

Test report no. : 134363-4**Item tested : Sirius-3****Type of equipment : NAVTEX Receiver****Client : Polaris Electronics A/S**Nemko AS is granted accreditation by Norwegian
Accreditation under registration number TEST 033**ETSI EN 300 065**Narrow-band direct-printing telegraph equipment for
receiving meteorological or navigational information (NAVTEX)
v.1.2.1 (2009-01)**IEC 61097-6**Narrowband direct-printing telegraph equipment for
the reception of navigational and meteorological warnings
and urgent information to ships (NAVTEX)
(Second edition 2005-12)**2010-04-23****Authorized by :**Geir Antonsen
Technical Verificator

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1 GENERAL INFORMATION

1.1 Tested by

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1.2 Client Information

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Address : Kærholt 1, P.O. Box 7957, DK-9210 Aalborg SØ, Denmark
Telephone : +45 9631 7900
E-mail : info@polaris-as.dk

Contact:

Name : /

1.3 Responsible Manufacturer (if other than client)

Name : /
Address : /
Telephone : /
Fax : /
E-mail : /

2 Test Information

2.1 Tested Item

Name :	Polaris
Model/version :	Sirius-3
Serial number :	/
Hardware identity and/or version:	/
Software identity and/or version :	FW rev. 0.1
Receive Frequencies :	490 kHz, 518 kHz, 4209.5 kHz
Power Adaptor :	13.2 V DC
Antenna Connector :	50 ohm, N-type

Description of Tested Device(s)

The tested device is a NAVTEX receiver without direct printing device.

2.2 Test Environment

2.2.1 Normal test condition

Temperature:	20 – 23 °C
Relative humidity:	20 – 50 %
Normal test voltage:	13.2 V DC

The values are the limit registered during the test period.

2.2.2 Extreme test conditions

Voltage

Minimum Voltage:	15.6 V AC
Maximum Voltage:	10.8 V AC

Temperature

Minimum Temp.:	0 °C
Maximum Temp.:	+40 °C

2.3 Test Period

Item received date:	2009-09-20
Test period :	from 2009-09-20 to 2011-02-19

2.4 Test Engineer

Frode Sveinsen

2.5 Test Equipment

See list of test equipment in clause 6.

2.6 Other Comments

All tested items complies with the requirements in EN 300 065-1.

3 TEST REPORT SUMMARY

3.1 General

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with EN 300 065-1 V1.2.1 (2009-01) Narrow-band direct printing telegraph equipment for receiving meteorological or navigational information (NAVTEX).

The test methods have been in accordance with Comlab 1003 and EN 300 065 where applicable.

☒ Production Unit

☐ Pre-production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

**Deviations from, additions to, or exclusions from the test specifications
are described in "Summary of Test Data".**



TEST REPORT NO.: 134363-4

TESTED BY :



Frode Sveinsen, Chief Engineer

DATE: 23 April 2010

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4 Test Report Summary

4.1 Abbreviations

The following abbreviations are used in the test summary:

- Pass** The test results are inside the limits given in EN 300065.
- Fail** The test results are outside the limits given in EN 300065.
- NA** Not applicable. The testcase is not applicable for the tested equipment.
- NT** Not tested. The testcase is not covered by this test report.

4.2 Test Summary

Test name	IEC 61097-6 reference	EN 300 065-1 reference	Verdict
Construction	4.1	4.1	Pass ¹
Receivers	4.5	4.2	Pass ¹
Handling of Messages	4.3	4.3	Pass ¹
Alarms	4.3.9 8.4 8.5	4.4	Pass ¹
Safety Precautions	/	4.5	Pass ¹
Environmental tests	/	5.6	NT ²
Call sensitivity	9.1 9.5	6.1	Pass
Interference Rejection and blocking immunity	9.2	6.2	Pass
Co-channel rejection	9.3	6.3	Pass
Intermodulation	9.4	6.4	Pass
Spurious emissions	12.1	6.5	Pass
Protection of input circuits	9.7	6.6	Pass
Simultaneous reception	9.6	6.7	Pass
Message processing	4.3	6.8	Pass ¹
Integrated printer tests	10	6.9	Pass ¹
Memory storage tests	11	6.10	Pass ¹
Integrated printing device	10	7	Pass ¹
Dedicated display device	4.6 10	8	Pass ¹
Interfaces	7	9	Pass ¹
Message memory	11	10	Pass ¹

Notes:

¹ Some tests must be covered by manufacturer declaration

² Not covered by this test report

5 Test results

5.1 General requirements

ETSI EN 300065-1 subclause 4

Requirement		Verdict
4.1 Construction	The mechanical and electrical design and the construction and finish of the equipment shall accord with good engineering practice and the equipment shall be designed for use on board ships at sea.	Pass
	All controls, instruments and terminals shall be clearly identified. Details concerning the power source with which the equipment is to be used shall be clearly indicated. A label indicating the type designation shall be affixed to the equipment in a place where it is clearly visible in the normal operating position.	Pass
	It shall be possible to reduce to zero the intensity of any equipment light source other than visual alarms.	Pass
	The equipment shall have either: - an integrated printing device; or - a dedicated display device, an industry standard printer output port and non-volatile message memory; or - an interface to an Integrated Navigation System (INS) and a non-volatile memory.	Pass
	The equipment shall consist of a radio-frequency receiver incorporating a signal processor and a printing and/or displaying device.	Pass
	The message format shall conform to ITU-R Recommendation M.625-3 [1], collective B-mode. The system shall conform to ITU-R Recommendation M.540-2 [2].	Pass
	The equipment shall be provided with installation documentation including notably the required information for antenna siting.	Pass
	Documentation shall also be available detailing servicing and fault finding of the equipment. Where practicable this should detail all required information for repair down to component level.	Pass
4.2 Receivers	The primary radio-frequency receiver shall operate on a frequency of 518 kHz.	Pass
	At least one additional radio frequency receiver shall be provided and operation shall be selectable both manually and via the INS interface to either 490 kHz or 4 209,5 kHz. Such additional receivers shall be capable of simultaneous operation with the primary receiver.	Pass (both frequencies are available)
	The equipment shall comprise a device for performing tests to verify whether the radio-frequency receiver, signal processor or printing device are working correctly. The test shall at least provide verification of the signal's path from the antenna to the loudspeaker or to an audio-frequency output delivering sufficient power to operate a loudspeaker or earphones. A self-return switch shall be used if a loudspeaker is used.	Pass
4.3 Handling of messages	To limit the number of messages printed or displayed, it shall be possible to select the appropriate B1 character for those messages that are wanted.	Pass
	The equipment shall display information indicating that the B1 characters have been selected or excluded, or this information shall be easily accessible via the user interface.	Pass

	It shall be possible to inhibit the printing or displaying of message categories (defined by the B2 characters), transmitted by the coast stations selected, other than navigational warnings, gale warnings and SAR messages. It shall be possible to exclude at least four different message categories.	Pass
	The equipment shall provide a clear indication of the message categories that are excluded.	Pass
	Means shall be provided to avoid the outputting of messages which are not correctly received or which have already been correctly received.	Pass
	A message is considered to have been correctly received if the character error rate is less than 4×10^{-2} . The message identification of each such message shall be stored in memory until erased.	Pass
	When the received character error rate exceeds 33×10^{-2} for more than 5 seconds, the printing or displaying of the message shall be inhibited, the message shall be considered as not correctly received, and the message identification shall not be stored in memory.	Pass
	The equipment shall not print or display any message (except as defined in the following paragraph), the identification of which is already stored in memory.	
	A message shall always be printed or displayed if B3B4 = 00.	Pass
	The equipment may be provided with facilities to store complete messages without being printed or displayed directly, with the exception of messages with the message identity B3B4 = 00 and/or B2 = A, B, D or L, which shall always be printed or displayed upon receipt. Where such storage facilities are provided, it shall be possible at least to print or display, on request, stored messages in the sequential order: last stored - first output.	NA
	If the number of message identifications received exceeds the memory capacity, the oldest message identification shall be erased.	NT
	However, after a period of 60 hours to 72 hours, a message identification shall automatically be erased from the memory.	Pass
	The equipment shall output an asterisk for each corrupted character detected.	Pass
	The equipment may be provided with additional facilities to output messages in a second language using an alphabet different from the Latin alphabet.	NT
	If an automatic line feed causes a word to be divided then this shall be indicated in the text.	Pass (words not divided in msg view)
	The printer or printer output shall automatically insert line feeds after completion of message printing.	NT
	The equipment may optionally use an externally provided source of UTC or an internal RTC to provide timing data for message handling.	NT
4.4 Alarms	An alarm indicating the reception of SAR messages shall be provided, whether incorporated in the equipment or remote from it. The remote alarm interface shall be a normally open pair of contacts, neither of which shall be grounded. This alarm shall only be able to be stopped (acknowledged) manually but without inhibiting receipt of further other alarms. The audible level of the alarm shall be between 75 dB(A) and 85 dB(A).	Pass
	If an additional alarm is used to indicate the reception of navigational and gale warnings, it shall be capable of being suppressed.	NA

