DNV type approval testing report
IEC 61097-6 Ed2

Model: NAVTEX RECEIVER

Type: NX-900

Report No : K08-17-219

Date of Issue: 2023-06-12

Tested by: Masaaki Tsukuma **Witnessed by: DNV**

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1. Main module

1.1. Equipment

1.1.1. Equipment under test (EUT)

The following was tested

Component	Type	Serial number	SW-Version	Equipment Category
NAVTEX RECEIVER (MAIN UNIT)	NX-900	1001-6400-0005	0850202-01.XX	Protected
ANTENNA UNIT *)	NX-9HE	000005		Exposed
PRINTER UNIT	PP-900	000005		Protected
JUNCTION BOX	IF-900	000005		Protected
AC/DC POWER SUPPLY UNIT	PR-241	103358		Protected

*) Antenna unit not used during testing as output signal from signal generator was connected directly to input of NX-900 main unit on IF.

1.1.2. Auxiliary Equipment (AE)

The following was tested

Component	Type	Serial number	SW-Version	Equipment Category
UDPdebugger23			23.181130	NA
NX700TestSim				NA
Signal Generator, Rohde&Schwarz	SMC100A	FC27286		NA
CONV-BOX	Furuno	SN0009		NA
Combiner, Mini-circuits, 0.01-30MHz	ZSC-3-2+	B FG97202217		NA

Comment 1: OK- Factory reset test to be performed at end of test to confirm default settings, e.g. Alert Interface set to BAM, Remote maintenance mode is off, Navigation display is off etc.
Update 2023-04-27: Verified that correct default settings are applied after factory reset (i.e. also at first time startup).

Comment 2: OK- Table should be updated to reflect that antenna was not used during witnessed test, as all signals were simulated.
Update 2023-04-27: Table updated with note regarding antenna, comment is closed.

Comment 3: OK- Table should be added with description of simulators used during test, including SW version and calibration status (where relevant)
Update 2023-04-27: Table updated, comment is closed

1.2. Product documentation

For production of this report the following product documentation was used:

Description	Date
Operator's manual OME-57150-Z6	2023/5/24

1.3. Test date and test place

Test date : 2023/04/17 - 04/28
Test place : FEC (9-52 Ashihara-cho, Nishinomiya, Japan)

1.4. Observations and comments

The below comments were recorded during testing, including updated status as per issuance of this report:

Comment 1: OK- Factory reset test to be performed at end of test to confirm default settings, e.g. Alert Interface set to BAM, Remote maintenance mode is off, Navigation display is off etc.

Comment 2: OK- Table should be updated to reflect that antenna was not used during witnessed test, as all signals were simulated.

Comment 3: OK- Table should be added with description of simulators used during test, including SW version and calibration status (where relevant)

Comment 4: OK- The sentences SRP and PFEC should be added to table "Transmission intervals" in Appendix 2 of Operators Manual.

Comment 5: OK- A description of proprietary sentence PFEC should be added to description of sentences transmitted in Appendix 2 of Operators Manual (e.g. after last sentence on page 65)

Comment 6: OK- The background for the reference to "(In case of connection of FURUNO device talker)" in Load Requirements as listener (ref Appendix 2 of Operators Manual) and should be considered for removal. Also consider whether "Threshold" should be replaced by "Typical", "Average" or similar.

Comment 7: OK- The "Mounting considerations" in sec. 4.3 of Operators Manual should include instructions on separation requirements from other radio transmitting equipment.

Comment 8: OK- The differences between the alert modes in ch. 4.8 are not described (Legacy, IF1, IF2)..IF2= BAM should be default.

Comment 9: OK- Manual does not include all menu options for legacy mode, i.e. System Menu is different for Legacy- and BAM mode.

Comment 10: OK- The abbreviation RMS should be defined and a description of the Management Function (ch. 2.3 and 4.6) should be included in the Operators manual

Comment 11: OK- The description of Chapter 2.11 Systems Menu, no 1- [Alert Enable] should be clarified, as selection on/off does not apply to all alerts, additional alerts are classified as Cautions and hence are not audible, and SAR alert always will be raised even if Alert Enable is set to "Off".

1.5. Applied standards

IMO Resolution A.694(17)
IMO Resolution A.525(13)
IMO Resolution MSC.148(77)
IMO Resolution MSC.191(79)
IMO Resolution MSC.302(87)
IMO Resolution MSC.430(98)
IMO Resolution MSC.508(105)
IMO Resolution MSC.36(63)-(1994 HSC Code) 14,
IMO Resolution MSC.97(73)-(2000 HSC Code) 14,

ITU-R M.540-2
ITU-R M.625-4

IEC 61097-6	Ed. 2 (2005) +A1(2011) +A2(2019)
IEC 61162-1	Ed.5 (2016)
IEC 61162-450	Ed.2 (2018)
IEC 62923-1/-2	Ed.1 (2018)
IEC 62288	Ed.3 (2021)

1.6. List of attendees

company	Name
DNV	Steinar Kristensen
FEC	Masaaki Tsukuma
FEC	Satoshi Adachi
TIS Solution Link	Tsuruta Takayuki
TIS Solution Link	Imamoto Toshiki
TIS Solution Link	Nakayama Katsuki

2. Test results module

2.1. IEC 60945 (2002) *)

7	Test Item	Section No.	Performed verification (YES/NO/N.A.)	Result	Remark
E.1	Ergonomics and HMI	IEC 60945, 6.1	YES	Pass	LIC test report LIC 12-23-031
E.2	Hardware	IEC 60945, 6.2	YES	Pass	LIC test report LIC 12-23-031
E.3	Software	IEC 60945, 6.3	YES	Pass	LIC test report LIC 12-23-031
E.4	Inter-unit connection	IEC 60945, 6.4	YES	Pass	LIC test report LIC 12-23-031
E.5	Extreme power supply variation test	IEC 60945, 7.1	YES	Pass	LIC test report LIC 12-23-028
E.6	Excessive power supply conditions	IEC 60945, 7.2	YES	Pass	LIC test report LIC 12-23-030
E.7	Dry heat test, incl. extreme power supply	IEC 60945, 8.2 & 7.1	YES	Pass	LIC test report LIC 12-23-028
E.8	Damp heat test	IEC 60945, 8.3	YES	Pass	LIC test report LIC 12-23-028
E.9	Low temperature test (Cold test), incl. extreme power supply	IEC 60945, 8.4 & 7.1	YES	Pass	LIC test report LIC 12-23-028
E.10	Vibration test	IEC 60945, 8.7	YES	Pass	LIC test report LIC 12-23-028
E.11	Rain Test	IEC 60945, 8.8	YES	Pass	LIC test report LIC 12-23-028 and FLI12-13-044 (for GP-170)
E.12	Salt mist test	IEC 60945, 8.12	YES	Waived	LIC test report LIC 12-23-028 and waiver CW-118
E.13	Conducted emissions	IEC 60945, 9.2	YES	Pass	LIC test report LIC 12-23-027
E.14	Radiated emissions	IEC 60945, 9.3	YES	Pass	LIC test report LIC 12-23-027
E.15	Immunity to conducted radio frequency interference.	IEC 60945, 10.3	YES	Pass	LIC test report LIC 12-23-027
E.16	Immunity to radiated radio frequency interference.	IEC 60945, 10.4	YES	Pass	LIC test report LIC 12-23-027
E.17	Immunity to fast transients on a.c. power, signal and control lines	IEC 60945, 10.5	YES	Pass	LIC test report LIC 12-23-027
E.18	Immunity to surges a.c. power lines	IEC 60945, 10.6	N.A.		Because EUT is not A.C.
E.19	Immunity to power supply short-term variation	IEC 60945, 10.7	N.A.		Because EUT is not A.C.
E.20	Immunity to power supply failure	IEC 60945, 10.8	YES	Pass	LIC test report LIC 12-23-027
E.21	Immunity to electrostatic discharge	IEC 60945, 10.9	YES	Pass	LIC test report LIC 12-23-027
E.22	Acoustic noise and signals test	IEC 60945, 11.1	YES	Pass	LIC test report LIC 12-23-030
E.23	Compass safe distance	IEC 60945, 11.2	YES	Pass	LIC test report LIC 12-23-029
E.24	Protection against accidental access to dangerous voltages	IEC 60945, 12.1	N.A.		EUT does not include dangerous voltages LIC test report LIC 12-23-030
E.25	Emissions from visual display unit	IEC 60945, 12.3	YES	Pass	LIC test report LIC 12-23-030
				Pass	
				Pass	
				Pass	
				Pass	
				Pass	

*) Reports in table above does not include power supply unit PR-241 which are covered by separate reports.

2.2. IEC 61162-1 Ed.5 (2018)

Refer to “K08-17-221_NX-900 DNV type approval testing report (IEC 61162-1 -450)”.

2.3. IEC 61162-450 Ed.2 (2018)

Refer to “K08-17-221_NX-900 DNV type approval testing report (IEC 61162-1 -450)”.

2.4. IEC 62288:2021

No.	Test Item	Section No.	Performed verification (YES/NO/N.A.)	Result	Remark
Y.1	General requirements for all displays on the bridge of a ship	IEC 62288, 4	YES	Pass	LIC test report LIC12-23-033
Y.2	Presentation of operational information	IEC 62288, 5	N.A.		In the case of NAVTEX receiver, This section is not available.
Y.3	INS, radar and chart displays	IEC 62288, 6	N.A.		In the case of NAVTEX receiver, This section is not available.
Y.4	Physical requirements	IEC 62288, 7	YES	Pass	LIC12-23-033

2.5. IEC 61097-6:2005, Amd.1 and Amd.2

The result of these test items is written in this report.

No.	Test Item	Section No.	Performed verification (YES/NO/N.A.)	Result	Remark
Z.1	Serial interface tests	IEC 61097-6 Ed.2, 7	N.A.		This is section Title.
Z.2	INS input electrical tests	IEC 61097-6 Ed.2, 7.1	YES	Pass	Witness test
Z.3	INS input performance tests	IEC 61097-6 Ed.2, 7.2	YES	Pass	Witness test
Z.4	INS output electrical tests	IEC 61097-6 Ed.2, 7.3	YES	Pass	Witness test
Z.5	INS output performance tests	IEC 61097-6 Ed.2, 7.4	YES	Pass	Witness test
Z.6	Printer output electrical tests	IEC 61097-6 Ed.2, 7.5	YES	Pass	Witness test
Z.7	Printer output performance tests	IEC 61097-6 Ed.2, 7.6	YES	Pass	Witness test
Z.8	General and signal processing tests	IEC 61097-6 Ed.2, 8	N.A.		This is section Title.
Z.9	Exclusion of stations	IEC 61097-6 Ed.2, 8.1	YES	Pass	
Z.10	Exclusion of message categories	IEC 61097-6 Ed.2, 8.2	YES	Pass	
Z.11	Receiver test facility	IEC 61097-6 Ed.2, 8.3	YES	Pass	
Z.12	Search and rescue (SAR) alarm provision and reset	IEC 61097-6 Ed.2, 8.4	YES	Pass	Witness test
Z.13	Additional alarms	IEC 61097-6 Ed.2, 8.5	YES	Pass	
Z.14	Receiver tests	IEC 61097-6 Ed.2, 9	N.A.		This is section Title.
Z.15	Call sensitivity	IEC 61097-6 Ed.2, 9.1	YES	Pass	Witness test FEC test report (K08-17-220)
Z.16	Interference rejection and blocking immunity	IEC 61097-6 Ed.2, 9.2	YES	Pass	Witness test FEC test report (K08-17-220)
Z.17	Co-channel rejection	IEC 61097-6 Ed.2, 9.3	YES	Pass	Witness test FEC test report (K08-17-220)
Z.18	Intermodulation	IEC 61097-6 Ed.2, 9.4	YES	Pass	Witness test FEC test report (K08-17-220)
Z.19	Off-frequency transmitter	IEC 61097-6 Ed.2, 9.5	YES	Pass	Witness test FEC test report (K08-17-220)
Z.20	Simultaneous operation on several receive frequencies	IEC 61097-6 Ed.2, 9.6	YES	Pass	Witness test FEC test report (K08-17-220)
Z.21	Protection of input circuits	IEC 61097-6 Ed.2, 9.7	YES	Pass	Witness test FEC test report (K08-17-220)
Z.22	Printer tests	IEC 61097-6 Ed.2, 10	N.A.		This is section Title.
Z.23	Basic requirements	IEC 61097-6 Ed.2, 10.1	YES	Pass	
Z.24	Paper roll end alarm and storage inhibition	IEC 61097-6 Ed.2, 10.2	YES	Pass	
Z.25	Automatic line feed indication and paper feed	IEC 61097-6 Ed.2, 10.3	YES	Pass	
Z.26	Mutilated character indication	IEC 61097-6 Ed.2, 10.4	YES	Pass	Witness test
Z.27	B1/B2 characters selection	IEC 61097-6 Ed.2, 10.5.1	YES	Pass	
Z.28	Printer activation/error-free preamble B1-B4	IEC 61097-6 Ed.2, 10.5.2	YES	Pass	
Z.29	Non-repetitive printing of a message	IEC 61097-6 Ed.2, 10.5.3	YES	Pass	
Z.30	Message with B3B4 = 00	IEC 61097-6 Ed.2, 10.5.4	YES	Pass	
Z.31	Memory tests	IEC 61097-6 Ed.2, 11	N.A.		This is section Title.
Z.32	Internal storage, message tagging and erasure of oldest message identifications	IEC 61097-6 Ed.2, 11.1	YES	Pass	Witness test
Z.33	Erasure of message identifications/storage time	IEC 61097-6 Ed.2, 11.2	YES	Pass	
Z.34	Storage of message identifications	IEC 61097-6 Ed.2, 11.3	N.A.		EUT does not have printer internal.
Z.35	Reception of messages with character errors	IEC 61097-6 Ed.2, 11.4	YES	Pass	
Z.36	Unsatisfactory reception	IEC 61097-6 Ed.2, 11.5	YES	Pass	
Z.37	Power-off check	IEC 61097-6 Ed.2, 11.6	YES	Pass	
Z.38	Brown-out test	IEC 61097-6 Ed.2, 11.7	YES	Pass	
Z.39	UTC handling check	IEC 61097-6 Ed.2, 11.8	YES	Pass	
Z.40	Miscellaneous tests	IEC 61097-6 Ed.2, 12	N.A.		This is section Title.
Z.41	Spurious emissions	IEC 61097-6 Ed.2, 12.1	YES	Pass	Witness test FEC test report (K08-17-220)
Z.42	Equipment manuals – checks of the manufacturer's documentation	IEC 61097-6 Ed.2, 12.2	YES	Pass	
Z.43	Marking and identification	IEC 61097-6 Ed.2, 12.3	YES	Pass	
Z.4	Serial interface tests	IEC 61097-6 Ed.2 Amd2, 7	N.A.		This is section Title.
Z.45	BAM interface performance tests	IEC 61097-6 Ed.2 Amd2, 7.7	YES	Pass	

2.6. IEC 62923-1/-2 Ed.1 (2018)

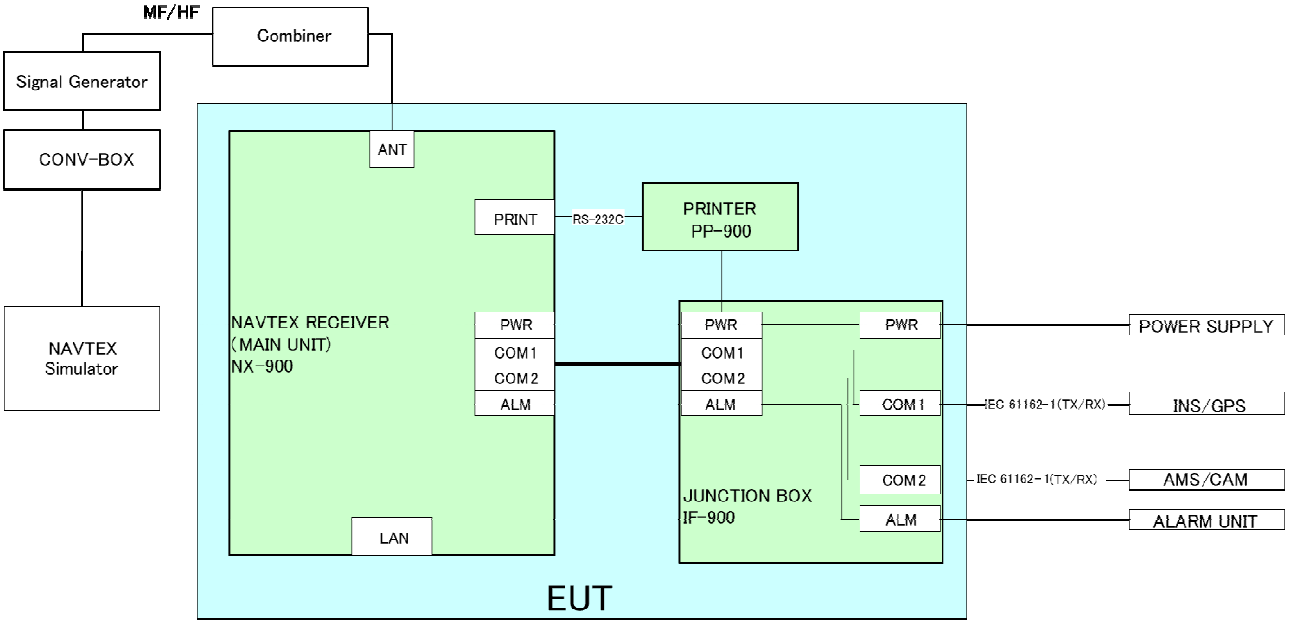
Refer to “K08-17-222_NX-900 DNV type approval testing report (IEC 62923-1-2)”.

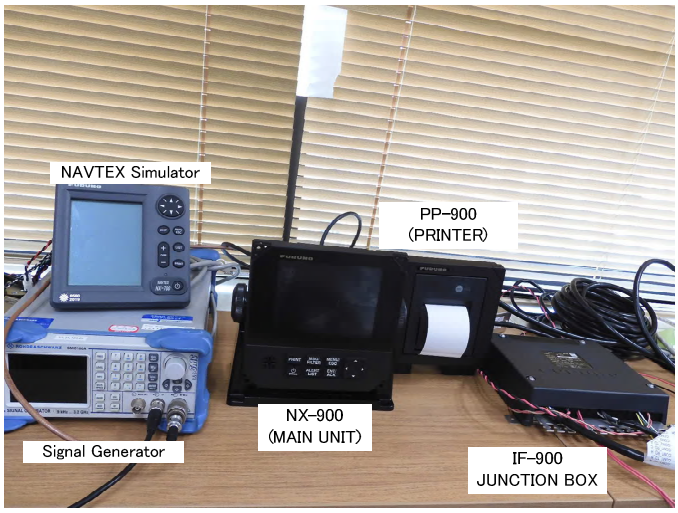
2.7. MSC.508(105)

No.	Test Item	Section No.	Performed verification (YES/NO/N.A.)	Result	Remark
W.1	ALERT	MSC 508(105), 7	YES	Pass	Refer to FEC test report (IEC 62923-1/-2) FEC test report (IEC 61097-6 Amd.2)
W.2	INTERFACES	MSC 508(105), 9.4	YES	Pass	Refer to FEC test report (IEC 62923-1/-2) FEC test report (IEC 61097-6 Amd.2)

3. EUT connection diagram

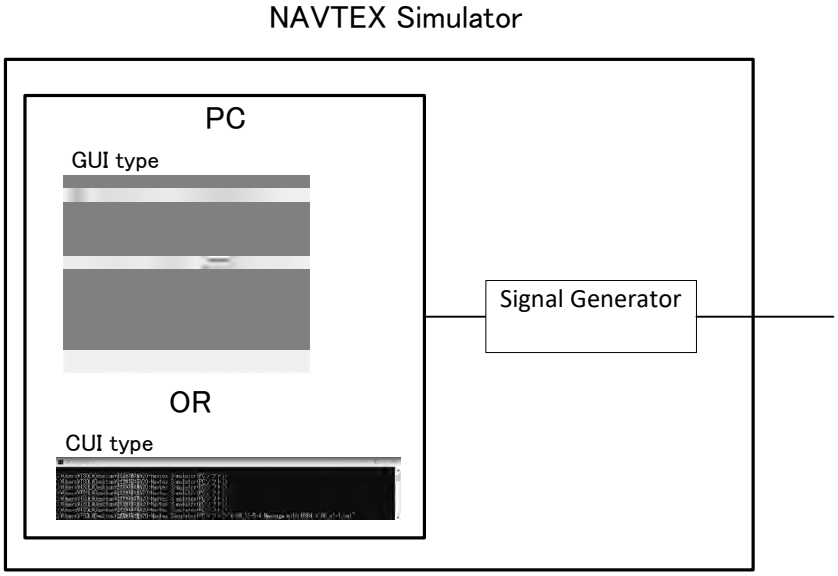
Standard test environment is indicated in the following figure.
(※) EUT : equipment under test
(※) Alert Mode : Alert IF2.
(※) Antenna units were not used because the protocol test requires receiving arbitrary NAVTEX messages.





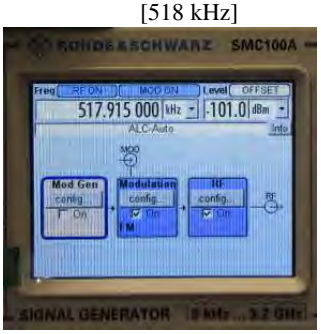
NAVTEX Simulator

We use this simulator to let receive NAVTEX message to EUT.

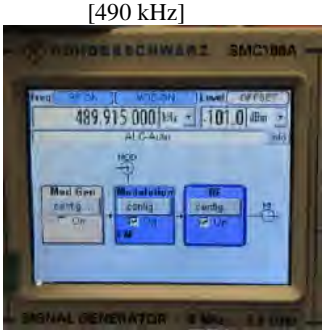


The settings of each frequency of the signal generator are below.

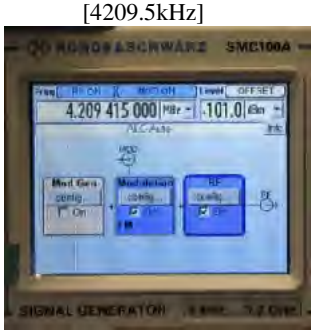
[518 kHz]



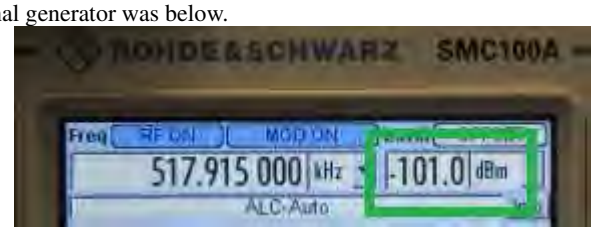
[490 kHz]



[4209.5kHz]



A test signal +6 dB relative to the STS level.
STS level is -107 dBm.
The screen of the signal generator was below.



Fill Memory

This function is the function for only developer.
If we run this function, then EUT becomes full memory by STF message.
This function is the function which is written in section 5.6 of IEC 61097-6.

IEC 61097-6

5.6 Standard test file

The standard test file (STF) shall consist of a series of unique identifiable messages each 500 characters long. The STF is intended to be used to fill the declared memory capacity of the EUT exactly and shall be downloaded directly into the EUT's memory via the INS port or some other method declared by the manufacturer.

4. Performance tests (ref. IEC 61097-6 Ed.2)

4.1. 7.1 INS input electrical tests

[IEC 61097-6 Ed.2]

Method of test
The INS input port configured in accordance with IEC 61162-1 and IEC 61162-2, shall be tested according to the relevant standard with regard to minimum and maximum voltage and current at the input terminals.

Required results
The interfaces shall fulfil the applicable requirements of IEC 61162-1 and IEC 61162-2.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The interfaces shall fulfil the applicable requirements of IEC 61162-1 and IEC 61162-2.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. EUT support only IEC 61162-1. Refer to LIC12-23-016 (LIC test report of IEC 61162-1). The result of them is Passed.

4.2. 7.2 INS input performance tests

[IEC 61097-6 Ed.2]
Method of measurement
Operate the input with simulated data that represent the receiver control functions defined in Annex C, including messages with invalid and unavailable data formatters. This test shall include loading the EUT input with 100 % of the interface's capacity for a period of not less than 5 min. Check for correct operation of the EUT.

Required results
Verify that the displayed data/EUT operation agrees with the simulated input data and that invalid and unavailable data formats do not stop/inhibit the correct operation of the EUT.

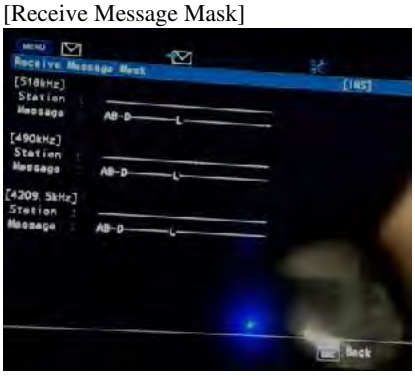
[Test procedures/ Test Result]

Passed

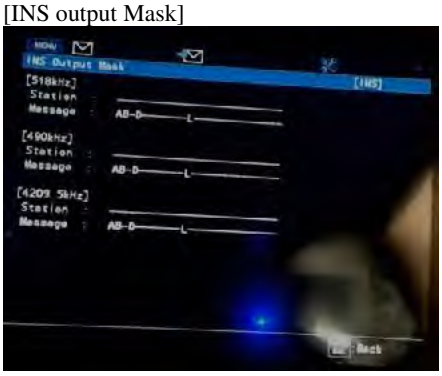
No.	Check item	Result
a)	Operate the input with simulated data that represent the receiver control functions defined in Annex C, including messages with invalid and unavailable data formatters. This test shall include loading the EUT input with 100 % of the interface's capacity for a period of not less than 5 min. Check for correct operation of the EUT. Verify that the displayed data/EUT operation agrees with the simulated input data and that invalid and unavailable data formats do not stop/inhibit the correct operation of the EUT.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. We confirmed that the displayed data/EUT operation agreed with the simulated input data and that invalid and unavailable data formats do not stop/inhibit the correct operation of the EUT and NAVTEX message could be received as normal with the interface from the INS at 100% capacity Refer to “4-02_07-2 INS input performance tests” movie file.

Mask screen was below before test.

