June 11, 2025

Next Meters Global
Brett Jepsen
73 S Gateway Dr
Providence, UT 84332

Dear Brett Jepsen,

Enclosed is the Electromagnetic Compatibility for the Next Meters Global, LLC, NL4, tested to the requirements of:

- FCC Part 15.247 (per ANSI C63.10: 2020)
- Innovation, Science, and Economic Development (ISED) Canada RSS-247 Issue 3

Thank you for using the services of Eurofins E&E Testing NA, LLC. Please contact me if you have any questions regarding these results or if Eurofins E&E can be of further service to you.

Sincerely,

Rheine Nguyen

Documentation Department
Eurofins E&E Testing NA, LLC.

Reference: WIRS135089-FCC 15.247 (BLE) Rev. 1

A2LA ACCREDITED TESTING CERT #0591.02

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	June 3, 2025	Initial Issue.
1	June 11, 2025	TCB Updates.

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1.0 Testing Summary

The Next Meters Global, LLC, NL4 was found to be compliant to the following specification(s).

- FCC Part 15.247 (per ANSI C63.10: 2020)
- RSS-247 Issue 3

Chin Ming Lui
Senior Wireless Test Engineer

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements.

Brandon Quan
Senior Wireless Test Engineer

2.0 Overview

Eurofins E&E Testing NA, LLC. was contracted by Next Meters Global, LLC to perform testing on the NL4, under purchase order number PO-NMG3226.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of Next Meters Global, LLC, NL4.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	NL4

FCC ID and IC:

FCC ID: 2A8EC-NL4
IC: 28950-NL4

2.1 Test Site

All testing was performed at Eurofins E&E Testing NA, LLC., 3162 Belick St. Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology. Eurofins E&E Testing NA, LLC. has been accredited by the American Association for Laboratory Accreditation (A2LA) (Certificate #: 0591.02) in accordance with ISO/IEC 17025:2017.

2.2 Equipment Overview and Test Configuration

Name of EUT/Model:	NL4
Additional Models Covered, but not tested:	N/A
Description of EUT and Intended Use:	Solar Powered Gateway
Mode(s) of Operation:	BLE: 1 Mbps and 2 Mbps ISM 900 MHz: FHSS
Configuration(s):	Test mode
EUT Power Requirement	
Voltage:	7V
AC or DC	DC
Voltage Frequency:	0 Hz
Number of Phases:	N/A
Amperage:	N/A
Uses an external AC/DC Adapter:	No
Battery Return Configuration (DC-C, DC-I, or either):	DC-I
Physical Description	
EUT Arrangement:	Mounted
System with Multiple Chassis:	N/A

Size (HxWxD) inches:	18.1 x 13 x 2.75
Weight (lbs):	18
Emissions Class Declaration:	B
Other Info:	
Highest frequency used in device:	2480 MHz (highest channel frequency of BLE radio)
EUT Software (internal to EUT):	Custom firmware by Next Meters Global, LLC
Support Software (used by support PC to exercise EUT):	PuTTY

Note: EUT information was provided by Next Meters Global, LLC.

Equipment Configuration List

N/A

Support Equipment List

N/A

Ports and Cabling List

N/A

Antenna Information

Radio	Antenna Type	Manufacturer	Part No	Frequency Range	Peak Gain
BLE	Inverted F Printed PCB Trace	Next Meters Global, LLC	N/A	2.4 – 2.48 GHz	-0.5 dBi
ISM 900	Apex Straight TG.33 Dipole	Taoglas	TG.33.8H11W	824 – 960 MHz	2.20 (dBi)

Note: Antenna information was provided by Next Meters Global, LLC. Eurofins E&E Testing NA, LLC did not test or verify the accuracy of the antenna information.

Test Configuration

The BLE radio was configured to low, middle, and high channels for both 1 Mbps and 2 Mbps data rates.

Channel	Frequency (MHz)	Power Setting
0	2402	+4 dBm
19	2440	+4 dBm
39	2480	+4 dBm

2.3 Modifications to the EUT

No modifications were made to the EUT.

2.4 Modifications to the Standard

No modifications were made to the Test Standard.

2.5 Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electromagnetic Compatibility Lab for testing was returned to Next Meters Global, LLC upon completion of testing.

3.0 Electromagnetic Compatibility Criteria for Intentional Radiators

3.1 Radiated Spurious Emissions

Test Method: ANSI C63.10: 2020; FCC KDB 558074 D01 15.247 Meas Guidance v05r02

Test Requirement(s): The following standards specified below are covered in the scope of this section of the test report:

- FCC Part 15 Subpart C §15.247
- RSS-247 Issue 3

FCC – §15.209 Radiated emission limits; general requirements.
(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (dBµV/m)	Measurement Distance (m)
30 - 88	40	3
88 - 216	43.5	3
216 - 960	46	3
Above 960	54	3

ISED – Transmitter emission limits:
Refer to RSS-Gen Issue 5 Section 8.9 Transmitter emission limits Table 5 – General field strength limits at frequencies above 30 MHz.

FCC – §15.205 Restricted bands of operation.
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1] 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41	--	--	--

[1] Until February, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

ISED – Restricted frequency bands:
Refer to RSS-Gen Issue 5 Section 8.10 Restricted frequency bands Table 7 – Restricted frequency bands.

Sample Calculation for Distance Correction factor (DCF) measurement:

$$F_d = 20*LOG_{10}(D_m/D_s)$$

where:

F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

Sample formula for calculating the Corrected Data for the Radiated Emissions Measurements:

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBµV)	ACF (dB/m) (+)	Pre Amp Gain (dB)(-)	CBL (dB) (+)	DCF (dB) (+)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
249.99	V	359.9	240.7	55.46	11.4	28.335	0	0	***38.505***	47	-8.495

Corrected Amplitude (dBµV/m) = Uncorrected Amplitude (dBµV) +ACF (dB/m) - Preamp Gain (dB) + CBL (dB) +DCF (dB) = 55.46 + 11.4 - 28.335 + 0 + 0 = ***38.505***

Test Procedure: The method of testing, test conditions, and test procedures of ANSI C63.10: 2020 were used in addition to FCC KDB 558074 D01 15.247 Meas Guidance v05r02. Any measured frequency that exhibits a margin of compliance that is less than 3 dB below the specification limit is marked. Eurofins E&E recommends that every emission measured, has at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

For emissions between 30 MHz and 1000 MHz, the EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber a biconilog antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated, and the antenna height was varied between 1 m and 4 m to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz resolution bandwidth.

For emissions between 1 GHz and 18 GHz, a double ridged guide horn was located 3 m from the EUT on an adjustable mast. The EUT as placed on a non-metallic table 150 cm above the ground plane inside a semi-anechoic chamber. A pre-scan was performed and used to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated, and the antenna height was varied depending on the geometry of the EUT. To ensure maximized emissions, the horn antenna was positioned both vertically and horizontally. Unless otherwise specified, measurements were made using a peak and average detector with a 1 MHz resolution bandwidth.

For emission between 18 GHz and 26 GHz, a high frequency standard gain horn antenna was located 3 m from the EUT on an adjustable mast. The EUT as placed on a non-metallic table 150 cm above the ground plane inside a semi-anechoic chamber. A pre-scan was performed and used to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated, and the antenna height was varied depending on the geometry of the EUT. To ensure maximized emissions, the horn antenna was positioned both vertically and horizontally. Unless otherwise specified, measurements were made using a peak and average detector with a 1 MHz resolution bandwidth.

Radiated measurements were performed with the EUT setup in an orientation that is most representative of normal and typical use.

Test Software Used: Nexio BAT-EMC was used to perform this test.

Test Results:

Test Standard:	FCC Part 15.247 (Per FCC KDB 558074 D01 15.247 Meas Guidance v05r02; ANSI C63.10-2020) RSS-247 Issue 3
Test Name	Radiated Spurious Emissions
Test Dates:	05/08/2025
Laboratory	Eurofins E&E Testing NA, LLC.
Test Engineer:	Chin Ming Lui
Test Results:	Compliant

Test Data (FCC 15.247 & RSS-247 Radiated Spurious Emissions)

BLE Low Channel 2402 MHz

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
56.174	QuasiPeak (PASS)	20.764	40	-19.236	3.527	19	Vertical	120000	0.1	-14.321
75.593	QuasiPeak (PASS)	19.928	40	-20.072	3.205	152	Vertical	120000	0.1	-16.184
105.553	QuasiPeak (PASS)	16.946	43.522	-26.576	2.963	32	Horizontal	120000	0.1	-7.479
105.564	QuasiPeak (PASS)	18.133	43.522	-25.389	1.466	117	Vertical	120000	0.1	-9.956

Table 1. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (30 MHz – 1 GHz) Test Results

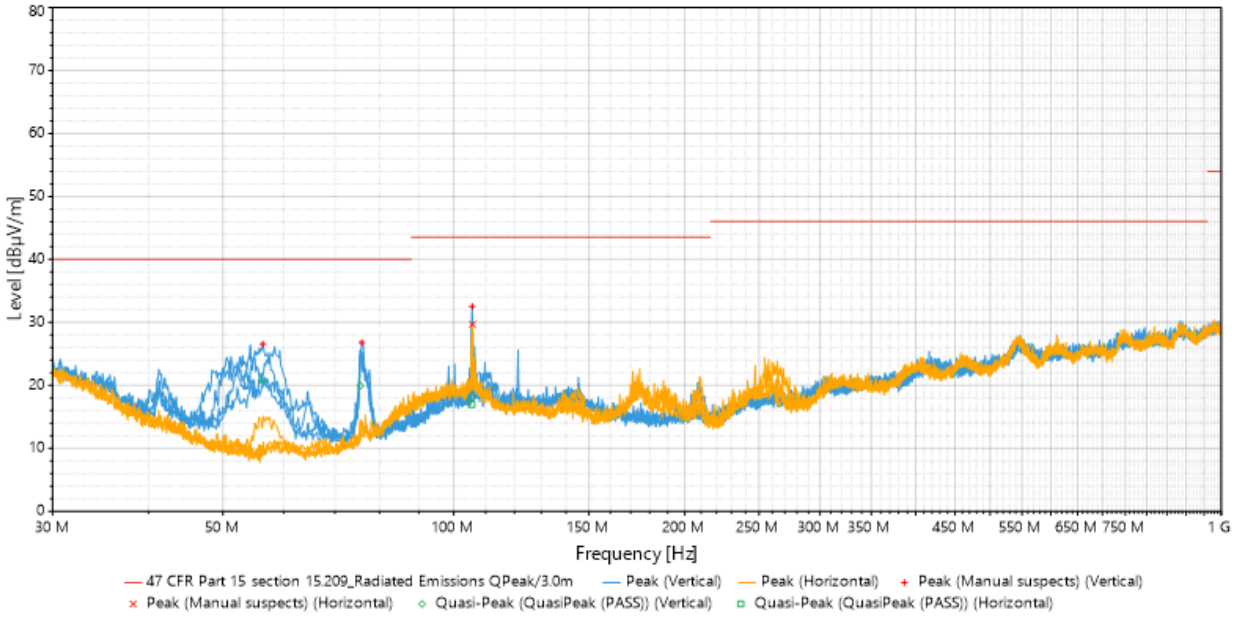

Figure 1. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (30 MHz – 1 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7206.7	Peak (PASS)	53.399	74	-20.601	1.465	5	Vertical	1000000	0.1	3.184
7206.7	Average (PASS)	44.916	54	-9.084	1.465	5	Vertical	1000000	0.1	3.184
16756.3	Peak (PASS)	52.175	74	-21.825	2.507	64	Horizontal	1000000	0.1	5.579
16756.3	Average (PASS)	38.505	54	-15.495	2.507	64	Horizontal	1000000	0.1	5.579

Table 2. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (1 – 18 GHz) Test Results

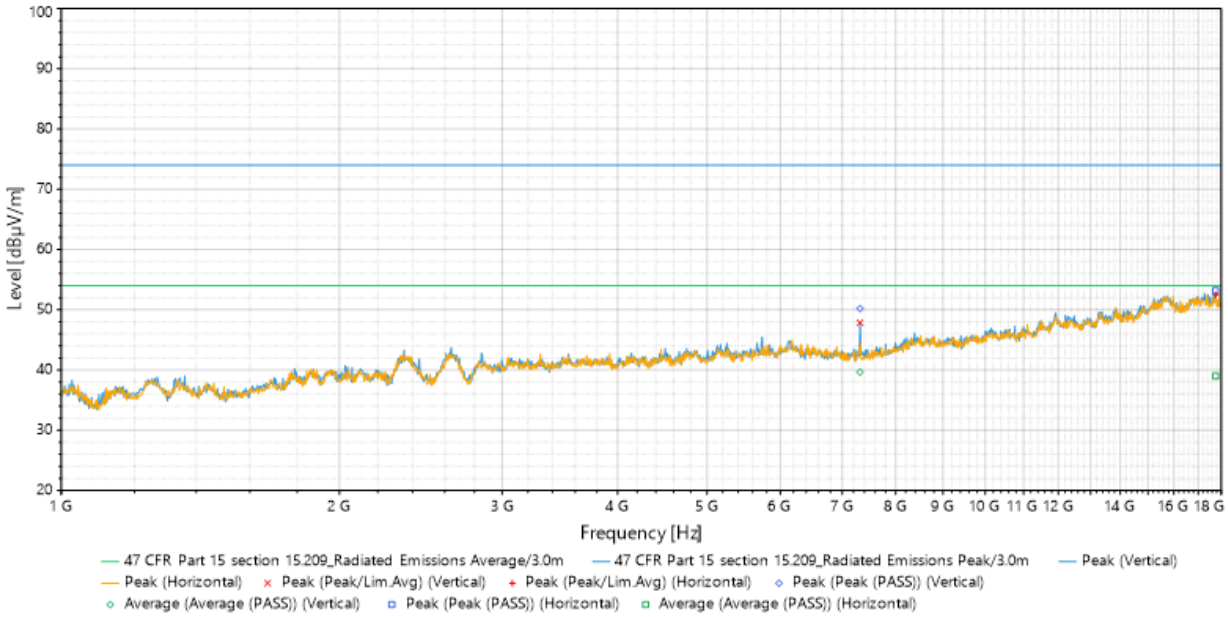

Figure 2. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7213.4	Peak (PASS)	53.218	74	-20.782	1.574	7	Vertical	1000000	0.1	3.173
7213.4	Average (PASS)	43.82	54	-10.18	1.574	7	Vertical	1000000	0.1	3.173
15646.3	Peak (PASS)	52.725	74	-21.275	4	337	Horizontal	1000000	0.1	6.83
15646.3	Average (PASS)	39.265	54	-14.735	4	337	Horizontal	1000000	0.1	6.83

Table 3. Radiated Spurious Emissions, BLE 2 Mbps Low Channel 2402 MHz (1 – 18 GHz) Test Results

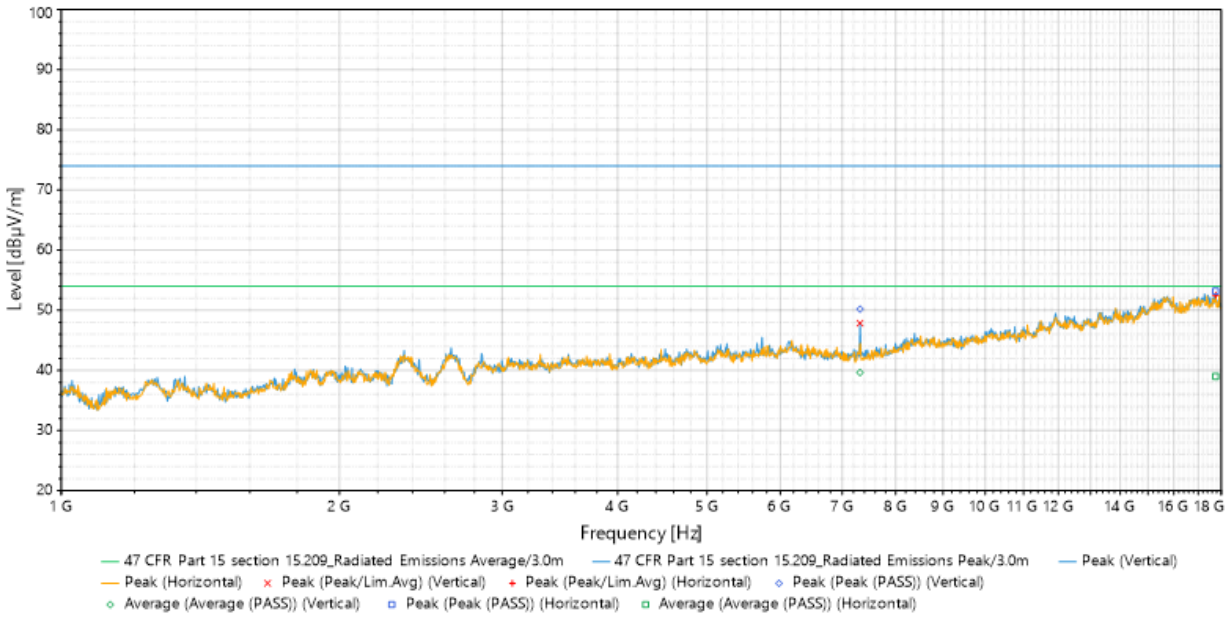

Figure 3. Radiated Spurious Emissions, BLE 2 Mbps Low Channel 2402 MHz (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
2313.76	Peak (PASS)	57.03	74	-16.97	1.241	213	Horizontal	1000000	0.1	35.571
2313.76	Average (PASS)	40.395	54	-13.605	1.241	213	Horizontal	1000000	0.1	35.571
2326.3	Peak (PASS)	57.54	74	-16.46	1.263	25	Vertical	1000000	0.1	35.686
2326.3	Average (PASS)	40.557	54	-13.443	1.263	25	Vertical	1000000	0.1	35.686
2345.5	Peak (PASS)	57.893	74	-16.107	2.476	1	Vertical	1000000	0.1	35.806
2345.5	Average (PASS)	40.708	54	-13.292	2.476	1	Vertical	1000000	0.1	35.806
2352.64	Peak (PASS)	57.9	74	-16.1	1	48	Horizontal	1000000	0.1	35.911
2352.64	Average (PASS)	40.849	54	-13.151	1	48	Horizontal	1000000	0.1	35.911
2373.58	Peak (PASS)	57.715	74	-16.285	1.245	256	Horizontal	1000000	0.1	36.097
2373.58	Average (PASS)	40.977	54	-13.023	1.245	256	Horizontal	1000000	0.1	36.097
2387.94	Peak (PASS)	57.999	74	-16.001	1.581	222	Vertical	1000000	0.1	35.984
2387.94	Average (PASS)	40.754	54	-13.246	1.581	222	Vertical	1000000	0.1	35.984

