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

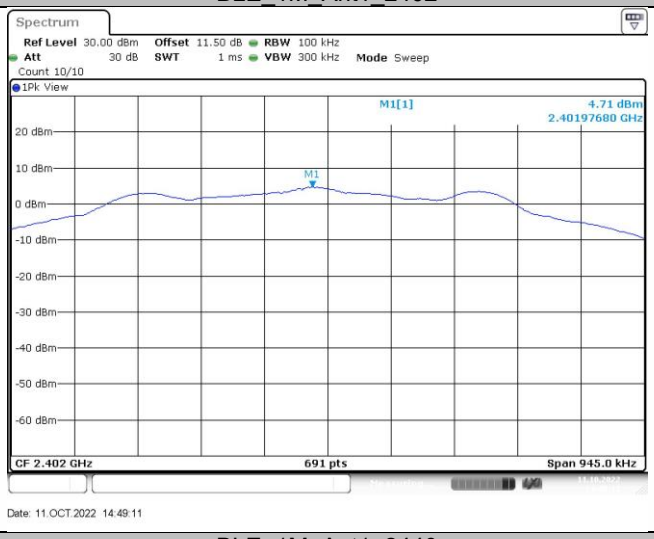
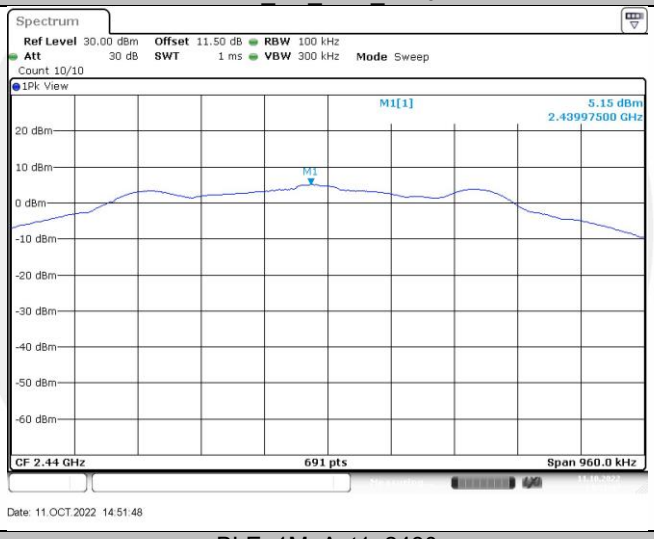
Band edge measurements

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

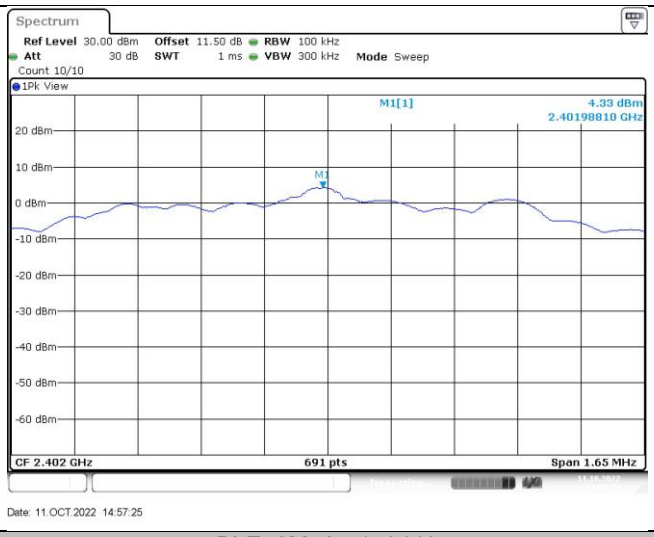
Conducted Spurious Emission

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

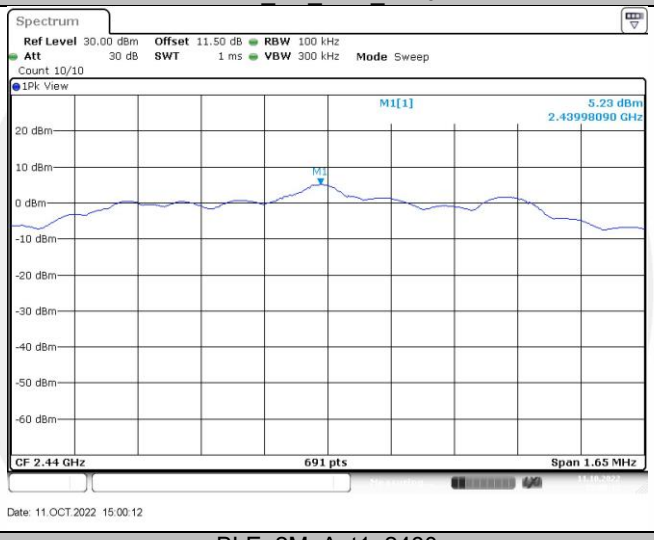
Reference level measurement

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

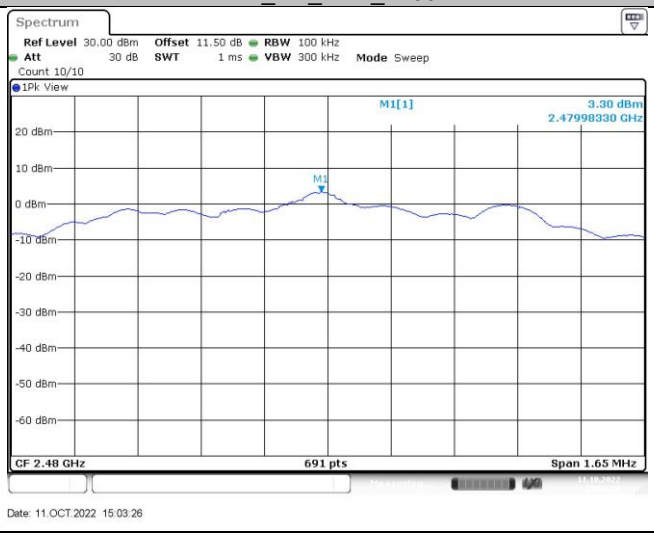
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440

