Test Report Serial Number:	**45461430 R3.0**
Test Report Date:	**20 March 2018**
Project Number:	**1398**

EMC Test Report - Class II Permissive Change

Applicant:

4RF Limited
PO Box 13-506
Wellington, New Zealand 6440
New Zealand

FCC ID:	IC Registration Number
UIPSQ215M141	**-**
Product Model Number / HVIN	**Product Name / PMN**
Aprisa SR	**SX215M141**
Aprisa SR+	**SQ215M141**

In Accordance With:

FCC 47 CFR Part 80 - Automated Systems (AMTS)
Licensed Non-Broadcast Station Transmitter (TNB)
FCC 47 CFR Part 95 - Personal Radio Service
Subpart F - 218-219 MHz Serviced

Approved By:

Ben Hewson, President
Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada

Test Lab Certificate: 2470.01 **IC Registration 3874A-1** **FCC Registration: CA3874**

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1.0 DOCUMENT CONTROL

Revision History				
Samples Tested By:	Art Voss, P.Eng.	**Date(s) of Evaluation:**		19 Feb - 12 Mar, 2018
Report Prepared By:	Art Voss, P.Eng.	**Report Reviewed By:**		Ben Hewson
Report Revision	**Description of Revision**	**Revised Section**	**Revised By**	**Revision Date**
1.0	Draft Release	n/a	Art Voss	12 March 2018
2.0	Initial Release	n/a	Art Voss	15 March 2018
3.0	Changed Original Filing to Class II Permissive Change	n/a	Art Voss	20 March 2018

2.0 CLIENT AND DUT INFORMATION

Client Information	
Applicant Name	**4RF Limited**
Applicant Address	PO Box 13-506 Wellington, New Zealand, 6440 New Zealand
DUT Information	
Device Identifier(s):	**FCC ID:** **UIPSQ215M141**
	ISED ID: **-**
Equipment Class:	TNB - Licensed Non-Broadcast Station Transmitter
Device Type:	Digital Radio
Device Model(s) / HVIN: (See Note 1)	SX215M141
	SQ215M141
Device Marketing Name / PMN:	Aprisa SR
	Aprisa SR+
Firmware Version ID Number / FVIN:	-
Host Marketing Name / HMN:	-
Test Sample Serial No.:	T/A Sample - Identical Prototype
Transmit Frequency Range:	§80.385 AMTS Group D: 216.0125 - 216.4875MHz
	§80.385 AMTS Group C: 216.5125 - 216.9875MHz
	§80.385 AMTS Group B: 217.0125 - 217.4875MHz & 219.0125 - 219.4875MHz
	§80.385 AMTS Group A: 217.5125 - 217.9875MHz & 219.5125 - 219.9875MHz
	§90.853 Segment A: 218.000-218.500MHz
	§90.853 Segment B: 218.501-219.00MHz
Test Channels:	Programmable
Manuf. Max. Rated Output Power:	QPSK: 37dBm
	16 QAM: 35dBm
	64 QAM: 34dBm
Manuf. Max. Rated BW/Data Rate:	12.5kHz, 25kHz
Antenna Make and Model:	n/a
Antenna Type and Gain:	External, 0dBi nominal (15dBi maximum).
Modulation:	QPSK, 16QAM, 64QAM
Mode:	Half Duplex
Emission Designator:	See Section 8.0
DUT Power Source:	13.8 VDC External (Nominal)
DUT Dimensions [HxWxD] (mm)	90 x 432 x 280
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

Note 1: This is a Class II Permissive Change. The SR and SR+ variants are same and identical units in all aspects of the RF Transmitter circuitry and form factor to that of the original filing. . The SR is a feature reduced variant capable of QPSK only, no receive antenna and slight enclosure modifications. Both variants were evaluated for frequency stability and Rx spurious emissions. This Class II Permissive Change is to add Channel Groups A, B, C and D per §80.385 (AMTS) and Channel Segments A and B per §95.1953. These changes are accomplished via software without any hardware changes in any manner.

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3.0 SCOPE

This Certification Report was prepared on behalf of:

4RF Limited

,(the '*Applicant*"), in accordance with the applicable Federal Communications Commission (FCC) CFR 47 rules parts and regulations (the '*Rules*'). The scope of this investigation was limited to only the equipment, devices and accessories (the '*Equipment*') supplied by the *Applicant*. The tests and measurements performed on this *Equipment* were only those set forth in the applicable *Rules* and/or the Test and Measurement Standards they reference. The *Rules* applied and the Test and Measurement Standards used during this evaluation appear in the Normative References section of this report. The limits set forth in the technical requirements of the applicable *Rules* were applied to the measurement results obtained during this evaluation and ,unless otherwise noted, these limits were used as the Pass/Fail criteria. The Pass/Fail statements made in this report apply to only the tests and measurements performed on only the *Equipment* tested during this evaluation. Where applicable and permissible, information including test and measurement data and/or results from previous evaluations of same or similar equipment, devices and/or accessories may be cited in this report.

As per FCC CFR 47 Part §2.1091 and §2.1093, an RF Exposure evaluation report is required for this *Equipment* and the results of the RF Exposure evaluation appear in a separate exhibit from this report.

This *Equipment* is subject to FCC Declaration of Conformity (DoC). DoC evaluations were performed on this *Equipment* and the results of the DoC evaluation appear in a separate exhibit from this report.

4.0 TEST SUMMARY

TEST SUMMARY

Section	Description of Test	Procedure Reference	Applicable Rule Part(s) FCC	Test Date	Result
7.0	Conducted Pow er (Fundemental)	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1046 §80.215(h)(5) §95.1955	20 - 21 Feb 2018	Pass
8.0	Occupied Bandw idth	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1049	20 Feb 2018	Pass
9.0	Emission Mask (Out of Band)	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1049 §80.211(c)	23 Feb 2018	Pass
10.0	Band Edge and Conducted Tx Spurious Emissions	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1049 §80.211(f) §80.481	20 - 21 Feb 2018	Pass
11.0	Band Edge	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1049 §95.1957	23 Feb 2018 12 Mar 2018	Pass
12.0	Conducted Tx Spurious Emissions	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1051 §95.1957	23 Feb 2018	Pass
13.0	Conducted Tx Spurious Emissions to 10th Harmonic	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1051 §80.211(f) §95.1957(d)	23 Feb 2018	Pass
14.0	Radiated Tx Spurious Emissions	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1053 §80.211(f) §95.1957	27 Feb 2018	Pass
15.0	Frequency Stability	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§2.1055 §80.209(a)(6)	26 Feb 2018	Pass
16.0	Radiated Rx Spurious Emissions	ANSI/TIA/EIA-603-E-2016 ANSI C63.4:2014	§15B	27 Feb 2018	Pass

I attest that the data reported herein is true and accurate w ithin the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements w ere performed in accordance w ith accepted practices or procedures; and that all tests and measurements w ere performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client w hich w ere not adjusted, modified or altered in any manner w hatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance w ith ISO/IEC 17025.

Art Voss, P.Eng.
Technical Manager
Celltech Labs Inc.

12 March 2018
Date

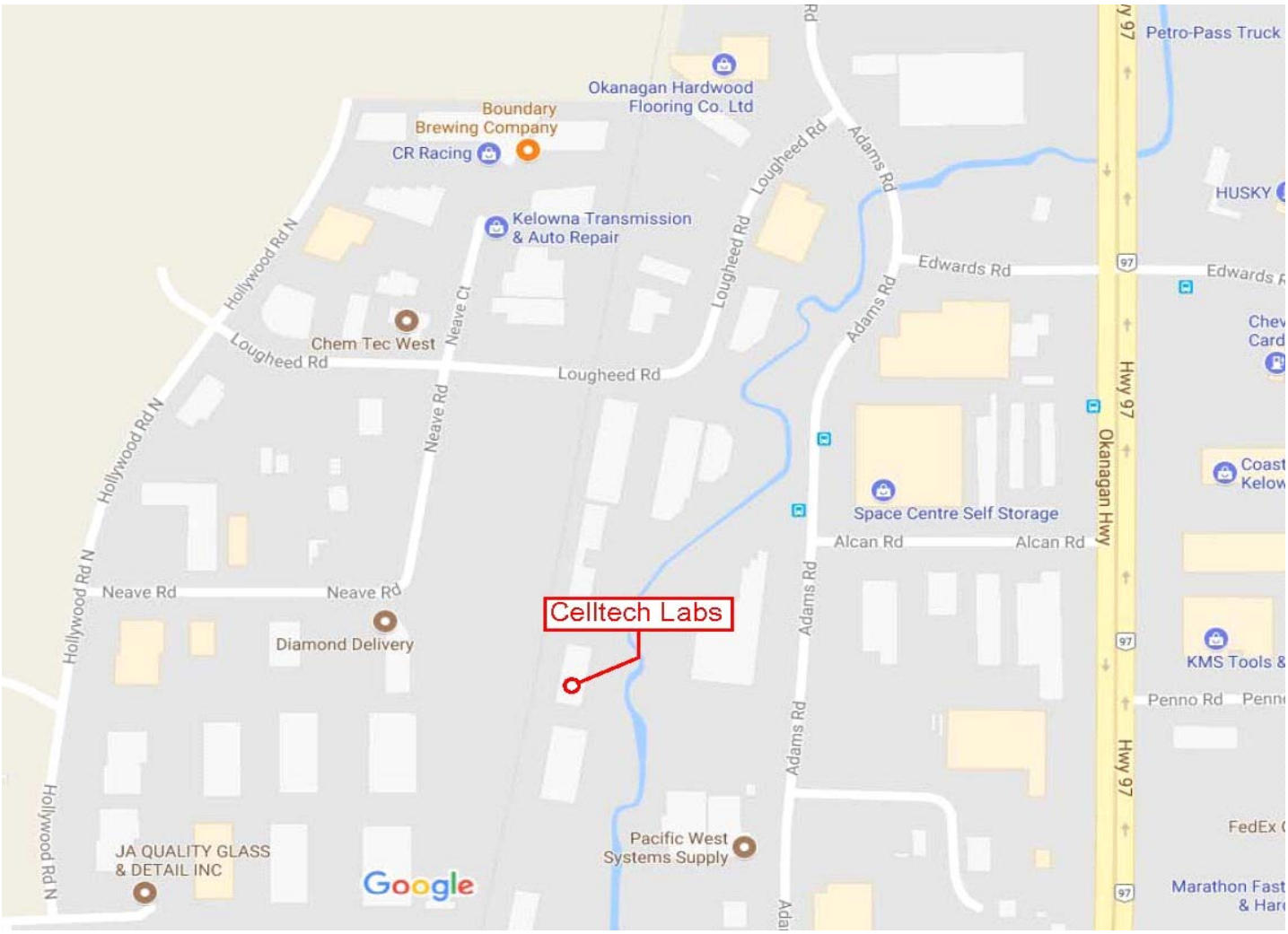
5.0 NORMATIVE REFERENCES

Normative References	
ANSI / ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
IEEE/ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/TIA/EIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
CFR Title 47	Code of Federal Regulations
Title 47:	Telecommunication
Part 2:	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47	Code of Federal Regulations
Title 47:	Telecommunication
Part 80:	Stations in the Maritime Services
CFR Title 47	Code of Federal Regulations
Title 47:	Telecommunication
Part 95:	Personal Radio Services
CFR Title 47	Code of Federal Regulations
Title 47:	Telecommunication
Part 15:	Radio Frequency Devices
Subpart B:	Unintensional Radiators

6.0 FACILITIES AND ACCREDITATIONS

Facility and Accreditation:

The facilities used to evaluate this device outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site (OATS) conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Test Firm Registration Number CA3874 and Industry Canada under Test Site File Number IC 3874A-1. Celltech is accredited to ISO 17025, through accrediting body A2LA and with certificate 2470.01.



7.0 CONDUCTED POWER

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §80.215(h)(5), §95.1955**

Limits	
47 CFR §80.215	**§ 80.215 Transmitter Power** (h) Coast stations in an AMTS may radiate as follows, subject to the condition that no harmful interference will be caused to television reception except that TV services authorized subsequent to the filing of the AMTS station application will not be protected. (5) The transmitter power, as measured at the input terminals to the station antenna, must be 50 watts or less.
47 CFR §95.1955	No CTS or fixed RTU may transmit with an ERP exceeding 20 watts.

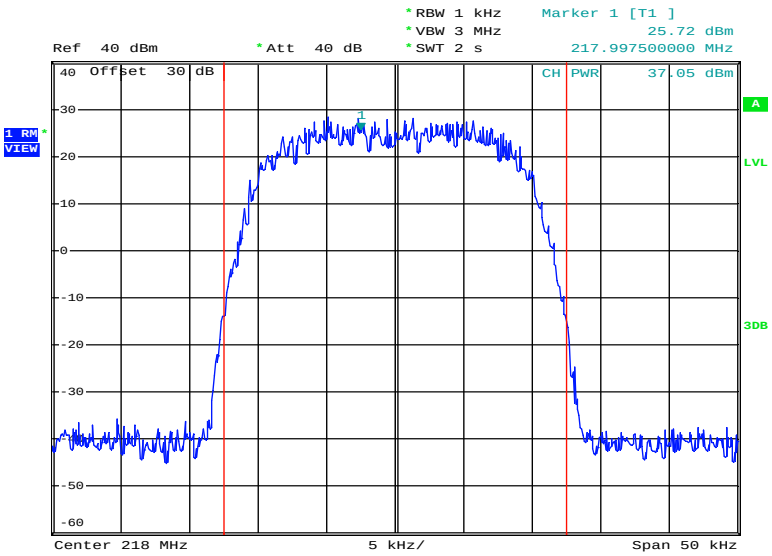
Test Setup	
Test Setup	**Appendix A Figure A.1**

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to Max Peak with the RBW set to ≥ the OBW of the DUT. The output power of the DUT was set to the manufacturer's highest rated setting for each modulation type and to the center frequency of each transmission band. All modulations (QPSK, 16 QAM, and 64 QAM) and all bandwidths (12.5kHz and 25kHz) were investigated.

Plot 7.1 – Conducted Power 218MHz, 25kHz BW, QPSK

Conducted Power (RMS)

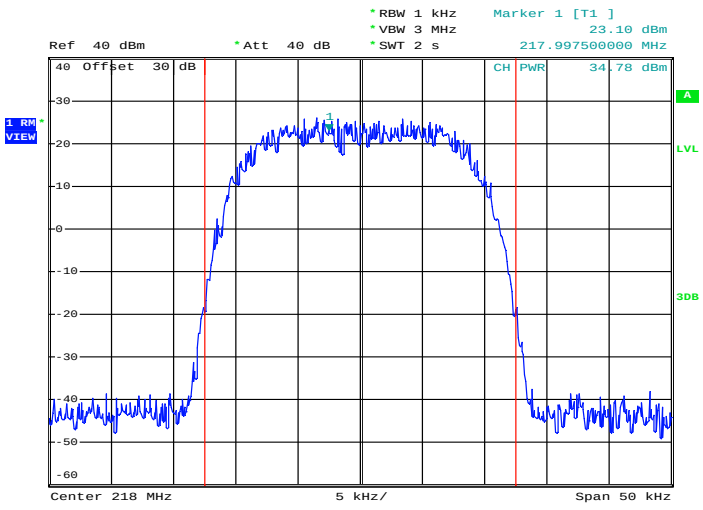


Date: 20.FEB.2018 11:35:29

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	QPSK
Power Setting (dBm):	37
Measured Power (dBm):	37.05

Plot 7.2 – Conducted Power 218MHz, 25kHz BW, 16QAM

Conducted Power (RMS)

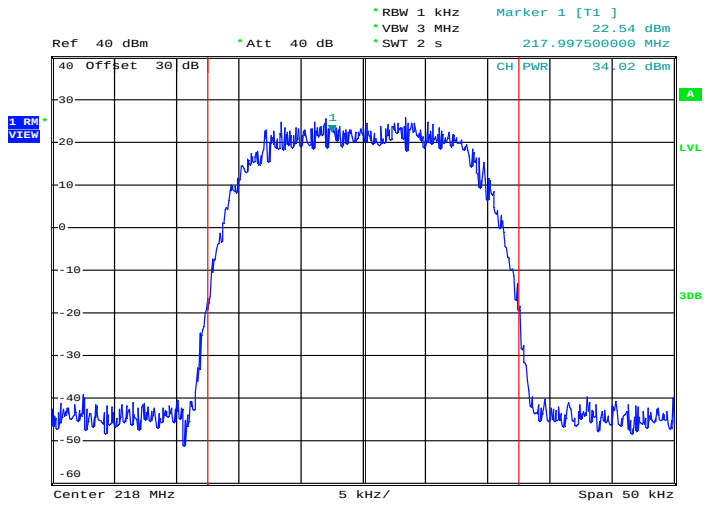


Date: 20.FEB.2018 11:36:50

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	16QAM
Power Setting (dBm):	35
Measured Power (dBm):	34.78

Plot 7.3 – Conducted Power 218MHz, 25kHz BW, 64QAM

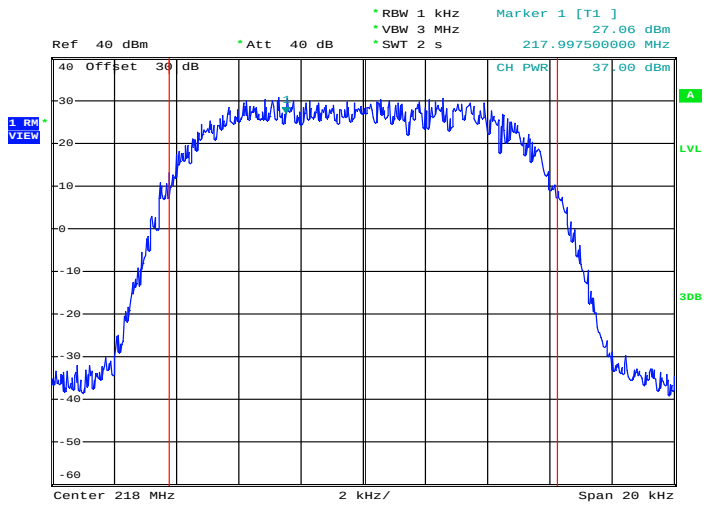
Conducted Power (RMS)



Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	64QAM
Power Setting (dBm):	34
Measured Power (dBm):	34.02

Plot 7.4 – Conducted Power 218MHz, 12.5kHz BW, QPSK

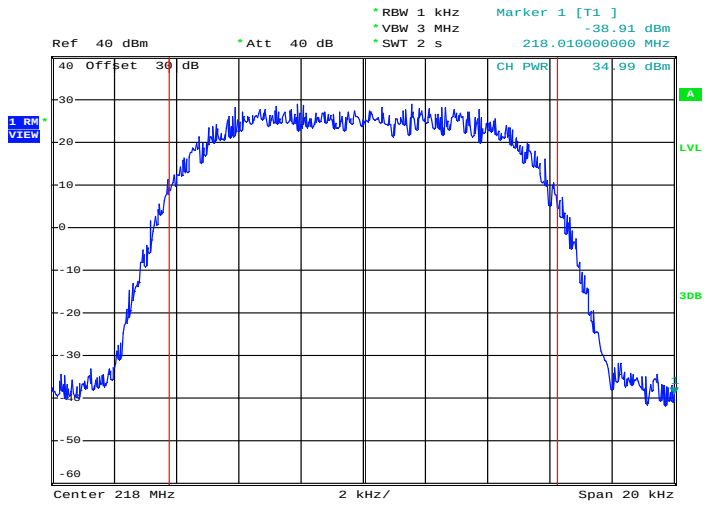
Conducted Power (RMS)



Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	QPSK
Power Setting (dBm):	37
Measured Power (dBm):	37.00

Plot 7.5 – Conducted Power 218MHz, 12.5kHz BW, 16QAM

Conducted Power (RMS)

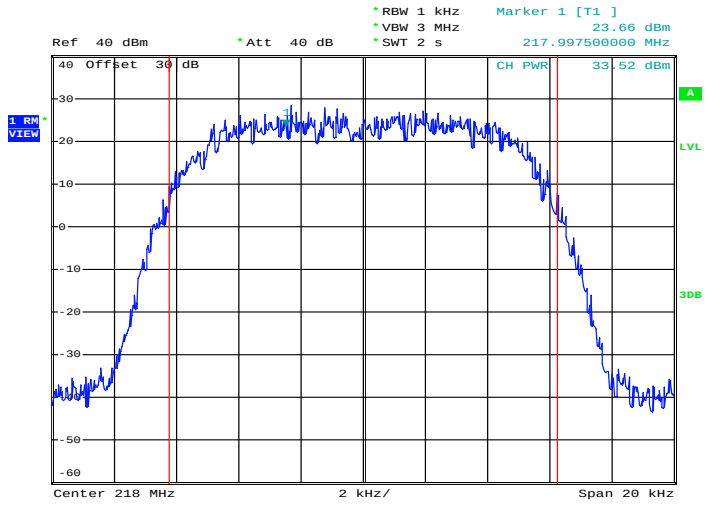


Date: 12.MAR.2018 15:16:31

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	16QAM
Power Setting (dBm):	35
Measured Power (dBm):	34.99

Plot 7.6 – Conducted Power 218MHz, 12.5kHz BW, 64QAM

Conducted Power (RMS)



Date: 20.FEB.2018 12:48:12

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	64QAM
Power Setting (dBm):	34
Measured Power (dBm):	33.52

Table 7.1 – Summary of Conducted Power Measurements

§95.1955 Channel Output Power (RMS)									
Freq (MHz)	BW (kHz)	Modulation	Power Setting[1] (dBm)	Measured Power [E_{Meas}] (dBm)	Maximum Antenna Gain [G] (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Margin (dB)
218.0	12.5	QPSK	37	37.00	8	42.85	19.28	20.0	**0.2**
		16 QAM	35	0.00		5.85	0.00		**37.2**
		64 QAM	34	33.52		39.37	8.65		**3.6**
	25.0	QPSK	37	37.05		42.90	19.50		**0.1**
		16 QAM	35	34.78		40.63	11.56		**2.4**
		64 QAM	34	34.02		39.87	9.71		**3.1**
							Results:	**Complies**	

§80.215(h)(5) Channel Output Power (RMS)									
Freq (MHz)	BW (kHz)	Modulation	Power Setting[1] (dBm)	Measured Power [E_{Meas}] (dBm)	Maximum Antenna Gain [G] (dBi)	EIRP (dBm)	EIRP (W)	Limit (W)	Margin (dB)
218.0	12.5	QPSK	37	37.00	8	42.85	19.28	50.0	**4.1**
		16 QAM	35	34.99		40.84	12.13		**6.1**
		64 QAM	34	33.52		39.37	8.65		**7.6**
	25.0	QPSK	37	37.05		42.90	19.50		**4.1**
		16 QAM	35	34.78		40.63	11.56		**6.4**
		64 QAM	34	34.02		39.87	9.71		**7.1**
							Results:	**Complies**	

ERP (dBm) = E_{Meas} + G -2.15

Margin = Limit - ERP in dB

Applicant Attestation Regarding Antenna Gain:

The maximum antenna gain in the manual does not consider regulatory requirements as it is there for exposure calculation only.
As the Aprisa SR+ is installed by professionals the TX power should be reduced at installation if using a higher gain antenna (typically at the remote site) to ensure that the license conditions are adhered to.
This is covered explicitly in the user manual under “Compliance General” which states:

> The Aprisa SR+ radio predominantly operates within frequency bands that require a site license be issued by the radio regulatory authority with jurisdiction over the territory in which the equipment is being operated.
> It is the responsibility of the user, before operating the equipment, to ensure that where required the appropriate license has been granted and all conditions attendant to that license have been met.

Adjustment of the TX power is included in our product for exactly this reason.
Typically the Base station will have an omni directional antenna and the Remotes will have small directional antenna.
The ability to adjust the TX power at the remotes to ensures EIRP requirements are meet also improves frequency reuse that may not be possible if directional (i.e. higher gain) antennas were not used.
Consideration in setting the TX power must also be given to the modulation used and feeder loss.

8.0 OCCUPIED BANDWIDTH

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1049, KDB 971168 D01v02r02**

Limits	
47 CFR §2.1049	**§ 2.1049 Measurements required: Occupied Bandwidth.** The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured…

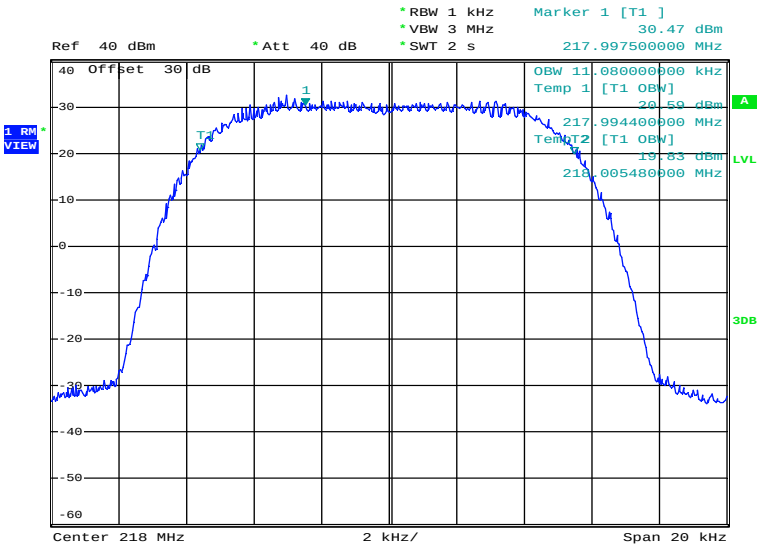
Test Setup	Appendix A Figure A.1

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to Max Peak with the RBW set to < the OBW of the DUT. The output power of the DUT was set to the manufacturer's highest rated setting for each modulation type and set to the center frequency of each transmission band. All modulations (QPSK, 16 QAM, and 64 QAM) and all bandwidths (12.5kHz and 25kHz) were investigated. The SA trace was set to Max Hold and the SA set to measure the 99% Occupied Bandwidth.

