Test Report No.:
FCC2025-0001-RF

TEST REPORT

FCC ID	:	2AN5D-Y2089
Applicant	:	Shenzhen Yunding Information Technology Co., Ltd.
Product Name	:	Oclean X Elite WiFi Smart Sonic Electric Toothbrush
Model No.	:	Y2089

CVC Testing Technology Co., Ltd.

Product Name	Oclean X Elite WiFi Smart Sonic Electric Toothbrush	**Trade Mark**	Oclean
Type/Model	Y2089	**Sample Status**	/
Applicant	Shenzhen Yunding Information Technology Co., Ltd.		
Applicant Address	28G,Building 3,Dachong Business Center (phase 3) No.18 Dachong 1st Road, Dachong Community Yuehai Street,Nanshan District,Shenzhen,Guangdong China		
Manufacturer	Shenzhen Yunding Information Technology Co., Ltd.		
Manufacturer Address	28G,Building 3,Dachong Business Center (phase 3) No.18 Dachong 1st Road, Dachong Community Yuehai Street,Nanshan District,Shenzhen,Guangdong China		
Factory	Xiamen Smart Tech Healthcare Co., Ltd		
Factory Address	The East of 4th Floor, Building Four, No.89, Dingshanzhong Road, Dongfu Street, Haicang District, Xiamen		
Sample Identification	1-1	**Test Item**	See page 9
Tested According To	FCC CFR47 Part 15C Radio Frequency Devices ANSI C63.10-2020/Cor1-2023 KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01		
Receiving Date	2025-01-09	**Completing Date**	2025-02-28
Test conclusion	The equipment under test was found to comply with the requirements of the standards applied. Final Verdict：Pass. Seal of CVC Date of issue: 2025-03-18		
Abbreviations: / Pass= passed Fail = failed N/A= not applicable			
This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of **CVC**.			

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2025-0001-RF	Original release	March.18,2025

1. General Product Information

1.1 General information

Product Name	Oclean X Elite WiFi Smart Sonic Electric Toothbrush
Model No.	Y2089
Additional model	/
Power Supply	DC 3.6V
Serial Number(SN)	/
Hardware	V01
Software	V0.0.01.2
specific power settings	Bluetooth(LE_1M, LE_2M): 11 IEEE 802.11b: 0 IEEE 802.11g: 20 IEEE 802.11n(20MHz): 20
Antenna Type	PCB Antenna
Antenna Gain	WIFI:-0.49 dBi (provided by client) Bluetooth: -0.49 dBi (provided by client)
Beamforming gain	Unsupported (provided by client)
Frequency Range	Bluetooth(LE_1M, LE_2M): 2402~2480MHz IEEE 802.11b/g/n(20MHz): 2412~2462MHz
Channel Number	Bluetooth(LE_1M, LE_2M):40 Channels IEEE 802.11b/g/n (20MHz): 11 Channels
Type of Modulation	Bluetooth(LE_1M, LE_2M):GFSK IEEE 802.11b: DSSS (CCK,DQPSK,DBPSK); IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK); IEEE 802.11n(HT20) : OFDM (64QAM, 16QAM,QPSK,BPSK)
Max. Conducted Power	Bluetooth(LE): 1.22 dBm WIFI2.4G:18.65dBm
Operate Temp.Range	5℃~+40℃

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: Y2089. All the tests carried out on model Y2089.

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)

CNAS(Test firm designation number：L0095)

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 X**.

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(LE_1M)	1TX / 1RX	0,19,39
Bluetooth(LE_2M)	1TX / 1RX	0,19,39
IEEE 802.11b	1TX / 1RX	1,6,11
IEEE 802.11g	1TX / 1RX	1,6,11
IEEE 802.11n 20 SISO	1TX / 1RX	1,6,11
IEEE 802.11n 40 SISO	1TX / 1RX	3,6,9

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 configurations 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(LE_1M)	1	/	/
Bluetooth(LE_2M)	2	/	/
IEEE 802.11b	1	/	/
IEEE 802.11g	6	/	/
IEEE 802.11n 2.4GHz 20MHz	MCS 0	/	/
IEEE 802.11n 2.4GHz 40MHz	MCS 0	/	/

Test Items	Test Antennas	Test Modes	Test Channels
Radiated Emissions	Antenna 1	IEEE 802.11n 20 Bluetooth(LE_2M)	1/ 0
Radiated Emissions (Band Edge)	Antenna 1	IEEE 802.11n 20 Bluetooth(LE_2M)	1,6,11/ 0,19,39
Maximum conducted output power	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,19,39/ 0,19,39/ 1,6,11/ 1,6,11/ 1,6,11/ 3,6,9
Minimum 6 dB bandwidth	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,19,39/ 0,19,39/ 1,6,11/ 1,6,11/ 1,6,11/ 3,6,9
Occupied Channel Bandwidth	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,19,39/ 0,19,39/ 1,6,11/ 1,6,11/ 1,6,11/ 3,6,9
Band Edge Measurement	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,39/ 0,39/ 1,11/ 1,11/ 1,11/ 3,9
Maximum Power spectral density	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,19,39/ 0,19,39/ 1,6,11/ 1,6,11/ 1,6,11/ 3,6,9
Spurious RF Conducted Emissions	Antenna 1	Bluetooth(LE_1M)/ Bluetooth(LE_2M)/ IEEE 802.11b/ IEEE 802.11g/ IEEE 802.11n 20/ IEEE 802.11n 40	0,19,39/ 0,19,39/ 1,6,11/ 1,6,11/ 1,6,11/ 3,6,9

3.2 Duty cycle

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	1.01	1.10	91.82	---	---
		2437	1.01	1.10	91.82	---	---
		2462	1.01	1.10	91.82	---	---
11G	Ant1	2412	0.61	0.66	92.42	---	---
		2437	0.62	0.67	92.54	---	---
		2462	0.61	0.67	91.04	---	---
11N20SISO	Ant1	2412	0.61	0.67	91.04	---	---
		2437	0.61	0.67	91.04	---	---
		2462	0.61	0.66	92.42	---	---
11N40SISO	Ant1	2422	0.61	0.67	91.04	---	---
		2437	0.61	0.67	91.04	---	---
		2452	0.61	0.67	91.04	---	---
BLE_1M	Ant1	2402	2.10	2.50	84.00	---	---
		2440	2.10	2.50	84.00	---	---
		2480	2.10	2.50	84.00	---	---
BLE_2M	Ant1	2402	1.06	1.88	56.38	---	---
		2440	1.06	1.88	56.38	---	---
		2480	1.06	1.88	56.38	---	---

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	Appendix C of WIFI2.4G_ diagram and Appendix C of BLE_ diagram
Minimum 6 dB bandwidth	15.247(a)(2)	PASS	Appendix A of WIFI2.4G_ diagram and Appendix A of BLE_ diagram
Occupied Channel Bandwidth	15.247(a)(2)	PASS	Appendix B of WIFI2.4G_ diagram and Appendix B of BLE_ diagram
Band Edge Measurement	15.247(d)	PASS	Appendix E of WIFI2.4G_ diagram and Appendix E of BLE_ diagram
Maximum Power spectral density	15.247(e)	PASS	Appendix D of WIFI2.4G_ diagram and Appendix D of BLE_ diagram
Spurious RF Conducted Emissions	15.247(d)	PASS	Appendix F of WIFI2.4G_ diagram and Appendix F of BLE_ 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%	101.2kPa