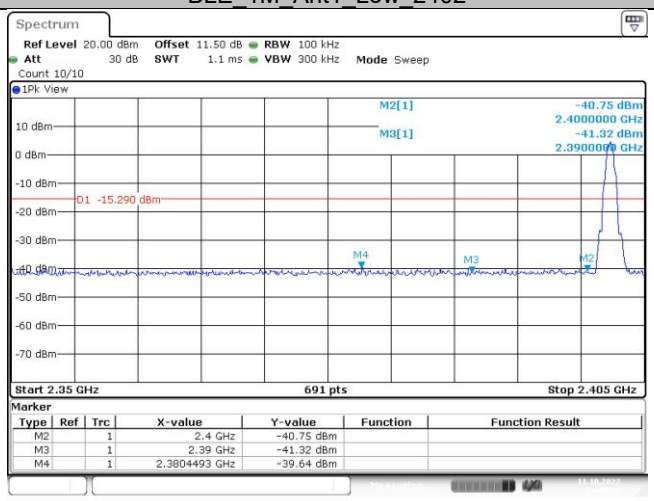


BLE_2M_Ant1_2480

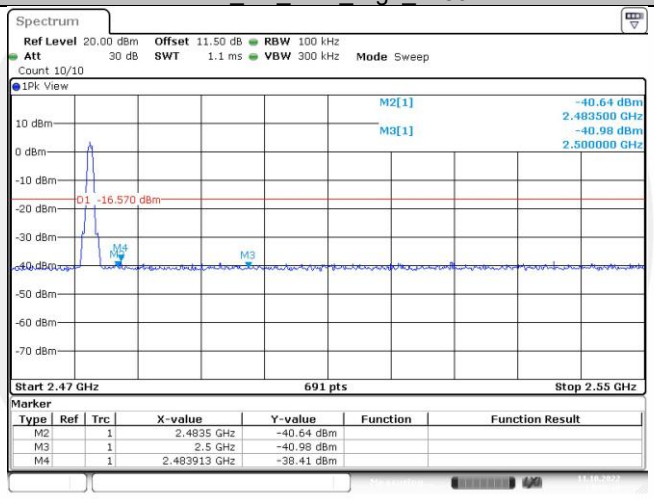


Band edge measurements

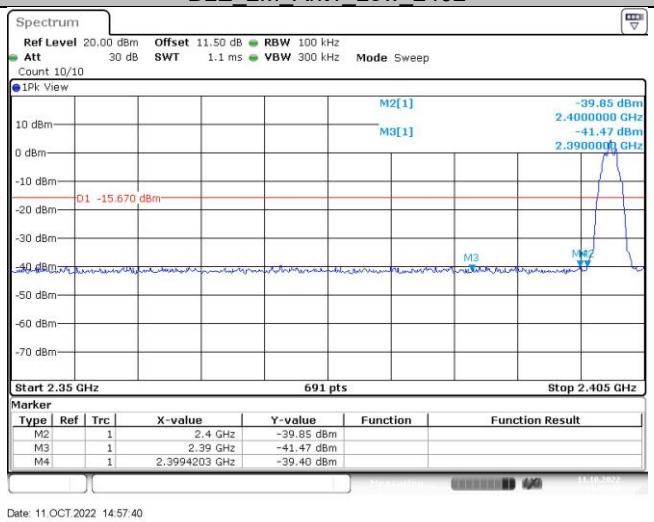
BLE_1M_Ant1_Low_2402



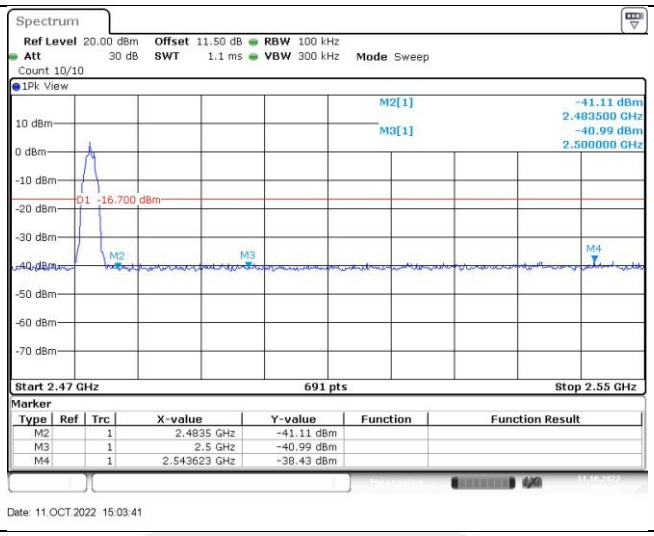
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402

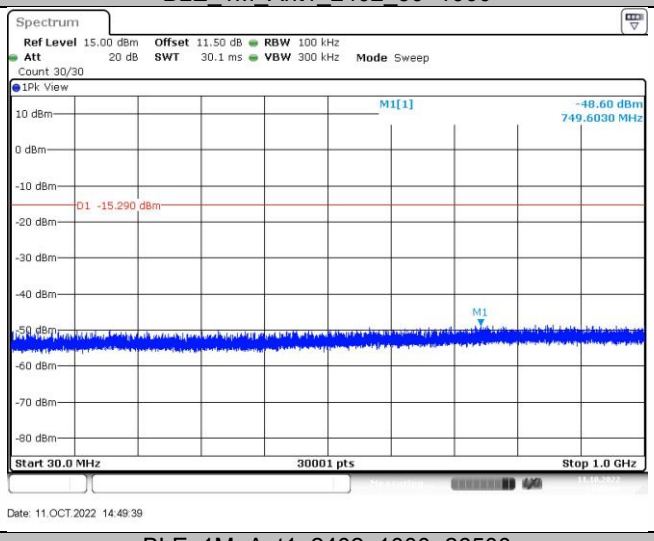


BLE_2M_Ant1_High_2480

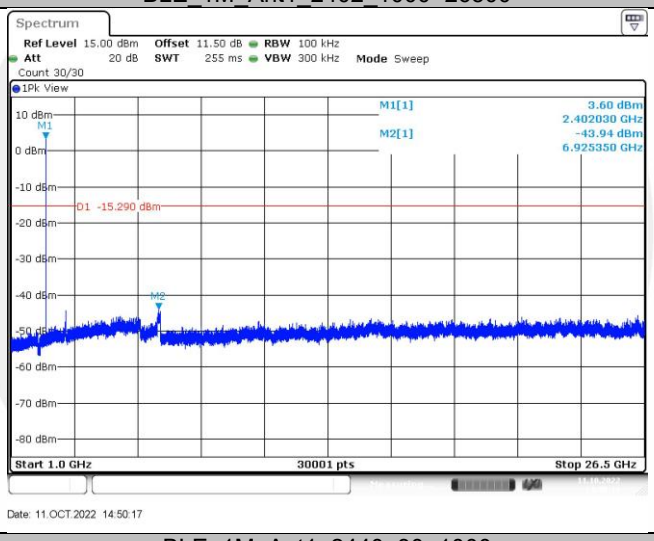

Spectrum
Ref Level 20.00 dBm Offset 11.50 dB RBW 100 kHz
Att 30 dB SWT 1.1 ms VBW 300 kHz Mode Sweep
Count 10/10
1Pk View
M2[1] -41.11 dBm
2.483500 GHz
M3[1] -40.99 dBm
2.500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1 -16.700 dBm
M2
M3
M4
Start 2.47 GHz
691 pts
Stop 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

