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# FCC Test Report

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Report No.: AGC02294220801FE01

**FCC ID** : 2AJGM-GM30

**PRODUCT DESIGNATION** : GMRS Two way radio

**BRAND NAME** : BAOFENG, POFUNG

**MODEL NAME** : GM-30, GMRS-15J, GM-13PRO, GM-15E, GM-15X, GM-H5

**APPLICANT** : PO FUNG ELECTRONIC (HK) INTERNATONAL GROUP COMPANY LIMITED

**DATE OF ISSUE** : Sep. 06, 2022

**STANDARD(S)** : FCC Part 15 Rules

**REPORT VERSION** : V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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**REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 06, 2022	Valid	Initial Release

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**1. VERIFICATION OF COMPLIANCE**

<b>Applicant:</b>	PO FUNG ELECTRONIC (HK) INTERNATONAL GROUP COMPANY LIMITED
<b>Address:</b>	Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan Road, Kowloon, Hong Kong
<b>Manufacturer:</b>	PO FUNG ELECTRONIC (HK) INTERNATONAL GROUP COMPANY LIMITED
<b>Address:</b>	Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan Road, Kowloon, Hong Kong
<b>Factory:</b>	PO FUNG ELECTRONIC (HK) INTERNATONAL GROUP COMPANY LIMITED
<b>Address:</b>	Room 1508, 15/F, Office Tower II, Grand Plaza, 625 Nathan Road, Kowloon, Hong Kong
<b>Product Designation</b>	GMRS Two way radio
<b>Brand Name</b>	BAOFENG, POFUNG
<b>Test Model</b>	GM-30
<b>Series Model(s)</b>	GMRS-15J, GM-13PRO, GM-15E, GM-15X, GM-H5
<b>Difference Description</b>	The same electromagnetic emissions and electromagnetic compatibility characteristics. GM-30, GMRS-15J, GM-13PRO, GM-15E, GM-15X, GM-H5 are just different model name &Brand name & appearance outside speaker, the rest are the same.
<b>Measurement Procedure:</b>	ANSI C63.4: 2014
<b>Deviation:</b>	No any deviation from the test method.
<b>Date of Test:</b>	Aug. 09, 2022~Sep. 06, 2022
<b>Condition of Test Sample:</b>	Normal
<b>Test Result:</b>	Pass
<b>Report Template;</b>	AGCRT-US-PTT/EMC

The above equipment was tested by Attestation Of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements. The test results of this report relate only to the tested sample identified in this report.

Prepared By

Bibo Zhang  
(Project Engineer)

Sep. 06, 2022

Reviewed By

Calvin Liu  
(Reviewer)

Sep. 06, 2022

Approved By

Max Zhang  
Authorized Officer

Sep. 06, 2022

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## 2. PRODUCT INFORMATION

The EUT is a **GMRS Two way radio** designed for voice communication. It is designed by way of utilizing the F3E modulation achieves the system operating.

A major technical description of EUT is described as following:

<b>Communication Type</b>	Voice / Tone only
<b>Modulation</b>	FM
<b>RX Frequency Range</b>	76 MHz-108MHz(FM Receiver)
<b>Emission Type</b>	F3E
<b>Antenna Designation</b>	Detachable
<b>Antenna Gain</b>	0.8dBi
<b>Hardware Version</b>	V05
<b>Software Version</b>	V1.00.32
<b>Power Supply</b>	DC 7.4V,1500mAh by battery, charging for DC8.4V

### I/O Port Information (Applicable Not Applicable)

I/O Port of EUT			
I/O Port Type	Q'TY	Cable	Tested with
Antenna Port	1	-	1
Earphone Port	1	-	1

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### 3. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

<b>Test Site</b>	Attestation of Global Compliance (Shenzhen) Co., Ltd
<b>Location</b>	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
<b>Designation Number</b>	CN1259
<b>FCC Test Firm Registration Number</b>	975832
<b>A2LA Cert. No.</b>	5054.02
<b>Description</b>	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 09, 2022	May 08, 2023
LISN	R&S	ESH2-Z5	100086	Jun. 08, 2022	Jun. 07, 2023
TEST SOFTWARE	FARA	EZ-EMC (Ver.AGC-C ON03A1)	N/A	N/A	N/A

### TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 09, 2022	May 08, 2023
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 08, 2021	Jan. 07, 2023
ANTENNA	SCHWARZBECK	VULB9168	D69250	Apr. 28, 2021	Apr. 27, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03, 2020	Sep. 02, 2022
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 01, 2022	Aug. 31, 2023
POSITIONING CONTROLLER	MF	MF-7802	MF780208285	--	--
HORN ANTENNA	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
RF Communication Test Set	HP	8920B	US35010161	Aug. 03, 2022	Aug. 02, 2023
EXA Signal Analyzer	Agilent	N9020A	MY53300860	Jun. 08, 2022	Jun. 07, 2023
Attenuator	Schaffner	58-30-33	ML030	Oct. 24, 2021	Oct. 23, 2022
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A

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#### 4. SUPPORT EQUIPMENT LIST

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Adapter		BF-0501000	-	-	-
Battery	-	BP-58	-	-	-
Back clip	-	N/A	-	-	-

#### 5. SYSTEM DESCRIPTION

**EUT TEST PROCEDURE:**

1. Connect EUT and peripheral devices.
2. Power on the EUT, the EUT begins to work.
3. Make sure the EUT normal working.

**EMC TEST MODE:**

No.	TEST MODES
1	FM Broadcast Receiver Mode

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## 6. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission,  $U_c = \pm 3.1$  dB
- Uncertainty of Radiated Emission below 1GHz,  $U_c = \pm 4.0$  dB
- Uncertainty of Radiated Emission above 1GHz,  $U_c = \pm 4.8$  Db

## 7. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.107	Conduction Emission	Compliant
§15.109	Radiated Emission	Compliant

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## 8. FCC RADIATED EMISSION TEST

### 8.1 PROVISIONS APPLICABLE

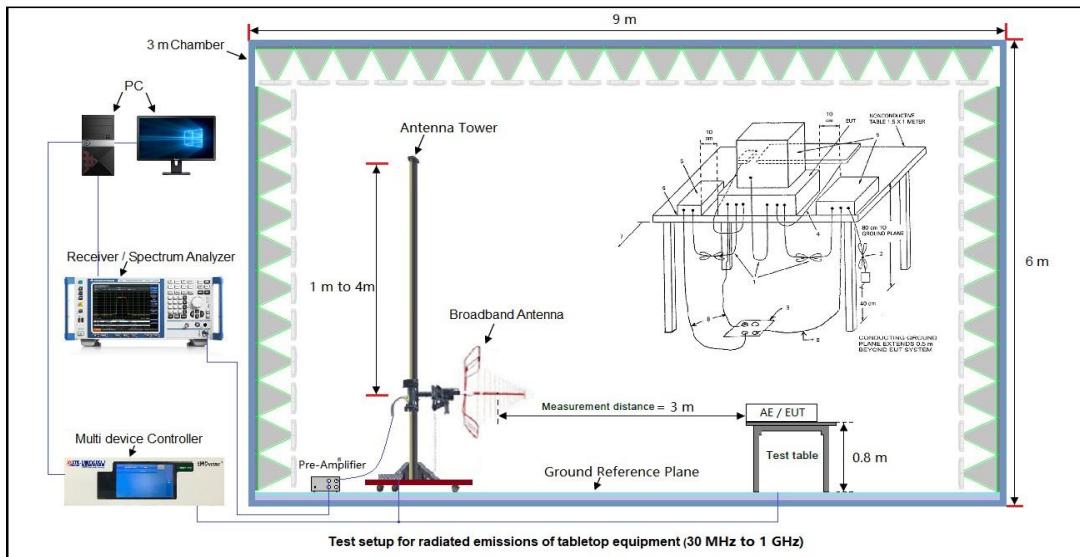
FCC CFR Title 47 Part 15 Subpart B Section 15.109:

Frequency	Limit (dBuV/m @ 3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

Note: The lower limit shall apply at the transition frequency. Because the EUT RX frequency range up to 480 MHz, so the upper the frequency range up to 2 GHz.

