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Report No.: SHEM130700129602
Page 1 of 30

FCC Part 95 TEST REPORT

Application No. :	SHEM1307001296PF
Applicant:	Zhengzhou eShow Import And Export Trade Co., Ltd.
FCC ID:	2AAR8RETEVISRT628
Equipment Under Test (EUT): NOTE: The following sample(s) submitted was/were identified on behalf of the client as	
Product Name:	2 way Radio
Brand Name:	N/A
Model:	T-628
Added Model:	N/A
Standards:	FCC PART 95: 2012
Date of Receipt:	July 16, 2013
Date of Test:	July 16, 2013 to July 29, 2013
Date of Issue:	August 05, 2013
Test Result :	PASS *

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Tony Wu

E&E Section Manager

SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	August 05, 2013	/	Original

Authorized for issue by:				
Engineer		Eddy Zong _____ Print Name		_____ _____
Clerk		Susie Liu _____ Print Name		_____ _____
Reviewer		Keny Xu _____ Print Name		_____ _____



3 Test Summary

Test Item	Test Requirement	Test method	Result
RF Output Power	FCC Part 2.1046& FCC Part 95.639	ANSI/TIA-603-D: 2010	PASS
Modulation Characteristics	FCC Part 2.1047& FCC Part 95.637	ANSI/TIA-603-D: 2010	PASS
Occupied Bandwidth And Emission Mask	FCC Part 2.1049& FCC Part 95.633, 95.635	ANSI/TIA-603-D: 2010.	PASS
Radiated Spurious Emission	FCC Part 2.1051& FCC Part 95.635	ANSI/TIA-603-D: 2010	PASS
Frequency Stability	FCC Part 2.1055& FCC Part 95.621, 95.626	ANSI/TIA-603-D: 2010	PASS
RF exposure evaluation	FCC Part 2.1093	ANSI/TIA-603-D: 2010	PASS



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5 General Information

5.1 Client Information

Applicant:	Zhengzhou eShow Import And Export Trade Co., Ltd.
Address of Applicant:	Room 722 Sanjiang Building N.170 Nanyang Road, Huiji District, Zhengzhou, Henan Province, China
Manufacturer:	Zhengzhou eShow Import And Export Trade Co., Ltd.
Address of Manufacturer:	Room 722 Sanjiang Building N.170 Nanyang Road, Huiji District, Zhengzhou, Henan Province, China
Factory:	Not supplied by the client.

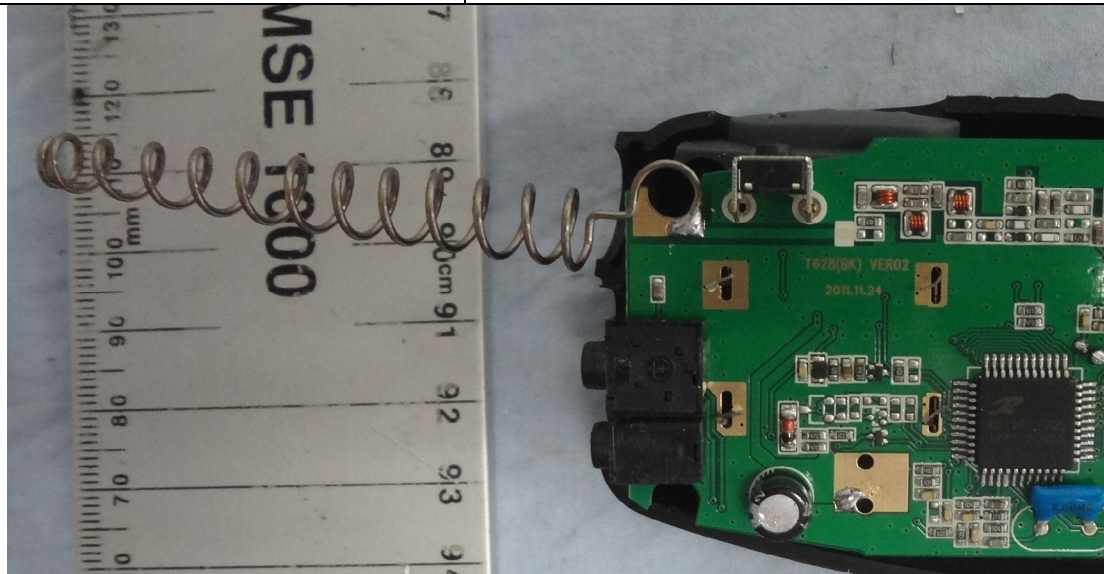
5.2 General Description of E.U.T.

Product Name	2 way radio
Brand Name:	N/A
Model No:	T-628
Added Model:	N/A
Product Description:	Portable production

5.3 Technical Specifications:

Operation Frequency:	462.5625MHz ~ 462.7125 MHz (GMRS 1~7 channel) 467.5625 MHz ~ 467.7125 MHz (FRS 8~14 channel) 462.5500 MHz ~ 462.7250 MHz (GMRS 15~22 channel)					
Modulation Technique:	FM					
Emission Type	F3E					
Channel Information:	Channel	Frequency (MHz)	Description	Channel	Frequency (MHz)	Description
	1	462.5625	GMRS	12	467.6625	FRS
	2	462.5875	GMRS	13	467.6875	FRS
	3	462.6125	GMRS	14	467.7125	FRS
	4	462.6375	GMRS	15	462.5500	GMRS
	5	462.6625	GMRS	16	462.5750	GMRS
	6	462.6875	GMRS	17	462.6000	GMRS
	7	462.7125	GMRS	18	462.6250	GMRS
	8	467.5625	FRS	19	462.6500	GMRS
	9	467.5875	FRS	20	462.6750	GMRS
	10	467.6125	FRS	21	462.7000	GMRS
	11	467.6375	FRS	22	462.7250	GMRS
Antenna Type	Spiral Antenna					

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Antenna Gain	2.0 dBi
	

5.4 Accessories of Product:

Battery:	Battery Type:	Li-on Rechargeable(*2)	
	Manufacturer:	N/A	
	Remark:	Supply the EUT with a new and fully charged battery during the testing.	
Adapter:	Rated Input:	AC 100V-230V 60Hz	
	Rated Output:	DC 7.0V 100mA	
	Cable length:	AC port:	0 cm (2 wires)
		DC port:	120 cm

5.5 Support equipments for Testing

The EUT has been tested independently.

5.6 Details of Test Mode

Test Mode	Description of Test Mode
Engineering mode:	Control EUT work in continuous transmitter and receiver mode.

5.7 Test Channel:

GMRS		FRS	
Channel	Frequency	Channel	Frequency
4	462.6375MHz	11	467.6375MHz



5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
No.588 West Jindu Road, Songjiang District, Shanghai, China.201612.

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

5.9 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.



