

FCC Test Report

Report No.: AGC16235240101FR01

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION: Ultra-Portable Transceiver

BRAND NAME : GUOHETEC

MODEL NAME: PMR-171

APPLICANT: Chongqing Guohe Electronic Technology Co.,Ltd.

DATE OF ISSUE : Jan. 25, 2024

STANDARD(S) : FCC Part 97 Rules

REPORT VERSION: V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



Page 2 of 91

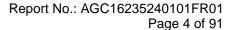
Report Revise Record

Report Version	n Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 25, 2024	Valid	Initial Release



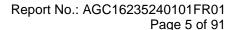
TABLE OF CONTENTS

1. GENERAL INFORMATION	
2. PRODUCT INFORMATION	6
2.1 PRODUCT TECHNICAL DESCRIPTION	6
2.2 TEST FREQUENCY LIST	7
2.3 RELATED SUBMITTAL(S) / GRANT (S)	8
2.4 TEST METHODOLOGY	8
2.5 CALCULATION OF EMISSION INDICATORS	3
2.6 SPECIAL ACCESSORIES	8
2.7 EQUIPMENT MODIFICATIONS	8
3. TEST ENVIRONMENT	g
3.1 ADDRESS OF THE TEST LABORATORY	<u></u>
3.2 TEST FACILITY	<u></u>
3.3 ENVIRONMENTAL CONDITIONS	10
3.4 MEASUREMENT UNCERTAINTY	10
3.5 LIST OF EQUIPMENTS USED	11
4.SYSTEM TEST CONFIGURATION	12
4.1 EUT CONFIGURATION	12
4.2 EUT EXERCISE	12
4.3 CONFIGURATION OF TESTED SYSTEM	12
4.4 EQUIPMENT USED IN TESTED SYSTEM	12
4.5 SUMMARY OF TEST RESULTS	13
5.DESCRIPTION OF TEST MODES	14
6.FREQUENCY TOLERANCE	15
6.1 PROVISIONS APPLICABLE	15
6.2 MEASUREMENT PROCEDURE	15
6.3 MEASUREMENT SETUP	15
6.4 MEASUREMENT RESULTS	16
7. EMISSION BANDWIDTH&OCCUPIED BANDWIDTH	18
7.1 PROVISIONS APPLICABLE	18
7.2 MEASUREMENT PROCEDURE	18
7.3 MEASUREMENT SETUP	18
7.4 MEASUREMENT RESULTS	19
8. SPURIOUS RATIATED EMISSION	22
8.1 PROVISIONS APPLICABLE	22





8.2 MEASUREMENT PROCEDURE	22
8.3 MEASUREMENT SETUP	23
8.4 MEASUREMENT RESULTS	23
9.MODULATION CHARACTERISTICS	28
9.1 PROVISIONS APPLICABLE	28
9.2 MEASUREMENT METHOD	28
9.3 MEASUREMENT SETUP	28
9.4 MEASUREMENT RESULTS	29
10. MAXIMUMN TRANSMITTER POWER	33
10.1 PROVISIONS APPLICABLE	33
10.2 MEASUREMENT METHOD	33
10.3 MEASUREMENT METHOD	33
10.4 MEASUREMENT RESULTS	34
11. SPURIOUS EMISSION ON ANTENNA PORT	38
11.1 PROVISIONS APPLICABLE	38
11.2 MEASUREMENT METHOD	38
11.3 MEASUREMENT SETUP	38
11.4 MEASUREMENT RESULTS	39
12. AC LINE CONDUCTED EMISSIONS LIMITS	43
12.1 PROVISIONS APPLICABLE	43
12.2 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	43
12.3 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	44
12.4 MEASUREMENT SETUP	44
12.5 MEASUREMENT RESULTS	44
13. RECEIVER RADIATED EMISSIONS LIMITS	45
13.1 PROVISIONS APPLICABLE	45
13.2 MEASUREMENT METHOD	45
13.4 MEASUREMENT SETUP	46
13.5 MEASUREMENT RESULTS	47
APPENDIX I: PHOTOGRAPHS OF TEST SETUP	67
APPENDIX II: PHOTOGRAPHS OF TEST FUT	71





1. GENERAL INFORMATION

Applicant	Chongqing Guohe Electronic Technology Co.,Ltd.		
Address	15F, Unit 1, Building 12, No.2 Gangan 2nd Road, Jiangbei District, Chongqing		
Manufacturer	Chongqing Guohe Electronic Technology Co.,Ltd.		
Address	15F, Unit 1, Building 12, No.2 Gangan 2nd Road, Jiangbei District, Chongqing		
Factory	Chongqing Guohe Electronic Technology Co.,Ltd.		
Address	15F, Unit 1, Building 12, No.2 Gangan 2nd Road, Jiangbei District, Chongqing		
Product Designation	Ultra-Portable Transceiver		
Brand Name	GUOHETEC		
Test Model	PMR-171		
Series Model(s)	N/A		
Difference Description	N/A		
Deviation from Standard	No any deviation from the test method.		
Date of receipt of test item	Jan. 09, 2024		
Date of Test	Jan. 09, 2024~Jan. 25, 2024		
Test Result	Pass		

WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA-603-E-2016 and ANSI C63.4-2013. The sample tested as described in this report is in compliance with the FCC Rules Part 97. The test results of this report relate only to the tested sample identified in this report.

Prepared By	Bibo zhang	
	Bibo Zhang (Project Engineer)	Jan. 25, 2024
Reviewed By	Calin Lin	
	Calvin Liu (Reviewer)	Jan. 25, 2024
Approved By	Max Zhang	
•	Max Zhang Authorized Officer	Jan. 25, 2024



Page 6 of 91

2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Product Designation	Ultra-Portable Transceiver		
Test Model	PMR-171		
Hardware Version	V3.0		
Software Version	V3.4.6		
Power Supply	DC 13.8V,6A by DC Line/ DC 14.2V,5Ah by Battery		
Communication Type	Voice / Tone only		
Operation Frequency Range	14.0~14.35MHz(USB), 420~450MHz(FM)		
Modulation Type	USB /FM		
Channel Separation	12.5KHz		
Emission Designator	11K0F3E		
Rated Output Power	VHF: 25W, UHF: 10W (It was fixed by the manufacturer, any individual can't arbitrarily change it.)		
Maximum Transmitter Power	VHF: 43.865dBm(25W-12.5kHz)		
Antenna Designation	Detachable Antenna		
Antenna Gain OdBi			
Emission Bandwidth	VHF: 0.327 kHz (25W-12.5kHz), UHF: 10.18 kHz (10W-12.5kHz)		



Page 7 of 91

2.2 TEST FREQUENCY LIST

According to ANSI C63.26 section 5.1.2.1:

Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in Table 2.

Frequency range Over which EUT operates	Number of Frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

Operation mode	Channel Separation	Operation Frequency Range	Test channel	Test Frequency
	12.5 kHz	14.0kHz-14.35MHz	Bottom	14.025 MHz
Analog	12.5 kHz	14.0kHz-14.35MHz	Middle	14.175 MHz
	12.5 kHz	14.0kHz-14.35MHz	Тор	14.325 MHz
	12.5 kHz	420MHz-450MHz	Bottom	420.025 MHz
Analog	12.5 kHz	420MHz-450MHz	Middle	435.025 MHz
	12.5 kHz	420MHz-450MHz	Тор	449.975 MHz



Page 8 of 91

2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the FCC Part 97 requirements.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 97	Private Land Mobile Radio Services
2	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
3	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
4	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
5	ANSI C63.4-2014	American National Standard of Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
6	KDB 634817 D01	KDB 634817 D01 Freq Range Listing for Grants v04r01

2.5 CALCULATION OF EMISSION INDICATORS

FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth

For FM Mode (ChannelSpacing: 12.5kHz)

Emission Designator 11K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz = 11KO

F3E portion of the designator represents an FM voice transmission.

Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

For FM Mode (Channel Spacing: 25kHz)

Emission Designator 16K0F3E

In this case, the maximum modulating frequency is 3.0 kHz with a 5.0 kHz deviation.

BW = 2(M+D) = 2*(3.0 kHz + 5.0 kHz) = 16 kHz = 16K0

F3E portion of the designator represents an FM voice transmission.

Therefore, the entire designator for 25 kHz channel spacing FM mode is 16K0F3E.

2.6 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

2.7 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



Page 9 of 91

3. TEST ENVIRONMENT

3.1 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 TEST FACILITY

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

CNAS-Lab Code: L5488

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

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory 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 with Registration 975832.

IC-Registration No.: 24842

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.



Page 10 of 91

3.3 ENVIRONMENTAL CONDITIONS

NORMAL CONDITIONS	EXTREME CONDITIONS	
15 - 35	-20 - 50	
20 % - 75 %	20 % - 75 %	
86 - 106	86 - 106	
DC 13.8V	LV 11.73V /HV 15.87V	
DC 14.2V	LV 12.07V /HV 16.33V	
	15 - 35 20 % - 75 % 86 - 106 DC 13.8V	

Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.

3.4 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty

multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Test Items	Measurement Uncertainty		
Frequency stability	±0.5%		
Transmitter power conducted	±0.8dB		
Transmitter power Radiated	±1.3dB		
Conducted spurious emission 9kHz-40 GHz	±2.7dB		
Conducted Emission	±3.2 dB		
Radiated Emission below 1GHz	±3.9 dB		
Radiated Emission above 1GHz	±4.8 dB		
Occupied Channel Bandwidth	±2 %		
FM deviation	±2 %		
Audio level	±0.98dB		
Low Pass Filter Response	±0.65dB		
Modulation Limiting	0.42 %		
Transient Frequency Behavior	6.8 %		



Page 11 of 91

3.5 LIST OF EQUIPMENTS USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Feb. 18, 2023	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
LISN	R&S	ESH2-Z5	100086	Jun. 03, 2023	Jun. 02, 2024
EXA Signal Analyzer	Aglient	N9020A	W1312-60196	Jun. 03, 2023	Jun. 02, 2024
EXA Signal Analyzer	Aglient	N9020A	MY52090123	Jun. 03, 2023	Jun. 02, 2024
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Nov. 13, 2023	Nov. 12, 2024
preamplifier	ChengYi	EMC184045SE	980508	Sep. 20, 2023	Sep. 19, 2025
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Mar. 23, 2023	Mar. 22, 2025
Broadband Preamplifier	SCHWARZBECK	BBHA 9120 J	00073	N/A	N/A
SIGNAL GENERATOR	AGILENT	E4421B	MY43351603	Feb. 17, 2023	Feb. 16, 2024
SIGNAL GENERATOR	Agilent	N5182A	MY50140530	Jun. 01, 2023	May 31, 2024
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 05, 2023	Jan. 04, 2025
ANTENNA	SCHWARZBECK	VULB9168	D69250	May 11, 2023	May 10, 2024
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Modulation Domain Analyzer	HP	53310A	3121A02467	Jun. 08, 2022	Jun. 07, 2024
Small environmental tester	ESPEC	SH-242	1	Aug. 03, 2022	Aug. 02, 2024
RF Communication Test Set	HP	8920B		Jun. 02, 2023	Jun. 01, 2024
30dB Attenuator	Weinachel	58-30-33	ML030	Jun. 01, 2023	May 31, 2024
RF Cable	R&S	1#		Each time	N/A
RF Cable	R&S	2#		Each time	N/A
Fliter-UHF	Microwave	N25155M2	498705	May 05, 2023	May 04, 2024
Fliter-VHF	Microwave	N26460M1	498703	May 05, 2023	May 04, 2024
TEST SOFTWARE	FARA	EZ-EMC (Ver.AGC-CON0 3A1)	N/A	N/A	N/A
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A



Page 12 of 91

4.SYSTEM TEST CONFIGURATION

4.1 EUT CONFIGURATION

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

4.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System

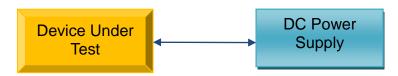


Table 2-1 Equipment Used in Tested System

4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:

☐ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	50ohm Load	N/A	Amphenol	DC-3G, Max.50W	N/A

☐ Test Accessories Come From The Manufacturer

Equipment	Manufacturer	Model Name	Specification	Data Cable	Power Cable
Hand microphone	N/A	N/A	N/A	•	0.8m Unshielded
Battery	N/A	N/A	DC 14.2V 5AH	-	-
DC Power Line	N/A	N/A	N/A	N/A	0.5m Unshielded
USB Cable	N/A	N/A	N/A	N/A	1.0m Unshielded



Page 13 of 91

4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	§97.313& 2.1046	Maximum Transmitter Power	Pass
2	§97.305& 2.1049	Occupied Bandwidth	Pass
3	§2.1047	Modulation Characteristic	Pass
4	§97.307& 2.1053	Spurious Ratiated Emission	Pass
6	§97.307& 2.1051	Spurious Emission on Antenna Port	Pass
7	§2.1055	Frequency Tolerance	Pass
9	§15.107	AC Line Conducted Emission	N/A
10	§15.109	Receiver Spurious Emissions	Pass

Remarks: The device is a DC power supply device and does not need to meet the conducted disturbance test



Page 14 of 91

5.DESCRIPTION OF TEST MODES

The EUT (**Ultra-Portable Transceiver**) has been tested under normal operating condition. (The top channel, the middle channel and the bottom channel) are chosen for testing at each channel separation.

	RF TEST MODE						
NO.	TEST MODE DESCRIPTION	CHANNEL SEPARATION					
1	TX Bottom channel-UHF	12.5 kHz					
2	TX Middle channel-UHF	12.5 kHz					
3	TX Top channel-UHF	12.5 kHz					
4	TX Bottom channel-VHF	12.5 kHz					
5	TX Middle channel-VHF	12.5 kHz					
6	TX Top channel-VHF	12.5 kHz					
	EMC TEST MODE						
7	VHF RX (Charging from DC 13.8V, 6A by DC Line)	12.5 kHz					
8	UHF RX (Charging from DC 13.8V, 6A by DC Line)	12.5 kHz					
9	VHF RX (Charging from DC 14.2V, 5Ah by Battery)	12.5 kHz					
10	10 UHF RX (Charging from DC 14.2V, 5Ah by Battery)						

Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. The battery is full-charged during the test.
- 3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
- 5. Manufacturers use computer PC programming software to switch and operate frequency points, refer to the instructions for details.



