

BLE 2M Ant1 2402



BLE 2M Ant1 2440



BLE 2M Ant1 2480

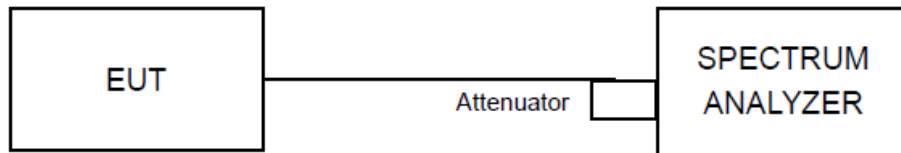


4.3 Conducted Output Power

4.3.1 Limit

For systems using digital modulation in the 2400 – 2483.5 MHz bands: 1 Watt (30 dBm)

4.3.2 Test Setup



4.3.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” for compliance to FCC 47CFR 15.247 requirements (clause 9.2.2.4).

- a) Set RBW $\geq$ DTS bandwidth
- b) Set VBW $\geq$ 3 RBW.
- c) Set Span $\geq$ 3 RBW.
- d) Sweep time = auto couple.
- e) Detector = peak
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize
- h) Use peak marker function to determine the peak amplitude level.

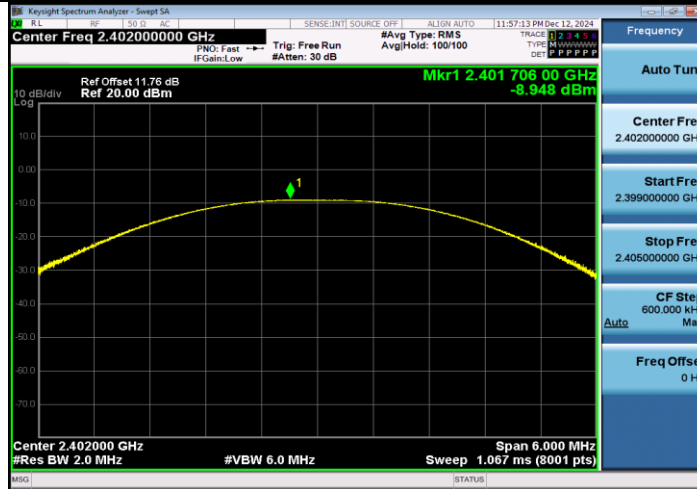
4.3.4 Deviation of Test Standard

No deviation.

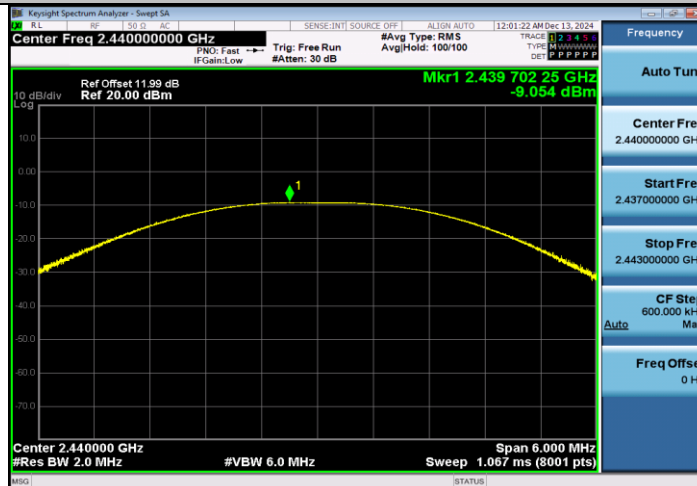
4.3.5 Test Results

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
BLE_1M	Ant1	2402	-8.95	≤30	-6.99	≤36	PASS
		2440	-9.05	≤30	-7.09	≤36	PASS
		2480	-8.86	≤30	-6.90	≤36	PASS
BLE_2M	Ant1	2402	-8.89	≤30	-6.93	≤36	PASS
		2440	-9.02	≤30	-7.06	≤36	PASS
		2480	-8.80	≤30	-6.84	≤36	PASS

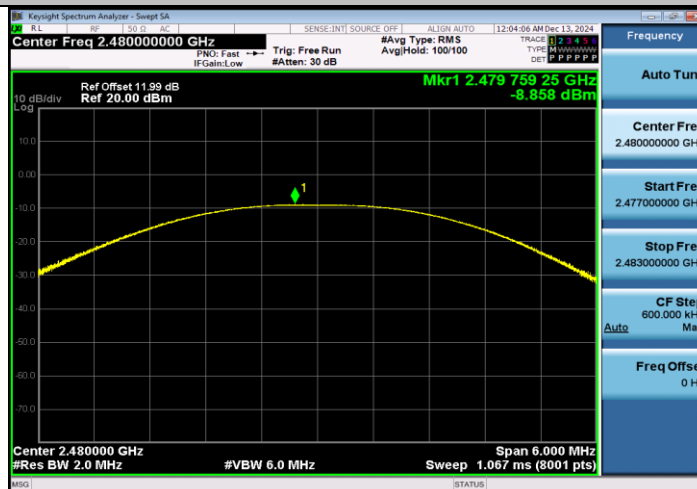
BLE_1M_Ant1_2402



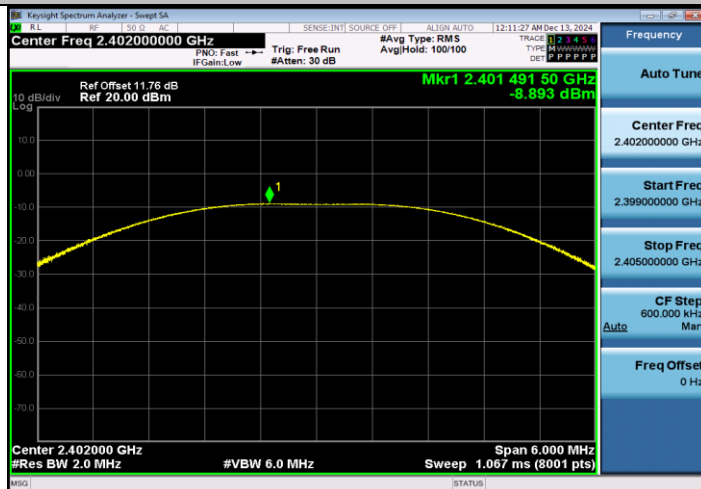
BLE_1M_Ant1_2440



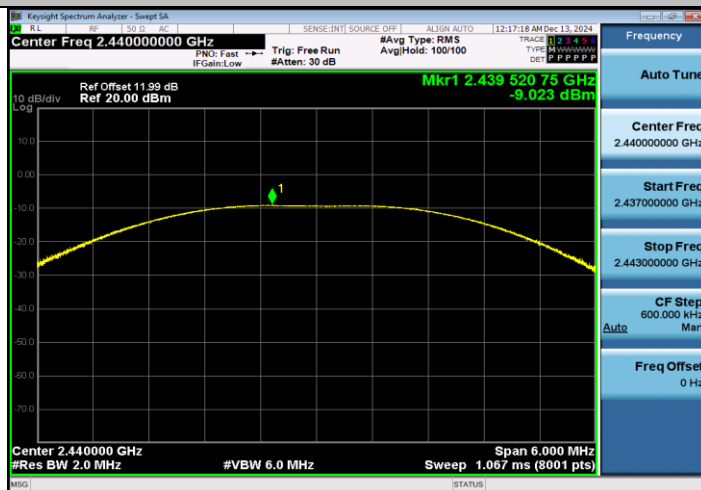
BLE_1M_Ant1_2480



BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

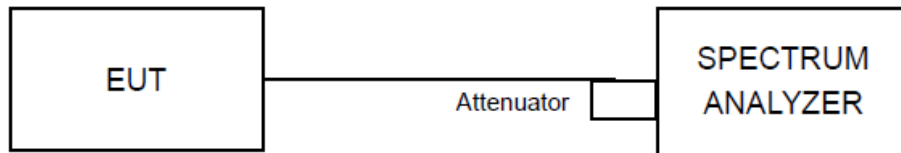


4.4 Power Spectral Density

4.4.1 Limit

The Maximum of Power Spectral Density Measurement is 8 dBm.

4.4.2 Test Setup



4.4.3 Test Procedures

The power output per FCC § 15.247(e) was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 10.5) for compliance to FCC 47CFR 15.247 requirements.

