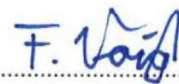


RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2303-1961-TFC247BL-V05
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Navico Inc.
Address	4500 S. 129th East Avenue, Ste. 200 OK 74134 Tulsa USA
Test Specification	4500 South 129th East Ave, Suite 200 Tulsa, Oklahoma, Postal Code 74134-5885 United States
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Marine and recreational IoT Gateway and vessel management system
Model(s)	Connect 1
Model(s) number	80-911-0270-00
Brand Name(s)	CZone
Hardware Version(s)	E4
Software Version(s)	emc_tests_op11587 / 1.0
FCC ID	RAYE3801
IC	978B-E3801
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2023-05-16	
Report:		
Compiled by	Stephan Liebich	
Tests supervised by (+ signature) (Responsible for Test)	Florian Voigt	
Approved by (+ signature) (Senior Radio Expert)	Radwan Jaafar	
Date of Issue	2025-01-10	
Total number of pages	110	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2023-11-22	Initial Release	--
02	2024-02-05	Replaced document: G0M-2303-1961-TFC247BL-V01 Replaced by: G0M-2303-1961-TFC247BL-V02 Reason: - Brand name updated - Model name updated - Model number added	G. Offorji
03	2024-05-30	Replaced document: G0M-2303-1961-TFC247BL-V02 Replaced by: G0M-2303-1961-TFC247BL-V03 Reason: - Applicant updated - Address update	St. Liebich
04	2024-12-18	Replaced document: G0M-2303-1961-TFC247BL-V03 Replaced by: G0M-2303-1961-TFC247BL-V04 Reason: - Update master data	St. Liebich
05	2025-01-10	Replaced document: G0M-2303-1961-TFC247BL-V04 Replaced by: G0M-2303-1961-TFC247BL-V05 Reason: - Add power calculation tables	A. Ibraimov

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

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1 Equipment (Test Item) Under Test

Description	Marine and recreational IoT Gateway and vessel management system	
Model(s)	Connect 1	
Model(s) number	80-911-0270-00	
Brand Name(s)	CZone	
Serial Number(s)	EHE22000056	
Test Sample Id(s)	44397	
Hardware Version(s)	E4	
Software Version(s)	emc_tests_op11587 / 1.0	
PMN	Connect 1	
HVIN	E4/A	
FVIN	1.18.0	
HMN	n/a	
FCC ID	RAYE3801	
IC	978B-E3801	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth LE 5.0	
Bluetooth Specification	LE 1M PHY	Yes
	LE 2M PHY	Yes
	LE Coded PHY S=8 (125 kbit)	No
	LE Coded PHY S=2 (500 kbit)	No
	Stable Modulation Index - Transmitter	No
	Stable Modulation Index - Receiver	No
Modulation	GFSK	
Number of antenna ports	1	
Antenna	Type	External antenna
	Model	JC- 2458E1 08
	Manufacturer	JC Antenna
	Gain	Max 2.6 dBi @ 2.4-2.5 GHz Max 4.0 dBi @ 4.9-5.8 GHz
Supply Voltage	V _{NOM}	13.8 VDC
Operating Temperature	T _{NOM}	25 °C
AC/DC-Adaptor	None	
Manufacturer	Fell Technology AS Bragernes Torg 2 3017 Drammen NORWAY	

1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	AC/DC adapter	I.T.E. Power Supply	SA07H1217 120VAC to 12 VDC	Used for AC powerline conducted emissions
SIM	Artificial load	FellTech	HS load	Artificial load used for tests under stress
AE	Lead-acid battery	BPower Quoltec Betta Batteries	BCL24-12 53030 6-CNFJ-14	--
AE	WiFi router	TP Link Asus	Archer AX1500 RT-N12	--
AE	CC1352R devkit	Texas Instruments	LAUNCHXL- CC1352R1	Device providing connection with DUT over WIMEA protocol
AE	Antenna	not specified	GPS-500 JCW402D COTS	
AE	Laptop	Lenovo	T410	
SFT	SSH terminal program	None	Putty	
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.4 Test Modes

Mode	Description
GFSK 1 Mbit/s	Mode = Transmit Modulation = 2-GFSK Spreading = None Duty cycle = 86 %
GFSK 2 Mbit/s	Mode = Transmit Modulation = 2-GFSK Spreading = None Duty cycle = 43 %
Receive	Mode = Receive
Comment:	

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx	0	2402
F2	Tx / Rx	19	2440
F3	Tx	39	2480

1.6 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dB μ V. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Field strength limit:

This is the FCC Class B radiated emission limit (in units of dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/m:

$$\text{Field strength limit (dB}\mu\text{V/m)} = 20 \cdot \log (\mu\text{V/m})$$

Example only for radiated field strength:

Reading + AF	= Net Reading	:	Net reading	- Field strength limit	= Margin
+21.5 dB μ V	+ 26 dB/m	:	47.5 dB μ V/m	- 57.0 dB μ V/m	= -9.5

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 A2 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	N/R	no provisions for connection to the public utility ac power-lines
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 A2 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.4-2014	PASS	
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

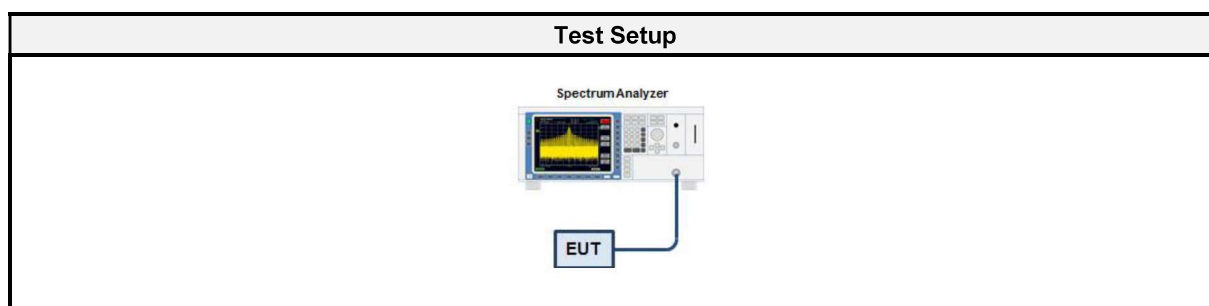
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 A2 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Test Sample ID	44397
Operator	Azamat Ibraimov
Date	2023-09-25

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.1.5 Procedure

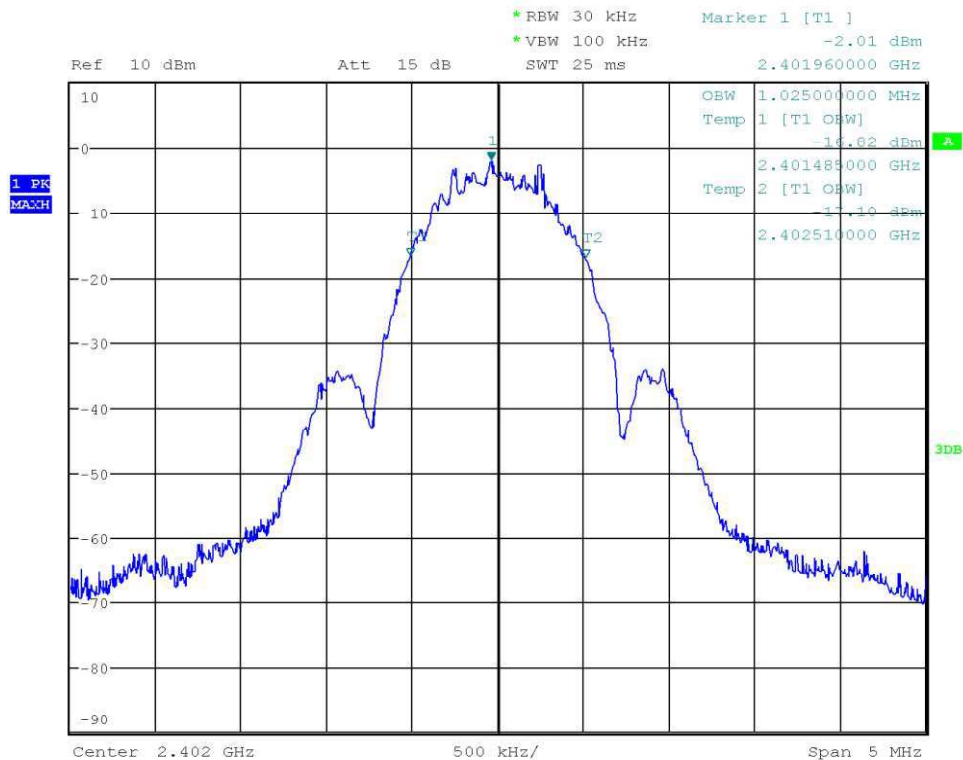
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
GFSK 1 Mbit/s	2402	1.025
GFSK 1 Mbit/s	2440	1.025
GFSK 1 Mbit/s	2480	1.025
GFSK 2 Mbit/s	2402	2.070
GFSK 2 Mbit/s	2440	2.065
GFSK 2 Mbit/s	2480	2.065

Occupied Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Occupied Bandwidth [MHz]: 1.025



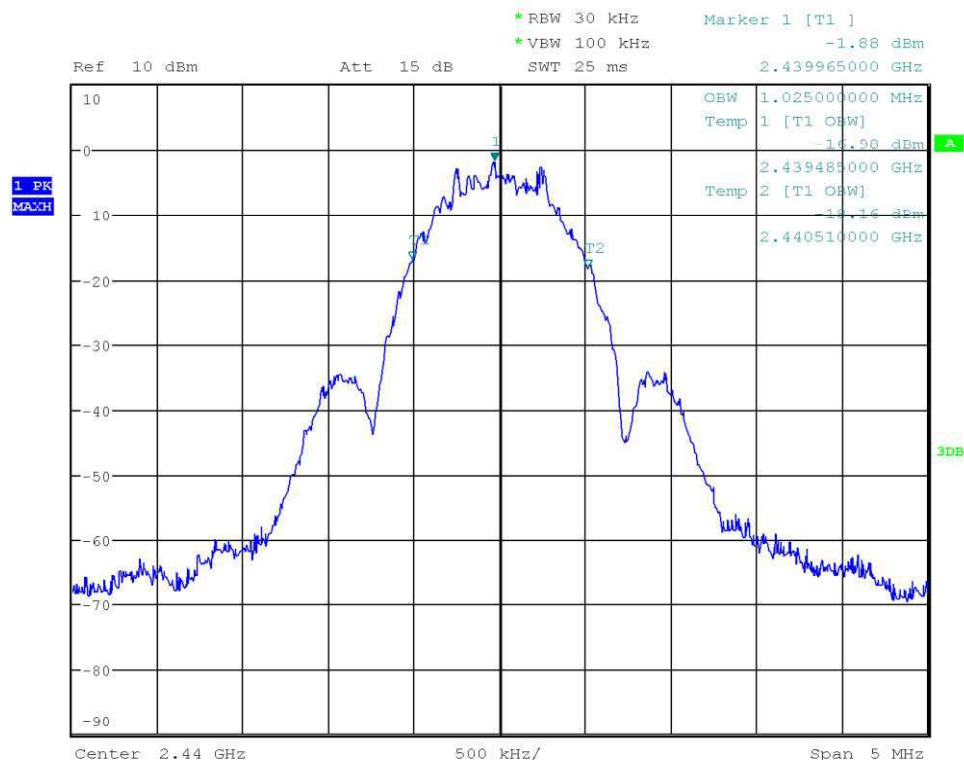
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Occupied Bandwidth [MHz]: 1.025



