ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2023-0030-RF2

TEST REPORT

FCC ID	:	2AWMK-BTP-AIN2
Applicant	:	Guangzhou Pinzhong Electronic Technology Co.,Ltd.
Product Name	:	BEITONG ASURA 2 PRO WIRELESS GAMEPAD MULTI MODE
Mode No.	:	BTP-AIN2, BTP-A1N3S

CVC Testing Technology Co., Ltd.

Applicant	**Name:** Guangzhou Pinzhong Electronic Technology Co.,Ltd. **Address:** Room 611-612, Greenland Center of Financial city, No.662, Huangpu Avenue Middle Road. Tianhe District, Guangzhou City.
Manufacturer	**Name:** Guangzhou Pinzhong Electronic Technology Co.,Ltd. **Address:** Room 611-612, Greenland Center of Financial city, No.662, Huangpu Avenue Middle Road. Tianhe District, Guangzhou City.
Equipment Under Test	**Product Name :** BEITONG ASURA 2 PRO WIRELESS GAMEPAD MULTI MODE **Model No. :** BTP-AIN2 **Trade mark :** BEITONG **Serial no. :** K22F97005846 **Sampling :** 1-1

Date of Receipt.	2023.06.08	**Date of Testing**	2023.07.12

Test Specification	**Test Result**
FCC CFR47 Part 15C (2020) Radio Frequency Devices ANSI C63.10 (2013) DA00-705 Filing and Frequency Measurement Guidelines For Frequency Hopping Spread Spectrum System (2000).	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Seal of CVC** **Date of issue: 2023.10.07**

Approved by:	Reviewed by:	Tested by:
Chen HuaWen	**Xu Zhenfei**	**Lu Weiji**

Other Aspects: NONE.

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

Note: This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of **CVC**.

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1. General Product Information

1.1 General information

Product Name	BEITONG ASURA 2 PRO WIRELESS GAMEPAD MULTI MODE	
Model No.	BTP-AIN2	
Additional model	BTP-A1N3S	
Power Supply	Rated voltage	DC 5.0V
	Battery voltage	DC 3.7V
Serial Number(SN)	K22F97005846	
firmware	2.1	
software	1.0.5	
specific power settings	Bluetooth(BR): 0.5 Bluetooth(EDR):1.02	
Antenna Type	Internal Antenna	
Antenna Connector	A permanently attached antenna	
Antenna Gain	1.95 dBi (provided by client)	
Beamforming gain	Unsupported (provided by client)	
Frequency Range	2402MHz~2480MHz	
Bluetooth Version:	5.2	
Channel Number	79	
Type of Modulation	GFSK，π/4-DQPSK，8-DPSK	
Hopping Channel Type:	Adaptive Frequency Hopping systems	
Max. Conducted Power	2.09 dBm	
Operate Temp.Range	-20~60℃	

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.
3. The product models of this application are: BTP-AIN2, BTP-A1N3S. The material difference between the parts and the parts in the product model for inspection is shown in the table below:

No	Model	Difference	Remarks
1	BTP-AIN2	1. The circuit, PCB layout, and electrical components of the product are the same. 2. Hall Joysticks, Tact Switch of Dpad, Mechanical Switch of ABXY, part of structure and appearance are different. 3. BTP-AIN2 comes in two colors: black and white.BTP-A1N3S comes in one color: blue. 4. The letters on the A1N3S version ABXY buttons adopt the surface printing process, the handle shell has added icons and line printing in two areas, and the joystick has partially changed to use transparent raw materials.	Inspection model
2	BTP-A1N3S		Coverage model

All the tests carried out on model BTP-AIN2.

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by RF 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

Fax : +86-20-32293889

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 A**.

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
DH1/DH3/DH5 2DH1/2DH3/2DH5 3DH1/3DH3/3DH5	1TX / 1RX	0,39,78,hop

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 and different channels. Preliminary tests have been done on all the configuration for confirming worst case. Data rate and channel below means worst-case rate of each test item.

Worst-case data rates and channels are shown as following table.

Test Items	Test Modes	Test Channels
Conducted Emissions	3DH5	0
Radiated Emissions	3DH5	0
Peak Power Output -Conducted	DH5/2DH5/3DH5	0,39,78
20dB Emission Bandwidth	DH5/2DH5/3DH5	0,39,78
Occupied Channel Bandwidth	DH5/2DH5/3DH5	0,39,78
Frequency Separation	DH5/2DH5/3DH5	hop
Time of Occupancy (Dwell Time)	DH1/DH3/DH5/ 2DH1/2DH3/2DH5/ 3DH1/3DH3/3DH5	hop
Band Edge Compliance	DH5/2DH5/3DH5	0,78
Number of Hopping Frequency	DH5/2DH5/3DH5	hop
Spurious RF Conducted Emissions	DH5/2DH5/3DH5	0,39,78

3.2 Duty cycle

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
DH5	Ant1	2402	2.88	3.75	76.80	---	---
		2441	2.88	3.75	76.80	---	---
		2480	2.88	3.75	76.80	---	---
2DH5	Ant1	2402	2.87	3.75	76.53	---	---
		2441	2.87	3.74	76.74	---	---
		2480	2.88	3.75	76.80	---	---
3DH5	Ant1	2402	2.87	3.74	76.74	---	---
		2441	2.88	3.75	76.80	---	---
		2480	2.88	3.75	76.80	---	---

4. Summary of measurement results

Summary of measurements of results	Clause in FCC rules	Verdict	Note
Conducted Emissions	15.207	PASS	/
Radiated Emissions	15.247(d),15.205,15.209	PASS	/
Peak Power Output -Conducted	15.247(b)(1)	PASS	Appendix D of BT_ diagram
20dB Emission Bandwidth	15.247(a)(1)	PASS	Appendix B of BT_ diagram
Occupied Channel Bandwidth	15.247(a)(1)	PASS	Appendix C of BT_ diagram
Frequency Separation	15.247(a)(1)	PASS	Appendix E of BT_ diagram
Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	PASS	Appendix F of BT_ diagram
Band Edge Compliance	15.247(d)	PASS	Appendix H of BT_ diagram
Number of Hopping Frequency	15.247(a)(1)(iii)	PASS	Appendix G of BT_ diagram
Spurious RF Conducted Emissions	15.247(d)	PASS	Appendix I of BT_ diagram
Antenna Requirement	15.203	PASS	See note 1

Note 1: According to 15.203, it is considered sufficient to comply with the provisions of this section.

5. Measurement procedure

5.1 Conducted Emission

Ambient condition:

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

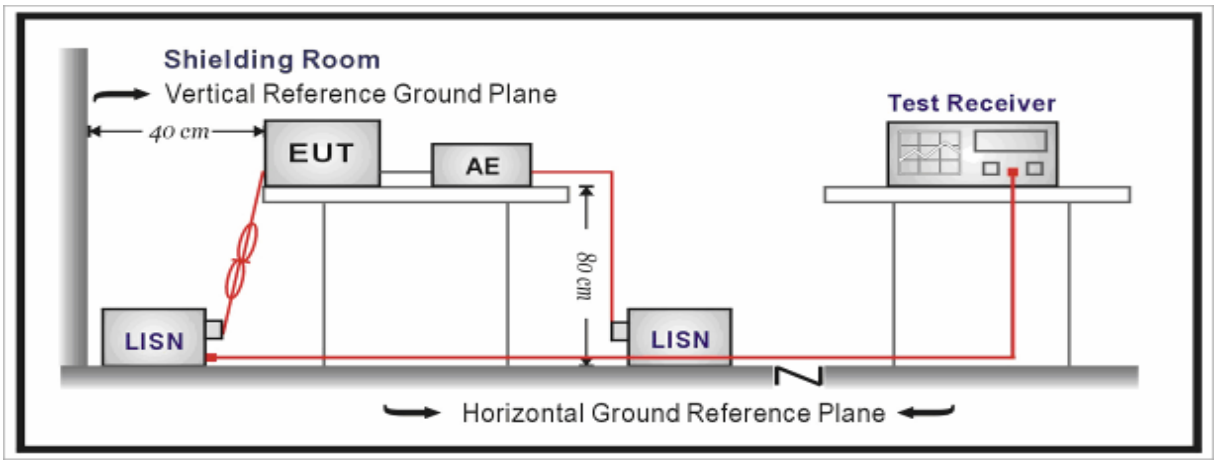
Method of Measurement:

The EUT was setup according to ANSI C63.10, 2013 for compliance to FCC 47CFR 15.207 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：

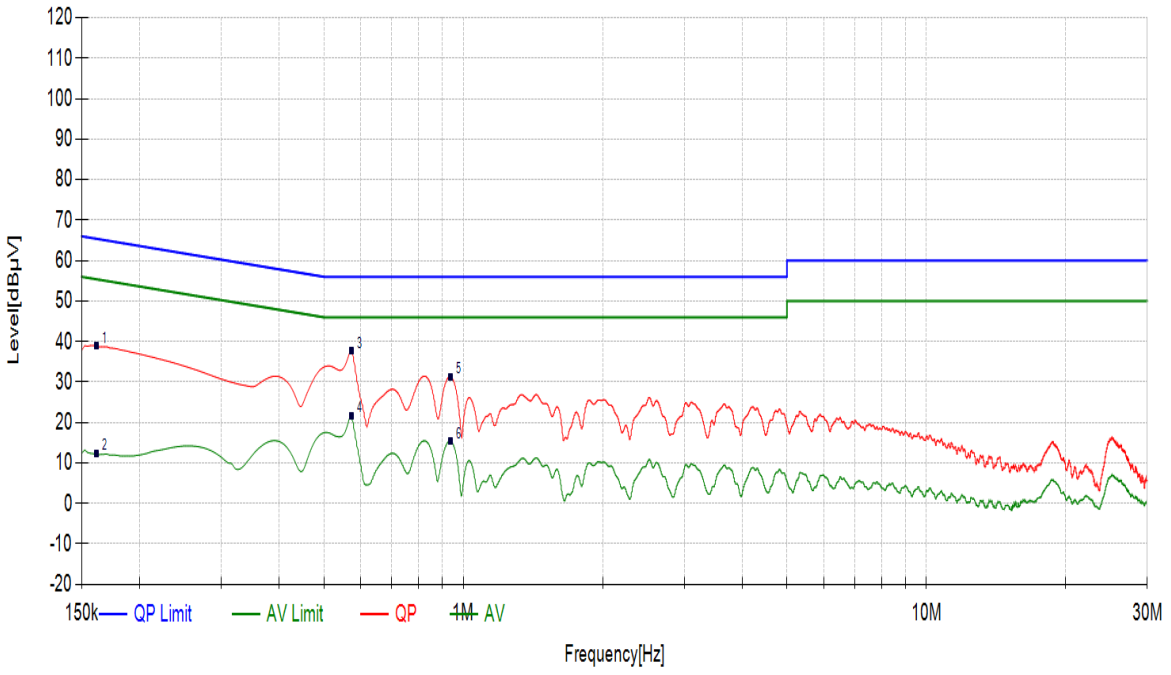
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96. U= 3.12 dB.

Test Results:

During the test, the Conducted Emission from 150kHz to 30MHz was performed in all modes with all channels, and all antennas. BT 8-DPSK Channel 0, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

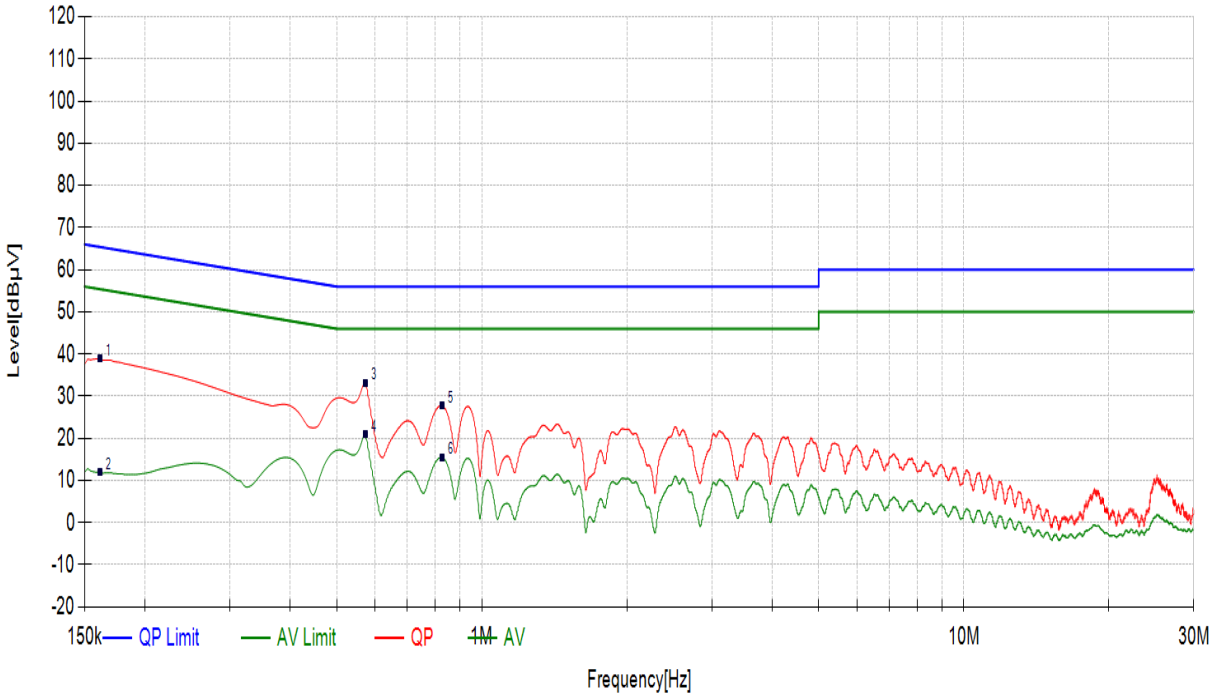
Power Line	L
Test channel	Worst-Case

Suspected List								
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
1	0.1613	10.29	28.70	38.99	65.40	26.41	QP	PASS
3	0.5730	10.31	27.44	37.75	56.00	18.25	QP	PASS
5	0.9375	10.31	21.02	31.33	56.00	24.67	QP	PASS
2	0.1613	10.29	2.05	12.34	55.40	43.06	AV	PASS
4	0.5730	10.31	11.41	21.72	46.00	24.28	AV	PASS
6	0.9375	10.31	5.10	15.41	46.00	30.59	AV	PASS



Power Line	N
Test channel	Worst-Case

Suspected List								
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
3	0.5730	10.30	22.90	33.20	56.00	22.80	QP	PASS
5	0.8273	10.32	17.42	27.74	56.00	28.26	QP	PASS
1	0.1613	10.28	28.57	38.85	65.40	26.55	QP	PASS
6	0.8273	10.32	5.13	15.45	46.00	30.55	AV	PASS
2	0.1613	10.28	1.71	11.99	55.40	43.41	AV	PASS
4	0.5730	10.30	10.69	20.99	46.00	25.01	AV	PASS



5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~58%	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 (μV/m)	Limit (dBμV/m @3m)	Remark
0.009MHz-0.490MHz	2400/F(kHz)@300m	20lg(240000/F(kHz))	Quasi-peak Level
0.490MHz~1.705MHz	24000/F(kHz)@30m	20lg(240000/F(kHz))	Quasi-peak Level
1.705MHz~30.0MHz	30@30m	49.54	Quasi-peak Level
30MHz-88MHz	100@3m	40.0	Quasi-peak Level
88MHz-216MHz	150@3m	43.5	Quasi-peak Level
216MHz-960MHz	200@3m	46.0	Quasi-peak Level
960MHz-1GHz	500@3m	54.0	Quasi-peak Level
Above 1GHz	500@3m	54.0	Average Level