Plot 8.1 – Occupied Bandwidth 218MHz, 12.5kHz BW, QPSK

Occupied Bandwidth

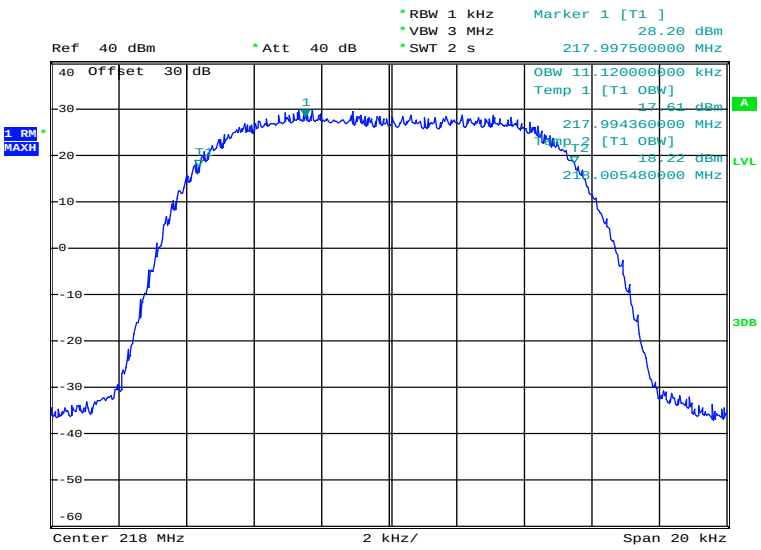


Date: 20.FEB.2018 12:52:33

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	QPSK
Power Setting (dBm):	37
Measured OBW (kHz):	11.08

Plot 8.2 – Occupied Bandwidth 218MHz, 12.5kHz BW, 16QAM

Occupied Bandwidth

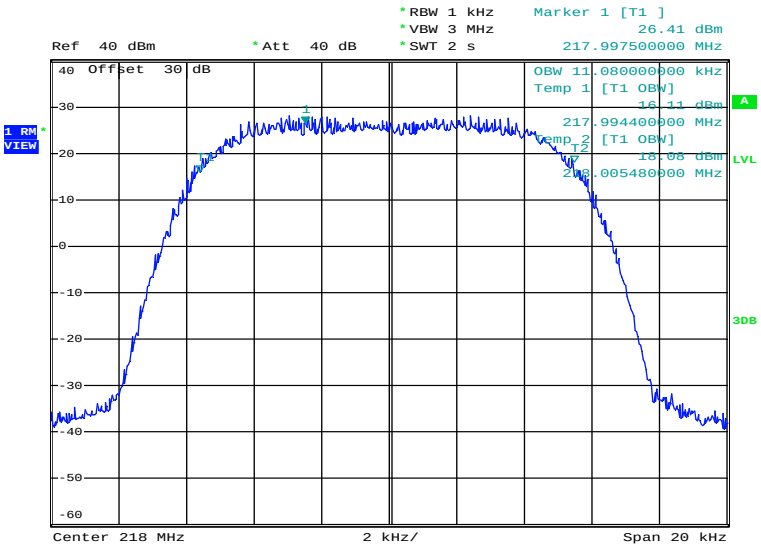


Date: 20.FEB.2018 12:53:38

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	16QAM
Power Setting (dBm):	35
Measured OBW (kHz):	11.12

Plot 8.3 – Occupied Bandwidth 218MHz, 12.5kHz BW, 64QAM

Occupied Bandwidth

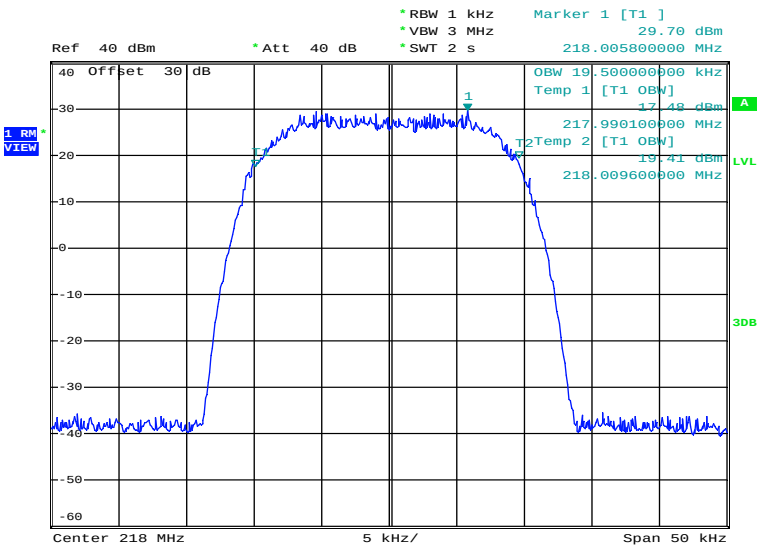


Date: 20.FEB.2018 12:49:30

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	12.50
Modulation:	64QAM
Power Setting (dBm):	34
Measured OBW (kHz):	11.08

Plot 8.4 – Occupied Bandwidth 218MHz, 25kHz BW, QPSK

Occupied Bandwidth

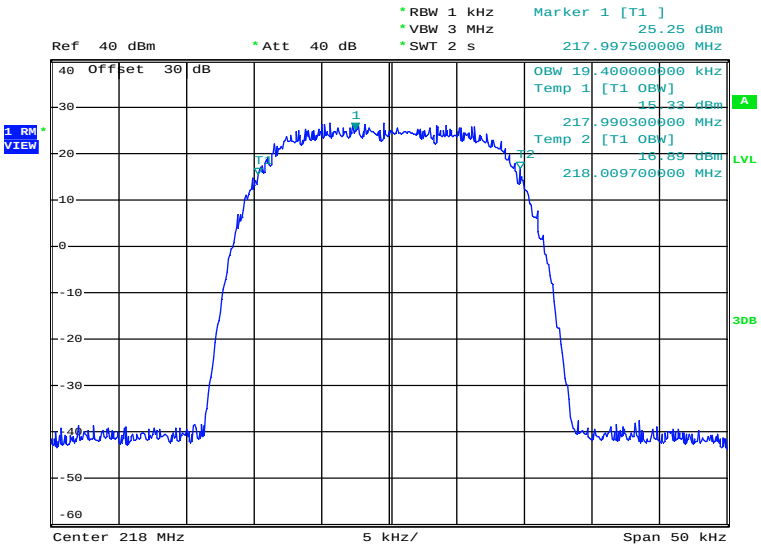


Date: 12.MAR.2018 15:20:28

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	QPSK
Power Setting (dBm):	37
Measured OBW (kHz):	19.50

Plot 8.5 – Occupied Bandwidth 218MHz, 25kHz BW, 16QAM

Occupied Bandwidth

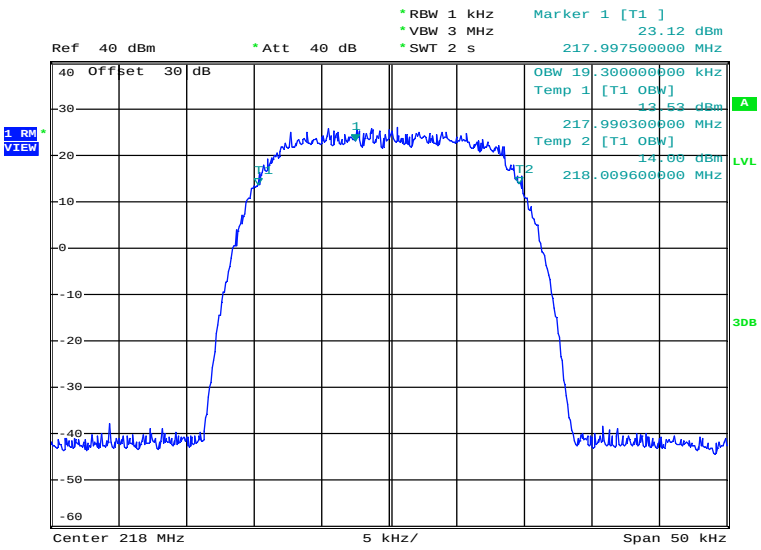


Date: 20.FEB.2018 11:27:07

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	16QAM
Power Setting (dBm):	35
Measured OBW (kHz):	19.40

Plot 8.6 – Occupied Bandwidth 218MHz, 25kHz BW, 64QAM

Occupied Bandwidth



Date: 20.FEB.2018 11:28:32

Channel Frequency (MHz):	218.00
Channel Bandwidth (kHz):	25.00
Modulation:	64QAM
Power Setting (dBm):	34
Measured OBW (kHz):	19.30

Table 8.1 – Summary of Occupied Bandwidth Measurements

§2.1049 Occupied Bandwidth						
Freqency (MHz)	Bandwidth Setting (kHz)	Modulation	Measured OBW [OBW] (kHz)	Authorized BW [ABW] (kHz)	Margin (kHz)	Emission Designator
218	12.5	QPSK	11.08	12.5	1.42	11K1G1D
		16 QAM	11.12		1.38	11K1D1D
		64 QAM	11.08		1.42	11K1D1D
	25	QPSK	19.50	25	5.50	19K5G1D
		16 QAM	19.40		5.60	19K4D1D
		64 QAM	19.30		5.70	19K3D1D
Margin = ABW - OBW						
					Result:	Complies

9.0 COMPLIANCE TO §80.211(C)

Test Conditions	
Normative Reference	**FCC 47 CFR §2.1046, §80.211(c), KDB 971168 D01v02r02**

Limits	
47 CFR §80.211(c)	**§ 80.211 Emission limitations** (c) In any 4 kHz band the peak power of spurious emissions and noise at the input to the transmit antenna must be attenuated below the peak output power of the station as follows: (1) 125 dB at 1525.0 MHz, increasing linearly to 90 dB at 1612.5 MHz; (3) 90 dB from 1624.0 MHz to 1650.0 MHz, except at frequencies near the transmitted carrier where the requirements of paragraphs (b)(1) through (3) of this section, apply; (4) 60 dB at 1650.0 MHz decreasing linearly to 90 dB at 1662.5 MHz; (5) 90 dB at 1662.5 MHz decreasing linearly to 125 dB at 1752.5 MHz; and (6) 125 dB outside above range, except for harmonics which must comply with (b)(3) of this section.

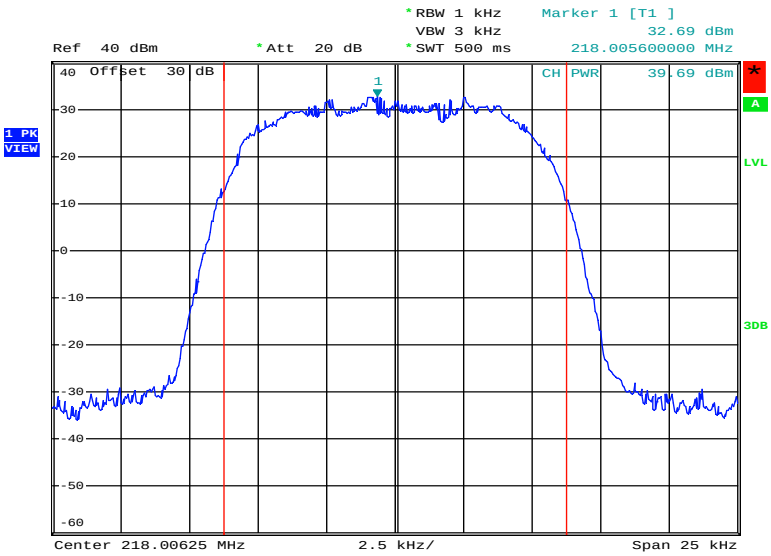
Test Setup	**Appendix A Figure A.2**

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via the DUT's antenna port using a high-pass filter to filter out the carrier. The SA Detector was set to Max Peak. The output power of the DUT was set to the manufacturer's highest rated setting.To determine compliance an emission mask was created in accordance with the above requirements referenced to the carrier, or dBc. The DUT frequency was set a frequency which would produce a harmonic at the frequency of the worst case attenuation criteria from above. The emission was measured with minimum *attenuation* referenced to the carrier, dBc.

Plot 9.1 – Peak Power Measurement, 25kHz BW, QPSK

Conducted Power (Peak)

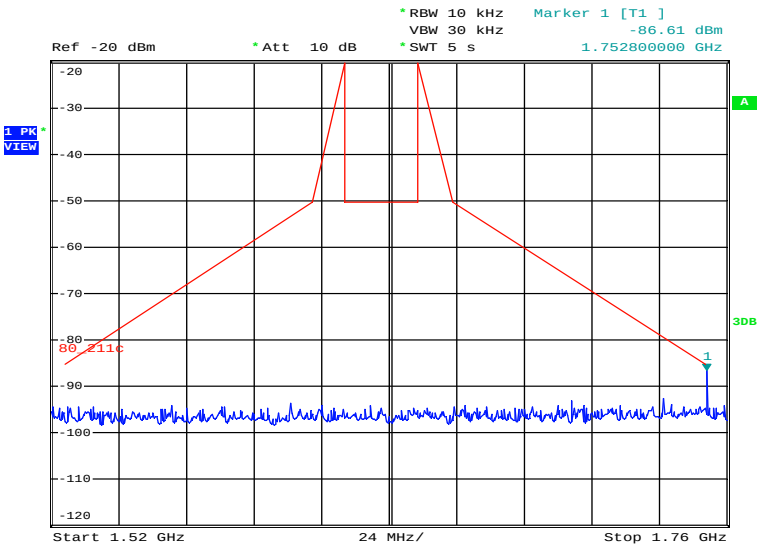


Date: 23.FEB.2018 12:09:12

Channel Frequency (MHz):	218.00625
Channel Bandwidth (kHz):	25.00
Modulation:	QPSK
Power Setting (dBm):	37
Meas Chan Peak Power (dBm):	39.69

Plot 9.2 – §80.211(c) Emission Mask and Spurious Emissions

80.211(c) Emission Mask (Reference Measurement)

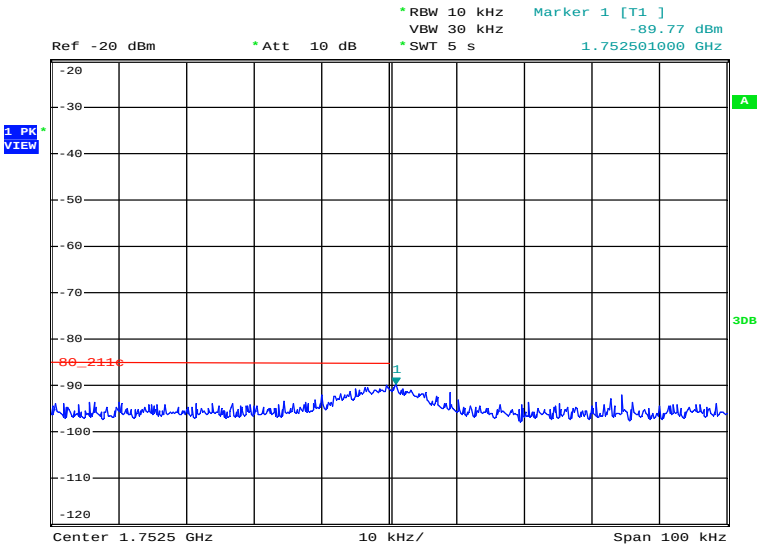


Date: 23.FEB.2018 13:55:13

Channel Frequency (MHz):	219.06250
Channel Bandwidth (kHz):	25.00
Modulation:	QPSK
Power Setting (dBm):	37
Meas Chan Peak Power (dBm):	39.69
Emission Frequency (MHz):	Reference
Emission Level (dBm):	Reference

Plot 9.3 – §80.211(c) Emission Mask and Spurious Emissions, Worst Case

80.211(c) Emission Measurement



Date: 23.FEB.2018 14:02:48

Channel Frequency (MHz):	219.06250
Channel Bandwidth (kHz):	25.00
Modulation:	QPSK
Power Setting (dBm):	37
Meas Chan Peak Power (dBm):	39.69
Emission Frequency (MHz):	1752.5
Emission Level (dBm):	-89.77

Table 9.1 – Summary of §80.211(c) Spurious Emissions

§80.211 (c) Out of Band Emission in 1525 - 1752.5MHz Band											
Freq (MHz)	BW (kHz)	Modulation	Power Setting(1) (dBm)	Measured Peak Power [E_{Meas}] (dBm)	Emission Frequency (MHz)	Measured Emission [E_{EM}] (dBm)	Attenuation [A] (dBc)	Filter Loss* [L_F] (dB)	Corrected Attenuation [A_C] (dBc)	Limit (dB)	Margin (dB)
219.06250	25	QPSK	37	39.69	1752.5	-89.77	129.46	0.50	128.96	125.0	**4.0**
									Results:	**Complies**	

* Insertion Loss of Hi-Pass Filter at Measured Frequency

Attenuation [A] = E_{Meas} - E_{EM}

Corrected Attenuation = [A] - L_F

Margin = A_C - Limit

10.0 §80.211(F) AND §80.481 BAND EDGE COMPLIANCE

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §80.211(f), §80.481**

Limits	
47 CFR §80.211	**§ 80.211 Emission Limitations** (f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB; (2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.
47 CFR §80.481	In lieu of the technical parameters set forth in this part, AMTS transmitters may utilize any modulation or channelization scheme so long as emissions are attenuated in accordance with §80.211 at the band edges of each station's assigned channel group or groups.

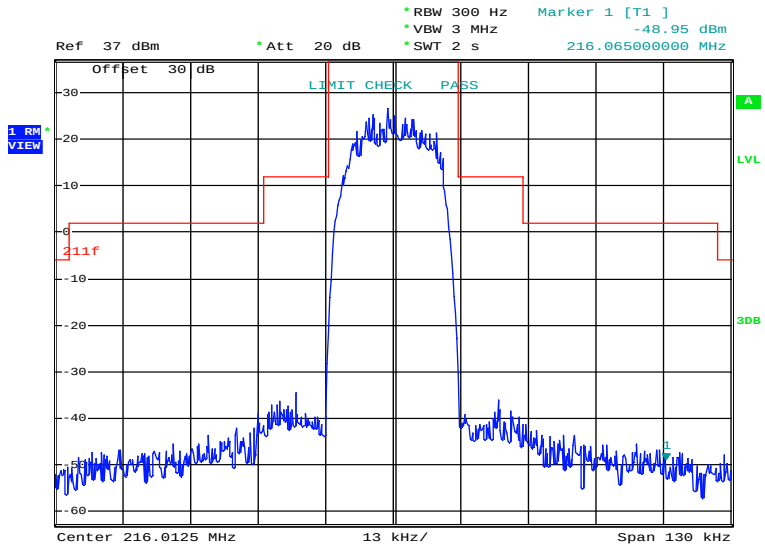
Test Setup	**Appendix A** **Figure A.1**

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to RMS with the RBW set to ≤ the OBW of the DUT. The output power of the DUT was set to the manufacturer's highest rated setting for each modulation type. The DUT frequency was set to the lowest and highest channel setting in each channel Group. All modulations (QPSK, 16 QAM, and 64 QAM) and all bandwidths (12.5kHz and 25kHz) were investigated. An emission mask of the above limits was used to determine compliance.

Plot 10.1 – Band Edge, Coast Channel Group D, Lower Channel, 216.0125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

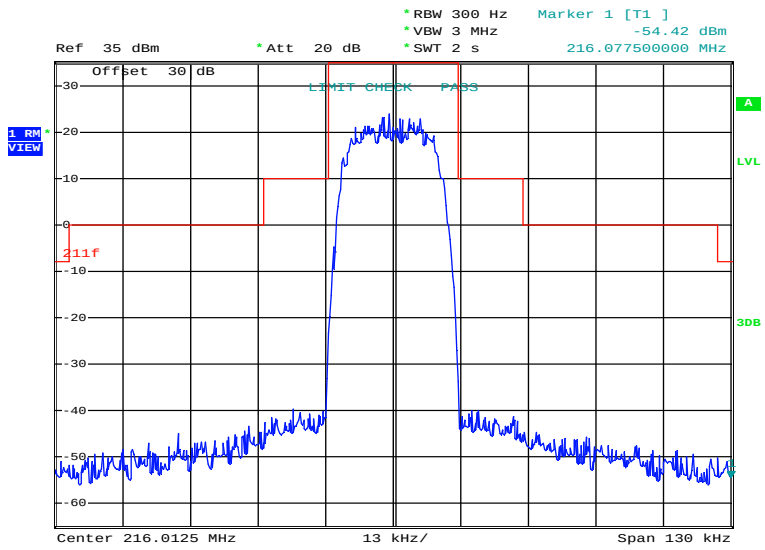


Date: 20.FEB.2018 16:55:21

Coast Channel Group:	D
Group D Lower Channel (MHz):	216.0125
DUT Channel Frequency (MHz):	216.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.2 – Band Edge, Coast Channel Group D, Lower Channel, 216.0125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

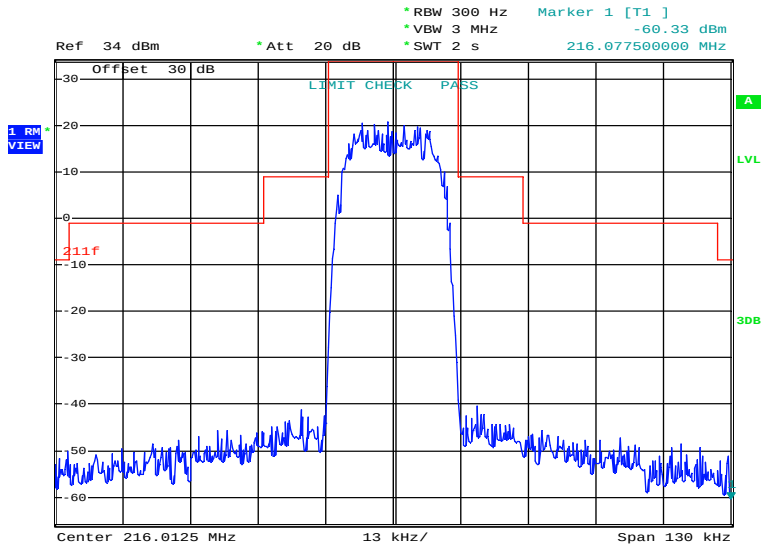


Date: 21.FEB.2018 12:00:04

Coast Channel Group:	D
Group D Lower Channel (MHz):	216.0125
DUT Channel Frequency (MHz):	216.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.3 – Band Edge, Coast Channel Group D, Lower Channel, 216.0125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

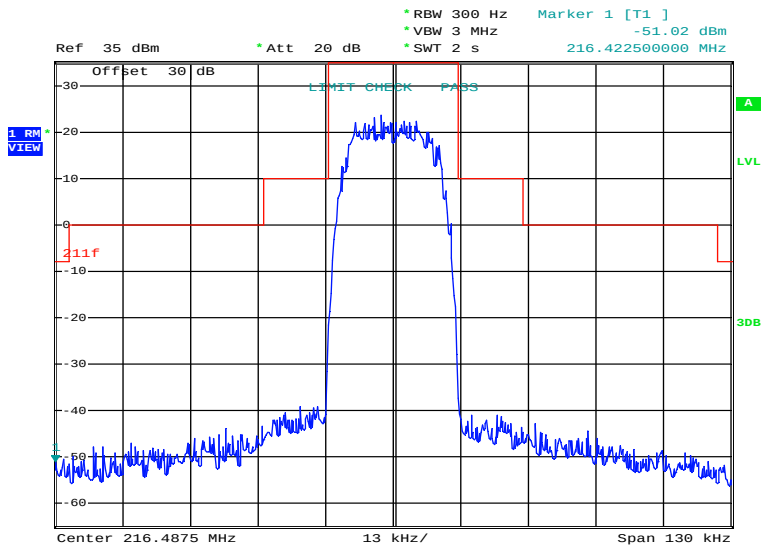


Date: 21.FEB.2018 12:31:10

Coast Channel Group:	D
Group D Lower Channel (MHz):	216.0125
DUT Channel Frequency (MHz):	216.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.4 – Band Edge, Coast Channel Group D, Upper Channel, 216.4875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

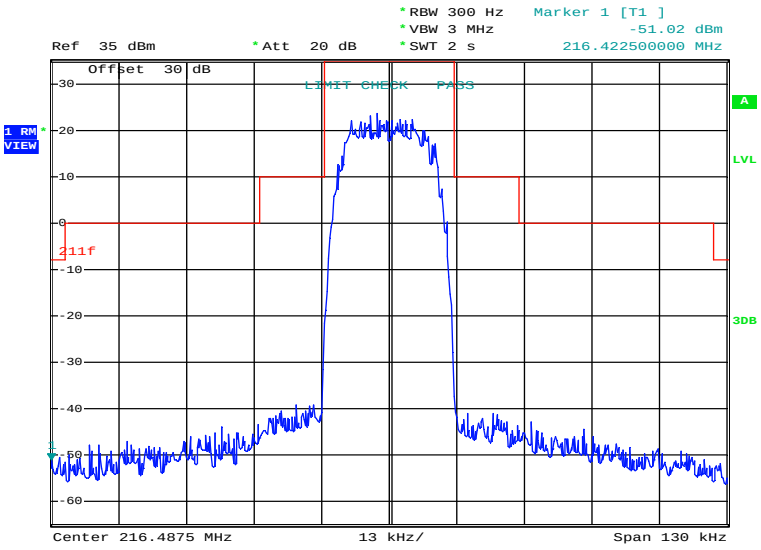


Date: 21.FEB.2018 12:01:19

Coast Channel Group:	D
Group D Upper Channel (MHz):	216.4875
DUT Channel Frequency (MHz):	216.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.5 – Band Edge, Coast Channel Group D, Upper Channel, 216.4875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

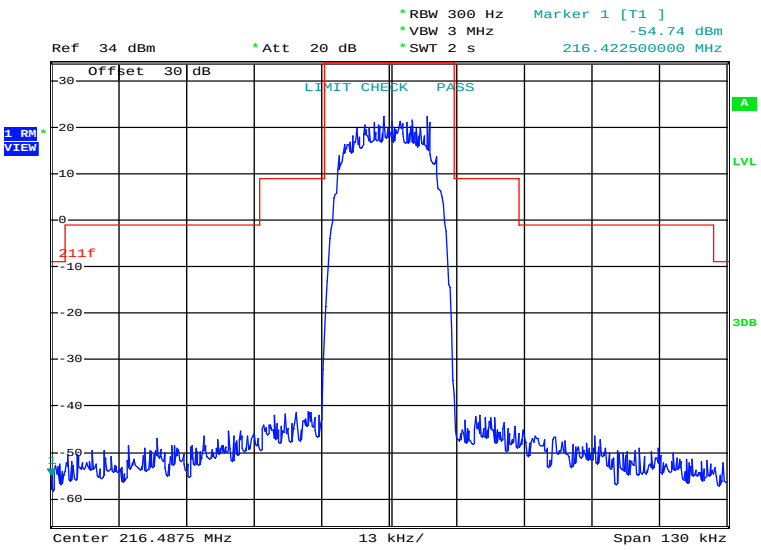


Date: 21.FEB.2018 12:01:19

Coast Channel Group:	D
Group D Upper Channel (MHz):	216.4875
DUT Channel Frequency (MHz):	216.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.6 – Band Edge, Coast Channel Group D, Upper Channel, 216.4875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

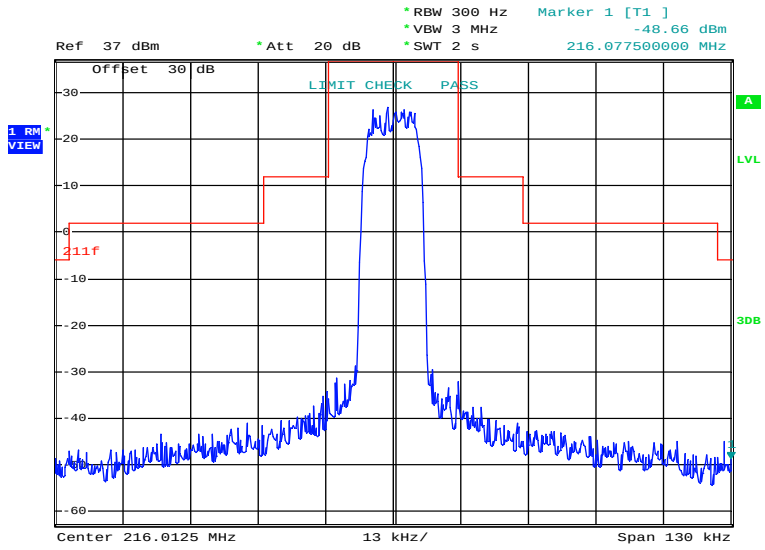


Date: 21.FEB.2018 12:32:17

Coast Channel Group:	D
Group D Upper Channel (MHz):	216.4875
DUT Channel Frequency (MHz):	216.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.7 – Band Edge, Coast Channel Group D, Lower Channel, 216.0125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

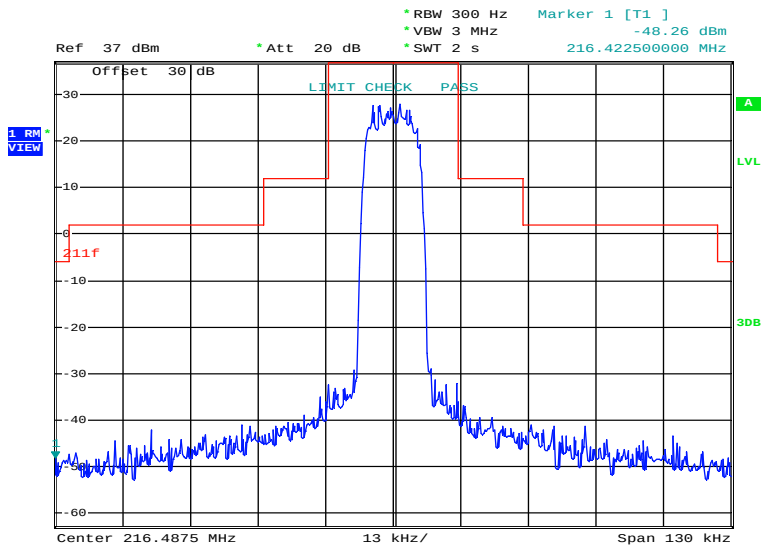


Date: 20.FEB.2018 16:23:04

Coast Channel Group:	D
Group D Lower Channel (MHz):	216.0125
DUT Channel Frequency (MHz):	216.0125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.8 – Band Edge, Coast Channel Group D, Lower Channel, 216.0125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



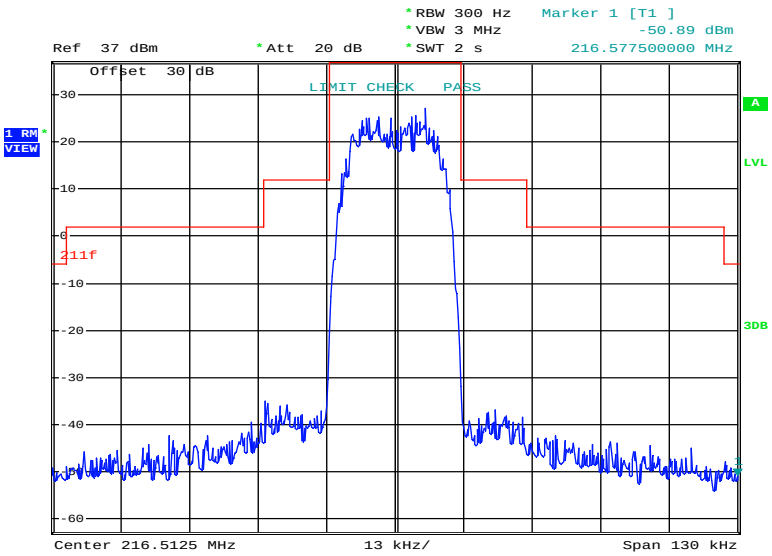
Date: 20.FEB.2018 16:24:25

Coast Channel Group:	D
Group D Upper Channel (MHz):	216.4875
DUT Channel Frequency (MHz):	216.4875
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

