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# Otodata Wireless Network Inc. TEST REPORT

## SCOPE OF WORK

EMC TESTING – SMART LID NEEVO MONITOR

## REPORT NUMBER

104421615LEX-001.2

## ISSUE DATE

10/29/2020

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2/10/2021

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## EMC TEST REPORT (FULL COMPLIANCE)

**Report Number:** 104421615LEX-001.2

**Project Number:** G104421615

**Report Issue Date:** 2/10/2021

**Model(s) Tested:** Smart Lid Neevo Monitor

**Standards:** Title 47 CFR Part 15.247  
RSS-247 Issue 2  
RSS-Gen Issue 5

Tested by:  
Intertek Testing Services NA, Inc.  
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Client:  
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## 1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

## 2 Test Summary

Section	Test full name	Result
6	Receiver Spurious Emissions (ANSI C63.4: 2014)	Pass
7	Transmitter Spurious Emissions (FCC Part 15.247(d), RSS-247 Issue 2 § 5.5)	Pass
8	Output Power (FCC Part 15.247(b)(3), RSS-247 Issue 2 § 5.4(d))	Pass
9	Occupied Bandwidth (FCC Part 15.247, RSS-247 Issue 2 § 5.2(a))	Pass
10	Power Spectral Density (FCC Part 15.247(e), RSS-247 Issue 2 § 5.2(b))	Pass
11	Conducted Spurious Emissions (FCC Part 15.247(d), RSS-247 Issue 2 § 5.5)	Pass
12	Antenna Requirement (FCC Part 15.203, RSS-Gen Issue 5 § 6.8)	Pass
---	Conducted Emissions (ANSI C63.4: 2014)	N/A <sup>1</sup>

---

<sup>1</sup> Not applicable since this device is battery powered and does not connect to the AC mains.



### 3 Client Information

This product was tested at the request of the following:

Client Information	
<b>Client Name:</b>	Otodata Wireless Network Inc.
<b>Address:</b>	9280 Boul. De l'Acadie Montreal, QC H4N 3C5 Canada
<b>Contact:</b>	Pascal Turcotte
<b>Email:</b>	pturcotte@otodata.ca
Manufacturer Information	
<b>Manufacturer Name:</b>	Otodata Wireless Network Inc.
<b>Manufacturer Address:</b>	9280 Boul. De l'Acadie Montreal, QC H4N 3C5 Canada



#### 4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Smart Lid Neevo Monitor
Model Number	TM6035
Hardware Version	C018
Software Version	2008
Supported Transmit Bands	Bluetooth Low Energy 2402 – 2480MHz
Receive Date	9/13/2020
Test Start Date	9/14/2020
Test End Date	2/2/2021
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	7.2VDC Battery
Antenna	PCB Trace Antenna. 2.14dBi Gain
Description of Equipment Under Test (provided by client)	
<p>TM6035 (SmartLid) is a remote tank level monitoring device that reads the tank level sensor. It is intended to be powered by a non-rechargeable lithium battery pack. The unit contains an embedded LTE Cat 1 cellular module which manages all cellular communications. The unit uses Bluetooth advertising to allow infield testing and diagnostics as well as enabling possible firmware upgrades.</p>	

##### 4.1 Variant Models:

There were no variant models covered by this evaluation.



## 5 System Setup and Method

### 5.1 Method:

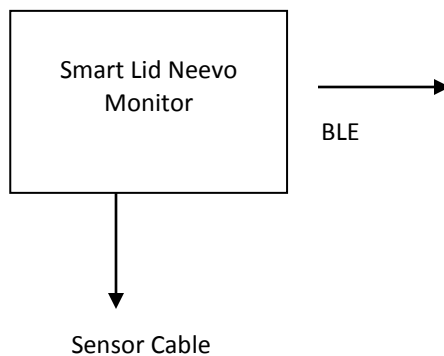
Configuration as required by ANSI C63.4: 2014 and ANSI C63.10:2013

No.	Descriptions of EUT Exercising
1	Test commands were used to force the Smart Lid Neevo Monitor to transmit a Bluetooth Low Energy (BLE) signal or low, middle, or high channel.
2	Idle, not transmitting.

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	Sensor	1	None	None	EUT

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

### 5.2 EUT Block Diagram:





## 6 Receiver Spurious Emissions

### 6.1 Test Method

Tests are performed in accordance with ANSI C63.4: 2014

**TEST SITE:** 10m ALSE

**Site Designation:** 10m Chamber

#### Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 10m	30-1000 MHz	3.9dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.0dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.7dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7dB	5.5 dB

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required.





## 6.2 Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB $\mu$ V/m
- RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V/m}$$

To convert from dB $\mu$ V to  $\mu$ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$
$$NF = \text{Net Reading in dB}\mu\text{V}$$

### Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$



### 6.3 Test Equipment Used

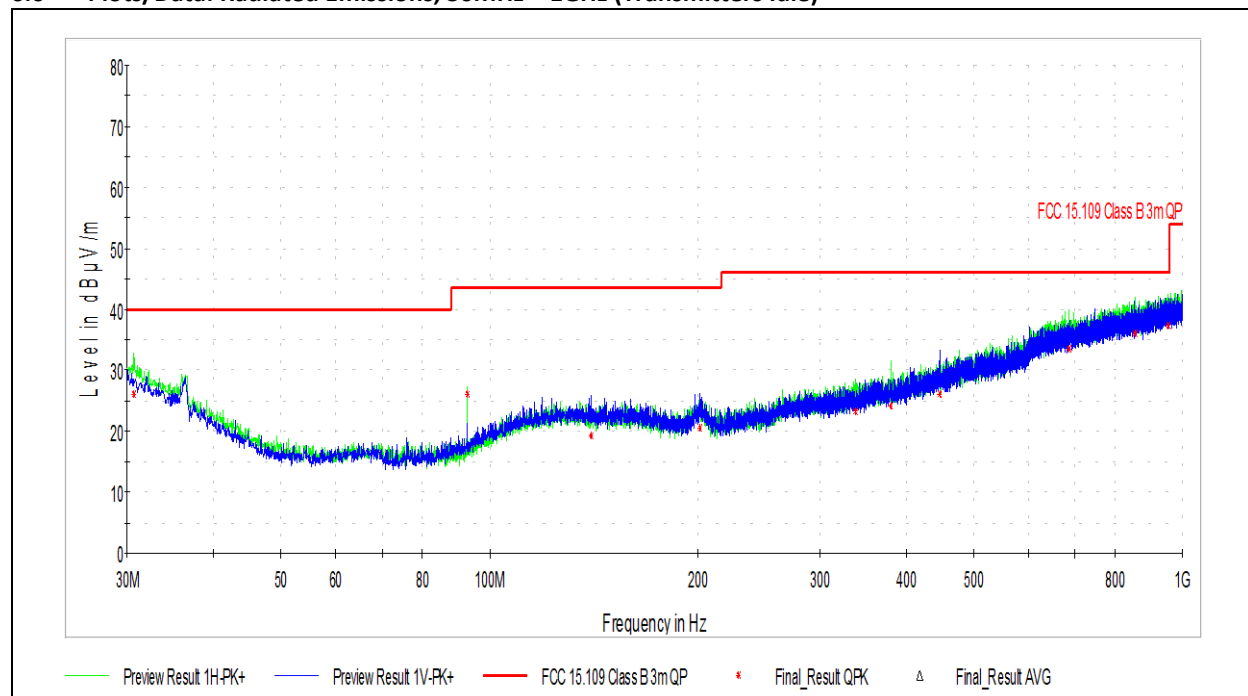
Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	3900	Rohde & Schwarz	ESU40	9/18/2019	9/18/2020
Bilog Antenna (30MHz-1GHz)	7085	SunAR	JB6	9/4/2020	9/4/2021
Horn Antenna (18-40GHz)	3779	ETS	3116c	7/23/2020	7/23/2021
Horn Antenna	4001	ETS	3117	1/16/2020	1/16/2021
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
Preamplifier (18-40GHz)	3921	Rohde & Schwarz	TS-PR40	12/4/2019	12/4/2020
Coaxial Cable (40GHz)	7020			12/4/2019	12/4/2020
Coaxial Cable (40GHz)	7021			12/4/2019	12/4/2020
3m Cable Antenna→Preamp	3074			12/4/2019	12/4/2020
3m Cable Preamplifier	3918	Rohde & Schwarz	TS-PR18	12/4/2019	12/4/2020
3m Cable Preamp→Chamber	2588			12/4/2019	12/4/2020
3m Cable Chamber→Control Room	2593			12/4/2019	12/4/2020
3m Cable Control Room→Receiver	2592			12/4/2019	12/4/2020

### 6.4 Software Utilized

Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 9.15.02

### 6.5 Test Results

The sample tested was found to be **compliant**.

**6.6 Plots/Data: Radiated Emissions, 30MHz – 1GHz (Transmitters Idle)**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.700556	25.95	40.00	14.05	120.000	213.3	H	310.0	28.3
92.888333	26.02	43.52	17.50	120.000	320.8	H	64.0	16.5
140.095000	19.20	43.52	24.32	120.000	392.3	V	111.0	22.1
201.043333	20.45	43.52	23.07	120.000	104.7	V	8.0	22.2
337.436111	23.18	46.02	22.84	120.000	335.6	H	8.0	25.2
379.361667	24.11	46.02	21.91	120.000	225.7	H	313.0	26.4
446.938333	26.03	46.02	19.99	120.000	129.4	V	145.0	28.0
687.067222	33.50	46.02	12.52	120.000	383.2	H	127.0	33.7
853.745556	36.05	46.02	9.97	120.000	130.3	H	340.0	36.3
955.326111	37.43	46.02	8.59	120.000	165.9	H	275.0	37.4

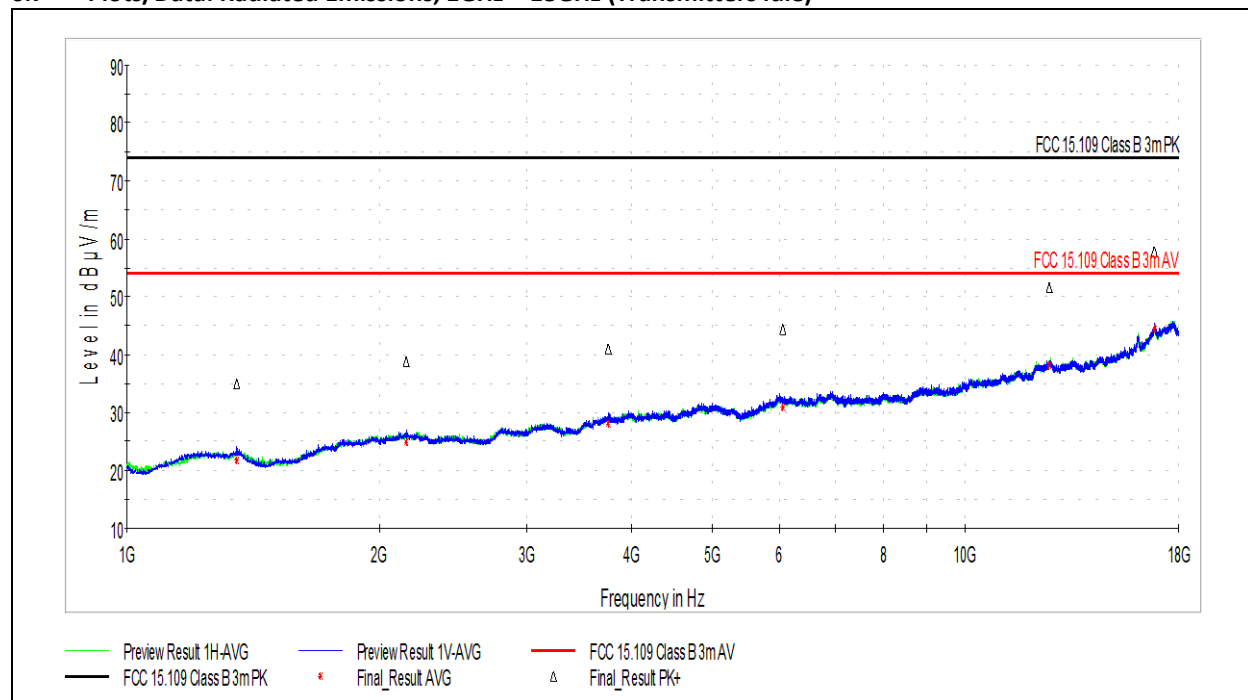
Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) N/A  
 Product Standard: ICES-003 Issue 6  
 Input Voltage: 7.2VDC  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/14/2020  
 Limit Applied: Class B  
 Ambient Temperature: 25.3°C  
 Relative Humidity: 56.7%  
 Atmospheric Pressure: 990.1 mbar

Deviations, Additions, or Exclusions: None



## 6.7 Plots/Data: Radiated Emissions, 1GHz – 18GHz (Transmitters Idle)



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1352.500000	34.91	73.98	39.07	1000.000	125.0	V	210.0	-0.4
2153.500000	38.75	73.98	35.23	1000.000	100.0	V	312.0	2.8
3754.000000	41.08	73.98	32.90	1000.000	100.0	V	301.0	6.6
6067.000000	44.33	73.98	29.65	1000.000	100.0	V	0.0	10.3
12612.000000	51.53	73.98	22.45	1000.000	100.0	H	143.0	19.2
16835.500000	57.76	73.98	16.22	1000.000	100.0	V	293.0	26.1

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1352.500000	21.67	53.98	32.31	1000.000	125.0	V	210.0	-0.4
2153.500000	24.90	53.98	29.08	1000.000	100.0	V	312.0	2.8
3754.000000	28.02	53.98	25.96	1000.000	100.0	V	301.0	6.6
6067.000000	30.90	53.98	23.08	1000.000	100.0	V	0.0	10.3
12612.000000	38.12	53.98	15.86	1000.000	100.0	H	143.0	19.2
16835.500000	44.41	53.98	9.57	1000.000	100.0	V	293.0	26.1

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: (Where Applicable) N/A  
 FCC Part 15B  
 Product Standard: ICES-003 Issue 6  
 Input Voltage: 7.2 VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/17/2020  
 Limit Applied: Class B  
 Ambient Temperature: 23.9°C  
 Relative Humidity: 54.7%  
 Atmospheric Pressure: 988.6 mbar

Deviations, Additions, or Exclusions: None



## 7 Transmitter Spurious Emissions

### 7.1 Test Limits

#### FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### RSS-247 Issue 2 § 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### 7.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.12.1 Radiated emission measurements.