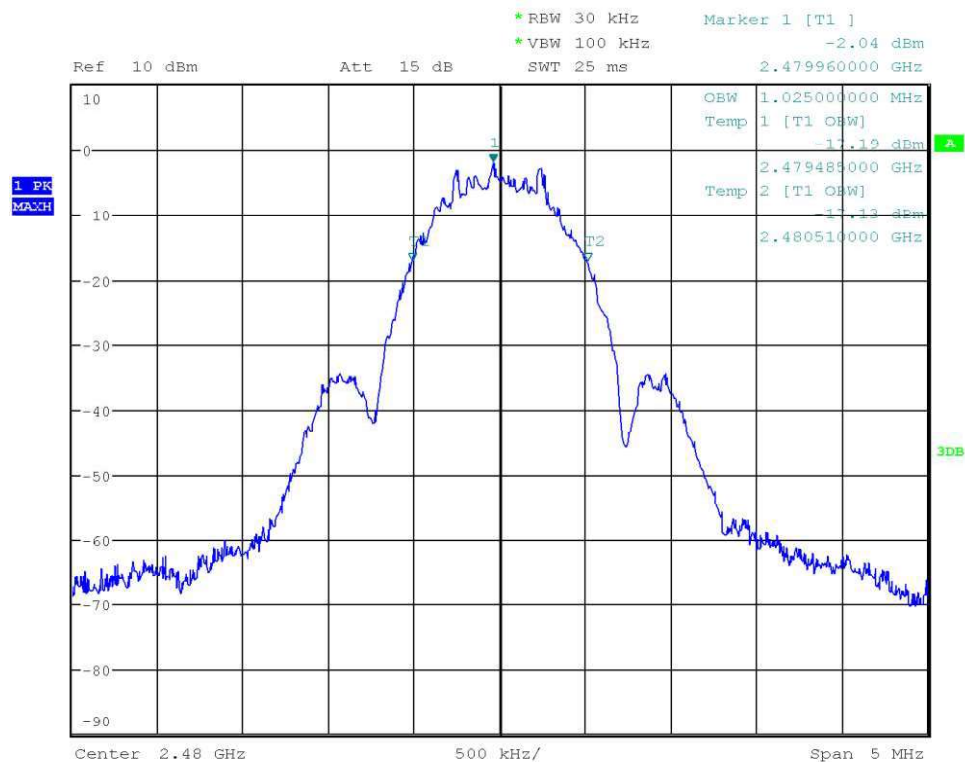
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Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Occupied Bandwidth [MHz]: 1.025



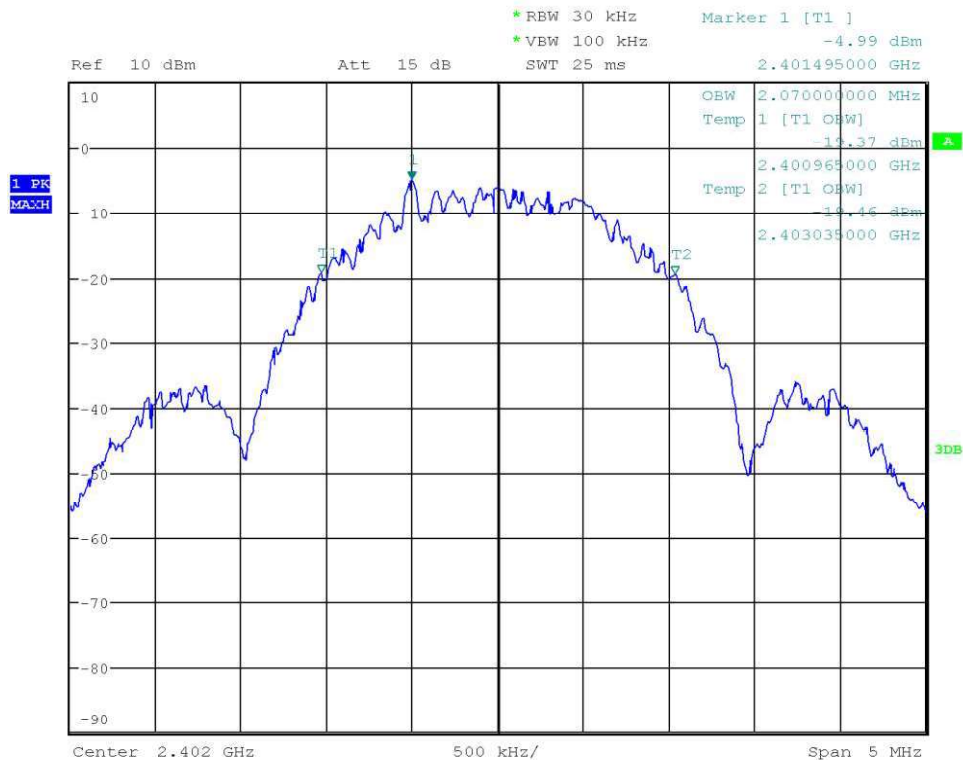
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Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

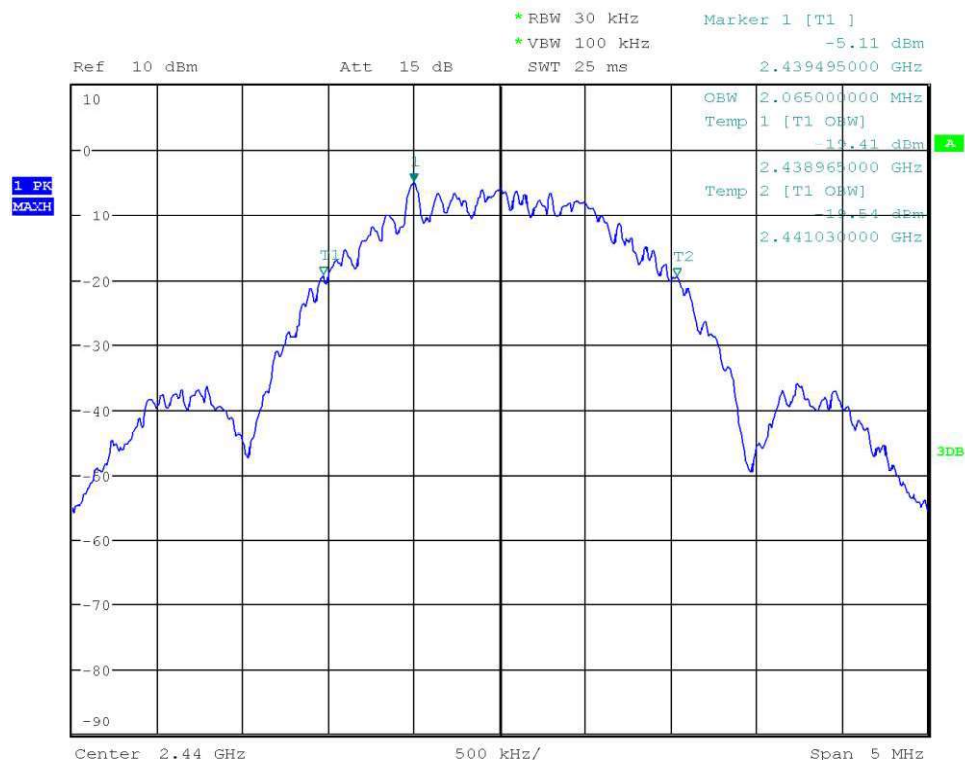
Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Occupied Bandwidth [MHz]: 2.070



Date: 25.SEP.2023 15:07:28

Occupied Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Occupied Bandwidth [MHz]: 2.065



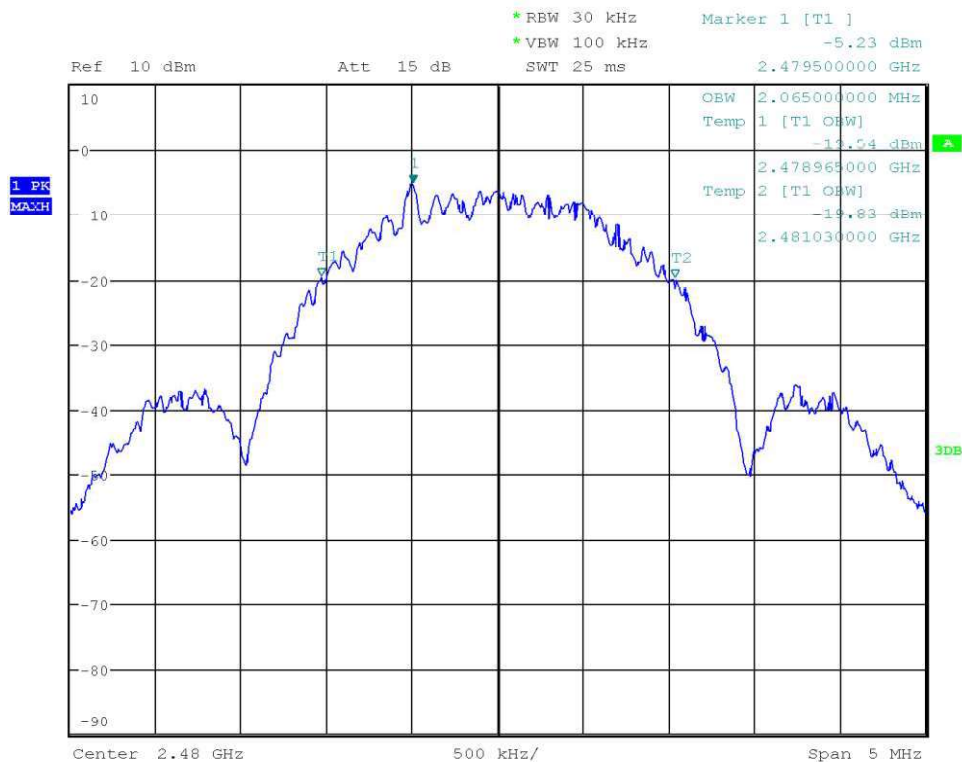
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Occupied Bandwidth [MHz]: 2.065