Plot 10.9 – Band Edge, Coast Channel Group C, Lower Channel, 216.5125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

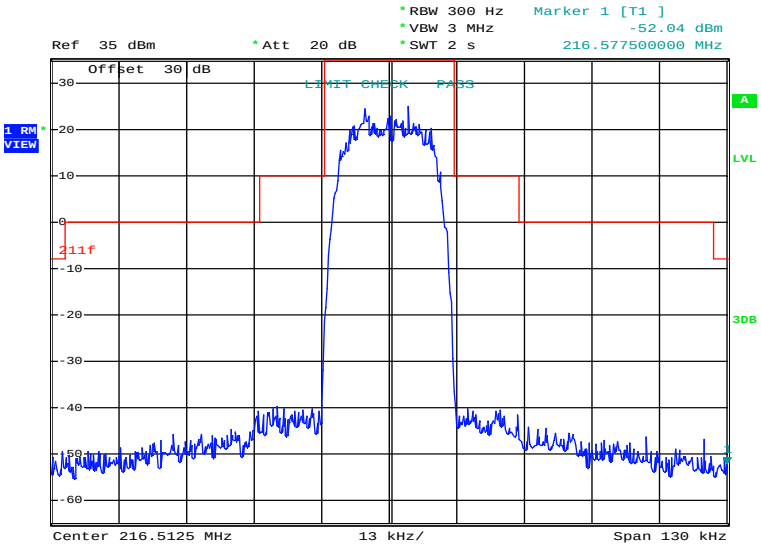


Date: 20.FEB.2018 16:52:01

Coast Channel Group:	C
Group C Lower Channel (MHz):	216.5125
DUT Channel Frequency (MHz):	216.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.10 – Band Edge, Coast Channel Group C, Lower Channel, 216.5125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

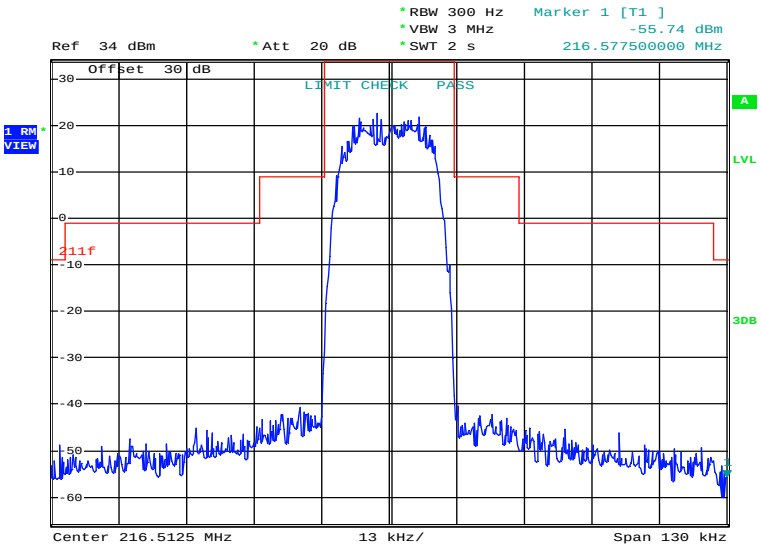


Date: 21.FEB.2018 11:57:18

Coast Channel Group:	C
Group C Lower Channel (MHz):	216.5125
DUT Channel Frequency (MHz):	216.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.11 – Band Edge, Coast Channel Group C, Lower Channel, 216.5125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

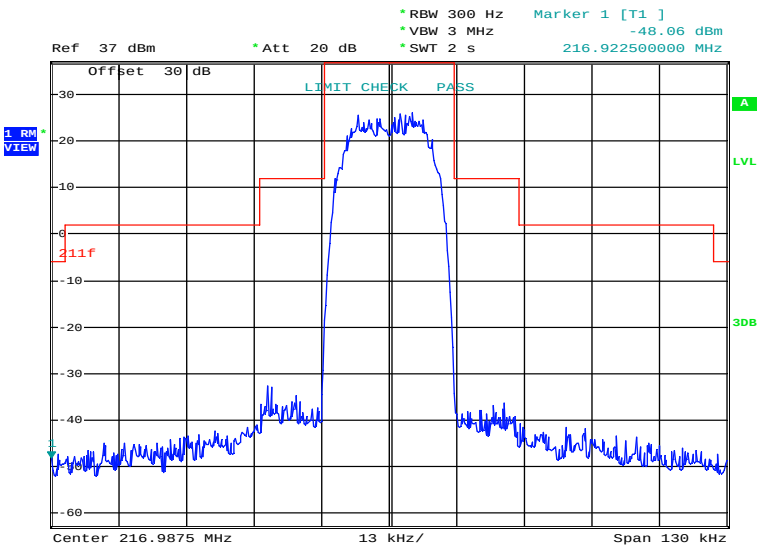


Date: 21.FEB.2018 12:28:40

Coast Channel Group:	C
Group C Lower Channel (MHz):	216.5125
DUT Channel Frequency (MHz):	216.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.12 – Band Edge, Coast Channel Group C, Upper Channel, 216.9875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

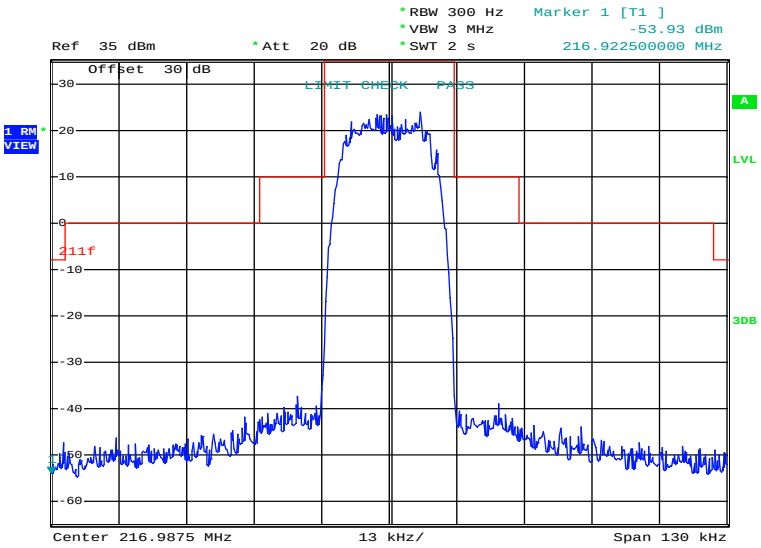


Date: 20.FEB.2018 16:53:34

Coast Channel Group:	C
Group C Upper Channel (MHz):	216.9875
DUT Channel Frequency (MHz):	216.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.13 – Band Edge, Coast Channel Group C, Upper Channel, 216.9875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

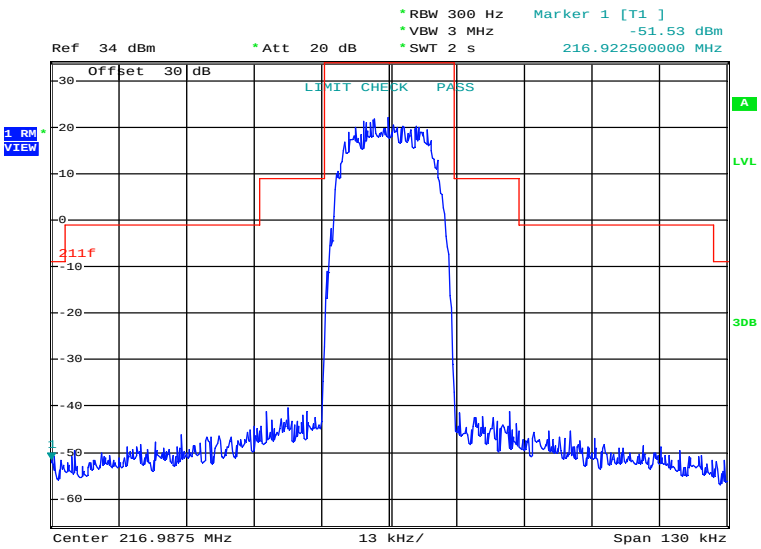


Date: 21.FEB.2018 11:58:50

Coast Channel Group:	C
Group C Upper Channel (MHz):	216.9875
DUT Channel Frequency (MHz):	216.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.14 – Band Edge, Coast Channel Group C, Upper Channel, 216.9875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

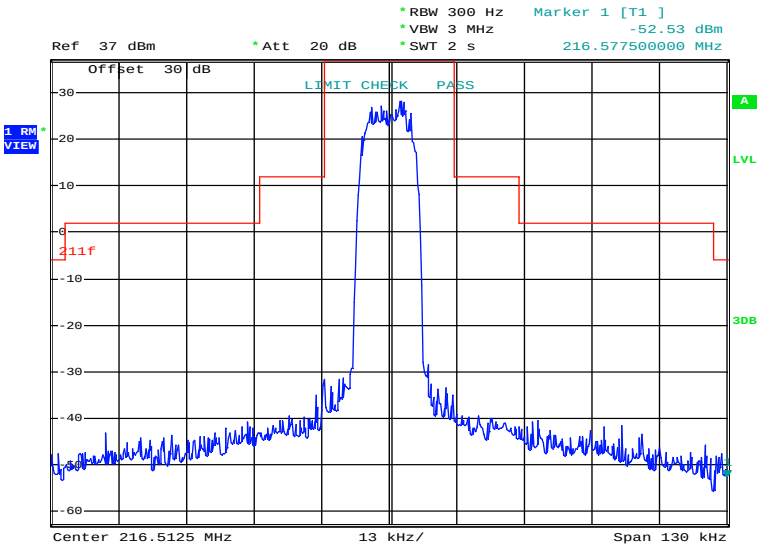


Date: 21.FEB.2018 12:29:59

Coast Channel Group:	C
Group C Upper Channel (MHz):	216.9875
DUT Channel Frequency (MHz):	216.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.15 – Band Edge, Coast Channel Group C, Lower Channel, 216.5125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

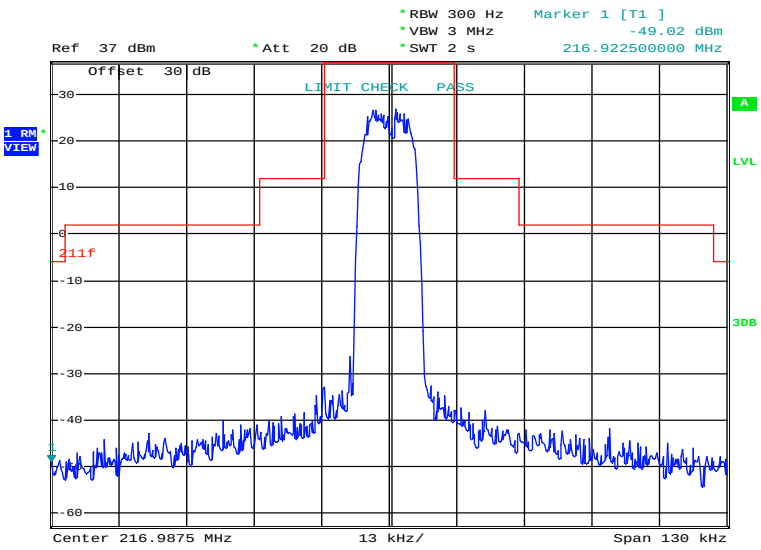


Date: 20.FEB.2018 16:20:09

Coast Channel Group:	C
Group C Lower Channel (MHz):	216.5125
DUT Channel Frequency (MHz):	216.5125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.16 – Band Edge, Coast Channel Group C, Upper Channel, 216.9875MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



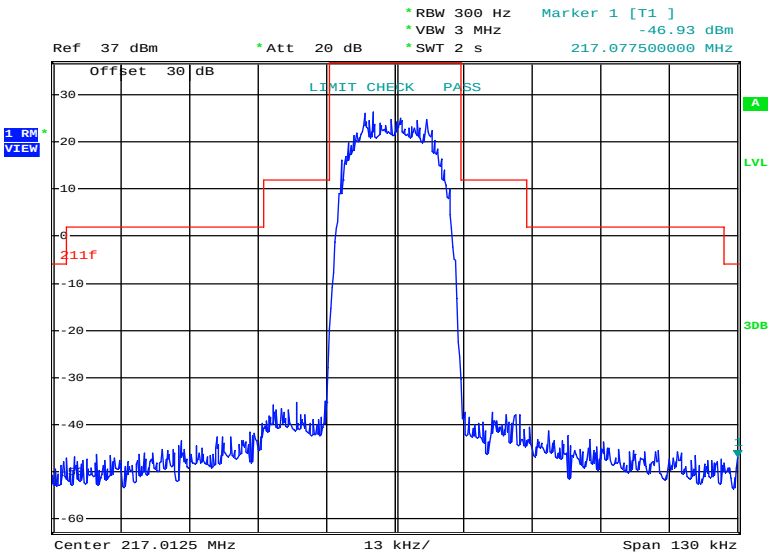
Date: 20.FEB.2018 16:21:37

Coast Channel Group:	C
Group C Upper Channel (MHz):	216.9875
DUT Channel Frequency (MHz):	216.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

Plot 10.17 – Band Edge, Coast Channel Group B, Lower Channel, 217.0125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

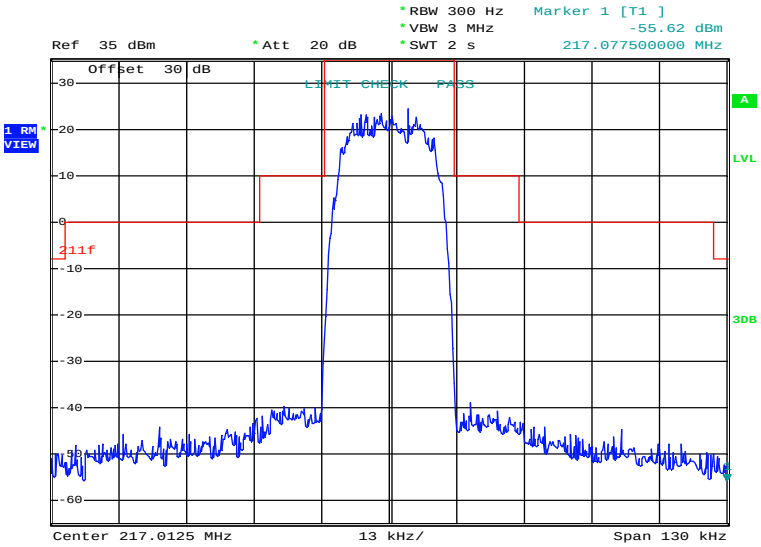


Date: 20.FEB.2018 16:36:55

Coast Channel Group:	B
Group B Lower Channel (MHz):	217.0125
DUT Channel Frequency (MHz):	217.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.18 – Band Edge, Coast Channel Group B, Lower Channel, 217.0125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

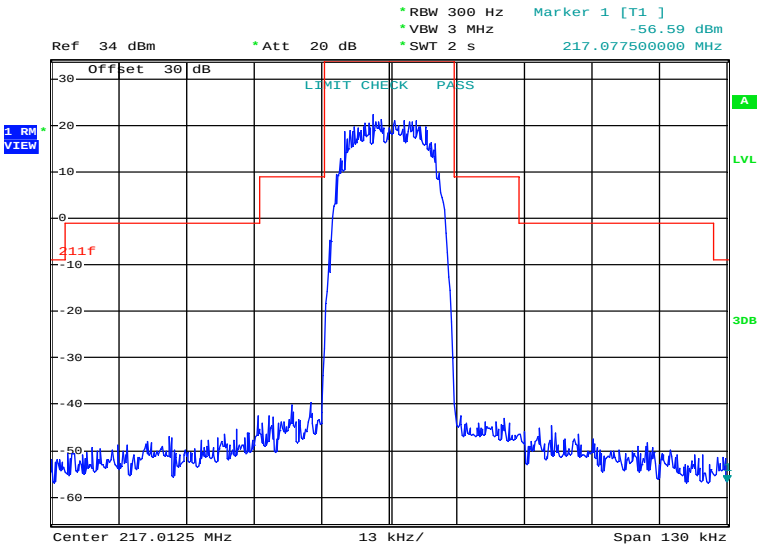


Date: 21.FEB.2018 11:50:35

Coast Channel Group:	B
Group B Lower Channel (MHz):	217.0125
DUT Channel Frequency (MHz):	217.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.19 – Band Edge, Coast Channel Group B, Lower Channel, 217.0125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

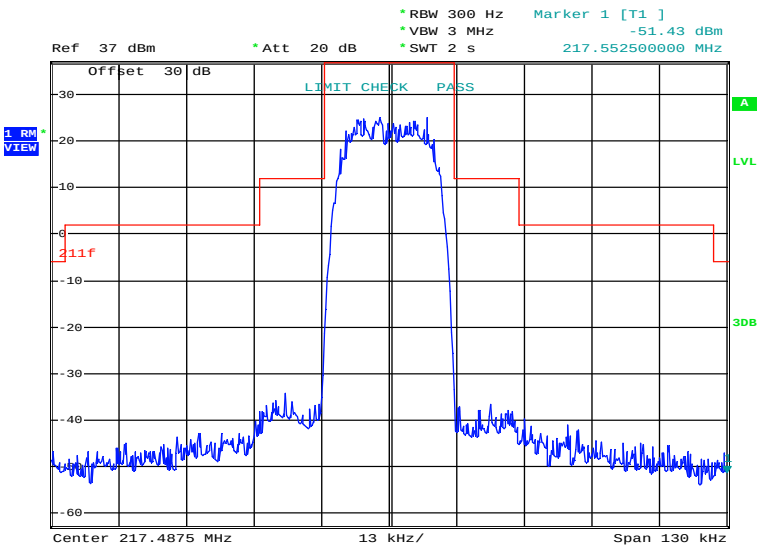


Date: 21.FEB.2018 12:22:37

Coast Channel Group:	B
Group B Lower Channel (MHz):	217.0125
DUT Channel Frequency (MHz):	217.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.20 – Band Edge, Coast Channel Group B, Upper Channel, 217.4875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

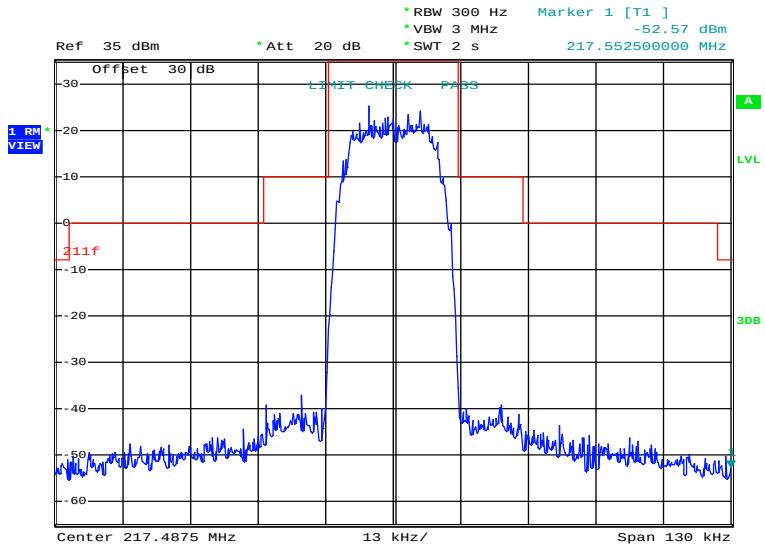


Date: 20.FEB.2018 16:43:19

Coast Channel Group:	B
Group B Upper Channel (MHz):	217.4875
DUT Channel Frequency (MHz):	217.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.21 – Band Edge, Coast Channel Group B, Upper Channel, 217.4875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

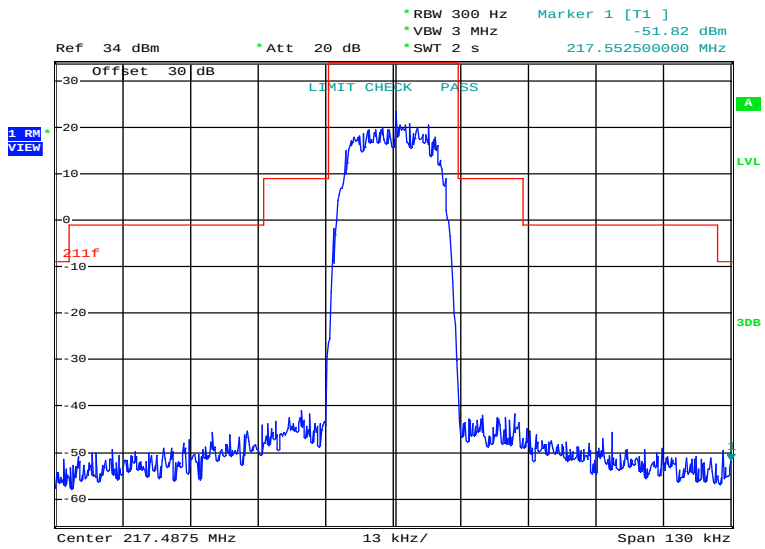


Date: 21.FEB.2018 11:54:54

Coast Channel Group:	B
Group B Upper Channel (MHz):	217.4875
DUT Channel Frequency (MHz):	217.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.22 – Band Edge, Coast Channel Group B, Upper Channel, 217.4875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

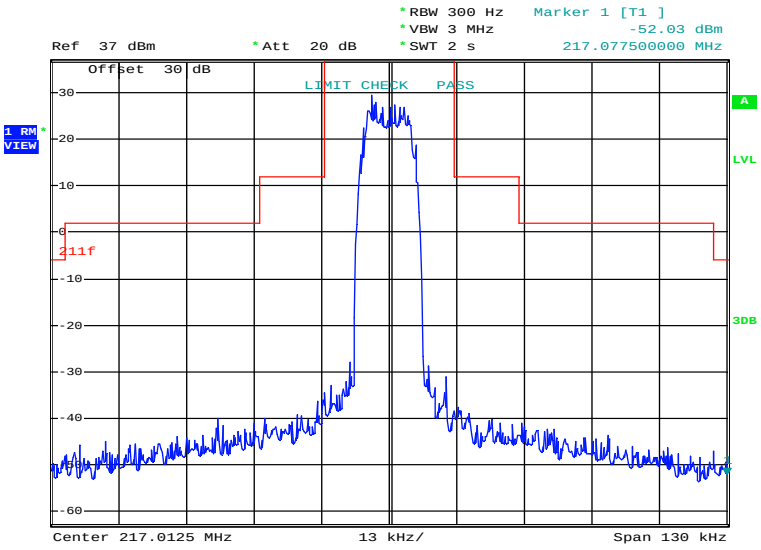


Date: 21.FEB.2018 12:26:37

Coast Channel Group:	B
Group B Upper Channel (MHz):	217.4875
DUT Channel Frequency (MHz):	217.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.23 – Band Edge, Coast Channel Group B, Lower Channel, 217.0125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

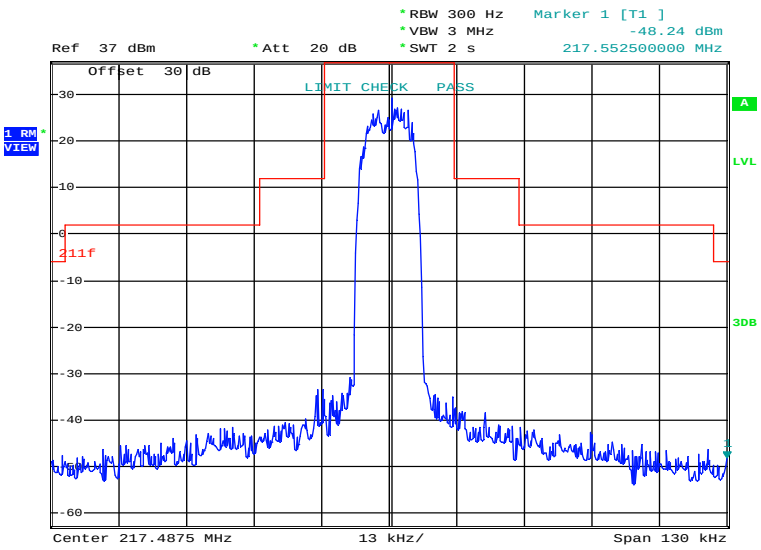


Date: 20.FEB.2018 16:06:24

Coast Channel Group:	B
Group B Lower Channel (MHz):	217.0125
DUT Channel Frequency (MHz):	217.0125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.24 – Band Edge, Coast Channel Group B, Upper Channel, 217.4875MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



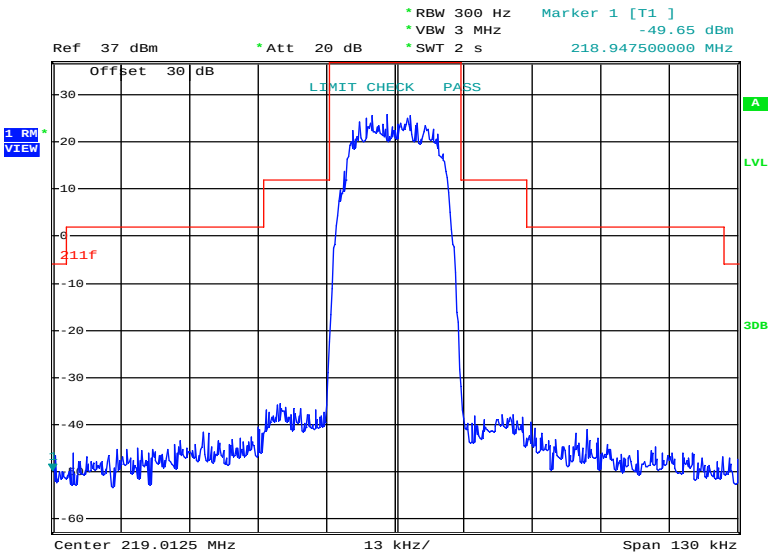
Date: 20.FEB.2018 16:10:31

Coast Channel Group:	B
Group B Upper Channel (MHz):	217.4875
DUT Channel Frequency (MHz):	217.4875
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

Plot 10.25 – Band Edge, Ship Channel Group B, Lower Channel, 219.0125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

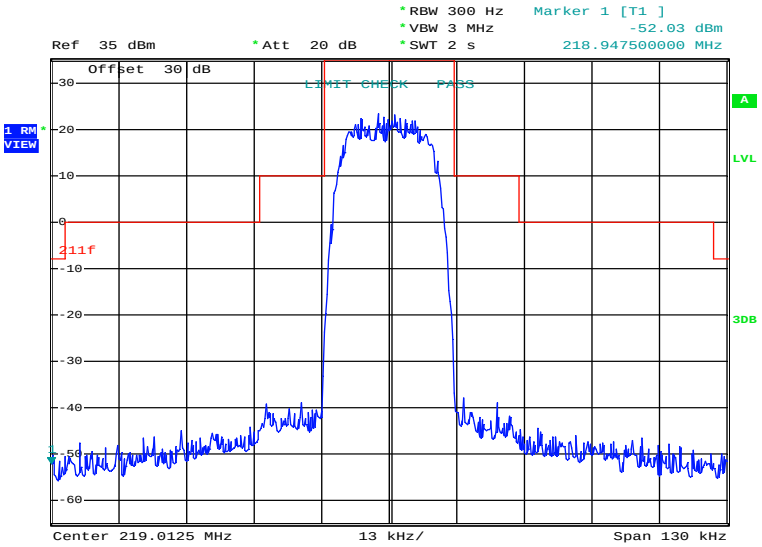


Date: 20.FEB.2018 16:38:18

Ship Channel Group:	B
Group B Lower Channel (MHz):	219.0125
DUT Channel Frequency (MHz):	219.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.26 – Band Edge, Ship Channel Group B, Lower Channel, 219.0125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

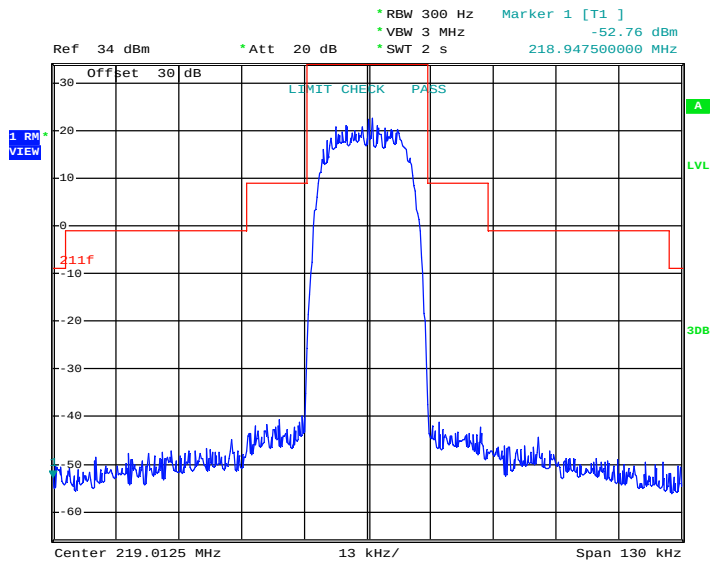


Date: 21.FEB.2018 11:52:05

Ship Channel Group:	B
Group B Lower Channel (MHz):	219.0125
DUT Channel Frequency (MHz):	219.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.27 – Band Edge, Ship Channel Group B, Lower Channel, 219.0125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