Table 4. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – Lower Band Edge Test Results

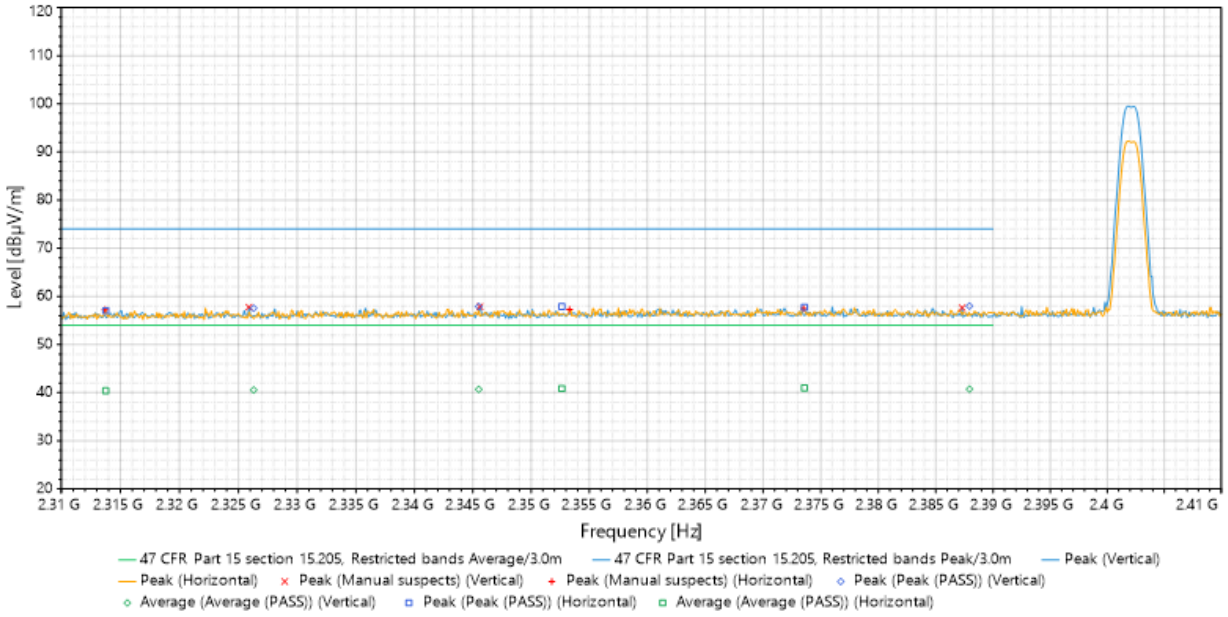

Figure 4. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – Lower Band Edge Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
2312.18	Peak (PASS)	57.529	74	-16.471	2.591	268	Horizontal	1000000	0.1	35.565
2312.18	Average (PASS)	40.369	54	-13.631	2.591	268	Horizontal	1000000	0.1	35.565
2337.26	Peak (PASS)	57.371	74	-16.629	2.171	113	Vertical	1000000	0.1	35.745
2337.26	Average (PASS)	40.62	54	-13.38	2.171	113	Vertical	1000000	0.1	35.745
2340.34	Peak (PASS)	58.017	74	-15.983	2.251	154	Horizontal	1000000	0.1	35.772
2340.34	Average (PASS)	40.65	54	-13.35	2.251	154	Horizontal	1000000	0.1	35.772
2366.44	Peak (PASS)	58.074	74	-15.926	1.69	52	Vertical	1000000	0.1	35.932
2366.44	Average (PASS)	40.867	54	-13.133	1.69	52	Vertical	1000000	0.1	35.932
2370.36	Peak (PASS)	57.655	74	-16.345	1	283	Horizontal	1000000	0.1	36.072
2370.36	Average (PASS)	40.986	54	-13.014	1	283	Horizontal	1000000	0.1	36.072
2388.92	Peak (PASS)	58.601	74	-15.399	3.379	41	Vertical	1000000	0.1	35.983
2388.92	Average (PASS)	40.755	54	-13.245	3.379	41	Vertical	1000000	0.1	35.983

Table 5. Radiated Spurious Emissions, BLE 2 Mbps Low Channel 2402 MHz RSE – Lower Band Edge Test Results

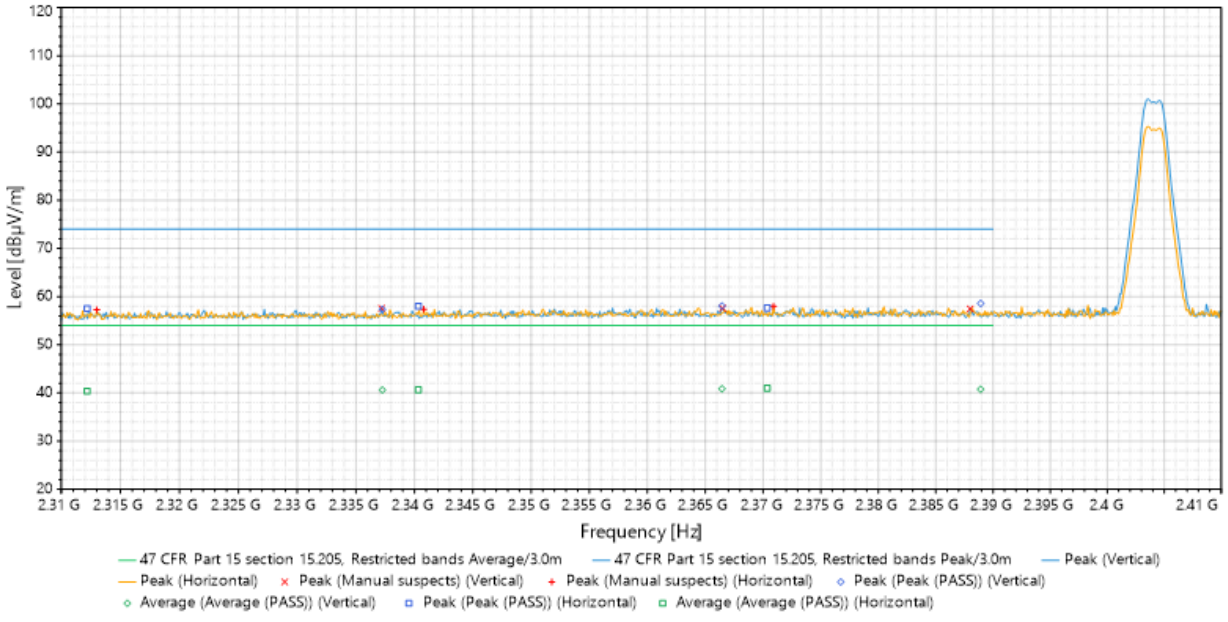

Figure 5. Radiated Spurious Emissions, BLE 2 Mbps Low Channel 2402 MHz RSE – Lower Band Edge Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
18022.5	Peak (PASS)	49.501	74	-24.499	3.63	214	Vertical	1000000	0.1	-0.65
18022.5	Average (PASS)	34.917	54	-19.083	3.63	214	Vertical	1000000	0.1	-0.65
18080.5	Peak (PASS)	48.075	74	-25.925	2.59	212	Horizontal	1000000	0.1	-0.976
18080.5	Average (PASS)	34.492	54	-19.508	2.59	212	Horizontal	1000000	0.1	-0.976

Table 6. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (18 – 26 GHz) Test Results

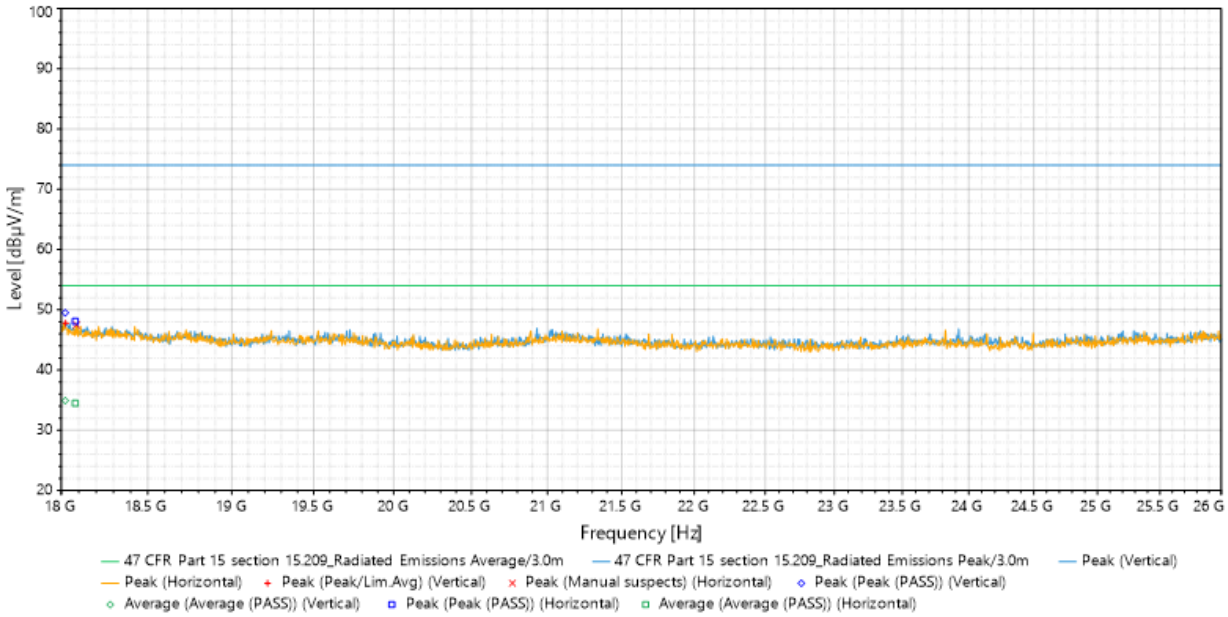

Figure 6. Radiated Spurious Emissions, BLE 1 Mbps Low Channel 2402 MHz RSE – (18 – 26 GHz) Plot

BLE Mid Channel 2440 MHz

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
105.473	QuasiPeak (PASS)	13.46	43.522	-30.062	1.687	141	Vertical	120000	0.1	-9.964
105.637	QuasiPeak (PASS)	17.986	43.522	-25.536	1.237	21	Horizontal	120000	0.1	-7.455

Table 7. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (30 MHz – 1 GHz) Test Results

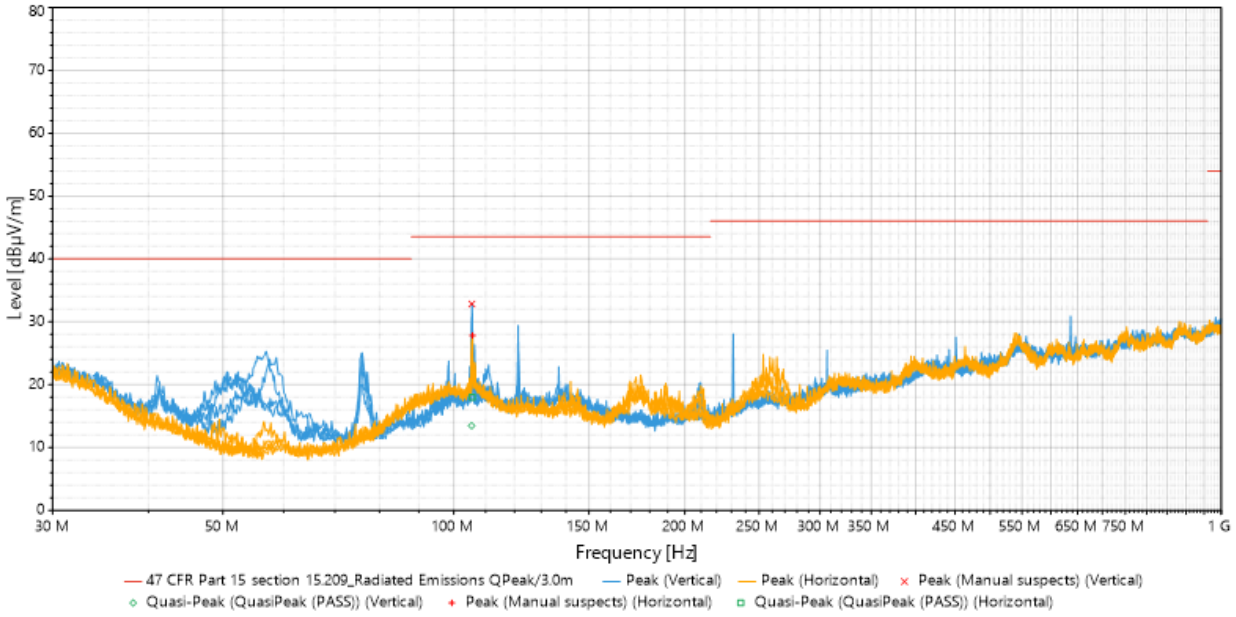

Figure 7. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (30 MHz – 1 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7319.1	Peak (PASS)	50.195	74	-23.805	1.462	10	Vertical	1000000	0.1	3.086
7319.1	Average (PASS)	39.651	54	-14.349	1.462	10	Vertical	1000000	0.1	3.086
17756.2	Peak (PASS)	53.182	74	-20.818	3.754	124	Horizontal	1000000	0.1	3.737
17756.2	Average (PASS)	39.023	54	-14.977	3.754	124	Horizontal	1000000	0.1	3.737

Table 8. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (1 – 18 GHz) Test Results

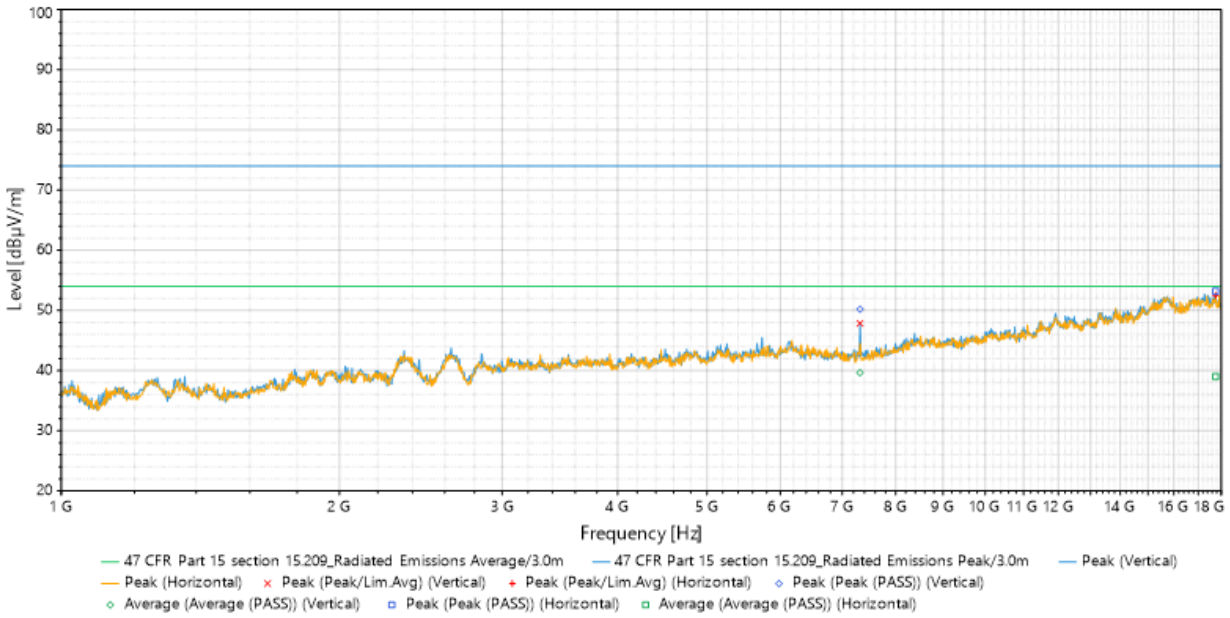

Figure 8. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7318.5	Peak (PASS)	52.802	74	-21.198	1.678	5	Vertical	1000000	0.1	3.086
7318.5	Average (PASS)	42.576	54	-11.424	1.678	5	Vertical	1000000	0.1	3.086
17382.6	Peak (PASS)	53.098	74	-20.902	4	205	Horizontal	1000000	0.1	4.359
17382.6	Average (PASS)	39.321	54	-14.679	4	205	Horizontal	1000000	0.1	4.359

