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Tenovi Co.
TEST REPORT

SCOPE OF WORK
EMC TESTING – TENOVI GATEWAY

REPORT NUMBER
104630548LEX-009

ISSUE DATE

6/4/2021

PAGES
54

DOCUMENT CONTROL NUMBER
Non-Specific EMC Report Shell Rev. December 2017

EMC TEST REPORT

(FULL COMPLIANCE)

Report Number: 104630548LEX-009
Project Number: G104630548

Report Issue Date: 6/4/2021

Model(s) Tested: Tenovi Gateway

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

Tested by:
Intertek Testing Services NA, Inc.
731 Enterprise Dr.
Lexington, KY 40510
USA

Client:
Tenovi Co.
18023 Sky Park Cir STE H2
Irvine, CA, 92614
USA

Report prepared by

Bryan Taylor, Team Leader

Report reviewed by

Brian Lackey, Staff Engineer

Table of Contents

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	Conducted Emissions (ANSI C63.4: 2014)	Pass
13	Antenna Requirement (FCC Part 15.203, RSS-Gen Issue 5 § 6.8)	Pass

3 Client Information

This product was tested at the request of the following:

Client Information	
Client Name:	Tenovi Co.
Address:	18023 Sky Park Cir STE H2 Irvine, CA, 92614 USA
Contact:	Nizan Friedman
Email:	nfriedman@flintrehab.com
Manufacturer Information	
Manufacturer Name:	Tenovi Co.
Manufacturer Address:	18023 Sky Park Cir STE H2 Irvine, CA, 92614 USA

4 Description of Equipment under Test and Variant Models

Equipment Under Test	
Product Name	Tenovi Gateway
Model Number	Tenovi Gateway
Serial Number	860016040136579
Transmission Type	Bluetooth Low Energy
Frequency Range	2402 – 2480MHz
Antenna Type	¼ wave monopole (PCB trace)
Antenna Gain	2.79dBi (peak)
Test Frequencies	2402MHz, 2440MHz, 2480MHz
Receive Date	3/29/2021
Test Start Date	3/30/2021
Test End Date	5/27/2021
Device Received Condition	Good
Test Sample Type	Production
Rated Voltage	120VAC / 60Hz
Description of Equipment Under Test (provided by client)	
The Tenovi Gateway is a gateway device for home health devices that is capable of Bluetooth Low Energy transmission.	

4.1 Variant Models:

There were no variant models covered by this evaluation.

5 System Setup and Method

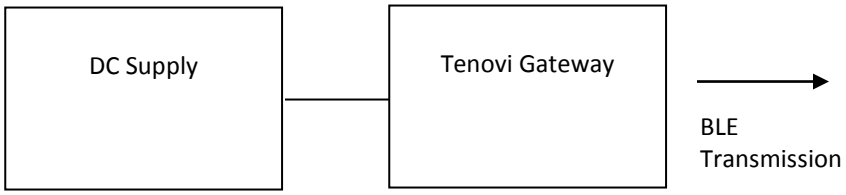
5.1 Method:

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

No.	Descriptions of EUT Exercising
1	Transmitting a BLE signal on low, mid, or high channels.
2	Idle, not transmitting.

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	DC power cable	0.5	none	none	DC power supply

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)	Ucispr
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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

6.3 Test Equipment Used

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	3900	Rohde & Schwarz	ESU40	10/5/2020	10/5/2021
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	4001	ETS	3117	1/26/2021	1/26/2022
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	12/21/2020	12/21/2021
Coaxial Cable (40GHz)	7020			12/21/2020	12/21/2021
Coaxial Cable (40GHz)	7021			12/21/2020	12/21/2021
Coaxial Cable	3074			12/21/2020	12/21/2021
Preamplifier	3918	Rohde & Schwarz	TS-PR18	12/21/2020	12/21/2021
Coaxial Cable	2588			12/21/2020	12/21/2021
Coaxial Cable	2593			12/21/2020	12/21/2021
Coaxial Cable	2592			12/21/2020	12/21/2021

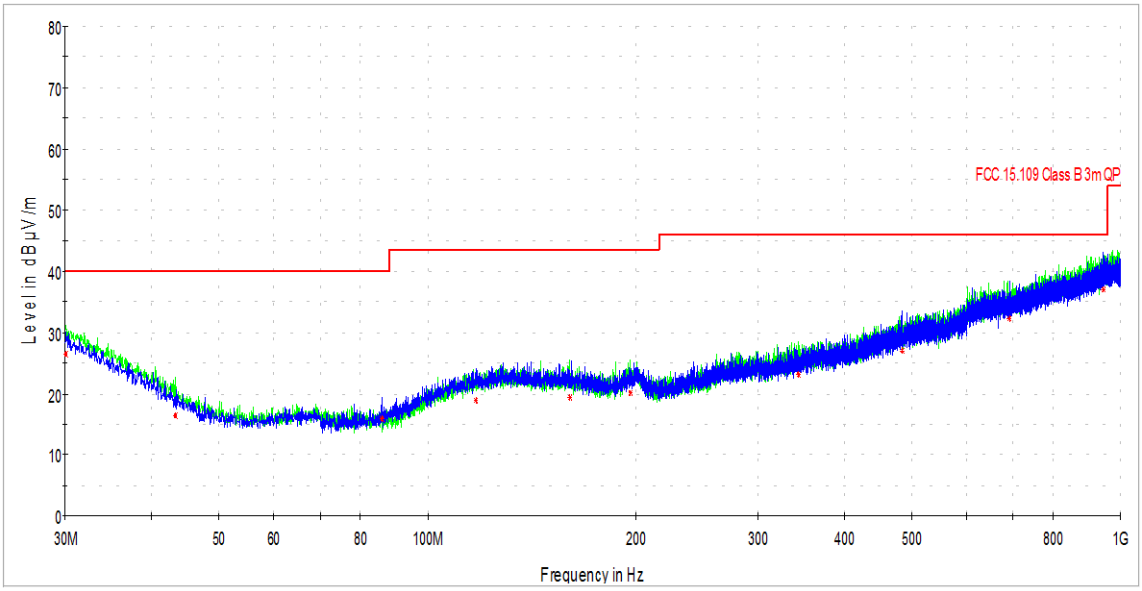
6.4 Software Utilized

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)

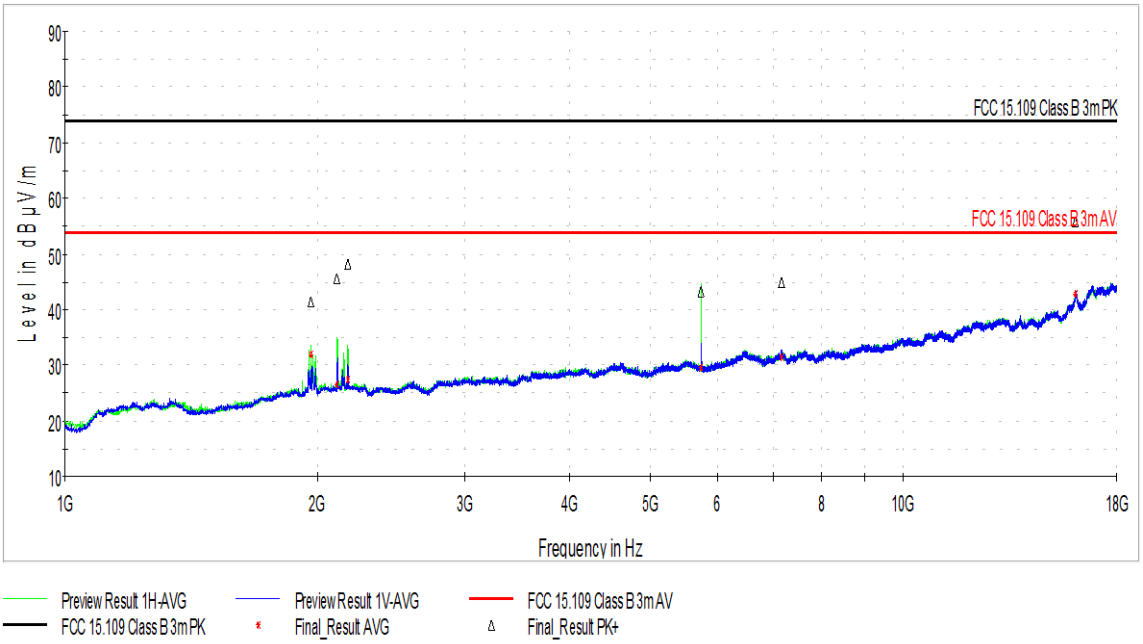


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.053889	26.45	40.00	13.55	120.000	212.9	H	77.0	28.8
43.310556	16.37	40.00	23.63	120.000	212.6	H	144.0	19.2
85.882778	15.83	40.00	24.17	120.000	400.1	V	92.0	15.9
117.407778	18.88	43.52	24.64	120.000	306.6	V	138.0	21.8
160.357222	19.33	43.52	24.19	120.000	100.3	H	163.0	21.5
196.355000	20.12	43.52	23.40	120.000	99.9	H	64.0	21.4
343.471667	23.17	46.02	22.85	120.000	104.9	H	277.0	25.1
483.906111	26.99	46.02	19.03	120.000	354.4	V	183.0	28.7
691.324444	32.22	46.02	13.80	120.000	307.8	V	7.0	32.4
944.817778	37.07	46.02	8.95	120.000	105.8	V	26.0	37.0

Test Personnel:	Ben Coolbear	Test Date:	3/30/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	Class B
Product Standard:	FCC Part 15B ICES-003	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 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)
1966.000000	41.27	73.98	32.71	1000.000	100.0	H	0.0	2.7
2110.500000	45.56	73.98	28.42	1000.000	150.0	H	0.0	2.4
2176.500000	48.25	73.98	25.73	1000.000	346.0	H	243.0	2.8
5740.000000	43.19	73.98	30.79	1000.000	355.0	H	347.0	9.6
7170.000000	44.85	73.98	29.13	1000.000	410.0	V	207.0	11.7
16078.000000	55.87	73.98	18.11	1000.000	410.0	H	159.0	25.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1966.000000	32.05	53.98	21.93	1000.000	100.0	H	0.0	2.7
2110.500000	26.49	53.98	27.49	1000.000	150.0	H	0.0	2.4
2176.500000	27.57	53.98	26.41	1000.000	346.0	H	243.0	2.8
5740.000000	29.50	53.98	24.48	1000.000	355.0	H	347.0	9.6
7170.000000	31.39	53.98	22.59	1000.000	410.0	V	207.0	11.7
16078.000000	42.80	53.98	11.18	1000.000	410.0	H	159.0	25.2

Test Personnel:	Michael Carlson	Test Date:	4/5/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	Class B
Product Standard:	FCC Part 15B ICES-003	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 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	10/5/2020	10/5/2021
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	4001	ETS	3117	1/26/2021	1/26/2022
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	12/21/2020	12/21/2021
Coaxial Cable (40GHz)	7020			12/21/2020	12/21/2021
Coaxial Cable (40GHz)	7021			12/21/2020	12/21/2021
Coaxial Cable	3074			12/21/2020	12/21/2021
Preamplifier	3918	Rohde & Schwarz	TS-PR18	12/21/2020	12/21/2021
Coaxial Cable	2588			12/21/2020	12/21/2021
Coaxial Cable	2593			12/21/2020	12/21/2021
Coaxial Cable	2592			12/21/2020	12/21/2021

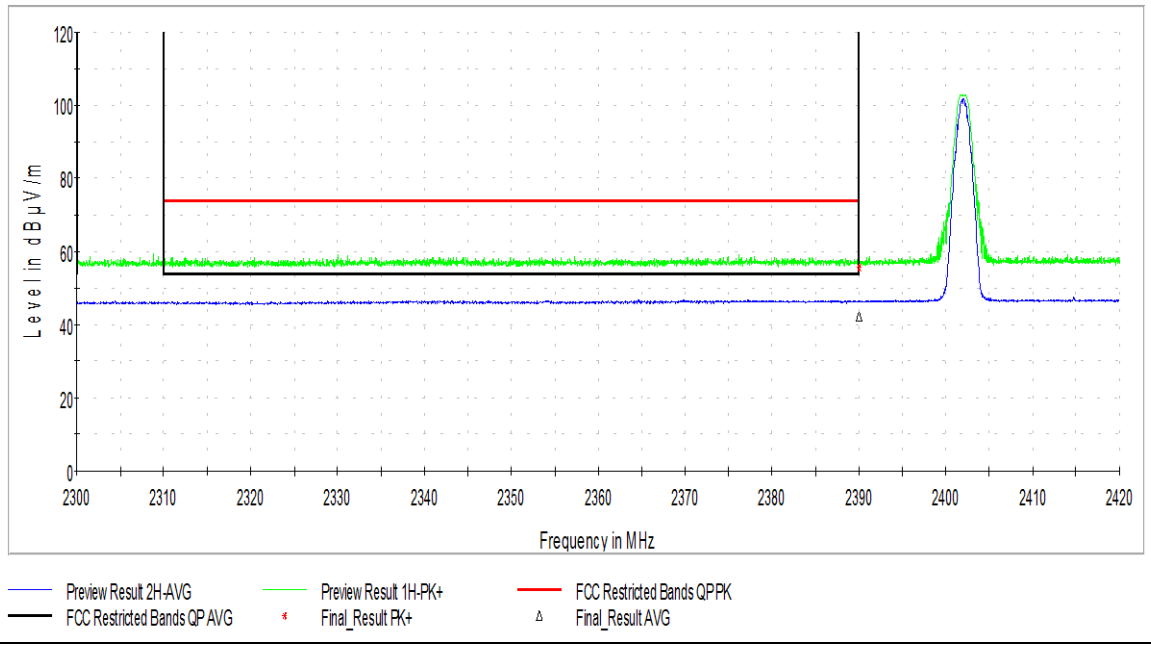
7.4 Software Utilized

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.

