







Test Report No.:  
FCC2022-0045-RF1

## TEST REPORT

**FCC ID** : 2AWMK-BTP-2585NS  
**Applicant** : Guangzhou Pinzhong Electronic Technology Co.,Ltd.  
**Product Name** : BEITONG ASURA 2 GAME CONTROLLER  
MULTI-MODE  
**Mode No.** : BTP-2585NS

**CVC Testing Technology Co., Ltd.**

<b>Applicant</b>		<b>Name:</b> Guangzhou Pinzhong Electronic Technology Co.,Ltd.	
		<b>Address:</b> Room 611-612,Greenland Center of Financial city,No.662,Huangpu Avenue Middle Road.Tianhe District,Guangzhou City.	
<b>Manufacturer</b>		<b>Name:</b> Guangzhou Pinzhong Electronic Technology Co.,Ltd.	
		<b>Address:</b> Room 611-612,Greenland Center of Financial city,No.662,Huangpu Avenue Middle Road.Tianhe District,Guangzhou City.	
<b>Equipment Under Test</b>		<b>Product Name :</b> BEITONG ASURA 2 GAME CONTROLLER MULTI-MODE  <b>Model No. :</b> BTP-2585NS  <b>Trade mark :</b>   <b>Serial no. :</b> —  <b>Sampling :</b> 1-1	
Date of Receipt.	<b>2022.08.15</b>	Date of Testing	<b>2022.08.16~2022.10.09</b>
<b>Test Specification</b>		<b>Test Result</b>	
FCC CFR47 Part 15C (2020) Radio Frequency Devices  ANSI C63.10 (2013)  KDB 558074 D01 DTS Meas Guidance v05  KDB 662911 D01 Multiple Transmitter Output v02r01		<p style="text-align: center;">PASS</p>	
<b>Evaluation of Test Result</b>		The equipment under test was found to comply with the requirements of the standards applied.   <p style="text-align: right;"><b>Seal of CVC</b> <b>Issue Date: 2022.11.09</b></p>	
Approved by:  <b>Chen HuaWen</b>		Reviewed by:  <b>Xu Zhenfei</b>	
		Tested by:  <b>Lu WeiJi</b>	
<b>Other Aspects: NONE.</b>			
Abbreviations:OK,      Pass= passed      Fail = failed      N/A= not applicable      EUT= equipment, sample(s) under tested			
This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of <b>CVC</b> .			

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# 1. General Product Information

## 1.1 General information

Product Name	BEITONG ASURA 2 GAME CONTROLLER MULTI-MODE	
Model No.	BTP-2585NS	
Power Supply	DC 5V-600mA	
Serial Number(SN)	/	
Power Supply	Adapter	/
	Battery	/
Antenna Type	PCB Antenna	
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)	
Antenna Gain	1.5 dBi (provided by client)	
Beamforming gain	Unsupported	
Frequency Range	Bluetooth(Low Energy): 2402~2480MHz	
Channel Number	Bluetooth(Low Energy):40 Channels	
Type of Modulation	Bluetooth(Low Energy):GFSK	
Max. Conducted Power	Bluetooth(Low Energy): -3.34 dBm	
Operate Temp.Range	0°C to +85°C	
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.

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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 and different channels. 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 and channels are shown as following table.

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

Test Items	Test Modes	Test Antennas	Test Channels
Conducted Emissions	BLE 1M	Antenna 1	39
Radiated Emissions	BLE 1M	Antenna 1	39
Radiated Emissions (Band Edge)	BLE 1M	Antenna 1	0,39
Maximum conducted output power	BLE 1M	Antenna 1	0,19,39
Minimum 6 dB bandwidth	BLE 1M	Antenna 1	0,19,39
Occupied Channel Bandwidth	BLE 1M	Antenna 1	0,19,39
Band Edge Measurement	BLE 1M	Antenna 1	0,39
Maximum Power spectral density	BLE 1M	Antenna 1	0,19,39
Spurious RF Conducted Emissions	BLE 1M	Antenna 1	0,19,39

### 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	---	---
		2440	50.00	50.00	100	---	---
		2480	50.00	50.00	100	---	---

## 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	/
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.

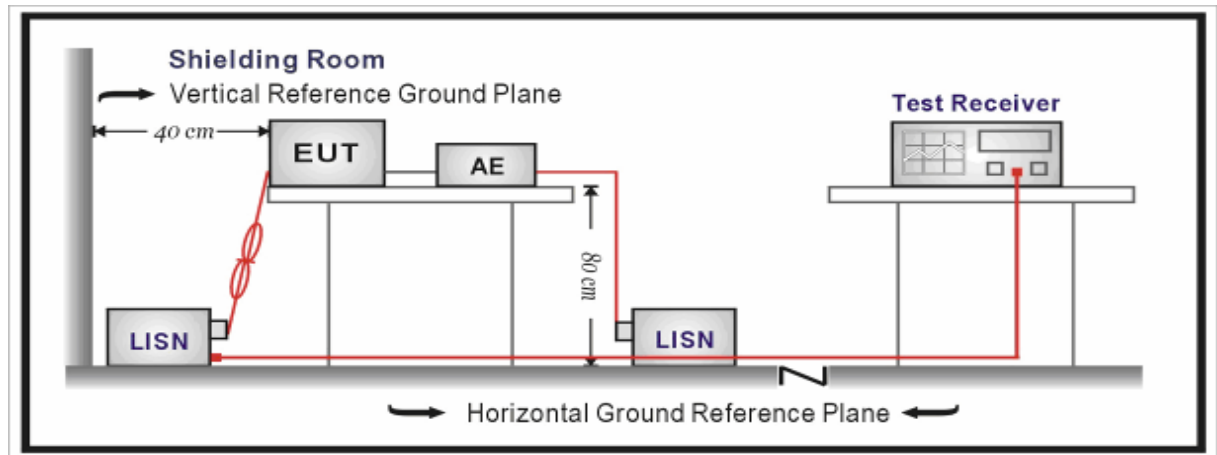
#### Limits:

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.

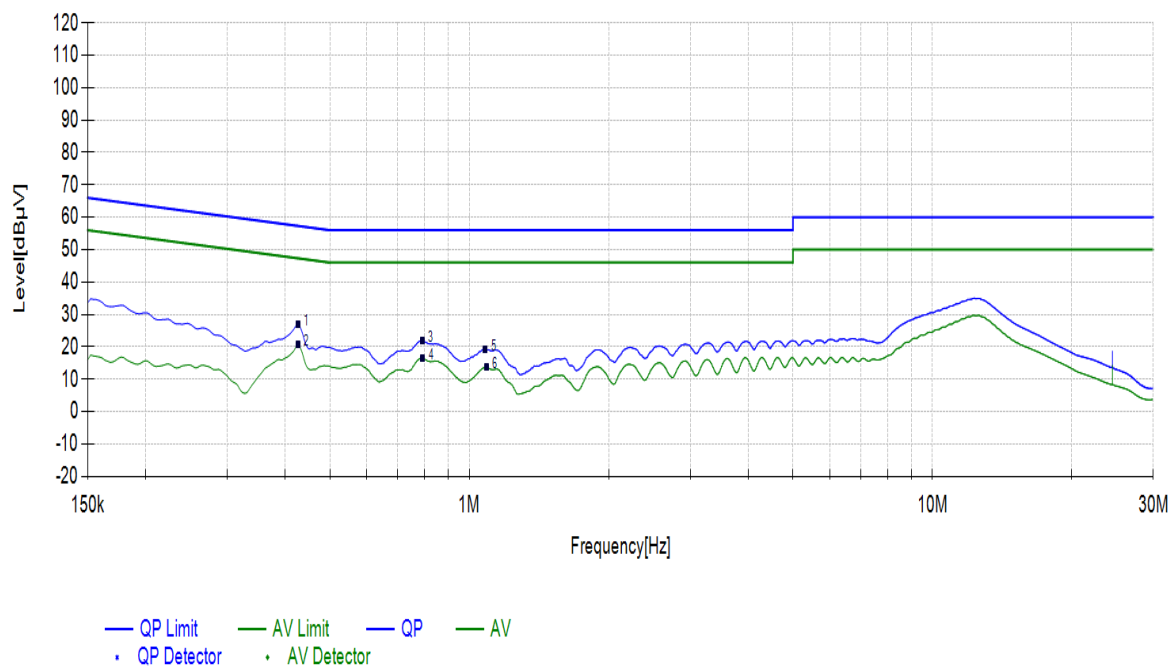
## Test Results:

During the test, the Conducted Emission from 150KHz to 30MHz was performed in all modes with all channels, and all antenna. BLE(1Mbps), Channel 39, Antenna1 are selected as the worst condition.