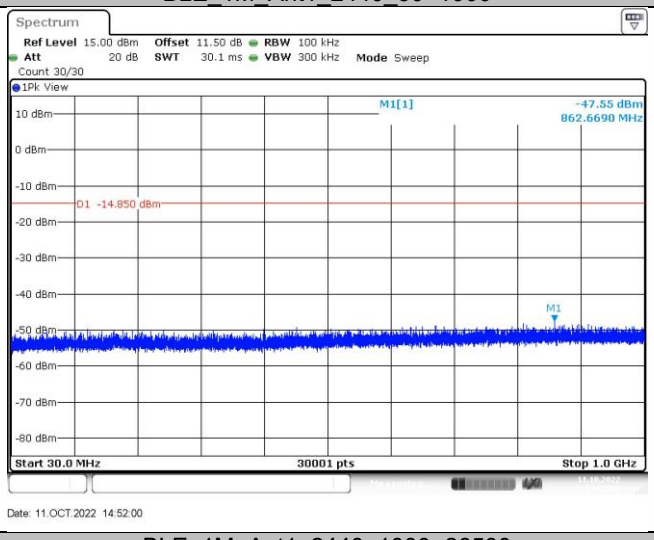
BLE_1M_Ant1_2402_30~1000



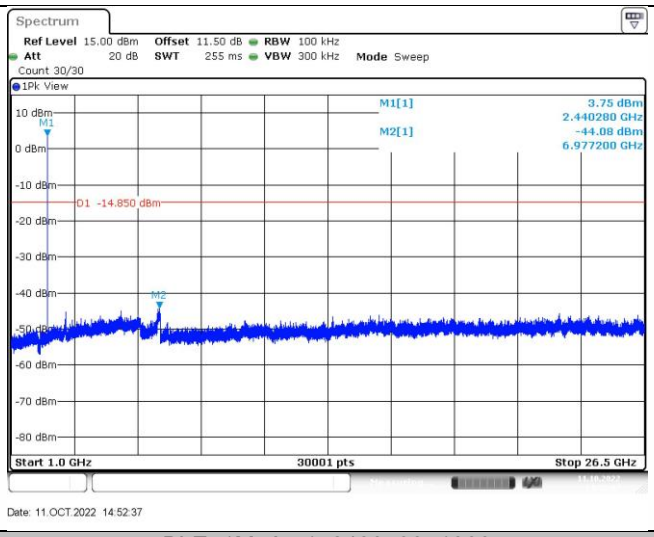
BLE_1M_Ant1_2402_1000~26500



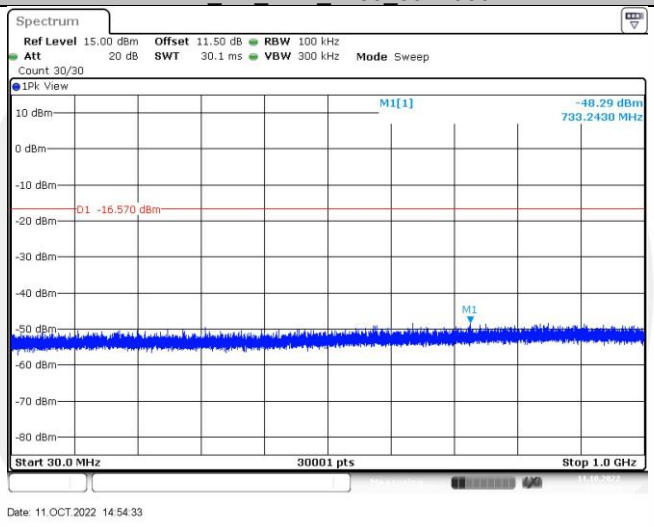
BLE_1M_Ant1_2440_30~1000



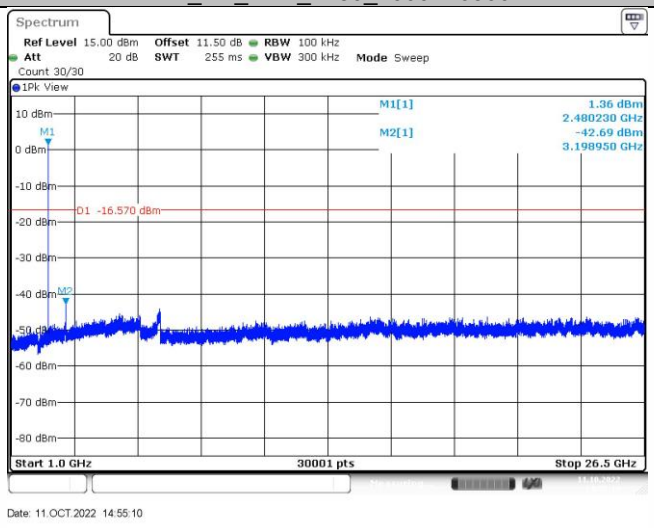
BLE_1M_Ant1_2440_1000~26500



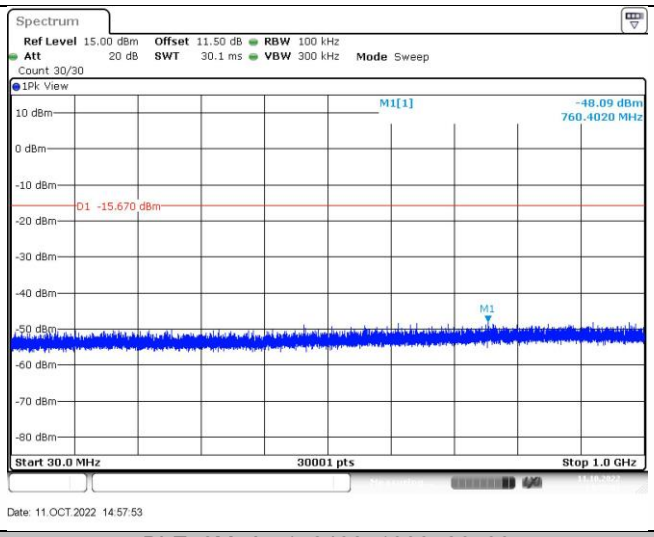
BLE_1M_Ant1_2480_30~1000



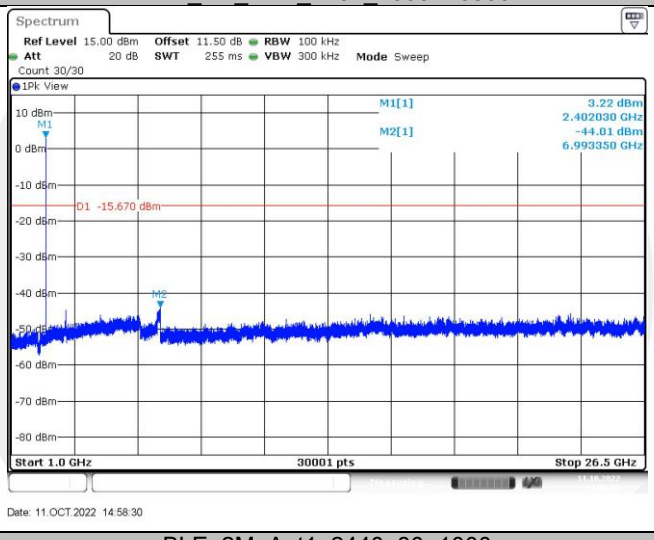
BLE_1M_Ant1_2480_1000~26500



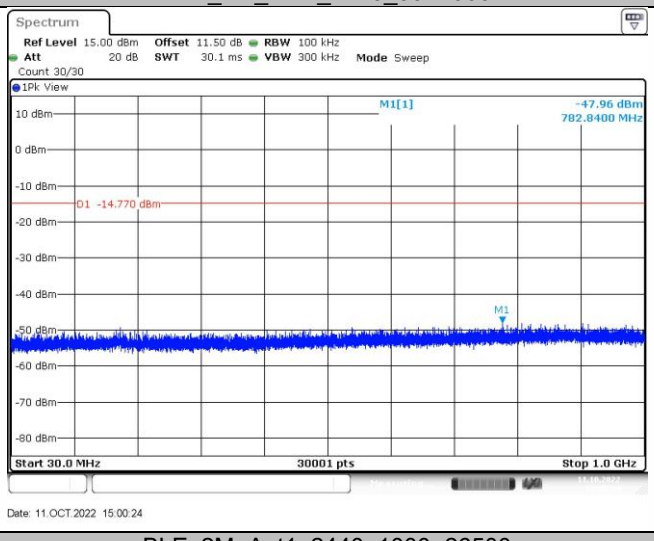