5.10 Measurement Uncertainty

No.	Parameter	Measurement Uncertainty
1	Radio Frequency	$< \pm 1 \times 10^{-5}$
2	Total RF power, conducted	$< \pm 1.5 \text{ dB}$
3	RF power density, conducted	$< \pm 3 \text{ dB}$
4	Spurious emissions, conducted	$< \pm 3 \text{ dB}$
5	All emissions, radiated	$< \pm 6 \text{ dB}$ (30MHz – 1GHz) $< \pm 6 \text{ dB}$ (above 1GHz)
6	Temperature	$< \pm 1^{\circ}\text{C}$
7	Humidity	$< \pm 5 \%$
8	DC and low frequency voltages	$< \pm 3 \%$

5.11 Environmental Conditions

Items	Required (IEC 68-1)	Actual
Temperature ($^{\circ}\text{C}$)	15-35	22-24
Humidity (%RH)	25-75	51-58
Barometric Pressure (kPa)	86-106	96-103.5

6 Equipments Used during Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Due date
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2014-06-05
2	EMI test receiver	Rohde & Schwarz	ESU40	100109	2014-02-22
3	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2014-03-06
4	Horn Antenna	Rohde & Schwarz	HF906	100284	2014-06-01
5	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2014-03-06
6	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2013-10-08
7	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2014-02-22
8	Audio Signal Generator	R&S	UPV	101141	2014-02-22
10	Attenuator	SHX	DC-13	N/A	N/A
11	DC power supply	GW	GPS-185017	--	2014-06-01
12	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2014-06-01
13	Power Meter	Rohde & Schwarz	NRP	101641	2014-05-06
14	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2013-10-08
15	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2009P	--	2013-10-08



7 Test Results

7.1 RF Output Power

Test standard:	FCC Part 95 Section 95.639
Test Method:	Based on TIA603:2010.
Test Date:	
Measurement Distance:	3m (Semi-Anechoic Chamber)
	Test instrumentation resolution bandwidth 100 kHz (30 MHz - 1000 MHz)

Requirements:

Per FCC §2.1046 and §95.639(d): No FRS unit, under any condition of modulation, shall exceed 0.500 W effective radiated power (ERP).

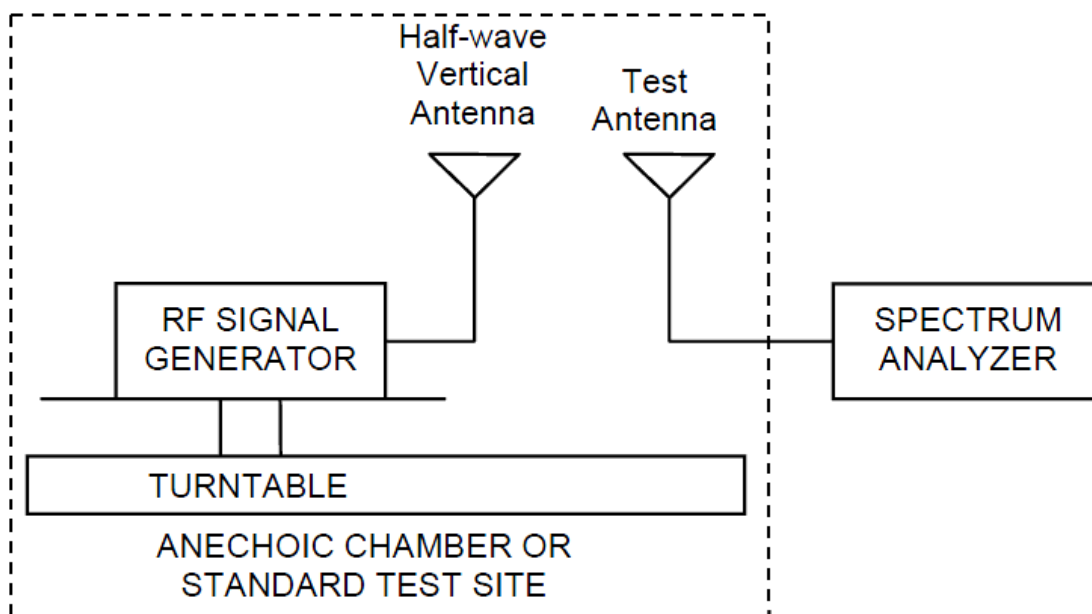
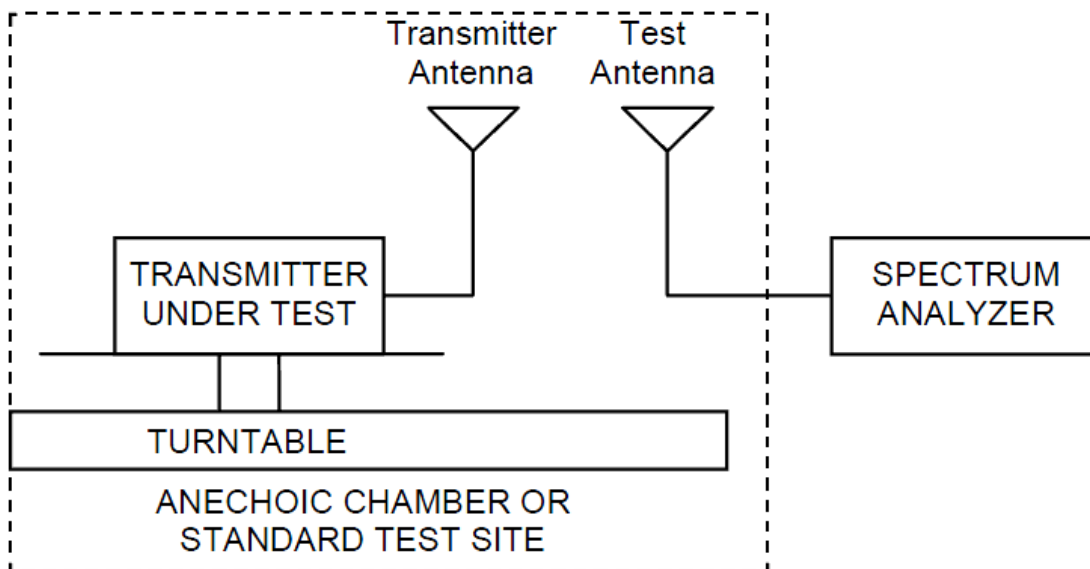
Per FCC §2.1046 and §95.639(a): No GMRS transmitter, under any condition of modulation, shall exceed 50 W Carrier power (average TP during one un-modulated RF cycle) when transmitting emission type A1D, F1D, G1D, A3E, F3E or G3E.

Test Procedure:

The technique used to find the output power of the transmitter was the antenna substitution method. The following test procedure was followed:

1. The EUT was powered ON and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length.
2. The fundamental frequency of the transmitter was maximized on the test Receiver display by raising and lowering the receive antenna and by rotating the turntable.
After the fundamental emission was maximized, a field strength measurement was made.
3. Steps 1 and 2 were performed with the EUT and the receive antenna in both vertical and horizontal polarization and performed a pre-test three orthogonal planes.
4. The transmitter was then removed and replaced with a substitution antenna.
5. A signal at the fundamental frequency was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally and vertically polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test Receiver. The level of the signal generator was adjusted until the measured field strength level in step 2 is obtained for this set of conditions.
6. The output power into the substitution antenna was then measured

Test Configuration:



Test result:

Channel	Channel Description	Frequency	Conducted Power	Effective Radiated Power		Limit	Margin
		MHZ	dBm	dBm	W	W	W
1	GMRS	462.5625	26.97	28.97	0.7889	50	49.2111
2		462.5875	27.11	29.11	0.8147	50	49.1853
3		462.6125	26.88	28.88	0.7727	50	49.2273
4		462.6375	26.86	28.86	0.7691	50	49.2309
5		462.6625	26.43	28.43	0.6966	50	49.3034
6		462.6875	26.89	28.89	0.7745	50	49.2255
7		462.7125	27.06	29.06	0.8054	50	49.1946
8	FRS	467.5625	24.05	26.05	0.4027	0.5	0.0973
9		467.5875	24.01	26.01	0.3990	0.5	0.1010
10		467.6125	23.89	25.89	0.3882	0.5	0.1118
11		467.6375	23.77	25.77	0.3776	0.5	0.1224
12		467.6625	23.64	25.64	0.3664	0.5	0.1336
13		467.6875	23.76	25.76	0.3767	0.5	0.1233
14		467.7125	24.14	26.14	0.4111	0.5	0.0889
15	GMRS	462.5500	26.76	28.76	0.7516	50	49.2484
16		462.5750	26.98	28.98	0.7907	50	49.2093
17		462.6000	27.16	29.16	0.8241	50	49.1759
18		462.6250	26.46	28.46	0.7015	50	49.2985
19		462.6500	26.34	28.34	0.6823	50	49.3177
20		462.6750	26.77	28.77	0.7534	50	49.2466
21		462.7000	26.65	28.65	0.7328	50	49.2672
22		462.7250	26.59	28.59	0.7228	50	49.2772

The unit does meet the FCC requirements.