### 7.3 Test Equipment Used

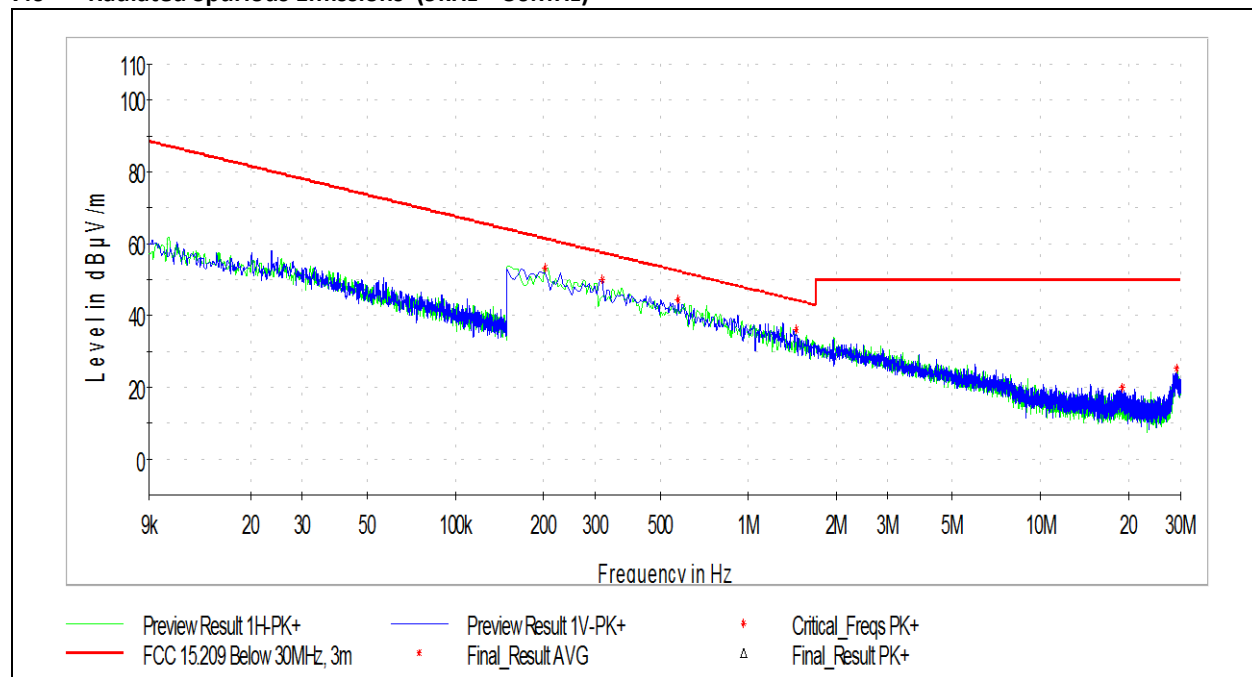
Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	3900	Rohde & Schwarz	ESU40	9/18/2019	9/18/2020
Magnetic Loop Antenna	2366	ETS	6502	7/17/2020	7/17/2021
Bilog Antenna (30MHz-1GHz)	7085	SunAR	JB6	9/4/2020	9/4/2021
Horn Antenna (18-40GHz)	3779	ETS	3116c	7/23/2020	7/23/2021
Horn Antenna (1-18GHz)	4001	ETS	3117	1/16/2020	1/16/2021
System Controller	4096	ETS Lindgren	2090	Verify at Time of Use	Verify at Time of Use
System Controller	3957	Sunol Sciences	SC99V	Verify at Time of Use	Verify at Time of Use
Preamplifier (18-40GHz)	3921	Rohde & Schwarz	TS-PR40	12/4/2019	12/4/2020
Coaxial Cable (40GHz)	7020			12/4/2019	12/4/2020
Coaxial Cable (40GHz)	7021			12/4/2019	12/4/2020
3m Cable Antenna→Preamp	3074			12/4/2019	12/4/2020
3m Cable Preamplifier	3918	Rohde & Schwarz	TS-PR18	12/4/2019	12/4/2020
3m Cable Preamp→Chamber	2588			12/4/2019	12/4/2020
3m Cable Chamber→Control Room	2593			12/4/2019	12/4/2020
3m Cable Control Room→Receiver	2592			12/4/2019	12/4/2020

### 7.4 Software Utilized

Name	Manufacturer	Version
EMC32	Rohde & Schwarz	Version 9.15.02

### 7.5 Test Results

The sample tested was found to be **compliant**. The data presented represents the worst case emissions with the device positioned in three orthogonal positions. All observed emissions outside of the band of operation were attenuated by at least 20dB.

**7.6 Radiated Spurious Emissions (9kHz – 30MHz)**

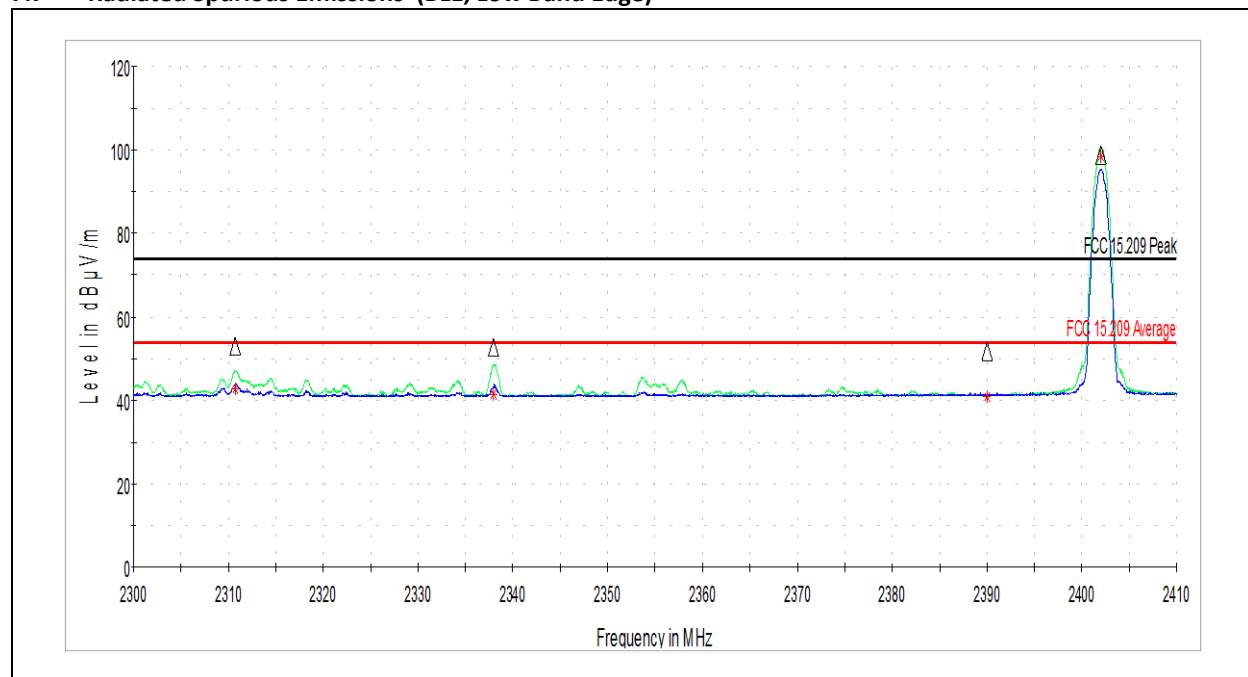
Note: The scan above was performed in a continuous max-hold mode and includes the worst case emissions with the transmitter operating on low, mid, and high channels.

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Azimuth (deg)	Corr. (dB)
0.202677	53.19	61.47	8.28	9kHz	180.0	12.1
0.316809	49.86	57.59	7.73	9kHz	0.0	11.9
0.575802	44.24	52.40	8.16	9kHz	180.0	12.0
1.458132	36.12	44.33	8.21	9kHz	180.0	11.9
18.968669	20.11	50.00	29.89	9kHz	0.0	11.1
29.157176	25.27	50.00	24.73	9kHz	0.0	9.3

Test Personnel: Bryan Taylor  
 Supervising/Reviewing Engineer: N/A  
 (Where Applicable)  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 1/30/2021  
 Limit Applied: 15.209  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: This data was measured in a semi-anechoic chamber that has been correlated to measurements performed in an open field.

**7.7 Radiated Spurious Emissions (BLE, Low Band Edge)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2310.692000	52.88	74.00	21.12	1000.000	410.0	H	156.0	36.6
2337.961000	52.55	74.00	21.45	1000.000	206.0	H	217.0	36.7
2390.002000	51.84	74.00	22.16	1000.000	410.0	H	329.0	37.0

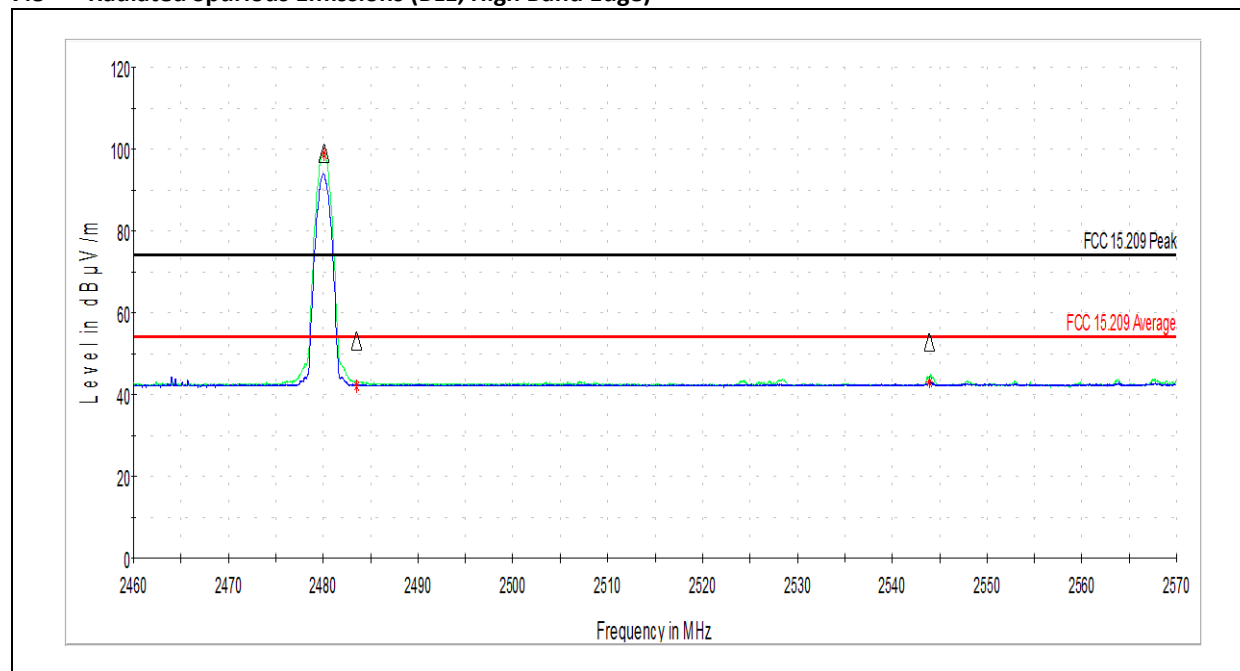
Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2310.692000	42.80	54.00	11.20	1000.000	410.0	H	156.0	36.6
2337.961000	41.59	54.00	12.41	1000.000	206.0	H	217.0	36.7
2390.002000	40.95	54.00	13.05	1000.000	410.0	H	329.0	37.0

Test Personnel: Bryan Taylor  
Supervising/Reviewing Engineer: N/A  
(Where Applicable)  
Product Standard: FCC Part 15C  
Input Voltage: 7.2VDC (Battery)  
Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
Limit Applied: 15.205 Restricted Bands  
Ambient Temperature: 24.3°C  
Relative Humidity: 52.8%  
Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None



**7.8 Radiated Spurious Emissions (BLE, High Band Edge)**

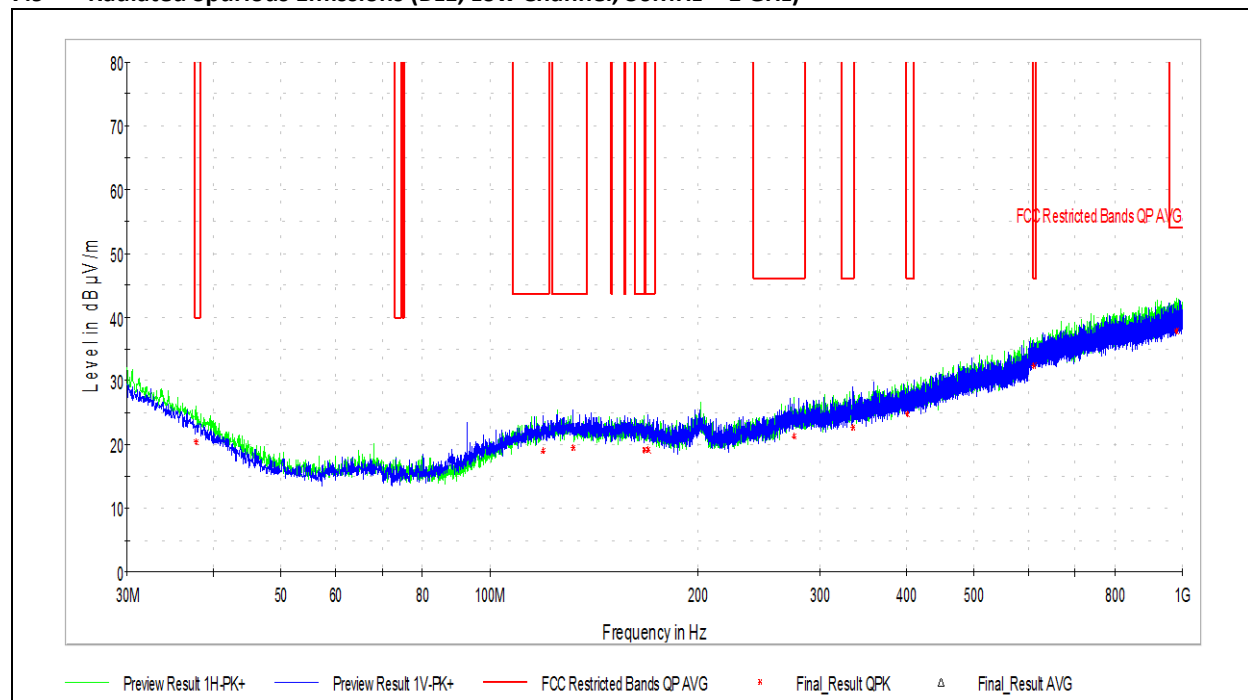
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.507000	52.96	74.00	21.04	1000.000	200.0	H	154.0	37.5
2543.963000	52.75	74.00	21.25	1000.000	208.0	H	283.0	37.4

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.507000	41.90	54.00	12.10	1000.000	200.0	H	154.0	37.5
2543.963000	43.10	54.00	10.90	1000.000	208.0	H	283.0	37.4

Test Personnel: Bryan Taylor  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) N/A  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.9 Radiated Spurious Emissions (BLE, Low Channel, 30MHz – 1 GHz)**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.706111	20.46	40.00	19.54	120.000	225.0	H	258.0	23.2
119.347778	19.07	43.52	24.45	120.000	393.3	V	295.0	21.9
132.173333	19.53	43.52	23.99	120.000	107.7	V	102.0	22.3
167.147222	19.19	43.52	24.33	120.000	309.7	H	294.0	21.4
169.464445	19.24	43.52	24.28	120.000	296.9	V	145.0	21.5
275.086667	21.29	46.02	24.73	120.000	399.9	H	239.0	23.6
334.957222	22.68	46.02	23.34	120.000	177.5	V	347.0	24.6
400.701667	24.78	46.02	21.24	120.000	391.5	H	8.0	27.0
609.844444	32.27	46.02	13.75	120.000	308.6	H	294.0	32.2
981.570000	37.82	53.98	16.16	120.000	360.3	H	323.0	37.7

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: \_\_\_\_\_

(Where Applicable) N/A

Product Standard: FCC Part 15C

Input Voltage: 7.2VDC (Battery)