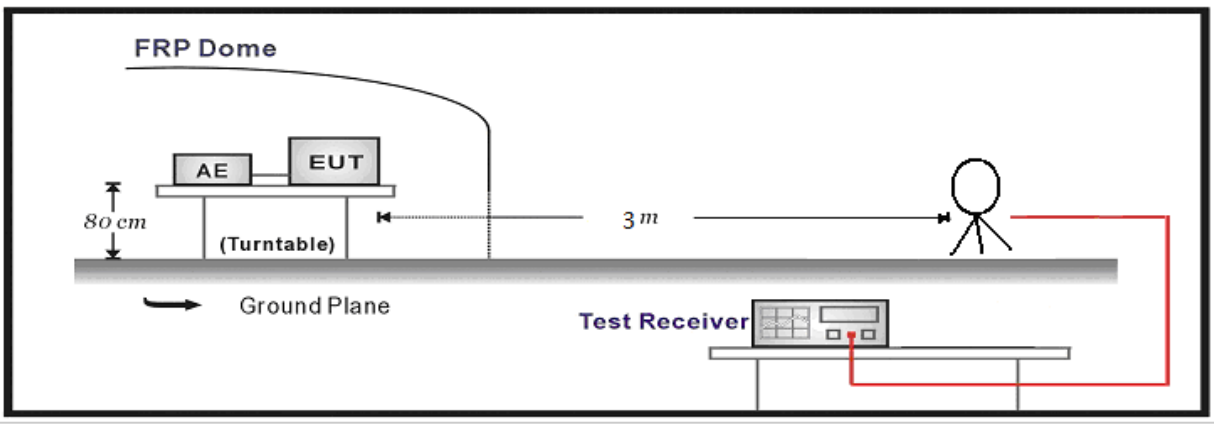
	5000@3m	74.0	Peak Level

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

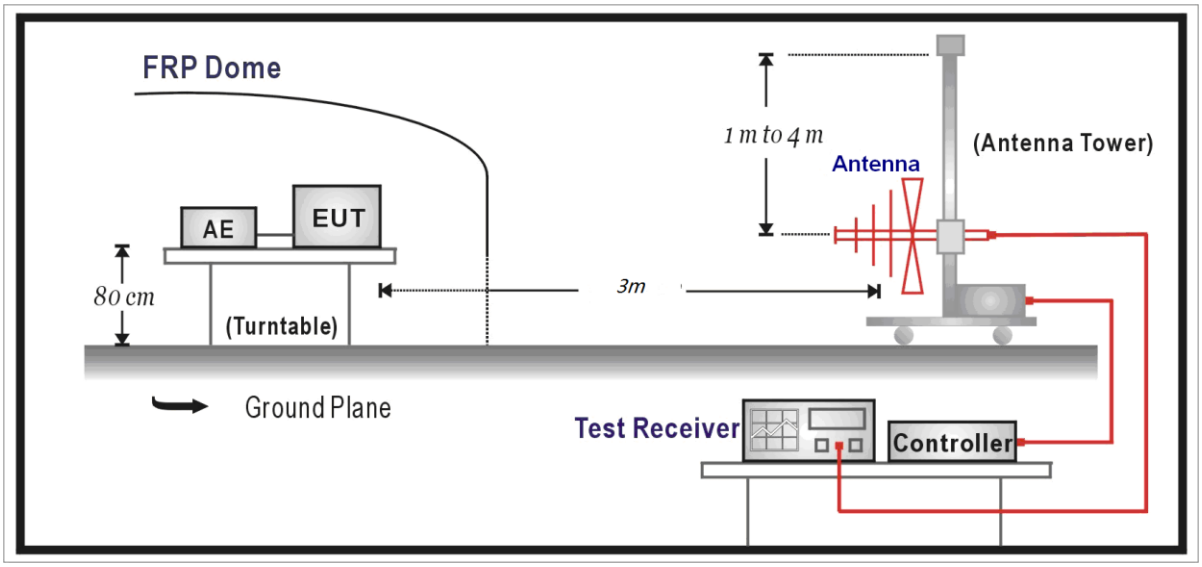
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	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:

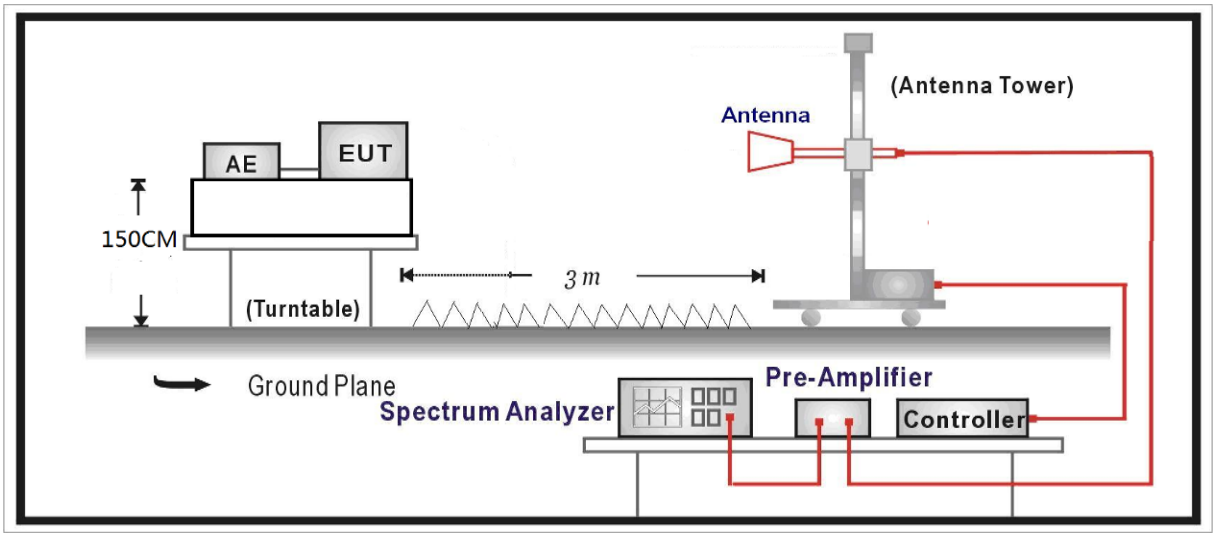
Below 30MHz Test Setup:



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:

During the test, the Radiates Emission from 9kHz to 40GHz was performed in all modes with all channels, and all antennas. BT 8-DPSK, Channel 0, antenna 1 is selected as the worst condition. The test data of the worst-case condition was recorded in this report.

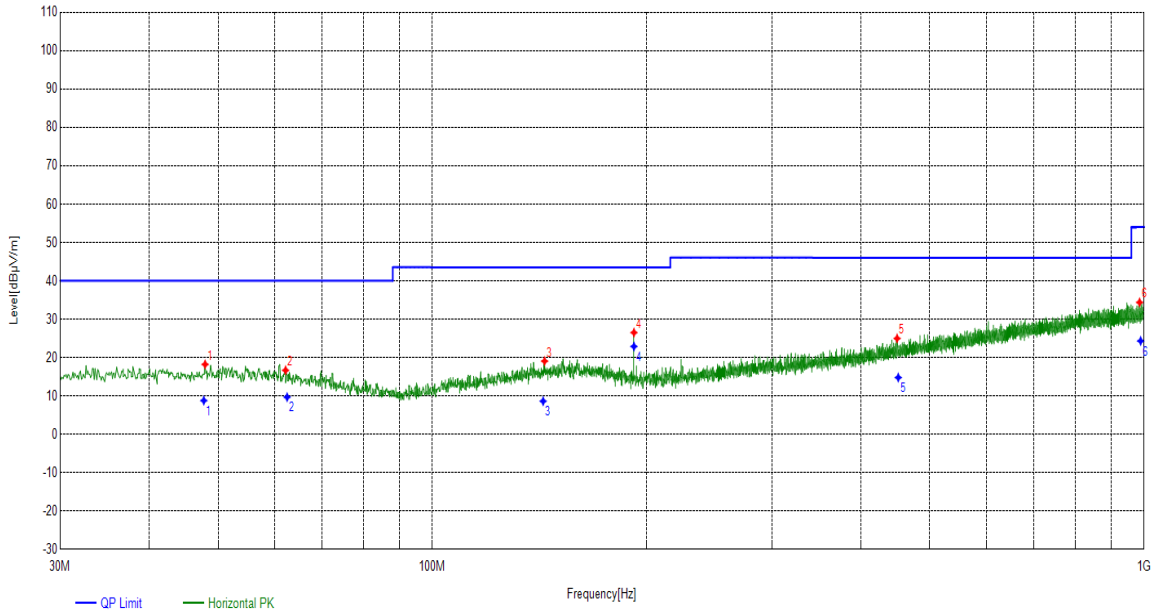
SPURIOUS EMISSIONS：

Radiates Emission	9kHz~1GHz
Test channel	Worst-Case
Polarity	Horizontal

Suspected List									
Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
47.9468	20.34	-2.12	18.22	40.00	21.78	PK	100	300	PASS
62.2072	19.52	-2.84	16.68	40.00	23.32	PK	100	190	PASS
143.7924	20.32	-1.25	19.07	43.51	24.44	PK	100	60	PASS
192.0062	17.75	8.76	26.51	43.50	16.99	PK	100	100	PASS
449.858	25.28	-0.30	24.98	46.01	21.03	PK	100	220	PASS
985.6426	33.99	0.38	34.37	53.99	19.62	PK	100	240	PASS

Note: 9kHz~30MHz have been test and test data more than 20dB margin.

