TEST REPORT

Reference No.	:	WTX19S01002344W
FCC ID.....	:	VEP-RZRWT
Applicant	:	K-Mark Industrial Limited.
Address	:	Flat A, 7/F., Mai On Ind. Bldg 17-21 Kung Yip St., Kwai Chung Hong Kong
Manufacturer	:	K-Mark Industrial (ShenZhen) Ltd.
Address	:	Building 2, No.43 Jinshi Road, Guangpei Community, Guanlan Street, Longhua New District, Shenzhen City
Product Name	:	Razor Mounted Walkie Talkie
Model No.	:	GWP-RZRWT, GWP-RZRWT-XX, GWP-RZRWT-XXX, GWP-RZRWT-XXXX, GWP-SF-RZRWT, GWP-SF-RZRWT-XX, GWP-SF-RZRWT-XXX, GWP-SF-RZRWT-XXXX, “X”=A to Z
Standards.....	:	FCC CFR47 Part 95
Date of Receipt sample....	:	2019-01-11
Date of Test.....	:	2019-01-11 to 2019-01-23
Date of Issue	:	2019-01-24
Test Result.....	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:
Waltek Services (Shenzhen) Co., Ltd.
Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China
Tel :+86-755-83551033
Fax:+86-755-83552400

Compiled by:

Ford Wang

Ford Wang / Project Engineer

Approved by:

Philo Zhong

Philo Zhong / Manager

2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China.Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), ISED (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:

1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. ISED Canada Registration No.: 7760A

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd.	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Test Summary

Test Items	Test Requirement	Test Method	Result
Carrier Output Power(ERP)	Part 95.1767 Part 2.1046(a)	ANSI/TIA-603-E:2016	PASS
99% Occupied Bandwidth & 26dB bandwidth	Part 95.1773(a)(b) Part 2.1049	ANSI/TIA-603-E:2016	PASS
Emission Mask	Part 95.1779(a) Part 2.1049	ANSI/TIA-603-E:2016	PASS
Modulation Limit	Part 95.1775(a)(b)(c) Part 2.1047(b)	ANSI/TIA-603-E:2016	PASS
Audio Frequency Response	Part 95.1775(c) Part 2.1047(a)	ANSI/TIA-603-E:2016	PASS
Audio Low Pass Filter Response	Part 95.1775(e) Part 2.1047(a)	ANSI/TIA-603-E:2016	PASS
Frequency Stability V.S. Temperature	Part 95.1765 Part 2.1055	ANSI/TIA-603-E:2016	PASS
Frequency Stability V.S. Voltage	Part 95.1765 Part 2.1055	ANSI/TIA-603-E:2016	PASS
Transmit Radiated Spurious Emission	Part 95.1779(b)(1)(2)(7) Part 2.1053	ANSI/TIA-603-E:2016	PASS
Remark: PASS means that the test results complies with related requirements. N/A means that the test is not applicable for the EUT.			

4 Contents

5 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTX19S01002344W	2019-01-11	2019-01-11 to 2019-01-23	2019-01-24	original	-	Valid

6 General Information

6.1 General Description of E.U.T

Items	Description
RF Output Power:	25.47 dBm (ERP)
Frequency Range:	462.5625MHz~462.7125MHz (GMRS Channel1-7) 467.5625MHz~467.7125MHz (FRS Channel 8-14) 462.5500 MHz~462.7250MHz (GMRS Channel 15-22)
Antenna Type:	Non-detachable External Antenna
Antenna Gain:	-3.5dBi
Modulation:	FM
Bandwidth:	12.5kHz
Quantity of Channels:	22
Device Category:	Portable Device

6.2 Details of E.U.T

Rated Voltage:	DC 4.5V

6.3 Test Equipment List and Details

3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	2018-04-29	2019-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-09	2019-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2018-04-09	2019-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-09-12	2019-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-04-09	2019-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-04-09	2019-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-13	2019-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2018-04-13	2019-04-12
9	Signal Generator	R&S	SMR20	100046	2018-09-12	2019-09-11
10	Smart Antenna	SCHWARZBECK	HA08	-	2018-04-09	2019-04-08
RF Conducted Testing						

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2018-09-12	2019-09-11
2.	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018-09-12	2019-09-11
3.	Universal Radio Communication Tester	R&S	CMW 500	127818	2018-04-13	2019-04-12
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2018-09-12	2019-09-11
4.	Modulation Analyzer	HP	8920B	-	2018-09-12	2019-09-11

7 Carrier Output Power(ERP)

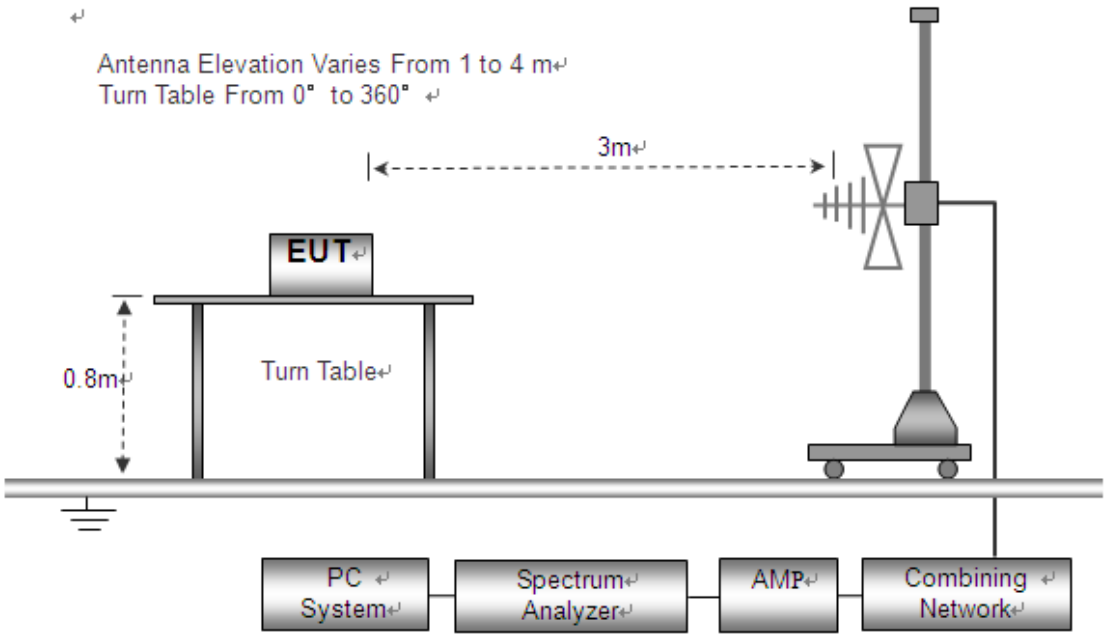
Test requirement: FCC CFR47 Part 95

Test method: Based on ANSI/TIA-603-E:2016

Limit: According to Part 95.567, Each FRS transmitter type must be designed such that the effective radiated power (ERP) on channels 8 through 14 does not exceed 0.5 Watts and the ERP on channels 1 through 7 and 15 through 22 does not exceed 2.0 Watts. According to Part 95.1767(a)(1), The transmitter output power of mobile, repeater and base stations must not exceed 50 Watts, and (a)(4), 462 MHz interstitial channels. The effective radiated power (ERP) of mobile, hand-held portable and base stations transmitting on the 462 MHz interstitial channels must not exceed 5 Watts.

