## 8.6 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

### 8.6.1 Applicable Standard

According to FCC Part15.247(d)
According to RSS-247 5.5
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.5
According to ANSI C63.10 Section 11.11

### 8.6.2 Conformance Limit

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.

### 8.6.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

### 8.6.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

- **Reference level measurement**

Establish a reference level by using the following procedure:
Set instrument center frequency to DTS channel center frequency.
Set the span to = 1.5 times the DTS bandwidth.
Set the RBW = 100 kHz.
Set the VBW ≥ 3 x RBW.
Set Detector = peak.
Set Sweep time = auto couple.
Set Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

- **Band-edge measurement**

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation
Set RBW ≥ 1% of the span=100kHz Set VBW ≥ 3 x RBW
Set Sweep = auto Set Detector function = peak Set Trace = max hold
Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

- **Emission level measurement**

Set the center frequency and span to encompass frequency range to be measured.
Set the RBW = 100 kHz.
Set the VBW =300 kHz.
Set Detector = peak
Sweep time = auto couple.

Trace mode = max hold.
Allow trace to fully stabilize.
Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements . Report the three highest emissions relative to the limit.

### 8.6.5 Test Results

| | |
|---|---|
| Temperature: | 25 ˚C |
| Relative Humidity: | 45% |
| ATM Pressure: | 1011 mbar |
| Test Engineer: | XXH |

Note: N/A

**Reference level measurement**

| TestMode | Antenna | Freq(MHz) | Max.Point[MHz] | Result[dBm] |
|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 2401.98 | 4.71 |
| | | 2440 | 2439.98 | 5.15 |
| | | 2480 | 2479.98 | 3.43 |
| BLE_2M | Ant1 | 2402 | 2401.99 | 4.33 |
| | | 2440 | 2439.98 | 5.23 |
| | | 2480 | 2479.98 | 3.30 |

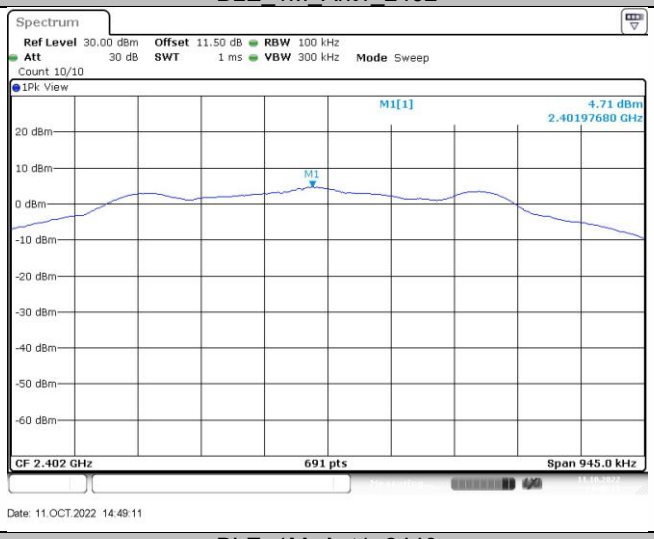
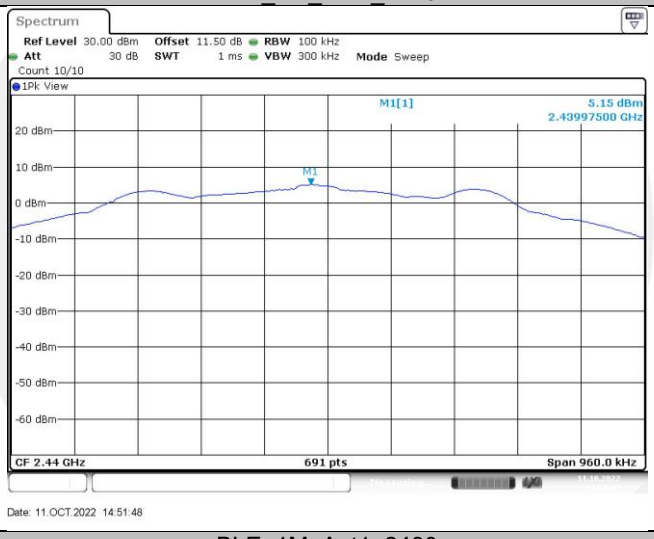
**Band edge measurements**

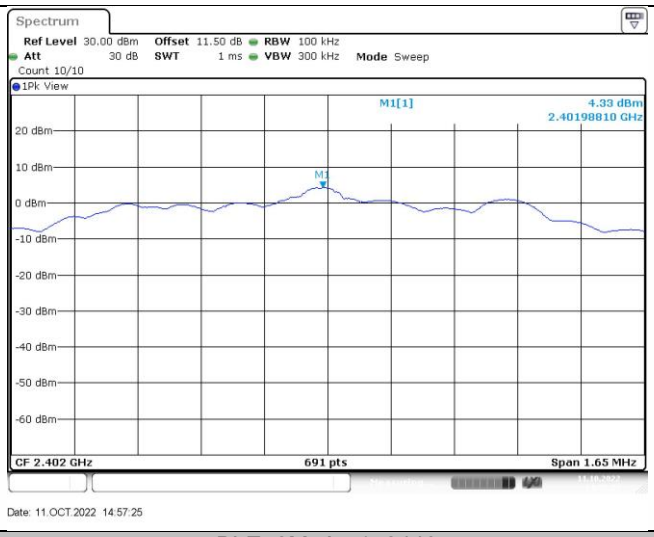
| TestMode | Antenna | ChName | Frequency [MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | Low | 2402 | 4.71 | -39.64 | ≤-15.29 | PASS |
| | | High | 2480 | 3.43 | -38.41 | ≤-16.57 | PASS |
| BLE_2M | Ant1 | Low | 2402 | 4.33 | -39.4 | ≤-15.67 | PASS |
| | | High | 2480 | 3.30 | -38.43 | ≤-16.7 | PASS |

**Conducted Spurious Emission**

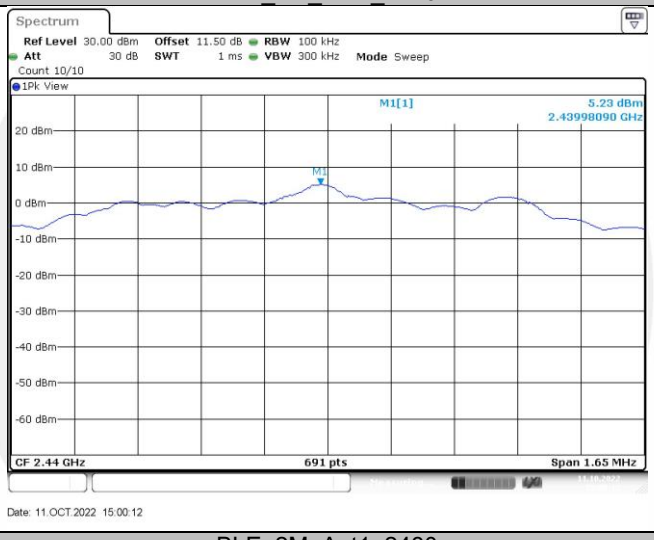
| TestMode | Antenna | Frequency[MHz] | FreqRange [MHz] | RefLevel [dBm] | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 30~1000 | 4.71 | -48.6 | ≤-15.29 | PASS |
| | | | 1000~26500 | 4.71 | -43.94 | ≤-15.29 | PASS |
| | | 2440 | 30~1000 | 5.15 | -47.55 | ≤-14.85 | PASS |
| | | | 1000~26500 | 5.15 | -44.08 | ≤-14.85 | PASS |
| | | 2480 | 30~1000 | 3.43 | -48.29 | ≤-16.57 | PASS |
| | | | 1000~26500 | 3.43 | -42.69 | ≤-16.57 | PASS |
| BLE_2M | Ant1 | 2402 | 30~1000 | 4.33 | -48.09 | ≤-15.67 | PASS |
| | | | 1000~26500 | 4.33 | -44.01 | ≤-15.67 | PASS |
| | | 2440 | 30~1000 | 5.23 | -47.96 | ≤-14.77 | PASS |
| | | | 1000~26500 | 5.23 | -44.18 | ≤-14.77 | PASS |
| | | 2480 | 30~1000 | 3.30 | -47.27 | ≤-16.7 | PASS |
| | | | 1000~26500 | 3.30 | -44.25 | ≤-16.7 | PASS |

**Reference level measurement**

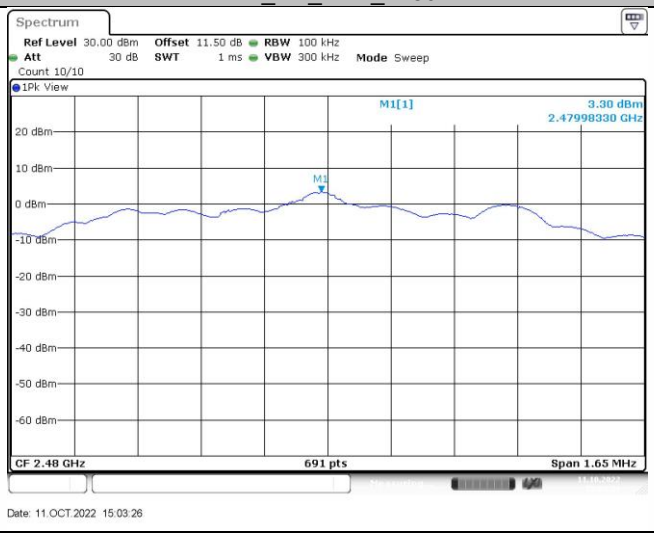
| BLE_1M_Ant1_2402 |
|---|
|  |
| BLE_1M_Ant1_2440 |
|  |
| BLE_1M_Ant1_2480 |
|  |
| BLE_2M_Ant1_2402 |




