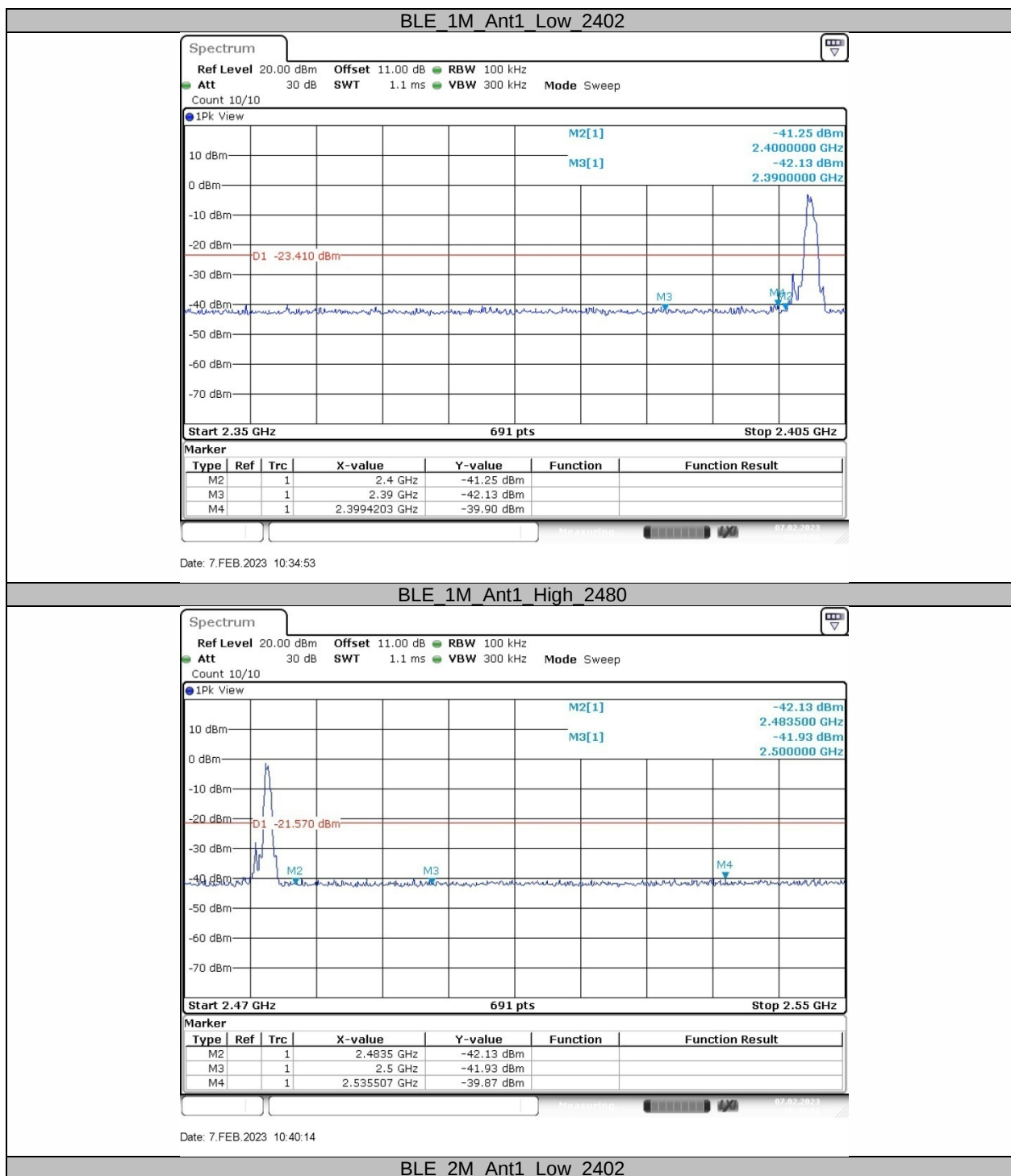
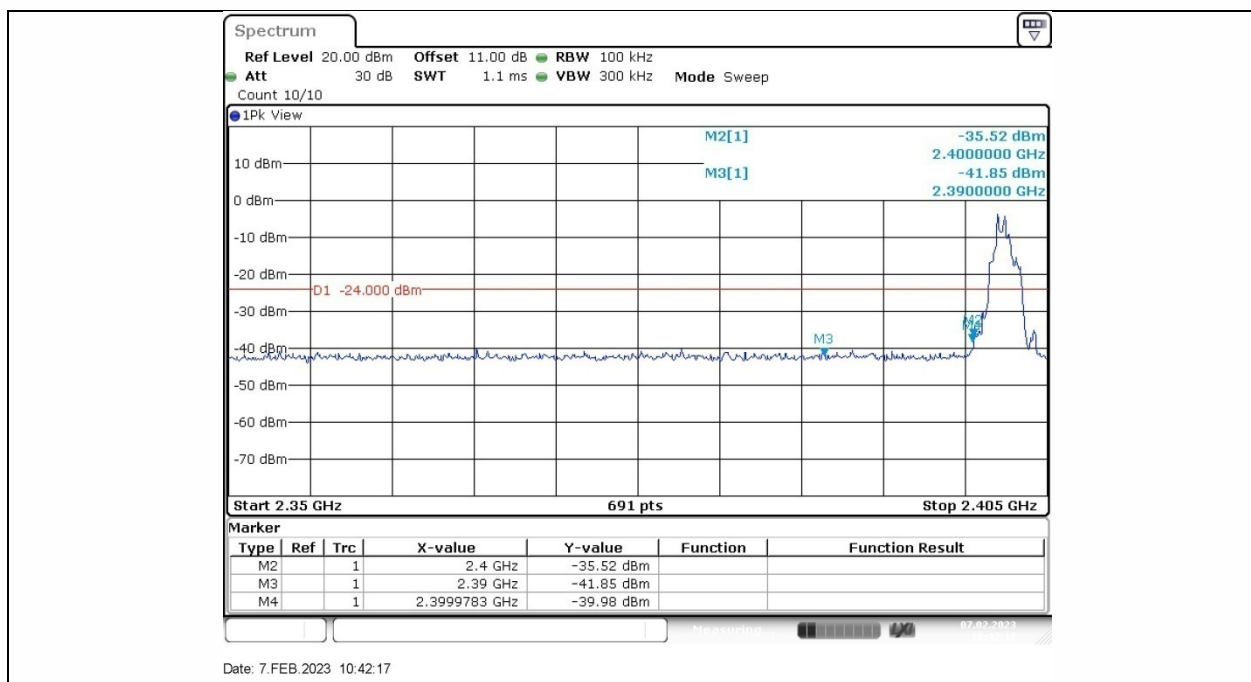
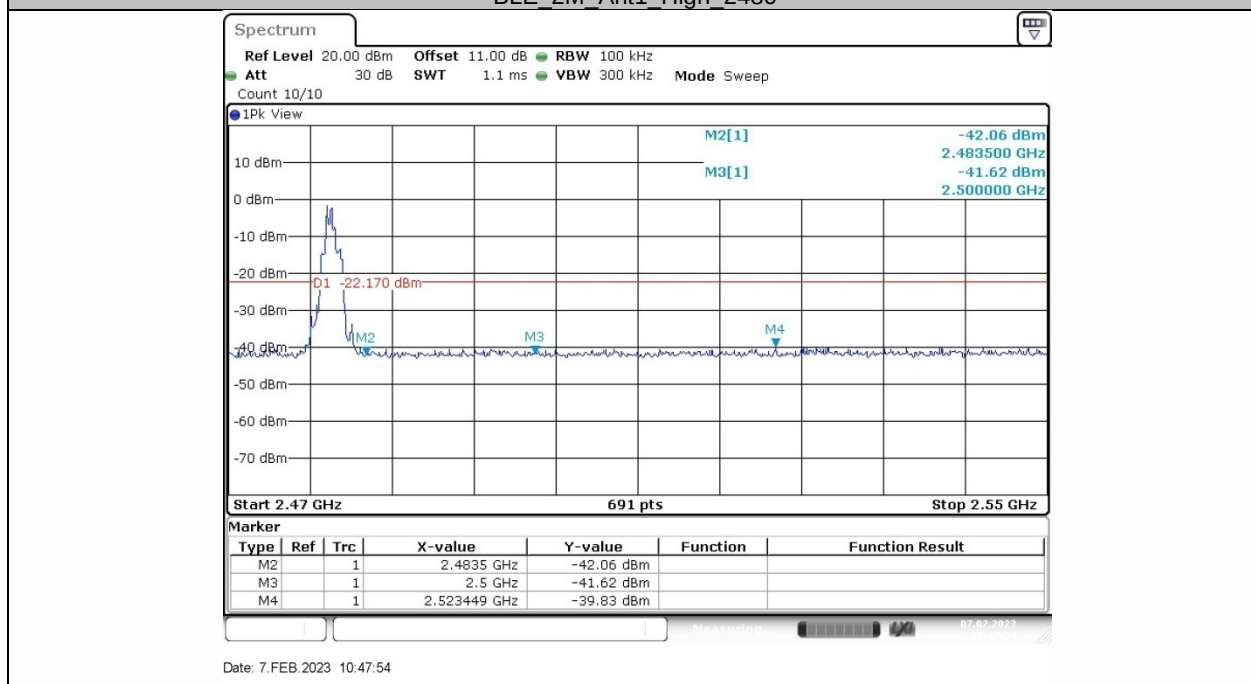




