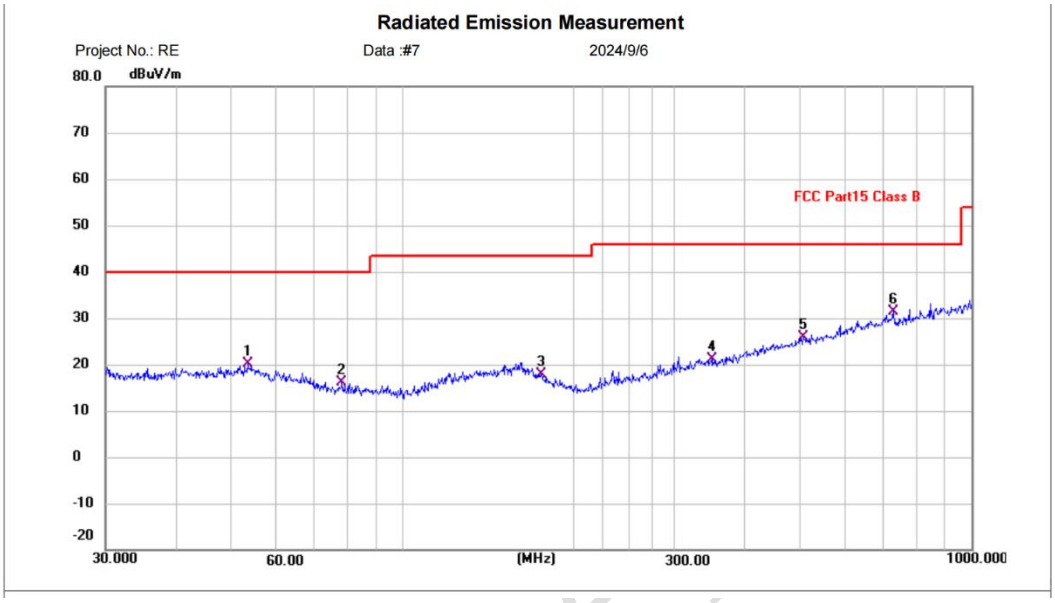
6.8.4 Test data

Below 1GHz

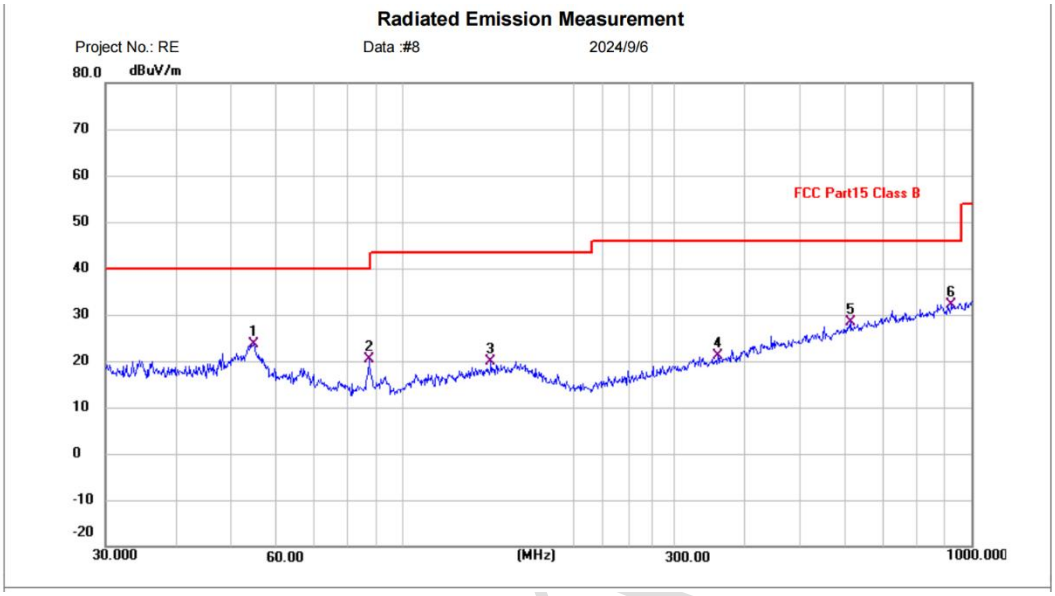
[Test mode: TX]; [Polarity: Horizontal]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	53.3179	0.33	19.81	20.14	40.00	-19.86	QP	P	
2	78.1389	0.43	15.58	16.01	40.00	-23.99	QP	P	
3	175.0368	-1.06	18.94	17.88	43.50	-25.62	QP	P	
4	349.2500	-0.19	21.33	21.14	46.00	-24.86	QP	P	
5	506.4791	0.32	25.48	25.80	46.00	-20.20	QP	P	
6 *	729.3583	2.28	29.00	31.28	46.00	-14.72	QP	P	

Test Result: Pass

[Test mode: TX]; [Polarity: Vertical]



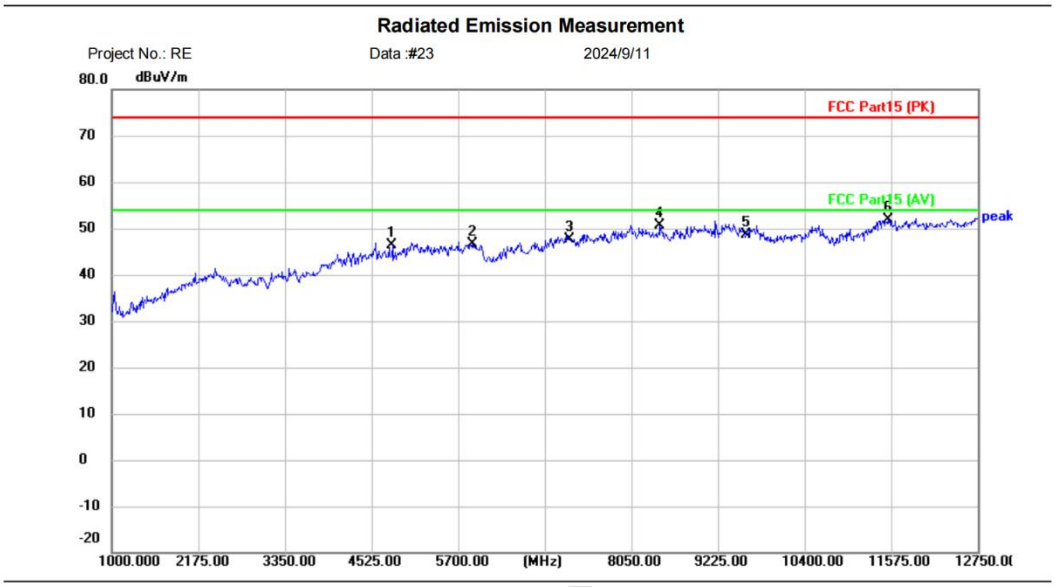
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	54.6429	4.14	19.49	23.63	40.00	-16.37	QP	P	
2	87.1117	4.97	15.53	20.50	40.00	-19.50	QP	P	
3	142.8243	-0.16	20.14	19.98	43.50	-23.52	QP	P	
4	357.9287	-0.47	21.48	21.01	46.00	-24.99	QP	P	
5	612.0642	1.19	27.07	28.26	46.00	-17.74	QP	P	
6 *	922.5157	0.80	31.37	32.17	46.00	-13.83	QP	P	

Test Result: Pass

Above 1GHz:

Remark:During the test, pre-scan the BLE 1Mbps /BLE 2Mbps modulation, and found the 1Mbps which it is worse case.

