ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2021-0012-RF

TEST REPORT

FCC ID	:	2A6GW-IS200
Applicant	:	Sportsoul Co.，LTD
Product Name	:	TRAMPOLINE SOMATOSENSORY GAME
Mode No.	:	IS200

CVC Testing Technology Co., Ltd.

Applicant	**Name: Sportsoul Co.，LTD** **Address: No. 3 Road, Qingdao, Industrial District, China**		
Manufacturer	**Name: Sportsoul Co.，LTD** **Address: No. 3 Road, Qingdao, Industrial District, China**		
Equipment Under Test	**Product Name : TRAMPOLINE SOMATOSENSORY GAME** **Model No. : IS200** **Trade mark : /** **Serial no. : 7dd31a01** **Sampling : 3-1、3-2**		
Date of Receipt.	**2021.06.03**	Date of Testing	**2021.06.03~2021.07.20**
Test Specification		**Test Result**	
FCC CFR47 Part 15C (2020) Radio Frequency Devices ANSI C63.10 (2013) KDB 558074 D01 DTS Meas Guidance v05 KDB 66911 D01 Multiple Transmitter Output v02r01		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Seal of CVC** **Issue Date: 2022.08.10**		

Tested by: Reviewed by: Approved by:

Xu Zhenfei **Liu Yonghai** **Chen HuaWen**

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

Note1：This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of **CVC**.
Note2：The report was originally issued on July 20, 2021, and was modified for the first time on Feb 23, 2022. The modification contents are as follows: Add the information of the semi anechoic chamber used for radiated emissions test and the information of measurement software in the equipment list at page 42 and page 43; the corresponding revised pages are marked with C1 at the bottom of the pages.
Note3：The report was originally issued on July 20, 2021, and was modified for the second time on Aug 10, 2022. The modification contents are as follows: Modify the information of the Applicant at page 1 and page 2, and change “Qingdao Triple Master Health Technologies Co.，LTD” to “Sportsoul Co.，LTD”; modify the information of the FCC ID at page 1 and change “2AULA” to “2A6GW”;.the corresponding revised pages are marked with C2 at the bottom of the pages.

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1. General Product Information

1.1 General information

Product Name	TRAMPOLINE SOMATOSENSORY GAME	
Model No.	IS200	
Serial Number(SN)	7dd31a01	
Power Supply	Adapter	/
	Battery	DC 3V
Antenna Type	Internal antenna	
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)	
Antenna Gain	Bluetooth(Low Energy) Antenna 1: 2.76 dBi (provided by client)	
Beamforming gain	Unsupported	
Frequency Range	Bluetooth(Low Energy): 2400~2483.5MHz	
Channel Number	Bluetooth(Low Energy):40 Channels	
Type of Modulation	Bluetooth(Low Energy):GFSK	
Max. Conducted Power	Bluetooth(Low Energy): 5.02 dBm	
Operate Temp.Range	-40℃ to +85℃	

Note：
1. The information of the EUT is declared by the manufacturer.
2. The laboratory is not responsible for the product technical specification provided by the client.

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

Add.: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou,Guangdong,510663, People's Republic of China

Telephone : +86-20-32293888

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FCC(Test firm designation number：CN1282)

IC(Test firm CAB identifier number：CN0103)

2.2 Description of Non-standard Method and Deviations

The testing and measurement methods used in this report are applied by all standard methods. Not any non-standard method or deviation from the used standards was used.

2.3 List of Test and Measurement Instruments

Refer to **Appendix E**.

3. Test Configuration

3.1 Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Test Mode	Antenna Delivery	Test Channel
Bluetooth(Low Energy)	1TX / 1RX	0,19,39

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Test Mode	Data Rate		
	Antenna 1	Antenna 2	MIMO
Bluetooth(Low Energy)	1	/	/

3.2 Duty cycle

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
BLE_1M	Ant1	2402	50.00	50.00	100.00	---	PASS
		2440	50.00	50.00	100.00	---	PASS
		2480	50.00	50.00	100.00	---	PASS

4. Summary of measurement results

Summary of measurements of results	Clause in FCC rules	Verdict	Note
Conducted Emissions	15.207	NA	/
Radiated Emissions	15.247(d),15.205,15.209	PASS	/
Maximum conducted output power	15.247(b)(3)	PASS	/
Minimum 6 dB bandwidth	15.247(a)(2)	PASS	/
Occupied Channel Bandwidth	15.247(a)(2)	PASS	/
Band Edge Measurement	15.247(d)	PASS	/
Maximum Power spectral density	15.247(e)	PASS	/
Spurious RF Conducted Emissions	15.247(d)	PASS	/

5. Measurement procedure

5.1 Conducted Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

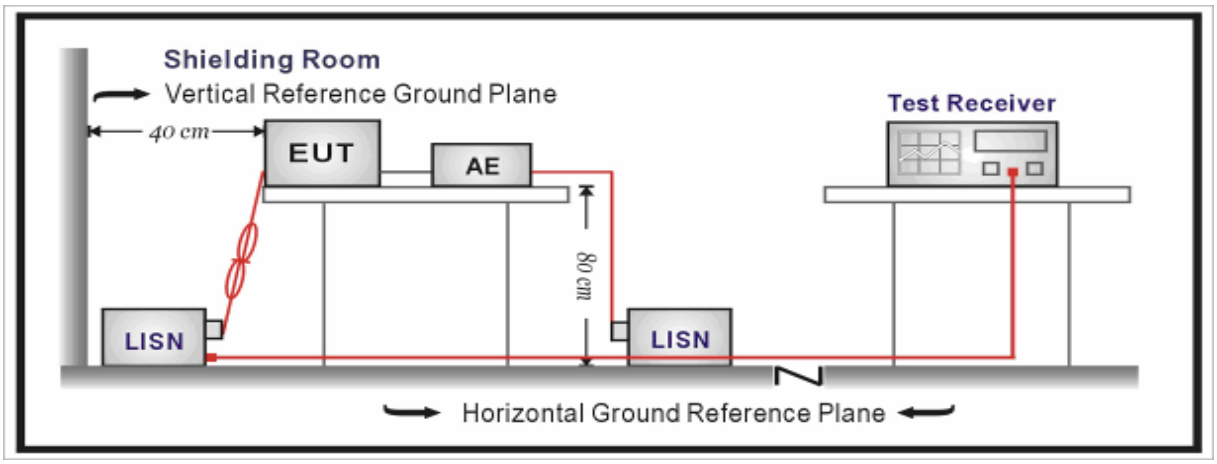
Method of Measurement:

The EUT was setup according to ANSI C63.10, 2013 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

Limits:

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

Test Setup:



Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Notes:

1. *The following Quasi-Peak and Average measurements were performed on the EUT:*
2. *Final Level =Reading + Factor.*

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96. U= 3.12 dB.

Test Results:

The device is powered by a built-in battery and does not require this test.

5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

The EUT was setup and tested according to ANSI C63.10, 2013.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from Antenna to the EUT was 3 meters.

The Antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn Antenna will be bended down a little (as horn

Antenna has the narrow beamwidth) in order to keeping the Antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

Limits:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

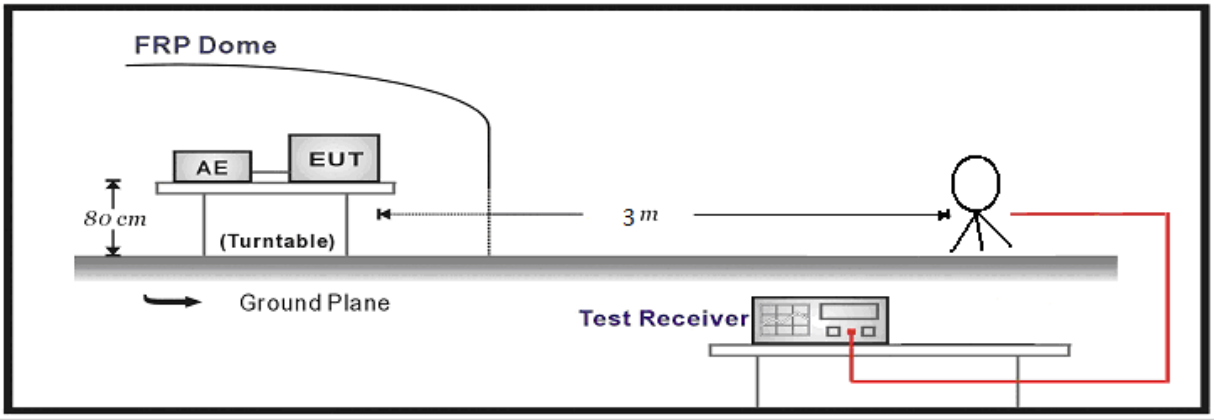
Frequency	Limit (dBµV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Level
88MHz-216MHz	43.5	Quasi-peak Level
216MHz-960MHz	46.0	Quasi-peak Level
960MHz-1GHz	54.0	Quasi-peak Level
Above 1GHz	54.0	Average Level
	74.0	Peak Level