7.1 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site,
using the setup accordance with the ANSI C63.4
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



7.2 Spectrum Analyzer Setup

According to FCC Part 2 Section 2.1053 Rules, the system was tested 9KHz to 6000MHz.

30MHz ~ 1GHz
Start Frequency .....30 MHz
Stop Frequency.....1000MHz
Sweep Speed.....Auto
IF Bandwidth .....120 KHz
Video Bandwidth 300KHz
Quasi-Peak Adapter Bandwidth.....120 KHz
Quasi-Peak Adapter Mode .....Normal
Resolution Bandwidth 100KHz

7.3 Test Procedure

1. Place the transmitter to be tested on the turntable in the standard test site. The transmitter is Transmitting into a non-radiating load, which is placed on the turntable.
2. The output of the antenna was connected to the measuring receiver and a peak detector was used for the measurement as indicated on the report.
3. The transmitter was switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and Lowed through the specified range of height until the measuring receiver detects a maximum signal level.
5. The transmitter shall than be rotated through 360^{o} in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
6. The test antenna shall be raised and Lowed again through the specified range of height until the measuring receiver detects a maximum signal level.
7. The maximum signal level detected by the measuring receiver shall be noted.
8. The measurement shall be repeated with the test antenna set to horizontal polarization.
9. Replace the antenna with a proper antenna (substitution antenna).
10. 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.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and Lowed through the specified range of the height to ensure that the maximum signal is received.
14. 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.
15. 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.

16. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17. The radiation emission was tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
18. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Test result

Test Mode	Modulation Type	Test Channel (MHz)	Measured power (dBm)	Measured power (W)	Limit(W)	Result
TX-GMRS	FM	462.6375	25.36	0.344	≤5	Pass
TX-FRS	FM	467.6375	25.47	0.352	≤0.5	Pass
TX-GMRS	FM	462.650	25.38	0.345	≤50	Pass

8 Occupied Bandwidth of Emission

Test requirement: FCC Part 95.1773, FCC Part 2.1049

Test method: Based on ANSI/TIA-603-E:2016

Limit: (a) Main channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz main channels (see §95.1763(a)) or any of the 467 MHz main channels (see §95.1763(c)).

(b) Interstitial channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz interstitial channels (see §95.1763(b)) and is 12.5 kHz for GMRS transmitters operating on any of the 467 MHz interstitial channels (see §95.1763(d)).

Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

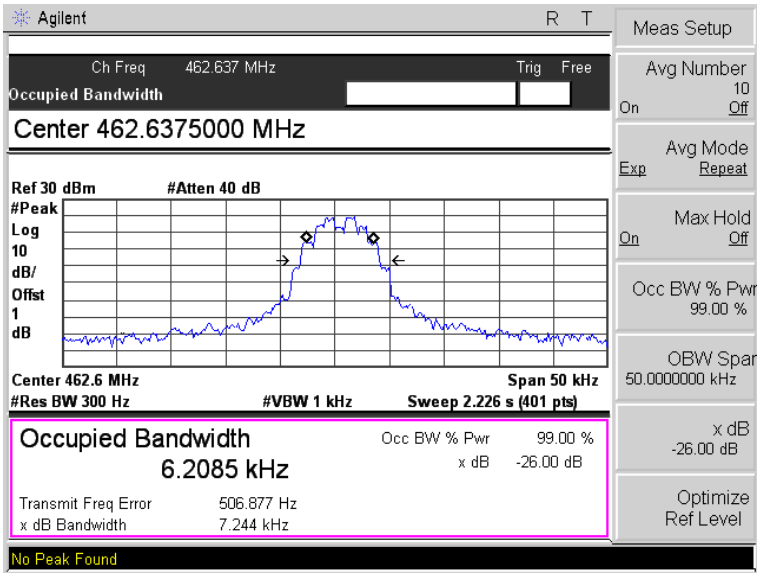
8.1 Test Procedure

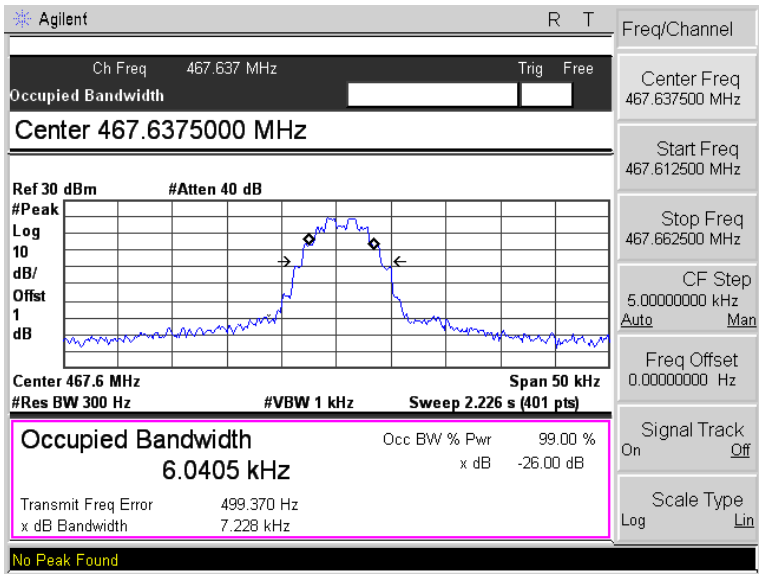
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and set it to any one convenient frequency within its operating range.

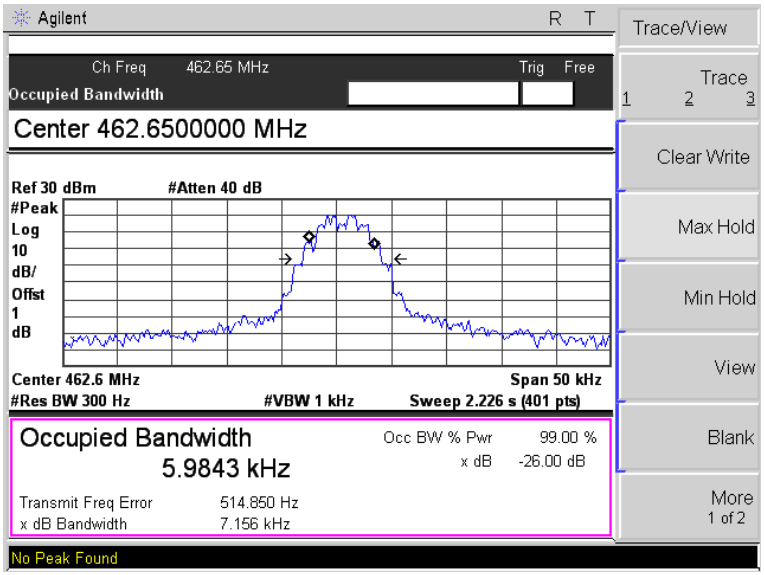
8.2 Test Result

Test Mode	Modulation Type	Test Channel (MHz)	Occupied Bandwidth		99% Limit(kHz)	Result
			99%(kHz)	26dB(kHz)		
TX-GMRS	FM	462.6375	6.2085	7.244	≤12.5	Pass
TX-FRS	FM	467.6375	6.0405	7.228	≤12.5	Pass
TX-GMRS	FM	462.6500	5.9843	7.156	≤12.5	Pass