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020

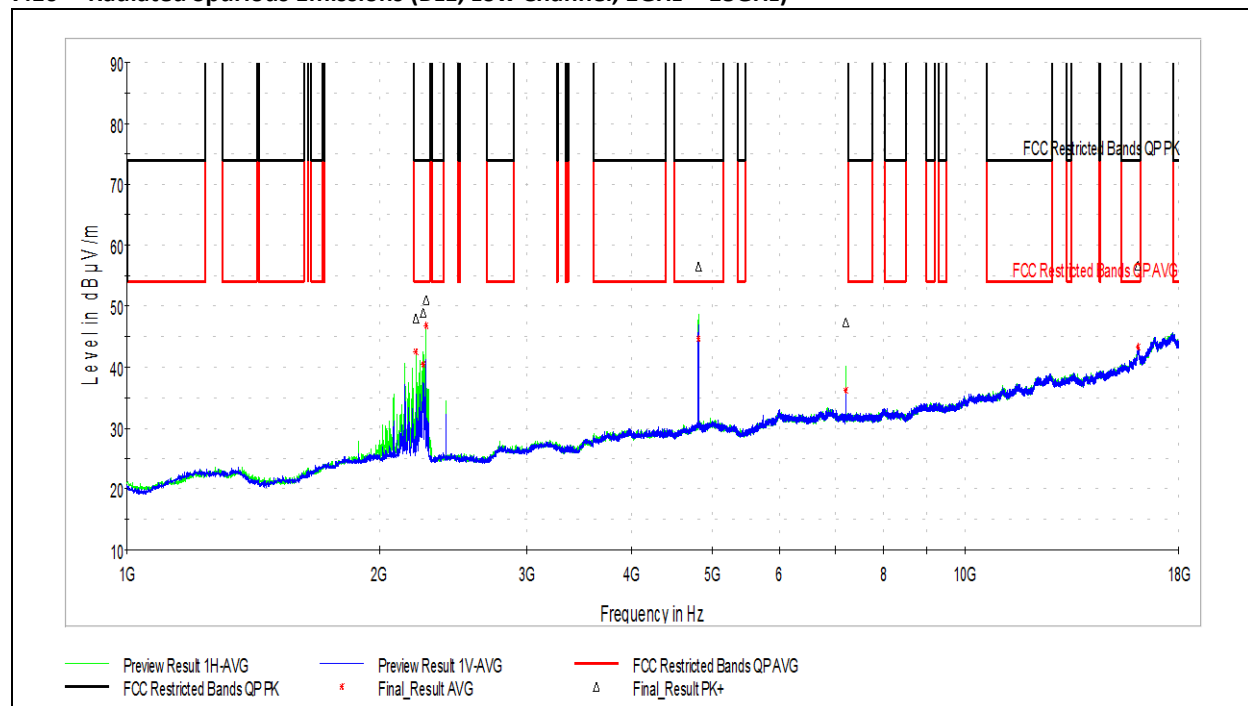
Limit Applied: 15.205 Restricted Bands

Ambient Temperature: 24.3°C

Relative Humidity: 52.8%

Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.10 Radiated Spurious Emissions (BLE, Low Channel, 1GHz – 18GHz)**

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2210.000000	48.06	73.98	25.92	1000.000	335.0	H	344.0	3.2
2258.000000	48.94	73.98	25.04	1000.000	252.0	H	325.0	3.3
2274.000000	50.99	73.98	22.99	1000.000	282.0	H	331.0	3.4
4804.000000	56.45	73.98	17.53	1000.000	224.0	H	25.0	8.2
7206.500000	47.35	-	-	1000.000	184.0	H	0.0	11.6
16096.000000	56.67	73.98	17.31	1000.000	100.0	H	212.0	25.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2210.000000	42.63	53.98	11.35	1000.000	335.0	H	344.0	3.2
2258.000000	40.46	53.98	13.52	1000.000	252.0	H	325.0	3.3
2274.000000	46.83	53.98	7.15	1000.000	282.0	H	331.0	3.4
4804.000000	44.67	53.98	9.31	1000.000	224.0	H	25.0	8.2
7206.500000	36.18	-	-	1000.000	184.0	H	0.0	11.6
16096.000000	43.31	53.98	10.67	1000.000	100.0	H	212.0	25.6

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: N/A

(Where Applicable)

Product Standard: FCC Part 15C

Input Voltage: 7.2VDC (Battery)

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020

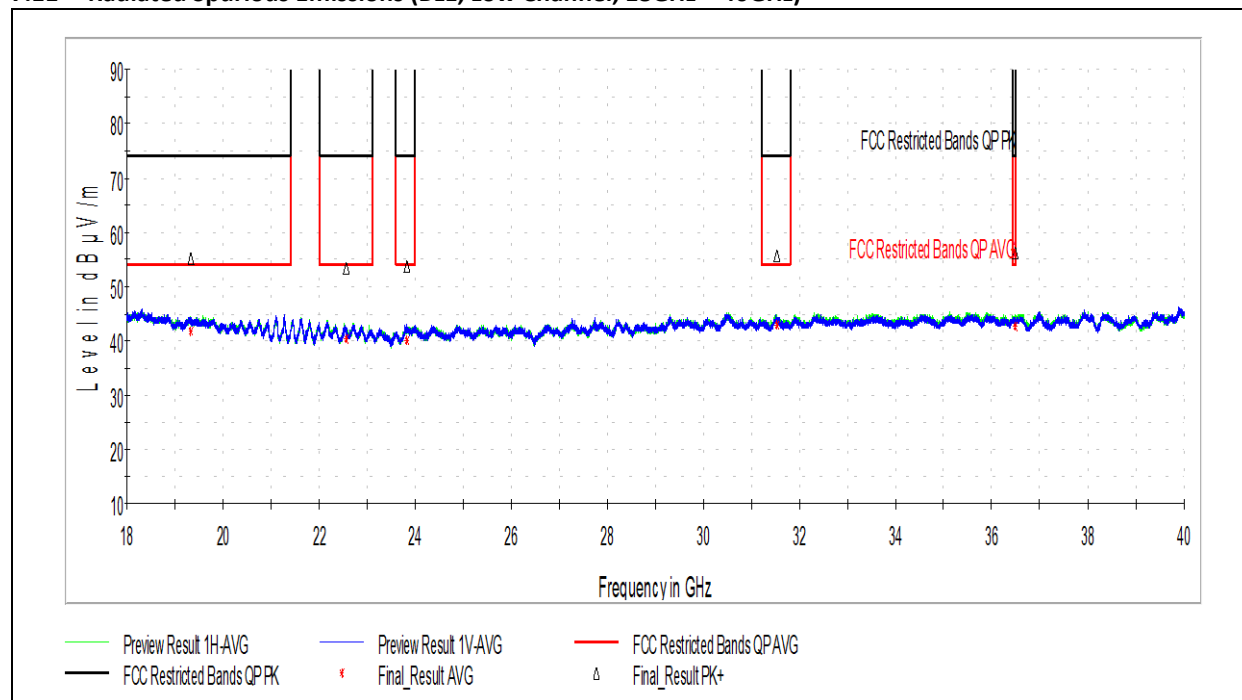
Limit Applied: 15.205 Restricted Bands

Ambient Temperature: 24.3°C

Relative Humidity: 52.8%

Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.11 Radiated Spurious Emissions (BLE, Low Channel, 18GHz – 40GHz)**

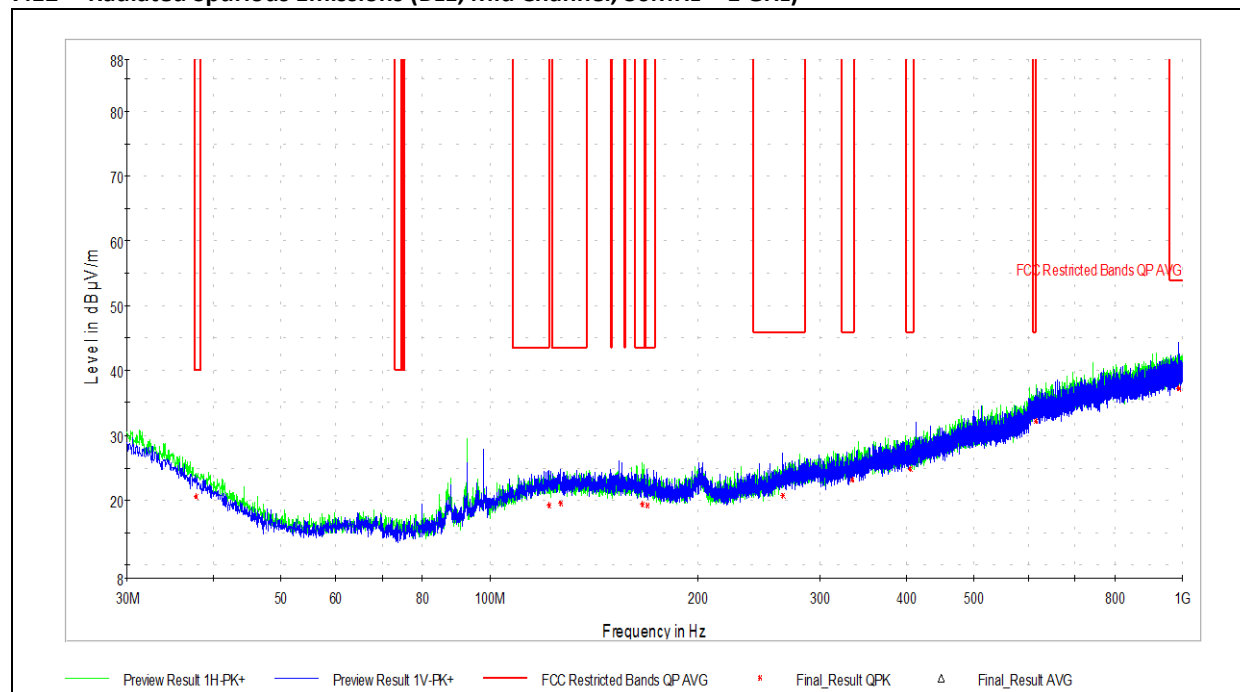
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
19331.500000	55.23	73.98	18.75	1000.000	100.0	V	258.0	16.9
22560.500000	53.51	73.98	20.47	1000.000	109.0	V	59.0	7.0
23818.500000	53.76	73.98	20.22	1000.000	100.0	V	158.0	6.3
31522.000000	55.81	73.98	18.17	1000.000	118.0	H	271.0	11.4
36482.500000	56.13	73.98	17.85	1000.000	109.0	H	187.0	11.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
19331.500000	41.67	53.98	12.31	1000.000	100.0	V	258.0	16.9
22560.500000	40.26	53.98	13.72	1000.000	109.0	V	59.0	7.0
23818.500000	40.20	53.98	13.78	1000.000	100.0	V	158.0	6.3
31522.000000	42.83	53.98	11.15	1000.000	118.0	H	271.0	11.4
36482.500000	42.73	53.98	11.25	1000.000	109.0	H	187.0	11.7

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: (Where Applicable) N/A  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

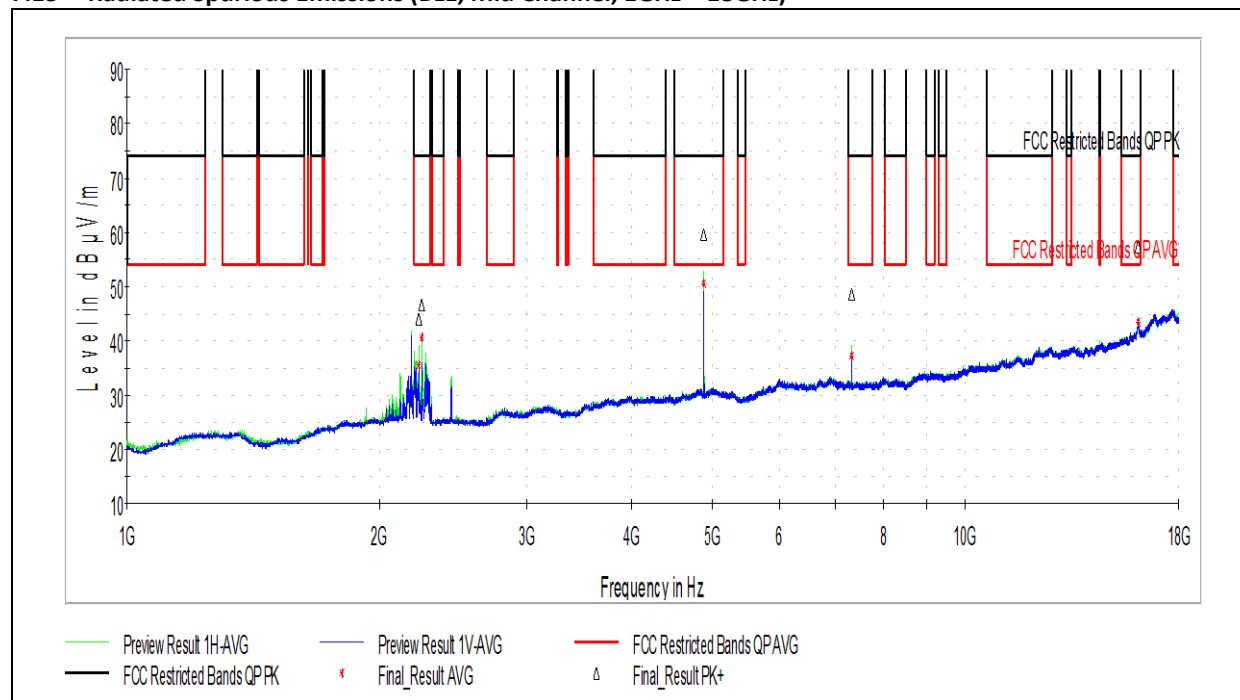
**7.12 Radiated Spurious Emissions (BLE, Mid Channel, 30MHz – 1 GHz)**

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.706111	20.48	40.00	19.52	120.000	344.7	H	310.0	23.2
121.934445	19.26	43.52	24.26	120.000	400.2	V	17.0	22.1
126.784445	19.52	43.52	24.00	120.000	105.3	V	28.0	22.3
166.123333	19.28	43.52	24.24	120.000	213.8	H	347.0	21.5
169.033333	19.24	43.52	24.28	120.000	309.3	V	240.0	21.5
265.225000	20.77	46.02	25.25	120.000	321.3	V	163.0	23.1
333.933333	23.16	46.02	22.86	120.000	249.9	H	182.0	25.1
404.366111	24.85	46.02	21.17	120.000	225.2	H	0.0	27.1
613.886111	32.25	46.02	13.77	120.000	285.3	H	182.0	32.2
988.629444	37.24	53.98	16.74	120.000	249.0	V	230.0	37.0

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) N/A  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.13 Radiated Spurious Emissions (BLE, Mid Channel, 1GHz – 18GHz)**

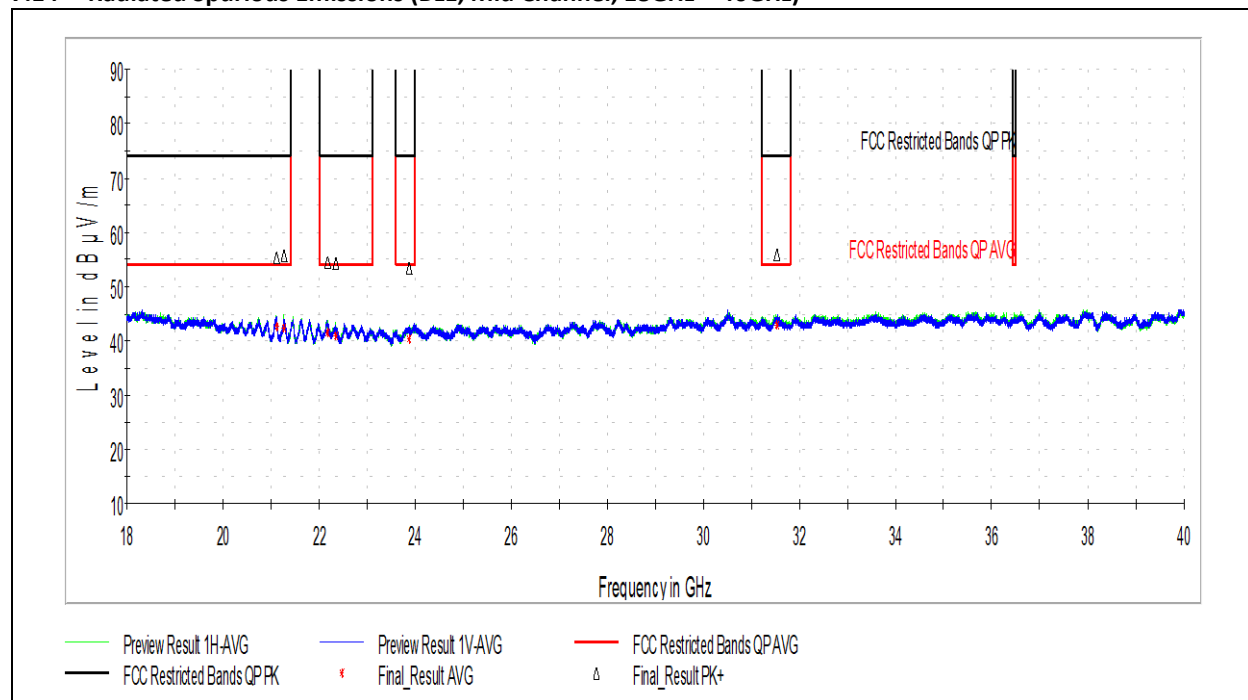
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2228.000000	44.17	73.98	29.81	1000.000	292.0	H	157.0	3.4
2248.000000	46.61	73.98	27.37	1000.000	330.0	H	157.0	3.3
4880.000000	59.58	73.98	14.40	1000.000	100.0	H	0.0	8.3
7321.000000	48.70	73.98	25.28	1000.000	140.0	H	34.0	11.6
16100.500000	57.29	73.98	16.69	1000.000	100.0	H	324.0	25.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2228.000000	35.64	53.98	18.34	1000.000	292.0	H	157.0	3.4
2248.000000	40.66	53.98	13.32	1000.000	330.0	H	157.0	3.3
4880.000000	50.44	53.98	3.54	1000.000	100.0	H	0.0	8.3
7321.000000	37.16	53.98	16.82	1000.000	140.0	H	34.0	11.6
16100.500000	43.37	53.98	10.61	1000.000	100.0	H	324.0	25.7