Final Data List							
Frequency [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
47.7497	20.34	8.79	40.00	31.21	280	300	PASS
62.516	19.52	9.68	40.00	30.32	210	190	PASS
143.1223	20.32	8.62	43.51	34.89	390	60	PASS
191.9979	17.75	22.89	43.50	20.61	160	100	PASS
451.4856	25.28	14.79	46.01	31.22	260	220	PASS
988.9804	33.99	24.32	53.99	29.67	220	240	PASS


110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
Level[dBµV/m]
30M
100M
1G
Frequency[Hz]
QP Limit
Horizontal PK

Radiates Emission	9kHz~1GHz
Test channel	Worst-Case
Polarity	Vertical

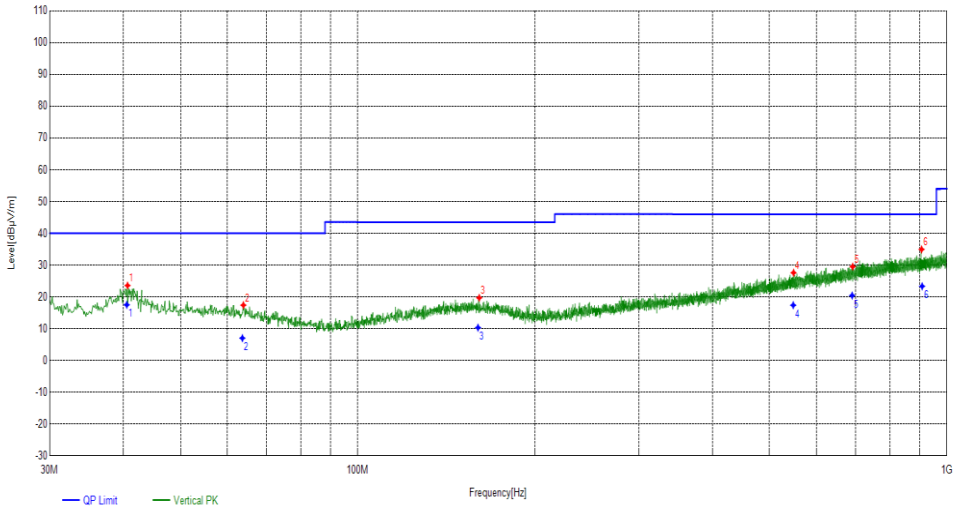
Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
40.6711	19.94	3.63	23.57	40.00	16.43	PK	100	70	PASS
63.9534	19.24	-1.84	17.40	40.00	22.60	PK	100	360	PASS
160.7691	20.84	-1.13	19.71	43.51	23.80	PK	100	110	PASS
549.1959	27.68	-0.09	27.59	46.01	18.42	PK	100	60	PASS
691.8972	30.22	-0.70	29.52	46.00	16.48	PK	100	40	PASS
905.9006	33.09	1.86	34.95	46.00	11.05	PK	100	220	PASS

Note: 9kHz~30MHz have been test and test data more than 20dB margin.

Final Data List

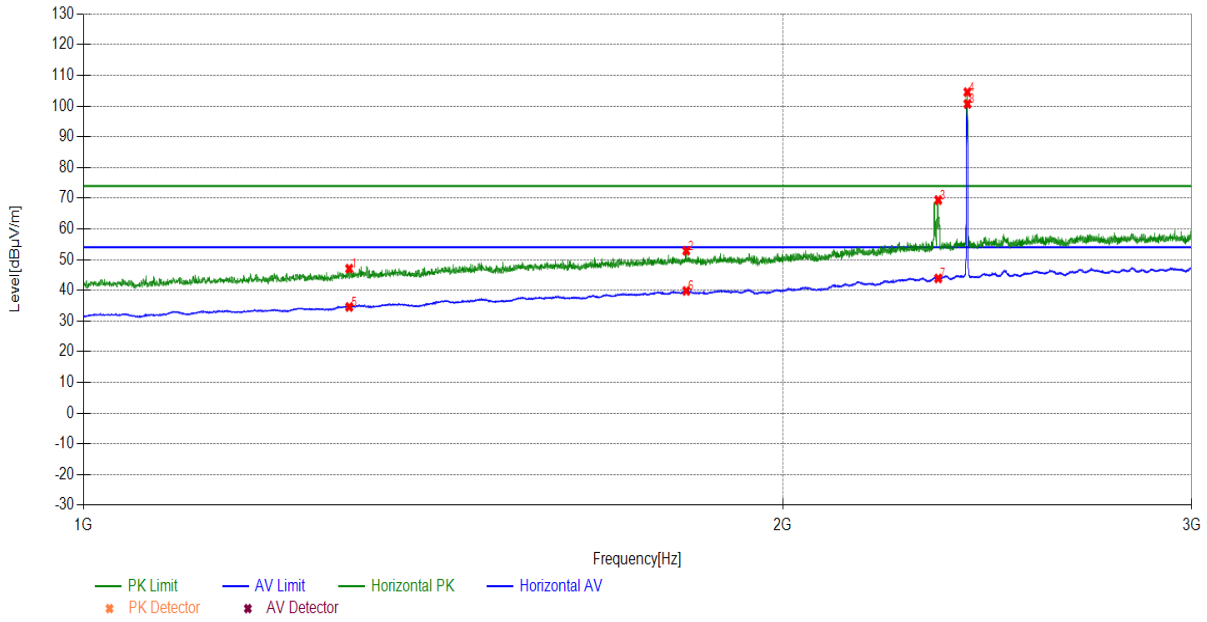
Frequency [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
40.5428	19.94	17.51	40.00	22.49	250	70	PASS
63.7017	19.24	7.03	40.00	32.97	310	0	PASS
159.999	20.84	10.33	43.51	33.18	240	110	PASS
548.5044	27.68	17.39	46.01	28.62	210	60	PASS
690.4557	30.22	20.43	46.00	25.57	160	40	PASS
907.7101	33.09	23.34	46.00	22.66	270	220	PASS



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

Suspected List

Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1301.4301	28.88	18.18	47.06	74.00	26.94	PK	150	265	PASS
1817.6818	33.03	19.84	52.87	74.00	21.13	PK	150	356	PASS
2333.5334	36.74	32.66	69.40	74.00	4.60	PK	150	238	PASS
2401.9402	37.34	67.19	104.53	74.00	-30.53	PK	150	345	---
1301.4301	28.88	5.71	34.59	54.00	19.41	AV	150	278	PASS
1817.6818	33.03	6.77	39.80	54.00	14.20	AV	150	360	PASS
2333.5334	36.74	7.13	43.87	54.00	10.13	AV	150	304	PASS
2402.1402	37.34	63.35	100.69	54.00	-46.69	AV	150	3	---