Test Plot:


Agilent
R T
Ch Freq 462.637 MHz
Trig Free
Occupied Bandwidth
Center 462.6375000 MHz
Ref 30 dBm
#Atten 40 dB
#Peak
Log
10
dB/
Offst
1
dB
Center 462.6 MHz
Span 50 kHz
#Res BW 300 Hz
#VBW 1 kHz
Sweep 2.226 s (401 pts)
Occupied Bandwidth
6.2085 kHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 506.877 Hz
x dB Bandwidth 7.244 kHz
No Peak Found
Meas Setup
Avg Number
10
On Off
Avg Mode
Exp Repeat
Max Hold
On Off
Occ BW % Pwr
99.00 %
OBW Spar
50.0000000 kHz
x dB
-26.00 dB
Optimize
Ref Level


Agilent
R T
Ch Freq 467.637 MHz
Trig Free
Occupied Bandwidth
Center 467.6375000 MHz
Ref 30 dBm
#Atten 40 dB
#Peak
Log
10
dB/
Offst
1
dB
Center 467.6 MHz
Span 50 kHz
#Res BW 300 Hz
#VBW 1 kHz
Sweep 2.226 s (401 pts)
Occupied Bandwidth
6.0405 kHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 499.370 Hz
x dB Bandwidth 7.228 kHz
No Peak Found
Freq/Channel
Center Freq
467.637500 MHz
Start Freq
467.612500 MHz
Stop Freq
467.662500 MHz
CF Step
5.00000000 kHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Scale Type
Log Lin


Agilent
R T
Ch Freq 462.65 MHz
Trig Free
Occupied Bandwidth
Center 462.6500000 MHz
Ref 30 dBm
#Atten 40 dB
#Peak
Log
10
dB/
Offst
1
dB
Center 462.6 MHz
Span 50 kHz
#Res BW 300 Hz
#VBW 1 kHz
Sweep 2.226 s (401 pts)
Occupied Bandwidth
5.9843 kHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Transmit Freq Error 514.850 Hz
x dB Bandwidth 7.156 kHz
No Peak Found
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

9 Emission Mask Spurious

Test requirement: FCC Part 95.1779(b)(1)(2)(7),FCC Part 2.1049

Test method: Based on ANSI/TIA-603-E:2016

Limit: GMRS: Per § 95.1775 (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 than 100% 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%.

FRS: Per § 95.579 (a) Attenuation requirements. The power of unwanted emissions must be attenuated below the carrier power output in Watts (P) by at least:

(1) 25 dB (decibels) in the frequency band 6.25 kHz to 12.5 kHz removed from the channel center frequency.

(2) 35 dB in the frequency band 12.5 kHz to 31.25 kHz removed from the channel center frequency.

(3) 43 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.

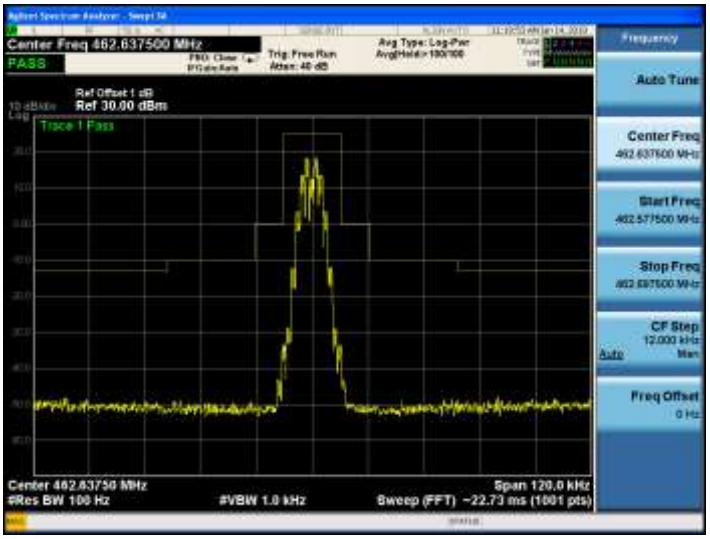
9.1 Test Procedure

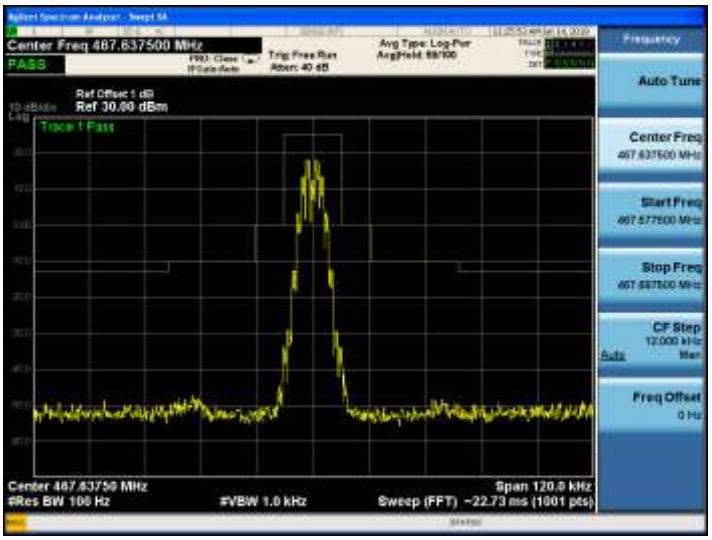
1. Connect the equipment as illustrated.
2. Spectrum set as follow:

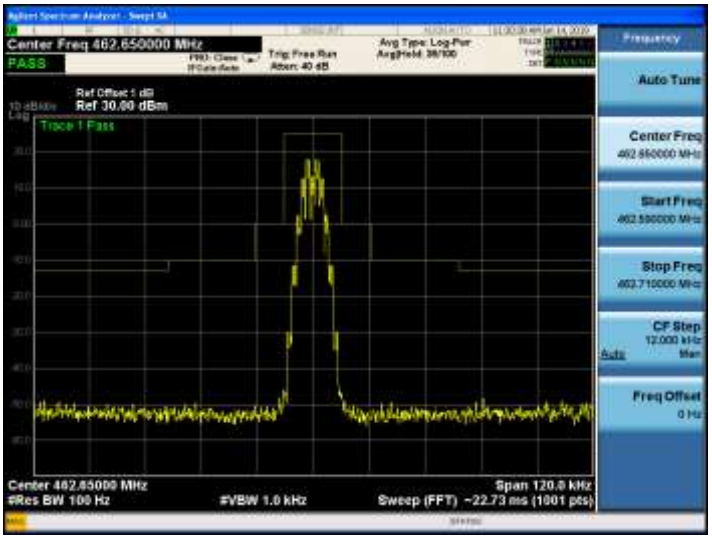
   Centre frequency = fundamental frequency, span=120kHz, RBW=100Hz, VBW=1000Hz, Sweep = auto,

   Detector function = peak, Trace = max hold
3. Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line. This is the 0dB reference for the measurement.
4. Measure and record the results in the test report.