7.1 Radiated Spurious Emissions (Low Band Edge)



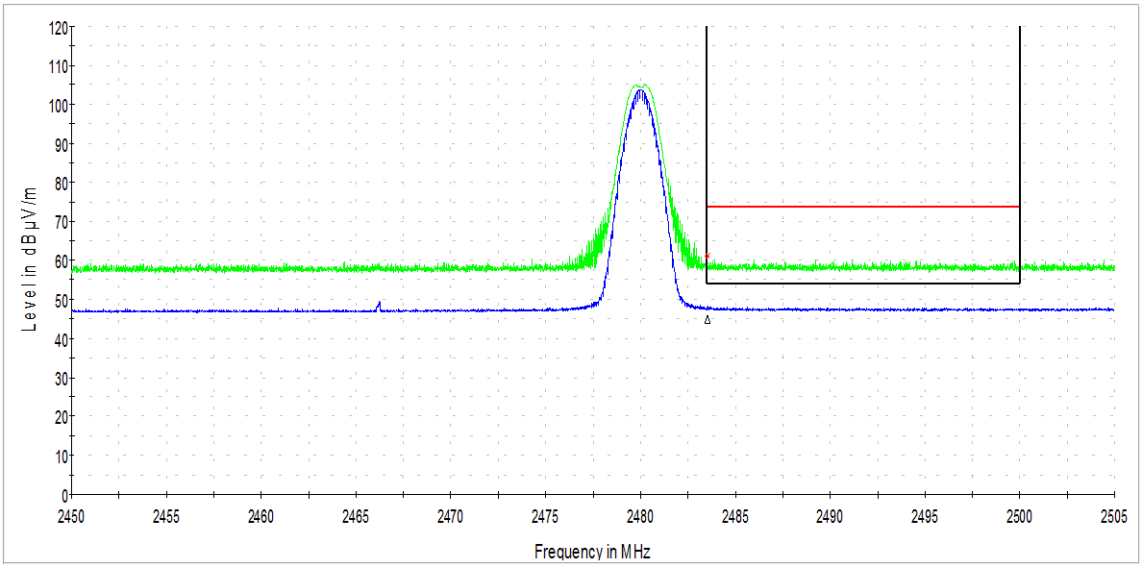
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.000000	55.49	73.98	18.49	1000.000	157.0	H	92.0	38.6

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2390.000000	42.35	53.98	11.63	1000.000	157.0	H	92.0	38.6

Test Personnel:	Bryan Taylor	Test Date:	4/16/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	24.3°C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	52.8%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	987.3 mbar

Deviations, Additions, or Exclusions: None

7.2 Radiated Spurious Emissions (High Band Edge)



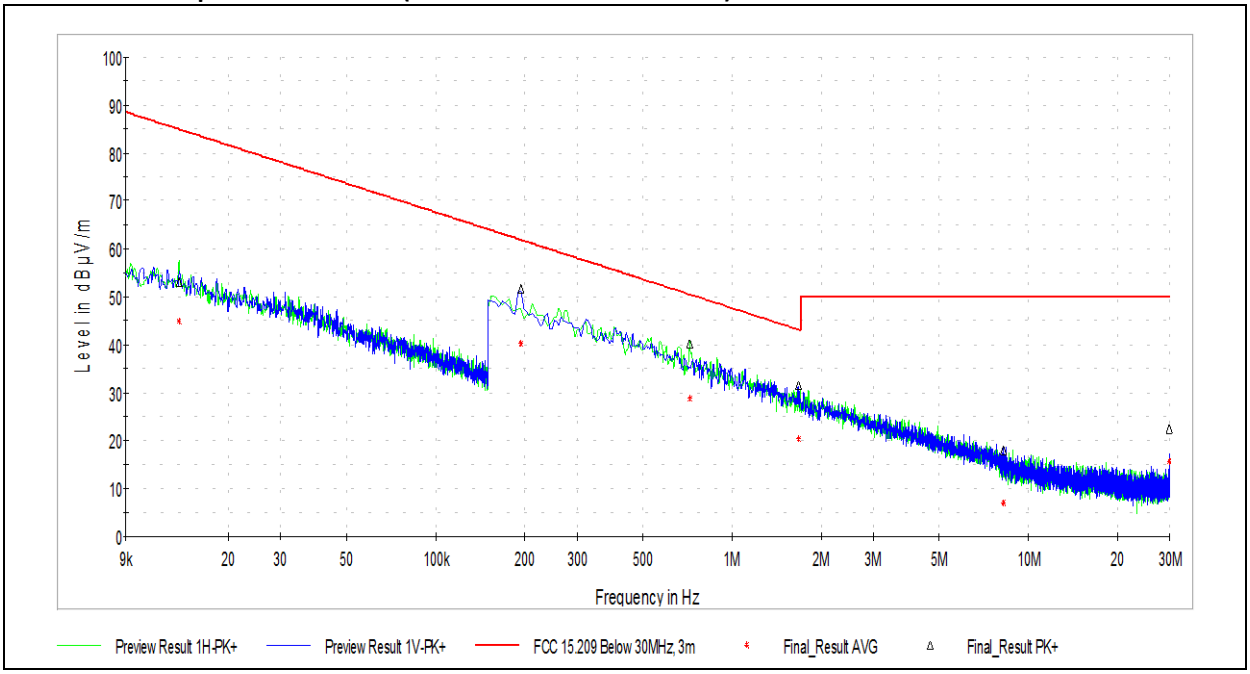
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.518269	61.11	73.98	12.87	1000.000	100.0	H	225.0	39.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2483.518269	44.80	53.98	9.18	1000.000	100.0	H	225.0	39.2

Test Personnel:	Bryan Taylor	Test Date:	4/16/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	24.3°C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	52.8%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	987.3 mbar

Deviations, Additions, or Exclusions: None

7.3 Radiated Spurious Emissions (Bluetooth BLE 9kHz - 30MHz) Low Channel

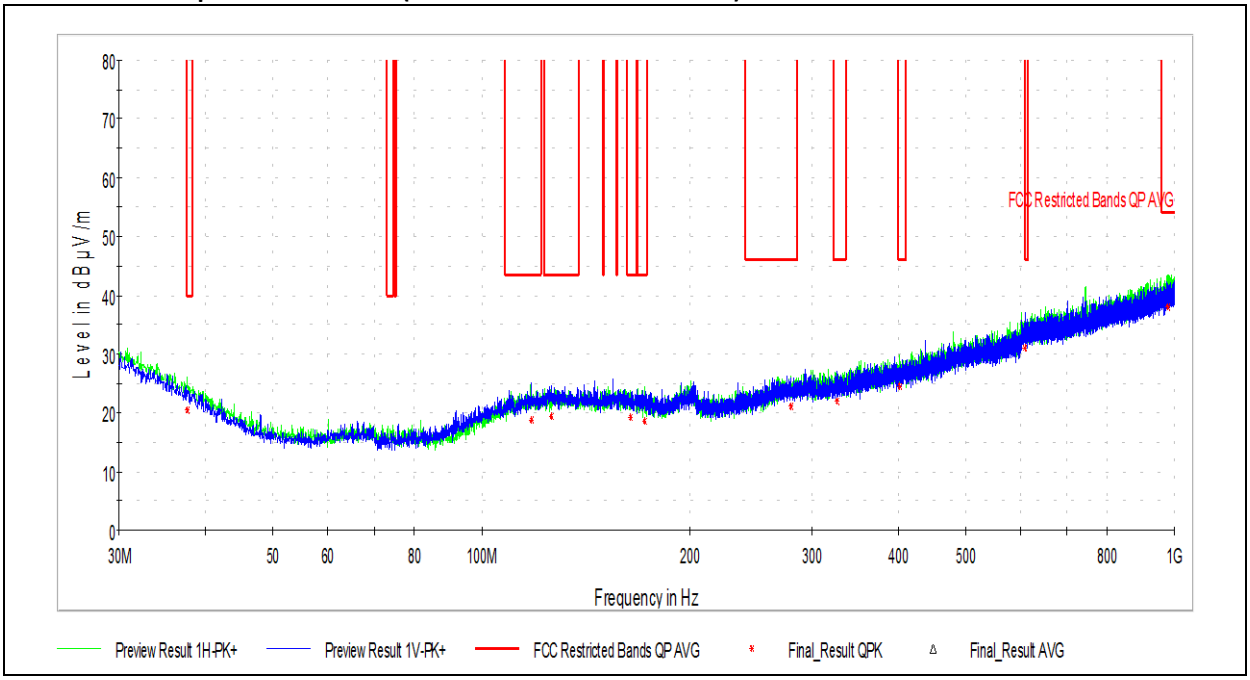


Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Azimuth (deg)	Corr. (dB)
0.013633	44.78	84.91	40.13	0.200	197.0	17.0
0.193897	40.15	61.85	21.70	9.000	156.0	12.1
0.720662	28.64	50.45	21.81	9.000	124.0	11.9
1.673228	20.31	43.13	22.82	9.000	0.0	11.8
8.249007	6.93	50.00	43.07	9.000	264.0	11.3
29.863919	15.76	50.00	34.24	9.000	270.0	9.1

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.4 Radiated Spurious Emissions (Bluetooth BLE 30MHz – 1GHz) Low Channel

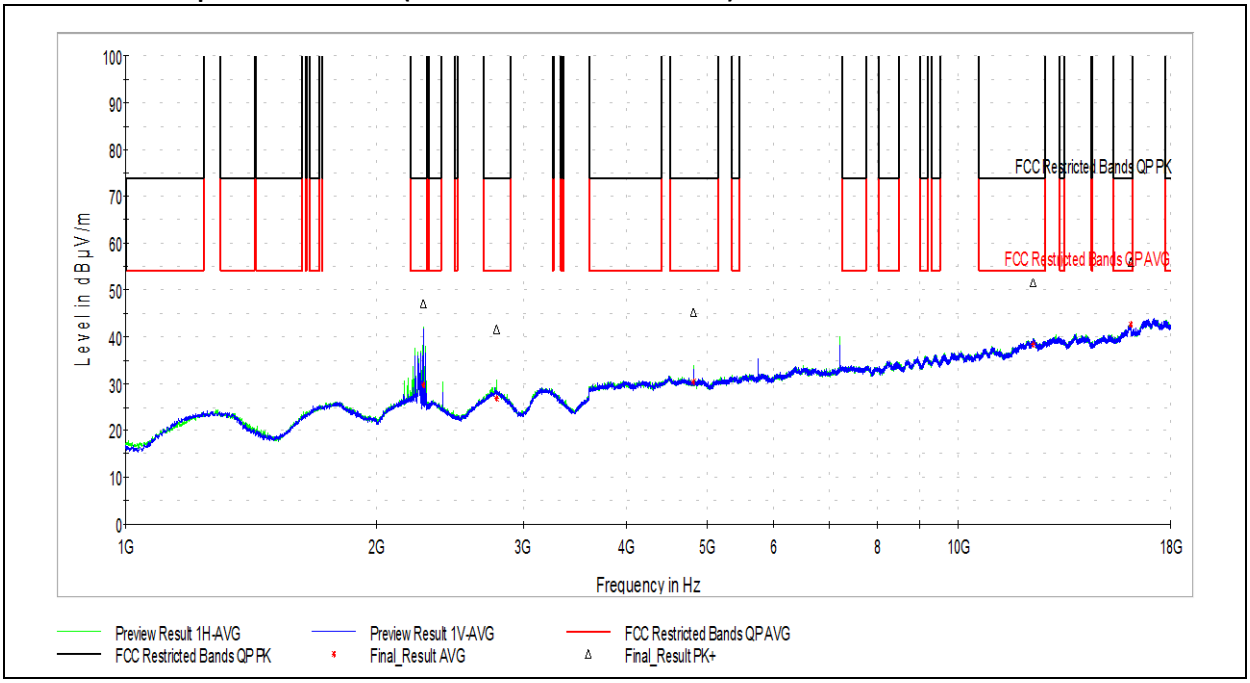


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
37.598333	20.46	40.00	19.54	120.000	128.5	H	108.0	23.2
118.108333	18.79	43.52	24.73	120.000	200.0	V	210.0	21.8
126.083889	19.40	43.52	24.12	120.000	132.7	V	192.0	22.3
163.913889	19.23	43.52	24.29	120.000	104.4	H	9.0	21.5
171.835556	18.54	43.52	24.98	120.000	371.4	H	188.0	20.9
279.667222	21.17	46.02	24.85	120.000	151.7	H	243.0	23.5
325.634445	21.94	46.02	24.08	120.000	247.4	V	193.0	24.1
401.132778	24.52	46.02	21.50	120.000	139.2	H	200.0	26.7
608.497222	31.05	46.02	14.97	120.000	129.1	V	0.0	31.0
977.851667	38.10	53.98	15.88	120.000	163.4	H	233.0	37.9

Test Personnel:	Michael Carlson	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.5 Radiated Spurious Emissions (Bluetooth BLE 1GHz – 18GHz) Low Channel



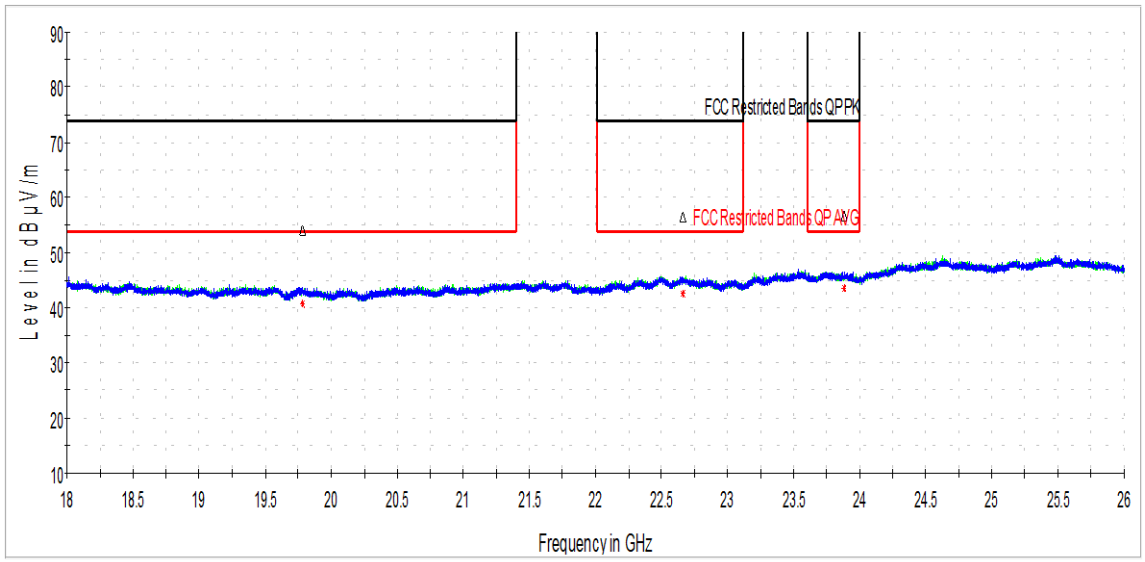
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2275.500000	47.17	73.98	26.81	1000.000	304.0	H	126.0	4.7
2787.500000	41.68	73.98	32.30	1000.000	265.0	H	346.0	6.4
4808.000000	45.25	73.98	28.73	1000.000	291.0	H	181.0	9.4
12292.000000	51.77	73.98	22.21	1000.000	380.0	V	168.0	19.9
16118.000000	55.92	73.98	18.06	1000.000	194.0	V	42.0	25.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2275.500000	29.57	53.98	24.41	1000.000	304.0	H	126.0	4.7
2787.500000	26.88	53.98	27.10	1000.000	265.0	H	346.0	6.4
4808.000000	30.30	53.98	23.68	1000.000	291.0	H	181.0	9.4
12292.000000	38.16	53.98	15.82	1000.000	380.0	V	168.0	19.9
16118.000000	42.65	53.98	11.33	1000.000	194.0	V	42.0	25.2

Test Personnel:	Ben Coolbear	Test Date:	4/14/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.6 Radiated Spurious Emissions (Bluetooth BLE 18GHz – 26GHz) Low Channel



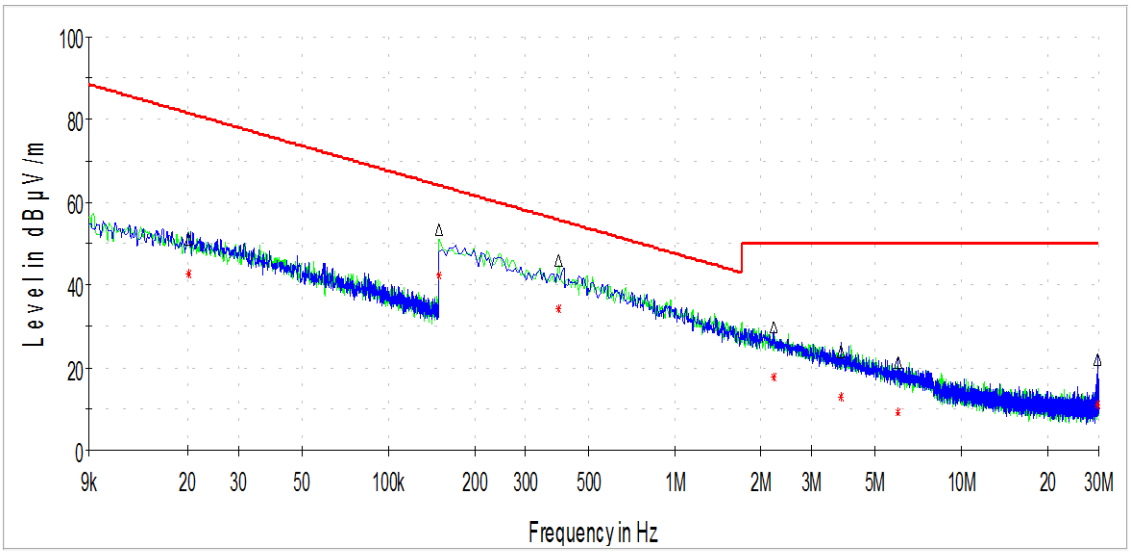
Frequency	MaxPeak	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
19782.545455	54.22	73.98	19.76	1000.000	100.0	V	0.0	15.9
22660.363636	56.51	73.98	17.47	1000.000	371.0	H	0.0	10.5
23881.090909	56.83	73.98	17.15	1000.000	100.0	H	137.0	11.4

