forsyth	UKAS
	14.8.3.4	Speed sensors	N Forsyth	UKAS
	14.8.3.5	GNSS position mismatch	N Forsyth	UKAS
	14.8.3.6	Incorrect NavStatus	N Forsyth	UKAS
	14.8.3.7	Auto detection of type of electronic position fixing device	F Orr	UKAS
2.9	14.9.1	Data input/output facilities	F Orr	UKAS
	14.9.2	Initiate message transmission	N Forsyth	UKAS
	14.9.3	Communication test	F Orr	UKAS
	14.9.4	System control	N Forsyth	UKAS
	14.9.5	Display of received targets	F Orr	UKAS
	14.9.6	Display of position quality	N Forsyth	UKAS
	14.9.7	Display of targets if optional filter is implemented	N/A	UKAS
	14.9.8	Display of received safety related messages	F Orr	UKAS
	14.9.9	Presentation of navigation information	F Orr	UKAS
2.10	16.1.1	Synchronisation test using UTC	N Forsyth	UKAS
	16.1.2	Synchronisation test using UTC with repeated messages	N Forsyth	UKAS
	16.1.3	Synchronisation test without UTC, semaphore	F Orr	UKAS
	16.1.4	Synchronisation test without UTC	N Forsyth	UKAS
	16.1.5	Reception of un-synchronised messages	N Forsyth	UKAS
2.11	16.2	Time division (frame format)	N Forsyth	UKAS
2.12	16.3	Synchronisation jitter	N Forsyth	UKAS
2.13	16.4	Data encoding (bit stuffing)	N Forsyth	UKAS
2.14	16.5	Frame check sequence	N Forsyth	UKAS
2.15	16.6.1	Network entry	N Forsyth	UKAS
	16.6.2	Autonomous scheduled transmissions (SOTDMA)	F Orr	UKAS
	16.6.3	Autonomous scheduled transmissions (ITDMA)	F Orr	UKAS
	16.6.4	Safety related/binary message transmission	F Orr	UKAS
	16.6.5	Transmission of Message 5 (ITDMA)	N Forsyth	UKAS
	16.6.6.1	Assigned mode using reporting rates	F Orr	UKAS
	16.6.6.2	Receiving test	N Forsyth	UKAS
	16.6.6.3	Slot assignment to FATDMA reserved slots	N Forsyth	UKAS
	16.6.7.1	Assignment priority	F Orr	UKAS
	16.6.7.2	Increased reporting interval assignment	F Orr	UKAS
	16.6.7.3	Entering interval assignment	F Orr	UKAS
	16.6.7.4	Assignment by region	F Orr	UKAS
	16.6.7.5	Assignment by station type	F Orr	UKAS
	16.6.7.6	Addressing by ship and cargo type	F Orr	UKAS
	16.6.7.7	Reverting from interval assignment	F Orr	UKAS
	16.6.8	Fixed allocated transmissions (FATDMA)	N Forsyth	UKAS
	16.6.9	Randomisation of message transmissions	N Forsyth	UKAS
2.16	16.7.1	Received messages	N Forsyth	UKAS
	16.7.2	Transmitted messages	N Forsyth	UKAS

Section	Specification Clause	Test Description	Name of Engineer	Accreditation
2.17	17.1	Dual channel operation – Alternate transmissions	N Forsyth	UKAS
2.18	17.2	Regional area designation by VDL message	F Orr	UKAS
2.19	17.3	Regional area designation by serial message	F Orr	UKAS
2.20	17.4	Regional area designation with lost position	N Forsyth	UKAS
2.21	17.5	Power setting	F Orr	UKAS
2.22	17.6	Message priority handling	F Orr	UKAS
2.23	17.7	Slot reuse and FATDMA reservations	F Orr	UKAS
2.24	17.8.1	Test for replacement or erasure of dated or remote regional operating settings	F Orr	UKAS
	17.8.2	Test of correct input via presentation interface or MKD	F Orr	UKAS
	17.8.3	Test of addressed telecommand	N Forsyth	UKAS
	17.8.4	Test for invalid regional operating areas	N Forsyth	UKAS
2.25	17.9	Continuation of autonomous mode reporting interval	N Forsyth	UKAS
2.26	18.1.1	Transmission	N Forsyth	UKAS
	18.1.2	Acknowledgement	N Forsyth	UKAS
	18.1.3	Transmission retry	F Orr	UKAS
	18.1.4	Acknowledgement of addressed safety related messages	F Orr	UKAS
	18.1.5	Behaviour of NavStatus 14 reception	F Orr	UKAS
2.27	18.2	Interrogation responses	N Forsyth	UKAS
2.28	19.1	General	N Forsyth	UKAS
2.29	19.2	Check of the manufacturer's documentation	F Orr	UKAS
2.30	19.3	Electrical test	F Orr	UKAS
2.31	19.4	Test of input sensor interface performance	F Orr	UKAS
2.32	19.5.1	Test of GNS input	N Forsyth	UKAS
	19.5.2	Test of RMC input	N Forsyth	UKAS
	19.5.3	Test of DTM input	F Orr	UKAS
	19.5.4	Test of GBS input	F Orr	UKAS
	19.5.5	Test of VBW input	F Orr	UKAS
	19.5.6	Test of VTG input	N Forsyth	UKAS
	19.5.7	Test of HDT/THS input	N Forsyth	UKAS
	19.5.8	Test of ROT input	F Orr	UKAS
	19.5.9	Test of different inputs	F Orr	UKAS
	19.5.10	Test of multiple inputs	F Orr	UKAS
2.33	19.6	Test of high speed output	N Forsyth	UKAS
2.34	19.7	High speed output interface performance	F Orr	UKAS
2.35	19.8	Output of undefined VDL messages	F Orr	UKAS
2.36	19.9.1	General		UKAS
	19.9.2	Test of VSD input sentence	F Orr	UKAS
	19.9.3	Test of SSD input sentence	F Orr	UKAS
	19.9.4	Test of EPV input sentence	F Orr	UKAS
	19.9.5	Test of the pilot port access level	F Orr	UKAS
	20.1.1	LR interrogation	F Orr	UKAS
	20.1.2	LR "all ships" interrogation	F Orr	UKAS
	20.1.3	Consecutive LR ”all ships” interrogations	F Orr	UKAS
	20.2.1	Long-range broadcast	F Orr	UKAS
	20.2.2	Multiple assignment operation	F Orr	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Operating Modes / Capability

2.1.1 Specification Reference

IEC 61993-2, Clause 14.1

2.1.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 1

2.1.3 Date of Test

30-January-2018

2.1.4 Test Results and Methods of Measurement

Autonomous Mode – Clause 14.1.1

Transmit Position Reports – Clause 14.1.1.1

Method of Measurement

Set up standard test environment. Record the VDL communication and check for messages of the EUT as follows:

a) Operate the EUT with the default MMSI (000000000).
b) Attempt to program an invalid MMSI (outside of the range specified in 6.4).
c) Enable the Message 27 transmission and repeat test with a programmed valid MMSI (see 8.3).
d) Repeat test with a programmed MMSI and after a power down for 12 h.

Required Results

a) The EUT does not transmit with the default MMSI and an BIIT ID 001 is activated,
b) The EUT rejects an invalid MMSI programming and does not transmit with the default MMSI and BIIT ID 001 is activated
c) The EUT transmits autonomously when programmed with a valid MMSI and that the transmitted data complies with sensor inputs. Confirm that EUT transmits Message 27 as described in 8.3
d) All static and voyage related data has been retained and is output correctly via the PI.

Test Results

a) Default MMSI (000000000)		
Requirement		Verdict
The EUT does not transmit		Pass
Alarm with ID 01 output on PI.	$AIALR,141357.00,001,A,V,AIS: Tx malfunction*7D	Pass
Alarm is displayed on the MKD	AIS: Tx malfunction displayed in pop up window	Pass

b) MMSI out of allowable range	
Requirement	Verdict
The EUT does not accept a MMSI value = 199999999	Pass
The EUT does not accept the MMSI value = 800000000	Pass
The EUT does not accept the MMSI value = 988000000	Pass

c) Valid MMSI	
Requirement	Verdict
The EUT transmits autonomously on alternate channels.	Pass
The transmitted data complies with sensor inputs, position, COG and SOG were verified.	Pass
Message 27 is transmitted every 3 minutes on alternate channels: !AIVDM,1,1,,C,K39E<ih?u7CfOjO@,0*6F !AIVDM,1,1,,D,K39E<ih?u7CfOoO@,0*6D	Pass

d) Valid MMSI after power down for 12 hours		
Requirement		Verdict
The EUT transmits autonomously on alternate channels.		Pass
The transmitted data complies with sensor inputs, position, COG and SOG were verified.		Pass
Message 27 is transmitted every 3 minutes on alternate channels.		Pass
SSD and VSD Data is retained:		
Before power down	After 12 hours	Verdict
$AISSD,8765432,TUV SUD,1,3,4,7,0,AI*20	$AISSD,8765432,TUV SUD,1,3,4,7,0,AI*20	Pass
$AISSD,8765432,TUV SUD,2,1,8,9,0,GP*3C	$AISSD,8765432,TUV SUD,2,1,8,9,0,GP*3C	Pass
$AIVSD,71,5.9,0,SOUTHAMPTON,246000.00,0,0,0,0*03	$AIVSD,71,5.9,0,SOUTHAMPTON,246000.00,0,0,5,0*06	Pass
!AIVDM,2,1,2,A,53O:ARKfL9BgSOKGC?9AEJ1=DB118tAD=B1<E9I708347t0Ht>lkmE20CD53,0*70 !AIVDM,2,2,2,A,kP000000008,2*15	!AIVDM,2,1,6,A,53O:ARKfL9BgSOKGC?9AEJ1=DB118tAD=B1<E9I708347t0Ht>lkmE20CD53,0*74 !AIVDM,2,2,6,A,kP000000008,2*11	Pass

Receive Position Reports – Clause 14.1.1.2

Method of Measurement

Set up standard test environment as follows:

a) Switch on test targets, then start operation of the EUT;
b) Start operation of the EUT, then switch on test targets.

Check the VDL communication and presentation interface outputs of the EUT.

Required Results

Confirm that EUT receives continuously under conditions a) and b) and outputs the received messages via the PI.

Test Results

The following test targets were setup:

Test Targets	
Type	MMSI
Class A	321000000
Base Station	2222222
AtoN	992010000
Class B CS	123456789

a)				
Requirement	MMSI	Sample Messages	Rate	Verdict
Class A received continuously	321000000	!AIVDM,1,1,,A,14j8B@0P00wrCNdM6qWP0?vP2<03,0*56	10 s	Pass
		!AIVDM,1,1,,B,14j8B@0P00wrCNrM6qVh0?vh2D03,0*3A	10 s	Pass
BS received continuously	2222222	!AIVDM,1,1,,A,4027`SQv8qfIEOrCT4M6qT1005iT,0*69	10 s	Pass
		!AIVDM,1,1,,B,4027`SQv8qfI;OrCT0M6qSi005iT,0*4F	10 s	Pass
AtoN received continuously	992010000	!AIVDM,1,1,,A,E>j3O4;Pb7W@@@@@@@@@@@@@@@@@@2q3f>SI2p00000v030,4*57	3 min	Pass
		!AIVDM,1,1,,B,E>j3O4;Pb7W@@@@@@@@@@@@@@@@@@2q3f>SI2p00000v030,4*54	3 min	Pass
Class B received continuously	123456789	!AIVDM,1,1,,A,B1mg=5@007vTpL7AfK403w`5kP06,0*4D	3 min	Pass
		!AIVDM,1,1,,B,B1mg=5@007vToV7Afl`hGw`UkP06,0*51	3 min	Pass

b)				
Requirement	MMSI	Sample Messages	Rate	Verdict
Class A received continuously	321000000	!AIVDM,1,1,,A,14j8B@0P00OrCRDM6qQJhOwV2<03,0*61	10 s	Pass
		!AIVDM,1,1,,B,14j8B@0P00OrCR@M6qPrbwv02D03,0*72	10 s	Pass
BS received continuously	2222222	!AIVDM,1,1,,A,4027`SQv8qfS1OrCa`M6qWQ00D03,0*4A	10 s	Pass
		!AIVDM,1,1,,B,4027`SQv8qfS;OrCa6M6qWA00D03,0*05	10 s	Pass
AtoN received continuously	992010000	!AIVDM,1,1,,A,E>j3O4;Pb7W@@@@@@@@@@@@@@@@@@2q3f>SI2p00000v030,4*57	3 min	Pass
		!AIVDM,1,1,,B,E>j3O4;Pb7W@@@@@@@@@@@@@@@@@@2q3f>SI2p00000v030,4*54	3 min	Pass
Class B received continuously	123456789	!AIVDM,1,1,,A,B1mg=5@007vTouWAfFLiSwa5kP06,0*46	3 min	Pass
		!AIVDM,1,1,,B,B1mg=5@007vTpNWAfH803woUkP06,0*4C	3 min	Pass

Assigned Mode – Clause 14.1.2

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode. Using a base station MMSI, transmit an assigned mode command Message 16 to the EUT with:

a) slot offset and increment,
b) designated reporting interval.

Record transmitted messages.

Required Results

Confirm that the EUT transmits position reports Message 2 according to defined parameters and reverts to SOTDMA Message 1 with standard reporting interval after 4 min to 8 min.

Test Results

a) slot offset and increment – slot offset = 10, increment = 5: !AIVDO,1,1,,A,@027`SRqMa>L0`1@,0*3E sent to EUT on slot 1203		
Requirement	Result	Verdict
Slot offset used was 10	First message 2 transmitted on slot 1213	Pass
Message 2 reporting interval is 2 seconds	2 seconds	Pass
EUT reverts to message 1 and SOTDMA after 4 - 8 minutes	Message 16 sent at 10:22:31, EUT exits assigned mode at 10:29:28	Pass

a) slot offset and increment – slot offset = 20, increment = 3: !AIVDO,1,1,,A,@027`SRqMa>L1@0h,0*36 sent to EUT on slot 1197		
Requirement	Result	Verdict
Slot offset used was 20	First message 2 transmitted on slot 1217	Pass
Message 2 reporting interval is 6 seconds	6 seconds	Pass
EUT reverts to message 1 and SOTDMA after 4 - 8 minutes	Message 16 sent at 10:32:31, EUT exits assigned mode at 10:37:29	Pass

b) designated reporting interval – slot offset = 100, increment = 0: !AIVDO,1,1,,A,@027`SRqMa>L6@00,0*69		
Requirement	Result	Verdict
Message 2 reporting interval is 6 seconds	6 seconds	Pass
EUT reverts to message 1 and SOTDMA after 4 - 8 minutes	Message 16 sent at 11:00:04, EUT exits assigned mode at 11:04:02	Pass

b) designated reporting interval – slot offset = 400, increment = 0		
Requirement	Result	Verdict
Message 2 reporting interval is 1.5 seconds	1.5 seconds	Pass
EUT reverts to message 1 and SOTDMA after 4 - 8 minutes	Message 16 sent at 11:06:06, EUT entered assigned mode at 11:06:12, EUT exits assigned mode at 11:14:08	Pass

Polled Mode – Clause 14.1.3

Transmit an Interrogation – Clause 14.1.3.1

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Apply position reports (Message 1) without static data (Message 5) on the VDL.
b) Apply position reports (Message 18) without static data (Message 24A and 24B) on the VDL.
c) Initiate the transmission of an interrogation message (Message 15) by the EUT addressing 1 or 2 destinations requesting the following responses:

- Message 3, 5, 9, 18, 19, 24 from mobile stations;
- Message 4, Message 24 from base stations.

Record transmitted messages.

Required Results

Verify that:

a) the AIS does not automatically initiate the transmission of Message 15;
b) the AIS does not automatically initiate the transmission of Message 15;
c) the EUT transmits the interrogation message (Message 15) as appropriate.

Test Results

a) Message 1 transmitted without static data	
Requirement	Verdict
Message 1 is transmitted by the EUT for 10 minutes: !AIVDM,1,1,,A,18ABQ;h2P:wrPL0M5T`02gw@1`Gc,0*34	-
The EUT does not automatically initiate the transmission of Message 15.	Pass

b) Message 18 transmitted without static data	
Requirement	Verdict
Message 18 is transmitted by the EUT for 10 minutes: !AIVDM,1,1,,A,B7>R4:h02WvbWhWAIlt0`5g01`Al,0*2E	-
The EUT does not automatically initiate the transmission of Message 15.	Pass

c) Message 3 – One Destination	
Requirement	Verdict
Sentence sent to PI: $AIAIR,200300900,3,,,,,,,,,*59	-
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqhghFF@<00,2*25	Pass
Message 15 contents correct	Pass
Message 3 sent by addressed mobile station (MMSI 200300900) received by AIS test unit: !AIVDM,1,1,,A,32w1II8P00wrCSnM6qI>4?v62000,0*46	Pass
Message 3 received by EUT and output on PI: !AIVDM,1,1,,A,32w1II8P00wrCSnM6qI>4?v62000,0*46	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 5 – One Destination	
Requirement	Verdict
Sentence sent to PI: $AIAIR,200300900,5,,,,,,,,,*5F	-
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqhghFF@D00,2*5D	Pass
Message 15 contents correct	Pass
Message 5 sent by addressed mobile station (MMSI 200300900): !AIVDM,2,1,1,A,52w1II8000051<@s403t@Oq0U<e000000000001@1Ap::t0HtwmiDm1RAC10,0*64	Pass

c) Message 5 – One Destination	
Requirement	Verdict
!AIVDM,2,2,1,A,00000000000,2*25	
Message 5 received by EUT and output on PI: !AIVDM,2,1,6,A,52w1II8000051<@s403t@Oq0U<e000000000001@1Ap::t0HtwmiDm1RAC10,2*64 !AIVDM,2,2,6,A,00000000000,2*22	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 3 and 5 – Two Destinations	
Requirement	Verdict
Sentence sent to PI: $AIAIR,200300900,3,,5,,555555555,3,,,,,*6A	-
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqhghFF@<005008AlJphh00,2*3F	Pass
Message 15 contents correct	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 9	
Requirement	Verdict
Sentence sent to the PI: $AIAIR,200300900,9,,,,,,,,,*53	-
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqhghFF@T00,2*4D	Pass
Message 15 contents correct.	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 18	
Requirement	Verdict
Sentence sent to the PI: $AIAIR,200300900,18,,,,,,,,,*63	-
Message 15 sent over VDL: !AIVDM,1,1,,B,?;UnTqhghFFA800,2*23	Pass
Message 15 contents correct.	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 19	
Requirement	Verdict
Sentence sent to PI: $AIAIR,200300900,19,,,,,,,,,*62	-
Message 15 sent over VDL: !AIVDM,1,1,,A,?;UnTqhghFFA<00,2*24	Pass
Message 15 contents correct.	Pass
Acknowledgement on PI: $AIABK,200300900,A,15,0,3*12	Pass

c) Message 24	
Requirement	Verdict
Sentence sent to PI: $AIAIR,200300900,24,,,,,,,,,*6C	Pass
Message 15 sent over VDL: !AIVDM,1,1,,B,?;UnTqhghFFAP00,2*4B	Pass
Message 15 contents correct.	Pass
Acknowledgement on PI: $AIABK,2222222,A,15,0,3*18	Pass

c) Message 4 – One Destination	
Requirement	Verdict
Sentence sent to PI: $AIAIR,2222222,4,,,,,,,,,*54	Pass
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqh0Qr8p@00,2*4D	Pass
Message 15 contents correct	Pass
Acknowledgement on PI:	Pass

c) Message 4 – One Destination	
Requirement	Verdict
$AIABK,2222222,A,15,0,3*18	

c) Message 22 – One Destination	
Requirement	Verdict
Message “$AIAIR, 2222222,22,,,,,,” sent to PI $AIAIR,2222222,22,,,,,,,,,,*60	Pass
Message 15 sent over the VDL: !AIVDM,1,1,,A,?;UnTqh0Qr8qH00,2*44	Pass
Message 15 contents correct	Pass
Acknowledgement on PI: $AIABK,2222222,A,15,0,3*18	Pass

Interrogation Response – Clause 14.1.3.2

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode. Apply an interrogation message (Message 15; EUT as destination) to the VDL for responses with Message 3, Message 5 and slot offset set to a defined value which is greater than 10 slots. Record transmitted messages and frame structure.

Required Results

Check that the EUT transmits the appropriate interrogation response message as requested after defined slot offset. Confirm that the EUT transmits the response on the same channel as where interrogation was received.

Test Results

Message 3 – First Destination, One Message, Offset = 11				
Action	Channel	Tx Slot	Message	Verdict
Msg 15 sent to EUT	A	1865	!AIVDO,1,1,,A,?027`SRqMa>L<0d000000000000,2*0A	Pass
Msg 3 sent by EUT	A	1876	!AIVDM,1,1,,B,3;UnTqwP?wOrCQ`M6qGN4?wR0000,0*3E	Pass

Message 5 – First Destination, One Message, Offset = 50				
Action	Channel	Tx Slot	Message	Verdict
Msg 15 sent to EUT	A	2011	!AIVDO,1,1,,A,?027`SRqMa>LD38000000000000,2*2D	Pass
Msg 3 sent by EUT	A	2061	!AIVDM,2,1,4,B,5;UnTqp0000000000000000<<000000h000000 3000000t3Ht000<0000000,0*6E !AIVDM,2,2,4,B,00300000088,2*20	Pass

Message 3 – First Destination, One Message, Offset = 500				
Action	Channel	Tx Slot	Message	Verdict
Msg 15 sent to EUT	B	1939	!AIVDO,1,1,,B,?027`SRqMa>L<O@000000000000,2*52	Pass
Msg 3 sent by EUT	B	0189	!AIVDM,1,1,,B,3;UnTqwP?wOrCQ`M6qGN4?v80000,0*55	Pass

Message 3 – First Destination, Two Messages, Offset 1.1 = 20, Offset 1.2 = 22				
Action	Channel	Tx Slot	Message	Verdict
Msg 15 sent to EUT	A	1626	!AIVDO,1,1,,A,?027`SRqMa>L<1@50F000000000,2*5C	Pass
Msg 3 sent by EUT	A	1646	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1F0000,0*59	Pass
Msg 5 sent by EUT	A	1648	!AIVDM,2,1,9,A,5;UnTqswwwwt74000015LE9AUDTu37;?CGKO ST160000040Ht6L@00000000,0*7F !AIVDM,2,2,9,A,00000000008,2*25	Pass

Message 3 – Second Destination, One Message, Offset 2.1 = 120				
Action	Channel	Tx Slot	Message	Verdict
Msg 15 sent to EUT	A	1585	!AIVDO,1,1,,A,?027`SQdr38h<3851T;UnTqhhN0,2*07	Pass
Msg 3 sent by EUT	A	1705	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1J0000,0*55	Pass

Addressed Operation – Clause 14.1.4

Transmit an Addressed Message – Clause 14.1.4.1

Method of Measurement

a) Initiate the transmission of an addressed binary Message 6; EUT as source by the EUT. Record the transmitted messages.
b) Repeat test with the addressed safety related Message 12.
c) Repeat test with the addressed unstructured binary Message 25.
d) Repeat test with the addressed structured binary Message 25.
e) Repeat test with a single addressed unstructured binary Message 26.
f) Repeat test with a single addressed structured binary Message 26.

Required Results

a) The EUT transmits the Message 6 as appropriate,
b) The EUT transmits the Message 12 as appropriate,
c) The EUT transmits the Message 25 as appropriate.
d) The EUT transmits the Message 25 as appropriate.
e) The EUT transmits the Message 26 as appropriate.
f) The EUT transmits the Message 26 as appropriate.

Test Results

Message 6	
Requirement	Verdict
Message sent to PI on channel 1 with sequence number = 2: !AIABM,1,1,2,200300900,1,6,04205@E=B0lE=<4LD,2*14	-
Message transmitted by EUT on channel 1 with sequence number = 2: !AIVDO,1,1,,A,6;UnTqpghFF@04205@E=B0lE=<4LD0,4*51	Pass
Acknowledge message output on PI, with type of acknowledgment = 1 (no response from destination) with sequence number = 2: $AIABK,200300900,A,6,2,1*20	Pass

Message 12	
Requirement	Verdict
Message sent to PI on channel 1 with sequence number = 0: !AIABM,1,1,0,200300900,1,12,D5CDP=5CC175,0*51	-
Message transmitted by EUT on channel 1 with sequence number 0: !AIVDO,1,1,,A,<;UnTqhghFF@D5CDP=5CC175,0*07	Pass
Acknowledge message output on PI, with type of acknowledgment = 1 (no response from destination) with sequence number = 0: $AIABK,200300900,A,12,0,1*17	Pass

Message 25 - Unstructured	
Requirement	Verdict
Sentence sent to PI: !AIABM,1,1,1,412000000,1,70,bGEEEEMbRbVjbaTg,0*70	-
Message transmitted by EUT on channel 1 with sequence number 1: !AIVDO,1,1,,A,I;UnTqqR>Wh0bGEEEEMbRbVjbaTg,0*6C	Pass

Message 25 - Structured	
Requirement	Verdict
Sentence sent to PI: !AIABM,1,1,2,200300900,1,25,0400:PbJQ`bJH8p`,0*75	-
Message transmitted by EUT on channel 1: !AIVDO,1,1,,A,I;UnTqtghFF@0400:PbJQ`bJH8p`,0*4C	Pass

Message 26 - Unstructured	
Requirement	Verdict
Sentence sent to PI: !AIABM,1,1,1,200300900,2,71,2EQEEBEG735FI000,4*27	-
Message transmitted by EUT on channel 2: !AIVDO,1,1,,B,J;UnTqpghFF@2EQEEBEG735F0000,0*66	Pass

Message 26 - Structured	
Requirement	Verdict
Sentence sent to PI: !AIABM,1,1,2,200300900,2,26,0400:PbJV>@I000,4*59	-
Message transmitted by EUT on channel 2: !AIVDO,1,1,,B,J;UnTqtghFF@0400:PbJV>@I0000,0*54	Pass

Received Addressed Message – Clause 14.1.4.2

Method of Measurement

Set-up standard test environment and operate EUT in autonomous mode.

a) Apply an addressed message (Message 6, 12, 25, 26; EUT as destination) to the VDL.
b) Apply an addressed message (Message 6, 12, 25, 26; other station as destination) to the VDL

Record transmitted messages and frame structure.

Required Results

Check that EUT transmits the appropriate acknowledgement message. Confirm that

a) EUT outputs the received message via the presentation interface.
b) EUT does not output the received message via the presentation interface.

Test Results

a) EUT outputs the received message via the presentation interface.

Message 6 - !AIVDO,1,1,,A,66WuQTRqMa>L04205@E=@0,4*01	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,66WuQTRqMa>L04205@E=@0,4*03	Pass
Acknowledgement sent by the EUT, (message 7): !AIVDM,1,1,,A,7;UnTqiawHI8,0*72	Pass
Acknowledgement sent by EUT on the same channel as Message 6	Pass

Message 12 - !AIVDO,1,1,,A,<1mg=5BqMa>LD5CDP=C7Pijklm0,2*22	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,<1mg=5BqMa>LD5CDP=C7Pijklm0,2*20	Pass
Acknowledgement sent by the EUT, (message 13): !AIVDM,1,1,,B,=;UnTqhMKkAD,0*3D	Pass
Acknowledgement sent by EUT on the same channel as Message 12	Pass

Message 25 - !AIVDO,1,1,,A,l1mg=5NqMa>L0400:PbJQ`bJH8p`,0*00	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,l1mg=5NqMa>L0400:PbJQ`bJH8p`,0*0	Pass
EUT does not send an acknowledgement	Pass

Message 26 - !AIVDO,1,1,,A,J1mg=5NqMa>L04008I0:@8JPbBHI000,2*32	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,J1mg=5NqMa>L04008I0:@8JPbBHI000,2*3	Pass
EUT does not send an acknowledgement	Pass

b) EUT does not output the received message via the presentation interface.

Message 6 – !AIVDO,1,1,,A,61mg=5BqMa>H04205@E=@0,4*37	
Requirement	Verdict
EUT does not output the received message via the presentation interface	Pass

Message 12 - !AIVDO,1,1,,A,<1mg=5BqMa>HD5CDP=C7Pijklm0,2*26	
Requirement	Verdict
EUT does not output the received message via the presentation interface	Pass

Message 25 - !AIVDO,1,1,,A,I1mg=5NqMa>H0400:PbJQ`bJH8p`,0*04	
Requirement	Verdict
EUT does not output the received message via the presentation interface	Pass

Message 26 - !AIVDO,1,1,,A,J1mg=5NqMa>H04008I0:@8JPbBHI000,2*36	
Requirement	Verdict
EUT does not output the received message via the presentation interface	Pass

Broadcast operation – Clause 14.1.5

Transmit a broadcast message – Clause 14.1.5.1

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode as follows:

a) Initiate the transmission of a broadcast binary Message 8; EUT as source by the EUT. Record the transmitted messages.
b) Repeat test a) with binary data which is not byte aligned.
c) Repeat test a) with the broadcast safety related Message 14.
d) Repeat test c) with safety related text which is not byte aligned.
e) Repeat test a) with the broadcast unstructured binary Message 25.
f) Repeat test a) with the broadcast structured binary Message 25.
g) Repeat test a) with a single broadcast unstructured binary Message 26.
h) Repeat test a) with a single broadcast structured binary Message 26.
i) Initiate the transmission of a broadcast of single unstructured binary Message 26 with all bits (104) set to alternating sequence 0,1,0,1,0,1… .
j) Initiate the transmission of a broadcast of single structured binary Message 26 with DAC=1 FI=0 as defined in ITU-R M.1371 with 6 ASCII characters.
k) Repeat test h) with 5 ASCII characters. This message results transmission of 7 spare bits 6 of which will be interpreted as a character.
l) Initiate the transmission of Message 26 with unstructured data which is not byte aligned.

Required Results

Check that:

a) the EUT transmits the Message 8 as appropriate;
b) the EUT pads the binary data using zero bits to the next byte boundary;
c) the EUT transmits the Message 14 as appropriate;
d) the EUT pads the safety related text using zero bits to the next byte boundary;
e) the EUT transmits the Message 25 as appropriate;
f) the EUT transmits the Message 25 as appropriate;
g) the EUT transmits the Message 26 as appropriate;
h) the EUT transmits the Message 26 as appropriate;
i) the EUT transmits the Message 26 according to the input and the 4 (four) spare bits before CommState are zero;
j) the EUT transmits Message 26 with 6 ASCII characters followed by 1 (one) padding bit for byte boundary and the 4 (four) spare bits set as zero;
k) the EUT transmits Message 26 with 5 ASCII characters followed by 7 (seven) padding bits for byte boundary and the 4 (four) spare bits set as zero;
l) the EUT pads the unstructured binary data using zero bits to the next byte boundary.

Test Results

a) Message 8	
Requirement	Verdict
Message sent to PI with sequence number = 2: !AIBBM,1,1,2,1,8,04005@E=@,2*29	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,8,2,3*14	Pass

b) Message 8 with byte misalignment	
Requirement	Verdict
Message sent to PI with sequence number = 2: !AIBBM,1,1,2,1,8,04005@E=C4,2*1E	-
Message transmitted by EUT on channel 1 with sequence number = 2:	Pass

b) Message 8 with byte misalignment	
Requirement	Verdict
!AIVDM,1,1,,A,8;UnTqh0@00E1Dm<@0,4*36	
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,8,2,3*14	Pass
The EUT shall pad the binary data using zero bits to the next byte boundary.	Pass

c) Message 14	
Requirement	Verdict
Message sent to PI with sequence number = 2: !AIBBM,1,1,2,1,14,D5CDP=5CC175,0*42	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,>;UnTqi@E=B0lE=<4LD,2*08	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,14,2,3*29	Pass

d) Message 14 with byte misalignment	
Requirement	Verdict
Message sent to PI with sequence number = 2: !AIBBM,1,1,2,1,14,D5CDPi,0*10	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,>;UnTqi@E=B340,4*1D	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,14,2,3*29	Pass
The EUT shall pad the binary data using zero bits to the next byte boundary.	Pass

e) Broadcast unstructured Message 25	
Requirement	Verdict
Message 25 sent to PI with sequence number = 2: !AIBBM,1,1,2,1,70,000000000000000000009V@,4*46	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,I;UnTqh000000000000000000VI,0*0D	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,25,2,3*2B	Pass

f) Broadcast structured Message 25	
Requirement	Verdict
Message 25 sent to PI with sequence number = 2: !AIBBM,1,1,2,1,25,0400:PbJT1bHt6F`0,4*04	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,I;UnTql0@00b2ab@6aShIJP00000,0*4A	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,25,2,3*2B	Pass

g) Single broadcast unstructured Message 26	
Requirement	Verdict
Message 26 sent to PI with sequence number = 2: !AIBBM,1,1,2,1,71,2EQEEBEG735Fc2bbTP,4*1C	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTqh9F5EE9ELL<EJd:bbB0000,0*38	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass

h) Single broadcast structured Message 26	
Requirement	Verdict
Message 26 sent to PI with sequence number = 2: !AIBBM,1,1,2,1,26,04008l0:@8JPbBN8,3*16	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTql0@00QT0a0Qb2a9pP00000,0*78	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass

i) Message 26 with binary data consisting of an alternating sequence	
Requirement	Verdict
Sentence sent to PI: !AIBBM,1,1,2,1,71,EEEEEEEEEEEEEEEEE@,4*5D	-

i) Message 26 with binary data consisting of an alternating sequence	
Requirement	Verdict
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTqiEEEEEEEEEEEEEEEE0000,0*65	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass
The four spare bits before comm state shall be zero.	Pass

j) Message 26 with DAC = 1, FI = 0 and 6 ASCII characters	
Requirement	Verdict
Sentence sent to PI: !AIBBM,1,1,2,1,26,0400:PbJVFh,3*63	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTql0@00b2abIK00000000000,0*34	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass
The EUT shall use one padding bit for byte boundary, and four spare bits are set as zero.	Pass

k) Message 26 with 5 ASCII characters	
Requirement	Verdict
Sentence sent to PI: !AIBBM,1,1,2,1,26,0400:PbJQH,3*02	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTql0@00b2ab5P00000000000,0*53	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass
The message shall be transmitted with 7 spare bits; 6 of which shall be interpreted as a '@' character.	Pass

l) Message 26 with unstructured data with unstructured data which is byte misaligned	
Requirement	Verdict
Sentence sent to PI: !AIBBM,1,1,2,1,71,00000000000000005@,4*2D	-
Message transmitted by EUT on channel 1: !AIVDM,1,1,,A,J;UnTqh0000000000000000E0000,0*64	Pass
Acknowledge sentence output to PI with sequence number = 2 and type of acknowledgement = 3: $AIABK,,A,26,2,3*28	Pass
The EUT shall pad the unstructured binary data using zero bits to the next byte boundary.	Pass

Receive a broadcast message – Clause 14.1.5.2

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Apply a broadcast message (Message 8, 14, 25, 26) to the VDL.
b) Apply a broadcast Message 26 with DAC=1 FI=0 with 6 ASCII characters.
c) Repeat test b) with 5 ASCII characters. This message results in 7 spare bits 6 of which will be interpreted as a character.

Required Results

a) The EUT outputs the received message via the presentation interface;
b) the EUT outputs the received message with 6 ASCII characters;
c) the EUT outputs the received message with 5 ASCII characters followed by a single null (@) ASCII character.

Test Results

a) Message 8 - !AIVDO,1,1,,A,81mg=5@0@00B1C33h0,4*73	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,81mg=5@0@00B1C33h0,4*71	Pass

a) Message 14 - !AIVDO,1,1,,A,>1mg=5A@E=B0m<N37;?CD0,4*0E	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,>1mg=5A@E=B0m<N37;?CD0,4*0C	Pass

a) Message 25 - !AIVDO,1,1,,A,I1mg=5D0@00b2ab@6RaaPSRhHqIP,0*04	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,I1mg=5D0@00b2ab@6RaaPSRhHqIP,0*06	Pass

a) Message 26 - !AIVDO,1,1,,A,J1mg=5D0@00QT0a0Qb2a9PI000,4*79	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,J1mg=5D0@00QT0a0Qb2a9PI000,4*7B	Pass

b) Message 26 - !AIVDO,1,1,,A,J1mg=5D0@00T2V67WPI000,4*22	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,J1mg=5D0@00T2V67WPI000,4*20	Pass

c) Message 26 - !AIVDO,1,1,,A,J1mg=5D0@00T2V67PI0000,4*45	
Requirement	Verdict
EUT outputs the received message via the presentation interface: !AIVDM,1,1,,A,J1mg=5D0@00T2V67PI0000,4*47	Pass

3 slot messages – Clause 14.1.6.1

Method of Measurement

Apply a BBM sentence to the PI of EUT with a maximum of 68 data bytes of binary data in order to initiate transmission of a binary message (Message 8).

Required Results

Check that the message is transmitted in up to 3 slots accordingly.

Test Results

BBM sent to PI: **!AIBBM,5,1,2,1,8,04005@E=B0lE=<4LF1@E=B0lE=<4LD,2*66** **!AIBBM,5,2,2,1,8,1@E=B0lE=<4LD,2*08** **!AIBBM,5,3,2,1,8,1@E=B0lE=<4LD,2*09** **!AIBBM,5,4,2,1,8,1@E=B0lE=<4LD,2*0E** **!AIBBM,5,5,2,1,8,1@E=B0lE=<4LD,2*0F**	
Requirement	Verdict
Message transmitted by EUT: !AIVDO,2,1,6,A,8;UnTqh0@00E1Dm83ADlhAiH51Dm83ADlhAi@51Dm83ADlhAi@51Dm83ADlh,4*00 !AIVDO,2,2,6,A,Ai@51Dm83ADlhAi@51Dm83ADlhAi@0,4*4E	Pass
Acknowledgement output: !AIVDO,2,2,6,A,Ai@51Dm83ADlhAi@51Dm83ADlhAi@0,4*44	Pass

Longer messages – Clause 14.1.6.2

Method of Measurement

Apply a BBM sentence to the PI of the EUT with an information content not fitting in 3 slots (i.e. more than 68 data bytes of binary data containing only binary bits with value one).

Required Results

Check that the message is not transmitted. Check that a negative acknowledgement is given on the presentation interface.

Test Results

Requirement	Verdict
The BBM applied to the EUT is: !AIBBM,4,1,2,1,8,04007WWWWWWWWWWWWWWWWWWWW,2*56 !AIBBM,4,2,2,1,8,WWWWWWWWWWWWWWWWWWWWWWWWWWWWWW,2*11 !AIBBM,4,3,2,1,8,WWWWWWWWWWWWWWWWWWWWWWWWWWWWWW,2*10 !AIBBM,4,4,2,1,8,WWWWWWWWWWWWWWWWWWWWWWWWWWWWWW,2*17	-
Message 8 is not transmitted	Pass
Negative acknowledgement: $AIABK,,A,8,2,2*1	Pass

2.2 Manuals, marking and identification

2.2.1 Specification Reference

IEC 61993-2, Clause 14.2

2.2.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 14

2.2.3 Date of Test

22-October-2019

2.2.4 Test Results and Methods of Measurement

2.2.4.1 Method of Measurement

Check:
a) the manuals provided by manufacturer;
b) the marking and identification labels of EUT.

2.2.4.2 Required results

Confirm that:
a) the manuals:
- fulfil the requirements set in IEC 60945:2002, Clause 14;
- include the type and details of all external connectors (including the pilot plug) referred to in 7.6;
- include the needed information for correct siting of the antennas;
- include the requirements for external illumination, as appropriate;
- include description for each alert that may be released by the AIS. The description shall briefly explain the root causes for each alert, give guidance for user on what implications the alert has for safe operation of ship and what actions may be necessary to rectify the alert condition.

b) the EUT markings:
- fulfil the requirements of IEC 60945:2002, Clause 15;
- include details of the power supply from which the equipment is intended to be operated;
- if applicable, include the date by which batteries need to be replaced.

2.2.4.3 Test Results

a) Operating and Servicing Manuals		
Requirement	Result	Verdict
The operating and servicing manuals are to be written in English.	The installation and user manuals are both written in English.	Pass
The manuals can identify the category of the equipment or units to which they refer: portable, protected from the weather, exposed to weather or submerged / in continuous contact with sea water.	The EUT is described as 'protected' in accordance with 60945, under the general notices list at the beginning of the user manual.	Pass
In the case of equipment so designed that fault diagnosis and repair down to component level are practicable, the manuals shall provide full circuit diagrams, component layouts and a component parts list.	The EUT has no user-serviceable parts. As such, repair down to component level is not practicable and full circuit diagrams, component layouts and a component parts list are not required.	-
In the case of equipment containing complex modules in which fault diagnosis and repair down to component level are not practicable, contain sufficient information to enable a	The EUT consists of only one module; the AIS class A transceiver. As this device contains no user serviceable parts, it is not required that the manuals contain this information.	-

a) Operating and Servicing Manuals		
Requirement	Result	Verdict
defective complex module to be located, identified and replaced.		
The type and details of the VHF antenna are to be present in the operating or servicing manual.	The VHF antenna is clearly labelled as PL259 in section 2.3.1 of the installation manual.	Pass
The type and details of the GPS antenna are to be present in the operating or servicing manual	The GNSS antenna connector is labelled as TNC male in the installation manual, in section 2.3.2.	Pass
The type and operating details of the BIIT relay terminal are to be present in the operating or servicing manual.	The pinout diagram, along with the maximum switching voltage and switching current are labelled clearly in section 2.3.4.	Pass
The type and operating details of the sensor ports are to be present in the operating or servicing manual.	IEC 61192-2 requires a minimum of 3 sensor input ports; there are 3 present on the EUT. The supported sentences, connectors and port pinout diagrams are provided in the installation manual in sections 2.3.3 and 2.3.5. The sensor ports are set to IEC 61162-2 by default as shown in section 4.2 of the installation manual and may be configured to meet the requirements of 61162-1.	Pass
The type and operating details of the high-speed input/output ports are to be present in the operating or servicing manual.	The high-speed IO ports use a screw-terminal adaptor. This is described in 2.3.5 of the installation manual, where the user can also find a pinout description for the ports of the high-speed input/output.	Pass
The type and operating details of the pilot port are to be present in the operating or servicing manual.	The connector type is described as an AMP/Receptacle shell size 11, 9-pin plug. The pinout diagram provided for the pilot plug connector in the installation manual is compliant with 61193-2. The baud rate and supported sentences are detailed within section 4.2 of the installation manual.	Pass
The required information for the correct sitting of the antennas is to be included within the operating or servicing manual.	The GPS antenna features installation instructions detailing best practices for positioning an orientation. Details for pole-mounting the antenna are provided, including the antenna mounting thread size. Instructions on installing the VHF antenna are included, detailing best practices for installation and antenna cable terminating connectors.	Pass
The installation or servicing manual is to include the requirements for external illumination, as appropriate.	The EUT contains a physical display brightness key that controls the brightness intensity for the LCD display, the joy stick and the physical buttons. The user manual describes the steps for setting the brightness in section 5.2. All buttons are illuminated with a dedicated LED and the display cannot be turned off, only dimmed.	Pass
The operating or servicing manuals shall contain a description for each alert that may be released by the AIS. The description shall briefly explain the root causes for each alert, give guidance for user on what implications the alert has for safe operation of ship and what actions may be necessary to rectify the alert condition.	A table describing the alert released by the EUT are described in section 7.1.4 of the user manual, under 'System Alerts'. For each alert, an identifier, cause and additional information that identifies the root cause within reason is supplied.	Pass

b) EUT Markings		
Requirement	Result	Verdict
The manufacturer identification shall be marked clearly and externally on the unit.	The manufacturers logo is clearly displayed on the front of the EUT, which reads 'ocean signal'. The manufacturer is also labelled on the rear of the EUT in text. If the unit is mounted flush in a bridge or on the provided stand the manufacturer details are always visible.	Pass
The equipment type number or model identification shall be marked clearly and externally on the unit.	The model identification is printed on the front of the unit, labelled as 'ATA100'. Two identical stickers attached to the rear of the unit describe the EUT as 'ATA100 AIS Class A Transceiver'.	Pass
The serial number of the unit shall be marked clearly and externally on the unit.	The serial number is clearly marked in text on the rear of the EUT on two identical stickers.	Pass
The title and version of each software element included in the installed software system shall either be marked or displayed on command on the equipment.	The user is able to see the name of the software build, along with a version number via the display. Navigating through [Menu / Status / System / Info...] outputs the build number and name to the display.	Pass
When the marking and the title and version and displayed only on the display, such information shall also be included in the equipment manual.	Instructions detailing how to locate this information is found in section 8.1.2 of the user manual.	Pass

b) EUT Markings		
Requirement	Result	Verdict
The equipment shall be marked with the minimum safe distance at which it may be mounted from a standard or steering magnetic compass.	The minimum safe compass distance is available in the user manual under the 'general notices' section. The minimum safe compass distance is also printed on the two identical stickers attached to the rear of the EUT. The minimum safe compass distance is listed as 0.5m on both the stickers and in the user guide.	Pass

2.3 Information provided by the AIS

2.3.1 Specification Reference

IEC 61993-2, Clause 14.3

2.3.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 0

2.3.3 Date of Test

01-January-2018

2.3.4 Test Results and Methods of Measurement

Reporting Intervals – Clause 14.3.2

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

Apply all static, dynamic and voyage related data to the EUT.

Record all messages on VDL and check the content of position report Message 1 and static data report Message 5.

Required results

Confirm that data transmitted by the EUT complies with manual and sensor inputs.

Test Results

The EUT was configured as follows:

$AISSD,1234567,TUV SUD UK,0,0,0,0,1,AI*4E
$AISSD,1234567,TUV SUD UK,1,2,4,5,1,GP*53
$AIVSD,52,5.3,22,SOUTHAMPTON,000001.00,6,10,0,0*0

EUT operating with internal GNSS		
Requirement	Result	Verdict
Content of Message 1 and 5 is correct.	!AIVDM,1,1,,B,1;UnTqhP?wOrCQ`M6qI>4?v2081D,0*41 !AIVDM,2,1,1,B,5;UnTqp000037;?CGKMAEJ1=DB1Dd0000000000l00000vS00=DkmE20CD53,0*60 !AIVDM,2,2,1,B,kP000000008,2*15	Pass

Message 1 Decode		
!AIVDM,1,1,,B,1;UnTqhP?wOrCQ`M6qI>4?v2081D,0*41		
Parameter	Decoded Value	Verdict
Message ID	1 - Position report	-
Repeat Indicator	0	-
MMSI	777888999	-
Navigational Status	0 - under way using engine	Pass
Rate Of Turn	no turn information available (default)	-
Speed Over Ground	not available	-
Position Accuracy	0 - low (>10 m)	-
Longitude	1 14.6444 W	-
Latitude	50 52.17 N	-
Course Over Ground	not available	-
True Heading	511 - not available	-
Time Stamp	1	-
Special Manoeuvre Indicator	0 - not available	-
Spare	0	-
RAIM Flag	0 - RAIM not in use	-
Communication State - Sync State	0	-
Communication State - Slot Timeout	2	-
Communication State - Sub Message	Slot Number = 84	-

Message 5 Decode		
!AIVDM,2,1,1,B,5;UnTqp000037;?CGKMAEJ1=DB1Dd0000000000l00000vS00=DkmE20CD53,0*60 !AIVDM,2,2,1,B,kP000000008,2*15		
Parameter	Decoded Value	Verdict
Message ID	5 - Static and voyage related data	-
Repeat Indicator	0	-
MMSI	777888999	-
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)	-
IMO Number	0	-
Call Sign	1234567	Pass
Name	TUV SUD UK@@@@@@@@@@@	Pass
Type of ship and cargo type	52	Pass
Overall dimension/reference for position	0,0,0,0	Pass
Type of EPFS	15 - Internal GNSS	Pass
ETA	06/10 00:00	Pass
Maximum present static draught	5.3	Pass
Destination	SOUTHAMPTON@@@@@@@@@@	Pass
DTE	1 - not available	Pass
Spare	0	-

EUT operating with external GNSS		
Requirement	Result	Verdict
Content of Message 1 and 5 is correct.	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0F00RE,0*4D !AIVDM,2,1,3,B,5;UnTqp000037;?CGKMAEJ1=DB1Dd0000000000l082456S00=DkmE20CD53,0*29 !AIVDM,2,2,3,B,kP000000008,2*17	Pass

Message 1 Decode		
!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0F00RE,0*4D		
Parameter	Decoded Value	Verdict
Message ID	1 - Position report	-
Repeat Indicator	0	-
MMSI	777888999	-
Navigational Status	0 - under way using engine	Pass
Rate Of Turn	0	-
Speed Over Ground	10	-
Position Accuracy	1 - high (> 10 m)	-
Longitude	1 13.9423 W	-
Latitude	50 52.7903 N	-
Course Over Ground	11.1	-
True Heading	0	-
Time Stamp	11	-
Special Manoeuvre Indicator	0 - not available	-
Spare	0	-
RAIM Flag	0 - RAIM not in use	-
Communication State - Sync State	0	-
Communication State - Slot Timeout	0	-
Communication State - Sub Message	Slot Offset = 2197	-

Message 5 Decode		
!AIVDM,2,1,3,B,5;UnTqp000037;?CGKMAEJ1=DB1Dd0000000000l082456S00=DkmE20CD53,0*29 !AIVDM,2,2,3,B,kP000000008,2*17		
Parameter	Decoded Value	Verdict
Message ID	5 - Static and voyage related data	-
Repeat Indicator	0	-
MMSI	777888999	-
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)	-
IMO Number	0	-
Call Sign	1234567	Pass
Name	TUV SUD UK@@@@@@@@@@	Pass
Type of ship and cargo type	52	Pass
Overall dimension/reference for position	1,2,4,5	Pass
Type of EPFS	1 - GPS	Pass
ETA	06/10 00:00	Pass
Maximum present static draught	5.3	Pass
Destination	SOUTHAMPTON@@@@@@@@@@	Pass
DTE	1 - not available	Pass
Spare	0	-

Reporting Intervals – Clause 14.3.2

Speed and Course Change – Clause 14.3.2.1

Method of Measurement

Set-up standard test environment and operate EUT in autonomous mode.

a) Start with own speed of 10kn; record all messages on VDL for 10min and evaluate reporting rate for position report of EUT by calculating average slot offset over test period.
b) Increase speed and change course (ROT > 20°/min, derived from heading)
c) Reduce speed and rotation rate to values below those given in Table 1.
d) Make speed sensor unavailable.
e) Apply continuously changing heading data. Make heading sensor unavailable.

For b), c), d) record all messages on VDL and check slot offset between two consecutive transmissions.

Required results

a) Reporting interval shall comply with Table 1 (10 s with a tolerance of ± 10 %).
b) Confirm that the new reporting rate has been established.
c) Confirm that the reporting rate is reduced after 4 min (speed reduction) or 20 s (ROT reduction).
d) Check that with unavailable speed sensor the reporting interval reverts to default.
e) Check that with unavailable heading sensor the reporting interval reverts to autonomous reporting interval for the given speed.

Test Results

a) Speed of 10kn		
Requirement	Result	Verdict
With a speed of 10kn, the reporting rate (Rr) shall be 10s (±10%) over 10 minutes, every 375 slots.	Min Rr = 8.9 s Max Rr = 11.5 s Average Rr = 10.0 s	Pass

b) Speed increase to 15kn		
Requirement	Result	Verdict
New slots shall be allocated with message 3	Allocation with Message 3	Pass
Message 1 shall be transmitted after all slots allocated	Yes	Pass
The reporting rate shall be 6 seconds, every 225 slots	Min Rr = 5.0 s Max Rr = 6.9 s Average Rr = 6.0 s	Pass

b) Speed increase to 25kn		
Requirement	Result	Verdict
New slots shall be allocated with message 3	Allocation with Message 3	Pass
Message 1 shall be transmitted after all slots allocated	Yes	Pass
The reporting rate shall be 2 seconds, every 75 slots	Min Rr = 1.7 s Max Rr = 2.4 s Average Rr = 2.0 s	Pass

c) Speed decreased to 15kn		
Requirement	Result	Verdict
Check slot de-allocation	Timeout set to zero	Pass
The new reporting rate shall be established after 4 minutes of the speed reduction.	De-allocation starts after 3 minutes 4 seconds and is established within one frame.	Pass
The reporting rate shall be 6 seconds, every 225 slots	Min Rr = 5.0 s Max Rr = 6.9 s Average Rr = 6.0 s	Pass

c) Speed decreased to 10kn		
Requirement	Result	Verdict
Check slot de-allocation	Timeout set to zero	Pass
The new reporting rate shall be established after 4 minutes of the speed reduction.	De-allocation starts after 3 minutes 4 seconds and is established within one frame.	Pass
The reporting rate shall be 10 seconds, every 375 slots	Min Rr = 8.5 s Max Rr = 11.8 s Average Rr = 10.0 s	Pass

b) c) Heading Change – Speed of 10kn	
Requirement	Verdict
Reporting rate is 10s	Pass
Heading increased by 22°: Message 3 used for new report rate	Pass
New rate is established immediately	Pass
New reporting rate shall be 3 1/3 seconds, every 125 slots	Pass
Cease increase of heading: cessation of message 3	Pass
New reporting rate established after 20 seconds: Final message 3s with no slot increment sent after 30 seconds, new rate is established after this.	Pass
The reporting rate shall be 10 seconds, every 225 slots	Pass
b) c) Heading Change – Speed of 15kn	
Requirement	Verdict
Reporting rate is 6s	Pass
Heading decreased by 22°: Message 3 used for new report rate	Pass
New rate is established immediately	Pass
New reporting rate shall be 2 seconds, every 75 slots	Pass
Cease decrease of heading: cessation of message 3	Pass
New reporting rate established after 20 seconds: Final message 3s with no slot increment sent after 33 seconds, new rate is established after this.	Pass
The reporting rate shall be 6 seconds, every 225 slots	Pass
b) c) Heading Change – Speed of 25kn	
Requirement	Verdict
Message 1 providing position reports at 2s reporting rate	Pass
Heading increased by 22°: no change to reporting rate	Pass
Heading decreased by 22°: no change to reporting rate	Pass

d) Speed Sensor Unavailable	
Requirement	Verdict
Speed at 15kn with a reporting rate of 6 seconds	Pass
Speed sensor made unavailable, reporting rate reverts to default reporting rate of 10 seconds	Pass

e) Heading Sensor Unavailable	
Requirement	Verdict
Speed at 10kn, heading changing >20°/min with a reporting rate of 3.3 seconds	Pass
Heading sensor made unavailable, reporting rate reverts to default reporting rate of 10 seconds	Pass

Change of Navigation Status – Clause 14.3.2.2

Method of Measurement

Set-up standard test environment and operate EUT in autonomous mode. Change Navigational status by applying voyage data message to the Presentation Interface of the EUT.

a) Set NavStatus to ”at anchor” and “moored” and speed <3 kn
b) Set NavStatus to “at anchor” and speed >3 kn
c) Set NavStatus to other values

Record all messages on VDL and evaluate reporting rate of position report of EUT.

Required results

a) Reporting rate shall be 3 min.
b) Reporting rate shall be 10 s.
c) Reporting rate shall be adjusted according to speed and course (see Table 1).

Test Results

Requirement	Verdict
Navigation status = 1 (at anchor), speed = 1kn. Check reporting rate is 3 minutes	Pass
Navigation status = 1 (at anchor), speed = 4kn. Check reporting rate is 10 seconds	Pass
Navigation status = 1 (at anchor), speed = 15kn. Check reporting rate is 10 seconds	Pass
Navigation status = 1 (at anchor), speed = 25kn. Check reporting rate is 10 seconds	Pass
Navigation status = 2 (not under command), speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 3 (restricted manoeuvrability), speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 4 (constrained by draught), speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 5 (moored), speed = 2kn. Check reporting rate is 3 minutes	Pass
Navigation status = 6 (aground), speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 7 (fishing), speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 8 (sailing), speed = 2kn. Check reporting rate is 10 seconds	Pass

Behaviour of slots and allocation when changing to a 3 minute reporting interval and back to 10 seconds reporting interval:

Requirement	Verdict
Navigation status = 0, speed = 2kn. Check reporting rate is 10 seconds	Pass
Navigation status = 1, speed = 2kn. Verify that used slots are release by time-out 0 and slot offset = 0	Pass
Record if the slots are forced to time-out 0 or if they are released after count down to 0	-
Comments	
Slot time out values set to 0.	
Requirement	Verdict
Check that the position reports are transmitted in RATDMA mode using message 3	Pass
Navigation status = 0. Check that a procedure like network entry is performed	Pass

Assigned reporting intervals – Clause 14.3.2.3

Set up standard test environment and operate EUT in autonomous mode. Using a base station MMSI, transmit an assigned mode command Message 16 to the EUT with

a) initial slot offset and increment,
b) designated reporting interval.

Change course, speed and NavStatus. Record transmitted messages.

Required results

Confirm that the EUT transmits position reports Message 2 according to the parameters defined by Message 16 if the reporting interval of the assignment is shorter than the autonomous reporting interval. The EUT shall revert to Message 1 or 3 in autonomous mode with the autonomous reporting interval:

- after a period of 4 min to 8 min, or
- if a change of course, speed and NavStatus require a shorter autonomous reporting interval.

Test Results

a) Slot offset = 100, increment = 4, then SOG increase to 25 knots		
Requirement	Result	Verdict
Message 16 sent to EUT	!AIVDO,1,1,,A,@027`SRqMa>L6@10,0*68	-
Reporting interval = 3.3 seconds	3.3 seconds	Pass
SOG increased to 25 knots	!AIVDM,1,1,,A,2;UnTqh03rwrFu2M7AWhKh040000,0*0F	-
Reporting interval = 2 seconds	2 seconds	Pass

a) Slot offset = 200, increment = 3, SOG = 10 knots, then heading change applied		
Requirement	Result	Verdict
Message 16 sent to EUT on slot 1528	!AIVDO,1,1,,A,@027`SRqMa>L<P0h,0*2B	-
Message 2 transmitted 200 slots after message 16	Message 2 transmitted on slot 1728	Pass
Reporting interval = 6 seconds	6 seconds	Pass
Heading change applied	!AIVDM,1,1,,A,2;UnTqhOiTwrFu2M7AWhKibB0D01,0*5C	-
Reporting interval = 2 seconds	2 seconds	Pass

b) Slot offset = 200, increment = 0, then SOG increase to 25 knots		
Requirement	Result	Verdict
Message 16 sent to EUT	!AIVDO,1,1,,A,@027`SRqMa>L<P00,0*73	-
Reporting interval = 3 seconds	3 Seconds	Pass
SOG increased to 25 knots	!AIVDM,1,1,,A,2;UnTqh03rwrFu2M7AWhKh1:0HF@,0*7E	-
Reporting interval = 2 seconds	2 seconds	Pass

b) Slot offset = 100, increment = 0, SOG = 10 knots, then heading change applied		
Requirement	Result	Verdict
Message 16 sent to EUT	!AIVDO,1,1,,A,@027`SRqMa>L6@00,0*69	-
Message 2 transmitted	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0r08Ag,0*43	Pass
Reporting interval = 6 seconds	6 seconds	Pass
Heading change applied	!AIVDM,1,1,,B,3;UnTqhOiTwrFu2M7AWhKi1001;h,0*58	-
Reporting interval = 2 seconds	2 seconds	Pass

Static Data Reporting Intervals – Clause 14.3.2.4

Set-up standard test environment and operate EUT in autonomous mode.

Record the transmitted messages and check for static and voyage related data (Message 5).

a) Change static and/or voyage related station data. Record the transmitted messages and check for static and voyage related data (Message 5).
b) Apply SSD and VSD sentences with the same static parameters several times.
c) Record the transmitted messages and check for Message 24B.

Required results

Confirm that the EUT transmits Message 5 with a reporting interval of 6 min alternating Channel A and Channel B.

a) Confirm that the EUT transmits Message 5 within 1 min reverting to a reporting rate of 6 min.
b) Confirm that the EUT transmits Message 5 within 1 min after the first SSD sentence was received and revert to a reporting interval of 6 min. Subsequent identical SSD and VSD sentences shall not generate a further Message 5.
c) Confirm that the EUT transmits Message 24B within 12 min after power up and thereafter once within the next 24 h. Confirm that Message 24B contains correct Vendor ID.

Test Results

a) Change of static and voyage related station data		
Requirement	Result	Verdict
The ship static data is queried to determine what values are currently stored by the EUT.	The SSD query returned the following: $AISSD,TUVSUD,TUV,35,15,3,7,0,AI*30	-
The ship static data is changed using the SSD sentence, preceded by an SSA sentence.	The sentences applied to the EUT: $AISSA,SSD,1,B789D9DB93D4965027F3606F61E8EFCD*17 $AISSD,TESTING,TUVSUD,20,20,10,10,1,AI*36	-
The EUT shall transmit Message 5 within 1 minute of receiving the new static station data.	The SSD sentence is applied at 16:45:59, and the following Message 5 is transmitted at 16:46:02: !AIVDM,2,1,3,A,5;UnTqp21m`9@E=@TpMAEI=D@0 0000000000000l2PD5540HtD4kmE20CD5kP000000008,2*14 !AIVDM,2,2,3,A,kP000000008,2*14	Pass
The EUT shall revert to an autonomous reporting rate of 6 minutes.	The EUT transmits Message 5 at 16:46:02, 16:52:36, 16:58:31- giving an average reporting interval of 00:06:14.	Pass

b) Identical SSD sentences applied several times		
Requirement	Result	Verdict
The static station data is queried to determine the values currently stored by the EUT.	The SSD query returned the following: $AISSD,TESTING,TUVSUD,20,20,10,10,1,AI*36	-
The ship static data is changed using the SSD sentence, preceded by an SSA sentence.	The sentences repeatedly applied to the EUT are: $AISSA,SSD,1,E1180D95C74A014F1865D725A0A5EF17*19 $AISSD,TUVSUD,TUV SUD A,35,15,5,5,1,AI*36	-
The EUT shall transmit Message 5 within 1 minute of receiving the new static station data.	The SSD sentence is applied at 17:17:50, and the following Message 5 is transmitted at 17:17:51: !AIVDM,2,1,9,A,5;UnTqp21m`9AEI=D@1AEJ1=DB04 000000000000l2PD5540HtD4kmE20CD5kP000000008,2*1E !AIVDM,2,2,9,A,kP000000008,2*1E	Pass
The EUT shall transmit Message 5 for the first SSD sentence only; the identical SSD sentences shall not cause the EUT to transmit Message 5.	The EUT only outputs a single Message 5 at 17:17:51 in response to the SSD sentence applied.	Pass
The EUT shall revert to an autonomous reporting rate of 6 minutes.	The EUT transmits Message 5 at 17:17:51 and again at 17:23:55- giving a reporting interval of 00:06:04.	Pass

b) Identical VSD sentences applied several times		
Requirement	Result	Verdict
The voyage static data is queried to determine the values currently stored by the EUT.	The VSD query returned the following: $AIVSD,52,8.0,120,SOUTHAMPTON,246000.00,00,00,0,0*05	-
The voyage static data is updated several times using the same VSD sentence.	The VSD sentence repeatedly applied to the PI of the EUT is: $AIVSD,52,8.0,120,PORTSMOUTH,246000.00,00,00,0,0*58	-

b) Identical VSD sentences applied several times		
Requirement	Result	Verdict
The EUT shall transmit Message 5 within 1 minute of receiving the new static station data.	The VSD sentence is applied at 17:24:45 and the following Message 5 was transmitted at 17:24:49: !AIVDM,2,1,1,A,5;UnTqp21m`9AEI=D@1AEJ1=DB 0400000000000l2PD5540HtD43lU4kCmE2,0*78	Pass
The EUT shall transmit Message 5 for the first VSD sentence only; the identical VSD sentences shall not cause the EUT to transmit Message 5.	The EUT only outputs a single Message 5 at 17:24:49 in response to the VSD sentence applied.	Pass
The EUT shall revert to an autonomous reporting rate of 6 minutes.	The EUT transmits Message 5 autonomously at 17:30:57 and 17:37:09, giving a reporting interval of 00:06:10.	Pass

c) Autonomous transmission of Message 24B		
Requirement	Result	Verdict
The EUT shall transmit Message 24B within 12 minutes of powering on.	The EUT is powered on at 18:01:08 and transmits Message 24B at 18:03:48.	Pass
The EUT shall transmit Message 24B again within the next 24 hours.	The EUT transmits a second Message 24 less than 24 hours after the first, at 18:03:44.	Pass
The vendor ID encoded in the Message 24B shall be correct.	The vendor ID contained within the Message 24 is correct and the same in all instances of the Message.	Pass

2.4 Event Log

2.4.1 Specification Reference

IEC 61993-2, Clause 14.5

2.4.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 5

2.4.3 Date of Test

19-February-2018

2.4.4 Test Results and Methods of Measurement

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

Switch the EUT off for more than 15 min and on again at least ten times. Recover and readout recorded data.

Switch the EUT to receive only silent mode if implemented. Recover and readout recorded data.

Required Results

Confirm that the EUT records and displays times and events correctly.

Test Results

The on and off time was recorded by the test PC. There is a time difference of one hour due to the time zone being on British summer time, GMT+1. The time stamp in the TRL sentence is to the nearest minute.

Date	Off Time	On Time	Sentence
13/05/2019	14:12:22	14:47:52	$AITRL,17,1,0,13052019,131200,13052019,134800,1*7B
13/05/2019	13:56:42	14:11:52	$AITRL,17,2,0,13052019,125700,13052019,131200,1*77
13/05/2019	13:41:02	13:56:12	$AITRL,17,3,0,13052019,124100,13052019,125600,1*70
13/05/2019	13:25:22	13:40:32	$AITRL,17,4,0,13052019,122500,13052019,124100,1*73
13/05/2019	13:09:42	13:24:52	$AITRL,17,5,0,13052019,121000,13052019,122500,1*76
13/05/2019	12:54:02	13:09:12	$AITRL,17,6,0,13052019,115400,13052019,120900,1*78
13/05/2019	12:38:22	12:53:32	$AITRL,17,7,0,13052019,113800,13052019,115400,1*78
13/05/2019	12:22:42	12:37:52	$AITRL,17,8,0,13052019,112300,13052019,113800,1*77
13/05/2019	12:07:02	12:22:12	$AITRL,17,9,0,13052019,110700,13052019,112200,1*7B
13/05/2019	11:51:22	12:06:32	$AITRL,17,10,0,13052019,105100,13052019,110700,1*46

2.5 Software Update

2.5.1 Specification Reference

IEC 61993-2, Clause 14.5

2.5.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 5

2.5.3 Date of Test

13-May-2019

2.5.4 Test Results and Methods of Measurement

Method of Measurement

Perform an update of the equipment software according to the specification of the manufacturer.

Required Results

Verify that the equipment software can be successfully updated.

Test Results

The software can be successfully updated as follows.

Two files, “gui.bin” and “systema.bin” are copied to a memory stick, which is then connected to the USB port, using an OTG cable. The USB port is situated next to the pilot port on the front of the EUT.

The EUT is power cycled and the software update is applied, during which time a completion status bar is shown on the EUT splash screen.

After the update is complete, the EUT restarts.

The software version can be checked by sending a query, $AIAIQ,VER*3C, to the Pilot port or ECDIS port.

2.6 Initialization Period

2.6.1 Specification Reference

IEC 61993-2, Clause 14.6

2.6.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 0

2.6.3 Date of Test

19-February-2018

2.6.4 Test Results and Methods of Measurement

Method of Measurement

Set up standard test environment with all sensors available.

Switch on EUT with EUT operating in autonomous mode.

Switch off EUT for approximately 0,5 s. Record transmitted messages.

Required Results

Confirm that the EUT starts transmissions within 2 min after switch on.

Test Results

EUT Switch on Time	Time of First Transmission	Verdict
11:07:02	11:08:10	Pass

2.7 Technical Characteristics

2.7.1 Specification Reference

IEC 61993-2, Clause 14.7

2.7.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 0

2.7.3 Date of Test

19-February-2018

2.7.4 Test Results and Methods of Measurement

Channel Selection – Clause 14.7.1

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode. Switch the EUT to different channels randomly selected from the maritime mobile band as specified by ITU-R M.1084-5, Annex 4 using 25 kHz channel spacing:

a) manually;
b) by transmission of channel management message (Message 22) broadcast and addressed to EUT using a base station MMSI;
c) by application of ACA sentence to the presentation interface;
d) by transmission of DSC telecommand to EUT using a base station MMSI.

Record the VDL messages.

Required Results

Confirm that the EUT uses the appropriate channels as commanded in the tests.

Confirm that the EUT delivers a single TXT sentence with ID 036, followed by the ACA sentences needed to inform of changes in the AIS use of regional operating settings.