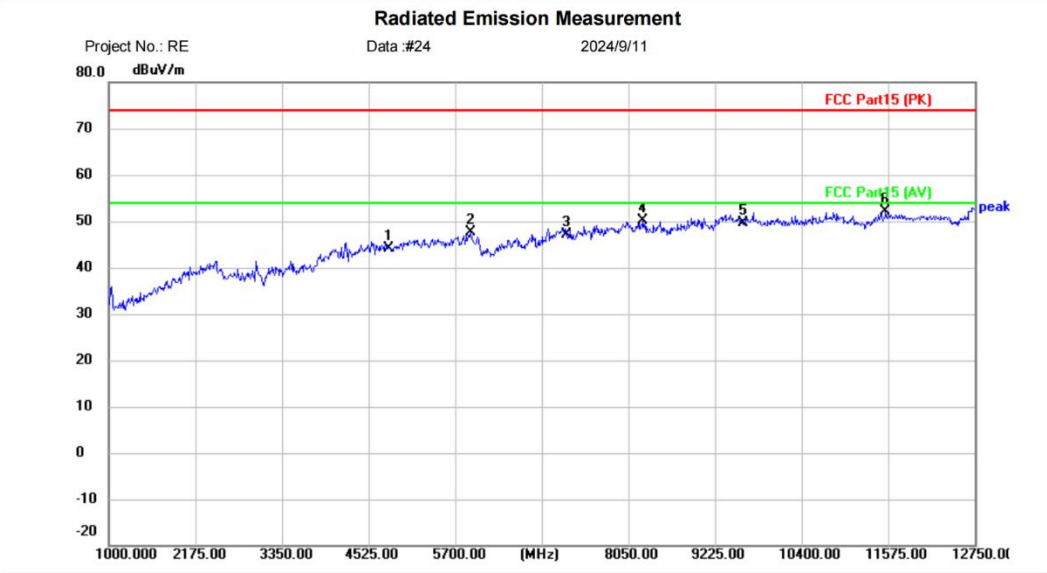
[Test mode: TX low channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	40.15	6.31	46.46	74.00	-27.54	peak	
2		5888.000	37.57	9.05	46.62	74.00	-27.38	peak	
3		7206.000	37.29	10.39	47.68	74.00	-26.32	peak	
4		8437.750	38.74	11.81	50.55	74.00	-23.45	peak	
5		9608.000	34.46	14.16	48.62	74.00	-25.38	peak	
6	*	11528.00	32.34	19.43	51.77	74.00	-22.23	peak	

Test Result: Pass

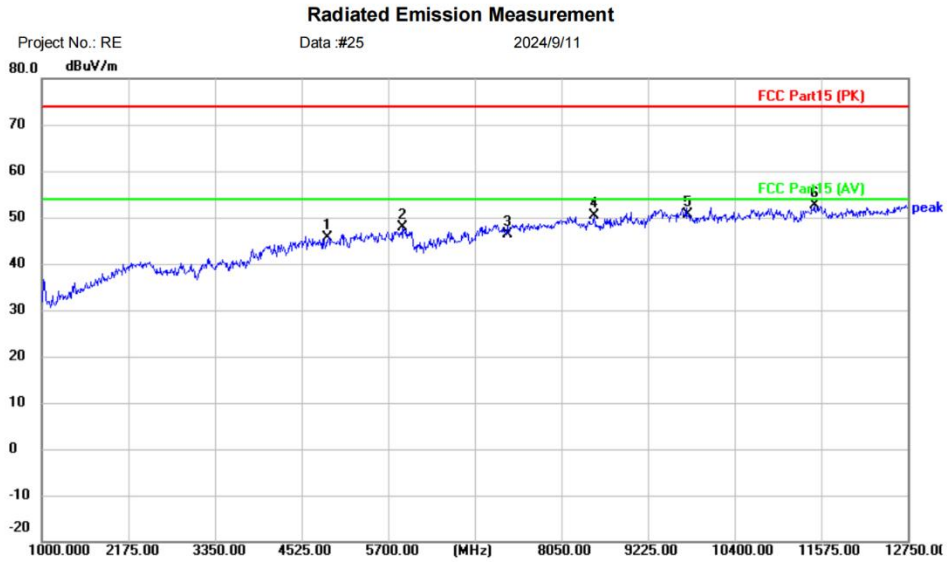
[Test mode: TX low channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	37.84	6.31	44.15	74.00	-29.85	peak	
2		5911.500	38.53	9.08	47.61	74.00	-26.39	peak	
3		7206.000	36.84	10.39	47.23	74.00	-26.77	peak	
4		8249.750	38.60	11.44	50.04	74.00	-23.96	peak	
5		9608.000	35.57	14.16	49.73	74.00	-24.27	peak	
6	*	11539.75	32.68	19.43	52.11	74.00	-21.89	peak	

Test Result: Pass

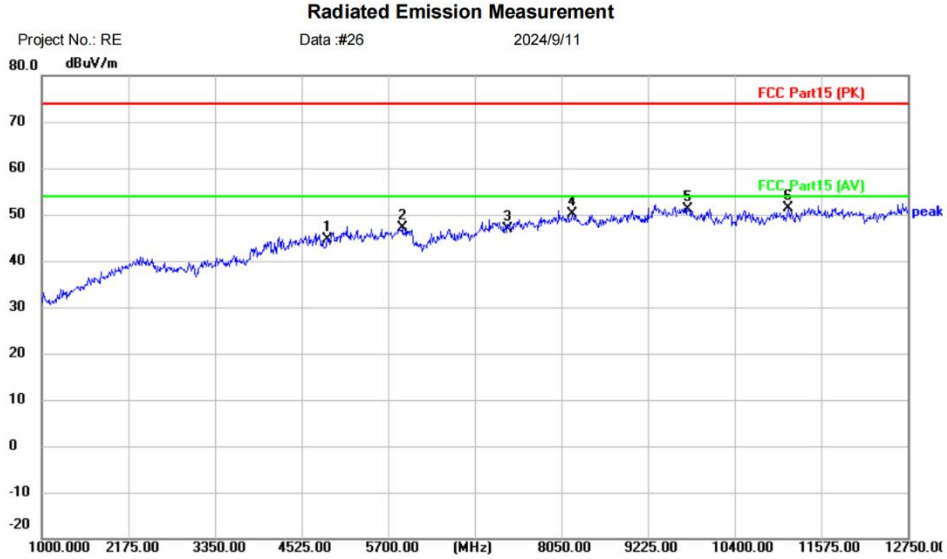
[Test mode: TX middle channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4884.000	39.19	6.45	45.64	74.00	-28.36	peak	
2		5899.750	38.84	9.10	47.94	74.00	-26.06	peak	
3		7326.000	36.27	10.21	46.48	74.00	-27.52	peak	
4		8496.500	38.41	11.88	50.29	74.00	-23.71	peak	
5		9768.000	35.70	14.95	50.65	74.00	-23.35	peak	
6	*	11481.00	33.37	19.37	52.74	74.00	-21.26	peak	

Test Result: Pass

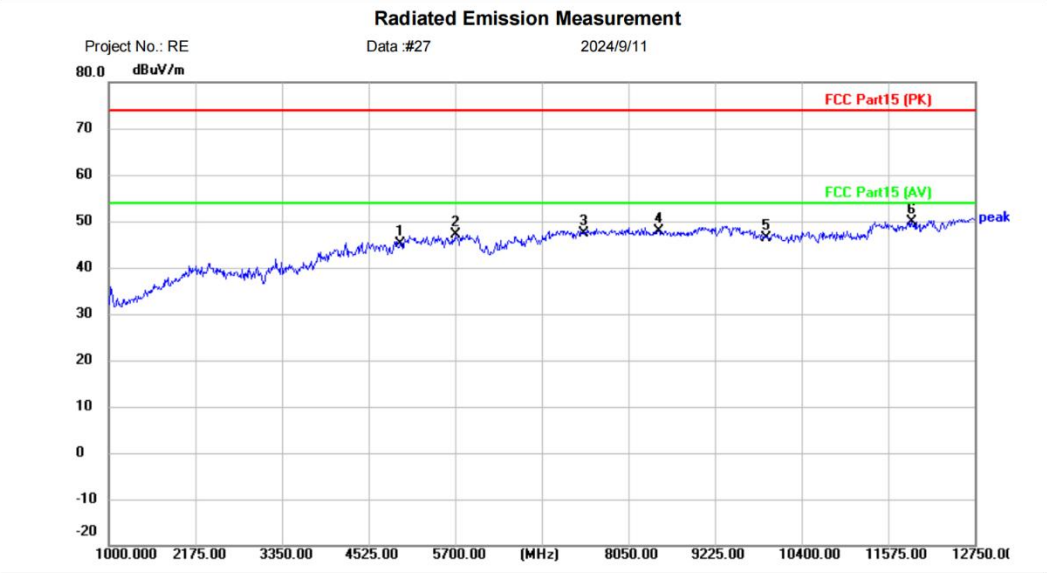
[Test mode: TX middle channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4884.000	38.06	6.45	44.51	74.00	-29.49	peak	
2		5888.000	38.07	9.05	47.12	74.00	-26.88	peak	
3		7326.000	36.75	10.21	46.96	74.00	-27.04	peak	
4		8191.000	38.49	11.68	50.17	74.00	-23.83	peak	
5		9768.000	36.18	14.95	51.13	74.00	-22.87	peak	
6	*	11128.50	33.46	17.92	51.38	74.00	-22.62	peak	

