NVLAP LAB CODE 200707-0

FCC PART 95

EMI MEASUREMENT AND TEST REPORT

For

Bonso Electronics Ltd.

Unit 1106-1110, 11/F Star House 3 Salisbury Road,
Tsim Sha Tsui Kowloon, Hong Kong

FCC ID: OVVGMRS1882

This Report Concerns:	Equipment Type:
☒ Original Report	22 channels FRS/GMRS

Test Engineer:	Phoenix Liu
Report No.:	RSZ08030701
Test Date:	2008-03-29 to 2008-04-17
Report Date:	2008-04-17
Reviewed By:	EMC Manager: Green Xu
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *BONSO ELECTRONICS LTD.*'s product, model number: GMRS1882 or the "EUT" as referred to in this report is a 22 channels FRS/GMRS. The EUT is measured approximately 5.0 cm L x 3.0 cmW x 17.0 cmH rated input voltage: DC 6 V Battery, with permanent Antenna.

** All measurement and test data in this report was gathered from production sample serial number: 0803019 (Assigned by BACL, Shenzhen). The EUT was received on 2008-03-07.*

Objective

This Type approval report is prepared on behalf of *BONSO ELECTRONICS LTD.* in accordance with Part 2, Subpart J, and Part 95 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart A,B and Subpart E of the Federal Communication Commissions rules.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).

NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2007070.htm

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

Bay Area Compliance Laboratories Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup

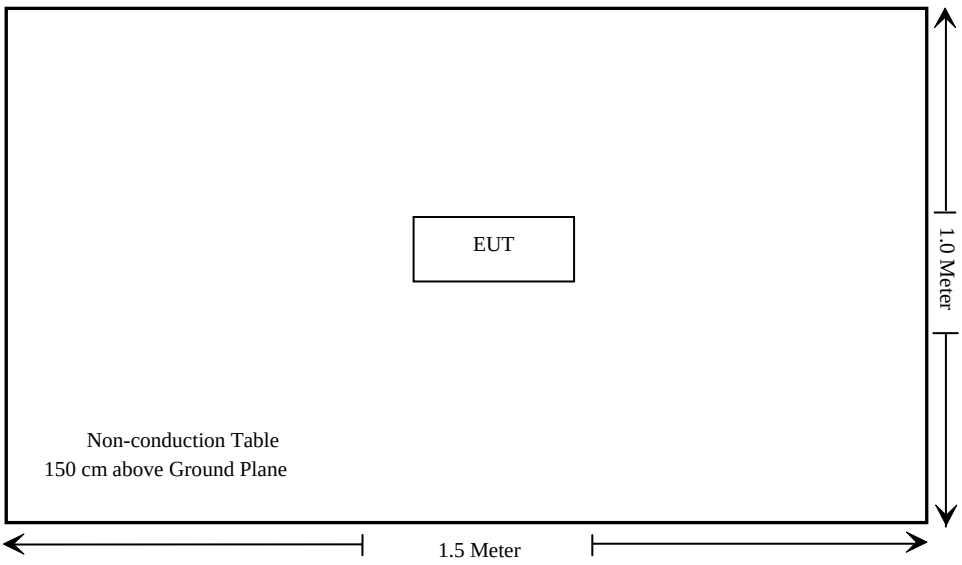
Standing View

Lying View

Side View

Note: We tested Lying orientation, Side orientation and standing orientation, the Standing orientation is the worst mode, so we select the Standing orientation to test.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307(b) (1)	RF Exposure	Compliant, refer to SAR report
§2.1046, §95.639(a) and §95.639(d)	RF Output Power	Compliant
§2.1047, and §95.637(a)	Modulation Characteristic	Compliant
§2.1049, §95.631, and § 95.633(a)(c)	Occupied Bandwidth and Emission Mask	Compliant
§2.1053 §95.635(b) (7)	Spurious Radiated Emissions	Compliant
§2.1055 (d), §95.627(b) and §95.621	Frequency stability	Compliant

§1.1307(b)(1) & §2.1093 RF EXPOSURE

Standard Applicable

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

Measurement Result:

The EUT is a portable device with Max peak output power of 1035.142 mW, SAR is required, please refer to SAR report.