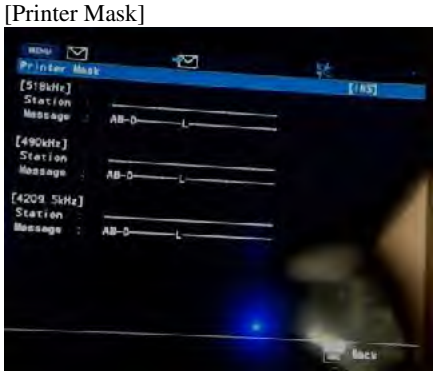
[Receive Message Mask]



[INS output Mask]

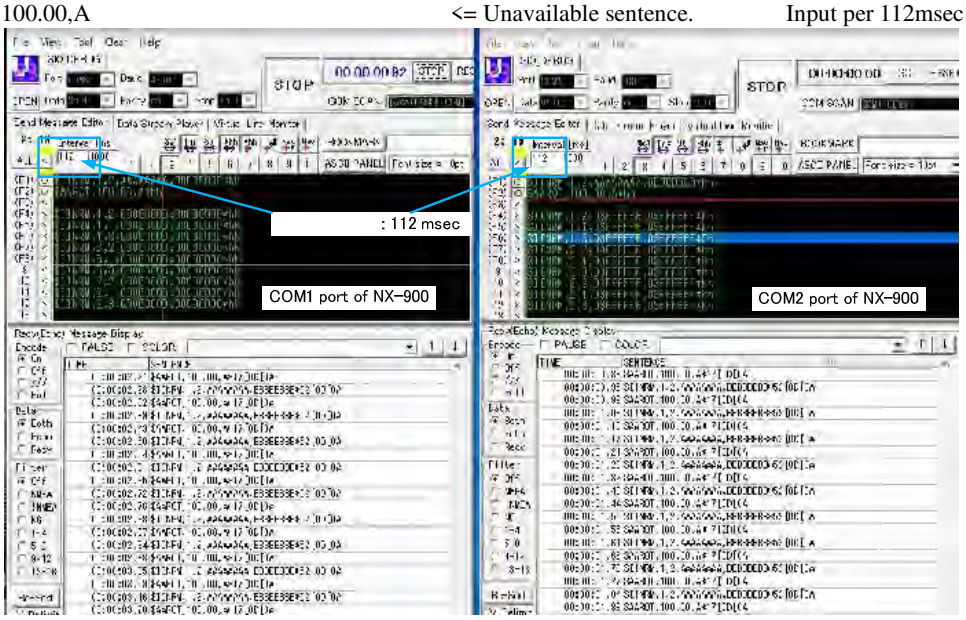


[Printer Mask]



Kept inputting sentences below to COM1 and COM2 per 112msec msec more than 5 min：
(The baud rate is 4800 bps. Therefore, in the case of these sentences, the load becomes highest load when output cycle is 112 msec.)

$IINRM,1,2,AAAAAAAA,BBBBBBBB	<= invalid data format.	Input per 112msec
$AAROT,100.00,A	<= Unavailable sentence.	Input per 112msec



After 5 min, input sentence below while inputting above sentence.

We confirmed that EUT updated the settings of mask although the load of ports is heavy.

[COM1]

・Receive Message Mask	$IINRM,1,2,00000000,00000000	518kHz
	$IINRM,1,1,00000000,00000000	490kHz
	$IINRM,1,3,00000000,00000000	4902.5kHz
・INS output Mask	$IINRM,3,2,00000000,00000000	518kHz
	$IINRM,3,1,00000000,00000000	490kHz
	$IINRM,3,3,00000000,00000000	4902.5kHz
・Printer Mask	$IINRM,2,2,00000000,00000000	518kHz
	$IINRM,2,1,00000000,00000000	490kHz
	$IINRM,2,3,00000000,00000000	4902.5kHz

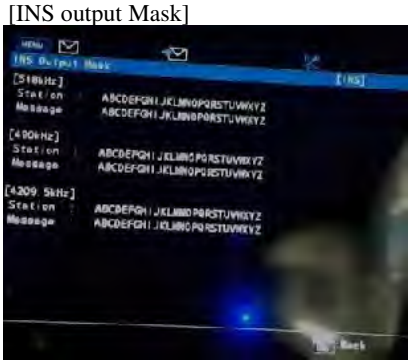
[COM2]

We confirmed that EUT updated the settings of mask.

・Receive Message Mask	$IINRM,1,2,03FFFFF,03FFFFF	518kHz
	$IINRM,1,1,03FFFFF,03FFFFF	490kHz
	$IINRM,1,3,03FFFFF,03FFFFF	4902.5kHz
・INS output Mask	$IINRM,3,2,03FFFFF,03FFFFF	518kHz
	$IINRM,3,1,03FFFFF,03FFFFF	490kHz
	$IINRM,3,3,03FFFFF,03FFFFF	4902.5kHz
・Printer Mask	$IINRM,2,2,03FFFFF,03FFFFF	518kHz
	$IINRM,2,1,03FFFFF,03FFFFF	490kHz
	$IINRM,2,3,03FFFFF,03FFFFF	4902.5kHz

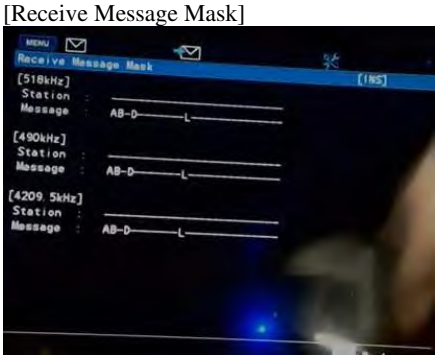
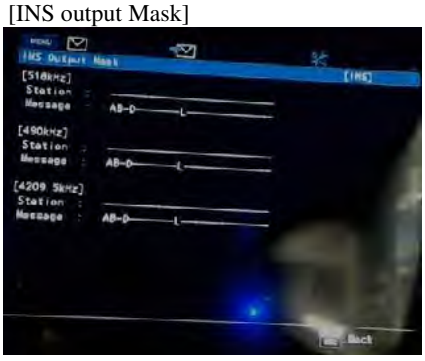
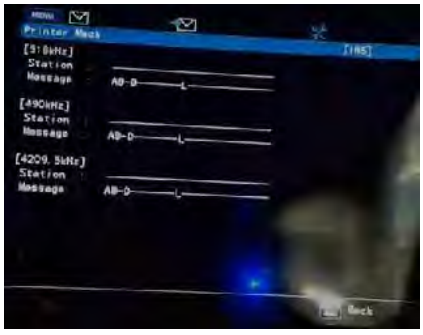
When We input sentence to COM2.

[Receive Message Mask] [INS output Mask] [Printer Mask]



When We input sentence to COM1.

[Receive Message Mask] [INS output Mask] [Printer Mask]

4.3. 7.3 INS output electrical tests

[IEC 61097-6 Ed.2]
Method of test
The INS output port configured in accordance with IEC 61162-1 and IEC 61162-2, shall be tested according to the relevant standard with regard to minimum and maximum voltage and current driving capability at the output terminals.

Required results
The interfaces shall fulfil the applicable requirements of IEC 61162-1 and IEC 61162-2.

[Test procedures/ Test Result]

Passed		
No.	**Check item**	**Result**
a)	The INS output port configured in accordance with IEC 61162-1 and IEC 61162-2, shall be tested according to the relevant standard with regard to minimum and maximum voltage and current driving capability at the output terminals. The interfaces shall fulfil the applicable requirements of IEC 61162-1 and IEC 61162-2.	Passed. EUT support only IEC 61162-1. Refer to LIC12-23-016 (LIC test report of IEC 61162-1). The result of them is Passed.

4.4. 7.4 INS output performance tests

[IEC 61097-6 Ed.2]
Method of test
Set the EUT to output to the INS port so that it is loaded with 100 % of the interface's capacity.
Check for correct operation of the EUT.

Required results
Verify that the output data/EUT operation agrees with the requested output data.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	Set the EUT to output to the INS port so that it is loaded with 100 % of the interface's capacity. Check for correct operation of the EUT. Verify that the output data/EUT operation agrees with the requested output data. [Test Sequence] Seq 1. NAVTEX simulator transmits messages for 2 min with 518Khz, 490kHz and 4209.5kHz at the same time. (It's maximum heavy load) Seq 2. Confirm that EUT received all messages, by checking output sentence and the screen.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. Refer to "4-04_07-4 INS output performance tests INS" movie file. NAVTEX simulator transmits 40 messages below each frequency for 5 min to become the condition of highest load. After NAVTEX simulator finished transmitting all messages, we confirmed that there were appropriately NRX sentence of 120 messages (40messages×3 frequencies) in the log file of COM1 port and COM2 port. [LOG DATA] : : 00:00:13.11 recv0 $CRNRX,001,001,00,AC01,2,180955,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *14 00:00:13.27 recv0 $CRNRX,001,001,01,AC01,1,180955,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *16 00:00:13.43 recv0 $CRNRX,001,001,02,AC01,3,180955,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *17 00:00:20.51 recv0 $CRNRX,001,001,03,AC02,2,181002,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1E 00:00:20.67 recv0 $CRNRX,001,001,04,AC02,1,181002,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1A 00:00:20.83 recv0 $CRNRX,001,001,05,AC02,3,181002,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *19 00:00:28.11 recv0 $CRNRX,001,001,06,AC03,2,181010,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *19 00:00:28.27 recv0 $CRNRX,001,001,07,AC03,1,181010,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1B 00:00:28.43 recv0 $CRNRX,001,001,08,AC03,3,181010,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *16 00:00:35.72 recv0 $CRNRX,001,001,09,AC04,2,181017,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *16 00:00:35.88 recv0 $CRNRX,001,001,10,AC04,1,181017,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1D 00:00:36.02 recv0 $CRNRX,001,001,11,AC04,3,181017,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1E 00:00:43.31 recv0 $CRNRX,001,001,12,AC05,2,181025,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1C 00:00:43.47 recv0 $CRNRX,001,001,13,AC05,1,181025,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1E 00:00:43.63 recv0 $CRNRX,001,001,14,AC05,3,181025,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1B 00:00:50.90 recv0 $CRNRX,001,001,15,AC06,2,181033,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1F 00:00:51.06 recv0 $CRNRX,001,001,16,AC06,1,181033,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1F 00:00:51.22 recv0 $CRNRX,001,001,17,AC06,3,181033,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *1C 00:00:58.30 recv0 $CRNRX,001,001,18,AC07,2,181040,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *17 00:00:58.46 recv0 $CRNRX,001,001,19,AC07,1,181040,06,04,2023,17,0,A,^0D^0AABCDEFGHIJKLMN *15 : : : :

4.5. 7.5 Printer output electrical tests

[IEC 61097-6 Ed.2]
These tests are only applicable for EUTs that do not contain an integral printer.
These tests shall be conducted against the standard that the manufacturer has declared this interface will meet.

Method of test
The printer output port configured in accordance with the manufacturer's data, shall be tested according to the relevant standard with regard to minimum and maximum voltage and current driving capability at the output terminals.

Required results
The interfaces shall fulfil the applicable requirements of the relevant standard.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The printer output port configured in accordance with the manufacturer's data, shall be tested according to the relevant standard with regard to minimum and maximum voltage and current driving capability at the output terminals. The interfaces shall fulfil the applicable requirements of the relevant standard.	STEKR, 2023-04-17: Passed. Verified by inspection of documentation. Interface is specified in Operator Manual OME57150Z5_NX900, Specifications (page 73) The interface for printer port is RS-232C. The standard is TIA/EIA-232-F. The driver IC of printer port is MAX3222 [Maker: TI(Texas Instruments)]. This driver IC complies with TIA/EIA-232-F. Because it is written in datasheet of this driver IC. Refer to data sheet of this driver IC.

TEXAS INSTRUMENTS — MAX3222
SLLS408H – JANUARY 2000 – REVISED OCTOBER 2018

MAX3222 3-V to 5.5-V Multichannel RS-232 Line Driver and Receiver With ±15-kV ESD Protection

1 Features
- RS-232 Bus-Pin ESD Protection Exceeds ±15 kV Using Human-Body Model (HBM)
- Meets or Exceeds the Requirements of TIA/EIA-232-F and ITU v.28 Standards
- Operates With 3-V to 5.5-V V_{CC} Supply
- Operates Up to 250 kbps
- Two Drivers and Two Receivers
- Low Standby Current: 1 µA Typical
- External Capacitors: 4 × 0.1 µF
- Accepts 5-V Logic Input With 3.3-V Supply
- Alternative High-Speed Pin-Compatible Device (1 Mbps)
  - SNx5C3222

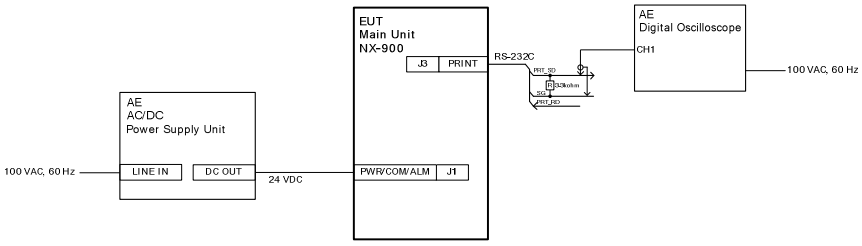
3 Description
The MAX3222 consists of two line drivers, two line receivers, and a dual charge-pump circuit with ±15-kV ESD protection pin to pin (serial-port connection pins, including GND). The device meets the requirements of TIA/EIA-232-F and provides the electrical interface between an asynchronous communication controller and the serial-port connector. The charge pump and four small external capacitors allow operation from a single 3-V to 5.5-V supply. The device operates at data signaling rates up to 250 kbit/s and a maximum of 30-V/µs driver output slew rate.

The MAX3222 can be placed in the power-down mode by setting PWRDOWN low, which draws only 1 µA from the power supply. When the device is powered down, the receivers remain active while the drivers are placed in the high-impedance state.

	RS-232C Standard value	MAX3222 Datasheet
Driver output voltage (Space)	+5 ~ +15 V (3k-7kohm load)	+5 ~ +13.2 V (3kohm load)
Driver output voltage (Mark)	-5 ~ -15 V (3k-7kohm load)	-5 ~ -13.2 V (3kohm load)
Short-circuit output current	±500 mA max.	±60 mA max.

The results of actual measurements at the printer port end of the EUT (NX-900 main unit) are as follows, which meet the RS-232C output voltage standards.

EUT Setup/Test Arrangement



<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>RS-232C Standard value</td><td>NX-900
M</td></tr>
<tr><td>Driver output voltage (Space)</td><td>+5 ~ +15 V
(3k-7kohm load)</td><td>+5.10 V
(3.3kohm load)</td></tr>
<tr><td>Driver output voltage (Mark)</td><td>-5 ~ -15 V
(3k-7kohm load)</td><td>-5.10 V
(3.3kohm load)</td></tr>
</table>

</td></tr>
</table>

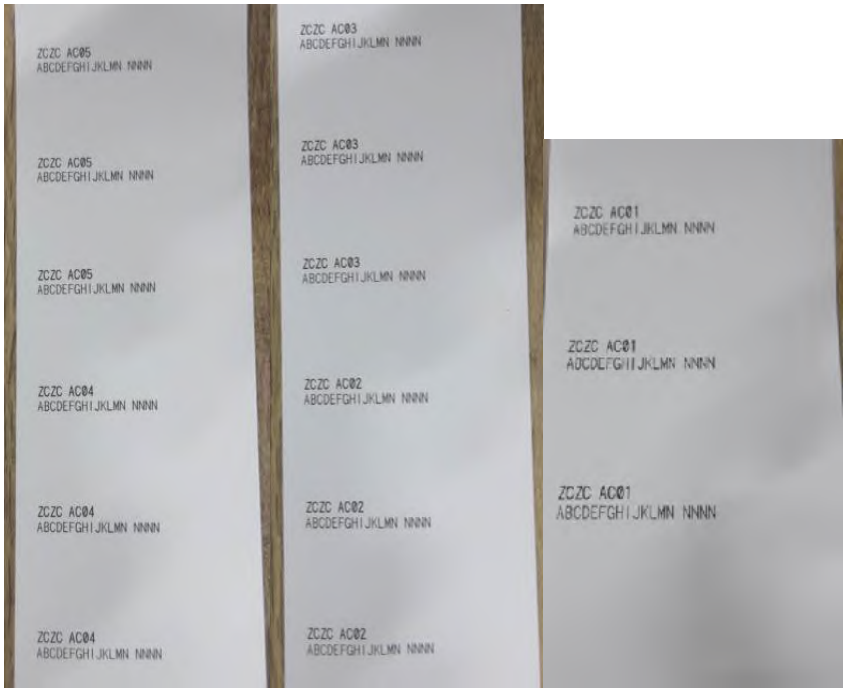
4.6. 7.6 Printer output performance tests

[IEC 61097-6 Ed.2]
Method of test
Set the EUT to output to the printer port so that it is loaded with 100 % of the interface's capacity.
Check for correct operation of the EUT.

Required results
Verify that the output data/EUT operation agrees with the requested output data.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	Set the EUT to output to the printer port so that it is loaded with 100 % of the interface's capacity. Check for correct operation of the EUT. [Test Sequence] Seq 1. Make the test condition same as "7.4 INS output performance tests INS" (It's maximum heavy load) Seq 2. Confirm the printed result.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. Verified that 40 messages were printed for each of the receiving channels. We confirmed that the output data/EUT operation agreed with the requested output data. 

4.7. 8.1 Exclusion of stations

[IEC 61097-6 Ed.2]

Method of test
The EUT shall be programmed to select all B2 characters and specific B1 characters.
A test signal +6 dB relative to the STS level, with the B1 and B2 characters varied at random over 25 repetitions of the STS, shall be applied to the EUT. B3B4 = 00 shall not be used.
The test shall be repeated for other selected B1 characters.

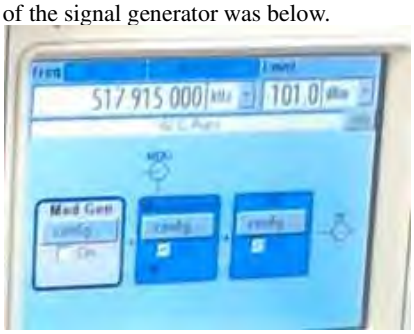
Required results
Verify that the output data/EUT operation agrees with the requested output data.

[Test procedures/ Test Result]

Passed

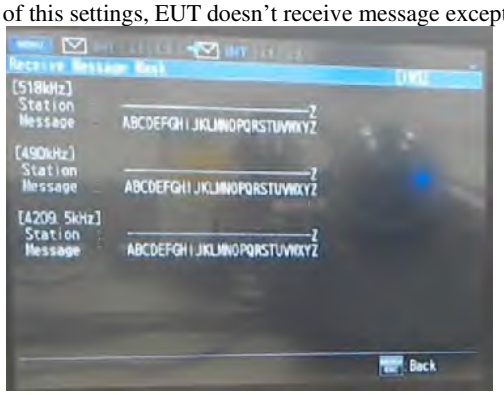
No.	Check item	Result
a)	The EUT shall be programmed to select all B2 characters and specific B1 characters. A test signal +6 dB relative to the STS level, with the B1 and B2 characters varied at random over 25 repetitions of the STS, shall be applied to the EUT. B3B4 = 00 shall not be used. The test shall be repeated for other selected B1 characters. For each value of B1 not selected, the EUT shall neither display nor print the test message.	STEKR, 2023-04-27: Passed. Test witnessed at Furuno. We confirmed that the EUT neither displayed nor printed the test message for each value of B1 not selected. Refer to “4-07_08-1 Exclusion of stations” movie file with B1=Z Test also repeated under witnessed at Furuno with B1=C and B1=M.

A test signal +6 dB relative to the STS level.
STS level is -107 dBm.
The screen of the signal generator was below.



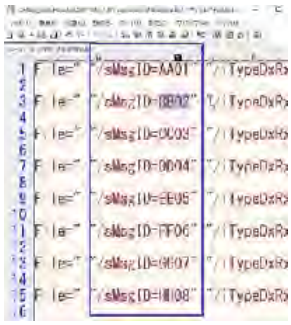
There were not any messages in list before test.

Receive mask settings was below.
In the case of this settings, EUT doesn't receive message except B1=Z.



Message IDs of STS were below. There isn't any B1=Z in message IDs.
And the test senario file was below.

ID = AA01→BB02→CC03→DD04→EE05→FF06→GG07→HH08→II09→JJ10→KK11→LL12→MM13→
NN14→OO15→PP16→QQ17→RR18→SS19→TT20→UU21→VV22→WW23→XX24→YY25



If EUT receives message, then icon lights up.

The icon doesn't lights up when not receiving message.

The icon lights up during receiving message.

We confimed that EUT neither displayed nor printed the test message for each value of B1 not selected even if the icon lights up.
The message list screen was below. There were not any message.
The printer didn't work.

4.8. 8.2 Exclusion of message categories

[IEC 61097-6 Ed.2]

Method of test
The EUT shall be programmed to select all B1 characters and specific B2 characters.
A test signal +6 dB relative to the STS level, with the B1and B2 characters varied at random over 25 repetitions of the STS, shall be applied to the EUT. B3B4 = 00 shall not be used.
The test shall be repeated for other selected B2 characters.

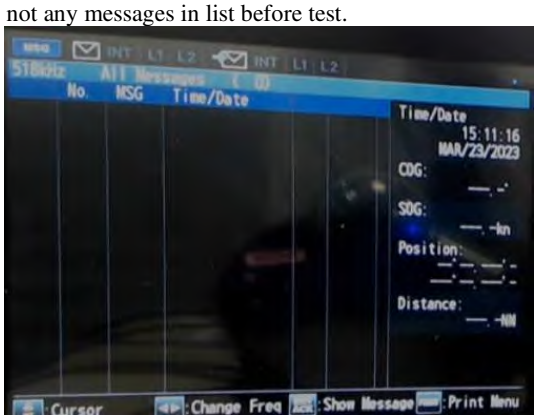
Required results
The EUT shall display or print the messages with the currently programmed B2 characters, and also the messages with the B2 characters A, B, D and L.

[Test procedures/ Test Result]

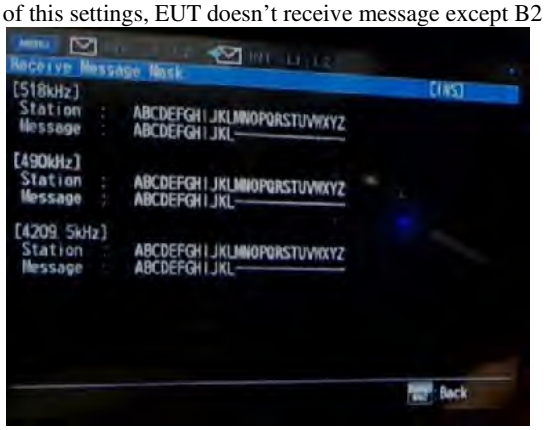
Passed

No.	Check item	Result
a)	The EUT shall be programmed to select all B1 characters and specific B2 characters. A test signal +6 dB relative to the STS level, with the B1and B2 characters varied at random over 25 repetitions of the STS, shall be applied to the EUT. B3B4 = 00 shall not be used. The test shall be repeated for other selected B2 characters. The EUT shall display or print the messages with the currently programmed B2 characters, and also the messages with the B2 characters A, B, D and L.	STEKR, 2023-04-27: Passed. Witnessed via verification of video. We that the EUT displayed or printed the messages with the currently programmed B2 characters, and also the messages with the B2 characters A, B, D and L. Refer to “4-08_08-2 Exclusion of message categories” movie file.

STS level was -107 dBm.
There were not any messages in list before test.

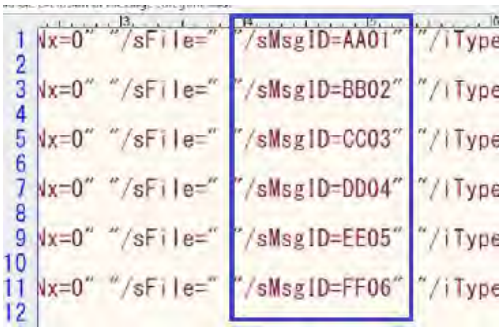


Receive mask settings was below.
In the case of this settings, EUT doesn't receive message except B2 = A～L.



Message IDs of STS were below. There isn't any B1=Z in message IDs.
And the test senario file was below.
EUT doesn't receive the message of the message IDs of green color.
Because B2 of green color is OFF on Receive Message Mask screen.

ID = AA01→BB02→CC03→DD04→EE05→FF06→GG07→HH08→II09→JJ10→KK11→LL12→
AM13→BN14→CO15→DP16→EQ17→FR18→GS19→HT20→IU21→JV22→KW23→AX24→BY25



If EUT receives message, then INT, L1 or L2 icon lights up depending on frequency of message.
We confirmed that the EUT displayed or printed the messages with the currently programmed B2 characters (B2=C, E, F, G, H, I, J, K).
We confirmed that the EUT displayed or printed the messages with the B2 characters A, B, D and L.
There were message IDs (B2=A,B,C,D,E,F,G,H,I,J,K,L) on Message List screen.

We confimed that the EUT didn't displaye or printe the messages with B2 = M～Y even if the icon lights up.
There were not message IDs (B2=M～Y) on Message List screen.
The picture of the printed message is below.

4.9. 8.3 Receiver test facility

[IEC 61097-6 Ed.2]

Method of test
By inspection of the manufacturer's test data and documentation and actuating the test facility.

Required results
The test display/print-out shall contain at least 36 valid characters and an indication of whether the test passed or failed.
The test data shall be displayed but not stored in memory.

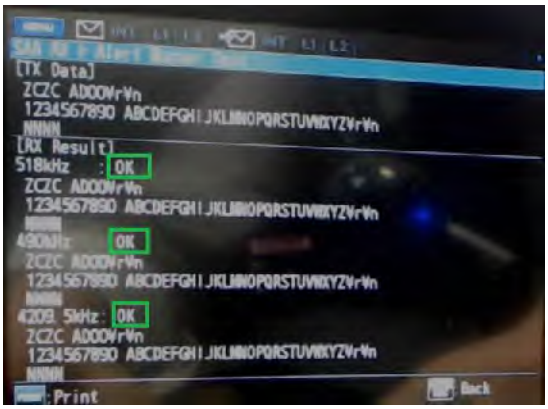
[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	By inspection of the manufacturer's test data and documentation and actuating the test facility. The test display/print-out shall contain at least 36 valid characters and an indication of whether the test passed or failed. The test data shall be displayed but not stored in memory.	STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno, and via verification of video file. Passed. After we run self test, we confirmed below. No.1 Displaying at least 36 characters and test result. No.2 Printing at least 36 characters and test result. No.3 Not storing in memory, by confirming Message List screen. Self test : Menu → Self Test → Receive Monitor Refer to “4-09_08-3 Receiver test facility” movie file.

The self test screen was below.

- Number of characters of test message was 37 characters each the frequency.
  Test Message: 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ
- EUT displayed test result each the frequency.

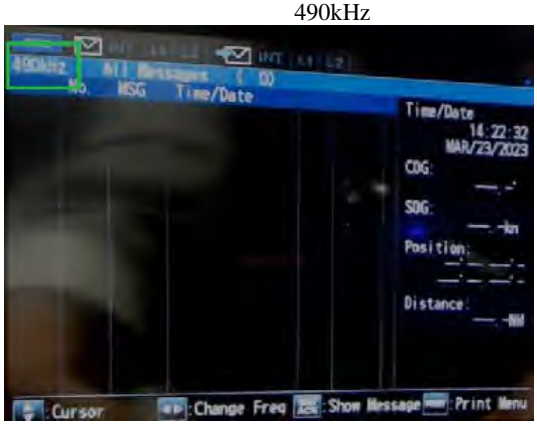


We were able to print test result by pressing Print key.