Frequency	Average	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
19782.545455	40.76	53.98	13.22	1000.000	100.0	V	0.0	15.9
22660.363636	42.57	53.98	11.41	1000.000	371.0	H	0.0	10.5
23881.090909	43.52	53.98	10.46	1000.000	100.0	H	137.0	11.4

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.7 Radiated Spurious Emissions (Bluetooth BLE 9kHz - 30MHz) Mid Channel

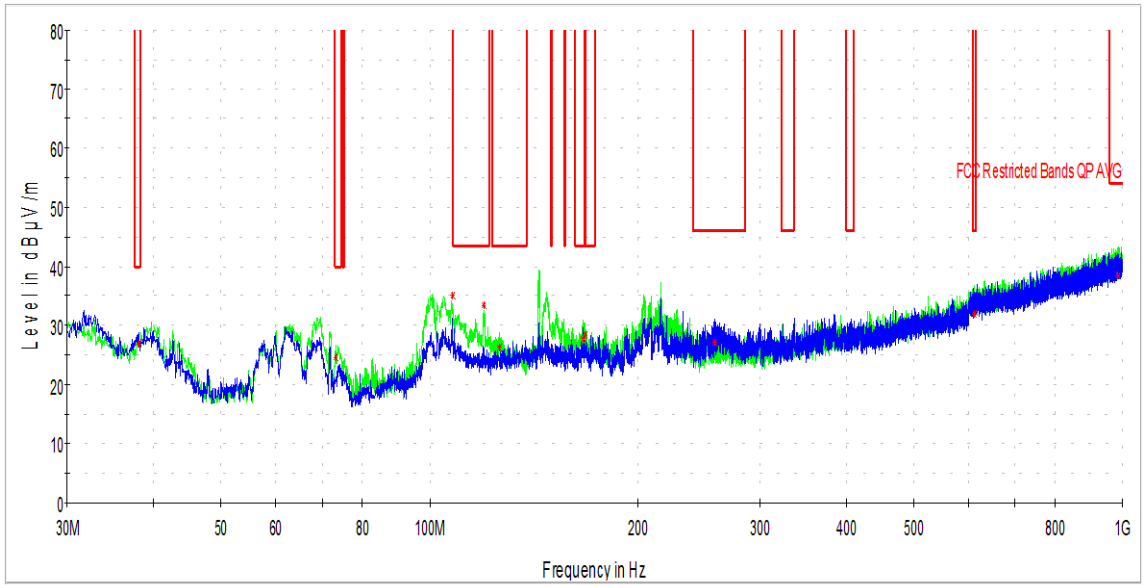


Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Azimuth (deg)	Corr. (dB)
0.020079	42.52	81.55	39.03	0.200	276.0	15.1
0.150000	42.19	64.08	21.89	9.000	253.0	12.2
0.391434	34.04	55.75	21.71	9.000	237.0	11.9
2.204382	17.64	50.00	32.36	9.000	160.0	11.7
3.797846	12.99	50.00	37.01	9.000	114.0	11.5
5.997088	9.31	50.00	40.69	9.000	282.0	11.4
29.872699	10.90	50.00	39.10	9.000	292.0	9.1

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.8 Radiated Spurious Emissions (Bluetooth BLE 30MHz – 1 GHz) Mid Channel

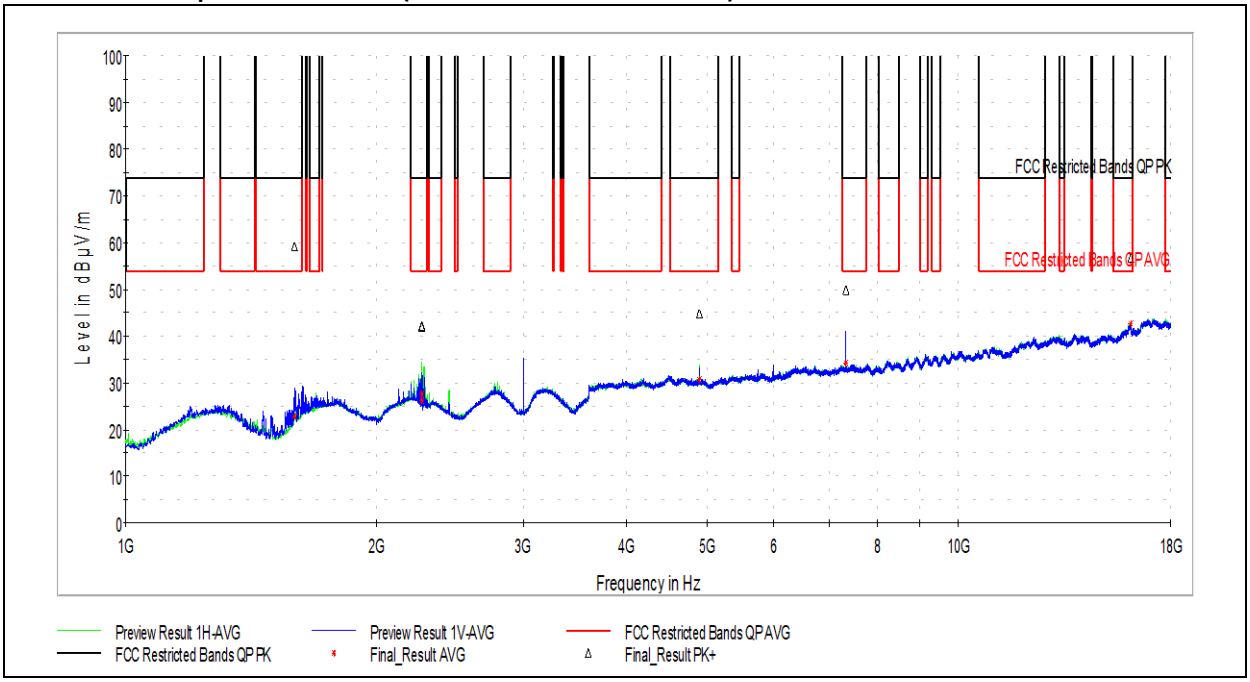


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.083333	26.79	40.00	13.21	120.000	99.9	V	0.0	21.7
73.165000	24.49	40.00	15.51	120.000	241.3	H	323.0	15.6
108.031111	35.16	43.52	8.36	120.000	139.7	H	133.0	20.4
119.778889	33.37	43.52	10.15	120.000	115.4	H	141.0	21.7
126.191667	26.31	43.52	17.21	120.000	128.5	H	288.0	22.0
166.338889	27.77	43.52	15.75	120.000	119.2	H	212.0	21.4
167.793889	28.29	43.52	15.23	120.000	100.2	H	182.0	21.3
257.950000	27.00	46.02	19.02	120.000	223.5	V	182.0	22.3
611.515000	31.82	46.02	14.20	120.000	151.2	H	138.0	31.6
985.881111	38.45	53.98	15.53	120.000	223.2	H	165.0	38.1

Test Personnel:	Michael Carlson	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.9 Radiated Spurious Emissions (Bluetooth BLE 1GHz – 18GHz) Mid Channel



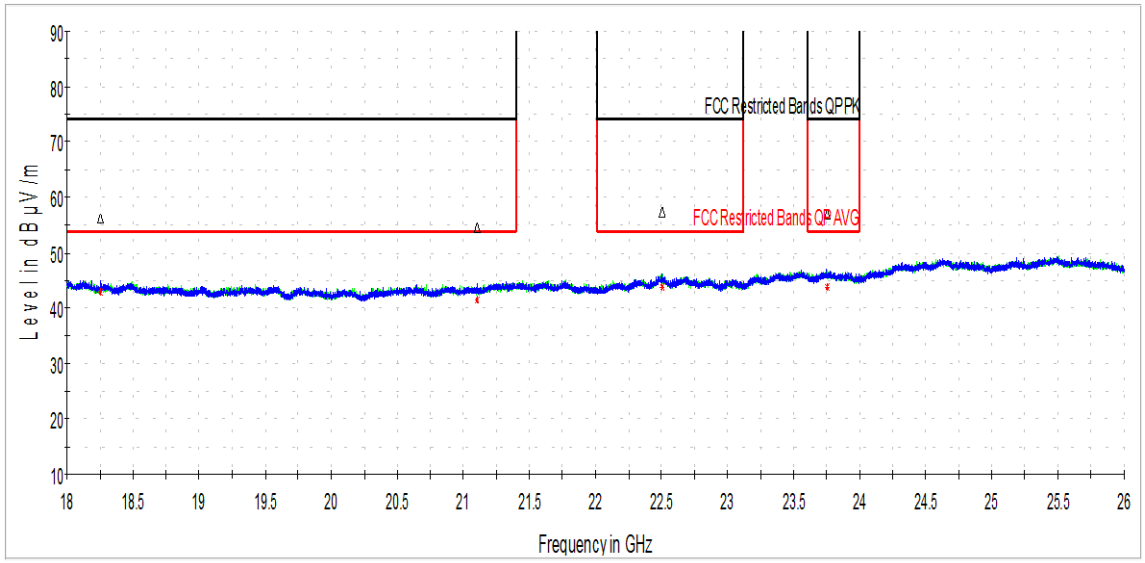
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1596.000000	59.31	73.98	14.67	1000.000	362.0	V	165.0	0.3
2267.500000	41.99	73.98	31.99	1000.000	391.0	H	101.0	4.7
2268.000000	42.16	73.98	31.82	1000.000	298.0	H	43.0	4.7
4888.000000	44.88	73.98	29.10	1000.000	230.0	H	52.0	10.1
7331.500000	49.84	73.98	24.14	1000.000	314.0	V	306.0	13.4
16120.500000	56.81	73.98	17.17	1000.000	374.0	H	334.0	25.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1596.000000	22.79	53.98	31.19	1000.000	362.0	V	165.0	0.3
2267.500000	26.14	53.98	27.84	1000.000	391.0	H	101.0	4.7
2268.000000	27.57	53.98	26.41	1000.000	298.0	H	43.0	4.7
4888.000000	30.77	53.98	23.21	1000.000	230.0	H	52.0	10.1
7331.500000	34.29	53.98	19.69	1000.000	314.0	V	306.0	13.4
16120.500000	42.63	53.98	11.35	1000.000	374.0	H	334.0	25.2

Test Personnel:	Ben Coolbear	Test Date:	4/14/2021
Supervising/Reviewing Engineer (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.10 Radiated Spurious Emissions (Bluetooth BLE 18GHz – 26GHz) Mid Channel



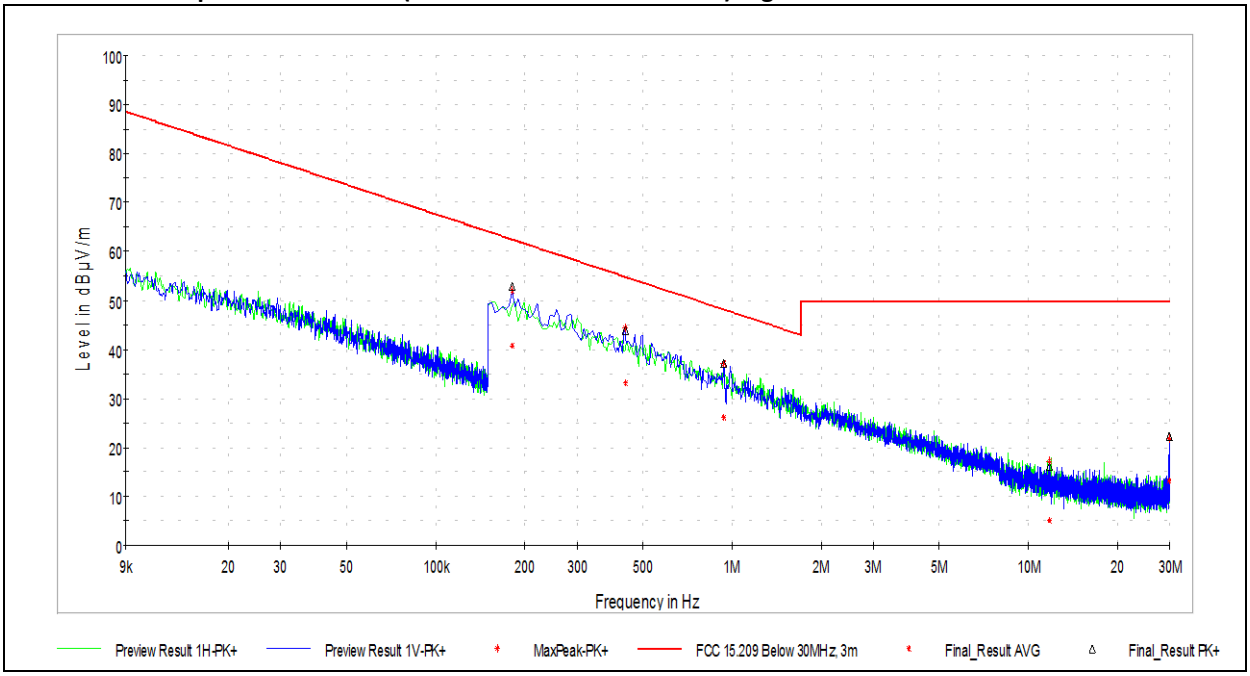
Frequency	MaxPeak	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
18249.818182	56.14	73.98	17.84	1000.000	349.0	V	185.0	20.9
21101.454546	54.67	73.98	19.31	1000.000	357.0	V	24.0	12.5
22506.181818	57.45	73.98	16.53	1000.000	109.0	V	232.0	10.8
23753.090909	56.85	73.98	17.13	1000.000	117.0	H	141.0	11.1

Frequency	Average	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
18249.818182	42.93	53.98	11.05	1000.000	349.0	V	185.0	20.9
21101.454546	41.42	53.98	12.56	1000.000	357.0	V	24.0	12.5
22506.181818	43.76	53.98	10.22	1000.000	109.0	V	232.0	10.8
23753.090909	43.70	53.98	10.28	1000.000	117.0	H	141.0	11.1

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.11 Radiated Spurious Emissions (Bluetooth BLE 9kHz - 30MHz) High Channel

