

Report on Radio Testing of the
Weatherdock AG
Marine Man Over Board device
Model: easy2-MOB
In accordance with
IEC FDIS 63269 ED1 : 2022

Prepared for: Weatherdock AG
Emmericher Strasse 17
90411 Nuremberg, Germany



Product Service

**Add value.
Inspire trust.**

COMMERCIAL-IN-CONFIDENCE

Date: 2022-11-28
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Executive Statement:

A sample of this product was tested and found to be compliant with IEC FDIS 63269 ED1 : 2022

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1 Report Summary

1.1 Modification Report

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

<i>Revision</i>	<i>Description of changes</i>	<i>Date of Issue</i>
0	First Issue	2022-10-04
1	Corrected typos on pages 2, 4 and 74.	2022-11-28

Table 1: Report of Modifications

1.2 Introduction

<i>Applicant</i>	Weatherdock AG Emmericher Strasse 17 90411 Nuremberg, Germany
<i>Manufacturer</i>	Weatherdock AG
<i>Model Number(s)</i>	easy2-MOB
<i>Serial Number(s)</i>	Prototype
<i>Hardware Version(s)</i>	Sample Unit May 2022 V2
<i>Software Version(s)</i>	V 2.0
<i>Number of Samples Tested</i>	4
<i>Test Specification(s) /</i>	IEC FDIS 63269 ED1 : 2022
<i>Issue / Date</i>	
<i>Test Plan/Issue/Date</i>	---
<i>Order Number</i>	7796
<i>Date</i>	2022-05-06
<i>Date of Receipt of EUT</i>	2022-07-13; 2022-09-07; 2022-09-15
<i>Start of Test</i>	2022-07-13; 2022-09-07; 2022-09-23
<i>Finish of Test</i>	2022-07-15; 2022-09-09; 2022-09-29
<i>Name of Engineer(s)</i>	M. Steindl
<i>Related Document(s)</i>	---



1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance IEC FDIS 63269 ED1 : 2022 is shown below.

Section	Specification Clause	Test Description	Result
2.1	5.4.2.1	Frequency error	Pass
2.2	5.5.2.2	Conducted power	Pass
2.3	5.4.2.3	Radiated power	Pass
2.4	5.4.2.4	Slotted transmission spectrum	Pass
2.5	5.4.2.5	Transmitter test sequence and modulation accuracy	Pass
2.6	5.4.2.6	Transmitter output power versus time function	Pass
2.7	5.4.2.7	Spurious emissions from the transmitter	Pass

Table 2: Results for AIS operation

Section	Specification Clause	Test Description	Result
3.1	6.4.2.1	Frequency error	Pass
3.2	6.4.2.2	Conducted power	Pass
3.3	6.4.2.3	Radiated power	Pass
3.4	6.4.2.4	Transmitter modulation spectrum	Pass
3.5	6.4.2.5	Transmitter transient behaviour	Pass
3.6	6.4.2.6	Frequency error (demodulated DSC signal)	Pass
3.7	6.4.2.7	Modulation index for DSC	Pass
3.8	6.4.2.8	Modulation rate for DSC	Pass
3.9	6.4.2.9	Spurious emissions	Pass
3.10	6.4.2.10	Testing of free channel transmission on DSC channel 70	Pass

Table 3: Results for DSC transmitter operation

Section	Specification Clause	Test Description	Result
3.10	6.4.2.10	Testing of free channel transmission on DSC channel 70	Pass
3.11	6.4.3.1	Maximum sensitivity	Pass
3.12	6.4.3.2	Co-channel rejection	Pass
3.13	6.4.3.3	Adjacent channel selectivity	Pass
3.14	6.4.3.4	Intermodulation response	Pass
3.15	6.4.3.5	Dynamic range	Pass
3.16	6.4.3.6	Spurious response rejection	Pass
3.17	6.4.3.7	Receiver Blocking	Pass

Table 4: Results for DSC receiver operation



1.4 Product Information

1.4.1 General Technical Description

Frequency Bands: DSC: 156.525 MHz (25 kHz)
AIS1: 161.975 MHz (25 kHz)
AIS2: 162.025 MHz (25 kHz)
GPS: 1575 MHz
BT: 2400.0 – 2483.5 MHz

Supply Voltage: 6 V
Supply Frequency: DC (battery supply)

Internal clock frequencies: 8 MHz, 9.6 MHz; 16 MHz; 19.2 MHz; 28.8 MHz; 127.27 MHz;
139.745 MHz

1.4.2 EUT Ports / Cables identification

Port	Max Cable Length specified	Usage	Type	Screened
N/A				

Table 5

1.5 Test Configuration

The EUT was configured as battery operated standalone device.
The applicant provided conducted test samples used for most tests except radiated power.

1.6 Modes of Operation

The applicant provided test modes for AIS transmitting and DSC transmitting and receiving.

1.7 Deviations from Standard

The applicant didn't provide a test sample that was able to transmit an unmodulated carrier. So alternative test methods were used on frequency error and transmitter transient behavior tests. Please refer to 3.5.6.

1.8 EUT Modifications Record

The table below details modifications made to the EUT during the test programme.



The modifications incorporated during each test are recorded on the appropriate test pages.

<i>Modification State</i>	<i>Description of Modification still fitted to EUT</i>	<i>Modification Fitted By</i>	<i>Date Modification Fitted</i>
0	As supplied by the customer on 2022-07-13	Not Applicable	Not Applicable
1	As supplied by the customer on 2022-09-07	Not Applicable	Not Applicable
2	Updated firmware	T. Pirkelmann	2022-09-08
3	Updated firmware	T. Pirkelmann	2022-09-09
4	As supplied by the customer on 2022-09-16	T. Pirkelmann	Not Applicable

Table 6

1.9 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

<i>Test Name</i>	<i>Name of Engineer(s)</i>
Frequency error	M. Steindl
Conducted power	M. Steindl
Radiated power	M. Steindl
Slotted transmission spectrum / Transmitter modulation spectrum	M. Steindl
Transmitter test sequence and modulation accuracy	M. Steindl
Transmitter output power versus time function	M. Steindl
Spurious emissions from the transmitter	M. Steindl
Transmitter transient behaviour	M. Steindl
Frequency error (demodulated DSC signal)	M. Steindl
Modulation index for DSC	M. Steindl
Modulation rate for DSC	M. Steindl
Testing of free channel transmission on DSC channel 70	M. Steindl
Maximum sensitivity	M. Steindl
Co-channel rejection	M. Steindl
Adjacent channel selectivity	M. Steindl
Intermodulation response	M. Steindl
Dynamic range	M. Steindl
Spurious response rejection	M. Steindl
Receiver Blocking	M. Steindl

Office Address:

Äußere Frühlingstraße 45
94315 Straubing
Germany



2 Test Details on AIS functionality

2.1 Frequency error

2.1.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.1

2.1.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

2.1.3 Date of Test

2022-07-13

2.1.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

2.1.5 Specification Limits

The frequency error shall not exceed ± 0.5 kHz, under normal test conditions and ± 1.0 kHz under extreme test conditions

2.1.6 Test Method

The test was performed in reference to IEC FDIS 63269 ED1 : 2022, section 5.4.2.1.2

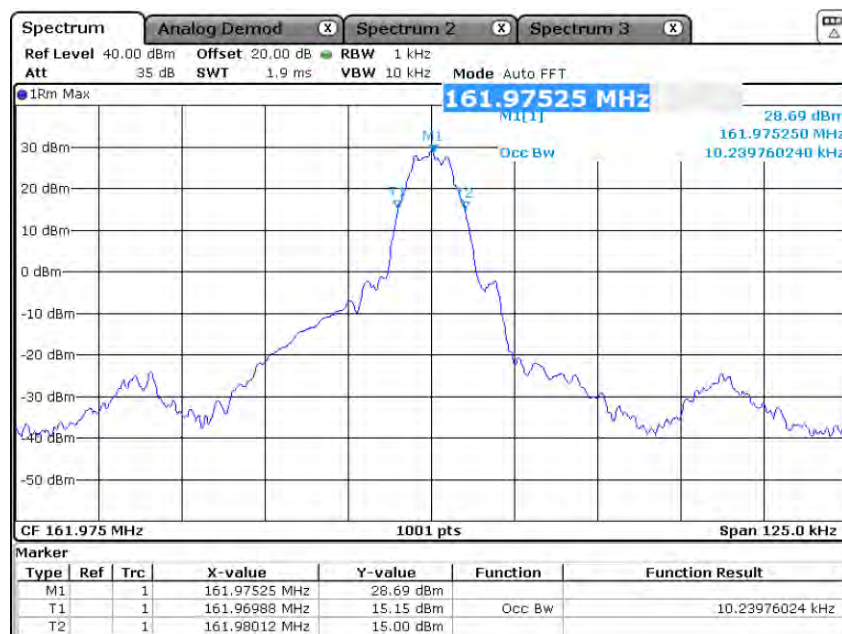
The applicant did not provide a test sample with unmodulated carrier test mode. So the test was performed as occupied 99 % bandwidth test and the test frequency calculated as arithmetic middle of the upper and lower frequency of the occupied bandwidth: $f_m = \frac{f_l + f_h}{2}$.



2.1.7 Test Results

Nominal frequency	Temperature	f_i (MHz)	f_n (MHz)	f_c (MHz)	Δf (kHz)	Limit (kHz)
AIS 1 (161.975 MHz)	-20 °C	161.969880	161.980120	161.975000	0.000	≤ 1.0
AIS 1 (161.975 MHz)	+20 °C	161.969880	161.980120	161.975000	0.000	≤ 0.5
AIS 1 (161.975 MHz)	+50 °C	161.969006	161.980495	161.974751	-0.2495	≤ 1.0
AIS 2 (162.025 MHz)	-20 °C	162.019131	162.030495	162.024813	-0.187	≤ 1.0
AIS 2 (162.025 MHz)	+20 °C	162.018881	162.030495	162.024688	-0.312	≤ 0.5
AIS 2 (162.025 MHz)	+50 °C	162.019006	162.030370	162.024688	-0.312	≤ 1.0

AIS1

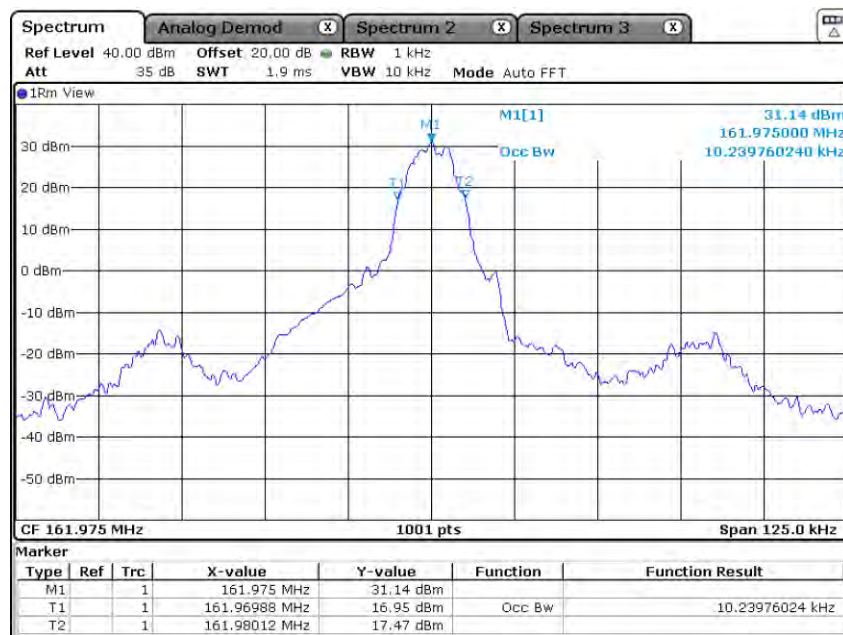


Date: 13 JUL 2022 18:57:52

AIS1, -20 °C

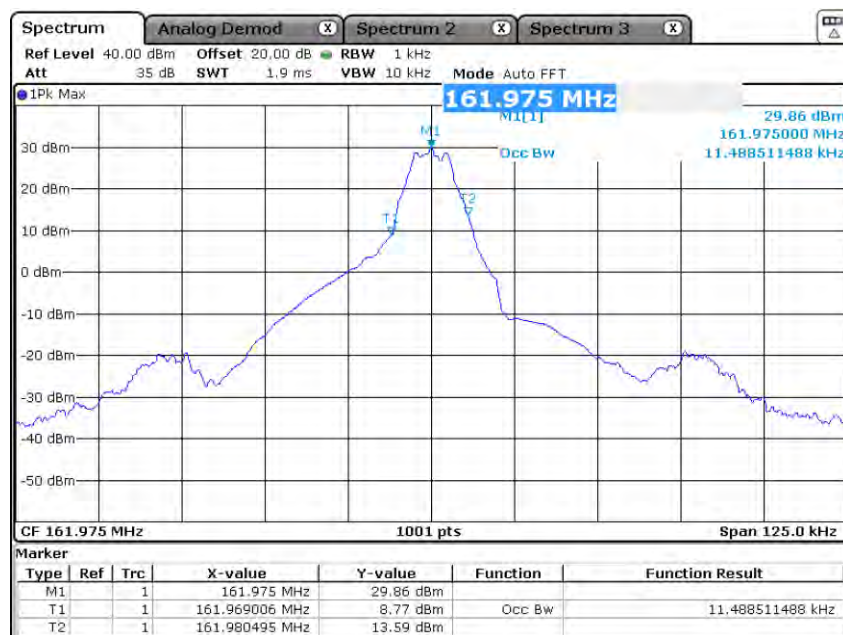


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Date: 13 JUL 2022 18:11:16

AIS1, +20 °C



Date: 13 JUL 2022 20:07:48

AIS1, +50 °C

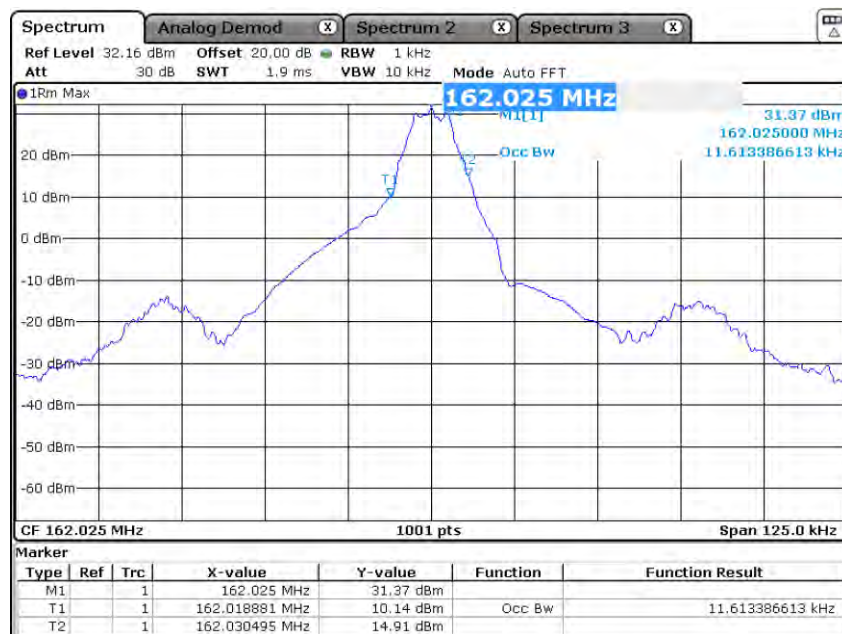


AIS2



Date: 13 JUL 2022 18:55:21

AIS2, -20 °C

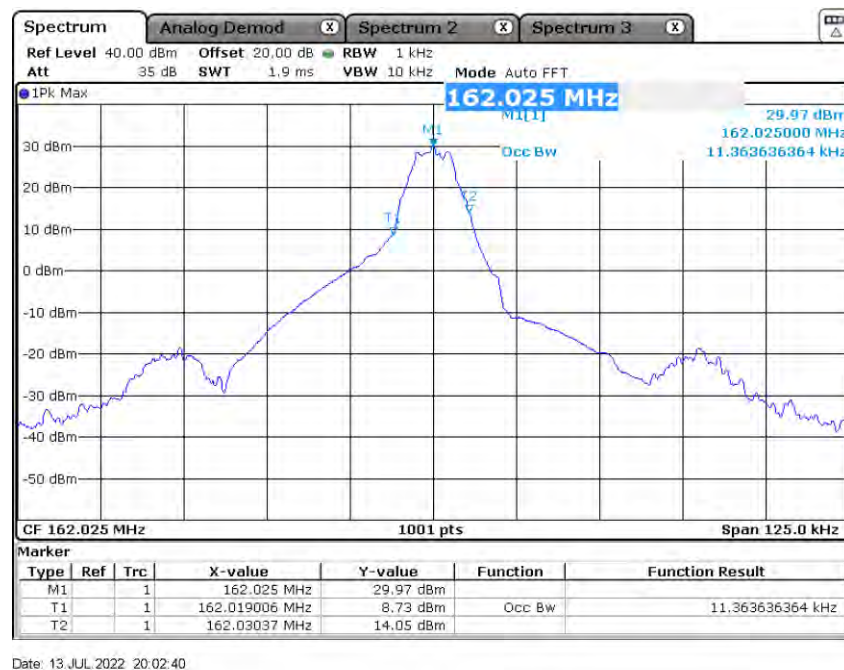


Date: 13 JUL 2022 17:36:02

AIS2, +20 °C



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AIS2, +50 °C

2.1.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibra- tion Pe- riod (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 7



2.2 Conducted Power

2.2.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.2

2.2.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

2.2.3 Date of Test

2022-07-13

2.2.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

2.2.5 Specification Limits

The conducted power, corrected for the antenna gain shall be at least the values given in table

<i>Power</i>	<i>dBm</i>
$P_{-20} + G + P_d$	27
$P_{50} + G + P_d$	27

Note: This power equates to the radiated power at extreme temperatures

Table 8

2.2.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.2.2

The test was carried out using a spectrum analyser with RMS detector and a resolution bandwidth of 1 MHz, wider than the nominal bandwidth of the transmitter.

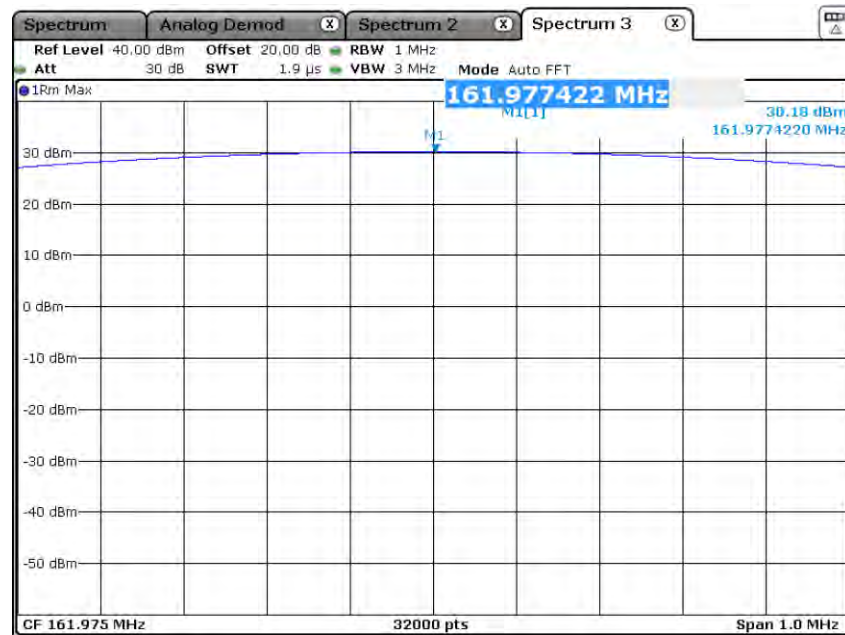


2.2.7 Test Results

Nominal frequency	Temperature	Conducted Power	Radiated Power	Limit
AIS 1 (161.975 MHz)	-20 °C	30.2 dBm	27.9 dBm	≥ 27.0 dBm
AIS 1 (161.975 MHz)	+20 °C	31.9 dBm	29.6 dBm	--- *
AIS 1 (161.975 MHz)	+50 °C	30.6 dBm	28.3 dBm	≥ 27.0 dBm
AIS 2 (162.025 MHz)	-20 °C	30.6 dBm	28.1 dBm	≥ 27.0 dBm
AIS 2 (162.025 MHz)	+20 °C	32.2 dBm	29.7 dBm	--- *
AIS 2 (162.025 MHz)	+50 °C	30.7 dBm	28.0 dBm	≥ 27.0 dBm

*: Radiated reference value not evaluated here. Refer to section 2.3 for details.

