ACCREDITED
CERTIFICATE #5473.01

Test Report No.:
FCC2023-0067-RF

TEST REPORT

FCC ID	:	2AX51-001
Applicant	:	ECO(XIAMEN)TECHNOLOGY INC.
Product Name	:	Bluetooth remote-control unit
Model No.	:	YS-ECO

CVC Testing Technology Co., Ltd.

Applicant	**Name:** ECO(XIAMEN)TECHNOLOGY INC. **Address:** No.2,Xiafei East Road, Haicang District,Xiamen City,Fujian Province, China
Manufacturer	**Name:** ECO(XIAMEN)TECHNOLOGY INC. **Address:** No.2,Xiafei East Road, Haicang District,Xiamen City,Fujian Province, China
Equipment Under Test	**Product Name :** Bluetooth remote-control unit **Model No. :** YS-ECO **Trade mark :** *ECOTECH* **Serial no. :** / **Sampling :** 1-1

Date of Receipt.	2023.11.16	**Date of Testing**	2024.1.18

Test Specification	**Test Result**
FCC CFR47 Part 15C Radio Frequency Devices ANSI C63.10-2020 KDB 558074 D01 15.247 Meas Guidance v05r02	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Seal of CVC** **Issue Date: 2024.01.28**

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

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1. General Product Information

1.1 General information

Product Name	Bluetooth remote-control unit
Model No.	YS-ECO
Additional model	/
Power Supply	DC 3V
Serial Number(SN)	/
Antenna Type	onboard antenna
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Antenna Gain	-0.14dBi (provided by client)
Beamforming gain	Unsupported (provided by client)
Frequency Range	2402~2480MHz
Channel Number	40 Channels
Type of Modulation	GFSK
Max. Conducted Power	-3.78 dBm

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 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 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
BT-LE	1TX / 1RX	2402,2440,2480

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
BT-LE	1Mbps	/	/

Test Items	Test Antennas	Test Modes	Test Channels
Radiated Emissions	Antenna 1	BT-LE	0,39
Radiated Emissions (Band Edge)	Antenna 1	BT-LE	0,39
Maximum conducted output power	Antenna 1	BT-LE	0,19,39

3.2 Duty cycle

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
BT-LE	Ant1	2402	0.42	2.86	14.69	---	---
		2440	0.42	2.86	14.69	---	---
		2480	0.42	2.87	14.63	---	---

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	Appendix A of BT-LE_ diagram
Occupied Channel Bandwidth	15.247(a)(2)	PASS	Appendix B of BT-LE_ diagram
Band Edge Measurement	15.247(d)	PASS	Appendix E of BT-LE_ diagram
Maximum Power spectral density	15.247(e)	PASS	Appendix D of BT-LE_ diagram
Spurious RF Conducted Emissions	15.247(d)	PASS	Appendix F of BT-LE_ diagram
Antenna Requirement	15.203	PASS	See note 1

Note1: 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
24°C ~26°C	46%~52%	101.3kPa

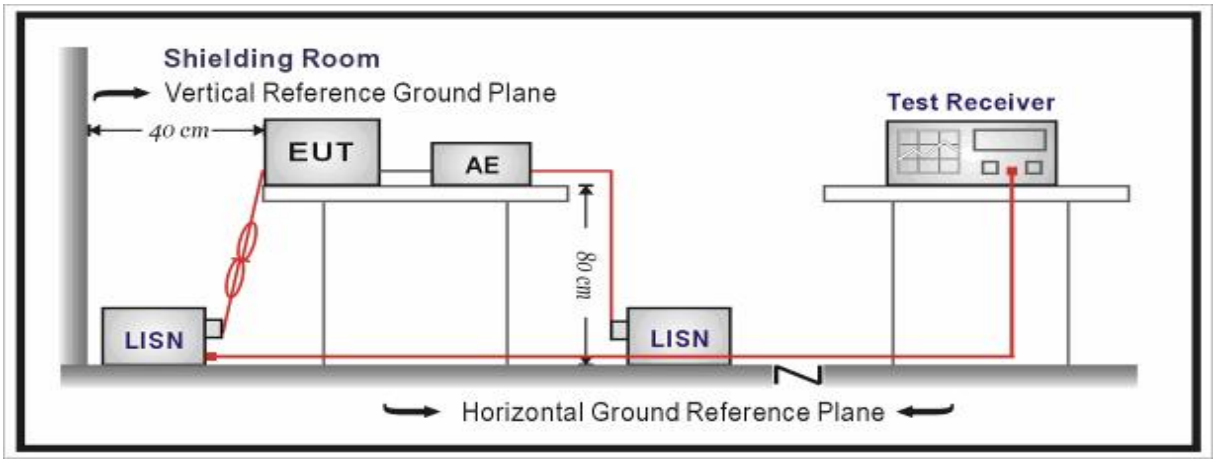
Method of Measurement:

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:

Conducted Emission applies to an intentional radiator that is designed to be connected to the public utility (AC) power line. Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

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

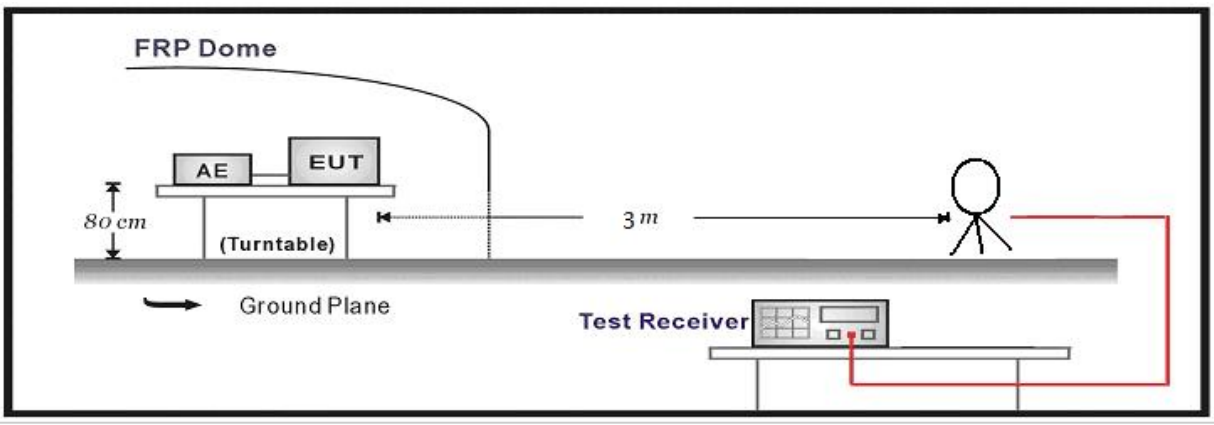
	5000@3m	74.0	Peak Level

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

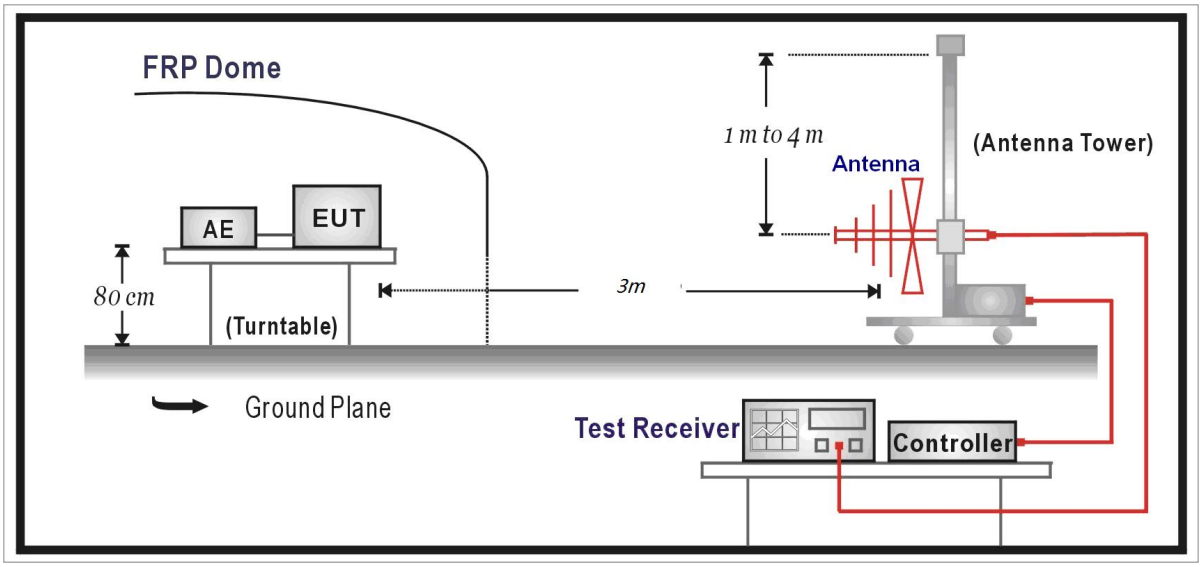
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218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

