FCC Test Report

Report No.: AGC05559210701FE10

FCC ID	:	2AN62-GMN1
PRODUCT DESIGNATION	:	Two way radio
BRAND NAME	:	Radioddity
MODEL NAME	:	GM-N1, GM-N2, GM-N3
APPLICANT	:	SAIN3 LLC
DATE OF ISSUE	:	Aug. 09, 2021
STANDARD(S)	:	FCC Part 95 Rules
REPORT VERSION	:	V 1.0

***A**ttestation of **G**lobal Compliance (Shenzhen) Co., Ltd*

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 09, 2021	Valid	Initial Release

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1. GENERAL INFORMATION

Applicant	SAIN3 LLC
Address	36 Berkley Drive Newark Delaware United States 19702
Manufacturer	SAIN3 LLC
Address	36 Berkley Drive Newark Delaware United States 19702
Factory	SAIN3 LLC
Address	36 Berkley Drive Newark Delaware United States 19702
Product Designation	Two way radio
Brand Name	Radioddity
Test Model	GM-N1
Series Model(s)	GM-N2, GM-N3
Difference Description	Different models only
Deviation from Standard	No any deviation from the test method.
Date of Receipt	Jul. 05, 2021
Date of Test	Jul. 05, 2021~Aug. 09, 2021
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. The sample tested as described in this report is in compliance with the FCC Rules Part 95. The test results of this report relate only to the tested sample identified in this report.

Prepared By — Eddy Liu (Project Engineer) — Aug. 09, 2021

Reviewed By — Calvin Liu (Reviewer) — Aug. 09, 2021

Approved By — Forrest Lei (Authorized Officer) — Aug. 09, 2021

2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	SHX-3000	
Software Version	V1.02	
Power Supply	DC 3.7V, 3000mAh by battery	
Adapter Information	Input: AC 100-240V 50/60Hz, 0.15A Output: DC 5V 1A	
Communication Type	Voice / Tone only	
Operation Frequency Range	462.5500MHz-462.7250MHz (GMRS 462 MHz main channels) 462.5625MHz-462.7125MHz (GMRS 462 MHz interstitial channels) 467.5500MHz-467.7250MHz (GMRS 467 MHz main channels) 467.5625MHz-467.7125MHz (GMRS 467 MHz interstitial channels)	
Modulation Type	FM	
Channel Separation	12.5 KHz/25 KHz	
Emission Bandwidth	GMRS: 10.47 KHz-12.5 KHz	GMRS: 15.59 KHz-25 KHz
Emission Designator	11K0F3E/16K0F3E	
Number of Channels:	30 Channels	
Rated Output Power	3W (It was fixed by the manufacturer, any individual can't arbitrarily change it.)	
Maximum Transmitter Power	GMRS: 34.53dBm (3W-12.5KHz) GMRS: 26.85dBm (0.5W-12.5KHz)	
	GMRS: 34.62dBm (3W-25KHz)	
Antenna Designation	Inseparable Antenna	
Antenna Gain	1.5dBi	
Frequency Tolerance	1.092ppm	

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

Channel. No	CH. Freq	Rated Power	CH. No	CH. Freq	Rated Power
1	462.5625	3W	16	467.5500	3W
2	462.5875		17	467.5750	
3	462.6125		18	467.6000	
4	462.6375		19	467.6250	
5	462.6625		20	467.6500	
6	462.6875		21	467.6750	
7	462.7125		22	467.7000	
8	462.5500	3W	23	467.7250	
9	462.5750		24	467.5625	0.5W
10	462.6000		25	467.5875	
11	462.6250		26	467.6125	
12	462.6500		27	467.6375	
13	462.6750		28	467.6625	
14	462.7000		29	467.6875	
15	462.7250		30	467.7125	

2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: **2AN62-GMN1,** filing to comply with Part 2, Part 95 of the Federal Communication Commission rules.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 95	Personal Radio Services
2	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
3	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
4	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
5	KDB 888861 D01	888861 D01 Part 95 GMRS FRS v01

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 = 11K0
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.

2.8 ANTENNA REQUIREMENT

Excerpt from §95.1787 of the FCC Rules/Regulations:

The antenna of each GMRS transmitter type must meet the following requirements.
(1) The antenna must be a non-removable integral part of the GMRS transmitter type.
(2) The non-detachable antenna is only for handheld portable GMRS equipment.

- The antenna of this device is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion: The unit complies with the requirement of §95.1787.

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.

3.3 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range (℃)	15 - 35	-20 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	DC 3.7V	LV DC 3.15V/HV DC 4.26V
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 %

3.5 LIST OF EQUIPMENTS USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Apr. 14, 2021	Apr. 13, 2022
EXA Signal Analyzer	Aglient	N9020A	W1312-60196	Aug. 21, 2020	Aug. 20, 2021
EXA Signal Analyzer	Aglient	N9020A	MY52090123	Sep. 03, 2020	Sep. 02, 2021
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.16, 2019	Sep.15, 2021
preamplifier	ChengYi	EMC184045SE	980508	Sep. 23, 2019	Sep. 22, 2011
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun. 07, 2021	Jun. 06, 2022
HORN ANTENNA	EM	EM-AH-10180	/	Feb.26, 2021	Feb.25, 2022
SIGNAL GENERATOR	AGILENT	E4421B	MY43351603	May 11, 2021	May 10, 2022
SIGNAL GENERATOR	R&S	SMT03	A0304261	Jun. 07, 2021	Jun. 06, 2022
ANTENNA	SCHWARZBECK	VULB9168	VULB9168-494	Jan. 08, 2021	Jan. 07, 2023
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.26, 2018	Sep.25, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Modulation Domain Analyzer	HP	53310A	3121A02467	Aug. 26, 2020	Aug. 25, 2021
Small environmental tester	ESPEC	SH-242	--	Sep. 03, 2020	Sep. 02, 2021
RF Communication Test Set	HP	8920B	--	Sep. 03, 2020	Sep. 02, 2021
Attenuator	Weinachel Corp	58-30-33	ML030	Oct. 26, 2020	Oct. 25, 2021
RF Cable	R&S	1#	--	Each time	N/A
RF Cable	R&S	2#	--	Each time	N/A
Fliter-UHF	Microwave	N25155M2	498705	May 09, 2021	May 08, 2022