Test Results

Step	Requirement	Results	Verdict
a)	The test unit was configured with channel A = 2087, B = 2088, C= 2085 and D = 2086		
	Region manually configured via MKD with channel A = 2085 and channel B = 2086	The following messages were received on channel C and D: !AIVDM,1,1,,C,1;UnTqhPATwrFu2M7AWhKh4`0L01,0*17 !AIVDM,1,1,,D,1;UnTqhPATwrFu2M7AWhKhFr0D01,0*78	Pass
	TXT sentence with ID 036 output to PI	$AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass

Step	Requirement	Results	Verdict
b)	The test unit was configured with channel A = 2087, B = 2088, C= 2083 and D = 2084		
	Broadcast Message 22 received by EUT with channel A = 2083 and channel B = 2084: !AIVDM,1,1,,A,F027`SR2>2@7vm1oR?sD3bH2P000,0*29	The following messages were received on channel C and D: !AIVDM,1,1,,C,3;UnTqh01TwrFu2M7AWhKjBV02rQ,0*1B !AIVDM,1,1,,D,3;UnTqh01TwrFu2M7AWhKjBp02rQ,0*3A	Pass
	TXT sentence with ID 036 output to PI	$AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
	The test unit was configured with channel A = 2083, B = 2084, C= 2081 and D = 2082		
	Addressed Message 22 sent to EUT with channel A = 2081 and channel B = 2082: !AIVDO,1,1,,A,4027`SQv=e<;;OrCR2M6qDA00000,0*74 !AIVDO,1,1,,A,F027`SR26285jsBLp000000BP000,0*48	The following messages were received on channel C and D: !AIVDM,1,1,,C,3;UnTqh000wrCR2M6qD@Kh1P0001,0*01 !AIVDM,1,1,,D,1;UnTqh000wrCR2M6qD@Kh1>0L03,0*14	Pass
	TXT sentence with ID 036 output to PI	$AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
c)	The test unit was configured with channel A = 2081, B = 2082, C= 2085 and D = 2086		
	The following sentence was sent to the PI: $AIACA,0,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2085,0,2086,0,0,0,,,*60	The following sentences were received on channel C and D: !AIVDM,1,1,,C,1;UnTqh000wrCR2M6qD@Kh0L0D01,0*6A !AIVDM,1,1,,D,1;UnTqh000wrCR2M6qD@Kh080D01,0*19	Pass
	TXT sentence with ID 036 output to PI	$AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
d)	The test unit was configured with channel A = 2087, B = 2088, C = 2085, D = 2086		
	The DSC call with symbol 103 is sent to the EUT	The following sentences were received on channels C and D: !AIVDM,1,1,,C,3;UnTqh03rwr@v2A7AWhI00B00W1,0*4F !AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhI00v00UA,0*07	Pass
	TXT sentence with ID 036 output to PI	$AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass

Transceiver Protection – Clause 14.7.2

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode. Open circuit and short circuit VHF-antenna terminals of the EUT for at least 60 s each.

Required Results

The EUT shall be operative again within 2 min after refitting the antenna without damage to the transceiver.

Test Results

Requirement	Verdict
The EUT shall operate after refitting the antenna.	Pass

Automatic Power Setting – Clause 14.7.3

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode.

a) Set NavStatus to moored, SOG to < 3 kn and ship type to “tanker”.
b) Repeat test a) and assign the power level to high via the VDL.
c) Change the NavStatus to underway.

Required results

a) the power setting is 1 W and the MKD indicates the correct power setting
b) the power setting is 1 W and the MKD indicates the correct power setting
c) the power setting is 12,5 W and the MKD indication reverts to normal

Test Results

Step	Requirement	Result	Verdict
a)	The power is 1W.	The power is 1W	Pass
	The MKD indicates the correct power setting.	Low power symbol is shown at the bottom of the MKD	Pass
b)	Message 22 sent with power level = high: !AIVDO,1,1,,A,F027`SR2N2P7vm1oR?sD3bH2P000,0*4B	EUT indicates that the message was received: $AITXT,01,01,36,AIS: Channel management parameters changed*1	-
	The power is 1W.	The power is 1W	Pass
	The MKD indicates the correct power setting.	Low power symbol is shown at the bottom of the MKD	Pass
c)	The power is 12.5W.	The power is 12.5W	Pass
	The MKD indication reverts to normal.	The low power symbol is removed from the display	Pass

2.8 Alerts and indicators, fall-back arrangements

2.8.1 Specification Reference

IEC 61993-2, Clause 14.8

2.8.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 0

2.8.3 Date of Test

22-March-2018

2.8.4 Test Results and Methods of Measurement

Loss of power supply – Clause 14.8.1

Method of Measurement

Disconnect power supplies of the EUT.

Required Results

Verify that the relay output is “active” when the power is “off”.

Test Results

Requirement	Verdict
Relay output is “active” when the power is “off”	Pass

Monitoring of functions and integrity – Clause 14.8.2

Tx Malfunction – Clause 14.8.2.1

Method of Measurement

Check the manufacturer's documentation details how the EUT detects Tx malfunction.

Required Results

Confirm that the requirements of 4.1.5 and 6.10.1.2 are fulfilled and BIIT ID 1 is activated. Confirm that appropriate alert is released as required in Table 4.

Test Results

The EUT MMSI was set to zero, causing a Tx malfunction.

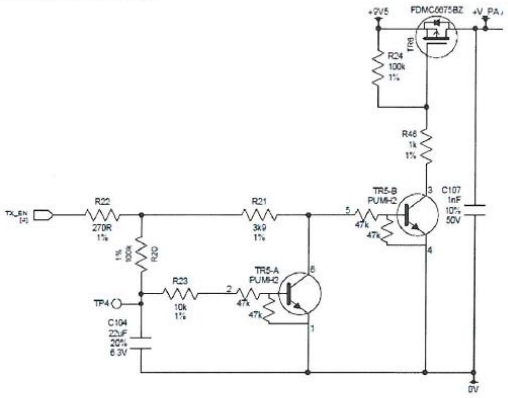
Requirement	Result	Verdict
The requirements of 4.1.5 is fulfilled	See description below	Pass
The requirements of 6.10.1.2 is fulfilled	ALR, ALF and ALC output as described below	Pass
ALR sentence with alarm ID 1 is sent to the PI	$AIALR,155153.00,001,A,V,AIS: Tx malfunction*5A	Pass
Confirm that appropriate alert is released with the following fields: Alert Identifier = 3008 1st Alert Text = "Transceiver fail" 2nd Alert Text = "Not transmitting, check AIS" Category = "B" Priority = "W" Alert State = "V"	The EUT outputs the following ALF and ALC sentences: $AIALF,2,1,2,155153.00,B,W,V,,3008,1,1,0,Transceiver fail*78 $AIALF,2,2,2,,,,,,3008,1,1,0,Not transmitting, check AIS*1C $AIALC,01,01,50,4,,3008,1,1,,3013,1,75,,3013,2,42,,3003,1,78,*69	Pass

Description of Transmitter shutdown procedure

Circuit Description	Document No.	920S-02504
	Issue	01.00
	Date Last Amended	04/09/18
	Last Amended by	W. Card
Document Title	Circuit Desc: ATB1	

ocean SIGNAL

5.4 Transmit Time Out



Supply to the PA circuit is controlled by switching +9.5V through TR6. This control is performed by the TX_EN signal. To begin transmission TX_EN is taken high to turn on TR5B thus turning on TR6.

To ensure that a transmission can last no longer than 2 seconds, due to a fault; when the PA supply voltage is switched on, C104 is charged through R20. This charging voltage is compared to the input threshold of TR5A. When the threshold has been exceeded TR5A switches on, turning TR5B off, this in turn switches TR6 off thus removing the supply voltage from the PA and ending any further transmission.

Antenna VSWR – Clause 14.8.2.2

Method of Measurement

Prevent the EUT from radiating with full power by mismatching the antenna for a VSWR of 3:1. During the mismatch the output power is not required to be the rated output power.

Required Results

Verify that the EUT continues operating. Verify that BIIT ID 2 is activated. Confirm that appropriate alert is released as required in Table 4.

Test Results

Requirement	Result	Verdict
Confirmation that BIIT IS 2 is activated by an alarm message appearing on the PI with an ID of 002:	$AIALR,160120.00,002,A,V,AIS: VHF Antenna VSWR exceeds limit*2E	Pass
Confirm that the EUT continues operating	The EUT continues transmissions	Pass
Confirm that appropriate alert is released with the following fields: Alert Identifier = 3116 1st Alert Text = “Impaired radio” 2nd Alert Text = “Reduced coverage (antenna VSWR)” Category = “B” Priority = “C” Alert State = “V”	The EUT outputs the following ALF and ALC sentences: $AIALF,2,1,3,163522.00,B,C,V,,3116,4,7,0,Impaired radio*6F $AIALF,2,2,3,,,,,,3116,4,7,0,Reduced coverage (antenna VSWR)*7E $AIALC,01,01,06,3,,3116,4,7,,3019,1,9,,3003,1,14,*6E	Pass

Rx malfunction – Clause 14.8.2.3

Method of measurement

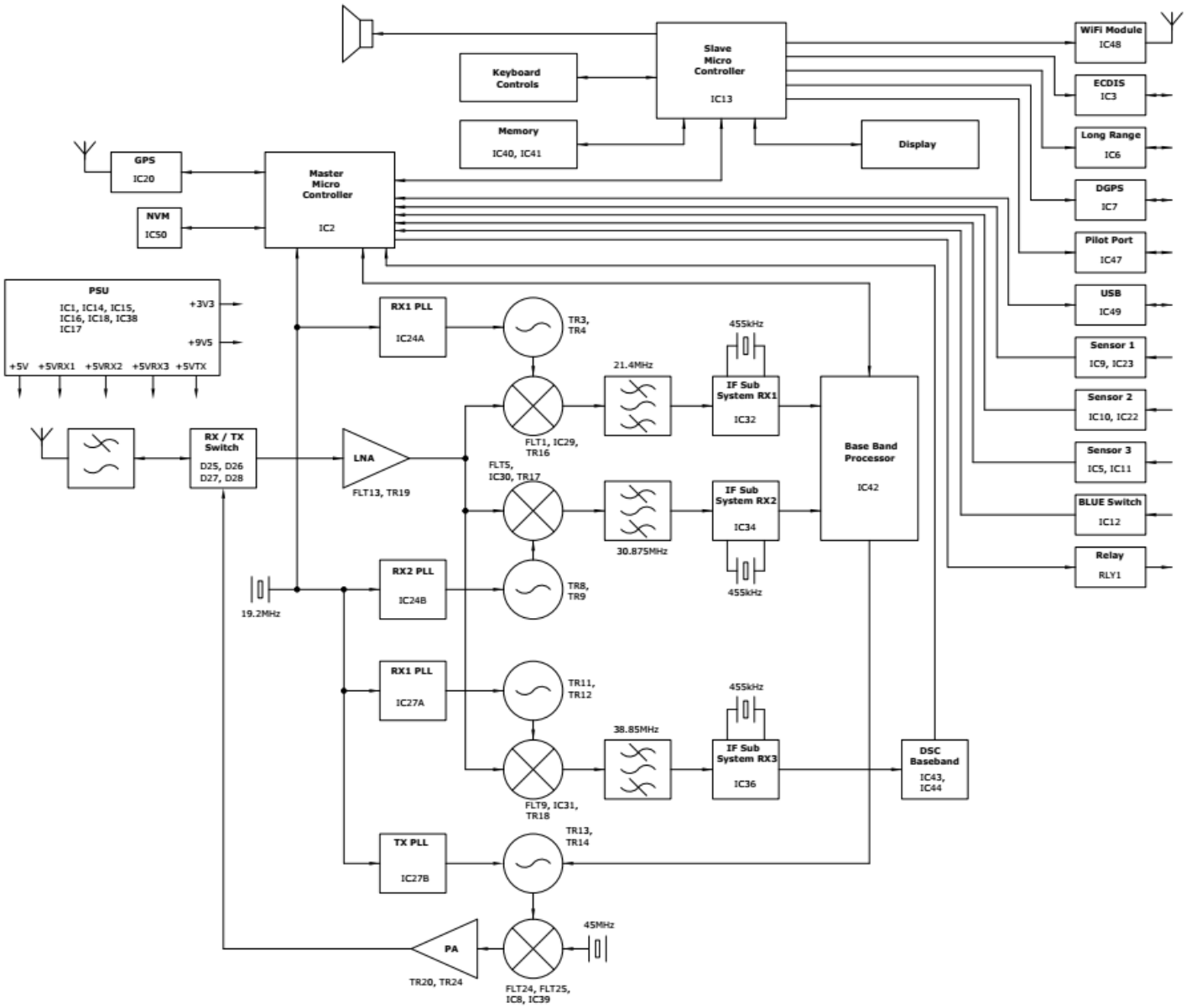
The manufacturer shall provide documentation describing how the AIS detects Rx malfunction and that the BIIT ID 3, 4 or 5 as appropriate is activated.

Required Results

Confirm by inspection of manufacturer's documentation that appropriate alert is released as required in Table 4.

Test Results

Receive malfunctions are detected by monitoring their lock state via IC24 for Rx channel 1 and channel 2 and IC27 for Rx channel 3. The receivers lock state is indicated by two lock detect lines which are monitored by the main processor (IC2). When the line state indicates that one or more receivers are out of lock, the processor interrogates the device(s) to determine which receiver(s) is at fault and raises the appropriate BIIT alert(s). These alert(s) will remain active while the lock fault condition remains. In the case of Channel 1 and Channel 2, the processor prevents any transmission on the faulty channel for as long as the BIIT alert remains active.



Circuit Description	Document No.	Circuit Supplement
	Issue	01.00
Approved:	Date Last Amended	22/10/19
	Last Amended by	S. Moore
Document Title	ATA100 Rx Malfunction	

Loss of UTC – Clause 14.8.2.4

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

a) Disconnect the GNSS antenna (UTC synch invalid).
b) Reconnect the GNSS antenna.

Required Results

Verify that:

a) the system continues to operate and changes sync state to indirect synchronisation and BIIT ID 7 is activated. Confirm that appropriate alert is released as required in Table 4;
b) BIIT ID 7 is inactivated. Confirm that appropriate alert is inactivated. The EUT shall change sync state to UTC direct synchronisation.

Test Results

a)		
Requirement	Result	Verdict
System continues to operate	EUT continues transmissions	
Sync state changed to 3	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1R1UHT,0*35	Pass
BIIT ID 7 is activated	EUT outputs ALR ID 007 with alarm condition = A: $AIALR,110942.00,007,A,V,AIS: UTC sync invalid*0A	Pass
Confirm that appropriate alert is released with the following fields: Alert Identifier = 3113 1st Alert Text = “Sync in fallback” 2nd Alert Text = “Check AIS for UTC time synchronisation” Category = “B” Priority = “C” Alert State = “V”	The EUT outputs the following ALF and ALC sentences: $AIALF,2,1,5,110942.00,B,C,V,,3113,1,1,0,Sync in fallback*33 $AIALF,2,2,5,,,,,,3113,1,1,0,Check AIS for UTC time synchronisation*00 $AIALC,02,01,70,4,,3116,4,29,,3113,1,1,,3019,1,28,,3003,1,28,*6B	Pass

NOTE: The field, “total number of sentences”, in the ALC sentence is incorrect and has been corrected in a later firmware version.

b)		
Requirement	Result	Verdict
BIIT ID 7 is inactivated	EUT outputs ALR ID 007 with alarm condition = V: $AIALR,112952.00,007,V,V,AIS: UTC sync invalid*1B	Pass
Sync state changed to 0	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1P0D01,0*3A	Pass
Confirm that appropriate alert is inactivated with the following fields: Alert Identifier = 3113 1st Alert Text = “Sync in fallback” 2nd Alert Text = “Check AIS for UTC time synchronisation” Category = “B” Priority = “C” Alert State = “N”	The EUT outputs the following ALF sentences: $AIALF,2,1,8,112952.00,B,C,U,,3113,1,5,3,Sync in fallback*39 $AIALF,2,2,8,,,,,,3113,1,5,3,Check AIS for UTC time synchronisation*0A $AIALF,2,1,9,112953.00,B,C,N,,3113,1,6,3,Sync in fallback*21 $AIALF,2,2,9,,,,,,3113,1,6,3,Check AIS for UTC time synchronisation*08	Pass
Confirm that appropriate alert is inactivated by removing alert identifier 3113 from the ALC sentence	The EUT outputs the following ALC sentence: $AIALC,01,01,09,3,,3116,4,29,,3019,1,32,,3003,1,32,*61	Pass

NOTE: The first ALF sentence output when the alert is inactivated, contains alert state “U”, this is for information only. IEC 61992-2 6.10.1.2 states that, “Rectified, unacknowledged (U)" state is not required to be implemented by any of the alerts required by this document.”

Legacy translation of alerts – Clause 14.8.2.6

Method of Measurement

The test for ALR/ACK handling shall be performed with an appropriate BIIT ID. No other BIIT IDs shall be active.

a) Modify the BIIT ID condition so that the condition is exceeded.
b) Modify the BIIT ID condition so that the condition is rectified.
c) Modify the BIIT ID condition so that the condition is exceeded.
d) Apply an acknowledgement with the ACK sentence to the PI port.
e) Modify the BIIT ID condition so that the condition is rectified.

Required Results

Verify that:

a) an ALR sentence with the BIIT ID of the tested BIIT ID is output with status "A,V". Verify that the ALR output is repeated every 30 s. Verify that the BIIT ID is displayed on the MKD;
b) an ALR sentence with the BIIT ID of the tested alert is output with status "V,V". Verify that the BIIT ID is no longer displayed on the MKD;
c) an ALR sentence with the BIIT ID of the tested BIIT ID is output with status "A,V". Verify that the ALR output is repeated every 30 s. Verify that the BIIT ID is displayed on the MKD;
d) the status of the ALR sentence is changed to "A,A". Confirm that appropriate alert in Table 4 is changed to "A" "Active, acknowledged" state. Verify that the ALR output is repeated every 30 s. Verify that the BIIT ID is displayed on the MKD;
e) an ALR sentence with the BIIT ID of the tested BIIT ID is output with status "V,V". Verify that the BIIT ID is not displayed on the MKD. Verify that an ALR sentence is output every 60 s indicating that no BIIT IDs are active.

Test Results

a) The cable connected to the antenna was removed causing a BIIT ID 2		
Requirement	Result	Verdict
ALR sentence with the BIIT ID of the tested BIIT ID is output with status "A,V"	$AIALR,115459.00,002,A,V,AIS: Antenna VSWR exceeds limit*5F	Pass
Verify that the ALR output is repeated every 30 s	ALR sentence is output at 11:55:29, 11:55:59, 11:56:30 etc.	Pass
Verify that the BIIT ID is displayed on the MKD	A pop up window is shown on the display with “Alarm ID: 3116:4”	Pass

b) The cable connected to the antenna was reconnected		
Requirement	Result	Verdict
ALR sentence with the BIIT ID of the tested alert is output with status "V,V".	$AIALR,122129.00,002,V,V,AIS: Antenna VSWR exceeds limit*4E	Pass
Verify that the BIIT ID is no longer displayed on the MKD	The pop up window, showing the alarm is removed from the display	Pass

c) The cable connected to the antenna was removed causing a BIIT ID 2		
Requirement	Result	Verdict
ALR sentence with the BIIT ID of the tested BIIT ID is output with status "A,V"	$AIALR,122400.00,002,A,V,AIS: Antenna VSWR exceeds limit*57	Pass
Verify that the ALR output is repeated every 30 s	ALR sentence is output at 12:25:01, 12:25:31, 12:26:01 etc.	Pass
Verify that the BIIT ID is displayed on the MKD	A pop up window is shown on the display with “Alarm ID: 3116:4”	Pass

d) $AIACK,2*5F sent to PI		
Requirement	Result	Verdict
The status of the ALR sentence is changed to "A,A"	$AIALR,123138.00,002,A,A,AIS: Antenna VSWR exceeds limit*4F	Pass
Confirm that appropriate alert in Table 4 is changed to "A" "Active, acknowledged" state	$AIALF,2,1,2,123138.00,B,C,A,,3116,4,2,0,Impaired radio*77 $AIALF,2,2,2,,,,,,3116,4,2,0,Reduced coverage (antenna VSWR)*7A	Pass
Verify that the ALR output is repeated every 30 s	ALR sentence is output at 12:32:01, 12:32:31, 12:33:01 etc.	Pass
Verify that the BIIT ID is removed from the MKD but remains in the alert list (see note below)	The pop up window, showing the alarm is removed from the display. From the menu, in “Messages” – “Alarms”, the alert is displayed with ACT = Yes and ACK = Yes.	Pass

NOTE: The requirement in this step is not clearly defined, the BIIT ID should not be displayed on the MKD, as stated. The requirement is defined in table D.2 of IEC 61993-2, where upon reception of an ACK sentence, the alert shall be removed from the MKD but shall remain in the alert list.

e)		
Requirement	Result	Verdict
ALR sentence with the BIIT ID of the tested BIIT ID is output with status "V,V"	$AIALR,124850.00,002,V,V,AIS: Antenna VSWR exceeds limit*4F	Pass
Verify that the BIIT ID is not displayed on the MKD	The BIIT ID is not displayed on the MKD.	Pass
Verify that an ALR sentence is output every 60 s indicating that no BIIT IDs are active.	$AIALR,,,V,V,*7B	Pass

BAM alerts – Clause 14.8.2.7

Method of Measurement

Perform an appropriate test sequence according to IEC 62923-1, for one Warning priority alert.

Perform an appropriate test sequence according to IEC 62923-1, for one Caution priority alert.

Required Results

Confirm by analytic evaluation that reporting of alert at BAM interface and presentation of alert on MKD conforms to IEC 62923-1. Verify that the alarm relay is activated only when alert state is "V", Active, unacknowledged.

Confirm by analytic evaluation that reporting of alert at BAM interface and presentation of alert on MKD conforms to IEC 62923-1. Verify that the alarm relay is not activated.

Test Results

Warning Priority Alert – MMSI set to zero, causing BIIT ID 1 and alert ID 3008 Caution Priority Alert – GNSS antenna removed, causing BIIT 7 and alert ID 3013			
Clause	Requirement	Result	Verdict
6.1.1	The EUT is verified by tests in 6.1.2 and 6.1.3, and the applicable subclauses of 6.2, 6.3 and 6.4.	Results shown below.	-
6.1.2	Confirm by analytic evaluation that, if there is a situation that requires attention, the EUT raises a functional alert (see Annex E), while the underlying causes (e.g. technical situations or symptoms) do not provide (additional) audible alerts.	EUT raises functional alerts by outputting ALF and ALC sentences describing the alerts: $AIALF,2,1,8,132038.00,B,W,V,,3008,1,6,5,Transceiver fail*7D $AIALF,2,2,8,,,,,,3008,1,6,5,Not transmitting, check AIS*14 $AIALF,2,1,9,142141.00,B,C,V,,3113,1,1,0,Sync in fallback*33 $AIALF,2,2,9,,,,,,3113,1,1,0,Check AIS for UTC time synchronisation*0C $AIALC,01,01,50,3,,3008,1,6,,3113,1,1,,3015,1,2,*54	Pass
6.1.3	Methods of test and required test results are described in 6.3.2.3.	Results shown in these sections.	-
	In case the EUT contains an alert HMI that is not a CAM-HMI, confirm by analytical evaluation that it is not possible to display alerts of other equipment in its list of active alerts.	EUT does not support the display of alerts from other equipment.	-
6.1.4.1	Provisions for CAM system	EUT is not function type Q.	N/A
6.1.4.2	Provisions for INS	EUT is not function type T.	N/A
6.2.3	Confirm by inspection that the manufacturer's documentation lists the alerts of the EUT indicating at least the priority, category and the criteria used for classification (see 6.3.2.3 for further tests).	The alerts are defined in the AIS product standard.	N/A
	Identify if category A alerts can be displayed on an HMI even if these alerts cannot be acknowledged on that HMI. If such alerts can be displayed, simulate an alert of category A and confirm by observation that:	Only category B alerts can be displayed.	N/A
	For INS or MFD (see 6.2.2.2), confirm by analytic evaluation that all locations in which it is possible to acknowledge a category A alert are displaying necessary graphical information and perform audible annunciation according to Table 2, Table 3, Table 4 and Table 5 when they allow acknowledgement of the category A alert.	Only category B alerts can be displayed.	N/A

Clause	Requirement	Result	Verdict
6.3.2.3	Refer to the manufacturer's documentation. Identify all displays associated with the EUT that may present alerts.	The EUT has a single display.	-
	Cause at least one alert of each priority and each state, if applicable, at the EUT.	Warning Priority Alert – MMSI set to zero, causing BIIT ID 1 and alert ID 3008. Caution Priority Alert – GNSS antenna removed, causing BIIT 7 and alert ID 3013.	Pass
	Confirm by observation that, disregarding colour coding (see Table 3 and Table 4), the different alert priorities and states can be distinguished.	Alert priorities are shown at the top of the pop-up window. The alert list contains a priority column, which displays W or C, depending on the priority.	Pass
	Confirm by observation that an HMI presenting alerts while that HMI is not in control has a permanent indication that "Alert handling is disabled". Confirm by observation that, in this mode, any HMI of the EUT which is not in control does not provide audible annunciation.	The EUT HMI is always in control of alert handling.	N/A
	Additional methods of test and required results are described in 6.3.3, 6.3.4, 6.3.5, 6.3.6 and 6.4.5. For all these tests, in addition to the test itself, confirm by observation that the state of the alerts is consistently presented on all associated displays.	Tests 6.3.5 and 6.3.6 are only applicable to the EUT and are shown below.	-
6.3.3	Emergency alarms	EUT does not support emergency alarms.	N/A
6.3.4	Alarms	EUT does not support alarms.	N/A
6.3.5.1	The BAM shall distinguish between different warning states: unacknowledged warning; and acknowledged warning.	The list of alerts has a column, “ACK”, which shows if the alert has been acknowledged.	Pass
6.3.5.2	Each warning is visually presented as "active – unacknowledged" warning in compliance with Table 4 together with its associated alert title and/or alert description text, at least on the HMI(s) directly assigned to the function generating the warning and together with its associated alert title and, if provided, alert description text on the CAM-HMI(s) if provided in the EUT;	Each warning is presented as a flashing yellowish orange circle with a symbol of a loudspeaker in the middle of the circle. The alert title and description is displayed in the pop-up window. There is no flashing text on any of the displayed alerts.	Pass
	The alert title and if provided the alert description text, where possible, uses the terminology defined in IEC 62288;	The alert title and description is defined in IEC 61993-2, this is displayed correctly on the pop-up window. Alert title is correctly displayed at the bottom of the screen	Pass
	An audible signal in compliance with Table 4 and 6.4.4 occurs for category B warnings.	Audible signal is comprised of 2 short audible signals.	Pass
	Speech output	Speech output is not supported by the EUT.	N/A
6.3.5.3	Silencing of warnings	The EUT does not provide facilities to temporarily silence warnings.	N/A
6.3.5.4	A flashing visual presentation in compliance with Table 4 is available after the warning condition is rectified;	The standard is incorrect, the IMO resolution is, “the visual indication (presentation) can be ceased when the alarm condition is rectified”. Therefore, the flashing visual presentation shall be unavailable, not available. When the condition is rectified the flashing visual presentation and the pop-up window is removed.	Pass
	The audible signal and, if provided, speech output are silent.	The audible signal is very short and is already silent. However, the audible signal is not repeated after the escalation timeout. Speech output is not supported by the EUT.	Pass

Clause	Requirement	Result	Verdict
6.3.5.4	Refer to the manufacturer's documentation. If available, generate 3 warnings for which an equipment performance standard allows removal of the warning after the warning condition is rectified. Confirm by observation that the warnings are presented. Do not acknowledge them but rectify the warning conditions. Confirm by observation that the warnings, including the visual presentation, disappear after the warning condition is rectified.	The equipment performance standard does not allow this.	N/A
	Refer to the manufacturer's documentation to identify whether or not there are functions that can be deactivated while the associated alert reporting function remains operational.	There are no functions that can be deactivated.	N/A
6.3.5.5	After acknowledgement, the visual presentation changes in compliance with Table 4	Icon changes to a static yellowish orange circle with an exclamation mark in the middle of the circle.	Pass
	After acknowledgement, the audible signal is in compliance with Table 4.	No audible signal is output after acknowledgement.	Pass
	Rectify the condition causing the warnings and confirm by observation that the warnings, including the visual presentation, disappear after the alert conditions are rectified.	The warning text at the bottom of the display and the icon is removed. In the alert list, the alert active status (“ACT”) is changed to “No”.	Pass
	Refer to the manufacturer's documentation for displayed warnings that can have the state "active – responsibility transferred".	The EUT does not support the transfer of responsibility.	N/A
6.3.6.1	Each caution is presented as "active" caution in compliance with Table 5 together with its alert title and/or alert description text on all alert related HMI(s) of the EUT;	Alert title and description are displayed in the pop-up window. Text is yellow, and a static icon is shown at the bottom of the screen. The icon is presented as a yellow square with a tick mark in the middle of the square.	Pass
	Audible signal is silent for cautions.	There are no audible signals for cautions.	Pass
	If speech output is provided for alerts, confirm by observation that speech output is silent for cautions.	Speech output is not supported by the EUT.	N/A
	Confirm by observation that the cautions, including their visual presentation, disappear after the alert conditions are rectified, while, in case of a momentary event, taking into account measures to ensure that the operator is able to read the cautions.	Icons and pop-up window are removed when the alert is rectified. The list of alerts shows all previous alerts that have been rectified.	Pass
6.3.7	the "active – unacknowledged" warning is repeated as warning;	An audible signal is repeated after 5 minutes.	Pass
	Confirm by inspection of documented evidence that, for the alerts for which the individual performance standard for the EUT has a requirement for alert escalation, only option 4) is applied.	The performance standard does not require option 4.	N/A
	The warnings are repeated within 5 min	An audible signal is repeated after 5 minutes.	Pass
	The escalation counter is incremented in the associated ALF message	$AIALF,2,1,7,101019.00,B,W,V,,3008,1,9,5,Transceiver fail*7E After the next repeat, the escalation counter is incremented to 6: $AIALF,2,1,8,101522.00,B,W,V,,3008,1,10,6,Transceiver fail*47	Pass
	The time stamp of the associated ALF reflects the (UTC) time of the last state change, if available (see 8.1.3.1 and Figure G.3).	In IEC 61162-1, the time of change field shall be updated when “in-/decrementing a contained counter or count down” and “should cause a revision of alert message and a new time.” Each time a counter is updated, the ALF time of change field is modified with the current time.	Pass

Clause	Requirement	Result	Verdict
6.3.7	If applicable to the EUT, generate 3 warnings that are configured to be escalated to an alarm after a fixed time period.	The EUT does not support any warnings that escalate to an alarm.	N/A
	If applicable to the EUT, generate 3 warnings but do not acknowledge them. Rectify the cause of the warnings. Confirm by observation that the "rectified – unacknowledged" warnings are not escalated.	Rectified, unacknowledged (U)" state is not required to be implemented by the equipment product standard.	N/A
	Cause a warning set to escalate to warning and with escalation timer set to 30 s and silence the warning,	User selectable escalation timer is not supported.	N/A
	Confirm by observation that the warning escalates to warning immediately after the silence period has expired.	Silencing is not supported.	N/A
	Confirm by observation that the warning escalates to warning at the period of time set after it has been caused.	User selectable escalation timer is not supported.	N/A
	Confirm by observation that the warning escalates to alarm immediately after the silence period has expired.	Silencing is not supported.	N/A
6.4.2	Confirm by observation that the appearance of each new alert is visualized.	Each alert is displayed in a pop-up window and in a list.	Pass
	For each representative mode, confirm by observation that at least presented is either: the list of active alerts in the EUT or in a dedicated area of the HMI	The presentation of alerts is in a list.	Pass
	Set all active alerts to "normal". Subsequently select all representative modes. Confirm by observation that, in all representative modes, there is an indication that there are no active alerts present in the EUT.	The icons and text indicating active alerts are removed and the list indicates that no alerts are active.	Pass
	Confirm by observation for each such representative mode that, for each subsequently displayed alert, the priority, state and alert title and/or alert description text is presented.	The alert title and text are displayed in a pop-up window. The priority is displayed in at the top of the pop-up window.	Pass
	Cause more alerts than can be displayed simultaneously. Confirm by observation that there is a clear and unambiguous indication that there are additional alerts present in the EUT.	Apart from the list, the HMI displays alerts, one at a time in a pop-up window. The icons at the bottom of the screen indicate that there are additional alerts present.	Pass
	The state "active – responsibility transferred" can occur in the EUT, then if alerts with state "active – responsibility transferred" can be hidden, activate the presentation of those hidden alerts for all such representative modes.	The EUT does not support the transfer of responsibility.	N/A
	If applicable, cause at least two "active – responsibility transferred" warnings and two "active – responsibility transferred" alarms, or the maximum number of "active – responsibility transferred" alerts of the EUT, if that is lower than four. Subsequently confirm by observation for each such representative mode that the caused alerts are displayed.	The EUT does not support the transfer of responsibility.	N/A
	Subsequently confirm by observation that, in each representative mode, all alerts are displayed in order of display priority (highest display priority on top) and, within the display priorities, in the order in which they transitioned to their current state (sequence with, on top, the alert which changed state most recently) (see 6.4.2.1) and that the order of alerts does not change for activation of silence or for return from silence.	Display priority is grouped by priority, with warnings displayed at the top of the alert list.	Pass

Clause	Requirement	Result	Verdict
6.4.2	For EUT type other than CAM-HMI, if available, generate three alarms and three warnings in the EUT. Use a CAM simulator to silence the alert which is in sorting order in the middle of the alert list of the EUT (i.e. use the alert identifier of the middle alert in the ACN command sent from the simulator to the EUT). Confirm by observation that there is no change in the order of display of the alerts. Wait until silence expires and confirm by observation that there is no change in order of the display of the alerts.	Only warnings are supported by the EUT	N/A
	Set the EUT to display the list of active alerts. Cause additional (if necessary) alerts until there is one more alert than the number of alerts that can be presented simultaneously on the EUT; or the maximum number of alerts of the EUT, if that is lower. If applicable, confirm by observation that: There is a clear and unambiguous indication that there are additional alerts requiring attention It is possible to present additional alerts (e.g. second page) by a single operator action It is possible to return to the alert display containing the alerts with the highest display priority by a single operator action.	The icons at the bottom of the screen indicate alerts requiring attention. It is possible to present additional alerts and return to the highest display priority by scrolling the list using the control wheel on the front of the EUT.	Pass
	If applicable, generate more alerts until there is a third page required to present all alerts. Confirm by observation that: The EUT presents the new alerts Any subsequent page can be selected from the previous one by single operator action It is possible to return to the alert display containing the alerts with the highest display priority by a single operator action.	The alert list is a scrollable list. It is possible to present additional alerts and return to the highest display priority by scrolling the list using the control wheel on the front of the EUT.	Pass

Clause	Requirement	Result	Verdict
6.4.3	Confirm by analytic evaluation that combinations of "alert title" and "alert description text" are appropriate for the bridge team and that the "alert description text" provides, where practicable, aids for decision-making for the bridge team.	Alert title and description text are defined by the equipment product standard.	Pass
	Generate an alert for which "alert description text" is available. Confirm by observation that at least on request the alert description text is displayed at the HMI.	Alert description text is displayed in the pop-up window when the alert is activated.	Pass
6.4.4	If applicable, generate alarms. Do not acknowledge the alarms nor rectify their causes and confirm by observation that only audible annunciation as defined in Table 3 is repeated.	The EUT supports warnings only.	N/A
	If applicable, generate a warning. Do not acknowledge the warning nor rectify its cause. Confirm by observation that audible annunciation occurs as defined in Table 4.	Audible signal is comprised of 2 short audible signals.	Pass
	Generate, within 15 s of the previous warning, two new warnings. Confirm by observation that 15 s after the audible annunciation of the original warning, the new warnings are announced once with the audible signal according to Table 4.	IEC 61993-2 requires the testing of only one warning priority alert.	N/A
	Generate both alarms and warnings. Do not acknowledge the alerts nor rectify their causes and confirm by observation that the audible annunciation for the alarms is suppressing the audible annunciation for the warnings.	The EUT supports warnings only.	N/A
	Initiate temporary silence and confirm by observation that, during the temporary silence period of 30 s, the initial audible annunciation according to Table 4 for a new warning is given.	Silencing of alarms is not implemented as the only applicable audible signal is 2 short audible signals. Therefore the audible signal will have finished before the user has had the time to try and silence it.	N/A
	Initiate temporary silence and confirm by observation that generation of a new alarm will interrupt the temporary silence with the audible annunciation for an alarm according to Table 3.	The EUT supports warnings only.	N/A
	Initiate temporary silence and rectify or acknowledge all alarms and confirm by observation that audible annunciation for a warning according to Table 4 is given after 30 s.	The EUT does not support silencing of alarms.	N/A
	Refer to the manufacturer's documentation for all audible indications in the EUT. If applicable, cause the EUT to subsequently raise the available audible indications. Confirm by observation that the audible indications are clearly distinguishable from the audible signals defined in Table 3 and Table 4.	The audible indications for warnings are clearly distinguishable from other audible signals.	Pass
6.4.5	If icons are used to indicate the state, priority, category, aggregation or functional alert grouping of alerts, cause successively for each icon an alert with the corresponding state, priority and category and confirm by observation that the icon complies with the requirements in Annex F.	Icons are in accordance with Annex F. There are 4 icons supported, icons numbers 6, 8, 10 and 11 as defined in Table F.1.	Pass
	Refer to the manufacturer's documentation for the use of icons other than those for alert management. If such other icons are used, confirm by analytical evaluation that they cannot be easily mistaken for the icons of Annex F.	The icons used by the EUT for non-alert status indication cannot be mistaken for the icons in Annex F.	Pass
6.4.6	Functionality to help reduce the number of high-priority alerts	The EUT does not support the transfer of responsibility or present alerts received from other functions or equipment	N/A
6.5	Systems failures, redundancies, back-up and fallback arrangements	An EUT which has it's own alert HMI that is not part of a CAM system meets this requirement through compliance with Modules A and C of this document independent of a CAM system.	N/A

Clause	Requirement	Result	Verdict
6.6	Documentation	We are complying with the requirements of the equipment product standard. Therefore, the requirements are to confirm that the, “reporting of alert at BAM interface and presentation of alert on MKD conforms to IEC 62923-1. Therefore, the documentation requirements are not applicable.	N/A
6.7	Functional alert grouping	The EUT does not provide functional grouping of alerts.	N/A
6.8	Alert aggregation	The EUT does not aggregate alerts.	N/A
6.9	Responsibility transfer	Only applicable to EUTs with functions of type R.	N/A
8.1.1.1	Confirm by inspection of the manufacturer's documentation which interfaces are provided.	The manufacturer’s documentation documents the interfaces provided.	Pass
	Confirm by inspection of documented evidence that the EUT provides alert interface in compliance with Annex C.	The EUT provides an IEC 61162-1 interface and supports ALF, ALC, CAN, ARC and HBT sentences.	Pass
	Confirm by observation that, if the equipment is required to transmit the HBT sentence, it does this at least every 30 s.	HBT sentence is output every second.	Pass
8.1.1.2	Provisions for legacy alert conversion functions	Only applicable to EUTs with functions of type S	N/A
8.1.2	Applying ALF message is the standardized concept	ALF sentences are used by the EUT.	Pass
8.1.3	Confirm by observation whether the EUT can perform time synchronization and under which conditions the time is unsynchronized.	The EUT contains an internal GNSS receiver for synchronisation.	Pass
	Generate an alert in unsynchronized time condition and confirm by observation that in the ALF message the field for "time of last change" is null.	To achieve unsynchronised time, the GNSS antenna was removed, external GNSS data was stopped and the AIS base station position reports were turned off. The time of last change is null: $AIALF,2,1,7,,,B,C,V,,3119,3,1,0,Missing Heading*34	Pass
	In case the EUT provides time synchronization, set up the EUT in time synchronized mode. Generate an alert and confirm by observation that in the ALF message the field for "time of last change" is filled with the right time information.	The time of last information is correct: $AIALF,2,1,2,125907.00,B,C,U,,3113,1,2,0, Sync in fallback*33	Pass
8.1.4	Simulate an ACN sentence with a silence command, an empty field for manufacturer mnemonic code, value 0 for alert identifier and null field for alert instance. Confirm by observation that the EUT temporarily silences all alerts or, in case of refusal of the silencing command, responds by sending an ARC sentence for each alert for which it refused the command, to inform refusal of the ACN command.	An ACN sentence was sent to the EUT: $AIACN,,,0,,S,C*64 The EUT responded with a refusal, for each alert, as silencing of alarms is not supported: $AIARC,,,3116,4,S*16 $AIARC,,,3113,1,S*16 $AIARC,,,3003,1,S*16 $AIARC,,,3015,0,S*10 $AIARC,,,3119,1,S*1C $AIARC,,,3119,2,S*1F $AIARC,,,3119,3,S*1E $AIARC,,,3119,4,S*19	Pass
	Use a simulator to generate an ACN sentence with an acknowledgement command, an empty field for manufacturer mnemonic code, value 0 for alert identifier and null field for alert instance. Confirm by observation that the EUT ignores the command and responds by sending an ARC sentence for each alert for which it refused the command, to inform refusal of the ACN command.	Sentence sent to the EUT: $AIACN,,,0,,A,C*76 EUT does not respond with ARC: $AIARC,,,3003,1,A*04 $AIARC,,,3015,1,A*03 $AIARC,,,3119,1,A*0E $AIARC,,,3119,2,A*0D $AIARC,,,3119,3,A*0C $AIARC,,,3119,4,A*0B	Pass
	Use a simulator to generate an ACN sentence with a responsibility transfer command, an empty field for manufacturer mnemonic code, value 0 for alert identifier and a null field for alert instance. Confirm by observation that the EUT ignores the command and responds by sending an ARC sentence for each alert for which it refused the command, to inform refusal of the CAN command.	The EUT does not support the transfer of responsibility.	N/A

Clause	Requirement	Result	Verdict
8.1.4	Put the EUT in a normal operational mode. If applicable, cause alerts such that each possible alert state is present. Use a simulator to generate an ACN sentence with a retransmit request, an empty field for manufacturer mnemonic code, value 0 for alert identifier and a null field for the alert instance. Confirm by observation that the EUT transmits, using ALF messages, the actual state of all active alerts (i.e. excluding alerts in state "normal").	Sentence sent to the EUT: $AIACN,,,0,,Q,C*66 EUT outputs ALF sentences for all alerts: $AIALF,2,1,8,160049.00,B,C,V,,3113,1,1,0,Sync in fallback*3B $AIALF,2,2,8,,,,,,3113,1,1,0,Check AIS for UTC time synchronisation*0D $AIALF,2,1,9,160018.00,B,C,V,,3003,1,1,0,Lost ext EPFS*5F $AIALF,2,2,9,,,,,,3003,1,1,0,Check external position sensor*12 $AIALF,2,1,1,160018.00,B,W,V,,3015,1,1,0,Lost position*14 $AIALF,2,2,1,,,,,,3015,1,1,0,Own ship position not transmitted*2E $AIALF,2,1,2,160019.00,B,C,V,,3119,1,1,0,Missing SOG*2D $AIALF,2,2,2,,,,,,3119,1,1,0,Not transmitting SOG*77 $AIALF,2,1,3,160019.00,B,C,V,,3119,2,1,0,Missing COG*3F $AIALF,2,2,3,,,,,,3119,2,1,0,Not transmitting COG*65 $AIALF,2,1,4,160019.00,B,C,V,,3119,3,1,0,Missing Heading*3A $AIALF,2,2,4,,,,,,3119,3,1,0,Not transmitting Heading*60 $AIALF,2,2,5,,,,,,3119,4,1,0,Not transmitting Rate of Turn*38	Pass
	Put the EUT in a non-operational mode (e.g. service, commissioning, test). Use a simulator to generate an ACN sentence with a retransmit request, an empty field for manufacturer mnemonic code, value 0 for alert identifier and a null field for the alert instance. Confirm by observation that the EUT transmits, using ALF messages, the actual state of all alerts, including those in state "normal".	The EUT does not have a non-operational mode.	N/A
8.1.5	Aggregation	The EUT does not aggregate alerts.	N/A
8.1.6	Reconnection	An EUT which has it's own alert HMI that is not part of a CAM system meets this requirement through compliance with Modules A and C of this document independent of a CAM system.	N/A
8.2	Connection to the ship's power supply	This is only applicable to EUTs with functions of type Q.	N/A
8.3	Function not in operational use	There are no functions in the EUT that can be configured to be not in use.	N/A

Status query – Clause 14.8.2.8

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

Send a query sentence to the EUT ($xxAIQ,TXT).

Required Results

Verify that a set of TXT sentences representing the current status is output on the PI.

Test Results

Requirement	Result	Verdict
$AIAIQ,TXT*25	$AITXT,01,01,21,AIS: external DGNSS in use*06 $AITXT,01,01,27,AIS: external SOG/ COG in use*52 $AITXT,01,01,31,AIS: Heading valid*0D $AITXT,01,01,34,AIS: Other ROT source in use*62	Pass

Version information query – Clause 14.8.2.9

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

Send a query sentence to the EUT ($xxAIQ,VER).

Required Results

Verify that a VER sentence representing the software and hardware version information is output on the PI.

Test Results

Requirement	Result	Verdict
$AIAIQ,VER*3C	$AIVER,1,1,AI,OSG,777888999,1234567Q,ATA100,00.2.01,02.0.00,0*19	Pass

Priority of position sensors – Clause 14.8.3.1

Method of Measurement

Set-up standard test environment and operate EUT in autonomous mode. Verify the manufacturer's documentation to ascertain the configuration implemented on the EUT for position sensors.

Apply position sensor data in a way that the EUT operates in the states defined below:

a) external DGNSS in use (corrected);
b) internal DGNSS in use (corrected; Message 17) if implemented;
c) internal DGNSS in use (corrected; beacon) if implemented;
d) external GNSS in use (uncorrected);
e) internal GNSS in use (uncorrected);
f) external Loran-C EPFS in use (talker ID "LC");
g) unknown external EPFS in use (talker ID "SN");
h) no sensor position in use;
i) no sensor position in use, external EPFS function disabled by configuration.

Check that EUT handles alerts as required in Table 4 and outputs appropriate ALR sentences. Check the position accuracy flag in the VDL Message 1.

Required Results

Verify that the use of position source, position accuracy flag, RAIM flag and position information complies with table 4.

Verify that when the status is changed, the related alert status (BIIT ID 25, 26, 29, 30) is adapted, or a TXT (021, 022, 023, 024, 025, 027, 028) sentence is sent in accordance with Table 3 or Table 6, respectively.

Verify that the status is changed after 5 s when switching downwards and 30 s when switching upwards.

Verify that EUT does not release alert for missing EPFS when EPFS is not connected by the configuration.

Test Results

Switching Upwards – Lowest to Highest Priority

Section (i) – No sensor position in use, external EPFS function disabled by configuration		
Requirement	Testing Result	Verdict
Position accuracy flag = 0	Position accuracy flag = 0.	Pass
Time stamp = 63	Time stamp in position report = 63.	Pass
Default position used in position report.	Default position of 181° 0' E 91° 0 N is used by the EUT.	Pass
RAIM flag = 0	RAIM flag = 0 – RAIM not in use.	Pass
ALR Message (ID = 026), No position sensor in use to be output to PI every 30 seconds.	Alarm is raised and output at a rate of once every 30 seconds: $AIALR,150104.00,026,A,A,AIS: No position sensor in use*6B	Pass
ALR on MKD displays correct alert identifier.	The ALR ID's displayed on the MKD are confirmed as correct.	Pass
Status is changed after 30 seconds.	As this is the lowest priority, it cannot be switched up to- so this requirement is not applicable.	-
EUT does not release alert for missing EPFS.	No alert is released for missing EPFS, as this has been disabled by configuration using the MKD.	Pass

Section (i) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv0h@F,0*0C	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate Of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	181 0 E
Latitude	91 0 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	63
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	4
Communication State - Sub Message	Slot Number = 1046

Section (h) – No sensor position in use		
Requirement	Testing Result	Verdict
Position accuracy flag = 0	Position accuracy flag = 0	Pass
Time stamp = 63	Time stamp in the position report = 63	Pass
Default position is used in the position report.	The default position of 91°N, 181°E is used in the position report	Pass
RAIM flag = 0	RAIM flag = 0, RAIM not in use	Pass
ALR Message (ID = 026), No position sensor in use to be output to PI every 30 seconds.	The alarm is raised, and the data being output to the PI is correct: $AIALR,150612.00,026,V,V,AIS: No position sensor in use*6B	Pass
ALR Message (ID = 025) is raised, and output to the PI with an interval of 30 s.	The alarm warning users that the external EPFS is lost is raised, only when enabled by configuration: $AIALR,152210.00,025,A,V,AIS: External EPFS lost*08	Pass
ALR on MKD displays correct alert identifier.	Alerts 3015 and 3003 are displayed on the MKD to the user	Pass

Section (h) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv0d01,0*07	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate Of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	181 0 E
Latitude	91 0 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	63
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	3

Section (g) - unknown external EPFS in use (talker ID "SN");		
Requirement	Result	Verdict
Correct position data is used in the position report.	The position data from the RMC sentence is used in the position report.	Pass
Position Accuracy Flag = 0	The position accuracy flag is set to 0 in the position report.	Pass
RAIM flag = 0	The RAIM flag is reported as 0 – RAIM not in use.	Pass

Section (g) - unknown external EPFS in use (talker ID "SN");		
Requirement	Result	Verdict
ALR Message = ID 026, (no sensor position in use), shall be acknowledged.	The alarm with ID 026 is acknowledge when the RMC sentence is applied: $AIALR,150612.00,026,V,V,AIS: No position sensor in use*6B	Pass
MKD displays the correct position data.	The MKD displays the position data from the external EPFS on the MKD.	Pass
Message 5 is not output when external EPFS is in use with talked ID 'SN'.	Message 5 is not output, as its contents are not changed.	Pass

Section (g) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwvl0`@F,0*27	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	26
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	2

Section (f) - External GNSS input with talker ID 'LC'		
Requirement	Result	Verdict
Position data from the EPFS sensor is used in the Message 1.	The EUT uses the position data from the EPFS sentence to generate Message 1.	Pass
Position Accuracy Flag = 0.	The position accuracy flag is reported as 0.	Pass
RAIM flag = 0.	The RAIM flag is reported as 0.	Pass
MKD displays correct positional data from the external EPFS sensor.	The position reported on the MKD matches the position information provided by the external EPFS sentence.	Pass
Type of EPFS in Message 5 shall remain 'undefined'.	A Message 5 is not output- and the type of EPFS remains 'undefined' as Loran-C has the same position sensor priority as undefined.	Pass

Section (f) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwv>0PS;,0*2B	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	7
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	0
Communication State - Sub Message	Slot Offset = 2251

Section (f) – Static and voyage related data	
!AIVDM,2,1,8,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l2PD5500HtD4kmE20CD53,0*35 !AIVDM,2,2,8,A,kP000000000,2*17	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	0 - Undefined
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (e) - No external GNSS input, using internal GNSS input (uncorrected)	
Requirement	Verdict
Verify Status changes after 30 seconds	Pass
Internal GPS position used in position report	Pass
Position Accuracy Flag = 0	Pass
RAIM Flag = 0	Pass
Message 5 output with internal reference position	Pass
TXT sentence = ID 025 (internal GNSS in use) and ID 028 (internal SOG/COG in use) output to PI: $AITXT,01,01,25,AIS:internal GNSS in use*7C $AITXT,01,01,28,AIS:internal SOG/COG in use*47	Pass
MKD displays position data from internal GPS	Pass
Type of EPFS in Message 5 is Internal GNSS	Pass

Section (e) - Position report	
!AIVDM,1,1,,A,1;UnTqhP00OrCThM6qMv4?wN05p`,0*5E	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	0
Position Accuracy	0 - low (>10 m)
Longitude	1 14.6344 W
Latitude	50 52.1719 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	47
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	1
Communication State - Sub Message	UTC Hour and Minute = 15:10

Section (e) – Static and voyage related data	
!AIVDM,2,1,9,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l4H?37t0HtD4kmE20CD53,0*11 !AIVDM,2,2,9,A,kP000000000,2*16	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	35,15,3,7

Section (e) – Static and voyage related data	
!AIVDM,2,1,9,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l4H?37t0HtD4kmE20CD53,0*11 !AIVDM,2,2,9,A,kP000000000,2*16	
Parameter	Decoded Value
Type of EPFS	15 - Internal GNSS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (d) – External GNSS in used (uncorrected)	
Requirement	Verdict
Status changes after 30 seconds	Pass
External GPS position used in position report	Pass
Position accuracy flag = 0	Pass
RAIM Flag = 0	Pass
Message 5 output with external reference	Pass
TXT Sentence = ID 022 (external GNSS in use) and ID 027 (external SOG/COG in use), output to PI: $AITXT,01,01,22,AIS:external GNSS in use*61 $AITXT,01,01,27,AIS:external SOG/COG in use*52	Pass
MKD displays position data from external GPS	Pass
Type of EPFS in Message 5 is external GNSS (GPS)	Pass

Section (d) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwv@05ph,0*40	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	8
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	1
Communication State - Sub Message	UTC Hour and Minute = 15:12

Section (d) – Static and voyage related data	
!AIVDM,2,1,1,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l2PD5540HtD4kmE20CD53,0*38 !AIVDM,2,2,1,A,kP000000000,2*1E	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (c) - Internal DGNSS input with correction data by beacon	
Requirement	Verdict
Status changes after 30 seconds	Pass

Section (c) - Internal DGNSS input with correction data by beacon	
Requirement	Verdict
Internal GPS position used in position report	Pass
Position accuracy flag = 1	Pass
RAIM Flag = 0	Pass
Message 5 output with new internal reference point	Pass
TXT sentence ID 023 (internal DGNSS in use (beacon) and ID 028 (internal SOG/COG in use) output to PI: $AITXT,01,01,23,AIS:internal DGNSS in use(beacon)*3B $AITXT,01,01,28,AIS:internal SOG/COG in use*47	Pass
MKD displays position data from internal GPS	Pass
Type of EPFS in Message 5 is Internal GNSS	Pass

Section (c) - Position report	
!AIVDM,1,1,,A,1;UnTqhP00wrCO8M6qNv4?vn0<01,0*17	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	0
Position Accuracy	1 - high (> 10 m)
Longitude	1 14.6524 W
Latitude	50 52.1723 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	27
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	3
Communication State - Sub Message	Received Stations = 1

Section (c) – Static and voyage related data	
!AIVDM,2,1,3,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l4H?37t0HtD4kmE20CD53,0*1B !AIVDM,2,2,3,A,kP000000000,2*1C	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	35,15,3,7
Type of EPFS	15 - Internal GNSS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (b) - Internal DGNSS input with correction data by Message 17	
Requirement	Verdict
Verify Status changes after 30 seconds	Pass
Internal GPS position used in position report	Pass
Position Accuracy Flag =1	Pass
RAIM Flag = 0	Pass
TXT sentence = ID 024 (internal DGNSS in use (message 17) output to PI: $AITXT,01,01,24,AIS:internal DGNSS in use(Message 17)*55	Pass
Type of EPFS in Message 5 is internal GNSS	Pass

Section (b) - Position report	
!AIVDM,1,1,,B,1;UnTqhP00wrCO8M6qNv4?vR0@:?,0*50	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	0
Position Accuracy	1 - high (> 10 m)
Longitude	1 14.6524 W
Latitude	50 52.1723 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	17
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	4
Communication State - Sub Message	Slot Number = 655

Section (b) – Static and voyage related data	
!AIVDM,2,1,7,A,5;UnTqp21m`9AEI=D@1AEH000000000000000l4H?37t0HtD4kmE20CD53,0*1F !AIVDM,2,2,7,A,kP000000000,2*18	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	35,15,3,7
Type of EPFS	15 - Internal GNSS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (a) - External DGNSS input, internal GNSS input	
Requirement	Verdict
Status changed after 30 seconds	Pass
External GPS position used in position report	Pass
Position accuracy flag = 1	Pass
RAIM Flag = 0	Pass
TXT Sentence = ID 021 (external DGNSS in use) output to PI: $AITXT,01,01,21,AIS:external DGNSS in use*26 $AITXT,01,01,27,AIS:external SOG/COG in use*52	Pass
MKD displays position data from external GPS	Pass
Type of EPFS in Message 5 is external GNSS (GPS)	Pass

Section (a) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TwrFu2M7AWhKwvp00Rm,0*6A	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	28
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	0
Communication State - Sub Message	Slot Offset = 2229

Section (a) – Static and voyage related data	
!AIVDM,2,1,6,B,5;UnTqp21m`9AEI=D@1AEH000000000000000l2PD5540HtD4kmE20CD53,0*3C !AIVDM,2,2,6,B,kP000000000,2*1A	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Switching Downwards

Section (a) - External DGNSS input, internal GNSS input	
Requirement	Verdict
External GPS position used in position report	Pass
Position accuracy flag = 1	Pass
RAIM Flag = 0	Pass
TXT Sentence = ID 021 (external DGNSS in use) output to PI: $AITXT,01,01,21,AIS:external DGNSS in use*26 $AITXT,01,01,27,AIS:external SOG/COG in use*52	Pass
MKD displays position data from external GPS	Pass
Type of EPFS in Message 5 is external GNSS (GPS)	Pass

Section (a) - Position report	
!AIVDM,1,1,,B,1;UnTqhP1TwrFu2M7AWhKwvl0H?l,0*61	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	26
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	6
Communication State - Sub Message	Slot Number = 1012

Section (a) – Static and voyage related data	
!AIVDM,2,1,5,A,5;UnTqp21m`9AEI=D@1AEH000000000000000l2PD5540HtD4kmE20CD53,0*3C !AIVDM,2,2,5,A,kP000000000,2*1A	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Section (b) - External GNSS input, internal DGNSS input with correction data by Message 17	
Requirement	Verdict
Internal GPS position used in position report	Pass
Position Accuracy Flag =1	Pass
RAIM Flag = 0	Pass
Message 5 output with new internal reference point	Pass
TXT sentence = ID 024 (internal DGNSS in use (message 17) and ID 028 (internal SOG/COG in use) output to PI: $AITXT,01,01,24,AIS:internal DGNSS in use(Message 17)*55 $AITXT,01,01,28,AIS:internal SOG/COG in use*47	Pass
Internal GPS position used in position report	Pass
Verify Status changes after 5 seconds	Pass
Type of EPFS in Message 5 is internal GNSS	Pass

Section (b) - Position report	
!AIVDM,1,1,,A,1;UnTqhP00wrCOlM6qCN4?w808EW,0*36	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	0
Position Accuracy	1 - high (> 10 m)
Longitude	1 14.6502 W
Latitude	50 52.1677 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	36
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	2
Communication State - Sub Message	Slot Number = 1383

Section (b) – Static and voyage related data	
!AIVDM,2,1,7,B,5;UnTqp21m`9AEI=D@1AEH000000000000000l4H?37t0HtD4kmE20CD53,0*1C !AIVDM,2,2,7,B,kP000000000,2*1B	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	35,15,3,7
Type of EPFS	15 - Internal GNSS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Section (c) – External GNSS input, internal DGNSS input with correction data by beacon	
Requirement	Verdict
Internal GPS position used in position report	Pass
Position accuracy flag = 1	Pass
RAIM Flag = 0	Pass
TXT sentence ID 023 (internal DGNSS in use (beacon) output to PI: $AITXT,01,01,23,AIS:internal DGNSS in use(beacon)*3B	Pass
MKD displays position data from internal GPS	Pass
Verify Status changes after 5 seconds	Pass
Type of EPFS in Message 5 is internal GNSS	Pass

Section (c) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwwh05rl,0*6F	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	56
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	1
Communication State - Sub Message	UTC Hour and Minute = 15:45

Section (c) – Static and voyage related data	
!AIVDM,2,1,9,B,5;UnTqp21m`9AEl=D@1AEH000000000000000l2PD5540HtD4kmE20CD53,0*33 !AIVDM,2,2,9,B,kP000000000,2*15	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Section (d) - External GNSS input, internal GNSS input	
Requirement	Verdict
External GPS position used in position report	Pass
Position accuracy flag = 0	Pass
RAIM Flag = 0	Pass
Message 5 output with external reference	Pass
TXT Sentence = ID 022 (external GNSS in use) and ID 027 (external SOG/COG in use), output to PI: $AITXT,01,01,22,AIS:external GNSS in use*61 $AITXT,01,01,27,AIS:external SOG/COG in use*52	Pass
MKD displays position data from external GPS	Pass
Verify Status changes after 5 seconds	Pass
Type of EPFS in Message 5 is external GNSS (GPS)	Pass

Section (d) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwvR0<01,0*42	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	17
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	3
Communication State - Sub Message	Received Stations = 1

Section (d) – Static and voyage related data	
!AIVDM,2,1,2,A,5;UnTqp21m`9AEI=D@1AEH000000000000000l2PD5540HtD4kmE20CD53,0*3B !AIVDM,2,2,2,A,kP000000000,2*1D	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Section (e) - No external GNSS input, internal GNSS input	
Requirement	Verdict
Internal GPS position used in position report	Pass
Position Accuracy Flag = 1	Pass
RAIM Flag = 0	Pass
Message 5 output with internal reference position	Pass
TXT sentence = ID 025 (internal GNSS in use) and ID 028 (internal SOG/COG in use) output to PI: $AITXT,01,01,25,AIS:internal GNSS in use*7C $AITXT,01,01,28,AIS:internal SOG/COG in use*47	Pass
MKD displays position data from internal GPS	Pass
Status changed after 5 seconds	Pass
Type of EPFS in Message 5 is internal GNSS	Pass

Section (e) - Position report	
!AIVDM,1,1,,A,1;UnTqhP00OrCPLM6qIf4?wf08Pr,0*7D	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	0
Position Accuracy	0 - low (>10 m)
Longitude	1 14.6482 W
Latitude	50 52.1702 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	55
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	2
Communication State - Sub Message	Slot Number = 2106

Section (e) – Static and voyage related data	
!AIVDM,2,1,4,A,5;UnTqp21m`9AEI=D@1AEH000000000000000l4H?37t0HtD4kmE20CD53,0*1C !AIVDM,2,2,4,A,kP000000000,2*1B	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	35,15,3,7
Type of EPFS	15 - Internal GNSS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available

Section (f) - No external GNSS input, No internal GNSS input	
Requirement	Verdict
Default position used in position report	Pass
Position Accuracy Flag = 0	Pass
RAIM flag = 0	Pass
ALR Message = ID 026, (no sensor position in use), output to PI every 30 seconds: $AIALR,155530.00,026,A,V,AIS: No position sensor in use*7A	Pass
Alarm on MKD = ALR ID 026	Pass
MKD displays no GPS data	Pass
Status changes after 5 seconds	Pass

Section (f) - Position report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKww:0Us@,0*70	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	37
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	1
Communication State - Sub Message	UTC Hour and Minute = 15:52

Section (f) – Static and voyage related data	
!AIVDM,2,1,6,A,5;UnTqp21m`9AEl=D@1AEH000000000000000l2PD55@0HtD4kmE20CD53,0*4B !AIVDM,2,2,6,A,kP000000000,2*19	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	20,20,5,5
Type of EPFS	4 - Loran-C
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@@@
DTE	0 - available
Spare	0

Section (g) - unknown external EPFS in use (talker ID "SN");		
Requirement	Result	Verdict
Correct position data is used in the position report	The position data from the RMC sentence is used in the position report.	Pass
Position Accuracy Flag = 0	The position accuracy flag is set to 0 in the position report.	Pass
RAIM flag = 0	The RAIM flag is reported as 0 – RAIM not in use.	Pass
ALR Message = ID 026, (no sensor position in use), shall be acknowledged	The alarm with ID 026 is acknowledge when the RMC sentence is applied: $AIALR,155534.00,026,A,A,AIS: No position sensor in use*69	Pass
MKD displays the correct position data	The MKD displays the position data from the external EPFS on the MKD.	Pass

Section (g) - unknown external EPFS in use (talker ID "SN");		
Requirement	Result	Verdict
Message 5 is not output when external EPFS is in use with talked ID 'SN'	Message 5 is not output, as its contents are not changed.	Pass

Section (g) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKwvP0p:I,0*7E	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	0 - low (>10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	16
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	6

Section (h) – No sensor position in use		
Requirement	Testing Result	Verdict
Position accuracy flag = 0	Position accuracy flag = 0	Pass
Time stamp = 63	Time stamp in the position report = 63	Pass
Default position is used in the position report	The default position of 91°N, 181°E is used in the position report	Pass
RAIM flag = 0	RAIM flag = 0, RAIM not in use	Pass
ALR Message (ID = 026), No position sensor in use to be output to PI every 30 seconds.	The alarm is raised, and the data being output to the PI is correct: $AIALR,155534.00,026,A,A,AIS: No position sensor in use*69	Pass
ALR Message (ID = 025) is raised, and output to the PI with an interval of 30 s.	The alarm warning users that the external EPFS is lost is raised, only when enabled by configuration: $AIALR,155535.00,025,A,A,AIS: External EPFS lost*18	Pass
ALR on MKD displays correct alert identifier	Alerts 3015 and 3003 are displayed on the MKD to the user	Pass

Section (h) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv0h:I,0*79	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	181 0 E
Latitude	91 0 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	63
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	4

Section (i) – No sensor position in use, external EPFS function disabled by configuration		
Requirement	Testing Result	Verdict
Position accuracy flag = 0	Position accuracy flag = 0.	Pass
Time stamp = 63	Time stamp in position report = 63.	Pass
Default position used in position report	Default position of 181° 0' E 91° 0 N is used by the EUT.	Pass
RAIM flag = 0	RAIM flag = 0 – RAIM not in use.	Pass

Section (i) – No sensor position in use, external EPFS function disabled by configuration		
Requirement	Testing Result	Verdict
ALR Message (ID = 026), No position sensor in use to be output to PI every 30 seconds.	Alarm is raised and output at a rate of once every 30 seconds: $AIALR,155535.00,025,A,A,AIS: External EPFS lost*18	Pass
ALR on MKD displays correct alert identifier	The ALR ID's displayed on the MKD are confirmed as correct.	Pass
Status is changed after 30 seconds	As this is the lowest priority, it cannot be switched up to- so this requirement is not applicable.	-
EUT does not release alert for missing EPFS	No alert is released for missing EPFS, as this has been disabled by configuration using the MKD.	Pass

Section (i) – Position Report	
!AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv0Us`,0*24	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	181 0 E
Latitude	91 0 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	63
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	1
Communication State - Sub Message	UTC Hour and Minute = 15:58

Multiple Message 17 from different DGNSS reference stations – Clause 14.8.3.2

Method of measurement

Set up standard test environment and operate EUT in autonomous mode.

When applying Message 17, use a base station MMSI as follows:

a) Apply Message 17 from a distant DGNSS reference station.
b) Apply Message 17 from a near DGNSS reference station in addition to the distant station.
c) Switch off Message 17 from the near DGNSS reference station.

Required results

a) The use Message 17 for position determination
b) The use Message 17 from the near DGNSS reference station
c) The use Message 17 from the distant DGNSS reference station.

Test Results

a) Message 17 applied with position 10 52 N 1 14 W, EUT position 50 52 N, 1 14 W with MMSI = 2110078 and station ID = 680: !AIVDO,1,1,,A,A020jOSwAh<g02J`0<lP7?qh00@0we`23bbb,0*4C	
Requirement	Verdict
EUT uses the data message 17, the following sentence was output: $AITXT,01,01,24,AIS: internal DGNSS in use (Message 17)*55 The Differential reference station ID field in the GGA sentence was checked to verify the station ID in use: $GPGGA,150037.000,5052.1701,N,00114.6458,W,2,10,1.14,41.8,M,47.5,M,31,0680*41	Pass

b) Message 17 applied with position 10 52 N 1 14 W, EUT position 50 52 N, 1 14 W with MMSI = 2110078 and station ID = 680: !AIVDO,1,1,,A,A020jOP5o15902J`998`1OjkwD8=wggw:0ww0P0P,0*76 A second message 17 is applied with position 50 52 N 1 14 W with MMSI = 2110079 and station ID = 300: !AIVDM,1,1,,A,A020jOkwAhsW02Dd0Q8`0Osowjd3wPT2:@Svt08@,0*71	
Requirement	Verdict
The Differential reference station ID field in the GGA sentence was checked to verify the station ID in use: $GPGGA,150049.000,5052.1701,N,00114.6458,W,2,10,1.14,41.8,M,47.5,M,31,0300*45	Pass

c) Second message 17 is switched off	
Requirement	Verdict
The Differential reference station ID field in the GGA sentence was checked to verify the station ID in use: $GPGGA,150139.000,5052.1701,N,00114.6458,W,2,10,1.14,41.8,M,47.5,M,27,0680*49	Pass

Heading Sensor – Clause 14.8.3.3

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode.

a) Disconnect the inputs for HDG and ROT or set their data to invalid (e.g. by wrong checksum, ”valid/invalid” flag).
b) Reconnect the inputs for HDG and ROT
c) Disconnect the input for ROT or set the data to invalid (e.g. by wrong checksum, “valid/invalid” flag). Establish a rate of heading change that is greater than 5 degrees in 30 seconds
d) Reconnect the ROT input
e) Apply a SOG less than 5 kn and a difference between COG and HDT greater than 45° for 5 min.
f) Apply a SOG greater than 5 kn and a difference between COG and HDT greater than 45° for 5 min.
g) Disable heading and ROT input by configuration to prevent raising an alert in their absence. Disconnect the inputs for HDG and ROT or set their data to invalid (for example by wrong checksum, "valid/invalid" flag).

Required results

a) BIIT ID 32 for invalid HDG and BIIT ID 35 for invalid ROT are activated and the "default" data is sent in VDL Message 1, 2, or 3. Confirm that appropriate alert is released as required in Table 4;
b) BIIT ID 32 for valid HDG and BIIT ID 35 for valid ROT is inactivated. Confirm that appropriate alert is inactivated. Verify that TXT sentences with ID 031 for valid HDG and ID 033 for ROT indicator in use are sent to the PI;
c) a TXT sentence with ID 034 for "other ROT source in use" is sent to the PI and that the contents of the message's ROT field is the correct "direction of turn" (Table 9 "ROT sensor fall-back conditions" Priority 2);
d) a TXT sentence with ID 033 for ROT indicator in use and with the alert no ID 035 for valid ROT is inactivated;
e) BIIT ID 11 for heading sensor offset is not activated;
f) BIIT ID 11 for heading sensor offset is activated after 5 min and appropriate alert is released as required in Table 4.
g) BIIT ID 32 for invalid HDG and BIIT ID 35 for invalid ROT are not activated. Confirm that appropriate alert as required in Table 4 is not released.