7.2 Modulation Characteristics

Test standard: FCC Part 95 Section 95.637

Test Method: Based on TIA603:2010.

Test Date:

Requirements:

Per FCC §2.1047 and §95.637(a): A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A FRS unit that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 2.5 kHz, and the audio frequency response must not exceed 3.125 kHz.

Each GMRS transmitter, except a mobile station transmitter with a power output of 2.5 W or less, must automatically prevent a greater than normal audio level from causing over-modulation. The transmitter also must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of § 95.631 (without filtering.) The filter must be between the modulation limiter and the modulated stage of the transmitter. At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least 60 log 10 (f/3) dB greater than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB greater than the attenuation at 1 kHz.

Test Procedure:

a. Frequency deviation

- (1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1 KHz 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 500, 1000, 2500 and 3125Hz in sequence.

b. Modulation Frequency Response

- (1). Configure the EUT as shown in figure 1.
- (2). Adjust the audio signal generator frequency to the sound pressure level 107dB SPL at the microphone of the EUT.
- (3). Vary the Audio frequency from 100 Hz to 5 KHz and record the frequency deviation.
- (4). The peak frequency deviation must not exceed ± 2.5 KHz.

c. Audio Low Pass Filter Response

- (1) Connect the equipment in figure 2.
- (2) Connect the audio frequency generator as close as possible to the input of the post limiter low pass filter within the transmitter under test.
- (3) Connect the audio spectrum analyzer to the output of the post limiter low pass filter within the transmitter under test.
- (4) Apply a 1000 Hz tone from the audio frequency generator and adjust the level per manufacturer's specifications.
- (5) Record the dB level of the 1000 Hz spectral line on the audio spectrum analyzer as LEV1.
- (6) Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.
- (7) Record audio spectrum analyzer levels, at the test frequency in step (6).
- (8) Record the dB level on the audio spectrum analyzer as LEV2. Method of Measurement for transmitters.

Test Configuration:

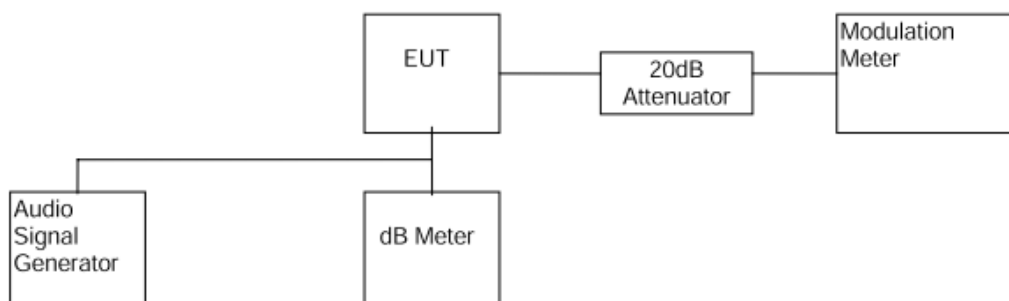


Figure 1

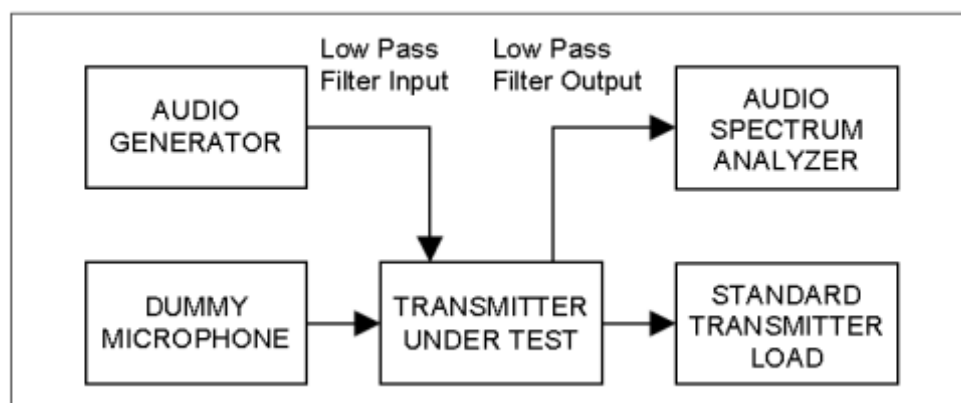


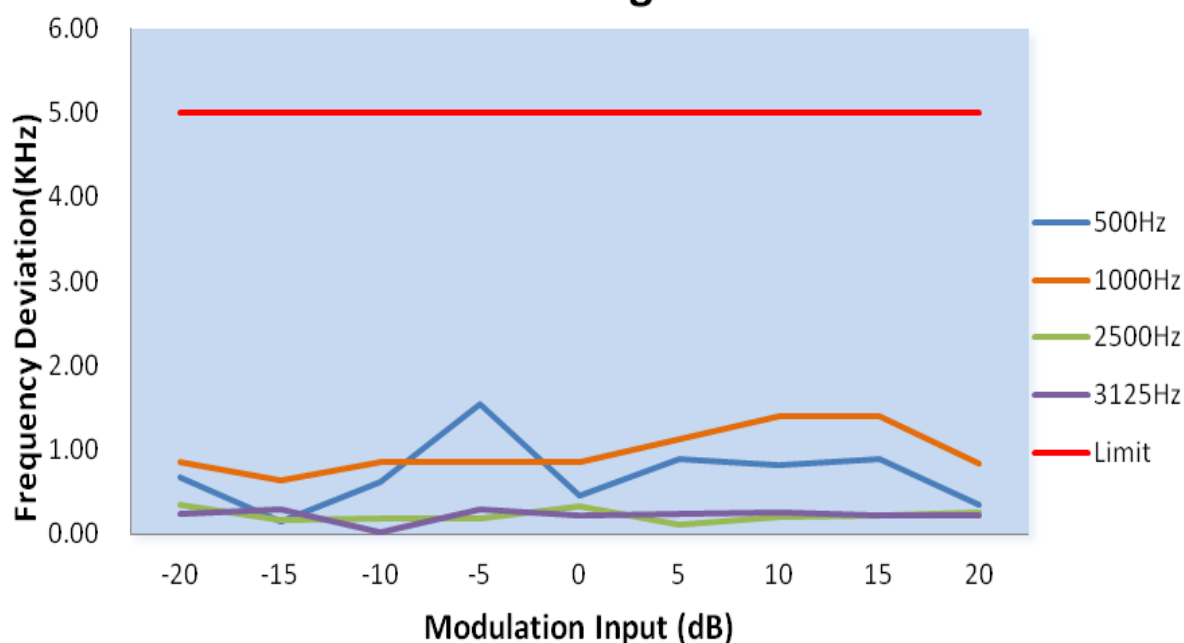
Figure 2

Test result:

a. Frequency deviation:

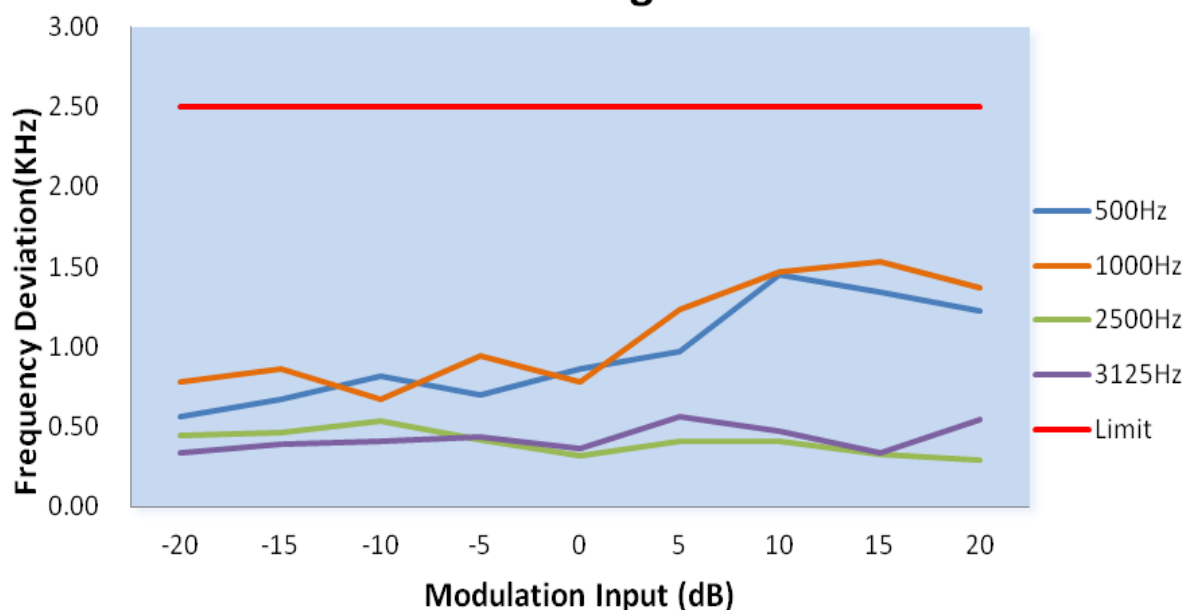
Channel 4: 462.6375MHz GMRS					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 500Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3125Hz	Limit (KHz)
-20	0.68	0.86	0.34	0.24	5.00
-15	0.15	0.63	0.17	0.29	5.00
-10	0.62	0.85	0.18	0.02	5.00
-5	1.55	0.85	0.18	0.30	5.00
0	0.46	0.85	0.33	0.23	5.00
5	0.89	1.12	0.11	0.24	5.00
10	0.82	1.39	0.21	0.25	5.00
15	0.90	1.40	0.23	0.23	5.00
20	0.34	0.83	0.25	0.22	5.00

Modulation Limiting Characteristics



Channel 11: 467.6375MHz FRS					
Modulation Input(dB)	Peak Frequency Deviation(KHz) at 500Hz	Peak Frequency Deviation(KHz) at 1000Hz	Peak Frequency Deviation(KHz) at 2500Hz	Peak Frequency Deviation(KHz) at 3125Hz	Limit (KHz)
-20	0.56	0.77	0.45	0.34	2.50
-15	0.67	0.86	0.46	0.39	2.50
-10	0.82	0.67	0.54	0.41	2.50
-5	0.70	0.94	0.42	0.44	2.50
0	0.86	0.78	0.32	0.36	2.50
5	0.97	1.23	0.41	0.56	2.50
10	1.45	1.47	0.41	0.47	2.50
15	1.34	1.53	0.33	0.34	2.50
20	1.22	1.37	0.29	0.55	2.50

Modulation Limiting Characteristics



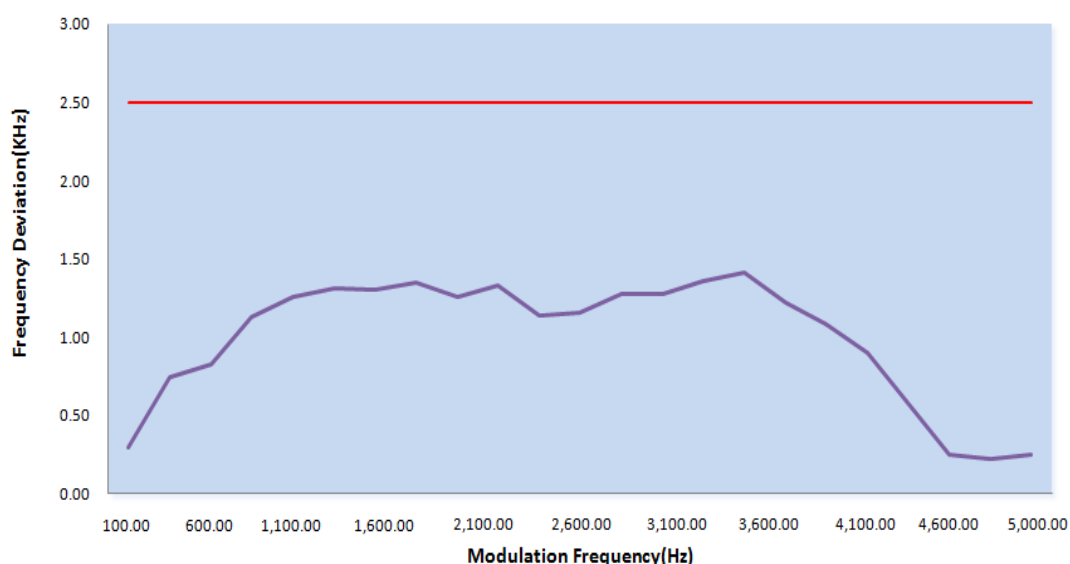
The unit does meet the FCC requirements.

b. Audio Frequency Response

Channel 11 for FRS

Modulation Frequency(Hz)	Peak Modulation Deviation(KHz)	Limit (KHz)
100	0.30	±2.5
200	0.75	±2.5
300	0.83	±2.5
400	1.13	±2.5
500	1.26	±2.5
600	1.31	±2.5
700	1.30	±2.5
800	1.35	±2.5
900	1.26	±2.5
1000	1.33	±2.5
1250	1.14	±2.5
1500	1.16	±2.5
1750	1.28	±2.5
2000	1.28	±2.5
2250	1.36	±2.5
2500	1.41	±2.5
2750	1.22	±2.5
3000	1.08	±2.5
3125	0.90	±2.5
3250	0.57	±2.5
3500	0.25	±2.5
4000	0.22	±2.5
5000	0.25	±2.5