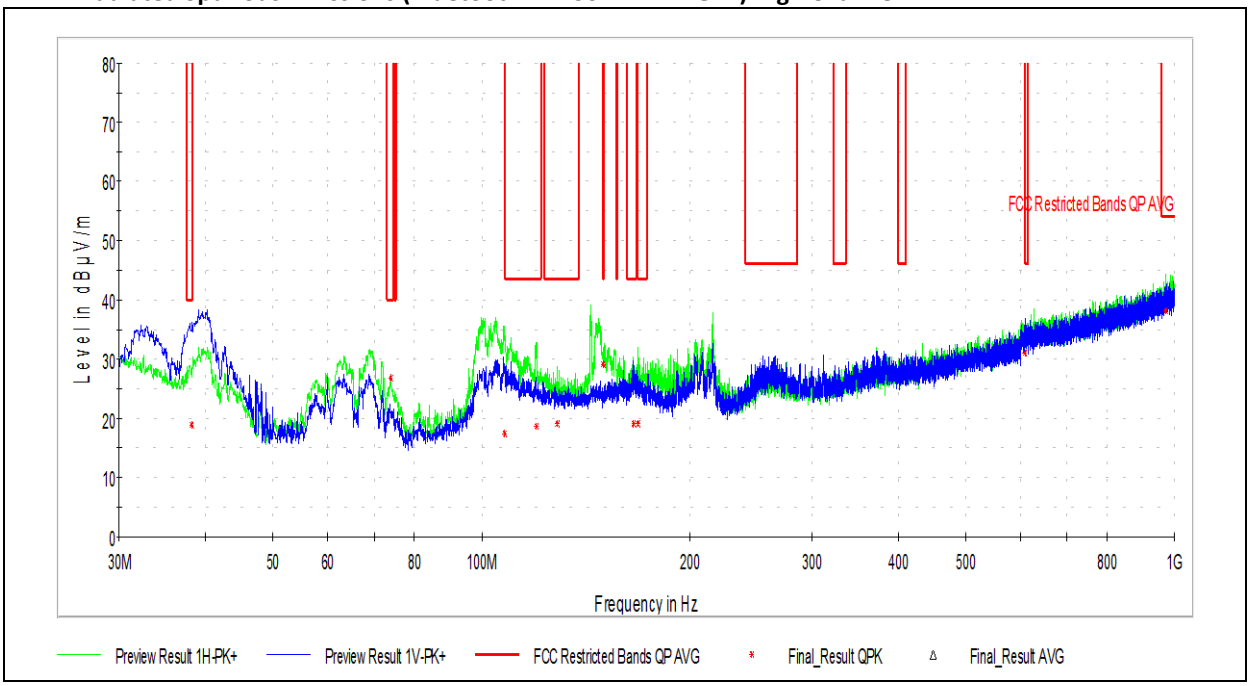


Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Azimuth (deg)	Corr. (dB)
0.180728	40.79	62.46	21.67	9.000	266.0	12.1
0.435331	33.15	54.83	21.68	9.000	216.0	11.9
0.935757	26.11	48.18	22.07	9.000	6.0	11.9
11.721265	5.04	50.00	44.96	9.000	6.0	11.3
29.863919	13.10	50.00	36.90	9.000	207.0	9.1

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.12 Radiated Spurious Emissions (Bluetooth BLE 30MHz – 1 GHz) High Channel

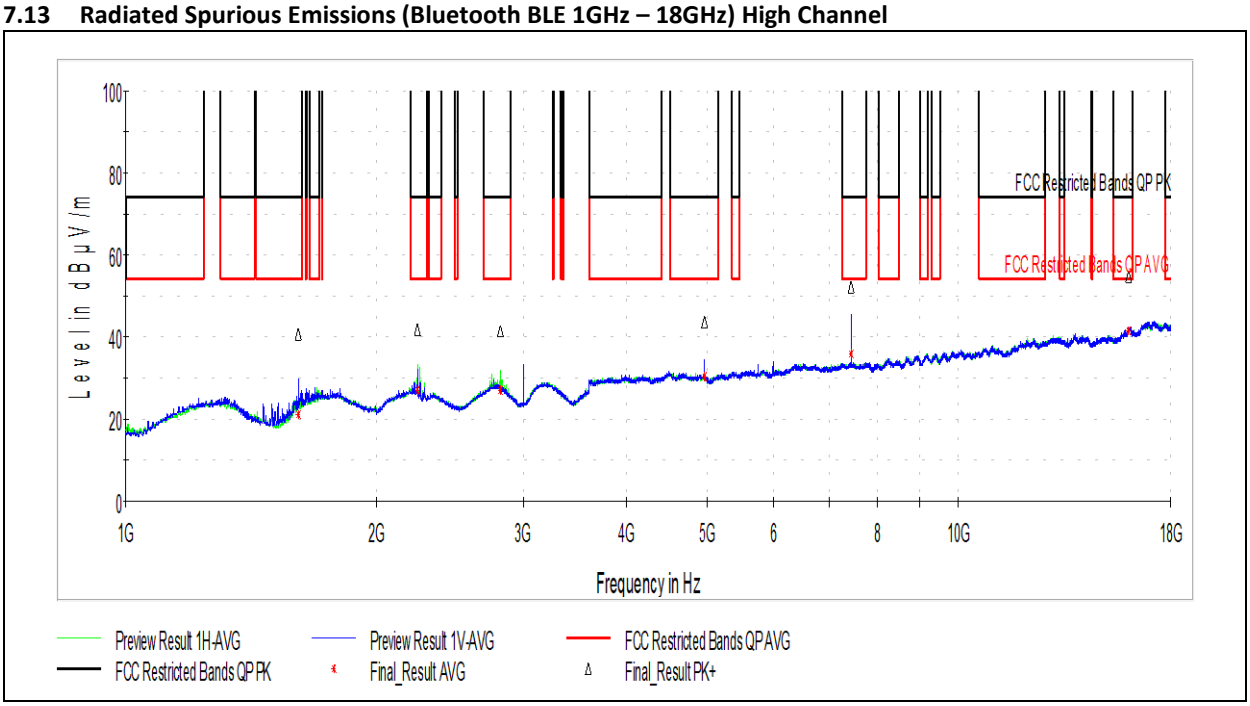


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
38.191111	18.78	40.00	21.22	120.000	358.9	V	36.0	21.6
73.973333	26.82	40.00	13.18	120.000	235.6	H	314.0	15.6
108.031111	17.42	43.52	26.10	120.000	400.0	H	110.0	20.4
120.210000	18.74	43.52	24.78	120.000	98.7	H	82.0	21.8
128.616667	19.06	43.52	24.46	120.000	400.1	H	308.0	22.0
149.902778	29.12	43.52	14.40	120.000	127.9	H	179.0	21.3
165.853889	18.99	43.52	24.53	120.000	138.9	H	239.0	21.4
168.063333	19.00	43.52	24.52	120.000	235.5	H	252.0	21.3
608.012222	31.07	46.02	14.95	120.000	276.5	V	44.0	31.0
972.031667	38.07	53.98	15.91	120.000	290.7	H	243.0	38.0

Test Personnel:	Michael Carlson	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.13 Radiated Spurious Emissions (Bluetooth BLE 1GHz – 18GHz) High Channel



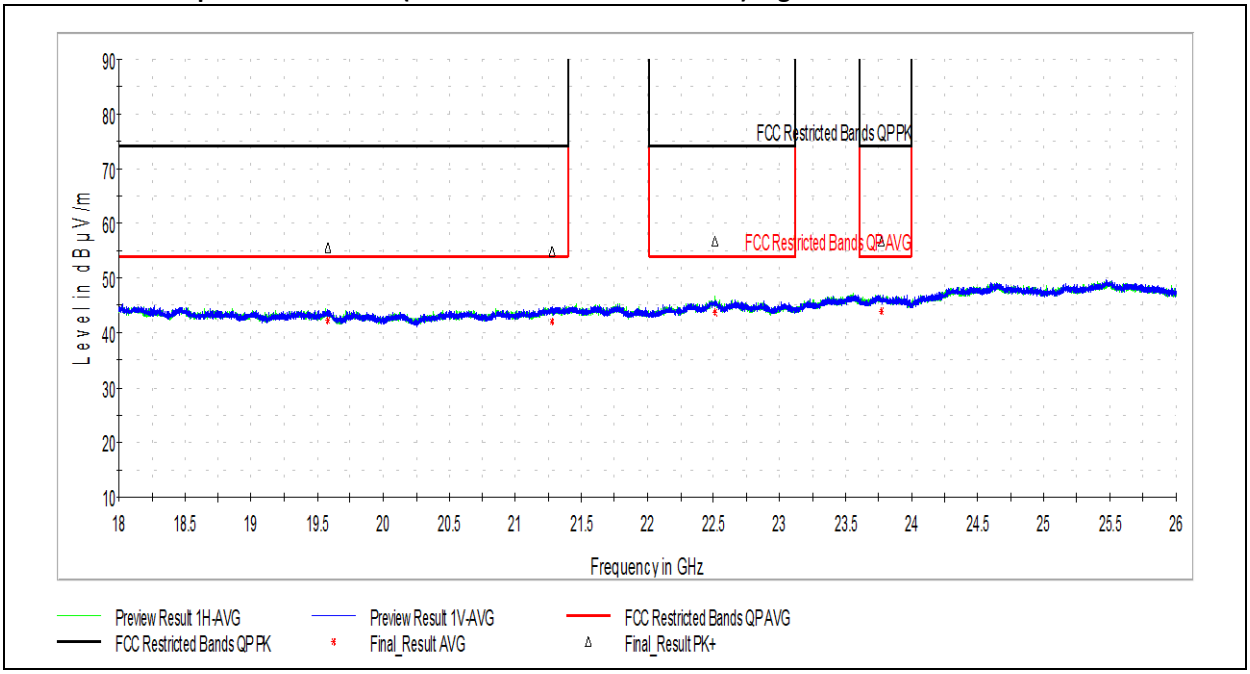
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1611.000000	40.70	73.98	33.28	1000.000	410.0	V	170.0	0.3
2240.000000	41.77	73.98	32.21	1000.000	352.0	H	102.0	4.5
2816.000000	41.40	73.98	32.58	1000.000	255.0	H	0.0	6.5
4960.000000	43.75	73.98	30.23	1000.000	311.0	V	114.0	9.7
7439.500000	52.36	73.98	21.62	1000.000	356.0	V	309.0	13.1
16008.000000	54.75	73.98	19.23	1000.000	272.0	V	255.0	23.6

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1611.000000	20.95	53.98	33.03	1000.000	410.0	V	170.0	0.3
2240.000000	27.07	53.98	26.91	1000.000	352.0	H	102.0	4.5
2816.000000	26.92	53.98	27.06	1000.000	255.0	H	0.0	6.5
4960.000000	30.47	53.98	23.51	1000.000	311.0	V	114.0	9.7
7439.500000	35.88	53.98	18.10	1000.000	356.0	V	309.0	13.1
16008.000000	41.54	53.98	12.44	1000.000	272.0	V	255.0	23.6

Test Personnel:	Ben Coolbear	Test Date:	4/14/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 mbar

Deviations, Additions, or Exclusions: None

7.14 Radiated Spurious Emissions (Bluetooth BLE 18GHz – 26GHz) High Channel



Frequency	MaxPeak	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
19577.090909	55.54	73.98	18.44	1000.000	410.0	H	302.0	16.4
21276.000000	54.98	73.98	19.00	1000.000	100.0	V	172.0	12.4
22510.909091	56.76	73.98	17.22	1000.000	326.0	H	121.0	10.9
23769.818182	56.80	73.98	17.18	1000.000	333.0	H	287.0	11.2

Frequency	Average	Limit	Margin	Bandwidth	Height	Pol	Azimuth	Corr.
19577.090909	42.37	53.98	11.61	1000.000	410.0	H	302.0	16.4
21276.000000	42.00	53.98	11.98	1000.000	100.0	V	172.0	12.4
22510.909091	43.65	53.98	10.33	1000.000	326.0	H	121.0	10.9
23769.818182	43.81	53.98	10.17	1000.000	333.0	H	287.0	11.2

Test Personnel:	Ben Coolbear	Test Date:	4/15/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.205 Restricted Bands, 15.209
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	21.5 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	40.2 %
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	988.8 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
Wideband RF Power Meter	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:	5/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	See Above
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	22.6C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	41.2%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar

Deviations, Additions, or Exclusions: None

8.6 Test Data (Peak Power)

Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
0	2402	4.13	30	25.87	PASS
39	2440	3.97	30	26.03	PASS
79	2480	3.82	30	26.18	PASS

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	3720	Rohde & Schwarz	FSEK30	10/13/2020	10/13/2021

9.4 Test Results

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

9.5 Test Conditions

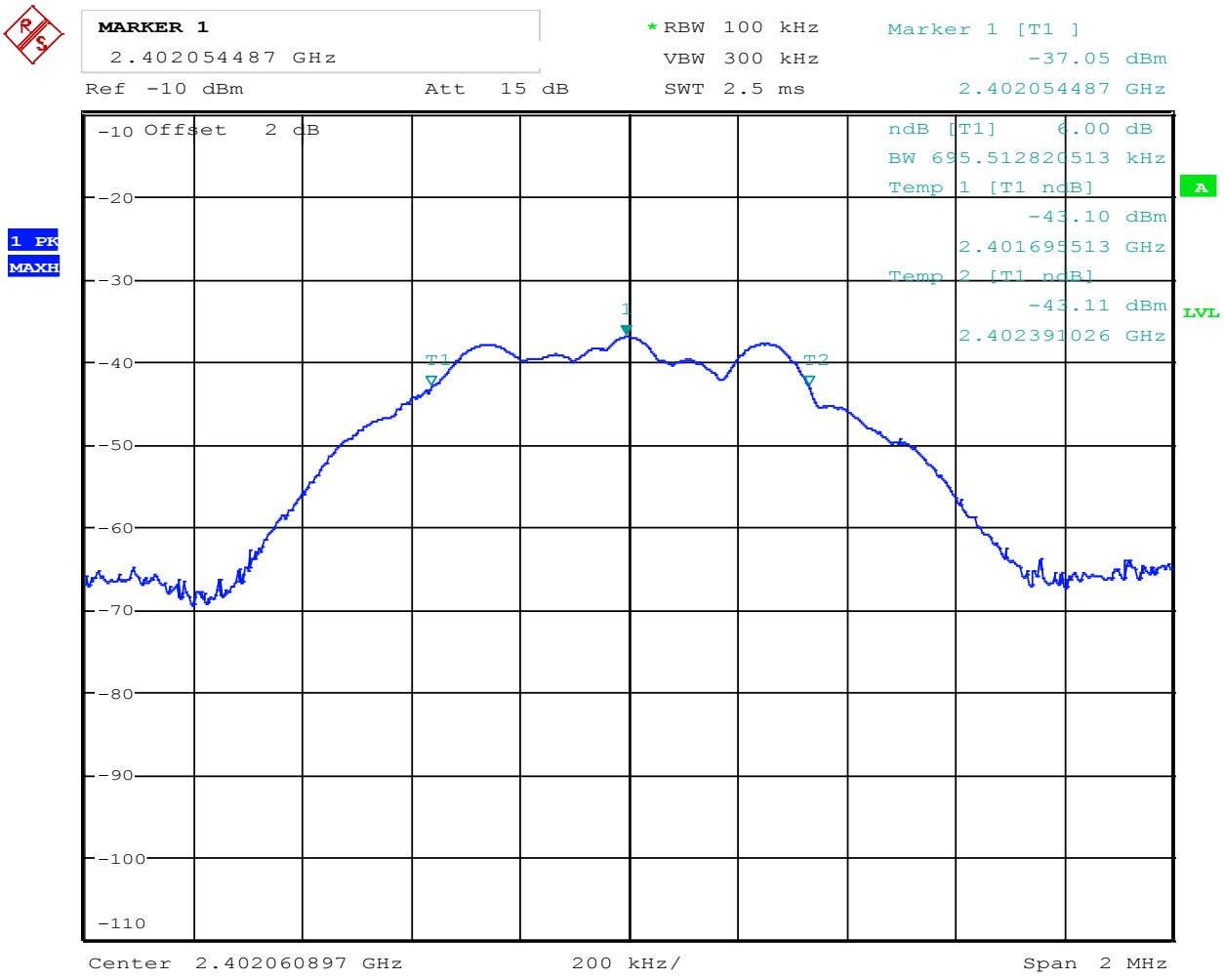
Test Personnel:	Bryan Taylor	Test Date:	4/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	6dB BW >500kHz
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	22.6C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	41.2%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar

Deviations, Additions, or Exclusions: None

9.6 Test Data

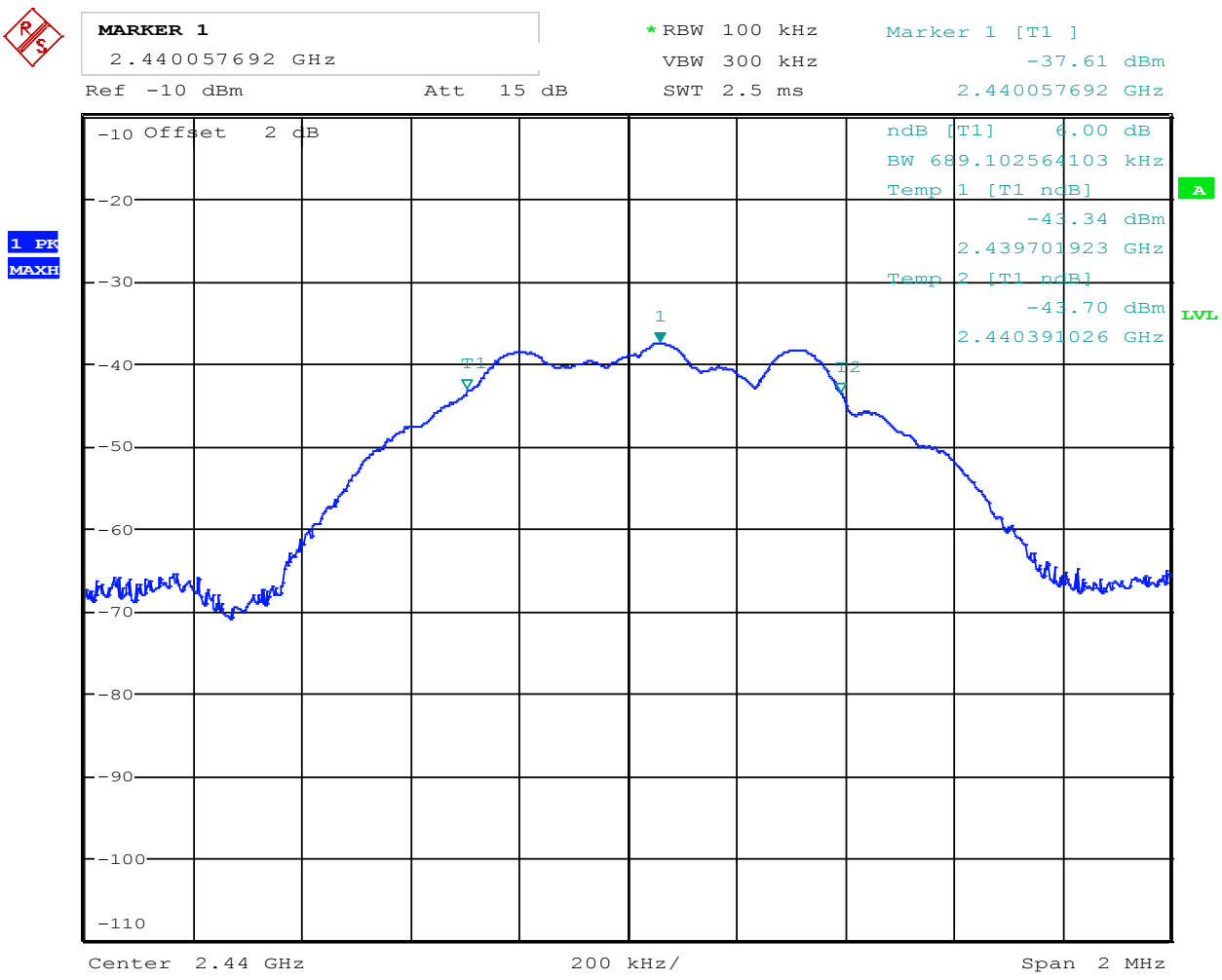
Channel	Frequency (MHz)	DTS BW (kHz)	6dB BW (kHz)	99% BW (kHz)
0	2402	695.5	615.4	1038
39	2440	689.1	612.2	1044
79	2480	685.9	608.9	1044

