TEST REPORT

Report No. :	**KS2206S2730E01**
FCC ID:	**2AHYV-GWKPOP**
Applicant :	**PEAG, LLC dba JLab Audio**
Address :	5927 Landau Ct. Carlsbad, CA 92008 , USA
Manufacturer.....:	GuangDong Simpreal Intelligent Technology Co., Ltd
Address.....:	Room 2408, JiaHong ZhenXing DaSha, DongGuan Avenue #13, DongCheng District, DongGuan City, GuangDong Province, P.R. China
Product Name :	**WIRELESS ON-EAR HEADSET**
Trade Mark :	JLAB
Model/Type reference :	GO WORK POP
Listed Model(s) :	N/A
Standard :	**FCC 15.247** **ANSI C63.10: 2013**
Date of Receipt :	June. 23, 2022
Date of Test Date :	June. 23, 2022~June. 28, 2022
Date of issue :	June. 28, 2022
Test result :	**Pass**

Prepared by: (Printed Name + Signature)	Sky Dong	
Approved by: (Printed Name + Signature)	Neil Wan	

Testing Laboratory Name :	**KSIGN(Guangdong) Testing Co., Ltd.**
Address :	West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB558074 D01 V05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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2. SUMMARY

2.1 Product Description

Product Description:	WIRELESS ON-EAR HEADSET
Model/Type reference:	GO WORK POP
Power supply:	DC 3.7V
Adapter information (Auxiliary test suppied by test Lab）	N/A
Testing sample ID：	KS2206S2730E-1# (Engineer sample), KS2206S2730E-2# (Normal sample)
Hardware version:	V5
Software version:	V06
Bluetooth BLE	
Supported type:	Bluetooth low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Antenna type:	Ceramic Antenna
Antenna gain:	5dBi

2.2 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	●	120V / 60Hz
		○	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

DC 3.7V From Battery and DC 5V From external circuit

2.3 Short description of the Equipment under Test (EUT)

This is a ZORDAI Smart wear.
For more details, refer to the user's manual of the EUT.

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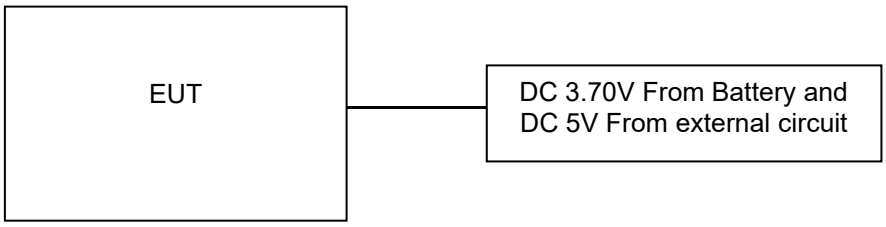
2.4 EUT operation mode

The Applicant provides communication tools software(Engineer mode) to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 40 channels provided to the EUT and Channel 00/19/39 were selected to test.

Operation Frequency：

Channel	Frequency (MHz)
00	**2402**
01	2404
02	2406
⋮	⋮
19	**2440**
⋮	⋮
37	2476
38	2478
39	**2480**

2.5 Block Diagram of Test Setup



2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for the device filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.7 Modifications

No modifications were implemented to meet testing criteria.

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3. TEST ENVIRONMENT

3.1 Address of the test laboratory

KSIGN(Guangdong) Testing Co., Ltd.

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L13261
KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5457.01
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical Competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED#: 25693 CAB identifier.: CN0096
KSIGN(Guangdong) Testing Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

FCC-Registration No.: 294912 Designation Number: CN1328
KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	25 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	25 ° C

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Humidity:	46 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

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3.4 Summary of measurement results

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Test result
§15.247(e)	Power spectral density	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(a)(2)	Spectrum bandwidth – 6 dB bandwidth	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(b)(1)	Maximum output power	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(d)	Band edge compliance conducted	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Highest	complies
§15.205	Band edge compliance radiated	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Highest	complies
§15.247(d)	TX spurious emissions conducted	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	complies
§15.247(d)	TX spurious emissions radiated	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	BLE 1Mpbs 2 Mpbs	☒ Lowest ☒ Middle ☒ Highest	complies
§15.209(a)	TX spurious Emissions radiated Below 1GHz	BLE 1Mpbs 2 Mpbs	-/-	BLE 1Mpbs	-/-	complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	BLE 1Mpbs 2 Mpbs	-/-	BLE 1Mpbs	-/-	complies

Remark:
1. The measurement uncertainty is not included in the test result.
2. We tested all test mode and recorded worst case in report

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTA Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Maximum transmit power	±1.5dB	(1)
Power Spectral Density	±1.5dB	(1)
Duty Cycle, Tx-sequence, Tx-gap	±5%	(1)
Accumulated Transmit Time, Frequency Occupation and Hopping Sequence	±5%	(1)
Hopping Frequency Separation	±5%	(1)

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Medium Utilisation (MU) factor	±5%	(1)
Adaptively	±5%	(1)
Occupied Channel Bandwidth	±5%	(1)
Transmitter unwanted emissions in the out-of-band domain	±2.8dB	(1)
Transmitter unwanted emissions in the spurious domain	±2.8dB	(1)
Receiver spurious emissions	±2.8dB	(1)
Receiver Blocking	±2.8dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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3.6 Equipments Used during the Test

Tonscend JS0806-2 Test system					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
2	Vector Signal Generator	Agilent	N5182A	MY50142520	03/04/2023
3	Analog Signal Generator	HP	83752A	3344A00337	03/04/2023
4	Power Sensor	Agilent	E9304A	MY50390009	03/04/2023
5	Power Sensor	Agilent	E9300A	MY41498315	03/04/2023
6	Wideband Radio Communication Tester	R&S	CMW500	157282	03/04/2023
7	Climate Chamber	Angul	AGNH80L	1903042120	03/04/2023
8	Dual Output DC Power Supply	Agilent	E3646A	MY40009992	03/04/2023
9	RF Control Unit	Tonscend	JS0806-2	/	03/04/2023

Transmitter spurious emissions & Receiver spurious emissions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
1	EMI Test Receiver	R&S	ESR	102525	03/04/2023
2	High Pass Filter	Chengdu E-Microwave	OHF-3-18-S	0E01901038	03/04/2023
3	High Pass Filter	Chengdu E-Microwave	OHF-6.5-18-S	0E01901039	03/04/2023
4	Spectrum Analyzer	HP	8593E	3831U02087	03/04/2023
5	Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	01230	12/04/2023
6	Loop Antenna	Beijin ZHINAN	ZN30900C	18050	03/04/2023
7	Spectrum Analyzer	R&S	FSV40-N	101798	03/04/2023
8	Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	03/29/2023
9	Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	03/04/2023
10	Pre-Amplifier	EMCI	EMC051835SE	980662	03/04/2023

Note: The Cal.Interval was one year.

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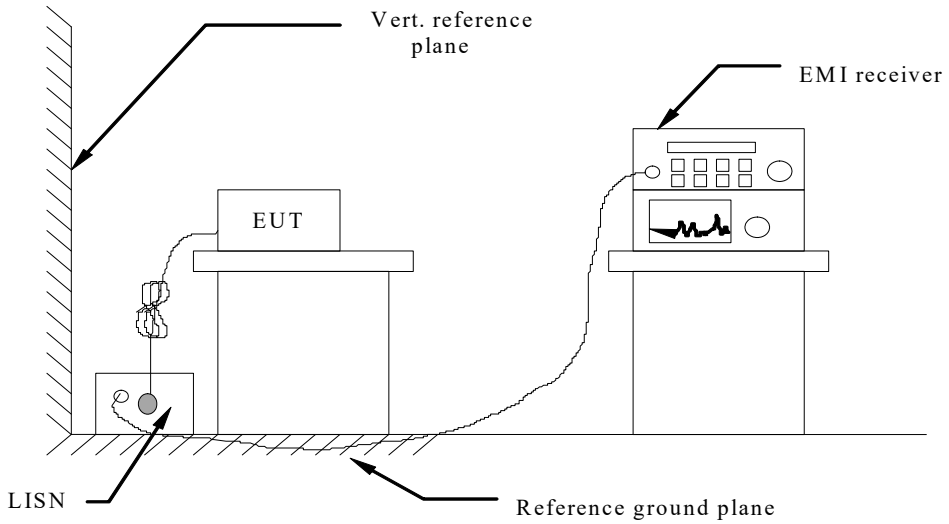
4. TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

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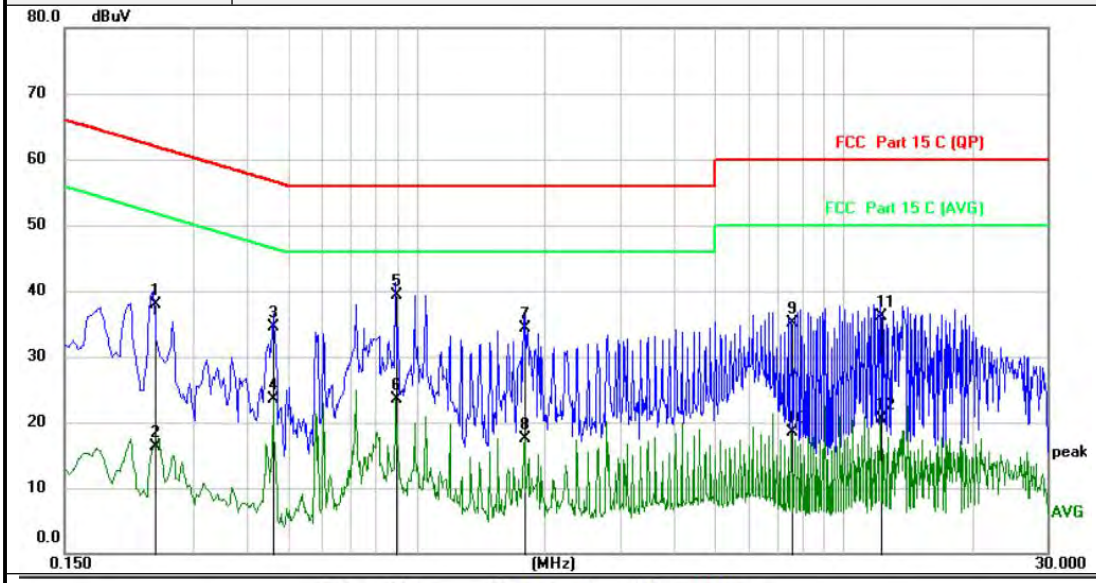
TEST RESULTS

Remark:

1. Both modes of BLE 1Mpbs and 2Mpbs were tested at Low, Middle, and High channel; only the worst result of BLE 1Mpbs was reported as below:

Test Voltage:	AC 120V/60Hz
Terminal:	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2442	27.27	10.73	38.00	61.95	-23.95	QP
2		0.2442	5.62	10.73	16.35	51.95	-35.60	AVG
3		0.4620	24.05	10.44	34.49	56.66	-22.17	QP
4		0.4620	13.10	10.44	23.54	46.66	-23.12	AVG
5	*	0.8980	28.74	10.48	39.22	56.00	-16.78	QP
6		0.8980	13.08	10.48	23.56	46.00	-22.44	AVG
7		1.7940	23.89	10.51	34.40	56.00	-21.60	QP
8		1.7940	7.04	10.51	17.55	46.00	-28.45	AVG
9		7.5540	24.48	10.58	35.06	60.00	-24.94	QP
10		7.5540	7.97	10.58	18.55	50.00	-31.45	AVG
11		12.2020	25.39	10.69	36.08	60.00	-23.92	QP
12		12.2020	9.80	10.69	20.49	50.00	-29.51	AVG

Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

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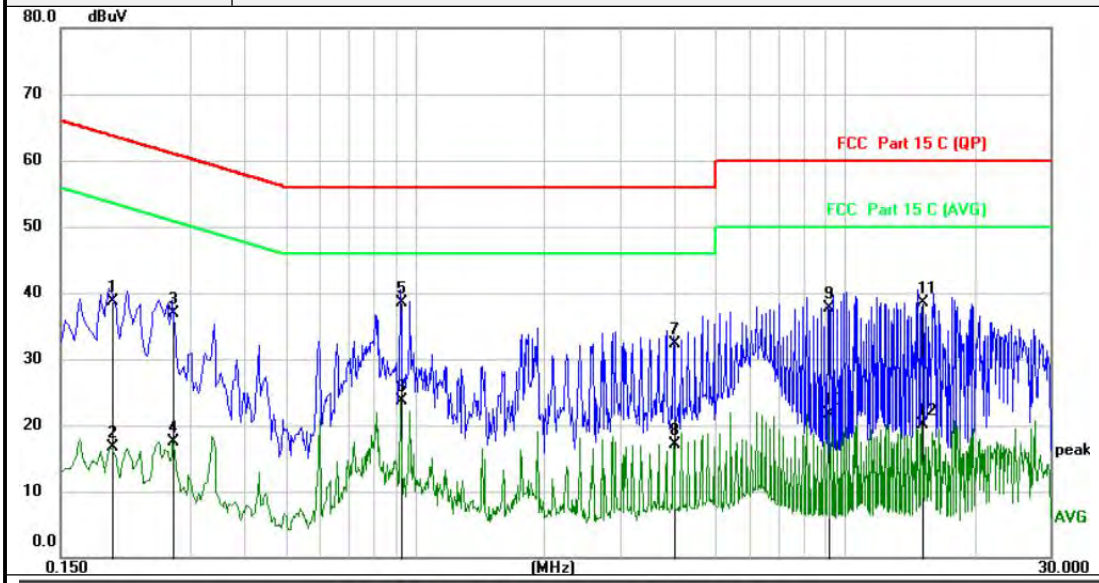
Test Voltage:	AC 120V/60Hz
Terminal:	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1980	27.88	10.75	38.63	63.69	-25.06	QP
2		0.1980	5.90	10.75	16.65	53.69	-37.04	AVG
3		0.2740	26.27	10.61	36.88	61.00	-24.12	QP
4		0.2740	6.88	10.61	17.49	51.00	-33.51	AVG
5	*	0.9260	28.09	10.47	38.56	56.00	-17.44	QP
6		0.9260	13.14	10.47	23.61	46.00	-22.39	AVG
7		4.0060	21.79	10.61	32.40	56.00	-23.60	QP
8		4.0060	6.47	10.61	17.08	46.00	-28.92	AVG
9		9.1180	27.20	10.59	37.79	60.00	-22.21	QP
10		9.1180	11.15	10.59	21.74	50.00	-28.26	AVG
11		15.0940	27.68	10.77	38.45	60.00	-21.55	QP
12		15.0940	9.32	10.77	20.09	50.00	-29.91	AVG

Remarks:
1.Measurement = Reading Level+ Correct Factor
2.Over = Measurement -Limit

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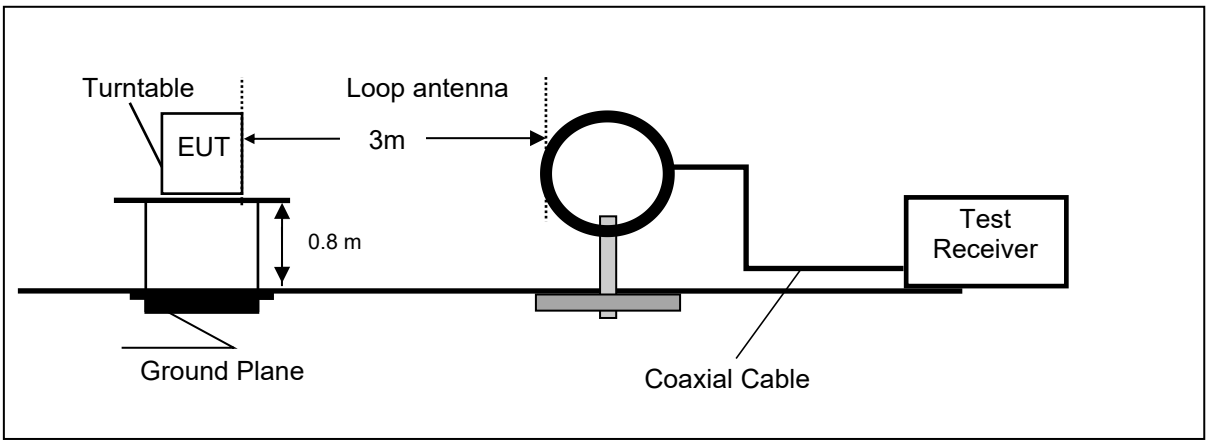
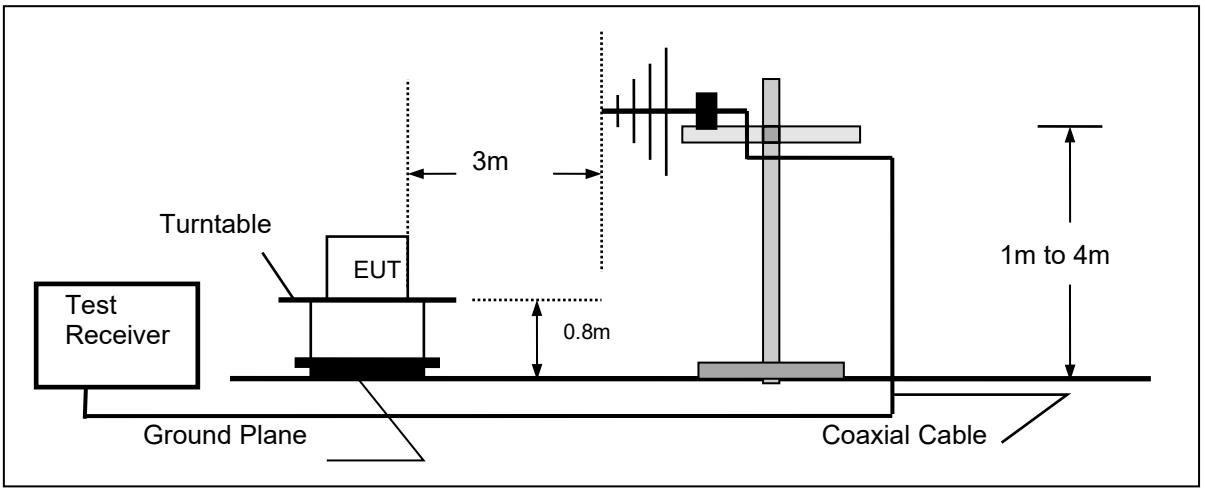
4.2 Radiated Emissions and Band Edge

TEST CONFIGURATION

Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz

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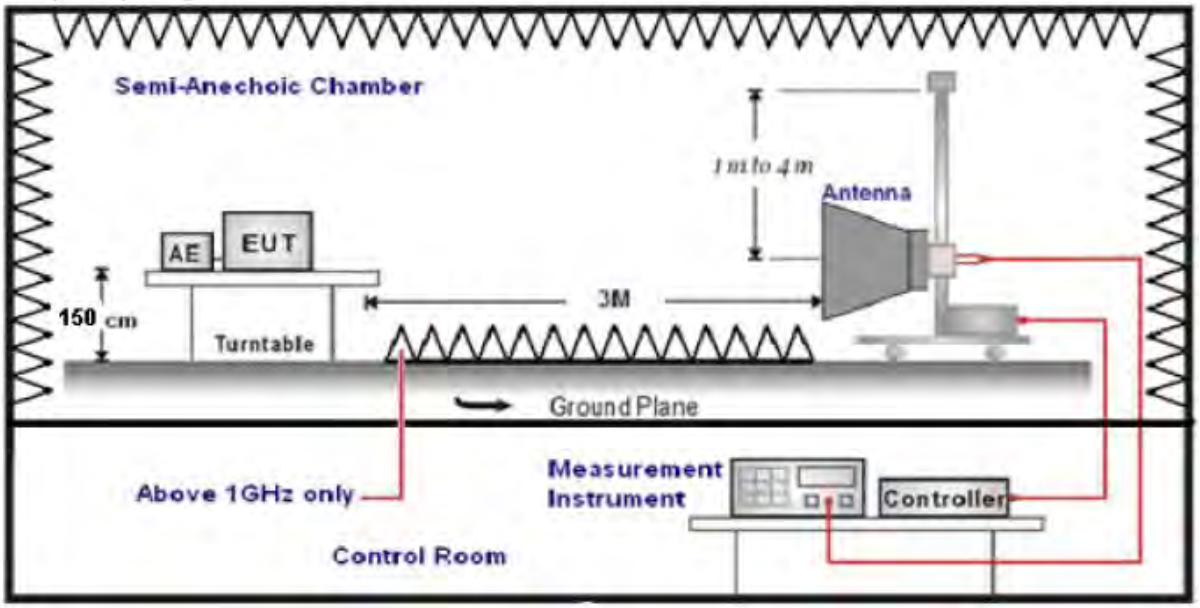

TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

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Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

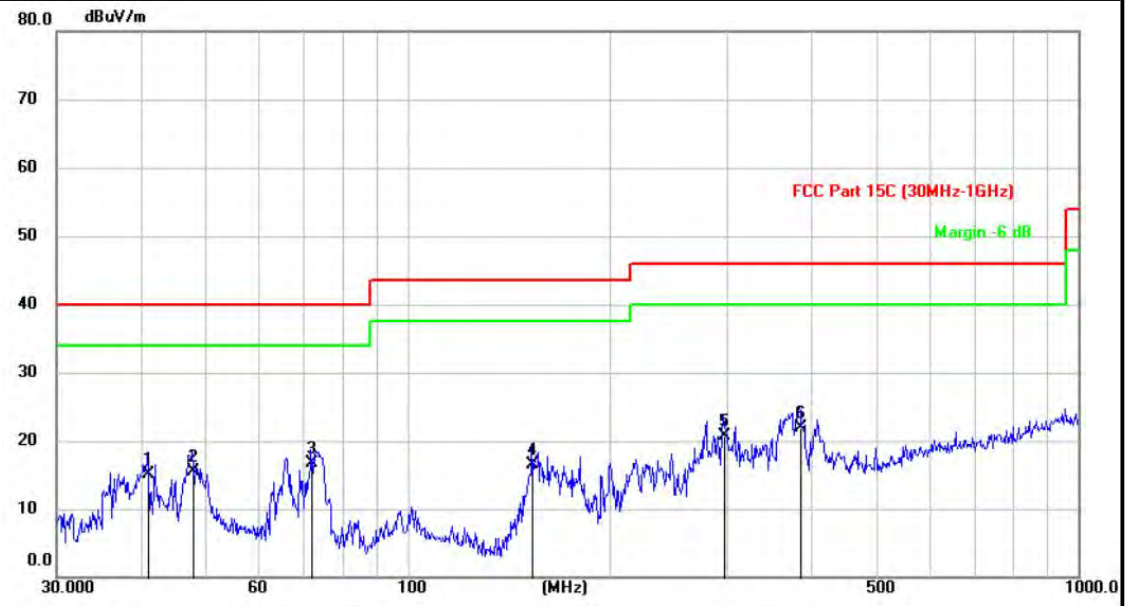
Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. Both modes of BLE 1Mpbs and 2Mpbs were tested at Low, Middle, and High channel and recorded worst mode at BLE 1Mpbs.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

For 30MHz-1GHz

Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	BLE 1M 2402 MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		41.0024	32.07	-16.90	15.17	40.00	-24.83	QP
2		47.8596	31.28	-15.81	15.47	40.00	-24.53	QP
3	*	71.8823	36.69	-19.91	16.78	40.00	-23.22	QP
4		153.5231	37.86	-21.31	16.55	43.50	-26.95	QP
5		296.2875	35.42	-14.75	20.67	46.00	-25.33	QP
6		384.6055	33.38	-11.41	21.97	46.00	-24.03	QP