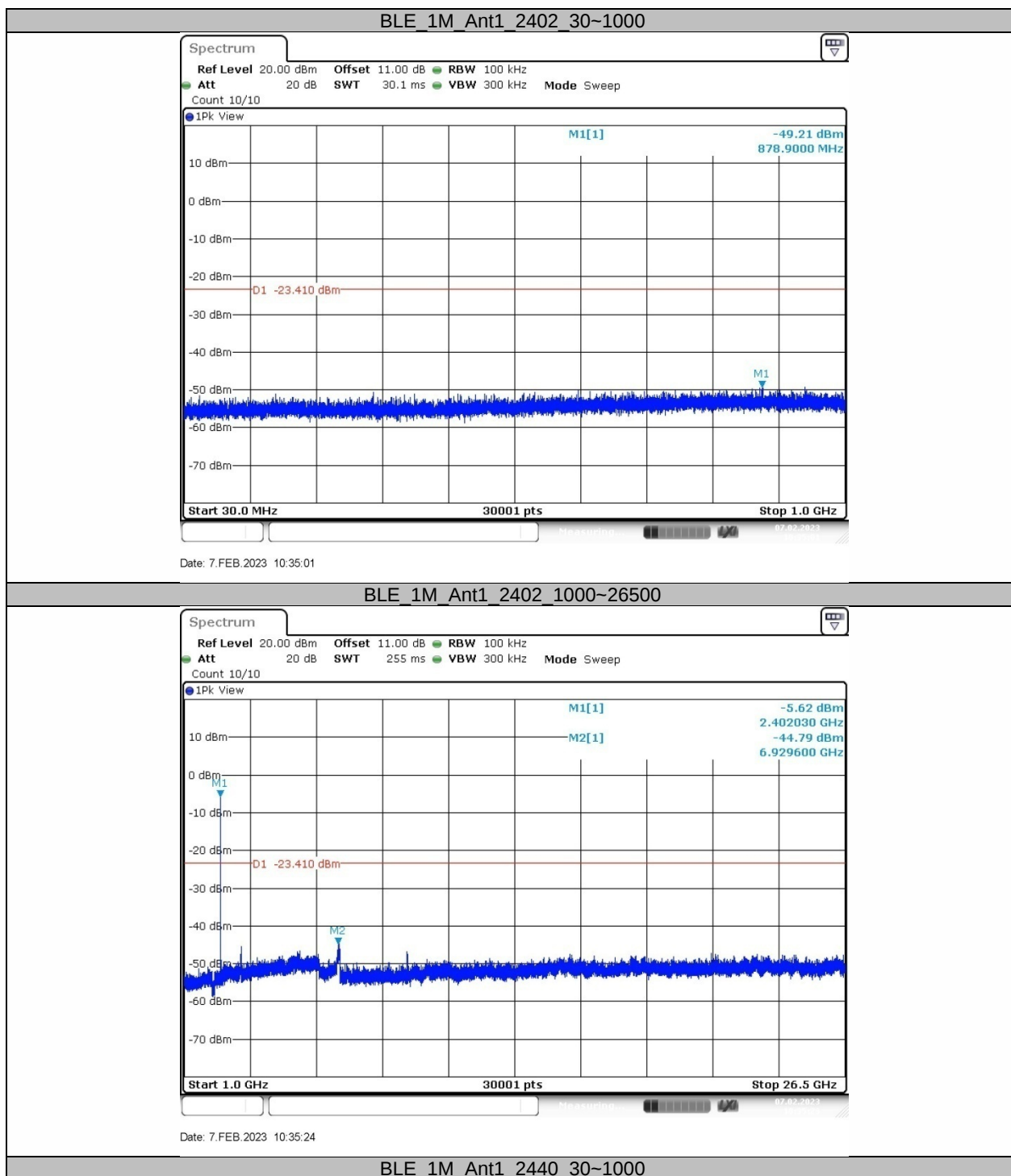


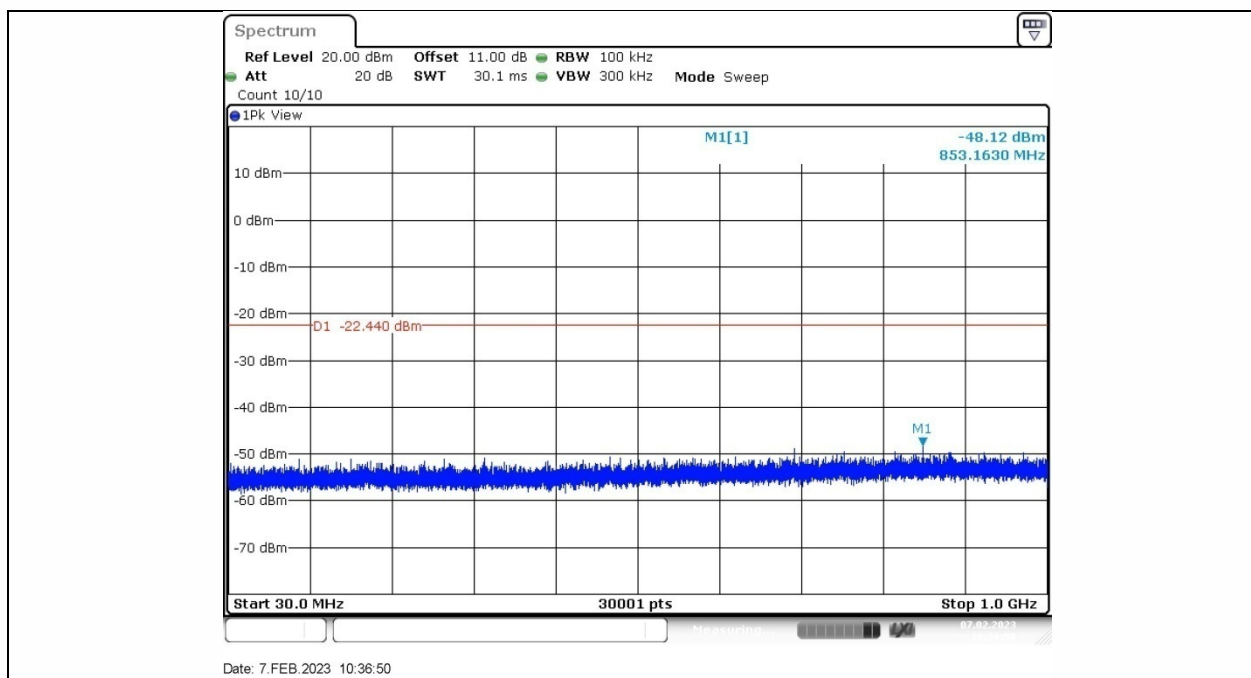
BLE_2M_Ant1_High_2480



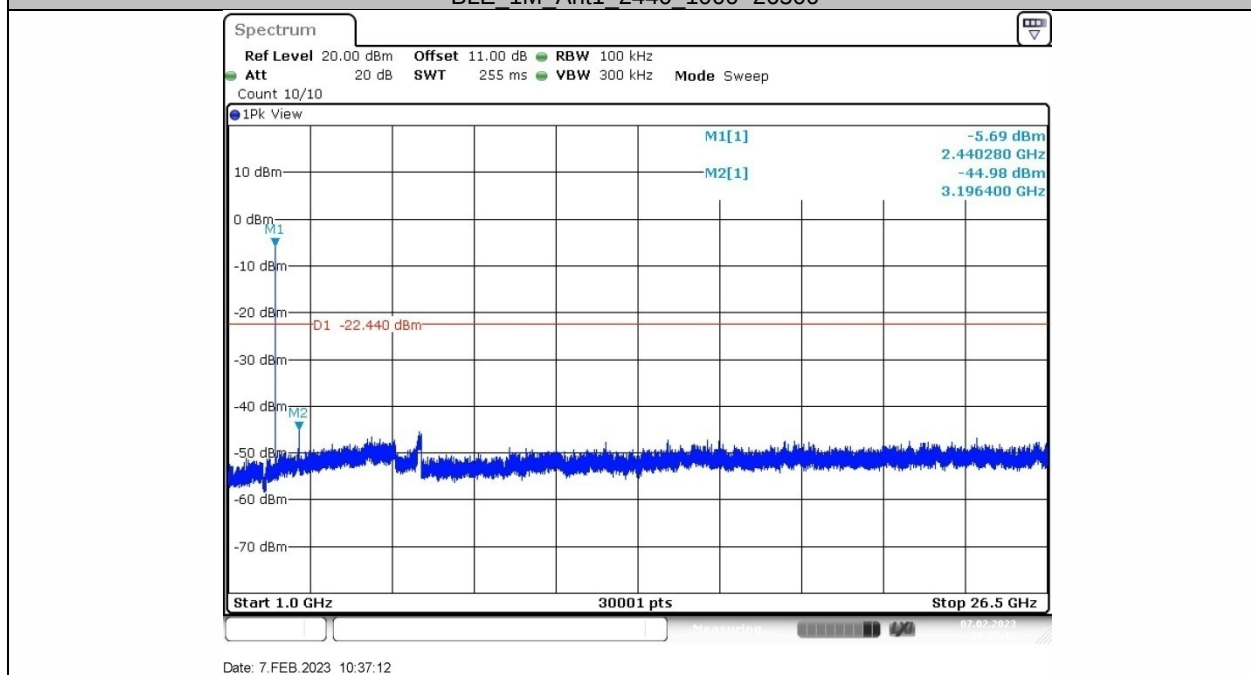
TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	30~1000	-3.41	-49.21	≤-23.41	PASS
			1000~26500	-3.41	-44.79	≤-23.41	PASS
		2440	30~1000	-2.44	-48.12	≤-22.44	PASS
			1000~26500	-2.44	-44.98	≤-22.44	PASS
		2480	30~1000	-1.57	-49.32	≤-21.57	PASS
			1000~26500	-1.57	-44.38	≤-21.57	PASS
BLE_2M	Ant1	2402	30~1000	-4.00	-48.8	≤-24	PASS
			1000~26500	-4.00	-44.08	≤-24	PASS
		2440	30~1000	-3.05	-49.61	≤-23.05	PASS
			1000~26500	-3.05	-45.7	≤-23.05	PASS
		2480	30~1000	-2.17	-49.2	≤-22.17	PASS
			1000~26500	-2.17	-45.65	≤-22.17	PASS