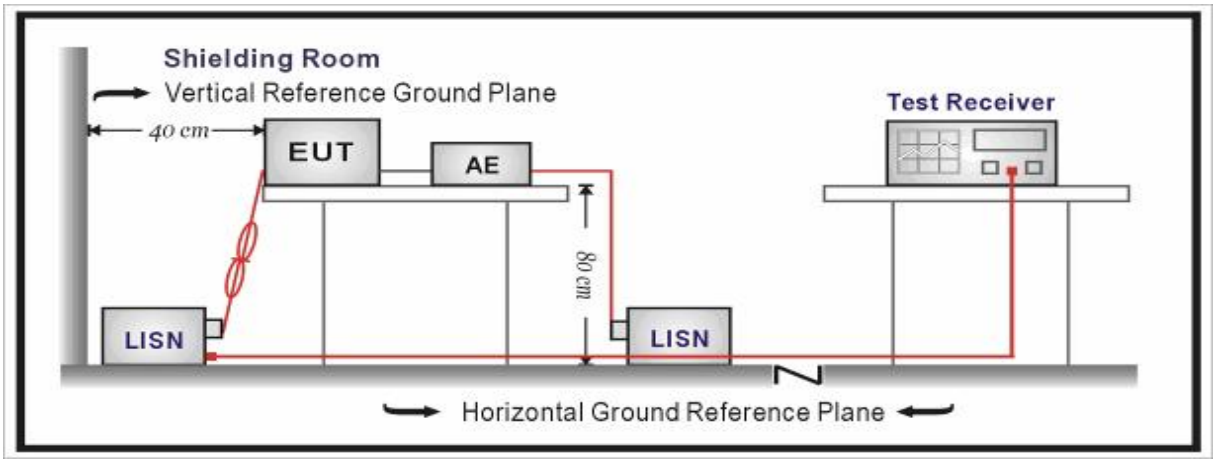
Method of Measurement:

The EUT was setup according to ANSI C63.10-2020/Cor1-2023 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:

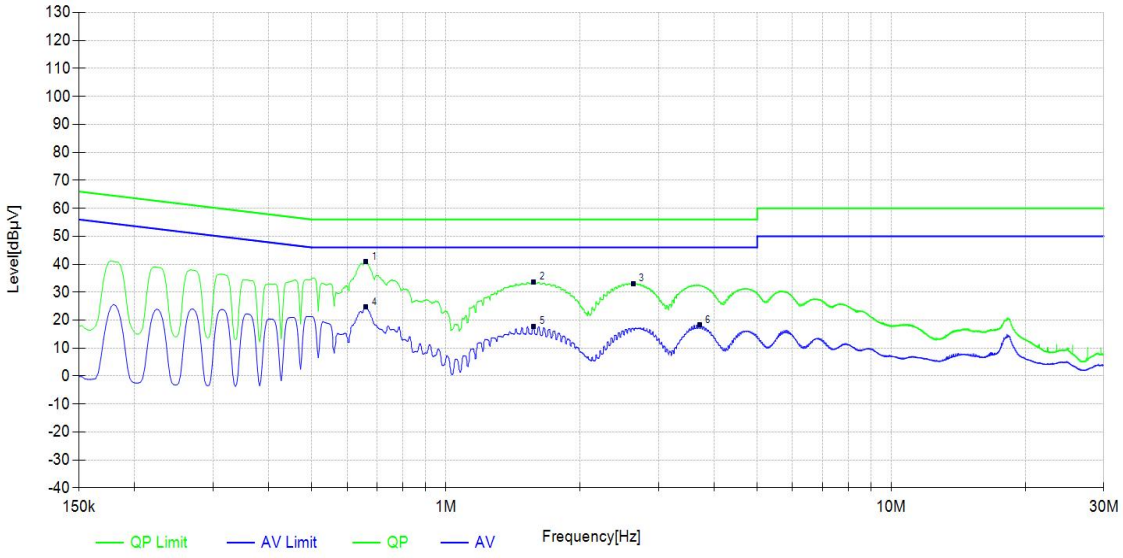
WIFI:

During the test, the Conducted Emission from 150kHz to 30MHz was performed in all modes with all channels, and all antennas. 802.11n20, Channel 1, Antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	150k~30MHz
Power Line	L
Test channel	Worst-Case

Suspected List

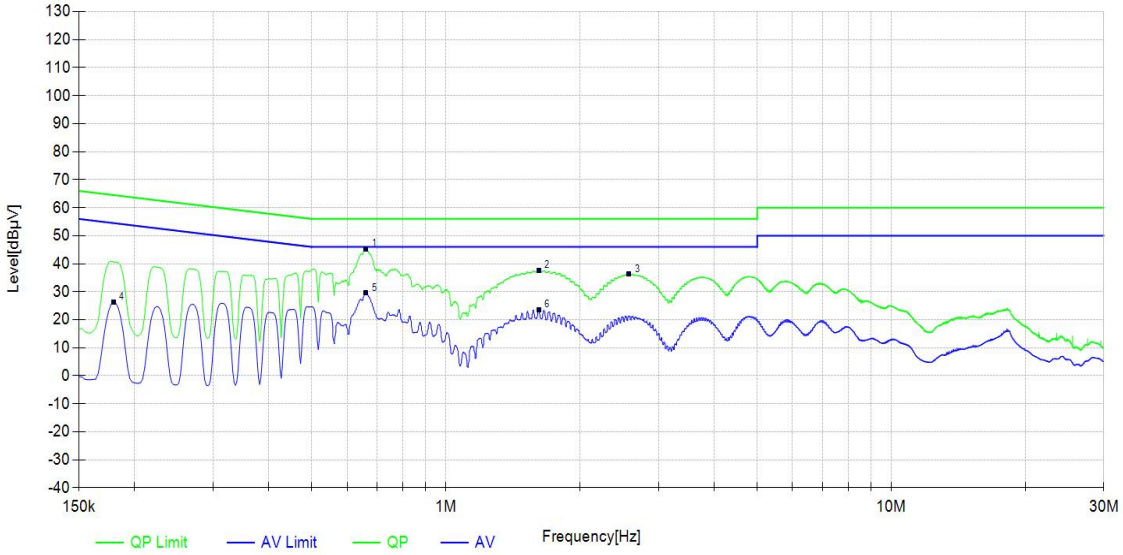
Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
0.66075	10.24	30.64	40.88	56.00	15.12	QP	PASS
1.57425	10.27	23.37	33.64	56.00	22.36	QP	PASS
2.63175	10.33	22.80	33.13	56.00	22.87	QP	PASS
0.66075	10.24	14.44	24.68	46.00	21.32	AV	PASS
1.57425	10.27	7.57	17.84	46.00	28.16	AV	PASS
3.7095	10.36	7.86	18.22	46.00	27.78	AV	PASS



Radiates Emission	150k~30MHz
Power Line	N
Test channel	Worst-Case

Suspected List

Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
0.66075	10.22	34.99	45.21	56.00	10.79	QP	PASS
1.617	10.27	27.36	37.63	56.00	18.37	QP	PASS
2.57775	10.31	25.95	36.26	56.00	19.74	QP	PASS
0.17925	10.19	16.19	26.38	54.52	28.14	AV	PASS
0.66075	10.22	19.35	29.57	46.00	16.43	AV	PASS
1.617	10.27	13.28	23.55	46.00	22.45	AV	PASS



Test Results:

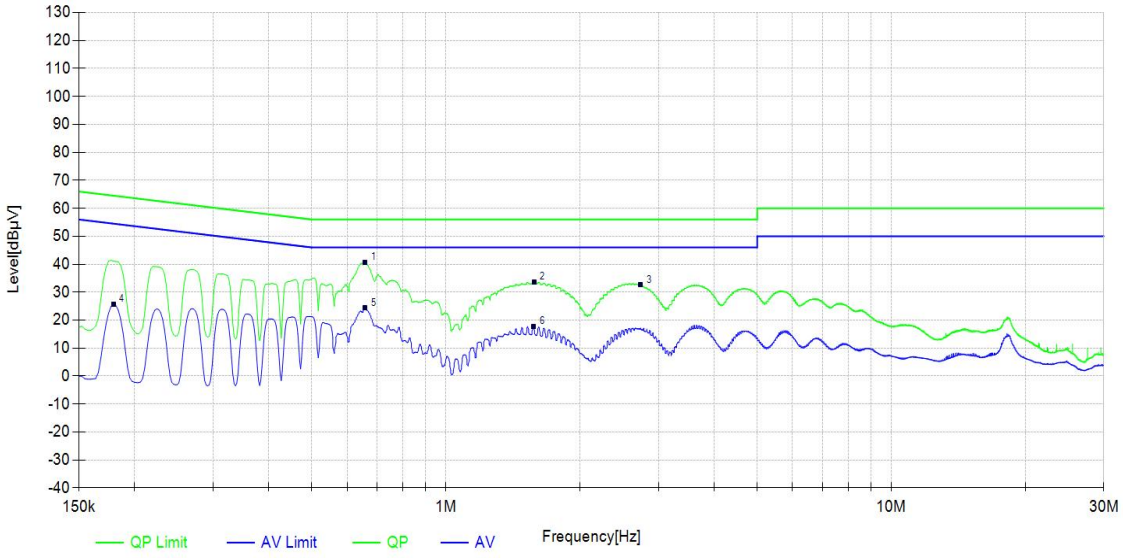
Bluetooth(Low Energy):