6.FREQUENCY TOLERANCE

6.1 PROVISIONS APPLICABLE

- a). According to FCC $\S2.1055(a)(1)$, the frequency stability shall be measured with variation of ambient temperature from -30° C to $+50^{\circ}$ C centigrade.
- b). According to FCC Part 2 Section 2.1055(d)(2), for battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacturer..

6.2 MEASUREMENT PROCEDURE

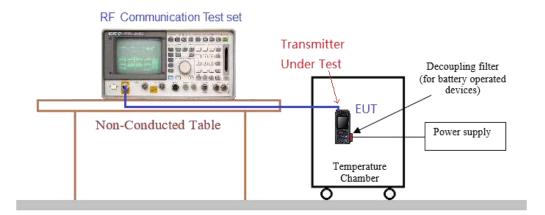
6.2.1 Frequency stability versus environmental temperature

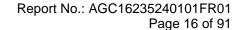
- 1. Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.
- 2. Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1kHz and Video Resolution Bandwidth to 1kHz and Frequency Span to 50kHz.Record this frequency as reference frequency.
- 3. Set the temperature of chamber to 50 ℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
- 4. Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measured frequencies on each temperature step.

6.2.2 Frequency stability versus input voltage

- Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15℃ to 25℃.
 Otherwise, an environment chamber set for a temperature of 20℃ shall be used. The EUT shall be powered by DC 13.8V &DC 14.2V.
- 2. Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1 kHz and Video Resolution Bandwidth to 1kHz. Record this frequency as reference frequency.
- 3. Supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.

6.3 MEASUREMENT SETUP



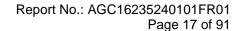




6.4 MEASUREMENT RESULTS

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For VHF 25W							
Test conditions		Fi	Frequency error (ppm)			5 "	
Voltage	Temp	Te	est Frequency (MHz	<u>z</u>)	Limit (ppm)	Result	
(V)	(℃)	14.025	14.175	14.325			
	-30	0.665	0.653	0.843		Pass	
	-20	0.838	0.837	0.616	N/A		
	-10	0.957	0.682	0.864			
	0	0.898	0.786	0.836			
13.80	10	0.519	0.579	0.535			
	20	0.903	1.098	0.527			
	30	1.020	0.985	0.630			
	40	0.844	0.735	0.536			
	50	0.860	0.565	0.815			
15.87	20	0.920	0.894	0.962			
11.73	20	0.573	1.022	0.782		1	

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For UHF 10W							
Test conditions		Fr	requency error (ppm	n)	1.1.27 (2.2.2)	D 11	
Voltage	Temp	Te	est Frequency (MHz	<u>z</u>)	Limit (ppm)	Result	
(V)	(℃)	420.025	435.025	449.975			
	-30	0.952	0.827	0.894			
	-20	0.894	0.763	0.711	N/A		
	-10	1.059	0.742	0.974			
	0	0.578	1.072	0.934			
13.80	10	0.753	0.853	0.684			
	20	1.055	0.777	1.080		Pass	
	30	0.709	1.056	0.745			
	40	0.514	0.915	0.973			
	50	0.966	0.619	1.088			
15.87	20	0.922	1.010	0.592			
11.73	20	0.727	0.704	0.858			





	12.5 kHz Cl	hannel Separation, A	Analog modulation,	Assigned Frequen	cy For VHF 25W	
Test conditions		Fi	requency error (ppn	n)	Limit (nnm)	Result
Voltage	Temp	Te	est Frequency (MHz	<u>z</u>)	Limit (ppm)	Resuit
(V)	(℃)	14.025	14.175	14.325		
	-30	0.590	0.849	0.944		Pass
	-20	0.757	0.624	0.994		
	-10	0.567	0.682	0.636		
	0	0.751	0.919	0.561		
14.2	10	1.059	0.770	0.520		
	20	0.718	0.780	0.818	N/A	
	30	1.059	0.550	0.878		
	40	1.060	1.071	0.825		
	50	0.806	0.645	0.501		
16.33	20	0.523	0.898	0.597		
12.07	20	0.566	0.520	0.649		

12.5 kHz Channel Separation, Analog modulation, Assigned Frequency For UHF 10W							
Test conditions		Fi	requency error (ppn	n)	Limit (ppm)	Result	
Voltage	Temp			Limit (ppm)	Resuit		
(V)	(℃)	420.025	435.025	449.975			
	-30	0.974	0.664	0.818			
	-20 -10	0.613	1.086	1.080	N/A	Pass	
		0.822	0.948	0.545			
	0	0.602	0.944	0.746			
14.2	4.2 10 20	0.869	0.828	0.700			
		1.052	0.566	0.580			
	30	0.762	0.704	0.808			
	40	0.641	0.656	0.931			
	50	0.879	1.063	0.640	1		
16.33	20	0.682	0.888	0.514			
12.07	20	0.978	0.844	0.932			



Page 18 of 91

7. EMISSION BANDWIDTH&OCCUPIED BANDWIDTH

7.1 PROVISIONS APPLICABLE

According to FCC Part 97 Section 97.305& FCC Part 2.1049: The authorized bandwidth shall be 100 KHz.

7.2 MEASUREMENT PROCEDURE

1.The EUT was modulated by 2.5kHz sine wave audio signal; the level of the audio signal employed is 16dB greater than that necessary to produce 50% of rated system deviation.

Rated system deviation is 2.5 kHz for 12.5kHz channel spacing).

2.Spectrum set as follow:

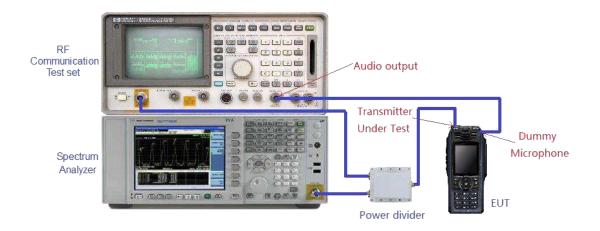
Centre frequency = fundamental frequency, span=50kHz for 12.5kHz channel spacing, RBW=100Hz, VBW=300Hz, Sweep = auto,

Centre frequency = fundamental frequency, span=50kHz for 25 kHz channel spacing, RBW=100Hz, VBW=300Hz, Sweep = auto,

Detector function = peak, Trace = max hold

- 3.Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.
- 4. Measure and record the results in the test report.

7.3 MEASUREMENT SETUP





Page 19 of 91

7.4 MEASUREMENT RESULTS

DC 13.8V, 6A by DC Line

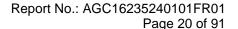
DO 10.0V, O/LOY DO LING							
Measurement Result of VHF-Analog Modulation 25W							
Operating Frequency	12.5 kHz Channel Separation						
Operating Frequency	Occupied Bandwidth	Emission Bandwidth	Limits	Result			
14.025 MHz	0.238 kHz	0.324 kHz	100 kHz	Pass			
14.175 MHz	0.238 kHz	0.325 kHz	100 kHz	Pass			
14.325 MHz	0.238 kHz	0.325 kHz	100 kHz	Pass			

Measurement Result of UHF-Analog Modulation 10W							
Operating Frequency		12.5 kHz Channel Sepa	aration				
Operating Frequency	Occupied Bandwidth	Emission Bandwidth	Limits	Result			
420.025MHz	9.983 kHz	10.18 kHz	100 kHz	Pass			
435.025MHz	9.983 kHz	10.18 kHz	100 kHz	Pass			
449.975MHz	9.983 kHz	10.18 kHz	100 kHz	Pass			

DC 14.2V, 5Ah by Battery

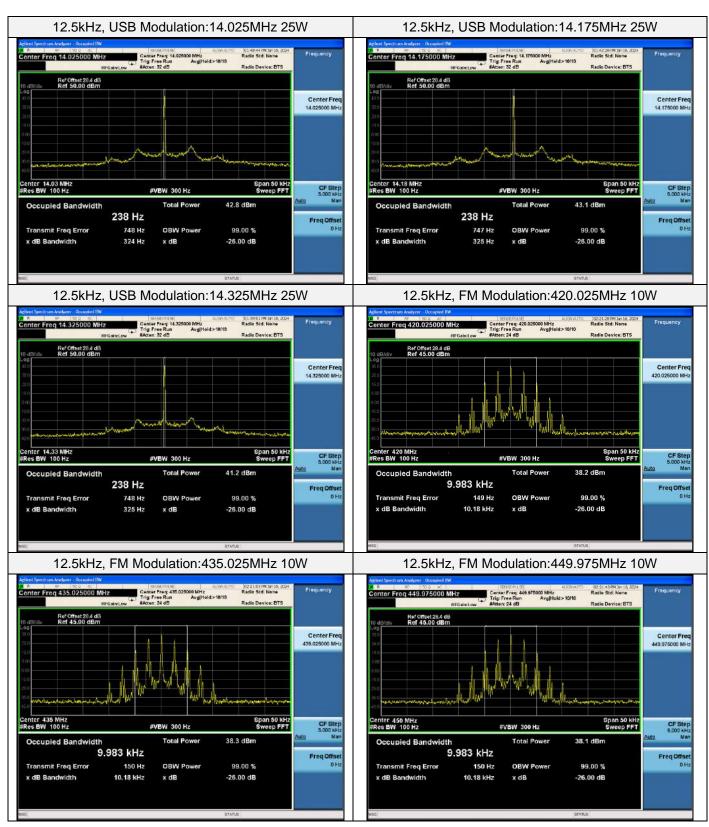
20 TH21, of the by Battery							
Measurement Result of VHF-Analog Modulation 25W							
Operating Fraguency		12.5 kHz Channel Sepa	aration				
Operating Frequency	Occupied Bandwidth	Emission Bandwidth	Limits	Result			
14.025 MHz	0.238 kHz	0.324 kHz	100 kHz	Pass			
14.175 MHz	0.238 kHz	0.327 kHz	100 kHz	Pass			
14.325 MHz	0.238 kHz	0.324 kHz	100 kHz	Pass			

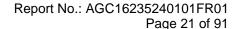
Measurement Result of UHF-Analog Modulation 10W							
Operating Frequency		12.5 kHz Channel Sepa	aration				
Operating Frequency	Occupied Bandwidth	Emission Bandwidth	Limits	Result			
420.025MHz	9.983 kHz	10.18 kHz	100 kHz	Pass			
435.025MHz	9.982 kHz	10.18 kHz	100 kHz	Pass			
449.975MHz	9.983 kHz	10.18 kHz	100 kHz	Pass			





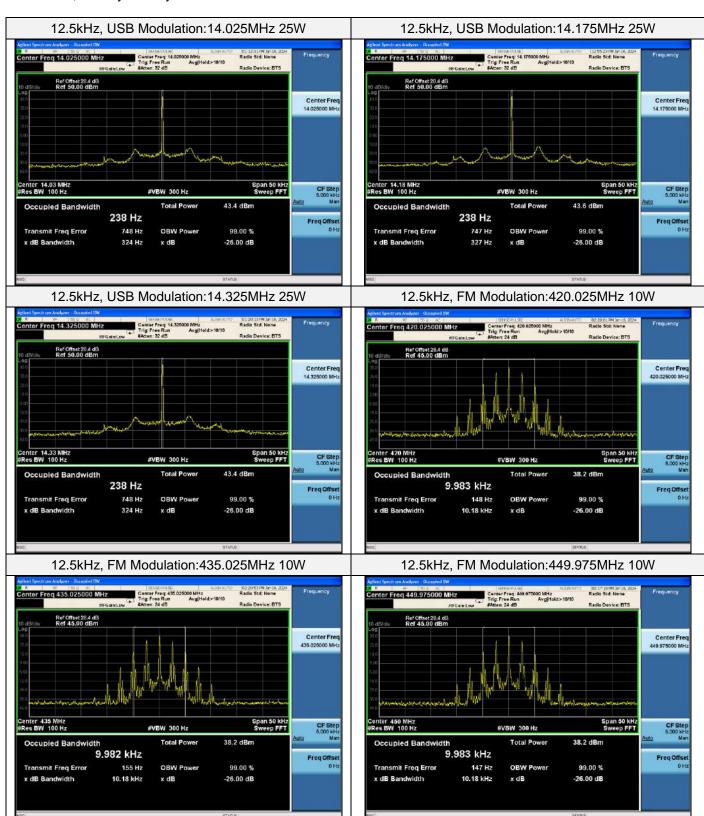
Test plot as follows: DC 13.8V, 6A by DC Line







DC 14.2V, 5Ah by Battery



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Page 22 of 91

8. SPURIOUS RATIATED EMISSION

8.1 PROVISIONS APPLICABLE

According to FCC §2.1053 §90.307, the power of each unwanted emission shall be less than Transmitted Power as specified below for transmitters designed to operate with each channel separation.

- (1) No amateur station transmission shall occupy more bandwidth than necessary bandwidth for the information rate and emission type being transmitted, in accordance with good amateur practice.
- (2) Emissions resulting from modulation must be confined to the band or segment available to the control operator. Emissions outside the necessary bandwidth must not cause splatter or key click interference to operations on adjacent frequencies.
- (3) The mean power of any spurious emissions from a station transmitter or external RF power amplifier transmitting on a frequency between 30-225 MHz must be at least 60dB below the mean power of the fundamental. For a transmitter having a mean power of 25W or less, the mean power of any spurious emission supplied to the antenna transmission line must not exceed 25 uW and must be at least 40dB below the mean power of the fundamental emission, but need not be reduced below the power of 10uW.

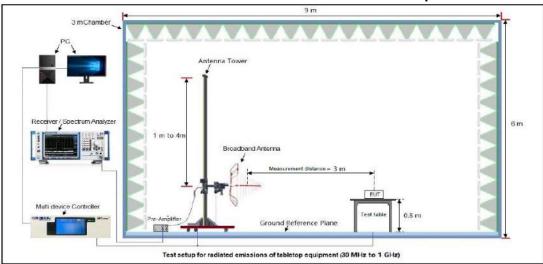
8.2 MEASUREMENT PROCEDURE

- (1) On a test site, the EUT shall be placed on a turntable, and in the position closest to the normal use as declared by the user.
- (2) The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3) The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4) The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5) The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6) The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7) The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8) The maximum signal level detected by the measuring receiver shall be noted.
- (9) The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11) The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12) The substitution antenna shall be connected to a calibrated signal generator.
- (13) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14) The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15) The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16) The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17) The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

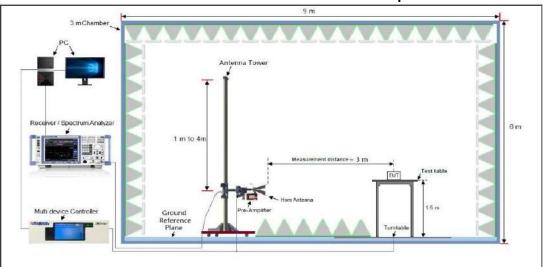


8.3 MEASUREMENT SETUP

Radiated Emissions Below 30MHz-1GHz Test Setup



Radiated Emissions Above 1GHz Test Setup



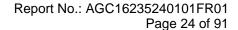
8.4 MEASUREMENT RESULTS

Limit is at least 60dB below the mean power of the fundamental. For a transmitter having a mean power of 25W or less, the mean power of any spurious emissions supplied to the antenna transmission line must not exceed 25uW and must be at least 40dB below the mean power of the fundamental emission.

