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Report On

Testing of the
Ocean Signal Class A AIS ATA100
In accordance with IEC 62288 and IEC 60945 (Clause 6 only)

COMMERCIAL-IN-CONFIDENCE

Document 75936860 Report 06 Issue 1 **December 2019**

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REPORT ON

Ocean Signal
Class A AIS ATA100

Document 75936860 Report 06 Issue 1

December 2019

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DATED

20 December 2019

CONTENTS

SECTION 1

REPORT SUMMARY

Testing of the Ocean Signal
Class A AIS ATA100
To IEC 62288 and IEC 60945 (Limited)

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Ocean Signal Class A AIS ATA100 to IEC 62288.

Manufacturer	Ocean Signal
Part Description	AIS Transponder / display
Model Number	ATA100
Serial Number	TA0008
Number of Samples Tested	1
Test Specification/Issue/Date	IEC 62288: 2014
Order Number Date	3123-00 31-October-2016
Start of Test	20 June 2019
Finish of Test	07 November 2019
Name of Engineer(s)	Neil Douglas
Related Document(s)	IEC 61993-2: 2018

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with IEC 62288 is shown below.

Clause and description	EUT1	Comment
4.2 Application of IEC 60945 in accordance with IEC 62288 Annex D	Pass	
IEC 60945 6.1.2a	Pass	
IEC 60945 6.1.2b	Pass	
IEC 60945 6.1.2c	N/A	
IEC 60945 6.1.2d	Pass	
IEC 60945 6.1.2e	Pass	
IEC 60945 6.1.2f	Pass	
IEC 60945 6.1.2g	Pass	
IEC 60945 6.1.2h	Pass	
IEC 60945 6.1.3a	Pass	
IEC 60945 6.1.3b	Pass	
IEC 60945 6.1.3c	Pass	
IEC 60945 6.1.3d	Pass	
IEC 60945 6.1.4a	Pass	
IEC 60945 6.1.4b	Pass	
IEC 60945 6.1.4c	Pass	
IEC 60945 6.1.4d	Pass	
IEC 60945 6.1.5a	Pass	
IEC 60945 6.1.5b	Pass	
IEC 60945 6.1.5c	Pass	
IEC 60945 6.1.5d	Pass	
IEC 60945 6.1.5e	Pass	
IEC 60945 6.1.5f	Pass	
IEC 60945 6.1.5g	Pass	
IEC 60945 6.1.5h	Pass	
IEC 60945 6.1.5i	Pass	
IEC 60945 6.1.5j	Pass	
IEC 60945 6.1.5k	Pass	
IEC 60945 6.1.5l	Pass	
IEC 60945 6.1.5m	Pass	
IEC 60945 6.1.5n	Pass	
IEC 60945 6.1.5o	Pass	
IEC 60945 6.1.5p	Pass	
IEC 60945 6.1.5q	Pass	
IEC 60945 6.1.5r	Pass	
IEC 60945 6.1.5s	Pass	
IEC 60945 6.1.5t	Pass	
IEC 60945 6.1.6a	NT	
IEC 60945 6.1.6b	NT	
IEC 60945 6.1.6c	NT	
IEC 60945 6.1.6d	NT	
IEC 60945 6.1.7a	Pass	

IEC 60945 6.1.7b	Pass	
IEC 60945 6.1.7c	Pass	
IEC 60945 6.1.7d	Pass	
IEC 60945 6.1.7e	Pass	
IEC 60945 6.1.8a	N/A	
IEC 60945 6.1.8b	N/A	
IEC 60945 6.1.8c	N/A	
IEC 60945 6.1.8d	N/A	
IEC 60945 6.1.8e	N/A	
IEC 60945 6.1.8f	N/A	
IEC 60945 6.2.1a	Pass	
IEC 60945 6.2.1b	Pass	
IEC 60945 6.2.1c	Pass	
IEC 60945 6.2.1d	N/A	
IEC 60945 6.2.2a	Pass	
IEC 60945 6.2.2b	Pass	
IEC 60945 6.2.2c	Pass	
IEC 60945 6.2.3a	Pass	
IEC 60945 6.2.3b	Pass	
IEC 60945 6.2.3c	Pass	
IEC 60945 6.2.3d	Pass	
IEC 60945 6.2.3e	Pass	
IEC 60945 6.2.3f	Pass	
IEC 60945 6.2.3g	Pass	
IEC 60945 6.2.3h	N/A	
IEC 60945 6.3.1	Pass	
IEC 60945 6.3.2	Pass	
IEC 60945 6.3.3	Pass	
IEC 60945 6.3.4	N/A	
IEC 60945 6.4	Pass	
4.7 Colour coding of information	Pass	
4.8 Integrity marking	Pass	
4.9 Alerts and indications	Pass	
4.10 Presentation mode	Pass	
4.11 User manuals, instructions and reference guides	Pass	
5.2 Presentation of operational information	N/A	
5.3 Presentation of chart information	Pass	
5.4 Presentation of radar information	N/A	
5.5 Presentation of target information	Pass	
5.6 Operational alerts	Pass	
5.7 AIS and radar target association	N/A	
5.8 Measurement	N/A	
5.9 Navigation tools	Pass	
6 Radar and chart displays	Pass	
6.2 Radar displays	N/A	
6.3 Chart displays	N/A	
6.4 Composite task-oriented presentations	Pass	

7 Physical requirements	Pass	
7.2 Display adjustment	Pass	
7.3 Screen size	N/A	
7.4 Multicoloured display equipment	Pass	
7.5 Screen resolution	Pass	
7.6 Screen viewing angle	Pass	
Annex A (normative)	Pass	
Annex B (normative)	Pass	
Annex C (informative)	N/A	
Annex D (informative)	N/A	
Annex E (normative)	Pass	
Annex F (normative.	Pass	
Annex G (normative)	Pass	

N/A - Not Applicable
NT - Not Tested

1.3 APPLICATION FORM

MAIN EUT			
MANUFACTURING DESCRIPTION	Class A AIS transponder		
MANUFACTURER	Ocean Signal Ltd.		
MODEL NAME/NUMBER	ATA100		
PART NUMBER	760S-02697		
SERIAL NUMBER	N/A		
HARDWARE VERSION	TBD		
SOFTWARE VERSION	TBD		
PSU VOLTAGE/FREQUENCY/CURRENT	10.8-31.2Volts DSC, 6 amps		
HIGHEST INTERNALLY GENERATED / USED FREQUENCY	207.025MHz		
FCC ID (if applicable)	N/A		
INDUSTRY CANADA ID (if applicable)	N/A		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Class A AIS transponder		
COUNTRY OF ORIGIN	United Kingdom		
RF CHARACTERISTICS (if applicable)			
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	156.025 - 162.025 MHz		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	156.025 - 162.025 MHz		
INTERMEDIATE FREQUENCIES	38.85/30.875/21.4MHz, 455kHz		
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	16K0GXW		
MODULATION TYPES: (i.e. GMSK, QPSK)	GMSK		
OUTPUT POWER (W or dBm)	12.5W		
SEPARATE BATTERY/POWER SUPPLY (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
PSU VOLTAGE/FREQUENCY/CURRENT			
COUNTRY OF ORIGIN			
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
COUNTRY OF ORIGIN			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

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

Name: David Sheekey Position held: Type Approval Manager
Date: 5/4/18

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) detailed in 1.1 shown in the photograph below.
A full technical description can be found in the manufacturer's documentation.

Equipment Under Test

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions.

The EUT was powered from 12.5 V DC

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	-	20 Jun 2019
1	Version 0.02.11	Ocean Signal	07 Nov 2019

1.8 ABREVIATIONS

Abbreviation	Definition
ODA	Operational Display Area
CPA	Closest Point of Approach
TCPA	Time to Closest Point of Approach
CCRP	Consistent Common Reference Point
C UP	Course Up
H UP	Heading Up
N UP	North up
VRM	Variable Range Marker
EBL	Electronic Bearing Line
BRG	Bearing
BRILL	Brilliance (display brilliance)
DEG	Degrees
EUT	Equipment Under Test
HL	Heading Line
km	Kilometre
kn	Knot
NM	Nautical Mile
m	Meters
mm	Millimetre
cm	Centimetre
ECDIS	Electronic Chart Display and Information System
COG	Coarse Over Ground
SOG	Speed Over Ground
POS	Position

SECTION 2

TEST DETAILS

Testing of the Ocean Signal
Class A AIS ATA100

2.1 IEC 62288 CLAUSE 4.2

2.1.1 Equipment Under Test

EUT 1 – Modification State 0

2.1.2 4.2 Application of IEC 60945

4.2.1 Remark

If display equipment is permitted to be monochrome, then the colour-related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2 will not apply.

4.2.2 General requirements

4.2.2.1 Requirement

(MSC191/3) *In addition to the general requirements set forth in* IMO *Resolution A.694(17)* and further specified in IEC 60945, *display equipment* shall *meet the requirements* set forth in IMO Resolution MSC.191(79) and further specified in this standard*, as applicable*.

4.2.2.2 Methods of test and required results

See Annex D for guidance in the application of IEC 60945 for testing.

IEC 60945 Clause 6.0 additional

6 Operational checks (all equipment categories)

6.1 Ergonomics and HMI

The EUT shall be checked to ensure compliance with the specific requirements as detailed below. The checks carried out shall be described and the results noted in the test report.

6.1.1 General

A check shall be made that all modes of operation required by the equipment standard are available, and that they may be controlled over the required range. Use shall be made of every position of every control provided to ensure that it performs the function for which it is identified and that it operates in the expected manner.

6.1.2 Arrangement

(See 4.2.1.2)

a) Check that the number of operational controls, their design and manner of function, location, arrangement and size provide for simple, quick and effective operation of the EUT. Check that the controls are logically grouped according to their function.

b) Check that the shape and size of each control is appropriate to its mode of operation. In the case of trackballs, joysticks and mice check that the controller can produce any combination of x and y axis output values and that the controller does not drive the follower off the edge of the screen. In the case of joysticks, check that there is a “home position” with a capability for a return to that point.

c) In the case of touch screens check that the dimension of the response area for a push to activate operation is a minimum of 15 mm height and width and the force required for operation is a maximum of 1,5 N where applicable.

d) Check that information presentation is suited to the maximum expected rate of change of information, for example analogue presentation is sometimes more suited to rapid change than digital.

e) Check that rotating controls and indicators turn clockwise for increased value or effect.

f) Check that linear controls and indicators move upwards or to the right for increased value or effect.

g) Check that where users must rapidly discern directional change, digital displays are provided with indications of directions of change.

h) Check that equipment elements relating to control, and indicators associated with control, are readily distinguishable from elements provided for other functions, such as equipment set-up.

6.1.3 Operation
(See 4.2.1.3)

a) Check that all operational controls permit normal adjustments to be easily performed, and are arranged in a manner which minimizes the chance of inadvertent operation. Check that controls not required for normal operation and which may affect performance are not readily accessible.

b) Check all operational controls and indications for ease of use and correctness, and for general suitability related to their function and environment, for example expected ambient illumination and sound.

c) Check that the operation of a control does not cause obscuration of its related indicator where observation of the indicator is necessary for making the adjustment.

d) Check that in all operations there is a clearly marked or consistent simple action to recover from a mistaken choice or to leave an unwanted state. Check that it is always possible for a user to start, interrupt, resume and end an operation.

6.1.4 Identification
(See 4.2.1.4)

a) Check that all operational controls and indicators are easy to identify and read from the position where the equipment is normally operated.

b) Check that instrument and indicator character type is simple and clear. The character height (mm) shall be not less than 3,5 times the reading distance in metres, and the nominal character width shall be 0,7 times the character height. Check that instruments meant to be operated, or fitted in connection with controls are readable from a distance of at least 1 m, and that other instruments are readable from a distance of at least 2 m.

c) Check that the controls and indicators are identified in English, and that the identifications provided in the equipment standard are used.

d) Check that indicators are satisfactorily positioned relative to the operator's line of sight, and are not obscured when operating associated controls under normal operating conditions.

6.1.5 Screen display and indicators
(see 4.2.1.5)

a) Check that menus are grouped according to the task environment. Check that hierarchical menu structures have been designed to minimize the number of steps required and that the user has an indication of current position in the menu.

b) If menu selections are made of keyed codes, check that each code is the first letter or letters of the displayed option label rather than an arbitrary letter.

c) Check that a menu displays only those options currently available in the current context to the user. Check that menu items are highlighted when the cursor passes over them.

d) Check that for menu items that can be in an “On” or “Off” state the “On” state should be indicated by making the item perceptually distinct and that selection of menu items with “On” and “Off” states change their state.

e) Check that items which appear the same behave consistently by, for instance,
– checking for consistent display format and selection logic in hierarchical menus,
– checking that menus used in different displays are consistent,
– checking that menus are displayed in consistent screen locations,
– checking for consistent input prompts and checking that labels are consistent.

f) Check that the user does not have to remember information from one part of a dialogue to another

g) Check that the system employs marine terminology conforming with the SMCPs where appropriate.

h) Check that displayed text is easy to understand wherever possible.

i) Check that where additional on-line help is available it is in task dependent form, easy to search and list the steps to be carried out.

j) Check that in all operations the system state is observable with essential data displayed.

k) Check that all information required by the user to perform an operation is available on the current display.

l) Check that feedback timing is consistent with the task requirements. Check that there is a clear feedback from any action within a short time. Check that where a perceptible delay in response occurs, a visible indication is given.

m) Check that it is possible at any step of a screen supported operation to return with one action to the original status before the operation was started.

n) Check that any mode in use is distinctively identified by the display.

o) Check that displays present the simplest information consistent with their function, information irrelevant to the task is not displayed, and extraneous text and graphics are not present.

p) Check that displayed text is clearly legible to the user. Check that the font and size of alphanumeric characters are consistent. For any font used, check that it is possible to clearly distinguish between the characters: X and K, T and Y, I and L, I and 1, 0, O and Q, S and 5 and U and V.

q) Check that the unit of measure is indicated for any data.

r) Check that all information is presented on a background of high contrast.

s) Check that highlighting is easily recognizable and is disabled when it is no longer applicable.

t) Check that flashing is only used to signal an alarm and that only a small percentage of the screen is flashing at any one time. Check that if a user is required to read alarm text a marker symbol shall flash rather than the text. Check that no more than two flash rates are used and that they are then time synchronized.

6.1.6 Voice announcement

(See 4.2.1.6)

a) Check that voice announcements are in plain language, using marine terminology conforming with the SMCPs where appropriate, and in the English language.

b) Check that it is possible to adjust the volume to extinction and that sudden changes in loudness do not occur.

c) Check that voice announcements stop when their associated indication or alarm is acknowledged.

d) Check that failure of the voice announcement system by disabling the loudspeaker, does not degrade the operation of the provided indicators and alarms.

6.1.7 Safety of operation
(See 4.2.1.7)

a) Check that the system attempts to prevent ascertainable user-action error from occurring.

b) Check that all actions that may be irreversible, require a confirmation before proceeding.

c) Check that when an action causes a detectable error the system gives clear feedback such as by including UNDO and/or REDO options where possible.

d) Check that the EUT makes use of any quality indication contained in the input from other systems or sources.

e) Check that the user has available means to return to a known safe state with a single action.

6.1.8 Distress alert
(See 4.2.1.8)

a) Check that a distress alert is only activated by means of a dedicated distress button, and that it is not a key of an ITU-T digital input panel, or of an ISO keyboard on the equipment. Check that the button is physically separated from functional buttons/keys used for normal operation. Check that the button is a single button used for no other purpose than to initiate a distress alert.

b) Check that the dedicated distress button is clearly identified by being red in colour and marked “DISTRESS”. Where a non-transparent protective lid or cover is used check that this is also marked “DISTRESS”.

c) Check that the dedicated distress button is protected against inadvertent operation by means of a spring loaded lid or cover permanently attached to the equipment, for example by hinges. Check that it is not necessary for a user to remove additional seals or to break the lid or cover in order to operate the distress button.

d) Check that the distress alert initiation requires at least two independent actions. Lifting the protective lid or cover is considered as the first action. Pressing the distress button is considered as the second independent action.

e) Check that the equipment indicates the status of a distress alert transmission by checking that the distress button generates a visible and audible indication. Check that when the distress button is pressed a flashing light and intermittent acoustic signal start immediately. Check that after the distress button has been pressed for at least 3 s, the transmission of the distress alert is initiated and the indication becomes steady.

f) Check that it is not possible to interrupt the transmission of a distress alert or distress message which is in progress, but that it is possible to interrupt repetitive transmissions of a distress message.

6.2 Hardware

The EUT shall be checked to ensure compliance with the specific requirements as detailed below. The checks carried out shall be described and the results noted in the test report.

6.2.1 General

(See 4.2.2.1)

a) Check that provision has been made for the removal of, or for blocking off, the position of controls of any optional facilities which are not fitted.

b) Check that operational controls, the inadvertent exercise of which could switch off the equipment, lead to performance degradation, or to false indications not obvious to the operator, are specially protected against unintentional operation.

c) Check that the design of the EUT is such that misuse of the controls required for normal operation, and which are accessible to the operator, shall not cause damage to the equipment or injury to personnel.

d) Check that where a digital input panel with the digits “0” to “9” is provided, the digits are arranged to conform with ITU-T Recommendation E.161 (4x3 array) or, alternatively, where an alpha-numeric keyboard layout, as used on office machinery and data processing equipment, is provided, the digits “0” to “9” are arranged to conform with ISO 3791.

6.2.2 Alarms and indicators

(See 4.2.2.2)

a) Check that the EUT is provided with facilities which permit the testing of all operational indicators (alarm, warning and routine), displays and audible devices. Check audible alarms as described in 11.1.

b) Check that alarm indications are red, or if on displays, red or otherwise highlighted.

c) Check that warning and alarm indications show no self-illumination, except to outline the alarm area on CRT or LCD displays, in the “safe” condition, and that any indirect illumination is low enough to avoid false indications.

6.2.3 Illumination
(See 4.2.2.3)

a) Check that any illumination provided in the EUT is adequate for operation of the equipment under all expected conditions of ambient illumination. Check that it can be adjusted for night use so that the night vision of the officer of the watch is not harmed by it.

b) Check that means are provided for dimming the output of any light source of the equipment which is capable of interfering with navigation.

c) Check that any external illumination required is clearly identified in the equipment manual.

d) Check that warning and alarm indicator lamps cannot be dimmed below reading intensity.

e) Check that the illumination is dazzle-free and adjustable to extinction, except for those warning and alarm indicators which are illuminated in the warning/alarm condition, and indicators required for equipment reactivation or distress alerting, which are to be clearly visible in all appropriate conditions of ambient illumination.

f) Check that controls which are not illuminated, such as tracker balls, are locatable easily and unambiguously by tactile means.

g) Check that all information is presented with high contrast on a low-reflectance background which emits negligible light at night.

h) Check that transparent covers to instruments cannot cause reflections which reduce readability to an unacceptable level.

i) Check that adjustable dimming from full brightness is provided for all lamps which are to be used in conditions of varying ambient illumination.

6.3 Software
The EUT shall be checked to ensure compliance with the specific requirements as detailed below. The checks carried out shall be described and the results noted in the test report.

6.3.1 General
(See 4.2.3.1)
Check documentation for compliance with 4.2.3.1.

6.3.2 Safety of operation
(See 4.2.3.2)
a) Check documentation for compliance with 4.2.3.2.
b) Check that software defaults, where applicable, are inserted in all modes of operation and that the default value:
– facilitates the preferred or expected operation of the equipment in accordance with the applicable equipment standards
– does not lead to an unexpected or invalid operation, and
– has the effect of minimising the number of inputs or transmissions into the system under which it operates.
c) Check that the software prevents an operation or warns an operator when attempting an input that leads to an invalid operation of the equipment.
d) Check that the operator has the possibility to choose a value other than the default value.
e) Check that operations not required for normal operation, or which may adversley affect system performance, are not readily accessible.

6.3.3 Monitoring

(See 4.2.3.3)
Check documentation for compliance with 4.2.3.3. The manufacturer shall provide information on how to produce a non-recoverable error.
Carry out the non-automatically recoverable error according to the above information. Check that the alarm can be recognized as noted in the manufacturers documentation.
NOTE This test can be waived if the manufacturer gives a written explanation of how the equipment watchdog operates and a written declaration is given to the test-house of how this function works and that the behaviour of the watchdog complies with the noted requirements.

6.3.4 Operation
(See 4.2.3.4)
Check documentation for compliance with 4.2.3.4.

6.4 Inter-unit connection
(See 4.2.4)
Check with the manufacturer of the EUT, using equipment documentation if necessary, that when it is connected to, and operating with, other units of equipment, arrangements have been provided to maintain the performance of the EUT and of the other units. In particular:

a) check that the software interfaces between the EUT and other equipment are tested, and that special test software is provided for this purpose if necessary;

b) ensure that arrangements have been made to achieve electrical separation and isolation between the EUT and the equipment to which it may be connected, if appropriate, such as by checking that:

1) an exchange of any signals between units is carried out with minimum effect on the signal source;

2) there is no loading of circuits or mismatch of transmission lines, particularly on high frequency or fast-rise time signals;

2.1.3 Result

4.2 a,

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	REF EMC 75936860 Report 04 Enviromental 75936860 Report 05

6.1 (1,2,3,4,5,7,8)

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	**2**, Controls are easily identified versus indication on screen functions. Dials are consistent with normal direction of operation. No touch screen function **5**, Menus form logical hierarchical order and are reversable, indication of state of functions is clearly identified by colour. Modes are clearly different in operation. **3**, Contrast of information is clear, controls size are relevant and are simple but follow normal guides i.e. right or up for increase return press or menu button **4**, Control use does not cover indicators associated. Incorrect actions are

			recoverable by return button. Character size is appropriate to the small size of the screen and reading distance. Main controls are more centrally positioned. **7**, Inputs from controls causing errors are indicated and reversable. .All actions are reversable. There are no distress alert outputs. **6**, no voice announcements. **8**, no distress alert functions

6.2 (1,2,3)

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	**1**, No other functions available so no blanking, use of controls is only by direct positive action and not confusable No controls are obviously capable of damage in ordinary use. .**2**, Alarms are indicated by orange to red illumination with audible warning. **3**, Illumination is up to a maximum of 800cd/m² down to 1.5cd/m². There is a function of completely no illumination however the screen returns to a minimum level of brightness on any button or alarm function. All controls are illuminated and do no dazzle in use. On/ off function by long press so cannot be actioned inadvertently. Light levels of screen or controls do not dazzle or distract. 6.2.1d no numeric keypad.

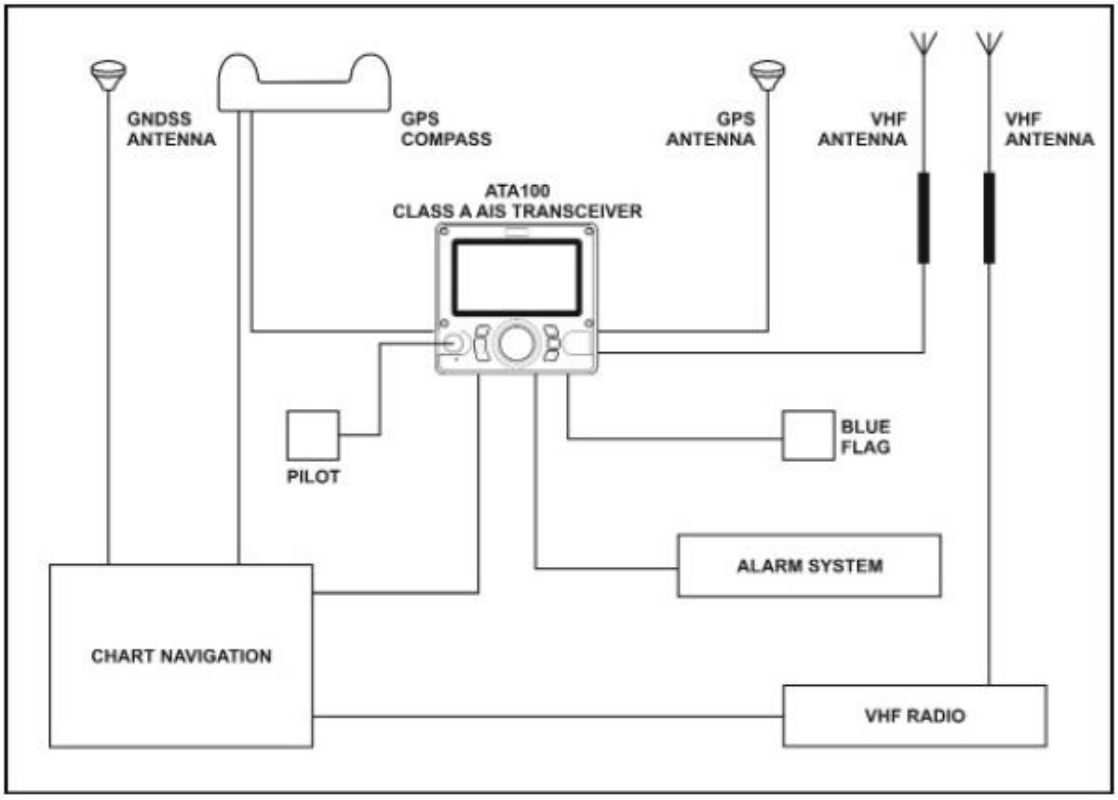
6.3 (1,2,3)

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	**1,** Software meets 4.2.3.2 by not allowing inadvertent access. **2,** Software setup allows reset to defaults, flow through menus and ease of use of both setup and function. Start up checks for errors in software. Input errors are highlighted and reversable. Defaults are provided alongside variable values. **3,** No non recoverable error. **4,** No speed keys utilised.

6.4 (a,b1-2)

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	**1,** The EUT is designed is for interconnection to sensors providing the necessary information for operation of the EUT.**2,** Additionally, a Pilot output is available for portable equipment connection as per diagram AIS test report covers input and output operation. a,equipment designed to be used self standing but can interface with input and output devices. b, 61162 report 03 for interconnections

Unit interconnection example



2.2 IEC 62288 CLAUSE 4.3

2.2.1 Equipment Under Test

EUT 1– Modification State 0

2.2.2 Arrangement of information

4.3.1 Consistency of layout

4.3.1.1 Requirement
(MSC191/5.1.1) *The presentation of information* shall *be consistent* within the user interface *with respect to screen layout and arrangement of information*, for example, with respect to concepts, terminology, labelling and interaction paradigms used across the application and from screen to screen and/or from page to page*. Data and control functions* shall *be logically grouped* according to their function or the task-at-hand*. Priority information* essential to the task-at-hand shall *be identified for each application* (for example, radar, ECDIS, etc.)*, permanently* or persistently *displayed*, as appropriate for the application, *and presented to the user in a prominent manner by, for example, use of position* (for example, screen location)*, size and colour*.

4.3.1.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by analytical evaluation that the arrangement, logical grouping, operation and identification of controls, screen displays and indications are in accordance with Annex E and IEC 60945:2002, 4.2.1.2 through 4.2.1.5;

b) confirm by analytical evaluation that the concepts, terminology, labelling and interaction paradigms, screen layout and arrangement of information is consistent from screen to screen and/or page to page;

c) confirm by analytical evaluation that priority information essential to the task-at-hand is identified and permanently or persistently displayed in a prominent manner, as appropriate, for each application.

2.2.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	Controls being minimal they follow normal easily identified icons meeting Annex E 62288

b,

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	Screens follow similar setup of information as per photos 4.3 b

c,

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	Priority information is highlighted all information is clearly labelled and persistently displayed.