Test Result: Pass

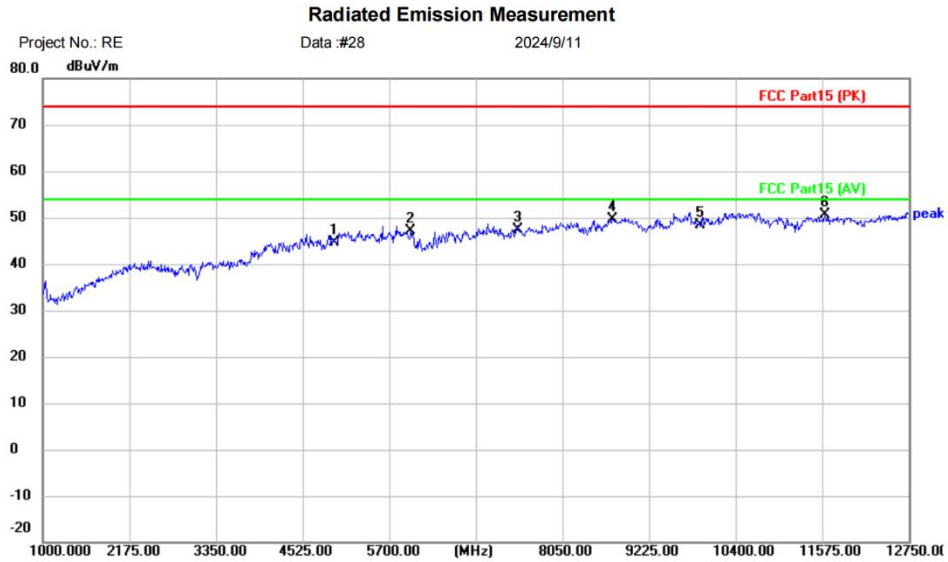
[Test mode: TX High channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	37.66	7.41	45.07	74.00	-28.93	peak	
2		5700.000	38.16	8.95	47.11	74.00	-26.89	peak	
3		7440.000	36.34	11.03	47.37	74.00	-26.63	peak	
4		8461.250	36.07	11.92	47.99	74.00	-26.01	peak	
5		9920.000	32.01	14.41	46.42	74.00	-27.58	peak	
6	*	11892.25	31.82	18.11	49.93	74.00	-24.07	peak	

Test Result: Pass

[Test mode: TX High channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	37.23	7.41	44.64	74.00	-29.36	peak	
2		5993.750	38.22	8.96	47.18	74.00	-26.82	peak	
3		7440.000	36.47	11.03	47.50	74.00	-26.50	peak	
4		8731.500	37.22	12.50	49.72	74.00	-24.28	peak	
5		9920.000	33.99	14.41	48.40	74.00	-25.60	peak	
6	*	11610.25	31.38	19.23	50.61	74.00	-23.39	peak	

Test Result: Pass

6.9 Radiated emissions which fall in the restricted bands

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.9.1 Limit

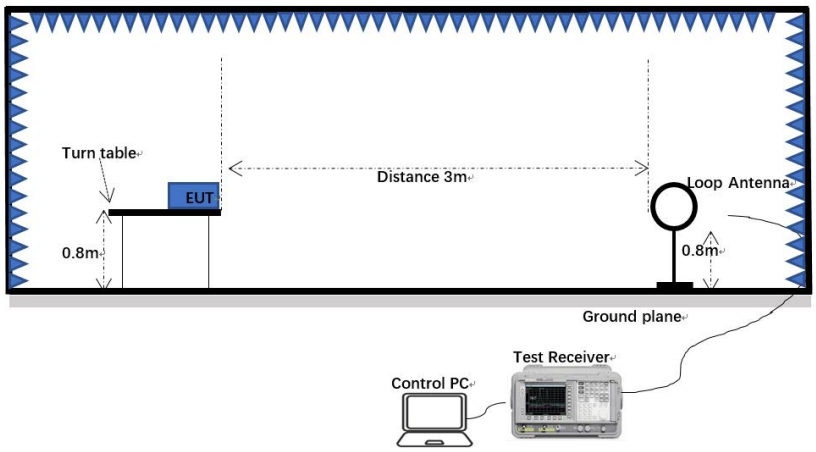
Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.

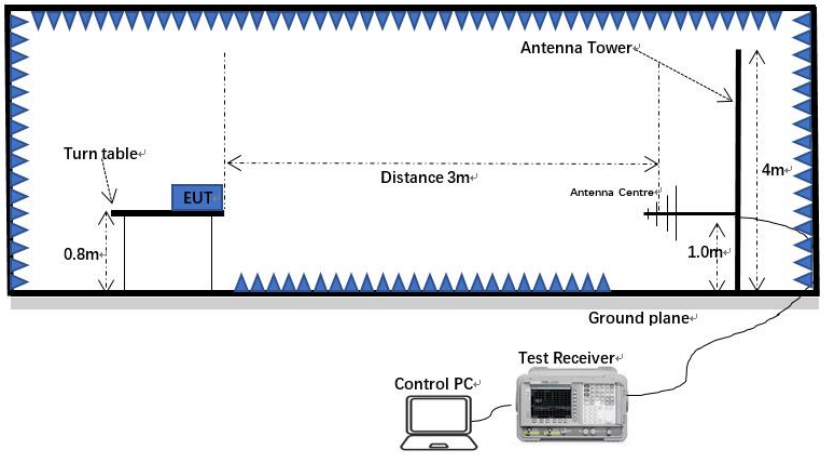
BlueAsia

6.9.2 Test setup

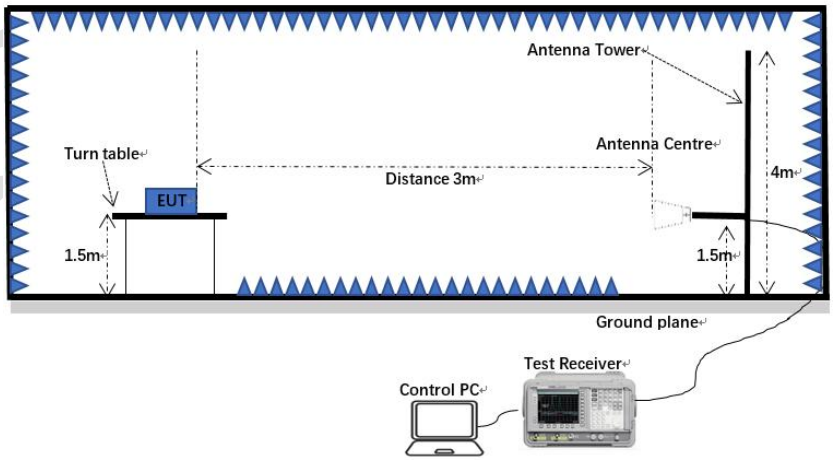
Below 1GHz：



30MHz-1GHz：



Above 1GHz：



6.9.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height 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.

