



Timco Test Report # TR_2920CUT19_IEC 62388 DSC

Revision: 2

Issue Date: November 17, 2020

Final Test Date: November 16, 2020



Test Report – IEC 62238

Prepared For: ALPHATRON MARINE USA, INC

Approved for Release By:

Signature: Bruno Clavier

Name & Title: Bruno Clavier, General Manager

Date of Signature

(YYYY-MM-DD): 2020-11-17

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1. Customer Information

Applicant: ALPHATRON MARINE USA, INC
Address: 1205 BUTLER ROAD
LEAGUE CITY TX 77573

Contact: MR. TOM MCCASLAND
Email address: t.mccasland@jrc.am

1.1 Test Result Summary

The following test procedure and guidance were used for measuring Maritime navigation and radiocommunication equipment and systems – VHF radiotelephone equipment incorporating Class "D" Digital Selective Calling (DSC) –Methods of testing and required test results

No additions to the test methods were needed. There were no deviations, or exclusions from the test methods. No test results are from external providers or from the customer. The test results relate only to the items tested. Timco does not offer opinions and interpretations, only a pass/fail statement.



IEC 62238	Description of the requirements	Result (Pass, Fail or N/A)
Transmitter test specifications		
8.1	Frequency error	Pass
8.2	Carrier power	Pass
8.3	Frequency deviation	Pass
8.4	Sensitivity of the modulator, including microphone	N/A
8.5	Audiofrequency response	Pass
8.6	Audiofrequency harmonic distortion of the emission	N/A
8.7	Adjacent channel power	Pass
8.8	Conducted spurious emissions conveyed to the antenna	Pass
8.9	Transient frequency behaviour of the transmitter	Pass
8.10	Residual modulation of the transmitter	Pass
8.11	Frequency error (DSC signal)	Pass
8.12	Modulation index for DSC	Pass
8.13	Modulation rate for DSC	Pass
8.14	Testing of generated call sequences	Pass



2. Location of Testing

Test Laboratory

Timco Engineering Inc. is a subsidiary of Industrial Inspection & Analysis, Inc. ("IIA"). Testing was performed at Timco's permanent laboratory located at 849 NW State Road 45, Newberry, Florida 32669

FCC test firm # 578780
FCC Designation # US1070
FCC site registration is under A2LA certificate # 0955.01
ISED Canada test site registration # 2056A
EU Notified Body # 1177
For all designations see A2LA scope # 0955.01

2.1 Testing was performed, reviewed by:

Dates of Testing: November 16, 2020

Signature: _____

A handwritten signature in black ink, appearing to read "Tim Royer", is written over a horizontal line.

Sr. EMC Engineer
EMC-003838-NE



Name & Title: Tim Royer, EMC Engineer

Date of Signature

(YYYY-MM-DD): 2020-11-17

3. Test Sample(s) (EUT/DUT)

The test sample was received: August 25, 2020

3.1 Description of the EUT

A description as well as unambiguous identification of the EUT(s) tested. Where more than one sample is required for technical reasons (such as the use of connected units for the purpose of conducted output power testing where the product units will have integral antennas), each specific test shall identify which unit was tested.

Identification

FCC ID	2ADJKJHS-800S
Brief Description	ALPHATRON MARINE USA, INC
Type of Modular	MARINE VHF RADIOTELEPHONE
Model(s) #	JHS-800S
Trade name	N/A
Firmware version	N/A
Software version	N/A

Technical Characteristics

Technology	MARINE VHF RADIOTELEPHONE
Frequency Range	156.025-157.425 MHz
RF O/P Power (Max.)	43.44dBm
Modulation	FM
Bandwidth & Emission Class	12.06 kHz
Number of Channels	88
Antenna Type	N/A
Antenna Gain (for each ant.)	1 dBi
Antenna Connector	External N-Conector
Voltage Rating (AC or Batt.)	DC 12.5v

Antenna Characteristics

Frequency Range	Ant Gain 1	Ant Gain 2
156.025-157.425 MHz	N/A	



3.2 Configuration of EUT

Test Modes

Operational

Operating conditions during Testing:

No modifications of the device under test (including firmware, specific software settings, and input/output signal levels to the EUT).

Peripherals used during Testing:

No peripherals used.

3.3 Test Setup of EUT

Equipment, antenna, and cable arrangement. The setup of the equipment and cable or wire placement on the test site that produces the highest radiated and the highest ac power-line conducted emissions shall be shown clearly and described. Information on the orientation of portable equipment during testing shall be included. Drawings or photographs may be used for this purpose.

Test Setups are included in the test report.



4. Test methods & Applicable Regulatory Limits

Test methods/Standards/Guidance:

Test procedures and guidance of KDB 553680 as defined in IEC 62238.

5. Measurement Uncertainty

Standard	Test Items	Measurement Uncertainty	Notes
55022	Radiated Disturbance (electric field strength at an OATS or in a SAC), 30 MHz to 1000 MHz	±6.3 dB	(1)
55022	Conducted Disturbance at Mains Port using AMN, 9 kHz to 150 kHz	±3.8 dB	(1)
Valid up to 1 GHz for the RF parameters unless otherwise stated			

6. Environmental Conditions

Temperature & Humidity

Measurements performed at the test site did not exceed the following:

TEMPERATURE	23 C +/- 5%
HUMIDITY	55% +/- 5%
BARAMETRIC PRESSURE	30.05 inHg

Note: Specific environmental conditions that are applicable to a specific test are available in the test result section.



7. List of Test Equipment and Test Facility

The test equipment used identified by type, manufacturer, serial number, or other identification and the date on which the next calibration or service check is due.

Description of the firmware or software used to operate EUT for testing purposes.

A complete list of all test equipment used shall be included with the test report. The manufacturer's model and serial numbers, and date of last calibration, and calibration interval shall be included. Measurement cable loss, measuring instrument bandwidth and detector function, video bandwidth, if appropriate, and antenna factors shall also be included where applicable.

List of Test Equipment

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Amplifier	Amplifier Research	10W1000B	23117	NA	NA
Field Monitor	Amplifier Research	FM5004	22288	NA	NA
CHAMBER	Panashield	3M	N/A	N/A	N/A
Signal Generator HP 8648C	HP	8648C	3847A04696	12/05/17	12/05/20
Coaxial Cable - Immunity 3 cable set	Semflex	Immunity 3 cable set	Immunity 3 cable set	NA	NA
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
RF Power Amplifier	Ophir RF 120W	5126F	1015	NA	NA
RF Power Amplifier OPHIR	Ophir RF	5172F	1064	NA	NA



8. Test Results

The results of the test are usually indicated in the form of tables, spectrum analyzer plots, charts, sample calculations, as appropriate for each test procedure.

A description and/or a block diagram of the test setup is usually provided.

The measurement results, along with the appropriate limits for comparison, may be presented in tabular or graphical form. In addition, any variation in the measurement environment may be reported if applicable (e.g., a significant change of temperature that could affect the cable loss and amplifier response).