The test data of the worst-case condition was recorded in this report.

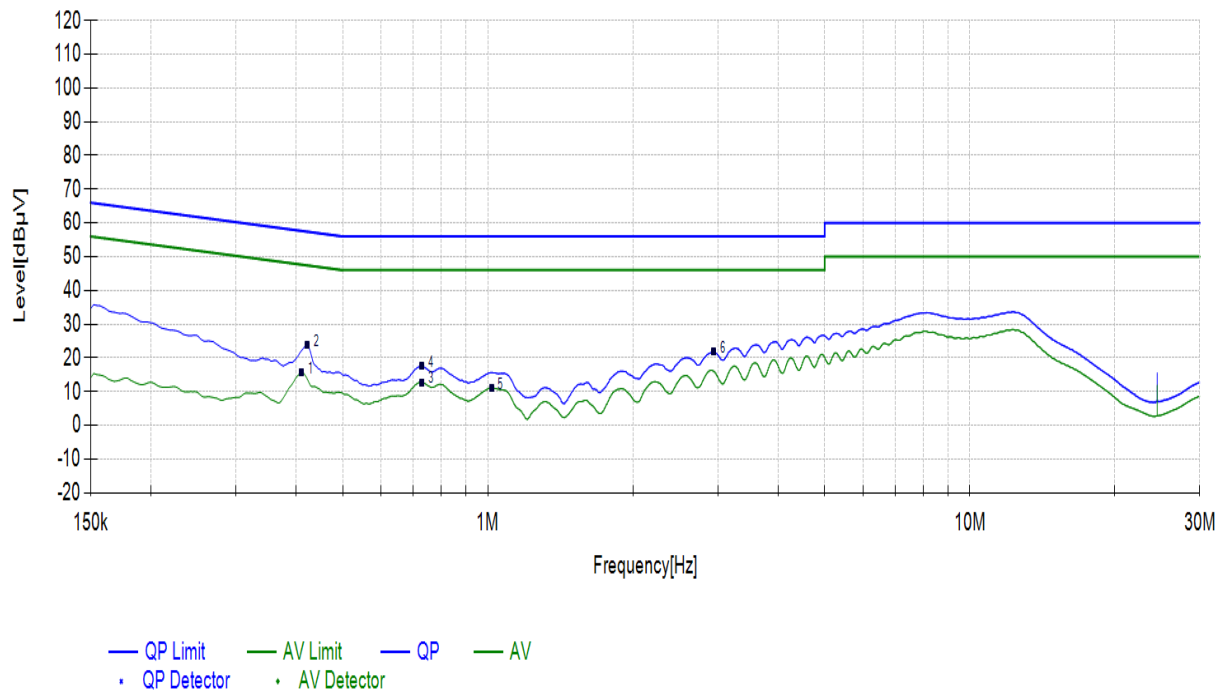
Power Line	L
Test channel	Worst-Case

Suspected List								
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV]	Limit [dBμV]	Margin [dB]	Detector	Pass/Fail
6	0.4268	10.48	16.46	26.94	57.32	30.38	QP	PASS
1	0.7913	10.51	11.31	21.82	56.00	34.18	QP	PASS
3	1.0838	10.51	8.72	19.23	56.00	36.77	QP	PASS
4	0.4268	10.48	10.08	20.56	47.32	26.76	AV	PASS
5	0.7935	10.51	5.91	16.42	46.00	29.58	AV	PASS
2	1.0883	10.51	3.16	13.67	46.00	32.33	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
1	2.9445	10.40	11.29	21.69	56.00	34.31	QP	PASS
4	0.4223	10.29	13.35	23.64	57.40	33.76	QP	PASS
5	0.7305	10.31	7.17	17.48	56.00	38.52	QP	PASS
2	0.7305	10.31	2.44	12.75	46.00	33.25	AV	PASS
6	1.0185	10.32	0.80	11.12	46.00	34.88	AV	PASS
3	0.4110	10.29	5.41	15.70	47.63	31.93	AV	PASS



## 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 ( $\mu\text{V/m}$ )	Limit (dB $\mu\text{V/m}$ @3m)	Remark
0.009MHz-0.490MHz	2400/F(kHz)@300m	/	Quasi-peak Level
0.490MHz~1.705MHz	24000/F(kHz)@30m	/	Quasi-peak Level
1.705MHz~30.0MHz	30@30m	/	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

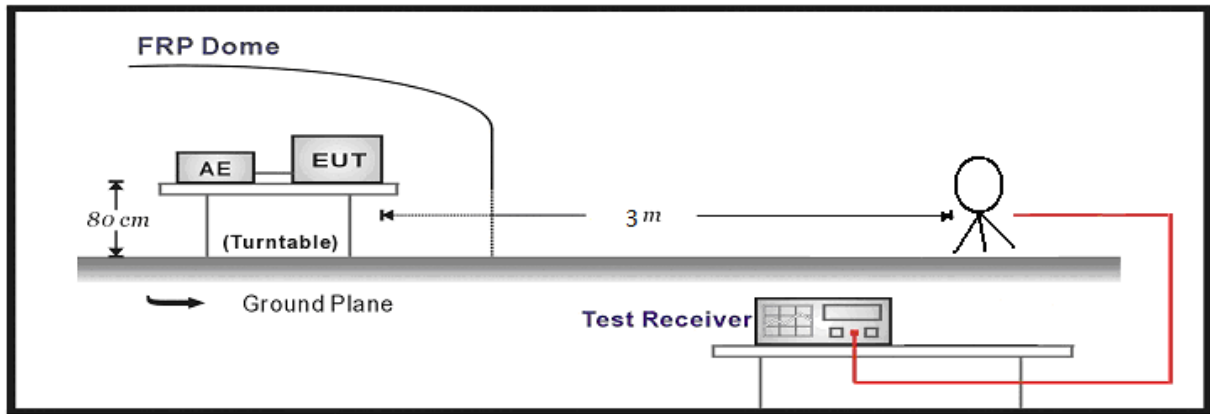
Above 1GHz	500@3m	54.0	Average Level
	5000@3m	74.0	Peak Level

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

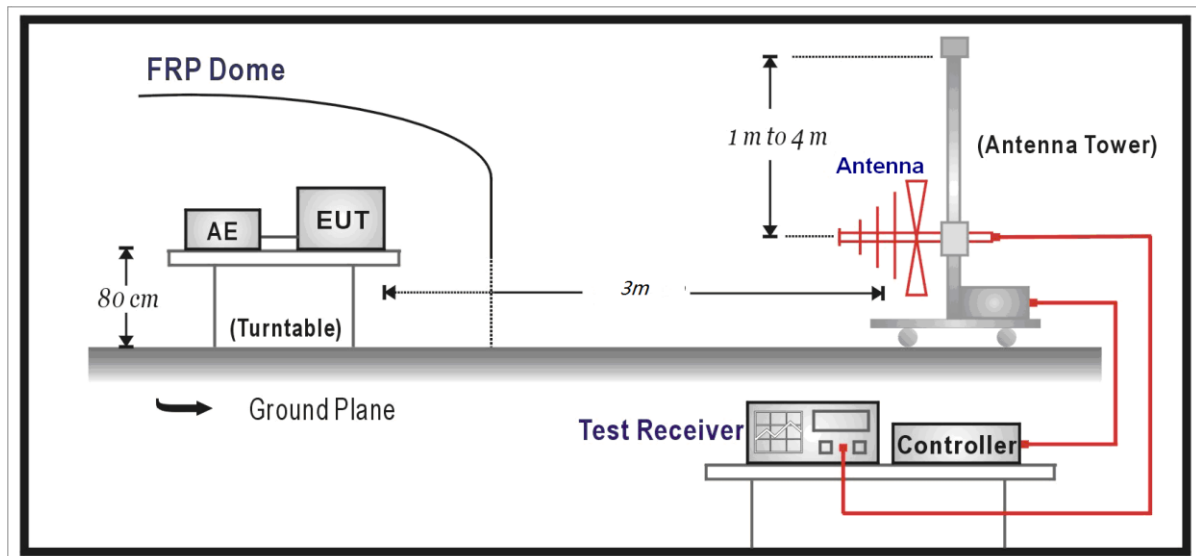
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218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