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

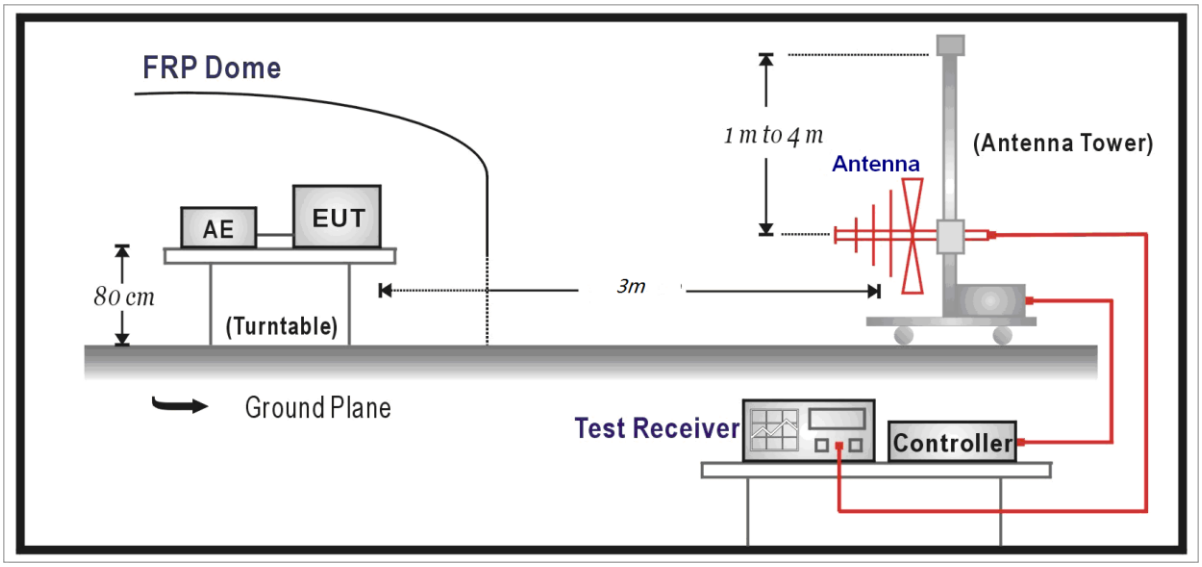
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	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	156.52475-156.52525	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.
12.57675-12.57725	322-335.4	3600-4400	/
13.36-13.41	/	/	/

Test Setup:

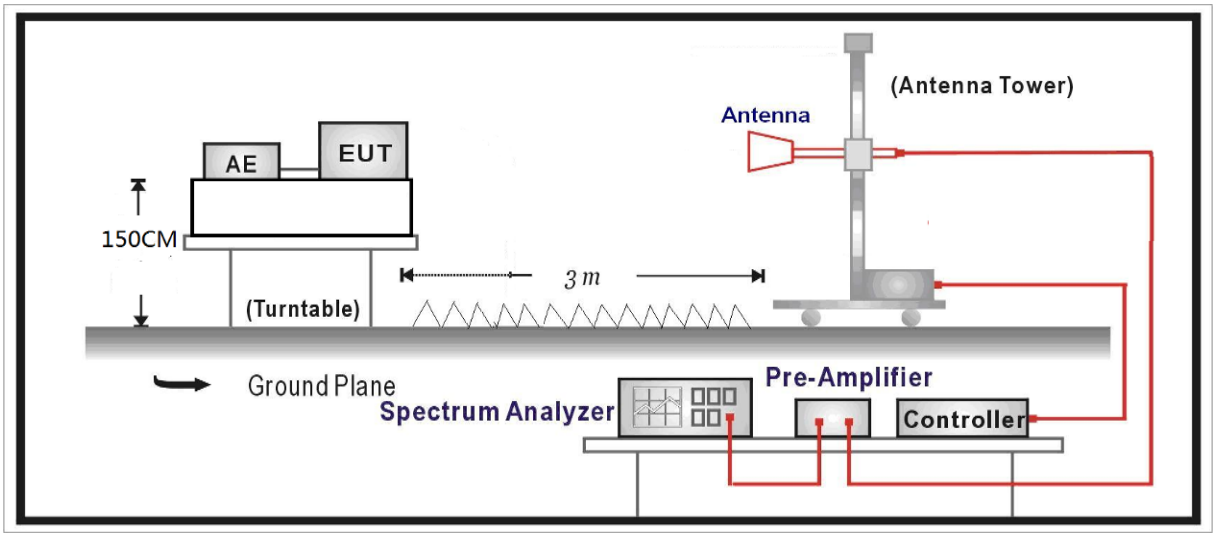
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



Measurement Data：

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Level =Reading - Factor

Factor = Preamplifier Factor – Antenna Factor–Cable Loss

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB

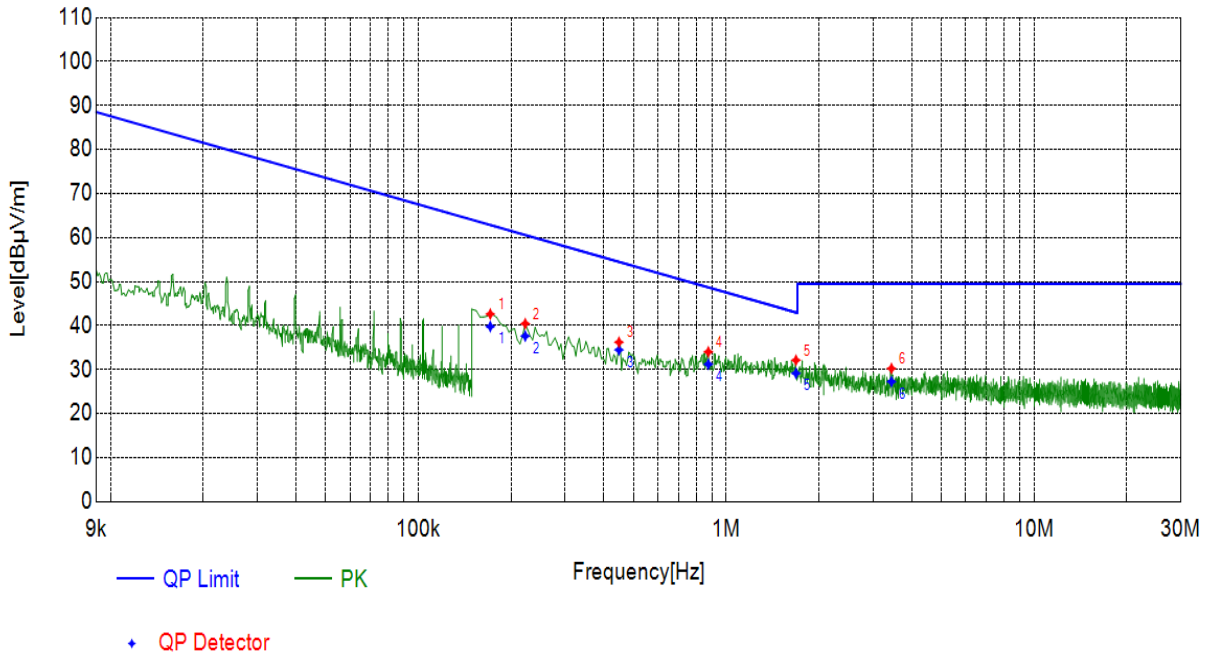
Test Results:

SPURIOUS EMISSIONS：

During the test, the Radiates Emission from 9KHz to 30MHz was performed in all modes with all channels and all antenna. BLE(1Mbps), Channel 39, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