BLE_2M_Ant1_2402_30~1000



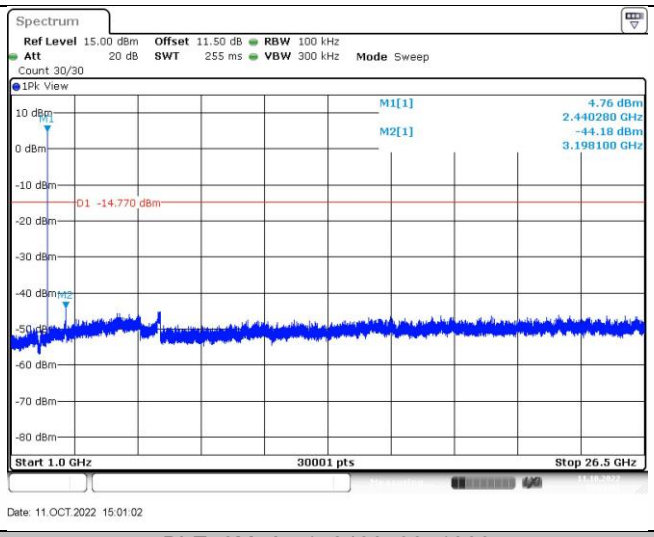
BLE_2M_Ant1_2402_1000~26500



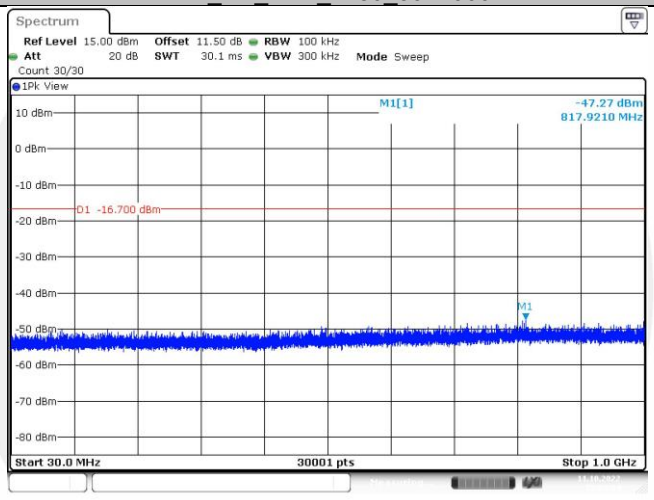
BLE_2M_Ant1_2440_30~1000



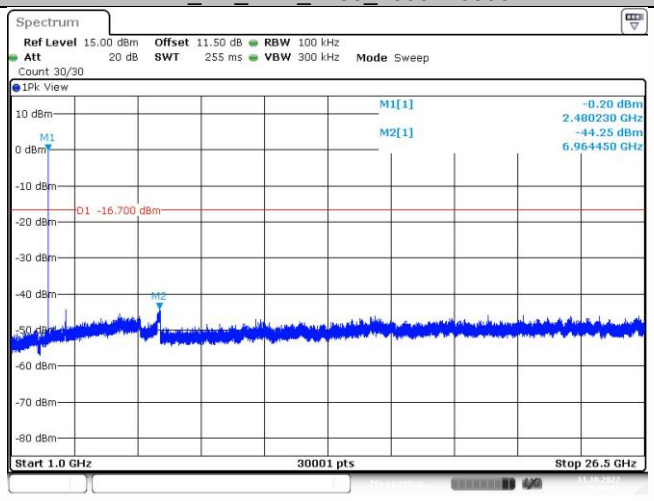
BLE_2M_Ant1_2440_1000~26500



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

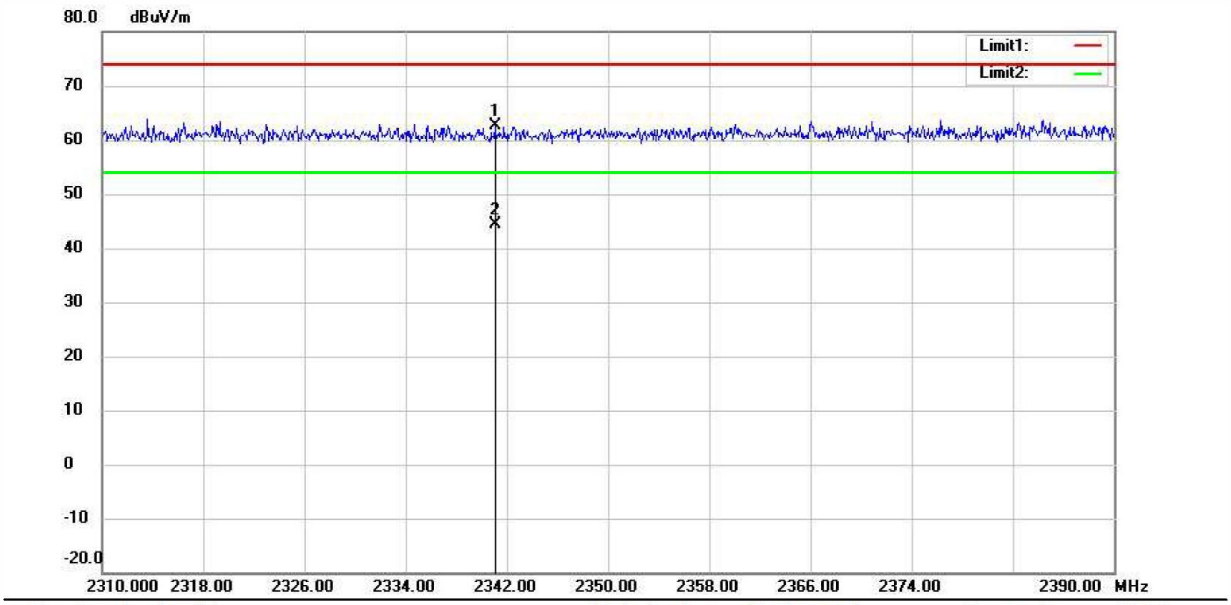
Note: (1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = 1/T_{on}, Detector = Peak, where: T_{on} is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