Test Results

a) The checksum for HDG and ROT sentences were set to an incorrect value		
Requirement		Verdict
Confirm that an alarm sentence with ID 32 is sent to the PI:	$AIALR,140853.00,032,A,V,AIS: Heading lost/invalid*0B	Pass
Confirm that an alarm sentence with ID 35 is sent to the PI	$AIALR,140849.00,035,A,V,AIS: No valid ROT information*67	Pass
Confirm that default data is sent in message 1, 2, or 3.	!AIVDM,1,1,,A,1;UnTqhP1TwrFu3RpfH@Kwwf0L01,0*76 See decoded message below.	Pass
Confirm that an ALF sentence for BIIT ID 32 is released with the following fields: Alert Identifier = 3119 1st Alert Text = “Missing Heading” 2nd Alert Text = “Not transmitting Heading” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,1,140853.00,B,C,V,,3119,3,1,0,Missing Heading*3B $AIALF,2,2,1,,,,,,3119,3,1,0,Not transmitting Heading*65	Pass
Confirm that an ALF sentence for BIIT ID 35 is released with the following fields:	$AIALF,2,1,9,140849.00,B,C,V,,3119,4,1,0,Missing ROT*3E	Pass

a) The checksum for HDG and ROT sentences were set to an incorrect value		
Requirement		Verdict
Alert Identifier = 3119 1st Alert Text = “Missing ROT” 2nd Alert Text = “Not transmitting Rate of Turn” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,2,9,,,,,,3119,4,1,0,Not transmitting Rate of Turn*34	
Confirm that an ALC sentence is output for BIIT ID 32 and 35	$AIALC,01,01,31,2,,3119,3,1,,3119,4,1,*5D	Pass

a) The checksum for HDG and ROT sentences were set to an incorrect value	
!AIVDM,1,1,,A,1;UnTqhP1TwrFu3RpfH@Kwwf0L01,0*76	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	no turn information available (default)
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 S
Course Over Ground	11.1
True Heading	511 - not available
Time Stamp	55
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	7
Communication State - Sub Message	Received Stations = 1

b) Reconnect the inputs for HDG and ROT - HDG = 16, ROT = 0.2		
Requirement		Verdict
Confirm alarm sentence with ID 32 has condition flag = V, the message on the PI was: $AIALR,100114.00,032,V,V,AIS: Heading lost/invalid*12		Pass
Confirm alarm sentence with ID 35 has condition flag = V, the message on the PI was: $AIALR,100114.00,035,V,V,AIS: No valid ROT information*75		Pass
Confirm that a text message with ID 31 is sent to the PI $AITXT,01,01,31,AIS: Heading valid*0D		Pass
Confirm that a text message with ID 33 is sent to the PI $AITXT,01,01,33,AIS: Rate of Turn Indicator in use*02		Pass
Confirm that data is correct in message 1, 2 or 3.		Pass
Confirm that an ALF sentence for BIIT ID 32 is released with the following fields: Alert Identifier = 3119 1st Alert Text = “Missing Heading” 2nd Alert Text = “Not transmitting Heading” Category = “B” Priority = “C” Alert State = “U”, then “N”	$AIALF,2,1,3,100114.00,B,C,U,,3119,3,2,0,Missing Heading*37 $AIALF,2,2,3,,,,,,3119,3,2,0,Not transmitting Heading*64 $AIALF,2,1,5,100116.00,B,C,N,,3119,3,3,0,Missing Heading*29 $AIALF,2,2,5,,,,,,3119,3,3,0,Not transmitting Heading*63	Pass
Confirm that an ALF sentence for BIIT ID 35 is released with the following fields: Alert Identifier = 3119 1st Alert Text = “Missing ROT” 2nd Alert Text = “Not transmitting Rate of Turn” Category = “B” Priority = “C” Alert State = “U”, then “N”	$AIALF,2,1,2,100114.00,B,C,U,,3119,4,2,0,Missing ROT*30 $AIALF,2,2,2,,,,,,3119,4,2,0,Not transmitting Rate of Turn*3C $AIALF,2,1,4,100115.00,B,C,N,,3119,4,3,0,Missing ROT*2D $AIALF,2,2,4,,,,,,3119,4,3,0,Not transmitting Rate of Turn*3B	Pass
Confirm that both instances of alert identifier 3119 are removed from the ALC sentence	$AIALC,01,01,34,0*71	Pass

b) Reconnect the inputs for HDG and ROT – Message 3 Decode	
!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh040@1m,0*04	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999

b) Reconnect the inputs for HDG and ROT – Message 3 Decode	
!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh040@1m,0*04	
Parameter	Decoded Value
Navigational Status	0 - under way using engine
Rate of Turn	0
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	0
Time Stamp	2
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	4
Communication State - Sub Message	Slot Number = 117

c) Disconnect the input for ROT, HDG greater than +5° in 30 s	
Requirement	Verdict
Confirm that a text sentence with ID 034 is sent to the PI $AITXT,01,01,34,AIS: Other ROT source in use*62	
The ROT field in the position report is correct, 127, turning right more than 5°/30 s	Pass

c) Disconnect the input for ROT, HDG greater than +5° in 30 s – Message 1 Decode	
!AIVDM,1,1,,A,1;UnTqhOiTwrCR2M6qD@KhLd0<02,0*05	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	Turning Right more than 5°/30 s
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 14.6431 W
Latitude	50 52.1681 N
Course Over Ground	11.1
True Heading	14
Time Stamp	22
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	3
Communication State - Sub Message	Received Stations = 2

c) Disconnect the input for ROT, HDG greater than -5° in 30 s	
Requirement	Verdict
Confirm that a text sentence with ID 034 is sent to the PI $AITXT,01,01,34,AIS: Other ROT source in use*62	Pass
The ROT field in the position report is correct, 129, turning left more than 5°/30 s	Pass

c) Disconnect the input for ROT, HDG greater than -5° in 30 s – Message 1 Decode	
!AIVDM,1,1,,A,1;UnTqhPATwrCR2M6qD@KhRd08=B,0*55	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate of Turn	Turning Left more than 5°/30 s
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 14.6431 W
Latitude	50 52.1681 N
Course Over Ground	11.1
True Heading	17

c) Disconnect the input for ROT, HDG greater than -5° in 30 s – Message 1 Decode	
!AIVDM,1,1,,A,1;UnTqhPATwrCR2M6qD@KhRd08=B,0*55	
Parameter	Decoded Value
Time Stamp	22
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	2
Communication State - Sub Message	Slot Number = 850

d) Reconnect the ROT input		
Requirement		Verdict
Confirm that a text message with ID 033 is sent to the PI: $AITXT,01,01,33,AIS: Rate of Turn Indicator in use*02		Pass
BIIT ID 35 is inactive: $AIALR,102218.00,035,V,V,AIS: No valid ROT information*78		Pass
Confirm that an ALF sentence for BIIT ID 35 is released with the following fields: Alert Identifier = 3119 1st Alert Text = “Missing ROT” 2nd Alert Text = “Not transmitting Rate of Turn” Category = “B” Priority = “C” Alert State = “U”, then “N”	$AIALF,2,1,3,102218.00,B,C,U,,3119,4,2,0,Missing ROT*3C $AIALF,2,2,3,,,,,,3119,4,2,0,Not transmitting Rate of Turn*3D $AIALF,2,1,4,102219.00,B,C,N,,3119,4,3,0,Missing ROT*20 $AIALF,2,2,4,,,,,,3119,4,3,0,Not transmitting Rate of Turn*3B	Pass
Confirm that alert identifier 3119 is removed from the ALC sentence	$AIALC,01,01,74,0*75	Pass

e) SOG < 5 kn and > 45° difference between COG and HDT	
Requirement	Verdict
BIIT ID 11 for heading sensor offset is not activated	Pass

f) SOG > 5 kn and > 45° difference between COG and HDT @ 11:10:00		
Requirement		Verdict
BIIT ID 11 is activated, ALR with ID 11 sent to the PI after 5 minutes: 11:15:02 $AIALR,121501.00,011,A,V,Heading sensor offset*27		Pass
Confirm that an ALF sentence for BIIT ID 11 is released with the following fields: Alert Identifier = 3013 1st Alert Text = “Doubtful heading” 2nd Alert Text = “Difference with COG exceeds limit” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,9,131533.00,B,C,V,,3013,2,13,3,Doubtful heading*57 $AIALF,2,2,9,,,,,,3013,2,13,3,Difference with COG exceeds limit*36	Pass
Confirm that both instances of alert identifier 3119 are removed from the ALC sentence	$AIALC,01,01,30,2,,3013,1,11,,3013,2,13,*5A	Pass

Speed Sensor – Clause 14.8.3.4

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Verify the manufacturer's documentation to ascertain the configuration implemented on the EUT for position sensors (see 6.10).

a) apply valid external DGNSS position and external speed data.
b) disconnect external DGNSS position, disconnect the inputs for SOG, COG or set their data to invalid (e.g. by wrong checksum, "valid/invalid" flag) .

NOTE: Test b) is applicable only if the internal GNSS is used as position source.

Required results

a) Check that an alarm sentence ALR with alarm ID 027 is sent to the PI and the external data for SOG/COG is sent in VDL msg 1, 2 or 3. Verify that the system continues to operate and that the relay output is not activated.
b) Check that an alarm sentence ALR with alarm ID 028 is sent to the PI and the internal data for SOG/COG is sent in VDL msg 1, 2 or 3. Verify that the system continues to operate and that the relay output is not activated.

Test Results

External COG and SOG data with external GPS data applied	
Requirement	Verdict
Verify that the values for COG and SOG from external sensor in position report: COG = 350 and SOG = 10.	Pass
Confirm that the alarm relay is not activated.	Pass
Confirm a text message with ID 027 is output to the PI, the message on the PI was: $AITXT,01,01,27,AIS: external SOG/ COG in use*52	Pass

External COG and SOG data applied with external GPS removed	
Requirement	Verdict
Verify that the values for COG and SOG from internal GPS in position report.	Pass
Confirm a text message with ID 28 is output to the PI, the message on the PI was: $AITXT,01,01,28,AIS: internal SOG/ COG in use*47	Pass
Check that an alarm is not generated due to invalid COG, ID 029	Pass
Check that an alarm is not generated due to invalid SOG, ID 030	Pass

GNSS position mismatch – Clause 14.8.3.5

Method of measurement

Set up standard test environment and operate EUT with valid internal position available and using valid external position. Configure the dimension/reference values of internal and external position sources with a distance of at least 80 m between the two GNSS antennas.

a) Apply an external position with an offset of more than 100 m + distance between the two GNSS antennas to the internal position for 3 min. Then modify external position to an offset of less than 100 m + distance between the two GNSS antennas to the internal position.
b) Modify the external position to an offset of more than 100 m + distance between the two GNSS antennas to the internal position for more than 1 h 15 min.
c) Then modify external position to an offset of less than 100 m + distance between the two GNSS antennas to the internal position.

Required results

a) BIIT ID 9 is not activated;
b) BIIT ID 9 is activated 15 min after the modification of the position and appropriate alert is released as required in Table 4;
c) BIIT ID 9 is inactivated and appropriate alert is inactivated.

Test Results

The EUT was configured with a distance of 90m between the two GNSS antennas:

$AISSD,765432,TUV SUD UK,100,10,10,20,1,AI*4C
$AISSD,765432,TUV SUD UK,10,100,10,20,1,GP*53

a) Internal Position 50 N 52.1712 1 W 14.6484		
Requirement		Verdict
External Position 50 N 52.3012 1 W 14.6484 (offset of 241m) for 3 minutes, then External Position 50 N 52.2012 1 W 14.6484 (offset of 56m)	BIIT ID 9 is not activated	Pass

b) Internal Position 50 N 52.1681 W 14.6431		
Requirement		Verdict
External Position 50 N 52.2781 1 W 14.6431 (offset of 205m) for 1 hour 16 minutes, time started 15:03:00. The EUT shall output an ALR sentence with ID 009 after 15 minutes:	BIIT ID 9 is activated after 15 minutes 14 seconds: $AIALR,151814.00,009,A,V,AIS: Internal / external GNSS position mismatch*13	Pass
Confirm that ALF sentences for BIIT ID 9 are released with the following fields: Alert Identifier = 3013 1st Alert Text = “Doubtful GNSS” 2nd Alert Text = “Int/Ext GNSS position mismatch” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,8,151814.00,B,C,V,,3013,1,1,0,Doubtful GNSS*0A $AIALF,2,2,8,,,,,,3013,1,1,0,Int/Ext GNSS position mismatch*67	Pass
Confirm that an ALC sentence is output containing alert ID 3013	$AIALC,01,01,64,2,,3013,1,1,,3119,4,1,*54	Pass

c) Internal Position 50 N 52.1681 W 14.6431		
Requirement		Verdict
External Position 50 N 52.1844 1 W 14.6938 (offset of 56m) The EUT shall output an ALR sentence with ID 009 and status set to not exceeded:	$AIALR,152306.00,009,V,V,AIS: Internal / external GNSS position mismatch*0F	Pass
Confirm that ALF sentences for alert ID 3013 are output with the following fields: Alert Identifier = 3013 1st Alert Text = “Doubtful GNSS” 2nd Alert Text = “Int/Ext GNSS position mismatch” Category = “B” Priority = “C” Alert State = “U”, then “N”	$AIALF,2,1,1,152306.00,B,C,U,,3013,1,2,0,Doubtful GNSS*08 $AIALF,2,2,1,,,,,,3013,1,2,0,Int/Ext GNSS position mismatch*6D $AIALF,2,1,2,152316.00,B,C,N,,3013,1,3,0,Doubtful GNSS*10 $AIALF,2,2,2,,,,,,3013,1,3,0,Int/Ext GNSS position mismatch*6F	Pass
Confirm that an ALC sentence is output without alert ID 3013	$AIALC,01,01,76,1,,3119,4,2,*56	Pass

Incorrect NavStatus – Clause 14.8.3.6

Method of measurement

Set up standard test environment and operate EUT with valid internal position available and using valid external position then proceed as follows:

a) Set NavStatus to “at anchor” and set SOG to > 3 kn.
b) Repeat test with NavStatus “moored”.
c) Repeat test with NavStatus “aground”.
d) Set NavStatus to “under way” and set SOG to 0 kn for more than 2 h.
e) Try to set NavStatus to 14.

Required results

a) BIIT ID 10 is activated and appropriate alert is released as required in Table 4. Verify that the system transmits with the reporting interval as appropriate, and that the MKD prompts the user to correct the NavStatus;
b) BIIT ID 10 is activated and appropriate alert is released as required in Table 4. Verify that the system transmits with the reporting interval as appropriate;
c) BIIT ID 10 is activated and appropriate alert is released as required in Table 4. Verify that the system transmits with the reporting interval as appropriate;
d) BIIT ID 10 is activated and appropriate alert is released as required in Table 4 after two hours. Verify that the system transmits with the reporting interval as appropriate, and that the MKD prompts the user to correct the NavStatus;
e) setting of NavStatus 14 is rejected.

Test Results

a) Navigational status = At anchor and SOG = 4 knots		
Requirement	Result	Verdict
BIIT ID 10 is activated	$AIALR,164118.00,010,A,V,AIS: NavStatus incorrect*0D	Pass
Confirm that an ALF sentence for BIIT ID 10 is released with the following fields: Alert Identifier = 3019 1st Alert Text = “Wrong NavStatus” 2nd Alert Text = “Check NavStatus setting” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,5,164118.00,B,C,V,,3019,1,1,0,Wrong NavStatus*1E $AIALF,2,2,5,,,,,,3019,1,1,0,Check NavStatus setting*3C	Pass
Confirm that an ALC sentence containing alert identifier 3019 is output	$AIALC,01,01,24,2,,3116,4,2,,3019,1,1,*56	Pass
The EUT transmits at a reporting interval of 10 seconds	The reporting interval is 10 seconds	Pass
The MKD prompts the user the correct the navigational status	A flashing yellow prompt appears at the bottom of the screen, “Incorrect NavStatus”.	Pass

b) Navigational status = Moored via MKD		
Requirement	Result	Verdict
BIIT ID 10 is activated	$AIALR,143739.00,010,A,V,AIS: NavStatus incorrect*0D	Pass
Confirm that an ALF sentence for BIIT ID 10 is released with the following fields: Alert Identifier = 3019 1st Alert Text = “Wrong NavStatus” 2nd Alert Text = “Check NavStatus setting” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,8,143739.00,B,C,V,,3019,1,1,0,Wrong NavStatus*13 $AIALF,2,2,8,,,,,,3019,1,1,0,Check NavStatus setting*31	Pass
Confirm that an ALC sentence containing alert identifier 3019 is output	$AIALC,01,01,36,4,,3019,1,1,,3013,2,26,,3003,1,25,,3119,4,25,*68	Pass
The EUT transmits at a reporting interval of 10 seconds	The reporting interval is 10 seconds	Pass
The MKD prompts the user the correct the navigational status	A flashing yellow prompt appears at the bottom of the screen, “Incorrect NavStatus”.	Pass

c) Navigational status = Aground		
Requirement	Result	Verdict
BIIT ID 10 is activated	$AIALR,144011.00,010,A,V,AIS: NavStatus incorrect*07	Pass
Confirm that an ALF sentence for BIIT ID 10 is released with the following fields: Alert Identifier = 3019 1st Alert Text = “Wrong NavStatus” 2nd Alert Text = “Check NavStatus setting” Category = “B” Priority = “C” Alert State = “V”	$AIALF,2,1,2,144011.00,B,C,V,,3019,1,1,0,Wrong NavStatus*13 $AIALF,2,2,2,,,,,,3019,1,1,0,Check NavStatus setting*3B	Pass
Confirm that an ALC sentence containing alert identifier 3019 is output	$AIALC,01,01,41,4,,3019,1,1,,3013,2,26,,3003,1,25,,3119,4,25,*68	Pass
The EUT transmits at a reporting interval of 10 seconds	The reporting interval is 10 seconds	Pass
The MKD prompts the user the correct the navigational status	A flashing yellow prompt appears at the bottom of the screen, “Incorrect NavStatus”.	Pass

d) Navigational status = Underway with SOG = 0 kn at 15:50:48		
Requirement		Verdict
BIIT ID 10 is activated and appropriate alert is released as required in Table 4 after two hours	The EUT successfully releases BIIT ID 10, ‘Wrong NavStatus’ after 2 hours.	Pass
The MKD prompts the user the correct navigational status	A flashing yellow prompt appears at the bottom of the screen, “Incorrect NavStatus” and alert ID 3019 is shown on the screen.	Pass

e) Navigational status = 14 via MKD	
Requirement	Verdict
The MKD does not allow the user to select navigational status = 14	Pass

Auto detection of type of electronic position fixing device – Clause 14.8.3.7

Method of measurement

Set up standard test environment and operate EUT with valid internal position available and using valid external position. Then proceed as follows.

a) Provide an external position sensor with a talker ID of GP.
b) Provide an external position sensor with a talker ID of GL.
c) Provide an external position sensor with a talker ID of GN.
d) Provide an external position sensor with a talker ID of LC.
e) Provide an external position sensor with a talker ID of IN.
f) Provide an external position sensor with a talker ID of GA.
g) Provide an external position sensor with a talker ID of other than as in a) to f).
h) Disconnect external position.

Required results

Check that:

a) the type of electronic position fixing device reported by the VDL Message 5 is "1";
b) the type of electronic position fixing device reported by the VDL Message 5 is "2";
c) the type of electronic position fixing device reported by the VDL Message 5 is "3";
d) the type of electronic position fixing device reported by the VDL Message 5 is "4";
e) the type of electronic position fixing device reported by the VDL Message 5 is "6";
f) the type of electronic position fixing device reported by the VDL Message 5 is "8";
g) the type of electronic position fixing device reported by the VDL Message 5 is "0";
h) the type of electronic position fixing device reported by the VDL Message 5 is "15".

Test Results

Step	External sensor sentence	Message 5 Message	EPFS Type	Verdict
a)	$GPGNS,170141,5052.7903,N,00113.9423,W,AP,4,,,,,*43	!AIVDM,2,1,2,A,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?4640HtD0000000000,0*00 !AIVDM,2,2,2,A,00000000000,2*26	1	Pass
b)	$GLGNS,170242,5052.7903,N,00113.9423,W,AP,4,,,,,*5F	!AIVDM,2,1,3,B,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?4680HtD0000000000,0*0E !AIVDM,2,2,3,B,00000000000,2*24	2	Pass
c)	$GNGNS,170343,5052.7903,N,00113.9423,W,AP,4,,,,,*5D	!AIVDM,2,1,4,A,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?46<0HtD0000000000,0*0E !AIVDM,2,2,4,A,00000000000,2*20	3	Pass
d)	$LCRMC,170457,A,5052.7903,N,00113.9423,W,10.0,11.1,011019,,,D*77	!AIVDM,2,1,5,B,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?46@0HtD0000000000,0*70 !AIVDM,2,2,5,B,00000000000,2*22	4	Pass
e)	$INRMC,170559,A,5052.7903,N,00113.9423,W,10.0,11.1,011019,,,D*70	!AIVDM,2,1,7,B,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?46H0HtD0000000000,0*7A !AIVDM,2,2,7,B,00000000000,2*20	6	Pass
f)	$GAGNS,170706,5052.7903,N,00113.9423,W,AP,4,,,,,*57	!AIVDM,2,1,8,A,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?46P0HtD0000000000,0*6E !AIVDM,2,2,8,A,00000000000,2*2C	8	Pass
g)	$XRGNS,170809,5052.7903,N,00113.9423,W,AP,4,,,,,*5B	!AIVDM,2,1,9,B,5;UnTqp21el9AEH4001AEJ1=DB040000000001638?4600HtD0000000000,0*0C !AIVDM,2,2,9,B,00000000000,2*2E	0	Pass
h)	-	!AIVDM,2,1,0,A,5;UnTqp21el9AEH4001AEJ1=DB040000000000163h:55t0HtD0000000000,0*15 !AIVDM,2,2,0,A,00000000000,2*24	15	Pass

2.9 Display, input and output

2.9.1 Specification Reference

IEC 61993-2, Clause 14.9

2.9.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 0

2.9.3 Date of Test

22-March-2018

2.9.4 Test Results and Methods of Measurement

Data input/output facilities – Clause 14.9.1

Method of Measurement

Set up the standard test environment and operate the EUT in autonomous mode.

a) Check the MKD indication and, by inspection, check that it is possible to input the entire 6-bit ASCII character set required by Recommendation ITU-R M.1371-5:2014, Table 47.
b) Record received messages and check contents of minimum display.
c) Input static and voyage related data including the "<" and ">" brackets in the destination field via the MKD. Consider the full range of input fields, for example minimum and maximum.
d) Record transmitted messages and check contents of MKD and PI query.
e) Input static and voyage related data including the "<" and ">" brackets in the destination field via the PI.
f) Record transmitted messages and check contents of MKD and PI query.
g) Change NavStatus to 12.
h) Input dimension extensions to A, B, C and D values.
i) Set dimension extensions to A, B, C and D values as zero.

Required Results

Confirm that:

a) the minimum display contains at least three lines of target data, with no horizontal scrolling of elapsed time and the range and bearing data display, and that the entire 6-bit character set is supported. Confirm that all characters except trailing "@" signs are displayed;
b) all messages of Table 13 are displayed and that means to select messages and data fields to be displayed are available;
c) all necessary data can be input. Verify that the access to input data required to be protected by 6.11 is password protected. Check that all data not defined in 6.11 has a different password level or no password. Check that input data values outside the allowable range are not accepted. Confirm that all values within the allowable range, but not explicitly prohibited to be used, are accepted;
d) all transmitted data is displayed correctly;
e) all necessary data can be input. Verify that the access to input data required to be protected by 6.11 is password protected. Check that protected data can be displayed without entering a password. Parameters that have to be changed during normal operation, if protected, shall not be protected by the same password level as that used to protect data in 6.11;
f) all transmitted data is displayed correctly;
g) confirm that MKD provides user guidance on setting dimension extension values;
h) confirm that the dimension extension values are correctly stored. Confirm that correctly calculated values are transmitted in Message 5 for both internal and external position sources;
i) confirm that MKD provides user guidance to set NavStatus other than 12.

Test Results

a) Display and character set		
Requirement	Result	Verdict
Minimum of 3 lines of target data	There are greater than 3 lines of target data	Pass
No horizontal scrolling of elapsed time and the range and bearing	There is no horizontal scrolling	Pass
Confirm that all characters except trailing "@" signs are displayed	There is no trailing @ signs	Pass
The EUT shall support the entire 6-bit ASCII character set required by 'Recommendation ITU-R M.1371-5:2014', Table 47	All characters in table 47 of ITU-R M. 1371-5:2014 are supported by the EUT, special characters are encoded and displayed correctly	Pass

b) Displayed messages			
Type	Information Required	Result	Verdict
All	MMSI	Shown on target list screen	Pass
1,2,3	Position (Lat, Lon, Range, Bearing)	Range and bearing shown on target list screen. Latitude and longitude are shown on the target information screen	Pass
	Time in minutes since last position report was received (0-19)	Age is shown on both target list and information screens.	Pass
	The name of locating device shall show according to Table 10, Table 11 and Table 12 as appropriate, followed by the MMSI.	MMSI = 970010000, Nav status = 14 displayed as AIS SART MMSI = 972010000, Nav status = 14 displayed as MOB AIS MMSI = 974010000, Nav status = 14 displayed as EPIRB AIS MMSI = 970010000, Nav status = 15 displayed as SART TEST MMSI = 972010000, Nav status = 15 displayed as MOB TEST MMSI = 974010000, Nav status = 15 displayed as EPIRB TEST	Pass
	PA-flag, RAIM, time stamp, description of position quality as derived from Table 14	Shown on the target information screen	Pass
	Navigational status	Shown on the target information screen	Pass
4	Position (Lat, Lon, Range, Bearing)	Shown on the target information screen	Pass
	Time in minutes since last position report was received	Shown on the target information screen	Pass
	Name shall show "BS:MMSI" unless the name is derived from a Message 24a	BS:002222222 is shown on both target list and information screens EUT was sent message 24 with the name "HELP!": !AIVDO,1,1,,A,H027`SPPDi24000000000000000,2*73 The displayed name changed to "HELP!"	Pass
	PA-flag, RAIM, time stamp, description of position quality as derived from Table 14	Shown on the target information screen	Pass
5	Name of ship	Shown on both target list and information screens	Pass
9	Position (Lat, Lon, Range, Bearing, Altitude)	Range and bearing shown on target list screen. Latitude, longitude and altitude are shown on the target information screen	Pass
	Time in minutes since last position report was received	Shown on both target list and information screens	Pass
	Name shall show "SAR:MMSI" unless the name is derived from a Message 24a	SAR:111234000 is shown on both target list and information screens EUT was sent message 24 with the name "SAR TEST": !AIVDO,1,1,,A,H1b5;l1<5:1@E=@000000000000,2*14 The displayed name changed to "SAR TEST"	Pass
	PA-flag, RAIM, time stamp, description of position quality as derived from Table 14	Shown on the target information screen	Pass
11	The result of the communication test should be displayed.	After message 11 is received, the MKD shows the position, time, date, EPFS, accuracy and RAIM flag	Pass
12,14	Text content	The message content is displayed	Pass
18	Position (Lat, Lon, Range, Bearing)	Range and bearing shown on target list screen. Latitude and longitude are shown on the target information screen	Pass
	Time in minutes since last position report was received	Shown on both target list and information screens	Pass
	PA-flag, RAIM, time stamp, description of position quality as derived from Table 14	Shown on the target information screen	Pass
19	Name of ship	Shown on both target list and information screens	Pass

b) Displayed messages			
Type	Information Required	Result	Verdict
21	Name of Aids to Navigation	Shown on both target list and information screens. There is an indication that the target is an AtoN in the top right-hand corner of the target information screen in cyan.	Pass
	Time in minutes since last position report was received	Shown on both target list and information screens	Pass
	Position (Lat, Lon, Range, Bearing)	Range and bearing shown on target list screen. Latitude and longitude are shown on the target information screen	Pass
	PA-flag, RAIM, time stamp, description of position quality as derived from Table 14	Shown on the target information screen	Pass
	Off-position flag	Shown on the target information screen	Pass
	Type of AtoN	Shown on the target information screen	Pass
	Virtual AtoN flag	Shown on the target information screen	Pass
24a	Name of ship	Shown on both target list and information screens	Pass

c) Static data			
Type	Value	Result	Verdict
IMO Number	0000000001	Message is displayed stating number is not valid	Pass
	0000999999	Message is displayed stating number is not valid	Pass
	0001000000	IMO number is accepted after pressing save	Pass
	0010000000	IMO number is accepted after pressing save	Pass
	1073741823	IMO number is accepted after pressing save	Pass
	1073741824	Message is displayed stating number is not valid	Pass
Call sign	1234567	Setting is accepted	Pass
	12345678	It is not possible to enter more than 7 characters	Pass
	A	Setting is accepted	Pass
	*\:;<>=	Setting is accepted	Pass
Name	TUV	Setting is accepted	Pass
	QWERTYUIOP1234567890	Setting is accepted	Pass
	123456789012345678901 2	It is not possible to enter more than 20 characters	Pass
Type of ship	255	A list is available, as well as an option, “Other – Select To Enter Value”.	Pass
Dimensions	A = 100, B = 10, C = 10, D = 20	Setting is accepted	Pass
	A = 100, B = 511, C = 63, D = 20	Setting is accepted	Pass
	A = 100, B = 512, C = 63, D = 20	Message is displayed stating number is not valid	Pass
	A = 100, B = 511, C = 64, D = 20	Message is displayed stating number is not valid	Pass

c) Voyage data			
Type	Value	Result	Verdict
Draught	0	Setting is accepted	Pass
	18.6	Setting is accepted	Pass
	25.5	Setting is accepted	Pass
	26	Setting is accepted, but the draught transmitted in message 5 is 0	Pass
Destination	<HOME>	Setting is accepted	Pass
	<HOME>12345678901234	Setting is accepted	Pass
	<HOME>123456789012345	It is not possible to enter more than 20 characters	Pass
ETA	04/02 06:38	Setting is accepted	Pass
	04/13 24:08	Setting not accepted, text advises the allowable ranges for day, month, minute and month.	Pass
Cargo	2	With type of ship=40, the encoded type in message 5=42	Pass

c) Password protection			
Type	Password Level	Comment	Verdict
MMSI	Admin		Pass
Call sign	Admin		Pass
Name of ship	Admin		Pass
IMO number	Admin		Pass
Dimension/reference for position	Admin		Pass
Interface configuration	Admin		
Password(s)	Admin	If User password is entered, it is only possible to change the user password	Pass
Pre-shared key for SSA-sentence	Admin	It is only possible to modify this by proprietary sentence.	Pass
Message 27 Tx channels	Admin		Pass
Vessel type	User		Pass
Max draught	User		Pass
Vessel Cargo	User		Pass
ETA	User		Pass

d) Static data			
Type	Value	Result	Verdict
IMO Number	1005206580	MKD Display is correct	Pass
	1005206580	Message 5 is correct: !AIVDM,2,1,4,A,5;UnTqsgb?3CCCC3739AEJ05@773000000000 00r4H5466Gj0D4kmE20CD5kP000000000,2*1B !AIVDM,2,2,4,A,kP000000000,2*1B	Pass
Call sign	4440102	MKD Display is correct	Pass
	4440102	Message 5 is correct: !AIVDM,2,1,4,A,5;UnTqsgb?3CCCC3739AEJ05@773000000000 00r4H5466Gj0D4kmE20CD5kP000000000,2*1B !AIVDM,2,2,4,A,kP000000000,2*1B	Pass
	4440102	SSD query is correct: $AISSD,4440102,TUV ATA100,30,10,3,7,0,AI*57	Pass
Name	TUV ATA100	MKD Display is correct	Pass
	TUV ATA100	Message 5 is correct: !AIVDM,2,1,6,B,5;UnTqsgb?3CCCC3739AEJ05@773000000000 00r3h:37vGj0D4kmE20CD5kP000000000,2*1A !AIVDM,2,2,6,B,kP000000000,2*1A	Pass
	TUV ATA100	SSD query is correct: $AISSD,4440102,TUV ATA100,30,10,3,7,0,AI*57	Pass
Type of ship	58	MKD Display is correct	Pass
	58	Message 5 is correct: !AIVDM,2,1,0,A,5;UnTqsgb?3CCCC3739AEJ05@773000000000 00r3h:37vGj0D4kmE20CD5kP000000000,2*1F !AIVDM,2,2,0,A,kP000000000,2*1F	Pass
	58	SSD query is correct: $AIVSD,58,8.0,0,SOUTHAMPTON,180000.00,15,09,15,0*3C	Pass
Dimensions (internal GNSS)	A = 30, B = 10, C = 3, D = 7	MKD Display is correct	Pass
	A = 30, B = 10, C = 3, D = 7	Message 5 is correct: !AIVDM,2,1,0,A,5;UnTqsgb?3CCCC3739AEJ05@773000000000 00r3h:37vGj0D4kmE20CD5kP000000000,2*1F !AIVDM,2,2,0,A,kP000000000,2*1F	Pass
	A = 30, B = 10, C = 3, D = 7	SSD query is correct: $AISSD,4440102,TUV ATA100,30,10,3,7,0,AI*57	Pass

d) Voyage data			
Type	Value	Result	Verdict
Draught	8.0	MKD Display is correct	Pass
	8.0	Message 5 is correct: !AIVDM,2,1,7,B,5;UnTqsgb?3CCCC3739AEJ05@77300000000000r4H5466Gj0D?4kmE20CD3kgP0000000,2*4F	Pass
	8.0	SSD query is correct: $AIVSD,58,8.0,0,SOUTHAMPTON,180000.00,15,09,15,0*3C	Pass
Destination	<SOUTHAMPTON>	MKD Display is correct	Pass
	<SOUTHAMPTON>	Message 5 is correct: !AIVDM,2,1,0,B,5;UnTqsgb?3CCCC3739AEJ05@77300000000000r3h:37vGj0D?4kmE20CD3kgP0000000,2*48	Pass
	<SOUTHAMPTON>	SSD query is correct: $AIVSD,58,8.0,0,<SOUTHAMPTON>,180000.00,15,09,15,0*3E	Pass
ETA	Day: 15 Month: Sep Hour : 18 Minute : 00	MKD Display is correct	Pass
	15/09 18:00	Message 5 is correct: !AIVDM,2,1,9,A,5;UnTqsgb?3CCCC3739AEJ05@77300000000000r3h:37vGj0D?4kmE20CD3kgP0000000,2*42	Pass
	15/09 18:00	SSD query is correct: $AIVSD,58,8.0,0,<SOUTHAMPTON>,180000.00,15,09,15,0*3E	Pass
Cargo	1 (Type: Tanker, 80)	MKD Display is correct	Pass
	1 (Type: Tanker, 80)	Message 5 is correct: !AIVDM,2,1,3,A,5;UnTqsgb?3CCCC3739AEJ05@77300000000001A3h:37vGj0D?4kmE20CD3kgP0000000,2*48	Pass
	1 (Type: Tanker, 80)	SSD query is correct: $AIVSD,81,8.0,0,<SOUTHAMPTON>,180000.00,15,09,15,0*3A	Pass

e) Static data				
Type	Value	Sentence Sent via PI	Result	Verdict
Call sign	1234567	$AISSA,SSD,1,1D9C2DA777139EEDE856E3EDCEDB11CC*69 $AISSD,12345678,,,,,,,AI*4C	Input accepted by EUT: $AISSD,1234567,TUV TEST,25,15,4,6,0,AI*24	Pass
	87654321	$AISSA,SSD,1,0B2A9F76041F5509C29D36FBE15E4B91*62 $AISSD,87654321,,,,,,,AI*4C	The EUT trims the trailing digits of the call sign: $AISSD,8765432,TUV TEST,25,15,4,6,0,AI*2D	Pass
	A	$AISSA,SSD,1,F1CD217446451B708B0DCA87300616C4*61 $AISSD,A,,,,,,,AI*05	Input accepted by EUT: $AISSD,A,TUV TEST,25,15,4,6,0,AI*55	Pass
	*/:;<>=	$AISSA,SSD,1,D0D1351C28F0AEC64FC2D6BF4803807B*6F $AISSD,*/:;<>=,,,,,,,AI*60	Input isn't accepted: $AISSD,A,TUV TEST,25,15,4,6,0,AI*55	Pass
	^2A<TUV>	$AISSA,SSD,1,C19DC78F4C5820A3440C607153B25E43*6D $AISSD,^2A<TUV>,,,,,,,AI*3C	Input is accepted by EUT: $AISSD,^2A<TUV>,TUV TEST,25,15,4,6,1,AI*6D	Pass
Name	TUV	$AISSA,SSD,1,04E6D813F0941C7BB2ADB13A04EB342A*66 $AISSD,,TUV,,,,,,AI*13	The input is accepted: $AISSD,^2A<TUV>,TUV, 25,15,4,6,1,AI*5B	Pass
	QWERTYUIOP1234567890	$AISSA,SSD,1,BA7AE40C26681A31B90321BC5BF182C3*1F $AISSD,,QWERTYUIOP1234567890,,,,,,AI*5A	The input is accepted: $AISSD,TUVSUD,QWERTYUIOP1234567890,25,15,3,7,0,AI*78	Pass
	1234567890123456789012	$AISSA,SSD,1,9CA087B895345DCB4710D8E34B4AC7C2*1B $AISSD,,QWERTYUIOP12345678901234567890,,,,,,AI*5B	The input is rejected: $AISSD,TUVSUD,QWERTYUIOP1234567890,25,15,3,7,0,AI*78	Pass
Type of ship	255	$AISSA,VSD,1,1597DE50E6C8B1304FEA89E7B5A31085*6F $AIVSD,52,8.0,120,SOUTHAMPTON,001800.00,20,10,0,0*0F	The EUT accepts all fields: $AIVSD,52,8.0,120,SOUTHAMPTON,001800.00,20,10,0,0*0F	Pass
Dimensions	A = 100, B = 10, C = 10, D = 20	$AISSA,SSD,1,B5557C747F7E3970D6B71E351571FF85*64 $AISSD,TUVSUD,TUV,100,10,10,20,0,AI*05	The EUT accepts all fields: $AISSD,TUVSUD,TUV,100,10,10,20,0,AI*05	Pass
	A = 100, B = 511, C = 63, D = 20	$AISSA,SSD,1,B62D3861CCF84329F9D7F3DE06AF7E9F*18 $AISSD,TUVSUD,TUV,100,511,63,20,0,AI*35	The EUT accepts all fields: $AISSD,TUVSUD,TUV,100,511,63,20,0,AI*35	Pass

e) Static data				
Type	Value	Sentence Sent via PI	Result	Verdict
	A = 100, B = 512, C = 63, D = 20	$AISSA,SSD,1,7C0C705D071F446A7AD72E0952A29A65*12 $AISSD,TUVSUD,TUV,100,512,63,20,0,AI*36	EUT rejects the input: $AISSD,TUVSUD,TUV,101,0,63,20,0,AI*31	Pass
	A = 100, B = 511, C = 64, D = 0	$AISSA,SSD,1,7C0C705D071F446A7AD72E0952A29A65*12 $AISSD,TUVSUD,TUV,100,512,63,0,0,AI*04	The EUT rejects the input: $AINAK,AI,SSD,777888999,5,Access denied, for sentence formatter requested*6A	Pass

g) Change nav status to 12		
Requirement	Result	Verdict
Check dimensions before setting nav status.	Dimensions are set to 1,1,1,1: !AIVDM,2,1,5,A,54uq3EH21m`8000000000000000000000000000n08111t0Ht:0000000000,0*38 !AIVDM,2,2,5,A,00000000000,2*21	Pass
Confirm that MKD provides user guidance on setting dimension extension values.	Dimension extension value window is shown.	Pass
After entering 1,1,1,1 in the extension value window, the dimensions are updated in message 5.	Dimensions are set to 2,2,2,2: !AIVDM,2,1,7,B,54uq3EH21m`8000000000000000000000000000n0@222t0Ht:0000000000,0*42 !AIVDM,2,2,7,B,00000000000,2*20	Pass

h)		
Requirement	Result	Verdict
The static data of the ship is queried to provide a reference of the ship's size.	The query returns A = 20, B = 20, C = 5 and D = 5: $AISSD,TUVSUD,TUV,20,20,5,5,0,GP*29	-
Set the navigational status to 12.	The NavStatus is set to 12 and the user is prompted with a dialogue box	Pass
Input valid values for dimensions A, B, C, D	The extension values input are: A = 10, B = 10, C =10, D = 10.	Pass
After extending all the dimensions by 10 metres in the extension value window, the dimensions are updated in message 5.	The Message 5 output reports the dimensions of the ship to be 10 metres larger in each direction when compared with the results of the SSD query, as seen in the decode below.	Pass

h) Message 5 decode	
!AIVDM,2,1,2,A,5;UnTqp21m`9AEI=D@1AEH000000000000000000l3hN??40HtD4kmE20CD5kP000000000,2*1D	
Parameter	Decoded Value
Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	30,30,15,15
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@
DTE	0 - available
Spare	0

i)		
Requirement	Result	Verdict
The EUT shall provide guidance on setting the other navigational statuses.	The EUT lists all possible navigational statuses along with a description of each setting under the menu: Settings / AIS / Voyage	Pass
The dimension extensions A,B,C,D are set to zero	When the NavStatus is changed, the EUT outputs a Message 5, showing that the dimensions of the ship have changed, as shown in the decode below.	Pass

h) Message 5 decode	
!AIVDM,2,1,5,B,5;UnTqp21m`9AEI=D@1AEH000000000000000000l2PD5540HtD4kmE20CD5kP000000000,2*19	
Parameter	Decoded Value

Message ID	5 - Static and voyage related data
Repeat Indicator	0
MMSI	777888999
AIS Version Indicator	2 - ITU-R M.1371-5 (or later)
IMO Number	8509058
Call Sign	TUVSUD@
Name	TUV@@@@@@@@@@@@@@@@
Type of ship and cargo type	52
Overall dimension/reference for position	30,30,15,15
Type of EPFS	1 - GPS
ETA	00/00 24:60
Maximum present static draught	8
Destination	SOUTHAMPTON@@@@@@@@
DTE	0 - available
Spare	0

Initiate message transmission – Clause 14.9.2

Method of Measurement

Initiate the transmission of non-scheduled messages and interrogations as provided by the EUT.

Required Results

Confirm that at least the transmission of safety-related addressed and broadcast messages (Message 12 and Message 14) can be initiated by means of the minimum display. Confirm that transmission of Messages 4, 9, 16, 17, 18, 19, 20, 21, 22, and 23 is not possible. Confirm that MKD shall not accept input of more characters that can be transmitted in a 3-slot message. Confirm that MKD will indicate if the addressed station cannot display the addressed message (DTE flag).

Confirm, by inspection of the manufacturer's documentation, that pre-configured safety related text Messages 12 and 14 are not available.

Test Results

Requirement	Result	Verdict
Safety related addressed and broadcast messages can be initiated via the MKD	This is available from the menu, Messages – Safety Message – Send Message. The type of message can be chosen between Addressed or Broadcast.	Pass
Confirm that transmission of Messages 4, 9, 16, 17, 18, 19, 20, 21, 22, and 23 is not possible	There no options available on the MKD to send these messages.	Pass
Confirm that MKD shall not accept input of more characters that can be transmitted in a 3-slot message	There is a remaining characters count shown, which is 85 for addressed messages and 90 for broadcast. It is not possible to enter more characters than this limit.	Pass
Confirm that MKD will indicate if the addressed station cannot display the addressed message (DTE flag).	A message is displayed, “Warning: Unable to determine if recipient can display this message”, when the DTE flag = 1	Pass

Communication test – Clause 14.9.3

Method of Measurement

Set up the standard test environment and operate the EUT in autonomous mode. The test environment shall include at least one Class B SO station. Initiate the communication test function (transmit Message 10) by:

a) MKD using proposed target;
b) MKD using alternative target;
c) AIR sentence;
d) another transmitter (EUT as destination).

Required Results

Confirm that:

a) the EUT transmits Message 10 addressed to the target and that the communication test result is correct for both a successful and unsuccessful response on the MKD. Verify that only Class A stations are proposed on the MKD;
b) the EUT transmits Message 10 addressed to the target and that the communication test result is correct for both a successful and unsuccessful response on the MKD. Verify that only Class A stations can be selected as alternative targets on the MKD;
c) the EUT transmits Message 10 addressed to the target;
d) the EUT transmits Message 11 as the response;

In all cases, verify that VDO Message 10 and received VDM Message 11 is output to the PI. Verify that Class B stations are not selected by the MKD.

Test Results

a) Successful Response		
Requirement	Result	Verdict
A Message 10 is transmitted by the EUT.	The Message 10 sent is output to the PI: !AIVDM,1,1,,A,:;UnTqi7hqD0,0*0A	Pass
The Message 11 transmitted by the other class A device is output to the PI.	The Message 11 received is output to the PI: !AIVDM,1,1,,A,;4O3U@1v>H:@8wrCOhM6qJ?02000,0*1F	Pass
Class B devices are not displayed on the communication test target list.	No class B devices are displayed on the target list.	Pass
Only Class A stations are in the list	When selecting “Manual Select”, only Class A MMSIs are available in a drop-down list.	Pass
The communication test result is correct for both a successful response on the MKD	The contents of message 11 is displayed, indicating a successful response.	Pass

a) Unsuccessful Response		
Requirement	Result	Verdict
A Message 10 is transmitted by the EUT.	The Message 10 sent is output to the PI: !AIVDM,1,1,,A,:;UnTqi7hqD0,0*0A	Pass
No Message 11 is sent in response.	After 5 seconds, the EUT displays, “Error, no response within the time limit.”	Pass

b) Successful Response		
Requirement	Result	Verdict
A Message 10 is transmitted by the EUT.	The Message 10 sent is output to the PI: !AIVDM,1,1,,A,:4uq3E@o4jKD,0*24	Pass
The Message 11 transmitted by the other class A device is output to the PI.	The Message 11 received is output to the PI: !AIVDM,1,1,,A,;3LC9eAv>T>10OrCPLM6qN100000,0*38	Pass
Class B devices are not displayed on the communication test target list.	No class B devices are displayed on the target list.	Pass
Only Class A stations are in the list	When selecting “Manual Select”, only Class A MMSIs are available in a drop-down list.	Pass
The communication test result is correct for both a successful response on the MKD	The contents of message 11 is displayed, indicating a successful response.	Pass

b) Unsuccessful Response		
Requirement	Result	Verdict
A Message 10 is transmitted by the EUT.	The Message 10 sent is output to the PI: !AIVDM,1,1,,A,:4uq3E@o4jKD,0*24	Pass
No Message 11 is sent in response.	After 5 seconds, the EUT displays, “Error, no response within the time limit.”	Pass

c) Request for message 10		
Requirement	Result	Verdict
Air sentence sent to the PI: $AIAIR,200300900,10,,,,,,,,,*6B	Message 10 is transmitted by the EUT, address to MMSI = 200300900: !AIVDM,1,1,,A,:4uq3E@ghFF@,0*55	Pass

d) Interrogation by another station		
Requirement	Result	Verdict
Message 10 sent to the EUT: !AIVDO,1,1,,A,:1:9lSA?N@mD,0*4A	Message 11 is transmitted by the EUT: !AIVDM,1,1,,A,;4uq3EAv>T>l5OrCR0M6qEg00000,0*40	Pass

System control – Clause 14.9.4

Method of Measurement

Set up the standard test environment and operate the EUT in autonomous mode. Perform system control/configuration commands as specified. Check indication of system status.

Required Results

Confirm that the configuration level and other functions, not intended for use by the operator, are protected by password or adequate means.

Verify that regional channel management settings can be input via the MKD and that there is no other means of changing the radio parameters.

Test Results

Requirement	Result	Verdict
Confirm that the configuration level and other functions, not intended for use by the operator, are protected by password or adequate means	All system settings are protected by password	Pass
Verify that regional channel management settings can be input via the MKD	This can be input from the menu, Settings – AIS – Regions	Pass
There is no other means of changing the radio parameters	The MKD does not allow any way of changing the RF parameters	Pass

Display of received targets – Clause 14.9.5

Method of Measurement

Set up the standard test environment and operate the EUT in autonomous mode.

a) Apply messages from the following targets to the VDL:

– Class A with Messages 1 and 5, 10 s reporting interval;
– Class A with Messages 3 and 5, 3 min reporting interval;
– base station with Message 4, 10 s reporting interval;
– airborne AIS with Messages 9 and 5, 10 s reporting interval;
– Class B SO with Messages 18 and 19, 30 s reporting interval;
– Class B CS with Messages 18 and 24A,B, 3 min reporting interval;
– AIS AtoN with Message 21, 1 min reporting interval;
– AIS-SART, MOB-AIS and EPIRB-AIS under test with Messages 1 and 14, transmit 1 TDMA burst;
– AIS-SART, MOB-AIS and EPIRB-AIS under test with Messages 1 and 14, transmit 1 TDMA burst with enabling testing locating device indication;
– one active locating device of each kind transmitting Messages 1, with a 1 min reporting interval.

b) Remove all targets from VDL.
c) Apply again all targets after 17 min, without static data Messages 5, 19 and 24.
d) Switch off two locating devices.
e) Apply 200 targets to the EUT.
f) Apply 300 targets to the EUT.

Required Results

The following results are required.

a) Confirm that all targets are auto-sorted in ascending range and displayed on the target list with name, range, bearing and minutes from last received position report.
Confirm that all active locating devices are displayed on the target list above all other targets and the names of all locating devices are in accordance with Table 10.
Confirm that alerts in accordance with Table 4 are raised.
Confirm that the locating devices in test mode are not displayed; however, they are displayed only when enabling testing locating device indication.
Confirm that the other targets are displayed in an order according to the range, nearest target first.
Confirm that all targets can be selected for detailed view.
Confirm that all information required by Table 13 is displayed in the detailed view if not displayed in the target list.
Confirm that all target information that is displayed on the MKD is displayed correctly.
b) Confirm that the time from the last received message is counting up every minute for all targets. Confirm that all targets, except the active locating devices, are removed from display 7 min after the last received message.
c) Confirm that all targets are displayed again. Confirm that all static data from all targets are displayed correctly.
d) Confirm that the time from the last received message is counting up every minute for the switched off locating devices. Confirm that the switched off locating devices are removed from display 18 min after the last received message.
e) Confirm that the MKD displays 200 targets.
f) Confirm that the MKD displays 200 nearest targets as a minimum.

Test Results

a)		
Requirement	Result	Verdict
Appropriate target Messages are sent to the EUT	See log files for list of transmitted messages	-
All targets are auto-sorted in ascending range on the target list	As new targets are added to the target list, the EUT orders them ascending by range	Pass
Target name, range, bearing and minutes from last received position report are displayed on the target list	The target list details the range, bearing and the previous position report's age on target list. The age of the position report uses seconds when < 1 minute	Pass
All active locating devices are displayed on the target list above all other targets.	Active locating devices are displayed at the top of the target list, above all other devices	Pass
The names of all locating devices are in accordance with Table 10	SART devices are named "AIS SART", MOB devices are named "MOB AIS" and EPIRB's are listed as "EPIRB AIS", as described in Table 10	Pass
Alerts in accordance with Table 4 are raised	BIIT 14 becomes active, corresponding to alert 3108. A pop-up window instructs the user to 'Check AIS targets': $AIALR,141835.00,014,A,V,AIS: Active AIS-SART*52	Pass
The locating devices in test mode are not displayed; however, they are displayed only when enabling testing locating device indication	A 'Show Devices under test as targets' setting is configurable via Settings/System/General	Pass
Other targets are displayed in an order according to the range, nearest target first	Targets that aren't SART, MOB or EPIRB devices are displayed in ascending distance order	Pass
All targets can be selected for detailed view	All devices listed on the target list can be selected for detailed view, detailing static and dynamic data	Pass
All information required by Table 13 is displayed in the detailed view if not displayed in the target list	All information required by Table 13 is available to the user, as shown in the table below	Pass
Target information that is displayed on the MKD is displayed correctly	The information displayed on the MKD matches the information sent to the EUT	Pass

a) Table 13 – Message display on MKD			
Message Type	Required Content	Actual Content	Result
Message 1,2,3 Position report	Position (latitude, longitude, range, bearing)	Latitude, longitude, range and bearing are all visible on the MKD	Pass
	Time in minutes since last position report was received	The age of the position report is clearly shown in the correct format	Pass
	The name of locating device shall show according to tables 10, 11 and 12, followed by the MMSI	The MMSI's for SART, MOB and EPIRB devices is correct, with respect to tables 10, 11 and 12	Pass
	The PA flag, RAIM flag, time stamp and description of position quality should be correct as derived from table 14	The position accuracy, RAIM status, time stamp and description of position quality is correctly encoded	Pass
	The navigational status of the target	The navigational status clearly displays the ID and description	Pass
Message 5 Static data	The name of the ship shall be available	The name of the ship is correctly applied to the relevant target	Pass
Message 4 Base station report	Position (latitude, longitude, range, bearing)	The values for latitude, longitude, range and bearing are displayed on the MKD	Pass
	Time since last position report, in minutes	The age of the position report is shown, representing the time since the last position report was received	Pass
	Name shall show BS:MMSI unless the name is derived from a Message 24a	For a base station with MMSI = 2222222, the name shown on the MKD is BS:2222222	Pass
	The position-accuracy flag, the RAIM flag and description of position quality shall be derived from table 14	The PA flag, RAIM flag and description of position accuracy matches that being output by the base station	Pass
Message 9 SAR aircraft position report	Position (latitude, longitude, range, bearing)	The position data is correctly reported by the MKD	Pass
	Time in minutes since last position report was received	An accurate age of the position report is displayed in hh:mm format	Pass
	Name shall show "SAR:MMSI" unless the name is derived from a Message 24a or 5	The EUT displays SAR:111234000 until a Message 5 is applied	Pass
	The PA flag, RAIM flag, time stamp and description of position quality shall be correct as derived from table 14	The PA and RAIM flags are set to 1, in accordance with table 14. The timestamp accurately reflects the time of transmission	Pass
Message 18, 19	Position (latitude, longitude, range and bearing)	The position data in the Message 18 and 19's is correct, and the range between EUT and the targets is correct	Pass

a) Table 13 – Message display on MKD			
Message Type	Required Content	Actual Content	Result
	Time in minutes since last position report was received	The time since the last position report is displayed as the age of the target as hh:mm	Pass
	PA flag, RAIM flag, time stamp,	The PA, RAIM and time stamp are all correct on the MKD	Pass

b)		
Requirement	Result	Verdict
After receiving a position report, the target must age- the time since last position report must increment	The age of a position report shows how old it is in seconds when the age is <1 minute. After 1 minute, the time since last position report is shown in minutes, and correctly shows the age of all position reports	Pass
All targets, except active locating devices, are removed from the display 7 minutes after the last position report	Targets are correctly removed from the target list 7 minutes after the last received message, leaving only the locating devices on the target list	Pass

c)		
Requirement	Result	Verdict
The same targets are all transmitted again, without static data Messages 5, 19 and 24	The targets are applied to the VDL	-
All the targets are displayed again, with the static data being retained from the previous Messages 5, 19 and 24	The static data such as names of vessels is retained after 17 minutes	Pass
All targets shall be displayed correctly on the MKD	The targets are displayed using the correct icons, as per IEC-62288	Pass

d)		
Requirement	Result	Verdict
Two locating devices shall be switched off	The position reports of two SART's are removed	-
The time from the last received message shall increment every minute	The time since the last position report is displayed as the age of the target. This is displayed in minutes and updates accurately	Pass
The switched off locating devices shall be removed from the display 18 minutes after the last received message	The AIS-SART's are removed from the MKD map screen, as well as the target list after 18 minutes since the last transmission	Pass

e)		
Requirement	Result	Verdict
200 targets are to be applied to the EUT	200 simulated targets are sent to the EUT	-
The EUT shall display all 200 targets	All targets are visible via the target list, as well as being displayed on the map screen	Pass

f)		
Requirement	Result	Verdict
300 targets are to be applied to the EUT	300 simulated targets are sent to the EUT	-
The EUT shall display the 200 nearest targets as a minimum	The EUT displays all 300 targets on both the target list and the map screen	Pass

Display of position quality – Clause 14.9.6

Method of Measurement

Set up standard test environment and operate EUT in autonomous mode.

Apply Class A transmissions with the following data to the VDL and observe the position quality display on the MKD:

a) Time stamp = 63;
b) Time stamp = 61;
c) Time stamp = 62;
d) Time stamp = 60;
e) Time stamp 0... 59, PA = 0, RAIM = 0;
f) PA = 0, RAIM = 1;
g) PA = 1, RAIM = 0;
h) PA = 1, RAIM = 1;
i) Set SOG = 10 kn, then stop target transmissions;
j) Start transmission again, set SOG = 20 kn, then stop transmission.

Required Results

Confirm that:

a) the position quality "No position" is displayed;
b) the position quality "Manual position" is displayed;
c) the position quality "Dead reckoning position" is displayed;
d) the position quality "valid position with no time stamp" is displayed;
e) the position quality "Position > 10m" is displayed;
f) the position quality "Position with RAIM > 10 m" is displayed;
g) the position quality "Position < = 10 m" is displayed;
h) the position quality "Position with RAIM < = 10 m" is displayed;
i) 40 s after the last transmission the position quality is changed to "Outdated position > 200 m";
j) 20 s after the last transmission the position quality is changed to "Outdated position > 200 m".

Test Results

Step	Requirement	Result	Verdict
a	!AIVDO,1,1,,A,13LC9e@2P:wrCR2M6qD@2gwv0000,0*11	“No position” displayed	Pass
b	!AIVDO,1,1,,A,13LC9eP2P:wrCR2M6qD@2gwr0000,0*05	“Manual position” displayed	Pass
c	!AIVDO,1,1,,A,13LC9eh2P:wrCR2M6qD@2gwt0000,0*3B	“Dead reckoning position” displayed	Pass
d	!AIVDO,1,1,,A,13LC9f02P:wrCR2M6qD@2gwp0000,0*64	“Valid position with no time stamp” displayed	Pass
e	!AIVDO,1,1,,A,13LC9f@2P:OrCR2M6qD@2gwN0000,0*12	“Position > 10m” is displayed	Pass
f	!AIVDO,1,1,,A,13LC9fP2P:OrCR2M6qD@2gwT2000,0*1A	“Position with RAIM > 10 m” is displayed	Pass
g	!AIVDO,1,1,,A,13LC9fh2P:wrCR2M6qD@2gwf0000,0*2A	“Position < 10 m” is displayed	Pass
h	!AIVDO,1,1,,A,13LC9g02P:wrCR2M6qD@2gwh2000,0*7F	“Position with RAIM < 10 m” is displayed	Pass
i	!AIVDO,1,1,,A,13LC9e@2QTwrCR2M6qD@2gv`0000,0*69	“Outdated position > 200 m” is displayed after 40 s	Pass
j	!AIVDO,1,1,,A,13LC9e@2S8wrCR2M6qD@2gvN0000,0*29	“Outdated position > 200 m” is displayed after 20 s	Pass

Display of received safety related messages – Clause 14.9.8

Method of Measurement

Set up the standard test environment and operate the EUT in autonomous mode.

a) Transmit 20 Message 12 addressed to the EUT.
b) Clear displayed message on the MKD.
c) Transmit 20 Message 12 addressed to the EUT.
d) Transmit Message 14.

Required Results

Confirm that:

a) the most recently received Message 12 is displayed foremost and all 20 messages are available for display;
b) the Message 12 is removed from foremost display on the MKD;
c) the most recently received Message 12 is displayed foremost and all 20 messages are available for display;
d) there is an indication that the Message 14 has been received and that Message 14 is available for display.

Test Results

Step	Requirement	Result	Verdict
a)	20 Message 12 are constructed and sent to the EUT.	!AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pi,0*09 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pj,0*0A !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pk,0*0B !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pl,0*0C !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pm,0*0D !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pn,0*0E !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Po,0*0F !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pp,0*10 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pq,0*11 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pih0,4*55 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pii0,4*54 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pij0,4*57 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pik0,4*56 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pil0,4*51 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pim0,4*50 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pin0,4*53 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pio0,4*52 !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pip0,4*4D !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Piq0,4*4C !AIVDO,1,1,,A,<7MJ?O2qMa>LDEFCE4Pjh0,4*56	-
	The most recently received Message 12 should be displayed and all 20 messages should be available via the MKD.	The most recently received message is correctly displayed foremost. All 20 messages are available and can be accessed by dismissing the newest messages.	Pass
b)	The displayed message is cleared from the MKD.	Clearing a message from the screen shows the next most recently received message.	Pass
c)	The Message 12's sent to the EUT are the same as the messages sent in (a).	The most recently received message is displayed successfully.	Pass
d)	A Message 14 is transmitted to the EUT.	The Message 14 sent is: !AIVDO,1,1,,A,>;UnTqi@E=B0m<O7@0,4*41	-
	There is an indication that the Message 14 has been received, and that the Message 14 is available for display.	A flashing message icon on the MKD indicates the Message 14 is available to display. Clearing the Message 12 from the display displays Message 14.	Pass

Presentation of navigation information – Clause 14.9.9

Requirement

Verify compliance with the general requirements for the presentation of navigation-related information in accordance with the test methods and required results specified in IEC 62288.

Verify compliance with requirements for graphical presentation of targets in accordance with the test methods and required results of IEC 62288, if display of graphical symbols for AIS data is provided.

Provide input of the messages listed below and confirm by observation that the MKD displays graphical symbology as described in IEC 62288, if display of graphical symbols for AIS data is provided:

• Messages 1, 2, 3 and 5 (Class A AIS, AIS-SART);
• Messages 18, 19 and 24 (Class B AIS);
• Message 4 (AIS Base Stations);
• Message 9 (AIS on Airborne SAR-craft);
• Message 21 (AIS AtoN).

Symbols not described in IEC 62288 may be defined by the manufacturer.

Verify compliance in accordance with the test methods and required results of IEC 62388 (Radar) for calculation of CPA/TCPA, if provided.

Test Results

Compliance with IEC 62288		
Requirement	Result	Verdict
Confirm by observation that navigational terms and abbreviations are presented using the nomenclature in Annex B	All navigational terms are in accordance with Annex B	Pass
Targets shall be presented with their relevant symbols as set forth in Annex A.	See table below	Pass
Reported AIS targets shall be graphically presented either as sleeping or activated.	All targets are displayed with no differentiation between sleeping or activated	N/A
The course and speed of a tracked radar target or an activated reported AIS target shall be indicated by a vector that clearly shows the predicted motion. The vector time (i.e. length) shall be consistent for presentation of any target regardless of its source.	The drawing of vectors is not supported	N/A
The presentation of vector symbols shall be consistent irrespective of the source of information. The presentation mode shall be clearly and permanently or persistently indicated, as appropriate for the application,	The drawing of vectors is not supported	N/A
The orientation of the AIS target symbol shall indicate its heading. If the heading information is not received, the orientation of the AIS symbol shall be aligned to the reported course over ground (COG). If available, the turn or rate of turn (ROT) indicator and/or the path prediction shall indicate the manoeuvre of an activated AIS target.	The orientation of the target matches does not match its heading	Pass
Own ship's CCRP shall be used for alignment of tracked radar target symbols and reported AIS target symbols with other information on the same display.	The EUT's heading is used for the alignment of AIS targets. The display also shows "H UP" when this mode is active	Pass
On large scale, low range displays, a means or method to present a true scale outline of an activated AIS target shall be provided in accordance with Annex A.	True scale outlines are not supported	N/A
It shall be possible to display the past positions of activated AIS targets.	Display of past positions of activated targets is not supported	N/A
Messages 1, 2, 3 and 5 (Class A AIS)	Represented by a filled triangle.	Pass

Compliance with IEC 62288		
Requirement	Result	Verdict
Message 1 (AIS-SART)	Represented by a circled with an X inside	Pass
Messages 18, 19 and 24 (Class B AIS)	Represented by a filled triangle.	Pass
Message 4 (AIS Base Stations)	Represented by a diamond with a dot in the centre, as stated in the user manual.	Pass
Message 9 (AIS on Airborne SAR-craft)	Represented as an aircraft symbol	Pass
Message 21 (AIS AtoN)	Represented by a diamond with a cross in the centre.	Pass

Compliance with IEC 62388 - §11.7.1: CPA alarm activation by simulated collision		
Requirement	Result	Verdict
The EUT is configured to have a CPA boundary of 1 NM, located at 50°40”N, 1°30”W- the EUT has a speed of 0kn.	The Message 1 transmitted by the EUT is: !AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2m:05qT,0*55	-
A vessel is simulated with a course that directly intersects the stationary EUT.	The EUT with MMSI 685000341 tracks a course from 50°40N, 1°32W to 50°40N, 1°28W.	-
The EUT shall cause a visual and audio alarm to be activated.	An audio alarm is sounded and an alert with ID 4053:1 is displayed, stating ‘Proximity Alert; AIS: CPA/TCPA Collision Warning’. The alarm with ID 53 is raised: $AIALF,2,1,1,152537.00,B,W,V,OS,4053,1,1,0,Proximity Alert*22 $AIALF,2,2,1,,,,,OS,4053,1,1,0,AIS: CPA/TCPA Collision Warning*5E $AIALR,152537.00,053,A,V,AIS: CPA Collision Warning*74	Pass
The target causing the alarm shall be clearly indicated on the MKD.	The target is highlighted red and a flashing ‘DGR’ label. A pop-up window displays information about the vessel that has triggered the alarm, detailing the vessel’s name, MMSI, callsign, range, bearing and the closest point and the time to closest approach.	Pass
When the AIS automatic activation for targets meeting CPA/TCPA limits is disabled, the status is indicated.	A CPA status symbol is always displayed on the status bar; when the CPA/TCPA alerts are disabled, the icon has a red cross over it.	Pass
The CPA and TCPA function limits shall apply to all activated AIS targets and sleeping targets on user request.	The user can adjust the CPA and TCPA thresholds via the MKD. The new CPA and TCPA boundary values are then applied to both active and sleeping AIS targets, which update as appropriate.	Pass

CPA alarm activation by simulated collision				
Slot	Chan	MMSI	Msg	Sentence
290	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2l>0D01,0*06
674	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2lR0<01,0*11
1071	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2lp08@g,0*12
1143	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wpvj0LwN002Rlt0000,0*6C
1401	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq1>@LwN002Rm:0000,0*41
1419	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2m:05qT,0*55
				$AIALF,2,1,1,152537.00,B,W,V,OS,4053,1,1,0,Proximity Alert*22
				$AIALF,2,2,1,,,,,OS,4053,1,1,0,AIS: CPA/TCPA Collision Warning*5E
				$AIALR,152537.00,053,A,V,AIS: CPA Collision Warning*74
				$AIALF,2,1,2,152541.00,B,W,A,OS,4053,1,2,0,Proximity Alert*34
				$AIALF,2,2,2,,,,,OS,4053,1,2,0,AIS: CPA/TCPA Collision Warning*5E
				$AIALR,152541.00,053,A,A,AIS: CPA Collision Warning*62
1815	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2mP08LG,0*1F
2088	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq3bPLwN002Rmf0000,0*53
2211	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2ml05qT,0*03
160	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq66hLwN00FRl80000,0*11
290	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2l>0@4R,0*65
				$AIALR,152541.00,053,A,A,AIS: CPA Collision Warning*62
404	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq66hLwN002RlD0000,0*19
674	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2lR08:R,0*7C
696	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq8S0LwN002RlT0000,0*3A
1071	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2lp05q`,0*29
1265	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq:w@LwN002Rm20000,0*0B
1419	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2m:00T1,0*10

CPA alarm activation by simulated collision				
Slot	Chan	MMSI	Msg	Sentence
				$AIALR,152541.00,053,A,A,AIS: CPA Collision Warning*62
1690	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wq?ohLwN00FRmH0000,0*30
1815	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2mP05q`,0*08
2206	A	685000341	1	!AIVDO,1,1,,A,1:=A6U@00:wqBD0LwN00FRml0000,0*1A
2211	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh000wq8S0LwN03Q2ml00SI,0*39
				$AIALF,2,1,3,152658.00,B,W,N,OS,4053,1,3,0,Proximity Alert*30
				$AIALF,2,2,3,,,,,OS,4053,1,3,0,AIS: CPA/TCPA Collision Warning*5E
				$AIALR,152658.00,053,V,V,AIS: CPA Collision Warning*69
290	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh000wq8S0LwN03Q2l>0<02,0*7D

Compliance with IEC 62388 - §11.7.1: CPA alarm activation at the CPA boundary		
Requirement	Result	Verdict
The EUT is configured to have a CPA boundary of 1 NM, located at 50°40”N, 1°30”W- the EUT has a speed of 0kn.	The Message 1 transmitted by the EUT is: !AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2lR05qd,0*69	-
A vessel is simulated, with a course that repeatedly crosses into and out of the CPA boundary.	Once the target crosses the CPA boundary of 1 NM, the EUT raises the alert. The alert stays active until the EUT crosses the boundary. The alert is then raised again successfully once the EUT re-enters the CPA boundary.	Pass
The EUT shall cause a visual and audio alarm to be activated.	The EUT sounds two short beeps and displays a warning on the screen detailing the device that has caused the alarm. The EUT outputs the following to the PI: $AIALR,152541.00,053,A,A,AIS: CPA Collision Warning*62 $AIALF,2,1,3,152658.00,B,W,N,OS,4053,1,3,0,Proximity Alert*30 $AIALF,2,2,3,,,,,OS,4053,1,3,0,AIS: CPA/TCPA Collision Warning*5E $AIALR,152658.00,053,V,V,AIS: CPA Collision Warning*69	Pass
The target causing the alarm shall be clearly indicated on the MKD.	The target that caused the alarm to be raised is clearly displayed as red and with a flashing ‘DGR’ label on the MKD.	Pass
When the AIS automatic activation for targets meeting CPA/TCPA limits is disabled, the status is indicated.	When the CPA/TCPA function is disabled via the MKD, the always-visible status icon displays a red cross over the CPA symbol.	Pass
The CPA and TCPA function limits shall apply to all activated AIS targets and sleeping targets on user request.	The CPA/TCPA thresholds are changed to include all targets, raising the alarm for all targets including sleeping ones. Reducing the range of the CPA boundary acknowledges the alarm.	Pass

CPA alarm activation at the CPA boundary				
Slot	Chan	MMSI	Msg	Sentence
674	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2lR05qd,0*69
1071	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2lp00S:,0*31
1152	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wpvj0Lv?p0FRlt0000,0*05
1431	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq1>@Lvnt0<QU:0000,0*3C
				$AIALF,2,1,4,152738.00,B,W,V,OS,4053,1,1,0,Proximity Alert*2A
				$AIALF,2,2,4,,,,,OS,4053,1,1,0,AIS: CPA/TCPA Collision Warning*5B
				$AIALR,152738.00,053,A,V,AIS: CPA Collision Warning*79
1474	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2m<0<03,0*19
				$AIALF,2,1,5,152740.00,B,W,A,OS,4053,1,2,0,Proximity Alert*30
				$AIALF,2,2,5,,,,,OS,4053,1,2,0,AIS: CPA/TCPA Collision Warning*59
				$AIALR,152740.00,053,A,A,AIS: CPA Collision Warning*61
1815	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2mP00S4,0*1E
2226	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2ml0@Rj,0*0E
98	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq3bPLw:N0<QT40000,0*12
290	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2l>084R,0*78
				$AIALR,152740.00,053,A,A,AIS: CPA Collision Warning*61
608	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq8S0Lvnt0FRlN0000,0*1C
674	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2lR00Sa,0*4B
1071	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2lp0L03,0*27
1196	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq:w@Lw:N1Gbtv0000,0*35
				$AIALR,152740.00,053,A,A,AIS: CPA Collision Warning*61
1474	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2m<08G2,0*6B

CPA alarm activation at the CPA boundary				
Slot	Chan	MMSI	Msg	Sentence
1754	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq=KPLvnt0FRmL0000,0*62
				$AIALF,2,1,6,152847.00,B,W,N,OS,4053,1,3,0,Proximity Alert*35
				$AIALF,2,2,6,,,,,OS,4053,1,3,0,AIS: CPA/TCPA Collision Warning*5B
				$AIALR,152847.00,053,V,V,AIS: CPA Collision Warning*69
1809	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2mN0HLA,0*12
2209	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq:w@Lw:N1Gbul0000,0*2E
2226	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2ml0<03,0*49
				$AIALF,2,1,7,152859.00,B,W,V,OS,4053,1,1,0,Proximity Alert*21
				$AIALF,2,2,7,,,,,OS,4053,1,1,0,AIS: CPA/TCPA Collision Warning*58
				$AIALR,152859.00,053,A,V,AIS: CPA Collision Warning*71
				$AIALF,2,1,8,152902.00,B,W,A,OS,4053,1,2,0,Proximity Alert*35
				$AIALF,2,2,8,,,,,OS,4053,1,2,0,AIS: CPA/TCPA Collision Warning*54
				$AIALR,152902.00,053,A,A,AIS: CPA Collision Warning*69
290	B	777888999	3	!AIVDM,1,1,,B,3;UnTqh01Twq8S0LwN03Q2l>01L3,0*6A
705	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2lT0D03,0*08
789	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wq=KPLvnt0FRl`0000,0*4F
				$AIALF,2,1,9,152921.00,B,W,N,OS,4053,1,3,0,Proximity Alert*3B
				$AIALF,2,2,9,,,,,OS,4053,1,3,0,AIS: CPA/TCPA Collision Warning*54
				$AIALR,152921.00,053,V,V,AIS: CPA Collision Warning*68
1071	B	777888999	1	!AIVDM,1,1,,B,1;UnTqh01Twq8S0LwN03Q2lp0H@g,0*07
1136	A	664900125	1	!AIVDO,1,1,,A,19r6B7@00:wqBD0Lvnt0FRlt0000,0*4B
1474	A	777888999	1	!AIVDM,1,1,,A,1;UnTqh01Twq8S0LwN03Q2m<05ql,0*0E

2.10 TDMA synchronisation

2.10.1 Specification Reference

IEC 61993-2, Clause 16.1

2.10.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 0

2.10.3 Date of Test

26-March-2018

2.10.4 Test Results and Methods of Measurement

Synchronisation Test Using UTC - Clause 16.1.1

Method of measurement

Set up standard test environment; chose test conditions in a way that the EUT operates in following synchronisation modes:

a) UTC direct
b) UTC indirect (internal GNSS receiver disabled; at least one other station UTC direct synchronised);
c) UTC indirect (internal GNSS disabled; base station with UTC direct synchronisation within range).
d) base direct (internal GNSS disabled; base station with semaphore qualified within range
e) UTC indirect (internal GNSS receiver disabled; only Class B SO station UTC direct synchronised).