AIS1

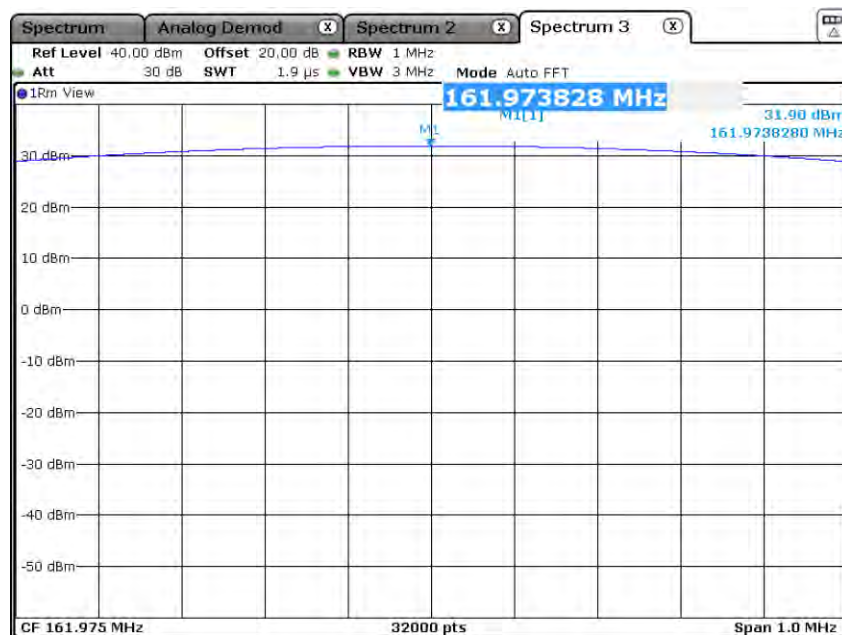


Date: 13 JUL 2022 18:57:27

AIS1, -20 °C

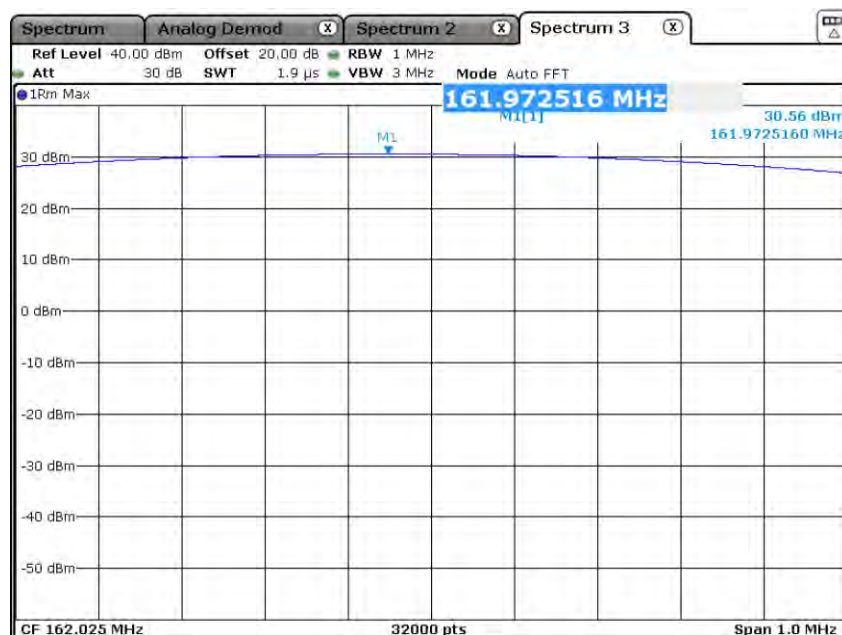


Product Service



Date: 13 JUL 2022 18:10:37

AIS1, +20 °C



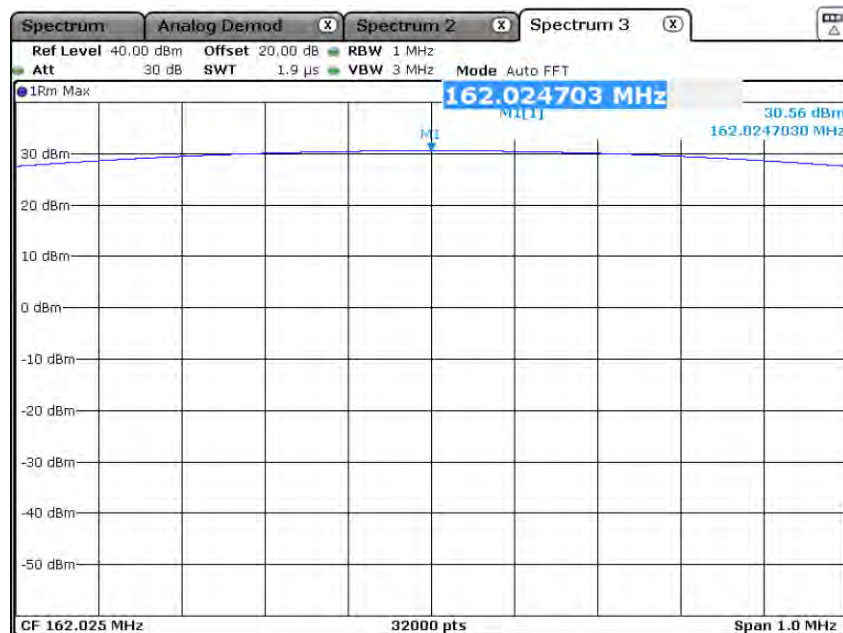
Date: 13 JUL 2022 20:08:42

AIS1, +50 °C



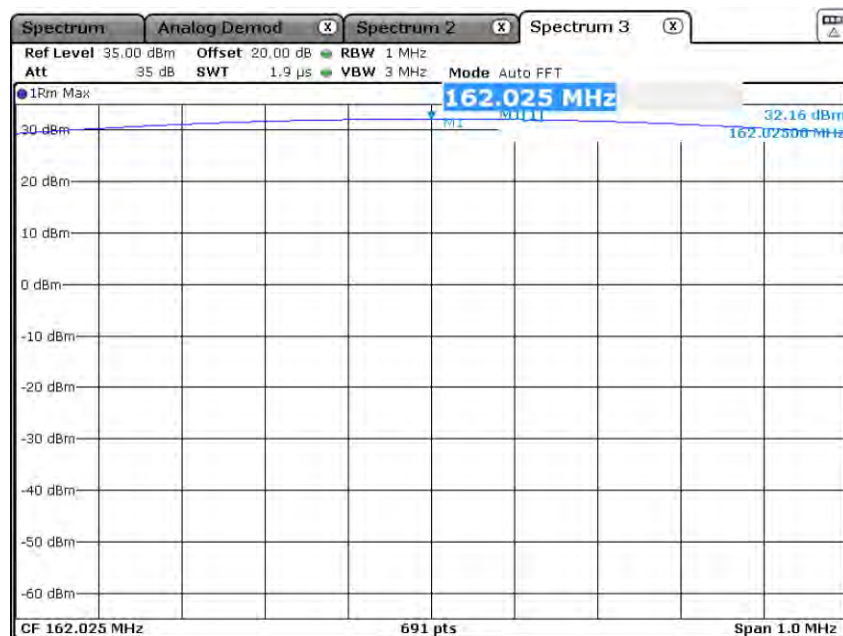
Product Service

AIS2



Date: 13 JUL 2022 18:56:14

AIS2, -20 °C

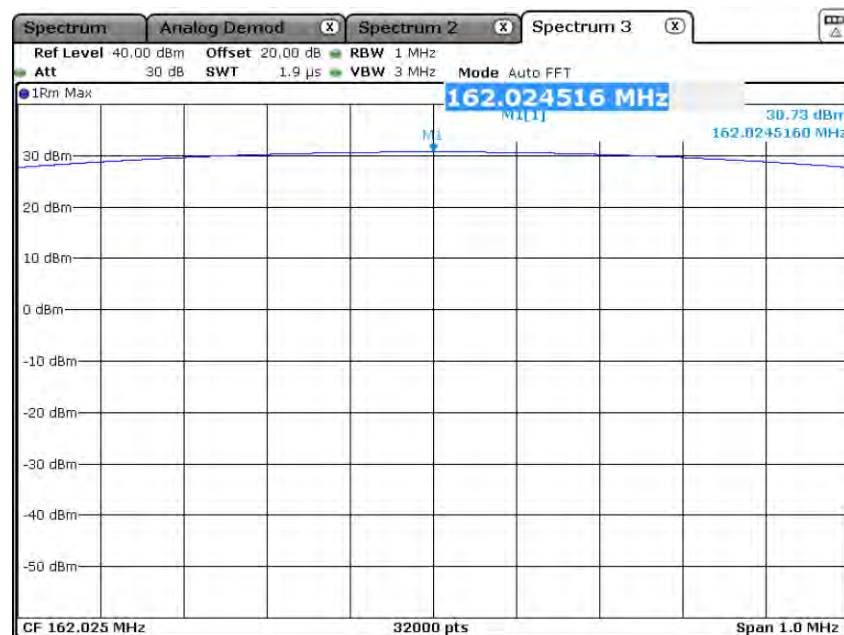


Date: 13 JUL 2022 17:33:46

AIS2, +20 °C



Product Service



Date: 13 JUL 2022 20:01:46

AIS2, +50 °C

2.2.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 9



2.3 Radiated Power

2.3.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.3

2.3.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

2.3.3 Date of Test

2022-07-15

2.3.4 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	39 %

2.3.5 Specification Limits

The purpose of this test is to verify that the equipment has a nominal radiated power (EIRP) of 1 W at normal operating conditions.

The radiated power shall be at least 27 dBm (500 mW).

2.3.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.3.2



2.3.7 Test Results

Nominal frequency	Position	P_R	Cable	Antenna Gain	Free Field Attenuation	P	Limit
AIS 1 (161.975 MHz)	-90°	2.9 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.59	≥ 27.0 dBm
AIS 1 (161.975 MHz)	0°	3.0 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.69	≥ 27.0 dBm
AIS 1 (161.975 MHz)	+90°	3.3 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.99	≥ 27.0 dBm
AIS 1 (161.975 MHz)	+180°	3.2 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.89	≥ 27.0 dBm
AIS 2 (162.025 MHz)	-90°	3.2 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.89	≥ 27.0 dBm
AIS 2 (162.025 MHz)	0°	3.0 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.69	≥ 27.0 dBm
AIS 2 (162.025 MHz)	+90°	3.1 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.79	≥ 27.0 dBm
AIS 2 (162.025 MHz)	+180°	3.1 dBm	1.48 dB	-5.41 dB _i	30.62 dB	29.79	≥ 27.0 dBm

2.3.8 Test Location and Test Equipment

The test was carried out in semi anechoic room, No. 8

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2022-10-31
TRILOG broadband antenna	Schwarzbeck	VULB 9163	19589	36	2025-06-30
Semi anechoic room	Albatross Projects	Cabin No. 8	19917		

Table 10



2.4 Slotted transmission spectrum

2.4.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.4

2.4.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

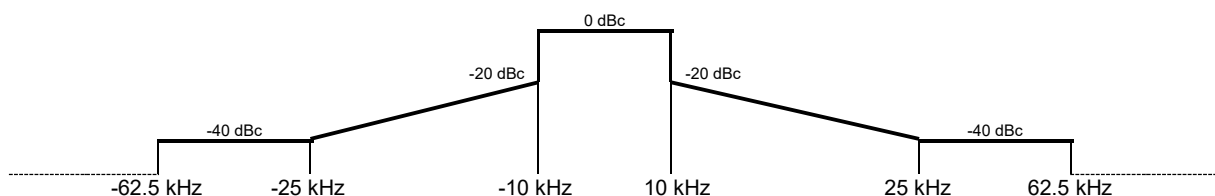
2.4.3 Date of Test

2022-07-13

2.4.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

2.4.5 Specification Limits



2.4.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.4.2



Product Service

2.4.7 Test Results

AIS1



Date: 13 JUL 2022 18:09:03

AIS 1

AIS2



Date: 13 JUL 2022 17:34:34

AIS 2



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2.4.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 11



2.5 Transmitter test sequence and modulation accuracy

2.5.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.5

2.5.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 1

2.5.3 Date of Test

2022-09-08

2.5.4 Environmental Conditions

Ambient Temperature 24 °C
Relative Humidity 56 %

2.5.5 Specification Limits

Measurement period from center to center of each bit	Test signal 1		Test signal 2	
	Normal	Extreme	Normal	Extreme
Bit 0 to 1	< 3400 Hz			
Bit 2 to 3	2400 Hz $\pm$ 480 Hz			
Bit 4 to 31	2400 Hz $\pm$ 240 Hz	2400 Hz $\pm$ 480 Hz	2400 Hz $\pm$ 240 Hz	2400 Hz $\pm$ 480 Hz
Bit 32 to 199	1740 Hz $\pm$ 175 Hz	1740 Hz $\pm$ 350 Hz	2400 Hz $\pm$ 240 Hz	2400 Hz $\pm$ 480 Hz

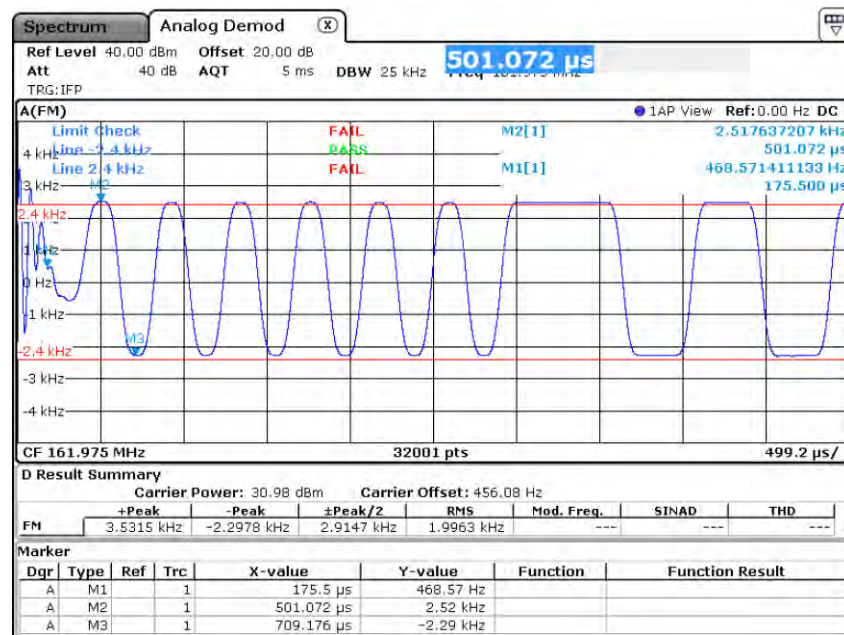
2.5.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.5.2

2.5.7 Test Results

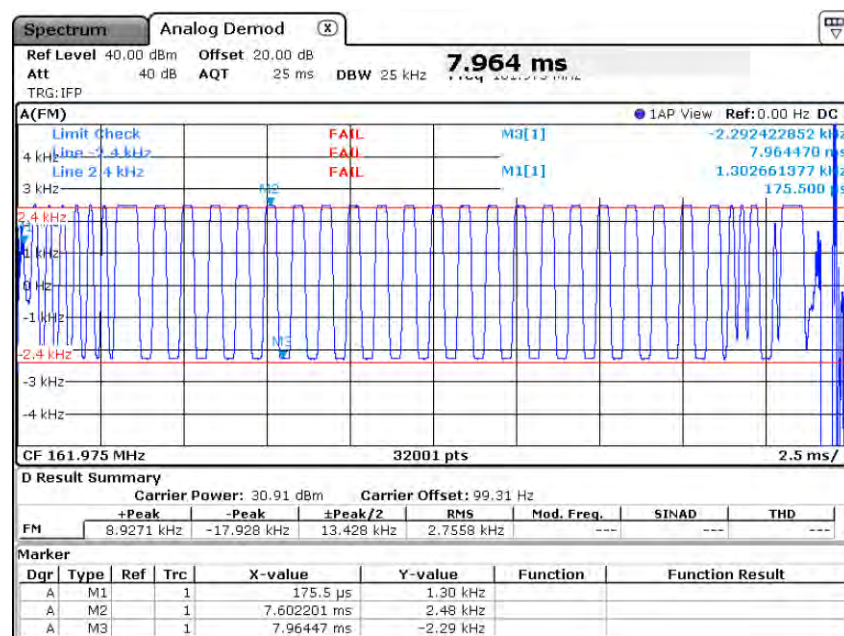
Note: Measured deviations are within the allowed tolerances