9.2 Test Data


Center Freq 462.637500 MHz
PASS
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Ref Offset 1 dB
Ref 30.00 dBm
Trace 1 Pass
Center 462.63750 MHz
#Res BW 100 Hz
#VBW 1.0 kHz
Span 120.0 kHz
Sweep (FFT) ~22.73 ms (1001 pts)
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
0 Hz


Center Freq 467.637500 MHz
PASS
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Ref Offset 1 dB
Ref 30.00 dBm
Trace 1 Pass
Center 467.63750 MHz
#Res BW 100 Hz
#VBW 1.0 kHz
Span 120.0 kHz
Sweep (FFT) ~22.73 ms (1001 pts)
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
0 Hz


Center Freq 462.650000 MHz
PASS
Trig: Free Run
Atten: 40 dB
Avg Type: Log-Pwr
Ref Offset 1 dB
Ref 30.00 dBm
Trace 1 Pass
Center 462.65000 MHz
#Res BW 100 Hz
#VBW 1.0 kHz
Span 120.0 kHz
Sweep (FFT) ~22.73 ms (1001 pts)
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
0 Hz

10 Modulation Limit

Test requirement: FCC Part 95.1775, FCC Part 95.575, FCC Part 2.1047(b)

Test method: Based on ANSI/TIA-603-E:2016

Limit: Each GMRS transmitter type must be designed to satisfy the modulation requirements in this section. Operation of GMRS stations must also be in compliance with these requirements.

(a)Main channels. The peak frequency deviation for emissions to be transmitted on the main channels must not exceed ± 5 kHz.

(b)462 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 462 MHz interstitial channels must not exceed ± 5 kHz.

(c)467 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 467 MHz interstitial channels must not exceed ± 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

Each FRS transmitter type must be designed such that the peak frequency deviation does not exceed 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

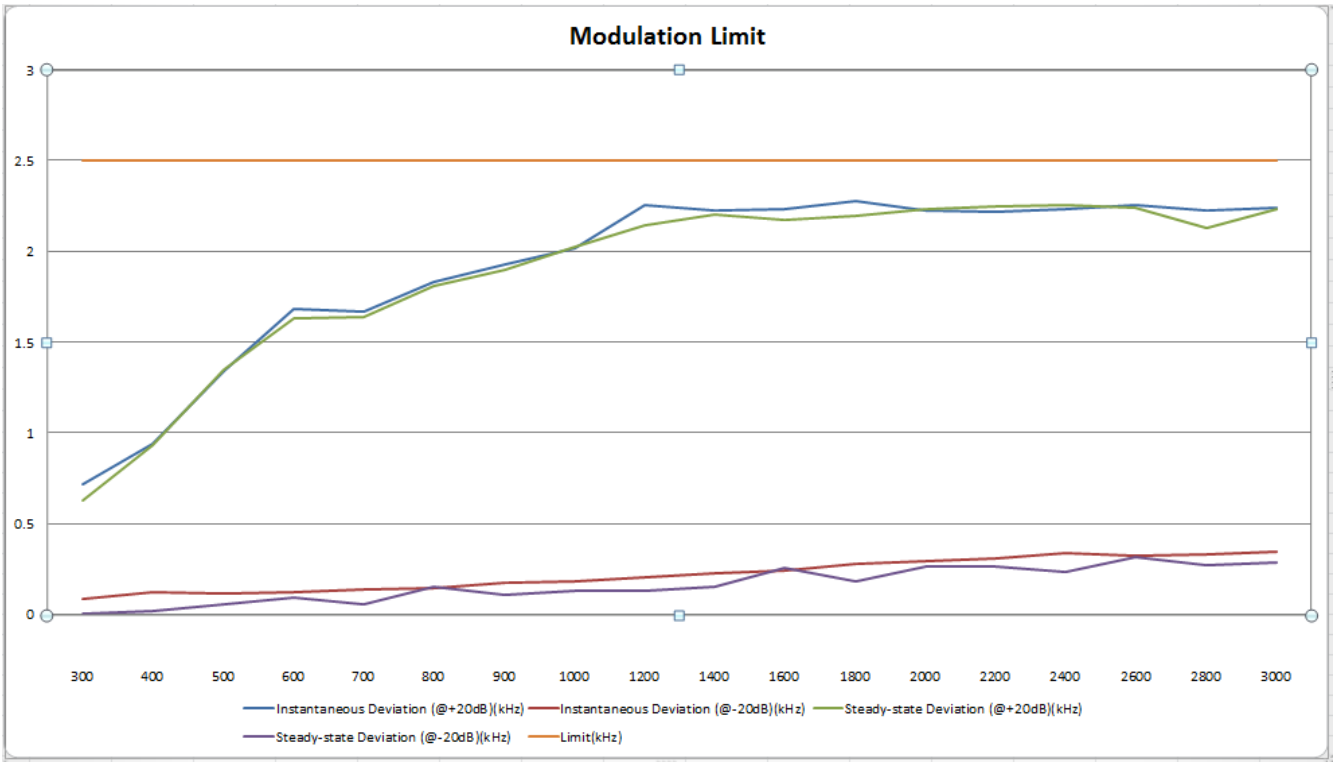
10.1 Test Procedure

1. Connect the equipment as illustrated.
2. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
3. Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤0.25 Hz to ≥15,000 Hz. Turn the de-emphasis function off.
4. Apply Input Modulation Signal to EUT according to Section 3.4 and vary the input level from –20 to +20dB.
5. Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level
6. Repeat step 4-5 with input frequency changing to 300Hz, 1004Hz, 1500Hz and 2500Hz in sequence.