We confirmed that there was not test message on the message list screen each frequency.

518kHz

490kHz



4209.5kHz

4.10. 8.4 Search and rescue (SAR) alarm provision and reset

[IEC 61097-6 Ed.2]

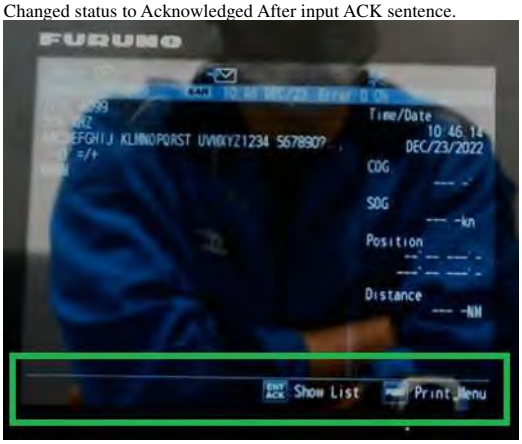
Method of test
An STS with B2 = D is input to the EUT once only.

Required results
An alarm shall be activated. The EUT shall be examined for the means whereby an alarm is generated.
It shall be demonstrated that this alarm can be reset manually via the user interface in the case of an EUT with integral display.
It shall be demonstrated that this alarm can be reset via the INS port and the use of the IEC 61162 'ACK' sentence.
The audible level of the alarm signal shall be measured to be between 75 dBA to 85 dBA.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	An alarm shall be activated. [Test sequence] Seq 1. Setting Alert mode to "Legacy". Seq 2. NAVTEX Simulator transmits an STS with B2 = D message to the EUT once only.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. Refer to "4-10_08-4 Search and rescue (SAR) alarm provision and reset_a)-b)" movie file. We confirmed that alarm was activated. Set Alert Mode to "Legacy". Message ID = AD99 (B2=D message)
b)	It shall be demonstrated that this alarm can be reset manually via the user interface in the case of an EUT with integral display.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno Refer to "4-10_08-4 Search and rescue (SAR) alarm provision and reset_a)-b)" movie file. Press ACK key after alert be activated after a). We confirmed that alarm was reset manually by pressing ACK key.

No.	Check item	Result
c)	It shall be demonstrated that this alarm can be reset via the INS port and the use of the IEC 61162 'ACK' sentence. [Test Sequence] Seq 1. Setting Alert mode to "Legacy". Seq 2. NAVTEX Simulator transmits an STS with B2 = D message to the EUT once only. Seq 3. Input ACK sentence below. $EIACK,3	STEKR, 2023-04-17: Passed. Test witnessed at Furuno Refer to "4-10_08-4 Search and rescue (SAR) alarm provision and reset_c)" movie file. We confirmed that the alarm was able to be reset via INS port and the use of the ACK sentence. When EUT received message. Changed status to Acknowledged After input ACK sentence.  00:00:54 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 : 00:01:20 recv0 $CRALR,,003,A,V,NAVTEX: Search and rescue information*52 <= Alert was activated. : 00:01:31 echo0 $EIACK,3*5A <= Input ACK sentence 00:01:31 recv0 $CRALR,,003,A,A,NAVTEX: Search and rescue information*45 <= Changed to Acknowledged
d)	The audible level of the alarm signal shall be measured to be between 75 dBA to 85 dBA.	STEKR, 2023-04-28: Passed. Verified by inspection of test report. Refer to LIC12-23-030.

4.11. 8.5 Additional alarms

[IEC 61097-6 Ed.2]

Method of test
The manufacturer shall declare any additional alarms available.

Required results
It shall be demonstrated that such additional alarms can be suppressed.
It shall be demonstrated that such additional alarms can be reset.

[Test procedures/ Test Result]

Passed

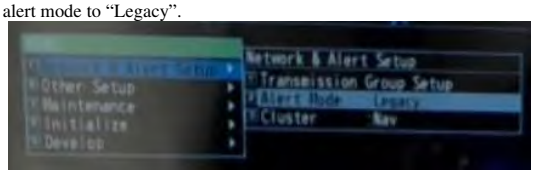
<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td>a)</td><td>The manufacturer shall declare any additional alarms available.</td><td>Declaration.

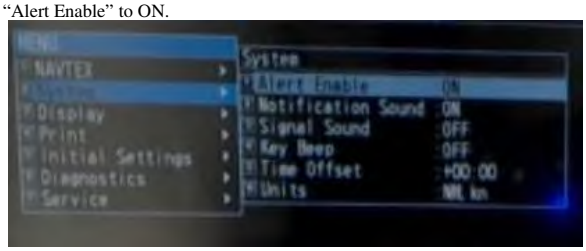
EUT has alarms below.
Refer to Appendix 4 in Operator’s manual.

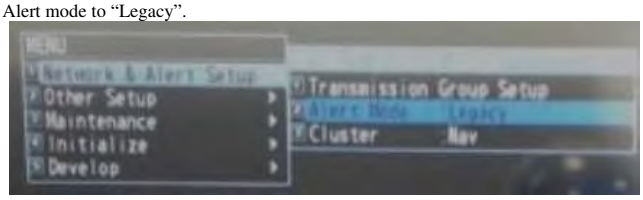
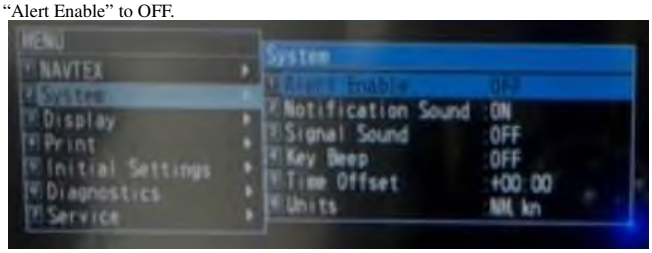
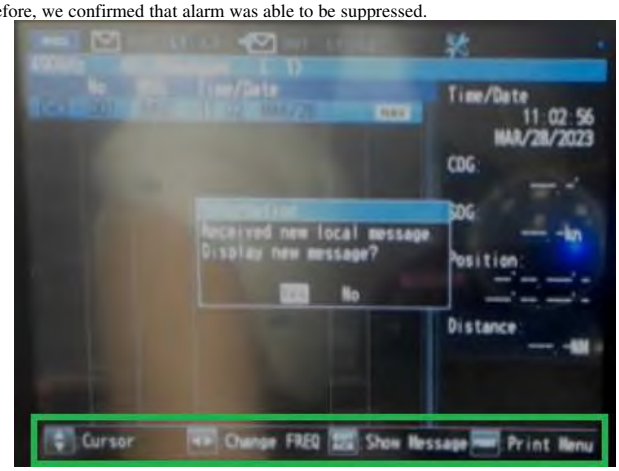
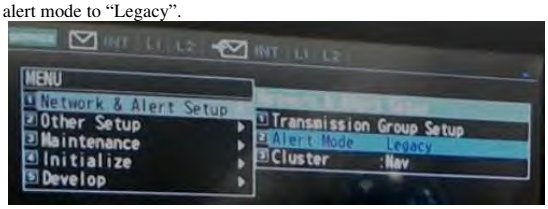
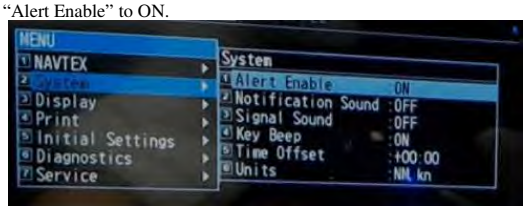
For [Legacy/Alert IF1]
<table>
<tr><th>Alert ID</th><th>Displayed message</th><th>Sub message</th><th>Priority/ Category</th><th>Meaning</th><th>Measures</th></tr>
<tr><td>001</td><td>NAV RX</td><td>Navigational warning</td><td>Warning /A</td><td>SAR message is received</td><td>Check the message contents.</td></tr>
<tr><td>002</td><td>MET RX</td><td>Meteorological warning</td><td>Warning /A</td><td>Navigational warning message is received.</td><td>Check the message contents.</td></tr>
<tr><td>003</td><td>SAR RX</td><td>Search and rescue information</td><td>Warning /A</td><td>Meteorological warning message is received.</td><td>Check the message contents.</td></tr>
<tr><td>051</td><td>PRINTER</td><td>Printer failure</td><td>Warning /A</td><td>Printer error (no paper, not connected to the printer etc.).</td><td>- Check if the thermal paper runs out. See section 3.2 for replacement.
-Check if the printer and the main unit are firmly connected. See section 3.4.</td></tr>
</table></td></tr>
<tr><td>b)</td><td>It shall be demonstrated that such additional alarms can be suppressed.
It shall be demonstrated that such additional alarms can be reset.</td><td>Declaration.

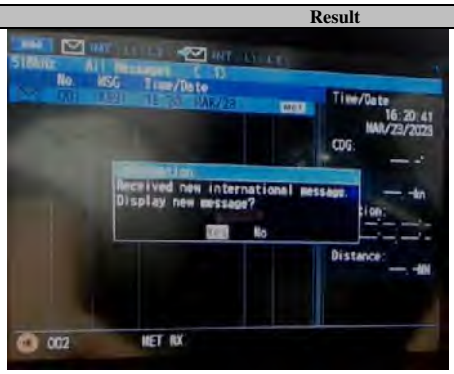
EUT can suppressed alarms below by Alert Enable menu.
Alarm ID = 001, 002, 051.
</td></tr>
<tr><td>b)-1-1</td><td>About Alert ID = 001
NAV RX</td><td>STEKR, 2023-04-27: Passed.
Compliance verified during witnessed testing at Furuno, and via verification of video file.

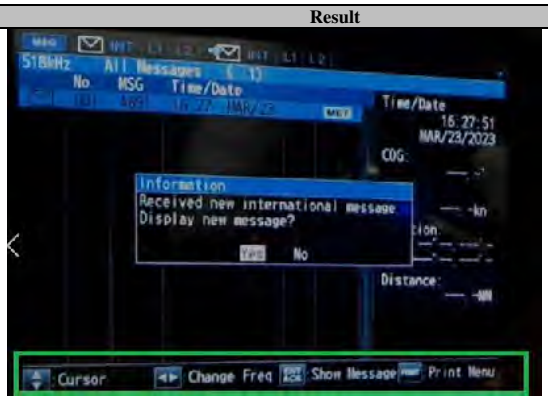
Refer to “4-11_08-5 Additional alarms_b)-1-1” movie file.

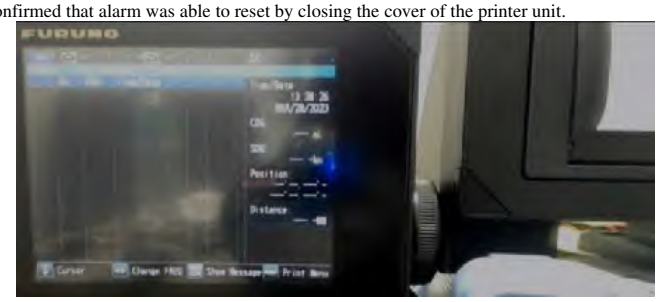
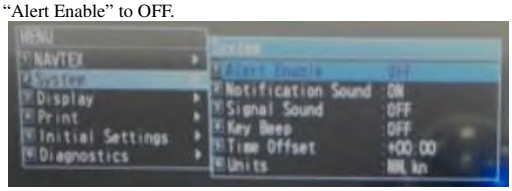
Seq 1. We set alert mode to “Legacy”.
 
</td></tr>
</table>

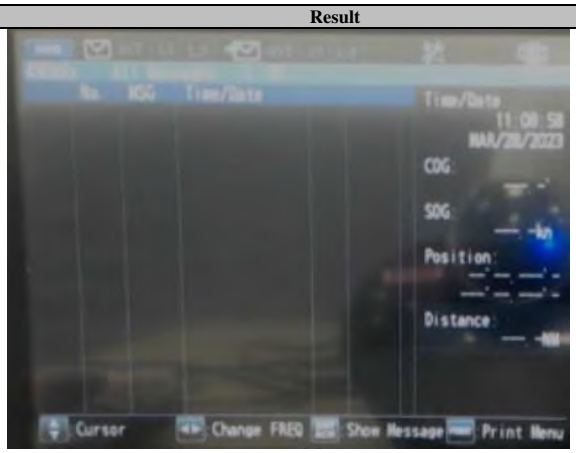
No.	Check item	Result
		Seq 2. We set “Alert Enable” to ON.  Seq 3. NAVTEX Simulator transmitted Navigational warning message. Seq 4. We confirmed that EUT received message and activated alert. 10:52:47 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 : 10:53:06 recv0 $CRALR,,001,A,V,NAVTEX: Navigational warning*23 <= Activated Alert 10:53:06 recv0 $CRNRX,002,001,00,AA91,1,105306,28,03,2023,21,0,A,^0D^0AAA91 TEST MESSAG*2F 10:53:06 recv0 $CRNRX,002,002,00,,,,,,,,,E^0D^0A*39 Seq 5. We confirmed that alarm was able to reset by confirming the message. 10:53:06 recv0 $CRNRX,002,002,00,,,,,,,,,E^0D^0A*39 : 10:53:13 recv0 $CRALR,,001,V,A,NAVTEX: Navigational warning*23 <= Alert was rested.

No.	Check item	Result
b)-1-2		STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno, and via verification of video file. Refer to “4-11_08-5 Additional alarms_b)-1-2” movie file. Seq 1. We set Alert mode to “Legacy”.  Seq 2. We set “Alert Enable” to OFF.  Seq 3. NAVTEX Simulator transmitted Navigational warning message. Seq 4. We confirmed that alarm was not activated. Therefore, we confirmed that alarm was able to be suppressed.  11:02:35 recv0$CRALR,,006,V,V,NAVTEX: General failure*48 11:02:52 recv0$CRNRX,002,001,00,AA91,1,110253,28,03,2023,21,0,A,^0D^0AAA91 TEST MESSAG*2A 11:02:52 recv0$CRNRX,002,002,00,,,,,,,,,,E^0D^0A*39
b)-2-1	About Alert ID = 002 MET RX	Passed. Test witnessed via inspection of video file. Refer to “4-11_08-5 Additional alarms_b)-2-1” movie file. Seq 1. We set alert mode to “Legacy”.  Seq 2. We set “Alert Enable” to ON.  Seq 3. NAVTEX Simulator transmitted Meteorological warning message. Seq 4. We confirmed that EUT received message and activated alert.

No.	Check item	Result
		 02:31:09 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 : 02:31:26 recv0 $CRALR,,002,A,V,NAVTEX: Meteorological warning*2F <= Activated Alert 02:31:26 recv0 $CRNRX,002,001,00,AB91,2,162037,23,03,2023,21,0,A,^0D^0AAB91 TEST MESSAG*27 02:31:26 recv0 $CRNRX,002,002,00,,,,,,,,,,E^0D^0A*39 Seq 5. We confirmed that alarm was able to reset by confirming the message. 02:31:26 recv0 $CRNRX,002,002,00,,,,,,,,,,E^0D^0A*39 : 02:31:33 recv0 $CRALR,,002,V,A,NAVTEX: Meteorological warning*2F <= Alert was reset.
b)-2-2		Passed. Test witnessed via inspection of video file. Refer to “4-11_08-5 Additional alarms_b)-2-2” movie file. Seq 1. We set Alert mode to “Legacy”. Seq 2. We set “Alert Enable” to OFF. Seq 3. NAVTEX Simulator transmitted Meteorological warning message. Seq 4. We confirmed that alarm was not activated. Therefore, we confirmed that alarm was able to be suppressed.

No.	Check item	Result
		 02:38:28 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 02:38:35 recv0 $CRNRX,002,001,00,AB91,2,162746,23,03,2023,21,0,A,^0D^0AAB91 TEST MESSAG*26 02:38:35 recv0 $CRNRX,002,002,00,,,,,,,,,E^0D^0A*39
b)-3-1	About Alert ID = 051 PRINTER	Passed. Test witnessed via inspection of video file. Refer to “4-11_08-5 Additional alarms_b)-3-1” movie file. Seq 1. We set alert mode to “Legacy”. Seq 2. We set “Alert Enable” to ON. Seq 3. We opened the cover of the printer unit. Seq 4. We confirmed that EUT activated alert. Seq 5. We confirmed that alarm was able to be acknowledged by pressing ENT/ACK key.

No.	Check item	Result
		 Seq 6. We confirmed that alarm was able to reset by closing the cover of the printer unit.  13:37:45 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 <= Normal Status 13:38:03 recv0 $CRALR,,051,A,V,NAVTEX: Printer Error*75 <=Alert was activated 13:38:07 recv0 $CRALR,,051,A,A,NAVTEX: Printer Error*62 <=Acknowledged 13:38:24 recv0 $CRALR,,051,V,A,NAVTEX: Printer Error*75 <=Alert was deactivated
b)-3-2		Passed. Test witnessed via inspection of video file. Refer to “4-11_08-5 Additional alarms_b)-3-2” movie file. Seq 1. We set Alert mode to “Legacy”. Seq 2. We set “Alert Enable” to OFF.  Seq 3. We opened the cover of the printer unit. Seq 4. We confirmed that alarm was not activated. Therefore, we confirmed that alarm was able to be suppressed.

No.	Check item	Result
		 11:09:02 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48 11:10:02 recv0 $CRALR,,006,V,V,NAVTEX: General failure*48

4.12. 9 Receiver tests

[IEC 61097-6 Ed.2]

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)		STEKR, 2023-04-27: Passed. Tests witnessed at Furuno, ref separate test report. Refer to K08-17-220_NX-900_DNV type approval testing report (IEC 61097-6 Physical). The result of them is Passed.

4.13. 10.1 Basic requirements

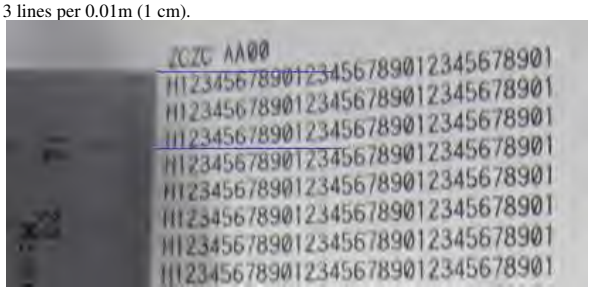
[IEC 61097-6 Ed.2]

Method of test
The manufacturer shall declare the paper requirement and printing capacity of the EUT.

Required results
The declarations in Annex D shall be consistent with a minimum paper and printing capacity of 200 000 characters.
The EUT print-out shall have at least 32 easily legible characters per line. The acoustic noise shall be <60 dBA at a distance of 1 m from any part of the equipment.

[Test procedures/ Test Result]

Passed

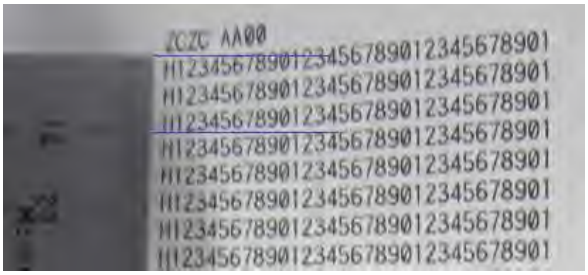
No.	Check item	Result
a)	The manufacturer shall declare the paper requirement and printing capacity of the EUT. An STS shall be applied to the EUT.	STEKR, 2023-04-27: Passed. Verified by inspection of manual. We confirmed that the paper requirement and printing capacity were declared in operator's manual. Refer to section of "SPECIFICATIONS OF NAVTEX RECEIVER NX-900" in operator's manual. **SPECIFICATIONS OF NAVTEX RECEIVER NX-900** **4 PRINTER** 4.1 Printing system — Line thermal head 4.2 Dot pitch — 8 dots/mm 4.3 Number of characters — 32 characters/line 4.4 Printing width — 48 mm 4.5 Printing paper — Thermal paper (57 mm x 30 m) 4.6 Amount of printed characters 200,000 characters available (for optional thermal paper) The declarations in Annex D shall be consistent with a minimum paper and printing capacity of 200 000 characters. The EUT print-out shall have at least 32 easily legible characters per line. The acoustic noise shall be <60 dBA at a distance of 1 m from any part of the equipment.
b)	The declarations in Annex D shall be consistent with a minimum paper and printing capacity of 200 000 characters.	STEKR, 2023-04-27: Passed. Verified by inspection of manual. We confirmed that printing capacity of 200,000 characters was written in operator's manual. Refer to section of "SPECIFICATIONS OF NAVTEX RECEIVER NX-900" in operator's manual. **SPECIFICATIONS OF NAVTEX RECEIVER NX-900** **4 PRINTER** 4.1 Printing system — Line thermal head 4.2 Dot pitch — 8 dots/mm 4.3 Number of characters — 32 characters/line 4.4 Printing width — 48 mm 4.5 Printing paper — Thermal paper (57 mm x 30 m) 4.6 Amount of printed characters 200,000 characters available (for optional thermal paper) We confirmed the printing capacity of 200,0000 characters by calculation. [Calculation] There were 3 lines per 0.01m (1 cm).  The specification of the roll paper is below. (Refer to EQUIPMENT LISTS in Operator's manual.)

<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td></td><td></td><td>
Optional Supply
<table>
<tr><th>Name</th><th>Type</th><th>Code No.</th><th>Remarks</th></tr>
<tr><td>Thermal Paper</td><td>TP058-30CL</td><td>001-097-110</td><td>Width: 57 mm, Roll: 30 m</td></tr>
</table>
The length of the roll paper is 30 m.
30 m ÷ 0.01 m × 3 lines = 9,000 lines

There were 32 characters per 1 line.
9,000 lines × 32 characters = 288,000 characters

We confirmed that the printing capacity was more than 200 000 characters.
</td></tr>
<tr><td>c)</td><td>The EUT print-out shall have at least 32 easily legible characters per line.</td><td>
STEKR, 2023-04-27: Passed.
Verified by inspection of printout
We confirmed that EUT print-out had 32 easily legible character per line.

1 + 10 + 10 + 10 + 1 = 32 characters.
H 1234567890 1234567890 1234567890 1



</td></tr>
<tr><td>d)</td><td>The acoustic noise shall be <60 dBA at a distance of 1m from any part of the equipment.</td><td>
STEKR, 2023-04-27: Passed.

Refer to LIC12-23-030 of IEC 60945 report.
</td></tr>
</table>

4.14. 10.2 Paper roll end alarm and storage inhibition

[IEC 61097-6 Ed.2]

Method of test
The printer shall be set up so that while the STS is received the paper-end alarm is activated.
An STS +6 dB relative to the STS level, with its message content repeated 25 times, shall be applied to the EUT. A new paper roll is then inserted into the printer. One further identical STS shall be applied to the EUT.

Required results
The EUT shall neither print out the initial (for example 25 times long) test message nor store the associated message identifications.
After insertion of the new roll of paper, the EUT shall print out the (one) extra test message.

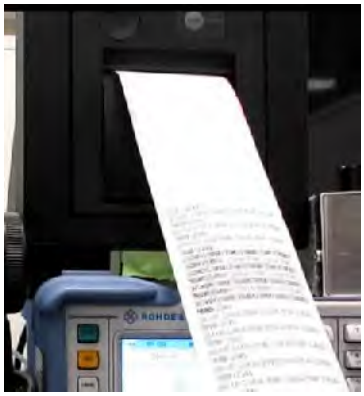
[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The printer shall be set up so that while the STS is received the paper-end alarm is activated. An STS +6 dB relative to the STS level, with its message content repeated 25 times, shall be applied to the EUT. A new paper roll is then inserted into the printer. One further identical STS shall be applied to the EUT. The EUT shall neither print out the initial (for example 25 times long) test message nor store the associated message identifications. After insertion of the new roll of paper, the EUT shall print out the (one) extra test message.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that EUT didn't print out the test message when the paper-end alert was activated. We confirmed that EUT didn't store the test message when the paper-end alert was activated. We confirmed that EUT printed out the extra test message after we inserted the new roll of paper. Refer to "4-14_10-2 Paper roll end alarm and storage inhibition" movie file.
	[Test sequence] Seq 1. Set up paper which would become paper end soon to printer unit. Seq 2. NAVTEX simulator transmits 25 test messages. Paper-end alert is activated while EUT receiving. Confirm printer and storage. Seq 4. Set up new paper. Seq 2. NAVTEX simulator transmits one test message. Seq 8. Confirm printer and storage.	

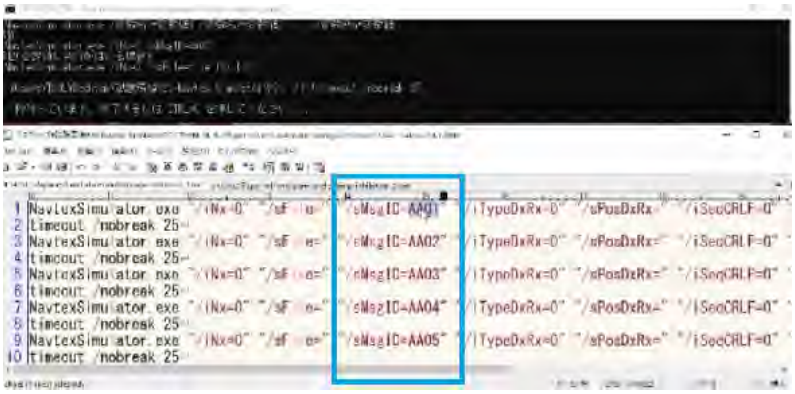
We took 2 video files.
They are the video file of PC side, and the video file of EUT side.
Then, we merged 2 video files.
Refer to “4-14_10-2 Paper roll end alarm and storage inhibition” movie file.

We set up paper which would become paper end soon to printer unit.

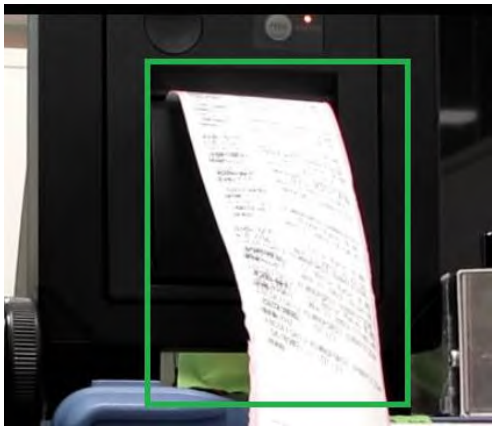


NAVTEX simulator transmitted 25 messages below.