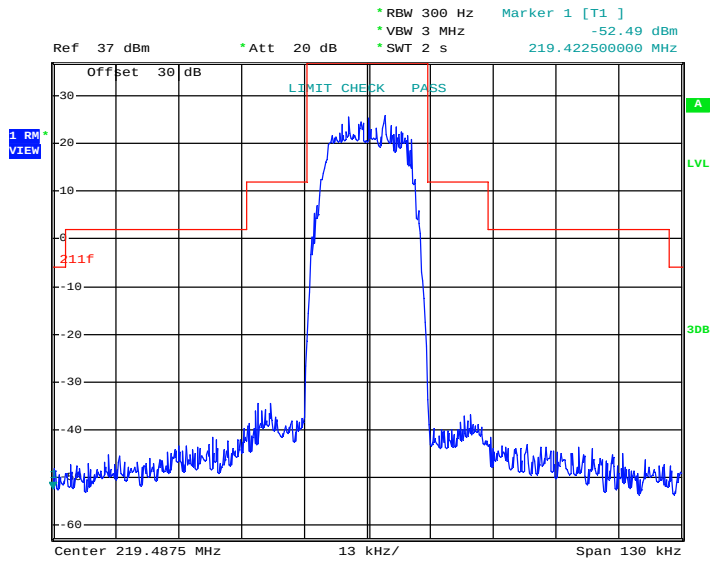


Date: 21.FEB.2018 12:24:10

Ship Channel Group:	B
Group B Lower Channel (MHz):	219.0125
DUT Channel Frequency (MHz):	219.0125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.28 – Band Edge, Ship Channel Group B, Upper Channel, 219.4875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

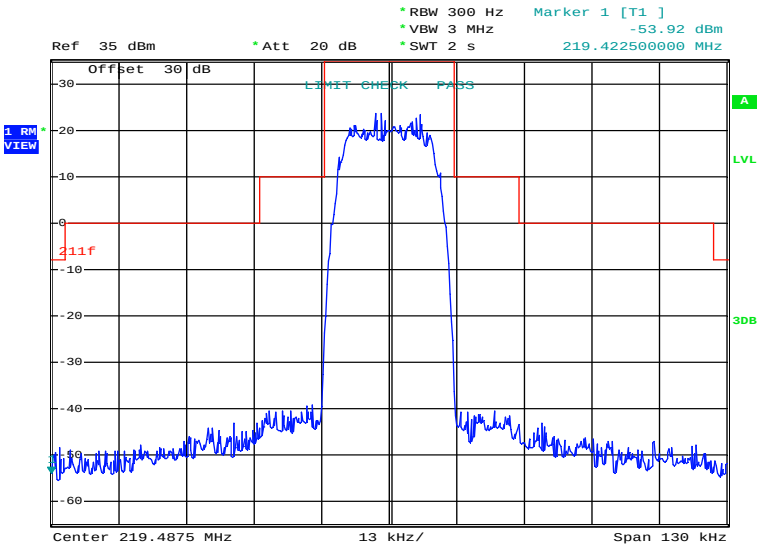


Date: 20.FEB.2018 16:41:34

Ship Channel Group:	B
Group B Upper Channel (MHz):	219.4875
DUT Channel Frequency (MHz):	219.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.29 – Band Edge, Ship Channel Group B, Upper Channel, 219.4875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

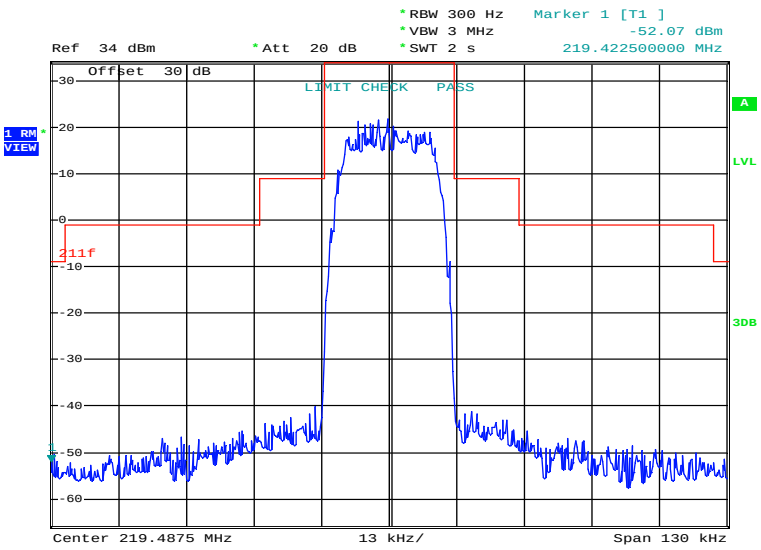


Date: 21.FEB.2018 11:53:32

Ship Channel Group:	B
Group B Upper Channel (MHz):	219.4875
DUT Channel Frequency (MHz):	219.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.30 – Band Edge, Ship Channel Group B, Upper Channel, 219.4875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

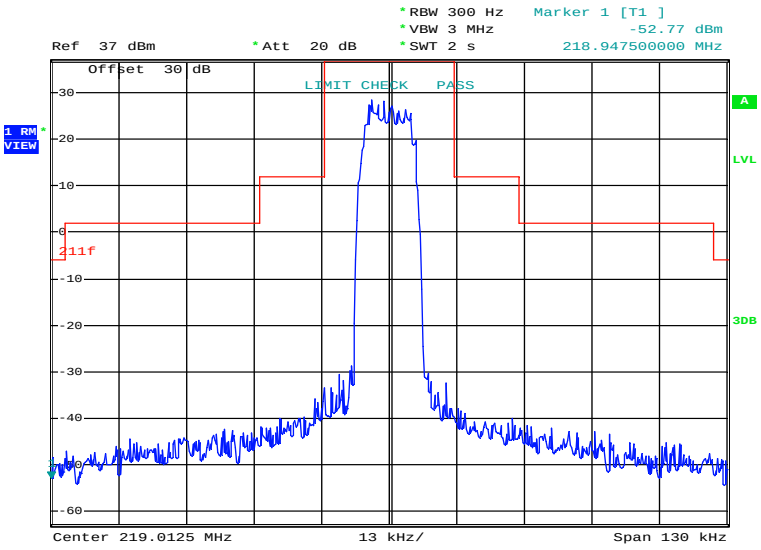


Date: 21.FEB.2018 12:25:25

Ship Channel Group:	B
Group B Upper Channel (MHz):	219.4875
DUT Channel Frequency (MHz):	219.4875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.31 – Band Edge, Ship Channel Group B, Lower Channel, 219.0125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

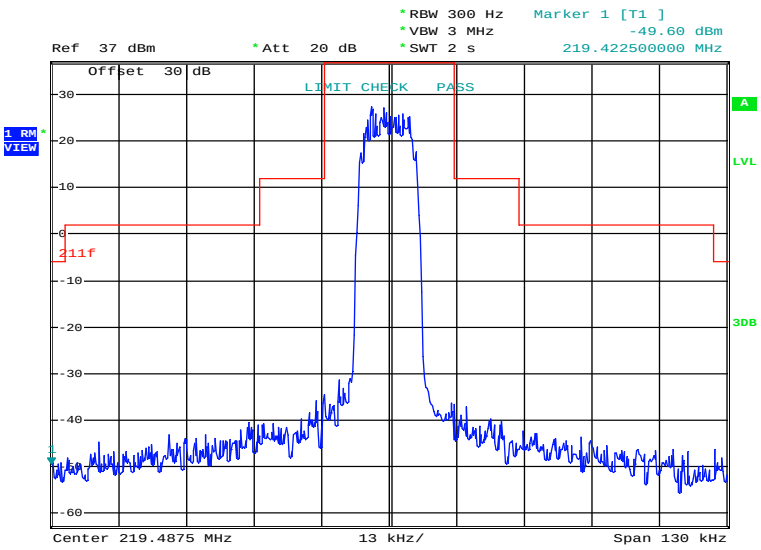


Date: 20.FEB.2018 16:07:53

Ship Channel Group:	B
Group B Lower Channel (MHz):	219.0125
DUT Channel Frequency (MHz):	219.0125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.32 – Band Edge, Ship Channel Group B, Upper Channel, 219.4875MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



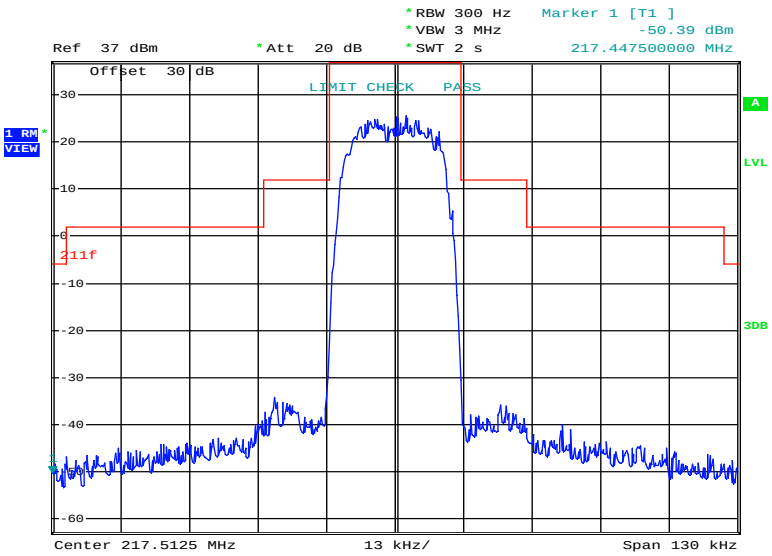
Date: 20.FEB.2018 16:09:17

Ship Channel Group:	B
Group B Upper Channel (MHz):	219.4875
DUT Channel Frequency (MHz):	219.4875
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

Plot 10.33 – Band Edge, Coast Channel Group A, Lower Channel, 217.5125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

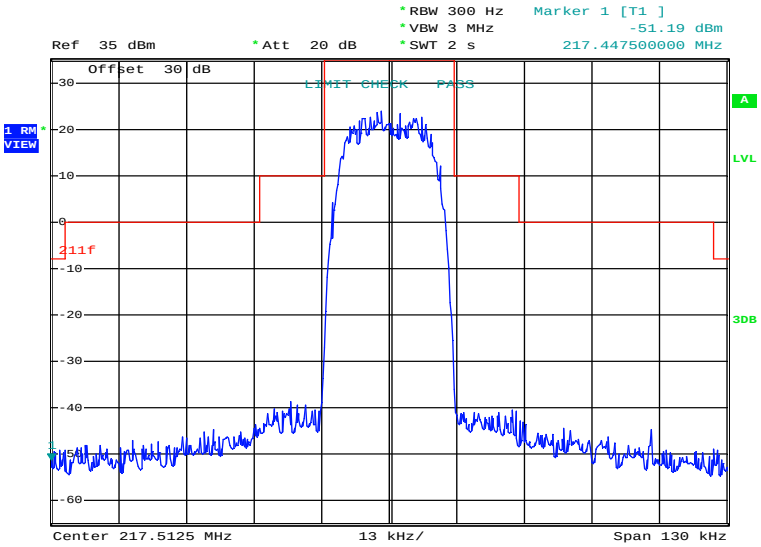


Date: 20.FEB.2018 16:30:06

Coast Channel Group:	A
Group A Lower Channel (MHz):	217.5125
DUT Channel Frequency (MHz):	217.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.34 – Band Edge, Coast Channel Group A, Lower Channel, 217.5125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

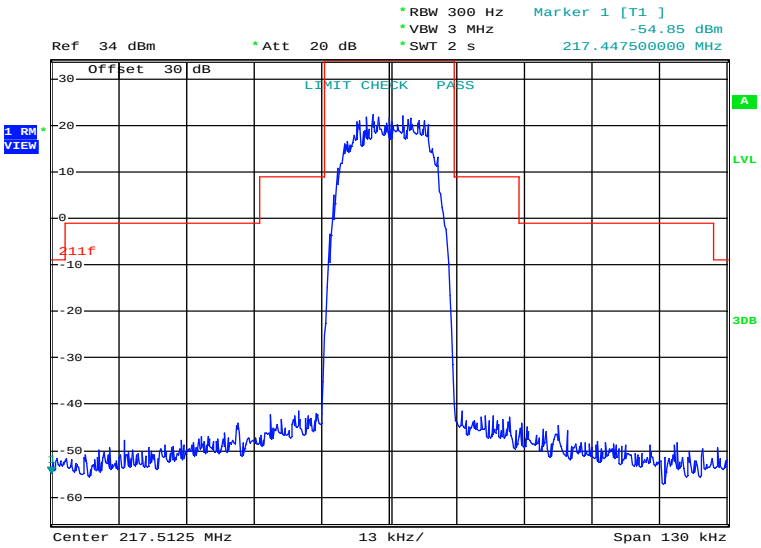


Date: 21.FEB.2018 11:43:07

Coast Channel Group:	A
Group A Lower Channel (MHz):	217.5125
DUT Channel Frequency (MHz):	217.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.35 – Band Edge, Coast Channel Group A, Lower Channel, 217.5125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

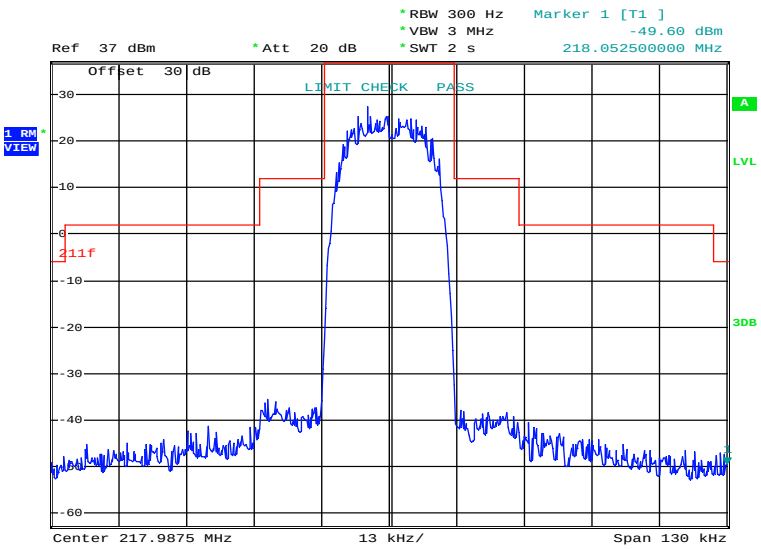


Date: 21.FEB.2018 12:16:19

Coast Channel Group:	A
Group A Lower Channel (MHz):	217.5125
DUT Channel Frequency (MHz):	217.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.36 – Band Edge, Coast Channel Group A, Upper Channel, 217.9875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

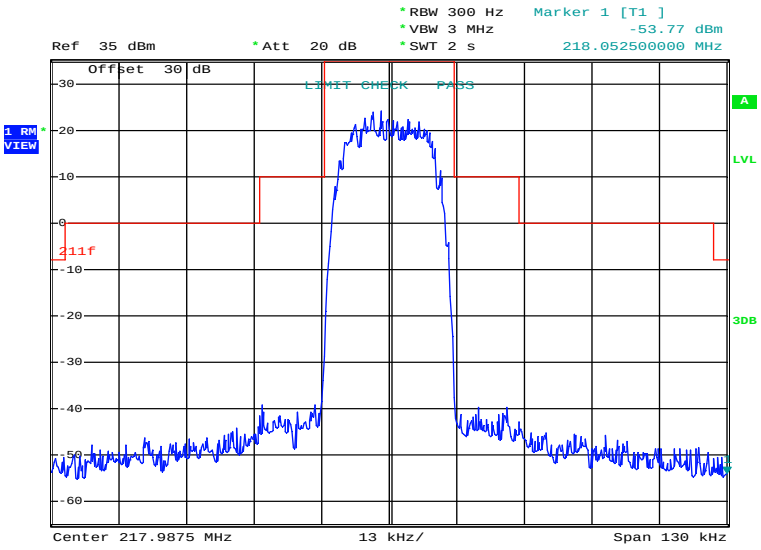


Date: 20.FEB.2018 16:35:27

Coast Channel Group:	A
Group A Upper Channel (MHz):	217.9875
DUT Channel Frequency (MHz):	217.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.37 – Band Edge, Coast Channel Group A, Upper Channel, 217.9875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

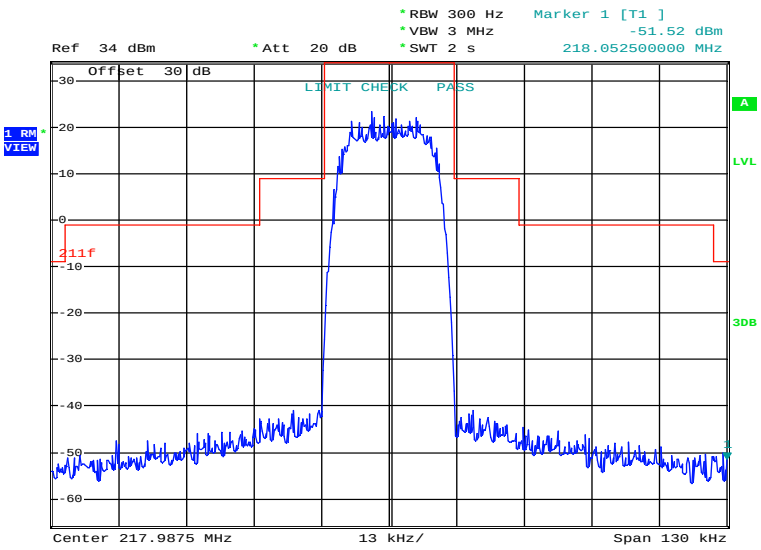


Date: 21.FEB.2018 11:48:58

Coast Channel Group:	A
Group A Upper Channel (MHz):	217.9875
DUT Channel Frequency (MHz):	217.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.37 – Band Edge, Coast Channel Group A, Upper Channel, 217.9875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

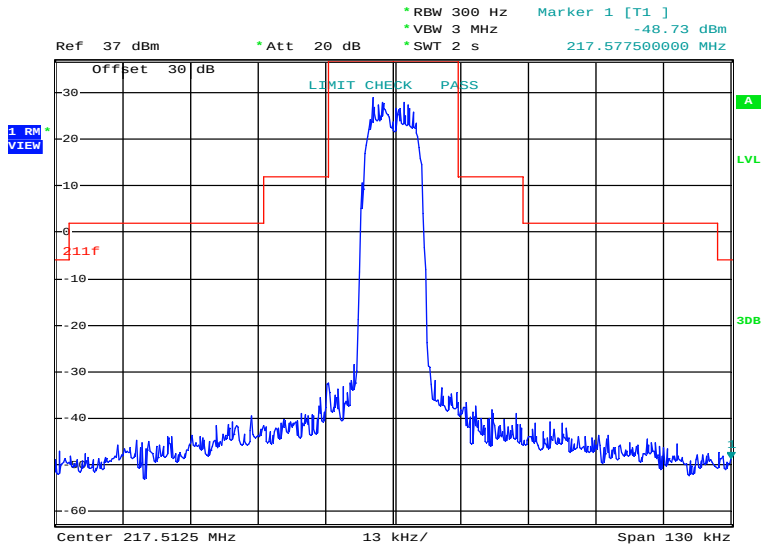


Date: 21.FEB.2018 12:20:58

Coast Channel Group:	A
Group A Upper Channel (MHz):	217.9875
DUT Channel Frequency (MHz):	217.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.39 – Band Edge, Coast Channel Group A, Lower Channel, 217.5125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

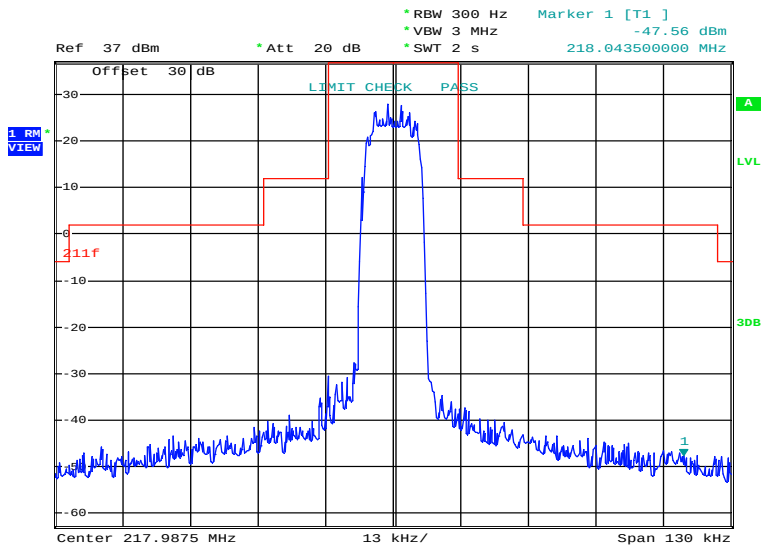


Date: 20.FEB.2018 15:59:06

Coast Channel Group:	A
Group A Lower Channel (MHz):	217.5125
DUT Channel Frequency (MHz):	217.5125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.40 – Band Edge, Coast Channel Group A, Upper Channel, 217.9875MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



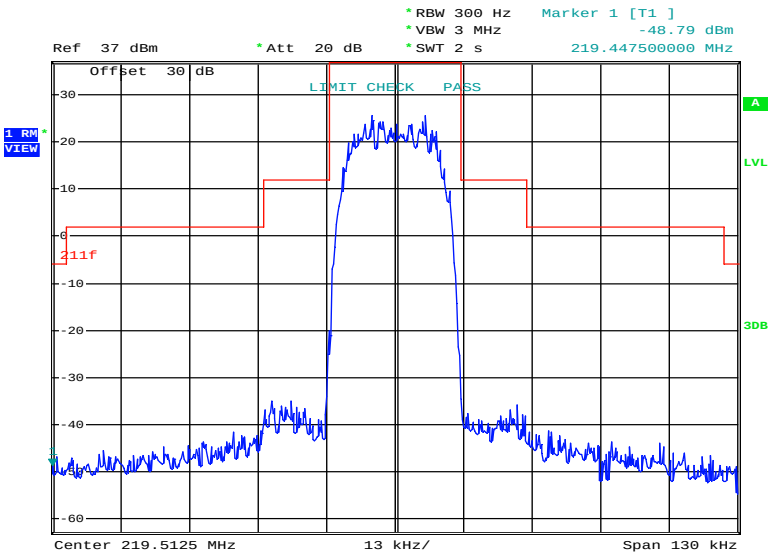
Date: 20.FEB.2018 16:04:06

Coast Channel Group:	A
Group A Upper Channel (MHz):	217.9875
DUT Channel Frequency (MHz):	217.9875
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

Plot 10.41 – Band Edge, Ship Channel Group A, Lower Channel, 219.5125MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

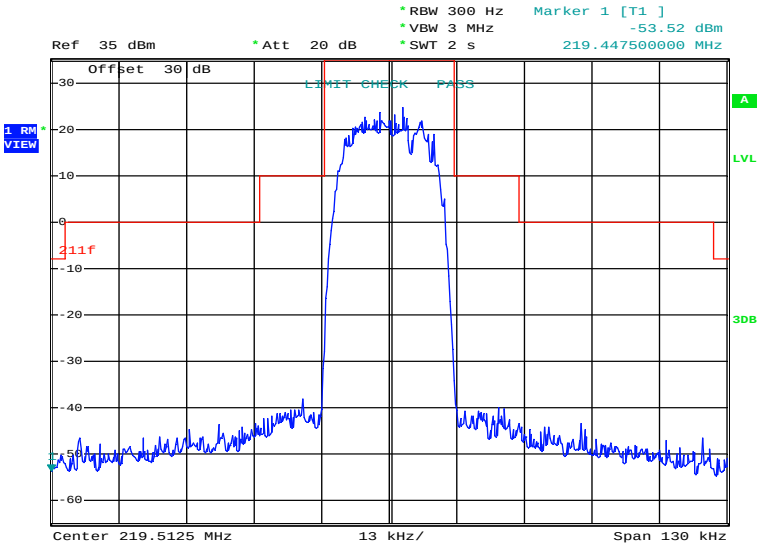


Date: 20.FEB.2018 16:31:47

Ship Channel Group:	A
Group A Lower Channel (MHz):	219.5125
DUT Channel Frequency (MHz):	219.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.42 – Band Edge, Ship Channel Group A, Lower Channel, 219.5125MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

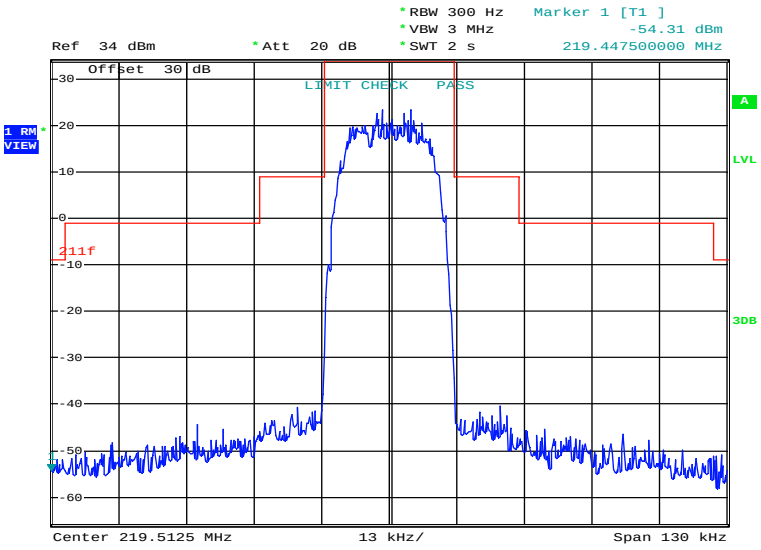


Date: 21.FEB.2018 11:45:09

Ship Channel Group:	A
Group A Lower Channel (MHz):	219.5125
DUT Channel Frequency (MHz):	219.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.43 – Band Edge, Ship Channel Group A, Lower Channel, 219.5125MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

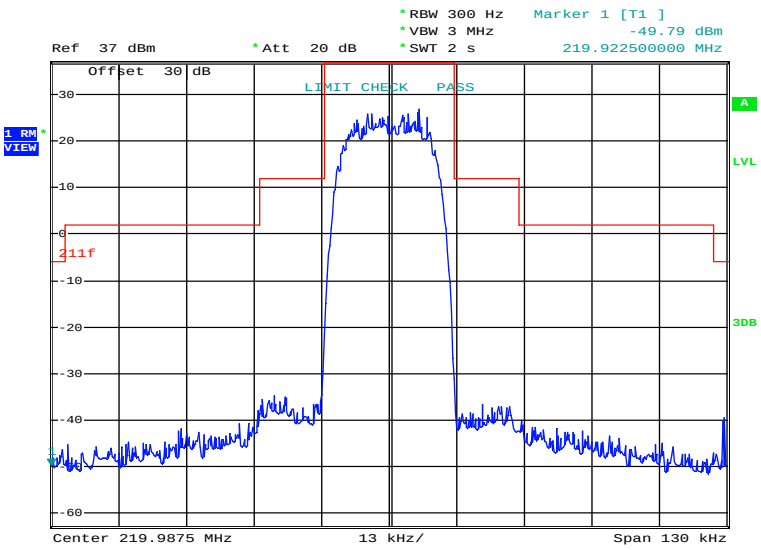


Date: 21.FEB.2018 12:17:56

Ship Channel Group:	A
Group A Lower Channel (MHz):	219.5125
DUT Channel Frequency (MHz):	219.5125
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	**Complies**

Plot 10.44 – Band Edge, Ship Channel Group A, Upper Channel, 219.9875MHz, 25kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

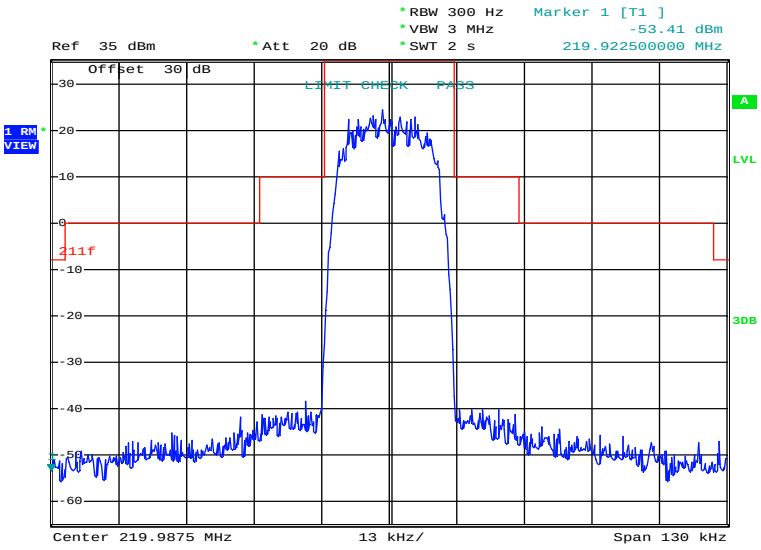


Date: 20.FEB.2018 16:34:04

Ship Channel Group:	A
Group A Upper Channel (MHz):	219.9875
DUT Channel Frequency (MHz):	219.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	**Complies**