### 8.2 TEST SETUP BLOCK DIAGRAM

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



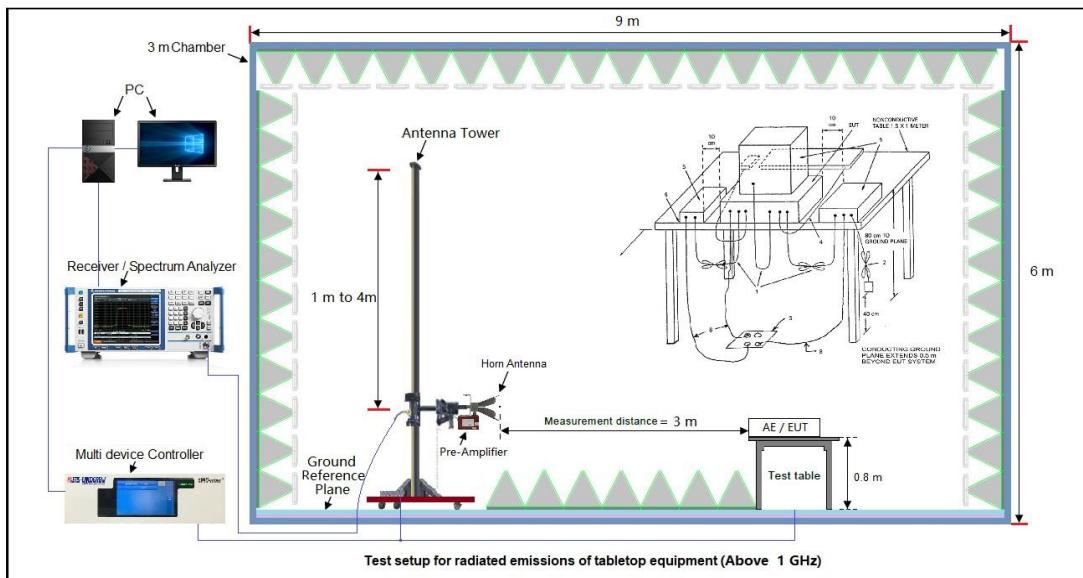
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## RADIATED EMISSION TEST SETUP ABOVE 1000MHz



## EMI TEST RECEIVER SETUP:

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurment
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

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### 8.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received power by AC 120V/60Hz.
5. The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6. The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7. The test mode(s) were scanned during the test:
8. Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented. For emissions below 1GHz, use 120KHz RBW and VBW>=3RBW for QP reading.
9. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
11. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
12. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
13. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
14. The test data of the worst case condition (mode 1) was reported on the following Data page.