	The alarm status shall be communicated using the ALR sentence via the INS interface. The ALR sentences shall include the local alarm number and descriptive text as given in table 1 (EN 300065-1).	Pass
	While any alarm is active (even acknowledged alarms) the equipment shall send the corresponding ALR sentences once every 30 seconds via the data interface. When no alarms are active, the equipment shall send an ALR sentence with the status set to "V" every 60 seconds.	Pass
	If an additional alarm is used to indicate the reception of navigational and gale warnings, it shall be capable of being suppressed.	NA
	Where an integrated printer is used, an alarm shall be provided to indicate that the paper has nearly run out or has run out. If any message is incompletely printed because the paper has run out, the message identification for that message shall not be stored in the memory. Memory storage of new message identifications shall be inhibited if there is no paper available in the printing device. It shall be possible to print continuously 200,000 characters.	NA
	There shall be an audible or visual alert if a malfunction or general failure occurs with either the dedicated display, printer or non-volatile memory.	NT
4.5 Safety Precautions	Measures shall be taken to protect the equipment against the effects of excessive current or voltage and against an excessive temperature increase in any part of the equipment as a result of any defect in the cooling system.	NT
	Measures shall be taken to protect the equipment from damage as a result of transient changes of voltage or an accidental reversal of polarity at the power source.	NT
	Means shall be provided for earthing the equipment's metal parts which are accessible from the outside, but the equipment shall not cause any terminal of the electrical power source to be earthed.	NT
	All parts and all wiring in which the dc or ac voltage (except radio-frequency voltage) produce, singly or in combination, a peak voltage in excess of 50 volts, shall be protected against accidental access and shall automatically be isolated from all electrical power sources when the protective covers are removed.	Pass
	Alternatively, the equipment shall be constructed in such a way as to prevent access to such voltages unless an appropriate tool is used such as a nut-spanner or screwdriver, and conspicuous warning labels shall be affixed both inside the equipment and on the protective covers.	Pass
	The information in memories, programmed by the user, (see clause 4.3), shall not be erased by power source interruptions of less than 6 hours.	Pass

5.2 Call sensitivity

ETSI EN 300065-1 subclause 6.1

Frequency kHz	Input levels	Verdict
490	2 and 5 μ V	Pass
518	2 and 5 μ V	Pass
4209.5	2 and 5 μ V	Pass

The test was performed with artificial antenna as specified in 5.1.1 a) with input level 2 μ V, and with artificial antenna specified in 5.1.1 b) with input level 5 μ V.

The test was performed at normal test conditions as well as extreme test conditions (clauses 5.4.1 and 5.4.2 applied simultaneously).

The test was repeated with normal signal offset by 25 Hz from the values specified above.

The character error ratio was 0 for all tests.

Limits: Clause 6.1.3

The character error ratio shall be less than 4×10^{-2}

Test Equipment Used: 1, 2, 3, 8, 9, 10

5.3 Interference rejection and blocking immunity

ETSI EN 300065-1 subclause 6.2

Frequency kHz	Unwanted Signal		Verdict
	Frequency Offset	Level	
490 / 518 / 4209.5	±500 to 1000 Hz	40 dBµV	Pass
	±1 to 3 kHz	60 dBµV	Pass
	±100 to 3 kHz	90 dBµV	Pass
	+100 to 30 MHz		Pass
	156 to 174 MHz		Pass
	450 to 470 MHz		Pass

Two signals were applied to the receiver as specified in clause 5.1.3.

The test was performed with artificial antenna as specified in 5.1.1 b).

The test was performed at normal test conditions as well as extreme test conditions (clauses 5.4.1 and 5.4.2 applied simultaneously).

Wanted signal level was 20 dBµV for all tests. The tests were performed on all 3 frequencies.

Unwanted signal was unmodulated for all tests. Offsets and levels of the unwanted signal is given in the table above.

The character error ratio was 0 for all tests.

Limits: Clause 6.2.3

The unwanted signal shall not induce a character error ratio of more than 4×10^{-2}

Test Equipment Used: 1, 2, 3, 8, 9, 10

5.4 Co-channel rejection

ETSI EN 300065-1 subclause 6.3

Frequency	Unwanted signal input level	Verdict
490 kHz	14 dB μ V	Pass
518 kHz	14 dB μ V	Pass
4209.5 kHz	14 dB μ V	Pass

Two signals were applied to the receiver as specified in clause 5.1.3.

The test was performed with artificial antenna as specified in 5.1.1 b).

The test was performed at normal test conditions only.

Wanted signal level was 20 dB μ V for all tests. The tests were performed on all 3 frequencies.

Unwanted signal was unmodulated for all tests, the level was 14 dB μ V and the frequency the same as the nominal receiver frequency.

The character error ratio was 0 for all tests.

Limits: Clause 6.3.3

The unwanted signal shall not induce a character error ratio of more than 4×10^{-2}

Test Equipment Used: 1, 2, 3, 8, 9

5.5 Intermodulation

ETSI EN 300065-1 subclause 6.4

Frequency	Unwanted signal Frequency Offset	Verdict
490 kHz	$\pm 5 / 10$ kHz	Pass
518 kHz	$\pm 5 / 10$ kHz	Pass
4209.5 kHz	$\pm 50 / 100$ kHz	Pass

Three signals were applied to the receiver as specified in clause 5.1.3.

The test was performed with artificial antenna as specified in 5.1.1 b).

The test was performed at normal test conditions only.

Wanted signal level was 20 dB μ V for all tests. The tests were performed on all 3 frequencies.

Unwanted signal was unmodulated for all tests and the level was 70 dB μ V.

The character error ratio was 0 for all tests.