8. Sensitivity of the modulator, including microphone

Requirement and values from clause 8.4 of IEC 62388

Test Data: N/A

Timco Engineering, Inc., an IIA Company
849 NW State Road 45, Newberry, Florida 32669
(352) 472-5500 / testing@timcoengr.com





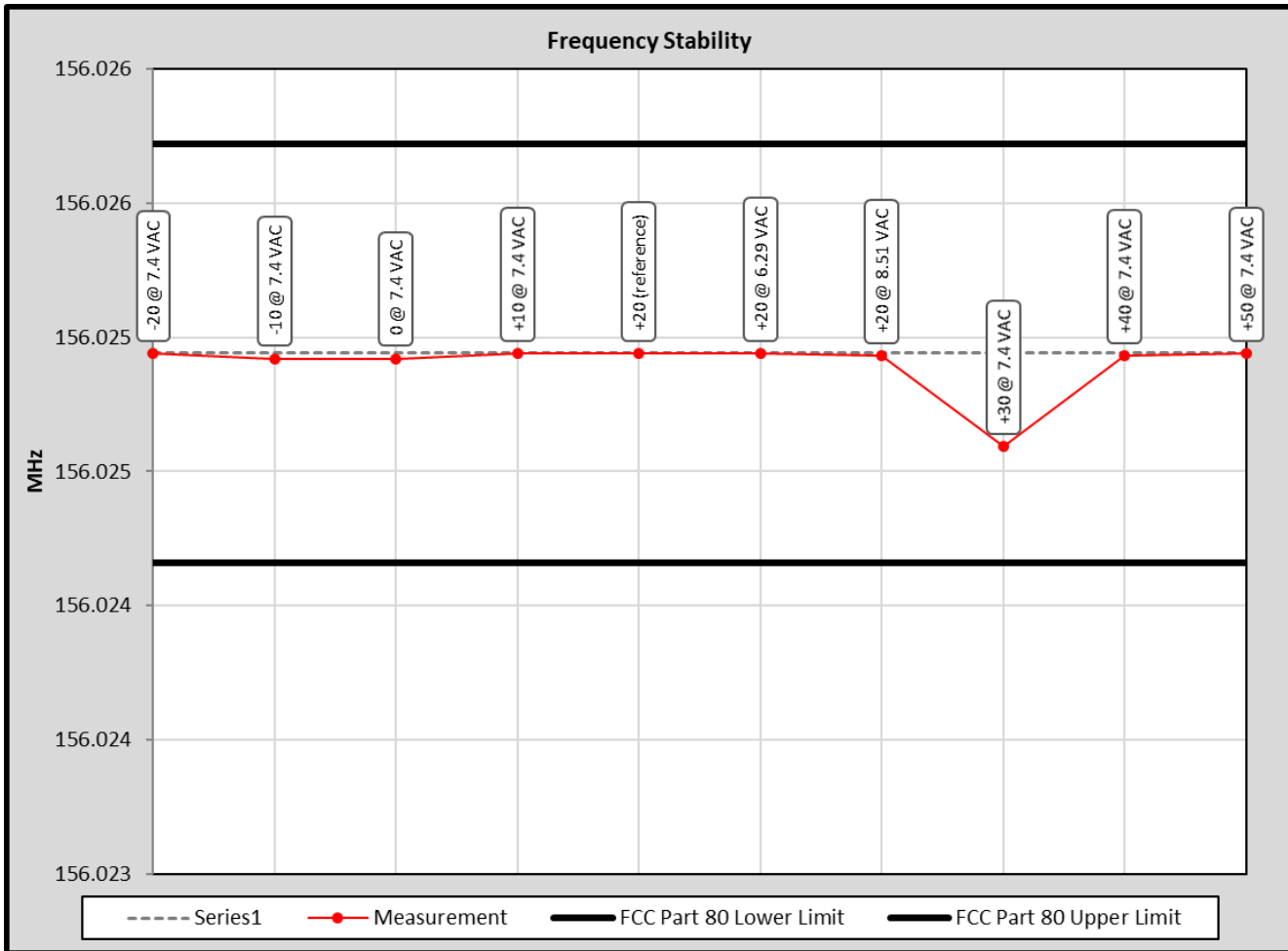
9. Frequency error

Requirement and values from clause 8.1 of IEC 62388

Test Data: Measurement Table

Limit	15.0	ppm	
Limit	2340.374	Hz	
Lower Limit	156.022600	MHz	
Upper Limit	156.027280	MHz	
Rated Supply Voltage	24.0	<input checked="" type="radio"/> AC <input type="radio"/> DC	
Temperature / Voltage Variation			
Temperature (°C)	Supplied Voltage (V)	Frequency (MHz)	Deviation (kHz)
-20	24.0	156.02494	0.000
-10	24.0	156.02492	0.020
0	24.0	156.02492	0.020
+10	24.0	156.02494	0.000
+20 (reference)	24.0	156.02494	0.000
+20	20.4	156.02494	0.000
+20	27.6	156.02493	0.010
+30	24.0	156.02459	0.347
+40	24.0	156.02493	0.010
+50	24.0	156.02494	0.000

Test Data: Measurement Plot



Pass



10. Carrier power

Requirement and values from clause 8.2 of IEC 62388

Test Data:

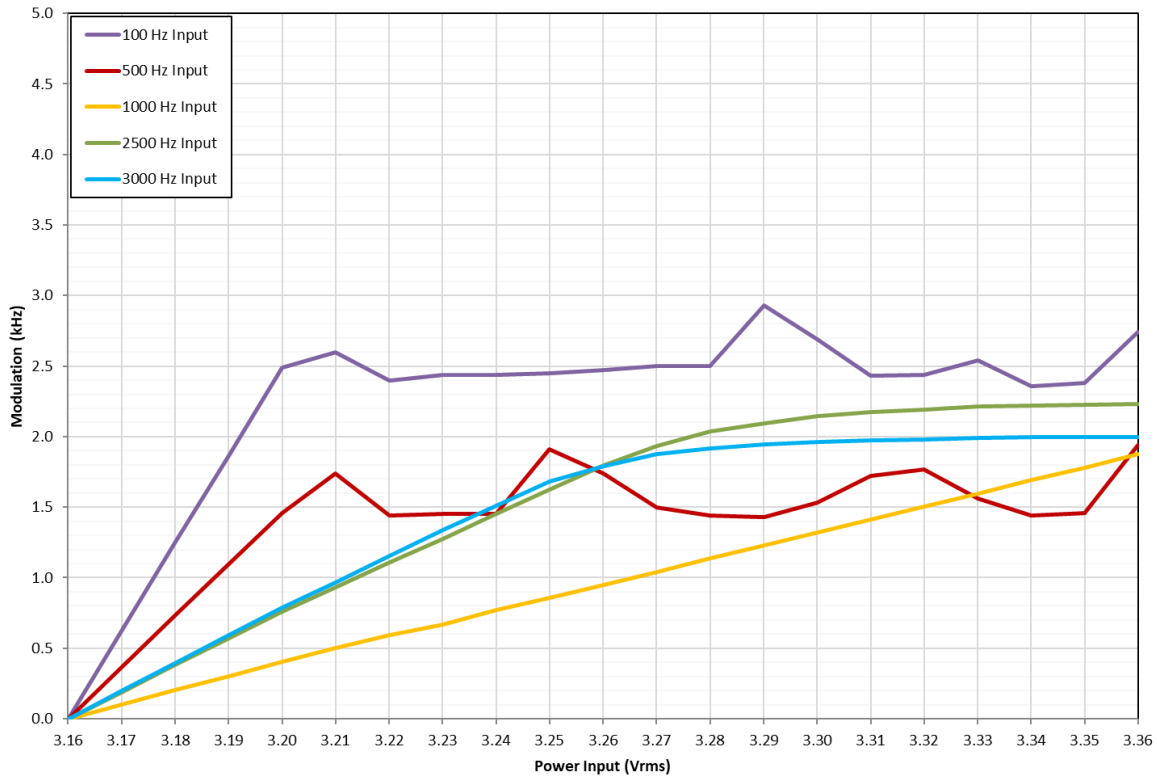
Peak Output Power					
Tuned Freq. MHz	Channel	dBm		Watts	
		High	Low	High	Low
156.0250	60	43.44	28.85	22.08	0.77
156.8000	16	42.59	27.98	18.16	0.63
157.4250	88	42.69	28.03	18.58	0.64

