2010-03-04 Ba	Test details – Content of broadcast messages 25		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 112 bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination indicator	Check that value = 0		Passed
Binary data flag	Check the field content		Passed
Binary data	Check the field content		Passed

2010-03-04 Ba	Test details – Content of addressed messages 26		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 112 bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination indicator	Check that value = 1		Passed
Binary data flag	Check the field content		Passed
Destination ID (MMSI)	Check the field content		Passed
Binary data	Check the field content		Passed
Comm. state	Check the field content		Passed

2010-03-04 Ba	Test details – Content of broadcast messages 26		
Test item	Check	Remark	Result
Transmit a message 6 from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 112 bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination indicator	Check that value = 0		Passed
Binary data flag	Check the field content		Passed
Binary data	Check the field content		Passed
Comm. state	Check the field content		Passed

Message content result overview

The PI output results are an overview of the above tables of the various received messages. Response results can be derived from other tests as mentioned in the "response result" column

Message type	PI out Yes/no	PI output Result	Response required (in addition to PI output)	Response result
Msg1,2,3	Yes	Passed	No	
Msg 4	Yes	Passed	No	
Msg 5	Yes	Passed	No	
Msg 6	Yes	Passed	Tx of ackn. msg 7	(6.1.2)
Msg 7	Yes	Passed	ABK output, no further repetitions	(2.1.4.1)
Msg 8	Yes	Passed	No	
Msg 9	Yes	Passed	No	
Msg 10	Yes	Passed	Tx of msg 11 UTC/date response	Passed
Msg 11	Yes	Passed	No	
Msg 12	Yes	Passed	Tx of ackn. msg 13, Display on MKD	(6.2)
Msg 13	Yes	Passed	ABK output, no further repetitions	(2.1.4.1)
Msg 14	Yes	Passed	Display on MKD	(2.10.1)
Msg 15	Yes	Passed	Tx of requested message 3, 5	(6.3)
Msg 16	Yes	Passed	Change of TDMA mode, position report using msg 2	(4.6.5)
Msg 17	Yes	Passed	Internal GNSS receiver shall switch to differential mode	(14.9.3.1)
Msg 18	Yes	Passed	No	
Msg 19	Yes	Passed	No	
Msg 20	Yes	Passed	Has to avoid using reserved slots	4.6.6
Msg 21	Yes	Passed	no	
Msg 22	Yes	Passed	Addition of new area to the regional area table	5.2
Msg 23	Yes	Passed	No	
Msg 24 A	Yes	Passed	No	
Msg 24 B	Yes	Passed	No	
Msg 25 addr.	Yes	Passed	No	
Msg 25 bc	Yes	Passed	No	
Msg 26 addr.	Yes	Passed	No	
Msg 26 bc	Yes	Passed	No	

4.7.2 16.7.2 Transmitted messages

(M.1371 A1/3.3.7)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Initiate the transmission of messages relevant for a mobile station according to Table 7 by the EUT.

Record transmitted messages.

Required results

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

The message contents are checked using the VDL analyser

2008-06-03 Ba	Test details – Message 1,2,3 Position report		
Test item	Check	Remark	Result
The message content of message 1,2,3 is checked in 2.3.1 Information content of msg 1			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
	Check that the channel field is empty (NULL) if not TX		Passed
Fill bits	Check that value = 0		Passed

2008-06-03 Ba	Test details – Message 5 Static data		
Test item	Check	Remark	Result
The message content of message 5 is checked in 2.3.2 Information content of msg 5.			
Number of sentences	Check that value = 2		Passed
Check sentence number	Check that value = 1,2		Passed
Sequential message ident.	Check that counting from 0...9 modulo 10		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2		Passed

2008-06-03 Ba	Test details – Content of msg 6 Addressed binary message		
Test item	Check	Remark	Result
This test can be done in combination with test 2.1.4.1 14.1.4.1 Transmit an addressed message Apply PI sentence: File AIABM_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 112 bit)	Value = 0 The input contains 40 bit (7 characters, 2 fill bits = 42 bit – 2 bit = 40 bit The transmitted message contains 20 characters encapsulated data, no fill bits = 120 bit. It seems that the fill bits in the ABM sentence are ignored. So EUT transmits 120 bit instead of 112 bit (UTC 11:13) Retest 2008-10-01 Ba: UTC 07:12 The fill bits value is 2, the number of bits is 112	Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Sequence number	Check the field content		Passed
Destination ID (MMSI)	Check the field content		Passed
Retransmit flag	Check the field content		Passed
DAC	Check the field content		Passed
FI	Check the field content		Passed
Binary data	Check the field content		Passed

2008-06-03 Ba	Test details – Content of msg 7 Binary acknowledge		
Test item	Check	Remark	Result
This test can be done in combination with test 6.1.2 18.1.2 Acknowledgement Message 6 has to be transmitted by other AIS or VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination ID 1 (MMSI)	Check the field content		Passed
Sequence number 1	Check the field content		Passed
Destination ID 2 (MMSI)	Omitted		
Sequence number 2	Omitted		
Destination ID 3 (MMSI)	Omitted		
Sequence number 3	Omitted		
Destination ID 4 (MMSI)	Omitted		
Sequence number 4	Omitted		

2008-06-03 Ba	Test details – Content of msg 8 Binary broadcast message		
Test item	Check	Remark	Result
This test can be done in combination with 6.4 18.3 Broadcast messages Apply PI sentence: File AIBBM_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 4 (msg length = 80 bit)	(UTC 11:17) fill bits value = 2 Data bits in BBM: 40 (42 – 2) Bits in message should be: 40 bit header + 40 bit data = 80 bit = 14 character – 4 fill bits: EUT (VDO): 15 characters – 2 fill bit = 88 bit Retest 2008-10-01 Ba: UTC 07:13 No change, the fill bits value is 2, the number of bits is 88 It seems that the number of fill bits in the ABM sentence is ignored Retest 2009-01-16 Ba: Fill bits = 4, message length = 80 bit	Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
DAC	Check the field content		Passed
FI	Check the field content		Passed
Binary data	Check the field content		Passed

2008-06-03 Ba	Test details – Content of msg 10 UTC and date inquiry		
Test item	Check	Remark	Result
activate transmission of msg 10 if implemented (not required)			
		Not implemented	N/T

2008-06-03 Ba	Test details – Content of msg 11 UTC date response		
Test item	Check	Remark	Result
Transmit a msg 10 from VDL generator to request transmission of msg 11 by EUT Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0		Passed
Message id	Check the field content		Passed
User ID (MMSI)	Check the field content		Passed
UTC year, month, day, hour, minute, second	Check the field content		Passed
Position accuracy flag	Check the field content		Passed
Longitude	Check the field content		Passed
Latitude	Check the field content		Passed
Type of EPFD	Check the field content		Passed
RAIM flag	Check the field content		Passed

2008-06-03 Ba	Test details – Content of msg 12 Addressed safety related message		
Test item	Check	Remark	Result
This test can be done in combination with test 2.1.4.1 14.1.4.1 Transmit an addressed message Apply PI sentence: File AIABM_safety.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0 (msg length = 96bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Sequence number	Check the field content		Passed
Destination ID (MMSI)	Check the field content		Passed
Retransmit flag	Check the field content		Passed
Safety related text	Check the field content		Passed

2008-06-03 Ba	Test details – Content of msg 13 Safety related acknowledge		
Test item	Check	Remark	Result
This test can be done in combination with test 6.1.2 18.1.2 Acknowledgement Send message 12 from other transponder or VDL generator Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination ID 1 (MMSI)	Check the field content		Passed
Sequence number 1	Check the field content		Passed
Destination ID 2 (MMSI)	Omitted		
Sequence number 2	Omitted		
Destination ID 3 (MMSI)	Omitted		
Sequence number 3	Omitted		
Destination ID 4 (MMSI)	Omitted		
Sequence number 4	Omitted		

2008-06-03 Ba	Test details – Content of msg 14 Safety related broadcast message		
Test item	Check	Remark	Result
This test can be done in combination with 6.4 18.3 Broadcast messages Apply PI sentence: File AIBBM_safety..sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1	UTC 11:29	Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (length = 64 bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Safety related text	Check the field content		Passed

2008-06-03 Ba	Test details – Content of msg 15 Interrogation		
Test item	Check	Remark	Result
This test can be done in combination with 6.3 18.2 (M.1371 A1/5.3) Interrogation responses Apply PI sentence: File AIAIR_35_5_bin.sst Check the field content of the fields listed under Test item.			
Number of sentences	Check that value = 1		Passed
Check sentence number	Check that value = 1		Passed
Sequential message ident.	Check that field is empty (NULL)		Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 160 bit)		Passed
Message ID	Check the field content		Passed
Source ID (MMSI)	Check the field content		Passed
Destination ID 1 (MMSI)	Check the field content		Passed
Message ID 1.1	Check the field content		Passed
Slot offset 1.1	Check the field content = 0		Passed
Message ID 1.2	Check the field content		Passed
Slot offset 1.2	Check the field content = 0		Passed
Destination ID 2 (MMSI)	Check the field content		Passed
Message ID 2.1	Check the field content		Passed
Slot offset 2.1	Check the field content = 0		Passed

5 17 Specific tests of Network Layer

(7.4)

5.1 17.1 Dual channel operation

(M.1371 A1/4.1)

5.1.1 17.1.1 Alternate transmissions

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode on default channels AIS1, AIS2. Record transmitted scheduled position reports on both channels. Check CommState for slot allocation.

Required results

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

2008-05-30 Ba	Test details – Alternate transmissions		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode, set report rate to 10sec with external sensor input. Record transmitted scheduled position reports on both channels. Check Comm State for slot allocation.			
Alternate transmissions	Check that the EUT transmission is alternating		Passed
Comm state	Check that the slots of each channel are allocated on the same channel		Passed
Same test on network entry (data link access period)			
Alternate transmissions	Check that the EUT transmission is alternating		Passed
Comm state	Check that the slots of each channel are allocated on the same channel		Passed

5.2 17.2 Regional area designation by VDL message

(M.1371 A1/4.1))

Method of measurement

Set-u p standard test environment and operate EUT in autonomous mode. Apply Channel management messages (msg 22) to the VDL defining two adjacent regional areas 1 and 2 with different channel assignments for both regions and a transitional zone extending 4nm either side of the regional boundary. At least one channel shall be 12.5kHz channel. Let the EUT approach region 1 from outside region 2 more than 5 nm away from region boundary transmitting on default channels. Record transmitted messages on all 6 channels.

Region	***Primary channel***	***Secondary channel***
Region 1	*CH A1*	*CH B1*
Region 2	*CH A2*	*CH B2*
Default region	*AIS 1*	*AIS 2*

Required results

Check that the EUT transmits and receives on the primary channels assigned for each region alternating channels and doubling reporting rate when passing through the transitional zones. EUT shall revert to default autonomous operation on the regional channels after leaving the transitional zones.

Item	***Area***	***Channels in use***
1	*default region*	*AIS1, AIS2*
2	*first transitional zone*	*AIS1, CH A 2*
3	*region 2*	*CH A 2, CH B 2*
4	*second transitional zone*	*CH A 2, CH A 1*
5	*region 1*	*CH A 1, CH B 1*

This Test is divided in 2 parts:

- The first part checks the general behaviour including check of ACA and TXT output, check of the borders of area an transitional zone, check of the correct frequency use.
- The second part concentrates on the slot allocation and use during a transition from one area (high sea) into another.

2008-05-30 Ba	Test details part 1 – Channel management by VDL msg 22		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode transmitting on channel AIS1/AIS2, send 2 Msg 22 by VDL generator, defining 2 adjacent areas with channels A1, B1 and A2, B2. Use external sensor input to simulate a voyage through both areas. Set transitional zone to 4nm. Set the position outside the areas. “TZ” is used for “transitional zone” Set the positions near the limits of the transitional zones to check the dimensions			
PI output	Check that the msg 22 are output on PI		Passed
Display of defined area	Check that the defined area is correctly stored (displayed on MKD)		Passed
	Check ACA and TXT output on PI (not required but recommended.		Passed
	ACA: check in use flag and time of in use flag		Passed

Item 1: In high sea area	Check that channels AIS1 and AIS2 are in use		Passed
Item 2: Move position into outer TZ of region 2	Check ACA and TXT output (No required)	All area settings are output, not only the area which is entered	Passed
	If ACA output: check in use flags and time of in use flag		Passed
	Check the limit of the TZ (5 nm = 8.8 minutes)	The border seems to be at 4 nm = 7.1 minutes, which is the inner TZ size Retest 2009-01-21 Ba: The TZ is 5 nm	Passed
	Check that channel AIS 1 and A2 are used	Retest 2009-01-21 Ba: • In the range between 4 and 5 nm from the area border the channels A2 and B2 are used • In the range between the area border and 4 nm distance to the area border the correct channels (AIS1,A2) are used Retest 2009-06-25 Ba: The correct channels are used in the range between 4 and 5 nm from the area border.	Passed Passed
	Check that reporting rate is doubled	Retest 2009-01-21 Ba: • In the range between 4 and 5 nm from the area border the reporting rate is not doubled • In the range between the area border and 4 nm distance to the area border the reporting rate is doubled Retest 2009-06-25 Ba: The reporting rate is double in the range between 4 and 5 nm from the area border.	Passed Passed
Item 3: Move position into inner TZ of region 2 (crossing the area border)	Check ACA and TXT output (Required)	No ACA and TXT output Retest 2009-01-21 Ba: There is a TXT and ACA output of all stored areas	Passed
	ACA: check in use flag = 1	Retest 2009-01-21 Ba: The in-use flag of area 2 is 1	Passed
	ACA: check time of in use flag	Retest 2009-01-21 Ba: The time is correct	Passed
	Check the border of area	Retest 2009-01-21 Ba:	Passed

Item 4: Move position into region 2 (out of TZ)	Check ACA and TXT output (not required)		Passed
	Check the limit of the TZ (4 nm = 7 minutes)		Passed
	Check that channel A2 and B2 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Item 5: Move position into TZ between region 1 and 2, inside area 2	Check that channels A2 and A1 are used		Passed
	Check that reporting rate is doubled		Passed
Item 6: Move position into area 1 (inside the TZ) (crossing the area border)	Check ACA and TXT output (Required)	No ACA and TXT output Retest 2009-01-21 Ba: There is an ACA and TXT output of all areas, the in-use flag of area 1 is set to 1	Passed
	Check the border of area	Retest 2009-01-21 Ba:	Passed
Item 7: Move position into region 1 (out of TZ)	Check that channels A1 and B1 are used		Passed
	Check the limit of the TZ (4 nm = 7 minutes)		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Item 8: Move position into TZ of region 1 to high sea	Check that channels A1 and AIS1 are used		Passed
	Check that reporting rate is doubled		Passed
Move position out of the TZ of region 1, into high sea	Check that channels AIS1 and AIS2 are used		Passed
	ACA: check in use flags and time of in use flag		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed

Main scope of this table is the correct slot allocation and use on the different channels.

2008-05-30 Ba	Test details part 2 – Channel management by VDL msg 22		
Test item	Check	Remark	Result
The same area and movement is used as in test part 1.			
Item 1: In high sea area	Record 1 frame before entering the area		
	Check that channels AIS1 and AIS2 are in use		Passed
Item 2: Move position into transitional area of region 2, first frame after transition	Check that EUT continues TX on AIS1 and AIS2 for 1 frame		Passed
	Check that EUT releases the slots on AIS2 by msg 1 with time-out 0 and no slot offset		Passed
	Check that channel AIS 1 and **A2** are used for **Rx**	Retest 2009-06-25 Ba: AIS1 is output as B and A2 is output as A: Remark: This may have been the same in older version. I have noted it only under item 3 but it is in the same way valid for item 2 (first frame). The channel mapping in the first and the next frames should be the same. Retest 2009-07-22 Ba: The VDM output channels are correct	Passed
Item 3: In outer transitional area of region 2, next frames after transition	Check allocation of additional slots on channel A (AIS1) using msg 3	There is a complete rescheduling on channel A	Passed
	Check complete slot allocation on channel B (A2) using msg 3	The allocation for channel B on the area frequency is done in the first frame. This is incorrect because the EUT has to receive the new channel for one frame to build up a slot map before transmission Retest 2009-01-21 Ba: No change Retest 2009-06-25 Ba: • The EUT starts an allocation after about 30s, when the slot table has not yet completed. • This is stopped 1 min after TZ entry and started again Retest 2009-07-22 Ba: The EUT correctly starts slot allocation after 1 minute.	Passed
	Check that channel AIS 1 and A2 are used for Tx		Passed

	Check that channel AIS 1 and A2 are used for Rx		Passed
	Check that reporting rate is doubled		Passed
	Check that msg on AIS1 are output on PI (VDM/VDO) as channel A and A2 as channel B	AIS1 is output as B and A2 is output as A Retest 2009-01-21 Ba: No change, A2 is output as A and AIS1 is output as B Retest 2009-06-25 Ba: AIS1 is output as A and A2 is output as B:	Passed
Item 4: Move into inner transitional area of region 2, crossing the area border,	Check that msg on AIS1 are output on PI (VDM/VDO) as channel B and A2 as channel A (channels reverted)		Passed
Item 5: Move position into the area of region 2 (out of TZ), first frame after transition	Check that EUT continues TX on AIS1 and A2 for 1 frame		Passed
	Check that EUT releases all slots on AIS1 by msg 1 with time-out 0 and no slot offset		Passed
	Check that EUT releases every second slot on channel A2 by msg 1 (for reversion to normal reporting rate	All slots are released	Passed
	Check that channel A2 and **B2** are used for **Rx**		Passed
Item 6: Inside area of region 2, next frames after transition	Check allocation of Slots on channel B (B2) using msg 3	The allocation for channel B on the area frequency is done in the first frame. This is incorrect because the EUT has to receive the new channel for one frame to build up a slot map before transmission Retest 2009-01-21 Ba: No change Retest 2009-06-25 Ba: The slot allocation starts in the next frame Retest 2009-07-22 Ba: The EUT starts slot allocation with the doubled reporting rate within the first minute after leaving the TZ. Then it it stopped in the next frame and a new allocation starts with the correct reporting rate. Retest 2009-08-27 Ba: The slot allocation starts in the next frame	Passed

	Check that channels A2 and B2 are used for Tx		Passed
	Check that channel A2 and B2 are used for Rx		Passed
	Check that reporting rate is back to normal reporting rate		Passed
	Check that msg on A2 are output on PI (VDM/VDO) as channel A and B2 as channel B		Passed

2008-05-30 Ba	Test details – Check of Tx/Rx mode		
Test item	Check	Remark	Result
Set Tx/Rx-Mode in msg 22 to 0	Check that mode is correctly stored		Passed
	Check that channel A and B are used for Tx		Passed
	Check that channel A and B are used for Rx		Passed
Set Tx/Rx- Mode in msg 22 to 1	Check that mode is correctly stored	UTC 12:00	Passed
	Check that channel A only is used for Tx	Tx on A and B Retest 2009-01-21 Ba: Tx on A only	Passed
	Check that channel A and B are used for Rx		Passed
	Check that the reporting rate is correct	Retest 2009-01-21 Ba: The reporting rate is 10 s	Passed
Set Tx/Rx-Mode in msg 22 to 2	Check that mode is correctly stored	UTC 10:42	Passed
	Check that channel B only is used for Tx	Tx on A and B Retest 2009-01-21 Ba: Tx on B only	Passed
	Check that channel A and B are used for Rx	Retest 2009-01-21 Ba: The reporting rate is 10 s	Passed

5.3 17.3 Regional area designation by serial message

(M.1371 A1/4.1.3)

Repeat test 17.2 using ACA serial message for channel assignment.

2008-06-03 Ba	Test details – Channel management by ACA sentence on PI		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode transmitting on channel AIS1/AIS2, send 2 ACA sentences to the PI , defining 2 adjacent areas with channels A1, B1 and A2, B2. Use external sensor input to simulate a voyage through both areas. Set transitional zone to 1nm. Set the position outside the areas. Areas are in SW quadrant. File name is AIACA_Region_17_3_SW.sst Set the positions near the limits of the transitional zones to check the dimensions			
Display of defined area	Check that the defined area is correctly stored (displayed on MKD)		Passed
	Check ACA and TXT output on PI (not required but recommended.		Passed
Item 1: In high sea area	Check that channels AIS1 and AIS2 are in use		Passed
Item 2: Move position into outer TZ of region 2	Check ACA and TXT output (No required)		Passed
	Check the limit of the TZ (5 nm = 5.8 minutes)	The inner TZ size of 2 NM is used instead of the default (high sea) TZ size of 5 NM Retest 2009-06-25 Ba: The TZ size is 5 NM	Passed
	Check that channel AIS 1 and A2 are used		Passed
	Check that reporting rate is doubled		Passed
Item 3: Move position into inner TZ of region 2 (crossing the area border)	Check ACA and TXT output (Required)	No ACA and TXT output Retest 2009-06-25 Ba: There is an ACA and TXT output	Passed
	Check the border of area	Cannot be tested because nothing happens at the border, no ACA output and not change of channel usage Retest 2009-06-25 Ba: The area border is correctly used	Passed

Item 4: Move position into region 2 (out of TZ)	Check ACA and TXT output (not required)		Passed
	Check the limit of the TZ (2 nm = 2.3 minutes)		Passed
	Check that channel A2 and B2 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Item 5: Move position into TZ between region 1 and 2, inside area 2	Check that channels A2 and A1 are used	A2 and AIS1 are used (UTC 12:00) Retest 2009-06-25 Ba: A2 and A1 are used	Passed
	Check that reporting rate is doubled		Passed
Item 6: Move position into area 1 (inside the TZ) (crossing the area border)	Check ACA and TXT output (Required)	No ACA and TXT output Retest 2009-06-25 Ba: There is a TXT and ACA output	Passed
	Check the border of area	Retest 2009-06-25 Ba: The border is correcly evaluated	Passed
Item 7: Move position into region 1 (out of TZ)	Check that channels A1 and B1 are used		Passed
	Check the limit of the TZ 1 nm = 1.15 minutes)	A TZ of 2 NM (as in area 2) is used Retest 2009-06-25 Ba: A TZ size of 1 NM is used	Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Item 8: Move position into TZ of region 1 to high sea	Check that channels A1 and AIS1 are used		Passed
	Check the limit of the TZ 1 nm = 1.15 minutes)		Passed
	Check that reporting rate is doubled		Passed
Move position out of the TZ of region 1, into high sea	Check that channels AIS1 and AIS2 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed

2009-06-25 Ba	Test details – Check of Tx/Rx mode		
Test item	Check	Remark	Result
Set Tx/Rx-Mode to 0	Check that mode is correctly stored		N/T
	Check that channel A and B are used for Tx		N/T
	Check that channel A and B are used for Rx		N/T
Set Tx/Rx-Mode to 1	Check that mode is correctly stored	UTC 13:47	Passed
	Check that channel A only is used for Tx		Passed
	Check that channel A and B are used for Rx		Passed
	Check that the reporting rate is correct		Passed
Set Tx/Rx-Mode to 2	Check that mode is correctly stored	UTC 13:50	Passed
	Check that channel B only is used for Tx		Passed
	Check that channel A and B are used for Rx		Passed
Set Tx/Rx-Mode to 3	Check that mode is correctly stored	UTC 13:55	Passed
	Check that EUT is not transmitting		Passed
	Check that channel A and B are used for Rx		Passed

5.4 17.4 Power setting

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Transmit channel management message (msg 22) defining output power high/low.

Repeat test using ACA and manual input.

Required result

Check that EUT sets output power as defined.

2008-07-08 Ba	Test details – Power setting by msg 22		
Test item	Check	Remark	Result
The EUT has to be in an area with regional operating settings and the channels as used in the following msg 22. Transmit a msg 22 from VDL generator like the following: 22,0,2345,0,2086,1086,0,**1**,[MMSI(MSB)],[MMSI(LSB)],1,0,0,,0			
Channel switch	Check that the EUT doesn't switch channels		Passed
Power low	Check that the transmitting power is changed from high to low	The transmitting power is not changed, it remains at power level of about 4.5 Watt Retest 2009-01-20 Ba: Power is set to 35 dBm	Passed
MKD	Check the low power settings are displayed on MKD		Passed
Transmit the same message 22, but power setting to 0 = high power			
Power high	Check that EUT reverts to high power	Retest 2009-01-20 Ba: Power is set to 41 dBm	Passed

2008-07-08 Ba	Test details – Power setting by ACA		
Test item	Check	Remark	Result
Apply the following message at PI: File name = AIACA_region_in_ch86.sst. Set power flag to 1 = low power and channels to actually used channels			
Power low	Check that the transmitting power is changed from high to low	The transmitting power is not changed, it remains at power level of about 4.5 Watt Retest 2009-01-20 Ba: Power is set to 35 dBm	Passed
MKD	Check the low power settings are displayed on MKD		Passed
Transmit the same ACA sentence, but power setting to 0 = high power			
Power high	Check that EUT reverts to high power	Retest 2009-01-20 Ba: Power is set to 41 dBm	Passed

2008-07-08 Ba	Test details – Power setting by manual input		
Test item	Check	Remark	Result
Set the power level of the region in use to low power, Don't change the channels			
Power low	Check that the transmitting power is changed from high to low	The transmitting power is not changed, it remains at power level of about 4.5 Watt Retest 2009-01-20 Ba: Power is set to 35 dBm	Passed
Set power level back to high power.			
Power high	Check that EUT reverts to high power	Retest 2009-01-20 Ba: Power is set to 41 dBm	Passed

Remark:
The above tests show a low power level of 2 Watt.

The later physical radio tests show a level of 30 dBm = 1 Watt as required by ITU-R M.1371-3

5.5 17.5 Message priority handling

(M.1371 A1/4.1.8)

Method of measurement

Set-up standard test environment and operate test equipment with 90% channel load. 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. Initiate the transmission of two 5 slot messages (msg 12 and msg 8) by the EUT. Record transmitted messages on both channels.

Required results

Check that EUT transmits the messages in correct order according to their priority (ITU-R M.1371 A/3.3.8.1 table 13).

This test is modified in that way that first a BBM sentence is sent to make the EUT busy with a transmission process. Then the 2 test sentences with msg 8 and msg 12 are applied.

Otherwise the EUT has already started the transmission process of the first msg, has allocated slots or even has already transmitted the msg before the input of the ABM sentence with the msg 12 has been completed. In this case it would not be possible to transmit the msg 12 first.

2008-07-17 Ba	Test details – Message priority handling		
Test item	Check	Remark	Result
Simulate a channel load of 90% on both channels, set reporting rate to 2 s Apply an BBM sentence with msg 8 and immediately following an ABM sentences with msg 12 to the PI port. File name is AIBBM_ABM_17_5.sst Check transmissions by VDL analyser.			
Transmission order	Check that msg 12 is transmitted first because of higher priority		Passed

5.6 17.6 Slot reuse (link congestion)

(M.1371 A1/4.4)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Transmit a Data Link Management message (msg 20) to the EUT with slot offset and increment to allocate slots for a base station. Assure that at test receiver location the signal level received from EUT exceeds the signal level received from test transmitter. Record transmitted messages and check frame structure. Set up additional test targets to simulate a VDL load of >90% until slot reuse by EUT is observed.

Required results

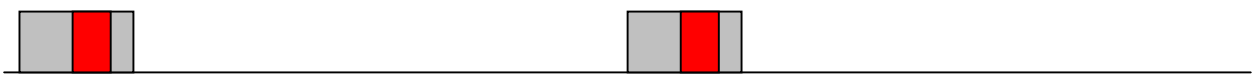
Check that the nominal reporting rate for Position Report msg 1 is achieved ±10% (allocating slots in selection interval SI) under link congestion conditions. Confirm that the slot occupied by the most distant station (within selection interval) is used by the slot reuse algorithm.

Check that a station is not subject to slot reuse more than once a frame. Check that slots allocated by a local base station are not subject to slot reuse.

Used test procedure:

In one frame 3 blocks of 60 targets are transmitted in consecutive slot. The 3 blocks start at slot 1, 751 and 1501 or at slot 31, 781 and 1531, depending on the position report slots.

The EUT is set to 2 s reporting rate to increase the probability that the relevant selection intervals are completely covered by targets..



The grey area is covered by targets, the red area is the selection interval of 15 slots.

The targets are numbered from 1 to 60 and transmitted in the order of the IDs. They are divided into 2 groups:

- The even numbered targets have a low distance (1..2 Nm),
- the odd numbered targets have a high distance to the EUT (about 30 Nm)

This test have to be run for at minimum 30 minutes to observe a sufficient number of slot allocations (every 3-8 min). The selected slots of the selection intervals covered by targets have to be checked.

2008-07-10 Ba	Test details – Slot reuse		
Test item	Check	Remark	Result
This test can be done as described before.			
Reporting rate, use of selection interval	Check that the slots are selected within the SI		Passed
Slot reuse	Check that only the slots of odd numbered targets are used	Slot of near targets (even numbered) are used Retest 2008-10-01 Ba: Same result Retest 2008-10-01 Ba: Same result Retest 2009-01-20 Ba: There are still near targets used. See note) Retest 2009-06-24 Ba: Only distant targets are reused.	Passed
	Check that a the slot of a target is not used twice in a frame	Targets are reused twice in a frame Retest 2008-10-01 Ba: Same result Retest 2009-01-20 Ba: On target is reused twice per frame, target 25 starting in frame 11:36. The reason again seems to be that the target has not been received in the previous frames and there not handled as re-used. See note) Retest 2009-06-24 Ba: Only distant targets are reused	Passed
Reserved Slot	Check that slots reserved by msg 20 are not used	The test of use of reserved slots is done in 16.6.5 Fixed allocated transmissions (FATDMA)	N/A

Note:
The reason seems to be that the target before the own transmission are generally not received. It is required that targets in the slot before the own transmission are received.

Retest 2009-06-24 Ba:
The targets in the slot before the own transmission are received.

In 3 of 4 cases the re-used near target has not been received in the frames before the re-use because the target used the slot before the Tx slot of the EUT. So the slot is used as a free slot.

In 1 case (start with frame 11:24, slot 26) the reused near target has been received in the previous frames except 2 frames before the start of re-using the slot. There may be an implementation error that only the Rx in this frame has been considered and that the time-out value (4) of the other received message has not been considered.

5.7 17.7 Management of received regional operating settings

(7.4.1)

5.7.1 17.7.1 Test for replacement or erasure of dated or remote regional operating settings

(7.4.1)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Send a valid regional operating setting to the EUT by msg 22 with the regional operating area including the own position of the EUT. Consecutively send a total of seven (7) valid regional operation settings to EUT, using both msgs 22 and DSC telecommands, with regional operating areas not overlapping to the first and to each other. Perform the following in the order shown:

a) Send a ninth msg 22 to the EUT with valid regional operating areas not overlapping with the previous eight regional operating areas.

b) Step 1: Set own position of EUT into any of the regional operating areas defined by the second to the ninth telecommands sent to the EUT previously.

Step 2: Send a tenth telecommand to the EUT, with a regional operating area which partly overlaps the regional operating area to which the EUT was set by Step 1 but which does not include the own position of the EUT.

c) Step 1: Move own position of EUT to a distance of more than 500 miles from all regions defined by previous commands.

Step 2: Consecutively set own position of EUT to within all regions defined by the previous telecommands.

Required results

After the initialisation, the EUT should operate according to the regional operating settings defined by the first msg 22 sent.

a) The EUT shall return to the default operating settings.

b) Step 1: Check that the EUT changes its operating settings to those of that region which includes own position of the EUT.

Step 2: Check that the EUT reverts to the default operating settings.

Note: Since the regional operating settings to which the EUT was set in Step 1 shall be erased due to Step 2, and since there is no other regional operating setting due to their non- overlapping definition, the EUT shall return to default.

c) Step 1: Check that the EUT operates with the default settings.

Step 2: Check that the EUT operates with the default settings.

2008-07-09 Ba	Test details – Test of replacement or erasure of dated or remote regional operating settings		
Test item	Check	Remark	Result
The following check of area entries can be done by MKD or by request of ACA			
Send by ACA • 1 area including own position • 7 areas not overlapping, not including own position File name: AIACA_8_regions_17_7_1.sst	Check that area 1...7 are displayed on MKD	Only the first 5 areas are displayed on MKD UTC 13:25 Retest 2009-01-20 Ba: All areas are displayed on the MKD	Passed
	Check that all 8 areas are output on PI after request by sentence xxAIQ,ACA	The first 5 areas are output correctly, the 6th area is displayed only partly. Area 7 and 8 are not output Retest 2009-01-20 Ba: All areas are output as ACA	Passed
a) Send a 9. msg 22 to the EUT	Check that the first area is deleted	Cannot be tested because the 8 areas are not stored Retest 2009-01-20 Ba: The first area is replaced by the new one	Passed
	Check that the EUT returns to the default operating settings	Retest 2009-01-20 Ba: The EUT returns to the default operating settings	Passed
b) step 1: Set own position to one of the 7 areas	Check that the EUT changes its operating settings according to that region		Passed
b) step 2: Send an area overlapping the area of step 1 not including own position	Check the overlapped area is deleted and replaced by the new one		Passed
	Check that the EUT reverts to the default operating settings		Passed
d) Erasure by distance: Move own position of EUT to a distance of more than 500 miles from all regions defined by previous commands	Check that all areas are deleted		Passed
Check of erasure: Set own position of EUT to within all regions defined by the previous telecommands.	Check that the EUT operates with the default settings because the areas are deleted		Passed

5.7.2 17.7.2 Test of correct input via Presentation Interface or MKD

(7.4.1)

Method of measurement

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

following tests in the following order:

a) Send msg 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 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 msg 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 Presentation Interface with a valid regional operating area overlapping the regional operating area sent to the EUT by msg 22 or a DSC telecommand.