Preliminary calculation	Final Result		
PEP=30+10log(25W)=43.98 dBm	Limit=Preliminary calculation-60dB=43.98-60≈-16.02dBm		

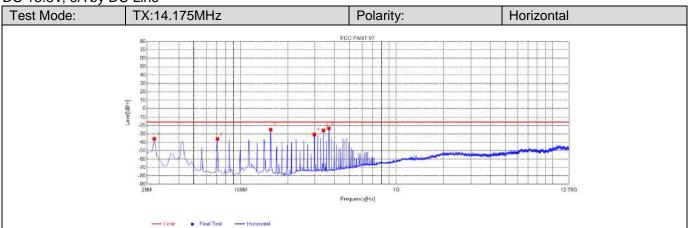
Preliminary calculation	Final Result
Power is less than 23.7W	Spurious emissions are limited to -16 dBm

Note: The report only reflects the test data of the worst channel in each frequency band.

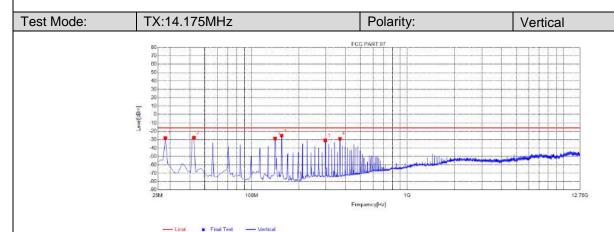




DC 13.8V, 6A by DC Line

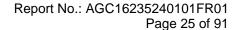


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	27.925	-65.01	-36.00	-16.00	20.00	29.01	10	Horizontal
2	70.825	-60.75	-36.12	-16.00	20.12	24.63	347	Horizontal
3	155.65	-50.18	-24.85	-16.00	8.85	25.33	260	Horizontal
4	297.025	-58.73	-30.70	-16.00	14.70	28.03	312	Horizontal
5	339.925	-54.16	-25.90	-16.00	9.90	28.26	118	Horizontal
6	368.2	-52.23	-23.42	-16.00	7.42	28.81	278	Horizontal

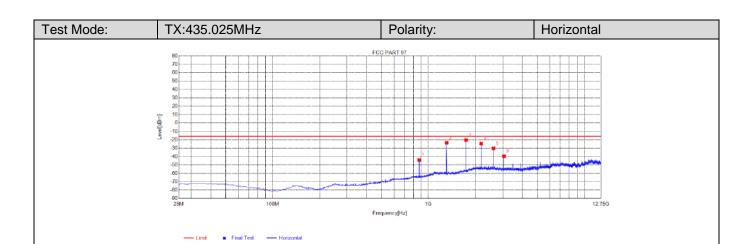


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	27.925	-57.04	-28.03	-16.00	12.03	29.01	198	Vertical
2	42.55	-56.81	-27.55	-16.00	11.55	29.26	270	Vertical
3	141.025	-55.93	-28.69	-16.00	12.69	27.24	188	Vertical
4	155.65	-50.50	-25.17	-16.00	9.17	25.33	116	Vertical
5	297.025	-58.90	-30.87	-16.00	14.87	28.03	69	Vertical
6	368.2	-57.87	-29.06	-16.00	13.06	28.81	1	Vertical

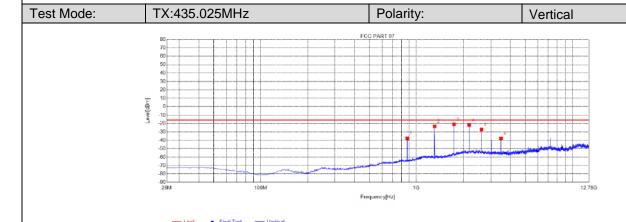
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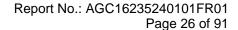


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	870.325	-81.33	-44.05	-16.00	28.05	37.28	188	Horizontal
2	1305.5306	-19.50	-23.60	-16.00	7.60	-4.10	170	Horizontal
3	1740.324	-19.24	-20.41	-16.00	4.41	-1.17	206	Horizontal
4	2175.1175	-26.84	-24.64	-16.00	8.64	2.20	160	Horizontal
5	2609.911	-32.57	-30.26	-16.00	14.26	2.31	294	Horizontal
6	3045.8796	-41.23	-39.64	-16.00	23.64	1.59	142	Horizontal



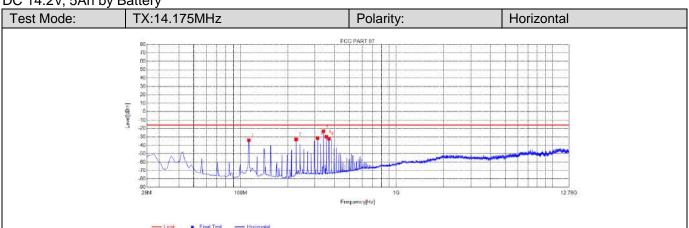
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	870.325	-75.07	-37.79	-16.00	21.79	37.28	268	Vertical
2	1305.5306	-19.25	-23.35	-16.00	7.35	-4.10	72	Vertical
3	1740.324	-19.77	-20.94	-16.00	4.94	-1.17	250	Vertical
4	2175.1175	-24.08	-21.88	-16.00	5.88	2.20	278	Vertical
5	2609.911	-29.48	-27.17	-16.00	11.17	2.31	126	Vertical
6	3480.6731	-40.16	-37.90	-16.00	21.90	2.26	250	Vertical

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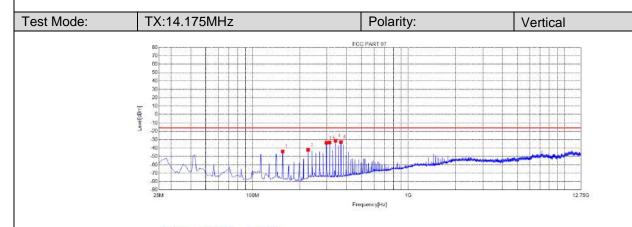




DC 14.2V, 5Ah by Battery

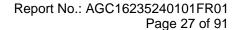


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	112.75	-55.16	-33.99	-16.00	17.99	21.17	218	Horizontal
2	226.825	-59.26	-33.06	-16.00	17.06	26.20	156	Horizontal
3	311.65	-59.71	-31.64	-16.00	15.64	28.07	128	Horizontal
4	339.925	-51.51	-23.25	-16.00	7.25	28.26	120	Horizontal
5	354.55	-58.22	-29.77	-16.00	13.77	28.45	298	Horizontal
6	368.2	-61.08	-32.27	-16.00	16.27	28.81	306	Horizontal

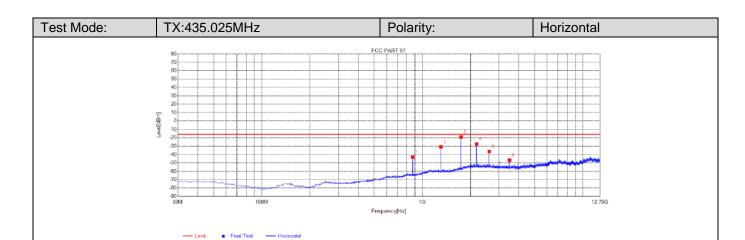


NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	155.65	-69.31	-43.98	-16.00	27.98	25.33	359	Vertical
2	226.825	-68.35	-42.15	-16.00	26.15	26.20	148	Vertical
3	297.025	-61.83	-33.80	-16.00	17.80	28.03	350	Vertical
4	311.65	-61.54	-33.47	-16.00	17.47	28.07	350	Vertical
5	339.925	-59.72	-31.46	-16.00	15.46	28.26	70	Vertical
6	368.2	-61.73	-32.92	-16.00	16.92	28.81	140	Vertical

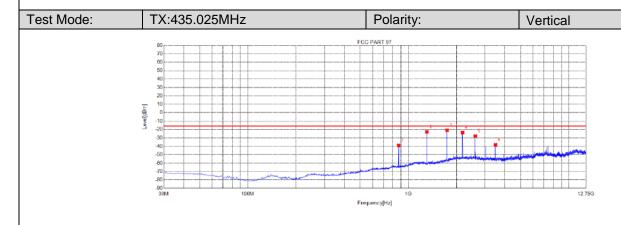
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NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	870.02	-80.40	-43.12	-16.00	27.12	37.28	178	Horizontal
2	1305.5306	-26.78	-30.88	-16.00	14.88	-4.10	308	Horizontal
3	1740.324	-17.92	-19.09	-16.00	3.09	-1.17	353	Horizontal
4	2175.1175	-29.63	-27.43	-16.00	11.43	2.20	353	Horizontal
5	2609.911	-38.70	-36.39	-16.00	20.39	2.31	46	Horizontal
6	3480.6731	-48.91	-46.65	-16.00	30.65	2.26	308	Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	870.02	-76.23	-38.95	-16.00	22.95	37.28	106	Vertical
2	1305.5306	-18.78	-22.88	-16.00	6.88	-4.10	194	Vertical
3	1740.324	-19.72	-20.89	-16.00	4.89	-1.17	228	Vertical
4	2175.1175	-25.84	-23.64	-16.00	7.64	2.20	96	Vertical
5	2609.911	-30.16	-27.85	-16.00	11.85	2.31	184	Vertical
6	3480.6731	-40.61	-38.35	-16.00	22.35	2.26	228	Vertical

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Page 28 of 91

9.MODULATION CHARACTERISTICS

9.1 PROVISIONS APPLICABLE

According to FCC§2.1047(a), for Voice Modulation Communication Equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000Hz shall be measured.

9.2 MEASUREMENT METHOD

9.2.1 Modulation Limit

- (1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1kHz using this level as a reference (0dB) and vary the input level from -20 to +20dB. Record the frequency deviation obtained as a function of the input level.
- (2). Repeat step 1 with input frequency changing to 300, 1000, 1500 and 3000Hz in sequence.

9.2.2 Audio Frequency Response

- (1). Configure the EUT as shown in figure 1.
- (2). Adjust the audio input for 20% of rated system deviation at 1 kHz using this level as a reference (0 dB).
- (3). Vary the Audio frequency from 100 Hz to 10 kHz and record the frequency deviation.
- (4). Audio Frequency Response = 20log10 (Deviation of test frequency/Deviation of 1 kHz reference).

9.3 MEASUREMENT SETUP

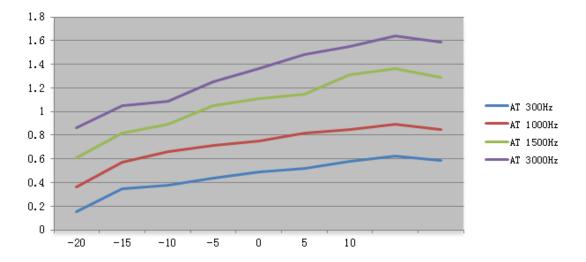


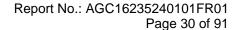


9.4 MEASUREMENT RESULTS

(A). MODULATION LIMIT:

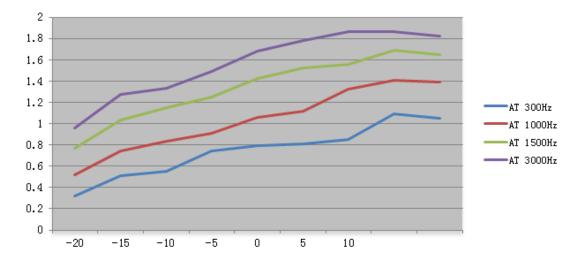
12.5k	Hz, Analog modulatio	on, Assigned Frequenc	cy:14.175MHz-USB 2	25W
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)
-20	0.15	0.36	0.61	0.86
-15	0.35	0.57	0.82	1.05
-10	0.38	0.66	0.89	1.09
-5	0.44	0.71	1.05	1.25
0	0.49	0.75	1.11	1.36
+5	0.52	0.82	1.15	1.48
+10	0.58	0.85	1.31	1.55
+15	0.62	0.89	1.36	1.64
+20	0.59	0.85	1.29	1.59



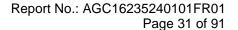




12.5	kHz, Analog modulatio	n, Assigned Frequenc	cy: 435.025MHz-FM 1	OW					
Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (kHz)	Peak Freq. Deviation At 1000 Hz (kHz)	Peak Freq. Deviation At 1500 Hz (kHz)	Peak Freq. Deviation At 3000 Hz (kHz)					
-20	0.32	0.52	0.77	0.96					
-15	0.51	0.74	1.03	1.27					
-10	0.55	0.83	1.15	1.33					
-5	0.74	0.91	1.25	1.49					
0	0.79	1.06	1.42	1.68					
+5	0.81	1.12	1.52	1.78					
+10	0.85	1.32	1.56	1.86					
+15	1.09	1.41	1.69	1.86					
+20	1.05	1.39	1.65	1.82					



Note: All the modes had been tested, but only the worst data recorded in the report.