AIS1



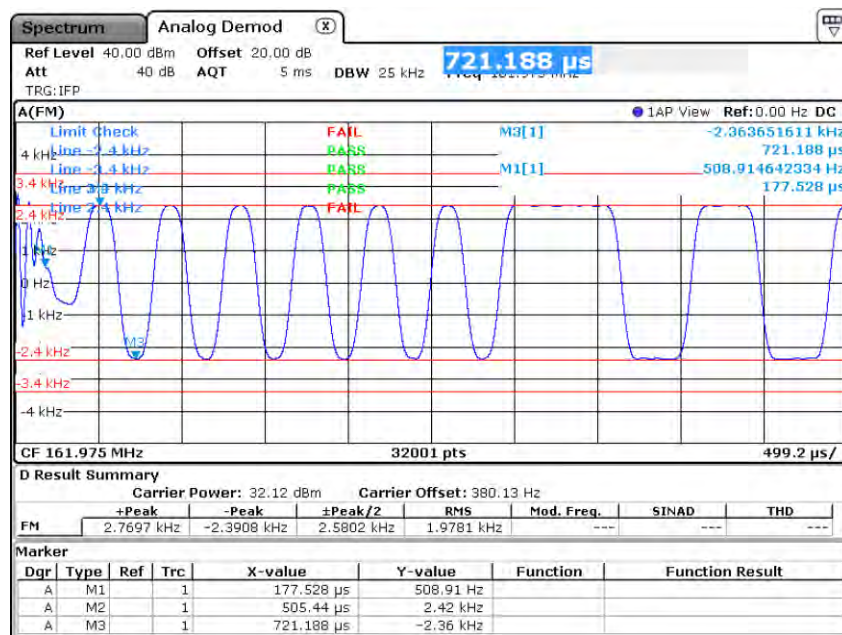
Date: 8. SEP. 2022 10:03:12

AIS 1, Test Signal 1, -20 °C



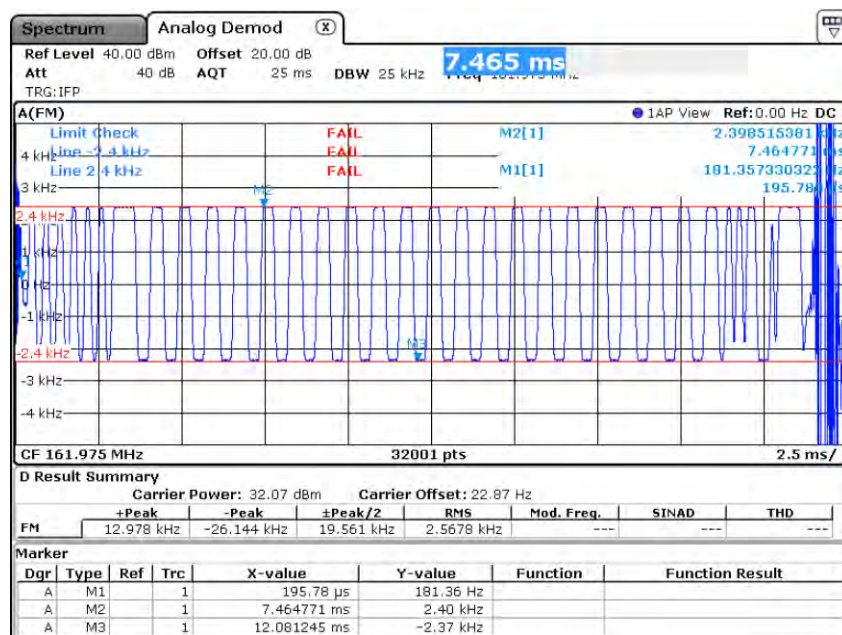
Date: 8. SEP. 2022 10:02:01

AIS 1, Test Signal 1, -20 °C



Date: 8 SEP 2022 09:17:31

AIS 1, Test Signal 1, +20 °C

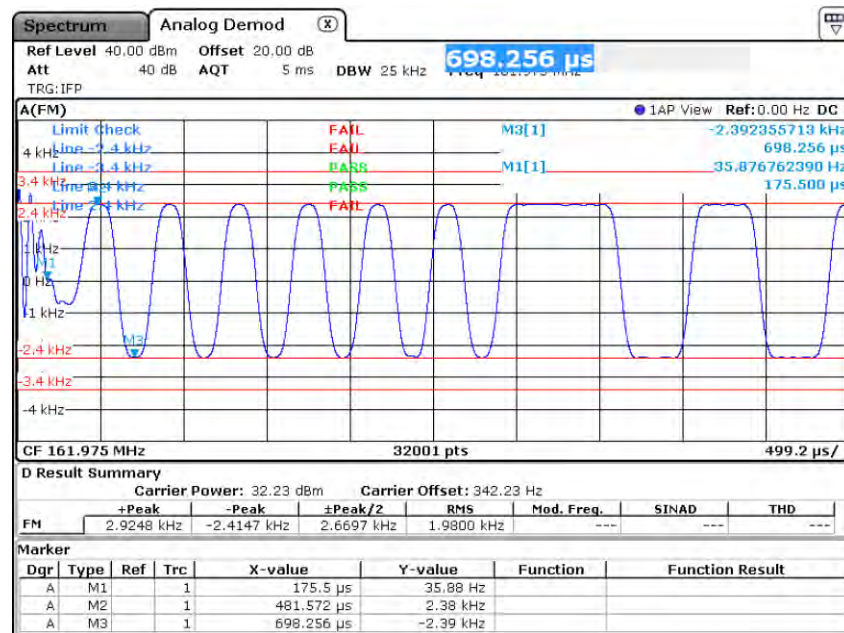


Date: 8 SEP 2022 09:16:07

AIS 1, Test Signal 1, +20 °C

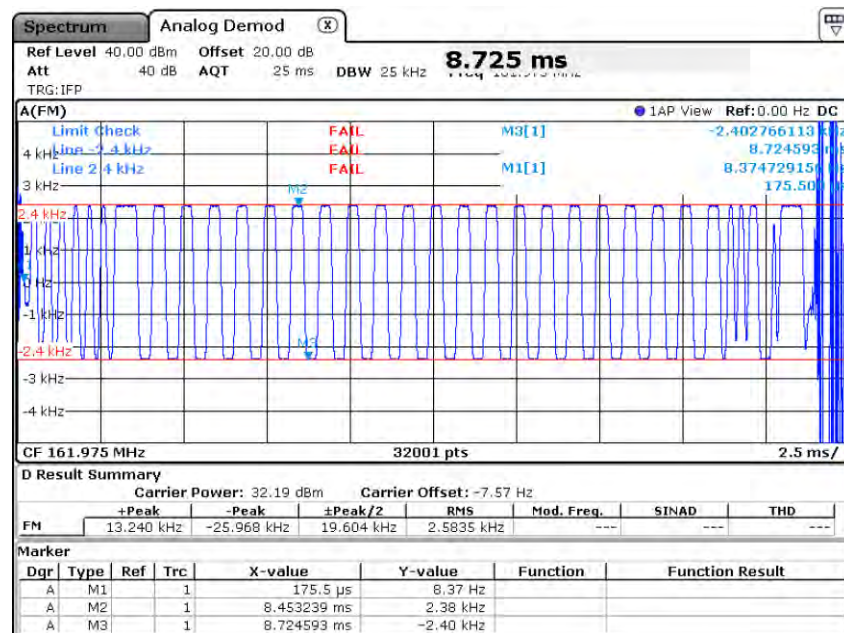


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Date: 8 SEP 2022 10:40:15

AIS 1, Test Signal 1, +50 °C

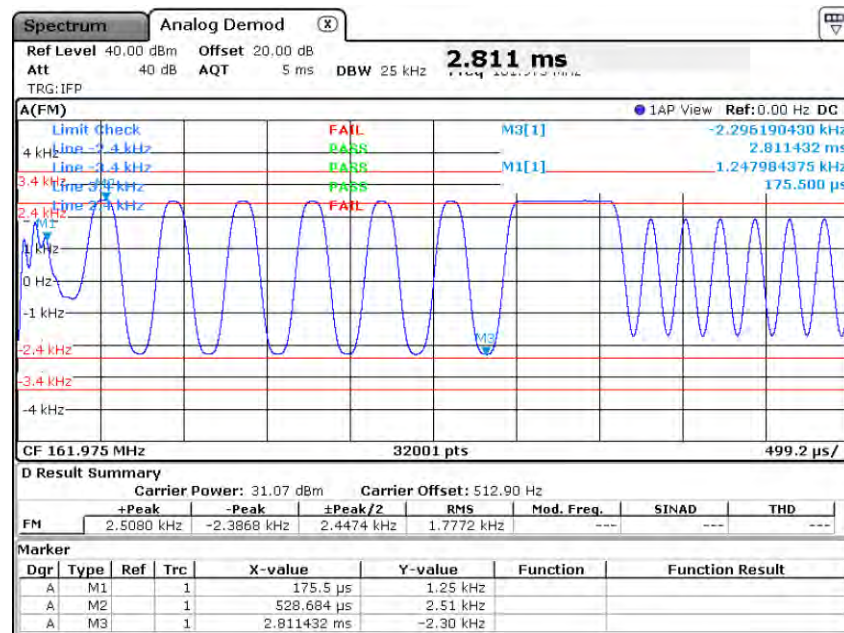


Date: 8 SEP 2022 10:42:21

AIS 1, Test Signal 1, +50 °C

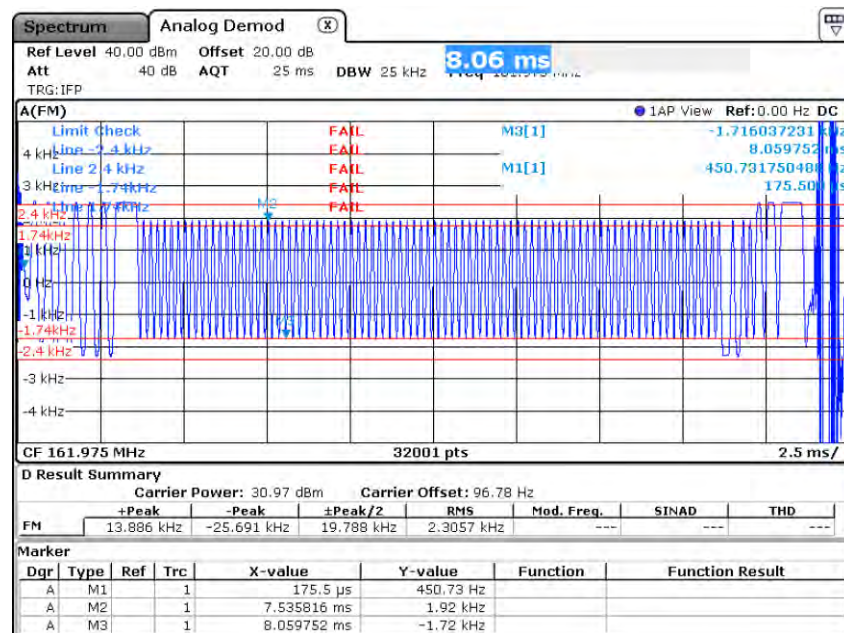


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Date: 8 SEP 2022 09:58:10

AIS 1, Test Signal 2, -20 °C

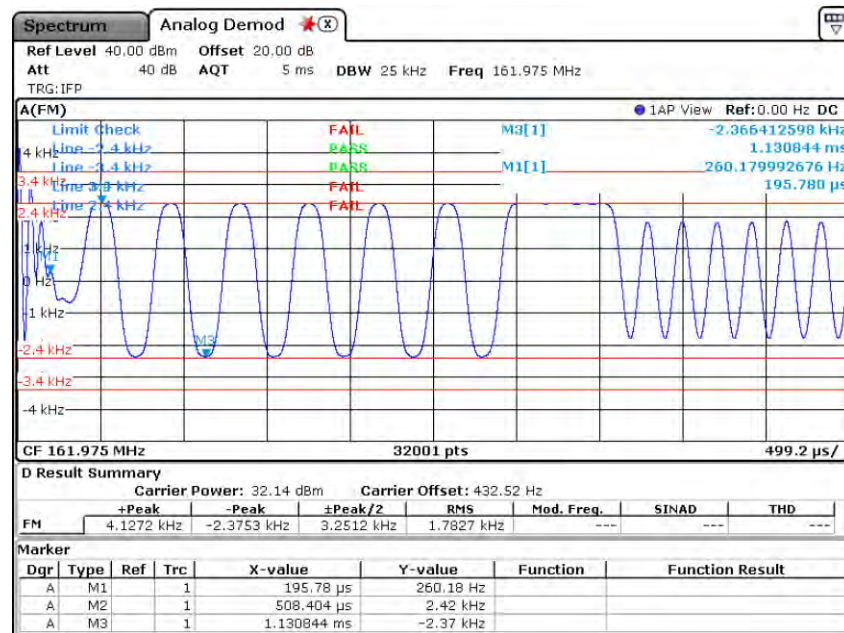


Date: 8 SEP 2022 09:59:33

AIS 1, Test Signal 2, -20 °C

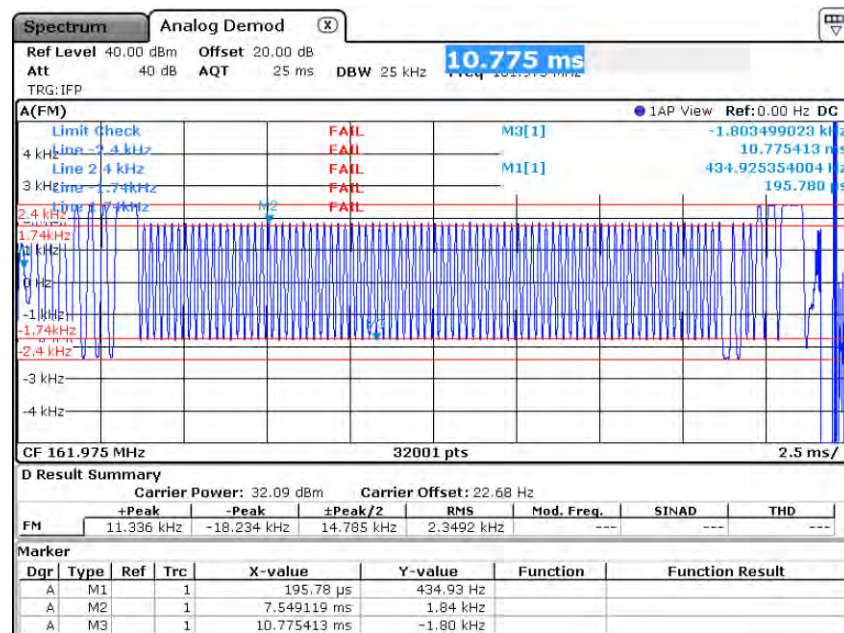


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Date: 8 SEP 2022 09:08:43

AIS 1, Test Signal 2, +20 °C

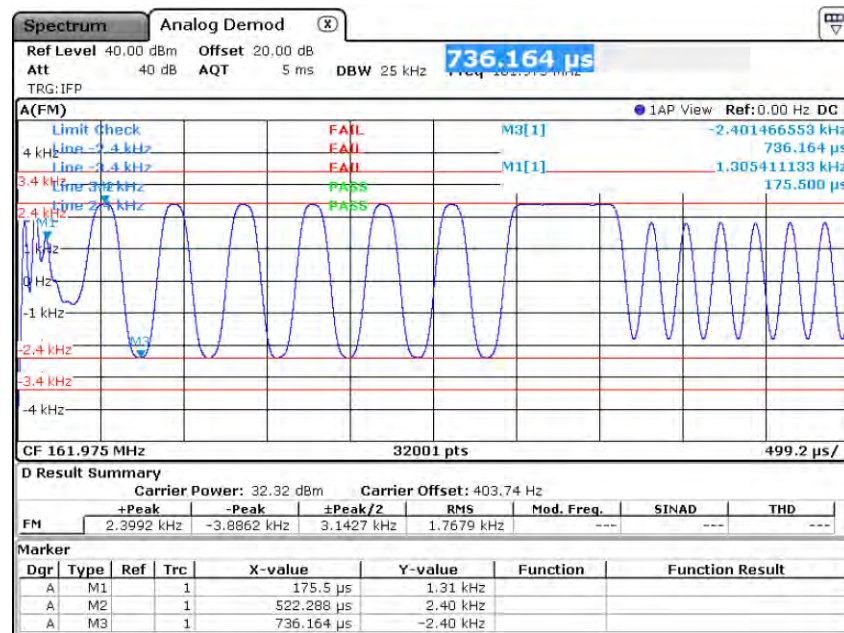


Date: 8 SEP 2022 09:12:07

AIS 1, Test Signal 2, +20 °C

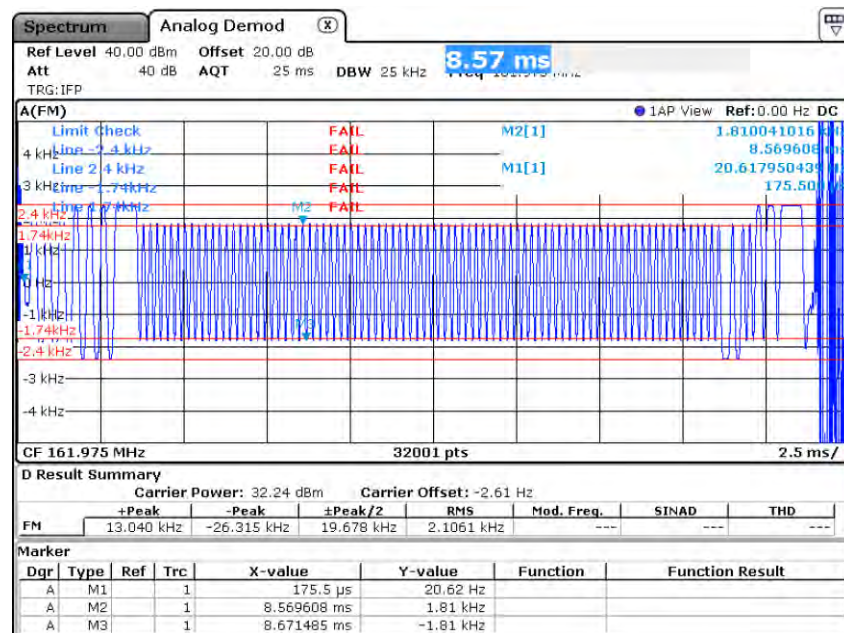


Product Service



Date: 8 SEP 2022 10:48:25

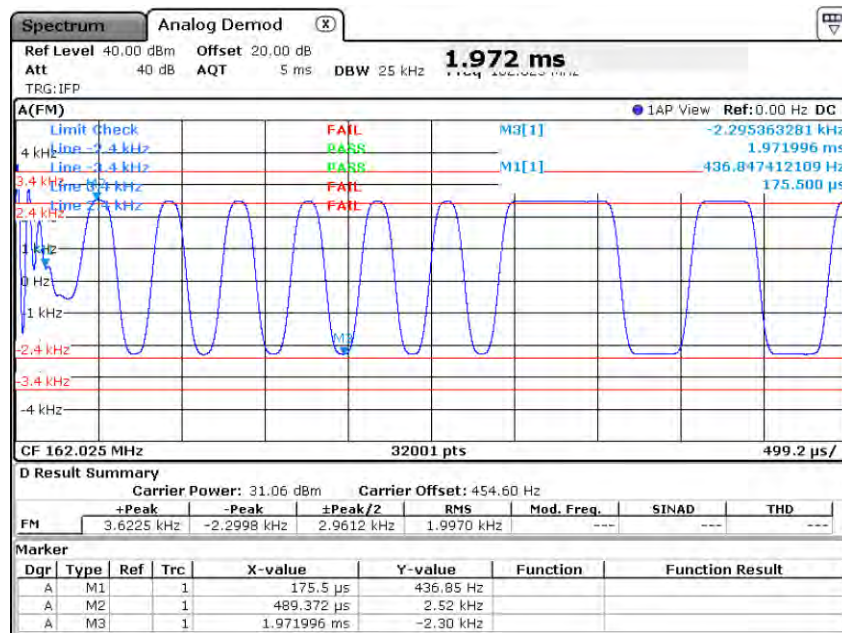
AIS 1, Test Signal 2, +50 °C



Date: 8 SEP 2022 10:46:46

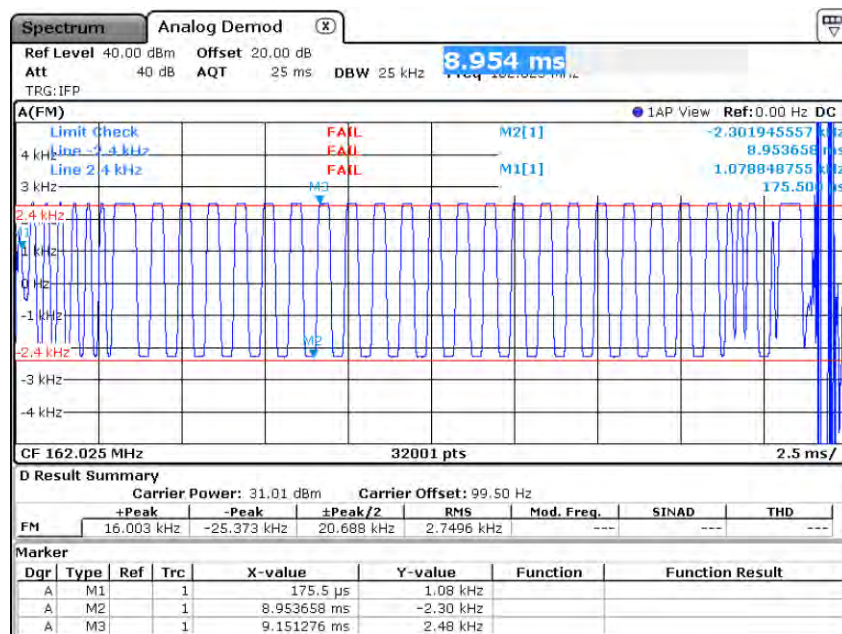
AIS 1, Test Signal 2, +50 °C

AIS2



Date: 8 SEP 2022 09:56:39

AIS 2, Test Signal 1, -20 °C

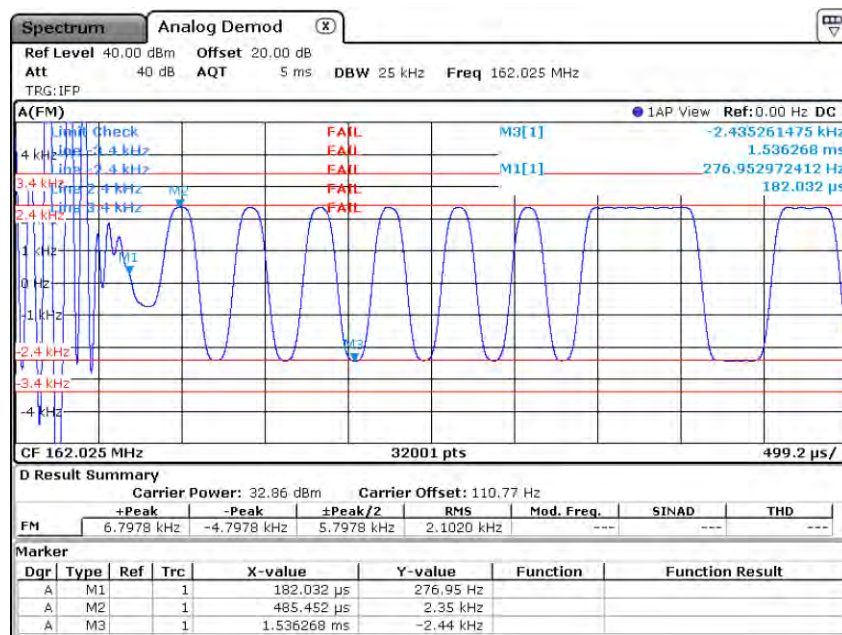


Date: 8 SEP 2022 09:55:11

AIS 2, Test Signal 1, -20 °C

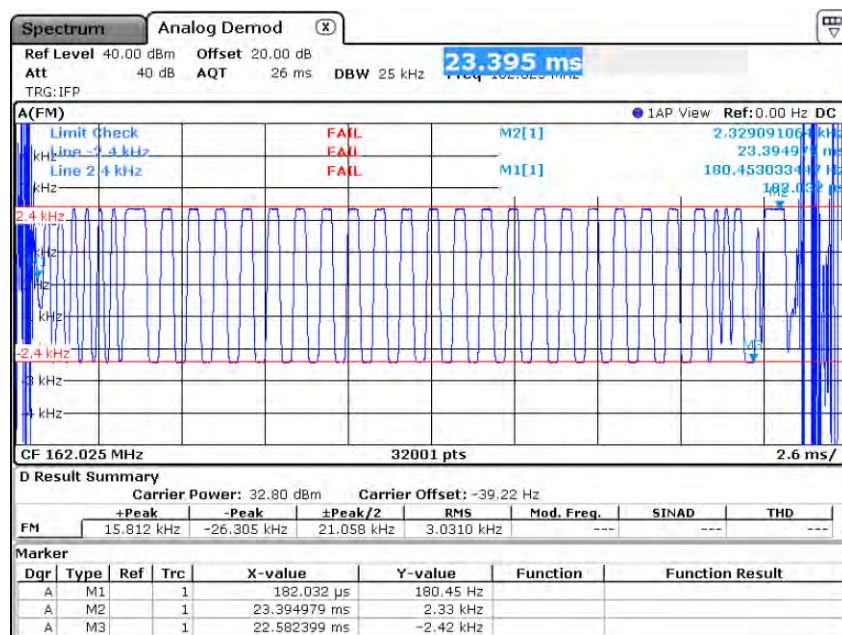


Product Service



Date: 7.SEP.2022 10:38:37

AIS 2, Test Signal 1, +20 °C

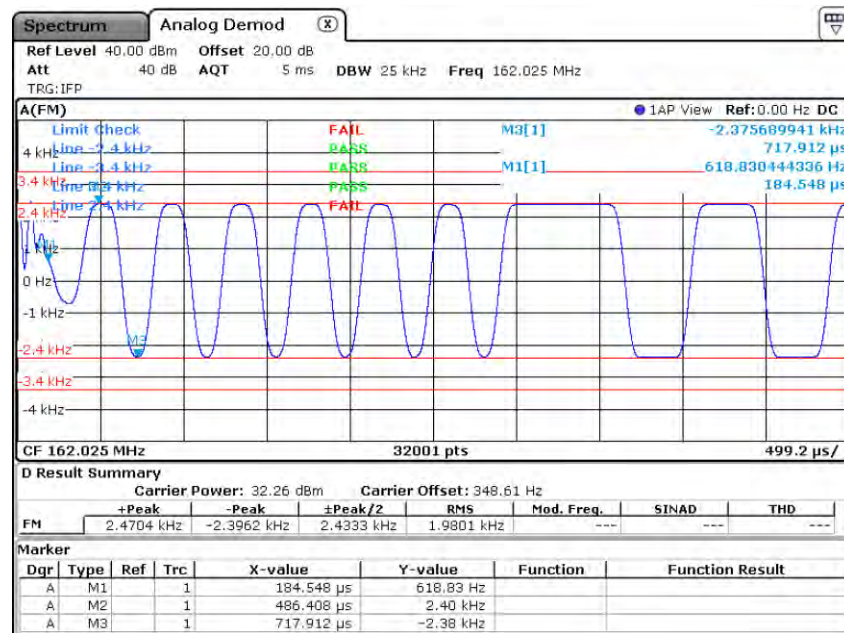


Date: 7.SEP.2022 10:40:45

AIS 2, Test Signal 1, +20 °C

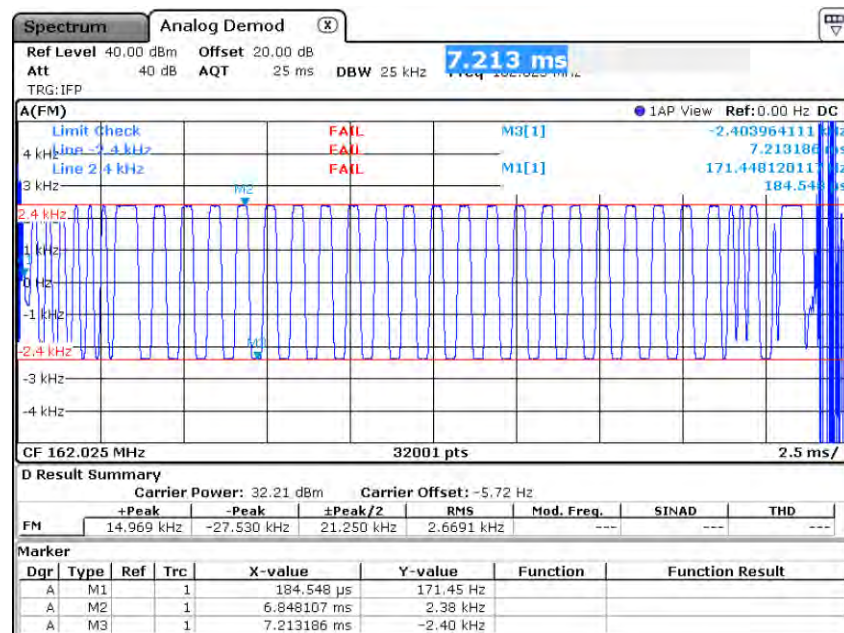


Product Service