Evidence

Photo 4.3b

2.3 IEC 62288 CLAUSE 4.3.2

2.3.1 Equipment Under Test

EUT 1– Modification State 0

2.3.2 Consistent presentation of information

4.3.2.1 Requirement
(MSC191/5.1.2) *The presentation of information* shall *be consistent with respect to:*
• numerical *values* (for example, position, speed, distance, time, etc.); • *units;*
• *meaning* of information (for example, using the terms and abbreviations in Annex B);
• *sources* of information (for example, using the terms and abbreviations in Annex B);
• *validity* of information (see also 4.8.1 and 4.8.2); *and*
• *integrity* of information, if available (see also 4.8.1 and 4.8.2).
(See also IEC 60945:2002, 4.2.1.5)

4.3.2.2 Methods of test and required results
Confirm by observation that numerical values and their units, the meaning and source(s) of information, and the validity and integrity of information are presented in a consistent manner

2.3.3 Result

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	Numerical information is clear and presented with units where needed in a consistent manner.

2.3.4 Evidence

Photo 4.3.2a

2.4 IEC 62288 CLAUSE 4.3.3

2.4.1 Equipment Under Test

EUT 1– Modification State 0

2.4.2 Separation of operational display area

4.3.3.1 Requirement
(MSC191/5.1.3) *The presentation of information* shall *be clearly separated into* one or more *operational display areas (for example radar, chart) and one or more user dialogue areas (for example*, *menus, data, control functions).*

4.3.3.2 Methods of test and required results
Confirm by observation that the presentation is clearly separated into one or more operational display areas and one or more user dialogue areas.

2.4.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	18 Jul 2019	EUT 1 PASS	Information is presented on various screens, i.e. map position, nearby MMSI, messages, giving clear definition between functions photo 4.3.3

2.4.4 Evidence


ATA100
Own Ship
MMSI Number
Range
Bearing
Name
Callsign
Age
Position
Course
Speed
Heading
Active Targets Sorted By: Distance
ocean
SIGNAL

Photo 4.3.3

2.5 IEC 62288 CLAUSE 4.4

2.5.1 Equipment Under Test

EUT 1– Modification State 1

2.5.2 Readability

4.4.1 Readability under all ambient light conditions

4.4.1.1 Requirement

(MSC191/5.2.1) *The presentation of alphanumeric data, text, symbols and other graphical information (*for example, chart information, radar echoes or a *radar* video *image*, etc.) shall *support readability from typical user positions* (i.e. with respect to reading distance) *under all ambient light conditions likely to be experienced on the bridge of a ship* (for example, day, dusk and night)*, and with due consideration to the night vision of the officer of the watch.* (See also 4.5.1 and 7.2.1)

Table 1 characterizes light levels for the ambient light conditions day, dusk and night.

Table 1 – Ambient light conditions

Ambient condition	Light level
Day	200 cd/m² ± 50 %
Dusk	10 cd/m² ± 50 %
Night	Darkness (i.e. where the display is the predominant light source)
NOTE Natural daylight is preferred for the day and dusk conditions.	

NOTE 1 The "Day" colour table provided in the IHO ECDIS Presentation Library uses a white background that may not support readability under all light conditions and may be a risk to safety of navigation for some navigational systems and equipment, including radar. Readability may be achieved by using the black background in the "Dusk" or "Night" colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

Display equipment shall provide a luminance of at least 85 cd/m2 measured at the centre of the display when set to the maximum brightness setting. The white luminance level of the display shall be adjustable down to 1 cd/m2 ± 20 % and may be extinguishable below that point.

If provided, dimming below 0,8 cd/m2 as white level shall continue to ensure readability of alerts (alarms, warnings and cautions) while readability of all other items is not required.

NOTE 2 General requirements for illumination are described in IEC 60945.

Transflective and reflective displays shall provide adjustable self illumination suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch. It shall be adjustable to produce display luminance at least from 1 cd/m2 to 5 cd/m2 under night conditions. The luminance across the operational display area shall not have a variance of more than 30 % from the brightest point to the dimmest point.

NOTE 3 Variance is determined by the equation: $1-\left(\frac{L_{min}}{L_{max}}\right)$

where

L_{min} is the minimum luminance and

L_{max} is the maximum luminance measured across the operational display area, or the entire screen depending on the application.

It shall be possible to display alphanumeric data, text, symbols (see 4.6) and other graphical information using a lighter foreground (for instance character, symbol, etc.) against a dark

background of high contrast, emitting as little light as possible at night. The brightest elements of the presentation shall be restricted to points and thin lines.
If display equipment is intended to present symbols for charted information (see 4.6.2), it shall provide a means or method for the user to verify that the colour black is visually distinguishable against a background set to dark grey and vice-versa.

NOTE 4 The IHO ECDIS Presentation Library provides “black-adjust” symbols BKAJ1 and BKAJ2, for the colours black and grey, respectively.

If display equipment is not intended to present symbols for charted information (see 4.6.2), it shall maintain that any colours used are visually distinguishable against the background.
NOTE 5 Visually distinguishable is at least luminance ratio 1:2 when using instrumental verification.

It is important to avoid affecting the night vision of the officer of the watch by excessive glow from displays on the bridge at night. The display shall be capable of providing a contrast of 100:1 between the 1 cd/m2 white level and the black background.

4.4.1.2 Methods of test and required results
Set up the display equipment for measurements of luminance, contrast and colour according to the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM), see VESA-2001-6) standard. Before measurements are taken, power up the display equipment and allow it to stabilize for the period of time specified by the manufacturer, as follows.

a) Confirm by observation at the manufacturer’s recommended viewing distance that alphanumeric data, text, symbols and other graphical information including alerts are readable under the ambient light conditions described in Table 1.

b) For direct view displays (for example CRT (cathode ray tube), LCD (liquid crystal display) with backlight, etc.) confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be varied from a minimum level of at most 1 cd/m2 to a maximum level of at least 85 cd/m2 measured under dark condition. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m2 white level and the black background is 100:1,
minimum.

c) For transflective and reflective displays, confirm by measurement using a test image with a white square at the centre of the operational display area (to be provided by the manufacturer) that the brightness can be adjustable at least from 1 cd/m2 to 5 cd/m2 under conditions of night ambient illumination to a maximum level of at least 85 cd/m2 under conditions of daylight ambient illumination. Confirm by measurement that the values for brightness used for the setup are stable after the stabilisation period defined by the manufacturer. Confirm by measurement in the night ambient condition that the contrast ratio between the 1 cd/m2 white level and the black background is 100:1, minimum. The ambient illumination levels shall be as specified in Table 1.
NOTE This test image is not generated internally by the display equipment.

d) Confirm by observation that alphanumeric data, text, symbols and other graphical information including alerts can be presented using a lighter foreground against a dark background.

e) Confirm by measurement that when the display equipment is set to maximum brightness, the luminance does not vary across the operational display area by more than 30 % from the brightest point to the dimmest point.

f) Confirm by observation that the brightest elements of the presentation in the night ambient light condition described in Table 1 are points and thin lines.

g) Where display equipment is intended to present symbols for charted information confirm by observation for each ambient light condition that the user can verify that the colour black is visually distinguishable against a background set to dark grey, and vice-versa.

h) Where display equipment is not intended to present symbols for charted information confirm by observation for each ambient light condition that any colours used are visually distinguishable against background.

i) If dimming below 0,8 cd/m2 as white level is provided then confirm by observation after 10 min adaptation period to night ambient light condition by the observer that at least the alerts (alarms, warnings, cautions).

2.5.3 Result

a-i

Initials	Date	Pass/Fail	Comments
NGD	7-Nov 2019	EUT 1 PASS	Display is LED and LCD procedure in (b) was used. It is not possible to have a light foreground on a dark background. The display is a fixed colour scheme. The display variance from the lowest to highest brightness across the screen do not vary by more than 30 %. No night mode is available within the equipment, therefore (f) does not apply. No chart information can be displayed – therefore (g) does not apply. In day mode, the brightest setting is 800cd/m² to the darkest setting of 122 cd/m². In low brightness setting is 15 cd/m² to the darkest setting of 1.5cd/m². Black area being 0.01 cd/m² giving ratio more than 100:1 Whilst illumination is present the screen is distinguishable in minimal light and all alpha numeric symbols are readable. Optimal viewing distance given in manual as 0.5 m. When dimmed below 0,8 cd/m², different alert levels were distinguishable from each other. There is a minimal “no light” setting which reverts to night time level after any interaction.

2.5.4 Evidence

Photo 4.4.1.2 (camera adjusts for minimum brightness)

2.6 IEC 62288 CLAUSE 4.4.2

2.6.1 Equipment Under Test

EUT 1– Modification State 1

2.6.2 Legibility of alphanumeric data and text

4.4.2.1 Requirement
(MSC191/5.2.2) *Alphanumeric data and text* shall *be presented using a clearly legible nonitalic, sans-serif font*. *The font size* shall *be appropriate for the viewing distance from user positions* (i.e. with respect to reading distance and viewing angles) *likely to be experienced on the bridge of a ship.*

The character height in millimetres shall be not less than 3,5 times the nominal viewing distance in metres. The manufacturer's documentation shall identify the nominal viewing distance for the display equipment.

4.4.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that alphanumeric data and text is presented using non-italic, sans-serif font;

b) confirm by measurement that the character height (i.e. the distance between the top and bottom edges of the smallest capital letter used in the presentation) in millimetres is not less than 3,5 times the nominal viewing distance in metres.

2.6.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	20 Jun 2019	EUT 1 :PASS	Font straight and readable, alpha numeric data correct and easily read.

b,

Initials	Date	Pass/Fail	Comments
NGD	20 Jun 2019	EUT 1 :PASS	Smallest capital 2.5mm against viewing distance of 0.5m

2.6.4 Evidence

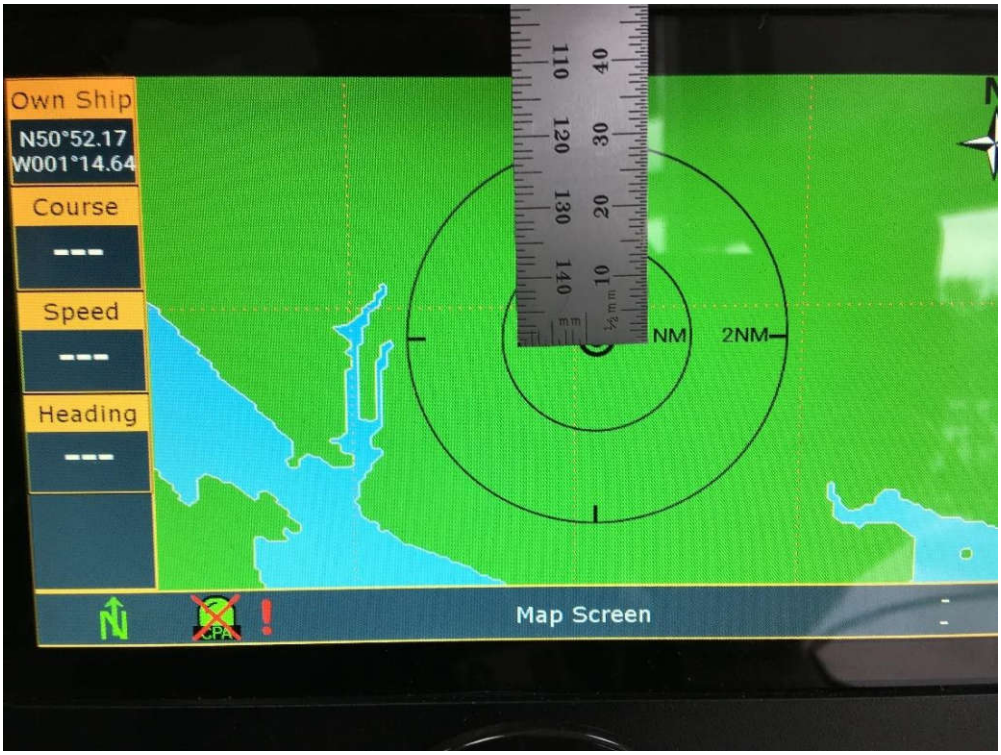


Photo 4.4.2a

2.7 IEC 62288 CLAUSE 4.4.3

2.7.1 Equipment Under Test

EUT 1– Modification State 0

2.7.2 2.7.2 Presentation of text

4.4.3.1 Requirement

(MSC191/5.2.3) *Text* shall *be presented using simple unambiguous language that is easy to understand* (for example, standard marine terminology or text that provides clear meaning by its context). *Navigational terms and abbreviations* shall *be presented using the nomenclature* set forth in Annex B.

4.4.3.2 Methods of test and required results

The methods of test and the required results are as follows:

a) confirm by analytical evaluation that text is presented using simple unambiguous language;

b) confirm by observation that navigational terms and abbreviations are presented using the nomenclature in Annex B;

c) confirm by inspection of documented evidence that another terminology or abbreviation, if used, are explained in the operator's manual

2.7.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	20 Jun 2019	EUT 1 :PASS	Simple one or two word identification of main functions used

b,

Initials	Date	Pass/Fail	Comments
NGD	20 Jun 2019	EUT 1 : PASS	Ref Annex B

c,

Initials	Date	Pass/Fail	Comments
NGD	20 Jun 2019	EUT 1 :PASS	User manual describes all functionality

2.8 IEC 62288 CLAUSE 4.4.4

2.8.1 Equipment Under Test

EUT 1– Modification State 0

2.8.2 Icons

4.4.4.1 Requirement
(MSC191/5.2.4) *When icons are used, their purpose* shall *be intuitively recognized by appearance, placement*, *and grouping*. (See also ISO 80416-4). Icons used for data and control functions shall be presented according to Annex E. Icons used for the presentation of alerts shall be presented according to Annex F.

4.4.4.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by analytical evaluation that icons and their purpose can be intuitively recognized by appearance, placement, and grouping;

b) confirm by observation that icons used for data and control function are presented according to Annex E;

c) confirm by observation that icons used for the presentation of alerts are presented according to Annex F (see also 5.6.1.2).

2.8.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Icons for North, satellites, NUP, underway or at anchor are all used on screen and are easily distinguished

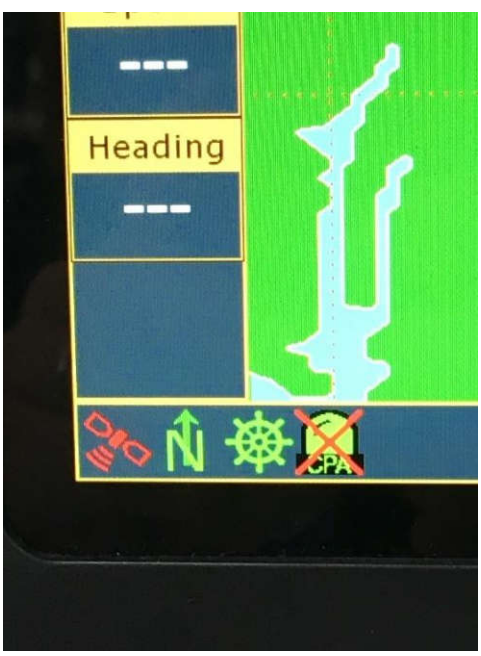
b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Icons conform to Annex E

c,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Alerts and their icons conform to Annex F

2.8.4 Evidence



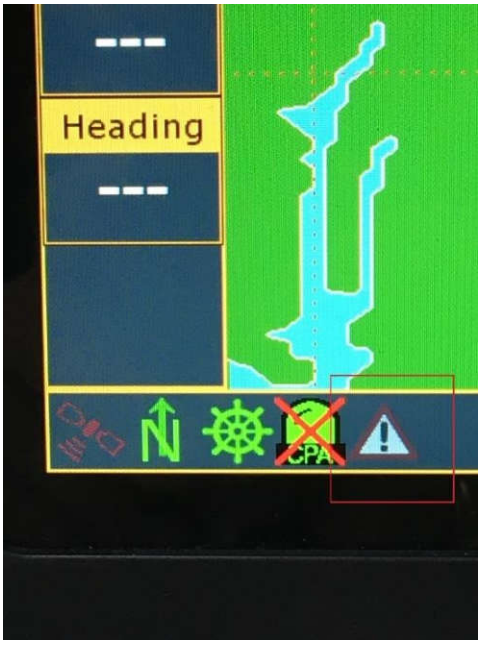


Photo 4.4.4

2.9 IEC 62288 CLAUSE 4.5

2.9.1 Equipment Under Test

EUT 1– Modification State 0

2.9.2 Colours and intensity

4.5.1 Discrimination of colours – Requirement

(MSC191/5.3.1) *The colours used for the presentation of alphanumeric data, text, symbols and other graphical information* shall *provide sufficient contrast* for discrimination and identification *against the background under all* ambient *light conditions likely to be experienced on the bridge of a ship* (for example, day, dusk and night) and with due consideration to the night vision of the officer of the watch.

(MSC191/5.3.2) *The colours and brightness* shall *take into account the* ambient *light conditions of day, dusk and night. The presentation* shall *support night viewing by showing lighter foreground information on a dark non-reflecting background.*

(MSC191/5.3.3) *The background colour and contrast* shall *be chosen to allow* displayed *information to be easily discriminated without degrading the colour coding aspects of the presentation.* Display equipment may use a range of tones of basic colours, provided they are identifiable and visually distinguishable from each other. Colours used for the presentation of information in the user dialogue areas shall not detract from the presentation of information in the operational display area.

If display equipment is intended to present symbols for charted information, it shall use colours that comply with or are based upon the colours specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent set of colour tables, as far as practical.

NOTE The “Day” colour table provided in the IHO ECDIS Presentation Library uses a white background that may not support readability under all light conditions and may be a risk to safety of navigation for some navigational systems and equipment, including radar. Readability may be achieved by using the black background in the “Dusk” or “Night” colour tables provided in the IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided, for use under all light conditions.

4.5.2 Methods of test and required results

The person conducting this test shall have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B and have adapted to night viewing for 10 min before checking the night display.

a) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information provide sufficient contrast for identification and discrimination against the background under the ambient light conditions described in Table 1.

b) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information support night viewing by showing lighter foreground information on a dark non-reflecting background.

c) Confirm by observation that the colours used for the presentation of alphanumeric data, text, symbols and other graphical information are identifiable and visually distinguishable from each other.

d) Confirm by observation that the colours used in the user dialogue areas do not detract from the presentation of information in the operational display area.

e) Where display equipment is intended to present symbols for charted information, confirm by analytical evaluation that the colours used conform to the IHO specified colours in the IHO ECDIS Presentation Library, or equivalent, as far as practical (see Clause G.1 for additional guidance).

2.9.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07-Aug-2109	EUT 1 :PASS	Text colours being black, white or yellow are clearly distinguished from background colours in all light conditions.

b,

Initials	Date	Pass/Fail	Comments
NGD	07-Aug-2109	EUT 1 :PASS	In darkest of setting for night time text is distinguishable from map, menu or surround back ground colour.

c,

Initials	Date	Pass/Fail	Comments
NGD	07-Aug-2109	EUT 1 :PASS	Three text colours are clearly distinguished between.

d,

Initials	Date	Pass/Fail	Comments
NGD	07-Aug-2109	EUT 1 :PASS	Colours of information areas, writing or icons do not detract from map or AIS area.

e,

Initials	Date	Pass/Fail	Comments
			N/A

2.9.4 Evidence

Photo 4.5

2.10 IEC 62288 CLAUSE 4.6

2.10.1 Equipment Under Test

EUT 1 – Modification State 0

2.10.2 Symbols

4.6.1 Operational information

4.6.1.1 Requirement
(MSC191/5.4.1) *Symbols used for the presentation of operational information* other than chart information shall comply with or be based upon the symbols set forth *in* Annex A. (SN-Circ.243/1/3) *Where a standard symbol is not available, another symbol may be used, but this symbol* shall *not conflict with the symbols listed in* Annex A or in the ECDIS presentation library. (For additional guidance, see also ISO 80416-4.)

Colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information.

A symbol shall subtend at least 5 mm/m (17 min of arc) at the nominal viewing distance. Where accurate colour identification of a symbol is required, the symbol shall subtend at least 8,7 mm/m (30 min of arc) at the nominal viewing distance. The use of spectrally extreme blue ($v' < 0{,}2$) shall be avoided for images subtending less than 35 mm/m (2° of arc) of viewing distance.

4.6.1.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by inspection of documented evidence that the symbols used to present operational information are presented in accordance with Annex A;

b) confirm by measurement that the largest dimension of the symbol is at least 5 mm/m (17 min of arc) at the nominal viewing distance, and includes at least 16 pixels;

c) where accurate colour identification is required for a symbol, confirm by measurement that the largest dimension of the symbol is at least 8,7 mm/m (30 min of arc) at the nominal viewing distance, and includes at least 29 pixels.

2.10.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Symbols employed for AIS targets, own ship etc are all to Annex A

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Symbols measure at 5mm

c,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Coloured symbols also measured at 5mm, limitations of screen size would not be better to have larger symbols, colour symbols still discernible.

2.10.4 Evidence

Photo 4.6

2.11 IEC 62288 CLAUSE 4.6.2

2.11.1 Equipment Under Test

EUT 1 – Modification State 0

2.11.2 Electronic chart information

4.6.2.1 Requirement
(MSC191/5.4.2) *Symbols used for the* presentation *of* vector format electronic *chart information* shall *comply with* or be based upon the symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent symbol set, as far as practical.
NOTE Some symbols provided in the IHO ECDIS Presentation Library may not be suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

If symbols that deviate from the IHO ECDIS Presentation Library are used for the presentation of any chart information, then they shall:

• be legible;

• be certain and unambiguous in their meaning;

• be of sufficient size to support the nominal viewing distance (see also 4.4.2);

• have the same general shape as IHO ECDIS Presentation Library symbols used for the same or similar purpose(s).

Symbols added to the ECDIS Presentation Library shall not be confused with IHO ECDIS Presentation Library symbols.

4.6.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by inspection of documented evidence that the symbols used to present chart information are presented in accordance with IHO S-52 and its Appendices;

b) where symbols deviate from the IHO ECDIS Presentation Library, confirm by observation that they:
1) are legible;
2) are certain and unambiguous in their meaning;
3) are of sufficient size to support the nominal viewing distance;
4) have the same general shape as IHO ECDIS Presentation Library symbols used for the same or similar purposes;

c) confirm by observation that symbols added to the ECDIS Presentation Library cannot be confused with IHO ECDIS Presentation Library symbols.

2.11.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	N/A

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Symbols adjusted for size for small screen, not full ECDIS charts, size

			adjustment is still clearly distinguishable. Own base station symbol used.

c,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Confusion between symbols is not present.

2.11.4 Evidence

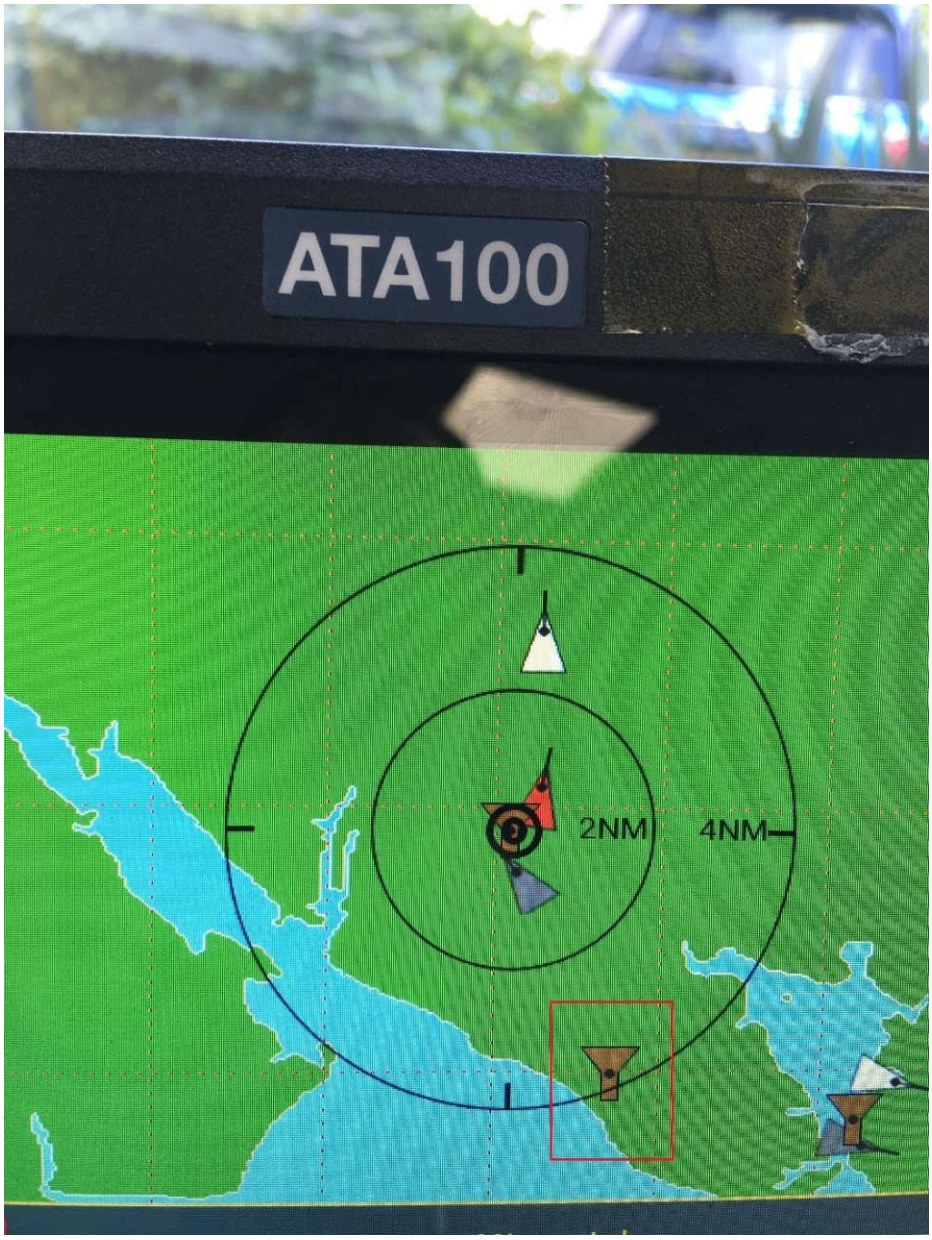


Photo 4.6.2

2.12 IEC 62288 CLAUSE 4.7

2.12.1 Equipment Under Test

EUT 1– Modification State 0

2.12.2 coding of information

4.7.1 Colour coding for discrimination

4.7.1.1 Requirement
(MSC191/5.5.1) If *colour coding is used for discrimination or conspicuousness of alphanumeric text, symbols and other graphical information all colours in* each colour table shall *clearly differ from one another* (see also 4.5.1).

4.7.1.2 Methods of test and required results
Confirm by observation that the colours within each colour table clearly differ from one another.

2.12.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Colours are clearly differentiated from each other under all background colour conditions. where appropriate

2.13 IEC 62288 CLAUSE 4.7.2

2.13.1 Equipment Under Test

EUT 1 – Modification State 0

2.13.2 Colour coding of information

4.7.2.1 Requirement
(MSC191/5.5.2) If *colour coding is used,* then *the colour red* shall *be used for* the *coding of* alert *related information* for alarm and emergency alarm conditions unless otherwise specified by the IMO (for example in tables 7.1.1 and 7.1.2 of the IMO A.1021(26) Code on Alerts and Indications).

4.7.2.2 Methods of test and required results
Confirm by inspection of documented evidence that the colour red is used to indicate an alarm or emergency alarm condition unless otherwise specified by the IMO.

