TEST REPORT

Client Information:

Applicant:	Xiang Tan Taide Trading Co., Ltd.
Applicant add.:	Yue Tang Qu Fu Rong Lu 9 Hao 1 Dan Yuan 1401028 Hao Hu Nan Xiang Tan China 411100
Manufacturer:	Xiang Tan Taide Trading Co., Ltd.
Manufacturer add.:	Yue Tang Qu Fu Rong Lu 9 Hao 1 Dan Yuan 1401028 Hao Hu Nan Xiang Tan China 411100

Product Information:

Product Name:	BOYI GMK67-65 Keyboard Kit
Model No.:	BOYI GMK67, BOYI GMK67 Keyboard
Brand Name:	BOYI
FCC ID:	2A6KU-BOYI-GMK67

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249

Prepared By:

Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan, Guangdong, China

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Date of Receipt:	Aug. 10, 2023	Date of Test:	Aug. 10, 2023 - Aug. 29, 2023
Date of Issue:	Sep. 20, 2023	Test Result:	Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Reviewed by: Simba Huang Simba Huang **Approved by:** Seal.chen Seal.chen

1 Contents

Revision History

Revision	Issue Date	Revisions	Revised By
000	Sep. 20, 2023	Initial Issue	Seal Chen

2 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	§15.203	Pass
AC Power Line Conducted Emission	§15.207	Pass
Fundamental &Radiated Spurious Emission Measurement	§15.249 (a)/ §15.209	Pass
20dB Channel Bandwidth	15.215(c)	Pass
Band Edge	§15.249 (d)/ §15.205	Pass

Note

1. Test according to ANSI C63.10:2013.

2. The measurement uncertainty is not included in the test result.

2.1 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 AiT 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.

2.2 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	0.009MHz-30MHz	3.10dB	(1)
Radiated Emission	30MHz-1GHz	3.75dB	(1)
Radiated Emission	1GHz-18GHz	3.88dB	(1)
Radiated Emission	18GHz-40GHz	3.88dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	1.20dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

3 Test Facility

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

.CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2017 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on April 18, 2022

FCC-Registration No.: 703111 Designation Number: CN1313

Dongguan Yaxu (AiT) 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.: 6819A CAB identifier: CN0122

The 3m Semi-anechoic chamber of Dongguan Yaxu (AiT) technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6819A

A2LA-Lab Cert. No.: 6317.01

Dongguan Yaxu (AiT) 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.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

3.3 Test Location

Dongguan Yaxu (AiT) Technology Limited

Address: No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan, Guangdong, China

Tel.: +86-769-8202 0499

Fax.: +86-769-8202 0495

4 General Information

EUT Name:	BOYI GMK67-65 Keyboard Kit
Model No:	BOYI GMK67
Serial Model:	BOYI GMK67 Keyboard
Test sample(s) ID:	S01, S02
Sample(s) Status:	Engineer sample
Operation frequency:	2405MHz-2475MHz
Channel Number:	16 channels
Modulation Technology:	GFSK
Antenna Type:	PCB Antenna
Antenna gain:	3.85 dBi
H/W No.:	N/A
S/W No.:	N/A
Power supply:	DC 5V from adapter or DC 3.7V from battery
Model different:	only the model name and appearance color different.
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.1 Test frequencies

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2405(Low)	09	2445
02	2409	10	2450
03	2413	11	2453
04	2425	12	2457
05	2429	13	2461
06	2432	14	2465
07	2435	15	2469
08	2440(Middle)	16	2475(High)

4.2 EUT Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	Adapter	HUAWEI	CE/FCC	HW-100400C00	N/A	N/A	N/A

4.4 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Dongguan Yaxu (AiT) Technology Limit.

EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT Exercise

The EUT was operated in the normal operating mode and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209, 15.247 under the FCC Rules Part 15 Subpart C and RSS-247 Issue 2, RSS-Gen Issue 5.

General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.

4.5 Description of Test Modes

The EUT has been tested under operating condition.

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was determined to be TX(1Mbps-Low Channel).

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Transmitting mode	Keep the EUT in continuously transmitting mode.		
Test software:	fixed in EUT by manufacturer		
Frequency	2405 MHz	2440 MHz	2475 MHz
Parameters(1Mbps)	Default	Default	Default

5 Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2022.09.02	2023.09.01
2	EMI Measuring Receiver	R&S	ESR	101160	2022.09.02	2023.09.01
3	Low Noise Pre Amplifier	HP	HP8447E	1937A01855	2022.09.02	2023.09.01
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2022.09.02	2023.09.01
5	Passive Loop	ETS	6512	00165355	2022.09.04	2024.09.03
6	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBECK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2022.09.02	2023.09.01
10	LISN	Kyoritsu	KNW-242	8-837-4	2022.09.02	2023.09.01
11	LISN	R&S	ESH3-Z2	0357.8810.54-101161-S2	2022.09.02	2023.09.01
12	Pro.Temp&Humi.chamber	MENTEK	MHP-150-1C	MAA08112501	2022.09.02	2023.09.01
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
14	Signal Generator	Agilent	N5182A	MY50143009	2022.09.02	2023.09.01
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2022.09.02	2023.09.01
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
17	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	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.						