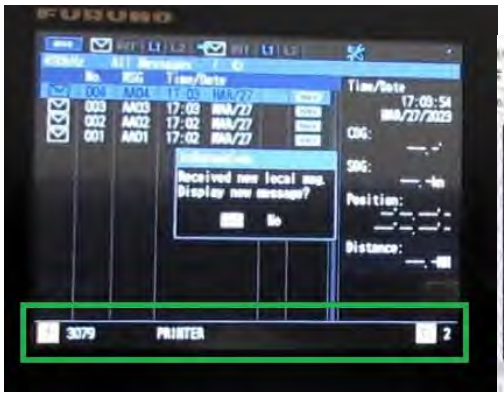
AA01→ AA02→ AA03→ AA04→ AA05→ AA06→ AA07→ AA08→ AA09→ AA10→ AA11→ AA12→
AA13→ AA14→ AA15→ AA16→ AA17→ AA18→ AA19→ AA20→ AA21→ AA22→ AA23→ AA24→ AA25

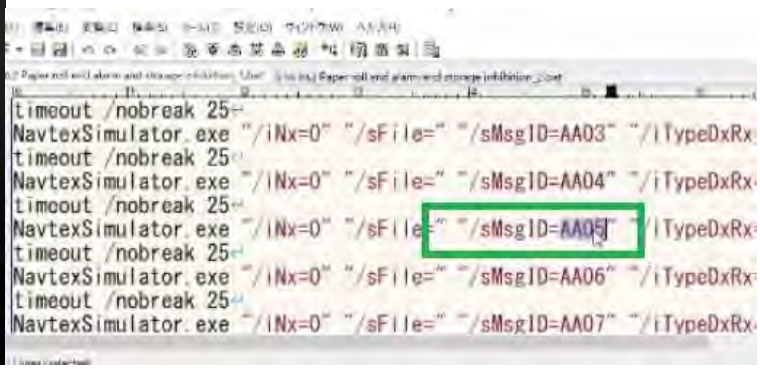


We confirmed that EUT displayed and printed messages from AA01 to AA04 before printer unit became paper end.



Then, printer unit became paper end while EUT received AA05 message.

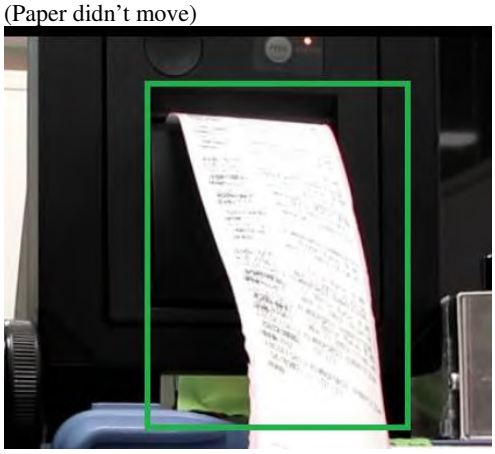




We confirmed that EUT didn't display and print messages from AA05 to AA25 after printer unit became paper end.

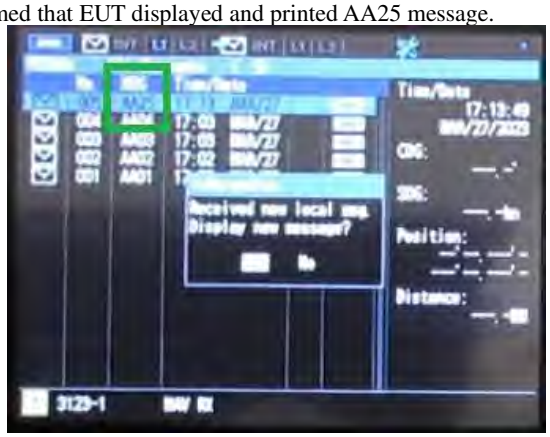
(The screen was not changed)

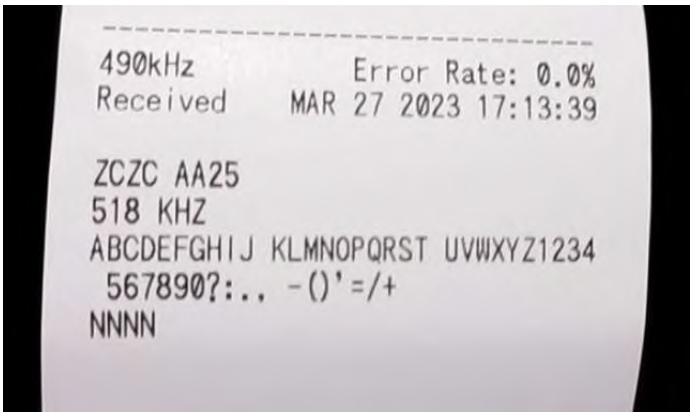
(Paper didn't move)



Then, we set up new paper to printer unit. Printer alert was deactivated.

After that, NAVTEX simulator transmitted one more message (AA25 message).
We confirmed that EUT displayed and printed AA25 message.





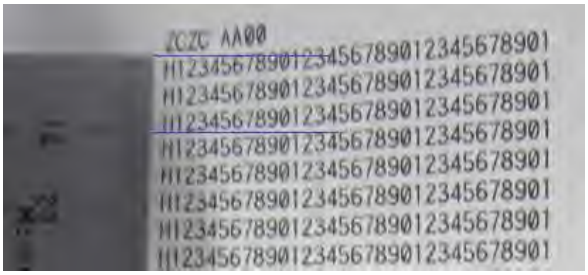
4.15. 10.3 Automatic line feed indication and paper feed

[IEC 61097-6 Ed.2]
Method of test
The manufacturer shall declare the number of characters per line for the EUT. The STS shall be applied to the EUT with a message containing more characters than the declared characters per line.

Required results
Any division of a word by an automatic line feed shall be indicated in the print-out.
There shall be two lines feeds at the end of the message.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	Declaration The manufacturer shall declare the number of characters per line for the EUT.	Declaration. EUT can print 32 characters per line. We confirmed that EUT print-out had 32 easily legible character per line. 1 + 10 + 10 + 10 + 1 = 32 characters. H 1234567890 1234567890 1234567890 1 
b)	NAVTEX simulator transmits a test message. Test messages containing more characters than the declared characters per line. Any division of a word by an automatic line feed shall be indicated in the print-out. There shall be two lines feeds at the end of the message.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that any division of a word by an automatic line feed was indicated in the print-out. We confirmed that there were two lines feeds at the end of the message. Refer to “4-15_10-3 Automatic line feed indication and paper feed” movie file.

4.16. 10.4 Mutilated character indication

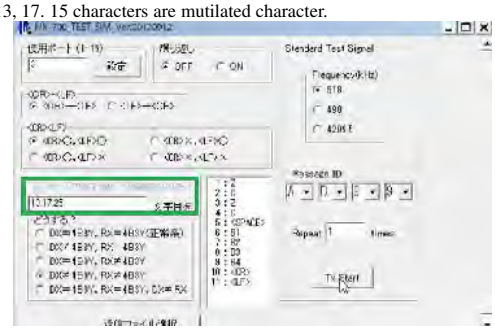
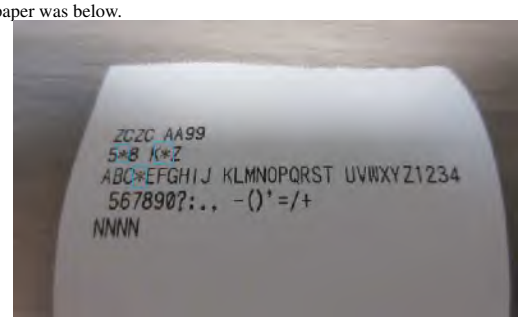
[IEC 61097-6 Ed.2]

Method of test
ITU-R Recommendation M.625 Annex I, 4.6.5 defines the conditions under which a character is defined as mutilated.
A test signal shall be applied to the EUT containing randomly mutilated characters in the message.

Required results
The print-out shall contain an asterisk for each mutilated character.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	A test signal shall be applied to the EUT containing randomly mutilated characters in the message. The print-out shall contain an asterisk for each mutilated character. [Test Sequence] Seq 1. NAVTEX simulator transmits message mutilated characters. No.13, 17. 15 characters are mutilated character. Seq 2. Confirm the printed paper.	STEKR, 2023-04-17: Passed. Test witnessed at Furuno Refer to "4-16_10-04 Mutilated character indication" movie file. We confirmed that the print-out contained an asterisk for each mutilated character. No.13, 17. 15 characters are mutilated character.  The printed paper was below.  12345678910 11 ZCZC AA99<CR><LF> 12 13 14 15 (figure shift) 5 1 8 (space) 16 17 18 19 20 21 (letter shift) K H 2 (space) (carriage return) (line feed) 22 23 24 25 (letter shift) A B C D E F G H I J (space) (letter shift) K L M N O P Q R S T (space) (letter shift) U V W X Y Z (figure shift) 1 2 3 4 (space) (figure shift) 5 6 7 8 9 0 ? : . , (space) (figure shift) - ( ) ' =/+ (space) (carriage return) (line feed)

4.17. 10.5.1 B1/B2 characters selection

[IEC 61097-6 Ed.2]

Method of test
Required results
These tests are in 8.1 and 8.2.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)		Passed. These tests are in 8.1 and 8.2.

4.18. 10.5.2 Printer activation/error-free preamble B1-B4

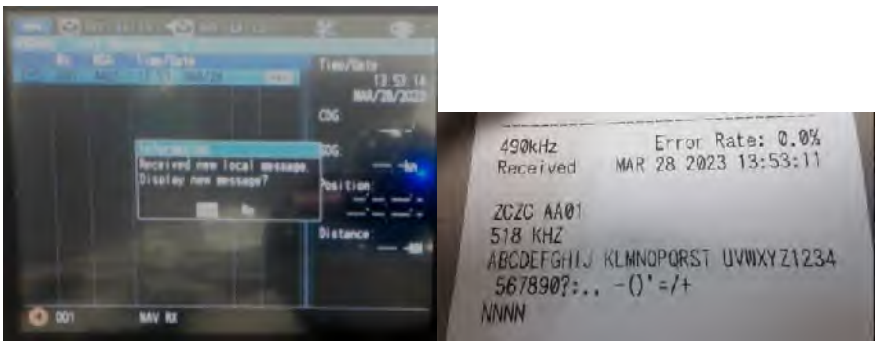
[IEC 61097-6 Ed.2]

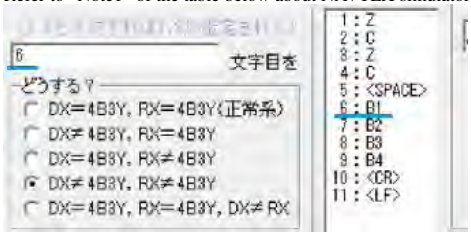
Method of test
The EUT shall be programmed to select specific B1 and B2 characters.
An STS shall be input to the EUT with the B1, B2, B3 and B4 message identification characters mutilated in turn.

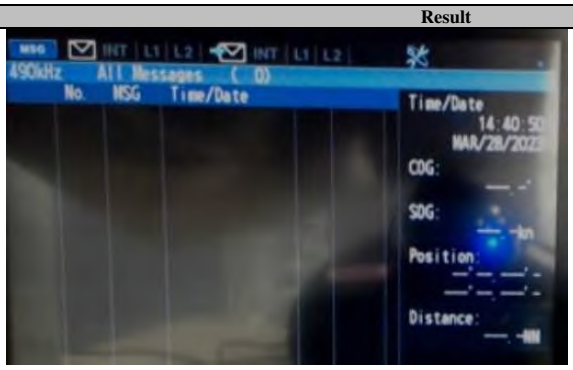
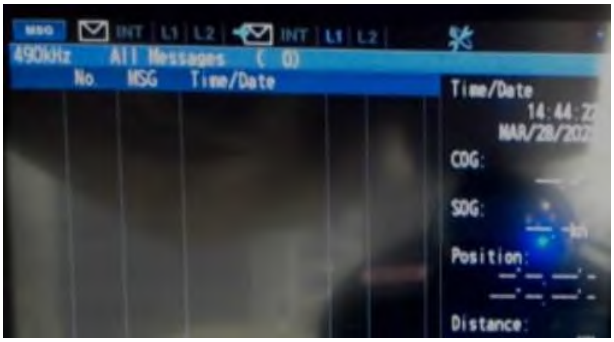
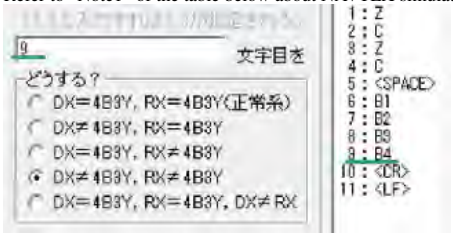
Required results
The EUT shall neither store the message identifications nor print out the messages.

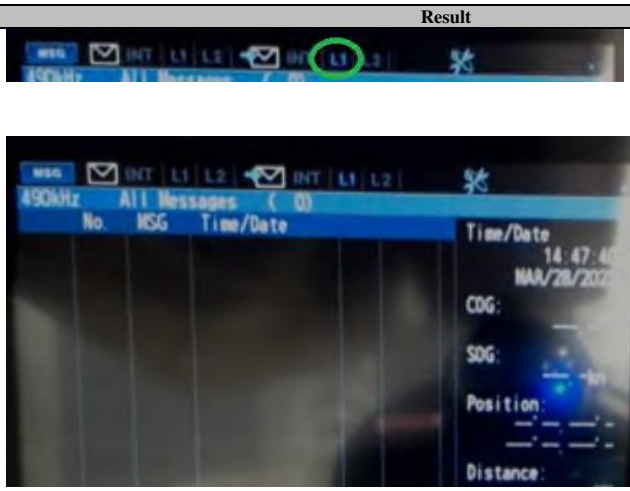
[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The EUT shall be programmed to select specific B1 and B2 characters. An STS shall be input to the EUT with the B1, B2, B3 and B4 message identification characters mutilated in turn. The EUT shall neither store the message identifications nor print out the messages.	STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno The EUT shall neither store the message identifications nor print out the messages. Refer to below in this section. b)-1, b)-2, b-3), b-4), b-5)
b)-1	At first, confirm the case of message with the B1, B2, B3 and B4 message identification characters no mutilated. The EUT is programmed to select below. B1: A, B B2: A, B, D, L The EUT shall store the message identifications and print out the message.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that EUT stored the message identifications and printed out the message. Refer to “4-18_10-5-2 Printer activationerror-free preamble B1-B4_b)-1” movie file.  The screen of Receive Message Mask

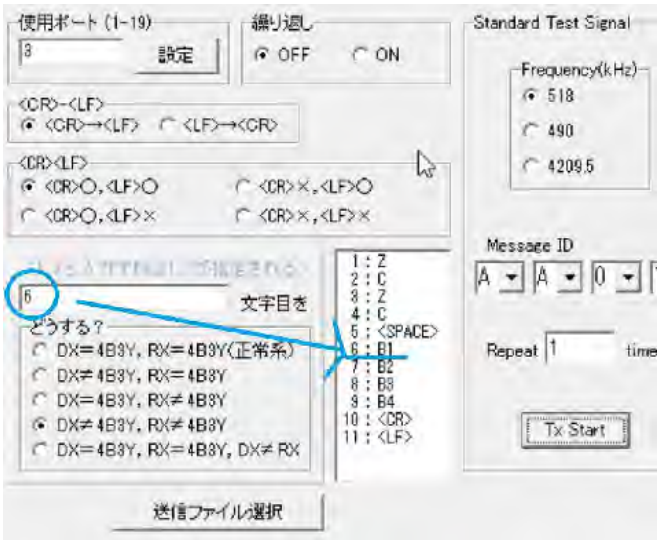
No.	Check item	Result
b)-2	Confirm the case of message below. B1: Character mutilated. B2: Character no mutilated. B3: Character no mutilated. B4: Character no mutilated. The EUT is programmed to select below. The setting of b)-2 is same as b)-1. The EUT shall neither store the message identifications nor print out the messages.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT didn't store the message identifications and didn't print out the messages. EUT didn't store the message identifications and EUT didn't print out the message. Refer to "4-18_10-5-2 Printer activationerror-free preamble B1-B4_b)-2" movie file. Refer to "Note1" of the table below about NAVTEX simulator application.  Although icon was lights up (received message), EUT didn't display message. And printer unit didn't work.
b)-3	Confirm the case of message below. B1: Character no mutilated. B2: Character mutilated. B3: Character no mutilated. B4: Character no mutilated. The EUT is programmed to select below. The setting of b)-2 is same as b)-1. The EUT shall neither store the message identifications nor print out the messages.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT didn't store the message identifications and didn't print out the messages. EUT didn't store the message identifications and EUT didn't print out the message. Refer to "4-18_10-5-2 Printer activationerror-free preamble B1-B4_b)-3" movie file. Refer to "Note1" of the table below about NAVTEX simulator application. Although icon was lights up (received message), EUT didn't display message. And printer unit didn't work.

No.	Check item	Result
		
b)-4	Confirm the case of message below. B1: Character no mutilated. B2: Character no mutilated. B3: Character mutilated. B4: Character no mutilated. The EUT is programmed to select below. The setting of b)-2 is same as b)-1. The EUT shall neither store the message identifications nor print out the messages.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT didn't store the message identifications and didn't print out the messages. EUT didn't store the message identifications and EUT didn't print out the message. Refer to "4-18_10-5-2 Printer activationerror-free preamble B1-B4_b)-4" movie file. Refer to "Note1" of the table below about NAVTEX simulator application. Although icon was lights up (received message), EUT didn't display message. And printer unit didn't work. 
b)-5	Confirm the case of message below. B1: Character no mutilated. B2: Character no mutilated. B3: Character no mutilated. B4: Character mutilated. The EUT is programmed to select below. The setting of b)-2 is same as b)-1. The EUT shall neither store the message identifications nor print out the messages.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT didn't store the message identifications and didn't print out the messages. EUT didn't store the message identifications and EUT didn't print out the message. Refer to "4-18_10-5-2 Printer activationerror-free preamble B1-B4_b)-5" movie file. Refer to "Note1" of the table below about NAVTEX simulator application.  Although icon was lights up (received message), EUT didn't display message. And printer unit didn't work.

No.	Check item	Result
		

[Note 1]

Refer to figure below.
This is application for NAVTEX Simulator.
If we input number in edit box, the character of the number becomes character mutilated.
In this case, B1 character becomes character mutilated.



4.19. 10.5.3 Non-repetitive printing of a message

[IEC 61097-6 Ed.2]

Method of test
Required results
This test is covered by 11.3.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)		Passed This test is covered by 11.3. Therefore, refer to section 11.3.

4.20. 10.5.4 Message with B3B4 = 00

[IEC 61097-6 Ed.2]

Method of test
The EUT shall be programmed to select a specific B1 character.
An STS +6 dB relative to the STS level, with B3B4 = 00 and with the selected B1 and then with a B1 not selected, shall be applied to the EUT.

Required results
The EUT shall always print, store and display the test message when transmitted with B1 selected.

FEC comment:
We think that the information of this test is not enough about below.
A. There is no explanation what value B2 is.
B. There is no explanation of required results when transmitted with a B1 not selected.

But the specification of B3B4=00 message is written in section 4.3.5 in this standard.
4.3.5 Mandatory printing/display
(540/AII.6) A message shall always be printed, stored, and displayed if B3 B4 = 00 and if it is transmitted by a coast station that the equipment is programmed to select.

Therefore, we confirm that EUT always print, store and display the test message regardless B2 when EUT received message with the selected B1.
So, we use message a B2 not selected, as test message.
And we confirm that EUT doesn't print, store and display the test message when ETU received message with a B1 not selected.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The EUT shall be programmed to select a specific B1 character. An STS +6 dB relative to the STS level, with B3B4 = 00 and with the selected B1 and then with a B1 not selected, shall be applied to the EUT. The EUT shall always print, store and display the test message when transmitted with B1 selected.	
a)-1	[Test Sequence] Seq 1. Set B1 to Z on Receive Message Mask screen. Seq 2. Set B2 to not Z on Receive Message Mask screen. Seq 2. NAVTEX Simulator transmits test message with B1=Z, B2=not Z B3=0 and B4=0.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that EUT printed, stored, and displayed the test message when transmitted with B1 selected. Refer to "4-20_10-5-4 Message with B3B4 = 00_a)-1" movie file.
a)-2	[Test Sequence] Seq 1. After a)-1. Seq 2. NAVTEX Simulator transmits test message with B1 = not Z, B2=Z, B3=0, and B4=0.	Passed. We confirmed that EUT didn't print, store, and display the test message when transmitted with not B1 selected. Refer to "4-20_10-5-4 Message with B3B4 = 00_a)-2" movie file.

Refer to “4-20_10-5-4 Message with B3B4 = 00_a)-1” movie file.

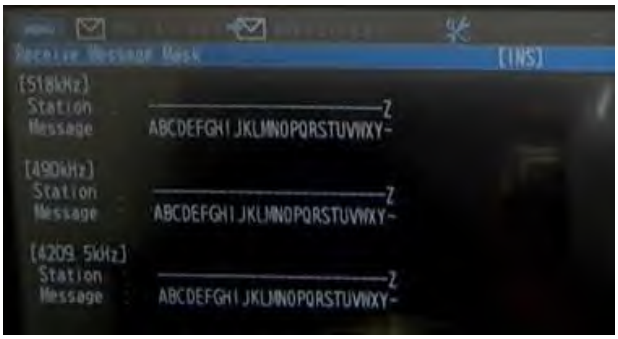
a)-1

Refer to “4-20_10-5-4 Message with B3B4 = 00_a)-1” movie file.

The settings of “Receive Message Mask” were below.

B1: EUT can receive only Z.

B2: EUT can receive except Z.



NAVTEX Simulator transmitted message (Message ID = ZZ00).
EUT received message.
Then, EUT displayed message and printed message.

a)-2

Refer to “4-20_10-5-4 Message with B3B4 = 00_a)-2” movie file.
Although icon was light up (received message), EUT didn’t displayed message, and EUT didn’t print message.

4.21. 11.1 Internal storage, message tagging and erasure of oldest message identifications

11 Memory tests
These tests require that the manufacturer provides a method of deleting all stored messages via a method unavailable to the end user.
The manufacturer shall also provide a 'standard test file' STF which shall be used to pre-load and 100 % fill the non-volatile message memory, and a method of loading this file into memory.

The message storage capacity shall be declared by the manufacturer.
The EUT must be configured to display/print the stations and message types used in the test.

[IEC 61097-6 Ed.2]
This test is not required for EUTs with integral printers and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
a) The STF shall be used to pre-load and 100 % fill the non-volatile message memory. The size of this file shall be defined by the manufacturer and the last message shall be MSGn.
b) The 5 oldest messages shall then be tagged for permanent retention.
c) A test script consisting of 10 unique identifiable messages each 500 characters long shall be sent to the EUT.
d) The tagged messages shall then be untagged and a new test script of ten unique messages (MSG 211-220) shall then be sent to the EUT.

Required results
The following results are required:
a) a check of the EUT shall indicate that all messages of the STF have been stored;
b) the EUT shall be checked to ensure it has correctly tagged the messages;
c) a check of the EUT shall indicate that all messages of the test script have been stored, that the first (oldest) 5 tagged messages are still stored and that the next 10 oldest messages of the STF are no longer stored;
d) a check of the EUT shall indicate that the 10 oldest messages have been replaced by the 10 new messages.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)-1	[Declaration] The message storage capacity shall be declared by the manufacturer.	[Declaration] Refer to SPECIFICATION OF NAVTEX RECEIVER in operator's manual. Spec is below. Message capacity : 500 characters with 200 messages × 3 channels **SPECIFICATIONS OF NAVTEX RECEIVER** **NX-900** **2 MAIN UNIT** 2.1 Screen type: 5.7-inch color TFT, 640 x 480 (VGA) 2.2 Screen size: 115.2 (W) x 86.4 (H) mm 2.3 Brightness: 394 cd/m² typical 2.4 Brilliance: 20 steps (off to maximum brightness) 2.5 Display color: Day/Night mode 2.6 Display modes: Message list, Message details 2.7 Message capacity: 500 characters with 200 messages x 3 channels 2.8 Alert category: Navigational warning Meteorological warning Search and rescue information Printer error
a)-2	[Declaration] These tests require that the manufacturer provides a method of deleting all stored messages via a method unavailable to the end user.	[Declaration] EUT has the function which can delete message. The end user can't use this function, because this function needs the password which the end user doesn't know. Menu->Service Menu->Initialize->Delete All message.
a)-3	[Declaration] The manufacturer shall also provide a 'standard test file' STF which shall be used to pre-load and 100 % fill the non-volatile message memory, and a method of loading this file into memory.	[Declaration] EUT has the function which can fill memory by messages (STF). The end user can't use this function, because this function needs the password which the end user doesn't know. Menu->Service Menu->Developer Menu->Fill Memory

No.	Check item	Result
b)-a)	The STF shall be used to pre-load and 100 % fill the non-volatile message memory. The size of this file shall be defined by the manufacturer and the last message shall be MSGn. Results required is all messages of the STF have been stored. [Test Sequence] Seq 1. Run “Fill Memory”. NAVTEX messages stored MSG1 MSG2 | | | MSGn	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. Refer to “4-21_11-1 Internal storage, message tagging and erasure of” movie file. We confirmed that the memory in EUT filled by messages (STF). N of MSGn is 200.
b)-b)	The 5 oldest messages shall then be tagged for permanent retention. Results required is it has correctly tagged the messages. NAVTEX messages stored MSG1 TAG MSG2 TAG MSG3 TAG MSG4 TAG MSG5 TAG MSG6 | | | MSGn	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. Refer to “4-21_11-1 Internal storage, message tagging and erasure of” movie file. We confirmed that EUT correctly tagged the 5 oldest messages. ↓ Tagged

<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td></td><td></td><td>
</td></tr>
<tr><td>b)-c)</td><td>A test script consisting of 10 unique identifiable messages each 500 characters long shall be sent to the EUT.

Results required is all messages of the test script have been stored
Results required the first (oldest) 5 tagged messages are still stored and that the next 10 oldest messages of the STF are no longer stored.