2.13.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Red used for alarms

2.13.4 Evidence

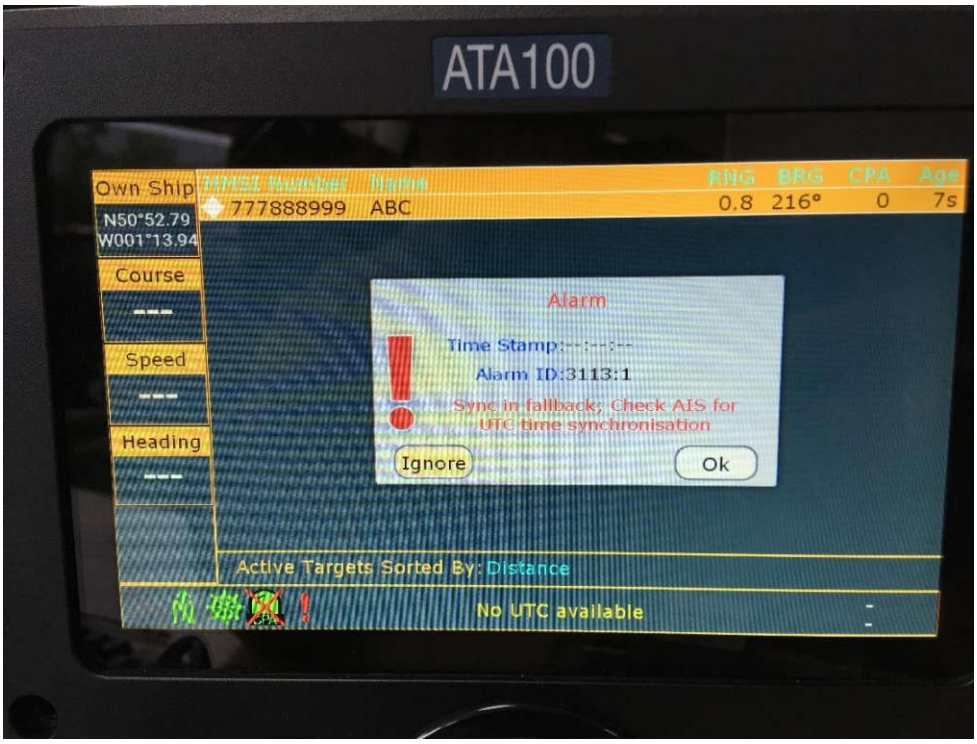


Photo 4.7.2

2.14 IEC 62288 CLAUSE 4.7.3

2.14.1 Equipment Under Test

EUT 1 – Modification State 0

2.14.2 Colour coding in combination with other attributes

4.7.3.1 Requirement
(MSC191/5.5.3). If *colour coding is used it* shall *be used in combination with other symbol attributes, such as size, shape and orientation.*
A specific implementation shall not rely solely on a single saturated colour. If the display equipment technology relies on the separate transmission of primary colours, the presentation of alerts shall be visible and identifiable even after the failure of any one primary colour input to the display.

4.7.3.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by inspection of documented evidence that the colour coding is always combined with another symbol attribute;

b) where the display equipment technology relies on the separate transmission of primary colours, confirm by observation that alerts remain identifiable even after transmission of each of the primary colours is disabled one at a time.

2.14.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1: PASS	All symbols, icons, mapping or alerts are transmitted with colour or shape code/symbol.

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1:	N/A

2.15 IEC 62288 CLAUSE 4.7.4

2.15.1 Equipment Under Test

EUT 1 – Modification State 0

2.15.2 Flashing of information

4.7.4.1 Requirement
(MSC191/5.5.4) *Flashing of information* shall *be reserved for unacknowledged* alerts.
4.7.4.2 Methods of test and required results

Confirm by observation that flashing of information is only used for unacknowledged alerts

2.15.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Flashing is only used for unacknowledge alert status.

2.16 IEC 62288 CLAUSE 4.8

2.16.1 Equipment Under Test

EUT 1 – Modification State 0

2.16.2 Integrity marking

4.8.1 Indication of source, validity and integrity status

4.8.1.1 Requirement
(MSC191/5.6.1) *The source, validity, and where possible, the integrity of information* shall *be indicated*. *Invalid information or information with low integrity* shall *be clearly marked qualitatively and/or quantitatively* (see important indication). *Invalid information or information with low integrity may be quantitatively indicated by displaying absolute or percentage values*.

4.8.1.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the source of information can be indicated;

b) confirm by observation that the validity of information is indicated;

c) confirm by observation that the integrity of information is indicated, where available. Where integrity is indicated quantitatively, confirm by observation that either absolute values or percentage values are displayed.

2.16.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	The source of positional information shown by coloured satellite icon. Colour gives source of information.

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	If no valid source is available, no symbol is displayed. Where a valid source is present, a symbol is displayed.

c,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :	Integrity of information is as described in (b). Integrity is not quantitively indicated

2.16.4 Evidence

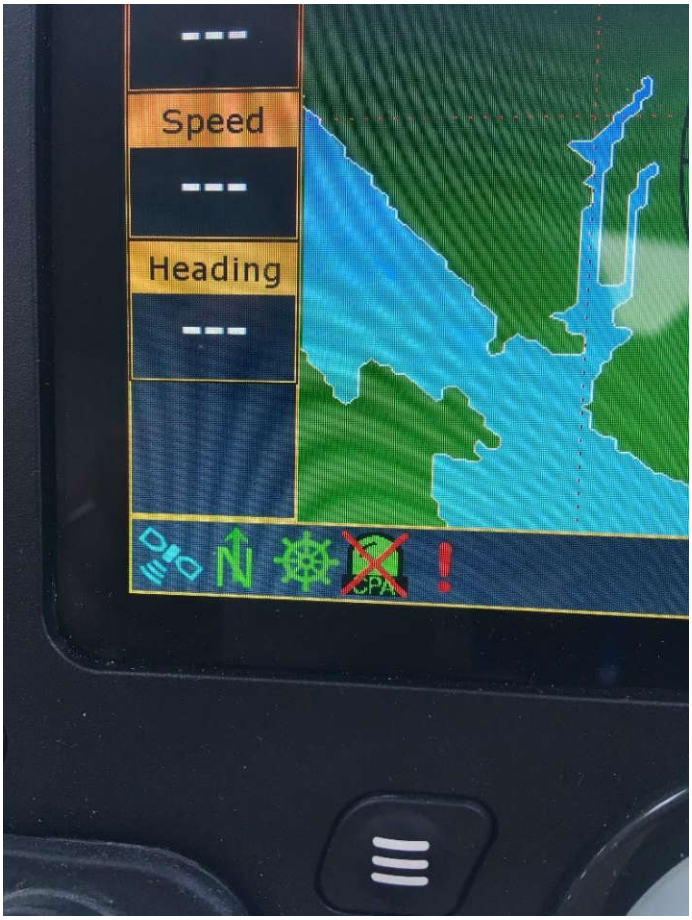


Photo 4.8

2.17 IEC 62288 CLAUSE 4.8.2

2.17.1 Equipment Under Test

EUT 1 – Modification State 0

2.17.2 Colour coding of validity and integrity

4.8.2.1 Requirement
(MSC191/5.6.2) If *colour coding is used,* then *information with low* or doubtful *integrity* shall *be qualitatively marked by using* the colour as defined in Table 2*, and invalid information* shall *be qualitatively marked by using* the colour as defined in Table 2*.*

4.8.2.2 Methods of test and required results
If colour coding is used, the methods of test and the required results are as follows:

a) confirm by observation that the colour as defined in Table 2 is used to indicate information with low or doubtful integrity;

b) confirm by observation that the colour as defined in Table 2 is used to indicate invalid information.

2.17.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	All usage of colour coding meets table 2 requirements

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Aug 2019	EUT 1 :PASS	Yellow/Orange used to show integrity loss.

2.17.4 Evidence

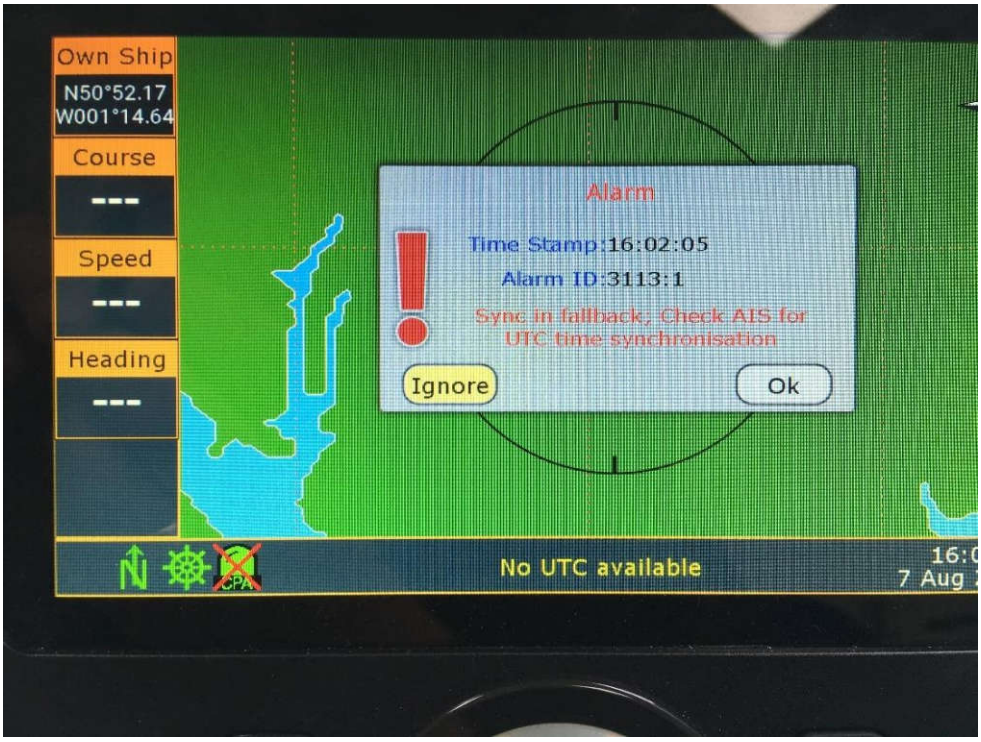


Photo 4.8.2

2.18 IEC 62288 CLAUSE 4.8.3

2.18.1 Equipment Under Test

EUT 1 – Modification State 0

2.18.2 Indication of presentation failure

4.8.3.1 Requirement
(MSC191/5.6.3) In many cases, information on the display does not change frequently enough to make presentation failure immediately obvious to the user. *In order to show that the screen is being refreshed,* a *means* or method shall *be provided to immediately make the user aware of a presentation failure on an operational display (*for example*, "picture freeze").*

A conspicuous periodically time varying element shall be provided as a prominent indication of normal screen refresh (for example two alternating dots, etc.).

4.8.3.2 Methods of test and required results
Confirm by observation that a conspicuous periodically time-varying indication is provided in all presentation modes.

2.18.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	Time updates every minute. The manufacturer declares that the display is not used for primary navigational purposes, therefore the update rate of time at 1 minute intervals is deemed sufficient.

2.18.4 Evidence

Photo 4.8.3

2.19 IEC 62288 CLAUSE 4.9

2.19.1 Equipment Under Test

EUT 1 – Modification State 1

2.19.2 Alerts and indications

4.9.1 Operational status

4.9.1.1 Requirement

(MSC191/5.7.1) *The operational status of information* shall *be indicated as* in Table 2 unless otherwise specified by the IMO (for example in tables 7.1.1 and 7.1.2 of the Code on Alerts and Indications, 2009):
(MSC 302/7.6.2) *An unacknowledged warning* shall *be:*
1) repeated as a warning after a limited time period not exceeding 5 min; or
2) changed to alarm priority after a limited time period not exceeding 5 min; or
3) changed to alarm priority after a user selectable time not more than 5 min, if provided; or
4) changed to alarm priority, as required by specific requirements for the individual equipment and system.

Table 2 – Operational status

Status	Visual Indication	Audible Signal
Emergency alarm	As specified in Table 7.1.1 of the Code on Alerts and Indications 2009 (IMO resolution A.1021(26))	As specified in Tables 7.1.1 and 7.2 of the Code on Alerts and Indications 2009 (IMO resolution A.1021(26))
Alarm, not acknowledged	Red, Flashing	Accompanied by an audible signal, as 3 short audible signals repeated every 7 s to 10 s
Alarm, silenced	Red, Flashing	Silent
Alarm, acknowledged	Red	Suppression of audible signal (= silent)
Invalid information	Yellowish orange	Silent
Information with low integrity	Yellow	Silent
Warnings, not acknowledged	Yellowish orange, Flashing	Accompanied by an audible signal, as 2 short audible signals, to be repeated at least once per 5 min or be replaced by an alarm.
Warnings, silenced	Yellowish orange, Flashing	Silent
Warnings, acknowledged	Yellowish orange	Silent
Caution	Yellow	Silent
Important Indications	Yellow	Silent
Indication	No special requirement	Silent
Normal State	Optionally Green	Silent

NOTE Code on Alerts and Indications 2009 (IMO resolution A.1021(26)) specifies frequency range (in 5.11) and sound pressure level (in 5.13) for audible signal.

4.9.1.2 Method of test and required results

Confirm by inspection of documented evidence that alerts and indications are presented in accordance with Table 2.
NOTE Alert management for integrated navigation systems is described in detail in IEC 61924-2.

2.19.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	User manual has diagram of alarm page and explanation of indications is given in accordance with Table 2.

2.19.4 Evidence

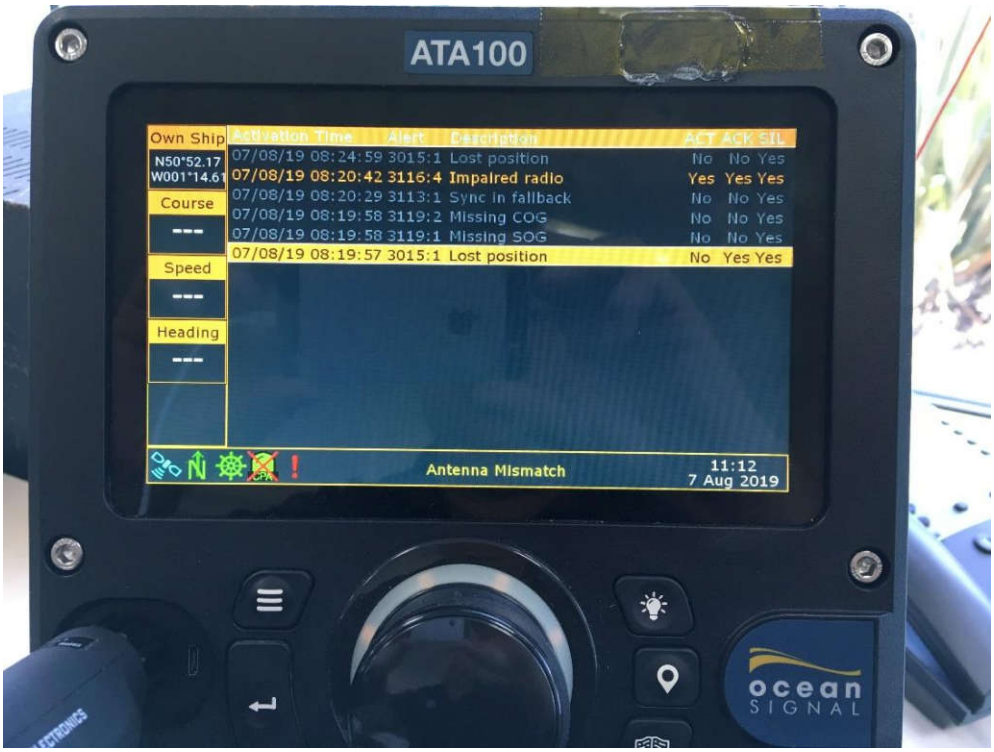


Photo 4.9

2.20 IEC 62288 CLAUSE 4.9.2

2.20.1 Equipment Under Test

EUT 1 – Modification State 0

2.20.2 List of alerts

4.9.2.1 Requirement
(MSC191/5.7.2) *A list of* alerts shall *be provided based on the sequence of occurrence. Additional indication of priority, as set by the user,* shall *be provided on displays* that present alerts *from multiple sources.* Alerts *that have been acknowledged and are no longer relevant* shall *be deleted from the list of* alerts*, but may be retained in an* alert *history list.*

4.9.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the display equipment provides a sequential list of alerts;

b) where display equipment supports the presentation of alerts from multiple sources (for example, from multiple navigational systems and equipment):
1) confirm by observation that there is the capability for the user to set a priority for the alerts;
2) confirm by observation that an indication of priority is included in the list of alerts;

c) confirm by analytical evaluation that acknowledged alerts which are no longer relevant are deleted from the list of alerts.

2.20.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	Alerts page lists sequential alarms

b,

Initials	Date	Pass/Fail	Comments
		EUT 1 :	N/A – Single source only

c,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	Acknowledged alerts change colour but remain until alert is no longer relevant.

2.20.4 Evidence

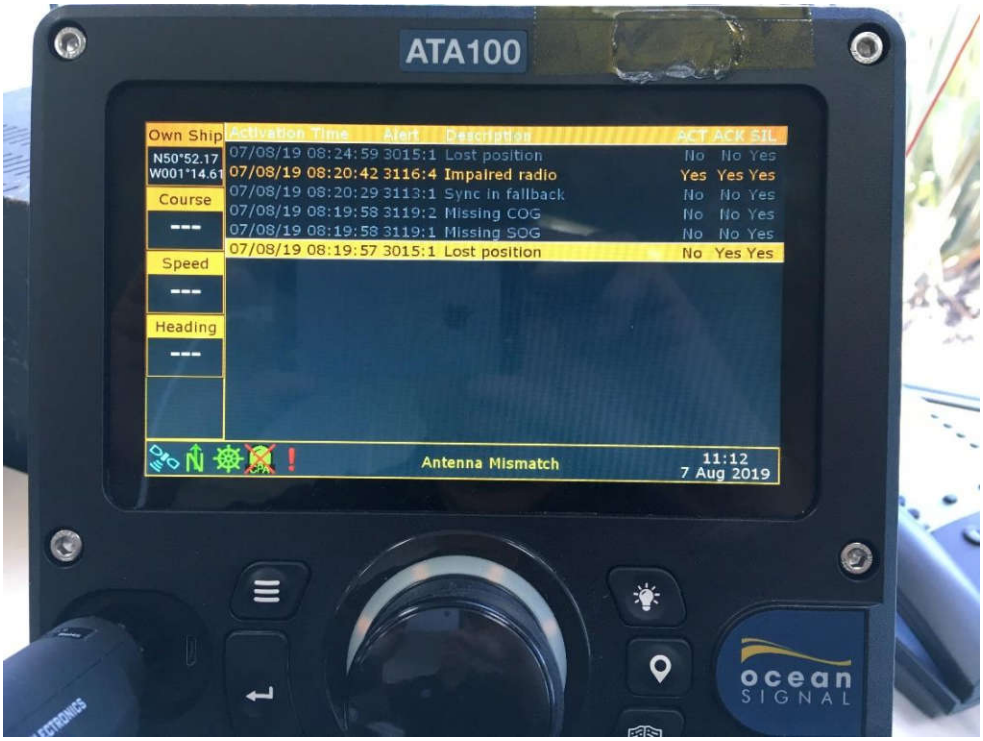


Photo 4.9.2

2.21 IEC 62288 CLAUSE 4.9.3

2.21.1 Equipment Under Test

EUT 1 – Modification State 0

2.21.2 Alert related information from multiple sources

4.9.3.1 Requirement
(MSC191/5.7.3) If *a single display is used to present* alert related *information from multiple navigational systems and equipment,* then *the presentation of* alerts *and indications* shall *be consistent for the display of:*

- *the time of* alert *occurrence,*
- *the cause of the* alert*,*
- *the source of the* alert*, and*
- *the status of the* alert *(*for example*, acknowledged, not acknowledged)*.

4.9.3.2 Methods of test and required results
Where display equipment supports the presentation of alerts and indications from multiple navigational systems and equipment, confirm by observation that the presentation of alert related information is consistent with respect to the time of alert occurrence, the cause of the alert, the source of the alert, and the status of the alert.

2.21.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – Single source only

2.22 IEC 62288 CLAUSE 4.9.4

2.22.1 Equipment Under Test

EUT 1 – Modification State 0

2.22.2 Speech output for alarms and warnings

4.9.4.1 Requirement
(MSC 302/7.3.2.3) An unacknowledged alarm condition *may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.*

(MSC 302/7.4.2.3) *An unacknowledged warning condition may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.*

(MSC 252/20.2.2) *The visual announcement and speech output* shall *occur simultaneously. The audio signal* shall *be announced before the speech output.*
NOTE IEC 60945:2002, 4.2.1.6 contains generic requirements for voice announcements.

The speech output shall only announce the visually indicated unacknowledged alert(s) which will be acknowledged by the next operation of the alert acknowledge. The speech output may announce them individually or may announce that multiple alerts are present.

The speech output shall be followed by at least a 2 s pause before repetition or new announcement. For alarms the speech output shall be repeated for every second cycle. If a new higher priority alert arrives during speech output of a lower priority alert then the lower priority alert shall be interrupted to allow audio signal as defined in Table 2 to occur before the speech output of the new higher priority alert.

The speech output shall be interrupted when the associated alert is acknowledged.
The speech output shall use plain language using marine terminology as defined in SMCP (see IMO A.918(22)), as appropriate. The speech output shall be clearly understandable. The volume shall be adjustable from 85 dB(A) at 1 m to extinction without affecting the sound pressure level of the audible alert signal.

Failure of the speech output shall not degrade operation of visual indication. Failure of the speech output shall not degrade operation of audible alert signal except when common components are used for both audible signals and speech output.

4.9.4.2 Methods of test and required results
If speech output is provided, confirm by observation that:
• the audio signal as defined in Table 2 occurs before the speech output;
• for alarms the same speech is repeated as long as the alarm is unacknowledged;
• for warnings the same speech is repeated only when repeating the warning based on requirement 4.9.1.1;
• the speech output only announce visually indicated unacknowledged alerts which can be acknowledged by the next operation of the alert acknowledge;
• the speech output has at least a 2 s pause before repetition or a new announcement and the speech output for alarms is repeated for every second cycle;
• the speech output of a lower priority alert is interrupted when a new higher priority alert arrives;

• the speech output is interrupted when the associated alert is acknowledged;

• it is possible to adjust the speech volume to extinction without affecting the audible signal. If speech output is provided, confirm by analytic evaluation that:

• speech output is at least in plain English language, using marine terminology conforming with the SMCP (see IMO A.918(22)) where appropriate;

• announcements are clearly understandable at the maximum loudness level.

If speech output is provided, follow manufacturer's instructions and cause failure of the speech output. Confirm by observation that visual indication and audible signal remain as defined in Table 2.

2.22.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – Feature not supported

2.23 IEC 62288 CLAUSE 4.10

2.23.1 Equipment Under Test

EUT 1 – Modification State 0

2.23.2 Presentation mode

4.10.1 Requirement
(MSC191/5.8) *If displays are capable of presenting information in different modes,* then *there* shall *be a clear indication of the modes in use, for example*:

- *orientation* (north-up, course-up, head-up);
- *stabilisation* (ground-stabilised, sea-stabilised);
- *motion* (true, relative); *and*
- *chart projection* (Mercator, gnomonic, etc.).

NOTE The indication of chart projection is only required when electronic chart information is presented. It may be provided to the user on request.

4.10.2 Methods of test and required results
Confirm by observation that the presentation modes in use are clearly indicated

2.23.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	Screen orientation is clearly shown, (NUI CUP, HUP). No options are given for stabilisation, (Ground Stabilisation used) or motion, (true motion used). Charts are not supported.

2.10.4 Evidence

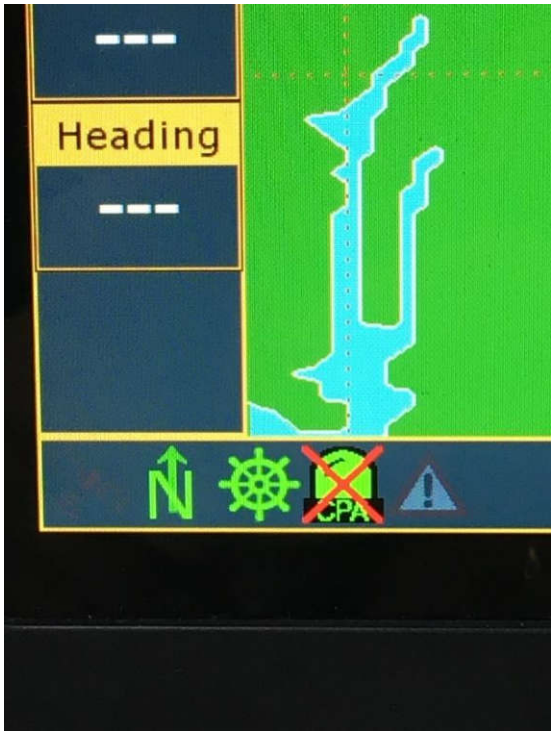


Photo 4.10

2.24 IEC 62288 CLAUSE 4.11

2.24.1 Equipment Under Test

EUT 1 – Modification State 0

2.24.2 User manuals, instructions and reference guides

4.11.1 Requirement
(MSC191/5.9) *The user manual and instructions* and reference guides shall *be available in the English language at least*. *The user manual or reference guide* shall *include a list of all terms, abbreviations, symbols*, icons *and their explanations presented by the system or equipment*.
(See also Annex A, Annex B and Annex E.)

4.11.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that user manual, instructions and reference guide are available in the English language;

b) confirm by inspection of documented evidence that the user manual and/or reference guide includes a list of all terms, abbreviations, symbols, icons and their explanations used by the system

2.24.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	User manual is presented in English

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	Icons and Symbols explained in context, abbreviations explained where needed.

2.25 IEC 62288 CLAUSE 5

2.25.1 Equipment Under Test

EUT 1 – Modification State 0

2.25.2 Presentation of operational information

5.1 Application
The provisions of this clause are applicable to displays on the bridge of a ship that provide functionality as described in the following subclauses.

5.2 Presentation of own ship information

5.2.1 Graphical representation of own ship – Requirement
(MSC191/6.1.1) *When a graphical representation of own ship is provided, it* shall *be possible for the user to select either a* true *scaled ship's outline or a simplified symbol as* set forth *in* Annex A*. The size of the ship's* true scaled *outline or the simplified symbol in the graphical presentation* shall *be the true scale size of the ship or 6 mm*, at a nominal viewing distance of 1 m*, whichever is greater.*

The manufacturer should adjust the symbol sizes to properly account for the nominal viewing distance of the display equipment. Display equipment may (unless stipulated as mandatory in an equipment standard) provide the capability to automatically switch from the ship's true scaled outline to the simplified symbol when the beam of own ship's true scale outline is less than 3 mm, and vice versa. The true scaled outline shall not be used when the heading is not known in a gyro/THD-stabilized mode. The user shall always have the capability to select the simplified symbol in lieu of the scaled ship's outline.
(MSC191/6.1.2) *A heading line, and where appropriate a velocity vector,* shall *be associated with own ship symbol and* shall *originate at the position of the consistent common reference point (CCRP)* as set forth in Annex A. The combination of the heading line and beam line (the minimised symbol) may be used as an alternative to the simplified symbol and may be selectable as such. Display equipment may provide the capability to automatically switch from the ship's true scaled outline to the heading and beam line when the beam of own ship's true scale outline is less than 3 mm, and vice versa.

5.2.2 Methods of test and required results
Where display equipment provides a graphical representation of own ship:

a) confirm by observation that the system provides a ship's true scaled outline and a simplified symbol in accordance with Annex A;

b) confirm by observation that the display equipment provides the user with the capability to select the representation of own ship as either the ship's true scaled outline or the simplified symbol;

c) confirm by measurement that the size of the ship's outline is correct for the scale of the display;

d) confirm by observation that the simplified symbol is automatically selected when the beam of the ship's true scaled outline is less than 3 mm, and vice versa;

e) confirm by observation that the display equipment provides a heading line in accordance with Annex A;
f) confirm by observation that the display equipment provides a velocity vector in accordance with Annex A.

