FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.249

Report Reference No.....	: **CTA23121202003**	
FCC ID.....	: **2BDOY-V3-01**	
Compiled by (position+printed name+signature)..	: File administrators Zoey Cao	Zoey Cao
Supervised by (position+printed name+signature)..	: Project Engineer Amy Wen	Amy Wen
Approved by (position+printed name+signature)..	: RF Manager Eric Wang	Eric Wang
Date of issue.....	: Dec. 21, 2023	
Testing Laboratory Name.....	: **Shenzhen CTA Testing Technology Co., Ltd.**	
Address.....	: Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China	
Applicant's name.....	: **Jiangxi Xuanfeng Technology Co., Ltd**	
Address.....	: Jiangxi Province Donghu District, Nanchang City, Jiangxi, China	
Test specification.....	**:**	
Standard.....	: **FCC Part 15.249**	

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Equipment description.....	**: Bluetooth keyboard**
Trade Mark.....	: /
Manufacturer.....	: **Jiangxi Jichi Technology Co., Ltd**
Model/Type reference.....	: V3
Listed Models	: --
Modulation	: GFSK
Frequency.....	From 2402MHz to 2480MHz
Ratings.....	: DC 3.7V From battery and DC 5.0V From external circuit
Result.....	: **PASS**

TEST REPORT

Equipment under Test	:	Bluetooth keyboard
Model /Type	:	V3
Listed Models	:	/
Applicant	:	**Jiangxi Xuanfeng Technology Co., Ltd**
Address	:	Jiangxi Province Donghu District, Nanchang City, Jiangxi, China
Manufacturer	:	**Jiangxi Jichi Technology Co., Ltd**
Address	:	Building 3, Block B13-1-2 and B14-1, New Industrial Park Control Plan, Jinggangshan Economic and Technological Development Zone, Ji'an City, Jiangxi Province

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, 5725 – 5875 MHZ, and 24.0 – 24.25 GHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Dec. 12, 2023
Testing commenced on	:	Dec. 21, 2023
Testing concluded on	:	Dec. 21, 2023

2.2 Product Description*

Product Description:	Bluetooth keyboard
Model/Type reference:	V3
Power supply:	DC 3.7V From battery and DC 5.0V From external circuit
Adapter information (Auxiliary test suppied by test Lab）	Model: EP-TA20CBC Input: AC 100-240V 50/60Hz Output: DC 5V 2A
Hardware version:	V1.0
Software version:	V1.0
Testing sample ID:	CTA231212020-1# (Engineer sample) CTA231212020-2# (Normal sample)
2.4G	
Supported type:	2.4G
Modulation:	GFSK
Operation frequency:	2403MHz to 2480MHz
Channel number:	16
Antenna type:	PCB antenna
Antenna gain:	1.5dBi

2.3 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 5.0V From external circuit

2.4 Short description of the Equipment under Test (EUT)

This is a smart Lock.
For more details, refer to the user's manual of the EUT.

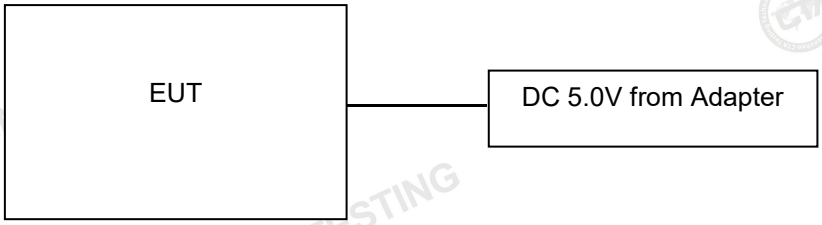
2.5 EUT operation mode

Switch channels by pressing keys to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing. There are 16 channels provided to the EUT and Channel 1/14/16 were selected to test.

Operation Frequency:

Channel	1	2	3	4	5	6	7	8
Frequency（MHz）	2403	2426	2441	2463	2407	2422	2445	2466
Channel	9	10	11	12	13	14	15	16
Frequency（MHz）	2414	2436	2459	2473	2419	2439	2453	2480

2.6 Block Diagram of Test Setup



2.7 Related Submittal(s) / Grant (s)

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

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
FCC-Registration No.: 517856 Designation Number: CN1318
Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01
Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

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

Temperature:	23 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	24 ° C
Humidity:	47 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