Limits: Clause 6.4.3

The unwanted signal shall not induce a character error ratio of more than 4×10^{-2}

Test Equipment Used: 1, 2, 3, 8, 9

5.6 Spurious emissions

ETSI EN 300065-1 subclause 6.5

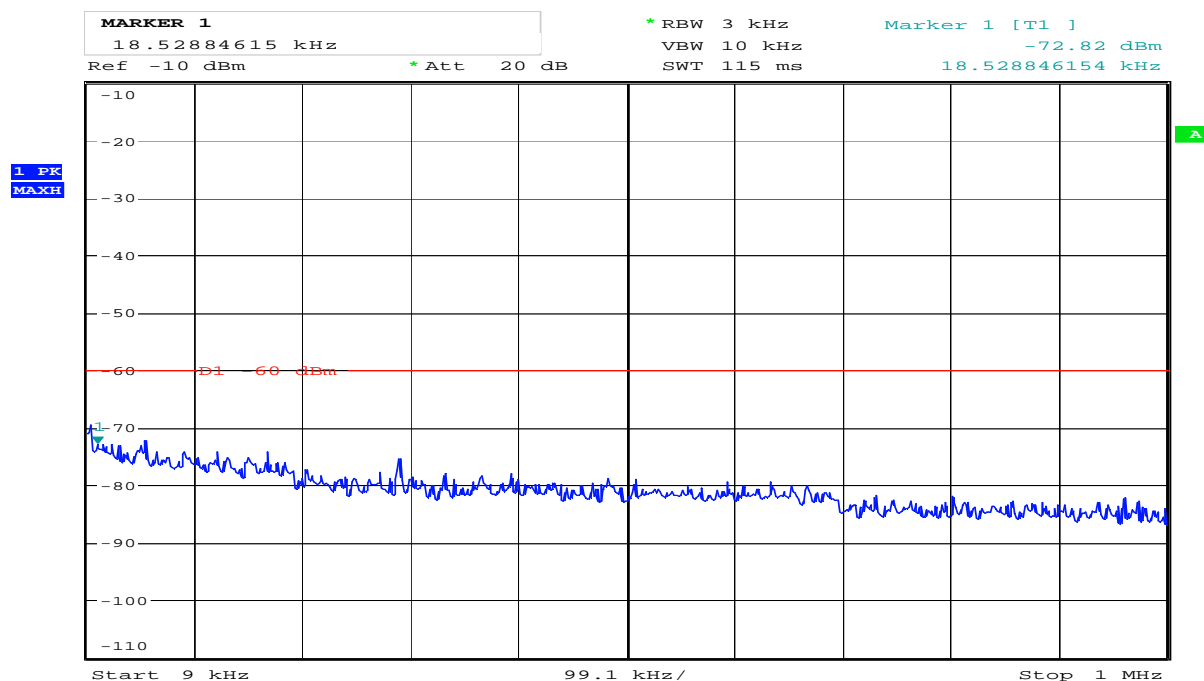
Frequency	Measured level (dBm)	Limit
9 kHz – 2000 MHz	< -60	-60 dBm

See plots.

Limits: Clause 6.5.3

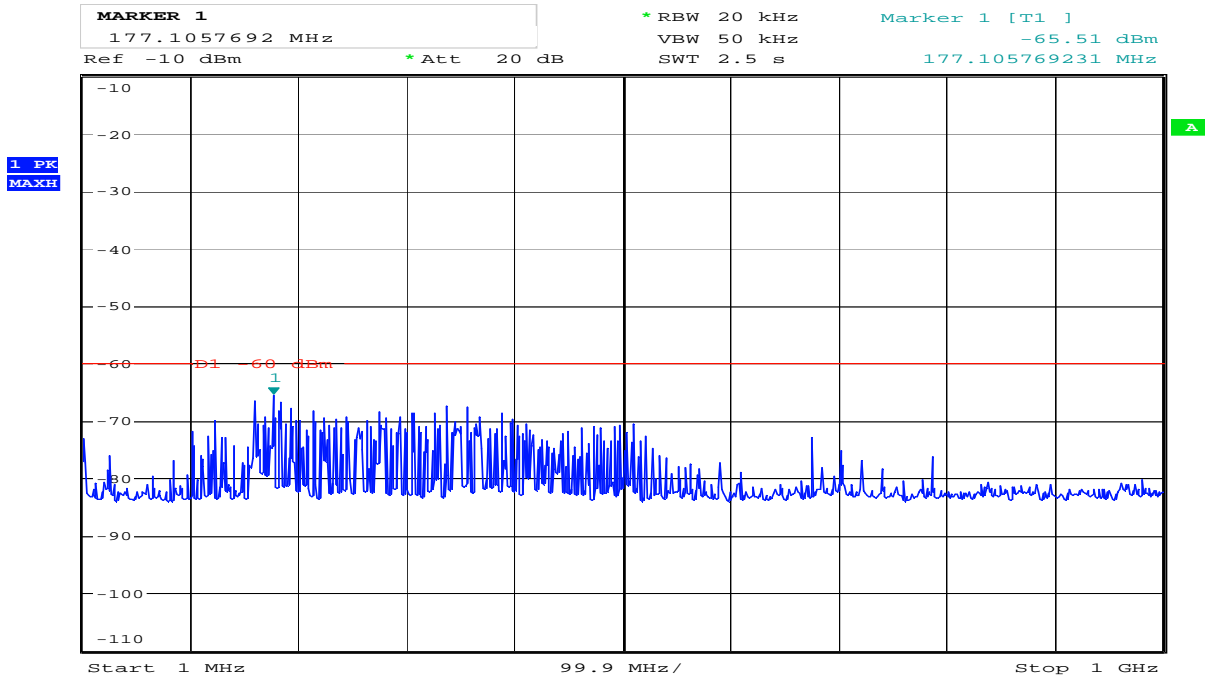
The power of any discrete component shall not exceed 1 nW (-60 dBm)