6 Test Results and Measurement Data

6.1 Antenna requirement

6.1.1 Standard requirement:
15.203 requirement: 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.
6.1.2 EUT Antenna:
The antenna is PCB antenna, the best case gain of the antenna is 3.85dBi, reference to the appendix for details

6.2 20 dB Spectrum Bandwidth Measurement

6.4.1 Standard requirement:

FCC Part15 C Section part 15.249/15.215(c):

FCC Part15 (15.249) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
Part 15.215(c)	Bandwidth	2400-2483.5	PASS

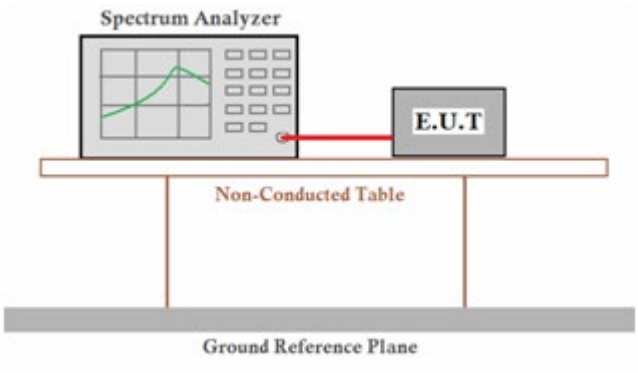
6.4.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.4.3 Test Procedures

1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

6.4.4 Test Setup Layout



6.4.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

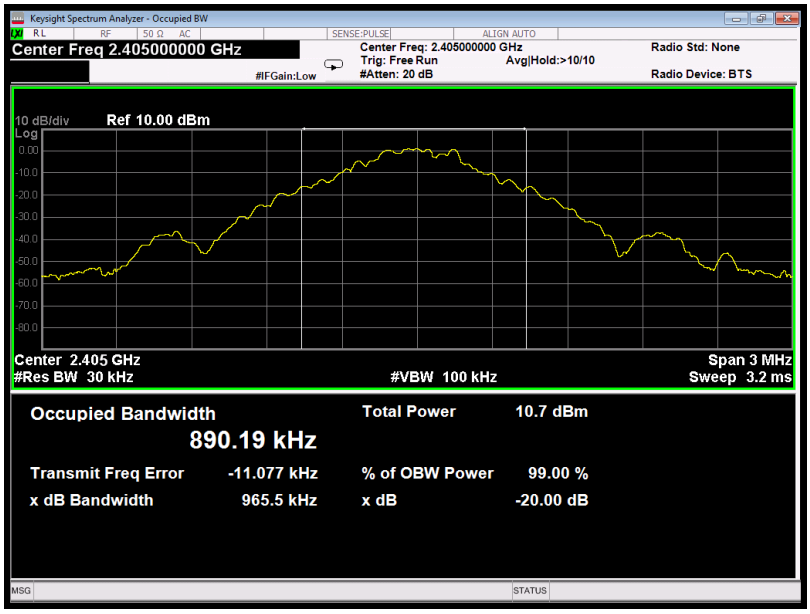
6.4.6 Test result

PASS

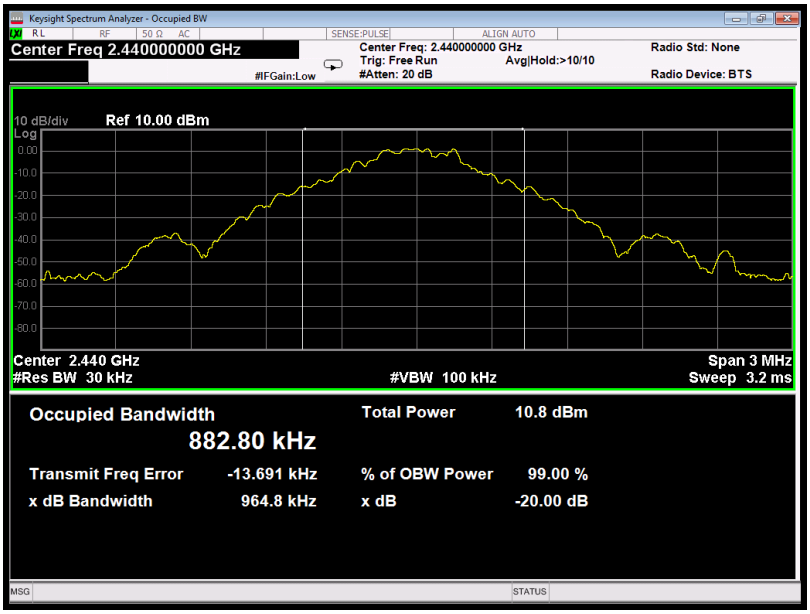
Frequency (MHz)	Ant.	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
2405	Ant1	0.9655	/	Pass
2440	Ant1	0.9648	/	Pass
2475	Ant1	0.9650	/	Pass