3.4 Summary of measurement results

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Test result
§15.215(c)	Spectrum bandwidth – 20 dB bandwidth	GFSK	☒ Lowest ☒ Middle ☒ Highest	GFSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.249(d)	Band edge compliance conducted	GFSK	☒ Lowest ☒ Highest	GFSK	☒ Lowest ☒ Highest	complies
§15.205	Band edge compliance radiated	GFSK	☒ Lowest ☒ Highest	GFSK	☒ Lowest ☒ Highest	complies
§15.249(a)(c)	TX spurious emissions radiated	GFSK	☒ Lowest ☒ Middle ☒ Highest	GFSK	☒ Lowest ☒ Middle ☒ Highest	complies
§15.209(a)	TX spurious Emissions radiated Below 1GHz	GFSK	-/-	GFSK	-/-	complies
§15.207	Conducted Emissions < 30 MHz	GFSK	-/-	GFSK	-/-	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 TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " 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. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)

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

3.6 Equipments Used during the Test

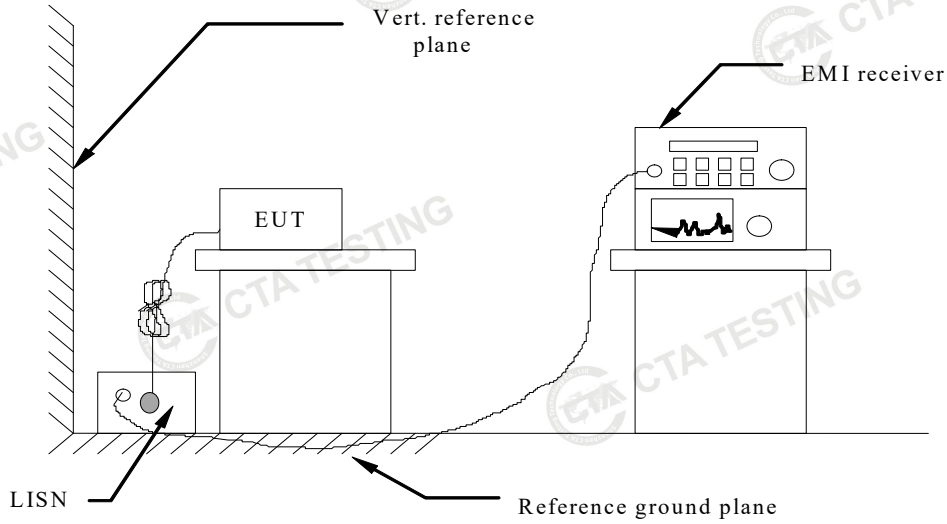
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2023/08/02	2024/08/01
LISN	R&S	ENV216	CTA-314	2023/08/02	2024/08/01
EMI Test Receiver	R&S	ESPI	CTA-307	2023/08/02	2024/08/01
EMI Test Receiver	R&S	ESCI	CTA-306	2023/08/02	2024/08/01
Spectrum Analyzer	Agilent	N9020A	CTA-301	2023/08/02	2024/08/01
Spectrum Analyzer	R&S	FSP	CTA-337	2023/08/02	2024/08/01
Vector Signal generator	Agilent	N5182A	CTA-305	2023/08/02	2024/08/01
Analog Signal Generator	R&S	SML03	CTA-304	2023/08/02	2024/08/01
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	R&S	CTA-302	2023/08/02	2024/08/01
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2023/08/02	2024/08/01
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2024/10/16
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2024/10/12
Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2024/10/16
Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2021/08/07	2024/08/06
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2023/08/02	2024/08/01
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2023/08/02	2024/08/01
Directional coupler	NARDA	4226-10	CTA-303	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2023/08/02	2024/08/01
Automated filter bank	Tonscend	JS0806-F	CTA-404	2023/08/02	2024/08/01
Power Sensor	Agilent	U2021XA	CTA-405	2023/08/02	2024/08/01
Amplifier	Schwarzbeck	BBV9719	CTA-406	2023/08/02	2024/08/01

Test Equipment	Manufacturer	Model No.	Version number	Calibration Date	Calibration Due Date
EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	N/A

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 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.		