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

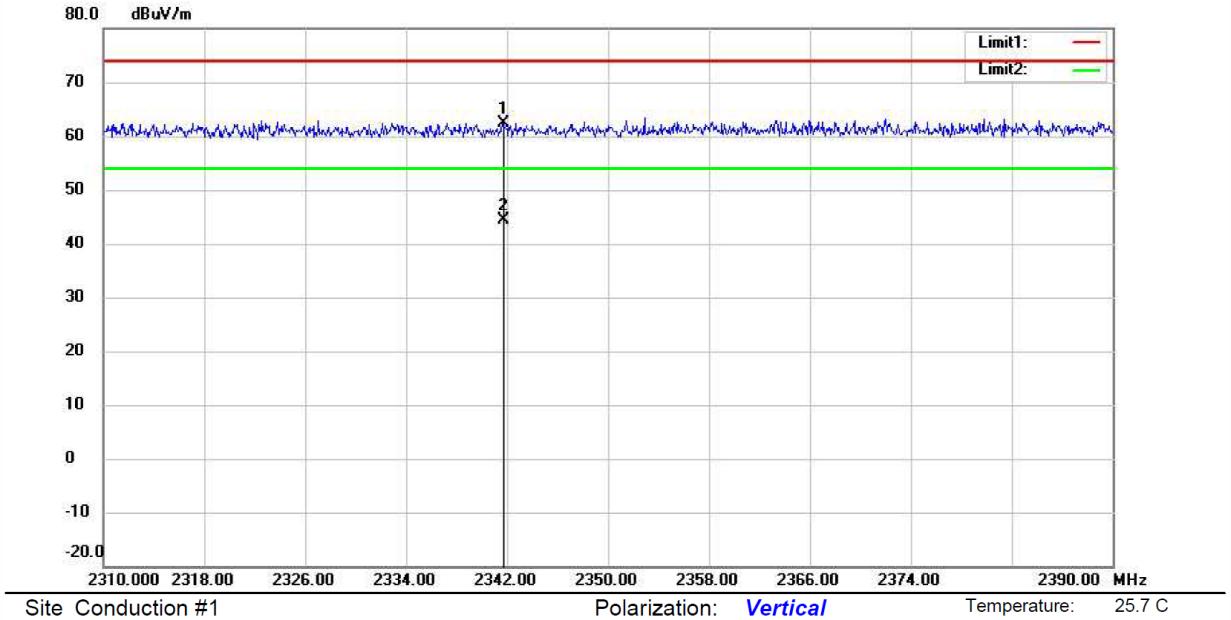
Note: (1) PeaK RBW = 1 MHz, VBW ≥ 3 × RBW, Detector = Peak;
(2) Avg RBW = 1 MHz, VBW = 1/T_{on}, Detector = Peak, where: T_{on} is transmit duration;
(3) Corrected Reading = Reading Level + Correct Factor;
(4) Correct Factor = Ant_F + Cab_L - Preamp;
(5) Margin = Limit - Corrected Reading;