[Test Sequence]
Seq 1. NAVTEX Simulator transmits 10 messages below.
AZ11, BZ11, CZ11, DZ11, EZ11,
FZ11, GZ11, HZ11, IZ11, JZ11

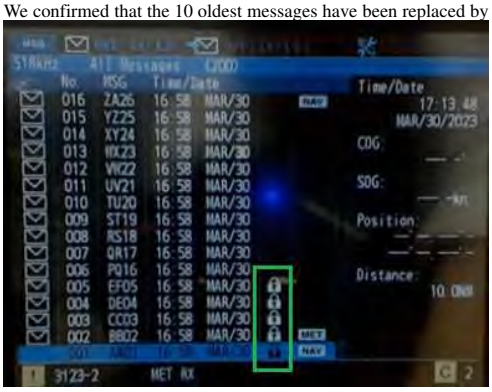
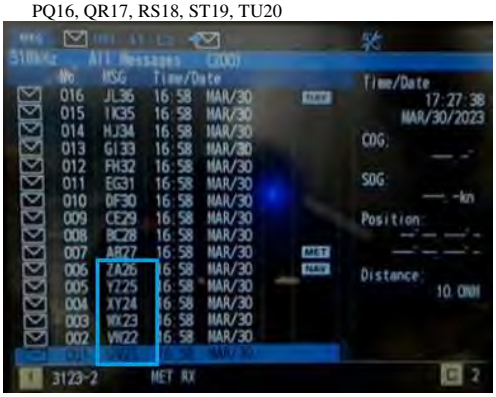
<table>
<tr><th>NAVTEX messages stored</th></tr>
<tr><td>MSG1 TAG</td></tr>
<tr><td>MSG2 TAG</td></tr>
<tr><td>MSG3 TAG</td></tr>
<tr><td>MSG4 TAG</td></tr>
<tr><td>MSG5 TAG</td></tr>
<tr><td>MSG16</td></tr>
<tr><td>|
|</td></tr>
<tr><td>MSGn</td></tr>
<tr><td>MSGn+1</td></tr>
<tr><td>|
|
|</td></tr>
<tr><td>MSGn+10</td></tr>
</table></td><td>STEKR, 2023-04-17: Passed.
Test witnessed at Furuno.

Refer to “4-21_11-1 Internal storage, message tagging and erasure of” movie file.
We confirmed that all messages of the test script had been stored.
We confirmed that the first (oldest) 5 tagged messages were still stored.
We confirmed that the next 10 oldest messages of the STF were no longer stored.

↓
Removed 10 messages below.
FG06, GH07, HI08, IJ09, JK10,
KL11, LM12, MN13, NO14, OP16

And there were 5 tagged messages. (EF05, DE04, CC03, BB02, AA01)

Stored new 10 messages.
AZ11, BZ11, CZ11, DZ11, EZ11,
FZ11, GZ11, HZ11, IZ11, JZ11
 </td></tr>
<tr><td>b)-d)</td><td>The tagged messages shall then be untagged and a new test script of ten unique messages (MSG 211-220) shall</td><td>STEKR, 2023-04-17: Passed.
Test witnessed at Furuno.</td></tr>
</table>

No.	Check item	Result
	then be sent to the EUT. Results required the 10 oldest messages have been replaced by the 10 new messages. [Test Sequence] Seq 1. Set tagged 5 messages to untagged. Seq 2 NAVTEX Simulator transmits 10 messages below. AY22, BY11, CY11, DY11, EY11, FY11, GY11, HY11, IY11, JY11 NAVTEX messages stored MSG21 MSG22 MSG23 MSG24 MSG25 MSG26 : MSGn MSGn+1 : MSGn+20	Refer to "4-21_11-1 Internal storage, message tagging and erasure of" movie file. We confirmed that the 10 oldest messages have been replaced by the 10 new messages.  ↓ untagged ↓ Removed 10 messages below. AA01, BB02, CC03, DE04, EF05 PQ16, QR17, RS18, ST19, TU20  And, stored new 10 messages. AY22, BY11, CY11, DY11, EY11, FY11, GY11, HY11, IY11, JY11

4.22. 11.2 Erasure of message identifications/storage time

[IEC 61097-6 Ed.2]

This test is required for EUTs that do not contain an integral printer and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test

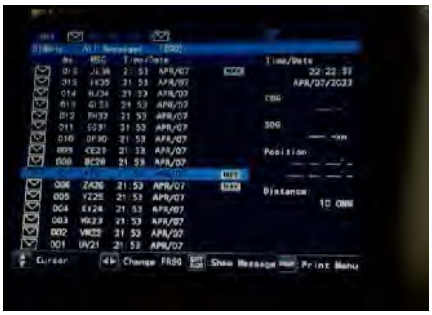
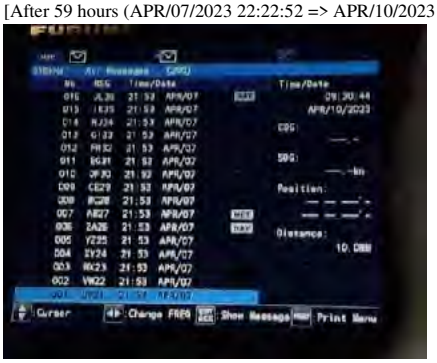
After the test of 11.1 wait 59 h and then apply to the EUT one more message with a specific message identification previously used and currently stored in the EUT.
At the same time, tag another of the previously used messages for permanent retention.
Wait another 2 h and apply a new previously unused message ‘A’.
Check the contents of non-volatile message storage.
Wait another 12 h, check the contents of non-volatile message storage.
Then again apply the test script of 11.1 with the message identifications previously used.
Check non-volatile storage for the last time.

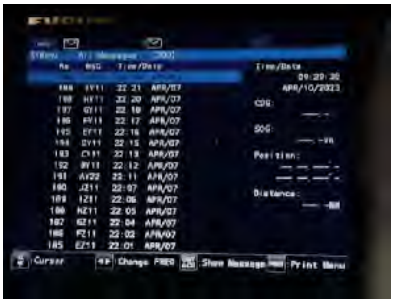
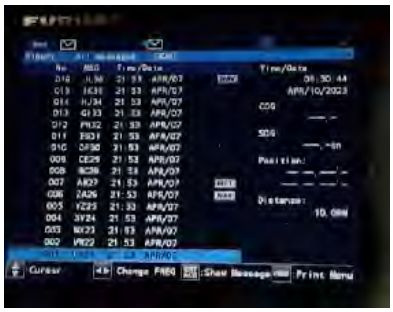
Required results

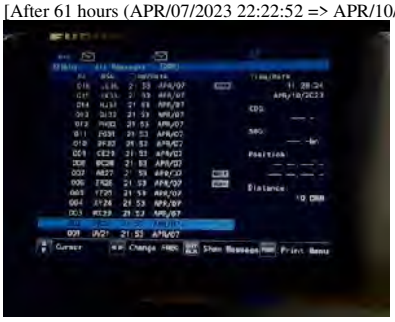
A check of the EUT shall indicate that the message applied after 59 h was not stored and did not overwrite any of the stored contents of the EUT.
A check of the EUT shall indicate that the message ‘A’ applied after 61 h was stored and overwrote the oldest message stored in the EUT.
A check of the EUT after 73 h shall indicate that only message ‘A’ and the message tagged for retention are stored in the EUT.
After applying the test script the EUT shall contain the contents of the test script, message ‘A’, and the message tagged for retention.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	After the test of 11.1 wait 59 h.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to “4-21_11-1 Internal storage, message tagging and erasure of” movie file. EUT after completing the 4-21_11-1 test  Refer to “4-22_11-2 Erasure of message identifications_01 half” movie file. EUT after 59 hours is below. [After 59 hours (APR/07/2023 22:22:52 => APR/10/2023 09:29:27)] 

No.	Check item	Result
	Apply to the EUT one more message with a specific message identification previously used and currently stored in the EUT. [Test Sequence] Seq 1. NAVTEX Simulator transmits AY22 of message ID of message. Seq 2. Check message list screen.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to “4-22_11-2 Erasure of message identifications_01 half” movie file. We confirmed EUT was not stored and did not overwrite any of the stored contents of the EUT. EUT didn't receive message (Message ID = AY22) although mail icon was lighted.  
	Tag another of the previously used messages for permanent retention.	R STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to “4-22_11-2 Erasure of message identifications_02 half” movie file. We tagged another of the previously used messages for parameter retention.

No.	Check item	Result
	Wait another 2 h and apply a new previously unused message 'A'. Check the contents of non-volatile message storage. A check of the EUT shall indicate that the message 'A' applied after 61 h was stored and overwrote the oldest message stored in the EUT. [Test Sequence] Seq 1. NAVTEX Simulator transmits AX22 of message ID of message. This message is message 'A'. Seq 2. Check message list screen.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to "4-22_11-2 Erasure of message identifications_02 half" movie file. We confirmed that ETU stored message A and overwrote the oldest message (ID=UV21) stored. [After 61 hours (APR/07/2023 22:22:52 => APR/10/2023 11:28:24)]  [Navtex Simulator transmitted message A (Message ID=AX22)] ETU stored message A and overwrote the oldest message stored.
	Wait another 12 h, check the contents of non-volatile message storage. A check of the EUT after 73 h shall indicate that only message 'A' and the message tagged for retention are stored in the EUT.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to "4-22_11-2 Erasure of message identifications_03 half" movie file. We confirmed that there were Message A and the message tagged. [After 73 hours (APR/07/2023 22:22:52 => APR/10/2023 23:37:27)]

No.	Check item	Result
	Again, apply the test script of 11.1 with the message identifications previously used. Check non-volatile storage for the last time. After applying the test script the EUT shall contain the contents of the test script, message 'A', and the message tagged for retention. [Test Sequence] Seq 1. NAVTEX Simulator transmits test script with the message identifications previously used. Message ID is below. Seq 2. Check message list screen.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. Refer to "4-22_11-2 Erasure of message identifications_03 half" movie file. We confirmed that there were test script message, message 'A', and the message tagged for retention. Please refer to the video file "4-22_11-2 Erasure of message identifications_04 half" for the contents of each message.

4.23. 11.3 Storage of message identifications

[IEC 61097-6 Ed.2]
This test is required for EUTs with an integral printer only and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
An STS is applied to the EUT.
The test signal shall be so composed that the message identification is correct.
The signal shall contain a character error rate of <4 %.
The STS shall be repeated 35 times with unique message identification for each transmission.
After the first part of this test, wait 59 h and then apply to the EUT one more message with a specific message identification previously used and currently stored in the EUT.
Wait another 2 h and apply a new previously unused message 'A'. Check the contents of non-volatile message storage.
Wait another 12 h, check the contents of non-volatile message storage.
Then again apply the test script with the message identifications previously used. Check non-volatile storage for the last time.

Required results
The print-out or display of the test messages shall be examined and the character error rate shall not exceed 4 %.
The message identifications shall be stored.
A check of the EUT shall indicate that the message applied after 59 h was not stored and did not overwrite any of the stored contents of the EUT.
A check of the EUT shall indicate that the message 'A' applied after 61 h was stored in the EUT.
A check of the EUT after 73 h shall indicate that only message 'A' was stored in the EUT.
After applying the test script the EUT shall contain the contents of the test script and message A.

[Test procedures/ Test Result]
This test is required for EUTs with an integral printer only and can be conducted using any combination of the declared receive frequencies as the source of test messages.

N.A.

No.	Check item	Result
a)	An STS is applied to the EUT. The test signal shall be so composed that the message identification is correct. The signal shall contain a character error rate of <4 %. The STS shall be repeated 35 times with unique message identification for each transmission. After the first part of this test, wait 59 h and then apply to the EUT one more message with a specific message identification previously used and currently stored in the EUT. Wait another 2 h and apply a new previously unused message 'A'. Check the contents of non-volatile message storage. Wait another 12 h, check the contents of non-volatile message storage. Then again apply the test script with the message identifications previously used. Check non-volatile storage for the last time. The print-out or display of the test messages shall be examined and the character error rate shall not exceed 4 %. The message identifications shall be stored. A check of the EUT shall indicate that the message applied after 59 h was not stored and did not overwrite any of the stored contents of the EUT. A check of the EUT shall indicate that the message 'A' applied after 61 h was stored in the EUT. A check of the EUT after 73 h shall indicate that only message 'A' was stored in the EUT. After applying the test script the EUT shall contain the contents of the test script and message A.	N.A. EUT is not the product with an integral printer. Therefore, this test is not available.

4.24. 11.4 Reception of messages with character errors

[IEC 61097-6 Ed.2]
This test is required for all EUTs and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
a)
An STS is applied to the EUT. The test signal shall be so composed that the message identification is correct.
The signal shall contain a character error rate of >20 % and ≤33 %.
The STS shall be repeated 35 times with unique message identification for each transmission.
There shall then be a check of the contents of message memory (for non-printing EUTs) or the print-out (printing NAVTEX).

b)
An STS with the same 35 message identifications shall be applied to the EUT.
The signal shall contain a character error rate of >4 % and ≤20 %.
There shall then be a check of the contents of message memory (for non-printing EUTs) or the print-out (printing NAVTEX).

Required results
a) The EUT shall store (non-printing EUTs) or print (printing EUTs) the 35 messages, each indicating character error rate of >20 % and ≤33 %.
b) The EUT shall store (non-printing EUTs) or print (printing EUTs) the 35 messages, each indicating character error rate of >4 % and ≤20 %.

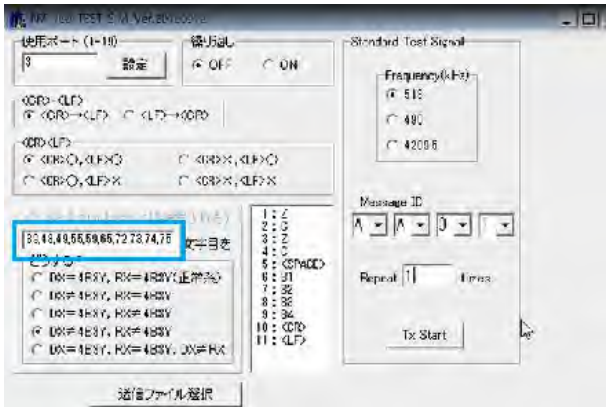
[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	An STS is applied to the EUT. The test signal shall be so composed that the message identification is correct. The signal shall contain a character error rate of >20 % and ≤33 %. The STS shall be repeated 35 times with unique message identification for each transmission. There shall then be a check of the contents of message memory (for non-printing EUTs) or the print-out (printing NAVTEX). The EUT shall store (non-printing EUTs) or print (Printing EUTs) the 35 messages, each indicating character error rate of >20 % and ≤33 %. [Test Sequence] Seq1. NAVTEX Simulator transmits 35 messages below. AA01, AA02, AA03,…, AA35 Error character rate of each message is rate of 25.4%.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT shall store and print the 35 messages, each indicating character error rate of > 20% and ≦ 33 %. Refer to “4-24_11-4 Reception of messages with character errors” movie file.
b)	An STS with the same 35 message identifications shall be applied to the EUT. The signal shall contain a character error rate of >4 % and ≤20 %. There shall then be a check of the contents of message memory (for non-printing EUTs) or the print-out (printing NAVTEX). [Test Sequence] Seq1. NAVTEX Simulator transmits 35 messages below. AA01, AA02, AA03,…, AA35 (Same Message ID of a) test) Error character rate of each message is rate of 15.2%.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. The EUT shall store (non-printing EUTs) or print (printing EUTs) the 35 messages, each indicating character error rate of >4 % and ≤20 %. Refer to “4-24_11-4 Reception of messages with character errors” movie file.

a)

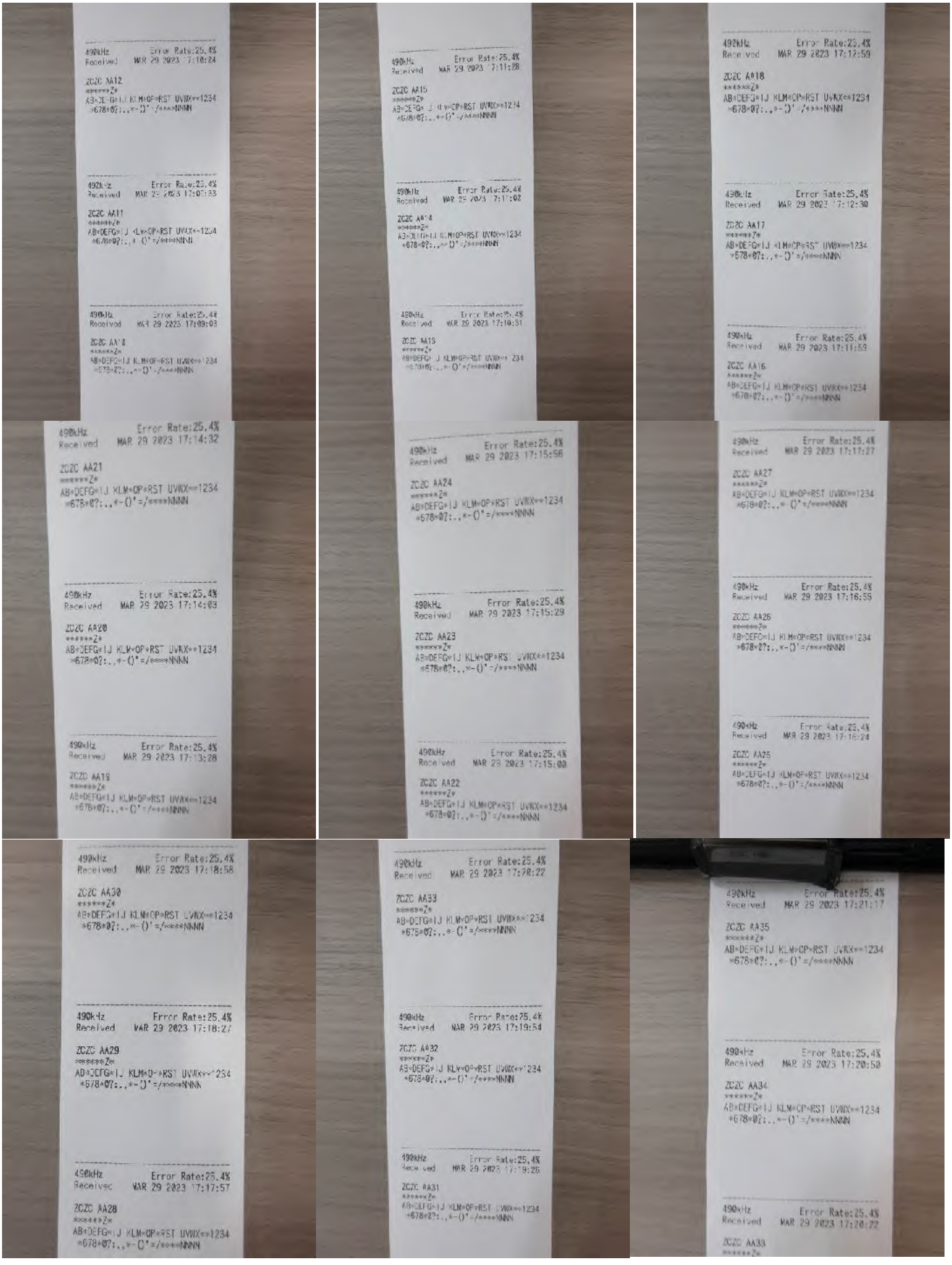
The place of characters mutilated in message is below.



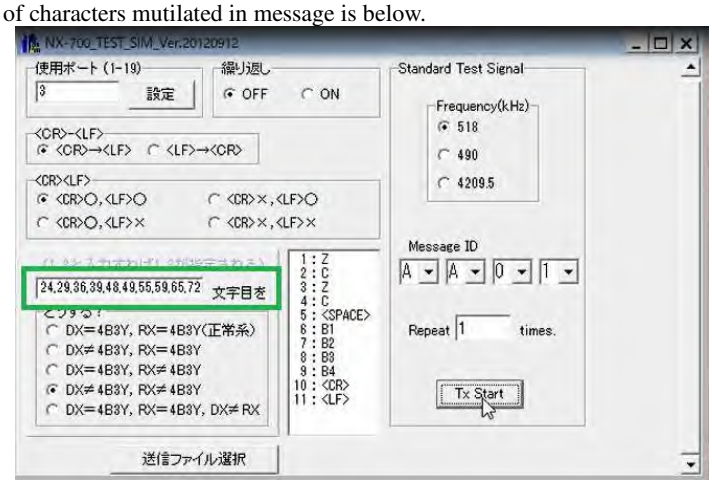
The place of characters mutilated is 12,13,14,15,16,17,19,24,29,36,39,48,49,55,59,65,72,73,74,75. Error Rate = 25.4%（20 characters / 79 characters）

The error rate become 25.4 %

NAVTEX simulator transmitted 35 messages with error rate 25.4 %.
We confirmed that EUT received these messages.
We confirmed that EUT printed these messages.


490kHz Error Rate:25.4%
Received MAR 29 2023 17:10:24
ZCZC AA12
490kHz Error Rate:25.4%
Received MAR 29 2023 17:07:53
ZCZC AA11
490kHz Error Rate:25.4%
Received MAR 29 2023 17:09:03
ZCZC AA18
490kHz Error Rate:25.4%
Received MAR 29 2023 17:11:28
ZCZC AA15
490kHz Error Rate:25.4%
Received MAR 29 2023 17:10:31
ZCZC AA13
490kHz Error Rate:25.4%
Received MAR 29 2023 17:12:59
ZCZC AA18
490kHz Error Rate:25.4%
Received MAR 29 2023 17:12:30
ZCZC AA17
490kHz Error Rate:25.4%
Received MAR 29 2023 17:11:59
ZCZC AA16
490kHz Error Rate:25.4%
Received MAR 29 2023 17:14:32
ZCZC AA21
490kHz Error Rate:25.4%
Received MAR 29 2023 17:14:03
ZCZC AA20
490kHz Error Rate:25.4%
Received MAR 29 2023 17:13:28
ZCZC AA19
490kHz Error Rate:25.4%
Received MAR 29 2023 17:15:56
ZCZC AA24
490kHz Error Rate:25.4%
Received MAR 29 2023 17:15:29
ZCZC AA23
490kHz Error Rate:25.4%
Received MAR 29 2023 17:15:00
ZCZC AA22
490kHz Error Rate:25.4%
Received MAR 29 2023 17:17:27
ZCZC AA27
490kHz Error Rate:25.4%
Received MAR 29 2023 17:16:55
ZCZC AA26
490kHz Error Rate:25.4%
Received MAR 29 2023 17:16:24
ZCZC AA25
490kHz Error Rate:25.4%
Received MAR 29 2023 17:18:58
ZCZC AA30
490kHz Error Rate:25.4%
Received MAR 29 2023 17:17:57
ZCZC AA28
490kHz Error Rate:25.4%
Received MAR 29 2023 17:20:28
ZCZC AA33
490kHz Error Rate:25.4%
Received MAR 29 2023 17:19:54
ZCZC AA32
490kHz Error Rate:25.4%
Received MAR 29 2023 17:21:17
ZCZC AA35
490kHz Error Rate:25.4%
Received MAR 29 2023 17:20:50
ZCZC AA34
490kHz Error Rate:25.4%
Received MAR 29 2023 17:20:22
ZCZC AA33

b)
After a) test,
The place of characters mutilated in message is below.

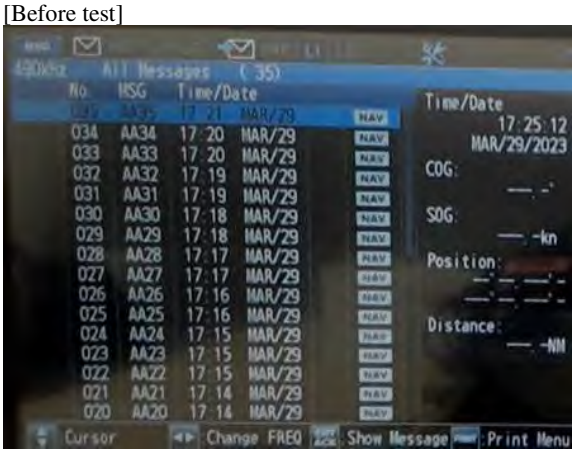


The place of characters mutilated is 15,19,24,29,36,39,48,49,55,59,65,72. Error Rate = 15.2%（12 characters / 79 characters）

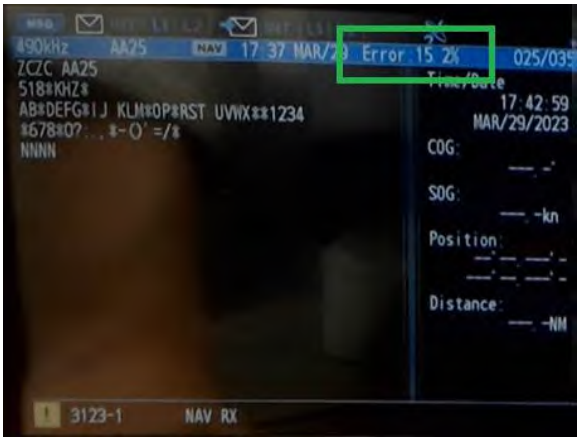
The error rate become 15.2 %

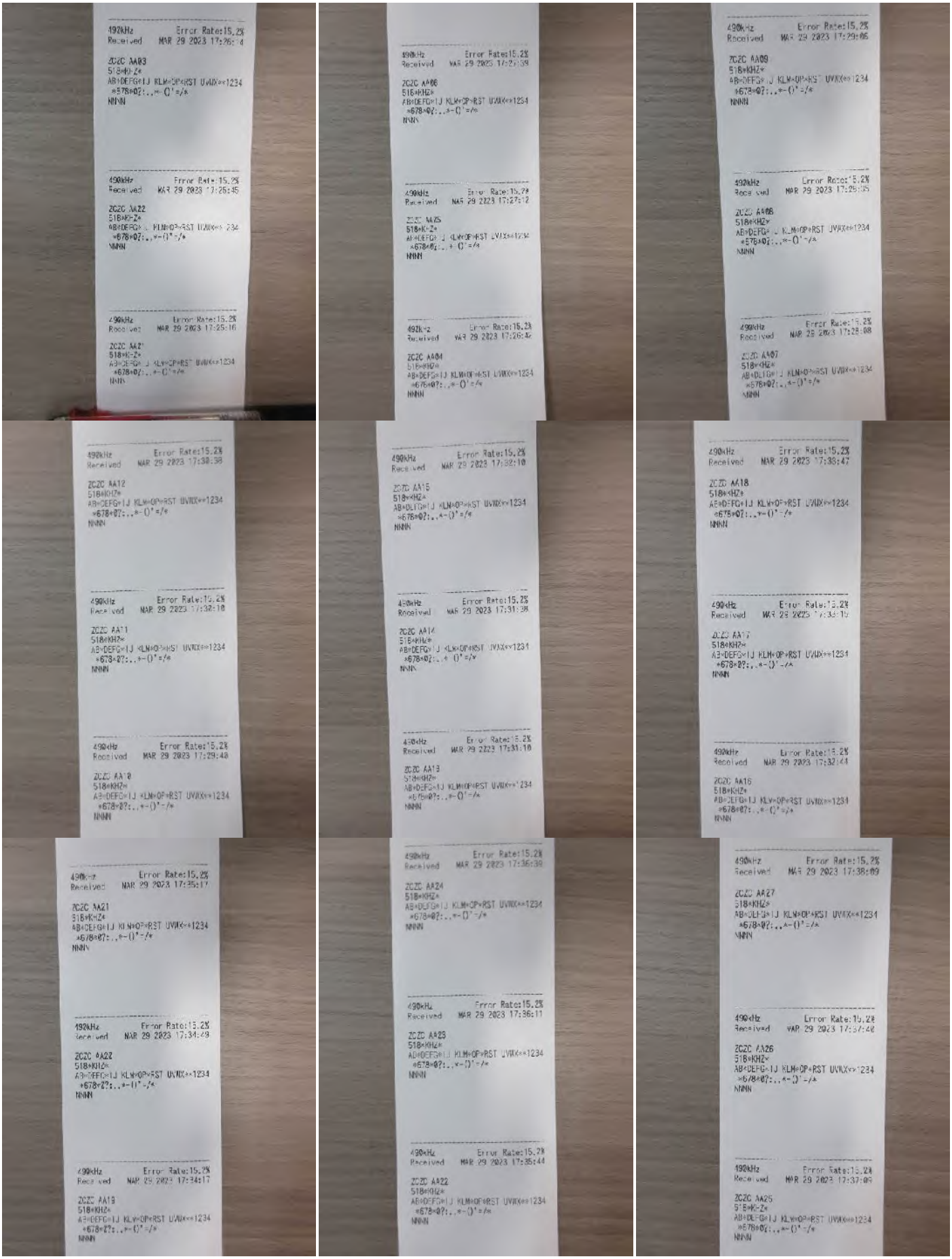
NAVTEX simulator transmitted 35 messages with error rate 15.2 %.
We confirmed that EUT received these messages.　(There was mail icon about all messages.)
We confirmed that EUT printed these messages.

