

TEST REPORT

Product Name : 2.4GHz wireless guitar system with charging box
Brand Name : N/A
Model : WS-MINI2
Series Model : WS-5, WS-5S, WS-6S, WS-7S, WS-8S, WS-9S, WS-10S,
WS-MIC, WS-MIC2, WS-MIC3, WS-MIC4
FCC ID : 2A6PB-WS-MINI2
Applicant : **Zhuhai Kuwee Technology Co., LTD.**
Address : North factory building 4-3-402, Honghui 2nd Road, Hongqi Town
Industrial Zone, Jinwan District, Zhuhai, China
Manufacturer : **Zhuhai Kuwee Technology Co., LTD.**
Address : North factory building 4-3-402, Honghui 2nd Road, Hongqi Town
Industrial Zone, Jinwan District, Zhuhai, China
Standard(s) : FCC CFR Title 47 Part 15 Subpart C Section 15.249
Date of Receipt : Apr. 23, 2025
Date of Test : Apr. 23, 2025~ Apr. 24, 2025
Issued Date : Apr. 25, 2025

Issued By: **Guangdong Asia Hongke Test Technology Limited**
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Reviewed by: 
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Note: This device has been tested and found to comply with the standard(s) listed, this 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. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.



Report Revise Record

Report Version	Issued Date	Notes
M1	Apr. 25, 2025	Initial Release

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1 TEST SUMMARY

1.1 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

1.2 Test Summary

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	PASS
FCC Part 15.203	Antenna Requirement	PASS

Note 1: The device is powered with battery.

1.3 Test Facility

Test Laboratory:

Guangdong Asia Hongke Test Technology Limited

B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

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

FCC-Registration No.: 251906 Designation Number: CN1376

Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165

The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01

Guangdong Asia Hongke Test Technology Limited 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.

1.4 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 according 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 Guangdong Asia Hongke Test Technology Limited's quality system according 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 Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	9KHz~30MHz ± 1.20 dB	(1)
Radiated Emission	9KHz~30MHz ± 3.10 dB	(1)
Radiated Emission	30MHz~1GHz ± 3.75 dB	(1)
Radiated Emission	1GHz~18GHz ± 3.88 dB	(1)
Radiated Emission	18GHz~40GHz ± 3.88 dB	(1)
RF power, conducted	30MHz~6GHz ± 0.16 dB	(1)
RF power density, conducted	± 0.24 dB	(1)
Spurious emissions, conducted	± 0.21 dB	(1)
Temperature	$\pm 1^{\circ}\text{C}$	(1)
Humidity	$\pm 3\%$	(1)
DC and low frequency voltages	$\pm 1.5\%$	(1)
Time	$\pm 2\%$	(1)
Duty cycle	$\pm 2\%$	(1)

The report uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

2 GENGGENERAL INFORMATION

2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Name:	2.4GHz wireless guitar system with charging box
Model/Type reference:	WS-MINI2
Serial Model:	WS-5, WS-5S, WS-6S, WS-7S, WS-8S, WS-9S, WS-10S, WS-MIC, WS-MIC2, WS-MIC3, WS-MIC4
Model difference:	All models except model name and appearance color, The internal structure is the same as the circuit.
Power Supply:	Charging box: Input: USB DC 5.0V 3.7V by 1000mAh Rechargeable Li-ion battery 2.4GHz wireless guitar system: 3.7V by 320mAh Rechargeable Li-ion battery
Hardware Version:	N/A
Software Version:	N/A
Sample(s) Status:	AiTSZ-250423029-1(Normal sample) AiTSZ-250423029-2(Engineer sample)
SRD:	
Supported type:	2.4G wireless protocol
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	6
Antenna type:	PCB antenna
Antenna gain:	-0.58dBi
Remark: The above DUT's information was declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual..	

2.3 Description of Test Modes and Test Frequency

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing.

Operation Frequency List:

Channel	Frequency (MHz)
01	2402
02	2426
03	2433
04	2464
05	2478
06	2480

Note: The line display in grey were the channel selected for testing

Power setting during the test:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version	fixed in EUT by manufacturer		
Frequency	2402MHz	2464MHz	2480MHz
2.4G	Default	Default	Default

2.4 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
Adapter	HNT	HNT-QC530	/	Test lab	/

2.5 Equipment List for the Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI Measuring Receiver	R&S	ESR	101160	2024.09.25	2025.09.24
2	Spectrum Analyzer	R&S	FSV40	101470	2024.09.23	2025.09.22
3	Low Noise Pre Amplifier	SCHWARZBECK	BBV 9745	00282	2024.09.25	2025.09.24
4	Low Noise Pre Amplifier	CESHENG	CSKJLNA231016A	CSKJLNA231016A	2024.09.25	2025.09.24
5	Passive Loop	ETS	6512	00165355	2024.08.29	2027.08.28
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9168	01434	2024.08.29	2027.08.28
7	Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	452	2024.08.29	2027.08.28
8	Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367	2024.08.28	2027.08.27
9	6dB Attenuator	JFW	50FPE-006	4360846-949-1	2024.09.24	2025.09.23
10	EMI Test Receiver	R&S	ESPI	100771	2024.09.25	2025.09.24
11	LISN	R&S	NNLK 8129	8130179	2024.09.24	2025.09.23
12	LISN	R&S	ESH3-Z5	892785/016	2024.09.23	2025.09.22
13	Pulse Limiter	R&S	ESH3-Z2	102789	2024.09.24	2025.09.23
14	RF Automatic Test system	TST	TSTPASS	21033016	2024.09.25	2025.09.24
15	Vector Signal Generator	Agilent	N5182A	MY50143009	2024.09.25	2025.09.24
16	Analog signal generator	Agilent	E8257	MY51554256	2024.09.25	2025.09.24
17	Spectrum Analyzer	Agilent	N9020A	MY51289843	2024.09.25	2025.09.24
18	Spectrum Analyzer	Agilent	N9020A	MY53421570	2024.09.25	2025.09.24
19	Power Sensor	Agilent	8481A	MY41097697	2024.09.25	2025.09.24
20	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2024.09.24	2025.09.23
21	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	2024.09.24	2025.09.23
22	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
23	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
24	RF Software	TST	TSTPASS	Version 2.0	N/A	N/A
25	RF Software	cesheng	WCS-WCN	Version 2024.6.20	N/A	N/A
26	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