Test Equipment Used: 4, 8



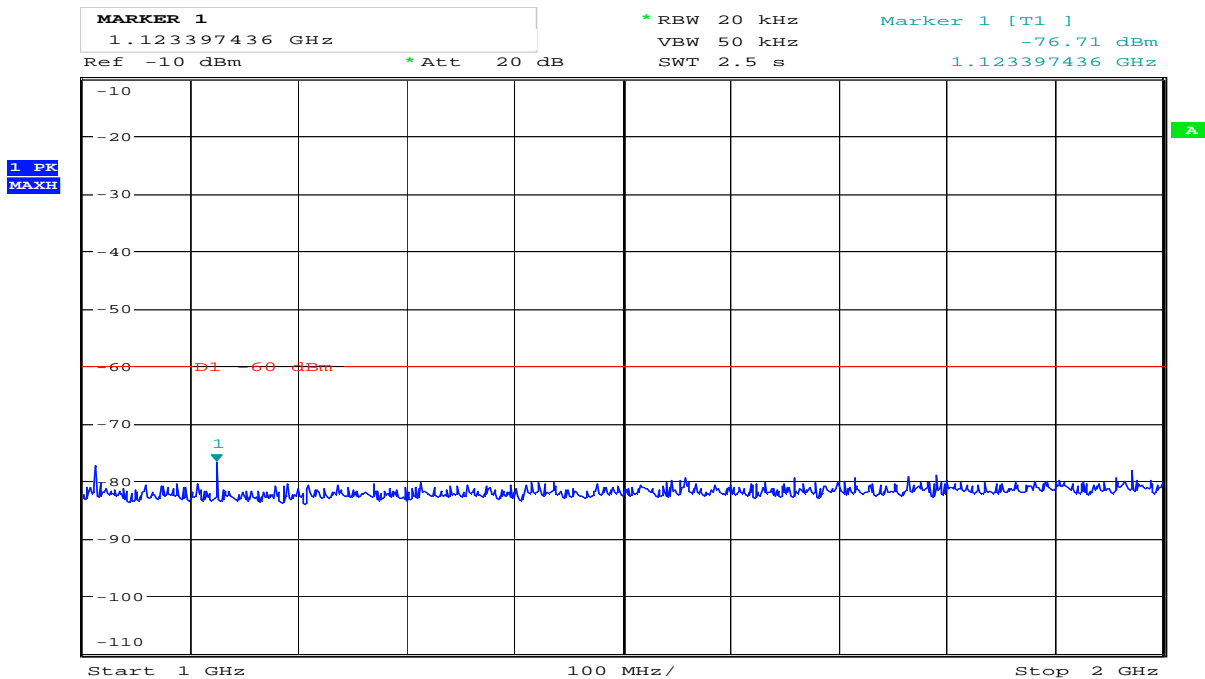
Date: 19.JAN.2010 12:20:50

Conducted Emissions, 9 kHz – 1 MHz



Date: 19.JAN.2010 12:23:05

Conducted Emissions, 1 MHz – 1 GHz



Date: 19.JAN.2010 12:22:04

Conducted Emissions, 1 - 2 GHz

5.7 Protection of input circuits

ETSI EN 300065-1 subclause 6.6

Frequency	Signal level	Verdict
490 kHz	5 μ V	Pass
518 kHz	5 μ V	Pass
4209.5 kHz	5 μ V	Pass

An unmodulated signal at 30 Volt r.m.s. was applied to the antenna input for 15 minutes, the frequency was varied between 100 kHz and 28 MHz.

Limits: Clause 6.6.3

The receiver shall operate normally without further intervention after the test

Test Equipment Used: 1, 5, 6, 7, 8, 9

5.8 Simultaneous reception

ETSI EN 300065-1 subclause 6.7

Freq 1 st Wanted Signal	Input level	Freq 2 nd Wanted Signal	Input Level	Verdict
518 kHz	20 dBμV	490 kHz	70 dBμV	Pass
518 kHz	70 dBμV	490 kHz	20 dBμV	Pass
518 kHz	20 dBμV	4209.5 kHz	70 dBμV	Pass
518 kHz	70 dBμV	4209.5 kHz	20 dBμV	Pass
490 kHz	20 dBμV	4209.5 kHz	70 dBμV	Pass
490 kHz	70 dBμV	4209.5 kHz	20 dBμV	Pass

Two signals were applied to the receiver as specified in clause 5.1.3.

The test was performed with artificial antenna as specified in 5.1.1 b).

The test was performed at normal test conditions only.

The character error ratio was 0 for all tests.