Note that the minimised symbol may be used as alternative to the simplified symbol

2.25.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - No own ship outline just simple symbol

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - No own ship outline

c,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - Simple symbol always on

d,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - Simple symbol always on

e

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - No own ship heading

f,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A - No own ship vector

2.25.4 Evidence

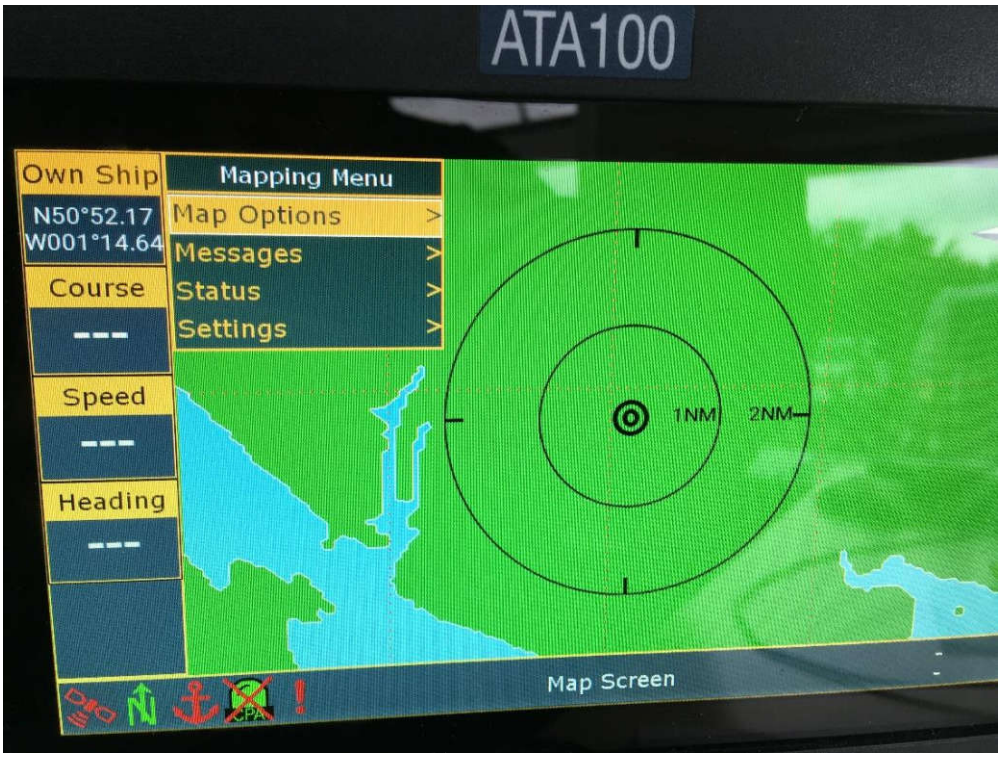


Photo 5

2.26 IEC 62288 CLAUSE 5.3

2.26.1 Equipment Under Test

EUT 1 – Modification State 0

2.26.2 Presentation of chart information

5.3.1 Alteration of chart information

5.3.1.1 Requirement
It shall not be possible to alter the electronic chart information, except by update.

5.3.1.2 Methods of test and required results
Confirm by observation that it is not possible to alter the electronic chart information

2.26.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	No charts but simple mapping that cannot be altered

2.27 IEC 62288 CLAUSE 5.3.2

2.27.1 Equipment Under Test

EUT 1 – Modification State 0

2.27.2 Colours and symbols for charted information

5.3.2.1 Requirement

(MSC191/6.2.1) *The presentation of* official electronic *chart information that is issued by, or on the authority of a government authorized hydrographic office, or other relevant government institution* or agency (for example, ENC), shall *comply with* or be based upon *the* colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, as far as is practicable.

(MSC191/6.2.2) *The presentation of proprietary* electronic *chart information* shall *comply with* or be based upon *the* colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, *as far as practical. There* shall *be a clear indication when the presentation is not in accordance with IHO standards.*

(MSC191/6.2.3) *The presentation of user-added* electronic *chart information* shall *comply with* or be based upon *the* colours and symbols specified for the IHO ECDIS Presentation Library in IHO S-52 and its Appendices, or an equivalent colour and symbol set, *as far as practical.*

NOTE Some colours and symbols provided in the IHO ECDIS Presentation Library or otherwise specified by IHO in S-52 and its Appendices may not be suitable for the display of electronic chart information on radar or in a composite presentation based upon radar. IHO S-52 and its Appendices allow minor deviations to symbology. It provides a framework and guidelines for chart symbolization from which manufacturers can derive a customized symbol set.

(MSC191/6.2.4) *If* electronic *chart* information *derived from different scales appears* in *the* presentation*, the scale boundary* shall *be clearly indicated* as defined in the IHO ECDIS Presentation Library in IHO S-52 and its Appendices.

5.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

a) verify by observation that the presentation of official and user-added electronic chart information, as applicable, is in accordance with 4.5.1 and 4.6.2;

b) where the presentation of proprietary electronic chart information is not in accordance with 4.5.2, confirm by observation that an indication is provided;

c) when electronic chart information derived from different scales (for example, adjacent ENC cells) is displayed confirm by observation that a scale boundary is presented between the scales.

2.27.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no charts can be added

2.28 IEC 62288 CLAUSE 5.4

2.28.1 Equipment Under Test

EUT 1 – Modification State 0

2.28.2 Presentation of radar information

5.4.1 Radar video images

5.4.1.1 Requirement

(MSC191/6.3.1) *Radar* video *images* shall *be displayed by using a basic colour that provides optimum contrast*. *Radar echoes* shall *be clearly visible when presented on top of a chart background. The relative strength of* radar *echoes may be differentiated by tones of the same basic colour. The colour*s *may be different for operation under different ambient light conditions* (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch. Additional processed radar information that is not a part of the radar video image may be discriminated from the radar video by tones of the basic colour used to present the image. Alternatively, it may be differentiated by tones of other basic colours. For radar displays a dark non-reflecting background shall be used. The colour used for the radar image shall provide contrast against the background and shall be clearly visible when presented over a chart background.

NOTE The colour tables specified by IHO and provided in IHO ECDIS Presentation Library include a “Day” table based on a white background that may not support readability under daylight conditions and may be a risk to safety of navigation for some navigational systems and equipment, including radar. Readability under daylight conditions may be achieved by using the black background in the “Dusk” or “Night” colour tables provided in IHO ECDIS Presentation Library and adjusting brightness and contrast, if provided.

If the colour red is used for the radar video image, then it shall be distinguishable from other uses of the colour red, for example, alarms including dangerous targets.
If electronic chart information overlays radar information (i.e. a radar video image), or a radar image overlays chart information, then the overlay may be displayed as transparent or opaque. If a transparent overlay is used, then it may be variable so that the underlying information is visible through the overlay. If an opaque chart overlay is used, then the colour fill of area objects shall be excluded. Optionally, the colour fill of point objects may also be excluded. In either case, the background of the radar image shall be the same basic colour as the chart’s water surfaces. If display equipment provides facilities for the overlay of radar information that are independent of a shipborne radar system (for example, by a separate radar scan converter), then the facilities should comply with the relevant clauses of IEC 62388.

5.4.1.2 Methods of test and required results

The methods of test and the required results are as follows:

a) confirm by observation under each of the ambient light conditions described in Table 1, that radar information is presented using a contrasting colour against the background and that the background shall be dark for radar displays;

b) confirm by observation that radar information is clearly visible when presented on top of a chart background for the ambient light conditions described in Table 1.

2.28.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information can be displayed

2.29 IEC 62288 CLAUSE 5.4.2

2.29.1 Equipment Under Test

EUT 1 – Modification State 0

2.29.2 Target trails

5.4.2.1 Requirement
(MSC191/6.3.2) If display equipment provides *target trails*, then they shall *be distinguishable from* radar echoes *and clearly visible under all ambient light conditions* (day, dusk and night) likely to be experienced on the bridge of a ship, and with due consideration to the night vision of the officer of the watch. Target trails may be differentiated by tones of the basic colour used for the radar video image. Alternatively, they may be distinguished by tones of another basic colour.

If display equipment provides target trails, then there shall be an indication of trail time and motion stabilisation *mode.*

5.4.2.2 Methods of test and required results
Where target trails are provided:

a) confirm by observation that they are distinguishable from radar echoes and clearly visible under the ambient light conditions described in Table 1;

b) confirm by observation that the trail time and motion stabilization mode are indicated

2.29.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

2.30 IEC 62288 CLAUSE 5.5

2.30.1 Equipment Under Test

EUT 1 – Modification State 0

2.30.2 Presentation of target information

5.5.1 Providing target information

5.5.1.1 Requirement
(MSC191/6.4.1.1) *Target information may be provided by* a *radar target tracking* system *and/or by the AIS*.

A radar target tracking system detects and tracks radar targets. Other navigational systems may provide remote presentation of tracked radar targets. These systems shall present reported radar targets in accordance with Annex A.

If display equipment provides facilities for radar target detection and tracking that are independent of a shipborne radar system, then the facilities should comply with the relevant clauses of IEC 62388.

Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall present reported AIS targets in accordance with Annex A. An AIS target may be repeated or VTS-generated (see 5.5.4.1). In such case the presentation shall be as for reported AIS target in accordance with Annex A.

5.5.1.2 Methods of test and required results
The methods of test and the required results are as follows:
a) where display equipment provides the capability to connect to a radar target tracking system, confirm by observation that the presentation is in accordance with Annex A;
b) where display equipment provides the capability to connect to an AIS: confirm by observation that the presentation is in accordance with Annex A.

2.30.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

2.31 IEC 62288 CLAUSE 5.5.2

2.31.1 Equipment Under Test

EUT 1 – Modification State 0

2.31.2 Consistent user interface for target information

5.5.2.1 Requirement
(MSC191/6.4.1.3) *As far as practical, the user interface and data format for operating and* presenting tracked *radar* target information *and* reported *AIS* target *information* shall *be consistent*.

5.5.2.2 Methods of test and required results
Confirm by observation that the presentation of tracked radar target information and reported AIS target information is consistent.

2.31.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

2.32 IEC 62288 CLAUSE 5.5.3

2.32.1 Equipment Under Test

EUT 1 – Modification State 0

2.32.2 Indication of exceeding target capacity

5.5.3.1 Requirement
(MSC191/6.4.2.1) *There* shall *be an indication when the target tracking and/or reported target processing/display capacity is about to be exceeded.*
(MSC191/6.4.2.2) *There* shall *be an indication when the target tracking and/or reported target processing/display capacity have been exceeded*.
NOTE A definition of minimum target capacities is given in IEC 62388.

5.5.3.2 Methods of test and required results
There are two methods of test depending on the capability of the equipment.

a) Where display equipment provides the capability to connect to a radar target tracking system:

1) confirm by measurement that it provides an indication that the tracked radar target display capacity is about to be exceeded, for example, when the number of tracked radar targets presented exceeds 95 % of the display capacity;

2) confirm by measurement that it provides an indication that the tracked radar target display capacity has been exceeded when the number of tracked radar targets presented exceeds 100 % of the display capacity.

b) Where display equipment provides the capability to connect to an AIS:

1) confirm by measurement that it provides an indication that the reported AIS target display capacity is about to be exceeded, for example, when the number of reported AIS targets presented exceeds 95 % of the display capacity;

2) confirm by measurement that it provides an indication that the reported AIS target display capacity has been exceeded when the number of reported AIS targets presented exceeds 100 % of the display capacity.

2.32.3 Result

A1,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

A2,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :	N/A – no radar information is displayed

B1,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 : PASS	No maximum given or action of unit on max reached. Note IEC61993-2 states that the EUT must display a minimum of 200 targets. See 75936860 Report 01.

B2,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 :PASS	200+ targets displayed as per report 75936860 report 1 clause 14.9.5 e,f

2.33 IEC 62288 CLAUSE 5.5.4

2.33.1 Equipment Under Test

EUT 1 – Modification State 0

2.33.2 Merging AIS targets from multiple source

5.5.4.1 Requirement
AIS Base Stations may relay or repeat AIS information and target reports with a lower update rate than transmitted from the sending vessel and with latency that is significant and variable. If both relayed and direct AIS reports are received for the same target, the relayed reports shall not be processed for display of AIS target or information. An AIS target may be VTS-generated (AIS ASM(17)) as described in IMO SN.1/Circ.289. If both VTS-generated and direct AIS reports are received for the same target (MMSI, IMO number,call sign), the VTS-generate reports shall not be processed for display of AIS target or information.

If both VTS-generated and relayed AIS reports are received for the same target, the relayed reports shall not be processed for display of AIS target or information.
If multiple relayed AIS reports are received for the same target, the report with the highest repeat count shall not be processed for display of AIS target or information.
If direct and VTS-generated AIS target information are both available as not merged by MMSI, IMO-number or Call sign AIS information and where the direct and VTS-generated targets are considered as one target, then the direct AIS target shall be automatically used and displayed as set forth in Annex A.

5.5.4.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the relayed data is not displayed;

b) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and VTS-generated AIS reports with equal MMSI for this target, that the VTS-generated data is not displayed;

c) confirm by analytical evaluation and using the AIS simulator to produce VTS-generated AIS reports with equal MMSI for a nearby AIS target moving at 24 kn and relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that the relayed data is not displayed;

d) confirm by analytical evaluation and using the AIS simulator to produce two or more relayed VTS-generated AIS reports with equal MMSI for a nearby AIS target moving at 24 kn and two or more relayed AIS reports for this target with delayed and reduced update rate (for example: delayed by 30 s with a 10 s update rate), that only data from lowest repeat count is displayed;

e) confirm by analytical evaluation and using the AIS simulator to produce AIS reports for a nearby AIS target moving at 24 kn and VTS-generated AIS reports with target identifier set as 3 (other) for this target, that the VTS-generated data is not displayed.

2.33.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	From class A tests only 1 MMSI will be shown therefore the primary will be shown if available, if not then the repeat will be shown.

b,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	From class A tests only 1 MMSI will be shown therefore the primary will be shown if available, if not then the repeat will be shown.

c,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	From class A tests only 1 MMSI will be shown therefore the primary will be shown if available, if not then the repeat will be shown.

d,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	From class A tests only 1 MMSI will be shown therefore the primary will be shown if available, if not then the repeat will be shown.

e,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	From class A tests only 1 MMSI will be shown therefore the primary will be shown if available, if not then the repeat will be shown.

2.34 IEC 62288 CLAUSE 5.5.5

2.34.1 Equipment Under Test

EUT 1 – Modification State 0

2.34.2 Filtering sleeping AIS targets

5.5.5.1 Requirement
(MSC191/6.4.3.1) *It* shall *be possible to filter the presentation of sleeping AIS targets (*for example*, by target range, CPA/TCPA or AIS target class A/B, etc.).*

Criteria for filtering shall only include sleeping class A or sleeping class B when combined with one or more other factors, for example including CPA/TCPA, Speed, Range or Course. If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

It shall be possible to filter the presentation of AIS data reports other than sleeping AIS targets (for example, AIS AtoN (aids to navigation), AIS Base Station, AIS-SART, AIS SAR Aircraft).

(MSC191/6.4.3.2) *If a filter is applied,* then *there* shall *be a clear and permanent* or persistent *indication*, as appropriate for the application*. The filter criteria in use* shall *be readily available* to the user*.*

(MSC191/6.4.3.3) *It* shall *not be possible to remove individual AIS targets from the* presentation*.*

5.5.5.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the user can filter the presentation of sleeping AIS targets;

b) confirm by observation that the user can filter the presentation of AIS data reports;

c) confirm by observation that an indication is provided when sleeping targets are filtered from the presentation;

d) confirm by observation that the indication remains while the filter is active;

e) confirm by analytical evaluation that the filter criteria in use is readily available;

f) confirm by observation that the user cannot remove individual AIS targets from the presentation.

2.34.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

b,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

c,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

d,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

e,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

f,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :	No AIS filtering not required for IEC 61993-2

2.35 IEC 62288 CLAUSE 5.5.7

2.35.1 Equipment Under Test

EUT 1 – Modification State 1

2.35.2 Graphical presentation of targets

5.5.7.1 Requirement
(MSC191/6.4.5.1) *Targets* shall *be presented with their relevant symbols* as set forth in Annex A.

(MSC191/6.4.5.2) Reported *AIS* targets shall *be graphically presented either as sleeping or activated*.

(MSC191/6.4.5.3) *The course and speed of a tracked radar target or* an activated *reported AIS target* shall *be indicated by a vector that clearly shows the predicted motion*. *The vector time (i.e. length)* shall be *consistent for presentation of any target regardless of its source*.

(MSC191/6.4.5.4) *The presentation of vector symbols* shall *be consistent irrespective of the source of information. The presentation mode* shall *be clearly and permanently* or persistently *indicated*, as appropriate for the application, *including for example,*

- *True/Relative* motion*,*
- *vector time, and*
- *stabilisation*.

(MSC191/6.4.5.5) *The orientation of the AIS target symbol* shall *indicate its heading*. *If the heading information is not received, the orientation of the AIS symbol* shall *be aligned to the* reported course over ground (*COG*). If *available, the turn or rate of turn (ROT) indicator and/or the path prediction* shall *indicate the manoeuvre of an activated AIS target.*

(MSC191/6.4.5.6) Own ship's *CCRP* shall *be used for alignment of tracked* radar *target symbols and* reported *AIS target symbols with other information on the same display*.
(MSC191/6.4.5.7) *On large scale, low range displays, a means* or method *to present a true scale outline of an activated AIS target* shall *be provided* in accordance with Annex A.

(MSC191/6.4.5.8) *It* shall *be possible to display the past positions of activated* AIS *targets*.

5.5.7.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that targets are presented with their relevant symbols according to Annex A;

b) confirm by observation that reported AIS targets are graphically presented as sleeping or activated targets in accordance with Annex A;

c) confirm by observation that the predicted motion of tracked radar targets and activated reported AIS targets is clearly indicated by a vector;

d) confirm by observation that the vector time (i.e. length) is consistent for all targets;

e) confirm by observation that the presentation of vector symbols are consistent irrespective of the source of information;

f) verify that the presentation mode is clearly indicated in accordance with 4.10.1;

g) confirm by observation that the vector time is clearly indicated;

h) confirm by observation that the orientation of the AIS target symbol clearly indicates its heading. Change the heading information to 'not available' for one reported AIS target and confirm by observation that the orientation of the AIS symbol is aligning to the reported COG;

i) confirm by observation that the turn or rate of turn (ROT) flag and/or the path prediction indicates the manoeuvre of an activated AIS target changing course;

j) confirm by analytical evaluation that own ship's CCRP is used to align tracked radar target symbols and reported AIS target symbols with other information on the same display;

k) confirm by observation that on large scale, low range displays, a means or method to present a true scaled outline of an activated AIS target is provided;

l) confirm by observation that it is possible to display the past positions of activated AIS targets.

2.35.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	7 Nov 2019	EUT 1 PASS	AIS targets shown as per Annex A Detailed in User manual

b,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	AIS all active

c,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 :PASS	Direction vector on front of target.

d,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A Vector length does not vary

e,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A

f,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1 PASS	Presentation mode indicated in accordance with IEC 62288 Clause 4.10

g,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A - No vector time

h,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A – no heading information used

i,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A - No rate of turn flag

j,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A – no radar information used

k,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A – target information not displayed

I,

Initials	Date	Pass/Fail	Comments
NGD	8 Aug 2019	EUT 1	N/A – only current position displayed

2.35.4 Evidence

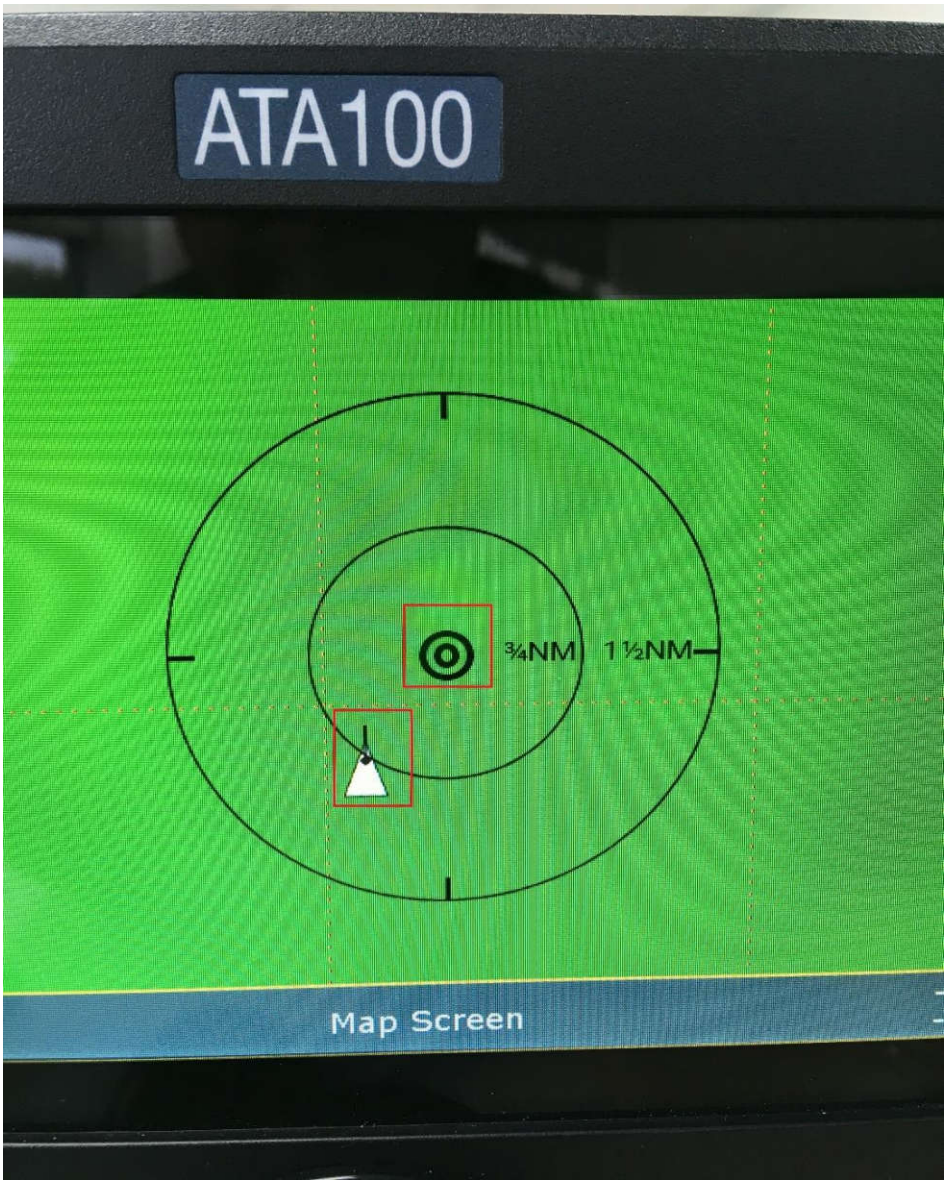


Photo 5.5.7a

2.36 IEC 62288 CLAUSE 5.5.8

2.36.1 Equipment Under Test

EUT 1 – Modification State 1

2.36.2 Target selection

5.5.8.1 Requirement
(MSC191/6.4.6.1) *A target selected for the display of its alphanumeric information* shall *be identified by the relevant symbol* set forth in Annex A. *If more than one target is selected for data display, the symbols and the corresponding target data* shall *be clearly identified*.

5.5.8.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that a selected target is identified in accordance with Annex A;

b) confirm by observation that if more than one target is selected, the symbols and corresponding target information is clearly identified in accordance with Annex A.

2.36.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	7 Nov 2019	EUT 1 :PASS	Selection of target as per annex A

b,

Initials	Date	Pass/Fail	Comments
NGD	7 Nov 2019	EUT 1	N/A – only one target selectable

2.36.4 Evidence

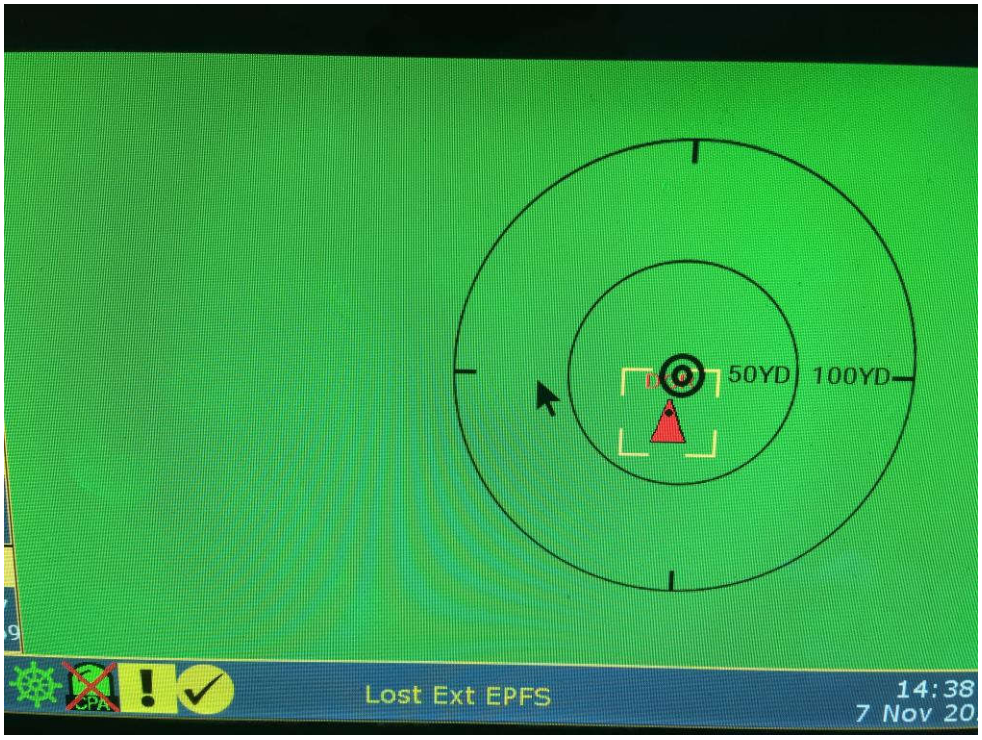


Photo 5.5.8

2.37 IEC 62288 CLAUSE 5.5.9

2.37.1 Equipment Under Test

EUT 1 – Modification State 0

2.37.2 Indication of target derivation

5.5.9.1 Requirement
(MSC191/6.4.6.2) *There* shall *be a clear indication to show that target* information *is derived from radar or AIS or* from *a combination of these*.

5.5.9.2 Methods of test and required results
Confirm by analytical evaluation that there is a clear indication of the source of target information.

2.37.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – only one source available

2.38 IEC 62288 CLAUSE 5.5.10

2.38.1 Equipment Under Test

EUT 1 – Modification State 0

2.38.2 Presentation of tracked radar target information

5.5.10.1 Requirement
(MSC191/6.4.6.3) *For each selected tracked radar target the following* information shall *be presented in alphanumeric form:*

- *source(s) of target* information,
- *measured range of target,*
- *measured bearing of target,*
- *predicted target range at the closest point of approach (CPA)*,
- *predicted time to CPA (TCPA),*
- calculated CTW *of target* (or calculated COG if ground stabilised),
- calculated STW *of target* (or calculated SOG if ground stabilised).

Additional target information, where available, shall *be provided* to the user *on request*. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target.
If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.
Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, course and speed).
If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.5.10.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the information listed above is presented in alphanumeric form for each selected target;

b) confirm by observation that additional information, where available, is indicated and provided to the user on request;

c) confirm by analytical evaluation that the target information is logically "paired" for presentation.