§2.1046, §95.639(a) AND §95.639(d) - RF OUTPUT POWER

Applicable Standard

Per FCC §2.1046, §95.639(a) AND §95.639(d), No FRS Unit, under any condition of modulation, shall exceed a 0.500 w effective radiated power (ERP).

Per §95.639 (a) (1), No GMRS transmitter, under any condition of modulation, shall exceed 50 W Carrier power when transmitting emission type A1D, F1D, G1D, A3E, F3E or G3E.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
COM POWER	Dipole Antenna	AD-100	041000	2007-09-25	2008-09-25

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the emissions were measured by the substitution.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Phoenix Liu on 2008-03-29.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted					Absolute Level		Part 95A/B	
Freq. (MHz)	Meter Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	S.G. Level (dBm)	Ant. Polar (H/V)	Ant. Gain Cord.	Cable Loss (dB)	(dBm)	(mW)	Limit (W)	Note
462.6375	92.28	0	1.5	H	462.6375	15.00	H	0	3.75	11.25	13.34	5	CH4
462.6375	106.46	0	1.5	V	462.6375	33.90	V	0	3.75	30.15	1035	5	
467.6375	89.11	0	1.5	H	467.6375	12.00	H	0	3.75	8.25	6.683	0.5	CH11
467.6375	101.72	0	1.5	V	467.6375	28.50	V	0	3.75	24.75	298.54	0.5	
462.6250	90.46	0	1.5	H	462.6250	13.00	H	0	3.75	9.25	8.414	5	CH18
462.6250	106.20	0	1.5	V	462.6250	33.87	V	0	3.75	30.12	1028	5	

Test Result: Compliant.

§2.1047, and §95.637(a) - MODULATION CHARACTERISTIC

Applicable Standard

§2.1047 & §95.637:

(a) Equipment which utilizes voice modulated communication shall show the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz. for equipment which is required to have a low pass filter, the frequency response of the filter, or all of the circuitry installed between the modulation limited and the modulated stage shall be supplied.

(b) Equipment which employs modulation limiting, a curve showing the percentage of modulation versus the modulation input voltage shall be supplied.

(c) A FRS Unit that transmits emission type F3E must not exceed peak frequency deviation of plus or minus 2.5 kHz.

(d) A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	RF Communication Test Set	HP8920A	3438A05201	N/A	N/A

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Test Method: TIA/EIA-603-C

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Phoenix Liu on 2008-03-29.