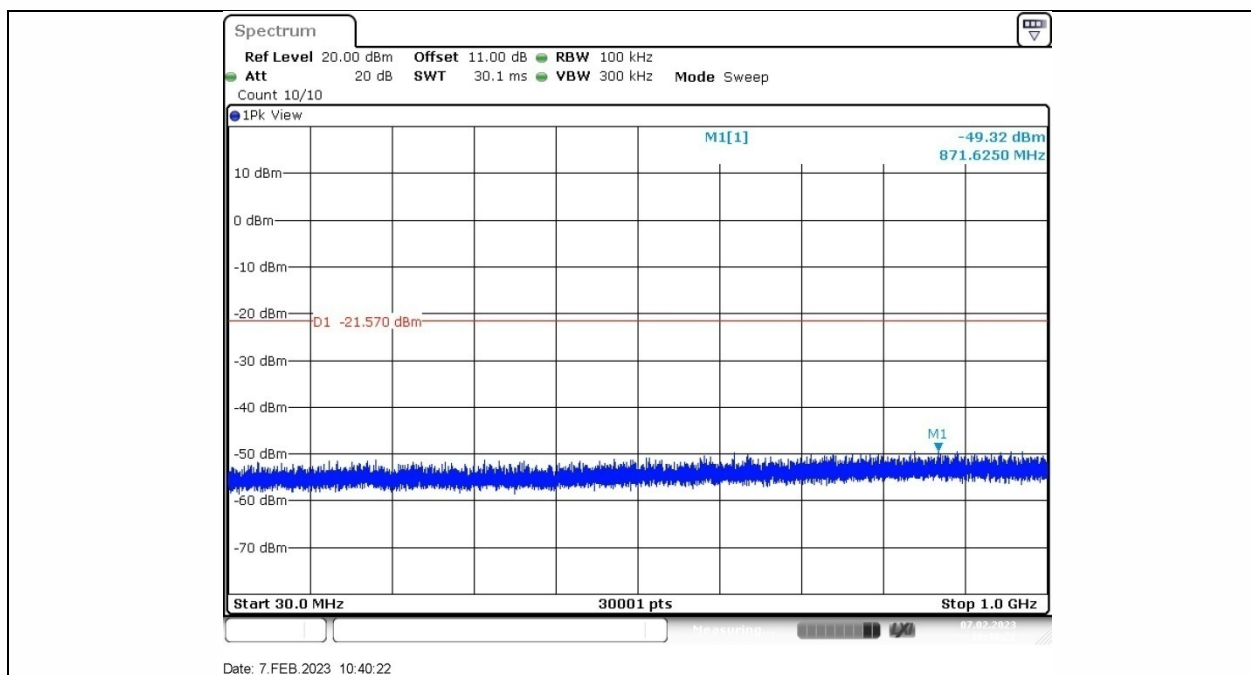




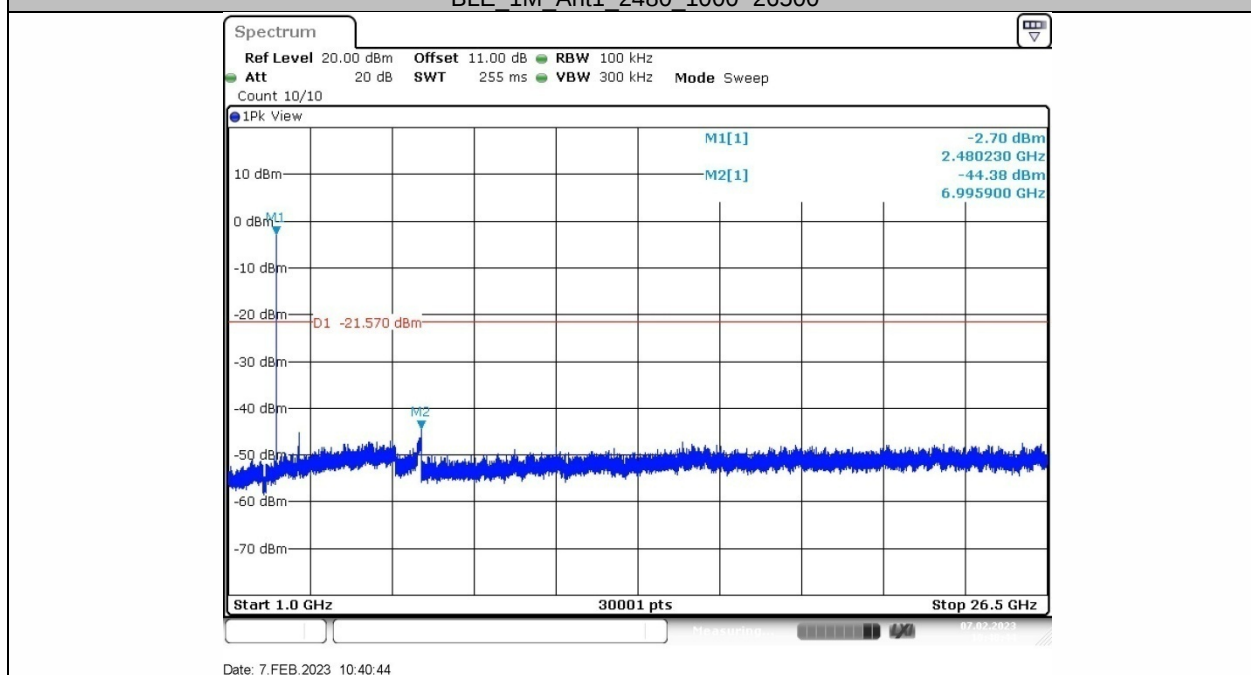
BLE_1M_Ant1_2440_1000~26500



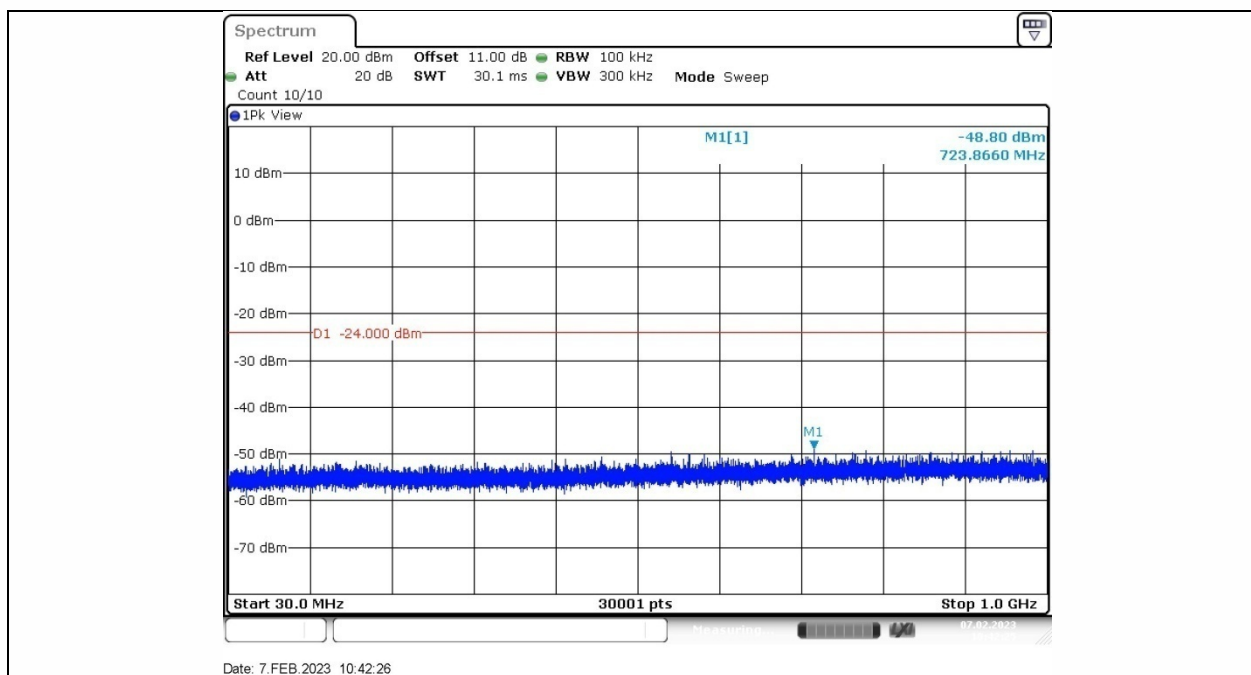
BLE_1M_Ant1_2480_30~1000



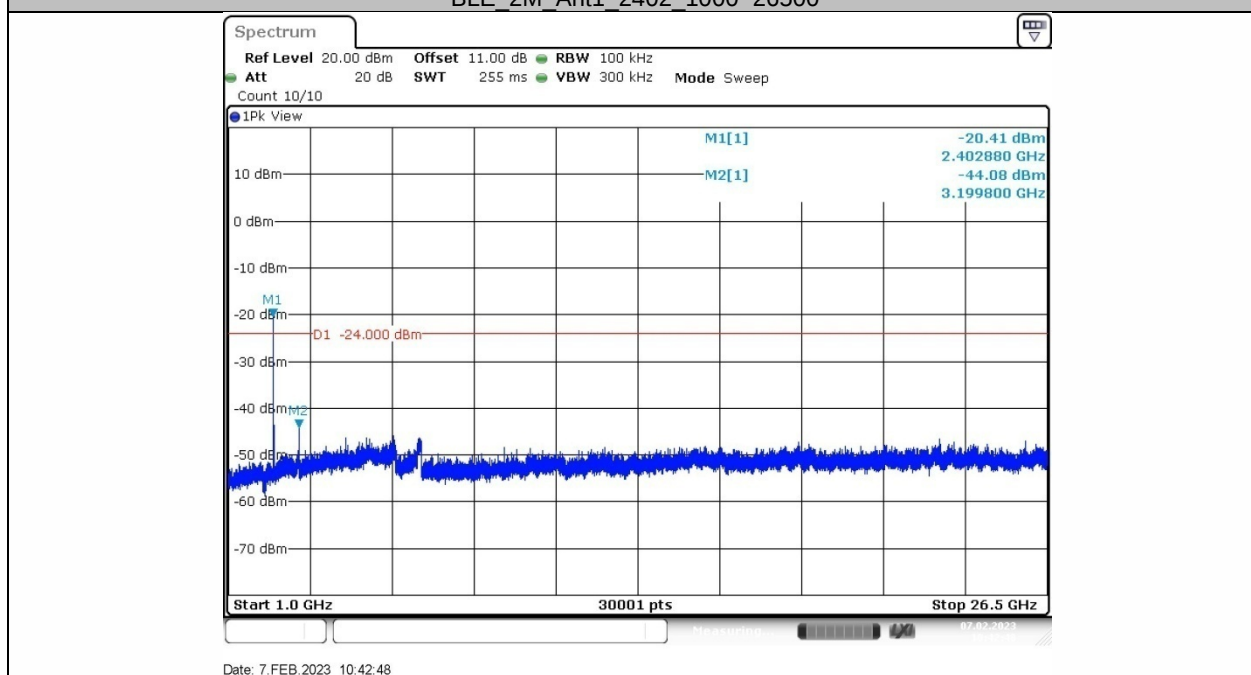
BLE 1M Ant1 2480 1000~26500



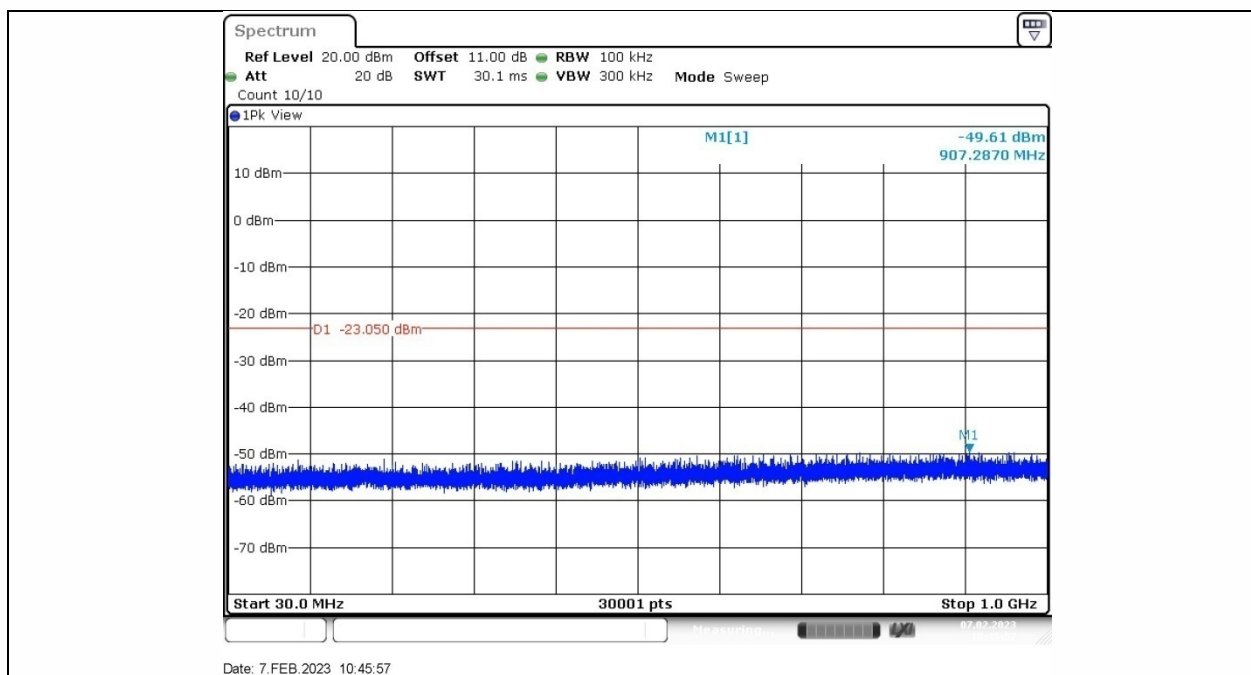
BLE 2M Ant1 2402 30~1000



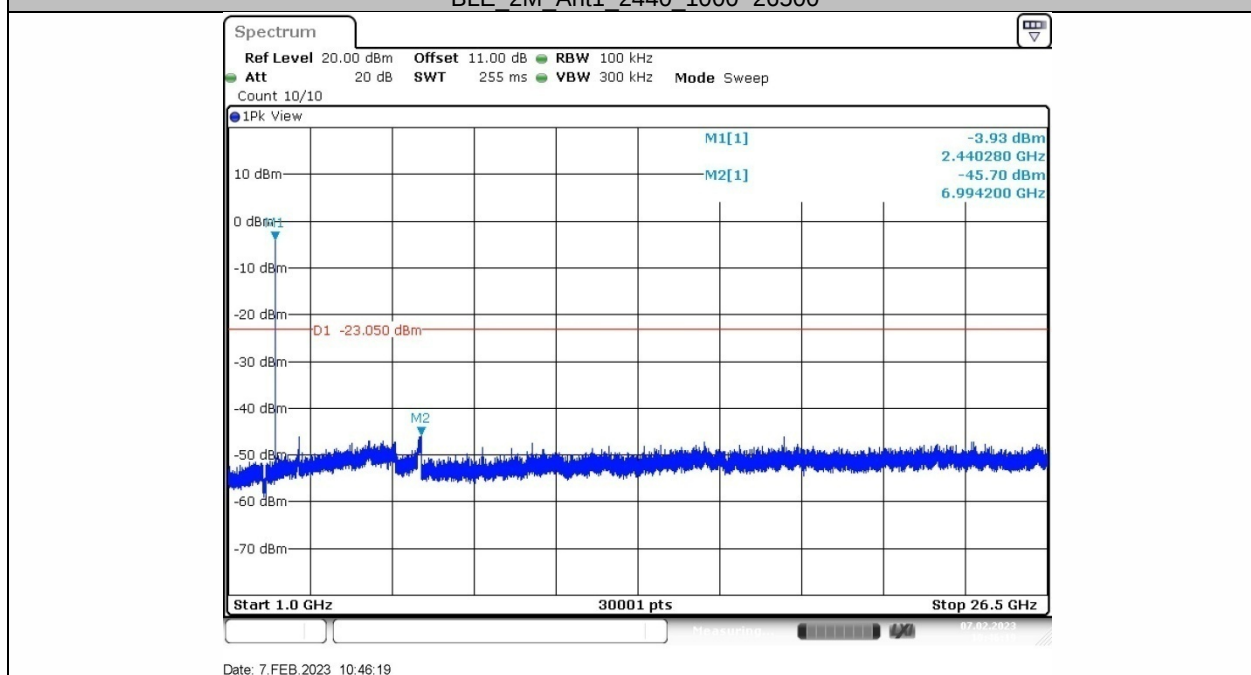
BLE_2M_Ant1_2402_1000~26500



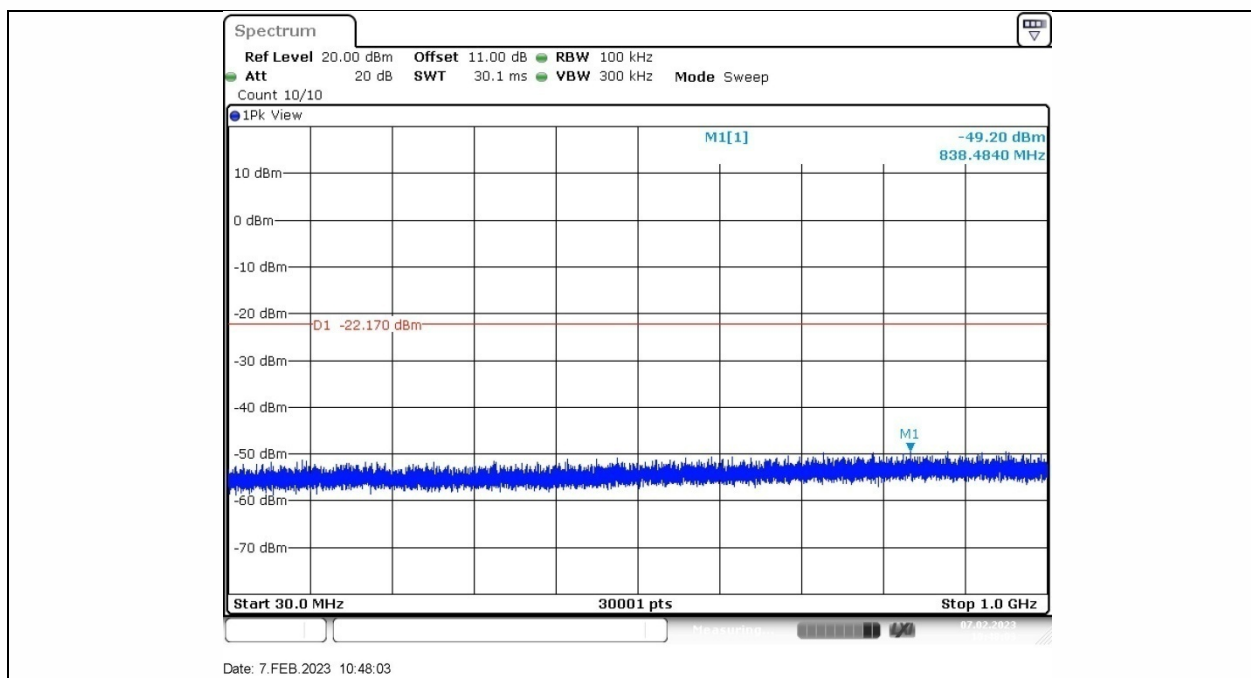
BLE_2M_Ant1_2440_30~1000



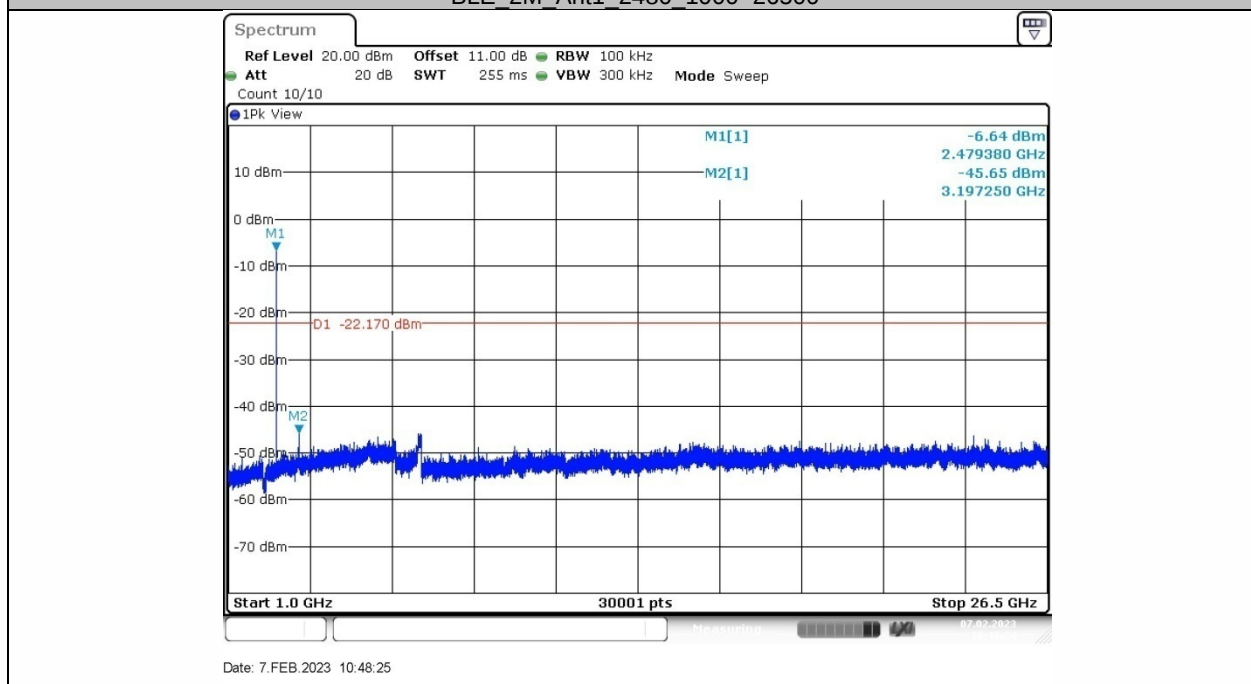
BLE_2M_Ant1_2440_1000~26500



BLE_2M_Ant1_2480_30~1000



BLE_2M_Ant1_2480_1000~26500



8.6 RADIATED SPURIOUS EMISSION

8.6.1 Applicable Standard

According to FCC Part 15.247(d),15.205, 15.209 and KDB 558074 D01 15.247 Meas Guidancev05r02
According to IC RSS-Gen and RSS-247

8.6.2 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
10.495-0.505	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	(2)
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

8.6.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.6.4 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:

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 = 1 MHz for $f \geq 1$ GHz(1GHz to 25GHz), 100 kHz for $f < 1$ GHz(30MHz to 1GHz)