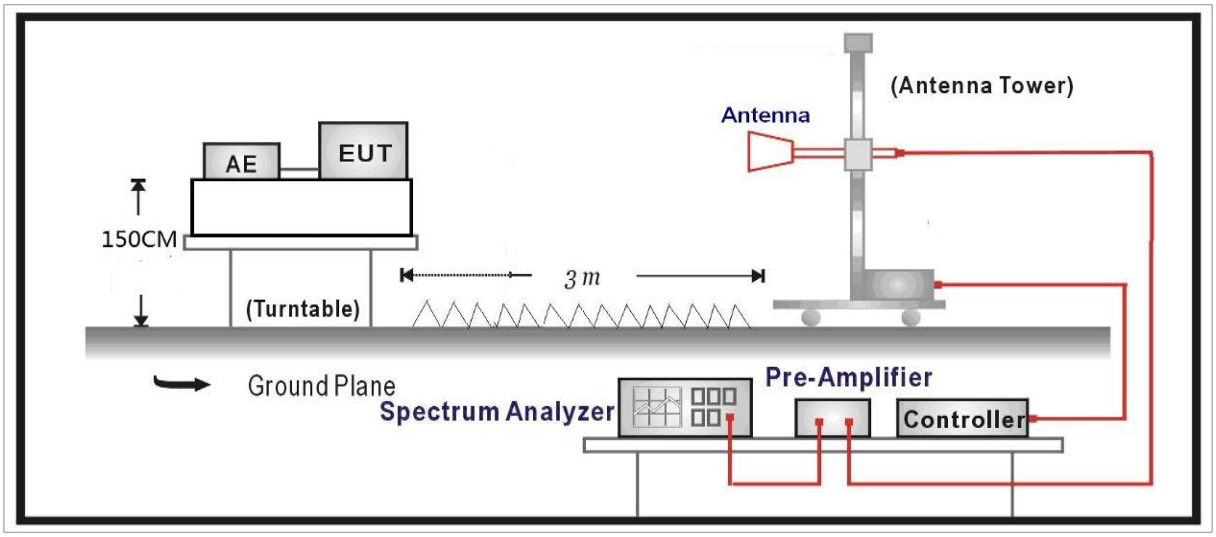
Below 30MHz Test Setup:



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:

SPURIOUS EMISSIONS：

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

During the test, the Radiates Emission from 30MHz to 40GHz was performed in all channels of YS-ECO. YS-ECO, the lowest and highest channels. The test data of the worst-case condition was recorded in this report.

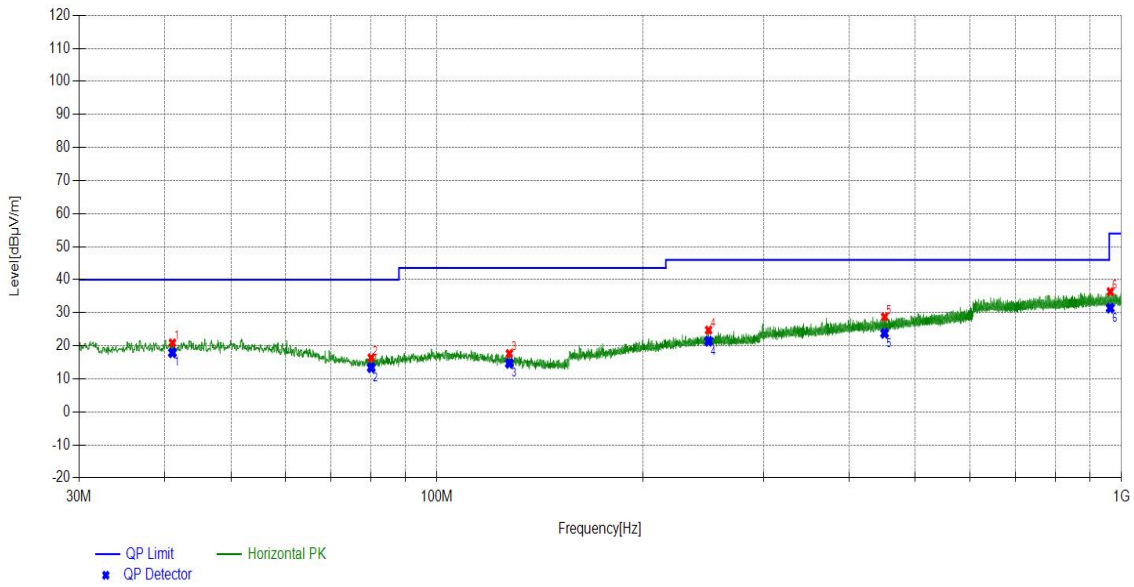
Radiates Emission	30MHz~1GHz
Polarity	Horizontal
Test Channel	2402MHz

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
41.0701	14.89	5.96	20.85	40.00	19.15	PK	100	345	PASS
80.1577	10.76	5.59	16.35	40.00	23.65	PK	100	224	PASS
127.5763	12.03	5.61	17.64	43.52	25.88	PK	100	50	PASS
249.347	16.33	8.42	24.75	46.02	21.27	PK	100	37	PASS
450.7765	19.81	8.93	28.74	46.02	17.28	PK	100	264	PASS
963.1378	27.29	9.08	36.37	53.98	17.61	PK	100	145	PASS

Final Data List

Frequency [MHz]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
41.0701	14.89	17.89	40.00	22.11	100	345	PASS
80.1577	10.76	13.39	40.00	26.61	100	224	PASS
127.5763	12.03	14.68	43.52	28.84	100	50	PASS
249.347	16.33	21.38	46.02	24.64	100	37	PASS
450.7765	19.81	23.77	46.02	22.25	100	264	PASS
963.1378	27.29	31.40	53.98	22.58	100	145	PASS