2.38.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no radar information is displayed

2.39 IEC 62288 CLAUSE 5.5.11

2.39.1 Equipment Under Test

EUT 1 – Modification State 0

2.39.2 Presentation of reported AIS target information

5.5.11.1 Requirement

(MSC191/6.4.6.4) *For each selected* reported *AIS target, the following* information shall *be presented in alphanumeric form:*

- *source(s) of* target information (for example, repeated, VTS-generated, etc.);
- target *identification* (for example, MMSI, call sign, ship's name, etc.);
- reported *position and* where available *its quality*;
- calculated *range* of target;
- calculated *bearing* of target;
- calculated *CPA*;
- calculated *TCPA*;
- reported *COG* (or calculated course of target if the sea is stabilised);
- reported *SOG* (or calculated speed of target if the sea is stabilised);
- reported *navigational status*.

Target *heading and* reported *rate of turn* (ROT) shall *also be made available*. All *additional target information*, where available from the same MMSI source (including for example most recent AIS safety messages), shall *be provided* to the user *on request*. If additional target information is available, an indication shall be provided when viewing alphanumeric information of the selected target.
If multiple targets are selected, a subset of alphanumeric data, information and text may be presented.
Target information shall be logically "paired" for presentation (i.e. range and bearing, CPA and TCPA, COG and SOG, heading and ROT).
(MSC191/6.4.6.5) *If the received AIS* target *information is incomplete*, then *the absent information* shall *be clearly indicated in the target data field as missing*.
If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.5.11.2 Methods of test and required results

The methods of test and the required results are as follows:

a) confirm by observation that the information listed above is presented in alphanumeric form;

b) confirm by observation that additional information, where available, is provided to the user on request;

c) confirm by analytical evaluation that the target information is logically "paired" for presentation;

d) confirm by observation, that there is a clear indication of absent information in the target data field.

2.39.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Information provided in tabular form

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Additional information in new display window

c,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Information layout logical

d,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Not available is indicated

2.39.4 Evidence

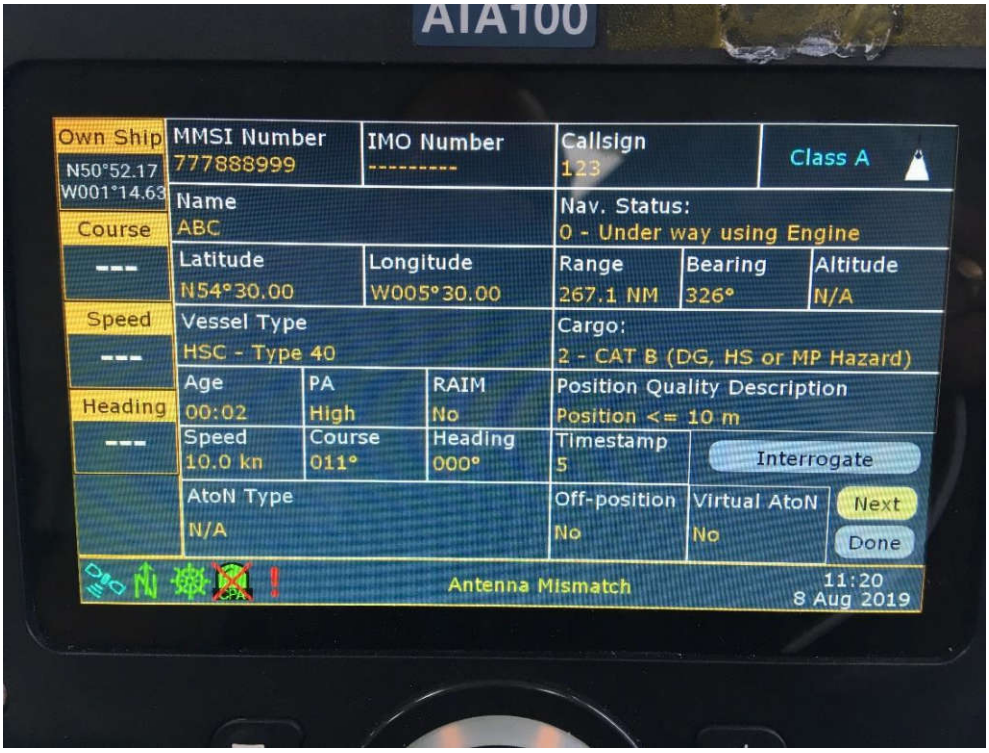
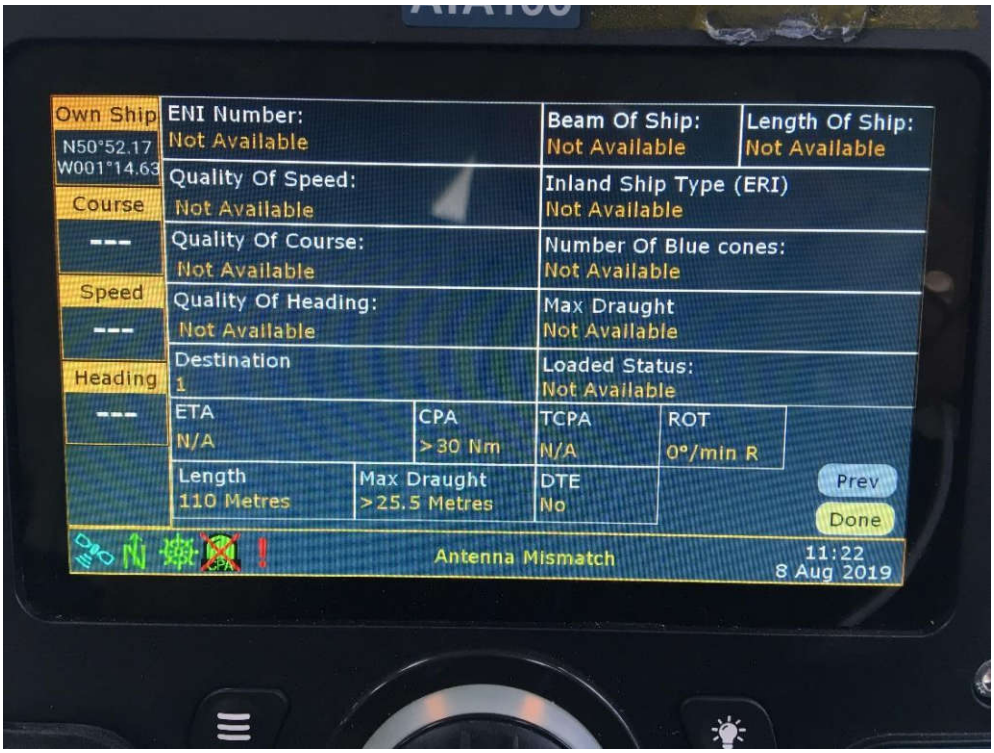


Photo 5.5.11


Own Ship
N50°52.17
W001°14.63
Course

Speed

Heading

ENI Number:
Not Available
Beam Of Ship:
Not Available
Length Of Ship:
Not Available
Quality Of Speed:
Not Available
Inland Ship Type (ERI)
Not Available
Quality Of Course:
Not Available
Number Of Blue cones:
Not Available
Quality Of Heading:
Not Available
Max Draught
Not Available
Destination
1
Loaded Status:
Not Available
ETA
N/A
CPA
>30 Nm
TCPA
N/A
ROT
0°/min R
Length
110 Metres
Max Draught
>25.5 Metres
DTE
No
Prev
Done
Antenna Mismatch
11:22
8 Aug 2019
Photo 5.5.11

2.40 IEC 62288 CLAUSE 5.5.12

2.40.1 Equipment Under Test

EUT 1 – Modification State 0

2.40.2 Continual update of target information

5.5.12.1 Requirement
(MSC191/6.4.6.6) *The* information for a selected target shall *be displayed and continually updated, until another target is selected for* information *display or*, if applicable*, until the* user dialogue area *is closed.*

5.5.12.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that information displayed for a selected target is continually updated;

b) confirm by observation that the information displayed for a selected target remains displayed until another target is selected or the user dialogue is closed.

2.40.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Information is continually updated

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Only one screen available

2.41 IEC 62288 CLAUSE 5.5.13

2.41.1 Equipment Under Test

EUT 1 – Modification State 0

2.41.2 Own ship's AIS information

5.5.13.1 Requirement
(MSC191/6.4.6.7) A *means* or method shall *be provided to present own ship AIS data on request*.

5.5.13.2 Methods of test and required results
Confirm by observation that it is possible to present own ship's AIS data on request.

2.41.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Own ships info available

2.41.4 Evidence

Photo 5.5.13

2.42 IEC 62288 CLAUSE 5.5.14

2.42.1 Equipment Under Test

EUT 1 – Modification State 0

2.42.2 Obscuring the operational display area

5.5.14.1 Requirement
(MSC191/6.4.6.8) *The* display of *alphanumeric data,* information and text shall *not obscure graphically presented operational information.*

5.5.14.2 Methods of test and required results
Confirm by analytical evaluation that the display of alphanumeric data, information and text does not obscure graphically presented operational information

2.42.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	Graphical screen not available whilst data displayed

2.43 IEC 62288 CLAUSE 5.6

2.43.1 Equipment Under Test

EUT 1 – Modification State 0

2.43.2 Operational alerts

5.6.1 Alert status

5.6.1.1 Requirement
(MSC191/6.4.7.1) *A clear indication of the status of the* alerts *and the* alert *criteria* (i.e. identification) shall *be given* to the user. (See also 4.9.1 and 4.9.3.)
Except for IMO requirements for radar and AIS target symbols displayed in the operational area and for ECDIS highlight of danger, warnings, and caution in the chart area, only text based visual indication of alert (e.g. in user dialog area) is mandatory. Optionally icons can be presented together with the text, see Annex F.

5.6.1.2 Methods of test and required results
Confirm by analytic evaluation that a clear indication of the status of alerts and the alert criteria is provided as text to the user.
Confirm by observation that if icons are additionally provided that they conform to Annex F (see also 4.4.4.2).

2.43.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	As per 4.9.1 Alert status displayed

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Icons conform to annex F

2.43.4 Evidence

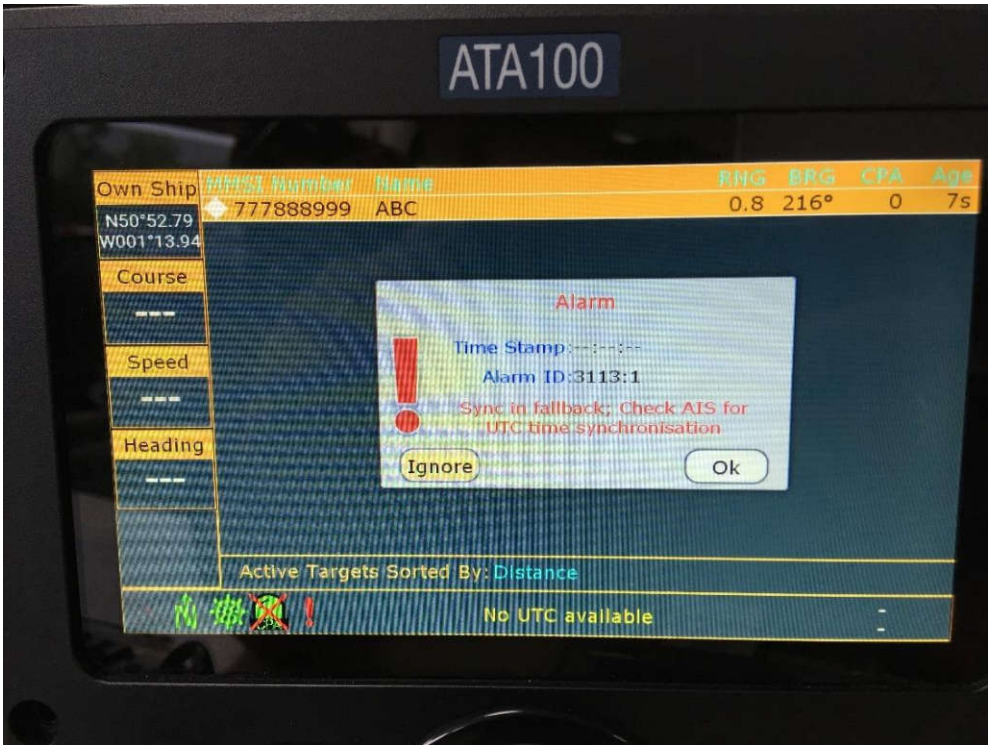


Photo 5.6

2.44 IEC 62288 CLAUSE 5.6.2

2.44.1 Equipment Under Test

EUT 1– Modification State 0

2.44.2 CPA/TCPA alarms

5.6.2.1 Requirement
(MSC191/6.4.7.2) *A CPA/TCPA alarm of a tracked radar or activated AIS target* shall *be clearly indicated and the target* shall *be clearly marked by a dangerous target symbol* as set forth in Annex A.
If display equipment provides facilities for the calculation of CPA/TCPA that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.6.2.2 Methods of test and required results
Confirm by observation that dangerous targets are presented in accordance with Annex A.

2.44.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	AIS dangerous target shows correct highlighted red in accordance with Annex A

2.44.4 Evidence

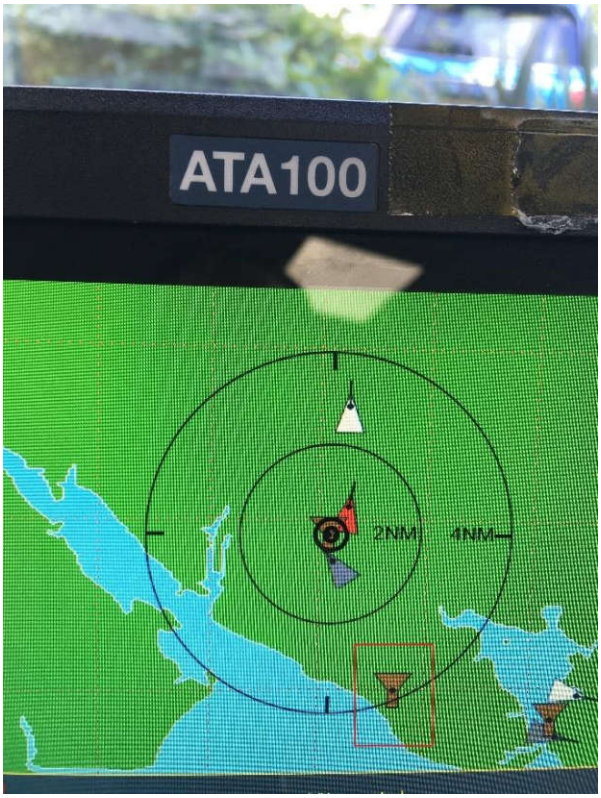


Photo 5.6.2

2.45 IEC 62288 CLAUSE 5.6.3

2.45.1 Equipment Under Test

EUT 1 – Modification State 0

2.45.2 Acquisition/activation zones warnings

5.6.3.1 Requirement
(MSC191/6.4.7.3) *If a user defined acquisition/activation zone facility is provided, a target entering* or within *the zone* shall *be clearly identified with the relevant symbol* set forth in Annex A *and for tracked radar targets* a warning shall *be given. The zone* shall *be identified with the relevant symbology* set forth in Annex A, *and* shall *be applicable to* both *tracked radar and* reported *AIS targets.* A radar target tracking system shall control radar target acquisition zones. The target tracking system shall provide all warnings and indications associated with target detection and tracking including entry into or detection within an acquisition area. Other navigational systems and equipment may provide acquisition zone warnings and indications only if they provide a radar target tracking function complying to IEC 62388.

Other navigational systems and equipment that provide remote presentation of tracked radar targets shall not provide warnings and indications associated with acquisition zones. Any navigational system or equipment may provide remote presentation of reported AIS targets. These systems shall provide their own AIS activation zone facilities. If display equipment provides facilities for acquisition zones for the detection of radar targets that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.6.3.2 Methods of test and required results
Where display equipment provides zones for automatic acquisition/activation:

a) verify that the zones are presented with their relevant symbology in accordance with 5.5.7;

b) confirm by observation that detected radar targets entering or within a zone are acquired;
NOTE The acquisition status of tracked radar targets is reported by the radar target tracking system, for example, in accordance with the IEC 61162 series of standards.

c) confirm by observation that radar targets in acquisition state are presented in accordance with Annex A;

d) verify that the zones apply to both radar targets and reported AIS targets in accordance with 5.5.7.

2.45.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no radar information is displayed

2.46 IEC 62288 CLAUSE 5.6.4

2.46.1 Equipment Under Test

EUT 1 – Modification State 1

2.46.2 Lost target warnings

5.6.4.1 Requirement
(MSC191/6.4.7.4) *The last* reported/predicted *position of a lost target* shall *be clearly marked by a lost target symbol on the display* as set forth in Annex A*, and the lost target* warning shall *be given* if the lost target warning function is enabled*. The lost target symbol* shall *disappear if the signal* (or message) for the target *is received again or after the* warning *has been acknowledged.* A means or method shall be provided for the user to enable/disable the lost target warning function. *There* shall *be a clear indication whether the lost target* warning *function for* tracked radar targets and activated *AIS targets is enabled or disabled*. If a target is beyond a user defined range, then no warning shall be generated.

5.6.4.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that when a tracked radar target or reported AIS target is lost, a warning is given and the last reported/predicted position is clearly marked by the lost target symbol in accordance with Annex A;

b) confirm by observation that the lost target symbol disappears if the signal for the target is received again or after the lost target warning has been acknowledged;

c) confirm by observation that a means or method is provided to enable/disable the lost target warning function;

d) confirm by observation that there is a clear indication of whether the lost target warning function for tracked radar targets and activated AIS targets is enabled or disabled;

e) confirm by observation that no warning is generated for a lost target that is beyond the user defined range.

2.46.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 : PASS	Lost AIS target as per Annex A. Warning given in info bar

b,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 PASS	Lost target goes to previous colour if target reappears

c,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 :	Not an IEC 61993-2 requirement

d,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 :	Not an IEC 61993-2 requirement

e,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 :	Not an IEC 61993-2 requirement

2.46.4 Evidence

Photo 5.6.4

2.47 IEC 62288 CLAUSE 5.7

2.47.1 Equipment Under Test

EUT 1 – Modification State 0

2.47.2 AIS and radar target association

5.7.1 Target association
5.7.1.1 Requirement
(MSC191/6.4.8.1) *If target* information *from AIS and radar tracking are both available and where the AIS and radar information are considered as one target, then as a default condition, the activated AIS target symbol and the alphanumeric AIS target* information shall *be automatically selected and displayed* as set forth in Annex A. *The user* shall *have the option to change the default condition to the display of tracked radar targets and* shall *be permitted to select either radar tracking or AIS alphanumeric* information. If the radar target tracking system distributes tracked radar target data that identifies associated targets including the MMSI for the associated AIS target, then other navigational systems and equipment displaying these targets may display them as a single target according to Annex A. Where these systems and equipment also receive reported targets directly from AIS, they shall filter the display of the reported AIS targets using the MMSI to avoid duplicated targets.

(MSC191/6.4.8.2) Where *the AIS and radar information are considered as two distinct targets, one activated AIS target* symbol *and one tracked radar target* symbol shall *be displayed* asset forth in Annex A. *No* alert shall *be raised.*

If display equipment provides facilities for the automatic association of reported AIS targets with tracked radar targets that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.7.1.2 Methods of test and required results
Where display equipment provides the capability to automatically associate reported AIS targets with tracked radar targets:

a) confirm by observation that a reported AIS target associated with a tracked radar target is presented in accordance with Annex A:
1) as an activated AIS target, the default condition;
2) as a tracked radar target, based upon user-selection as the default condition;

b) confirm by observation that the user can select either AIS or radar tracking information;

c) where the equipment also receives reported targets directly from an AIS, confirm by observation that it filters the display of reported AIS targets to avoid duplicated targets.

2.47.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no radar information is displayed

2.48 IEC 62288 CLAUSE 5.7.2

2.48.1 Equipment Under Test

EUT 1 – Modification State 0

2.48.2 AIS presentation status

5.7.2.1 Requirement
(MSC191/6.4.9) *The AIS presentation status* shall *be indicated as follows* in Table 3.

Table 3 – AIS status

Function	*Cases to be Presented*		*Presentation*
AIS ON/OFF	***AIS processing switched ON/ graphical presentation switched OFF***	***AIS processing switched ON/ graphical presentation switched ON***	***Alphanumeric or graphical***
***Filtering of sleeping AIS targets* (See 5.5.5.)**	Indicate whether the *filter status* for sleeping AIS targets is switched ON	Indicate whether the *filter status* for sleeping AIS targets is switched ON	Indications may be *alphanumeric or graphical*
***Activation of targets* (See 5.5.6)**		Indicate the *activation criteria* is for AIS targets, including automatic activation zones	Indications shall be *graphical*
***CPA/TCPA alarm* (See 5.6.2)**	Indicate whether the CPA/TCPA Alarm *function* is switched *ON/OFF* Indicate the *CPA/TCPA Criteria* Indicate whether *Sleeping* AIS *targets* are *included* or excluded from CPA/TCPA processing	Indicate whether the CPA/TCPA Alarm *function* is switched *ON/OFF* Indicate the *CPA/TCPA Criteria* Indicate whether *Sleeping* AIS *targets* are *included* or excluded from CPA/TCPA processing	Indications shall be *alphanumeric and graphical*
***Lost target* warning (See 5.6.4)**	Indicate whether the Lost Target Warning *function* is switched *ON/OFF* Indicate the *Lost target Filter Criteria*	Indicate whether the Lost Target Warning *function* is switched *ON/OFF* Indicate the *Lost target Filter Criteria*	Indications shall be *alphanumeric and graphical*
***Target association* (See 5.7.1)**	Indicate whether the Target Association *function* is switched *ON/OFF* Indicate the *Association Criteria* Indicate the *Default Target Priority*	Indicate whether the Target Association *function* is switched *ON/OFF* Indicate the Association Criteria Indicate the *Default Target Priority*	Indications shall be *Alphanumeric*
This table is a simplified matrix for the presentation of indications associated with AIS functions.			

5.7.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) verify the filtering of sleeping AIS targets in accordance with 5.5.6;

b) verify the activation of AIS targets in accordance with 5.5.7;

c) verify CPA/TCPA alarm functionality in accordance with 5.6.2;

d) verify lost target warning functionality in accordance with 5.6.4;

e) verify the association of AIS targets to tracked radar targets in accordance with 5.7.1.

2.48.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no filtering feature is provided

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – AIS simplified targets in use

c,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	CPA/TCPA activates as per 5.6.2

d,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	AIS warnings as per 5.6.4

e,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no radar information is displayed

2.49 IEC 62288 CLAUSE 5.7.3

2.49.1 Equipment Under Test

EUT 1 – Modification State 0

2.49.2 5.7.3 Trial manoeuvre

5.7.3.1 Requirement
(MSC191/6.4.10) *A trial manoeuvre simulation* shall *be clearly identified by the relevant symbol* set forth in Annex A, *positioned* in a conspicuous location within the operational display area, for example, nominally centred at the bottom of the presentation area or *astern of own ship* symbol. If display equipment provides facilities for trial manoeuvre that are independent of a shipborne radar target tracking system, then the facilities should comply with the relevant clauses of IEC 62388.

5.7.3.2 Methods of test and required results
Where display equipment provides a trial manoeuvre simulation:

a) confirm by observation that the manoeuvre is identified in accordance with Annex A;

b) confirm by analytical evaluation that the symbol is positioned in a conspicuous location

2.49.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no trial manoeuvre available

2.50 IEC 62288 CLAUSE 5.8

2.50.1 Equipment Under Test

EUT 1 – Modification State 0

2.50.2 Measurement

5.8.1 Measurement from own ship
5.8.1.1 Requirement
Measurements from own ship (for example, range rings, range and bearing, cursor, tracking data) shall be made with respect to the CCRP (for example, conning position). For consistency of measured ranges and bearings, the recommended reference location should be the conning position. Alternative reference locations may be used where clearly indicated or distinctively obvious.

5.8.1.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the means of taking measurements are centred on to the CCRP and not centred on any other position except where specifically selected and clearly indicated;

b) confirm by measurement, by comparing at least two alternative sensor inputs that have different position offsets from CCRP, that the range and bearing measurements are correct to the CCRP position and, if provided, alternative reference position;

c) confirm by measurement that when switching from CCRP to an alternative reference position that displayed data is changing accordingly but data transmitted via the interface remains referenced to the CCRP.

2.50.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – only one input source

2.51 IEC 62288 CLAUSE 5.8.2

2.51.1 Equipment Under Test

EUT 1 – Modification State 0

2.51.2 Bearing and range measurements

5.8.2.1 Requirement
Bearings and distances (ranges) drawn on the display or bearing and range measurements between features already drawn on the display, shall have an accuracy no less than that afforded by the scale and resolution of the display.
Range measurements shall be in nautical miles. In addition, facilities for metric measurements may be provided. All indicated values for range measurement shall be consistent and unambiguous. Where metric range measurements are required, the accuracy shall not be inferior to other range measurements.

5.8.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by analytical evaluation that bearings and distances are measured to an accuracy consistent with the scale and resolution of the display;

b) confirm by observation that distances can be measured in nautical miles;

c) confirm by observation that the units used for range measurements and range scales are consistent within the system;

d) confirm by observation that an indication of the units used for measurement is provided.

2.51.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no radar information is displayed

2.52 IEC 62288 CLAUSE 5.9

2.52.1 Equipment Under Test

EUT 1– Modification State 0

2.52.2 Navigation tools

5.9.1 General requirements
This subclause addresses user tools that are common to navigational systems and equipment. Requirements for the provision of these tools are addressed in the relevant individual performance standards. When provided, these tools shall be presented with their relevant symbol(s) as set forth in Annex A.

5.9.2 Range rings
5.9.2.1 Requirement
(MSC191/7.1.4) If *range rings are displayed,* then *the range ring scale* shall *be indicated.*
Range rings shall be spaced to logically separate the range scale into equal divisions.
Typically from two to six range rings would be provided for nautical mile range scale units, and up to five rings for metric range scale units. The system accuracy of range rings shall be within 1 % of the maximum range of the range scale in use or 30 m, whichever is the greater distance. Range rings shall always be centred at the CCRP.
A means or method shall be provided to enable and disable the set of range rings. (See also 6.1.4.)

5.9.2.2 Methods of test and required results
Where range rings are provided:

a) confirm by observation that range rings are presented in accordance with Annex A;

b) confirm by observation that the range ring separation (scale) is indicated;

c) confirm by analytical evaluation that the range ring spacing logically separates each range scale into equal divisions;

d) confirm by measurement that the accuracy of the range rings is within ±1 % of the range scale in use or 30 m, whichever is greater;

e) confirm by observation that the range rings are always centred at the CCRP;

f) confirm by observation that a means or method is provided to enable and disable the set of range rings.