During the test, the Conducted Emission from 150kHz to 30MHz was performed in all modes with all channels, and all antennas. BLE(2Mbps), channel 0, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	150k~30MHz
Power Line	L
Test channel	Worst-Case

Suspected List

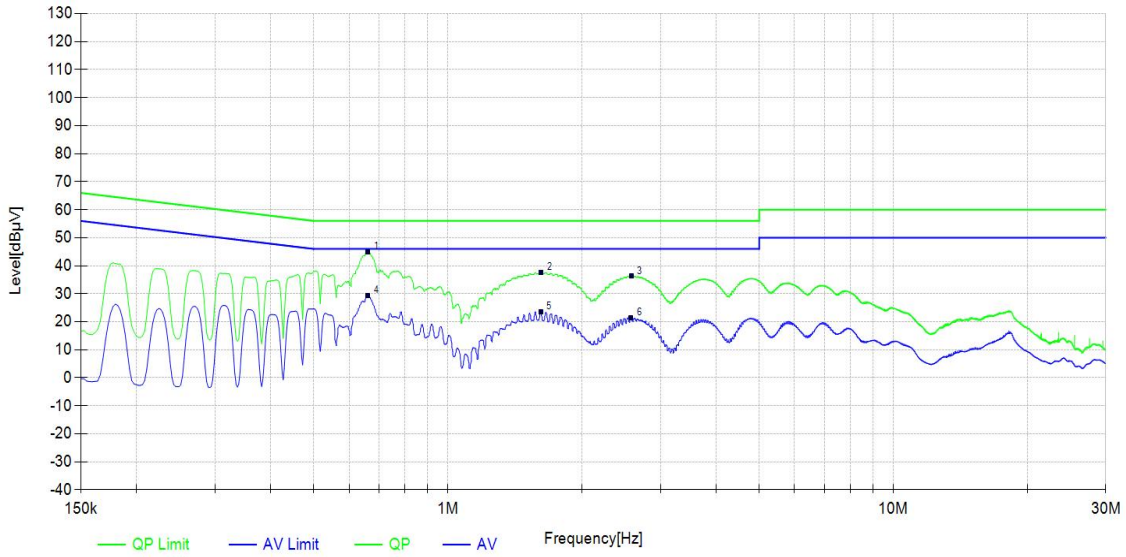
Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
0.6585	10.24	30.43	40.67	56.00	15.33	QP	PASS
1.5765	10.27	23.38	33.65	56.00	22.35	QP	PASS
2.73525	10.33	22.32	32.65	56.00	23.35	QP	PASS
0.17925	10.20	15.56	25.76	54.52	28.76	AV	PASS
0.6585	10.24	14.06	24.30	46.00	21.70	AV	PASS
1.57425	10.27	7.52	17.79	46.00	28.21	AV	PASS



Radiates Emission	150k~30MHz
Power Line	N
Test channel	Worst-Case

Suspected List

Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
0.66075	10.22	34.84	45.06	56.00	10.94	QP	PASS
1.61925	10.27	27.39	37.66	56.00	18.34	QP	PASS
2.58225	10.31	26.00	36.31	56.00	19.69	QP	PASS
0.66075	10.22	19.12	29.34	46.00	16.66	AV	PASS
1.617	10.27	13.29	23.56	46.00	22.44	AV	PASS
2.57775	10.31	11.08	21.39	46.00	24.61	AV	PASS



5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

The EUT was setup and tested according to ANSI C63.10-2020/Cor1-2023.

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 C63.10-2020/Cor1-2023 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)).

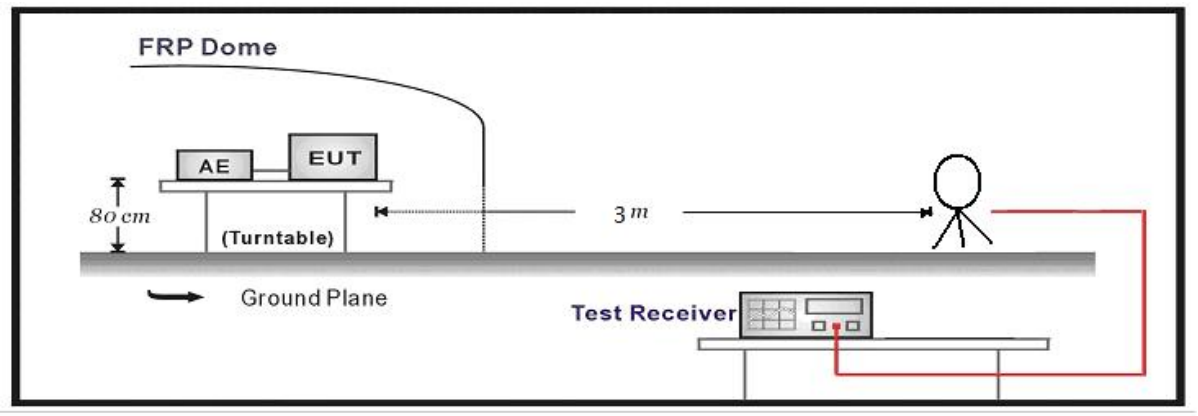
Frequency	Limit (μV/m)	Limit (dBμV/m @3m)	Remark
0.009MHz-0.490MHz	2400/F(kHz)@300m	20lg(24000000/F(kHz))	Quasi-peak Level
0.490MHz~1.705MHz	24000/F(kHz)@30m	20lg(2400000/F(kHz))	Quasi-peak Level
1.705MHz~30.0MHz	30@30m	69.54	Quasi-peak Level
30MHz-88MHz	100@3m	40.0	Quasi-peak Level
88MHz-216MHz	150@3m	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:

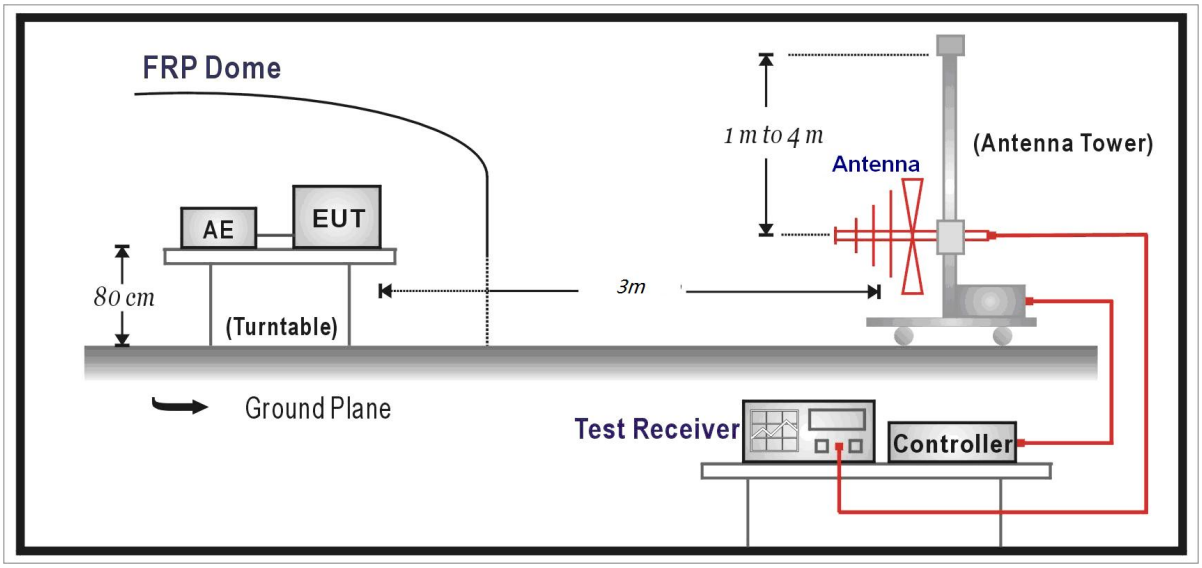
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218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