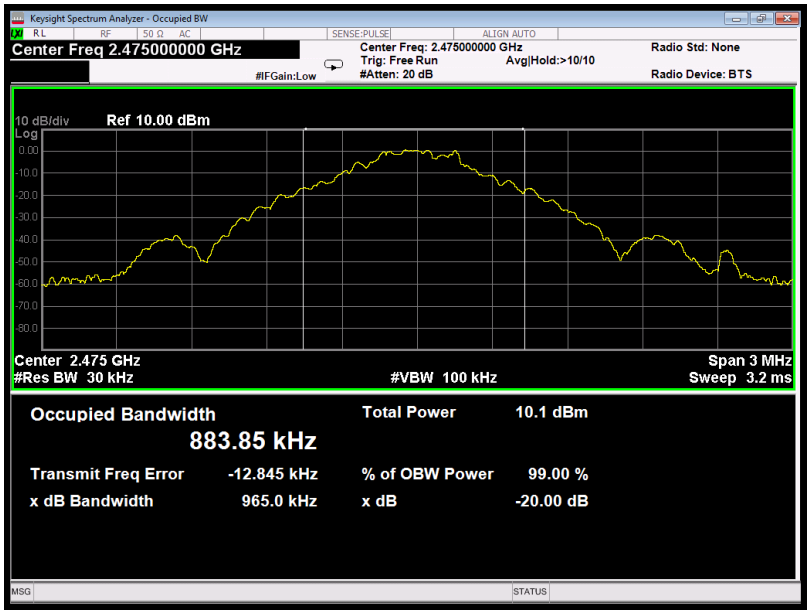
Test Graphs

2405MHz Ant1



2440MHz Ant1



2475MHz Ant1


Remark:

1). Measured 20dB Bandwidth at difference data rate for each mode and recorded worst case for each mode.

2). Test results including cable loss;

6.3 Radiated Emissions Measurement

6.8.1 Standard requirement:

FCC Part15 C Section 15.209 :

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Band-edge Measurements

According to §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

6.8.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

6.8.3 Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 1.0 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

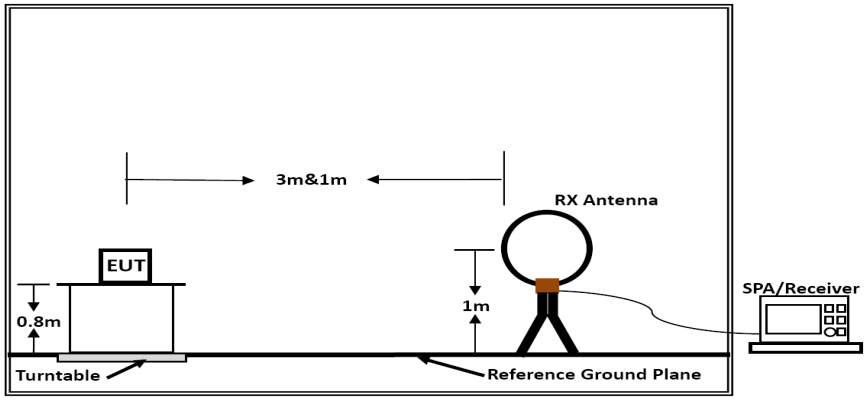
--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

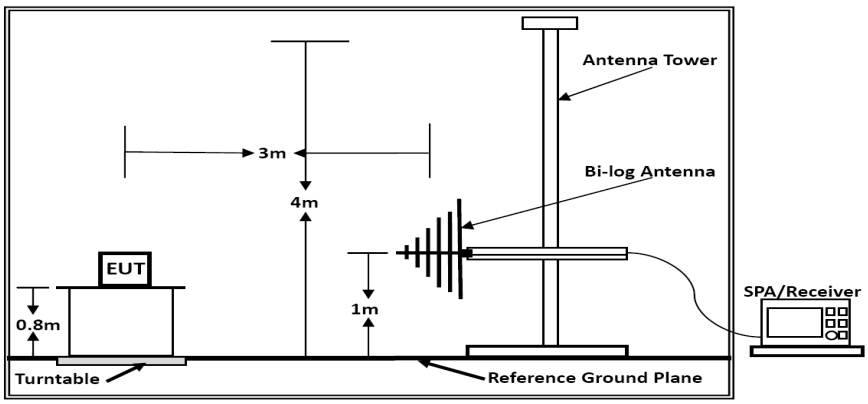
--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

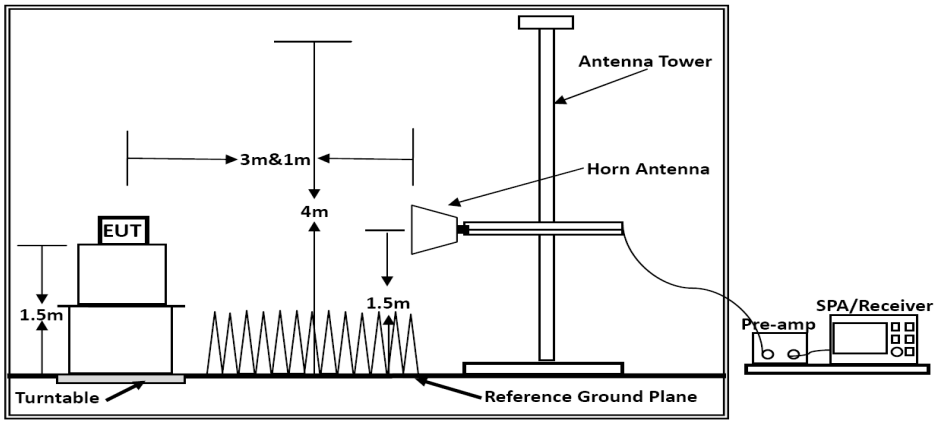
6.8.4 Test Setup Layout



Below 30MHz



Below 1GHz



Above 1GHz

Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

6.8.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.8.6 Test result

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Temperature	25.7℃	Humidity	52.3%
Test Engineer	Simba Huang	Configurations	TX