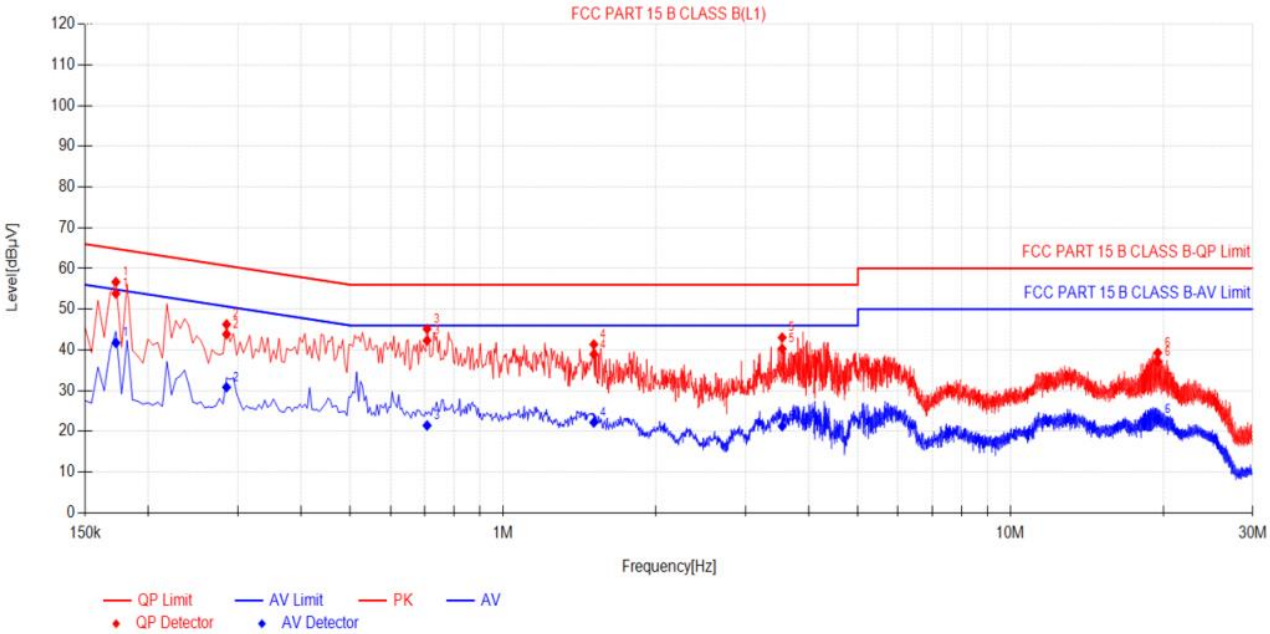
TEST RESULTS

Remark:

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

2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:	DC 5.0V from Adapter AC 120V/60Hz	Polarization	L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.1725	9.97	43.87	53.84	64.84	11.00	31.74	41.71	54.84	13.13	PASS
2	0.285	9.95	33.89	43.84	60.67	16.83	20.88	30.83	50.67	19.84	PASS
3	0.708	9.91	32.39	42.30	56.00	13.70	11.53	21.44	46.00	24.56	PASS
4	1.509	9.90	29.03	38.93	56.00	17.07	12.28	22.18	46.00	23.82	PASS
5	3.5475	9.96	30.33	40.29	56.00	15.71	11.31	21.27	46.00	24.73	PASS
6	19.509	10.42	26.72	37.14	60.00	22.86	12.54	22.96	50.00	27.04	PASS

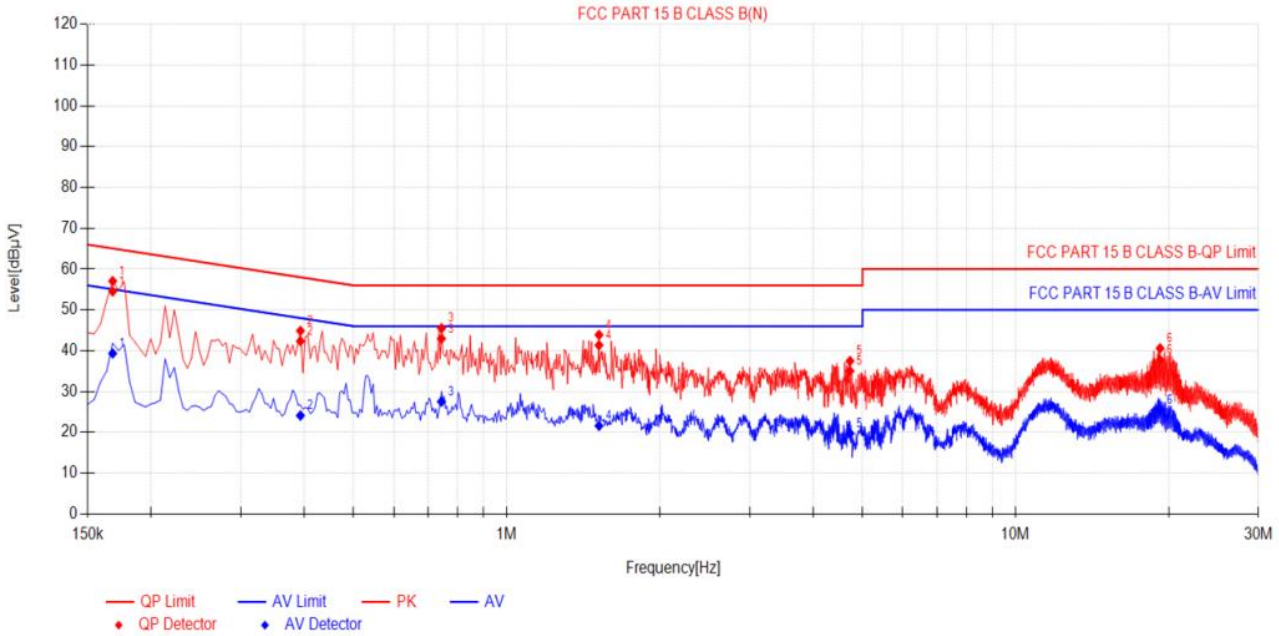
Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)