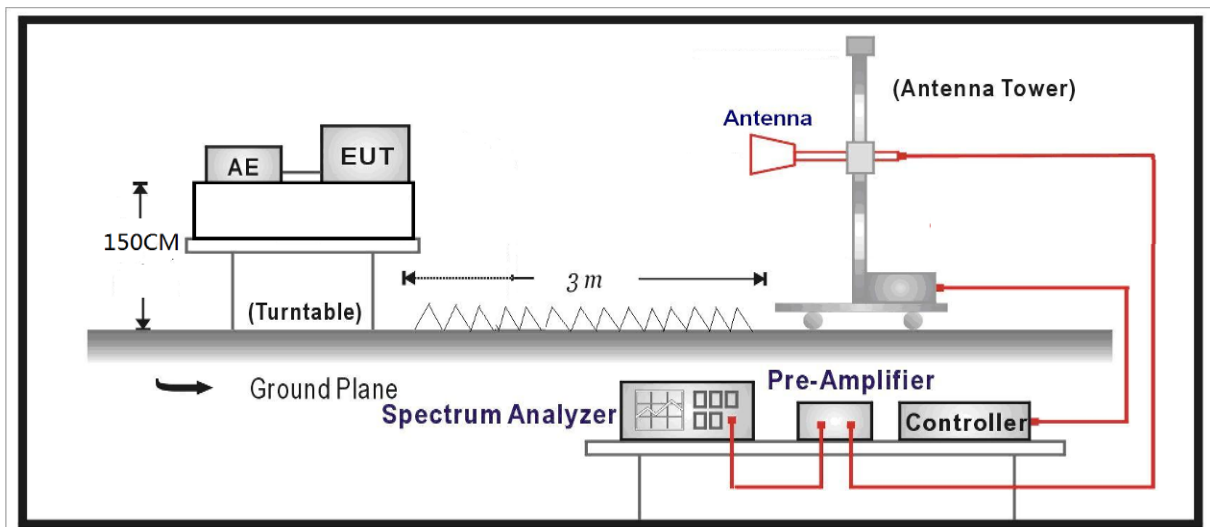
Below 30MHz Test Setup:



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

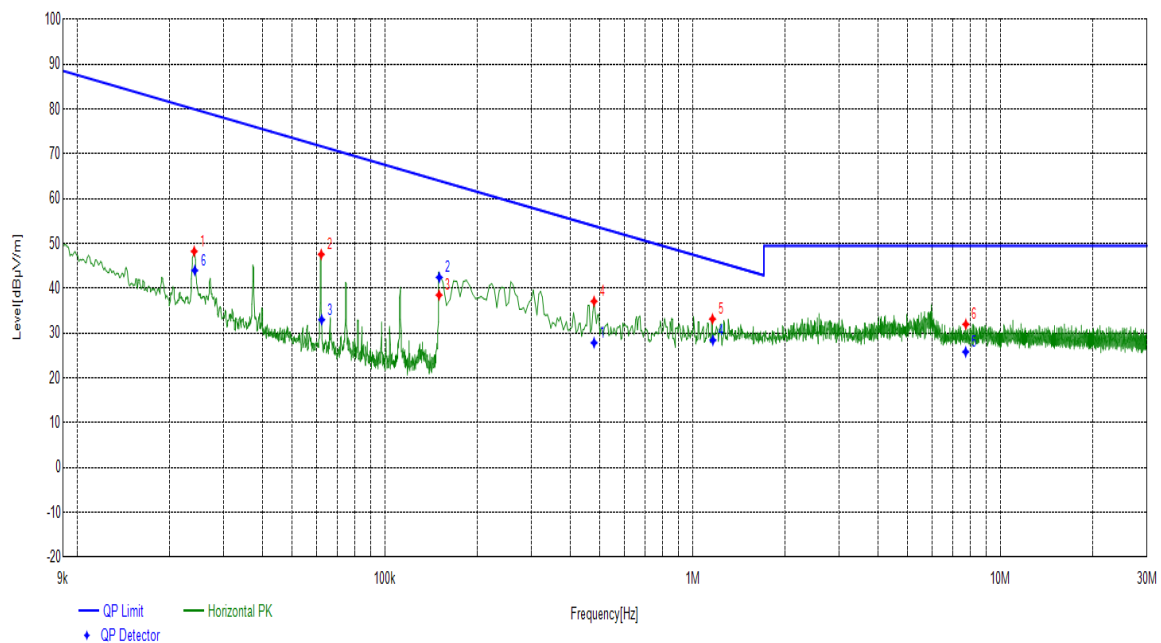
## Test Results:

### 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, Antenna1, X axis 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
0.4785	X axis	20.51	27.84	53.91	26.07	100	112	PASS
0.1502	X axis	20.44	42.43	64.00	21.57	100	112	PASS
0.0623	X axis	20.55	32.97	71.66	38.69	100	211	PASS
1.1641	X axis	20.56	28.41	46.21	17.80	100	252	PASS
7.7192	X axis	20.84	25.81	49.50	23.69	100	347	PASS
0.0241	X axis	20.74	43.98	79.92	35.94	100	0	PASS

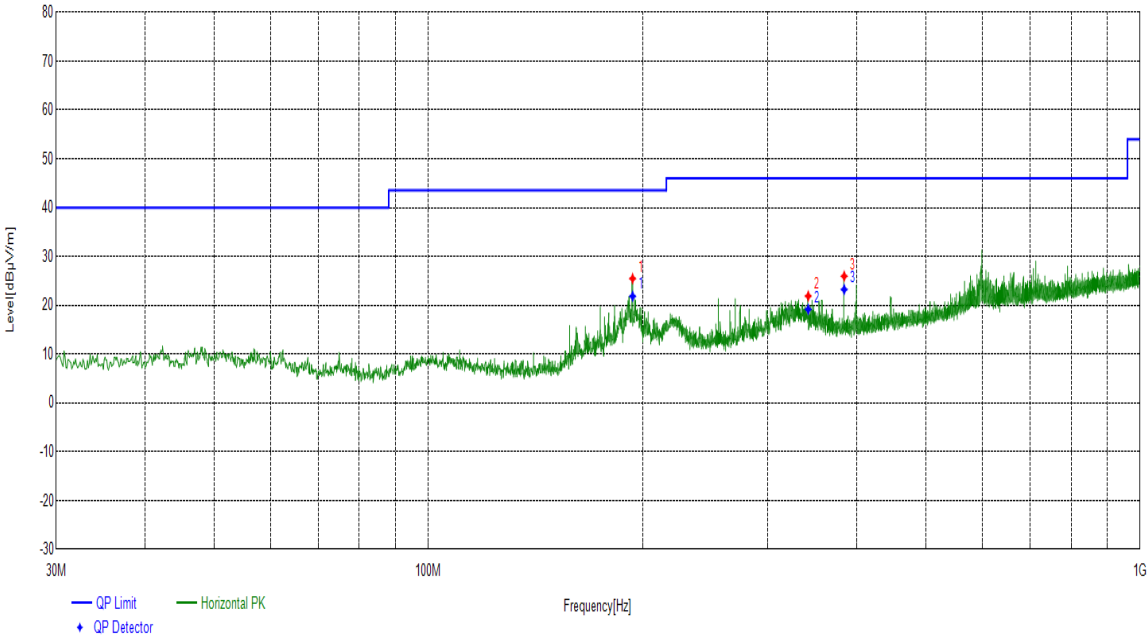


Bluetooth(Low Energy):

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.