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	BLE 1M 2402 MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	41.1464	45.19	-16.87	28.32	40.00	-11.68	QP
2		72.7701	46.95	-20.00	26.95	40.00	-13.05	QP
3		156.7323	40.71	-21.23	19.48	43.50	-24.02	QP
4		224.3619	35.12	-16.90	18.22	46.00	-27.78	QP
5		309.7804	34.61	-14.24	20.37	46.00	-25.63	QP
6		397.7729	32.01	-10.98	21.03	46.00	-24.97	QP

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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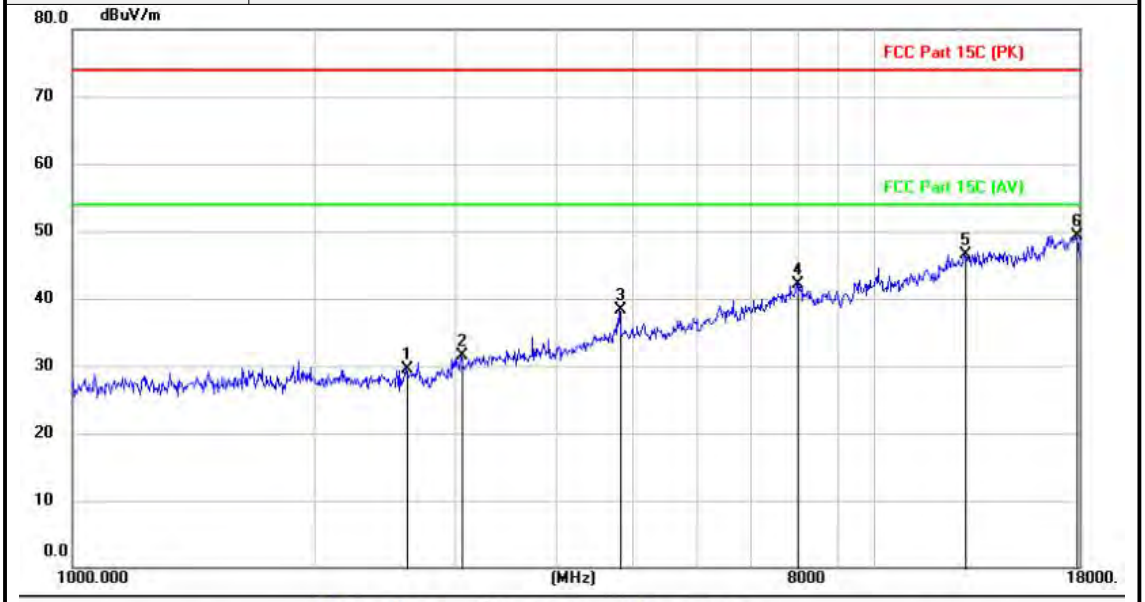
Above 1GHz

Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	BLE 1M 2402MHz

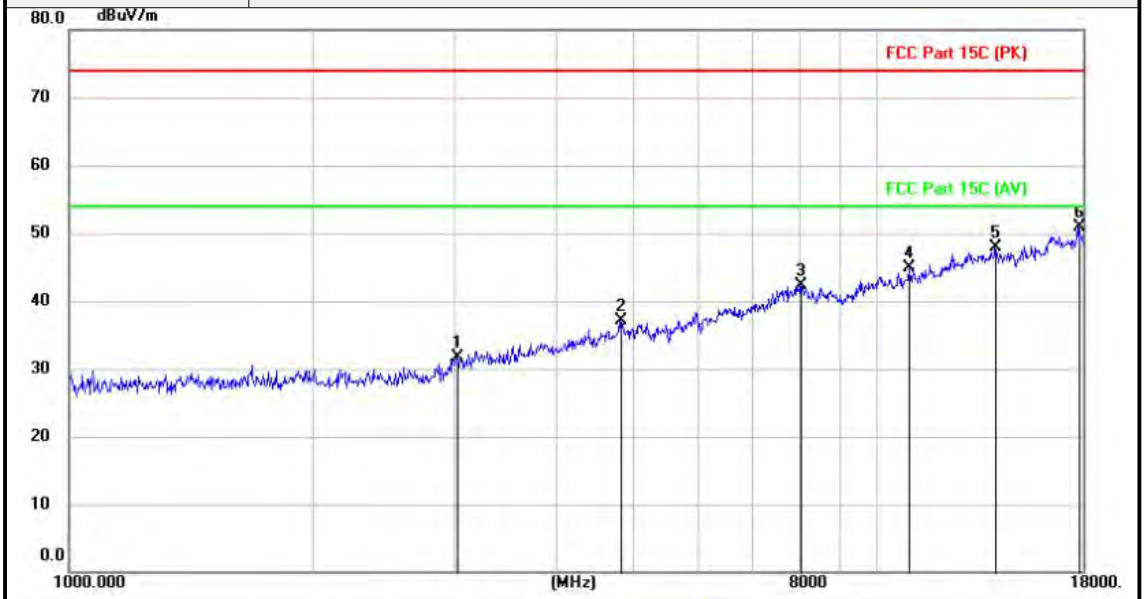


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	192.0142	45.94	-18.34	27.60	40.00	-12.40	peak
2		287.9904	38.98	-14.96	24.02	47.00	-22.98	peak
3		336.0352	34.55	-13.13	21.42	47.00	-25.58	peak
4		384.0665	41.39	-11.43	29.96	47.00	-17.04	peak
5		480.0224	37.10	-10.09	27.01	47.00	-19.99	peak
6		576.0381	40.74	-8.26	32.48	47.00	-14.52	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	BLE 1M 2402MHz

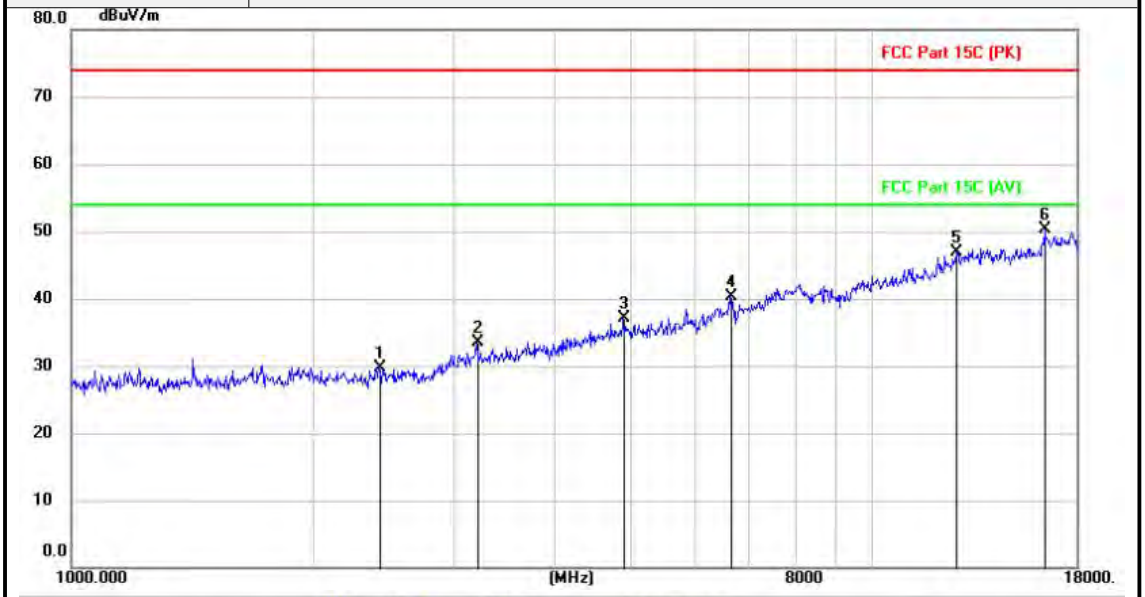


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		3021.300	42.34	-10.55	31.79	74.00	-42.21	peak
2		4804.600	42.93	-5.92	37.01	74.00	-36.99	peak
3		8048.200	40.17	2.06	42.23	74.00	-31.77	peak
4		10960.300	39.29	5.64	44.93	74.00	-29.07	peak
5		14008.400	36.60	11.22	47.82	74.00	-26.18	peak
6	*	17751.800	37.47	13.51	50.98	74.00	-23.02	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	BLE 1M 2440MHz

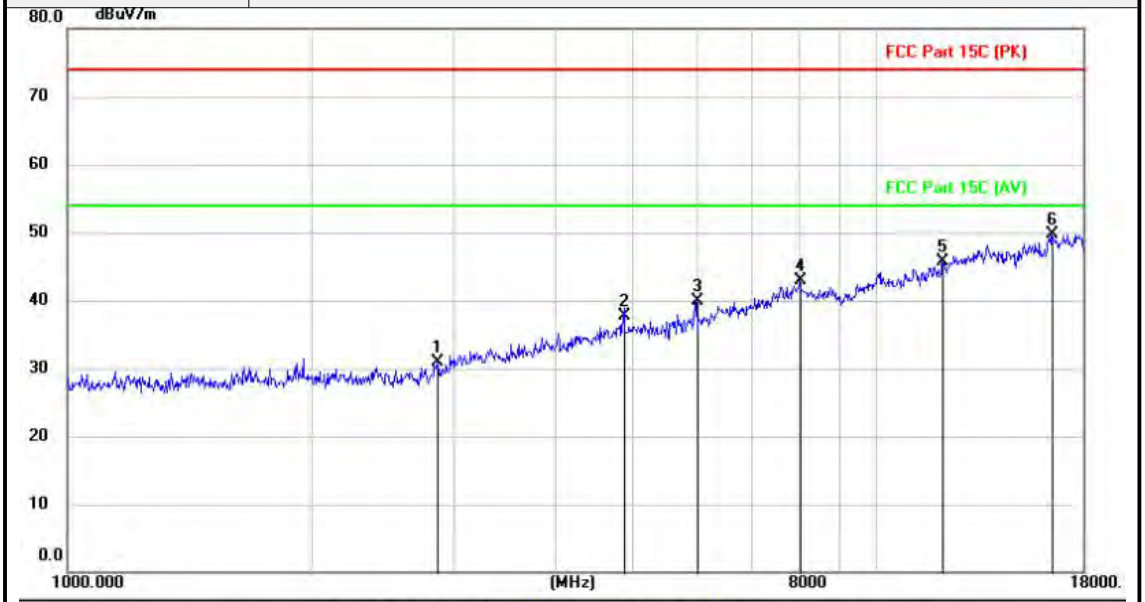


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2422.900	40.71	-10.91	29.80	74.00	-44.20	peak
2		3206.600	43.71	-10.22	33.49	74.00	-40.51	peak
3		4899.800	42.70	-5.66	37.04	74.00	-36.96	peak
4		6655.900	41.91	-1.67	40.24	74.00	-33.76	peak
5		12755.500	37.54	9.46	47.00	74.00	-27.00	peak
6	*	16434.300	36.56	13.65	50.21	74.00	-23.79	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	BLE 1M 2440MHz