Table 9. Radiated Spurious Emissions, BLE 2 Mbps Mid Channel 2440 MHz RSE – (1 – 18 GHz) Test Results

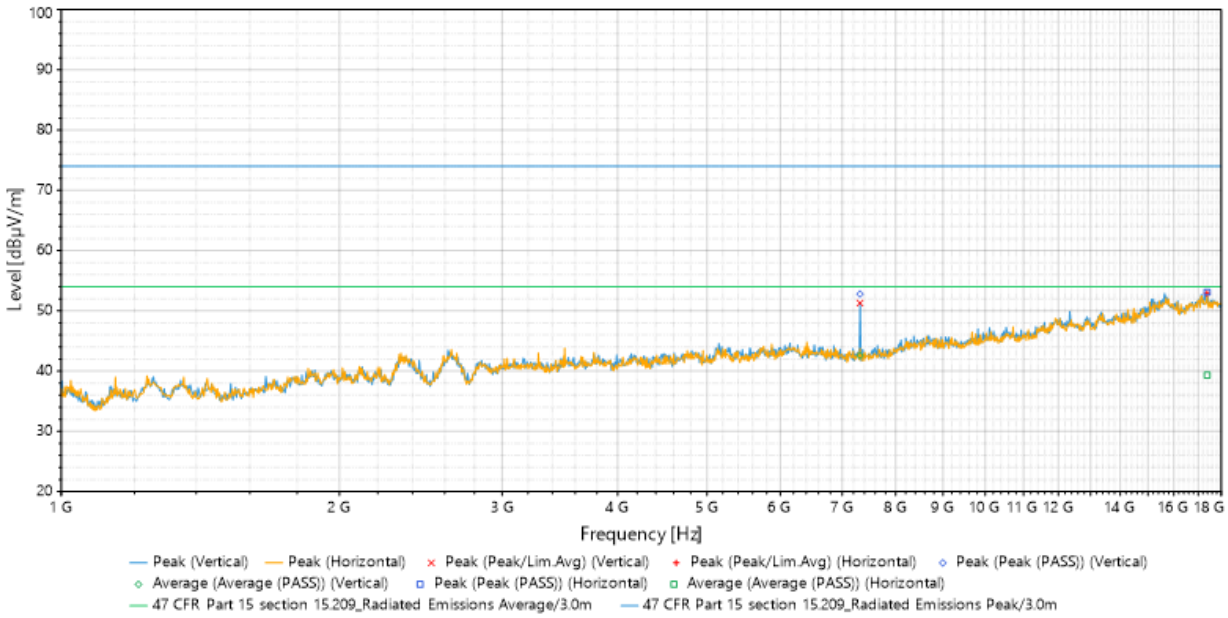

Figure 9. Radiated Spurious Emissions, BLE 2 Mbps Mid Channel 2440 MHz RSE – (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
18011.2	Peak (PASS)	47.971	74	-26.029	3.3	109	Vertical	1000000	0.1	-0.612
18011.2	Average (PASS)	34.734	54	-19.266	3.3	109	Vertical	1000000	0.1	-0.612
18120.8	Peak (PASS)	48.639	74	-25.361	1.032	299	Horizontal	1000000	0.1	-1.134
18120.8	Average (PASS)	34.426	54	-19.574	1.032	299	Horizontal	1000000	0.1	-1.134

Table 10. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (18 – 26 GHz) Test Results

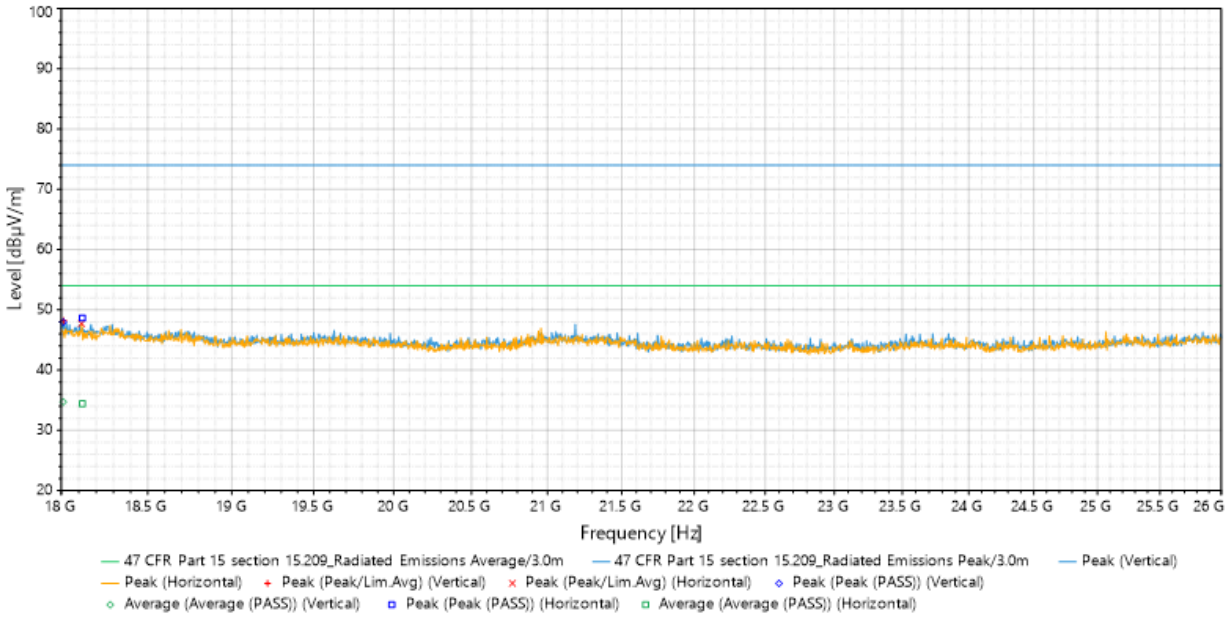

Figure 10. Radiated Spurious Emissions, BLE 1 Mbps Mid Channel 2440 MHz RSE – (18 – 26 GHz) Plot

BLE High Channel 2480 MHz

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
105.696	QuasiPeak (PASS)	25.417	43.522	-18.105	2.919	137	Vertical	120000	0.1	-9.945
143.856	QuasiPeak (PASS)	10.645	43.522	-32.877	3.866	48	Vertical	120000	0.1	-9.849

Table 11. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (30 MHz – 1 GHz) Test Results

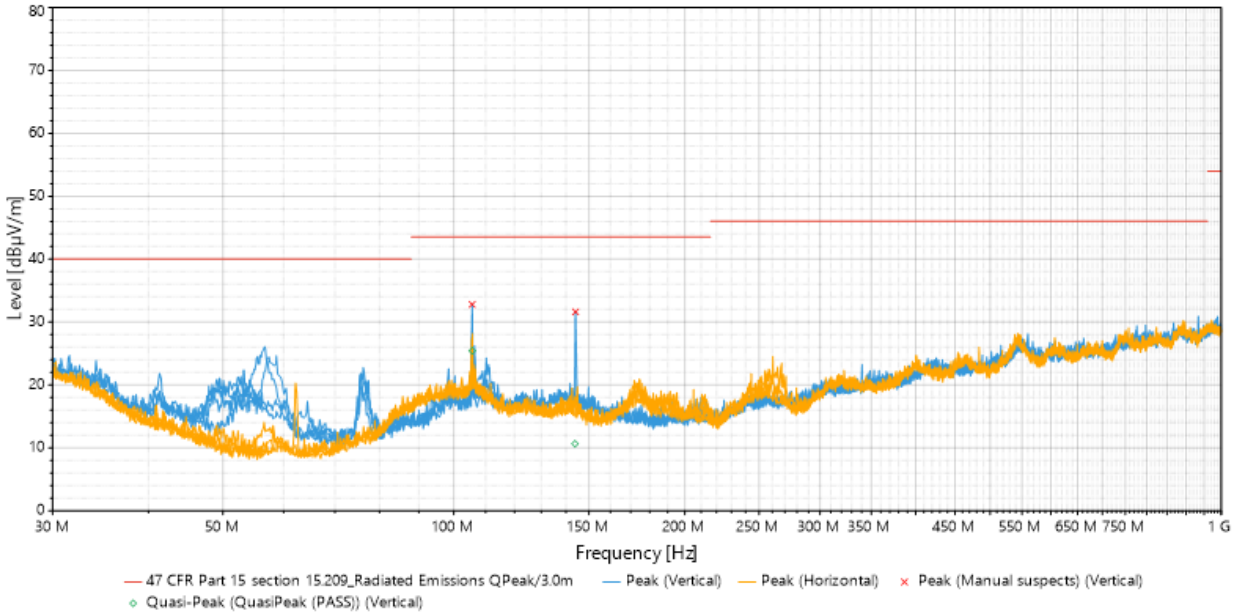

Figure 11. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (30 MHz – 1 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7439.4	Peak (PASS)	52.056	74	-21.944	2.59	10	Vertical	1000000	0.1	3.115
7439.4	Average (PASS)	43.419	54	-10.581	2.59	10	Vertical	1000000	0.1	3.115
15624.8	Peak (PASS)	52.793	74	-21.207	3.934	267	Horizontal	1000000	0.1	6.799
15624.8	Average (PASS)	39.278	54	-14.722	3.934	267	Horizontal	1000000	0.1	6.799

Table 12. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (1 – 18 GHz) Test Results

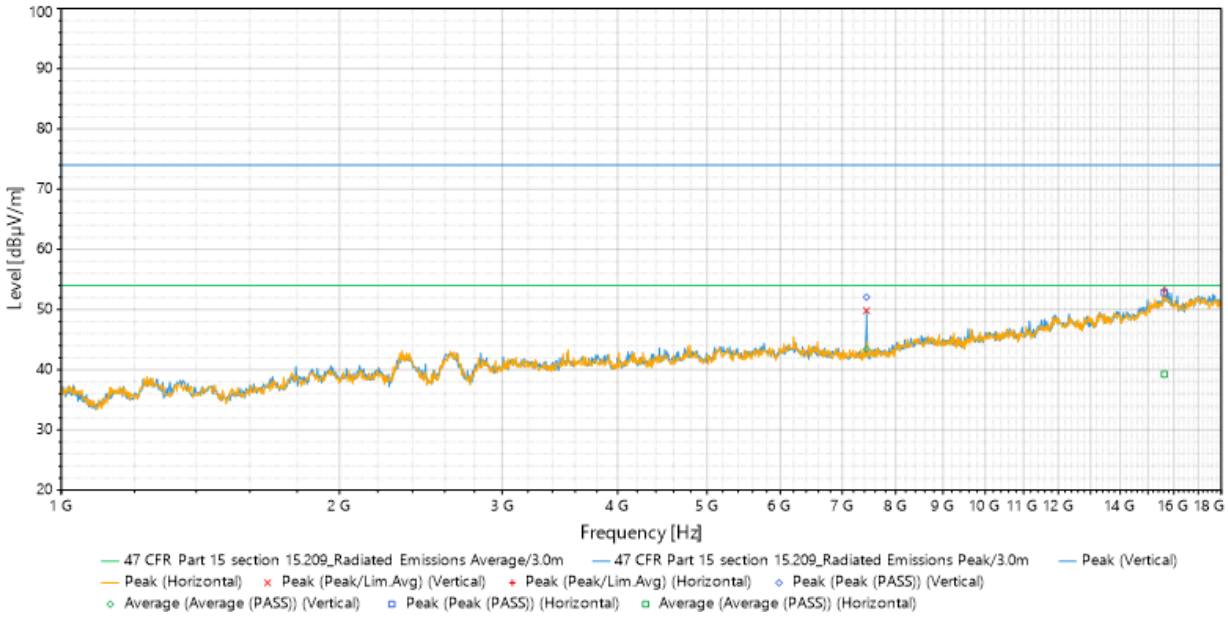

Figure 12. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
7432.5	Peak (PASS)	55.218	74	-18.782	1.801	360	Vertical	1000000	0.1	3.111
7432.5	Average (PASS)	45.492	54	-8.508	1.801	360	Vertical	1000000	0.1	3.111
17760	Peak (PASS)	53.695	74	-20.305	1.241	0	Horizontal	1000000	0.1	3.734
17760	Average (PASS)	39.313	54	-14.687	1.241	0	Horizontal	1000000	0.1	3.734

Table 13. Radiated Spurious Emissions, BLE 2 Mbps High Channel 2480 MHz RSE – (1 – 18 GHz) Test Results

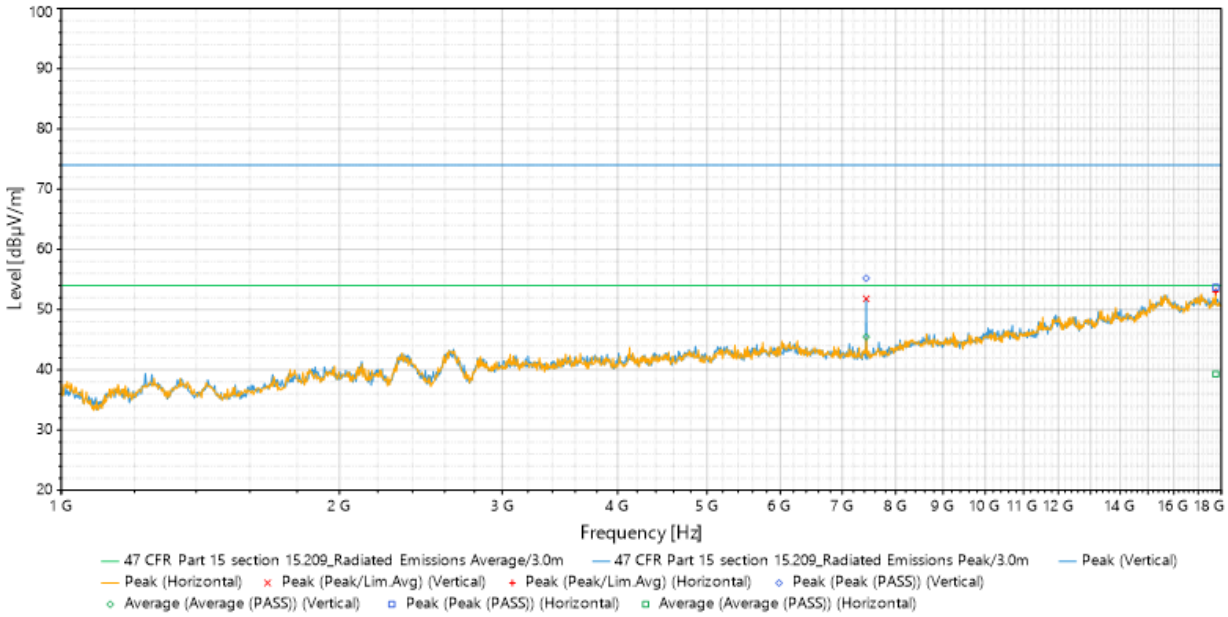

Figure 13. Radiated Spurious Emissions, BLE 2 Mbps High Channel 2480 MHz RSE – (1 – 18 GHz) Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
2484.76	Peak (PASS)	58.747	74	-15.253	4	31	Vertical	1000000	0.1	36.325
2484.76	Average (PASS)	41.921	54	-12.079	4	31	Vertical	1000000	0.1	36.325
2484.79	Peak (PASS)	58.915	74	-15.085	4	65	Horizontal	1000000	0.1	36.13
2484.79	Average (PASS)	41.735	54	-12.265	4	65	Horizontal	1000000	0.1	36.13
2489.65	Peak (PASS)	59.096	74	-14.904	3.612	239	Horizontal	1000000	0.1	36.152
2489.65	Average (PASS)	41.821	54	-12.179	3.612	239	Horizontal	1000000	0.1	36.152
2493.79	Peak (PASS)	58.974	74	-15.026	1.581	0	Horizontal	1000000	0.1	36.16
2493.79	Average (PASS)	41.902	54	-12.098	1.581	0	Horizontal	1000000	0.1	36.16
2495.83	Peak (PASS)	59.025	74	-14.975	1.576	86	Vertical	1000000	0.1	36.375
2495.83	Average (PASS)	42.139	54	-11.861	1.576	86	Vertical	1000000	0.1	36.375
2497.3	Peak (PASS)	59.675	74	-14.325	1.13	260	Vertical	1000000	0.1	36.38
2497.3	Average (PASS)	42.164	54	-11.836	1.13	260	Vertical	1000000	0.1	36.38

Table 14. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – Upper Band Edge Test Results