Date: 8 SEP 2022 11:02:03

AIS 2, Test Signal 1, +50 °C

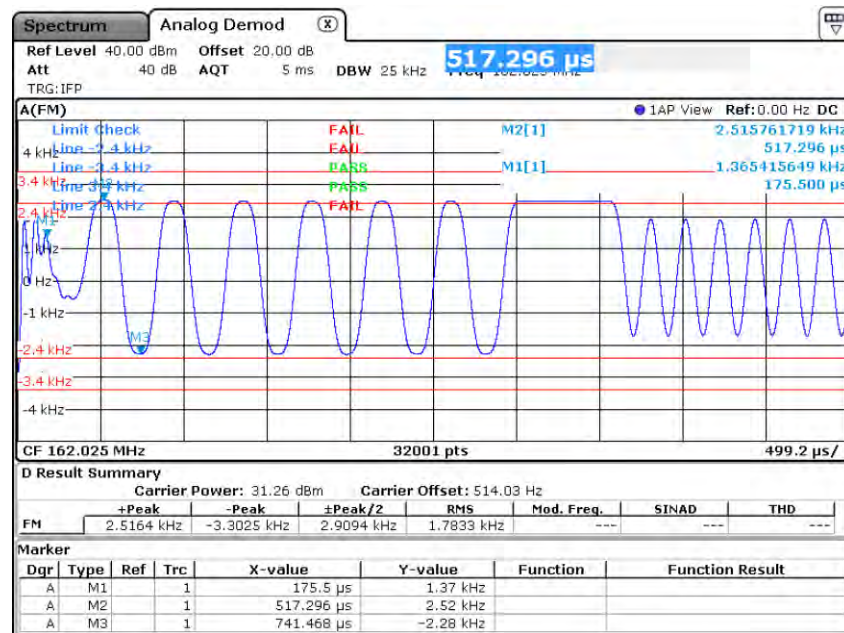


Date: 8 SEP 2022 10:57:37

AIS 2, Test Signal 1, +50 °C

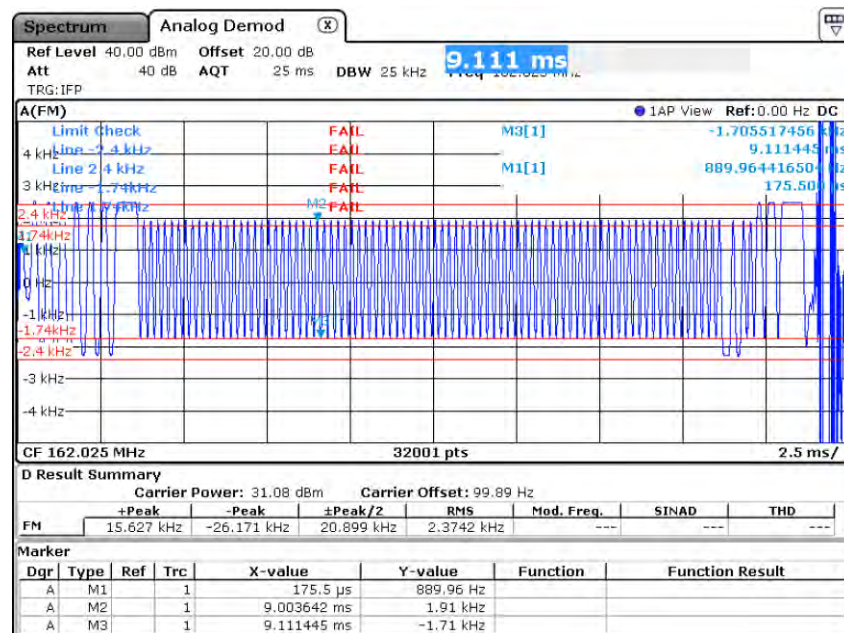


Product Service



Date: 8 SEP 2022 09:51:39

AIS 2 Test Signal 2, -20 °C

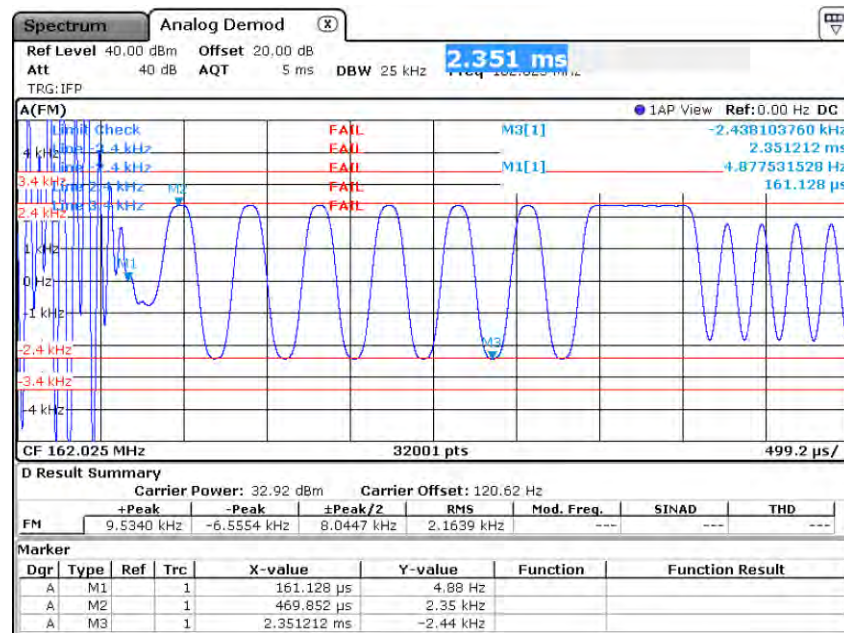


Date: 8 SEP 2022 09:53:42

AIS 2, Test Signal 2, -20 °C

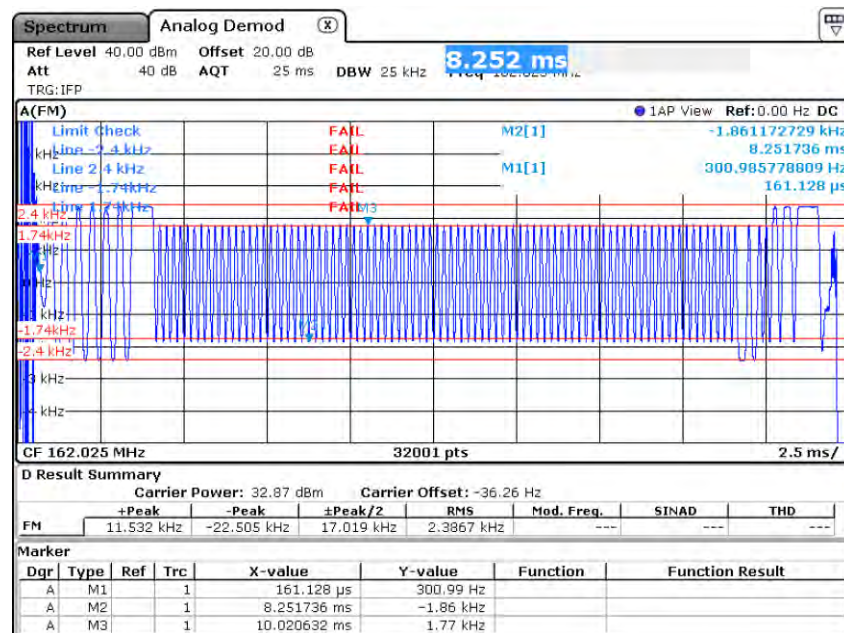


Product Service



Date: 7.SEP.2022 10:44:17

AIS 2, Test Signal 2, +20 °C

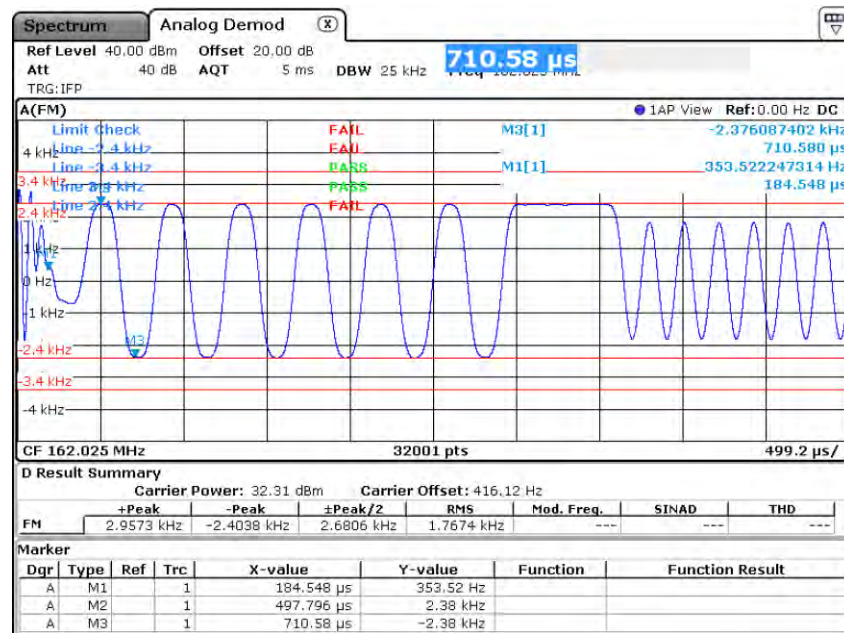


Date: 7.SEP.2022 10:45:55

AIS 2, Test Signal 2, +20 °C

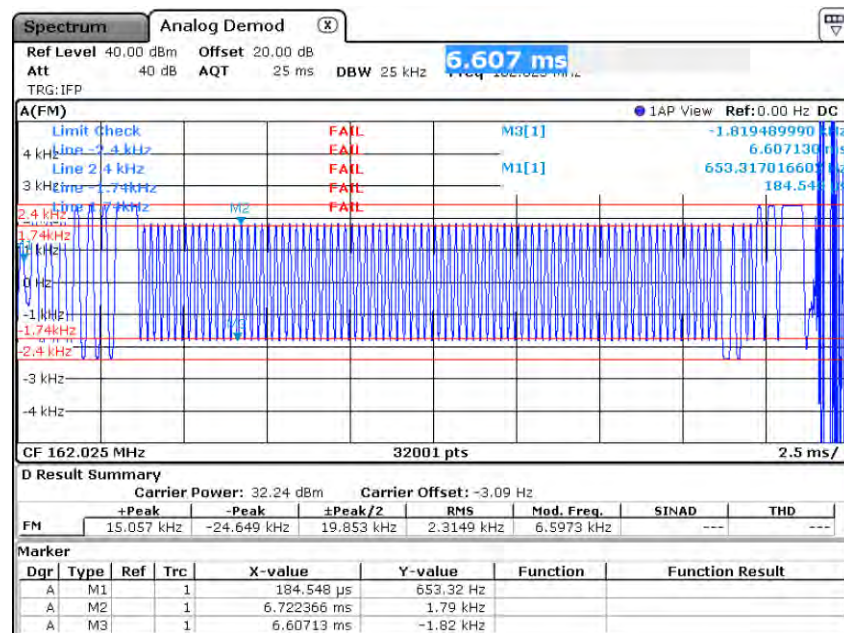


Product Service



Date: 8 SEP 2022 10:52:46

AIS 2, Test Signal 2, +50 °C



Date: 8 SEP 2022 10:54:43

AIS 2, Test Signal 2, +50 °C



2.5.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 12



2.6 Transmitter output power versus time function

2.6.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.6

2.6.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

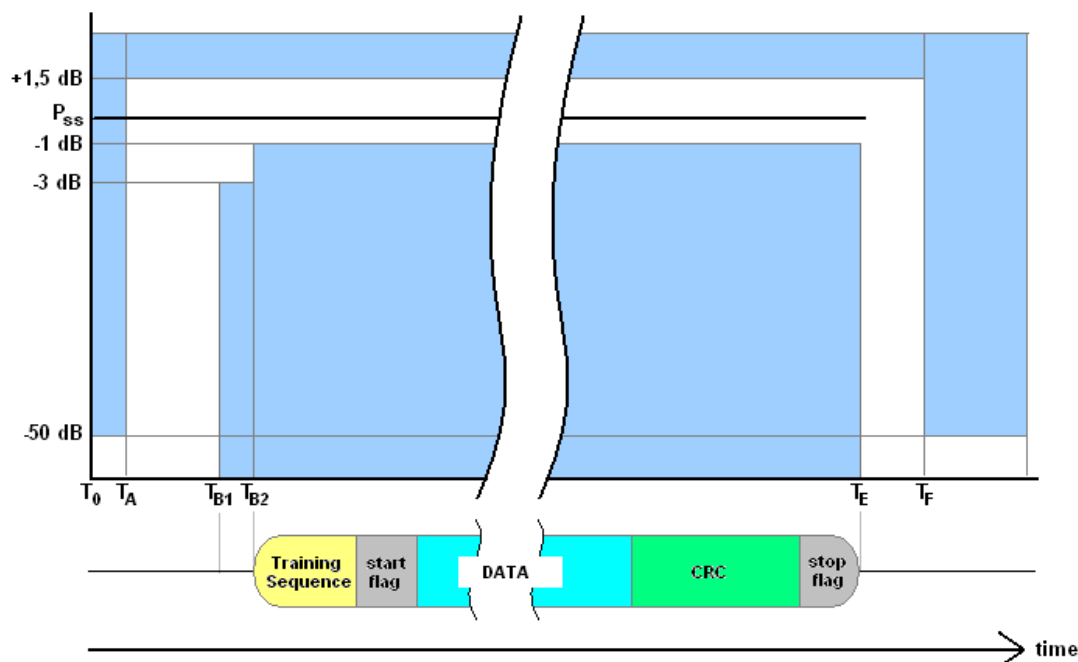
2.6.3 Date of Test

2022-07-13

2.6.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

2.6.5 Specification Limits



Reference	Bits	Time	
T ₀	0	0	Start of transmission slot. Power shall <i>not</i> exceed -50 dB of P _{ss} before T ₀
T ₀ – T _A	0 – 6	0 – 0.625	Power may exceed -50 dB of P _{ss}
T _{B1}	6	0.625	Power shall be within +1.5 dB or -3 dB of P _{ss}
T _{B2}	8	0.833	Power shall be within +1.5 dB or -1 dB of P _{ss}
T _E		24.271	Power shall be within +1.5 dB or -1 dB of P _{ss} during the period T _{B2} to T _E
T _E	233	25.104	Power may exceed -50 dB of P _{ss} and stay below this
T _G	241	26.667	Start of next transmission time period
There shall be no modulation of the RF after the termination of transmission (T _E) until the power has reached zero and next slot begins (T _G).			