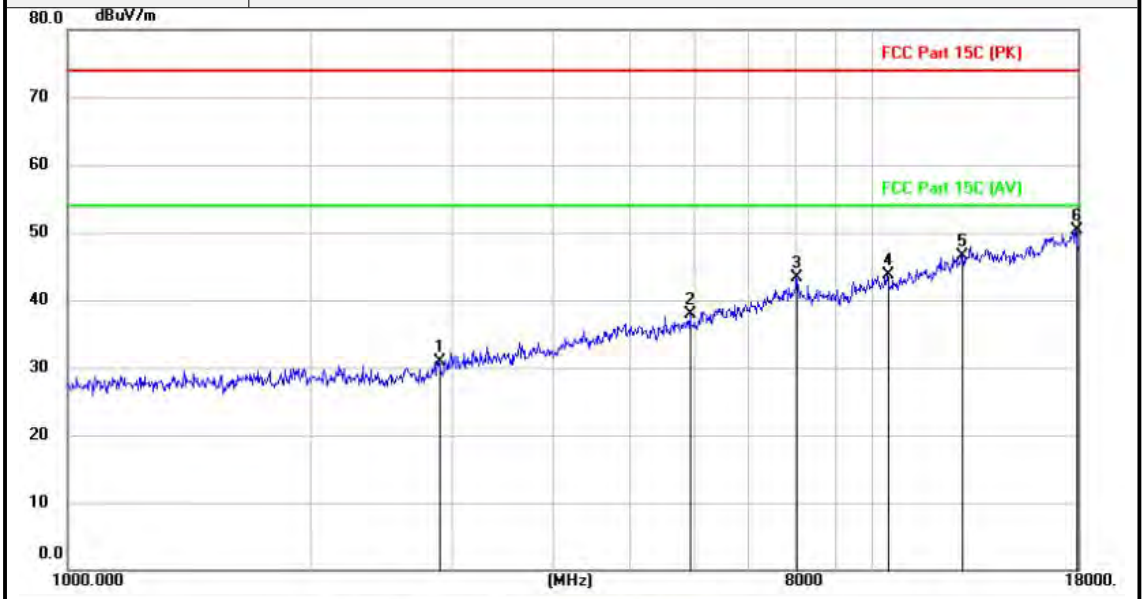


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2871.700	41.54	-10.66	30.88	74.00	-43.12	peak
2		4864.100	43.40	-5.76	37.64	74.00	-36.36	peak
3		5989.500	43.63	-3.82	39.81	74.00	-34.19	peak
4		8055.000	40.87	2.05	42.92	74.00	-31.08	peak
5		12056.800	37.66	8.00	45.66	74.00	-28.34	peak
6	*	16492.100	35.99	13.79	49.78	74.00	-24.22	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	BLE 1M 2480MHz

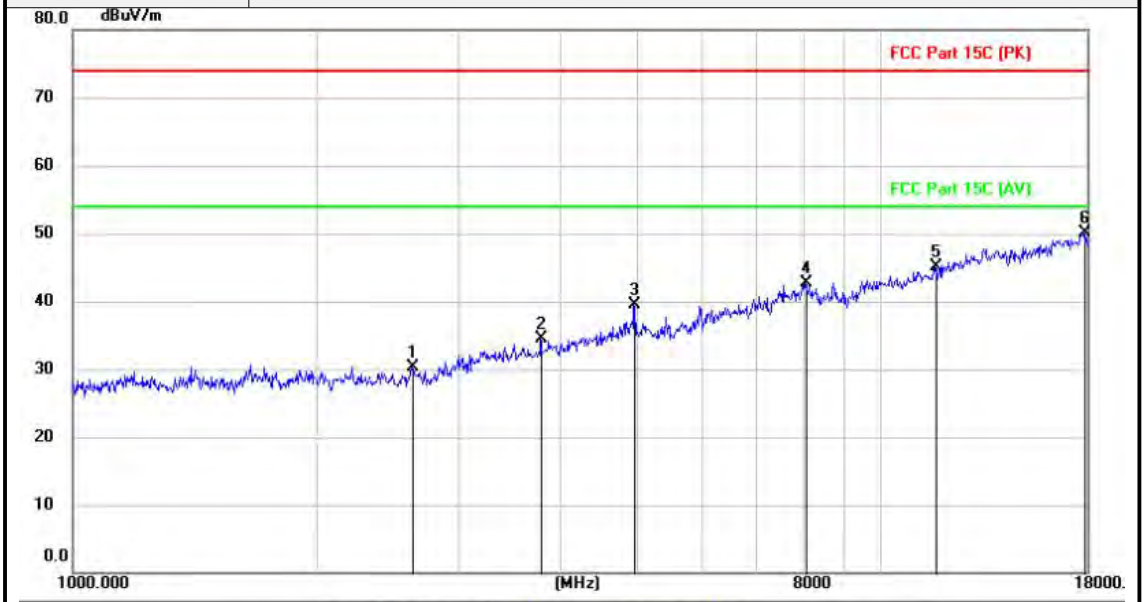


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2890.400	41.53	-10.66	30.87	74.00	-43.13	peak
2		5947.000	41.91	-3.92	37.99	74.00	-36.01	peak
3		8049.900	41.24	2.06	43.30	74.00	-30.70	peak
4		10440.100	38.85	4.81	43.66	74.00	-30.34	peak
5		12942.500	36.78	9.82	46.60	74.00	-27.40	peak
6	*	17908.200	36.76	13.58	50.34	74.00	-23.66	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	BLE 1M 2480MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2630.300	41.04	-10.81	30.23	74.00	-43.77	peak
2		3796.500	43.52	-8.93	34.59	74.00	-39.41	peak
3		4959.300	44.99	-5.51	39.48	74.00	-34.52	peak
4		8077.100	40.61	2.05	42.66	74.00	-31.34	peak
5		11693.000	37.92	7.25	45.17	74.00	-28.83	peak
6	*	17867.400	36.59	13.56	50.15	74.00	-23.85	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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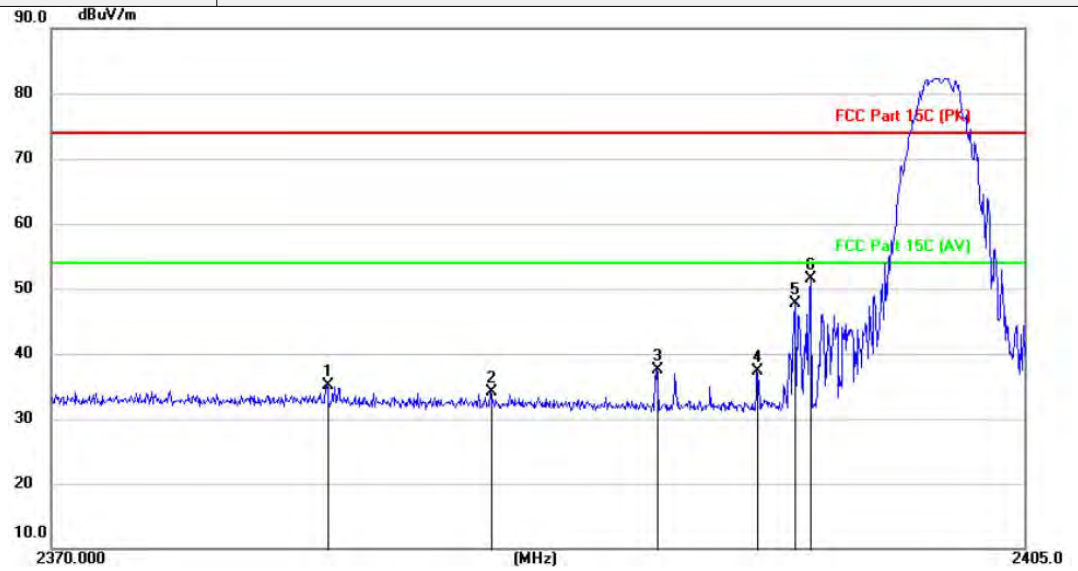
Results of Band Edges Test (Radiated)

Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	DH5 Mode 2402MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2379.870	46.09	-10.92	35.17	74.00	-38.83	peak
2		2385.743	45.03	-10.92	34.11	74.00	-39.89	peak
3		2391.731	48.44	-10.92	37.52	74.00	-36.48	peak
4		2395.354	48.22	-10.91	37.31	74.00	-36.69	peak
5		2396.715	58.54	-10.92	47.62	74.00	-26.38	peak
6	*	2397.262	62.35	-10.92	51.43	74.00	-22.57	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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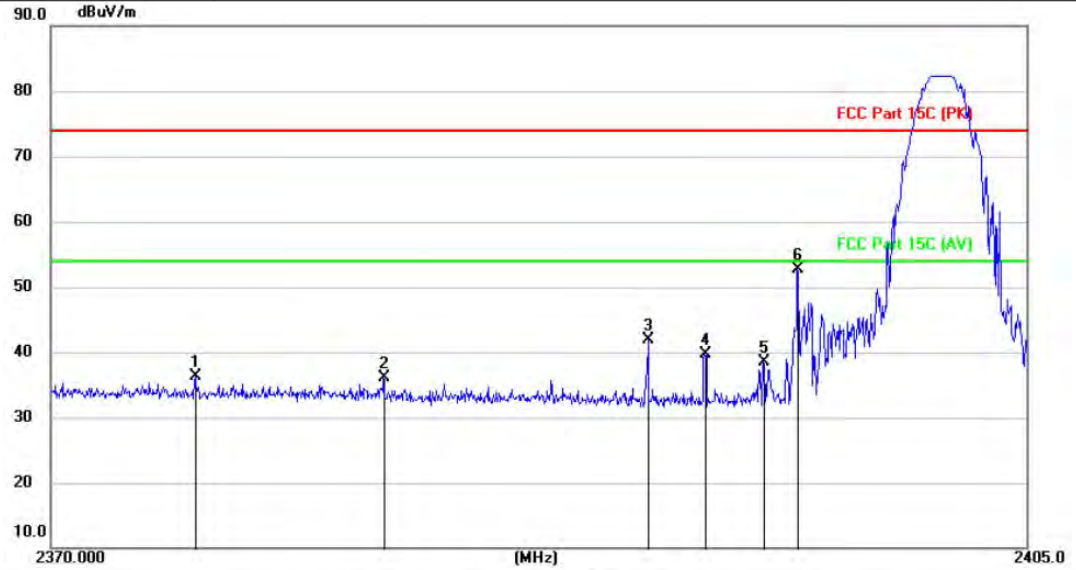
Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	DH5 Mode 2402MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2375.173	47.32	-10.93	36.39	74.00	-37.61	peak
2		2381.896	46.99	-10.92	36.07	74.00	-37.93	peak
3		2391.389	52.75	-10.92	41.83	74.00	-32.17	peak
4		2393.394	50.69	-10.92	39.77	74.00	-34.23	peak
5		2395.529	49.47	-10.91	38.56	74.00	-35.44	peak
6	*	2396.747	63.57	-10.92	52.65	74.00	-21.35	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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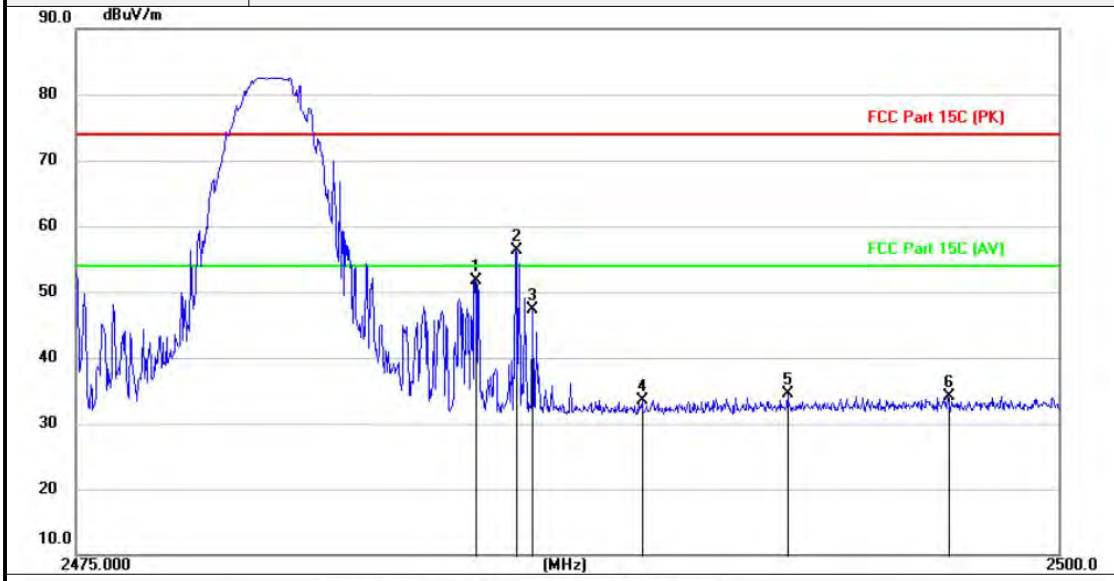
Test Voltage	DC 3.7V
Ant. Pol.	Horizontal
Test Mode:	DH5 Mode 2480 MHz