Remarks:

1. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

6.3.1 Field Strength of the Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2405	88.95	-2.17	86.78	114.00	-27.22	Vertical
2405	84.39	-2.17	82.22	114.00	-31.78	Horizontal
2440	85.26	-2.56	82.70	114.00	-31.30	Vertical
2440	86.72	-2.56	84.16	114.00	-29.84	Horizontal
2475	82.24	-2.98	79.26	114.00	-34.74	Vertical
2475	89.39	-2.98	86.41	114.00	-27.59	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
2405	72.22	-2.17	70.05	94.00	-23.95	Vertical
2405	71.27	-2.17	69.10	94.00	-24.90	Horizontal
2440	79.10	-2.56	76.54	94.00	-17.46	Vertical
2440	73.13	-2.56	70.57	94.00	-23.43	Horizontal
2475	79.17	-2.98	76.19	94.00	-17.81	Vertical
2475	70.27	-2.98	67.29	94.00	-26.71	Horizontal

Note: Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

6.3.2 Spurious emissions

■ **Results of Radiated Emissions (9 KHz~30MHz)**

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

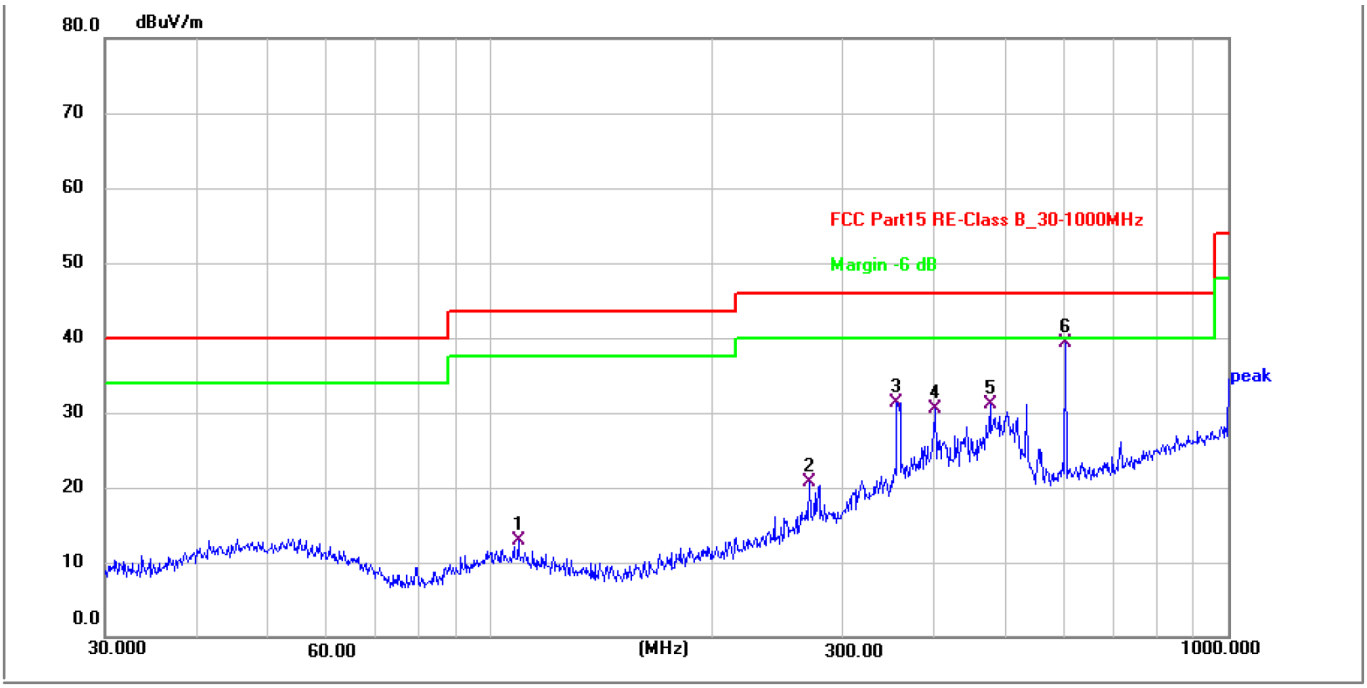
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

■ **Results of Radiated Emissions (30MHz~1GHz)**

Pre-scan all test modes, found worst case at GFSK (LCH), and so only show the test result of GFSK (LCH).