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

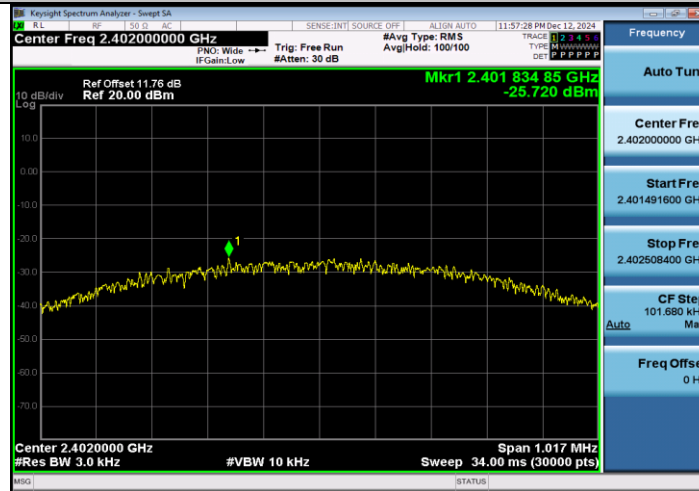
4.4.4 Deviation of Test Standard

No deviation.

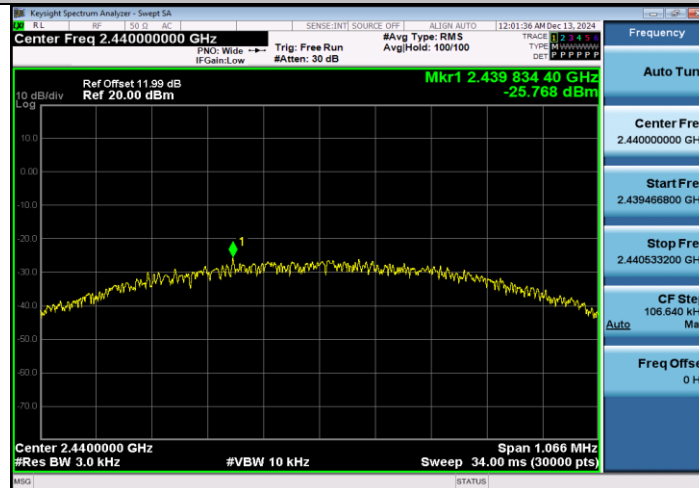
4.4.5 Test Results

TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-25.72	≤8.00	PASS
		2440	-25.77	≤8.00	PASS
		2480	-25.67	≤8.00	PASS
BLE_2M	Ant1	2402	-28.72	≤8.00	PASS
		2440	-28.87	≤8.00	PASS
		2480	-28.63	≤8.00	PASS

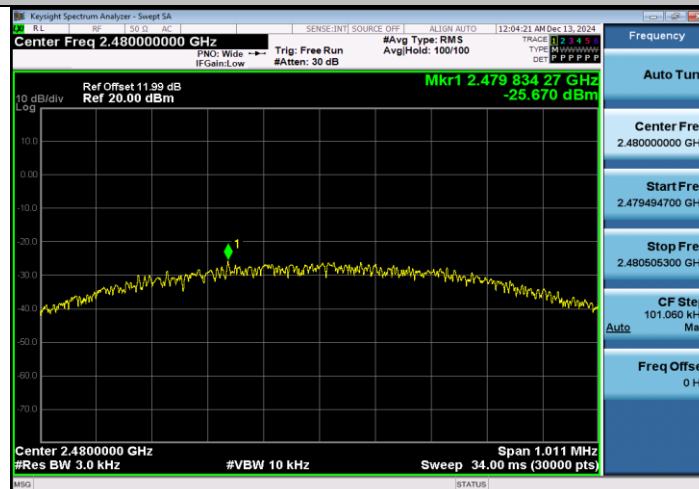
BLE_1M_Ant1_2402



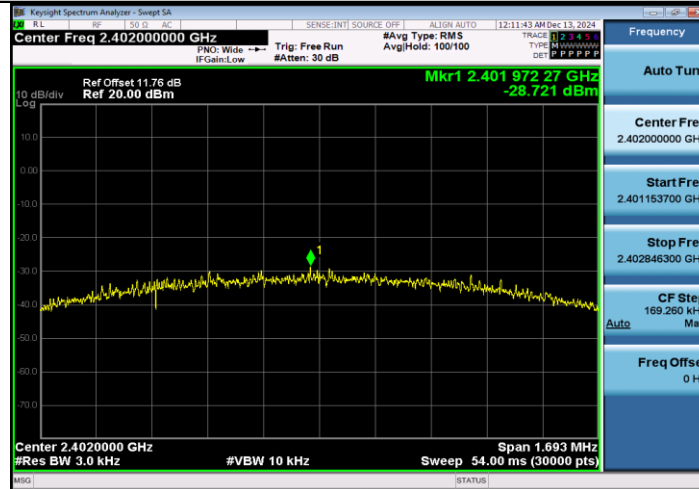
BLE_1M_Ant1_2440



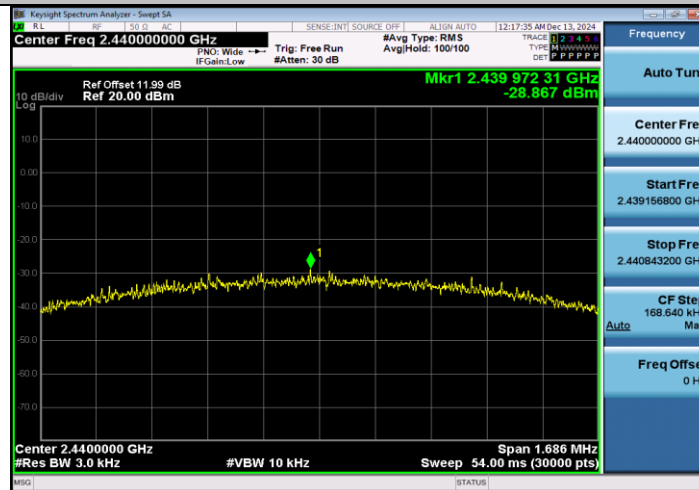
BLE_1M_Ant1_2480



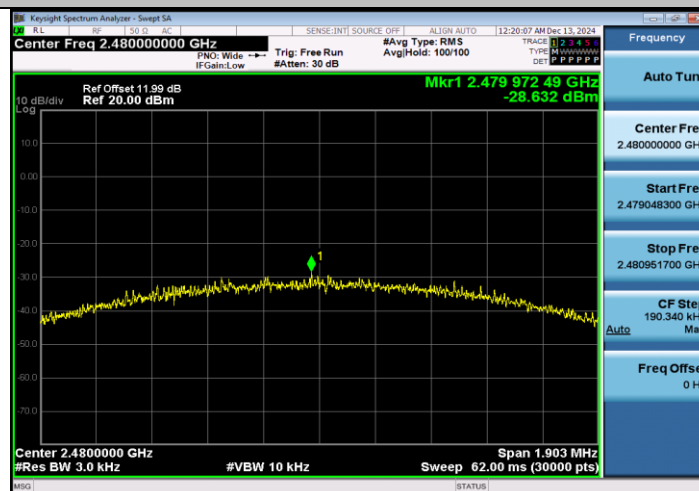
BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480

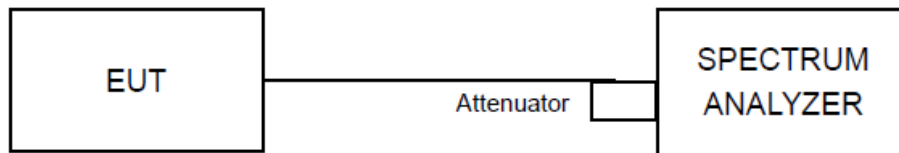


4.5 Conducted Band Edges Measurement

4.5.1 Limit

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.5.2 Test Setup



4.5.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

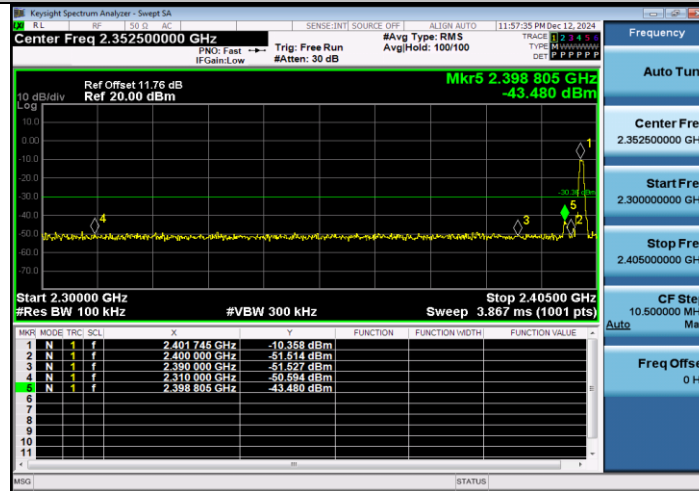
4.5.4 Deviation of Test Standard

No deviation.