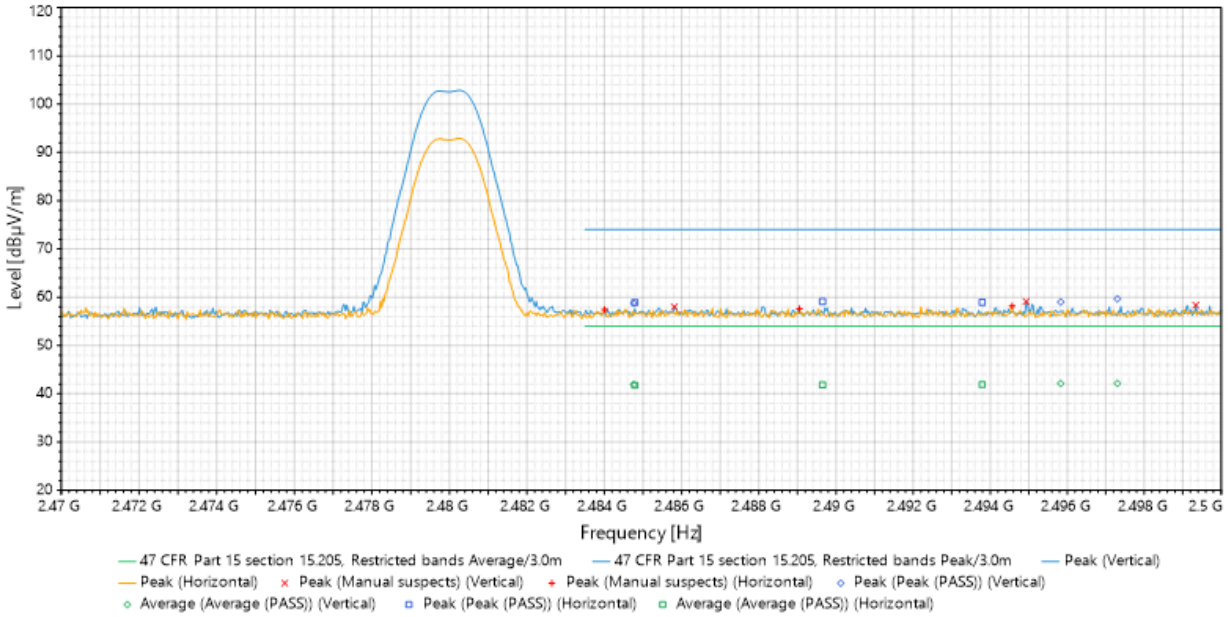

Figure 14. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – Upper Band Edge Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
2485.45	Peak (PASS)	58.747	74	-15.253	2.506	152	Vertical	1000000	0.1	36.329
2485.45	Average (PASS)	41.98	54	-12.02	2.506	152	Vertical	1000000	0.1	36.329
2486.41	Peak (PASS)	59.401	74	-14.599	1.605	132	Vertical	1000000	0.1	36.334
2486.41	Average (PASS)	41.956	54	-12.044	1.605	132	Vertical	1000000	0.1	36.334
2488.15	Peak (PASS)	59.473	74	-14.527	1.801	216	Horizontal	1000000	0.1	36.145
2488.15	Average (PASS)	41.775	54	-12.225	1.801	216	Horizontal	1000000	0.1	36.145
2491.27	Peak (PASS)	59	74	-15	3.643	327	Vertical	1000000	0.1	36.359
2491.27	Average (PASS)	42.065	54	-11.935	3.643	327	Vertical	1000000	0.1	36.359
2493.4	Peak (PASS)	58.77	74	-15.23	2.734	240	Horizontal	1000000	0.1	36.159
2493.4	Average (PASS)	41.877	54	-12.123	2.734	240	Horizontal	1000000	0.1	36.159
2494.99	Peak (PASS)	59.805	74	-14.195	3.814	32	Vertical	1000000	0.1	36.372
2494.99	Average (PASS)	42.117	54	-11.883	3.814	32	Vertical	1000000	0.1	36.372
2497.99	Peak (PASS)	58.672	74	-15.328	3.382	358	Horizontal	1000000	0.1	36.167
2497.99	Average (PASS)	41.965	54	-12.035	3.382	358	Horizontal	1000000	0.1	36.167
2499.79	Peak (PASS)	58.89	74	-15.11	2.995	148	Vertical	1000000	0.1	36.389
2499.79	Average (PASS)	42.223	54	-11.777	2.995	148	Vertical	1000000	0.1	36.389

Table 15. Radiated Spurious Emissions, BLE 2 Mbps High Channel 2480 MHz RSE – Upper Band Edge Test Results

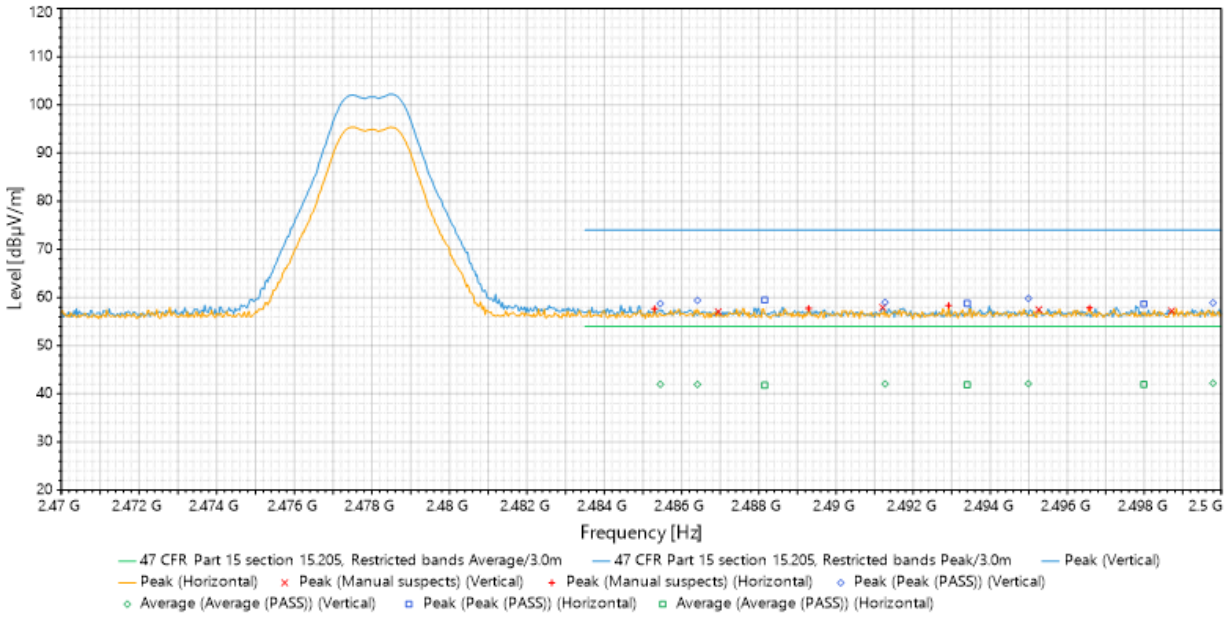

Figure 15. Radiated Spurious Emissions, BLE 2 Mbps High Channel 2480 MHz RSE – Upper Band Edge Plot

Frequency (MHz)	Source	Level (dBµV/m)	Limit (dBuV/m)	Margin (dB)	Height (m)	Azimuth (°)	Pol.	RBW (Hz)	Meas. Time (s)	Correction (dB)
18062.9	Peak (PASS)	48.317	74	-25.683	1.134	17	Vertical	1000000	0.1	-0.784
18062.9	Average (PASS)	34.353	54	-19.647	1.134	17	Vertical	1000000	0.1	-0.784
18690.5	Peak (PASS)	46.448	74	-27.552	2.029	56	Horizontal	1000000	0.1	-2.69
18690.5	Average (PASS)	33.135	54	-20.865	2.029	56	Horizontal	1000000	0.1	-2.69

Table 16. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (18 – 26 GHz) Test Results

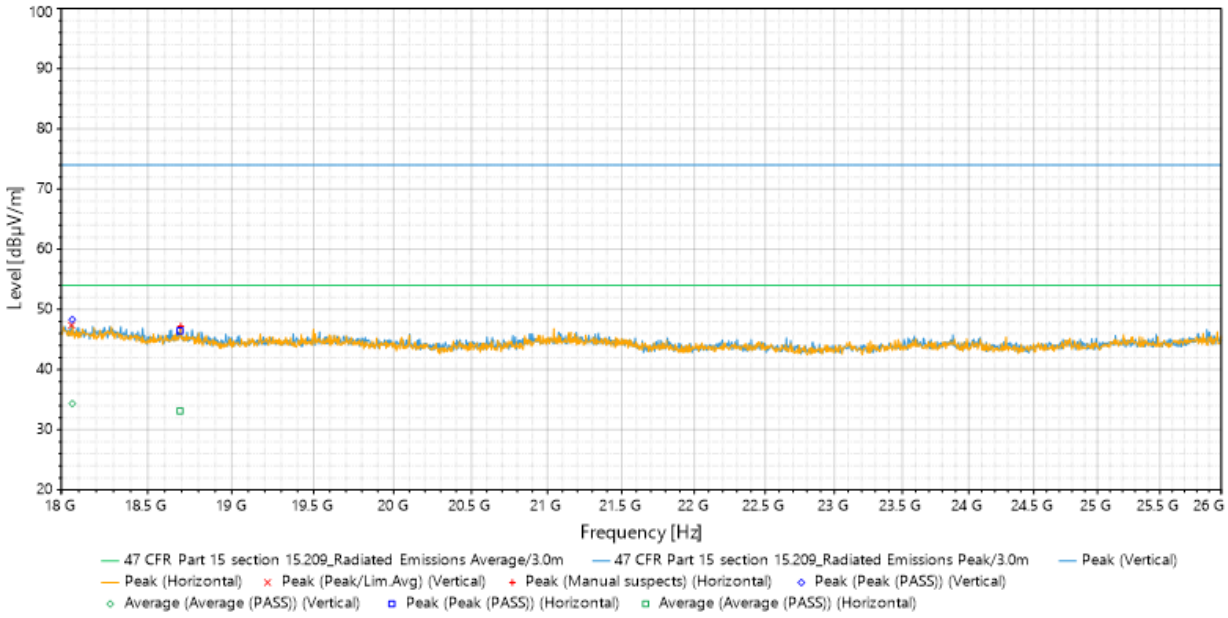

Figure 16. Radiated Spurious Emissions, BLE 1 Mbps High Channel 2480 MHz RSE – (18 – 26 GHz) Plot

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Test Name: FCC 15.247 & RSS-247 Radiated Spurious Emissions			**Test Date(s):** 05/08/2025		
Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1S2399	Turntable Controller	Sunol Sciences	SC99V	See Note 1	
1S4856	Antenna Positioning Tower	ETS-Lindgren	2171B	See Note 1	
1S2482	5 Meter Chamber	Panashield - ETS	5 Meter Semi-Anechoic Chamber	See Note 2	
1S4804	EMI Test Receiver	Rohde & Schwarz	ESW44	08/07/2024	08/07/2025
1S2485	Bilog Antenna	Teseq	CBL6112D	11/27/2024	11/27/2026
1S2435	Horn Antenna	ETS-Lindgren	3117	03/17/2025	03/17/2027
1S3818	DRG Horn Antenna	A.H. Systems, Inc.	SAS-574	05/24/2023	05/24/2025
1S2668	Pre-Amplifier	Sonoma Instruments	310 N	03/18/2025	03/18/2027
1S4802	Pre-Amplifier	EMC Instruments Corporation	EMC118A45SE	See Note 1	
1S3865	Table Top Amplifier	MITEQ	TTA1840-35-HG	See Note 1	
Note 1: Functionally tested equipment is verified using calibrated instrumentation at the time of testing. **Note 2:** Latest NSA and VSWR data available upon request.					

Table 17. Radiated Spurious Emissions, Test Equipment

3.2 Antenna-Port Conducted Measurements

Test Method: ANSI C63.10: 2020; FCC KDB 558074 D01 15.247 Meas Guidance v05r02

Test Requirements: The following standards are covered under this test:

- FCC Part 15 Subpart C §15.247
- ISED RSS-247 Issue 3 §5.2, §5.4, §5.5

Test Procedure: The EUT was configured to operate in continuous transmission mode on BLE channels using its lowest, middle, and highest frequencies (2402 MHz, 2440 MHz, and 2480 MHz) for both 1 Mbps and 2 Mbps data rates.

- Conducted measurements were performed at the antenna port of the EUT using a spectrum analyzer. Procedures for testing DTS devices operating in the 2400 MHz to 2483.5 MHz band per Section 11 of ANSI C63.10: 2020 were followed.
- The reference level was set based on the peak power of the fundamental channel.
- Emissions outside the 2400-2483.5 MHz band were measured and compared to the 20 dB attenuation requirement per FCC §15.247(d) and RSS-247 Section 5.5, using a resolution bandwidth (RBW) of 100 kHz and video bandwidth (VBW) of 300 kHz.
- Measurement traces were recorded for each tested channel.

Test Results:

Test Standard:	FCC Part 15 Subpart C §15.247 (Per FCC KDB 558074 D01 15.247 Meas Guidance v05r02; ANSI C63.10-2020), ISED RSS-247 Issue 3 §5.2, §5.4, §5.5
Test Name	Antenna-Port Conducted Measurements
Test Dates:	05/08/2025 – 05/09/2025
Laboratory	Eurofins E&E Testing NA, LLC.
Test Engineer:	Chin Ming Lui
Test Results:	Compliant

Test Data (FCC 15.247 & RSS-247 Antenna-Port Conducted Measurements)

3.2.1 Duty Cycle

Data Rate	Frequency (MHz)	Channel	Duty Cycle	Duty Cycle Correction Factor
1 Mbps	2402	Low	100%	0
2 Mbps	2402	Low	100%	0

Table 18. Duty Cycle Test Results

Figure 17. Duty Cycle: Low Channel, 2402 MHz, BLE 1 Mbps Plot

Figure 18. Duty Cycle: Low Channel, 2402 MHz, BLE 2 Mbps Plot

3.2.2 6dB DTS Bandwidth

Data Rate	Frequency (MHz)	Channel	Measured 6dB BW (kHz)	Minimum 6dB BW (kHz)
1 Mbps	2402	Low	716.4	≥ 500
	2440	Mid	709.1	≥ 500
	2480	High	716.4	≥ 500
2 Mbps	2402	Low	1302.5	≥ 500
	2440	Mid	1316.9	≥ 500
	2480	High	1324.2	≥ 500

Table 19. 6dB DTS Bandwidth Test Results

Figure 19. 6dB DTS Bandwidth: Low Channel, 2402 MHz, BLE 1 Mbps Plot

Figure 20. 6dB DTS Bandwidth: Mid Channel, 2440 MHz, BLE 1 Mbps Plot

Figure 21. 6dB DTS Bandwidth: High Channel, 2480 MHz, BLE 1 Mbps Plot

Figure 22. 6dB DTS Bandwidth: Low Channel, 2402 MHz, BLE 2 Mbps Plot

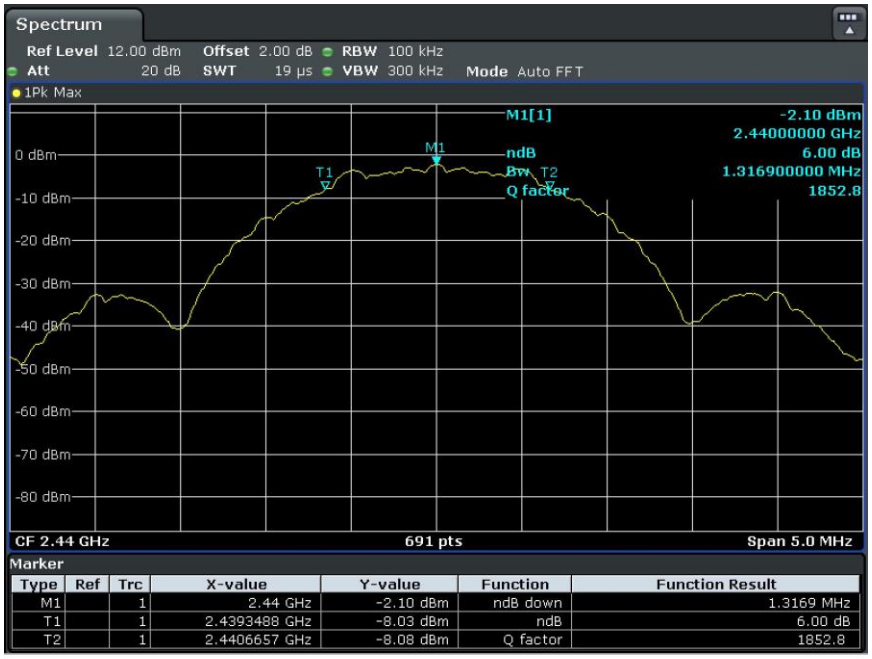

Figure 23. 6dB DTS Bandwidth: Mid Channel, 2440 MHz, BLE 2 Mbps Plot

Figure 24. 6dB DTS Bandwidth: High Channel, 2480 MHz, BLE 2 Mbps Plot

3.2.3 99% Occupied Bandwidth

Data Rate	Frequency (MHz)	Channel	99% OBW (MHz)
1 Mbps	2402	Low	1.0637
	2440	Mid	1.0637
	2480	High	1.0637
2 Mbps	2402	Low	2.0839
	2440	Mid	2.0839
	2480	High	2.0912