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## 8.4 TEST RESULT

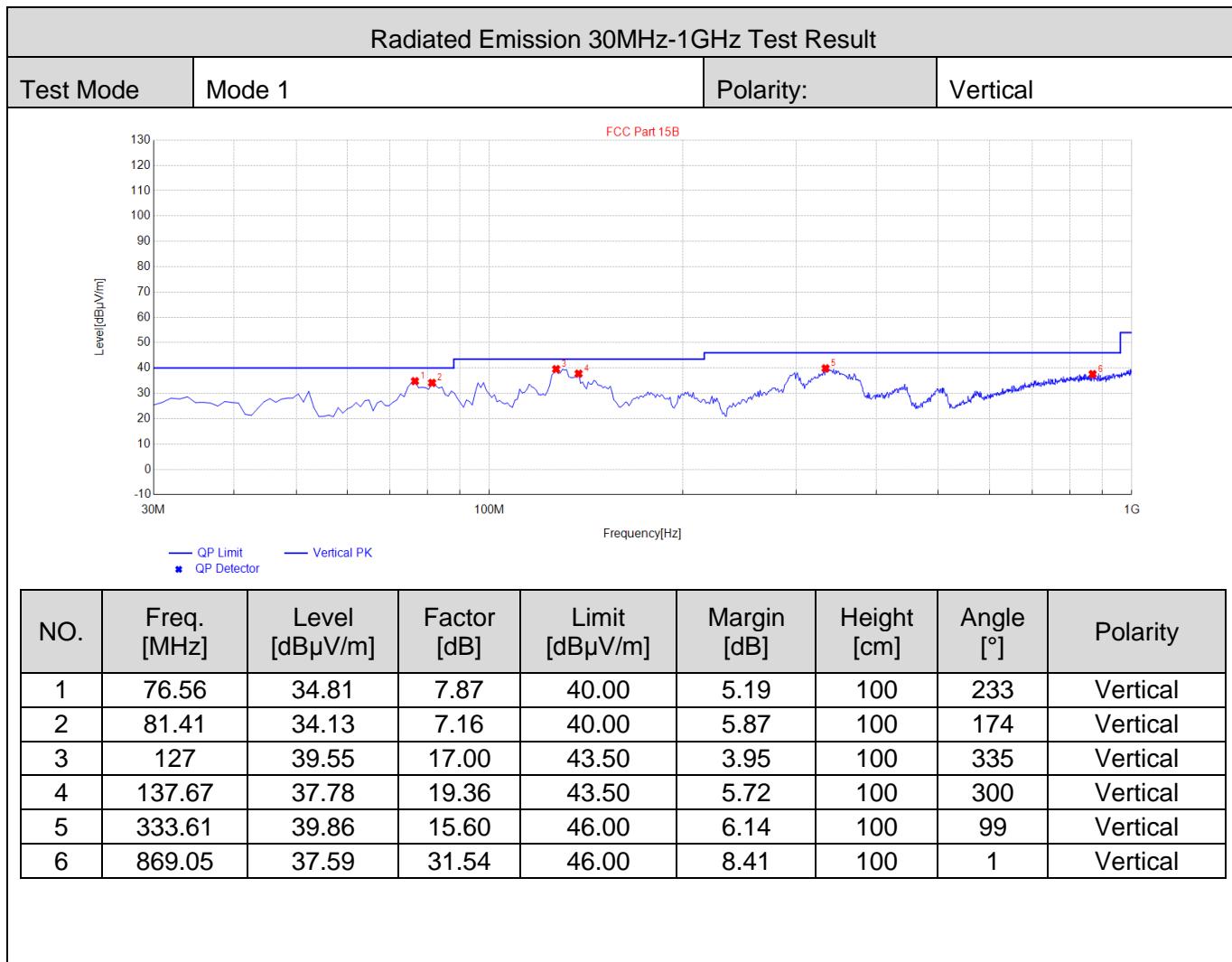
Radiated Emission 30MHz-1GHz Test Result								
Test Mode	Mode 1			Polarity:	Horizontal			
FCC Part 15B								
Level[dB $\mu$ V/m]								
-10	0	10	20	30	40	50	60	70
30M		100M						1G
Frequency[Hz]								
— QP Limit	— Horizontal PK	*	QP Detector					
NO.	Freq. [MHz]	Level [dB $\mu$ V/m]	Factor [dB]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	136.7	32.96	17.14	43.50	10.54	100	266	Horizontal
2	224.97	35.46	11.86	46.00	10.54	100	266	Horizontal
3	280.26	39.75	16.27	46.00	6.25	100	124	Horizontal
4	325.85	42.50	15.38	46.00	3.50	100	108	Horizontal
5	374.35	37.30	16.61	46.00	8.70	100	32	Horizontal
6	299.8071	14.80	42.12	46.00	3.88	100	40	Horizontal