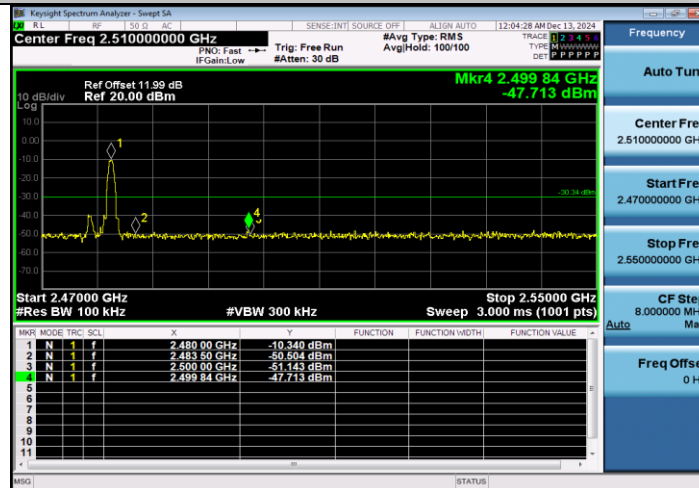
4.5.5 Test Results

TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-10.36	-43.48	≤ -30.36	PASS
		High	2480	-10.34	-47.71	≤ -30.34	PASS
BLE_2M	Ant1	Low	2402	-10.73	-41.67	≤ -30.73	PASS
		High	2480	-10.49	-47.98	≤ -30.49	PASS

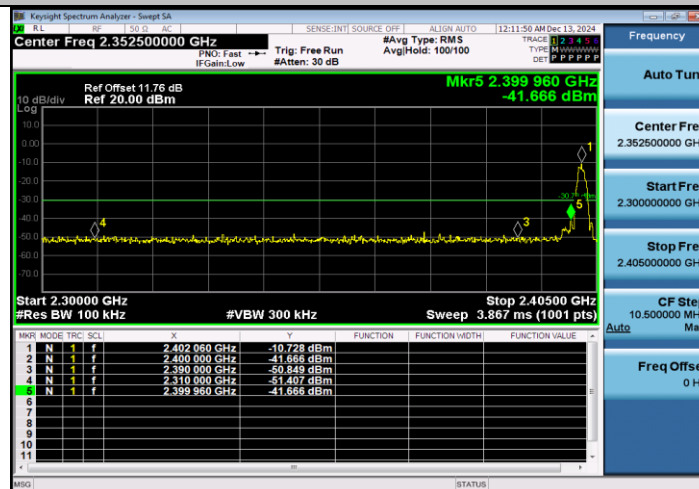
BLE_1M_Ant1_Low_2402



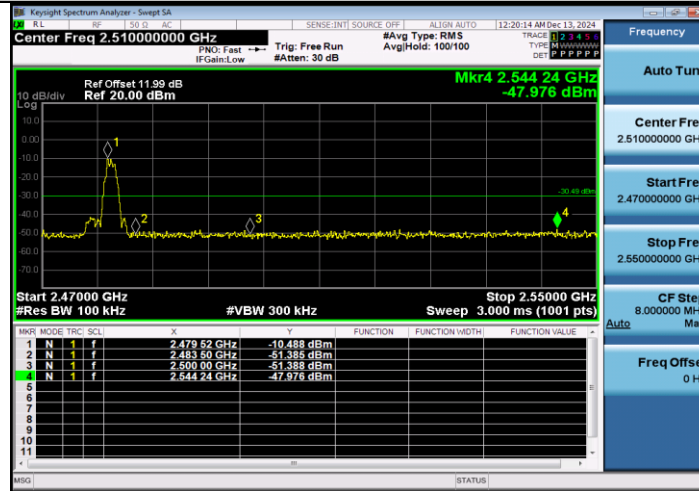
BLE_1M_Ant1_High_2480



BLE_2M_Ant1_Low_2402



BLE_2M_Ant1_High_2480

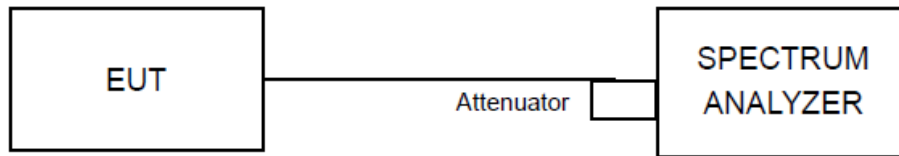


4.6 Conducted Spurious Emissions

4.6.1 Limit

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Procedures

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.4 Deviation of Test Standard

No deviation.

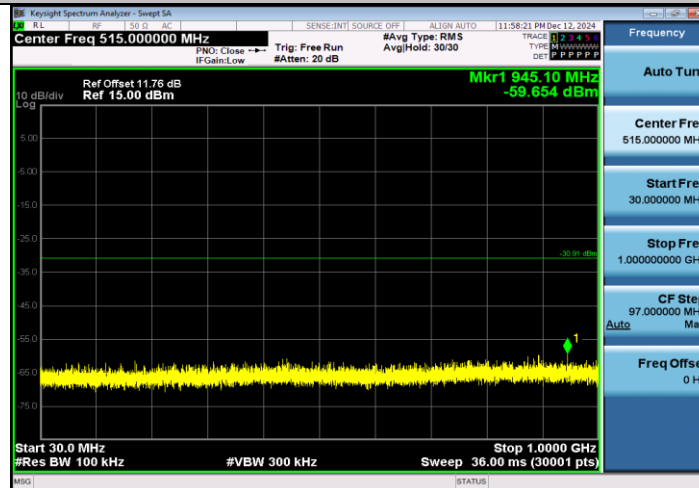
4.6.5 Test Results

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	-10.91	-10.91	---	PASS
			30~1000	-10.91	-59.65	≤ -30.91	PASS
			1000~26500	-10.91	-42.98	≤ -30.91	PASS
		2440	Reference	-10.58	-10.58	---	PASS
			30~1000	-10.58	-60.05	≤ -30.58	PASS
			1000~26500	-10.58	-43.99	≤ -30.58	PASS
		2480	Reference	-9.29	-9.29	---	PASS
			30~1000	-9.29	-59.89	≤ -29.29	PASS
			1000~26500	-9.29	-40.35	≤ -29.29	PASS
BLE_2M	Ant1	2402	Reference	-12.55	-12.55	---	PASS
			30~1000	-12.55	-60.03	≤ -32.55	PASS
			1000~26500	-12.55	-43.02	≤ -32.55	PASS
		2440	Reference	-12.57	-12.57	---	PASS
			30~1000	-12.57	-59.46	≤ -32.57	PASS
			1000~26500	-12.57	-43.6	≤ -32.57	PASS
		2480	Reference	-9.95	-9.95	---	PASS
			30~1000	-9.95	-59.97	≤ -29.95	PASS
			1000~26500	-9.95	-39.25	≤ -29.95	PASS