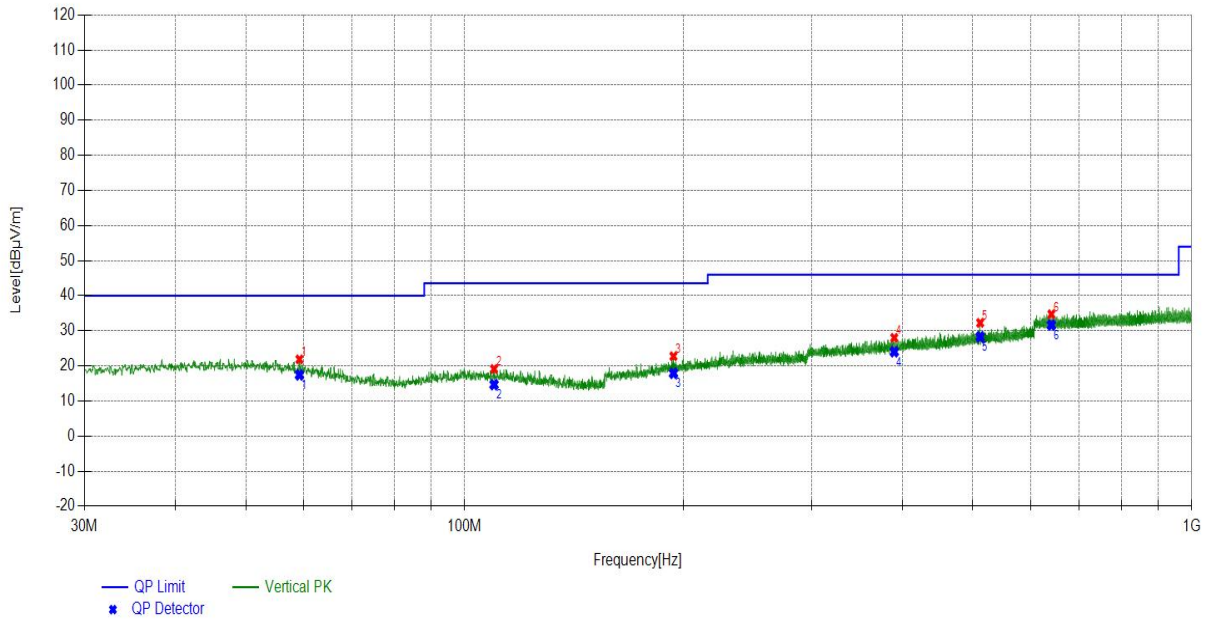
Radiates Emission	30MHz~1GHz
Polarity	Vertical
Test Channel	2402MHz

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
59.2729	14.38	7.50	21.88	40.00	18.12	PK	100	4	PASS
109.7729	13.58	5.54	19.12	43.52	24.40	PK	100	136	PASS
193.7685	13.58	9.18	22.76	43.52	20.76	PK	100	351	PASS
389.8912	18.76	9.24	28.00	46.02	18.02	PK	100	257	PASS
511.776	21.23	11.02	32.25	46.02	13.77	PK	100	230	PASS
641.3071	23.60	11.11	34.71	46.02	11.31	PK	100	150	PASS

Final Data List

Frequency [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
59.2729	14.38	17.43	40.00	22.57	100	4	PASS
109.7729	13.58	14.67	43.52	28.85	100	136	PASS
193.7685	13.58	17.90	43.52	25.62	100	351	PASS
389.8912	18.76	24.03	46.02	21.99	100	257	PASS
511.776	21.23	28.28	46.02	17.74	100	230	PASS
641.3071	23.60	31.64	46.02	14.38	100	150	PASS



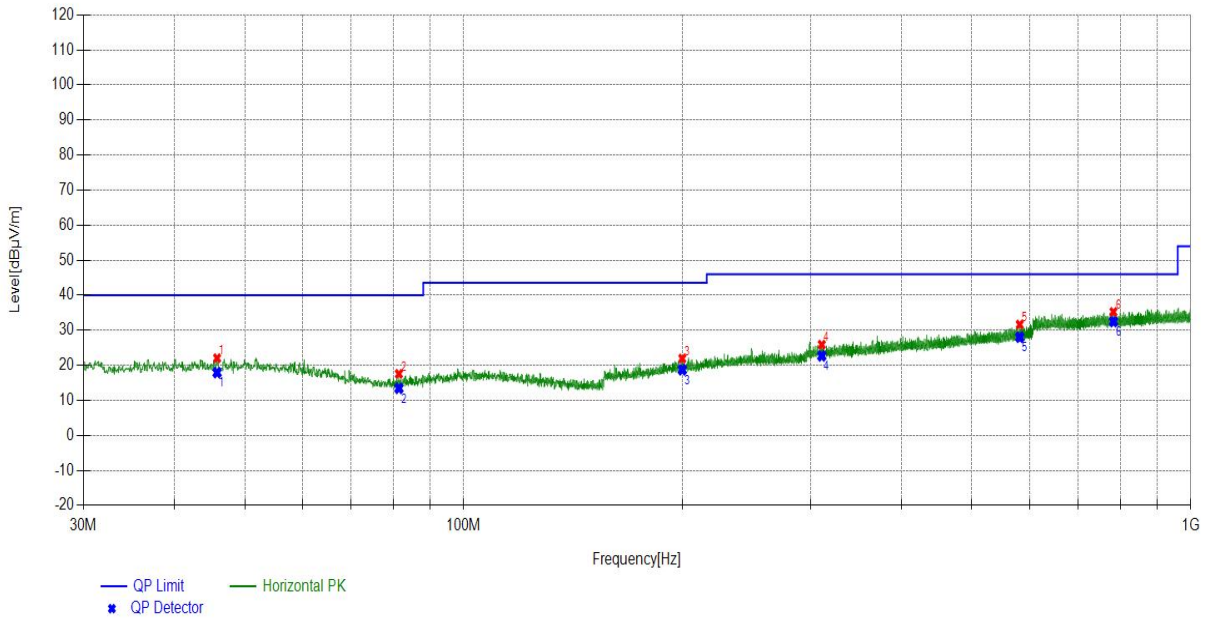
Radiates Emission	30MHz~1GHz
Polarity	Horizontal
Test Channel	2480MHz

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
45.8062	15.18	6.86	22.04	40.00	17.96	PK	100	2	PASS
81.4701	10.95	6.60	17.55	40.00	22.45	PK	100	211	PASS
199.8741	13.85	8.09	21.94	43.52	21.58	PK	100	278	PASS
310.9171	17.07	8.83	25.90	46.02	20.12	PK	100	11	PASS
581.9625	22.53	9.12	31.65	46.02	14.37	PK	100	356	PASS
783.0496	25.33	9.89	35.22	46.02	10.80	PK	100	90	PASS

Final Data List

Frequency [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
45.8062	15.18	19.01	40.00	20.99	100	2	PASS
81.4701	10.95	14.26	40.00	25.74	100	211	PASS
199.8741	13.85	18.87	43.52	24.65	100	278	PASS
310.9171	17.07	23.12	46.02	22.9	100	11	PASS
581.9625	22.53	28.97	46.02	17.05	100	356	PASS
783.0496	25.33	32.95	46.02	13.07	100	90	PASS



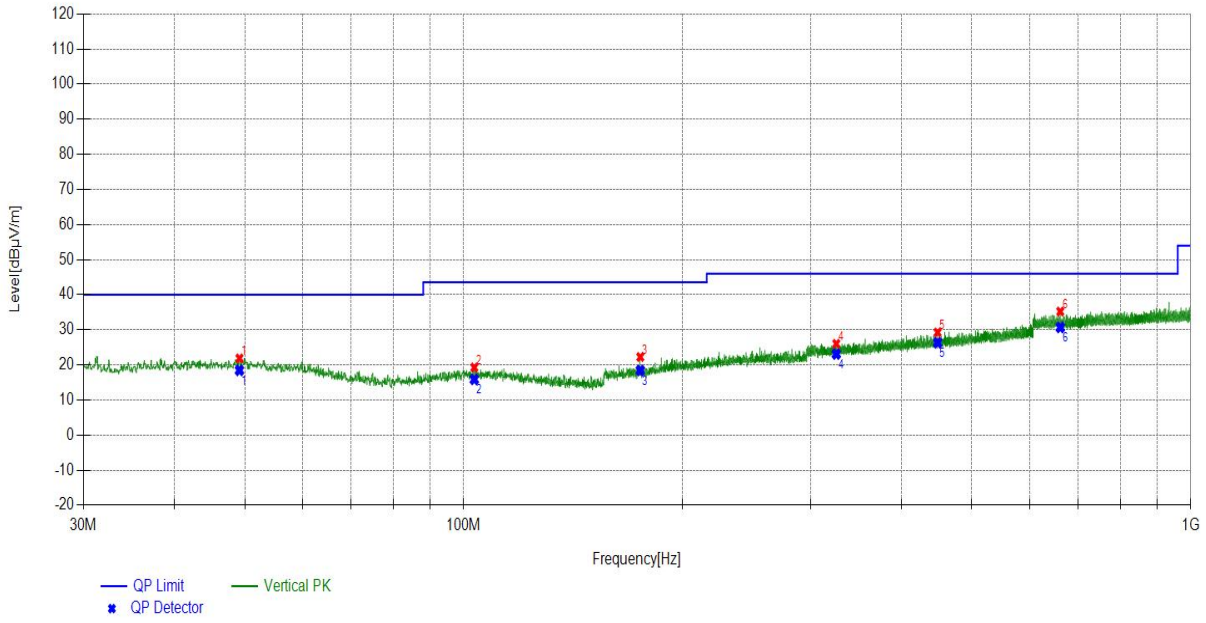
Radiates Emission	30MHz~1GHz
Polarity	Vertical
Test Channel	2480MHz