3 TEST CONDITIONS AND RESULTS

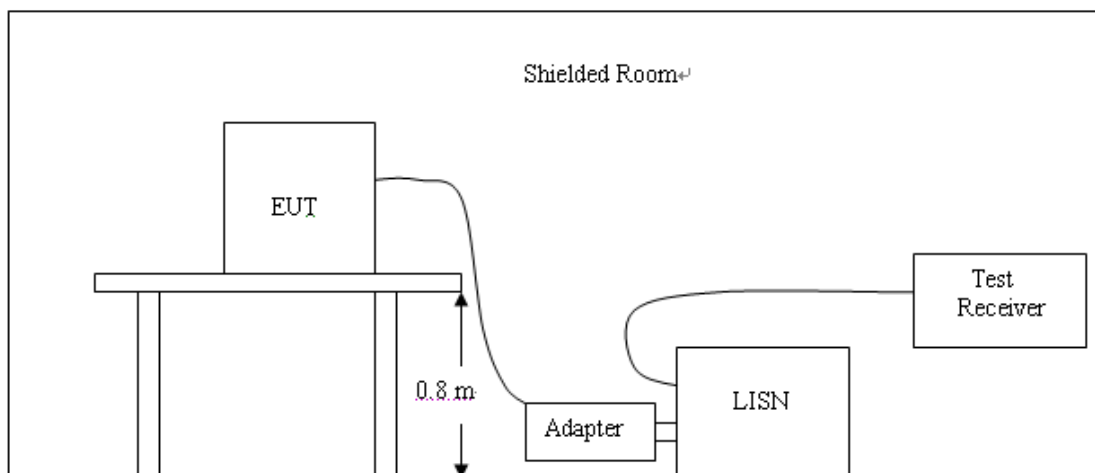
3.1 Conducted Emissions Test

LIMIT

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 CONFIGURATION

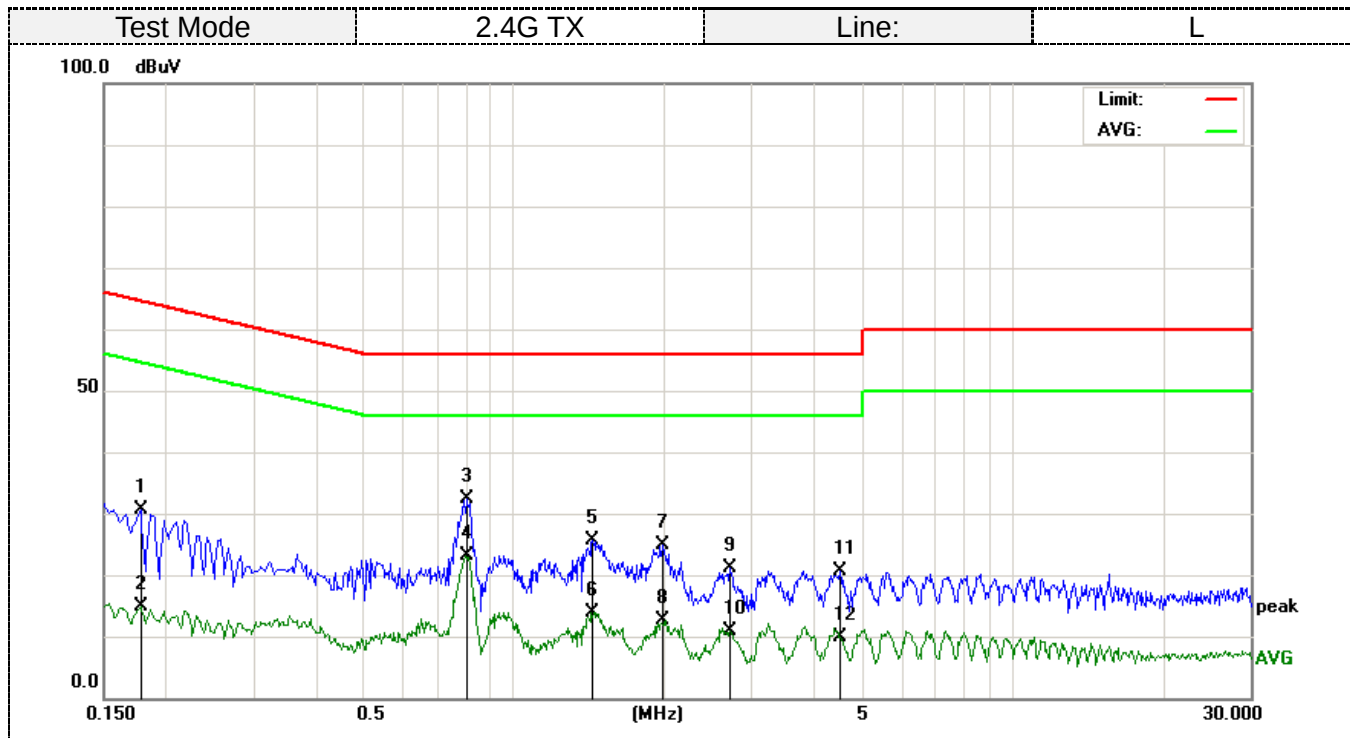


TEST PROCEDURE

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 adapter received AC120V/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.