e) 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

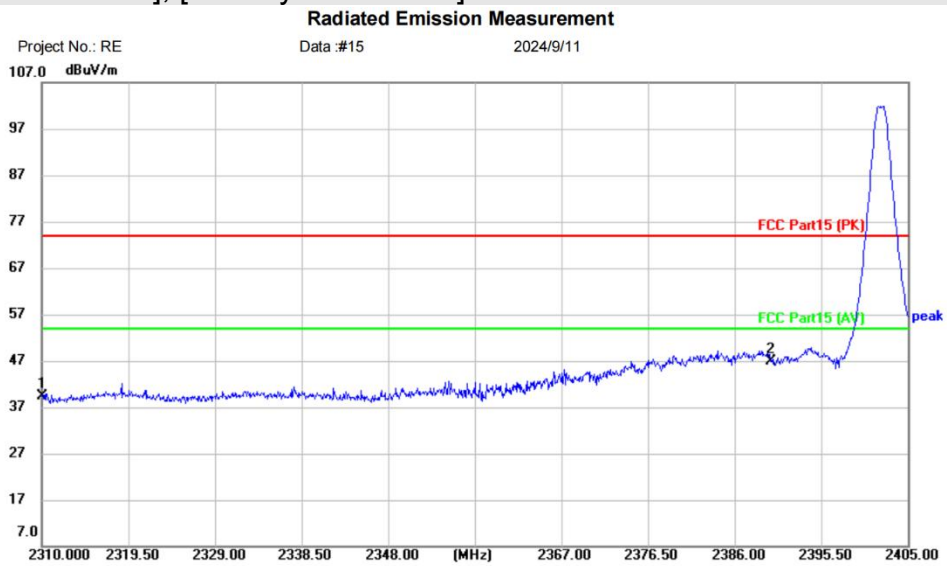
j) Repeat above procedures until all frequencies measured was complete.

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)
Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

6.9.4 Test data

Remark:During the test, pre-scan the BLE 1Mbps /BLE 2Mbps modulation, and found the 1Mbps which it is worse case.

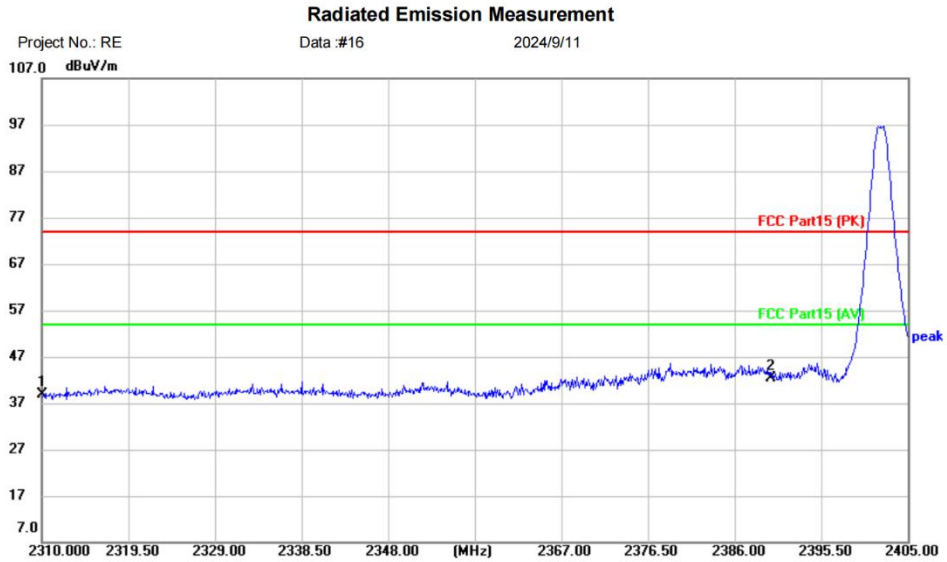
[Test mode: TX low channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	42.13	-2.87	39.26	74.00	-34.74	peak	
2	*	2390.000	49.21	-2.44	46.77	74.00	-27.23	peak	

Test Result: Pass

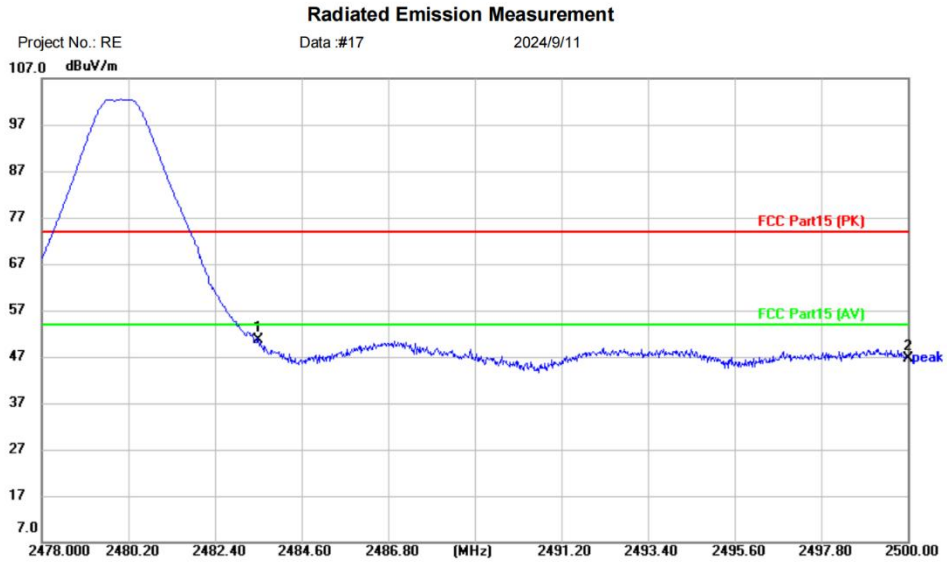
[Test mode:TX low channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	41.70	-2.87	38.83	74.00	-35.17	peak	
2	*	2390.000	44.71	-2.44	42.27	74.00	-31.73	peak	

Test Result: Pass

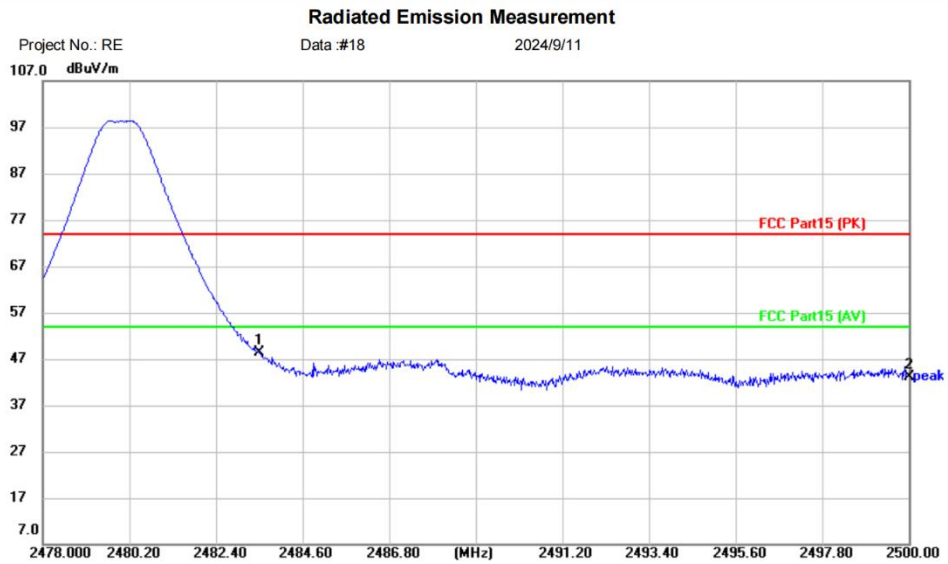
[Test mode: TX High channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	53.61	-2.91	50.70	74.00	-23.30	peak	
2		2500.000	49.67	-3.00	46.67	74.00	-27.33	peak	

Test Result: Pass

[Test mode:TX High channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	51.29	-2.91	48.38	74.00	-25.62	peak	
2		2500.000	46.13	-3.00	43.13	74.00	-30.87	peak	