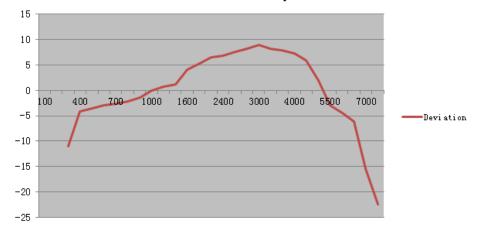


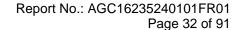


(B). AUDIO FREQUENCY RESPONSE:

12.5kHz, Analog modulation, Assigned Frequency:14.175MHz-USB 25W			
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB	
100			
200			
300	0.15	-10.96	
400	0.33	-4.12	
500	0.35	-3.60	
600	0.38	-2.89	
700	0.39	-2.66	
800	0.41	-2.23	
900	0.45	-1.42	
1000	0.53	0.00	
1200	0.58	0.78	
1400	0.61	1.22	
1600	0.85	4.10	
1800	0.97	5.25	
2000	1.12	6.50	
2400	1.15	6.73	
2500	1.26	7.52	
2800	1.35	8.12	
3000	1.47	8.86	
3200	1.36	8.19	
3600	1.32	7.93	
4000	1.22	7.24	
4500	1.05	5.94	
5000	0.66	1.91	
5500	0.38	-2.89	
6000	0.32	-4.38	
6500	0.26	-6.19	
7000	0.09	-15.40	
7500	0.04	-22.44	

12.5KHz Channel Separations

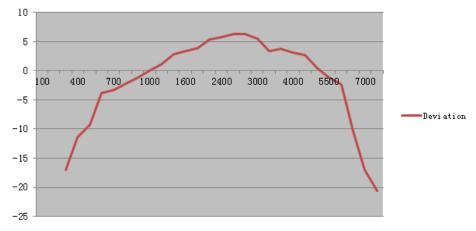




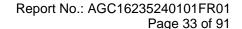


12.5kHz, Analog modulation, Assigned Frequency:435.025MHz-FM 10W				
Frequency (Hz)	Deviation (kHz)	Audio Frequency Response(dB		
100				
200				
300	0.12	-17.00		
400	0.23	-11.35		
500	0.29	-9.34		
600	0.55	-3.78		
700	0.58	-3.32		
800	0.66	-2.20		
900	0.74	-1.20		
1000	0.85	0.00		
1200	0.96	1.06		
1400	1.18	2.85		
1600	1.26	3.42		
1800	1.34	3.95		
2000	1.58	5.38		
2400	1.66	5.81		
2500	1.74	6.22		
2800	1.75	6.27		
3000	1.59	5.44		
3200	1.25	3.35		
3600	1.31	3.76		
4000	1.22	3.14		
4500	1.16	2.70		
5000	0.89	0.40		
5500	0.74	-1.20		
6000	0.65	-2.33		
6500	0.26	-10.29		
7000	0.12	-17.00		
7500	0.08	-20.53		

12.5KHz Channel Separations



Note: All the modes had been tested, but only the worst data recorded in the report.





10. MAXIMUMN TRANSMITTER POWER

10.1 PROVISIONS APPLICABLE

Per FCC §2.1046 and §97.313: No station may transmit with a transmitter power exceeding 1.5 kW PEP.

10.2 MEASUREMENT METHOD

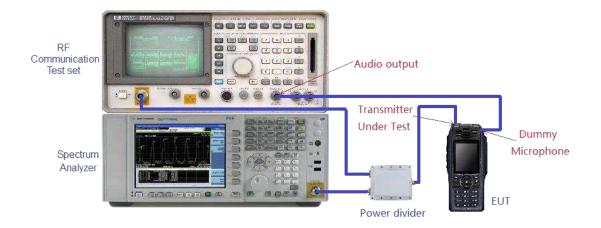
Conducted RF Output Power:

- The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
- 2. The DUT was connected to a Spectrum Analyzer (SA) via a 30dB attenuator connected to the DUT's antenna port. The SA was configured as above using the Automatic 6dB Cursor Bandwidth measurement. The output power of the DUT was set to the manufacturer's highest output power setting at the Low, Mid and High frequency channels as permitted by the device. The DUT was set to transmit at its maximum Duty Cycle.
- 3. Spectrum set as follow:

Centre frequency = fundamental frequency, Span=50kHz, RBW=30KHz, VBW=30KHz;

Sweep = auto, Detector function = peak, Trace = max hold

10.3 MEASUREMENT METHOD





Page 34 of 91

10.4 MEASUREMENT RESULTS

Note: Calculation Formula: CP = R + A + L

(1) CP: The final Conducted Power

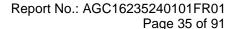
(2) R : The reading value from spectrum analyzer(3) A : The attenuation value of the used attenuator

(4) L: The loss of all connection cables

DC 13.8V, 6A by DC Line

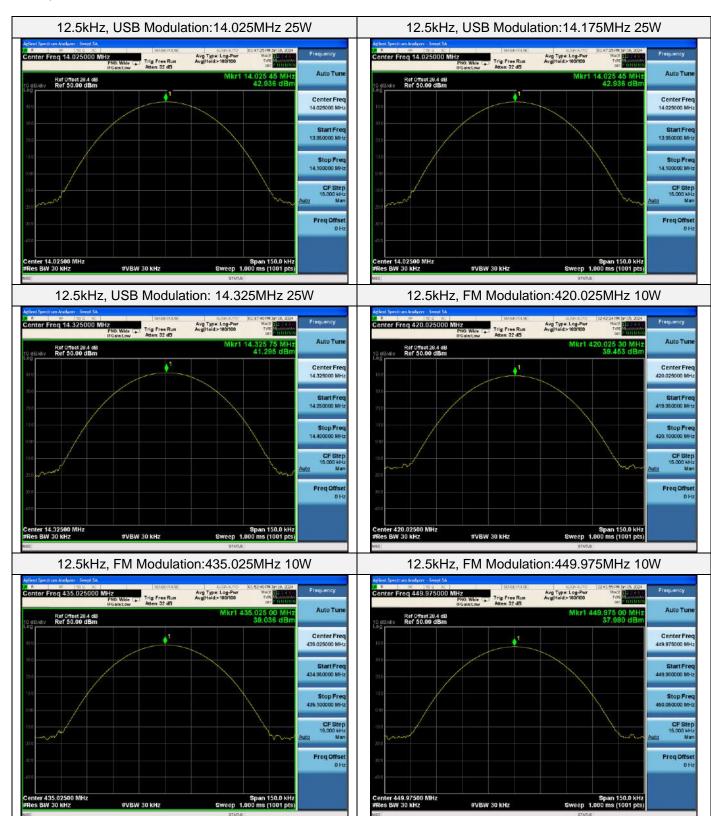
Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
Mode			For 43.98dBm(25W)
Analog +Vioce	12.5 kHz	Bottom(14.025MHz)	42.936
		Middle(14.175MHz)	43.094
		Top (14.325MHz)	41.295

Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 40.00dBm(10W)
Analog +Vioce	12.5 kHz	Bottom(420.025MHz)	39.453
		Middle(435.025MHz)	39.036
		Top (449.975MHz)	37.980





Test plot as follows:



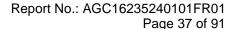


Page 36 of 91

DC 14.2V, 5Ah by Battery

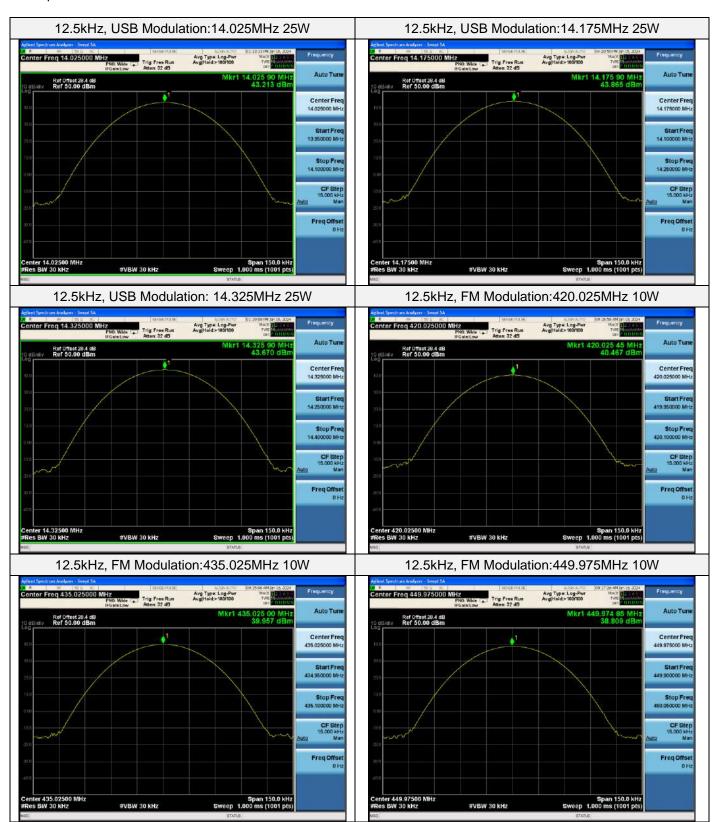
Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 43.98dBm(25W)
Analog +Vioce	12.5 kHz	Bottom(14.025MHz)	43.213
		Middle(14.175MHz)	43.865
		Top (14.325MHz)	43.670

Conducted Power Measurement Results			
Mode	Channel Separation	Test Channel	Measurement Result (dBm)
			For 40.00dBm(10W)
Analog +Vioce	12.5 kHz	Bottom(420.025MHz)	40.467
		Middle(435.025MHz)	39.957
		Top (449.975MHz)	38.809





Test plot as follows:





Report No.: AGC16235240101FR01

Page 38 of 91

11. SPURIOUS EMISSION ON ANTENNA PORT

11.1 PROVISIONS APPLICABLE

Please refer to FCC 47 CFR 2.1051, 2.1057, & 97.307 for specification details.

The mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency between 30-225 MHz must be at least 60 dB below the mean power of the fundamental. For a transmitter having a mean power of 25 W or less, the mean power of any spurious emission supplied to the antenna transmission line must not exceed 25 μ W and must be at least 40 dB below the mean power of the fundamental emission, but need not be reduced below the power of 10 μ W

Emissions shall be attenuated below the mean output power of the transmitter as follows:

FCC Rules	Attenuation Limit (dBc)			
§ 97.307	Limit (dBm) = P(dBm)-60 = -16.99 dBm			

EL=30 + 10 log (Pwatts) =30+10log(20)=43.01 dBm

Calculation: Limit (dBm) = PEP-60 dB

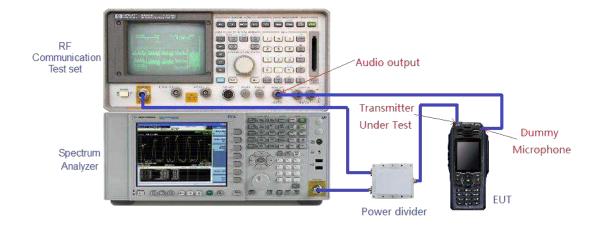
Notes: EL is the emission level of the Output Power expressed in dBm.

In this application, the EL is P(dBm). Limit (dBm) = P(dBm)-60 = -16.99 dBm

11.2 MEASUREMENT METHOD

- 1. The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation.
- 2. The resolution bandwidth of the spectrum analyzer was set to 100 kHz. Sufficient scans were taken to show any out of band emission up to 10th . Harmonic for the lower and the highest frequency range.
- 3. Set RBW 100 kHz, VBW 300 kHz in the frequency band 30MHz to 1GHz, while set RBW=1MHz.VBW=3MHz from the 1GHz to 10th Harmonic.
- 4. The audio input was set the unmodulated carrier, the resulting picture is print out for each channel separation.

11.3 MEASUREMENT SETUP

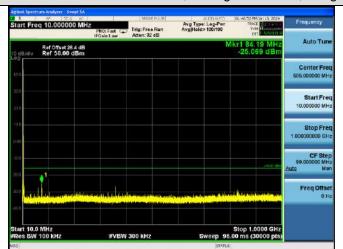




11.4 MEASUREMENT RESULTS

DC 13.8V, 6A by DC Line

12.5kHz, Analog modulation, Assigned Frequency:14.025MHz, USB 25W





12.5kHz, Analog modulation, Assigned Frequency:14.175MHz, USB 25W

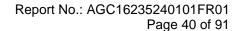




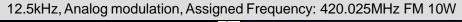
12.5kHz, Analog modulation, Assigned Frequency:14.325MHz, USB 25W

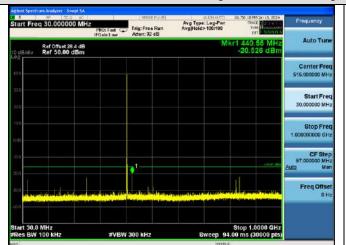






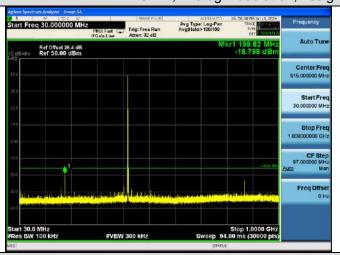








12.5kHz, Analog modulation, Assigned Frequency: 435.025MHz FM 10W





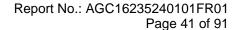
12.5kHz, Analog modulation, Assigned Frequency: 449.975MHz FM 10W





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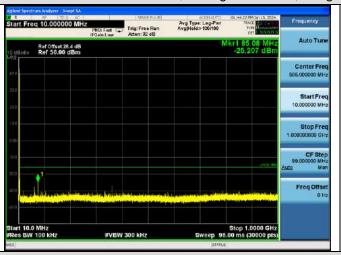
DC 14.2V, 5Ah by Battery







12.5kHz, Analog modulation, Assigned Frequency:14.175MHz, USB 25W

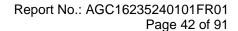




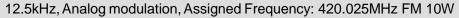
12.5kHz, Analog modulation, Assigned Frequency:14.325MHz, USB 25W

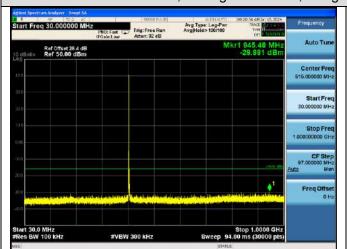


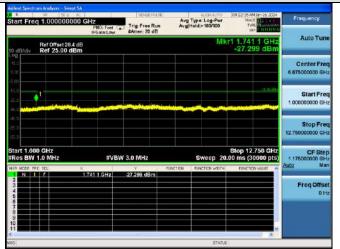










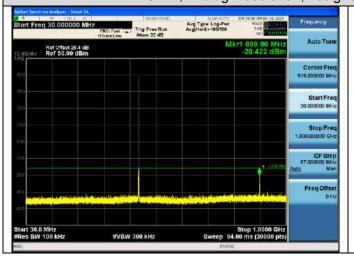


12.5kHz, Analog modulation, Assigned Frequency: 435.025MHz FM 10W





12.5kHz, Analog modulation, Assigned Frequency: 449.975MHz FM 10W







Report No.: AGC16235240101FR01

Page 43 of 91

12. AC LINE CONDUCTED EMISSIONS LIMITS

12.1 PROVISIONS APPLICABLE

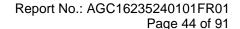
For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using 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		

12.2 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 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 C63.10 (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 C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipment received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
- 6. The 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 mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

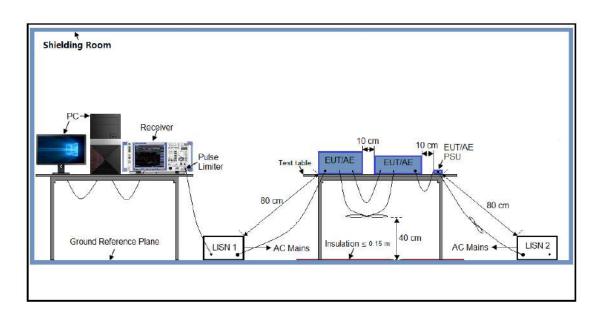




12.3 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- 3. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 4. The test data of the worst case condition(s) was reported on the Summary Data page.