Pass

11. Frequency deviation

Requirement and values from clause 8.3 of IEC 62388

Test Data:

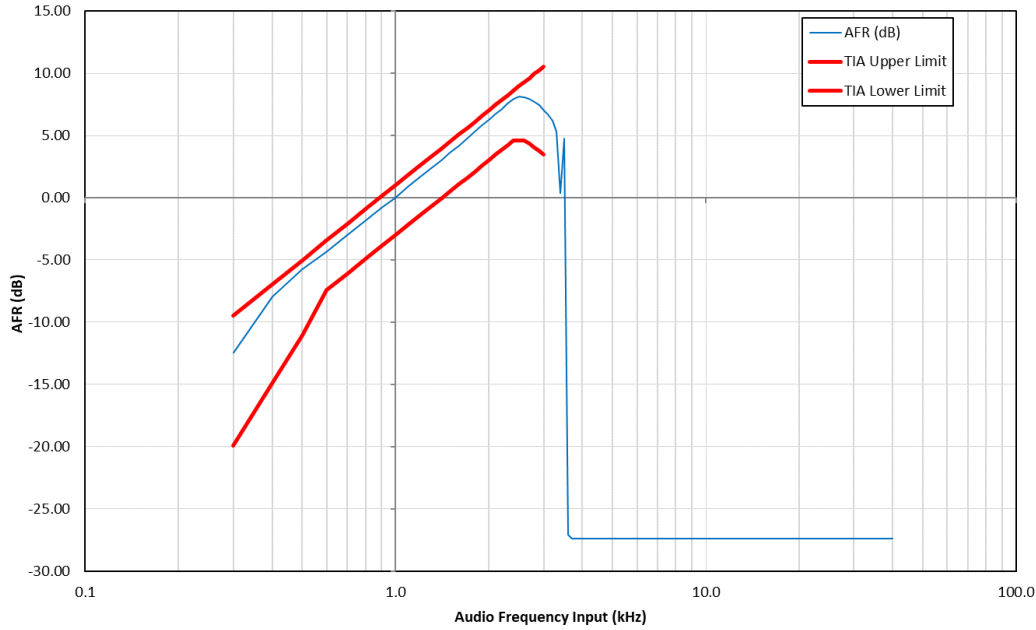


Pass

12. Audiofrequency response

Requirement and values from clause 8.5 of IEC 62388

Test Data: 0.1 – 5 KHz Audio Input Plot



Pass



13. Audiofrequency harmonic distortion of the emission

Requirement and values from clause 8.6 of IEC 62388

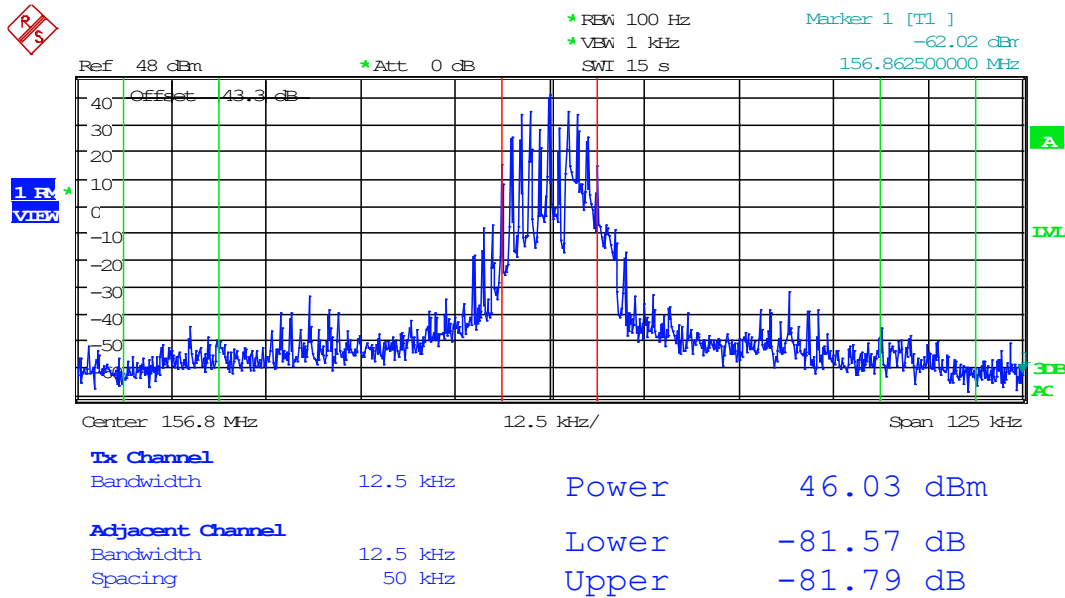
Test Data: N/A

14. Adjacent channel power

Requirement and values from clause 8.7 of IEC 62388

Adjacent channel power Test Data / Spectrum Plots