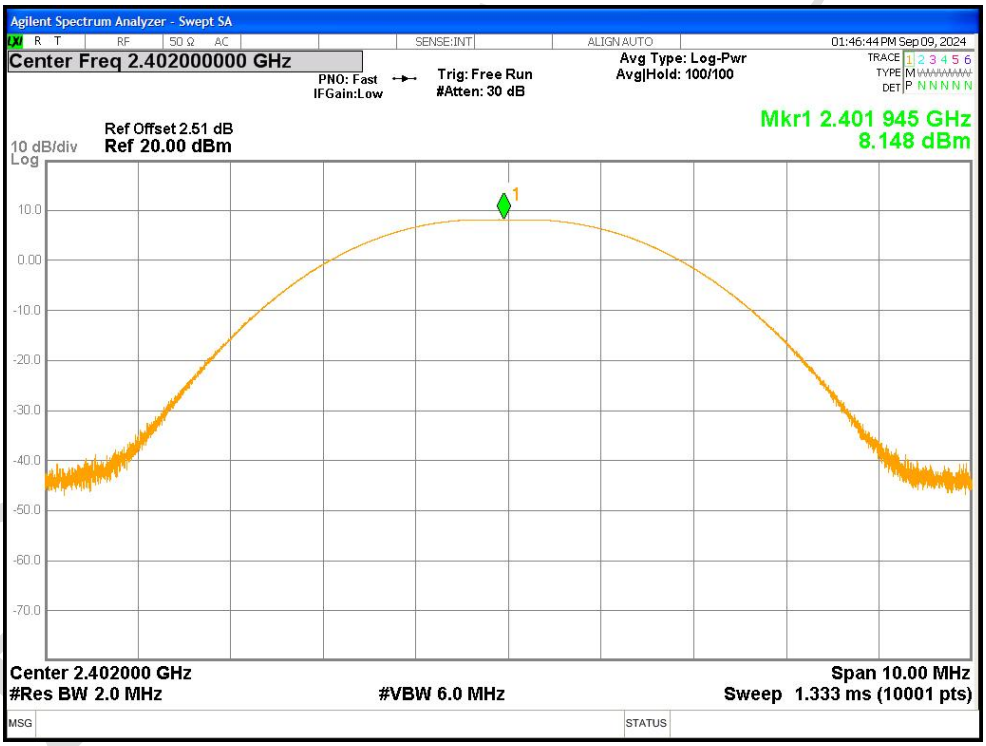
Test Result: Pass

7 Appendix A

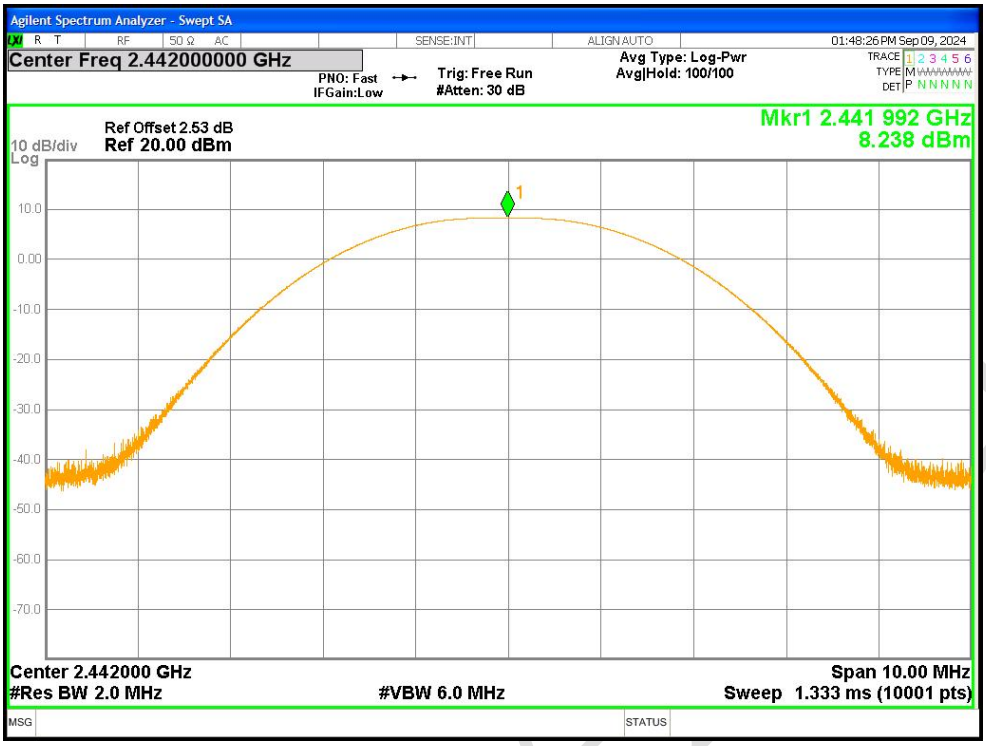
7.1 Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	8.148	30	Pass
NVNT	BLE 1M	2442	Ant1	8.238	30	Pass
NVNT	BLE 1M	2480	Ant1	7.556	30	Pass
NVNT	BLE 2M	2402	Ant1	8.083	30	Pass
NVNT	BLE 2M	2442	Ant1	8.254	30	Pass
NVNT	BLE 2M	2480	Ant1	7.594	30	Pass