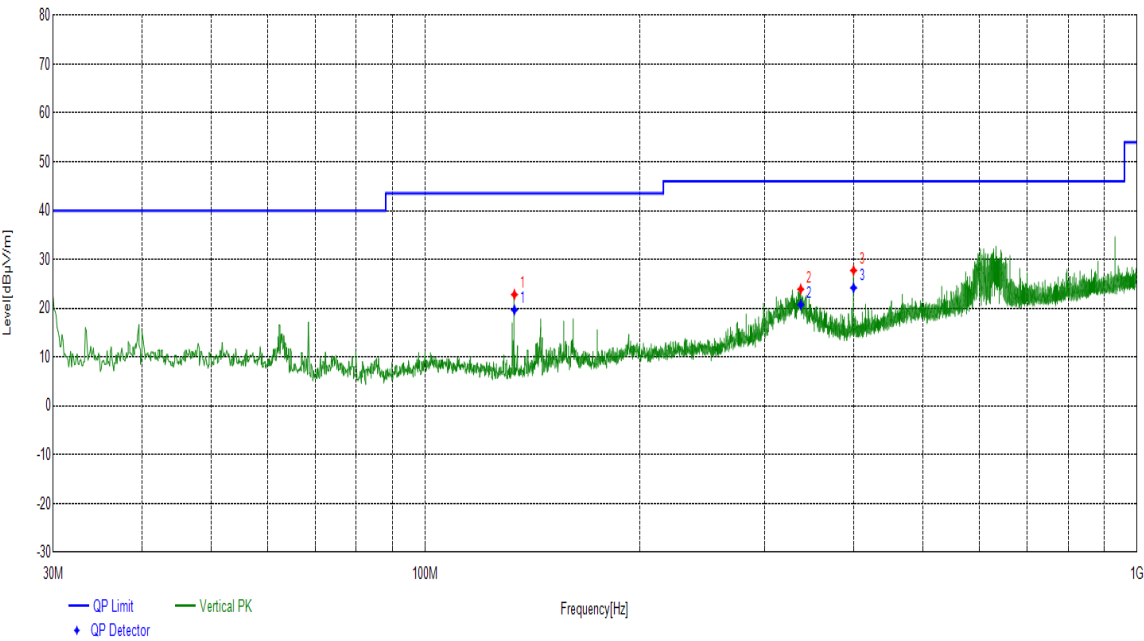
Radiates Emission			30M~1G							
Test channel			Worst-Case							
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/Fail
193.6554	Horizontal	12.79	12.67	25.46	43.52	18.06	PK	100	217	PASS
341.7892	Horizontal	16.50	5.38	21.88	46.02	24.14	PK	100	92	PASS
383.9884	Horizontal	17.51	8.44	25.95	46.02	20.07	PK	100	151	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	
193.6554	Horizontal	12.79	21.84	43.52	21.68	102	217	PASS	
341.7892	Horizontal	16.50	19.16	46.02	26.86	117	92	PASS	
383.9884	Horizontal	17.51	23.23	46.02	22.79	128	151	PASS	

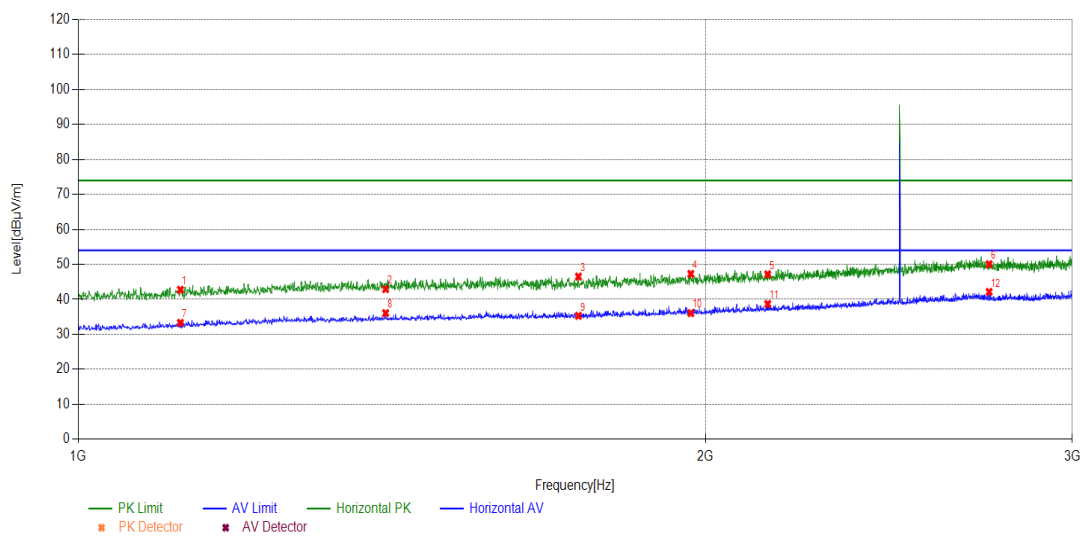


Radiates Emission			30M~1G							
Test channel			Worst-Case							
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/Fail
133.4123	Vertical	9.64	13.16	22.80	43.52	20.72	PK	100	64	PASS
336.8417	Vertical	16.39	7.50	23.89	46.02	22.13	PK	100	130	PASS
399.7040	Vertical	17.88	9.86	27.74	46.02	18.28	PK	100	57	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	
133.4123	Vertical	9.64	19.66	43.52	23.86	107	64	PASS	
336.8417	Vertical	16.39	20.75	46.02	25.27	126	130	PASS	
399.7040	Vertical	17.88	24.19	46.02	21.83	114	57	PASS	