2.52.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Two range rings only

b,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Range ring separation marked on screen

c,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Range rings logically separate

d,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no screen range scale

e,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Centred on Ships antenna

f,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1 PASS	Rings can be enabled / disabled

2.52.4 Evidence

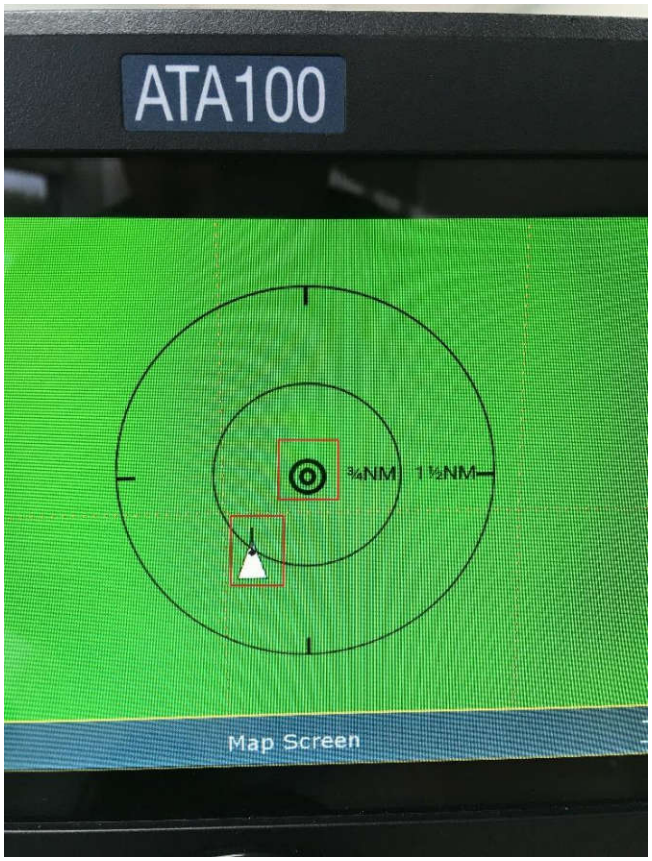


Photo 5.9

2.53 IEC 62288 CLAUSE 5.9.3

2.53.1 Equipment Under Test

EUT 1 – Modification State 0

2.53.2 Variable range marker (VRM)

5.9.3.1 Requirement

Variable range marker(s) (VRMs) may be provided to measure the range of any point object within the operational display area. Each active VRM shall have a numerical readout and the readout shall have a resolution compatible with the range scale in use. Each active VRM shall be capable of adjustment to resolution of 0,01 NM, or to appropriate metric equivalent. A coarser resolution may be provided for higher range scales. The readout shall be available in the user dialogue area or, additionally, adjacent to the cursor when the cursor is over the VRM. The VRM shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance. It shall be possible to use each VRM to measure the range to any point within the operational area and with the specified accuracy within 5 s.

A means or method to switch each VRM on and off shall be provided. The VRM range set by the user shall be retained when there is a change in range scale. If means are provided to move VRM origin from the CCRP to other points within the operational display area, geographically fixed or moving with the velocity of own ship, then a means shall be provided to reset the VRM origin to the CCRP position by a simple operator action.

5.9.3.2 Methods of test and required results

Where a VRM is provided:

a) confirm by observation that each VRM is presented in accordance with Annex A;

b) confirm by observation that a dedicated readout is available for each active VRM;

c) confirm that the VRMs are capable of adjustment to 0,01 NM (or appropriate metric equivalent). A coarser adjustment may be provided for ranges greater than 24 NM or appropriate metric equivalent;

d) confirm by measurement that the accuracy of the VRMs meet the requirement using a calibrated target or marker;

e) confirm by measurement that when metric measurements are provided, the readout and accuracy is equivalent to those relevant to nautical miles;

f) confirm by measurement that the range to any object within the operational display area can be measured within 5 s with the required accuracy;

g) confirm by observation that a means or method to switch each VRM on and off is provided;

h) confirm by observation that the range of the VRM is maintained from range scale to range scale;

i) confirm by observation that if means are provided to move VRM origin from the CCRP to other points means are provided to reset the VRM origin to the CCRP position by a simple operator action.

2.53.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no VRM implemented

2.54 IEC 62288 CLAUSE 5.9.4

2.54.1 Equipment Under Test

EUT 1 – Modification State 0

2.54.2 Bearing scale

5.9.4.1 Requirement

A bearing scale may be provided. The bearing scale shall indicate the bearing from the CCRP. For radar display equipment, including radar with charted information, the bearing scale shall be outside of the operational display area (i.e. around its periphery and outside of which no radar video shall be displayed). For other display equipment the bearing scale may be inside the operational display area. It shall be numbered at least every 30° division and shall have division marks of at least 5°. The 5° and 10° division marks shall be clearly distinguishable from each other. 1° division marks may be presented where they are clearly distinguishable from each other and from the 5° and 10° division marks. If the display is off-centred or the position of own ship is outside of the operational display area, then the bearing scale shall be suppressed or its marks shall be adjusted to represent the bearing from CCRP. For display equipment not presenting radar, a means or method shall be provided to enable and disable the bearing scale.

5.9.4.2 Methods of test and required results

Where a bearing scale is provided:

a) confirm by analytical evaluation that the bearing scale indicates bearings as measured from the CCRP;

b) for radar display equipment, confirm by observation that the bearing scale is around the periphery of the operational display area;

c) confirm by observation that the bearing scale remains centred at the CCRP (for example, in a true motion display mode);

d) confirm by observation that the bearing scale is numbered at least every 30° and has division marks at least every 5°;

e) confirm by observation that the 5° division marks are clearly distinguishable from the 10° division marks;

f) where 1° division marks are provided, confirm by observation that they are clearly distinguishable from each other and from the 5° and 10° division marks;

g) for display equipment not presenting radar, confirm by observation that a means or method is provided to enable and disable the bearing scale

2.54.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no bearing scale implemented

2.55 IEC 62288 CLAUSE 5.9.5

2.55.1 Equipment Under Test

EUT 1 – Modification State 0

2.55.2 Electronic bearing line (EBL)

5.9.5.1 Requirement

Electronic bearing line(s) (EBLs) may be provided to measure the bearing of any point object within the operational display area, with a maximum system error of 1° at the periphery of the display. The EBL(s) shall be capable of measurement from the CCRP relative to the ships heading and relative to true north. There shall be a clear indication of the bearing reference (i.e. true or relative).

It shall be possible to move the EBL origin from the CCRP to any point within the operational display area and to reset the EBL to the CCRP by a simple operator action. It shall be possible to fix the EBL origin or to move the EBL origin at the velocity of own ship. A means or method shall be provided to ensure that the user is able to position the EBL smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements. It shall be possible to use the EBL to measure the bearing to any point object in the operational display area within 5 s. Each active EBL shall have a numerical readout with a resolution of 0,1° adequate to maintain the system measurement accuracy requirements based on a measurement uncertainty of ± 0,5°.

A means or method shall be provided to enable and disable each EBL.

The bearing of the EBL (i.e. set by the user) shall be retained while the EBL is enabled (for example, after a change in range scale or after a change in display orientation).

5.9.5.2 Methods of test and required results

Where an EBL is provided:

a) confirm by observation that each EBL is presented in accordance with Annex A;

b) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of 1°;

c) confirm by analytical evaluation that bearings can be measured relative to the ships heading and relative to true north, and that a clear indication of the bearing reference is provided;

d) confirm by observation that a means or method is provided to move the origin of an EBL from the CCRP to any point within the operational display area;

e) confirm by observation that it is possible to return the origin of the EBL to the CCRP by a simple user action;

f) confirm by observation that a means or method is provided to fix the origin of the EBL in a geographic location;

g) confirm by observation that a means or method is provided to move the origin of the EBL at the velocity of own ship;

h) confirm by observation that the EBL can be rotated smoothly in either direction;

i) confirm by observation that the incremental adjustment is at least 0,1°;

j) confirm by measurement that the EBL can be used to measure the bearing to any point object in the operational display area within ±0,5° in less than 5 s;

k) confirm by observation that a numerical readout with a resolution of 0,1° is available for each active EBL;

l) confirm by observation that a means or method is provided to enable and disable each EBL;

m) confirm by observation that an enabled EBL remains over the same point object during a change of range scale and a change of orientation mode.

2.55.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no EBL implemented

2.56 IEC 62288 CLAUSE 5.9.6

2.56.1 Equipment Under Test

EUT 1 – Modification State 0

2.56.2 5.9.6 Parallel index lines (PI)

5.9.6.1 Requirement

Parallel index (PI) lines may be provided. If parallel index lines are provided:

• independent parallel index lines with a means or method to truncate and switch off individual lines shall be provided;

• a simple and quick means or method of setting the bearing and beam range of a parallel index line shall be provided.

The bearing and beam range of any selected parallel index line shall be available on demand. It shall be possible to set the bearing and beam range of a parallel index line within 5 s. PI line range settings shall remain constant when the operator changes the range scale of the display and PI line bearing settings shall remain constant when own ship heading changes. In addition to on/off selection of individual PI lines, means shall be provided to turn on/off all PI lines as a group.

5.9.6.2 Methods of test and required results

Where parallel index lines are provided:

a) confirm by observation that parallel index lines are presented in accordance with Annex A;

b) confirm by observation that a means or method is provided to truncate the length of each PI line;

c) confirm by observation that PI lines are selectable for display on/off individually and as a group including all PI lines;

d) confirm by measurement that a means or method is provided to set the bearing or range of a parallel index line within 5 s;

e) confirm by observation that means are provided to display the bearing and range for any parallel index line on demand;

f) confirm by observation that the distance of a PI line from the own ship and the true bearing of PI line does not change when a different range scale is selected, when own ship heading changes, and during True motion operation.

2.56.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no PI implemented

2.57 IEC 62288 CLAUSE 5.9.7

2.57.1 Equipment Under Test

EUT 1– Modification State 0

2.57.2 5.9.7 Offset measurement of range and bearing

5.9.7.1 Requirement

There may be a means or method to measure the range and bearing of one position on the display relative to any other position within the operational display area. This may be accomplished, for example, using an electronic range and bearing line (ERBL), a combination of a VRM and an EBL, or the cursor.

If a separate tool is provided to measure the combination of range and bearing (for example, an ERBL):

• it shall have a numerical range and bearing readout. The resolution of the range readout shall be compatible with the range scale in use. The resolution of the bearing readout shall be 0,1° adequate to maintain the system measurement accuracy requirements;

• it shall enable the user to measure the range of an object within the operational display area with a maximum system error of 1 % of the range scale in use or 30 m, whichever is the greater distance, and the bearing of any point object with a maximum system error of 1° based on a measurement uncertainty of ±0,5° at the periphery of the display;

• the user setting shall be retained while the tool is enabled (for example, after a change in range scale or after a change in display orientation);

• it shall enable the user to position its bearing component smoothly in either direction, with an incremental adjustment adequate to maintain the system measurement accuracy requirements.

It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.9.7.2 Methods of test and required results

Where a means or method is provided to measure the range and bearing from one position to another in the operational display area:

a) confirm by observation that numerical readouts are available to display the range and bearing;

b) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;

c) confirm by observation that the resolution of the bearing readout is 0,1°;

d) confirm by measurement that the range from one position within the operational display area to any other position can be measured to within an accuracy of ±1 % of the range scale in use or 30 m, whichever is greater;

e) confirm by measurement that the bearing from one position within the operational display area to any position can be measured to within an accuracy of 0,5° at the periphery of the display;

f) confirm by observation that the bearing component can be rotated smoothly in either direction;

g) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s;

h) where a separate tool is provided to measure the combination of range and bearing, confirm by observation that a means or method is provided to enable and disable that tool;

i) confirm by observation that the user settings are retained after the change of the range scale and a change of orientation mode while the tool is enabled.

2.57.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – feature not implemented

2.58 IEC 62288 CLAUSE 5.9.8

2.58.1 Equipment Under Test

EUT 1– Modification State 0

2.58.2 User cursor

5.9.8.1 Requirement

A user cursor may be provided to enable a fast and concise means or method to designate any position on the operational display area. If a user cursor is provided:

• the cursor position shall have a continuous numerical readout to provide the range and bearing, measured from the CCRP, and the latitude and longitude of the cursor position presented either alternatively or simultaneously;

• a means or method shall be provided to easily locate the cursor position in the operational display area;

• the accuracy of the range and bearing measurements provided by the cursor shall meet the relevant requirements for VRM and EBL. It shall be possible to measure the range and bearing to any object in the operational display area within 5 s.

5.9.8.2 Methods of test and required results

Where a user cursor is provided:

a) confirm by observation that the cursor is presented in accordance with Annex A;

b) confirm by observation that a numerical readout is available and that it continuously displays, either alternatively or simultaneously, the range and bearing of the cursor's position measured from own ship's CCRP, and the latitude and longitude of the cursor's position;

c) confirm by observation that a means or method is provided to locate the cursor in the operational display area;

d) confirm by analytical evaluation that the resolution of the range readout is compatible with each range scale;

e) confirm by observation that the resolution of the bearing readout is 0,1°;

f) confirm by analytical evaluation that the resolution of the latitude and longitude readout is compatible with each display scale;

g) confirm by measurement that the range to an object within the operational display area can be measured to within an accuracy of ± 1 % of the range scale in use or 30 m, whichever is greater;

h) confirm by measurement that the bearing to any point object within the operational display area can be measured to within an accuracy of 0,5° at the periphery of the display;

i) confirm by observation that the cursor can be moved smoothly to create rotation in either direction;

j) confirm by measurement that the range and bearing to any object within the operational display area can be measured within 5 s.

2.58.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no user cursor implemented

2.59 IEC 62288 CLAUSE 6.

2.59.1 Equipment Under Test

EUT 1 – Modification State 0

2.59.2 2.59.2 Radar and chart displays

6.1 General

6.1.1 Application

NOTE See IEC 62388 for equivalent tests for this clause for radar equipment.

The provisions of this clause are applicable to stand-alone displays, associated with radar systems or responsible for the presentation of electronic chart information (for example, ECDIS) and multifunction display equipment when providing a radar or chart display.

6.1.2 Multifunction displays

6.1.2.1 Requirement

(MSC191/7.1.1) *If the display equipment is capable of supporting the presentation of multiple functions* or operational modes, *then there* shall *be a clear indication of the primary function supported by the presentation (*for example, *radar,* chart, etc*.). It* shall *be possible to select* the presentation associated with the primary function, for example, *the radar presentation* (see 6.2) *or the* chart *presentation* (for example, ECDIS) (see 6.3)*, by a simple* operator *action.*

Note that if multifunction display equipment provides the primary presentation for multiple navigational systems and equipment required or allowed for carriage (for example, radar or ECDIS), then redundant display equipment should be available. The number of displays fitted on the bridge of a ship should support the simultaneous presentation of information for all navigational systems and equipment.

6.1.2.2 Methods of test and required results

Where display equipment is capable of supporting the presentation of multiple functions:

a) confirm by observation that the primary function of the display equipment is clearly indicated;

b) confirm by observation that the presentation associated with the primary function can be selected by a simple operator action.

2.59.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – not a multifunctional device

2.60 IEC 62288 CLAUSE 6.1.3

2.60.1 Equipment Under Test

EUT 1 – Modification State 0

2.60.2 Simultaneous display of radar and chart data

6.1.3.1 Requirement
(MSC191/7.1.2) *If a radar* video *image and electronic chart* information *are displayed together, the chart and the radar* video *image* shall *use* the same reference system and coordinate criteria, including, as applicable, datum, CCRP, and stabilisation mode, *and* shall *match in scale, projection and orientation. Any* user-entered *offset*, in addition to installation alignment (for example, to CCRP and/or heading reference), shall *be indicated.* The details of the offset shall be readily available to the user.
NOTE The Performance Standards for individual navigational systems and equipment provide functional requirements for offsets.

6.1.3.2 Methods of test and required results
Where a radar video image and electronic chart information are displayed together:

a) confirm by observation that they use the same reference system and co-ordinate criteria;

b) confirm by observation that they use the same stabilisation mode;

c) confirm by observation that they match in scale, projection and orientation;

d) confirm by observation that an indication is provided for any user-entered offset to the presentation of either the radar video image or the electronic chart information;

e) confirm by observation that the details of the user-entered offset are readily available

2.60.3 Result

a,-e

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – not a multifunctional device

2.61 IEC 62288 CLAUSE 6.1.4

2.61.1 Equipment Under Test

EUT 1 – Modification State 0

2.61.2 Range scales

6.1.4.1 Requirement

(MSC191/7.1.3) If a radar video image is displayed, *range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 nautical miles* shall *be provided. Additional range scales are permitted* below 0,25 NM and/or above 24 NM. *The* selected *range scale* shall *be* clearly and *permanently* or persistently *indicated*, as appropriate for the application.
Metric units may also be provided. (See also 5.8.2.)

6.1.4.2 Methods of test and required results

Where a radar video image is displayed:

a) confirm by observation that range scales of 0,25, 0,5, 0,75, 1,5, 3, 6, 12 and 24 NM are provided for user selection;

b) where additional range scales are provided, confirm by observation that they are below 0,25 NM and/or above 24 NM;

c) confirm by observation that the selected range scale is clearly indicated and remains visible while the radar video image is displayed.

2.61.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar range scales implemente

2.62 IEC 62288 CLAUSE 6.1.5

2.62.1 Equipment Under Test

EUT 1 – Modification State 0

2.62.2 Operational display area

6.1.5.1 Requirement
(MSC191/7.1.5) *No part of the operational display area* shall *be permanently used for the presentation of information that is not part of the navigational presentation* (for example, *pop up displays, drop down menus and information windows*). *Temporary, limited and relevant alphanumeric data*, information and text *may be displayed adjacent to a selected symbol, graphic or target within the operational display area.*

Any windows containing text, diagrams, etc. superimposed on the operational display area shall be temporary and movable (for example, to a less important part of the display, such as on land).

Note that display equipment should avoid the use of dialogue boxes using white backgrounds, or provide a means or method of automatically changing the background of dialogue boxes which appear on displays set for use in dusk or dark conditions.

6.1.5.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that any information that is not part of the navigational presentation but is superimposed on the operational display area is presented only in response to an explicit user action (for example, a menu selection, hyperlink, hot key, etc.);

b) confirm by observation that any windows containing text, diagrams, etc. superimposed on the operational display area are movable within the operational display area or can be removed from the operational display area.

2.62.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS:	No overlays of information

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no additional overlay windows available

2.63 IEC 62288 CLAUSE 6.1.6

2.63.1 Equipment Under Test

EUT 1 – Modification State 0

2.63.2 Motion display modes

6.1.6.1 Requirement
A clear indication of the motion mode in use shall be provided. (See also 4.10.1.)

6.1.6.2 Methods of test and required results
Verify that a clear indication of the display mode in use is provided in accordance with 4.10.1.

2.63.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :PASS	NUP,CUP,HUP displayed.

2.64 IEC 62288 CLAUSE 6.1.7

2.64.1 Equipment Under Test

EUT 1 – Modification State 0

2.64.2 Orientation modes

6.1.7.1 Requirement
A north up orientation mode shall be provided for radar and chart presentations.
A course up orientation mode shall be provided for radar presentations and may be provided for chart presentations. A head up orientation mode may be provided for both radar and chart presentations. A clear indication of the orientation mode in use shall be provided. (See also 4.10.1)
It shall always be possible to display the SENC information in a “north-up” orientation. Other orientations are permitted. When such orientations are displayed, the orientation shall be altered in steps large enough to avoid unstable display of the chart information.

6.1.7.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that a north up orientation mode is provided;

b) for radar displays, confirm by observation that a course up orientation mode is provided;

c) verify that a clear indication of the orientation mode in use is provided in accordance with 4.10.1;

d) for each bearing stabilised orientation that may be provided, confirm by analytical evaluation that for rates of turn between 0°/s and 20°/s the displayed chart symbols and text in the operational display area do not re-orient more often than twice per second and remain legible.

2.64.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :PASS	NUP Provided

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

c,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :PASS	Permanent screen display

d,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :PASS	Rates of turn smooth and without degradation due to rate of turn.

2.65 IEC 62288 CLAUSE 6.1.8

2.65.1 Equipment Under Test

EUT 1 – Modification State 0

2.65.2 Off-centring

6.1.8.1 Requirement

If a radar video image is displayed, manual off-centring shall be provided to locate the selected antenna position (i.e. the centre of the radar video image) at any point within at least 50 % and not more than 75 % of the radius, measured from the centre of the operational display area. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example this limitation is not valid for radar overlay in an ECDIS). If a radar video image is displayed, and an off-centred display is selected, the selected antenna position shall be capable of being located to any point on the display up to at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area. A facility for automatically positioning own ship for the maximum view ahead may be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example this limitation is not valid for radar overlay in an ECDIS). If a radar video image is displayed, and an off-centred display and true motion display mode are selected, the selected antenna position shall automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area to a location giving the maximum view along own ship's course. Provision for an early reset of the selected antenna position shall be provided. This limitation is only applicable for Radar or Radar-mode available in the equipment (for example this limitation is not valid for radar overlay in an ECDIS).

6.1.8.2 Methods of test and required results

Where a radar video image is displayed in a Radar or Radar-mode (not, for example, as a radar overlay on ECDIS):

a) confirm by observation that manual off-centring is provided;

b) confirm by observation that manual off-centring provides the capability to locate the selected radar antenna position at any point in the operational display area at least 50 % and not more than 75 % of the radius measured from the centre;

c) where true motion display mode is selected
1) confirm by observation that the selected radar antenna position is automatically reset at least 50 %, and not more than 75 %, of the radius from the centre of the operational display area,
2) confirm by observation that the user may manually reset the selected radar antenna position.

2.65.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

2.66 IEC 62288 CLAUSE 6.1.9

2.66.1 Equipment Under Test

EUT 1– Modification State 0

2.66.2 Stabilisation modes

6.1.9.1 Requirement

If electronic chart information is displayed, then a ground stabilisation mode shall be provided. Where radar information is displayed, both ground and sea stabilisation modes shall be provided. The stabilisation mode and stabilisation source (i.e. velocity or speed source) shall be clearly indicated. (See also 4.10.1.)

NOTE Ground stabilisation requires a ground-referenced velocity (i.e. COG/SOG) from an external sensor capable of providing own ship speed measured over the ground (for example, an EPFS). Sea stabilisation requires a water-referenced velocity (i.e. CTW/STW or HDG/SPD) from an external sensor capable of providing own ship speed measured through the water (for example, an SDME).

6.1.9.2 Methods of test and required results

The methods of test and the required results are as follows:

a) where electronic chart information is displayed, confirm by observation that a ground stabilisation mode is provided;

b) where a radar information is displayed, confirm by observation that both ground and sea stabilisation modes are provided;

c) confirm by observation that a clear indication of the stabilisation mode selected and its source are provided.

2.66.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – ground stabilisation mode only

2.67 IEC 62288 CLAUSE 6.2

2.67.1 Equipment Under Test

EUT 1 – Modification State 0

2.67.2 Radar displays

6.2.1 Application

The provisions of this subclause are applicable to stand-alone displays associated with radar systems and multifunction displays when providing a radar display.

NOTE The functional requirements for radar are defined in the performance standards set forth in IMO Resolution MSC.192(79) and further specified in IEC 62388. The presentation requirements for radar information are defined in the performance standards for presentation set forth in IMO Resolution MSC.191(79) and further specified in this standard.

6.2.2 Radar video image

6.2.2.1 Requirement

(MSC191/7.2.1.1) The *radar video* image (i.e. echoes)*, tracked radar targets and* reported *AIS targets* shall *not be substantially degraded, masked or obscured by other presented information.* (See also 5.4.1.)

(MSC191/7.2.1.2) *It* shall *be possible to temporarily suppress all graphical information from the display, retaining only* the *radar video* image *and* target *trails.*

6.2.2.2 Methods of test and required results

The methods of test and the required results are as follows:

a) confirm by analytical evaluation that the presentation of the radar video image, tracked radar targets and reported AIS targets is not degraded, masked or obscured by other presented information;

b) confirm by observation that the user can suppress the presentation of all graphical information so that only the radar video image and target trails remain.

2.67.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

2.68 IEC 62288 CLAUSE 6.2.3

2.68.1 Equipment Under Test

EUT 1– Modification State 0

2.68.2 Brightness of radar information

6.2.3.1 Requirement
(MSC191/7.2.1.3) *The brightness of* the *radar* video image (*i.e. echoes*) *and associated graphic symbols for tracked radar targets* shall *be variable. It* shall *be possible to control the brightness of all displayed* radar *information. There* shall *be independent means to adjust the brightness of groups of displayed graphics and alphanumeric data*, information and text (for example, tracked radar targets, navigation tools, etc.)*. The brilliance* (i.e. brightness) *of the heading line* shall *not be variable to extinction.*

6.2.3.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that a means or method to adjust the brightness of the radar video image is provided;

b) confirm by observation that a separate independent means or method to adjust the brightness of tracked radar target symbols is provided;

c) confirm by observation that a separate independent means or method to adjust the brightness of groups of other displayed graphics and alphanumeric data, information and text is also provided;

d) confirm by observation that the brightness of the heading line cannot be adjusted to the point of extinction.

2.68.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

2.69 IEC 62288 CLAUSE 6.2.4

2.69.1 Equipment Under Test

EUT 1 – Modification State 0

2.69.2 Display of chart information on radar

6.2.4.1 Requirement
(MSC191/7.2.2.1) *Vector* format electronic *chart information may be* presented *on a radar* display*. This* shall *be accomplished using layers* (i.e. of charted objects or elements) *selected from* an electronic *chart database. As a minimum, the elements of the ECDIS Standard Display* (see IEC 61174) shall *be available for individual selection by* IMO display *category or layer* (for example, by IHO suggested viewing group)*, but not as individual objects. As far as practical,* electronic *chart information* shall *be presented in accordance* with this standard (see 4.5.1, 4.6.2 and 5.5.1) and *with the ECDIS*
Performance Standards (IEC 61174). Raster navigational charts are not permitted for chart radar applications. NOTE IEC 62388 requires a subset of the ECDIS standard display, called the primary chart information set, to be made available by a primary control function.

(MSC191/7.2.2.3) If electronic *chart information is displayed* on a radar presentation*,* then *there* shall *be a permanent* or persistent *indication of its status* (for example, on/off, official/unofficial data, overscale/underscale, etc.), as appropriate for the application. *The source and update information* shall *also be available* to the user on demand. Note that the overscale area pattern addressed in IHO S-52 and provided in the IHO ECDIS Presentation Library may obscure or degrade the presentation of the radar video image. An alternative means or method of overscale indication (for example, the display of an overscale factor) is an acceptable alternative.

If electronic chart information is presented on a radar display, it shall be possible to temporarily remove it by a single operator action and also to switch charts on and off.

6.2.4.2 Methods of test and required results
When vector format electronic chart information is presented on a radar display:

a) confirm by observation that the content of the electronic chart database includes all of the elements specified by the IMO for the ECDIS standard display (see IEC 61174);

b) confirm by observation that elements of the standard display are available for selection (i.e. for display) by IMO display category and/or by layer, but not as individual chart objects;

c) verify the presentation of vector format electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;

d) confirm by observation that raster format electronic chart information cannot be presented when the radar is displayed;

e) where electronic chart information is presented in shades of grey, confirm that they are distinguishable between respective chart features;

f) confirm by observation that a permanent indication of the status (official/unofficial data and overscale/underscale) of the electronic chart information is provided;

g) confirm by observation that the source of the electronic chart information and its update information are available to the user on demand;

h) confirm by observation that the user may temporarily remove electronic chart information from the display by a single operator action and that there is a facility to switch charts on and off. The temporarily removed function may be combined with other functions;

i) confirm by document inspection that the user manual describes all available chart functionalities;

j) confirm by document inspection that the EUT has no functionality to use raster navigational charts;

k) verify the testing of colours and intensity in accordance with the test methods and required results of the Annex G.

2.69.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

2.70 IEC 62288 CLAUSE 6.2.5

2.70.1 Equipment Under Test

EUT 1 – Modification State 0

2.70.2 Priority of radar information

6.2.5.1 Requirement
(MSC191/7.2.2.2) *If* electronic *chart information is* presented *within the operational display area, the* presentation *of radar information* (for example, the radar video image, target trails, etc.) shall *have priority. The* electronic *chart information* shall *be clearly perceptible as such. The* electronic *chart information* shall *not substantially degrade, mask or obscure the radar video* image, *tracked radar targets* or reported *AIS targets.*

6.2.5.2 Methods of test and required results
When electronic chart information is presented on a radar display:

a) confirm by observation that the radar video image and target trails have display priority over the electronic chart information;

b) confirm by analytical evaluation that the presentation of electronic chart information cannot be confused with the display of any other information (for example radar information or AIS information);

c) confirm by analytical evaluation that the presentation of the electronic chart information does not substantially degrade, mask or obscure the presentation of radar information in accordance with 6.2.3.