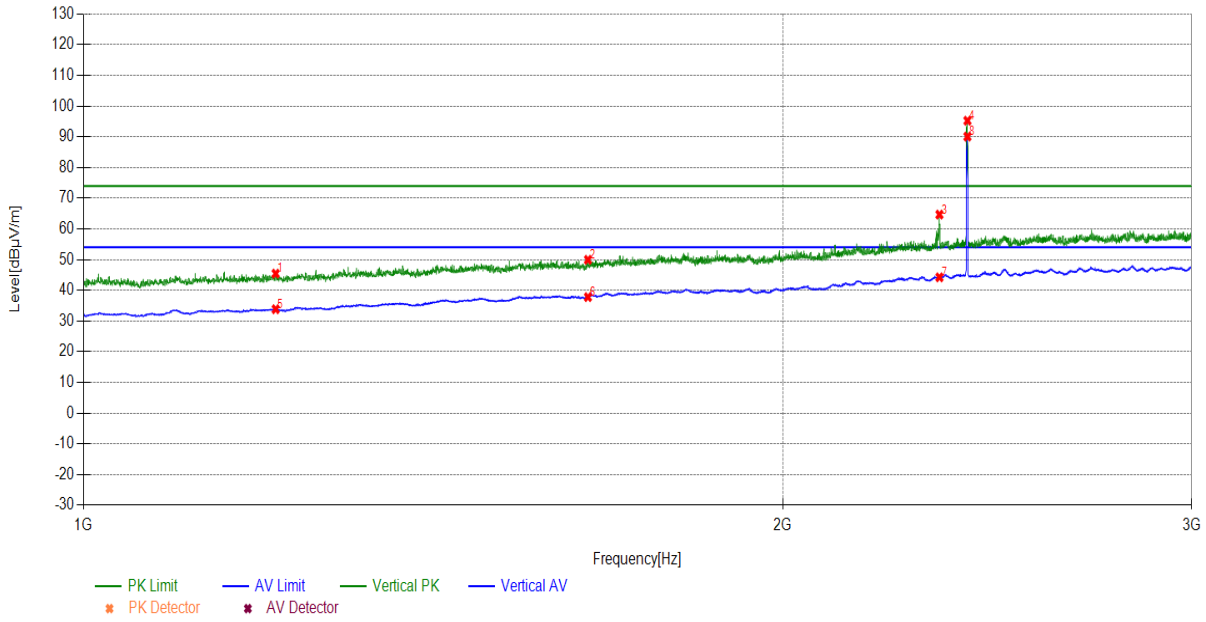


Note: The signal beyond the limit is carrier.

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

Suspected List

Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1209.821	28.01	17.44	45.45	74.00	28.55	PK	150	56	PASS
1648.8649	31.87	18.09	49.96	74.00	24.04	PK	150	108	PASS
2336.3336	36.76	27.92	64.68	74.00	9.32	PK	150	122	PASS
2402.1402	37.34	57.90	95.24	74.00	-21.24	PK	150	15	---
1209.821	28.01	5.84	33.85	54.00	20.15	AV	150	15	PASS
1648.8649	31.87	5.93	37.80	54.00	16.20	AV	150	42	PASS
2336.3336	36.76	7.48	44.24	54.00	9.76	AV	150	108	PASS
2402.1402	37.34	52.73	90.07	54.00	-36.07	AV	150	15	---

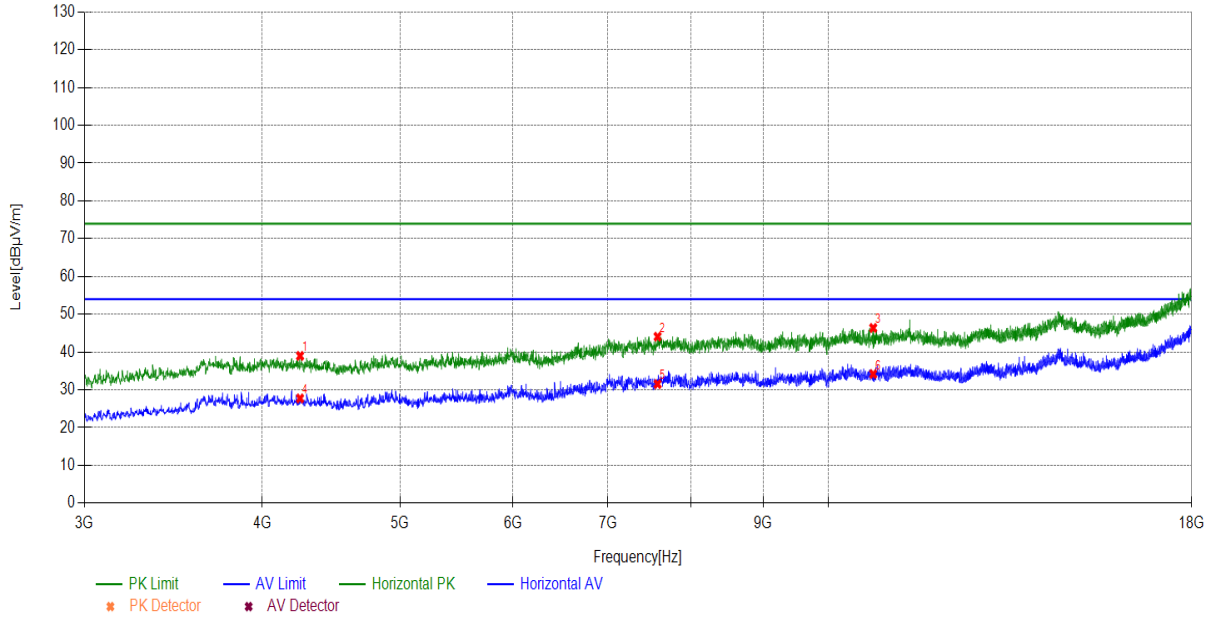


Note: The signal beyond the limit is carrier.

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

Suspected List

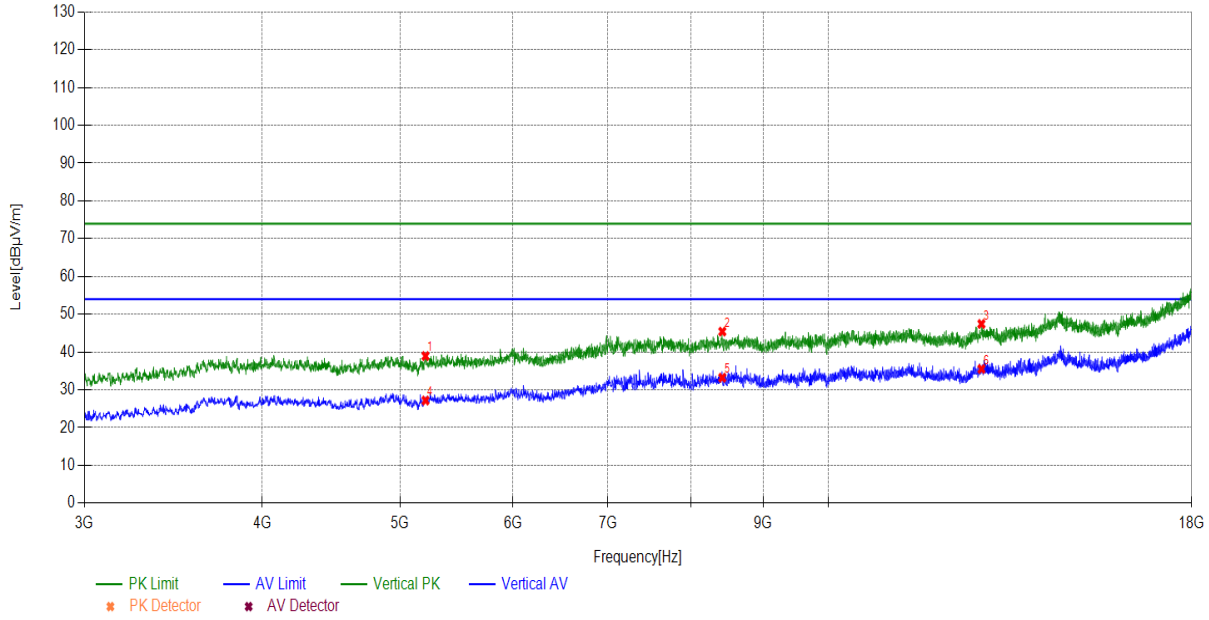
Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
4252.6253	-0.41	39.40	38.99	74.00	35.01	PK	150	300	PASS
7584.4584	8.34	35.75	44.09	74.00	29.91	PK	150	180	PASS
10751.2751	11.82	34.57	46.39	74.00	27.61	PK	150	230	PASS
4252.6253	-0.41	28.15	27.74	54.00	26.26	AV	150	10	PASS
7584.4584	8.34	23.21	31.55	54.00	22.45	AV	150	20	PASS
10751.2751	11.82	22.39	34.21	54.00	19.79	AV	150	90	PASS