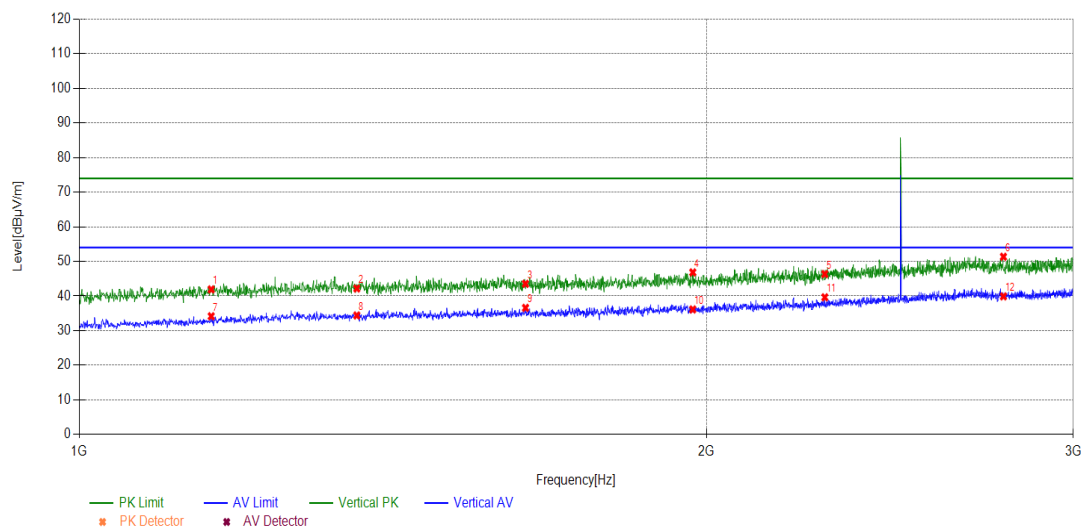


Radiates Emission			1G~3G							
Test channel			Worst-Case							
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/Fail
1119.51	Horizontal	28.83	13.91	42.74	74.00	31.26	PK	150	116	PASS
1404.54	Horizontal	29.94	13.00	42.94	74.00	31.06	PK	150	4	PASS
1738.07	Horizontal	30.67	15.86	46.53	74.00	27.47	PK	150	107	PASS
1968.09	Horizontal	30.63	16.67	47.30	74.00	26.70	PK	150	28	PASS
2142.61	Horizontal	31.12	16.04	47.16	74.00	26.84	PK	150	4	PASS
2736.67	Horizontal	33.41	16.66	50.07	74.00	23.93	PK	150	204	PASS
1119.51	Horizontal	28.83	4.48	33.31	54.00	20.69	AV	150	4	PASS
1404.54	Horizontal	29.94	6.15	36.09	54.00	17.91	AV	150	4	PASS
1738.07	Horizontal	30.67	4.64	35.31	54.00	18.69	AV	150	63	PASS
1968.09	Horizontal	30.63	5.45	36.08	54.00	17.92	AV	150	360	PASS
2142.61	Horizontal	31.12	7.59	38.71	54.00	15.29	AV	150	4	PASS
2736.67	Horizontal	33.41	8.74	42.15	54.00	11.85	AV	150	4	PASS



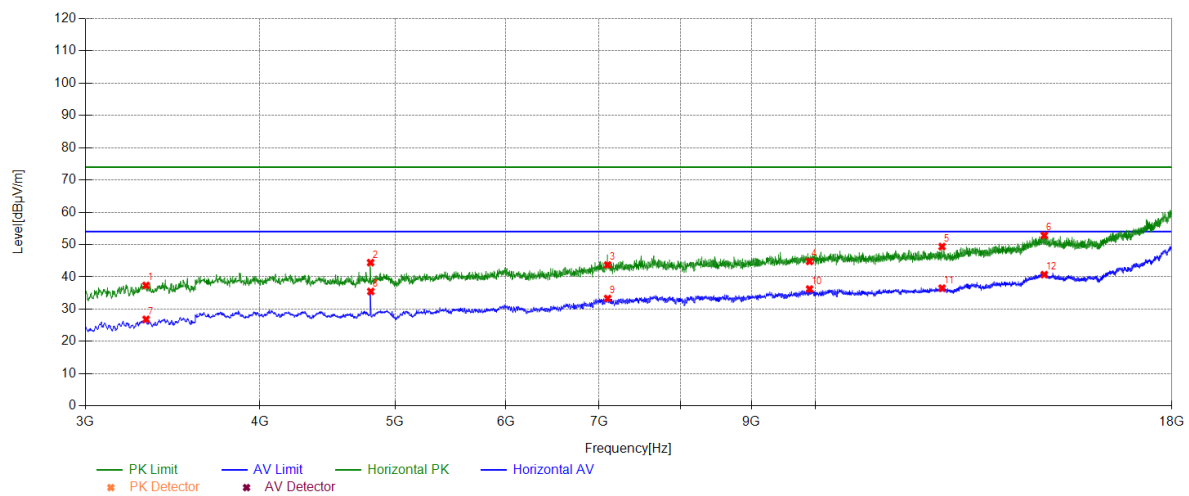
Note: The signal beyond the limit is carrier

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
1157.01	Vertical	29.01	12.91	41.92	74.00	32.08	PK	150	10	PASS
1359.03	Vertical	29.77	12.41	42.18	74.00	31.82	PK	150	4	PASS
1637.56	Vertical	30.44	13.10	43.54	74.00	30.46	PK	150	45	PASS
1970.09	Vertical	30.63	16.21	46.84	74.00	27.16	PK	150	45	PASS
2279.62	Vertical	31.63	14.73	46.36	74.00	27.64	PK	150	10	PASS
2777.17	Vertical	33.58	17.78	51.36	74.00	22.64	PK	150	10	PASS
1157.01	Vertical	29.01	5.16	34.17	54.00	19.83	AV	150	10	PASS
1359.03	Vertical	29.77	4.64	34.41	54.00	19.59	AV	150	10	PASS
1637.56	Vertical	30.44	6.15	36.59	54.00	17.41	AV	150	4	PASS
1970.09	Vertical	30.63	5.51	36.14	54.00	17.86	AV	150	45	PASS
2279.62	Vertical	31.63	8.01	39.64	54.00	14.36	AV	150	10	PASS
2777.17	Vertical	33.58	6.33	39.91	54.00	14.09	AV	150	45	PASS