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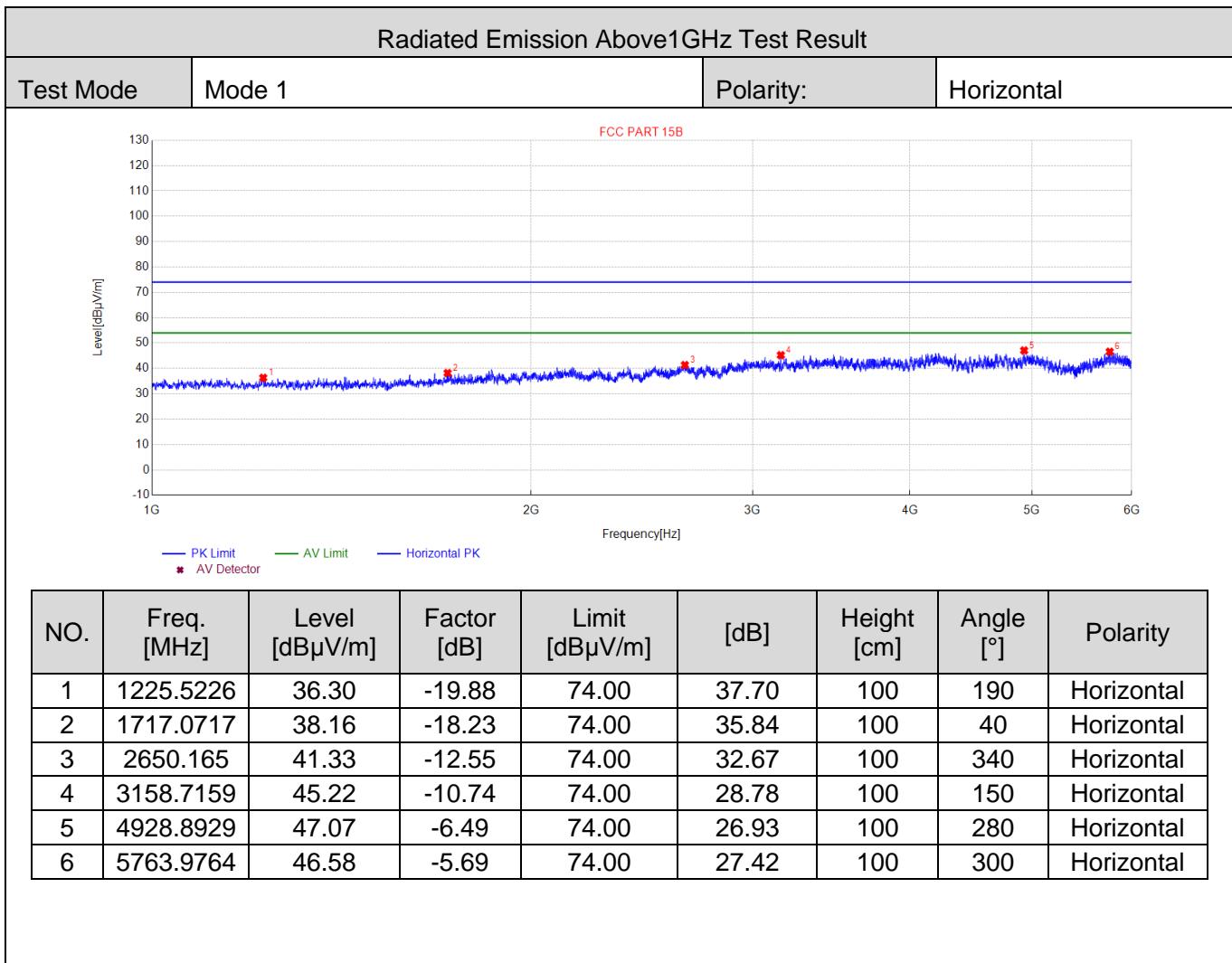