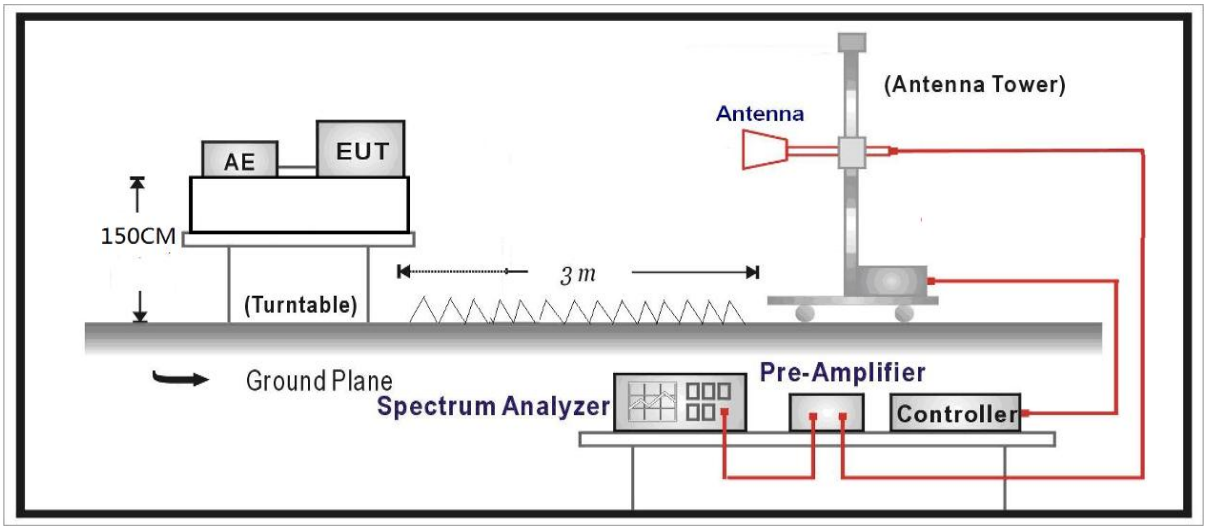
Below 30MHz Test Setup:



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:

SPURIOUS EMISSIONS：

WIFI:

During the test, the Radiates Emission from 9kHz to 1GHz was performed in WIFI all modes with all channels and all antennas. 802.11n20, Channel 1, Antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	9k~1G
Test channel	Worst-Case

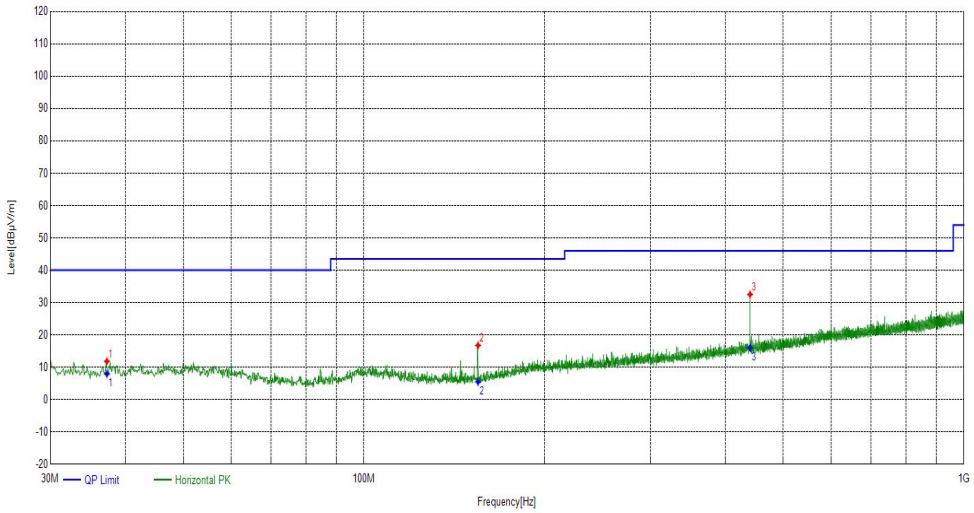
Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
37.2757	Horizontal	11.59	0.25	11.84	40.00	28.16	PK	100	305	PASS
154.9485	Horizontal	9.77	7.01	16.78	43.50	26.72	PK	100	60	PASS
440.06	Horizontal	18.60	13.90	32.50	46.00	13.50	PK	100	270	PASS

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

Final Data List

Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
37.2757	Horizontal	11.59	7.96	40.00	32.04	184	305	PASS
154.9485	Horizontal	9.77	5.48	43.50	38.02	190	60	PASS
440.06	Horizontal	18.60	16.02	46.00	29.98	220	270	PASS



Radiates Emission	9k~1G
Test channel	Worst-Case

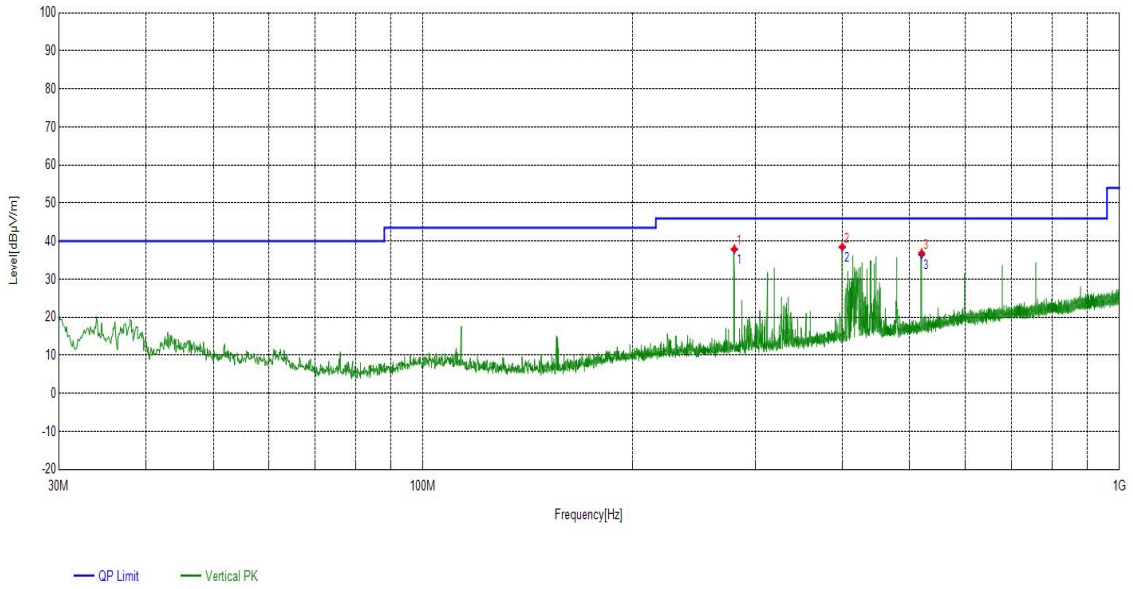
Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
279.994	Vertical	15.00	23.01	38.01	46.00	7.99	PK	100	247	PASS
399.995	Vertical	17.89	20.71	38.60	46.00	7.40	PK	100	90	PASS
519.996	Vertical	20.19	16.75	36.94	46.00	9.06	PK	100	261	PASS