Table 20. 99% Occupied Bandwidth Test Results

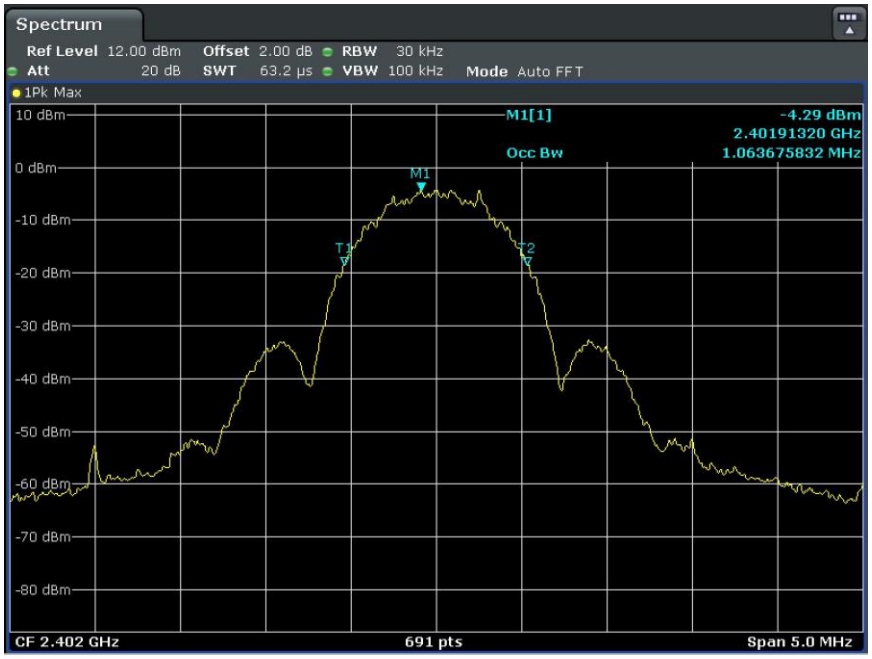

Figure 25. 99% OBW: Low Channel, 2402 MHz, BLE 1 Mbps Plot

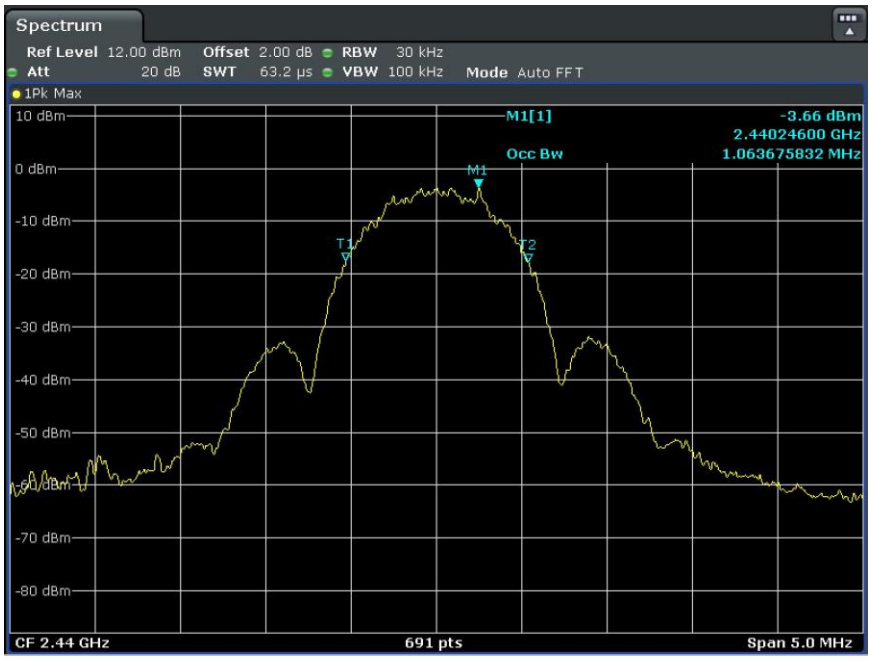

Figure 26. 99% OBW: Mid Channel, 2440 MHz, BLE 1 Mbps Plot

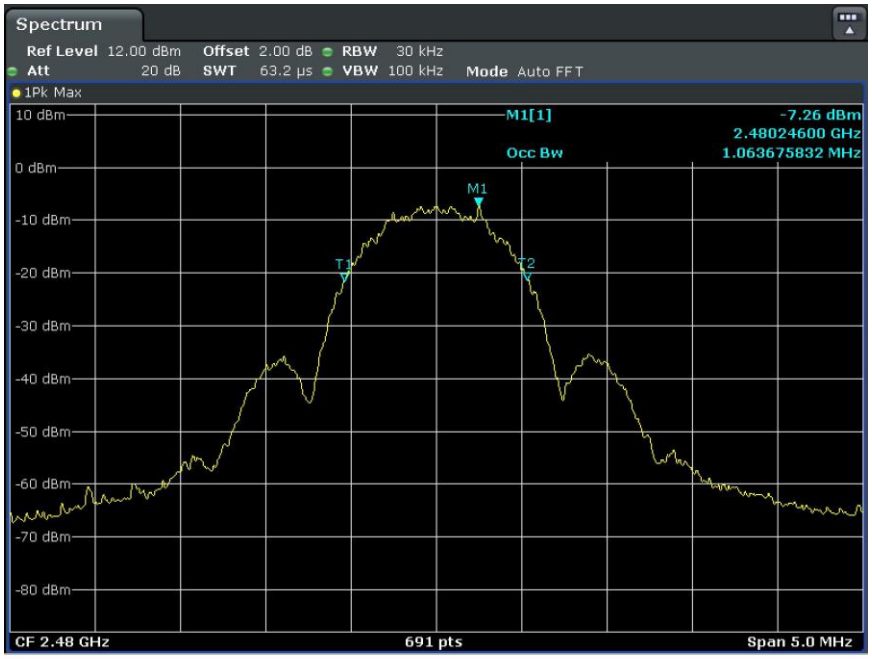

Figure 27. 99% OBW: High Channel, 2480 MHz, BLE 1 Mbps Plot

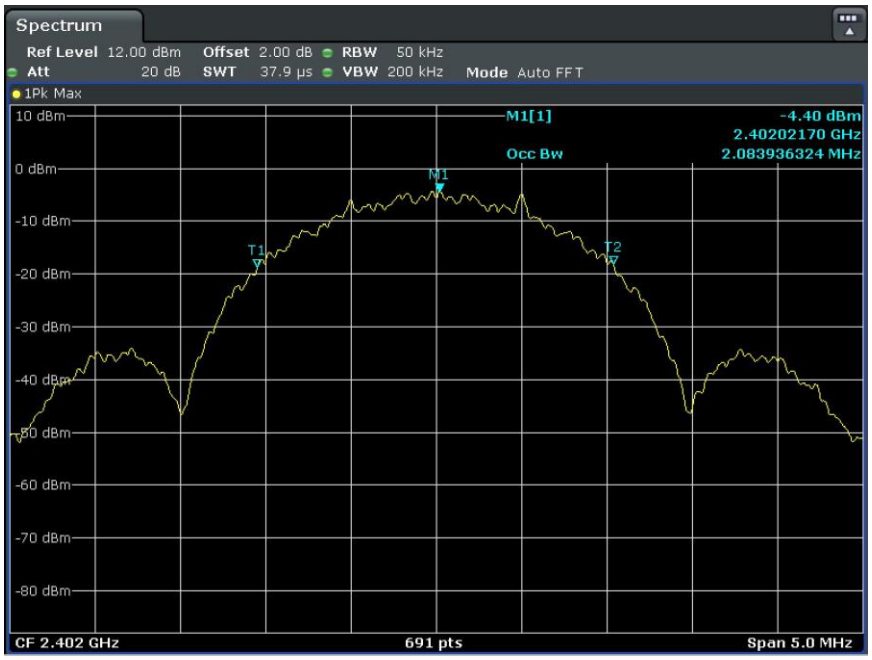

Figure 28. 99% OBW: Low Channel, 2402 MHz, BLE 2 Mbps Plot

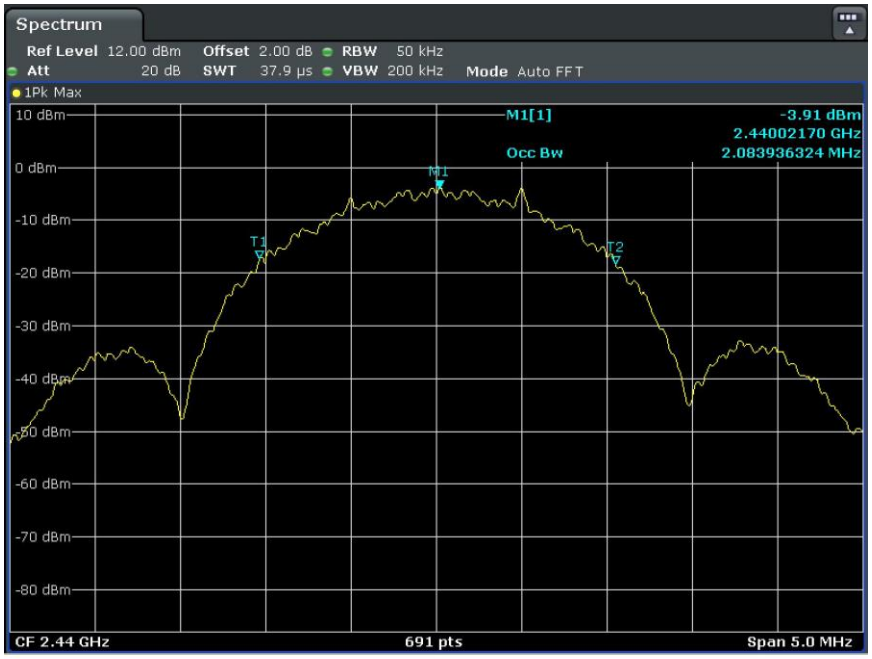

Figure 29. 99% OBW: Mid Channel, 2440 MHz, BLE 2 Mbps Plo

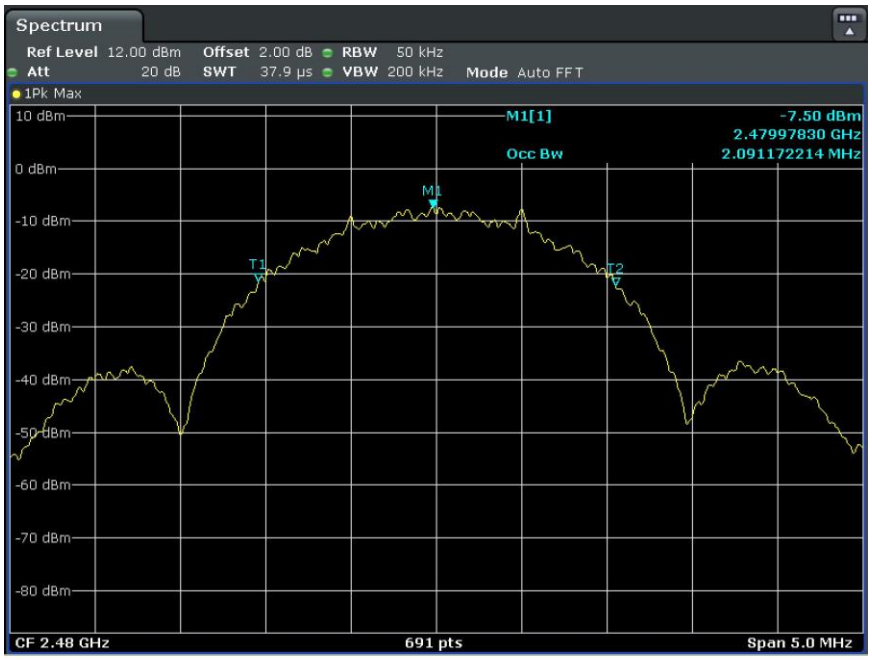

Figure 30. 99% OBW: High Channel, 2480 MHz, BLE 2 Mbps Plot

3.2.4 Maximum Peak Conducted Output Power

Data Rate	Frequency (MHz)	Channel	Measured Max Peak Conducted Output Power (dBm)	Max Peak Conducted Output Power Limit (dBm)
1 Mbps	2402	Low	-0.75	30
	2440	Mid	0.23	30
	2480	High	-2.72	30
2 Mbps	2402	Low	-0.82	30
	2440	Mid	0.31	30
	2480	High	-2.64	30

Table 21. Maximum Peak Conducted Output Power Test Results

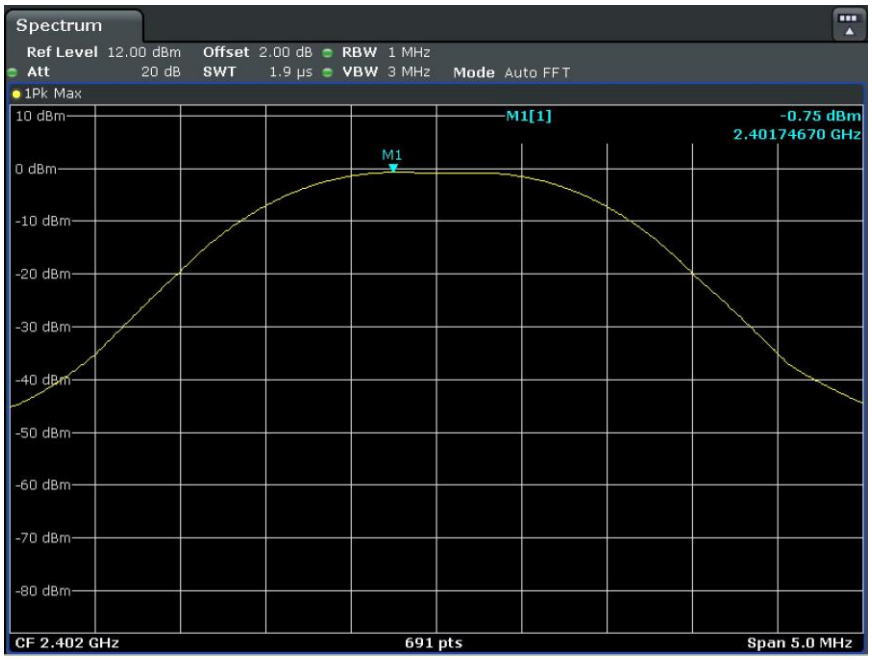

Figure 31. Maximum Peak Conducted Output Power: Low Channel, 2402 MHz, BLE 1 Mbps Plot

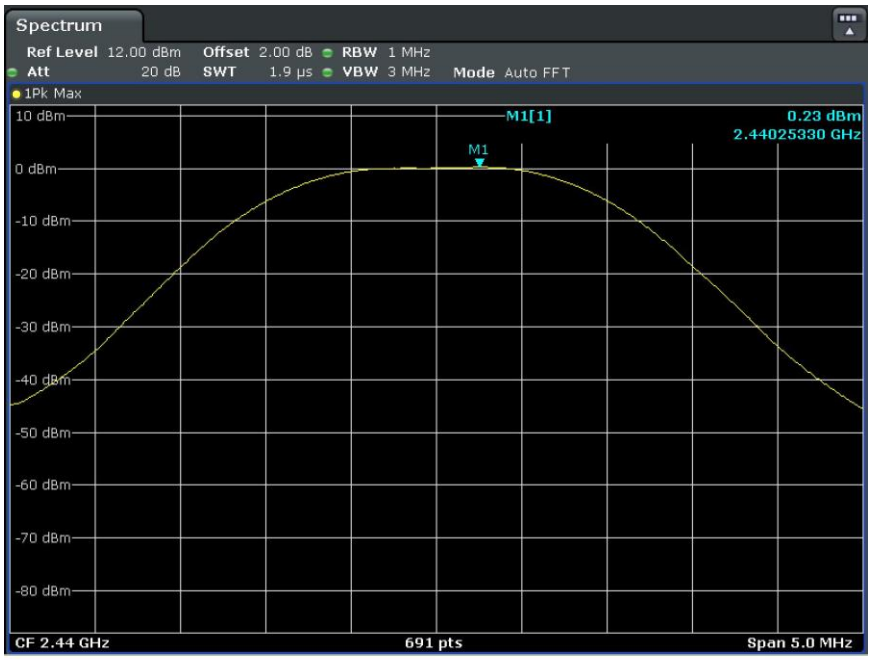

Figure 32. Maximum Peak Conducted Output Power: Mid Channel, 2440 MHz, BLE 1 Mbps Plot

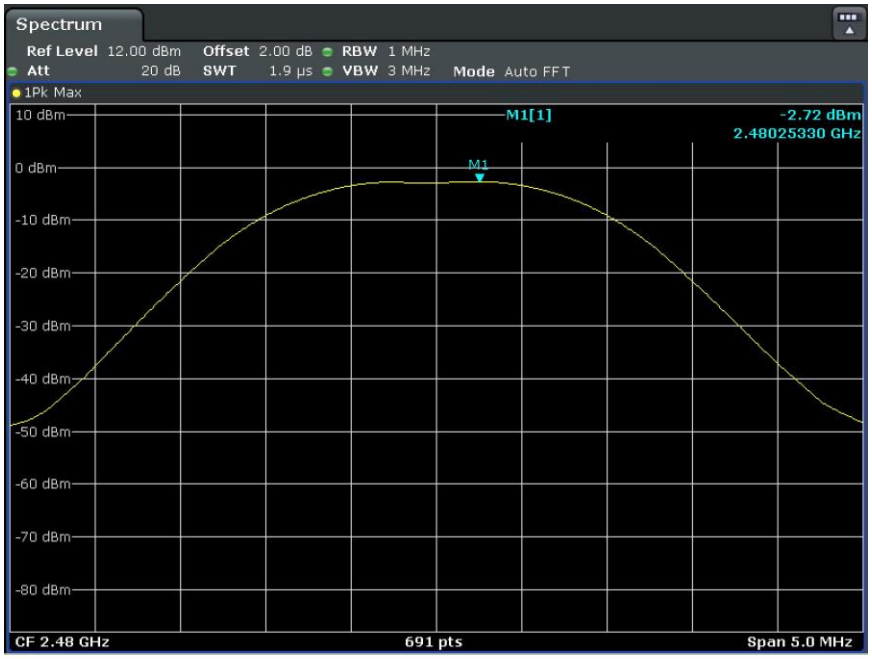

Figure 33. Maximum Peak Conducted Output Power: High Channel, 2480 MHz, BLE 1 Mbps Plot