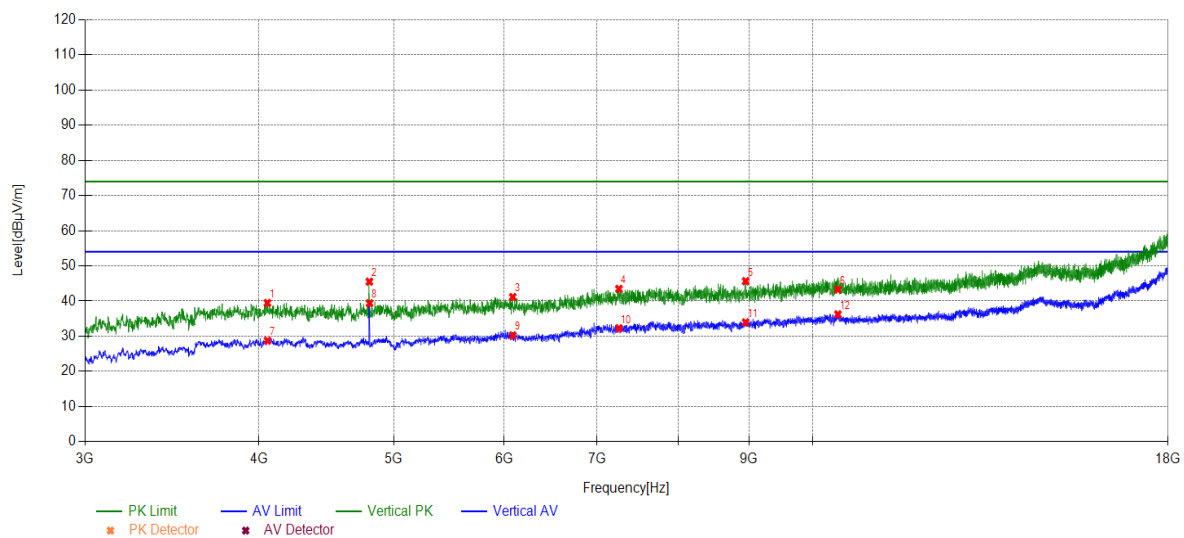


Note: The signal beyond the limit is carrier

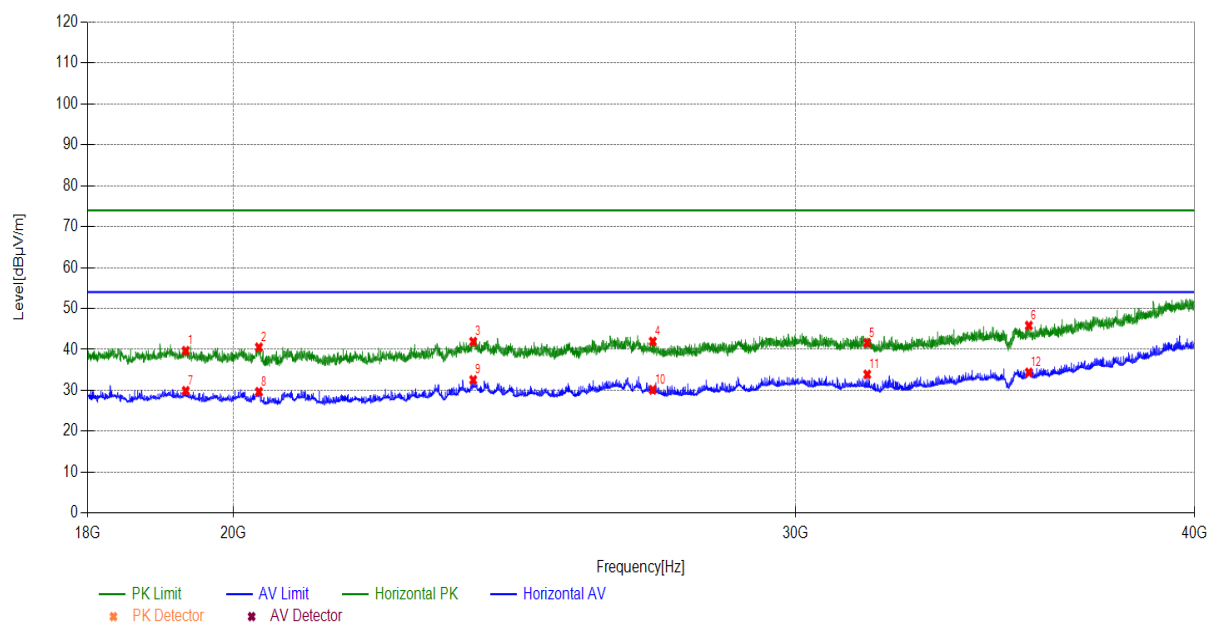
Radiates Emission			3G~18G							
Test channel			Worst-Case							
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
3315.63	Horizont	-0.80	38.15	37.35	74.00	36.65	PK	150	0	PASS
4801.58	Horizont	2.03	42.38	44.41	74.00	29.59	PK	150	311	PASS
7098.50	Horizont	8.43	35.26	43.69	74.00	30.31	PK	150	71	PASS
9903.79	Horizont	13.06	31.73	44.79	74.00	29.21	PK	150	148	PASS
12321.4	Horizont	12.91	36.47	49.38	74.00	24.62	PK	150	34	PASS
14584.3	Horizont	18.51	34.34	52.85	74.00	21.15	PK	150	5	PASS
3315.63	Horizont	-0.80	27.65	26.85	54.00	27.15	AV	150	354	PASS
4803.28	Horizont	2.04	33.44	35.48	54.00	18.52	AV	150	290	PASS
7098.50	Horizont	8.43	24.89	33.32	54.00	20.68	AV	150	357	PASS
9903.79	Horizont	13.06	23.17	36.23	54.00	17.77	AV	150	357	PASS
12321.4	Horizont	12.91	23.58	36.49	54.00	17.51	AV	150	357	PASS
14584.3	Horizont	18.51	22.19	40.70	54.00	13.30	AV	150	346	PASS



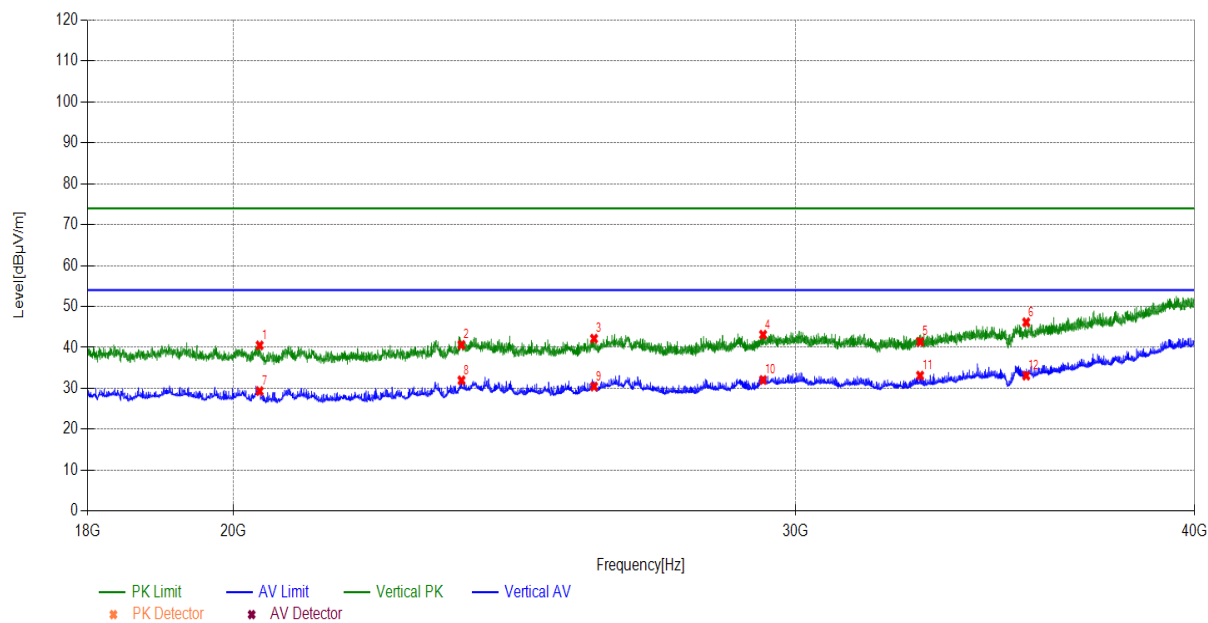
Radiates Emission			3G~18G							
Test channel			Worst-Case							
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
4056.90	Vertical	1.33	38.15	39.48	74.00	34.52	PK	150	27	PASS
4801.58	Vertical	2.03	43.50	45.53	74.00	28.47	PK	150	37	PASS
6086.90	Vertical	6.20	34.94	41.14	74.00	32.86	PK	150	22	PASS
7256.62	Vertical	8.56	34.90	43.46	74.00	30.54	PK	150	12	PASS
8948.29	Vertical	10.65	35.01	45.66	74.00	28.34	PK	150	17	PASS
10424.0	Vertical	12.86	30.41	43.27	74.00	30.73	PK	150	17	PASS
4056.90	Vertical	1.33	27.40	28.73	54.00	25.27	AV	150	12	PASS
4803.28	Vertical	2.04	37.34	39.38	54.00	14.62	AV	150	12	PASS
6086.90	Vertical	6.20	24.05	30.25	54.00	23.75	AV	150	12	PASS
7256.62	Vertical	8.56	23.70	32.26	54.00	21.74	AV	150	12	PASS
8948.29	Vertical	10.65	23.29	33.94	54.00	20.06	AV	150	12	PASS
10424.0	Vertical	12.86	23.37	36.23	54.00	17.77	AV	150	12	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]	Detect or	Height [cm]	Angle deg	Pass/ Fail
19322.3322	1.33	38.37	39.70	74.00	34.30	PK	150	130	PASS
20369.6370	1.43	39.11	40.54	74.00	33.46	PK	150	160	PASS
23773.3773	3.52	38.40	41.92	74.00	32.08	PK	150	10	PASS
27060.5061	4.93	37.03	41.96	74.00	32.04	PK	150	110	PASS
31586.3586	6.04	35.57	41.61	74.00	32.39	PK	150	310	PASS
35491.7492	7.19	38.65	45.84	74.00	28.16	PK	150	300	PASS
19322.3322	1.33	28.58	29.91	54.00	24.09	AV	150	10	PASS
20369.6370	1.43	28.23	29.66	54.00	24.34	AV	150	10	PASS
23773.3773	3.52	29.05	32.57	54.00	21.43	AV	150	10	PASS
27060.5061	4.93	25.23	30.16	54.00	23.84	AV	150	350	PASS
31586.3586	6.04	27.87	33.91	54.00	20.09	AV	150	10	PASS
35491.7492	7.19	27.22	34.41	54.00	19.59	AV	150	10	PASS