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
49.1729	15.39	6.47	21.86	40.00	18.14	PK	100	195	PASS
103.439	13.55	5.73	19.28	43.52	24.24	PK	100	275	PASS
174.995	12.04	10.21	22.25	43.52	21.27	PK	100	262	PASS
325.525	17.36	8.66	26.02	46.02	20.00	PK	100	181	PASS
448.6652	19.77	9.48	29.25	46.02	16.77	PK	100	1	PASS
661.7354	23.81	11.40	35.21	46.02	10.81	PK	100	329	PASS

Final Data List

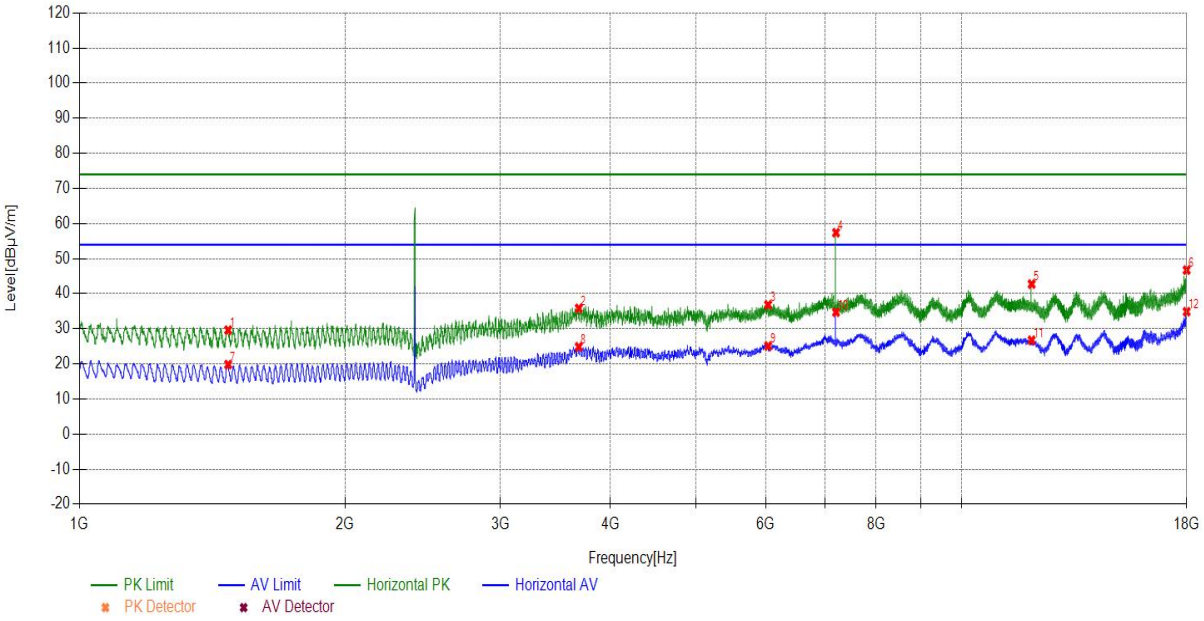
Frequency [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
49.1729	15.39	18.44	40.00	21.56	100	195	PASS
103.439	13.55	15.86	43.52	27.66	100	275	PASS
174.995	12.04	18.42	43.52	25.10	100	262	PASS
325.525	17.36	23.09	46.02	22.93	100	181	PASS
448.6652	19.77	26.32	46.02	19.70	100	1	PASS
661.7354	23.81	30.67	46.02	15.35	100	329	PASS



Radiates Emission	1G~18GHz
polarization	Horizontal
Test Channel	2402MHz

Suspected List

Frequency [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1474.3237	-9.60	39.22	29.62	74.00	44.38	PK	150	259	PASS
3681.8841	-3.01	38.82	35.81	74.00	38.19	PK	150	359	PASS
6035.6518	2.25	34.57	36.82	74.00	37.18	PK	150	320	PASS
7207.0104	4.87	52.51	57.38	74.00	16.62	PK	150	108	PASS
12008.9004	6.78	35.95	42.73	74.00	31.27	PK	150	108	PASS
17998.2999	21.02	25.71	46.73	74.00	27.27	PK	150	244	PASS
1474.3237	-9.60	29.40	19.80	54.00	34.20	AV	150	4	PASS
3681.8841	-3.01	27.85	24.84	54.00	29.16	AV	150	4	PASS
6035.6518	2.25	22.83	25.08	54.00	28.92	AV	150	48	PASS
7206.1603	4.87	29.86	34.73	54.00	19.27	AV	150	138	PASS
12008.9004	6.78	19.96	26.74	54.00	27.26	AV	150	92	PASS
17998.2999	21.02	13.86	34.88	54.00	19.12	AV	150	62	PASS