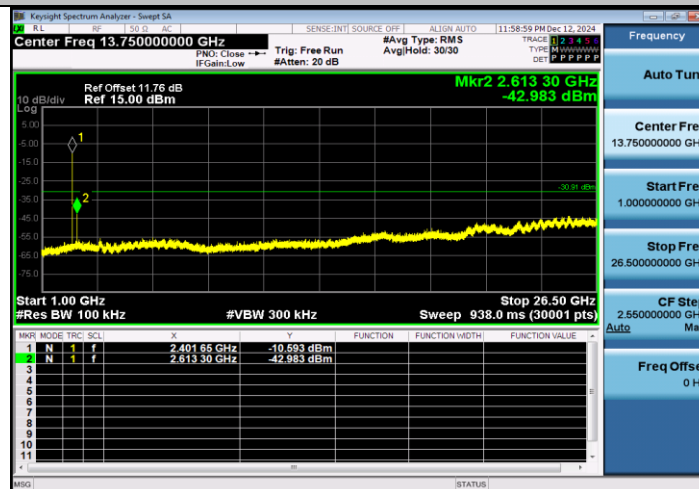
BLE_1M_Ant1_2402_0~Reference



BLE_1M_Ant1_2402_30~1000



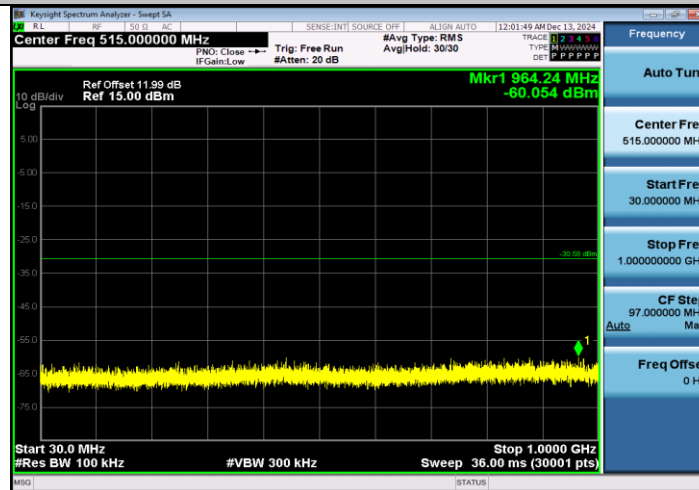
BLE_1M_Ant1_2402_1000~26500



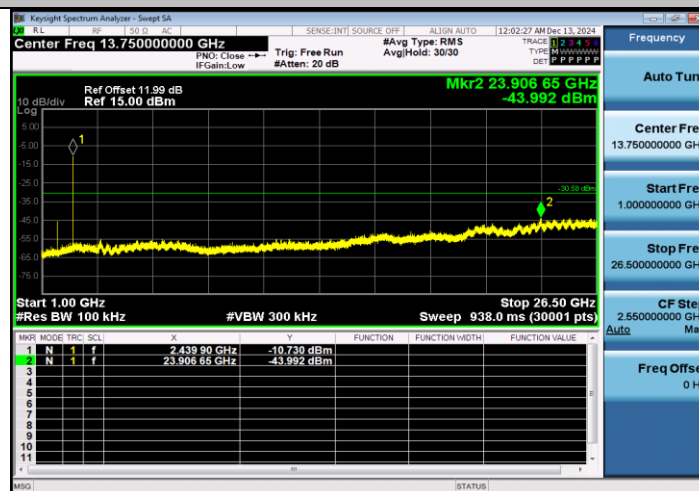
BLE_1M_Ant1_2440_0~Reference



BLE_1M_Ant1_2440_30~1000



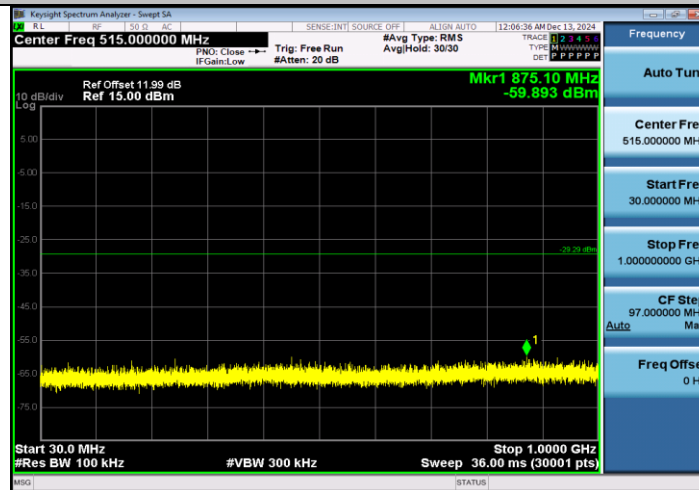
BLE_1M_Ant1_2440_1000~26500



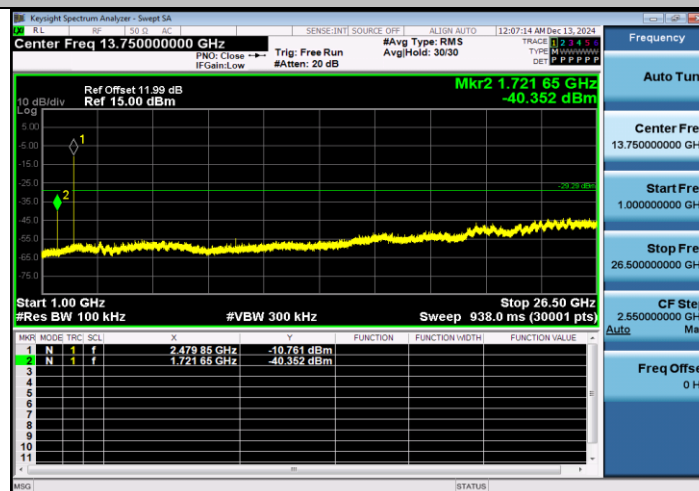
BLE_1M_Ant1_2480_0~Reference



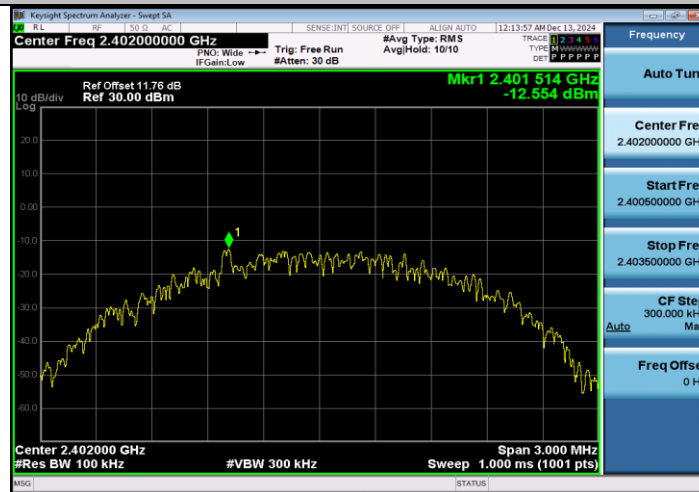
BLE_1M_Ant1_2480_30~1000



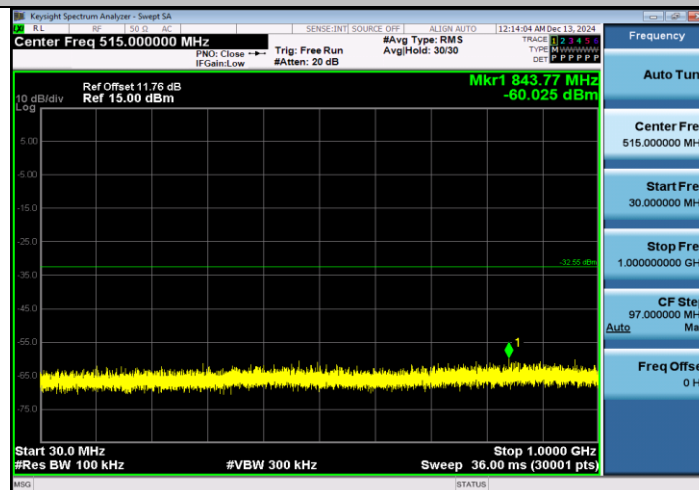
BLE_1M_Ant1_2480_1000~26500



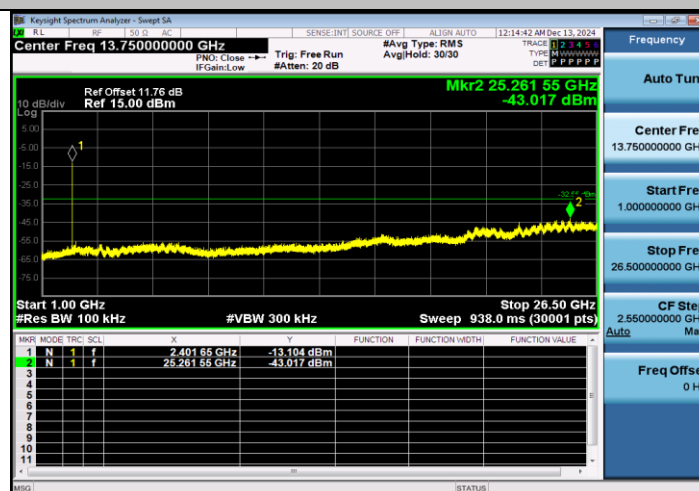
BLE_2M_Ant1_2402_0~Reference



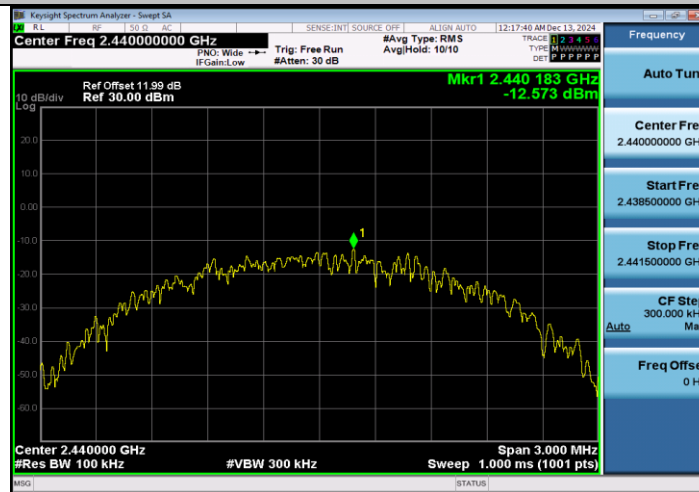
BLE_2M_Ant1_2402_30~1000



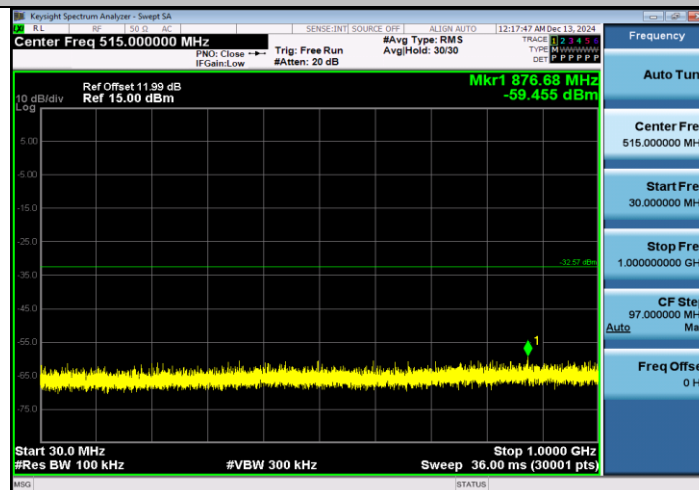
BLE_2M_Ant1_2402_1000~26500



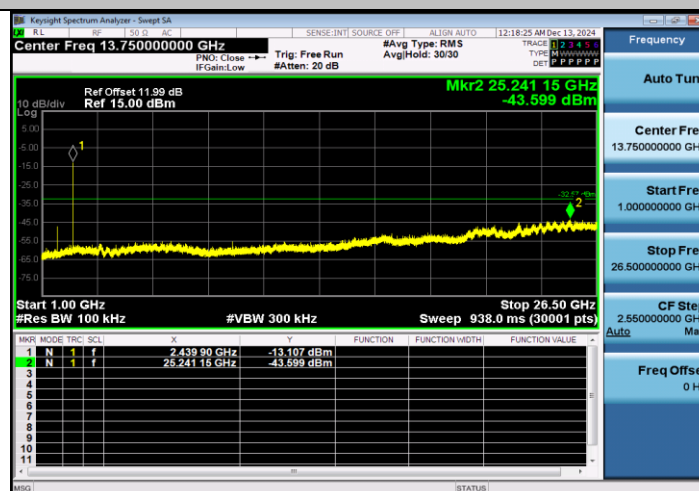
BLE_2M_Ant1_2440_0~Reference