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



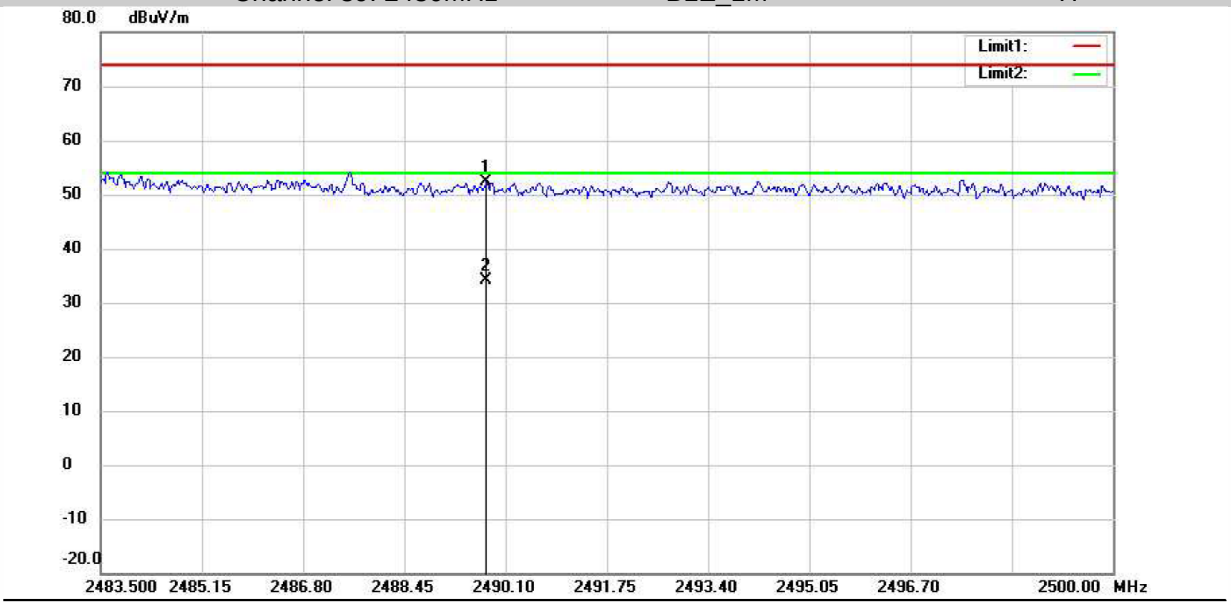
Site Conduction #1 Polarization: *Horizontal* Temperature: 25.7 C

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



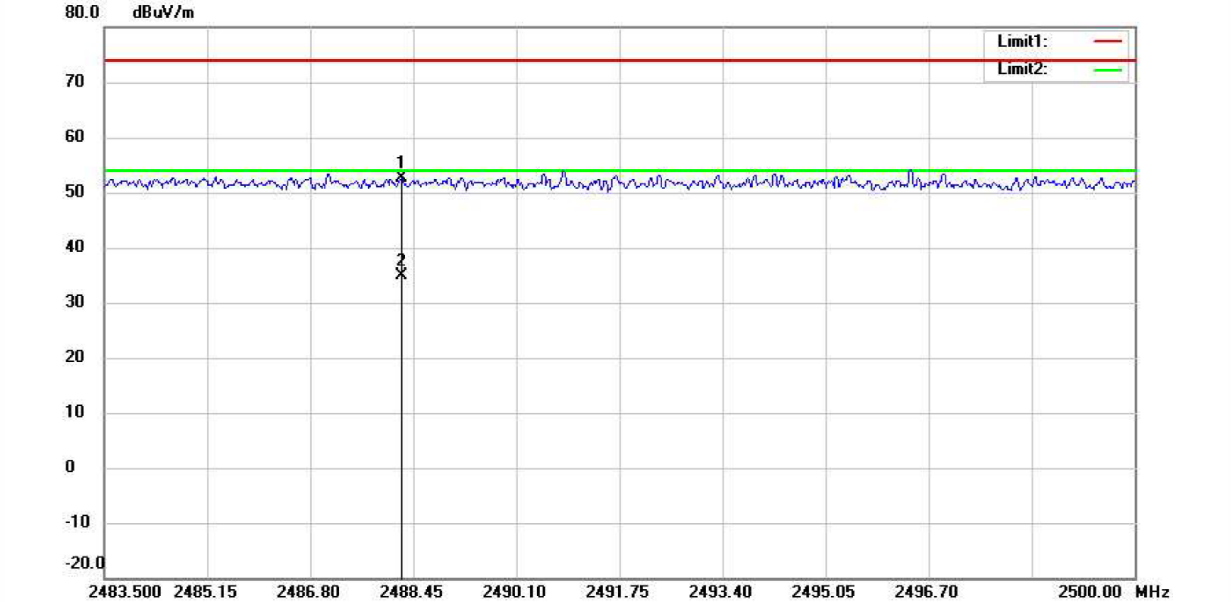
Site Conduction #1 Polarization: *Vertical* Temperature: 25.7 C

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			

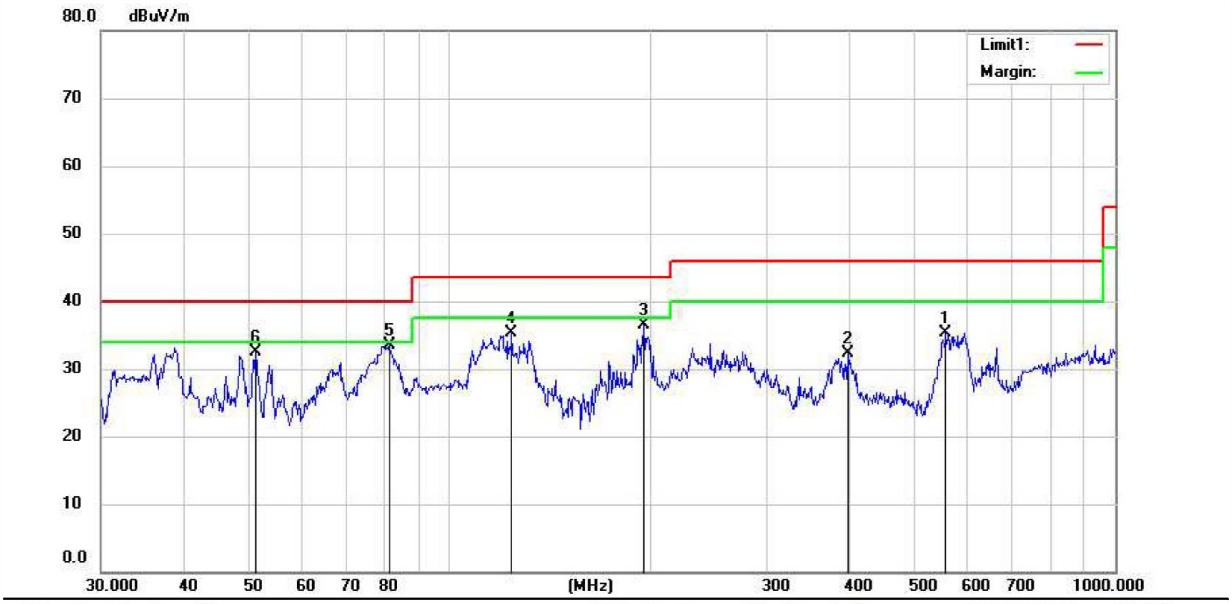
Site Conduction #1 Polarization: *Horizontal* Temperature: 25.7 C