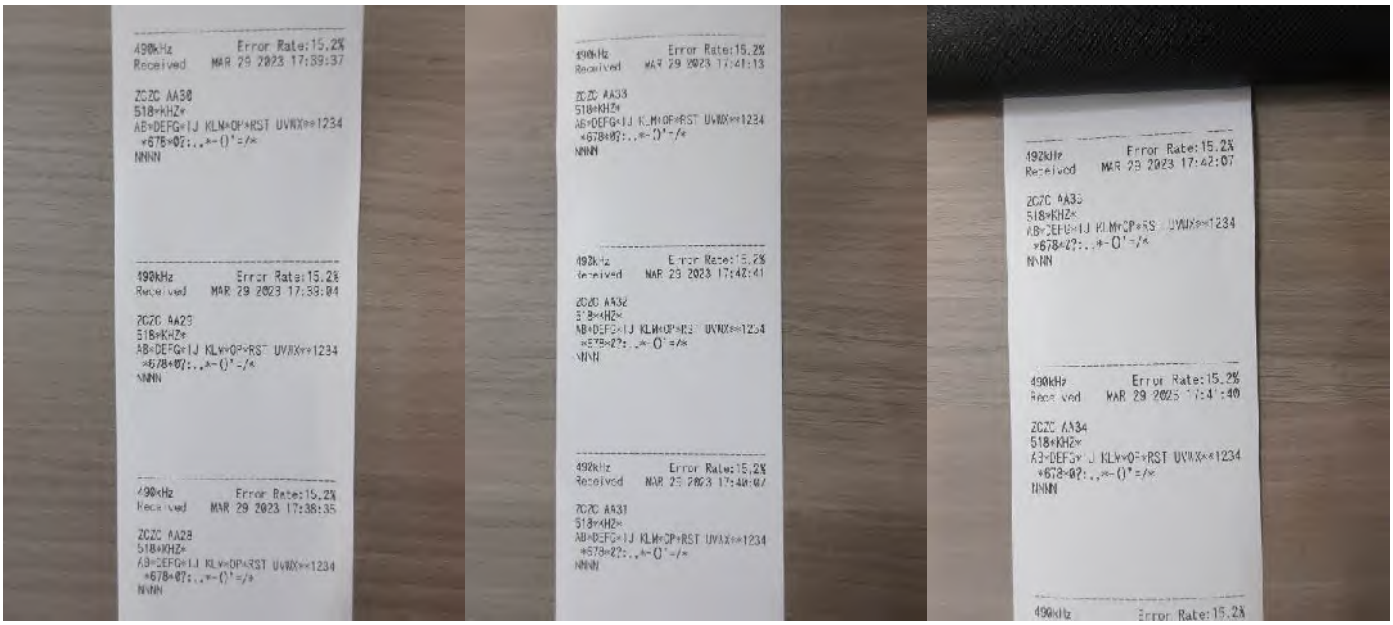
[Before test]



[After test]






490kHz Error Rate:15.2%
Received MAR 29 2023 17:39:37
ZCZC AA30
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
192kHz Error Rate:15.2%
Received MAR 29 2023 17:39:04
ZCZC AA29
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
490kHz Error Rate:15.2%
Received MAR 29 2023 17:38:35
ZCZC AA28
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
490kHz Error Rate:15.2%
Received MAR 29 2023 17:41:13
ZCZC AA33
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
192kHz Error Rate:15.2%
Received MAR 29 2023 17:42:41
ZCZC AA32
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
492kHz Error Rate:15.2%
Received MAR 29 2023 17:40:07
ZCZC AA31
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
192kHz Error Rate:15.2%
Received MAR 29 2023 17:42:07
ZCZC AA35
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN
490kHz Error Rate:15.2%
Received MAR 29 2023 17:40:40
ZCZC AA34
518*KHZ*
AB*DEFG*IJ KLM*OP*RST UVWX**1234
*678*9?:.,*-()'=/*
NNNN

4.25. 11.5 Unsatisfactory reception

[IEC 61097-6 Ed.2]
This test is required for all EUTs and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
An STS is applied to the EUT.
The test signal shall be so composed that the message identification is correct.
The signal shall contain a character error rate of >33 %.
The STS shall be repeated 35 times with unique message identification for each transmission.

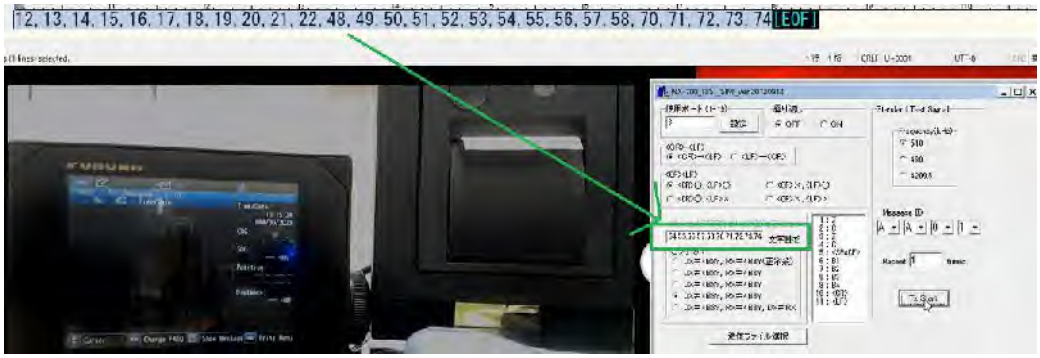
Required results
The EUT shall not store messages or message identifications.
An EUT with an integral printer shall not print any of the test messages.

[Test procedures/ Test Result]

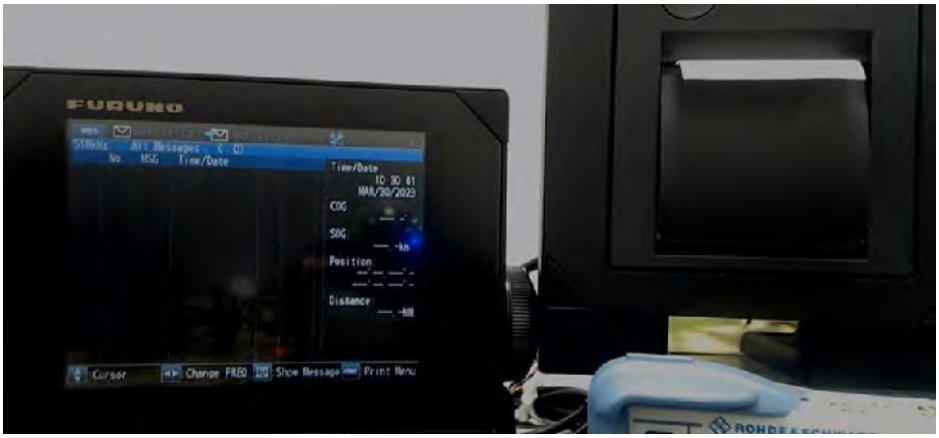
Passed

No.	Check item	Result
a)	An STS is applied to the EUT. The test signal shall be so composed that the message identification is correct. The signal shall contain a character error rate of >33 %. The STS shall be repeated 35 times with unique message identification for each transmission. The EUT shall not store messages or message identifications. An EUT with an integral printer shall not print any of the test messages. [Test Sequence] Seq1. NAVTEX Simulator transmits 35 messages below. AA01, AA02, AA03,…, AA35 Error character rate of each message is rate 34.2%.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that the EUT did not store messages or message identifications. EUT is not EUT with printer internal. Therefore, we don't need to confirm that EUT doesn't print any of the test messages. Refer to "4-25_11-5 Unsatisfactory reception" movie file.

The place of characters mutilated in message is below.



The error rate become 34.2% (27 characters / 79 characters).
NAVTEX simulator transmitted 35 messages with error rate 34.2 %.
We confirmed that EUT didn't receive these messages.
We confirmed that EUT didn't printed these messages.



4.26. 11.6 Power-off check

[IEC 61097-6 Ed.2]
This test is required for all EUTs that do not contain an integral printer and can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
The STF shall be loaded into the EUT.
The power shall be removed for a period of 6 h.
Power shall then be applied, and the contents of the non-volatile message storage shall then be checked.
The previously applied settings for transmitter coverage area (B1) and message type (B2) for each receiver and any other settings that the manufacturer has declared are non-volatile shall also be checked.

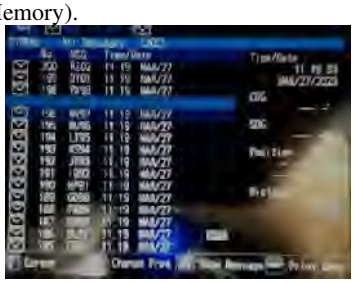
Required results
After a 6 h power-down cycle the EUT's non-volatile message storage shall contain the set of messages defined in the STF.
All settings that the manufacturer has declared as non-volatile shall be unchanged from before the power-off cycle.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The STF shall be loaded into the EUT. The power shall be removed for a period of 6 h. Power shall then be applied and the contents of the non-volatile message storage shall then be checked. The previously applied settings for transmitter coverage area (B1) and message type (B2) for each receiver and any other settings that the manufacturer has declared are non-volatile shall also be checked. After a 6 h power-down cycle the EUT's non-volatile message storage shall contain the set of messages defined in the STF. All settings that the manufacturer has declared as non-volatile shall be unchanged from before the power-off cycle. [Test Sequence] Seq1. Run "Fill Memory" function to load STF. Seq 2. Set B1 and B2. Seq 3. Turn off. Seq 4. Turn on after 6 hours. Seq 5. Check the message, B1, and B2. Seq 6. Check all settings that the manufacturer has declared. These settings are the list below.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that EUT's non-volatile message storage contained the set of messages defined in the STF. We confirmed that all settings that the manufacturer has declared as non-volatile were unchanged from before the power-off cycle. Refer to "4-26_11-6 Power-off check_the 1st half" movie file. Refer to "4-26_11-6 Power-off check_the 2nd half" movie file.

In advance, EUT loaded STF message by developer's function (Fill Memory).

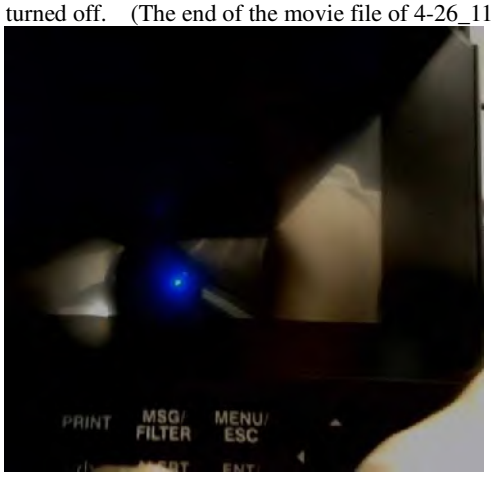


We took 2 video by dividing because video file size become large size.
We input Query sentence per 1 min below to check power on/off of EUT using log file.

$EICRQ,NRM

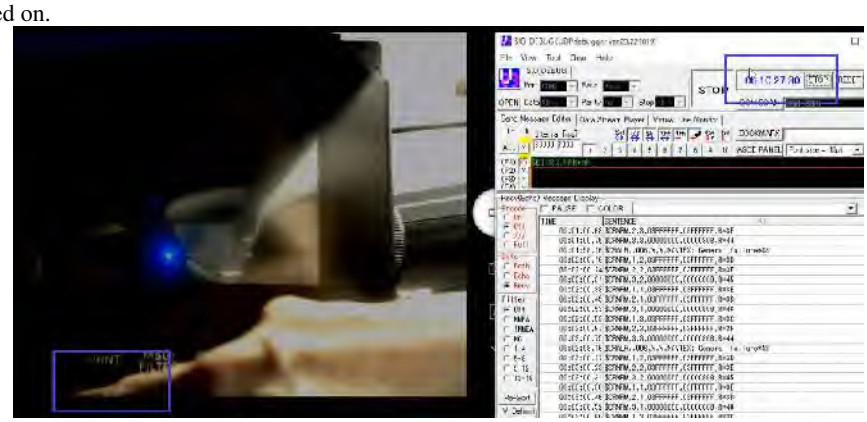
If EUT receive NRM, then EUT output NRM sentence as acknowledge.
Therefore, If no acknowledge then the power condition of EUT is off.
If acknowledge then the power condition of EUT is on.

We confirmed all parameters on the all screen to confirm unchanging all parameters from before the power-off cycle.
Then, EUT turned off. (The end of the movie file of 4-26_11-6 Power-off check_the 1st half)



00:03:00	echo0	$EICRQ,NRM*31	<= Input Query Sentence
00:03:00	recv0	$CRNRM,1,2,03FFFFFF,03FFFFFF,R*3D	<= ACK
00:03:00	recv0	$CRNRM,2,2,03FFFFFF,03FFFFFF,R*3E	<= ACK
00:03:00	recv0	$CRNRM,3,2,00000000,0000080B,R*45	<= ACK
00:03:00	recv0	$CRNRM,1,1,03FFFFFF,03FFFFFF,R*3E	<= ACK
00:03:00	recv0	$CRNRM,2,1,03FFFFFF,03FFFFFF,R*3D	<= ACK
00:03:00	recv0	$CRNRM,3,1,00000000,0000080B,R*46	<= ACK
00:03:00	recv0	$CRNRM,1,3,03FFFFFF,03FFFFFF,R*3C	<= ACK
00:03:00	recv0	$CRNRM,2,3,03FFFFFF,03FFFFFF,R*3F	<= ACK
00:03:00	recv0	$CRNRM,3,3,00000000,0000080B,R*44	<= ACK
		:	
00:04:00	echo0	$EICRQ,NRM*31	<= Input Query Sentence (No Acknowledged => power off)
00:05:00	echo0	$EICRQ,NRM*31	<= Input Query Sentence (No Acknowledged => power off)
00:06:00	echo0	$EICRQ,NRM*31	<= Input Query Sentence (No Acknowledged => power off)
		:	
		:	

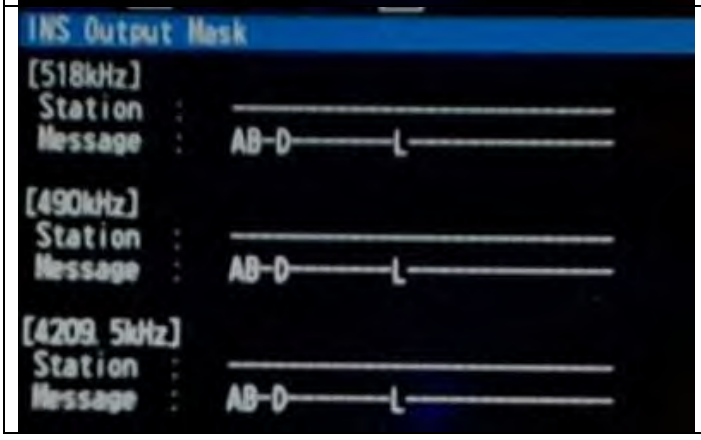
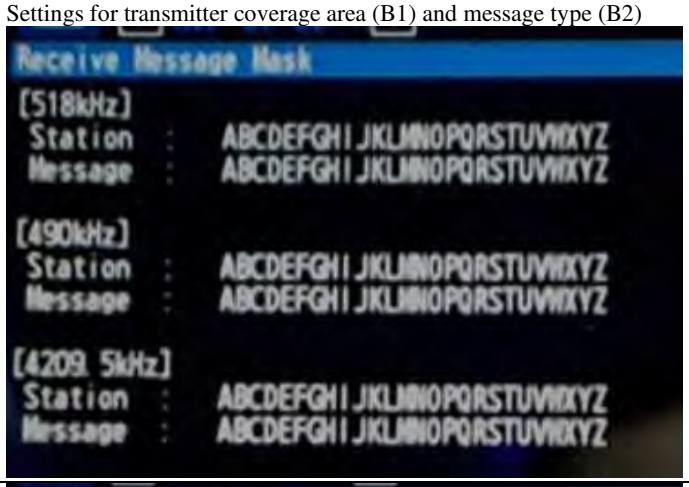
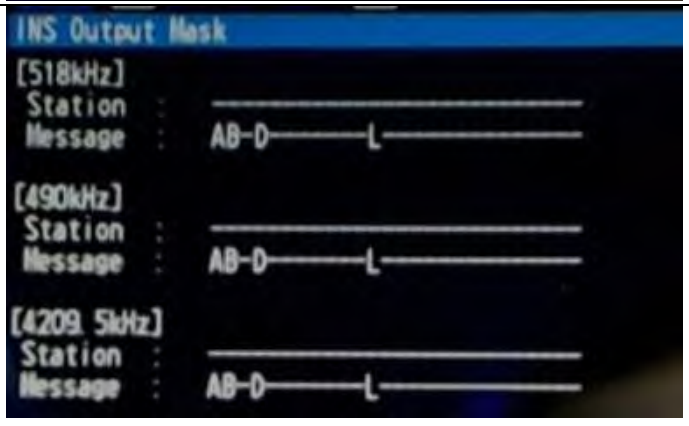
We started taking video of “4-26_11-6 Power-off check_the 2nd half” after about 6 hours.
Refer to “4-26_11-6 Power-off check_the 2nd half” movie file.
EUT turned on.

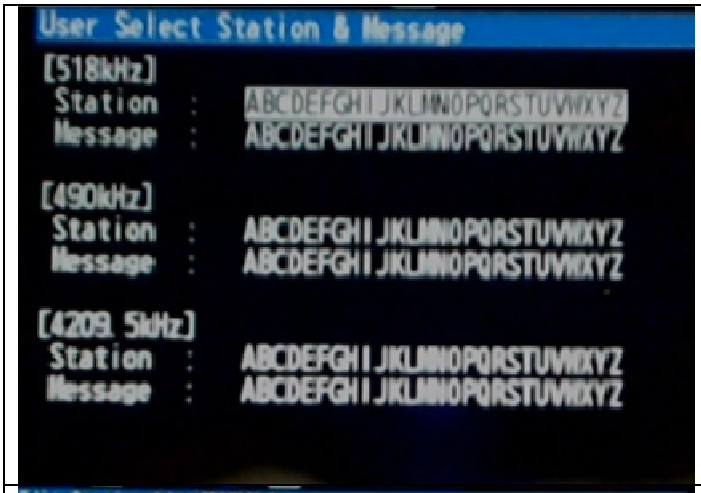


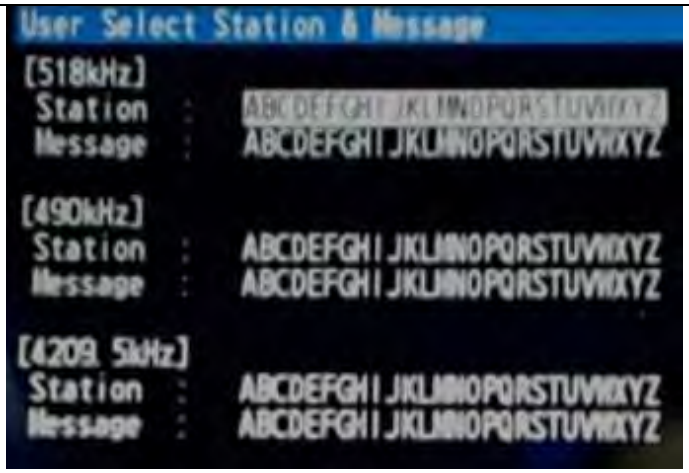
```
00:03:00 echo0 $EICRQ,NRM*31                                  <= Input Query Sentence
00:03:00 recv0 $CRNRM,1,2,03FFFFFF,03FFFFFF,R*3D  <= ACK
                                :
00:04:00 echo0 $EICRQ,NRM*31                                  <= Input Query Sentence    (No Acknowledged => power off)
                                :
                                :
06:09:00 echo0 $EICRQ,NRM*31                                  <= Input Query Sentence    (No Acknowledged => power off)
06:10:00 echo0 $EICRQ,NRM*31                                  <= Input Query Sentence    (No Acknowledged => power off)
06:11:00 echo0 $EICRQ,NRM*31                                  <= Input Query Sentence
06:11:00 recv0  $CRNRM,1,2,03FFFFFF,03FFFFFF,R*3D             <= ACK    (Started up)     ( After about 6 hours)
06:11:00 recv0  $CRNRM,2,2,03FFFFFF,03FFFFFF,R*3E             <= ACK    (Started up)     ( After about 6 hours)
06:11:00 recv0  $CRNRM,3,2,00000000,0000080B,R*45             <= ACK    (Started up)     ( After about 6 hours)
```

We confirmed all parameters on the all screen by comparing to confirm unchanging all parameters from before the power-off cycle.

Before power off Refer to “4-26_11-6 Power-off check_the 1st half” movie file.	After power on (After 6 hours) Refer to “4-26_11-6 Power-off check_the 2nd half” movie file.
518kHz 	518kHz
490kHz 	490kHz

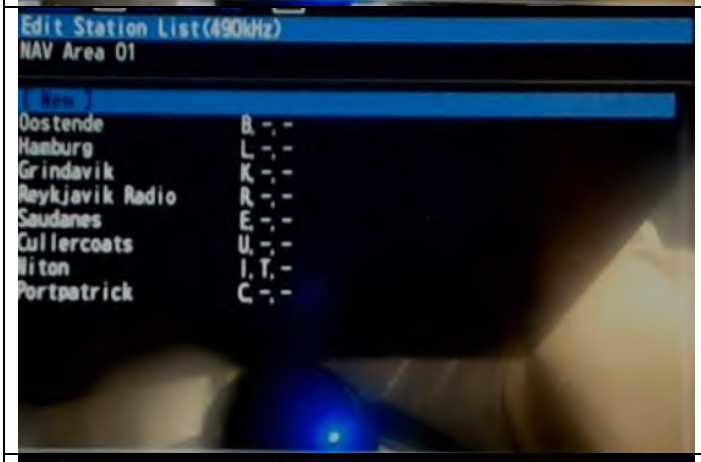
4209.5kHz 	4209.5kHz
Settings for transmitter coverage area (B1) and message type (B2)  	Settings for transmitter coverage area (B1) and message type (B2)  

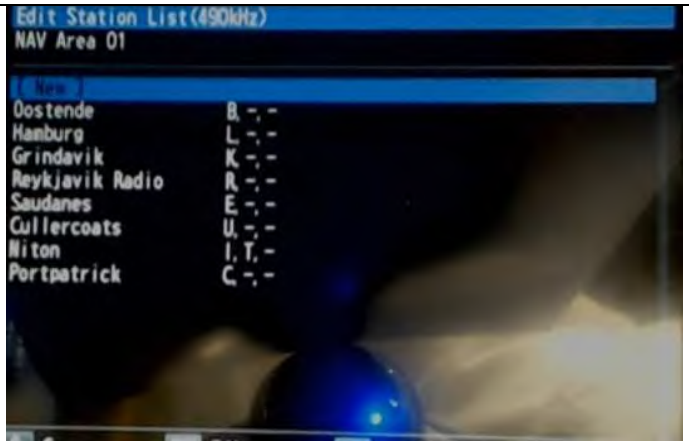

User Select Station & Message
[518kHz]
Station :
Message :
[490kHz]
Station :
Message :
[4209.5kHz]
Station :
Message :


User Select Station & Message
[518kHz]
Station :
Message :
[490kHz]
Station :
Message :
[4209.5kHz]
Station :
Message :

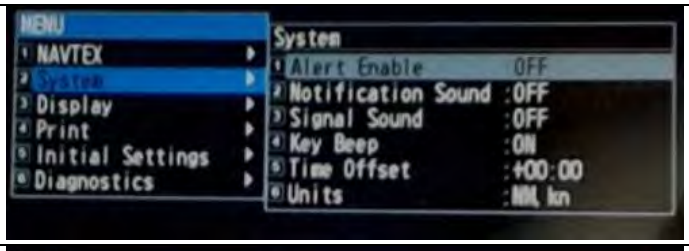
Edit Station List(518kHz)
NAV Area 01
[New]
Oostende V, T, -
Tallinn U, -, -
Torshavn D, -, -
Hamburg S, -, -
Grindavik X, -, -
Reykjavik Radio R, -, -
Malin Head Q, -, -
Valencia H, -, -
Den Helder P, -, -
Bodo B, -, -
Orlandet N, -, -
Rogaland Radio L, -, -
Svalbard A, -, -
Tjome(Jeloya) M, -, -

Edit Station List(518kHz)
NAV Area 01
[New]
Oostende V, T, -
Tallinn U, -, -
Torshavn D, -, -
Hamburg S, -, -
Grindavik X, -, -
Reykjavik Radio R, -, -
Malin Head Q, -, -
Valencia H, -, -
Den Helder P, -, -
Bodo B, -, -
Orlandet N, -, -
Rogaland Radio L, -, -
Svalbard A, -, -
Tjome(Jeloya) M, -, -


Edit Station List(490kHz)
NAV Area 01
[New]
Oostende B, -, -
Hamburg L, -, -
Grindavik K, -, -
Reykjavik Radio R, -, -
Saudanes E, -, -
Cullercoats U, -, -
Niton I, T, -
Portpatrick C, -, -


Edit Station List(490kHz)
NAV Area 01
[New]
Oostende B, -, -
Hamburg L, -, -
Grindavik K, -, -
Reykjavik Radio R, -, -
Saudanes E, -, -
Cullercoats U, -, -
Niton I, T, -
Portpatrick C, -, -

MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
7 Service
System
1 Alert Enable :OFF
2 Notification Sound :OFF
3 Signal Sound :OFF
4 Key Beep :ON
5 Time Offset :+00:00
6 Units :NM, kn