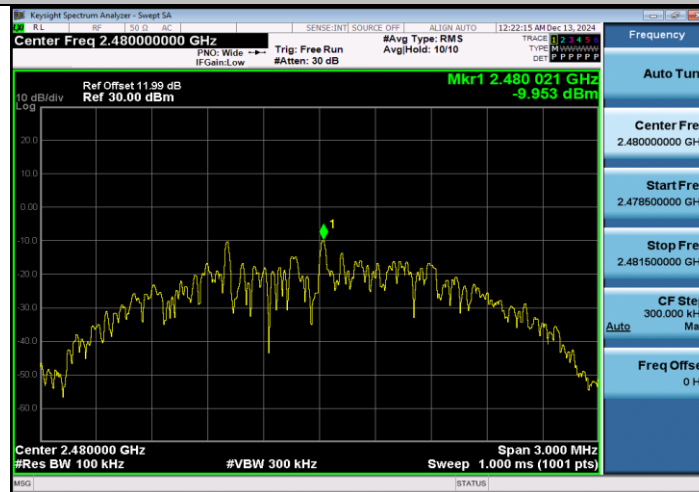
BLE_2M_Ant1_2440_30~1000



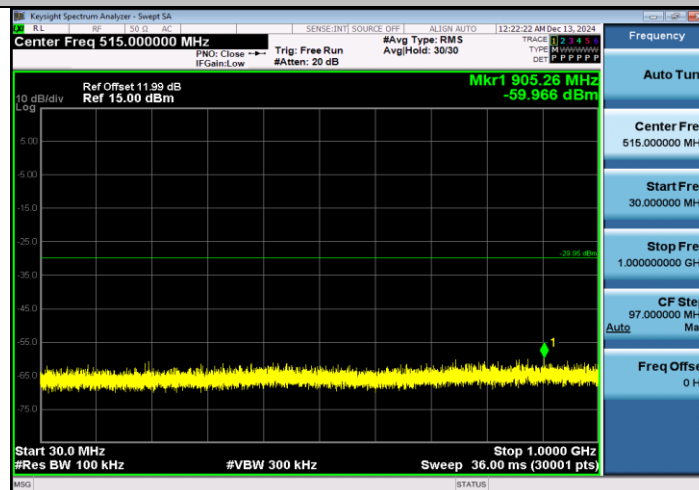
BLE_2M_Ant1_2440_1000~26500



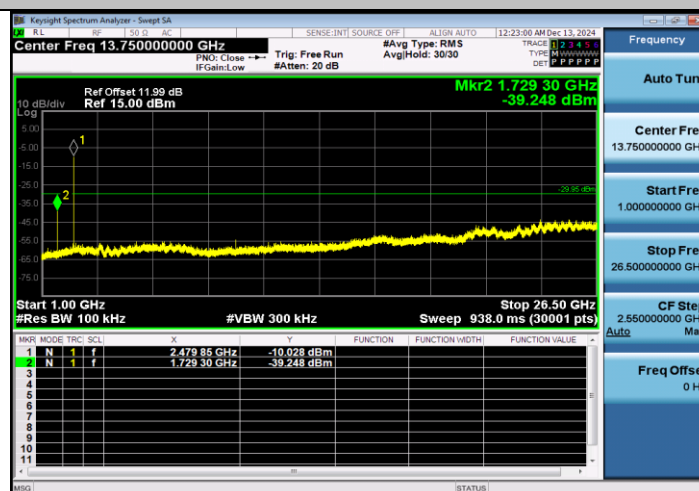
BLE_2M_Ant1_2480_0~Reference



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



4.7 Emissions in restricted frequency bands

4.7.1 Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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 - 156.525	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	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

4.7.2 Test Procedure Reference

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

4.7.3 Test Procedures

Peak Field Strength Measurements

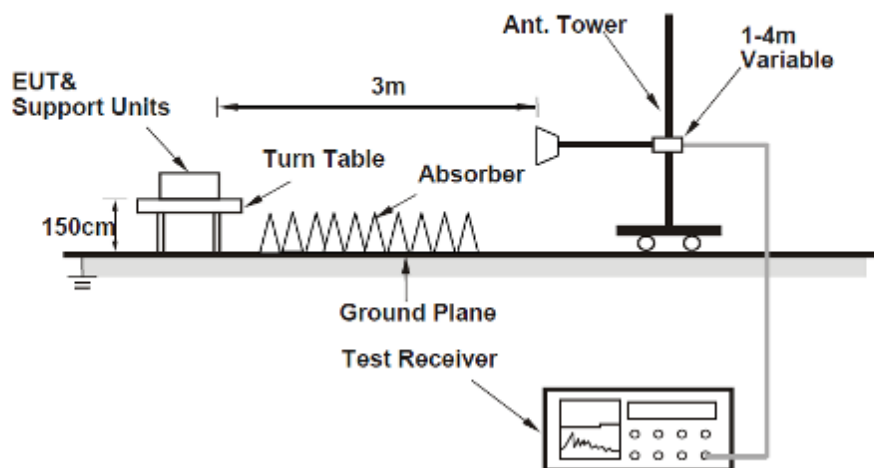
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$. T is the minimum transmission duration.
3. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