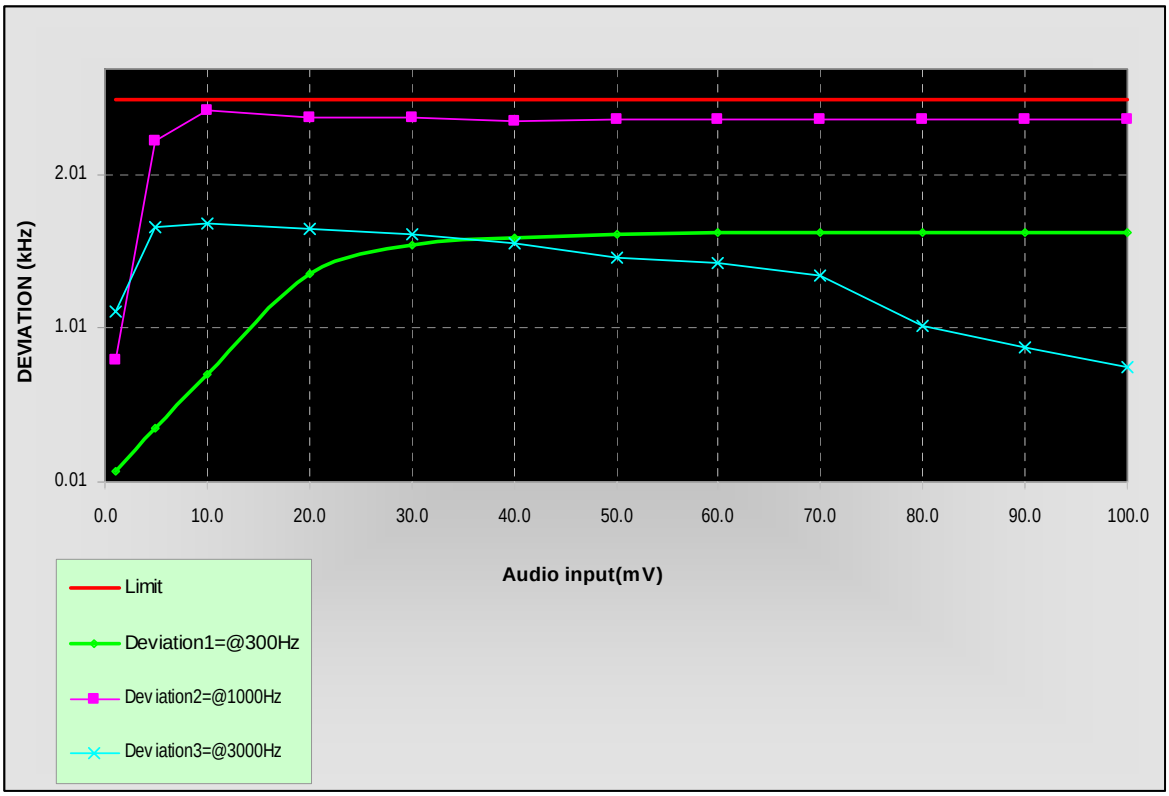
Test result: Compliant.

Please refer to the following tables and plots.

Test Mode: Transmitting

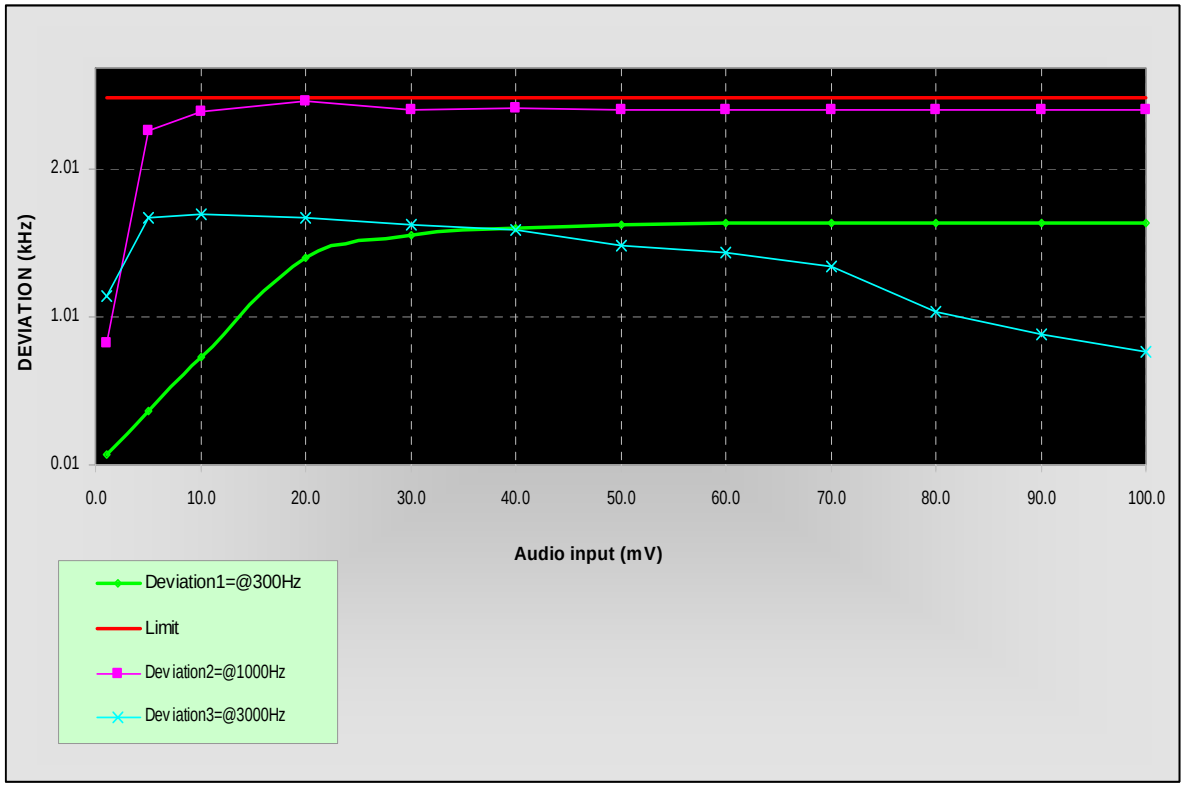
GMRS/FRS –Channel 4 (462.6375 MHz)