TEST RESULTS

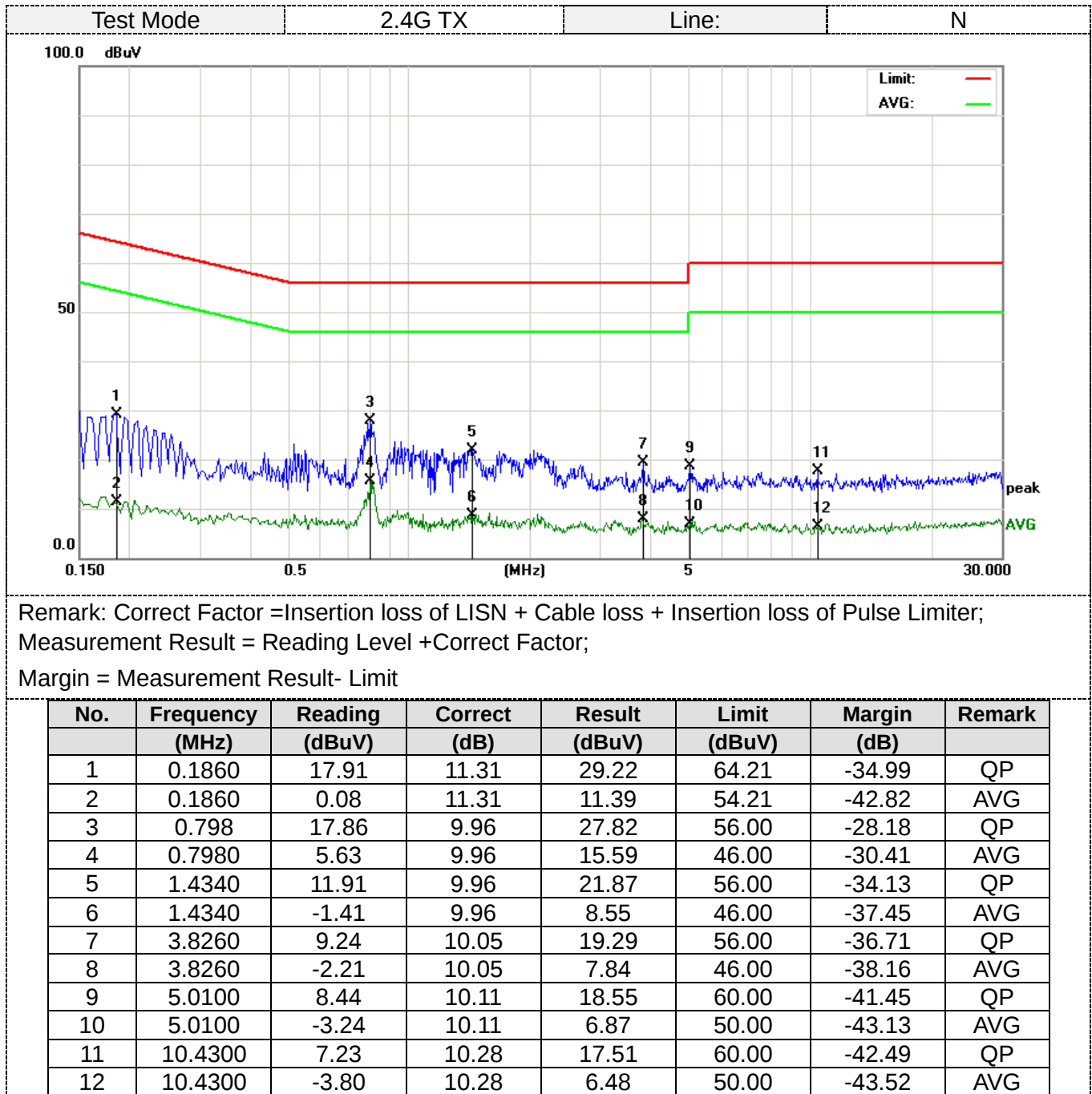
Remark: Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:



Remark: Correct Factor = Insertion loss of LISN + Cable loss + Insertion loss of Pulse Limiter;
Measurement Result = Reading Level + Correct Factor;

Margin = Measurement Result - Limit

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1780	19.22	11.41	30.63	64.57	-33.94	QP
2	0.1780	3.55	11.41	14.96	54.57	-39.61	AVG
3	0.8020	22.44	9.96	32.40	56.00	-23.60	QP
4	0.802	13.11	9.96	23.07	46.00	-22.93	AVG
5	1.4380	15.66	9.96	25.62	56.00	-30.38	QP
6	1.4380	3.92	9.96	13.88	46.00	-32.12	AVG
7	1.9820	14.78	9.99	24.77	56.00	-31.23	QP
8	1.9820	2.69	9.99	12.68	46.00	-33.32	AVG
9	2.7100	11.19	10.03	21.22	56.00	-34.78	QP
10	2.7100	0.93	10.03	10.96	46.00	-35.04	AVG
11	4.5140	10.58	10.08	20.66	56.00	-35.34	QP
12	4.5140	-0.19	10.08	9.89	46.00	-36.11	AVG



3.2 Radiated Emissions and Band Edge

Limit

According 15.249, the field strength of emissions from intentional radiators operated within 2400-2483.5 MHz shall not exceed 94 dB μ V/m (50 mV/m).