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

Suspected List

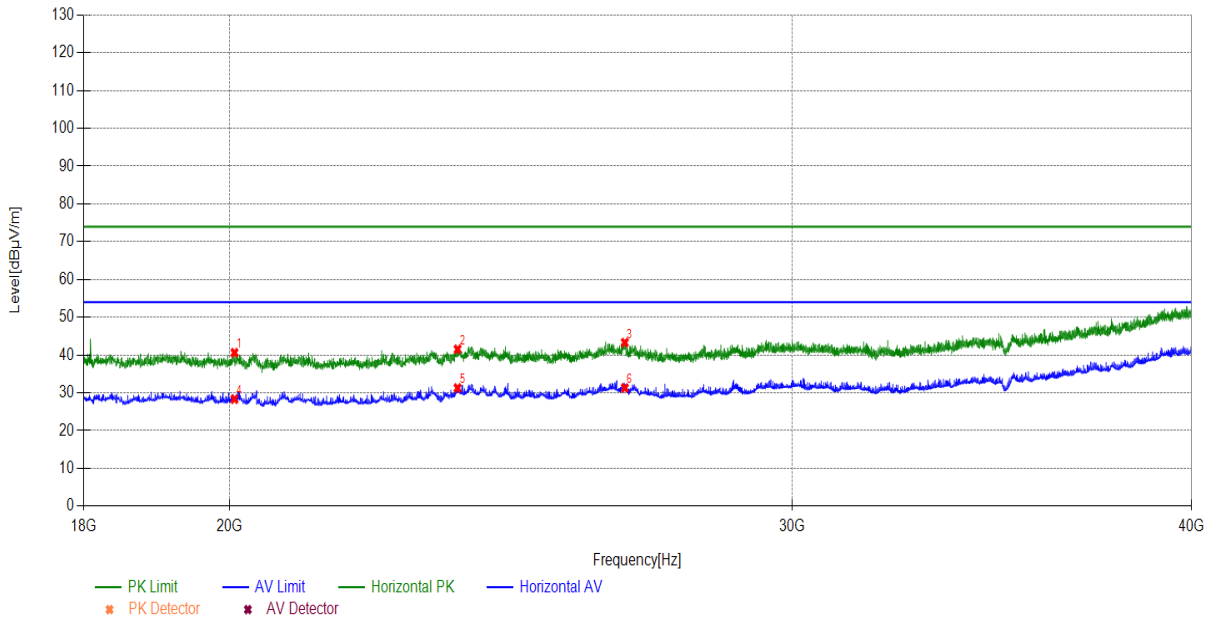
Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
5209.721	2.11	36.84	38.95	74.00	35.05	PK	150	190	PASS
8421.5422	9.04	36.38	45.42	74.00	28.58	PK	150	140	PASS
12809.4809	12.80	34.65	47.45	74.00	26.55	PK	150	50	PASS
5209.721	2.11	25.07	27.18	54.00	26.82	AV	150	150	PASS
8421.5422	9.04	24.19	33.23	54.00	20.77	AV	150	30	PASS
12809.4809	12.80	22.73	35.53	54.00	18.47	AV	150	10	PASS



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

Suspected List

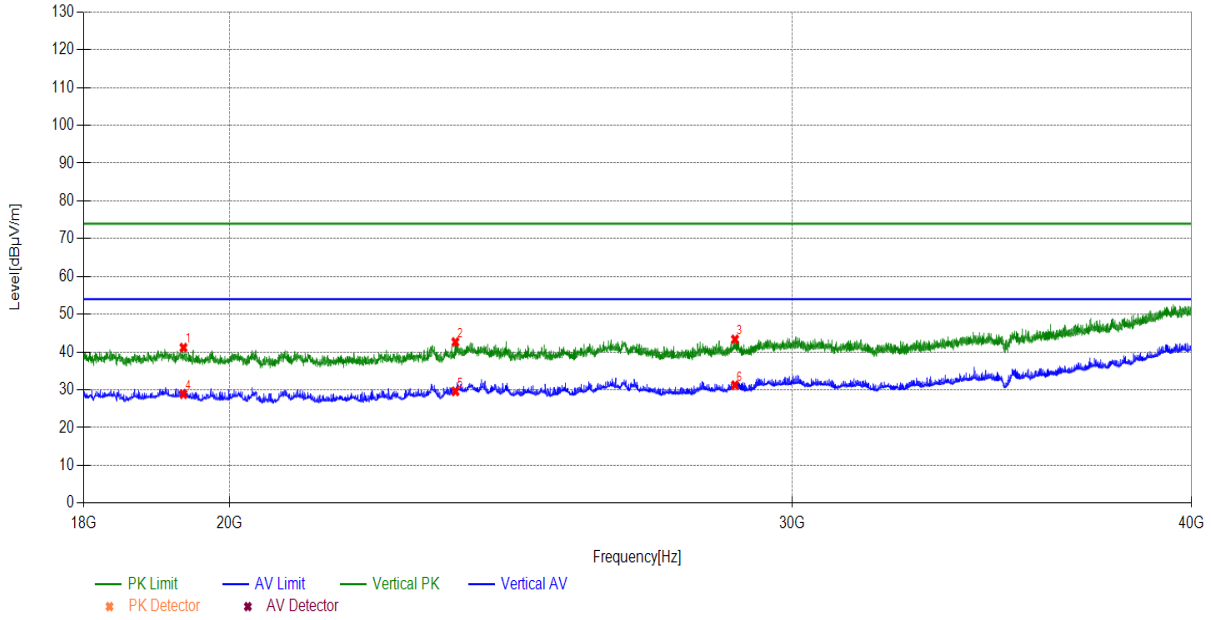
Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
20068.2068	1.32	39.30	40.62	74.00	33.38	PK	150	200	PASS
23568.7569	3.36	38.18	41.54	74.00	32.46	PK	150	20	PASS
26587.4587	4.73	38.57	43.30	74.00	30.70	PK	150	80	PASS
20068.2068	1.32	27.02	28.34	54.00	25.66	AV	150	210	PASS
23568.7569	3.36	27.93	31.29	54.00	22.71	AV	150	10	PASS
26587.4587	4.73	26.56	31.29	54.00	22.71	AV	150	100	PASS



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

Suspected List

Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
19344.3344	1.33	39.84	41.17	74.00	32.83	PK	150	70	PASS
23531.3531	3.33	39.33	42.66	74.00	31.34	PK	150	110	PASS
28783.2783	5.87	37.49	43.36	74.00	30.64	PK	150	90	PASS
19344.3344	1.33	27.52	28.85	54.00	25.15	AV	150	150	PASS
23531.3531	3.33	26.27	29.60	54.00	24.40	AV	150	140	PASS
28783.2783	5.87	25.37	31.24	54.00	22.76	AV	150	300	PASS



Band Edge：

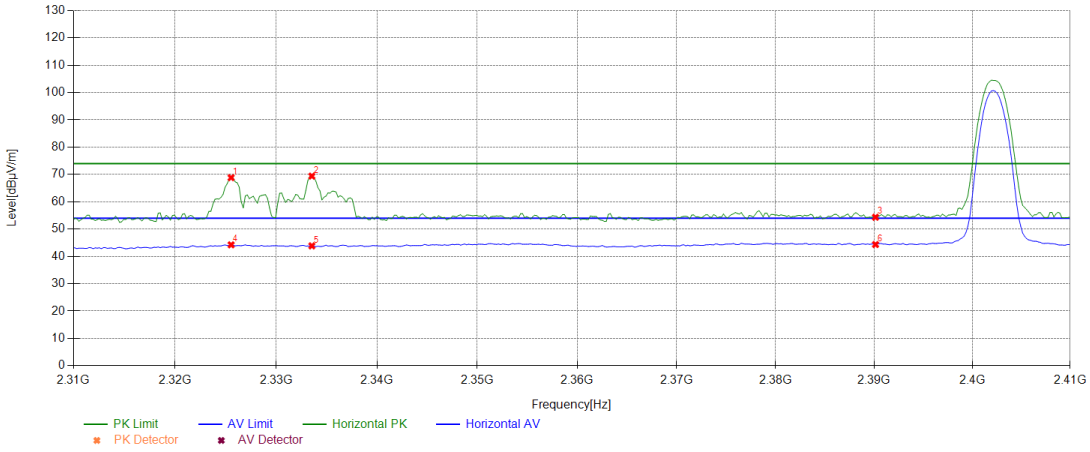
During the test, the Band Edge was performed in BT with all channels and all antennas.