Check CommState Parameter SyncState in position Report and reporting rate

Required results

a) the SynchState = 0
b) the SynchState = 1
c) the SynchState = 1. Verify that the correct UTC date and time is derived from Message 4 of the base station;
d) the SynchState = 2
e) the SynchState = 1

Test Results

a) UTC direct		
Requirement	Result	Verdict
Confirm that the sync state is 0	Sync state = 0	Pass
Position Report sent by EUT:		
!AIVDM,1,1,,B,13O:ARA01TOrFu2M7AWhKh1028C=,0*3B		
Parameter	Decoded Value	
Message ID	000001	
Repeat Indicator	00	
MMSI	001101111100101001000110001001	
Navigational Status	0001	
Rate Of Turn	0	
Speed Over Ground	100	
Position Accuracy	0	
Longitude	267696033 (739423)	
Latitude	30527903	
Course Over Ground	111	
True Heading	000000000	
Time Stamp	100000	
Special Manoeuvre Indicator	00	
Spare	000	
RAIM Flag	1	
Communication State - Sync State	00	
Communication State - Slot Timeout	2	
Communication State - Sub Message	1229	

b) internal GNSS receiver disabled; at least one other station UTC direct synchronised		
Requirement	Result	Verdict
Confirm that the sync state is 1	Sync state = 1	Pass
Position Report sent by EUT:		
!AIVDM,1,1,,A,13O:AR@P?w<tSF0l4Q@>41Wv0h4u,0*3D		
Parameter	Decoded Value	
Message ID	1 - Position report	
Repeat Indicator	0	
MMSI	234000777	
Navigational Status	0 - under way using engine	
Rate Of Turn	no turn information available (default)	
Speed Over Ground	not available	
Position Accuracy	0 - low (>10 m)	
Longitude	181 0 E	
Latitude	91 0 N	
Course Over Ground	not available	
True Heading	51	
Time Stamp	63	
Special Manoeuvre Indicator	0 - not available	
Spare	0	
RAIM Flag	0 - RAIM not in use	
Communication State - Sync State	1	
Communication State - Slot Timeout	4	
Communication State - Sub Message	Slot Number = 317	

c) internal GNSS disabled; base station with UTC direct synchronisation		
Requirement	Result	Verdict
Confirm that the sync state is 1	Sync state = 1	Pass
Verify that the correct UTC date and time is derived from Message 4	When the sync state changed to 1, the time and date displayed on the MKD changed to the time and date from message 4	Pass
Position Report sent by EUT:		
!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1J0`K@,0*0F		
Parameter	Decoded Value	
Message ID	1 - Position report	
Repeat Indicator	0	
MMSI	777888999	
Navigational Status	0 - under way using engine	
Rate Of Turn	0	
Speed Over Ground	10	
Position Accuracy	1 - high (> 10 m)	
Longitude	1 13.9423 W	
Latitude	50 52.7903 N	
Course Over Ground	11.1	
True Heading	0	
Time Stamp	45	
Special Manoeuvre Indicator	0 - not available	
Spare	0	
RAIM Flag	0 - RAIM not in use	
Communication State - Sync State	1	
Communication State - Slot Timeout	2	
Communication State - Sub Message	Slot Number = 1744	

d) base direct (internal GNSS disabled; base station with semaphore qualified within range)		
Requirement		Verdict
Confirm that the sync state is 2	Sync state = 2	Pass
Position Report sent by EUT:		
!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1N1L01,0*2C		
Parameter	Decoded Value	
Message ID	1 - Position report	
Repeat Indicator	0	
MMSI	777888999	
Navigational Status	0 - under way using engine	
Rate Of Turn	0	
Speed Over Ground	10	
Position Accuracy	1 - high (> 10 m)	
Longitude	1 13.9423 W	
Latitude	50 52.7903 N	
Course Over Ground	11.1	
True Heading	0	
Time Stamp	47	
Special Manoeuvre Indicator	0 - not available	
Spare	0	
RAIM Flag	0 - RAIM not in use	
Communication State - Sync State	2	
Communication State - Slot Timeout	7	
Communication State - Sub Message	Received Stations = 1	

e) UTC indirect (internal GNSS receiver disabled; only Class B SO station UTC direct synchronised)	
Requirement	Verdict
Confirm that the sync state is 1	Pass
Position Report sent by EUT:	
!AIVDM,1,1,,B,1;UnTqhP?w<tSF0l4Q@>4?wv0d02,0*07	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate Of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	181 0 E
Latitude	91 0 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	63
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	1
Communication State - Slot Timeout	3
Communication State - Sub Message	Received Stations = 2

Synchronisation test using UTC with repeated messages - Clause 16.1.2

Method of measurement

Set up a test environment where all messages have a SyncState 0; choose test conditions in a way that the EUT operates in the following synchronisation modes:

a) UTC direct
b) UTC indirect (internal GNSS receiver disabled; at least one other station UTC direct synchronised)
c) UTC indirect (internal GNSS receiver disabled; all other stations UTC direct synchronised and syncstate 0, repeat indicator 1).

Check CommState parameter Sync state in position report and reporting interval.

Required results

The following results are required:

a) transmitted communication state shall fit the synchronisation mode
b) the EUT shall synchronise to the other station
c) the EUT shall go to syncstate 3.

Test Results

Step	Configuration	Result	Verdict
a)	GNSS enabled	Syncstate = 0: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0P0@9b,0*64	Pass
b)	GNSS disable, receiving station with UTC direct: !AIVDO,1,1,,A,13LC9e@2P:wrFu2M7AWh2gwD0000,0*0B	Syncstate = 1: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1J0`K@,0*0F	Pass
c)	GNSS disable, receiving station with UTC direct and repeat indicator = 1: !AIVDO,1,1,,A,1CLC9e@2P:wrFu2M7AWh2gwP0000,0*6F	Syncstate = 3: !AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv1PRV,0*37	Pass

Synchronisation Test Without UTC, Semaphore - Clause 16.1.3

Method of measurement

Set up standard test environment without UTC available.

Let EUT be semaphore qualified (sync mode 1 or 3) as follows:

a) Simulate other semaphore qualified stations with a different number of received stations.
b) Simulate other semaphore qualified stations with the same number of received stations.

Check CommState Parameter SyncState in position Report and reporting interval.

Required results

Transmitted CommState shall fit the Synchronisation mode.

a) EUT acts as semaphore only if it has the highest number of received stations
b) EUT acts as semaphore only if it has the lowest MMSI.

The EUT shall decrease reporting interval to 2 s when acting as a semaphore and shall remain in this state until the semaphore qualifying conditions have been invalid for 3 min.

Test Results

a) 2 Class A transponders were set up, both receiving each other. A position report from another class A was sent to the EUT from the test system, so that it had the highest number of stations.

EUT – Number of Received Stations = 3 **Class A 1– Number of Received Stations = 1**		
Action	Result	Verdict
The EUT is made semaphore qualified, entering sync state 3	UTC connection and base station removed, EUT enters sync state 3: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0P1d02,0*1B	-
EUT acts as a semaphore when it has the highest number of received stations	EUT acts as a semaphore, increasing its reporting interval to 2 seconds- as it has more received stations: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh081l03,0*79 !AIVDM,1,1,,B,14O3U@0P?w<tSF0l4Q@>4?wv1t01,0*35	Pass

b) 3 Transponders were set up all receiving each other with no GPS applied. The EUT MMSI was set to the highest value and then changed to the lowest value. Another Class A is applied with a lower MMSI than the EUT.

Requirement	Result	Verdict
Another class A with a lower MMSI acts as the semaphore. The MMSI of the EUT is then changed to be less than the other class A.	EUT starts transmitting with lowest MMSI at 11:03:02 EUT starts to timeout the slots at 11:03:03 Default reporting interval established at 11:04:02	Pass
When the EUT has the highest MMSI, it does not change its reporting interval	Reporting interval = 10 seconds	Pass
When the EUT has the lowest MMSI, it acts as a semaphore by increasing its reporting rate to 2 seconds	Reporting interval = 2 seconds	Pass

Synchronisation test without UTC - Clause 16.1.4

Method of measurement

Set up standard test environment; choose test conditions in a way that EUT operates in following sync modes:

a) base indirect (internal GNSS disabled; no station with UTC direct synchronisation or base station within range);
b) mobile indirect (internal GNSS disabled; other station with UTC direct synchronisation or base station without range);
c) internal GNSS enabled in synchronisation modes other than UTC direct.

Check CommState parameter sync state in position report and reporting interval.

Required results

The following results are required:

a) transmitted communication state shall fit the synchronisation mode;
b) transmitted communication state shall fit the synchronisation mode;
c) synchronisation mode shall revert to UTC direct.

Test Results

Step	Action	Result	Verdict
a)	Base station with sync state = 3 received by mobile, but not by EUT: !AIVDO,1,1,,A,402=W=1v=l<f0wrFu2M7AWi01d00,0*5D Mobile in base direct mode being received by EUT: !AIVDM,1,1,,A,14j8B@0P?w<tSF0l4Q@>4?wv1<03,0*45	Sync state = 3: !AIVDM,1,1,,B,3;UnTqhP?w<tSF0l4Q@>4?wv1P01,0*33	Pass
b)	UTC applied to mobile: !AIVDM,1,1,,B,14j8B@0P?w<tSF0l4Q@>4?wv00Rl,0*76	Sync state = 1: !AIVDM,1,1,,A,1;UnTqhP?w<tSF0l4Q@>4?wv0hKg,0*26	Pass
c)	UTC applied to EUT	Sync state = 0: !AIVDM,1,1,,B,1;UnTqhP?wOrCRHM6qJv4?vT08:l,0*64	Pass

Reception of un-synchronised messages - Clause 16.1.5

Method of measurement

Set up standard test environment and operate EUT in UTC direct mode.

Transmit un-synchronised test messages (more than ± 10 ms away from the slot boundary).

Required results

Verify that the transmitted test messages are received and processed.

Test Results

Message sent 14.2 ms away from slot boundary		
Message Sent	Message Received	Verdict
!AIVDO,1,1,,A,13LC9e@2P:wsK20MEs7h2gv<0000,0*1B	!AIVDM,1,1,,A,13LC9e@2P:wsK20MEs7h2gv<0000,0*19	Pass

2.11 Time division (frame format)

2.11.1 Specification Reference

IEC 61993-2, Clause 16.2

2.11.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 3

2.11.3 Date of Test

27-March-2018

2.11.4 Test Results and Methods of Measurement

Method of measurement

Set the EUT to max reporting rate of 2 sec by applying a speed of >23kn and a ROT of >20°/sec. Record VDL messages and check for used slots. Check parameter slot number in CommState of position report. Check slot length (transmission time)

Required results

Slot number used and slot number indicated in CommState shall match. Slot number shall not exceed 2249. Slot length shall not exceed 26.67 ms.

Test Results

Requirement	Verdict
Verify that the slot number used is the same as the indicated CommState.	Pass
Check that the slot number does not exceed 2249.	Pass
Confirm that the slot length does not exceed 26.67 ms. Maximum value = 23.66 ms.	Pass

2.12 Synchronisation and jitter accuracy

2.12.1 Specification Reference

IEC 61993-2, Clause 16.3

2.12.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 3

2.12.3 Date of Test

30-July-2019

2.12.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment, reporting interval of 2 s and using

a) UTC direct synchronisation
b) UTC indirect synchronisation by disconnecting the GNSS antenna of the EUT.

Record VDL messages and measure the time between the nominal beginning of the slot interval and the initiation of the “transmitter on” function. Alternative methods, e.g. by evaluating the start flag and calculating back to T_0 are allowed.

Required results

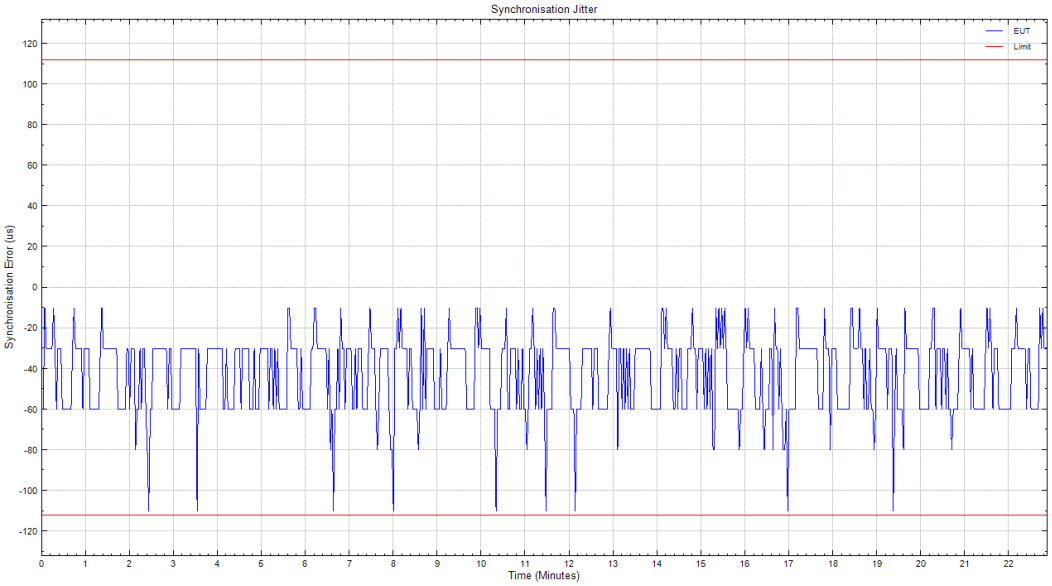
The synchronisation, including its jitter, shall not exceed

a) ±104 µs using UTC direct synchronisation,
b) ±312 µs using UTC indirect synchronisation.

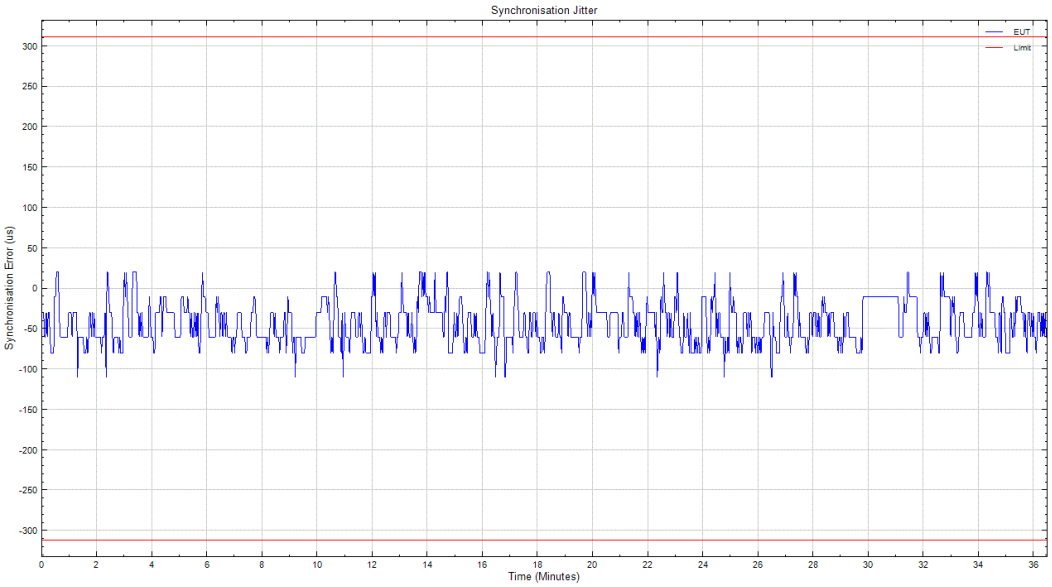
Test Results

UTC Direct	
Requirement	Verdict
Confirm that the jitter does not exceed ±104 µs.	Pass

UTC Indirect	
Requirement	Verdict
Confirm that the jitter does not exceed ±312 µs.	Pass



Synchronisation Jitter – UTC Direct



Synchronisation Jitter – UTC Indirect

2.13 Data encoding (bit stuffing)

2.13.1 Specification Reference

IEC 61993-2, Clause 16.4

2.13.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 3

2.13.3 Date of Test

27-March-2018

2.13.4 Test Results and Methods of Measurement

Method of measurement

Setup standard test environment.

a) Apply a binary broadcast message (msg 8) to the VDL containing the HEX-values “7E 3B 3C 3E 7E” in the data portion and check Presentation Interface output of EUT
b) Apply a BBM message to the EUT initiating the transmission of msg 8 containing the HEX-values as above in the data portion and check the VDL

Required results

Confirm that:

a) data output on the presentation interface conforms to transmitted data;
b) transmitted VDL message conforms to data input on the Presentation Interface.

Test Results

a) From EUT	
Requirement	Verdict
Message, “AIBBM,1,1,1,1,8,04001v>khvOP,4” sent to PI.	Pass
Confirm that correct VDO message is output to the PI: !AIVDO,1,1,,A,83O:AR@0@007ps?3qv0,2*74	Pass
Check that the target received the message, message received: !AIVDO,1,1,,A,83O:AR@0@007ps?3qv0,2*74	Pass
Confirm that the received message data is the same as the transmitted message data.	Pass

b) To EUT	
Requirement	Verdict
Message sent to EUT: !AIVDO,1,1,,A,84aagV00@00Gps?3qv0,2*24	Pass
Check that the EUT received the message, message received and output on PI: !AIVDM,1,1,,A,84aagV00@00Gps?3qv0,2*26	Pass

2.14 Frame check sequence

2.14.1 Specification Reference

IEC 61993-2, Clause 16.5

2.14.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 3

2.14.3 Date of Test

27-March-2018

2.14.4 Test Results and Methods of Measurement

Method of measurement

Apply a simulated position report message with wrong CRC bit sequence to the VDL.

Required results

Confirm that this message is not forwarded to the PI by the EUT.

Test Results

Requirement	Verdict
Confirm that the position report with an invalid CRC is not output on the PI.	Pass

2.15 Slot allocation (channel access protocols)

2.15.1 Specification Reference

IEC 61993-2, Clause 16.6

2.15.2 Equipment Under Test and Modification State

ATA100, S/N: TA008 - Modification State 3

2.15.3 Date of Test

27-March-2018

2.15.4 Test Results and Methods of Measurement

Network Entry - Clause 16.6.1

Method of measurement

Set up standard test environment; switch on EUT. Record transmitted scheduled position reports for the first 3 frames after initialisation period. Check CommState for channel access mode

Required results

EUT shall start autonomous transmissions of msg 3 (position report) with ITDMA CommState with Keep Flag set true for first frame and msg 1 with SOTDMA CommState for consecutive frames.

Test Results

Speed of 10 kn	
Requirement	Verdict
Verify that the first message is message 3.	Pass
Check that the keep flag is set in message 3.	Pass
Confirm that ITDMA CommState is used with message 3.	Pass
Confirm that message 1 is transmitted in the allocated slots in the next frame.	Pass
Verify that the initial slot timeout is between 3 and 7.	Pass
Confirm that the slot timeout values are decreased by one in the next frame.	Pass
Confirm that SOTDMA CommState is used with message 1.	Pass

Autonomous scheduled transmissions (SOTDMA) - Clause 16.6.2

Method of measurement

Set up standard test environment and operate EUT in autonomous mode as follows:

a) Record transmitted scheduled position reports Message 1 and check frame structure. Check CommState of transmitted messages for channel access mode and parameters number of received stations, slot timeout, slot number and slot offset.
b) Repeat the test with 50 % channel loading ensuring there are at least 4 free slots in each SI.
c) Repeat the test with 50 % channel loading by message 26 ensuring there are at least 4 free slots in each SI.

Required results

a) Nominal reporting interval is achieved ± 20 % (allocating slots in selection interval SI). Confirm that the EUT allocates new nominal transmission slots (NTS) within selection interval (SI) after 3 min to 8 min. Check that slot offset indicated in CommState matches slots used for transmission. Check that Class B “CS” are not included in the number of received stations
b) only free slots are used for transmission.
c) only free slots are used for transmission.

Test Results

a) No VDL Load	
Requirement	Verdict
Confirm that position reports are transmitted every 10 seconds.	Pass
Verify that the allocated slots are correct according to the 10 second reporting rate.	Pass
Confirm that each position report slot interval is 375 ± 20%. Min = 301, Max = 442 over 29 frames	Pass
Confirm that each position report is transmitted on alternate channels.	Pass
Channel access mode is SOTDMA	Pass
Verify that the initial slot timeout is between 3 and 7.	Pass
Verify that for timeout values 3, 5 and 7, the sub message contains the number of received stations.	Pass
Verify that for timeout values 2, 4 and 6, the sub message contains the current slot number.	Pass
Verify that for timeout value 1, the sub message contains UTC hour and minute.	Pass
Verify that for timeout value 0, the sub message contains the next slot offset.	Pass
Confirm that after slot time-out is zero, the value indicated by slot offset is used in the following frame.	Pass
Check the slot offset value is 2250 ± 75. Min = 2199, max = 2310 over 29 frames	Pass
Check that Class B “CS” are not included in the number of received stations.	Pass

b) 50 % Load with Message 1, slots ending in xxx1-xxx5 used for loading, SOG = 2 knots	
Requirement	Verdict
Position reports are transmitted every 2 seconds.	Pass
Only free slots used for transmission	Pass

c) 50 % Load with Message 26, slots ending in xxx1-xxx5 used for loading	
Requirement	Verdict
Position reports are transmitted every 2 seconds.	Pass
Only free slots used for transmission	Pass

Autonomous scheduled transmissions (ITDMA) - Clause 16.6.3

Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Set NavStatus of EUT to "at anchor" giving a reporting interval of 3 min. Record transmitted scheduled position reports.

Required results

Check that EUT transmits Message 3 and allocates slots using ITDMA and that slot offset indicated in CommState matches slots used for transmission.

Check that nominal reporting interval is achieved ± 20 %.

Test Results

Requirement	Result	Verdict
EUT transmits message 3 using ITDMA	EUT times out its allocated slots, and begins transmitting message 3 using ITDMA: !AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh0:0FLr,0*02	Pass
Slot offset is correct for the next transmitted slot	The slot allocation defined in the CommState submessage is correct, see the table below for details.	Pass
Slot interval is 13500 ± 20%. Min = 10800, Max = 16200	Slot interval achieves a nominal reporting rate within the ±20% tolerance, as shown in the table below.	Pass

Time	Chan	Slot	Sentence	Slot Offset	Next Slot	Report Interval	Variance
13:54:56	B	2135	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh1h0ETJ,0*71	5521	98		
13:58:04	A	184	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh080@Ir,0*03	4199	1325	00:03:08	+4%
14:01:02	B	98	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh040DUJ,0*2C	5269	59	00:02:58	-1%
14:03:35	A	1325	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh140DSb,0*00	5262	1279	00:02:33	-15%
14:07:01	B	59	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh020Bkb,0*3A	4814	1815	00:03:26	+14%
14:09:34	A	1279	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh120Er:,0*7E	5608	1579	00:02:33	-15%
14:12:48	B	1815	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh1P0DAr,0*65	5191	1698	00:03:14	+8%
14:15:42	A	1579	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh1B0FI:,0*36	5732	2003	00:02:54	-3%
14:18:45	B	1698	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh1H0ElJ,0*69	5585	1975	00:03:03	+2%
14:21:53	A	2003	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh1`0B<b,0*3D	4658	1353	00:03:08	+4%
14:24:52	B	1975	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh1`0A`J,0*49	4513	1180	00:02:59	-1%
14:27:36	A	1353	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh160DNJ,0*37	5241	1286	00:02:44	-9%
14:30:31	B	1180	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh0v0I@r,0*4E	6467	89	00:02:55	-3%
14:33:34	A	1286	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh120GUb,0*03	6038	2016	00:03:03	+2%
14:37:02	B	89	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh020D2J,0*4D	5129	2160	00:03:28	+16%
14:39:53	A	2016	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh1b0AH:,0*10	4448	1156	00:02:51	-5%
14:42:57	B	2160	!AIVDM,1,1,,B,3;UnTqi00:wrFu2M7AWhKh1j0DPJ,0*76	5249	2101	00:03:04	+2%
14:45:30	A	1156	!AIVDM,1,1,,A,3;UnTqi00:wrFu2M7AWhKh0t0I4r,0*3B	6419	17	00:02:33	-15%

Safety related/binary message transmission - Clause 16.6.4

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode.

a) Apply a 1 slot binary broadcast message (Message 8) to the PI of the EUT less than 4 s before the next scheduled transmission. Record transmitted messages. Retry with a 90 % channel load.
b) Apply a 1 slot binary broadcast message (Message 8) to the PI of the EUT more than 4 s before the next scheduled transmission. Record transmitted messages. Retry with 90 % channel load.
c) Apply combinations of binary broadcast message (Message 8), addressed binary message (Message 6), broadcast safety related message (Message 14) and addressed safety related message (Message 12) to the PI of the EUT. Record transmitted messages and output of the PI of the EUT.
d) Apply more than 5 AIR sentence per minute to the PI.

Required results

a) the EUT transmits this Message 8 within 4 s using ITDMA
b) the EUT transmits this Message 8 within 4 s using RATDMA
c) maximum 20 slots can be used per frame for Messages 6, 8, 12, 14, 25 and 26 and that messages using more than 3 slots are rejected. Confirm that sentence ABK is sent with acknowledge type 2 (Message could not be broadcast) when the message is rejected.
d) the EUT transmits not more than 5 Messages 15 per minute. Confirm that sentence ABK is sent with acknowledge type 2 (Message could not be broadcast) when the message is rejected.

Test Results

a) No VDL Load		
Requirement	Result	Verdict
Confirm that Message 8 is sent within 4 seconds: !AIVDO,1,1,,A,82wV1900@00E1Dm0,0*2A	2.3 seconds average	Pass
Confirm that the Message 8 is sent using ITDMA	Message 1 successfully replaced by message 3	Pass
Slot offset is correct in Message 3	Slot increments of 49, 151, 148 and 103	Pass
Message 8 shall be transmitted on the correct slot	Message 8 is transmitted on slots 1399, 49, 794 and 1453	Pass
The contents of Message 3 shall be correct	Full Message 3 decode is below	Pass
!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1600<A,0*54		
Parameter	Decoded Value	Verdict
Message ID	3 - Position report	Pass
Repeat Indicator	0	Pass
MMSI	777888999	Pass
Navigational Status	0 - under way using engine	Pass
Rate Of Turn	0	Pass
Speed Over Ground	10	Pass
Position Accuracy	1 - high (>10 m)	Pass
Longitude	1 13.9423 W	Pass
Latitude	52 5.1 S	Pass
Course Over Ground	11.1	Pass
True Heading	0	Pass
Time Stamp	35	Pass
Special Manoeuvre Indicator	0 - not available	Pass
Spare	0	Pass
RAIM Flag	0 - RAIM not in use	Pass
Communication State - Sync State	0	Pass
Communication State - Slot Increment	49	Pass
Communication State - Number Of Slots	0 - 1 Slot	Pass
Keep Flag	1	Pass

a) No VDL Load				
Time	Slot	MMSI	Message No.	Sentence
11:58:35		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
11:58:36	1350	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1600<A,0*54
11:58:37	1399	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
11:58:55		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
11:58:57	2148	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1h00Ui,0*4B
11:59:01	49	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
11:59:14		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
11:59:17	646	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0P00U1,0*2A
11:59:21	794	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
11:59:33		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
11:59:36	1350	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1600Ii,0*09
11:59:38	1453	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E

a) 90% VDL Load		
Requirement	Result	Verdict
Confirm that Message 8 is sent within 4 seconds: !AIVDO,1,1,,A,82wV1900@00E1Dm0,0*2A	2 seconds average	Pass
Confirm that the Message 8 is sent using ITDMA	Message 1 successfully replaced by message 3	Pass
Slot offset is correct in Message 3	Slot increments of 99, 58 and 50	Pass
Message 8 shall be transmitted in the correct slot	Message 3 Slot + Slot Increment = Message 8 slot: 1350 + 99 = 1449 2148 + 58 = 2206 646 + 50 = 696	Pass
The contents of Message 3 shall be correct	The Message 3 is encoded correctly, as seen below	Pass
!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1600Hi,0*08		
Parameter	Decoded Value	Verdict
Message ID	3 - Position report	Pass
Repeat Indicator	0	Pass
MMSI	777888999	Pass
Navigational Status	0 - under way using engine	Pass
Rate Of Turn	0	Pass
Speed Over Ground	10	Pass
Position Accuracy	1 - high (>10 m)	Pass
Longitude	1° 13.9423' W	Pass
Latitude	52° 5.1' S	Pass
Course Over Ground	11.1	Pass
True Heading	0	Pass
Time Stamp	35	Pass
Special Manoeuvre Indicator	0 - not available	Pass
Spare	0	Pass
RAIM Flag	0 - RAIM not in use	Pass
Communication State - Sync State	0	Pass
Communication State - Slot Increment	99	Pass
Communication State - Number Of Slots	0 - 1 Slot	Pass
Keep Flag	1	Pass

a) 90% VDL Load				
Time	Slot	MMSI	Message No	Sentence
12:00:34		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
12:00:36	1350	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1600Hi,0*08
12:00:38	1449	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
12:00:55		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
12:00:57	2148	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1h00>Q,0*18
12:00:58	2206	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
12:01:15		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
12:01:17	646	777888999	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0P00<Q,0*23
12:01:18	696	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E

b) No VDL Load		
Requirement	Result	Verdict
Confirm that message 8 is sent within 4 seconds	The EUT transmits Message 8 in 3.5 seconds on average	Pass
Confirm that the message 8 is sent using RATDMA	Message 8 is not announced using ITDMA, instead it uses RATDMA access mode	Pass

b) No VDL Load				
Time	Slot	MMSI	Message No.	Sentence
13:19:08		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
13:19:09	362	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
13:19:17	648	777888999	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0P08:8,0*46
13:20:50		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
13:20:51	1946	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
13:20:57	2156	777888999	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1j0D02,0*01
13:21:10		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29
13:21:11	430	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E
13:21:17	648	777888999	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0P00Rt,0*6A

b) 90% VDL Load					
Requirement				Result	Verdict
Confirm that Message 8 is sent within 4 seconds				Between 2.5 and 4.0 seconds	Pass
Confirm that the Message 8 is sent using RATDMA				Message 3 not transmitted	Pass
Time	Slot	MMSI	Message No.	Sentence	
13:22:10		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29	
13:22:10	402	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	
13:22:16	634	777888999	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0P0H9r,0*7F	
13:23:09		777888999		!AIBBM,1,1,2,1,8,04005@E=@,2*29	
13:23:10	398	777888999	8	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	
13:23:16	634	777888999	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0P0D0g,0*6F	

c) Apply a combination of Messages 6, 8, 12 and 14 to the PI			
Requirement			Verdict
Confirm that only 20 messages are sent in one frame			Pass
Confirm that an ABK message is sent with acknowledge type 2 for the rejected messages			Pass
No.	Sentence	Message Sent	Acknowledge
1	!AIABM,1,1,2,301000000,1,6,04205@E=@,2*38	!AIVDM,1,1,,A,6;UnTqq7hqD004205@E=@0,4*61	$AIABK,301000000,A,6,2,0*2B
2	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
3	!AIABM,1,1,2,301000000,1,12,D5CD,0*32	!AIVDM,1,1,,A,<;UnTqq7hqD0D5CD,0*62	$AIABK,301000000,A,12,2,0*1E
4	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
5	!AIBBM,1,1,2,1,14,D5CD,0*29	!AIVDM,1,1,,A,>;UnTqi@E=@,2*2E	$AIABK,,A,14,2,3*29
6	!AIABM,1,1,2,301000000,1,6,04205@E=@,2*38	!AIVDM,1,1,,A,6;UnTqq7hqD004205@E=@0,4*61	$AIABK,301000000,A,6,2,0*2B
7	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
8	!AIABM,1,1,2,301000000,1,12,D5CD,0*32	!AIVDM,1,1,,A,<;UnTqq7hqD0D5CD,0*62	$AIABK,301000000,A,12,2,0*1E
9	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
10	!AIBBM,1,1,2,1,14,D5CD,0*29	!AIVDM,1,1,,A,>;UnTqi@E=@,2*2E	!AIBBM,1,1,2,1,14,D5CD,0*29
11	!AIABM,1,1,2,301000000,1,6,04205@E=@,2*38	!AIVDM,1,1,,A,6;UnTqq7hqD004205@E=@0,4*61	$AIABK,301000000,A,6,2,0*2B
12	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
13	!AIABM,1,1,2,301000000,1,12,D5CD,0*32	!AIVDM,1,1,,A,<;UnTqq7hqD0D5CD,0*62	$AIABK,301000000,A,12,2,0*1E
14	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
15	!AIBBM,1,1,2,1,14,D5CD,0*29	!AIVDM,1,1,,A,>;UnTqi@E=@,2*2E	$AIABK,,A,14,2,3*29
16	!AIABM,1,1,2,301000000,1,6,04205@E=@,2*38	!AIVDM,1,1,,A,6;UnTqq7hqD004205@E=@0,4*61	$AIABK,301000000,A,6,2,0*2B
17	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
18	!AIABM,1,1,2,301000000,1,12,D5CD,0*32	!AIVDM,1,1,,A,<;UnTqq7hqD0D5CD,0*62	$AIABK,301000000,A,12,2,0*1E
19	!AIBBM,1,1,2,1,8,04005@E=@,2*29	!AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	$AIABK,,A,8,2,3*14
20	!AIBBM,1,1,2,1,14,D5CD,0*29	!AIVDM,1,1,,A,>;UnTqi@E=@,2*2E	!AIBBM,1,1,2,1,14,D5CD,0*29
21	!AIABM,1,1,2,301000000,1,6,04205@E=@,2*38	-	$AIABK,301000000,A,6,2,2*29
22	!AIBBM,1,1,2,1,8,04005@E=@,2*29	-	$AIABK,,A,8,2,2*15
23	!AIABM,1,1,2,301000000,1,12,D5CD,0*32	-	$AIABK,,A,14,2,2*28
24	!AIBBM,1,1,2,1,8,04005@E=@,2*29	-	$AIABK,,A,8,2,2*15
25	!AIBBM,1,1,2,1,14,D5CD,0*29	-	$AIABK,,A,14,2,2*28

c) Messages using more than 3 slots are rejected
There is inconsistency in the specification for multiple slot messages. Clause 14.1.6.1 requires that messages up to 5 slots shall be transmitted; therefore, this requirement is incorrect.

d) Apply more than 5 AIR sentences in a minute to the PI			
Requirement			Verdict
Confirm that only 5 messages can be sent in one minute			Pass
Confirm that message ABK is sent with acknowledge type 2 for the rejected messages			Pass
No.	Sentence	Message Sent	Acknowledge
1	$AIAIR,301000000,3,,,,,,*53	!AIVDM,1,1,,A,?;UnTqi7hqD0<00,2*31	$AIABK,301000000,A,15,0,3*18
2	$AIAIR,301000000,3,,,,,,*53	!AIVDM,1,1,,A,?;UnTqi7hqD0<00,2*31	$AIABK,301000000,A,15,0,3*18
3	$AIAIR,301000000,3,,,,,,*53	!AIVDM,1,1,,A,?;UnTqi7hqD0<00,2*31	$AIABK,301000000,A,15,0,3*18
4	$AIAIR,301000000,3,,,,,,*53	!AIVDM,1,1,,A,?;UnTqi7hqD0<00,2*31	$AIABK,301000000,A,15,0,3*18
5	$AIAIR,301000000,3,,,,,,*53	!AIVDM,1,1,,A,?;UnTqi7hqD0<00,2*31	$AIABK,301000000,A,15,0,3*18
6	$AIAIR,301000000,3,,,,,,*53	None	$AIABK,301000000,A,15,0,2*19
7	$AIAIR,301000000,3,,,,,,*53	None	$AIABK,301000000,A,15,0,2*19

Transmission of Message 5 (ITDMA) - Clause 16.6.5

Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Record transmitted messages.

Required results

Confirm that EUT transmits Message 5 using the ITDMA access scheme. The ITDMA access scheme shall replace a scheduled position report Message 1 with a Message 3.

Test Results

Requirement	Result	Verdict
Message 1 is replaced by message 3 when allocating the slot for message 5.	09:09:43, Slot 1615: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1D0<01, 0*57 09:10:43, slot 1615: !AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1D00mk, 0*5E	Pass
The slot offset in message 3 is correct and message 5 is transmitted in this slot.	Slot offset = 215, transmitted on slot 1615. Message 5 transmitted on slot 1830.	Pass
Message 5 is transmitted on the same channel as the message 3 that is announcing it.	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1D00mk, 0*5E !AIVDM,2,1,9,B,5;UnTqswwwwvErErEp00000000000 0000000000`0@1354g`81L@00000000,0*1E !AIVDM,2,2,9,B,00000000008,2*26	Pass

Assigned mode for reporting rates - Clause 16.6.6.1

Method of measurement

Operate the standard test environment and the EUT in autonomous mode. Transmit an assigned mode command message (Message 16) using a base station MMSI to the EUT with:

a) the number of reports per 10 min which is not a multiple of 20;
b) the number of reports per 10 min which is higher than 600.

Required results

This test requires that:
a) the EUT transmits position reports Message 2 at a reporting rate that corresponds to the next highest multiple of 20 reports per 10 min;
b) the EUT transmits position reports Message 2 at a reporting interval of 1 s.

Test Results

a)		
Requirement	Result	Verdict
EUT was commanded to report its position at a rate of 190 reports per 10 minutes.	!AIVDO,1,1,,A,@027`SRqMa>L;p00,0*54	-
The EUT should report at a rate of 200 reports per 10 minutes, as 200 is the next highest multiple of 20 after 190. This corresponds to a reporting interval of 3 seconds.	EUT increases it's reporting rate to transmits message 2 with the required interval of 3 seconds.	Pass

b)		
Requirement	Result	Verdict
EUT was commanded to report its position at a rate of 800 reports per 10 minutes.	!AIVDO,1,1,,A,@027`SRqMa>Lj000,0*45	-
The EUT should default to using a reporting interval of 1 second.	The EUT successfully uses a reporting interval of 1 second, corresponding to 600 reports per 10 min.	Pass

Receiving test - Clause 16.6.6.2

Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Transmit an assigned mode command (Message 16) using a base station MMSI to the EUT with slot offset, slot increment, designated reporting interval.

Record transmitted messages.

Required results

Confirm that EUT transmits position report Message 2 according to defined parameters and reverts to SOTDMA Message 1 with standard reporting interval after 4 min to 8 min.

Test Results

Requirement	Result	Verdict
Message 16 is sent to the EUT- reporting rate is set to 10 reports per minute and an offset of 50 slots is used.	!AIVDO,1,1,,A,@027`SRqMa>L380h,0*4C	-
EUT uses message 2 to report position.	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0J0@7u,0*67	Pass
EUT uses the correct slot offset and increment.	See the table below for results.	Pass
EUT reverts to message 1, using SOTDMA to transmit position reports after 4 to 8 minutes.	First message 2 transmission at 12:36:01, and first message 1 transmission at 12:44:02. !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b0HOC,0*08	Pass

Message Transmission Log				
Time	Slot	Msg	Sentence	Comment
12:35:31	1169	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0t08BA,0*60	
12:35:42	1578	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1B0<02,0*51	
12:35:50	1882	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1R0L02,0*32	
12:35:59	9	16	!AIVDO,1,1,,A,@027`SRqMa>L380h,0*4C	Assigned mode command transmitted
12:36:01	53	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh020000,0*2E	EUT starts timing-out slots
12:36:01	59	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh020H0s,0*16	First message 2 transmitted 50 slots after the message 16
12:36:07	284	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0>0H4L,0*22	A slot increment of 225 corresponds to a reporting rate of 10 reports per minute, as set by message 16
12:36:10	402	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0D0000,0*5B	
12:36:13	509	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0J0H7u,0*6F	
12:36:19	734	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0V0H;N,0*47	
12:36:21	810	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0b0000,0*7E	
12:36:25	959	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0j0H>w,0*44	
12:36:31	1169	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0t0000,0*6B	
12:36:31	1184	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0v0HBP,0*00	
12:36:37	1409	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1:0HF1,0*2B	
12:36:42	1578	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1B0000,0*5F	
12:36:43	1634	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1F0HIR,0*38	
12:36:49	1859	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1R0HM3,0*4A	
12:36:50	1882	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1R0000,0*4C	EUT finishes timing out message 1 slots
12:36:55	2084	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1f0HPT,0*07	
A 5-minute period of message 2 results were recorded but omitted from this report.				
12:42:01	59	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh020000,0*2D	Message 2 slot timeout begins
12:42:07	284	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0>0000,0*22	
12:42:13	509	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0J0000,0*55	
12:42:19	734	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0V0000,0*4A	
12:42:25	959	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0j0000,0*75	
12:42:31	1184	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0v0000,0*6A	
12:42:37	1409	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1:0000,0*24	
12:42:43	1634	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1F0000,0*5B	Final message 2 slot timeout
12:42:49	1859	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1R01r@,0*7E	EUT reserves slots for message 1 00:06:50 after timing out initial message 1, using ITDMA

Message Transmission Log				
Time	Slot	Msg	Sentence	Comment
12:42:55	2084	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1f02bh,0*72	
12:43:02	98	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0402r1,0*6B	
12:43:13	517	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0J02t1,0*10	
12:43:22	842	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0d039i,0*29	
12:43:33	1269	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1202oQ,0*12	
12:43:44	1649	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1F0001,0*58	
12:43:53	2003	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1b0001,0*7F	Final message 3, all message 1 slots are now reserved
12:44:02	98	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh040L02,0*56	First message 1 transmission after 00:08:03
12:44:13	517	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0J0H85,0*20	
12:44:22	842	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0d0<02,0*76	
12:44:33	1269	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120D02,0*5A	
12:44:44	1649	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1F0L02,0*25	
12:44:53	2003	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b0HOC,0*08	End of first frame of message 1 transmissions, EUT returns to autonomous operation successfully

Slot assignment to FATDMA reserved slots - Clause 16.6.6.3

Method of measurement

Set up the standard test environment and operate EUT in autonomous mode. Transmit a data link management message (Message 20) using a base station MMSI to the EUT with slot offset and increment. Transmit an assigned mode command (Message 16) using a base station MMSI to the EUT and command it to use one or more of those FATDMA allocated slots. Record transmitted messages.

Required results

Confirm that the EUT uses the slots commanded by Message 16 for own transmissions.

Test Results

Requirement	Result	Verdict
A data link management message is sent to the EUT.	The EUT was configured to reserve the first 5 of every 10 slots: start slot = 10, offset = 10, number of reserved slots = 5, time out = 7 frames, increment = 10 slots. AIVDO,1,1,,A,D027`SP0aN0`,0*79	-
EUT does not use the reserved slots.	The EUT successfully timed out any message 1's that are scheduled on reserved slots and does not use these slots during the timeout period, as shown below.	Pass
An assigned mode command is sent by a base station to the EUT.	A message 16 is sent from the base station with an increment of 75 slots on slot 10: !AIVDO,1,1,,A,@027`SRqMa>L6@1@,0*18	-
EUT reports using message 2 at a rate of one position report per 45 slots, taking priority over message 20.	The message 16 takes priority over the message 20, and the EUT begins transmitting position reports on previously reserved slots.	Pass

Time	Slot	Msg	Sentence	Comment
13:20:59	10	20	!AIVDO,1,1,,A,D027`SP0aN0`,0*79	Message 20 sent to the EUT, slots ending in 0-4 are reserved
13:21:04	151	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0600Rt,0*0C	Timeout of reserved slot
13:21:15	564	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0L00R?,0*3E	Timeout of reserved slot
13:21:25	947	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0h0D02,0*02	
13:21:35	1316	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1400RA,0*39	
13:21:43	1648	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1F08Ih,0*72	
13:21:53	2007	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b0<02,0*72	
13:22:03	137	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh060H29,0*59	
13:22:13	505	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0J0L02,0*2B	
13:22:25	947	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0h0@>k,0*51	
13:22:43	1648	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1F05aH,0*77	
13:22:53	2007	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b08OG,0*7C	
13:23:03	137	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh060D02,0*5C	
13:23:13	505	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0J0H7q,0*6B	
13:23:25	947	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0h0<02,0*7A	
13:23:33	1259	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120D02,0*5A	
13:23:43	1648	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1F00Sr,0*7A	
13:23:53	2007	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b05aL,0*54	
13:24:03	137	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh060@29,0*51	
13:24:13	505	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0J0D02,0*23	
13:24:25	947	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0h08>k,0*29	
13:24:33	1259	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120@Cc,0*7C	
13:24:45	1696	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1H0HJP,0*37	
13:24:53	2007	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b00S;,0*14	
13:24:59	10	16	!AIVDO,1,1,,A,@027`SRqMa>L6@1@,0*18	Assigned mode command sent
13:25:02	110	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh040L02,0*55	EUT uses slot previously reserved by message 20
13:25:03	137	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh060000,0*2A	
13:25:04	185	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh080L02,0*5A	
13:25:06	260	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0<0L02,0*5D	
13:25:08	335	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0@0L02,0*22	
13:25:10	410	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0D0L02,0*25	
13:25:12	485	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0H0L02,0*2A	

Time	Slot	Msg	Sentence	Comment
13:25:13	505	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0J0000,0*55	
13:25:14	560	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0L0L02,0*2D	
13:25:16	635	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0P0L02,0*32	
13:25:18	710	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0T0L02,0*35	
13:25:20	785	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0`0L02,0*02	
13:25:22	860	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0d0L02,0*05	
13:25:24	935	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0h0L02,0*0A	
13:25:25	947	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0h0000,0*74	
13:25:26	1010	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0l0L02,0*0D	
13:25:28	1085	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0p0L02,0*12	
13:25:30	1160	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0t0L02,0*15	
13:25:32	1235	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh100L02,0*53	
13:25:33	1259	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120000,0*2C	
13:25:34	1310	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh140L02,0*54	
13:25:36	1385	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh180L02,0*5B	
13:25:38	1460	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1<0L02,0*5C	
13:25:40	1535	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1@0L02,0*23	
13:25:42	1610	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1D0L02,0*24	
13:25:44	1685	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1H0L02,0*2B	
13:25:45	1696	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1H0000,0*55	
13:25:46	1760	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1L0L02,0*2C	
13:25:48	1835	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1P0L02,0*33	
13:25:50	1910	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1T0L02,0*34	
13:25:52	1985	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1`0L02,0*03	
13:25:53	2008	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1b0000,0*7C	
13:25:54	2060	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1d0L02,0*04	
13:25:56	2135	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1h0L02,0*0B	
13:25:58	2210	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1l0L02,0*0C	

Assignment priority - Clause 16.6.7.1

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode and use a base station MMSI to transmit Messages 22 and 23.

a) Transmit an assigned mode command (Message 23) to the EUT with Tx/Rx mode 1. Wait for 2 min.
b) Transmit a Message 22 defining a region with the EUT inside that region, Tx/Rx mode = 0.
c) Wait for time-out of Message 23.
d) Transmit an assigned mode command (Message 23) to the EUT with Tx/Rx mode 1. Wait for 2 min.
e) Transmit a Message 22 to the EUT individually addressed and specifying Tx/Rx mode 2.
f) Transmit a Message 23 per minute for 15 min to the EUT with Tx/Rx mode 1.
g) Wait for time-out of message 23.

Record transmitted messages.

Required results

Verify that:
a) the Tx/Rx mode = 1 according to the Message 23 setting;
b) the Tx/Rx mode of Message 22 is ignored and Tx/Rx mode = 1 according to the Message 23 setting continues;
c) the Tx/Rx mode reverts to Tx/Rx mode 0 according to the Message 22 setting;
d) the Tx/Rx mode = 1 according to the Message 23 setting;
e) the Tx/Rx mode field setting of Message 22 takes precedence over the Tx/Rx mode field setting of Message 23 and so Tx/Rx mode = 2;
f) the EUT ignores the assignment by Message 23 and the setting of Message 22 takes precedence for 10 min; after 10 min the Tx/Rx mode changes to Tx/Rx mode 1 according to the Message 23 setting;
g) The receiving station shall revert to its previous Tx/Rx mode = 2 after a timeout value randomly chosen between 240 s and 480 s.

Test Results

a)		
Requirement	Result	Verdict
Message 23 is sent to the EUT.	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	-
EUT transmits using channel A, and receives using both channel A and B.	The EUT times out slots on channel B, and reserves slots on channel A, before transmitting on channel A.	Pass

a)					
Time	Slot	Chan	MSG	Sentence	Comment
09:26:00	36	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	
09:26:05	190	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0801Fi,0*08	EUT begins reserving slots
09:26:08	332	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0@0000,0*5F	EUT begins timing out slots
09:26:14	537	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0J01Mi,0*71	
09:26:17	661	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0R0000,0*4E	
09:26:24	912	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0f01OA,0*77	
09:26:26	1008	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0l0000,0*73	
09:26:34	1293	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1401PQ,0*2B	
09:26:38	1447	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1<0000,0*21	
09:26:44	1679	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1H01HA,0*5F	
09:26:47	1788	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1N0000,0*50	
09:26:54	2032	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1b0001,0*7C	
09:26:58	2175	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1j0000,0*77	
09:27:05	190	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh080D01,0*52	EUT enters assigned mode
09:27:14	537	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0J0D01,0*20	EUT uses channel A only
09:27:24	912	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0f01LS,0*66	
09:27:34	1293	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh140D01,0*5F	

a)					
Time	Slot	Chan	MSG	Sentence	Comment
09:27:44	1679	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1H0D01,0*23	
09:27:54	2032	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1b0D01,0*09	

b)		
Requirement	Result	Verdict
Message 22 is sent, defining a region that contains the EUT with Tx/Rx mode = 0.	!AIVDO,1,1,,A,F027`SR2N2P7vm1oR?sD3bH2P000,0*4B	-
The EUT shall ignore the Message 22 commanding a Tx/Rx = 0.	The EUT ignores the regional operating settings in Message 22, continuing to transmit on channel A only.	Pass

b)					
Time	Slot	Chan	MSG	Sentence	Comment
09:27:58	2218	A	22	!AIVDO,1,1,,A,F027`SR2N2P7vm1oR?sD3bH2P000,0*4B	Msg 22 with Tx/Rx = 0
09:28:05	190	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh080@2v,0*13	EUT ignores Msg 22
09:28:14	537	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0J0@8l,0*54	
09:28:24	912	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0f0@>@,0*77	
09:28:34	1293	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh140@D=,0*23	
09:28:44	1679	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1H0@J?,0*53	
09:28:54	2032	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1b0@Oh,0*2B	EUT maintains Tx/Tx = 1
09:29:05	190	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh080<01,0*2A	

c)		
Requirement	Result	Verdict
The EUT uses Tx/Rx mode = 0 as instructed by Message 22, after Message 23 time-out.	The EUT reserves slots on channel B using Message 3, then begins transmitting on both channels A and B.	Pass

c)					
Time	Slot	Chan	MSG	Sentence	Comment
09:33:03	116	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0402vA,0*1C	Message 23 times out after 7 minutes
09:33:12	485	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0H02m1,0*08	EUT reverts to Tx/Rx = 0 after timeout
09:33:23	877	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0d02g1,0*2D	
09:33:32	1209	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0v034A,0*1E	
09:33:42	1577	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1B0001,0*5F	
09:33:53	1994	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1`0001,0*7E	
09:34:03	116	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh040H1l,0*0E	EUT operates in autonomous mode
09:34:12	485	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0H0<01,0*59	Tx/Rx = 0
09:34:23	877	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0d0D01,0*0E	
09:34:32	1209	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0v0HBq,0*21	
09:34:42	1577	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1B00:3,0*57	Announcing Message 5
09:34:53	1994	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1`0L01,0*00	
09:35:03	116	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh040D01,0*5E	

d)		
Requirement	Result	Verdict
Message 23 is sent to the EUT, with Tx/Rx mode = 1.	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	-
The EUT adopts a Tx/Rx mode = 1.	The EUT times out all slots reserved on channel A and B with Message 1, while reserving new slots on channel A only using Message 3.	Pass

d)					
Time	Slot	Chan	MSG	Sentence	Comment
09:36:03	158	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	Set Tx/Rx = 1
09:36:11	442	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0F01OQ,0*47	EUT starts reserving slots on A
09:36:12	485	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0H0000,0*54	
09:36:21	824	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0b01EA,0*79	
09:36:23	877	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0f0000,0*79	EUT times out channel B slots
09:36:31	1165	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0t01S1,0*09	
09:36:32	1209	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0v0000,0*6A	
09:36:41	1561	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1B01IQ,0*44	
09:36:42	1577	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1B0000,0*5C	

d)					
Time	Slot	Chan	MSG	Sentence	Comment
09:36:51	1919	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1T01RQ,0*49	
09:36:53	1994	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1`0000,0*7D	
09:37:01	63	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh020001,0*2D	
09:37:03	116	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh040000,0*2B	EUT finishes timing out slots
09:37:11	442	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0F0D01,0*2C	EUT enters assigned mode on
09:37:21	824	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0b0D01,0*08	EUT uses channel A only
09:37:31	1165	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0t0D01,0*1E	
09:37:41	1561	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1B0D01,0*29	
09:37:51	1919	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1T0D01,0*3F	
09:38:01	63	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh020D01,0*58	
09:38:11	442	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0F0@6r,0*6D	

e)		
Requirement	Result	Verdict
Message 22 is sent to the EUT, with Tx/Rx mode = 2.	!AIVDO,1,1,,A,F027`SR2N2PUjsBLp000000BP000,0*38	-
The EUT adopts a Tx/Rx mode = 2.	The EUT times out reserved slots on channel A using Message 2, while reserving new transmissions slots on channel B using Message 3. The EUT then operates in assigned mode on channel B only.	Pass

e)					
Time	Slot	Chan	MSG	Sentence	Comment
09:38:59	2242	A	22	!AIVDO,1,1,,A,F027`SR2N2PUjsBLp000000BP000,0*38	Set Tx/Rx = 2
09:39:01	63	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh020000,0*2D	EUT begins timeout of channel A slots
09:39:04	180	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0801TQ,0*21	EUT begins reserving slots on B
09:39:11	442	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0F0000,0*59	
09:39:15	582	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0N01Ei,0*7E	
09:39:21	824	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0b0000,0*7D	
09:39:24	925	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0h01QA,0*64	
09:39:31	1165	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0t0000,0*6B	
09:39:35	1314	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1401LA,0*24	
09:39:41	1561	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1B0000,0*5C	
09:39:44	1683	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1H01P1,0*34	
09:39:51	1919	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1T0000,0*4A	
09:39:55	2067	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1d0001,0*79	EUT finishes timing out on channel A
09:40:04	180	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh08082l,0*72	EUT is in assigned mode on channel B
09:40:15	582	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0N0896,0*55	
09:40:24	925	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0h08>M,0*0F	
09:40:35	1314	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1408DR,0*37	
09:40:44	1683	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1H08JC,0*54	
09:40:55	2067	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1d08PC,0*62	
09:41:04	180	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0805:T,0*4F	

f)		
Requirement	Result	Verdict
Transmit Message 23 once per minute for 15 minutes, with Tx/Rx mode = 1	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	-
The EUT adopts a Tx/Rx mode = 1, only after the 10-minute time-out of Message 22 has occurred.	The EUT uses Tx/Rx mode = 1, 00:11:07 after Message 22 was sent.	Pass

f)					
Time	Slot	Chan	MSG	Sentence	Comment
09:42:00	45	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	Set Tx/Rx = 1
09:42:04	180	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh080000,0*24	EUT successfully ignores Msg 23
09:42:15	582	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0N0000,0*52	No slots on channel A are reserved
09:42:24	925	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0h0000,0*74	
09:42:35	1314	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh140000,0*29	
09:42:44	1683	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1H0000,0*55	

f)					
Time	Slot	Chan	MSG	Sentence	Comment
09:42:55	2067	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1d0000,0*79	
09:42:59	2238	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1n01OA,0*7D	
EUT transmits on channel B for another 7 minutes; this has been omitted from the report but can be seen in the test log.					
09:50:00	45	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	Set Tx/Rx = 1
09:50:06	261	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0<00ci,0*28	EUT uses Tx/Rx = 1, 11:07 after Msg 22
09:50:09	354	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0B0000,0*5D	EUT begins timing out channel B slots
09:50:11	436	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0F00iA,0*70	EUT begins reserving slots on channel A
09:50:16	633	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0P00hQ,0*77	
09:50:20	757	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0V0000,0*49	
09:50:22	827	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0b00eA,0*58	
09:50:26	1008	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0l00gQ,0*44	
09:50:30	1134	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0r0000,0*6D	
09:50:31	1198	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0v00fQ,0*5F	
09:50:36	1384	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1800hA,0*0E	
09:50:39	1480	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1>0000,0*20	
09:50:42	1577	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1B00fA,0*7A	
09:50:46	1762	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1L00hA,0*7A	
09:50:49	1851	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1P0000,0*4E	
09:50:52	1955	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1V00fQ,0*7E	
09:50:57	2141	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1h00ei,0*7B	
09:50:59	2238	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1n0000,0*70	EUT finishes timing out slots on A
09:51:00	45	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	Set Tx/Rx = 1, sent every min for 15 mins
09:51:01	74	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh020001,0*2D	EUT finishes reserving slots
09:51:06	261	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0<0D01,0*56	EUT operates in assigned mode
09:51:11	436	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0F0D01,0*2C	EUT uses channel A only, Tx/Rx = 1
09:51:16	633	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0P0D01,0*3A	
09:51:22	827	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0b0D01,0*08	

g)		
Requirement	Result	Verdict
The EUT reverts to Tx/Rx = 2 after a timeout of between 240s and 480s.	The EUT reverts to Tx/Rx = 2 after 427 seconds.	Pass

g)					
Time	Slot	Chan	MSG	Sentence	Comment
09:56:00	45	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000@00,2*43	Set Tx/Rx = 1
A period of 00:06:52 was omitted from this report, while the EUT remained in assigned mode.					
10:02:52	1955	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1V0000,0*48	
10:02:57	2141	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1h0000,0*76	
10:03:01	74	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh020000,0*2D	
10:03:07	264	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0<01SA,0*32	EUT reverts to Tx/Rx = 2 after 427s
10:03:17	661	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0R01JA,0*45	
10:03:27	1022	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0l01RA,0*63	
10:03:37	1415	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1:01Ni,0*00	

Increased reporting interval assignment - Clause 16.6.7.2

Method of measurement

Set up the standard test environment and operate EUT in autonomous mode with 10 s reporting interval, and use a base station MMSI to transmit Message 23 as follows:

a) Transmit a group assignment message (Message 23) to the EUT with a reporting interval that is longer than the autonomous reporting interval.
b) Transmit a group assignment message (Message 23) to the EUT with a quiet time command.
c) Set the Nav status to “moored” and “at anchor” and SOG < 3 kn. Transmit a group assignment message (Message 23) to the EUT with a reporting interval that is shorter than the autonomous reporting interval.
d) Set the Nav status to “moored” and “at anchor” and SOG > 3 kn. Transmit a group assignment message (Message 23) to the EUT with a reporting interval that is shorter than the autonomous reporting interval.

Required results

Confirm that

a) the EUT ignores the assignment command and transmits position reports with the autonomous reporting interval,
b) the EUT ignores the assignment command and transmits position reports with the autonomous reporting interval,
c) the EUT ignores the assignment command and transmits position reports with the autonomous reporting interval,
d) the EUT transmits position reports with the assigned reporting interval.

Test results

a)		
Requirement	Result	Verdict
Message 23 is sent to the EUT, commanding the reporting interval be changed from 10s to 30s.	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000500,2*36	-
The EUT ignores the message 23 command and continues to transmit position reports at the autonomous rate.	EUT maintains the higher reporting rate of once every 10 seconds: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0f0@=i,0*5E	Pass

b)		
Requirement	Result	Verdict
Message 23 is sent to the EUT, with a quiet time command of 5 minutes.	!AIVDO,1,1,,A,G027`SSwD@si7vL1o90000007D0,2*74	-
The EUT ignores the assignment command and continues transmitting message 1 at the autonomous reporting rate.	The EUT successfully ignores the quiet time command, maintaining its autonomous position reporting rate as seen below.	Pass

b)				
Time	Slot	Msg	Sentence	Comment
15:08:24	917	23	!AIVDO,1,1,,A,G027`SSwD@tkGvL1o>0000000D0,2*01	Message 23 commands the EUT to stop transmitting for 5 minutes.
15:08:27	1047	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0n05pP,0*57	EUT ignores the quiet time command.
15:08:38	1450	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1<0D02,0*54	
15:08:48	1804	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1N0D02,0*25	
15:08:58	2185	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1j0D02,0*02	

c) NavStatus = “Moored”		
Requirement	Result	Verdict
EUT NavStatus is set to “Moored” and the SOG < 3kn.	NavStatus configured via MKD and SOG successfully, with the EUT using a 3-minute reporting interval:	-

c) NavStatus = “Moored”		
Requirement	Result	Verdict
	!AIVDM,1,1,,A,3;UnTqm00DwrFu2M7AWhKh0R0F6J,0*52	
Message 23 is transmitted, instructing the EUT to adopt a reporting interval of 15 seconds.	The EUT ignores the increased reporting rate that is outlined in Message 23: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000600,2*35 The EUT maintains its autonomous reporting rate, as shown in the table below.	Pass

c) NavStatus = “Moored”				
Time	MMSI	MSG	Sentence	Interval
07:54:28	777888999	3	!AIVDM,1,1,,B,3;UnTqm00DwrFu2M7AWhKh0p0EGJ,0*01	N/A
07:57:17	777888999	3	!AIVDM,1,1,,A,3;UnTqm00DwrFu2M7AWhKh0R0F6J,0*52	00:02:49
08:00:33	777888999	3	!AIVDM,1,1,,B,3;UnTqm00DwrFu2M7AWhKh100@h:,0*1A	00:03:16
08:02:02	2222222	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000600,2*35	N/A
08:03:26	777888999	3	!AIVDM,1,1,,A,3;UnTqm00DwrFu2M7AWhKh0l0Ci:,0*46	00:02:53
08:06:05	777888999	3	!AIVDM,1,1,,B,3;UnTqm00DwrFu2M7AWhKh0:0HAr,0*78	00:02:39

c) NavStatus = “At Anchor”		
Requirement	Result	Verdict
EUT NavStatus is set to “At Anchor” and the SOG < 3kn.	NavStatus configured via MKD and SOG successfully, and the EUT adopts a 3-minute reporting interval: !AIVDM,1,1,,A,3;UnTqi00DwrFu2M7AWhKh0d0GpJ,0*27	-
Message 23 is transmitted, instructing the EUT to adopt a reporting interval of 15 seconds.	The EUT ignores the increased reporting rate that is outlined in Message 23: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B The EUT maintains its autonomous reporting rate, as shown in the table below.	

c) NavStatus = “At Anchor”			
Time	MSG	Sentence	Interval
09:18:22	3	!AIVDM,1,1,,A,3;UnTqi00DwrFu2M7AWhKh0d0GpJ,0*27	N/A
09:21:25	3	!AIVDM,1,1,,B,3;UnTqi00DwrFu2M7AWhKh0h0Bt:,0*59	00:03:03
09:21:40	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	N/A
09:24:44	3	!AIVDM,1,1,,A,3;UnTqi00DwrFu2M7AWhKh1H0ALr,0*08	00:03:19

d) NavStatus = “Moored”		
Requirement	Result	Verdict
EUT NavStatus is set to “Moored” and the SOG > 3 kn.	The Message 3 special position report is transmitted by the EUT at an appropriate rate for the speed. This test uses a SOG of 10kn, giving a reporting interval of 10s: !AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh0r02sA,0*59	-
A Message 23 is sent to the EUT, instructing the reporting interval to change from 10s to 5s.	The Message 23 sent to the EUT has a Reporting Interval = 8, which corresponds to 5 seconds: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	-
The EUT transmits position reports with the assigned reporting interval, as per Message 23.	The EUT increases the reporting rate of Message 3 as instructed by the Message 23- results are shown below.	Pass

d) NavStatus = “Moored”					
Time	Slot	Chan	Msg	Sentence	Comment
08:21:40	1519	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh1@02wA,0*6D	EUT uses 10s interval
08:21:49	1871	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh1R0001,0*49	
08:22:00	34	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh000001,0*29	
08:22:04	173	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	EUT instructed to increase reporting rate
08:22:11	425	A	1	!AIVDM,1,1,,A,1;UnTqm01TwrFu2M7AWhKh0D0000,0*5D	EUT begins timing out slots
08:22:12	478	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh0H01NQ,0*4D	EUT begins reserving slots
08:22:17	655	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh0R01R1,0*28	
08:22:20	765	B	1	!AIVDM,1,1,,B,1;UnTqm01TwrFu2M7AWhKh0`0000,0*7A	
08:22:22	856	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh0d01O1,0*00	
08:22:27	1047	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh0n01NQ,0*68	
08:22:29	1122	A	1	!AIVDM,1,1,,A,1;UnTqm01TwrFu2M7AWhKh0r0000,0*6B	
08:22:32	1236	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh1001LQ,0*36	
08:22:38	1425	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh1:01OA,0*2C	
08:22:40	1519	B	1	!AIVDM,1,1,,B,1;UnTqm01TwrFu2M7AWhKh1@0000,0*5B	
08:22:42	1606	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh1D01HA,0*56	

d) NavStatus = “Moored”					
Time	Slot	Chan	Msg	Sentence	Comment
08:22:48	1806	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh1N01Ki,0*74	
08:22:49	1871	A	1	!AIVDM,1,1,,A,1;UnTqm01TwrFu2M7AWhKh1R0000,0*4A	
08:22:52	1959	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh1V01Qi,0*75	
08:22:57	2173	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh1j01Li,0*57	
08:23:00	34	B	1	!AIVDM,1,1,,B,1;UnTqm01TwrFu2M7AWhKh000000,0*2A	EUT finishes timing out slots
08:23:02	100	A	3	!AIVDM,1,1,,A,3;UnTqm01TwrFu2M7AWhKh040001,0*2E	
08:23:07	294	B	3	!AIVDM,1,1,,B,3;UnTqm01TwrFu2M7AWhKh0>0001,0*27	EUT finishes reserving slots
08:23:12	478	A	2	!AIVDM,1,1,,A,2;UnTqm01TwrFu2M7AWhKh0H087N,0*23	EUT begins transmitting with the assigned reporting rate
08:23:17	655	B	2	!AIVDM,1,1,,B,2;UnTqm01TwrFu2M7AWhKh0R08:?,0*46	
08:23:22	856	A	2	!AIVDM,1,1,,A,2;UnTqm01TwrFu2M7AWhKh0d08=H,0*03	
08:23:27	1047	B	2	!AIVDM,1,1,,B,2;UnTqm01TwrFu2M7AWhKh0n08@G,0*78	
08:23:32	1236	A	2	!AIVDM,1,1,,A,2;UnTqm01TwrFu2M7AWhKh1008CD,0*24	
08:23:38	1425	B	2	!AIVDM,1,1,,B,2;UnTqm01TwrFu2M7AWhKh1:08FA,0*2D	

d) NavStatus = “At Anchor”		
Requirement	Result	Verdict
EUT NavStatus is set to “At Anchor” and the SOG > 3 kn.	The Message 3 special position report is transmitted by the EUT at an appropriate rate for the speed. This test uses a SOG of 10kn, giving a reporting interval of 10s: !AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1f02hQ,0*40	-
A Message 23 is sent to the EUT, instructing the reporting interval to change from 10s to 5s.	The Message 23 sent to the EUT has a Reporting Interval = 8, which corresponds to 5 seconds: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	-
The EUT transmits position reports with the assigned reporting interval, as per Message 23.	The EUT increases the reporting rate of Message 3 as instructed by the Message 23- results shown below.	Pass

d) NavStatus = “At Anchor”					
Time	Slot	Chan	Msg	Sentence	Comment
09:32:25	962	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0j02wQ,0*51	
09:32:35	1329	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh160001,0*2A	EUT uses a reporting interval of 10s
09:32:42	1604	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	New reporting interval of 5s transmitted
09:32:46	1747	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1L01OA,0*5D	
09:32:51	1926	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1T01L1,0*35	EUT uses new reporting interval of 5s
09:32:56	2111	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1f0000,0*79	EUT begins timing out slots
09:32:56	2128	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1h01GA,0*71	
09:33:01	44	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0001P1,0*4C	
09:33:05	199	A	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh080000,0*25	
09:33:06	227	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0:01Pi,0*1D	
09:33:11	428	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0F01KQ,0*41	
09:33:15	567	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh0L0000,0*52	
09:33:16	614	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0N01Q1,0*30	
09:33:21	794	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0`01Mi,0*59	
09:33:25	962	A	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0j0000,0*77	
09:33:26	1002	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0l01Ii,0*52	
09:33:31	1169	B	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0t01SQ,0*6B	
09:33:35	1329	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh160000,0*29	EUT finishes timing out slots
09:33:36	1361	A	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh160001,0*29	
09:33:46	1747	A	2	!AIVDM,1,1,,A,2;UnTqi01TwrFu2M7AWhKh1L0D02,0*25	EUT begins using Msg 2 once all slots are reserved
09:33:51	1926	B	2	!AIVDM,1,1,,B,2;UnTqi01TwrFu2M7AWhKh1T0D02,0*3E	EUT maintains 5s reporting interval
09:33:56	2128	A	2	!AIVDM,1,1,,A,2;UnTqi01TwrFu2M7AWhKh1h0D02,0*01	

Entering interval assignment – Clause 16.6.7.3

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode with a reporting interval of 10 s. Use a base station MMSI to transmit Message 23.

a) Transmit a group assignment command (Message 23) to the EUT with a reporting interval of 5 s assigned.
b) Repeat test with a reporting interval of 2 s assigned.
c) Transmit a group assignment command (Message 23) to the EUT with a reporting interval field setting 10 (next longer autonomous reporting interval).
d) Operate the EUT in autonomous mode with a reporting interval of 6 s. Transmit a group assignment command (Message 23) to the EUT with a reporting interval field setting 9 (next shorter autonomous reporting interval).