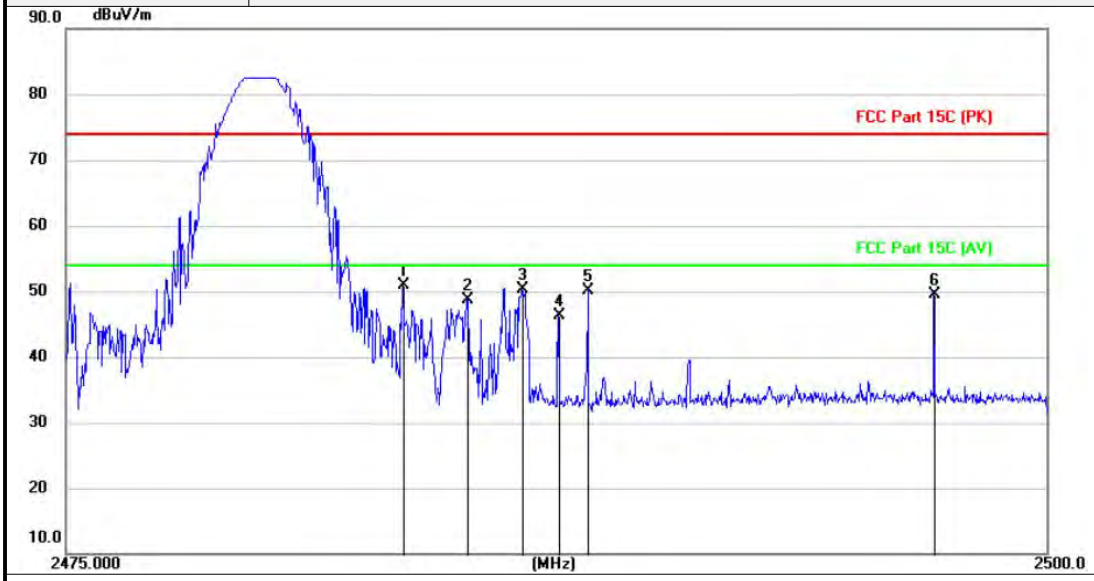


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1		2485.122	62.64	-10.88	51.76	74.00	-22.24	peak
2	*	2486.157	67.23	-10.88	56.35	74.00	-17.65	peak
3		2486.593	58.12	-10.88	47.24	74.00	-26.76	peak
4		2489.390	44.38	-10.89	33.49	74.00	-40.51	peak
5		2493.088	45.33	-10.89	34.44	74.00	-39.56	peak
6		2497.180	44.99	-10.88	34.11	74.00	-39.89	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

Test Voltage	DC 3.7V
Ant. Pol.	Vertical
Test Mode:	DH5 Mode 2480 MHz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	*	2483.548	61.88	-10.88	51.00	74.00	-23.00	peak
2		2485.218	59.59	-10.88	48.71	74.00	-25.29	peak
3		2486.605	61.23	-10.88	50.35	74.00	-23.65	peak
4		2487.532	57.10	-10.88	46.22	74.00	-27.78	peak
5		2488.275	61.05	-10.88	50.17	74.00	-23.83	peak
6		2497.128	60.40	-10.88	49.52	74.00	-24.48	peak

Measurement = Reading level + Correct Factor

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

4.3 Maximum Peak Output Power

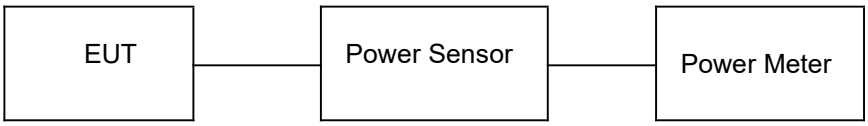
Limit

The Maximum Peak Output Power Measurement is 30dBm.

Test Procedure

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.

Test Configuration



Test Results

Type	Channel	Output power (dBm)	Limit (dBm)	Result
GFSK 1Mbps	00	-1.31	30.00	Pass
	19	-1.40		
	39	-2.15		
GFSK 2Mbps	00	-1.24	30.00	Pass
	19	-1.34		
	39	-2.10		

Note: 1.The test results including the cable lose.

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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4.4 Power Spectral Density

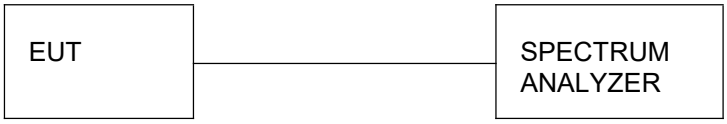
Limit

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.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW ≥ 3 kHz.
3. Set the VBW ≥ 3× RBW.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be 8dBm.

Test Configuration

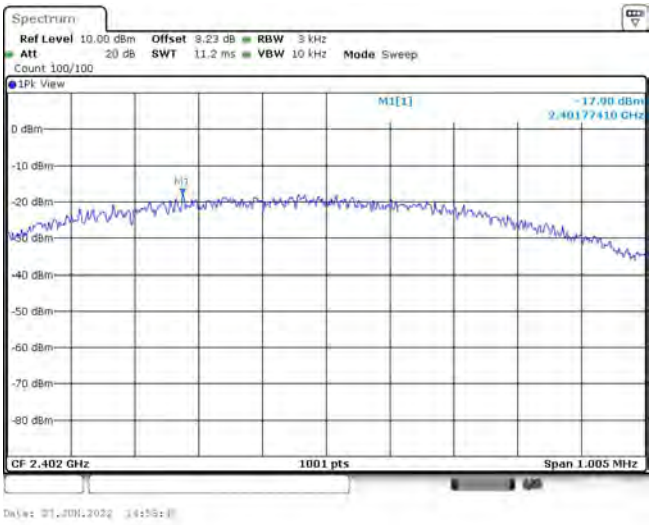
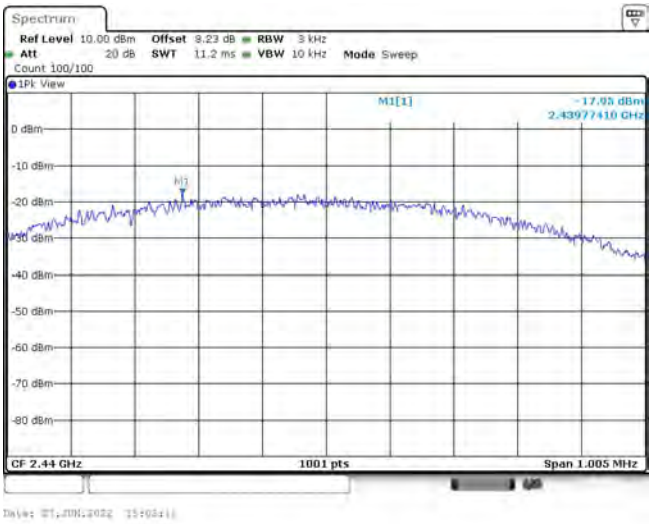


Test Results

Type	Channel	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
GFSK 1Mbps	00	-17.90	8.00	Pass
	19	-17.95		
	39	-18.81		
GFSK 2Mbps	00	-19.87	8.00	Pass
	19	-20.00		
	39	-20.75		

Test plot as follows:

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

BLE GFSK 1Mpbs

CH00

CH19

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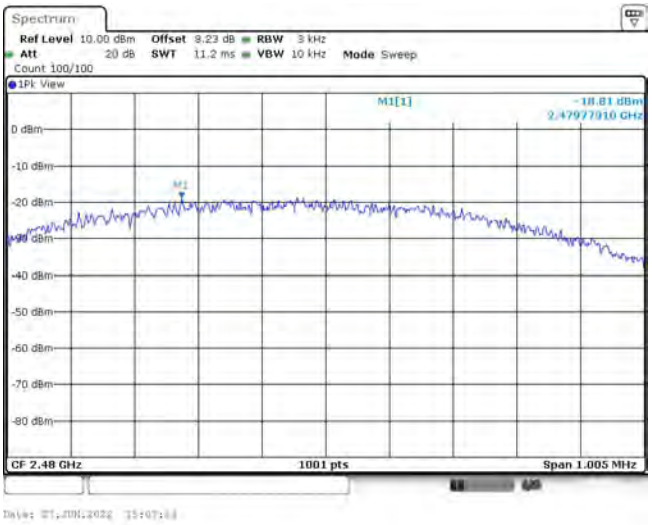
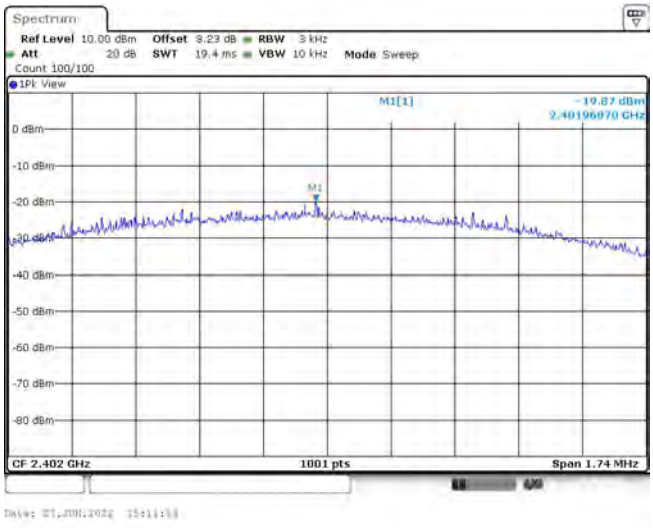
Tel：+(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail：info@gdksign.cn Web: www.gdksign.com

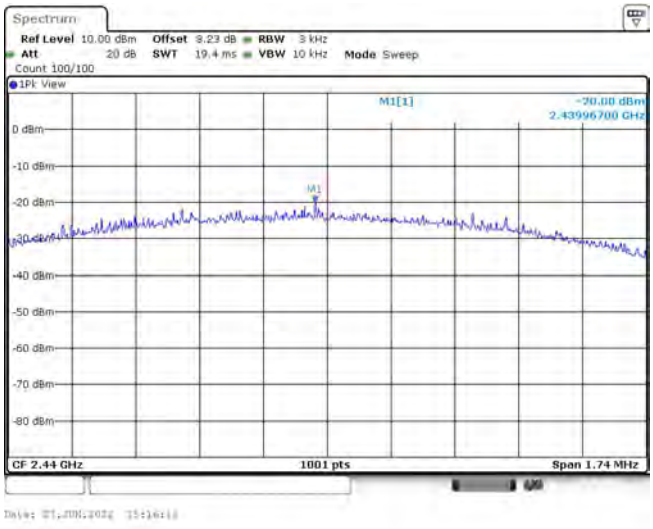


CH39

BLE GFSK 2Mpbs



CH00



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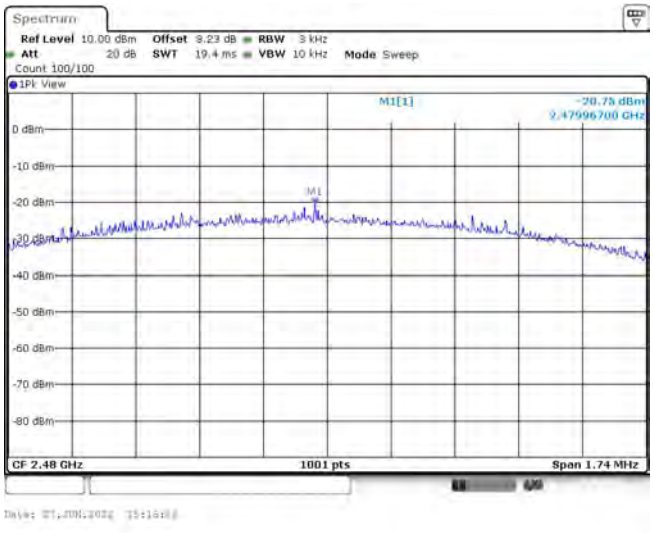
CH19