10.2 Test Data

Test Channel: 467.6735MHz

Audio Frequency (Hz)	Instantaneous		Steady-state		Limit(kHz)
	Deviation (@+20dB)(kHz)	Deviation (@-20dB)(kHz)	Deviation (@+20dB)(kHz)	Deviation (@-20dB)(kHz)	
300	0.718	0.083	0.625	0.003	2.5
400	0.942	0.121	0.936	0.017	2.5
500	1.34	0.113	1.347	0.054	2.5
600	1.685	0.124	1.633	0.092	2.5
700	1.67	0.139	1.635	0.056	2.5
800	1.835	0.147	1.807	0.15	2.5
900	1.925	0.172	1.896	0.107	2.5
1000	2.017	0.179	2.021	0.133	2.5
1200	2.253	0.201	2.143	0.128	2.5
1400	2.224	0.225	2.206	0.153	2.5
1600	2.236	0.24	2.171	0.258	2.5
1800	2.278	0.276	2.195	0.182	2.5
2000	2.226	0.293	2.236	0.261	2.5
2200	2.215	0.312	2.244	0.265	2.5
2400	2.234	0.338	2.252	0.236	2.5
2600	2.257	0.324	2.238	0.313	2.5
2800	2.226	0.33	2.126	0.272	2.5
3000	2.237	0.347	2.234	0.283	2.5

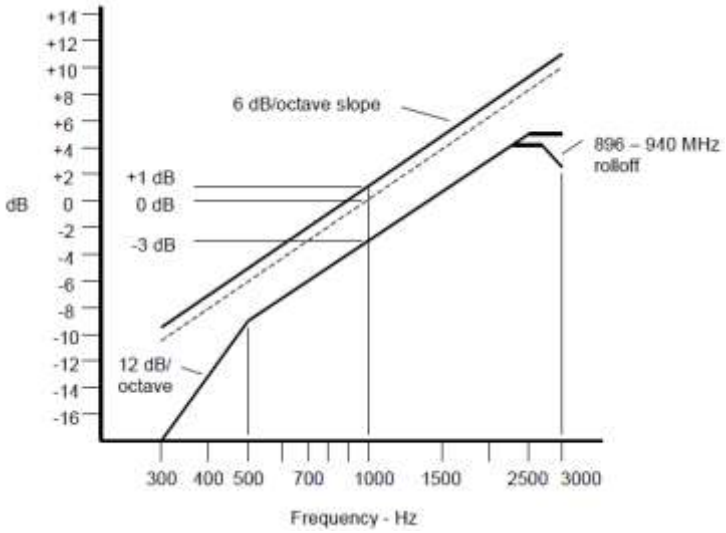


11 Audio Frequency Response

Test requirement: FCC Part 95.1775(c),FCC Part 2.1047(a):

Test method: Based on ANSI/TIA-603-E:2016

Limit: Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.



An additional 6 dB per octave attenuation is allowed from 2500 Hz to 3000 Hz in equipment operating in the 25 MHz to 869 MHz range.

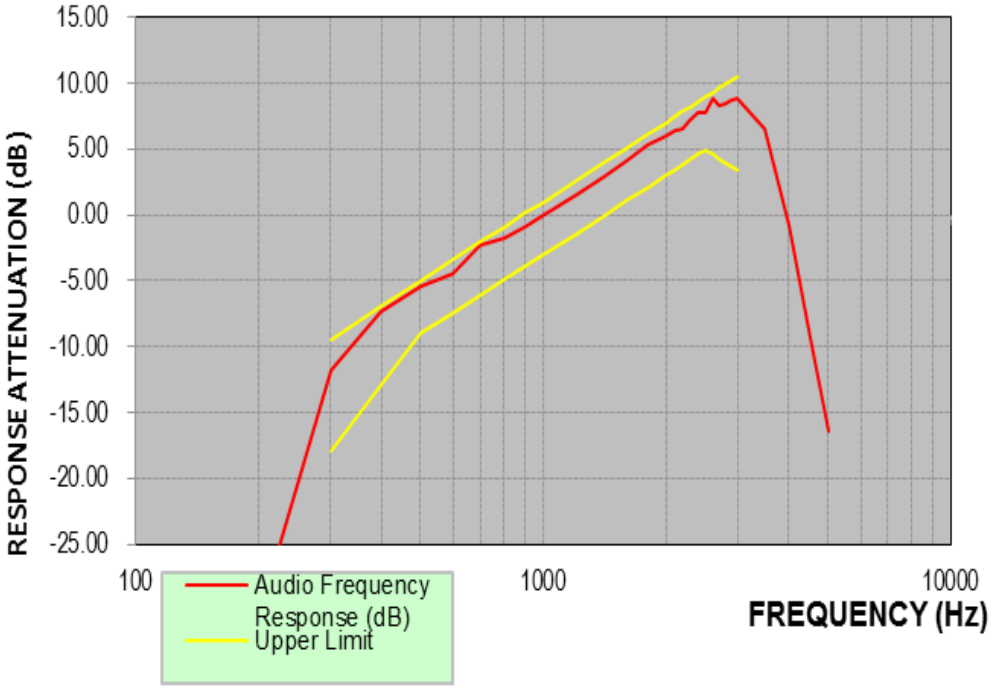
11.1 Test Procedure

1. Connect the equipment as illustrated.
2. Set the test receiver to measure peak positive deviation. Set the audio bandwidth for 50 Hz to 15,000 Hz. Turn the de-emphasis function off.
3. Set the DMM to measure rms voltage.
4. Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
5. Apply Input Modulation Signal to EUT according to Section 3.4
6. Set the test receiver to measure rms deviation and record the deviation reading.
7. Record the DMM reading as VREF .
8. Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
9. Vary the audio frequency generator output level until the deviation reading that was recorded in step 6) is obtained.
10. Record the DMM reading as VFREQ
11. Calculate the audio frequency response at the present frequency as:
audio frequency response=20log10 (VFREQ/VREF).
12. Repeat steps 8) through 11) for all the desired test frequencies

11.2 Test Data

Test Channel: 467.6735MHz

Frequency (Hz)	Audio Frequency Response (dB)	Lower Limit	Upper Limit	Result
100	-30.45	/	/	PASS
200	-30.64	/	/	PASS
300	-11.78	-17.84	-9.42	PASS
400	-7.25	-12.86	-6.93	PASS
500	-5.43	-9.00	-5.00	PASS
600	-4.52	-7.42	-3.42	PASS
700	-2.36	-6.09	-2.09	PASS
800	-1.78	-4.93	-0.93	PASS
900	-0.89	-3.91	0.09	PASS
1000	0.00	-3.00	1.00	PASS
1200	1.49	-1.42	2.58	PASS
1400	2.84	-0.09	3.91	PASS
1600	4.15	1.07	5.07	PASS
1800	5.27	2.09	6.09	PASS
2000	6.01	3.00	7.00	PASS
2100	6.43	3.42	7.42	PASS
2200	6.48	3.83	7.83	PASS
2300	7.25	4.21	8.21	PASS
2400	7.69	4.58	8.58	PASS
2500	7.74	4.93	8.93	PASS
2600	8.88	4.59	9.27	PASS
2700	8.36	4.27	9.60	PASS
2800	8.45	3.95	9.91	PASS
2900	8.76	3.65	10.22	PASS
3000	8.88	3.35	10.51	PASS
3500	6.52	/	/	PASS
4000	-0.79	/	/	PASS
4500	-9.32	/	/	PASS
5000	-16.48	/	/	PASS


15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
-25.00
RESPONSE ATTENUATION (dB)
100
1000
10000
FREQUENCY (Hz)
Audio Frequency Response (dB)
Upper Limit