Monitor the VDL.

Required results

Verify that:

a) The EUT enters assigned operation mode and transmits position report Message 2 with 5 s reporting interval. EUT builds up the assigned transmission scheduled according to network entry procedure; verify that unused slots of the previous reporting schedule are released.
b) The EUT enters assigned operation mode and transmits position report Message 2 with 2 s reporting interval.
c) The EUT does not enter assigned operation mode and transmits position report Message 1 with 10 s reporting interval.
d) The EUT enters assigned operation mode and transmits position report Message 2 with 2 s reporting interval.

Test results

a)				
Requirement			Result	Verdict
A Message 23 is constructed, defining a region that contains the EUT and a 5s reporting interval.			The Message 23 used is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	-
The EUT builds up the assigned transmission schedule according to network entry procedure.			Using Message 3, the EUT correctly reserves slots for the assigned mode transmission schedule over 1 frame.	Pass
The EUT reports using a 5s reporting interval			The EUT adopts a 5s reporting interval when in assigned mode.	Pass
Unused slots from the previous transmission schedule are released by the EUT.			The EUT successfully releases reserved slots using Message 1, as shown in the table below.	Pass
Slot	Chan	Msg	Sentence	Comment
1855	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1R0<03,0*43	
2236	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1n0@Rt,0*25	
104	A	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B	Message 23 commands a reporting interval of 5 seconds
386	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0B0000,0*5D	EUT begins releasing unused slots of the previous reporting schedule
420	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0D01QQ,0*58	EUT starts reserving slots
623	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0P01Ji,0*6C	
726	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0T0000,0*48	
810	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0b01Fi,0*51	
986	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0j01Qi,0*4D	
1118	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0r0000,0*6D	
1157	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0t01T1,0*0D	
1377	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1801G1,0*50	
1511	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1>0000,0*23	
1557	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1B01Gi,0*71	
1725	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1J01Qi,0*6C	
1855	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1R0000,0*4C	
1908	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1T01V1,0*2E	

a)				
2116	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1h01P1,0*17	
2236	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1n0000,0*73	EUT finishes timing out slots
66	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh020001,0*2E	
250	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0<0001,0*23	EUT finishes reserving slots
420	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0D086T,0*32	EUT enters assigned mode
623	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0P089g,0*19	
810	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0b08<b,0*28	
986	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0j08?J,0*08	
1157	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0t08B5,0*17	
1377	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1808EQ,0*3A	
1557	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1B08HE,0*5A	
1725	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1J08Ju,0*63	
1908	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh1T08Ml,0*60	
2116	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh1h08Q4,0*1B	
66	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh020812,0*25	
250	A	2	!AIVDM,1,1,,A,2;UnTqh01TwrFu2M7AWhKh0<083r,0*6A	
420	B	2	!AIVDM,1,1,,B,2;UnTqh01TwrFu2M7AWhKh0D05:L,0*2B	

b)				
Requirement			Result	Verdict
A Message 23 is sent to the EUT, defining a region that contains it and a reporting interval of 2s.			The Message 23 sent is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	-
The EUT enters assigned mode with a reporting interval of 2 seconds.			The EUT executes the network entry procedure, timing out unused slots and reserving new transmission slots using Message 3. The new reporting rate while in assigned mode is 2 seconds, as seen below.	Pass
Time	Slot	Msg	Sentence	Comment
10:36:07	297	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0@4a,0*61	
10:36:19	724	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p05B@,0*40	
10:36:26	1019	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	The Message 23 commands a reporting interval of 2 seconds.
10:36:29	1098	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0000,0*44	EUT begins timing out previous transmission slots
10:36:30	1158	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00TQ,0*43	EUT begins reserving new transmission slots
10:36:33	1236	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00T1,0*20	
10:36:34	1304	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00`1,0*17	
10:36:36	1380	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00`Q,0*74	
10:36:39	1464	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00SA,0*54	
10:36:39	1474	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0000,0*47	
10:36:41	1542	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00T1,0*20	
10:36:42	1605	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00UA,0*52	
10:36:45	1686	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00UA,0*51	
10:36:46	1754	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00UA,0*52	
10:36:48	1804	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0000,0*44	
10:36:48	1835	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00Ti,0*78	
10:36:50	1903	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00WA,0*50	
10:36:52	1982	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00VA,0*52	
10:36:54	2060	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00Si,0*7C	
10:36:56	2135	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00VQ,0*42	
10:36:58	2195	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0000,0*47	
10:36:58	2203	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00W1,0*20	
10:37:01	39	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00T1,0*20	
10:37:02	109	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00TA,0*53	
10:37:04	183	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00WQ,0*43	
10:37:06	254	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00`A,0*67	
10:37:07	297	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0000,0*44	
10:37:09	341	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00SA,0*57	
10:37:11	415	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00TQ,0*43	
10:37:12	482	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00TA,0*50	
10:37:15	561	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00UQ,0*42	
10:37:16	627	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00Vi,0*7A	
10:37:19	711	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00SQ,0*44	
10:37:19	724	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0000,0*47	EUT finishes timing out old slots
10:37:20	782	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00Ui,0*79	
10:37:22	853	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00`Q,0*77	
10:37:24	933	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00UA,0*51	

b)				
10:37:27	1015	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p0001,0*47	
10:37:28	1082	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p0001,0*44	EUT finishes reserving transmission slots
10:37:30	1158	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p08B6,0*3B	EUT begins reports position using Message 2 after slot reservation
10:37:33	1236	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1p08CD,0*4B	Reporting rate while in assigned mode is 2 seconds
10:37:34	1304	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p08DH,0*43	
10:37:36	1380	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1p08ET,0*5D	
10:37:39	1464	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p08Fp,0*79	
10:37:41	1542	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1p08H6,0*32	
10:37:42	1605	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p08I5,0*33	

c)			
Requirement		Result	Verdict
The EUT is set to operate in autonomous mode with a SOG = 10, giving a reporting interval of 10 s.		The position report of the EUT confirms the SOG = 10kn, and the reporting interval can be seen in the table below: !AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p08<o,0*1F	-
A Message 23 with a reporting interval = 10, corresponding to the next longest reporting interval, is sent to the EUT.		The Message 23 sent to the EUT is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000:00,2*39	-
The EUT rejects the new assignment reporting interval, as it is too slow for the current speed.		The EUT successfully ignores the Message 23, does not enter assigned mode and continues to operate with a reporting interval appropriate for its speed and ROT.	Pass
Time	Msg	Sentence	Comment
11:12:11	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0@6a,0*60	EUT SOG = 10
11:12:21	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p08<o,0*1F	EUT reporting interval = 10 s
11:12:31	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p00S:,0*2E	
11:12:38	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000:00,2*39	Command the next longest reporting interval
11:12:42	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0@Hs,0*0F	EUT does not enter assigned mode
11:12:53	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0@O8,0*40	EUT maintains current reporting interval
11:13:02	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p081b,0*1F	

d)				
Requirement			Result	Verdict
The EUT is set to operate in autonomous mode with a SOG = 15, giving a reporting interval of 6 s.			The position report of the EUT confirms the SOG = 15kn, and the reporting interval can be seen in the table below: !AIVDM,1,1,,B,1;UnTqw02FwrFu2M7AWiGP1p05J0,0*2A	-
A Message 23 with a reporting interval = 9, corresponding to the next shortest reporting interval, is sent to the EUT.			The Message 23 sent to the EUT is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000900,2*3A	-
The EUT enters assigned mode and adopts the next shortest reporting rate of 2 seconds.			The EUT performs the network entry procedure; timing out slots and reserving new transmission slots with a reporting interval of 2 seconds.	Pass
Time	Slot	Msg	Sentence	Comment
11:34:04	170	1	!AIVDM,1,1,,A,1;UnTqw02FwrFu2M7AWiGP1p00S9,0*3C	EUT operates in autonomous mode
11:34:10	387	1	!AIVDM,1,1,,B,1;UnTqw02FwrFu2M7AWiGP1p0L02,0*2B	EUT SOG = 15 kn
11:34:16	632	1	!AIVDM,1,1,,A,1;UnTqw02FwrFu2M7AWiGP1p089p,0*17	EUT reporting interval = 6 s
11:34:20	773	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000900,2*3A	Use next shortest reporting interval: 2s
11:34:22	839	1	!AIVDM,1,1,,B,1;UnTqw02FwrFu2M7AWiGP1p0000,0*55	EUT begins timing out previous slots
11:34:25	966	3	!AIVDM,1,1,,B,3;UnTqw02FwrFu2M7AWiGP1p00U1,0*33	EUT begins reserving new slots
11:34:27	1044	3	!AIVDM,1,1,,A,3;UnTqw02FwrFu2M7AWiGP1p00TQ,0*51	
11:34:28	1051	1	!AIVDM,1,1,,A,1;UnTqw02FwrFu2M7AWiGP1p0000,0*56	
40 seconds of network entry routine have been omitted for report clarity. Full details are available in the log file.				
11:35:16	632	1	!AIVDM,1,1,,A,1;UnTqw02FwrFu2M7AWiGP1p0000,0*56	
11:35:17	673	3	!AIVDM,1,1,,B,3;UnTqw02FwrFu2M7AWiGP1p00TA,0*42	
11:35:20	753	3	!AIVDM,1,1,,A,3;UnTqw02FwrFu2M7AWiGP1p00TA,0*41	
11:35:21	818	3	!AIVDM,1,1,,B,3;UnTqw02FwrFu2M7AWiGP1p0001,0*56	
11:35:23	898	3	!AIVDM,1,1,,A,3;UnTqw02FwrFu2M7AWiGP1p0001,0*55	EUT finishes slot reservations
11:35:25	966	2	!AIVDM,1,1,,B,2;UnTqw02FwrFu2M7AWiGP1p08?6,0*57	EUT transmits Msg2 in assigned mode
11:35:27	1044	2	!AIVDM,1,1,,A,2;UnTqw02FwrFu2M7AWiGP1p08@D,0*59	EUT uses next shortest transmission
11:35:29	1114	2	!AIVDM,1,1,,B,2;UnTqw02FwrFu2M7AWiGP1p08AJ,0*55	EUT transmits with a 2 second interval

Assignment by region - Clause 16.6.7.4

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode with a reporting interval of 10 s and use a base station MMSI to transmit Message 23 as follows.

a) Transmit a group assignment command (Message 23) to the EUT (define station type 0 and geographic region so that the EUT is inside this region). Set the reporting rate to 2 s and apply message to VDL.
b) Transmit a group assignment command (Message 23) to the EUT (define station type 0 and geographic region so that the EUT is outside this region). Set the reporting rate to 2 s and apply message to VDL.

Required results

Verify that:

a) the EUT switches to assigned mode and transmits position reports with 2 s intervals. Verify that EUT reverts to normal operation mode after timeout period;
b) the EUT declines Message 23.

Test Results

a)		
Requirement	Result	Verdict
The EUT reporting interval is set to 10 seconds.	By setting a SOG = 10, the EUT adopts a 10s reporting interval: !AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1B01LS,0*41	-
A Message 23 is transmitted, with the EUT within the operating region and commanding a 2s reporting rate.	The Message 23 transmitted is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	-
The EUT switches to assigned mode and transmits position reports with 2 second intervals.	The EUT successfully uses the 2 second reporting rate assigned to it by the Message 23, results can be seen in the table below.	Pass
The EUT reverts to normal operation mode after timeout period.	After the timeout period, the EUT successfully uses the correct autonomous reporting rate of 10 seconds.	

a)				
Time	Slot	Msg	Sentence	Comment
09:49:13	504	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0J0@7p,0*60	
09:49:22	842	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh0d0<02,0*74	
09:49:33	1239	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh1000RL,0*32	EUT reporting interval = 10 seconds
09:49:36	1362	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	Assigned mode commands reporting interval = 2 seconds
09:49:39	1498	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1>00WQ,0*25	EUT enters assigned mode
09:49:41	1561	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1B0000,0*5D	EUT begins timing out slots
09:49:42	1581	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1B00Ri,0*67	EUT begins reserving slots for Msg 2
09:49:44	1656	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1F00Ui,0*67	
EUT continues to time out and reserve slots; this data has been omitted from this table but is available in the log file.				
09:49:45	1720	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1J00`i,0*5D	
09:50:28	1055	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0n00UA,0*66	
09:50:30	1127	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0r00Ti,0*50	
09:50:31	1193	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0v0000,0*6B	EUT finishes timing out slots
09:50:32	1204	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0v00VQ,0*6D	
09:50:34	1274	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1200Ti,0*11	
09:50:36	1358	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh160001,0*2A	
09:50:37	1421	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1:0001,0*25	EUT finishes reserving slots
09:50:39	1498	2	!AIVDM,1,1,,B,2;UnTqi01TwrFu2M7AWhKh1>0HGJ,0*57	EUT begins transmitting Msg 2 in assigned mode
09:50:42	1581	2	!AIVDM,1,1,,A,2;UnTqi01TwrFu2M7AWhKh1B0HHe,0*08	
EUT operates in assigned mode for 7 minutes; this data has been omitted from this table but is available in the log file.				
09:57:36	1358	2	!AIVDM,1,1,,B,2;UnTqi01TwrFu2M7AWhKh160000,0*2A	
09:57:37	1421	2	!AIVDM,1,1,,A,2;UnTqi01TwrFu2M7AWhKh1:0000,0*25	
09:57:42	1588	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh1B02li,0*58	EUT begins reserving slots for Msg 1

a)				
Time	Slot	Msg	Sentence	Comment
09:57:52	1964	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh1V02o1,0*14	
09:58:01	61	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh02032Q,0*4E	
09:58:11	446	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0F02l1,0*06	
09:58:22	839	3	!AIVDM,1,1,,B,3;UnTqi01TwrFu2M7AWhKh0b0001,0*7F	
09:58:31	1166	3	!AIVDM,1,1,,A,3;UnTqi01TwrFu2M7AWhKh0t0001,0*6A	EUT finishes reserving slots for Msg 1
09:58:42	1588	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1B0HHl,0*01	EUT reverts to normal operation after timeout period
09:58:52	1964	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh1V0D02,0*3C	EUT adopts 10 sec reporting interval
09:59:01	61	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh020@0u,0*19	
09:59:11	446	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0F0H6v,0*63	
09:59:22	839	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh0b0D02,0*0A	

b)		
Requirement	Result	Verdict
The EUT reporting interval is set to 10 seconds.	By setting a SOG = 10, the EUT adopts a 10s reporting interval: !AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh040<02,0*24	-
A Message 23 is transmitted, defining a geographic region that does not contain the EUT and a reporting interval of 2 seconds.	The Message 23 defines an operating region, with the closest boundary 46 nm West of the EUT: !AIVDO,1,1,,A,G027`SSvm0si7tO1m<000000;00,2*52	-
The EUT does not adopt the parameters contained within the Message 23.	The EUT continues using its autonomous reporting rate of 10 seconds, as it is not located within the operating region defined by the Message 23.	Pass

b)				
Slot	Chan	Msg	Sentence	Comment
1213	A	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0v0<02,0*65	The EUT operates in autonomous mode
1587	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh1B0<02,0*53	
1905	A	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh1T08Mi,0*64	The EUT uses a reporting interval of 10 s
2168	A	23	!AIVDO,1,1,,A,G027`SSvm0si7tO1m<000000;00,2*52	Message 23 defines a region that does not contain the EUT
91	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh04081K,0*58	EUT successfully ignores the command
447	A	1	!AIVDM,1,1,,A,1;UnTqi01TwrFu2M7AWhKh0F00RR,0*5B	
831	B	1	!AIVDM,1,1,,B,1;UnTqi01TwrFu2M7AWhKh0b00S;,0*14	

Assignment by station type – Clause 16.6.7.5

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode with a reporting interval of 10 s and use a base station MMSI to transmit Message 23 as follows.

a) Transmit a group assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 2 s and the station type to 0 (all stations).
b) Transmit a group assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 2 s and the station type to 2. Repeat the test for station types 3, 4, 5 and 6.
c) Transmit a group assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 5 s and the station type to 1 (Class A Mobile). Apply this message to the VDL again within 4 min.

Record VDL and check reaction of the EUT.

Required results

Verify that:

a) the EUT switches to assigned mode and transmits position reports with 2 s reporting interval. Verify that EUT reverts to autonomous mode after timeout period;
b) the EUT declines Message 23 for each station type;
c) the EUT switches to assigned mode and transmits position reports with 5 s reporting interval. Verify that EUT reverts to autonomous operation mode after timeout period of second transmitted group assignment.

Test results

a)		
Requirement	Result	Verdict
Message 23 is transmitted, defining a geographic region that encompasses the EUT. The reporting interval if set to 2 seconds and the station type is set to 0.	The Message 23 sent is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	-
The EUT enters assigned mode and transmits position reports with 2s reporting interval.	The EUT performs network entry- timing out previous transmission slots using Message 1 and pre-announcing its new transmission schedule using Message 3. The reporting interval updates to 2s.	Pass
The EUT reverts to autonomous mode after timeout period.	The slots used in the assigned mode transmissions are timed out and new slots for the autonomous transmissions are reserved using Message 3. The reporting rate reverts correctly back to 10 s.	Pass

a)			
Time	Msg	Sentence	Comment
13:14:37	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0<01,0*4A	EUT operating in autonomous mode
13:14:49	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0@Lu,0*0D	Reporting interval = 10 seconds
13:14:58	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0<01,0*4A	
13:15:05	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000;00,2*38	Msg 23 assigns a reporting interval = 2 s
13:15:07	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0000,0*44	EUT begins timing out old slots
13:15:09	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p00`1,0*17	EUT reserves new slots
13:15:11	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p00`Q,0*74	
EUT continues to reserve new slots and time-out old slots, see log file for further details.			
13:16:06	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p0001,0*47	
13:16:07	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p0001,0*44	EUT finishes reserving slots
13:16:09	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p0H5m,0*67	EUT begins transmitting in assigned mode using Msg 2
13:16:11	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1p0H6u,0*7F	
EUT remains in assigned mode transmitting every 2 seconds. A 00:06:55 period has been omitted from this table.			
13:23:06	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1p0000,0*47	
13:23:07	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1p0000,0*44	EUT times out Message 2
13:23:13	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p02pi,0*5D	EUT begins reserving slots for Message 1
13:23:21	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p034i,0*1B	
13:23:33	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p02ei,0*48	
13:23:42	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p02fQ,0*70	
13:23:51	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1p0001,0*47	
13:24:01	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1p0001,0*44	EUT finishes reserving slots
13:24:13	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0H7n,0*65	EUT reverts to autonomous mode
13:24:21	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0L01,0*3A	Autonomous mode uses correct 10 s interval
13:24:33	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1p0L01,0*39	
13:24:42	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1p0D01,0*32	

b)				
Requirement	Station Type	Message 23	Result	Verdict
The EUT should decline a Message 23 when the EUT is located within the operating region but the station type field is 2,3,4,5 or 6.	2	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<200 000;00,2*3A	The EUT rejects the Message 23.	Pass
	3	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<300 000;00,2*3B	The EUT rejects the Message 23.	Pass
	4	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<400 000;00,2*3C	The EUT rejects the Message 23.	Pass
	5	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<500 000;00,2*3D	The EUT rejects the Message 23.	Pass
	6	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<600 000;00,2*3E	The EUT rejects the Message 23.	Pass

c)		
Requirement	Result	Verdict
A Message 23 is sent to the EUT with a reporting interval of 5 seconds and station type set to 1.	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<100000800,2*3A	-
The EUT switches to assigned mode and transmits position reports with a reporting interval of 5 seconds.	The EUT successfully enters assigned mode, transmitting Message 2 every 5 seconds.	Pass
The EUT reverts to autonomous operation after the timeout period of the second transmitted group assignment.	The timeout period for the second transmitted group assignment is 7 frames. The EUT successfully resumes autonomous operation after this timeout, reverting to its expected reporting rate of 10s.	Pass

Addressing by ship and cargo type – Clause 16.6.7.6

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode with a reporting interval of 10 s and use a base station MMSI to transmit Message 23 as follows.

a) Transmit a group assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 2 s and the ship and cargo value to a desired value. Make sure that this value is also configured in the EUT.
b) Transmit a group assignment command (Message 23) to the EUT (define geographic region so that the EUT is inside this region). Set the reporting interval to 2 s and the ship and cargo value to a desired value. Make sure that a different value is configured in the EUT.

Required results

Verify that:

a) EUT switches to assigned mode and transmits position reports with 2 s reporting interval. Verify that EUT reverts to autonomous mode after timeout period;
b) EUT declines Message 23.

Test results

a)		
Requirement	Result	Verdict
The EUT is set to a known ship and cargo type.	The ship and cargo type is set to 58: !AIVDM,2,1,3,B,5;UnTqp1?LSCCC@0001AEJ05@7730 0000000000r4H54640HtD0000000000000000000000,2*2 4 !AIVDM,2,2,3,B,00000000000,2*24	-
A Message 23 is sent to the EUT, commanding a reporting interval of 2 seconds, along with a ship and cargo type of 58.	The Message 23 sent to the EUT is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<0>P000;00,2*56	-
The EUT switches to assigned mode, transmitting position reports with a 2 second reporting interval.	The EUT successfully performs network entry- timing out slots used by the previous autonomous transmission schedule, before reserving new slots using Message 3 with a reporting interval of 2 seconds. The EUT remains in assigned mode for 5 frames before reverting to autonomous mode.	Pass

b)		
Requirement	Result	Verdict
The EUT is set to a known ship cargo type.	The ship and cargo type is set to 58: !AIVDM,2,1,5,B,5;UnTqp1?LSCCC@0001AEJ05@7730 0000000000r4H54640HtD0000000000000000000000,2*2 2 !AIVDM,2,2,5,B,00000000000,2*22	-
A Message 23 is sent to the EUT, defining a region that contains the EUT, a reporting interval of 2 seconds and a ship and cargo type of 80.	The Message 23 sent to the EUT is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<0D0000;00,2*4C	-
The EUT is to decline the Message 23.	The EUT does not use the transmission parameters defined in Message 23; it remains in autonomous mode.	Pass

c)					
Time	Slot	Msg	Sentence	Timeout	Comment
15:59:38	1455	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1<0<01,0*06	3	EUT operating in autonomous mode
15:59:49	1842	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1P0@Lj,0*32	4	EUT reporting interval = 10s
16:00:00	8	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1n0<01,0*54	3	
16:00:03	156	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<100000800,2*3A		Msg 23 sets reporting interval to 5 s
16:00:09	357	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP0B0000,0*77	0	EUT begins timing out slots
16:00:10	396	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP0D01K1,0*08		EUT begins reserving new slots for assigned mode
16:00:15	584	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP0N01RQ,0*78		
16:00:19	734	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP0V0000,0*60	0	
16:00:20	760	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP0V01RA,0*73		
16:00:26	978	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP0j01F1,0*28		
16:00:28	1077	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP0p0000,0*45	0	
16:00:30	1153	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP0t01PA,0*53		
16:00:35	1322	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1401Ti,0*3D		
16:00:38	1455	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1<0000,0*0B	0	
16:00:41	1538	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1@01Gi,0*59		
16:00:46	1725	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1J01L1,0*03		
16:00:49	1842	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1P0000,0*64	0	
16:00:50	1889	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1T01T1,0*06		
16:00:55	2093	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1f01OQ,0*4C		
16:01:00	8	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP1n0000,0*59	0	EUT finishes timing out previous schedule slots
16:01:01	39	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP000001,0*06		
16:01:06	225	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP0:0001,0*0F		EUT finishes reserving new slots for assigned mode
16:01:10	396	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0D0H6<,0*00	6	EUT begins transmitting in assigned mode
16:01:15	584	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0N0H98,0*02	6	
16:01:20	760	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0V0H;p,0*53	6	
16:01:26	978	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0j0H?B,0*5A	6	
16:01:30	1153	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0t0HB1,0*49	6	
16:01:35	1322	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP140HDb,0*5E	6	
16:01:41	1538	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1@0HH2,0*75	6	
16:01:46	1725	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1J0HJu,0*39	6	
16:01:50	1889	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1R0HMQ,0*01	6	
16:01:55	2093	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1f0HPe,0*1F	6	
16:02:01	39	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP000H0W,0*19	6	
16:02:06	225	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0:0H3Q,0*15	6	
16:02:10	396	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0D0D01,0*07	5	
16:02:15	584	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0N0D01,0*0E	5	
16:02:20	760	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0V0D01,0*15	5	
16:02:26	978	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0j0D01,0*2A	5	
16:02:30	1153	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0t0D01,0*37	5	
16:02:35	1322	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP140D01,0*75	5	
16:02:41	1538	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1@0D01,0*02	5	
16:02:46	1725	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1J0D01,0*0B	5	
16:02:50	1889	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1R0D01,0*10	5	
16:02:53	2004	23	!AIVDO,1,1,,A,G027`SSwJPsi7ub1m<100000800,2*3A		Message 23 retransmitted
16:02:55	2093	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1f0D01,0*27	5	
16:03:01	39	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP000D01,0*73	5	
16:03:06	225	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0:0D01,0*7A	5	
16:03:10	396	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0D0L01,0*0F	7	EUT assigned mode timeout recalculated after second Msg 23
16:03:15	584	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0N0L01,0*06	7	
16:03:20	760	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0V0L01,0*1D	7	
16:03:26	978	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0j0L01,0*22	7	
16:03:30	1153	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP0t0L01,0*3F	7	

c)					
Time	Slot	Msg	Sentence	Timeout	Comment
16:03:35	1322	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP140L01,0*7D	7	
16:03:46	1725	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1J0L01,0*03	7	
16:03:50	1889	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1R0L01,0*18	7	
16:03:55	2093	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1f0L01,0*2F	7	
16:04:01	39	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP000L01,0*7B	7	
16:04:06	225	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0:0L01,0*72	7	
The EUT continues to operate in assigned mode for 06:44, these results have been omitted from this table.					
16:10:50	1889	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP1R0000,0*65	0	
16:10:55	2093	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP1f0000,0*52	0	
16:11:01	39	2	!AIVDM,1,1,,B,2;UnTqw01TwrFu2M7AWiGP000000,0*06	0	
16:11:06	225	2	!AIVDM,1,1,,A,2;UnTqw01TwrFu2M7AWiGP0:0000,0*0F	0	EUT finishes assigned mode operation
16:11:18	678	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP0R034Q,0*03		EUT begins reserving new slots for SOTDMA
16:11:27	1021	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP0l02ti,0*47		
16:11:39	1464	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1<02pA,0*39		
16:11:47	1776	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP1L03<1,0*77		
16:11:58	2201	3	!AIVDM,1,1,,B,3;UnTqw01TwrFu2M7AWiGP1l0001,0*5B		
16:12:09	342	3	!AIVDM,1,1,,A,3;UnTqw01TwrFu2M7AWiGP0@0001,0*75		
16:12:18	678	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP0R0L01,0*1A	7	EUT reverts to autonomous operation
16:12:27	1021	1	!AIVDM,1,1,,A,1;UnTqw01TwrFu2M7AWiGP0l0D01,0*2F	5	
16:12:39	1464	1	!AIVDM,1,1,,B,1;UnTqw01TwrFu2M7AWiGP1<0@Fp,0*4E	4	

Reverting from interval assignment – Clause 16.6.7.7

Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Using a base station MMSI, transmit a group assignment command (Message 23) to the EUT with a reporting interval of 5 s assigned.

Monitor the VDL until at least 1 min after timeout occurred. Repeat 10 times (transmissions of Message 23 shall not be synchronised to the initial transmission schedule of the EUT).

Measure the time T_{rev} between the reception of Message 23 and the first transmission after timeout.

Required results

Verify that the EUT enter autonomous mode after a time out of 4 min to 8 min and transmits position report Message 1 and releases unused slots from previous schedule.

Test results

Requirement	Result	Verdict
A Message 23 is sent to the EUT from a base station MMSI, commanding a reporting interval of 5 seconds	The Message 23 sent has a reporting interval of 5 seconds: !AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	-
The EUT shall enter assigned mode immediately after receiving the Message 23	The EUT begins reserving slots for the new transmission schedule and timing out slots from the previous schedule immediately after receiving Message 23	-
The EUT enters autonomous mode after a timeout of 4 to 8 minutes of assigned mode	The EUT remains in assigned mode for no less than 4 minutes and no longer than 8 minutes, as shown below	Pass
The EUT reverts to transmitting Message 1 after leaving assigned mode, and releases unused slots from the previous schedule	After the assigned mode slot reservations are timed out by Message 2, the slots used for Message 1 position reports are randomly selected using Message 3.	Pass

Test No.	Time	Slot	Chan	Msg	Sentence	Trev
Test #1	08:05:02	120	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	08:12:15	583	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0N02ri,0*4A	00:07:13
Test #2	08:16:00	34	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	08:20:08	316	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0@01EQ,0*4B	00:04:08
Test #3	08:27:39	1501	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	08:34:48	1806	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1N02fA,0*77	00:07:09
Test #4	08:38:12	493	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	08:42:24	933	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0h02ni,0*73	00:04:12
Test #5	08:45:21	819	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	08:53:34	1275	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh12034A,0*5B	00:08:13
Test #6	08:56:39	1505	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	09:02:53	2010	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1b02s1,0*3E	00:06:14
Test #7	09:08:53	2002	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	09:16:08	309	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0>0321,0*20	00:07:15
Test #8	09:21:05	208	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	09:29:11	426	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0D02uQ,0*7C	00:08:06
Test #9	09:32:41	1574	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	09:36:46	1744	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1L02tA,0*64	00:04:05
Test #10	09:42:12	466	A	23	!AIVDO,1,1,,A,G020jOSwJPsi7ub1m<000000800,2*2A	
	09:47:21	791	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0`02gQ,0*49	00:05:09

Fixed allocated transmissions (FATDMA) - Clause 16.6.8

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Apply Message 4 to the VDL. A base station shall use a base station MMSI as follows:

a) Transmit a data link management message (Message 20) on Channel A from a base station within 120 NM to the EUT with slot offset and increment. Record transmitted messages.
b) Repeat the test when the EUT has no position.
c) Repeat the test with a base station beyond 120 NM.
d) Repeat the test without base station report (Message 4).
e) Repeat the test with a base station within 120 NM and maintain transmissions of Message 20. Stop transmission of Message 4.

Required results

Confirm that:

a) for the base station within 120 NM, the EUT does not use slots allocated by Message 20 for own transmissions until the timeout given in the Message 20. Confirm that the EUT does not use the same slots on Channel B;
b) the EUT does not use slots allocated by Message 20 for own transmissions until the timeout given in the Message 20;
c) for the base station beyond 120 NM, the EUT treats the slots as free;
d) the EUT treats the slots as free;
e) the EUT does not use slots allocated by Message 20 for own transmissions until the target timeout of the EUT occurs after Message 4 is stopped.

Test Results

a) Message 20 sent to the EUT on slot 10, with slot offset = 10, number of slots = 5, timeout = 7 and increment = 10: !AIVDO,1,1,,A,D027`SP0aN0`,0*79		
Requirement	Result	Verdict
EUT does not use slots allocated by message 20 until the timeout has ended	Slots ending in 0-4 are reallocated and not used for 08:42 minutes, see table below	Pass
EUT does not use allocated slots on channel B	See table below	Pass

a) Message 4 was sent, but was filtered out below, to prevent the table from being too large. Slot offset and next slot are shown when timeout = 0						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
10:40:59	A	10	D027`SP0aN0`			Message 20
10:41:01	B	65	1;UnTqhP?wOrCQDM6qH>4?v20@11			
10:41:12	A	464	1;UnTqhP?wOrCQDM6qH>4?vF00SG	2263	477	Reallocation from reserved slots
10:41:21	B	813	1;UnTqhP?wOrCQDM6qH>4?vb00Se	2285	848	Reallocation from reserved slots
10:41:33	A	1244	1;UnTqhP?wOrCQDM6qH>4?w000R?	2191	1185	Reallocation from reserved slots
10:41:43	B	1629	1;UnTqhP?wOrCQDM6qH>4?wF0<01			
10:41:52	A	1981	1;UnTqhP?wOrCQDM6qH>4?w`00SA	2257	1988	Reallocation from reserved slots
10:42:00	5	10	D027`SP0aN0`			Timeout of allocation, 7 minutes from this slot
10:42:01	B	65	1;UnTqhP?wOrCQDM6qH>4?v20<01			
10:42:12	A	477	1;UnTqhP?wOrCQDM6qH>4?vH0@7M			
10:42:22	B	848	1;UnTqhP?wOrCQDM6qH>4?vd0<01			
10:42:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv0L01			
10:42:43	B	1629	1;UnTqhP?wOrCQDM6qH>4?wF08IM			
10:42:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`0L01			
10:43:01	B	65	1;UnTqhP?wOrCQDM6qH>4?v20811			
10:43:12	A	477	1;UnTqhP?wOrCQDM6qH>4?vH0<01			
10:43:22	B	848	1;UnTqhP?wOrCQDM6qH>4?vd08=@			
10:43:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv0HBQ			

a) Message 4 was sent, but was filtered out below, to prevent the table from being too large. Slot offset and next slot are shown when timeout = 0						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
10:43:43	B	1629	1;UnTqhP?wOrCQDM6qH>4?wF05Bd			
10:43:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`0HO4			
10:44:01	B	65	1;UnTqhP?wOrCQDM6qH>4?v205Bh			
10:44:12	A	477	1;UnTqhP?wOrCQDM6qH>4?vH087M			
10:44:22	B	848	1;UnTqhP?wOrCQDM6qH>4?vd05Bi			
10:44:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv0D01			
10:44:43	B	1629	1;UnTqhP?wOrCQDM6qH>4?wF00Rd	2220	1599	
10:44:53	A	1988	3;UnTqhP?wOrCQDM6qH>4?w`00sk			
10:45:01	B	65	1;UnTqhP?wOrCQDM6qH>4?v200Sm	2293	108	
10:45:12	A	477	1;UnTqhP?wOrCQDM6qH>4?vH05Bl			
10:45:22	B	848	1;UnTqhP?wOrCQDM6qH>4?vd00S`	2280	878	
10:45:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv0@BQ			
10:45:42	B	1599	1;UnTqhP?wOrCQDM6qH>4?wD0@Hw			
10:45:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`0<01			
10:46:02	B	108	1;UnTqhP?wOrCQDM6qH>4?v40H1d			
10:46:12	A	477	1;UnTqhP?wOrCQDM6qH>4?vH00SF	2262	489	
10:46:23	B	878	1;UnTqhP?wOrCQDM6qH>4?vf0<01			
10:46:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv0<01			
10:46:42	B	1599	1;UnTqhP?wOrCQDM6qH>4?wD0<01			
10:46:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`08O4			
10:47:02	B	108	1;UnTqhP?wOrCQDM6qH>4?v40D01			
10:47:13	A	489	1;UnTqhP?wOrCQDM6qH>4?vH0D01			
10:47:23	B	878	1;UnTqhP?wOrCQDM6qH>4?vf08=f			
10:47:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv08BQ			
10:47:42	B	1599	1;UnTqhP?wOrCQDM6qH>4?wD08Hw			
10:47:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`05Bu			
10:48:02	B	108	1;UnTqhP?wOrCQDM6qH>4?v40@1d			
10:48:13	A	489	1;UnTqhP?wOrCQDM6qH>4?vH0@7a			
10:48:23	B	878	1;UnTqhP?wOrCQDM6qH>4?vf05C0			
10:48:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv05C0			
10:48:42	B	1599	1;UnTqhP?wOrCQDM6qH>4?wD05C0			
10:48:53	A	1988	1;UnTqhP?wOrCQDM6qH>4?w`00S1	2241	1979	
10:49:02	B	108	1;UnTqhP?wOrCQDM6qH>4?v40<01			
10:49:13	A	489	1;UnTqhP?wOrCQDM6qH>4?vH0<01			
10:49:23	B	878	1;UnTqhP?wOrCQDM6qH>4?vf00R?	2191	819	
10:49:31	A	1185	1;UnTqhP?wOrCQDM6qH>4?vv00Sw	2303	1238	
10:49:42	B	1599	1;UnTqhP?wOrCQDM6qH>4?wD00SE	2261	1610	Allocation of reserved slot after 07:42
10:49:52	A	1979	1;UnTqhP?wOrCQDM6qH>4?w`0@Ns			
10:50:02	B	108	1;UnTqhP?wOrCQDM6qH>4?v4081d			
10:50:13	A	489	1;UnTqhP?wOrCQDM6qH>4?vH087a			
10:50:21	B	819	1;UnTqhP?wOrCQDM6qH>4?vb0<01			
10:50:33	A	1238	1;UnTqhP?wOrCQDM6qH>4?w00HCF			
10:50:42	B	1610	1;UnTqhP?wOrCQDM6qH>4?wD0HI:			First use of reserved slots, 08:42 minutes after last message 20

b) Message 20 sent to EUT on slot 10, with slot offset = 10, number of slots = 5, timeout = 7 and increment = 10: !AIVDO,1,1,,A,D027`SP0aN0`,0*79		
Requirement	Result	Verdict
EUT does not use slots allocated by message 20 until the timeout has ended	Slots ending in 0-4 are reallocated and not used for 08:42 minutes, see table below	Pass
EUT does not use allocated slots on channel B	See table below	Pass

b) Message 4 was sent, but was filtered out below, to prevent the table from being too large. Slot offset and next slot are shown when timeout = 0						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
11:36:59	A	10	D027`SP0aN0`			Message 20, timeout of allocation, 7 minutes from this slot
11:37:01	B	40	1;UnTqhP?w<tSF0l4Q@>4?wv0PRt	2236	26	Reallocation from reserved slots
11:37:11	A	413	1;UnTqhP?w<tSF0l4Q@>4?wv0PSc	2283	446	Reallocation from reserved slots
11:37:21	B	814	1;UnTqhP?w<tSF0l4Q@>4?wv0PSI	2265	829	Reallocation from reserved slots
11:37:31	A	1179	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:37:41	B	1538	1;UnTqhP?w<tSF0l4Q@>4?wv0`H2			
11:37:51	A	1918	1;UnTqhP?w<tSF0l4Q@>4?wv0UJD			
11:38:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0h0J			
11:38:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:38:22	B	829	1;UnTqhP?w<tSF0l4Q@>4?wv0h<u			
11:38:31	A	1179	1;UnTqhP?w<tSF0l4Q@>4?wv0`BK			
11:38:41	B	1538	1;UnTqhP?w<tSF0l4Q@>4?wv0UJH			
11:38:51	A	1918	1;UnTqhP?w<tSF0l4Q@>4?wv0PS1	2241	1909	
11:39:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:39:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0h6v			
11:39:22	B	829	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:39:31	A	1179	1;UnTqhP?w<tSF0l4Q@>4?wv0UJL			
11:39:41	B	1538	1;UnTqhP?w<tSF0l4Q@>4?wv0PS1	2241	1529	
11:39:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv0pMm			
11:40:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0`0J			
11:40:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:40:22	B	829	1;UnTqhP?w<tSF0l4Q@>4?wv0`<u			
11:40:31	A	1179	1;UnTqhP?w<tSF0l4Q@>4?wv0PSW	2279	1208	
11:40:40	B	1529	1;UnTqhP?w<tSF0l4Q@>4?wv0pGq			
11:40:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:41:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0UJP			
11:41:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0`6v			
11:41:22	B	829	1;UnTqhP?w<tSF0l4Q@>4?wv0UJT			
11:41:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0t01			
11:41:40	B	1529	3;UnTqhP?w<tSF0l4Q@>4?wv0QDC		1866	
11:41:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv1hMm			
11:42:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0PT@	2320	96	
11:42:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0UJ`			
11:42:22	B	829	1;UnTqhP?w<tSF0l4Q@>4?wv0PRQ	2209	788	
11:42:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0pBp			
11:42:40	B	1529	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:42:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:43:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0p1P			
11:43:11	A	446	1;UnTqhP?w<tSF0l4Q@>4?wv0PS2	2242	438	
11:43:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0p<D			
11:43:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:43:40	B	1529	1;UnTqhP?w<tSF0l4Q@>4?wv0`Gq			
11:43:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv1`Mm			
11:44:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:44:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:44:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:44:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0hBp			
11:44:40	B	1529	1;UnTqhP?w<tSF0l4Q@>4?wv0UJh			
11:44:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv0UJh			
11:45:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0h1P			
11:45:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0h6n			
11:45:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0h<D			

b) Message 4 was sent, but was filtered out below, to prevent the table from being too large. Slot offset and next slot are shown when timeout = 0						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
11:45:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:45:40	B	1529	1;UnTqhP?w<tSF0l4Q@>4?wv0PSL	2268	1547	
11:45:50	A	1909	1;UnTqhP?w<tSF0l4Q@>4?wv0PST	2276	1935	
11:46:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:46:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:46:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:46:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv0`Bp			
11:46:41	B	1547	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:46:51	A	1935	1;UnTqhP?w<tSF0l4Q@>4?wv0l01			
11:47:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0`1P			
11:47:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0`6n			
11:47:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0`<D			
11:47:32	A	1208	3;UnTqhP?w<tSF0l4Q@>4?wv0Ps3		1444	Allocation of reserved slot after 10:33 minutes
11:47:38	A	1444	5;UnTqswwwww7;<000048<0000000000000000b08243t?P0?1PDQB0C@0000000000008			First use of reserved slots 10:39 minutes after last message 20
11:47:41	B	1547	1;UnTqhP?w<tSF0l4Q@>4?wv0`H;			
11:47:51	A	1935	1;UnTqhP?w<tSF0l4Q@>4?wv0hN?			
11:48:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0UK0			
11:48:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0UK1			
11:48:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0UK1			
11:48:32	A	1208	1;UnTqhP?w<tSF0l4Q@>4?wv1PS7	2247	1205	
11:48:41	B	1547	1;UnTqhP?w<tSF0l4Q@>4?wv0UK1			
11:48:51	A	1935	1;UnTqhP?w<tSF0l4Q@>4?wv0d01			
11:49:02	B	96	1;UnTqhP?w<tSF0l4Q@>4?wv0PR4	2180	26	
11:49:11	A	438	1;UnTqhP?w<tSF0l4Q@>4?wv0PS@	2256	444	Allocation of reserved slot after 12:12 minutes
11:49:21	B	788	1;UnTqhP?w<tSF0l4Q@>4?wv0PSo	2295	833	
11:49:32	A	1205	1;UnTqhP?w<tSF0l4Q@>4?wv1t01			
11:49:41	B	1547	1;UnTqhP?w<tSF0l4Q@>4?wv0PS0	2240	1537	
11:49:51	A	1935	1;UnTqhP?w<tSF0l4Q@>4?wv0`N?			
11:50:00	B	26	1;UnTqhP?w<tSF0l4Q@>4?wv0p0J			
11:50:11	A	444	1;UnTqhP?w<tSF0l4Q@>4?wv1p6t			Second use of reserved slots, 13:12 minutes after last message 20
11:50:22	B	833	1;UnTqhP?w<tSF0l4Q@>4?wv0t01			
11:50:32	A	1205	1;UnTqhP?w<tSF0l4Q@>4?wv0pBm			
11:50:41	B	1537	1;UnTqhP?w<tSF0l4Q@>4?wv0t01			

c) Message 20 sent to EUT on slot 10, with slot offset = 10, number of slots = 5, timeout = 7 and increment = 10: !AIVDO,1,1,,A,D027`SP0aN0`,0*79 The EUT was positioned 180 nm away		
Requirement	Result	Verdict
EUT treats the slots as free	Slots ending in 0-4 are used by the EUT	Pass

d) Message 20 sent to EUT on slot 10, with slot offset = 10, number of slots = 5, timeout = 7 and increment = 10: !AIVDO,1,1,,A,D027`SP0aN0`,0*79 Message 4 was not received by the EUT		
Requirement	Result	Verdict
EUT treats the slots as free	Slots ending in 0-4 are used by the EUT	Pass

e) Message 20 sent to EUT on slot 10, with slot offset = 10, number of slots = 5, timeout = 7 and increment = 10: !AIVDO,1,1,,A,D027`SP0aN0`,0*79 Message 4 transmission stopped		
Requirement	Result	Verdict
EUT does not use slots allocated by message 20 until the timeout of the base station target has ended	Slots ending in 0-4 are reallocated and not used for 09:42 minutes, see table below	Pass
EUT does not use allocated slots on channel B	See table below	Pass

e)						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
08:33:59	A	10	D027`SP0aN0`			Message 20
08:34:00	A	0	4027`SQv=q8QsOrCR2M6qDG00@00			
08:34:01	B	69	1;UnTqhP?wOrCNhM6qRf4?v20@15			
08:34:10	B	375	4027`SQv=q8R9OrCR2M6qDG00@5o			
08:34:10	A	389	1;UnTqhP?wOrCNhM6qRf4?vD0@65			
08:34:20	A	750	4027`SQv=q8RCOrCR2M6qDG008;f			
08:34:20	B	773	1;UnTqhP?wOrCNhM6qRf4?v`00S6	2246	769	Reallocation from reserved slots
08:34:30	B	1125	4027`SQv=q8RMOrCR2M6qDG00<01			
08:34:31	A	1182	1;UnTqhP?wOrCNhM6qRf4?vv00Ri	2225	1157	Reallocation from reserved slots
08:34:40	A	1500	4027`SQv=q8RWOrCR2M6qDG008GL			
08:34:40	B	1513	1;UnTqhP?wOrCNhM6qRf4?w@00T1	2305	1568	Reallocation from reserved slots
08:34:50	B	1875	4027`SQv=q8RiOrCR2M6qDG00528			
08:34:51	A	1922	1;UnTqhP?wOrCNhM6qRf4?wT00Rg	2223	1895	Reallocation from reserved slots
08:35:00	A	10	D027`SP0aN0`			
08:35:00	A	0	4027`SQv=q8RsOrCR2M6qDG00<01			Last Transmission of message 4
08:35:01	B	69	1;UnTqhP?wOrCNhM6qRf4?v20<01			
08:35:10	A	389	1;UnTqhP?wOrCNhM6qRf4?vD0<01			
08:35:20	B	769	1;UnTqhP?wOrCNhM6qRf4?v`0<01			
08:35:30	A	1157	1;UnTqhP?wOrCNhM6qRf4?vt0<01			
08:35:41	B	1568	1;UnTqhP?wOrCNhM6qRf4?wB0@HP			
08:35:50	A	1895	1;UnTqhP?wOrCNhM6qRf4?wT0<01			
08:35:59	A	10	D027`SP0aN0`			
08:36:01	B	69	1;UnTqhP?wOrCNhM6qRf4?v20815			
08:36:10	A	389	1;UnTqhP?wOrCNhM6qRf4?vD0865			
08:36:20	B	769	1;UnTqhP?wOrCNhM6qRf4?v`08<1			
08:36:30	A	1157	1;UnTqhP?wOrCNhM6qRf4?vt08B5			
08:36:41	B	1568	1;UnTqhP?wOrCNhM6qRf4?wB0<01			
08:36:50	A	1895	1;UnTqhP?wOrCNhM6qRf4?wT08MW			
08:36:59	A	10	D027`SP0aN0`			
08:37:01	B	69	1;UnTqhP?wOrCNhM6qRf4?v2052D			
08:37:10	A	389	1;UnTqhP?wOrCNhM6qRf4?vB052D			
08:37:20	B	769	1;UnTqhP?wOrCNhM6qRf4?v`052D			
08:37:30	A	1157	1;UnTqhP?wOrCNhM6qRf4?vt052D			
08:37:41	B	1568	1;UnTqhP?wOrCNhM6qRf4?wB08HP			
08:37:50	A	1895	1;UnTqhP?wOrCNhM6qRf4?wT052D			
08:37:59	A	10	D027`SP0aN0`			
08:38:01	B	69	1;UnTqhP?wOrCNhM6qRf4?v200RN	2206	25	
08:38:10	A	389	1;UnTqhP?wOrCNhM6qRf4?vD00S9	2249	388	
08:38:20	B	769	1;UnTqhP?wOrCNhM6qRf4?v`00Sh	2288	807	
08:38:30	A	1157	1;UnTqhP?wOrCNhM6qRf4?vt00S8	2248	1155	
08:38:41	B	1568	1;UnTqhP?wOrCNhM6qRf4?wB052H			
08:38:50	A	1895	1;UnTqhP?wOrCNhM6qRf4?wT00Sl	2292	1937	
08:38:59	A	10	D027`SP0aN0`			
08:39:00	B	25	1;UnTqhP?wOrCNhM6qRf4?v00<01			
08:39:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0L01			
08:39:21	B	807	3;UnTqhP?wOrCNhM6qRf4?vb01LS		1177	
08:39:30	A	1155	1;UnTqhP?wOrCNhM6qRf4?vt0<01			
08:39:31	B	1177	5;UnTqswwwww7;<000048<000000000000000000b08243t?P0?1PDQB0C@0000000000008			
08:39:41	B	1568	1;UnTqhP?wOrCNhM6qRf4?wB00SC	2259	1577	

e)						
Time	Chan	Slot	Message	Slot Offset	Next Slot	Comments
08:39:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV0D01			
08:39:59	A	10	D027`SP0aN0`			
08:40:00	B	25	1;UnTqhP?wOrCNhM6qRf4?v0080I			
08:40:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0H64			
08:40:21	B	807	1;UnTqhP?wOrCNhM6qRf4?vb08<W			
08:40:30	A	1155	1;UnTqhP?wOrCNhM6qRf4?vt08B3			
08:40:42	B	1577	1;UnTqhP?wOrCNhM6qRf4?wB0<01			
08:40:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV0@NA			
08:40:59	A	10	D027`SP0aN0`			
08:41:00	B	25	1;UnTqhP?wOrCNhM6qRf4?v0052T			
08:41:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0D01			
08:41:21	B	807	1;UnTqhP?wOrCNhM6qRf4?vb052T			
08:41:30	A	1155	1;UnTqhP?wOrCNhM6qRf4?vt052T			
08:41:42	B	1577	1;UnTqhP?wOrCNhM6qRf4?wB08Ha			
08:41:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV0<01			
08:42:00	A	10	D027`SP0aN0`			
08:42:00	B	25	1;UnTqhP?wOrCNhM6qRf4?v000SP	2272	47	
08:42:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0@64			
08:42:21	B	807	1;UnTqhP?wOrCNhM6qRf4?vb00RF	2198	755	
08:42:30	A	1155	1;UnTqhP?wOrCNhM6qRf4?vt00Ro	2231	1136	
08:42:42	B	1577	1;UnTqhP?wOrCNhM6qRf4?wB052`			
08:42:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV08NA			
08:42:59	A	10	D027`SP0aN0`			
08:43:01	B	47	1;UnTqhP?wOrCNhM6qRf4?v00L01			
08:43:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0<01			
08:43:20	B	755	1;UnTqhP?wOrCNhM6qRf4?vV0L01			
08:43:30	A	1136	1;UnTqhP?wOrCNhM6qRf4?vr0D01			
08:43:42	B	1577	1;UnTqhP?wOrCNhM6qRf4?wB00Rh	2224	1551	Allocation of reserved slot after 08:42
08:43:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV052d			
08:44:01	B	47	1;UnTqhP?wOrCNhM6qRf4?v00H0g			
08:44:10	A	388	1;UnTqhP?wOrCNhM6qRf4?vB0864			
08:44:20	B	755	1;UnTqhP?wOrCNhM6qRf4?vV0H;k			
08:44:30	A	1136	1;UnTqhP?wOrCNhM6qRf4?vr0@Ah			
08:44:41	B	1551	1;UnTqhP?wOrCNhM6qRf4?w@0HH?			First use of reserved slots, 09:42 minutes after last message 4
08:44:51	A	1937	1;UnTqhP?wOrCNhM6qRf4?wV00RF	2198	1885	

Randomisation of Message Transmission - Clause 16.6.9

Method of measurement

Set up the standard test environment. Power on the EUT and monitor the autonomous transmissions for 3 min. Restart the EUT and monitor the autonomous transmissions for another 10 min. Repeat this process the restart of the EUT for at least 5 times, starting at different seconds within a frame.

Required results

Verify that the nominal slots are not always within the same selection interval after a power cycle by monitoring the transmissions slots

Test Results

Requirement	Result	Verdict
Verify that the nominal slots are not always within the same selection interval after a power cycle	The slots used after a power cycle are not always within the selection interval of 75 slots. Only one power cycle resulted in a nominal slot less than the selection interval. At no time were the same slots used and the results below clearly show the message transmission is randomised	Pass

Time	Slot	Message	Power on	Slot Difference
16:49:16	630	!AIVDM,1,1,,A,3;UnTqhP?wOrCPNM6qN>4?vP032A,0*07	17:47:18	-
16:59:14	539	!AIVDM,1,1,,A,3;UnTqhP?wOrCODM6qMf4?vL02di,0*2A	17:57:27	91
17:02:18	691	!AIVDM,1,1,,A,3;UnTqhP?wOrCO4M6qMN4?vT030Q,0*07	18:00:27	152
17:12:36	1360	!AIVDM,1,1,,A,3;UnTqhP?wOrCO2M6qIN4?w60301,0*06	18:10:36	669
17:15:39	1497	!AIVDM,1,1,,A,3;UnTqhP?wOrCP2M6qIN4?w>037Q,0*76	18:13:37	137
17:25:49	1857	!AIVDM,1,1,,A,3;UnTqhP?wOrCS2M6qDv4?wR02li,0*4E	18:23:46	360
17:28:44	1661	!AIVDM,1,1,,A,3;UnTqhP?wOrCQ4M6qH>4?wF02ui,0*03	18:26:48	196
17:38:46	1728	!AIVDM,1,1,,A,3;UnTqhP?wOrCQVM6qNN4?wJ02vQ,0*20	18:36:57	67
17:41:40	1528	!AIVDM,1,1,,A,3;UnTqhP?wOrCRfM6qEv4?w@036A,0*7B	18:39:58	200
17:52:05	207	!AIVDM,1,1,,A,3;UnTqhP?wOrCOdM6qQ>4?v:02oi,0*33	18:50:07	1321

2.16 Message formats

2.16.1 Specification Reference

IEC 61993-2, Clause 16.7

2.16.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.16.3 Date of Test

19-July-2019

2.16.4 Test Results and Methods of Measurement

Received messages – Clause 16.7.1

Method of measurement

Set up standard test environment and operate EUT in autonomous mode. Apply messages according to Table 18 to the VDL including multiple slot messages up to 5 slots. Record messages output by the PI of the EUT.

Required results

Confirm that the EUT outputs the corresponding message with the correct field contents and format via the PI or responds as appropriate.

Test Results

Msg.	Requirement	Result	Verdict
1	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,13LC9e@2P:wsK20LW3P02gvR0000,0*19 Received message: !AIVDM,1,1,,A,13LC9e@2P:wsK20LW3P02gvR0000,0*1B	Pass
2	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,23LC9e@2P:dtSF0l4Q@02gw80000,0*38 Received message: !AIVDM,1,1,,A,23LC9e@2P:dtSF0l4Q@02gw80000,0*3A	Pass
3	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,33LC9e@2P:dtSF0l4Q@02gv<0000,0*3C Received message: !AIVDM,1,1,,A,33LC9e@2P:dtSF0l4Q@02gv<0000,0*3E	Pass
4	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,402=W=1v9ef5N<tSF0l4Q@100000,0*66 Received message: !AIVDM,1,1,,A,402=W=1v9ef5N<tSF0l4Q@100000,0*64	Pass

Msg.	Requirement	Result	Verdict
5	VDM sentence with the same content as transmitted, output to the PI.	Transmitted messages: !AIVDO,2,1,4,A,53LC9eD000037;?CGKM@E=@0000000000000002b00000t0002QPDQB0C@00,0*3B !AIVDO,2,2,4,A,00000000000000000000000,4*14 Received message: !AIVDM,2,1,0,A,53LC9eD000037;?CGKM@E=@0000000000000002b00000t0002QPDQB0C@00,4*39!AIVDM,2,2,7,A,00000000002,2*23 !AIVDM,2,2,0,A,00000000000000000000000,4*12	Pass
6	VDM sentence with the same content as transmitted, output to the PI. EUT responds to message 6 by transmitting message 7.	Transmitted message: !AIVDO,1,1,,A,61mg=5BqMa>L04204PDhht0,2*2C Received message: !AIVDM,1,1,,A,61mg=5BqMa>L04204PDhht0,2*2E Message 7 transmitted by EUT: !AIVDO,1,1,,A,7;UnTqhMKkAD,0*36	Pass
7	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,759bTRiEkAWP,0*7A Received message: !AIVDM,1,1,,A,759bTRiEkAWP,0*78	Pass
8	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,84uwmjh0@00E1Dm0,0*58 Received message: !AIVDM,1,1,,A,84uwmjh0@00E1Dm0,0*5A	Pass
9	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,91b5;l7l1TdtSF0l4Q@7q6`04000,0*4A Received message: !AIVDM,1,1,,A,91b5;l7l1TdtSF0l4Q@7q6`04000,0*48	Pass
10	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,:1mg=5BqMa>L,0*40 Received message: !AIVDM,1,1,,A,:1mg=5BqMa>L,0*42 Message 11 transmitted by EUT: !AIVDO,1,1,,A,;;UnTqiv=qc7rwrFu2McqGi00000,0*0A	Pass
11	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,;5tW4l1v9f<00<tSF0l4Q@100000,0*50 Received message: !AIVDM,1,1,,A,;5tW4l1v9f<00<tSF0l4Q@100000,0*52	Pass
12	VDM sentence with the same content as transmitted, output to the PI. EUT responds to message 12 by transmitting message 13.	Transmitted message: !AIVDO,1,1,,A,<1mg=5BqMa>LD5CDP=C7Pijklm0,2*22 Received message: !AIVDM,1,1,,A,<1mg=5BqMa>LD5CDP=C7Pijklm0,2*20 Message 13 transmitted by EUT: !AIVDO,1,1,,A,=;UnTqhMKkAD,0*3C	Pass
13	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,=59bTRkWA1fT,0*0F Received message: !AIVDM,1,1,,A,=59bTRkWA1fT,0*0D	Pass
14	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,>>M46rA@E=B0m<N37;?CD0,4*3E Received message: !AIVDM,1,1,,A,>>M46rA@E=B0m<N37;?CD0,4*3C	Pass

Msg.	Requirement	Result	Verdict
15	VDM sentence with the same content as transmitted, output to the PI. EUT responds to message 15 by transmitting message 24.	Transmitted message: !AIVDO,1,1,,A,?027`SRqMa>L<6@,2*28 Received message: !AIVDM,1,1,,A,?027`SRqMa>L<6@,2*2A Message 3 transmitted by EUT: !AIVDO,1,1,,A,3;UnTqh01TwrFu2McqGhKh1D0000,0*2D	Pass
16	VDM sentence with the same content as transmitted, output to the PI. EUT enters assigned mode and transmits message 2	Transmitted message: !AIVDO,1,1,,A,@027`SRqMa>L381@,0*65 Received message: !AIVDM,1,1,,A,@027`SRqMa>L381@,0*67 EUT enters assigned mode: !AIVDO,1,1,,B,2;UnTqh01TwrFu2McqGhKh1F0D02,0*5B	Pass
17	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,A027`SQb3Qba02J`Q3TP7Osk05hOwaT0:rbb,0*07 Received message: !AIVDM,1,1,,A,A027`SQb3Qba02J`Q3TP7Osk05hOwaT0:rbb,0*05	Pass
18	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,B4uwmjh02WvR@hWAdd0000K1T000,0*6E Received message: !AIVDM,1,1,,A,B4uwmjh02WvR@hWAdd0000K1T000,0*6C	Pass
19	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,C4uwmjh02WvUbh7Add00cwuP`:V`000000000000000000000030,0*6A Received message: !AIVDM,1,1,,A,C4uwmjh02WvUbh7Add00cwuP`:V`000000000000000000000030,0*68	Pass
20	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,D027`SP38B<`000000000000000,0*23 Received message: !AIVDM,1,1,,A,D027`SP38B<`000000000000000,0*21	Pass
21	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,E>j3O450b7W00000000000000000Ou;EP>SIH000000o03<0,2*60 Received message: !AIVDM,1,1,,A,E>j3O450b7W00000000000000000Ou;EP>SIH000000o03<0,2*62	Pass
22	VDM sentence with the same content as transmitted, output to the PI. EUT outputs ACA and ACS sentences with the same regional settings as message 22.	Transmitted message: !AIVDO,1,1,,A,F027`SR2F2H7vm1qp?sD3g41P000,0*1D Received message: !AIVDM,1,1,,A,F027`SR2F2H7vm1qp?sD3g41P000,0*1F ACA and ACS sentence: $AIACA,0,5200.00,N,00100.00,W,5100.00,N,00200.00,W,4,2085,0,2086,0,0,0,B,0,000000.00*3C $AIACS,0,2222222,111400.00,19,07,2019*75	Pass
23	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*3B Received message: !AIVDM,1,1,,A,G027`SSwJPsi7ub1m<000000800,2*39	Pass

Msg.	Requirement	Result	Verdict
24	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,H4uwmjh<h5=>0:1@E=@00000000,2*16 !AIVDM,1,1,,A,H4uwmjh<h5=>0:1@E=@00000000,2*14 Received message: !AIVDO,1,1,,A,H4uwmjm6ijkl0001234000000000,0*06 !AIVDO,1,1,,A,H4uwmjm6ijkl0001234000000000,0*06	Pass
25	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,I4uwmjl0@00b2ab@6RaaPSRhHqIP,0*2E Received message: !AIVDM,1,1,,A,I4uwmjl0@00b2ab@6RaaPSRhHqIP,0*2C	Pass
26	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,J4uwmjl0@00QT0a0Qb2a9pPI000,2*25 Received message: !AIVDM,1,1,,A,J4uwmjl0@00QT0a0Qb2a9pPI000,2*27	Pass
27	VDM sentence with the same content as transmitted, output to the PI.	Transmitted message: !AIVDO,1,1,,A,KkLC9eL?ub3fLM2n,0*3B Received message: !AIVDM,1,1,,A,KkLC9eL?ub3fLM2n,0*39	Pass

Transmitted messages – Clause 16.7.2

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Initiate the transmission of messages relevant for a mobile station according to Table 18 by the EUT. Record transmitted messages.

Required results

Confirm that the EUT transmits messages with correct field content and format or responses, as appropriate. Confirm that Messages 4, 9, 16, 17, 18, 19, 20, 21, 22 and 23 are not being transmitted by the EUT.

Test Results

Requirement	Result	Verdict
EUT transmits message 1 in autonomous mode	!AIVDO,1,1,,A,1;UnTqh01TwrFu3RpfH@Kh1b05II,0*31	Pass
EUT transmits message 2 in assigned mode	!AIVDO,1,1,,A,2;UnTqh01TwrFu3RD6`@Kh0:0000,0*22	Pass
EUT transmits message 1 during network entry	!AIVDO,1,1,,A,3;UnTqhP?wOrCRjM6qIN4?vH02u1,0*7A	
Message 4 cannot be transmitted by the EUT	There is no way of initiating the transmission of Msg 4	Pass
EUT transmits message 5 every 6 minutes	!AIVDO,2,1,4,A,5;UnTqswwwww7;<000048<00000000000000000b0@1354?P0?1PDQB0C@00,2*41 !AIVDO,2,2,4,A,00000000008,2*2A	Pass
EUT transmits message 6 when an ABM sentence is sent to the PI.	ABM Sentence: !AIABM,1,1,2,412000000,1,6,04205@E=B0lE=<4LD,2 Transmitted message: !AIVDO,1,1,,A,6;UnTqqR>Wh004205@E=B0lE=<4LD0,4*7C	Pass
EUT transmits message 7 after receiving a message 6 addressed to own station	Received message: !AIVDM,1,1,,A,61mg=5BqMa>L04204PDhht0,2*2E Message 7 transmitted by EUT: !AIVDO,1,1,,A,7;UnTqhMKkAD,0*36	Pass
EUT transmits message 8 when a BBM sentence is sent to the PI.	BBM Sentence: !AIBBM,1,1,2,1,8,04005@E=@,2 Transmitted message: !AIVDM,1,1,,A,8;UnTqh0@00E1Dm0,0*4E	Pass
Message 9 cannot be transmitted by the EUT	There is no way of initiating the transmission of Message 9	Pass
Message 10 transmitted when comms test is performed on the MKD	!AIVDM,1,1,,A,:;UnTqho4jKD,0*6F	Pass
Message 11 transmitted after receiving message 10	Message received: !AIVDM,1,1,,A,:6k`=l2qMa>L,0*6D Transmitted message: !AIVDO,1,1,,A,;;UnTqiv=qcbWwrFu3RpfHA00000,0*47	Pass
Message 12 sent after sending ABM sentence to the PI	ABM Sentence: !AIABM,1,1,2,412000000,1,12,D5CDP=5CC175,0*5C Transmitted message: !AIVDO,1,1,,A,<;UnTqqR>Wh0D5CDP=5CC175,0*32	Pass
EUT transmits message 13 after receiving a message 12 addressed to own station	Message received: !AIVDM,1,1,,A,<0cT1HRqMa>LD5CDP=C7Pijklm0,2*7D Transmitted message: !AIVDO,1,1,,A,=;UnTqh:q0F8,0*51	Pass
EUT transmits message 14 when a BBM sentence is sent to the PI.	BBM Sentence: !AIBBM,1,1,2,1,14,D5CDP=5CC175,0*42 Transmitted message: !AIVDO,1,1,,A,>;UnTqi@E=B0lE=<4LD,2*0A	Pass

Requirement	Result	Verdict
Message 15 sent after sending AIR sentence to the PI	AIR Sentence: $AIAIR,888999000,11,,,,,,,,,*63 Transmitted message: !AIVDO,1,1,,A,?;UnTqkCu35Pd00,2*53	Pass
Message 16 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 16	Pass
Message 17 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 17	Pass
Message 18 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 18	Pass
Message 19 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 19	Pass
Message 20 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 20	Pass
Message 21 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 21	Pass
Message 22 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 22	Pass
Message 23 cannot be transmitted by the EUT	There is no way of initiating the transmission of message 23	Pass
Message 24A cannot be transmitted by the EUT	There is no way of initiating the transmission of message 24A	Pass
EUT transmits Message 24B when operating in autonomous mode.	!AIVDM,1,1,,A,H;UnTqlbooo48L7ijk000008243t,0*7C	Pass
EUT transmits message 25 when an ABM sentence is sent to the PI.	ABM Sentence: !AIABM,1,1,0,412000000,1,25,0400:PbJP,0*51 Transmitted message: !AIVDO,1,1,,A,I;UnTquR>Wh00400:PbJP0000000,0*78	Pass
EUT transmits message 26 when an ABM sentence is sent to the PI.	ABM Sentence: !AIABM,1,1,0,412000000,1,26,0400:PI000,4*57 Transmitted message: !AIVDO,1,1,,A,J;UnTquR>Wh00400:PI000000000,0*4A	Pass
EUT transmits message 27 when LR is enabled.	Attingimus test unit channels configured as C = 2075 and D = 2076 !AIVDM,1,1,,C,K4W`qP0?u5SfLwP0,0*6C !AIVDM,1,1,,D,K4W`qP0?u5SfLwP0,0*6B	Pass

2.17 Dual channel operation – Alternate transmissions

2.17.1 Specification Reference

IEC 61993-2, Clause 17.1

2.17.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.17.3 Date of Test

09-July-2019

2.17.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment and operate the EUT in autonomous mode on default channels AIS 1, AIS 2. Record transmitted scheduled position reports on both channels.