Plot 10.45 – Band Edge, Ship Channel Group A, Upper Channel, 219.9875MHz, 25kHz BW, 16QAM

§80.211 (f) & 80.481 Band Edge Compliance

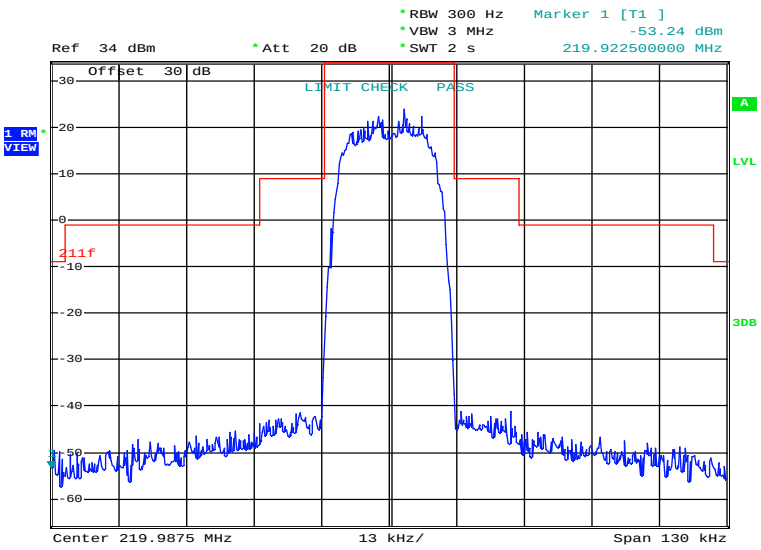


Date: 21.FEB.2018 11:47:40

Ship Channel Group:	A
Group A Upper Channel (MHz):	219.9875
DUT Channel Frequency (MHz):	219.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Power Setting (dBm):	35
Result:	Complies

Plot 10.46 – Band Edge, Ship Channel Group A, Upper Channel, 219.9875MHz, 25kHz BW, 64QAM

§80.211 (f) & 80.481 Band Edge Compliance

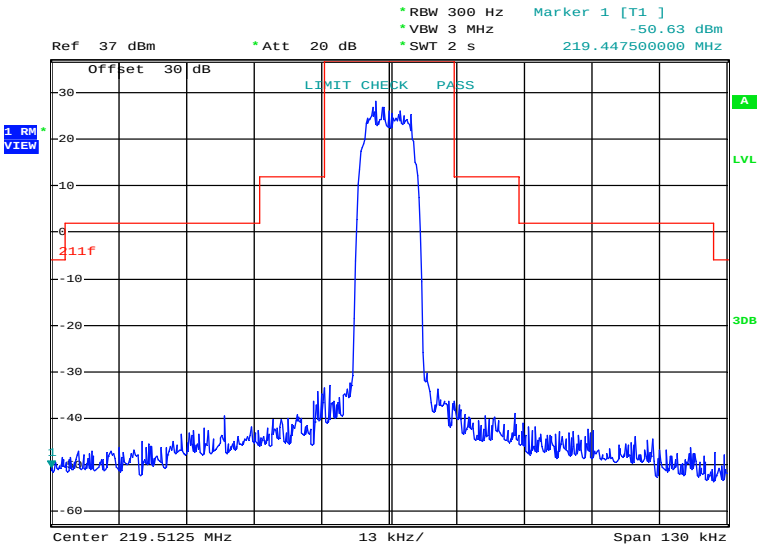


Date: 21.FEB.2018 12:19:43

Ship Channel Group:	A
Group A Upper Channel (MHz):	219.9875
DUT Channel Frequency (MHz):	219.9875
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Power Setting (dBm):	34
Result:	Complies

Plot 10.47 – Band Edge, Ship Channel Group A, Lower Channel, 219.5125MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance

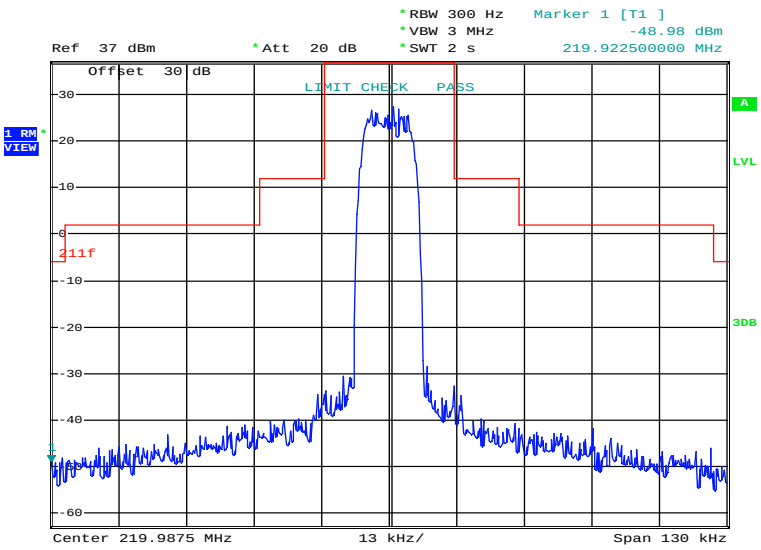


Date: 20.FEB.2018 16:00:29

Ship Channel Group:	A
Group A Lower Channel (MHz):	219.5125
DUT Channel Frequency (MHz):	219.5125
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

Plot 10.48 – Band Edge, Ship Channel Group A, Upper Channel, 219.9875MHz, 12.5kHz BW, QPSK

§80.211 (f) & 80.481 Band Edge Compliance



Date: 20.FEB.2018 16:02:23

Ship Channel Group:	A
Group A Upper Channel (MHz):	219.9875
DUT Channel Frequency (MHz):	219.9875
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Power Setting (dBm):	37
Result:	Complies

It is demonstrated that since all modulations of the DUT's 25kHz Channel Bandwidth are compliant that all modulations of the DUT's 12.5kHz Channel Bandwidth will be compliant.

11.0 BAND EDGE COMPLIANCE TO §95.1957

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §95.1957**

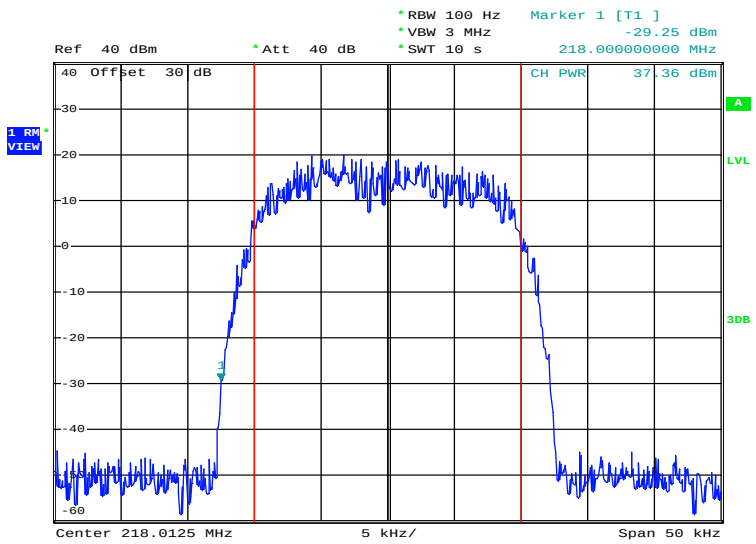
Limits	
47 CFR §95.1957	**§ 95.1957 Emission Standards** (a) All transmissions by each CTS and by each RTU shall use an emission type that complies with the following standard for unnecessary radiation. (b) All spurious and out-of-band emissions shall be attenuated: (1) Zero dB on any frequency within the authorized frequency segment. (2) At least 28 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 250 kHz up to and including 750 kHz; (3) At least 35 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 750 kHz up to and including 1250 kHz; (4) At least 43 plus 10 log (base 10) (mean power in Watts) dB on any frequency removed from the midpoint of the assigned frequency segment by more than 1250 kHz. (c) When testing for certification, all measurements of unnecessary radiation are performed using a carrier frequency as close to the edge of the authorized frequency segment as the transmitter is designed to be capable of operating. (d) The reference bandwidth of the instrumentation used to measure the emission power shall be 100 Hz for measuring emissions up to and including 250 kHz from the edge of the authorized frequency segment, and 10 kHz for measuring emissions more than 250 kHz from the edge of the authorized frequency segment. If a video filter is used, its bandwidth shall not be less than the reference bandwidth. The power level of the highest emission within the frequency segment, to which the attenuation is referenced, shall be remeasured for each change in reference bandwidth.

Test Setup	Appendix A Figure A.1

Measurement Procedure
The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to RMS.
For emissions at the band's edge, the SA RBW set to 100Hz and the emissions were compare to an emissions mask as described above. The emissions mask was set to the peak output level of the transmission. The DUT frequency was set as close to the band edge as capable. All transmission modes (QPSK, 16QAM and 64QAM) and channel bandwidths (12.5kHz and 50kHz) were evaluated. A marker indicates the emissions level at the band's edge.
For emissions greater than 250kHz from the band's edge, the SA RBW set to 10kHz and the emissions (Trace 2) were compare to an emissions mask as described above. The emissions mask was set to the peak output level of the transmission (Trace 1), measured with an RBW of 10kHz. The DUT frequency was set as close to the band edge as capable. All transmission modes (QPSK, 16QAM and 64QAM) and channel bandwidths (12.5kHz and 50kHz) were evaluated.

Plot 11.1 – 100Hz RBW Channel Power, 25kHz BW, QPSK

§95.1957 100Hz Channel Power

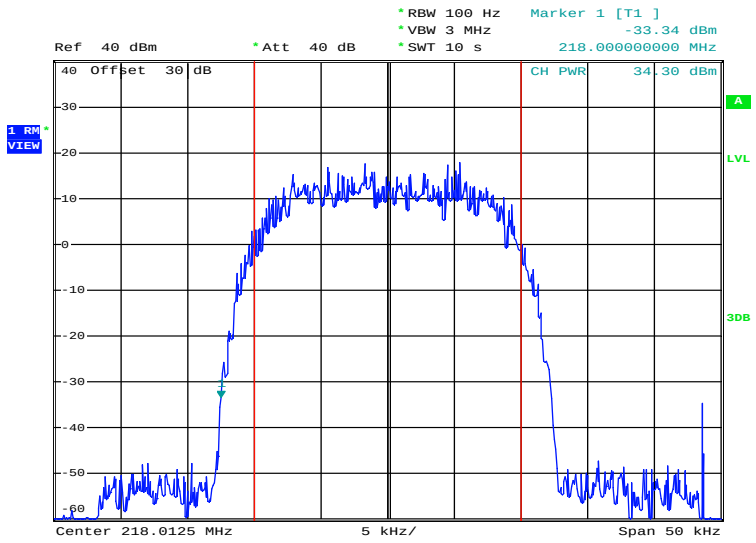


Date: 13.MAR.2018 08:43:58

DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36

Plot 11.2 – 100Hz RBW Channel Power, 25kHz BW, 16QAM

§95.1957 100Hz Channel Power

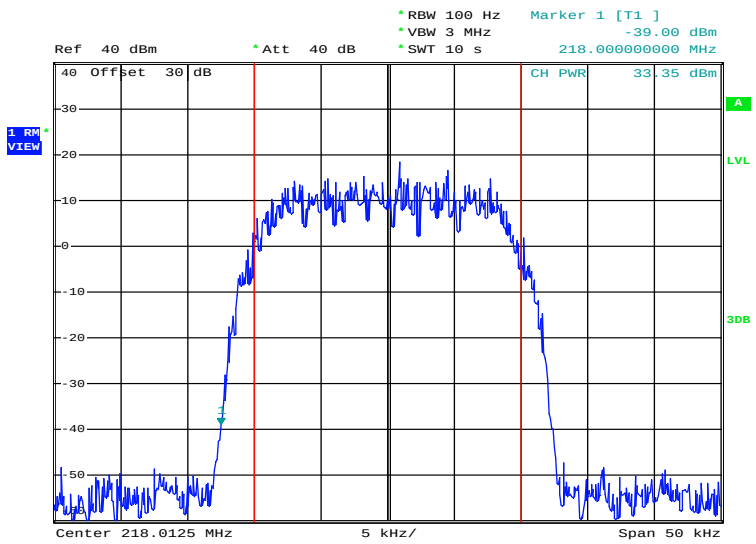


Date: 13.MAR.2018 08:46:49

DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.30

Plot 11.3 – 100Hz RBW Channel Power, 25kHz BW, 64QAM

§95.1957 100Hz Channel Power

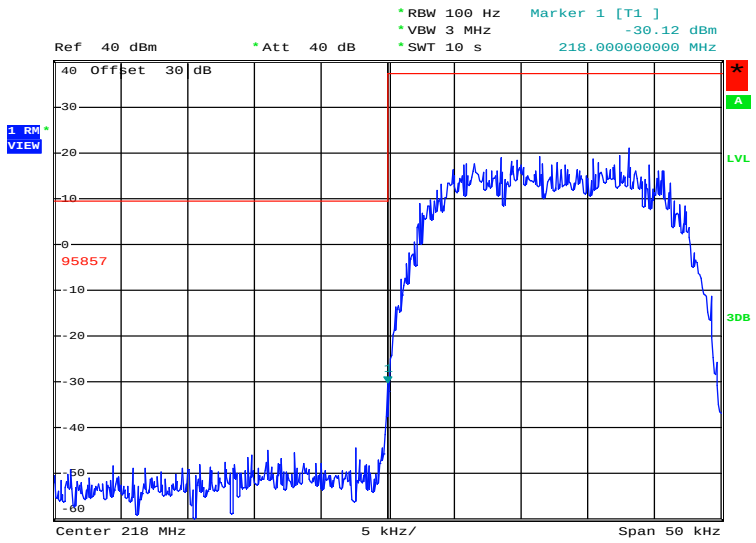


Date: 13.MAR.2018 08:48:44

DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.35

Plot 11.4 – Segment A Lower Band Edge 218.000MHz, 25kHz BW, QPSK

§95.1957 Band Edge Compliance

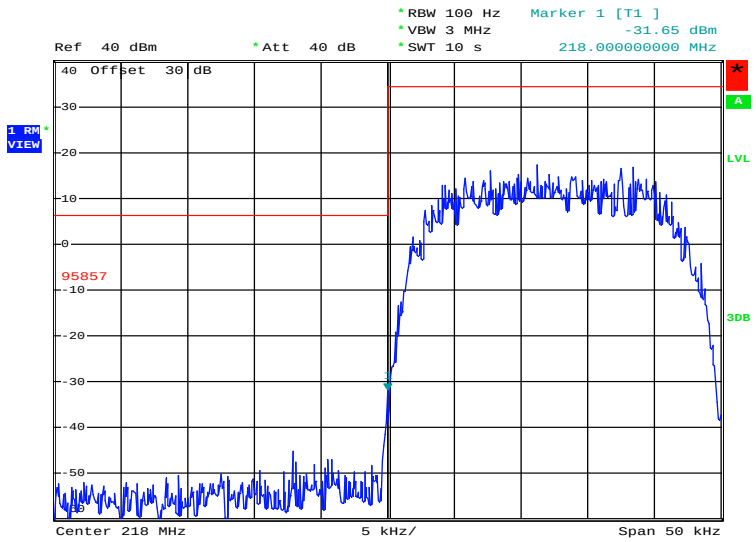


Date: 13.MAR.2018 08:58:11

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.0000
DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Emission at Band Edge (dBm):	**-30.12**

Plot 11.5 – Segment A Lower Band Edge 218.000MHz, 25kHz BW, 16QAM

§95.1957 Band Edge Compliance

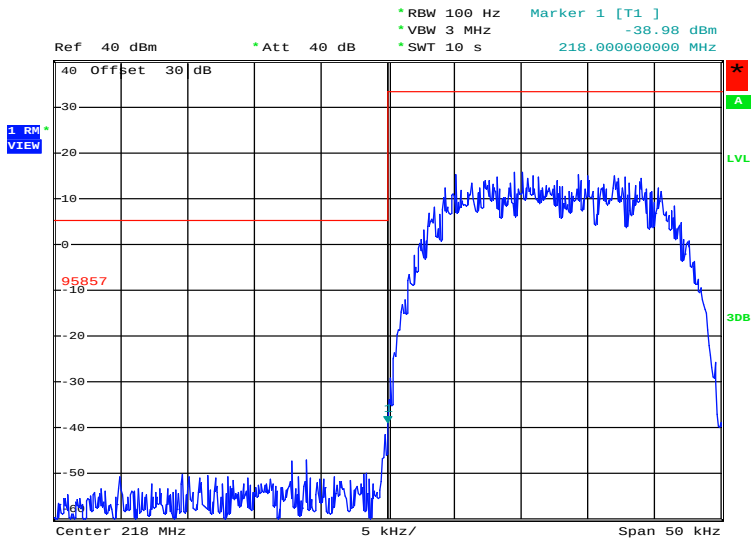


Date: 13.MAR.2018 09:02:44

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.0000
DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.30
Emission at Band Edge (dBm):	**-31.65**

Plot 11.6 – Segment A Lower Band Edge 218.000MHz, 25kHz BW, 64QAM

§95.1957 Band Edge Compliance

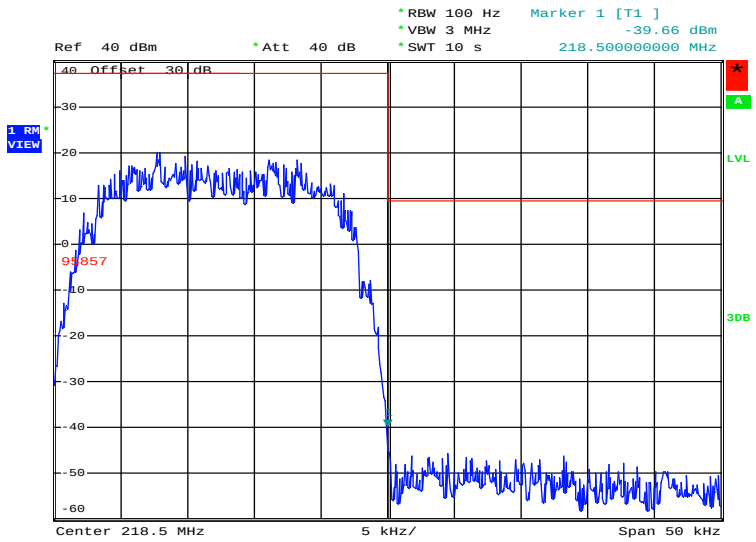


Date: 13.MAR.2018 09:05:25

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.000
DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.35
Emission at Band Edge (dBm):	**-38.98**

Plot 11.7 – Segment A Upper Band Edge 218.500MHz, 25kHz BW, QPSK

§95.1957 Band Edge Compliance

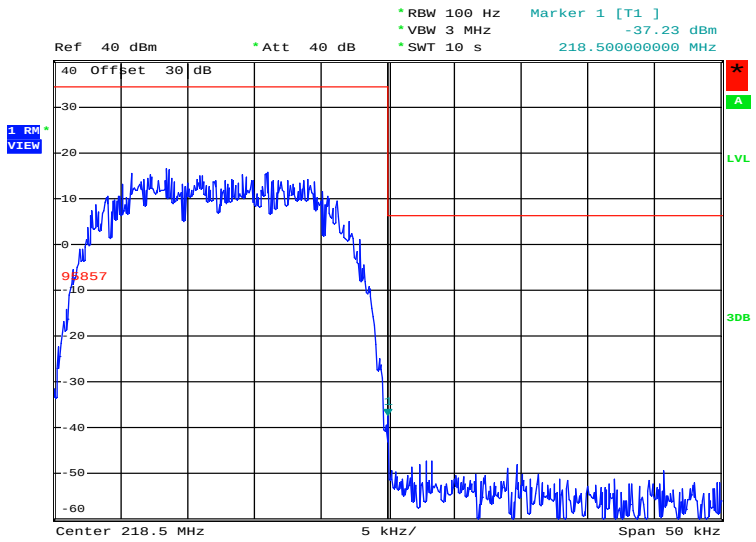


Date: 13.MAR.2018 09:11:10

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.48750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Emission at Band Edge (dBm):	**-39.66**

Plot 11.8 – Segment A Upper Band Edge 218.500MHz, 25kHz BW, 16QAM

§95.1957 Band Edge Compliance

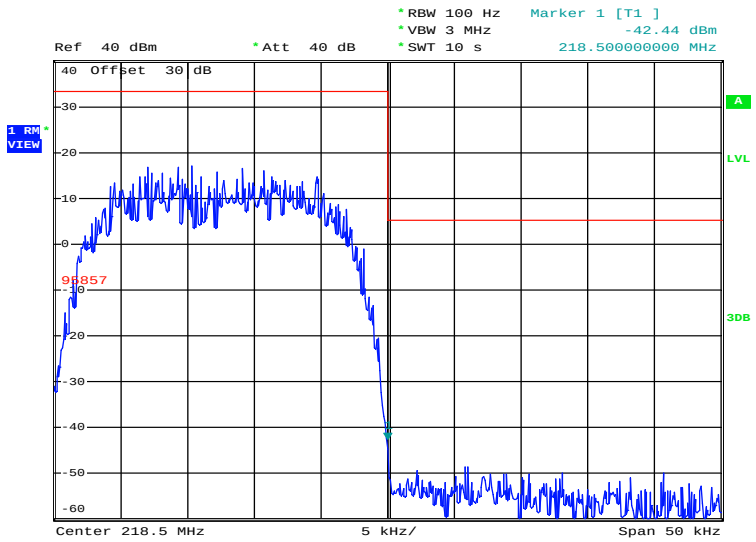


Date: 13.MAR.2018 09:13:26

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.48750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.30
Emission at Band Edge (dBm):	**-37.23**

Plot 11.9 – Segment A Upper Band Edge 218.500MHz, 25kHz BW, 64QAM

§95.1957 Band Edge Compliance

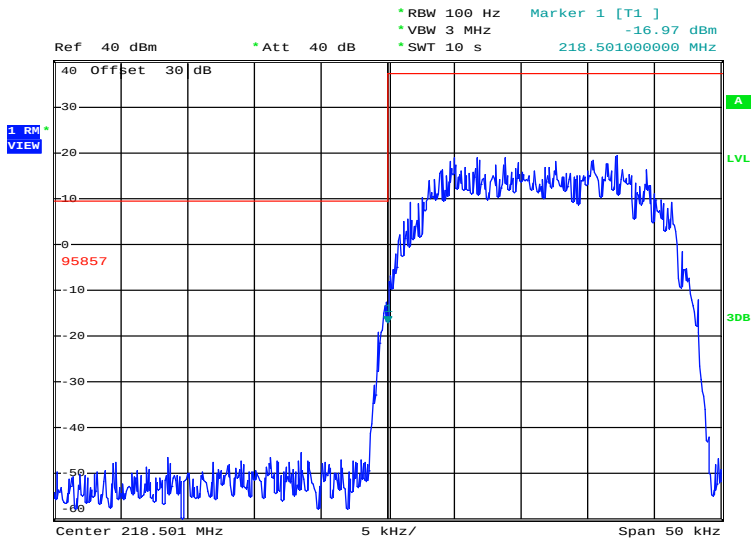


Date: 13.MAR.2018 09:29:36

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.48750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.35
Emission at Band Edge (dBm):	**-42.44**

Plot 11.10 – Segment B Lower Band Edge 218.501MHz, 25kHz BW, QPSK

§95.1957 Band Edge Compliance

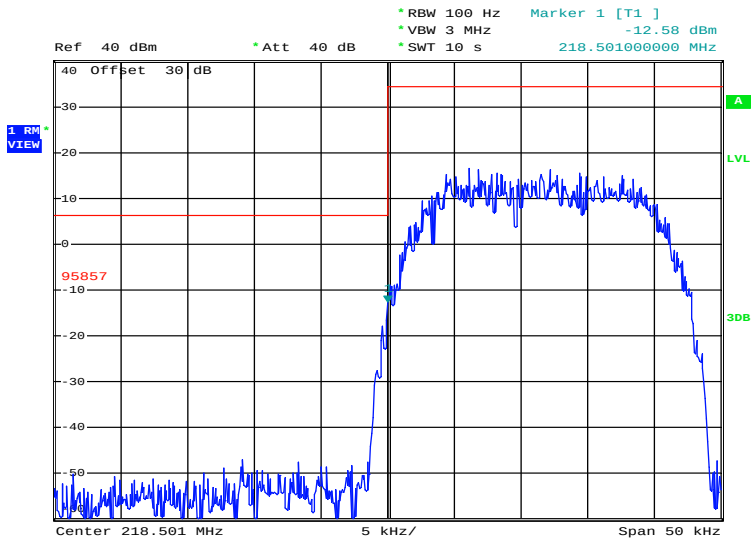


Date: 13.MAR.2018 09:34:41

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.51250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Emission at Band Edge (dBm):	**-16.97**

Plot 11.11 – Segment B Lower Band Edge 218.501MHz, 25kHz BW, 16QAM

§95.1957 Band Edge Compliance

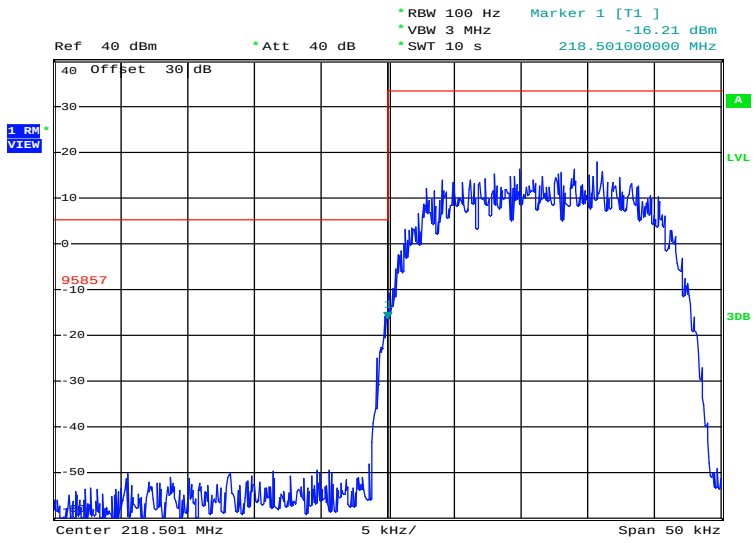


Date: 13.MAR.2018 09:36:47

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.51250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.30
Emission at Band Edge (dBm):	**-12.58**

Plot 11.12 – Segment B Lower Band Edge 218.501MHz, 25kHz BW, 64QAM

§95.1957 Band Edge Compliance

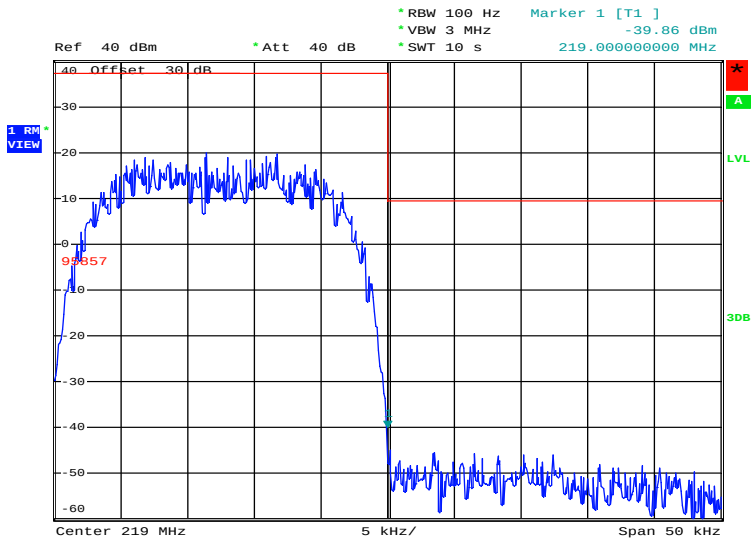


Date: 13.MAR.2018 09:38:39

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.51250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.35
Emission at Band Edge (dBm):	**-16.21**