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 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 specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

8.6.5 Test Results

Temperature:	22° C
Relative Humidity:	43%
ATM Pressure:	1011 mbar

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

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor $= 40\log(\text{Specific distance}/\text{test distance})$ (dB);

Limit line = Specific limits(dBuV) + distance extrapolation factor

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

All the antenna(Antenna 1) and modes(BLE_1M, BLE_2M) mode have been tested, and the worst(Antenna 1,BLE_1M) result recorded was report as below:

Test mode: BLE_1M Frequency: Channel 0: 2402MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4805.625	V	44.04	36.81	74.00	54.00	29.96	17.19
14655	V	63.60	50.39	74.00	54.00	10.40	3.61
17606.25	V	68.34	51.05	74.00	54.00	5.66	2.95
4800	H	47.98	36.93	74.00	54.00	26.02	17.07
14726.25	H	64.03	49.92	74.00	54.00	9.97	4.08
17600.62	H	68.32	50.47	74.00	54.00	5.68	3.53

Test mode: BLE_1M Frequency: Channel 19: 2440MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11488.12	V	60.45	49.75	74.00	54.00	13.55	4.25
14748.75	V	64.38	49.04	74.00	54.00	9.62	4.96
17619.37	V	69.92	50.07	74.00	54.00	4.08	3.93
11420.62	H	59.70	48.80	74.00	54.00	14.30	5.20
14655	H	63.86	50.28	74.00	54.00	10.14	3.72
17634.37	H	68.55	50.67	74.00	54.00	5.45	3.33

Test mode: BLE_1M Frequency: Channel 39: 2480MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4957.5	V	47.15	37.24	74.00	54.00	26.85	16.76
14625	V	64.23	50.95	74.00	54.00	9.77	3.05
17604.37	V	69.08	50.55	74.00	54.00	4.92	3.45
4959.375	H	47.30	37.26	74.00	54.00	26.70	16.74
14626.87	H	63.49	50.91	74.00	54.00	10.51	3.09
17598.75	H	68.61	50.63	74.00	54.00	5.39	3.37

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor.
 - (3) Correct Factor= Ant_F + Cab_L- Preamp
 - (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All the antenna(Antenna 1) and modes(BLE_1M, BLE_2M) mode have been tested, and the worst(Antenna 1,BLE_1M) result recorded was report as below:

Test mode: BLE_1M		Frequency:		Channel 0: 2402MHz	
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2323.87	H	44.77	74.00	41.19	54.00
2329.11	V	44.82	74.00	29.18	54.00

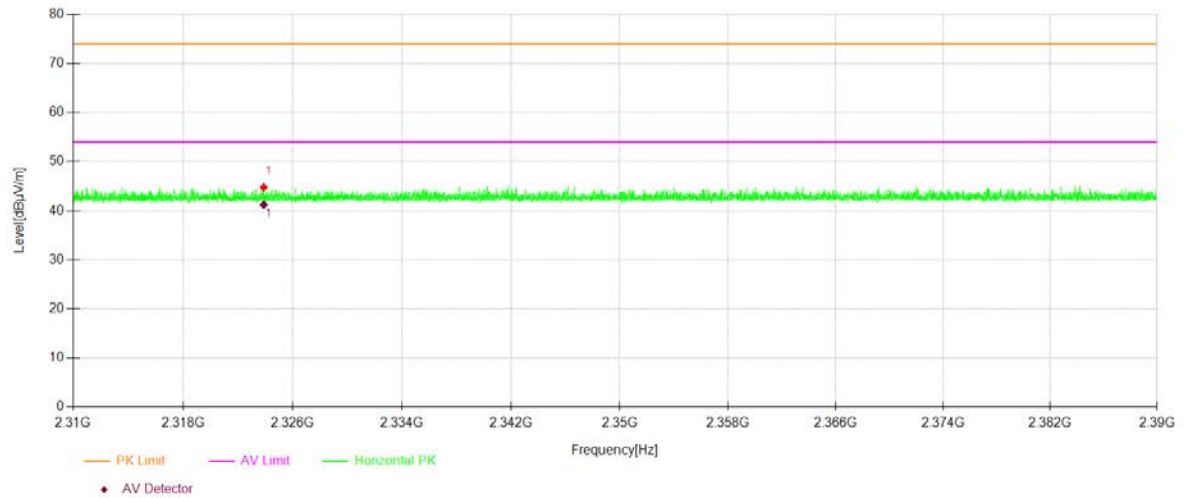
Test mode: BLE_1M		Frequency:		Channel 39: 2480MHz	
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2485.70	H	47.56	74.00	41.23	54.00
2488.32	V	46.11	74.00	41.23	54.00