Check CommState for slot allocation.

Required results

Confirm that the EUT allocates slots in alternating both channels. Repeat check for data link access period.

Test Results

Requirement	Results	Verdict
EUT allocates slots in alternating both channels	See Autonomous mode results below	Pass
EUT allocates slots in alternating both channels during network entry	See Network entry results below	Pass
Slot allocation is correct	See slot allocation results below	Pass

Autonomous mode					
Time	Msg	Channel	Slot	MMSI	Sentence
09:32:03	1	B	0128	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0605:0,0*26
09:32:11	1	A	0445	777888999	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0F0@6u,0*69
09:32:23	1	B	0867	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0d0@=S,0*65
09:32:33	1	A	1248	777888999	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1000R;,0*44
09:32:42	1	B	1610	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1D0D03,0*2D
09:32:51	1	A	1941	777888999	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1V00Sc,0*7B
09:33:03	1	B	0128	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0600R@,0*3B

Autonomous mode – Slot allocation on channel A						
Time	Msg	Channel	Slot	MMSI	Sentence	Offset
09:37:52	1	A	1974	777888999	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1`00SC,0*6D	2259
09:38:52	1	A	1983	777888999	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1`0@Nw,0*34	-

Autonomous mode – Slot allocation on channel B						
Time	Msg	Channel	Slot	MMSI	Sentence	Offset
09:36:23	1	B	0867	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0d00RC,0*6A	2195
09:37:21	1	B	0812	777888999	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0b0D03,0*0A	-

Network entry – Alternate channels and slot allocation						
Time	Msg	Channel	Slot	MMSI	Sentence	Increment
09:40:50	3	A	1886	777888999	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1T039Q,0*20	806
09:41:00	3	B	16	777888999	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0002qi,0*37	743
09:41:11	3	A	442	777888999	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0F02qQ,0*7A	742
09:41:20	3	B	759	777888999	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh0V02uQ,0*6D	758
09:41:31	3	A	1184	777888999	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh0v0001,0*69	0
09:41:40	3	B	1517	777888999	!AIVDM,1,1,,B,3;UnTqh01TwrFu2M7AWhKh1@0001,0*5D	0
09:41:50	3	A	1886	777888999	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKh1T02?Q,0*27	-

2.18 Regional area designation by VDL message

2.18.1 Specification Reference

IEC 61993-2, Clause 17.2

2.18.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 13

2.18.3 Date of Test

18-October-2019

2.18.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment and operate the EUT in autonomous mode.

a) Using a base station MMSI, apply channel management messages (Message 22) to the VDL defining two adjacent regional areas 1 and 2 with different channel assignments for both regions and a transitional zone extending 4 NM on either side of the regional boundary (see Figure 13). Let the EUT approach region 1 from outside region 2 more than 5 NM away from the region boundary transmitting on default channels. Record transmitted messages on all 6 channels.

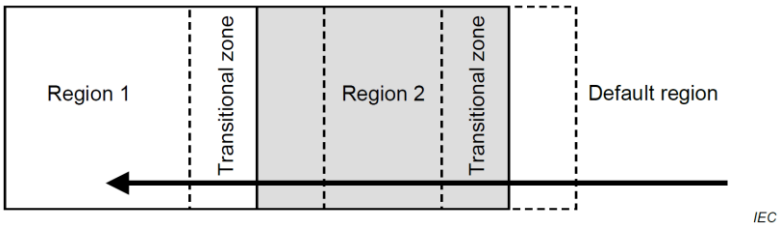


Figure 13

Region	Primary channel	Secondary channel
Region 1	CH A 1	CH B 1
Region 2	CH A 2	CH B 2
Default Region	AIS 1	AIS 2

b) Operate the unit in an area with Tx/Rx mode 1.
c) Operate the unit in an area with Tx/Rx mode 2.
d) Transmit Message 22 using a base station transmitting Message 4 with a position which is more than 120 NM away from the position of the EUT.
e) Transmit Message 22 using a base station which is not transmitting Message 4.

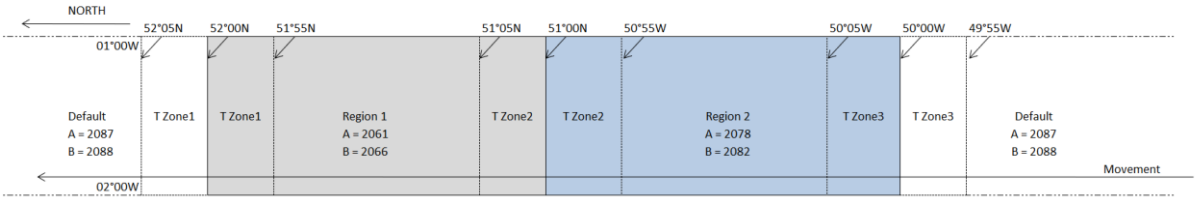
Required results

Check that:
a) the EUT transmits and receives on the primary channels assigned for each region (see Table 35) alternating channels and doubles the number of transmissions when passing through the transitional zones. The EUT shall revert to default autonomous operation on the regional channels after leaving the transitional zones. The number of transmissions doubles on the active channel when transmitting on one channel only;
TXT and ACA sentences are output when defining the area, crossing the boundary of the area and on request. The in-use flag shall be set to "1" if the position is inside the area which is defined by the two corner points of the area setting (e.g. the grey area defining region 2 in Figure 13);
b) the EUT transmits on channel A only with the nominal reporting rate;

c) the EUT transmits on channel B only with the nominal reporting rate;
d) the EUT does not accept the channel management;
e) the EUT does not accept the channel management.

Test Results

The orientation of the operating two operating regions is shown in the figure below. It should be noted that the EUT moves south to north, represented as moving from right to left in the diagram. Details of how the EUT is expected to behave is detailed in the table below, with the states of transitional zones (TZ), operating regions (R) and the default high seas regions (HS) identified using the zone column.



a)										
Test	Zone	Channel		Channel Use	Msg Check	PI Sentence		Reporting Interval	Position of Change	Verdict
1	HS-HSTZ3	A	2087	Continued	18 Reallocation	-	-	Halved	49°55.1	Pass
		B	2088	Ceased	18 Timeout	-	-			
		C	2078	Commenced	18 Allocation	-	-			
		D	2082	Not in Use	N/A	-	-			
2	HSTZ3-R2TZ3	A	2087	Continued	18	TXT	$AITXT,03,01,42,AIS: Operating in channel management mode by*07 $AITXT,03,02,42,Message 22 from base station 002222222 on*56 $AITXT,03,03,42,channels 2078 and 2082*08	Halved	-	Pass
		B	2088	Not in Use	N/A	ACA	$AIACA,9,5100.00,N,00100.00,W,5000.00,N,00200.00,W,5,2078,0,2082,0,0,0,B,1,135031.00*34			
		C	2078	Continued	18	ACS	$AIACS,9,2222222,134106.00,16,10,2019*71			
		D	2082	Not in Use	N/A	-				
3	R2TZ3-R2	A	2087	Ceased	18 Timeout	TXT		Normal	50°05.1	Pass
		B	2088	Not in Use	N/A	ACA				
		C	2078	Continued	18 Reallocation	ACS				
		D	2082	Commenced	18 Allocation	-				
4	R2-R2TZ2	A	2061	Commenced	18 Allocation	-		Halved	50°55.0	Pass
		B	2066	Not in Use	N/A	-				
		C	2078	Continued	18 Reallocation	-				
		D	2082	Ceased	18 Timeout	-				
5	R2TZ2-R1TZ2	A	2061	Continued	1	TXT	$AITXT,03,01,42,AIS: Operating in channel management mode by*07 $AITXT,03,02,42,Message 22 from base station 002222222 on*56 $AITXT,03,03,42,channels 2061 and 2066*0A	Halved	-	Pass
		B	2066	Not in Use	N/A	ACA	$AIACA,0,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2061,0,2066,0,0,0,B,1,140933.00*34			
		C	2078	Continued	1	ACS	$AIACS,0,2222222,134006.00,16,10,2019*79			
		D	2082	Not in Use	N/A	-				
6	R2TZ2-R1	A	2061	Continued	18 Reallocation	-		Normal	51°05.1	Pass
		B	2066	Commenced	18 Allocation	-				
		C	2078	Ceased	18 Timeout	-				
		D	2082	Not in Use	N/A	-				
7	R1-R1TZ1	A	2061	Continued	18 Reallocation	-		Halved	51°55.0	Pass
		B	2066	Ceased	18 Timeout	-				
		C	2087	Commenced	18 Allocation	-				
		D	2088	Not in Use	N/A	-				
8	R1TZ1-HSTZ1	A	2061	Continued	1	TXT	$AITXT,01,01,44,AIS: Returned to default operations*6C	Halved	-	Pass
		B	2066	Not in Use	N/A	ACA	$AIACA,1,9000.00,N,18000.00,E,9000.00,S,18000.00,W,5,2087,0,2088,0,0,0,,1,142835.00*75			
		C	2087	Continued	1	ACS	$AIACS,1,777888999,142333.00,16,10,2019*78			
		D	2088	Not in Use	N/A	-				
9	HSTZ1-HS	A	2061	Ceased	18 Timeout	-		Normal	52°05.0	Pass
		B	2066	Not in Use	N/A	-				
		C	2087	Continued	18 Reallocation	-				
		D	2088	Commenced	18 Allocation	-				

b)		
Requirement	Result	Verdict
A Message 22 is broadcast, defining a region with Tx/Rx mode = 1	The Message 22 sent to the EUT is: !AIVDM,1,1,,A,F027`SR2N2PGub1oR?pv3bH2P000,0*04	-
The EUT outputs ACA and text messages to the PI	The messages output by the EUT are: $AITXT,01,01,36,AIS: Channel management parameters changed*1C $AIACA,2,5100.00,N,00200.00,W,5000.00,N,00300.00,W,6,2087,0,2088,0,1,0,B,0,000000.00*31 $AITXT,03,01,42,AIS: Operating in channel management mode by*07 $AITXT,03,02,42,Message 22 from base station 002222222 on*56	-
The EUT operates in assigned mode, only transmitting on channel A	The EUT times out slots on channel B, reallocates slots on A and begins to transmit on channel A only	Pass

c)		
Requirement	Result	Verdict
A Message 22 is broadcast, defining a region with Tx/Rx mode = 2	The Message 22 sent to the EUT is: !AIVDM,1,1,,A,F027`SR2N2PWvm1oR?sD3bH2P000,0*29	-
The EUT outputs ACA and text messages to the PI	The messages output by the EUT are: $AITXT,01,01,36,AIS: Channel management parameters changed*1C $AIACA,1,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2087,0,2088,0,2,0,B,0,000000.00*33 $AIACS,1,2222222,102722.00,18,10,2019*72 $AITXT,03,01,42,AIS: Operating in channel management mode by*07 $AITXT,03,02,42,Message 22 from base station 002222222 on*56	-
The EUT operates in assigned mode, only transmitting on channel B	The EUT times out slots on channel A, reallocates slots on B and begins to transmit on channel B only	Pass

d)		
Requirement	Result	Verdict
The EUT and base station are separated by 300NM	The EUT gives the following position report: !AIVDM,1,1,,A,4027`SQv>a>:COrCR2M6qDG00@;f,0*21 The base station give the following position report: !AIVDM,1,1,,B,4027`SQv>a:SiOrCR2M6qDG000S:,0*21	-
A Message 22 is transmitted by the base station, more than 120 NM from the EUT	The Message 22 transmitted by the base station is: !AIVDM,1,1,,A,F027`SR2N2PWvm1oR?sD3bH2P000,0*29	-
The EUT does not accept the region defined in the Message	The EUT does not output any ACA or text messages to the PI, and an ACA query returns only the default settings	Pass

e)		
Requirement	Result	Verdict
A Message 22 is transmitted from a base station with no Message 4 position report	The Message 22 transmitted by the base station with MMSI 4444444 is: !AIVDO,1,1,,A,F04?A722N2PWvm1oR?sD3bH2P000,0*00	-
The EUT shall not accept a Message 22 without a valid Message 4	The EUT does not use the regional operating settings defined in the Message 22, by correctly ignoring the Message 22	Pass

2.19 Regional area designation by serial message

2.19.1 Specification Reference

IEC 61993-2, Clause 17.3

2.19.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 14

2.19.3 Date of Test

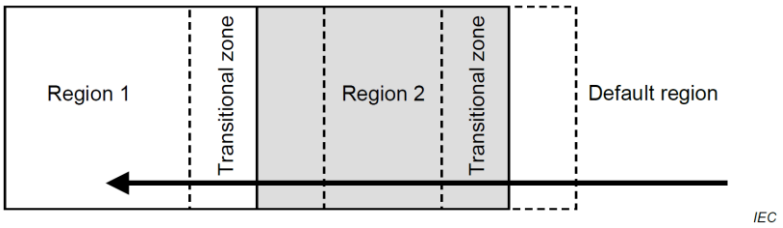
22-October-2019

2.19.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment and operate the EUT in autonomous mode.

a. Using a base station MMSI, apply channel management messages (ACA sentence) to the VDL defining two adjacent regional areas 1 and 2 with different channel assignments for both regions and a transitional zone extending 4 NM on either side of the regional boundary (see Figure 13). Let the EUT approach region 1 from outside region 2 more than 5 NM away from the region boundary transmitting on default channels. Record transmitted messages on all 6 channels.
b. Operate the unit in an area with Tx/Rx mode 1.
c. Operate the unit in an area with Tx/Rx mode 2.



Region	Primary channel	Secondary channel
Region 1	CH A 1	CH B 1
Region 2	CH A 2	CH B 2
Default Region	AIS 1	AIS 2

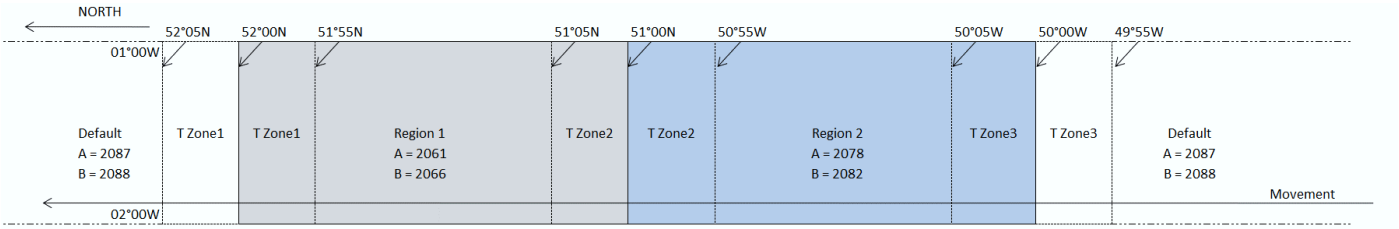
Required results

Check that:

a. the EUT transmits and receives on the primary channels assigned for each region (see Table 35) alternating channels and doubles the number of transmissions when passing through the transitional zones. The EUT shall revert to default autonomous operation on the regional channels after leaving the transitional zones. The number of transmissions doubles on the active channel when transmitting on one channel only;
TXT and ACA sentences are output when defining the area, crossing the boundary of the area and on request. The in-use flag shall be set to "1" if the position is inside the area which is defined by the two corner points of the area setting (e.g. the grey area defining region 2 in Figure 13);
b. the EUT transmits on channel A only with the nominal reporting rate;
c. the EUT transmits on channel B only with the nominal reporting rate;

Test Results

The orientation of the operating two operating regions is shown in the figure below. It should be noted that the EUT moves south to north, represented as moving from right to left in the diagram. Details of how the EUT is expected to behave is detailed in the table below, with the states of transitional zones (TZ), operating regions (R) and the default high seas regions (HS) identified using the *zone* column.



a)										
Test	Zone	Channel		Channel Use	Msg Check	PI Sentence		Reporting Interval	Position of Change	Verdict
1	HS-HSTZ3	A	2087	Continued	18 Reallocation	-	-	Halved	49°55.1	Pass
		B	2088	Ceased	18 Timeout	-	-			
		C	2078	Commenced	18 Allocation	-	-			
		D	2082	Not in Use	N/A	-	-			
2	HSTZ3-R2TZ3	A	2087	Continued	18	-		Halved	-	Pass
		B	2088	Not in Use	N/A	ACA	$AIACA,3,5100.00,N,00100.00,W,5000.00,N,00200.00,W,5,2078,0,2082,0,0,0,C,1,113510.00*3D			
		C	2078	Continued	18	ACS	$AIACS,3,0,112537.00,22,10,2019*7C			
		D	2082	Not in Use	N/A	-				
3	R2TZ3-R2	A	2087	Ceased	18 Timeout	-		Normal	50°05.1	Pass
		B	2088	Not in Use	N/A	-				
		C	2078	Continued	18 Reallocation	-				
		D	2082	Commenced	18 Allocation	-				
4	R2-R2TZ2	A	2061	Commenced	18 Allocation	-		Halved	50°55.0	Pass
		B	2066	Not in Use	N/A	-				
		C	2078	Continued	18 Reallocation	-				
		D	2082	Ceased	18 Timeout	-				
5	R2TZ2-R1TZ2	A	2061	Continued	1	-		Halved	-	Pass
		B	2066	Not in Use	N/A	ACA	$AIACA,4,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2061,0,2066,0,0,0,C,1,115412.00*3F			
		C	2078	Continued	1	ACS	$AIACS,4,0,112537.00,22,10,2019*7B			
		D	2082	Not in Use	N/A	-				
6	R2TZ2-R1	A	2061	Continued	18 Reallocation	-		Normal	51°05.1	Pass
		B	2066	Commenced	18 Allocation	-				
		C	2078	Ceased	18 Timeout	-				
		D	2082	Not in Use	N/A	-				
7	R1-R1TZ1	A	2061	Continued	18 Reallocation	-		Halved	51°55.1	Pass
		B	2066	Ceased	18 Timeout	-				
		C	2087	Commenced	18 Allocation	-				
		D	2088	Not in Use	N/A	-				
8	R1TZ1-HSTZ1	A	2061	Continued	1	TXT		Halved	-	Pass
		B	2066	Not in Use	N/A	ACA				
		C	2087	Continued	1	ACS				
		D	2088	Not in Use	N/A	-				
9	HSTZ1-HS	A	2061	Ceased	18 Timeout	-		Normal	52°05.105	Pass
		B	2066	Not in Use	N/A	-				
		C	2087	Continued	18 Reallocation	-				
		D	2088	Commenced	18 Allocation	-				

b) Operate the EUT in a region defining Tx/Rx = 1		
Requirement	Result	Verdict
An ACA sentence, defining a valid region with Tx/Rx = 1, is applied to the PI port of the EUT	The sentence sent to the EUT is: $AIACA,,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2087,0,2088,0,1,0,,,*5C	-
The EUT confirms the ACA sentence with a TXT message output to the PI	The text message output is: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	-
The EUT transmits on channel A only	The EUT times-out slots on channel A and B first, using Message 1. New slots are also reserved on channel A using Message 3, maintaining the transmission interval of 10 s.	Pass

c) Operate the EUT in a region defining Tx/Rx = 2		
Requirement	Result	Verdict
An ACA sentence, defining a valid region with Tx/Rx = 2, is applied to the PI port of the EUT	The sentence sent to the EUT is: $AIACA,,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2087,0,2088,0,2,0,,,*5F	-
The EUT confirms the ACA sentence with a TXT message output to the PI	The text message output is: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	-
The EUT transmits on channel B only	The EUT times-out slots on channel A and B first, using Message 1. New slots are also reserved on channel B using Message 3, maintaining the transmission interval of 10 s.	Pass

2.20 Regional area designation with lost position

2.20.1 Specification Reference

IEC 61993-2, Clause 17.4

2.20.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.20.3 Date of Test

09-July-2019

2.20.4 Test Results and Methods of Measurement

Method of measurement

Repeat the test of 17.2 using ACA sentence for channel assignment as follows.

a) Disable position information; apply new addressed Message 22 using a base station MMSI.
b) Make position information available again and query for area settings (ACA request).

Required results

Verify that:

a) the settings of the current area are still being used; check that settings of new addressed Message 22 are adopted;
b) all area settings are still available.

Test Results

a)	
Requirement	Verdict
The following ACA sentences were sent to the EUT: $AIACA,0,5100.0,N,00100.0,W,5000.0,N,00200.0,W,5,2078,0,2082,0,0,0,,,*65 $AIACA,1,5200.0,N,00100.0,W,5100.0,N,00200.0,W,5,2061,0,2066,0,0,0,,,*64	-
Settings of region 1 are in use, EUT transmitting on channels 2078 and 2082	Pass
External and internal GNSS was removed: !AIVDM,1,1,,A,1;UnTqh0?w<tSF0l4Q@>401v0d01,0*2E	-
Addressed Message 22 sent to EUT, with channels 2086 and 2085, sent on channel 2078: !AIVDO,1,1,,A,F027`SR2J2D5jsBLp000000BP000,0*48	-
The current settings are in use and the new channel settings from message 22 have been stored: $AIACA,4,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2086,0,2085,0,0,0,A,1,104523.00*3B $AIACS,4,2222222,104523.00,09,07,2019*74	Pass

b)	
Requirement	Verdict
The regions are still stored, $AIAQ,ACA*3E sent to the EUT: $AIACA,4,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2086,0,2085,0,0,0,A,1,104523.00*3B $AIACS,4,2222222,104523.00,09,07,2019*74 $AIACA,5,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2061,0,2066,0,0,0,C,0,000000.00*3D $AIACS,5,0,103540.00,09,07,2019*75	Pass

2.21 Power setting

2.21.1 Specification Reference

IEC 61993-2, Clause 17.5

2.21.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.21.3 Date of Test

09-July-2019

2.21.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Using a base station MMSI, transmit channel management message (Message 22), defining output power high/low.

Required results

Check that the EUT sets output power as defined and indicates when the low power setting is in operation.

Test Results

Requirement	Result	Verdict
Message 22 sent to EUT with power = 1 (low): !AIVDO,1,1,,A,F027`SR2N2P?vm1oR?sD3bH2P000,0*43	EUT sets output power to the low power setting and the low power icon is displayed on the MKD	Pass
Message 22 sent to EUT with power = 0 (high): !AIVDO,1,1,,A,F027`SR2N2P7vm1oR?sD3bH2P000,0*4B	EUT sets output power to the high power setting and the low power icon is removed from the MKD	Pass

2.22 Message Priority Handling

2.22.1 Specification Reference

IEC 61993-2, Clause 17.6

2.22.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.22.3 Date of Test

04-November-2019

2.22.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment and operate test equipment with 90 % channel load. Set the EUT to a reporting interval of 2 s by applying a speed of > 23 kn and a ROT of > 20°/s. Record VDL messages and check for used slots. Initiate the transmission of two 3 slot messages (Message 12 and Message 8) by the EUT. Record transmitted messages on both channels.

Required results

Check that the EUT transmits the messages in correct order according to their priority as given in ITU-R Recommendation M.1371-5/A8-2.

Test Results

Requirement	Result	Verdict
EUT adopts a reporting internal of 2 seconds by applying a speed of > 23 kn and ROT of > 20°/s.	!AIVDM,1,1,,B,1;UnTqhOSrwrFu2M7AWhKkNL0<01,0*18	-
A 3 slot message 12 is sent to the EUT.	!AIVDM,2,1,2,A,<;UnTqq7hqD0D89CP9CP1PD5CDP?6PEC9>7P1PkPC<?DP144B5CC54P29>1B,0*7E	-
A 3 slot message 8 is sent to the EUT.	!AIVDM,1,1,,A,8;UnTqh0@00E22Dp2Dp0H51Dm84m4RCQp3i`0H0PS@,4*51	-
ITU-R M. 1371-5/A8-2 states that message 12 has a higher priority than message 8; it must therefore be transmitted first.	Position reports are given the highest priority, while Message 12 is given a lower priority and Message 8 is given the lowest priority	Pass

2.23 Message Priority Handling

2.23.1 Specification Reference

IEC 61993-2, Clause 17.7

2.23.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.23.3 Date of Test

17-September-2019

2.23.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Assure that, at test receiver location, the signal level received from the EUT exceeds the signal level received from the test transmitter as follows.

NOTE Free slots are: slots not used, Slots used by a mobile station under way that has not been received for 3 min or more, slots used by a base station (Message 20 and Message 4) beyond 120 NM, garbled slots.

Available slots are: distant station slots.

Unavailable slots are: near station slots, slots used by a base station (Message 20 and Message 4) within 120 NM, slots used by mobile stations reporting without position information, slots used by mobile stations with a reporting interval of 1 min or more.

a) Transmit test targets on channel A with 50 % channel load. Channel B is free. This test covers Rule 0 and 1.
b) Transmit near and distant test targets with 100 % channel load on channel A in all selection intervals which are under observation. Channel B is free. There shall be enough different targets to allow the EUT to meet the requirement to reuse only one slot of each target per frame.
c) Transmit near and distant test targets with 100 % channel load on channel B in all selection intervals which are under observation. Channel A is free.
d) Transmit Message 4 with a position distance $<$ 120 NM and Message 20 with slot reservations on channel A.
e) Transmit Message 4 with a position distance $>$ 120 NM and Message 20 with slot reservations on channel A.
f) Transmit no Message 4 and Message 20 with slot reservations on channel A.
g) Transmit Message 4 with a position distance $<$ 120 NM and Message 20 with slot reservations on channel A. Transmit near and distant test targets in the unreserved slots on channel A. Channel B is free.

Required results

Confirm that:

a) only free slots are used for transmission on channel A. Confirm that only slots which are free on channel A are used for transmissions on channel B;
b) slots of the most distant test targets are used for transmission on channel A. Check that not more than one slot of a station is reused in a frame;
c) for transmission on channel A, the candidate slots on channel A are organized according to the most distant station on channel B;
d) only unreserved slots are used on channel A. Confirm that, at start of Message 20, the time-out of all reserved slots is forced to 0 and the slots are changed to free slots within one frame. Confirm that, for transmissions on channel B, only slots which are not reserved

on channel A are used after the next regular time-out 0. Confirm that, after the reservation time-out, all slots on channel A and B are used again;

e) all slots are used for transmission on channels A and B;

f) all slots are used for transmission on channels A and B;

g) only unreserved slots are used on channel A. Confirm that slots of the most distant test targets are used for transmission. Confirm that, for transmissions on channel B, only slots which are not reserved on channel A are used after the next regular time-out 0.

Test Results

a) Test Results		
Requirement	Result	Verdict
Test targets are transmitted on channel A with 50% channel load	Slots ending in 1-5 were reserved by VDL target	-
The EUT only transmits on channel A using free slots	The EUT does not transmit on the slots that are reserved by other targets- when transmission slots are timed out, it only reserves slots that are free	Pass
The EUT only uses slots that are free on channel A for transmissions on channel B	The EUT does not use any slots that end in 1-5 on channel B	Pass

b) Test Results		
Requirement	Result	Verdict
Test targets are transmitted on channel A with 100% channel load	50 targets transmit using a block gap of 0, resulting in 100% channel A load	-
Targets are located at different distances from the EUT	Targets with an MMSI ending in an even number are located 25 NM from the EUT, while targets that end in an odd number are located 150 NM from the EUT	-
Channel A transmissions are made only on slots ending in odd numbers, representing the slots used by the most distant targets	The EUT does reserve new transmission slots using the slots occupied by near targets. The EUT does not reuse more than one slot of a station in one frame	Pass

c) Test Results		
Requirement	Result	Verdict
Test targets are transmitted on channel B with 100% channel load	50 targets transmit using a block gap of 0, resulting in 100% channel B load	-
Targets are located at different distances from the EUT	Targets with an MMSI ending in an even number are located 25 NM from the EUT, while targets that end in an odd number are located 150 NM from the EUT	-
Channel A transmissions are made only on slots occupied by the most distant targets present on channel B	Once the target loading begins, the EUT does not use slots used by the nearest targets.	Pass

d) Test Results		
Requirement	Result	Verdict
A Message 4 from a base station MMSI is transmitted within 120 NM of the EUT	The Message 4 transmitted by MMSI 2222222 is: !AIVDM,1,1,,A,4027`SQv>Mb7WOrCR2M6qDG00<01,0*68	-
A Message 20 is sent to the EUT, reserving slots on channel A	The Message 20 sent on slot 5 has an offset of 5, reserves 5 consecutive slots and an increment of 10 slots. With a time-out of 7 minutes, the Message 20 effectively reserves all slots on channel A that end in 0, 1, 2,3 and 4 for 7 frames: !AIVDM,1,1,,A,D027`SP0EN0`,0*5F	-
The time-out values of all reserved slots are forced to 0 and changed to free slots within one frame	The EUT times-out reserved slots that clash with the Message 20 slots reservations	Pass
For transmissions on channel B, only slots which are not reserved on channel A are used for transmissions after timing out	The EUT does not transmit on slots reserved by the base station on channel B	Pass
After the time-out of Message 20, the reserved slots are treated as free and the EUT uses them again for transmissions	Both channel A and B return to treating all slots as free after the time-out of Message 20	Pass

e) Test Results		
Requirement	Result	Verdict
A Message 4 from a base station MMSI is transmitted within 120 NM of the EUT	The Message 4 transmitted by MMSI 6500480 is: !AIVDM,1,1,,A,406<hP1v>Md;=OrFu2J@:oi0184C,0*02	-
A Message 20 is sent to the EUT, reserving slots on channel A	The Message 20 sent on slot 5 has an offset of 5, reserves 5 consecutive slots and an increment of 10 slots. With a time-out	-

e) Test Results		
Requirement	Result	Verdict
	of 7 minutes, the Message 20 effectively reserves all slots on channel A that end in 0, 1, 2,3 and 4 for 7 frames: !AIVDM,1,1,,A,D06<hP00EN0`,0*3B	
No slots are timed out using Message 20, and the EUT continues transmitting as normal on channels A and B	Slots that clash with the reservations of Message 20 are not timed out and the EUT maintains its transmission schedule	Pass

f) Test Results		
Requirement	Result	Verdict
Transmit a Message 20 with no Message 4, on channel A	The Message 20 sent on slot 5 has an offset of 5, reserves 5 consecutive slots and an increment of 10 slots. With a time-out of 7 minutes, the Message 20 effectively reserves all slots on channel A that end in 0, 1, 2,3 and 4 for 7 frames: !AIVDO,1,1,,A,D06<hP00EN0`,0*39	-
All slots are used for transmission by the EUT on channels A and B	The EUT successfully ignores the Message 20 as it does not have a valid position report. The EUT does not time-out its transmission schedule and continues to treat all slots as free	Pass

g) Test Results		
Requirement	Result	Verdict
Transmit a Message 4 from a base station position within 120 NM from the EUT	The Message 4 sent to the EUT is from a base station 0.76 NM from the EUT: !AIVDM,1,1,,A,D027`SP0EH0`,0*59	-
Slots reserved by the base station, as well as slots occupied by targets near to the EUT should not be used for transmission by the EUT	The EUT times-out slots in its transmission schedule that are reserved by the base station's Message 20, and does not use these slots until the Message 20 time-out. After timing-out slots occupied by near targets, the EUT does not move back into these occupied slots, instead using slots reserved by distant targets to transmit position reports	Pass

2.24 Management of received regional operating settings

2.24.1 Specification Reference

IEC 61993-2, Clause 17.8

2.24.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.24.3 Date of Test

10-July-2019

2.24.4 Test Results and Methods of Measurement

Test for replacement or erasure of dated or remote regional operating settings – Clause 17.8.1

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Using a base station MMSI, send a valid regional operating setting to the EUT by Message 22 with the regional operating area, including the own position of the EUT (area 1). Consecutively, send another seven valid regional operating settings to the EUT, using both Messages 22 and DSC telecommands, with regional operating areas neither overlapping with the first nor with one another. Perform the following in the order shown.

a) Send another Message 22 to the EUT, with a ninth regional operating area (area 9) not overlapping with the previous eight regional operating areas.
b) Send a tenth telecommand to the EUT, with a regional operating area (area 10) which partly overlaps a regional operating area.
c) Move own position of EUT to a distance of more than 500 NM from one region defined by previous commands.
d) Move own position of EUT to a distance of more than 500 NM from all regions defined by previous commands.
e) Restart the EUT and make sure it cannot receive UTC. Apply a channel management area setting by message 22 and by ACA input. Wait for 24 h.

Query for area settings (ACA request) after a), b), c) and d).

Required results

Check that, after the initialization, the EUT operates according to the regional operating settings defined by area 1 and:

a) the most distant area is deleted, and the other areas are available;
b) area 10 is stored and that the old overlapped area is deleted;
c) this area is deleted by the output of TXT and ACA sentences showing the remaining area settings;
d) all areas are deleted by the output of a single TXT and ACA sentences showing high sea settings;
e) all area settings have been removed.

Test Results

Eight regional operating areas are defined using Message 22:

1. !AIVDO,1,1,,A,F027`SR2N2P7tO1oR?n`3bH2P000,0*52
2. !AIVDO,1,1,,A,F027`SR2N2P7ub1oR?pv3bH2P000,0*76
3. !AIVDO,1,1,,A,F027`SR2N2P7vm1oR?sD3bH2P000,0*4B
4. !AIVDO,1,1,,A,F027`SR2N2P7tO1jn?n`3Q02P000,0*20
5. !AIVDO,1,1,,A,F027`SR2N2P7ub1jn?pv3Q02P000,0*04
6. !AIVDO,1,1,,A,F027`SR2N2P7vm1jn?sD3Q02P000,0*39
7. !AIVDO,1,1,,A,F027`SR2N2P7tO1f:?n`3G`2P000,0*3E
8. !AIVDO,1,1,,A,F027`SR2N2P7ub1f:?pv3G`2P000,0*1A

The EUT is located inside area 1 at N50°50" W3°30":
!AIVDM,1,1,,A,1;UnTqh01TwgvW0M5T`0Kh0B0L01,0*5E

a)		
Requirement	Result	Verdict
Another Message 22 is sent to the EUT, defining a ninth regional operating area.	!AIVDO,1,1,,A,F027`SR2N2P7ub1lk?pv3VN2P000,0*7E	-
The most distant area is deleted, and the other areas are available.	Region number eight is the most distant from the EUT. When the ninth region is added, region eight is correctly removed from the region management list. All other regions, including region nine, are now available.	Pass

b)		
Requirement	Result	Verdict
A Message 22 is sent to the EUT, defining a tenth regional operating area.	!AIVDO,1,1,,A,F027`SR2N2P7tO1mv?oJ3W@2P000,0*62	-
Region ten overlaps region one, therefore region one should be deleted.	Region ten is added to the region management list and returned in the ACA sentence. Region one is correctly removed in both the region management list and the ACA sentence.	Pass

c)		
Requirement	Result	Verdict
The EUT is to be moved more than 500 NM from one of the regions defined in the previous commands.	The EUT is moved 515 NM from region seven. Starting position 50° 50' N 3° 30' W: !AIVDM,1,1,,A,1;UnTqh01TwgvW0M5T`0Kh1D0<01,0*29 Final position 50° 20' N 9° 0' E: !AIVDM,1,1,,B,1;UnTqh01TPa<f0Lk@h0Kh0L088w,0*70	-
Region seven is located more than 500 NM and should be deleted.	Region seven is successfully deleted; it is removed from the region management list on the MKD and is not present in the ACA sentence.	Pass

d)		
Requirement	Result	Verdict
The EUT is moved more than 500 NM from all regions previously defined.	The EUT is moved 6046 NM: Starting position 50° 50' N 3° 30' W: !AIVDM,1,1,,B,1;UnTqh01TPa<f0Lk@h0Kh180<01,0*4F Final position 50° 50' S 3° 30' W: !AIVDM,1,1,,B,1;UnTqh01TPa<f1S<g@0Kh1f0HPe,0*17	-
All previously defined regions are to be deleted.	The ACA sentence output by the EUT shows there are no operating regions remaining. The operating regions are also removed from the region management list on the MKD.	Pass

e)		
Requirement	Result	Verdict
The EUT's UTC source is removed and the device is restarted.	The internal GNSS antenna is disconnected from the EUT, the external GNSS is removed and the EUT is power cycled.	-
A channel management area is defined using a Message 22.	The Message 22 sent to the EUT is: !AIVDO,1,1,,A,F027`SR2N2PGtO1oR?n`3bH2P000,0*22	-
The area settings are removed, 24 hours after the area is defined.	After 24 hours the operating region is removed. This is seen in the ACA query returning the default regional settings: $AIACA,1,9000.00,N,18000.00,E,9000.00,S,18000.00,W,5,2087,0,2088,0,0,0,,1,150745.00*7E	Pass

Test of correct input via presentation interface or MKD – Clause 17.8.2

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Using a base station MMSI, perform the following tests in the following order.

a) Send Message 22 or a DSC telecommand with valid regional operating settings to the EUT with a regional operating area, which contains the current position of own station.
b) Input a different, valid regional operating setting – not overlapping the area defined under a) – via the MKD.
c) Send a different regional operating setting with a regional operating area which partly overlaps the regional operating area input via the MKD to the EUT via the presentation interface in the previous step, and which contains the present position of own station.
d) Input the default operating settings via the MKD for the regional operating area, which was received by the previous command via the presentation interface.
e) Send Message 22 or a DSC telecommand with a different regional operating setting to the EUT with a regional operating area, which contains current position of own station.
f) Within two hours, after e), send a different regional operating setting to the EUT via the presentation interface with a valid regional operating area overlapping the regional operating area sent to the EUT by Message 22 or a DSC telecommand.

Required results

The following results are required.

a) Confirm that the EUT uses the regional operating settings commanded by Message 22 or DSC telecommand.
b) Step 1: Confirm that the regional operating settings of the previous Message 22 or DSC telecommand are displayed to the user on the MKD for editing.
Step 2: Check that the EUT allows the user to edit the displayed regional operating settings. Check that the EUT does not accept incomplete or invalid regional operating settings. Check that the EUT accepts a complete and valid regional operating setting.
Step 3: Check that the EUT prompts the user to confirm the intended change of regional operating settings. Check that the EUT allows the user to return to the editing menu or to abort the change of the regional operating settings.
Step 4: Check that the EUT uses the regional operating settings input via the MKD.
c) Check that the EUT uses the regional operating settings received via the presentation interface.
d) Check that the EUT accepts the default operating settings for the regional operating area received in c). Check that the EUT uses the default operating settings.
e) Check that the EUT uses the regional operating settings commanded to it by Message 22 or DSC telecommand.
f) Check that the EUT does not use the regional operating setting commanded to it via the presentation interface.

Test Results

a) EUT was located @ 50° 51' N 1° 14' W		
Requirement	Result	Verdict
A Message 22 defining a regional operating area using primary channel 87 and secondary channel 67 is broadcast to a region containing the EUT	The Message 22 transmitted by the base station is: !AIVDM,1,1,,A,F027`SR2N1<7vm1oR?sD3bH2P000,0*26	-
The EUT shall use the settings commanded to it by the Message 22	The EUT times out slots used by the previous transmission schedule, before reserving new slots on channels A (87) and C (67).	Pass

a)				
Slot	Chan	Msg	Sentence	Comment
282	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh0>0@4J,0*28	EUT transmitting on channels A(87) and B (88) in autonomous mode
630	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0M6;d0Kh0P0H9n,0*64	
935	A	22	!AIVDO,1,1,,A,F027`SR2N1<7vm1oR?sD3bH2P000,0*24	Sets EUT to use channels A and C(67)
962	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh0j0000,0*72	EUT times out slots on channel A
1068	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0M6;d0Kh0p0391,0*61	EUT reserves new slots on A
1356	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0M6;d0Kh160000,0*2C	EUT times out slots on B
1479	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0M6;d0Kh1>02pQ,0*04	EUT reserves new slots on C
1745	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh1L0000,0*55	
1872	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0M6;d0Kh1R02oQ,0*75	
2092	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0M6;d0Kh1f0000,0*7C	
2217	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0M6;d0Kh1l02sQ,0*55	
282	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh0>0000,0*26	
356	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0M6;d0Kh0B0001,0*59	EUT finishes reserving slots on A
630	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0M6;d0Kh0P0000,0*4B	
717	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0M6;d0Kh0T0001,0*4D	EUT finishes reserving slots on C
1068	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh0p0<02,0*66	EUT operates in autonomous mode, transmitting on channels A (87) and C (67), as commanded by the Message 22
1479	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0M6;d0Kh1>0HG7,0*2D	
1872	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh1R0<02,0*45	

b)		
Requirement	Result	Verdict
Regional settings are displayed on the MKD.	This is displayed when pressing the menu button and selected, “Settings” – “AIS” – “Regions”	Pass
Check that the EUT allows the user to edit the displayed regional operating settings.	All fields can be edited via the MKD successfully, and fields cannot be left empty.	Pass
Check that the EUT does not accept incomplete or invalid regional operating settings.	Region size is not accepted if one side of the region is less than 20 nm.	Pass
Check that the EUT accepts a complete and valid regional operating setting.	The latitude was changed to a valid setting and the region was accepted and saved.	Pass
Input a different, valid regional operating setting- not overlapping the area defined under (a)- via the MKD.	A region that uses channels 88 and 68 is created, with NE corner located at 50° N 1° W and a SW corner at 49° N 2° W.	-
The EUT is moved into the operating region created using the MKD.	The EUT is moved to 49° 51’ N 1° 14’ W: !AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh0T0000,0*50	-
The EUT shall use the operating settings that were previously defined via the MKD.	The EUT switches to channels 88 and 68, as instructed by the regional operating settings.	Pass

b)				
Slot	Chan	Msg	Sentence	Comment
2232	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0M6;d0Kh1n0D02,0*03	
356	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0M6;d0Kh0B00Rd,0*6C	
710	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh0T0000,0*50	EUT moved into operating region
1095	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh0p0000,0*76	Slots on channel 87 are released
1120	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh0r0341,0*73	New slot reservation on channel 88
1494	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh1>0000,0*3B	Slots on channel 67 are released
1513	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh1>031A,0*4D	EUT begins reserving slots on 68
1834	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh1P0000,0*57	
1904	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh1T02tQ,0*75	
2232	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh1n0000,0*6B	
36	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh0002l1,0*6E	
326	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh0@0000,0*46	EUT finishes timing out previous slots
408	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh0D0001,0*42	EUT finishes reserving new slots on B
756	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh0V0001,0*56	EUT finishes reserving new slots on D
1120	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh0r0@AP,0*16	
1513	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh1>0L02,0*42	EUT operates in autonomous mode using channels 88 and 68
1904	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1T0L02,0*2E	

c)		
Requirement	Result	Verdict
An ACA query is run to find the regions currently stored by the EUT.	The EUT returns the two regions created in part a) and in part b): $AIACA,7,5000.00,N,00100.00,W,4900.00,N,00200.00,W,6,2067,0,2068,0,0,0,M,1,155847.00*3A $AIACA,7,5000.00,N,00100.00,W,4900.00,N,00200.00,W,6,2088,0,2068,0,0,0,M,1,155457.00*36	-
Send a different regional operating setting with a regional operating area which partly overlaps the regional operating area input via the MKD to the EUT via the presentation interface in the previous step, and which contains the present position of own station.	An ACA sentence is used to define a new region, which uses channel 67 as the primary channel and 68 ad the secondary channel: $AIACA,8,5000.00,N,00100.00,W,4900.00,N,00200.00,W,6,2067,0,2068,0,0,0,C,0,000000.00*30	-
The ACA query is run again, to confirm the EUT accepted the regional.	The results of the ACA query show the EUT has accepted the new region successfully: $AIACA,0,9000.00,N,18000.00,E,9000.00,S,18000.00,W,5,2087,0,2088,0,0,0,,0,155901.00*75 $AIACA,1,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2087,0,2067,0,0,0,B,0,155457.00*37 $AIACA,2,5000.00,N,00100.00,W,4900.00,N,00200.00,W,6,2067,0,2068,0,0,0,C,1,155901.00*32	-
The EUT shall use the regional operating settings received via the presentation interface.	The EUT correctly uses regional settings, by changing primary and secondary channels, as seen below.	Pass

c)				
Slot	Chan	Msg	Sentence	Comment
2241	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1n0<02,0*64	ACA sentence sent after this message
360	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0B0000,0*41	EUT begins timing out slots on channel D
434	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh0F02m1,0*19	EUT begins reserving slots for new transmission schedule on channel D
683	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh0R0000,0*57	EUT begins timing out slots on channel B
758	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0LQSt0Kh0V033i,0*09	New slots are reserved on channel C
1104	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0r0000,0*71	
1158	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh0t035A,0*02	
1417	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1:0000,0*3E	
1541	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0LQSt0Kh1@02sA,0*77	
1843	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh1P0000,0*52	
1947	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh1V0001,0*57	
2241	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1n0000,0*6A	EUT finishes releasing slots on channel B
40	C	3	!AIVDM,1,1,,C,3;UnTqh01TwrFc0LQSt0Kh000001,0*37	EUT finishes reserving slots on C
434	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0F0D01,0*30	Transmissions only occur on channels C (67) and D (68)
758	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh0V0L01,0*2F	

d)		
Requirement	Result	Verdict
Input the default operating settings via the MKD for the regional operating area, which was received by the previous command via the presentation interface.	The region defined in c) is set to transmit on channels AIS 1 (87) and AIS 2 (88) and TX mode is set to both channels.	-
The EUT shall accept the regional operating settings input via the MKD.	The results of the ACA query confirm that the EUT accepts the updates to the regional operating area: $AIACA,6,9000.00,N,18000.00,E,9000.00,S,18000.00,W,5,2087,0,2088,0,0,0,,0,161518.00*70 $AIACA,7,5100.00,N,00100.00,W,5000.00,N,00200.00,W,6,2087,0,2067,0,0,0,B,0,155457.00*31 $AIACA,8,5000.00,N,00100.00,W,4900.00,N,00200.00,W,6,2087,0,2088,0,0,0,M,1,161518.00*35	Pass
The EUT shall use the settings defined by the regional operating area.	When within the operating region, the EUT successfully uses the default operating settings, defined by the operating region- as seen in the table below.	Pass

d)				
Slots	Chan	Msg	Sentence	Comment
760	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh0V0000,0*52	After setting regional area to default, the EUT begins timing out slots on channel C
1163	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0t0000,0*77	Slots on channel D are also released, as channel A = AIS 1 (87) and B = AIS 2 (88).
1215	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh1002wA,0*02	New slots on channel B are reserved.
1532	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh1@0000,0*45	

d)				
Slots	Chan	Msg	Sentence	Comment
1570	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh1B02q1,0*05	EUT begins reserving slots for a new transmission schedule on channel A.
1896	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh1T0000,0*56	
1980	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh1`02ri,0*7F	
30	C	1	!AIVDM,1,1,,C,1;UnTqh01TwrFc0LQSt0Kh000000,0*34	EUT finishes releasing slots on channel C.
60	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh020321,0*36	
430	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0F0000,0*45	EUT finishes timing out slots previously used on channel D.
477	B	3	!AIVDM,1,1,,B,3;UnTqh01TwrFc0LQSt0Kh0H0001,0*4E	
836	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh0b0001,0*67	
1215	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh100<01,0*39	EUT operates using default operating settings.
1570	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh1B0D01,0*30	
1980	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1`0<01,0*69	

e)		
Requirement	Result	Verdict
Send Message 22 or a DSC telecommand with a different regional operating setting to the EUT with a regional operating area, which contains current position of own station.	The Message 22 sent to the EUT defines the primary channel as A (87) and secondary channel as D (68): !AIVDM,1,1,,A,F027`SR2N1@7vm1m<?sD3Ud2P000,0*2D	-
Check that the EUT uses the regional operating settings commanded to it by Message 22 or DSC telecommand.	The EUT adopts the settings given to it in the Message 22, as seen in the table below.	Pass

e)				
Slot	Chan	Msg	Sentence	Comment
1212	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh0v0<01,0*7E	EUT operating in autonomous mode on default channels, 87 and 88.
1570	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh1B00Rk,0*7C	
1824	A	22	!AIVDO,1,1,,A,F027`SR2N1@7vm1m<?sD3Ud2P000,0*2F	Message 22 commands use of channels A (87) and D (68).
1971	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh1`0000,0*64	EUT begins releasing slots.
2002	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh1b02qi,0*78	EUT begins reserving new slots for D.
116	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh040000,0*32	EUT begins timing out slots on A.
148	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh0602vi,0*2F	
485	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh0H0000,0*4D	
495	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh0H02uA,0*7F	
836	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh0b0000,0*64	
911	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh0f02nQ,0*5F	
1212	B	1	!AIVDM,1,1,,B,1;UnTqh01TwrFc0LQSt0Kh0v0000,0*73	
1252	D	3	!AIVDM,1,1,,D,3;UnTqh01TwrFc0LQSt0Kh120001,0*33	
1547	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh1@0000,0*47	
1641	A	3	!AIVDM,1,1,,A,3;UnTqh01TwrFc0LQSt0Kh1F0001,0*42	EUT finishes reserving new slots.
2002	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh1b0L01,0*1D	EUT operates using the regional settings commanded by the Message 22.
148	A	1	!AIVDM,1,1,,A,1;UnTqh01TwrFc0LQSt0Kh060D01,0*45	
495	D	1	!AIVDM,1,1,,D,1;UnTqh01TwrFc0LQSt0Kh0H0@7g,0*6B	

f)		
Requirement	Result	Verdict
Within two hours, after e), send a different regional operating setting to the EUT via the presentation interface with a valid regional operating area overlapping the regional operating area sent to the EUT by Message 22 or a DSC telecommand.	The following ACA sentences were applied to the PI port: $AIACA,4,5000.00,N,00100.00,W,4900.00,N, 00200.00,W,6,2067,0,2068,0,0,0,B,1,162908.00*38 $AIACA,5,5000.00,N,00100.00,W,4900.00,N, 00200.00,W,6,2087,0,2088,0,0,0,B,1,162148.00*35	-
Check that the EUT does not use the regional operating setting commanded to it via the presentation interface.	The EUT prioritises the region previously defined by Message 22 successfully. The EUT does not change its behaviour receiving the ACA sentences.	Pass

Test of addressed telecommand – Clause 17.8.3

Method of measurement

Set up a standard test environment and operate EUT in autonomous mode. Using a base station MMSI, perform the following tests in the following order.

a) Send Message 22 or a DSC telecommand with valid regional operating settings, that are different from the default operating settings, to the EUT with a regional operating area, which contains the current position of own station.

b) Send an addressed Message 22 or an addressed DSC telecommand to the EUT with different regional operating settings than the previous command.

c) Move the EUT out of the regional operating area defined by the previous addressed telecommand into an area without regional operating settings.

Required results

Check that:

a) the EUT uses the regional operating settings commanded to it in a);
b) the EUT uses the regional operating settings commanded to it in b);
c) the EUT reverts to default.

Test Results

a)		
Action/Requirement	Result	Verdict
Message 22 sent to the EUT with channel A = 2085 and channel B = 2086	!AIVDO,1,1,,A,F027`SR2F2H7vm1oR?sD3bH2P000,0*5B	-
The EUT uses channels 2085 and 2086 for its transmissions.	The Attingimus test unit was configured so that channel C = 2085 and channel D = 2086. The following messages were received: !AIVDM,1,1,,C,1;UnTqh0?wOrCP:M6qOf40020H15,0*6D !AIVDM,1,1,,D,1;UnTqh0?wOrCP:M6qOf400H0H7L,0*6F	Pass

b)		
Action/Requirement	Result	Verdict
Message 4 and message 22 sent to the EUT on channel 2085, with channel A = 2081 and channel B = 2082	!AIVDO,1,1,,A,4027`SQv=m?;0Orb=0M6;d100000,0*22 !AIVDO,1,1,,A,F027`SR26287vm1oR?sD3bH2P000,0*5B	-
The EUT uses channels 2081 and 2082 for it's transmissions.	The Attingimus test unit was configured so that channel C = 2081 and channel D = 2082. The following messages were received: !AIVDM,1,1,,C,1;UnTqh0?wOrCP:M6qOf400j0@?4,0*32 !AIVDM,1,1,,D,1;UnTqh0?wOrCP:M6qOf401f08Pl,0*77	Pass

c)		
Action/Requirement	Result	Verdict
EUT moved outside of the regional operating area to 51° 10' N 1° 14' W.	The Attingimus test unit was configured so that channel A = 2087 and channel B = 2088. The following messages were received: !AIVDM,1,1,,A,1;UnTqh01TwrFc0MAip0Kh0J0<01,0*6E !AIVDM,1,1,,B,1;UnTqh01TwrFc0MAip0Kh060D01,0*69	Pass

Test for invalid regional operating areas – Clause 17.8.4

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Using a base station MMSI, perform the following tests in the following order after completion of all other tests related to change of regional operating settings.

a) Send three different valid regional operating settings with adjacent regional operating areas, their corners within eight miles of each other, to the EUT by Message 22 or DSC telecommand, presentation interface input and manual input via MKD. The current own position of the EUT shall be within the regional operating area of the third regional operating setting.
b) Move current own position of the EUT consecutively to the regional operating areas of the first two valid regional operating settings.

Required results

Check that:

a) the EUT uses the operating settings that were in use prior to receiving the third regional operating setting;
b) the EUT consecutively uses the regional operating settings of the first two received regional operating areas.

Test Results

Regional operating settings sent via message 22.

a)		
Requirement	Result	Verdict
EUT positioned inside third region	EUT position is 50° 52.7903' N 1° 13.9423' W: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1J00Rd,0*61	-
EUT sent message 22 with channel A = 2084, channel B = 2085, NE corner = 52° N 1° W, SW corner = 51° 1' N 2° W: !AIVDO,1,1,,A,F027`SR2B2D7vm1qp?sD3g92P000,0*1B	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2082, channel B = 2083, NE corner = 52° N 0° 1' W, SW corner = 51° 1' N 0° 59' W: !AIVDO,1,1,,A,F027`SR2:2<7wviqp?udSg92P000,0*1F	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2081, channel B = 2086, NE corner = 51° N 1° W, SW corner = 50° 1' N 2° W: !AIVDO,1,1,,A,F027`SR262H7vm1oR?sD3bH2P000,0*2B	The EUT does not output a TXT sentence and uses the default settings that were in use before the third message 22 was received	Pass

b)		
Requirement	Result	Verdict
EUT positioned inside first region at: 51° 52.7903' N 1° 13.9423' W	The Attingimus test unit was configured so that channel C = 2084 and channel D = 2085. The EUT sent position reports on these channels: !AIVDM,1,1,,C,3;UnTqh01TwrFu2McqGhKh1R0301,0*39 !AIVDM,1,1,,D,3;UnTqh01TwrFu2McqGhKh0002pA,0*6C	Pass
EUT positioned inside second region at: 51° 52.7903' N 0° 13.9423' W	The Attingimus test unit was configured so that channel A = 2082 and channel B = 2083. The EUT sent position reports on these channels: !AIVDM,1,1,,A,1;UnTqh01Twvss2McqGhKh1R0D02,0*7A !AIVDM,1,1,,B,1;UnTqh0=Twvss2McqGhKh1R0D02,0*75	Pass

Regional operating settings sent to the presentation interface

a)		
Requirement	Result	Verdict
EUT positioned inside third region	EUT position is 50° 52.7903' N 1° 13.9423' W: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1J00Rd,0 *61	-
EUT sent message 22 with channel A = 2084, channel B = 2085, NE corner = 52 N 1 W, SW corner = 51° 1' N 2° W: !AIVDO,1,1,,A,F027`SR2B2D7vm1qp?sD3g92P000,0 *1B	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2082, channel B = 2083, NE corner = 52° N 0° 1' W, SW corner = 51° 1' N 0° 59' W: !AIVDO,1,1,,A,F027`SR2:2<7wviqp?udSg92P000,0*1 F	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2081, channel B = 2086, NE corner = 51° N 1° W, SW corner = 50° 1' N 2° W: !AIVDO,1,1,,A,F027`SR262H7vm1oR?sD3bH2P000,0 *2B	The EUT does not output a TXT sentence and uses the default settings that were in use before the third message 22 was received	Pass

b)		
Requirement	Result	Verdict
EUT positioned inside first region at: 51° 52.7903' N, 1° 13.9423' W	The Attingimus test unit was configured so that channel C = 2084 and channel D = 2085. The EUT sent position reports on these channels: !AIVDM,1,1,,C,3;UnTqh01TwrFu2McqGhKh1R0301,0 *39 !AIVDM,1,1,,D,3;UnTqh01TwrFu2McqGhKh0002pA,0 *6C	Pass
EUT positioned inside second region at: 51° 52.7903' N 0° 13.9423' W	The Attingimus test unit was configured so that channel A = 2082 and channel B = 2083. The EUT sent position reports on these channels: !AIVDM,1,1,,A,1;UnTqh01Twvss2McqGhKh1R0D02,0 *7A !AIVDM,1,1,,B,1;UnTqh0=Twvss2McqGhKh1R0D02,0 *75	Pass

Regional operating settings configured manually via MKD

a)		
Requirement	Result	Verdict
EUT positioned inside third region	EUT position is 50 52.7903 N 1 13.9423 W: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh1J00Rd,0 *61	-
EUT sent message 22 with channel A = 2084, channel B = 2085, NE corner = 52° N 1° W, SW corner = 51° 1' N 2° W: !AIVDO,1,1,,A,F027`SR2B2D7vm1qp?sD3g92P000,0 *1B	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2082, channel B = 2083, NE corner = 52° N 0° 1' W, SW corner = 51° 1' N 0° 59' W: !AIVDO,1,1,,A,F027`SR2:2<7wviqp?udSg92P000,0*1 F	EUT outputs TXT sentence to PI, indicating it has accepted the regional setting: $AITXT,01,01,36,AIS: Channel management parameters changed*1C	Pass
EUT sent message 22 with channel A = 2081, channel B = 2086, NE corner = 51° N 1° W, SW corner = 50° 1' N 2° W: !AIVDO,1,1,,A,F027`SR262H7vm1oR?sD3bH2P000,0 *2B	The EUT does not output a TXT sentence and uses the default settings that were in use before the third message 22 was received	Pass

b)		
Requirement	Result	Verdict
EUT positioned inside first region at: 51° 52.7903' N 1° 13.9423' W	The Attingimus test unit was configured so that channel C = 2084 and channel D = 2085. The EUT sent position reports on these channels: !AIVDM,1,1,,C,3;UnTqh01TwrFu2McqGhKh1R0301,0*39 !AIVDM,1,1,,D,3;UnTqh01TwrFu2McqGhKh0002pA,0*6C	Pass
EUT positioned inside second region at: 51° 52.7903' N 0° 13.9423' W	The Attingimus test unit was configured so that channel A = 2082 and channel B = 2083. The EUT sent position reports on these channels: !AIVDM,1,1,,A,1;UnTqh01Twvss2McqGhKh1R0D02,0*7A !AIVDM,1,1,,B,1;UnTqh0=Twvss2McqGhKh1R0D02,0*75	Pass

2.25 Regional area designation with lost position

2.25.1 Specification Reference

IEC 61993-2, Clause 17.9

2.25.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.25.3 Date of Test

09-July-2019

2.25.4 Test Results and Methods of Measurement

Method of measurement

When in the presence of an assigned mode command and in a transition zone, check that the EUT continues to report at the autonomous mode reporting interval.

Required results

Ensure that the autonomous reporting interval is maintained.

Test Results

Requirement	Result	Verdict
EUT in transition zone	EUT transmitting with double the number of transmissions	-
Message 16 sent to EUT: !AIVDO,1,1,,A,@027`SRqMa>L6@1@,0*18	EUT remains in autonomous mode at the same rate	Pass
EUT moved outside of transition zone	EUT reverts to normal number of transmissions	-
Message 16 sent to EUT: !AIVDO,1,1,,A,@027`SRqMa>L6@1@,0*18	EUT enters assigned mode	Pass

2.26 Addressed messages

2.26.1 Specification Reference

IEC 61993-2, Clause 18.1

2.26.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.26.3 Date of Test

11-July-2019

2.26.4 Test Results and Methods of Measurement

Transmission – Clause 18.1.1

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Set up a test target for scheduled transmissions on channel AIS 1 only. Initiate the transmission of an addressed binary message (Message 6) by the EUT (test target as destination). Record transmitted messages on both channels.

Required results

Check that the EUT transmits Message 6 on channel AIS 1. Repeat test for AIS 2.

Test Results

Action/Requirement	Result	Verdict
ABM sentence sent to PI, initiating the transmission of message 6 on channel A: !AIABM,1,1,2,321000000,1,6,04205@E=B0lE=<4LD,2*1C	EUT Sends message 6 on channel A: !AIVDM,1,1,,A,6;UnTqq<R4T004205@E=B0lE=<4LD0,4*23 Recipient replies with message 7: !AIVDM,1,1,,A,74j8B@2qMa>N,0*6A	Pass
ABM sentence sent to PI, initiating the transmission of message 6 on channel B: !AIABM,1,1,2,321000000,2,6,04205@E=B0lE=<4LD,2*1F	EUT Sends message 6 on channel B: !AIVDM,1,1,,B,6;UnTqq<R4T004205@E=B0lE=<4LD0,4*20 Recipient replies with message 7: !AIVDM,1,1,,B,74j8B@2qMa>N,0*69	Pass

Acknowledgement – Clause 18.1.2

Method of measurement

Operate the standard test environment and the EUT in autonomous mode. Apply up to 4 addressed binary messages (Message 6; EUT as destination) to the VDL on channel AIS 1. Record transmitted messages on both channels. Repeat with AIS 2.

Required results

Confirm that the EUT transmits a binary acknowledge message (Message 7) with the appropriate sequence numbers within 4 s on the channel where Message 6 was received. Confirm that the EUT transmits the result with an appropriate message to PI.

Test Results

Channel A		
Action/Requirement	Result	Verdict
Message 6 sent to EUT with sequence number = 0: !AIVDO,1,1,,A,668rO02qMa>L04205@EQC40,2*2E	EUT responds with message 7 with sequence number = 0, on channel A: !AIVDM,1,1,,A,7;UnTqiR>Wh0,0*3E	Pass
Message 6 sent to EUT with sequence number = 1: !AIVDO,1,1,,A,668rO0FqMa>L04205@EQC80,2*56	EUT responds with message 7 with sequence number = 1, on channel A: !AIVDM,1,1,,A,7;UnTqiR>Wh5,0*3B	Pass
Message 6 sent to EUT with sequence number = 2: !AIVDO,1,1,,A,668rO0bqMa>L04205@EQC<0,2*76	EUT responds with message 7 with sequence number = 2, on channel A: !AIVDM,1,1,,A,7;UnTqiR>Wh:HSat3h,4*65	Pass
Message 6 sent to EUT with sequence number = 3: !AIVDO,1,1,,A,668rO0vqMa>L04205@EQC@0,2*1E	EUT responds with message 7 with sequence number = 3, on channel A: !AIVDM,1,1,,A,7;UnTqiR>Wh:HSat3h,4*65	Pass
Comments		
The response for sequence number 2 and 3 were sent in the same message 7, using ID 1 and ID 2.		

Channel B		
Action/Requirement	Result	Verdict
Message 6 sent to EUT with sequence number = 0: !AIVDO,1,1,,B,668rO02qMa>L04205@EQC40,2*2D	EUT responds with message 7 with sequence number = 0, on channel B: !AIVDM,1,1,,B,7;UnTqiR>Wh0HSat1@,4*46	Pass
Message 6 sent to EUT with sequence number = 1: !AIVDO,1,1,,B,668rO0FqMa>L04205@EQC80,2*55	EUT responds with message 7 with sequence number = 1, on channel B: !AIVDM,1,1,,B,7;UnTqiR>Wh0HSat1@,4*46	Pass
Message 6 sent to EUT with sequence number = 2: !AIVDO,1,1,,B,668rO0bqMa>L04205@EQC<0,2*75	EUT responds with message 7 with sequence number = 2, on channel B: !AIVDM,1,1,,B,7;UnTqiR>Wh:,0*37	Pass
Message 6 sent to EUT with sequence number = 3: !AIVDO,1,1,,B,668rO0vqMa>L04205@EQC@0,2*1D	EUT responds with message 7 with sequence number = 3, on channel B: !AIVDM,1,1,,B,7;UnTqiR>Wh?,0*32	Pass
Comments		
The response for sequence number 0 and 1 were sent in the same message 7, using ID 1 and ID 2.		

Transmission retry – Clause 18.1.3

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Initiate the transmission of up to 4 addressed binary messages by the EUT which will not be acknowledged (i.e. destination not available). Record transmitted messages.

Required results

Confirm that EUT retries the transmission up to 3 times (configurable) for each addressed binary message. Confirm that the time between transmissions is 4 s to 8 s. Confirm that the EUT transmits the overall result with an appropriate message to PI.

Test Results

Requirement	Result	Verdict
An addressed binary message was sent by the EUT to an unreachable MMSI.	The message 6 sentences used were: !AIABM,1,1,2,412000001,1,6,04205@E=@,2 !AIABM,1,1,2,412000002,1,6,04205@E=@,2 !AIABM,1,1,2,412000003,1,6,04205@E=@,2 !AIABM,1,1,2,412000004,1,6,04205@E=@,2	-
The EUT may reattempt the transmission up to 3 times for each	Number of retransmission attempts is configurable via the MKD. The maximum number of 3 was selected for this test and was successful, as seen in the table below.	Pass
Re-transmit flag is set to 1 for retransmissions.	The retransmit flag was set to true for each of the retransmissions, as shown in the table below.	Pass

Time	Sentence	Destination	Retry Number	Retry Interval	Retransmit Flag
13:48:05	!AIVDM,1,1,,A,6;UnTqqR>Wh<04205@E=@0,4*54	412000003	0	-	0
13:48:06	!AIVDM,1,1,,A,6;UnTqqR>Wh@04205@E=@0,4*28	412000004	0	-	0
13:48:08	!AIVDM,1,1,,A,6;UnTqqR>Wh404205@E=@0,4*5C	412000001	0	-	0
13:48:08	!AIVDM,1,1,,A,6;UnTqqR>Wh804205@E=@0,4*50	412000002	0	-	0
13:48:11	!AIVDM,1,1,,A,6;UnTqqR>Wh>04205@E=@0,4*56	412000003	1	00:00:06	1
13:48:13	!AIVDM,1,1,,A,6;UnTqqR>WhB04205@E=@0,4*2A	412000004	1	00:00:07	1
13:48:14	!AIVDM,1,1,,A,6;UnTqqR>Wh604205@E=@0,4*5E	412000001	1	00:00:06	1
13:48:15	!AIVDM,1,1,,A,6;UnTqqR>Wh:04205@E=@0,4*52	412000002	1	00:00:07	1
13:48:19	!AIVDM,1,1,,A,6;UnTqqR>Wh>04205@E=@0,4*56	412000003	2	00:00:08	1
13:48:19	!AIVDM,1,1,,A,6;UnTqqR>WhB04205@E=@0,4*2A	412000004	2	00:00:06	1
13:48:20	!AIVDM,1,1,,A,6;UnTqqR>Wh604205@E=@0,4*5E	412000001	2	00:00:06	1
13:48:22	!AIVDM,1,1,,A,6;UnTqqR>Wh:04205@E=@0,4*52	412000002	2	00:00:07	1
13:48:27	!AIVDM,1,1,,A,6;UnTqqR>Wh>04205@E=@0,4*56	412000003	3	00:00:08	1
13:48:27	!AIVDM,1,1,,A,6;UnTqqR>WhB04205@E=@0,4*2A	412000004	3	00:00:08	1
13:48:27	!AIVDM,1,1,,A,6;UnTqqR>Wh604205@E=@0,4*5E	412000001	3	00:00:07	1
13:48:29	!AIVDM,1,1,,A,6;UnTqqR>Wh:04205@E=@0,4*52	412000002	3	00:00:07	1

Acknowledgement of addressed safety related messages – Clause 18.1.4

Repeat test 18.1.2 with addressed safety related message.