4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

Power supply:	DC 5.0V from Adapter AC 120V/60Hz	Polarization	N



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.168	10.08	44.44	54.52	65.06	10.54	29.24	39.32	55.06	15.74	PASS
2	0.393	9.93	32.41	42.34	58.00	15.66	14.18	24.11	48.00	23.89	PASS
3	0.744	10.09	32.87	42.96	56.00	13.04	17.43	27.52	46.00	18.48	PASS
4	1.518	10.13	31.22	41.35	56.00	14.65	11.47	21.60	46.00	24.40	PASS
5	4.7265	10.09	24.95	35.04	56.00	20.96	9.64	19.73	46.00	26.27	PASS
6	19.2345	10.55	27.18	37.73	60.00	22.27	14.98	25.53	50.00	24.47	PASS

Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

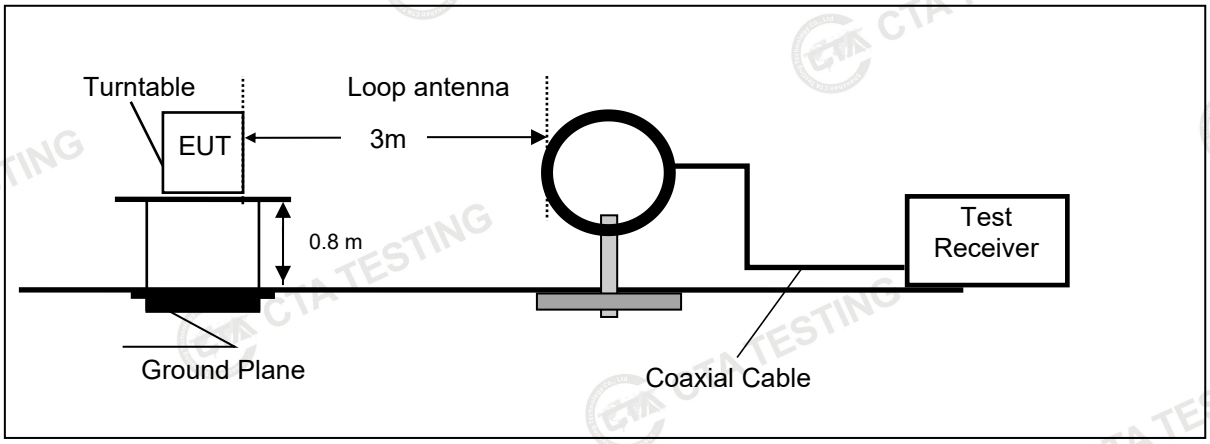
3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)