12kHz Channel, 156.8 MHz Ch 16 High Power

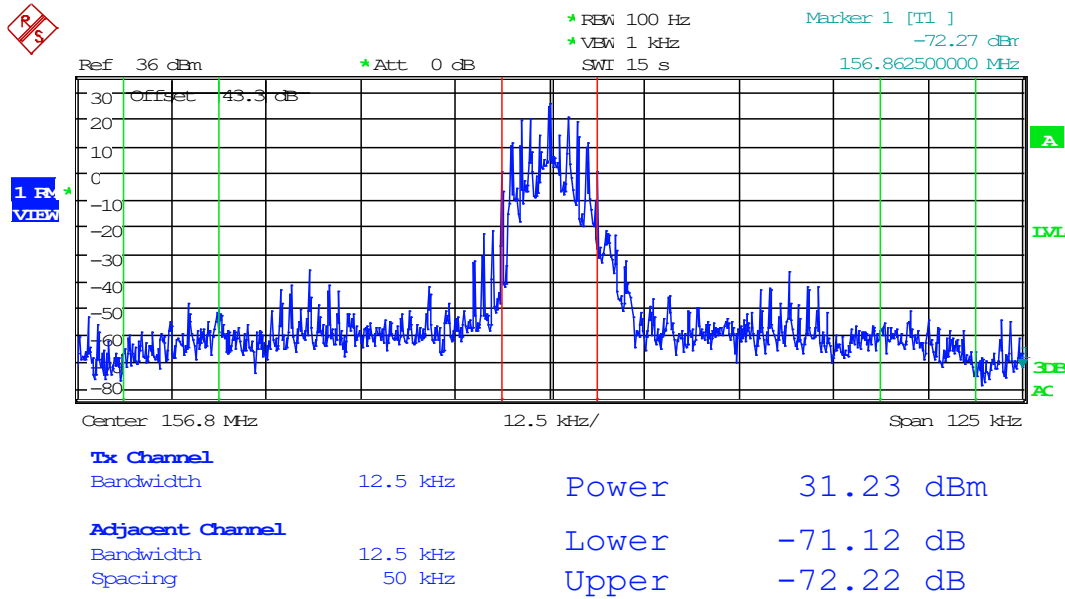


Date: 14.NOV.2019 15:59:05



Adjacent channel power Test Data / Spectrum Plots

12kHz Channel, 156.8 MHz Ch 16 Low Power

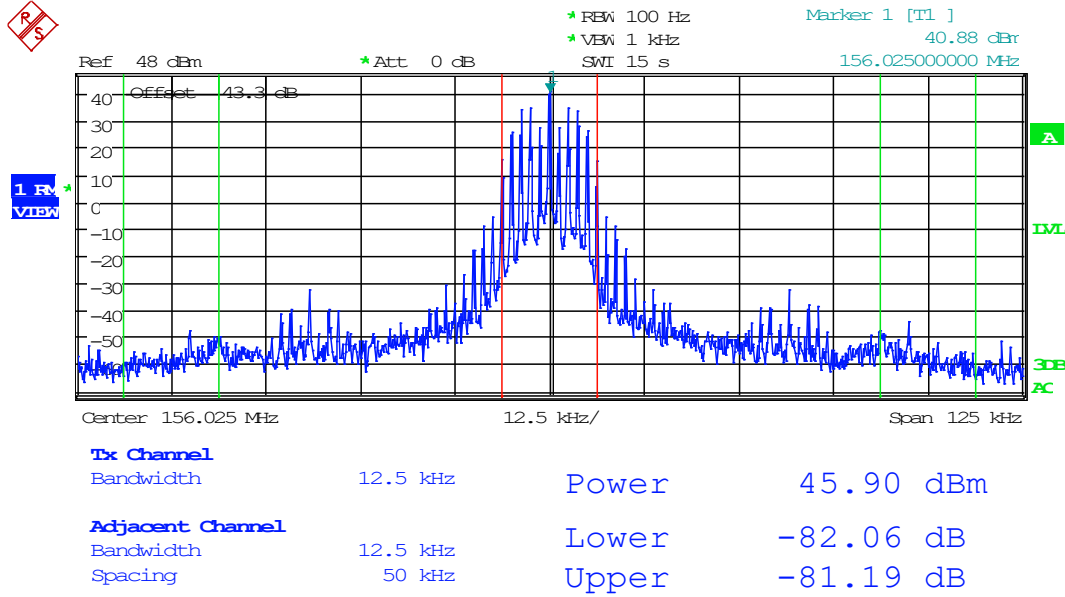


Date: 14.NOV.2019 16:03:08



Adjacent channel power Test Data / Spectrum Plots

12kHz Channel, 156.025 MHz Ch 60 High Power

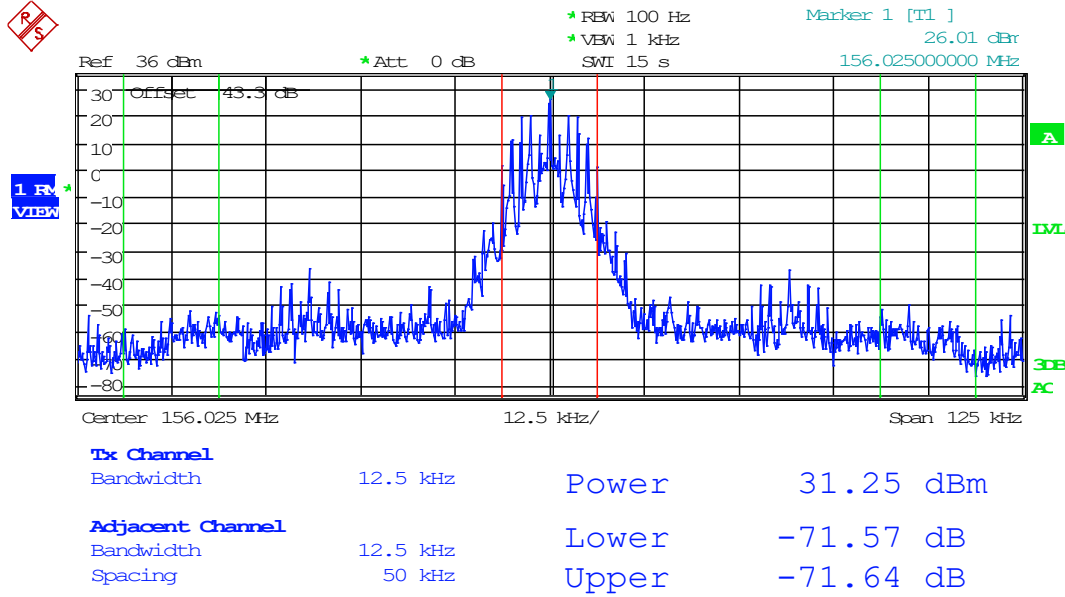


Date: 14.NOV.2019 16:05:31



Adjacent channel power Test Data / Spectrum Plots

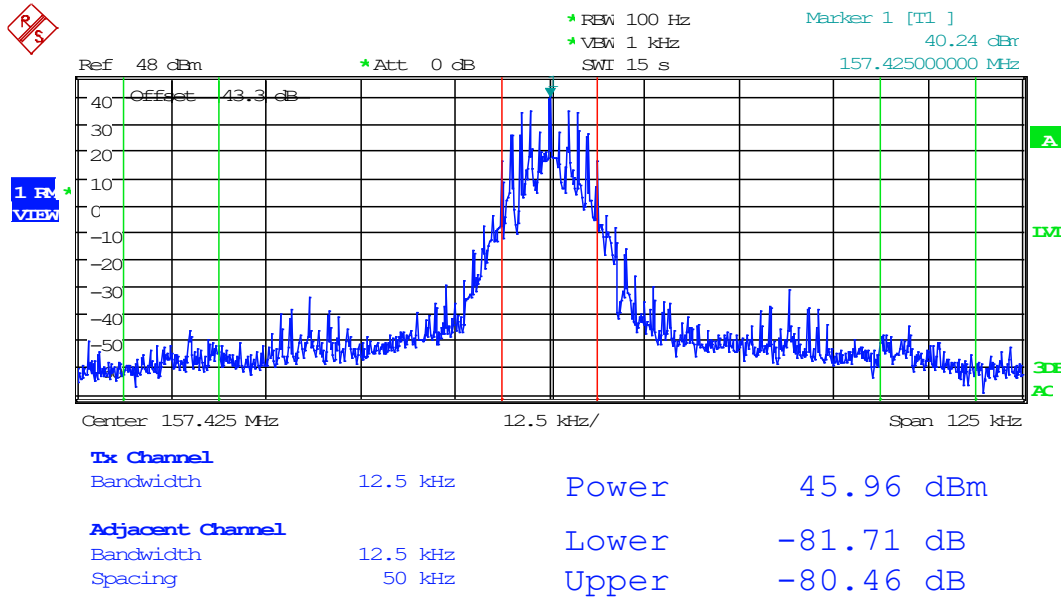
12kHz Channel, 156.025 MHz Ch 60 Low Power