Test Results

Channel A		
Action/Requirement	Result	Verdict
Message 12 sent to EUT with sequence number = 0: !AIVDO,1,1,,A,<6@Ri02qMa>LD5CDe1eh,0*57	EUT responds with message 13 with sequence number = 0, on channel A: !AIVDM,1,1,,A,=;UnTqiT8d@0I2;41@,4*2E	Pass
Message 12 sent to EUT with sequence number = 1: !AIVDO,1,1,,A,<6@Ri0FqMa>LD5CDe1ei,0*22	EUT responds with message 13 with sequence number = 1, on channel A: !AIVDM,1,1,,A,=;UnTqiT8d@0I2;41@,4*2E	Pass
Message 12 sent to EUT with sequence number = 2: !AIVDO,1,1,,A,<6@Ri0bqMa>LD5CDe1ej,0*05	EUT responds with message 13 with sequence number = 2, on channel A: !AIVDM,1,1,,A,=;UnTqiT8d@:,0*25	Pass
Message 12 sent to EUT with sequence number = 3: !AIVDO,1,1,,A,<6@Ri0vqMa>LD5CDe1ek,0*10	EUT responds with message 13 with sequence number = 3, on channel A: !AIVDM,1,1,,A,=;UnTqiT8d@?,0*20	Pass
Comments		
The response for sequence number 0 and 1 were sent in the same message 13, using ID 0 and ID 1.		

Channel B		
Action/Requirement	Result	Verdict
Message 12 sent to EUT with sequence number = 0: !AIVDO,1,1,,B,<6@Ri02qMa>LD5CDe2eh,0*57	EUT responds with message 13 with sequence number = 0, on channel B: !AIVDM,1,1,,B,=;UnTqiT8d@0,0*2C	Pass
Message 12 sent to EUT with sequence number = 1: !AIVDO,1,1,,B,<6@Ri0FqMa>LD5CDe2ei,0*22	EUT responds with message 13 with sequence number = 1, on channel B: !AIVDM,1,1,,B,=;UnTqiT8d@5I2;42P,4*3B	Pass
Message 12 sent to EUT with sequence number = 2: !AIVDO,1,1,,B,<6@Ri0bqMa>LD5CDe2ej,0*05	EUT responds with message 13 with sequence number = 2, on channel B: !AIVDM,1,1,,B,=;UnTqiT8d@5I2;42P,4*3B	Pass
Message 12 sent to EUT with sequence number = 3: !AIVDO,1,1,,B,<6@Ri0vqMa>LD5CDe2ek,0*10	EUT responds with message 13 with sequence number = 3, on channel B: !AIVDM,1,1,,B,=;UnTqiT8d@?,0*23	Pass
Comments		
The response for sequence number 1 and 2 were sent in the same message 13, using ID 1 and ID 2.		

Acknowledgement of addressed safety related messages – Clause 18.1.4

This test verifies the correct behaviour of the received Message 1 with NavStatus 14.

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Disable alert function for locating devices.

a) Initiate the transmission of a Message 1 with NavStatus 14. Wait 18 min. Enable alert function for locating devices.
b) Initiate the transmission of a Message 1 with NavStatus 14.
c) Acknowledge the alert.
d) Initiate the transmission of a Message 1 from the same user ID with NavStatus 14 within the time out.
e) Initiate the transmission of a Message 1 from the same user ID with NavStatus other than 14 within the time out.
f) Initiate the transmission of a Message 1 from different user ID with NavStatus 14.

Required results

Check that:

a) the MKD indicates the received message at the top of the target list and the EUT does not activate BIIT ID 14 or release related alert;
b) the MKD indicates the received message at the top of the target list and the EUT activates the BIIT ID 14, and releases appropriate alert as required in Table 4;
c) the EUT enters the appropriate acknowledge state;
d) the EUT does not re-activate BIIT ID 14 or the related alert;
e) the EUT does not re-activate BIIT ID 14 or the related alert;
f) the MKD indicates the received message at the top of the target list and the EUT does not re-activate BIIT ID 14 or the related alert.

Test Results

a)		
Requirement	Result	Verdict
The alert function for locating devices is disabled through configuration	The locating device alert is disabled using the EPV sentence: $AISSA,EPV,1,CA30CD09F690BD678DDFD33F571D0473*6D $RAEPV,C,AI,777888999,115,0*04	-
An active MOB device is applied to the VDL with a Message 1	The Message 1 sent is: !AIVDM,1,1,,A,1>Nvj5N2P:wrFu2M6jh02gwn1000,0*58	-
The EUT shall list the locating device at the top of the target list	The device is displayed on top of all other targets in the target list	Pass
The EUT shall not activate BIIT ID 14 or raise the related alert	The EUT does not release BIIT ID 14, nor raise the related alert	Pass
The alert function for locating devices is re-enabled through configuration	The locating device alert is enabled using the EPV sentence: $AISSA,EPV,1,B20F29AD7DC24E5649B3471BE40330D5*63 $RAEPV,C,AI,777888999,115,1*05	-

b)		
Requirement	Result	Verdict
18 minutes after the transmission of the Message 1 in part a), transmit a Message 14 with NavStatus 14	The Message 1 transmitted by the EUT is: !AIVDM,1,1,,A,1>Nvj5N2P:wrFu2M6jh02gwn1000,0*58	-
The MKD shall indicate the received message at the top of the target list	The locating device is listed at the top of the target list	Pass
The EUT shall activate BIIT ID 14 and release the appropriate alert	BIIT ID 14 is successfully activated: $AIALR,145000.00,014,A,V,AIS: Active AIS-SART*58 The audible alert is activated and the alert 3108 is displayed on the MKD	Pass

c)		
Requirement	Result	Verdict

c)		
Acknowledge the alert	When the alert is acknowledged via the MKD, the alert window in the GUI is dismissed, the ALR is still active and the audible alert is silenced	Pass

d)		
Requirement	Result	Verdict
Message 1 is retransmitted from the same user ID with NavStatus 14 within the time out period	The Message 1 transmitted is: !AIVDO,1,1,,A,1>NvjC>2P:wrFc0M7AWh2gv01000,0*5A	-
The EUT shall not re-activate BIIT ID 14	The EUT does not raise BIIT ID 14 again: $AIALR,145000.00,014,A,A,AIS: Active AIS-SART*4F	Pass
The EUT shall not re-activate alert 3108	The alert does not reappear on the MKD	Pass

e)		
Requirement	Result	Verdict
Message 1 is retransmitted from the same user ID with NavStatus 1 within the time out period	The Message 1 transmitted is: !AIVDO,1,1,,A,1>NvjC12P:wrFc0M7AWh2gv01000,0*55	-
The EUT shall not re-activate BIIT ID 14	BIIT ID 14 remains in acknowledged state: $AIALR,145000.00,014,A,A,AIS: Active AIS-SART*4F	Pass
The EUT shall not re-activate alert 3108	The alert with ID 3108 is not displayed on the MKD	Pass

f)		
Requirement	Result	Verdict
Message 1 is transmitted from a different user ID with NavStatus 14 within the time out period	The Message 1 transmitted is: !AIVDO,1,1,,A,1>NvjFv2P:wrFc0M7:<02gwd0000,0*0B	-
The MKD displays the received locating device at the top of the target list	The new target is displayed at the top of the target list, with the correct name and MMSI	Pass
The EUT shall not re-activate BIIT ID 14	The BIIT ID 14 is not re-activated: $AIALR,145000.00,014,A,A,AIS: Active AIS-SART*4F	Pass
The EUT shall not re-activate alert 3108	The alert is not re-activated: $AIALC,01,01,43,2,,3013,1,8,,3108,1,2,*5E	Pass

2.27 Interrogation responses

2.27.1 Specification Reference

IEC 61993-2, Clause 18.2

2.27.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.27.3 Date of Test

09-July-2019

2.27.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Apply an interrogation message (Message 15; EUT as destination) to the VDL according to Table 18 for responses with Message 5 and slot offset set to 10 on channel AIS 1. Record transmitted messages on both channels.

Required results

Check that EUT transmits the appropriate interrogation response message as requested on channel AIS 1. Repeat test for AIS 2.

Test Results

Requirement	Result	Verdict
Message 15 sent to EUT on Channel A on slot 1227: !AIVDO,1,1,,A,?027`SRqMa>LD0`,2*76	EUT transmits message 5 on slot 1237: !AIVDM,2,1,0,A,5;UnTqswwwwvErErEp000000000000000000000`0@1354g`81L@00000000,0*14 !AIVDM,2,2,0,A,00000000008,2*2C	Pass
Message 15 sent to EUT on Channel B on slot 1518: !AIVDO,1,1,,B,?027`SRqMa>LD0`,2*75	EUT transmits message 5 on slot 1528: !AIVDM,2,1,1,B,5;UnTqswwwwvErErEp000000000000000000000`0@1354g`81L@00000000,0*16 !AIVDM,2,2,1,B,00000000008,2*2E	Pass

2.28 General

2.28.1 Specification Reference

IEC 61993-2, Clause 19.1

2.28.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.28.3 Date of Test

09-July-2019

2.28.4 Test Results and Methods of Measurement

The EUT, including all necessary test equipment, shall be set up and checked that it is operational before testing commences.

The manufacturer shall provide sufficient technical documentation of the EUT and its interfaces in particular.

Where appropriate, tests according to various subclauses of Clause 19, as well as other clauses of this document, may be carried out simultaneously.

Test Results

The EUT was operational before testing commences.

The manufacturer provided sufficient technical documentation of the EUT and a description of it's interfaces.

2.29 Checking manufacturer's documentation

2.29.1 Specification Reference

IEC 61993-2, Clause 19.2

2.29.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 14

2.29.3 Date of Test

23-October-2019

2.29.4 Test Results and Methods of Measurement

The following checks for formal consistency and compliance shall be made for all ports:

- approved sentences against IEC 61162-1;
- proprietary sentences against IEC 61162-1;
- usage of fields as required for different functions, including provided default values or settings;
- transmission intervals against IEC 61162-1 and IEC 61162-2;
- configuration of hardware and software if this is relevant to the interface performance and port selection.

The following checks shall be made for compliance with IEC 61162-1 and IEC 61162-2:

- output drive capability;
- load on the line of inputs;
- electrical isolation of input circuits

Test Results

The EUT was tested against IEC 61162-1 and IEC 61162-2 in separate reports and found to be fully compliant.

2.30 Electrical test

2.30.1 Specification Reference

IEC 61993-2, Clause 19.3

2.30.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 19

2.30.3 Date of Test

06-December-2019

2.30.4 Test Results and Methods of Measurement

Method of Measurement

Input/output ports configured in accordance with IEC 61162-1 or IEC 61162-2 shall be tested according to the relevant standard with regard to minimum and maximum voltage and current at the input terminals.

Required Results

The interfaces shall fulfil the requirements of the relevant standards.

Test Results

The EUT was tested against the IEC 61162-1 and IEC 61162-2 standards in separate reports. The EUT was found to be compliant with regards to the minimum and maximum voltage and currents at the input terminals.

2.31 Test of input sensor interface performance

2.31.1 Specification Reference

IEC 61993-2, Clause 19.4

2.31.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.31.3 Date of Test

11-July-2019

2.31.4 Test Results and Methods of Measurement

Method of measurement

Connect all inputs and outputs of the EUT as specified by the manufacturer and simulate VDL-messages using the test system. Operate inputs with simulated sensor data that are both the relevant data and additional data with formatters not provided for the relevant input. Each sensor input shall be loaded with 70 % to 80 % of the interface's capacity. Record the VDL and output from the EUT's high-speed port.

Required Results

Verify that the output on the VDL and the presentation interface agree with the simulated input and that all output data is transmitted without loss or additional delay.

Test Results

Each sensor has a baud rate of 4800, to load the input with 70-80% of the interface's capacity, 367 characters of data were sent to the sensor input every second, resulting in a load of 76%

Included in this data were sentences with data that shall be accepted by the EUT as shown below.

Sensor 1		
Action/Requirement	Result	Verdict
Sentences with relevant data: $HEHDT,40,T*05	The display correctly shows the heading and the heading is correctly encoded in message 1: !AIVDM,1,1,,B,1;UnTqh1iTwrFu2M7AWhKi@H060<,0*75 The output from the high speed ECDIS port did not experience any delay or loss.	Pass

Sensor 2		
Action/Requirement	Result	Verdict
Sentences with relevant data: $TIROT,2.0,A*39	The display correctly shows the ROT and the ROT is correctly encoded in message 1: !AIVDM,1,1,,B,1;UnTqh1iTwrFu2M7AWhKi@H060<,0*75 The output from the high speed ECDIS port did not experience any delay or loss.	Pass

Sensor 3		
Action/Requirement	Result	Verdict
Sentences with relevant data: $GPDTM,W84,,,,,,,W84*4A $GPRMC,170401,A,5052.7903,N,00113.9423,W,10.0,11.1,080819,,,D*6C	The display correctly shows the position, COG and SOG and this information is correctly encoded in message 1: !AIVDM,1,1,,B,1;UnTqh1iTwrFu2M7AWhKi@H060<,0*75 The output from the high speed ECDIS port did not experience any delay or loss.	Pass

2.32 Test of sensor input

2.32.1 Specification Reference

IEC 61993-2, Clause 19.5

2.32.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.32.3 Date of Test

11-July-2019

2.32.4 Test Results and Methods of Measurement

Test of GNS input – Clause 19.5.1

Method of measurement

Set up the standard test environment and apply a GNS sentence with simulated sensor data. Record VDL output as follows.

a) Set mode indicator to AA (Autonomous).
b) Set mode indicator to AD, DA and DD (Differential).
c) Set mode indicator to P (Precise)
d) Set mode indicator to E (Estimated).
e) Set mode indicator to M (Manual).
f) Set mode indicator to S (Simulator).
g) Set mode indicator to N and NN (Data not valid).
h) Set mode indicator to A (GPS Autonomous) and time stamp field null.

Record the VDL position reports and evaluate the contents (Position, PA flag, RAIM flag and time stamp).

Required Results

Confirm that:

a) all of the content is correct and PA flag = 0;
b) all of the content is correct and PA flag = 1;
c) all of the content is correct and PA flag = 1;
d) external position is not used or time-stamp = 62;
e) external position is not used or time-stamp = 61;
f) the external position is not used;
g) the external position is not used;
h) all of the content is correct and PA flag = 0 and time stamp = 60.

Test Results

Step	GNS Sentence	Result	Verdict
a)	$GPGNS,154458,5252.7903,N,00013.9423,W,AA,4,,,,,*5A	PA flag = 0: !AIVDM,1,1,,B,1;UnTqh0?wOvss2N@Q7v40:t05k0,0*20	Pass
b)	$GPGNS,154511,5252.7903,N,00013.9423,W,AD,4,,,,,*53	PA flag = 1: !AIVDM,1,1,,A,1;UnTqh0?wwvss2N@Q7v40:000Rs,0*20	Pass
	$GPGNS,154854,5252.7903,N,00013.9423,W,DA,4,,,,,*5F	PA flag = 1: !AIVDM,1,1,,A,1;UnTqh0?wwvss2N@Q7v40;n0<03,0*51	Pass

Step	GNS Sentence	Result	Verdict
	$GPGNS,155336,5252.7903,N,00013.9423,W,DD,4,,,,,*54	PA flag = 1: !AIVDM,1,1,,A,1;UnTqh0?wwvss2N@Q7v40;<05kD,0*26	Pass
c)	$GPGNS,155413,5252.7903,N,00013.9423,W,P,4,,,,,*04	PA Flag = 1: !AIVDM,1,1,,A,1;UnTqh0?wwvss2N@Q7v40;@0HGi,0*26	Pass
d)	$GPGNS,155736,5252.7903,N,00013.9423,W,E,4,,,,,*15	Time stamp = 62, when internal GNSS is disabled: !AIVDM,1,1,,A,1;UnTqh0?w<tSF0l4Q@>401t0PSD,0*0E	Pass
e)	$GPGNS,155805,5252.7903,N,00013.9423,W,M,4,,,,,*12	Time stamp = 61, when internal GNSS is disabled: !AIVDM,1,1,,A,1;UnTqh0?w<tSF0l4Q@>401r0l03,0*20	Pass
f)	$GPGNS,155837,5252.7903,N,00013.9423,W,S,4,,,,,*0D	External position not used and time stamp = 63: !AIVDM,1,1,,A,1;UnTqh0?w<tSF0l4Q@>401v0hH5,0*5E	Pass
g)	$GPGNS,155943,5252.7903,N,00013.9423,W,N,4,,,,,*12	External position not used and time stamp = 63: !AIVDM,1,1,,A,1;UnTqh01T<tSF0l4Q@0Kh1v0`H5,0*52	Pass
	$GPGNS,160017,5252.7903,N,00013.9423,W,NN,4,,,,,*52	$AITXT,01,01,28,AIS: internal SOG/ COG in use*47 !AIVDM,1,1,,B,1;UnTqh0?wOrCP@M6qGN40;R0@M9,0*25	Pass
h)	$GPGNS,,5252.7903,N,00013.9423,W,A,4,,,,*12	PA flag = 0, time stamp = 60: !AIVDM,1,1,,B,1;UnTqh0?wOvss2N@Q7v40;p08AL,0*7E	Pass

Test of RMC input – Clause 19.5.2

Method of measurement

Set up standard test environment and apply an RMC sentence with simulated sensor data.

a) Set status to valid and mode indicator to A (Autonomous).
b) Set mode indicator to D (Differential).
c) Set mode indicator to P (Precise).
d) Set mode indicator to E (Estimated).
e) Set Mode indicator to M (Manual).
f) Set mode indicator to S (Simulator).
g) Set status to invalid and mode indicator to N (Data not valid).
h) Set mode indicator to A (Autonomous) and time stamp field null.

Record the VDL position reports and evaluate the contents (Position, PA flag, RAIM flag, time stamp, SOG and COG).

Required Results

Confirm that:

a) all of the content is correct and PA flag = 0;
b) all of the content is correct and PA flag = 1;
c) all of the content is correct and PA flag = 1;
d) external position and SOG/COG are not used or time-stamp = 62;
e) external position and SOG/COG are not used or time-stamp = 61;
f) external position and SOG/COG are not used;
g) external position and SOG/COG are not used;
h) all of the content is correct and PA flag = 0 and time stamp = 60.

Test Results

Step	RMC Sentence	Result	Verdict
a)	$GPRMC,163448,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,A*7C	PA Flag = 0: !AIVDM,1,1,,A,1;UnTqh01fOvss2N@Q7ho0;p0@GO,0*5A	Pass
b)	$GPRMC,163403,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,D*76	PA Flag = 1: !AIVDM,1,1,,A,1;UnTqh01fwvss2N@Q7ho0;p0<03,0*15	Pass
c)	$GPRMC,163614,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,P*66	PA Flag = 1: !AIVDM,1,1,,B,1;UnTqh01fwvss2N@Q7ho0;p0<03,0*16	Pass
d)	$GPRMC,163634,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,E*71	External position and SOG/COG are not used: $AITXT,01,01,25,AIS: internal GNSS in use*5C $AITXT,01,01,28,AIS: internal SOG/ COG in use*47	Pass
e)	$GPRMC,163734,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,M*78	External position and SOG/COG are not used: !AIVDM,1,1,,A,1;UnTqh0?wOrCP@M6qGN40:00<03,0*4E	Pass
f)	$GPRMC,163929,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,S*64	External position and SOG/COG are not used: !AIVDM,1,1,,A,1;UnTqh0?wOrCP@M6qGN40:0080S,0*2A	Pass
g)	$GPRMC,164017,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,N*7A	External position and SOG/COG are not used: !AIVDM,1,1,,B,1;UnTqh0?wOrCP@M6qGN40;T05rS,0*03	Pass
h)	$GPRMC,,A,5252.7903,N,00013.9423,W,11.0,22,110719,,,A	Position is correct, PA flag = 0, time stamp = 60: !AIVDM,1,1,,B,1;UnTqh01fOvss2N@Q7ho0;p0<03,0*2E	Pass

Test of DTM input – Clause 19.5.3

Method of measurement

Set up standard test environment and apply a GNS and DTM sentence with simulated sensor data.

a) Set local datum in the DTM sentence to "W84", set Reference datum to other value than "W84".
b) Set local datum in the DTM sentence to other value than "W84".
c) Set local datum in the DTM sentence to "W84" again.

Repeat the test with RMC input.

Record the VDL position reports and evaluate the contents (Position, PA flag, RAIM flag, time stamp, SOG and COG).

Required Results

Confirm that:

a) the position data from the sensor input are used;
b) the position data from the sensor input are not used;
c) the position data from the sensor input are used.

Test Results

Step	DTM + GNS Sentence	Result	Verdict
a)	$GPDTM,W84,,,,,,,W72*43 $GPGNS,105115,3052.7903,N,03013.9423,W,A,4,,,,,*14	The position data is used: !AIVDM,1,1,,B,1;UnTqh0?wMmVo2AbnWv400405;4,0*6C PA flag = 0, RAIM flag = 0, time stamp = 2, SOG = Not available, COG = Not available.	Pass
b)	$GPDTM,W72,,,,,,,W72*4A $GPGNS,093412,4052.7903,N,00913.9423,W,A,4,,,,,*15	The position data is not used: $AITXT,01,01,25,AIS: internal GNSS in use*5C $AITXT,01,01,28,AIS: internal SOG/ COG in use*47 !AIVDM,1,1,,B,1;UnTqh0?wOrCR2M6qAN401>00Sw,0*15 PA flag = 0, RAIM flag = 0, time stamp = 39, SOG = Not available, COG = Not available.	Pass
c)	$GPDTM,W84,,,,,,,W72*43 $GPGNS,093530,4052.7903,N,00913.9423,W,A,4,,,,,*14	The position data is used: $AITXT,01,01,22,AIS: external GNSS in use*41 $AITXT,01,01,27,AIS: external SOG/ COG in use*52 !AIVDM,1,1,,A,1;UnTqh0?wOEg=2GI47v401R0D04,0*2C PA flag = 0, RAIM flag = 0, time stamp = 49, SOG =Not available, COG = Not available.	Pass

Step	DTM + RMC Sentence	Result	Verdict
a)	$GPDTM,W84,,,,,,,W72*43 $GPRMC,093722,A,4052.7903,N,00913.9423,W,10.0,11.1,070819,,,D*64	Position data is used: !AIVDM,1,1,,A,1;UnTqh01TwEg=2GI47hKh0v0@BT,0*33 PA flag = 1, RAIM flag = 0, time stamp = 31, SOG =10, COG = 11.1.	Pass
b)	$GPDTM,P90,,,,,,,W72*41 $GPRMC,093757,A,4052.7903,N,00913.9423,W,10.0,11.1,070819,,,D*66	Position data is not used: $AITXT,01,01,25,AIS: internal GNSS in use*5C $AITXT,01,01,28,AIS: internal SOG/ COG in use*47 !AIVDM,1,1,,B,1;UnTqh0?wOrCR2M6qAN4000052H,0*41 PA flag = 0, RAIM flag = 0, time stamp = 0, SOG = not available, COG = not available.	Pass
c)	$GPDTM,W84,,,,,,,W72*43 $GPRMC,093903,A,4052.7903,N,00913.9423,W,10.0,11.1,070819,,,D*69	Position data is used: !AIVDM,1,1,,B,1;UnTqh01TwEg=2GI47hKh0`08<9,0*4D PA flag = 1, RAIM = 0, time stamp = 56, SOG = 20, COG = 11.1	Pass

Test of GBS input – Clause 19.5.4

Method of measurement

Set up the standard test environment and apply a GNS and GBS sentence with simulated sensor data. Set the position sentence to non-differential mode.

The expected RAIM error is calculated from expected error in longitude and expected error in latitude of the GBS sentence according to Table 8 as follows:

a) set expected RAIM error to a value ≤ 10 m;
b) set expected RAIM error to a value > 10 m;
c) remove the expected error in longitude and/or latitude (null field);
d) set the position sentence to differential mode. Set expected RAIM error to a value ≤ 10 m;
e) set expected RAIM error to a value > 10 m;
f) remove the expected error in longitude and/or latitude (null field).

Repeat the test with RMC input as position sentence.

Record the VDL position reports and evaluate the contents (Position, PA flag, RAIM flag and time stamp).

Required Results

Confirm that:

a) RAIM flag = 1 and PA flag = 1;
b) RAIM flag = 1 and PA flag = 0;
c) RAIM flag = 0 and PA flag = 0;
d) RAIM flag = 1 and PA flag = 1;
e) RAIM flag = 1 and PA flag = 0;
f) RAIM flag = 0 and PA flag = 1.

Test Results

GNS as EPFS			
Step	GNS + GBS Sentence	Result	Verdict
a)	For RAIM error < 10m: $GPGBS,155251,2,3,1,,,,*76 $GPGNS,155251,5052.7903,N,00113.9423,W,A,4,,,,,*16 For RAIM error = 10m: $GPGBS,155401,6,8,0,,,,*7B $GPGNS,155401,5052.7903,N,00113.9423,W,A,4,,,,,*15	RAIM error < 10 m: RAIM Flag = 1, PA Flag = 1, time stamp = 57: !AIVDM,1,1,,A,1;UnTqhP?wwrFu2M7AWv4?wj2HQp,0*11 RAIM error = 10 m: RAIM flag = 1, PA flag = 1, time stamp = 25: !AIVDM,1,1,,B,1;UnTqhP?wwrFu2M7AWv4?vj2D01,0*3F	Pass
b)	$GPGBS,155735,15,8,10,,,,*7C $GPGNS,155735,5052.7903,N,00113.9423,W,A,4,,,,,*11	RAIM flag = 1, PA flag = 0, time stamp = 46: !AIVDM,1,1,,B,1;UnTqhP?wOrFu2M7AWv4?wL28Ke,0*73	Pass
c)	$GPGBS,160148,,8,10,,,,*72 $GPGNS,160148,5052.7903,N,00113.9423,W,A,4,,,,,*1B	RAIM flag = 0, PA flag = 0, time stamp = 56: !AIVDM,1,1,,A,1;UnTqhP?wOrFu2M7AWv4?wh0@Q5,0*64	Pass
d)	For RAIM error < 10m: $GPGBS,160309,3,4,0,,,,*7B $GPGNS,160309,5052.7903,N,00113.9423,W,D,4,,,,,*19 For RAIM error = 10m: $GPGBS,160414,6,8,0,,,,*79 $GPGNS,160419,5052.7903,N,00113.9423,W,D,4,,,,,*1F	For RAIM error < 10m: RAIM flag = 1, PA flag = 1, time stamp = 27: !AIVDM,1,1,,B,1;UnTqhP?wwrFu2M7AWv4?vn28@?,0*39 For RAIM error = 10m: RAIM flag = 1, PA flag = 1, time stamp = 37: !AIVDM,1,1,,A,1;UnTqhP?wwrFu2M7AWv4?w:25pD,0*29	Pass
e)	$GPGBS,160609,15,14,0,,,,*78 $GPGNS,160609,5052.7903,N,00113.9423,W,D,4,,,,,*1C	RAIM flag = 1, PA flag = 0, time stamp = 56: !AIVDM,1,1,,A,1;UnTqhP?wOrFu2M7AWv4?wh2L01,0*0F	Pass
f)	$GPGBS,160747,,14,0,,,,*77	RAIM flag = 0, PA flag = 1, time stamp = 15:	Pass

GNS as EPFS			
Step	GNS + GBS Sentence	Result	Verdict
	$GPGNS,160747,5052.7903,N,00113.9423,W,D,4,,,,,*17	!AIVDM,1,1,,A,1;UnTqhP?wwrFu2M7AWv4?vN0<01,0*62	

RMC as EPFS			
Step	RMC + GBS Sentence	Result	Verdict
a)	For RAIM error < 10m: $GPGBS,163043,3,4,2,,,,*77 $GPRMC,163043,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,A*4F For RAIM error = 10m: $GPGBS,163143,6,8,0,,,,*7D $GPRMC,163143,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,A*4E	RAIM error < 10 m: RAIM Flag = 1, PA Flag = 1, time stamp = 56 !AIVDM,1,1,,A,1;UnTqhP1TwrFu2M7AWhKwwh2L01,0*33 RAIM error = 10 m: RAIM flag = 1, PA flag = 1, time stamp = 7 !AIVDM,1,1,,B,1;UnTqhP1TwrFu2M7AWhKwv>2<01,0*17	Pass
b)	$GPGBS,163231,12,13,0,,,,*74 $GPRMC,163231,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,A*48	RAIM flag = 1, PA flag = 0, time stamp = 46: !AIVDM,1,1,,B,1;UnTqhP1TOrFu2M7AWhKwwL2@KW,0*3D	Pass
c)	$GPGBS,163420,,13,0,,,,*71 $GPRMC,163420,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,A*4E	RAIM flag = 0, PA flag = 0, time stamp = 37: !AIVDM,1,1,,A,1;UnTqhP1TOrFu2M7AWhKww:05r8,0*69	Pass
d)	For RAIM error < 10m: $GPGBS,163540,3,4,0,,,,*73 $GPRMC,163540,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,D*4C For RAIM error = 10m: $GPGBS,164014,6,8,0,,,,*79 $GPRMC,164014,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,D*4F	For RAIM error < 10m: RAIM flag = 1, PA flag = 1, time stamp = 56 !AIVDM,1,1,,A,1;UnTqhP1TwrFu2M7AWhKwwh28QT,0*43 For RAIM error = 10m: RAIM flag = 1, PA flag = 1, time stamp = 26 !AIVDM,1,1,,B,1;UnTqhP1TwrFu2M7AWhKwvl2D01,0*3D	Pass
e)	$GPGBS,163837,15,20,0,,,,*7F $GPRMC,163837,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,,D*41	RAIM flag = 1, PA flag = 0, time stamp = 46: !AIVDM,1,1,,B,1;UnTqhP1TOrFu2M7AWhKwwL2D01,0*24	Pass
f)	$GPGBS,165057,,18,4.2,,,,*60 $GPRMC,165057,A,5052.7903,N,00113.9423,W,10.0,11.1,130819,,,D*65	RAIM flag = 0, PA flag = 1, time stamp = 07: !AIVDM,1,1,,B,1;UnTqhP1TwrFu2M7AWhKwv<084D,0*62	Pass

Test of VBW input – Clause 19.5.5

Method of measurement

Set up the standard test environment and apply a HDT and a VBW sentence with simulated sensor data.

NOTE: The HDT sentence is applied additionally to the VBW sentence in order to make the calculation of SOG and COG.

a) Set status, ground speed, to valid.
b) Set status, ground speed, to invalid.
c) Set status, ground speed, to valid, set heading to invalid.
d) Set status, ground speed, to valid and remove transverse ground speed.

Record the VDL position reports and evaluate the contents (SOG and COG).

Required Results

Confirm that:

a) SOG and COG are correctly calculated from VBW and HDT;
b) SOG and COG are set to default;
c) COG is set to default;
d) Confirm that SOG and COG are set to default.

Test Results

Step	VBW + HDT + GNS Sentence	Result	Verdict
a)	$GPVBW,1,1,A,3,4,A,,,,*53 $HEHDT,10,T*00 $GPGNS,133307,5052.7903,N,00113.9423,W,D,4,,,,,*11	The course and speed are correctly calculated from the VBW and HDT sentences. COG = 63.1° and SOG = 5 knots: !AIVDM,1,1,,B,1;UnTqh00jwrFu2M7AWjMhEh08QD,0*24	Pass
b)	$GPVBW,,,1,1,V,,,,*43 $HEHDT,10,T*00 $GPGNS,133913,5052.7903,N,00113.9423,W,D,4,,,,,*1E	SOG and COG are set to their default values of 1023 and 3600 respectively: !AIVDM,1,1,,B,1;UnTqh0?wwrFu2M7AWv40DP05RL,0*34	Pass
c)	$GPVBW,1,1,A,3,4,A,,,,*53 $HEHDT,10,T*01 (invalid checksum) $GPGNS,154846,5052.7903,N,00113.9423,W,AP,4,,,,,*4B	COG is set to default, COG = 3600: !AIVDM,1,1,,A,1;UnTqhP0jwrFu2M7AWv4?vl05k4,0*05	Pass
d)	$GPVBW,1,1,A,3,,A,,,,*67 $HEHDT,10,T*00 $GPGNS,155123,5052.7903,N,00113.9423,W,AP,4,,,,,*40	COG is set to default, COG = 3600. SOG is set to default, SOG = 1023: !AIVDM,1,1,,B,1;UnTqh0?wwrFu2M7AWv40D<0<01,0*4E	Pass

Test of VTG input – Clause 19.5.6

Method of measurement

Set up the standard test environment and apply a VTG sentence with simulated sensor data.

a) Set mode indicator to a valid value.
b) Set mode indicator to "N" (data not valid).

Record the VDL position reports and evaluate the contents (SOG and COG).

Required Results

Confirm that:

a) SOG and COG are correctly used;
b) SOG and COG are set to default.

Test Results

Step	VTG + GNS Sentence	Result	Verdict
a)	$GPGNS,112531,5052.1681,N,00114.6431,W,AA,4,,,,,*5D $GPVTG,12,T,,M,11,N,,K,A*20	On MKD, SOG = 11 and COG = 12, position report values are correct: !AIVDM,1,1,,B,1;UnTqh01fwrCR2M6qD@N0062823,0*65	Pass
b)	$GPGNS,112636,5052.1681,N,00114.6431,W,AA,4,,,,,*59 $GPVTG,12,T,,M,11,N,,K,N*2F	On MKD, SOG = “---” and COG = “---“, default values are used in position report: !AIVDM,1,1,,A,1;UnTqh0?wwrCR2M6qDN400H2D03,0*0D	Pass

Test of HDT/THS input – Clause 19.5.7

Method of measurement

Set up the standard test environment and apply a RMC and an HDT/THS sentence with simulated sensor data.

a) Set valid heading data in HDT/THS.
b) Remove heading data from HDT/THS.
c) Set SOG > 5 kn and heading data different from COG by > 45° for 5 min.

Record the VDL position reports and evaluate the contents (heading).

Required Results

Confirm that:

a) the heading value is correct;
b) the heading value is set to default;
c) ALR 11 is activated.

Test Results

Step	RMC + THS Sentence	Result	Verdict
a)	$GPRMC,111808,A,5052.7903,N,00113.9423,W,8.0,11.1,120719,,,D*53 $HETHS,30,A*00	The heading value is correct: !AIVDM,1,1,,B,1;UnTqh01@wrFu2M7AWhKhuH0L02,0*78	Pass
b)	$GPRMC,112137,A,5052.7903,N,00113.9423,W,8.0,11.1,120719,,,D*55	The heading value defaults to 511 – not available: !AIVDM,1,1,,A,1;UnTqhP1@wrFu2M7AWhKwwf05AD,0*56	Pass
c)	$GPRMC,120415,A,5052.7903,N,00113.9423,W,8.0,11.1,120719,,,D*51 $HETHS,90,A*0A	$AIALR,110331.00,011,A,V,Heading sensor offset*20	Pass

Test of ROT input – Clause 19.5.8

Method of measurement

Set up standard test environment and apply a HDT and ROT sentence with simulated sensor data. Set talker ID of ROT = "TI". Set ROT status to valid ("A").

a) Set ROT to several values between 0°/min and 708°/min turning left and right.
b) Set ROT to a value of more than 708°/min turning left and right.
c) Set ROT status to invalid ("V").

Set the ROT status to valid again and set the ROT talker ID to "HE".

When ROT values are used do as in d), e), and f).

d) Set ROT to 9°/min turning left and right.
e) Set ROT to 11°/min turning left.
f) Set ROT to 11°/min turning right.

When ROT values are not used but are calculated from the HDT data, do as in g), h) and i).

g) Change the heading value in HDT to 9°/min and −9°/min.
h) Change the heading value in HDT to 11°/min.
i) Change the heading value in HDT to −11°/min.

Record the VDL position reports and evaluate the contents (ROT).

Required Results

Confirm that:

a) the ROT value is calculated as defined in Table 9;
b) the ROT value is −126 turning left and 126 turning right;
c) ROT = default (–128) or 0 or ±127 if calculated from HDT;
d) ROT = 0;
e) ROT = −127;
f) ROT = 127;
g) ROT = 0;
h) ROT = −127;
i) ROT = 127.

Test Results

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
a)	$HEHDT,0,T*31 $TIROT,0.0,A*3B	!AIVDM,1,1,,A,1;UnTqh0?wwrCR2M6qDN401b2D02,0*27	0	4.733*SQRT(0) = 0	Pass
	$HEHDT,0,T*31 $TIROT,118,A*2D	!AIVDM,1,1,,B,1;UnTqh<wwwrCR2M6qDN400825B=,0*37	51	4.733*SQRT(118) = 51	Pass
	$HEHDT,0,T*31 $TIROT,236,A*22	!AIVDM,1,1,,B,1;UnTqhBOwwrCR2M6qDN400f2D02,0*23	73	4.733*SQRT(236) = 73	Pass
	$HEHDT,0,T*31 $TIROT,-462,A*08	!AIVDM,1,1,,B,1;UnTqhVgwwrCR2M6qDN400f2@=t,0*50	154	256 - 4.733*SQRT(462) = 154	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
b)	$HEHDT,0,T*31 $TIROT,-809,A*09	!AIVDM,1,1,,B,1;UnTqhPgwwrCR2M6qDN401D20S9,0*26	130	130 corresponds to -126 (2's complement)	Pass
	$HEHDT,0,T*31 $TIROT,909,A*25	!AIVDM,1,1,,B,1;UnTqhOgwwrCR2M6qDN40062<03,0*2F	126	126	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
c)	$HEHDT,0,T*31 $TIROT,10,V*03	!AIVDM,1,1,,A,1;UnTqh0?wwrCR2M6qDN401b2<03,0*5E	0	0	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
d)	$HEHDT,0,T*31 $HEROT,-9,A*11	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKnJ4010@,0*27	0	0	Pass
	$HEHDT,0,T*31 $HEROT,9,A*3C	!AIVDM,1,1,,A,3;UnTqh01TwrFu2M7AWhKhHP00t3,0*71	0	0	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
e)	$HEHDT,0,T*31 $HEROT,-11,A*28	!AIVDM,1,1,,B,1;UnTqhPATwrFu2M7AWhKh1J0<02,0*4A	129	-127 (corresponds to 129 using 2's complement)	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
f)	$HEHDT,0,T*31 $HEROT,11,A*05	! !AIVDM,1,1,,A,1;UnTqhOiTwrFu2M7AWhKh16059d,0*54	127	127	Pass

Step	HDT Sentence	Position Report	ROT Value	Expected ROT Value	Verdict
g)	$HEHDT,45,T*00 Changing rate of 0.15° per second	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKk::083S,0*44	0	0	Pass
	$HEHDT,107.0,T*29 Changing rate of -0.15° per second	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKjW408DW,0*56	0	0	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
h)	$HEHDT,66.6,T*19 Changing rate of -0.183° per sec	!AIVDM,1,1,,B,1;UnTqhPATwrFu2M7AWhKigH08JT,0*07	129 (= -127)	-127	Pass

Step	Sentences	Position Report	ROT Value	Expected ROT Value	Verdict
i)	$HEHDT,230.7,T*29 Changing rate of 0.183° per second	!AIVDM,1,1,,A,1;UnTqhOiTwrFu2M7AWhKiqh0@Q<,0*0E	127	127	Pass

Test of different inputs – Clause 19.5.9

Method of measurement

Set up the standard test environment and apply a GNS, VBW, HDT/THS and ROT sentence with simulated sensor data to the specified sensor inputs.

a) Apply RMC, VBW, HDT and ROT to sensor input 1.
b) Apply RMC, VBW, HDT and ROT to sensor input 2.
c) Apply RMC, VBW, HDT and ROT to sensor input 3.
d) Apply RMC to sensor input 1, VBW to sensor input 2, HDT and ROT to sensor input 3.

Record the VDL position reports and evaluate the contents of SOG and COG.

Required Results

Confirm that:

a) all sensor data are correct;
b) all sensor data are correct;
c) all sensor data are correct;
d) all sensor data are correct.

Test Results

a)						
Tx / RX	Sentence	COG	SOG	Heading	ROT	Verdict
Tx	$GPRMC,161339,A,5052.7903,N,00113.9423,W,11,21,140819,,,D*6E $GPVBW,1,1,A,1,1,A,,,,*54 $HEHDT,31.0,T*1D $TIROT,10,A*14	21	11	31	10	-
Rx	!AIVDM,1,1,,A,1;UnTqh3ifwrFu2M7AWhlPw40D02,0*6F	21	11	31	10	Pass
	!AIVDM,1,1,,B,1;UnTqh3ifwrFu2M7AWhlPwH0@J<,0*60	21	11	31	10	
	!AIVDM,1,1,,A,1;UnTqh3ifwrFu2M7AWhlPwd05pl,0*50	21	11	31	10	
	!AIVDM,1,1,,B,1;UnTqh3ifwrFu2M7AWhlPv600SF,0*0C	21	11	31	10	
	!AIVDM,1,1,,A,1;UnTqh3ifwrFu2M7AWhlPvL05pp,0*65	21	11	31	10	

b)						
Tx / RX	Sentence	COG	SOG	Heading	ROT	Verdict
Tx	$GPRMC,161852,A,5052.7903,N,00113.9423,W,12,22,140819,,,D*68 $GPVBW,2,2,A,2,2,A,,,,*54 $HEHDT,32.0,T*1E $TIROT,11,A*15	22	12	32	11	-
Rx	!AIVDM,1,1,,B,1;UnTqh41pwrFu2M7AWho11H0@JB,0*73	22	12	32	11	Pass
	!AIVDM,1,1,,A,1;UnTqh41pwrFu2M7AWho11d05q8,0*68	22	12	32	11	
	!AIVDM,1,1,,B,1;UnTqh41pwrFu2M7AWho10:0<02,0*76	22	12	32	11	
	!AIVDM,1,1,,A,1;UnTqh41pwrFu2M7AWho10L088p,0*4D	22	12	32	11	
	!AIVDM,1,1,,B,1;UnTqh41pwrFu2M7AWho10h0@>V,0*32	22	12	32	11	

c)						
Tx / RX	Sentence	COG	SOG	Heading	ROT	Verdict
Tx	$GPRMC,104306,A,5052.7903,N,00113.9423,W,13,23,150819,,,D*60 $GPVBW,3,3,A,3,A,3,A*39 $HEHDT,33.0,T*1F $TIROT,13,A*16	23	13	33	13	-
Rx	!AIVDM,1,1,,B,1;UnTqh4B2wrFu2M7AWhqQ3205:i,0*6A	23	13	33	13	Pass
	!AIVDM,1,1,,A,1;UnTqh4B2wrFu2M7AWhqQ3J0<02,0*49	23	13	33	13	
	!AIVDM,1,1,,B,1;UnTqh4B2wrFu2M7AWhqQ3b00S`,0*5F	23	13	33	13	
	!AIVDM,1,1,,A,1;UnTqh4B2wrFu2M7AWhqQ26082=,0*3D	23	13	33	13	
	!AIVDM,1,1,,B,1;UnTqh4B2wrFu2M7AWhqQ2L05:l,0*10	23	13	33	13	

d)		
Requirement	Result	Verdict
RMC sentence is applied to sensor input 1	The RMC sentence contains the values for COG = 10, SOG = 20: $GPRMC,134352,A,5052.7903,N,00113.9423,W,20,10,150819,,,D*62	-
A VBW sentence is applied to sensor input 2	All fields for the VBW sentence were set to 1, and status fields set to valid: $GPVBW,1,1,A,1,1,A,1,A,1,A*54	-
HDT and ROT sentences are transmitted over sensor input 3	The HDT sentence carries a heading value = 30 and ROT = 2: $TIROT,2,A*27 $HEHDT,30.0,T*1C	-
The contents of COG and SOG should be received should match the data that transmitted	The values for COG and SOG matched those that were applied to the sensor inputs: !AIVDM,1,1,,A,1;UnTqt1k8wrFu2M7AWhI0tH0<01,0*6C	Pass

Test of different inputs – Clause 19.5.10

Method of measurement

Check the manufacturer's documentation for the method of handling multiple sensor inputs, for instance:

• priority of sensor ports;
• assigning sensor sentences to ports by configuration.

Set up the standard test environment and apply RMC, VBW, HDT, THS and ROT sentences with different simulated sensor data to 2 or 3 sensor inputs. Record the VDL position reports and evaluate the contents.

Required Results

Confirm that, for each parameter (position, SOG/COG, heading, ROT), the data from only one sentence is used, in accordance with the manufacturer's definition. Confirm that the heading and rate of turn values from sources used for position reports are output at the pilot port.

Test Results

Requirement	Result	Verdict
RMC, VBW, HDT, THS and ROT sentences are to be applied with different simulated sensor data to 2 or 3 sensor inputs	RMC, VBW, HDT, THS and ROT sentences are applied to sensor ports 1 and 2. The sentences applied to each port contain different data	-
The data from only once sentence is used in accordance with the manufacturer's definition	It is stated in section 5.2 of the unit's installation manual that: "All of the ports may be used concurrently, however in the case that the same TALKER/SIGNATURE combination is received through two or more ports, the port that first received the sentence takes precedence until such time as the sentence has not been received on that port for 5 seconds at which point precedence will revert to the next port the sentence is received on etc."	-
	Data from each sentence is applied to both sensor ports 1 and 2. The EUT uses data from the port it was first received on, and successfully switches to the alternative port 5 seconds after the sentence is removed from the port	Pass

2.33 Test of high-speed output

2.33.1 Specification Reference

IEC 61993-2, Clause 19.6

2.33.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.33.3 Date of Test

15-July-2019

2.33.4 Test Results and Methods of Measurement

Method of measurement

Set up standard test environment and simulate VDL-position reports using the test system. Record output from the EUT high speed port (see Table 22 of IEC 61993-2).

Required Results

Verify that the recorded message contents agree with the simulated VDL contents (VDM sentence), its own transmitted data (VDO sentence) and its own position, SOG, COG information derived from the internal position sensor and in accordance with the sentence specifications of IEC 61162-1.

Test Results

Action	Result	Verdict
The following message was sent to the EUT: !AIVDO,1,1,,A,13LC9e@2P:wrFu2M7AWh2gvN0000,0*00	The high speed ECDIS port output the following sentence: !AIVDM,1,1,,A,13LC9e@2P:wrFu2M7AWh2gvN0000,0*02	Pass
Internal GNSS in use, static position @ 50 52.1758 N 1 14.6495 W	The high speed ECDIS port output the following sentence (see decode below): !AIVDM,1,1,,A,1;UnTqhP?wOrCP2M6qWf4?v80@36,0*55	Pass
External GNSS data sent to EUT: $GPRMC,115625,A,5052.7903,N,00113.9423,W,10.0,11.1,150719,,,D*68	The high speed ECDIS port output the following sentence (see decode below): !AIVDO,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120HCc,0*76	Pass

Internal GNSS Message 1 Decode	
!AIVDM,1,1,,A,1;UnTqhP?wOrCP2M6qWf4?v80@36,0*55	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate Of Turn	no turn information available (default)
Speed Over Ground	not available
Position Accuracy	0 - low (>10 m)
Longitude	1 14.6495 W
Latitude	50 52.1758 N
Course Over Ground	not available
True Heading	511 - not available
Time Stamp	4
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	4
Communication State - Sub Message	Slot Number = 198

External GNSS Message 1 Decode	
!AIVDO,1,1,,B,1;UnTqh01TwrFu2M7AWhKh120HCc,0*76	
Parameter	Decoded Value
Message ID	1 - Position report
Repeat Indicator	0
MMSI	777888999
Navigational Status	0 - under way using engine
Rate Of Turn	0
Speed Over Ground	10
Position Accuracy	1 - high (> 10 m)
Longitude	1 13.9423 W
Latitude	50 52.7903 N
Course Over Ground	11.1
True Heading	0
Time Stamp	33
Special Manoeuvre Indicator	0 - not available
Spare	0
RAIM Flag	0 - RAIM not in use
Communication State - Sync State	0
Communication State - Slot Timeout	6
Communication State - Sub Message	Slot Number = 1259

2.34 High speed output interface performance

2.34.1 Specification Reference

IEC 61993-2, Clause 19.7

2.34.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 19

2.34.3 Date of Test

28-November-2019

2.34.4 Test Results and Methods of Measurement

Method of measurement

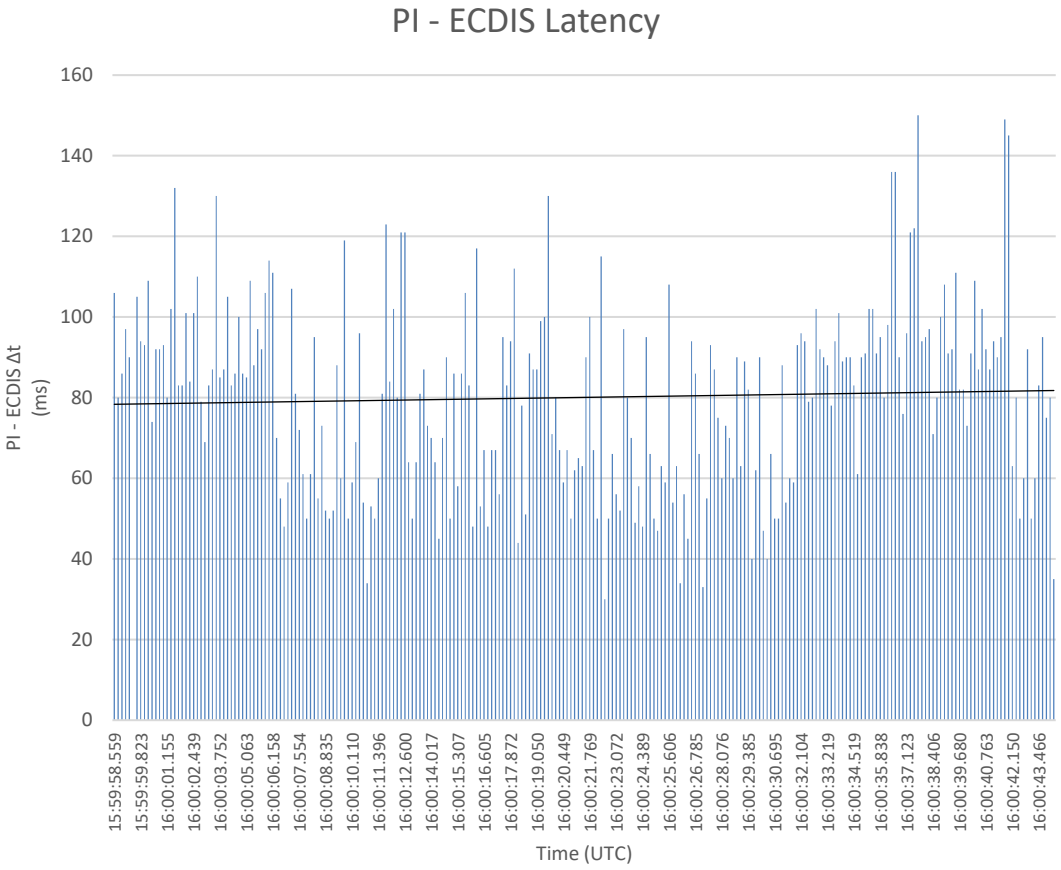
Set up standard test environment and operate EUT in autonomous mode. Increase the VDL load to > 90 %. Record transmitted messages and check PI output of the EUT on the port for "external display" and the “auxiliary display/pilot port”.

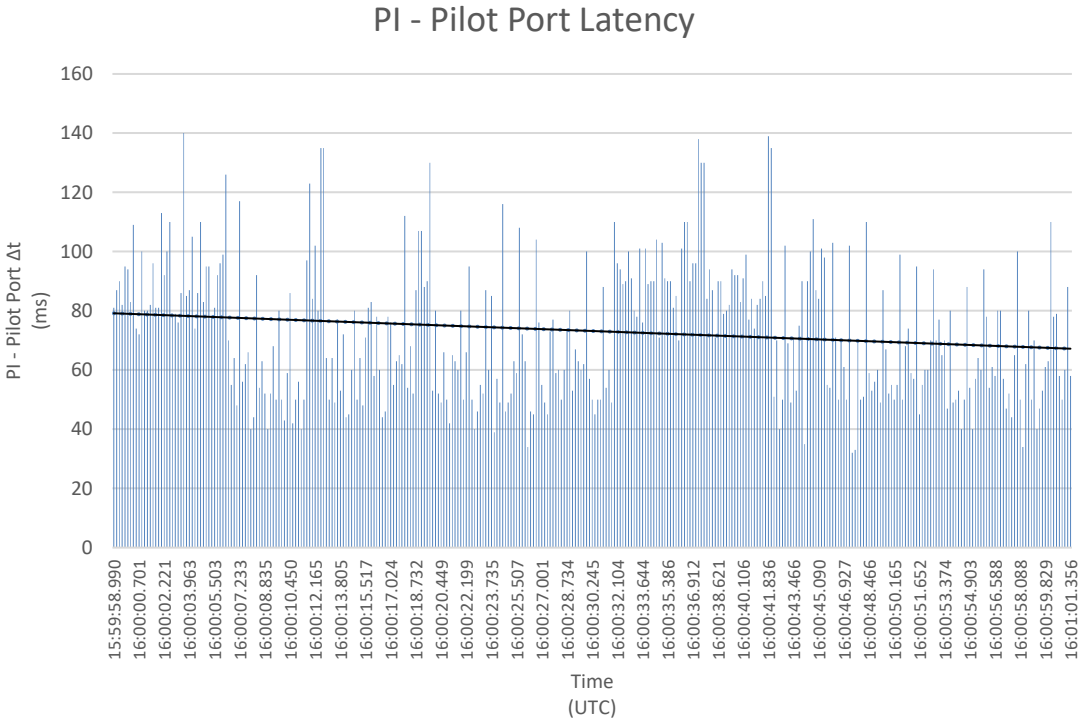
Required Results

Confirm that EUT outputs all received messages to the PI and the "auxiliary display/pilot port". Verify, during VDL load > 90 %, that the sync timing, the Tx slots and the slot number in the CommState are correct. Confirm that heading and rate of turn sentences are output with a latency of less than 200 ms. Confirm that heading is output at a rate of 5 sentences per second and rate of turn is output at a rate of 1 sentence per second.

Test Results

Requirement	Result	Verdict
The VDL load shall be increased to >90%.	The VDL is loaded with 45 targets transmitting position reports, with a block gap of 5 slots.	-
Confirm the EUT outputs all received messages to the PI and the pilot port.	Over the period of 250 messages, the EUT successfully output all messages without loss to the PI, ECDIS and pilot ports.	Pass
The sync timing of the of the messages transmitted by the EUT shall be correct.	The EUT’s transmissions do not exceed the permissible ±312µs synchronisation jitter: the EUT transmitted within 233±µs to 236±µs.	Pass
The EUT shall transmit VDL messages in the correct slots.	The EUT maintains the correct slots when transmitting with SOTDMA. When a reserved slot times-out, the EUT reserves a new transmission slot using Message 1; it then uses this new slot for SOTDMA transmissions. Message 3 is used to reserve a slot that Message 5 shall be transmitted in; the Message 5 is confirmed as using the slot announced in Message 3.	Pass
The slot number indicated in the CommState field of the position reports shall be correct.	The EUT uses the correct slot number in its position reports.	Pass
Confirm that the heading and rate of turn sentences are output with a latency of less than 200 ms.	Over the period of one frame, the latency between the PI and the ECDIS / pilot port does not exceed 200 ms. This is shown in the graphs below: the latency of the EUT does not appear to be trending positively.	Pass
Confirm that heading is output at a rate of 5 sentences per second and rate of turn is output at a rate of 1 per second.	Heading sentences are applied at a rate of 10 per second and are output on the PI at a rate of 5 per second. The rate of turn sentences are applied at a rate of 5 per second and are output at a rate of 1 per second.	Pass


PI - ECDIS Latency
PI - ECDIS Δt (ms)
160
140
120
100
80
60
40
20
0
15:59:58.559
15:59:59.823
16:00:01.155
16:00:02.439
16:00:03.752
16:00:05.063
16:00:06.158
16:00:07.554
16:00:08.835
16:00:10.110
16:00:11.396
16:00:12.600
16:00:14.017
16:00:15.307
16:00:16.605
16:00:17.872
16:00:19.050
16:00:20.449
16:00:21.769
16:00:23.072
16:00:24.389
16:00:25.606
16:00:26.785
16:00:28.076
16:00:29.385
16:00:30.695
16:00:32.104
16:00:33.219
16:00:34.519
16:00:35.838
16:00:37.123
16:00:38.406
16:00:39.680
16:00:40.763
16:00:42.150
16:00:43.466
Time (UTC)


PI - Pilot Port Latency
PI - Pilot Port Δt (ms)
160
140
120
100
80
60
40
20
0
15:59:58.990
16:00:00.701
16:00:02.221
16:00:03.963
16:00:05.503
16:00:07.233
16:00:08.835
16:00:10.450
16:00:12.165
16:00:13.805
16:00:15.517
16:00:17.024
16:00:18.732
16:00:20.449
16:00:22.199
16:00:23.735
16:00:25.507
16:00:27.001
16:00:28.734
16:00:30.245
16:00:32.104
16:00:33.644
16:00:35.386
16:00:36.912
16:00:38.621
16:00:40.106
16:00:41.836
16:00:43.466
16:00:45.090
16:00:46.927
16:00:48.466
16:00:50.165
16:00:51.652
16:00:53.374
16:00:54.903
16:00:56.588
16:00:58.088
16:00:59.829
16:01:01.356
Time (UTC)

2.35 Output of undefined VDL messages

2.35.1 Specification Reference

IEC 61993-2, Clause 19.8

2.35.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.35.3 Date of Test

15-July-2019

2.35.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Verify that AIS messages with undefined data contents according to Table 18 (Message type 28 or higher) are output by the PI. Repeat test for port "auxiliary display/pilot port".

Required Results

Confirm that the EUT outputs all undefined received messages to the PI.

Test Results

Requirement	Result	Verdict
EUT outputs all undefined messages to the PI	All messages are output, see table below.	Pass
EUT outputs all undefined messages to the Pilot port	All messages are output, see table below.	Pass

Presentation Interface			
Time	Msg	Message Sent	Message Output
11:56:08	28	!AIVDO,1,1,,A,LkLC9eL?u7CfPB4d,0*06	!AIVDM,1,1,,A,LkLC9eL?u7CfPB4d,0*04
11:56:09	29	!AIVDO,1,1,,A,MkLC9eL?u7CfPB4d,0*07	!AIVDM,1,1,,A,MkLC9eL?u7CfPB4d,0*05
11:56:12	30	!AIVDO,1,1,,A,NkLC9eL?u7CfPB4d,0*04	!AIVDM,1,1,,A,NkLC9eL?u7CfPB4d,0*06
11:56:15	31	!AIVDO,1,1,,A,OkLC9eL?u7CfPB4d,0*05	!AIVDM,1,1,,A,OkLC9eL?u7CfPB4d,0*07
11:56:19	32	!AIVDO,1,1,,A,PkLC9eL?u7CfPB4d,0*1A	!AIVDM,1,1,,A,PkLC9eL?u7CfPB4d,0*18
11:56:23	33	!AIVDO,1,1,,A,QkLC9eL?u7CfPB4d,0*1B	!AIVDM,1,1,,A,QkLC9eL?u7CfPB4d,0*19
11:56:26	34	!AIVDO,1,1,,A,RkLC9eL?u7CfPB4d,0*18	!AIVDM,1,1,,A,RkLC9eL?u7CfPB4d,0*1A
11:56:28	35	!AIVDO,1,1,,A,SkLC9eL?u7CfPB4d,0*19	!AIVDM,1,1,,A,SkLC9eL?u7CfPB4d,0*1B
11:56:30	36	!AIVDO,1,1,,A,TkLC9eL?u7CfPB4d,0*1E	!AIVDM,1,1,,A,TkLC9eL?u7CfPB4d,0*1C
11:56:35	37	!AIVDO,1,1,,A,UkLC9eL?u7CfPB4d,0*1F	!AIVDM,1,1,,A,UkLC9eL?u7CfPB4d,0*1D
11:56:39	38	!AIVDO,1,1,,A,VkLC9eL?u7CfPB4d,0*1C	!AIVDM,1,1,,A,VkLC9eL?u7CfPB4d,0*1E
11:56:42	39	!AIVDO,1,1,,A,WkLC9eL?u7CfPB4d,0*1D	!AIVDM,1,1,,A,WkLC9eL?u7CfPB4d,0*1F
11:56:43	40	!AIVDO,1,1,,A,`kLC9eL?u7CfPB4d,0*2A	!AIVDM,1,1,,A,`kLC9eL?u7CfPB4d,0*28
11:56:45	41	!AIVDO,1,1,,A,akLC9eL?u7CfPB4d,0*2B	!AIVDM,1,1,,A,akLC9eL?u7CfPB4d,0*29
11:56:46	42	!AIVDO,1,1,,A,bkLC9eL?u7CfPB4d,0*28	!AIVDM,1,1,,A,bkLC9eL?u7CfPB4d,0*2A
11:56:48	43	!AIVDO,1,1,,A,ckLC9eL?u7CfPB4d,0*29	!AIVDM,1,1,,A,ckLC9eL?u7CfPB4d,0*2B
11:56:51	44	!AIVDO,1,1,,A,dkLC9eL?u7CfPB4d,0*2E	!AIVDM,1,1,,A,dkLC9eL?u7CfPB4d,0*2C
11:56:55	45	!AIVDO,1,1,,A,ekLC9eL?u7CfPB4d,0*2F	!AIVDM,1,1,,A,ekLC9eL?u7CfPB4d,0*2D
11:56:59	46	!AIVDO,1,1,,A,fkLC9eL?u7CfPB4d,0*2C	!AIVDM,1,1,,A,fkLC9eL?u7CfPB4d,0*2E
11:57:02	47	!AIVDO,1,1,,A,gkLC9eL?u7CfPB4d,0*2D	!AIVDM,1,1,,A,gkLC9eL?u7CfPB4d,0*2F
11:57:04	48	!AIVDO,1,1,,A,hkLC9eL?u7CfPB4d,0*22	!AIVDM,1,1,,A,hkLC9eL?u7CfPB4d,0*20
11:57:07	49	!AIVDO,1,1,,A,ikLC9eL?u7CfPB4d,0*23	!AIVDM,1,1,,A,ikLC9eL?u7CfPB4d,0*21
11:57:08	50	!AIVDO,1,1,,A,jkLC9eL?u7CfPB4d,0*20	!AIVDM,1,1,,A,jkLC9eL?u7CfPB4d,0*22
11:57:10	51	!AIVDO,1,1,,A,kkLC9eL?u7CfPB4d,0*21	!AIVDM,1,1,,A,kkLC9eL?u7CfPB4d,0*23
11:57:15	52	!AIVDO,1,1,,A,lkLC9eL?u7CfPB4d,0*26	!AIVDM,1,1,,A,lkLC9eL?u7CfPB4d,0*24
11:57:19	53	!AIVDO,1,1,,A,mkLC9eL?u7CfPB4d,0*27	!AIVDM,1,1,,A,mkLC9eL?u7CfPB4d,0*25
11:57:24	54	!AIVDO,1,1,,A,nkLC9eL?u7CfPB4d,0*24	!AIVDM,1,1,,A,nkLC9eL?u7CfPB4d,0*26
11:57:25	55	!AIVDO,1,1,,A,okLC9eL?u7CfPB4d,0*25	!AIVDM,1,1,,A,okLC9eL?u7CfPB4d,0*27
11:57:29	56	!AIVDO,1,1,,A,pkLC9eL?u7CfPB4d,0*3A	!AIVDM,1,1,,A,pkLC9eL?u7CfPB4d,0*38
11:57:34	57	!AIVDO,1,1,,A,qkLC9eL?u7CfPB4d,0*3B	!AIVDM,1,1,,A,qkLC9eL?u7CfPB4d,0*39
11:57:36	58	!AIVDO,1,1,,A,rkLC9eL?u7CfPB4d,0*38	!AIVDM,1,1,,A,rkLC9eL?u7CfPB4d,0*3A
11:57:39	59	!AIVDO,1,1,,A,skLC9eL?u7CfPB4d,0*39	!AIVDM,1,1,,A,skLC9eL?u7CfPB4d,0*3B
11:57:44	60	!AIVDO,1,1,,A,tkLC9eL?u7CfPB4d,0*3E	!AIVDM,1,1,,A,tkLC9eL?u7CfPB4d,0*3C
11:57:46	61	!AIVDO,1,1,,A,ukLC9eL?u7CfPB4d,0*3F	!AIVDM,1,1,,A,ukLC9eL?u7CfPB4d,0*3D
11:57:48	62	!AIVDO,1,1,,A,vkLC9eL?u7CfPB4d,0*3C	!AIVDM,1,1,,A,vkLC9eL?u7CfPB4d,0*3E
11:57:51	63	!AIVDO,1,1,,A,wkLC9eL?u7CfPB4d,0*3D	!AIVDM,1,1,,A,wkLC9eL?u7CfPB4d,0*3F

Pilot Port			
Time	Msg	Message Sent	Message Output
12:07:25	28	!AIVDO,1,1,,A,LkLC9eL?u7CfPB4d,0*06	!AIVDM,1,1,,A,LkLC9eL?u7CfPB4d,0*04
12:07:27	29	!AIVDO,1,1,,A,MkLC9eL?u7CfPB4d,0*07	!AIVDM,1,1,,A,MkLC9eL?u7CfPB4d,0*05
12:07:29	30	!AIVDO,1,1,,A,NkLC9eL?u7CfPB4d,0*04	!AIVDM,1,1,,A,NkLC9eL?u7CfPB4d,0*06
12:07:33	31	!AIVDO,1,1,,A,OkLC9eL?u7CfPB4d,0*05	!AIVDM,1,1,,A,OkLC9eL?u7CfPB4d,0*07
12:07:37	32	!AIVDO,1,1,,A,PkLC9eL?u7CfPB4d,0*1A	!AIVDM,1,1,,A,PkLC9eL?u7CfPB4d,0*18
12:07:38	33	!AIVDO,1,1,,A,QkLC9eL?u7CfPB4d,0*1B	!AIVDM,1,1,,A,QkLC9eL?u7CfPB4d,0*19
12:07:42	34	!AIVDO,1,1,,A,RkLC9eL?u7CfPB4d,0*18	!AIVDM,1,1,,A,RkLC9eL?u7CfPB4d,0*1A
12:07:45	35	!AIVDO,1,1,,A,SkLC9eL?u7CfPB4d,0*19	!AIVDM,1,1,,A,SkLC9eL?u7CfPB4d,0*1B
12:07:47	36	!AIVDO,1,1,,A,TkLC9eL?u7CfPB4d,0*1E	!AIVDM,1,1,,A,TkLC9eL?u7CfPB4d,0*1C
12:07:48	37	!AIVDO,1,1,,A,UkLC9eL?u7CfPB4d,0*1F	!AIVDM,1,1,,A,UkLC9eL?u7CfPB4d,0*1D
12:07:51	38	!AIVDO,1,1,,A,VkLC9eL?u7CfPB4d,0*1C	!AIVDM,1,1,,A,VkLC9eL?u7CfPB4d,0*1E
12:07:56	39	!AIVDO,1,1,,A,WkLC9eL?u7CfPB4d,0*1D	!AIVDM,1,1,,A,WkLC9eL?u7CfPB4d,0*1F
12:08:01	40	!AIVDO,1,1,,A,`kLC9eL?u7CfPB4d,0*2A	!AIVDM,1,1,,A,`kLC9eL?u7CfPB4d,0*28
12:08:04	41	!AIVDO,1,1,,A,akLC9eL?u7CfPB4d,0*2B	!AIVDM,1,1,,A,akLC9eL?u7CfPB4d,0*29
12:08:05	42	!AIVDO,1,1,,A,bkLC9eL?u7CfPB4d,0*28	!AIVDM,1,1,,A,bkLC9eL?u7CfPB4d,0*2A
12:08:09	43	!AIVDO,1,1,,A,ckLC9eL?u7CfPB4d,0*29	!AIVDM,1,1,,A,ckLC9eL?u7CfPB4d,0*2B
12:08:14	44	!AIVDO,1,1,,A,dkLC9eL?u7CfPB4d,0*2E	!AIVDM,1,1,,A,dkLC9eL?u7CfPB4d,0*2C
12:08:17	45	!AIVDO,1,1,,A,ekLC9eL?u7CfPB4d,0*2F	!AIVDM,1,1,,A,ekLC9eL?u7CfPB4d,0*2D
12:08:21	46	!AIVDO,1,1,,A,fkLC9eL?u7CfPB4d,0*2C	!AIVDM,1,1,,A,fkLC9eL?u7CfPB4d,0*2E
12:08:22	47	!AIVDO,1,1,,A,gkLC9eL?u7CfPB4d,0*2D	!AIVDM,1,1,,A,gkLC9eL?u7CfPB4d,0*2F
12:08:24	48	!AIVDO,1,1,,A,hkLC9eL?u7CfPB4d,0*22	!AIVDM,1,1,,A,hkLC9eL?u7CfPB4d,0*20
12:08:28	49	!AIVDO,1,1,,A,ikLC9eL?u7CfPB4d,0*23	!AIVDM,1,1,,A,ikLC9eL?u7CfPB4d,0*21
12:08:31	50	!AIVDO,1,1,,A,jkLC9eL?u7CfPB4d,0*20	!AIVDM,1,1,,A,jkLC9eL?u7CfPB4d,0*22
12:08:35	51	!AIVDO,1,1,,A,kkLC9eL?u7CfPB4d,0*21	!AIVDM,1,1,,A,kkLC9eL?u7CfPB4d,0*23
12:08:36	52	!AIVDO,1,1,,A,lkLC9eL?u7CfPB4d,0*26	!AIVDM,1,1,,A,lkLC9eL?u7CfPB4d,0*24
12:08:40	53	!AIVDO,1,1,,A,mkLC9eL?u7CfPB4d,0*27	!AIVDM,1,1,,A,mkLC9eL?u7CfPB4d,0*25
12:08:44	54	!AIVDO,1,1,,A,nkLC9eL?u7CfPB4d,0*24	!AIVDM,1,1,,A,nkLC9eL?u7CfPB4d,0*26
12:08:48	55	!AIVDO,1,1,,A,okLC9eL?u7CfPB4d,0*25	!AIVDM,1,1,,A,okLC9eL?u7CfPB4d,0*27
12:08:52	56	!AIVDO,1,1,,A,pkLC9eL?u7CfPB4d,0*3A	!AIVDM,1,1,,A,pkLC9eL?u7CfPB4d,0*38
12:08:56	57	!AIVDO,1,1,,A,qkLC9eL?u7CfPB4d,0*3B	!AIVDM,1,1,,A,qkLC9eL?u7CfPB4d,0*39
12:08:58	58	!AIVDO,1,1,,A,rkLC9eL?u7CfPB4d,0*38	!AIVDM,1,1,,A,rkLC9eL?u7CfPB4d,0*3A
12:09:03	59	!AIVDO,1,1,,A,skLC9eL?u7CfPB4d,0*39	!AIVDM,1,1,,A,skLC9eL?u7CfPB4d,0*3B
12:09:04	60	!AIVDO,1,1,,A,tkLC9eL?u7CfPB4d,0*3E	!AIVDM,1,1,,A,tkLC9eL?u7CfPB4d,0*3C
12:09:06	61	!AIVDO,1,1,,A,ukLC9eL?u7CfPB4d,0*3F	!AIVDM,1,1,,A,ukLC9eL?u7CfPB4d,0*3D
12:09:09	62	!AIVDO,1,1,,A,vkLC9eL?u7CfPB4d,0*3C	!AIVDM,1,1,,A,vkLC9eL?u7CfPB4d,0*3E
12:09:14	63	!AIVDO,1,1,,A,wkLC9eL?u7CfPB4d,0*3D	!AIVDM,1,1,,A,wkLC9eL?u7CfPB4d,0*3F

2.36 Test of VSD input sentence

2.36.1 Specification Reference

IEC 61993-2, Clause 19.9

2.36.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 8

2.36.3 Date of Test

13-August-2019

2.36.4 Test Results and Methods of Measurement

General – Clause 19.9.1

Verify the configuration input by evaluation of the appropriate output sentence, either by response to the input sentence or as response to a query.