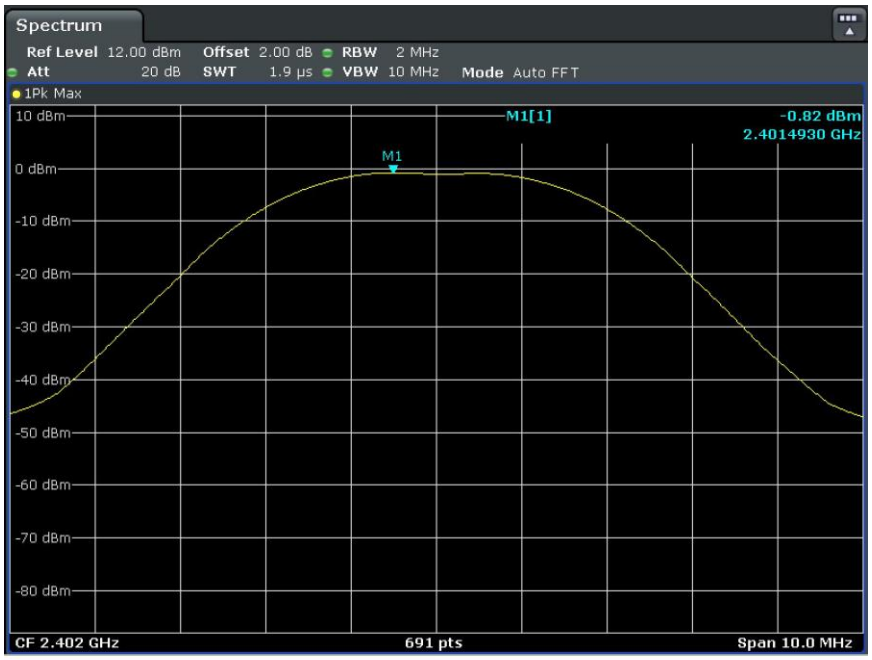

Figure 34. Maximum Peak Conducted Output Power: Low Channel, 2402 MHz, BLE 2 Mbps Plot

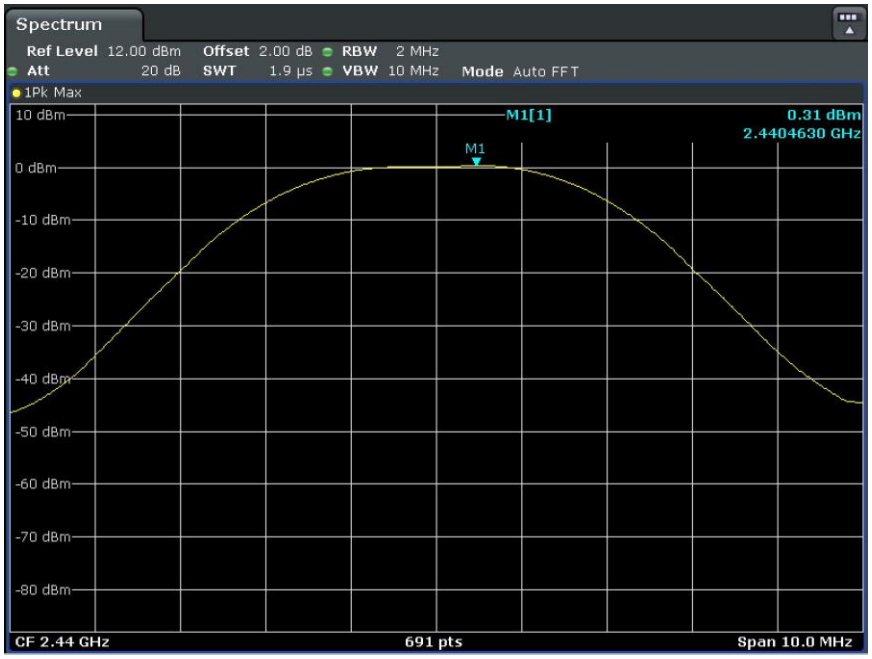

Figure 35. Maximum Peak Conducted Output Power: Mid Channel, 2440 MHz, BLE 2 Mbps Plot

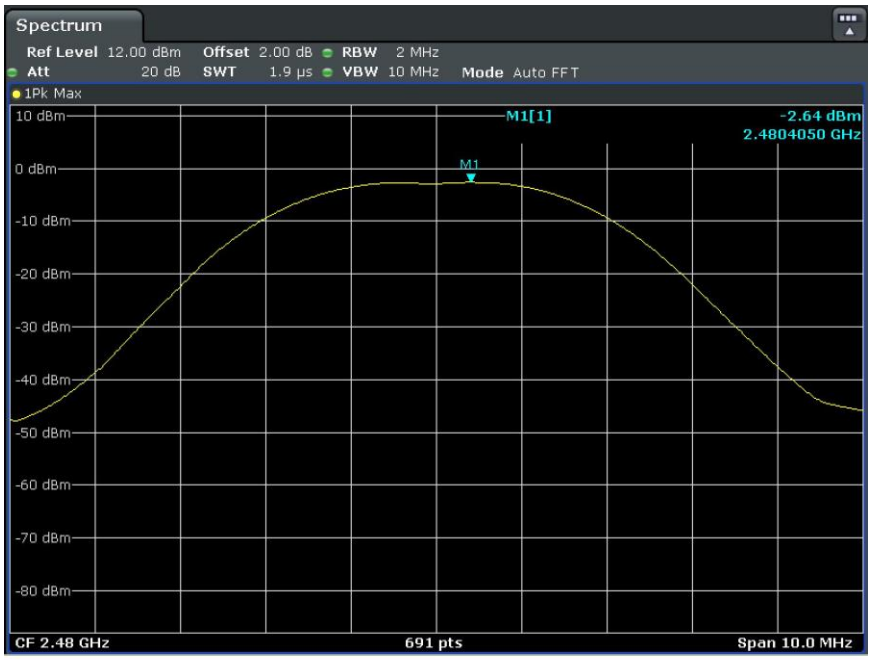

Figure 36. Maximum Peak Conducted Output Power: High Channel, 2480 MHz, BLE 2 Mbps Plot

3.2.5 Maximum Peak Power Spectral Density Test Results

Data Rate	Frequency (MHz)	Channel	Measured Max Peak Conducted Power Spectral Density (dBm / 3 kHz)	Max Peak Conducted Power Spectral Density Limit (dBm / 3 kHz)
1 Mbps	2402	Low	-15.65	8
	2440	Mid	-14.31	8
	2480	High	-16.67	8
2 Mbps	2402	Low	-19.20	8
	2440	Mid	-18.03	8
	2480	High	-20.59	8

Table 22. Maximum Peak Power Spectral Density Test Results

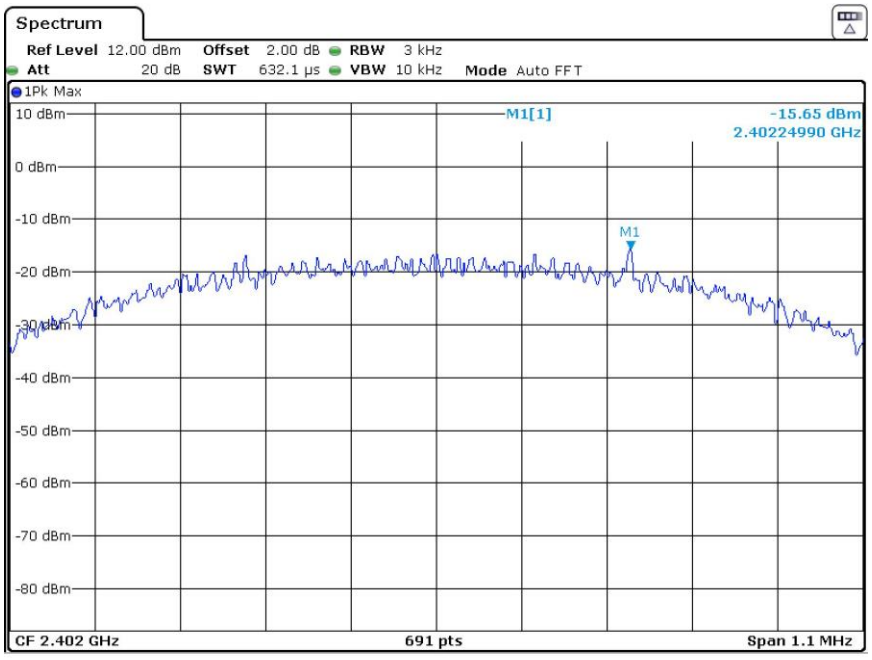

Figure 37. Maximum Peak Power Spectral Density: Low Channel, 2402 MHz, BLE 1 Mbps Plot

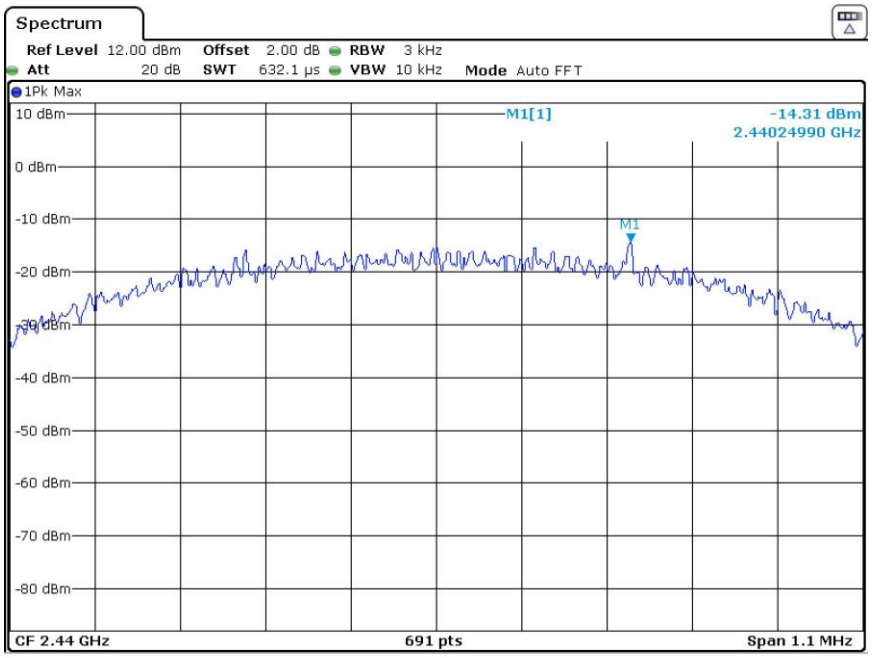

Figure 38. Maximum Peak Power Spectral Density: Mid Channel, 2440 MHz, BLE 1 Mbps Plot

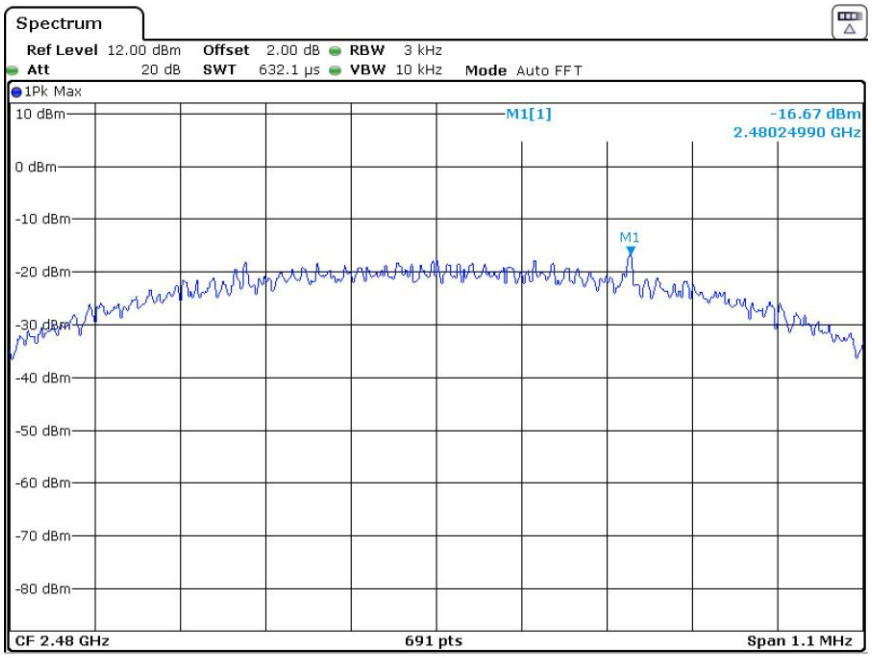

Figure 39. Maximum Peak Power Spectral Density: High Channel, 2480 MHz, BLE 1 Mbps Plot

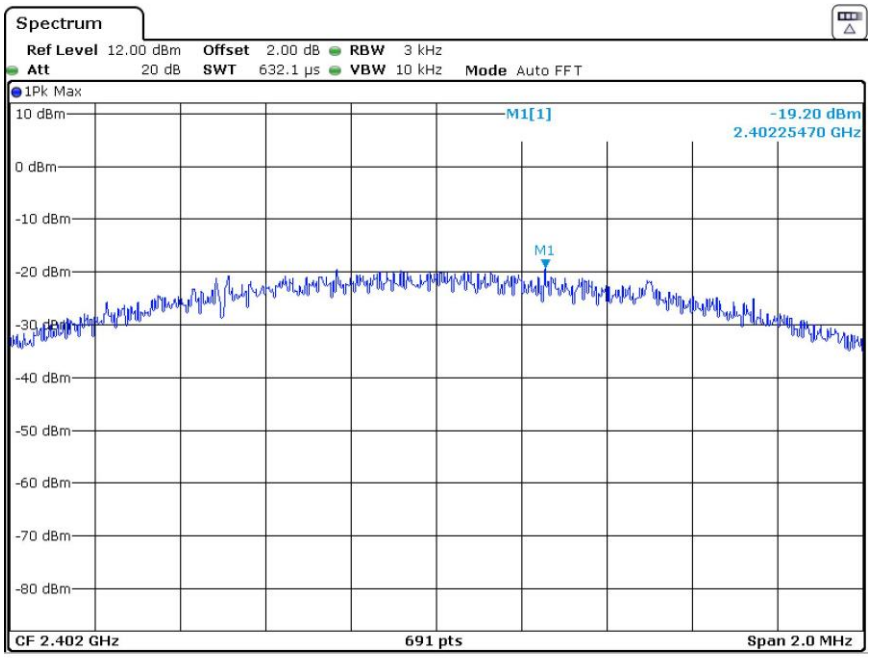

Figure 40. Maximum Peak Power Spectral Density: Low Channel, 2402 MHz, BLE 2 Mbps Plot

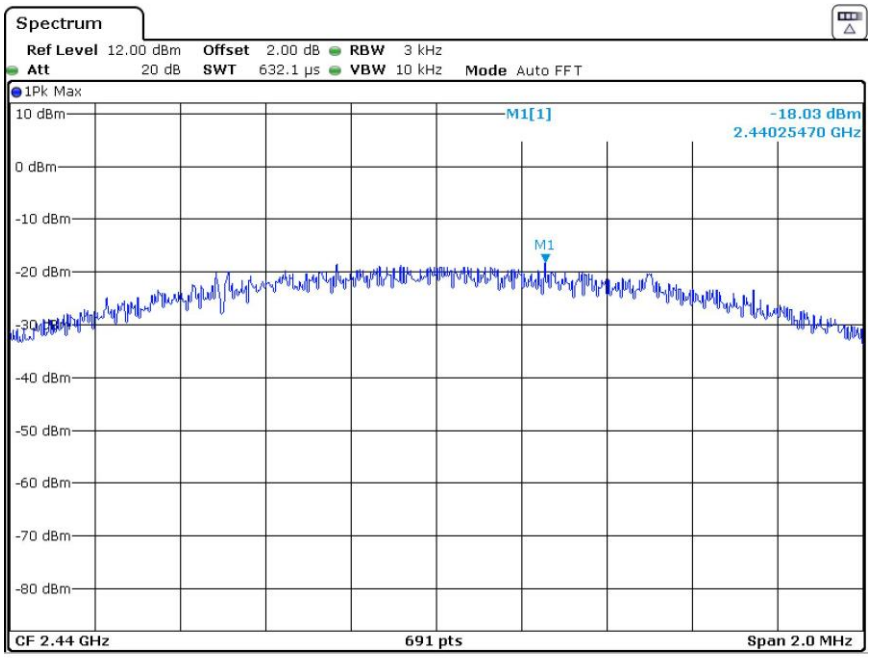

Figure 41. Maximum Peak Power Spectral Density: Mid Channel, 2440 MHz, BLE 2 Mbps Plot