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 Manufacturer

Item	Equipment	Model No.	Identifier	Note
1	Two way radio	GM-N1	FCC ID: 2AN62-GMN1	EUT
2	Battery	BP3000	DC 3.7V 3000mAh	Accessories
3	Adapter	U0B2E0D050100	Input: AC 100-240V 50/60Hz 0.15A Output: DC 5.0V 1A	Accessories
4	Earphone	N/A	N/A	Accessories
5	USB Cable	N/A	N/A	Accessories

4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	FCC 47 CFR PART 95	Antenna Equipment	Pass
2	§ 95.1767& 2.1046(a)	Maximum Transmitter Power	Pass
3	§95.1755& 2.1047(a) (b)	Modulation Limit	Pass
4	§95.1755& 2.1047(a)	Audio Frequency Response	Pass
4	§95.1755(e)	Audio Low Pass Filter Response	Pass
5	§95.1779& 2.1049	Emission Bandwidth	Pass
6	§95.1779& 2.1049	Emission Mask	Pass
7	§95.1765& 2.1055(a) (1)	Frequency Stability	Pass
9	§95.1779& 2.1051	Spurious Emission on Antenna Port	N/A
10	§95.1779& 2.1053	Spurious Ratiated Emission	Pass

Note:

1) N/A: In this whole report not application.
2) The EUT is Integral Antenna.

5. DESCRIPTION OF TEST MODES

The EUT (**Two-way radio**) has been tested under normal operating condition. (GMRS TX) are chosen for testing at each channel separation.

NO.	TEST MODE DESCRIPTION	CHANNEL SEPARATION
1	GMRS TX CHANNEL 4	12.5 kHz/25 kHz
2	GMRS TX CHANNEL 12	12.5 kHz/25 kHz
3	GMRS TX CHANNEL 20	12.5 kHz/25 kHz
4	GMRS TX CHANNEL 27	12.5 kHz

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 STABILITY

6.1 PROVISIONS APPLICABLE

Standard Applicable [Part 95.1765] The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.
GMRS: The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth of 12.5 kHz or less must remain within 2.5 ppm
The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth greater than 12.5 kHz must remain within 5 ppm

6.2 MEASUREMENT PROCEDURE

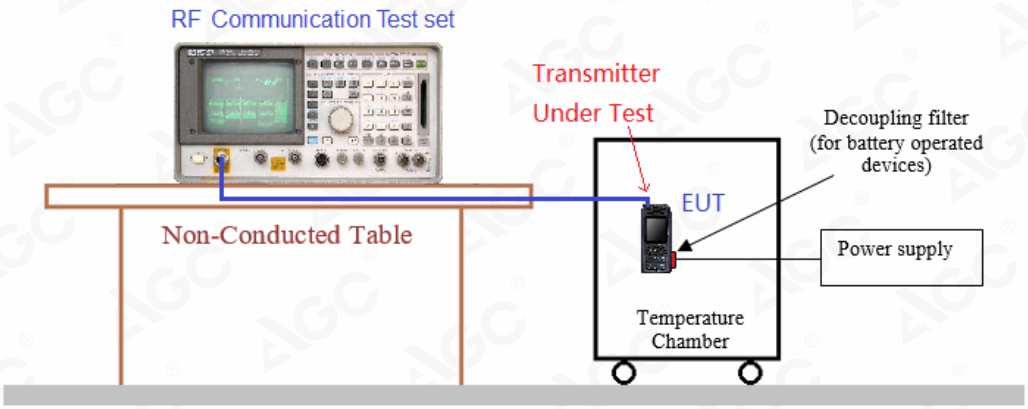
6.2.1 Frequency stability versus environmental temperature

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℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

6.2.2 Frequency stability versus input voltage

1. 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 3.7V.
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, FM modulation, Assigned Frequency For GMRS							
Test conditions		Frequency error (ppm)				Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)					
		462.6375	462.6500	467.6500	467.6375		
3.70	-30	0.986	0.653	0.962	0.412	2.5	Pass
	-20	0.619	0.844	0.573	0.729		
	-10	0.883	0.672	1.014	0.599		
	0	0.771	0.690	0.581	0.908		
	10	0.882	0.640	0.859	0.851		
	20	0.762	0.548	1.019	0.641		
	30	0.971	0.907	0.844	0.655		
	40	0.512	1.066	0.922	0.591		
	50	0.682	0.819	0.716	0.723		
4.26	20	1.022	0.788	0.848	0.820		
3.15	20	0.741	0.671	0.668	0.476		

25 kHz Channel Separation, FM modulation, Assigned Frequency For GMRS						
Test conditions		Frequency error (ppm)			Limit (ppm)	Result
Voltage (V)	Temp (℃)	Test Frequency (MHz)				
		462.6375	462.6500	467.6500		
3.70	-30	0.553	0.977	0.787	5	Pass
	-20	0.847	0.845	0.646		
	-10	0.915	0.744	0.665		
	0	0.715	0.542	0.541		
	10	0.794	1.039	0.841		
	20	1.019	0.517	0.633		
	30	0.772	1.005	0.889		
	40	**1.092**	0.618	0.717		
	50	0.970	0.802	0.929		
4.26	20	0.698	1.074	0.922		
3.15	20	1.089	0.728	1.019		

7. EMISSION BANDWIDTH

7.1 PROVISIONS APPLICABLE

FCC Part 95.1773: GMRS: Main channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz main channels, or any of the 467 MHz main channels.

Interstitial channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz interstitial channels, and is 12.5 kHz for GMRS transmitters operating on any of the 467 MHz interstitial channels.