4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

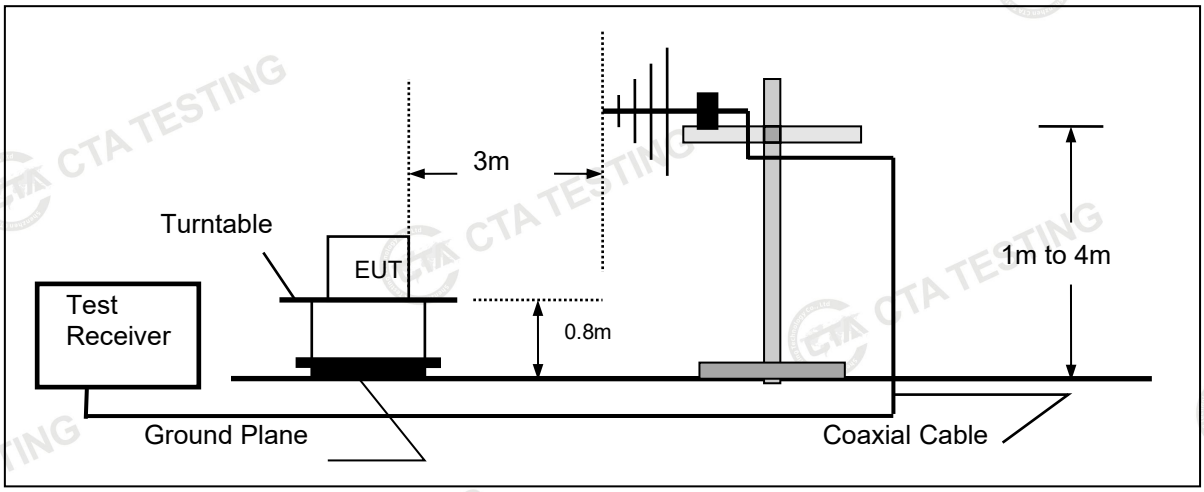
4.2 Radiated Emissions and Band Edge

TEST CONFIGURATION

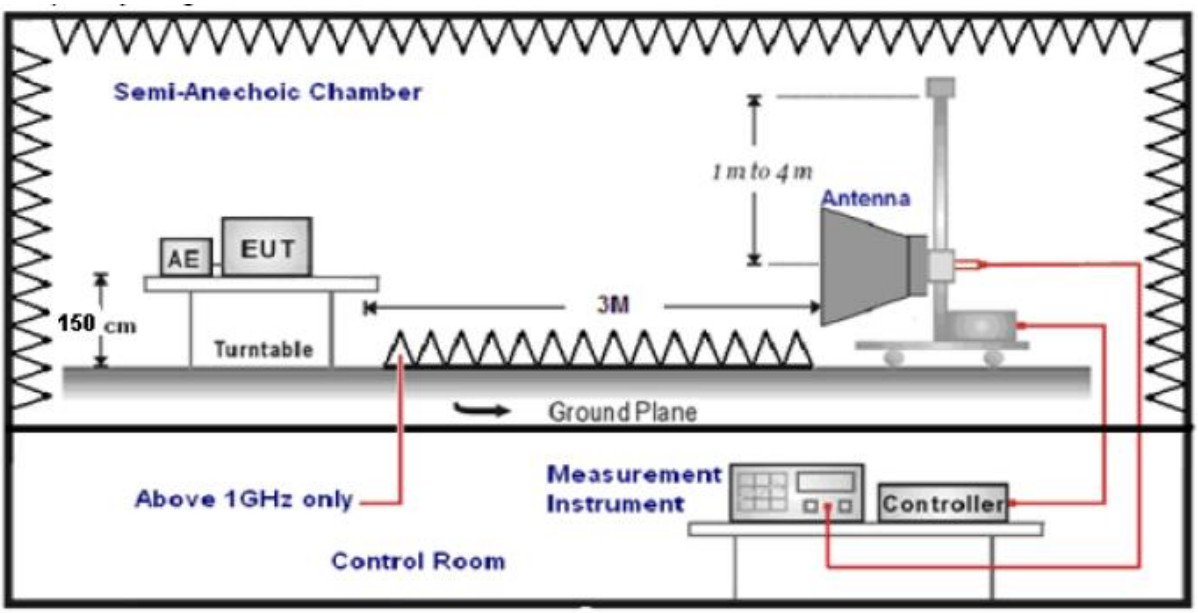
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



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

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

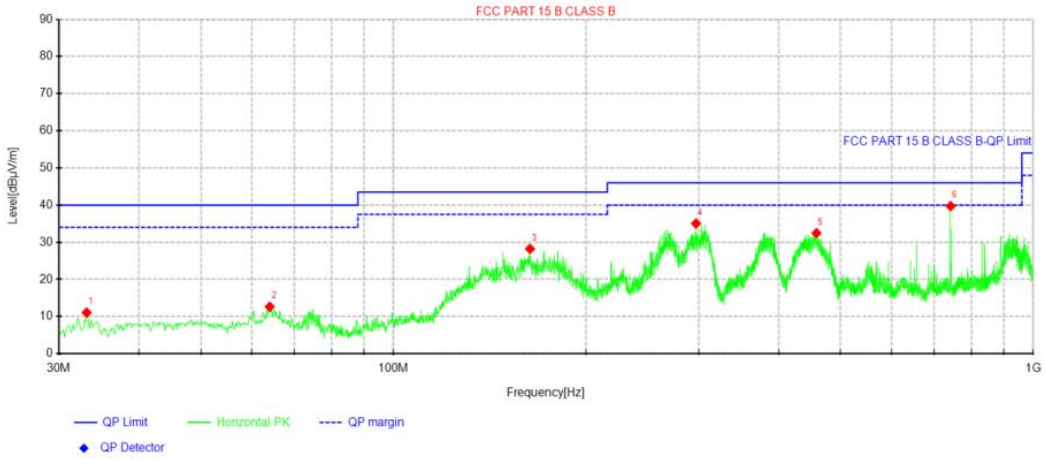
TEST RESULTS

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. BLE 1Mpbs 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.