Required results

a) Confirm that the EUT uses the regional operating settings commanded by msg 22 or DSC telecommand.

b) Step 1: Confirm that the regional operating settings of the previous msg 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 prompt 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 msg 22 or DSC telecommand.

f) Check, that the EUT does not use the regional operating setting commanded to it via the Presentation Interface.

2008-07-09 Ba	Test details – Correct input via Presentation Interface or MKD		
Test item	Check	Remark	Result
Send msg 22 with same settings as in 17.2 Channel management, set position of own ship into this area			
a) Use of settings	Confirm that the EUT uses the regional operating settings commanded by msg 22		Passed
b) MKD input Entering new area by MKD	Step 1: Confirm that the regional operating settings of the previous msg 22 is displayed to the user on the MKD for editing.		Passed
	Step 2: Check, that the EUT allows the user to edit the displayed regional operating settings.	The changed values are not accepted because of the 2 hours protection of msg 22	Passed
	Check, that the EUT does not accept incomplete or invalid regional operating settings.		Passed
	Check, that the EUT accepts a complete and valid new regional operating setting.		Passed
	Step 3: Check, that the EUT prompt the user to confirm the intended change of regional operating settings		Passed
	Check, that the EUT allows the user to return to the editing menu or to abort the change of the regional operating settings.	It is not possible to return to the editing but to abort the area screen	Passed
Move position inside the new area	Step 4: Check, that the EUT uses the regional operating settings input via the MKD.		Passed
c) New area by ACA Input a new area via PI (ACA sentence) overlapping area of b), position inside	Check, that the EUT uses the regional operating settings received via PI		Passed
d) Default settings via MKD Input the default operating settings via the MKD for the regional operating area of c)	Check, that the EUT accepts the default operating settings for the regional operating area		Passed
	Check, that the EUT uses the default operating settings		Passed

e) <u>Area setting by VDL</u> Send message 22 with a different regional operating setting to the EUT with a regional operating area, which contains current position of own station	Check, that the EUT uses the regional operating settings commanded to it by message 22		Passed
f) <u>Priority of VDL msg</u> Rejection of a shipborne (ACA) regional operating setting when overlapping a setting from base station not older than 2 hours (Clarifications to 1371, 2.54 paragraph 4	Check, that the EUT does not accept the regional operating setting commanded to it via the Presentation Interface.		Passed

5.7.3 17.7.3 Test of addressed telecommand

(7.4.1)

Method of measurement

Set-up a standard test environment and operate EUT in autonomous mode. Perform the following tests in the following order:

a) Send msg 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 msg 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

a) Check, that the EUT uses the regional operating settings commanded to it in a).

b) Check, that the EUT uses the regional operating settings commanded to it in b).

c) Check, that the EUT reverts to default.

2008-07-09 Ba	Test details – Test of addressed telecommand		
Test item	Check	Remark	Result
a) Send msg 22 with valid regional operating settings, with a regional operating area, which contains the current position of own station.	Check, that the EUT uses the regional operating settings commanded to it		Passed
b) Send an addressed DSC msg to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it		Passed
b) Send an addressed msg 22, addressed **as ID 2**, to the EUT with different regional operating settings	Check, that the EUT uses the regional operating settings commanded to it		Passed
c) Move the EUT out of the regional operating area defined by the previous addressed telecommand	Check, that the EUT reverts to default		Passed

5.7.4 17.7.4 Test for invalid regional operating areas (3 areas with same corner)

(7.4.1)

Method of measurement

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

b) Move current own position of the EUT consecutively to the regional operating areas of the first two valid regional operating settings.

Required test results

a) Check, that the EUT uses the operating settings that were in use prior to receiving the third regional operating setting.

b) Check, that the EUT consecutively uses the regional operating settings of the first two received regional operating areas.

2008-07-09 Ba	Test details – Test for invalid regional operating areas (three regional operating areas with same corner		
Test item	Check	Remark	Result
a) Send three different valid regional with adjacent corners by ACA, File name: AIACA_region_17_7_4.sst Position inside 3rd area.	Check, that the 3rd area is refused and settings are not used		Passed
b) Move own position to the first 2 areas	Check, that the EUT uses the operational settings of these areas		Passed

5.7.5 17.7.5 Self-Certification of other conditions

(7.4.1)

The fulfilment of all other conditions of 7.4.1 shall be self-certified by the manufacturer.

Date	**Result**	**Status**
2008-07-17 Ba	No Self-certification required	Passed

5.8 17.8 Continuation of autonomous mode reporting rate

(M.1371- 1 A2/3.3.6, IALA Technical clarifications to recommendation ITU- R M.1371- 1)

Method of test

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 rate.

Required result

Ensure that the autonomous reporting rate is maintained.

2008-07-09 Ba	Test details – Continuation of autonomous mode reporting rate		
Test item	Check	Remark	Result
Set the EUT into a transitional zone Send assignment commands msg 16 with an higher update rate to the EUT			
Rate assignment command in a transitional zone	Check that an rate assignment command is ignored in a transitional zone		Passed
Slot assignment command in a transitional zone	Check that an slot assignment command is ignored in a transitional zone		Passed

6 18 Specific tests of Transport Layer

(7.5)

6.1 18.1 Addressed messages

(M.1371 A1/5.3.1)

6.1.1 18.1.1 Transmission

(M.1371 A1/5.3)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Set up a test target for scheduled transmissions on channel AIS1 only. Initiate the transmission of an addressed binary message (msg 6) by the EUT (test target as destination). Record transmitted messages on both channels.

Required results

Check that the EUT transmits msg 6 on channel AIS1. Repeat test for AIS2.

Basic test of addressed message is made in **2.1.4.1 "**14.1.4.1 Transmit an addressed message**"**

The test procedure is modified in that way that the test target is transmitting on both channels, and in case of channel = 0 it is checked that the transmission is always on that channel on that the target transponder was last received.

2008-07-09 Ba	Test details - Addressed binary message 6		
Test item	Check	Remark	Result
Transmit an addressed binary message 6 by sending an ACA sentence to the PI. PI sentence: File AIABM_bin.sst: !AIABM,1,1,2,000005002,x,6,06P0test,0 Change transmission channel x according to test item Transmit some messages for each test item and check the used channel.			
Channel = 0 (autoselect)	Check tx on last received channel	UTC 13:24	Passed
Channel = 1 (A)	Check Tx on channel A		Passed
Channel = 2 (ch. B)	Check Tx on channel B		Passed
Channel = 3 (ch. A+B)	Check Tx on channel A+B		Passed

2008-07-09 Ba	Test details - Addressed safety related message 12		
Test item	Check	Remark	Result
Transmit an addressed safety related message 12 by sending an ACA sentence to the PI. PI sentence: File AIABM_safety.sst: !AIABM,1,1,2,000005002,x,12,D5CD,0 (D5CD = „TEST“. Change transmission channel x according to test item Transmit some messages for each test item and check the used channel.			
Channel = 0 (autoselect)	Check tx on last received channel		Passed
Channel = 1 (ch. A)	Check Tx on channel A		Passed
Channel = 2 (ch. B)	Check Tx on channel B		Passed
Channel = 3 (ch. A+B)	Check Tx on channel A+B		Passed

2008-07-09 Ba	Test details - 4 addressed binary messages 6		
Test item	Check	Remark	Result
Transmit an set of 4 addressed binary messages 6 by sending 4 ABM sentences to the PI. Transmission channel is alternating on channel A and B as indicated in the ABM sentences. PI sentence: File AIABM_4_bin.sst: A response is automatically transmitted by the addressed transponder ID 1028			
VDO output of EUT	Check that the 4 messages are transmitted directly without waiting for ackn.	UTC 13:30	Passed
Message content	Check the message content	The data for the message 6 are 52 bit, Together with the 72 bit header the complete message should be 72+52 = 124 bit, but the message length in the VDO is only 120 bit, the last 4 bit are not transmitted (see transmission of other station in the next test item) <u>Retest 2008-10-01 Ba:</u> UTC 08:20 The message length is 128 bit (22 characters, 4 fill bits). This are the 124 bit of the message + 4 additional bits to get a byte boundary.	Passed
Channel	Check Tx on channel A and B as indicated in the ABM sentence		Passed
Message sequence number	Check that sequence number in VDL msg = Sequential message identifier of ABM sentences		Passed
RX of request	Check that message is received by addressed transponder (VDM)		Passed
Received by VDL Analyser	Check msg on VDL analyser		Passed

TX of ackn. msg 7 (VDO)	Check that ackn msg 7 is transmitted by addressed transponder (VDO)		Passed
RX of msg 7 (VDM)	Check that the ackn. msg 7 is received by EUT (VDM)		Passed
	Check that a message is not repeated if an acknowledgement has been received	The message with sequence number 1 has successfully been transmitted and the acknowledgement received, with ABK output with type 0 (successful), but 2 s later the message is repeated Retest 2008-10-01 Ba: UTC 08:30 Same error again Retest 2009-01-20 Ba: Messages are only repeated if no acknowledgement has been received.	Passed
AIABK acknowledgement	Record and check the AIABK acknowledgements	$AIABK,000001028,A,6,3,0 $AIABK,000001028,B,6,0,0 $AIABK,000001028,A,6,1,0 $AIABK,000001028,A,6,1,4 $AIABK,000001028,B,6,2,0 Retest 2009-01-20 Ba: $AIABK,000001028,A,6,3,0 $AIABK,000001028,A,6,1,0 $AIABK,000001028,B,6,0,0 $AIABK,000001028,B,6,2,0	Passed

6.1.2 18.1.2 Acknowledgement

Method of measurement

Operate standard test environment and EUT in autonomous mode. Apply up to 4 addressed binary messages (msg 6; EUT as destination) to the VDL on Channel AIS 1. Record transmitted messages on both channels. Repeat with AIS2.

Required results

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

A basic receive test is made in 2.1.4.2 14.1.4.2 Receive addressed message.

The content fields of the transmitted acknowledgement should be checked in 4.7.2 16.7.2 Transmitted messages.

2008-07-09	Test details - Acknowledgement of binary message 6		
Test item	Check	Remark	Result
Transmit 4 addressed binary message with consecutive Sequential message identifiers from other Transponder File name: AIABM_4_bin.sst			
Rx of messages (VDM)	Check that the messages are received by VDM output on PI of EUT	UTC 13:40	Passed
Transmission of acknowledgement msg 7	Check transmission of ackn. by VDO output of EUT		Passed
Sequence numbers	Check that sequence number in ackn = sequence number of Rx message		Passed
Ackn. channel	Check that ackn Tx channel = Rx channel		Passed
RX of ackn. msg 7	Check that the ackn. msg are received by Transmitter (VDM/ABK)		Passed

6.1.3 18.1.3 Transmission Retry

(M.1371 A1/5.3.1)

Method of measurement

Set-up standard test environment and operate 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 to 8 sec. Confirm that EUT transmit the overall result with an appropriate message to PI.

Basic test of addressed message is made in **2.1.4.1** **"**14.1.4.1 Transmit an addressed message**"**

2008-07-10 Ba	Test details - Addressed binary message 6		
Test item	Check	Remark	Result
Transmit an addressed binary message 6 by sending an ABM sentence to the PI. PI sentence: File AIABM_bin.sst: The message is addressed to a not available transponder. So no acknowledgement is received. Record the VDO output of VDE with time stamp.			

VDO output of EUT	Check the transmission by VDO	UTC 13:44	Passed
Number of repetitions	Note and check the number or repetitions	3 repetitions	Passed
Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	2 s first transmission 5, 5, 6 s repetitions 4 s ABK	Passed
Retransmit flag	Check that the retransmit flag is set in the retransmissions	The retransmit flag is not set Retest 2008-10-01 Ba: UTC 08:13 The retransmit flag is set in the repetitions	Passed
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)		Passed
Message sequence numbers	Check message sequence numbers of transmissions and ABK		Passed

2008-07-10 Ba	Test details - Addressed safety related message 12		
Test item	Check	Remark	Result
Transmit an addressed safety related message 12 by sending an ABM sentence to the PI. PI sentence: File AIABM_safety.sst: The message is addressed to a not available transponder. So no acknowledgement is received. Record the VDO output of VDE with time stamp.			
VDO output of EUT	Check the transmission by VDO	UTC 13:45	Passed
Number of repetitions	Note the number or repetitions	3 repetitions	Passed
Repetition timing	Record the repetition timing. Note the time between repetitions and check that it is 4...8 s	1 s first transmission 7, 7, 6 s repetitions 4 s ABK	Passed
Retransmit flag	Check that the retransmit flag is set in the retransmissions	The retransmit flag is not set Retest 2008-10-01 Ba: UTC 08:14 The retransmit flag is set in the repetitions	Passed
ABK sentence	Note and check the ABK sentence Confirm the type = 1 (broadcast but no acknowledgement)		Passed
Message sequence numbers	Check message sequence numbers of transmissions and ABK		Passed

6.2 18.1.4 Acknowledgement of Addressed safety related messages

Repeat test under 18.1.2 with addressed safety related message.

The contents of the acknowledgement should be entered in test 4.7.2 16.7.2 Transmitted messages

2008-07-09 Ba	Test details - Acknowledgement of safety related text message 12		
Test item	Check	Remark	Result
Transmit 4 safety related text messages 12 with consecutive sequential message identifiers from other Transponder			
Rx of messages (VDM)	Check that the messages are received by VDM output on PI of EUT	(UTC 13:33) UTC 13:43	Passed
Transmission of acknowledgement msg 13	Check transmission of ackn. by VDO output of EUT		Passed
Sequence numbers	Check that sequence number in ackn = sequence number of Rx message		Passed
Ackn. channel	Check that ackn Tx channel = Rx channel		Passed
RX of ackn. msg 13	Check that the ackn. msg are received by Transmitter (VDM/ABK)		Passed

6.3 18.2 (M.1371 A1/5.3) Interrogation responses

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Apply an interrogation message (msg 15; EUT as destination) to the VDL according to message table 7 for responses with msg 5 and slot offset set to defined value 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 AIS1. Repeat test for AIS2.

A simple operational test is made in 2.1.3.2 14.1.3.2 Interrogation response

The check of the contents of the transmitted message should be entered in 4.7.2 16.7.2 Transmitted messages

The test cases “case 1” to “case 4” are the four cases as defined in ITU-R M1371, “3.3.8.2.11 Message 15 Interrogation”

The requests have to be made by the VDL generator, because a mobile transponder cannot generate requests with slot offset.

2008-07-09 Ba	Test details - case 1- Interrogation of msg 5, Ch 1		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 5 with given slot offset A response shall automatically be transmitted by the EUT Request is transmitted on channel 1			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 13:49	Passed
TX of response (VDO)	Check that response is transmitted by EUT (VDO)		Passed
Response on VDL	Check the response on VDL with the VDL analyser, note slot offset	Slot offset = 10	Passed
Response channel	Check that the response is transmitted on the request channel		Passed

2008-07-09 Ba	Test details - case 1 - Interrogation of msg 5, Ch 2		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 5 with given slot offset A response shall automatically be transmitted by the EUT Request is transmitted on channel 2			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 13:49	Passed
TX of response (VDO)	Check that response is transmitted by EUT (VDO)		Passed
Response on VDL	Check the response on VDL with the VDL analyser, note slot offset		Passed
Response channel	Check that the response is transmitted on the request channel		Passed

2008-07-09 Ba	Test details - case 2 - Interrogation of msg 3 and 5		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 3 and 5 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)		Passed
TX of response 1 (VDO)	Check that response is transmitted by EUT (VDO)		Passed
Response 1 on VDL	Check the response on VDL with the VDL analyser		Passed
Slot selection	Check that the slot offset 1 defined in the request is used		Passed
TX of response 2 (VDO)	Check that response is transmitted by EUT (VDO)		Passed
Response 2 on VDL	Check the response on VDL with the VDL analyser		Passed
Slot selection	Check that the slot offset 2 defined in the request is used		Passed

2008-07-09 Ba	Test details - case 3 Interrogation of msg 5		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 3 from other AIS and msg 5 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)		Passed
TX of response (VDO)	Check that response msg 5 is transmitted by EUT (VDO)		Passed
Response on VDL	Check the response on VDL with the VDL analyser		Passed
Slot selection	Check that the slot offset defined in the request 2.1 is used		Passed

2008-07-09 Ba	Test details - case 4 - Interrogation of msg 3		
Test item	Check	Remark	Result
Transmit an interrogation message 15 requesting msg 3,5 from other AIS and msg 5 from EUT with given slot offsets A response shall automatically be transmitted by the EUT			
RX of request by EUT	Check that the request message is received by the EUT (VDM)	UTC 13:55	Passed
TX of response (VDO)	Check that response msg 5 is transmitted by EUT (VDO)		Passed
Response on VDL	Check the response on VDL with the VDL analyser		Passed
Slot selection	Check that the slot offset defined in the request 2.1 is used		Passed

6.4 18.3 Broadcast messages

(M.1371 A1/5.3)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Initiate the transmission of 5 binary broadcast messages (msg 8) by the EUT. Record transmitted messages on both channels.

Required results

Check that EUT transmits the msg 8 messages on channels A and B alternating.

Test of multislot broadcast messages is done in 2.2 14.2 Multiple slot messages

The check of message contents should be entered in 4.7.2 16.7.2 Transmitted messages

2008-07-09 Ba	Test details - Binary broadcast message 8		
Test item	Check	Remark	Result
Transmit 5 binary broadcast messages 8 by sending 5 BBM sentences to the PI. PI sentence: File AIBBM_5_bin.sst: !AIBBM,1,1,[7;8;9;0;1],0,8,06P0test1,0 AIS channel for broadcast is 0: autoselect The file contains 5 BBM sentences with consecutive sequential message identifiers.			
VDO output of EUT	Check the VDO output on PI	UTC 13:57	Passed
Message content	Check the message content	The data for the message 8 are 52 bit, Together with the 40 bit header the complete message should be 40+52 = 92 bit, but the message length in the VDO is only 88 bit, the last 4 bit are not transmitted Retest 2008-10-01 Ba: Only 11 byte = 88 bit are transmitted (15 char – 2 fill bits) Retests 2009-01-20 Ba: 16 characters or 96 bit are transmitted. The fill bits value is 0.	Passed
Channel	Check Tx alternating channels A and B		Passed
AIABK acknowledgement	Record and check the AIABK acknowledgements		Passed
Message sequence number	Check that message sequence number in ABK = Sequential message identifier of BBM sentence		Passed
MMSI	Check Transmitter MMSI		Passed

2008-07-09 Ba	Test details - Safety related broadcast message 14		
Test item	Check	Remark	Result
Transmit 5 safety related broadcast messages 14 by sending 5 BBM sentences to the PI. PI sentence: File AIBBM_5_safety.sst: !AIBBM,1,1,[6;7;8;9;0],0,8,D5CDi,0 AIS channel for broadcast is 0: autoselect The file contains 5 BBM sentences with consecutive sequential message identifiers.			
VDO output of EUT	Check the VDO output on PI	UTC 13:58	Passed
Channel	Check Tx alternating channels A and B		Passed
AIABK acknowledgement	Record and check the AIABK acknowledgements		Passed
Message sequence number	Check that message sequence number in ABK = Sequential message identifier of BBM sentence		Passed
MMSI	Check Transmitter MMSI		Passed

7 19 Specific Presentation Interface Tests

(7.6)

7.1 19.1 General

The EUT (Equipment Under Test) 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.

The following tests shall be carried out under "Normal" environmental conditions as defined in IEC 60945.

Where appropriate, tests against different clauses of this and other chapters may be carried out simultaneously.

2008-07-17 Ba	Test details - General interface tests		
Test item	Check	Remark	Result
Checksum	Check that the output sentences include a checksum		Passed
	Check that the checksum is correct		Passed

7.2 19.2 Check of the manufacturer's documentation

(7.6.1)

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

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

The following checks for compliance with IEC 61162

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

This Test does not check the documentation, this is done in 1.6 4.3 Manuals. Here the function of the EUT is checked using the documentation information, the content of the documentation is checked if the EUT complies with the requirements.

2010-03-16 Ba	Test details - Check of manufacturers documentation		
Test item	Check	Remark	Result
Approved sentences	Check approved sentences against IEC 61162		Passed
Proprietary sentences	Check proprietary sentences against IEC 61162		Passed
Usage of Fields	Check usage of fields		Passed
Transmission intervals	Check transmission intervals		Passed
Hardware configuration	Check hardware configuration		N/A
Output drive capability	Check output drive capability		Passed
Input load	Check input load		Passed
Electrical Isolation	Check electrical isolation	Not included in the manual, but measured	Passed

7.3 19.3 Electrical test

(7.6.1)

Method of test

Input / Output Ports configured as 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.

2009-06-26 Ba	Test details - Electrical test of inputs		
Test item	Check	Remark	Result
Minimum voltage	Check that input works with minimum input voltage	Tested for sensor port and high speed port	Passed
Maximum voltage	Check that input is not damaged by maximum input voltage		Passed
Input current	Check the input current against the IEC 61162-1 or IEC 61162-2	5 Volt: + 0.31 / - 0.36 mA 10 Volt: + 0.65 / - 0.7 mA 15 Volt: +/- 1 mA	Passed
Electrical Isolation	Check that sensor inputs are electrically isolated		Passed
	Check that high speed inputs are electrically isolated		Passed
	Check that power supply input is electrically isolated (Required by IEC 60945, § 4.6.1		Passed

7.4 19.4 Test of input sensor interface performance

(7.6.2)

Method of measurement

Connect all inputs and outputs of the EUT as specified by the manufacturer and simulate VDL-messages using 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 percent 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 simulated input and all output data is transmitted without loss or additional delay

2008-07-15 Ba	Test details - Test of input sensor interface performance		
Test item	Check	Remark	Result
Load all 3 sensor inputs with 70-80 % of the interface's capacity 1 Sensor input at 4800 with position data 1 Sensor input at 4800 with log data 1 Sensor input at 38400 with heading and ROT data			
VDL contents	Check that the VDL contents agree with in input data		Passed
VDO output	Check that VDO outputs on both high speed ports agree with the sensor input data		Passed
Loss of data	Check that VDL messages are transmitted without loss of sensor data		Passed
	Check that output data at VDO output are sent without loss of sensor data		Passed
Delay of data	Check that there is no delay from sensor input change to VDL messages		Passed
	Check that there is no delay from sensor input change to VDO output		Passed
		After about 15 minutes with high load on the sensor inputs the EUT did not accept further sensor data. Retest 2009-01-20 Ba: After 30 min with high load on the sensor inputs the EUT still accepts the sensor data without delay	Passed

7.5 19.5 Test of sensor input

(7.6.2)

Method of measurement

Set-up standard test environment and operate inputs with simulated sensor data. Record VDL output.

a) simulate sensor information for position, speed, heading, ROT

b) simulate invalid and unavailable data

Required results

a) Verify that the recorded VDL message contents agree with the simulated sensor information.

b) Verify that affected data is set to default values.

Switch off internal GPS to get default values in case of invalid sensor data. The intention of this test is to check the conversion of sensor input data to the VDL messages, VDO output and MKD display including the test, if invalid and unavailable data are recognised.

Fall back behaviour at sensor fail is checked in another test (see 2.9.3 - 14.9.3 Monitoring of sensor data).

For message content of VDL messages 1, 2, 3 (position reports) no special test is required. Please enter the results of this test in that test table (go to 2.3.1 “Information content of msg 1” at the end of this test

7.5.1 GLL sentence

2008-07-15 Ba	Test details – GLL position input		
Test item	Check	Remark	Result
Apply simulated GLL sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Set status/mode to **A,A** Check on VDL	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0		Passed
Check VDO output on PI	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0		Passed
Check Display on MKD	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0	Not displayed	N/A
Set status/mode to **A,D** (differential mode)	Check PA-Flag = 1 on VDL		Passed
	Check PA-Flag = 1 in VDO		Passed
	Check display of differential mode on MKD		Passed
Set status/mode to **V,N** (invalid data) Check on VDL	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
Check on VDO output of PI	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
Check display on MKD	Check latitude = "-----"		Passed
	Check longitude = "-----"		Passed
	Check PA-Flag = 0	Not displayed	N/A
Set status/mode to **V,E** (Estimated position) Check on VDL or PI output	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
Set status/mode to **V,M** (manual position) Check on VDL or PI output	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
Set status/mode to A,A Change for latitude the number of digits after decimal point from 2 to 6	Check that latitude on VDL is correct for all numbers		Passed
Change the latitude to only degrees and minutes, without decimal point	Check that the latitude on VDL is correct		Passed
No GBS sentence applied	Check that RAIM-Flag = 0		Passed

7.5.2 GGA sentence

2008-07-15 Ba	Test details - GGA GPS position input		
Test item	Check	Remark	Result
Apply simulated GGA sentence to the sensor input File name is ais02_gga_vtg_hdt_rot.sst			
Set Mode = 1 (**autonomous**) Check on VDL	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0		Passed
Set mode = 2 (**differential**) Check on VDL	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set mode = 3 (GPS-PPS) Check on VDL	Short check data ok	Data are not accepted See note)	Passed
	Check PA-Flag = 0 on VDL		Passed
Set mode =4 (RTK fixed) Check on VDL	Short check data ok	Data are not accepted See note)	Passed
	Check PA-Flag = 1 on VDL	PA = 0 because position is not used	Passed
Set mode =5 (RTK float Check on VDL	Short check data ok	Data are not accepted See note)	Passed
	Check PA-Flag = 1 on VDL	PA = 0 because position is not used	Passed
Set mode = 6 (dead reck.) Check on VDL	Check that timestamp = 62 Note if data = default	Timestamp = 63. This is accepted because position data are not used	Passed
Set mode = 7 (manual) Check on VDL	Check that timestamp = 61 Note if data = default	Timestamp = 63. This is accepted because position data are not used	Passed
Set mode = 8 (simulated) Check on VDL	Check that timestamp = 63 Short check default data	Timestamp = 63.	Passed
Set mode = 0 (**no fix**) Check on VDL	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check that timestamp = 63		Passed
	Check PA-Flag = 0		Passed

Note)
The positions in mode 3,4,5 are very precise, more precise than in modes 1 and 2, therefore there is no reason not to use the data in these modes.

Because these modes are normally not used in maritime navigation systems it is accepted not to use the positions in these modes.

7.5.3 GNS sentence

2008-07-15 Ba	Test details – GNS satellite position input		
Test item	Check	Remark	Result
Apply simulated GNS sentence to the sensor input, check on VDL File name is ais03_gns_vtg_hdt_rot.sst			
Set Mode = **AA** (autonomous GPS/GLONASS) Check on VDL	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0		Passed
	Check RAIM-Flag = 0		Passed
Set Mode = AN (autonomous GPS/no GLONASS)	Short check data ok		Passed
	Check PA-Flag = 0 on VDL		Passed
Set Mode = A (autonomous GPS/no GLONASS)	Short check data ok		Passed
	Check PA-Flag = 0 on VDL		Passed
Set Mode = NA (no GPS/ autonomous GLONASS)	Short check data ok		Passed
	Check PA-Flag = 0 on VDL		Passed
Set Mode = **DA** (differential GPS/ autonomous GLONASS)	Short check data ok		Passed
	Check **PA-Flag = 1** on VDL		Passed
Set Mode = DD (differential GPS/ differential GLONASS)	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set Mode = DN (differential GPS/ no GLONASS)	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set Mode = D (differential GPS/ no GLONASS)	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set Mode = AD (autonomous GPS/ differential GLONASS)	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set Mode = ND (no GPS/ differential GLONASS)	Short check data ok		Passed
	Check PA-Flag = 1 on VDL		Passed
Set mode = E (estimated position.)	Check that timestamp = 62 Note if data = default	Timestamp = 63. This is accepted because position data are not used	Passed
Set mode = M (manual position)	Check that timestamp = 61 Note if data = default	Timestamp = 63. This is accepted because position data are not used	Passed
Set mode = S (simulated position)	Check that timestamp = 63 Short check default data	Timestamp = 63	Passed
Set Mode = **NN** (no GPS/ no GLONASS)	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed

7.5.4 RMC sentence

2008-07-15 Ba	Test details – RMC position input		
Test item	Check	Remark	Result
Apply simulated RMC sentence to the sensor input File name is ais04_rmc_hdt_rot.sst			
Set status/mode to **A,A** Check on VDL	Check latitude		Passed
	Check longitude		Passed
	Check PA-Flag = 0		Passed
Set status/mode to **A,D** (differential mode)	Short check of valid data		Passed
	Check PA-Flag = 1 in VDO		Passed
Set status/mode to **V,N** (invalid data) Check on VDL	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
Set status/mode to **A,E** (estimated position) (Test if also status is evaluated)	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
	Check SOG = 102.3	SOG is used	Passed
	Check COG = 360°	COG is used	Passed
Set status/mode to **A,M** (manual position) (Test if also status is evaluated)	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
	Check SOG = 102.3	SOG is used	Passed
	Check COG = 360°	COG is used	Passed
Set status/mode to **V,E** (estimated position) (Test if also status is evaluated)	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
	Check SOG = 102.3		Passed
	Check COG = 360°		Passed
Set status/mode to **V,M** (manual position) (Test if also status is evaluated)	Check latitude = 91º		Passed
	Check longitude = 181º		Passed
	Check PA-Flag = 0		Passed
	Check SOG = 102.3		Passed
	Check COG = 360°		Passed

7.5.5 DTM sentence

2008-07-15 Ba	Test details – DTM reference datum		
Test item	Check	Remark	Result
Apply simulated position sentences with DTM. Start with datum not WGS 84, change to WGS 84 and back to not WGS 84			
Apply **GLL** sentence with DTM File name: ais1d_gll_dtm_vtg_hdt_rot.sst Datum = not WGS 84	Check on VDL that data are default data		Passed
Set Datum = WGS 84	Check that data are valid		Passed
Set Datum = not WGS 84	Check that data are changed to default		Passed
Apply **GGA** sentence with DTM File name: ais2d_gga_dtm_vtg_hdt_rot.sst Datum = not WGS 84	Check on VDL that data are default data		Passed
Set Datum = WGS 84	Check that data are valid		Passed
Set Datum = not WGS 84	Check that data are changed to default		Passed

7.5.6 GBS sentence

2008-07-15 Ba	Test details – GBS input		
Test item	Check	Remark	Result
Apply simulated GLL sentence with GBS sentence to the sensor input File name is ais01g_gll_vtg_gbs_hdt_rot.sst			
Fields with expected error of Lat and Lon contain values	Check that RAIM-Flag = 1	UTC 10:34 Position is not excepted if there is a GBS sentence Tested with GLL and GGA Retest 2008-10-01 Ba: • Position is accepted if there is a GBS sentence • The RAIM flag = 1 if the estimated error < 10 m • The RAIM flag = 0 if the estimated error > 10 m Retest 2009-01-20 Ba: The RAIM flag is also set if the estimated error > 10 m	Passed Passed Passed
Fields with expected error of Lat and Lon are empty (NULL fields)	Check that RAIM-Flag = 0	Test 2008-10-01 Ba:	Passed
Apply GLL sentence in normal mode (mode flag = A)			
Set expected error in GPS sentence to < 10 m	Check that PA flag = 1	PA flag = 0 Retest 2009-04-01 Ba: PA flag = 1	Passed
Set expected error in GPS sentence to > 10 m	Check that PA flag = 0	PA flag = 0	Passed
Apply GLL sentence in differential mode (mode flag = D)			
Set expected error in GPS sentence to < 10 m	Check that PA flag = 1	PA flag = 1	Passed
Set expected error in GPS sentence to > 10 m	Check that PA flag = 0	PA flag = 0 Retest 2009-04-01 Ba: PA flag = 1	Passed

7.5.7 VTG sentence

2008-07-15 Ba	Test details – VTG speed input		
Test item	Check	Remark	Result
Apply simulated VTG sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Set mode to **A** (autonomous)	Check SOG		Passed
Check on VDL	Check COG		Passed
Check VDO output on PI	Check SOG		Passed
	Check COG		Passed
Check Display on MKD	Check SOG		Passed
	Check COG		Passed
Set mode to **D** (differential)	Short check SOG/COG ok		Passed
Set mode to **N (**invalid)	Check SOG = 102.3 (default)		Passed
Check on VDL	Check COG = 360 (default)		Passed
Check VDO output on PI	Check SOG = 102.3 (default)		Passed
	Check COG = 360 (default)		Passed
Check Display on MKD	Check SOG = "-----"		Passed
	Check COG = "-----"		Passed
Set mode to E (estimated)	Short check SOG/COG default		Passed
Set mode to M (manual)	Short check SOG/COG default		Passed
Set mode to S (simulated)	Short check SOG/COG default		Passed
Delete SOG-N field and add SOG K-Field (speed in km/h)	Check SOG value in VDL It has to be converted into knots or set to default		Passed