Plot 11.13 – Segment B Upper Band Edge 219.000MHz, 25kHz BW, QPSK

§95.1957 Band Edge Compliance

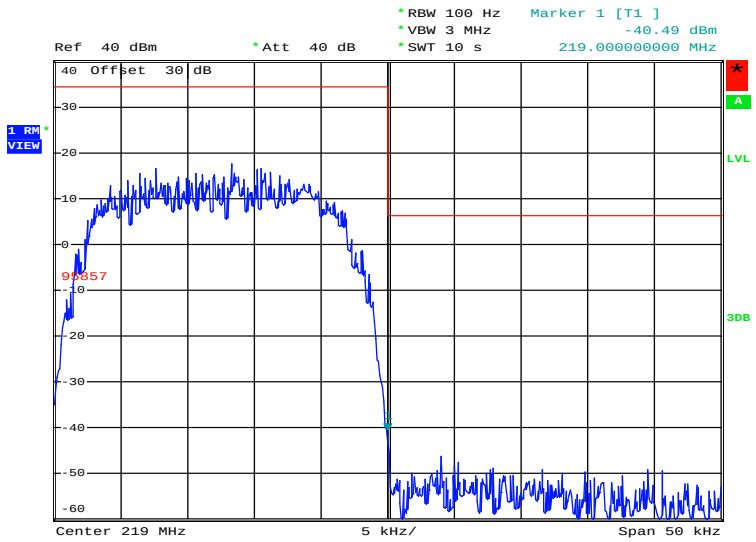


Date: 13.MAR.2018 09:43:25

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.98750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Emission at Band Edge (dBm):	**-39.86**

Plot 11.14 – Segment B Upper Band Edge 219.000MHz, 25kHz BW, 16QAM

§95.1957 Band Edge Compliance

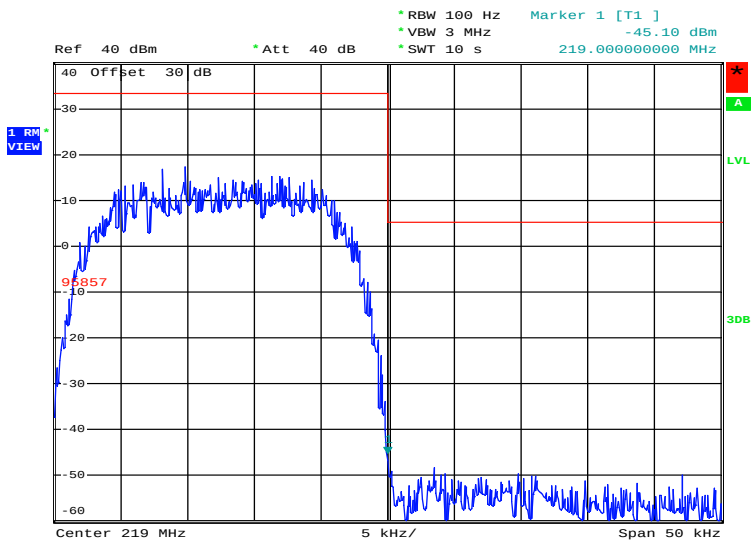


Date: 13.MAR.2018 09:45:23

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.98750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.30
Emission at Band Edge (dBm):	**-40.49**

Plot 11.15 – Segment B Upper Band Edge 219.000MHz, 25kHz BW, 64QAM

§95.1957 Band Edge Compliance

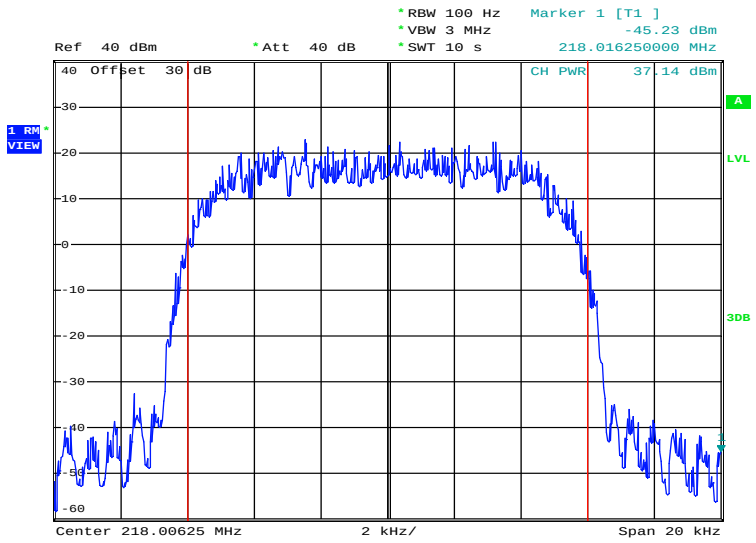


Date: 13.MAR.2018 09:47:11

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.98750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.35
Emission at Band Edge (dBm):	**-45.10**

Plot 11.16 – 100Hz RBW Channel Power, 12.5kHz BW, QPSK

§95.1957 100Hz Channel Power

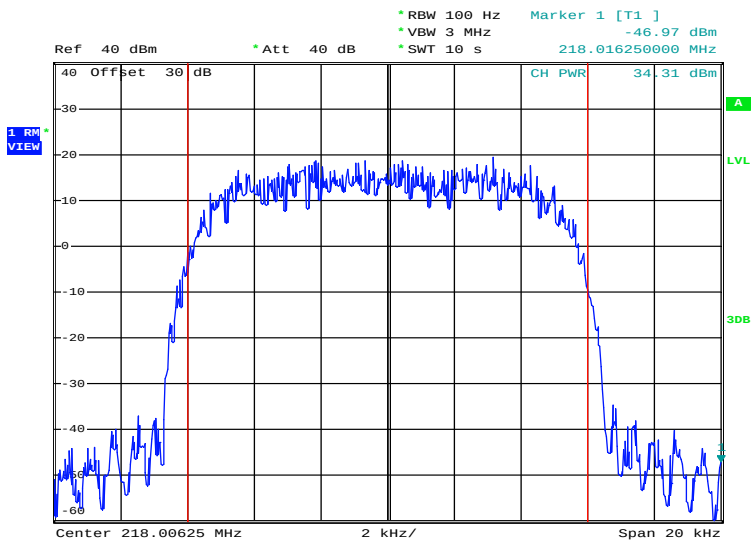


Date: 13.MAR.2018 10:06:01

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.14

Plot 11.17 – 100Hz RBW Channel Power, 12.5kHz BW, 16QAM

§95.1957 100Hz Channel Power

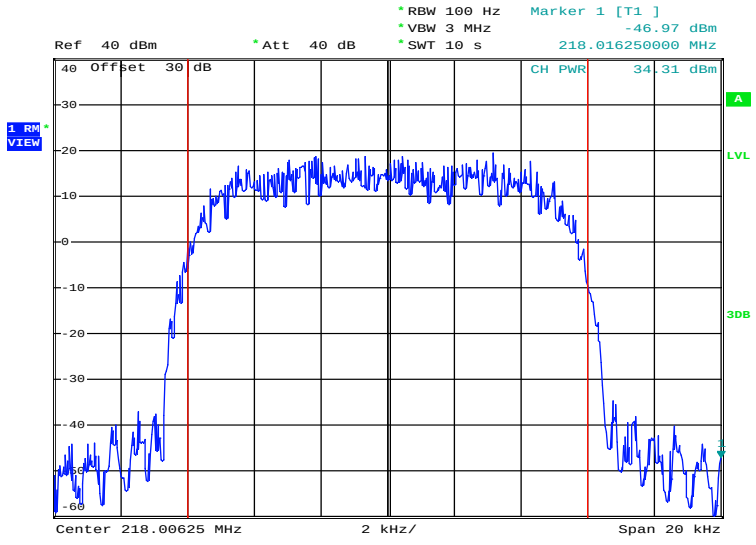


Date: 13.MAR.2018 10:07:49

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.31

Plot 11.18 – 100Hz RBW Channel Power, 12.5kHz BW, 64QAM

§95.1957 100Hz Channel Power

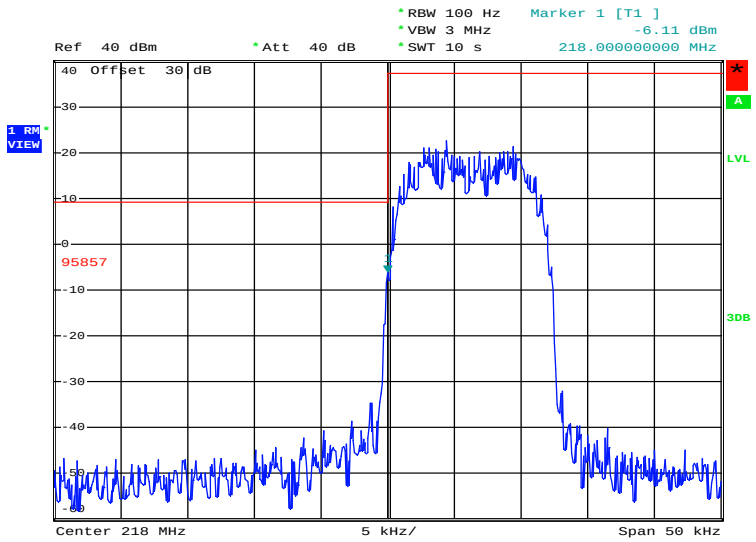


Date: 13.MAR.2018 10:07:49

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.47

Plot 11.19 – Segment A Lower Band Edge 218.000MHz, 12.5kHz BW, QPSK

§95.1957 Band Edge Compliance

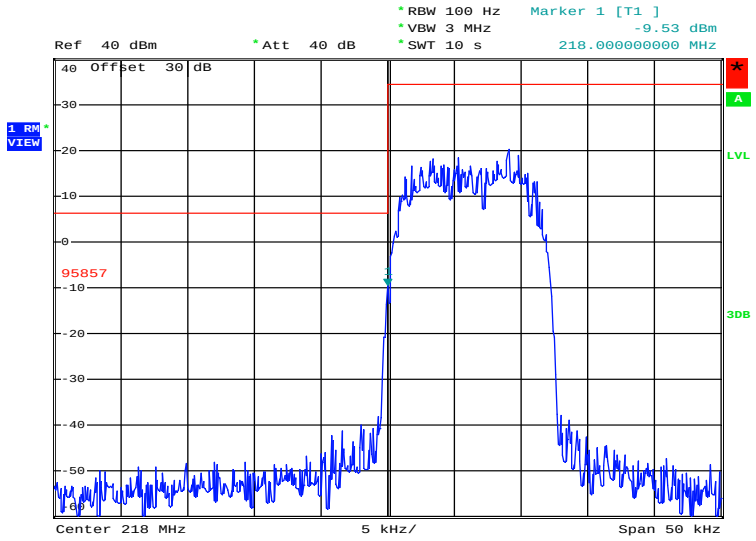


Date: 13.MAR.2018 10:15:52

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.0000
DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.14
Emission at Band Edge (dBm):	**-6.11**

Plot 11.20 – Segment A Lower Band Edge 218.000MHz, 12.5kHz BW, 16QAM

§95.1957 Band Edge Compliance

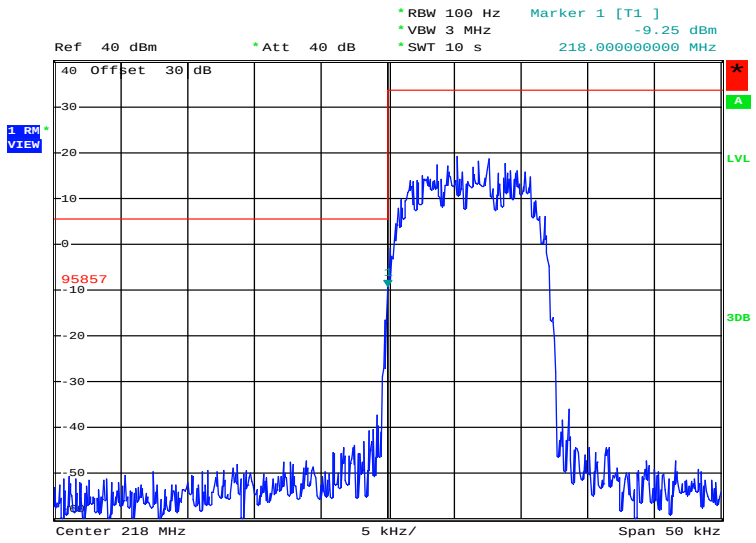


Date: 13.MAR.2018 10:24:11

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.0000
DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.31
Emission at Band Edge (dBm):	**-9.53**

Plot 11.21 – Segment A Lower Band Edge 218.000MHz, 12.5kHz BW, 64QAM

§95.1957 Band Edge Compliance

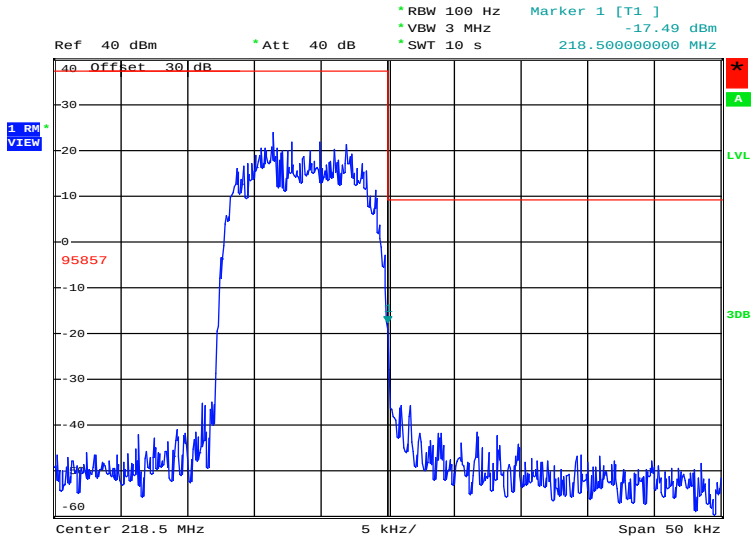


Date: 13.MAR.2018 10:27:44

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.000
DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.47
Emission at Band Edge (dBm):	**-9.25**

Plot 11.22 – Segment A Upper Band Edge 218.500MHz, 12.5kHz BW, QPSK

§95.1957 Band Edge Compliance

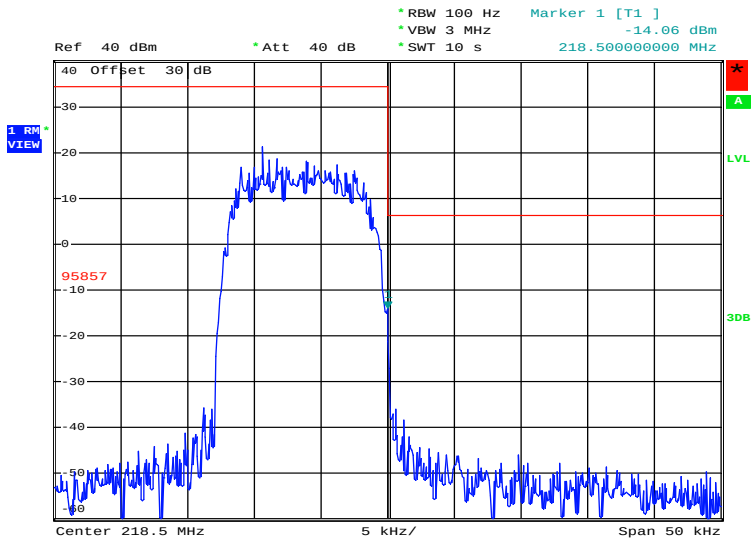


Date: 13.MAR.2018 10:31:54

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.49375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.14
Emission at Band Edge (dBm):	**-17.49**

Plot 11.23 – Segment A Upper Band Edge 218.500MHz, 12.5kHz BW, 16QAM

§95.1957 Band Edge Compliance

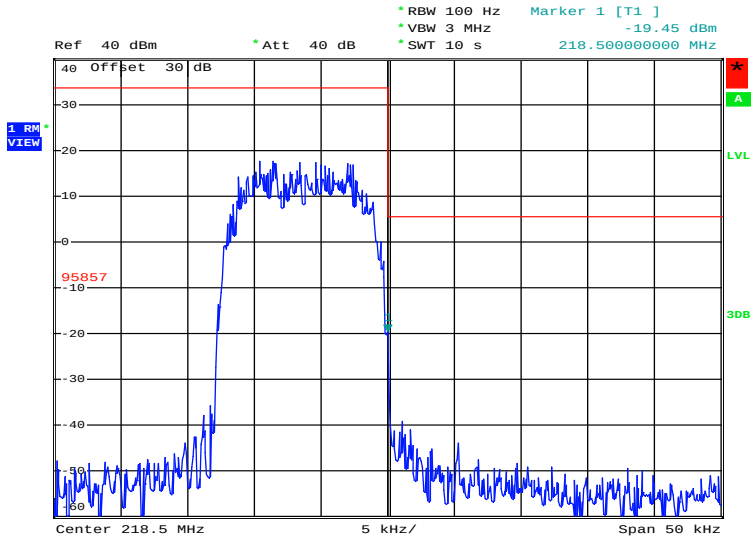


Date: 13.MAR.2018 10:39:59

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.49375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.31
Emission at Band Edge (dBm):	**-14.06**

Plot 11.24 – Segment A Upper Band Edge 218.500MHz, 12.5kHz BW, 64QAM

§95.1957 Band Edge Compliance

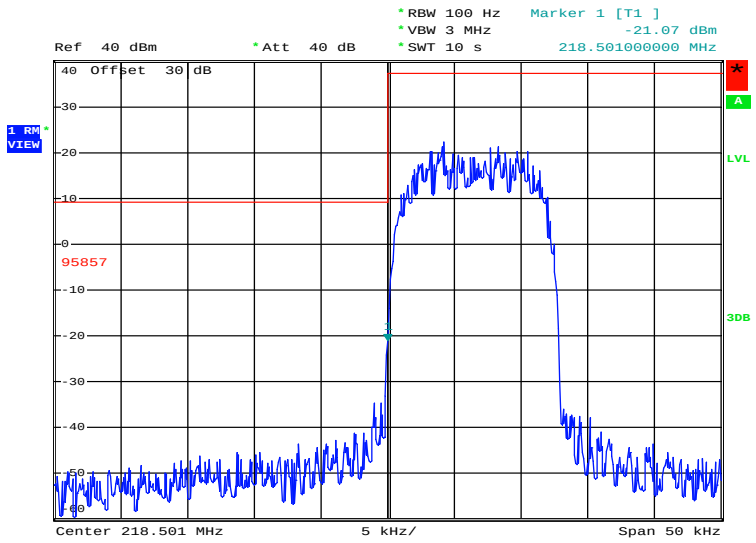


Date: 13.MAR.2018 10:41:25

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.49375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.47
Emission at Band Edge (dBm):	**-19.45**

Plot 11.25 – Segment B Lower Band Edge 218.501MHz, 12.5kHz BW, QPSK

§95.1957 Band Edge Compliance

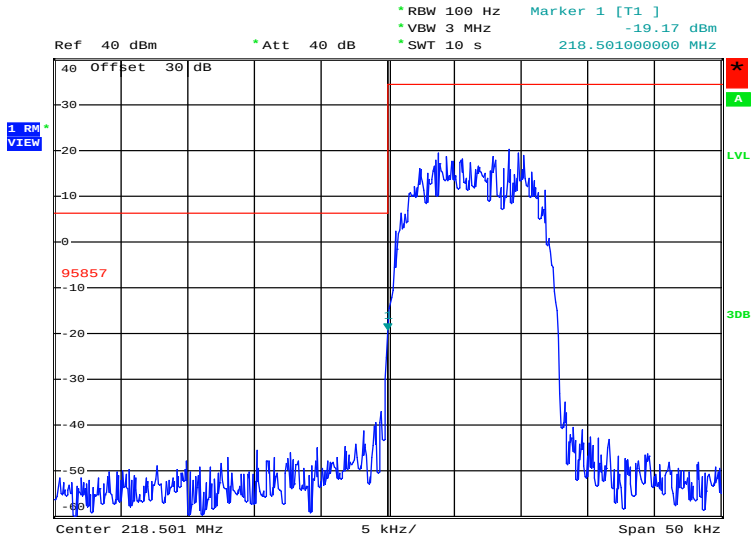


Date: 13.MAR.2018 10:45:38

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.50750
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.14
Emission at Band Edge (dBm):	**-21.07**

Plot 11.26 – Segment B Lower Band Edge 218.501MHz, 12.5kHz BW, 16QAM

§95.1957 Band Edge Compliance

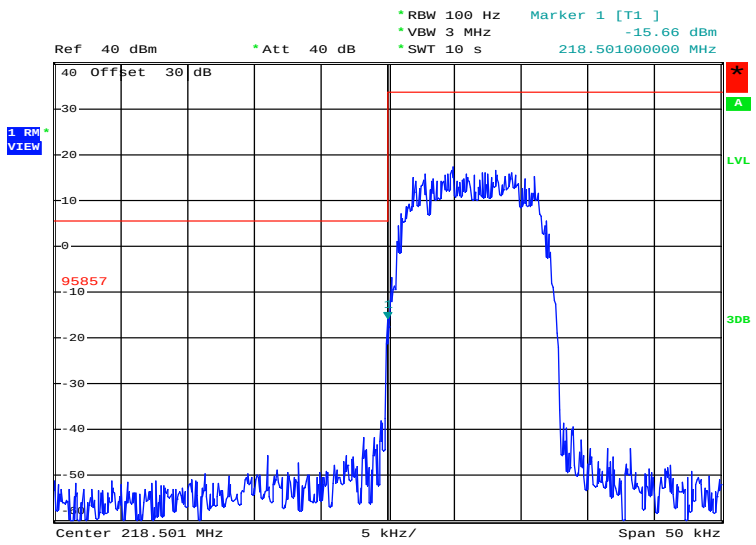


Date: 13.MAR.2018 10:47:50

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.50750
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.31
Emission at Band Edge (dBm):	**-19.17**

Plot 11.27 – Segment B Lower Band Edge 218.501MHz, 12.5kHz BW, 64QAM

§95.1957 Band Edge Compliance

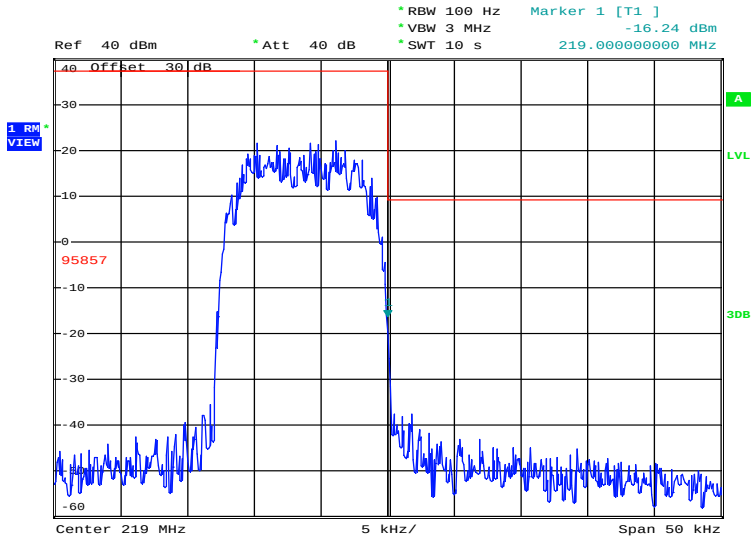


Date: 13.MAR.2018 10:49:27

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.50700
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.47
Emission at Band Edge (dBm):	**-15.66**

Plot 11.28 – Segment B Upper Band Edge 219.00MHz, 12.5kHz BW, QPSK

§95.1957 Band Edge Compliance

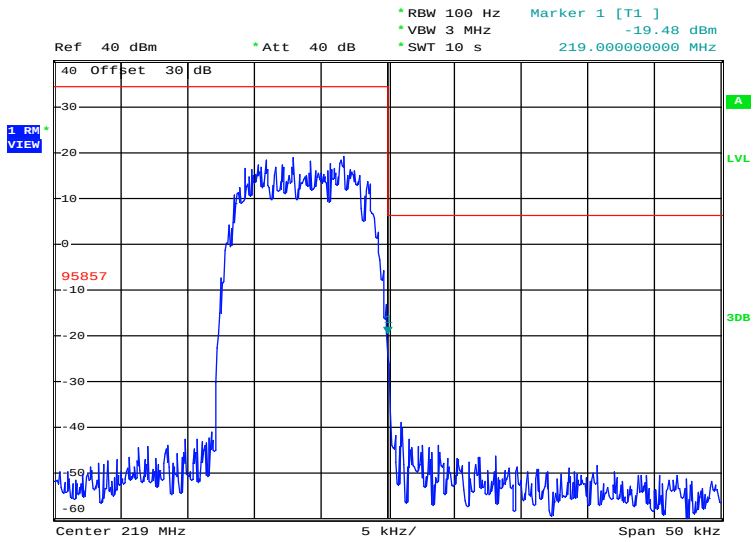


Date: 13.MAR.2018 10:53:18

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.99375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.14
Emission at Band Edge (dBm):	**-16.24**

Plot 11.29 – Segment B Upper Band Edge 219.00MHz, 12.5kHz BW, 16QAM

§95.1957 Band Edge Compliance

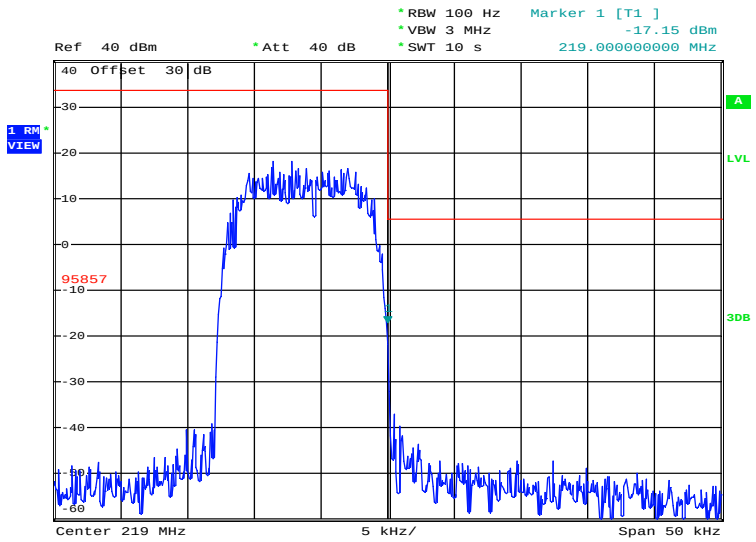


Date: 13.MAR.2018 10:54:55

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.99375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	16QAM
DUT Channel Power Setting (dBm):	35
Channel Power (dBm):	34.31
Emission at Band Edge (dBm):	**-19.48**

Plot 11.29 – Segment B Upper Band Edge 219.00MHz, 12.5kHz BW, 64QAM

§95.1957 Band Edge Compliance



Date: 13.MAR.2018 10:57:09

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.99375
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	64QAM
DUT Channel Power Setting (dBm):	34
Channel Power (dBm):	33.47
Emission at Band Edge (dBm):	**-17.15**

Table 11.1 – Summary of §95.1957 Band Edge Measurements

§95.1957 Band Edge Results									
Band Edge (MHz)	DUT Frequency (MHz)	Bandwidth Setting (kHz)	Modulation	Tx Power Setting (dBm)	Channel Power @ 100Hz RBW [P_{chan}] (dBm)	Band-Edge Emission @ 100Hz RBW [P_{BE}] (dBc)	Attenuation [A] (dB)	Limit (dBm)	Margin (dB)
218.000	218.0125	25	QPSK	37	37.36	-30.12	67.48	28.00	39.48
			16QAM	35	34.30	-31.65	65.95		37.95
			64QAM	34	33.35	-38.98	72.33		44.33
218.500	218.4875		QPSK	37	37.36	-39.66	77.02		49.02
			16QAM	35	34.30	-37.23	71.53		43.53
			64QAM	34	33.35	-42.44	75.79		47.79
218.501	218.5125	25	QPSK	37	37.36	-16.97	54.33	28.00	26.33
			16QAM	35	34.30	-12.58	46.88		18.88
			64QAM	34	33.35	-16.21	49.56		21.56
219.000	218.9875		QPSK	37	37.36	-39.86	77.22		49.22
			16QAM	35	34.30	-40.49	74.79		46.79
			64QAM	34	33.35	-45.10	78.45		50.45
218.000	218.00625	12.5	QPSK	37	37.14	-6.11	43.25	28.00	15.25
			16QAM	35	34.31	-9.53	43.84		15.84
			64QAM	34	33.74	-9.25	42.99		14.99
218.500	218.49375		QPSK	37	37.14	-17.49	54.63		26.63
			16QAM	35	34.31	-14.06	48.37		20.37
			64QAM	34	33.74	-19.45	53.19		25.19
218.501	218.507	12.5	QPSK	37	37.14	-21.07	58.21	28.00	30.21
			16QAM	35	34.31	-19.17	53.48		25.48
			64QAM	34	33.74	-15.66	49.40		21.40
219.000	218.99375		QPSK	37	37.14	-16.24	53.38		25.38
			16QAM	35	34.31	-19.48	53.79		25.79
			64QAM	34	33.74	-17.15	50.89		22.89

Attenuation [A] = [P_{chan}] - [P_{BE}]

Margin = Attenuation [A] - Limit

Result: Complies

12.0 CONDUCTED SPURIOUS EMISSIONS §95.1957

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §95.1957**

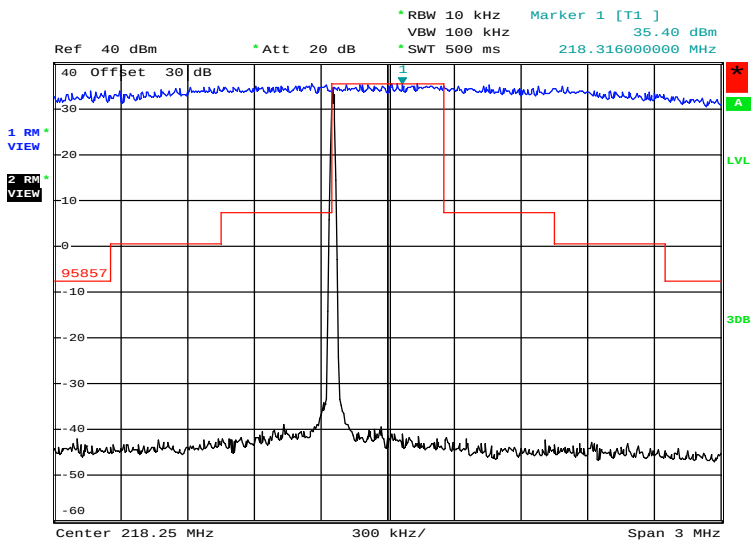
Limits	
47 CFR §95.1957	**§ 95.1957 Emission Standards** (a) All transmissions by each CTS and by each RTU shall use an emission type that complies with the following standard for unnecessary radiation. (b) All spurious and out-of-band emissions shall be attenuated: (1) Zero dB on any frequency within the authorized frequency segment. (2) At least 28 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 250 kHz up to and including 750 kHz; (3) At least 35 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 750 kHz up to and including 1250 kHz; (4) At least 43 plus 10 log (base 10) (mean power in Watts) dB on any frequency removed from the midpoint of the assigned frequency segment by more than 1250 kHz. (c) When testing for certification, all measurements of unnecessary radiation are performed using a carrier frequency as close to the edge of the authorized frequency segment as the transmitter is designed to be capable of operating. (d) The reference bandwidth of the instrumentation used to measure the emission power shall be 100 Hz for measuring emissions up to and including 250 kHz from the edge of the authorized frequency segment, and 10 kHz for measuring emissions more than 250 kHz from the edge of the authorized frequency segment. If a video filter is used, its bandwidth shall not be less than the reference bandwidth. The power level of the highest emission within the frequency segment, to which the attenuation is referenced, shall be remeasured for each change in reference bandwidth.