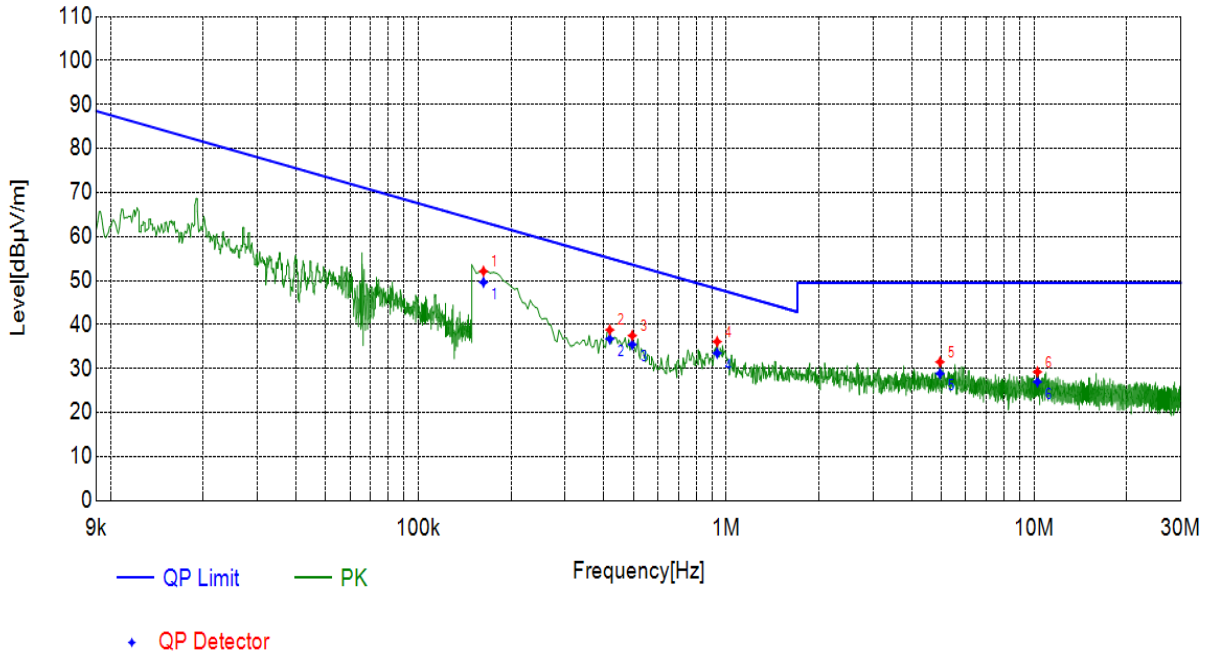
Radiated Emission	9KHz-30MHz
Polarity	X axis
Test channel	Worst-Case

Final Data List								
Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
0.1713	X axis	20.40	39.78	62.85	23.07	100	150	PASS
0.2225	X axis	20.37	37.61	60.57	22.96	100	90	PASS
0.4485	X axis	20.41	34.47	54.47	20.00	100	250	PASS
0.8750	X axis	20.59	31.21	48.68	17.47	100	320	PASS
1.6854	X axis	20.73	29.14	43.00	13.86	100	40	PASS
3.4425	X axis	20.99	27.26	49.50	22.24	100	0	PASS



Radiated Emission	9KHz-30MHz
Polarity	Y axis
Test channel	Worst-Case

Final Data List								
Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
0.1628	Y axis	20.41	49.61	63.29	13.68	100	270	PASS
0.4187	Y axis	20.32	36.75	55.07	18.32	100	300	PASS
0.4955	Y axis	20.56	35.47	53.60	18.13	100	320	PASS
0.9347	Y axis	20.56	33.49	48.11	14.62	100	90	PASS
4.9480	Y axis	21.13	28.87	49.50	20.63	100	270	PASS
10.2578	Y axis	20.95	26.98	49.50	22.52	100	230	PASS



Bluetooth(Low Energy):

During the test, the Radiates Emission from 30MHz to 40GHz was performed in Bluetooth(Low Energy) all modes with all channels and all antenna. BLE(1Mbps), Channel 39, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

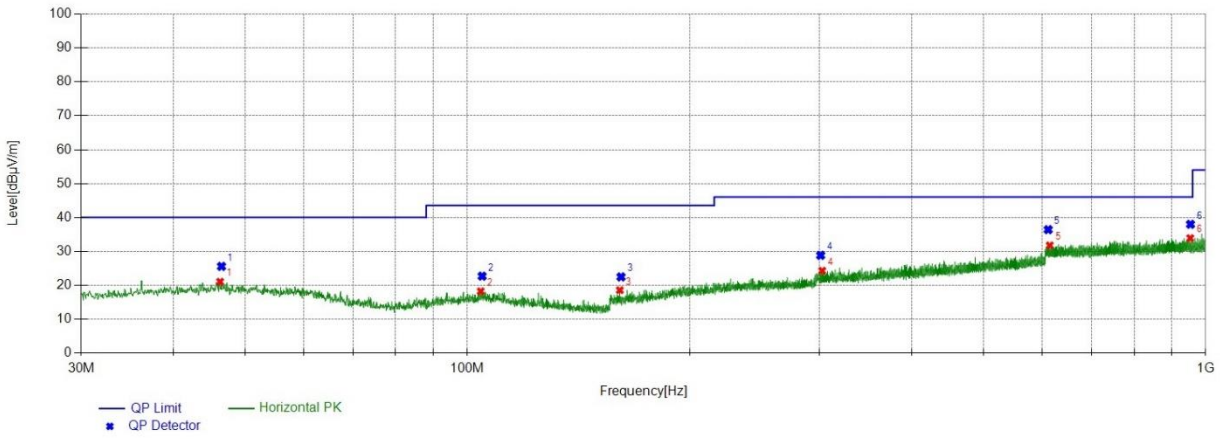
Radiates Emission	30M~1G
Test channel	Worst-Case

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
41.8689	Horizontal	14.06	6.80	20.86	40.00	19.14	PK	150	210	PASS
68.4028	Horizontal	10.77	7.47	18.24	40.00	21.76	PK	150	234	PASS
189.5459	Horizontal	12.05	7.16	19.21	43.52	24.31	PK	150	13	PASS
338.5352	Horizontal	16.01	8.57	24.58	46.02	21.44	PK	150	88	PASS
607.7546	Horizontal	21.14	11.50	32.64	46.02	13.38	PK	150	38	PASS
702.5349	Horizontal	22.04	11.17	33.21	46.02	12.81	PK	150	97	PASS

Final Data List

Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
41.6981	Horizontal	14.06	25.40	40.00	14.60	102	210	PASS
68.0779	Horizontal	10.78	22.11	40.00	17.89	130	234	PASS
190.2775	Horizontal	12.05	24.26	43.52	19.26	160	13	PASS
339.4662	Horizontal	16.02	29.23	46.02	16.79	230	78	PASS
608.5751	Horizontal	21.14	36.33	46.02	9.69	140	38	PASS
704.4598	Horizontal	22.04	36.34	46.02	9.69	302	97	PASS



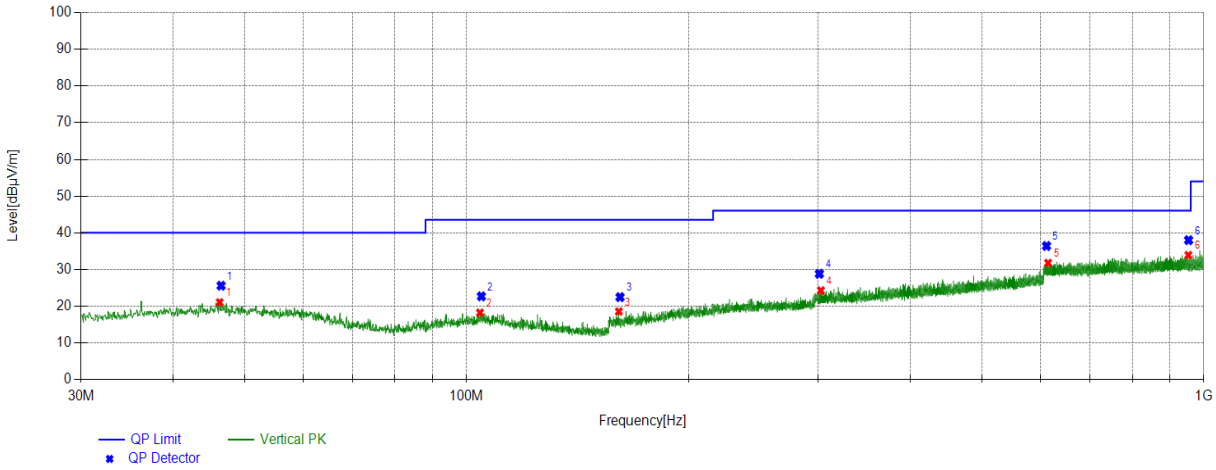
Radiates Emission	30M~1G
Test channel	Worst-Case