7.5.8 VBW sentence

2008-07-15 Ba	Test details – VBW log input with VTG sentence valid		
Test item	Check	Remark	Result
Apply simulated VBW sentence to the sensor input File name is ais06_gll_vtg_vbw_hdt_rot.sst			
Status of bottom track: **A** (valid) Ahead and across speed available. Check on VDL	Check that SOG = resultant of ahead and across speed		Passed
	COG = calculated from SOG vector and heading		Passed
Check on VDO output of PI	Check SOG = VDL SOG value		Passed
	Check COG = VDL COG value		Passed
Check on MKD	Check SOG = VDL SOG value		Passed
	Check COG = VDL COG value		Passed
Status of bottom track: **V** (invalid) Ahead and across speed not empty. Water speed valid ! Check on VDL	SOG from VTG		Passed
	COG from VTG		Passed
Check on VDO output of PI	SOG from VTG		Passed
	COG from VTG		Passed
Check on MKD	SOG from VTG		Passed
	COG from VTG		Passed
Status of bottom track: A (valid) Ahead available, **across speed empty (**e.g. single axis log)	SOG from VTG		Passed
	COG from VTG		Passed
Status of bottom track: A (valid) Ahead and across speed available, **Heading invalid**	SOG from VTG		Passed
	COG from VTG		Passed

2008-07-15 Ba	Test details – VBW log input, no VTG		
Test item	Check	Remark	Result
Apply simulated VBW sentence to the sensor input, GPS disconnected, No VTG speed available File name is ais08_gll_vbw_hdt_rot.sst			
Status of bottom track: **A** (valid) Ahead and across speed available. Check on VDL	Check that SOG = resultant of ahead and across speed		Passed
	COG = calculated from SOG vector and heading		Passed
Check on VDO output of PI	Check SOG = VDL SOG value		Passed
	Check COG = calculated from SOG vector and heading		Passed
Check on MKD	Check SOG = VDL SOG value		Passed
	Check COG = calculated from SOG vector and heading		Passed
Status of bottom track: **V** (invalid) Ahead and across speed not empty. Water speed valid ! Check on VDL	SOG = default		Passed
	COG = default		Passed
Check on VDO output of PI	SOG = default		Passed
	COG = default		Passed
Check on MKD	SOG = default		Passed
	COG = default		Passed
Status of bottom track: A (valid) Ahead available, **across speed empty (**e.g. single axis log)	SOG = default		Passed
	COG = default		Passed
Status of bottom track: A (valid) Ahead and across speed available, **Heading invalid**	SOG from VBW or default	default	Passed
	COG = default		Passed

7.5.9 OSD sentence

2008-07-15 Ba	Test details – OSD own ship data input		
Test item	Check	Remark	Result
Apply simulated GLL and OSD sentence to the sensor input. External GLL is required for the test because with internal position the speed is taken from the internal source too. File name is ais09_gll_osd.sst			
Heading status = A (valid) Speed reference = B (bottom) Check on VDL	Check SOG from OSD	SOG = default,	Passed
	Check COG from OSD	COG = default	Passed
	Check heading from OSD	Heading is used	Passed
Check VDO output on PI	Check SOG from OSD	SOG = default,	Passed
	Check COG from OSD	COG = default	Passed
	Check heading from OSD	Heading is used	Passed
Check Display on MKD	Check SOG from OSD	SOG = default,	Passed
	Check COG from OSD	COG = default	Passed
	Check heading from OSD	Heading is used	Passed
Set speed reference to P (Positioning system)	Check SOG and COG from OSD		Passed
Set speed reference to R Radar tracking	Check SOG and COG from OSD		Passed
Set speed reference to W (Water speed)	Check SOG = default		Passed
	Check COG = default		Passed
	Check heading from OSD		Passed
Set speed reference to M (Manual)	Check SOG = default		Passed
	Check COG = default		Passed
	Check heading from OSD		Passed
Set speed reference to P (Positioning system) Set **heading status = V** (invalid)	Check SOG from OSD	SOG = default,	Passed
	Check COG from OSD	COG = default	Passed
	Check heading = default	Heading = default	Passed
Change speed reference from N (kn) to K (km/h)	Check SOG value in VDL It has to be converted into knots	Not relavant because SOG is not used	N/A

Note)
Because the OSD is an optional sentence it is acceptable if some information (in this case SOG/COG) is not used

7.5.10 HDT sentence

2008-07-15 Ba	Test details – HDT heading input		
Test item	Check	Remark	Result
Apply simulated HDT sentence to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Heading value = 359.0	Check heading on VDL		Passed
	Check heading on VDO		Passed
	Check heading in MKD		Passed
Change value to 359.9	Check that heading on VDL = 359 or 0, **not 360**	Heading = 0°	Passed
Delete heading value (empty field)	Check that heading = default on VDL		Passed
	Check that heading = default on VDO		Passed
	Check that heading = default on MKD		Passed
Change talker to "HC" (Magnetic compass)	Check that heading is not used		Passed
If HC talker data are used: Apply • A HE talker with valid data • A HC talker without data	Check that only HE data are used and not changed sometime to HC data	Not applicable because heading is not used	N/A
Apply • A HE talker with valid data • A HC talker without data	Check that only HE data are used and not changed sometime to invalid		N/A

7.5.11 ROT sentence

2008-07-15 Ba	Test details – ROT Rate of Turn input		
Test item	Check	Remark	Result
Apply simulated ROT sentence to the sensor input, Talker = TI File name is ais01_gll_vtg_hdt_rot.sst			
ROT status = **A** (valid) ROT value = 0.0 degr./min	Check ROT on VDL		Passed
	Check ROT on VDO		Passed
	Check ROT on MKD		Passed
Change rate of turn to different values according to the check column and check the VDL value. The VDL value has to be the nearest value according the conversion formula (see conversion table)	10 converted to 10.0 (15)		Passed
	20 converted to 19.7 (21)		Passed
	60 converted to 61.1 (37)		Passed
	180 converted to 177.2 or 182.8 (63/64)	177.2	Passed
	360 converted to 361.6 (90)		Passed
	720 converted to 708.7 (126)		Passed
	-20 converted to 19.7 (-21)		Passed
	-720 converted to –708.7 (-126)		Passed
Set ROT status = **V** (invalid)	Check that ROT = default on VDL (default = -731.4 = -128)		Passed
	Check that ROT = default on VDO		Passed
	Check that ROT = default on MKD		Passed
ROT status = A (valid) ROT value = 0.0 degr./min Select other source of ROT (Talker not TI or configuration setting)	Check ROT = 0.0 on VDL		Passed
	Check ROT = 0.0 on VDO		Passed
	Check ROT = 0.0 on MKD		Passed
Change rate of turn to different values according to the check column and check the VDL value. Values have to be according to 6.10.3.6	9 converted to 0		Passed
	11 converted to 720		Passed
	- 9 converted to 0		Passed
	-11 converted to -720		Passed

7.5.12 Additional Tests

2008-07-15 Ba	Test details – Additional Tests		
Test item	Check	Remark	Result
Apply simulated sensor sentences to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
Send sentences without checksum, check on VDL	Check position = default		Passed
	Check SOG/COG = default		Passed
	Check heading = default		Passed
	Check ROT = default		Passed
Send sentences with false checksum, check on VDL	Check position = default		Passed
	Check SOG/COG = default		Passed
	Check heading = default		Passed
	Check ROT = default		Passed
Back to valid checksum Set baud rate of simulator to 38400 Bd, The purpose is to check if input survives wrong baudrate.	Check position = default		Passed
	Check SOG/COG = default		Passed
	Check heading = default		Passed
	Check ROT = default		Passed
Set baud rate of simulator and sensor input also to 38 400, check on VDL	Check position		Passed
	Check SOG/COG		Passed
	Check heading		Passed
	Check ROT		Passed

7.5.13 Compatibility check

For the practical use of AIS transponders mainly in case of retrofit it may make sense that the AIS transponder is compatible to older versions of IEC 61162.

Therefore we accept if an EUT evaluates also sentences according to IEC 61162 Edition 1 (1995)

This is not a test of required functions of the EUT but a record of the capabilities of the AIS transponder.

2008-07-15 Ba	Test details – Compatibility check		
Test item	Check	Remark	Result
Apply simulated sensor sentences to the sensor input File name is ais01_gll_vtg_hdt_rot.sst			
GLL sentence Without mode indicator	Record if position is used	Position is used	
	Check that PA flag is set to 0		Passed
RMC sentence Without mode indicator	Record if position is used	Position is used	
	Check that PA flag is set to 0		Passed
VTG sentence Without mode indicator	Record if SOG/COG is used	SOG/COG is used	
Priority check: • GGA sentence and • GLL sentence without mode indicator	Check that GGA sentence is used	The data from GGA are not used Retest 2008-10-01 Ba: The GGA data are used	Passed
	Check that data from GLL are not used	The data from GLL are used Retest 2008-10-01 Ba: The GLL data are not used	Passed
	Remark	If the mode indicator of the GGA sentence is set to 2 (differential) the position from GGA is used	Passed
		If the mode indicator of the GGA sentence is set back to 1 there is no position (default position) for 1 minute. After 1 minute the GLL position is used again. Retest 2008-10-01 Ba: Same problem, for 1 min there is no position, then the GGA position is used again Retest 2009-01-20 Ba: The EUT switches directly from external DGNSS to external GNSS, without default position for some time	Passed

7.5.14 Check of different inputs

2008-07-15 Ba	Test details – Different inputs		
Test item	Check	Remark	Result
Apply simulated sensor sentences to the sensor inputs File name of 1st part is ais01_gll_vtg_hdt_rot.sst			
Connect simulator to sensor input 2. Change configuration according to the used input	Check position		Passed
	Check SOG/COG		Passed
	Check heading		Passed
	Check ROT		Passed
Connect simulator to sensor input 3. Change configuration according to the used input	Check position		Passed
	Check SOG/COG		Passed
	Check heading		Passed
	Check ROT		Passed
• Connect simulator output 1 to sensor input 1 and apply GLL and VTG. File name is ais10_gll_vtg.sst	Check position		Passed
	Check SOG and COG		Passed
• Connect simulator output 2 to sensor input 2 and apply VBW . , File name is ais11_vbw.sst	Check heading		Passed
• Connect simulator output 3 to sensor input 3 and apply HDT and ROT. File name is ais12_hdt_rot.sst	Check ROT		Passed

7.5.15 Sensor sentences overview

2008-07-15 Ba	Supported sentences overview			
Sentence	Description	Required	Supported	Result
This list is derived from the results of the above tests of the single sentences for overview, not an additional test				
GLL	Geographical Latitude Longitude	required	Yes	Passed
GGA		optional	Yes	Passed
GNS		required	Yes	Passed
RMC		required (COG)	Yes	Passed
DTM		required	Yes	Passed
GBS		required	Yes	Passed
VTG	Velocity True Ground	optional	Yes	Passed
VBW	Velocity Bottom Water	required	Yes	Passed
OSD	Own Ship Data	optional	Yes, only heading	Passed
HDT	Heading	required	Yes	Passed
ROT	Rate of Turn	required	Yes	Passed

7.6 19.6 Test of high speed output

(7.6.3)

Method of measurement

Set-up standard test environment and simulate VDL-position reports using test system. Record output from the EUT high speed port (see table 11).

Required results

Verify that the recorded message contents agree with the simulated VDL contents (VDM) and own transmitted data (VDO) and in accordance with the sentence specifications of IEC 61162-1.

This contents of VDM and VDO are checked in

- 4.7.1 16.7.1 Received messages and
- 4.7.2 16.7.2 Transmitted Messages

7.6.1 VDM – Received message

2008-07-15 Ba	Test details – Content of received messages		
Test item	Check	Remark	Result
Transmit all types of messages from other AIS transponder or VDL generator . Check the field content of the fields listed under Test item.			
Message id	8 binary broadcast message, multi slot File name: AIBBM_multi_bin.sst		
Number of sentences	Check that value = 3		Passed
Check sentence number	Check that value = 1,2,3 according to length of message		Passed
Sequential message ident.	Check that counting from 0...9 modulo 10	It seems the sequential message identifier is counted up for each message (VDM,VDO). It should count up only for multi-sentence messages Retest 2008-10-01 Ba: The sequential message identifier is counted up for each multi-sentence messages	Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0 (msg length = 1008 bit)		Passed
Message id	14 Safety related broadcast message, multi slot File name: AIBBM_multi_safety.sst		
Number of sentences	Check that value = 3		Passed
Check sentence number	Check that value = 1,2,3		Passed
Sequential message ident.	Check that counting from 0...9 modulo 10	It seems the sequential message identifier is counted up for each message (VDM,VDO). It should count up only for multi-sentence messages Retest 2008-10-01 Ba: The sequential message identifier is counted up for each multi-sentence messages	Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 1000)		Passed

	Additional checks		
Length of sentence	Confirm that no sentence exceeded the length of 82 character (no warning from monitor program)	The ACA output exceeds the length of 82 characters. The resolution of the LAT and LON values should be reduced from 0.01 to 0.1 minutes. The resolution of the area setting is only 0.1 minutes, so there is no reason to output a higher resolution. Retest 2008-07-15 Ba: The ACA output length is ok	Passed
Checksum	Confirm that no sentence had a wrong checksum (no warning from monitor program)		Passed

7.6.2 VDO Transmitted messages

2008-07-15 Ba	Test details – Content of transmitted messages		
Test item	Check	Remark	Result
Transmit all applicable types of messages Check the field content of the fields listed under Test item.			
Message id	8 binary broadcast message, multi slot File name: AIBBM_multi_bin.sst		
Number of sentences	Check that value = 3		Passed
Check sentence number	Check that value = 1,2,3 according to length of message		Passed
Sequential message ident.	Check that counting from 0...9 modulo 10	The sequential message identifier is taken from the BBM input sentences	Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 0 (msg length = 1008 bit)		Passed
Message id	14 Safety related broadcast message, multi slot File name: AIBBM_multi_safety.sst		
Number of sentences	Check that value = 3		Passed
Check sentence number	Check that value = 1,2,3		Passed
Sequential message ident.	Check that counting from 0...9 modulo 10	It seems the sequential message identifier is counted up for each message (VDM,VDO). It should count up only for multi-sentence messages Retest 2008-10-01 Ba: The sequential message identifier is counted up for each multi-sentence messages	Passed
Channel	Check that the correct value A and B is output		Passed
Fill bits	Check that value = 2 (msg length = 1000 bit)		Passed
	Additional checks		
Length of sentence	Confirm that no sentence exceeded the length of 82 character (no warning from monitor program)		Passed
Checksum	Confirm that no sentence had a wrong checksum (no warning from monitor program)		Passed

7.7 19.7 High speed output Interface performance

(7.6.3)

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 EUT on port for "external Display" and "auxiliary Display".

Required results

Confirm that EUT outputs all received messages to the PI. Repeat test for port "auxiliary display".

Date	Result	Status
2008-04-16	99.3 % of the transmitted messages are output as VDM, 99.5% on channel A and 99.1% on channel B	Passed

7.8 19.8 Test of high speed input

(7.6.3)

Method of measurement

Set-up standard test environment. Apply simulated input data, in accordance with the sentence specifications of IEC 61162-1 and 7.6.3.3 table 10, to the EUT and record VDL output.

Required results

Verify that the VDL message contents agree with simulated input data.

Date	Format	Result	Status
	VSD	See test details below	
	SSD	See test details below	

All other sentences are tested in special test items

2008-07-15 Ba	Test details – Evaluation of SSD sentence		
Test item	Check	Remark	Result
Apply an SSD sentence to an high speed input (PI)			
VDL transmission	Check that msg 5 is transmitted after change of data by SSD sentence		Passed
	Check that msg 5 is transmitted only if a field has been changed		Passed
Call sign	Check that the new call sign is transmitted in msg 5		Passed
	Check that the new call sign is displayed on MKD		Passed
Ship's name	Check that the new ship's name is transmitted in msg 5		Passed
	Check that the new ship's name is displayed on MKD		Passed
External sensor A – Distance from bow B – Distance from stern C – Distance from port D – Distance from starboard	Check that the new dimensions are transmitted in msg 5		Passed
	Check that the new dimensions are displayed on MKD	The new dimensions are not displayed on the MKD Retest 2008-10-01 Ba: No change Retest 2009-04-06 Ba: Only the length is displayed. See note 2) Retest 2009-06-26 Ba: No change, only the length is displayed, not the A,B,C,D values Retest 2009-07-22 Ba: The A, B, C and D values are displayed	Passed

Internal sensor A – Distance from bow B – Distance from stern C – Distance from port D – Distance from starboard	Check that the new dimensions are transmitted in msg 5	The dimension/setting values are always used for the external sensor, independent of the "Source identifier" Retest 2008-10-01 Ba: The dimension/setting values are correctly used according to the source identifier field	Passed
	Check that the new dimensions are displayed on MKD	The new dimensions are not displayed on the MKD Retest 2008-10-01 Ba: No change Retest 2009-04-06 Ba: Only the length is displayed. See note 2) Retest 2009-06-26 Ba: No change, only the length is displayed, not the A,B,C,D values Retest 2009-07-22 Ba: The A, B, C and D values are displayed	
DTE indicator flag	Check if the DTE flag is entered in VDL message 5 Not required	The DTE flag is not set to 1 according to the SSD sentence. It is also not set to 1 if the MKD is disconnected, but there is an alarm ALR 008 MKD connection lost Retest 2008-10-01 Ba: Now the DTE flag is always set to 1 (no DTE available) even if the MKD is available and/or the DTE field in the SSD sentence is 0. Retest 2009-01-20 Ba: The DTE flag strictly follows the SSD input Note 1)	Passed

Note 1)
This fulfills the current requirements but it is not a sufficient solution.

The purpose of the DTE flag is to indicate the receiving stations if this station is able to display text message to the operators.

If the DTE flag strictly follows the SSD sentence the indication may be wrong:

DTE flag in SSD	MKD available	Proposed DTE flag in msg 5	Implemented DTE flag in msg 5
0	Yes	0	0
0	No	0	0
1	Yes	0	1
1	No	1	1

If the DTE flag in the SSD sentence is 1 and the MKD is available, the DTE flag in msg 5 is 1 but should be 0 because the MKD can display the message.

Therefore we recommend the proposed handling of the DTE flag.

Note 2)
Settings from SSD and VSD input are only stored in the transponder, not in the MKD.

The ship data in the MKD (e.g. RADAR Pilot) is the primary data base of ship data. At start of the MKD or the transponder the AIS transponder gets the settings from the MKD.

So if there is an SSD or VSD input there is an temporary difference between the settings of the MKD and the settings of the transponder.

This is acceptable if the user is able to verify which data are actually transmitted. This is fulfilled for all data except the Dimension/reference data. Only the length is displayed. Also because the configuration with the 3 different reference positions and 2 offsets is rather complex it is important to be able to see the A,B,C,D values which are transmitted.

2008-07-15 Ba	Test details – Evaluation of VSD sentence		
Test item	Check	Remark	Result
Apply an VSD sentence to an high speed input (PI)			
VDL transmission	Check that msg 5 is transmitted after change of data by VSD sentence		Passed
	Check that msg 5 is transmitted only if a field has been changed		Passed
Navigational status	Check that the new Navigational status is transmitted in msg 1		Passed
	Check that the Navigational status is displayed on MKD		Passed
Type of ship and cargo	Check that the new type is transmitted in msg 5		Passed
	Check that the new type of ship is displayed on MKD	The type of ship and cargo from VSD is not displayed on the MKD Retest 2009-04-06 Ba: The type of ship and carge is displayed on the MKD	Passed
Maximum actual static draught	Check that the new draught is transmitted in msg 5		Passed
	Check that the new draught is displayed on MKD		Passed
Destination	Check that the new destination is transmitted in msg 5		Passed
	Check that the new destination is displayed on MKD		Passed
Estimated Time of Arrival (ETA)	Check that the new ETA is transmitted in msg 5		Passed
	Check that the new ETA is displayed on MKD		Passed
Regional application flag	Check if the regional application flag is entered in VDL message 1		Passed
Persons on board	Check if the persons on board are displayed on MKD Not required	The number of persons on board from VSD is not displayed on the MKD Retest 2009-04-06 Ba: Only the length is displayed. See note)	Passed

8 20 DSC functionality tests

(M.1371 A3)

Remark:

In the first test phase the DSC polling function has been implemented. This polling function has been tested with the below results.

After the publication of ITU-R M.1371-3 which does no longer require DSC polling the manufacturer has decided to remove the DSC polling from the equipment.

Therefore the polling related test result are not relevant for the final product.

8.1 20.1 General

(M.1371 A3/1)

(a) For the tests in this clause, set the EUT into autonomous mode using channels AIS1 and AIS2 with a reporting interval of 2 s (for method of measurement see also IEC 61993-1).

(b) Check with a sequence of valid calls consisting of a test signal number 1, a geographic call from ITU-R M.493, a test signal number 1, an individual call from ITU-R M.493 and a test signal number 1 that the EUT correctly receives and processes the three tests calls and its correct AIS operation is not affected by the interleaved calls.

(c) Check that the EUT does not respond to invalid calls - incorrect MMSI, position outside addressed geographic area, different course, or ship's type.

(d) Send to the EUT a standard test signal number 1 but with symbol numbers 104 and 03 followed by values 01 and 120 (Activate alternate system with group number 1 and sequence number 120). Check that the EUT does not respond.

2008-04-22 Ba	Test details – General DSC functions check		
Test item	Check	Remark	Result
This is a first check that DSC transmission, reception and addressing is working in principle. Special addressing and data content checking is done in special tests			
Start DSC transmission of Test signal 1 (Position and name request) File name is "eut\Test_Signal_1.sst"	Check that the call is answered -> Contents are checked in a special test	About 50% of the calls are not responded Retest 2008-07-16 Ba: Still about 50% of the calls are not responded. It may not to be a receiving problem but a problem of transmitting the response Retest 2009-06-26 Ba: At receiving of the polling message the EUT restarts. The security log data which were recorded before the restart are completely modified Retest 2009-07-22 Ba:	

		The DSC polling call is ignored, the security log is not affected.	Passed
Start DSC transmission of area addressed call (Position and name request) File name is "area_pos_name_rq.sst"	Check that the call is answered within 20 s Contents are checked in a special test	All calls have been responded	Passed

2008-07-16 Ba	Test details (b) – Sequence of 5 calls		
Test item	Check	Remark	Result
Set reporting interval to 3 s and record VDL			
Start DSC transmission of test sentence File name is "eut\Sequence_20_1.sst" Delay between the calls is 3 s	Check that the three test signal 1 calls are acknowledged		Passed
	Check that the two M.493-calls are not acknowledged		Passed
	Check that the schedule of the AIS position reports is not changed by the transmission of the DSC calls		Passed
Increase the channel load so that there are no 20 free succeeding slots (1 position report every 5 slots) Transmit test signal 1	Check that no responses are transmitted by the EUT		Passed

2008-07-16 Ba	Test details (c), (d) – Check of addressing		
Test item	Check	Remark	Result
Start DSC transmission of Test signal 1 (Position and name request) File name is “eut\Test_Signal_1.sst” Change MMSI according to the test item			
With correct MMSI	Check that the call is answered		Passed
Change MMSI to not matching value	check that call is not answered		Passed
Start DSC transmission of area call (Position and name request) File name is “area_pos_name_rq.sst” Change position, course and type of ship according to the test item			
Position inside area	Check that the call is answered within 20 s		Passed
Change position to outside the area,	check that call is not answered		Passed
Position inside area again, add course matching the course of ship,	check that call is answered		Passed
Change course to a value differing > 2 degrees	Check that call is not answered		Passed
Delete course, add matching type of ship	check that call is answered		Passed
Change type of ship to All ships of this type	check that call is answered		Passed
Change type of ship	Check that call is not answered		Passed
Position inside area , area now in a critical region (lon about 180 degr.) File name =area_pos_name_rq_180.sst	Check that the call is answered within 20 s		Passed
Change position to outside the area,	check that call is not answered		Passed
Start DSC transmission of Selective call with command “Activate alternate system” File name is “eut\sel_act_alt_system.sst”			
Sel. Call with symbols: 104+03+01+120 (68+03+01+78)hex	Check that EUT does not transmit a response		Passed

8.2 20.2 Regional area designation

(M.1371 A3/5)

Perform the test specified in 17.2 using the following DSC command:

Send to the EUT a standard test signal number 1 but with symbol numbers appropriate to the geographical regions and channels specified in the test. Note the transition boundary is 5nm in this test.

2008-07-16 Ba	Test details – Regional area designation		
Test item	Check	Remark	Result
Send a selective region setting call File name “eut\sel_set_region.sst”	Check that an acknowledgement is received		Passed
	Check that an ACA sentence is output at PI port		Passed
	Check that new region is stored in the region list of the EUT		Passed
	Check that transition zone is 5 nm		Passed
Send a area addressed region setting call File name “area_set_region.sst”	Check that an acknowledgement is received		Passed
	Check that an ACA sentence is output at PI port		Passed
	Check that new region is stored in the region list of the EUT		Passed
Send a selective call with channel setting in the area in use. File name”eut\sel_set_ais_channel_65.sst”	Check that an acknowledgement is received		Passed
	Check that AIS channels are set according to the call content		Passed
	Check that new AIS channels are used for transmission and reception		Passed

2008-07-16 Ba	Test details – Channel management test of 17.2		
Test item	Check	Remark	Result
Set-up EUT in autonomous mode transmitting on channel AIS1/AIS2, send 2 DSC messages, defining 2 adjacent areas with channels A1, B1 and A2, B2. File name is area_set_region_20_2.sst Use external sensor input to simulate a voyage through both areas. Set the position outside the areas. Set the positions near the limits of the transitional zones to check the dimensions. The transitional zone is 5 nm by default			
MKD display defined area	Check that the defined areas are correctly displayed on MKD or output as ACA on request		Passed
Item 1:	Check that channels AIS1 and AIS2 are in use		Passed
Item 2: Move position into transitional area of region 2	Check the TZ size (5 Nm = 5 minutes)		Passed
	Check that channel AIS 1 and A2 are used		Passed
	Check that reporting rate is doubled		Passed
Item 3: Move position into region 2	Check the TZ size (5 Nm = 5 minutes)		Passed
	Check that channel A2 and B2 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Item 4: Move position into transitional area between region 1 and 2	Check that channels A2 and A1 are used		Passed
	Check that reporting rate is doubled		Passed
Item 5: Move position into region 1	Check that channels A1 and B1 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed
Move position into transitional area of region 1	Check that channels A1 and AIS1 are used		Passed
	Check that reporting rate is doubled		Passed
Move position out of the transitional zone of region 1	Check that channels AIS1 and AIS2 are used		Passed
	Check that reporting rate is changed back to normal reporting rate		Passed

8.3 20.3 Scheduling

(M.1371 A3/2)

Check that the time sequence of the TDMA messages is not changed when the EUT transmits a DSC signal.

Send a valid geographical call to the EUT. Check that the response is transmitted after a random delay distributed over the range of 0 to 20 s and subject to the restrictions of ITU-R M.1371 A3/2.2..

Send a valid geographical call to the EUT followed by a signal consisting of test signal 1 with a signal level of -107 dBm at the receiver input of 25 s duration. Check that the response is not transmitted.

2008-07-16	Test details – Scheduling		
Test item	Check	Remark	Result
Set reporting interval to 2 s and record VDL			
Start DSC transmission of test signal 1 File name: "eut\test_signal_1.sst" Delay between calls is 3 s	Check that the schedule of the AIS position reports is not changed by the transmission of the DSC calls		Passed
Send area addressed calls with a rate of 30 s for about 30 min. File name is "area_pos_name_rq.sst"	Record the transmissions and responses with time stamp and enter delay times in a prepared Excel sheet. Add diagram and check times	See diagram	Passed
Start DSC transmission Test sequence 20.3 (Area call + 25 s test signal 1) File name: "test_sequence_20_3.sst"	Check that EUT does not transmit a response		Passed

8.4 20.4 Polling

(M.1371 A3/3)

(a) Check that the EUT is capable of receiving, processing and automatically transmitting a response to the following calls from ITU-R M.825: 101 (command to duplex-channel), 102, 103, 108, 109, 111, 112, and 116. The sequence of calls consisting of test signals number 1 and valid geographic calls shall demonstrate the capability of the EUT to operate on single frequency channels as well as on two frequency channels.

(b) Verify through this test, that ships maritime mobile service identify (MMSI), ship name, ships length and type of ship is programmed into the EUT.

(c) Send a standard test signal number 1 with additional symbols number 109 and 116 and check that the reply messages 100, 119 and 120 are programmed automatically.

(d) Check that when information is not available to respond to a command the transmitted response is followed by the symbol 126.

(e) Send a standard test signal number 1 with additional symbol 101 followed by channel number 87. Repeat the test with channel number 88 and with symbol 104 and 00 followed by channel number 2087 and 2088. Check in all cases that the response is made on channel 70.

(f) Send a DSI sentence to CH 4 and CH 5 (see annex D) with an individual station address and with command sets 103 (report your position) and 111 (report ship name). Check that the EUT does not transmit a DSC message.

(g) Set the RF output power of the EUT high / low using the appropriate DSC command. Check that the output power is set accordingly.

2008-07-16 Ba	Test details (a),(b),(c) – Information polling		
Test item	Check	Remark	Result
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Set channel (101+xx) (101+ch 6) (65h+06h)	Check that direct answer on channel xx		Passed
	Check if following answers on channel xx		Passed
Request automatic position report (102+xx) (66 xx) hex	Check that immediate response with EOS=BQ is received	EOS = RQ Remark: This is not correct but it is not critical. Therefore it is accepted	Passed
	Check automatic reporting rate		Passed
	Check that further TX are transmitted with EOS = RQ (117)		Passed
	Check that automatic reporting is finished after 5 transmissions (without ackn. by base station)		Passed
	Check that the automatic reporting is not finished with ackn. by base station with symbol 110 (short ackn)	Automatic reporting is finished Retest 2009-06-26 Ba: Not relevant because the polling function is announced to be removed	N/A
	Check that the automatic reporting is not finished with ackn. by base station with call contents in ackn (normal ackn)	Automatic reporting is finished	N/A
Send message with 102+00 (66 00) hex	Check that the automatic position report is finished		Passed
Request position (103) (67 hex)	Check position in response		Passed
	Check time		Passed
	Check type of ship		Passed
Request length of ship (108=6Ch)	Check length of ship (124=7Ch)		Passed
Request course (109=6Dh)	Check course (119=77h)		Passed
Request ships name (111=6Fh)	Check name (115=73h)	Remark:	Passed

		If the name includes an underscore "_" there is no response. The underscore is a legal name character for AIS names but not included in the DSC character table (ITU-R M.825-3, Annex 1, Table 1).	
Request ackn. (112=70h)	Check ackn. (110=6Eh)		Passed
Request speed (116=74h)	Check speed (120=78h)		Passed
(C) Request test signal 1 (pos, name request) + 109 + 116 (6F 67 6D 74))	Check automatic response submitting • name (115=73h), • position (100=64h), • course 119=77h) and • speed (120=78h)		Passed
Send • modified test signal 1 (101+72)=(65h+48h) (set DSC channel to a simplex channel) + • Geographically addressed call. File: sel_check_channel.sst	Check that the communication on selected simplex channel is working		Passed
Send • Modified test signal 1 (101+60) =(65h+3Ch) (set DSC channel to a duplex channel) + • Geographically addressed call.	Check that the communication on selected duplex channel is working		Passed
	Check that the AIS transmits on the ship station frequency of the duplex channel (lower band frequency)		Passed

2008-07-16 Ba	Test details (d) – polling, information not available		
Test item	Check	Remark	Result
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst" Change request symbols according to the test item.			
Request position (103 = 67h)	Check response = (100+126) = (64 7E)h		Passed
Request length of ship (108 = 6Ch)	Check length of ship (124+126) = (7C 7E)h		Passed
Request course (109 = 6Dh)	Check course (119 + 126) = (77 7E)h		Passed
Request ships name (111 = 6Fh)	Check name (115 + 126) = (73 7E)h	Name cannot really be deleted	N/A
Request speed (116 = 74h)	Check speed (120 + 126) = (78 7E)h		Passed

2008-07-16 Ba	Test details (e) – Use of AIS channels for DSC		
Test item	Check	Remark	Result
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Set channel (101+87) (65 57) + 67 (pos requ.)	Check that response is transmitted on channel 70		Passed
Set channel (101+88) (65 58) + 67	Check that response is transmitted on channel 70		Passed
Set channel (104+00+2087) (68 00 14 57) + 67	Check that response is transmitted on channel 70		Passed
Set channel (104+00+2088) (68 00 14 58) + 67	Check that response is transmitted on channel 70		Passed

2008-07-16 Ba	Test details (f) – DSI sentence check		
Test item	Check	Remark	Result
Apply DSI sentence to the PI interface. File name is ais_dsi.sst			
ON CH4 = PI interface	Check that the EUT does not transmit a DSC message.		Passed

2008-07-16 Ba	Test details (g) – Power setting check		
Test item	Check	Remark	Result
Start DSC transmission of Test signal 1. File name is "eut\Test_Signal_1.sst". Modify sentence according test item			
Ad symbols to set power = 2 watt (low power)	Check that response is transmitted with low power		N/A
(Symbols 104+ 01+ 02) (68 01 02) h	Check that the actual active area is also set to low power		N/A
Request position (103 = 67 h)	Check that response is transmitted with low power		N/A
Ad symbols to set power = 12.5 watt (high power)	Check that response is transmitted with high power		N/A
(Symbols 104+ 01+ 12) (68 01 0C) h	Check that the actual active area is also set to low power		N/A
Request position (103 = 67 h)	Check that response is transmitted with high power		N/A

9 21 Long Range functionality tests

(9)

9.1 21.1 LR interrogation

(9.2)

Method of measurement

Set-up standard test environment and operate 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 EUT to

- *Automatic response*
- *Manual response via MKD*
- *Manual response via PI*

Required results

Check that EUT displays LR interrogation messages and sends to PI.