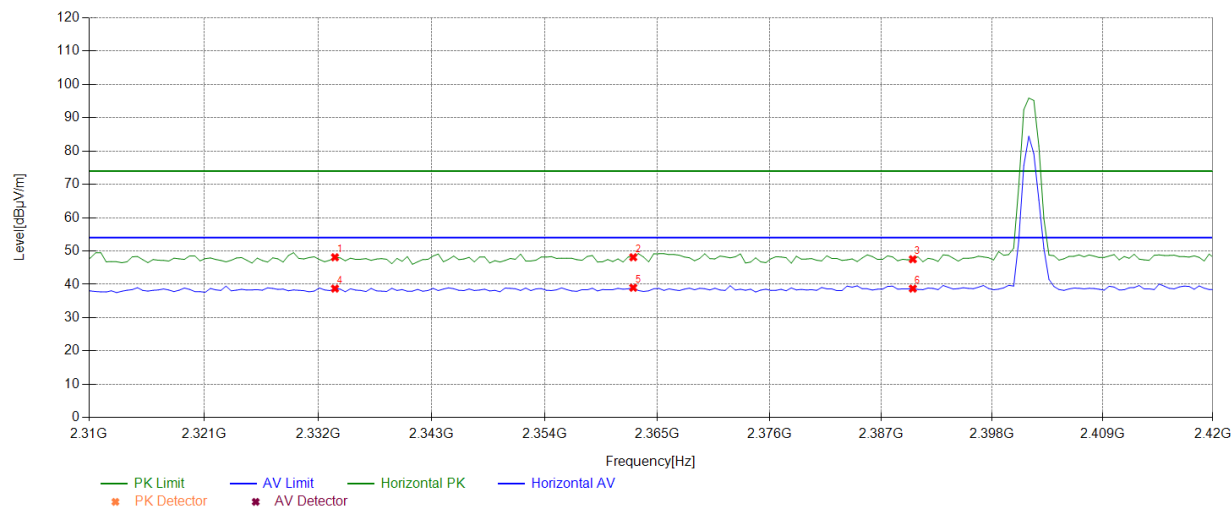
Radiates Emission		18G~40G							
Test channel		Worst-Case							
polarization		Vertical							
Suspected List									
Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect or	Height [cm]	Angle deg	Pass/ Fail
20380.6381	1.43	39.08	40.51	74.00	33.49	PK	150	140	PASS
23573.1573	3.36	37.28	40.64	74.00	33.36	PK	150	290	PASS
25938.3938	4.48	37.68	42.16	74.00	31.84	PK	150	70	PASS
29300.3300	6.21	36.92	43.13	74.00	30.87	PK	150	340	PASS
32814.0814	6.23	35.18	41.41	74.00	32.59	PK	150	250	PASS
35423.5424	7.14	39.01	46.15	74.00	27.85	PK	150	320	PASS
20380.6381	1.43	27.92	29.35	54.00	24.65	AV	150	10	PASS
23573.1573	3.36	28.61	31.97	54.00	22.03	AV	150	10	PASS
25938.3938	4.48	25.97	30.45	54.00	23.55	AV	150	300	PASS
29300.3300	6.21	25.85	32.06	54.00	21.94	AV	150	10	PASS
32814.0814	6.23	26.91	33.14	54.00	20.86	AV	150	10	PASS
35423.5424	7.14	25.99	33.13	54.00	20.87	AV	150	190	PASS



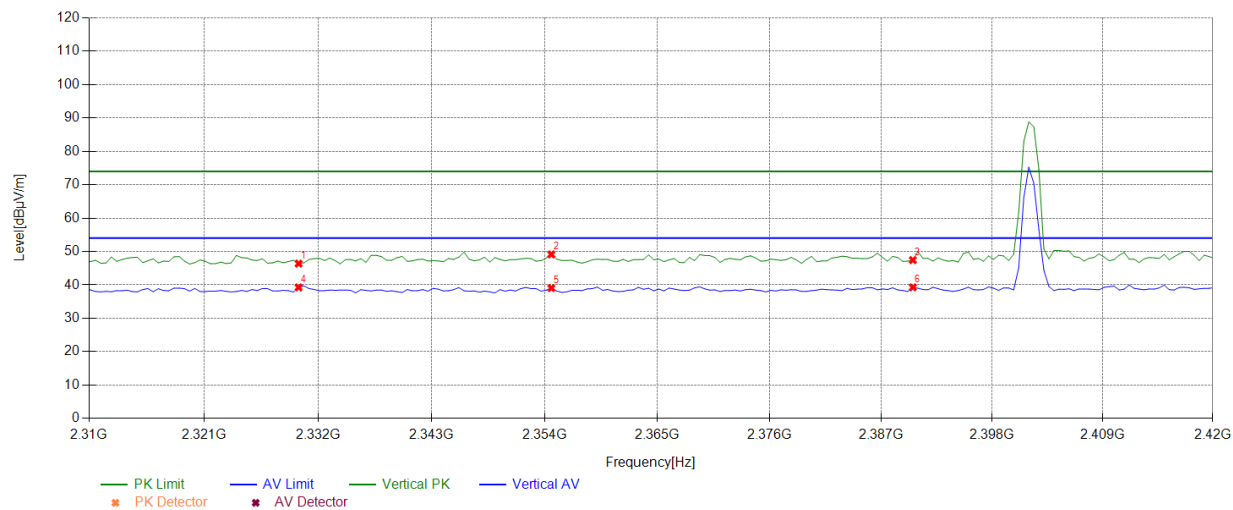
Band Edge:

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.

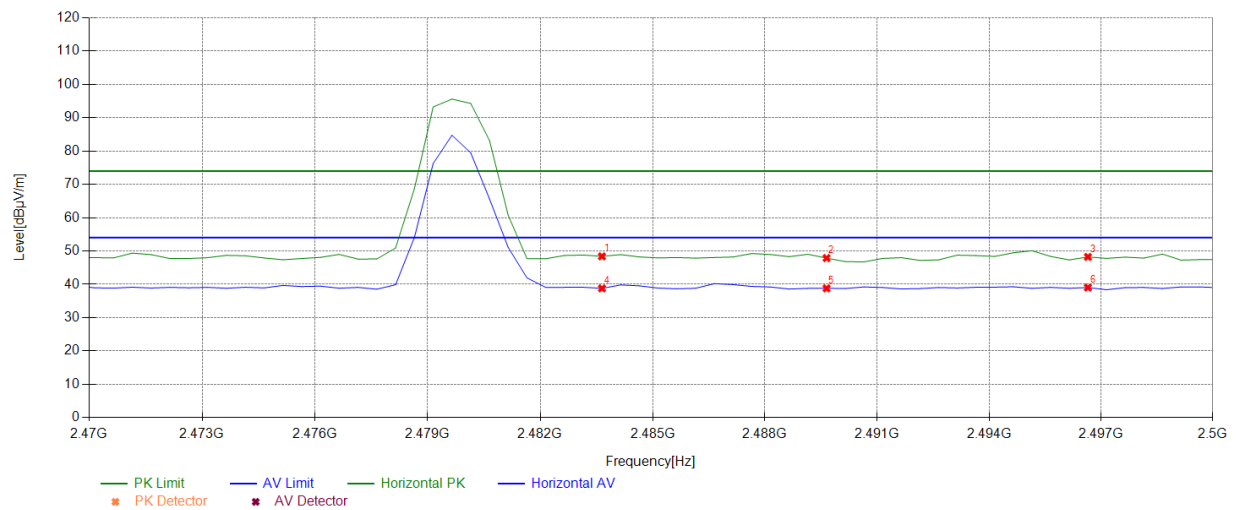
Test mode			BLE(1Mbps)						
Test channel			Lowest channel						
polarization			Horizontal						
Suspected List									
Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2333.6334	31.84	16.28	48.12	74.00	25.88	PK	150	203	PASS
2362.6363	31.95	16.17	48.12	74.00	25.88	PK	150	194	PASS
2390.1390	32.05	15.48	47.53	74.00	26.47	PK	150	46	PASS
2333.6334	31.84	6.89	38.73	54.00	15.27	AV	150	334	PASS
2362.6363	31.95	7.04	38.99	54.00	15.01	AV	150	344	PASS
2390.1390	32.05	6.67	38.72	54.00	15.28	AV	150	334	PASS