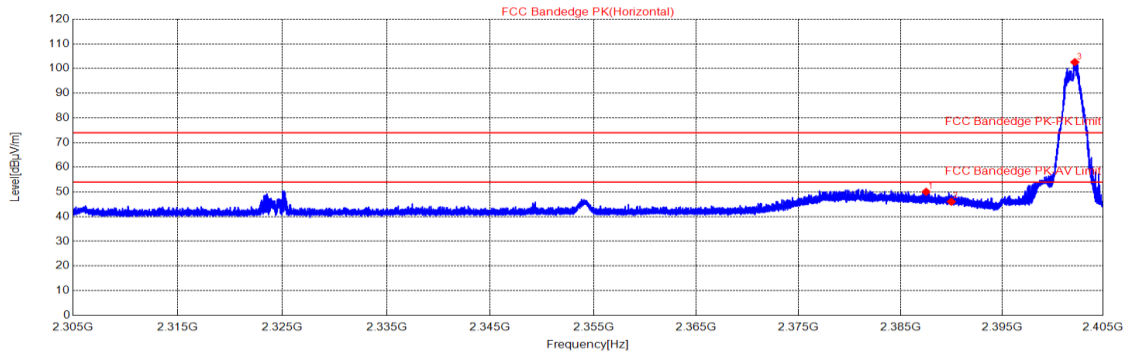
4.7.4 Test Setup

For Radiated emission above 1GHz



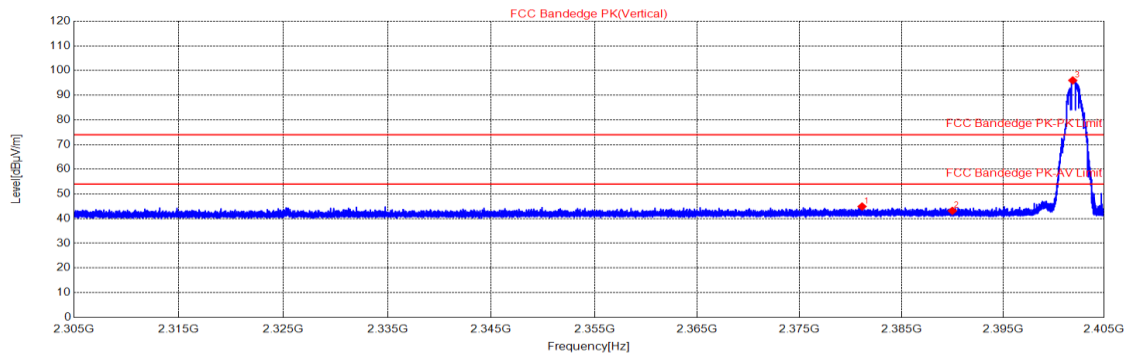
4.7.5 Test Results

BLE_1M_2402/ Horizontal



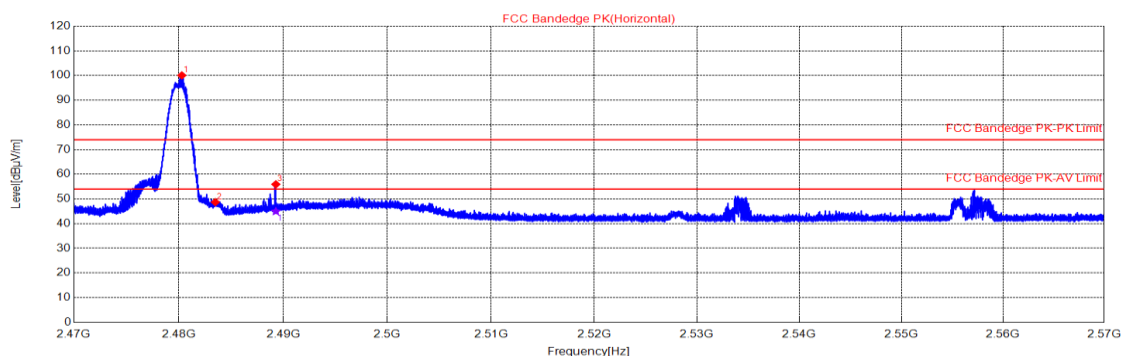
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity	Detector
1	2387.52	60.30	50.03	74.00	23.97	155	64	Horizontal	PK
2	2390.00	56.28	46.02	74.00	27.98	155	71	Horizontal	PK
3	2402.20	112.81	102.57	74.00	-28.57	155	220	Horizontal	PK

BLE_1M_2402/ Vertical



NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity	Detector
1	2381.12	55.17	44.89	74.00	29.11	155	0	Vertical	PK
2	2390.00	53.40	43.14	74.00	30.86	155	177	Vertical	PK
3	2401.89	106.24	96.00	74.00	-22.00	155	228	Vertical	PK

BLE_1M_2480/ Horizontal



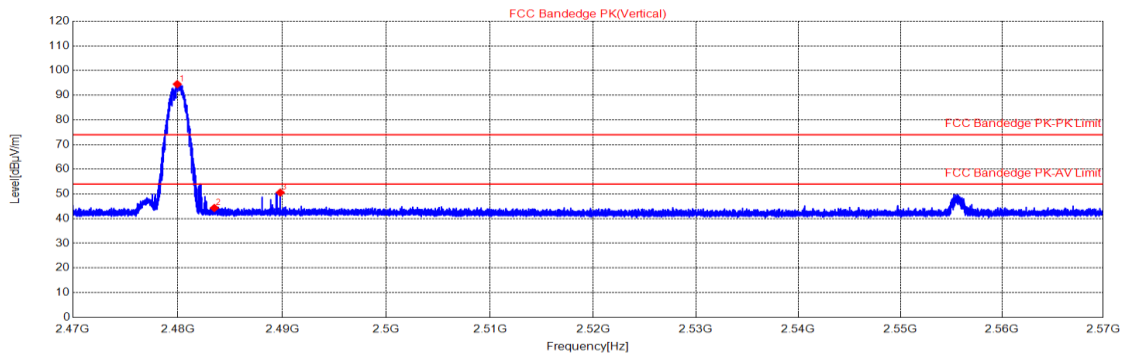
Suspected List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2480.30	110.58	-10.52	100.06	74.00	-26.06	PK	155	276	Horizontal
2	2483.50	59.20	-10.53	48.67	74.00	25.33	PK	155	80	Horizontal
3	2489.30	66.45	-10.55	55.90	74.00	18.10	PK	155	267	Horizontal

Final Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Value [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2489.29	55.47	-10.55	44.92	54.00	9.08	AV	170.7	279.7	Horizontal

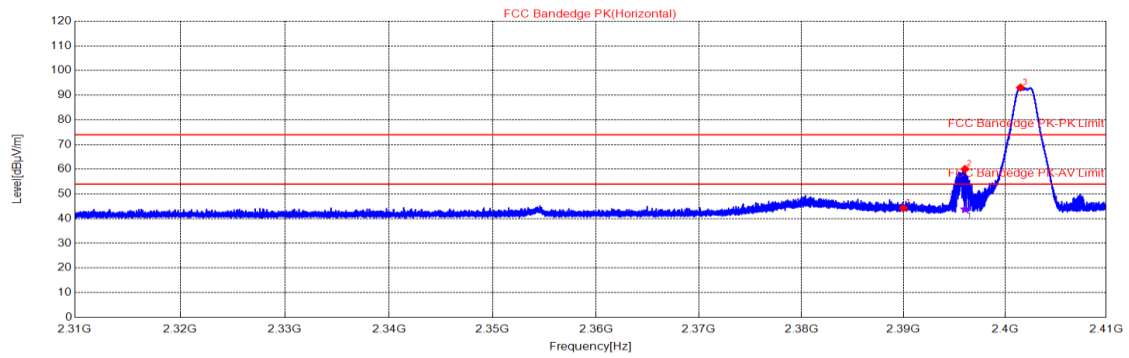
BLE_1M_2480/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2479.96	104.98	-10.52	94.46	74.00	-20.46	PK	155	167	Vertical
2	2483.50	54.81	-10.53	44.28	74.00	29.72	PK	155	270	Vertical
3	2489.82	61.08	-10.55	50.53	74.00	23.47	PK	155	78	Vertical

BLE_2M_2402/ Horizontal



★ RMS Detector

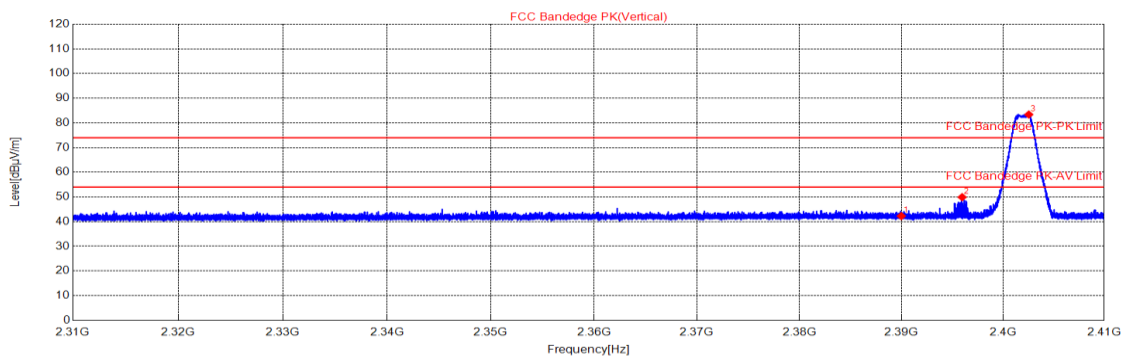
Suspected List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2390.00	54.47	-10.26	44.21	74.00	29.79	PK	155	161	Horizontal
2	2396.07	70.32	-10.25	60.07	74.00	13.93	PK	155	296	Horizontal
3	2401.54	103.31	-10.24	93.07	74.00	-19.07	PK	155	283	Horizontal

Final Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Value [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2396.07	54.01	-10.25	43.76	54.00	10.24	AV	154.1	360	Horizontal