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: N/A  
 (Where Applicable)  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.14 Radiated Spurious Emissions (BLE, Mid Channel, 18GHz – 40GHz)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
21106.000000	55.42	73.98	18.56	1000.000	109.0	V	180.0	10.8
21261.500000	55.60	73.98	18.38	1000.000	109.0	V	36.0	10.2
22174.000000	54.44	73.98	19.54	1000.000	100.0	H	114.0	8.2
22344.000000	54.22	73.98	19.76	1000.000	100.0	H	256.0	7.6
23863.500000	53.44	73.98	20.54	1000.000	109.0	V	36.0	6.1
31521.500000	55.88	73.98	18.10	1000.000	109.0	H	0.0	11.4

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
21106.000000	42.62	53.98	11.36	1000.000	109.0	V	180.0	10.8
21261.500000	42.28	53.98	11.70	1000.000	109.0	V	36.0	10.2
22174.000000	41.38	53.98	12.60	1000.000	100.0	H	114.0	8.2
22344.000000	41.01	53.98	12.97	1000.000	100.0	H	256.0	7.6
23863.500000	40.27	53.98	13.71	1000.000	109.0	V	36.0	6.1
31521.500000	42.85	53.98	11.13	1000.000	109.0	H	0.0	11.4

Test Personnel: Michael Carlson

Supervising/Reviewing Engineer: (Where Applicable) N/A

Product Standard: FCC Part 15C

Input Voltage: 7.2VDC (Battery)

Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020

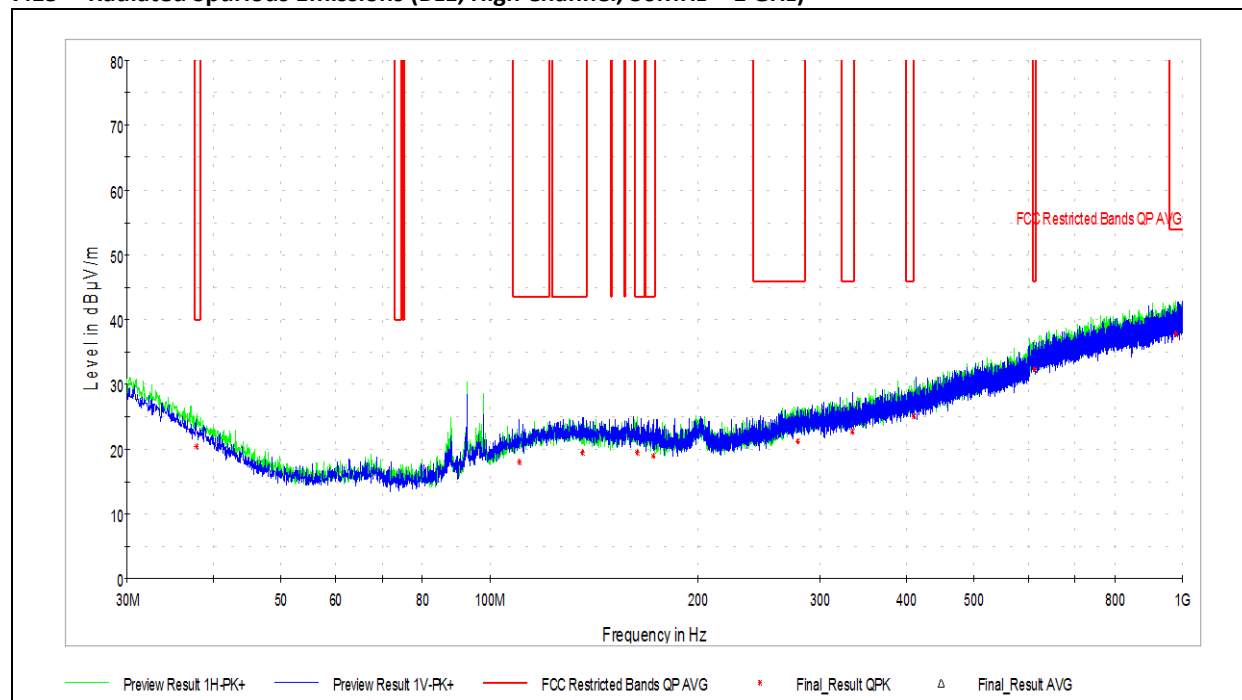
Limit Applied: 15.205 Restricted Bands

Ambient Temperature: 24.3°C

Relative Humidity: 52.8%

Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.15 Radiated Spurious Emissions (BLE, High Channel, 30MHz – 1 GHz)**

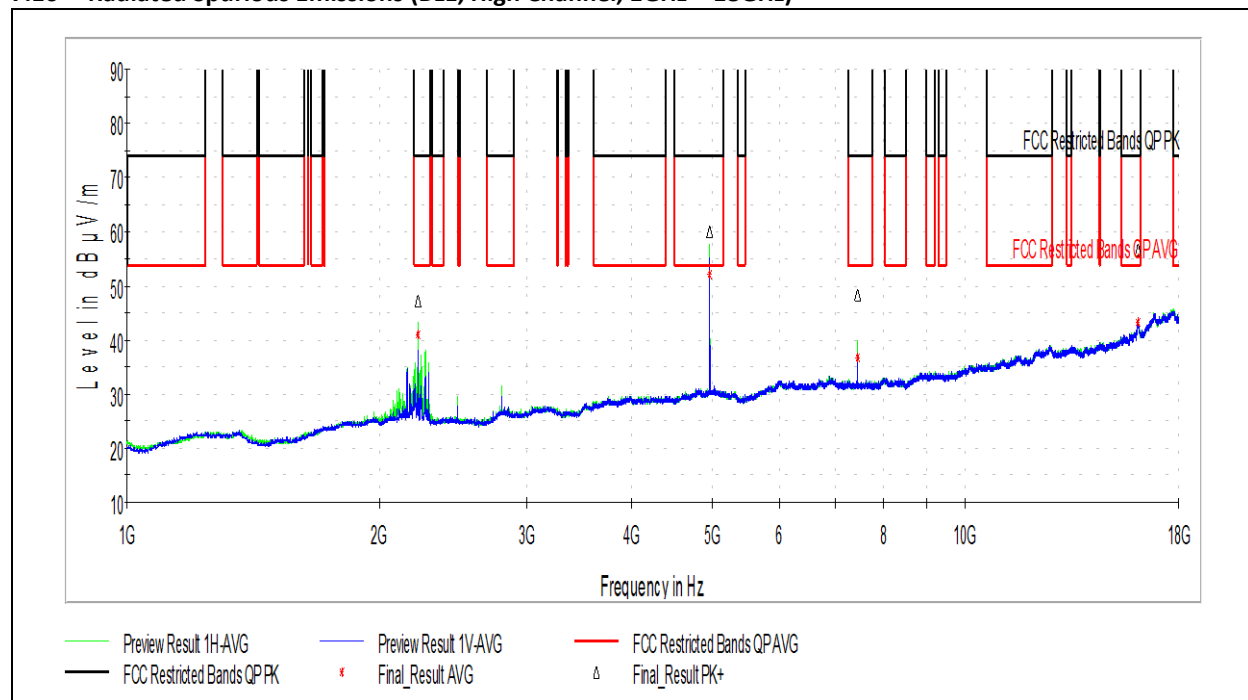
Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.760000	20.46	40.00	19.54	120.000	216.9	H	54.0	23.2
110.402222	18.06	43.52	25.46	120.000	332.7	V	278.0	21.1
136.215000	19.45	43.52	24.07	120.000	400.0	V	339.0	22.2
163.105556	19.51	43.52	24.01	120.000	371.7	H	320.0	21.7
172.158889	19.00	43.52	24.52	120.000	118.2	V	64.0	21.3
278.481667	21.20	46.02	24.82	120.000	372.0	V	138.0	23.5
333.663889	22.58	46.02	23.44	120.000	273.6	V	332.0	24.5
409.323889	24.98	46.02	21.04	120.000	153.7	H	230.0	27.2
611.838333	32.25	46.02	13.77	120.000	261.0	H	0.0	32.2
979.145000	37.77	53.98	16.21	120.000	371.8	H	202.0	37.6

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) N/A  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None



**7.16 Radiated Spurious Emissions (BLE, High Channel, 1GHz – 18GHz)**

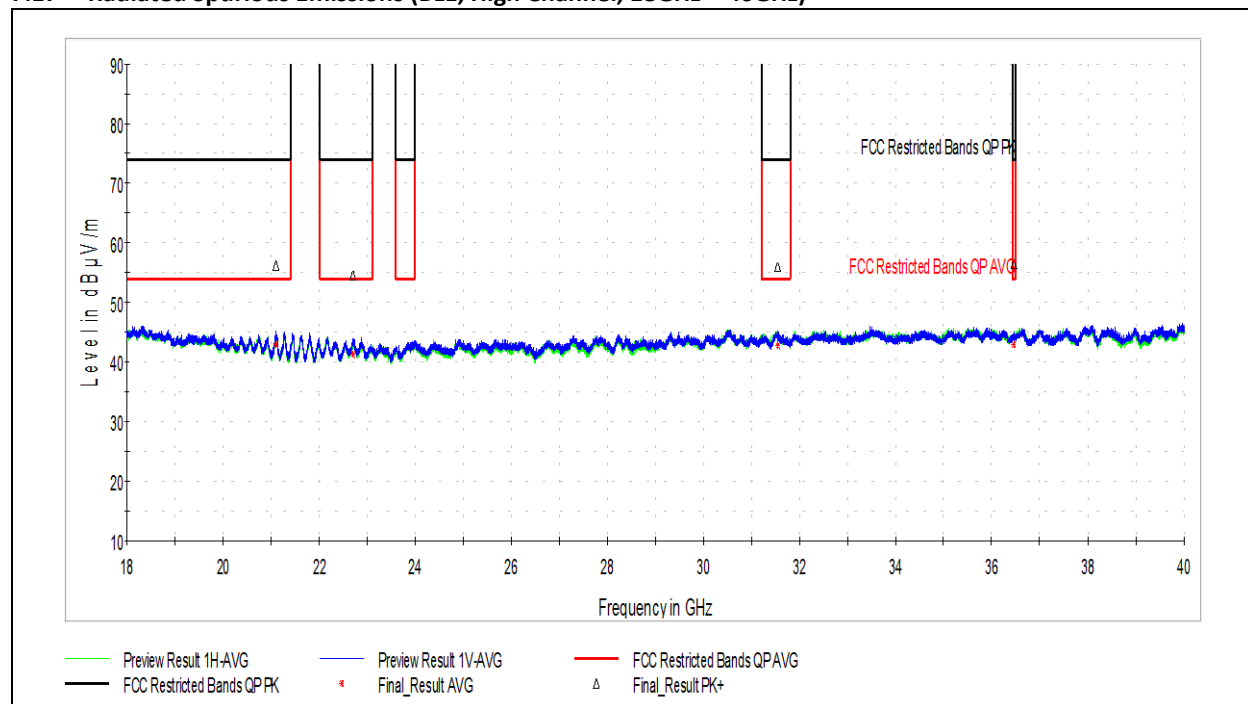
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2224.000000	47.16	73.98	26.82	1000.000	291.0	H	184.0	3.4
4960.000000	60.04	73.98	13.94	1000.000	249.0	H	288.0	8.2
7441.000000	48.49	73.98	25.49	1000.000	245.0	H	0.0	11.6
16094.000000	56.68	73.98	17.30	1000.000	410.0	V	246.0	25.5

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2224.000000	40.91	53.98	13.07	1000.000	291.0	H	184.0	3.4
4960.000000	52.05	53.98	1.93	1000.000	249.0	H	288.0	8.2
7441.000000	36.66	53.98	17.32	1000.000	245.0	H	0.0	11.6
16094.000000	43.25	53.98	10.73	1000.000	410.0	V	246.0	25.5

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: \_\_\_\_\_  
 (Where Applicable) N/A  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None

**7.17 Radiated Spurious Emissions (BLE, High Channel, 18GHz – 40GHz)**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
21099.000000	56.34	73.98	17.64	1000.000	100.0	V	314.0	10.8
22701.000000	54.54	73.98	19.44	1000.000	100.0	V	112.0	6.9
31547.000000	56.07	73.98	17.91	1000.000	100.0	V	195.0	11.0
36457.000000	56.40	73.98	17.58	1000.000	109.0	H	211.0	11.8

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
21099.000000	42.82	53.98	11.16	1000.000	100.0	V	314.0	10.8
22701.000000	41.35	53.98	12.63	1000.000	100.0	V	112.0	6.9
31547.000000	42.74	53.98	11.24	1000.000	100.0	V	195.0	11.0
36457.000000	42.83	53.98	11.15	1000.000	109.0	H	211.0	11.8

Test Personnel: Michael Carlson  
 Supervising/Reviewing Engineer: N/A  
 (Where Applicable)  
 Product Standard: FCC Part 15C  
 Input Voltage: 7.2VDC (Battery)  
 Pretest Verification w / Ambient Signals or BB Source: Yes

Test Date: 9/18/2020  
 Limit Applied: 15.205 Restricted Bands  
 Ambient Temperature: 24.3°C  
 Relative Humidity: 52.8%  
 Atmospheric Pressure: 987.3 mbar

Deviations, Additions, or Exclusions: None



## 8 Output Power

### 8.1 Test Limits

#### FCC Part 15.247(b)(3):

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

#### RSS-247 Issue 2 § 5.4(d):

For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode.



## 8.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.9.1.3

## 8.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	4022	Rohde&Schwarz	NRP-Z81	9/22/2020	9/22/2021

## 8.4 Test Results

The device was found to be **compliant**. The peak output power was less than 1W.

## 8.5 Test Conditions

Test Personnel:	Bryan Taylor	Test Date:	2/2/2021
Supervising/Reviewing Engineer:		Limit Applied:	See Above
(Where Applicable)	NA		
	FCC Part 15.247		
Product Standard:	RSS-247 Issue 2	Ambient Temperature:	22.6C
Input Voltage:	7.2VDC	Relative Humidity:	41.2%
Pretest Verification w / Ambient			
Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar

## 8.6 Test Data

Frequency (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
2402	4.43	30	Pass
2440	4.51	30	Pass
2480	4.62	30	Pass

Deviations, Additions, or Exclusions: None



## 9 Occupied Bandwidth

### 9.1 Test Limits

#### FCC Part 15.247(a)(2):

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

#### RSS-247 Issue 2 § 5.2(a):

The minimum 6 dB bandwidth shall be 500 kHz.