Date: 14.NOV.2019 16:04:27

Adjacent channel power Test Data / Spectrum Plots

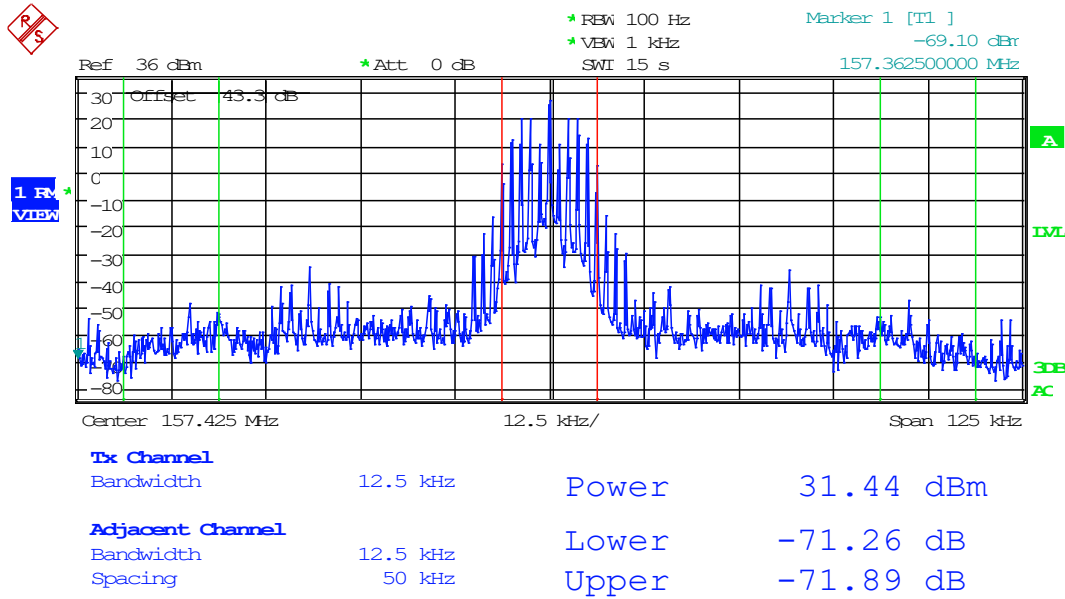
12kHz Channel, 157.425 MHz Ch 88 High Power



Date: 14.NOV.2019 15:57:07

Adjacent channel power Test Data / Spectrum Plots

12kHz Channel, 157.425 MHz Ch 88 Low Power

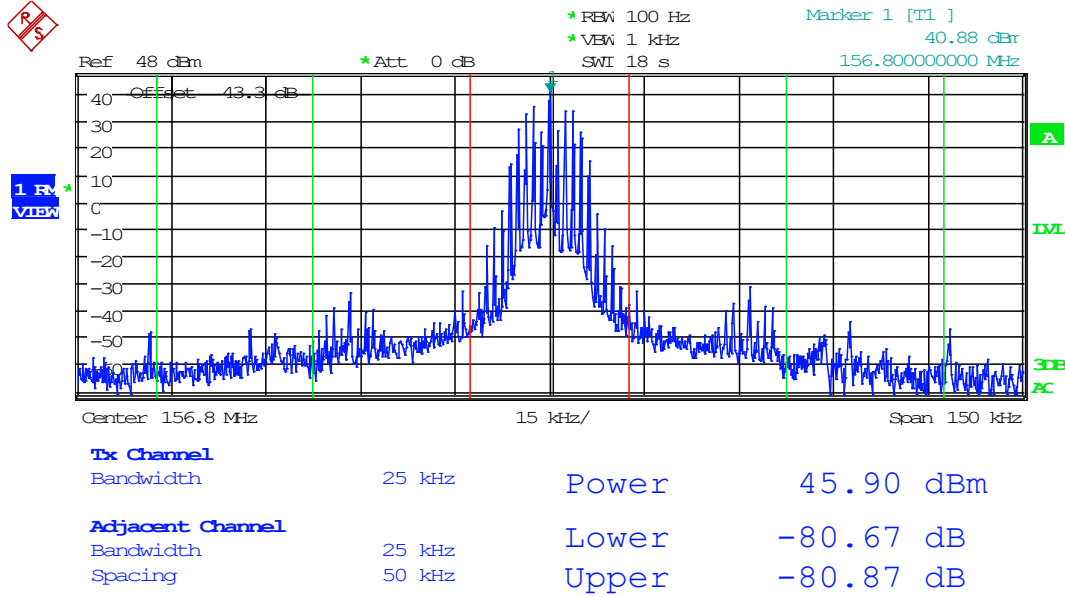


Date: 14.NOV.2019 16:01:00



Adjacent channel power Test Data / Spectrum Plots

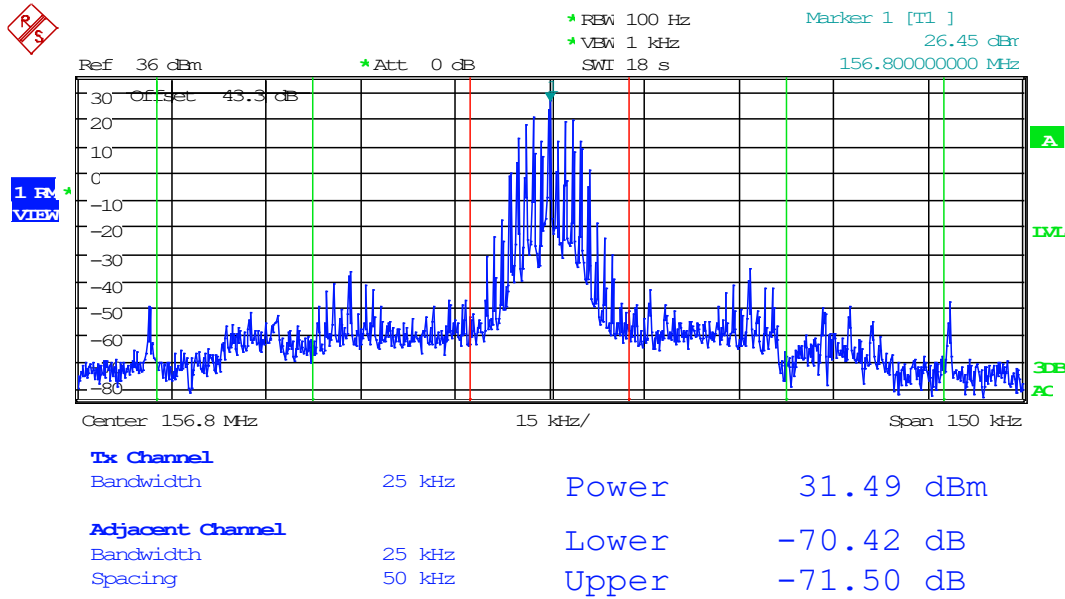
25kHz Channel, 156.8 MHz Ch 16 High Power