For 30MHz-1GHz

Horizontal



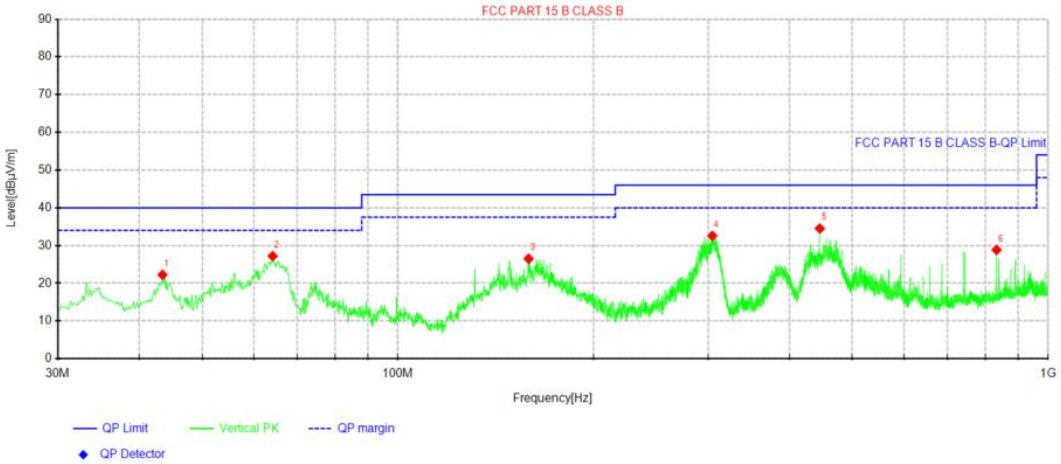
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.1525	29.25	11.07	-18.18	40.00	28.93	100	177	Horizontal
2	64.0713	31.94	12.65	-19.29	40.00	27.35	100	102	Horizontal
3	163.496	49.65	28.23	-21.42	43.50	15.27	100	94	Horizontal
4	297.113	52.44	35.05	-17.39	46.00	10.95	100	94	Horizontal
5	458.255	47.46	32.46	-15.00	46.00	13.54	100	318	Horizontal
6	742.586	50.58	39.72	-10.86	46.00	6.28	100	327	Horizontal

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.4588	38.91	22.25	-16.66	40.00	17.75	100	342	Vertical
2	64.1925	46.54	27.21	-19.33	40.00	12.79	100	241	Vertical
3	158.888	48.12	26.49	-21.63	43.50	17.01	100	357	Vertical
4	304.51	49.84	32.56	-17.28	46.00	13.44	100	157	Vertical
5	445.523	49.62	34.51	-15.11	46.00	11.49	100	216	Vertical
6	833.16	39.10	28.85	-10.25	46.00	17.15	100	16	Vertical

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

For 1GHz to 25GHz

GFSK (above 1GHz)

Field Strength of Fundamental			2403MHz		
Frequency (MHz)	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Polarity
2403.00	89.26	76.52	114	94	H
2403.00	79.14	63.64	114	94	V

Frequency(MHz):			2403		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4806.00	60.89	PK	74	13.37	65.16	32.33	5.12	41.72	-4.27
4806.00	42.54	AV	54	11.62	46.81	32.33	5.12	41.72	-4.27
7209.00	49.96	PK	74	24.04	50.48	36.6	6.49	43.61	-0.52
7209.00	42.50	AV	54	11.66	43.02	36.6	6.49	43.61	-0.52

Frequency(MHz):			2403		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4806.00	60.34	PK	74	13.66	64.61	32.33	5.12	41.72	-4.27
4806.00	43.45	AV	54	10.55	47.72	32.33	5.12	41.72	-4.27
7209.00	50.67	PK	74	23.33	51.19	36.6	6.49	43.61	-0.52
7209.00	41.25	AV	54	12.75	41.77	36.6	6.49	43.61	-0.52

Field Strength of Fundamental			2439MHz		
Frequency (MHz)	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Polarity
2439.00	88.79	73.55	114	94	H
2439.00	78.48	63.64	114	94	V

Frequency(MHz):			2439		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4878.00	61.24	PK	74	12.76	65.12	32.6	5.34	41.82	-3.88
4878.00	44.57	AV	54	9.43	48.45	32.6	5.34	41.82	-3.88
7318.00	53.72	PK	74	20.28	53.83	36.8	6.81	43.72	-0.11
7318.00	43.58	AV	54	10.42	43.69	36.8	6.81	43.72	-0.11

Frequency(MHz):			2439		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4878.00	59.59	PK	74	14.41	63.47	32.6	5.34	41.82	-3.88
4878.00	40.89	AV	54	13.11	44.77	32.6	5.34	41.82	-3.88
7318.00	53.06	PK	74	20.94	53.17	36.8	6.81	43.72	-0.11
7318.00	45.01	AV	54	8.99	45.12	36.8	6.81	43.72	-0.11

Field Strength of Fundamental			2480MHz		
Frequency (MHz)	Measure Result (PK, dBuV/m)	Measure Result (AVG, dBuV/m)	Peak Limit (dBuV/m)	AVG Limit (dBuV/m)	Polarity
2480.00	85.62	72.54	114	94	H
2480.00	79.29	63.65	114	94	V

Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	57.85	PK	74	16.15	60.93	32.73	5.66	41.47	-3.08
4960.00	43.61	AV	54	10.39	46.69	32.73	5.66	41.47	-3.08
7440.00	53.83	PK	74	20.17	53.38	37.04	7.25	43.84	0.45
7440.00	43.74	PK	54	10.26	43.29	37.04	7.25	43.84	0.45

Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	58.83	PK	74	15.17	61.91	32.73	5.66	41.47	-3.08
4960.00	39.88	AV	54	14.12	42.96	32.73	5.66	41.47	-3.08
7440.00	54.78	PK	74	19.22	54.33	37.04	7.25	43.84	0.45
7440.00	43.60	PK	54	10.40	43.15	37.04	7.25	43.84	0.45

REMARKS:
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

Results of Band Edges Test (Radiated)

GFSK

Frequency(MHz):			2403		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	61.59	PK	74	12.41	72.01	27.42	4.31	42.15	-10.42
2390.00	43.78	AV	54	10.22	54.20	27.42	4.31	42.15	-10.42
Frequency(MHz):			**2403**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	59.75	PK	74	14.25	70.17	27.42	4.31	42.15	-10.42
2390.00	41.16	AV	54	12.84	51.58	27.42	4.31	42.15	-10.42
Frequency(MHz):			**2480**		**P olarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	61.05	PK	74	12.95	71.16	27.7	4.47	42.28	-10.11
2483.50	43.80	AV	54	10.20	53.91	27.7	4.47	42.28	-10.11
Frequency(MHz):			**2480**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	59.18	PK	74	14.82	69.29	27.7	4.47	42.28	-10.11
2483.50	41.13	AV	54	12.87	51.24	27.7	4.47	42.28	-10.11

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)- Pre-amplifier
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3 20dB Bandwidth

Standard Applicable

§ 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through § 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Configuration

Test Procedure

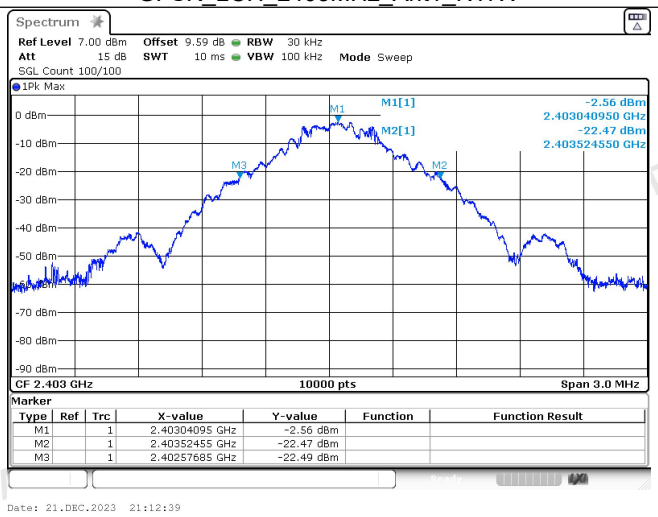
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

Test Results

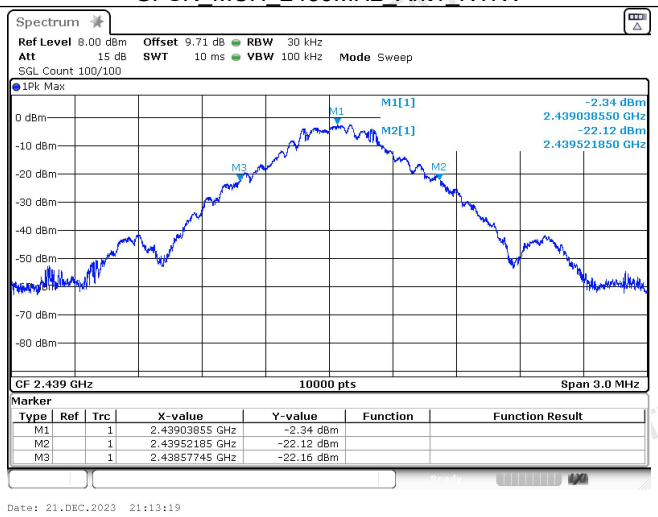
Type	Channel	20dB Bandwidth (MHz)	Limit (KHz)	Result
GFSK	01	0.94	--	Pass
	14	0.94		
	16	0.98		

Test plot as follows:

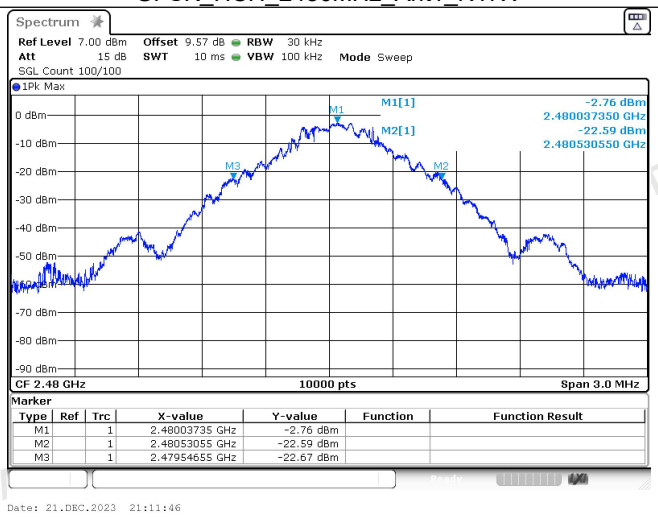
GFSK_LCH_2403MHz_Ant1_NTNV



GFSK_MCH_2439MHz_Ant1_NTNV



GFSK_HCH_2480MHz_Ant1_NTNV



4.4 Antenna Requirement

Standard Applicable

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

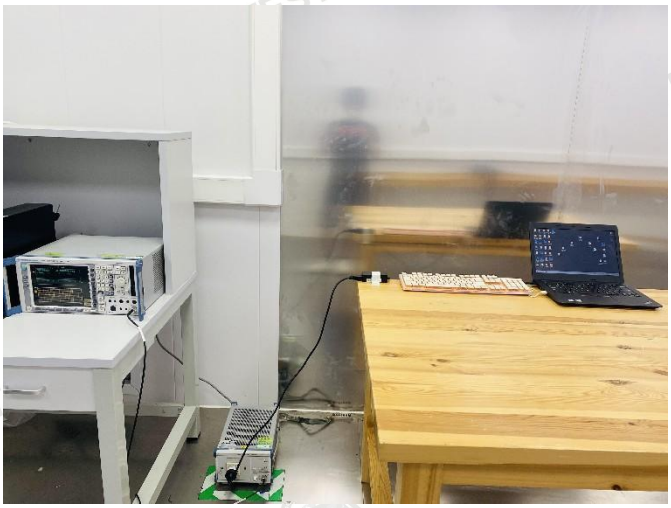
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

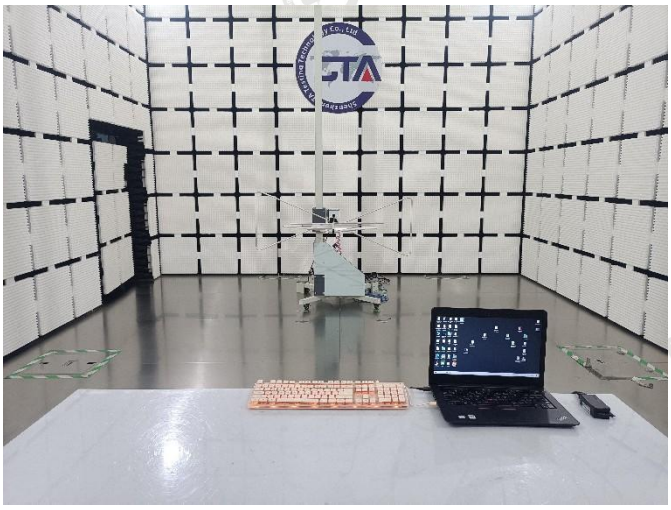
Antenna Connected Construction

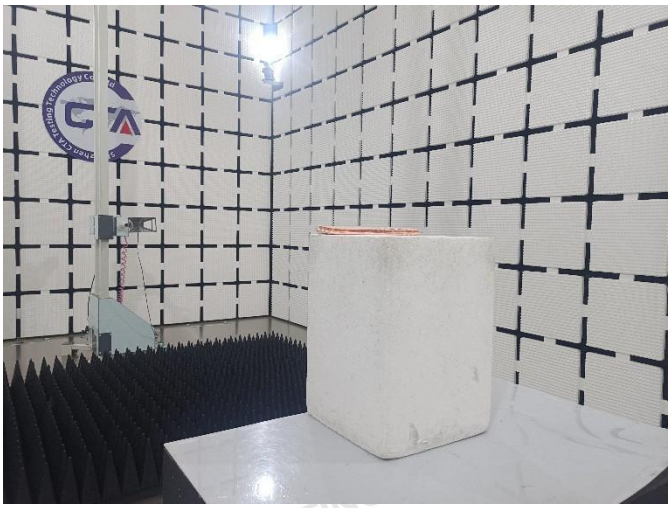
The gain of antenna was 1.5dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility.

5 Test Setup Photos of the EUT







6 Photos of the EUT

Please Refer: CTA23121202001

********** End of Reprt **********