2.6.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.6.1

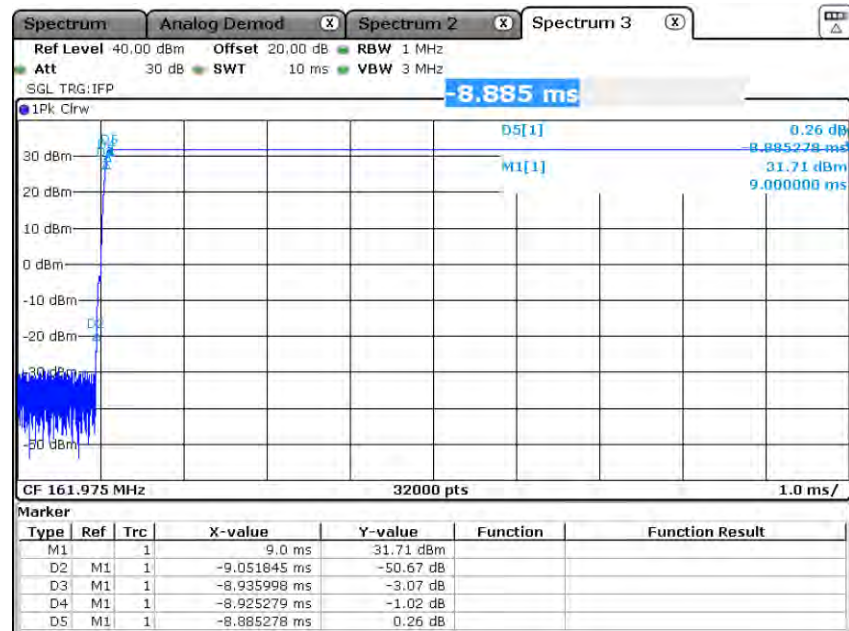
2.6.7 Test Results

Nominal frequency	t(-50 dBc to -3 dBc)	t(-50 dBc to -1 dBc)	P _{max}	t(-1 dBc to -50 dBc)
AIS 1 (161.975 MHz)	0.116 ms	0.127 ms	0.26 dB	0.031 ms
AIS 2 (162.025 MHz)	0.117 ms	0.128 ms	0.25 dB	0.032 ms
Limit	< 0.625 ms	< 0.833 ms	1.5 dB	< 1.563 ms

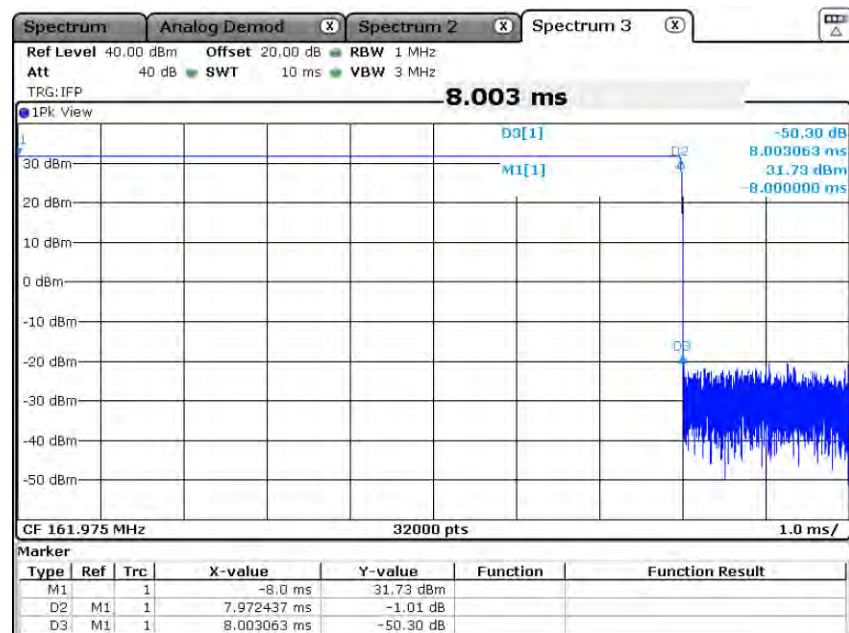


Product Service

AIS1



Date: 13 JUL 2022 18:07:30

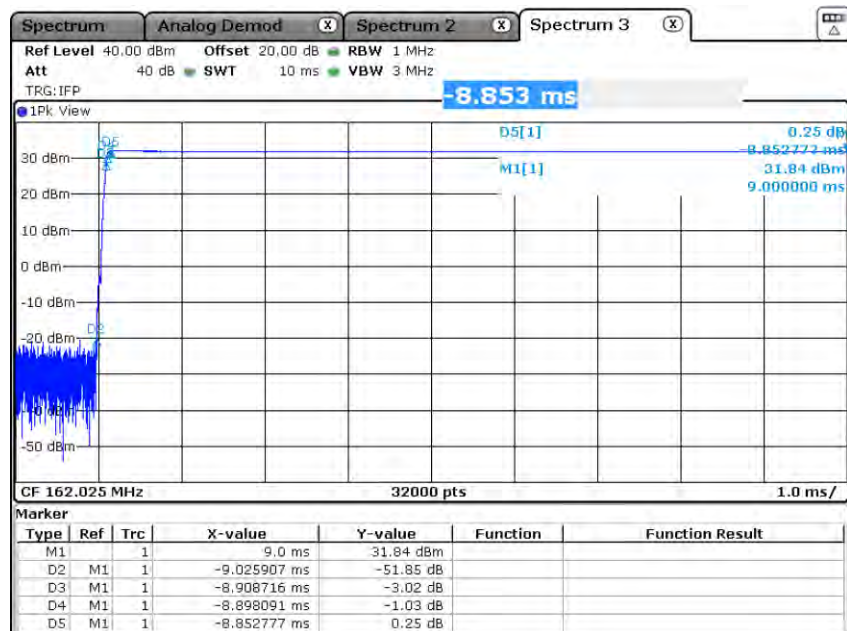


Date: 13 JUL 2022 18:04:48

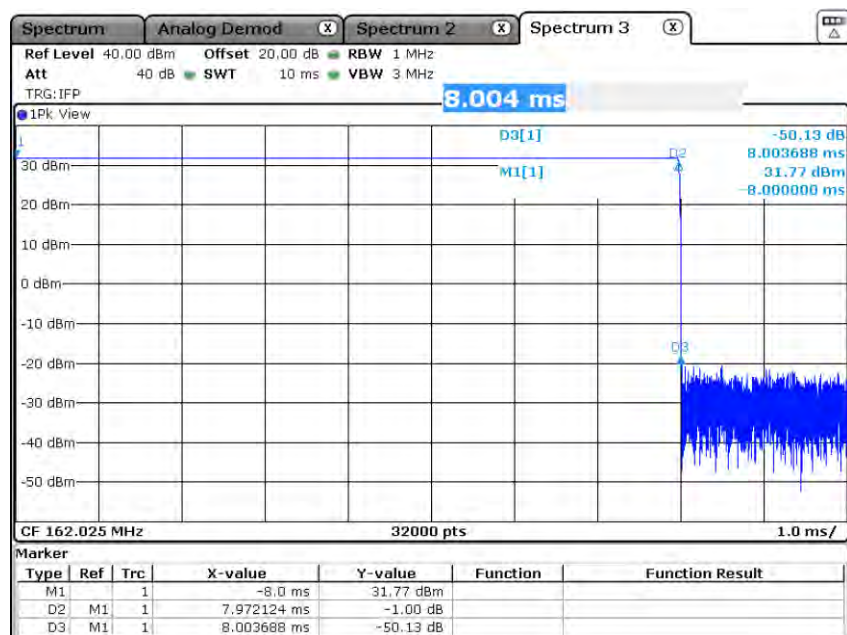


Product Service

AIS2



Date: 13 JUL 2022 17:53:35



Date: 13 JUL 2022 17:56:15



2.6.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 13



2.7 Spurious emissions from the transmitter

2.7.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 5.4.2.7

2.7.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

2.7.3 Date of Test

2022-07-13

2.7.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 41 %

2.7.5 Specification Limits

<i>Operational Frequency bands</i>	<i>Maximum Power</i>
108 – 137 MHz; 156 – 161.5 MHz; 406.0 – 406.1 MHz; 1525 – 1610 MHz	25 µW (-16 dBm)

2.7.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 5.4.2.7.2

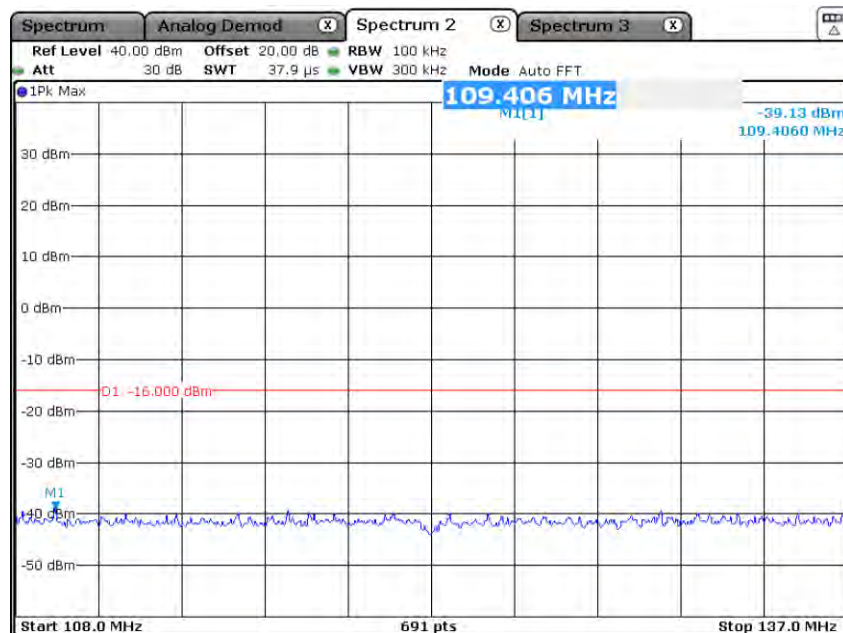
2.7.7 Test Results

<i>Nominal frequency</i>	<i>108 – 137 MHz</i>	<i>156 – 161.5 MHz</i>	<i>406.0 – 406.1 MHz</i>	<i>1525 – 1610 MHz</i>
AIS 1 (161.975 MHz)	-39.1 dBm	-38.0 dBm	-40.9 dBm	-38.3 dBm
AIS 2 (162.025 MHz)	-39.4 dBm	-36.4 dBm	-40.3 dBm	-38.7 dBm
<i>Limit</i>	≤ -16 dBm	≤ -16 dBm	≤ -16 dBm	≤ -16 dBm

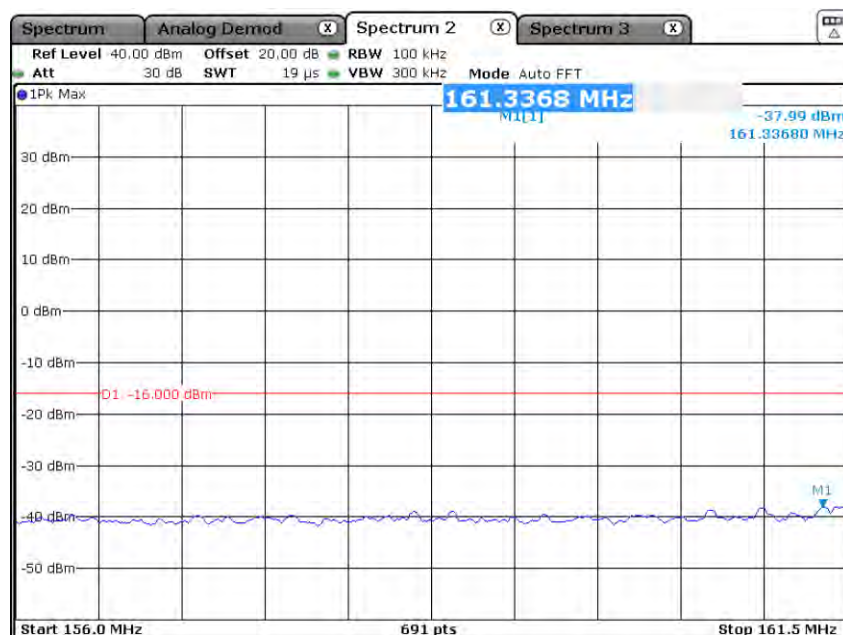


Product Service

AIS1



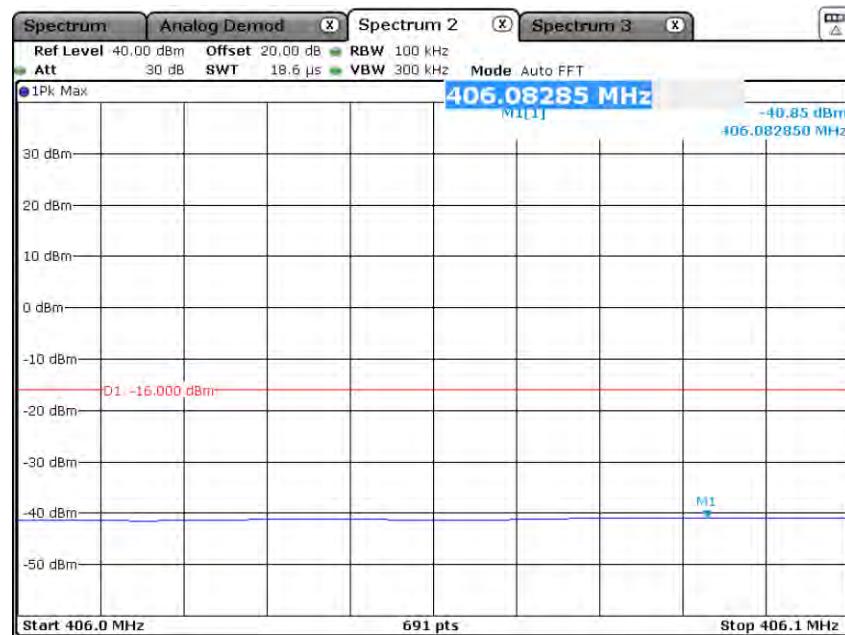
Date: 13 JUL 2022 18:02:11



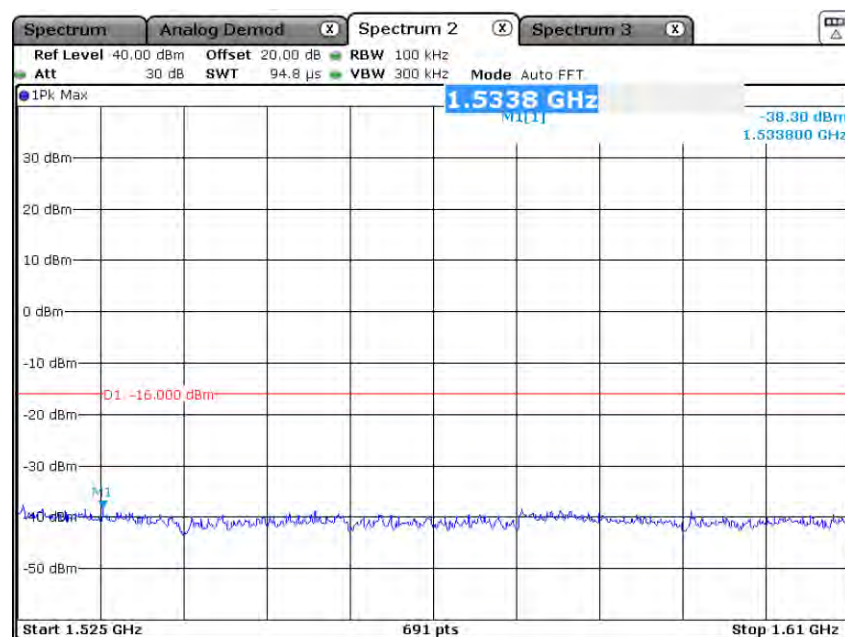
Date: 13 JUL 2022 18:02:46



Product Service



Date: 13 JUL 2022 18:03:07

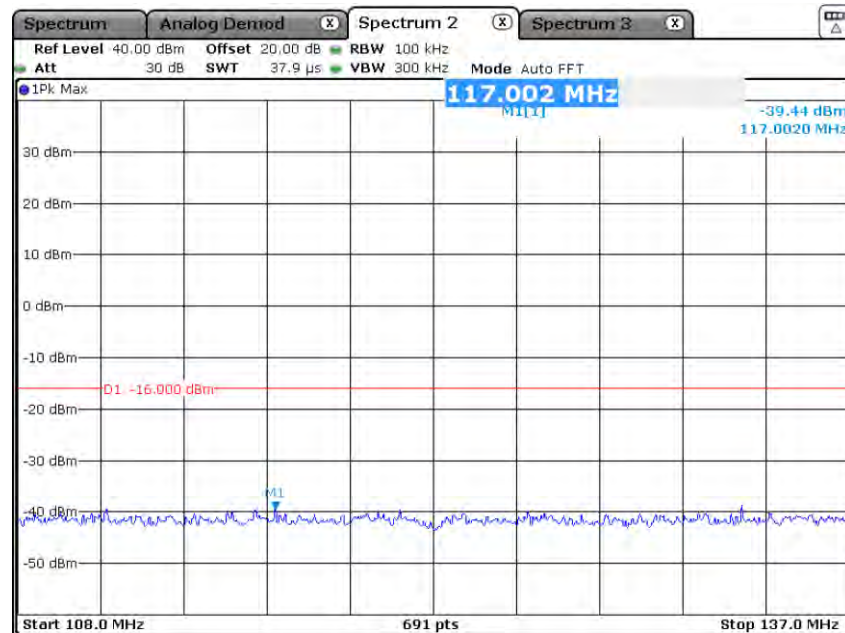


Date: 13 JUL 2022 18:03:38

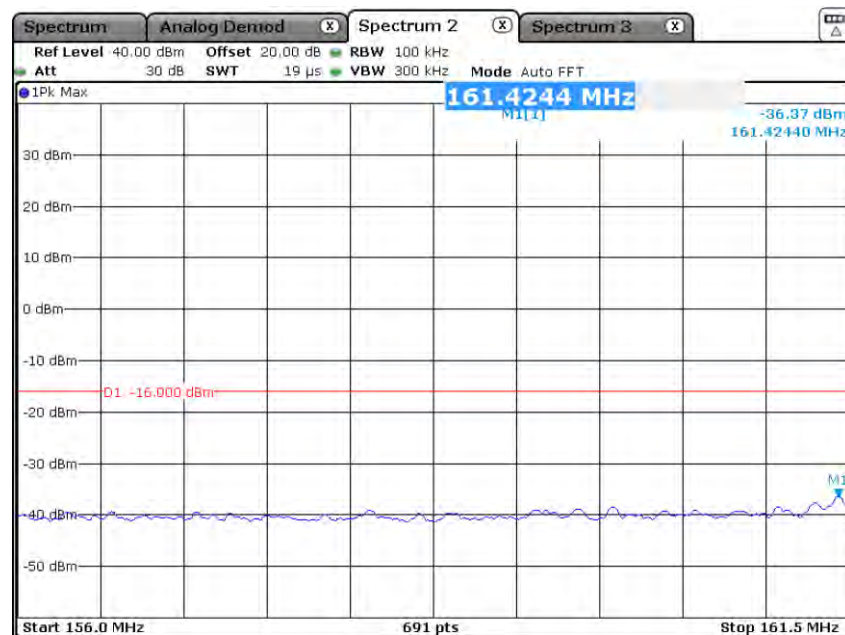


Product Service

AIS2



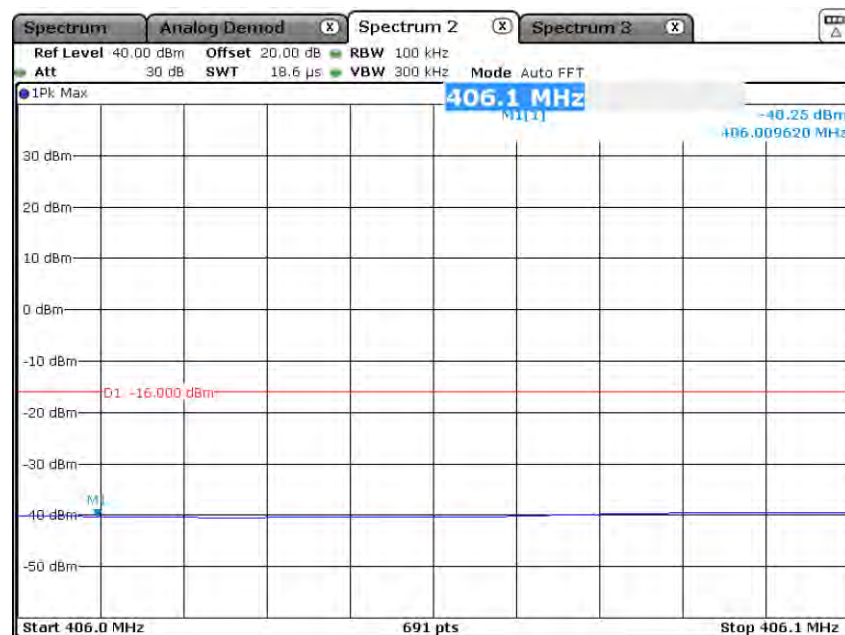
Date: 13 JUL 2022 18:00:44



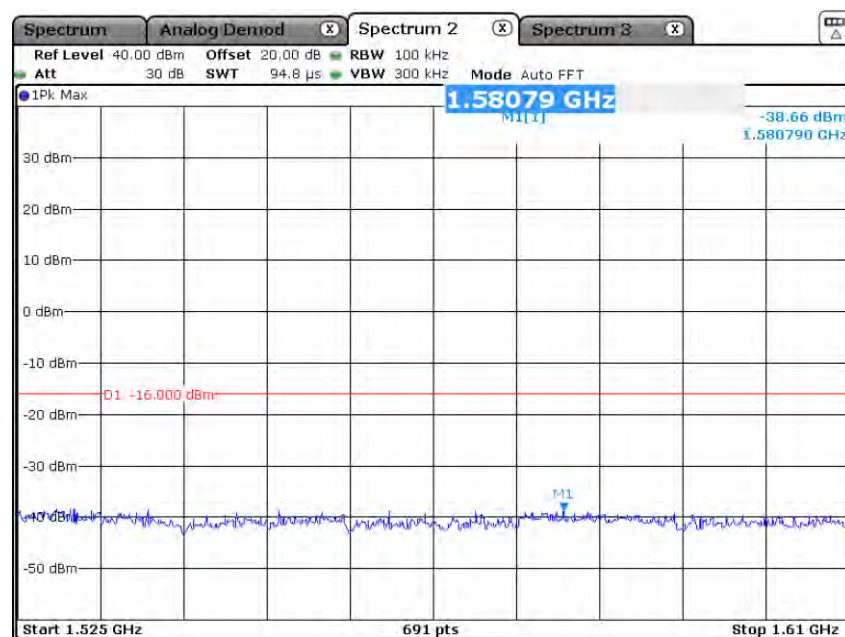
Date: 13 JUL 2022 18:00:03



Product Service



Date: 13 JUL 2022 17:59:21



Date: 13 JUL 2022 17:58:32



2.7.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 14



3 Test Details on DSC operation

3.1 Frequency error

3.1.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.1

3.1.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

3.1.3 Date of Test

2022-07-13

3.1.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

3.1.5 Specification Limits

The frequency error shall not exceed ± 1.5 kHz

3.1.6 Test Method

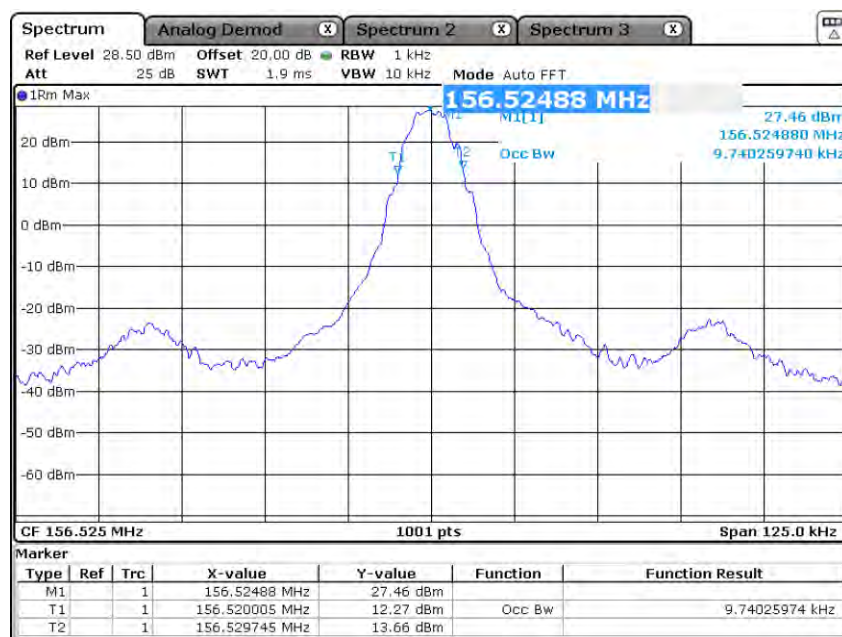
The test was performed in reference to IEC FDIS 63269 ED1 : 2022, section 6.4.2.1.2