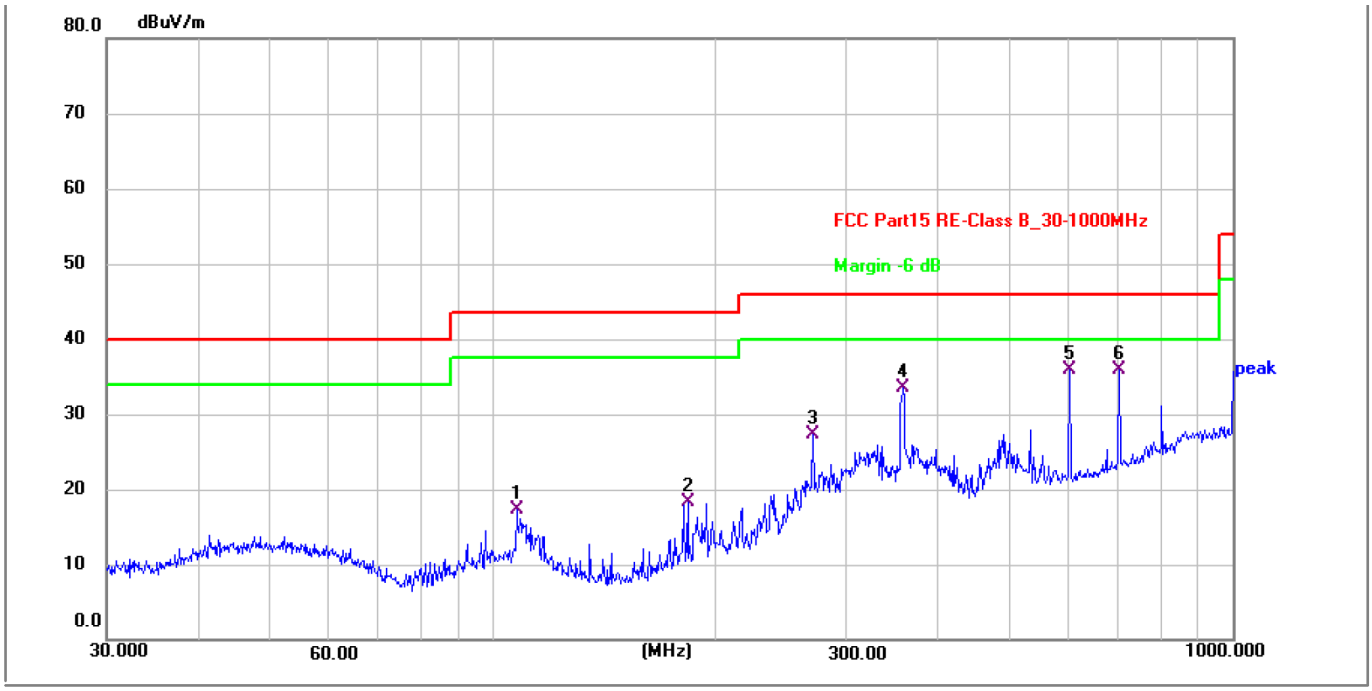
Model name:	BOYI GMK67	Test Date :	2023-08-11
Polarization :	Vertical	Test Result:	☒ Pass ☐ Fail



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	109.0286	28.63	-15.77	12.86	43.50	-30.64	QP	P
2	270.3748	33.19	-12.54	20.65	46.00	-25.35	QP	P
3	355.4272	41.98	-10.58	31.40	46.00	-14.60	QP	P
4	400.4318	40.20	-9.72	30.48	46.00	-15.52	QP	P
5	475.4991	39.65	-8.62	31.03	46.00	-14.97	QP	P
6 *	601.4265	45.06	-5.77	39.29	46.00	-6.71	QP	P

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Level = Reading + Factor Margin = Level - Limit

Model name:	BOYI GMK67	Test Date :	2023-08-11
Polarization :	Horizontal	Test Result:	☒ Pass ☐ Fail



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	107.5101	32.94	-15.68	17.26	43.50	-26.24	QP	P
2	183.2005	34.27	-15.87	18.40	43.50	-25.10	QP	P
3	270.3748	39.72	-12.45	27.27	46.00	-18.73	QP	P
4	357.9287	44.11	-10.52	33.59	46.00	-12.41	QP	P
5 *	601.4265	41.66	-5.77	35.89	46.00	-10.11	QP	P
6	701.7610	40.08	-4.19	35.89	46.00	-10.11	QP	P

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Level = Reading + Factor Margin = Level - Limit

Results for Radiated Emissions (1- 26 GHz)

Test Mode: CH01 (Low channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2405.0000	93.85	31.21	2.17	35.30	91.93	114.00	-22.07	V	Peak
2405.0000	82.58	31.21	2.17	35.30	80.66	94.00	-13.34	V	AVG
4810.0000	48.81	34.01	2.56	34.71	50.67	74.00	-23.33	V	Peak
4810.0000	41.27	34.01	2.56	34.71	43.13	54.00	-10.87	V	AVG
7215.0000	45.65	36.16	2.98	35.15	49.64	74.00	-24.36	V	Peak
7215.0000	38.80	36.16	2.98	35.15	42.79	54.00	-11.21	V	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								
2405.0000	95.74	31.21	2.17	35.30	93.82	114.00	-20.18	H	Peak
2405.0000	84.54	31.21	2.17	35.30	82.62	94.00	-11.38	H	AVG
4810.0000	50.50	34.01	2.56	34.71	52.36	74.00	-21.64	H	Peak
4810.0000	40.51	34.01	2.56	34.71	42.37	54.00	-11.63	H	AVG
7215.0000	47.52	36.16	2.98	35.15	51.51	74.00	-22.49	H	Peak
7215.0000	36.73	36.16	2.98	35.15	40.72	54.00	-13.28	H	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								

