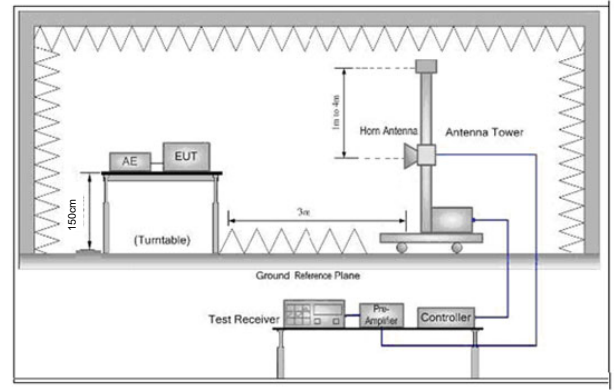
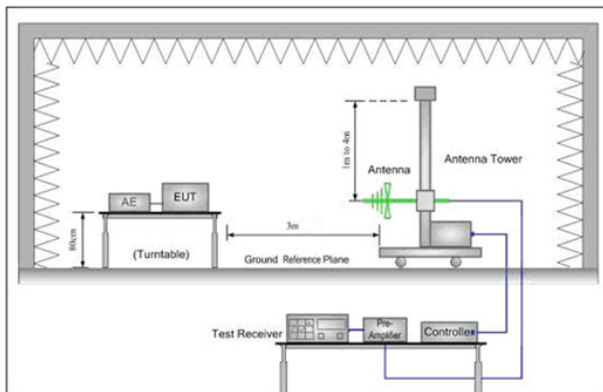
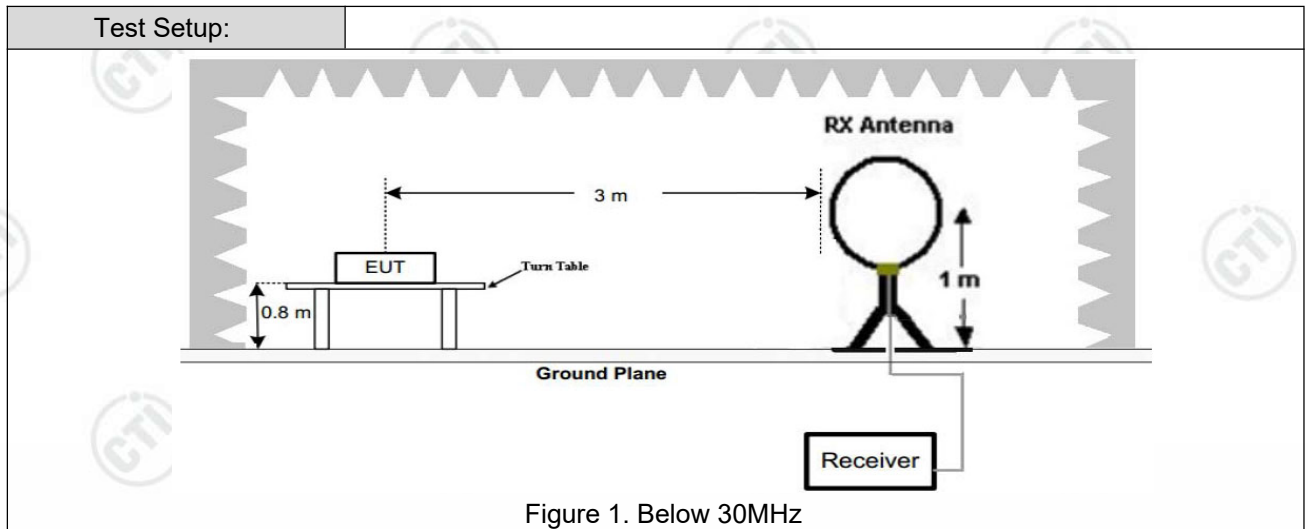


6.7 Radiated Spurious Emission & Restricted bands

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 2013				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10kHz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					



Test Procedure:

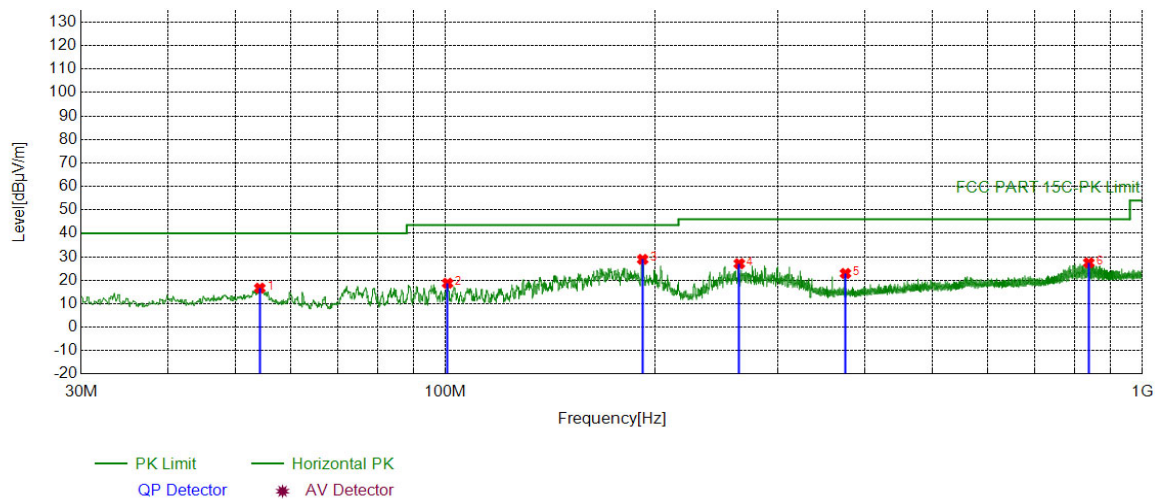
- 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
 - 2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- Note: For the radiated emission test above 1GHz:
- Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
 - 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

	<p>measurement.</p> <p>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 (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.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. 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.</p> <p>g. Test the EUT in the lowest channel (2402MHz),the middle channel (2440MHz),the Highest channel (2480MHz)</p> <p>h. 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.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p>
Test Mode:	Refer to clause 5.3
Test Results:	Pass

Radiated Spurious Emission below 1GHz:

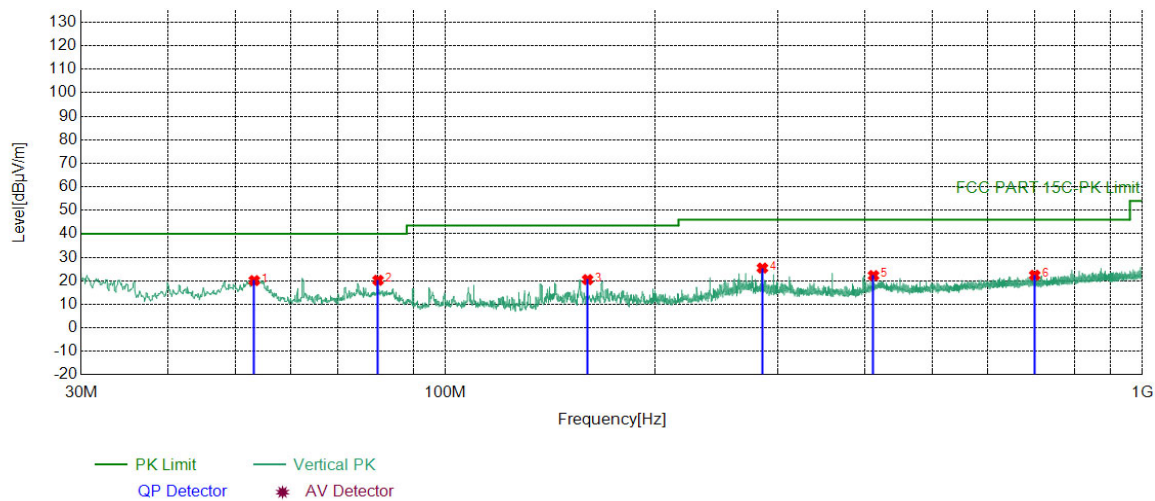
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes, only the worst case mode a was recorded in the report.

Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	54.1554	-17.72	34.36	16.64	40.00	23.36	PASS	Horizontal	Peak
2	100.7201	-18.40	37.13	18.73	43.50	24.77	PASS	Horizontal	Peak
3	191.9092	-18.59	47.48	28.89	43.50	14.61	PASS	Horizontal	Peak
4	264.0844	-16.27	43.33	27.06	46.00	18.94	PASS	Horizontal	Peak
5	375.0635	-13.45	36.35	22.90	46.00	23.10	PASS	Horizontal	Peak
6	838.0908	-5.89	33.31	27.42	46.00	18.58	PASS	Horizontal	Peak

Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	53.1853	-17.60	37.71	20.11	40.00	19.89	PASS	Vertical	Peak
2	80.0570	-22.55	42.77	20.22	40.00	19.78	PASS	Vertical	Peak
3	159.9930	-21.15	41.66	20.51	43.50	22.99	PASS	Vertical	Peak
4	285.0385	-15.83	41.27	25.44	46.00	20.56	PASS	Vertical	Peak
5	411.4421	-12.69	34.94	22.25	46.00	23.75	PASS	Vertical	Peak
6	700.9191	-7.69	30.07	22.38	46.00	23.62	PASS	Vertical	Peak

Radiated Spurious Emission above 1GHz:

Mode:			BLE GFSK Transmitting			Channel:		2402 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1507.8508	1.53	42.39	43.92	74.00	30.08	PASS	H	PK
2	1880.0880	3.88	42.19	46.07	74.00	27.93	PASS	H	PK
3	4804.1203	-16.23	64.90	48.67	74.00	25.33	PASS	H	PK
4	7204.2803	-11.83	68.07	56.24	74.00	17.76	PASS	H	PK
5	7205.2804	-11.83	57.58	45.75	54.00	8.25	PASS	H	AV
6	9755.4504	-7.53	53.28	45.75	74.00	28.25	PASS	H	PK
7	15521.8348	0.44	50.47	50.91	74.00	23.09	PASS	H	PK
8	1237.2237	0.90	43.39	44.29	74.00	29.71	PASS	H	PK
9	1809.4809	3.35	42.25	45.60	74.00	28.40	PASS	V	PK
10	4803.1202	-16.23	63.69	47.46	74.00	26.54	PASS	V	PK
11	7204.2803	-11.83	69.77	57.94	74.00	16.06	PASS	V	PK
12	7205.2804	-11.83	59.62	47.79	54.00	6.21	PASS	V	AV
13	9712.4475	-7.67	52.49	44.82	74.00	29.18	PASS	V	PK
14	13167.6778	-3.29	51.01	47.72	74.00	26.28	PASS	V	PK

Mode:			BLE GFSK Transmitting			Channel:		2440 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1293.8294	1.04	43.34	44.38	74.00	29.62	PASS	H	PK
2	1774.6775	3.19	42.26	45.45	74.00	28.55	PASS	H	PK
3	4879.1253	-16.21	65.69	49.48	74.00	24.52	PASS	H	PK
4	7318.2879	-11.66	69.23	57.57	74.00	16.43	PASS	H	PK
5	7319.2880	-11.66	56.55	44.89	54.00	9.11	PASS	H	AV
6	9664.4443	-7.58	54.76	47.18	74.00	26.82	PASS	H	PK
7	13759.7173	-1.69	51.09	49.40	74.00	24.60	PASS	H	PK
8	1327.0327	1.15	43.17	44.32	74.00	29.68	PASS	H	PK
9	1784.4784	3.23	42.49	45.72	74.00	28.28	PASS	V	PK
10	4881.1254	-16.21	63.69	47.48	74.00	26.52	PASS	V	PK
11	7318.2879	-11.66	70.77	59.11	74.00	14.89	PASS	V	PK
12	7320.2880	-11.65	59.97	48.32	54.00	5.68	PASS	V	AV
13	10812.5208	-6.25	52.35	46.10	74.00	27.90	PASS	V	PK
14	13771.7181	-1.67	50.95	49.28	74.00	24.72	PASS	V	PK

Mode:			BLE GFSK Transmitting			Channel:		2480 MHz	
NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	1409.0409	1.40	44.14	45.54	74.00	28.46	PASS	H	PK
2	1821.4821	3.44	42.36	45.80	74.00	28.20	PASS	H	PK
3	4961.1307	-15.97	63.25	47.28	74.00	26.72	PASS	H	PK
4	7438.2959	-11.35	71.83	60.48	74.00	13.52	PASS	H	PK
5	7439.2960	-11.34	61.91	50.57	54.00	3.43	PASS	H	AV
6	10634.5090	-6.55	53.27	46.72	74.00	27.28	PASS	H	PK
7	14386.7591	1.00	49.47	50.47	74.00	23.53	PASS	H	PK
8	1467.2467	1.44	42.96	44.40	74.00	29.60	PASS	H	PK
9	2076.5077	4.80	41.82	46.62	74.00	27.38	PASS	V	PK
10	4418.0945	-17.03	56.22	39.19	74.00	34.81	PASS	V	PK
11	5760.1840	-13.71	58.70	44.99	74.00	29.01	PASS	V	PK
12	7438.2959	-11.35	72.68	61.33	74.00	12.67	PASS	V	PK
13	7439.2960	-11.34	62.47	51.13	54.00	2.87	PASS	V	AV
14	13774.7183	-1.67	51.29	49.62	74.00	24.38	PASS	V	PK