Occupied Bandwidth: The EUT was connected to the audio signal generator and the spectrum analyzer via the main RF connector, and through an appropriate attenuator. The EUT was controlled to transmit its maximum power. Then the bandwidth of 99% power can be measured by the spectrum analyzer.

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:

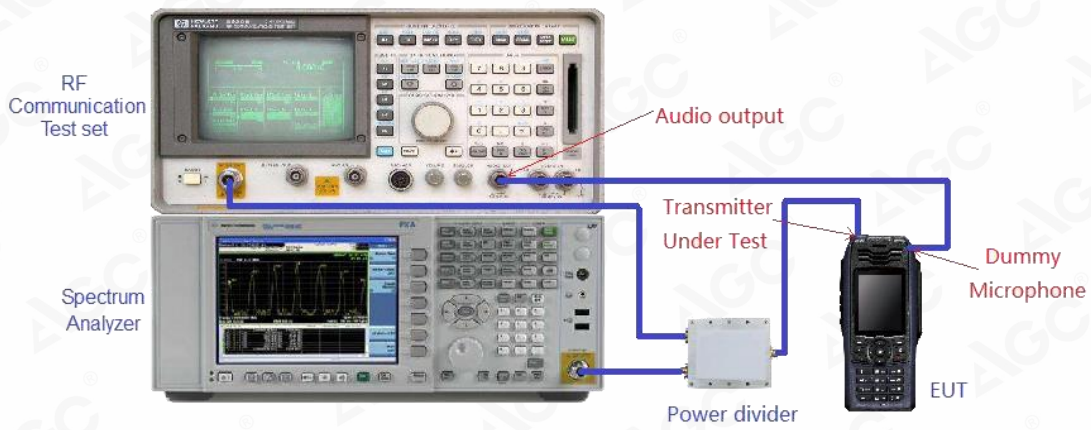
Centre frequency = fundamental frequency, span=50kHz for 12.5kHz channel spacing, RBW=300Hz, VBW=1KHz, Sweep = auto,

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

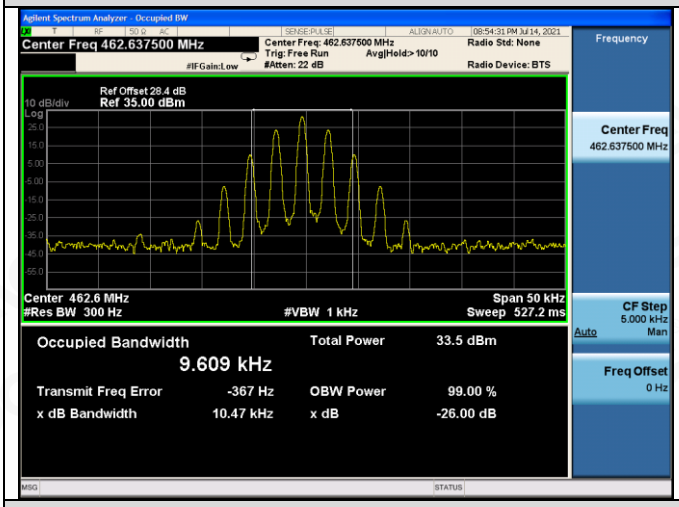
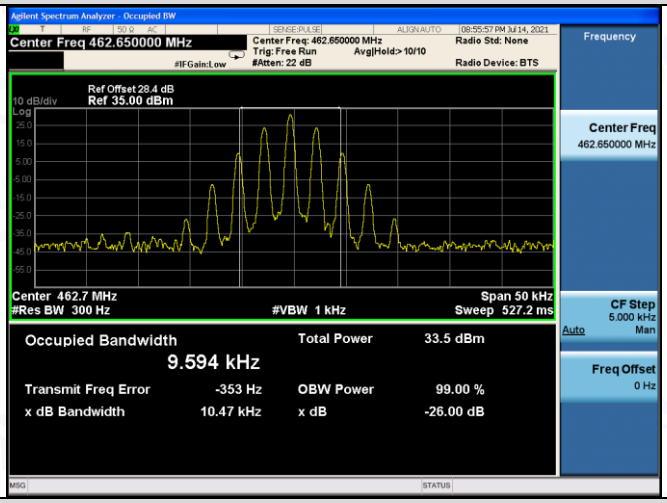
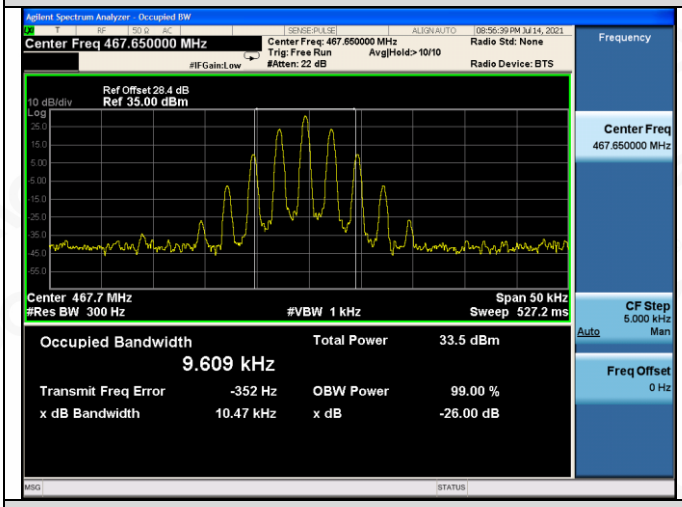
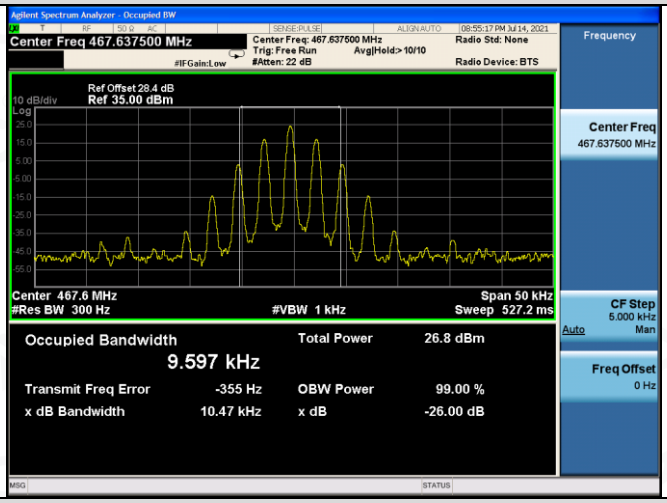
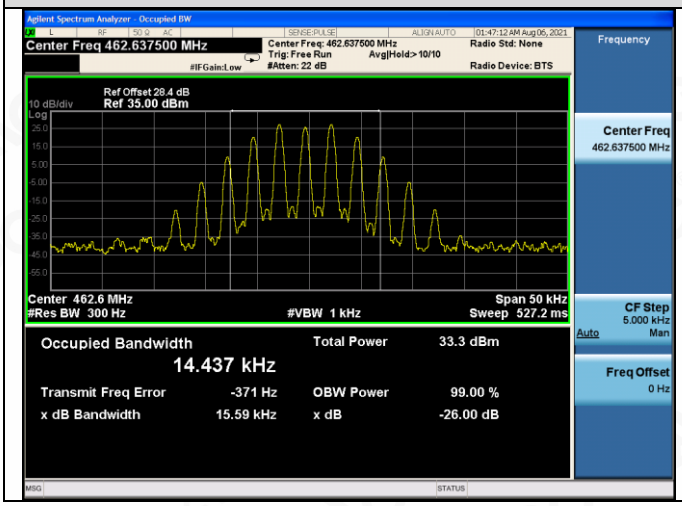
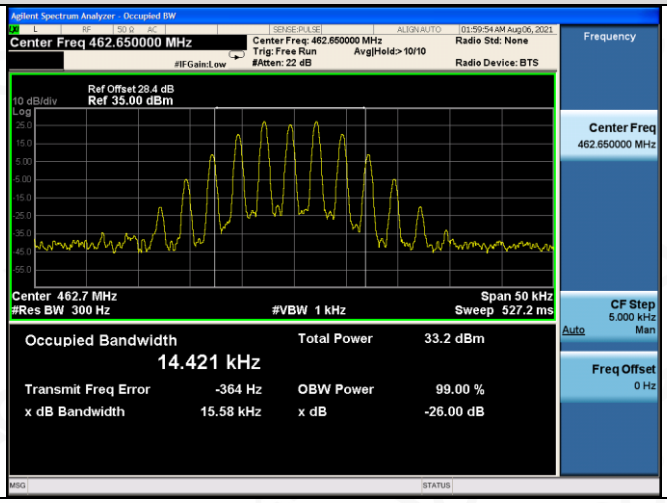