Note:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH08 (Middle channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2440.0000	94.99	31.12	2.20	34.51	93.80	114.00	-20.20	V	Peak
2440.0000	83.92	31.22	2.20	34.51	82.83	94.00	-11.17	V	AVG
4880.0000	48.89	34.98	2.49	34.14	52.22	74.00	-21.78	V	Peak
4880.0000	39.38	34.98	2.49	34.14	42.71	54.00	-11.29	V	AVG
7320.0000	45.30	36.01	3.01	34.56	49.76	74.00	-24.24	V	Peak
7320.0000	38.14	36.01	3.01	34.56	42.60	54.00	-11.40	V	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								
2440.0000	96.78	31.12	2.20	34.51	95.59	114.00	-18.41	H	Peak
2440.0000	83.82	31.12	2.20	34.51	82.63	94.00	-11.37	H	AVG
4880.0000	47.81	34.98	2.49	34.14	51.14	74.00	-22.86	H	Peak
4880.0000	41.32	34.98	2.49	34.14	44.65	54.00	-9.35	H	AVG
7320.0000	46.62	36.01	3.01	34.56	51.08	74.00	-22.92	H	Peak
7320.0000	35.51	36.01	3.01	34.56	39.97	54.00	-14.03	H	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								

Note:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH16(High channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2475.0000	94.81	31.64	2.18	35.89	92.74	114.00	-21.26	V	Peak
2475.0000	85.65	31.64	2.18	35.89	83.58	94.00	-10.42	V	AVG
4950.0000	48.09	35.10	2.52	34.87	50.84	74.00	-23.16	V	Peak
4950.0000	39.99	35.10	2.52	34.87	42.74	54.00	-11.26	V	AVG
7425.0000	45.20	36.18	3.18	34.96	49.60	74.00	-24.40	V	Peak
7425.0000	37.29	36.18	3.18	34.96	41.69	54.00	-12.31	V	AVG
9900.0000	*								
12375.0000	*								
14850.0000	*								
17325.0000	*								
2475.0000	94.63	31.64	2.18	35.89	92.56	114.00	-21.44	H	Peak
2475.0000	84.18	31.64	2.18	35.89	82.11	94.00	-11.89	H	AVG
4950.0000	47.37	35.10	2.52	34.87	50.12	74.00	-23.88	H	Peak
4950.0000	39.73	35.10	2.52	34.87	42.48	54.00	-11.52	H	AVG
7425.0000	45.42	36.18	3.18	34.96	49.82	74.00	-24.18	H	Peak
7425.0000	36.02	36.18	3.18	34.96	40.42	54.00	-13.58	H	AVG
9900.0000	*								
12375.0000	*								
14850.0000	*								
17325.0000	*								

Note:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

6.3.3 Band-edge Measurements

All of the restriction bands were tested, and only the data of worst case was exhibited.

Test channel:	Lowest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	50.74	29.15	3.41	34.01	49.29	74.00	-24.71	V
2400.00	61.12	29.16	3.43	34.01	59.70	74.00	-14.30	V
2390.00	53.77	29.15	3.41	34.01	52.32	74.00	-21.68	H
2400.00	62.74	29.16	3.43	34.01	61.32	74.00	-12.68	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	39.34	29.15	3.41	34.01	37.89	54.00	-16.11	V
2400.00	45.54	29.16	3.43	34.01	44.12	54.00	-9.88	V
2390.00	41.37	29.15	3.41	34.01	39.92	54.00	-14.08	H
2400.00	44.72	29.16	3.43	34.01	43.30	54.00	-10.70	H

Test channel:	Highest channel

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	51.45	29.28	3.53	34.03	50.23	74.00	-23.77	V
2500.00	48.74	29.30	3.56	34.03	47.57	74.00	-26.43	V
2483.50	55.63	29.28	3.53	34.03	54.41	74.00	-19.59	H
2500.00	51.24	29.30	3.56	34.03	50.07	74.00	-23.93	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	39.75	29.28	3.53	34.03	38.53	54.00	-15.47	V
2500.00	36.64	29.30	3.56	34.03	35.47	54.00	-18.53	V
2483.50	41.57	29.28	3.53	34.03	40.35	54.00	-13.65	H
2500.00	37.50	29.30	3.56	34.03	36.33	54.00	-17.67	H