### 9.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.8.1.

### 9.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	2327	Rohde & Schwarz	ES126	9/30/2019	9/30/2020

### 9.4 Test Results

The device was found to be **compliant**. The 6dB bandwidth was at least 500kHz.

### 9.5 Test Conditions

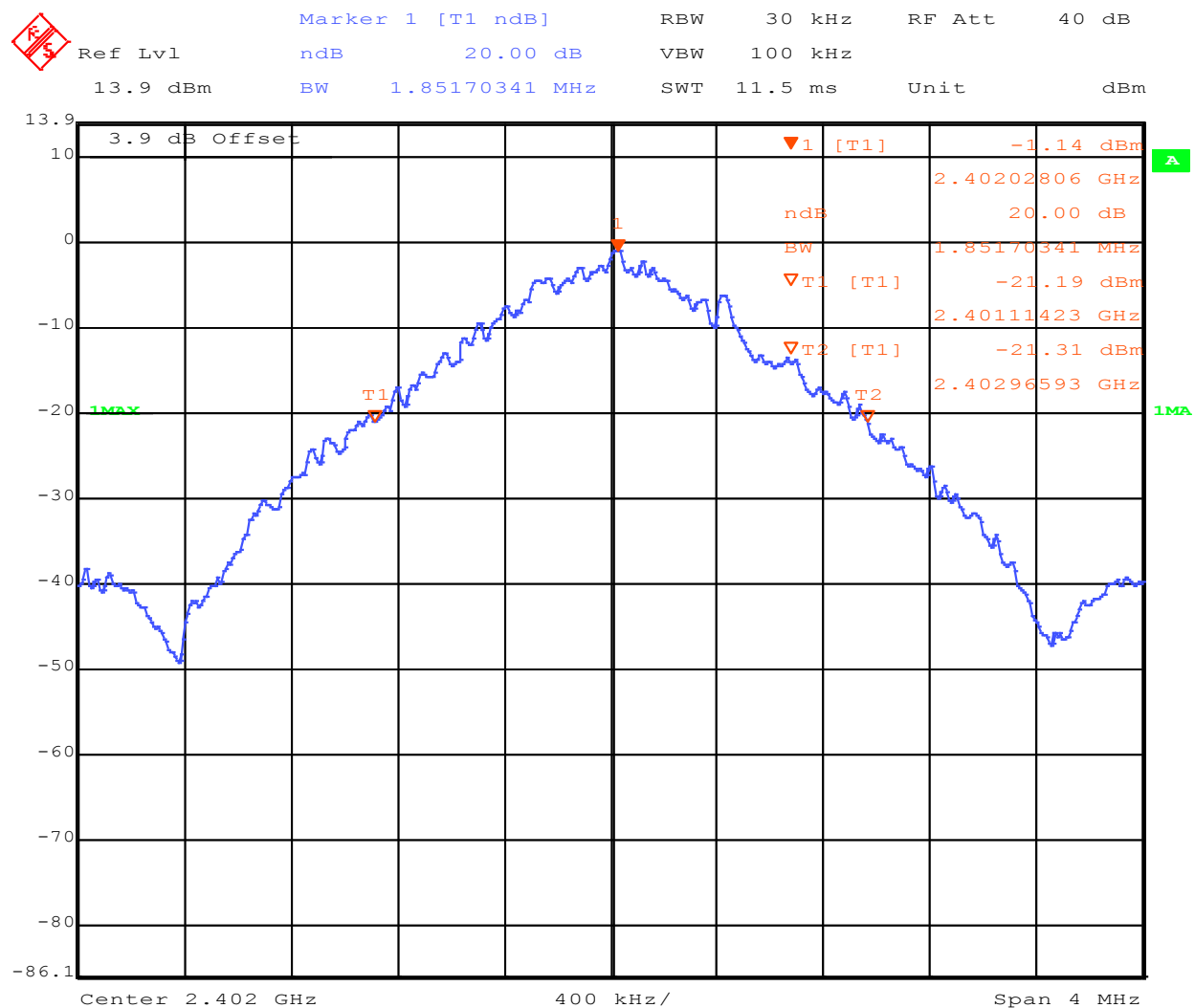
Test Personnel:	Bryan Taylor	Test Date:	9/15/2020
Supervising/Reviewing Engineer:			
(Where Applicable)	NA	Limit Applied:	See Above
	FCC Part 15.247		
Product Standard:	RSS-247 Issue 2	Ambient Temperature:	22.1C
Input Voltage:	7.2VDC	Relative Humidity:	47.7%
Pretest Verification w / Ambient			
Signals or BB Source:	Yes	Atmospheric Pressure:	992mbar

### 9.6 Test Data

Frequency (MHz)	DTS BW (kHz)	6dB BW (kHz)	20dB BW (kHz)	99% BW (kHz)
2402	881.7	617.2	1851	1795
2440	865.7	705.4	1811	1787
2480	881.7	665.3	1835	1819