Date: 25.SEP.2023 15:30:33

3.2 Test Conditions and Results - 6 dB bandwidth

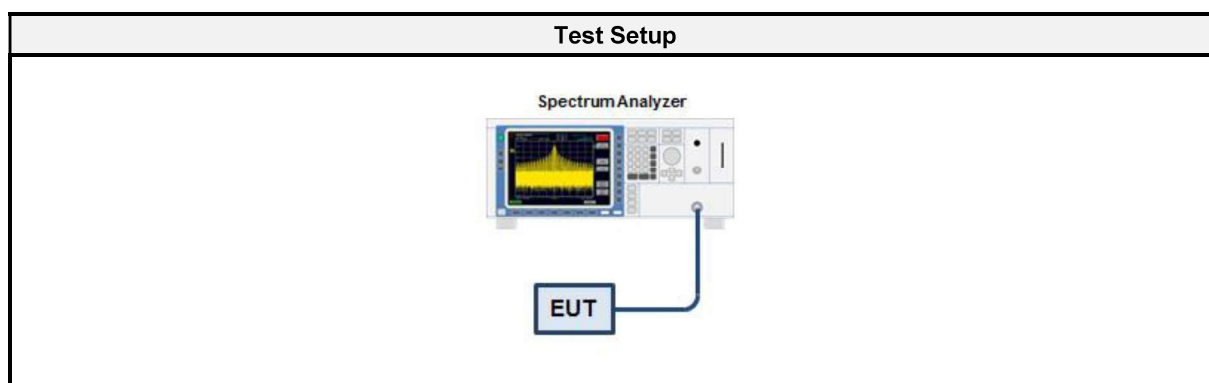
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	± 1.26 %
Operator	Azamat Ibraimov
Date	2023-09-25

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.2.5 Procedure

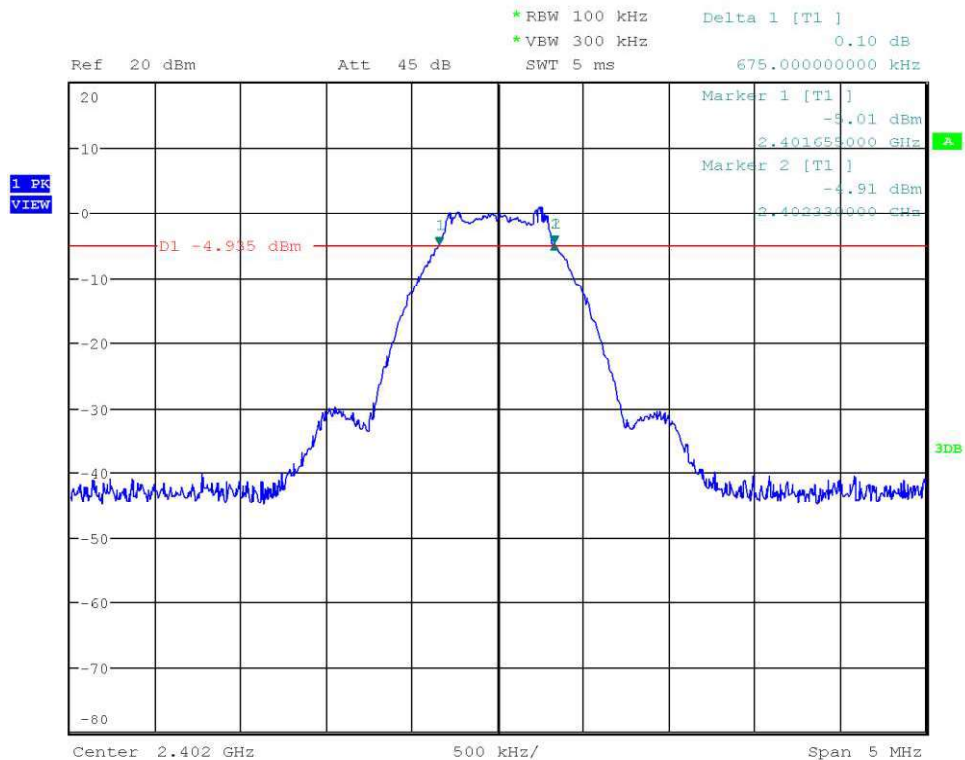
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
GFSK 1 Mbit/s	2402	675	500	PASS
GFSK 1 Mbit/s	2440	670	500	PASS
GFSK 1 Mbit/s	2480	690	500	PASS
GFSK 2 Mbit/s	2402	1140	500	PASS
GFSK 2 Mbit/s	2440	1140	500	PASS
GFSK 2 Mbit/s	2480	1155	500	PASS

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Lower Frequency [MHz]: 2401.655
 Upper Frequency [MHz]: 2402.330
 6 dB Bandwidth [kHz]: 675



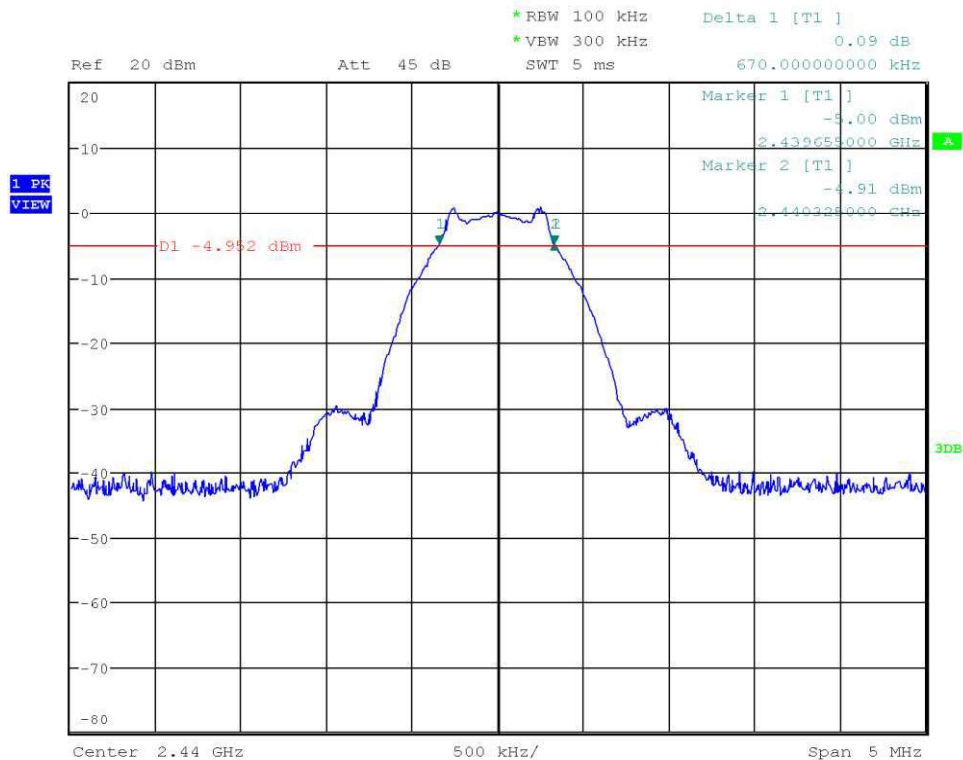
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Lower Frequency [MHz]: 2439.655
 Upper Frequency [MHz]: 2440.325
 6 dB Bandwidth [kHz]: 670



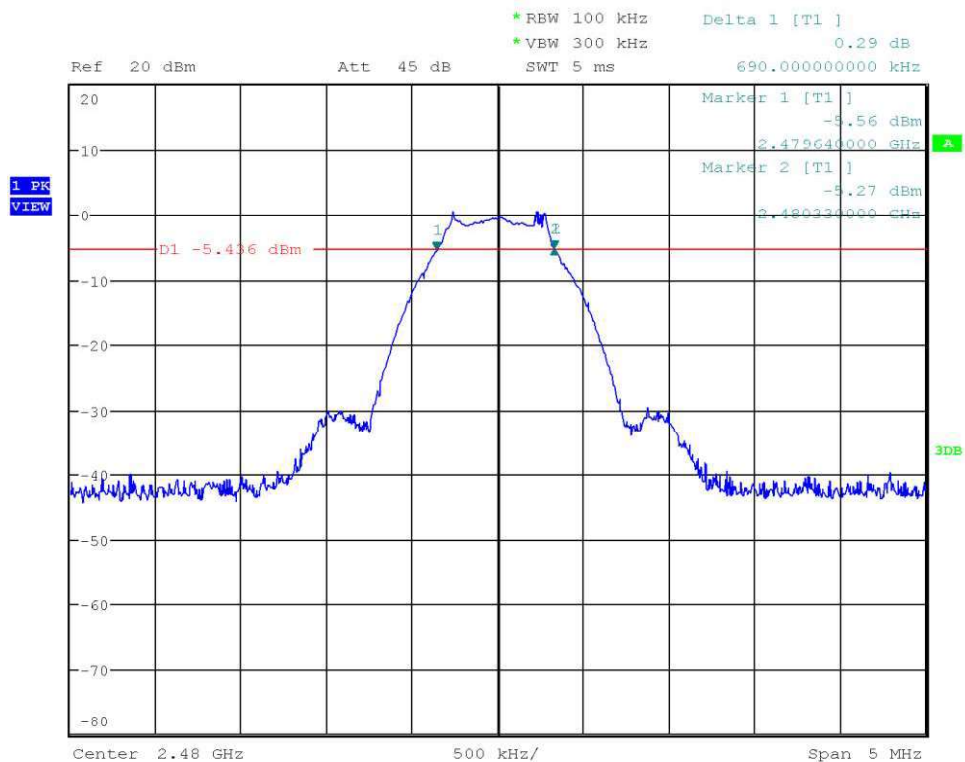
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Lower Frequency [MHz]: 2479.640
 Upper Frequency [MHz]: 2480.330
 6 dB Bandwidth [kHz]: 690



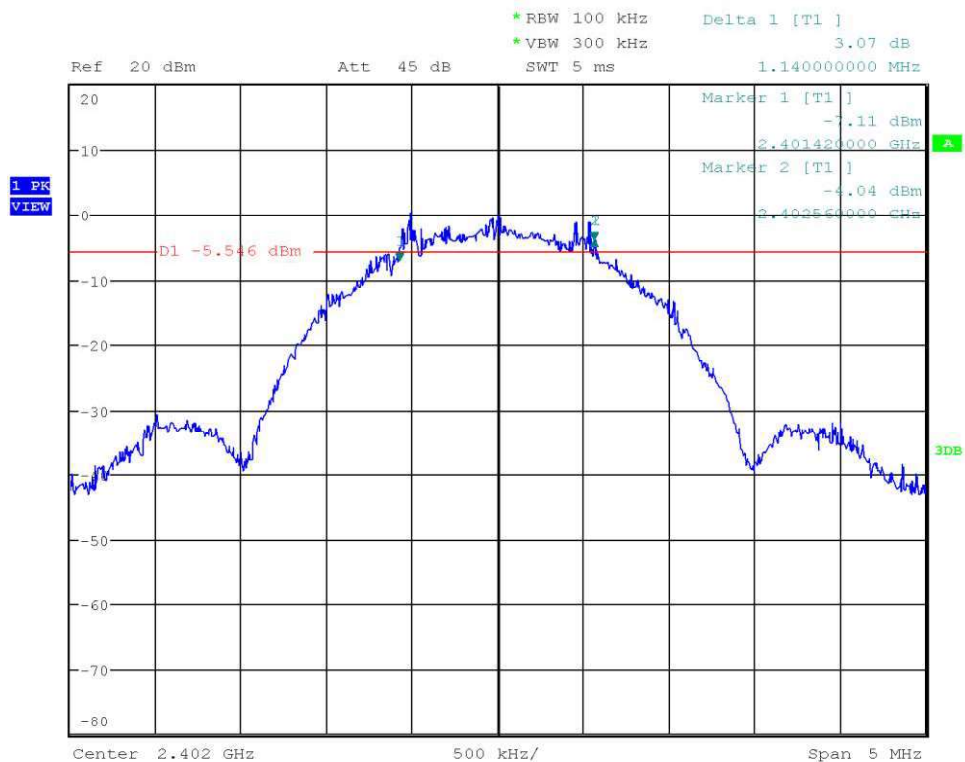
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Lower Frequency [MHz]: 2401.420
 Upper Frequency [MHz]: 2402.560
 6 dB Bandwidth [kHz]: 1140