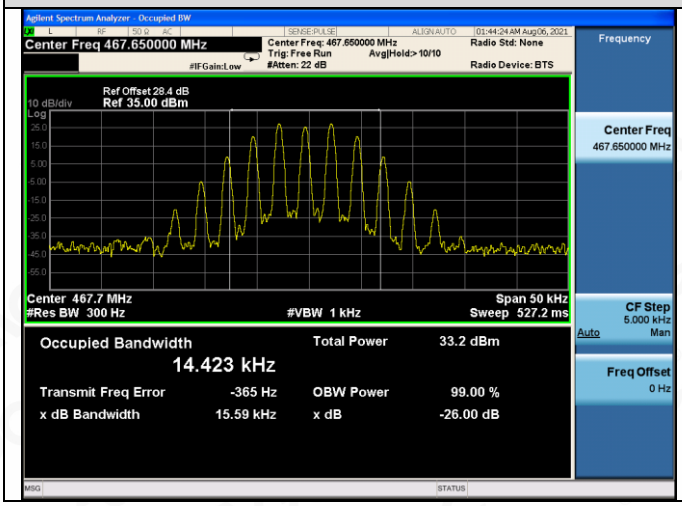
7.4 MEASUREMENT RESULTS

Emission Bandwidth Measurement Result-GMRS				
Operating Frequency	12.5 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
462.6375 MHz	9.609 kHz	10.47 kHz	20.0 kHz	Pass
462.6500 MHz	9.594 kHz	10.47 kHz	20.0 kHz	Pass
467.6500 MHz	9.609 kHz	10.47 kHz	20.0 kHz	Pass
467.6375 MHz	9.597 kHz	10.47 kHz	12.5 kHz	Pass

Emission Bandwidth Measurement Result-GMRS				
Operating Frequency	25 kHz Channel Separation			
	Occupied Bandwidth	Emission Bandwidth	Limits	Result
462.6375 MHz	14.437 kHz	15.59 kHz	20.0 kHz	Pass
462.6500 MHz	14.421 kHz	15.58 kHz	20.0 kHz	Pass
467.6500 MHz	14.423 kHz	15.59 kHz	20.0 kHz	Pass

Test plot as follows:

12.5kHz, FM Modulation:462.6375MHz-3W	12.5kHz, FM Modulation:462.6500MHz-3W
	
12.5kHz, FM Modulation:467.6500MHz-3W	**12.5kHz, FM Modulation:467.6375MHz-0.5W**
	
25kHz, FM Modulation:462.6375MHz-3W	**25kHz, FM Modulation:462.6500MHz-3W**
	

25kHz, FM Modulation:467.6500MHz-3W	
	

8. SPURIOUS RATIATED EMISSION

8.1 PROVISIONS APPLICABLE

Standard Applicable [FCC Part 95.1779] According to FCC section 95.1779, the unwanted emission should be attenuated below TP by at least 43+10 log (Transmit Power) dB

8.2 MEASUREMENT PROCEDURE

Each GMRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

a) Emission masks. Emission masks applicable to transmitting equipment in the GMRS are defined by the requirements in the following table. The numbers in the attenuation requirements column refer to rule paragraph numbers under paragraph (b) of this section.