Remark:

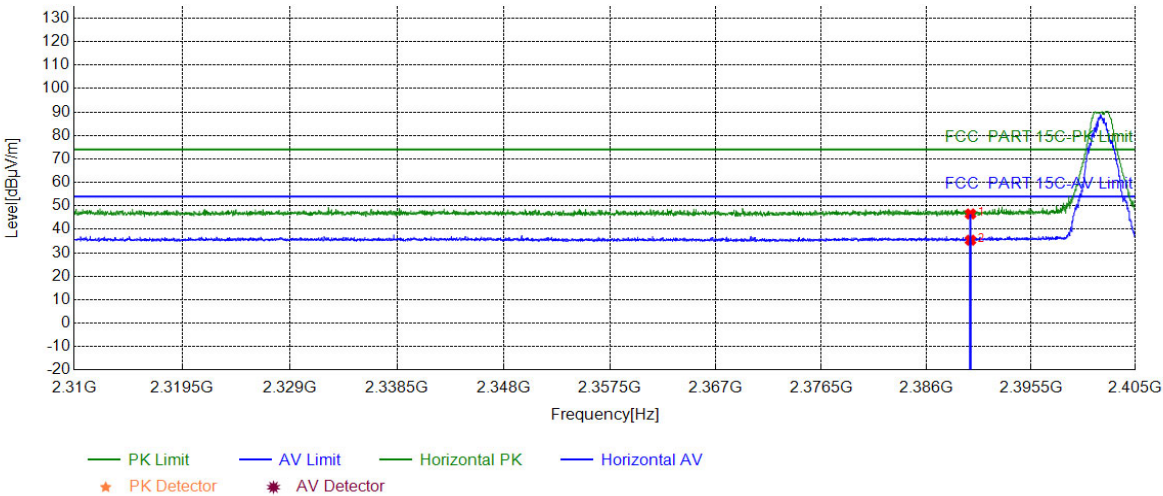
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading + Factor
 Factor = Antenna Factor + Cable Factor – Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. As shown in this section, 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. So, only the peak measurements were shown in the report.

Restricted bands:

Test plot as follows:

Mode:	BLE GFSK Transmitting	Channel:	2402 MHz
Remark:			

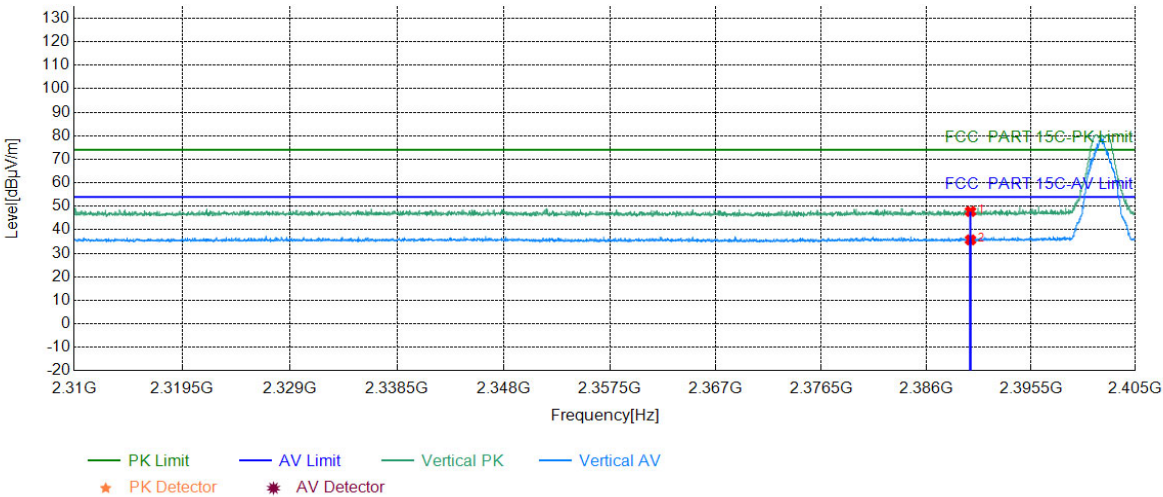
Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	2390.0000	5.77	40.79	46.56	74.00	27.44	PASS	Horizontal	PK
2	2390.0000	5.77	29.59	35.36	54.00	18.64	PASS	Horizontal	AV

Mode:	BLE GFSK Transmitting	Channel:	2402 MHz
Remark:			