2.70.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no radar information is displayed

2.71 IEC 62288 CLAUSE 6.2.6

2.71.1 Equipment Under Test

EUT 1 – Modification State 0

2.71.2 Display of map graphics

6.2.6.1 Requirement
(MSC191/7.2.3) User generated radar *map graphics* including monitored and/or additional planned routes *may be* presented on a radar display*, but* shall *not substantially degrade, mask or obscure the radar video* image, target trails, *tracked radar targets*, reported *AIS targets*, or electronic chart information.

Note that where a radar system provides map graphics for monitored and/or planned routes, it should comply with the relevant clauses of IEC 61174.

Map graphics may be referenced to own ship or to a geographical position. It shall be possible to remove the display of map graphics by a simple operator action.

Map graphics may consist of lines, symbols and reference points. The appearance and colours of map graphic lines and symbols are set forth in Annex A.

6.2.6.2 Methods of test and required results
When user generated map graphics are displayed on a radar presentation:

a) confirm by analytical evaluation that map graphics do not substantially degrade, mask or obscure the radar video image, target trails, tracked radar targets, reported AIS targets or electronic chart information;

b) confirm by observation that map graphics can be referenced to own ship or to a geographic position;

c) confirm by observation that the user may remove the display of map graphics by a simple operator action;

d) confirm by observation that the appearance and colour of the map graphics lines, symbols and reference points are in accordance with Annex A.

2.71.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – user generated maps not supported

2.72 IEC 62288 CLAUSE 6.3

2.72.1 Equipment Under Test

EUT 1 – Modification State 0

2.72.2 Chart displays

6.3.1 Application

The provisions of this subclause are applicable to stand-alone displays responsible for the presentation of electronic chart information and multifunction displays when providing a chart display.

NOTE The functional requirements for ECDIS are defined in the performance standards set forth in IMO Resolution MSC.232(82) and further specified in IEC 61174. The presentation requirements for electronic chart information are defined in the performance standards for presentation, set forth in IMO Resolution MSC.191(79) and further specified in this standard.

6.3.2 Display of chart information

6.3.2.1 Requirement

(MSC191/7.3.1.1) Electronic chart information *and all updates to it* shall *be* presented *without any degradation of information content.*

(MSC191/7.3.1.2) Electronic *chart information* shall *not be substantially degraded, masked or obscured by other presented information* (for example, a radar video image, tracked and/or reported targets, etc.).

6.3.2.2 Methods of test and required results

The methods of test and the required results are as follows:

a) verify the presentation of electronic chart information in accordance with 4.5.1, 4.6.2 and 5.5.1;

b) confirm by analytical evaluation that the electronic chart information is not substantially degraded, masked or obscured by other presented information.

2.72.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – no chart displays implemented

2.73 IEC 62288 CLAUSE 6.3.3

2.73.1 Equipment Under Test

EUT 1 – Modification State 0

2.73.2 IMO ECDIS display categories

6.3.3.1 Requirement
(MSC191/7.3.1.3) *It* shall *be possible to temporarily suppress all supplemental (e.g.* radar, AIS and other overlays) *information from the* chart *display, retaining only chart related information contained in the* ECDIS *Display Base*. This function is not required to be of single or simple operator action.

It shall be possible to remove radar information, AIS information and other navigational information including all non-charted information from the chart display by a single operator action. Chart display consists of chart itself and all automatic and manual updates for it. This removal may be permanent or momentary. ENC and other vector format electronic chart information available for presentation on a chart display during route planning and route monitoring shall be subdivided into the following three IMO display categories:

• ECDIS Display Base;

• ECDIS Standard Display; and

• All Other Information.

It shall be possible to present the ECDIS Standard Display at any time by a single operator action. This single operator action shall not change any non-chart related user settings for the display. When a chart display is switched on following a switch off or power failure, it shall return to the most recent settings for the display.

6.3.3.2 Methods of test and required results
The methods of test and the required results are as follows:
a) confirm by observation that the user can suppress the presentation of all graphical information so that only the electronic chart information in the ECDIS display base remains;

b) confirm by observation that by a single operator action the user can permanently or momentarily remove the presentation of all additional information so that only the chart display including automatic and manual updates remains;

c) verify the subdivision of vector format electronic chart information into IMO display categories in accordance with IEC 61174;

d) verify that the user can select the ECDIS standard display at any time by a single operator action. Confirm by observation that this single operator action does not change any other display setting than the displayed layers of the electronic charts;

e) confirm by observation that when the chart display is switched on, the electronic chart information is presented with the most recent display settings.

2.73.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.74 IEC 62288 CLAUSE 6.3.4

2.74.1 Equipment Under Test

EUT 1 – Modification State 0

2.74.2 Adding or removing information from the display

6.3.4.1 Requirement
(MSC191/7.3.1.4) *It* shall *be possible to add or remove information from the* chart *display* by layer (IHO viewing group), but not as individual objects. *It* shall *not be possible to remove information contained in the* ECDIS *Display Base* (see IEC 61174) *from the display*. (See also 6.3.2.)

6.3.4.2 Methods of test and required results
The methods of test and the required results are as follows:
a) confirm by observation that the user can add and remove information from the presentation by layer but not as individual objects;
b) confirm by observation that the user cannot remove information contained in the ECDIS display base;
c) confirm by observation that IHO viewing groups can be individually selected for display

2.74.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.75 IEC 62288 CLAUSE 6.3.5

2.75.1 Equipment Under Test

EUT 1 – Modification State 0

2.75.2 Safety contour

6.3.5.1 Requirement
(MSC191/7.3.1.5) *It* shall *be possible to select a safety contour from the depth contours provided by* vector format electronic chart information. *The safety contour* shall *be emphasized over other contours on the display* in accordance with IHO S-52.

6.3.5.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the user can select a safety contour from the depth contours provided in vector format electronic chart information;

b) confirm by observation that the presentation of the safety contour is emphasised over other depth contours.

2.75.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.76 IEC 62288 CLAUSE 6.3.6

2.76.1 Equipment Under Test

EUT 1 – Modification State 0

2.76.2 Safety depth

6.3.6.1 Requirement
(MSC191/7.3.1.6) *It* shall *be possible to* specify *a safety depth. Soundings equal to or less than the safety depth* shall *be emphasized whenever spot soundings are selected for display.*

6.3.6.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that the user can specify a safety depth;

b) confirm by observation that the presentation of spot soundings less than or equal to the safety depth are emphasized over other spot soundings.

2.76.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.77 IEC 62288 CLAUSE 6.3.7

2.77.1 Equipment Under Test

EUT 1 – Modification State 0

2.77.2 Chart scale

6.3.7.1 Requirement
(MSC191/7.3.1.7) *An indication* shall *be provided if* chart *information is displayed at a larger scale than contained in the* electronic chart database*, or if own ship's position is covered by* electronic chart information *at a larger scale than the* presentation*.*
(MSC191/7.3.1.8) *Overscaled areas* presented *on the* chart *display* shall *be identified* as defined in the IHO ECDIS Presentation Library in IHO S-52 and its Appendices.

6.3.7.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that an indication is provided when chart information is presented at a larger scale than in the electronic chart database;

b) confirm by observation that an indication is provided when own ship's position is covered by electronic chart information at a larger scale than the presentation;

c) confirm by observation that overscaled areas presented on the display are identified.

2.77.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.78 IEC 62288 CLAUSE 6.3.8

2.78.1 Equipment Under Test

EUT 1 – Modification State 0

2.78.2 Display of radar and target information

6.3.8.1 Requirement
(MSC191/7.3.2.1) A *radar* video image, tracked radar *and* reported AIS *target information may be* presented *on* a chart display *but* shall *not substantially degrade, mask or obscure the* presentation of electronic *chart information*. *As far as practical,* the *radar* video image *and target information* shall *be presented in accordance with the radar Performance Standards* (see IEC 62388) *and with* the *presentation standards* set forth in this standard. (MSC191/7.3.2.2) A *radar* video image, tracked radar *and* reported AIS *target information* shall *be clearly distinguishable from the* electronic *chart information*. *It* shall *be possible to remove* radar and target *information by a simple* operator *action*.

6.3.8.2 Methods of test and required results
The methods of test and the required results are as follows:

a) verify that the radar video image is presented in accordance with 5.4.1 and 5.4.2, as applicable;

b) verify that targets are presented in accordance with 5.5.8;

c) verify that radar and target information are clearly distinguishable from chart information in accordance with 6.3.2;

d) confirm by observation that radar and target information can be removed from the presentation by a simple operator action.

2.78.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no radar information is displayed

2.79 IEC 62288 CLAUSE 6.3.9

2.79.1 Equipment Under Test

EUT 1 – Modification State 0

2.79.2 Display of additional information

6.3.9.1 Requirement
(MSC191/7.3.3.1) *Information from additional sources may be displayed on ECDIS but* shall *not substantially degrade, mask or obscure the chart information.*

(MSC191/7.3.3.2) *Additional information* (including information for route planning, route monitoring, information overlays and supplementary navigation tasks) shall *be clearly distinguishable from the* electronic *chart information. It* shall *be possible to remove* additional *information by a simple operator action*.

6.3.9.2 Methods of test and required results
The methods of test and the required results are as follows:

a) verify the presentation of additional information in accordance with 4.6.2;

b) verify that the presentation of electronic chart information is not degraded, masked or obscured by the presentation of additional information in accordance with 6.3.2;

c) verify that additional navigation-related information is clearly distinguishable from chart information in accordance with 6.3.3;

d) confirm by observation that additional navigation-related information can be removed from the presentation by a simple operator action.

2.79.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	N/A – no ECDIS display support

2.80 IEC 62288 CLAUSE 6.4

2.80.1 Equipment Under Test

EUT 1 – Modification State 0

2.80.2 Composite task-oriented presentations

6.4.1 User-configured presentations
6.4.1.1 Requirement
(MSC191/7.4.1) *The user may configure a presentation for a specific task-at-hand. The presentation may include radar and/or* electronic *chart information, in combination with other navigation or ship related data* or information. *When not fully compliant with the* relevant *Performance Standards, such a presentation* shall *be identified as an auxiliary presentation.*

6.4.1.2 Methods of test and required results
The methods of test and the required results are as follows:

a) if the user can configure presentations for the task-at-hand confirm by inspection of documented evidence that all tasks configurable are noted in the manual;

b) confirm by analytical evaluation that for all tasks listed in the user documentation the relevant related data and information are displayed;

c) confirm that the display is fully compliant with the relevant performance standards either by analytical evaluation or inspection of the relevant test reports related to the task-at hand for which test standards exists.

If the display is not fully compliant with the relevant performance standards confirm by observation that a clear indication as an auxiliary presentation is provided.

2.80.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – single task equipment only

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Functionality described in manual all operates as per description.

c,

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – single task equipment only

2.81 IEC 62288 CLAUSE 6.4.2

2.81.1 Equipment Under Test

EUT 1 – Modification State 0

2.81.2 Information associated with the task-at-hand

6.4.2.1 Requirement
(MSC191/7.4.2) *As far as practical, the presentation of any radar and/or* chart *related functions* shall *be compliant with the requirements of the relevant Performance Standards and of* the *presentation standards* set forth in this standard*, with the exception of size requirements for the operational* display *area. Windows of* chart or *radar information may be presented along with other information associated with the task-at-hand.*

6.4.2.2 Methods of test and required results
The methods of test and the required results are as follows:

a) confirm by inspection of test reports that the Radar and/or chart related functions are compliant with the relevant Performance Standards;

b) confirm by analytical evaluation or inspection of the relevant test reports that the content and the physical display are compliant with the relevant parts of the presentation standards. Document the size of the operational display in use;

c) confirm by analytical evaluation that the presentation of chart and radar information along with other information associated with the task-at-hand, if available, is in line with this standard

2.81.3 Result

Initials	Date	Pass/Fail	Comments
NGD	08 Aug 2019	EUT 1	N/A – single task equipment only

2.82 IEC 62288 CLAUSE 7.0

2.82.1 Equipment Under Test

EUT 1– Modification State 1

2.82.2 Physical requirements

7.1 General
The provisions of this clause are applicable to the physical displays associated with all navigational systems and equipment on the bridge of a ship. The equipment manufacturer may provide documented evidence to show compliance with the requirements specified in this clause. Display equipment shall comply with the applicable requirements of IEC 60945. (See 4.2.2.1.)

7.2 Display adjustment
7.2.1 Contrast and brightness
7.2.1.1 Requirement
(MSC191/8.1.1) *It* shall *be possible to adjust the contrast and brightness of the display, as applicable to the display technology. It* shall *be possible to dim the display. The range of control* shall *permit the display to be legible under all ambient light conditions* likely to be experienced on the bridge of a ship (for example, day, dusk and night). The range of adjustment shall be sufficient to maintain the user's dark adaptation at night. (See also 4.4.1.)

(MSC191/8.1.2) *It* shall *be possible for the* user *to reset the values of contrast and/or brightness to a preset or default condition*. The manufacturer's documentation shall identify the default conditions. If the brightness adjustment is set for night, then means shall be provided to return to such a brightness level that it is possible to continue control under daylight. If display equipment is intended to present electronic chart information (see 4.6.2), then it shall

• provide the user with the capability to reset the values of brightness and/or contrast to a calibrated colour performance reference setting for each of the ambient light conditions defined in Table 1, and

• prevent inadvertent adjustments by the user by restricting access to controls that may cause degradation of colour performance, such as gamma and colour temperature adjustments.

7.2.1.2 Methods of test and required results
The setup for measurements of contrast, luminance and colour shall be conducted in accordance with the guidelines of IEC 61966-4 or the VESA Flat Panel Display Measurement (FPDM) (see VESA-2001-6) standard. Before measurements are taken, display equipment shall be powered up and allowed to stabilize for a period identified by the manufacturer. (See also Annex G.)

The following verifications are required.

a) Confirm by observation that a manual contrast control is provided, if applicable (for example, for CRT technology).

b) Confirm by observation that a manual brightness control is provided.

c) Confirm by observation that, after dimming, the equipment for use at night, when daylight ambient conditions are applied, there are means to readjust for operation under daylight.
d) Verify the adjustment of contrast and brightness in accordance with 4.4.1: (See 4.4.1.2.)
1) confirm by observation that the contrast and brightness controls can be reset to their default values;
2) where display equipment is intended to display chart information, confirm by

measurement of luminance that a means or method is provided to return the contrast and brightness controls to their calibrated setting for each ambient light condition in accordance with Table 1. (See 4.4.1.)

e) Confirm by inspection of documented evidence that the default conditions for contrast and brightness controls are identified.

2.82.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 :	N/A – no contrast controls

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Brightness control provided

c,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Adjustment from maximum to minimum possible.

d,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 PASS	Minimum level of light gives no illumination returns to a night setting, (default), with any user action. Chart information not possible.

e,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 PASS	Brightness control default settings identified in the user manual. Contrast control not provided.

2.83 IEC 62288 CLAUSE 7.2.2

2.83.1 Equipment Under Test

EUT 1 – Modification State 1

2.83.2 Magnetic interference

7.2.2.1 Requirement
(MSC191/8.1.3) If *magnetic fields degrade the presentation of navigation*-related *information,* then *a means* or method *to neutralise the effects of magnetic fields* shall *be provided.*

7.2.2.2 Methods of test and required results
Confirm by inspection of documented evidence that a means or method to neutralise the effects of magnetic fields is provided if magnetic fields degrade the presentation of navigation-related information.

2.83.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 :PASS	N/A - no magnetic field degradation.

2.84 IEC 62288 CLAUSE 7.2.3

2.84.1 Equipment Under Test

EUT 1 – Modification State 0

2.84.2 Temporal stability

7.2.3.1 Requirement

Display equipment shall be perceptually "flicker" free in direct and peripheral vision at the nominal viewing distance identified in the manufacturer's documentation in accordance with the perception thresholds, as defined in Clause G.2.

NOTE The perception threshold of "flicker" is known to vary for observers, depending on such factors as age, fatigue, ambient lighting conditions, frequencies, the displayed image size, image brightness and image content.

7.2.3.2 Methods of test and required results

Establish by inspection of documented evidence whether the luminance persistence (response time) of the display equipment is less than or more than 1 ms. The test methods are then as follows.

a) For display equipment with a luminance persistence of 1 ms or more (for example, CRT, LCDs, etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" (i.e.the predicted "flicker" threshold) according to G.2.3.1 under each ambient light condition specified in Table 1.

b) For display equipment based on technologies which have a luminance persistence much less than 1 ms (for example, EL (electro luminescent), plasma, light emitting diodes (LED), etc.), confirm by analytical evaluation or measurement that the display equipment emits less energy in the temporal frequencies than an observer will detect as "flicker" according to G.2.3.2 under each ambient light test condition specified in Table 1.

2.84.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	As per annex F no flicker present.

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	As per annex F no flicker present.

2.85 IEC 62288 CLAUSE 7.2.4

2.85.1 Equipment Under Test

EUT 1 – Modification State 1

2.85.2 Physical controls and status indicators

7.2.4.1 General
Physical controls for display equipment shall be locatable by visual or tactile means. If the display equipment has more than three adjacent controls (for example, knobs or switches), then labels with adjustable illumination shall be provided for identification of these controls. Labels shall comply with the legibility/readability requirements contained in 4.4.2, 4.4.3 and 4.4.4.

Any illuminated status indicators separate from the main display (for example, built-in to the front panel of the monitor) shall be locatable by visual means. Adjustable illumination provided for labels and status indicators shall be suitable for all ambient light conditions likely to be experienced on the bridge of a ship (day, dusk and night) and with due consideration to the night vision of the officer of the watch. Illumination shall be dimmable to produce a maximum brightness of not more than 1 cd/m2 and may be extinguishable below that point.

7.2.4.2 Method of test and required results
The methods of test and the required results are as follows:

a) confirm by observation that physical controls for display equipment, if available, are locatable by visual or tactile means;

b) where more than three adjacent control knobs or switches exist, confirm by observation that they have labels with adjustable illumination and that the illuminated labels comply with the legibility/readability requirements contained in 4.4.2, 4.4.3 and 4.4.4;
c) where illuminated status indicators exist separate from the main display, confirm by observation that they are locatable by visual means;

d) where adjustable illumination is provided, confirm by observation that illumination is dimmable to not more than 1 cd/m2 and may be extinguishable below that point;

e) confirm by observation that a visual indication of the presence of power to the display equipment is provided;

f) confirm by observation that a visual indication of the presence of video signals to the display equipment is provided.

2.85.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Controls easily found by tactile means

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Controls labelled and recorded for adjacent buttons and knobs in manual. All buttons are illuminated.

c,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	None

d,

Initials	Date	Pass/Fail	Comments
NDG	19 Jul 2019	EUT 1 PASS	Brightness adjustable from max to minimum, (<1 cd/m^2), and below to extinguished. No confirmation of unit working is shown.

e,

Initials	Date	Pass/Fail	Comments
NGD	07 Nov 2019	EUT 1 : PASS	Power and status indication given

f,

Initials	Date	Pass/Fail	Comments
NGD	07-Nov 2019	EUT 1 :	Green light indicates video feed.

2.85.4 Evidence

Photo 7.2.4

2.86 IEC 62288 CLAUSE 7.3

2.86.1 Equipment Under Test

EUT 1– Modification State 0

2.86.2 Screen size

7.3.1 Requirement

(MSC191/8.2.1) *Display equipment* shall *be of sufficient size to support the requirements of the relevant* IMO *Performance Standards.*

(MSC191/8.2.2) For ECDIS, *the operational display area of the chart presentation for route monitoring* shall *be at least 270 mm × 270 mm.*

For ECDIS back-up arrangements, the effective size of the chart presentation shall be not less than 250 mm × 250 mm or 250 mm diameter.

(MSC191/8.2.3) For radar display equipment, *the operational display area of the radar presentation* shall *be at least a circle of diameter of:*

- *180 mm for ships smaller than 500 gross tonnage;*
- *250 mm for ships larger than 500 gross tonnage and HSC less than 10 000 gross tonnage;*
- *320 mm for ships larger than 10 000 gross tonnage.*

The manufacturer's documentation shall identify the intended size of the operational display area.

Method of test and required results

The methods of test and the required results are as follows:

a) for ECDIS, confirm by measurement that the dimensions of the operational display area are at least 270 mm × 270 mm;

b) for ECDIS back-up arrangements, confirm by measurement that the dimensions of the operational display area are at least 250 mm × 250 mm, or 250 mm in diameter;

c) for radar display equipment, confirm by measurement that the diameter of the operational display area is at least a circle of diameter of the intended size specified in the manufacturer's documentation.

2.86.3 Result

a,

Initials	Date	Pass/Fail	Comments
		EUT 1 :	N/A – non-SOLAS equipment

b,

Initials	Date	Pass/Fail	Comments
		EUT 1 :	N/A – non-SOLAS equipment

c,

Initials	Date	Pass/Fail	Comments
		EUT 1 :	N/A – non-SOLAS equipment

2.87 IEC 62288 CLAUSE 7.4

2.87.1 Equipment Under Test

EUT 1– Modification State 0

2.87.2 Multicoloured display equipment

7.4.1 Requirement
(MSC191/8.3.1) *Multicoloured display equipment* shall *be used except where monochrome displays are permitted within individual* IMO *Performance Standards.*
(MSC191/8.3.2) *Multicoloured operational displays including multifunction displays* (for example*, conning displays*) shall *provide a minimum of 64 colours except where permitted or not required by the* IMO*, or when used for a single specific purpose* (for example*, speed log, echo-sounder*). Monochrome displays may be provided when used for a single specific purpose (for example, speed log, echo-sounder) except where multicoloured displays are required by IMO performance standards or Code on Alerts and Indicators.

7.4.2 Method of test and required results
For multicoloured display verify the result in accordance with Clause 4.

For monochrome display verify the result in accordance with Clause 4 except the colour related requirements specified in 4.5.1, 4.7.1, 4.7.2, 4.7.3 and 4.8.2.

For monochrome display confirm by inspection of documented evidence that the manufacturer has noted the limitation of usage of the display to a single specific purpose or noted relevant IMO Performance Standard permitting use of monochrome display.

2.87.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Clause 4 colour requirement met, contrast between elements is consistent and clear. From full bright to dim setting elements remain clear, (photo 7.4). Colours do not distract and are appropriate to usage.

2.87.4 Evidence

Photo 7.4 (camera adjusts brightness)

2.88 IEC 62288 CLAUSE 7.5

2.88.1 Equipment Under Test

EUT 1– Modification State 0

2.88.2 Screen resolution

7.5.1 Requirement

(MSC191/8.4) *Operational display equipment including multifunction displays* (for example*, conning displays*) shall *provide a minimum screen resolution of 1 280 × 1 024* pixels*, or equivalent for a different aspect ratio, except where permitted or not required by the* IMO*, or when used for a single specific purpose* (for example*, speed log, echo-sounder*) or 180 mm diameter radar. For 180 mm diameter radar, a minimum screen resolution of 1 024 pixels × 768 pixels, or equivalent for a different aspect ratio, shall be provided.

Display equipment intended to support the presentation of electronic chart information shall provide a maximum pixel pitch of 0,29 mm/m of nominal viewing distance (1 min of arc), for example, 0,36 mm at 1 237 mm viewing distance.

The manufacturer's documentation shall describe the screen resolution, pixel format and viewing distance (i.e. for measurement of pixel pitch).

7.5.2 Method of test and required results

The methods of test and the required results are as follows:

a) confirm by inspection of documented evidence that for radar displays larger than 180 mm diameter the display equipment supports a screen resolution of at least 1 280 × 1 024 or equivalent resolution if the equipment uses a different aspect ratio. For radar displays of 180 mm or smaller diameter the requirement is at least 1 024 × 768 or equivalent resolution if the equipment uses a different aspect ratio; alternatively, confirm by inspection of documented evidence that the display equipment supports the minimum screen resolution permitted by the applicable Performance Standards; alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a minimum screen resolution;

b) confirm by inspection of documented evidence that the display equipment provides a maximum pixel pitch of not more than 1 min of arc; alternatively, if the display equipment is used for a single specific purpose (for example, speed log, echo-sounder, etc.), confirm by inspection of documented evidence that it is not required to support a maximum pixel pitch;

c) confirm by inspection of documented evidence that the screen resolution, pixel format and the viewing distance used for the measurement of pixel pitch are identified.

2.88.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Performance standard for AIS states, Section 6.11.1 of 61993-2: “Display at least three (3) lines of target data. Each line to display at least the name of the station, time elapsed, bearing, range of the last position report received. Horizontal scrolling of bearing and range and time elapsed is not allowed. The title of display data shall be visible.” The EUT meets this requirement.

b,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	No minimum pixel pitch EUT not used fo ENC chart display

c,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1	No minimum pixel pitch EUT not used fo ENC chart display

2.88.4 Evidence

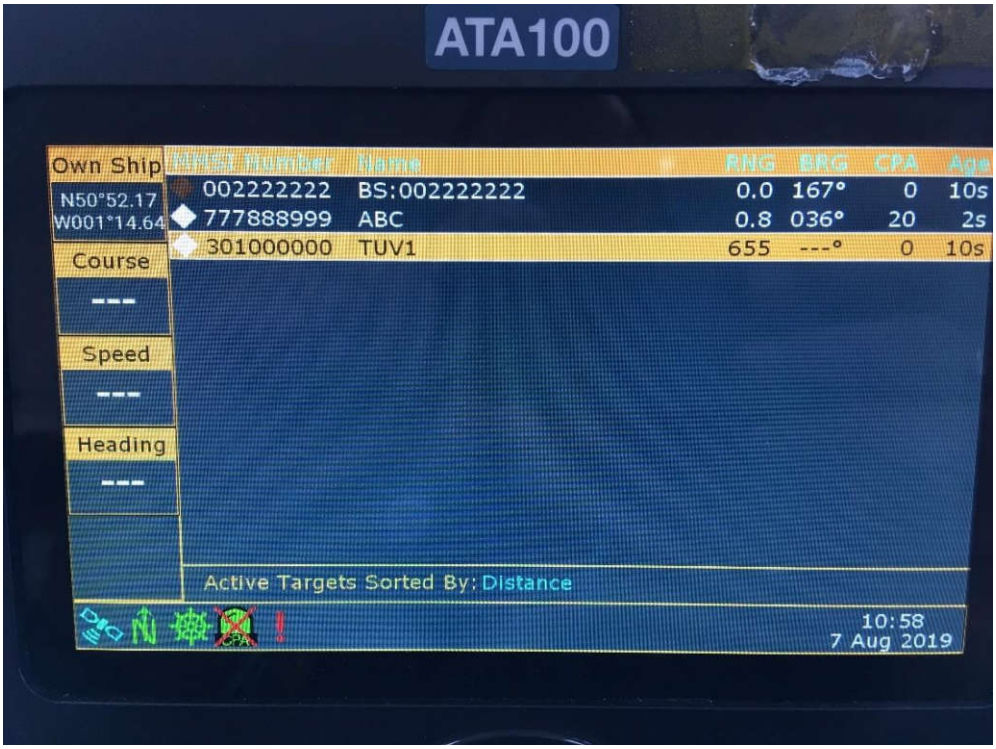


Photo 7.5

2.89 IEC 62288 CLAUSE 7.6

2.89.1 Equipment Under Test

EUT 1– Modification State 0

2.89.2 Screen viewing angle

7.6.1 Requirement
(MSC191/8.5) *The display* equipment shall *support the reading of information under all ambient light conditions, simultaneously, by at least two users, from standing and sitting* user *positions likely to be found on the bridge of a ship.*

7.6.2 Methods of test and required results
Verify in accordance with 4.4.1.2 a) that readability requirements are satisfied from a position at the side of the operator.