Check that EUT outputs a LR position report message

- *Automatically (and indicates action on display)*
- *After manual confirmation via MKD*
- *After manual confirmation via PI*

2008-04-22 Ba	Test details – LR automatic response, all data		
Test item	Check	Remark	Result
Set EUT to automatic response. Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Response	Check that a response is output on LR port		Passed
Display on MKD	Check that the request is displayed on MKD		Passed
	Check that replay status is displayed on MKD		Passed
PI output	Check that LR interrogation and response is output on PI	There is only a proprietary sentence indicating the LR request, similar to the LRF sentence. We recommend to output a copy of the interrogation and response on PI Retest 2009-01-20 Ba: • A copy of the LR request sentences is output on PI • A copy of the response is also output on PI A copy of the response is output on the PI port	Passed

Contents of LRF response	Check output of LRF sentence		Passed
	Check that sequence number = request		Passed
	Check MMSI = requestor		Passed
	Check name of requestor		Passed
	Check function request = request		Passed
	Check that function reply is according to the availability of data (2=avail, 3= not av.)		Passed
Contents of LR1 response	Check output of LR1 sentence		Passed
	Check that sequence number = request = LRF		Passed
	Check MMSI of responder = own MMSI		Passed
	Check MMSI of requestor		Passed
	Check ship's name	The ships name is missing, null field Retest 2009-01-20 Ba: The ship's name is output	Passed
	Check Call sign		Passed
	Check IMO number		Passed
Contents of LR2 response	Check output of LR2 sentence		Passed
	Check that sequence number = request = LRF		Passed
	Check MMSI of responder = own MMSI		Passed
	Check date, UTC		Passed
	Check Lat, Lon		Passed
	Check COG		Passed
	Check SOG		Passed
Contents of LR3 response	Check output of LR3 sentence		Passed
	Check that sequence number = request = LRF		Passed
	Check MMSI of responder = own MMSI		Passed
	Check destination		Passed
	Check ETA		Passed
	Check draught		Passed
	Check ship/cargo		Passed
	Check length of ship		Passed
	Check breadth of ship		Passed
	Check ship type		Passed
	Check persons		Passed

2008-07-17 Ba	Test details – LR automatic response, selected data		
Test item	Check	Remark	Result
Set EUT to automatic response. Apply an addressed request to the LR port of EUT requesting selected information File name: LRI_LRF_MMSI_all.sst, modified by deleting not requested information			
Request A Name Call sign IMO number	Check that only LF and LR1 is transmitted		Passed
	Check that function request field = request		Passed
	Check that function reply status field matches request and data availability		Passed
	Check that the requested fields are not empty	The name field is empty Retest 2009-01-20 Ba: The ship's name is output	Passed
Request A,E,F Name Call sign IMO number COG SOG	Check that LRF, LR1 and LR2 is transmitted		Passed
	Check that function request field = request		Passed
	Check that function reply status field matches request and data availability		Passed
	Check that requested fields are provided		Passed
	Check that only requested fields are not empty	The "E" and "N" fields of the position are not empty Retest 2009-01-20 Ba: The "E" and "N" fields of the position are empty	Passed
Request C,E,F Position COG SOG	Check that LRF, LR1 and LR2 are transmitted		Passed
	Check that function request field = request		Passed
	Check that function reply status field matches request and data availability		Passed
	Check that requested fields are provided		Passed
	Check that only requested fields are not empty		Passed
Request P,W Ship/cargo Persons	Check that LRFand LR3 is transmitted		Passed
	Check that function request field = request		Passed
	Check that function reply status field matches request and data availability		Passed
	Check that requested fields are provided		Passed
	Check that only requested fields are not empty		Passed

2008-07-17 Ba	Test details – Manual Confirmation		
Test item	Check	Remark	Result
Set EUT to manual response. Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Display on MKD	Check that the request for manual response is displayed on MKD	A alarm is displayed on the main screen. In the alarm list the Interrogation is displayed	Passed
	Check that response is transmitted after manual confirmation on MKD		Passed

2008-07-17 Ba	Test details – Confirmation via PI		
Test item	Check	Remark	Result
Set EUT to external or manual confirmation as implemented Apply an addressed request to the LR port of EUT requesting all possible information File name: LRI_LRF_MMSI_all.sst			
Confirmation via PI	Check that the request for manual response is output on PI (Copy of long range request input)	There is only a proprietary sentence indicating the LR request, similar to the LRF sentence. We recommend to output a copy of the interrogation and response on PI Retest 2009-01-20 Ba: • A copy of the LR request sentences is output on PI	Passed
	Check that response is transmitted after external confirmation via PI using the LRF sentence	• There is no response with the standard LRF sentence • There is a response on a propriatery sentence Retest 2009-01-20 Ba: No change Retest 2009-06-25 Ba: There is a response	Passed

9.2 21.2 LR "all ships" interrogations

(9.2)

Method of measurement

Set-up 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 ships position; Record LR output port. Set EUT to

- *Automatic response*
- *Manual response.*

Repeat check with own ship outside specified area.

Required results

Check that EUT outputs a LR position report message

- *Automatically (and indicates action on display)*
- *After manual confirmation.*

No response shall be output on the repeat check.

2008-07-17 Ba	Test details – Area addressing - Automatic response		
Test item	Check	Remark	Result
Set EUT to automatic response Apply an area addressed request to the LR port of EUT requesting position and speed information			
Own position in Area File name: LRI_LRF_area_CEF.sst	Check that the request is automatically responded		Passed
	Check that the request and response status is displayed on MKD		Passed
	Check that the request and response is output on PI	• The request is output with proprietary sentence. We recommend to use the standard sentences • The response is not output. We recommend to output the response on PI Retest 2009-01-20 Ba: • A copy of the LR request sentences is output on PI • A copy of the response is also output on PI	Passed
Own position not in Area File name: LRI_LRF_out_area_CEF.sst	Check that the request is not responded		Passed
	Check that the request is not displayed on MKD		Passed
	Check that the request is not output on PI		Passed

2008-07-17 Ba	Test details – Area addressing – Manual confirmation		
Test item	Check	Remark	Result
Set EUT to manual response Apply an area addressed request to the LR port of EUT requesting position and speed information			
Own position in Area File name: LRI_LRF_area_CEF.sst	Check that the request is displayed on MKD		Passed
	Check that response is transmitted on confirmation on MKD		Passed
	Check that the request and response is output on PI	• The request is output with proprietary sentence. We recommend to use the standard sentences • The response is not output. We recommend to output the response on PI Retest 2009-01-20 Ba: • A copy of the LR request sentences is output on PI • A copy of the response is also output on PI	Passed
Own position not in Area File name: LRI_LRF_out_area_CEF.sst	Check that the request is not displayed on MKD		Passed
	Check that the request is not output on PI		Passed

9.3 21.3 Consecutive LR "all ships" interrogations

(9.2)

Method of measurement

Set-up standard test environment and operate EUT in autonomous mode. Set EUT to automatic mode. Apply 5 LR "all ships" interrogation messages to the LR-interface port of EUT defining a geographical area which contains own ships position;

Record LR output port. Set the control flag in the LRI message to

- *0 (reply on first interrogation only)*
- *1 (reply on all applicable interrogations)*

Required results

Check that EUT outputs a LR position report message

- *On the first interrogation only*
- *On all interrogations.*

2008-07-17 Ba	Test details – Area addressing - Automatic response		
Test item	Check	Remark	Result
Set EUT to automatic response Apply some area addressed requests to the LR port of EUT requesting position and speed information File name: LRI_LRF_area_CEF.sst			
Control flag = 1 (reply on all requests)	Check that the 1. request is automatically responded		Passed
	Check that the following interrogations are responded		Passed
Control flag = 0 (reply only on first request) Change MMSI to get the first response	Check that the 1. request is automatically responded		Passed
	Check that the following interrogations are not responded		Passed
	Check that the following interrogations are not displayed on MKD		Passed
	Check that the following interrogations are not output on PI		Passed

Annex A Test equipment

A.1 Test equipment summary

#	description	type	identification
1	VDL analyser / Generator	Attingimus UAIS Test unit	S/N 001 BSH PC5593 SW AISterm V1.0rev47 AISmain V1.47011120R
2	Target simulator	Simutech	BSH PC3007 SW BSHSIM7T
3	Presentation Interface Monitor	BSH	BSH PC 3481 BSH PC 3544 SW NewMoni V2.1
4	DSC Testbox	DEBEG 3817 DEBEG 6348	S/N 475533
	Auxiliaries:		
5	Digital Multimeter	Voltcraft	S/N 1010365036
6	Fluke Scopemeter	123	BSH 101275/2001
7	5 Converters RS 422 to RS 232		
8	1 fixed voltage power supply (24 V/10A)		
9	3 adjustable power supplies (30 V/5 A)		
10	active retransmitting GPS antenna		

for a description of pos. 1-4 see below

A.1.1 VDL analyser / generator

The VDL analyser/generator:

- receives the radio data telegrams transmitted by the AIS under test, slotwise evaluates their radio parameters (field strength, SNR, etc.) and provides a transparent display of the decoded radio data telegrams (VDL messages).
- transmits radio data telegrams which have been entered/edited via a control panel. The AIS under test receives these messages and either passes the received data to it's presentation interface and/or responds as appropriate.
- records all data contained in the received radio telegrams and radio parameters in a data base for offline evaluation and documentation purposes.
- simulates AIS targets by transmitting position reports of virtual targets up to the maximum channel capacity.

A.1.2 Target simulator

The target simulator consists of a standard PC with

- special Radar and Target Simulator software
- extension boards for generation of Radar signals and RS422 serial output signals

Connection of AIS Test system
For tests of AIS transponders the data of 60 moving targets defined in the Radar Simulator are transferred to the VDL Generator and transmitted on VHF. Thus the AIS VHF data link is loaded with simulated AIS targets.
Connection of display systems
Radar systems as well as ECDIS systems will have the ability to receive, process and display AIS information in the near future. In order to test this feature the data of moving targets defined in the Radar Simulator are transferred to the RADAR (together with video, sensor data etc as known).
Connection of AIS under Test
The AIS under test can be connected to the own ship sensor outputs in order to provide full control over own ships dynamic data (for tests of reporting rates, channel management...).

A.1.3 Presentation Interface Monitor

The Presentation Interface Monitor is a PC software running on two standard PCs.
It is used to

- simulate Sensor inputs
- analyse the AIS high speed input / output
- analyse the AIS long range function
- generate DSC calls for the DSC test box and to display, log and evaluate the received DSC calls from EUT.

For that purpose it includes the functions:

- coding / decoding of NMEA 6-bit data fields
- online AIS message filtering
- online AIS message editing
- load and transmit predefined sequences
- online modification of transmitted sequences

A.1.4 DSC Testbox

The DSC test box includes:

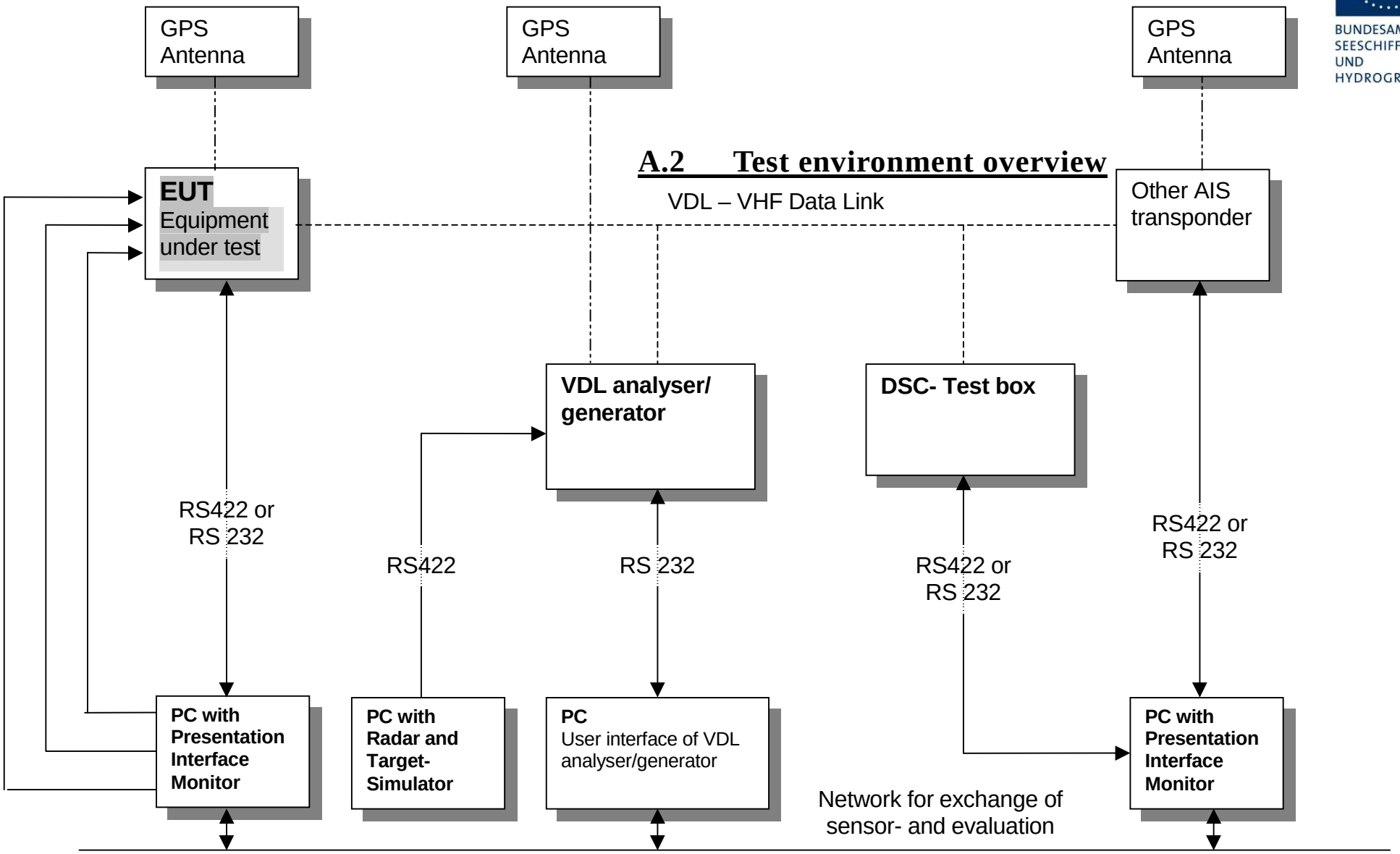
- A standard VHF DSC controller DEBEG 3817 with open interface
- A standard VHF radiotelephone DEBEG 6348

The software modification of the DSC controller comprises a remote control input/output facility

- to transmit DSC calls according to ITU 825-3 generated in an external device on DSC channel 70 and
- to output received DSC calls from the EUT to the external device.

The Presentation Interface Monitor is used to generate the DSC calls and to display, log and evaluate the received DSC calls.

A.2 Test environment overview



Annex B Test sentences

B.1 IEC 61162 test sentences

Many of the test sentences are modified manually during the test according to the requirements of the actual test items.
Mainly the MMSI in all addressed sentences are adapted to the actual MMSI of the EUT or of the unit the EUT communicates with.
In addition the files containing these sentences contain also some control information used by the monitor program like:

<UTC> is replaced by the actual UTC time at time of output
<WAIT EVENT> waiting for user action before next output
<WAIT xxxx> waiting xxx ms before next output

This control information is not shown in the following sentence examples because it is not sent to the EUT.

B.1.1 Sensor input

Sensor input sentences	
File name	Description
Sentences	
AIS01_gll_vtg_hdt_rot.sst	Standard sensor input sentences
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS01d_dtm_gll_vtg_hdt_rot.sst	Standard sensor input with DTM
Similar files with an additional DTM sentence are also available for the other position sentence sets and not listed explicitely	
$GPDTM,w84,,,,,,,P90 $GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS01g_gll_vtg_gbs_hdt_rot.sst	Standard sensor input with GBS sentence
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A $GPGBS,141800.00,2.6,2.8,4.2,,,, $TIHDT,359.9,T $TIROT,0.0,A	
AIS01x_gll_vtg_hdt_rot_180.sst	Standard sensor input at Longitude of 180°

$GPGLL,0001.00,N,17959.00,W,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS02_gga_vtg_hdt_rot.sst	Sensor Input set with GGA position
$GPGGA,092854,5330.1234,N,01001.2345,E,1,3,1.2,65.2,M,45.1,M,,, $GPVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS02d_dtm_gga_vtg_hdt_rot.sst	Sensor Input set with GGA position and DTM
$GPDTM,999,,,,,,,P90 $GPGGA,092854,5330.1234,N,01001.2345,E,1,3,1.2,65.2,M,45.1,M,,, $GPVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS03_gns_vtg_hdt_rot.sst	Sensor input set with GNS position
$GNGNS,122500.00,5330.1234,N,01001.2345,E,AA,5,1.2,35.5,41.1,, $GNVTG,350.0,T,,M,10.0,N,,K,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS04_rmc_hdt_rot.sst	Sensor input set with RMC position and speed
$GPRMC,122500.00,A,5330.1234,N,01001.2345,E,11.2,352.2,120202,2.0,E,A $TIHDT,359.9,T $TIROT,0.0,A	
AIS06_gll_vtg_vbw_hdt_rot.sst	Sensor input set with speed by VBW and VTG
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A $VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V $TIHDT,359.9,T $TIROT,0.0,A	
AIS07_osd.sst	Single OSD sentence
$INOSD,359.9,A,5.2,B,12.6,B,150.0,1.2,N	
AIS08_gll_vbw_hdt_rot.sst	Standard sensor input with VBW instead of VTG
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V $TIHDT,359.9,T $TIROT,0.0,A	
AIS09_gll_osd.sst	Sensor input set with GLL and OSD
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $INOSD,359.9,A,5.2,B,12.6,B,150.0,1.2,N	
AIS10_gll_vtg.sst	GPS receiver sentences (GLL and VTG)
$GPGLL,5330.1234,N,01001.2345,E,141800.00,A,A $GPVTG,350.0,T,,M,10.0,N,,K,A	
AIS11_vbw.sst	Log sentence VBW
$VDVBW,11.00,01.00,A,12.00,02.00,A,,V,,V	
AIS12_hdt_rot.sst	Gyro sentences (HDT and ROT)
$TIHDT,359.9,T $TIROT,0.0,A	

B.1.2 Settings (VSD,SSD)

Settings (VSD,SSD)	
File name	Description
Sentences	
AISSD_transpondertype.sst	Settings of static data, specific set for each transponder type
`$AISSD,callsign,name,100,20,15,10,1,GP`	
AIVSD_Hamburg.sst	Settings of voyage related data
`$AIVSD,51,11.5,26,HAMBURG,131020,20,05,0,0`	

B.1.3 Messages (ABM,BBM)

The addressed messages include a MMSI number which is changed according to the actual MMSI number of the EUT

Messages (ABM,BBM)	
File name	Description
Sentences	
AIABM_bin.sst	Standard addressed binary message
`!AIABM,1,1,2,000001005,1,6,06P0test,0`	
AIABM_safety.sst	Standard addressed safety related message
`!AIABM,1,1,2,000001005,1,12,D5CD,0`	
AIABM_4_bin.sst	Set of 4 addressed binary messages

`!AIABM,1,1,3,000008001,1,6,06P0test,0`
`!AIABM,1,1,0,000008001,2,6,06P0test,0`
`!AIABM,1,1,1,000008001,1,6,06P0test,0`
`!AIABM,1,1,2,000008001,2,6,06P0test,0`	

AIABM_4_safety.sst	Set of 4 addressed safety related messages

`!AIABM,1,1,0,000001005,1,12,D5CD,0`
`!AIABM,1,1,1,000001005,1,12,D5CD,0`
`!AIABM,1,1,2,000001005,1,12,D5CD,0`
`!AIABM,1,1,3,000001005,1,12,D5CD,0`	

AIBBM_bin.sst	Standard binary broadcast message
`!AIBBM,1,1,6,1,8,06P0test,0`	
AIBBM_safety.sst	Standard safety related broadcast message
`!AIBBM,1,1,6,1,14,D5CD,0`	
AIBBM_5_bin.sst	Set of 5 binary broadcast messages

!AIBBM,1,1,7,0,8,06P0test1,0 !AIBBM,1,1,8,0,8,06P0test2,0 !AIBBM,1,1,9,0,8,06P0test3,0 !AIBBM,1,1,0,0,8,06P0test4,0 !AIBBM,1,1,1,0,8,06P0test5,0	
AIBBM_5_safety.sst	Set of 5 safety related broadcast messages
!AIBBM,1,1,6,0,14,D5CDi,0 !AIBBM,1,1,7,0,14,D5CDj,0 !AIBBM,1,1,8,0,14,D5CDk,0 !AIBBM,1,1,9,0,14,D5CDl,0 !AIBBM,1,1,0,0,14,D5CDm,0	
AIBBM_bin_stuffing.sst	Special message for bit stuffing test
!AIBBM,1,1,6,1,8,06Qv>khvOP,4	
AIBBM_multi_bin.sst	Long 5 slot binary broadcast message
!AIBBM,4,1,6,2,8,06P0456789012345678901234567890123456789,0 !AIBBM,4,2,6,2,8,0123456789012345678901234567890123456789,0 !AIBBM,4,3,6,2,8,0123456789012345678901234567890123456789,0 !AIBBM,4,4,6,2,8,012345678901234567890123456789012345678901,4	
AIBBM_multi_safety.sst	Long 5 slot safety related broadcast message
!AIBBM,4,1,6,2,14,0123456789012345678901234567890123456789,0 !AIBBM,4,2,6,2,14,0123456789012345678901234567890123456789,0 !AIBBM,4,3,6,2,14,0123456789012345678901234567890123456789,0 !AIBBM,4,4,6,2,14,0123456789012345678901234567890123456789,0	
AIBBM_multi_bin_1.sst	Longer than 5 slots binary broadcast message, all bits 1
!AIBBM,4,1,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,2,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,3,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0 !AIBBM,4,4,1,1,8,wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww,0	
AIBBM_ABM_17_5.sst	Set of 2 long messages 8 and 12 for message priority test
!AIBBM,4,1,6,2,8,06P0456789012345678901234567890123456789,0 !AIBBM,4,2,6,2,8,0123456789012345678901234567890123456789,0 !AIBBM,4,3,6,2,8,0123456789012345678901234567890123456789,0 !AIBBM,4,4,6,2,8,0123456789012345678901234567890123456789,0 !AIABM,4,1,2,000001005,1,12,0123456789012345678901234567890123456789,0 !AIABM,4,2,2,000001005,1,12,0123456789012345678901234567890123456789,0 !AIABM,4,3,2,000001005,1,12,0123456789012345678901234567890123456789,0 !AIABM,4,4,2,000001005,1,12,0123456789012345678901234567890123456789,0	
AIBBM_25.sst	25 broadcast message to check 20 slots per frame rule

!AIBBM,1,1,6,1,8,06P0test1,0 !AIBBM,1,1,6,1,14,D5CD1,0 !AIBBM,1,1,7,1,8,06P0test2,0 !AIBBM,1,1,7,1,14,D5CD2,0 !AIBBM,1,1,8,1,8,06P0test3,0 !AIBBM,1,1,8,1,14,D5CD3,0 !AIBBM,1,1,9,1,8,06P0test4,0 !AIBBM,1,1,9,1,14,D5CD4,0 !AIBBM,1,1,0,1,8,06P0test5,0 !AIBBM,1,1,0,1,14,D5CD5,0 !AIBBM,1,1,1,1,8,06P0test6,0 !AIBBM,1,1,1,1,14,D5CD6,0 !AIBBM,1,1,2,1,8,06P0test7,0 !AIBBM,1,1,2,1,14,D5CD7,0 !AIBBM,1,1,3,1,8,06P0test8,0 !AIBBM,1,1,3,1,14,D5CD8,0 !AIBBM,1,1,4,1,8,06P0test9,0 !AIBBM,1,1,4,1,14,D5CD9,0 !AIBBM,1,1,5,1,8,06P0test10,0 !AIBBM,1,1,5,1,14,D5CD10,0 !AIBBM,1,1,6,1,8,06P0test11,0 !AIBBM,1,1,6,1,14,D5CD11,0 !AIBBM,1,1,7,1,8,06P0test12,0 !AIBBM,1,1,7,1,14,D5CD12,0 !AIBBM,1,1,7,1,8,06P0test13,0

AIAIR_5.sst	Simple interrogation for msg 5
$AIAIR,000001005,5,,,,,	
AIAIR_35_5.sst	Interrogation of msg 3 and 5 from ID1 and msg 5 from ID2
$AIAIR,000005002,3,,5,,000007001,5,,	
AIS_DSI.sst	Test that EUT ignores command to send a DSC msg
$AIDSI,1,1,2210393930,,,,03,,11,,	

B.1.4 Regional operational settings (ACA)

Regional operational settings (ACA)	
File name	Description
Sentences	
AIACA_Region_in_ch86.SST	Region around standard position with test channels
$ECACA,2,5400.0,N,01030.0,E,5300.0,N,00930.0,E,4,2086,0,1086,0,0,1,,,	
AIACA_Region_out_ch74_76.SST	Region not including standard position with channels 74 and 76
$ECACA,2,5500.0,N,00900.0,E,5400.0,N,00800.0,E,4,0074,0,0076,0,0,1,,,	
AIACA_Region_17_3_SW.SST	2 adjacent regions in SW quadrant, for test 17.3

$ECACA,2,3000.00,S,01200.00,W,3100.00,S,01300.00,E,1,2081,0,1081,0,0,1,,, $ECACA,2,3000.00,S,01100.00,W,3100.00,S,01200.00,E,1,2082,0,1082,0,0,1,,,	
AIACA_8_Regions_17_7_1.SST	8 different regions to fill quickly the complete list, for test 17.7.1
$ECACA,,5400.00,N,01030.00,E,5300.00,N,00930.00,E,2,72,0,74,0,0,1,,, $ECACA,,5200.00,N,00700.00,E,5100.00,N,00600.00,E,2,2060,0,1060,0,0,1,,, $ECACA,,5200.00,N,00900.00,E,5100.00,N,00800.00,E,2,2061,0,1061,0,0,1,,, $ECACA,,5200.00,N,01100.00,E,5100.00,N,01000.00,E,2,2062,0,1062,0,0,1,,, $ECACA,,5200.00,N,01300.00,E,5100.00,N,01200.00,E,2,2063,0,1063,0,0,1,,, $ECACA,,5200.00,N,01500.00,E,5100.00,N,01400.00,E,2,2064,0,1064,0,0,1,,, $ECACA,,5100.00,N,00800.00,E,5000.00,N,00700.00,E,2,2065,0,1065,0,0,1,,, $ECACA,,5100.00,N,01000.00,E,5000.00,N,00900.00,E,2,2066,0,1066,0,0,1,,,	
AIACA_Region_17_7_2_c.SST	Region for test 17.7.2 c
$ECACA,2,5430.00,N,01200.00,E,5300.00,N,01100.00,E,4,2083,0,1083,0,0,1,,,	
AIACA_Region_17_7_2_f.SST	Region for test 17.7.2 f
$ECACA,2,5300.00,N,01320.00,E,5200.00,N,01200.00,E,4,2081,0,1081,0,0,1,,,	
AIACA_Region_17_7_4.SST	4 adjacent regions for test 17.7.2 f
$ECACA,2,5800.00,N,00800.00,E,5700.00,N,00700.00,E,4,2081,0,1081,0,0,1,,, $ECACA,2,5800.00,N,00900.00,E,5700.00,N,00800.00,E,4,2082,0,1082,0,0,1,,, $ECACA,2,5700.00,N,00800.00,E,5600.00,N,00700.00,E,4,2083,0,1083,0,0,1,,, $ECACA,2,5700.00,N,00900.00,E,5600.00,N,00800.00,E,4,2084,0,1084,0,0,1,,,	
AIACA_Region_lon180.SST	Special region at longitude = 180°
$ECACA,2,0100.00,N,17900.00,W,0100.00,S,17900.00,E,2,0074,0,0076,0,0,1,,,	
AIACA_Set_channel.SST	Set channel command, without area co-ordinates
$ECACA,,N,,W,,N,,W,2,2074,0,2076,0,0,1,,,,	
Request_ACA.SST	Request of ACA sentences from EUT
$ECAIQ,ACA	

B.1.5 Long range requests

The of long range requests include a MMSI number which is changed according to the actual MMSI number the EUT

Long Range (LRI, LRF)	
File name	Description
Sentences	
LRI_LRF_MMSI_all.sst	Request of all data addressed by MMSI
`$LRLRI,5,0,211003000,000002002,,,,,,,,` `$LRLRF,5,211003000,VTS,ABCEFIOPUW,`	
LRI_LRF_area_CEF.sst	Request of some data addressed by area
`$LRLRI,6,1,211003000,,6000.0,N,2000.0,E,4000.0,N,0500.0,E` `$LRLRF,6,211003000,VTS,CEF,`	
LRI_LRF_out_area_CEF.sst	Request of some data addressed by area, standard position not in area
`$LRLRI,6,1,211003000,,6000.0,N,1500.0,E,5500.0,N,0800.0,E` `$LRLRF,6,211003000,VTS,CEF,`	
LRI_LRF_area_at_180_CEF.sst	Request of some data addressed by area, area around longitude of 180°and latitude of 0°
`$LRLRI,6,1,211003000,,0500.0,N,17500.0,W,0500.0,S,17500.0,E` `$LRLRF,6,211003000,VTS,CEF,`	
LRF_ack_all.sst	For external confirmation of request
`$LRLRF,5,211003000,VTS,ABCEFIOPUW,`	

B.2 DSC sentences

The sentences are listed as they are applied to the DSC Testbox for transmission of DSC test calls. There is a special format used based on an earlier definition of NMEA private sentences.

The frame for transmitting a DSC call is:
`$PDEBT,CCDSC,T,00014600<call content>FF`

The <call content> has to be entered in Hex code, 2 hex numbers for each 7 bit DSC symbol, without spaces, beginning with the format specifier which included only ones. The DSC coding and addition of redundancy (3 bit symbol redundancy and symbol repetition) are done by the test box. The content description of the calls is available on request.