12.4 MEASUREMENT SETUP



12.5 MEASUREMENT RESULTS

RESULT: Not applicable



Report No.: AGC16235240101FR01

Page 45 of 91

13. RECEIVER RADIATED EMISSIONS LIMITS

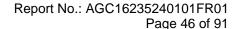
13.1 PROVISIONS APPLICABLE

FCC CFR Title 47 Part 15 Subpart B Section 15.109:

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

13.2 MEASUREMENT METHOD

- 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

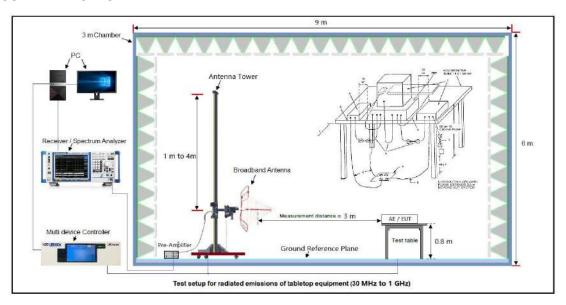


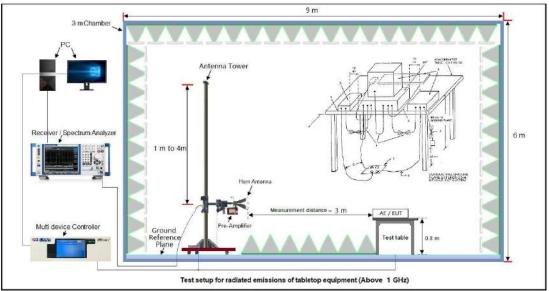


absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

- 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 was reported on the following Data page.

13.4 MEASUREMENT SETUP



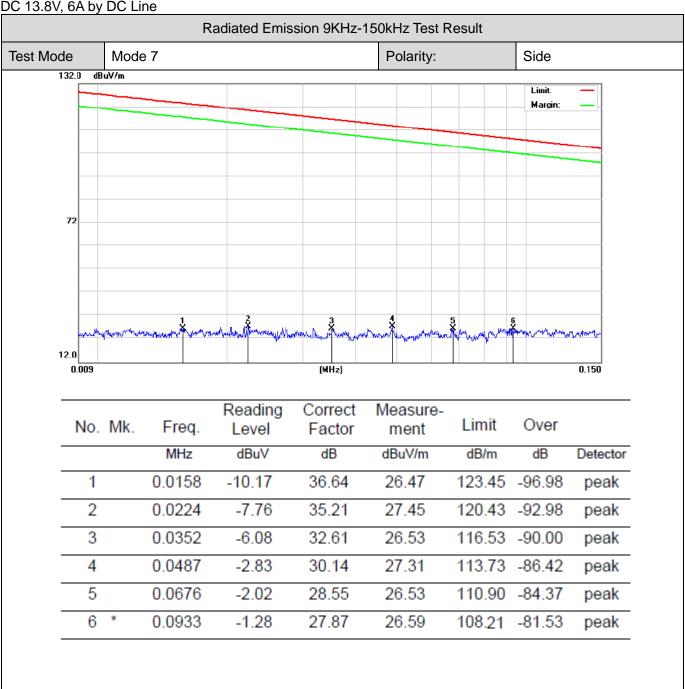


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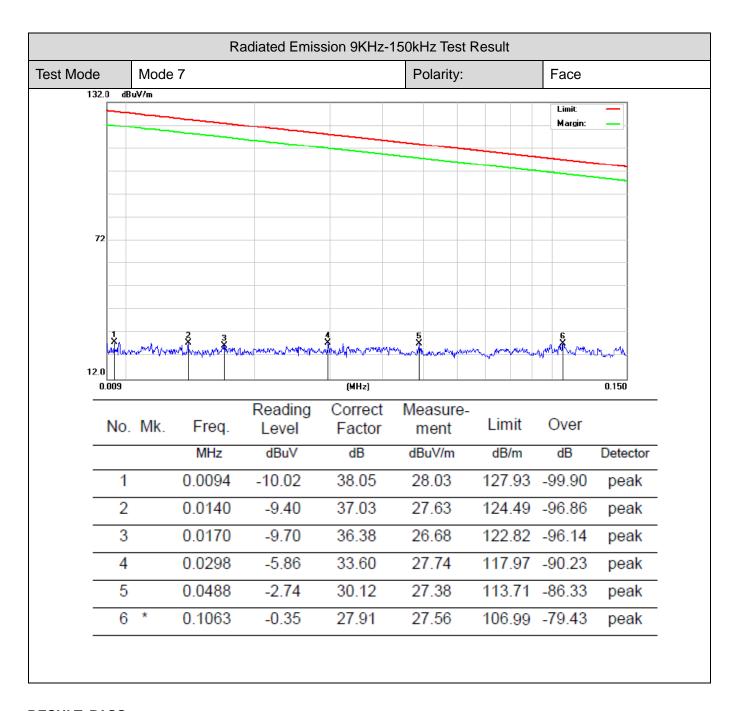
13.5 MEASUREMENT RESULTS

DC 13.8V, 6A by DC Line

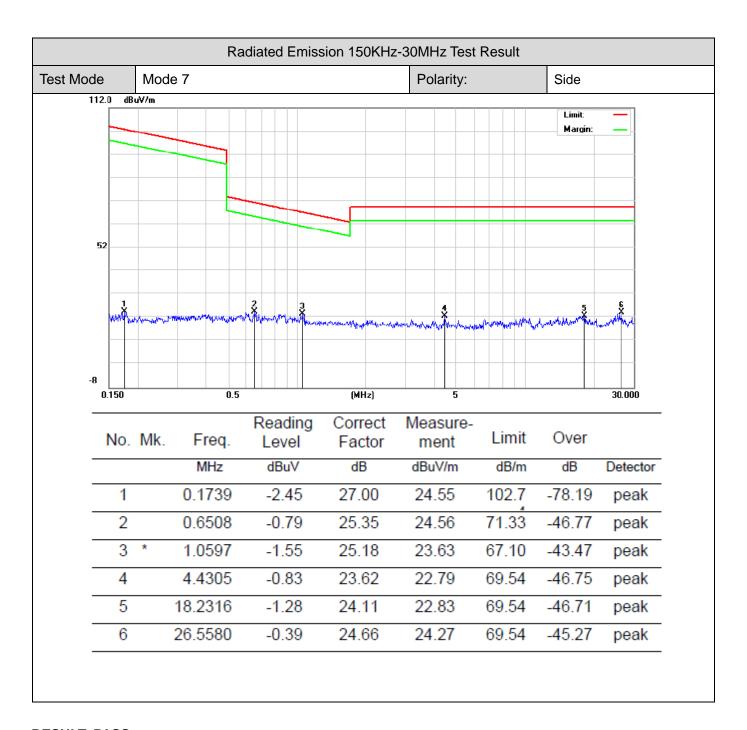


RESULT: PASS

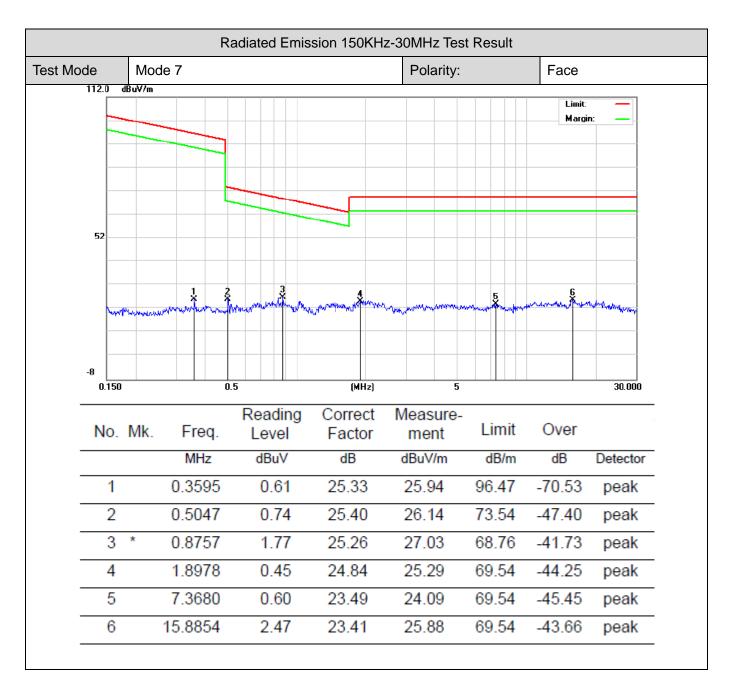




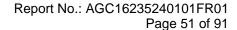




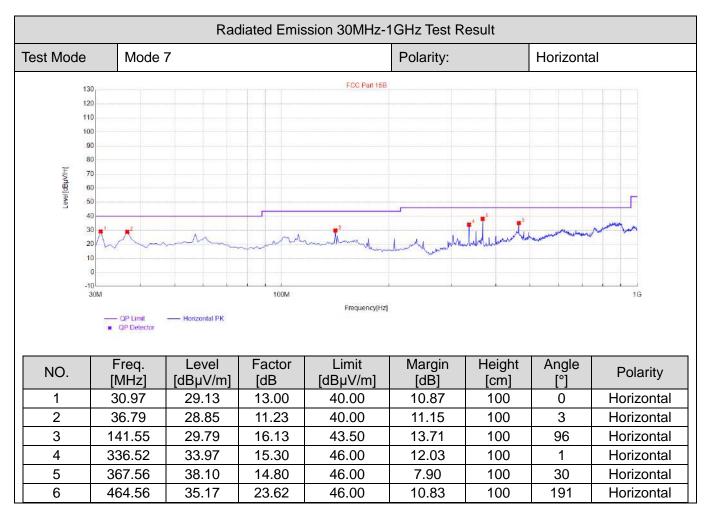


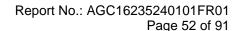


Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Measurement-Limit.

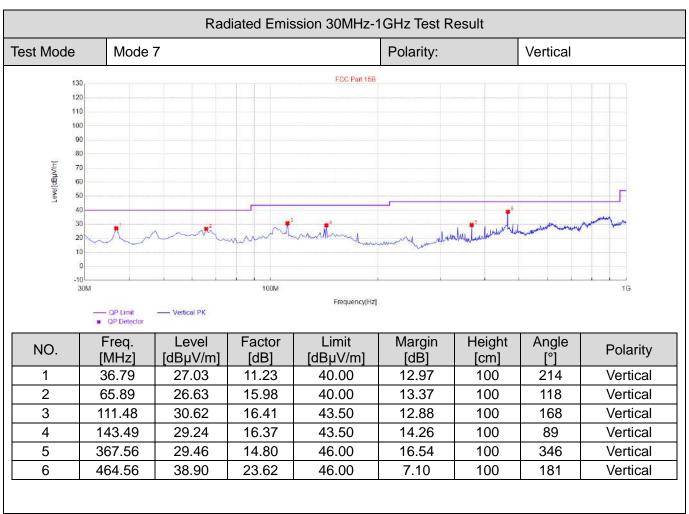






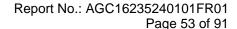




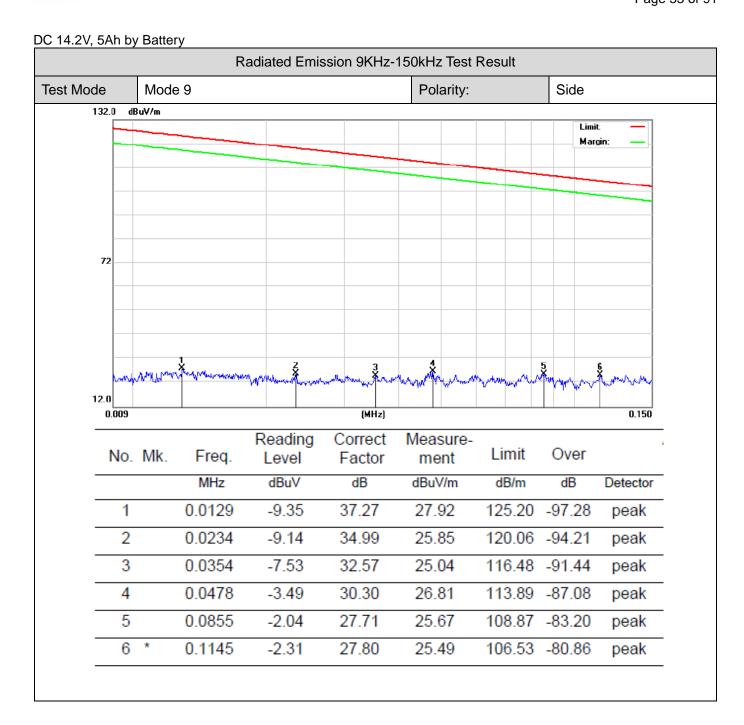


Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.