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor.
 - (3) Correct Factor= Ant_F + Cab_L - Preamp
 - (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Test Model

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

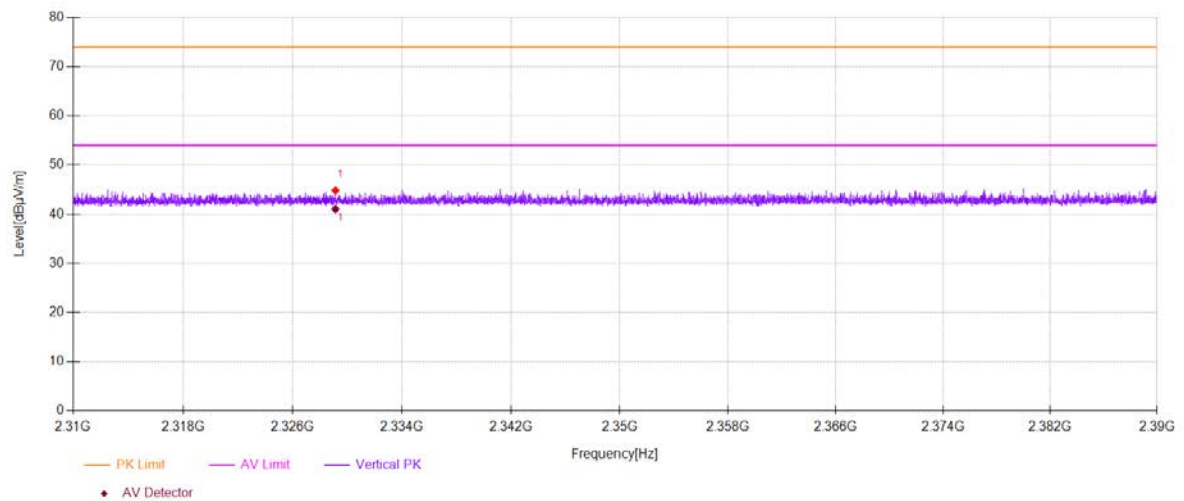
H



Test Model

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

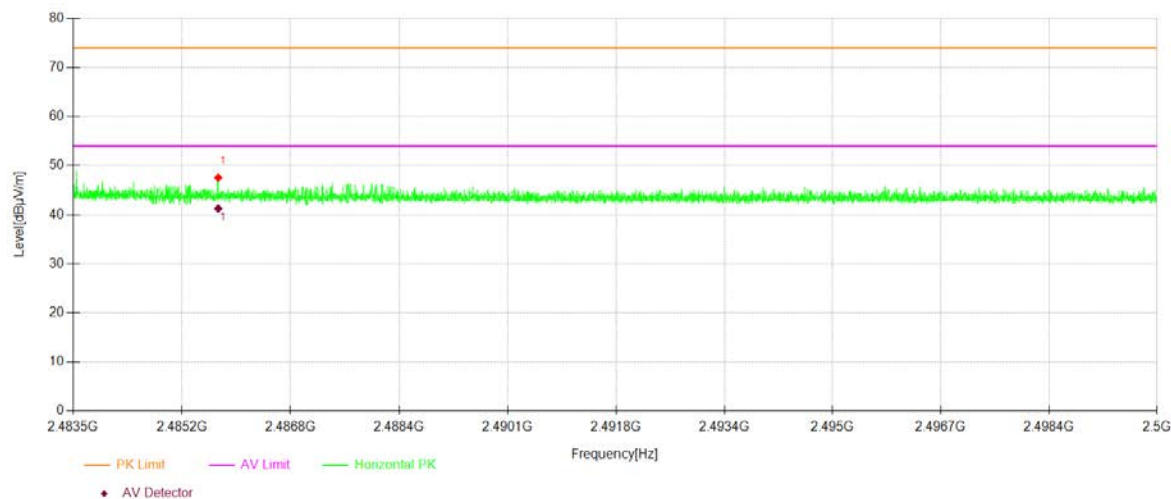
V



Test Model

Spurious Emission in Restricted Band 2483.5-2500MHz
Channel 39: 2480MHz BLE_1M

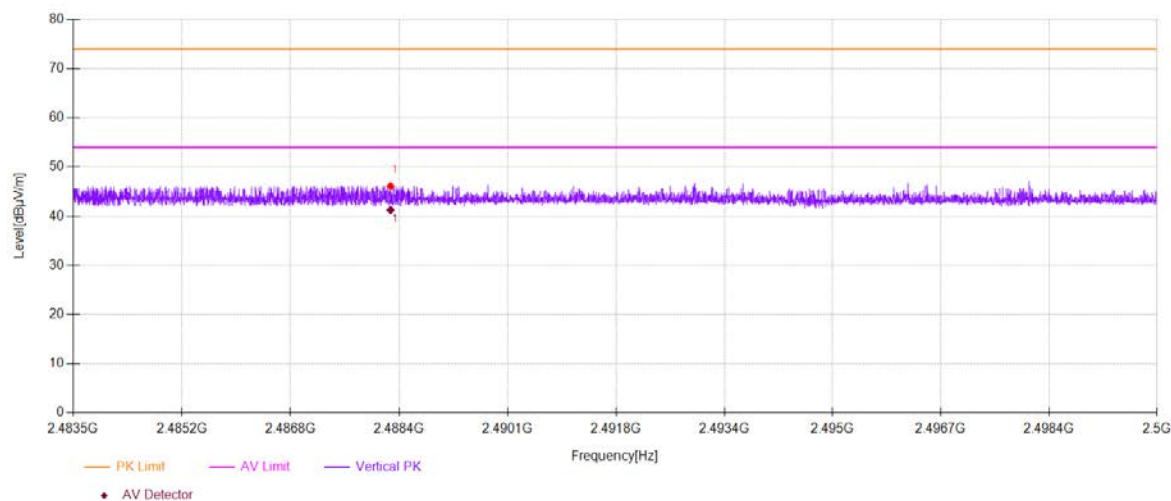
H



Test Model

Spurious Emission in Restricted Band 2483.5-2500MHz
Channel 39: 2480MHz BLE_1M

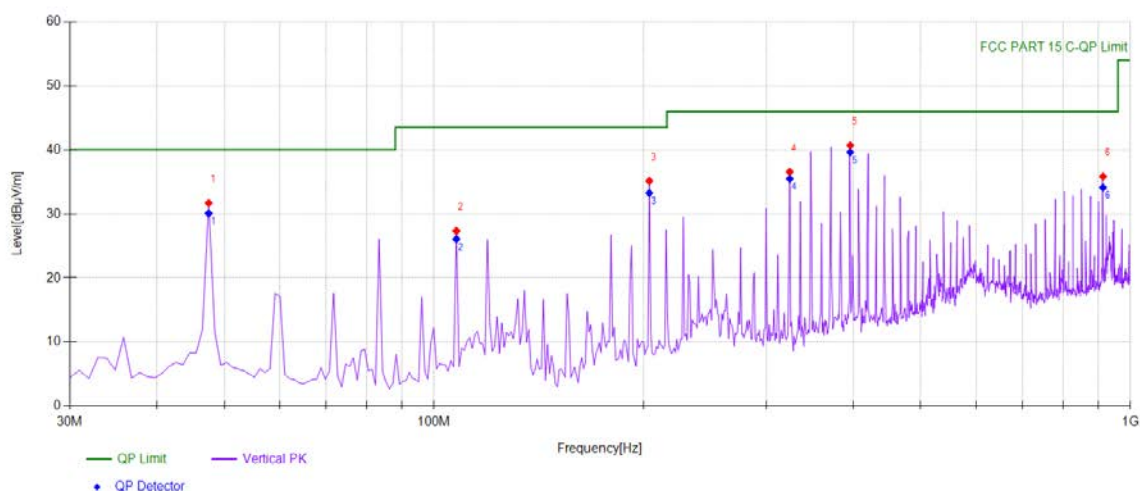
V



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

All the antenna(Antenna 1) and modes(BLE_1M, BLE_2M) mode have been tested, and the worst(Antenna 1,BLE_1M) result recorded was report as below:

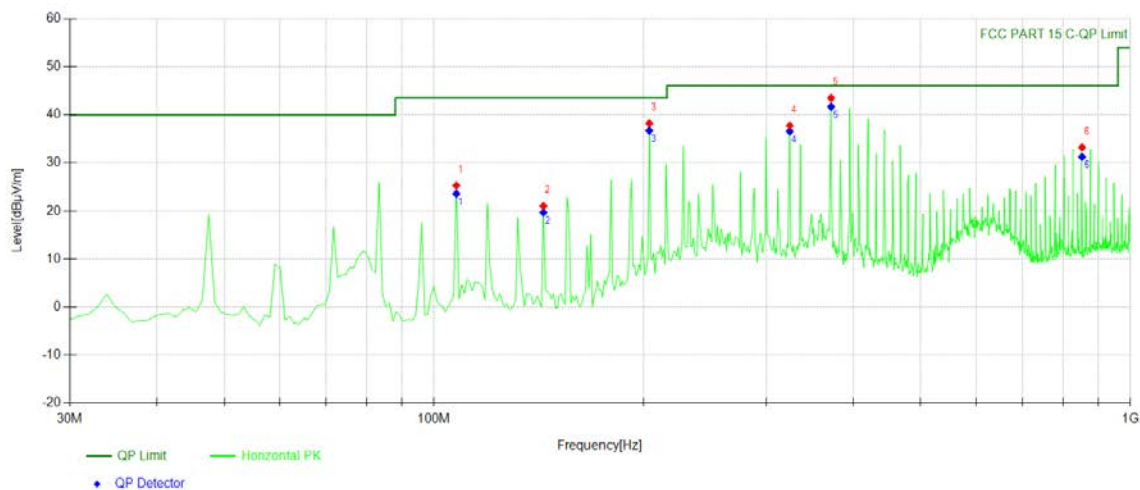
Mode:	BLE2402
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Suspected Data List

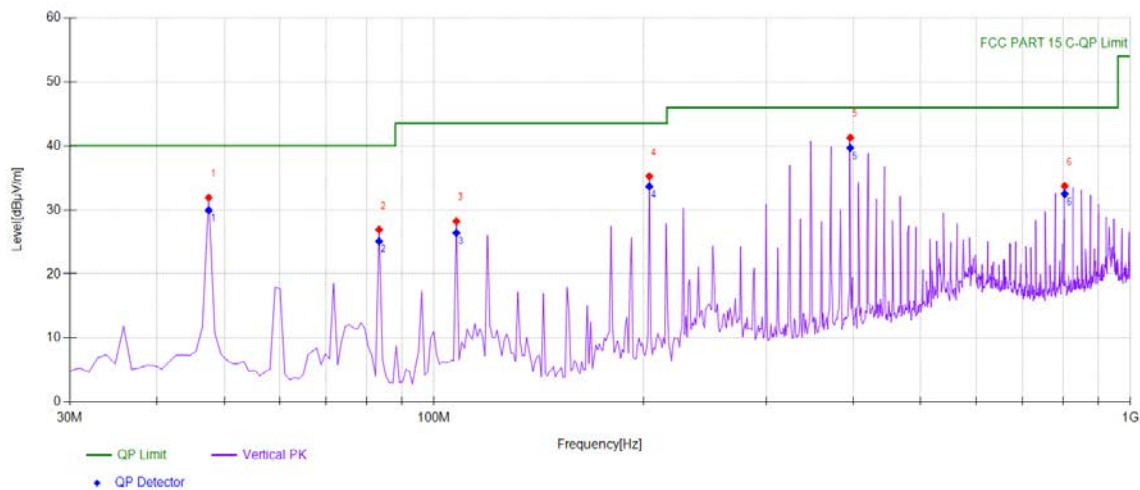
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	47.4775	31.70	-17.39	40.00	0.30	PK	100	336	Vertical
2	107.677	27.35	-17.20	43.50	8.15	PK	100	26	Vertical
3	203.803	35.15	-17.13	43.50	0.35	PK	100	150	Vertical
4	324.204	36.56	-13.97	46.00	1.44	PK	100	61	Vertical
5	396.056	40.69	-11.81	46.00	5.31	PK	100	39	Vertical
6	913.583	35.83	-2.85	46.00	2.17	PK	100	254	Vertical

Mode:	BLE2402
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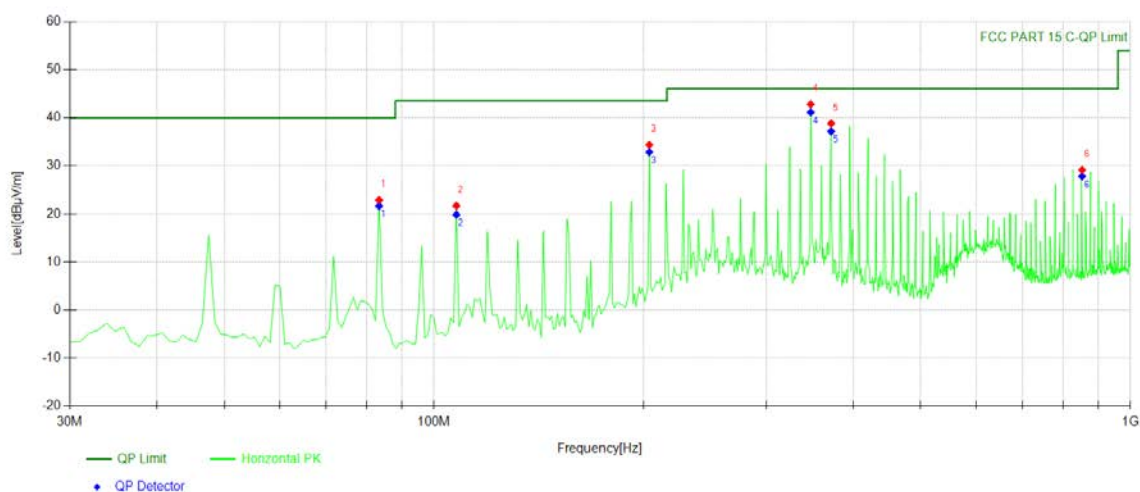
Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	107.677	25.30	-17.20	43.50	3.20	PK	100	62	Horizontal
2	143.603	21.03	-19.92	43.50	7.47	PK	100	222	Horizontal
3	203.803	38.23	-17.13	43.50	5.27	PK	100	87	Horizontal
4	324.204	37.73	-13.97	46.00	8.27	PK	100	270	Horizontal
5	371.781	43.47	-12.50	46.00	2.53	PK	100	287	Horizontal
6	852.412	33.22	-3.80	46.00	12.78	PK	100	316	Horizontal

Mode:	BLE2440
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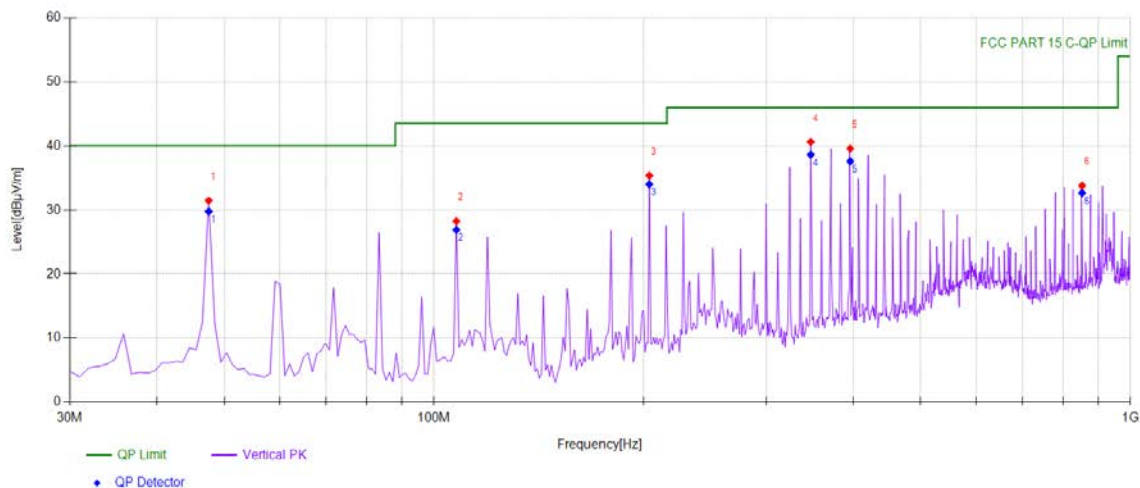
Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	47.4775	31.91	-17.39	40.00	0.09	PK	100	336	Vertical
2	83.4034	26.92	-20.70	40.00	5.08	PK	100	270	Vertical
3	107.677	28.22	-17.20	43.50	7.28	PK	100	12	Vertical
4	203.803	35.25	-17.13	43.50	0.25	PK	100	336	Vertical
5	396.056	41.26	-11.81	46.00	4.74	PK	100	49	Vertical
6	804.834	33.73	-4.38	46.00	4.27	PK	100	239	Vertical