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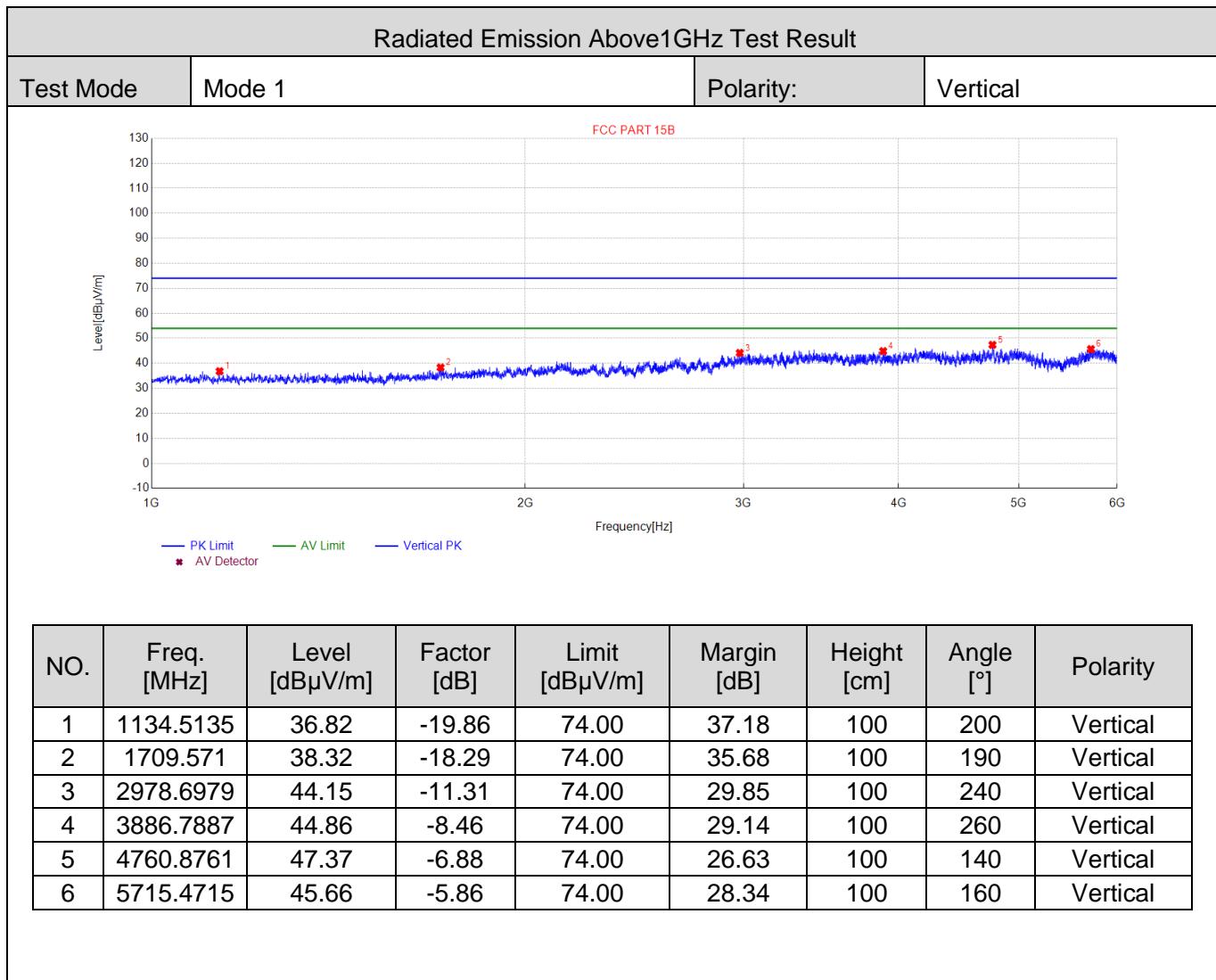


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## RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.  
 2. The "Factor" value can be calculated automatically by software of measurement system.

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## 9. FCC CONDUCTED EMISSION TEST

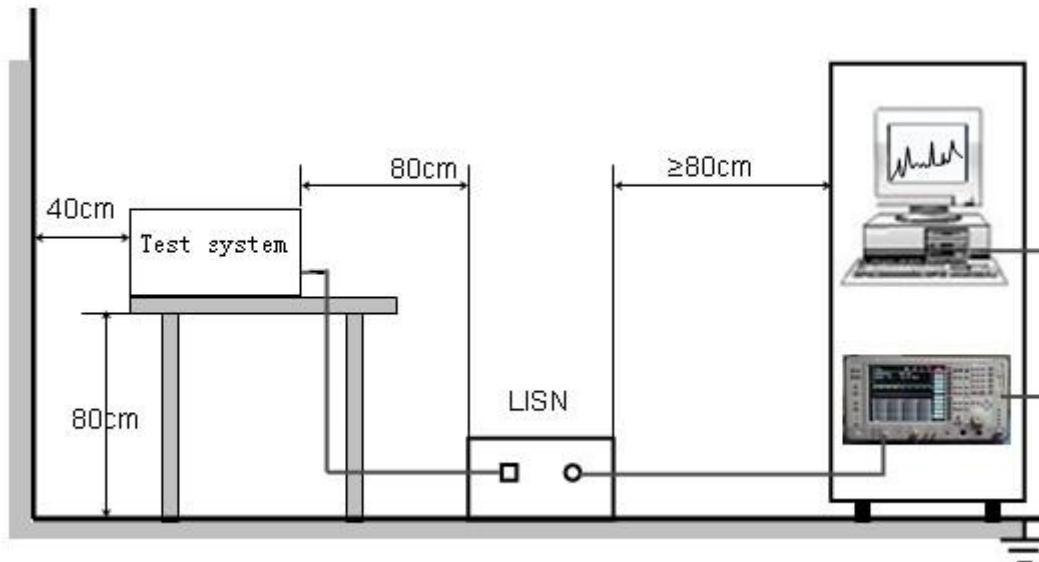
### 9.1 PROVISIONS APPLICABLE

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted 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.