The DSC sentences include MMSI number which is changed according to the actual MMSI number the EUT

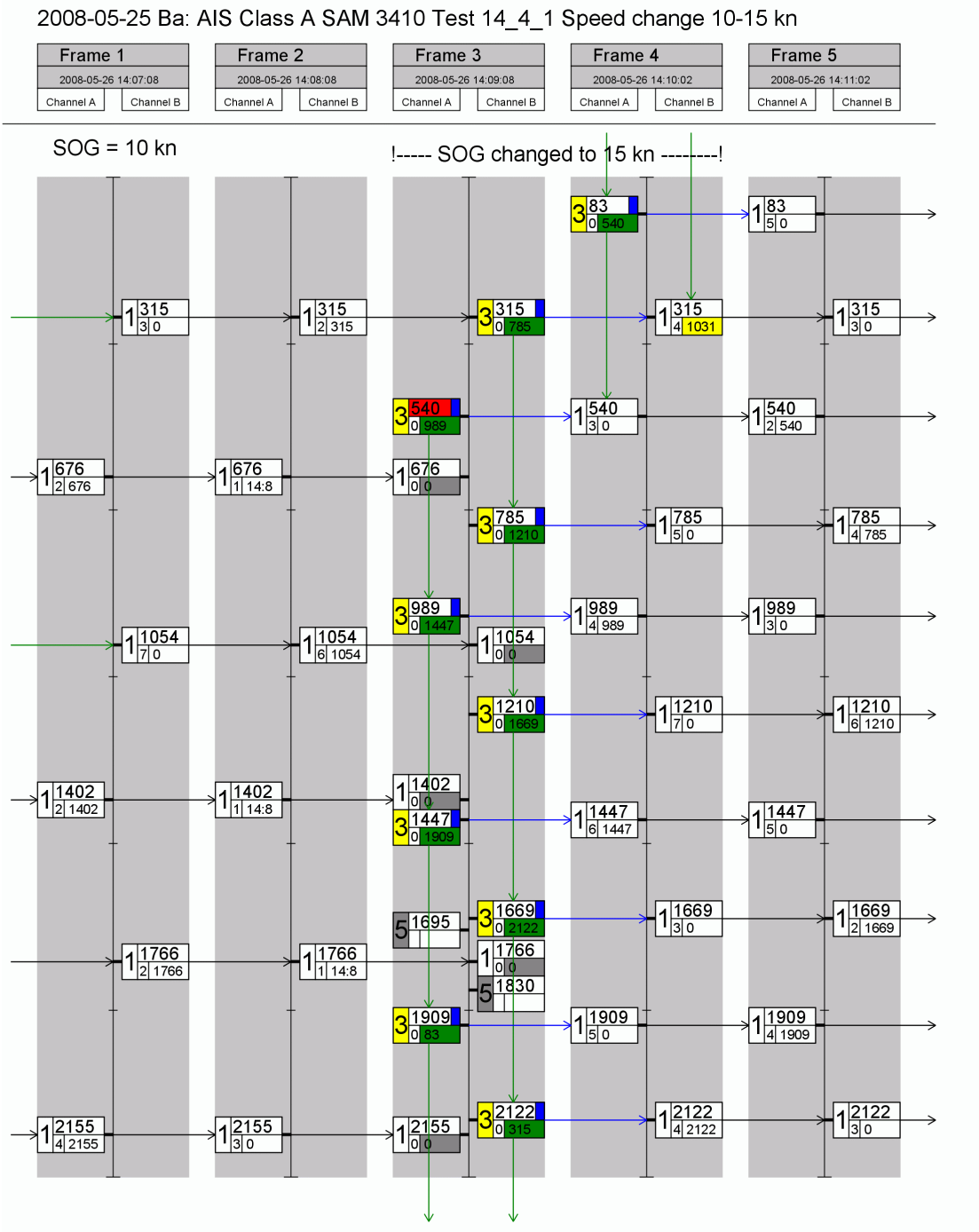
DSC Sentences	
File name	Description
Sentences	
Test_Signal_1.sst	Standard test signal no 1, selective position and name request.
$PDEBT,CCDSC,T,000146007800000010050671 50A27271E676F75FF	
area_pos_name_rq.sst	Position and name request addressed to an area, standard position inside
$PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E676F75FF	
area_pos_name_rq_180.sst	Position and name request addressed to an area around a longitude of 180° and latitude of 0°.
$PDEBT,CCDSC,T,000146006700030001 4F1E003C003C0067150A27271E676F75FF	
sel_set_region.sst	Selective regional setting by DSC, standard pos. outside, channel 61
$PDEBT,CCDSC,T,000146007800000010050671 50A27271E68090A3D00680A143D00680C053C0001140068 0D053200010A0075FF	
sel_set_region_in.sst	Selective regional setting, standard position inside, channel 72, 73, 12.5 kHz
$PDEBT,CCDSC,T,000146007800000010050671 50A27271E680900480A680A00490A680C05280001030068 0D051E00005D0075FF	
sel_set_ais_channel_ch65.sst	Setting AIS channel to 65
$PDEBT,CCDSC,T,000146007800000010050671 50A27271E68090A4100680A14410075FF	
sel_check_channel.sst	Test of channel use in 20.4
$PDEBT,CCDSC,T,000146007800000010100671 50A27271E654875FF $PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E676F75FF	
area_set_region.sst	Area addressed regional setting, standard position inside address, but not inside area, Ch 60
$PDEBT,CCDSC,T,000146006705280000091E003C003C0067150A27271E68090A3C00680A143C00680C05 1400005A00680D050A0000500075FF	
area_set_region_20_2.sst	Area addressed regional setting for test 20.2
$PDEBT,CCDSC,T,00014600670F3200000E00005A005A0067150A27271E6809145200680A0A5200680C0F 1E00011E00680D0F140001280075FF $PDEBT,CCDSC,T,00014600670F3200000E00005A005A0067150A27271E6809145100680A0A5100680C0F 1400011E00680D0F0A0001280075FF	
Sequence_20_1sst	Area addressed regional setting, standard position inside address, but not inside area, Ch 60
$PDEBT,CCDSC,T,000146007800000010100671 50A27271E676F75FF $PDEBT,CCDSC,T,000146006606000 50A0A64150A27271E646E5A00487E7E7E7FFF $PDEBT,CCDSC,T,000146007800000010100671 50A27271E676F75FF $PDEBT,CCDSC,T,000146007800000010100671 50A27271E646E5A00487E7E7E75FF $PDEBT,CCDSC,T,000146007800000010100671 50A27271E676F75FF	
Test_sequence_20_3.sst	Sequence of an area addressed call and continues transmission of other call for test of free channel check
$PDEBT,CCDSC,T,000146006705320000091E003C003C0067150A27271E676F75FF $PDEBT,CCDSC,T,000846007800000000101671 50A27271E676F75FF	

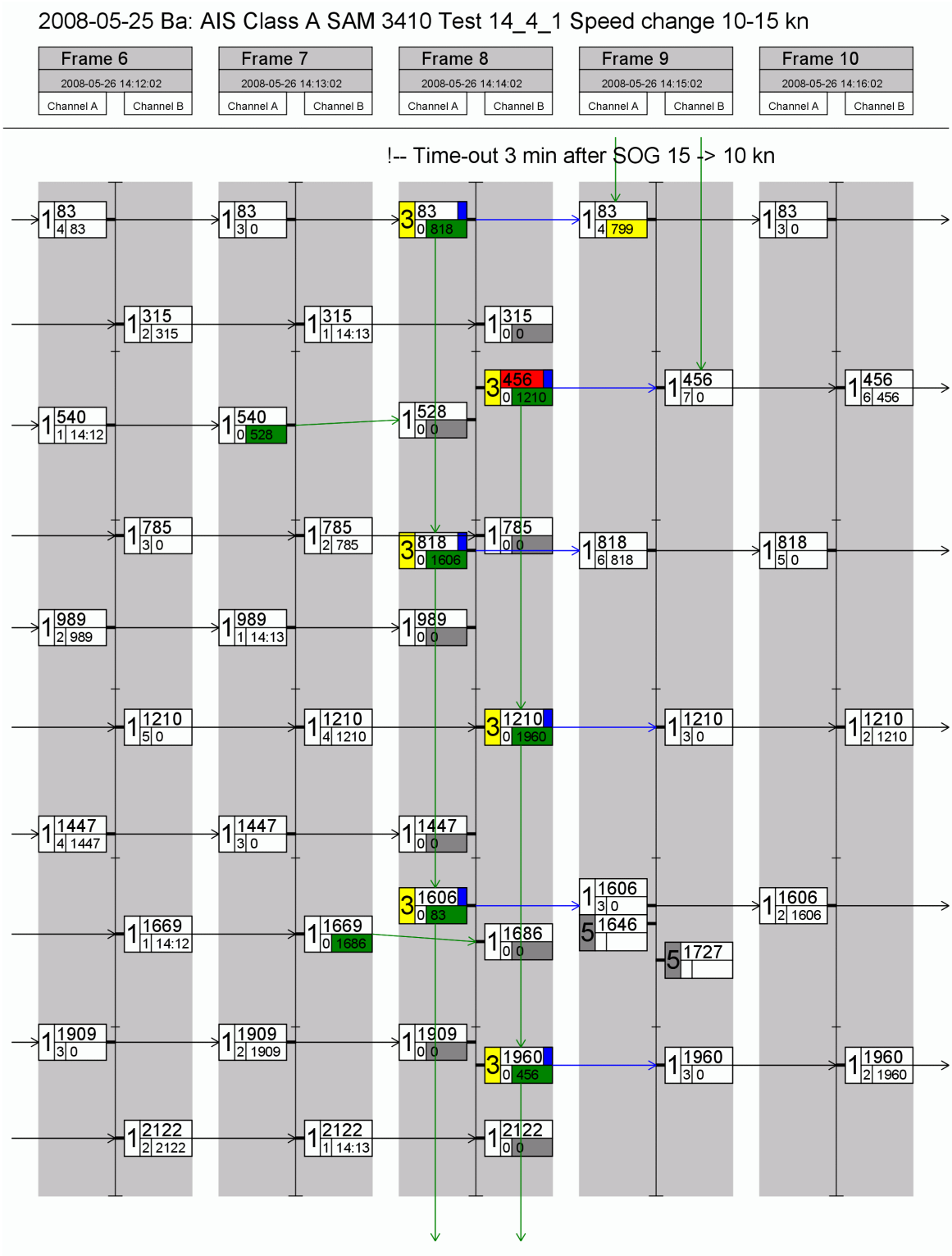
Sel_act_alt_system.sst	Activate an alternative system
`$PDEBT,CCDSC,T,000146007800000000A0567150A27271E6803017875FF`	

Annex C test diagrams

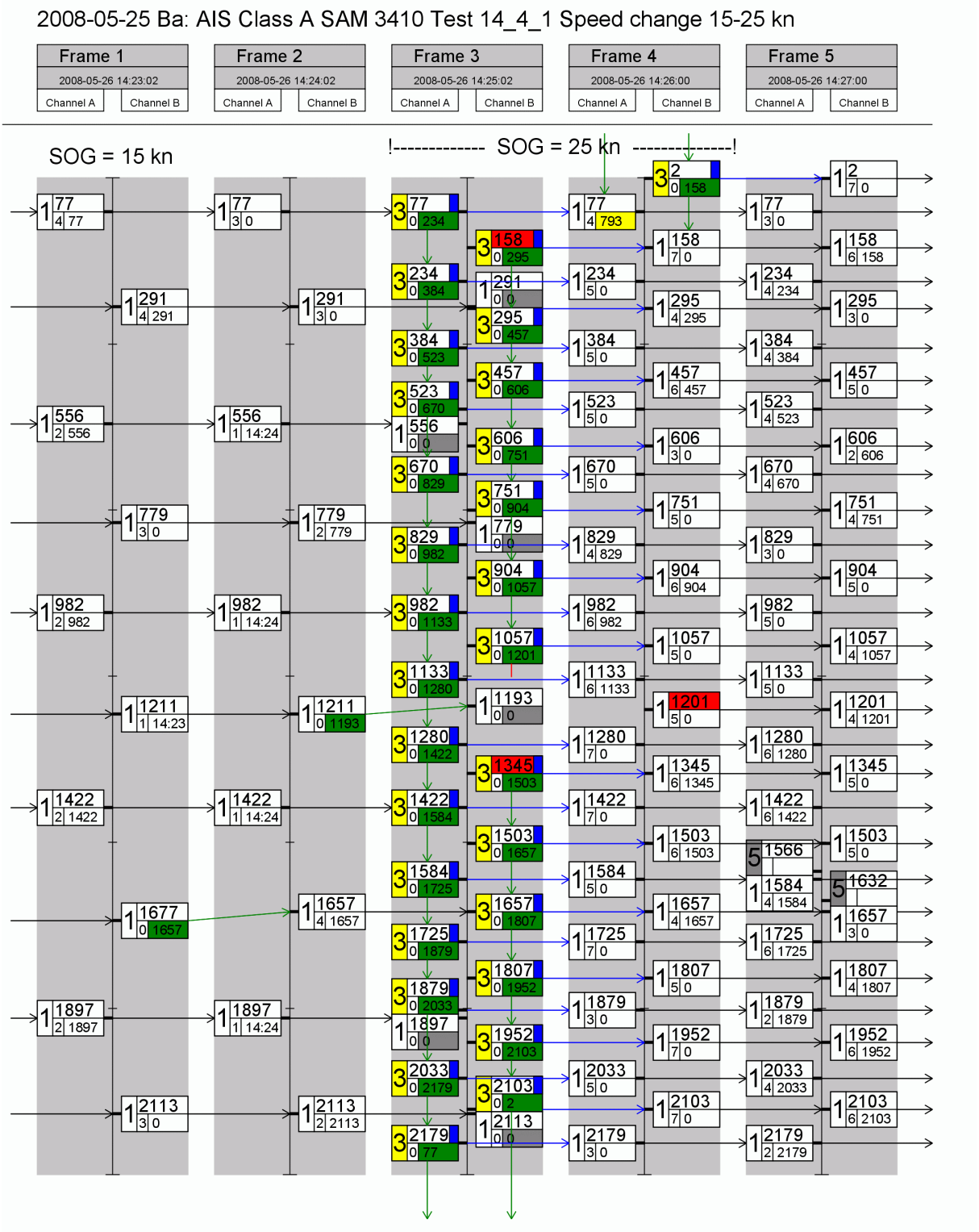
C.1 14.4.1 Reporting rates

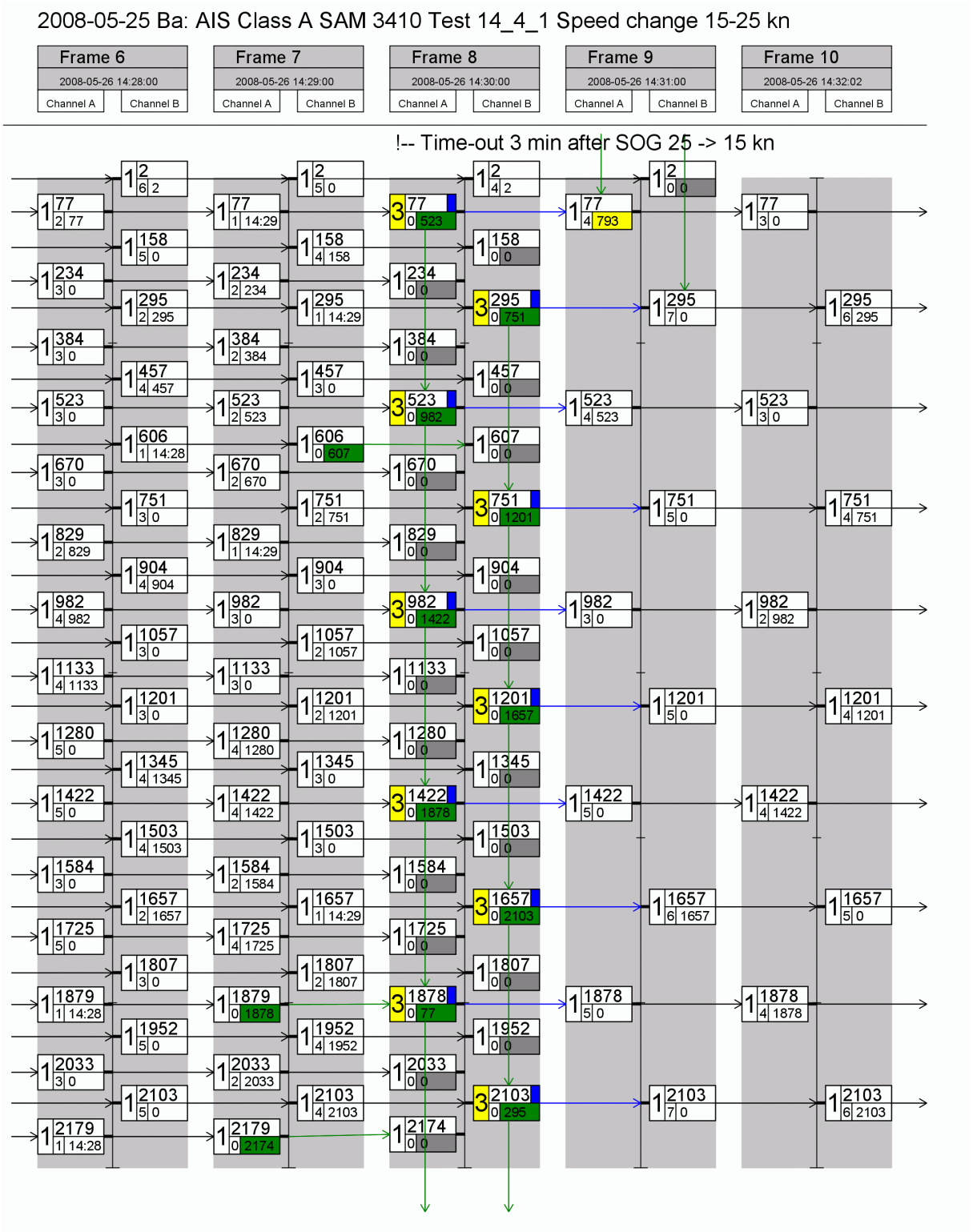
C.1.1 Reporting rate by speed change, 10 kn



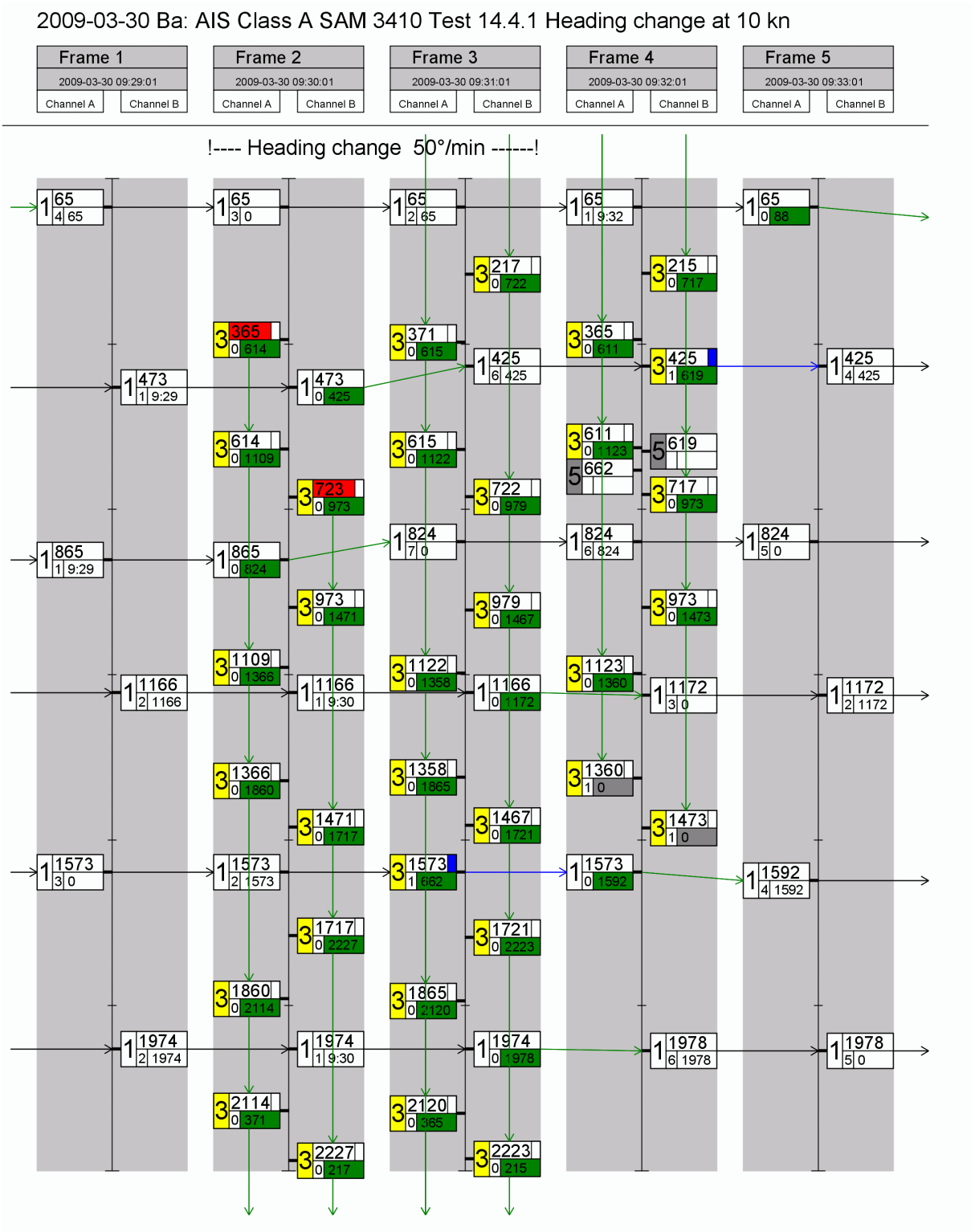

2008-05-25 Ba: AIS Class A SAM 3410 Test 14_4_1 Speed change 10-15 kn
Frame 6
2008-05-26 14:12:02
Frame 7
2008-05-26 14:13:02
Frame 8
2008-05-26 14:14:02
Frame 9
2008-05-26 14:15:02
Frame 10
2008-05-26 14:16:02
Channel A
Channel B
!-- Time-out 3 min after SOG 15 -> 10 kn

C.1.2 Reporting rate by speed change, 15 kn

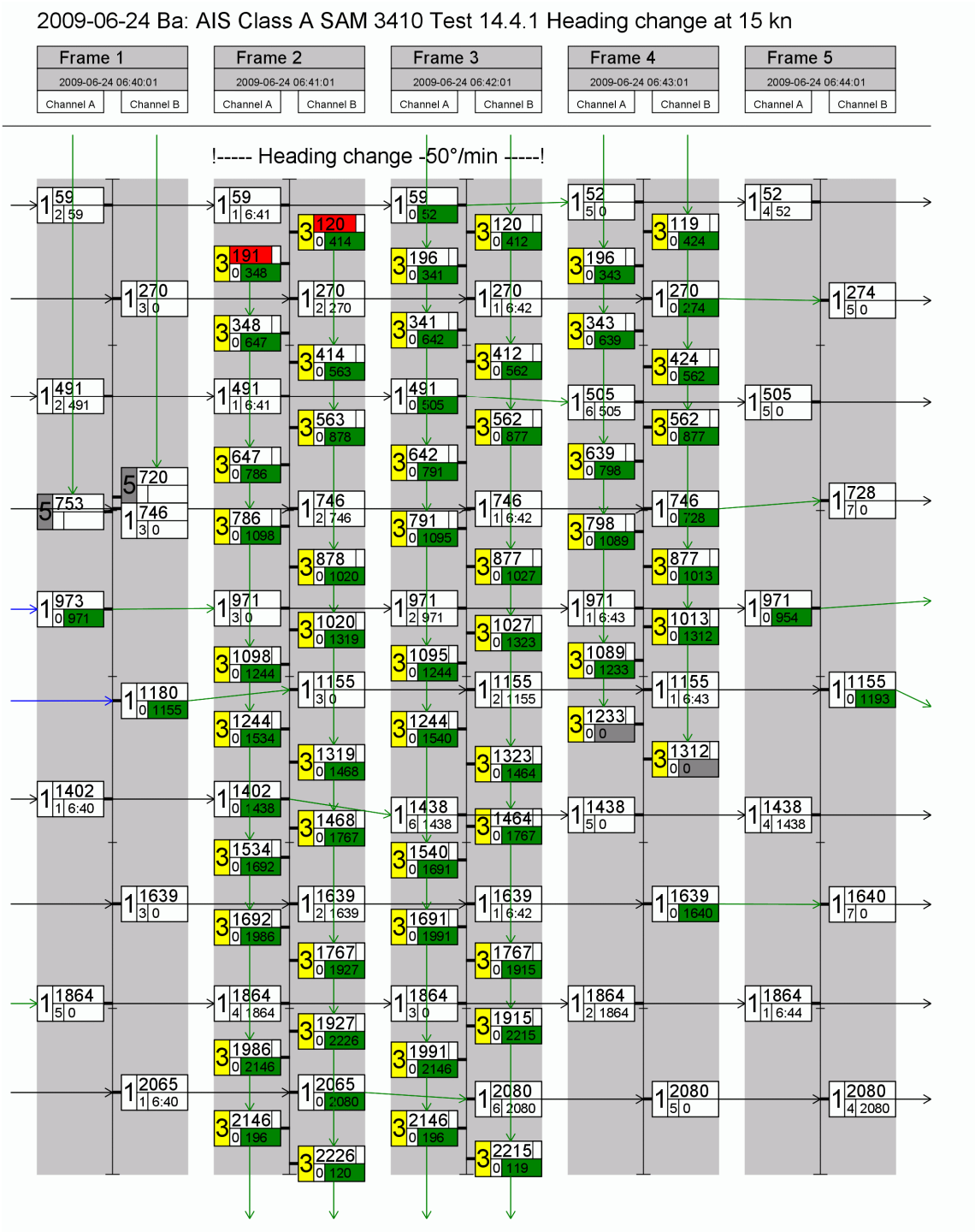



2008-05-25 Ba: AIS Class A SAM 3410 Test 14_4_1 Speed change 15-25 kn
Frame 6
2008-05-26 14:28:00
Frame 7
2008-05-26 14:29:00
Frame 8
2008-05-26 14:30:00
Frame 9
2008-05-26 14:31:00
Frame 10
2008-05-26 14:32:02
Channel A
Channel B
!-- Time-out 3 min after SOG 25 -> 15 kn

C.1.3 Reporting rate by heading change, 10 kn

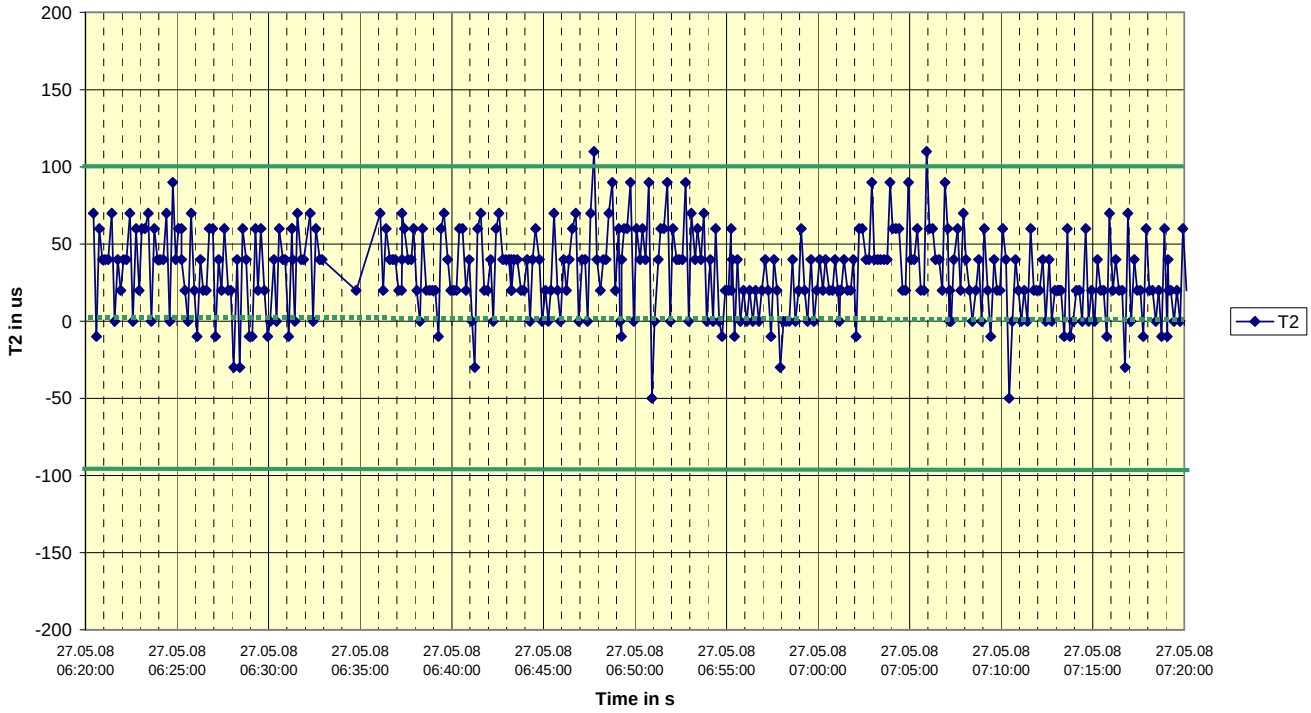


C.1.4 Reporting rate by heading change, 15 kn

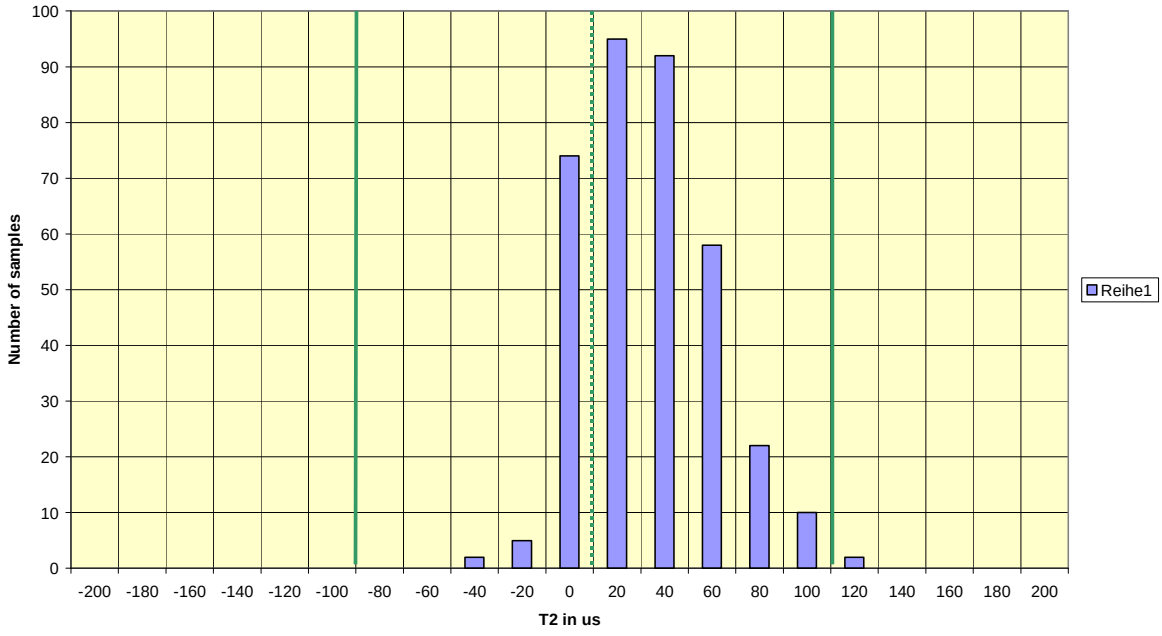


C.2 16.3 Synchronisation jitter

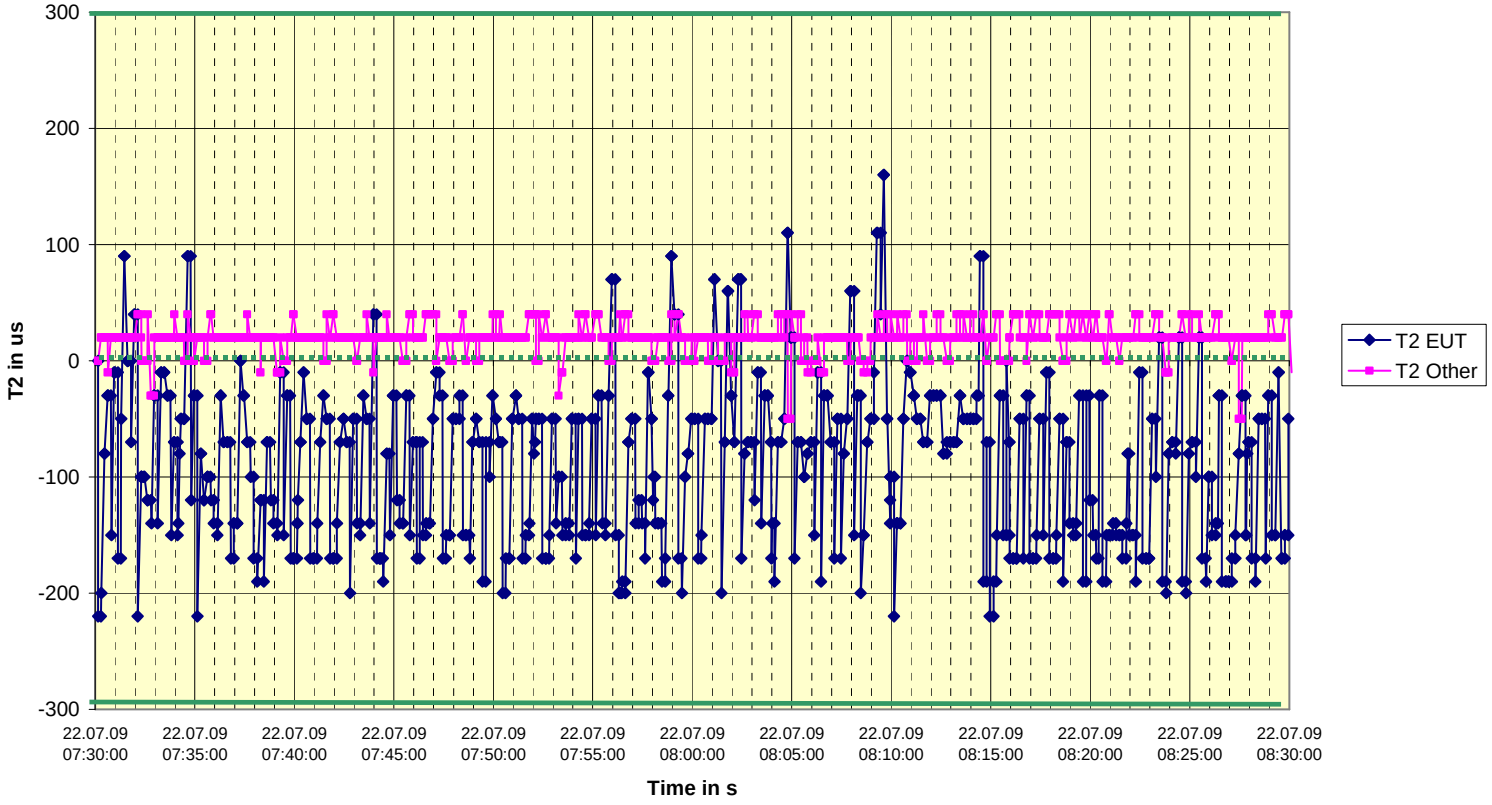
2008-05-07 SAM 3410 - 16.3 - Sync jitter deviation vs. time in sync mode 0