Date: 14.NOV.2019 16:25:01

Adjacent channel power Test Data / Spectrum Plots

25kHz Channel, 156.8 MHz Ch 16 Low Power

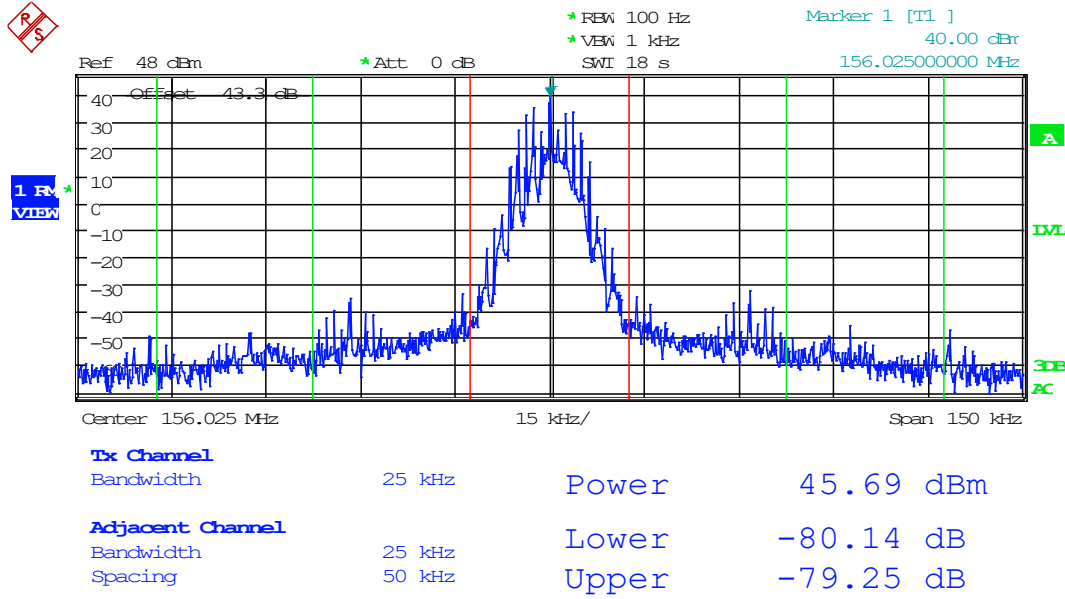


Date: 14.NOV.2019 16:23:19



Adjacent channel power Test Data / Spectrum Plots

25kHz Channel, 156.025 MHz Ch 60 High Power

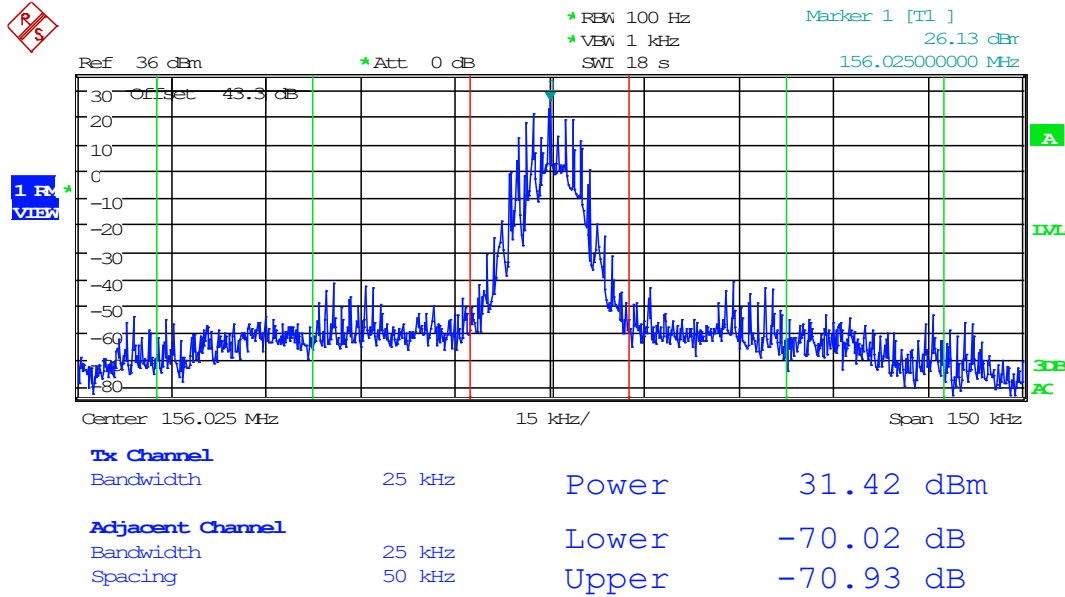


Date: 14.NOV.2019 16:16:42



Adjacent channel power Test Data / Spectrum Plots

25kHz Channel, 156.025 MHz Ch 60 Low Power

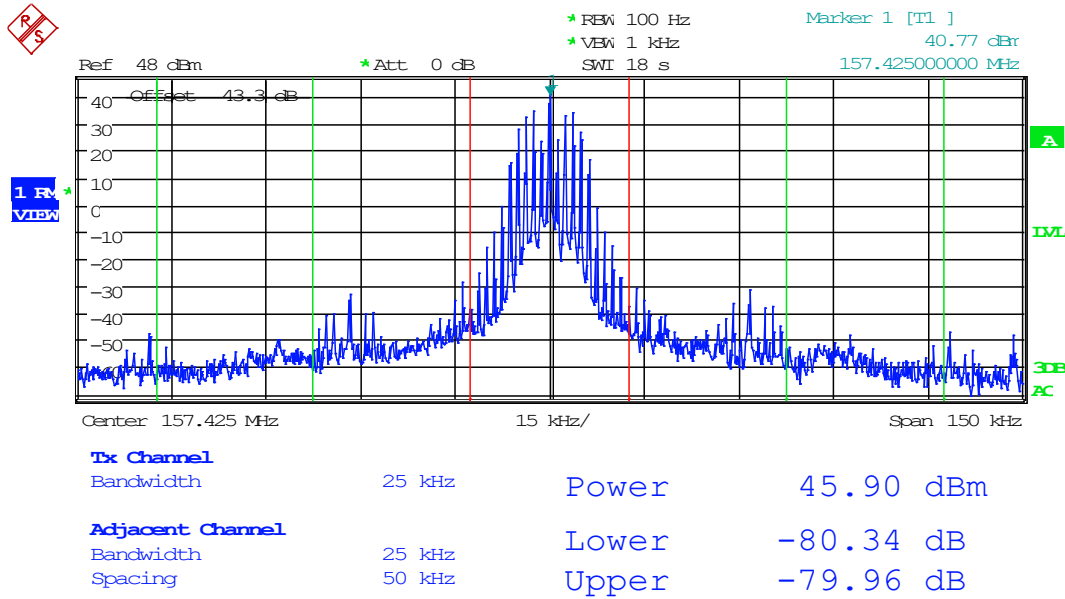


Date: 14.NOV.2019 16:21:22



Adjacent channel power Test Data / Spectrum Plots

25kHz Channel, 157.425 MHz Ch 88 High Power

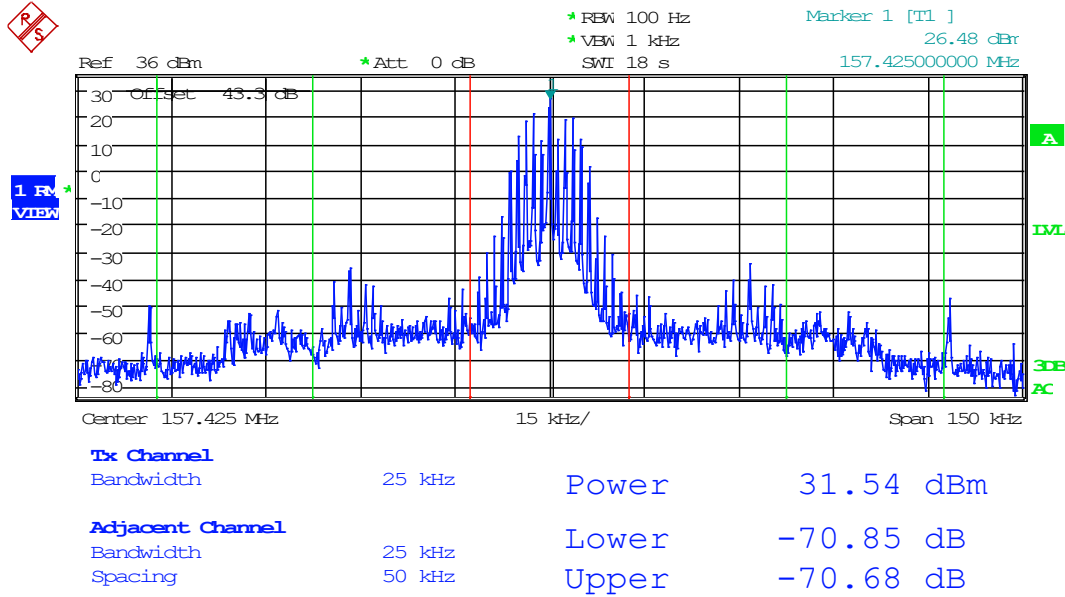


Date: 14.NOV.2019 16:26:56



Adjacent channel power Test Data / Spectrum Plots

25kHz Channel, 157.425 MHz Ch 88 Low Power



Date: 14.NOV.2019 16:28:03



15. Conducted spurious emissions conveyed to the antenna

Requirement and values from clause 8.8 of IEC 62388

Test Data: High Power Low End of Band

Power Mode	Emission Frequency (MHz)	Power Output (dBm)	Antenna Gain (dB)	Antenna Loss (dB)	ERP (dBm)	Limit (dBc)	Limit (dBm)	Margin (dB)
High	156.03	48.95	0.00	0.59	48.36	n/a	n/a	n/a
High	312.05	-43.48	0.00	52.86	-96.34	61.95	-13.00	83.34
High	468.08	-47.88	0.00	42.39	-90.27	61.95	-13.00	77.27
High	624.10	-48.53	0.00	45.76	-94.29	61.95	-13.00	81.29
High	780.13	-49.16	0.00	53.16	-102.32	61.95	-13.00	89.32
High	936.15	-51.34	0.00	41.69	-93.03	61.95	-13.00	80.03
High	1092.18	-51.53	0.00	43.35	-94.88	61.95	-13.00	81.88
High	1248.20	-51.12	0.00	30.66	-81.78	61.95	-13.00	68.78
High	1404.23	-50.94	0.00	31.23	-82.17	61.95	-13.00	69.17
High	1560.25	-50.64	0.00	17.91	-68.55	61.95	-13.00	55.55

Test Data: Low Power Low End of Band

Power Mode	Emission Frequency (MHz)	Power Output (dBm)	Antenna Gain (dB)	Antenna Loss (dB)	ERP (dBm)	Limit (dBc)	Limit (dBm)	Margin (dB)
Low	156.03	37.00	0.00	0.59	36.41	n/a	n/a	n/a
Low	312.05	-52.12	0.00	52.86	-104.98	50.00	-13.00	91.98
Low	468.08	-51.93	0.00	42.39	-94.32	50.00	-13.00	81.32