The applicant did not provide a test sample with unmodulated carrier test mode. So the test was performed as occupied 99 % bandwidth test and the test frequency calculated as arithmetic middle of the upper and lower frequency of the occupied bandwidth: $f_m = \frac{f_l + f_h}{2}$.



3.1.7 Test Results

Nominal frequency	Temperature	f_i (MHz)	f_n (MHz)	f_c (MHz)	Δf (kHz)	Limit (kHz)
DSC (156.525 MHz)	-20 °C	156.5200005	156.529745	156.524873	-0.127	≤ 1.5
DSC (156.525 MHz)	+20 °C	156.5205040	156.530245	156.525375	0.374	≤ 1.5
DSC (156.525 MHz)	+50 °C	156.520380	156.530470	156.525425	0.425	≤ 1.5

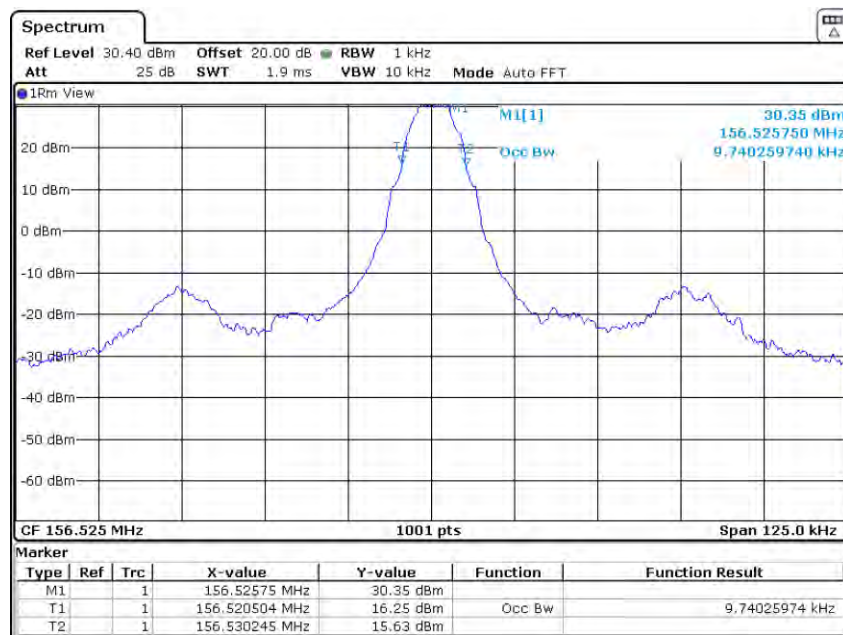


Date: 13 JUL 2022 18:52:14

-20 °C

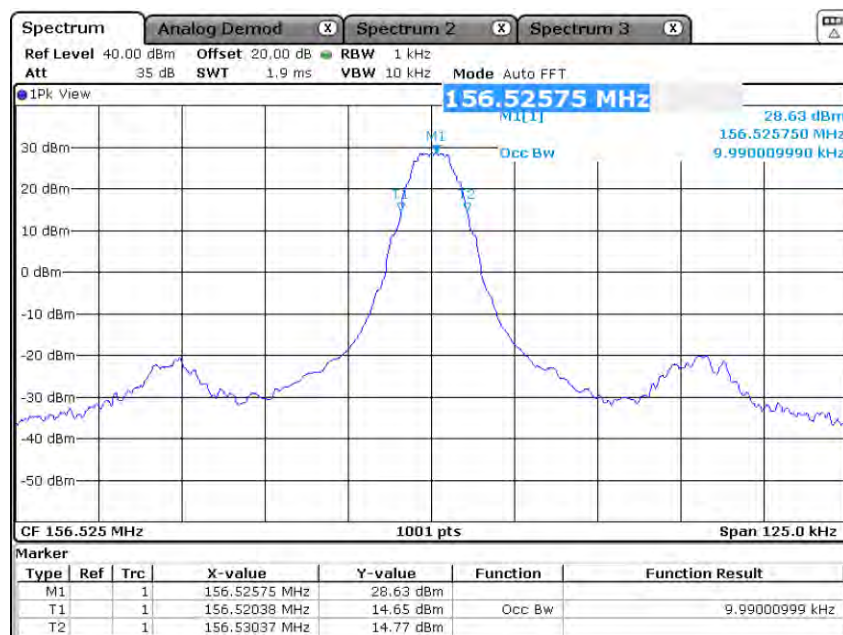


Product Service



Date: 13 JUL 2022 15:20:34

+20 °C



Date: 13 JUL 2022 20:00:09

+50 °C



3.1.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 15



3.2 Conducted Power

3.2.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.2

3.2.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

3.2.3 Date of Test

2022-07-13

3.2.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

3.2.5 Specification Limits

The difference between the conducted power under extreme conditions and the conducted power under normal conditions shall be less than ± 3 dB

3.2.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.2.3

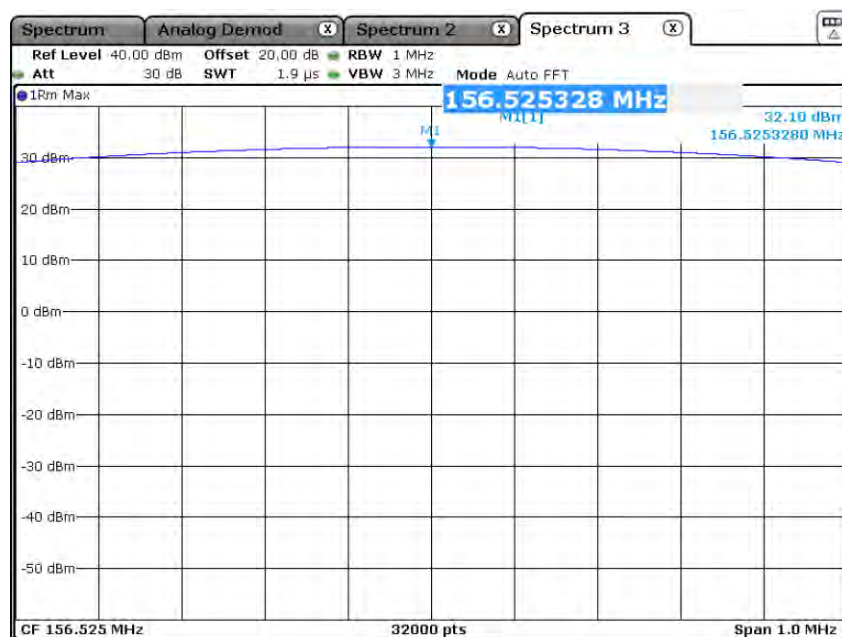
The test was carried out using a spectrum analyser with RMS detector and a resolution bandwidth of 1 MHz, wider than the nominal bandwidth of the transmitter.

3.2.7 Test Results

Nominal frequency	Temperature	Conducted Power	Difference	Limit
DSC (156.525 MHz)	-20 °C	32.10 dBm	-2.52 dB	< ± 3 dB
DSC (156.525 MHz)	+20 °C	34.62 dBm		---
DSC (156.525 MHz)	+50 °C	32.73 dBm	-1.89 dB	< ± 3 dB

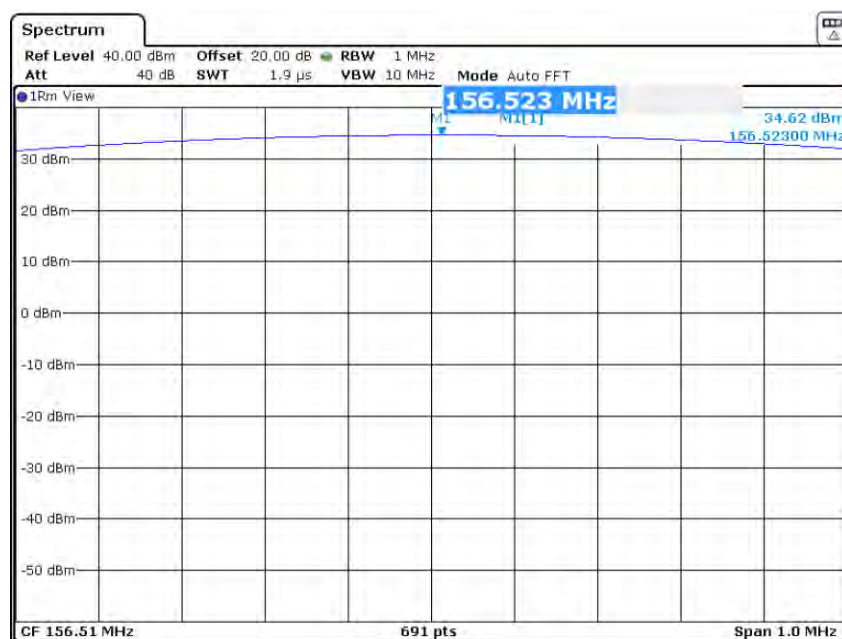


Product Service



Date: 13 JUL 2022 18:49:52

Conducted power, -20 °C

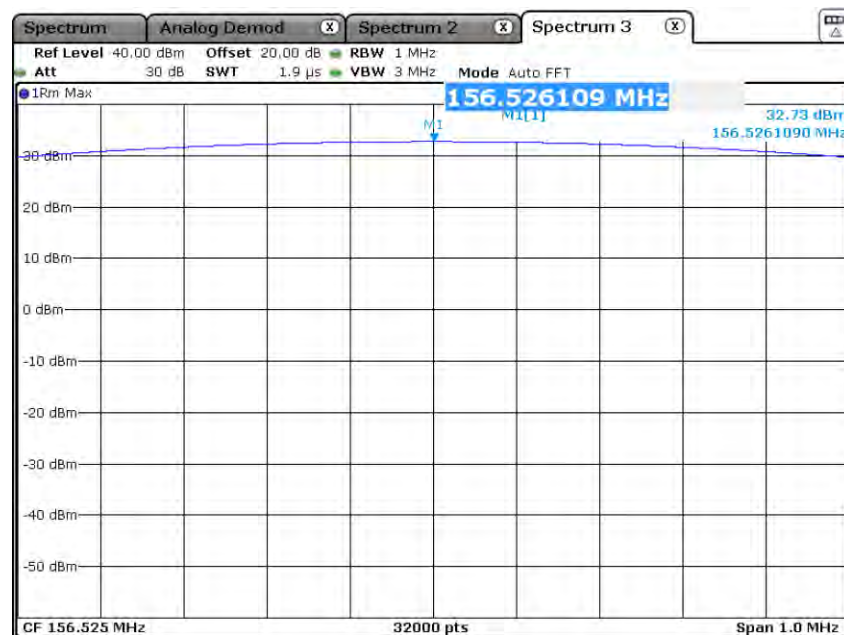


Date: 13 JUL 2022 15:12:58

Conducted power, +20 °C



Product Service



Date: 13 JUL 2022 20:00:35

Conducted power, +50 °C

3.2.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 16



3.3 Radiated Power

3.3.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.3

3.3.2 Equipment under Test and Modification State

easy-MOB; Prototype; Modification State 0

3.3.3 Date of Test

2022-07-15

3.3.4 Environmental Conditions

Ambient Temperature 24 °C
Relative Humidity 39 %

3.3.5 Specification Limits

The purpose of this test is to verify that the equipment has a nominal radiated power (EIRP) of 1 W at normal operating conditions.

The radiated power shall be at least 27 dBm (500 mW).

3.3.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.3.2

3.3.7 Test Results

Nominal frequency	Position	P_R	Cable	Antenna Gain	Free Field Attenuation	P	Limit
DSC (156.525 MHz)	-90°	7.5 dBm	1.47 dB	-5.21 dBm	30.32 dB	34.08 dBm	≥ 27.0 dBm
DSC (156.525 MHz)	0°	7.1 dBm	1.47 dB	-5.21 dBm	30.32 dB	33.68 dBm	≥ 27.0 dBm
DSC (156.525 MHz)	+90°	7.1 dBm	1.47 dB	-5.21 dBm	30.32 dB	33.68 dBm	≥ 27.0 dBm
DSC (156.525 MHz)	+180°	6.9 dBm	1.47 dB	-5.21 dBm	30.32 dB	33.48 dBm	≥ 27.0 dBm



3.3.8 Test Location and Test Equipment

The test was carried out in semi anechoic room, No. 8

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
EMI test receiver	Rohde & Schwarz	ESW26	28268	12	2022-10-31
TRILOG broadband antenna	Schwarzbeck	VULB 9163	19589	36	2025-06-30
Semi anechoic room	Albatross Projects	Cabin No. 8	19917		

Table 17

3.4 Transmitter modulation spectrum

3.4.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.4

3.4.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

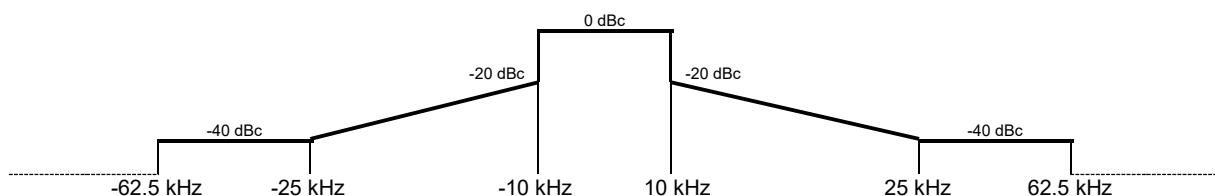
3.4.3 Date of Test

2022-07-13

3.4.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	41 %

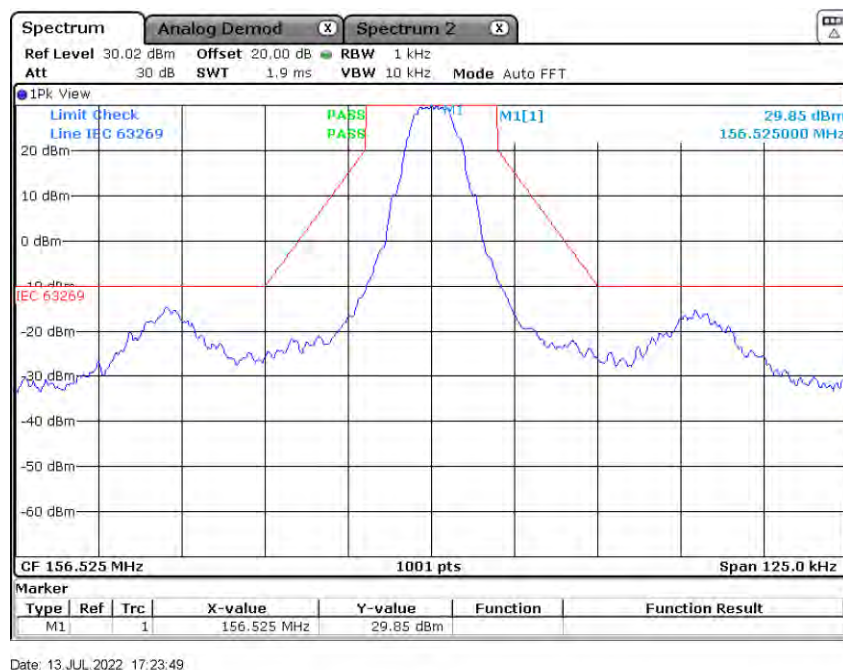
3.4.5 Specification Limits



3.4.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.4.2

3.4.7 Test Results



3.4.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 18



3.5 Transmitter transient behaviour

3.5.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.5

3.5.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 4

3.5.3 Date of Test

2022-09-29

3.5.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	44 %

3.5.5 Specification Limits

During the periods of time t_1 and t_3 the frequency difference shall not exceed ± 25 kHz.

The frequency difference after the end of t_2 shall be within the limit of the frequency error given in 6.4.2.1.

During the periods of time t_2 the frequency difference shall not exceed ± 12.5 kHz.

Before the start of t_3 the difference shall be within the limit of the frequency error given in 6.4.2.1.

3.5.6 Test Method

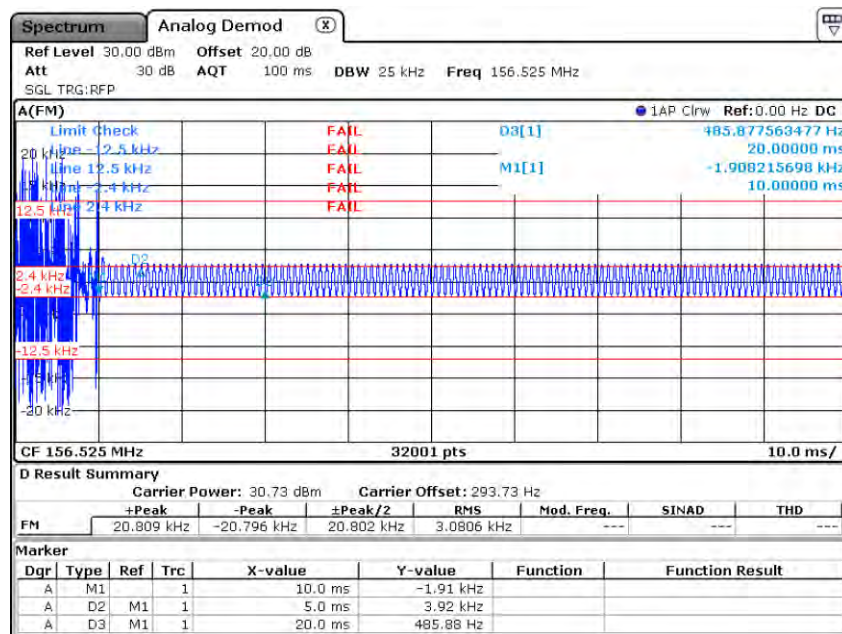
In reference to IEC FDIS 63269 ED1 : 2022, section 6.4.2.5.2 the test was performed using an alternative test method:

The applicant was not able to provide a transmitter with an unmodulated signal, so the demodulated audio signal of the Y mode signal was documented.