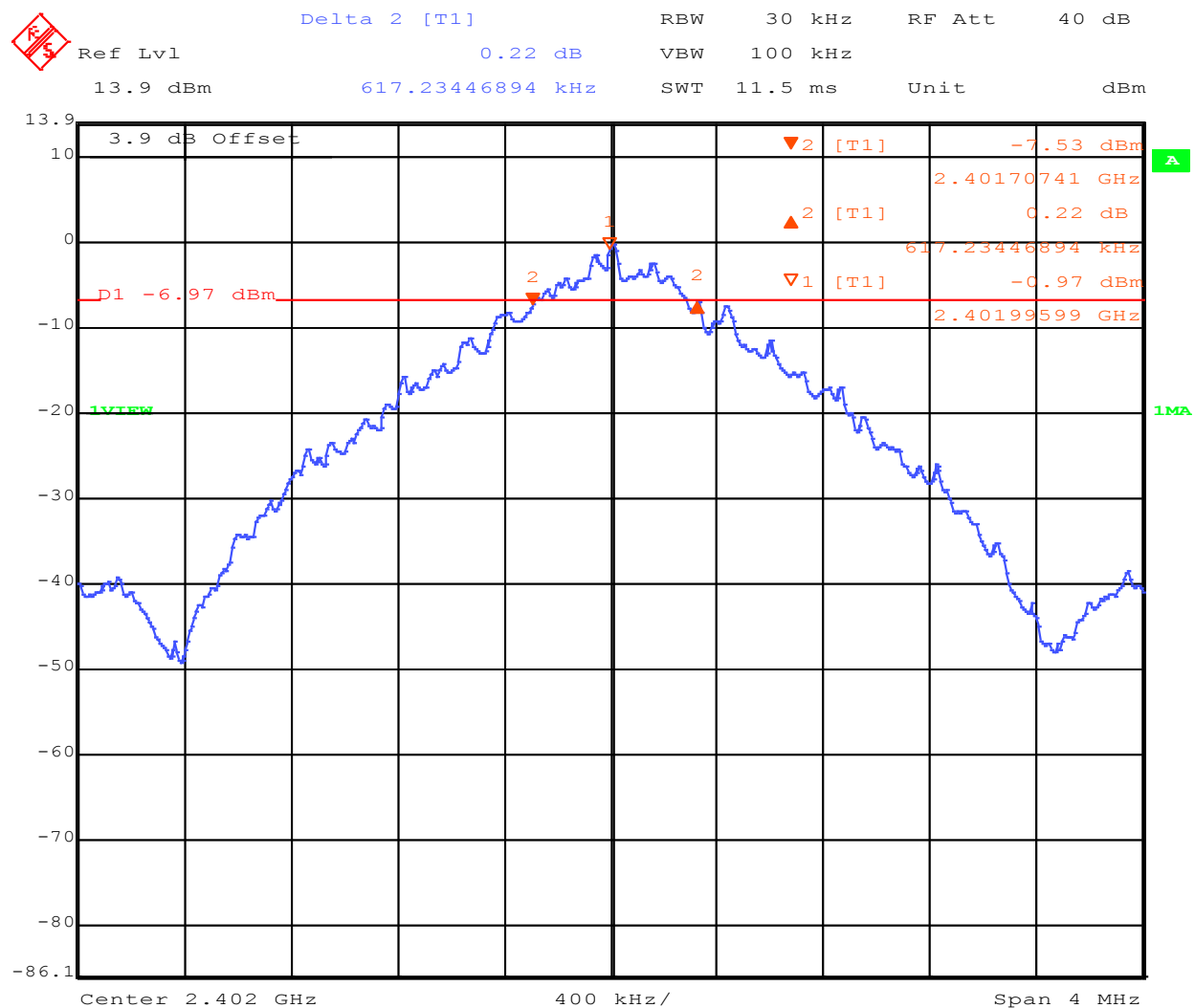


99% Bandwidth 2402MHz



Date: 15.SEP.2020 23:48:51

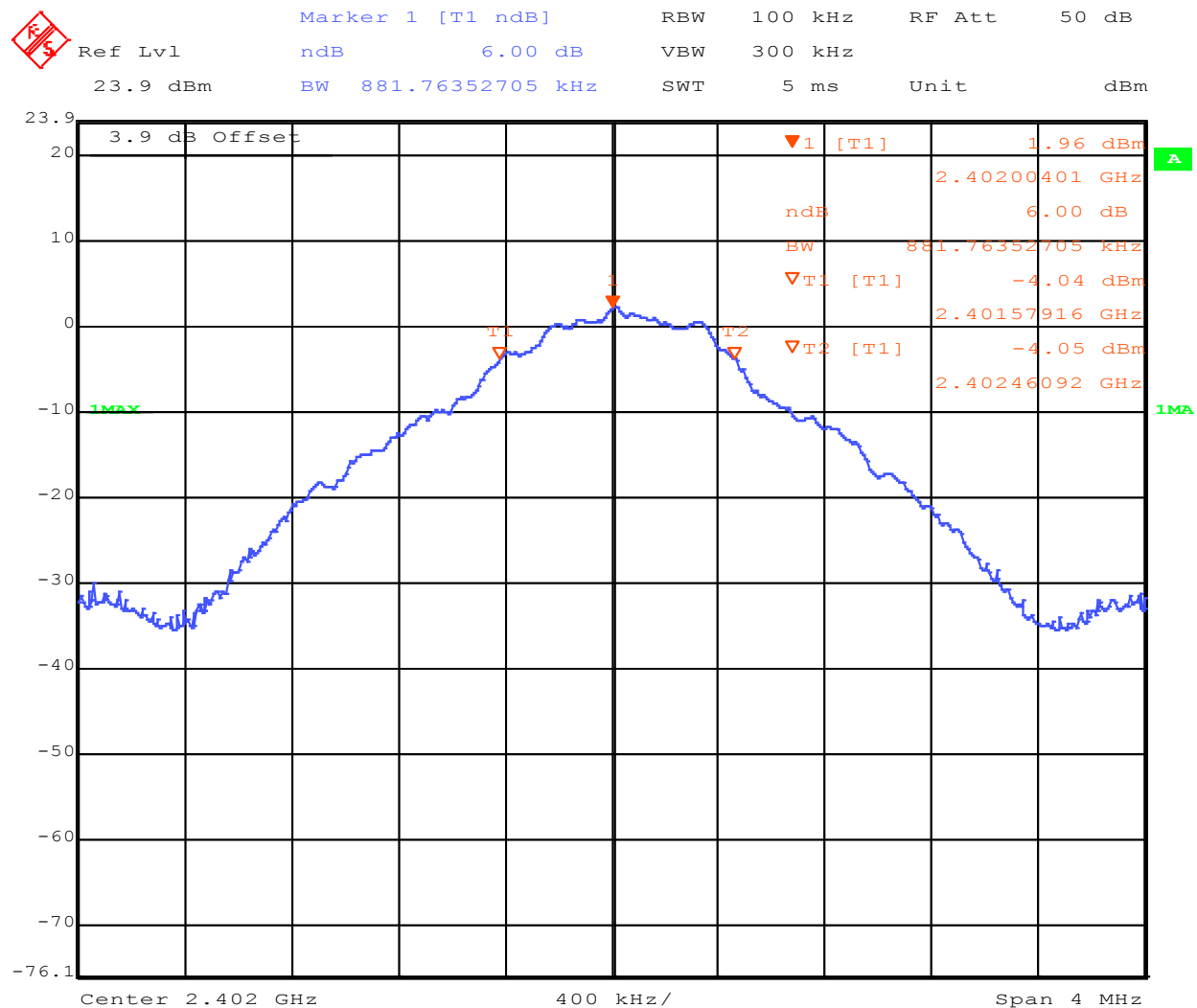
20dB Down Bandwidth 2402MHz



Date: 16.SEP.2020 00:08:50

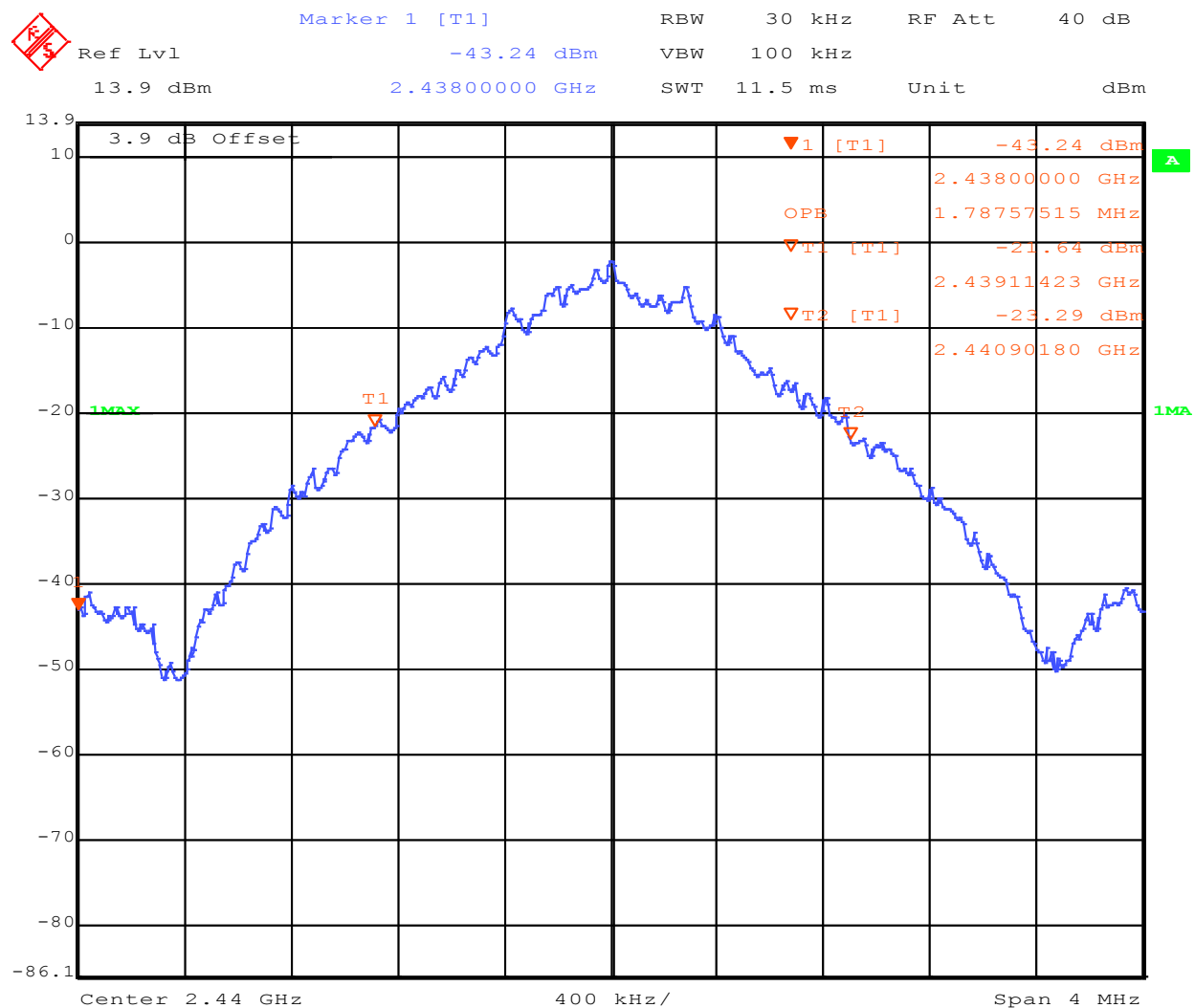
6dB Down Bandwidth 2402MHz





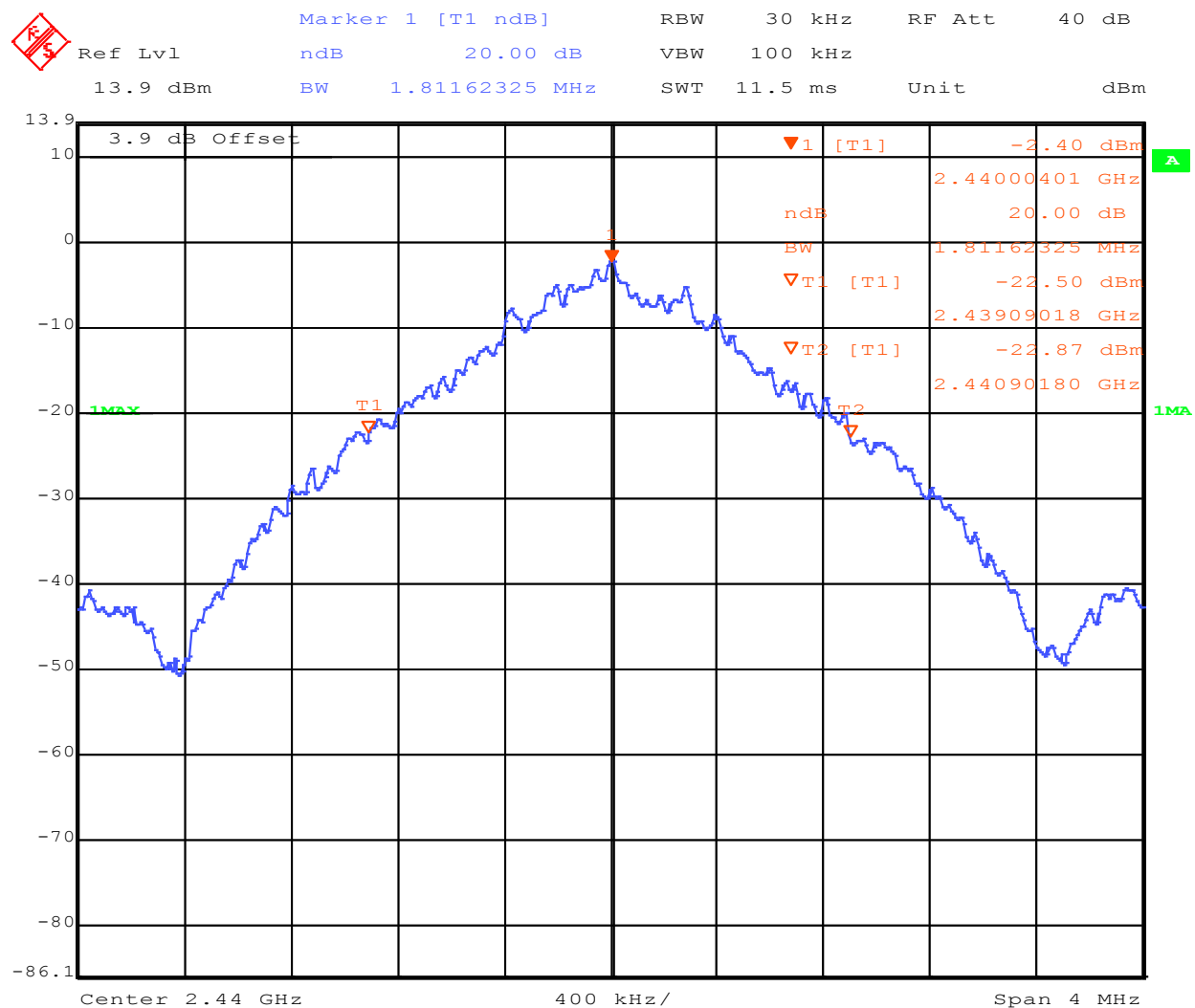
Date: 16.SEP.2020 00:19:37

DTS Bandwidth 2402MHz



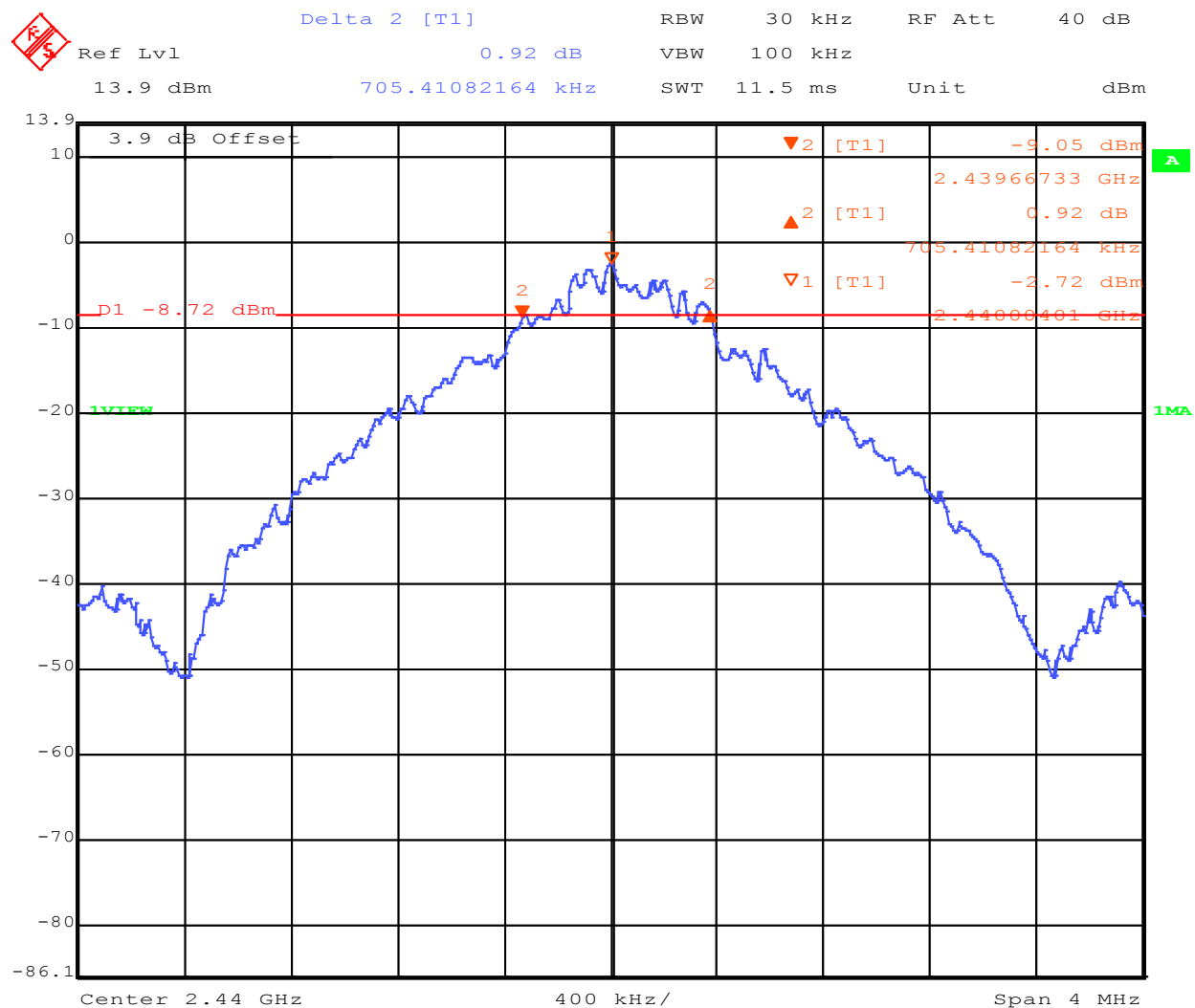
Date: 15.SEP.2020 23:52:17

99% Bandwidth 2440MHz



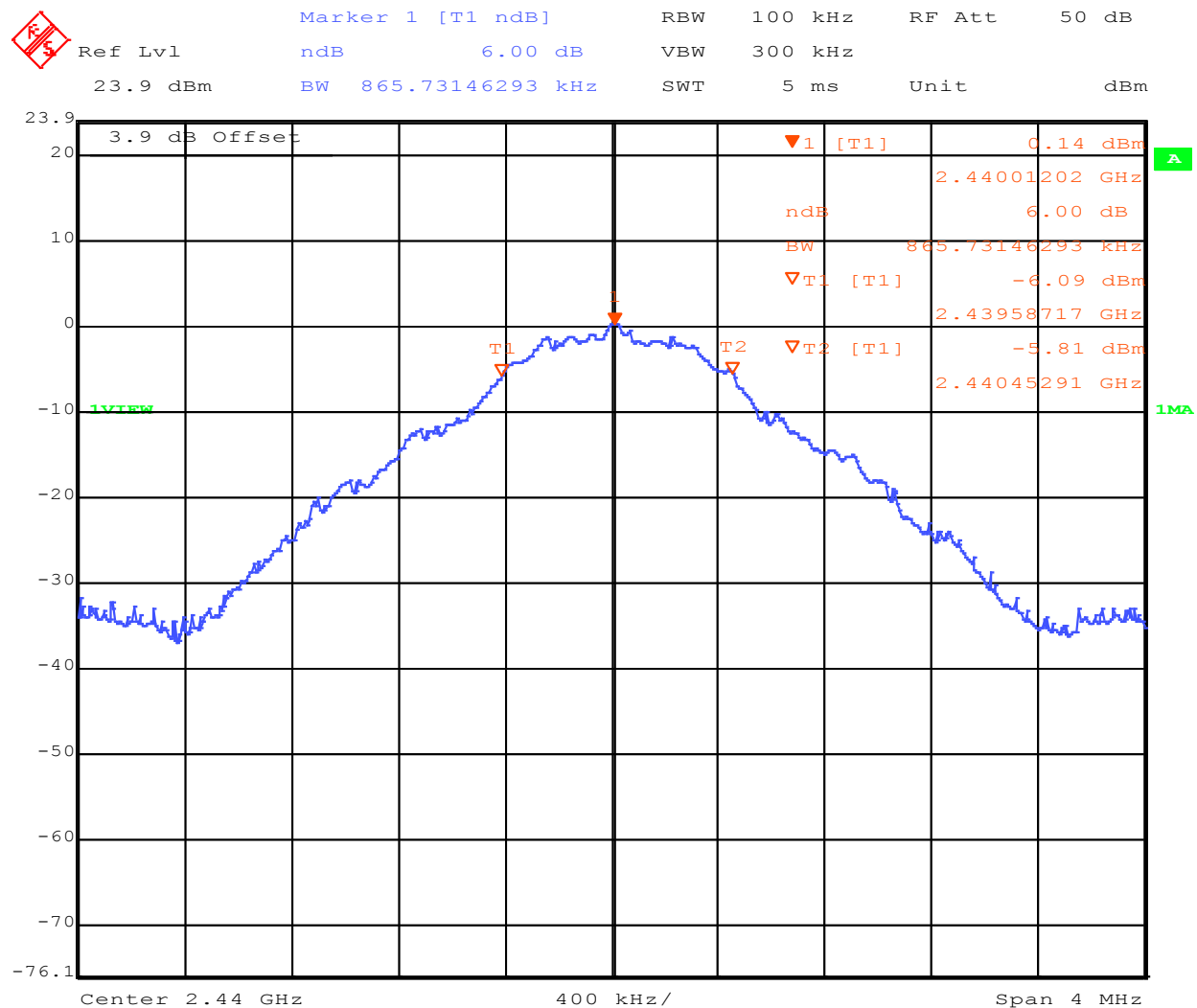
Date: 15.SEP.2020 23:53:03

20dB Down Bandwidth 2440MHz



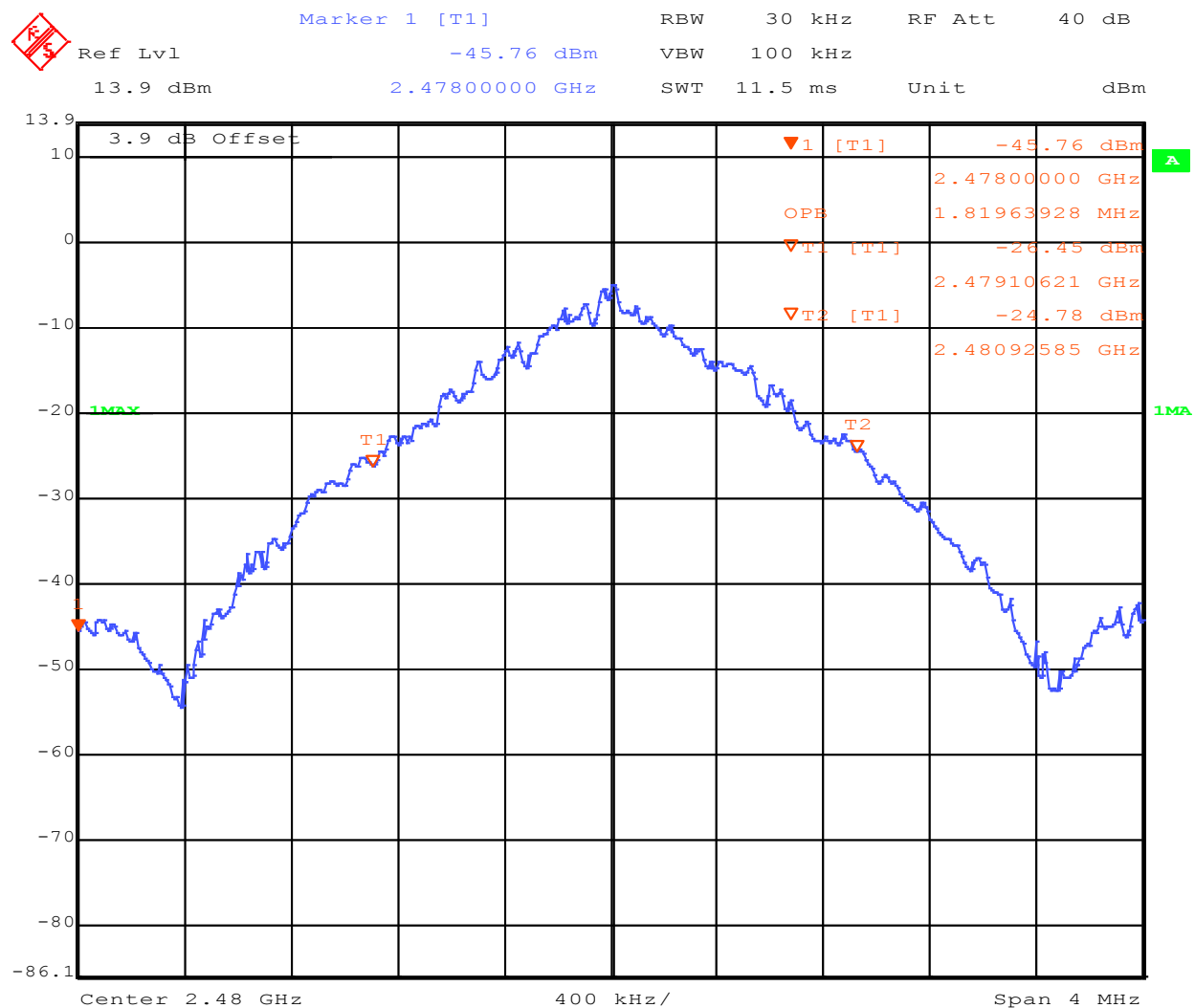
Date: 16.SEP.2020 00:03:32

6dB Down Bandwidth 2440MHz



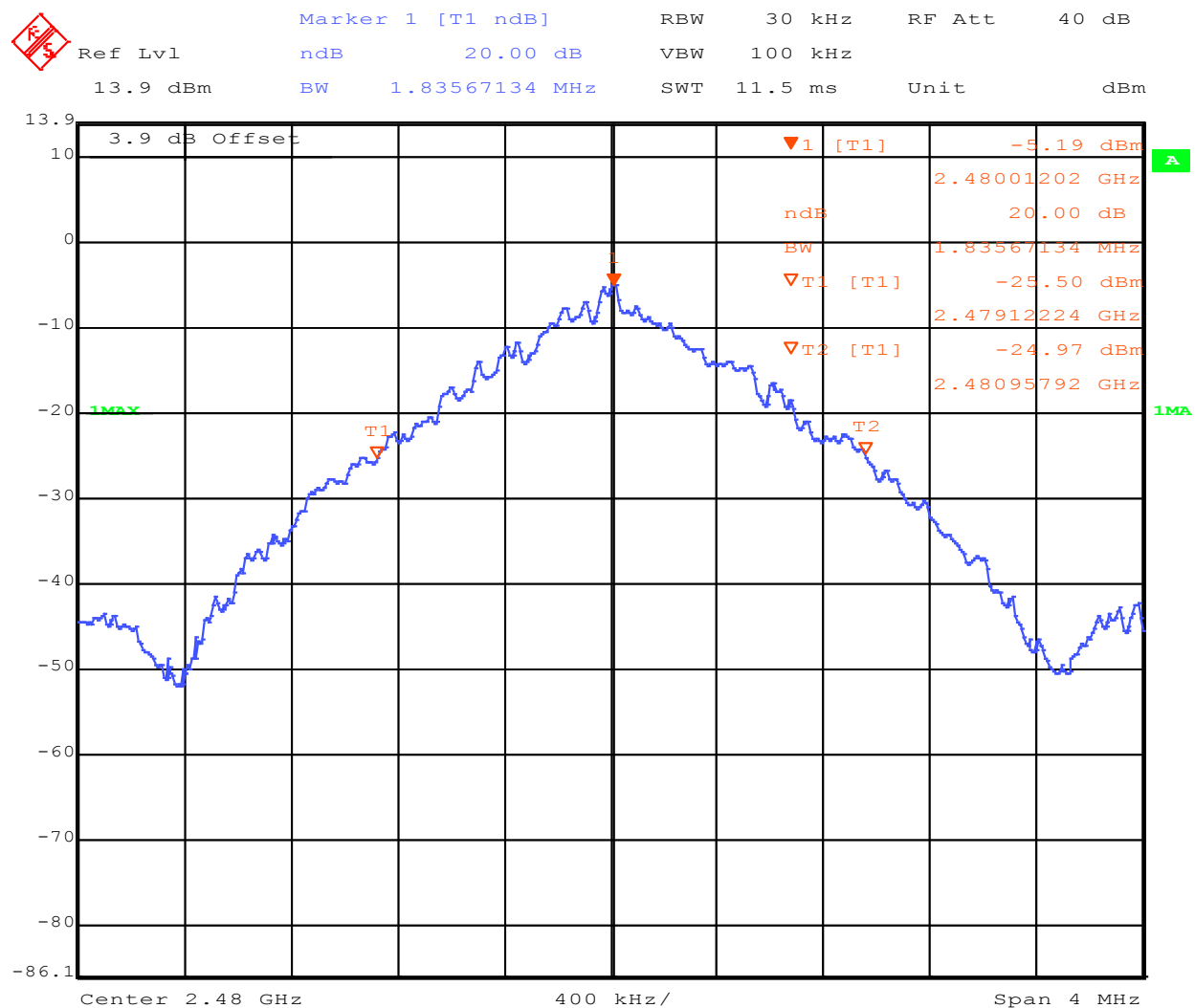
Date: 16.SEP.2020 00:20:53

DTS Bandwidth 2440MHz



Date: 15.SEP.2020 23:54:54

99% Bandwidth 2480MHz



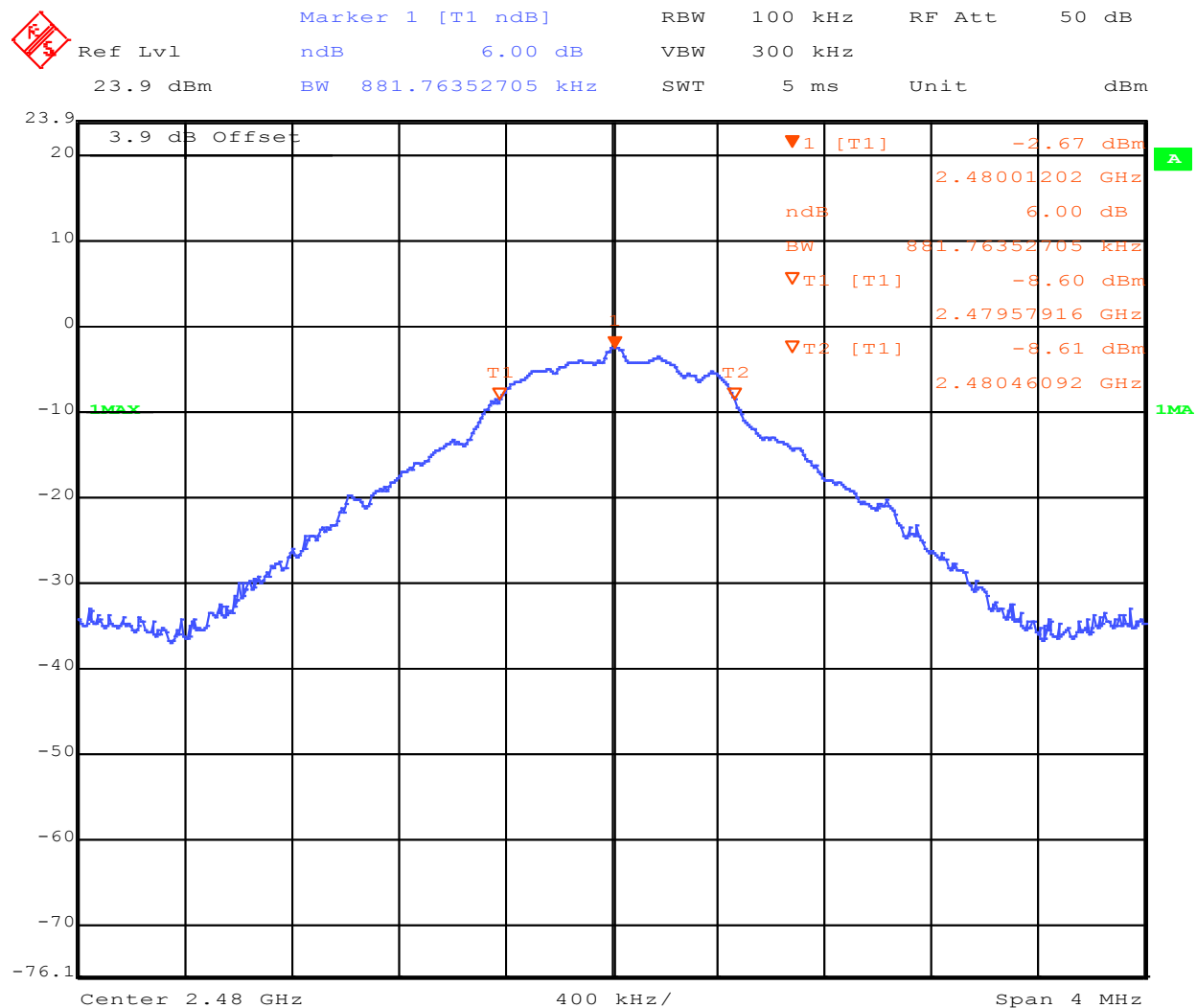
Date: 15.SEP.2020 23:56:35

20dB Down Bandwidth 2480MHz



6dB Down Bandwidth 2480MHz





Date: 16.SEP.2020 00:21:57

DTS Bandwidth 2480MHz



## 10 Power Spectral Density

### 10.1 Test Limits

#### FCC Part 15.247(e):

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