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
46.2627	Vertical	14.31	6.73	21.04	40.00	18.96	PK	150	325	PASS
104.2950	Vertical	12.43	5.81	18.24	43.52	25.28	PK	150	229	PASS
160.9577	Vertical	10.17	8.38	18.55	43.52	24.97	PK	150	360	PASS
302.4719	Vertical	15.37	8.93	24.30	46.02	21.72	PK	150	11	PASS
614.9444	Vertical	21.24	10.53	31.77	46.02	14.25	PK	150	95	PASS
952.8666	Vertical	24.97	8.94	33.91	46.02	12.11	PK	150	360	PASS

Final Data List

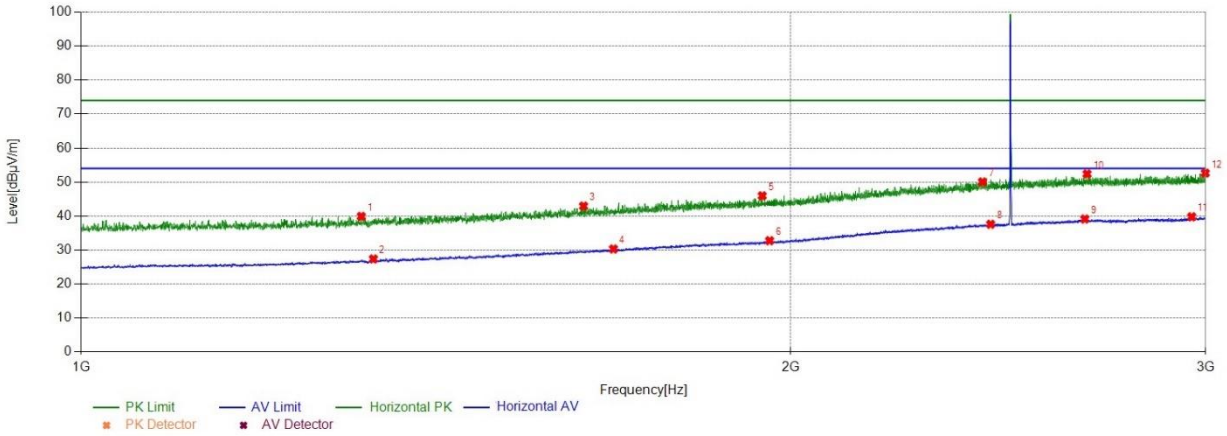
Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
46.4741	Vertical	14.31	25.58	40.00	14.42	110	325	PASS
104.7602	Vertical	12.43	22.68	43.52	20.84	146	229	PASS
161.5307	Vertical	10.18	22.47	43.52	21.05	182	331	PASS
301.0140	Vertical	15.37	28.82	46.02	17.20	204	11	PASS
611.9619	Vertical	21.24	36.41	46.02	9.61	256	95	PASS
953.7242	Vertical	24.96	37.99	46.02	8.03	310	360	PASS



Radiates Emission	1G~3G
Test channel	Worst-Case

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1314.8315	Horizontal	26.91	12.98	39.89	74.00	34.11	PK	150	130	PASS
1330.4330	Horizontal	27.01	0.33	27.34	54.00	26.66	AV	150	93	PASS
1633.6634	Horizontal	29.38	13.53	42.91	74.00	31.09	PK	150	360	PASS
1682.0682	Horizontal	29.83	0.46	30.29	54.00	23.71	AV	150	309	PASS
1945.2945	Horizontal	31.68	14.26	45.94	74.00	28.06	PK	150	256	PASS
1959.2959	Horizontal	31.76	0.97	32.73	54.00	21.27	AV	150	201	PASS
2412.1412	Horizontal	35.92	14.11	50.03	74.00	23.97	PK	150	256	PASS
2431.5432	Horizontal	36.00	1.56	37.56	54.00	16.44	AV	150	142	PASS
2665.7666	Horizontal	36.89	2.21	39.10	54.00	14.90	AV	150	267	PASS
2671.7672	Horizontal	36.91	15.46	52.37	74.00	21.63	PK	150	56	PASS
2959.3959	Horizontal	37.82	1.94	39.76	54.00	14.24	AV	150	37	PASS
2998.7999	Horizontal	37.95	14.68	52.63	74.00	21.37	PK	150	87	PASS

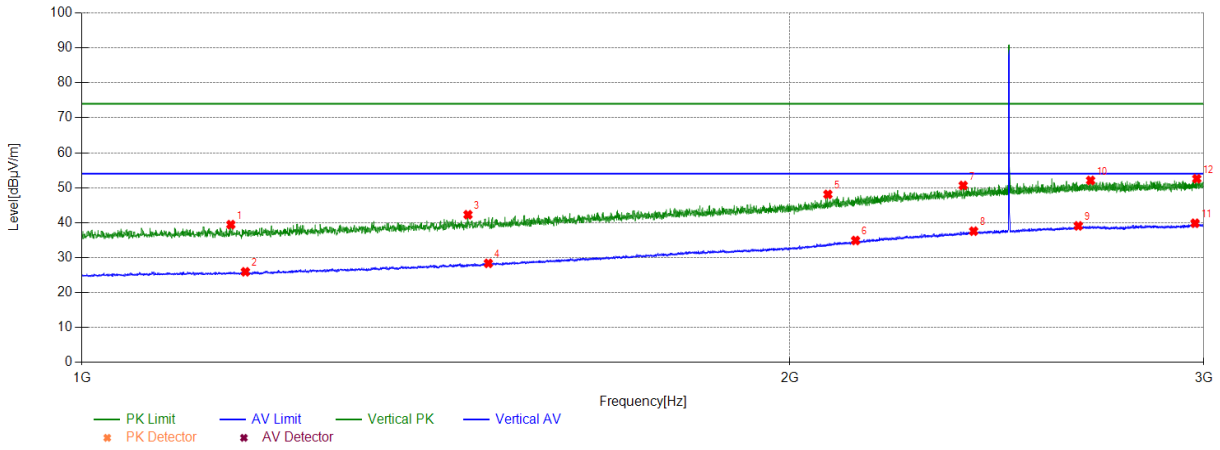


Note: The signal beyond the limit is carrier

Radiates Emission	1G~3G
Test channel	Worst-Case

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1157.0157	Vertical	26.04	13.38	39.42	74.00	34.58	PK	150	212	PASS
1173.6174	Vertical	26.11	-0.20	25.91	54.00	28.09	AV	150	260	PASS
1459.4459	Vertical	27.88	14.38	42.26	74.00	31.74	PK	150	163	PASS
1488.8489	Vertical	28.11	0.22	28.33	54.00	25.67	AV	150	217	PASS
2076.1076	Vertical	32.85	15.23	48.08	74.00	25.92	PK	150	200	PASS
2133.1133	Vertical	33.50	1.38	34.88	54.00	19.12	AV	150	217	PASS
2370.1370	Vertical	35.63	15.00	50.63	74.00	23.37	PK	150	12	PASS
2394.5395	Vertical	35.83	1.72	37.55	54.00	16.45	AV	150	0	PASS
2652.9653	Vertical	36.85	2.21	39.06	54.00	14.94	AV	150	297	PASS
2685.1685	Vertical	36.96	15.11	52.07	74.00	21.93	PK	150	316	PASS
2974.3974	Vertical	37.87	1.95	39.82	54.00	14.18	AV	150	200	PASS
2979.3979	Vertical	37.88	14.68	52.56	74.00	21.44	PK	150	86	PASS