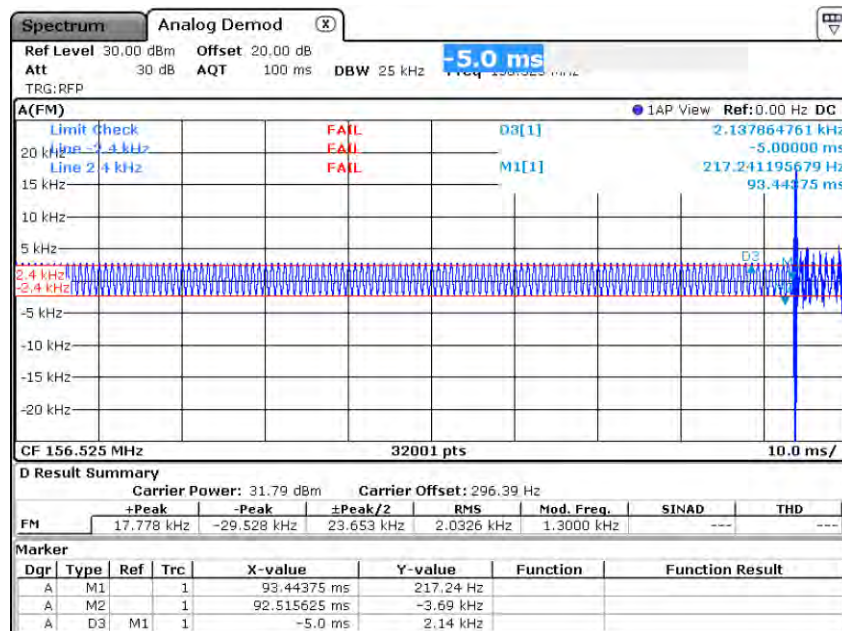


Product Service

3.5.7 Test Results



Date: 29.SEP.2022 10:38:04



Date: 29.SEP.2022 10:42:22



3.5.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 19



3.6 Frequency error (demodulated DSC signal)

3.6.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.6

3.6.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.6.3 Date of Test

2022-09-08

3.6.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 54 %

3.6.5 Specification Limits

The measured frequency from the demodulator at any time for the B-state shall be within 2100 Hz $\pm$ 10 Hz (2090 – 2110 Hz) and for the Y-state within 1300 Hz $\pm$ 10 Hz (1290 – 1310 Hz).

3.6.6 Test Method

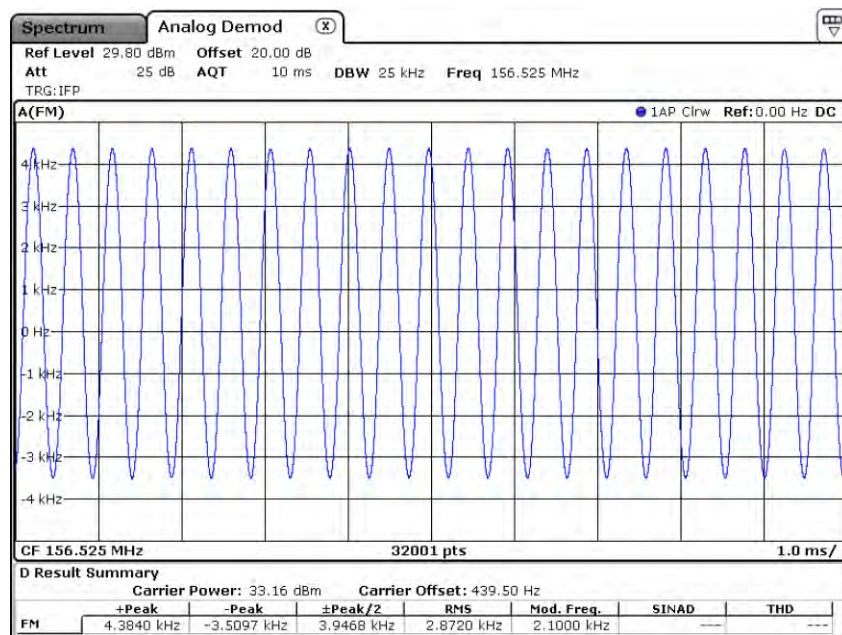
The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.6.2

3.6.7 Test Results

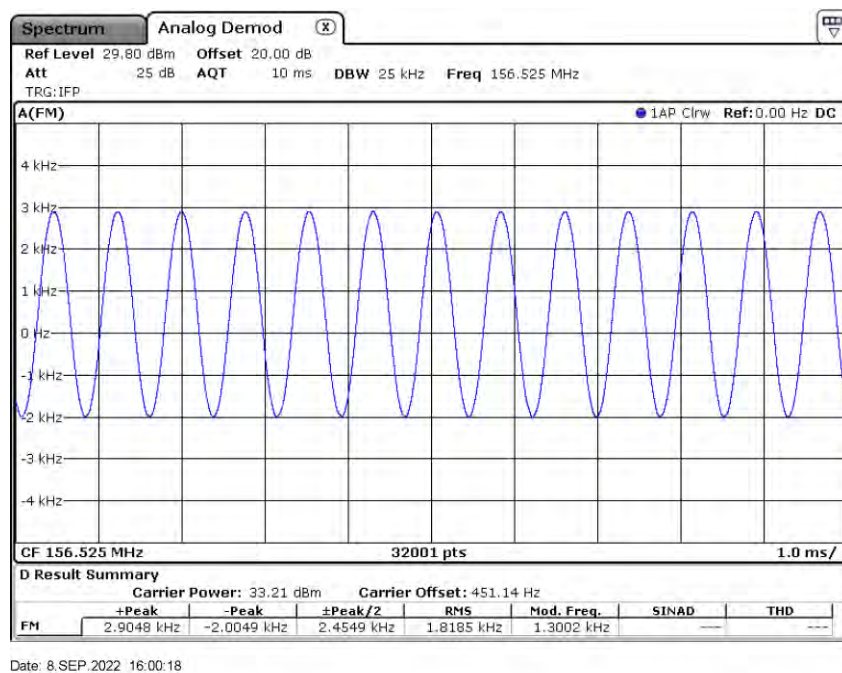
<i>Temperature</i>	<i>Mode</i>	<i>Modulation Frequency</i>	<i>Deviation</i>
-20 °C	B	2.1000 kHz	0.0 Hz
-20 °C	Y	1.3002 kHz	0.2 Hz
+20 °C	B	2.1000 kHz	0.0 Hz
+20 °C	Y	1.3001 kHz	0.1 Hz
+50 °C	B	2.1000 kHz	0.0 Hz
+50 °C	Y	1.3000 kHz	0.0 Hz



Product Service



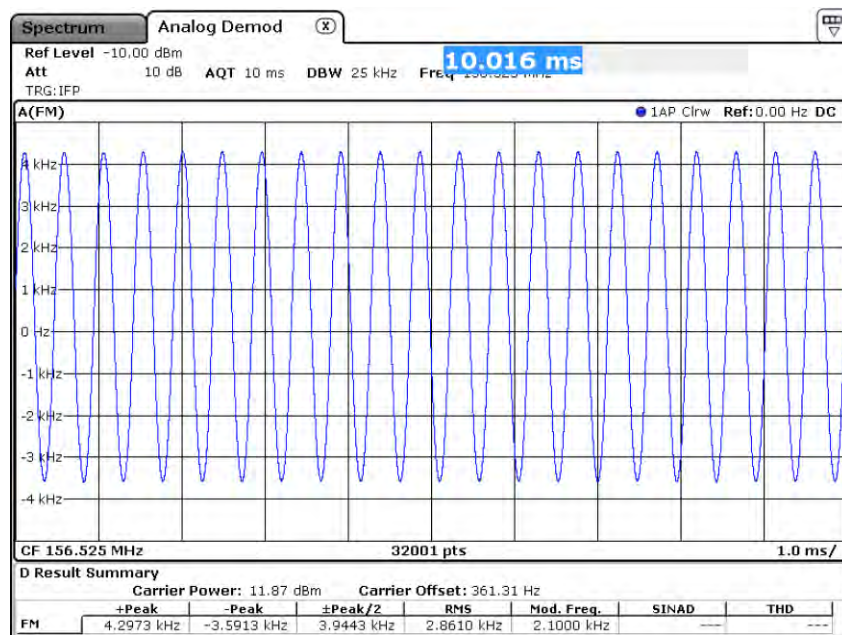
-20 °C, Mode B



-20 °C, Mode Y

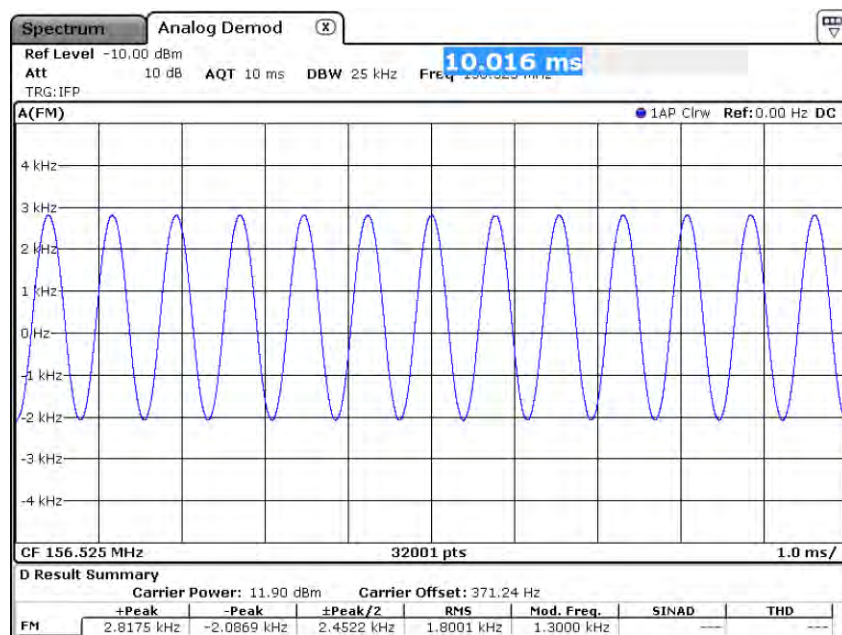


Product Service



Date: 8, SEP, 2022 15:14:04

+20 °C, Mode B

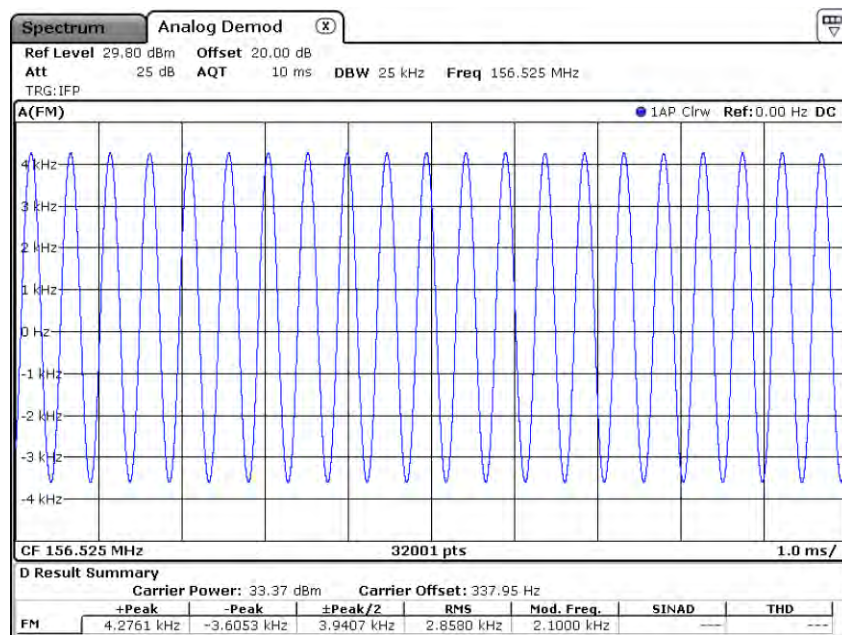


Date: 8, SEP, 2022 15:12:45

+20 °C, Mode Y

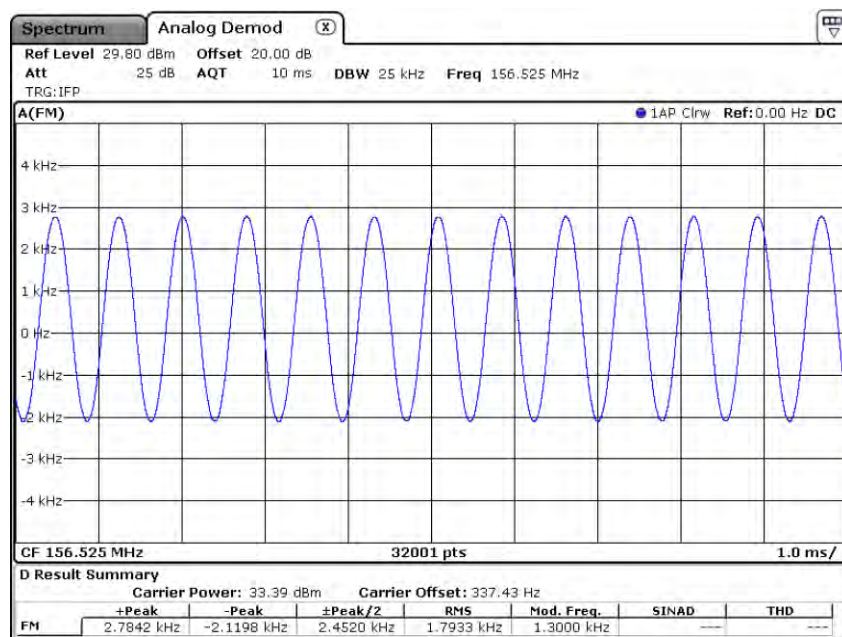


Product Service



Date: 8.SEP.2022 16:21:41

+50 °C, Mode B



Date: 8.SEP.2022 16:21:12

+50 °C, Mode Y



3.6.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 20



3.7 Modulation index for DSC

3.7.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.7

3.7.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.7.3 Date of Test

2022-09-08

3.7.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 54 %

3.7.5 Specification Limits

The modulation index shall be $2.0 \pm 10 \%$ (1.8 – 2.2).

3.7.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.7.2

3.7.7 Test Results

<i>Temperature</i>	<i>Mode</i>	<i>Modulation Frequency</i>	<i>Deviation</i>	<i>Modulation Index</i>	<i>Limit</i>
20 °C	B	2.1000 kHz	3.9443 kHz	1.878	$2.0 \pm 10 \%$
20 °C	Y	1.3001 kHz	2.4522 kHz	1.886	$2.0 \pm 10 \%$

For details on test results please refer to section 3.6.7



3.7.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 21



3.8 Modulation rate for DSC

3.8.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.8

3.8.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.8.3 Date of Test

2022-09-08

3.8.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	54 %

3.8.5 Specification Limits

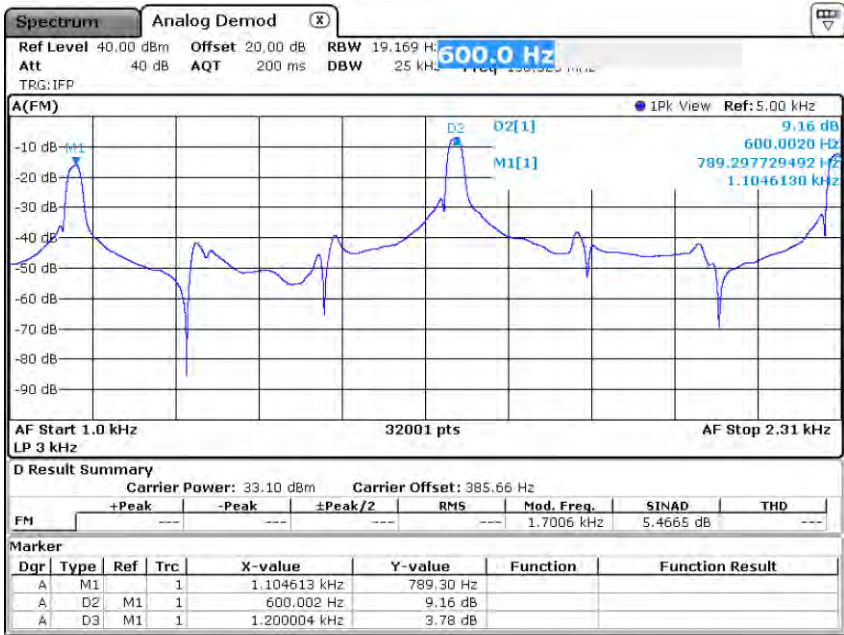
The frequency shall be 600 Hz $\pm$ 0.018 Hz (599.982 – 600.018 Hz) corresponding to a modulation rate of 1200 baud

3.8.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.8.2

3.8.7 Test Results

Modulation frequency	Limit
600.002 Hz	600 Hz ± 0.018 Hz



Date: 7.SEP.2022 14:18:19

3.8.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 22



3.9 Spurious emissions from the transmitter

3.9.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.9

3.9.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 0

3.9.3 Date of Test

2022-07-13

3.9.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 41 %

3.9.5 Specification Limits

<i>Operational Frequency bands</i>	<i>Maximum Power</i>
108 – 137 MHz; 156 – 161.5 MHz; 406.0 – 406.1 MHz; 1525 – 1610 MHz	25 µW (-16 dBm)

3.9.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.8.2

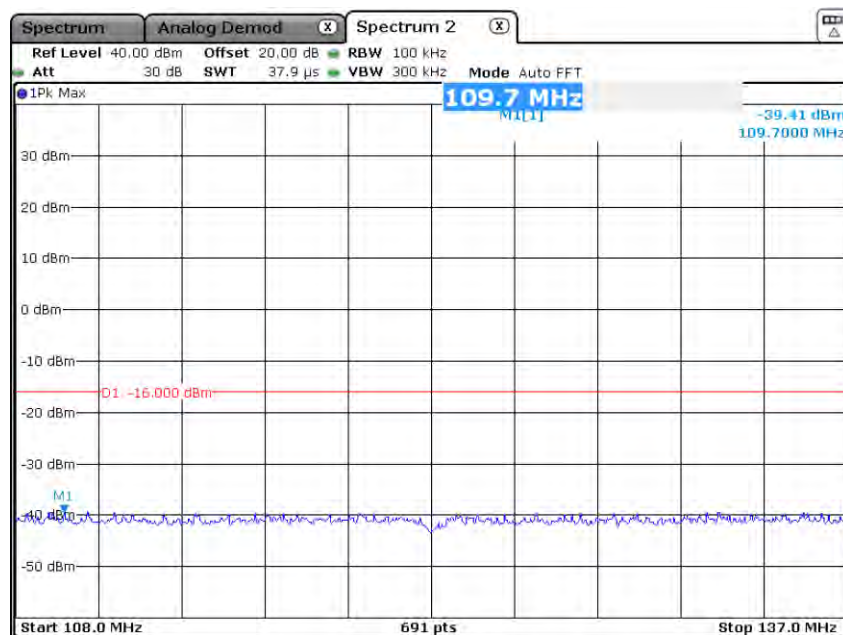
3.9.7 Test Results

<i>Nominal frequency</i>	<i>108 – 137 MHz</i>	<i>156 – 161.5 MHz</i>	<i>406.0 – 406.1 MHz</i>	<i>1525 – 1610 MHz</i>
DSC (156.525 MHz)	-39.4	34.1 dBm*	-39.3 dBm	-37.1 dBm
<i>Limit</i>	<i>≤ -16 dBm</i>	<i>≤ -16 dBm</i>	<i>≤ -16 dBm</i>	<i>≤ -16 dBm</i>