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

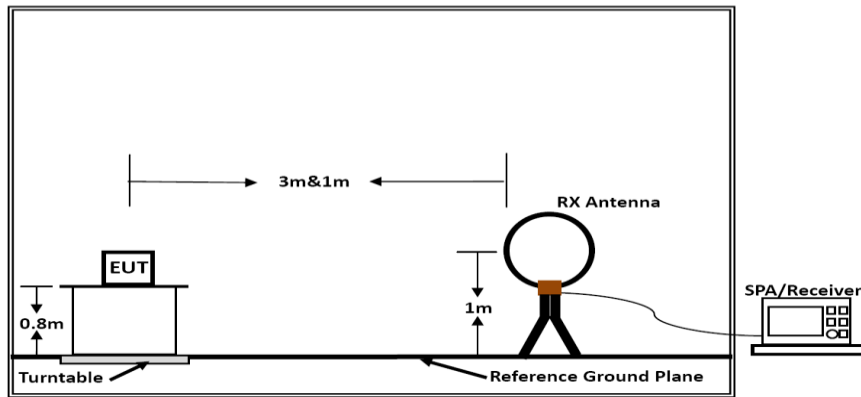
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

Frequency(MHz)	Distance(Meters)	Radiated(dB μ V/m)	Radiated(μ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	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

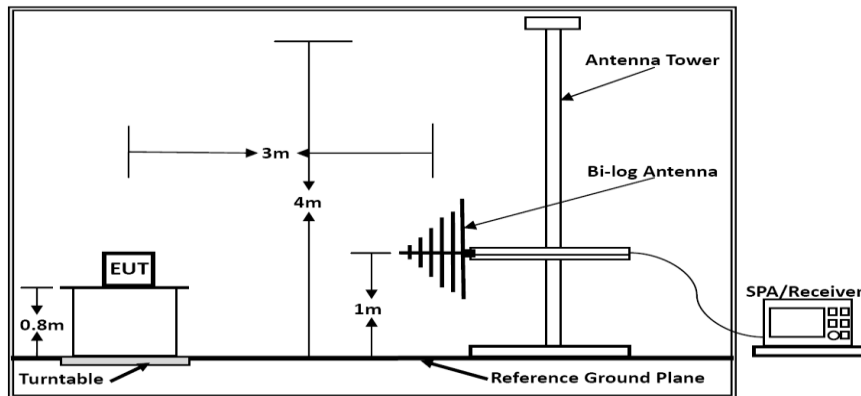
TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



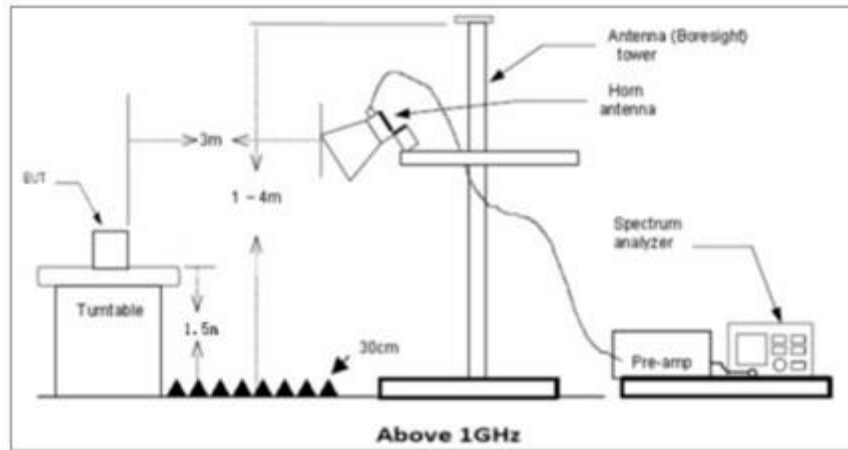
Below 30MHz

(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



Below 1GHz

(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

- Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
- Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- Radiated emission test frequency band from 9KHz to 25GHz.
- 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	BilogAntenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

- Setting test receiver/spectrum as following table states:

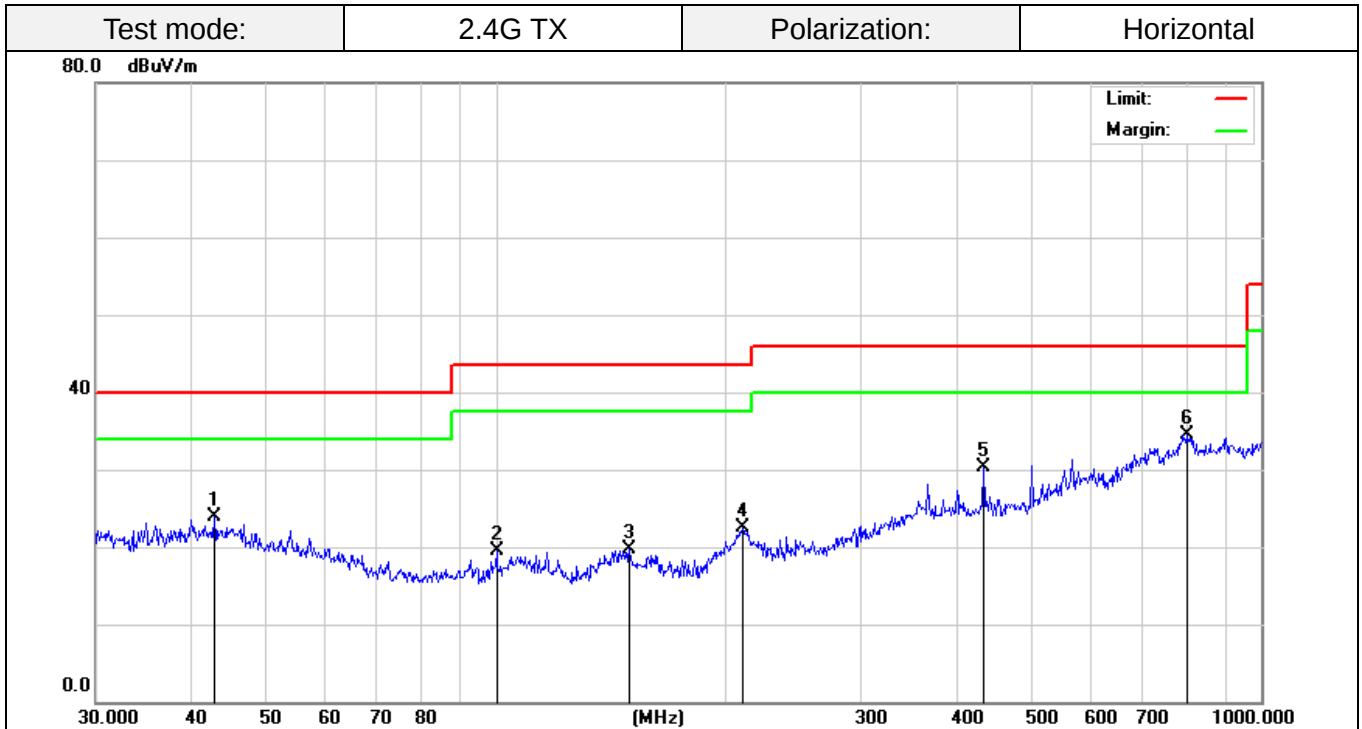
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz,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