BLE_2M_Ant1_2440

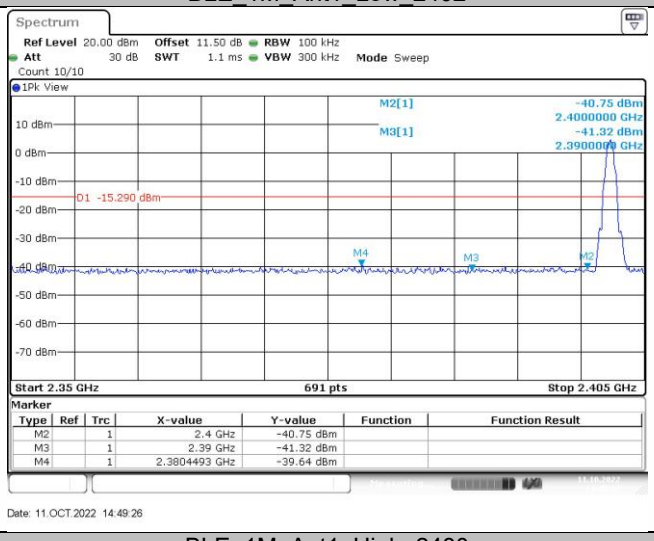



BLE_2M_Ant1_2480

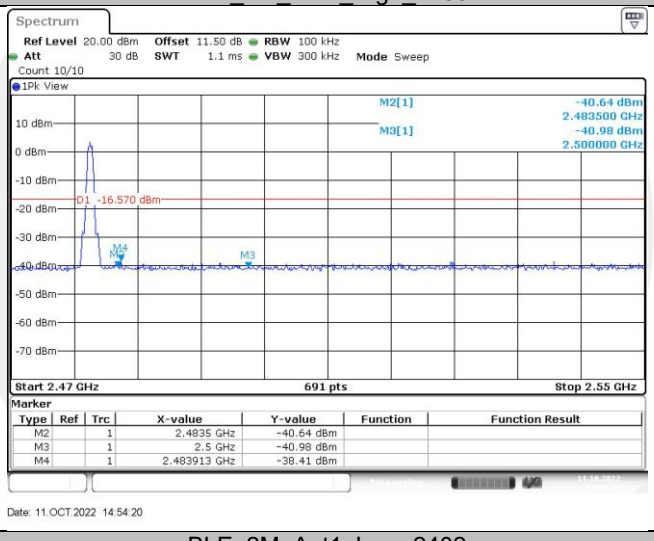


**Band edge measurements**

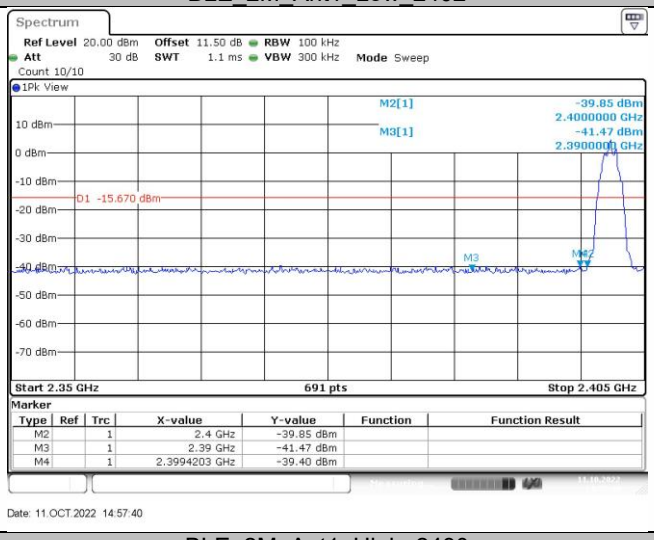
BLE_1M_Ant1_Low_2402



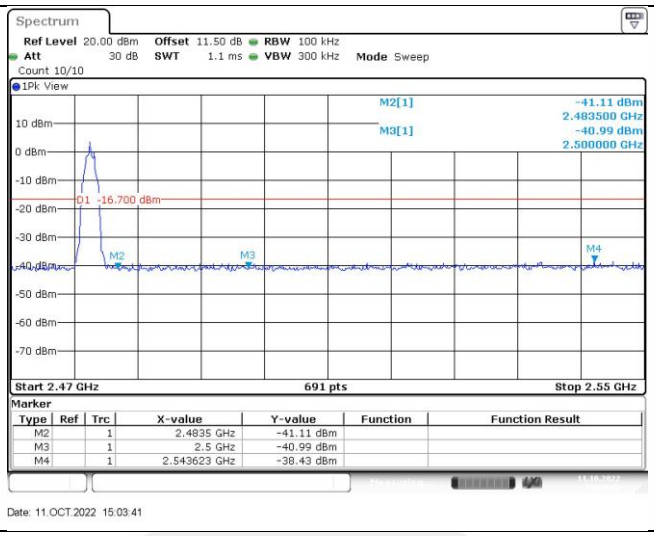

BLE_1M_Ant1_High_2480




BLE_2M_Ant1_Low_2402

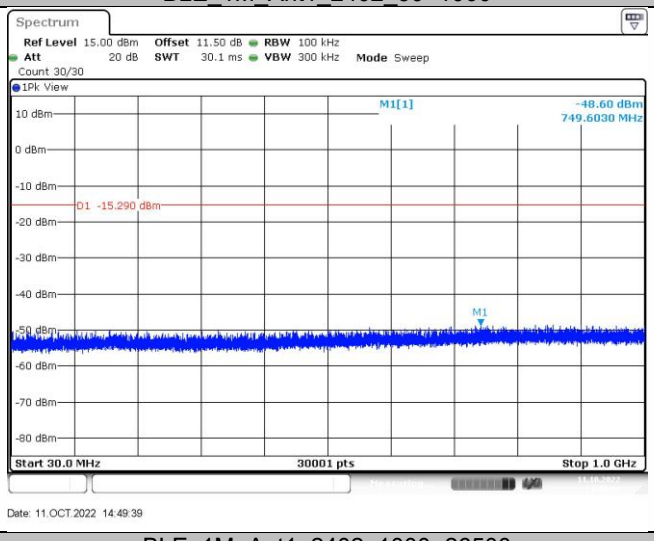



BLE_2M_Ant1_High_2480

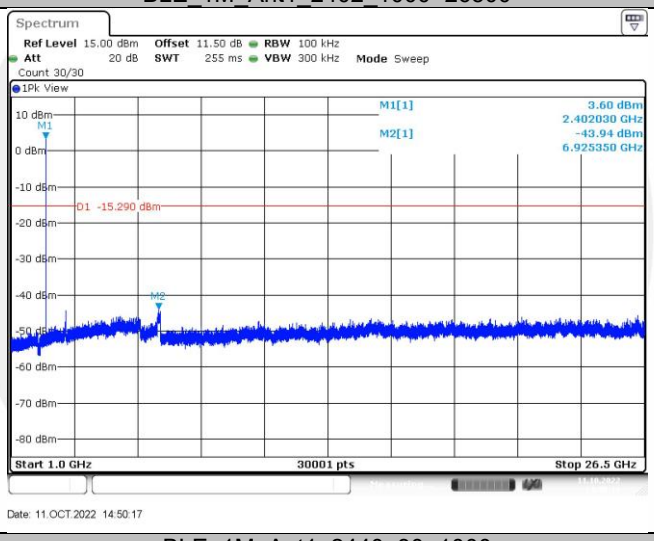

Spectrum
Ref Level 20.00 dBm Offset 11.50 dB RBW 100 kHz
Att 30 dB SWT 1.1 ms VBW 300 kHz Mode Sweep
Count 10/10
1Pk View
M2[1] -41.11 dBm
2.483500 GHz
M3[1] -40.99 dBm
2.500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -16.700 dBm
M2
M3
M4
Start 2.47 GHz
691 pts
Stop 2.55 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M2 1 2.4835 GHz -41.11 dBm
M3 1 2.5 GHz -40.99 dBm
M4 1 2.543623 GHz -38.43 dBm
Date: 11.OCT.2022 15:03:41