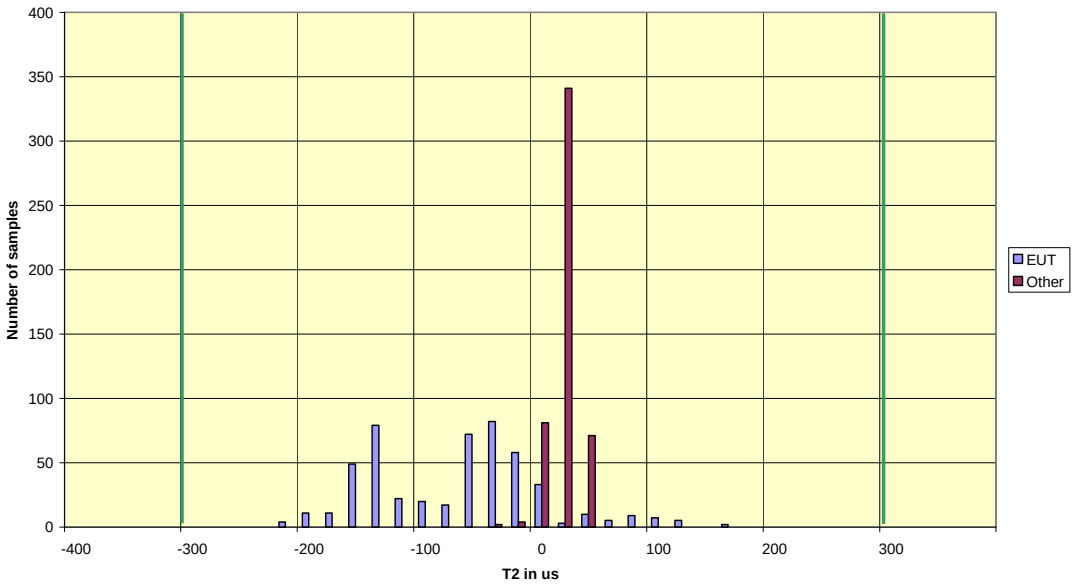
2008-05-07 SAM 3410 - 16.3 - Sync jitter deviation vs. time in sync mode 0



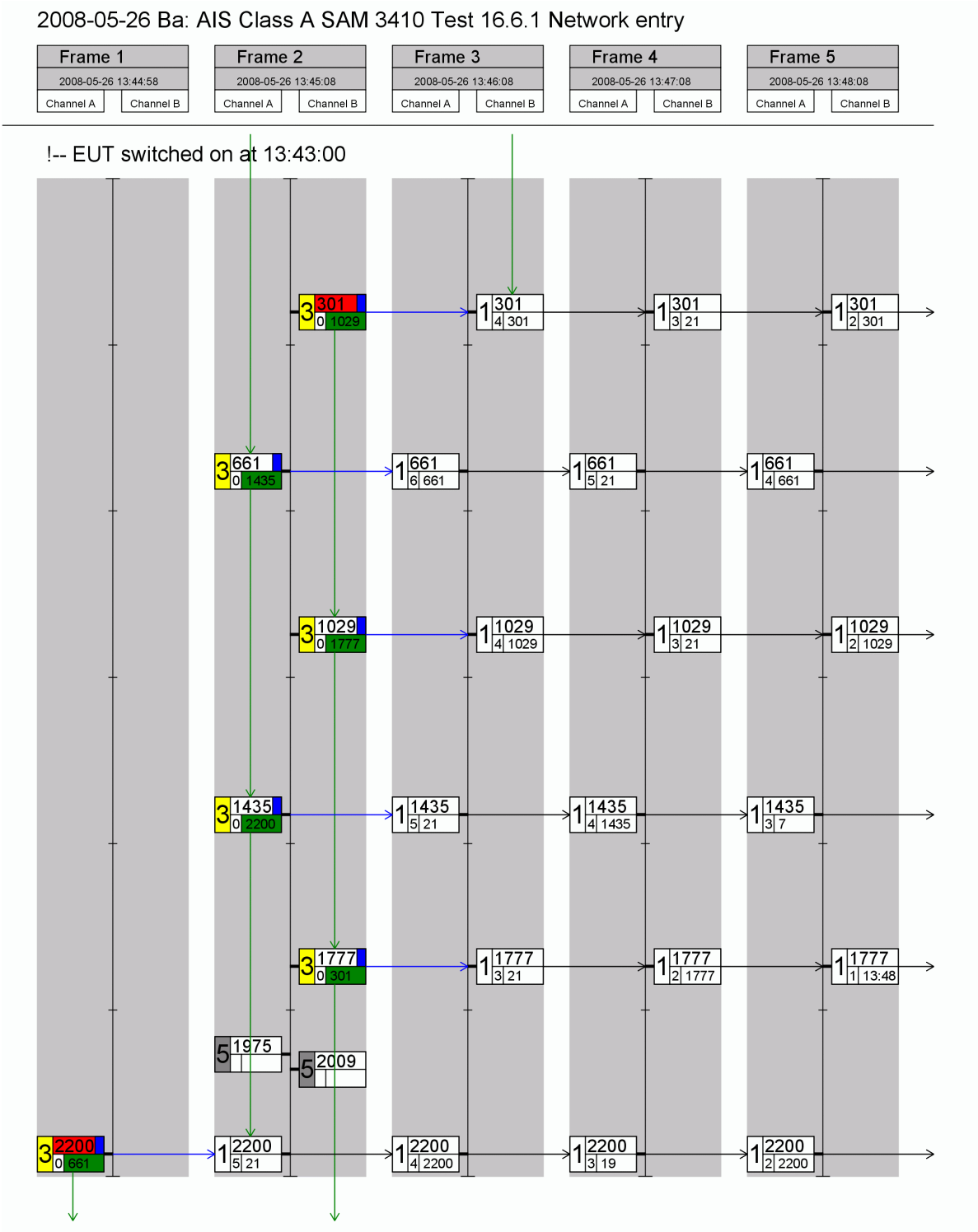
2009-07-22 Ba - SAM 3410 - 16.3 - Sync jitter deviation vs. time in sync mode 1



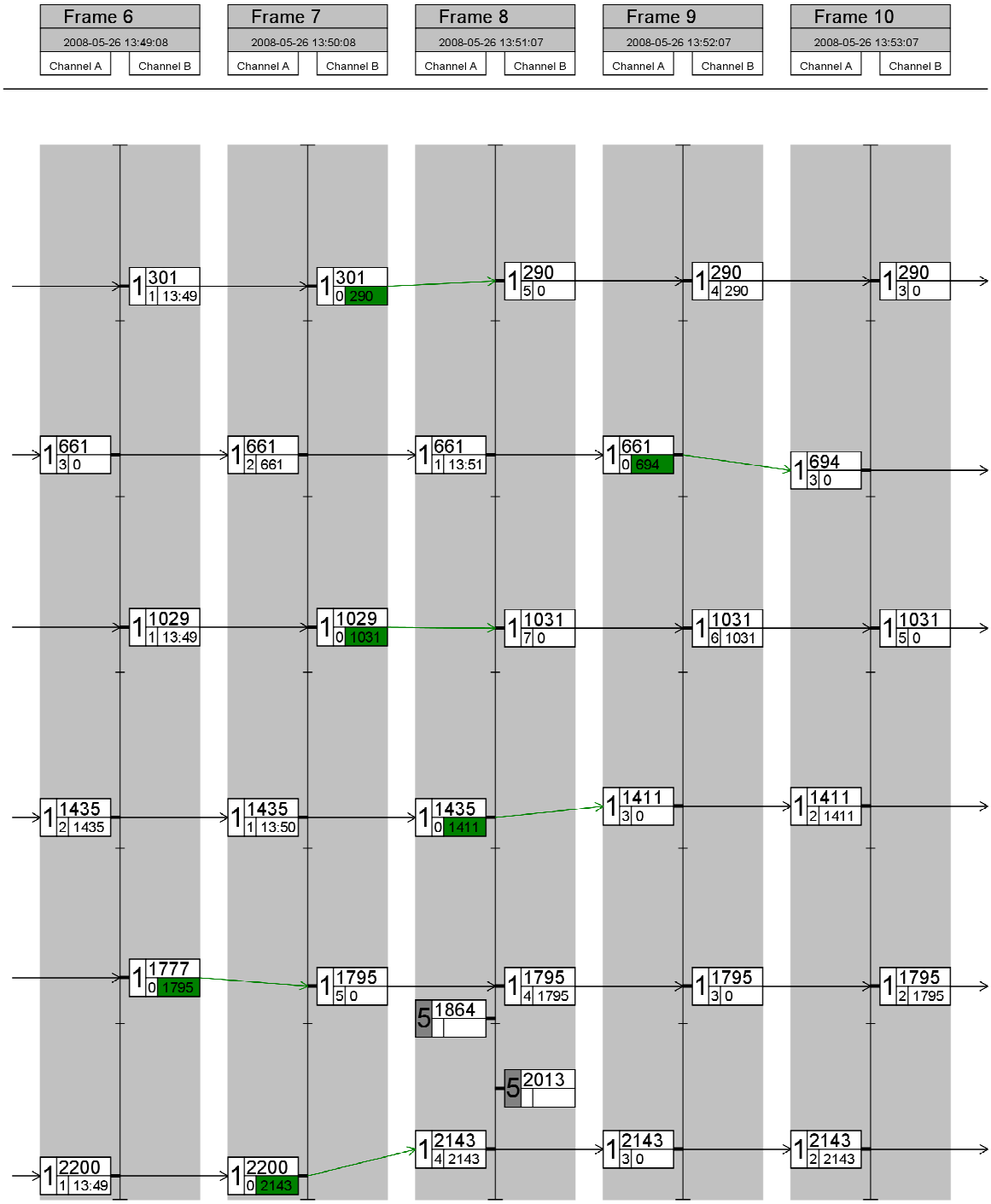
2009-07-22 Ba - SAM 3410 - 16.3 - Sync jitter deviation histogram in sync mode 1



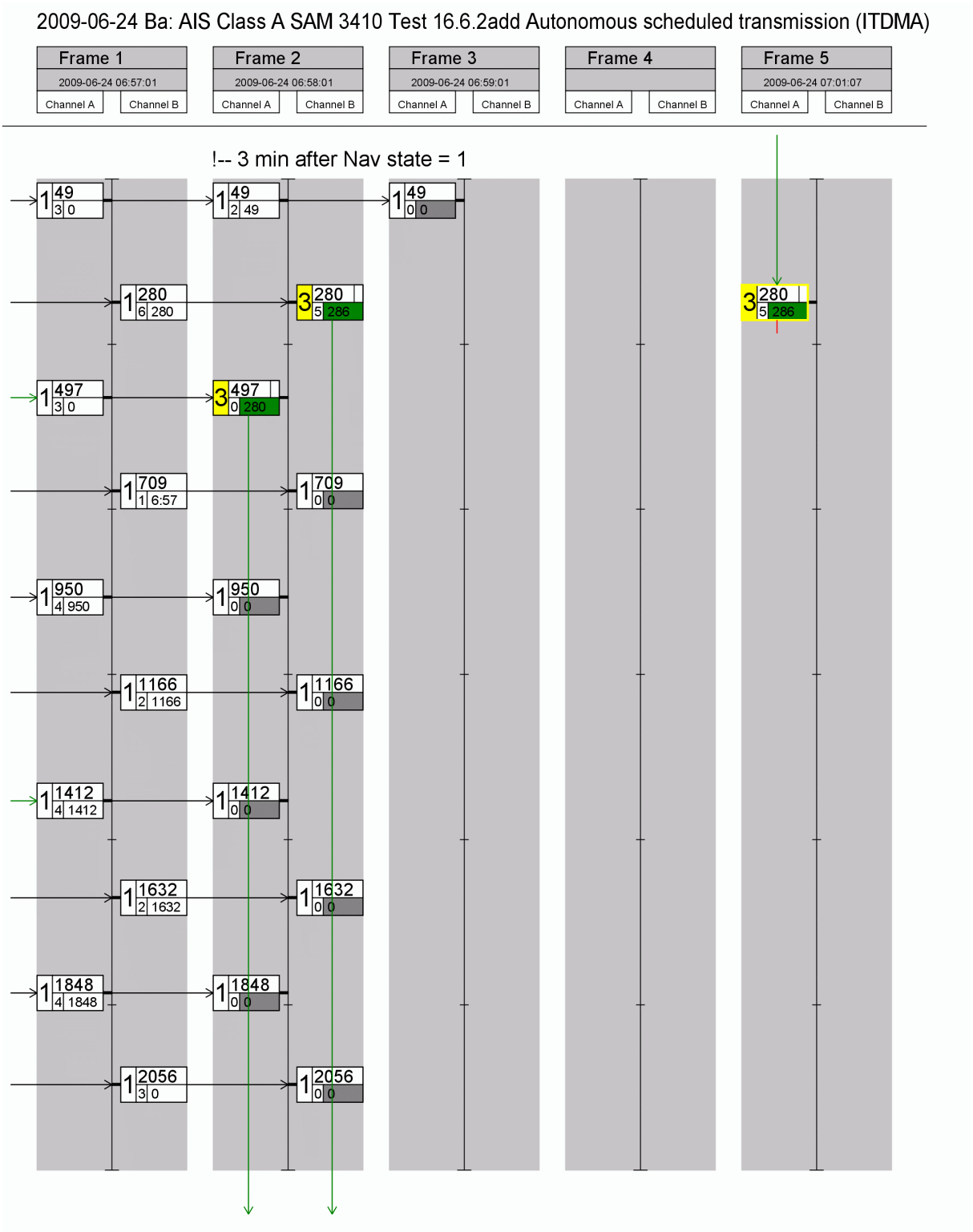
C.3 Network entry phase



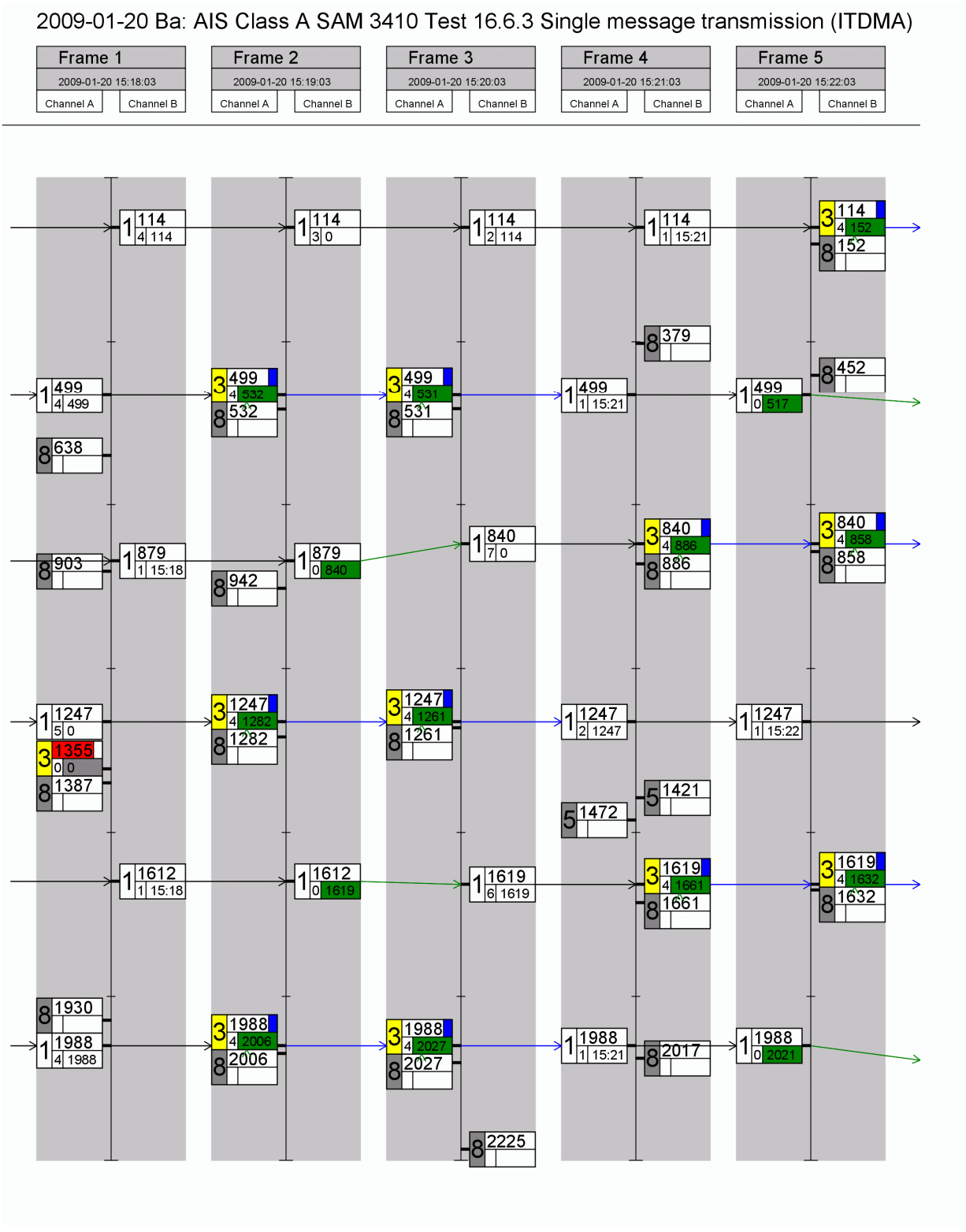
2008-05-26 Ba: AIS Class A SAM 3410 Test 16.6.1 Network entry



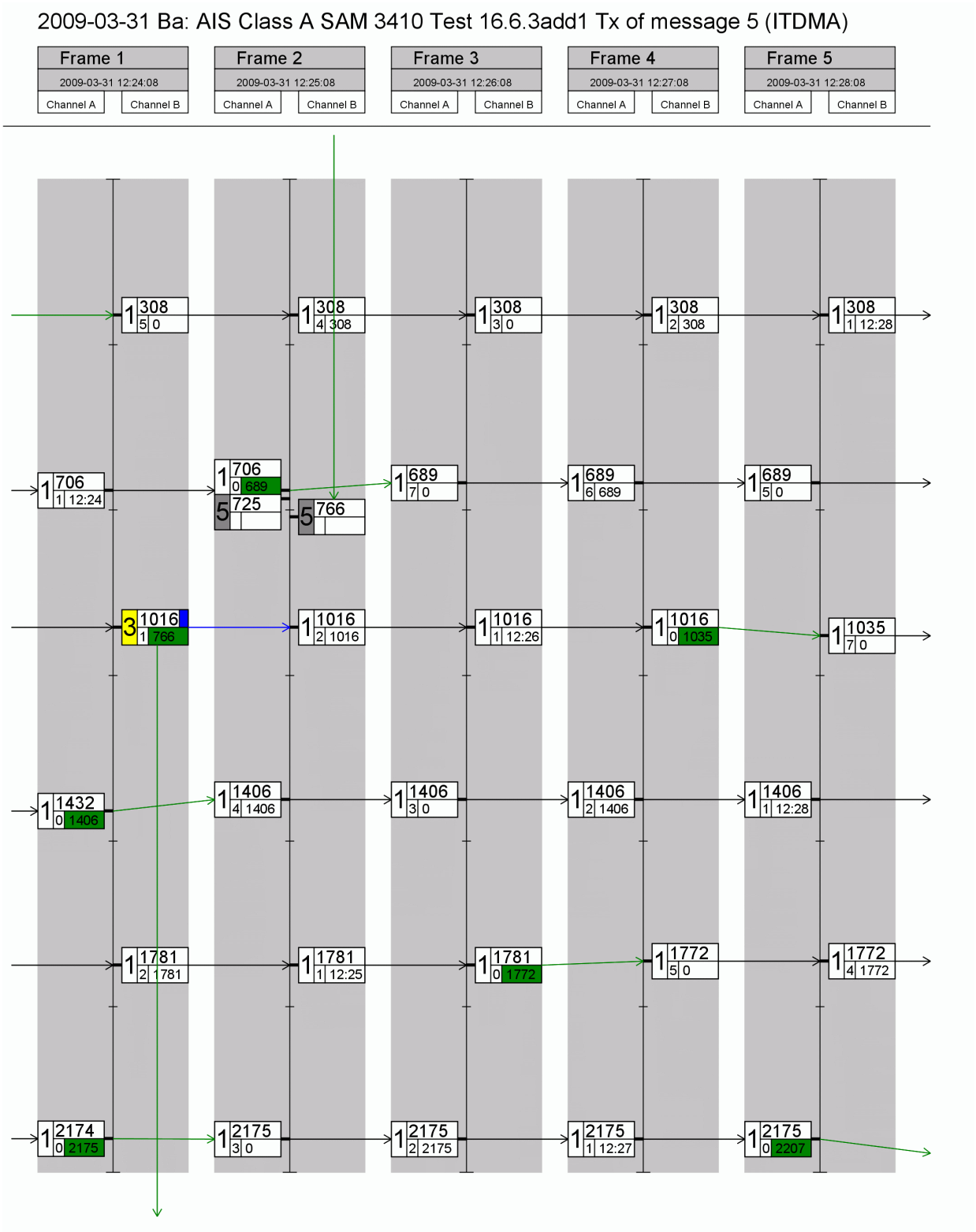
C.4 16.6.2 add Autonomous scheduled Tx (ITDMA)

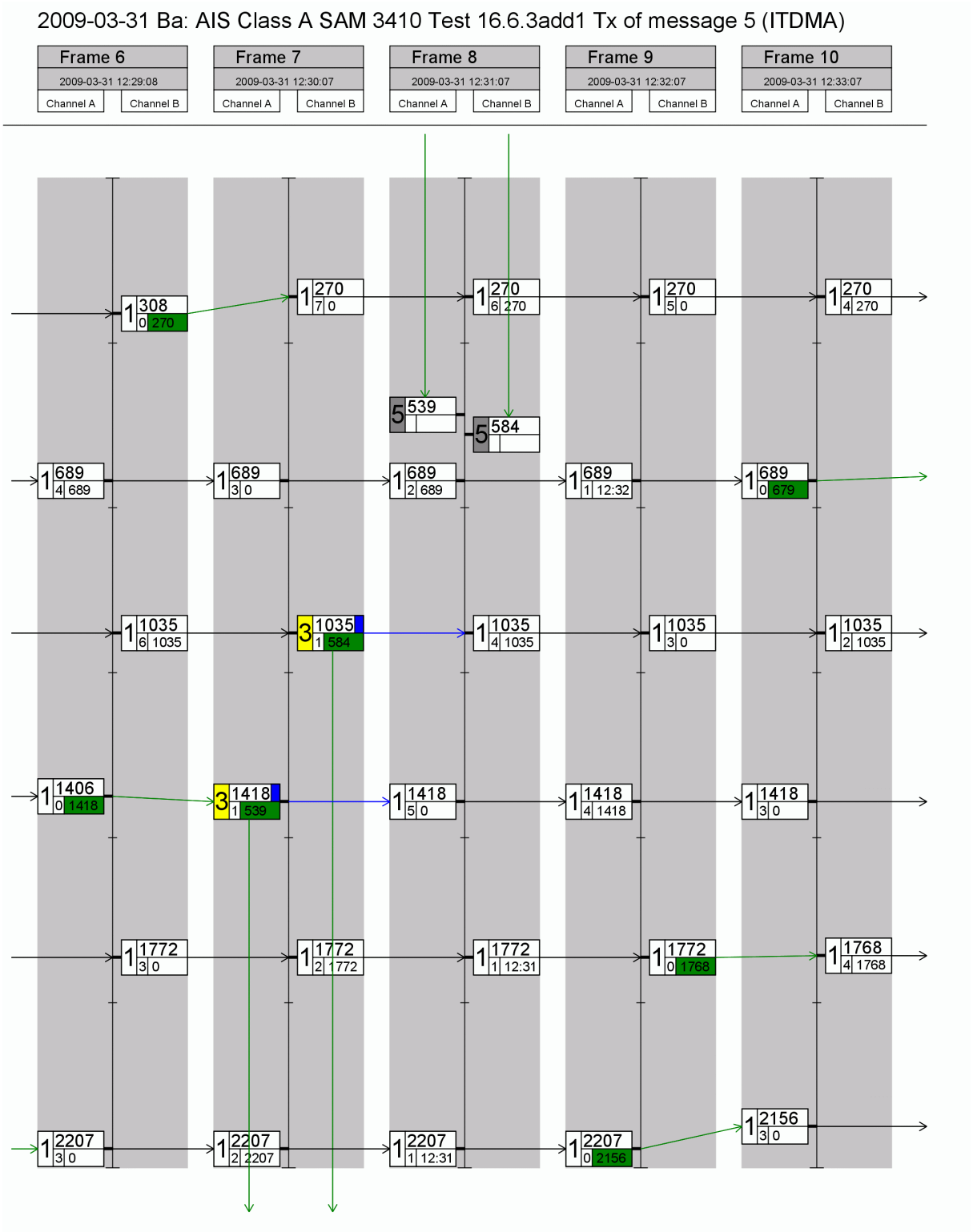


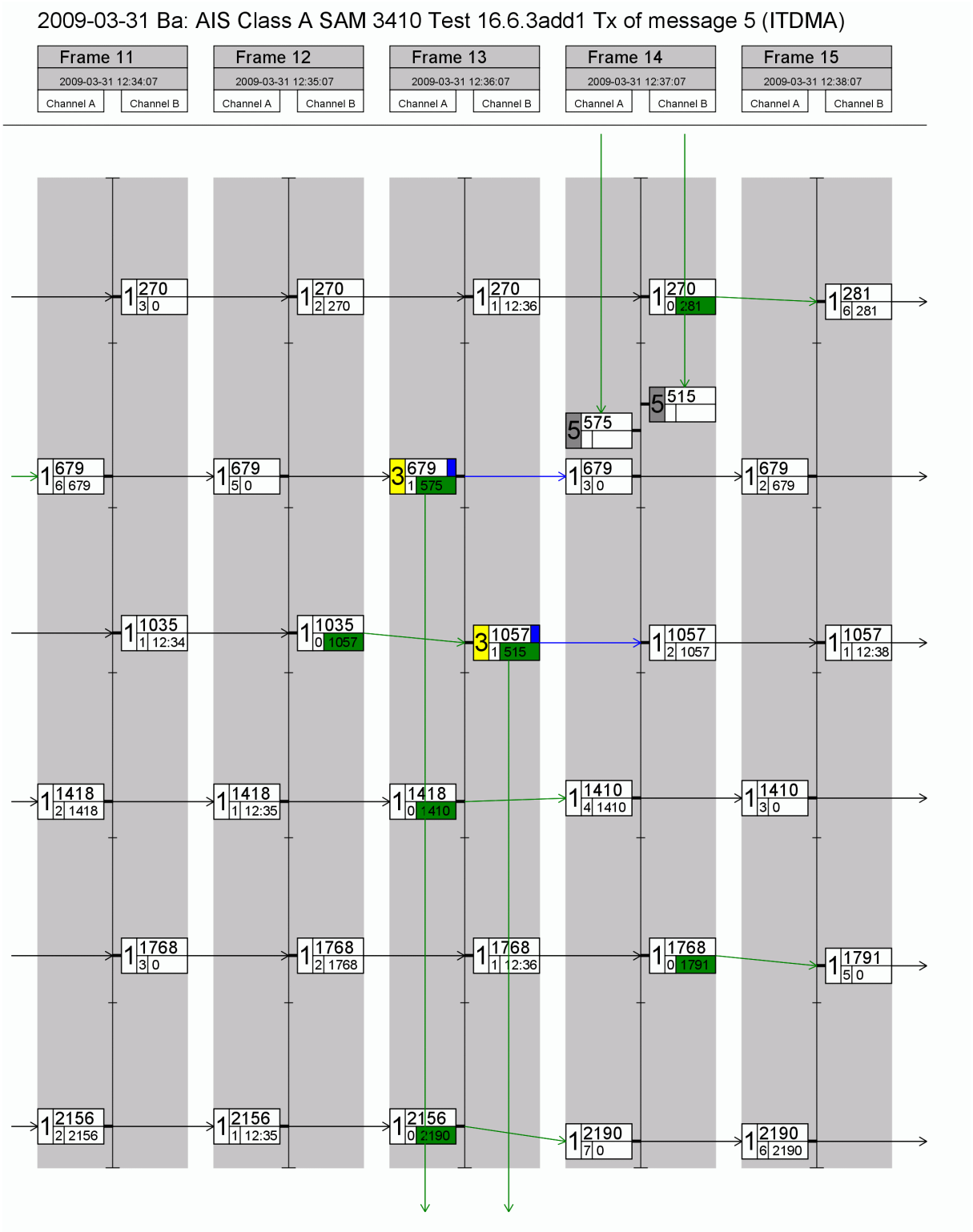
C.5 16.6.3 Single message transmissions

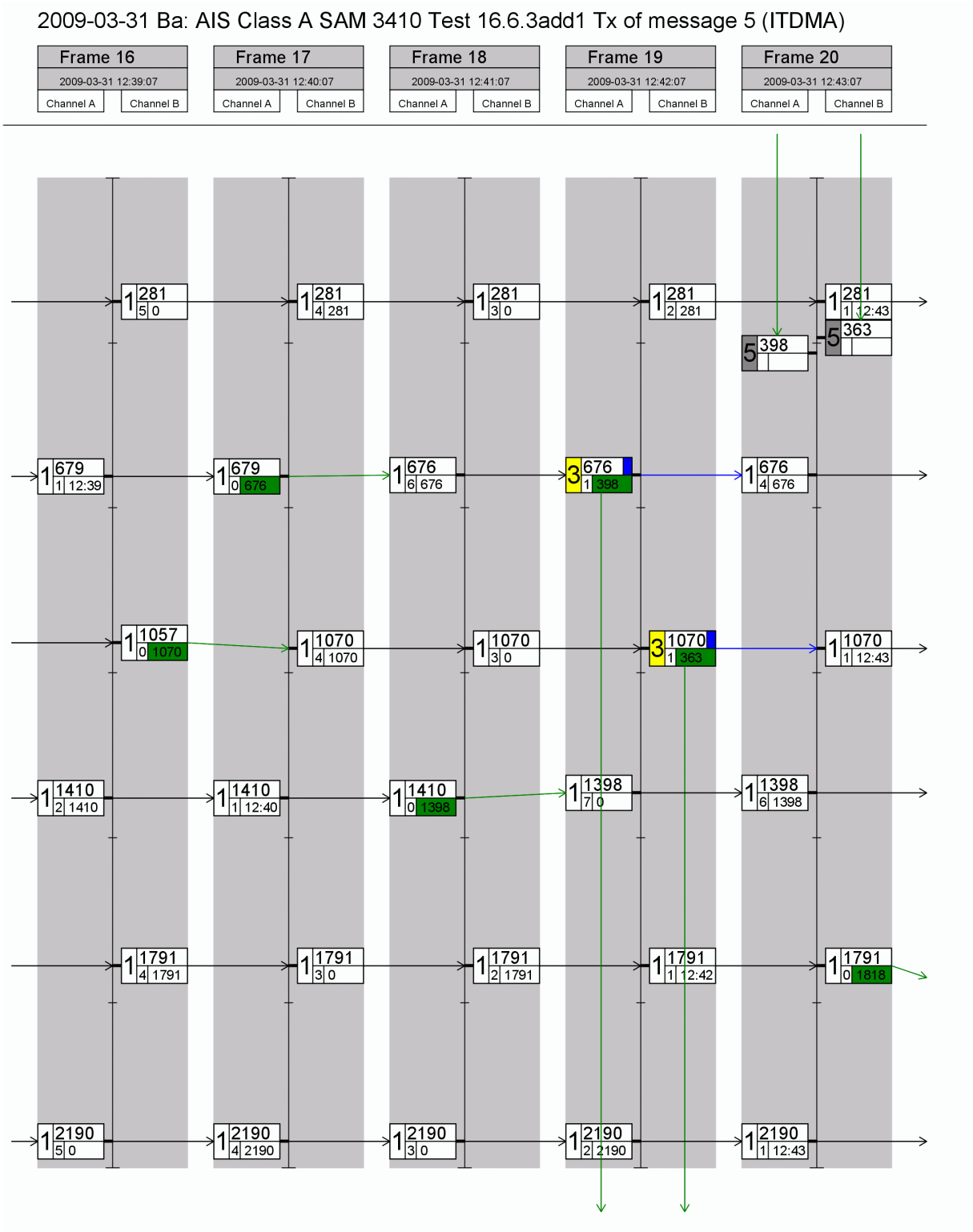


C.6 16.6.3 add1 Transmission of message 5 (ITDMA)