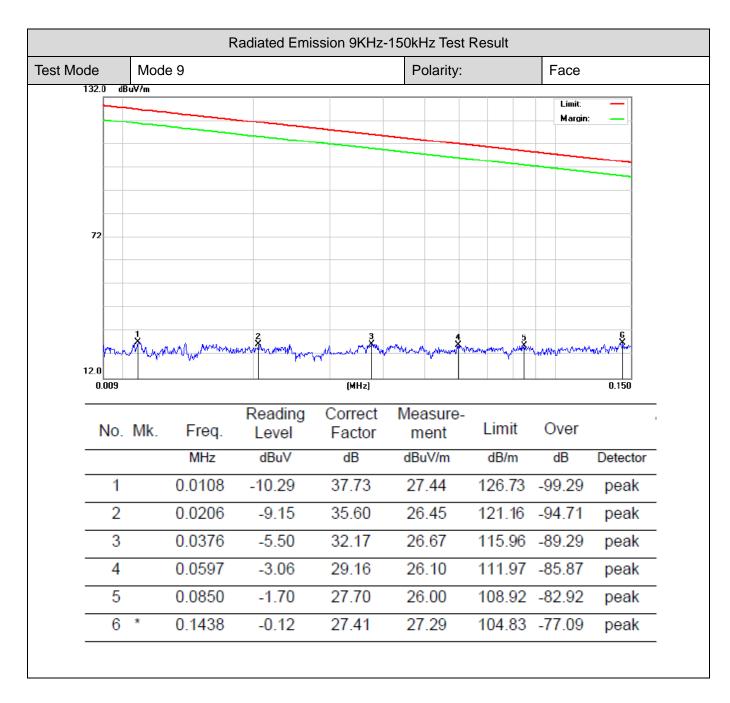
2. The "Factor" value can be calculated automatically by software of measurement system.



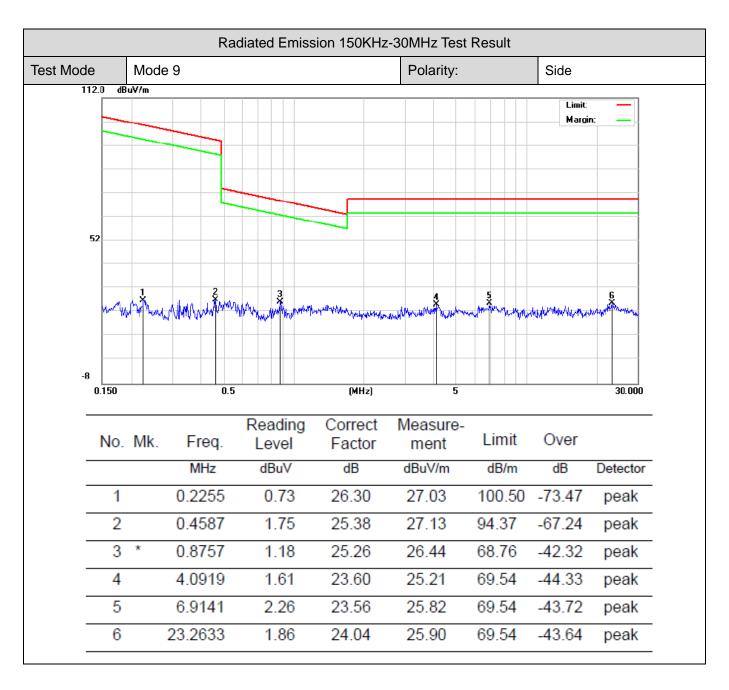




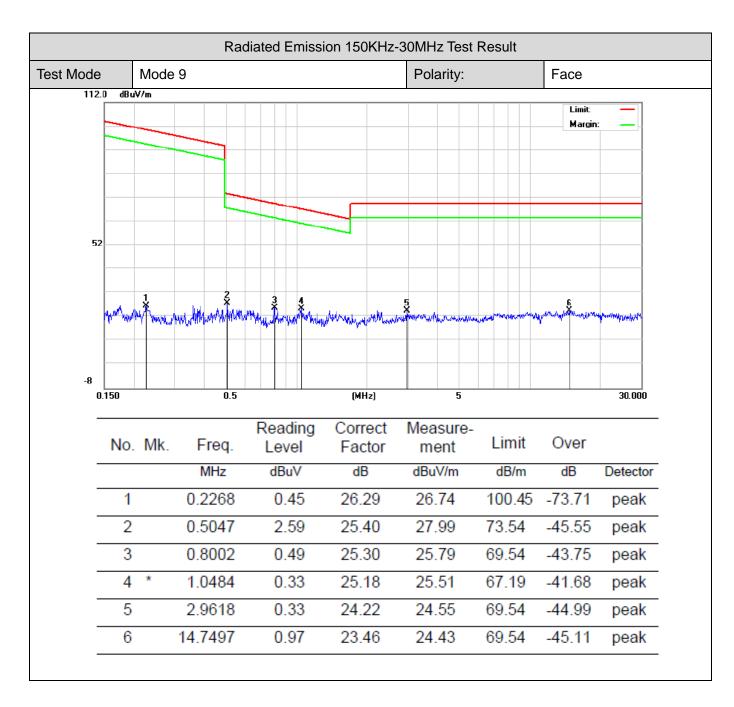




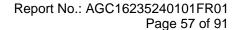




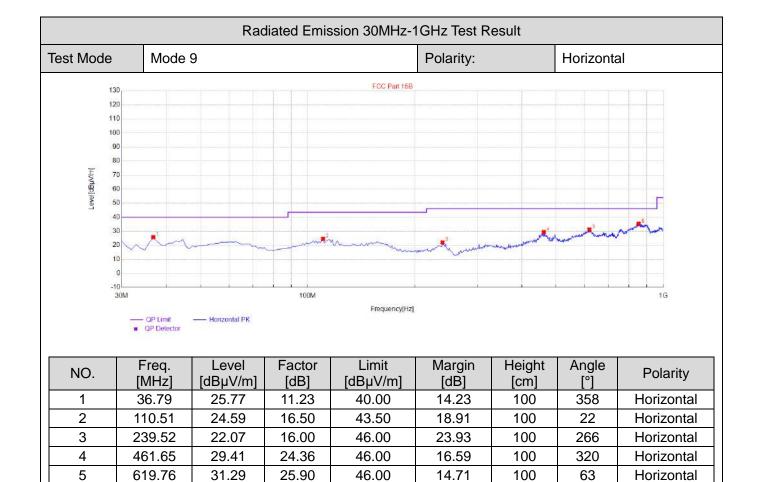




Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Measurement-Limit.







46.00

10.61

100

26

Horizontal

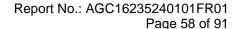
RESULT: PASS

852.56

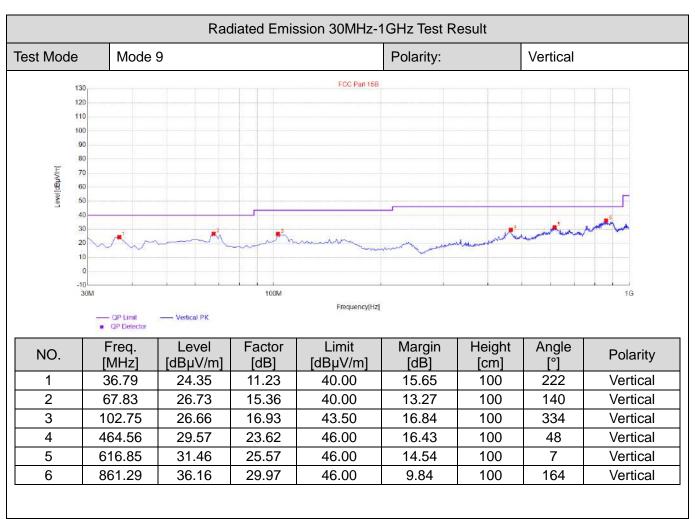
35.39

29.77

6





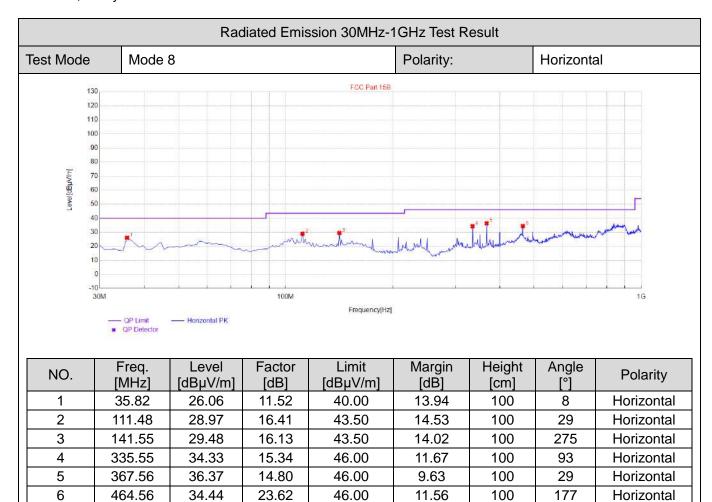


Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.

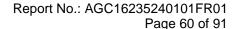
2. The "Factor" value can be calculated automatically by software of measurement system.



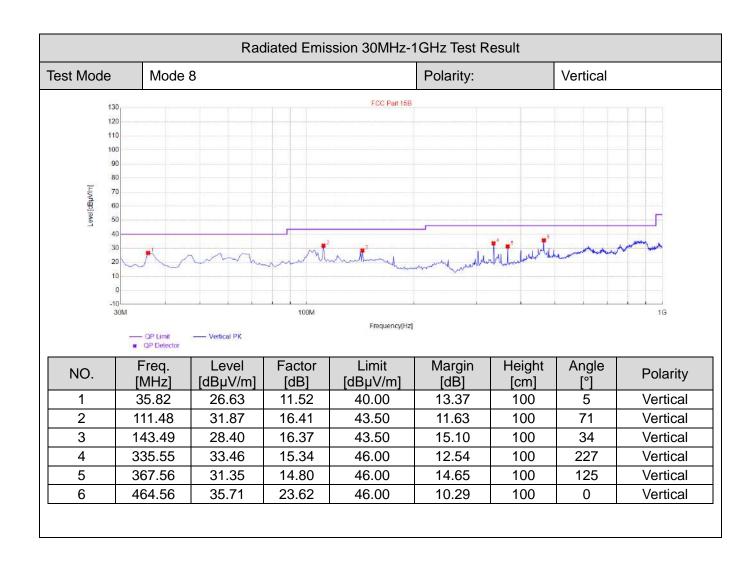
DC 13.8V, 6A by DC Line



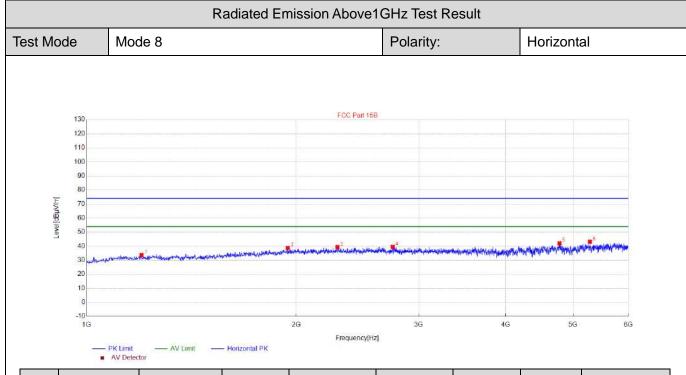
RESULT: PASS



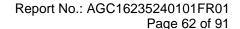




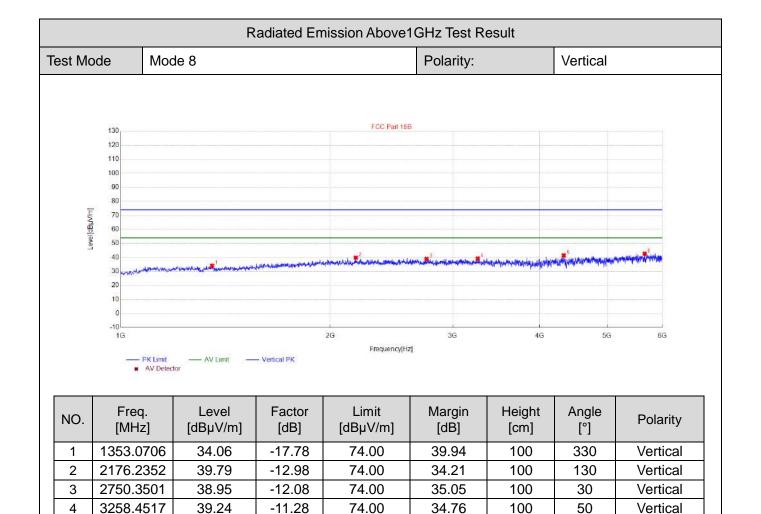




NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1199.0398	33.68	-18.02	74.00	40.32	100	190	Horizontal
2	1945.189	38.75	-13.86	74.00	35.25	100	340	Horizontal
3	2292.2585	39.43	-12.70	74.00	34.57	100	30	Horizontal
4	2752.3505	39.56	-12.08	74.00	34.44	100	210	Horizontal
5	4778.7558	42.09	-7.82	74.00	31.91	100	60	Horizontal
6	5284.857	43.15	-7.26	74.00	30.85	100	120	Horizontal







5

6

4331.6663 5661.9324

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.