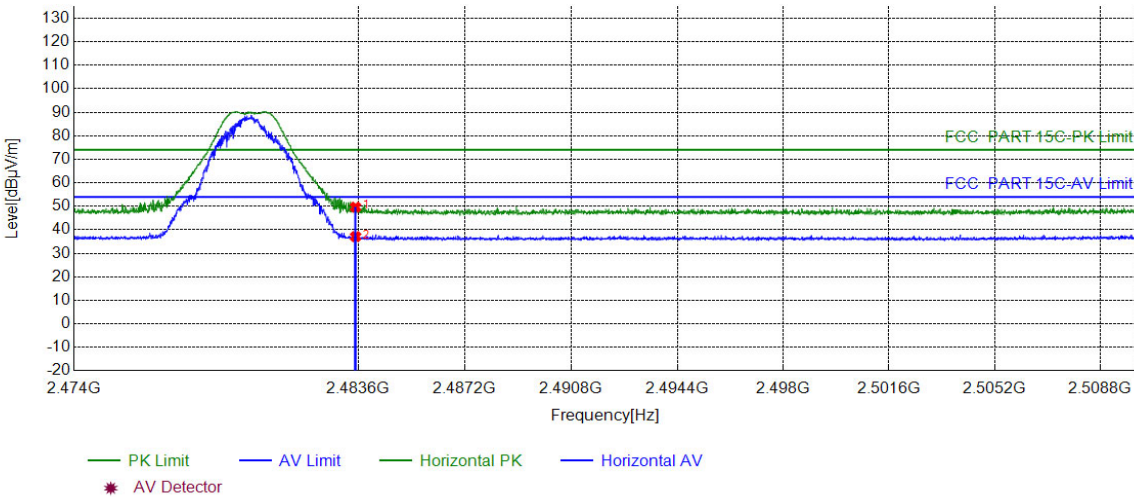
Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	2390.0000	5.77	42.03	47.80	74.00	26.20	PASS	Vertical	PK
2	2390.0000	5.77	29.94	35.71	54.00	18.29	PASS	Vertical	AV

Mode:	BLE GFSK Transmitting	Channel:	2480 MHz
Remark:			

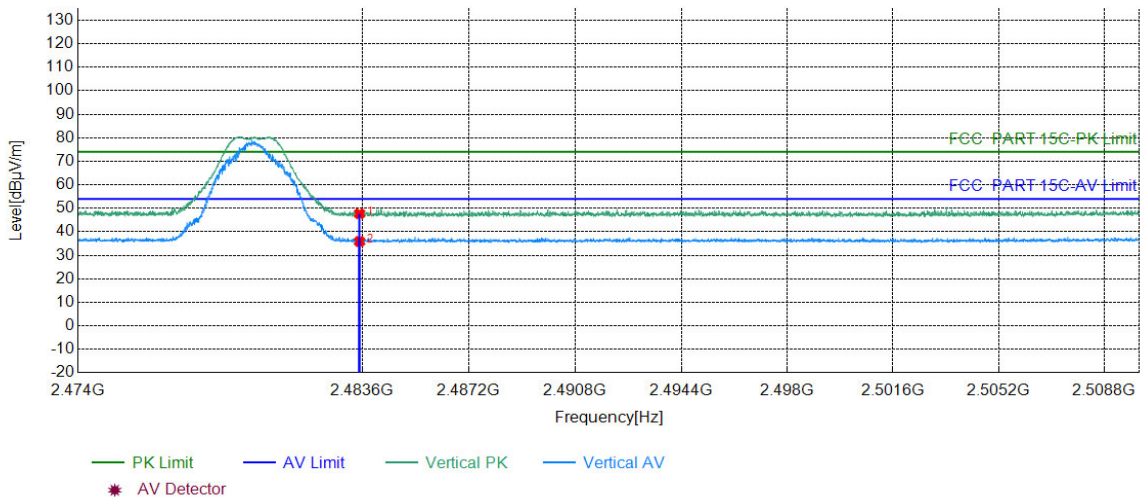
Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	2483.5000	6.57	43.07	49.64	74.00	24.36	PASS	Horizontal	PK
2	2483.5000	6.57	30.53	37.10	54.00	16.90	PASS	Horizontal	AV

Mode:	BLE GFSK Transmitting	Channel:	2480 MHz
Remark:			

Test Graph



NO	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Result	Polarity	Remark
1	2483.5000	6.57	41.15	47.72	74.00	26.28	PASS	Vertical	PK
2	2483.5000	6.57	29.32	35.89	54.00	18.11	PASS	Vertical	AV

Note:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Factor
Factor=Antenna Factor + Cable Factor – Preamplifier Factor

7 Appendix A

Refer to Appendix: Bluetooth LE of EED32N81031101.