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

6.4 Conducted Emissions

6.9.1 Standard requirement:

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

6.9.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

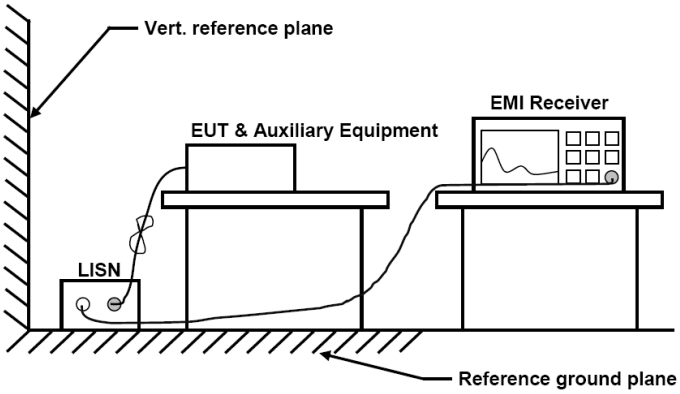
Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
RB / VB (Emission in restricted band)	100KHz/300KHz
RB / VB (Emission in non-restricted band)	100KHz/300KHz

6.9.3 Test Procedures

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz

The spectrum from 9 kHz to 26.5GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

6.9.4 Test Setup Layout



6.9.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.9.6 Test result

PASS

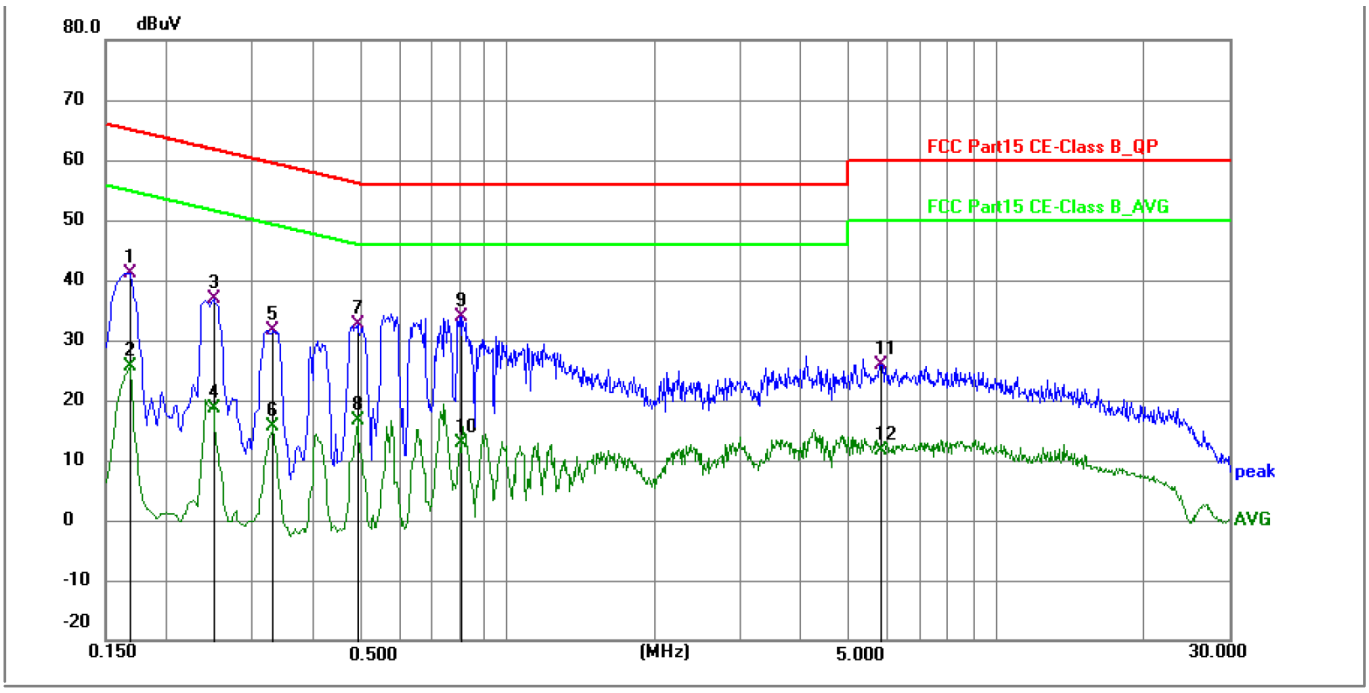
The test data please refer to following page.

Temperature	21.6℃	Humidity	52.0%
Test Engineer	Simba Huang	Configurations	2.4G

Measurement data:

Pre-scan all test modes, found worst case at GFSK 2475MHz, and so only show the test result of GFSK 2475MHz