**Conducted Spurious Emission**

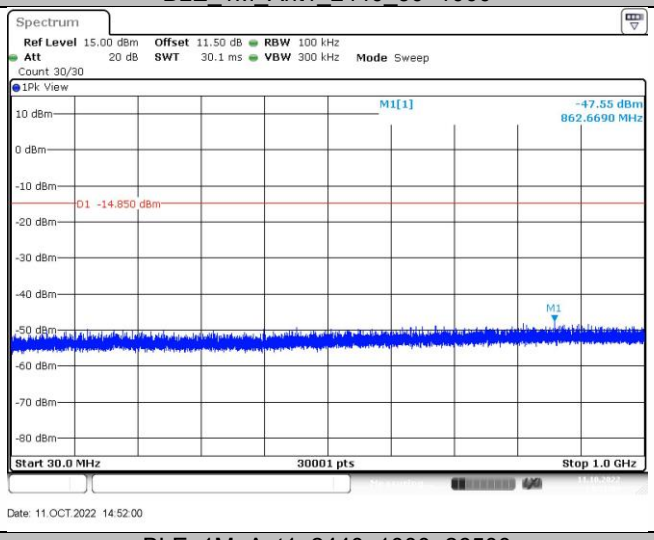
BLE_1M_Ant1_2402_30~1000



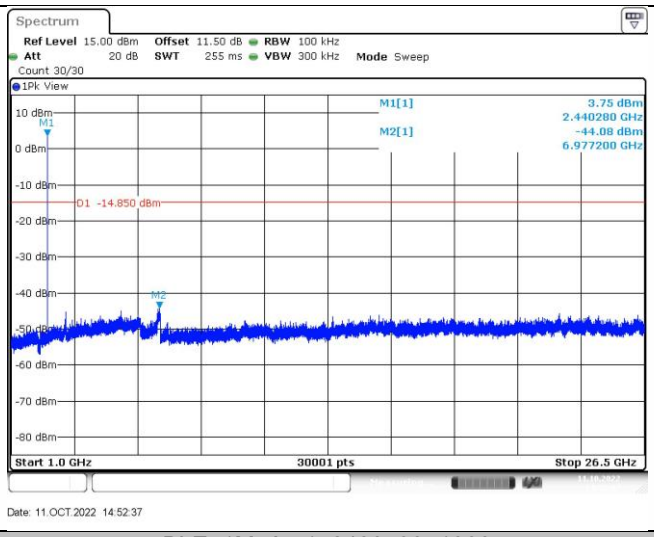

BLE_1M_Ant1_2402_1000~26500



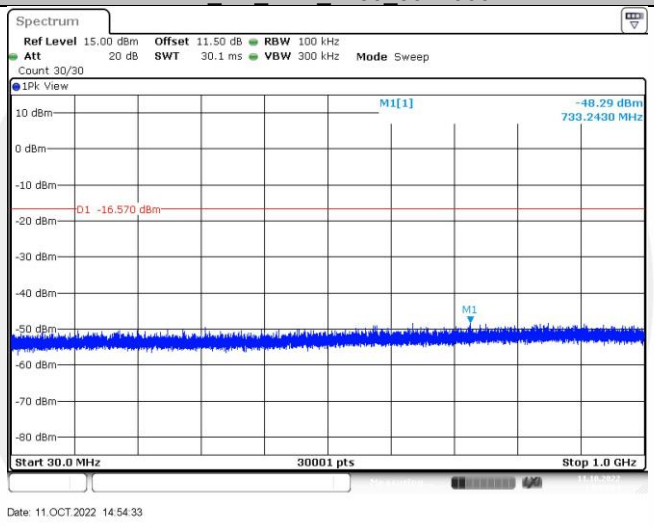

BLE_1M_Ant1_2440_30~1000



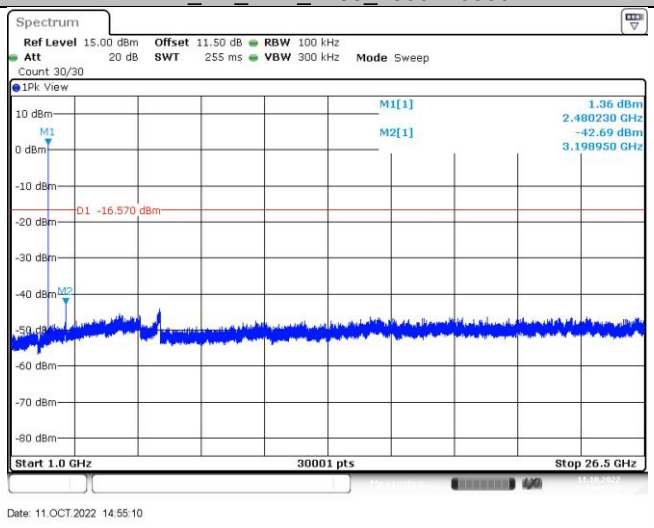

BLE_1M_Ant1_2440_1000~26500



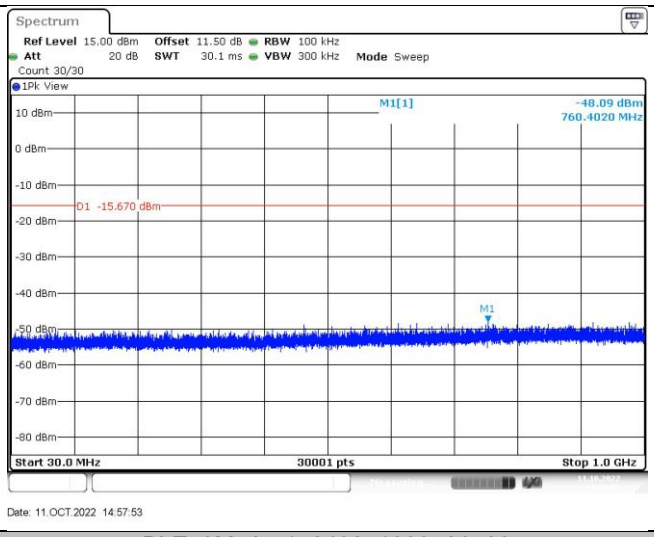

BLE_1M_Ant1_2480_30~1000



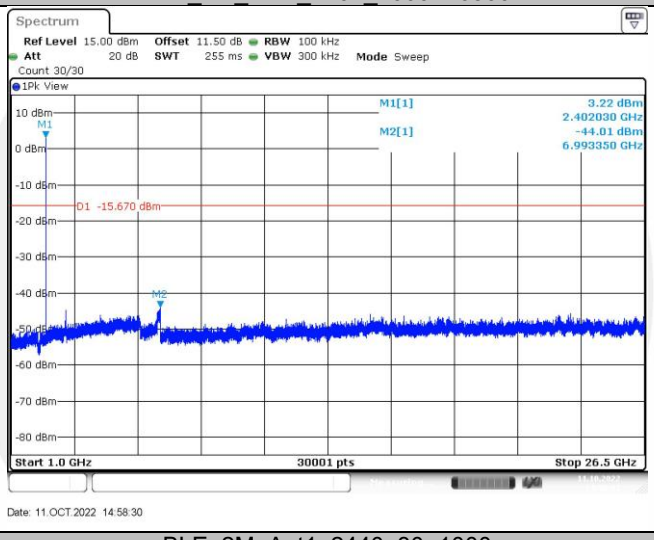

BLE_1M_Ant1_2480_1000~26500



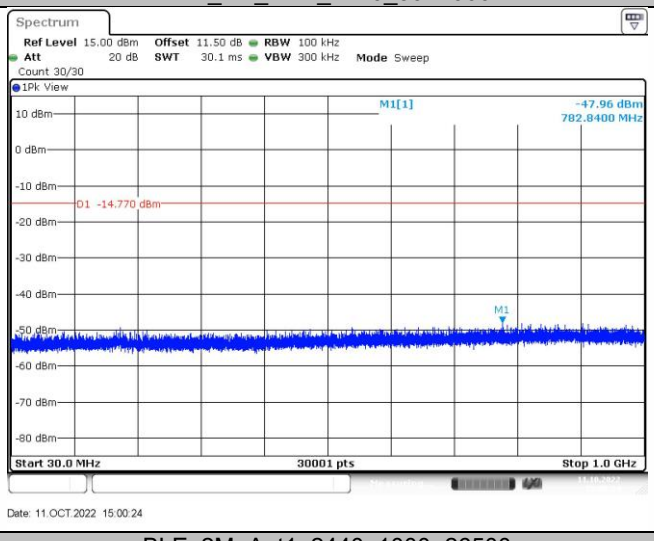

BLE_2M_Ant1_2402_30~1000



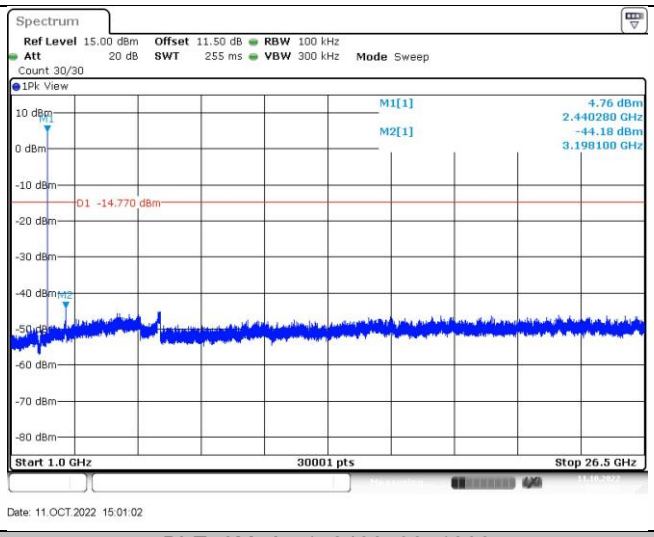

BLE_2M_Ant1_2402_1000~26500



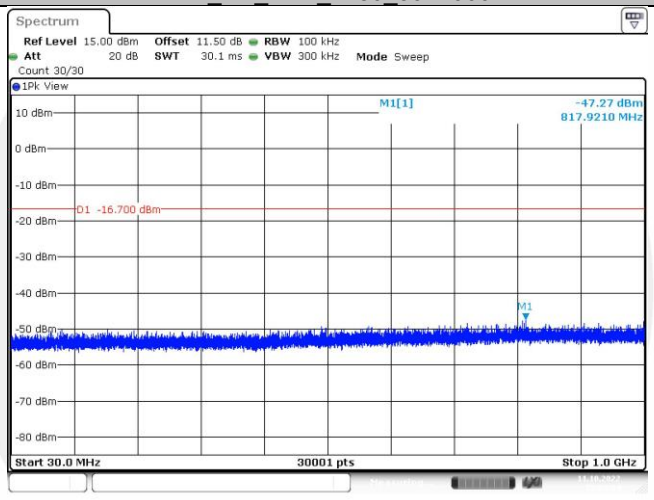

BLE_2M_Ant1_2440_30~1000



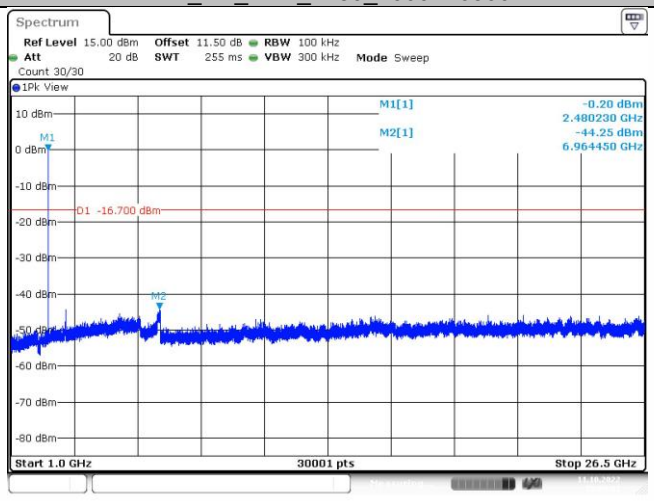

BLE_2M_Ant1_2440_1000~26500




BLE_2M_Ant1_2480_30~1000




BLE_2M_Ant1_2480_1000~26500



## 8.7 RADIATED SPURIOUS EMISSION

### 8.7.1 Applicable Standard

According to FCC Part 15.247(d), 15.205, 15.209
According to RSS-Gen and RSS-247
According to 558074 D01 15.247 Meas Guidance v05r02 Section 8.6
According to ANSI C63.10 Section 11.12

### 8.7.2 Conformance Limit

According to FCC Part 15.247(d): 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)).
According to FCC Part15.205, Restricted bands

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 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 | 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 | Above 38.6 |
| 13.36-13.41 | | | |

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

| Restricted Frequency(MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Measurement Distance |
|---|---|---|---|
| 0.009-0.490 | 2400/F(KHz) | 20 log (uV/m) | 300 |
| 0.490-1.705 | 24000/F(KHz) | 20 log (uV/m) | 30 |
| 1.705-30 | 30 | 29.5 | 30 |
| 30-88 | 100 | 40 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

### 8.7.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

### 8.7.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:
For Above 1GHz:
The EUT was placed on a turn table which is 1.5m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For average measurements the resolution bandwidth of spectrum analyzer is 1 MHz with the video bandwidth is ≥ 1/T with peak detector.
For Below 1GHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 100 kHz for
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 30MHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 9kHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
For Below 150KHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured
RBW = 200Hz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit. Submit this data.

### 8.7.5 Test Results

| | |
|---|---|
| Temperature: | 25 ˚C |
| Relative Humidity: | 54% |
| ATM Pressure: | 1011 mbar |
| Test Engineer: | XXH |

■ Spurious Emission below 30MHz (9KHz to 30MHz)

For Spurious Emission below 30MHz (9KHz to 30MHz), was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

■ Spurious Emission Above 1GHz (1GHz to 25GHz)

Bluetooth (BLE_1M, BLE_2M) mode have been tested, and the worst result was report as below:

| Test mode: | BLE_1M | Frequency: | Channel 0: 2402MHz |
|---|---|---|---|

| Freq. (MHz) | Ant.Pol. | Reading Level (dBuV/m) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit 3m (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 5046.000 | V | 48.59 | -4.70 | 43.89 | 74.00 | -30.11 | Peak |
| 5046.000 | V | 30.14 | -4.70 | 25.44 | 54.00 | -28.56 | Avg |
| 10928.00 | V | 47.47 | 10.63 | 58.10 | 74.00 | -15.90 | Peak |
| 10928.00 | V | 29.47 | 10.63 | 40.10 | 54.00 | -13.90 | Avg |