TEST RESULTS

Remark:

- For below 1GHz testing recorded worst at low channel.
- Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and the emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.

For 30MHz-1GHz



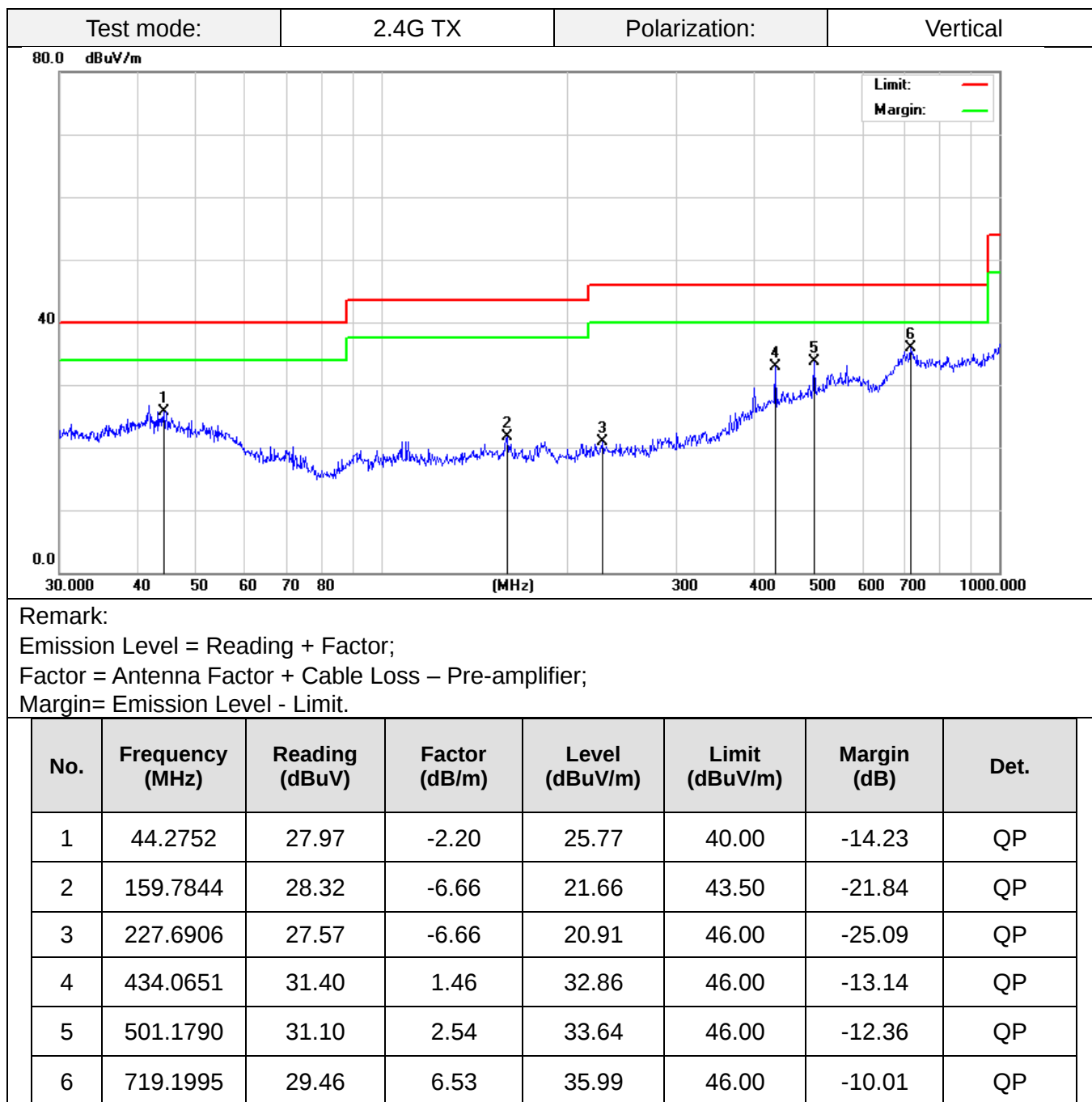
Remark:

Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin= Emission Level - Limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	42.8998	28.35	-4.42	23.93	40.00	-16.07	QP
2	100.2286	28.21	-8.66	19.55	43.50	-23.95	QP
3	149.4857	27.38	-7.72	19.66	43.50	-23.84	QP
4	210.0482	26.37	-3.93	22.44	43.50	-21.06	QP
5	434.0651	31.46	-1.12	30.34	46.00	-15.66	QP
6	798.9797	27.73	6.85	34.58	46.00	-11.42	QP