9.7 DTS Bandwidth Plots

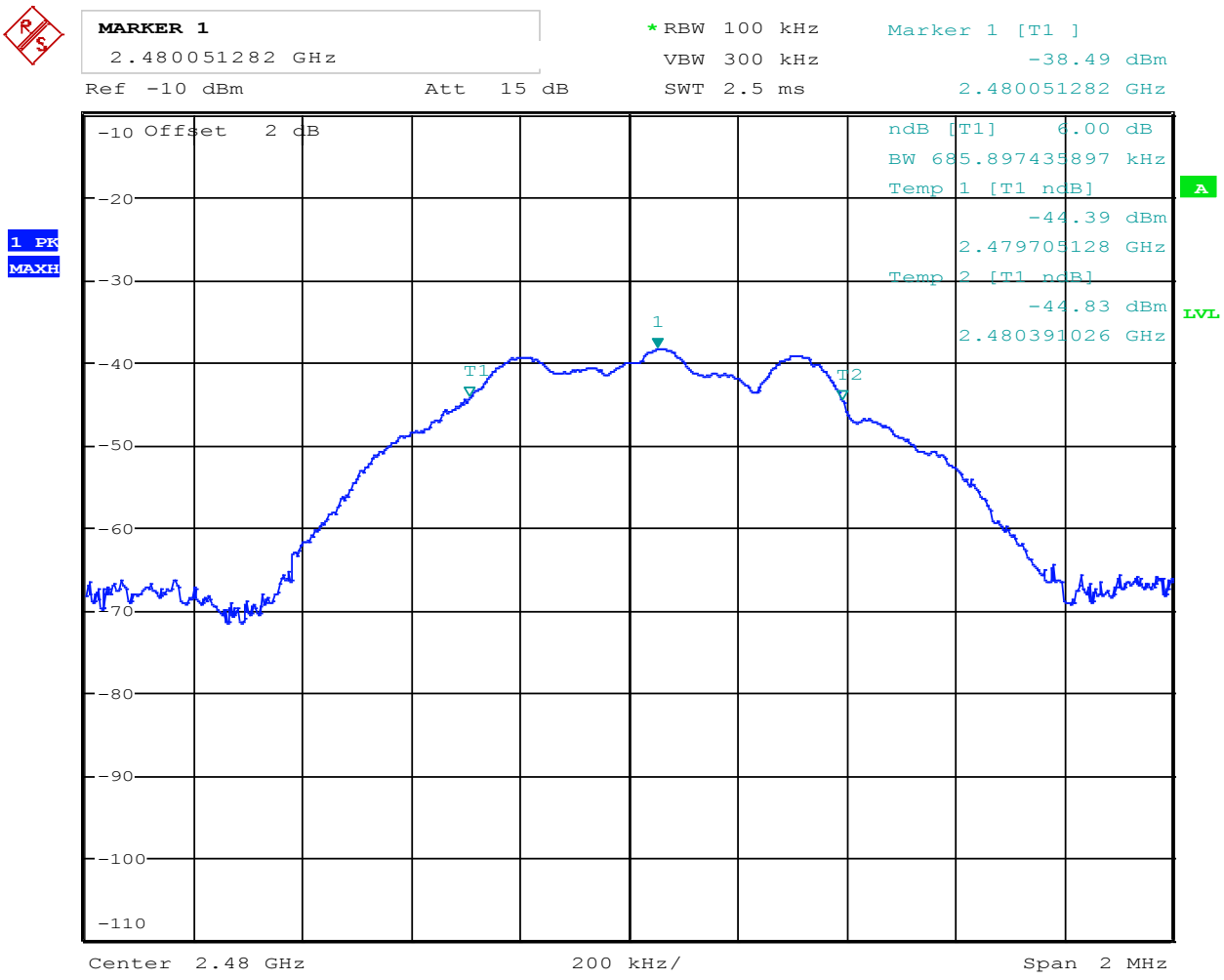


Date: 28.APR.2021 00:10:19

DTS Bandwidth, 2402MHz

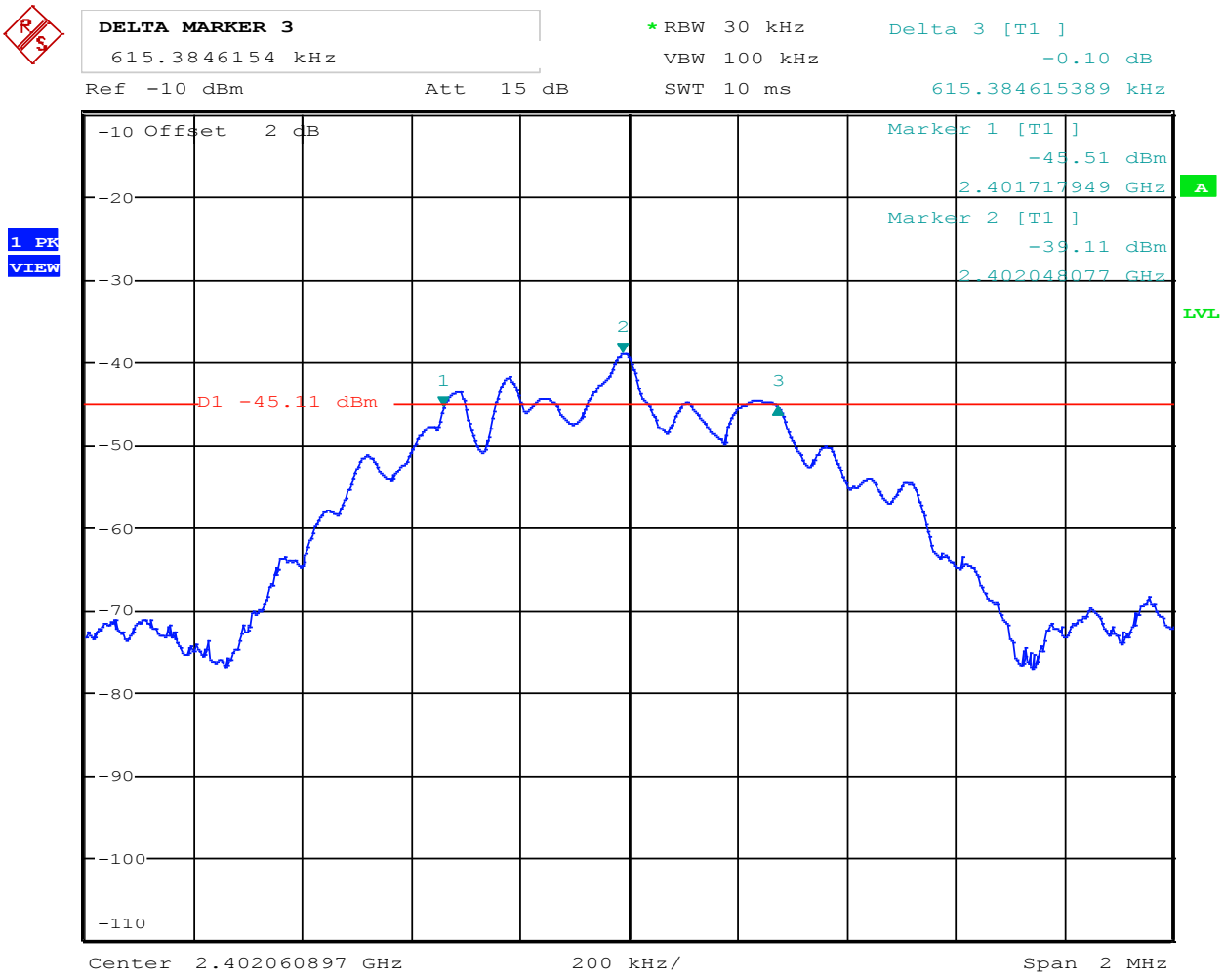


DTS Bandwidth, 2440MHz

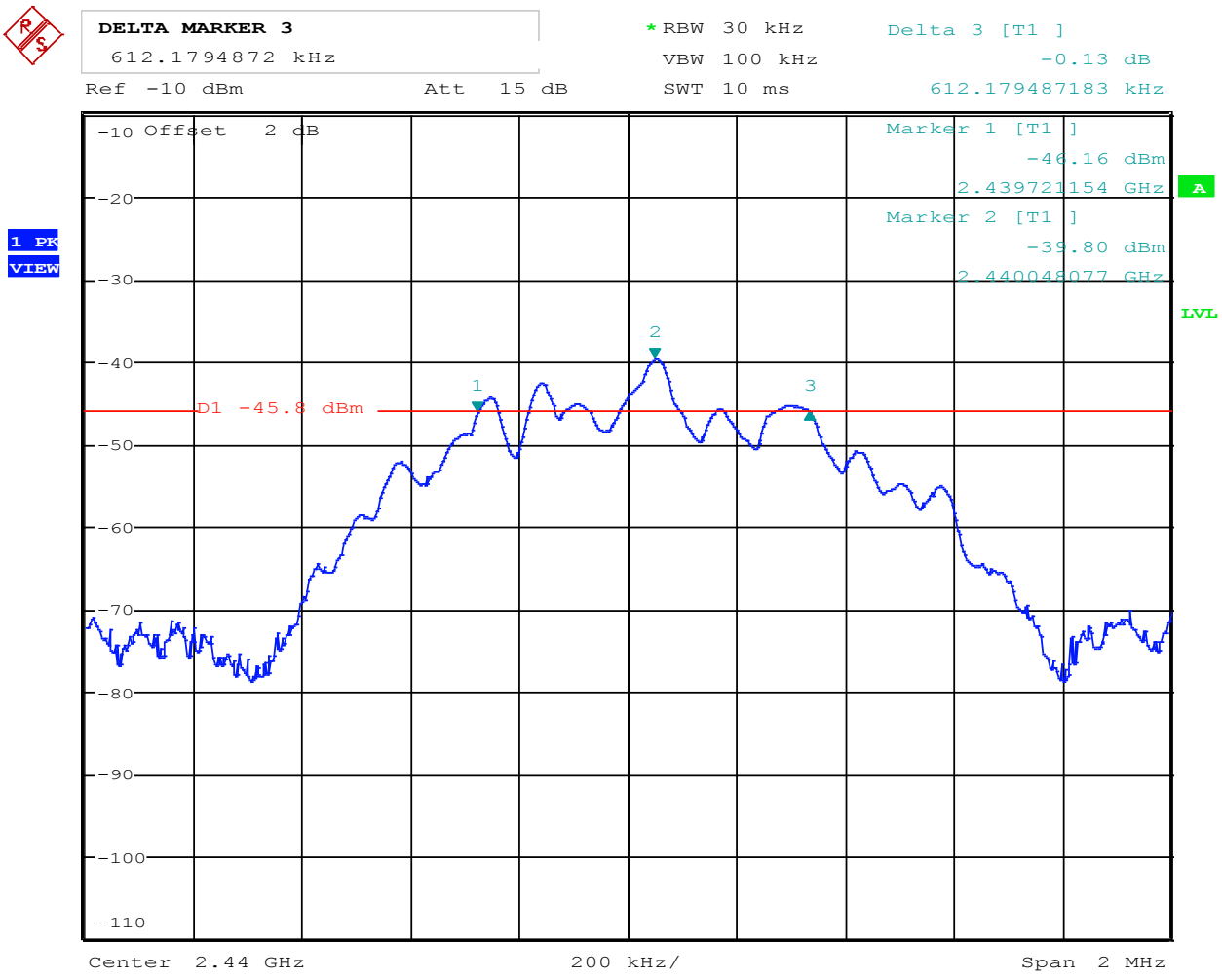


DTS Bandwidth, 2480MHz

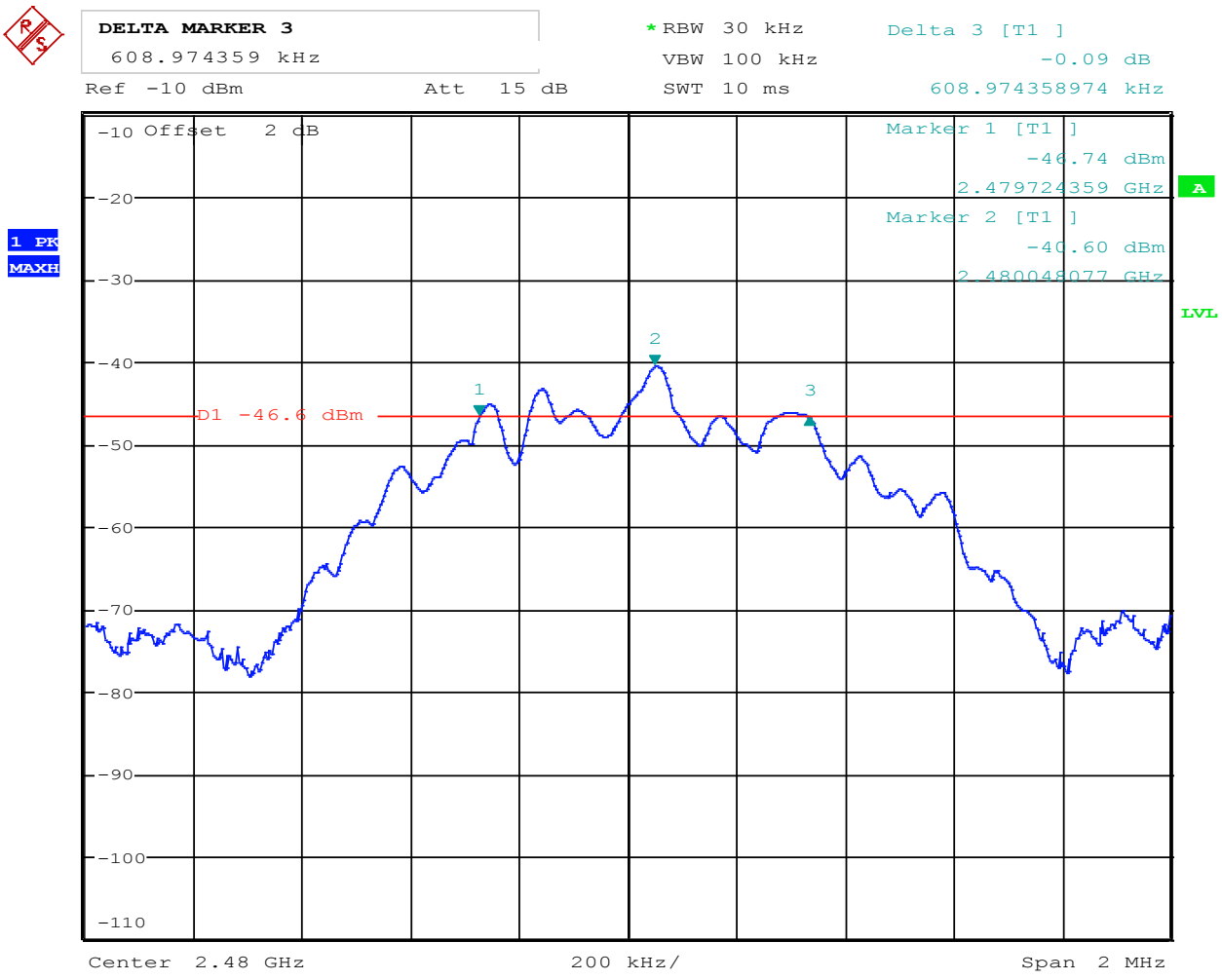
9.8 6dB Bandwidth Plots



6dB Bandwidth, 2402MHz

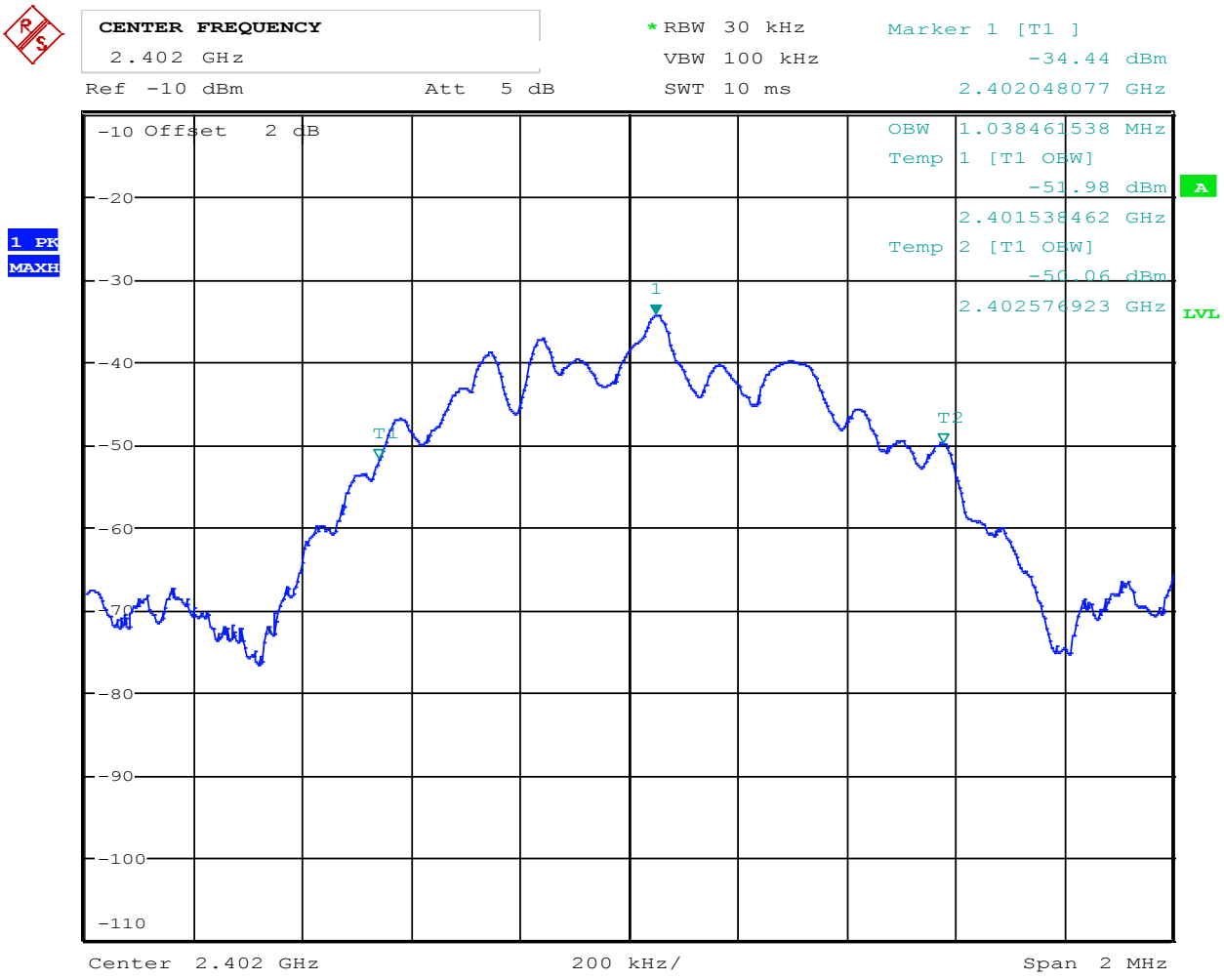


6dB Bandwidth, 2440MHz



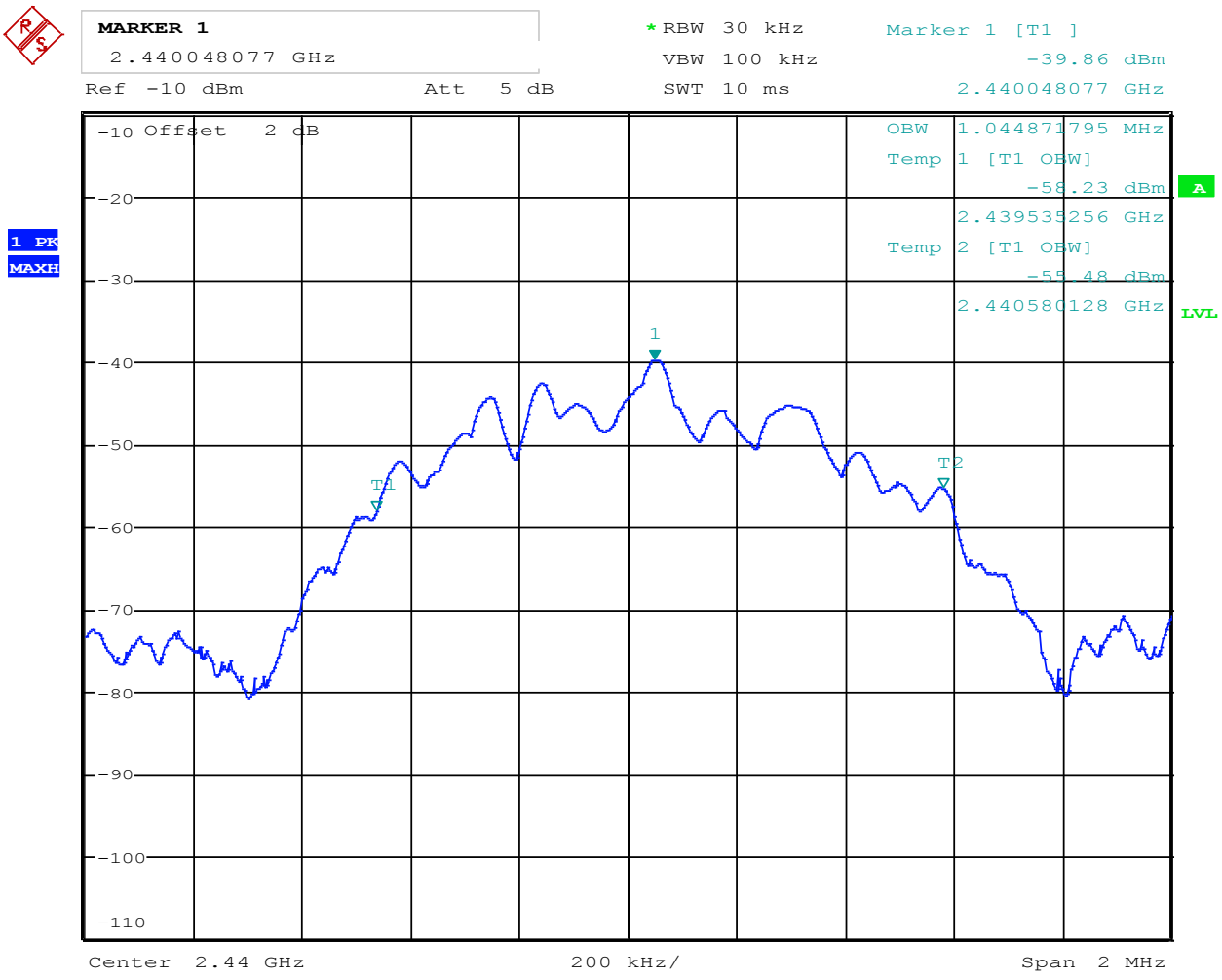
6dB Bandwidth, 2480MHz

9.9 99% Bandwidth Plots

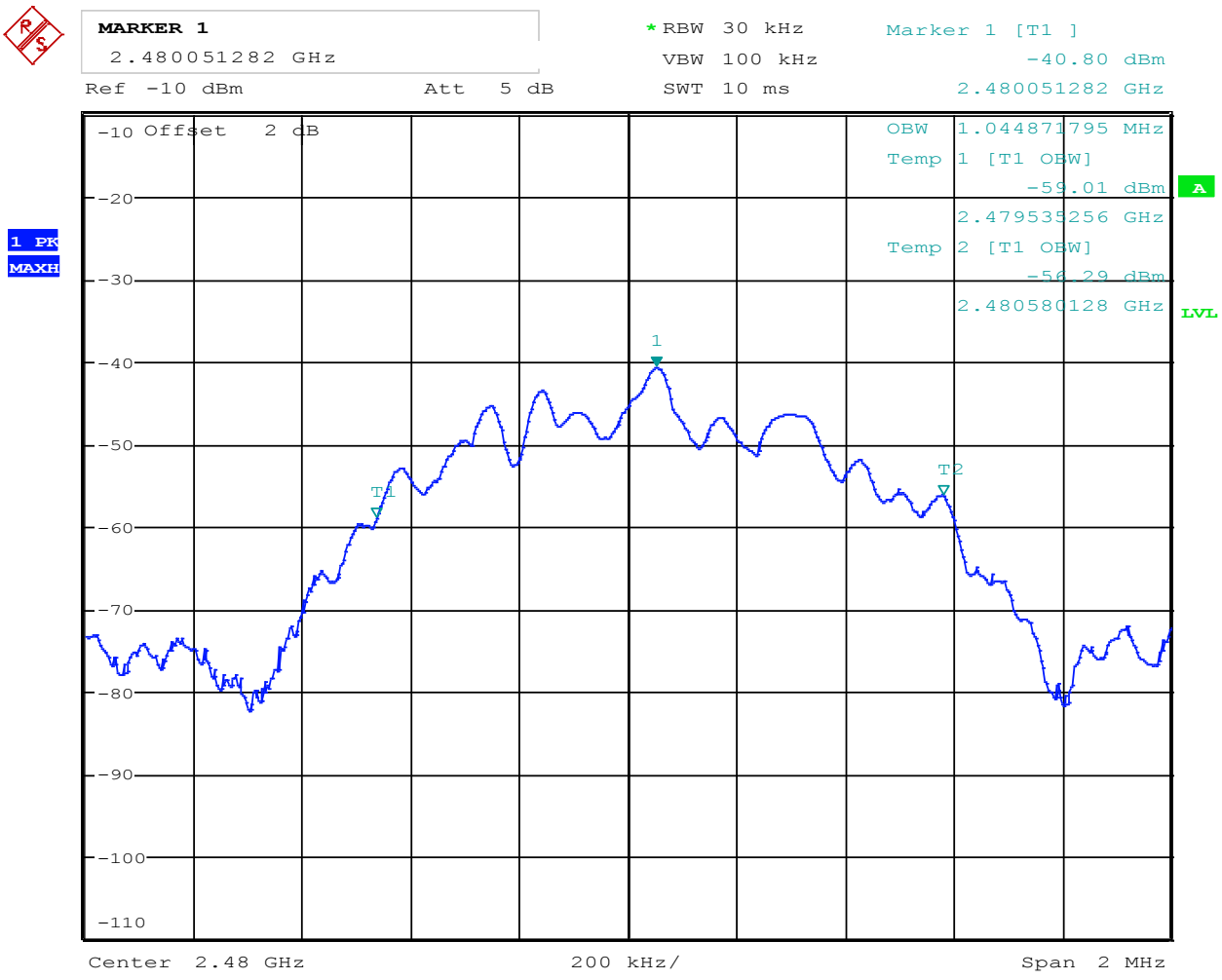


Date: 27.APR.2021 23:30:28

99% Bandwidth, 2402MHz



99% Bandwidth, 2440MHz



99% 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	3720	Rohde & Schwarz	FSEK30	10/13/2020	10/13/2021