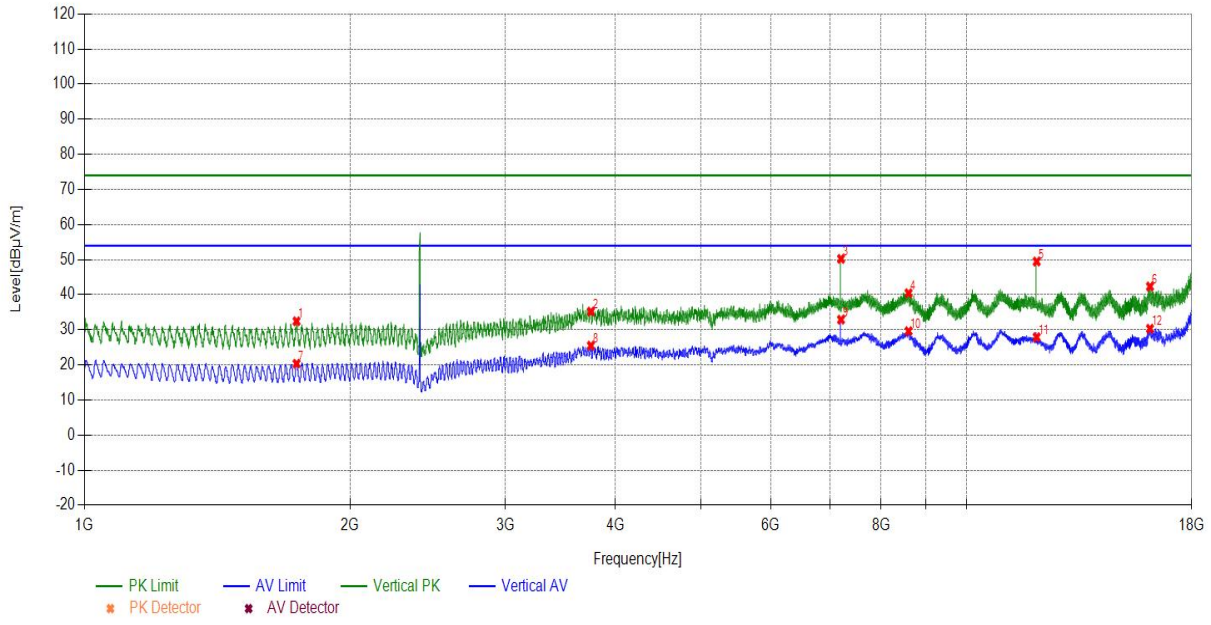


Note: The signal beyond the limit is carrier

Radiates Emission	1G~18GHz
polarization	Vertical
Test Channel	2402MHz

Suspected List

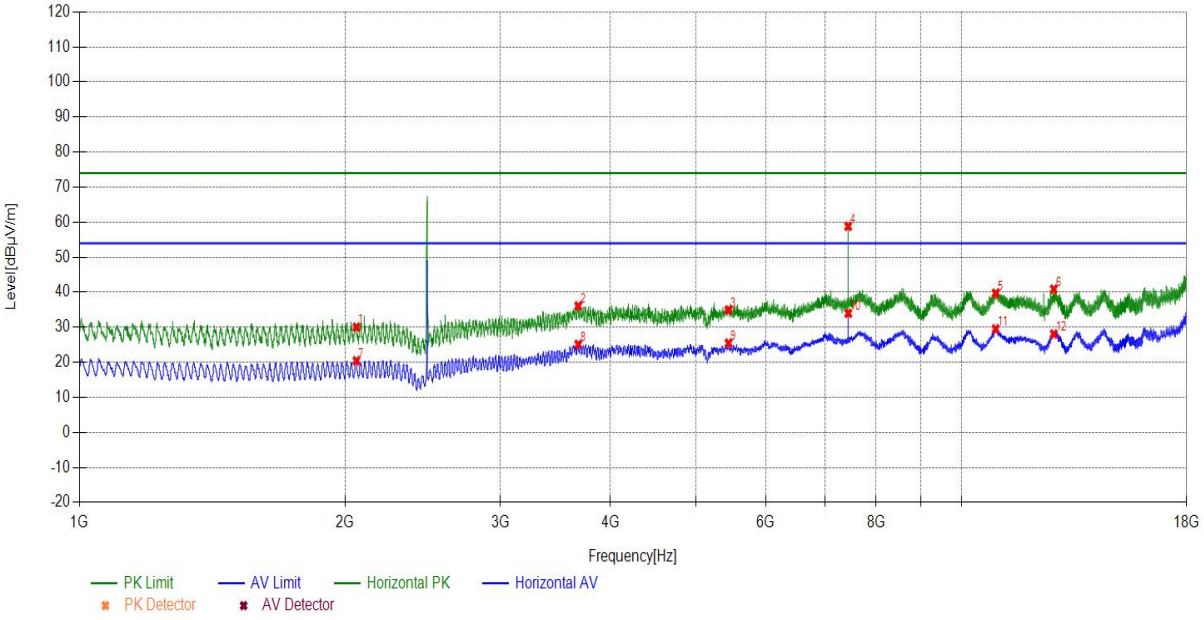
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1739.537	-8.85	41.30	32.45	74.00	41.55	PK	150	335	PASS
3751.5876	-2.94	38.15	35.21	74.00	38.79	PK	150	274	PASS
7207.0104	4.87	45.35	50.22	74.00	23.78	PK	150	123	PASS
8596.8298	5.95	34.48	40.43	74.00	33.57	PK	150	214	PASS
12008.9004	6.78	42.68	49.46	74.00	24.54	PK	150	63	PASS
16144.3572	11.71	30.63	42.34	74.00	31.66	PK	150	183	PASS
1739.537	-8.85	29.20	20.35	54.00	33.65	AV	150	0	PASS
3751.5876	-2.94	28.43	25.49	54.00	28.51	AV	150	359	PASS
7206.1603	4.87	28.02	32.89	54.00	21.11	AV	150	289	PASS
8596.8298	5.95	23.67	29.62	54.00	24.38	AV	150	350	PASS
12008.9004	6.78	21.12	27.90	54.00	26.10	AV	150	63	PASS
16144.3572	11.71	18.61	30.32	54.00	23.68	AV	150	183	PASS



Radiates Emission	1G~18G
polarization	Horizontal
Test Channel	2480MHz

Suspected List

Frequency[MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
2060.853	-7.85	37.88	30.03	74.00	43.97	PK	150	104	PASS
3676.7838	-3.02	39.08	36.06	74.00	37.94	PK	150	357	PASS
5443.1722	-0.10	35.03	34.93	74.00	39.07	PK	150	165	PASS
7439.072	5.14	53.67	58.81	74.00	15.19	PK	150	90	PASS
10931.8966	7.75	31.95	39.70	74.00	34.30	PK	150	210	PASS
12722.9361	8.35	32.51	40.86	74.00	33.14	PK	150	285	PASS
2060.853	-7.85	28.28	20.43	54.00	33.57	AV	150	3	PASS
3676.7838	-3.02	28.13	25.11	54.00	28.89	AV	150	3	PASS
5443.1722	-0.10	25.55	25.45	54.00	28.55	AV	150	29	PASS
7440.772	5.14	28.87	34.01	54.00	19.99	AV	150	134	PASS
10931.8966	7.75	21.79	29.54	54.00	24.46	AV	150	3	PASS
12722.9361	8.35	19.71	28.06	54.00	25.94	AV	150	15	PASS