Audio Frequency Response

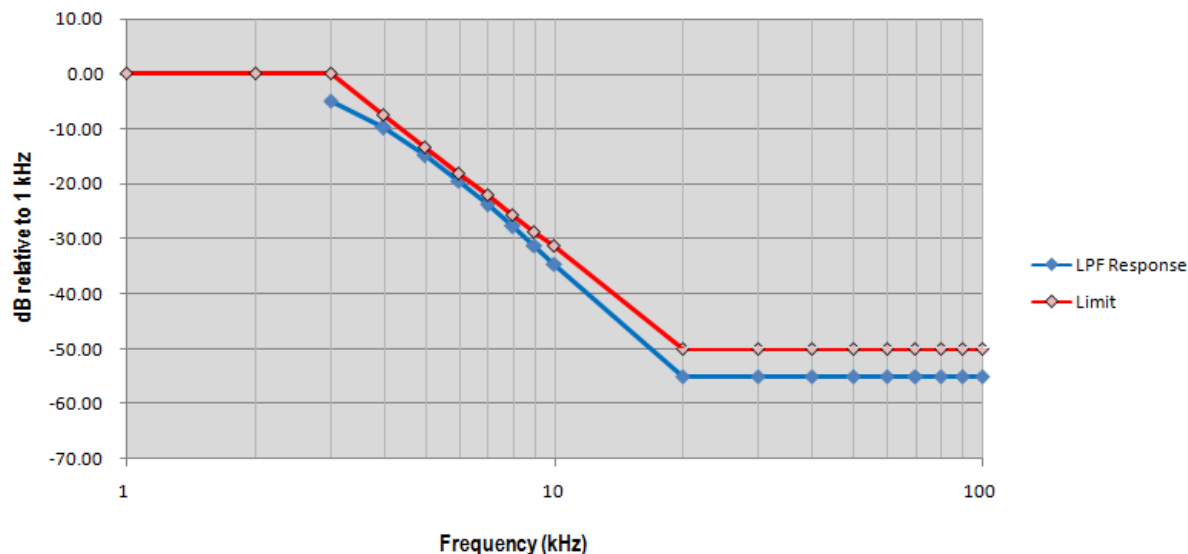


c. Audio Low Pass Filter Frequency Response

Channel 4 for GMRS

Frequency(KHz)	Response (dB)	Limit (KHz)
1	0.00	0.00
2	0.00	0.00
3	-5.46	0.00
4	-10.96	-8.52
5	-15.68	-13.64
6	-19.84	-18.75
7	-24.19	-22.16
8	-28.70	-25.57
9	-31.26	-28.98
10	-34.43	-32.39
20	-55.07	-49.43
30	-55.07	-50.00
40	-55.07	-50.00
50	-55.07	-50.00
60	-55.07	-50.00
70	-55.07	-50.00
80	-55.07	-50.00
90	-55.07	-50.00
100	-55.07	-50.00

Audio Low Pass Filter Response



7.3 Occupied Bandwidth And Emission Mask

Test Requirement: FCC Part 95 Section 95.633

Test Method: Based on TIA603:2010.

Test Date:

Requirements:

According to §95.633(c), the authorized bandwidth for emission type F3E or F2D transmitted by a FRS unit is 12.5 kHz. The authorized bandwidth for emission type F1D, G1D, F3E or G3E is 20kHz.

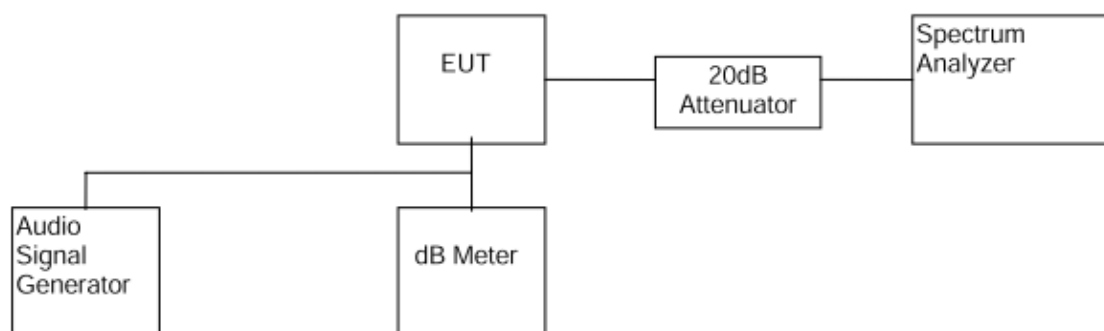
The power of each unwanted emission shall be less than TP as specified in the applicable paragraphs listed in the following :

- 1) At least 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) At least 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.
- 3) At least $43 + 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%, the calculation formulas and limit result refer Section 5.1.5 note 2.

Procedure:

- 1). The set-up test equipment in the following configuration:
- 2). The EUT was modulated by 2.5 KHz Sine wave audio signal, The level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing).
- 3). Set SPA Centre Frequency = fundamental frequency, RBW=VBW= 300 Hz, Span =20 KHz.
- 4). Set SPA Max hold. Mark peak, -20 dB.

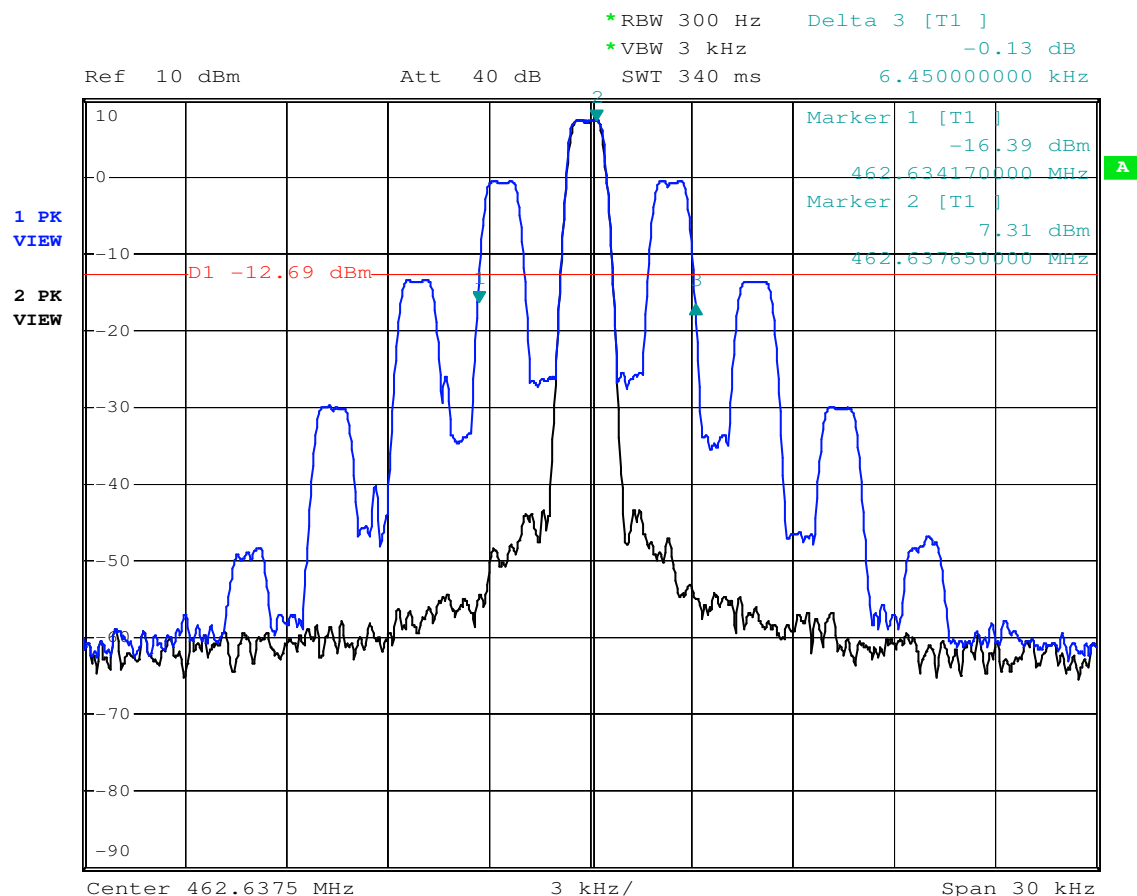
Test Configuration:



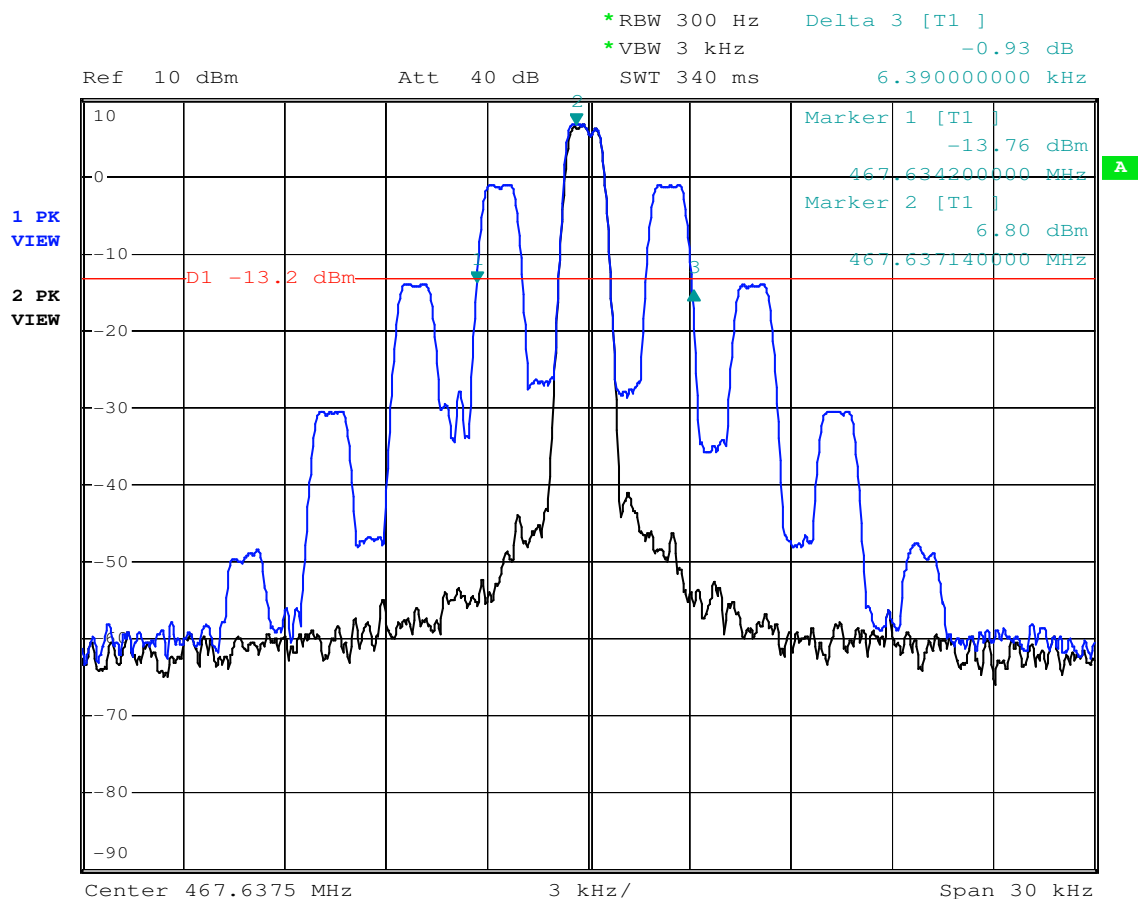


Test result:

The occupied Bandwidth is measured to be 6.45 KHz for GMRS and 6.39 KHz for FRS



Channel 4 462.6375MHz GMRS

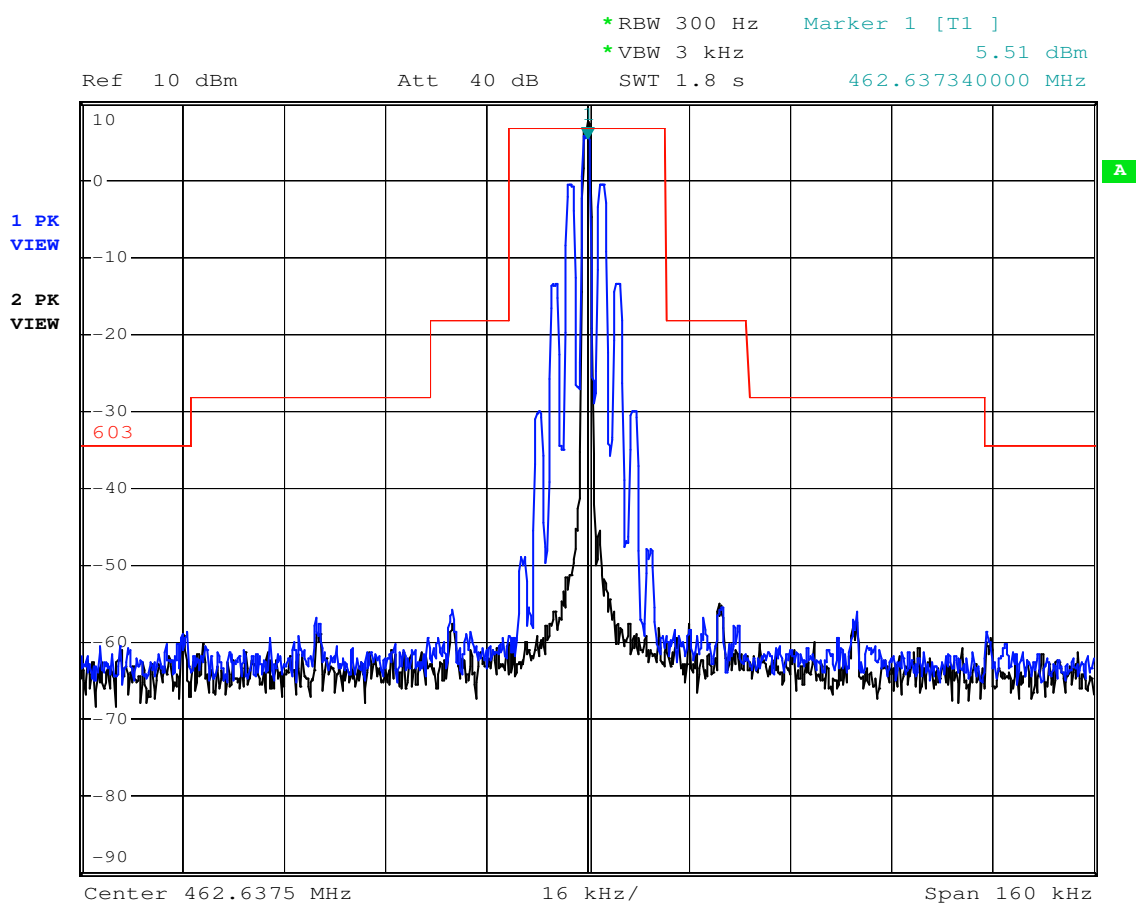


Channel 11 467.6375MHz FRS

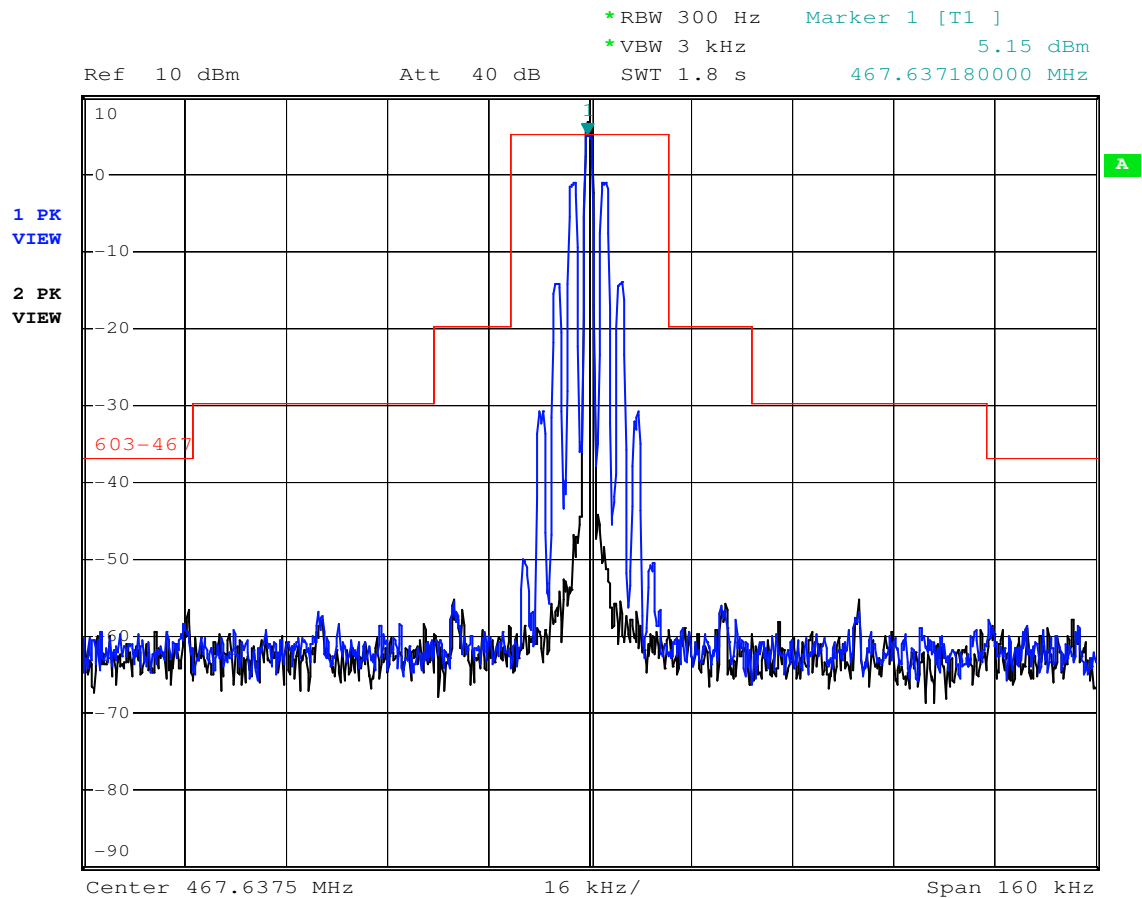
The unit does meet the FCC requirements.



Emission Mask:



Channel 4: 462.6375MHz GMRS



Channel 11: 467.6375MHz FRS

The unit does meet the FCC requirements.



7.4 Spurious Emission

Test standard:	FCC Part 95 Section 95.635
Test Method:	Based on TIA603:2010.
Test Date:	
Measurement Distance:	3m (Semi-Anechoic Chamber) Resolution bandwidth =10 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz. Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

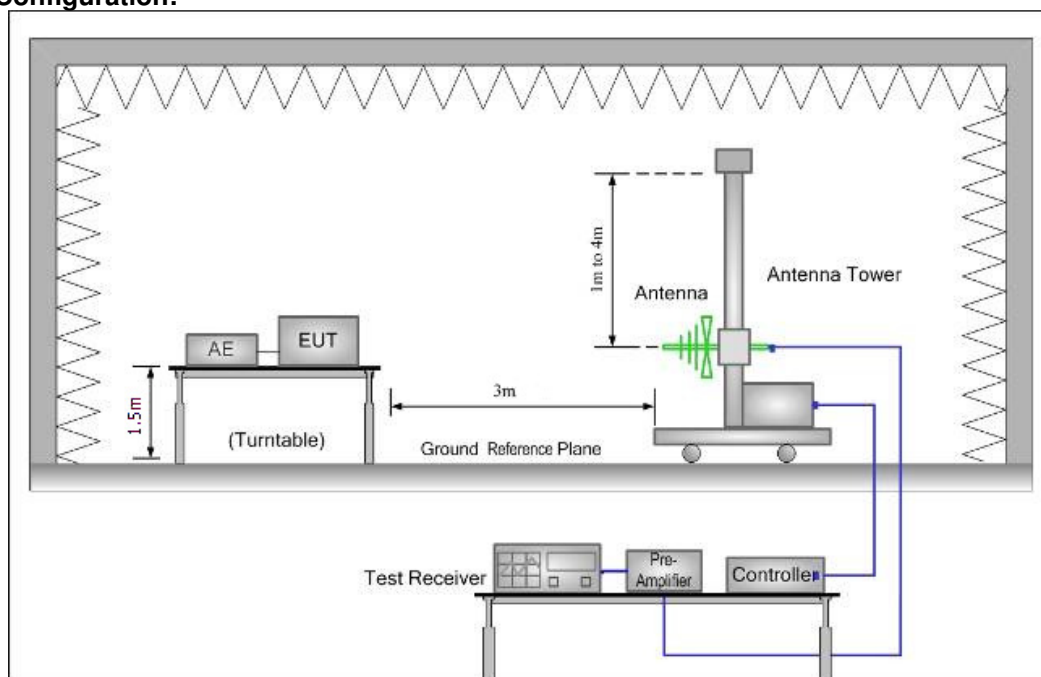
Requirements:

According to FCC section 95.635(b7), the unwanted emission should be attenuated below TP by at least 43+10log (Transmit Power) dB and it always -13dBm.

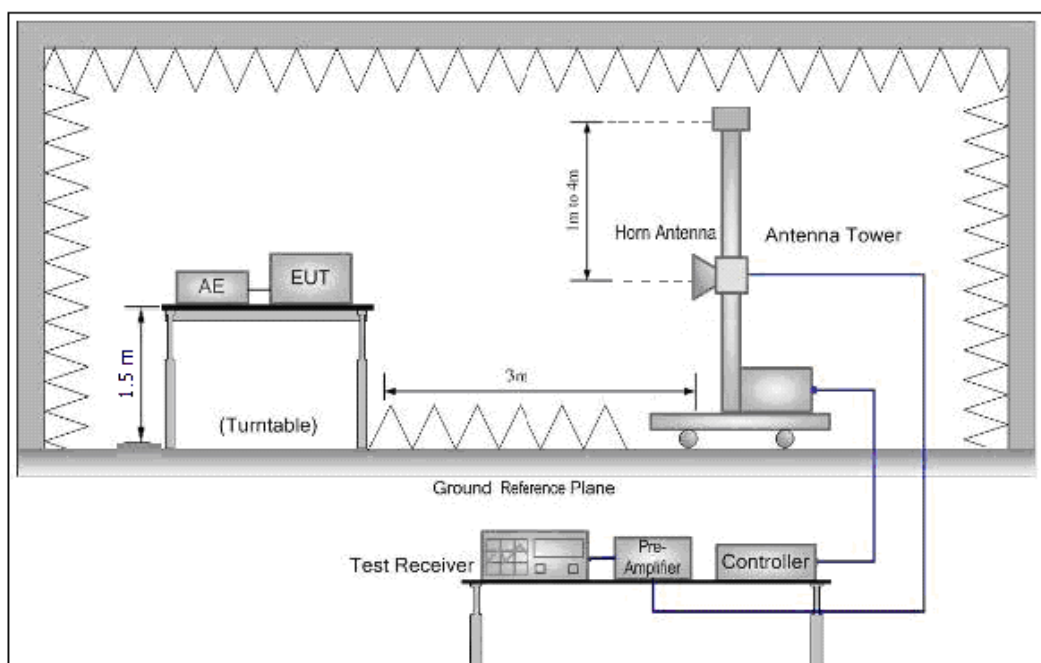
Test Procedure:

- (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 then 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.