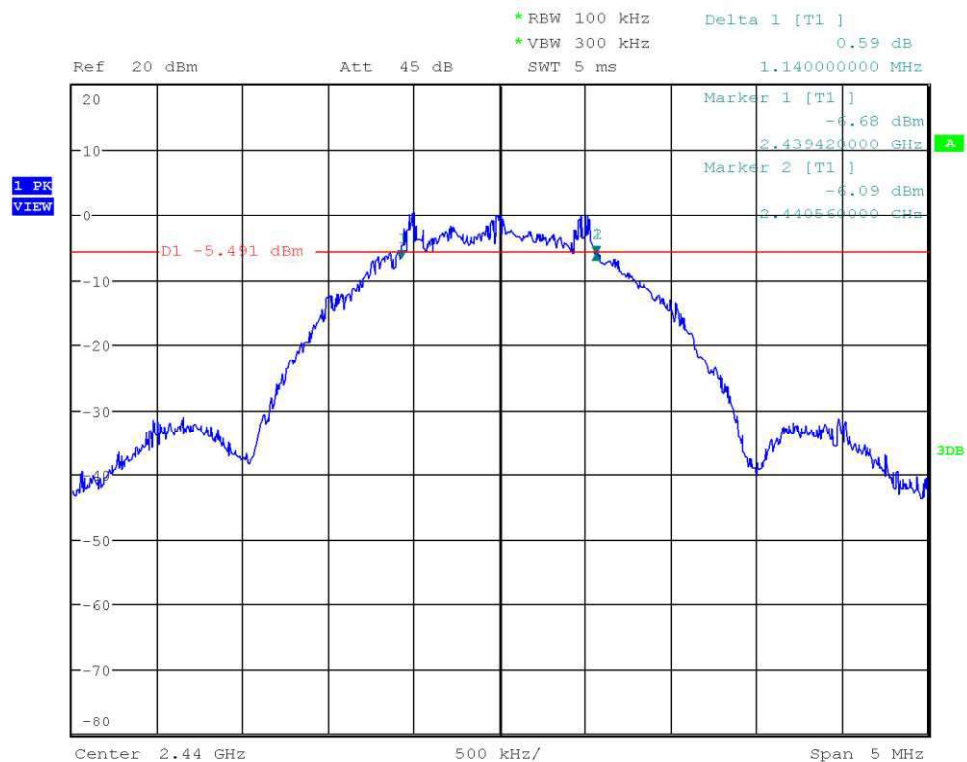
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Lower Frequency [MHz]: 2439.420
 Upper Frequency [MHz]: 2440.560
 6 dB Bandwidth [kHz]: 1140



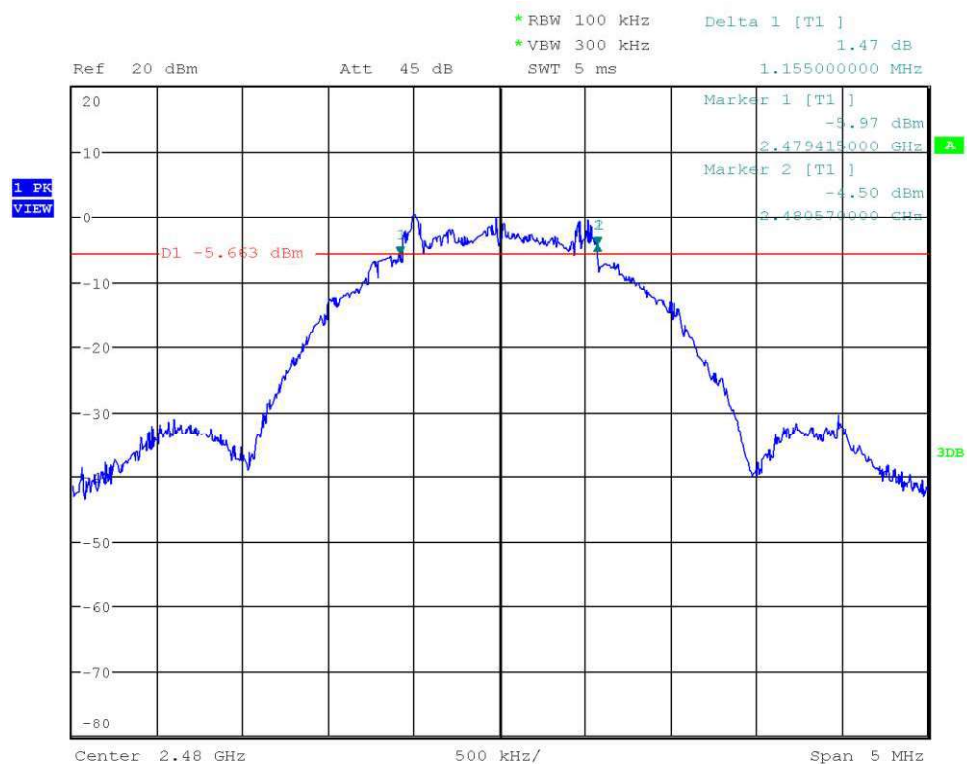
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Lower Frequency [MHz]: 2479.415
 Upper Frequency [MHz]: 2480.570
 6 dB Bandwidth [kHz]: 1155



Date: 25.SEP.2023 15:29:31

Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.3 Test Conditions and Results - Maximum peak conducted output power

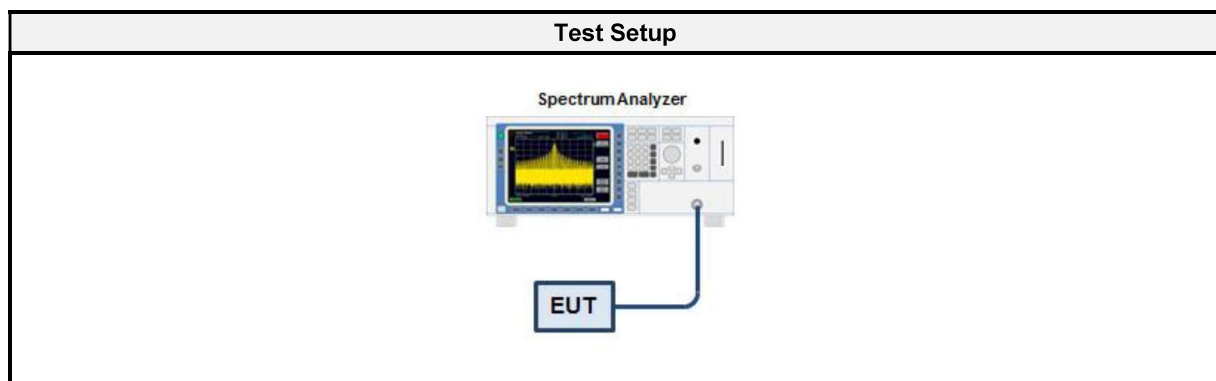
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISSED RSS-247, Issue 3 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Azamat Ibraimov
Date	2023-09-25

3.3.2 Limits

Limits
1 W conducted (30 dBm) / 4 W EIRP
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set ≥ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

3.3.6 Results

Test Results – 1 Mbit/s							
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Antenna Gain [dBi]	E.I.R.P. [W]	E.I.R.P. Limit [W]	Verdict
2402	2.036	0.0016	1.0	2.6	0.0029	4.0	PASS
2440	1.969	0.0016	1.0	2.6	0.0029	4.0	PASS
2480	1.817	0.0015	1.0	2.6	0.0028	4.0	PASS

Test Results – 2 Mbit/s							
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Antenna Gain [dBi]	E.I.R.P. [W]	E.I.R.P. Limit [W]	Verdict
2402	2.064	0.0016	1.0	2.6	0.0029	4.0	PASS
2440	1.996	0.0016	1.0	2.6	0.0029	4.0	PASS
2480	1.809	0.0015	1.0	2.6	0.0028	4.0	PASS

Peak Conducted Output Power

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	1 Mbit
Peak Power [dBm]:	2.036
Peak Power [W]:	0.0016



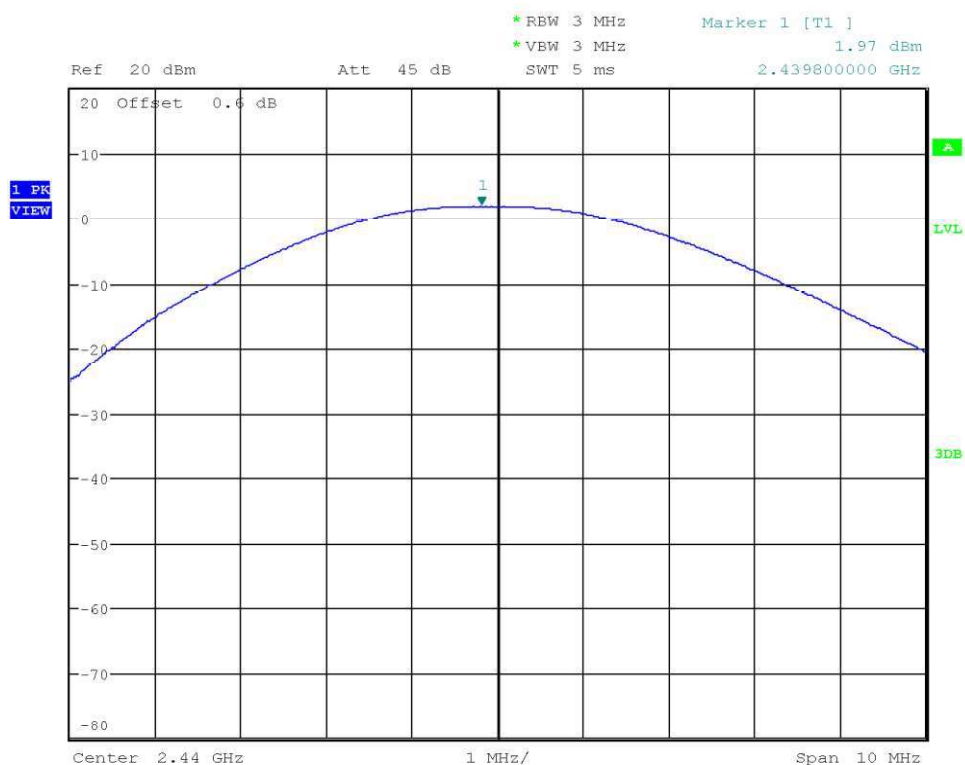
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	1 Mbit
Peak Power [dBm]:	1.969
Peak Power [W]:	0.0016