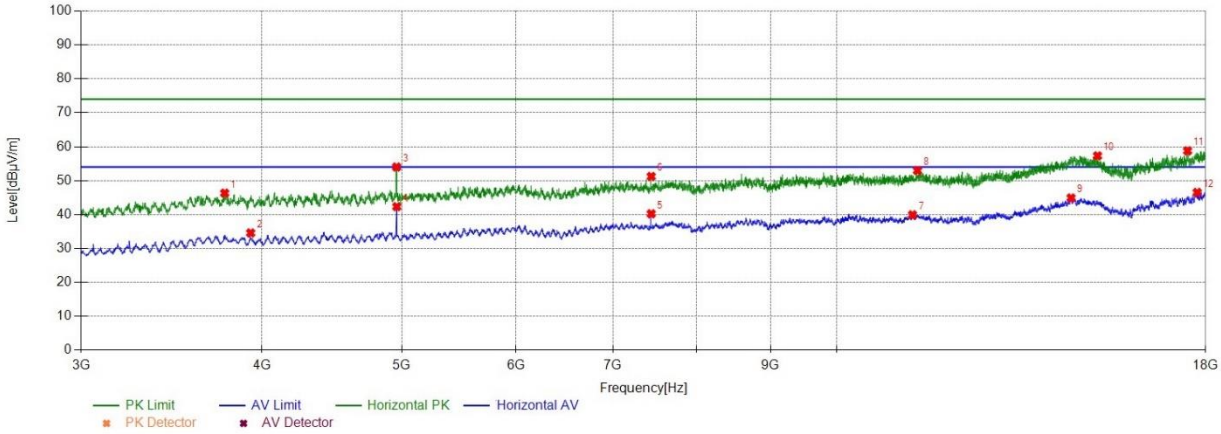


Note: The signal beyond the limit is carrier

Radiates Emission	3G~18G
Test channel	Worst-Case

Suspected List

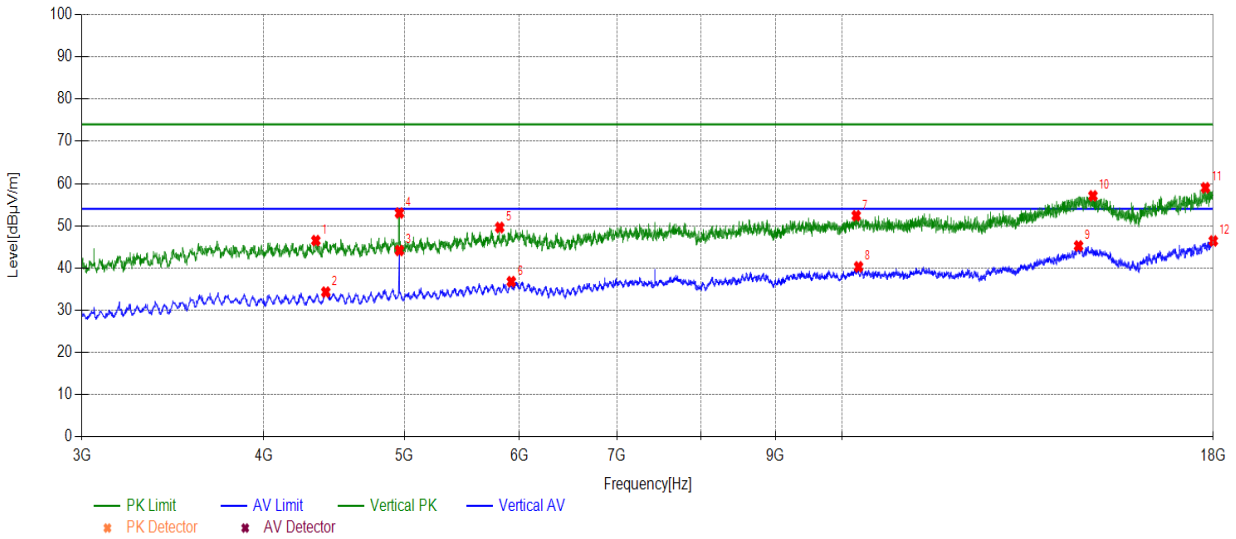
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
3771.0771	Horizontal	-6.96	53.26	46.30	74.00	27.70	PK	150	77	PASS
3930.0930	Horizontal	-6.68	41.22	34.54	54.00	19.46	AV	150	6	PASS
4959.1959	Horizontal	-5.62	59.63	54.01	74.00	19.99	PK	150	149	PASS
4960.6961	Horizontal	-5.62	47.93	42.31	54.00	11.69	AV	150	159	PASS
7440.4440	Horizontal	-0.46	40.66	40.20	54.00	13.80	AV	150	58	PASS
7440.4440	Horizontal	-0.46	51.68	51.22	74.00	22.78	PK	150	132	PASS
11282.3282	Horizontal	5.12	34.78	39.90	54.00	14.10	AV	150	10	PASS
11372.3372	Horizontal	5.08	47.87	52.95	74.00	21.05	PK	150	126	PASS
14525.6526	Horizontal	8.61	36.27	44.88	54.00	9.12	AV	150	6	PASS
15151.2151	Horizontal	8.20	49.10	57.30	74.00	16.70	PK	150	129	PASS
17488.4488	Horizontal	12.80	45.97	58.77	74.00	15.23	PK	150	142	PASS
17756.9757	Horizontal	14.19	32.31	46.50	54.00	7.50	AV	150	10	PASS



Radiates Emission	3G~18G
Test channel	Worst-Case

Suspected List

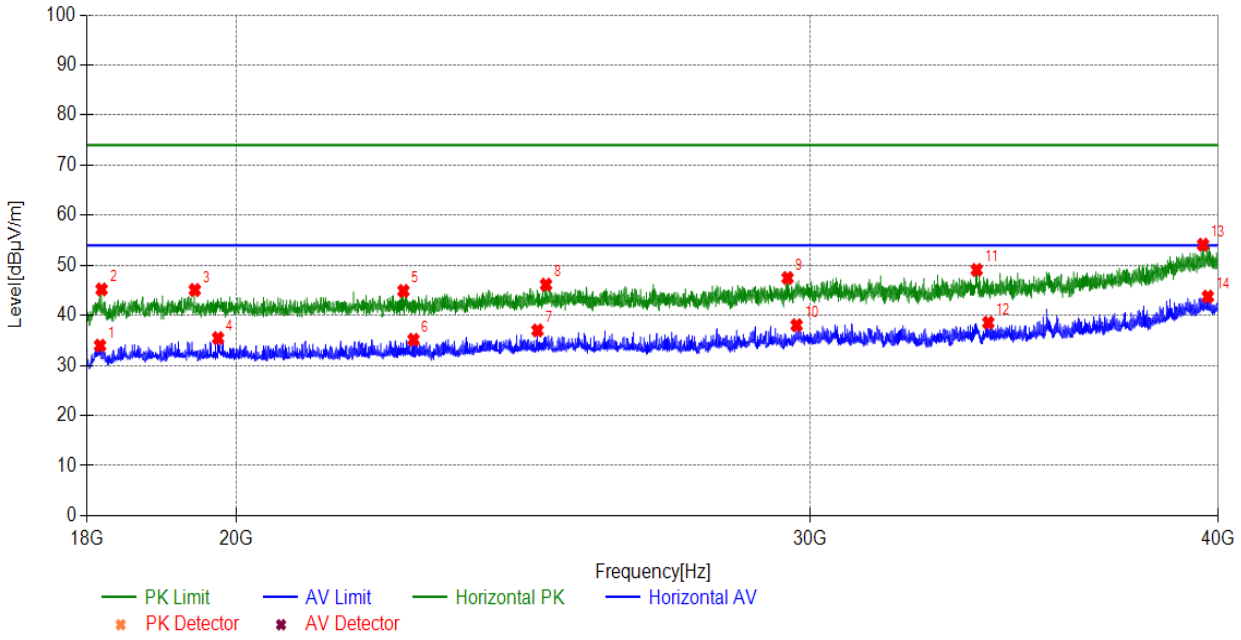
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
4345.6346	Vertical	-6.29	52.77	46.48	74.00	27.52	PK	150	69	PASS
4414.6415	Vertical	-6.24	40.52	34.28	54.00	19.72	AV	150	17	PASS
4960.6961	Vertical	-5.62	49.76	44.14	54.00	9.86	AV	150	20	PASS
4960.6961	Vertical	-5.62	58.63	53.01	74.00	20.99	PK	150	245	PASS
5814.2814	Vertical	-4.63	54.22	49.59	74.00	24.41	PK	150	339	PASS
5922.2922	Vertical	-4.27	41.03	36.76	54.00	17.24	AV	150	11	PASS
10226.2226	Vertical	4.14	48.24	52.38	74.00	21.62	PK	150	91	PASS
10263.7264	Vertical	4.23	36.05	40.28	54.00	13.72	AV	150	11	PASS
14542.1542	Vertical	8.61	36.61	45.22	54.00	8.78	AV	150	11	PASS
14876.6877	Vertical	8.63	48.45	57.08	74.00	16.92	PK	150	117	PASS
17777.9778	Vertical	14.29	44.70	58.99	74.00	15.01	PK	150	75	PASS
18000.0000	Vertical	15.44	30.96	46.40	54.00	7.60	AV	150	14	PASS