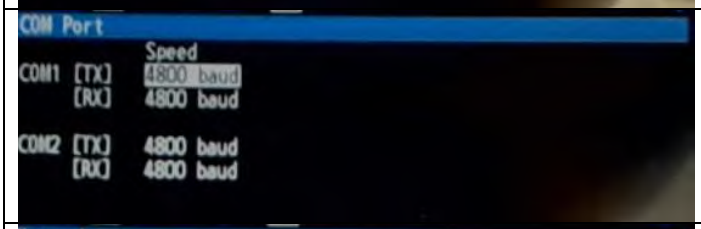

MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
System
1 Alert Enable :OFF
2 Notification Sound :OFF
3 Signal Sound :OFF
4 Key Beep :ON
5 Time Offset :+00:00
6 Units :NM, kn

MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
7 Service
Display
1 Remote Dimmer Control :OFF
2 Dimmer Preset
3 Contrast :19
4 Scrolling :Slow
5 NAV Display :ON
6 Speed Display :SOG
7 Date Display :MM/DD/YYYY

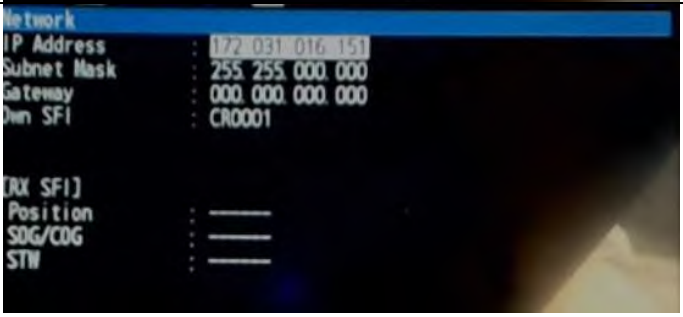
MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
Display
1 Remote Dimmer Control :OFF
2 Dimmer Preset
3 Contrast :19
4 Scrolling :Slow
5 NAV Display :ON
6 Speed Display :SOG
7 Date Display :MM/DD/YYYY

MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
7 Service
Print
1 Printer None
2 Header :OFF
3 Speed :9600 baud

MENU
1 NAVTEX
2 System
3 Display
4 Print
5 Initial Settings
6 Diagnostics
Print
1 Printer None
2 Header :OFF
3 Speed :9600 baud


COM Port
Speed
COM1 [TX] 4800 baud
[RX] 4800 baud
COM2 [TX] 4800 baud
[RX] 4800 baud

COM Port
Speed
COM1 [TX] 4800 baud
[RX] 4800 baud
COM2 [TX] 4800 baud
[RX] 4800 baud


Network
IP Address : 172.031.016.151
Subnet Mask : 255.255.000.000
Gateway : 000.000.000.000
Own SFI : CR0001
[RX SFI]
Position :
SOG/COG :
STW :
Management Profile
Management Profile : OFF

Network
IP Address : 172.031.016.151
Subnet Mask : 255.255.000.000
Gateway : 000.000.000.000
Own SFI : CR0001
[RX SFI]
Position :
SOG/COG :
STW :
Management Profile
Management Profile : OFF

4.27. 11.7 Brown-out test

[IEC 61097-6 Ed.2]

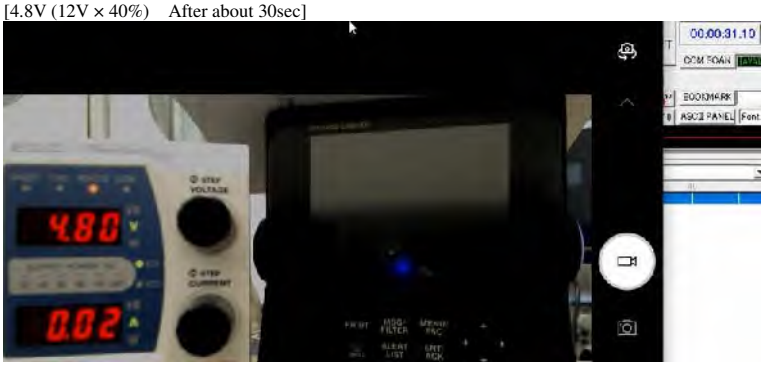
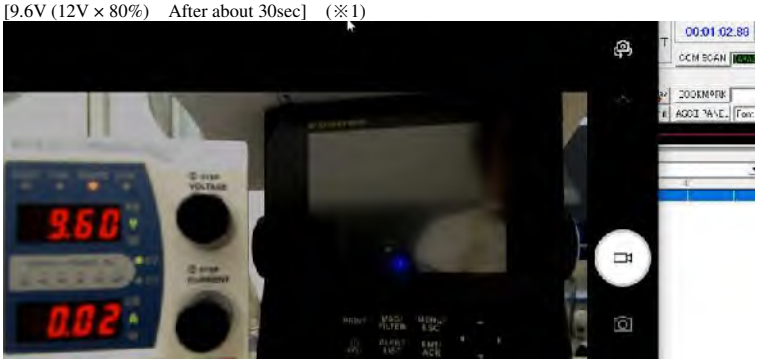
This test is required for all EUTs.
This test simulates the situation where the nominal supply voltage drops to below acceptable levels and then recovers over a medium time period.
This is consistent with the performance of a flat or unhealthy battery when an engine is started.
The unit shall not enter into any undefined or undesirable state.

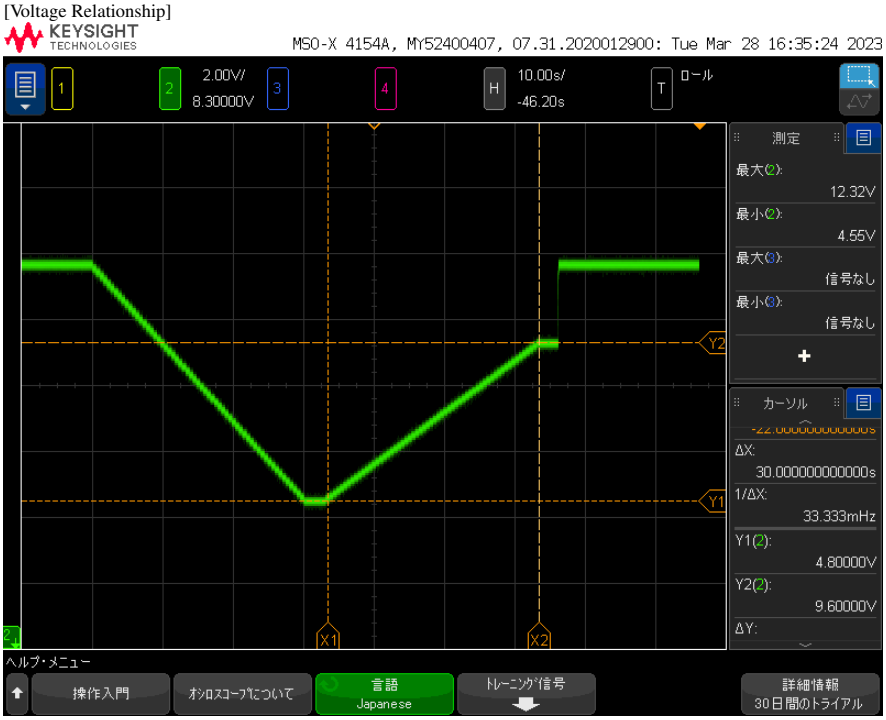
Method of test
Operate the EUT at the nominal supply voltage as indicated by the manufacturer.
Gradually reduce the supply voltage to 40 % of the nominal supply voltage over a time period of 30 s.
Gradually increase the supply voltage back to 80 % of the nominal supply voltage over a time period of 30 s.
The contents of the EUT's message and/or message identification memory, settings for transmitter coverage area (B1) and message type (B2) for each receiver and any user settings declared non-volatile by the manufacturer shall be inspected prior to and after a power supply brown-out condition.

Required results
After a power supply brown-out the EUT's non-volatile message storage shall contain the set of messages defined in the STF.
All settings that the manufacturer has declared as non-volatile shall be unchanged from before the brown-out condition.

[Test procedures/ Test Result]

Passed

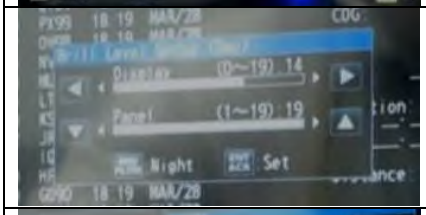
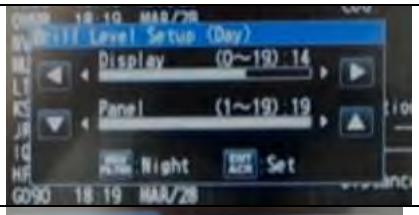
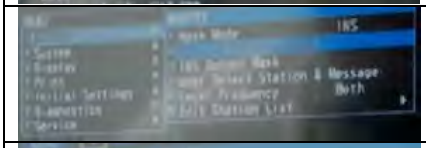
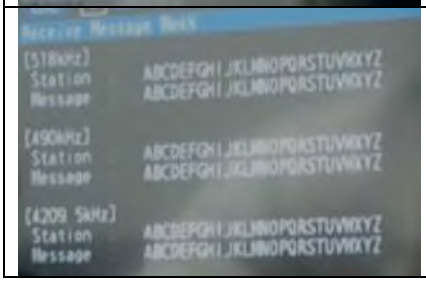
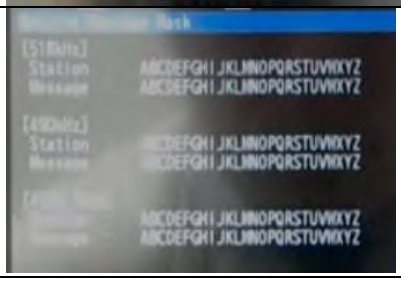
No.	Check item	Result
a)	Declaration Declaration of the nominal supply voltage of EUT.	Declaration The nominal supply voltage of EUT is 12V and 24V. Refer to operator's manual. **6 POWER SUPPLY** 6.1 Main unit DC12-24 (10.8-31.2 V): 1.6-0.5 A
b)	[Test of 12V] Seq 1. Check parameter below. ・NAVTEX Message ・Settings for B1 and B2 mask. ・Settings parameter which are defined by maker. Seq 2. Gradually reduce the supply voltage to 40 % of the nominal supply voltage over a time period of 30 s. Seq 3. Gradually increase the supply voltage back to 80 % of the nominal supply voltage over a time period of 30 s. Seq 4. Check parameter below. ・NAVTEX Message ・Settings for B1 and B2 mask. ・Settings parameter which are defined by maker.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that message and all settings didn't change from before the brown-out condition. Refer to "4-27_11-7 Brown-out test_12V" movie file. Refer to next table about the result of parameters which was compare between before test and after test. [Before test (12V)] [4.8V (12V × 40%) After about 30sec]  [9.6V (12V × 80%) After about 30sec] (※1) 

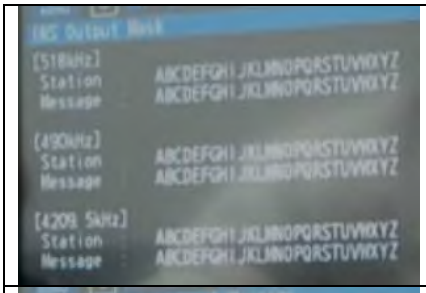
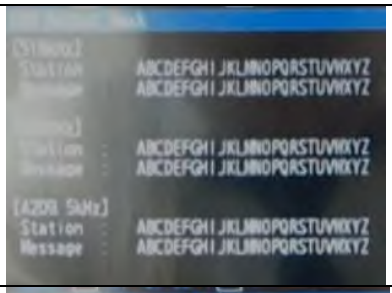
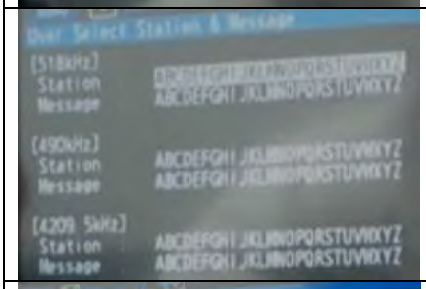
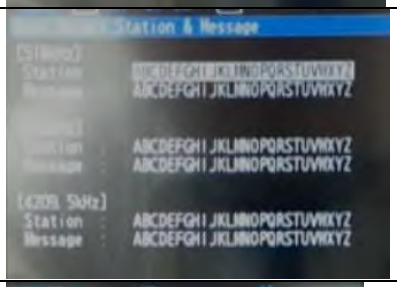
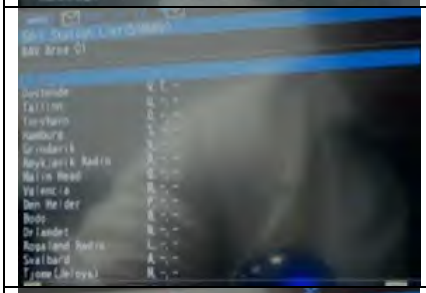
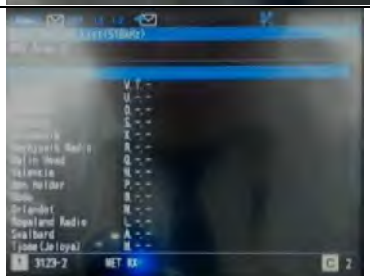
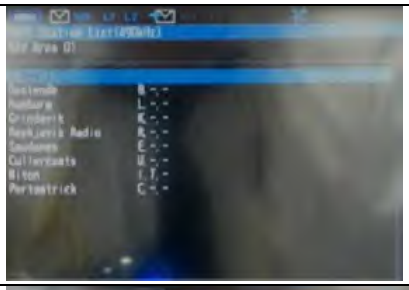
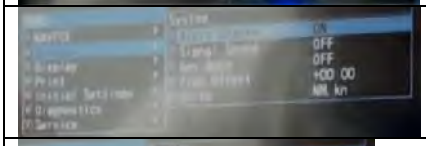
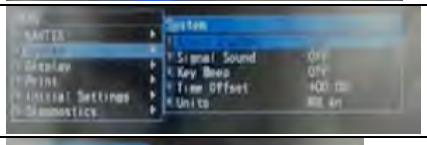
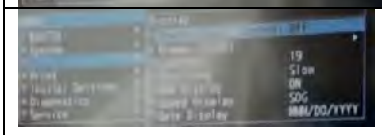
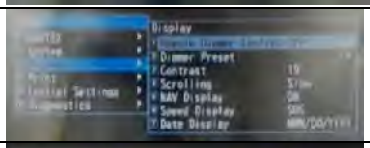
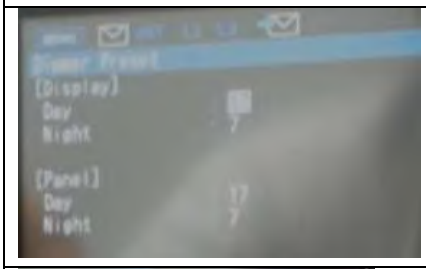
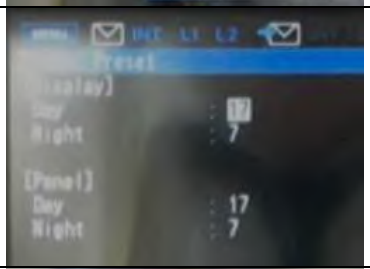
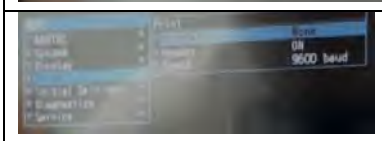
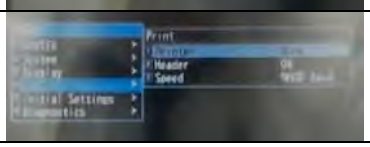
No.	Check item	Result
		[12V] (※1) **Note :** The specification of power supply is below. Refer to operator's manual. **6 POWER SUPPLY** 6.1 Main unit DC12-24 (10.8-31.2 V): 1.6-0.5 A This is compies with IEC 61097-6. **5.4.2.1 Power supply** **Table 2 – Extreme power supply variation** Power supply / Voltage variation % / Frequency variation % a.c. / ±10 / ±5 d.c. / +30 −10 / Not applicable Therefore, we were not able to confirmed at 9.6 V. So, we comfirmed at 12V. (※2) [Voltage Relationship] 

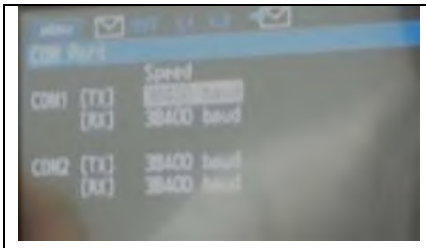
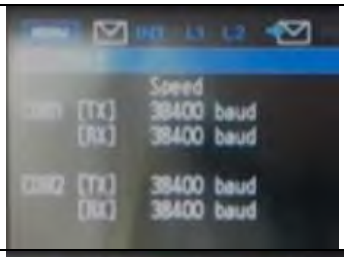
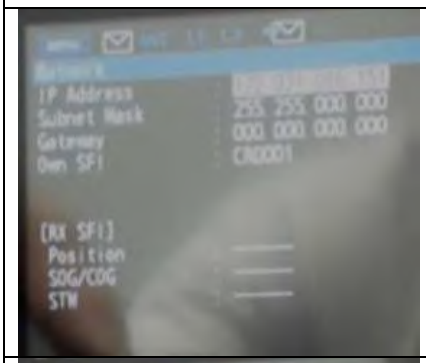
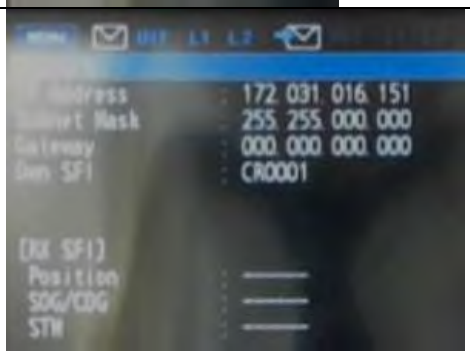
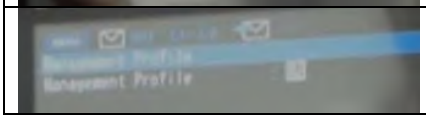
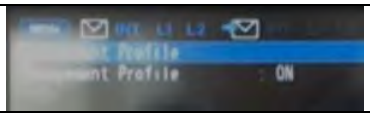
No.	Check item	Result
c)	[Test of 24V] Seq 1. Check parameter below. ・NAVTEX Message ・Settings for B1 and B2 mask. ・Settings parameter which are defined by maker. Seq 2. Gradually reduce the supply voltage to 40 % of the nominal supply voltage over a time period of 30 s. Seq 3. Gradually increase the supply voltage back to 80 % of the nominal supply voltage over a time period of 30 s. Seq 4. Check parameter below. ・NAVTEX Message ・Settings for B1 and B2 mask. ・Settings parameter which are defined by maker.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that message and all settings didn't change from before the brown-out condition. Refer to "4-27_11-7 Brown-out test_24V" movie file. Refer to next table about the result of parameters which was compare between before test and after test. [Before test (24V)] [9.6V (24V × 40%)　After about 30sec] [19.2V (24V × 80%)　After about 30sec] (※1) [Voltage Relationship]

We confirmed all parameters on the all screen by comparing to confirm unchanging all parameters.

[12V]

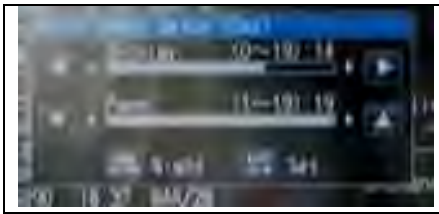
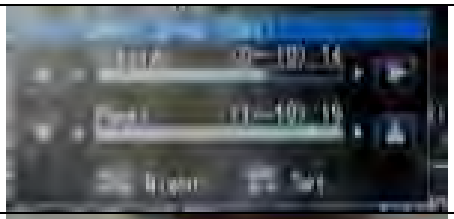
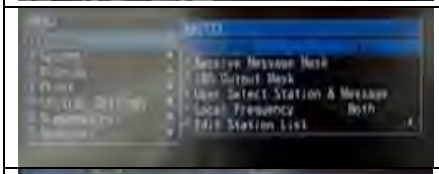
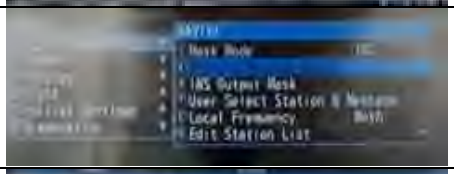
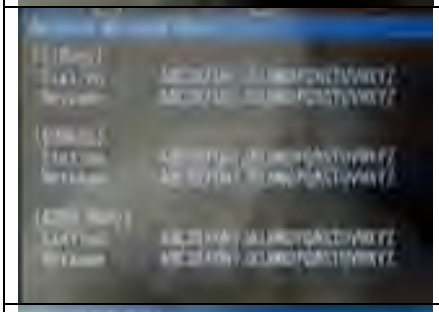
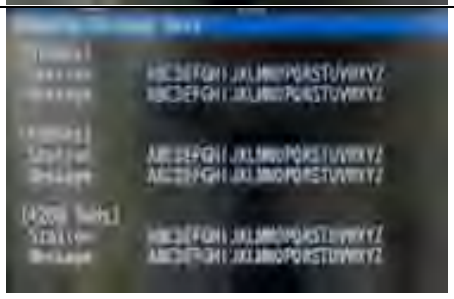
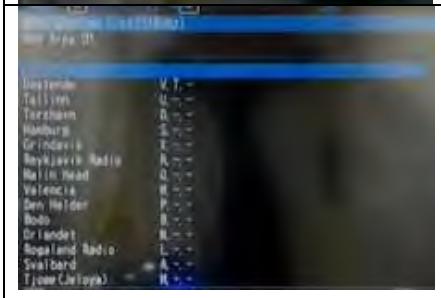
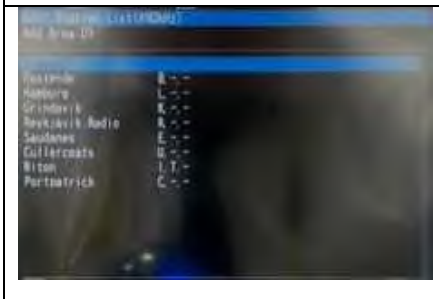
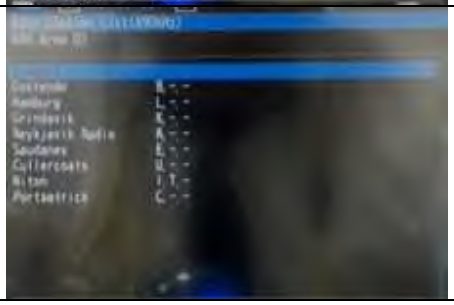
Before test	After test
518kHz 	518kHz
490kHz 	490kHz
4209.5kHz 	4209.5kHz
	
	
	

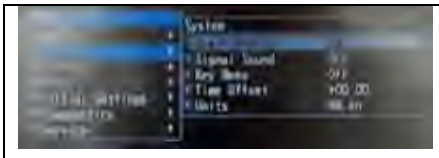
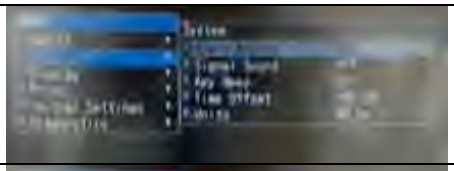
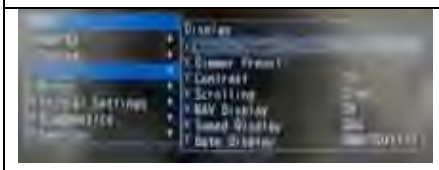
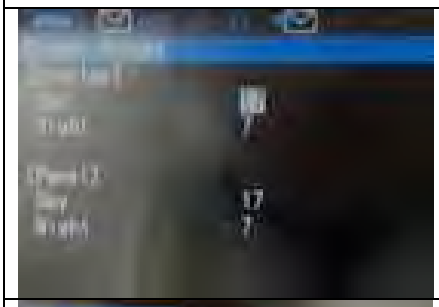
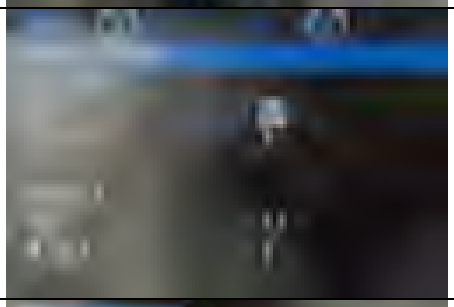
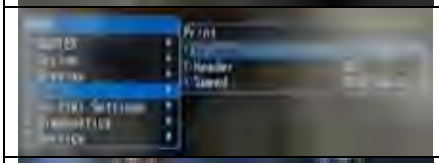
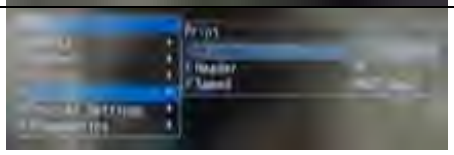
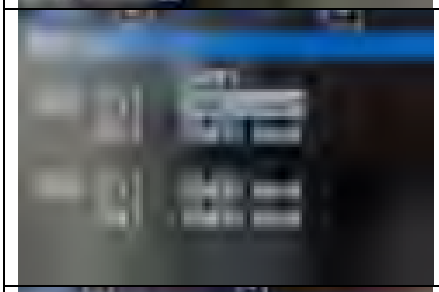
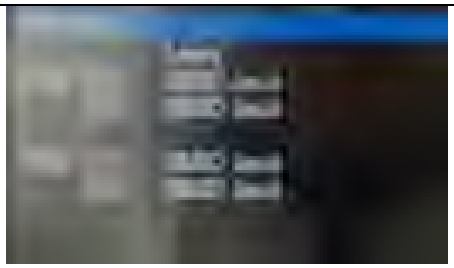
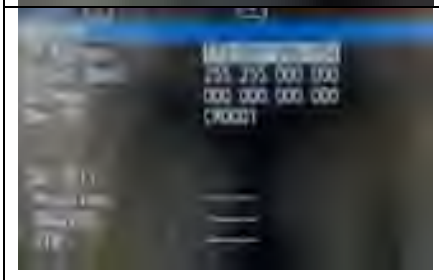
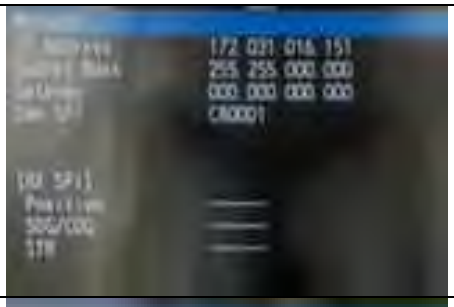
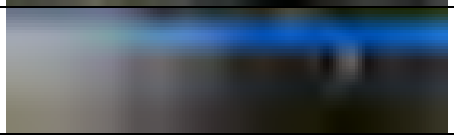
	
	
	
	
	
	
	
	

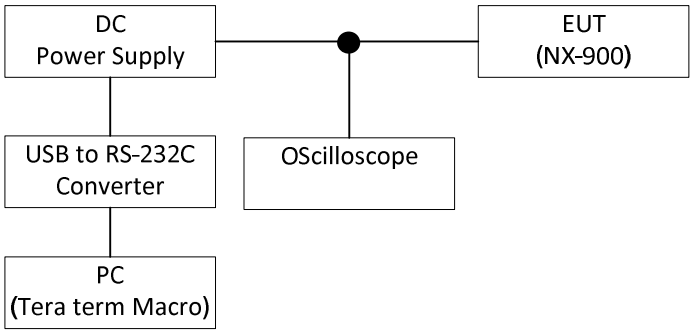
[24V]

Before test	After test
518kHz	518kHz
490kHz	490kHz
4209.5kHz	4209.5kHz

[Connection Diagram]



Instrument	Type	Manufacturer	S/N
Oscilloscope	MSO X 4154A	KEY SIGHT	1505029-1
DC power supply	ZX-S-400L	TAKASAGO	736714
Tool (PC application)	Tera Term	Tera Term Project	Ver 4.106

4.28. 11.8 UTC handling check

[IEC 61097-6 Ed.2]
This test is required for all EUTs that do not contain an integral printer and but only when the manufacturer has declared that the EUT can use a source of time (for example UTC from an external source or an internal RTC).
The test can be conducted using any combination of the declared receive frequencies as the source of test messages.