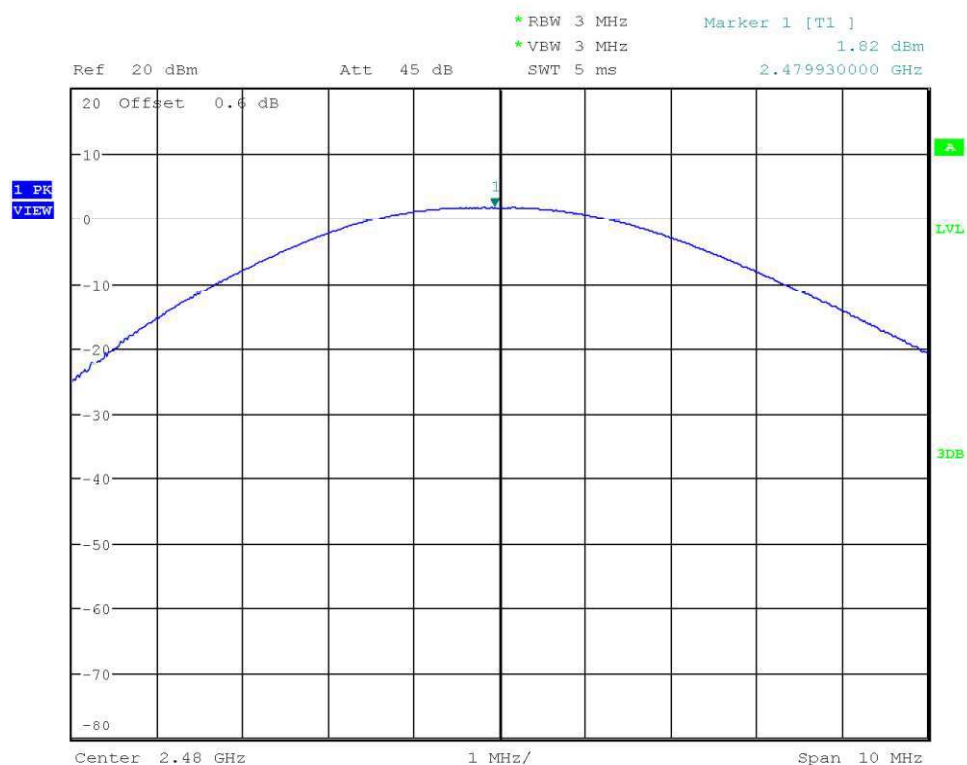
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	1 Mbit
Peak Power [dBm]:	1.817
Peak Power [W]:	0.0015



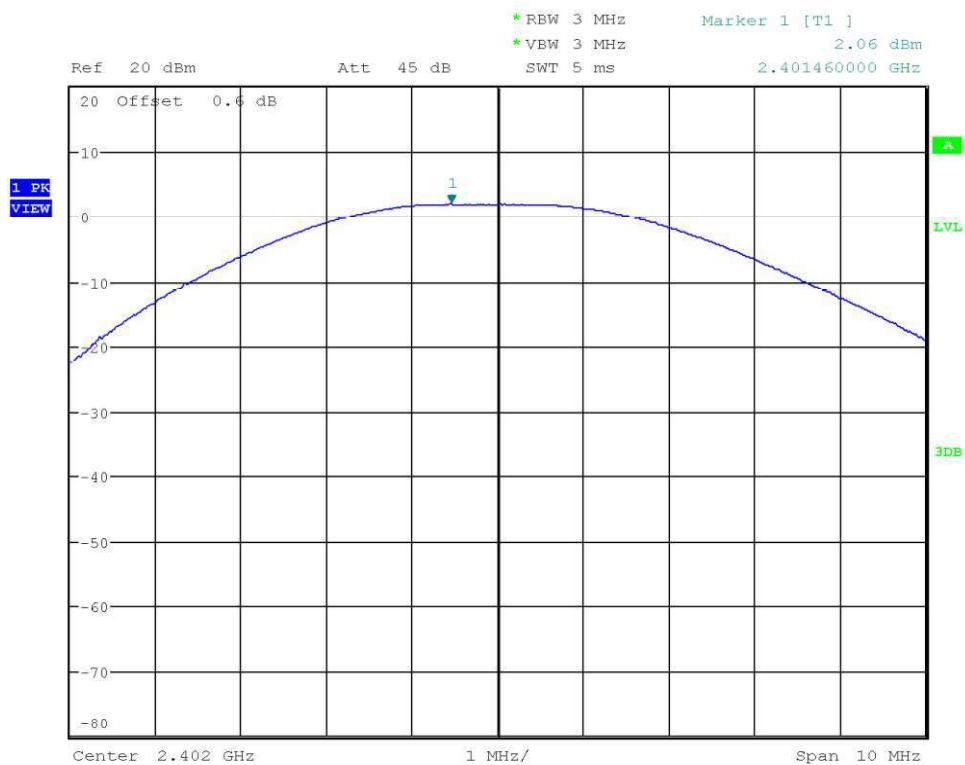
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

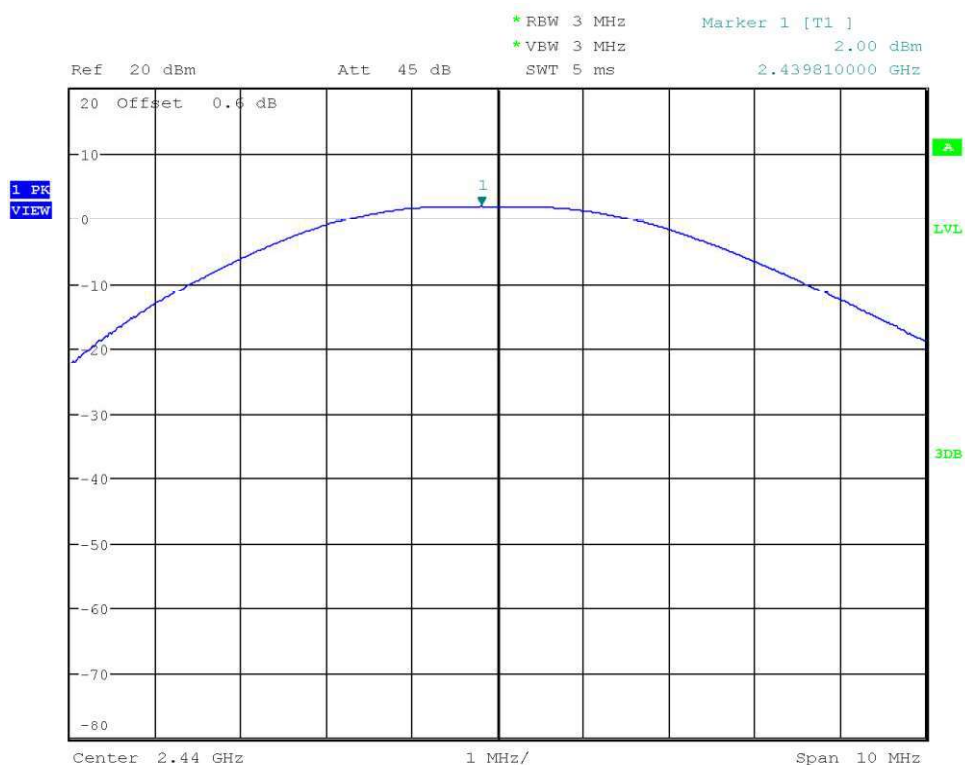
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Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	2 Mbit
Peak Power [dBm]:	2.064
Peak Power [W]:	0.0016



Date: 25.SEP.2023 15:08:31

Peak Conducted Output Power

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 19, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	2 Mbit
Peak Power [dBm]:	1.996
Peak Power [W]:	0.0016



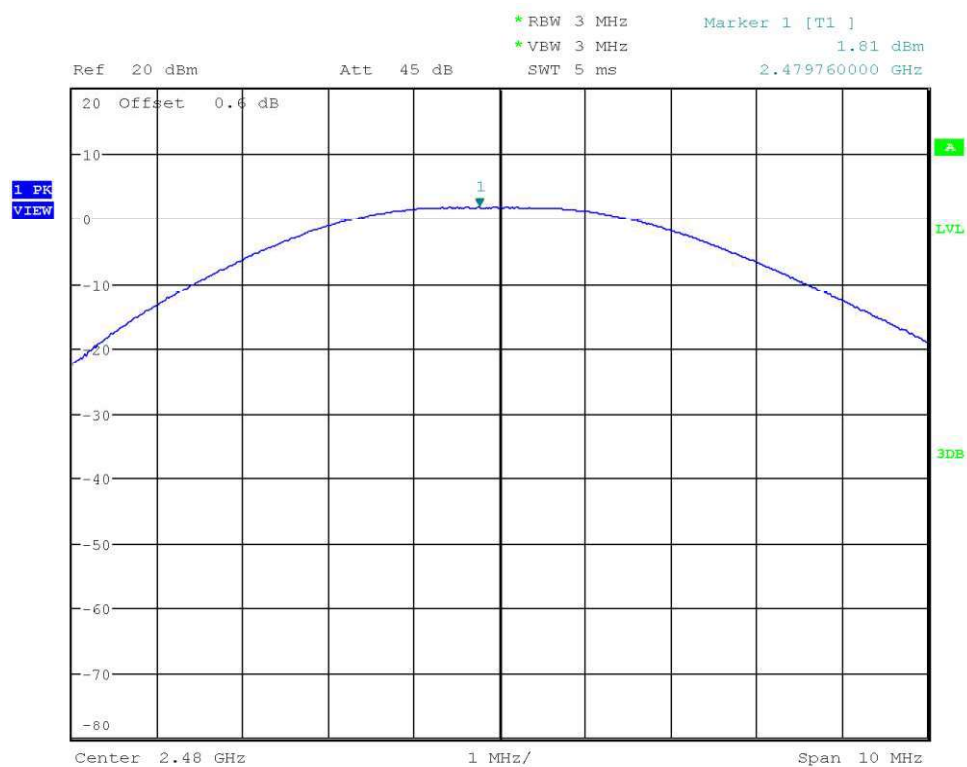
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.9.1.1
Operational Mode:	GFSK, Channel: 39, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	2 Mbit
Peak Power [dBm]:	1.809
Peak Power [W]:	0.0015