Mode:	BLE2440
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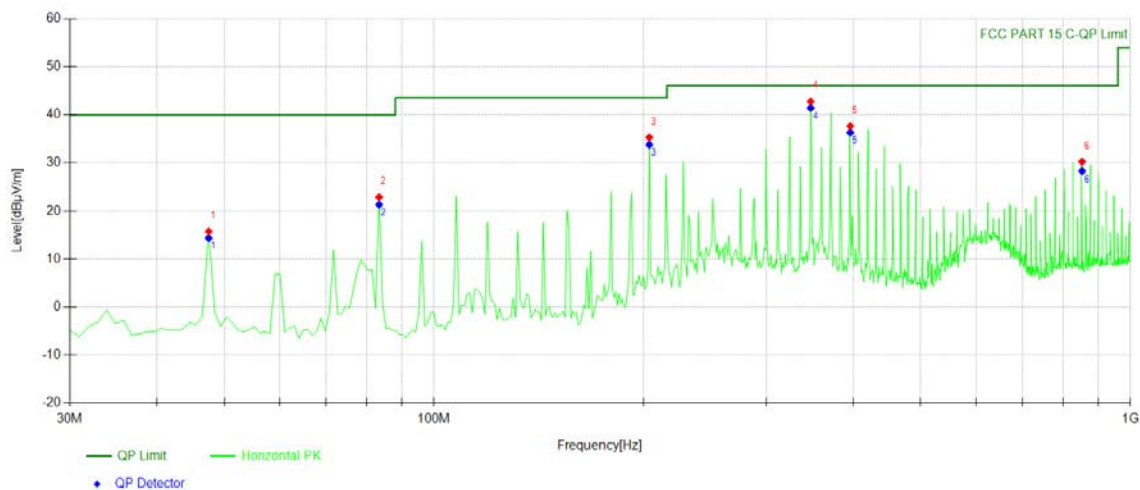
Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	83.4034	22.89	-20.70	40.00	17.11	PK	100	28	Horizontal
2	107.677	21.70	-17.20	43.50	2.80	PK	100	201	Horizontal
3	203.803	34.37	-17.13	43.50	9.13	PK	100	87	Horizontal
4	347.507	42.81	-13.47	46.00	3.19	PK	100	269	Horizontal
5	371.781	38.81	-12.50	46.00	7.19	PK	100	300	Horizontal
6	852.412	29.14	-3.80	46.00	16.86	PK	100	317	Horizontal

Mode:	BLE2480
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Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	47.4775	31.45	-17.39	40.00	0.55	PK	100	7	Vertical
2	107.677	28.23	-17.20	43.50	7.27	PK	100	7	Vertical
3	203.803	35.36	-17.13	43.50	8.14	PK	100	142	Vertical
4	347.507	40.61	-13.47	46.00	5.39	PK	100	65	Vertical
5	396.056	39.57	-11.81	46.00	6.43	PK	100	48	Vertical
6	852.412	33.79	-3.80	46.00	4.21	PK	100	233	Vertical

Mode:	BLE2480
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Suspected Data List									
NO.	Freq. [MHz]	Level [dBμV/m]	Factor[dB/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle [°]	Polarity
1	47.4775	15.72	-17.39	40.00	6.28	PK	100	65	Horizontal
2	83.4034	22.84	-20.70	40.00	17.16	PK	100	24	Horizontal
3	203.803	35.31	-17.13	43.50	8.19	PK	100	82	Horizontal
4	347.507	42.76	-13.47	46.00	3.24	PK	100	276	Horizontal
5	396.056	37.64	-11.81	46.00	8.36	PK	100	24	Horizontal
6	852.412	30.25	-3.80	46.00	15.75	PK	100	321	Horizontal

8.7 CONDUCTED EMISSIONS TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)

According to IC RSS-Gen 8.8

8.7.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	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.

8.7.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

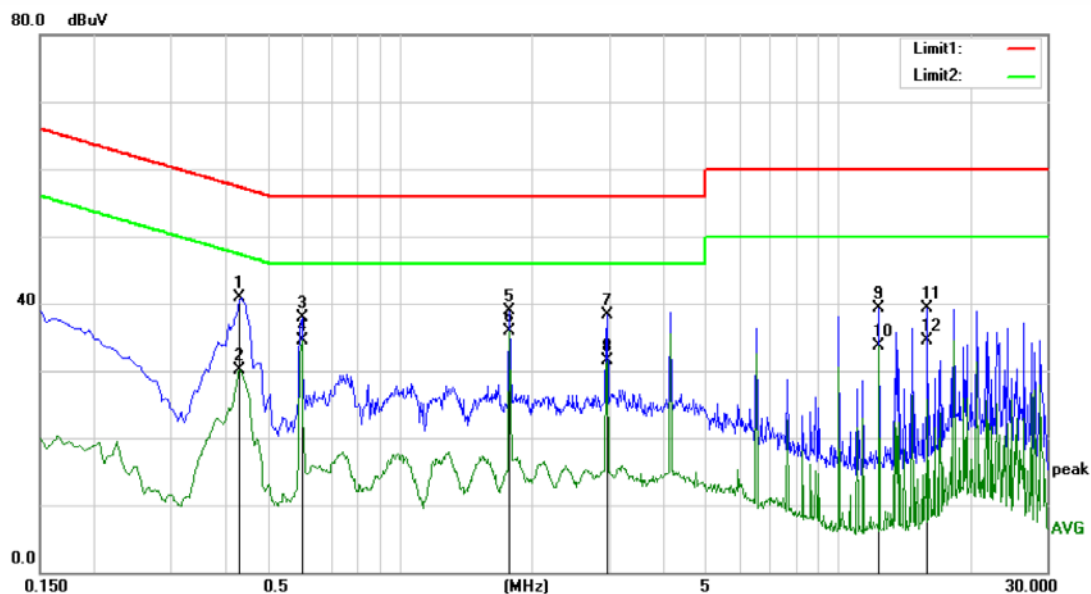
Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

Pass

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



Site Conduction #1

Phase: *N*

Temperature: 22.4

Limit: (CE)FCC PART 15 class B_QP

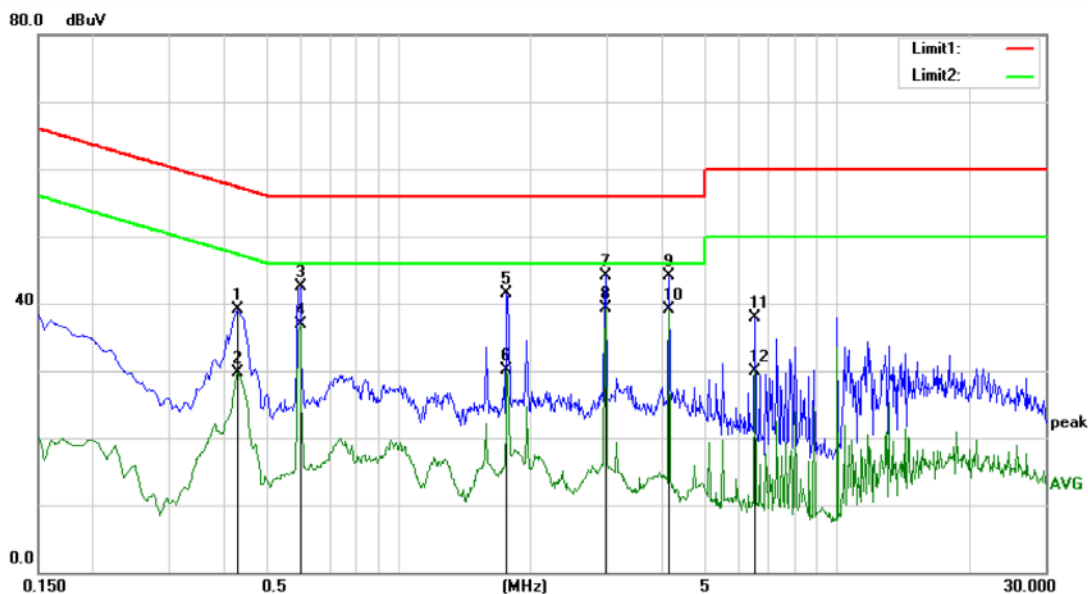
Power: DC 5V from adapter

Humidity: 55 %

Mode: BLE mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4300	31.57	9.31	40.88	57.25	-16.37	QP	
2		0.4300	20.84	9.31	30.15	47.25	-17.10	AVG	
3		0.5950	28.67	9.26	37.93	56.00	-18.07	QP	
4		0.5950	25.26	9.26	34.52	46.00	-11.48	AVG	
5		1.7800	29.06	9.93	38.99	56.00	-17.01	QP	
6	*	1.7800	26.02	9.93	35.95	46.00	-10.05	AVG	
7		2.9650	28.29	9.95	38.24	56.00	-17.76	QP	
8		2.9650	21.61	9.95	31.56	46.00	-14.44	AVG	
9		12.4300	29.10	10.15	39.25	60.00	-20.75	QP	
10		12.4300	23.58	10.15	33.73	50.00	-16.27	AVG	
11		15.9800	29.13	10.17	39.30	60.00	-20.70	QP	
12		15.9800	24.24	10.17	34.41	50.00	-15.59	AVG	



Site Conduction #1

Phase: L1

Temperature: 22.4

Limit: (CE)FCC PART 15 class B_QP

Power: DC 5V from adapter

Humidity: 55 %

Mode: BLE mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4300	29.74	9.31	39.05	57.25	-18.20	QP	
2		0.4300	20.45	9.31	29.76	47.25	-17.49	AVG	
3		0.5950	33.32	9.26	42.58	56.00	-13.42	QP	
4		0.5950	27.70	9.26	36.96	46.00	-9.04	AVG	
5		1.7700	31.53	9.93	41.46	56.00	-14.54	QP	
6		1.7700	20.16	9.93	30.09	46.00	-15.91	AVG	
7		2.9650	34.25	9.95	44.20	56.00	-11.80	QP	
8	*	2.9650	29.32	9.95	39.27	46.00	-6.73	AVG	
9		4.1500	34.19	9.92	44.11	56.00	-11.89	QP	
10		4.1500	29.26	9.92	39.18	46.00	-6.82	AVG	
11		6.5050	28.00	10.00	38.00	60.00	-22.00	QP	
12		6.5050	19.93	10.00	29.93	50.00	-20.07	AVG	

8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	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.

8.8.2 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 documentInternal Photos to show the antenna connector.

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