Audio Input Level (mv)	Deviation @300Hz (kHz)	Deviation @1000Hz (kHz)	Deviation @3000Hz (kHz)	FCC Limit (kHz)
1.0	0.08	0.81	1.12	2.5
5.0	0.36	2.23	1.67	2.5
10.0	0.71	2.38	1.69	2.5
20.0	1.37	2.43	1.66	2.5
30.0	1.55	2.39	1.62	2.5
40.0	1.60	2.38	1.56	2.5
50.0	1.62	2.38	1.47	2.5
60.0	1.63	2.36	1.44	2.5
70.0	1.64	2.37	1.36	2.5
80.0	1.64	2.37	1.03	2.5
90.0	1.64	2.37	0.89	2.5
100.0	1.64	2.37	0.76	2.5



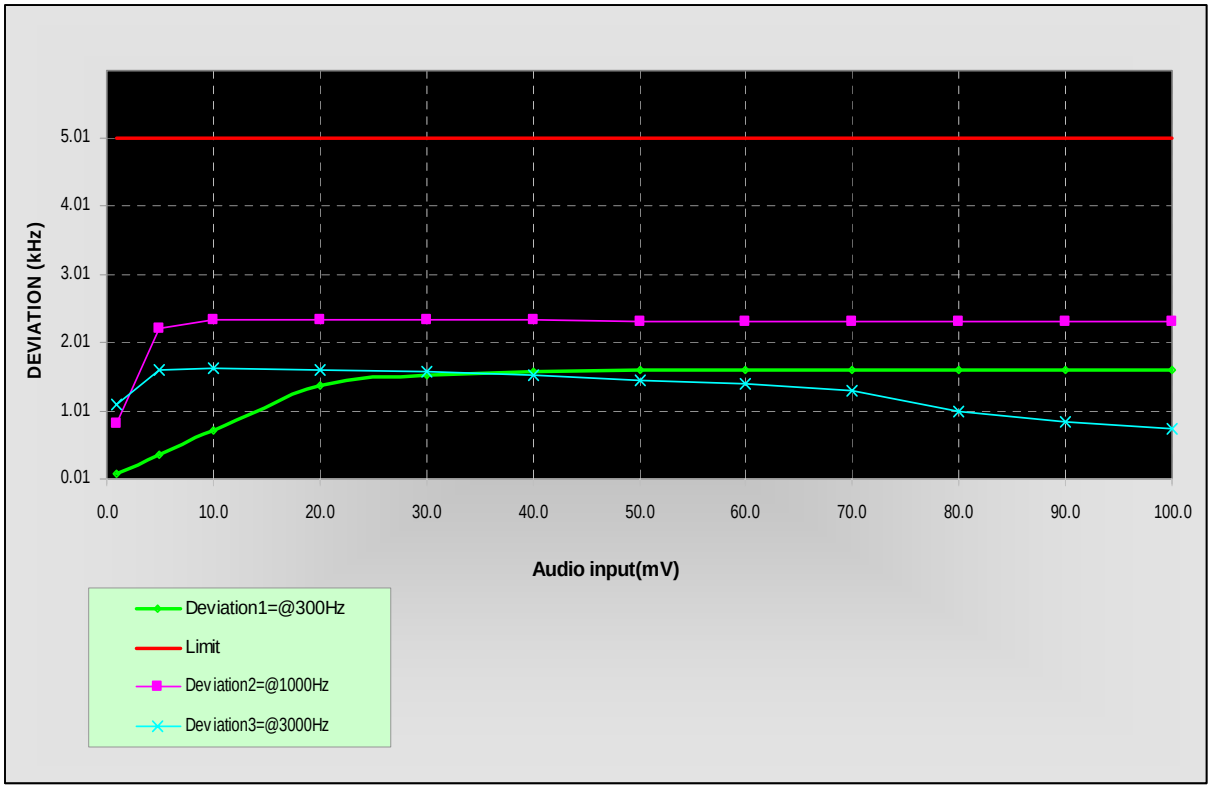
FRS –Channel 11(467.6375 MHz)