Method of test
An external source of UTC shall be applied as defined by the manufacturer.
The STF shall be loaded into the EUT. The power shall then be removed for a period of 6 h.
Power shall then be applied for 53 h and the contents of the non-volatile message storage shall then be checked.

Required results
After a 6 h power-down cycle the EUT's non-volatile message storage shall contain the set of messages defined in the STF.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	[Declaration] This test is required only when the manufacturer has declared that the EUT can use a source of time (for example UTC from an external source or an internal RTC).	[Declaration] EUT uses two sources of time. They are UTC (ZDA sentence) from an external source and the internal RTC. Refer to "2.12 [Display]" in operator's manual. **Note 2:** Time/Date is either UTC input from an external device or the time and date of the device's internal RTC.
b)	An external source of UTC shall be applied as defined by the manufacturer. The STF shall be loaded into the EUT. The power shall then be removed for a period of 6 h. Power shall then be applied for 53 h and the contents of the non-volatile message storage shall then be checked. [Test sequence] Seq 1. Input ZDA sentence per 1sec. Seq 2. NAVTEX simulator transmits STF message. Seq 3. Turn off for 6 hours. Seq 4. Turn on. Seq 5. Check message list. Seq 6. Wait for 53 hours. Seq 7. Check message list.	STEKR, 2023-04-27: Passed. Test witnessed by inspection of video file. We confirmed that EUT's non-volatile message storage contained the set of messages defined in the STF after 6 hours power-down cycle. Then, we confirmed that EUT's non-volatile message storage contained the set of messages defined in the STF after 53 hours. Refer to "4-28_11-8 UTC handling check 1st" movie file. (When starting.) Refer to "4-28_11-8 UTC handling check 2nd" movie file. (After 6 hours.) Refer to "4-28_11-8 UTC handling check 3rd" movie file. (After 53 hours.)

In advance, EUT loaded STF message by developer's function (Fill Memory).

We took 3 video by dividing because video file size become large size.

We confirmed all message list screen.
Then, EUT turned off. (The end of the movie file of "4-28_11-8 UTC handling check 1st".)

Time / Date : 09:23:58 MAR/28/2023

We started taking video of “4-28_11-8 UTC handling check 2nd” after about 6 hours.
Refer to “4-28_11-8 UTC handling check 2nd” movie file.
EUT turned on.

Time / Date : 15:28:07 MAR/28/2023 (After 6 hours from 09:23:58 MAR/28/2023)

We started taking video of “4-28_11-8 UTC handling check 3rd” after about 53 hours.
We confirmed all message list screen by comparing to confirm unchanging all messages from before the power-off cycle.

Time / Date : 20:35:35 MAR/30/2023 (After 53 hours from 15:28:07 MAR/28/2023)

When starting test	After 6 hours	After 53 hours (※1)
518kHz 	518kHz 	518kHz
490kHz 	490kHz 	490kHz
4209.5kHz 	4209.5kHz 	4209.5kHz

(※1) There is not mail icon on the picture of after 53 hours.
The reason is below.

IEC 61097-6 4.6.1.4 Display requirements

(148/A.5.2) If a dedicated display device is used, the following requirements shall be met:

a) an indication of newly received selected messages shall be immediately displayed until acknowledged or until 24 h after receipt;

4.29. 12.1 Spurious emissions

[IEC 61097-6 Ed.2]
Spurious emissions are any radio-frequency emissions generated in the EUT and radiated by conduction from the antenna.

Method of test
The EUT shall be connected to the artificial antenna specified in 5.8 and the r.m.s. value of any component of the spurious emissions shall be measured. The measurements shall cover the frequency range from 9 kHz to 2 GHz.

Required results
The power of any discrete component shall be ≤1×10–9 W.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	The EUT shall be connected to the artificial antenna specified in 5.8 and the r.m.s. value of any component of the spurious emissions shall be measured. The measurements shall cover the frequency range from 9 kHz to 2 GHz.	STEKR, 2023-04-27: Passed. Test witnessed at Furuno, ref separate test report. Refer to “K08-17-220_NX-900_DNV type approval testing report (IEC 61097-6 Physical)”

4.30. 12.2 Equipment manuals – checks of the manufacturer's documentation

In addition to checking that the requirements of 4.8 and Annex D of IEC 60945 are met,
the manufacturer shall submit to the test laboratory sufficient technical documentation of the EUT to define its interfaces.
The following checks shall be made for the input port, if applicable:

- approved sentences against IEC 61162-1 and/or IEC 61162-2 and the requirements of Annex C of this standard;
- proprietary sentences (if any) against IEC 61162-1 and/or IEC 61162-2;
- transmission intervals and baud rates against IEC 61162-1 and/or IEC 61162-2;
- load on the line of inputs;
- electrical isolation of input circuits.

The interface connections required shall be clearly identified in the operator manual or other appropriate literature.
This shall include identification of A and B signal lines for IEC 61162 interfaces.

In addition, the manuals shall include the needed information for correct siting of the antenna(s).

[Test procedures/ Test Result]

Passed

<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td>a)</td><td>Section 4.8 of IEC 60945</td><td>STEKR, 2023-04-28: Passed.
Verified by review of report.

Refer to LIC12-23-032.

Note: Result is subject to successful review of report</td></tr>
<tr><td>b)</td><td>Annex D of IEC 60945</td><td>STEKR, 2023-04-28: Passed.
Verified by review of report.

Refer to LIC12-23-032.
Refer to “SYSTEM CONFIGURATIONS” in operator’s manual (page 9).
We confirmed that the operator’s manual identified the category of the equipment or units to which they refer section 4.4 in IEC 60945.

Category of units
Antenna unit | Exposed to the weather.
Others | Protected from the weather.</td></tr>
<tr><td>c)</td><td>The following checks shall be made for the input port,
・Approved sentences against IEC 61162-1 and/or IEC 61162-2 and the requirements of Annex C of this standard</td><td>STEKR, 2023-06-05: Passed
Verified by review of operator’s manual.

Refer to Section “SPECIFICATION OF NAVTEX RECEIVER” in operator’s manual.

APPX. 2 DIGITAL INTERFACE
This equipment can receive navigation data in IEC61162-1 and IEC61162-450 format.
Sentence data
Input sentences:
ACK, ACN, CRQ, DDC, GGA, GLL, GNS, NRM, RMC, SRP*, VBW, VHW, VTG, ZDA
Output sentences:
ALC, ALF, ALR, ARC, DDC, HBT, NRM, NRX, SRP*, PFEC (pidal).
*: SRP sentence is for IEC61162-450 only.

Comment 4: OK- The sentences SRP and PFEC should be added to table “Transmission intervals” in Appendix 2 of Operators Manual.
Update 2023-06-05: Verified that sentences are included in manual, comment is closed.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Check item</th><th>Result</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>d)</td><td>The following checks shall be made for the input port,
・Proprietary sentences (if any) against IEC 61162-1 and/or IEC 61162-2</td><td>STEKR, 2023-06-05: Passed.
Verified by review of operator’s manual.

Refer to Section “APPX. 2 DIGITAL INTERFACE” in operator’s manual.

APPX. 2 DIGITAL INTERFACE

This equipment can receive navigation data in IEC61162-1 and IEC61162-450 format.

<u>Sentence data</u>

Input sentences:
ACK, ACN, CRQ, DDC, GGA, GLL, GNS, NRM, RMC, SRP*, VBW, VHW, VTG, ZDA

Output sentences:
ALC, ALF, ALR, ARC, DDC, HBT, NRM, NRX, SRP*, PFEC (pldat).

*: SRP sentence is for IEC61162-450 only.

Comment 5: OK- A description of proprietary sentence PFEC should be added to description of sentences transmitted in Appendix 2 of Operators Manual (e.g. after last sentence on page 65)
Update 2023-06-05: PFEC sentence is Furuno proprietary sentence, only intended for Furuno internal use. Sentence is listed in manual, but detailed format is not included. Comment is closed.</td></tr>
<tr><td>e)</td><td>The following checks shall be made for the input port,
・Transmission intervals and baud rates against IEC 61162-1 and/or IEC 61162-2</td><td>STEKR, 2023-04-17: Passed.
Test witnessed at Furuno.

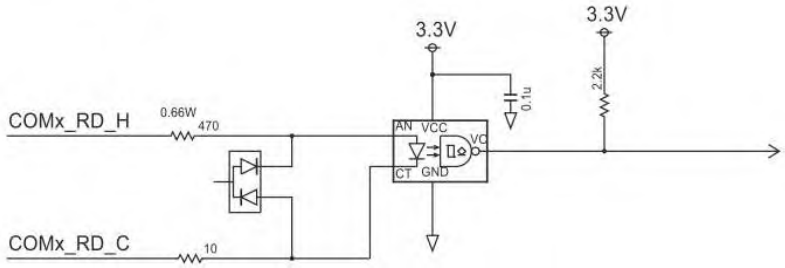
[About “Transmission intervals”]
Refer to Section “APPX. 2 DIGITAL INTERFACE” in operator’s manual.

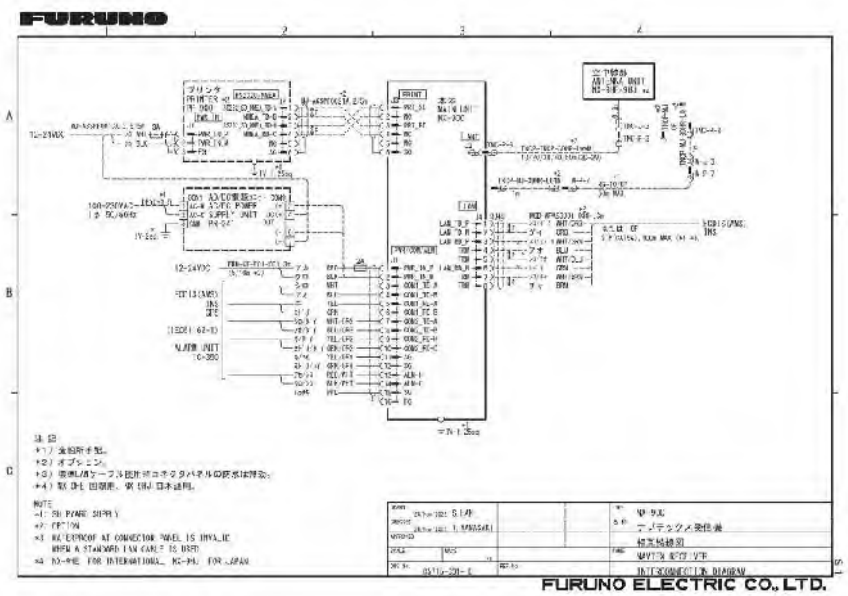
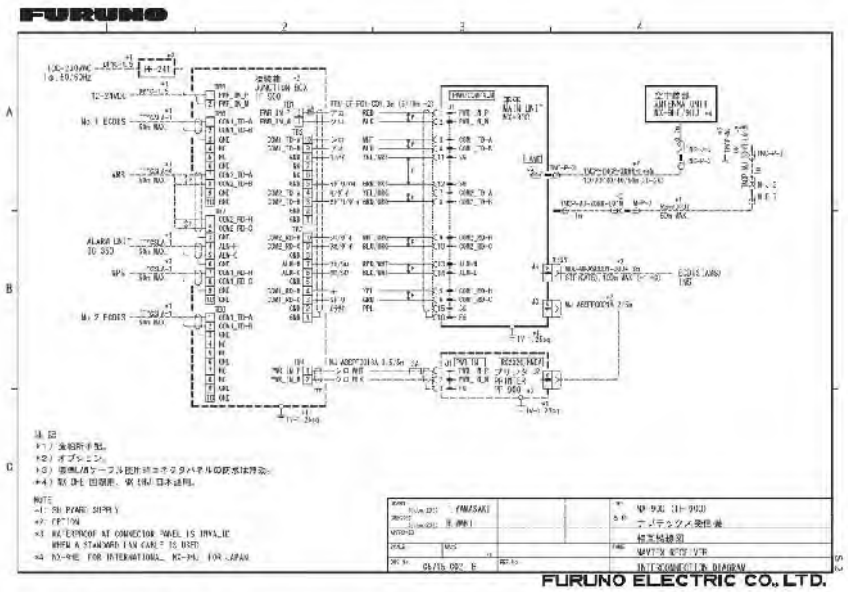
<u>Transmission intervals</u>

<table><tr><th>Sentence</th><th>Interval (msec)</th><th>Description</th></tr><tr><td>ALC</td><td>30 seconds</td><td>Output when [Alert Mode] is set as [Alert IF2]. ALC sentence is output when the system is turned on.</td></tr><tr><td>ALF</td><td>Not applicable</td><td>Output when [Alert Mode] is set as [Alert IF2] and when one of the following conditions is met:
• When the alert state changes.
• When a request is received by ACN.</td></tr><tr><td>ALR</td><td>30 seconds/ 60 seconds*1</td><td>When alert mode is set as [Legacy] or [AlertIF1] and when one of the following conditions is met:
• When the alert state changes.
• When the system is turned on.</td></tr><tr><td>ARC</td><td>Not applicable</td><td>Output when [Alert Mode] is set as [Alert IF2] and when ACN command is rejected.</td></tr><tr><td>DDC</td><td>60 seconds</td><td>Output when the system is turned on or when the settings is changed.</td></tr><tr><td>HBT</td><td>25 seconds</td><td>Output when [Alert Mode] is set as [Alert IF2] only.</td></tr><tr><td>NRM</td><td>Not applicable</td><td>Output into [Query sentence] when requested.</td></tr><tr><td>NRX</td><td>Not applicable</td><td>Output into NRM*2 when a message is received.</td></tr></table>
[About “baud rates”]
Refer to Section “SPECIFICATION OF NAVTEX RECEIVER” in operator’s manual.

5 INTERFACE
5.1 Number of ports
Serial — 2 ports, IEC61162-1 Ed.5, 4800 bps
LAN — 1 port, Ethernet 100Base-TX, RJ45 connector, Auto MDI/MDIX, for IEC61162-450 Ed.2
RS-232C — 1 port for printer, Xon/Xoff flow control, ESC/POS command compliance
Contact closure — 1 port, for alert, 50V: 40mA or less, normal close</td></tr>
<tr><td>f)</td><td>The following checks shall be made for the input port,
・Load on the line of inputs</td><td>STEKR, 2023-04-17: Passed.
Test witnessed at Furuno.

Refer to Section “APPX. 2 DIGITAL INTERFACE” in operator’s manual.</td></tr>
</table>

No.	Check item	Result
		Load requirements as listener Isolation: Photo coupler Input impedance: 470 ohms Max. Voltage ±15 V Threshold: 3 mA (in case of connection of FURUNO device talker) Electrical isolation: Max. 3750 Vrms. **Output drive capability** *Differential driver output* R = 100 ohm 2 V min. *Driver short-circuit current* 250 mA max. **Comment 6: OK**- The background for the reference to "(In case of connection of FURUNO device talker)" in Load Requirements as listener (ref Appendix 2 of Operators Manual) and should be considered for removal. Also consider whether "Threshold" should be replaced by "Typical", "Average" or similar. Update 2023-06-05: Verified that manual has been updated and reference to "Furuno device talker" is removed. Comment is closed.
g)	The following checks shall be made for the input port, ・Electrical isolation of input circuits	STEKR, 2023-04-17: Passed. Compliance verified via inspection of documentation. [About "electrical isolation"] Refer to Section "APPX. 2 DIGITAL INTERFACE" in operator's manual. **Load requirements as listener** Isolation: Photo coupler Input impedance: 470 ohms Max. Voltage ±15 V Threshold: 3 mA (in case of connection of FURUNO device talker) Electrical isolation: Max. 3750 Vrms. **Output drive capability** *Differential driver output* R = 100 ohm 2 V min. *Driver short-circuit current* 250 mA max. [About "input circuits"] Refer to Section "APPX. 2 DIGITAL INTERFACE" in operator's manual. **Serial & contact interface I/O circuit** COM1 or 2 port (input) 
f)	This shall include identification of A and B signal lines for IEC 61162 interfaces.	STEKR, 2023-04-17: Passed. Compliance verified via inspection of documentation. Refer to Section "INTERCONNECTION DIAGRAMS" in operator's manual. Its last page. This diagram has how to connect all interface.

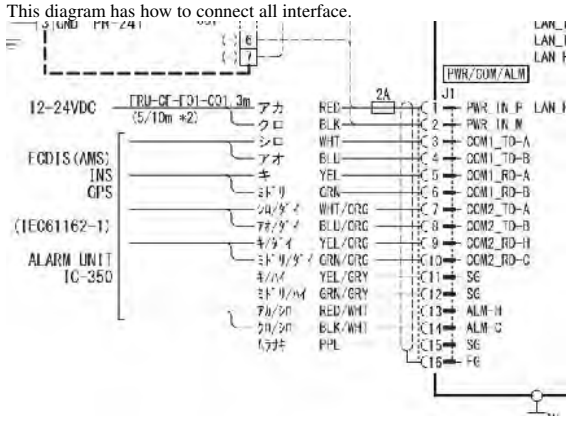
No.	Check item	Result
		 
g)	The manuals shall include the needed information for correct siting of the antenna(s).	STEKR, 2023-04-17: Pending Compliance verified via inspection of documentation. Refer to Section “4.3 Installation of Antenna Unit” in operator’s manual.

No.	Check item	Result
		4.3 Installation of Antenna Unit **Mounting considerations** Install the antenna unit referring to the antenna installation diagram at the end of this manual. When selecting a mounting location for the antenna unit, keep in mind the following points: • Do not shorten the antenna cable. • Do not install the antenna unit within beamwidth of the radar. • To install an antenna unit other than the NX-9HE, contact your dealer. • A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances at the front of this manual to prevent interference to a magnetic compass. **Comment 7: OK**- The "Mounting considerations" in sec. 4.3 of Operators Manual should include instructions on separation requirements from other radio transmitting equipment. Update 2023-06-05: Verified that requirements to install antenna away from MF/HF transceiver is included. Comment is closed.
	Other observations to documentation	The below observations were made to the Operators manual in addition to the tests above. **Comment 8: OK**- The differences between the alert modes in ch. 4.8 are not described (Legacy, IF1, IF2)..IF2= BAM should be default. Update 2023-06-05: Verified that information is included in revised operator manual. Comment is closed. **Comment 9: OK**- Manual does not include all menu options for legacy mode, i.e. System Menu is different for Legacy- and BAM mode. Update 2023-06-05: Verified that information is included in revised operator manual. Comment is closed. **Comment 10: OK**- The abbreviation RMS should be defined and a description of the Management Function (ch. 2.3 and 4.6) should be included in the Operators manual Update 2023-06-05: RMS is no longer used as abbreviation, but the terms "Remote maintenance" and "Remote monitoring" is used. Comment is closed. **Comment 11: OK**- The description of Chapter 2.11 Systems Menu, no 1- [Alert Enable] should be clarified, as selection on/off does not apply to all alerts, additional alerts are classified as Cautions and hence are not audible, and SAR alert always will be raised even if Alert Enable is set to "Off". Update 2023-06-05: Verified that information is included in revised operator manual. Comment is closed.

4.31. 12.3 Marking and identification

[IEC 61097-6 Ed.2]
The markings on the EUT shall include details of the power supply from which the equipment is intended to be operated as well as those specified in 4.9 of IEC 60945.
The interface connections required shall be clearly identified in the operator manual or other appropriate literature. This shall include identification of A and B signal lines for IEC 61162 interfaces.
[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	Section 4.9 in IEC 60945	STEKR, 2023-04-28: Passed. Verified by review of report. . Refer to LIC12-23-032.
b)	Details information of the power supply	STEKR, 2023-04-17: Passed. Test witnessed at Furuno. We confirmed that there was details information of the power supply on the markings on the EUT.
c)	The interface connections required shall be clearly identified in the operator manual or other appropriate literature. This shall include identification of A and B signal lines for IEC 61162 interfaces.	STEKR, 2023-04-17: Passed. Verified by inspection of documentation. Refer to Section “INTERCONNECTION DIAGRAMS” in operator’s manual. This diagram has how to connect all interface. 

5. Performance tests (ref. IEC 61097-6 Ed.2 amd.2)

5.1. 7.7 BAM interface performance tests

Add, at the end of 7.6.2 in IEC 61097-6 Ed.2, the following new Subclause 7.7:

Method of test

Check by analytical evaluation of the equipment or inspection of the manufacturer's documentation that the EUT complies with the requirements for an alert source in the BAM concept according to IEC 62923-1 and IEC 62923-2.
Input an STS with B2 = D to the EUT.
After a period of 10 min, attempt to remotely acknowledge the warning.
Reset the warning as in 8.4.

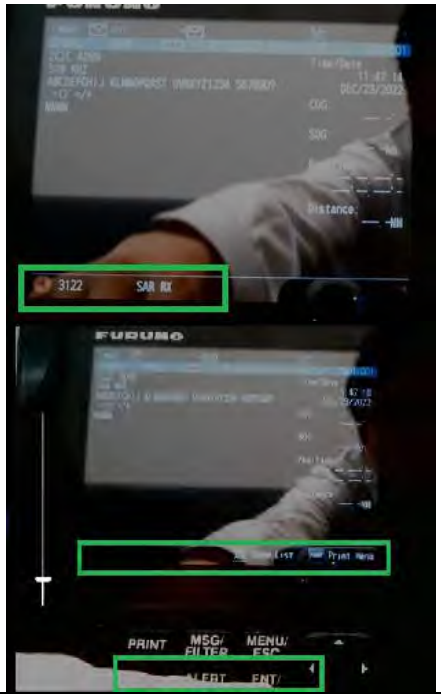
Required results

Check that a warning is transmitted by the EUT with the correct category, alert identifier and alert text.
Confirm by observation that the warning is repeated as a warning after a limited time period not exceeding 5 min and that the warning is not changed to alarm priority.
Check that it is not possible to remotely acknowledge the warning.
Check that, when the procedure of 8.4 is followed, the warning is acknowledged.

[Test procedures/ Test Result]

Passed

No.	Check item	Result
a)	NAVTEX Simulator transmits message (B2=D).	STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno, and via verification of video file. We confirmed that a warning was transmitted by the EUT with the correct category, alert identifier and alert text. Refer to "5-01_07-7 BAM interface performance tests_a)-b)" movie file. [IEC 61097-6 Ed.2 amd.2] 4.4 Interface The equipment shall be capable of releasing an alert with priority Warning and Category A with alert identifier 3122 on receipt of search and rescue information (B2 = D). The alert title for the first ALF sentence shall be "SAR RX". The additional information in the second ALF sentence shall be "Incoming SAR information. Check NAVTEX". **[Log Data]** 00:14:46 recv0 $CRALF,2,1,0,,A,W,V,,3122,,1,0,SAR RX*6C 00:14:46 recv0 $CRALF,2,2,0,,,,,,3122,,1,0,Incoming SAR information. Check NAVTEX*37 Category: A Priority: Warning 1st text: SAR RX 2nd test: Incoming SAR information. Check NAVTEX

No.	Check item	Result
b)	Attempt to remotely acknowledge the warning after 10 min.	STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno, and via verification of video file. Refer to "5-01_07-7 BAM interface performance tests_a)-b)" movie file. We confirmed that warning was repeated as a warning after a limited time period not exceeding 5 min and that the warning was not changed to alarm priority. We confirmed that it was not possible to remotely acknowledge the warning. And, refer to "5-01_07-7 BAM interface performance tests_a)-b)_buzzer" movie file to confirm alert buzzer. [Log Data] 00:19:35 recv0 $CRALF,2,1,1,,A,W,V,,3122,,2,1,SAR RX*6F <= Alert was activated. 00:19:35 recv0 $CRALF,2,2,1,,,,,,3122,,2,1,Incoming SAR information. Check NAVTEX*34 : 4 min 50 sec : 00:24:25 recv0 $CRALF,2,1,2,,A,W,V,,3122,,3,2,SAR RX*6E <= Alert was repeated. 00:24:25 recv0 $CRALF,2,2,2,,,,,,3122,,3,2,Incoming SAR information. Check NAVTEX*35 : 00:25:08 echo0 $IIACN,,,3122,,A,C*4C <= Remote ACK by ACN sentence 00:25:08 recv0 $CRARC,,,3122,,A*2E <= Rejected ACN sentence. --- T. Yamasaki, 2023-06-10 We revised test log. Because we changed specification about talker to receive. EUT became to receive only talker "CA" sentence about the ACN, HBT etc... of BAM sentence. [Log Data] 10:34:19 recv0 $CRALF,2,1,0,103417.00,A,W,V,,3122,,1,0,SAR RX*42 <= Alert was activated. 10:34:19 recv0 $CRALF,2,2,0,,,,,,3122,,1,0,Incoming SAR information. Check NAVTEX*37 : 4 min 50 sec. : 10:39:09 recv0 $CRALF,2,1,1,103907.00,A,W,V,,3122,,2,1,SAR RX*4D 10:39:09 recv0 $CRALF,2,2,1,,,,,,3122,,2,1,Incoming SAR information. Check NAVTEX*34 : 4 min 50 sec. : 10:43:59 recv0 $CRALF,2,1,2,104357.00,A,W,V,,3122,,3,2,SAR RX*44 10:43:59 recv0 $CRALF,2,2,2,,,,,,3122,,3,2,Incoming SAR information. Check NAVTEX*35 : 10:45:28 echo0 $CAACN,,,3122,,A,C*4E <= Remote ACK by ACN sentence 10:45:28 recv0 $CRARC,104526.00,,3122,,A*04 <= Rejected ACN sentence.
c)	Reset the warning as in 8.4.	STEKR, 2023-04-27: Passed. Compliance verified during witnessed testing at Furuno, and via verification of video file. We confirmed that the warning was acknowledged when the procedure of 8.4 was followed Refer to "5-01_07-7 BAM interface performance tests_c)" movie file. 

End.