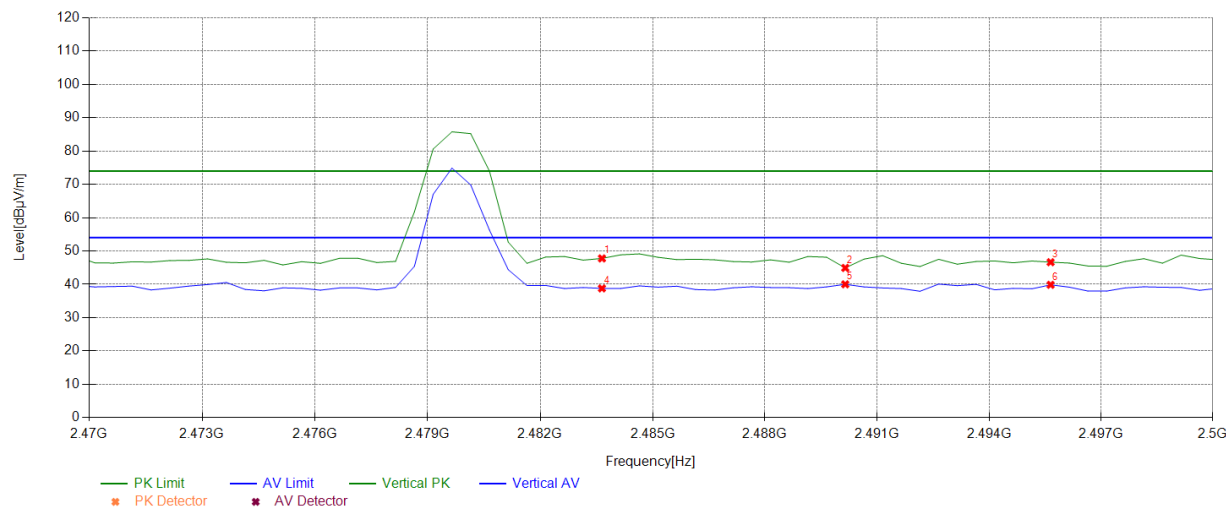
Test mode			BLE(1Mbps)						
Test channel			Lowest channel						
polarization			Vertical						
Suspected List									
Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2330.1330	31.82	14.57	46.39	74.00	27.61	PK	150	294	Pass
2354.6355	31.92	17.22	49.14	74.00	24.86	PK	150	0	Pass
2390.1390	32.05	15.39	47.44	74.00	26.56	PK	150	171	Pass
2330.1330	31.82	7.43	39.25	54.00	14.75	AV	150	358	Pass
2354.6355	31.92	7.13	39.05	54.00	14.95	AV	150	311	Pass
2390.1390	32.05	7.23	39.28	54.00	14.72	AV	150	354	Pass



Test mode			BLE(1Mbps)						
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
2483.6484	32.39	16.02	48.41	74.00	25.59	PK	150	357	PASS
2489.6490	32.41	15.47	47.88	74.00	26.12	PK	150	177	PASS
2496.6497	32.43	15.80	48.23	74.00	25.77	PK	150	80	PASS
2483.6484	32.39	6.41	38.80	54.00	15.20	AV	150	352	PASS
2489.6490	32.41	6.42	38.83	54.00	15.17	AV	150	125	PASS
2496.6497	32.43	6.62	39.05	54.00	14.95	AV	150	10	PASS



Test mode			BLE(1Mbps)						
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
2483.6484	32.39	15.39	47.78	74.00	26.22	PK	150	310	PASS
2490.1490	32.41	12.52	44.93	74.00	29.07	PK	150	200	PASS
2495.6496	32.43	14.22	46.65	74.00	27.35	PK	150	200	PASS
2483.6484	32.39	6.40	38.79	54.00	15.21	AV	150	90	PASS
2490.1490	32.41	7.60	40.01	54.00	13.99	AV	150	10	PASS
2495.6496	32.43	7.44	39.87	54.00	14.13	AV	150	340	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.

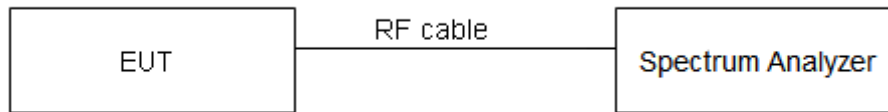
### Limits:

Average Output Power	$\leq 1W$ (30dBm)
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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	-5.45	$\leq 30$	PASS
		2440	-4.61	$\leq 30$	PASS
		2480	-3.34	$\leq 30$	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.

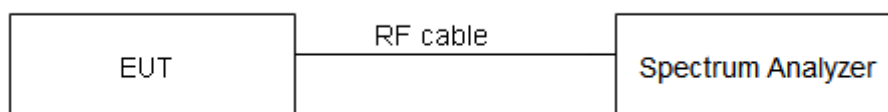
Detector=Peak, Trace mode=Max hold.

### 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	$\geq 500$ kHz
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### 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	0.66	2401.65	2402.31	$\geq 0.5$	PASS
		2440	0.66	2439.65	2440.31	$\geq 0.5$	PASS
		2480	0.66	2479.65	2480.31	$\geq 0.5$	PASS

## 5.5 Occupied Channel Bandwidth

Ambient condition:

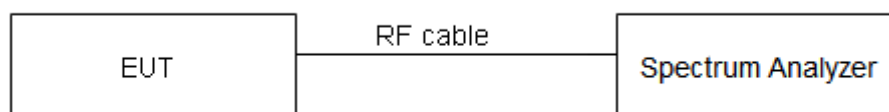
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### 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	1.019	2401.469	2402.488	---	PASS
		2440	1.019	2439.469	2440.488	---	PASS
		2480	1.023	2479.469	2480.492	---	PASS

## 5.6 Band Edge Measurement

Ambient condition:

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

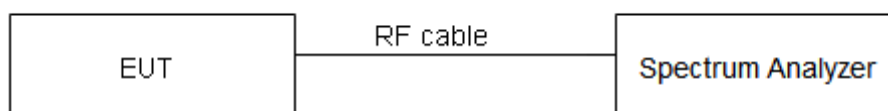
### Method of Measurement:

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  $k = 1.96$ ,  $U = 936 \text{ Hz}$ ,  $2 \text{ GHz} - 3 \text{ GHz} = 1.407 \text{ dB}$ .

## Test Results:

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	-7.58	-48.14	$\leq -27.58$	PASS
		High	2480	-5.20	-47.56	$\leq -25.2$	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.

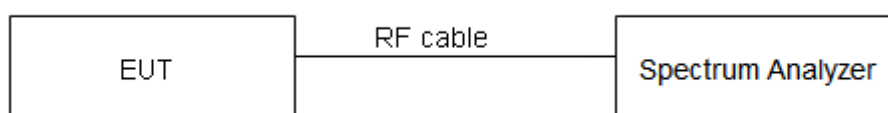
The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

### 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	$\leq 8 \text{ dBm} / 3\text{kHz}$
--------------------------------	------------------------------------

### Test Setup:



### Measurement Uncertainty:

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

## Test Results:

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-16.62	<=8	PASS
		2440	-15.63	<=8	PASS
		2480	-13.38	<=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 to 100kHz and VBW to 300 kHz, Sweep is set to AUTO. The test is in transmitting mode.

### Limits:

Rule Part 15.247(d) specifies 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	-7.33	-7.33	---	PASS
			30~1000	-7.33	-58.63	$\leq -27.33$	PASS
			1000~26500	-7.33	-48.09	$\leq -27.33$	PASS
		2440	Reference	-6.58	-6.58	---	PASS
			30~1000	-6.58	-59.65	$\leq -26.58$	PASS
			1000~26500	-6.58	-48.47	$\leq -26.58$	PASS
		2480	Reference	-5.17	-5.17	---	PASS
			30~1000	-5.17	-59.7	$\leq -25.17$	PASS
			1000~26500	-5.17	-47.97	$\leq -25.17$	PASS

## 6. Appendix E

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
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
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	EM-000383	SCHWARZBECK	2023/08/26
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2023/08/30
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2022/12/20

The End