-8.58

-6.40

2. The "Factor" value can be calculated automatically by software of measurement system.

74.00

74.00

32.60

31.36

100

100

180

90

Vertical

Vertical

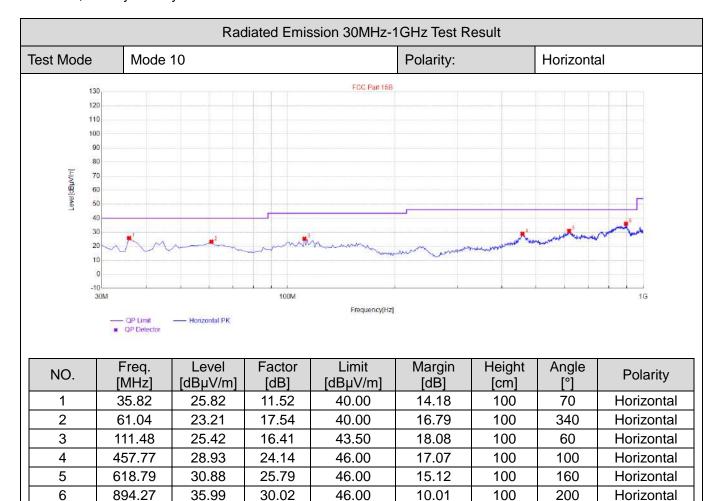
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41.40

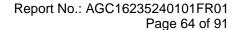
42.64



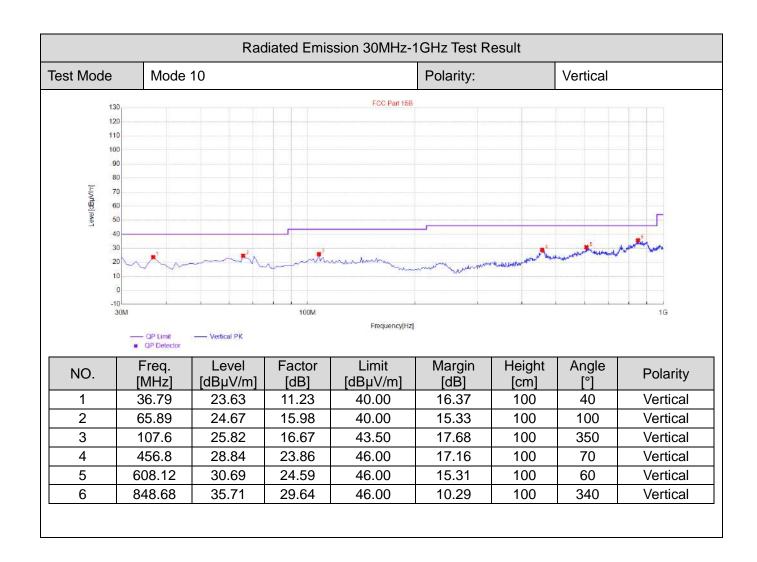
DC 14.2V, 5Ah by Battery



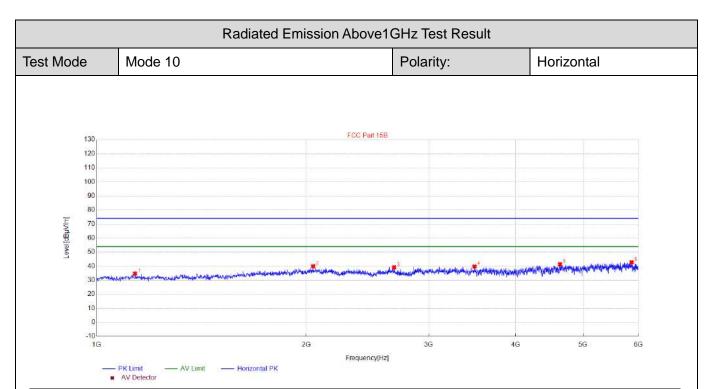
RESULT: PASS



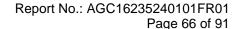




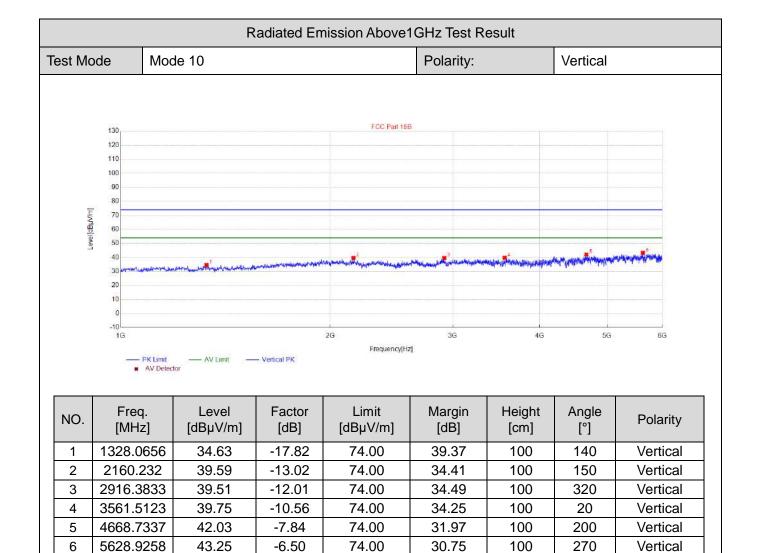




NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1135.027	34.80	-18.12	74.00	39.20	100	220	Horizontal
2	2046.2092	39.93	-13.30	74.00	34.07	100	280	Horizontal
3	2675.3351	39.17	-12.12	74.00	34.83	100	40	Horizontal
4	3490.4981	39.77	-10.67	74.00	34.23	100	40	Horizontal
5	4630.7261	41.28	-7.85	74.00	32.72	100	200	Horizontal
6	5868.9738	42.74	-5.79	74.00	31.26	100	230	Horizontal

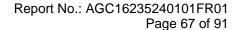






Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.

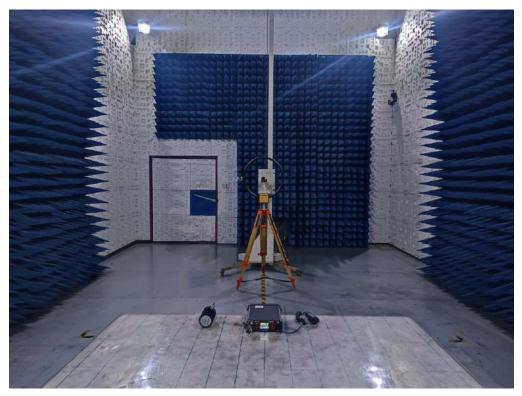
2. The "Factor" value can be calculated automatically by software of measurement system.



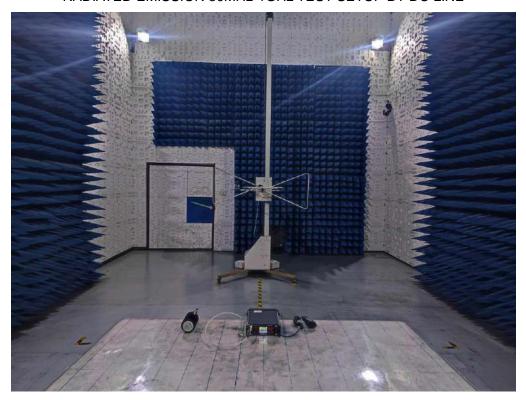


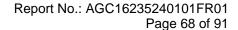
APPENDIX I: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP-BELOW 30MHz BY DC LINE



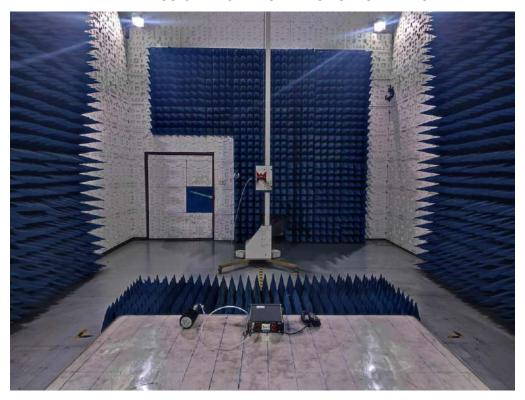
RADIATED EMISSION 30MHz-1GHz TEST SETUP BY DC LINE





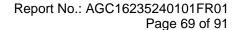


RADIATED EMISSION ABOVE 1GHz TEST SETUP BY DC LINE



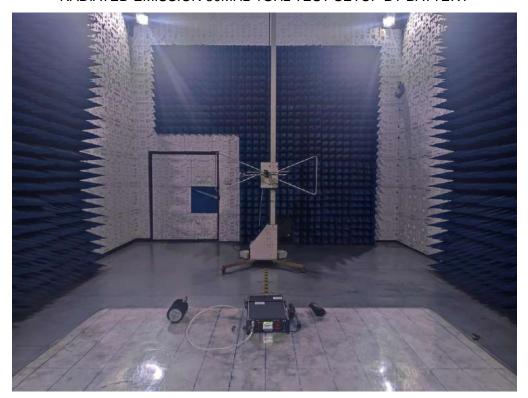
RADIATED EMISSION TEST SETUP-BELOW 30MHz BY BATTERY





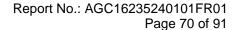


RADIATED EMISSION 30MHz-1GHz TEST SETUP BY BATTERY



RADIATED EMISSION ABOVE 1GHz TEST SETUP BY BATTERY



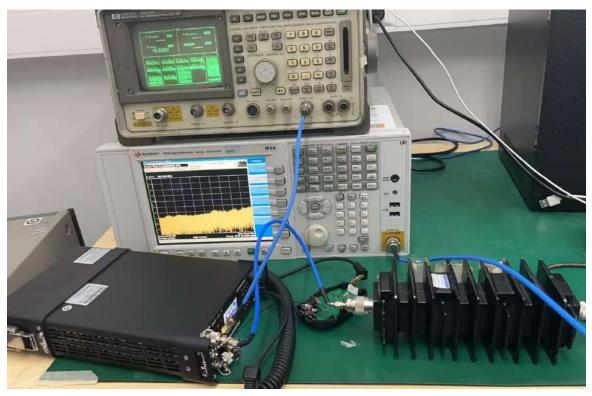




RF CONDUCTED TEST SETUP BY DC LINE

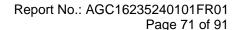


RF CONDUCTED TEST SETUP BY BATTERY



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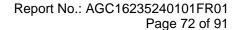
APPENDIX II: PHOTOGRAPHS OF TEST EUT

All VIEW OF EUT



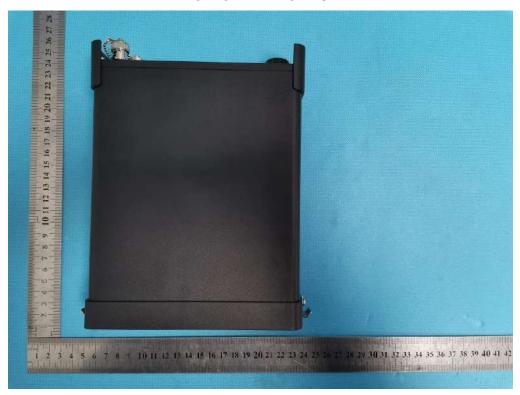
TOP VIEW OF EUT







BOTTOM VIEW OF EUT

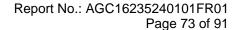


FRONT VIEW OF EUT



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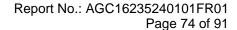


BACK VIEW OF EUT



LEFT VIEW OF EUT





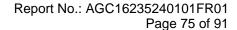


RIGHT VIEW OF EUT



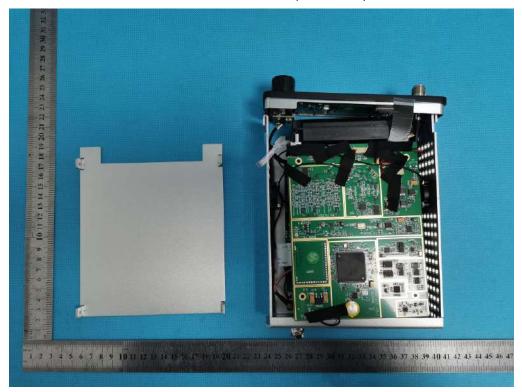
OPEN VIEW OF EUT (FIGURE 1)



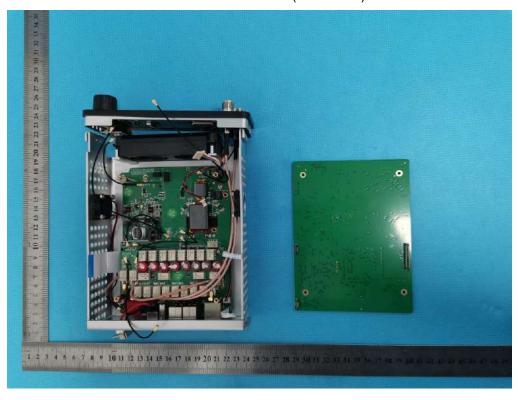


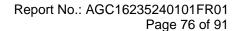


OPEN VIEW OF EUT (FIGURE 2)



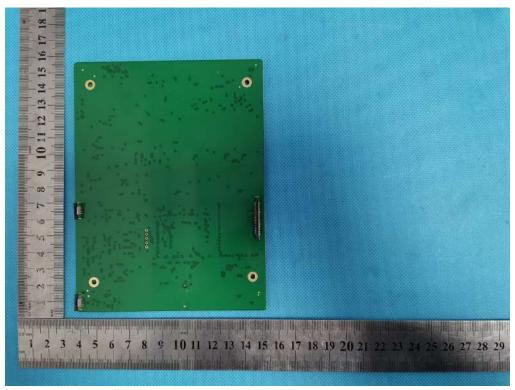
OPEN VIEW OF EUT (FIGURE 3)



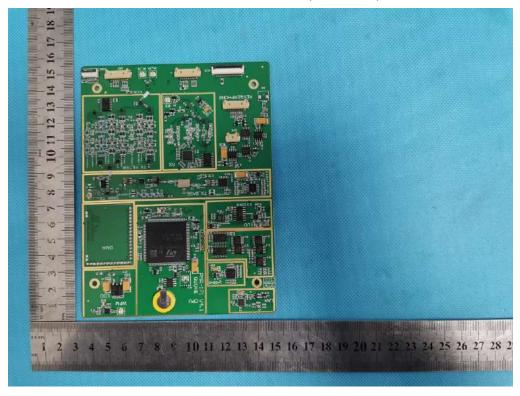


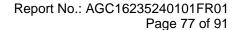


INTERNAL VIEW OF EUT (FIGURE 1)



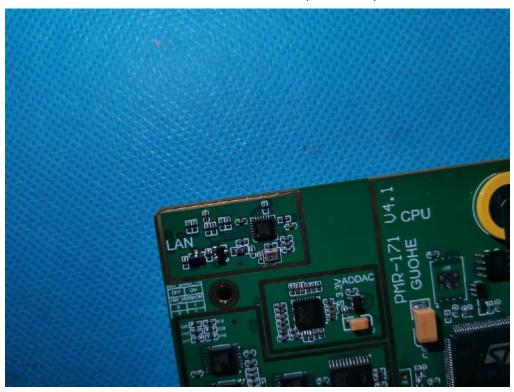
INTERNAL VIEW OF EUT (FIGURE 2)





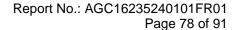


INTERNAL VIEW OF EUT (FIGURE 3)



INTERNAL VIEW OF EUT (FIGURE 4)



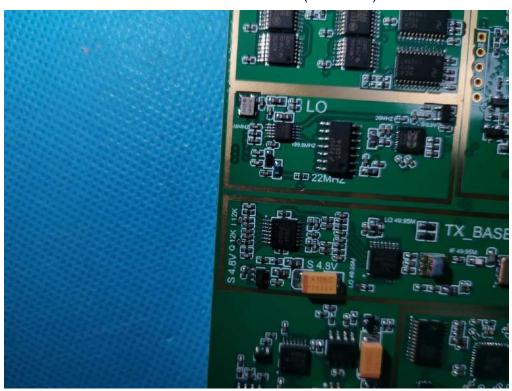


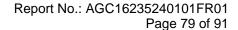


INTERNAL VIEW OF EUT (FIGURE 5)