BT 8-DPSK, antenna 1 is selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test mode	8-DPSK
Test channel	Lowest channel
polarization	Horizontal

Suspected List

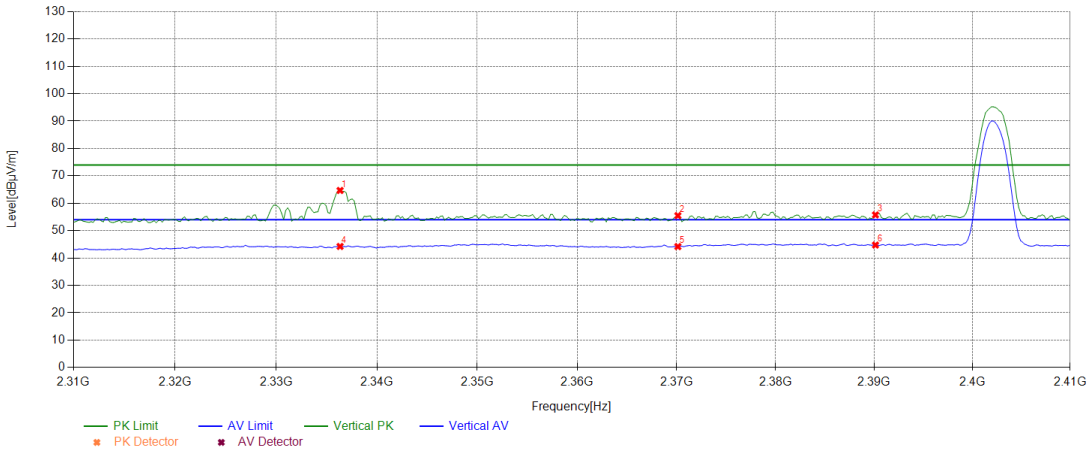
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2325.5326	36.67	32.17	68.84	74.00	5.16	PK	150	122	PASS
2333.5334	36.74	32.66	69.40	74.00	4.60	PK	150	134	PASS
2390.139	37.24	17.12	54.36	74.00	19.64	PK	150	4	PASS
2325.5326	36.67	7.58	44.25	54.00	9.75	AV	150	108	PASS
2333.5334	36.74	7.13	43.87	54.00	10.13	AV	150	161	PASS
2390.139	37.24	7.13	44.37	54.00	9.63	AV	150	309	PASS



Test mode	8-DPSK
Test channel	Lowest channel
polarization	Vertical

Suspected List

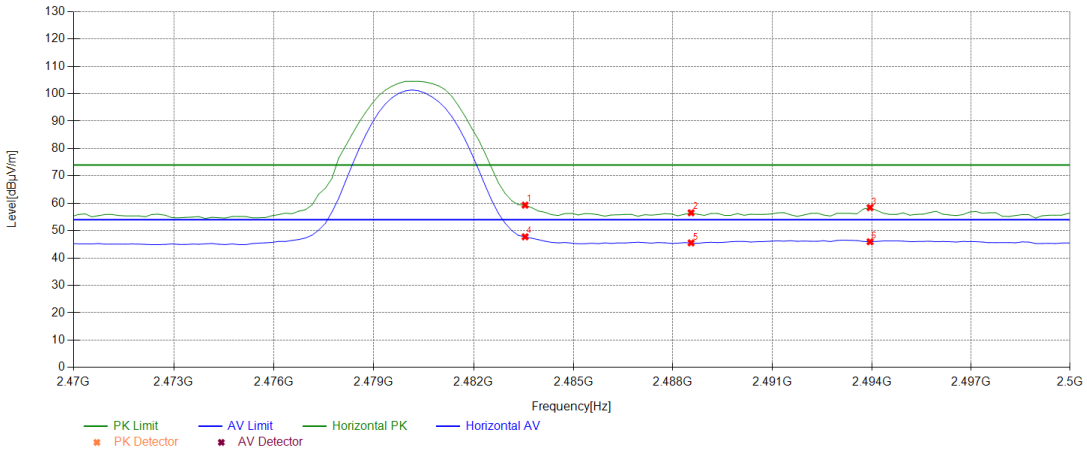
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2336.3336	36.76	27.92	64.68	74.00	9.32	PK	150	122	PASS
2370.137	37.07	18.41	55.48	74.00	18.52	PK	150	134	PASS
2390.139	37.24	18.51	55.75	74.00	18.25	PK	150	4	PASS
2336.3336	36.76	7.48	44.24	54.00	9.76	AV	150	108	PASS
2370.137	37.07	7.11	44.18	54.00	9.82	AV	150	161	PASS
2390.139	37.24	7.49	44.73	54.00	9.27	AV	150	309	PASS



Test mode	8-DPSK
Test channel	Highest channel
polarization	Horizontal

Suspected List

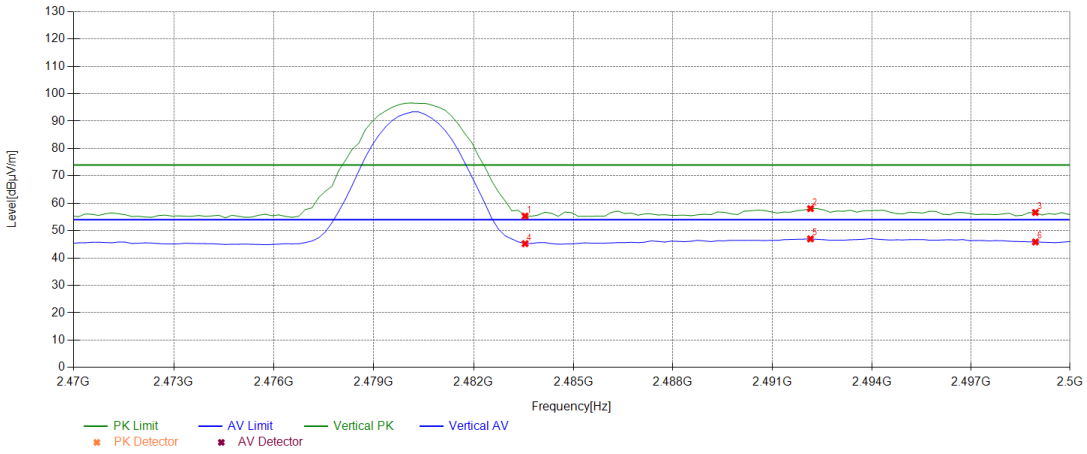
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2483.5484	37.72	21.60	59.32	74.00	14.68	PK	150	352	PASS
2488.5489	37.74	18.79	56.53	74.00	17.47	PK	150	359	PASS
2493.9494	37.77	20.63	58.40	74.00	15.60	PK	150	19	PASS
2483.5484	37.72	10.03	47.75	54.00	6.25	AV	150	359	PASS
2488.5489	37.74	7.78	45.52	54.00	8.48	AV	150	152	PASS
2493.9494	37.77	8.17	45.94	54.00	8.06	AV	150	359	PASS



Test mode	8-DPSK
Test channel	Highest channel
polarization	Vertical

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2483.5484	37.72	17.60	55.32	74.00	18.68	PK	150	254	PASS
2492.1492	37.76	20.29	58.05	74.00	15.95	PK	150	4	PASS
2498.9499	37.79	18.83	56.62	74.00	17.38	PK	150	201	PASS
2483.5484	37.72	7.53	45.25	54.00	8.75	AV	150	109	PASS
2492.1492	37.76	9.22	46.98	54.00	7.02	AV	150	81	PASS
2498.9499	37.79	8.07	45.86	54.00	8.14	AV	150	240	PASS



5.3 Peak Power Output -Conducted

Ambient condition:

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

Method of Measurement:

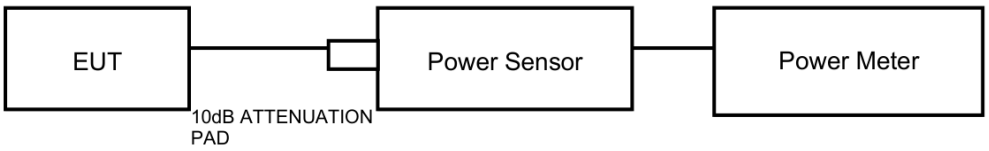
During the process of the testing, The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. The EUT is controlled by the Bluetooth test set to ensure max power transmission with proper modulation. The peak detector is used.

Limits:

Rule Part 15.247 (b) (1)specifies that " For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.”