Audio Input Level (mv)	Deviation @300Hz (kHz)	Deviation @1000Hz (kHz)	Deviation @3000Hz (kHz)	FCC Limit (kHz)
1.0	0.080	0.830	1.150	2.500
5.0	0.370	2.270	1.690	2.500
10.0	0.740	2.410	1.710	2.500
20.0	1.410	2.470	1.680	2.500
30.0	1.570	2.420	1.640	2.500
40.0	1.620	2.430	1.600	2.500
50.0	1.640	2.420	1.500	2.500
60.0	1.650	2.420	1.450	2.500
70.0	1.650	2.420	1.360	2.500
80.0	1.650	2.420	1.050	2.500
90.0	1.650	2.420	0.900	2.500
100.0	1.650	2.420	0.780	2.500



GMRS–Channel 18(462.6250 MHz)

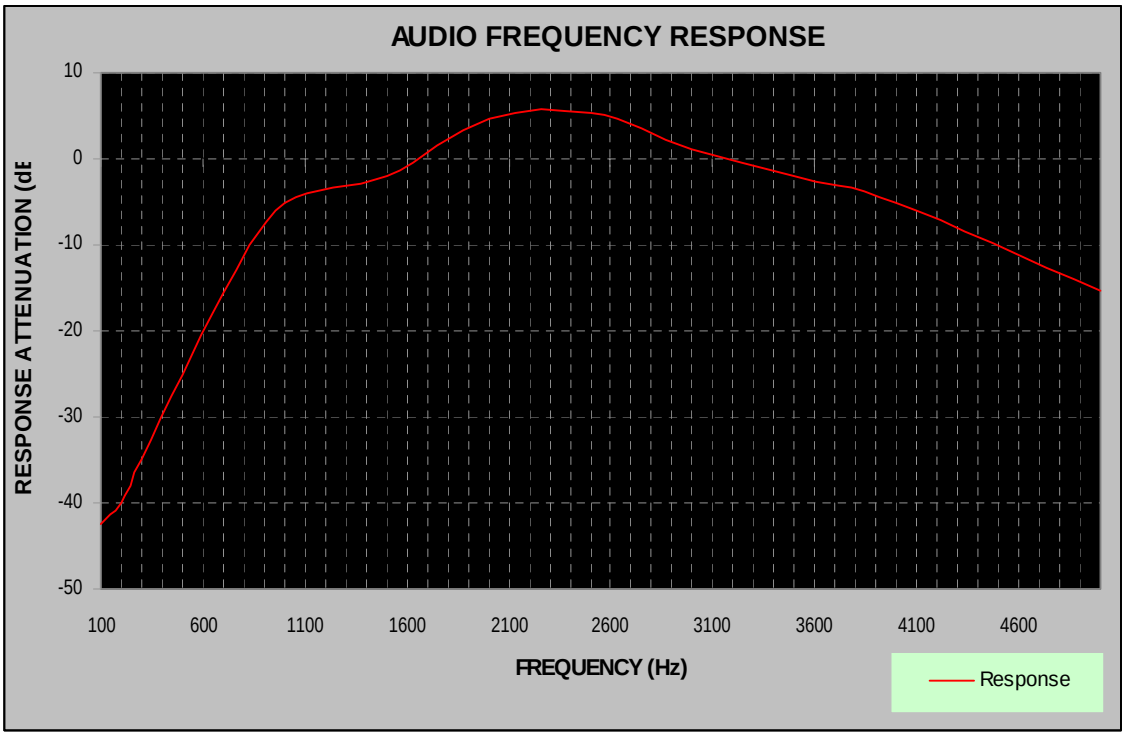
Audio Input Level (mv)	Deviation @300Hz (kHz)	Deviation @1000Hz (kHz)	Deviation @3000Hz (kHz)	FCC Limit (kHz)