2.10.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Screen viewing angle confirmed to manual 60° down to 40° up. Screen is visible by a minimum of two people alongside each other.

2.90 IEC 62288 ANNEX A (NORMATIVE)

2.90.1 Equipment Under Test

EUT 1– Modification State 0

2.90.2 A.1 Overview

This annex specifies the harmonised symbols to be used for the presentation of navigation related information on all shipborne navigational systems and equipment in conformance with guidelines published by the IMO and provided in SN/Circ.243.
All text in this annex whose wording is identical to text contained in IMO SN/Circ.243 is printed in *italics*. The IMO reference is made up of two parts; a prefix representing the IMO instrument, followed by the paragraph number, displayed as, for example: (SN243/1).

A.2 Purpose

(SN243/1/1) *The purpose of* this annex *is to provide guidance on the appropriate use of navigation-related symbols* and the use of colour *to achieve a harmonized and consistent presentation* on all shipborne navigational systems and equipment.

A.3 Scope

(SN243/1/2) *The use of these guidelines will insure that the symbols used for the display of navigation-related information on all shipborne navigational systems and equipment are presented in a consistent and uniform manner.*

A.4 Application

(SN243/1/3) *The symbols listed in* Table A.1 through Table A.5 shall *replace symbols which are currently in existing Performance Standards* for navigational systems and equipment. *Where a standard symbol is not available, another symbol may be used, but this symbol* shall *not conflict with the symbols listed in* this annex.

A.5 Navigation-related symbols

For the application of the symbols in Table A.1 through Table A.5, the following shall be considered:

• no colours are recommended for symbols except where IMO has specified the use of the colour red for dangerous targets;

• colours used for the presentation of tracked radar targets and reported AIS targets shall be consistent;

• colours used for the presentation of own ship symbols shall be identifiable from colours used for the presentation of targets;

• colours used for the presentation of operational information shall be discriminated from the colours used for the presentation of the radar image, target trails, additional processed radar information and electronic chart information;

• colours recommended for symbols assume that the presentation provides for lighter foreground information against a dark background;

• sizes specified for symbols assume a nominal viewing distance of 1 m;

• weights specified for line styles assume that the "thick" line style is at least twice the thickness of the "thin" line style.

An example of a possible colour scheme that may be used is given in Table A.6.

2.90.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Colours used are consistent with tables of symbols. Symbols for own ship , AIS targets and all objects are as per annex A requirements.

2.90.4 Evidence

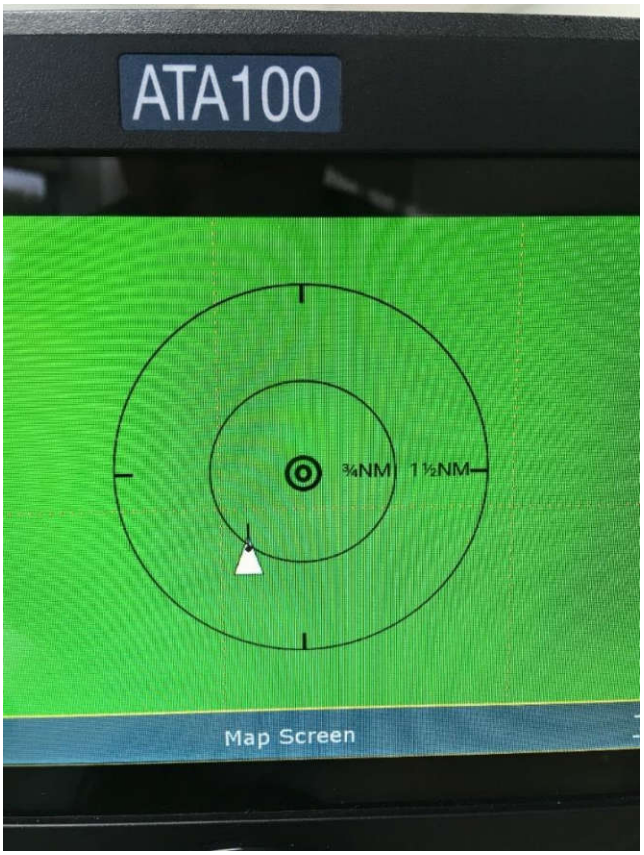


Photo Annex A

2.91 IEC 62288 ANNEX B (NORMATIVE)

2.91.1 Equipment Under Test

EUT 1– Modification State 0

2.91.2 B.1 Overview

This annex specifies the terminology and abbreviations to be used for the presentation of navigation related information in conformance with guidelines published by IMO and provided in SN/Circ.243. All text in this standard whose wording is identical to that in the IMO guidelines is printed in *italics*, and the referenced paragraph number is indicated in brackets with the abbreviated prefix for example (SN243/2).

B.2 Purpose

(SN243/2/1) *The purpose of* this annex *is to provide* guidelines *on the use of appropriate navigation-related terminology and abbreviations intended for presentation on* all *shipborne navigational* systems and equipment. *These are based on* terminology *and abbreviations used in existing navigation references.*

B.3 Scope of these guidelines

(SN243/2/2) *These guidelines* will *ensure that the* terminology *and abbreviations used for the* presentation *of navigation-related information on all shipborne* navigational *systems* and equipment *are* presented in a *consistent and uniform* manner.

B.4 Application

(SN243/2/3) *These guidelines apply to all shipborne navigational systems and equipment when navigation-related information is* presented *as text, the standard* terminology *or abbreviations listed in* Table B.1 and Table B.2 shall *be used* in place *of* terminology *and abbreviations which are currently contained in existing Performance Standards* for navigational systems and equipment. *Where standard* terminology or a standard *abbreviation is not available, another may be used. This* shall provide a clear meaning and shall *not conflict with the standard* terminology *or abbreviations listed in* Table B.1 and Table B.2.
Standard marine terminology shall *be used for this purpose. When the meaning is not clear from its context,* it shall *not be abbreviated.* When another terminology or abbreviation is used, it shall be explained in the operating manual. (SN243/2/3) *Unless otherwise specified, standard terms* shall *be* presented *in lower case while abbreviations* shall *be presented* in *upper case.*

B.5 Navigation related terminology and abbreviations

For the application of the standard terminology and abbreviations listed in Table B.1 and the standard units of measurement and abbreviations listed in Table B.2, the following shall be considered:

- terminology and abbreviations used in nautical charts are published in relevant IHO publications and are not listed here;
- in general, terminology should be presented using lower case text with upper case first character for each separate word and abbreviations should be presented using upper case text. Those abbreviations that may be presented using lower case text are identified in Table B.2;
- abbreviations may be combined, for example, “CPA LIM” or “T CRS”. When the abbreviation for the standard terminology “Relative” is combined with another abbreviation, the abbreviation “R” should be used instead of “REL”, for example, “R CRS” (see NOTE 2 to Table B.1);
- the use of the abbreviations “SIM” and “TRIAL” are not intended to replace the appropriate symbols listed in Table A.5 (see NOTE 3 to Table B.1).

2.91.3 Result

a,

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Minimal abbreviations and terminology used but conforms to list in Table B1

2.91.4 Evidence

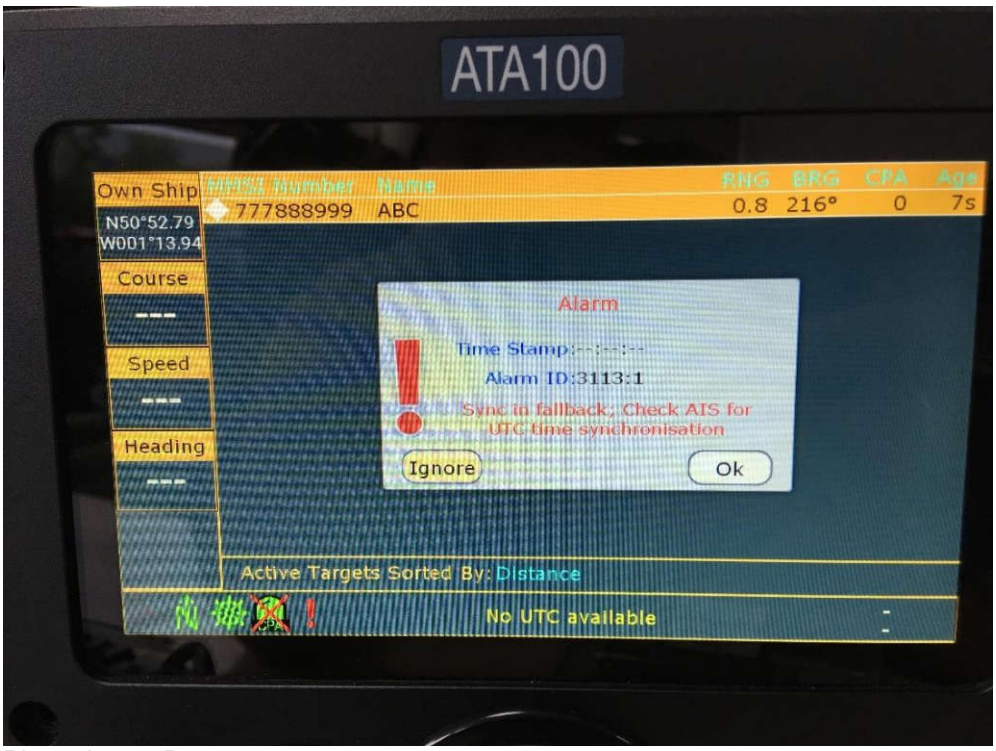


Photo Annex B

2.92 IEC 62288 ANNEX C (INFORMATIVE)

2.92.1 Equipment Under Test

EUT 1– Modification State 0

2.92.2 Guidance on display and dialogue design in MSC/Circ.982

C.1 Overview
This annex lists the guidelines in MSC/Circ.982 that are related to presentation, and their association with the presentation-related requirements provided in IEC 60945 and this standard.

C.2 General
IMO MSC/Circ.982 provides guidelines on ergonomic criteria for bridge equipment and layout with the objective of improving the reliability and efficiency of navigation. These guidelines contain additional, relevant and useful information that may be applied to the design of computer-based displays for navigational systems and equipment.

C.3 Requirements in MSC/Circ.982 related to the display design
Some of the paragraphs in MSC/Circ.982 can be associated with the general requirements for shipborne navigational systems and equipment in IEC 60945:2002, particularly those related to display equipment or displays. Others are wholly or partially related to display design.
Table C.1 through Table C.3 list those paragraphs.

2.92.3 Result

Informative only

2.93 IEC 62288 ANNEX D (INFORMATIVE)

2.93.1 Equipment Under Test

EUT 1– Modification State 0

2.93.2 Guidance on testing

D.1 Methods of test derived from ISO 9241-12

D.1.1 General

The methods of test in this standard are derived from ISO 9241-12. The methods of test do not identify specific processes, approaches or facilities. Rather, they are intended to provide guidance to accredited testing laboratories for the development of test plans and test procedures that evaluate compliance with the requirements specified.

D.1.2 Observation

The test method “observation” refers to simple examination of the presentation of information to confirm that a particular observable condition has been met. The phrase "confirm by observation" is used. Observations may be made by any person with the necessary skill to understand the presentation of information to determine if a statement concerning an observable property has been correctly applied. It is used when suitably trained individuals with a broad range of education and/or experience can be confidently expected to reach the same conclusion about a property of presented information or the performance of display equipment. Compliance is determined by comparing the observed property to the requirement. Some observations may be made directly from the presentation. Other observations may require simulation of input from sensors or other sources. Typical confirmations by observation include:

• existence of functions or features;
• use of symbols or a defined range of words;
• a system output in response to a defined input.

D.1.3 Inspection of documented evidence

The test method “inspection of documented evidence” refers to examination of relevant documents to confirm that a particular presentation or display requirement has been met. The phrase "confirm by inspection of documented evidence" is used.

Documented evidence may include manuals, system requirements, design justification, industry conventions, etc. Inspections may be made by a suitably qualified person who has the necessary education, skill and/or experience to apply the documentation to the system's presentation or display equipment. It is used when performance of a system's presentation or display equipment is not directly observable or measurable. It may also be used when observation would be excessively repetitious, time consuming, or expensive.

Compliance is determined by comparing the documented property to the requirement. Typical confirmations by inspection of documented evidence include:

• conformance to a standard or other documented evidence;
• existence of optional features or functions;
• design and/or operation of algorithms.

D.1.4 Measurement

The test method “measurement” refers to measuring or calculating a value or variable for comparison to a specified value to determine that a particular presentation or display requirement has been met. The phrase "confirm by measurement" is used.

Measurements may require the use of test facilities and equipment. Measurements may be made by any person with the necessary skill to measure and/or calculate the value and compare it against a requirement, standard or other documented evidence.

Compliance is determined by comparing the measured or calculated value or variable to the requirement. Typical confirmations by measurement include:

• assessing whether the end users of a display will be able to read characters from the intended viewing distance;
• differences between displayed colours or absolute levels of display brightness;
• achievement of a level of availability or dependability.

D.1.5 Analytical evaluation
The test method “analytical evaluation” refers to detailed examination of the presentation of information to confirm that a particular condition has been met. The phrase "confirm by analytical evaluation" is used. Analytical evaluations may be made by a relevant expert with the necessary education, skills and/or experience to make an informed and reliable judgement concerning the presentation of information, its appropriateness and usability. It is used for the evaluation of properties which can be judged only in the context of other information or knowledge which requires the tester to make an informed assessment of the likely performance of a typical user of the presentation.
Compliance is determined by comparing the observed property to the requirement. Typical confirmations by analytical evaluation include:
• the largest amount of information that can be presented to a user on a single display;
• the smallest difference in size, colour or line thickness that will be distinguished by a user on a particular display;
• consistency and clarity in presentation of information.

D.2 Application of IEC 60945
D.2.1 Display equipment category
The manufacturer should categorize their display equipment according to IEC 60945:2002, 4.4.

D.2.2 Technical performance
A performance test should be used to confirm compliance with the requirements specifying parameters.
A performance check should be used to confirm that the equipment operates.
The testing laboratory should use the appropriate measure of technical performance (i.e. performance test or performance check) for each test in the test plan.
The equipment should operate in accordance with this standard during each performance test or performance check.

D.2.3 Pre-conditioning for environmental tests
The manufacturer should specify any mechanical or electrical preconditioning required for environmental tests. The testing laboratory should inspect the display equipment and perform any preconditioning specified by the manufacturer.

The testing laboratory should carry out environmental tests with display equipment in its normal operational configuration, including mounting and supports, and with all mechanical arrangements secure.

D.2.4 Methods of test derived from ISO 9241-12 applied for IEC 60945
Many requirements for the presentation of information are of a nature that may be tested by simple observation. Other requirements are, however, of a more complex nature and may require informed judgement in the context of other information or knowledge by an expert with the necessary education, skills and/or experience. This is particularly the case in assessing conditions of appropriateness, usability or the likely performance of a typical user.
These considerations are reflected in the guidance on test methods provided by Clause D.1, and in the structure of IEC 62288 in general, where the test method to be applied is specified test by test.

IEC 60945:2002 simply specifies that each requirement should be “checked”, without further guidance. Table D.1 gives appropriate test methods.

2.92.3 Result

Informative

2.94 IEC 62288 ANNEX E (NORMATIVE)

2.94.1 Equipment Under Test

EUT 1– Modification State 0

2.94.2 Operational controls

E.1 Overview
Operational controls for navigational systems and equipment shall be easy to identify and simple to use. Controls may be implemented through dedicated hardware, screen-accessed soft keys, or a combination of both. The primary controls for each navigational system or equipment shall be identified and provided with an associated status indication in accordance with the function it is serving.

E.2 Logical grouping of data and control functions
Data and control functions shall be divided into logical groups for the function or the task-at hand, in accordance with 4.3.1.
Table E.1 and Table E.2 provide examples of top-level logical groupings of data and controls for radar and charting functionality. Specific requirements for logical grouping of data and control functions, when contained in the individual standards for navigational systems and equipment, shall also be followed. Examples of major groups:
• alerts and indications;
• own ship information;
• track monitoring data (as specified in IEC 62065);
• trial manoeuvre;
• navigational tools and readouts;
• target information;
• range/scale and mode readout;
• radar system information;
• radar signal information;
• chart database information;
• system settings.

Table E.1 – Top-level grouping of data and control functions for radar applications

Own ship information	Navigation tools
Position Heading/speed (or course/speed)	Cursor readout VRM/EBL/ERBL readout Parallel index lines readout
Range and mode information	**Radar system information**
Range scale Orientation mode Stabilization mode Motion mode	Standby/run Pulse length Frequency band Master/slave designation Tune
Target information	**Radar signal information**
Target association Target vector properties Target trails Collision avoidance parameters AIS status AIS filter	Gain Rain Sea Processing (for example, target enhancement or correlation)

Table E.2 – Top-level grouping of data and control functions for charting

Own ship information	Navigation tools
Position Course/speed	Cursor readout VRM/EBL/ERBL readout
Scale and mode information	**Chart database information**
Chart scale Chart datum Orientation mode Motion mode Symbol set	ENC cell Cell edition/date Corrected through date

E.3 Icons for common function controls

When any of the following controls listed in this subclause are used, they shall be identified in English by the relevant name or abbreviation as listed by the appropriate table. In addition, they may be identified by standard icons, described below.

General equipment controls apply to all equipment and are defined in Table E.3. Task oriented measurement controls are defined in Table E.4. Radar specific controls are defined in Table E.5.

The following code of practice shall be used when marking equipment controls with optional icons:

• the minimum dimension of a symbol shall be not less than 9 mm;

• the distance between the centres of two adjacent symbols shall be not less than 1,4 times the size of the larger symbol;

• switch function symbols shall be linked by a line. A linked line infers controlled action;

• variable control function symbols shall be linked by a line, preferably an arc. The direction of increase shall be indicated;

• icons shall be presented with a high contrast against their background;

• the various elements of a symbol shall have a fixed ratio one to another;

• multiple functions of controls and switch positions may be indicated by a combined symbol;

• where concentric controls or switches are fitted, the outer of the symbols should refer to the larger diameter control.

2.94.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Minimal controls but follow convention, labelling is consistent and action of controls positive. Controls actions are described in manuals.

2.94.4 Evidence

Photo Annex E

2.95 IEC 62288 ANNEX F (NORMATIVE)

2.95.1 Equipment Under Test

EUT 1– Modification State 0

2.95.2 Icons for presentation of the state of an alert

The use of icons for presentation of the alerts is optional, but if an icon is used then it is mandatory to use the icons provided in Table F.1 and Table F.2. If IMO has specified for an alert an associated symbol (for example in tables 7.1.1 and 7.1.2 of the Code of Alerts and Indications 2009 (IMO resolution A.1021(26))), then such a symbol shall be used together with icons provided in the Table F.1 and Table F.2.

Table F.1 and Table F.2 specify icons for daylight use. For other viewing conditions such as night and dusk the “Icon description” in Table F.1 and Table F.2 are in force, but the examples of icon graphics should be modified as appropriate.

2.95.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	Icons conform to tables F1 and F2 and give clear indication of meaning, i.e. GPS, alarm or warning.

2.95.4 Evidence

Photo Annex F

2.96 IEC 62288 ANNEX G (NORMATIVE)

2.96.1 Equipment Under Test

EUT 1– Modification State 0

2.96.2 Testing for colours, intensity and flicker

G.1 Testing for colours and intensity

G.1.1 General

The IHO ECDIS Presentation Library contains colour differentiation test diagrams to enable test personnel to determine whether it is possible to discriminate features by colour.

The colours in the IHO ECDIS Presentation Library are defined using the CIE 1931 colour coordinate system (*x*, *y* and *L*) which specify chrominance and luminance. CIE 15 defines the following units for colour difference in terms of chrominance and luminance:

• Δ*E** as a measure of the overall discrimination including both chrominance and luminance differences;
Δ*E** = *SQRT* [(*L*2* − *L*1*) + (*u*2* − *u*1*)2 + (*v*2* − *v*1*)2]
• Δ(*u**,*v**) as a measure of the discrimination in chrominance alone.
Δ(*u**,*v**) = *SQRT* [(*u*2* − *u*1*)2 + (*v*2* − *v*1*)2]
Tolerances for conversion from CIE 1931 colour coordinates to RGB values for display equipment are defined by three terms:
• Δ*E** between the colour coordinates resulting from the RGB values calculated for each colour and the other colours from the same colour table for each ambient light condition;
• Δ(*u**,*v**) between the defined colour coordinates and the coordinates resulting from the RGB values calculated for each colour in each colour table for each ambient light condition;
• luminance ratio (*L*measured/*L*defined) between the defined coordinates of the colours within the colour table for each ambient light condition and the coordinates resulting from the RGB values calculated for each colour.
Δ*E** should be a minimum of 10 except for colour pairs listed in IHO S-52 Table of Colour – Colour pairs that are exempt from the colour separation tolerance test, which, as defined, are very close in colour.

Δ(*u**,*v**) should be a maximum of 16 for display equipment tested as part of the navigational system or equipment (i.e. where the display screen and its source of video are tested together) or for system components between which the transfer of the video is based on a lossless method (for example DVI-D for digital transfer). Δ(*u**,*v**) should be a maximum of 8 for system components that are tested independently of each other (i.e. where the display screen equipment is not tested with the identical video source that it will be installed with aboard ship or where a computer is not tested with the identical display screen that it will be installed with aboard ship).

For each colour token within the colour table, the luminance should be within 20 % of the value specified in IHO S-52, Colour conversion tolerances and tests, for each colour table specified in the IHO S-52, for example; day, dusk and night. The colour black is an exception, which should be a maximum 0,52 cd/m2 as defined in the IHO S-52, Colour conversion tolerances and tests for the day colour table.

Calculations of *L**, *u**, and *v** shall be made in reference to the chromaticity and luminance specified for the brightest white colour token in the respective colour table (Y0, u0, y0); where Y0 is the luminance in cd/m2. It should be noted that this is not the brightest white of the monitor.

G.1.2 Test personnel

Personnel conducting tests related to the discrimination of colours should have passed the minimum colour vision and acuity tests required for users by IMO STCW Code Part B. They should also have adapted to night viewing for 10 min before conducting tests using the night display.

G.1.3 Method of test

The method of test is as follows:

a) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that for each colour table that the difference between the calculated RGB values for any two colours in the table are at least 10 ΔE^* units, except for those pairs defined to have a tabular ΔE^* less than 20; as defined in the IHO S-52, Colour conversion tolerances and tests and IHO S-52, Table of Colour – Colour pairs that are exempt from the colour separation tolerance test;

b) confirm by analytical evaluation the measurement process of the manufacturer and confirm by inspection of documented evidence provided by the manufacturer that the results of the colour calibration conversion of each specified colour (x, y, L) for each colour table into RGB values for an individual monitor are within the tolerance as defined in the IHO S-52, Calculations to achieve correct colours;

c) colour table calibration verification measurements shall be carried out in a dark-room.

Manufacturers may choose between two different methods of colour calibration. The first method is for the test of a monitor and a video source intended to be installed together as an integrated system. The second method is for the test of a monitor independent of the video source/computer with which it will be installed or, similarly, a video source tested independently of a monitor.

• For independent test of monitors, the manufacturer shall provide a reference computer.
• For independent test of computers, the manufacturer shall provide a reference monitor.

The test shall be performed as follows:

1) for the Day colour table display a completely black image on the screen provided by the manufacturer. Confirm by measurement perpendicular to the centre of the screen that the luminance is as required (less than or equal to 0,52 cd/m2 when the CHWHT is set to 80 cd/m2 or more (Day colour table));

2) for the Day colour table, select a screen provided by the manufacturer which has a box of CHWHT (brightest white) on a black background. The box size should be at least 5 cm per side but not more than 25 % of the total screen area. Confirm by measurement perpendicular to the centre of the screen that the level of CHWHT is within the tolerances of $\Delta(u^*, v^*)$ for $\Delta(u^*, v^*) < 16$ for integrated units, $\Delta(u^*, v^*) < 8$ for independent test) and L (is within 20 % of its specified value);

3) repeat the test for CHMGF (brightest magenta), CHYLW (brightest yellow) and BKAJ2 (darkest grey) from the Day colour table;

4) repeat the tests 2) and 3) for Dusk and Night colour tables and other colour tables provided, e.g. colour tables with black background for chart radar. Confirm by measurement that BKAJ1 (black background) luminance is 0,05 cd/m2 in the night setting when the white level is dimmed down so that CHWHT is 1 cd/m2;

d) colour table calibration verification observations shall be carried out as follows. The user's manual brightness control and contrast control, if provided, shall be set to their calibration reference settings; while the display is off, adjust the ambient light level reflected from a white paper positioned on the display screen to the appropriate ambient values specified in Table 1. For each colour table provided, under the appropriate ambient light condition, display the colour differentiation test diagram as defined in the IHO ECDIS presentation library. Confirm by observation that:

1) each foreground stripe is clearly distinguished from its background;

2) the foreground stripes representing yellow, orange, magenta, green, blue and grey may be clearly identified;

e) under each of the ambient light conditions defined above, display the black-adjust boxes available from ECDIS Chart 1 (see ECDIS chart 1 chart AA5C1ABO.) Select each table in turn and confirm by observation that the ECDIS colour token BKAJ2 (dark grey) is clearly distinguished against a black background (BKAJ1);

f) confirm by observation that the procedure for on-board use of the colour differentiation test diagrams is defined in the equipment manual;

g) confirm by observation that means are provided to return the display to the calibrated brightness and contrast settings for each ambient light condition defined above;

h) confirm by observation that each of the mandatory colour tables provided in the IHO ECDIS presentation library may be selected by the user.

G.2 Testing for flicker
G.2.1 Overview
This Clause reproduces the method originally developed in Annex B of ISO 13406-2:2001.
NOTE The actual perception of flicker is known to vary between individual observers and within an individual observer. Some of these variations are systematic. Flicker sensitivity decreases with age (between individuals) and with fatigue (for the individual). In addition, the conversion of display luminance to retinal illumination requires an assumption about the luminance that drives pupil response. In positive polarity displays, average display luminance and “adapting” luminance can be assumed to be the same. There is some evidence that this is not true for negative polarity displays. Due to cross-coupling of photo receptors in the eye, the correct value probably lies between the average and peak luminance. The average luminance is the worst case and is used in this method.

G.2.2 Analytic model
G.2.2.1 Principle
It can be predicted whether people will detect a homogeneously illuminated display appears to flicker or not by the amount of energy in the temporal frequencies of the display. The first step in the method therefore, is to find out the amount of energy in the temporal frequencies, $E\text{obs}\,n$. These numbers are then compared to the amounts of energies that people will detect as flicker, the predicted flicker threshold, $E\text{pred}\,n$. Flat panels exhibit more diverse luminance time functions than progressively scanned cathode ray tubes, so significant energy may exist at several different frequencies. The index, n is carried from 1, at the fundamental repetition frequency of the display (generally, 0,5 times the refreshment rate is necessary on LCD panels), in integer steps until the frequency exceeds 120 Hz. The observed energies may be calculated or measured. The energy at various frequencies is learned by examining the Fourier transform of the luminance-time function.

2.96.3 Result

Initials	Date	Pass/Fail	Comments
NGD	19 Jul 2019	EUT 1 PASS	No perceived flicker observed or measured, technology doesn’t employ techniques generating screen flicker.
NGD	19 Jul 2019	EUT 1	Colour intensity not tested.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Type No	TE No	Calibration Due
Rule	RS	500mm	5006	26-Jul-2019
Multi meter	Fluke	79 Series III	611	07-Sep-2019
Oscilloscope	Lecroy	9410	2761	01-Oct-2019
Luminance meter	Minolta	LS-100	5390	09-May-2021

SECTION 4

DISCLAIMERS AND COPYRIGHT

4.1 DISCLAIMERS AND COPYRIGHT