Peak Output Power	⩽ 0.125W (20.97dBm)

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
DH5	Ant1	2402	0.18	≤20.97	PASS
	Ant1	2441	-0.02	≤20.97	PASS
	Ant1	2480	-0.61	≤20.97	PASS
2DH5	Ant1	2402	1.87	≤20.97	PASS
	Ant1	2441	1.26	≤20.97	PASS
	Ant1	2480	0.58	≤20.97	PASS
3DH5	Ant1	2402	2.09	≤20.97	PASS
	Ant1	2441	1.58	≤20.97	PASS
	Ant1	2480	0.88	≤20.97	PASS

5.4 20dB Emission 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 20 kHz; VBW is set to 100 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

No specific occupied bandwidth requirements in part 15.247(a) (1).

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	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.96	2401.559	2402.516	---	---
	Ant1	2441	0.95	2440.562	2441.513	---	---
	Ant1	2480	0.95	2479.562	2480.516	---	---
2DH5	Ant1	2402	1.40	2401.325	2402.729	---	---
	Ant1	2441	1.42	2440.316	2441.735	---	---
	Ant1	2480	1.43	2479.931	2481.365	---	---
3DH5	Ant1	2402	1.38	2401.334	2402.711	---	---
	Ant1	2441	1.44	2440.28	2441.723	---	---
	Ant1	2480	1.46	2479.28	2480.738	---	---

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 20 kHz; VBW is set to 100 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

No specific occupied bandwidth requirements in part 15.247(a) (1).

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
DH5	Ant1	2402	0.875	2401.589	2402.465	---	---
	Ant1	2441	0.857	2440.598	2441.456	---	---
	Ant1	2480	0.857	2479.598	2480.456	---	---
2DH5	Ant1	2402	1.259	2401.404	2402.662	---	---
	Ant1	2441	1.292	2440.386	2441.677	---	---
	Ant1	2480	1.304	2479.383	2480.686	---	---
3DH5	Ant1	2402	1.247	2401.401	2402.647	---	---
	Ant1	2441	1.262	2440.392	2441.653	---	---
	Ant1	2480	1.289	2479.377	2480.665	---	---

5.6 Frequency Separation

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(a)(1)specifies that “Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. ”

Note: The value of two-thirds of 20 dB bandwidth is always greater than 25 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	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.009	≥0.960	PASS
2DH5	Ant1	Hop	1.183	≥0.953	PASS
3DH5	Ant1	Hop	1.122	≥0.973	PASS

5.7 Time of Occupancy (Dwell Time)

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 and Bluetooth test set via a power splitter with a known loss. RBW is set to 1MHz and VBW is set to 3MHz on spectrum analyzer. The dwell time is calculated by: Dwell time = time slot length * hop rate * 0.4s with:

The selected EUT Packet type uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600(ch*hop/s) for all channels.So the final hopping rate for all channel is1600/6=266.67(ch*hop/s)

Limits:

Rule Part15.247(a) specifies that " Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed."

Dwell time	⩽ 400ms

Test Setup:

Measurement Uncertainty：

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

Requirements	Uncertainty					
Dwell Time	DH5	U=0.70ms	2DH5	U=0.70ms	3DH5	U=0.70ms

Test Results:

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.36	320	0.115	≤0.4	PASS
DH3	Ant1	Hop	1.61	160	0.258	≤0.4	PASS
DH5	Ant1	Hop	2.85	106.67	0.304	≤0.4	PASS
2DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
2DH3	Ant1	Hop	1.62	160	0.259	≤0.4	PASS
2DH5	Ant1	Hop	2.86	106.67	0.305	≤0.4	PASS
3DH1	Ant1	Hop	0.37	320	0.118	≤0.4	PASS
3DH3	Ant1	Hop	1.62	160	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.86	106.67	0.305	≤0.4	PASS

5.8 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 Result:

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	-0.24	-50.44	≤-20.24	PASS
		High	2480	-0.94	-48.82	≤-20.94	PASS
		Low	Hop_2402	-0.76	-50.23	≤-20.76	PASS
		High	Hop_2480	-0.47	-48.28	≤-20.47	PASS
2DH5	Ant1	Low	2402	-1.35	-48.81	≤-21.35	PASS
		High	2480	-2.76	-49.3	≤-22.76	PASS
		Low	Hop_2402	-1.03	-50.17	≤-21.03	PASS
		High	Hop_2480	-1.47	-49.21	≤-21.47	PASS
3DH5	Ant1	Low	2402	-1.96	-50	≤-21.96	PASS
		High	2480	-3.12	-48.97	≤-23.12	PASS
		Low	Hop_2402	-2.12	-50.36	≤-22.12	PASS
		High	Hop_2480	-0.78	-48.65	≤-20.78	PASS

5.9 Number of hopping Frequency

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 and Bluetooth test set via a power splitter with a known loss. RBW is set to 100KHz and VBW is set to 300KHz on spectrum analyzer. Set EUT on Hopping on mode.

Limits:

Rule Part 15.247(a) (1) (iii) specifies that" Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels."

Limits	⩾ 15 channels

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[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

5.10 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
DH5	Ant1	2402	Reference	-0.13	-0.13	---	PASS
			30~1000	-0.13	-60.68	≤-20.13	PASS
			1000~26500	-0.13	-50.18	≤-20.13	PASS
		2441	Reference	-0.25	-0.25	---	PASS
			30~1000	-0.25	-60.67	≤-20.25	PASS
			1000~26500	-0.25	-28.48	≤-20.25	PASS
		2480	Reference	-0.93	-0.93	---	PASS
			30~1000	-0.93	-60.92	≤-20.93	PASS
			1000~26500	-0.93	-49.05	≤-20.93	PASS
2DH5	Ant1	2402	Reference	-1.30	-1.30	---	PASS
			30~1000	-1.30	-61.35	≤-21.3	PASS
			1000~26500	-1.30	-50.17	≤-21.3	PASS
		2441	Reference	-1.73	-1.73	---	PASS
			30~1000	-1.73	-60.94	≤-21.73	PASS
			1000~26500	-1.73	-49.18	≤-21.73	PASS
		2480	Reference	-2.55	-2.55	---	PASS
			30~1000	-2.55	-60.8	≤-22.55	PASS
			1000~26500	-2.55	-49.64	≤-22.55	PASS
3DH5	Ant1	2402	Reference	-1.74	-1.74	---	PASS
			30~1000	-1.74	-60.35	≤-21.74	PASS
			1000~26500	-1.74	-49.99	≤-21.74	PASS
		2441	Reference	-2.27	-2.27	---	PASS
			30~1000	-2.27	-61.22	≤-22.27	PASS
			1000~26500	-2.27	-49.09	≤-22.27	PASS
		2480	Reference	-2.99	-2.99	---	PASS
			30~1000	-2.99	-60.96	≤-22.99	PASS
			1000~26500	-2.99	-49.3	≤-22.99	PASS

6. Appendix A

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2024/04/22
Comprehensive Test Instrument	CMW270	100304	DZ-000240-1	R&S	2023/12/06
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	2024/05/29
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	2024/05/29
RF Radio Frequency Switch	JS0806-2	19H9080187	DZ-000241	Tonscend	2024/05/29
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2024/04/12
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
5m Semi-Anechoic Chamber	SAC-5	SAC-5-2.0	EM-000557	COMTEST	2024/11/02
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024/02/22
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2024/02/22
EMI Test Receiver	ESR7	102235	VGDY-0956	R&S	2024/02/22
loop antenna	HLA 6121	540046	EM-000546	TESEQ	2024/06/05
Broadband Antenna	VULB 9168	01537	EM-000736-1	SCHWARZBECK	2024/04/24
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2024/06/10
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2024/02/24
Waveguide Horn Antenna	BBHA9170	00949	EM-000383	SCHWARZBECK	2023/08/26
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2024/08/29
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2023/12/06
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2024/06/04
EMI Test Receiver	ESR3	102394	VGDY-0705	R&S	2024/04/22
LISN	NSLK 8127	8127644	EM-000370	SCHWARZBECK	2024/07/27
Plus Limiter（#2）	VTSD 9561	9561-F017	EM-000367	SCHWARZBECK	2024/09/03
Shielding Room(#2)	GP1A	001	WKNF-0006	LEINING	2024/08/07
Temperature and humidity meter	MHO-C201	/	DZ-000249-2	Seconds test	2024/09/23

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 Author 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/A" means "not applicable", " / "means "not testing", "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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