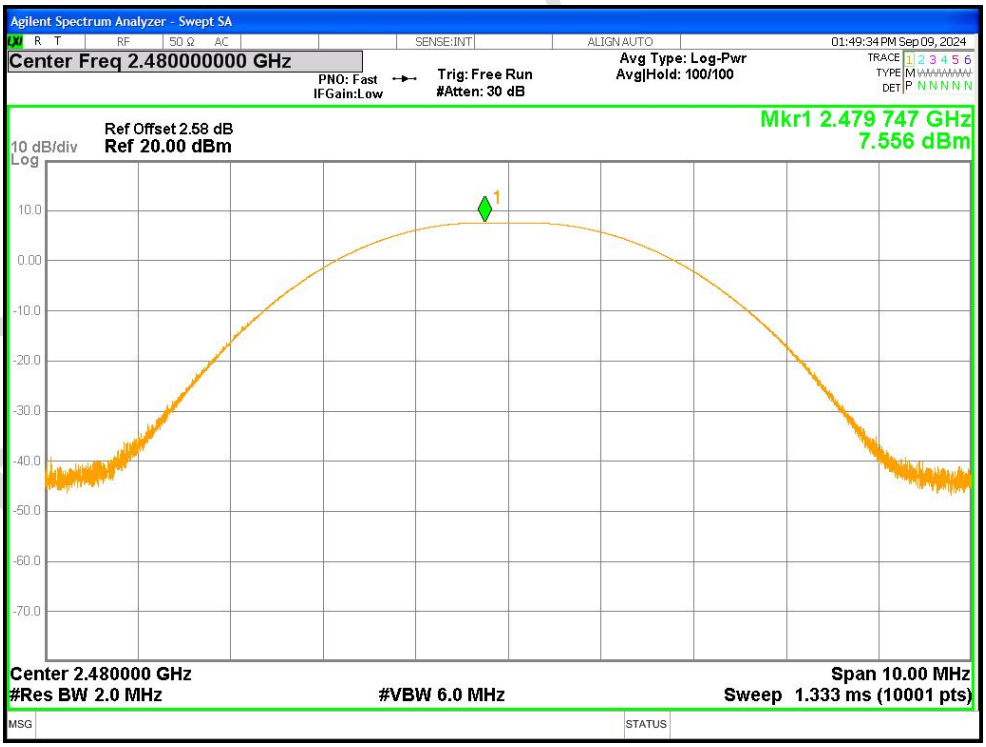
Power NVNT BLE 1M 2402MHz Ant1



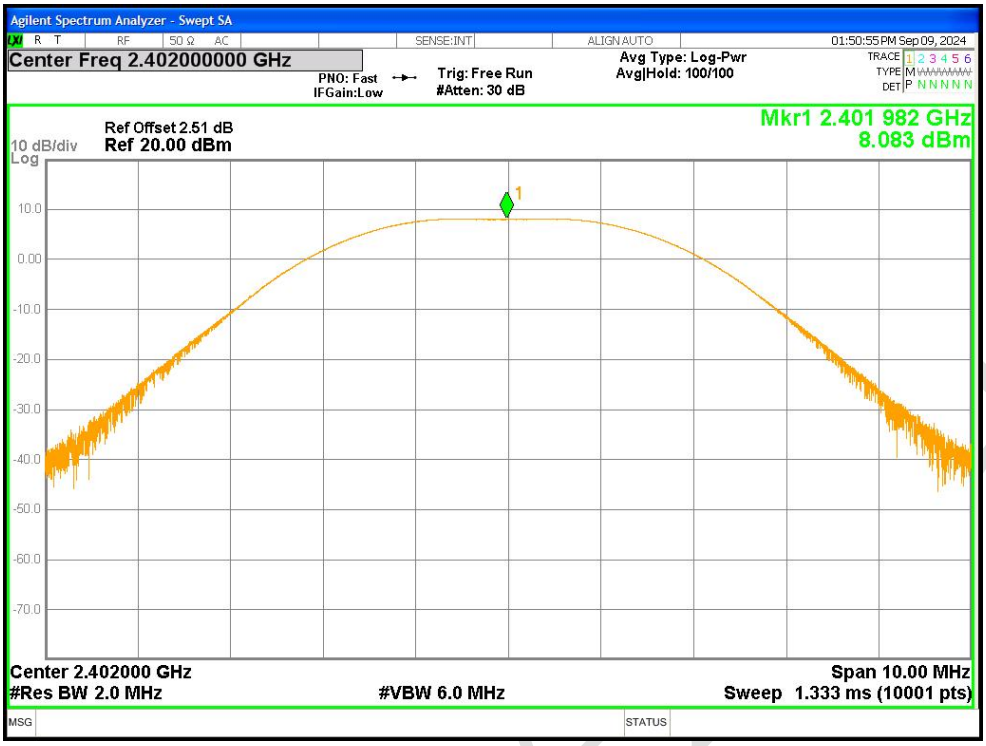
Power NVNT BLE 1M 2442MHz Ant1



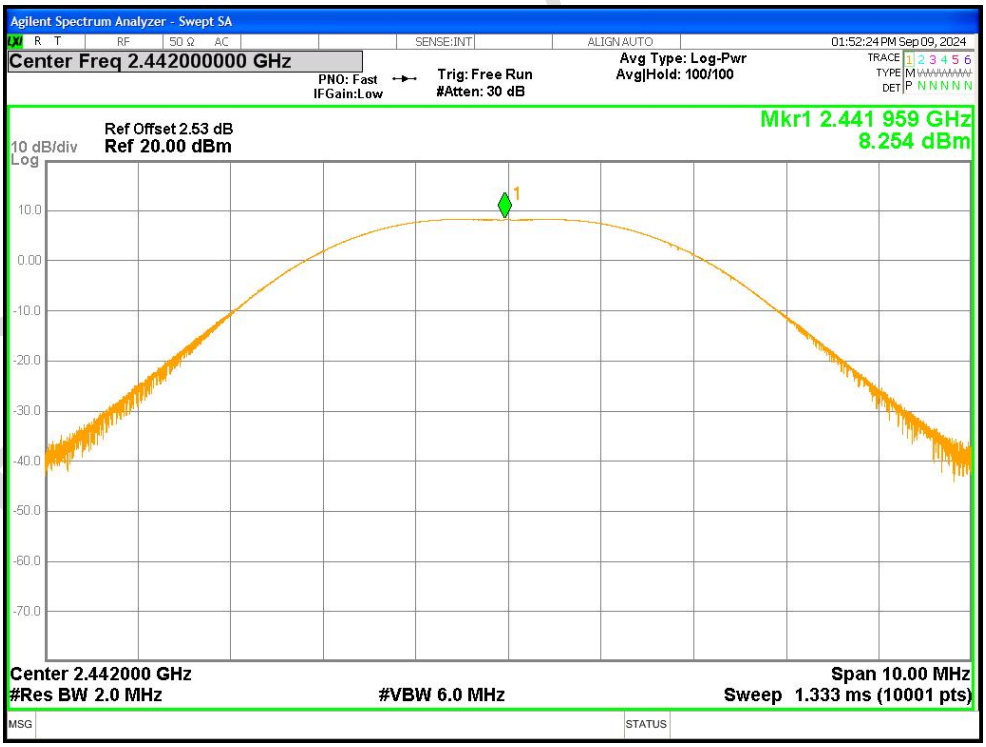
Power NVNT BLE 1M 2480MHz Ant1



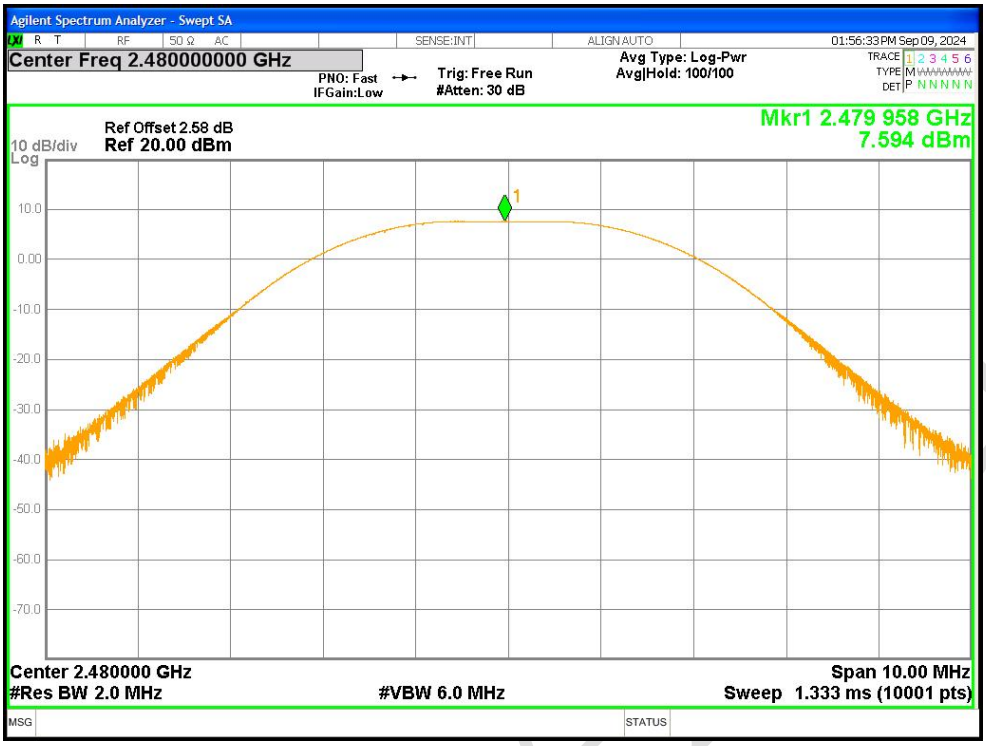
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2442MHz Ant1



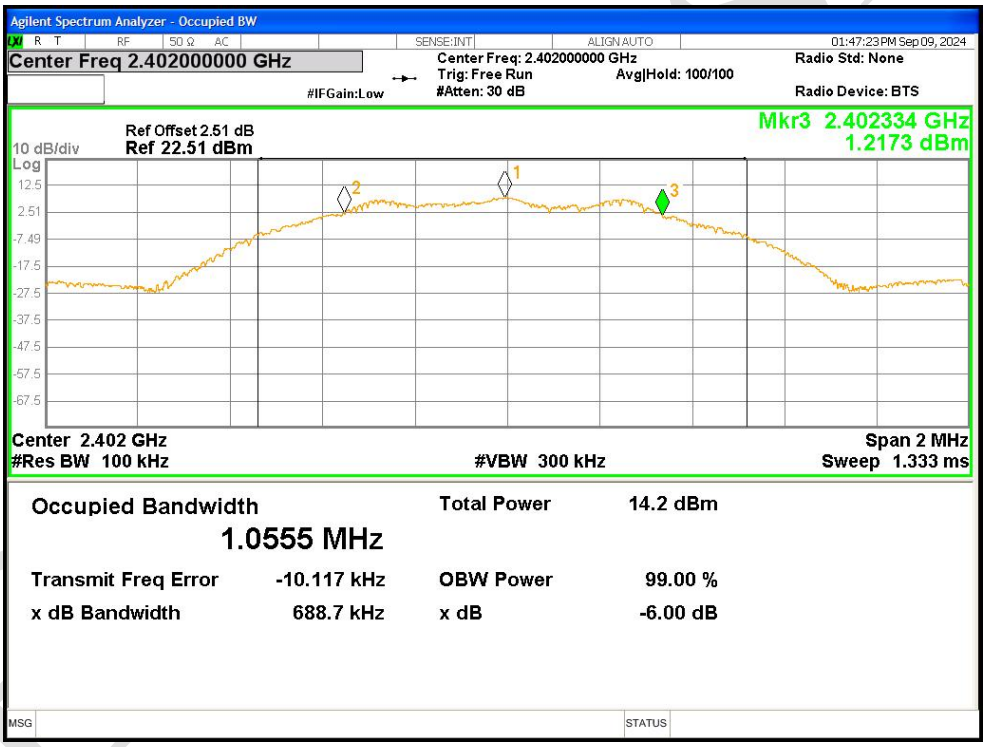
Power NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
01:56:33 PM Sep 09, 2024
Ref Offset 2.58 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 2.479 958 GHz
7.594 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 10.00 MHz
Sweep 1.333 ms (10001 pts)