1.0	0.080	0.810	1.100	5.000
5.0	0.370	2.210	1.620	5.000
10.0	0.710	2.340	1.640	5.000
20.0	1.370	2.350	1.610	5.000
30.0	1.540	2.350	1.580	5.000
40.0	1.580	2.340	1.540	5.000
50.0	1.600	2.330	1.450	5.000
60.0	1.610	2.330	1.400	5.000
70.0	1.610	2.330	1.310	5.000
80.0	1.610	2.330	1.010	5.000
90.0	1.610	2.330	0.860	5.000
100.0	1.610	2.330	0.750	5.000



Audio Frequency Response

GMRS/FRS –Channel 4 (462.6375 MHz)

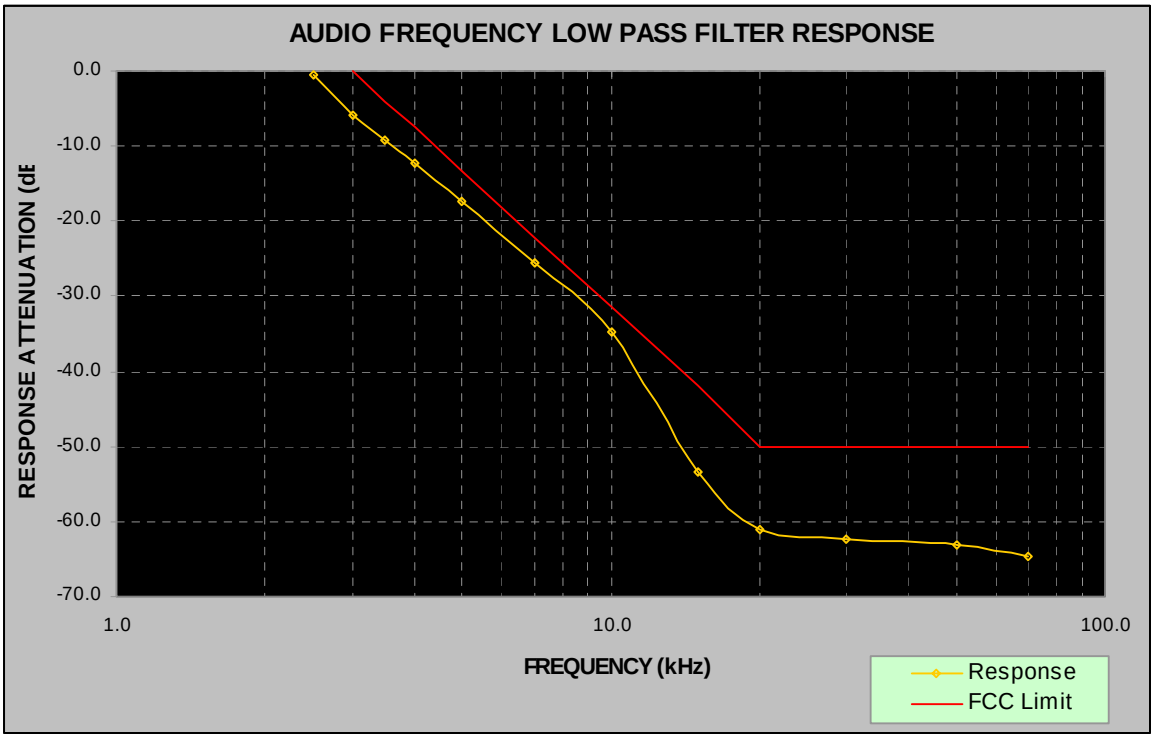
Audio Frequency (Hz)	Response Attenuation (dB)
100	-42.5
200	-40.1
300	-34.8
500	-25.1
700	-15.6
1000	-5.2
1500	-2.1
2000	4.7
2500	5.3
3000	1.1
3500	-2.1
4000	-5.1
5000	-15.3