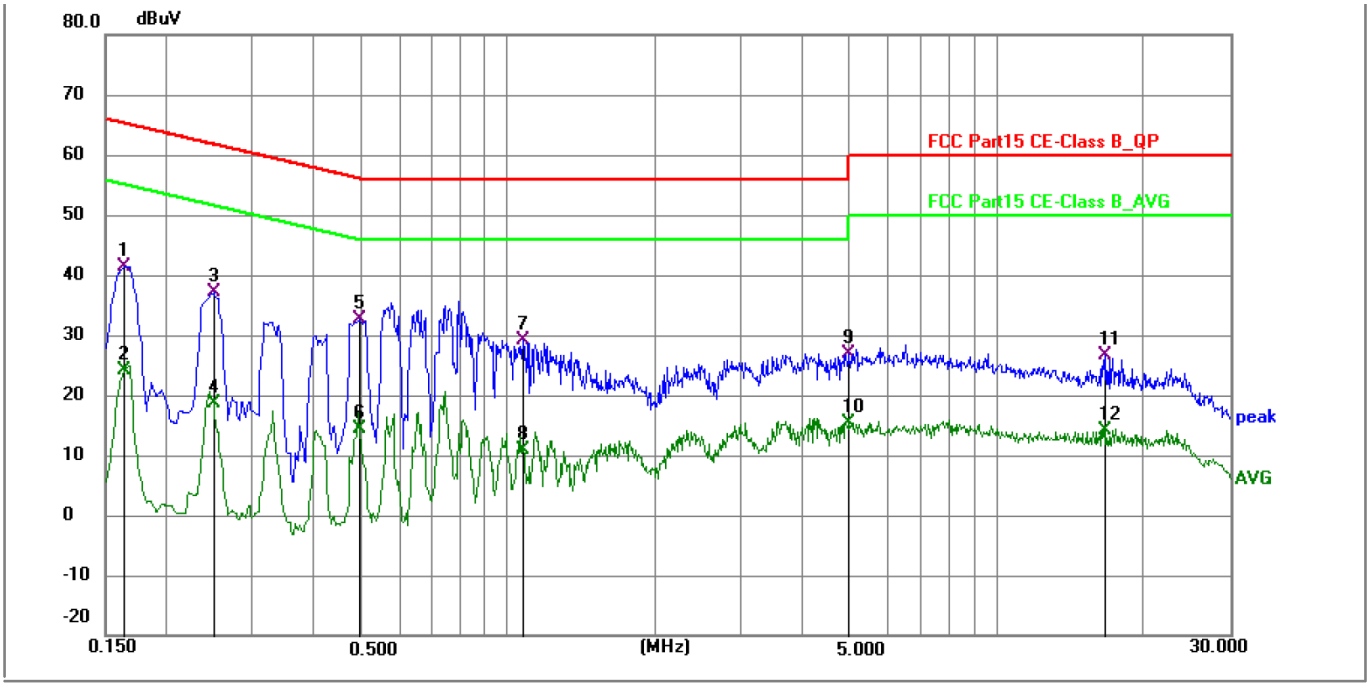
Model name:	BOYI GMK67	Test Date :	2023-08-11
ATM Pressure:	101 kPa	Test by:	Simba Huang
Phase :	Line	Test Result:	☒ Pass ☐ Fail



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Level = Reading + Factor Margin = Level - Limit

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1680	41.01	0.00	41.01	65.06	-24.05	QP	P	
2	0.1680	25.55	0.00	25.55	55.06	-29.51	AVG	P	
3	0.2490	36.86	0.00	36.86	61.79	-24.93	QP	P	
4	0.2490	18.75	0.00	18.75	51.79	-33.04	AVG	P	
5	0.3300	31.55	0.00	31.55	59.45	-27.90	QP	P	
6	0.3300	15.59	0.00	15.59	49.45	-33.86	AVG	P	
7	0.4920	32.61	0.00	32.61	56.13	-23.52	QP	P	
8	0.4920	16.53	0.00	16.53	46.13	-29.60	AVG	P	
9 *	0.8070	33.94	0.00	33.94	56.00	-22.06	QP	P	
10	0.8070	12.87	0.00	12.87	46.00	-33.13	AVG	P	
11	5.8649	25.99	0.00	25.99	60.00	-34.01	QP	P	
12	5.8649	11.66	0.00	11.66	50.00	-38.34	AVG	P	

Model name:	BOYI GMK67	Test Date :	2023-08-11
ATM Pressure:	101 kPa	Test by:	Simba Huang
Phase :	Neutral	Test Result:	☒ Pass ☐ Fail



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Level = Reading + Factor Margin = Level - Limit

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1633	41.29	0.00	41.29	65.29	-24.00	QP	P	
2	0.1633	24.21	0.00	24.21	55.29	-31.08	AVG	P	
3	0.2490	37.10	0.00	37.10	61.79	-24.69	QP	P	
4	0.2490	18.57	0.00	18.57	51.79	-33.22	AVG	P	
5 *	0.4965	32.56	0.00	32.56	56.06	-23.50	QP	P	
6	0.4965	14.32	0.00	14.32	46.06	-31.74	AVG	P	
7	1.0725	29.17	0.00	29.17	56.00	-26.83	QP	P	
8	1.0725	10.93	0.00	10.93	46.00	-35.07	AVG	P	
9	4.9965	26.77	0.00	26.77	56.00	-29.23	QP	P	
10	4.9965	15.45	0.00	15.45	46.00	-30.55	AVG	P	
11	16.7325	26.61	0.00	26.61	60.00	-33.39	QP	P	
12	16.7325	14.05	0.00	14.05	50.00	-35.95	AVG	P	

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7 Test Setup Photo

Reference to the **appendix Setup photo** for details.

8 EUT Constructional Details

Reference to the appendix **External EUT photo & Internal EUT photo** for details.

------End------