10.4 Test Results

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

10.5 Test Conditions

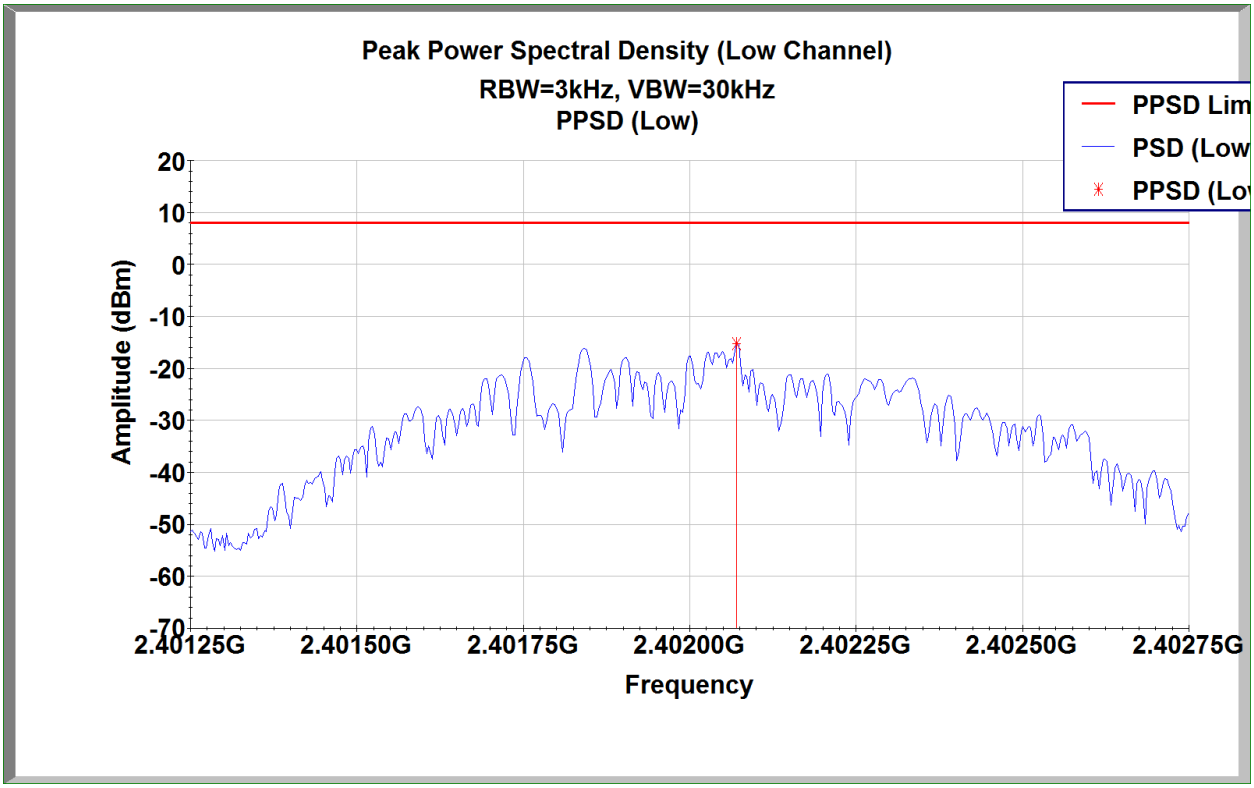
Test Personnel:	Bryan Taylor	Test Date:	5/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	8dBm / 3kHz
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	22.6C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	41.2%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar

Deviations, Additions, or Exclusions: None

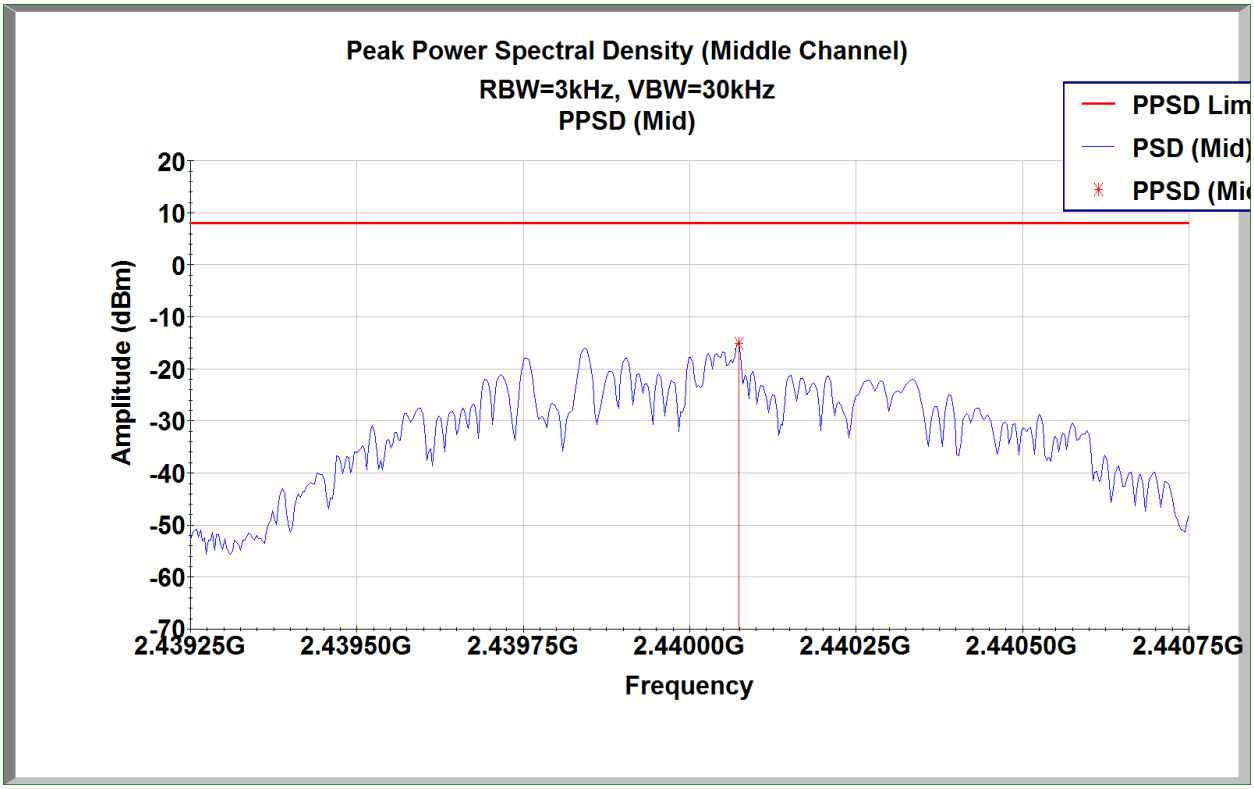
10.6 Test Data

Channel	Frequency (MHz)	PPSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)	Result
0	2402	-15.205	8	23.205	PASS
39	2440	-15.165	8	23.165	PASS
79	2480	-15.59	8	23.59	PASS

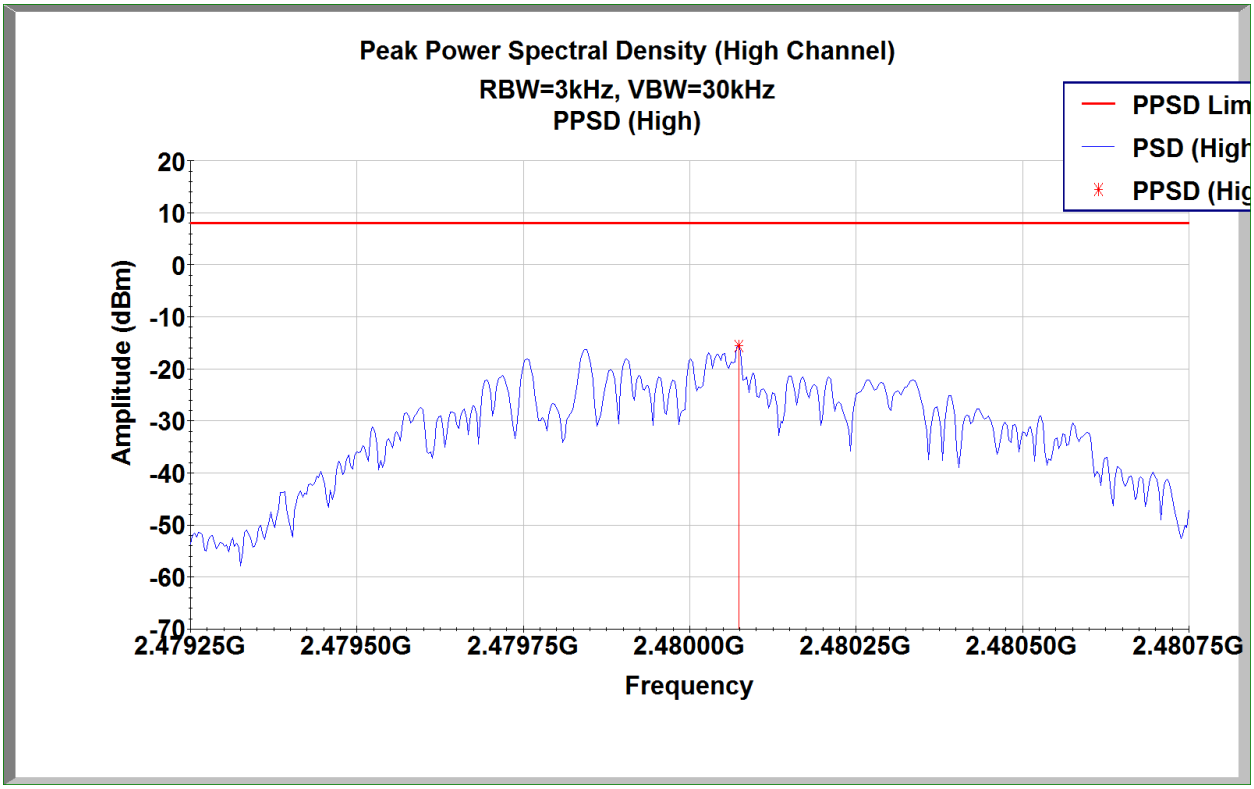
10.7 PPSD Plots



Peak Power Spectral Density (2402MHz)



Peak Power Spectral Density (2440MHz)



Peak Power Spectral Density (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	3720	Rohde & Schwarz	FSEK30	10/13/2020	10/13/2021

11.4 Test Results

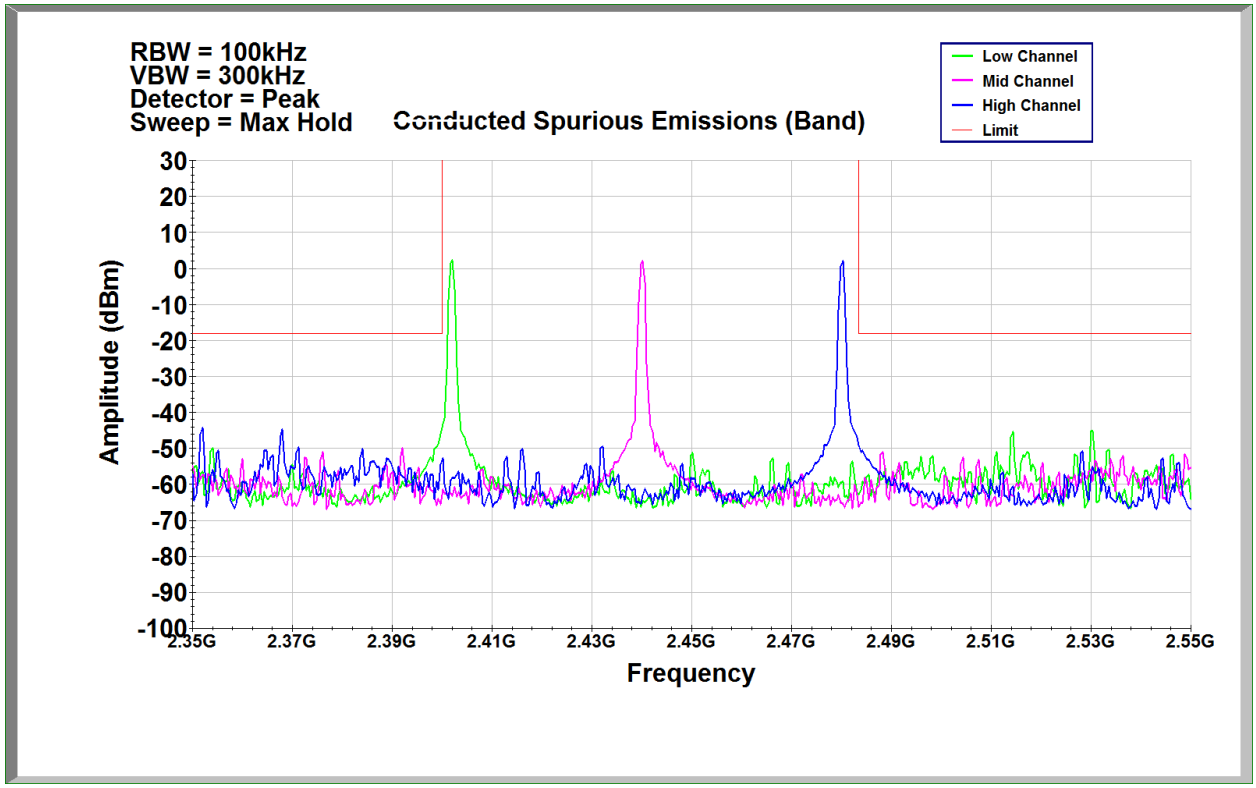
The device was found to be **compliant**. All spurious emissions were found to be attenuated more than 20dB below the level of the fundamental.

11.5 Test Conditions

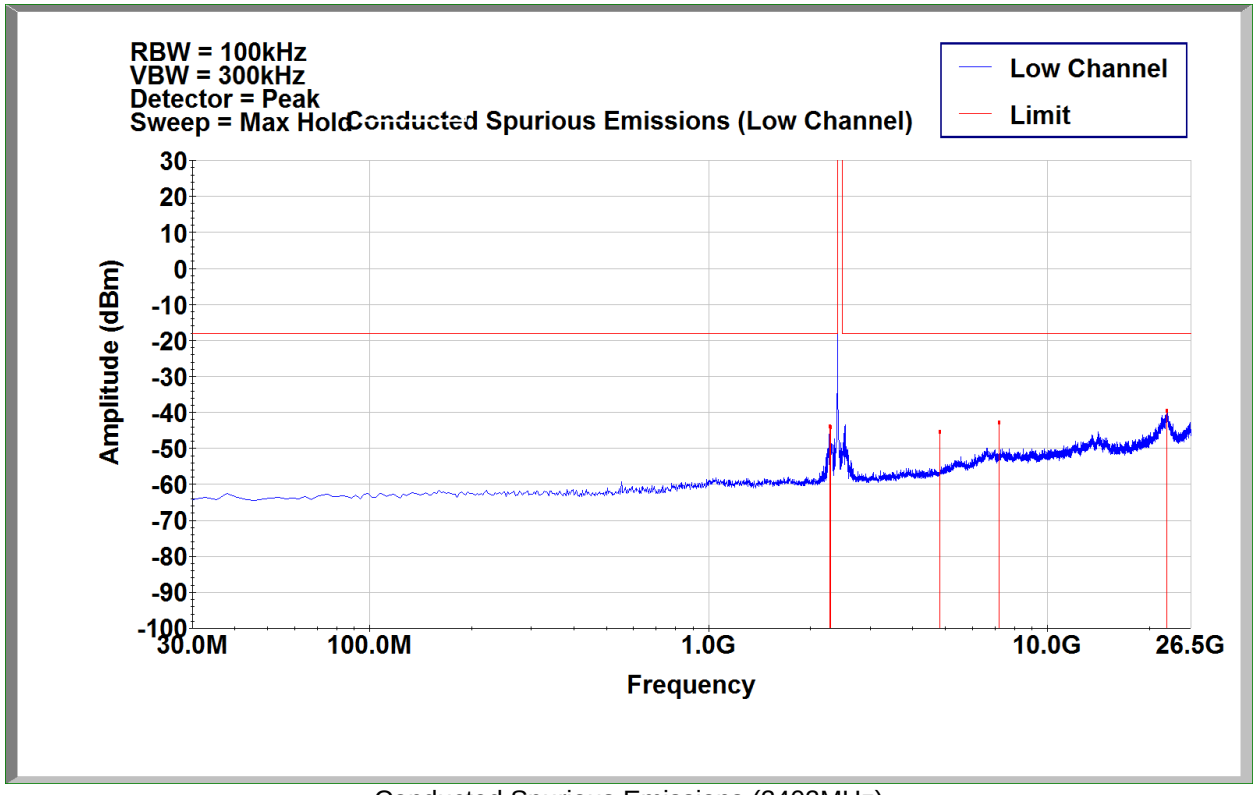
Test Personnel:	Bryan Taylor	Test Date:	5/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	-20dB Down
Product Standard:	FCC Part 15.247 RSS-247 Issue 2	Ambient Temperature:	22.6C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	41.2%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2mbar