12 Audio Low Pass Filter Response

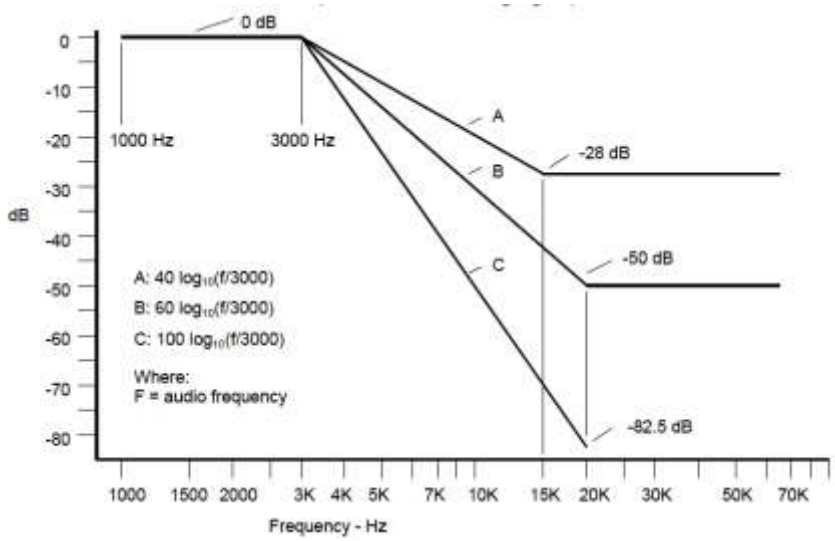
Test requirement: FCC Part 95.1775(e)(1)(2)

Test method: Based on ANSI/TIA-603-E:2016

Limit: (e) Audio filter. Each GMRS transmitter type must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of §95.1779 (without filtering).

(1) The filter must be between the modulation limiter and the modulated stage of the transmitter.

(2) At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least 60 log (f/3) dB more than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB more than the attenuation at 1 kHz.



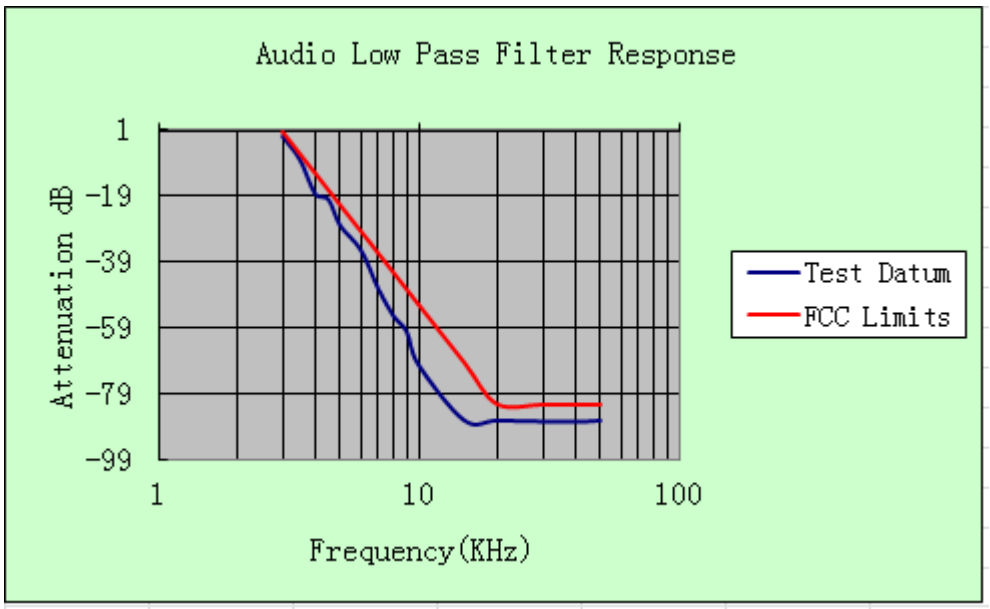
12.1 Test Procedure

1. Configure the EUT as shown in figure .
2. Apply a 1000 Hz tone from the audio signal generator and adjust the level per manufacturer's specifications. Record the dB level of the 1000 Hz tone as LEVREF.
3. Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as LEVFREQ.
4. Calculate the audio frequency response at the test frequency as:

   low pass filter response = LEV_{FREQ} - LEV_{REF}

12.2 Test Data

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
3	-1.4	0.00
3.5	-8.5	-6.69
4	-18.7	-12.49
4.5	-20.47	-17.61
5	-28.4	-22.18
6	-35.8	-30.10
7	-47.52	-36.80
8	-55.74	-42.60
9	-60.47	-47.71
10	-70.52	-52.29
15	-87.35	-69.90
20	-87.37	-82.39
30	-87.64	-82.50
40	-87.78	-82.50
50	-87.35	-82.50



13 Frequency stability VS Temperature

Test requirement: FCC Part 95.1775(e)(1)(2)

Test method: Based on ANSI/TIA-603-E:2016

Limit: Each GMRS transmitter type must be designed to comply with the frequency accuracy requirements in this section under normal operating conditions. Operators of GMRS stations must also ensure compliance with these requirements.

(a) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth greater than 12.5 kHz must remain within 5 parts-per-million (ppm) of the channel center frequencies listed in §95.1763 under normal operating conditions.

(b) 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 of the channel center frequencies listed in §95.1763 under normal operating conditions.

13.1 Test Procedure

1. The EUT output port was connected to communication tester.
2. The EUT was placed inside the temperature chamber.
3. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency as MCFMHz.
4. Calculate the ppm frequency error by the following:
   ppm error=(MCFMHZ/ACFMHZ-1)*106
   where
   MCFMHz is the Measured Carrier Frequency in MHz
   ACFMHz is the Assigned Carrier Frequency in MHz
5. Repeat step 3 measure with 10°C increased per stage until the highest temperature of +50°C reached.

13.2 Test Data

Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency as MCF_{MHz}.

Calculate the ppm frequency error by the following:

ppm error=(MCFMHZ/ACFMHZ-1)*106

where

MCFMHz is the Measured Carrier Frequency in MHz

ACFMHz is the Assigned Carrier Frequency in MHz

Repeat step 3 measure with 10°C increased per stage until the highest temperature of +50°C reached

Test Mode	Modulation Type	Test Conditions		Frequency error (ppm)			Limit (ppm)	Result
		Voltage	Temperature	CH_{M1}	CH_{M2}	CH_{M3}		
GMRS/FRS	FM	4.5	-30	0.063	0.016	0.011	±2.5	Pass
GMRS/FRS	FM	4.5	-20	0.061	0.019	0.013	±2.5	Pass
GMRS/FRS	FM	4.5	-10	0.054	0.025	0.021	±2.5	Pass
GMRS/FRS	FM	4.5	0	0.048	0.021	0.020	±2.5	Pass
GMRS/FRS	FM	4.5	10	0.066	0.015	0.022	±2.5	Pass
GMRS/FRS	FM	4.5	20	0	0	0	±2.5	Pass
GMRS/FRS	FM	4.5	30	0.035	0.021	0.014	±2.5	Pass
GMRS/FRS	FM	4.5	40	0.048	0.018	0.022	±2.5	Pass
GMRS/FRS	FM	4.5	50	0.042	0.013	0.021	±2.5	Pass

14 Frequency stability VS Voltage

Test requirement: FCC Part 95.1765:

Test method: Based on ANSI/TIA-603-E:2016

Limit: Each GMRS transmitter type must be designed to comply with the frequency accuracy requirements in this section under normal operating conditions. Operators of GMRS stations must also ensure compliance with these requirements.