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

Final Data List

Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
279.994	Vertical	15.00	37.80	46.00	8.20	160	247	PASS
399.995	Vertical	17.89	38.39	46.00	7.61	356	90	PASS
519.996	Vertical	20.19	36.50	46.00	9.50	100	261	PASS



During the test, the Radiates Emission from 1GHz to 40GHz was performed in WIFI all modes with all channels and all antennas. 802.11n20, Highest, medium, lowest channels, Antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	Above 1G
Test channel	Lowest
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
3216.021602	-1.38	44.84	43.46	74.00	30.54	PK	150	181	PASS
4821.182118	1.32	52.66	53.98	74.00	20.02	PK	150	168	PASS
10287.728773	12.72	32.85	45.57	74.00	28.43	PK	150	294	PASS
3217.521752	-1.38	33.07	31.69	54.00	22.31	AV	150	162	PASS
4825.682568	1.35	39.72	41.07	54.00	12.93	AV	150	359	PASS
10436.243624	12.87	21.48	34.35	54.00	19.65	AV	150	359	PASS

Radiates Emission	Above 1G
Test channel	Lowest
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
4825.682568	1.35	51.54	52.89	74.00	21.11	PK	150	330	PASS
8580.558056	10.08	35.15	45.23	74.00	28.77	PK	150	360	PASS
10431.743174	12.87	32.33	45.20	74.00	28.80	PK	150	100	PASS
4824.182418	1.34	41.16	42.50	54.00	11.50	AV	150	26	PASS
8475.547555	9.96	23.47	33.43	54.00	20.57	AV	150	30	PASS
10779.777978	12.75	23.19	35.94	54.00	18.06	AV	150	53	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Medium
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
4872.187219	1.54	50.73	52.27	74.00	21.73	PK	150	330	PASS
7066.906691	8.97	34.45	43.42	74.00	30.58	PK	150	170	PASS
8445.544555	9.92	33.69	43.61	74.00	30.39	PK	150	100	PASS
4875.187519	1.56	38.45	40.01	54.00	13.99	AV	150	36	PASS
6265.826583	5.96	23.80	29.76	54.00	24.24	AV	150	21	PASS
9444.644464	12.09	22.19	34.28	54.00	19.72	AV	150	16	PASS

Radiates Emission	Above 1G
Test channel	Medium
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
4876.687669	1.56	49.21	50.77	74.00	23.23	PK	150	170	PASS
6255.325533	5.96	34.08	40.04	74.00	33.96	PK	150	290	PASS
8508.550855	10.01	33.99	44.00	74.00	30.00	PK	150	160	PASS
4870.687069	1.54	39.10	40.64	54.00	13.36	AV	150	51	PASS
6879.387939	8.33	23.31	31.64	54.00	22.36	AV	150	32	PASS
8579.057906	10.08	23.74	33.82	54.00	20.18	AV	150	19	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Highest
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
4924.692469	1.77	46.55	48.32	74.00	25.68	PK	150	300	PASS
7323.432343	8.99	33.69	42.68	74.00	31.32	PK	150	20	PASS
10370.237024	12.84	33.24	46.08	74.00	27.92	PK	150	320	PASS
4927.692769	1.79	36.68	38.47	54.00	15.53	AV	150	42	PASS
7197.419742	9.01	24.07	33.08	54.00	20.92	AV	150	65	PASS
9954.69547	12.37	22.32	34.69	54.00	19.31	AV	150	26	PASS

Radiates Emission	Above 1G
Test channel	Highest
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
4923.192319	1.75	46.31	48.06	74.00	25.94	PK	150	200	PASS
7035.40354	8.95	34.63	43.58	74.00	30.42	PK	150	65	PASS
9641.164116	12.39	32.48	44.87	74.00	29.13	PK	150	35	PASS
4926.192619	1.78	36.01	37.79	54.00	16.21	AV	150	82	PASS
7237.923792	9.01	23.78	32.79	54.00	21.21	AV	150	67	PASS
9605.160516	12.39	22.18	34.57	54.00	19.43	AV	150	156	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Bluetooth(Low Energy):

During the test, the Radiates Emission from 9kHz to 40GHz was performed in Bluetooth(Low Energy) all modes with all channels and all antennas. BLE(2Mbps), channel 0, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	9k~1G
Test channel	Worst-Case

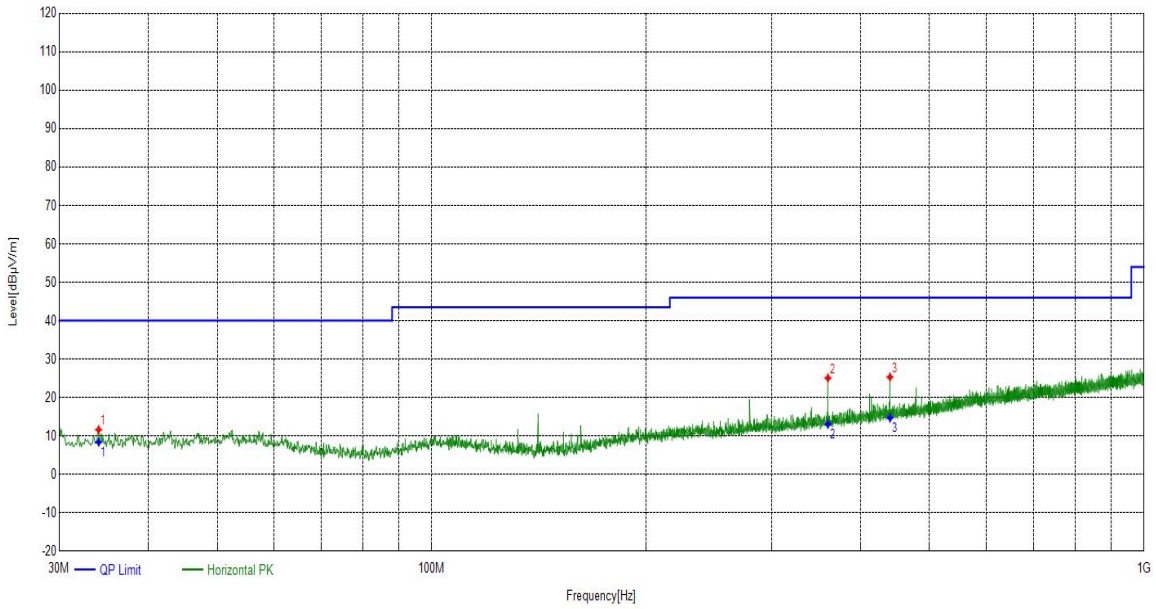
Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
34.0744	Horizontal	10.98	0.66	11.64	40.00	28.36	PK	100	344	PASS
360.027	Horizontal	16.94	8.13	25.07	46.00	20.93	PK	100	220	PASS
439.963	Horizontal	18.60	6.73	25.33	46.00	20.67	PK	100	68	PASS

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

Final Data List

Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
34.0744	Horizontal	10.98	8.40	40.00	31.60	140	344	PASS
360.027	Horizontal	16.94	13.05	46.00	32.95	261	220	PASS
439.963	Horizontal	18.60	14.72	46.00	31.28	110	68	PASS