Date: 25.SEP.2023 15:31:13

3.4 Test Conditions and Results - Power spectral density

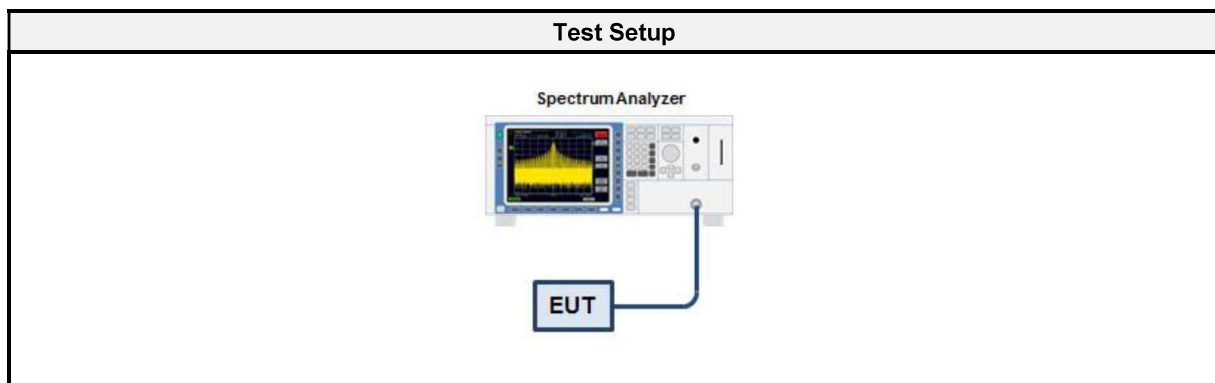
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISSED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Operator	Azamat Ibraimov
Date	2023-09-25

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.4.5 Procedure

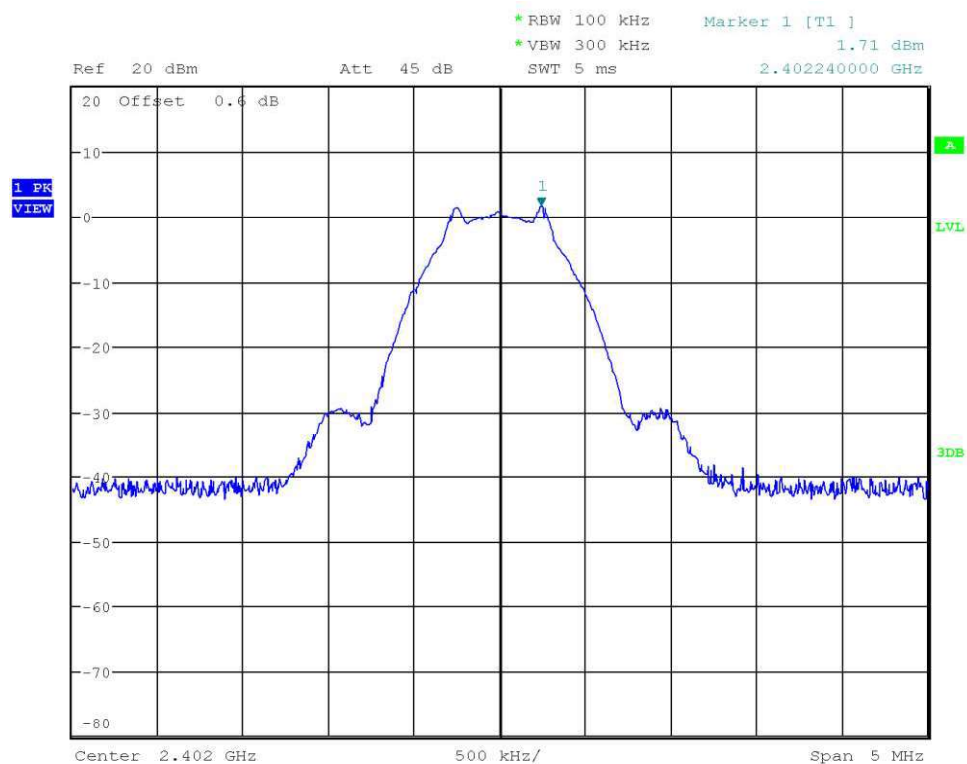
Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW ≥ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum 5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated 6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results				
Mode	Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
GFSK 1 Mbit/s	2402	1.711	8.0	PASS
GFSK 1 Mbit/s	2440	1.658	8.0	PASS
GFSK 1 Mbit/s	2480	1.487	8.0	PASS
GFSK 2 Mbit/s	2402	1.141	8.0	PASS
GFSK 2 Mbit/s	2440	1.035	8.0	PASS
GFSK 2 Mbit/s	2480	0.893	8.0	PASS
RBW = 100 kHz				

Peak Power Spectral Density

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Peak Frequency [MHz]: 2402.240
 Spectral Density [dBm/RBW]: 1.711
 Resolution Bandwidth [kHz]: 100 kHz



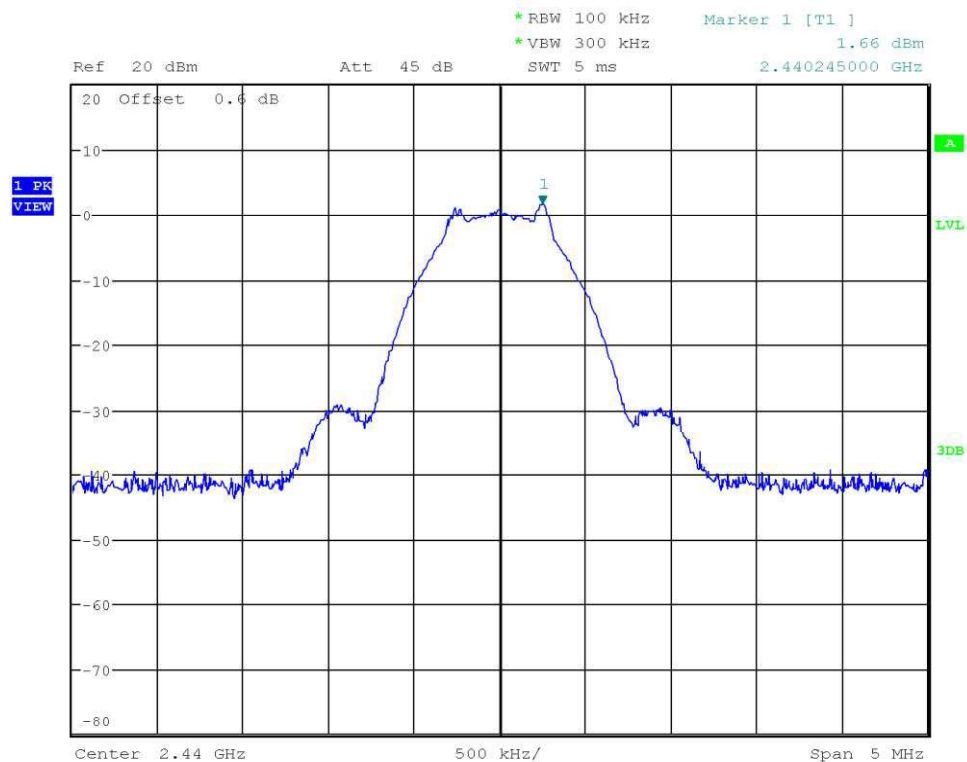
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Peak Frequency [MHz]: 2440.245
 Spectral Density [dBm/RBW]: 1.658
 Resolution Bandwidth [kHz]: 100 kHz



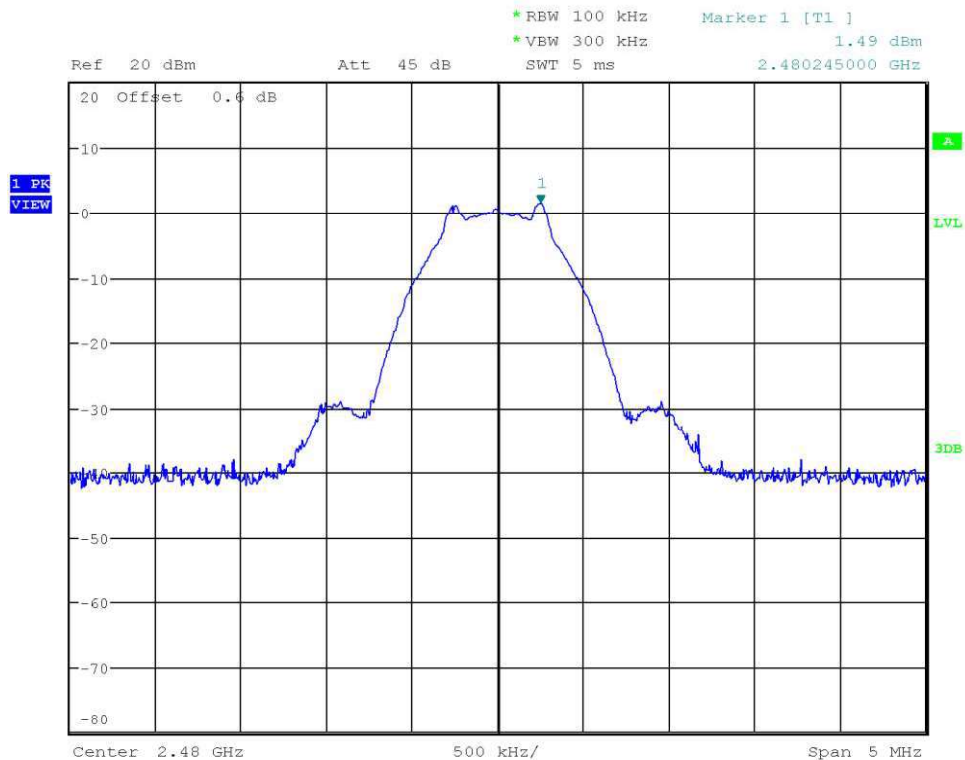
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit
 Peak Frequency [MHz]: 2480.245
 Spectral Density [dBm/RBW]: 1.487
 Resolution Bandwidth [kHz]: 100 kHz