Radiates Emission	18G~40G
Test channel	Worst-Case

Suspected List

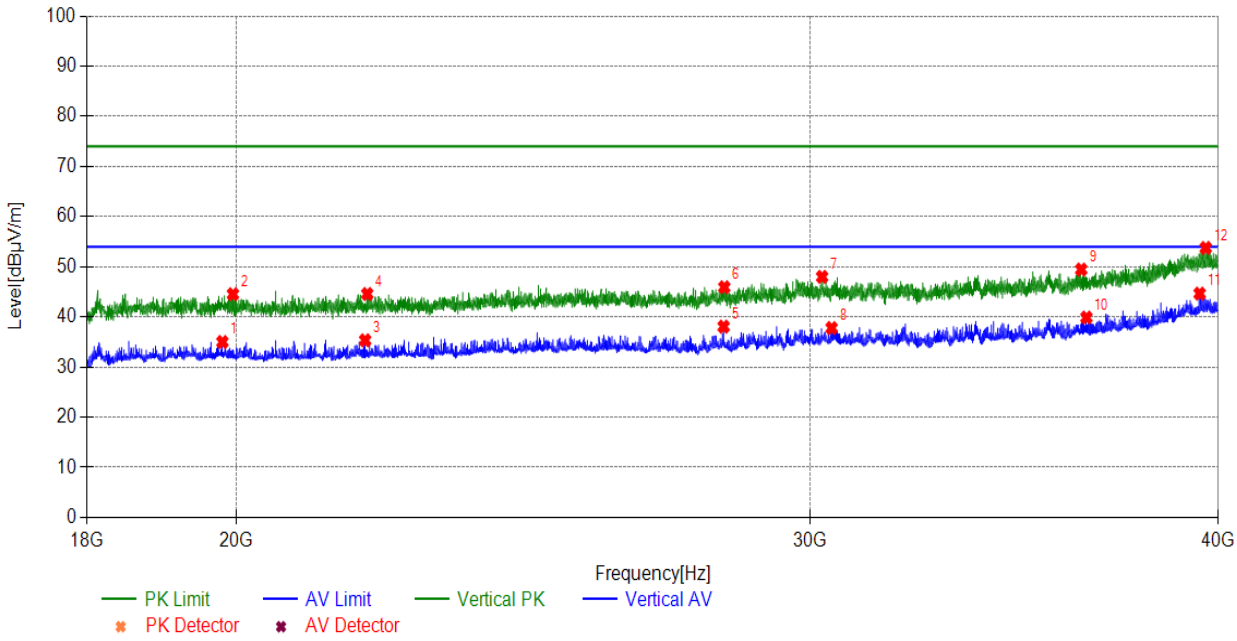
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
19423.5424	Horizontal	1.33	43.74	45.07	74.00	28.93	PK	100	100	PASS
24888.8889	Horizontal	4.06	42.06	46.12	74.00	27.88	PK	100	60	PASS
39575.3575	Horizontal	10.78	43.33	54.11	74.00	19.89	PK	100	150	PASS
18187.0187	Horizontal	1.15	44.03	45.18	74.00	28.82	PK	100	60	PASS
33731.5732	Horizontal	6.52	42.56	49.08	74.00	24.92	PK	100	180	PASS
22506.0506	Horizontal	2.41	42.47	44.88	74.00	29.12	PK	100	90	PASS
29515.9516	Horizontal	6.36	41.10	47.46	74.00	26.54	PK	100	170	PASS
19744.7745	Horizontal	1.31	34.14	35.45	54.00	18.55	AV	100	10	PASS
22666.6667	Horizontal	2.57	32.56	35.13	54.00	18.87	AV	100	10	PASS
24739.2739	Horizontal	4.00	32.99	36.99	54.00	17.01	AV	100	10	PASS
39709.5710	Horizontal	10.79	32.95	43.74	54.00	10.26	AV	100	10	PASS
29705.1705	Horizontal	6.49	31.53	38.02	54.00	15.98	AV	100	10	PASS
34008.8009	Horizontal	6.60	31.94	38.54	54.00	15.46	AV	100	10	PASS
18167.2167	Horizontal	1.14	32.82	33.96	54.00	20.04	AV	100	10	PASS



Radiates Emission	18G~40G
Test channel	Worst-Case

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
39650.1650	Vertical	10.78	42.97	53.75	74.00	20.25	PK	100	230	PASS
19953.7954	Vertical	1.30	43.22	44.52	74.00	29.48	PK	100	150	PASS
28226.6227	Vertical	5.54	40.37	45.91	74.00	28.09	PK	100	190	PASS
30244.2244	Vertical	6.59	41.39	47.98	74.00	26.02	PK	100	200	PASS
36314.6315	Vertical	7.38	42.06	49.44	74.00	24.56	PK	100	30	PASS
21938.3938	Vertical	1.88	42.69	44.57	74.00	29.43	PK	100	270	PASS
39480.7481	Vertical	10.77	33.87	44.64	54.00	9.36	AV	100	10	PASS
28213.4213	Vertical	5.53	32.52	38.05	54.00	15.95	AV	100	10	PASS
21905.3905	Vertical	1.88	33.45	35.33	54.00	18.67	AV	100	10	PASS
36448.8449	Vertical	7.48	32.39	39.87	54.00	14.13	AV	100	10	PASS
30448.8449	Vertical	6.50	31.27	37.77	54.00	16.23	AV	100	10	PASS
19806.3806	Vertical	1.31	33.68	34.99	54.00	19.01	AV	100	10	PASS

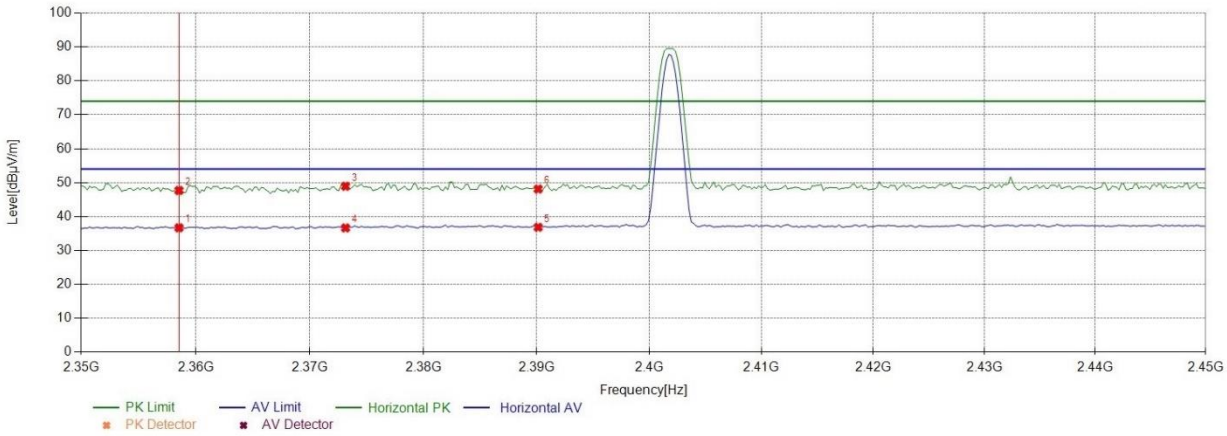


Band Edge：

During the test, the Band Edge was performed in BLE all modes with all channels and all antenna. BLE(1Mbps), Antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test mode	BLE(1Mbps)
Test channel	Channel 0