CH39

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4.5 6dB Bandwidth

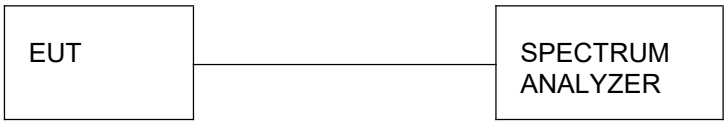
Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

Test Configuration



Test Results

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
GFSK 1Mbps	00	0.67	≥500	Pass
	19	0.67		
	39	0.67		
GFSK 2Mbps	00	1.16	≥500	Pass
	19	1.16		
	39	1.16		

Test plot as follows:

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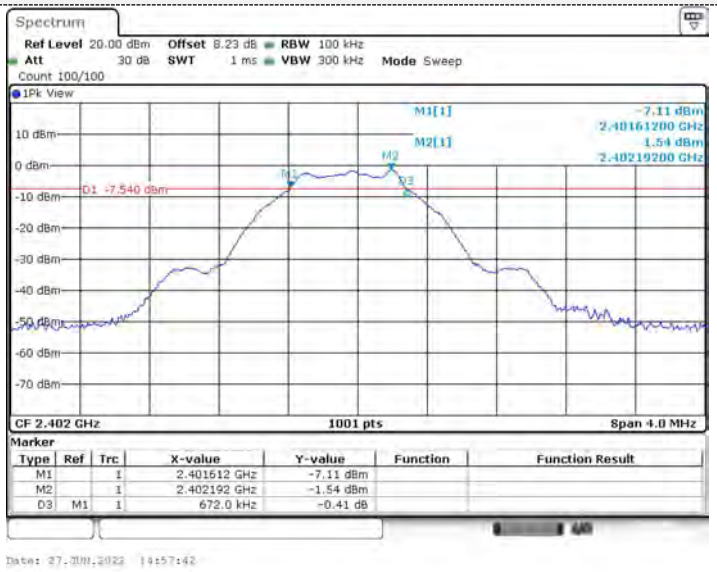
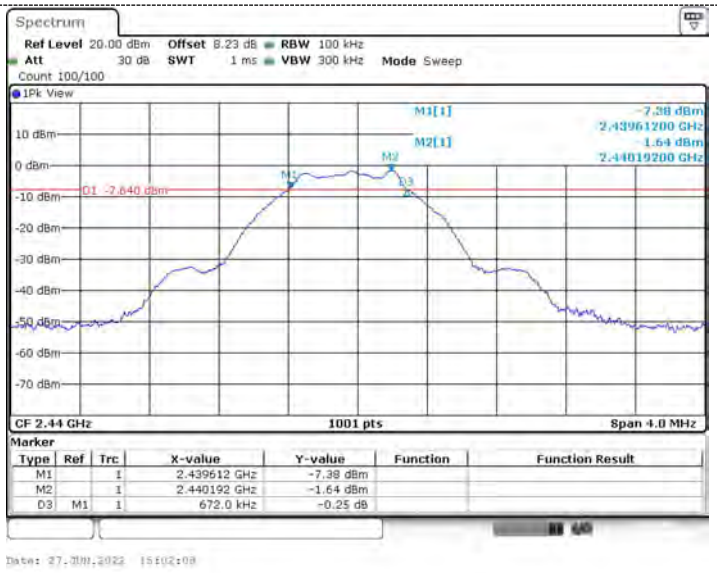
BLE GFSK 1Mpbs



CH00



CH19

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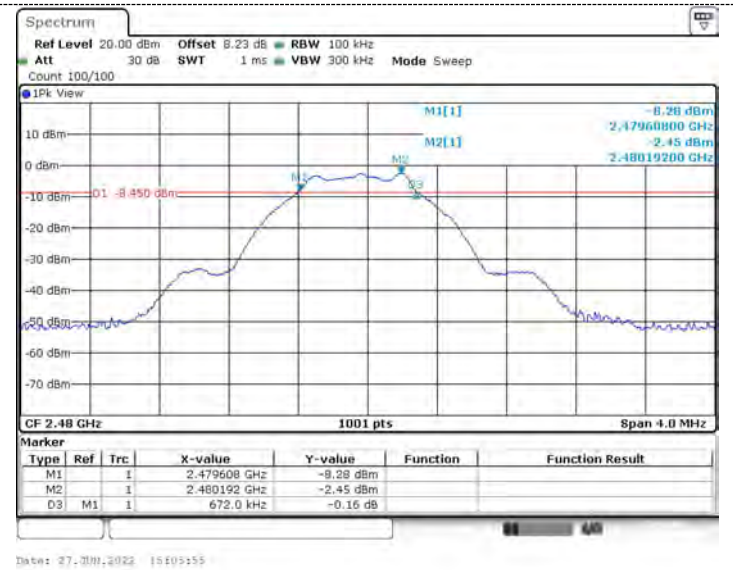
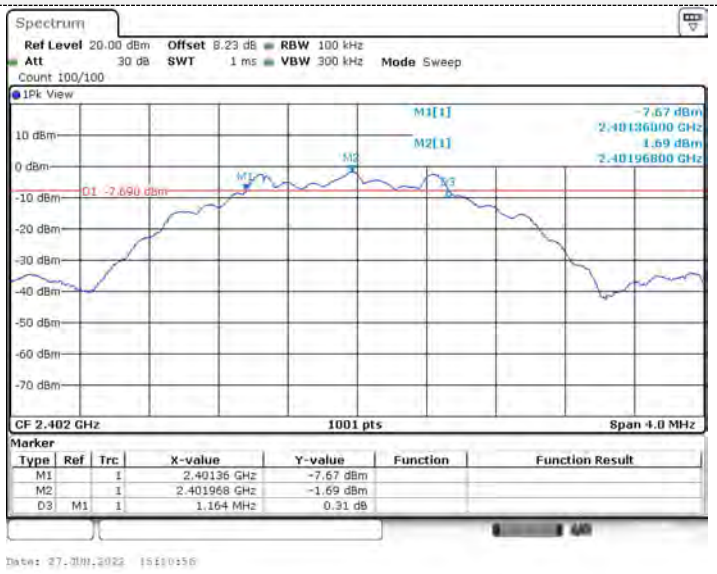


CH39

BLE GFSK 2Mpbs



CH00

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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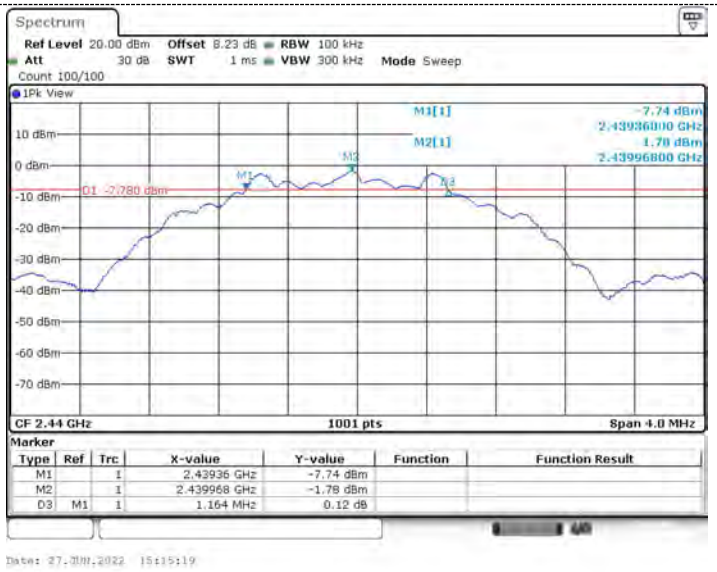
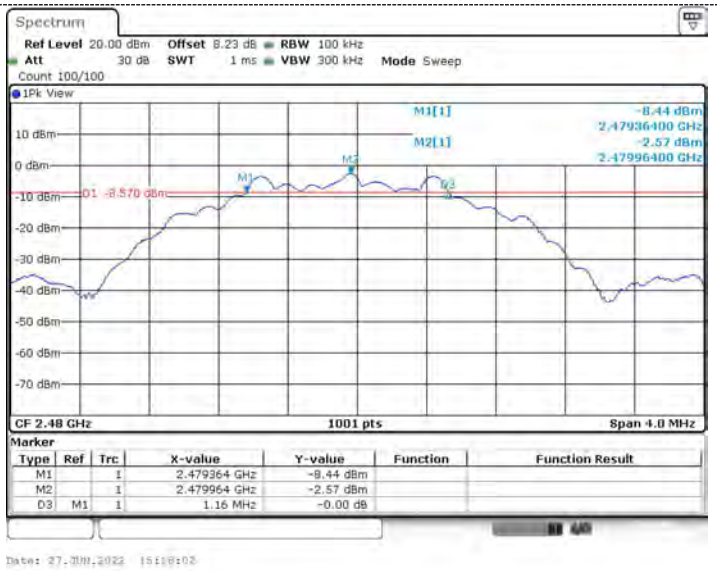


CH19



CH39

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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4.6 Out-of-band Emissions

Limit

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 con-ducted or a radiated measurement, pro-vided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter com-plies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Test Procedure

Connect the transmitter output to spectrum analyzer using a low loss RF cable, and set the spectrum analyzer to RBW=100 kHz, VBW= 300 kHz, peak detector , and max hold. Measurements utilizing these setting are made of the in-band reference level, bandedge and out-of-band emissions.

Test Configuration

Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandage measurement data.

Test plot as follows:

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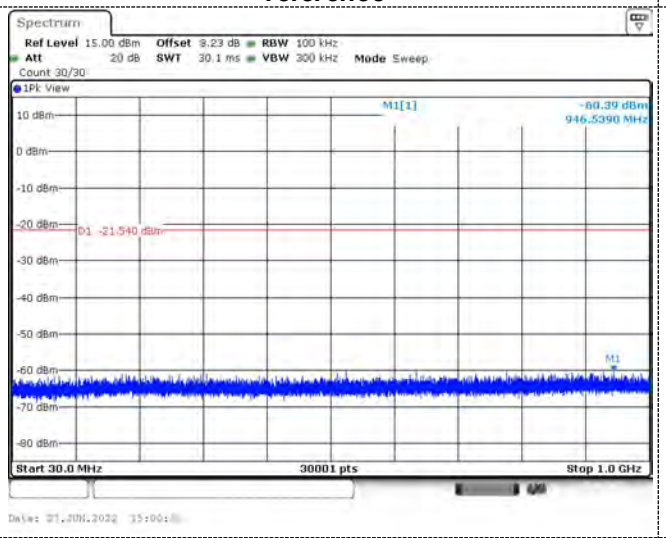
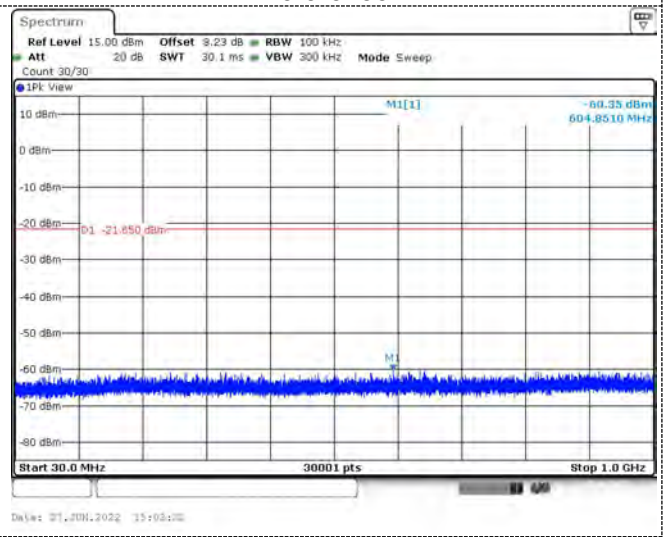
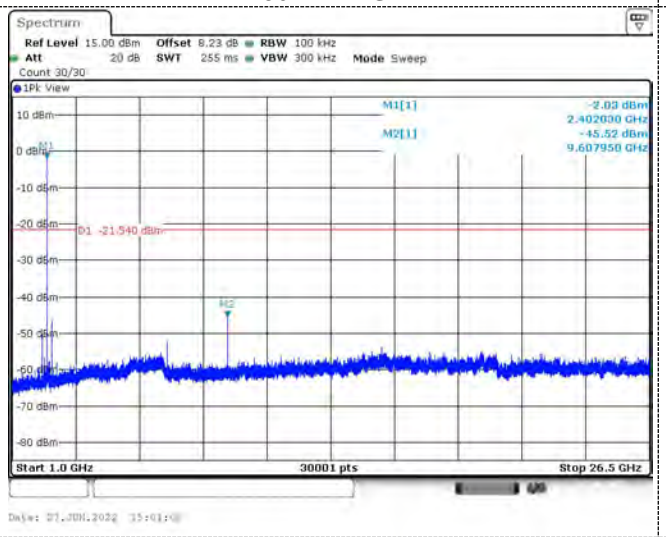
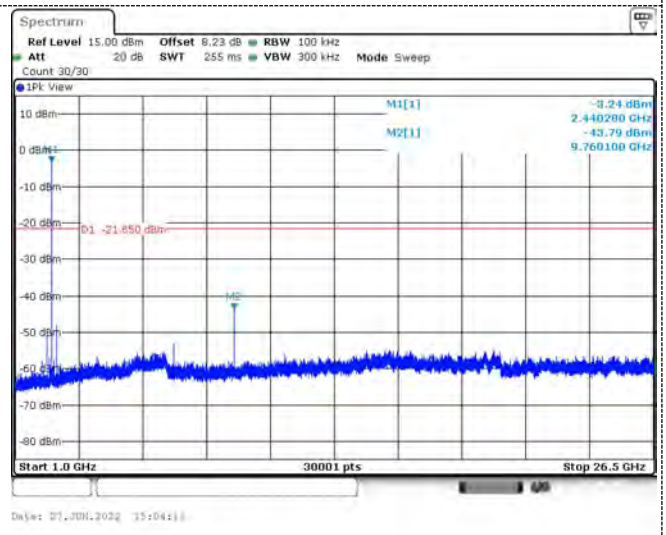
GFSK 1Mbps (CH00)	GFSK 1Mbps (CH39)
	
reference	reference
	
30MHz-1G	30MHz-1G
	
1G-26.5G	1G-26.5G

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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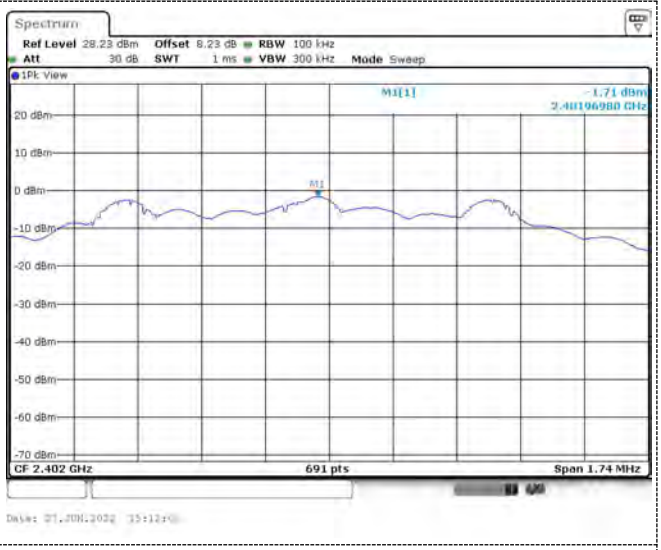
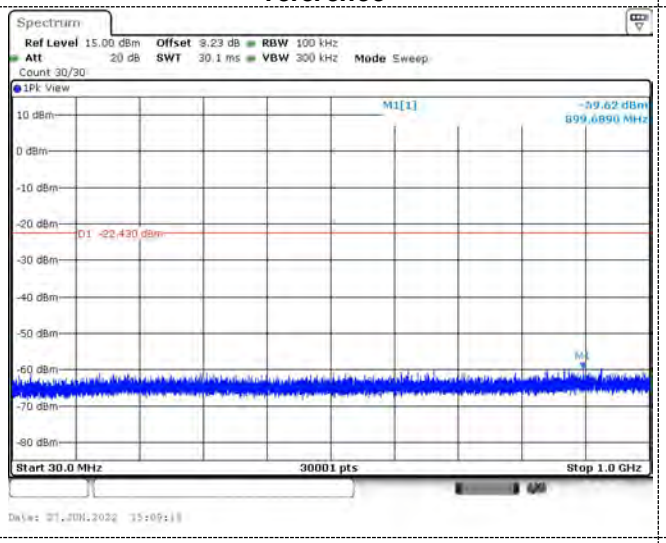
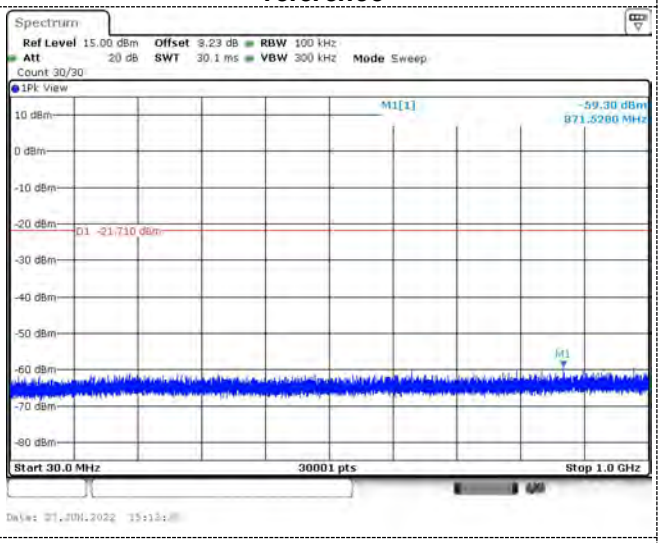
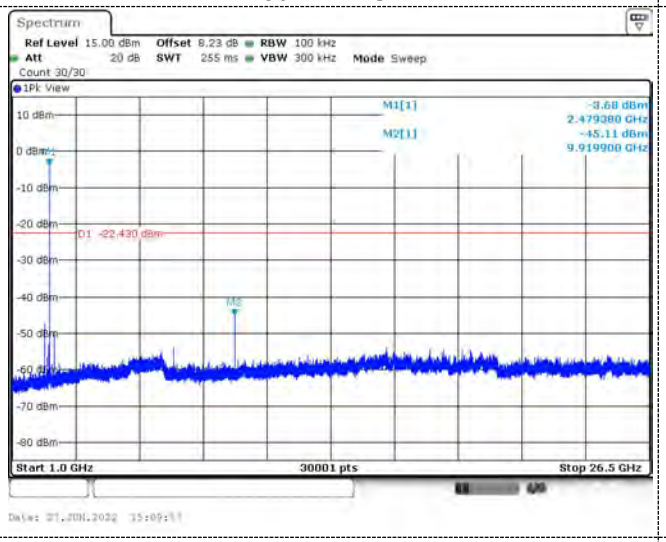
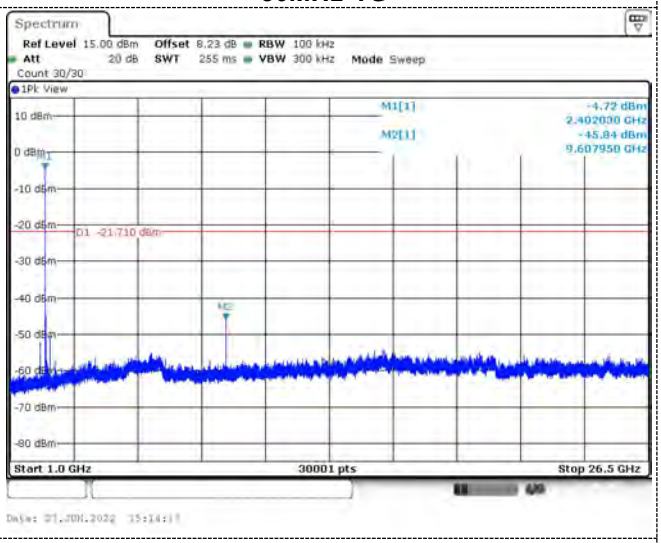
GFSK 1Mbps (CH78)	GFSK 2Mbps (CH00)
	