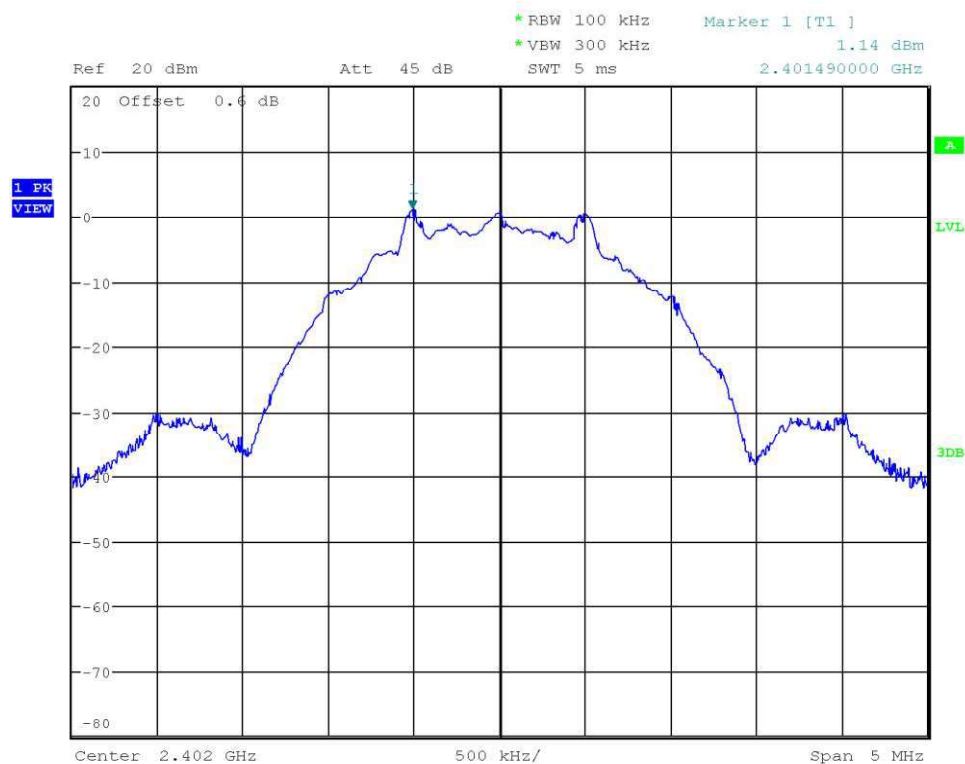
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number:	G0M-2303-1961
Applicant:	Navico Inc.
Model Description:	Marine and recreational IoT Gateway and vessel management system
Model:	Connect 1
Test Sample ID:	44396
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Azamat Ibraimov
Test Site:	Eurofins Product Service GmbH
Test Date:	2023-09-25
Note:	2 Mbit
Peak Frequency [MHz]:	2401.490
Spectral Density [dBm/RBW]:	1.141
Resolution Bandwidth [kHz]:	100 kHz



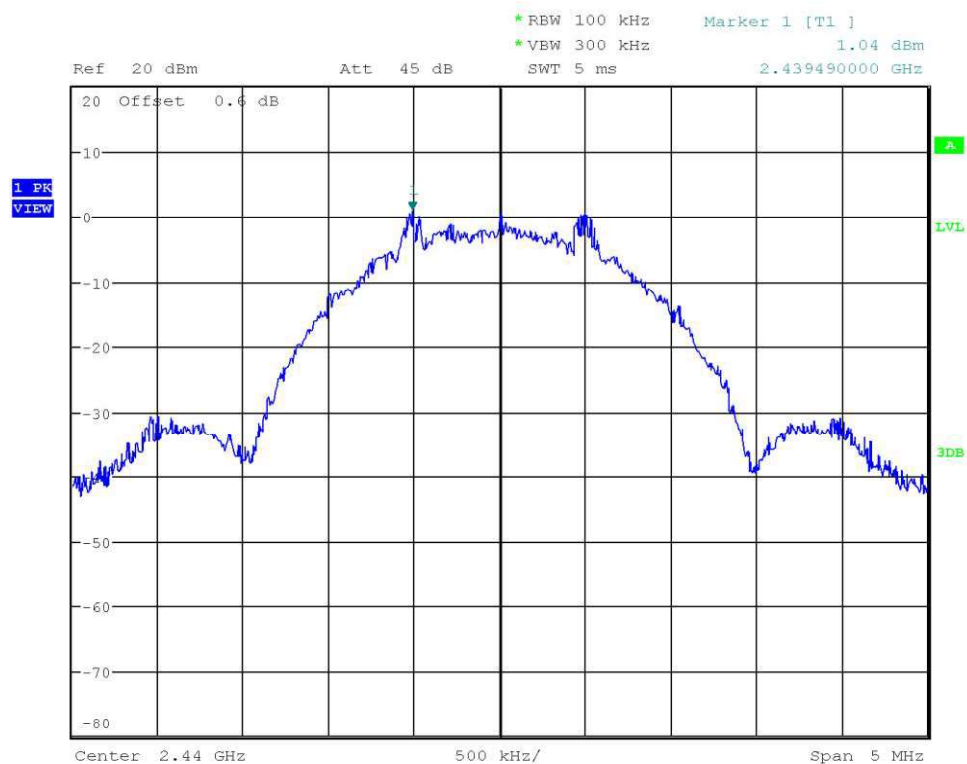
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 19, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Peak Frequency [MHz]: 2439.490
 Spectral Density [dBm/RBW]: 1.035
 Resolution Bandwidth [kHz]: 100 kHz



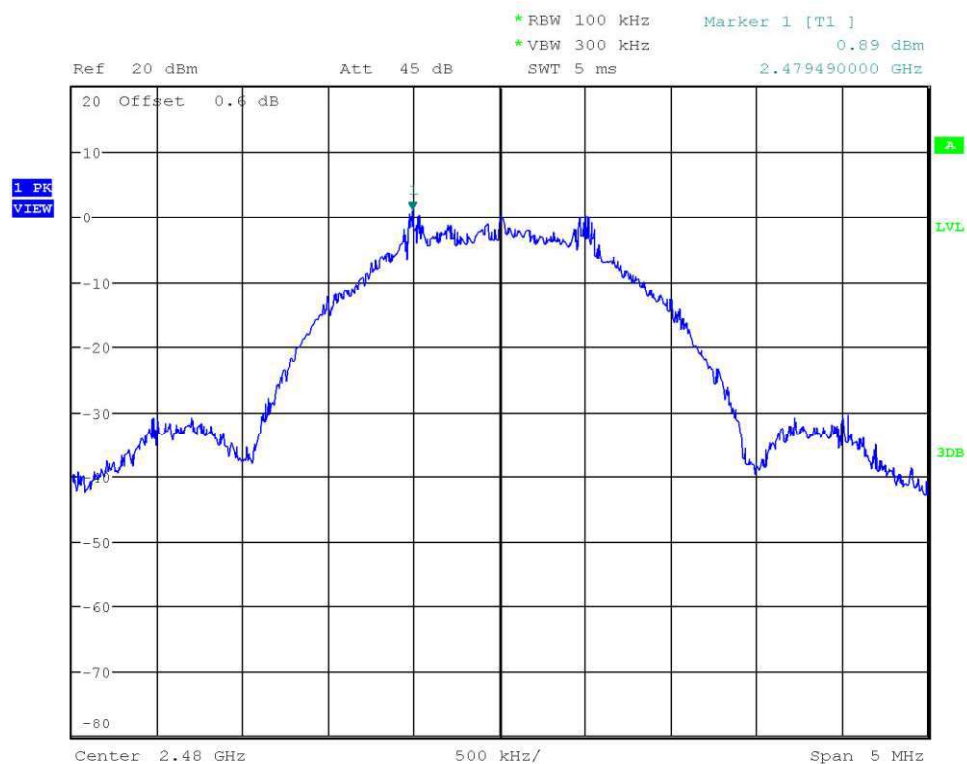
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: GFSK, Channel: 39, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit
 Peak Frequency [MHz]: 2479.490
 Spectral Density [dBm/RBW]: 0.893
 Resolution Bandwidth [kHz]: 100 kHz



Date: 25.SEP.2023 15:31:54

Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.5 Test Conditions and Results - Band-edge compliance

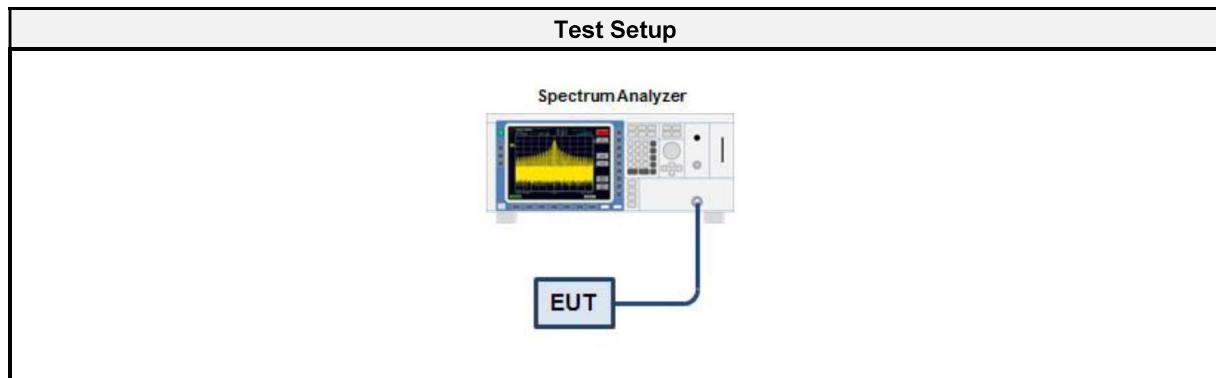
3.5.1 Information

Test Information	
Reference	FCC § 15.247(d); ISSED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Azamat Ibraimov
Date	2023-09-25

3.5.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.5.3 Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.5.5 Procedure

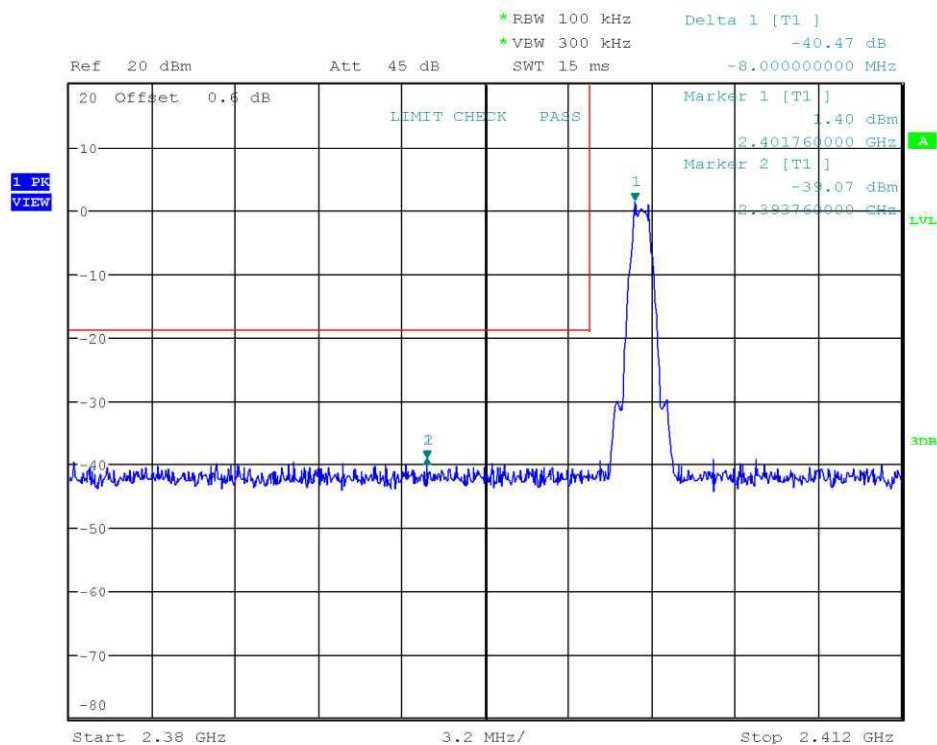
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.5.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
GFSK 1 Mbit/s	2402	-40.47	-20	PASS
GFSK 1 Mbit/s	2480	-39.2	-20	PASS
GFSK 2 Mbit/s	2402	-30.21	-20	PASS
GFSK 2 Mbit/s	2480	-39.17	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 1 Mbit/s
 Band-edge: Lower
 In-band Frequency [MHz]: 2401.76
 Max. in-band Level [dBm/100 kHz]: 1.403
 Out-of-band Frequency [MHz]: 2393.76
 Max. out-of-band Level [dBm/100 kHz]: -39.07
 Attenuation [dB]: -40.47