Above 1GHz:
GFSK (above 1GHz)

Frequency(MHz):		2402		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2402.00	105.87	-14.23	91.64	114.00	-22.36	PEAK
2402.00	94.11	-14.23	79.88	94.00	-14.12	AVG
4803.80	54.74	-7.56	47.18	74.00	-26.82	PEAK
--	--	--	--	--	--	AVG
7205.80	44.76	-1.64	43.12	74.00	-30.88	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2402		Polarity:	VERTICAL	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2402.00	107.82	-14.23	93.59	114.00	-20.41	PEAK
2402.00	95.06	-14.23	80.83	94.00	-13.17	AVG
4803.80	54.88	-7.56	47.32	74.00	-26.68	PEAK
--	--	--	--	--	--	AVG
7205.80	45.06	-1.64	43.42	74.00	-30.58	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2464		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2464.00	105.87	-13.89	91.98	114.00	-22.02	PEAK
2464.00	97.44	-13.89	83.55	94.00	-10.45	AVG
4928.00	53.16	-7.05	46.11	74.00	-27.89	PEAK
--	--	--	--	--	--	AVG
7392.00	43.79	-0.93	42.86	74.00	-31.14	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2464		Polarity:	VERTICAL	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2464.00	107.32	-13.89	93.43	114.00	-20.57	PEAK
2464.00	98.02	-13.89	84.13	94.00	-9.87	AVG
4928.00	53.74	-7.05	46.69	74.00	-27.31	PEAK
--	--	--	--	--	--	AVG
7392.00	44.41	-0.93	43.48	74.00	-30.52	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2480.00	103.58	-13.15	90.43	114.00	-23.57	PEAK
2480.00	93.08	-13.15	79.93	94.00	-14.07	AVG
4959.70	53.98	-5.77	48.21	74.00	-25.79	PEAK
--	--	--	--	--	--	AVG
7439.95	44.74	-0.51	44.23	74.00	-29.77	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	VERTICAL	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2480.00	105.74	-13.15	92.59	114.00	-21.41	PEAK
2480.00	94.01	-13.15	80.86	94.00	-13.14	AVG
4959.70	53.87	-5.77	48.10	74.00	-25.90	PEAK
--	--	--	--	--	--	AVG
7439.95	43.29	-0.51	42.78	74.00	-31.22	PEAK
--	--	--	--	--	--	AVG

REMARKS:

1. Emission level (dBuV/m) = Reading (dBuV)+ Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Emission level-Limit value.
4. -- Mean the PK detector measured value is below average limit.
5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value;RBW 1MHz VBW10Hz Peakdetector is for AV value.

Radiation Restricted band

Frequency(MHz):		2402		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2388.38	52.03	-4.08	47.95	74.00	-26.05	PEAK
--	--	--	--	--	--	AVG
2390.00	41.42	-4.10	37.32	74.00	-36.68	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2402		Polarity:	Vertical	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2387.56	53.42	-4.08	49.34	74.00	-24.66	PEAK
--	--	--	--	--	--	AVG
2390.00	52.08	-4.10	47.98	74.00	-26.02	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Horizontal	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	52.33	-3.09	49.24	74.00	-24.76	PEAK
--	--	--	--	--	--	AVG
2486.42	51.58	-3.05	48.53	74.00	-25.47	PEAK
--	--	--	--	--	--	AVG

Frequency(MHz):		2480		Polarity:	Vertical	
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	52.46	-3.09	49.37	74.00	-24.63	PEAK
--	--	--	--	--	--	AVG
2487.15	51.56	-3.04	48.52	74.00	-25.48	PEAK
--	--	--	--	--	--	AVG

REMARKS:

1. Emission level (dBuV/m) = Reading (dBuV)+ Factor (dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Emission level-Limit value.
4. -- Mean the PK detector measured value is below average limit.
5. Other emission levels are attenuated 20dB below the limit and not recorded in report.
6. RBW1MHz VBW3MHz Peak detector is for PK value;RBW 1MHz VBW10Hz Peakdetector is for AV value.

3.3 20dB Bandwidth

Limit

N/A

Test Procedure

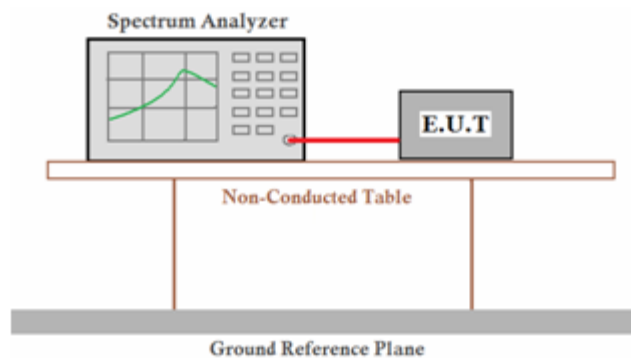
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer. Place the EUT on the table and set it in transmitting mode.