reference	reference
	
30MHz-1G	30MHz-1G
	
1G-26.5G	1G-26.5G

Add：West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China
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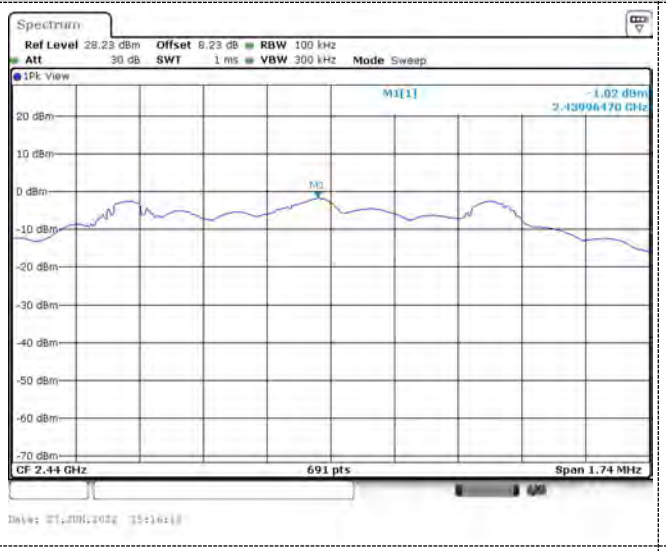
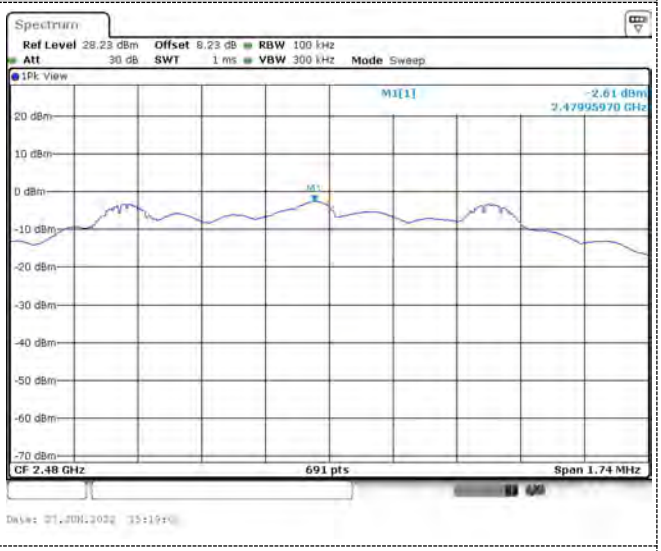
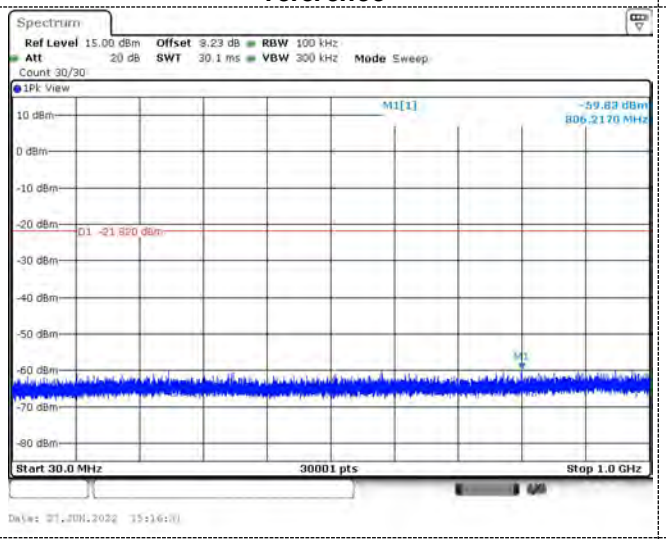
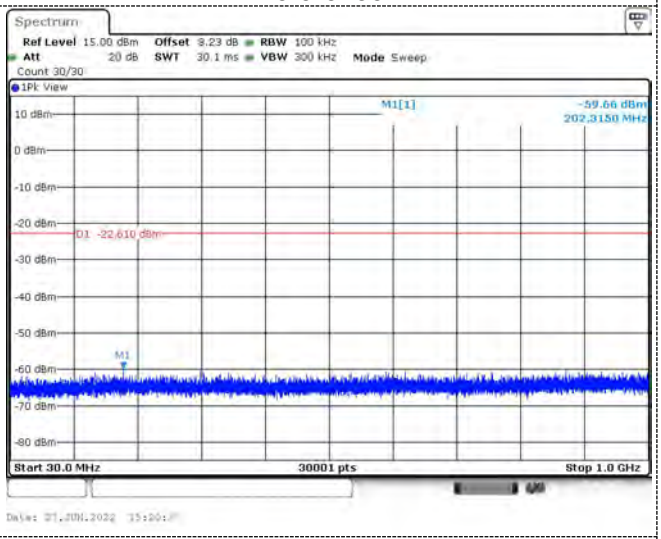
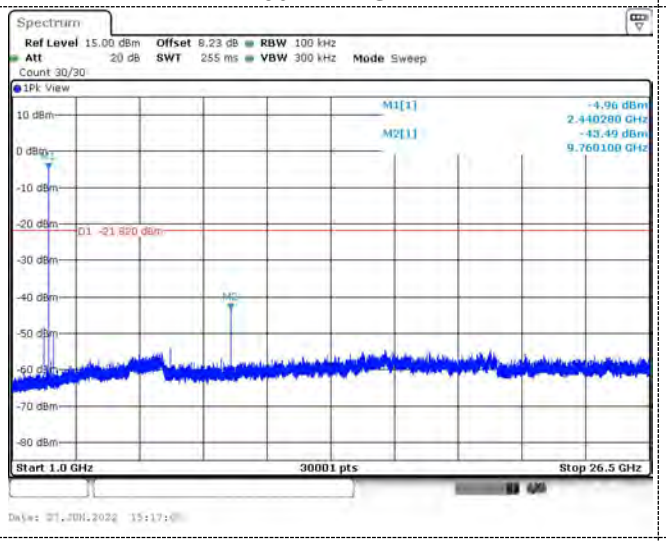
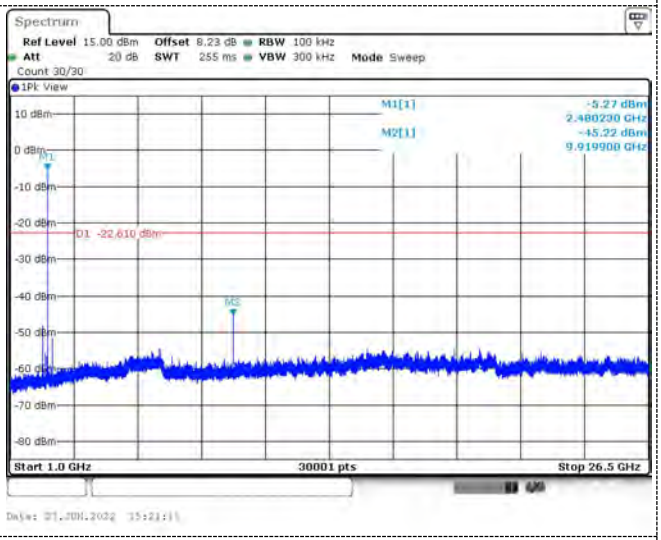
GFSK 2Mbps (CH39)	GFSK 2Mbps (CH78)
	
reference	reference
	
30MHz-1G	30MHz-1G
	
1G-26.5G	1G-26.5G

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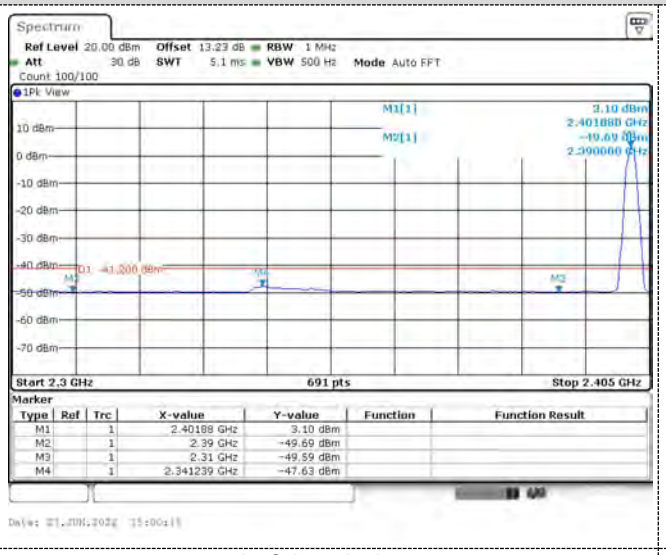
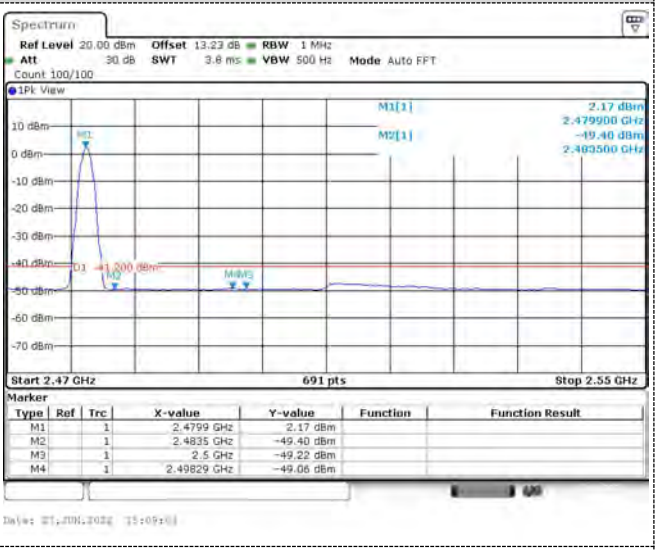
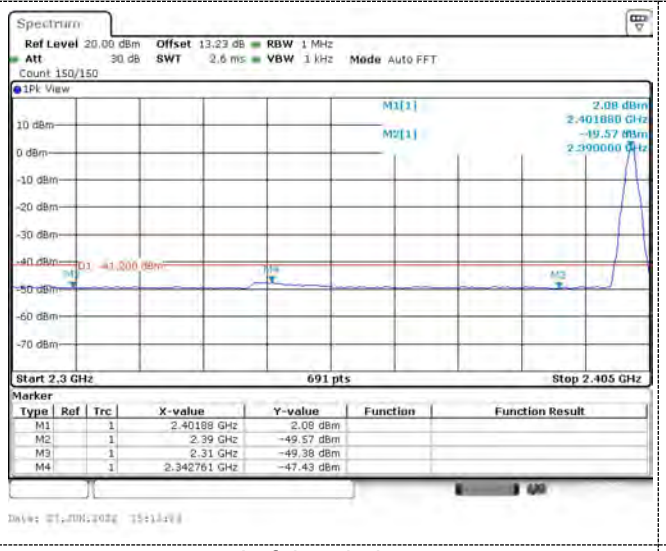
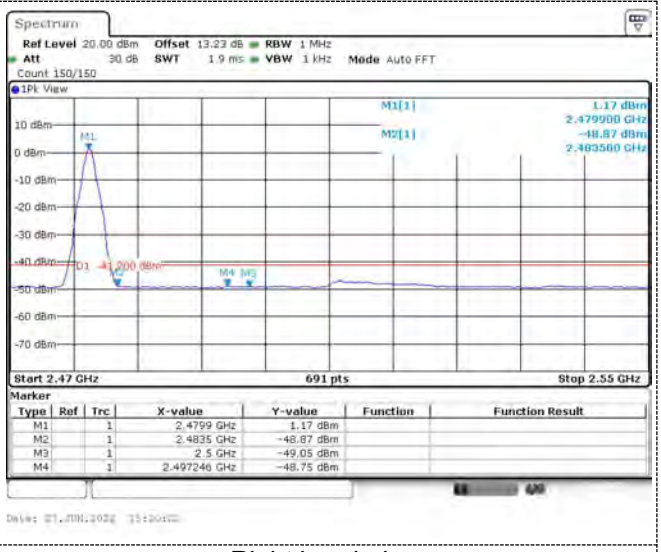
Band-edge Measurements for RF Conducted Emissions:

BLE GFSK 1Mpbs	
	
Left bandedge	Right bandedge

BLE GFSK 2Mpbs	
	
Left bandedge	Right bandedge

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4.7 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi 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 6dBi.

Antenna Connected Construction

The maximum gain of antenna was 5 dBi.

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5. Test Setup Photos of the EUT

Radiated Measurement (Below 1GHz)

Radiated Measurement (Above 1GHz)

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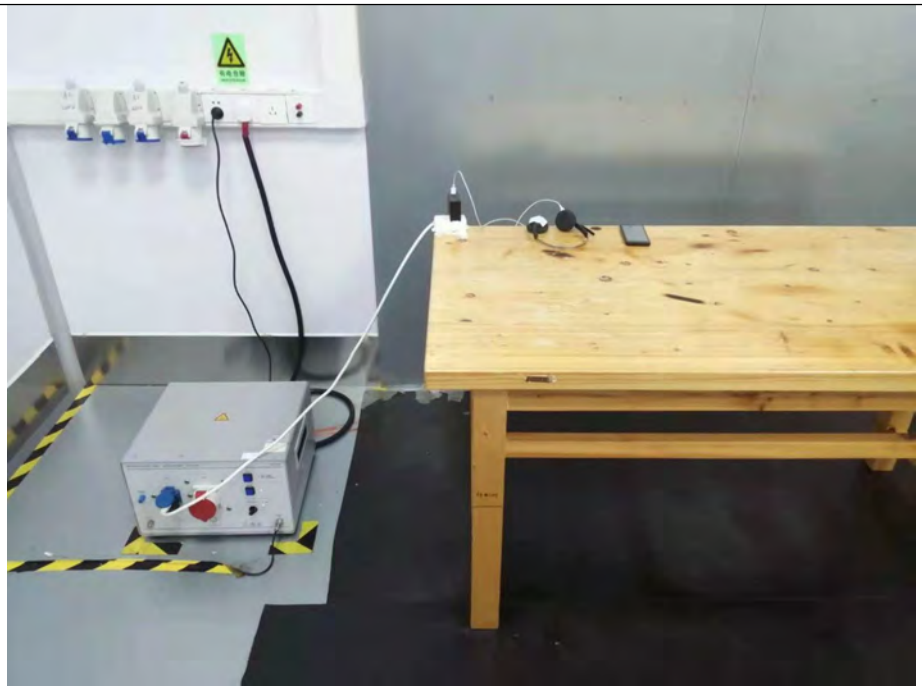
Conducted Emission


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6. Photos of the EUT

Reference to the test report No. KS2206S2730E02

********** End of Report **********

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