Emission types filter	Attenuation requirements
A1D, A3E, F1D, G1D, F2D, F3E, G3E with audio filter	(1), (2), (7)
A1D, A3E, F1D, G1D, F3E, G3E without audio filter	(3), (4), (7)
H1D, J1D, R1D, H3E, J3E, R2E	(5), (6), (7)

1) Filtering noted for GMRS transmitters refers to the requirement in §95.1775(e).

2) Unwanted emission power may be measured as either mean power or peak envelope power,provided that the transmitter output power is measured the same way.

b) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

1) 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

2) 35 dB on any frequency removed from the center of the authorized bandwidth by more than100% up to and including 250% of the authorized bandwidth.

3) 83 log (fd ÷ 5) dB on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz up to and including 10 kHz.

4) 116 log (fd ÷ 6.1) dB or 50 + 10 log (P) dB, whichever is the lesser attenuation, on any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz), of more than 10 kHz up to and including 250% of the authorized bandwidth.

5) 25 dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 150% of the authorized bandwidth.

6) 35 dB on any frequency removed from the center of the authorized bandwidth by more than 150% up to and including 250% of the authorized bandwidth.

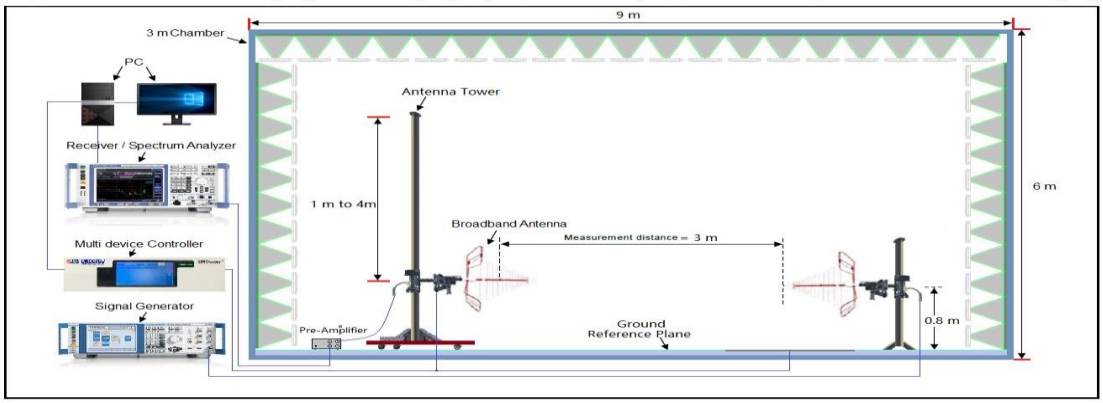
7) 43 + 10 log (P) dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

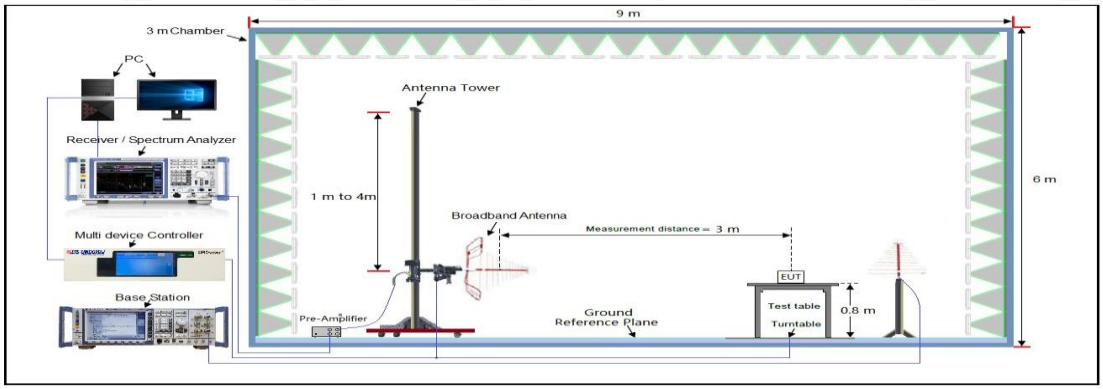
DETAILED OVERVIEW OF THE TEST METHOD IS AS FOLLOWS:

1) EUT was placed on a 0.8 or 1.5meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made. The radiated emission measurements of all transmit frequencies in all channels were measured with peak detector.
2) A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3) The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (Pr).
4) The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5) A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test
6) The measurement results are obtained as described below: Power(EIRP)=PMea- PAg - Pcl - Ga The measurement results are amend as described below:Power(EIRP)=PMea- Pcl - Ga
7) This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
8) ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.
9) Test the EUT in the lowest channel, the middle channel the Highest channel