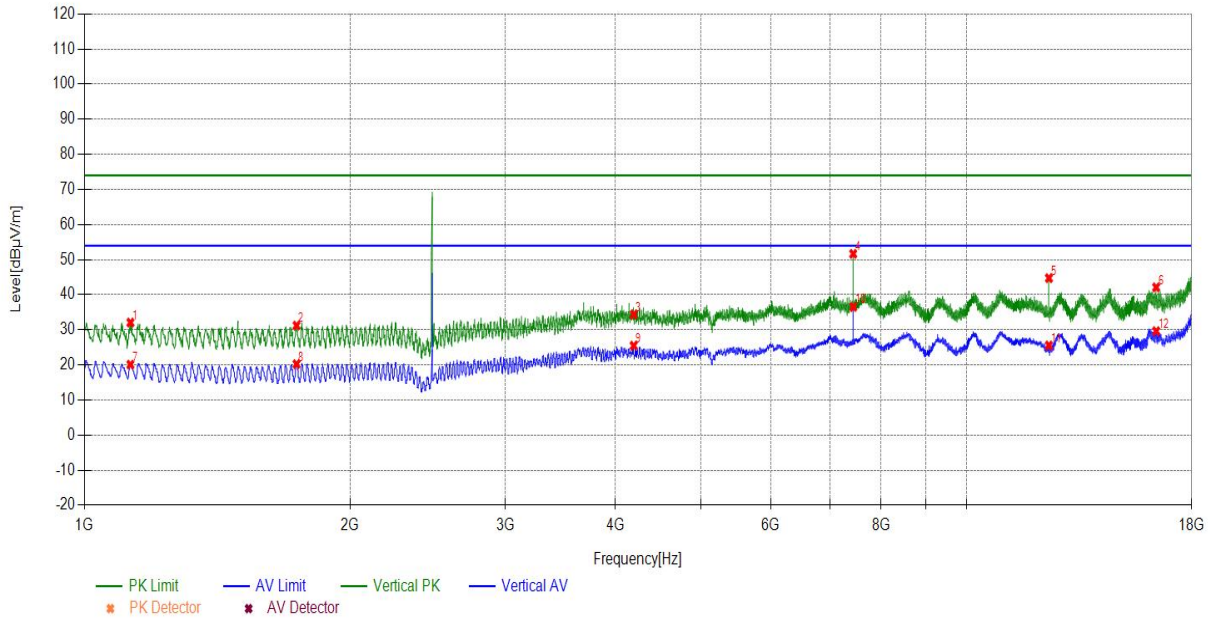


Note: The signal beyond the limit is carrier

Radiates Emission	1G~18GHz
polarization	Vertical
Test Channel	2480MHz

Suspected List

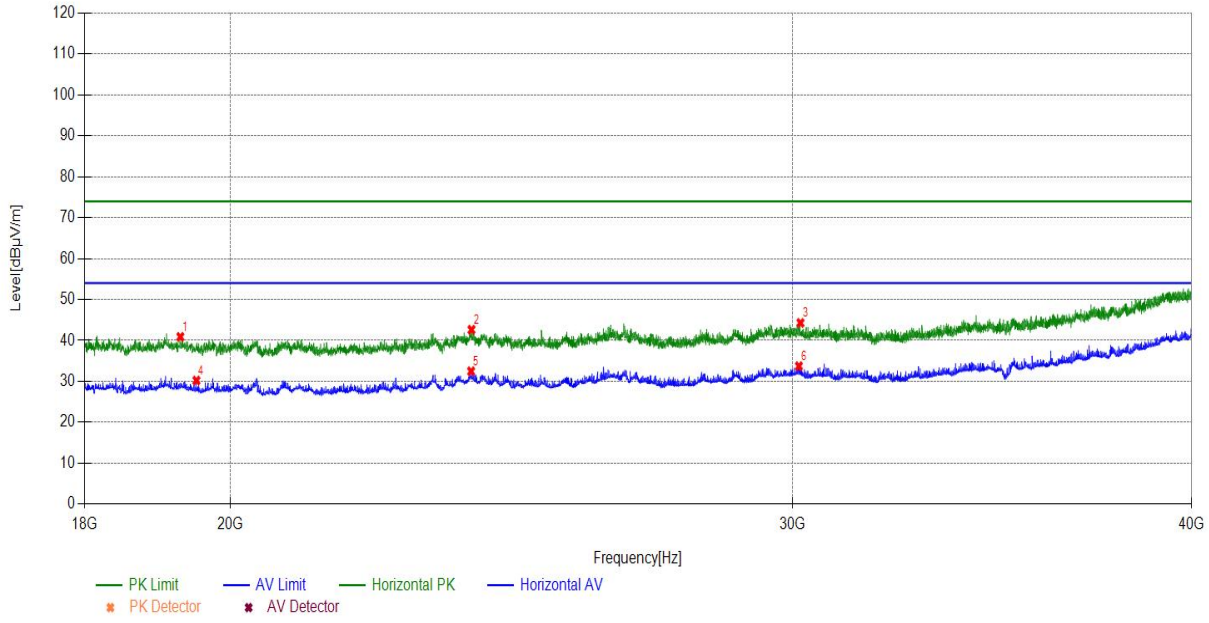
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
1127.5064	-10.32	42.38	32.06	74.00	41.94	PK	150	355	PASS
1739.537	-8.85	40.08	31.23	74.00	42.77	PK	150	327	PASS
4194.4597	-2.75	37.11	34.36	74.00	39.64	PK	150	297	PASS
7439.072	5.14	46.50	51.64	74.00	22.36	PK	150	355	PASS
12400.77	7.39	37.33	44.72	74.00	29.28	PK	150	56	PASS
16407.0204	12.90	29.21	42.11	74.00	31.89	PK	150	101	PASS
1127.5064	-10.32	30.40	20.08	54.00	33.92	AV	150	343	PASS
1739.537	-8.85	29.08	20.23	54.00	33.77	AV	150	355	PASS
4194.4597	-2.75	28.23	25.48	54.00	28.52	AV	150	355	PASS
7440.772	5.14	31.38	36.52	54.00	17.48	AV	150	355	PASS
12400.77	7.39	18.15	25.54	54.00	28.46	AV	150	312	PASS
16407.0204	12.90	16.71	29.61	54.00	24.39	AV	150	355	PASS



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

Suspected List

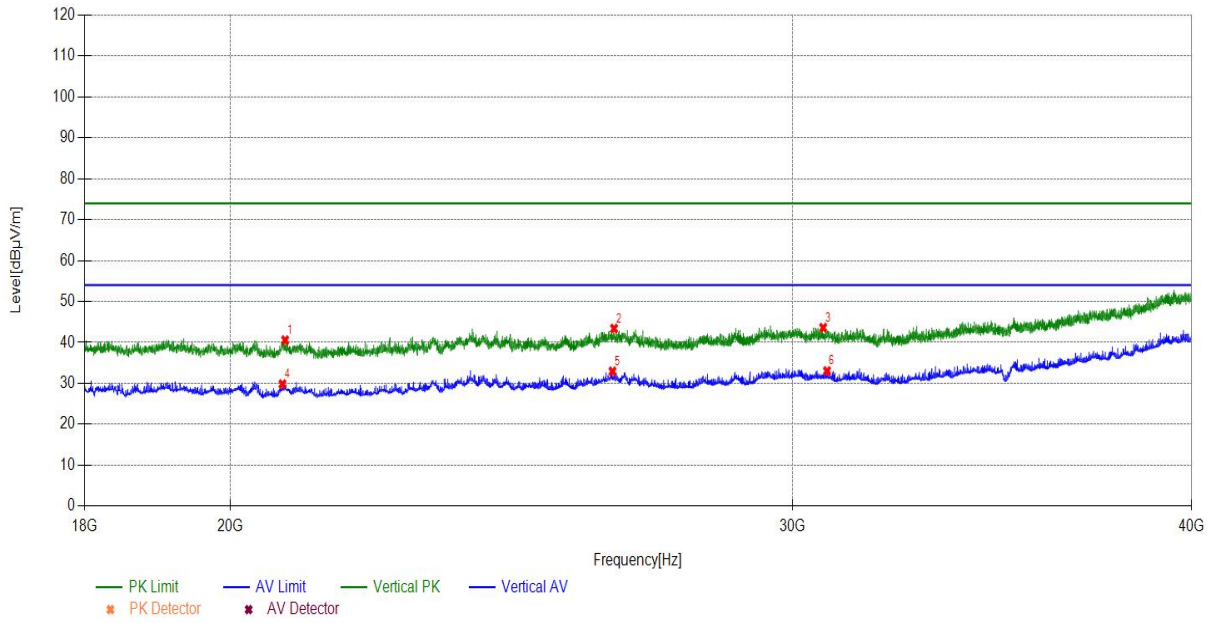
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
19289.3289	1.34	39.54	40.88	74.00	33.12	PK	150	80	PASS
23795.3795	3.54	39.10	42.64	74.00	31.36	PK	150	310	PASS
30167.2167	6.62	37.67	44.29	74.00	29.71	PK	150	210	PASS
19513.7514	1.32	28.91	30.23	54.00	23.77	AV	150	70	PASS
23788.7789	3.53	28.94	32.47	54.00	21.53	AV	150	40	PASS
30134.2134	6.64	27.09	33.73	54.00	20.27	AV	150	220	PASS



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

Suspected List

Frequency[MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
20803.0803	1.58	38.99	40.57	74.00	33.43	PK	150	180	PASS
26371.8372	4.65	38.76	43.41	74.00	30.59	PK	150	330	PASS
30664.4664	6.40	37.21	43.61	74.00	30.39	PK	150	90	PASS
20763.4763	1.57	28.28	29.85	54.00	24.15	AV	150	220	PASS
26343.2343	4.64	28.31	32.95	54.00	21.05	AV	150	170	PASS
30750.275	6.36	26.69	33.05	54.00	20.95	AV	150	40	PASS



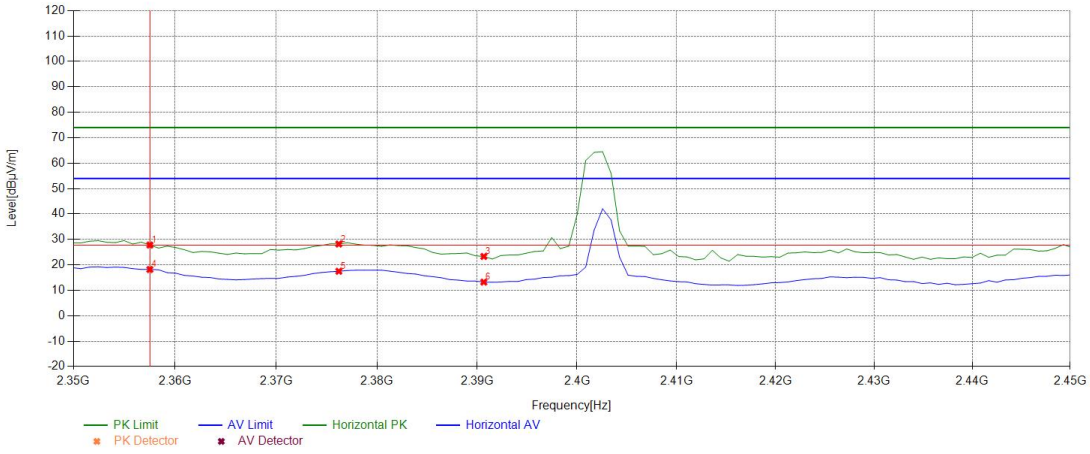
Band Edge:

During the test, the Band Edge was performed in all channels of YS-ECO. The test data of the worst-case condition was recorded in this report.