Limits: Clause 6.7.3

The character error ratio shall be less than 4×10^{-2} from either of the receiver output decoders

Test Equipment Used: 1, 2, 3, 8, 9

5.9 Message Processing

ETSI EN 300065-1 subclause 6.8

Requirement		Verdict
6.8.1 B1 tests	The equipment shall be programmed to accept all B2 characters and specified B1 characters.	Pass
	The test signal shall be at a level of 6 dB above STS and shall contain randomly selected B1 and B2 characters and shall be repeated 25 times. B3B4 = 00 shall not be used.	Pass
	For any value of B1 not specified in the equipment, the message shall be neither printed nor displayed.	Pass
6.8.2 B2 tests	The equipment shall be programmed to accept all B1 characters and specified B2 characters.	Pass
	The test signal shall be at a level of 6 dB above STS and shall contain randomly selected B1 and B2 characters and shall be repeated 25 times. B3B4 = 00 shall not be used.	Pass
	For any value of B2 not specified in the equipment other than A, B, D or L, the message shall be neither printed nor displayed.	Pass
6.8.3 Receiver test facility	As declared by the manufacturer	NT
6.8.4 SAR message alarm test	A single test message with B2 = D is applied to one of the receiver inputs.	
	An alarm shall be activated with an audible level of between 75 dBA and 85 dBA.	Pass
	For equipment with an integral display device it shall be possible to manually reset this alarm.	Pass
6.8.5 Additional alarm test	It shall also be possible to reset this alarm via the INS data port.	NT
	If any other additional alarms are declared by the manufacturer, they shall have the possibility of being inhibited.	NT
	Such alarms shall be activated by an appropriate signal.	NT
	It shall be possible to reset such alarms according to the documentation supplied with the equipment.	NT

5.10 Integrated printer tests

ETSI EN 300065-1 subclauses 6.9 and 7

Not applicable. The tested equipment does not have an integrated printer.

5.11 Memory storage tests

ETSI EN 300065-1 subclause 6.10

Requirement		Verdict
6.10.1 Storage, tagging and erasure	This test is not required for equipment with an integrated printing device.	
	A test file shall be used to pre-load the memory to 100 % capacity as specified by the manufacturer. This test file will consist of a list of messages from MSG1 to MSGn where MSGn is the most recent.	NT
	The 5 oldest messages shall be tagged for permanent storage.	NT
	A series of 10 unique identifiable messages shall be sent to the equipment (MSGs#1).	NT
	The equipment shall be checked to ensure that messages MSG1 to MSG5 are still retained in memory and that MSG6 to MSG15 have been replaced the new messages.	NT
	The 5 oldest messages shall now be un-tagged.	NT
	A second series of 10 unique identifiable messages shall be sent to the equipment.	NT
6.10.2 Erasure of message by timeout	The equipment shall be checked to ensure that the oldest 10 messages have been replaced by the 10 new messages.	NT
	This test is not required for equipment with an integrated printing device.	
	59 hours after the conclusion of the test in clause 6.10.1 send a test message to the equipment containing a specific message identification that is already contained in memory. One of the memorized messages shall also be tagged for permanent storage.	Pass
	The equipment shall be checked to ensure that this new test message has not been stored.	Pass
	After 2 hours, send a test message to the equipment that is a new and previously unused message (MSGa). The equipment shall be checked to ensure that this test message (MSGa) has been stored in place of the oldest message.	NT
	After another 12 hours, the memory contents shall be checked again and only MSGa and the tagged message shall be present in memory.	NT
	A series of 10 unique identifiable messages shall be sent to the equipment (MSGs#1 as in clause 6.10.1).	NT
6.10.3 Storage of message identifications	The memory contents shall be checked and the 10 messages of MSGs#1, MSGa and the tagged message shall be present in memory.	NT
	This test only applies to equipment with an integrated printing device.	Not applicable

5.12 Dedicated display device

ETSI EN 300065-1 subclause 8

Requirement		Verdict
8.1 General	There shall be controls to adjust display brightness and contrast.	Pass
	There shall be an indication of which receivers are currently receiving.	Pass
	There shall be a display mode to indicate which B1 and B2 characters are selected for each receiver. It shall be possible to independently configure the B1 and B2 selection for message storage, message output to the printer port and message output to the INS port.	Pass
	New search and rescue messages shall be displayed immediately they have been received and stored in memory. They shall remain displayed until the associated alarm has been cancelled.	Pass
	There shall be an indication displayed that new messages other than search and rescue messages have been received.	Pass
	Newly received selected messages shall be indicated on the display until either acknowledged or until 24 hours after reception.	Pass
	Stored messages shall be searchable by location (station) designators and type of message designators.	Pass
8.2 Display characteristics	The display device shall have a minimum of 16 lines of 32 alphanumeric characters per line.	Pass (vertical scrolling)
	The display characters shall be at least 3,5 mm high, with a nominal character width/height ratio of 0,7.	Pass
	The display shall also have the possibility to indicate newly received selected messages.	Pass