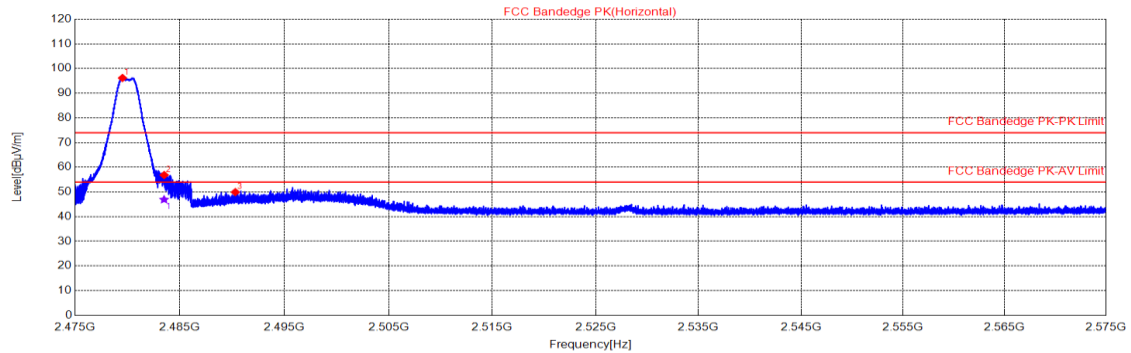
BLE_2M_2402/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2390.00	52.49	-10.26	42.23	74.00	31.77	PK	155	79	Vertical
2	2395.98	60.13	-10.25	49.88	74.00	24.12	PK	155	270	Vertical
3	2402.56	93.63	-10.25	83.38	74.00	-9.38	PK	155	260	Vertical

BLE_2M_2480/ Horizontal



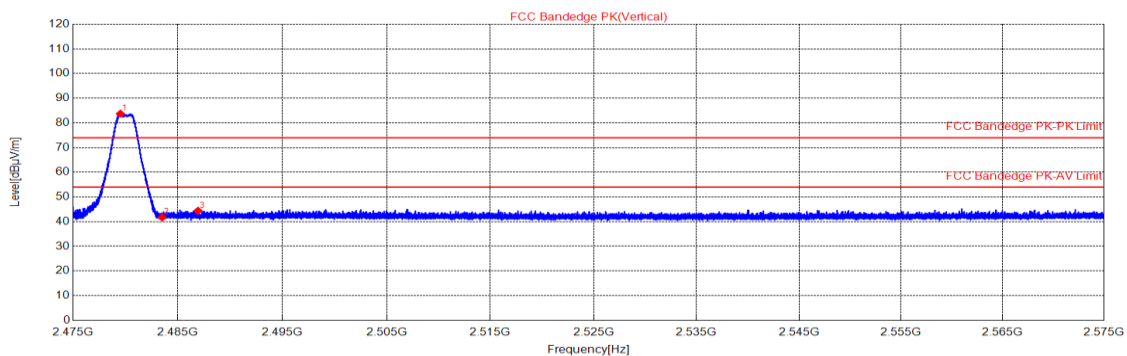
★ RMS Detector

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity	Detector
1	2479.53	106.69	96.17	74.00	-22.17	155	286	Horizontal	PK
2	2483.50	67.35	56.82	74.00	17.18	155	156	Horizontal	PK
3	2490.30	60.45	49.90	74.00	24.10	155	286	Horizontal	PK

Final Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Value [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2483.49	57.41	-10.53	46.88	54.00	7.12	AV	100	62.3	Horizontal

BLE_2M_2480/ Vertical



Suspected List

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	2479.52	94.23	-10.52	83.71	74.00	-9.71	PK	155	194	Vertical
2	2483.50	52.27	-10.53	41.74	74.00	32.26	PK	155	318	Vertical
3	2486.92	54.93	-10.55	44.38	74.00	29.62	PK	155	108	Vertical

4.8 Radiated Emission Measurement

4.8.1 Limits

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

4.8.2 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degree to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both X and Y axes of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotate table was turned from 0 degree to 360 degree to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

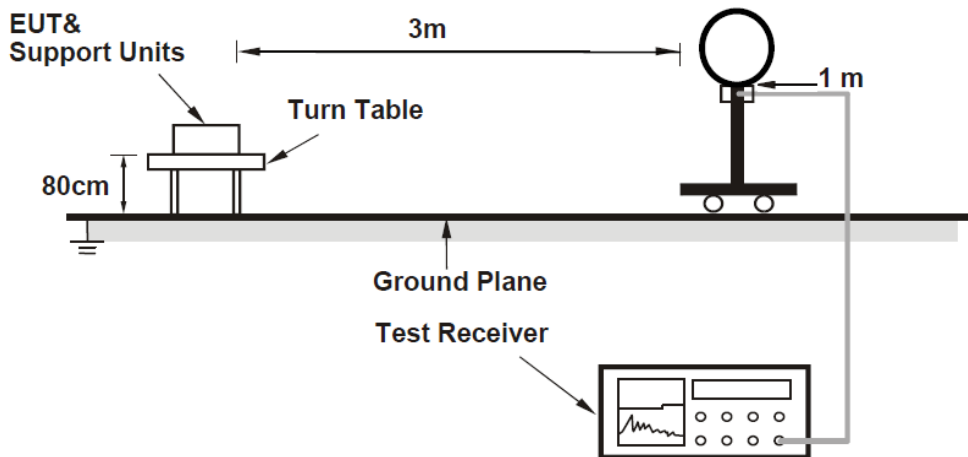
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for RMS Average (Duty cycle < 98 %) for Peak detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle $\geq$ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.8.3 Deviation from Test Standard

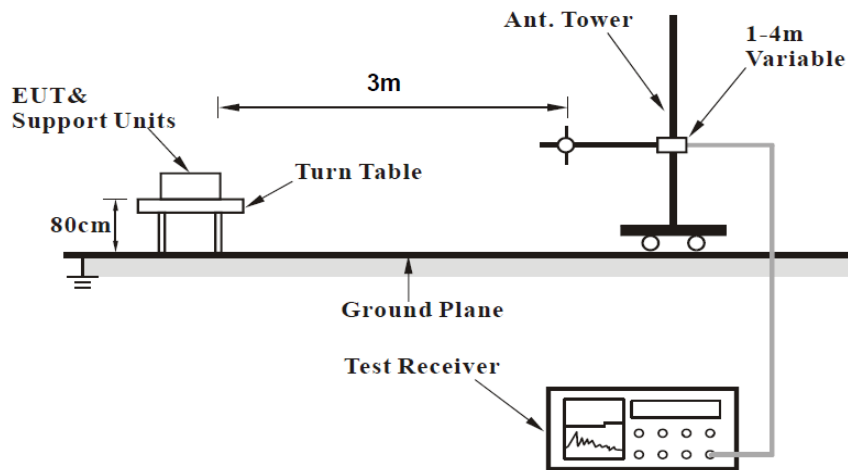
No deviation.

4.8.4 Test Setup

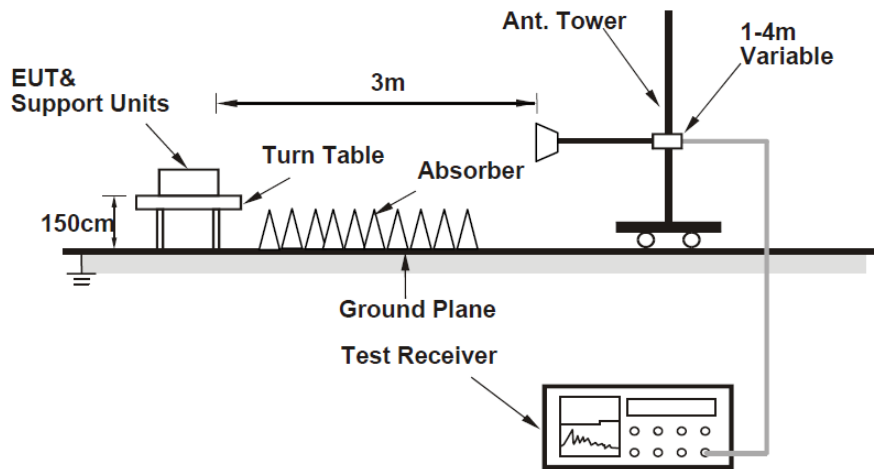
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.8.5 EUT Operating Conditions