Test Setup	**Appendix A** **Figure A.1**

Measurement Procedure
The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to RMS.
For emissions at the band's edge, the SA RBW set to 100Hz and the emissions were compare to an emissions mask as described above. The emissions mask was set to the peak output level of the transmission. The DUT frequency was set as close to the band edge as capable. All transmission modes (QPSK, 16QAM and 64QAM) and channel bandwidths (12.5kHz and 50kHz) were evaluated. A marker indicates the emissions level at the band's edge.
For emissions greater than 250kHz from the band's edge, the SA RBW set to 10kHz and the emissions (Trace 2) were compare to an emissions mask as described above. The emissions mask was set to the peak output level of the transmission (Trace 1), measured with an RBW of 10kHz. The DUT frequency was set as close to the band edge as capable. All transmission modes (QPSK, 16QAM and 64QAM) and channel bandwidths (12.5kHz and 50kHz) were evaluated.

Plot 12.1 – Spurious Emissions Segment A 218.000MHz

§95.1957 Band Edge Compliance

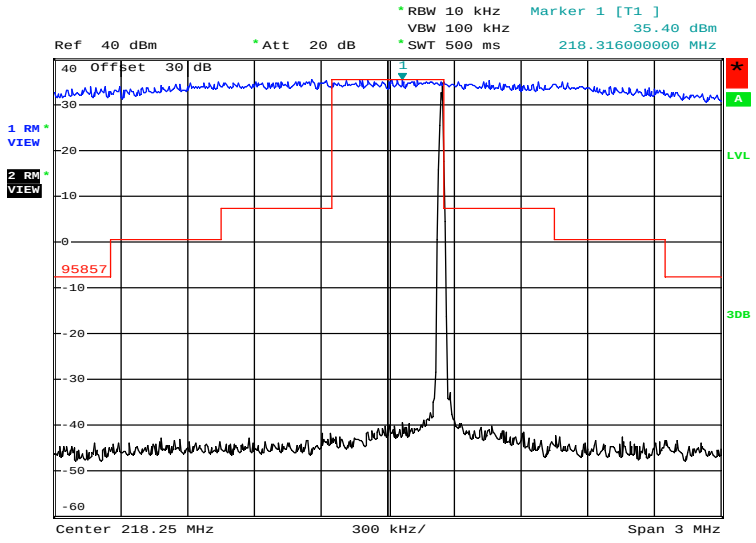


Date: 23.FEB.2018 10:54:04

Channel Segment:	A
Segment Lower Band Edge (MHz):	218.0000
DUT Channel Frequency (MHz):	218.01250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Spurious Emissions (dBm):	**None**

Plot 12.2 – Spurious Emissions Segment A 218.500MHz

§95.1957 Band Edge Compliance

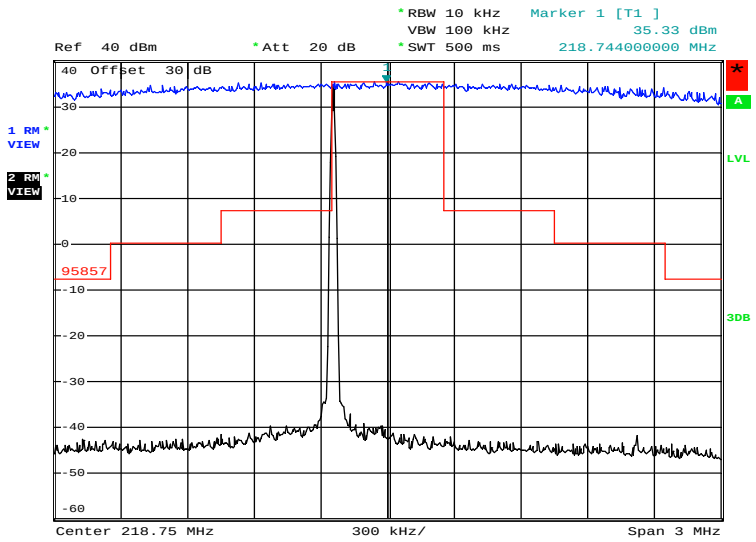


Date: 23.FEB.2018 10:53:02

Channel Segment:	A
Segment Upper Band Edge (MHz):	218.500
DUT Channel Frequency (MHz):	218.48750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Spurious Emissions (dBm):	**None**

Plot 12.3 – Spurious Emissions Segment B 218.501MHz

§95.1957 Band Edge Compliance

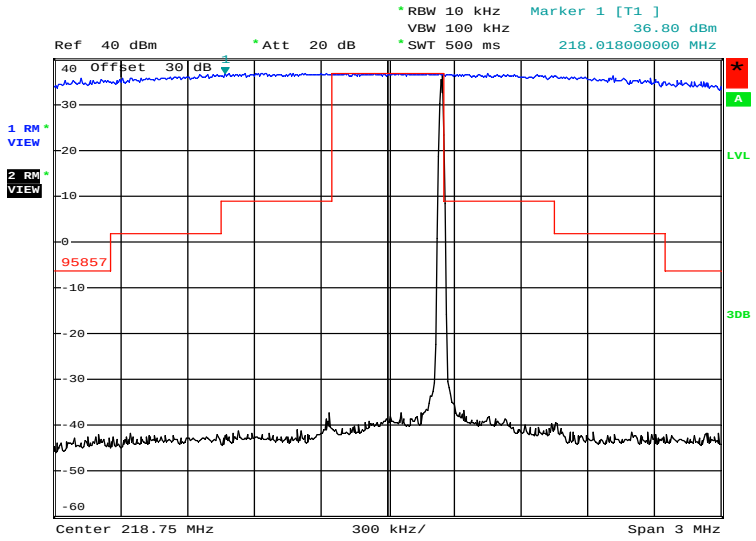


Date: 23.FEB.2018 11:09:47

Channel Segment:	B
Segment Lower Band Edge (MHz):	218.501
DUT Channel Frequency (MHz):	218.51250
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Spurious Emissions (dBm):	**None**

Plot 12.4 – Spurious Emissions Segment B 219.000MHz

§95.1957 Band Edge Compliance



Date: 23.FEB.2018 11:04:28

Channel Segment:	B
Segment Upper Band Edge (MHz):	219.000
DUT Channel Frequency (MHz):	218.98750
DUT Channel Bandwidth (kHz):	25.00
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Channel Power (dBm):	37.36
Spurious Emissions (dBm):	**None**

13.0 CONDUCTED SPURIOUS EMISSIONS TO 10TH HARMONIC

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §80.211(f), §95.1957**

Limits	
47 CFR §80.211	**§ 80.211 Emission Limitations** (f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB; (2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.
47 CFR §95.1957	**§ 95.1957 Emission Standards** (a) All transmissions by each CTS and by each RTU shall use an emission type that complies with the following standard for unnecessary radiation. (b) All spurious and out-of-band emissions shall be attenuated: (1) Zero dB on any frequency within the authorized frequency segment. (2) At least 28 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 250 kHz up to and including 750 kHz; (3) At least 35 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 750 kHz up to and including 1250 kHz; (4) At least 43 plus 10 log (base 10) (mean power in Watts) dB on any frequency removed from the midpoint of the assigned frequency segment by more than 1250 kHz. (c) When testing for certification, all measurements of unnecessary radiation are performed using a carrier frequency as close to the edge of the authorized frequency segment as the transmitter is designed to be capable of operating. (d) The reference bandwidth of the instrumentation used to measure the emission power shall be 100 Hz for measuring emissions up to and including 250 kHz from the edge of the authorized frequency segment, and 10 kHz for measuring emissions more than 250 kHz from the edge of the authorized frequency segment. If a video filter is used, its bandwidth shall not be less than the reference bandwidth. The power level of the highest emission within the frequency segment, to which the attenuation is referenced, shall be remeasured for each change in reference bandwidth.

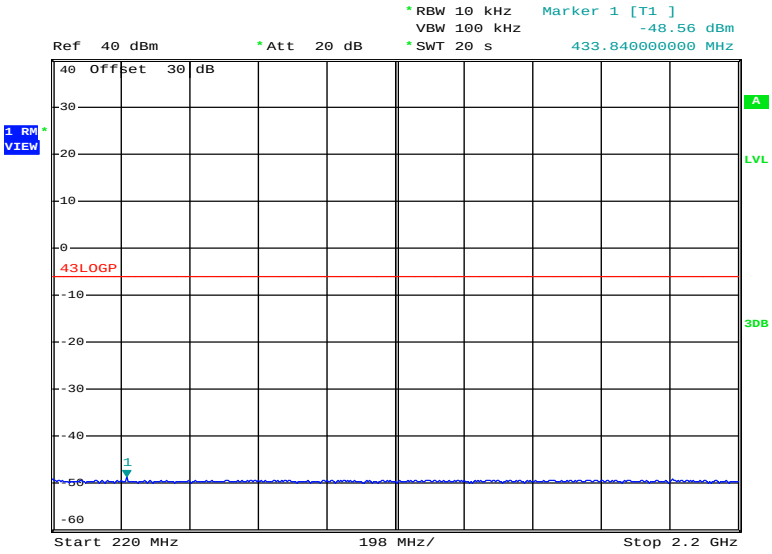
Test Setup	**Appendix A Figure A.1**

Measurement Procedure

The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA Detector was set to RMS with the RBW set to 10kHz. The output power of the DUT was set to the manufacturer's highest rated setting for QPSK Modulation. Emissions were investigate to the 10th harmonic.

Plot 13.1 – Spurious Emissions 220 – 2200MHz

Conducted Spurious Emission to 10th Harmonic

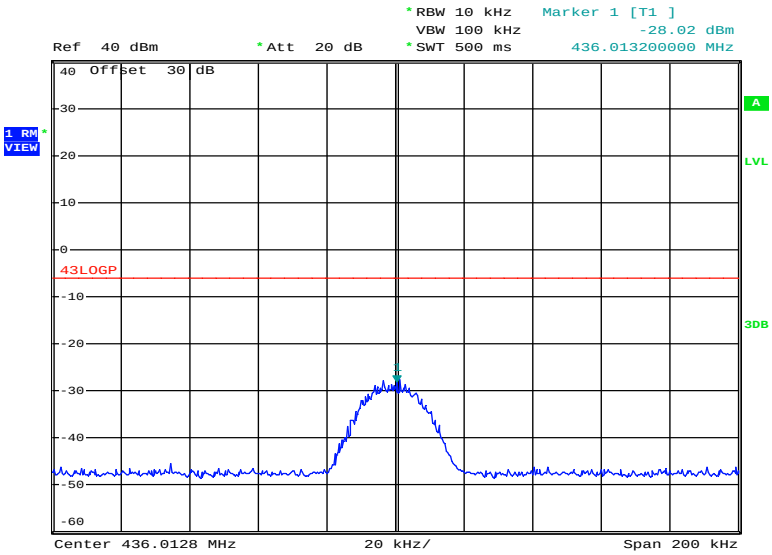


Date: 23.FEB.2018 11:44:16

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Frequency Range (MHz):	220 - 2200
Emission at Level (dBm):	Reference

Plot 13.2 – Spurious Emissions 2nd Harmonic

Conducted Spurious Emission to 10th Harmonic

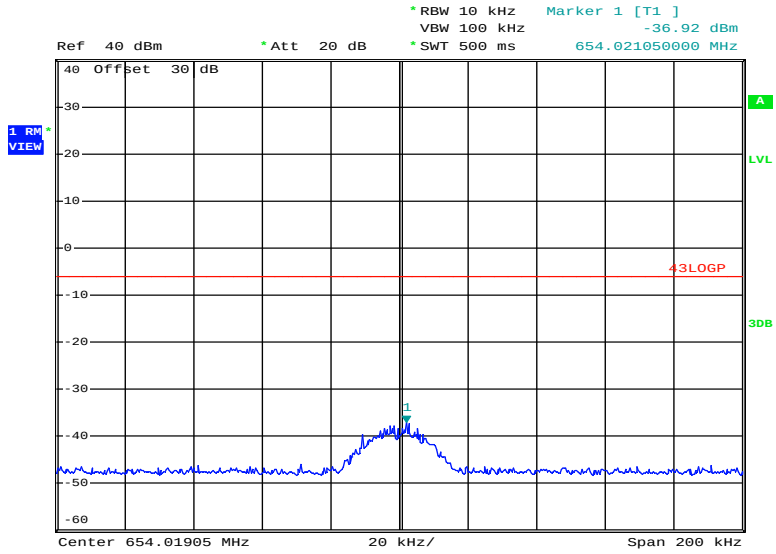


Date: 23.FEB.2018 11:47:33

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Emission Frequency (MHz):	436.013
Emission at Level (dBm):	-28.02

Plot 13.3 – Spurious Emissions 3rd Harmonic

Conducted Spurious Emission to 10th Harmonic



DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Emission Frequency (MHz):	654.021
Emission at Level (dBm):	**-36.92**

Table 13.1 – Summary of Conducted Spurious Emissions

Conducted Spurious Emissions Summary

Freq (MHz)	BW (kHz)	Modulation	Power Setting(1) (dBm)	Measured Power [E_{Meas}] (dBm)	Emission Frequency (MHz)	Measured Emission [E_{EM}] (dBm)	Attenuation [A] (dBc)	Limit (dB)	Margin (dB)
218.00625	12.5	QPSK	37	37.00	436.013	-28.02	65.02	43.0	**22.0**
					654.021	-36.92	73.92		**30.9**
							Results:		**Complies**

Attenuation [A] = E_{Meas} - E_{EM}

Margin = [A] - Limit

No other emissions spurious emissions were observed.

14.0 RADIATED SPURIOUS EMISSIONS

Test Procedure	
Normative Reference	**FCC 47 CFR §2.1046, §80.211(f), §95.1957**

Limits	
47 CFR §80.211	**§ 80.211 Emission Limitations** (f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB; (2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.
47 CFR §95.1957	**§ 95.1957 Emission Standards** (a) All transmissions by each CTS and by each RTU shall use an emission type that complies with the following standard for unnecessary radiation. (b) All spurious and out-of-band emissions shall be attenuated: (1) Zero dB on any frequency within the authorized frequency segment. (2) At least 28 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 250 kHz up to and including 750 kHz; (3) At least 35 dB on any frequency removed from the midpoint of the assigned frequency segment by more than 750 kHz up to and including 1250 kHz; (4) At least 43 plus 10 log (base 10) (mean power in Watts) dB on any frequency removed from the midpoint of the assigned frequency segment by more than 1250 kHz. (c) When testing for certification, all measurements of unnecessary radiation are performed using a carrier frequency as close to the edge of the authorized frequency segment as the transmitter is designed to be capable of operating. (d) The reference bandwidth of the instrumentation used to measure the emission power shall be 100 Hz for measuring emissions up to and including 250 kHz from the edge of the authorized frequency segment, and 10 kHz for measuring emissions more than 250 kHz from the edge of the authorized frequency segment. If a video filter is used, its bandwidth shall not be less than the reference bandwidth. The power level of the highest emission within the frequency segment, to which the attenuation is referenced, shall be remeasured for each change in reference bandwidth.

Test Setup	Appendix A Figure A.3, Figure A.4

Measurement Procedure

Measurements Below 1GHz

The DUT and measurement equipment were setup in accordance with Figure A.3 in appendix A. The Scan range was from 200MHz to 1GHz. The scans were made with the antennas in the horizontal and vertical polarizations and from 1 to 4m elevation. The DUT was rotated 360 degrees.

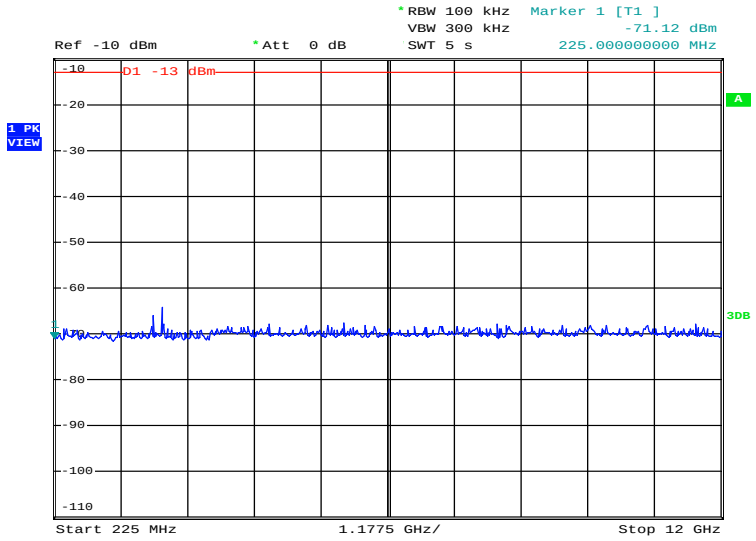
Measurements Above 1GHz

The DUT and measurement equipment were setup in accordance with Figure A.4 in appendix A. The Scan range was from 1 to 3GHz. The scans were made with the antennas in the horizontal and vertical polarizations on a bore-sighted mast and from 1 to 4m elevation. The DUT was rotated 360 degrees.

2

Plot 14.1 – Radiated Spurious Emissions 225MHz – 1.2GHz

Radiated Spurious Emissions (Horizontal)

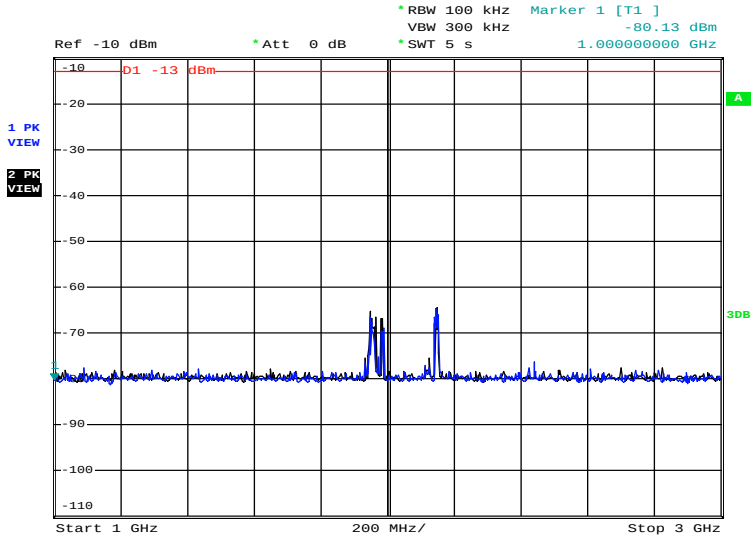


Date: 27.FEB.2018 14:11:11

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Frequency Range (MHz):	220 - 1200
Emission at Level (dBm):	None

Plot 14.2 – Radiated Spurious Emissions 1 – 3GHz Horizontal

Radiated Spurious Emissions 1 to 3 GHz (Horizontal)



Date: 27.FEB.2018 14:38:33

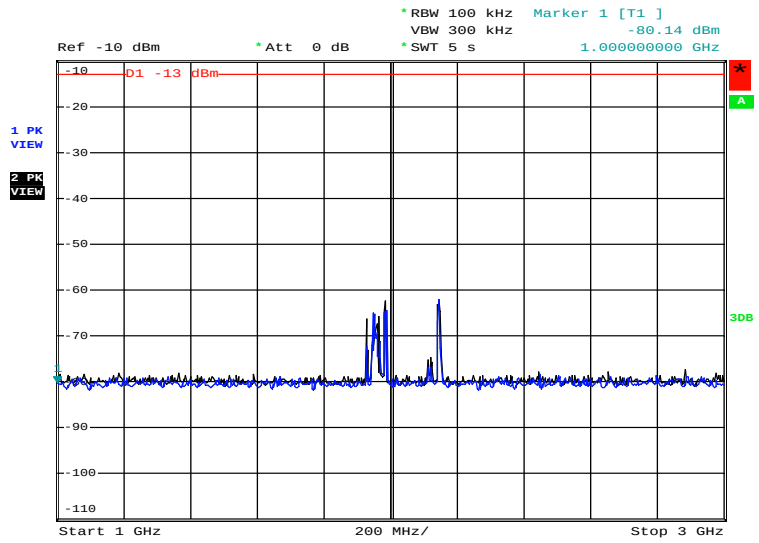
Trace Blue = Ambient

Trace Black = Spurious Emission

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Frequency Range (GHz):	43103.00
Emission at Level (dBm):	None

Plot 14.2 – Radiated Spurious Emissions 1 – 3GHz Vertical

Radiated Spurious Emissions 1 to 3 GHz (Vertical)



Date: 27.FEB.2018 14:35:33

Trace Blue = Ambient

Trace Black = Spurious Emission

DUT Channel Frequency (MHz):	218.00625
DUT Channel Bandwidth (kHz):	12.50
DUT Modulation:	QPSK
DUT Channel Power Setting (dBm):	37
Frequency Range (GHz):	43103.00
Emission at Level (dBm):	**None**

Table 14.1 – Summary of Radiated Spurious Emissions

Radiated Spurious Emissions Summary

Freq (MHz)	BW (kHz)	Modulation	Power Setting(1) (dBm)	Measured Power [E_{Meas}] (dBm)	Polarization	Emission Frequency (MHz)	Measured Emission [E_{EM}] (dBm)	Attenuation [A] (dBc)	Limit (dB)	Margin (dB)
218.00625	12.5	QPSK	37	37.00	Horizontal	No Emissions Detected			43.0	**-43.0**
					Vertical					**-43.0**
								Results:		**Complies**

Attenuation [A] = E_{Meas} - E_{EM}

Margin = [A] - Limit

No other emissions spurious emissions were observed.

15.0 FREQUENCY STABILITY

Test Conditions	
Normative Reference	**FCC 47 CFR §80.209(a)(6), §2.1055**

Limits	
47 CFR §80.209(a)(6)	**§ 80.209 Transmitter Frequency Tolerances** (a)(6)(i) Coat Stations: 5ppm, (a)(6)(ii) Ship Stations: 5ppm
47 CFR §2.1055	**§ 2.1055 Measurements required: Frequency stability** (a) The frequency stability shall be measured with variation of ambient temperature as follows: (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section. (d) The frequency stability shall be measured with variation of primary supply voltage as follows: (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Test Setup	**Appendix A Figure A.5**

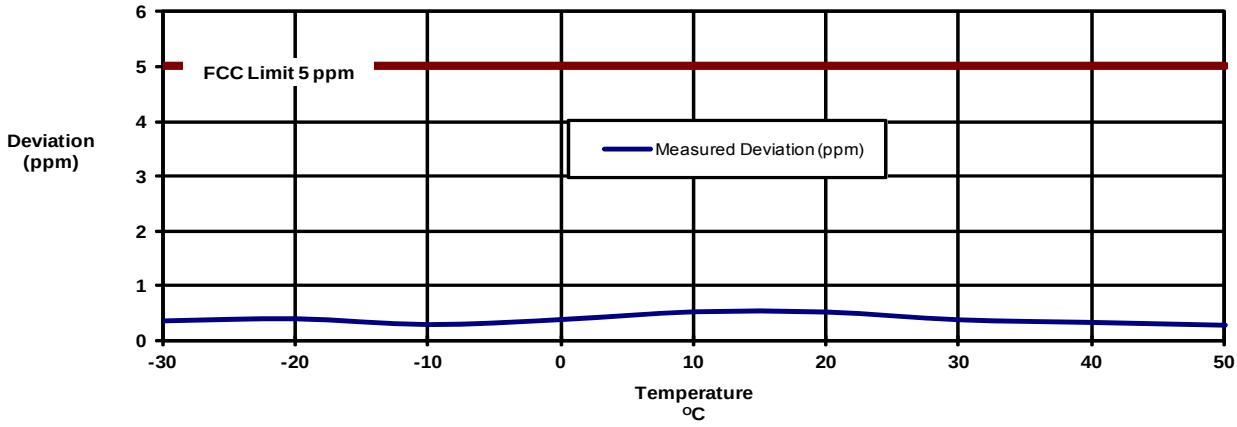
Measurement Procedure

The DUT was connected to a Frequency Counter via a 30dB attenuator connected to the DUT's antenna port. The output power of the DUT was set to the manufacturer's highest rated in CW mode at 219.0625MHz. The temperature was allowed to stablize and the frequency count was recorded at each temperature step. This procedure was carried out throughout the entire temperature range.