Audio frequency Low Pass Filter Response

GMRS/FRS –Channel 4 (462.6375 MHz)

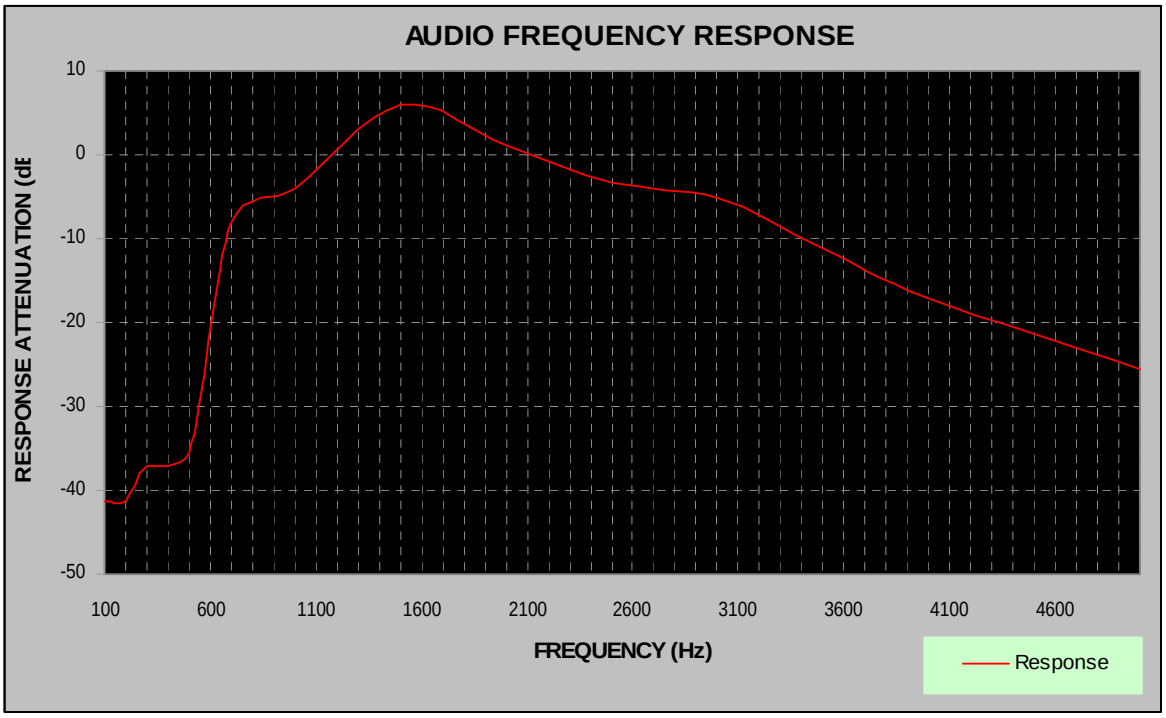
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
2.5	-0.4	
3.0	-5.8	0.0
3.5	-9.2	-4.0
4.0	-12.4	-7.5
5.0	-17.3	-13.3
7.0	-25.6	-22.1
10.0	-34.8	-31.4
15.0	-53.3	-42.0
20.0	-61.1	-50.0
30.0	-62.4	-50.0
50.0	-63.2	-50.0
70.0	-64.7	-50.0