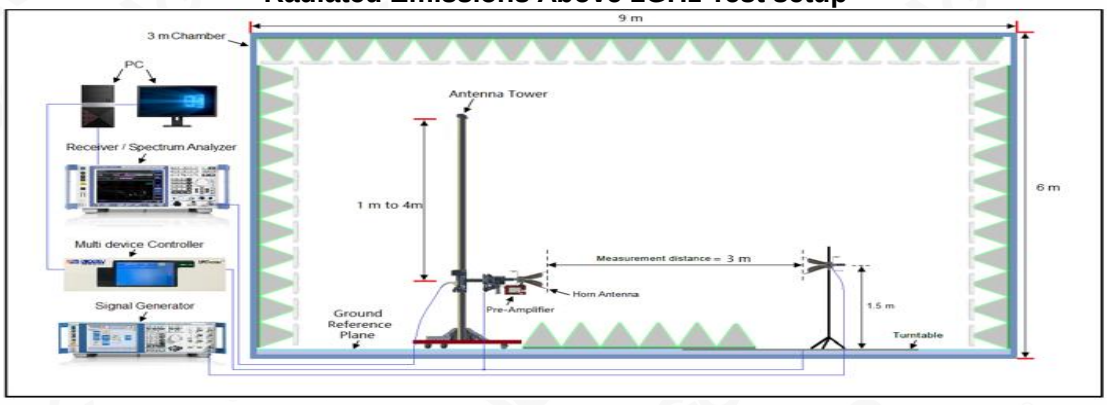
8.3 MEASUREMENT SETUP

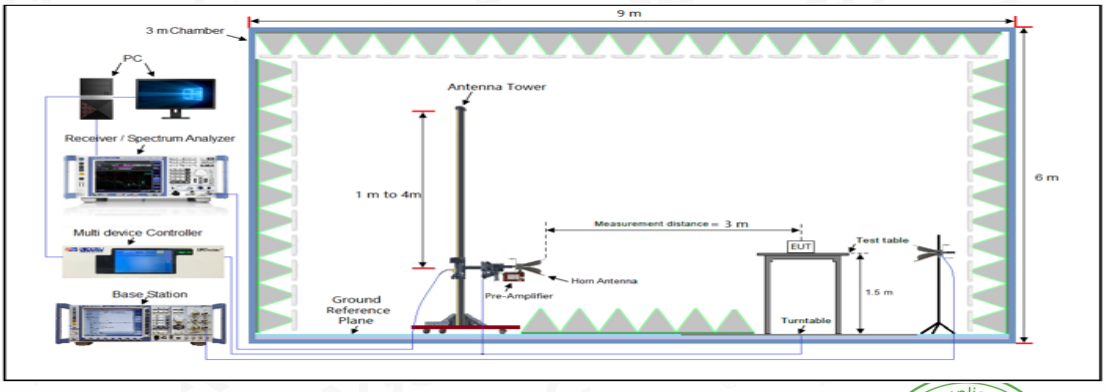
Radiated Emissions 30MHz to 1GHz Test setup





Radiated Emissions Above 1GHz Test setup



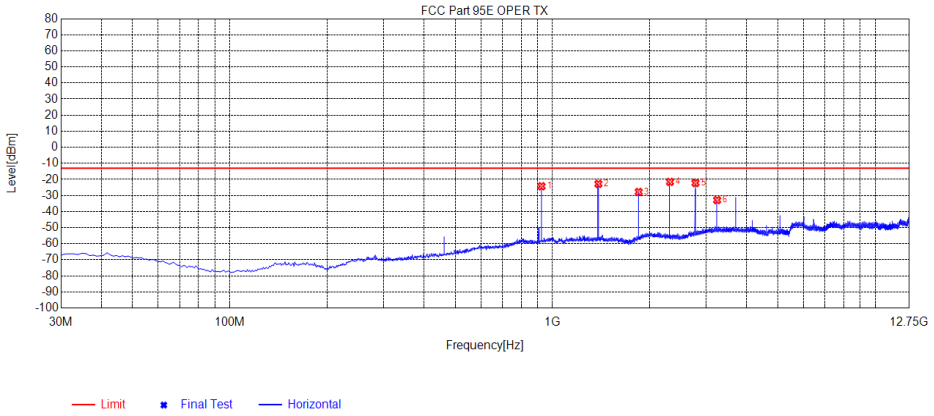


8.4 MEASUREMENT RESULTS

Preliminary calculation	Final Result
At least 43+10 log (P) =43+10log (3) =47.77 (dB)	Limit=P- Preliminary calculation=34.77-47.77=-13 dBm
At least 43+10 log (P) =43+10log (0.5) =43.00 (dB)	Limit=P- Preliminary calculation=30.00-43.00=-13 dBm

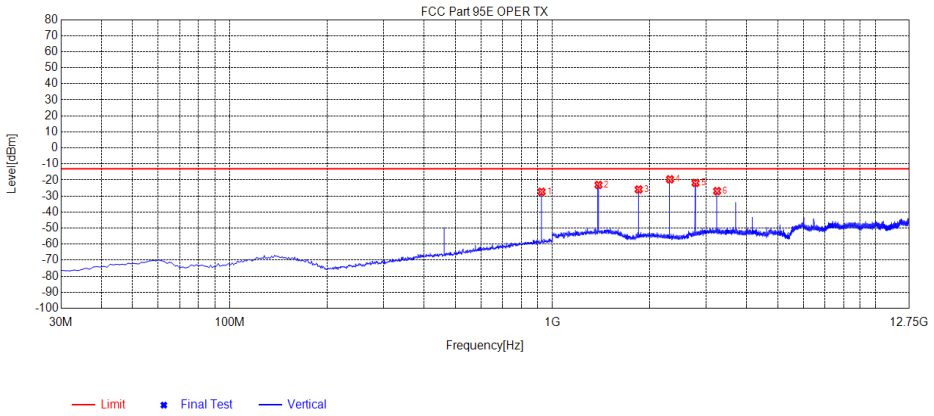
1. Factor=Antenna Factor + Cable loss. (Below 1GHz)
2. Factor=Antenna Factor+ Cable loss -Pre-amplifier. (Above 1 GHz)
3. Margin=Limit- Level

Test Mode:	TX-CH4-12.5KHz	Polarity:	Horizontal



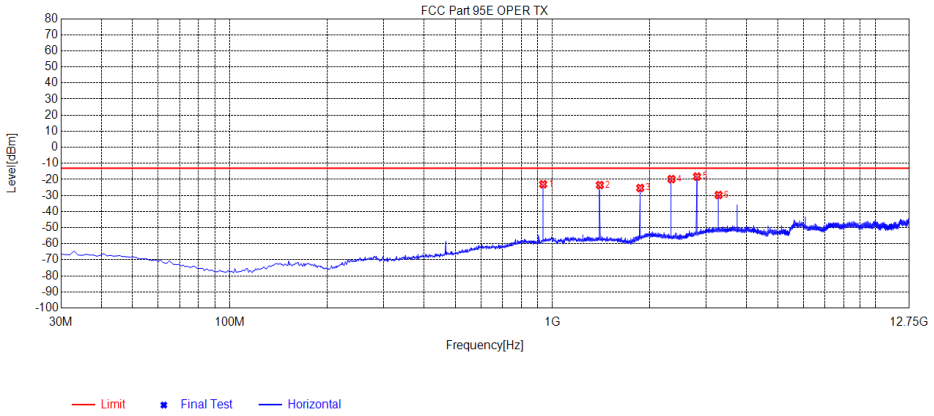
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	925.3100	-67.75	-24.26	-13.00	11.26	43.49	103	Horizontal
2	1387.7888	-19.31	-22.76	-13.00	9.76	-3.45	196	Horizontal
3	1850.7851	-27.20	-27.79	-13.00	14.79	-0.59	131	Horizontal
4	2313.7814	-20.81	-21.52	-13.00	8.52	-0.71	159	Horizontal
5	2775.6026	-23.38	-22.21	-13.00	9.21	1.17	47	Horizontal
6	3238.5989	-36.57	-32.86	-13.00	19.86	3.71	206	Horizontal