Deviations, Additions, or Exclusions: None

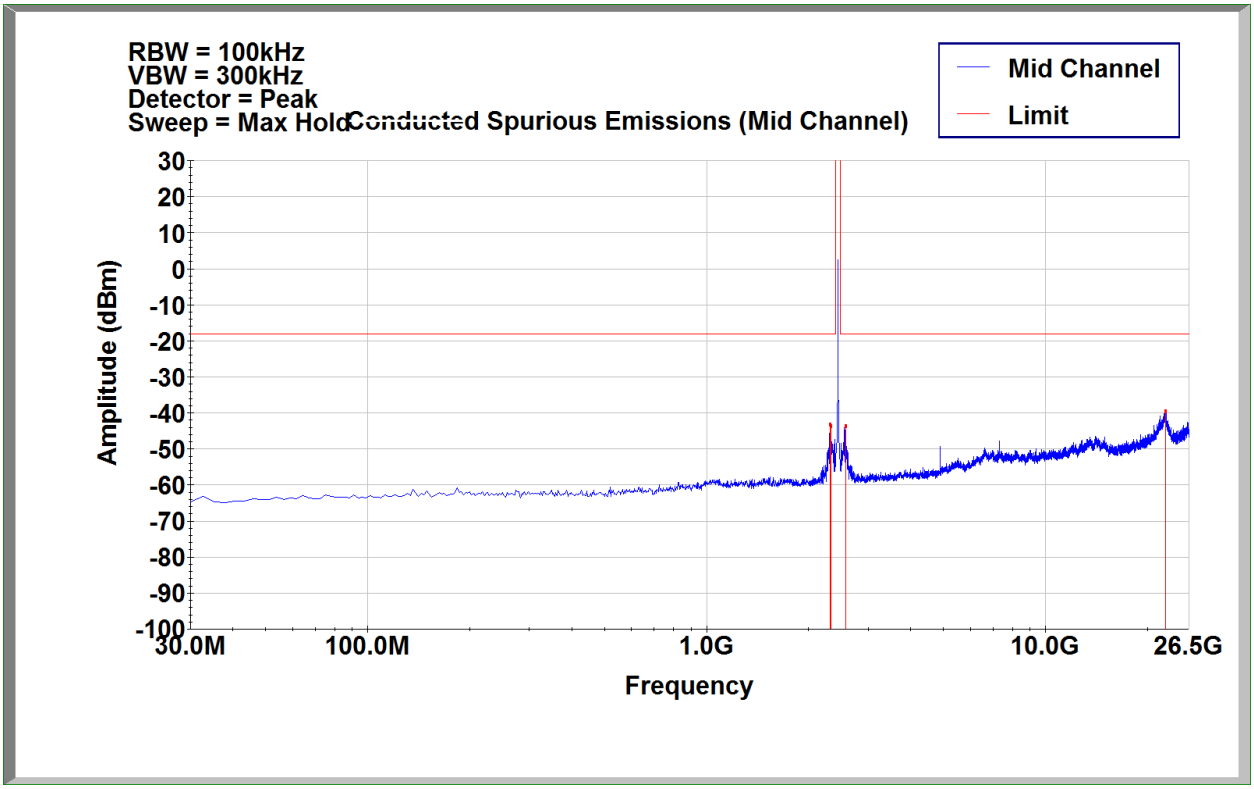
11.6 Test Data



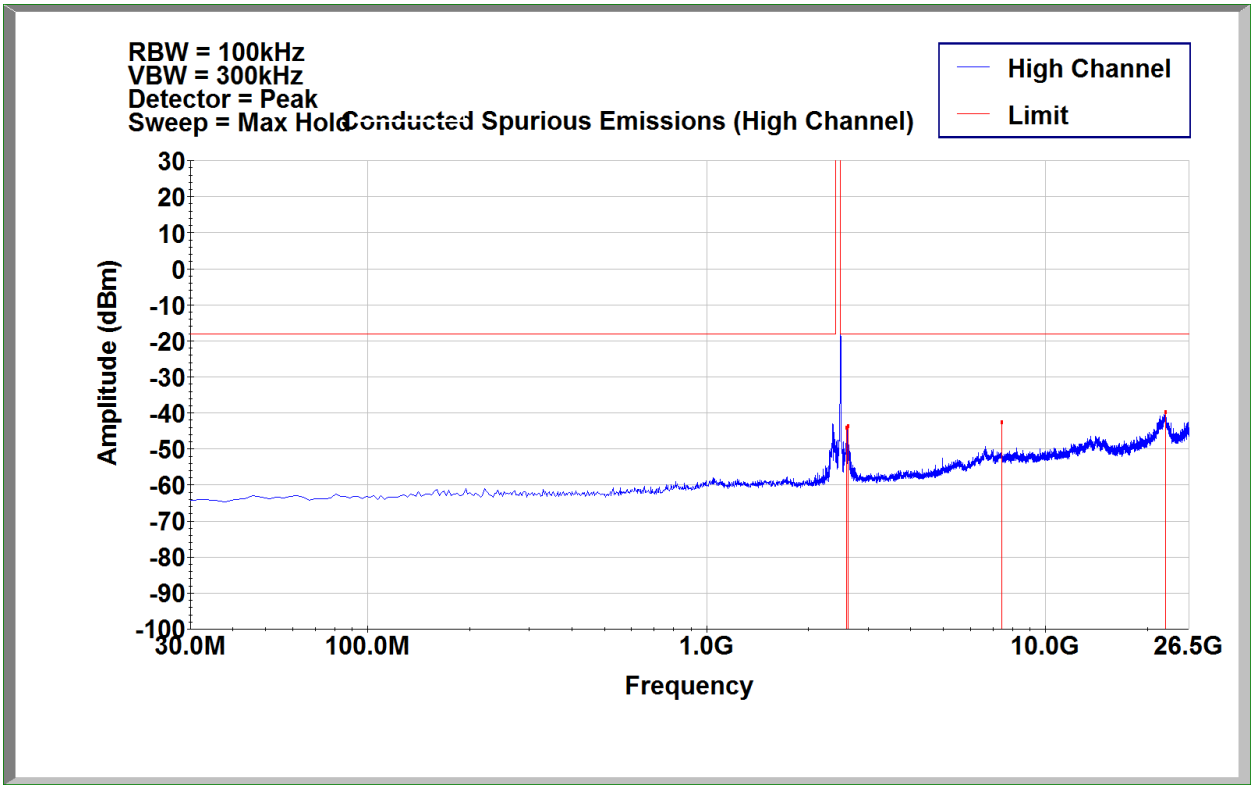
Conducted Spurious Emissions (Band Edge)



Conducted Spurious Emissions (2402MHz)



Conducted Spurious Emissions (2440MHz)



Conducted Spurious Emissions (2480MHz)

12 Conducted Emissions

12.1 Method

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

TEST SITE: Ground Plane

Site Designation: Ground Plane

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Power Line Conducted Emissions	150 kHz - 30 MHz	3.1dB	3.4dB

As shown in the table above our conducted 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.

12.2 Sample Calculations

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where NF = Net Reading in dBμV
RF = Reading from receiver in dBμV
LF = LISN or ISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(49.1\ dB\mu V / 20)}$ = 285.1 μV/m

12.3 Test Equipment Used:

Description	Asset	Manufacturer	Model	Cal Date	Cal Due
EMI Test Receiver	2327	Rohde & Schwarz	ESI26	10/9/2020	10/9/2021
LISN	2508	Fischer Custom Communication	FCC-LISN-50-50-2M	6/9/2020	6/9/2021
Coaxial Cable (COND 3)	6026			12/21/2020	12/21/2021

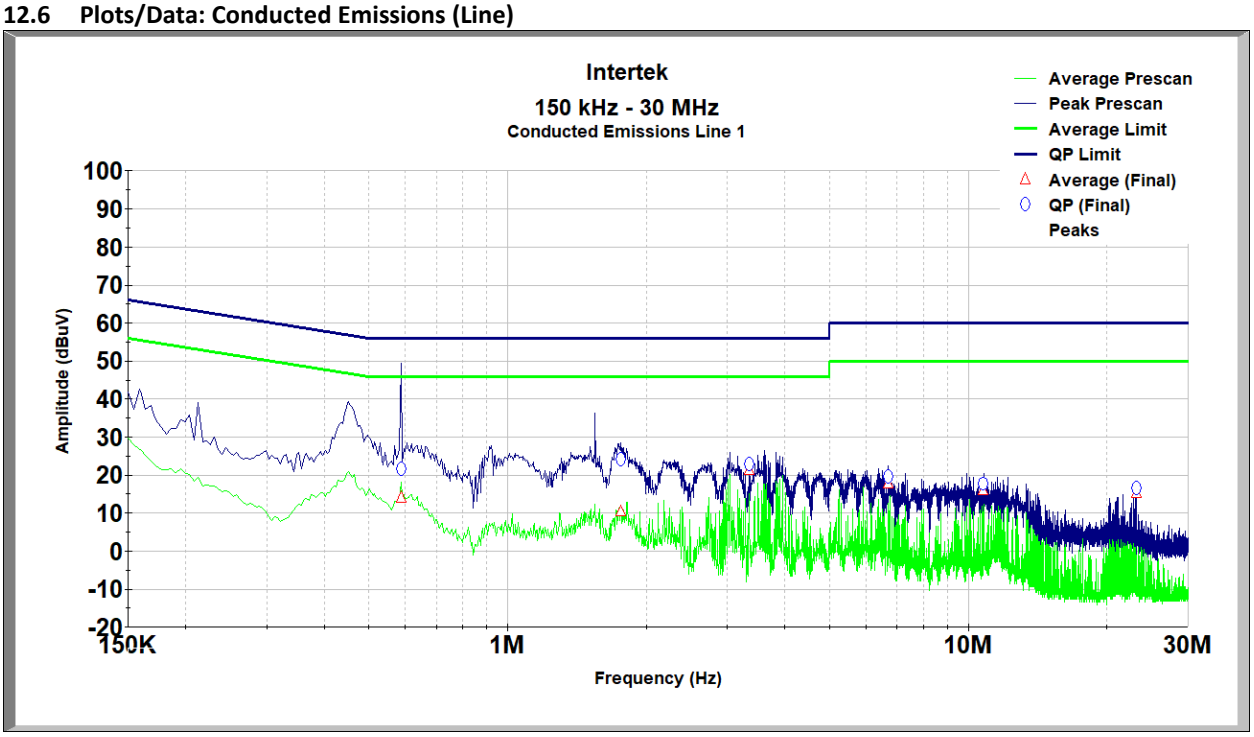
12.4 Software Utilized:

Name	Manufacturer	Version
TILE	ETS Lindgren	V7.0.6.545

12.5 Results:

The sample tested was found to Comply.

12.6 Plots/Data: Conducted Emissions (Line)

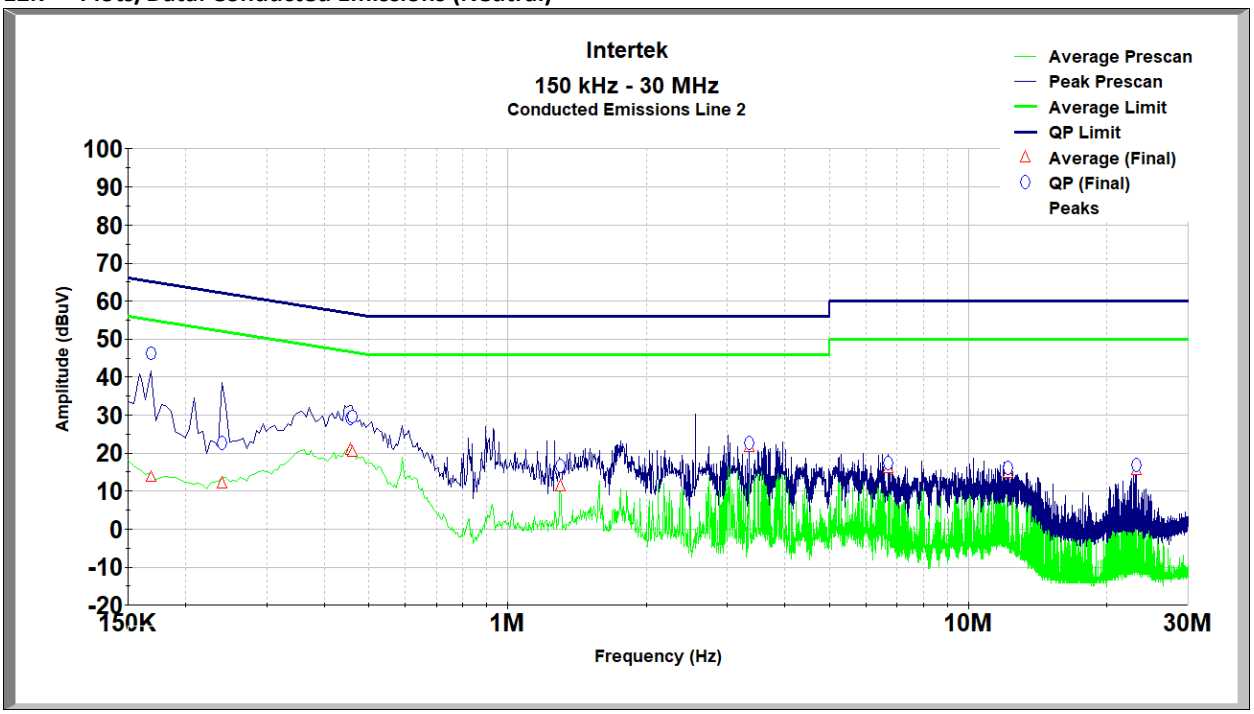


Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Margin (dB)	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)
0.587	21.625	56.000	34.375	14.078	46.000	31.922
1.761	24.279	56.000	31.721	10.651	46.000	35.349
3.342	22.797	56.000	33.203	21.400	46.000	24.600
6.700	19.565	60.000	40.435	17.878	50.000	32.122
10.793	17.969	60.000	42.031	16.061	50.000	33.939
23.128	16.619	60.000	43.381	15.262	50.000	34.738

Test Personnel:	Bryan Taylor	Test Date:	5/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.207
Product Standard:	FCC Part 15C, RSS-247	Ambient Temperature:	22.2 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	48.4%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2 mbar

Deviations, Additions, or Exclusions: None

12.7 Plots/Data: Conducted Emissions (Neutral)



Frequency (MHz)	Quasi-Peak (dBuV)	Quasi-Peak Limit (dBuV)	Quasi-Peak Margin (dB)	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)
0.168	46.281	65.486	19.204	13.859	55.486	41.627
0.240	22.568	63.429	40.860	12.143	53.429	41.285
0.456	29.321	57.257	27.936	20.782	47.257	26.475
0.461	29.729	57.129	27.400	20.480	47.129	26.649
1.302	16.512	56.000	39.488	11.326	46.000	34.674
3.342	22.593	56.000	33.407	21.715	46.000	24.285
6.700	17.329	60.000	42.671	16.184	50.000	33.816
12.198	16.213	60.000	43.787	14.860	50.000	35.140
23.128	16.824	60.000	43.176	15.560	50.000	34.440

Test Personnel:	Bryan Taylor	Test Date:	5/27/2021
Supervising/Reviewing Engineer: (Where Applicable)	NA	Limit Applied:	15.207
Product Standard:	FCC Part 15C, RSS-247	Ambient Temperature:	22.2 °C
Input Voltage:	120VAC / 60Hz	Relative Humidity:	48.4%
Pretest Verification w / Ambient Signals or BB Source:	Yes	Atmospheric Pressure:	991.2 mbar

Deviations, Additions, or Exclusions: None

13 Antenna Requirement

13.1 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).

13.2 Test Results

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

14 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	6/4/2021	104630548LEX-009	BCT	BL	Original Issue