Test channel	Lowest channel
polarization	Horizontal

Suspected List

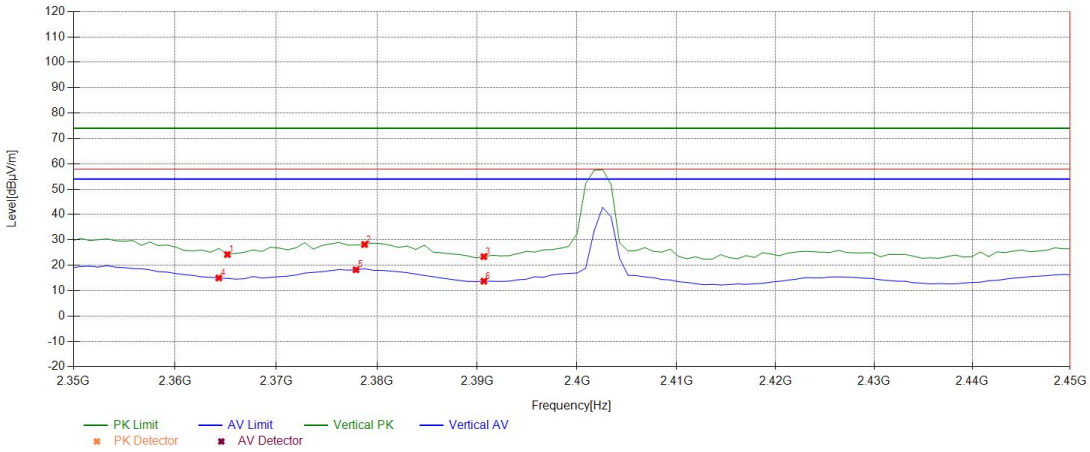
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2357.5179	-7.13	34.93	27.80	74.00	46.20	PK	150	4	PASS
2376.2188	-7.08	35.28	28.20	74.00	45.80	PK	150	153	PASS
2390.6695	-7.05	30.35	23.30	74.00	50.70	PK	150	214	PASS
2357.5179	-7.13	25.32	18.19	54.00	35.81	AV	150	17	PASS
2376.2188	-7.08	24.56	17.48	54.00	36.52	AV	150	320	PASS
2390.6695	-7.05	20.27	13.22	54.00	40.78	AV	150	17	PASS



Test channel	Lowest channel
polarization	Vertical

Suspected List

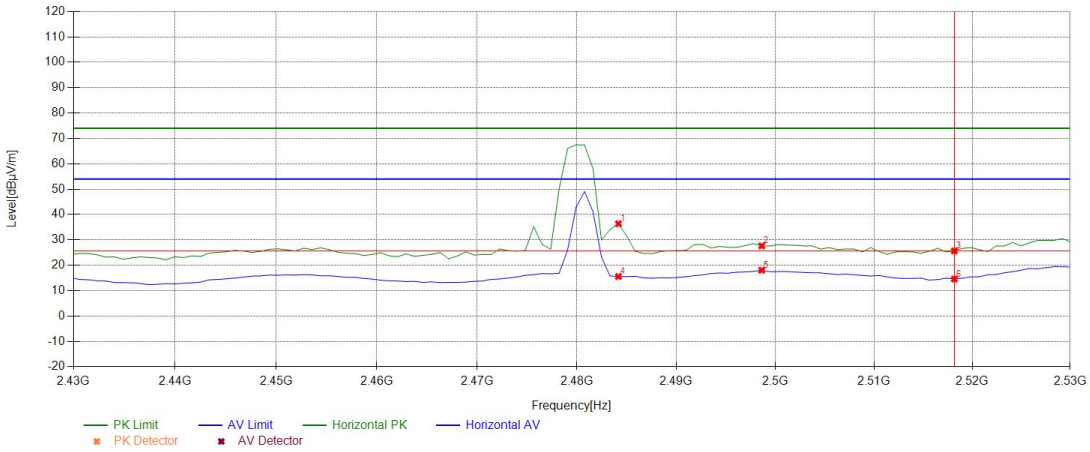
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2365.1683	-7.11	31.36	24.25	74.00	49.75	PK	150	0	PASS
2378.7689	-7.08	35.27	28.19	74.00	45.81	PK	150	289	PASS
2390.6695	-7.05	30.41	23.36	74.00	50.64	PK	150	229	PASS
2364.3182	-7.12	22.12	15.00	54.00	39.00	AV	150	335	PASS
2377.9189	-7.08	25.30	18.22	54.00	35.78	AV	150	304	PASS
2390.6695	-7.05	20.78	13.73	54.00	40.27	AV	150	359	PASS



Test channel	Highest channel
polarization	Horizontal

Suspected List

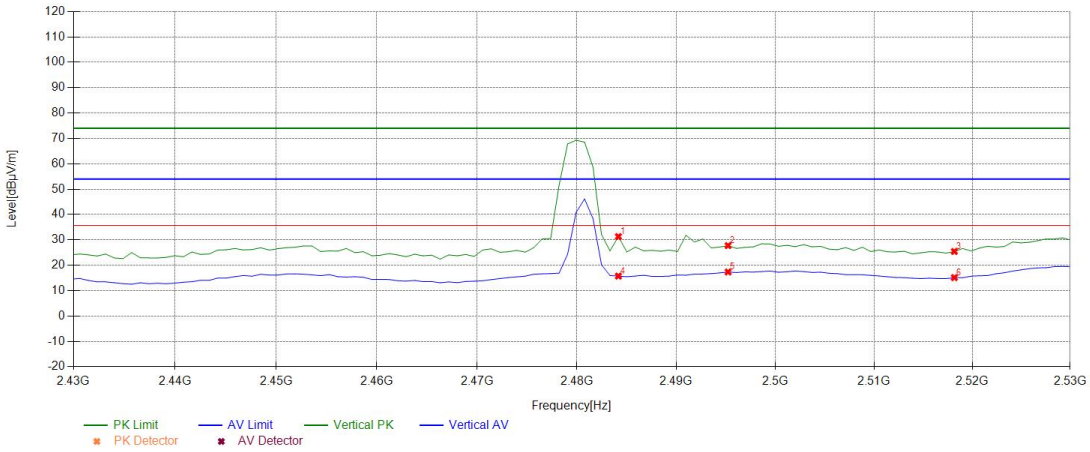
Frequency [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/ Fail
2484.1742	-6.84	43.21	36.37	74.00	37.63	PK	150	75	PASS
2498.6249	-6.81	34.46	27.65	74.00	46.35	PK	150	120	PASS
2518.1759	-6.74	32.39	25.65	74.00	48.35	PK	150	104	PASS
2484.1742	-6.84	22.42	15.58	54.00	38.42	AV	150	357	PASS
2498.6249	-6.81	24.87	18.06	54.00	35.94	AV	150	15	PASS
2518.1759	-6.74	21.32	14.58	54.00	39.42	AV	150	357	PASS



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
2484.1742	-6.84	38.15	31.31	74.00	42.69	PK	150	312	PASS
2495.2248	-6.82	34.57	27.75	74.00	46.25	PK	150	56	PASS
2518.1759	-6.74	32.18	25.44	74.00	48.56	PK	150	355	PASS
2484.1742	-6.84	22.57	15.73	54.00	38.27	AV	150	297	PASS
2495.2248	-6.82	24.15	17.33	54.00	36.67	AV	150	343	PASS
2518.1759	-6.74	21.87	15.13	54.00	38.87	AV	150	355	PASS