| 17966.00 | V | 48.76 | 14.22 | 62.98 | 74.00 | -11.02 | Peak |
| 17966.00 | V | 30.77 | 14.22 | 44.99 | 54.00 | -9.01 | Avg |
| 3992.000 | H | 54.88 | -6.71 | 48.17 | 74.00 | -25.83 | Peak |
| 3992.000 | H | 38.82 | -6.71 | 32.11 | 54.00 | -21.89 | Avg |
| 10962.00 | H | 50.18 | 10.74 | 60.92 | 74.00 | -13.08 | Peak |
| 10962.00 | H | 31.81 | 10.74 | 42.55 | 54.00 | -11.45 | Avg |
| 17966.00 | H | 49.61 | 14.22 | 63.83 | 74.00 | -10.17 | Peak |
| 17966.00 | H | 31.11 | 14.22 | 45.33 | 54.00 | -8.67 | Avg |

Note:
(1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = $1/T_{on}$, Detector = Peak, where: $T_{on}$ is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

| Test mode: | BLE_1M | Frequency: | Channel 19: 2440MHz |
|---|---|---|---|

| Freq. (MHz) | Ant.Pol. | Reading Level (dBuV/m) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit 3m (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 6627.000 | V | 51.17 | -1.07 | 50.10 | 74.00 | -23.90 | Peak |
| 6627.000 | V | 33.18 | -1.07 | 32.11 | 54.00 | -21.89 | Avg |
| 10979.00 | V | 49.70 | 10.93 | 60.63 | 74.00 | -13.37 | Peak |
| 10979.00 | V | 31.51 | 10.93 | 42.44 | 54.00 | -11.56 | Avg |
| 17949.00 | V | 49.76 | 14.03 | 63.79 | 74.00 | -10.21 | Peak |
| 17949 | V | 31.41 | 14.03 | 45.44 | 54.00 | -8.56 | Avg |
| 3992.000 | H | 55.23 | -6.71 | 48.52 | 74.00 | -25.48 | Avg |
| 3992.000 | H | 36.93 | -6.71 | 30.22 | 54.00 | -23.78 | Peak |
| 11370.00 | H | 52.39 | 9.80 | 62.19 | 74.00 | -11.81 | Avg |
| 11370.00 | H | 34.40 | 9.80 | 44.20 | 54.00 | -9.80 | Peak |
| 18000.00 | H | 50.07 | 14.59 | 64.66 | 74.00 | -9.34 | Avg |
| 18000 | H | 31.63 | 14.59 | 46.22 | 54.00 | -7.78 | Peak |

Note:
(1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = $1/T_{on}$, Detector = Peak, where: $T_{on}$ is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

| Test mode: | BLE_1M | Frequency: | Channel 39: 2480MHz |
|---|---|---|---|

| Freq. (MHz) | Ant.Pol. | Reading Level (dBuV/m) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit 3m (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 8191.000 | V | 50.65 | 3.21 | 53.86 | 74.00 | -20.14 | Peak |
| 8191.000 | V | 32.23 | 3.21 | 35.44 | 54.00 | -18.56 | Avg |
| 10860.00 | V | 50.47 | 10.26 | 60.73 | 74.00 | -13.27 | Peak |
| 10860.00 | V | 31.85 | 10.26 | 42.11 | 54.00 | -11.89 | Avg |
| 18000.00 | V | 49.84 | 14.59 | 64.43 | 74.00 | -9.57 | Peak |
| 18000.00 | V | 31.63 | 14.59 | 46.22 | 54.00 | -7.78 | Avg |
| 3992.000 | H | 56.72 | -6.71 | 50.01 | 74.00 | -23.99 | Peak |
| 3992.000 | H | 38.82 | -6.71 | 32.11 | 54.00 | -21.89 | Avg |
| 10962.00 | H | 50.45 | 10.74 | 61.19 | 74.00 | -12.81 | Peak |
| 10962.00 | H | 33.46 | 10.74 | 44.20 | 54.00 | -9.80 | Avg |
| 18000.00 | H | 49.67 | 14.59 | 64.26 | 74.00 | -9.74 | Peak |
| 18000.00 | H | 31.85 | 14.59 | 46.44 | 54.00 | -7.56 | Avg |

Note:
(1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = $1/T_{on}$, Detector = Peak, where: $T_{on}$ is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz
Bluetooth (BLE_1M, BLE_2M) mode have been tested, and the worst result was report as below:

Test mode: BLE_2M Frequency: Channel 0: 2402MHz

| Freq. (MHz) | Ant.Pol. | Reading Level (dBuV/m) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit 3m (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 2341.680 | V | 20.19 | 42.28 | 62.47 | 74.00 | -11.53 | Peak |
| 2341.68 | V | 2.05 | 42.28 | 44.33 | 54.00 | -9.67 | Avg |
| 2341.040 | H | 20.30 | 42.27 | 62.57 | 74.00 | -11.43 | Peak |
| 2341.04 | H | 2.06 | 42.27 | 44.33 | 54.00 | -9.67 | Avg |