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			

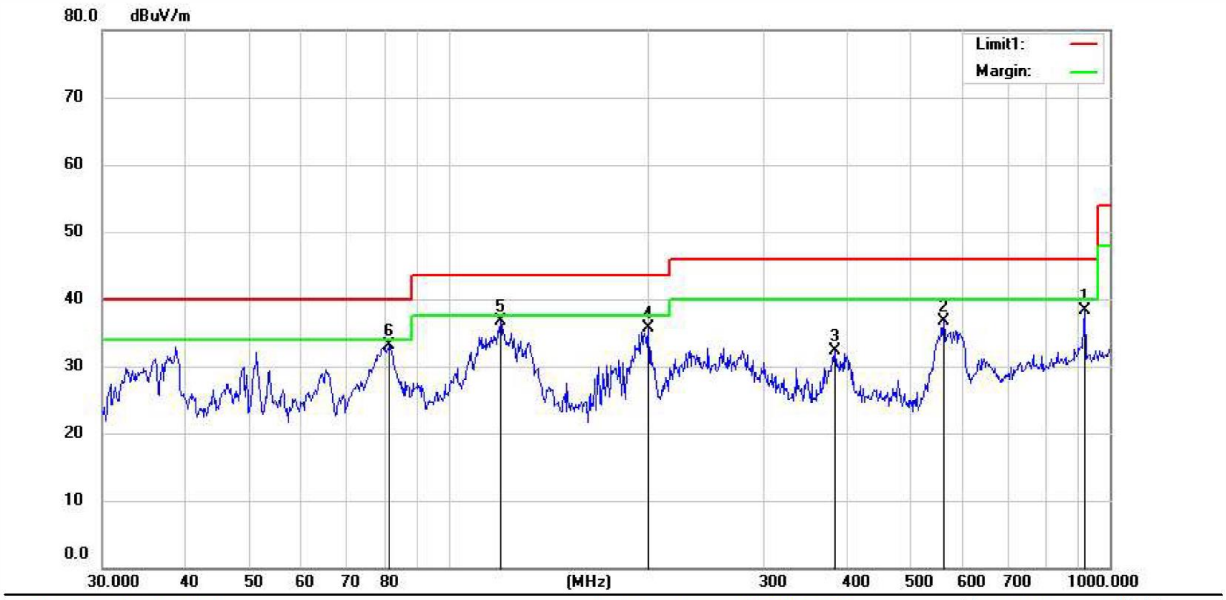
Site Conduction #1 Polarization: *Vertical* Temperature: 25.7 C

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

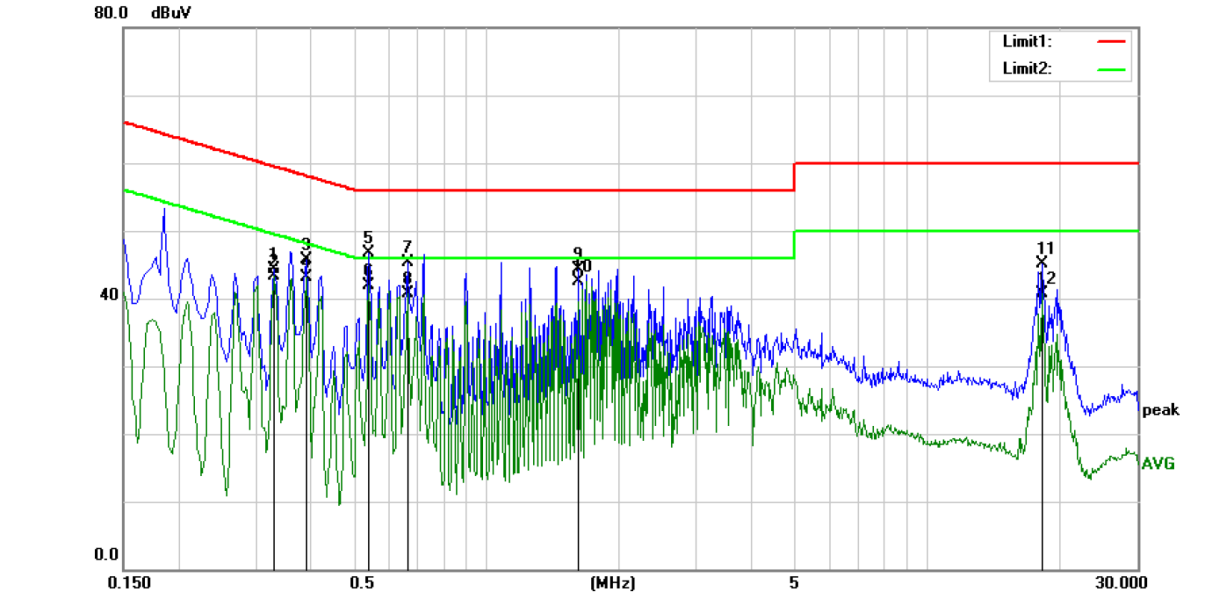
The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