5.3 Maximum conducted output power

Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

Method of Measurement:

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

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

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

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

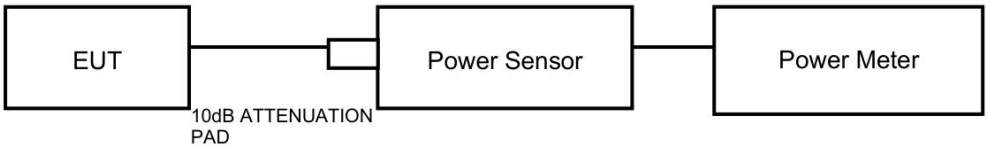
Limits:

Average Output Power	≤ 1W (30dBm)

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

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

Test Setup:



Measurement Uncertainty：

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

Test Results:

Test Model	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
YS-ECO	Ant1	2402	-6.12	≤30	PASS
	Ant1	2440	-4.30	≤30	PASS
	Ant1	2480	-3.78	≤30	PASS

5.4 Minimum 6 dB Bandwidth

Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

Method of Measurement:

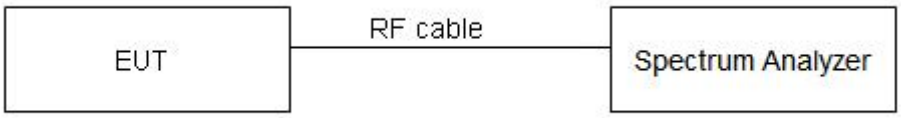
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.
Detector=Peak, Trace mode=Max hold.

Limits:

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

Minimum 6dB Bandwidth	≥ 500 kHz

Test Setup:



Measurement Uncertainty：

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

Test Results:

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BT-LE	Ant1	2402	0.68	2401.70	2402.37	≥0.5	PASS
		2440	0.68	2439.70	2440.38	≥0.5	PASS
		2480	0.68	2479.70	2480.38	≥0.5	PASS

5.5 Occupied Channel Bandwidth

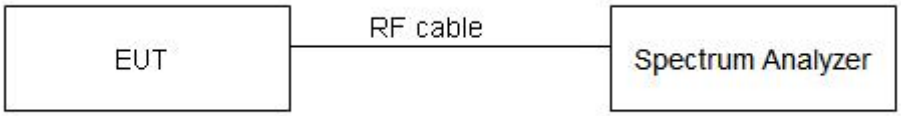
Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

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
BT-LE	Ant1	2402	1.031	2401.5205	2402.5514	---	---
		2440	1.035	2439.5205	2440.5554	---	---
		2480	1.035	2479.5205	2480.5554	---	---

5.6 Band Edge Measurement

Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

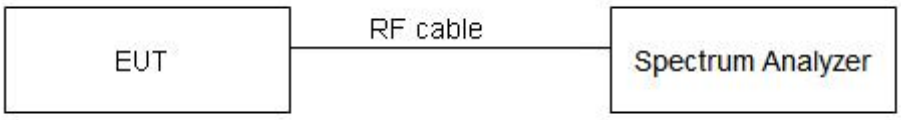
Method of Measurement:

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

Limits:

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Setup:



Measurement Uncertainty：

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

Test Results:

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BT-LE	Ant1	Low	2402	-5.80	-47.97	≤-25.8	PASS
		High	2480	-4.41	-45	≤-24.41	PASS

5.7 Maximum Power Spectral Density

Ambient condition:

Temperature	Relative humidity	Pressure
24°C ~26°C	46%~52%	101.3kPa

Method of Measurement:

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

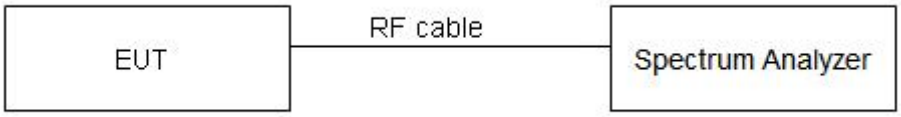
The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Limits:

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

Maximum Power Spectral Density	≤ 8 dBm / 3kHz

Test Setup:



Measurement Uncertainty：

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

Test Results:

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BT-LE	Ant1	2402	-19.23	≤8	PASS
		2440	-17.38	≤8	PASS
		2480	-16.94	≤8	PASS

5.8 Spurious RF Conducted Emissions

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.3kPa

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
BT-LE	Ant1	2402	Reference	-5.81	-5.81	---	PASS
			30~1000	-5.81	-49.55	≤-25.81	PASS
			1000~26500	-5.81	-30.62	≤-25.81	PASS
		2440	Reference	-5.01	-5.01	---	PASS
			30~1000	-5.01	-48.93	≤-25.01	PASS
			1000~26500	-5.01	-29.83	≤-25.01	PASS
		2480	Reference	-4.45	-4.45	---	PASS
			30~1000	-4.45	-49.94	≤-24.45	PASS
			1000~26500	-4.45	-30.78	≤-24.45	PASS

6. Appendix X

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
Conducted Test: Maximum Peak Conducted Output Power, Minimum 6dB Bandwidth, Occupied Channel Bandwidth, Band Edge Measurement, Maximum Power Spectral Density, Conducted Spurious Emissions					
Communication Shielded Room 2	4m*3m*3m	CRTDSWKSR44301	VGDS-0700	CRT	2024/04/24
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2024/04/22
Comprehensive Test Instrument	CMW270	100304	DZ-000240-1	R&S	2024/12/03
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
Analog Signal Generator	N5173B	MY53270588	EM-000487-2	KEYSIGHT	2024/12/03
Vector Signal Generator	N5172B	MY53051933	EM-000487-1	KEYSIGHT	2024/12.03
Temperature and humidity meter	MHO-C201	/	DZ-000249-3	Seconds test	2024/05/29
Radiated Test: Radiated Emission, Band Edge Measurement					
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024/02/22
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2024/02/22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2024/06/10
Broadband Antenna	VULB 9168	01537	EM-000736-1	SCHWARZBECK	2024/04/24
Waveguide Horn Antenna	HF906	360306/008	WKNA-0024-8	R&S	2024/02/24
Waveguide Horn Antenna	BBHA9170	00949	EM-000383	SCHWARZBECK	2024/08/25
EMI Test Receiver	ESR7	102235	VGDY-0956	R&S	2024/02/22
Loop Antenna	HLA 6121	540046	EM-000546	TESEQ	2024/06/05
Semi-Anechoic Chamber(5m)	SAC-5	SAC-5-2.0	EM-000557	COMTEST	2024/11/02
Bandstop Filters	SW-BSF-2400-100-7-A1	/	EM-000495	/	2024/08/25
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	1	DZ-000186	WI	2024/12/03
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2024/06/04
EMI Test Receiver	ESR3	102394	VGDY-0705	R&S	2024/04/22
Plus Limiter (#2)	VTSD 9561	9561-F017	VGDY-0152	SCHWARZBECK	2024/09/03
Shielding Room(#2)	GP1A	001	WKNF-0006	LEINING	2024/08/07
LISN	NSLK 8127	8127644	VGDY-0150	SCHWARZBECK	2024/08/25

Detection software

Conducted Test: Maximum Peak Conducted Output Power, Minimum 6dB Bandwidth, Occupied Channel Bandwidth, Band Edge Measurement, Maximum Power Spectral Density, Conducted Spurious Emissions		
Dynacomm	**Software Release**	**Software Developer**
TS1120-3 Test System	2.6.88.0342	Tonscend
Radiated Test: Radiated Emission, Band Edge Measurement		
Dynacomm	**Software Release**	**Software Developer**
JS36-RSE Radiation stray test system	2.5.1.2	Tonscend

The End

Important

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

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

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

4. The test report is invalid if altered;

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

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

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

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