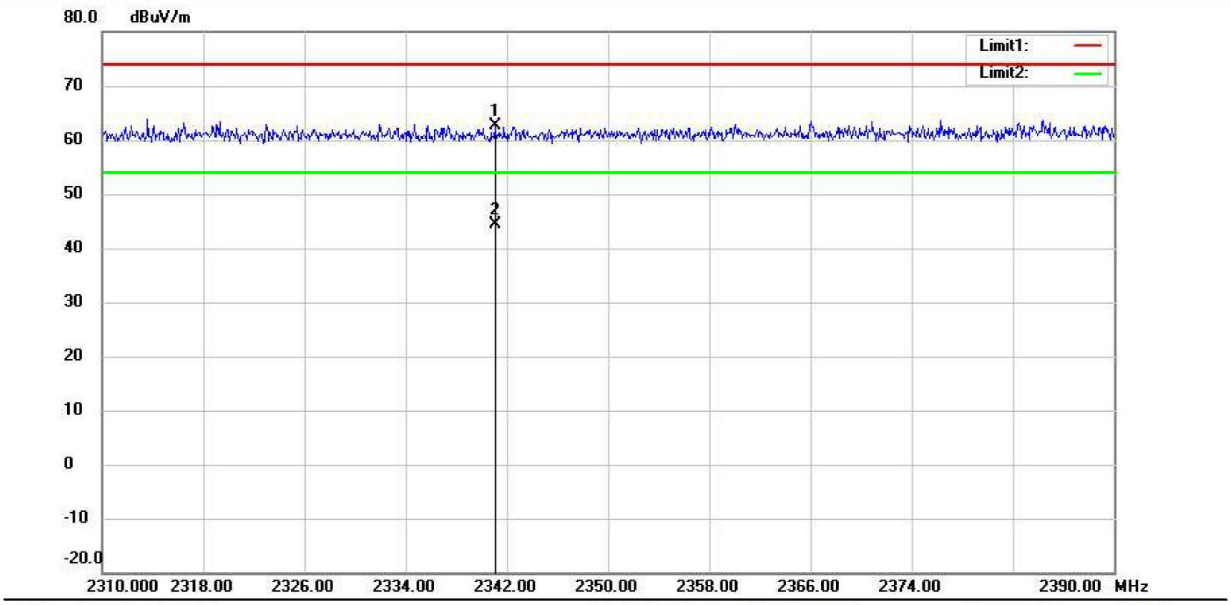
Note: (1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = 1/$T_{on}$, Detector = Peak, where: $T_{on}$ is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

Test mode: BLE_2M Frequency: Channel 39: 2480MHz

| Freq. (MHz) | Ant.Pol. | Reading Level (dBuV/m) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit 3m (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 2488.269 | V | 10.52 | 42.20 | 52.72 | 74.00 | -21.28 | Peak |
| 2488.269 | V | -7.44 | 42.20 | 34.76 | 54.00 | -19.24 | Avg |
| 2489.787 | H | 10.08 | 42.19 | 52.27 | 74.00 | -21.73 | Peak |
| 2489.787 | H | -8.08 | 42.19 | 34.11 | 54.00 | -19.89 | Avg |

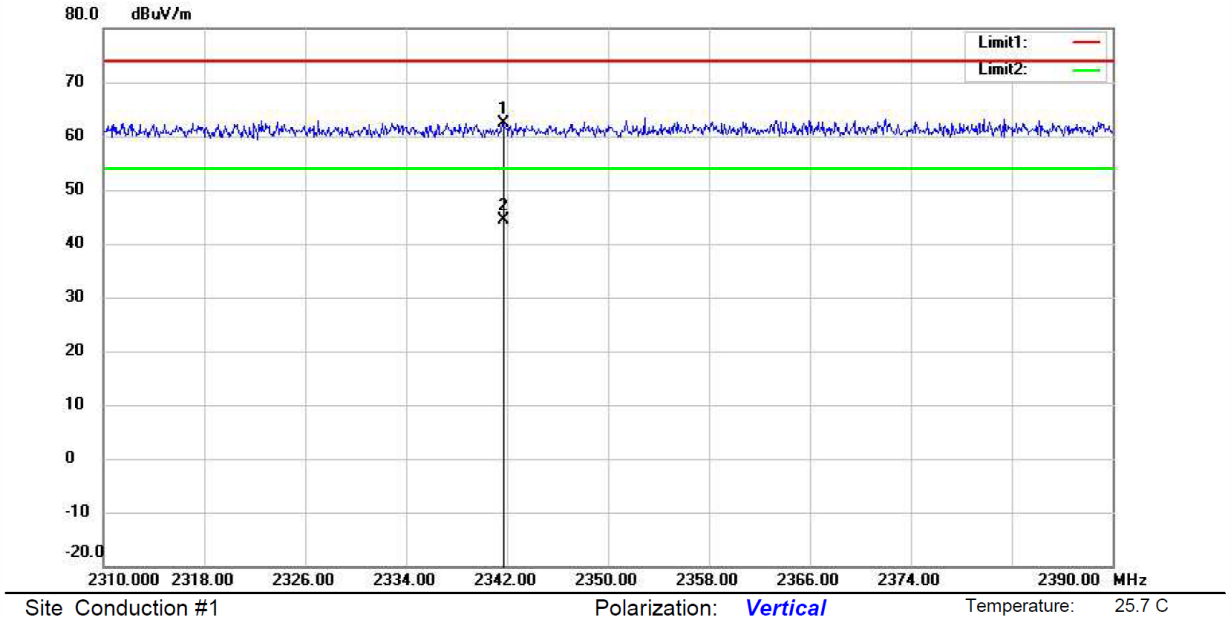
Note: (1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = 1/$T_{on}$, Detector = Peak, where: $T_{on}$ is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

| Test Model | Spurious Emission in Restricted Band 2310-2390MHz | | |
|---|---|---|---|
| | Channel 0: 2402MHz | BLE_1M | H |



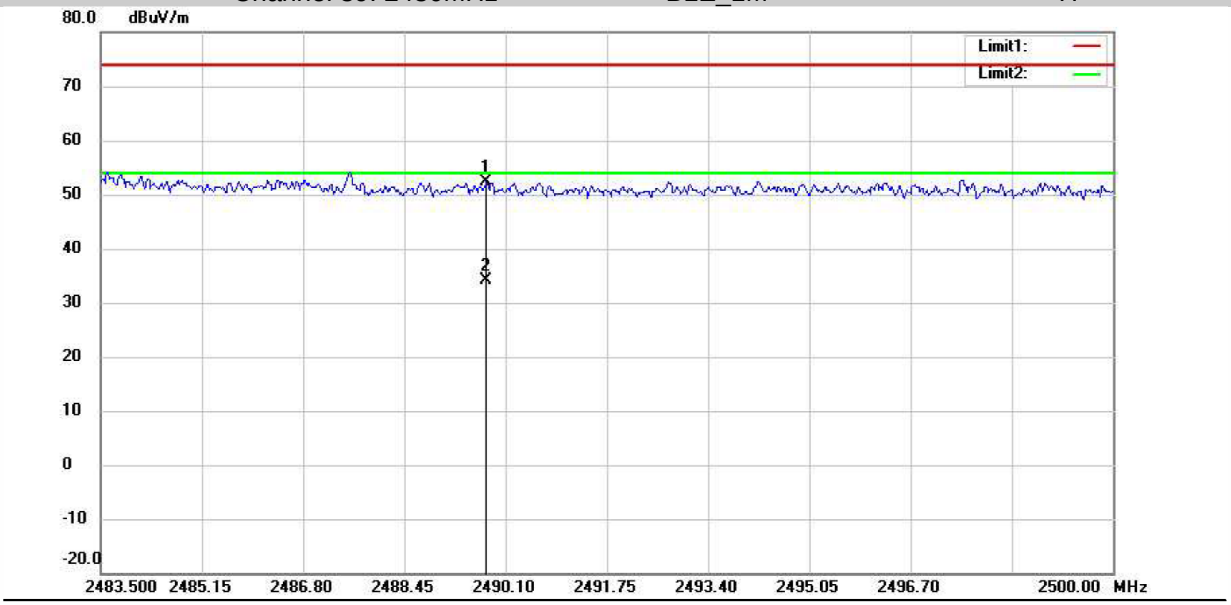

Site Conduction #1 Polarization: *Horizontal* Temperature: 25.7 C

| Test Model | Spurious Emission in Restricted Band 2310-2390MHz | | |
|---|---|---|---|
| | Channel 0: 2402MHz | BLE_1M | V |



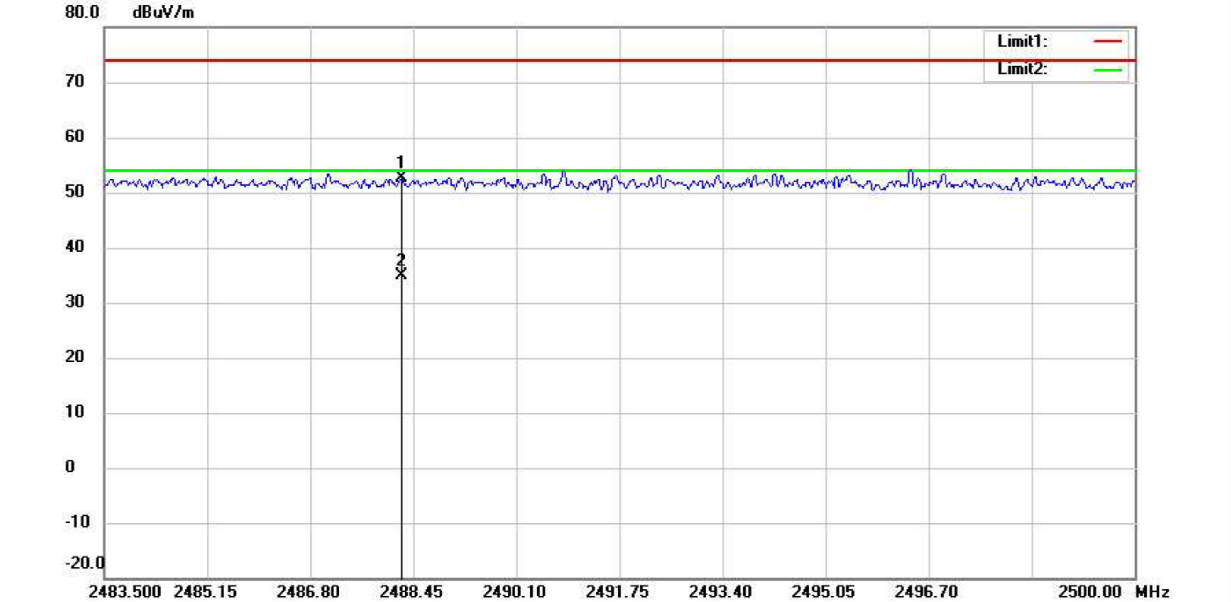

Site Conduction #1 Polarization: *Vertical* Temperature: 25.7 C

| Test Model | Spurious Emission in Restricted Band 2483.5-2500MHz | | |
|---|---|---|---|
| | Channel 39: 2480MHz | BLE_1M | H |