(a) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth greater than 12.5 kHz must remain within 5 parts-per-million (ppm) of the channel center frequencies listed in §95.1763 under normal operating conditions.

(b) 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 of the channel center frequencies listed in §95.1763 under normal operating conditions.

14.1 Test Procedure

1. The EUT output port was connected to communication tester.
2. The EUT was placed inside the temperature chamber at 25°C
3. Record the carrier frequency of the transmitter as MCFMHZ
4. Calculate the ppm frequency error by the following:
   ppm error=(MCF_{MHZ}/ACF_{MHZ}-1)*106
   where
   MCF_{MHz} is the Measured Carrier Frequency in MHz
   ACF_{MHz} is the Assigned Carrier Frequency in MHz
5. Repeat step 3 measure with varied ±15% of the nominal value measured at the input to the EUT
6. Repeat step 3 measure with 10°C increased per stage until the highest temperature of +50°C reached.

14.2 Test Data

Test Mode	Modulation Type	Test Conditions		Frequency error (ppm)			Limit (ppm)	Result
		Voltage	Temperature	CH_{M1}	CH_{M2}	CH_{M3}		
GMRS/FRS	FM	4.50	20	0	0	0	±2.5	Pass
GMRS/FRS	FM	4.05	20	0.012	0.012	0.012	±2.5	Pass
GMRS/FRS	FM	4.95	20	0.014	0.012	0.014	±2.5	Pass

15 Radiated Emission Test

Test requirement: FCC Part 95.1779(b)(7), FCC Part 95.579:

Test method: Based on ANSI/TIA-603-E:2016

Limit: 43 + 10 log (Pwatts)

Calculation: Limit (dBm) =EL-43-10log10 (TP)

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

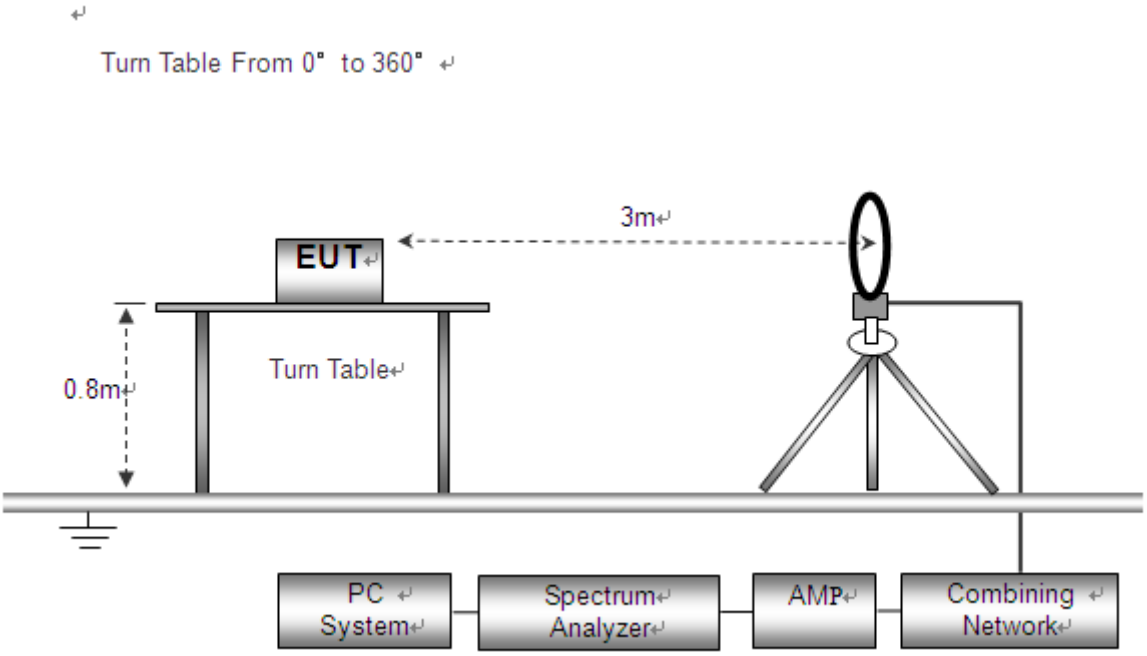
In this application, the EL is P(dBm).

Limit (dBm) = P(dBm)-43-10 log (Pwatts) = -13 dBm

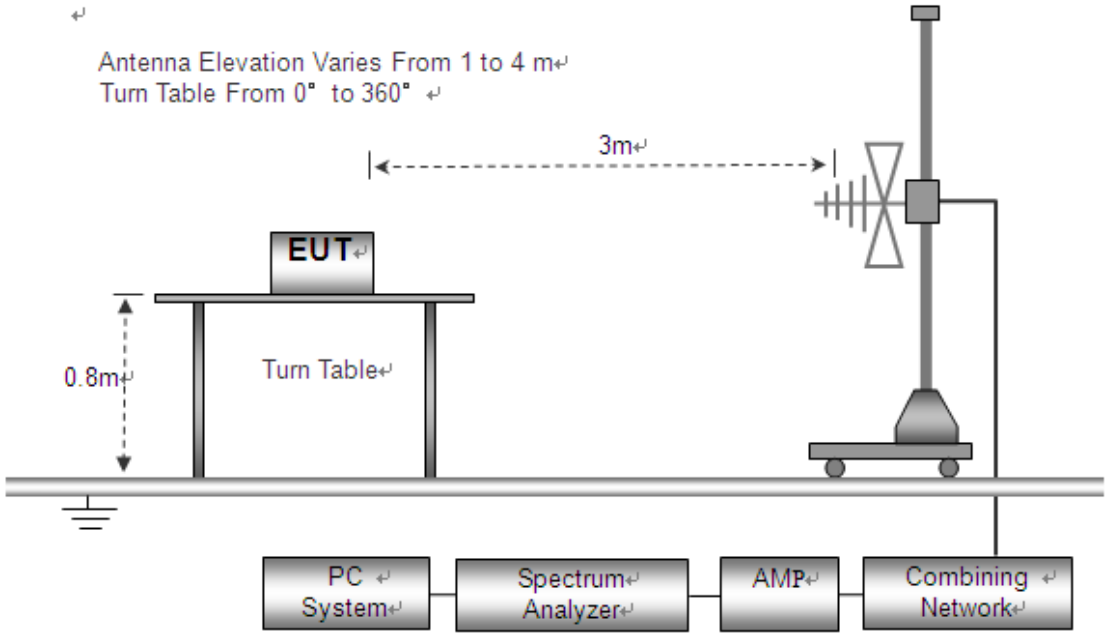
15.1 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4