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



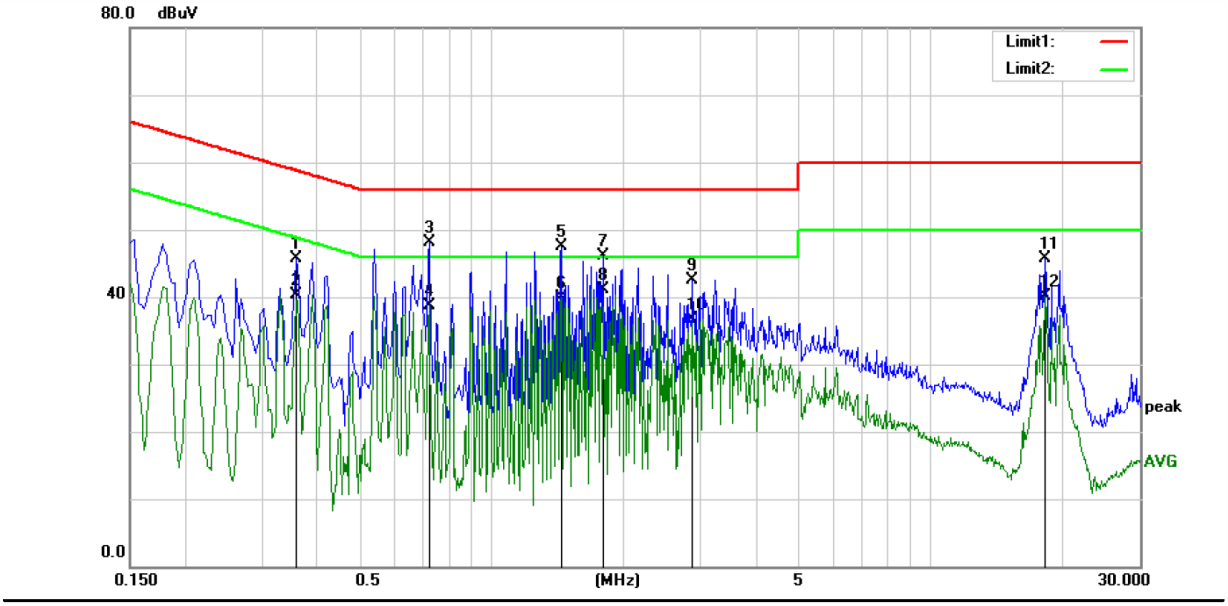
Site Conduction #2 Phase: *L1* Temperature: 25.1

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

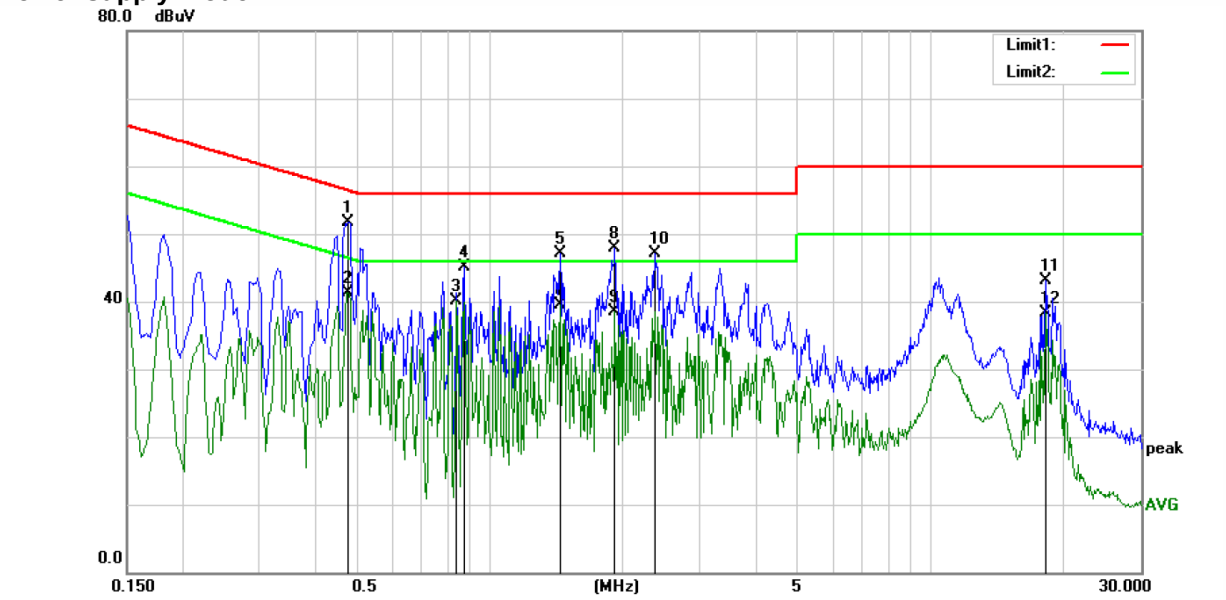
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 45 %

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



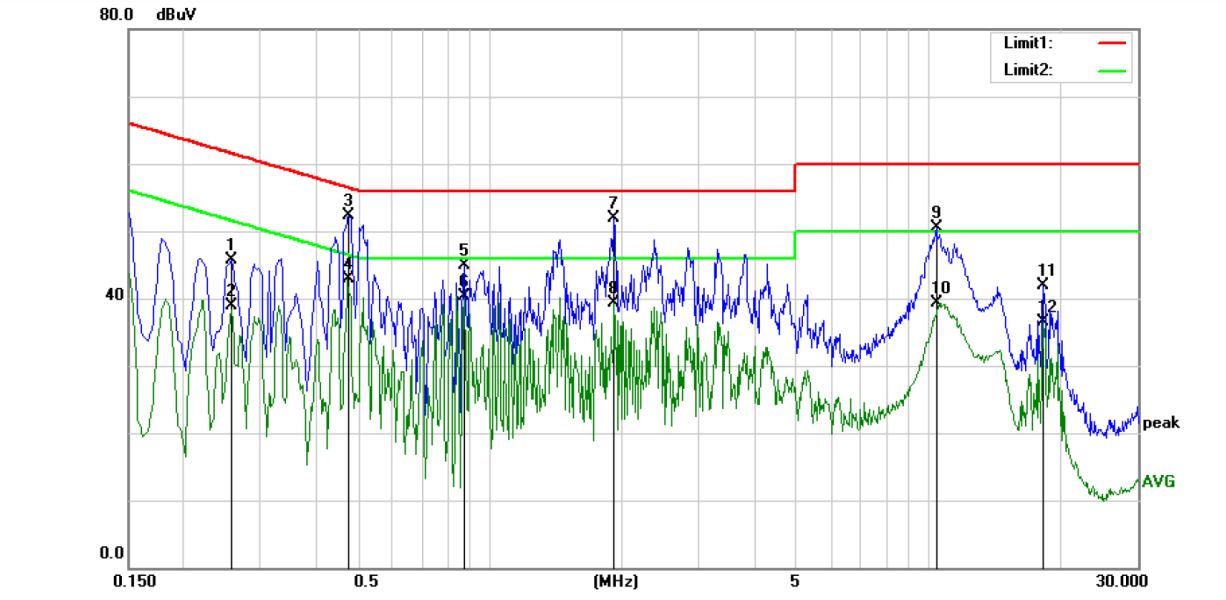
Site Conduction #2 Phase: N Temperature: 25.1

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 --------