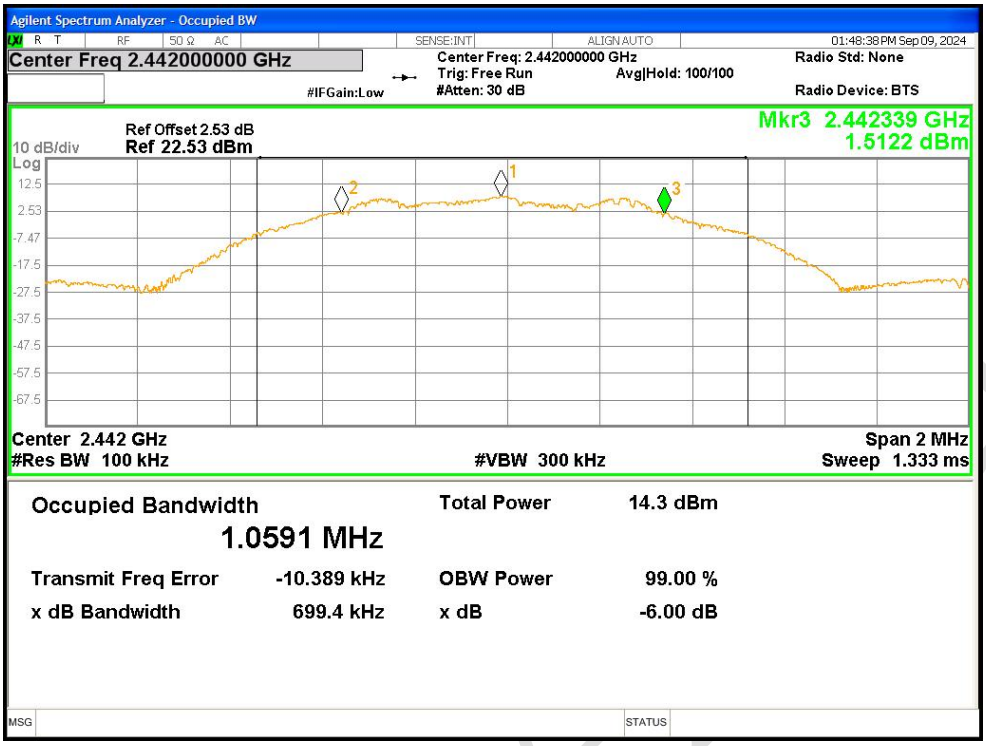
7.2 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.689	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.699	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.7	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.186	0.5	Pass
NVNT	BLE 2M	2442	Ant1	1.18	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.167	0.5	Pass

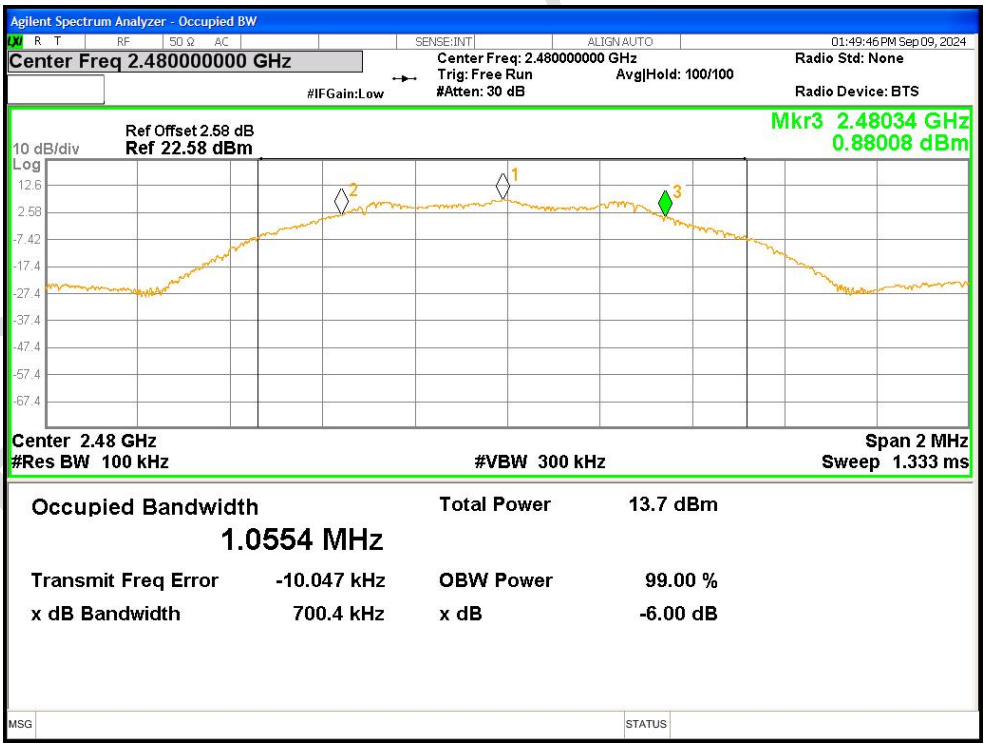
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



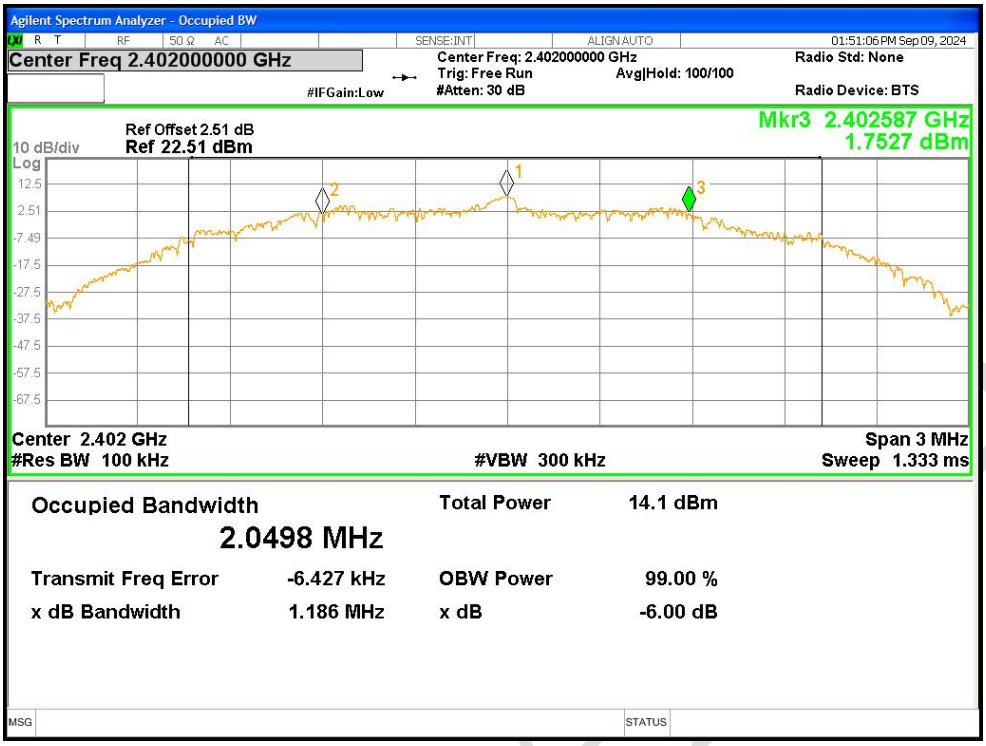
-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