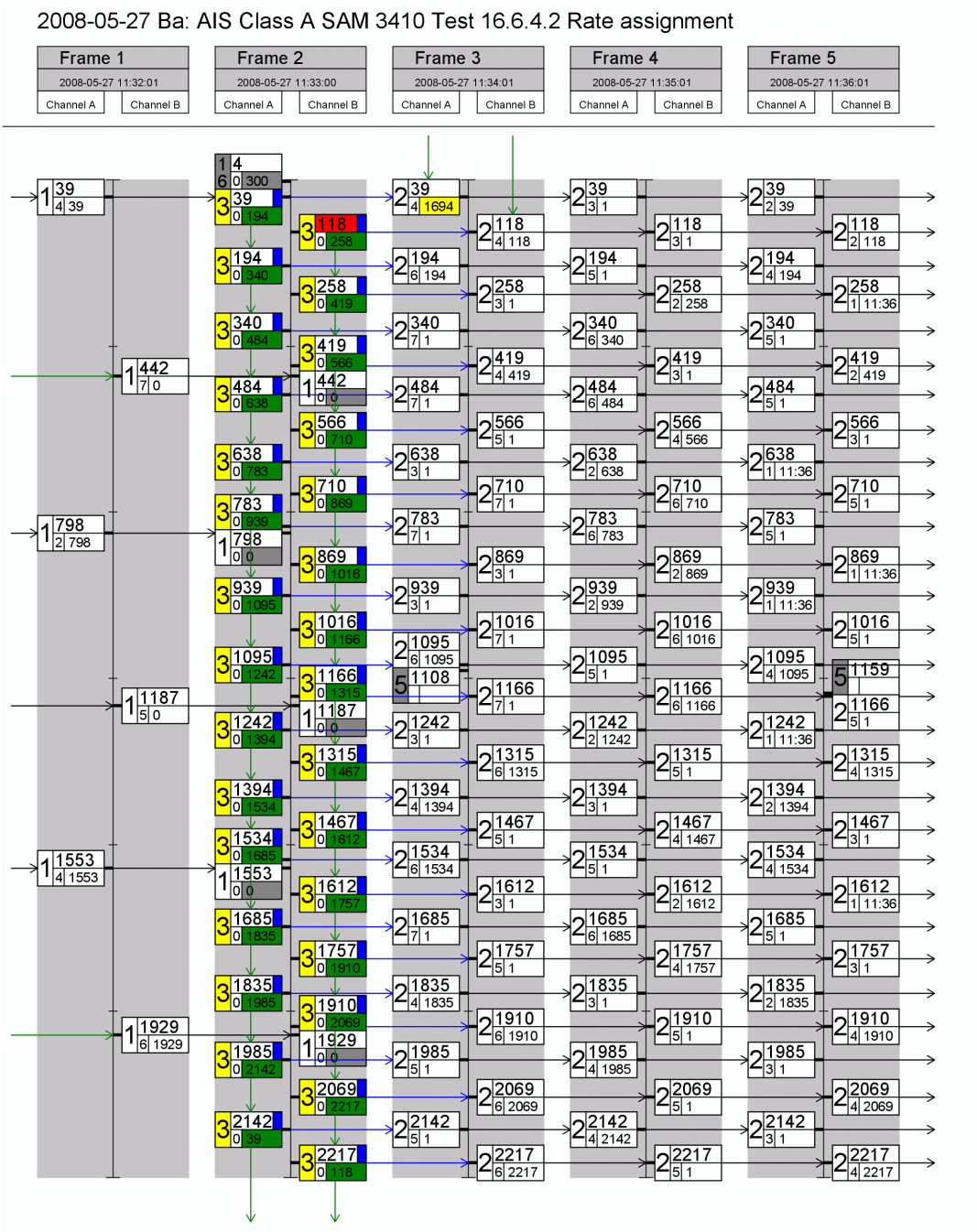

2009-03-31 Ba: AIS Class A SAM 3410 Test 16.6.3add1 Tx of message 5 (ITDMA)
Frame 6
2009-03-31 12:29:08
Channel A
Channel B
Frame 7
2009-03-31 12:30:07
Channel A
Channel B
Frame 8
2009-03-31 12:31:07
Channel A
Channel B
Frame 9
2009-03-31 12:32:07
Channel A
Channel B
Frame 10
2009-03-31 12:33:07
Channel A
Channel B

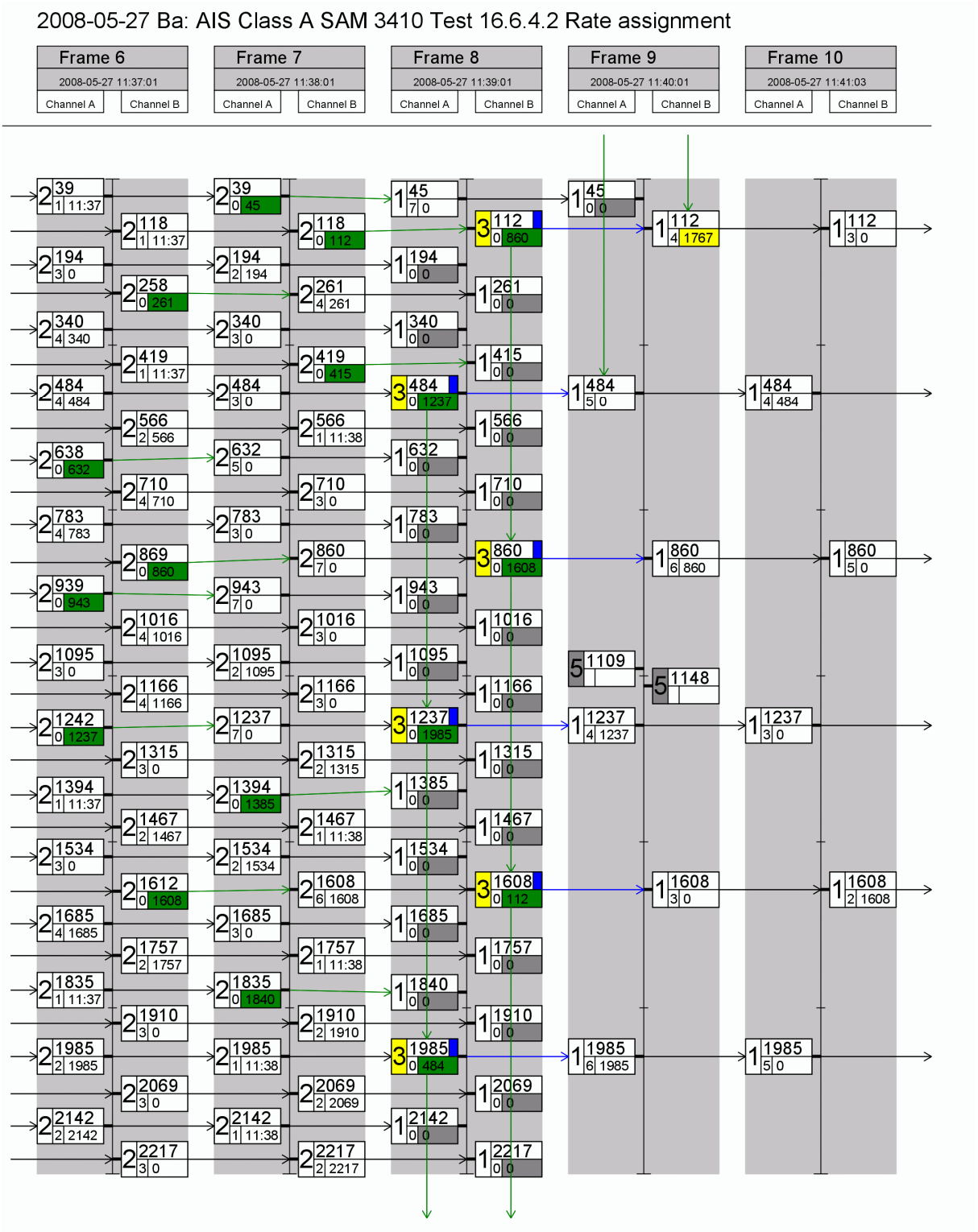

2009-03-31 Ba: AIS Class A SAM 3410 Test 16.6.3add1 Tx of message 5 (ITDMA)
Frame 11
2009-03-31 12:34:07
Channel A
Channel B
Frame 12
2009-03-31 12:35:07
Channel A
Channel B
Frame 13
2009-03-31 12:36:07
Channel A
Channel B
Frame 14
2009-03-31 12:37:07
Channel A
Channel B
Frame 15
2009-03-31 12:38:07
Channel A
Channel B


2009-03-31 Ba: AIS Class A SAM 3410 Test 16.6.3add1 Tx of message 5 (ITDMA)
Frame 16
2009-03-31 12:39:07
Channel A
Channel B
Frame 17
2009-03-31 12:40:07
Channel A
Channel B
Frame 18
2009-03-31 12:41:07
Channel A
Channel B
Frame 19
2009-03-31 12:42:07
Channel A
Channel B
Frame 20
2009-03-31 12:43:07
Channel A
Channel B

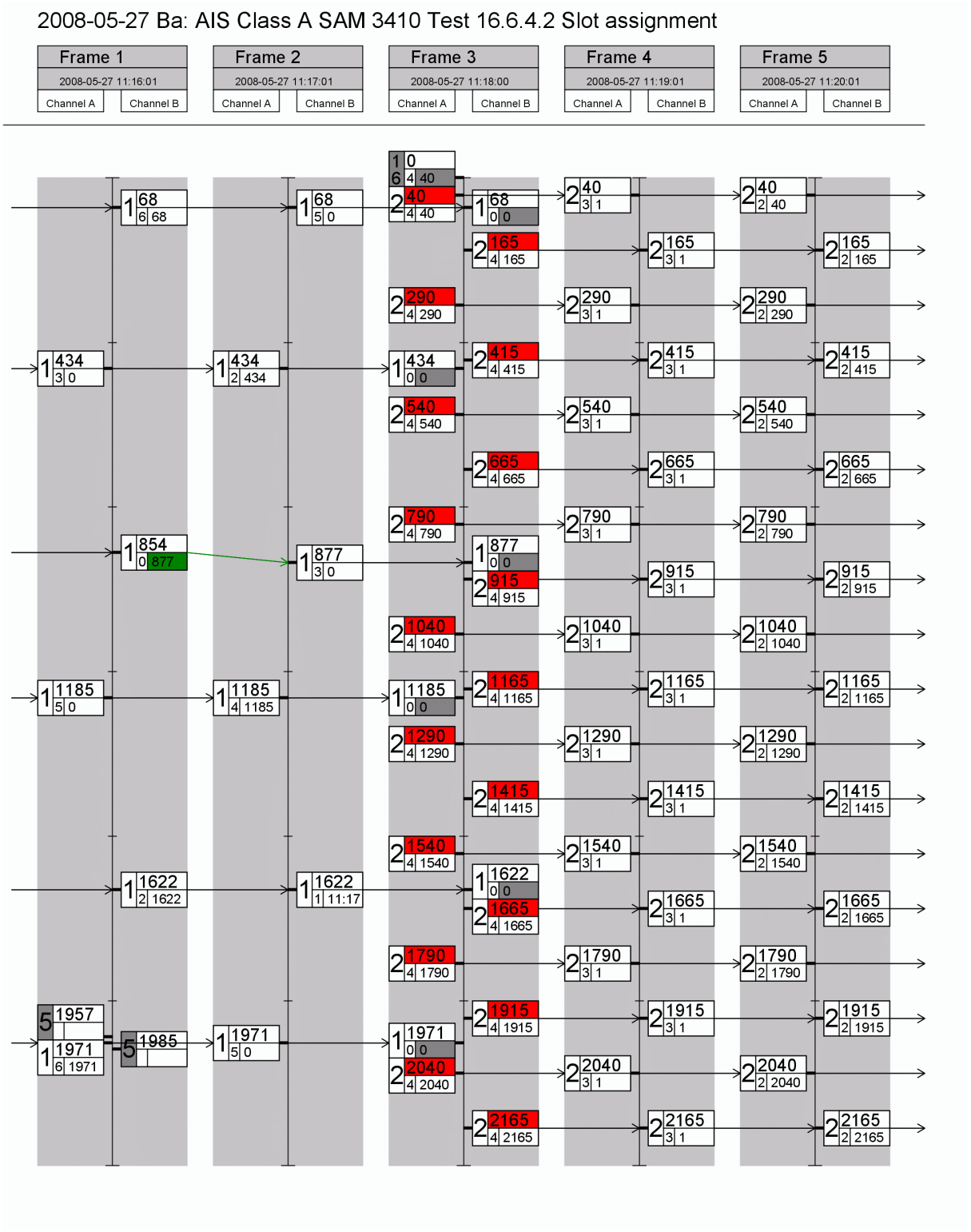
C.7 16.6.4.2 Assigned mode, Receiving test

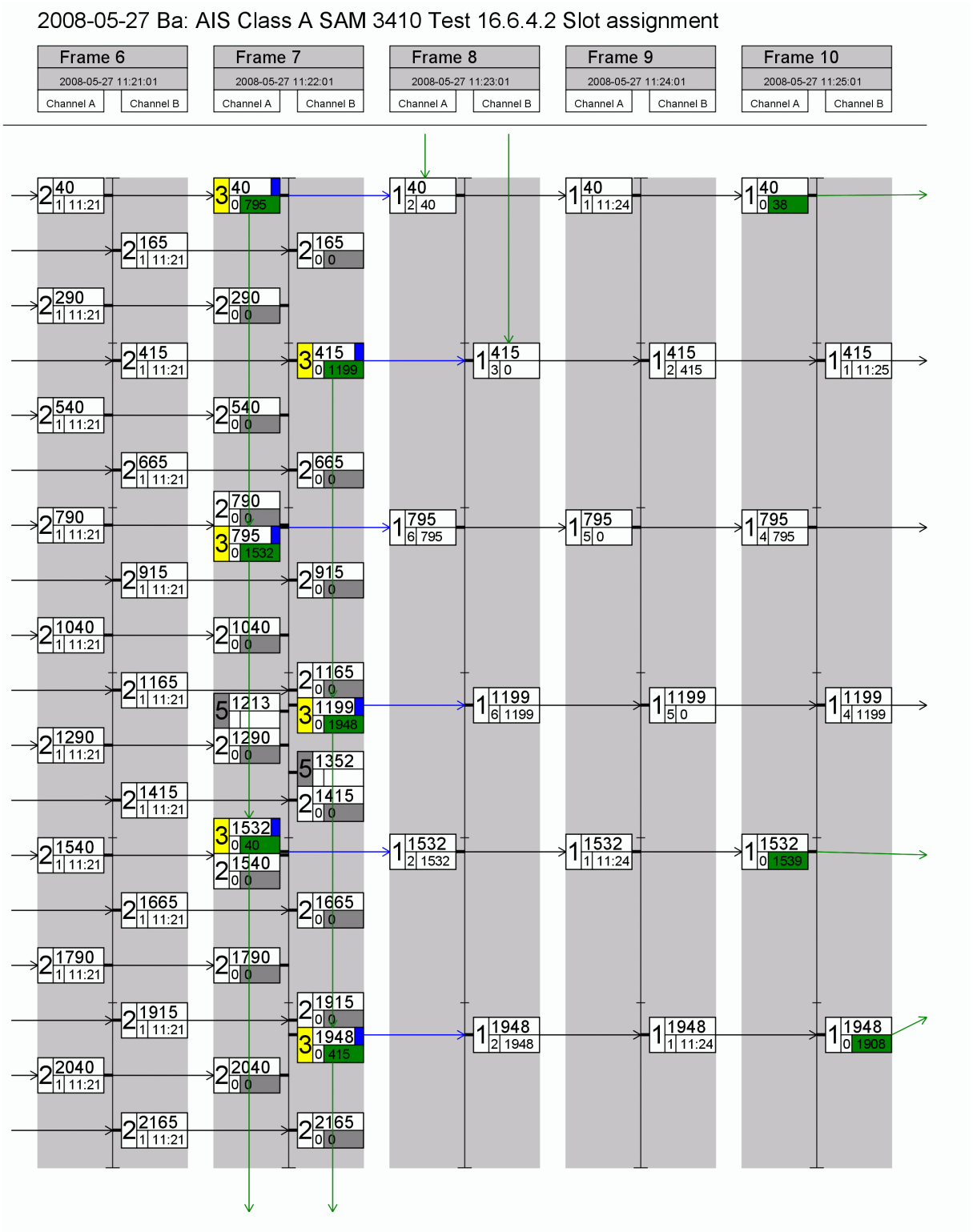
C.7.1 Rate assignment



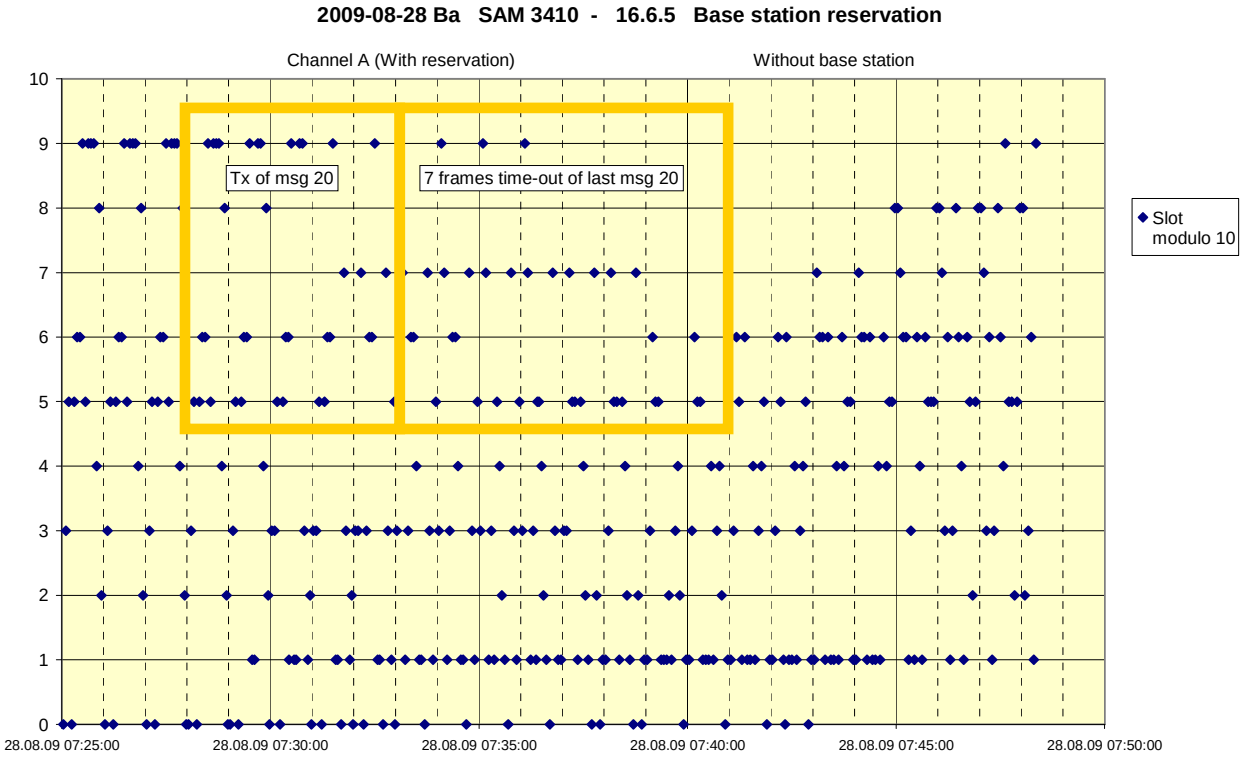

2008-05-27 Ba: AIS Class A SAM 3410 Test 16.6.4.2 Rate assignment
Frame 6
2008-05-27 11:37:01
Channel A
Channel B
Frame 7
2008-05-27 11:38:01
Channel A
Channel B
Frame 8
2008-05-27 11:39:01
Channel A
Channel B
Frame 9
2008-05-27 11:40:01
Channel A
Channel B
Frame 10
2008-05-27 11:41:03
Channel A
Channel B

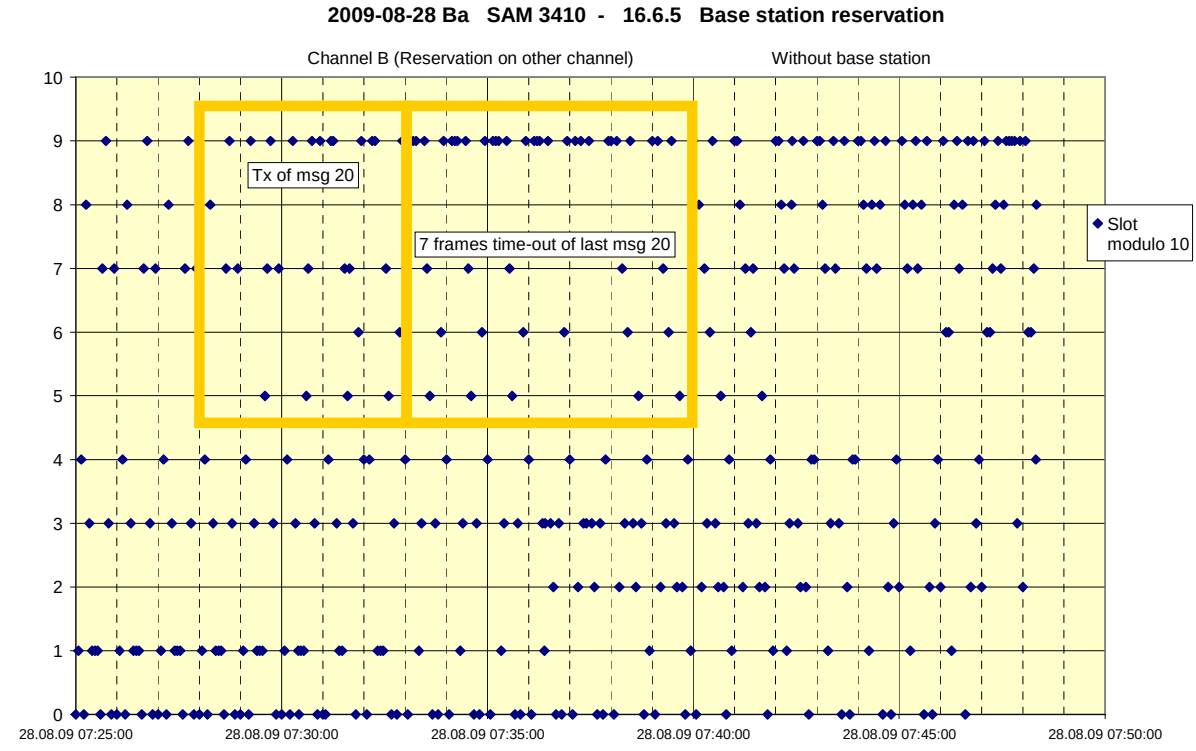
C.7.2 Slot assignment



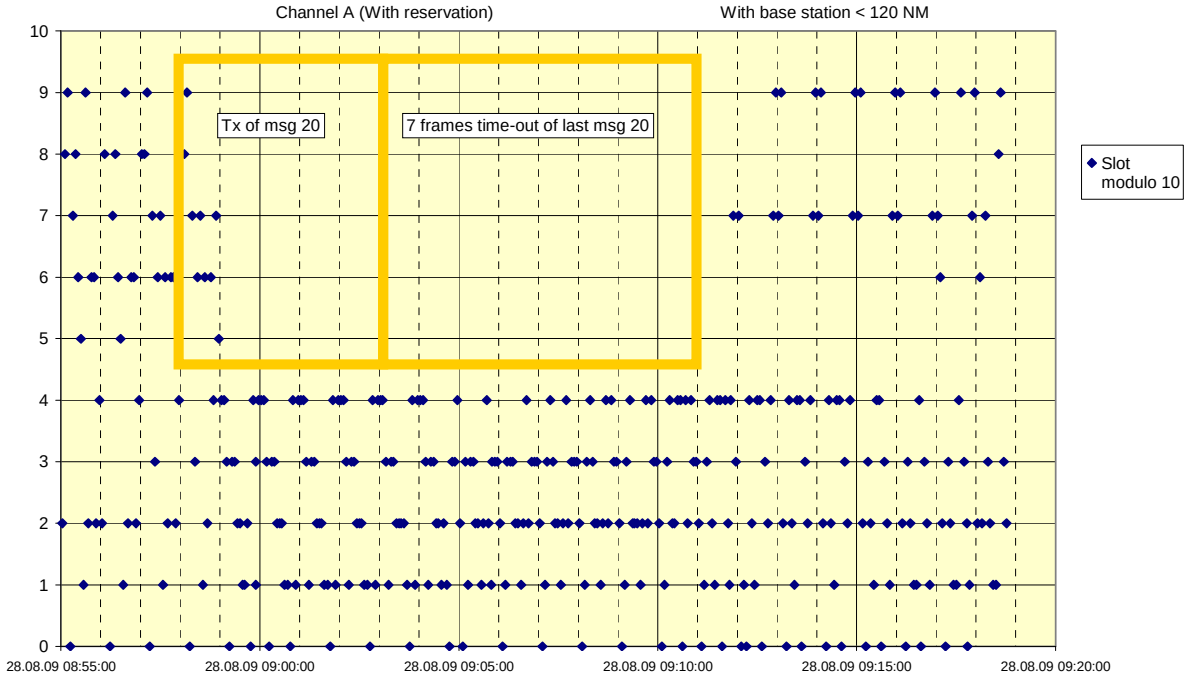

2008-05-27 Ba: AIS Class A SAM 3410 Test 16.6.4.2 Slot assignment
Frame 6
2008-05-27 11:21:01
Channel A
Channel B
Frame 7
2008-05-27 11:22:01
Channel A
Channel B
Frame 8
2008-05-27 11:23:01
Channel A
Channel B
Frame 9
2008-05-27 11:24:01
Channel A
Channel B
Frame 10
2008-05-27 11:25:01
Channel A
Channel B

C.8 16.6.5 Fixed allocated transmissions (FATDMA)

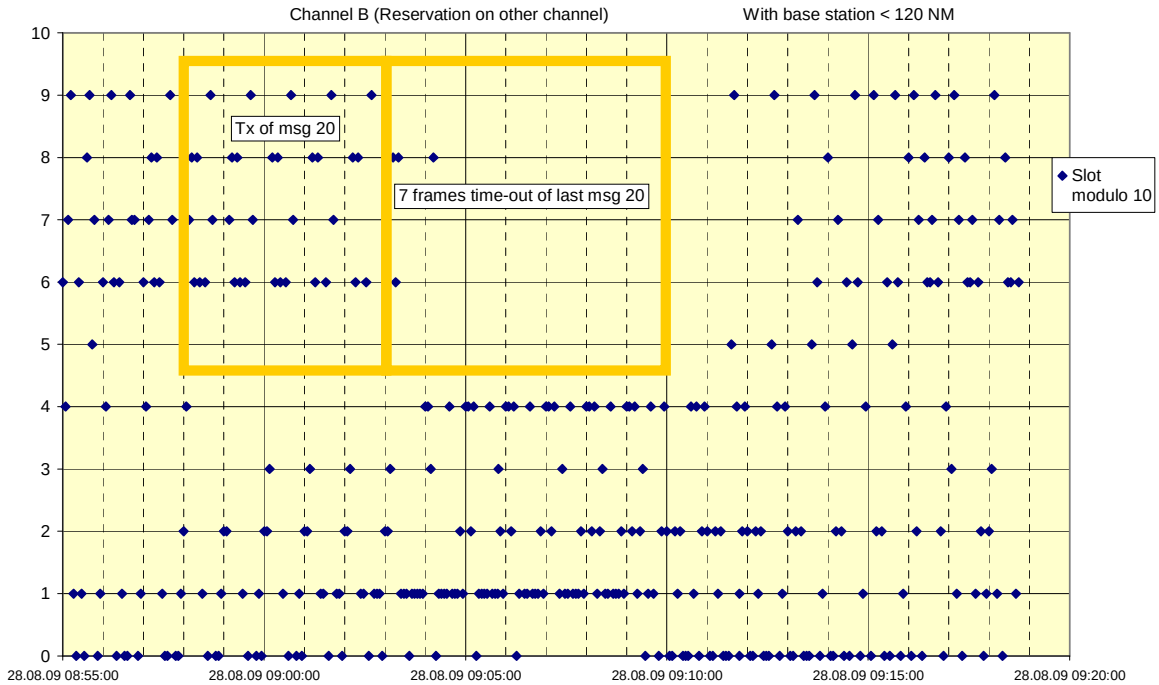




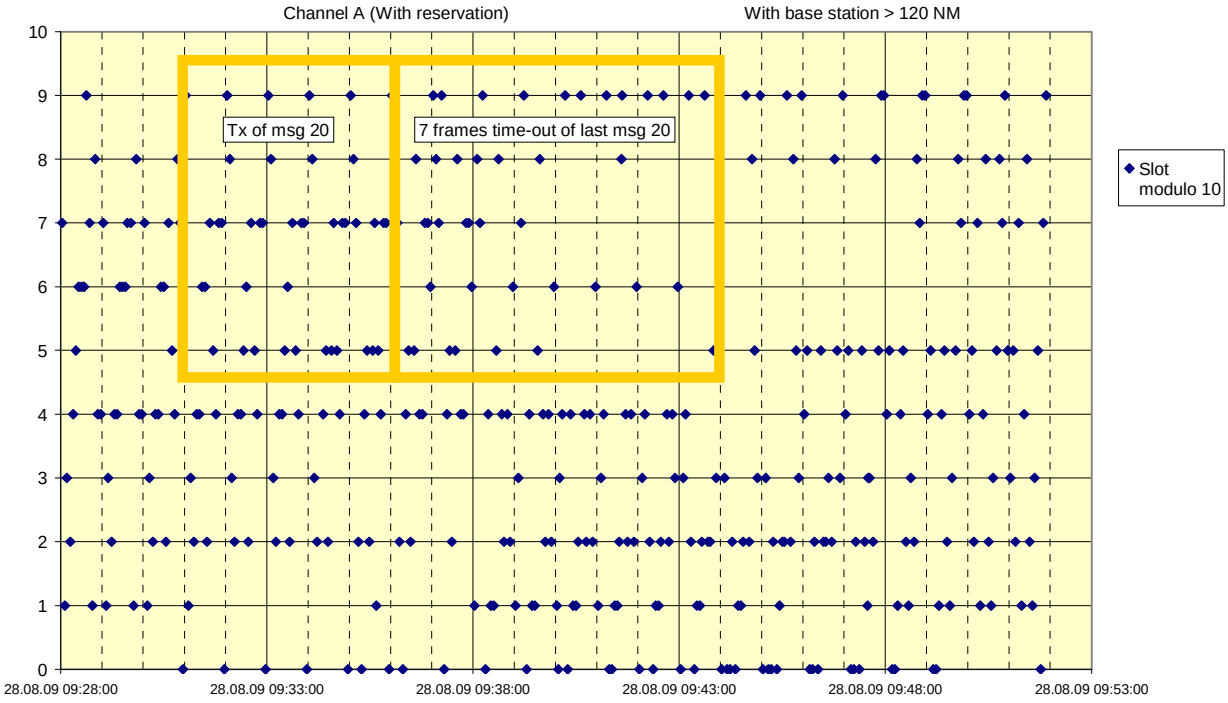
2009-08-28 Ba SAM 3410 - 16.6.5 Base station reservation



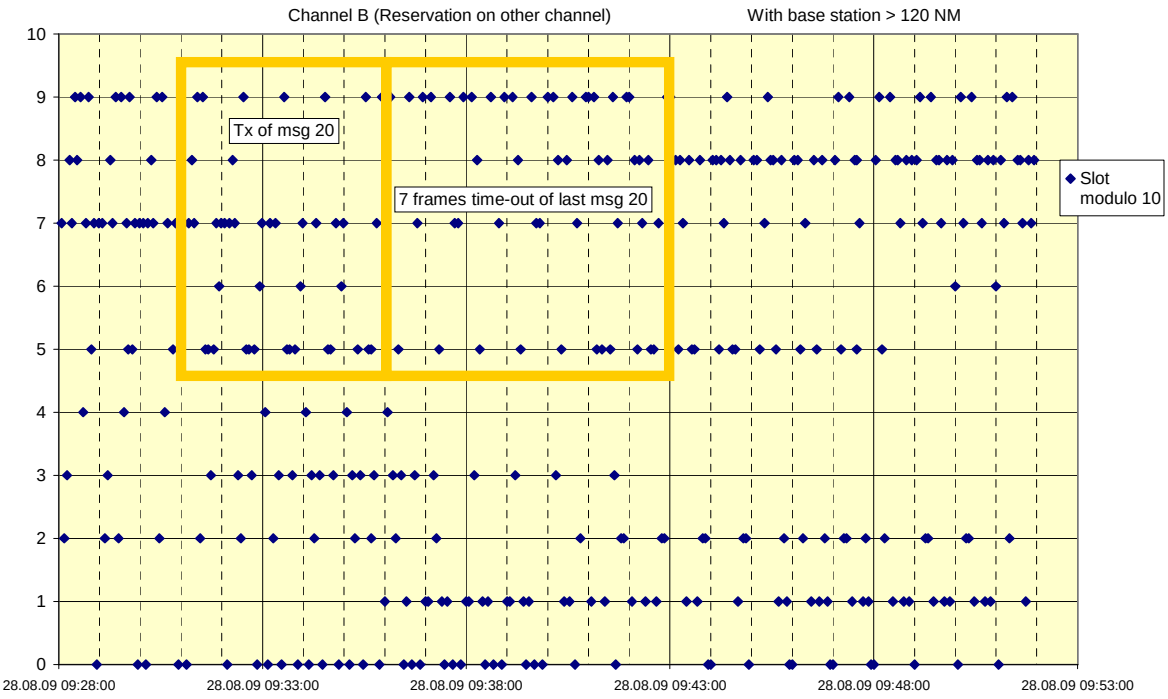
2009-08-28 Ba SAM 3410 - 16.6.5 Base station reservation