Test of VSD input sentence – Clause 19.9.2

Method of measurement

Set up standard test environment and apply VSD sentences with simulated configuration data to the high-speed ports.

a) Apply a VSD sentence, all fields with valid data, without preceding SSA sentence.
b) Set the Special Manoeuvre Indicator to "in special manoeuvre".
c) Set the Special Manoeuvre Indicator to "not in special manoeuvre".
d) Set the Special Manoeuvre Indicator to "not available".

Required Results

Confirm that:

a) all data of the VSD sentence are accepted;
b) the EUT transmits Message 1 with the Special Manoeuvre Indicator set to 2;
c) the EUT transmits Message 1 with the Special Manoeuvre Indicator set to 1;
d) the EUT transmits Message 1 with the Special Manoeuvre Indicator set to 0.

Test Results

a)		
Requirement	Result	Verdict
A VSD sentence with all fields containing valid data is applied to the EUT.	$AIVSD,30,20.0,10,WORK,083000.00,13,08,0,8*5D	-
All data of the VSD sentence are accepted.	Message 1: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh6Q0H9q,0*7B Message 5: !AIVDM,2,1,1,B,5;UnTqswwwww7;<000048<000000000000000000N1AT:D66`Nj5klRh00000,0*5B !AIVDM,2,2,1,B,00000000008,2*2E	Pass
VSD query was sent to the EUT to confirm the data was accepted.	$AIVSD,30,20.0,10,WORK,083000.00,13,08,0,8*5D	Pass

b)		
Requirement	Result	Verdict
The initial VSD sentence is retrieved from the EUT to confirm the Special Manoeuvre Indicator is not 2.	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh7h0D01,0*06	-

b)		
Requirement	Result	Verdict
The Special Manoeuvre Indicator is set to 2 with the use of a VSD sentence.	Regional application flag set to 8, corresponding to a Special Manoeuvre Indicator value of 2- engaged in special manoeuvre: $AIVSD,30,20.0,10,WORK,083000.00,13,08,0,8*5D	-
The EUT transmits Message 1 with the Special Manoeuvre Indicator now set to 2.	EUT accepts the VSD sentence. Message 1 transmitted by the EUT: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh6;0<01, 0*2F	Pass

c)		
Requirement	Result	Verdict
The initial VSD sentence is retrieved from the EUT to confirm the Special Manoeuvre Indicator is not 1.	!AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh7M00SG,0*41	-
The Special Manoeuvre Indicator is set to 1 with the use of a VSD sentence.	The regional application flag is set to 4, corresponding to a Special Manoeuvre Indicator value of 1- not engaged in special manoeuvre: $AIVSD,30,20.0,10,WORK,083000.00,13,08,0,4*51	-
The EUT transmits Message 1 with the Special Manoeuvre Indicator now set to 1.	Message 1 transmitted by the EUT shows that the VSD sentence was accepted, and all data fields were updated: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh6:P5I4, 0*3B	Pass

d)		
Requirement	Result	Verdict
The initial VSD sentence is retrieved from the EUT to confirm the Special Manoeuvre Indicator is not 0.	!AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh78P0S0,0*20	-
The Special Manoeuvre Indicator is set to 0 with the use of a VSD sentence.	The regional application flag is set to 0, corresponding to a Special Manoeuvre Indicator value of 0- not available / default: $AIVSD,30,20.0,10,WORK,083000.00,13,08,0,0*55	-
The EUT transmits Message 1 with the Special Manoeuvre Indicator now set to 0.	Message 1 transmitted by the EUT shows that the Special Manoeuvre Indicator is now set to 0: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh6l05I8,0*01	Pass

Test of SSD input sentence - Clause 19.9.3

Method of measurement

Set up the standard test environment and apply the SSD sentences with simulated configuration data to the high-speed ports.

a) Apply an SSD sentence, all fields with valid data, without a preceding SSA sentence.
b) Apply an SSD sentence, all fields with valid data, with a preceding SSA sentence with incorrect signature.
c) Apply an SSD sentence, all fields with valid data, with a preceding SSA sentence with correct signature. The source identifier shall be "AI" and the dim/ref values of the internal GNSS.
d) Apply an SSD sentence, all fields with valid data, with a preceding SSA sentence with correct signature. The source identifier shall be different to "AI" and the dim/ref values of the external GNSS.
e) Query for SSD.

Required Results

Confirm that:

a) all data of the SSD sentence, except the DTE flag, are not accepted. Confirm that a NAK sentence is output with correct content and reason code 5;
b) all data of the SSD sentence, except the DTE flag, are not accepted. Confirm that a NAK sentence is output with correct content and reason code 5;
c) all data of the SSD sentence are accepted. Confirm that the dim/ref values are stored for the internal GNSS and used in message 5 with internal GNSS position source;
d) all data of the SSD sentence are accepted. Confirm that the dim/ref values are stored for the external GNSS and used in message 5 with external GNSS position source;
e) there are two SSD output sentence, one with source identifier "AI" and internal dim/ref data and one with source identifier of a valid external source with external dim/ref data.

Test Results

a)		
Requirement	Result	Verdict
SSD sentence is checked first to establish the fields and their contents	The static data sentence output by the EUT is: $AISSD,TUVSUD,TUV TEST,25,15,4,6,1,AI*00	-
An SSD sentence is applied, with different data- including a new value for the DTE indicator flag	The new SSD sentence applied is: $AISSD,TEST,NEWNAME,50,50,10,10,0,AI*39	-
The EUT rejects the new SSD values, outputting a NAK sentence with reason code 5	The EUT correctly rejects the input data and a NAK sentence with reason code 5 is output: $AINAK,AI,SSD,777888999,5,Access denied, for sentence formatter requested*6A	Pass
The static data is checked for changes using the SSD sentence again; only the DTE flag should be accepted	The DTE flag is the only field updated, this is seen in the SSD sentence output by the EUT: $AISSD,TUVSUD,TUV TEST,25,15,4,6,0,AI*01	Pass

b)		
Requirement	Result	Verdict
SSD sentence is checked first to establish the fields and their contents	The static data sentence output by the EUT is: $AISSD,TUVSUD,TUV TEST,25,15,4,6,0,AI*01	-
An SSD sentence is sent to the EUT, with a preceding SSA sentence with an incorrect signature	The following sentences were sent to the EUT: $AISSA,SSD,1,6D78FC04F620310000000A2EF5CD0097*60 $AISSD,TEST,NEWNAME,50,50,10,10,1,AI*38	-
The EUT rejects the new SSD values, outputting a NAK sentence with reason code 5	The EUT correctly rejects the input data and a NAK sentence with reason code 5 is output: $AINAK,AI,SSD,777888999,5,Access denied, for sentence formatter requested*6A	Pass
All data fields in the SSD sentence, except the DTE flag, are not accepted	The EUT only updates the DTE field: $AISSD,TUVSUD,TUV TEST,25,15,4,6,1,AI*00	Pass

c)		
Requirement	Result	Verdict
SSD sentence is checked first to establish the fields and their contents	The static data sentence output by the EUT is: $AISSD,TEST,NEWNAME,25,15,4,6,0,GP*27	-
An SSD sentence with a valid preceding SSA sentence is sent to the EUT, defining the dim/ref values of the internal GNSS	The sentences sent to the EUT are: $AISSA,SSD,1,999AD46A2715D7386D89B22359A01153*6F $AISSD,TUVSUD,TUV TEST,15,15,5,5,1,AI*01	-
The EUT accepts all the data fields, including the new dimensions for internal GNSS	The EUT accepts all fields, updating the internal GNSS reference points: $AISSD,TUVSUD,TUV TEST,15,15,5,5,1,AI*01	Pass

d)		
Requirement	Result	Verdict
SSD sentence is checked first to establish the fields and their contents	The static data sentence output by the EUT is: $AISSD,TUVSUD,TUV TEST,15,15,5,5,1,AI*01	-
An SSD sentence with a valid preceding SSA sentence is sent to the EUT, defining the dim/ref values of the internal GNSS	The sentences sent to the EUT are: $AISSA,SSD,1,88E403AD605A0A068B28E8AB1A155BEB*68 $AISSD,TUVSUD,TUV TEST,10,20,2,8,1,GP*17	-
The EUT accepts all the data fields, including the new dimensions for internal GNSS	The EUT accepts all fields, updating the internal GNSS reference points: $AISSD,TUVSUD,TUV TEST,10,20,2,8,1,GP*17	Pass

e)		
Requirement	Result	Verdict
The SSD parameters are queried using "$AIAIQ,SSD"	The ship's static data fields returns two entries; one provides the internal GNSS dimensions: $AISSD,TUVSUD,TUV TEST,15,15,5,5,1,AI*01 The other result details the external GNSS dimensions: $AISSD,TUVSUD,TUV TEST,10,20,2,8,1,GP*17	Pass

2.37 Test of the EPV input sentence

2.37.1 Specification Reference

IEC 61993-2, Clause 19.9.4

2.37.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 15

2.37.3 Date of Test

29-October-2019

2.37.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and apply EPV sentences with simulated configuration data to the high-speed ports.

a) Apply an EPV sentence for all property identifiers of protected data without a preceding SSA sentence.
b) Apply an EPV sentence for all property identifiers of unprotected data without a preceding SSA sentence.
c) Apply an EPV sentence with protected data with a preceding SSA sentence with an incorrect signature.
d) Apply an EPV sentence for all property identifiers of protected data with a preceding SSA sentence with a correct signature.

Required Results

Confirm that:

a) the data of the EPV sentences are not accepted. Confirm that a NAK sentence is output with correct content and reason code 5;
b) the data of the EPV sentences are accepted;
c) the data of the EPV sentence are not accepted. Confirm that a NAK sentence is output with correct content and reason code 5;
e) the data of the EPV sentences are accepted.

Test Results

a) Test all property identifiers of protected data without a preceding SSA sentence			
Property	Sentence	Result	Verdict
Sensor 1 baud rate	$AIEPV,C,AI,777888999,101,9600*25	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Sensor 2 baud rate	$AIEPV,C,AI,777888999,102,9600*26	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Sensor 3 baud rate	$AIEPV,C,AI,777888999,103,9600*27	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Long range baud rate	$AIEPV,C,AI,777888999,104,9600*20	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
DGNSS baud rate	$AIEPV,C,AI,777888999,105,9600*21	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
MMSI number	$AIEPV,C,AI,777888999,106,770511020*1A	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
IMO number	$AIEPV,C,AI,777888999,107,4466110*1C	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Long range interface	$AIEPV,C,AI,777888999,108,0*13	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Long range channel 1	$AIEPV,C,AI,777888999,109,77*22	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass

a) Test all property identifiers of protected data without a preceding SSA sentence			
Property	Sentence	Result	Verdict
Long range channel 2	$AIEPV,C,AI,777888999,110,78*25	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Change admin password	$AIEPV,C,AI,777888999,111,ROOT*2D	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Change user password	$AIEPV,C,AI,777888999,112,USER*39	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Sensor alert configuration	$AIEPV,C,AI,777888999,116,0*1C	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass
Pilot port access level	$AIEPV,C,AI,777888999,117,0*1D	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass

b) Test all property identifiers with of unprotected data			
Property	Sentence	Result	Verdict
Locating device test mode	$AIEPV,C,AI,777888999,113,1*18	$AIEPV,R,AI,777888999,113,1*09	Pass
AIS silent mode	$AIEPV,C,AI,777888999,114,1*1F	$AIEPV,R,AI,777888999,114,1*0E	Pass
Activation of locating device alert	$AIEPV,C,AI,777888999,115,1*1E	$AIEPV,R,AI,777888999,115,1*0F	Pass
Dimension extension EA	$AIEPV,C,AI,777888999,150,15*2A	$AIEPV,R,AI,777888999,150,15*3B	Pass
Dimension extension EB	$AIEPV,C,AI,777888999,151,15*2B	$AIEPV,R,AI,777888999,151,15*3A	Pass
Dimension extension EC	$AIEPV,C,AI,777888999,152,15*28	$AIEPV,R,AI,777888999,152,15*39	Pass
Dimension extension ED	$AIEPV,C,AI,777888999,153,15*29	$AIEPV,R,AI,777888999,153,15*38	Pass

c) Modify protected data using a SSA sentence with corrupted signature			
Property	Sentence	Result	Verdict
Long range channel 1	$AISSA,EPV,1,66E2461AF6A500000B2E427A8E852383*19 $AIEPV,C,AI,777888999,109,73*26	$AINAK,AI,EPV,777888999,5,Access denied, for sentence formatter requested*6D	Pass

d) Modify all protected data fields with a valid SSA sentence			
Property	Sentence	Result	Verdict
Sensor 1 baud rate	$AISSA,EPV,1,EB77BAAF6ED29CBD30B3B8EDD333A46C*13 $AIEPV,C,AI,777888999,101,9600*25	$AIEPV,R,AI,777888999,101,9600*34	Pass
Sensor 2 baud rate	$AISSA,EPV,1,E6E9E383BD0D6E19B6B524AE199A67C9*66 $AIEPV,C,AI,777888999,102,9600*26	$AIEPV,R,AI,777888999,102,9600*37	Pass
Sensor 3 baud rate	$AISSA,EPV,1,3082E7EA0B7AB02E603269870FE37B87*14 $AIEPV,C,AI,777888999,103,9600*27	$AIEPV,R,AI,777888999,103,9600*36	Pass
Long range baud rate	$AISSA,EPV,1,90D3AB7B1A534FD4926AD27AFB9A60A8*14 $AIEPV,C,AI,777888999,104,9600*20	$AIEPV,R,AI,777888999,104,9600*31	Pass
DGNSS baud rate	$AISSA,EPV,1,36915048E1F7E0A2359872E9F254E935*61 $AIEPV,C,AI,777888999,105,9600*21	$AIEPV,R,AI,777888999,105,9600*30	Pass
MMSI number	$AISSA,EPV,1,B5397BA81CF4F33E9E30418232E3D21F*63 $AIEPV,C,AI,777999888,106,777888999*1B	$AIEPV,R,AI,777999888,106,777888999*0A	Pass
IMO number	$AISSA,EPV,1,6FC955036BA0331A14BB9510D3258B4C*1E $AIEPV,C,AI,777888999,107,4466110*1C	$AIEPV,R,AI,777888999,107,4466110*0D	Pass
Long range interface	$AISSA,EPV,1,54FD2A305791CE0DC0DC681CC52A9800*10 $AIEPV,C,AI,777888999,108,M*6E	$AIEPV,R,AI,777888999,108,M*7F	Pass
Long range channel 1	$AISSA,EPV,1,CB2AB1CB54320FD9556FAFFB3D914FF9*1D $AIEPV,R,AI,777888999,109,74*30	$AIEPV,R,AI,777888999,109,74*30	Pass
Long range channel 2	$AISSA,EPV,1,F97FD700297D0DE3D23FBDD7065E0BBF*66 $AIEPV,C,AI,777888999,110,71*2C	$AIEPV,R,AI,777888999,110,71*3D	Pass
Change admin password	$AISSA,EPV,1,5323ABBA0EF8587D970A524814CD71A0*64 $AIEPV,C,AI,777888999,111,2222*2B	$AIEPV,R,AI,777888999,111,2222*3A	Pass

d) Modify all protected data fields with a valid SSA sentence			
Property	Sentence	Result	Verdict
Change user password	$AISSA,EPV,1,A2464E23D914F938F74DEC57A0F54444*1D $AIEPV,C,AI,777888999,112,0000*28	$AIEPV,R,AI,777888999,112,0000*39	Pass
Sensor alert configuration	$AISSA,EPV,1,2F2D8A488101919C88C4BE151418E95B*69 $AIEPV,C,AI,777888999,116,0*1C	$AIEPV,R,AI,777888999,116,0*0D	Pass
Pilot port access level	$AISSA,EPV,1,1D416431444A8165EC1335A6771610E1*1F $AIEPV,C,AI,777888999,117,1*1C	$AIEPV,R,AI,777888999,117,1*0D	Pass

2.38 Test of the pilot port access level

2.38.1 Specification Reference

IEC 61993-2, Clause 19.9.5

2.38.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 15

2.38.3 Date of Test

29-October-2019

2.38.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and apply an EPV sentence with property identifier 146 to the pilot port.

a) Set the pilot port access level to 0.
b) Set the pilot port access level to 1.
c) Try to set the pilot port access level back to 0 without preceding SSA sentence.
d) Set the pilot port access level to 0 with preceding SSA sentence.

Required Results

Confirm that:
a) the EUT accepts all input commands;
b) the EUT rejects all input commands other than the EPV sentence with property identifier 146;
c) the parameter value of property identifier 146 in EUT is not changed;
d) the parameter value of property identifier 146 in EUT is changed to 0.

Test Results

It should be noted that property identifier 146 is a reserved value; instead the pilot port has a property identified value of 117- as per table 23 in IEC-61993-2:2018. As such, this test was carried out using property identifier 117.

a) Pilot port access level set to 0		
Requirement	Result	Verdict
An EPV sentence is applied with a preceding SSA sentence, setting the pilot port access level to 0	The sentences applied to the EUT are: $AISSA,EPV,1,782B41B46C4FBA2515A67F03263BBACB*6E $RAEPV,C,AI,777888999,117,0*06	-
The EUT accepts all input commands	The EUT confirms the input is accepted, by outputting an EPV reply stating the new value: $AIEPV,R,AI,777888999,117,0*0C	Pass

b) Pilot port access level set to 1		
Requirement	Result	Verdict
An EPV sentence is applied with a preceding SSA sentence, setting the pilot port access level to 1	The sentences applied to the EUT are: $AISSA,EPV,1,E17CF1DF598A811A577FF0CB8397537B*1C $RAEPV,C,AI,777888999,117,1*07	-
The EUT accepts all input commands	The EUT confirms the input is accepted, by outputting an EPV reply stating the new value: $AIEPV,R,AI,777888999,117,1*0D	Pass
The EUT shall reject all input commands other than the EPV sentence with property identifier value of 117	The EUT rejects input commands, such as setting the IMO: $AISSA,EPV,1,4E4BAE8FAFF0AB6F29252C0E6DDD9F45*6C $RAEPV,C,AI,777888999,107,1245780*0A $AINAK,AI,EPV,777888999,11,Cannot fulfil request*49 and setting the long range channel A to 74: $AISSA,EPV,1,CCA130589682D1BBE910166B47E0A9DD*19 $RAEPV,C,AI,777888999,109,74*3A	Pass

b) Pilot port access level set to 1		
Requirement	Result	Verdict
	$AINAK,AI,EPV,777888999,11,Cannot fulfil request*49	

c) Changing pilot port access level from 1 to 0 without SSA sentence		
Requirement	Result	Verdict
An EPV sentence is applied with no SSA sentence, setting the pilot port access level to 0	The sentences applied to the EUT are: $RAEPV,C,AI,777888999,117,0*06	-
The EUT does not accept the new value	The EUT does not accept the new value and outputs a NAK sentence with reason code 11: $AINAK,AI,EPV,777888999,11,Cannot fulfil request*49	Pass

d) Changing pilot port access level from 1 to 0 with a SSA sentence		
Requirement	Result	Verdict
An EPV sentence is applied with a preceding sentence, setting the pilot port access level to 0	The sentences applied to the EUT are: $AISSA,EPV,1,782B41B46C4FBA2515A67F03263BBACB*6E $RAEPV,C,AI,777888999,117,0*06	-
The EUT accepts the new value given in the EPV sentence	The EUT accepts the new value, outputting the updated field: $AIEPV,R,AI,777888999,117,0*0C	Pass

LR Interrogation– Clause 20.1.1

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Apply a LR addressed interrogation message to the LR-interface port of EUT. Record LR output port and AIS high-speed output port. Set the EUT to:

a) automatic response;
b) manual response via MKD;
c) manual response via PI.

Required Results

Check that the EUT displays LR interrogation messages and sends them to PI. Check that the EUT outputs a LR position report message:

a) automatically (and indicates action on display);
b) after manual confirmation via MKD;
c) after manual confirmation via PI.

Test Results

a) Automatic response		
Requirement	Result	Verdict
The EUT displays the LR interrogation request on the MKD	The EUT successfully displays LR requests on the MKD; the response is sent automatically and the EUT informs the user.	Pass
The EUT sends LR interrogation messages to the PI	The EUT is sent a LR request in normal mode (control flag = 0): $AILRI,0,0,200300400,777888999,,,,,,,*5C $AILRF,0,200300400,TUVTEST,ABCEFIOPUW,*2F The EUT is also sent a LR request in non-normal mode (control flag = 1): $AILRI,0,1,200300400,,5200.00,N,0100.00,W,5000.00,N,0200.00,W*6A $AILRF,0,200300400,TUVTEST,ABCEFIOPUW,*2F	Pass
The LR position report message contains the information requested in the LR interrogation message.	All function requests defined in the LRF sentence were correctly returned in sentences LRF, LR1, LR2 and LR3. Note the normal and non-normal mode interrogations requested the same data, as seen in the table below: $AILRF,0,200300400,TUVTEST,ABCEFIOPUW,2222222222*2F $AILR1,0,777888999,200300400,TEST4,444,1073741823*0C $AILR2,0,777888999,20082019,150404.00,5052.79,N,00113.94,W,11.1,T,10.0,N*39 $AILR3,0,777888999,SOUTHAMPTON,010919,150500.00,8.0,54,30.0,10.0,54.0,10*47	Pass

a) Automatic response				
Function Request	Information Request	Actual Value	Transmitted Value	Verdict
A	Ship's name	TUV TEST	TUV TEST	Pass
	Call sign	TUVSUD	TUVSUD	Pass
	IMO number	008509058	008509058	Pass
B	Date and time of message composition	10/10/2019 13:54:54	10/10/2019 13:54:54	Pass
C	Position	50°52.79"N, 01°13.94"W	50°52.79"N, 01°13.94"W	Pass
E	Course over ground	11.1°	11.1°	Pass
F	Speed over ground	10.0	10.0	Pass
I	Destination	SOUTHAMPTON	SOUTHAMPTON	Pass
I	ETA	20/10/2019, 18:00:00	20/10/2019, 18:00:00	Pass
O	Draught	8.0	8.0	Pass
P	Ship / cargo	70	70	Pass
U	Ship's length, breadth, type	40, 10, 70	40, 10, 70	Pass
W	Persons on board	120	120	Pass

b) Manual response via MKD		
Sentence	Result	Verdict
The EUT displays the LR interrogation request on the MKD	The EUT successfully displays LR requests on the MKD, with the most recently received message being displayed first. A prompt appears asking the user to accept or reject the LR interrogation request	Pass
The EUT sends LR interrogation messages to the PI	Fields that are marked to not auto reply are not sent in the long range replies. The function reply status fields of fields not transmitted are set to 4, representing data that is withheld by a sender.	Pass
The LR position report message contains the information requested in the LR interrogation message.	All fields in the long range reply transmitted by the EUT are correct, as seen in the table below.	Pass

b) Manual response via MKD				
Function Request	Information Request	Actual Value	Transmitted Value	Verdict
A	Ship's name	TUV TEST	TUV TEST	Pass
	Call sign	TUVSUD	TUVSUD	Pass
	IMO number	008509058	008509058	Pass
B	Date and time of message composition	10/10/19 14:02:41	10/10/19 14:02:41	Pass
C	Position	50°52.79"N, 01°13.94"W	50°52.79"N, 01°13.94"W	Pass
E	Course over ground	11.1°	11.1°	Pass
F	Speed over ground	10.0	10.0	Pass
I	Destination	SOUTHAMPTON	SOUTHAMPTON	Pass
I	ETA	20/10/19, 18:00:00	20/10/19, 18:00:00	Pass
O	Draught	8.0	8.0	Pass
P	Ship / cargo	70	70	Pass
U	Ship's length, breadth, type	40, 10, 70	40, 10, 70	Pass
W	Persons on board	120	120	Pass

c) Manual response via PI
There is no provision for accepting long range messages using the PI.

2.39 LR “All Ships” Interrogation

2.39.1 Specification Reference

IEC 61993-2, Clause 20.1.2

2.39.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 13

2.39.3 Date of Test

11-October-2019

2.39.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate EUT in autonomous mode. Apply a LR "all ships" interrogation message to the LR-interface port of EUT defining a geographical area which contains own ship's position. Record LR output port. Set EUT to:

a) automatic response;
b) manual response.

Repeat check with own ship outside specified area.

Required Results

Check that EUT outputs a LR position report message:

a) automatically (and indicates action on display);
b) after manual confirmation.

No response shall be output on the repeat check.

Test Results

a) Automatic response		
Requirement	Result	Result
Long range interrogation and function messages sent to the EUT	$AILRI,3,1,200000009,,5200.00,N,00200.00,W,5000.00,N,00000.00,W*66 $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,*6F	-
EUT responds with the requested data automatically when inside the geographic region defined	The EUT automatically responds with all fields in the response are correct: $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,2222222222*6F $AILR1,3,777888999,200000009,TUV TEST,TUVSUD,008509058*54 $AILR2,3,777888999,11102019,091013.00,5052.79,N,00113.94,W,11.1,T,10.0,N*3F $AILR3,3,777888999,SOUTHAMPTON,201019,001800.00,8.0,70,40.0,10.0,70.0,120*72	Pass
The EUT is moved outside of the geographic region defined in the interrogation sentence	The EUT is moved 3° south, outside of the regional operating area: !AIVDM,1,1,,A,1;UnTqh01TwrFu2KIJGhKh0L0D01,0*46	-
Long range interrogation and function messages are sent to the EUT	$AILRI,3,1,200000009,,5200.00,N,00200.00,W,5000.00,N,00000.00,W*66 $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,*6F	-
The EUT does not respond to the long range interrogation request	The EUT does not respond to the long range request when outside of the defined regional area	Pass

a) Manual response		
Requirement	Result	Result
Long range interrogation and function messages sent to the EUT	$AILRI,3,1,200000009,,5200.00,N,00200.00,W,5000.00,N,00000.00,W*66 $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,*6F	-
EUT responds with the requested data automatically when inside the geographic region defined	The EUT prompts the user to accept or reject the long range request: $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,2222222222*6F $AILR1,3,777888999,200000009,TUV TEST,TUVSUD,008509058*54 $AILR2,3,777888999,11102019,091013.00,5052.79,N,00113.94,W,11.1,T,10.0,N*3F $AILR3,3,777888999,SOUTHAMPTON,201019,001800.00,8.0,70,40.0,10.0,70.0,120*72	Pass
The EUT is moved outside of the geographic region defined in the interrogation sentence	The EUT is moved 3° south, outside of the regional operating area: !AIVDM,1,1,,B,1;UnTqh01TwrFu2KIJGhKh1D08l@,0*38	-
Long range interrogation and function messages are sent to the EUT	$AILRI,3,1,200000009,,5200.00,N,00200.00,W,5000.00,N,00000.00,W*66 $AILRF,3,200000009,TESTVESSEL,ABCEFIOPUW,*6F	-
The EUT does not respond to the long range interrogation request	The EUT does not respond to the long range request when outside of the defined regional area	Pass

2.40 Consecutive LR “All Ships” Interrogations

2.40.1 Specification Reference

IEC 61993-2, Clause 20.1.3

2.40.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 13

2.40.3 Date of Test

11-October-2019

2.40.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment and operate the EUT in autonomous mode. Set the EUT to automatic mode. Apply 5 LR "all ships" interrogation messages to the LR-interface port of the EUT defining a geographical area, which contains the ship's own position.

Set the control flag in the LRI message to:

a) 0 (reply on first interrogation only);
b) 1 (reply on all applicable interrogations).

Record LR output port.

Required results

Check that the EUT outputs a LR position report message:

a. on the first interrogation only;
b. on all interrogations.

Test Results

Due to the 24 hour time-out period of long range interrogations using a control flag value of 0, the date is generated by a GNSS simulator and does not reflect the date of testing.

a) Control Flag = 0,		
Requirement	Result	Result
Five long range “all ships” interrogation messages, with control bit = 0, are applied to the LR port of the EUT	The messages sent to the EUT are: $AILRI,0,0,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*63 $AILRF,0,719000001,TEST VESSEL,ABCEFIOPUW,*49 $AILRI,1,0,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*62 $AILRF,1,719000001,TEST VESSEL,ABCEFIOPUW,*48 $AILRI,2,0,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*61 $AILRF,2,719000001,TEST VESSEL,ABCEFIOPUW,*4B $AILRI,3,0,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*60 $AILRF,3,719000001,TEST VESSEL,ABCEFIOPUW,*4A $AILRI,4,0,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*67 $AILRF,4,719000001,TEST VESSEL,ABCEFIOPUW,*4D	-
The EUT responds to only the first long range interrogation	The EUT sends one response: $AILR1,0,777888999,719000001,TUV TEST,TUVSUD,008509058*52 $AILR2,0,777888999,15122019,130655.00,5052.79,N,00113.94,W,11.1,T,10.0,N*34 $AILR3,0,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*72	Pass

b) Control Flag = 1		
Requirement	Result	Result
Five long range “all ships” interrogation messages, using control bit = 1, are applied to the LR port of the EUT	$AILRI,0,1,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*62 $AILRF,0,719000001,TEST VESSEL,ABCEFIOPUW,*49 $AILRI,1,1,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*63 $AILRF,1,719000001,TEST VESSEL,ABCEFIOPUW,*48 $AILRI,2,1,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*60 $AILRF,2,719000001,TEST VESSEL,ABCEFIOPUW,*4B $AILRI,3,1,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*61 $AILRF,3,719000001,TEST VESSEL,ABCEFIOPUW,*4A $AILRI,4,1,719000001,,5100.00,N,00200.00,W,5000.00,N,00100.00,W*66 $AILRF,4,719000001,TEST VESSEL,ABCEFIOPUW,*4D	-
The EUT automatically responds to all interrogation requests	$AILR1,0,777888999,719000001,TUV TEST,TUVSUD,008509058*52 $AILR2,0,777888999,15122019,130711.00,5052.79,N,00113.94,W,11.1,T,10.0,N*35 $AILR3,0,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*72 $AILRF,1,719000001,TEST VESSEL,ABCEFIOPUW,2222222222*48 $AILR1,1,777888999,719000001,TUV TEST,TUVSUD,008509058*53 $AILR2,1,777888999,15122019,130711.00,5052.79,N,00113.94,W,11.1,T,10.0,N*34 $AILR3,1,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*73 $AILRF,2,719000001,TEST VESSEL,ABCEFIOPUW,2222222222*4B $AILR1,2,777888999,719000001,TUV TEST,TUVSUD,008509058*50 $AILR2,2,777888999,15122019,130711.00,5052.79,N,00113.94,W,11.1,T,10.0,N*37 $AILR3,2,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*70 $AILRF,3,719000001,TEST VESSEL,ABCEFIOPUW,2222222222*4A $AILR1,3,777888999,719000001,TUV TEST,TUVSUD,008509058*51 $AILR2,3,777888999,15122019,130711.00,5052.79,N,00113.94,W,11.1,T,10.0,N*36 $AILR3,3,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*71 $AILRF,4,719000001,TEST VESSEL,ABCEFIOPUW,2222222222*4D $AILR1,4,777888999,719000001,TUV TEST,TUVSUD,008509058*56 $AILR2,4,777888999,15122019,130711.00,5052.79,N,00113.94,W,11.1,T,10.0,N*31 $AILR3,4,777888999,SOUTHAMPTON,201020,246000.00,8.0,70,40.0,10.0,70.0,120*76	Pass

2.41 Long-Range Broadcast

2.41.1 Specification Reference

IEC 61993-2, Clause 20.2.1

2.41.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 15

2.41.3 Date of Test

28-October-2019

2.41.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment, enable the EUT to transmit Message 27 and operate the EUT in autonomous mode. Use base stations MMSI to transmit Message 4 and Message 23. Record the transmitted messages from the EUT. The designated long-range channels are defined in 8.3.

a) Do not apply Message 4 and Message 23.
b) Apply the Message 4 with the long-range control bit set to 1 and 0. Place the EUT inside the RF footprint (Message 4 receiving area) of a base station.
c) Apply the Message 4 with the long-range control bit set to 1 and 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the RF footprint area, but outside the base station coverage area.
d) Apply the Message 4 with the long-range control bit set to 1 and 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area. Message 23 fields after station type shall not match current settings of EUT.
e) Repeat the test d) using different MMSIs for Message 4 and Message 23.
f) Apply the Message 4 with the long-range control bit set to 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area. After 6 min, remove transmissions of Message 23.
g) Apply the Message 4 with the long-range control bit set to 0. Using the same MMSI as the Message 4, broadcast the Message 23 with station type 10 to define the base station coverage area. Place the EUT inside the base station coverage area. After 6 min, remove transmissions of Message 4.

Required results

Check that the EUT transmits the appropriate messages, for example in addition to the normal transmission of Messages 1 and 5 with adequate reporting interval on AIS 1 and AIS 2.

Confirm that:

a) EUT transmits Message 27 alternating the designated long-range channels with 3 min reporting interval;
b) irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval;
c) irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval;
d) EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval when the Message 4 long-range control bit is set to 1. EUT stops transmitting Message 27 when the Message 4 long-range control bit is set to 0. Verify

fields after station type in received Message 23 are ignored;

e) irrespective of the Message 4 long range control bit status, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval;
f) EUT begins transmission of Message 27 no sooner than 4 min and no later than 11 min (8 min timeout + 3 min transmission interval) after Message 23 was removed;
g) EUT begins transmission of Message 27 beyond 3 min after Message 4 was removed.

Test Results

a) No Message 4 or Message 23		
Requirement	Result	Verdict
The EUT operates in autonomous mode with long range transmissions enabled	The EUT outputs position reports using Message 1: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0H05c4,0*06	-
The EUT outputs Message 27 every 3 minutes, alternating between channels	The EUT outputs Message 27 with a reporting interval of 6 minutes per channel	Pass

a) Test Results				
Time	Chan	Msg	Sentence	Comment
14:48:54	C	27	!AIVDM,1,1,,C,K;UnTqp?u7CfL50d,0*4F	Message 27 is output on channel C (75)
14:51:58	D	27	!AIVDM,1,1,,D,K;UnTqp?u7CfL50d,0*48	After 00:03:04, the next long range transmission occurs on channel D (76)
14:54:58	C	27	!AIVDM,1,1,,C,K;UnTqp?u7CfL50d,0*4F	The EUT alternates between channels, transmitting every 3 minutes

b) Apply Message 4 with long range control bit set to 0 and 1		
Requirement	Result	Verdict
The EUT is located within the RF footprint of the base station	The EUT is located 40NM from the base station: !AIVDM,1,1,,A,1;UnTqh01TwrFu2GI47hKh0n00SW,0*17	-
A Message 4 is transmitted from a base station MMSI with long range control bit set to 0	The Message 4 transmitted is: !AIVDM,1,1,,A,4027`SQv>f:EswrCR2M6qDG005AD,0*78	-
Irrespective of the control bit state in the Message 4, the EUT is to transmit long range Message 27	The EUT transmits Message 27 on alternating channels, 75 and 76, with a reporting interval of 3 minutes: !AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24 !AIVDM,1,1,,D,K;UnTqp?u7BwWU0d,0*23	Pass
Message 4 is transmitted from a base station MMSI with long range control bit set to 1	The Message 4 transmitted is: !AIVDM,1,1,,A,402=W=1v>f:M?OrFu2GiNWiP1`MR,0*6C	-
Irrespective of the control bit state in the Message 4, the EUT is to transmit long range Message 27	The EUT transmits Message 27 on alternating channels, 75 and 76, with a reporting interval of 3 minutes: !AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24 !AIVDM,1,1,,D,K;UnTqp?u7BwWU0dH?;dwlO00@00,0*1F	Pass

b) Test Results				
Time	Chan	Msg	Sentence	Comment
10:21:50	A	4	!AIVDO,1,1,,A,402=W=1v>f:AGOrFu2GiNWi01`MR,0*7A	Long range control bit = 0
10:21:50	D	27	!AIVDM,1,1,,D,K;UnTqp?u7BwWU0d,0*23	EUT transmits long range message on channel D with control bit = 0
10:24:50	A	4	!AIVDO,1,1,,A,402=W=1v>f:AGOrFu2GiNWi01`MR,0*7A	
10:24:51	C	27	!AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24	Long range message transmitted on channel C
10:27:50	A	4	!AIVDO,1,1,,A,402=W=1v>f:AGOrFu2GiNWi01`MR,0*7A	
10:27:56	D	27	!AIVDM,1,1,,D,K;UnTqp?u7BwWU0d,0*23	Long range transmissions alternate back to channel D
10:30:50	A	4	!AIVDO,1,1,,A,402=W=1v>f:M?OrFu2GiNWiP1`MR,0*6E	Long range control bit = 1
10:30:58	C	27	!AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24	Long range transmissions maintained
10:34:00	A	4	!AIVDO,1,1,,A,402=W=1v>f:M?OrFu2GiNWiP1`0?,0*7E	
10:34:01	D	27	!AIVDM,1,1,,D,K;UnTqp?u7BwWU0dH?;dwlO00@00,0*1F	EUT maintains alternating long range transmissions
10:37:00	A	4	!AIVDO,1,1,,A,402=W=1v>f:M?OrFu2GiNWiP1`0?,0*7E	
10:37:02	C	27	!AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24	

c) EUT provided Message 4 and 23, but outside of the coverage area		
Requirement	Result	Verdict
The EUT is located within the RF footprint area	The EUT is located 40 NM from the base station: !AIVDO,1,1,,A,402=W=1v>f:M?OrFu2GiNWi01`Al,0*3C !AIVDM,1,1,,B,1;UnTqh01TwrFu2GI47hKh1:08FO,0*44	-

c) EUT provided Message 4 and 23, but outside of the coverage area		
Requirement	Result	Verdict
A Message 4 is transmitted, with long range control bit set to 0	The Message 4 is transmitted from a base station MMSI, with the EUT within the RF footprint: !AIVDO,1,1,,A,402=W=1v>f:M?OrFu2GiNWi01`66,0*11	-
Message 23 is transmitted from the base station MMSI, defining a coverage area that does not encompass the EUT	The Message 23 covers a region from 42°N,1°W to 41°N,2°W: !AIVDO,1,1,,A,G02=W=3wJPi>7ub1P6:00000000,2*70	-
The EUT shall continue to transmit long range messages while outside of the Message 23 coverage area	The EUT transmits Message 27 on alternating channels with a reporting interval of 3 minutes, when the long range control bit is set to 0: !AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24 !AIVDM,1,1,,D,K;UnTqp?u7BwWU0d,0*23	Pass
A Message 4 is transmitted, with long range control bit set to 1	The Message 4 is transmitted from the same base station MMSI, with the EUT located within the RF footprint: !AIVDO,1,1,,A,402=W=1v>f;6sOrFu2GI47iP1`6;,0*70	-
The EUT shall continue to transmit long range messages while outside of the Message 23 coverage area	The EUT transmits Message 27 on alternating channels with a reporting interval of 3 minutes, when the long range control bit is set to 1: !AIVDM,1,1,,C,K;UnTqp?u7BwWU0d,0*24 !AIVDM,1,1,,D,K;UnTqp?u7BwWU0d,0*23	Pass

d) Apply Message 23 with station type 10		
Requirement	Result	Verdict
The EUT is located within the RF footprint of the base station	The EUT is located 10NM from the base station: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1800T4,0*46 !AIVDO,1,1,,A,402=W=1v>f<L0OrFu2M1:wi01`AI,0*32	-
A Message 4 is transmitted, with long range control bit set to 0	The Message 4 transmitted every 10 seconds is: !AIVDO,1,1,,A,402=W=1v>f<L0OrFu2M1:wi01`;u,0*51	-
A Message 23 is transmitted, defining station type of 10, a region encompassing the EUT and fields following the station type shall not match the settings in use by the EUT	The Message 23 sent once per minute is: !AIVDO,1,1,,A,G02=W=3wJPsi7ub1m<:AP000C00,2*68	-
The EUT shall not transmit long range messages while the long range control bit in Message 4 is 0	The EUT ceases long range transmissions	Pass
A Message 4 is transmitted, with long range control bit set to 1	The Message 4 transmitted every 10 seconds is: !AIVDO,1,1,,A,402=W=1v>f<R1OrFu2M1;41P1`<7,0*71	-
A Message 23 is transmitted, defining station type of 10, a region encompassing the EUT and fields following the station type shall not match the settings in use by the EUT	The Message 23 sent once per minute is: !AIVDO,1,1,,A,G02=W=3wJPsi7ub1m<:AP000C00,2*68	-
The EUT shall resume transmissions of long range messages when the long range control bit is 1	The EUT resumes transmissions of long range messages, 3 minutes after the long range control flag is set to 1	Pass

e) Apply Message 23 with station type 10 and Message 4 with long range control set to 0 and 1, from different MMSI's		
Requirement	Result	Verdict
The EUT is located within the RF footprint of the base station	The EUT is located 10NM from the base station: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh0R00ST,0*4A !AIVDO,1,1,,A,402=W=1v>f=0POrFu2M1:wi01`0I,0*7B	-
A Message 4 is transmitted from MMSI = 2320180, with long range control bit set to 0	The Message 4 transmitted every 10 seconds is: !AIVDO,1,1,,A,402=W=1v>f=0POrFu2M1:wi01`Av,0*35	-
A Message 23 is transmitted from MMSI = 2222222, defining station type of 10, a region encompassing the EUT and fields following the station type shall not match the settings in use by the EUT	The Message 23 transmitted once per minute is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<:AP000H<0,2*5C	-
The EUT shall transmit long range messages while the long range control bit in Message 4 is 0	The EUT transmits Message 27 when the long range control bit is set to 0, alternating channels every 3 minutes: !AIVDM,1,1,,C,K;UnTqp?u7CfOU0d,0*2C !AIVDM,1,1,,D,K;UnTqp?u7CfOU0d,0*2B	Pass
A Message 4 is transmitted from MMSI = 2320180, with long range control bit set to 1	The Message 4 transmitted every 10 seconds is: !AIVDO,1,1,,A,402=W=1v>f=<4OrFu2M1:wiP1`6@,0*7C	-
The EUT shall transmit long range messages regardless of the long range control bit setting	The EUT continues to transmit Message 27: !AIVDM,1,1,,C,K;UnTqp?u7CfOU0d,0*2C !AIVDM,1,1,,D,K;UnTqp?u7CfOU0d,0*2B	Pass

f) Long range control via Message 23 timeout		
Requirement	Result	Verdict
The EUT is located within the RF footprint of the base station	The EUT is located 2 NM from the base station: !AIVDM,1,1,,B,1;UnTqh01TwrFu2M7AWhKh1l0<01,0*7F !AIVDO,1,1,,A,4027`SQv>f@TJOrFu2M6;d101`6O,0*06	-

f) Long range control via Message 23 timeout		
Requirement	Result	Verdict
A Message 4 is transmitted from MMSI = 2222222, with long range control bit set to 0	The Message 4 transmitted every 10 seconds is: !AIVDM,1,1,,A,4027`SQv>f@TJOrFu2M6;d101`6O,0*04	-
Message 23 is transmitted for 6 minutes, with station type set to 10 and defining a region that encompasses the EUT	The Message 23 transmitted once a minute is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<:00000000,2*39	-
The EUT begins transmission of Message 27 no sooner than 3 minutes and no later than 11 minutes after the removal of Message 23	The EUT begins transmitting long range messages 07:05 after the last Message 23 transmission	Pass

g) Long range control via Message 4 timeout		
Requirement	Result	Verdict
The EUT is located within the RF footprint of the base station	The EUT is located 2 NM from the base station: !AIVDM,1,1,,A,1;UnTqh01TwrFu2M7AWhKh0v0HBS,0*03 !AIVDM,1,1,,A,4027`SQv>fA<swrCR2M6qDG00800,0*72	-
A Message 4 is transmitted for 6 minutes from MMSI = 2222222, with long range control bit = 0	The Message 4 transmitted every 10 seconds is: !AIVDM,1,1,,B,4027`SQv>fA=9wrCR2M6qDG0068l,0*60	-
Message 23 is transmitted with station type set to 10 and defining a region that encompasses the EUT	The Message 23 transmitted once a minute for 6 minutes is: !AIVDO,1,1,,A,G027`SSwJPsi7ub1m<:00000000,2*39	-
The EUT begins transmission of Message 27 no sooner than 3 minutes after the final Message 4	The EUT begins transmitting long range messages 07:05 minutes after the last Message 4 transmission	Pass

2.42 Long-Range Broadcast

2.42.1 Specification Reference

IEC 61993-2, Clause 20.2.2

2.42.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 15

2.42.3 Date of Test

29-October-2019

2.42.4 Test Results and Methods of Measurement

Method of measurement

Set up the standard test environment, enable the EUT to transmit Message 27 and operate the EUT in autonomous mode with a reporting interval of 10 s. Use base stations MMSI to transmit Message 4 and Message 23. Record the transmitted messages from the EUT.

a) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping their RF footprints. Broadcast the Message 23 from multiple base stations with station type 10 to define the base station coverage areas not overlapping. Place the EUT inside the overlapped RF footprint area but outside the coverage area of both base stations.
b) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping RF footprints. Broadcast the Message 23 from multiple base stations with station type 10 to define the base station coverage areas partially overlapping the base station coverage areas. Place the EUT inside the overlapped base station coverage area.
c) Using different MMSIs, apply the Message 4 with long range control bit set to 1 and 0 from multiple base stations partially overlapping RF footprints. Broadcast the Message 23 from one base station with station type 10 to define the base station coverage areas. Do not broadcast Message 23 from other base stations. Place the EUT inside the RF footprint area of base station not broadcasting Message 23 but outside the coverage area of the base station transmitting Message 23.

Required results

Verify that:

a) irrespective of the Message 4 long-range control bit status of both base stations, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval;
b) EUT transmits Message 27;
c) irrespective of the Message 4 long range control bit status of both base stations, EUT transmits Message 27 alternating on the designated long-range channels with 3 min reporting interval.

Test Results

a) EUT located within the RF footprint but not coverage area of 2 base stations		
Requirement	Result	Verdict
Two base stations with different MMSI's transmit position reports with an overlapping RF footprint. Base station A has the long range control bit set to 0, while base station B has long range control bit set to 1	Base station A has an MMSI of 2222222: !AIVDM,1,1,,A,4027`SQv>fb1swrCR2M6qDG005@4,0*25 Base station B has an MMSI of 2320180: !AIVDM,1,1,,A,402=W=1v>fb1LOrFu2MnI`1P1`MW,0*5B	-

a) EUT located within the RF footprint but not coverage area of 2 base stations		
Requirement	Result	Verdict
Message 23 is transmitted by both base stations, defining 2 coverage areas that neither overlap nor encompass the EUT	The Message 23 sent by base station A is: !AIVDM,1,1,,A,G027`SSwJPsi7ub1m<:00000000,2*3B The Message 23 sent by base station B is: !AIVDM,1,1,,A,G02=W=3wJPv77ub1qp:00000000,2*03	-
The EUT shall transmit Message 27, alternating on designated long-range channels, with a 3 minute reporting interval	The EUT transmits Message 27 on channels 75 and 76, with a 3 minute reporting interval.	Pass

b) EUT located within the coverage area overlap of 2 base stations, with different long range control bit status		
Requirement	Result	Verdict
Two base stations with different MMSI's transmit position reports with an overlapping RF footprint. Base station A has the long range control bit set to 0, while base station B has long range control bit set to 1.	Base station A has an MMSI of 2222222: !AIVDM,1,1,,A,4027`SQv>fcJWwrCR2M6qDG00D03,0*7D Base station B has an MMSI of 2320180: !AIVDM,1,1,,A,402=W=1v>fcBmOrFu2MnpOiP0000,0*0D	-
Message 23 is transmitted by both base stations, defining 2 coverage areas that neither overlap nor encompass the EUT.	The Message 23 sent by base station A is: !AIVDM,1,1,,A,G027`SSwJPtt7ub1nG:00000000,2*59 The Message 23 sent by base station B is: !AIVDM,1,1,,A,G02=W=3wJPv77ub1pD:00000000,2*36	-
The EUT shall transmit Message 27, alternating on designated long-range channels, with a 3 minute reporting interval.	The EUT transmits Message 27 on channels 75 and 76, with a 3 minute reporting interval.	Pass

c) EUT located outside station B's coverage area, but inside station A's RF footprint		
Requirement	Results	Verdict
Two base stations with different MMSI's transmit position reports with an overlapping RF footprint. Base station A has the long range control bit set to 0, while base station B has long range control bit set to 1 .	Base station A has an MMSI of 2222222: !AIVDM,1,1,,B,4027`SQv>fc8iwrCR2M6qDG00@MC,0*3B Base station B has an MMSI of 2320180: !AIVDM,1,1,,A,402=W=1v>fc8oOrFu2MnpOiP0000,0*75	-
Message 23 is transmitted from base station A only, defining a region that does not include the EUT.	The Message 23 sent by base station A is: !AIVDM,1,1,,A,G027`SSwJPsi7ub1m<:00000000,2*3B	-
The EUT shall continue to transmit long range messages, irrespective of the long range control bits present in the Message 4.	The EUT transmits long range messages on channels 75 and 76.	Pass

2.43 Annex C – DCS functionality

2.43.1 Specification Reference

IEC 61993-2, Annex C.3

2.43.2 Equipment Under Test and Modification State

ATA100, S/N: TA010 - Modification State 15

2.43.3 Date of Test

30-October-2019

2.43.4 Test Results and Methods of Measurement

The EUT shall correctly process the channel management command by DSC messages addressed to the stations in the designated geographical area or the stations individually designated.

Method of measurement

For the tests in Clause C.3, set the EUT into autonomous mode using channels AIS 1 and AIS 2 with a reporting interval of 2 s. Standard AIS channel management by DSC calls, consisting of format specifier 103 and message symbol number 104 with expansion symbols 09, 10, 12, 13, shall be applied to the EUT using a base station MMSI as follows.

a) Apply a geographical channel management call using symbol constructions: "103" "geographical coordinates" "103" "source MMSI" "104" "primary CH No" "secondary CH No" "NE of CH management area" "SW of CH management area". Apply the call with EOS = 117 and EOS = 127.
b) Move the EUT outside the channel management area.
c) Apply an individual channel management call using symbol constructions: "120" "EUT MMSI" "103" "source MMSI" "104" "primary CH No" "secondary CH No" "NE of CH management area" "SW of CH management area". Apply the call with EOS = 117 and EOS = 127.
d) Move the EUT outside the channel management area.
e) Apply an extraneous call using symbol constructions: "120" "EUT MMSI" "103" "source MMSI" "104" "03" "01" "120" (active alternative system with group number 1 and sequence number 120). Transmit a DSC telecommand using a non-base station MMSI.

Required results

The following items shall be verified.
a) Verify that the EUT operates on the designated channels with the transition boundary of 5 NM.
b) Verify that the EUT reverts to the operation on AIS 1 and AIS 2 channels.
c) Verify that the EUT operates on the designated channels with the transition boundary of 5 NM.
d) Verify that the EUT reverts to the operation on AIS 1 and AIS 2 channels.
e) Verify that the EUT operation is not affected.
f) Verify that the EUT operation is not affected.

Test results

a)		
Requirement	Result	Verdict
A geographic channel management call using symbols 103, 103, 104 and an EOS symbol of 117 is sent from the base station MMSI 2222222.	The call is received by the unit, as shown in the debug text output to the PI: $POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 103*57 $POSG,BROADCAST,LOG,Ch. Mgmt:,0 adjacent corners*6A $POSG,BROADCAST,LOG,Ch. Mgmt:,saved region index: 0*15 $POSG,BROADCAST,LOG,Ch. Mgmt:,record added to DB*6C	-
The EUT shall operate on the designated channels with the transition boundary of 5 NM.	The EUT operates on the designated channels, accepting the regions as shown in the ACA sentences: $AIACA,5,5200.00,N,00100.00,W,5100.00,N,00200.00, W,5,2085,0,2084,0,0,0,D,1,114455.00*3D $AIACS,5,2222222,150811.00,08,11,2019*7E $AIACA,6,9000.00,N,18000.00,E,9000.00,S,18000.00, W,5,2087,0,2088,0,0,0,,1,114455.00*7B $AIACS,6,777888999,143831.00,08,11,2019*79	Pass
A geographic channel management call using symbols 103, 103, 104 and an EOS symbol of 127 is sent from the base station MMSI 2222222.	The DSC call is successfully received by the unit, as shown in the debug text output to the PI: $POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 103*57 $POSG,BROADCAST,LOG,Ch. Mgmt:,Region 1 deleted*48 $POSG,BROADCAST,LOG,Ch. Mgmt:,Channel Assignment count: 0*05 $POSG,BROADCAST,LOG,Ch. Mgmt:,Ch. 0 assignment deleted - overwritten*03 $POSG,BROADCAST,LOG,Ch. Mgmt:,0 adjacent corners*6A $POSG,BROADCAST,LOG,Ch. Mgmt:,saved region index: 0*15 $POSG,BROADCAST,LOG,Ch. Mgmt:,record added to DB*6C	-
The EUT shall operate on the designated channels with the transition boundary of 5 NM.	The EUT operates on the designated channels, accepting the regions as shown in the ACA sentences: $AIACA,7,5200.00,N,00100.00,W,5100.00,N,00200.00,W,5,2085,0,2084, 0,0,0,D,1,114455.00*3F $AIACS,7,2222222,150855.00,08,11,2019*7C $AIACA,8,9000.00,N,18000.00,E,9000.00,S,18000.00,W,5,2087,0,2088, 0,0,0,,1,114455.00*75 $AIACS,8,777888999,143831.00,08,11,2019*77	Pass

b)		
Requirement	Result	Verdict
The EUT shall be moved outside of the channel management area.	The EUT is moved 60 NM south: !AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1d0000,0*5D	-
The EUT shall operate on the default AIS 1 and AIS 2 channels; 87 and 88.	The EUT outputs position reports on channels 87 and 88	Pass

c)		
Requirement	Result	Verdict
An individual channel management call using symbols 120, 103, 104 and an EOS symbol of 117 is sent from the base station MMSI 2222222.	The individual channel management call is sent to the EUT after a region is defined, as seen in the table below.	-
The EUT shall operate on the designate channels with the transition boundary of 5 NM.	The EUT uses the channels assigned to it in the individual channel management call correctly.	Pass
An individual channel management call using symbols 120, 103, 104 and an EOS symbol of 127 is sent from the base station MMSI 2222222.	A second individual channel management call is sent to the EUT, as seen in the table below.	-
The EUT shall operate on the designate channels with the transition boundary of 5 NM.	The EUT times out slots used by the previous transmission schedule and reserves slots according to the new channel management call with EOS = 127.	Pass

c) EOS = 117					
Slot	Chan	Msg	Sentence	Timeout	Comment
459	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0F0D01,0*08	5	

c) EOS = 117					
Slot	Chan	Msg	Sentence	Timeout	Comment
541	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0L088M,0*09	2	
606	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0N0<01,0*78	3	
Individual channel management command with EOS = 117 sent, commanding the use of channels A (87) and C (67).					
685	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0R0000,0*6A	0	EUT begins timing out slots reserved by the previous transmission schedule.
766	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0`0000,0*5B	0	
793	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0`00Ui,0*66		EUT begins reallocating slots on channel A (87)
830	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0b0000,0*5A	0	
869	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0d00Wi,0*62		EUT begins reserving slots on channel C (67)
908	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0f0000,0*5D	0	
944	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0h00Ui,0*6E		
980	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0j0000,0*52	0	
1028	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0n00Si,0*6C		
1057	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0n0000,0*55	0	
1095	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0p00T1,0*2F		
1132	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0r0000,0*4A	0	
1171	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0t00U1,0*28		
1203	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0v0000,0*4D	0	
1239	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1000Wi,0*35		
1278	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh120000,0*0B	0	
1319	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1400Ti,0*30		
1366	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh180000,0*02	0	
1398	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1800Si,0*39		
1428	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1:0000,0*03	0	
1466	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1<00WQ,0*03		
1509	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1>0000,0*04	0	
1541	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1@00V1,0*1C		
1592	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1D0000,0*7D	0	
1624	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1D00SA,0*6F		
1656	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1F0000,0*7C	0	
1693	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1H00Wi,0*4D		
1734	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1J0000,0*73	0	
1765	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1L00`Q,0*44		
1809	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1N0000,0*74	0	
1852	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1R00TQ,0*6C		
1891	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1T0000,0*6D	0	
1927	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1V00RQ,0*6C		
1965	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1`0000,0*5A	0	
1998	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1`00Ui,0*67		
2039	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1b0000,0*5B	0	
2065	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1d00`1,0*0C		
2116	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1h0000,0*52	0	
2149	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1h00VA,0*44		
2191	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1l0000,0*55	0	
2225	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh1l00VA,0*42		
13	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh1n0000,0*54	0	
52	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0200SA,0*1A		
84	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh020000,0*0A	0	
128	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0600UA,0*1A		
164	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh080000,0*03	0	
193	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0800WQ,0*04		
242	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0<0000,0*04	0	
277	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0>00V1,0*61		
317	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0@0000,0*7B	0	
351	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0@00Ui,0*46		
392	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0D0000,0*7C	0	
429	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0F00Ri,0*45		
459	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0F0000,0*7D	0	
502	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0H00V1,0*15		
541	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0L0000,0*74	0	
568	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0L00VQ,0*73		
606	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2M7AWhKh0N0000,0*75	0	EUT finishes timing out slots on channel B (88).
654	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0R0001,0*69		

c) EOS = 117					
Slot	Chan	Msg	Sentence	Timeout	Comment
722	C	3	!AIVDM,1,1,,C,3;UnTqh03rwrFu2M7AWhKh0T0031,0*6E		EUT finishes reserving slots for the new transmission schedule.
793	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0`0H<I,0*55	6	EUT reverts to autonomous operation, using channels A (87) and C (67), as instructed by the DSC call.
869	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0d0L01,0*23	7	
944	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0h0@>h,0*76	4	
1028	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0n0<01,0*59	3	

c) EOS = 127					
Slot	Chan	Msg	Sentence	Timeout	Comment
1624	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1D0@IH,0*0E	4	EUT in autonomous mode using channels A(87) and B(67)
1693	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1H0@JM,0*06	4	
c) Individual channel management command with EOS = 127 sent commanding the use of channels 87(A) and 68(D).					
1852	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1R0000,0*6B	0	EUT begins timing out slots from the previous schedule.
1927	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1V000<,0*61	0	
1981	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1`00Ri,0*60		EUT reallocates slots on channel A (87).
1998	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1`0000,0*59	0	
2054	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1d00RA,0*49		
2065	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1d3000,0*5C	0	
2120	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1h00Ti,0*6E		
2149	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1h0000,0*51	0	
2191	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1l00a1,0*02		
2225	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1l0000,0*57	0	
17	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0000Vi,0*35		
52	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh000000,0*08	0	
105	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0400Ui,0*37		
128	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh060000,0*0C	0	
172	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0800UQ,0*06		
193	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh080000,0*00	0	
256	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0<00Qi,0*3B		
277	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0>0000,0*04	0	
322	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0@00W1,0*1C		
351	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0@0000,0*78	0	
391	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0D00W1,0*1D		
429	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu>M7AWhKh0F0000,0*70	0	
478	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0H00Ri,0*49		
502	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0J0000,0*72	0	
547	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0L00TQ,0*76		
568	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0L0000,0*76	0	
617	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0P00`A,0*4B		
654	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0R0000,0*6A	0	
693	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0T00Ui,0*57		
722	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0T0000,0*6E	0	
778	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0`00Ti,0*67		
793	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0`0000,0*58	0	
844	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0d00`A,0*7A		
869	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0d0000,0*5E	0	
925	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0h00W1,0*34		
944	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0h0000,0*50	0	
1005	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0l00RA,0*40		
1028	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0n0<00,0*58	0	
1081	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh0p00TQ,0*4F		
1095	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh0p0000,0*48	0	
1142	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh0t00a1,0*1B		
1171	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh0t0000,0*4E	0	
1227	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1000Ri,0*30		
1239	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh100000,0*09	0	
1306	D	3	!AIVDM,1,1,,D,3;Un4ql03rwrFu2M7AWhKh1400UQ,0*6A		
1319	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWkKk140000,0*0F	0	
1366	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1800W1,0*65		
1398	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh180000,0*01	0	
1456	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1<00U1,0*66		
1466	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1<0000,0*07	0	
1522	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1@00Ui,0*47		

c) EOS = 127					
Slot	Chan	Msg	Sentence	Timeout	Comment
1541	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1@0000,0*79	0	
1604	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1D00U1,0*1E		
1624	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1D0000,0*7F	0	
1673	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1H00W1,0*15		
1693	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1H0000,0*71	0	EUT finishes releasing slots on channel A (87).
1752	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1L00VA,0*65		
1765	C	1	!AIVDM,1,1,,C,1;UnTqh03rwrFu2M7AWhKh1L0000,0*77	0	EUT finishes releasing slots on channel C (67).
1829	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2M7AWhKh1P0001,0*6A		EUT finishes reserving new slots on channels A and D.
1905	D	3	!AIVDM,1,1,,D,3;UnTqh03rwrFu2M7AWhKh1T0001,0*6B		
1981	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1`0@Nu,0*12	4	EUT reverts to autonomous operation, transmitting on the assigned channels A and D.
2054	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2M7AWhKh1d0L01,0*25	7	
2120	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh1h0L01,0*2C	7	
2191	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2M7AWhKh1l0HR?,0*45	6	

d)		
Requirement	Result	Verdict
The EUT shall be moved outside of the channel management area	The EUT is moved 1° South of its previous location, so that it is >5 miles from the boundary of the region used in part c)	-
The EUT shall revert to operating on the default AIS 1 and AIS 2 channels: 87 and 88	The EUT reverts to using channels 87 and 88, after timing out slots used by the previous transmissions	Pass

d) Test results					
Slot	Chan	Msg	Sentence	Timeout	Comment
1142	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2M7AWhKh0t0D01,0*3C	5	EUT within the operating region, in autonomous mode.
1227	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2M7AWhKh100<01,0*04	3	
Moving EUT 1° South, so that it is outside of the channel management area.					
1306	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh140000,0*74	0	EUT begins releasing slots from previous transmission schedule.
1366	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh180000,0*7D	0	
1456	D	1	!AIVDM,1,1,,D,3;UnTqh03rwrFu2LRaohKh1<0000,0*70	0	
1505	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1>00UQ,0*7D		EUT reallocates slots on channel A (87 / AIS 1).
1522	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1@0000,0*05	0	
1579	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1B00Ui,0*3A		EUT begins reserving slots on channel B (88 / AIS 2).
1604	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh1D0000,0*04	0	
1655	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1F00Vi,0*3E		
1673	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1H0000,0*0D	0	
1730	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1J00Ui,0*32		
1752	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh1L0000,0*0C	0	
1810	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1N00Ri,0*32		
1829	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1P0000,0*15	0	
1881	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1R00Si,0*2C		
1905	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh1T0000,0*14	0	
1949	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1V00`A,0*30		
1981	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1`0000,0*25	0	
2024	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1b00WA,0*30		
2054	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh1d0000,0*24	0	
2110	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1f00TQ,0*24		
2120	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1h0000,0*2D	0	
2181	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1j00Vi,0*11		
2191	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh1l0000,0*2C	0	
6	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh1n00VQ,0*2E		
17	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh000000,0*74	0	
86	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0200T1,0*12		
105	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh040000,0*75	0	
160	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0600R1,0*13		
172	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh080000,0*7C	0	
230	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0:00UA,0*6B		
256	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0<0000,0*7D	0	
296	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0>00`Q,0*49		
322	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0@0000,0*04	0	
379	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0B00SQ,0*05		

d) Test results					
Slot	Chan	Msg	Sentence	Timeout	Comment
391	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0D0000,0*05	0	
458	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0F00Ui,0*3C		
478	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0H0000,0*0C	0	
521	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0J00Ui,0*33		
547	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0L0000,0*0D	0	
609	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0N00T1,0*6D		
617	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0P0000,0*14	0	
672	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0R00`i,0*1E		
693	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0T0000,0*15	0	
753	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0V00Si,0*2A		
778	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0`0000,0*24	0	
835	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0b00T1,0*42		
844	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0d0000,0*25	0	
896	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0f00Wi,0*1E		
925	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0h0000,0*2C	0	
979	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0j00Si,0*15		
1005	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0l0000,0*2D	0	
1055	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0n00VQ,0*2F		
1081	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh0p0000,0*34	0	
1122	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh0r00UA,0*23		
1142	D	1	!AIVDM,1,1,,D,1;UnTqh03rwrFu2LRaohKh0t0000,0*35	0	
1209	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh0v00UA,0*24		
1227	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh100000,0*75	0	EUT finishes timing out from previous transmission schedule.
1271	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1200VA,0*61		
1358	A	3	!AIVDM,1,1,,A,3;UnTqh03rwrFu2LRaohKh160001,0*70		EUT finishes reserving slots on AIS 1 / AIS 2
1424	B	3	!AIVDM,1,1,,B,3;UnTqh03rwrFu2LRaohKh1:0001,0*7F		
1505	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1>0<01,0*76	3	EUT operates in autonomous mode, on default channels A (AIS 1 / 87) and B (AIS 2 / 88)
1579	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2LRaohKh1B0D01,0*71	5	
1655	A	1	!AIVDM,1,1,,A,1;UnTqh03rwrFu2LRaohKh1F0<01,0*0E	3	
1730	B	1	!AIVDM,1,1,,B,1;UnTqh03rwrFu2LRaohKh1J0<01,0*01	3	

e)		
Requirement	Result	Verdict
An individual channel management call, addressing an MMSI that does not belong to the EUT using symbols 120, 103, 104, with an EOS symbol of 117, is sent from the base station MMSI 2222222	The operation of the EUT is unaffected and the EUT outputs the following debug text: $POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 120*56 $POSG,BROADCAST,LOG,DSC,Addr DSC ChanMgmt - for another MMSI*13	Pass
A geographic channel management call, defining a region that does not contain the EUT, using symbols 103, 103, 104 and an EOS symbol of 117 is sent from the base station MMSI 2222222	The operation of the EUT is unaffected and the EUT outputs the following debug text: $POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 103*57 $POSG,BROADCAST,LOG,DSC,Broadcast - outside calling area*36	Pass
A geographic channel management call, defining a different course to the EUT using symbols 103, 103, 104 and an EOS symbol of 117 is sent from the base station MMSI 2222222	The operation of the EUT is not affected by the invalid DSC call, and the EUT outputs the following debug text: POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 103*57 $POSG,BROADCAST,LOG,DSC,Broadcast - cannot use course*51	Pass
A geographic channel management call, defining a different ship type, using symbols 103, 103, 104 and an EOS symbol of 117 is sent from the base station MMSI 2222222	The operation of the EUT is not affected by the invalid DSC call, and the EUT outputs the following debug text: $POSG,BROADCAST,LOG,DSC,Received Packet*63 $POSG,BROADCAST,LOG,DSC:,Symbol = 103*57 $POSG,BROADCAST,LOG,DSC,Broadcast - cannot use vessel type*6E	Pass

f)		
Requirement	Result	Verdict
An invalid call using symbol constructions 120, 103, 104, 03, 01 and 120 is transmitted using a non-base station MMSI.	An invalid DSC call is transmitted to the EUT.	-
The operation of the EUT shall not be affected by the invalid DSC message.	The EUT does not accept the DSC call, and the operation of the unit is not affected.	Pass

3 Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
AIS Test Unit	Attingimus	MK II	4057	-	O/P MON
AIS Base Station	SAAB	R40	S/N:5006	-	O/P MON
Multimeter	White Gold	WG022	190	12	16-May-2020
Multimeter	White Gold	WG022	190	18	16-May-2019
Power Supply	Rohde & Schwarz	HMP2020	4735	-	O/P MON

Table 5

O/P MON – Output Monitored using calibrated equipment

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Synchronisation Accuracy	± 30 µs

Table 6

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.