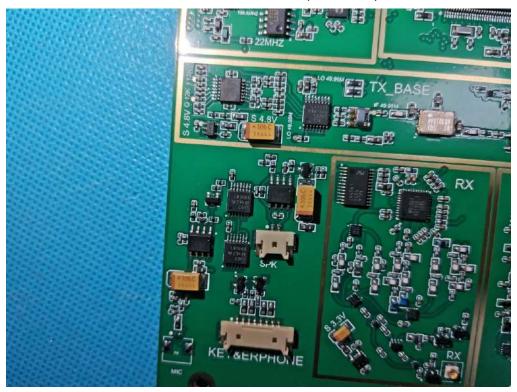
INTERNAL VIEW OF EUT (FIGURE 6)





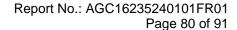


INTERNAL VIEW OF EUT (FIGURE 7)



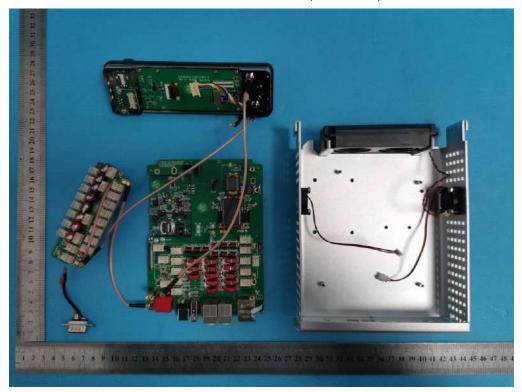
INTERNAL VIEW OF EUT (FIGURE 8)



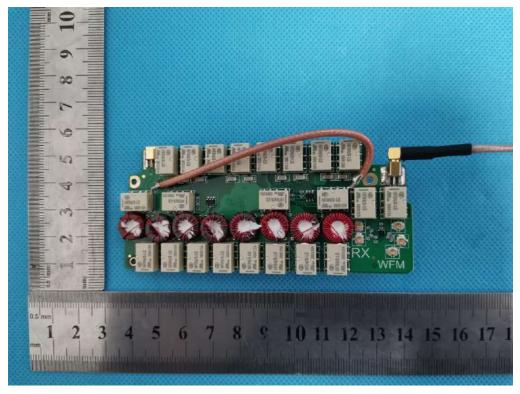




INTERNAL VIEW OF EUT (FIGURE 9)

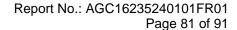


INTERNAL VIEW OF EUT (FIGURE 10)



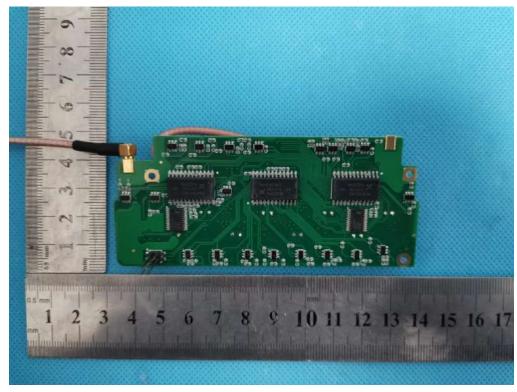
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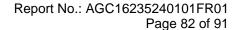


INTERNAL VIEW OF EUT (FIGURE 11)



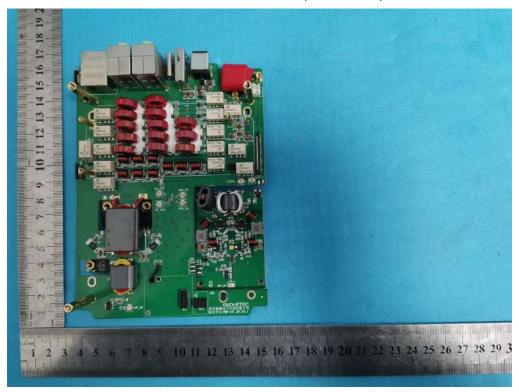
INTERNAL VIEW OF EUT (FIGURE 13)



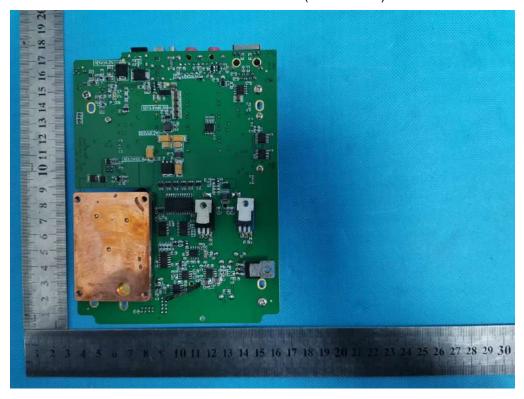


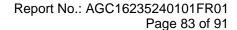


INTERNAL VIEW OF EUT (FIGURE 14)



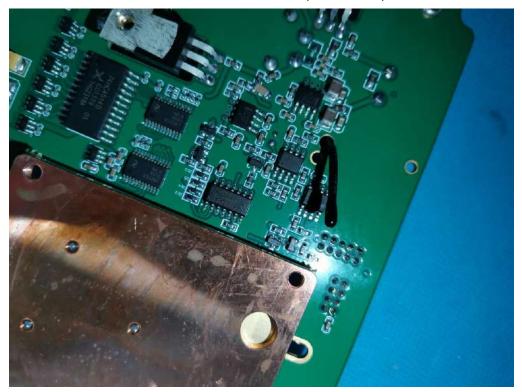
INTERNAL VIEW OF EUT (FIGURE 15)



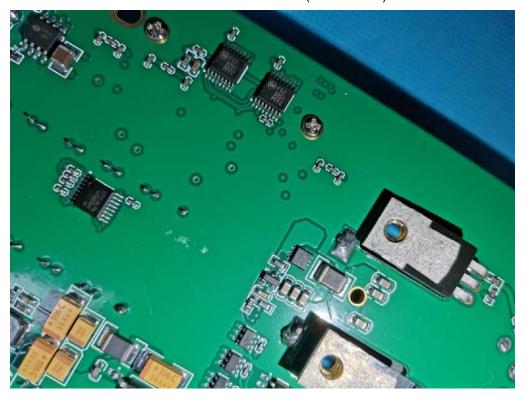


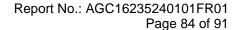


INTERNAL VIEW OF EUT (FIGURE 16)



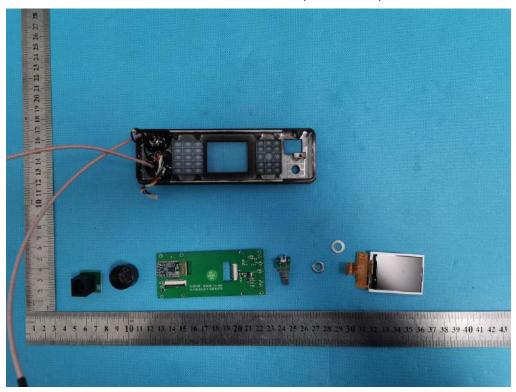
INTERNAL VIEW OF EUT (FIGURE 18)



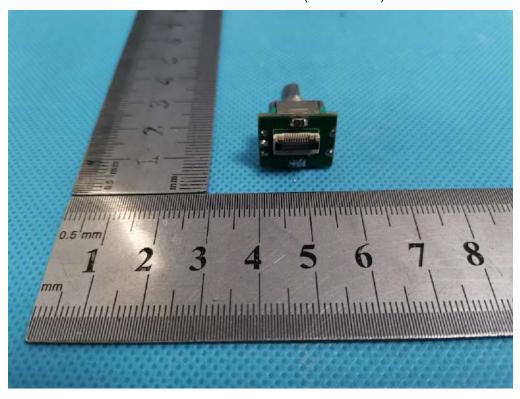


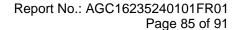


INTERNAL VIEW OF EUT (FIGURE 19)



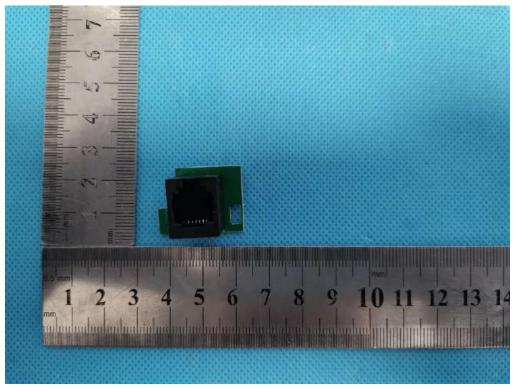
INTERNAL VIEW OF EUT (FIGURE 20)



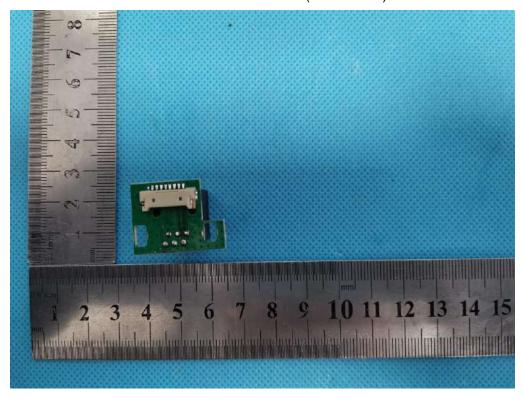


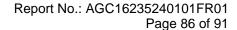


INTERNAL VIEW OF EUT (FIGURE 21)



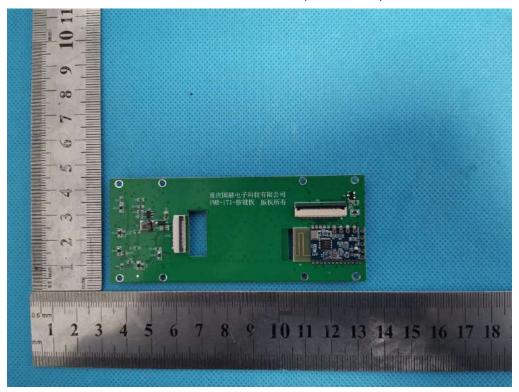
INTERNAL VIEW OF EUT (FIGURE 22)



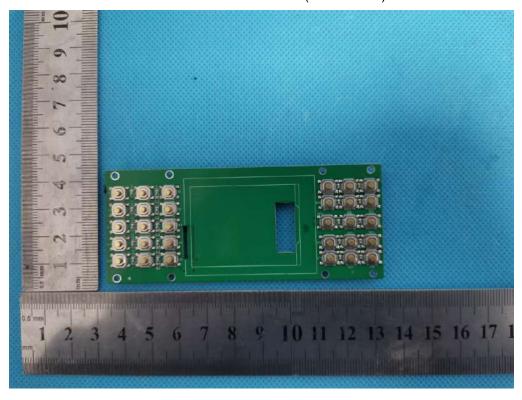




INTERNAL VIEW OF EUT (FIGURE 23)

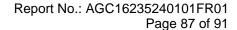


INTERNAL VIEW OF EUT (FIGURE 24)



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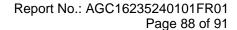


HAND MICROPHONE TOP VIEW OF EUT



BOTTOM VIEW OF EUT





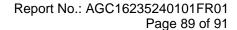


FRONT VIEW OF EUT



BACK VIEW OF EUT





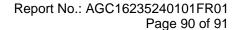


LEFT VIEW OF EUT



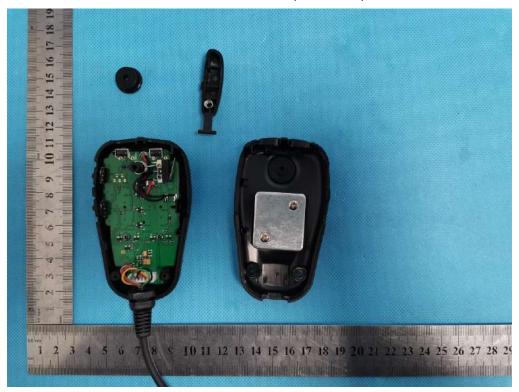
RIGHT VIEW OF EUT



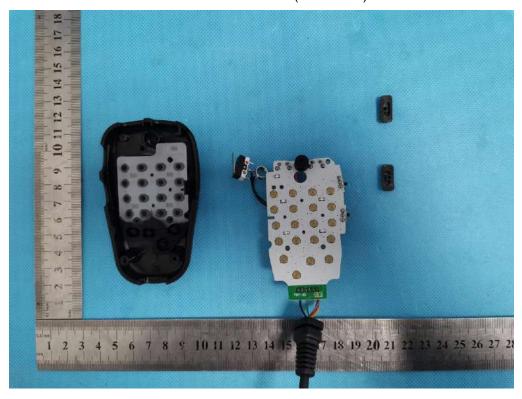


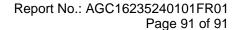


OPEN VIEW OF EUT (FIGURE 1)



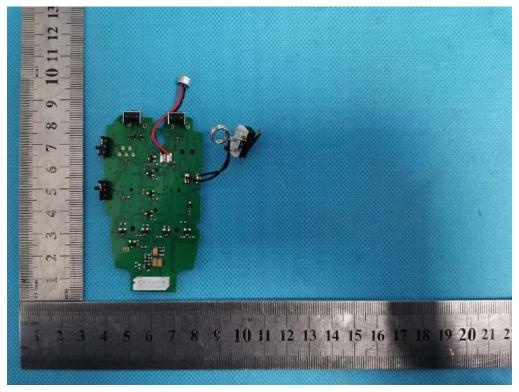
OPEN VIEW OF EUT (FIGURE 2)



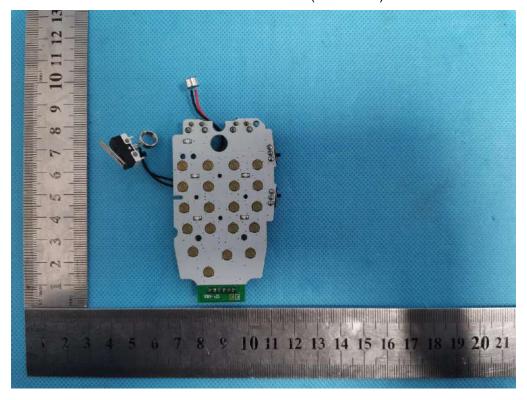




INTERNAL VIEW OF EUT (FIGURE 1)



INTERNAL VIEW OF EUT (FIGURE 2)



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



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- 3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
- 4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
- 5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
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