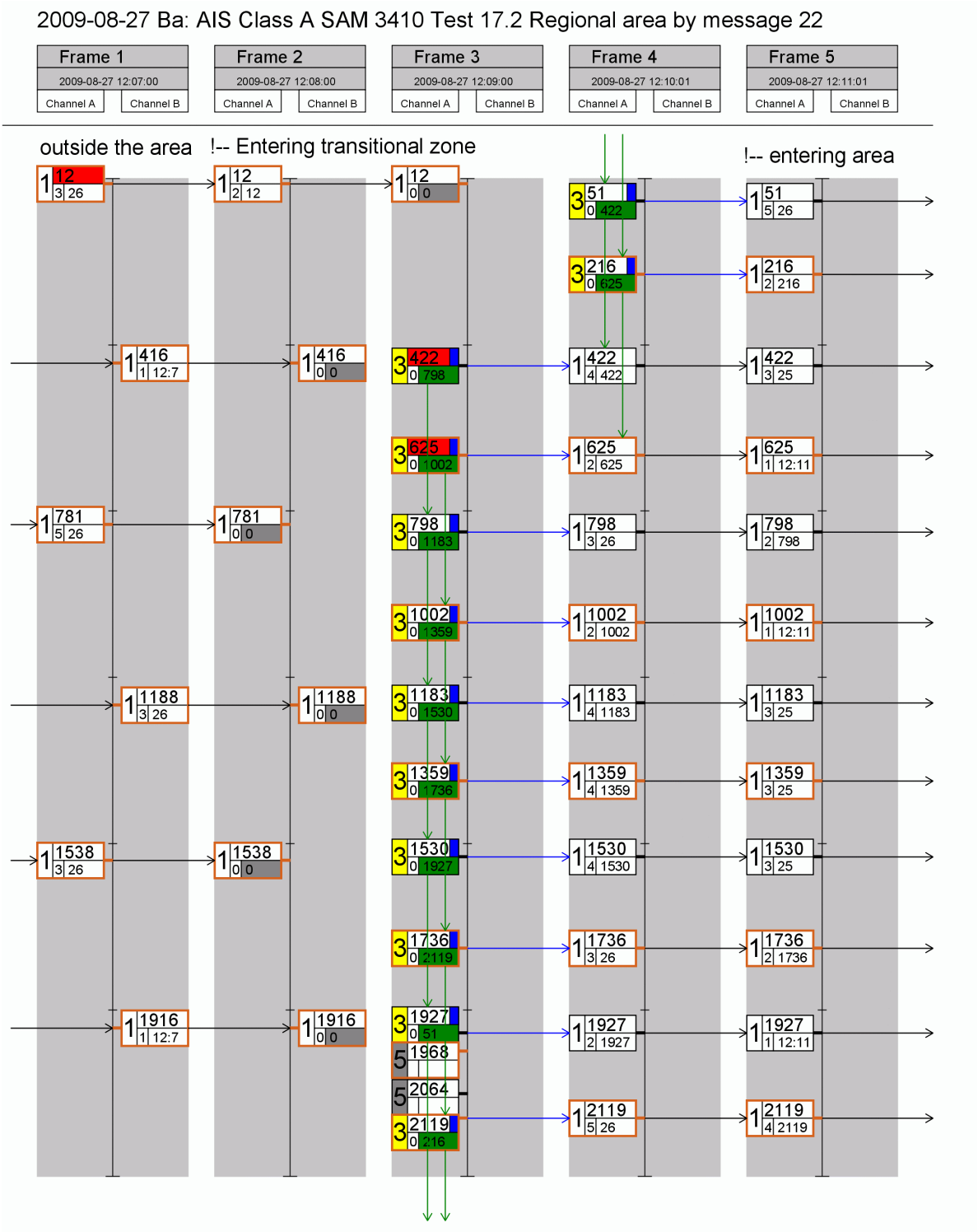
2009-08-28 Ba SAM 3410 - 16.6.5 Base station reservation

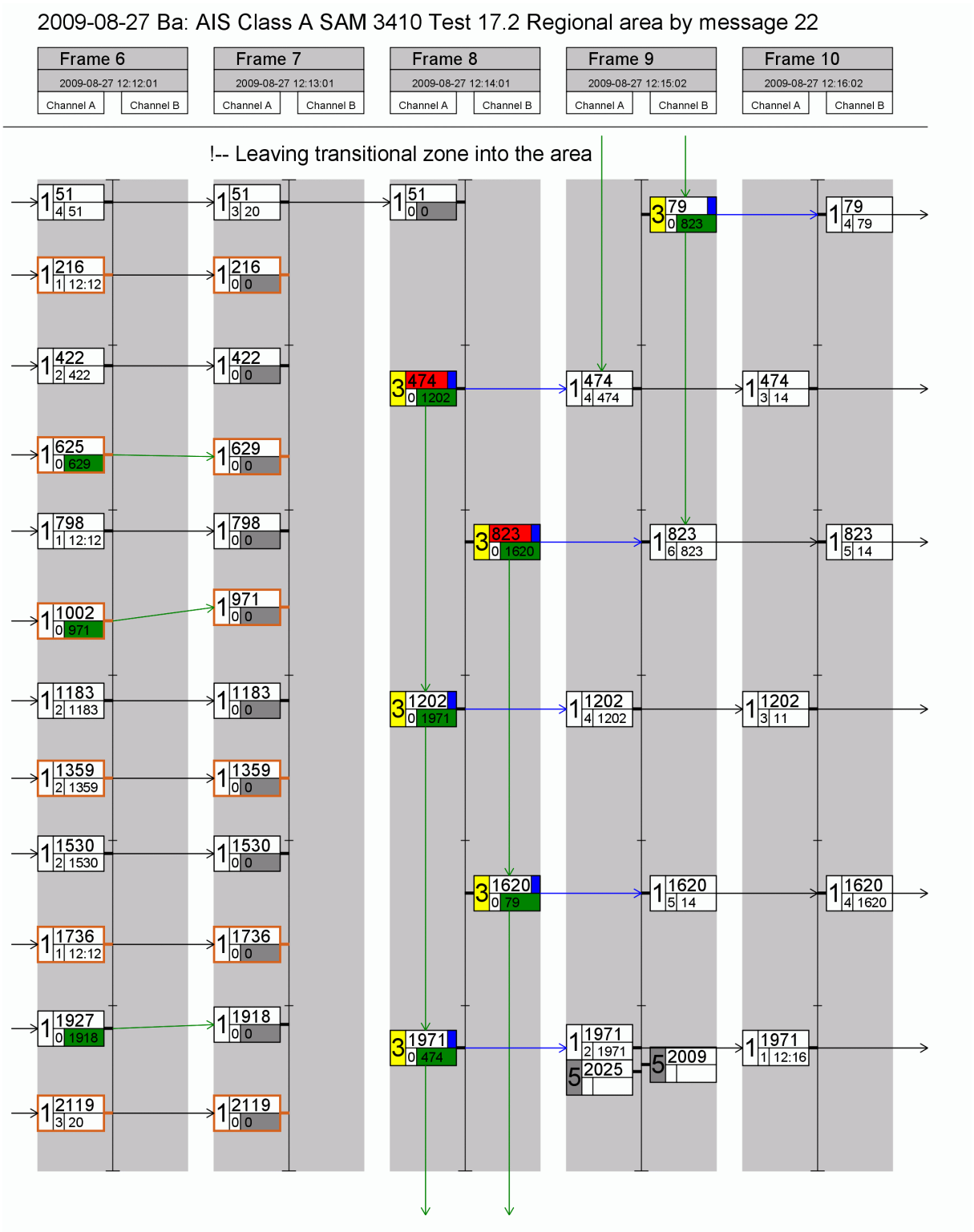


2009-08-28 Ba SAM 3410 - 16.6.5 Base station reservation



C.9 Area entry through transitional zone



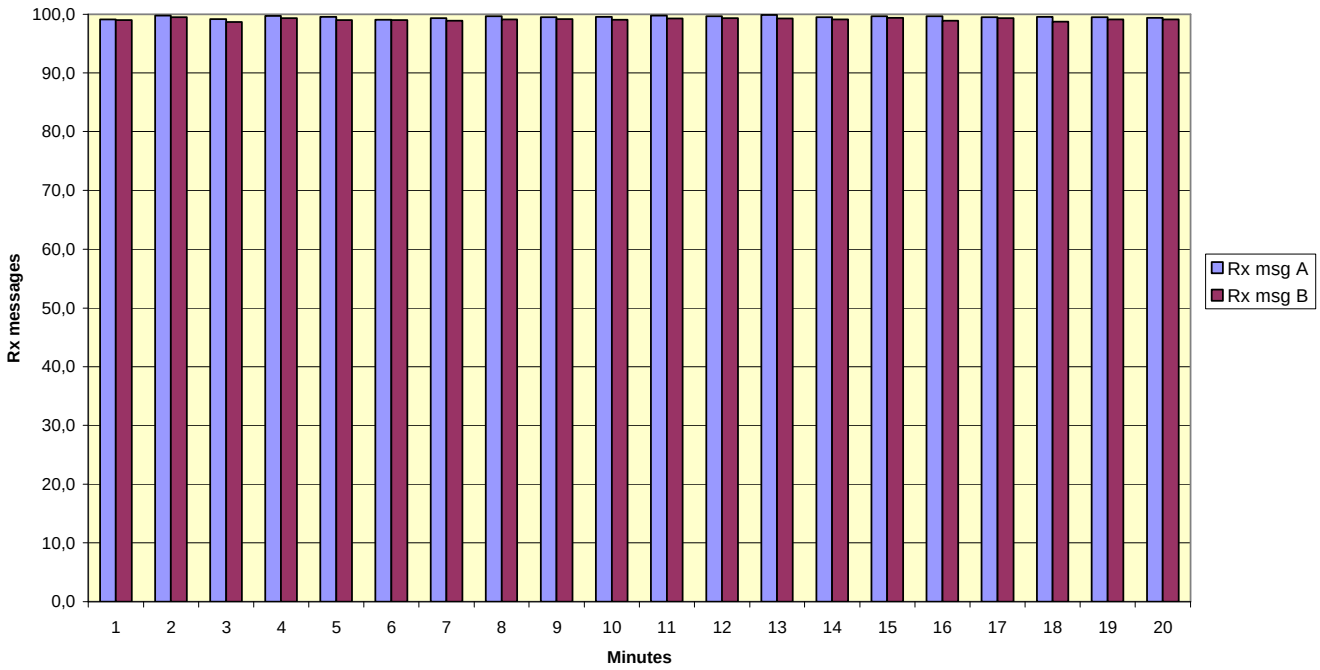

2009-08-27 Ba: AIS Class A SAM 3410 Test 17.2 Regional area by message 22
Frame 6
2009-08-27 12:12:01
Channel A
Channel B
Frame 7
2009-08-27 12:13:01
Channel A
Channel B
Frame 8
2009-08-27 12:14:01
Channel A
Channel B
Frame 9
2009-08-27 12:15:02
Channel A
Channel B
Frame 10
2009-08-27 12:16:02
Channel A
Channel B
!-- Leaving transitional zone into the area

C.10 High speed output performance

2008-04-16 - SAM 3410 - 19.7 PI output performance, PI port

Result: Average = A= 99.5 %, B=99.1%

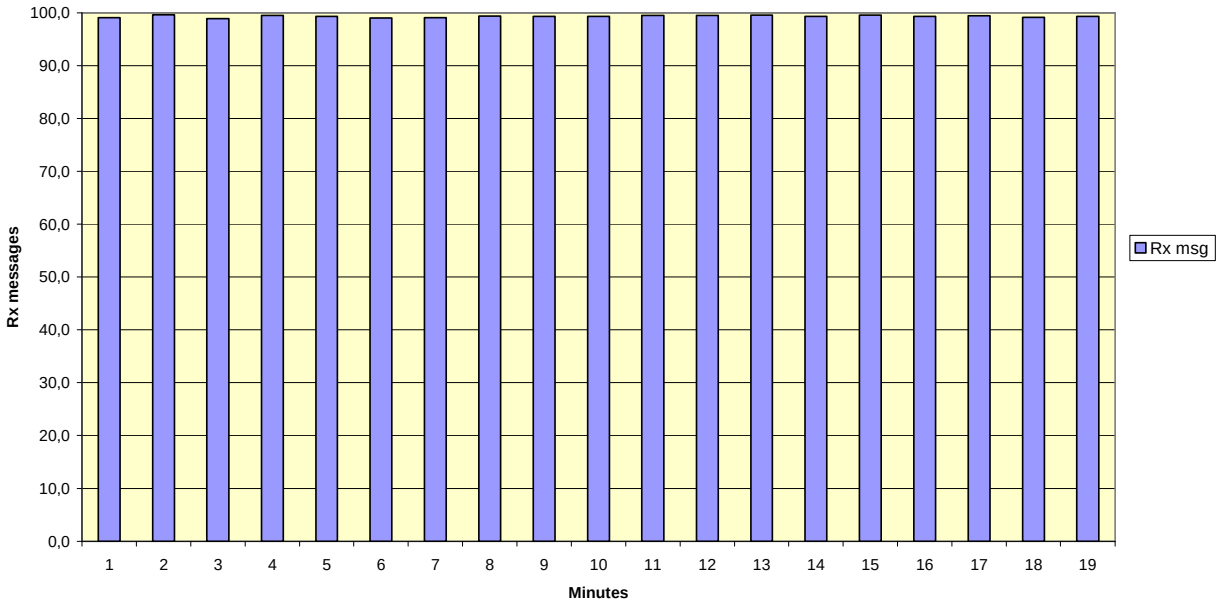
Ch A: 2084 Ch B: 2086



2008-04-16 - SAM 3410 - 19.7 PI output performance, PI port

Result: Average = 99.3%

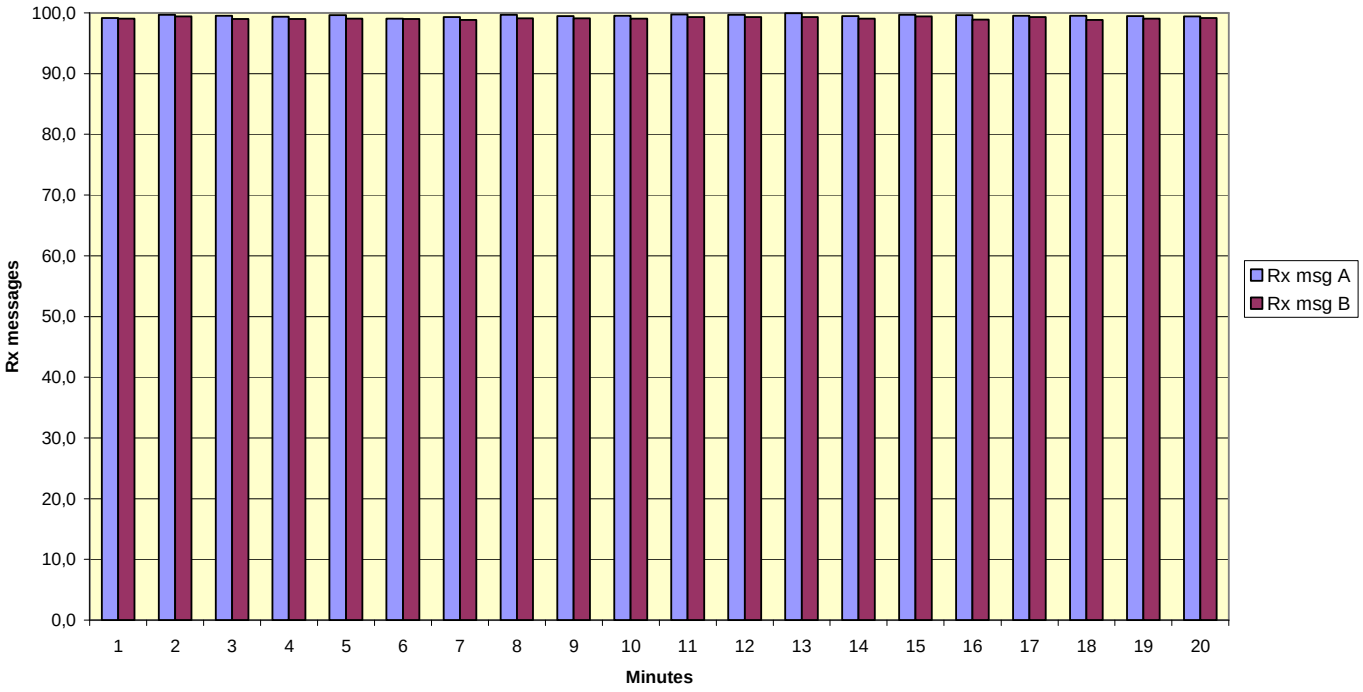
Ch A: 2084 Ch B: 2086



2008-04-16 - SAM 3410 - 19.7 PI output performance, Pilot port

Result: Average = A= 99.5 %, B=99.1%

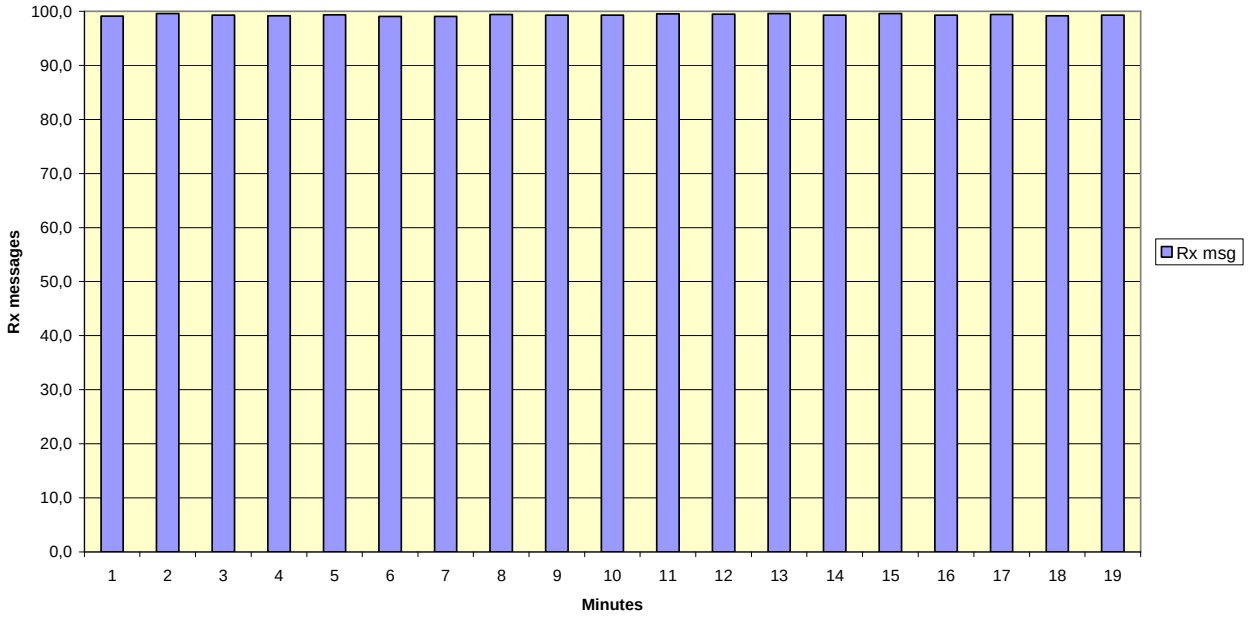
Ch A: 2084 Ch B: 2086



2008-04-16 - SAM 3410 - 19.7 PI output performance, Pilot port

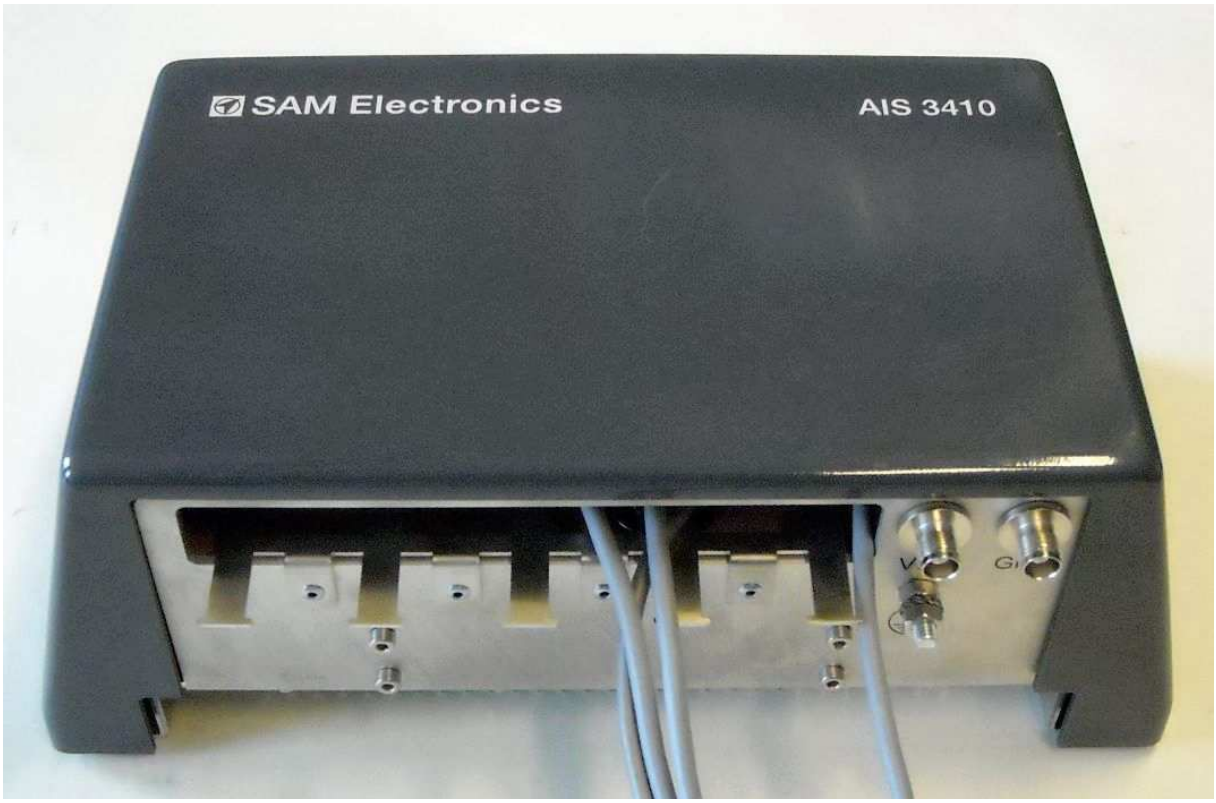
Result: Average = 99.3%

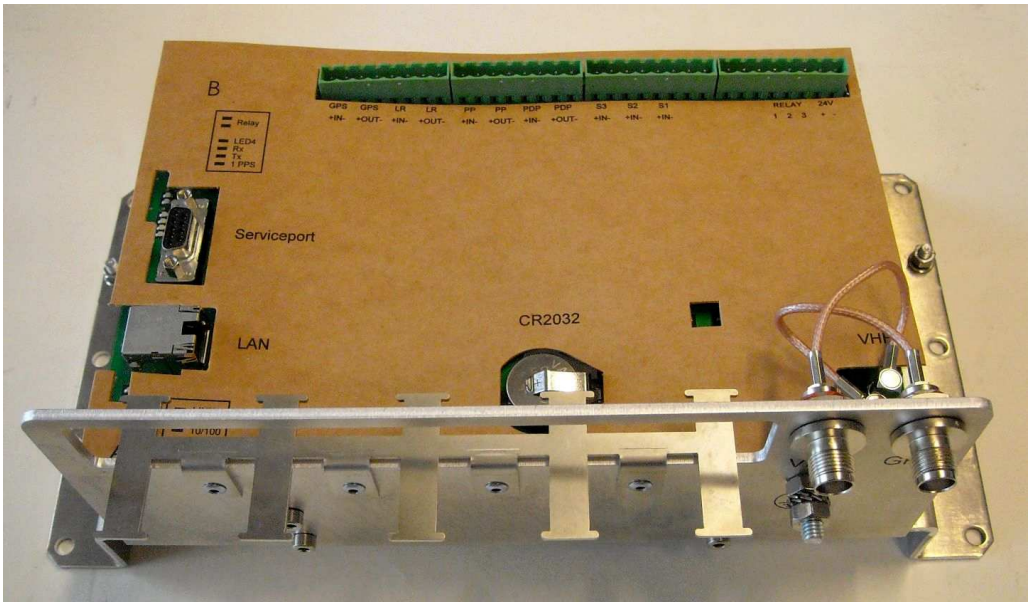
Ch A: 2084 Ch B: 2086

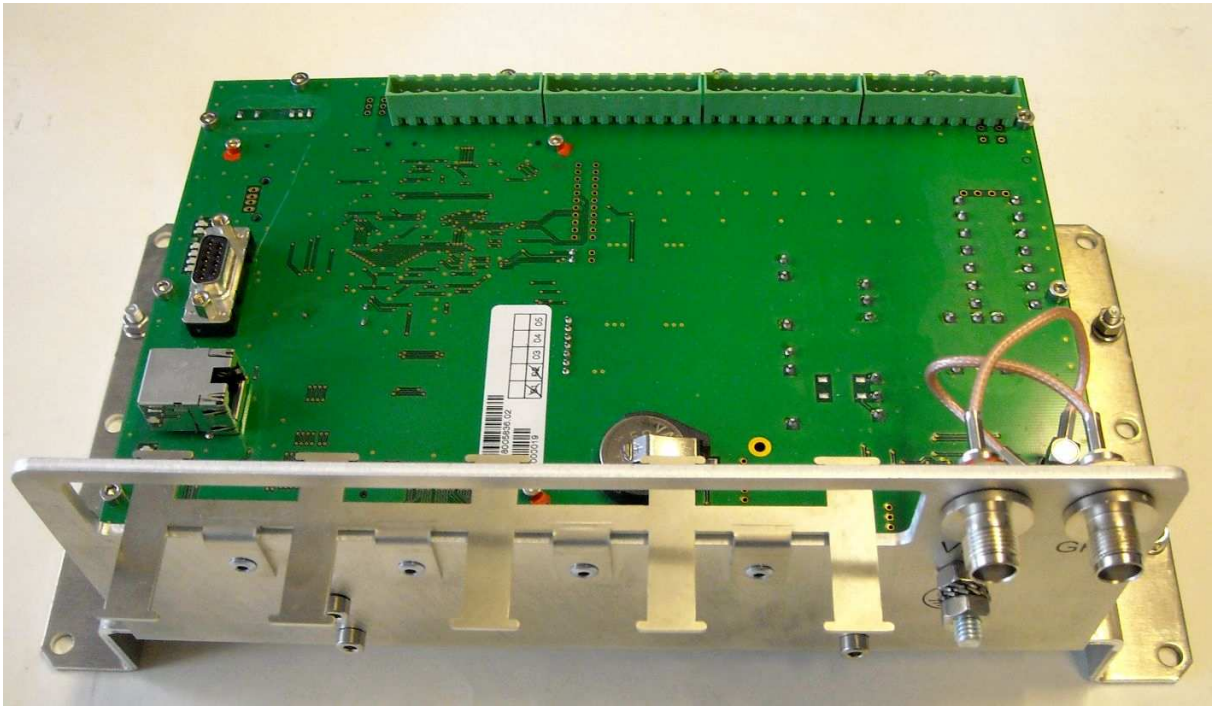


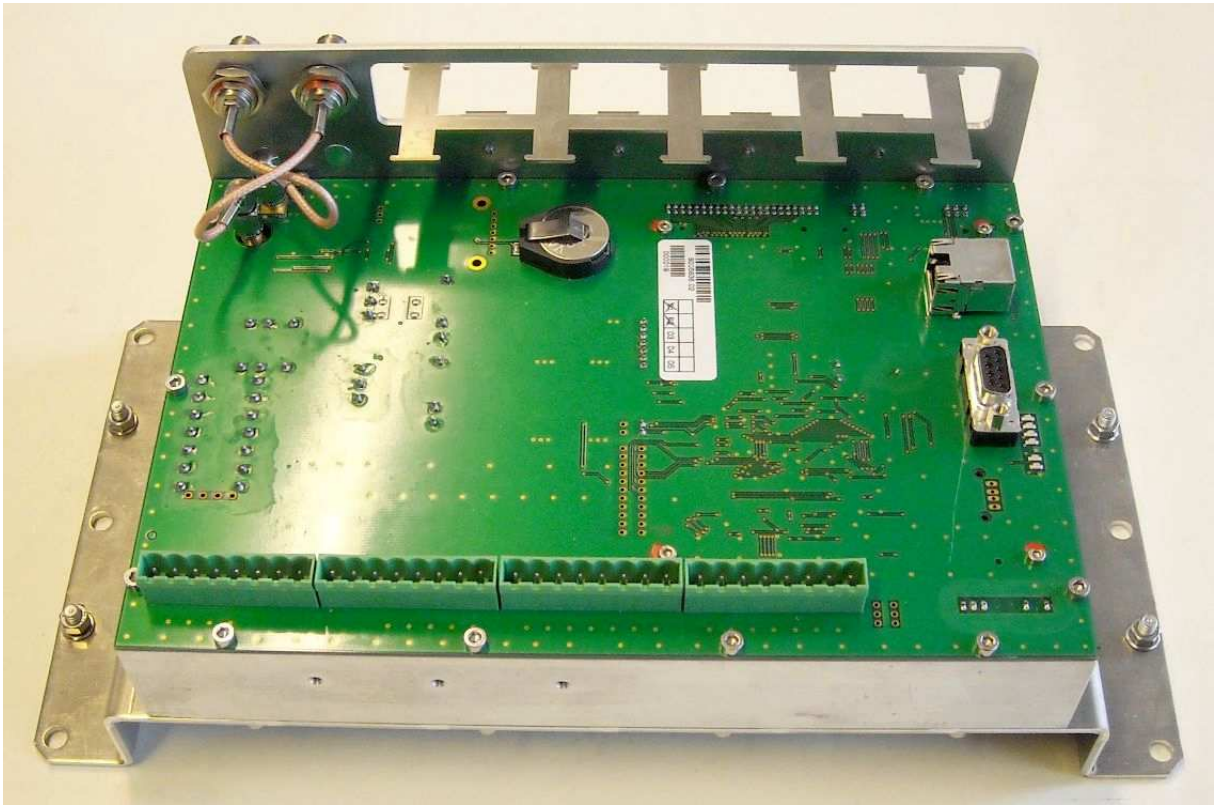
Annex D Photos of equip m ent under test

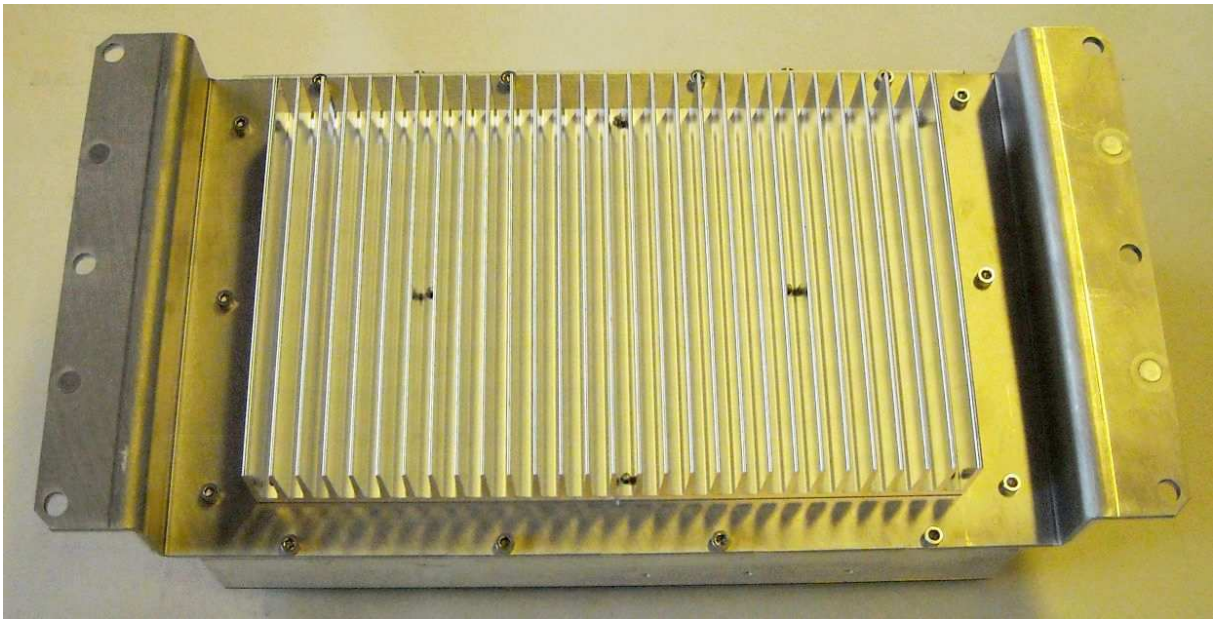
D.1 Transponder Unit











D.2 GPS antenna


MICRO PULSE
ANTENNA- GPS
P/N: 1330FW/D
DATE: 27/01
PAT. NO. 5541617


MICRO PULSE
ANTENNA- GPS
P/N: 1330FW/D
DATE: 27/01
PAT. NO. 5541617