### 9.2 TEST SETUP BLOCK DIAGRAM



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### 9.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. The EUT received AC 120V/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.
9. The test data of the worst case condition (mode 3) was reported on the following Data page.TEST

### 9.4 TEST RESULT

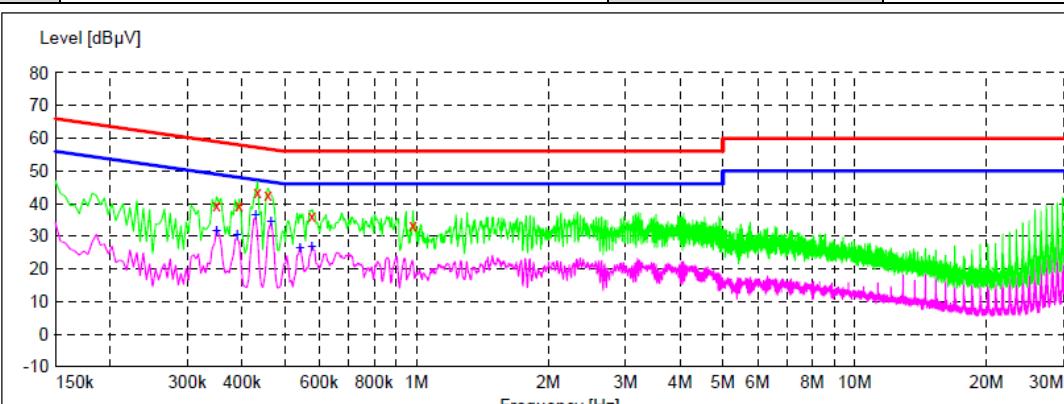
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## 9.4 TEST RESULT