#### RSS-247 Issue 2 § 5.2(b):

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

### 10.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.10.2 Method PKPSD (peak PSD).

### 10.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	2327	Rohde & Schwarz	ES126	9/30/2019	9/30/2020

### 10.4 Test Results

The device was found to be **compliant**. The peak power spectral density was less than 8dBm.

### 10.5 Test Conditions

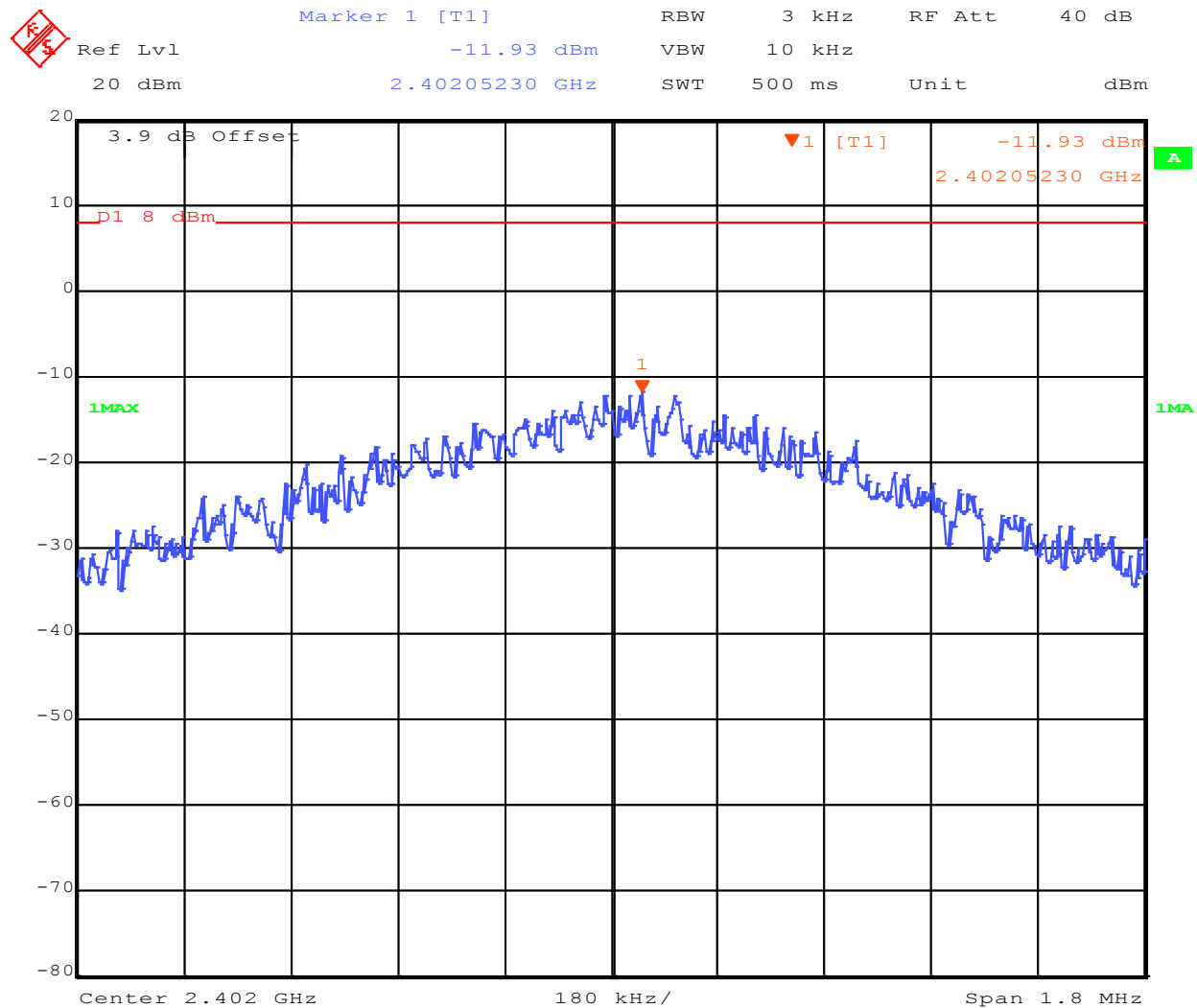
Test Personnel:	Bryan Taylor	Test Date:	9/16/2020
Supervising/Reviewing Engineer:			
(Where Applicable)	NA	Limit Applied:	See Above
Product Standard:	FCC Part 15.247	Ambient Temperature:	22.6C
Input Voltage:	RSS-247 Issue 2	Relative Humidity:	41.2%
Pretest Verification w / Ambient	7.2VDC		
Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar



## 10.6 Test Data

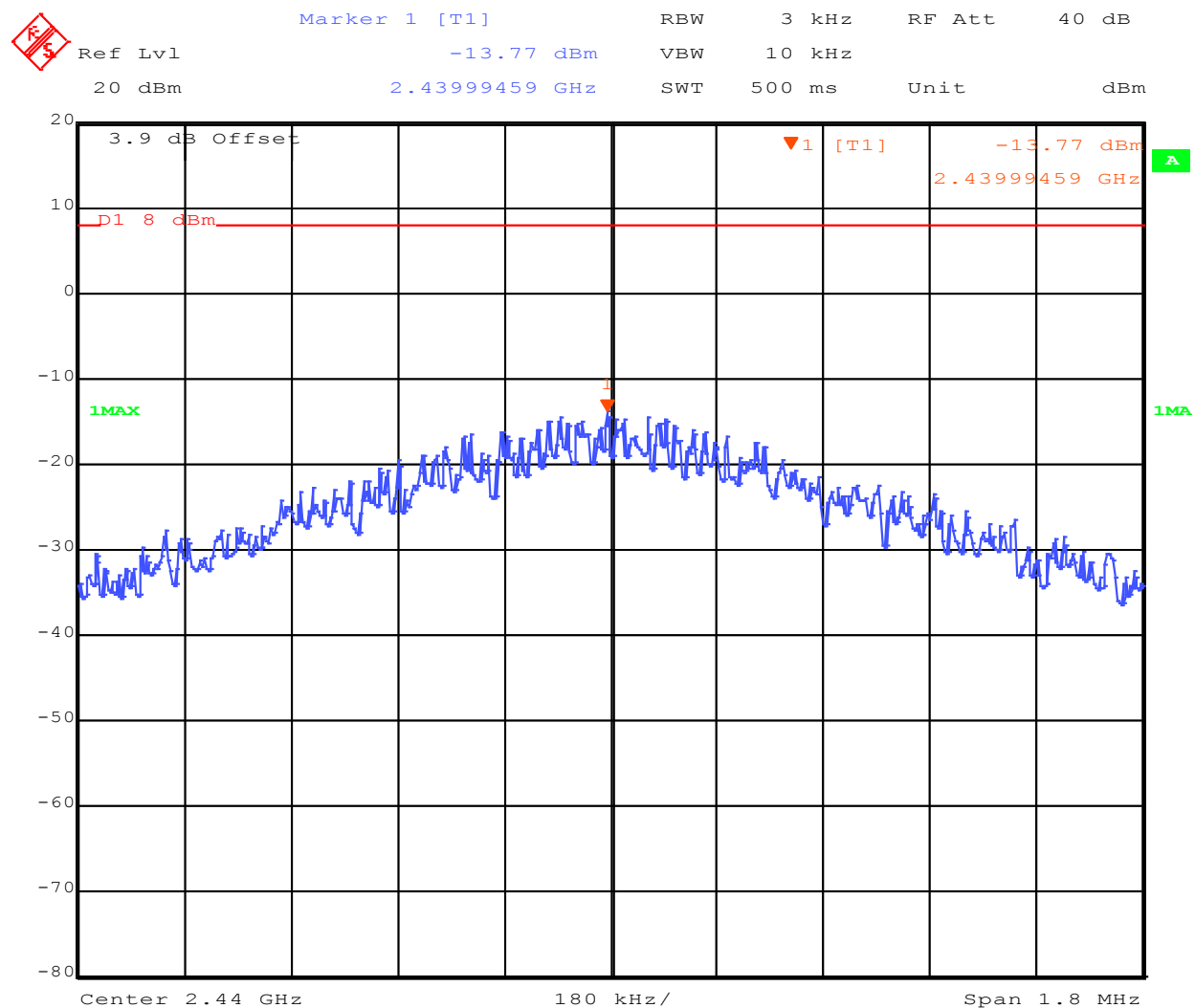
Frequency (MHz)	RBW (kHz)	PPSD (dBm)	Limit (dBm EIRP)	Result
2402	3	-11.93	8	Pass
2440	3	-13.77	8	Pass
2480	3	-14.58	8	Pass

Deviations, Additions, or Exclusions: None.