Site Conduction #1 Polarization: ***Horizontal*** Temperature: 25.7 C

| Test Model | Spurious Emission in Restricted Band 2483.5-2500MHz | | |
|---|---|---|---|
| | Channel 39: 2480MHz | BLE_1M | V |




Site Conduction #1 Polarization: ***Vertical*** Temperature: 25.7 C

■ Spurious Emission below 1GHz (30MHz to 1GHz)

Bluetooth (BLE_1M, BLE_2M) mode have been tested, and the worst result was report as below:


Site Conduction #1 Polarization: *Vertical* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 55 %

Mode:BLE 1M 2402

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 556.7743 | 42.35 | -6.68 | 35.67 | 46.00 | -10.33 | QP | | | |
| 2 | | 404.6665 | 40.66 | -8.61 | 32.05 | 46.00 | -13.95 | QP | | | |
| 3 | * | 195.8220 | 52.03 | -15.04 | 36.99 | 43.50 | -6.51 | QP | | | |
| 4 | | 116.1321 | 47.49 | -10.96 | 36.53 | 43.50 | -6.97 | QP | | | |
| 5 | | 81.2117 | 49.69 | -17.41 | 32.28 | 40.00 | -7.72 | QP | | | |
| 6 | | 38.7517 | 48.46 | -15.11 | 33.35 | 40.00 | -6.65 | QP | | | |

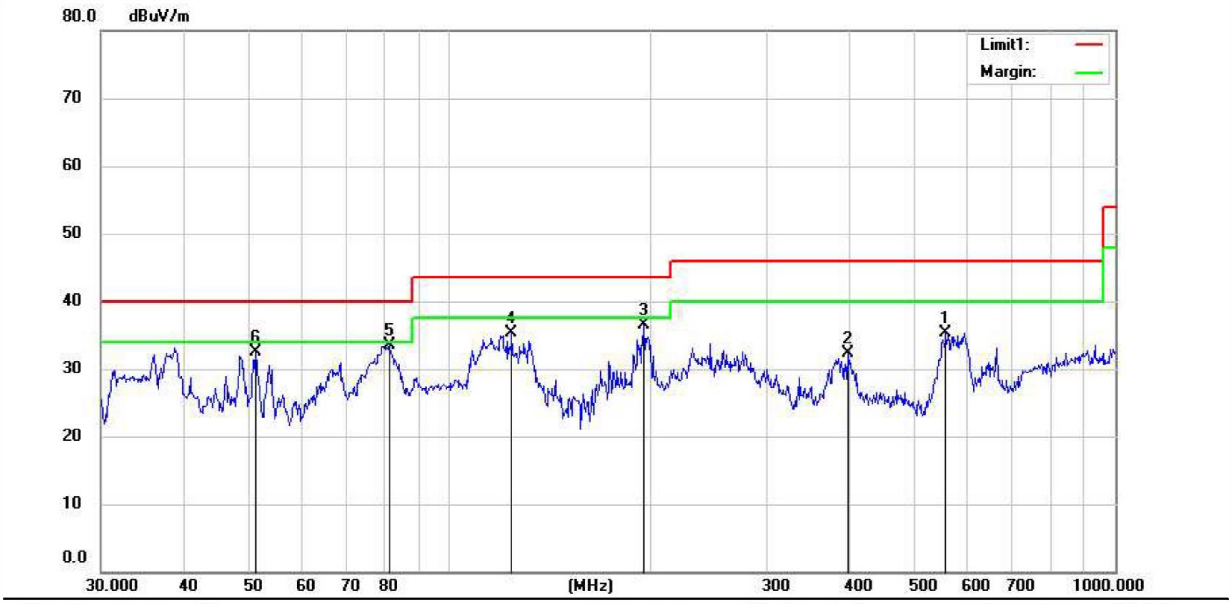

Site Conduction #1 Polarization: *Horizontal* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 55 %

Mode:BLE 1M 2402

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 572.6144 | 43.16 | -7.97 | 35.19 | 46.00 | -10.81 | QP | | | |
| 2 | | 381.2487 | 42.76 | -10.24 | 32.52 | 46.00 | -13.48 | QP | | | |
| 3 | | 195.8220 | 51.66 | -15.04 | 36.62 | 43.50 | -6.88 | QP | | | |
| 4 | | 119.8556 | 47.44 | -11.40 | 36.04 | 43.50 | -7.46 | QP | | | |
| 5 | | 81.4970 | 50.24 | -17.25 | 32.99 | 40.00 | -7.01 | QP | | | |
| 6 | * | 51.1210 | 47.70 | -14.22 | 33.48 | 40.00 | -6.52 | QP | | | |




Site Conduction #1 Polarization: *Horizontal* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 55 %

Mode:BLE 1M 2440

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 556.7744 | 42.23 | -6.95 | 35.28 | 46.00 | -10.72 | QP | | | |
| 2 | | 396.2415 | 41.67 | -9.28 | 32.39 | 46.00 | -13.61 | QP | | | |
| 3 | | 195.8220 | 51.57 | -15.04 | 36.53 | 43.50 | -6.97 | QP | | | |
| 4 | | 124.1330 | 47.09 | -11.88 | 35.21 | 43.50 | -8.29 | QP | | | |
| 5 | * | 81.2117 | 51.01 | -17.41 | 33.60 | 40.00 | -6.40 | QP | | | |
| 6 | | 51.3005 | 46.82 | -14.24 | 32.58 | 40.00 | -7.42 | QP | | | |


Site Conduction #1
Limit: (RE)FCC PART 15 CLASS B
Mode:BLE 1M 2440
Note:

Polarization: *Vertical*
Power: AC 120V/60Hz

Temperature: 25.7 C
Humidity: 55 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 556.7744 | 43.01 | -6.68 | 36.33 | 46.00 | -9.67 | QP | | | |
| 2 | | 383.9318 | 41.90 | -10.07 | 31.83 | 46.00 | -14.17 | QP | | | |
| 3 | * | 197.8928 | 51.51 | -14.90 | 36.61 | 43.50 | -6.89 | QP | | | |
| 4 | | 119.8556 | 47.42 | -11.40 | 36.02 | 43.50 | -7.48 | QP | | | |
| 5 | | 79.5210 | 50.87 | -18.09 | 32.78 | 40.00 | -7.22 | QP | | | |
| 6 | | 38.7518 | 48.12 | -15.11 | 33.01 | 40.00 | -6.99 | QP | | | |

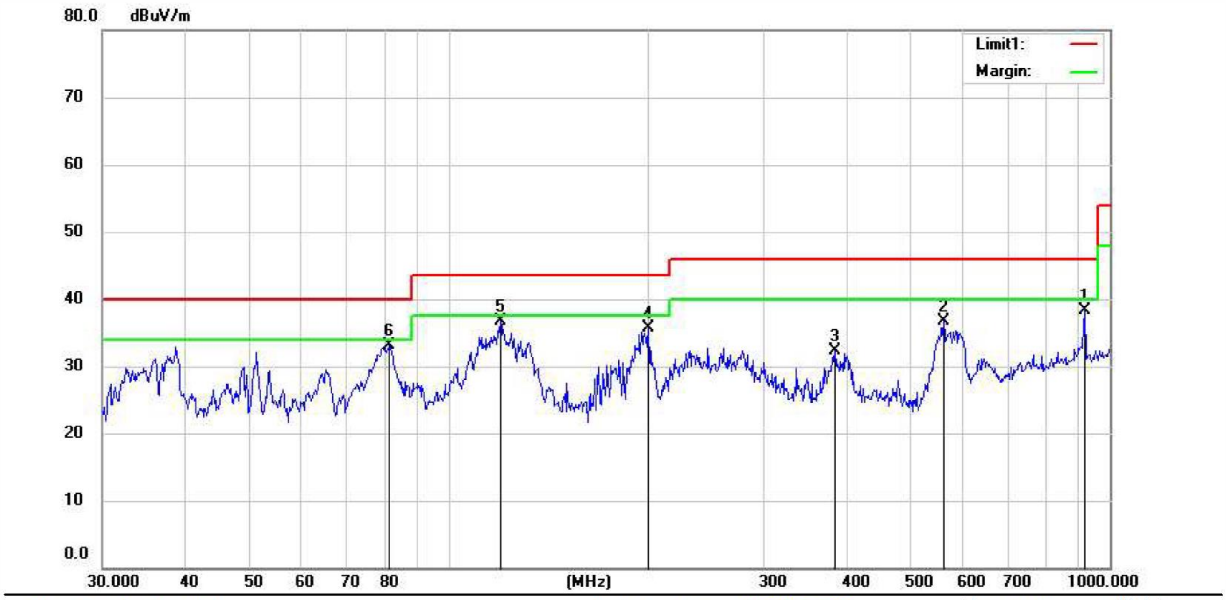

Site Conduction #1 Polarization: *Vertical* Temperature: 25.7 C

Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 55 %

Mode:BLE 1M 2480

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 593.0497 | 42.51 | -6.46 | 36.05 | 46.00 | -9.95 | QP | | | |
| 2 | | 195.8220 | 51.01 | -15.04 | 35.97 | 43.50 | -7.53 | QP | | | |
| 3 | | 120.2766 | 47.20 | -11.44 | 35.76 | 43.50 | -7.74 | QP | | | |
| 4 | * | 80.6442 | 50.61 | -17.73 | 32.88 | 40.00 | -7.12 | QP | | | |
| 5 | | 48.5016 | 46.08 | -14.39 | 31.69 | 40.00 | -8.31 | QP | | | |
| 6 | | 38.8878 | 47.87 | -15.10 | 32.77 | 40.00 | -7.23 | QP | | | |