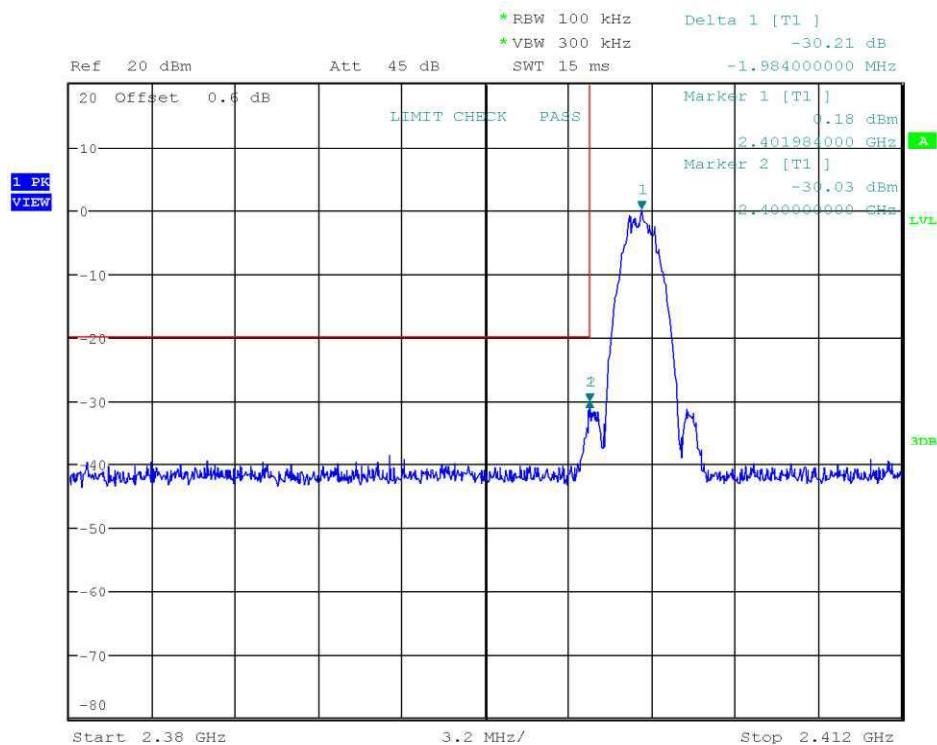
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Azamat Ibraimov
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-09-25
 Note: 2 Mbit/s
 Band-edge: Lower
 In-band Frequency [MHz]: 2401.984
 Max. in-band Level [dBm/100 kHz]: 0.185
 Out-of-band Frequency [MHz]: 2400.0
 Max. out-of-band Level [dBm/100 kHz]: -30.03
 Attenuation [dB]: -30.21



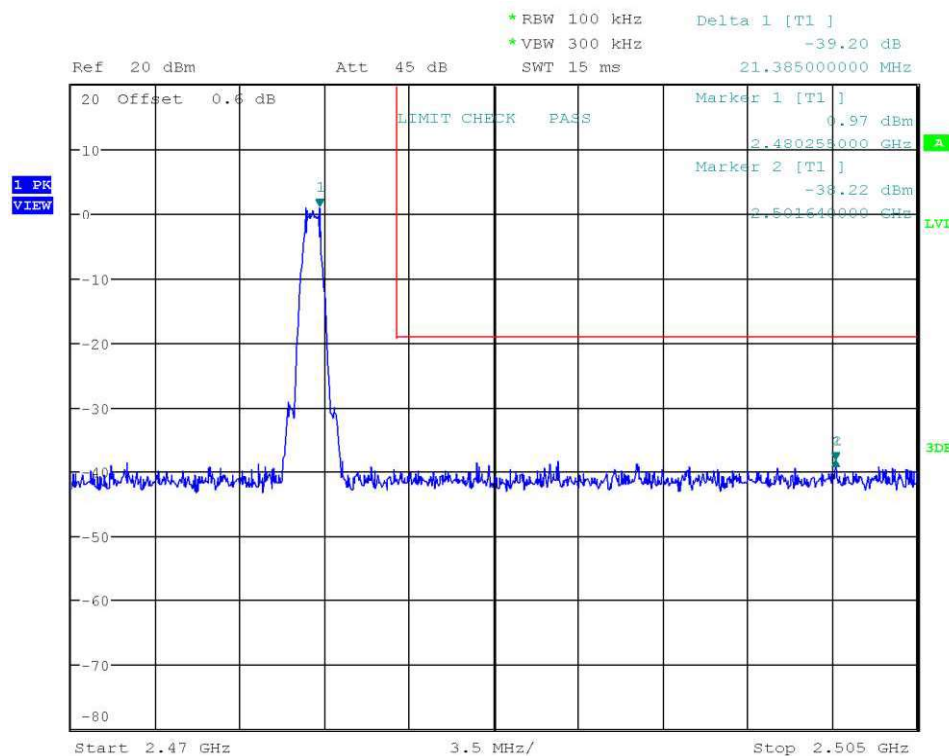
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Florian Voigt
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-10-18
 Note: 1 MBit/s
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.255
 Max. in-band Level [dBm/100 kHz]: 0.97
 Out-of-band Frequency [MHz]: 2501.64
 Max. out-of-band Level [dBm/100 kHz]: -38.225
 Attenuation [dB]: -39.2



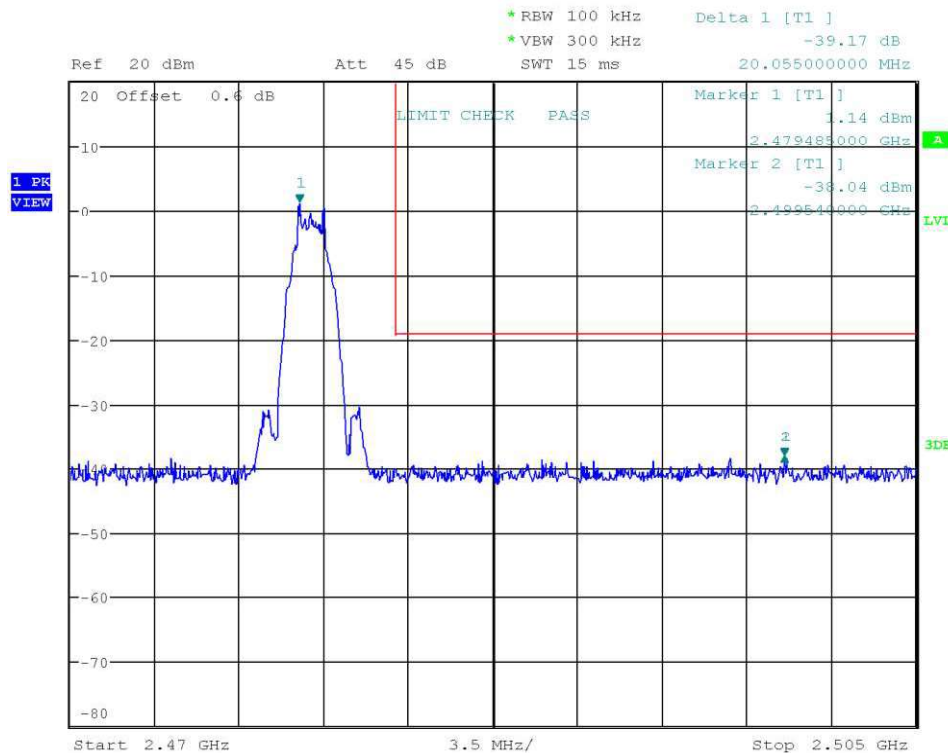
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Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2303-1961
 Applicant: Navico Inc.
 Model Description: Marine and recreational IoT Gateway and vessel management system
 Model: Connect 1
 Test Sample ID: 44396
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operating Conditions: Tnom/Vnom
 Operator: Florian Voigt
 Test Site: Eurofins Product Service GmbH
 Test Date: 2023-10-18
 Note: 2 MBit/s
 Band-edge: Upper
 In-band Frequency [MHz]: 2479.485
 Max. in-band Level [dBm/100 kHz]: 1.138
 Out-of-band Frequency [MHz]: 2499.54
 Max. out-of-band Level [dBm/100 kHz]: -38.037
 Attenuation [dB]: -39.17



Date: 18.OCT.2023 11:44:58

Test Report No.: G0M-2303-1961-TFC247BL-V05

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.6 Test Conditions and Results - Conducted spurious emissions

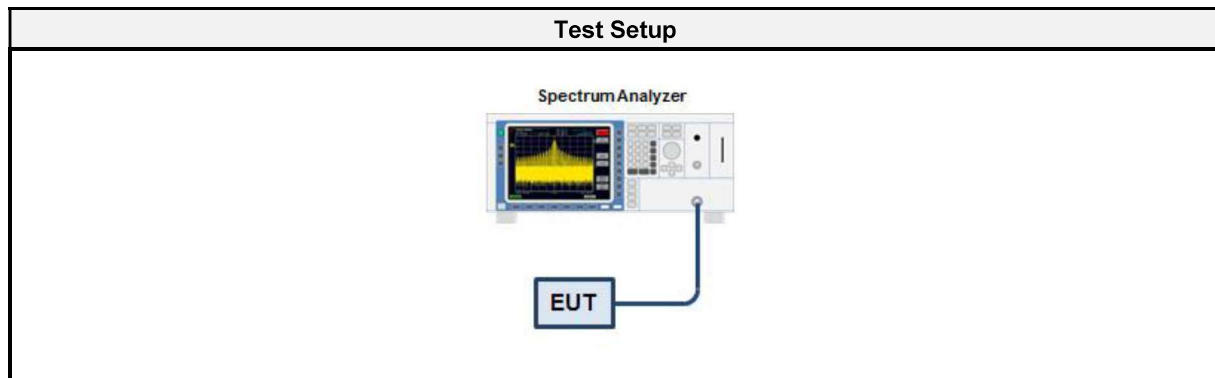
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Operator	Azamat Ibraimov
Date	2023-09-25

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01003	2023-08	2024-08
Cable (diverse)	— (diverse)	— (diverse)	EF00779 CAABM	2023-03	2024-03

3.6.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band