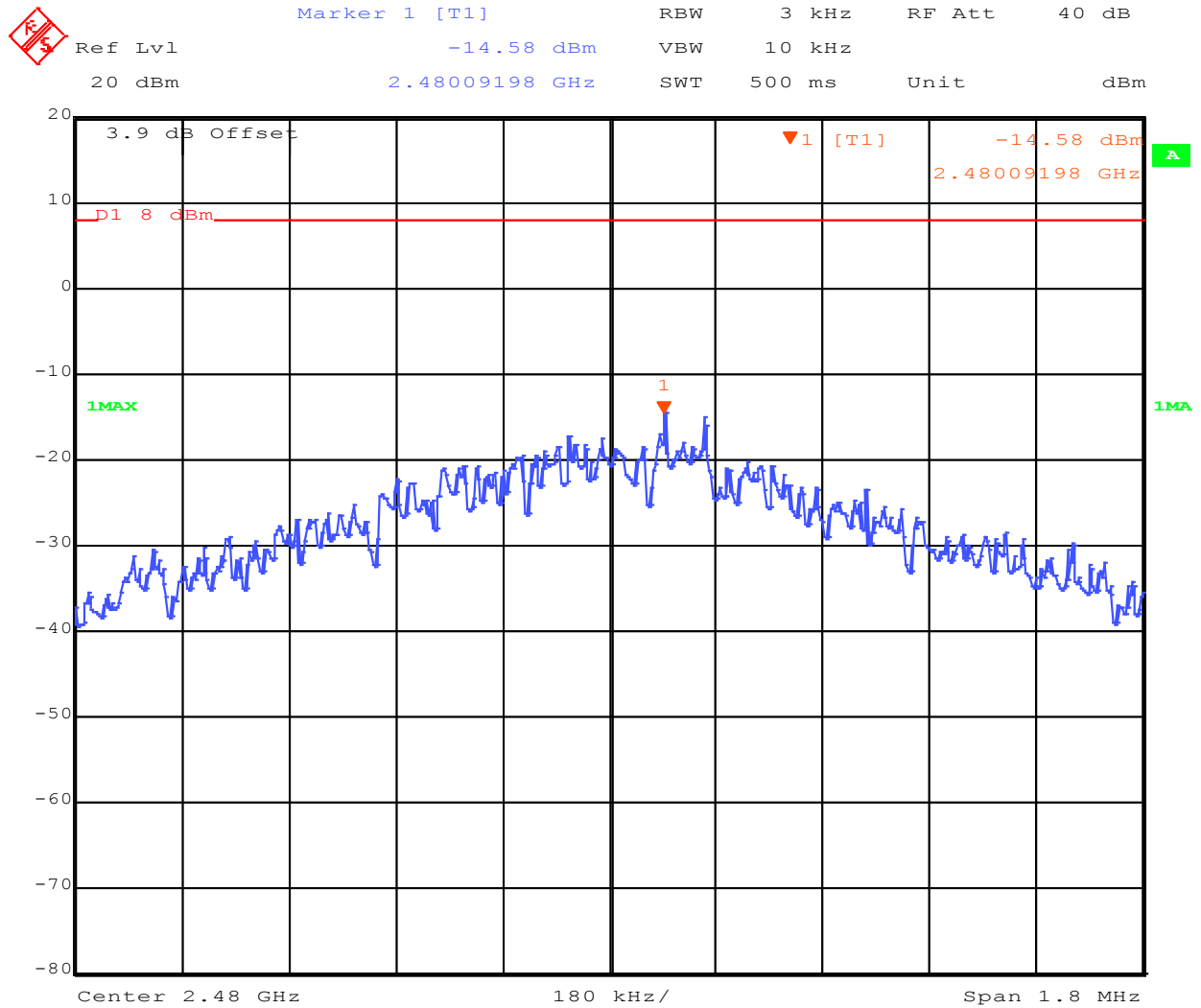
Date: 16.SEP.2020 00:35:07

Peak psd 2402MHz



Date: 16.SEP.2020 00:35:54

Peak psd 2440MHz



Date: 16.SEP.2020 00:39:10

Peak psd 2480MHz



## 11 Conducted Spurious Emissions

### 11.1 Test Limits

#### FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

#### RSS-247 Issue 2 § 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### 11.2 Test Method

Tests are performed in accordance with ANSI C63.10:2013 § 11.11 Emissions in nonrestricted frequency bands.

### 11.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	2327	Rohde & Schwarz	ESI26	9/30/2019	9/30/2020

### 11.4 Test Results

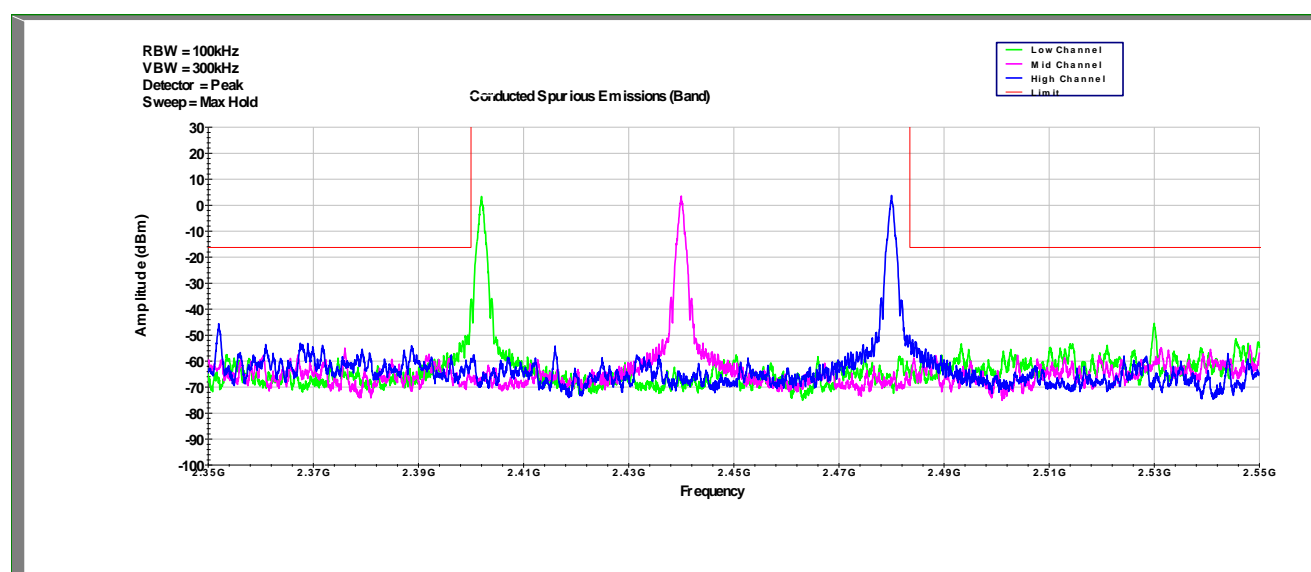
The device was found to be **compliant**. All spurious emissions were found to be attenuated more than 20dB below the level of the fundamental.



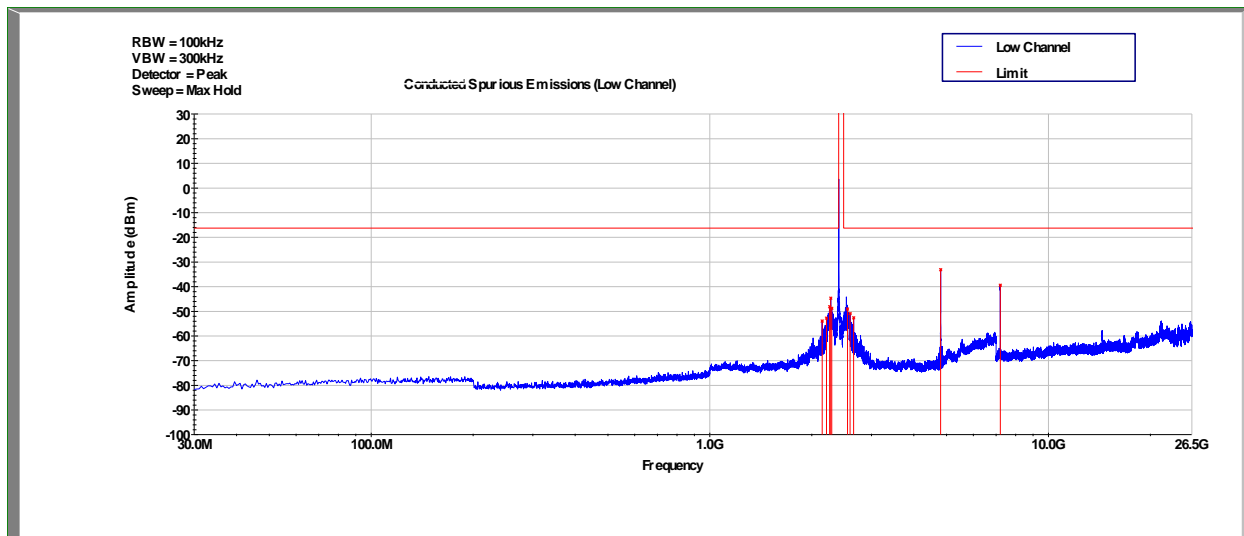
## 11.5 Test Conditions

Test Personnel:	Bryan Taylor	Test Date:	9/16/2020
Supervising/Reviewing Engineer:		Limit Applied:	See Above
(Where Applicable)	NA		
Product Standard:	FCC Part 15.247	Ambient Temperature:	22.6C
Input Voltage:	RSS-247 Issue 2	Relative Humidity:	41.2%
Pretest Verification w / Ambient	7.2VDC	Atmospheric Pressure:	991.2mbar
Signals or BB Source:	Yes		

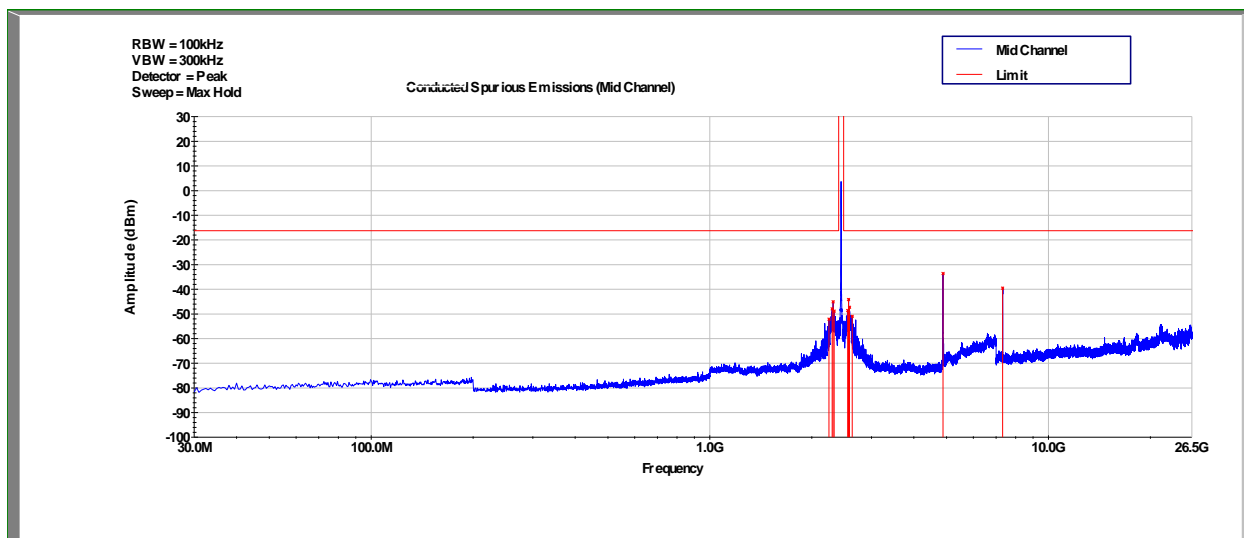
## 11.6 Test Data



Conducted Spurious Emissions (Band)

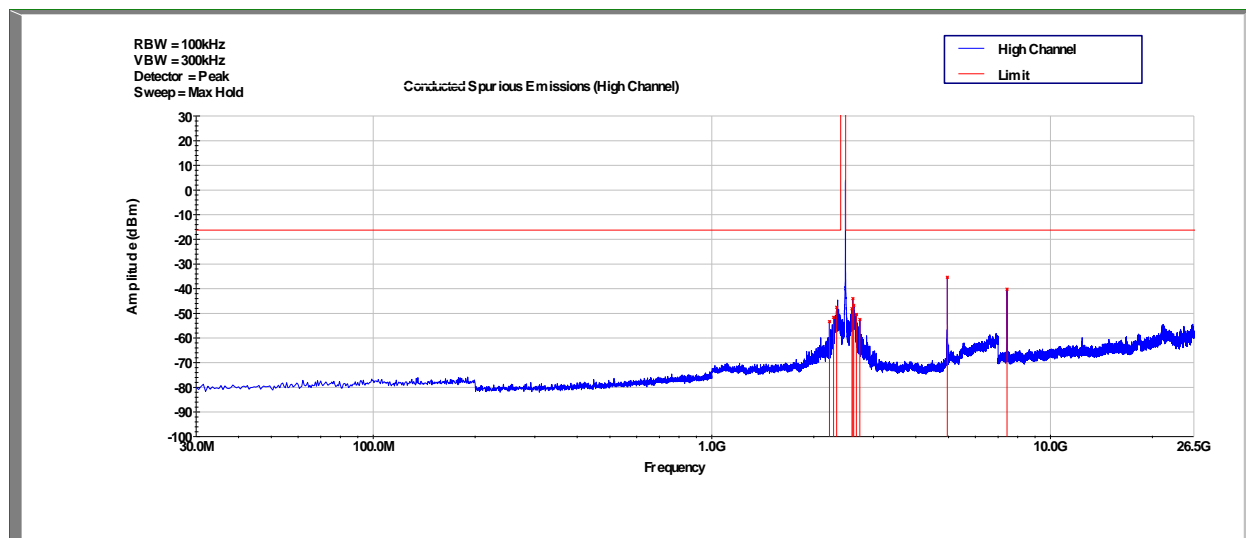


2402MHz Conducted Spurious Emissions



2440MHz Conducted Spurious Emissions



**2480MHz Conducted Spurious Emissions**



## 12 Antenna Requirement

### 12.1 Test Limits

#### FCC Part 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

#### RSS-Gen Issue 5 § 6.8:

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

*This radio transmitter (identify the device by certification number) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.*

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

### 12.2 Test Results

The device was found to be **compliant**. The device has an internal, permanently affixed antenna.



### 13 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	10/29/2020	104421615LEX-001	BCT	BZ	Original Issue
1	2/2/2021	104421615LEX-001.1	BCT	BZ	Re-measured output power data using peak power meter method
2	2/10/2021	104421615LEX-001.2	BCT	BZ	Included radiated data below 30MHz