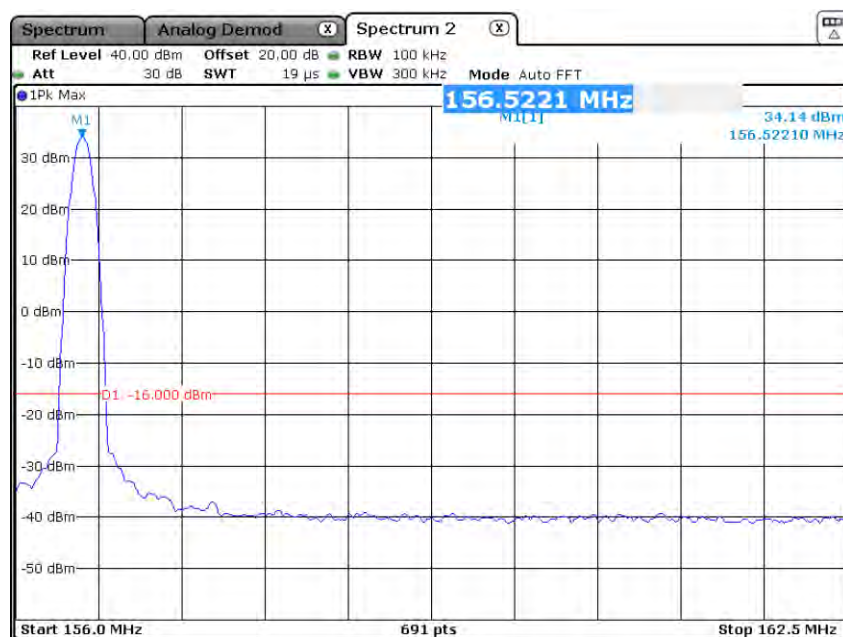
*: Carrier frequency, not evaluated



Product Service



Date: 13 JUL 2022 17:25:56

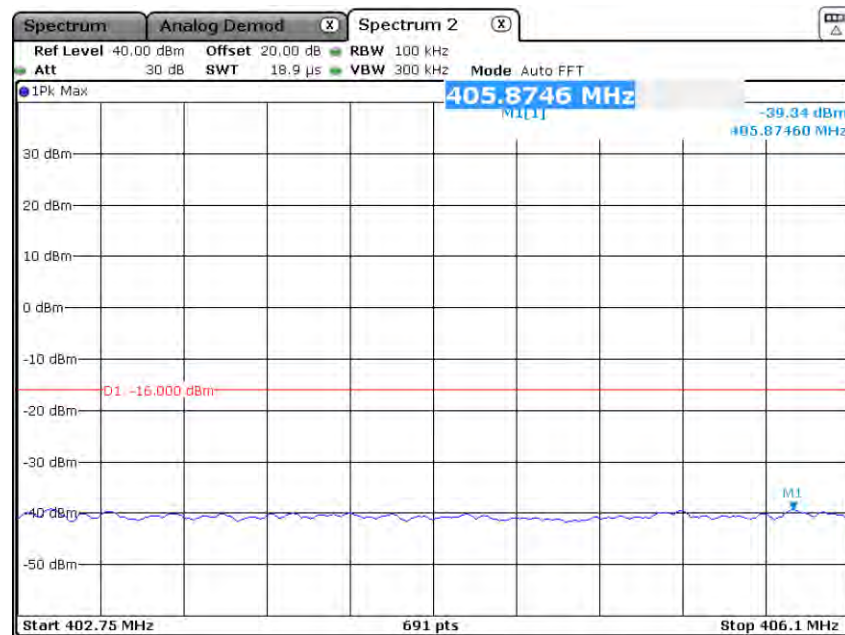


Date: 13 JUL 2022 17:26:39

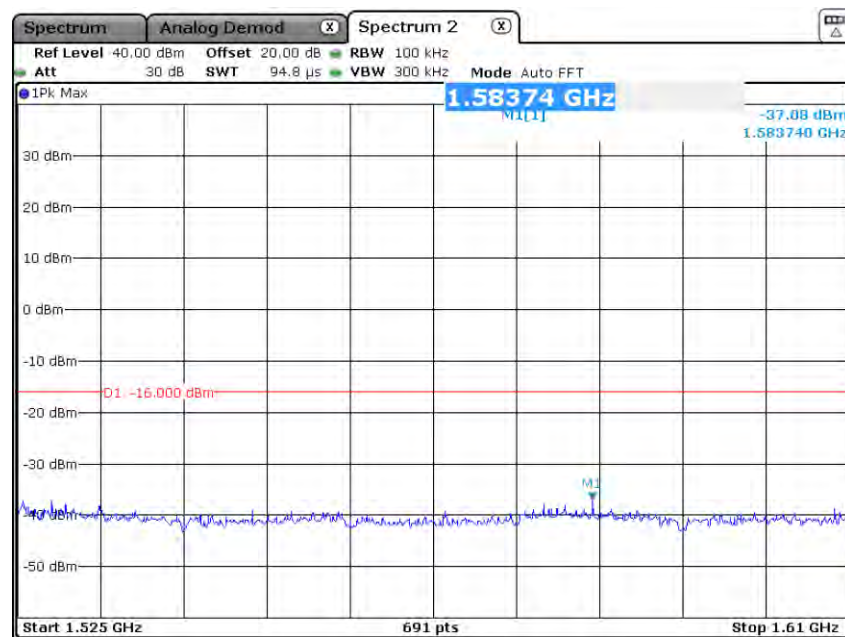
No emissions except carrier frequency



Product Service



Date: 13 JUL 2022 17:27:31



Date: 13 JUL 2022 17:28:01



3.9.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Power Attenuator	Rohde & Schwarz	RDL50	47717		

Table 23



3.10 Testing of free channel transmission on DSC channel 70

3.10.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.2.10

3.10.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 1

3.10.3 Date of Test

2022-09-07

3.10.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	56 %

3.10.5 Specification Limits

No transmission if channel 70 is occupied with a signal of +6 dBμV (e.m.f.) – corresponding to approx. -107 dBm in a 50 Ω-system.

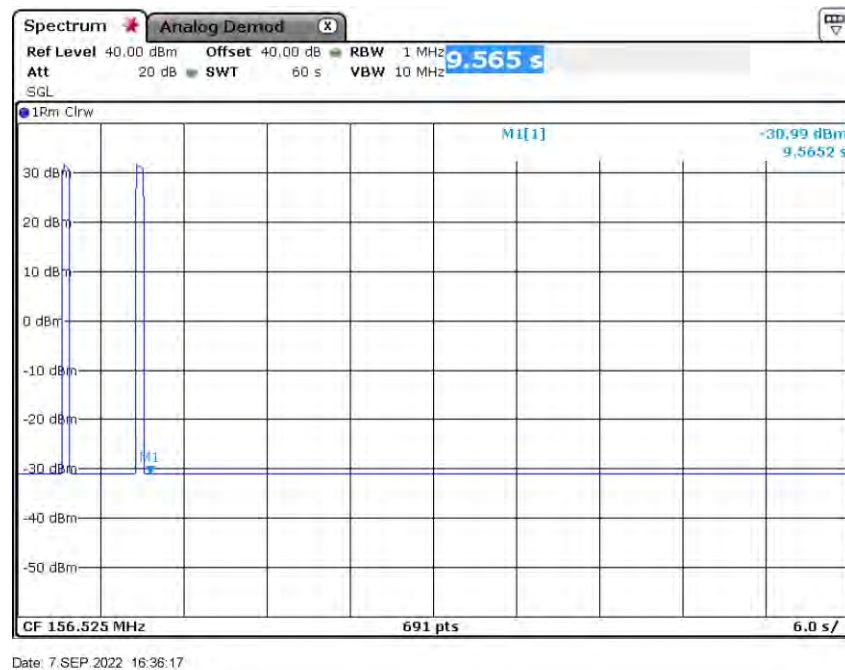
3.10.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.2.10.2



Product Service

3.10.7 Test Results



No transmission as long as signal present from signal generator.

3.10.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	20219	24	2024-02-29
Signal generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Directional coupler	Amplifier Research	DC3002M2	19579		

Table 24



3.11 Maximum usable sensitivity

3.11.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.1

3.11.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.11.3 Date of Test

2022-09-09

3.11.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	52 %

3.11.5 Specification Limits

The bit error ratio shall be equal to or less than 10^{-2} at -103 dBm for signal for nominal conditions and at -100 dBm for extreme conditions.

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.11.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.1.2



3.11.7 Test Results

<i>Temperature</i>	<i>Operational Frequency</i>	<i>Wanted signal</i>	<i>Successful Transmissions</i>
-20 °C	156.5235 MHz	-100 dBm	10/10
-20 °C	156.525 MHz	-100 dBm	10/10
-20 °C	156.5265 MHz	-100 dBm	10/10
+20 °C	156.5235 MHz	-103 dBm	9/10
+20 °C	156.525 MHz	-103 dBm	9/10
+20 °C	156.5265 MHz	-103 dBm	9/10
+50 °C	156.5235 MHz	-100 dBm	10/10
+50 °C	156.525 MHz	-100 dBm	10/10
+50 °C	156.5265 MHz	-100 dBm	10/10

3.11.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibration Period (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 25



3.12 Co-channel rejection

3.12.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.2

3.12.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.12.3 Date of Test

2022-09-09

3.12.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	52 %

3.12.5 Specification Limits

The co-channel rejection should be 10 dB with a wanted signal of -100 dBm and unwanted signal of -110 dBm.

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.12.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.2.2

3.12.7 Test Results

<i>Operational Frequency</i>	<i>Interferer Frequency</i>	<i>Wanted signal</i>	<i>Interferer level</i>	<i>Successful Transmissions</i>
156.525 MHz	156.522 MHz	-100 dBm	-110 dBm	9/10
156.525 MHz	156.525 MHz	-100 dBm	-110 dBm	9/10
156.525 MHz	156.528 MHz	-100 dBm	-110 dBm	9/10

3.12.8 Test Location and Test Equipment

The test was carried out in radio test laboratory



Product Service

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	38808	36	2024-10-31
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 26



3.13 Adjacent channel selectivity

3.13.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.3

3.13.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.13.3 Date of Test

2022-09-09

3.13.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 52 %

3.13.5 Specification Limits

The adjacent channel rejection should be 50 dB with a wanted signal of -100 dBm and unwanted signal of -50 dBm for normal conditions and 47 dB with a wanted signal of -97 dBm for extreme conditions.

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.13.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.3.2

3.13.7 Test Results

<i>Temperature</i>	<i>Operational Frequency</i>	<i>Interferer Frequency</i>	<i>Wanted signal</i>	<i>Interferer level</i>	<i>Successful Transmissions</i>
-20 °C	156.525 MHz	156.500 MHz	-97 dBm	-50 dBm	10/10
-20 °C	156.525 MHz	156.550 MHz	-97 dBm	-50 dBm	9/10
+20 °C	156.525 MHz	156.500 MHz	-100 dBm	-50 dBm	9/10
+20 °C	156.525 MHz	156.550 MHz	-100 dBm	-50 dBm	9/10
+50 °C	156.525 MHz	156.500 MHz	-97 dBm	-50 dBm	10/10
+50 °C	156.525 MHz	156.550 MHz	-97 dBm	-50 dBm	10/10



Product Service

3.13.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	38808	36	2024-10-31
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 27



3.14 Intermodulation response

3.14.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.4

3.14.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.14.3 Date of Test

2022-09-09

3.14.4 Environmental Conditions

Ambient Temperature 25 °C
Relative Humidity 52 %

3.14.5 Specification Limits

The intermodulation response should be 55 dB with -100 dBm for the wanted signal and -45 dBm for both unwanted signals.

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.14.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.4.2

3.14.7 Test Results

<i>Temperature</i>	<i>Operational Frequency</i>	<i>Interferer Frequencies</i>	<i>Wanted signal</i>	<i>Interferer levels</i>	<i>Successful Transmissions</i>
+20 °C	156.525 MHz	156.475 MHz / 145.425 MHz	-100 dBm	-45 dBm	9/10
+20 °C	156.525 MHz	156.575 MHz / 145.625 MHz	-100 dBm	-45 dBm	9/10



Product Service

3.14.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	38808	36	2024-10-31
Radio Communication Service Moni- tor	Rohde & Schwarz	CMS54	19398	36	2025-03-31
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 28



3.15 Dynamic range

3.15.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.5

3.15.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.15.3 Date of Test

2022-09-29

3.15.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	44 %

3.15.5 Specification Limits

The bit error ratio shall be equal to or less than 10^{-2} at -103 dBm for signal for nominal conditions and at -100 dBm for extreme conditions.

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.15.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.5.2

3.15.7 Test Results

<i>Temperature</i>	<i>Operational Frequency</i>	<i>Wanted signal</i>	<i>Successful Transmissions</i>
+20 °C	156.525 MHz	-100 dBm	9/10
+20 °C	156.525 MHz	-13 dBm	10/10



Product Service

3.15.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30

Table 29



3.16 Spurious response rejection

3.16.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.6

3.16.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification States 3 and 4

3.16.3 Date of Test

2022-09-09 and 2022-09-23

3.16.4 Environmental Conditions

Ambient Temperature	23 °C
Relative Humidity	43 %

3.16.5 Specification Limits

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.16.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, sections 6.4.3.6
For LFR a initial search was performed using SINAD measurement acc. to 6.4.3.6.5.



3.16.7 Test Results

The applicant provided information about internal frequencies as follows:

$IF_1 = 29.255$ MHz; $IF_2 = 169$ MHz; $IF_3 = 900$ kHz; $f_{LO} = 127.27$ MHz.

3.16.7.1 Test Results for Limited Frequency Range (LFR)

$LFR_{LO} = f_{LO} - (IF_1 + IF_2 + IF_3) = -71.885$ MHz;

$LFR_{HI} = f_{LO} + (IF_1 + IF_2 + IF_3) = 326.425$ MHz

Since a signal with a negative frequency is equivalent to a signal with a phase shift of π (180°), the limited frequency range was tested from 71.885 MHz to 326.425 MHz.

Operational Frequency	Interferer Frequency	Wanted signal	Interferer level	Successful Transmissions
156.525 MHz	98.005 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	98.010 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	98.015 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	98.020 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	98.025 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	168.990 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	168.995 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	169.000 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	169.005 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	169.010 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	176.270 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	176.280 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	176.285 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	225.275 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	225.280 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	225.285 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	225.290 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	225.295 MHz	-100 dBm	-50 dBm	9/10

Note:

Tests for 98 MHz frequencies were performed with modification state 4 on 2022-09-23, all other tests were performed on with modification state 3 on 2022-09-09



3.16.7.2 Test Results for Identified Frequencies of Interest (SFI)

$$SFI_{1k} = (k \times f_{LO}) \pm IF_1 \quad k \in \{2, 3, 4\}$$

Operational Frequency	Interferer Frequency	Wanted signal	Interferer level	Successful Transmissions
156.525 MHz	225.285 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	283.795 MHz	-100 dBm	-50 dBm	9/10
156.525 MHz	352.555 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	411.065 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	479.825 MHz	-100 dBm	-50 dBm	10/10
156.525 MHz	538.335 MHz	-100 dBm	-50 dBm	9/10

3.16.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	38808	36	2024-10-31
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 30



3.17 Receiver Blocking

3.17.1 Specification Reference

IEC FDIS 63269 ED1 : 2022, section 6.4.3.7

3.17.2 Equipment under Test and Modification State

easy2-MOB; Prototype; Modification State 3

3.17.3 Date of Test

2022-09-09

3.17.4 Environmental Conditions

Ambient Temperature	25 °C
Relative Humidity	52 %

3.17.5 Specification Limits

The observation of the EUT was on at least successful nine transmissions out of ten attempts.

3.17.6 Test Method

The test was performed according to IEC FDIS 63269 ED1 : 2022, section 6.4.3.7.2

3.17.7 Test Results

<i>Operational Frequency</i>	<i>Interferer Frequency</i>	<i>Wanted signal</i>	<i>Interferer level</i>	<i>Successful Transmissions</i>
156.525 MHz	146.525 MHz	-100 dBm	-30 dBm	10/10
156.525 MHz	155.525 MHz	-100 dBm	-30 dBm	9/10
156.525 MHz	157.525 MHz	-100 dBm	-30 dBm	9/10
156.525 MHz	166.525 MHz	-100 dBm	-30 dBm	10/10

3.17.8 Test Location and Test Equipment

The test was carried out in radio test laboratory

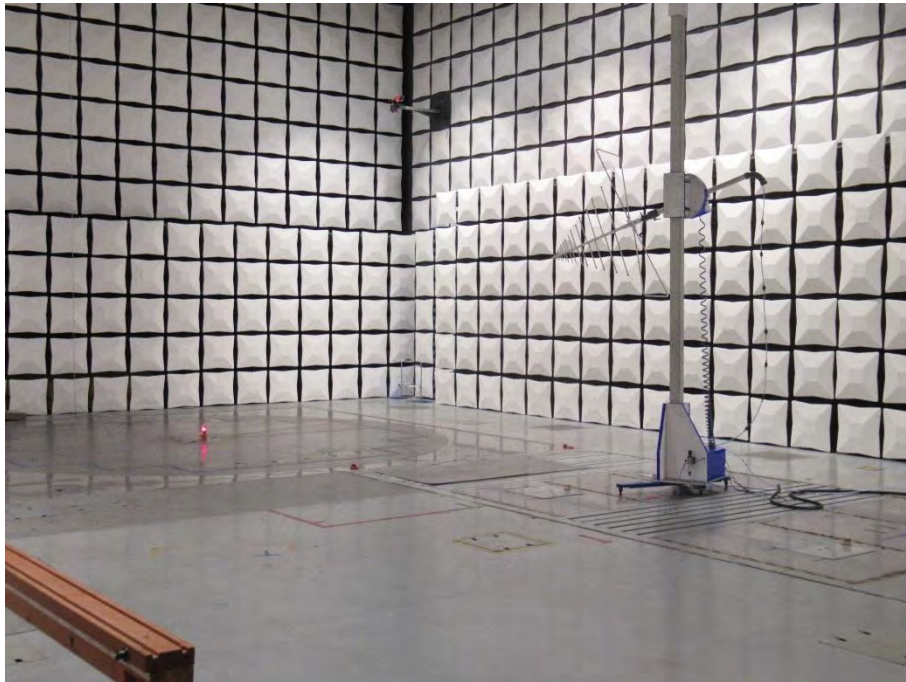


Product Service

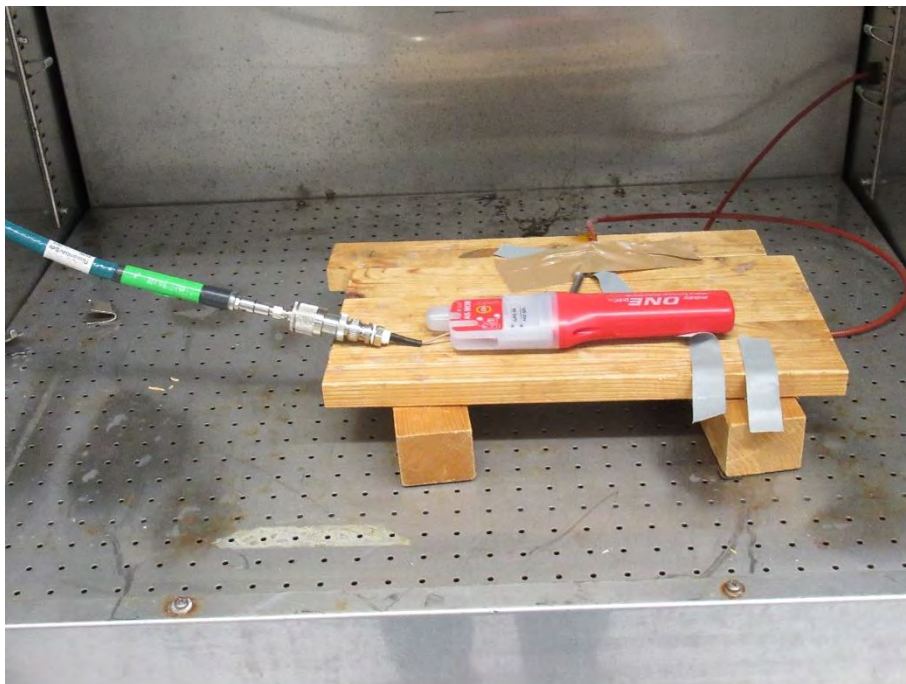
<i>Instrument</i>	<i>Manufacturer</i>	<i>Type No</i>	<i>TE No</i>	<i>Calibra- tion Pe- riod (months)</i>	<i>Calibration Due</i>
Signal Generator	Rohde & Schwarz	SMB100A03	45828	36	2025-06-30
Vector Signal Generator	Rohde & Schwarz	SMBV100A	38808	36	2024-10-31
Broadband Resistive Power Divider	Weinschel	1506A	19537		
Broadband Resistive Power Divider	JFW	50PD-478	41258		

Table 31

4 Photos of test setups



Test setup for radiated emission



Test setup for conducted tests within temperature chamber



5 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

<i>Radio Interference Emission Testing</i>		
<i>Test Name</i>	<i>kp</i>	<i>Expanded Uncertainty</i>
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
25 MHz – 6 GHz	1.96	±4.4 dB
1 GHz – 18 GHz	1.96	±4.7 dB
18 GHz – 40 GHz	1.96	±4.9 dB
40 GHz – 325 GHz	1.96	±6.1 dB
Conducted Spurious Emissions	2	± 3.0 dB
Electric Field Strength 9 kHz – 40 GHz	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10 ⁻⁷
The expanded uncertainty reported according to ETSI TR 100 028:2001 and ETSI TR 102 273:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 32 Measurement uncertainty based on ETSI TR 100 028 and ETSI TS 102 273

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to EN 300 220-1 V3.1.1 (2017-02). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.