5.13 Interfaces

ETSI EN 300065-1 subclause 9

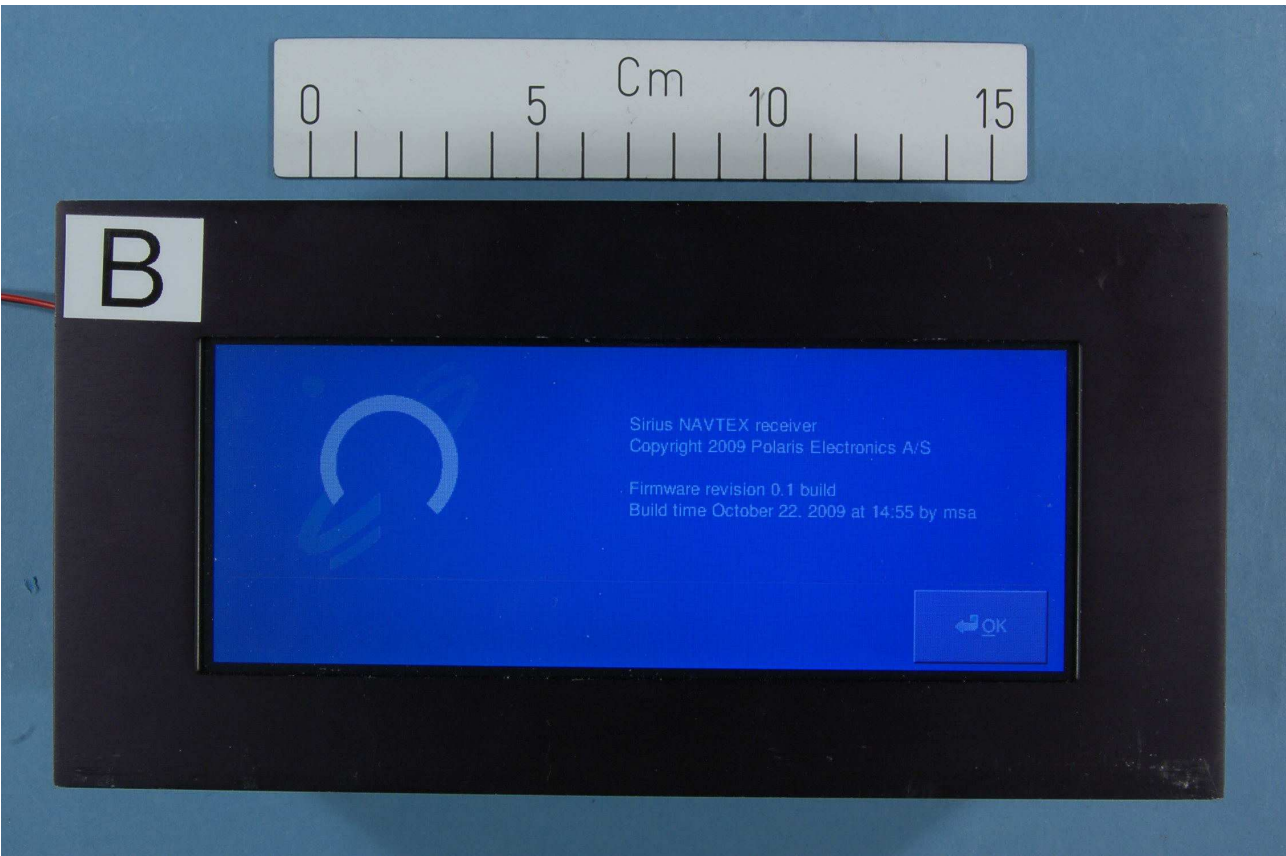
Requirement		Verdict
9.1 Printer	If the equipment does not have an integrated printing device, an industry standard printer interface shall be provided.	Pass
	<p>The operator shall have the possibility to select the following output options using the printer interface:</p> <ul style="list-style-type: none"> all messages as they are received; all messages stored in memory; all messages received on specified frequencies, locations or message designators; all messages currently displayed; individual messages selected from those being displayed. 	NT
9.2 Data	The equipment shall have at least one data interface for the purpose of communicating received messages with other navigational or communications equipment. Any such interfaces shall comply with EN 61162-1 [i.3]. As a minimum the equipment shall recognize the ACK, ALR, NRM and NRX sentences.	NT
	Any proprietary sentences identified in the equipment documentation shall also comply with EN 61162-1 [i.3] for format, transmission intervals and baud rate.	NT
	The equipment documentation shall clearly identify the interface connections including the A and B signal lines for any EN 61162-1 [i.3] interface.	NT
	The equipment shall also be capable of responding to NRM and NRX query sentences as defined in EN 61162-1 [i.3].	NT
	The signal characteristics of these data ports shall comply with EN 61162-1 [i.3].	NT