Plot 15.1 – Frequency Stability Aprisa SR+

Frequency Stability Aprisa SR+

Nominal Frequency (MHz):	219.0625
Nominal Channel BW (KHz):	8.0
Nominal Voltage (VDC):	13.8
Nominal Temperature (°C):	25



Frequency Stability Measurements (Temperature)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
-30	219.062500	219.0625783	78	0.36
-20	219.062500	219.0625873	87	0.40
-10	219.062500	219.0625630	63	0.29
0	219.062500	219.0625840	84	0.38
10	219.062500	219.0626170	117	0.53
20	219.062500	219.0626162	116	0.53
30	219.062500	219.0625830	83	0.38
40	219.062500	219.0625719	72	0.33
50	219.062500	219.0625600	60	0.27
			Maximum Deviation:	0.53
			Maximum Limit:	5.0
			Result:	Complies

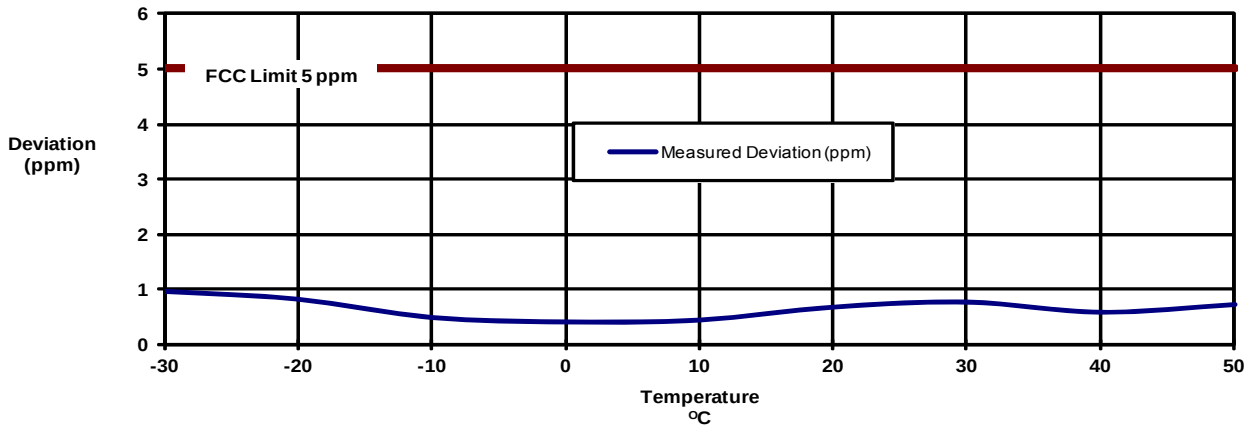
Frequency Stability Measurements (Voltage)

Voltage (VDC)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
15.87 (115%)	219.062500	219.0626170	117	0.53
13.8 (100%)	219.062500	219.0626162	116	0.53
11.73 (85%)	219.062500	219.0626175	117	0.54
			Maximum Deviation:	0.54
			Maximum Limit:	5.0
			Result:	Complies

Plot 15.2 – Frequency Stability Aprisa SR

Frequency Stability Aprisa SR

Nominal Frequency (MHz):	219.0625
Nominal Channel BW (KHz):	12.5
Nominal Voltage (VDC):	13.6
Nominal Temperature (°C):	25



Frequency Stability Measurements (Temperature)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
-30	219.062500	219.0627100	210	0.96
-20	219.062500	219.0626800	180	0.82
-10	219.062500	219.0626100	110	0.50
0	219.062500	219.0625930	93	0.42
10	219.062500	219.0626000	100	0.46
20	219.062500	219.0626500	150	0.68
30	219.062500	219.0626690	169	0.77
40	219.062500	219.0626300	130	0.59
50	219.062500	219.0626600	160	0.73
			Maximum Deviation:	0.96
			Maximum Limit:	5.0
			Result:	Complies

Frequency Stability Measurements (Voltage)

Voltage (VDC)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
15.87 (115%)	219.062500	219.0626525	153	0.70
13.8 (100%)	219.062500	219.0626535	154	0.70
11.73 (85%)	219.062500	219.0626550	155	0.71
			Maximum Deviation:	0.71
			Maximum Limit:	5.0
			Result:	Complies

16.0 RECEIVER RADIATED SPURIOUS EMISSIONS

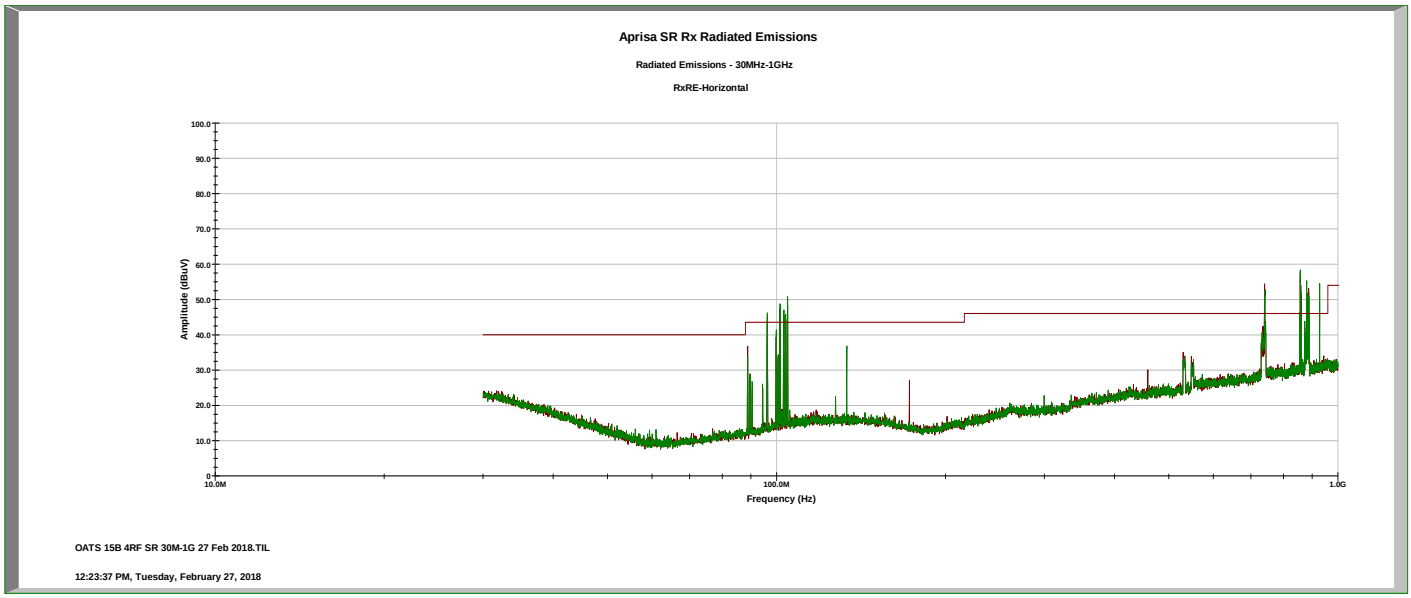
Test Conditions	
Normative Reference	**FCC 47 CFR §15.109**

Limits	
FCC §15.109	**§15.109 Radiated emission limits.** (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:
	30-88MHz: 40dBuV/m 88-216MHz: 43.5dBuV/m 216-960MHz: 46dBuV/m > 960MHz: 54dBuV/m

Test Setup	Appendix A Figure A.3

Plot 16.1 – SR Radiated Emissions - Horizontal

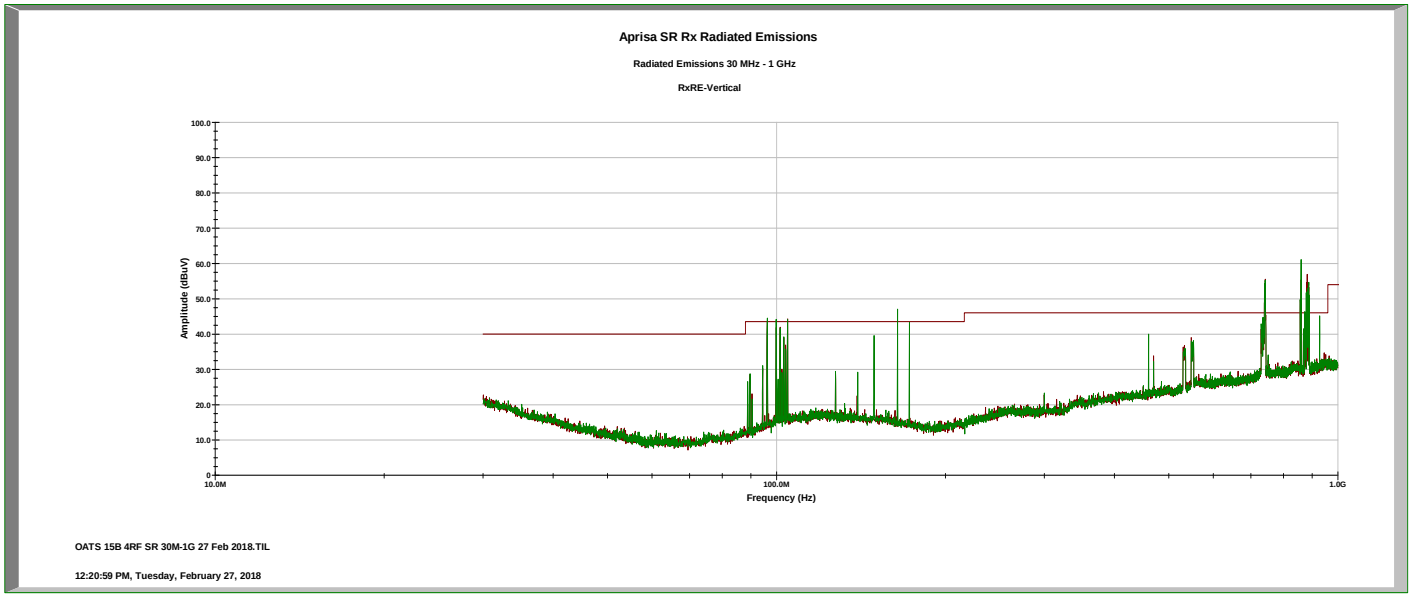
SR Receiver Radiated Spurious Emissions 30MHz to 1 GHz (Horizontal)



Trace Green = Ambient
Trace Red = Spurious Emission

Plot 16.2 – SR Radiated Emissions - Vertical

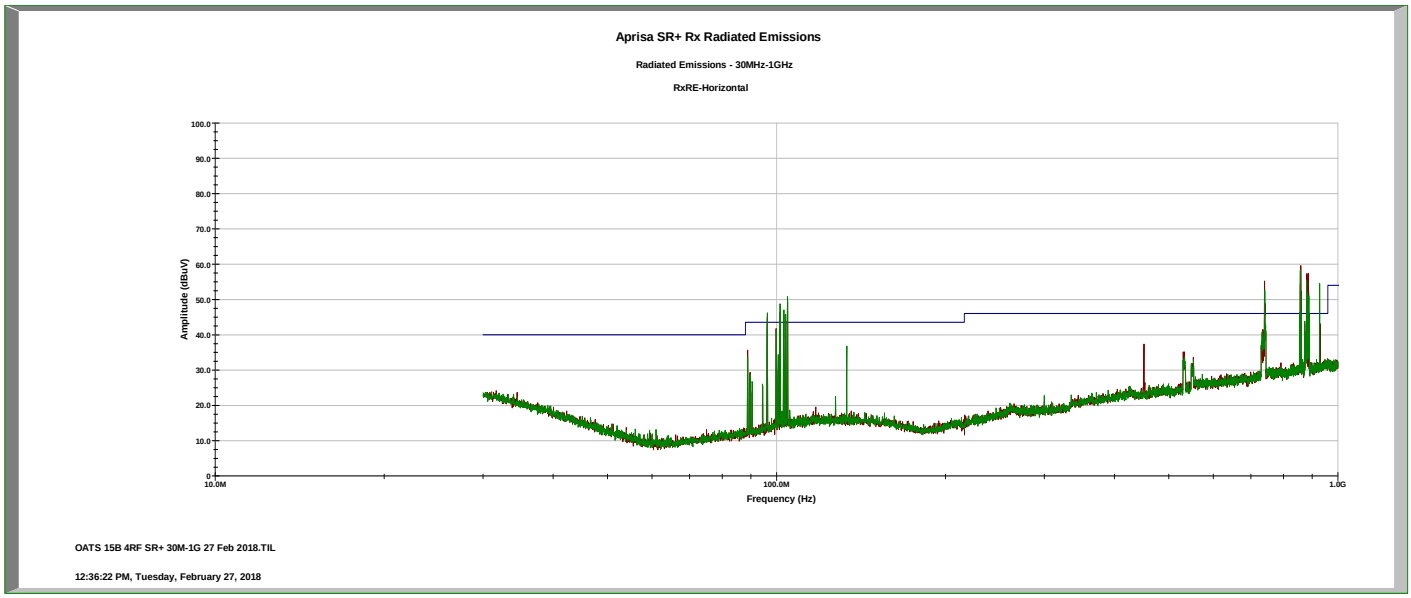
SR Receiver Radiated Spurious Emissions 30MHz to 1 GHz (Vertical)



Trace Green = Ambient
Trace Red = Spurious Emission

Plot 16.3 – SR+ Radiated Emissions - Horizontal

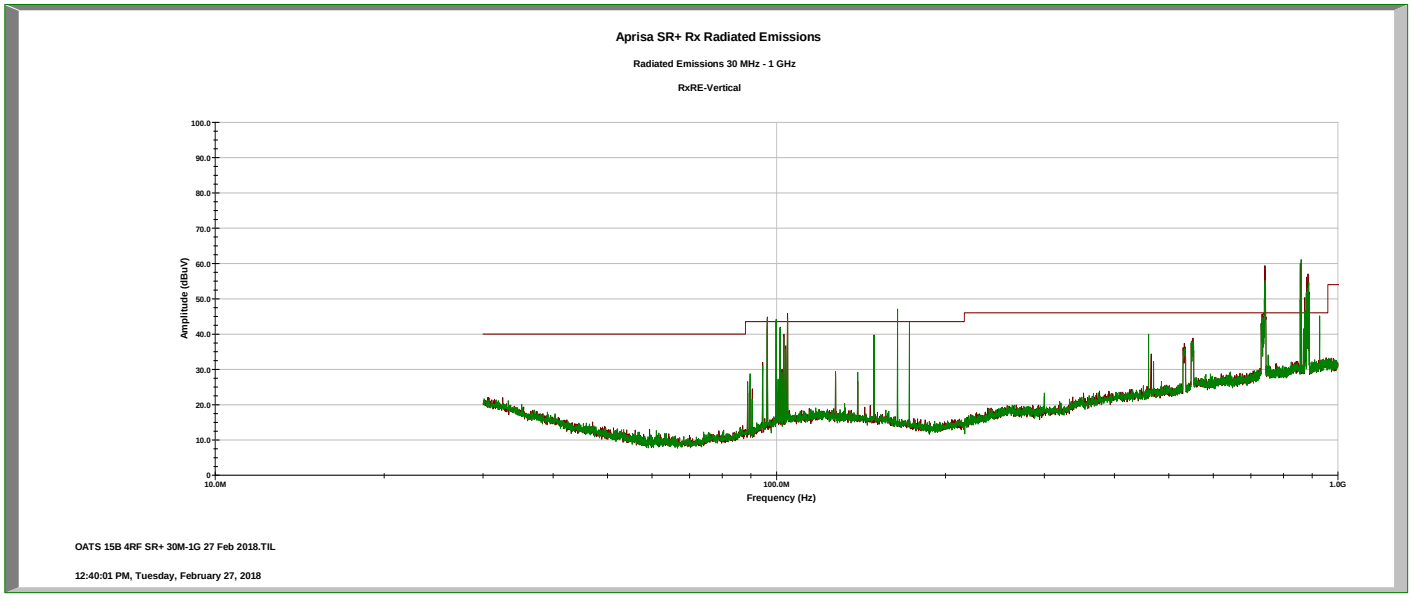
SR+ Receiver Radiated Spurious Emissions 30MHz to 1 GHz (Horizontal)



Trace Green = Ambient
Trace Red = Spurious Emission

Plot 16.4 – SR+ Radiated Emissions - Horizontal

SR+ Receiver Radiated Spurious Emissions 30MHz to 1 GHz (Vertical)



Trace Green = Ambient
Trace Red = Spurious Emission

APPENDIX A – TEST SETUP DRAWINGS AND CONDITIONS

Table A.1 – Conducted Measurement Setup and Environmental

Environmental Conditions (Typical)	
Temperature	25°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List			
Asset Number	Manufacturer	Model Number	Description
00241	R&S	FSU40	Spectrum Analyzer

Figure A.1 – Test Setup – Conducted Measurements

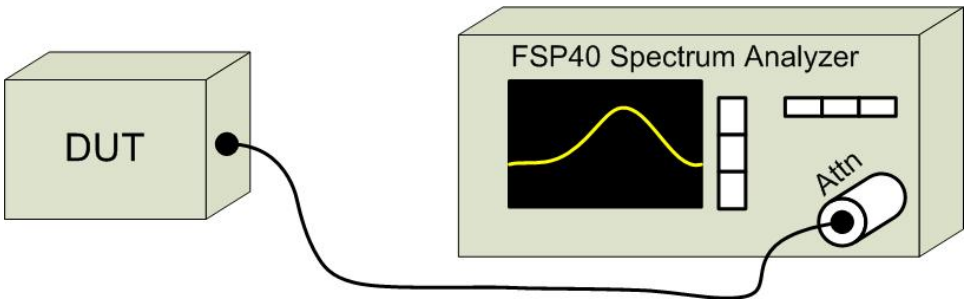


Table A.2 – §80.211(c) Conducted Measurement Setup and Environmental

Environmental Conditions (Typical)	
Temperature	25°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List			
Asset Number	**Manufacturer**	**Model Number**	**Description**
00241	R&S	FSU40	Spectrum Analyzer
00301	Mini-Ckts	VHF-650+	High-Pass Filter 710 - 2490 MHz

Figure A.2 – §80.211(c) Test Setup

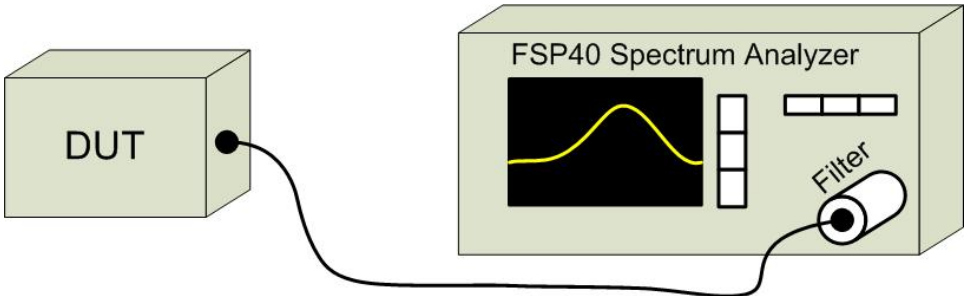


Table A.3 – Radiated Emissions Measurement Equipment and Environmental

Environmental Conditions (Typical)	
Temperature	3°C
Humidity	<60%
Barometric Pressure	101 +/- 3kPa

Equipment List

Asset Number	Manufacturer	Model Number	Description
00051	HP	8566B	Spectrum Analyzer
00049	HP	85650A	Quasi-peak Adapter
00047	HP	85685A	RF Preselector
00072	EMCO	2075	Mini-mast
00073	EMCO	2080	Turn Table
00071	EMCO	2090	Multi-Device Controller
00265	Miteq	JS32-00104000-58-5P	Microwave L/N Amplifier
00241	R&S	FSU40	Spectrum Analyzer
00050	Chase	CBL-6111A	Bilog Antenna
00275	Coaxis	LMR400	25m Cable
00276	Coaxis	LMR400	4m Cable
00278	TILE	34G3	TILE Test Software
00034	ETS	3115	Double Ridged Guide Horn

CNR: Calibration Not Required
COU: Calibrate On Use

Figure A.3 – Test Setup Radiated Measurements Below 1GHz

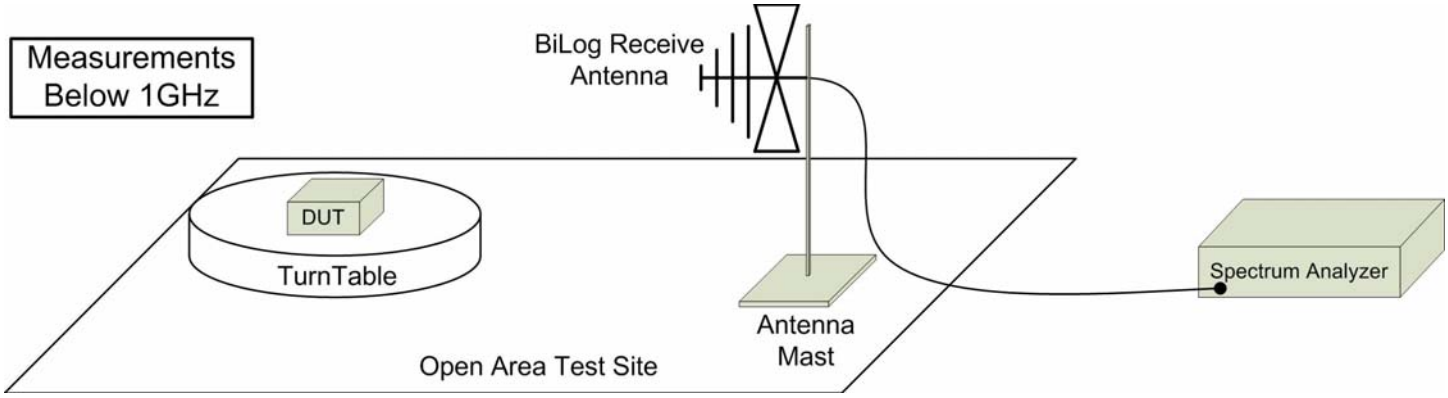


Figure A.4 – Test Setup Radiated Measurements Above 1GHz

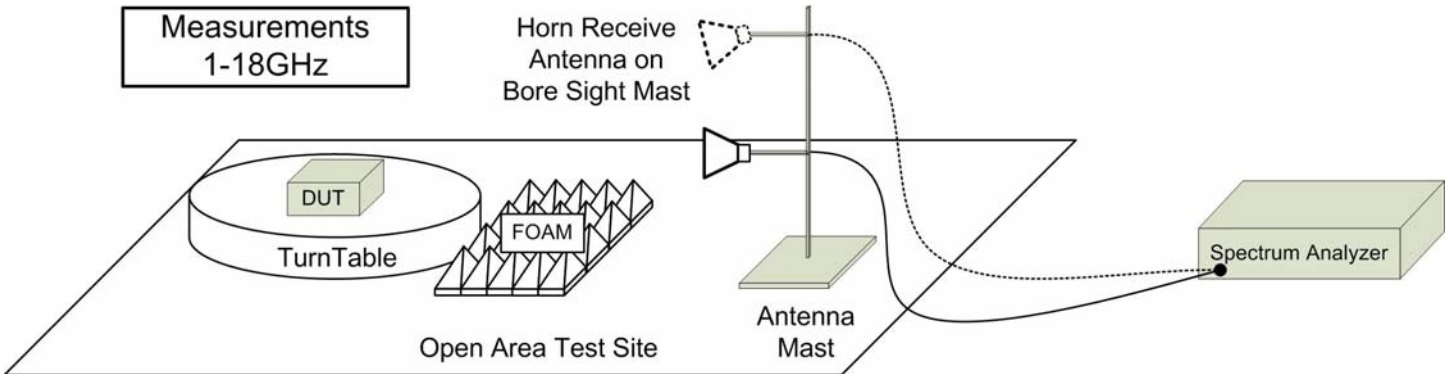
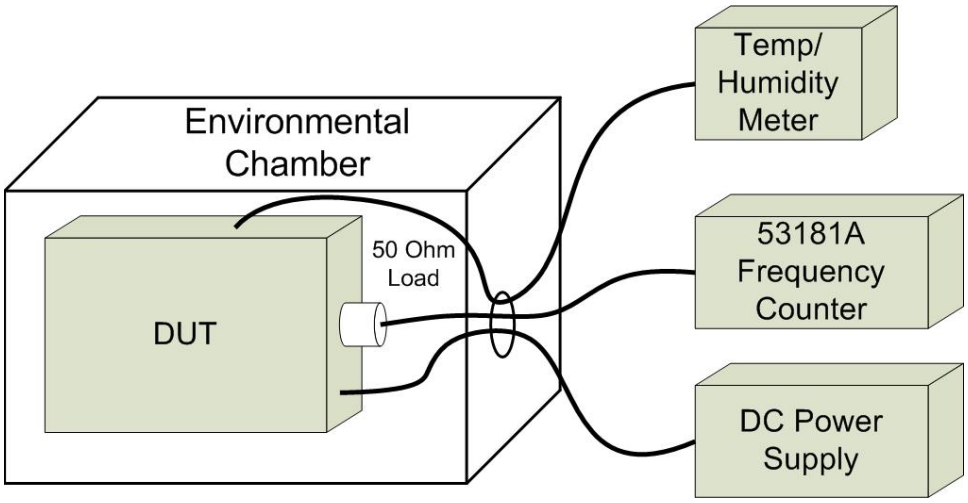


Table A.4 – Frequency Stability Measurement Equipment and Environmental

Test Conditions	
Temperature	-30°C to +50°C at 10°C Increments
Humidity	<100% Non Condensating
Voltage (VDC)	11.7 VDC(85%) - 13.8VDC - 15.9VDC(115%)

Equipment List			
Asset Number	Manufacturer	Model Number	Description
n/a	ESPEC	ECT-2	Environmental Chamber
00003	HP	53181A	Frequency Counter
n/a	HP	E3611A	Power Supply
00234	VWR	61161-378	Temp/Humidity Meter

Figure A.5 – Test Setup Frequency Stability



APPENDIX B – EQUIPMENT LIST AND CALIBRATION

Equipment List

(*)	Asset Number	Manufacturer	Model Number	Serial Number	Description	Last Calibrated	Calibration Interval
*	00050	Chase	CBL-6111A	1607	Bilog Antenna	23 Jun 2017	Triennial
*	00034	ETS	3115	6267	Double Ridged Guide Horn	02 Dec 2015	Triennial
	00035	ETS	3115	6276	Double Ridged Guide Horn	02 Dec 2015	Triennial
*	00047	HP	85685A	2837A00826	RF Preselector	23 Jun 2017	Triennial
*	00049	HP	85650A	2043A00162	Quasi-peak Adapter	23 Jun 2017	Triennial
*	00051	HP	8566B	2747A05510	Spectrum Analyzer	23 Jun 2017	Triennial
	00223	HP	8901A	3749A07154	Modulation Analyzer	27 Dec 2017	Triennial
	00224	HP	8903B	3729A18691	Audio Analyzer	28 Dec 2017	Triennial
*	00241	R&S	FSU40	100500	Spectrum Analyzer	23 Apr 2015	Triennial
*	00005	HP	8648D	3847A00611	Signal Generator	21 Jun 2017	Triennial
	00006	R&S	SMR20	100104	Signal Generator	29 May 2017	Triennial
	00243	Rigol	DS1102E	DS1ET150502164	Oscilloscope	7 Nov 2017	Triennial
	00254	LeCroy	WM8600A	532	Oscilloscope	NCR	n/a
	00110	Gigatronics	8652A	1875801	Power Meter	29 Feb 2016	Triennial
	00237	Gigatronics	80334A	1837001	Power Sensor	23 Jun 2014	Triennial
	00232	ETS Lindgren	HI-6005	91440	Isotropic E-Field Probe	18 Dec 2017	Triennial
*	00003	HP	53181A	3736A05175	Frequency Counter	21 Jun 2017	Triennial
	00257	Com-Power	LI-215A	191934	LISN	5 Jan 2018	Triennial
	00041	AR	10W1000C	27887	Power Amplifier	NCR	n/a
	00106	AR	5SIG4	26235	Power Amplifier	NCR	n/a
	00280	AR	25A250AM6	22702	Power Amplifier	NCR	n/a
	00265	Miteq	JS32-00104000-58-5P	1939850	Microwave L/N Amplifier	COU	n/a
	00071	EMCO	2090	9912-1484	Multi-Device Controller	n/a	n/a
	00072	EMCO	2075	0001-2277	Mini-mast	n/a	n/a
	00073	EMCO	2080	0002-1002	Turn Table	n/a	n/a
*	00081	ESPEC	ECT-2	0510154-B	Environmental Chamber	CNR	n/a
	00234	VWR	61161-378	140320430	Temp/Humidity Meter	New	Triennial
	00236	Nokia	-	236	ESD Table	NCR	n/a
	00255	Expert ESD	A4001	A4001-155	ESD Target	COU	n/a
	00064	NARDA	3020A	n/a	Bi-Directional Coupler	COU	n/a
	00263	Koaxis	KP10-1.00M-TD	263	1m Armoured Cable	COU	n/a
*	00263B	Koaxis	KP10-1.00M-TD	263B	1m Armoured Cable	COU	n/a
	00264	Koaxis	KP10-7.00M-TD	264	1m Armoured Cable	COU	n/a
*	00275	TMS	LMR400	n/a	25m Cable	COU	n/a
*	00276	TMS	LMR400	n/a	4m Cable	COU	n/a
	00277	TMS	LMR400	n/a	4m Cable	COU	n/a
*	00278	TILE	34G3	n/a	TILE Test Software	NCR	n/a
Rented Equipment							
	-						-

* Used during the course of this investigation
CNR: Calibration Not Required
COU: Calibrate On Use

APPENDIX C – MEASUREMENT INSTRUMENT UNCERTAINTY

CISPR 16-4 Measurement Uncertainty (U_{LAB})	
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence interval using a coverage factor of k=2	
30MHz - 200MHz	
U_{LAB} = 5.14dB U_{CISPR} = 6.3dB	
200MHz - 1000MHz	
U_{LAB} = 5.90dB U_{CISPR} = 6.3dB	
1GHz - 6GHz	
U_{LAB} = 4.80dB U_{CISPR} = 5.2dB	
6GHz - 18GHz	
U_{LAB} = 5.1dB U_{CISPR} = 5.5dB	
If the calculated uncertainty **U_{lab}** is **less** than **U_{CISPR}** then:	
1	Compliance is deemed to occur if **NO** measured disturbance exceeds the disturbance limit
2	Non-Compliance is deemed to occur if **ANY** measured disturbance **EXCEEDS** the disturbance limit
If the calculated uncertainty **U_{lab}** is **greater** than **U_{CISPR}** then:	
3	Compliance is deemed to occur if **NO** measured disturbance, increased by (**U_{lab} - U_{CISPR}**), exceeds the disturbance limit
4	Non-Compliance is deemed to occur if **ANY** measured disturbance, increased by (**U_{lab} - U_{CISPR}**), **EXCEEDS** the disturbance limit