Site Conduction #1
Limit: (RE)FCC PART 15 CLASS B
Mode:BLE 1M 2480
Note:

Polarization: *Horizontal*
Power: AC 120V/60Hz

Temperature: 25.7 C
Humidity: 55 %

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | | 916.0687 | 39.57 | -1.36 | 38.21 | 46.00 | -7.79 | QP | | | |
| 2 | | 560.6928 | 43.66 | -7.01 | 36.65 | 46.00 | -9.35 | QP | | | |
| 3 | | 383.9318 | 42.34 | -10.07 | 32.27 | 46.00 | -13.73 | QP | | | |
| 4 | | 200.6881 | 50.42 | -14.71 | 35.71 | 43.50 | -7.79 | QP | | | |
| 5 | * | 119.8556 | 48.20 | -11.40 | 36.80 | 43.50 | -6.70 | QP | | | |
| 6 | | 81.2117 | 50.57 | -17.41 | 33.16 | 40.00 | -6.84 | QP | | | |

## 8.8 CONDUCTED EMISSIONS TEST

### 8.8.1 Applicable Standard

According to FCC Part 15.207(a)
According to IC RSS-Gen 8.8

### 8.8.2 Conformance Limit

| Conducted Emission Limit | | |
|---|---|---|
| Frequency(MHz) | Quasi-peak | Average |
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

Note: 1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 8.8.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

### 8.8.4 Test Procedure

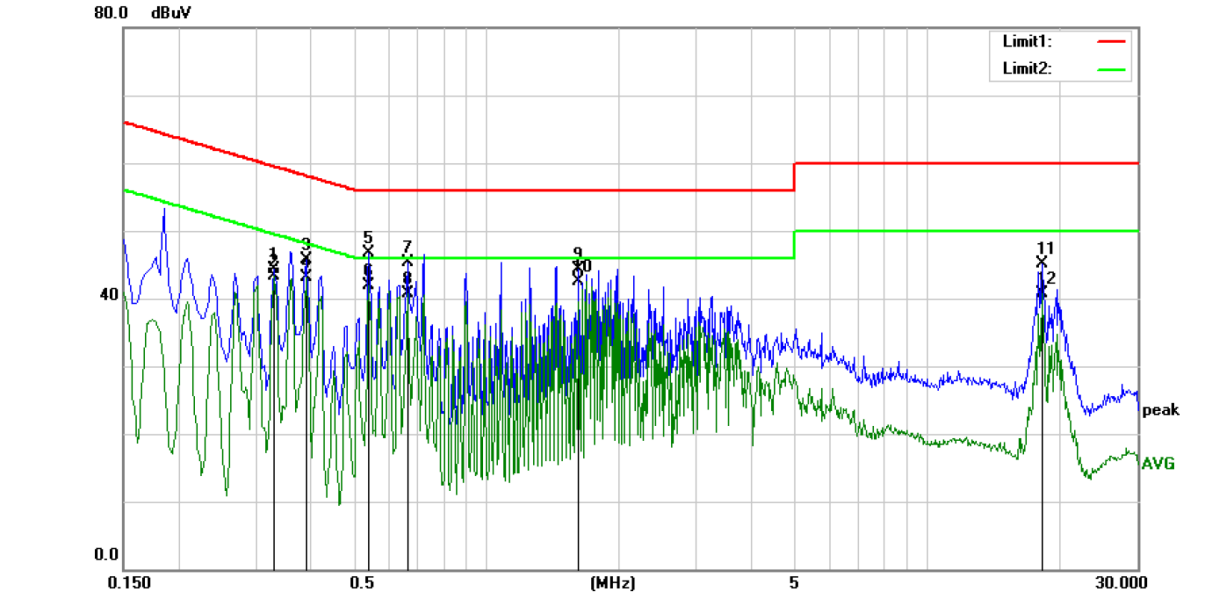
The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

### 8.8.5 Test Results

Pass

The AC120V &240V voltage have been tested, and the worst result recorded was report as below:

## Power supply model 1



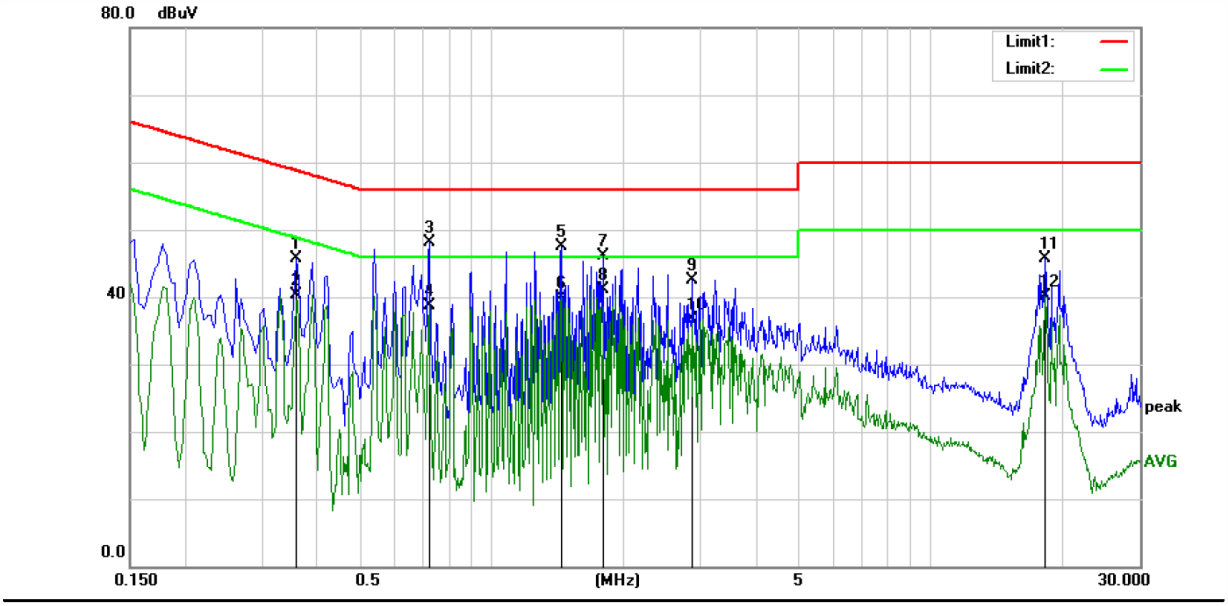

Site Conduction #2 Phase: *L1* Temperature: 25.1

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 45 %

Mode: bt mode

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.3300 | 34.19 | 10.09 | 44.28 | 59.45 | -15.17 | QP | |
| 2 | | 0.3300 | 33.30 | 10.09 | 43.39 | 49.45 | -6.06 | AVG | |
| 3 | | 0.3900 | 35.57 | 10.10 | 45.67 | 58.06 | -12.39 | QP | |
| 4 | | 0.3900 | 32.93 | 10.10 | 43.03 | 48.06 | -5.03 | AVG | |
| 5 | | 0.5420 | 36.67 | 10.11 | 46.78 | 56.00 | -9.22 | QP | |
| 6 | | 0.5420 | 31.83 | 10.11 | 41.94 | 46.00 | -4.06 | AVG | |
| 7 | | 0.6620 | 35.18 | 10.13 | 45.31 | 56.00 | -10.69 | QP | |
| 8 | | 0.6620 | 30.52 | 10.13 | 40.65 | 46.00 | -5.35 | AVG | |
| 9 | | 1.6220 | 34.21 | 10.14 | 44.35 | 56.00 | -11.65 | QP | |
| 10 | * | 1.6220 | 32.42 | 10.14 | 42.56 | 46.00 | -3.44 | AVG | |
| 11 | | 18.2460 | 34.66 | 10.42 | 45.08 | 60.00 | -14.92 | QP | |
| 12 | | 18.2460 | 30.33 | 10.42 | 40.75 | 50.00 | -9.25 | AVG | |