Radiates Emission	9k~1G
Test channel	Worst-Case

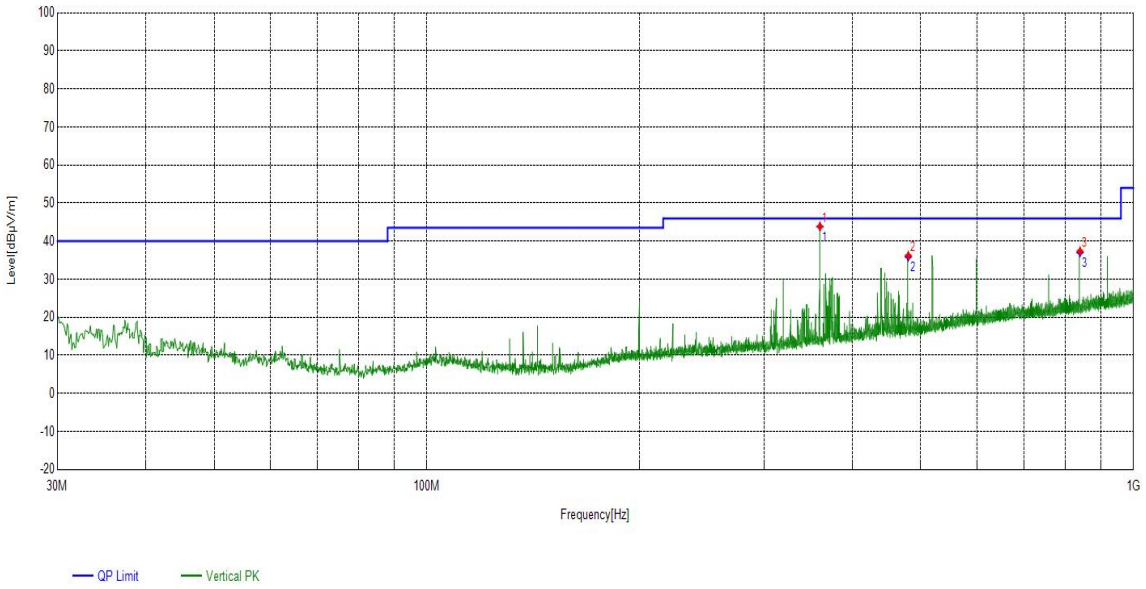
Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
360.027	Vertical	16.94	26.95	43.89	46.00	2.11	PK	100	129	PASS
480.028	Vertical	19.34	16.92	36.26	46.00	9.74	PK	100	201	PASS
840.031	Vertical	24.68	12.73	37.41	46.00	8.59	PK	100	195	PASS

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

Final Data List

Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
360.027	Vertical	16.94	43.82	46.00	2.18	230	129	PASS
480.028	Vertical	19.34	35.87	46.00	10.13	262	201	PASS
840.031	Vertical	24.68	37.02	46.00	8.98	100	195	PASS



During the test, the Radiates Emission from 1GHz to 40GHz was performed in WIFI all modes with all channels and all antennas. BLE(2Mbps), Highest, medium, lowest channels, antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Radiates Emission	Above 1G
Test channel	Lowest
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
4803.180318	1.25	58.32	59.57	74.00	14.43	PK	150	130	PASS
6222.322232	5.96	34.93	40.89	74.00	33.11	PK	150	290	PASS
8606.060606	10.11	34.72	44.83	74.00	29.17	PK	150	310	PASS
4806.180618	1.27	50.98	52.25	54.00	1.75	AV	150	50	PASS
6061.806181	5.77	24.50	30.27	54.00	23.73	AV	150	35	PASS
8504.050405	10.00	24.07	34.07	54.00	19.93	AV	150	18	PASS

Radiates Emission	Above 1G
Test channel	Lowest
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
4803.180318	1.25	45.40	46.65	74.00	27.35	PK	150	100	PASS
6933.393339	8.61	33.42	42.03	74.00	31.97	PK	150	90	PASS
8504.050405	10.00	34.11	44.11	74.00	29.89	PK	150	220	PASS
4804.680468	1.25	38.07	39.32	54.00	14.68	AV	150	20	PASS
6984.39844	8.86	23.16	32.02	54.00	21.98	AV	150	55	PASS
8481.548155	9.96	23.81	33.77	54.00	20.23	AV	150	32	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Medium
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
4879.687969	1.58	56.15	57.73	74.00	16.27	PK	150	90	PASS
7291.929193	9.00	34.18	43.18	74.00	30.82	PK	150	80	PASS
10352.235224	12.82	32.79	45.61	74.00	28.39	PK	150	100	PASS
4881.188119	1.59	49.04	50.63	54.00	3.37	AV	150	250	PASS
7660.966097	9.13	24.47	33.60	54.00	20.40	AV	150	35	PASS
10319.231923	12.78	23.15	35.93	54.00	18.07	AV	150	78	PASS

Radiates Emission	Above 1G
Test channel	Medium
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
4879.687969	1.58	44.58	46.16	74.00	27.84	PK	150	270	PASS
7321.932193	8.99	34.39	43.38	74.00	30.62	PK	150	150	PASS
10614.761476	12.68	33.62	46.30	74.00	27.70	PK	150	340	PASS
4881.188119	1.59	37.55	39.14	54.00	14.86	AV	150	85	PASS
7320.432043	8.99	24.27	33.26	54.00	20.74	AV	150	360	PASS
9759.675968	12.40	22.91	35.31	54.00	18.69	AV	150	37	PASS

Note: The emission levels of other frequencies were greater than 20dB margin.

Radiates Emission	Above 1G
Test channel	Highest
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
3448.544855	-0.53	47.34	46.81	74.00	27.19	PK	150	360	PASS
4959.19592	1.92	52.54	54.46	74.00	19.54	PK	150	171	PASS
5173.717372	2.72	44.43	47.15	74.00	26.85	PK	150	360	PASS
3307.530753	-1.04	30.53	29.49	54.00	24.51	AV	150	224	PASS
4960.69607	1.92	44.03	45.95	54.00	8.05	AV	150	201	PASS
9617.161716	12.39	20.81	33.20	54.00	20.80	AV	150	162	PASS

Radiates Emission	Above 1G
Test channel	Highest
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
4959.19592	1.92	51.30	53.22	74.00	20.78	PK	150	90	1.92
8303.030303	9.68	34.30	43.98	74.00	30.02	PK	150	40	9.68
10770.777078	12.76	33.52	46.28	74.00	27.72	PK	150	210	12.76
4960.69607	1.92	44.11	46.03	54.00	7.97	AV	150	110	1.92
8571.557156	10.07	24.57	34.64	54.00	19.36	AV	150	50	10.07
11091.809181	12.58	23.38	35.96	54.00	18.04	AV	150	61	12.58

Note: The emission levels of other frequencies were greater than 20dB margin.

Band Edge：

During the test, the Band Edge was performed in WIFI all modes with all channels and all antennas. 802.11n20,MIMO are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test mode	802.11n20
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
2315.7315	-5.27	52.14	46.87	74.00	27.13	PK	150	129	PASS
2390.1390	-5.04	52.01	46.97	74.00	27.03	PK	150	129	PASS
2412.1409	-4.99	90.65	85.66	---	---	PK	150	195	---
2315.7315	-5.27	40.69	35.42	54.00	18.58	AV	150	223	PASS
2390.1390	-5.04	40.92	35.88	54.00	18.12	AV	150	318	PASS
2412.3411	-4.98	77.90	72.92	---	---	AV	150	195	---

Test mode	802.11n20
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
2343.9343	-5.18	53.71	48.53	74.00	25.47	PK	150	226	PASS
2390.1390	-5.04	51.68	46.64	74.00	27.36	PK	150	11	PASS
2412.3417	-4.97	90.91	85.94	---	---	PK	150	226	---
2343.9343	-5.18	40.70	35.52	54.00	18.48	AV	150	120	PASS
2390.1390	-5.04	41.13	36.09	54.00	17.91	AV	150	206	PASS
2412.1411	-4.98	77.22	72.24	---	---	AV	150	200	---

Test mode	802.11n20
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
2462.7462	-4.84	94.06	89.22	---	---	PK	150	188	---
2483.5483	-4.79	52.53	47.74	74.00	26.26	PK	150	188	PASS
2501.1501	-4.73	52.90	48.17	74.00	25.83	PK	150	195	PASS
2462.9460	-4.84	81.30	76.46	---	---	AV	150	19	---
2483.5483	-4.79	41.68	36.89	54.00	17.11	AV	150	195	PASS
2501.1501	-4.73	41.30	36.57	54.00	17.43	AV	150	68	PASS