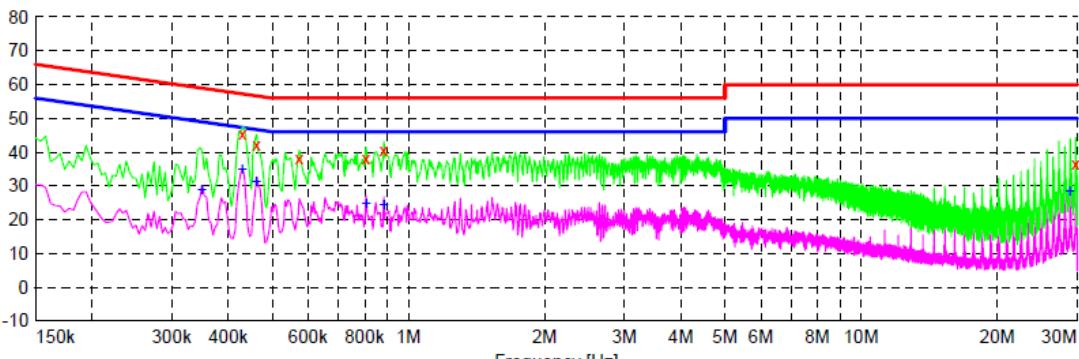
LINE CONDUCTED EMISSION TEST																																																																																																									
Test Mode	Mode 1		LISN line		Hot Side																																																																																																				
 <b>MES agc_fin</b>																																																																																																									
<b>MEASUREMENT RESULT: "agc_fin"</b> 2022/8/15 10:03 <table> <thead> <tr> <th>Frequency MHz</th> <th>Level dB<math>\mu</math>V</th> <th>Transd dB</th> <th>Limit dB<math>\mu</math>V</th> <th>Margin dB</th> <th>Detector</th> <th>Line</th> </tr> </thead> <tbody> <tr><td>0.350000</td><td>39.60</td><td>5.8</td><td>59</td><td>19.4</td><td>QP</td><td>L1</td></tr> <tr><td>0.394000</td><td>39.60</td><td>5.7</td><td>58</td><td>18.4</td><td>QP</td><td>L1</td></tr> <tr><td>0.434000</td><td>43.40</td><td>5.6</td><td>57</td><td>13.8</td><td>QP</td><td>L1</td></tr> <tr><td>0.458000</td><td>42.50</td><td>5.5</td><td>57</td><td>14.2</td><td>QP</td><td>L1</td></tr> <tr><td>0.578000</td><td>36.00</td><td>5.4</td><td>56</td><td>20.0</td><td>QP</td><td>L1</td></tr> <tr><td>0.982000</td><td>33.50</td><td>5.4</td><td>56</td><td>22.5</td><td>QP</td><td>L1</td></tr> </tbody> </table> <b>MEASUREMENT RESULT: "agc_fin2"</b> 2022/8/15 10:03 <table> <thead> <tr> <th>Frequency MHz</th> <th>Level dB<math>\mu</math>V</th> <th>Transd dB</th> <th>Limit dB<math>\mu</math>V</th> <th>Margin dB</th> <th>Detector</th> <th>Line</th> </tr> </thead> <tbody> <tr><td>0.350000</td><td>31.80</td><td>5.8</td><td>49</td><td>17.2</td><td>AV</td><td>L1</td></tr> <tr><td>0.390000</td><td>30.70</td><td>5.7</td><td>48</td><td>17.4</td><td>AV</td><td>L1</td></tr> <tr><td>0.430000</td><td>36.70</td><td>5.6</td><td>47</td><td>10.6</td><td>AV</td><td>L1</td></tr> <tr><td>0.466000</td><td>34.40</td><td>5.5</td><td>47</td><td>12.2</td><td>AV</td><td>L1</td></tr> <tr><td>0.542000</td><td>26.70</td><td>5.4</td><td>46</td><td>19.3</td><td>AV</td><td>L1</td></tr> <tr><td>0.578000</td><td>26.80</td><td>5.4</td><td>46</td><td>19.2</td><td>AV</td><td>L1</td></tr> </tbody> </table>								Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	0.350000	39.60	5.8	59	19.4	QP	L1	0.394000	39.60	5.7	58	18.4	QP	L1	0.434000	43.40	5.6	57	13.8	QP	L1	0.458000	42.50	5.5	57	14.2	QP	L1	0.578000	36.00	5.4	56	20.0	QP	L1	0.982000	33.50	5.4	56	22.5	QP	L1	Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	0.350000	31.80	5.8	49	17.2	AV	L1	0.390000	30.70	5.7	48	17.4	AV	L1	0.430000	36.70	5.6	47	10.6	AV	L1	0.466000	34.40	5.5	47	12.2	AV	L1	0.542000	26.70	5.4	46	19.3	AV	L1	0.578000	26.80	5.4	46	19.2	AV	L1
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LINE CONDUCTED EMISSION TEST									
Test Mode	Mode 1		LISN line		Neutral Side				
Level [dB $\mu$ V]									
									
<b>MEASUREMENT RESULT: "agc_fin"</b>									
2022/8/15 10:06									
Frequency	Level	Transd	Limit	Margin	Detector	Line			
MHz	dB $\mu$ V	dB	dB $\mu$ V	dB					
0.430000	45.50	5.6	57	11.8	QP	N			
0.462000	42.20	5.5	57	14.5	QP	N			
0.574000	38.10	5.4	56	17.9	QP	N			
0.806000	38.40	5.4	56	17.6	QP	N			
0.882000	40.70	5.4	56	15.3	QP	N			
29.734000	36.80	9.6	60	23.2	QP	N			
<b>MEASUREMENT RESULT: "agc_fin2"</b>									
2022/8/15 10:06									
Frequency	Level	Transd	Limit	Margin	Detector	Line			
MHz	dB $\mu$ V	dB	dB $\mu$ V	dB					
0.350000	29.00	5.8	49	20.0	AV	N			
0.430000	35.10	5.6	47	12.2	AV	N			
0.462000	31.50	5.5	47	15.2	AV	N			
0.806000	25.00	5.4	46	21.0	AV	N			
0.882000	24.30	5.4	46	21.7	AV	N			
28.918000	28.40	9.5	50	21.6	AV	N			

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**APPENDIX I PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No: AGC02294220801AP03

**APPENDIX II: PHOTOGRAPHS OF EUT**

Refer to the Report No: AGC02294220801AP02

**----END OF REPORT----**

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