Test Mode:	TX-CH4-12.5KHz	Polarity:	Vertical



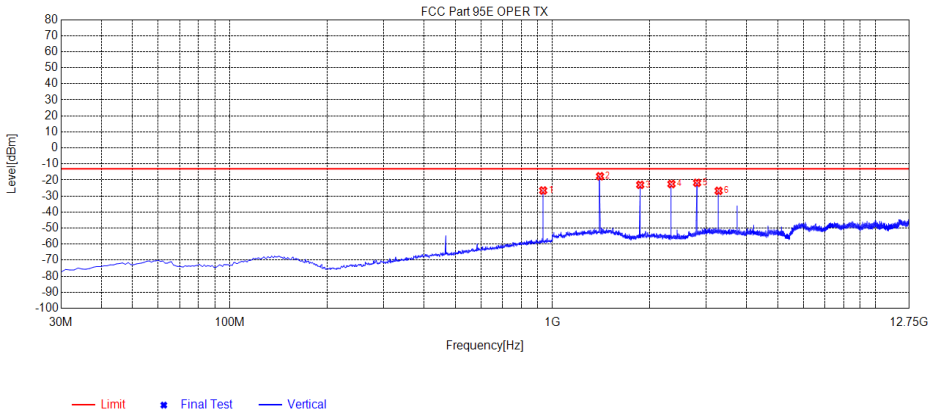
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	925.3100	-70.93	-27.36	-13.00	14.36	43.57	174	Vertical
2	1388.9639	-24.49	-23.07	-13.00	10.07	1.42	174	Vertical
3	1850.7851	-26.82	-25.89	-13.00	12.89	0.93	154	Vertical
4	2313.7814	-19.04	-19.57	-13.00	6.57	-0.53	136	Vertical
5	2776.7777	-23.13	-21.84	-13.00	8.84	1.29	136	Vertical
6	3238.5989	-30.05	-26.91	-13.00	13.91	3.14	164	Vertical

Test Mode:	TX-CH12-12.5KHz	Polarity:	Horizontal



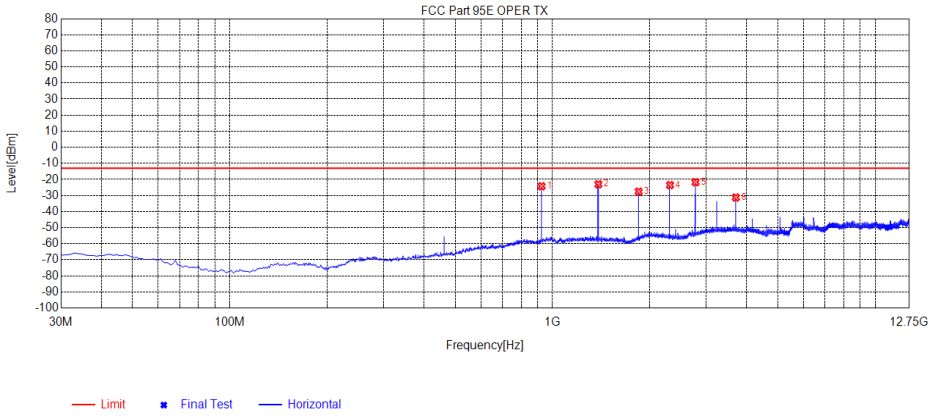
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	935.9800	-66.75	-23.03	-13.00	10.03	43.72	84	Horizontal
2	1403.0653	-20.11	-23.52	-13.00	10.52	-3.41	159	Horizontal
3	1870.7621	-24.90	-25.34	-13.00	12.34	-0.44	140	Horizontal
4	2338.4588	-19.00	-19.80	-13.00	6.80	-0.80	150	Horizontal
5	2806.1556	-19.70	-18.24	-13.00	5.24	1.46	47	Horizontal
6	3273.8524	-33.48	-29.70	-13.00	16.70	3.78	122	Horizontal

Test Mode:	TX-CH12-12.5KHz	Polarity:	Vertical



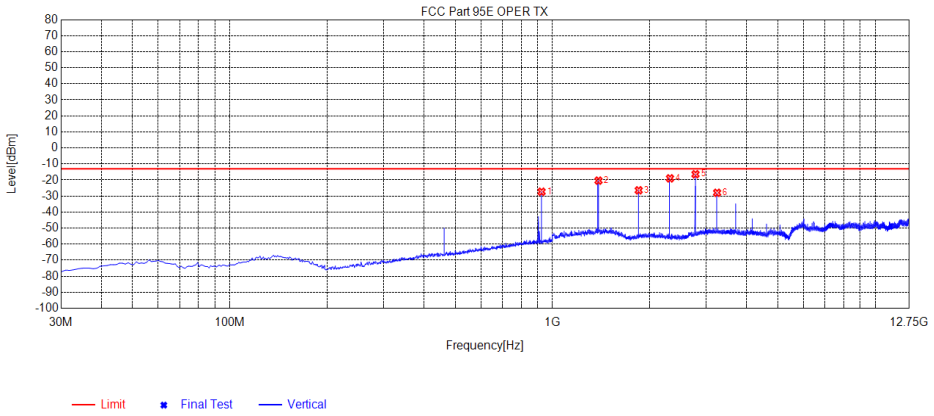
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	935.9800	-70.24	-26.56	-13.00	13.56	43.68	182	Vertical
2	1404.2404	-19.20	-17.68	-13.00	4.68	1.52	163	Vertical
3	1870.7621	-23.88	-23.02	-13.00	10.02	0.86	163	Vertical
4	2338.4588	-21.90	-22.51	-13.00	9.51	-0.61	116	Vertical
5	2807.3307	-23.32	-21.77	-13.00	8.77	1.55	125	Vertical
6	3273.8524	-29.90	-26.77	-13.00	13.77	3.13	144	Vertical