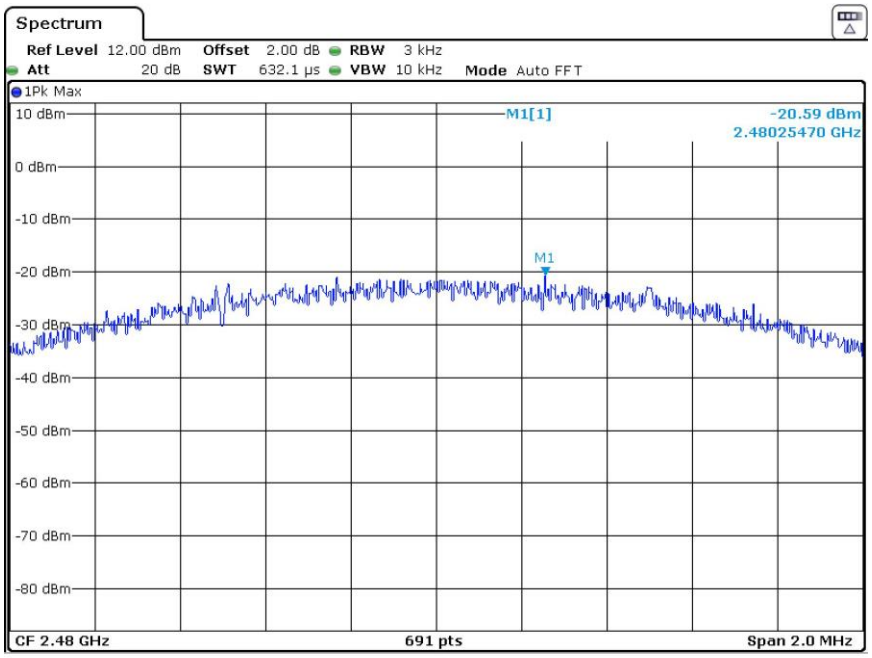

Figure 42. Maximum Peak Power Spectral Density: High Channel, 2480 MHz, BLE 2 Mbps Plot

3.2.6 Conducted Spurious Emissions

Data Rate	Frequency (MHz)	Channel	Fundamental Peak (dBm)	Max Spurious Emission Freq (MHz)	Max Spurious Emission Level (dBm)	Emissions Limit (dBm)
1 Mbps	2402	Low	-1.26	6828.44	-61.47	-21.26
	2440	Mid	-0.17	15780.91	-61.80	-20.17
	2480	High	-3.54	15723.91	-61.35	-23.54
2 Mbps	2402	Low	-2.98	19888.53	-61.43	-22.98
	2440	Mid	-2.15	15746.41	-61.26	-22.15
	2480	High	-4.82	15749.41	-61.55	-24.82