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.8.6 Test Results

Radiated Emissions Range 9kHz~30MHz

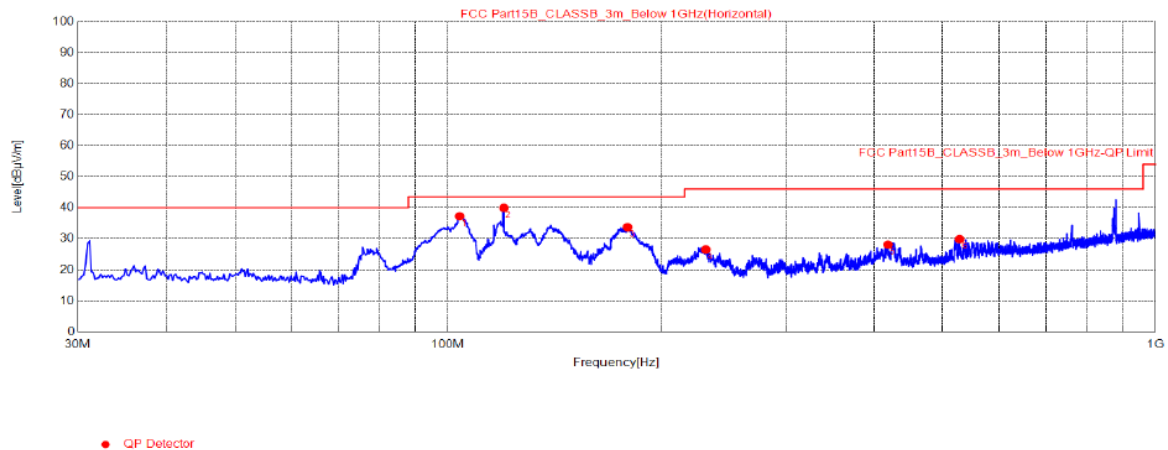
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Radiated Emissions Range 30MHz~1GHz

Below is the worst test data

Channel	BLE_2402	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	Antenna Polarity	Horizontal

Test Plot:



Final Data List

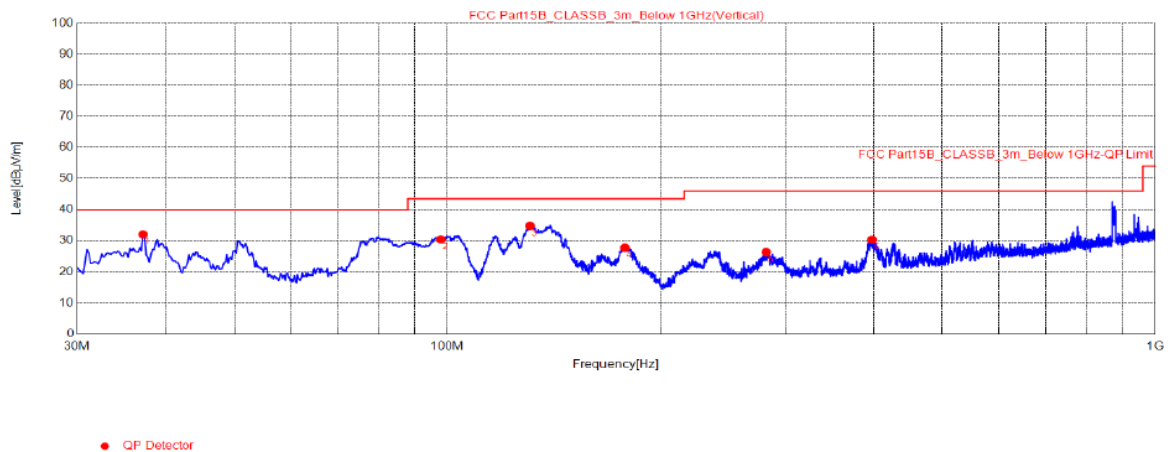
NO.	Freq.[MHz]	Reading [dBμV]	Factor [dB]	Value [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle[°]	Polarity
1	103.91	51.37	-14.15	37.22	43.50	6.28	QP	125	210	Horizontal
2	120.02	51.59	-11.62	39.97	43.50	3.53	QP	200	141	Horizontal
3	179.38	44.36	-10.66	33.70	43.50	9.80	QP	117	132	Horizontal
4	231.37	38.29	-11.79	26.50	46.00	19.50	QP	163	264	Horizontal
5	418.78	34.02	-5.90	28.12	46.00	17.88	QP	112	251	Horizontal
6	528.58	33.51	-3.63	29.88	46.00	16.12	QP	200	245	Horizontal

REMARKS:

- Emission Level(dBuV/m) = Spectrum reading (dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Limit value – Emission Level

Channel	BLE_2402_Ant1	Detector Function	Quasi-Peak (QP)
Frequency Range	30MHz ~ 1GHz	Antenna Polarity	Vertical

Test Plot:



Final Data List

NO.	Freq.[MHz]	Reading [dBμV]	Factor [dB]	Value [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle[°]	Polarity
1	37.18	43.51	-11.48	32.03	40.00	7.97	QP	147	258	Vertical
2	97.90	45.67	-15.26	30.41	43.50	13.09	QP	100	65	Vertical
3	130.88	46.06	-11.29	34.77	43.50	8.73	QP	118	125	Vertical
4	178.22	38.33	-10.58	27.75	43.50	15.75	QP	100	185	Vertical
5	282.01	35.17	-8.83	26.34	46.00	19.66	QP	136	220	Vertical
6	397.82	36.78	-6.46	30.32	46.00	15.68	QP	169	195	Vertical

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Radiated Emission Range 1GHz~10th Harmonic

Below is the worst test data

Channel	BLE_1M_2402_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4804.60	37.54	74.00	36.46	-3.03	H	PK
2	4804.60	30.87	54.00	23.13	-3.03	H	AV
3	4804.60	38.49	74.00	35.51	-3.03	V	PK
4	4804.60	30.04	54.00	23.96	-3.03	V	AV
5	7206.70	39.69	74.00	34.31	3.97	H	PK
6	7206.70	32.75	54.00	21.25	3.97	H	AV
7	7206.70	40.91	74.00	33.09	3.97	V	PK
8	7206.70	32.59	54.00	21.41	3.97	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	BLE_1M_2440_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4881.10	39.31	74.00	34.69	-2.87	H	PK
2	4881.10	30.49	54.00	23.51	-2.87	H	AV
3	4881.10	36.62	74.00	37.38	-2.87	V	PK
4	4881.10	29.18	54.00	24.82	-2.87	V	AV
5	7320.60	39.50	74.00	34.50	3.42	H	PK
6	7320.60	32.46	54.00	21.54	3.42	H	AV
7	7320.60	40.20	74.00	33.80	3.42	V	PK
8	7320.60	33.66	54.00	20.34	3.42	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	BLE_1M_2480_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4961.00	39.76	74.00	34.24	-2.56	H	PK
2	4961.00	31.33	54.00	22.67	-2.56	H	AV
3	4961.00	36.27	74.00	37.73	-2.56	V	PK
4	4961.00	28.70	54.00	25.30	-2.56	V	AV
5	7441.30	39.92	74.00	34.08	3.94	H	PK
6	7441.30	32.59	54.00	21.41	3.94	H	AV
7	7441.30	40.82	74.00	33.18	3.94	V	PK
8	7441.30	33.37	54.00	20.63	3.94	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	BLE_2M_2402_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4804.60	34.47	74.00	39.53	-3.03	H	PK
2	4804.60	28.53	54.00	25.47	-3.03	H	AV
3	4804.60	34.00	74.00	40.00	-3.03	V	PK
4	4804.60	26.35	54.00	27.65	-3.03	V	AV
5	7206.70	40.43	74.00	33.57	3.97	H	PK
6	7206.70	30.90	54.00	23.10	3.97	H	AV
7	7206.70	38.14	74.00	35.86	3.97	V	PK
8	7206.70	31.29	54.00	22.71	3.97	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	BLE_2M_2440_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4881.10	34.65	74.00	39.35	-2.87	H	PK
2	4881.10	27.56	54.00	26.44	-2.87	H	AV
3	4881.10	35.62	74.00	38.38	-2.87	V	PK
4	4881.10	26.86	54.00	27.14	-2.87	V	AV
5	7320.60	37.84	74.00	36.16	3.42	H	PK
6	7320.60	31.15	54.00	22.85	3.42	H	AV
7	7320.60	37.25	74.00	36.75	3.42	V	PK
8	7320.60	31.21	54.00	22.79	3.42	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

Channel	BLE_2M_2480_Ant1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Spurious Emission Level							
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Correction Factor (dB/m)	Antenna Polarity	Detector
1	4961.00	34.47	74.00	39.53	-2.56	H	PK
2	4961.00	27.62	54.00	26.38	-2.56	H	AV
3	4961.00	35.77	74.00	38.23	-2.56	V	PK
4	4961.00	26.45	54.00	27.55	-2.56	V	AV
5	7441.30	40.01	74.00	33.99	3.94	H	PK
6	7441.30	31.94	54.00	22.06	3.94	H	AV
7	7441.30	38.72	74.00	35.28	3.94	V	PK
8	7441.30	31.03	54.00	22.97	3.94	V	AV

REMARKS:

1. Emission Level(dBuV/m) = Original Spectrum reading (dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value – Emission Level

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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