Test Mode:	TX-CH20-12.5KHz	Polarity:	Horizontal



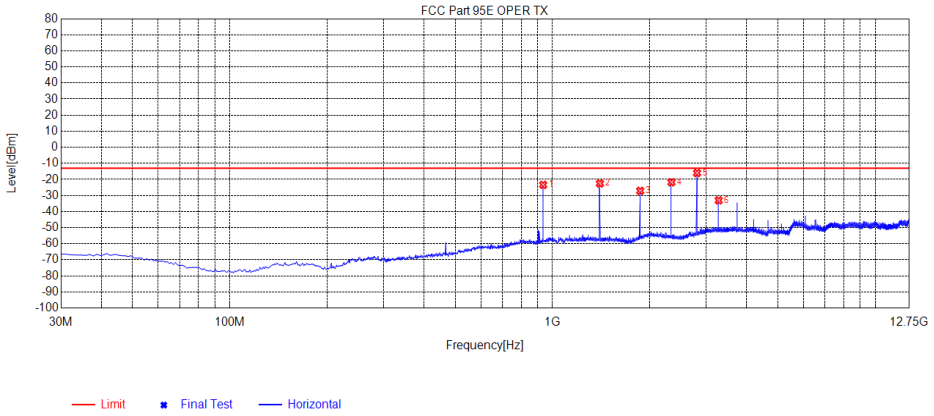
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	925.3100	-67.75	-24.26	-13.00	11.26	43.49	54	Horizontal
2	1387.7888	-19.55	-23.00	-13.00	10.00	-3.45	195	Horizontal
3	1850.7851	-27.01	-27.60	-13.00	14.60	-0.59	138	Horizontal
4	2313.7814	-22.81	-23.52	-13.00	10.52	-0.71	166	Horizontal
5	2775.6026	-22.91	-21.74	-13.00	8.74	1.17	45	Horizontal
6	3701.5952	-35.66	-31.25	-13.00	18.25	4.41	120	Horizontal

Test Mode:	TX-CH20-12.5KHz	Polarity:	Vertical



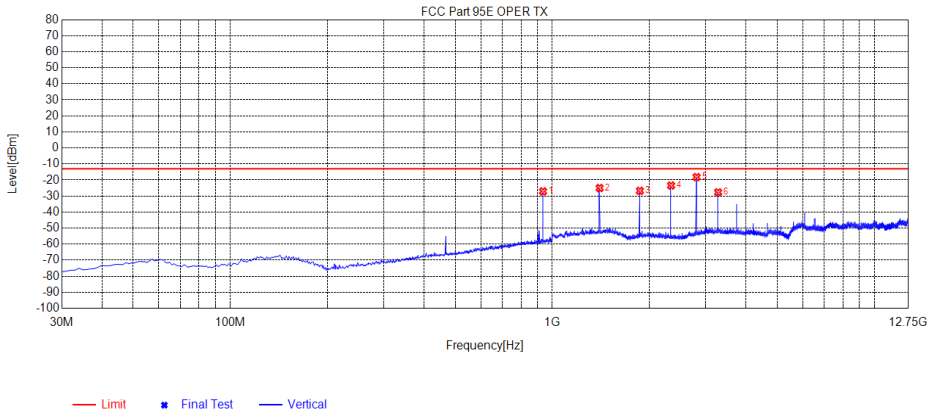
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	925.3100	-70.89	-27.32	-13.00	14.32	43.57	165	Vertical
2	1388.9639	-21.80	-20.38	-13.00	7.38	1.42	137	Vertical
3	1850.7851	-27.36	-26.43	-13.00	13.43	0.93	147	Vertical
4	2313.7814	-18.44	-18.97	-13.00	5.97	-0.53	137	Vertical
5	2775.6026	-17.68	-16.40	-13.00	3.40	1.28	137	Vertical
6	3238.5989	-31.11	-27.97	-13.00	14.97	3.14	137	Vertical

Test Mode:	TX-CH27-12.5KHz	Polarity:	Horizontal



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	935.9800	-67.09	-23.37	-13.00	10.37	43.72	84	Horizontal
2	1403.0653	-19.11	-22.52	-13.00	9.52	-3.41	169	Horizontal
3	1870.7621	-26.66	-27.10	-13.00	14.10	-0.44	160	Horizontal
4	2338.4588	-20.98	-21.78	-13.00	8.78	-0.80	150	Horizontal
5	2806.1556	-17.49	-16.03	-13.00	3.03	1.46	47	Horizontal
6	3273.8524	-36.81	-33.03	-13.00	20.03	3.78	112	Horizontal

Test Mode:	TX-CH27-12.5KHz	Polarity:	Vertical



NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Angle [°]	Polarity
1	935.9800	-70.76	-27.08	-13.00	14.08	43.68	22	Vertical
2	1403.0653	-26.53	-25.01	-13.00	12.01	1.52	173	Vertical
3	1870.7621	-27.61	-26.75	-13.00	13.75	0.86	163	Vertical
4	2338.4588	-22.83	-23.44	-13.00	10.44	-0.61	144	Vertical
5	2806.1556	-19.73	-18.19	-13.00	5.19	1.54	144	Vertical
6	3273.8524	-30.81	-27.68	-13.00	14.68	3.13	163	Vertical