Site Conduction #2 Phase: *N* Temperature: 25.1

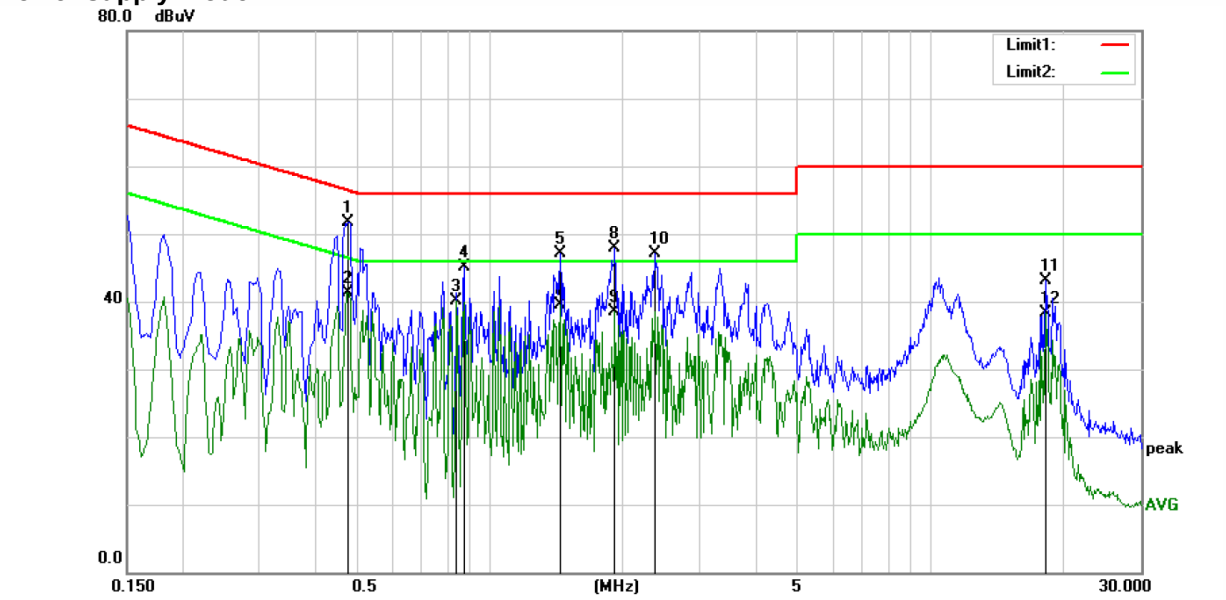
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 45 %

Mode: bt mode

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.3574 | 35.55 | 10.10 | 45.65 | 58.79 | -13.14 | QP | |
| 2 | | 0.3574 | 30.27 | 10.10 | 40.37 | 48.79 | -8.42 | AVG | |
| 3 | | 0.7197 | 38.06 | 10.14 | 48.20 | 56.00 | -7.80 | QP | |
| 4 | | 0.7197 | 28.62 | 10.14 | 38.76 | 46.00 | -7.24 | AVG | |
| 5 | | 1.4408 | 37.33 | 10.14 | 47.47 | 56.00 | -8.53 | QP | |
| 6 | | 1.4408 | 29.72 | 10.14 | 39.86 | 46.00 | -6.14 | AVG | |
| 7 | | 1.7903 | 35.90 | 10.13 | 46.03 | 56.00 | -9.97 | QP | |
| 8 | * | 1.7903 | 30.94 | 10.13 | 41.07 | 46.00 | -4.93 | AVG | |
| 9 | | 2.8692 | 32.45 | 10.15 | 42.60 | 56.00 | -13.40 | QP | |
| 10 | | 2.8692 | 26.47 | 10.15 | 36.62 | 46.00 | -9.38 | AVG | |
| 11 | | 18.2314 | 35.23 | 10.42 | 45.65 | 60.00 | -14.35 | QP | |
| 12 | | 18.2314 | 29.67 | 10.42 | 40.09 | 50.00 | -9.91 | AVG | |

## Power supply model 2



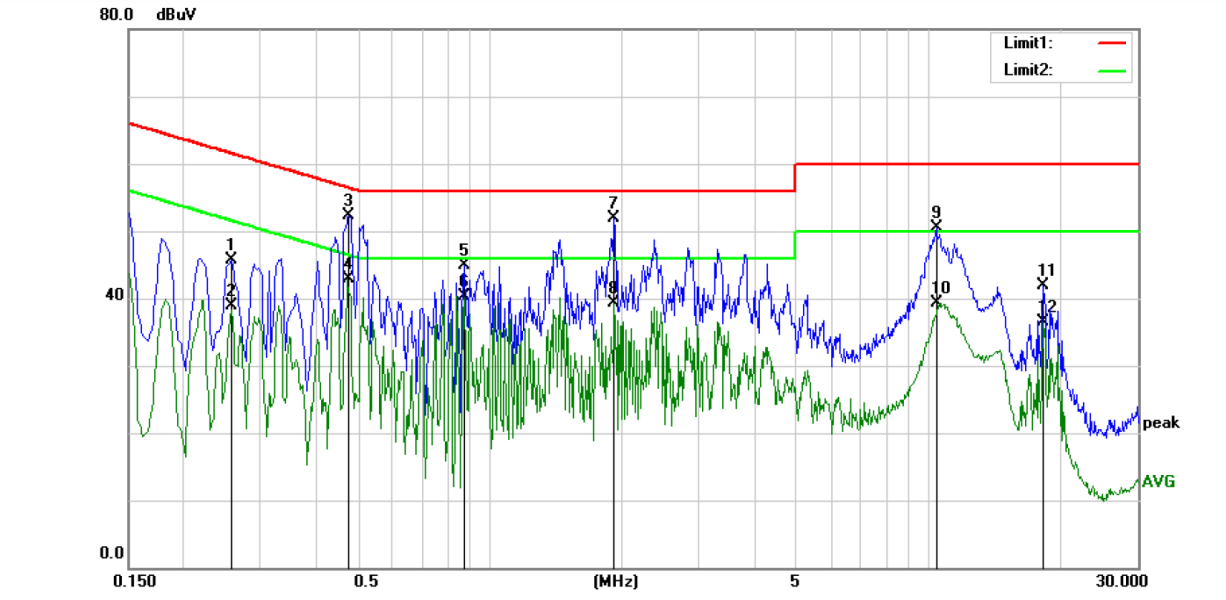

Site Conduction #2 Phase: N Temperature: 25.1

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 45 %

Mode: bt mode

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | * | 0.4780 | 41.65 | 10.10 | 51.75 | 56.37 | -4.62 | peak | |
| 2 | | 0.4780 | 31.20 | 10.10 | 41.30 | 46.37 | -5.07 | AVG | |
| 3 | | 0.8420 | 30.01 | 10.16 | 40.17 | 46.00 | -5.83 | AVG | |
| 4 | | 0.8740 | 35.02 | 10.16 | 45.18 | 56.00 | -10.82 | peak | |
| 5 | | 1.4420 | 36.90 | 10.14 | 47.04 | 56.00 | -8.96 | peak | |
| 6 | | 1.4420 | 29.42 | 10.14 | 39.56 | 46.00 | -6.44 | AVG | |
| 7 | | 1.4420 | 29.42 | 10.14 | 39.56 | 46.00 | -6.44 | AVG | |
| 8 | | 1.9220 | 37.87 | 10.12 | 47.99 | 56.00 | -8.01 | peak | |
| 9 | | 1.9220 | 28.29 | 10.12 | 38.41 | 46.00 | -7.59 | AVG | |
| 10 | | 2.3700 | 36.96 | 10.12 | 47.08 | 56.00 | -8.92 | peak | |
| 11 | | 18.2460 | 32.67 | 10.42 | 43.09 | 60.00 | -16.91 | peak | |
| 12 | | 18.2460 | 27.93 | 10.42 | 38.35 | 50.00 | -11.65 | AVG | |




Site Conduction #2 Phase: *L1* Temperature: 25.1

Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 45 %

Mode: bt mode

Note:

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.2580 | 35.57 | 10.10 | 45.67 | 61.50 | -15.83 | QP | |
| 2 | | 0.2580 | 28.79 | 10.10 | 38.89 | 51.50 | -12.61 | AVG | |
| 3 | | 0.4761 | 42.22 | 10.10 | 52.32 | 56.41 | -4.09 | QP | |
| 4 | * | 0.4761 | 32.80 | 10.10 | 42.90 | 46.41 | -3.51 | AVG | |
| 5 | | 0.8740 | 34.68 | 10.16 | 44.84 | 56.00 | -11.16 | QP | |
| 6 | | 0.8740 | 30.18 | 10.16 | 40.34 | 46.00 | -5.66 | AVG | |
| 7 | | 1.9260 | 41.87 | 10.12 | 51.99 | 56.00 | -4.01 | QP | |
| 8 | | 1.9260 | 29.23 | 10.12 | 39.35 | 46.00 | -6.65 | AVG | |
| 9 | | 10.4380 | 40.12 | 10.44 | 50.56 | 60.00 | -9.44 | QP | |
| 10 | | 10.4380 | 28.92 | 10.44 | 39.36 | 50.00 | -10.64 | AVG | |
| 11 | | 18.2460 | 31.40 | 10.42 | 41.82 | 60.00 | -18.18 | QP | |
| 12 | | 18.2460 | 26.18 | 10.42 | 36.60 | 50.00 | -13.40 | AVG | |

## 8.9 ANTENNA APPLICATION

### 8.9.1 Antenna Requirement

| Standard | Requirement |
|---|---|
| FCC CRF 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. |
| FCC 47 CFR Part 15.247 (b) | If transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. |
| RSS-Gen Section 6.8 | The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. |
| RSS-247 Section 5.4 | If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain. |

### 8.9.2 Result

PASS.

Note: ☑ Antenna use a permanently attached antenna which is not replaceable.
☐ Not using a standard antenna jack or electrical connector for antenna replacement
☐ The antenna has to be professionally installed (please provide method of installation)

Please refer to the attached document Internal Photos to show the antenna connector.

--------- END OF REPORT --------