Low	624.10	-51.72	0.00	45.76	-97.48	50.00	-13.00	84.48
Low	780.13	-51.56	0.00	53.16	-104.72	50.00	-13.00	91.72
Low	936.15	-51.26	0.00	41.69	-92.95	50.00	-13.00	79.95
Low	1092.18	-51.45	0.00	43.35	-94.80	50.00	-13.00	81.80
Low	1248.20	-51.04	0.00	30.66	-81.70	50.00	-13.00	68.70
Low	1404.23	-50.86	0.00	31.23	-82.09	50.00	-13.00	69.09
Low	1560.25	-50.56	0.00	17.91	-68.47	50.00	-13.00	55.47

Results Meet Requirements



SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Data: High Power High End of Band

Power Mode	Emission Frequency (MHz)	Power Output (dBm)	Antenna Gain (dB)	Antenna Loss (dB)	ERP (dBm)	Limit (dBc)	Limit (dBm)	Margin (dB)
High	157.43	48.95	0.00	0.59	48.36	n/a	n/a	n/a
High	314.85	-41.99	0.00	52.86	-94.85	61.95	-13.00	81.85
High	472.28	-46.59	0.00	42.39	-88.98	61.95	-13.00	75.98
High	629.70	-46.43	0.00	45.76	-92.19	61.95	-13.00	79.19
High	787.13	-46.16	0.00	53.16	-99.32	61.95	-13.00	86.32
High	944.55	-45.92	0.00	41.69	-87.61	61.95	-13.00	74.61
High	1101.98	-45.98	0.00	43.35	-89.33	61.95	-13.00	76.33
High	1259.40	-45.68	0.00	30.66	-76.34	61.95	-13.00	63.34
High	1416.83	-45.58	0.00	31.23	-76.81	61.95	-13.00	63.81
High	1574.25	-45.05	0.00	17.91	-62.96	61.95	-13.00	49.96

Test Data: Low Power High End of Band

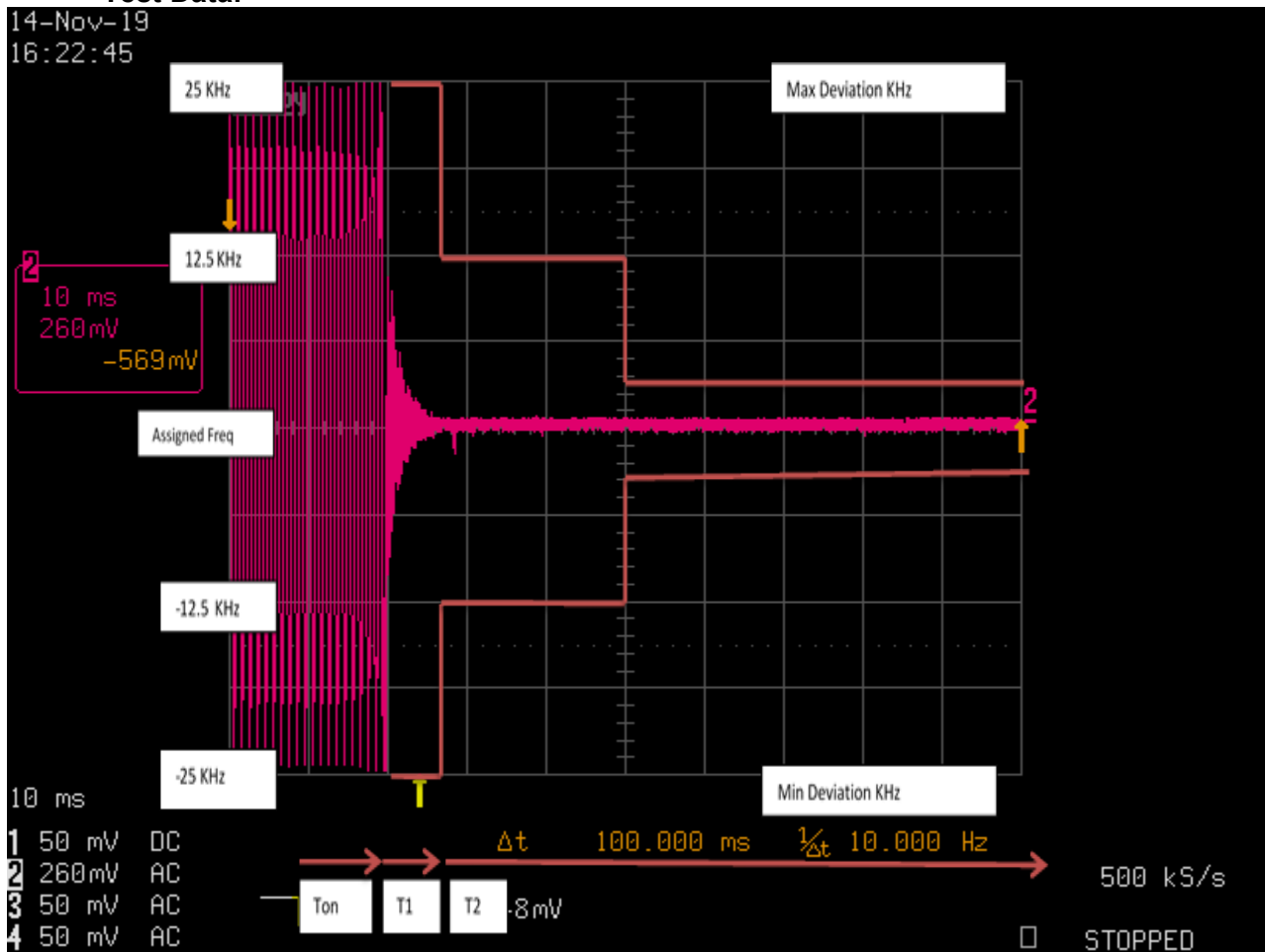
Power Mode	Emission Frequency (MHz)	Power Output (dBm)	Antenna Gain (dB)	Antenna Loss (dB)	ERP (dBm)	Limit (dBc)	Limit (dBm)	Margin (dB)
Low	157.43	37.49	0.63	0.00	38.12	n/a	n/a	n/a
Low	314.85	-48.65	0.00	54.42	-103.07	50.49	-13.00	90.07
Low	472.28	-48.40	0.00	44.10	-92.50	50.49	-13.00	79.50
Low	629.70	-48.24	0.00	41.76	-90.00	50.49	-13.00	77.00
Low	787.13	-47.97	0.00	49.47	-97.44	50.49	-13.00	84.44
Low	944.55	-47.73	0.00	32.08	-79.81	50.49	-13.00	66.81
Low	1101.98	-47.79	0.00	35.62	-83.41	50.49	-13.00	70.41
Low	1259.40	-47.49	0.00	29.73	-77.22	50.49	-13.00	64.22
Low	1416.83	-47.39	0.00	18.39	-65.78	50.49	-13.00	52.78
Low	1574.25	-46.86	0.00	14.80	-61.66	50.49	-13.00	48.66