Test mode	802.11n20
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
2462.9459	-4.85	92.46	87.61	---	---	PK	150	225	---
2483.5483	-4.79	53.61	48.82	74.00	25.18	PK	150	171	PASS
2600.3600	-4.38	54.15	49.77	74.00	24.23	PK	150	164	PASS
2462.9462	-4.84	78.29	73.45	---	---	AV	150	171	---
2483.5483	-4.79	41.13	36.34	54.00	17.66	AV	150	359	PASS
2600.3600	-4.38	41.75	37.37	54.00	16.63	AV	150	359	PASS

During the test, the Band Edge was performed in BLE all modes with all channels and all antennas. BLE(2Mbps), Antenna 1 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Test mode	BLE(2Mbps)
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
2377.1377	-5.08	51.41	46.33	74.00	27.67	PK	150	89	PASS
2390.1390	-5.04	51.02	45.98	74.00	28.02	PK	150	235	PASS
2401.9401	-5.01	100.41	95.40	---	---	PK	150	175	---
2377.1377	-5.08	41.00	35.92	54.00	18.08	AV	150	354	PASS
2390.1390	-5.04	40.93	35.89	54.00	18.11	AV	150	188	PASS
2402.1402	-5.00	91.85	86.85	---	---	AV	150	76	---

Test mode	BLE(2Mbps)
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
2364.9364	-5.11	52.16	47.05	74.00	26.95	PK	150	58	PASS
2390.1390	-5.04	51.77	46.73	74.00	27.27	PK	150	45	PASS
2401.9401	-5.01	98.76	93.75	---	---	PK	150	228	---
2364.9364	-5.11	40.64	35.53	54.00	18.47	AV	150	176	PASS
2390.1390	-5.04	40.95	35.91	54.00	18.09	AV	150	253	PASS
2402.1402	-5.00	92.38	87.38	---	---	AV	150	241	---

Test mode	BLE(2Mbps)
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
2479.9479	-4.80	105.40	100.60	---	---	PK	150	179	---
2483.5483	-4.79	54.63	49.84	74.00	24.16	PK	150	147	PASS
2506.3506	-4.71	54.10	49.39	74.00	24.61	PK	150	44	PASS
2480.1480	-4.80	96.95	92.15	---	---	AV	150	147	---
2483.5483	-4.79	42.87	38.08	54.00	15.92	AV	150	147	PASS
2506.3506	-4.71	41.23	36.52	54.00	17.48	AV	150	23	PASS

Test mode	BLE(2Mbps)
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
2479.94799	-4.80	101.49	96.69	---	---	PK	150	224	---
2483.54835	-4.79	54.20	49.41	74.00	24.59	PK	150	218	PASS
2504.35043	-4.71	54.51	49.80	74.00	24.20	PK	150	211	PASS
2480.14801	-4.80	93.31	88.51	---	---	AV	150	173	---
2483.54835	-4.79	41.94	37.15	54.00	16.85	AV	150	173	PASS
2504.35043	-4.71	41.00	36.29	54.00	17.71	AV	150	186	PASS

5.3 Maximum conducted output power

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

a.A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor and set the detector to PEAK. Record the power level.

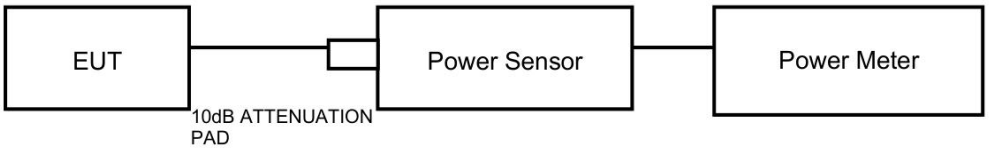
Limits:

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:

Test Mode	Antenna	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	18.65	≤30.00	PASS
		2437	17.66	≤30.00	PASS
		2462	17.52	≤30.00	PASS
11G	Ant1	2412	17.28	≤30.00	PASS
		2437	16.51	≤30.00	PASS
		2462	15.87	≤30.00	PASS
11N20SISO	Ant1	2412	16.33	≤30.00	PASS
		2437	15.51	≤30.00	PASS
		2462	15.11	≤30.00	PASS
11N40SISO	Ant1	2422	15.65	≤30.00	PASS
		2437	15.13	≤30.00	PASS
		2452	14.83	≤30.00	PASS
BLE_1M	Ant1	2402	1.21	≤30.00	PASS
		2440	0.51	≤30.00	PASS
		2480	-0.03	≤30.00	PASS
BLE_2M	Ant1	2402	1.22	≤30.00	PASS
		2440	0.59	≤30.00	PASS
		2480	-0.02	≤30.00	PASS

5.4 Minimum 6 dB Bandwidth

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

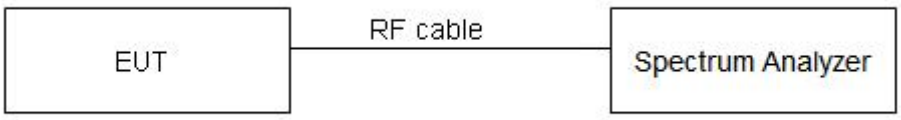
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz; VBW is set to greater than 3 times RBW on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

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	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.400	2407.280	2416.680	≥0.5	PASS
		2437	9.720	2432.000	2441.720	≥0.5	PASS
		2462	9.440	2457.240	2466.680	≥0.5	PASS
11G	Ant1	2412	16.680	2403.760	2420.440	≥0.5	PASS
		2437	16.600	2428.760	2445.360	≥0.5	PASS
		2462	16.560	2453.840	2470.400	≥0.5	PASS
11N20SISO	Ant1	2412	17.640	2403.160	2420.800	≥0.5	PASS
		2437	17.560	2428.200	2445.760	≥0.5	PASS
		2462	17.600	2453.160	2470.760	≥0.5	PASS
11N40SISO	Ant1	2422	36.000	2403.760	2439.760	≥0.5	PASS
		2437	36.160	2418.840	2455.000	≥0.5	PASS
		2452	36.080	2433.920	2470.000	≥0.5	PASS
BLE_1M	Ant1	2402	0.612	2401.684	2402.296	≥0.5	PASS
		2440	0.616	2439.676	2440.292	≥0.5	PASS
		2480	0.628	2479.672	2480.300	≥0.5	PASS
BLE_2M	Ant1	2402	1.120	2401.440	2402.560	≥0.5	PASS
		2440	1.080	2439.452	2440.532	≥0.5	PASS
		2480	1.244	2479.328	2480.572	≥0.5	PASS

5.5 Occupied Channel Bandwidth

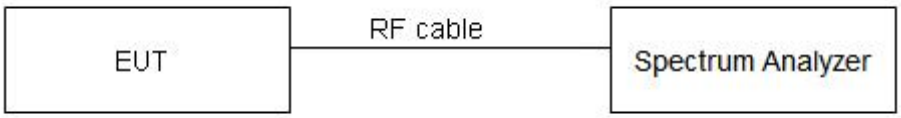
Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

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 1% to 5% of the OBW; video bandwidth (VBW) shall be at least three times RBW 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	Frequency[MHz]	OCB [MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	13.207	---	---
		2437	13.038	---	---
		2462	13.032	---	---
11G	Ant1	2412	17.253	---	---
		2437	17.263	---	---
		2462	17.259	---	---
11N20SISO	Ant1	2412	18.092	---	---
		2437	18.257	---	---
		2462	18.182	---	---
11N40SISO	Ant1	2422	36.476	---	---
		2437	36.603	---	---
		2452	36.573	---	---
BLE_1M	Ant1	2402	1.0240	---	---
		2440	1.0348	---	---
		2480	1.0320	---	---
BLE_2M	Ant1	2402	2.0268	---	---
		2440	2.0200	---	---
		2480	2.0429	---	---