Use the following spectrum analyzer settings:

- 1) Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel.
- 2) RBW $\geq 1\%$ of the 20 dB bandwidth, VBW $\geq$ RBW.
- 3) Detector function = peak.
- 4) Trace = max hold.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration

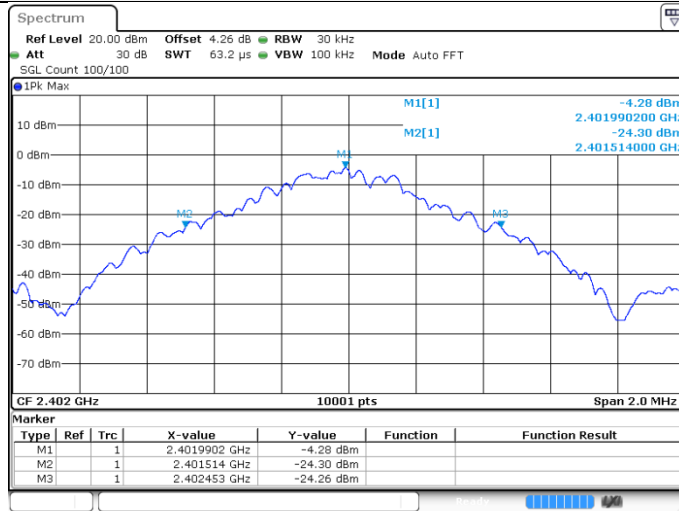


Test Results

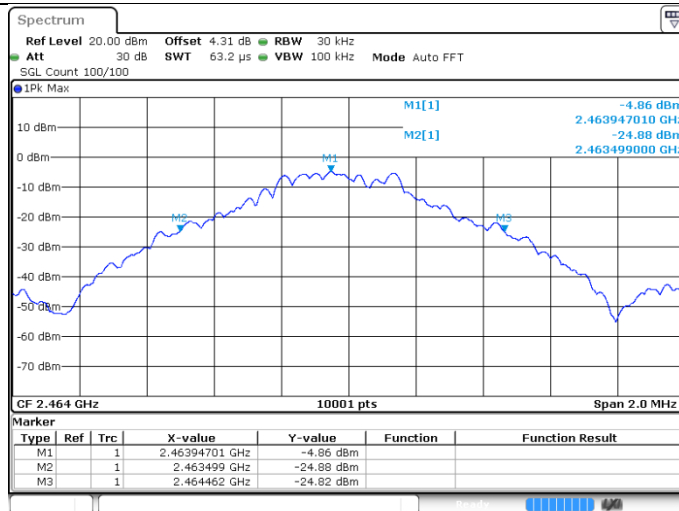
Modulation	Test Frequency (MHz)	20dB bandwidth (MHz)	Result
GFSK	2402	0.939	Pass
	2464	0.963	
	2480	0.945	

Test plot as follows:

GFSK 2.4G TX



2402 MHz



2464 MHz



2480 MHz

3.4 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

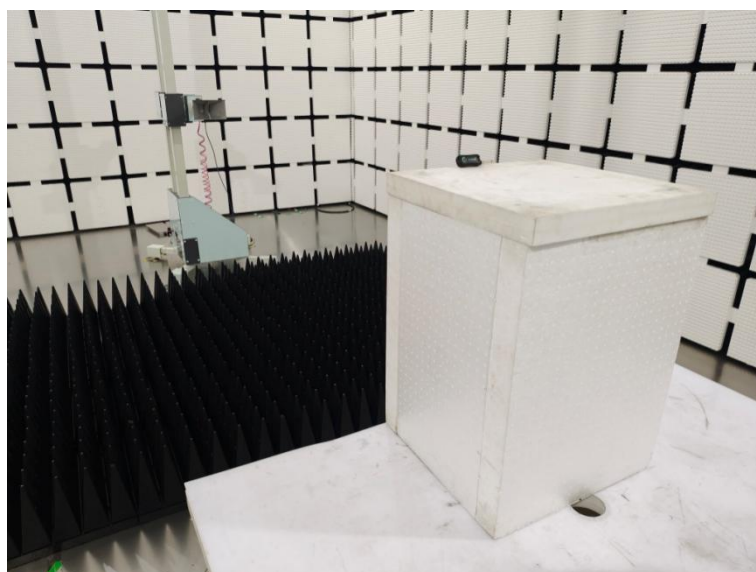
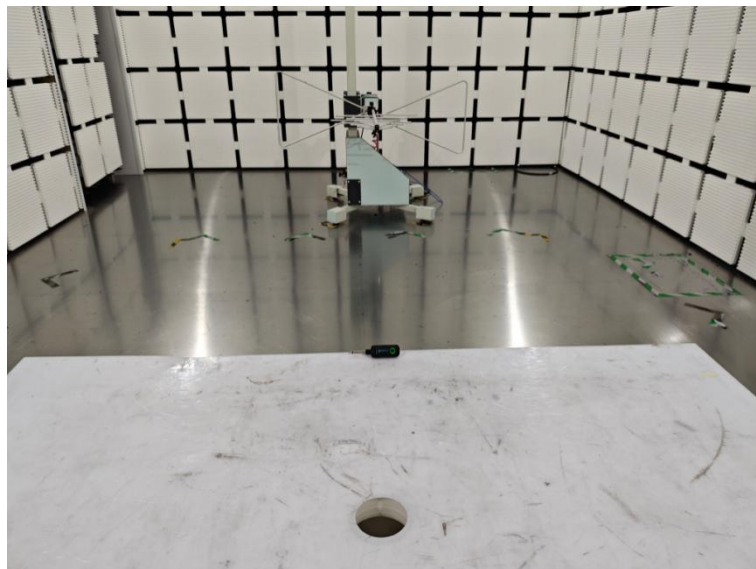
FCC CFR Title 47 Part 15 Subpart C Section 15.247(b) (4):

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Result

The maximum gain of antenna was -0.58dBi with impedance 50Ω.