Test Configuration:



30MHz to 1GHz



Above 1 GHz



Test result:

Test mode 1: GMRS mode continue transmitting

Channel 4; Frequency= 462.6375MHz;

Frequency MHz	Polarity V/H	Emission level dBm	FCC Part 95 Limit dBm	Margin dB
924.1	V	-38.32	-13.00	25.32
1379	V	-39.03	-13.00	26.03
1854	V	-42.44	-13.00	29.44
2319	V	-44.47	-13.00	31.47
2780	V	-46.29	-13.00	33.29
924.1	H	-38.56	-13.00	25.56
1385	H	-39.41	-13.00	26.41
1839	H	-42.41	-13.00	29.41
2300	H	-45.77	-13.00	32.77
2801	H	-47.25	-13.00	34.25

Test mode 2: FRS mode continue transmitting

Channel 11; Frequency= 467.6375MHz;

Frequency MHz	Polarity V/H	Emission level dBm	FCC Part 95 Limit dBm	Margin dB
934.9	V	-39.87	-13.00	26.87
1402	V	-39.44	-13.00	26.44
1869	V	-44.03	-13.00	31.03
2335	V	-45.38	-13.00	32.38
2800	V	-46.24	-13.00	33.24
934.9	H	-39.24	-13.00	26.24
1400	H	-42.56	-13.00	29.56
1878	H	-43.75	-13.00	30.75
2340	H	-44.89	-13.00	31.89
2869	H	-46.94	-13.00	33.94

Note: Margin= Spurious Attenuation- limit

7.5 Frequency Stability

Test Requirement: FCC Part 95 Section 95.621 & 95.626

Test Method: Based on TIA603:2010.

Test Date:

Requirements:

According to FCC Section 95.626, the frequency stability shall be measured with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$ centigrade. Each FRS unit must be maintained within a frequency tolerance of 0.00025%.

According to FCC Section 95.621, the frequency stability shall be measured with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$ centigrade. Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005%.

Procedure:

a. Frequency stability versus environmental temperature

(1) Setup the configuration per Test Configuration 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 1 KHz and Video Resolution Bandwidth to 1 KHz and Frequency Span to 50 KHz. Record this frequency as reference frequency.

(3) Set the temperature of chamber to 50°C . 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.

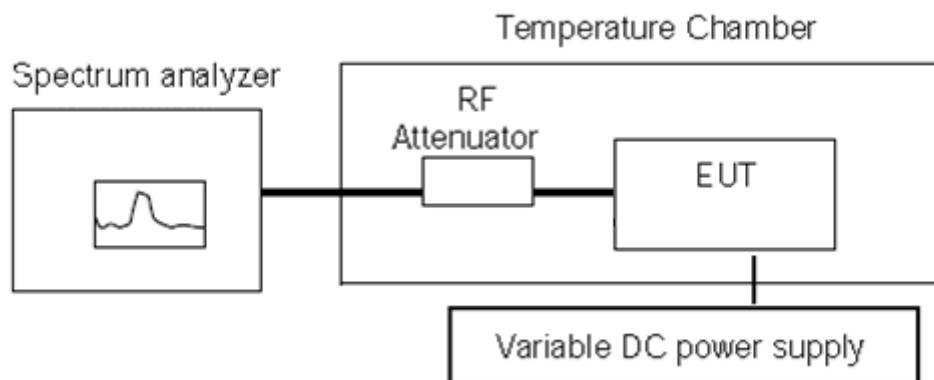
b. Frequency stability versus input voltage

(1) Setup the configuration per Test Configuration for frequencies measured at temperature if it is within 15°C to 25°C . Otherwise, an environment chamber set for a temperature of 20°C shall be used. The EUT shall be powered by DC 4.5 V

(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.

Test Configuration:





Test Results:

Frequency Stability vs. Temperature

Assigned Frequency(MHz)	Temperature (°C)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
GMRS Channel 4 462.6375	-30	462.6379	0.000086	0.0005%
	-20	462.6377	0.000043	0.0005%
	-10	462.6380	0.000108	0.0005%
	0	462.6381	0.000130	0.0005%
	+10	462.6380	0.000108	0.0005%
	+20	462.6376	0.000022	0.0005%
	+30	462.6377	0.000043	0.0005%
	+40	462.6379	0.000086	0.0005%
	+50	462.6378	0.000065	0.0005%
FRS Channel 11 467.6375	-30	467.6381	0.000128	0.00025%
	-20	467.6381	0.000128	0.00025%
	-10	467.6378	0.000064	0.00025%
	0	467.6379	0.000086	0.00025%
	+10	467.6378	0.000064	0.00025%
	+20	467.6380	0.000107	0.00025%
	+30	467.6377	0.000043	0.00025%
	+40	467.6376	0.000021	0.00025%
	+50	467.6379	0.000086	0.00025%

Frequency Stability GMRS vs. Supply Voltage

Assigned Frequency(MHz)	Voltage (V)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
GMRS Channel 4 462.6375	3.6	462.6380	0.000108	0.0005%
	3.7	462.6382	0.000151	0.0005%
	3.8	462.6381	0.000130	0.0005%
	3.9	462.6378	0.000065	0.0005%
	4.0	462.6379	0.000086	0.0005%
	4.1	462.6377	0.000043	0.0005%
	4.2	462.6380	0.000108	0.0005%
	4.3	462.6378	0.000065	0.0005%
	4.4	462.6378	0.000065	0.0005%
FRS Channel 11 467.6375	4.5	462.6376	0.000108	0.0005%
	3.6	467.6381	0.000128	0.00025%
	3.7	467.6381	0.000128	0.00025%
	3.8	467.6379	0.000086	0.00025%
	3.9	467.6380	0.000107	0.00025%
	4.0	467.6379	0.000086	0.00025%
	4.1	467.6380	0.000107	0.00025%
	4.2	467.6377	0.000043	0.00025%
	4.3	467.6378	0.000064	0.00025%
	4.4	467.6376	0.000021	0.00025%
	4.5	467.6380	0.000128	0.00025%

Remark: The applicant declared the endpoint voltage 7.0Vdc. Nominal Voltage: 4.5VDC

Nominal Temperature: 20 °C

It will give the operation guidance to the customer in user manual.

The unit does meet the FCC requirements.



7.6 RF exposure evaluation

Test result:

This is a portable device which compliance with part 2.1093, please refer to SAR test report.



8 Test Setup Photographs

Refer to the < T-628_Test Setup photos>.

9 EUT Constructional Details

Refer to the < T-628_External Photos > & < T-628_Internal Photos >.

End of Report