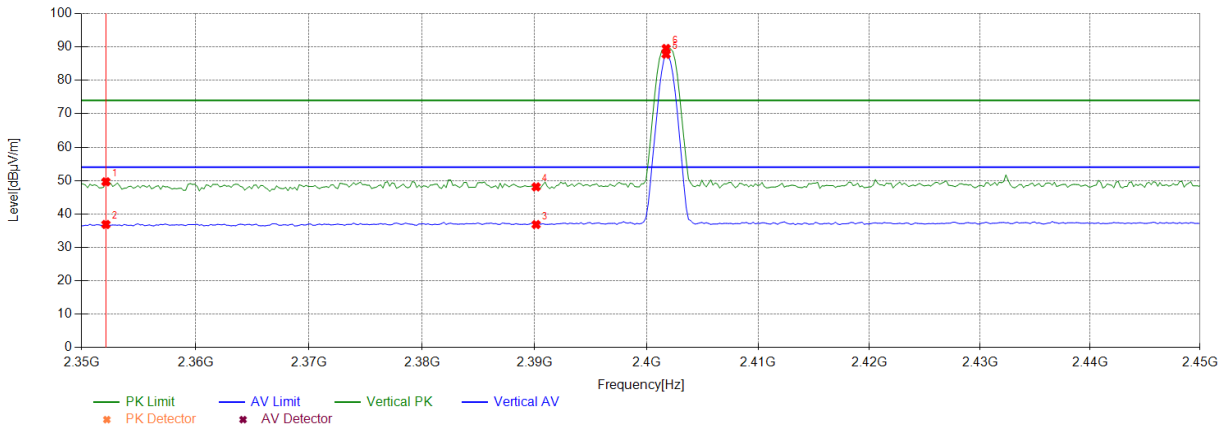
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2358.5359	Horizontal	35.54	1.12	36.66	54.00	17.34	AV	150	296	PASS
2358.5359	Horizontal	35.54	12.13	47.67	74.00	26.33	PK	150	140	PASS
2373.1373	Horizontal	35.66	13.25	48.91	74.00	25.09	PK	150	38	PASS
2373.1373	Horizontal	35.66	0.95	36.61	54.00	17.39	AV	150	230	PASS
2390.1390	Horizontal	35.79	1.02	36.81	54.00	17.19	AV	150	247	PASS
2390.1390	Horizontal	35.79	12.30	48.09	74.00	25.91	PK	150	85	PASS



Test mode	BLE(1Mbps)
Test channel	Channel 0

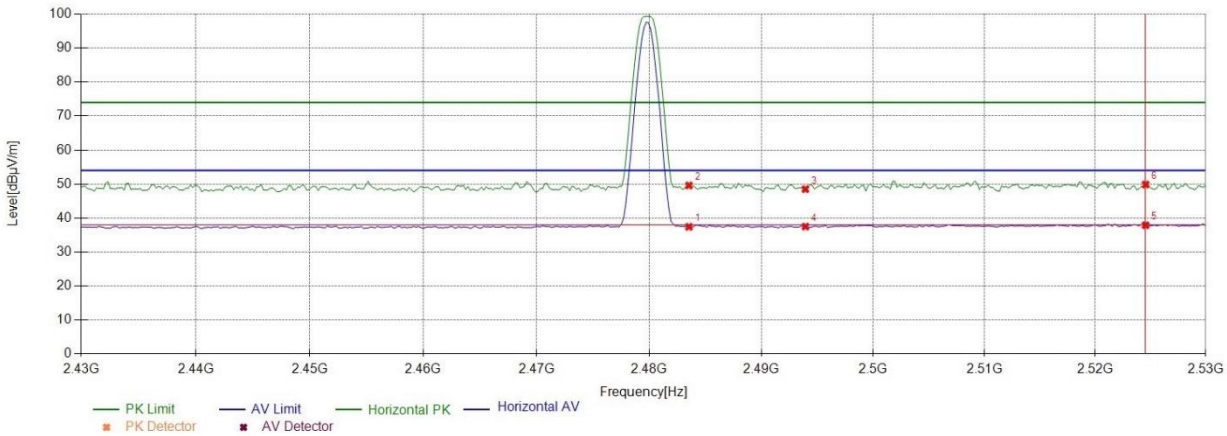
Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
2352.1352	Vertical	35.49	14.13	49.62	74.00	24.38	PK	150	7	PASS
2352.1352	Vertical	35.49	1.35	36.84	54.00	17.16	AV	150	7	PASS
2390.1390	Vertical	35.79	1.02	36.81	54.00	17.19	AV	150	247	PASS
2390.1390	Vertical	35.79	12.30	48.09	74.00	25.91	PK	150	85	PASS
2401.7402	Vertical	35.88	51.92	87.80	54.00	-33.80	AV	150	188	---
2401.7402	Vertical	35.88	53.69	89.57	74.00	-15.57	PK	150	188	---



Test mode	BLE(1Mbps)
Test channel	Channel 39

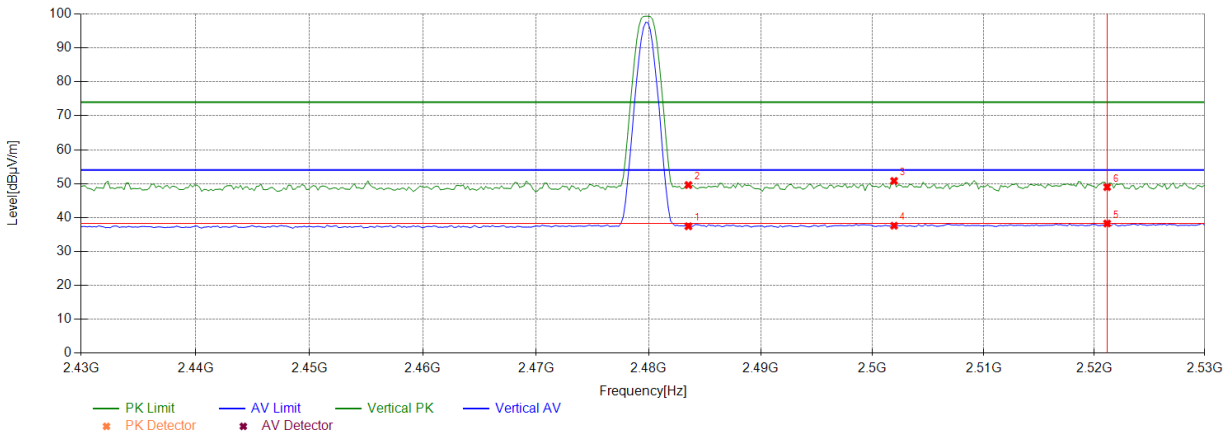
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2483.5484	Horizontal	36.20	1.20	37.40	54.0	16.60	AV	150	124	PASS
2483.5484	Horizontal	36.20	13.37	49.57	74.0	24.43	PK	150	244	PASS
2493.9494	Horizontal	36.25	12.24	48.49	74.0	25.51	PK	150	44	PASS
2493.9494	Horizontal	36.25	1.22	37.47	54.0	16.53	AV	150	159	PASS
2524.5525	Horizontal	36.37	1.49	37.86	54.0	16.14	AV	150	183	PASS
2524.5525	Horizontal	36.37	13.49	49.86	74.0	24.14	PK	150	81	PASS



Test mode	BLE(1Mbps)
Test channel	Channel 39

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
2483.5484	Vertical	36.20	1.20	37.40	54.00	16.60	AV	150	124	PASS
2483.5484	Vertical	36.20	13.37	49.57	74.00	24.43	PK	150	244	PASS
2501.9502	Vertical	36.28	14.50	50.78	74.00	23.22	PK	150	219	PASS
2501.9502	Vertical	36.28	1.29	37.57	54.00	16.43	AV	150	44	PASS
2521.1521	Vertical	36.36	1.86	38.22	54.00	15.78	AV	150	344	PASS
2521.1521	Vertical	36.36	12.58	48.94	74.00	25.06	PK	150	142	PASS



5.3 Maximum conducted output power

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

The EUT was tested according to DTS test procedure of ANSI C63.10 for compliance to FCC 47CFR 15.247 requirements. The maximum conducted output power using ANSI C63.10 section 11.9.2.3 AVGPM Average power meter method.

1. Power meter and sensor's minimum video bandwidth is 50MHz, larger than 802.11n(40MHz) bandwidth;
2. Fast responding diode sensors respond immediately to changes in power level to reduce total test time.
3. Use average detector to test.