5.6 Band Edge Measurement

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

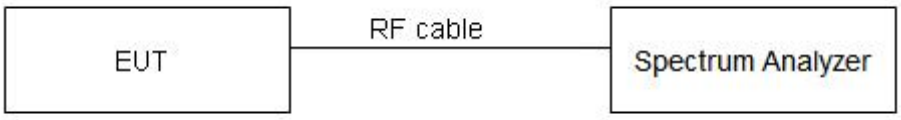
Method of Measurement:

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	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.77	-32.5	≤-13.23	PASS
		High	2462	4.96	-46.63	≤-15.04	PASS
11G	Ant1	Low	2412	-1.32	-36.7	≤-21.32	PASS
		High	2462	-2.45	-47.12	≤-22.45	PASS
11N20SISO	Ant1	Low	2412	-2.22	-39.36	≤-22.22	PASS
		High	2462	-3.69	-46.61	≤-23.69	PASS
11N40SISO	Ant1	Low	2422	-5.47	-38.86	≤-25.47	PASS
		High	2452	-6.43	-45.19	≤-26.43	PASS
BLE_1M	Ant1	Low	2402	-0.70	-47.13	≤-20.7	PASS
		High	2480	-1.73	-47.12	≤-21.73	PASS
BLE_2M	Ant1	Low	2402	-1.67	-46.7	≤-21.67	PASS
		High	2480	-3.59	-47.07	≤-23.59	PASS

5.7 Maximum Power Spectral Density

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

Method of Measurement:

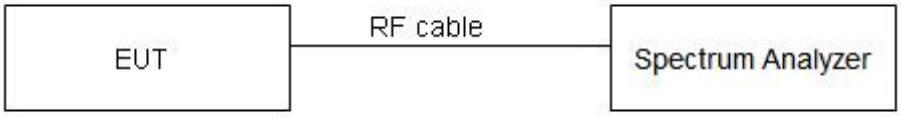
During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. The Peak detector is used.
The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed 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:

Test Mode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-8.10	≤8.00	PASS
		2437	-8.90	≤8.00	PASS
		2462	-9.41	≤8.00	PASS
11G	Ant1	2412	-15.88	≤8.00	PASS
		2437	-16.70	≤8.00	PASS
		2462	-17.16	≤8.00	PASS
11N20SISO	Ant1	2412	-16.57	≤8.00	PASS
		2437	-17.27	≤8.00	PASS
		2462	-17.53	≤8.00	PASS
11N40SISO	Ant1	2422	-18.53	≤8.00	PASS
		2437	-19.08	≤8.00	PASS
		2452	-19.26	≤8.00	PASS
BLE_1M	Ant1	2402	-14.77	≤8.00	PASS
		2440	-16.07	≤8.00	PASS
		2480	-16.01	≤8.00	PASS
BLE_2M	Ant1	2402	-16.45	≤8.00	PASS
		2440	-17.13	≤8.00	PASS
		2480	-17.72	≤8.00	PASS

5.8 Spurious RF Conducted Emissions

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.2kPa

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	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	4.99	4.99	---	PASS
			30~1000	4.99	-59.02	≤-15.01	PASS
			1000~26500	4.99	-30.53	≤-15.01	PASS
		2437	Reference	4.12	4.12	---	PASS
			30~1000	4.12	-58.55	≤-15.88	PASS
			1000~26500	4.12	-30.48	≤-15.88	PASS
		2462	Reference	5.74	5.74	---	PASS
			30~1000	5.74	-58.63	≤-14.26	PASS
			1000~26500	5.74	-32.18	≤-14.26	PASS
11G	Ant1	2412	Reference	-1.94	-1.94	---	PASS
			30~1000	-1.94	-58.91	≤-21.94	PASS
			1000~26500	-1.94	-46.88	≤-21.94	PASS
		2437	Reference	-2.52	-2.52	---	PASS
			30~1000	-2.52	-58.7	≤-22.52	PASS
			1000~26500	-2.52	-46.81	≤-22.52	PASS
		2462	Reference	-6.00	-6.00	---	PASS
			30~1000	-6.00	-59.13	≤-26	PASS
			1000~26500	-6.00	-46.82	≤-26	PASS
11N20SISO	Ant1	2412	Reference	-2.29	-2.29	---	PASS
			30~1000	-2.29	-58.68	≤-22.29	PASS
			1000~26500	-2.29	-46.94	≤-22.29	PASS
		2437	Reference	-3.51	-3.51	---	PASS
			30~1000	-3.51	-58.73	≤-23.51	PASS
			1000~26500	-3.51	-46.65	≤-23.51	PASS
		2462	Reference	-3.74	-3.74	---	PASS
			30~1000	-3.74	-58.36	≤-23.74	PASS
			1000~26500	-3.74	-46.45	≤-23.74	PASS
11N40SISO	Ant1	2422	Reference	-8.64	-8.64	---	PASS
			30~1000	-8.64	-48.03	≤-28.64	PASS
			1000~26500	-8.64	-46.84	≤-28.64	PASS
		2437	Reference	-7.41	-7.41	---	PASS
			30~1000	-7.41	-49.42	≤-27.41	PASS
			1000~26500	-7.41	-46.22	≤-27.41	PASS
		2452	Reference	-7.76	-7.76	---	PASS
			30~1000	-7.76	-49.13	≤-27.76	PASS
			1000~26500	-7.76	-46.85	≤-27.76	PASS
BLE_1M	Ant1	2402	Reference	-0.30	-0.30	---	PASS
			30~1000	-0.30	-59.04	≤-20.3	PASS
			1000~26500	-0.30	-47.15	≤-20.3	PASS
		2440	Reference	-1.16	-1.16	---	PASS
			30~1000	-1.16	-59.23	≤-21.16	PASS
			1000~26500	-1.16	-45.76	≤-21.16	PASS
		2480	Reference	-1.47	-1.47	---	PASS
			30~1000	-1.47	-58.43	≤-21.47	PASS
			1000~26500	-1.47	-45.93	≤-21.47	PASS
BLE_2M	Ant1	2402	Reference	-3.02	-3.02	---	PASS
			30~1000	-3.02	-58.68	≤-23.02	PASS
			1000~26500	-3.02	-46.68	≤-23.02	PASS
		2440	Reference	-3.08	-3.08	---	PASS
			30~1000	-3.08	-58.16	≤-23.08	PASS
			1000~26500	-3.08	-46.84	≤-23.08	PASS
		2480	Reference	-0.23	-0.23	---	PASS
			30~1000	-0.23	-58.81	≤-20.23	PASS
			1000~26500	-0.23	-46.27	≤-20.23	PASS

6. Appendix X

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR 44301	/	CRT	2027/04/22
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2025/04/22
Power Meter	JS0806-2	19H9080187	DZ-000241	Tonscend	2025/04/27
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2025/04/11
5m Semi-Anechoic Chamber	SAC-5	SAC-5-2.0	EM-000557	COMTEST	2027/02/01
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2026/01/01
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2025/12/26
EMI Test Receiver	ESR7	102235	EM-000574	R&S	2025/12/26
loop antenna	HLA 6121	540046	EM-000546	TESEQ	2025/06/04
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2025/06/09
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2025/12/26
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2025/08/03
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2025/06/02
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2025/08/29
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2025/12/02
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2025/06/03
Temperature and humidity meter	MHO-C201	/	DZ-000249-2	Seconds test	2025/07/28
Temperature and humidity meter	MHO-C201	/	DZ-000249-5	Seconds test	2025/07/28

Dynacomm	Software Release	Software Developer
TS1120-3 Test System(Conduction test)	3.3.38	Tonscend
TS+（5m,Radiation test）	JS32-RE 5.0.0	Tonscend

No Body Text Below

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".

Address: No.3,Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, China (Test location)
Post Code：510663 Tel：020-32293888
FAX：020 32293889 E-mail：office@cvc.org.cn