4 Test Setup Photographs of EUT



5 Photos of EUT

External EUT photo

Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Internal EUT photo
Photo 9

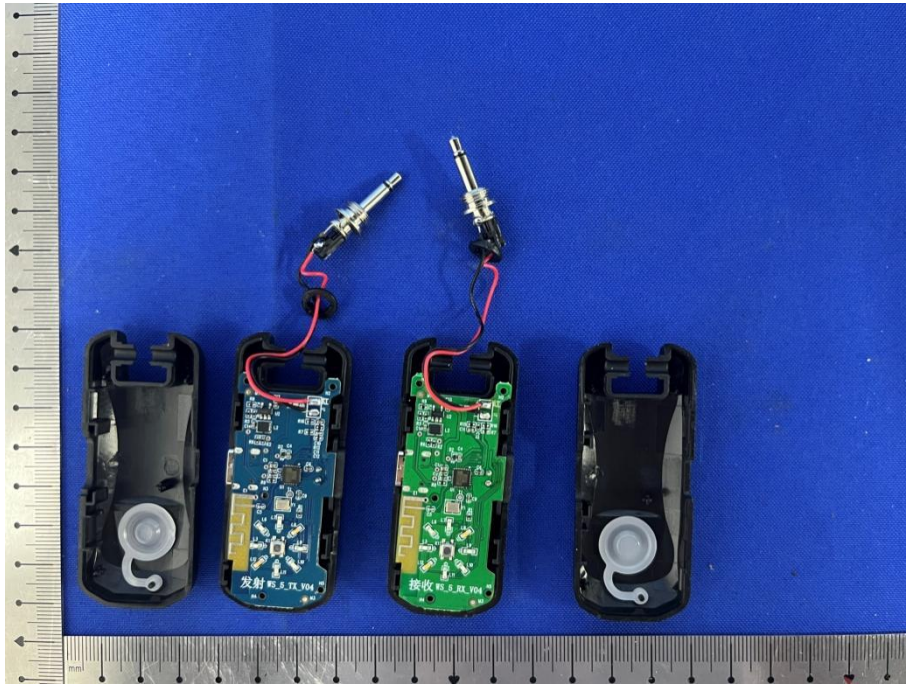


Photo 10

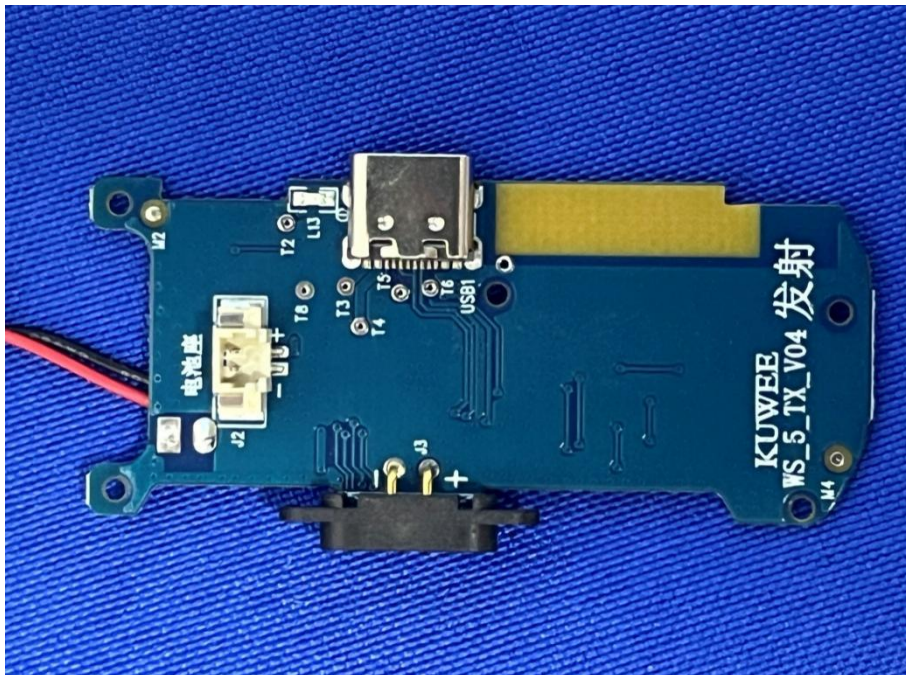
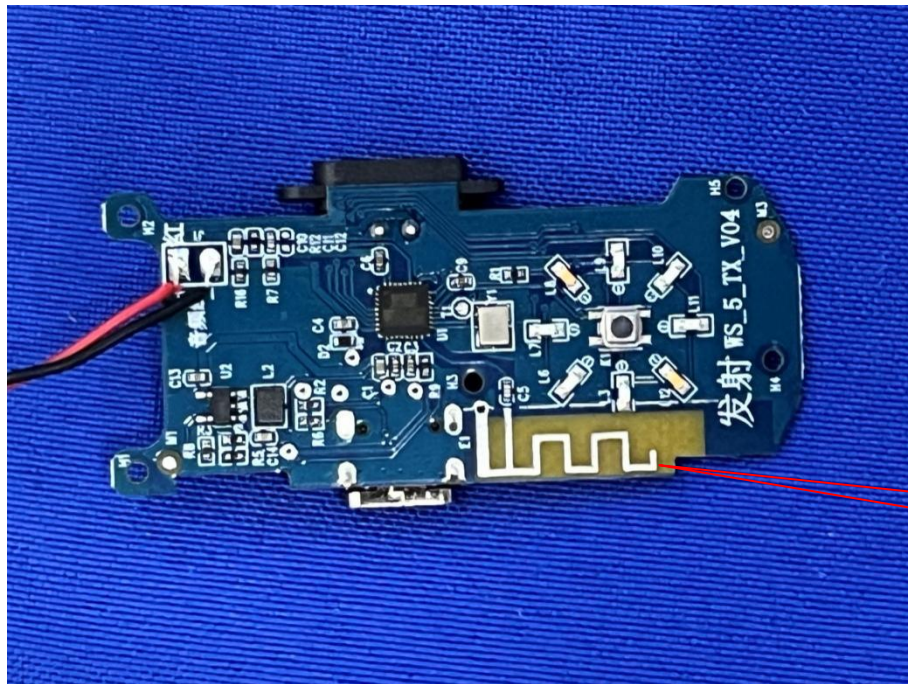


Photo 11



2.4G Antenna

Photo 12



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