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. The Average detector is used. We use Maximum Average Conducted Output Power Level Method AVGSA-2 in KDB 558074 D01 /KDB662911 D01 for this test.

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

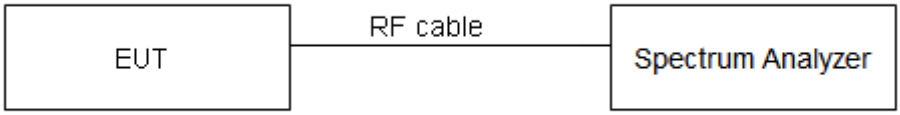
Limits:

Average Output Power	≤ 1W (30dBm)

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated Levels above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.44 dB.

Test Results:

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	5.02	<=30	PASS
		2440	5.01	<=30	PASS
		2480	4.83	<=30	PASS

5.4 Minimum 6 dB Bandwidth

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

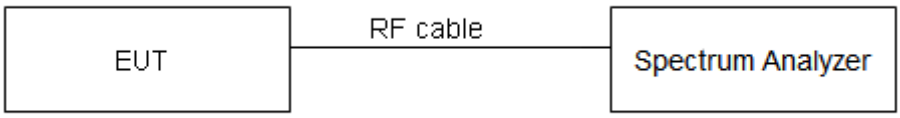
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

Minimum 6dB Bandwidth	≥ 500 kHz

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.680	2401.644	2402.324	0.5	PASS
		2440	0.688	2439.640	2440.328	0.5	PASS
		2480	0.680	2479.640	2480.320	0.5	PASS

5.5 Occupied Channel Bandwidth

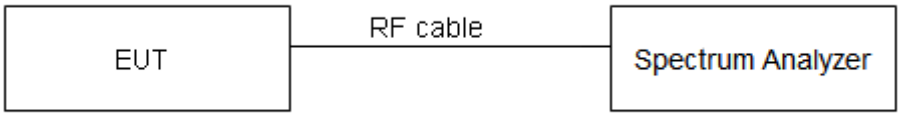
Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 50 kHz; VBW is set to 200 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.023	2401.469	2402.492	---	PASS
		2440	1.027	2439.465	2440.492	---	PASS
		2480	1.031	2479.465	2480.496	---	PASS

5.6 Band Edge Measurement

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

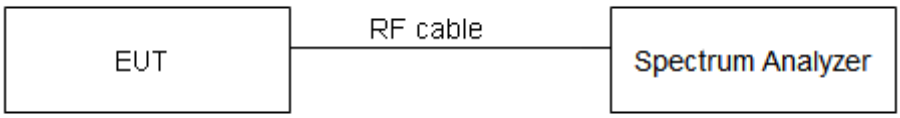
Method of Measurement:

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer.

Limits:

Rule Part 15.247(d) specifies that “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.

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 936 Hz, 2 GHz-3 GHz = 1.407 dB.

Test Results:

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	4.52	-48.71	<=-15.48	PASS
		High	2480	4.57	-47.62	<=-15.43	PASS

5.7 Maximum Power Spectral Density

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. The Average detector is used. We use Method AVGPSD-2 in KDB 558074 D01 for this test.

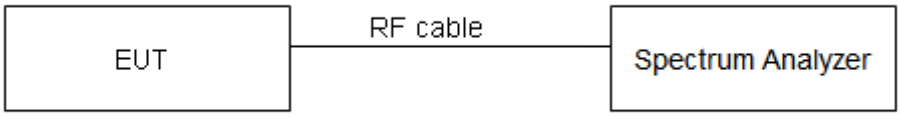
The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Limits:

Rule Part 15.247(e) specifies that" For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Maximum Power Spectral Density	≤ 8 dBm / 3kHz

Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.75dB.

Test Results:

TestMode	Antenna	Channel	Result[dBm/10kHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	5.72	-4.88	<=8	PASS
		2440	6.02	-4.68	<=8	PASS
		2480	5.58	-4.7	<=8	PASS

5.8 Spurious RF Conducted Emissions

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to100kHz and VBW to 300 kHz, Sweep is set to AUTO .The test is in transmitting mode.

Limits:

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

Test Setup:

Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

Test Results:

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	4.74	4.74	---	PASS
			30~1000	4.74	-60.01	<=-25.26	PASS
			1000~26500	4.74	-48.95	<=-25.26	PASS
		2440	Reference	4.69	4.69	---	PASS
			30~1000	4.69	-60.17	<=-25.31	PASS
			1000~26500	4.69	-49.12	<=-25.31	PASS
		2480	Reference	4.56	4.56	---	PASS
			30~1000	4.56	-60.14	<=-25.44	PASS
			1000~26500	4.56	-49.35	<=-25.44	PASS

6. Appendix E

Test Equipment：

Conduction test：Maximum conducted output power, Minimum 6dB Bandwidth, Occupied Channel Bandwidth, Band Edge Measurement, Maximum Power Spectral Density, Spurious RF Conducted Emissions					
Test Equipment	**Type/Mode**	**SERIAL NO.**	**Equipment No.**	**Manufacturer**	**Cal. Due**
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR44301	/	CRT	2024/04/24
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2023/06/05
Comprehensive Test Instrument	CMW270	100304	DZ-000240-1	R&S	2022/12/09
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	2023/06/05
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	2023/06/05
RF Radio Frequency Switch	JS0806-2	19H9080187	DZ-000241	Tonscend	2023/06/06
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2023/04/21
Temperature and humidity meter	MHO-C201	/	DZ-000249-3	Seconds test	2022/09/23
Radiation test: Transmitter Radiated Emission(above 1GHz)					
Test Equipment	**Type/Mode**	**SERIAL NO.**	**Equipment No.**	**Manufacturer**	**Cal. Due**
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2023/03/02
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2023/03/02
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2023/06/25
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2023/03/04
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2022/08/27
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2023/06/05
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2022/08/31
Radiation test: Transmitter Radiated Emission(below 1GHz)					
Test Equipment	**Type/Mode**	**SERIAL NO.**	**Equipment No.**	**Manufacturer**	**Cal. Due**
5m Semi-Anechoic Chamber	SAC-5	SAC-5-2.0	EM-000557	COMTEST	2024/11/02
EMI Test Receiver	ESR7	102235	VGDY-0956	R&S	2023/03/03
Broadband Antenna(5m)	VULB 9163	9163-676	EM-000382	SCHWARZBECK	2023/05/06
Conduction test: Conducted Emission					
Test Equipment	**Type/Mode**	**SERIAL NO.**	**Equipment No.**	**Manufacturer**	**Cal. Due**
EMI Test Receiver	ESCI	100857	WKNB-0081	R&S	2022/12/08
LISN	NSLK 8128	8128-316	VGDY-0149	SCHWARZBECK	2022/09/01
Plus Limiter（#1）	VTSD 9561 F-N	00515	VGDY-0808	SCHWARZBECK	2023/03/05
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2022/09/01

Detection software

Conduction test：Maximum conducted output power, Minimum 6dB Bandwidth, Occupied Channel Bandwidth, Band Edge Measurement, Maximum Power Spectral Density, Spurious RF Conducted Emissions		
Dynacomm	**Software Release**	**Software Developer**
TS1120-3 Test System	2.6.88.0342	Tonscend
Radiation test: Transmitter Radiated Emission(above 1GHz)		
Dynacomm	**Software Release**	**Software Developer**
JS36-RSE Radiation stray test system	2.5.1.2	Tonscend
Radiation test: Transmitter Radiated Emission(below 1GHz)		
Dynacomm	**Software Release**	**Software Developer**
JS36-RSE	3.0.0.2	Tonscend
Conduction test: Conducted Emission		
Dynacomm	**Software Release**	**Software Developer**
EMI Measurement Software EP9/CE	4.0.110	TOYO

The End

Important

1. The test report is invalid without the official stamp of CVC;

2. Any part photocopies of the test report are forbidden without the written permission from CVC;

3. The test report is invalid without the signatures of Approval and Reviewer;

4. The test report is invalid if altered;

5. Objections to the test report must be submitted to CVC within 15 days;

6. Generally, commission test is responsible for the tested samples only;

7. As for the test result, "—"or "N" means "not applicable" , " / "means "not test""P" means "pass" and "F" means "fail".

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

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