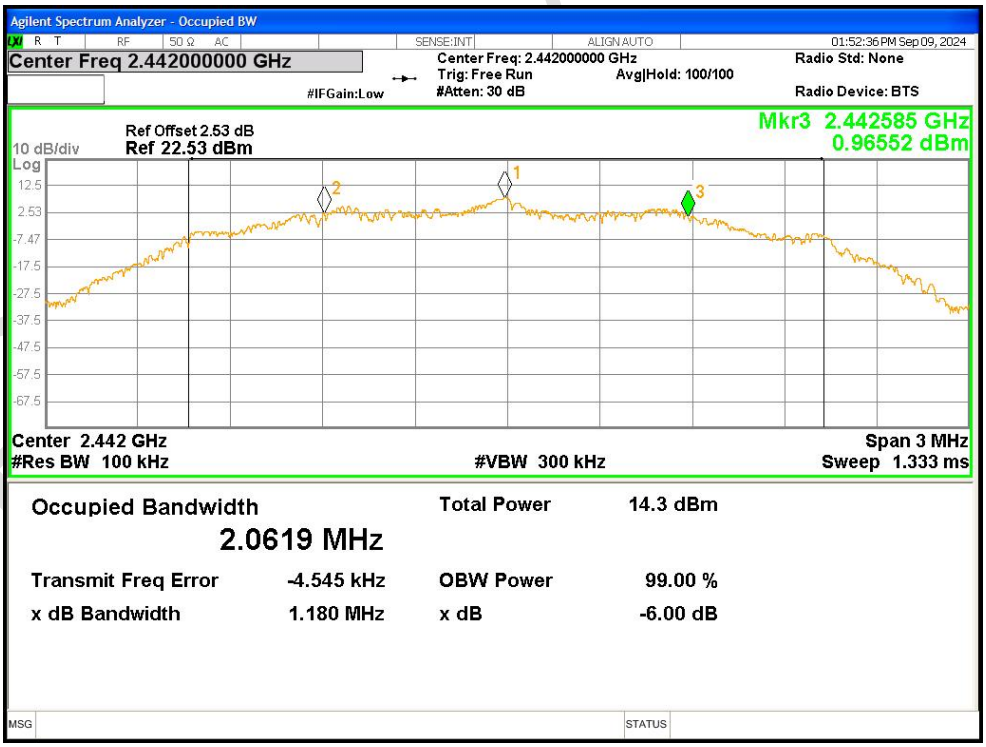
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



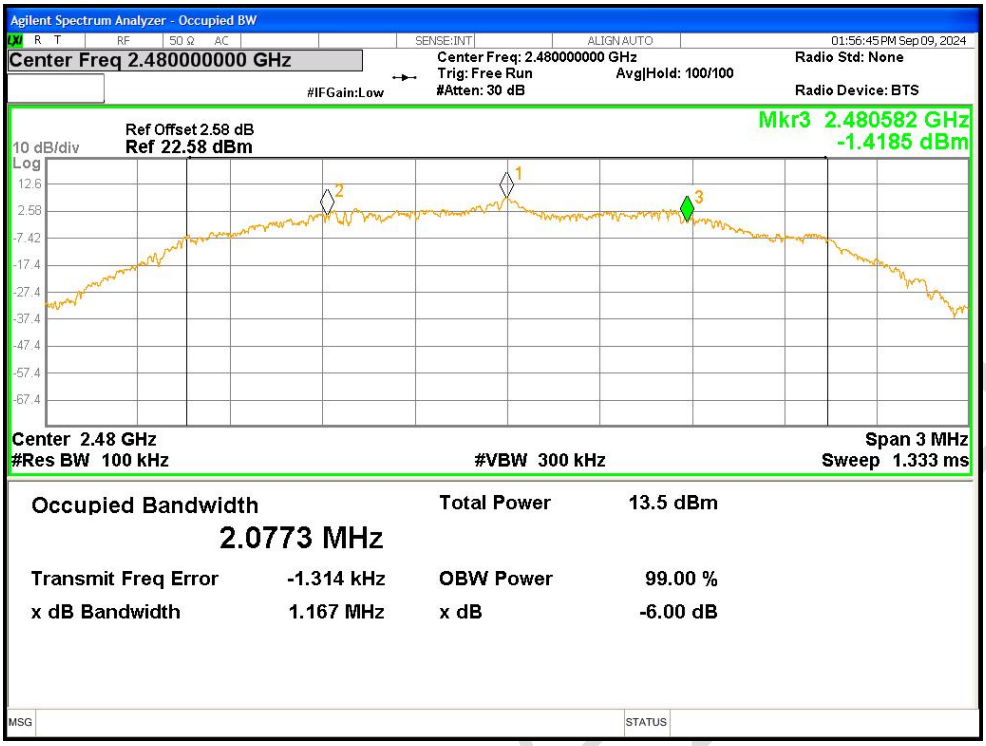
-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



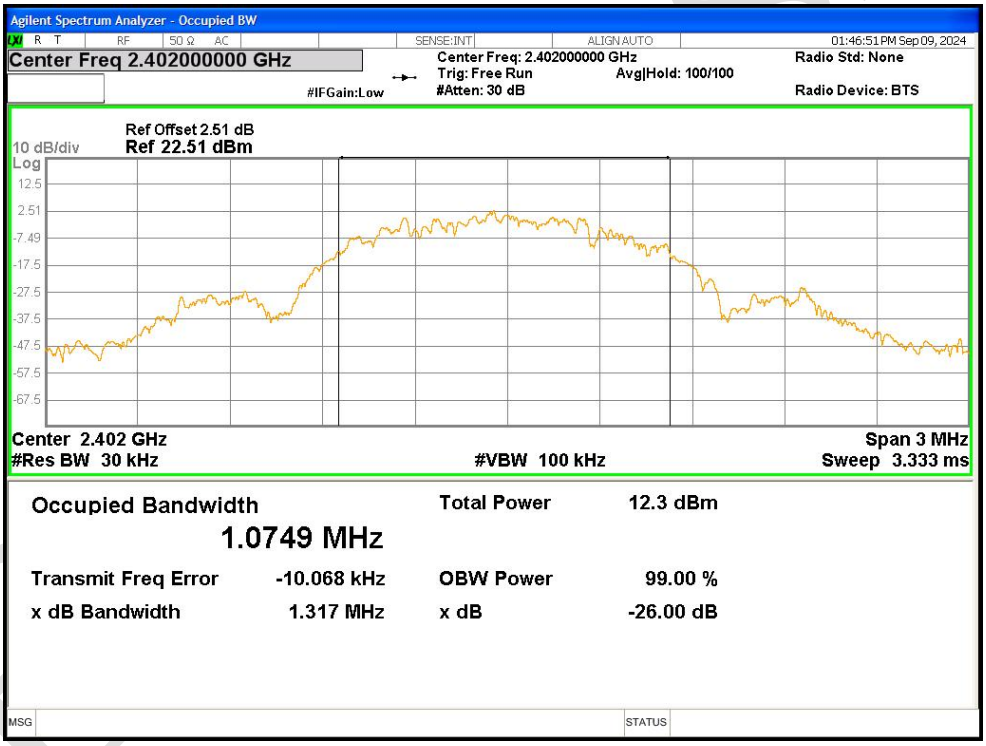
-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
#Atten: 30 dB
Avg|Hold: 100/100
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Mkr3 2.480582 GHz
-1.4185 dBm
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3 MHz
Sweep 1.333 ms
Occupied Bandwidth
2.0773 MHz
Total Power 13.5 dBm
Transmit Freq Error -1.314 kHz
OBW Power 99.00 %
x dB Bandwidth 1.167 MHz
x dB -6.00 dB

7.3 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.0749
NVNT	BLE 1M	2442	Ant1	1.0431
NVNT	BLE 1M	2480	Ant1	1.0376
NVNT	BLE 2M	2402	Ant1	2.0440
NVNT	BLE 2M	2442	Ant1	2.0416
NVNT	BLE 2M	2480	Ant1	2.0408

OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2442MHz Ant1