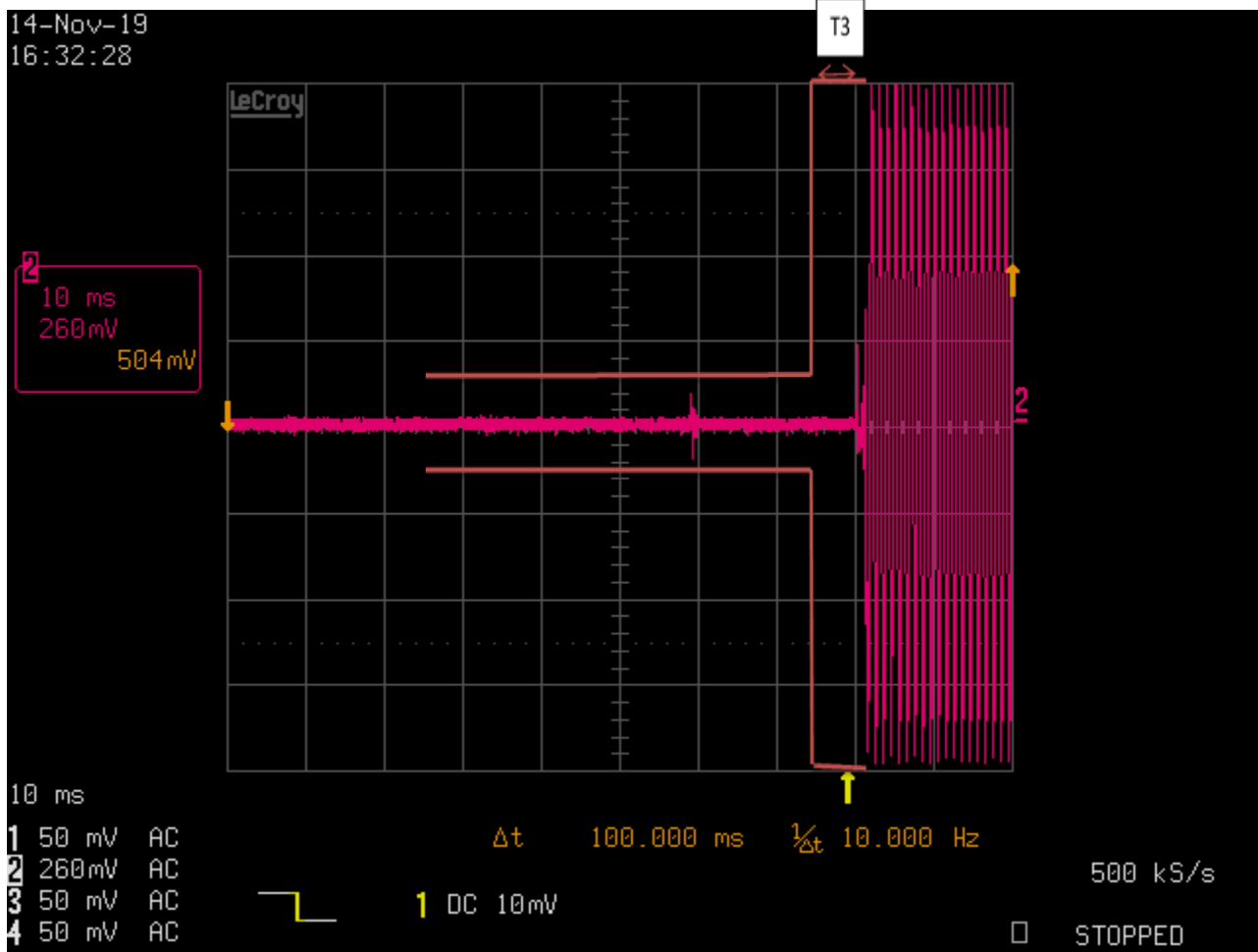
Results Meet Requirements

16. Transient frequency behaviour of the transmitter

Requirement and values from clause 8.9 of IEC 62388

Test Data:







17. Residual modulation of the transmitter

Requirement and values from clause 8.10 of IEC 62388

Test Data:

Ch 60 High Power = -43.6 dB
Ch 16 High Power = -42.71 dB
Ch 88 High Power = -43.46 dB
Ch 60 Low Power = -42.02 dB
Ch 16 Low Power = -42.33 dB
Ch 88 Low Power = -45.26 dB

Pass



18. Frequency error (DSC signal)

Requirement and values from clause 8.11 of IEC 62388

Test Data:

DSC 2100 = **2099.9**

DSC 1300 = **1300.1**

Pass



19. Modulation index for DSC

Requirement and values from clause 8.12 of IEC 62388

Test Data:

DSC 2100 = $4.29/2100 = 2.042$

DSC 1300 = $2.785/1300 = 2.142$

Pass



20. Modulation rate for DSC

Requirement and values from clause 8.13 of IEC 62388

Test Data:

DSC Dot = 600.83Hz

Pass



21. Testing of generated call sequences

Requirement and values from clause 8.14 of IEC 62388

Test Data:

Radio started on channel 70, all ships distress call made radio went to channel 16 at 25W

Pass



22. History of Test Report Changes

Test Report #	Revision #	Description	Date of Issue
TR_2920CUT19_IEC 62388 DSC	1	Initial release	November 17, 2020
	2	Updated Page 7	November 20, 2020



END of Test Report