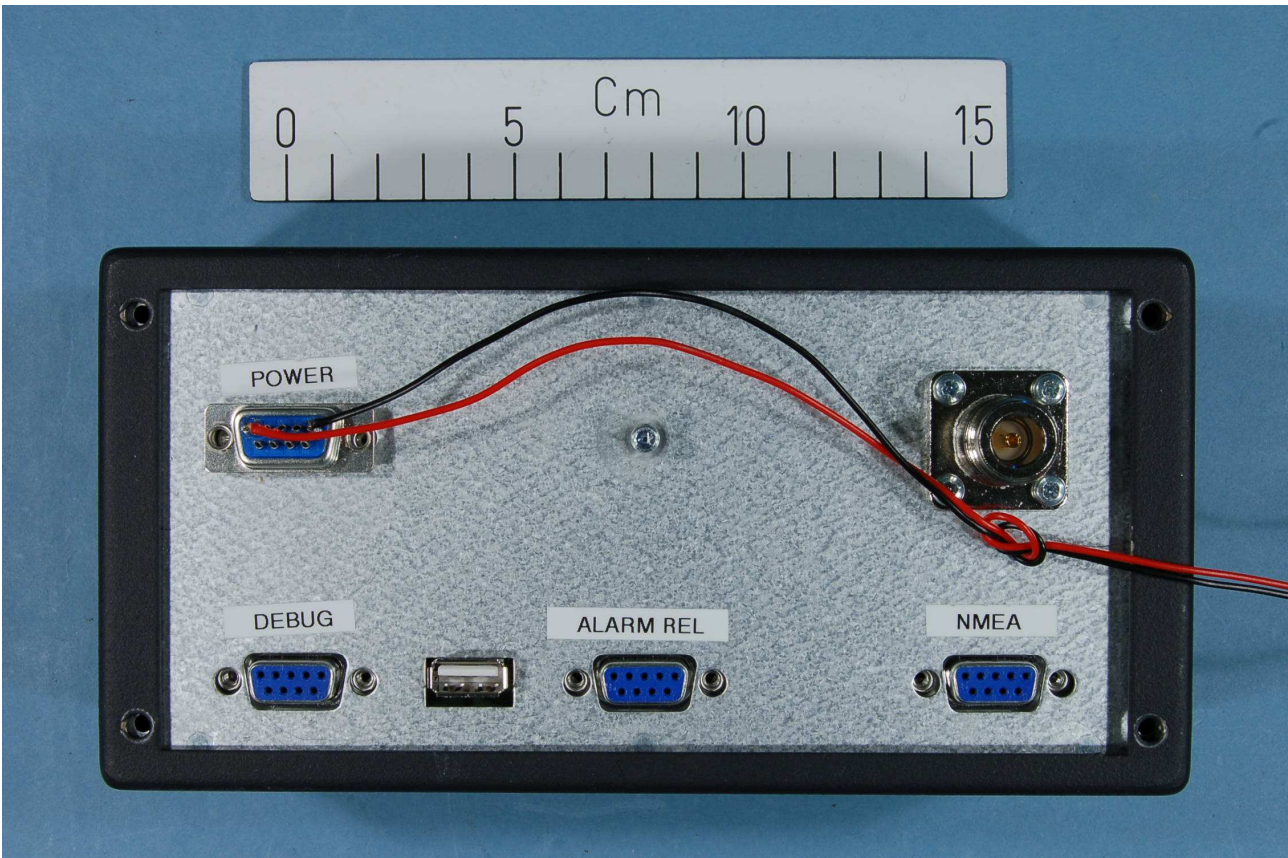
5.14 Message memory

ETSI EN 300065-1 subclause 10

Requirement		Verdict
10.1 General requirements	Messages not tagged shall be automatically deleted after between 60 hours and 72 hours from reception.	Pass
	When the memory capacity is exceeded, messages shall be deleted on an oldest message first basis.	NT
10.2 Equipment without an integrated printing device	Separate non-volatile memory shall be provided for each radio frequency receiver and each shall be capable of storing at least 200 messages of 500 characters. Messages of up to 8 000 characters shall be storable.	NT
	The user shall have the possibility to tag messages for permanent storage. Such messages may occupy up to 25 % of the available memory. These messages shall not be overwritten unless they have been un-tagged by the user.	NT
10.3 Equipment with an integrated printing device	Separate non-volatile memory shall be provided for each radio frequency receiver and each shall be capable of storing at least 200 messages.	Not applicable

6 Pictures of EUT





7 Test Equipment Used

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the testhouse.

No.	Instrument/ancillary	Type of instrument/ancillary	Manufacturer	Ref. no.
1	HP 8657B	Signal generator	Hewlett Packard	S.no.: 3538U07025
2	CMTA 84	Radiocom tester	Rohde & Schwarz	LR 1047
3	SMHU	Signal generator	Rohde & Schwarz	LR 1240
4	FSU26	Spectrum analyzer	Rohde & Schwarz	LR1504
5	75A250	RF Amplifier	Amplifier Research	N-3816
6	URV5	Millivoltmeter	Rohde & Schwarz	LR 192
7	URV5-Z4	Insertion unit	Rohde & Schwarz	LR 342
8	B32-10R	Power supply	Oltronics	LR 016
9	N500	Computer with audio output and message generating software	Lenovo	/
10	TY80 4101	Climatic chamber	acs	LR 1083