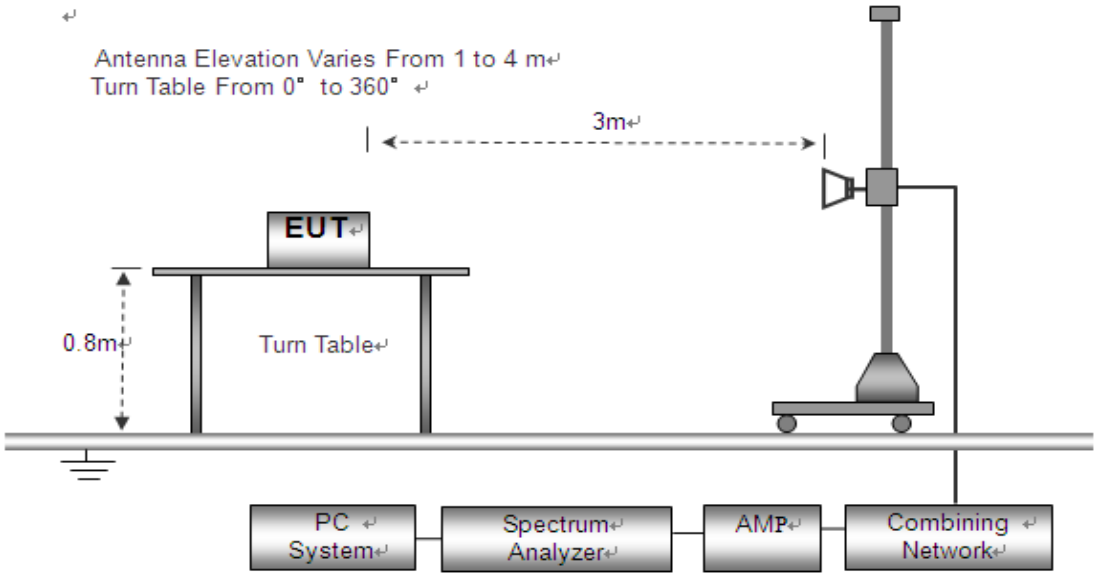
The test setup for emission measurement below 30MHz.



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz Emissions.



15.2 Spectrum Analyzer Setup

According to FCC Part 2 Section 2.1053 Rules, the system was tested 9KHz to 6000MHz.

Below 30MHz
Sweep Speed .....Auto
IF Bandwidth.....10kHz
Video Bandwidth.....10kHz

Resolution Bandwidth.....10kHz

30MHz ~ 1GHz
Start Frequency .....30 MHz
Stop Frequency.....1000MHz
Sweep Speed.....Auto
IF Bandwidth .....120 KHz
Video Bandwidth 300KHz
Quasi-Peak Adapter Bandwidth.....120 KHz
Quasi-Peak Adapter Mode .....Normal
Resolution Bandwidth 100KHz

Above 1GHz
Start Frequency .....1000 MHz
Stop Frequency.....7000MHz
Sweep Speed.....Auto
IF Bandwidth .....120 KHz
Video Bandwidth 3MHz
Quasi-Peak Adapter Bandwidth.....120 KHz
Quasi-Peak Adapter Mode .....Normal
Resolution Bandwidth 1MHz

15.3 Test Procedure

1. Place the transmitter to be tested on the turntable in the standard test site. The transmitter is Transmitting into a non-radiating load, which is placed on the turntable.
2. The output of the antenna was connected to the measuring receiver and a peak detector was used for the measurement as indicated on the report.
3. The transmitter was switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and Lowed through the specified range of height until the measuring receiver detects a maximum signal level.
5. The transmitter shall than be rotated through 360^{o} in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
6. The test antenna shall be raised and Lowed again through the specified range of height until the measuring receiver detects a maximum signal level.
7. The maximum signal level detected by the measuring receiver shall be noted.
8. The measurement shall be repeated with the test antenna set to horizontal polarization.
9. Replace the antenna with a proper antenna (substitution antenna).
10. 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.

11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and Lowed through the specified range of the height to ensure that the maximum signal is received.
14. 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.
15. 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.
16. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17. The radiation emission was tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
18. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

15.4 Test Result

Test Frequency : 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 5GHz

462.6375MHz

Frequency	Detector	Ant.	Antenna Height	Turntable Angle	Emission Level	Limit	Margin
(MHz)		Pol	(m)	(°)	(dBm)	(dBm)	(dB)
925.7563	Peak	H	1.0	263	-43.28	-13.00	-30.28
925.7563	Peak	V	1.0	99	-28.44	-13.00	-15.44
1385.000	Peak	H	1.0	287	-31.32	-13.00	-18.32
1385.000	Peak	V	1.0	93	-43.12	-13.00	-30.12
1850.000	Peak	H	1.0	80	-40.61	-13.00	-27.61
1850.000	Peak	V	1.0	91	-44.44	-13.00	-31.44
2310.000	Peak	H	1.0	121	-43.91	-13.00	-30.91
2310.000	Peak	V	1.0	90	-43.07	-13.00	-30.07

467.6375MHz

Frequency	Detector	Ant.	Antenna Height	Turntable Angle	Emission Level	Limit	Margin
(MHz)		Pol	(m)	(°)	(dBm)	(dBm)	(dB)
935.5463	Peak	H	1.0	64	-39.82	-13.00	-26.82
935.5463	Peak	V	1.0	115	-31.63	-13.00	-18.63
1400.000	Peak	H	1.0	159	-29.44	-13.00	-16.44
1400.000	Peak	V	1.0	292	-38.68	-13.00	-25.68
1870.000	Peak	H	1.0	99	-39.65	-13.00	-26.65
1870.000	Peak	V	1.0	117	-45.17	-13.00	-32.17
2335.000	Peak	H	1.0	112	-41.78	-13.00	-28.78
2335.000	Peak	V	1.0	78	-43.18	-13.00	-30.18

462.65MHz

Frequency	Detector	Ant.	Antenna Height	Turntable Angle	Emission Level	Limit	Margin
(MHz)		Pol	(m)	(°)	(dBm)	(dBm)	(dB)
925.7563	Peak	H	1.0	88	-37.82	-13.00	-24.82
925.7563	Peak	V	1.0	173	-34.69	-13.00	-21.69
1385.000	Peak	H	1.0	72	-32.75	-13.00	-19.75
1385.000	Peak	V	1.0	299	-34.01	-13.00	-21.01
1850.000	Peak	H	1.0	82	-47.86	-13.00	-34.86
1850.000	Peak	V	1.0	81	-47.85	-13.00	-34.85
2310.000	Peak	H	1.0	171	-39.72	-13.00	-26.72
2310.000	Peak	V	1.0	82	-36.96	-13.00	-23.96

======End of Report======