Table 23. Conducted Spurious Emissions, Test Results

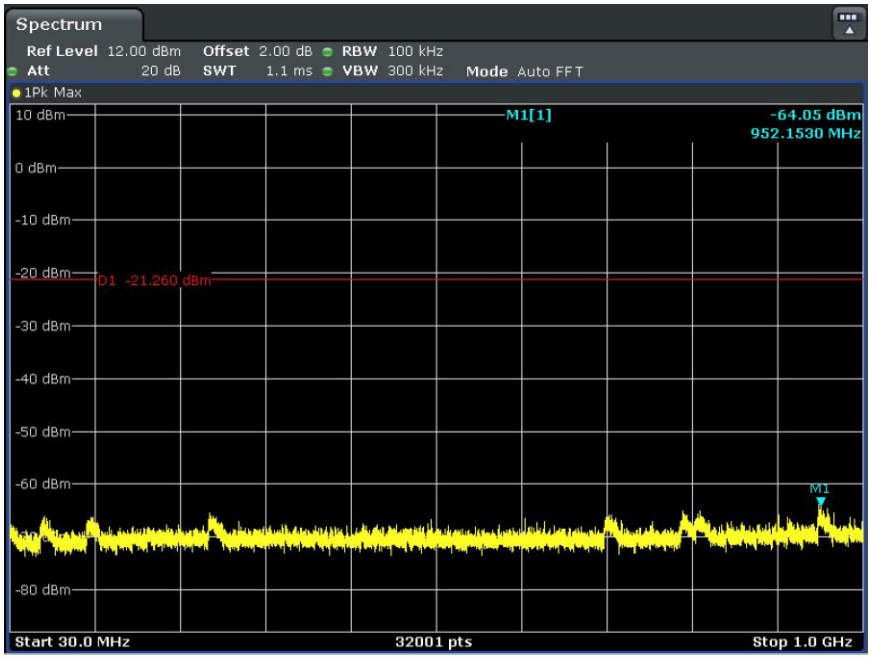

Figure 43. Conducted Spurious Emissions, Low Channel, 2402 MHz, BLE 1 Mbps Plot

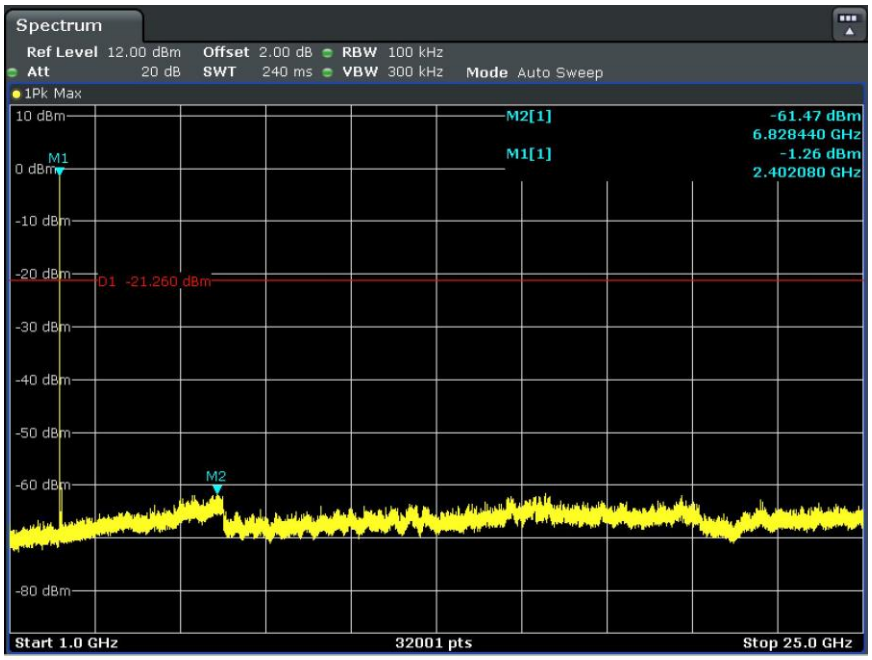

Figure 44. Conducted Spurious Emissions, Low Channel, 2402 MHz, BLE 1 Mbps Plot

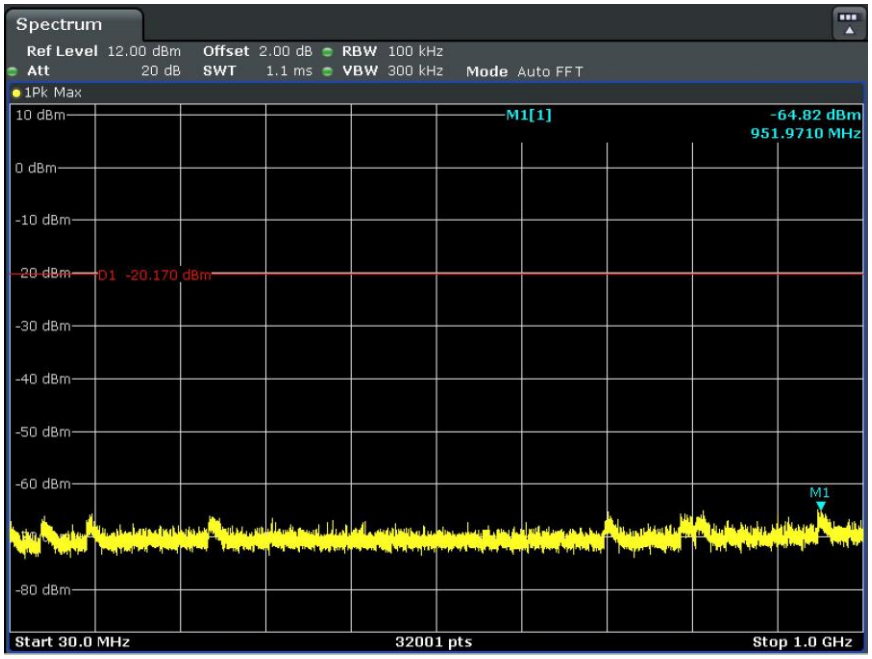

Figure 45. Conducted Spurious Emissions, Mid Channel, 2440 MHz, BLE 1 Mbps Plot

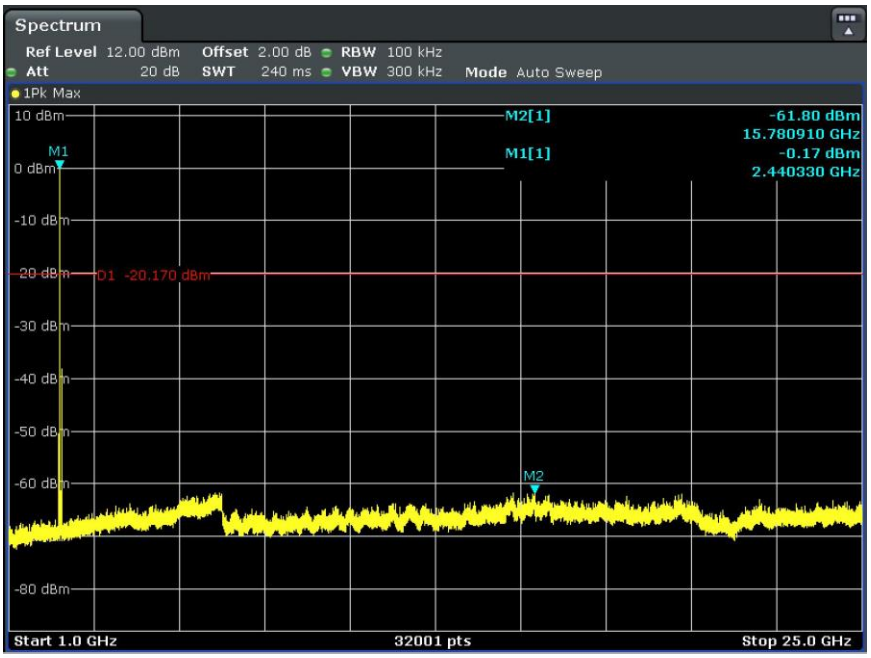

Figure 46. Conducted Spurious Emissions, Mid Channel, 2440 MHz, BLE 1 Mbps Plot

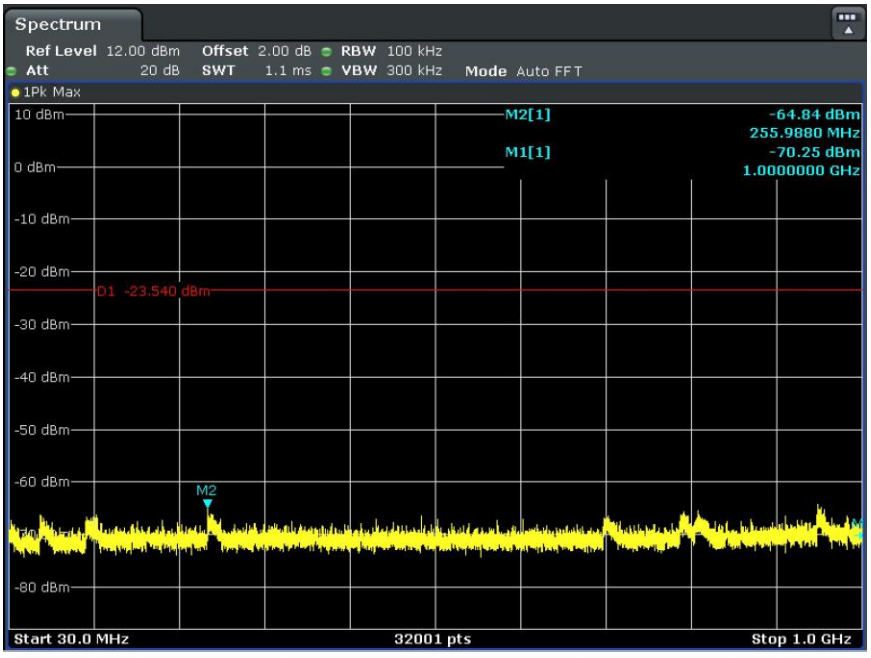

Figure 47. Conducted Spurious Emissions, High Channel, 2480 MHz, BLE 1 Mbps Plot

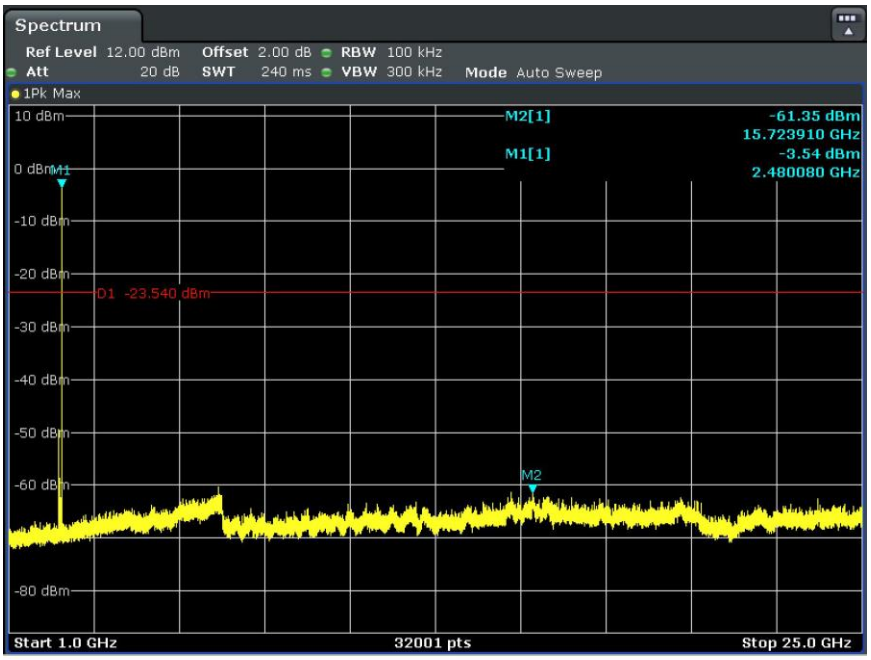

Figure 48. Conducted Spurious Emissions, High Channel, 2480 MHz, BLE 1 Mbps Plot

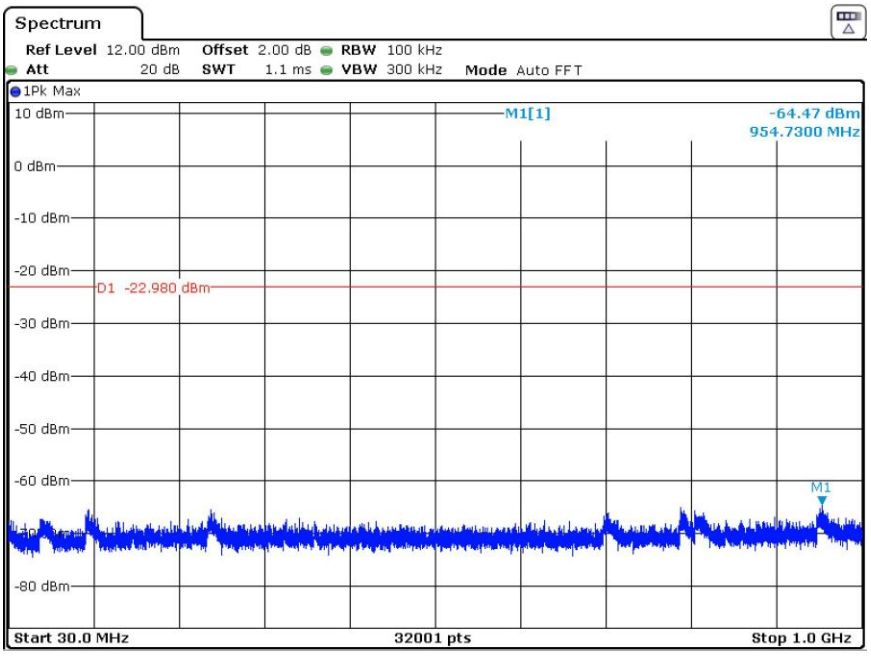

Figure 49. Conducted Spurious Emissions, Low Channel, 2402 MHz, BLE 2 Mbps Plot

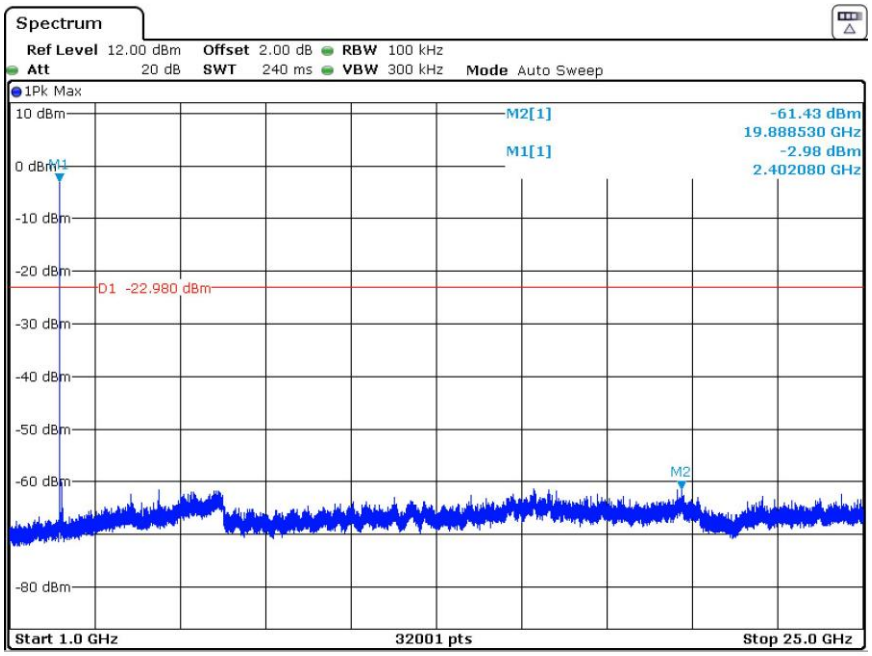

Figure 50. Conducted Spurious Emissions, Low Channel, 2402 MHz, BLE 2 Mbps Plot

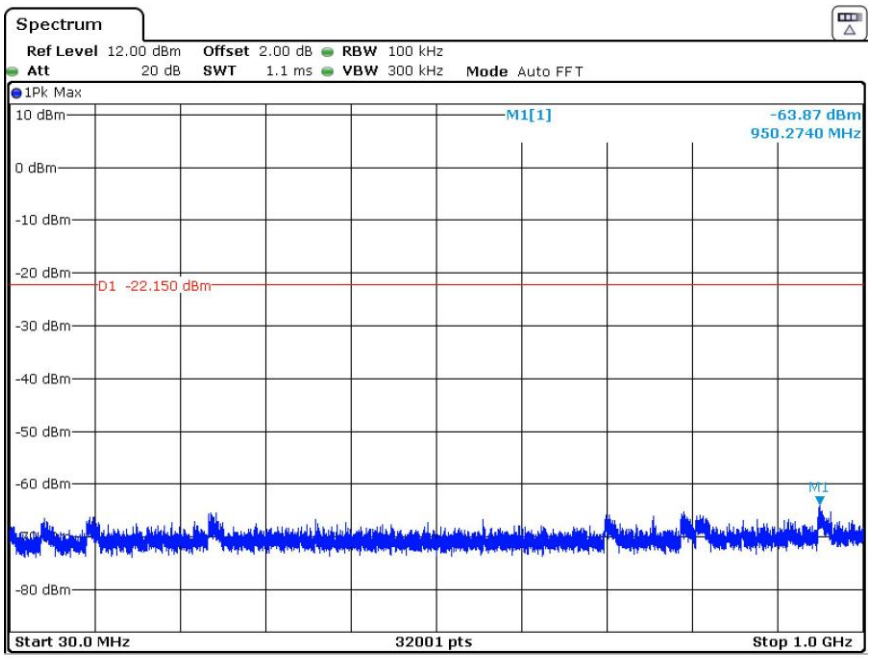

Figure 51. Conducted Spurious Emissions, Mid Channel, 2440 MHz, BLE 2 Mbps Plot

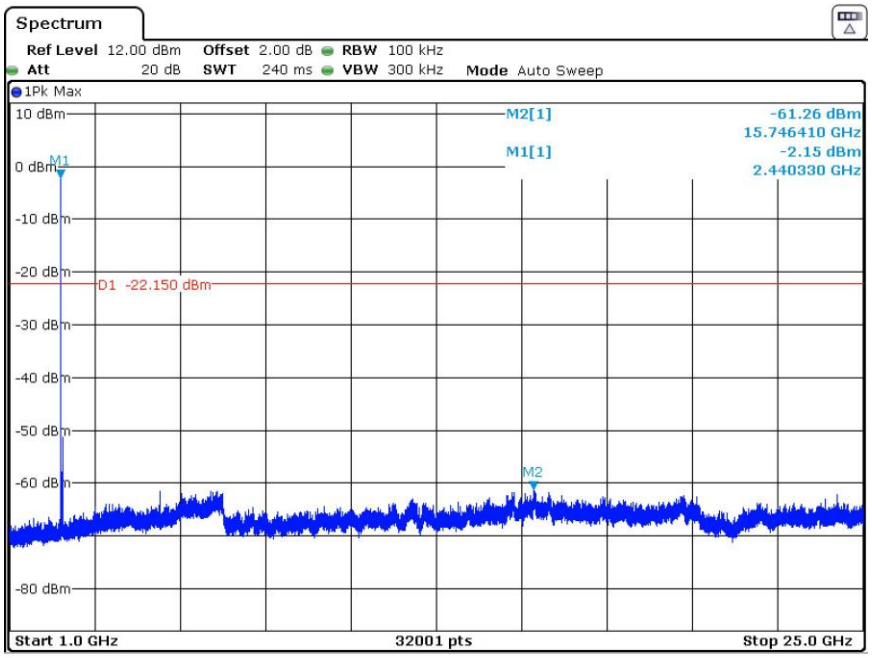

Figure 52. Conducted Spurious Emissions, Mid Channel, 2440 MHz, BLE 2 Mbps Plot

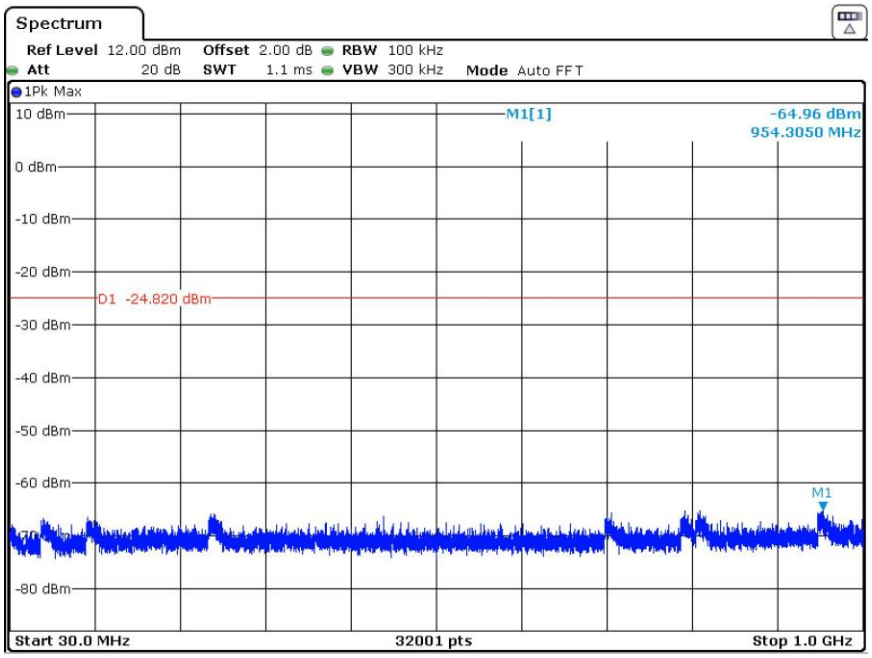

Figure 53. Conducted Spurious Emissions, High Channel, 2480 MHz, BLE 2 Mbps Plot

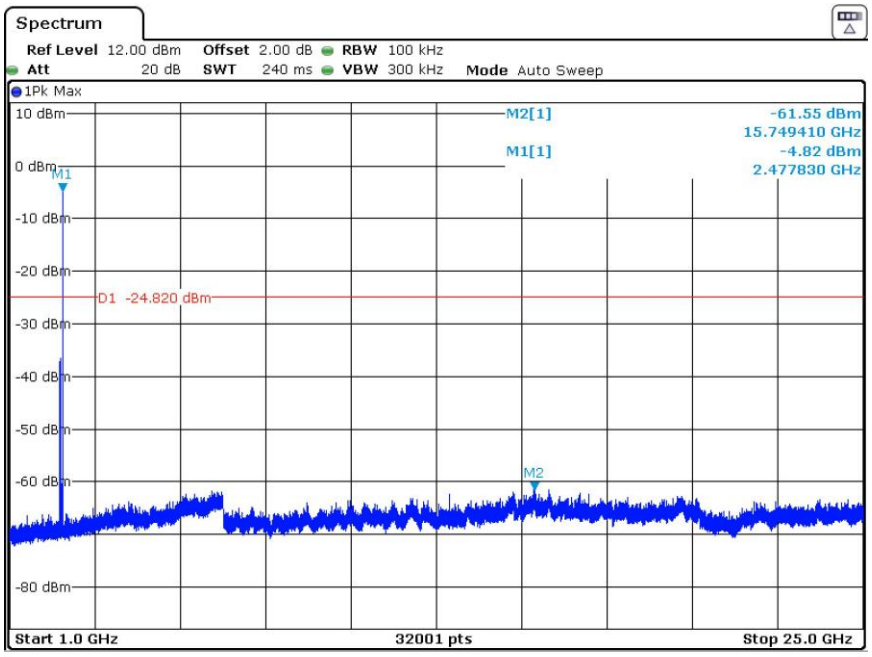

Figure 54. Conducted Spurious Emissions, High Channel, 2480 MHz, BLE 2 Mbps Plot

3.2.7 Band Edge

Data Rate	Frequency (MHz)	Channel	Fundamental Peak (dBm)	Unwanted Emission Level (dBm)	Peak-to-Unwanted Emission Delta (Δ) (dBc)	Limit (dBc)
1 Mbps	2402	Low	0.48	-47.09	47.57	≥ 20
	2480	High	-2.94	-61.78	58.84	≥ 20
2 Mbps	2402	Low	-1.69	-31.54	29.85	≥ 20
	2480	High	-4.88	-56.82	51.94	≥ 20

Table 24. Band Edge Test Results

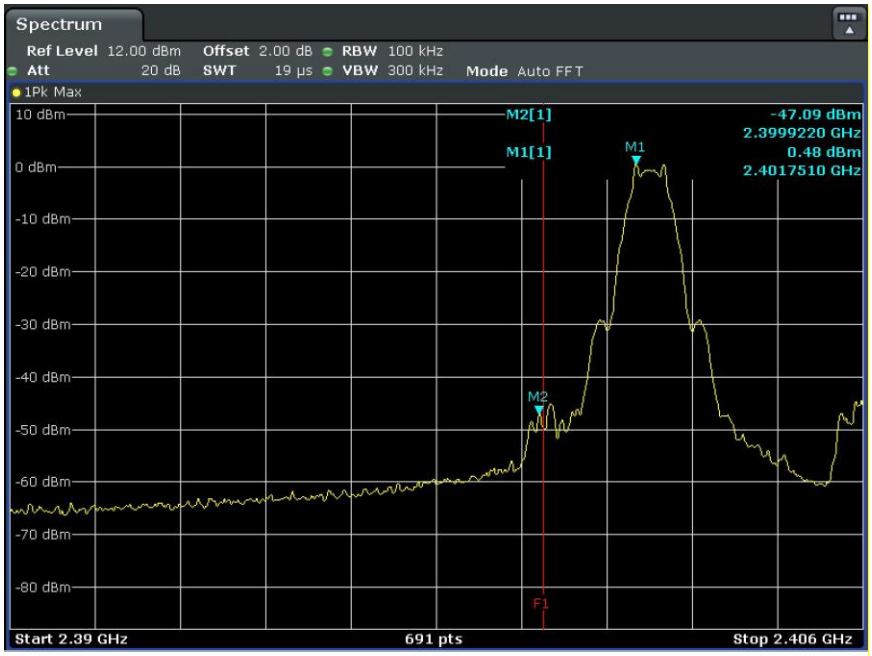

Figure 55. Lower Band Edge: Low Channel, 2402 MHz, BLE 1 Mbps Plot

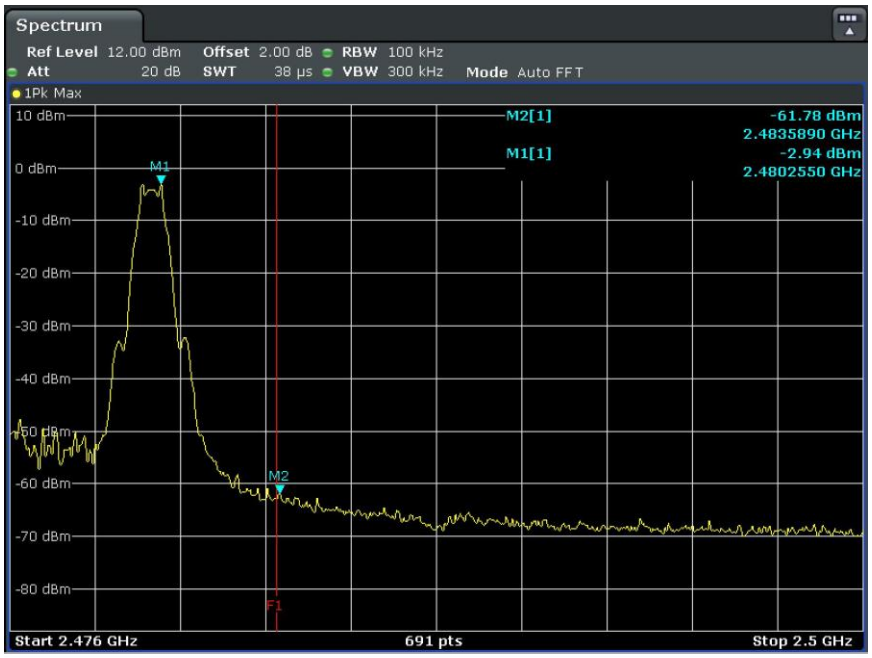

Figure 56. Upper Band Edge: High Channel, 2480 MHz, BLE 1 Mbps Plot

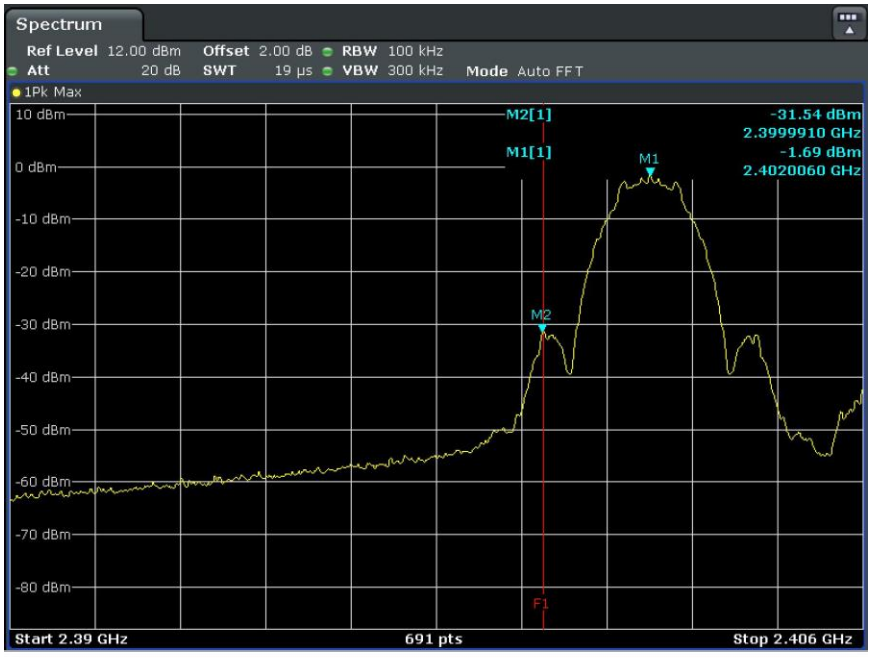

Figure 57. Lower Band Edge: Low Channel, 2402 MHz, BLE 2 Mbps Plot

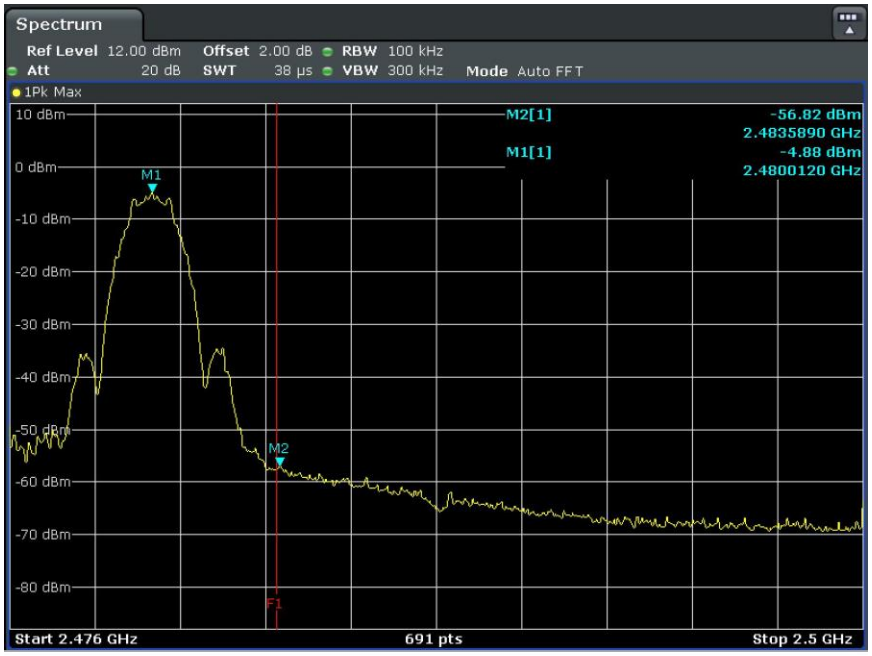

Figure 58. Upper Band Edge: High Channel, 2480 MHz, BLE 2 Mbps Plot

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Test Name: FCC 15.247 & RSS-247 Antenna-Port Conducted Measurements			**Test Date(s):** 05/08/2025 – 05/09/2025		
Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1S3812	Signal Analyzer	Rohde & Schwarz	FSV	01/10/2025	01/10/2027
Note 1: Functionally tested equipment is verified using calibrated instrumentation at the time of testing. **Note 2:** Latest NSA and VSWR data available upon request.					

Table 25. Antenna-Port Conducted Measurements, Test Equipment

END OF REPORT