Audio Frequency Response

FRS –Channel 11(467.6375 MHz)

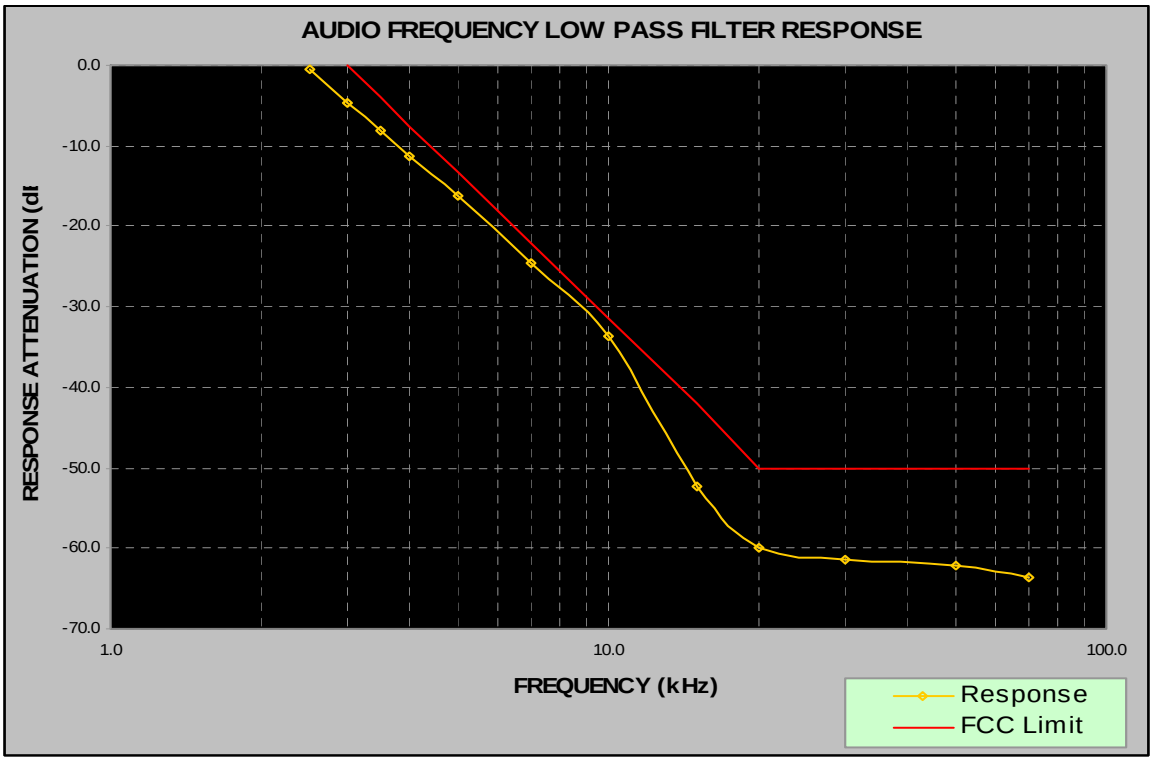
Audio Frequency (Hz)	Response Attenuation (dB)
100	-41.29
200	-41.29
300	-37.19
500	-35.49
700	-7.89
1000	-3.99
1500	5.91
2000	1.1
2500	-3.4
3000	-5
3500	-11
4000	-17.1
5000	-25.59



Audio frequency Low Pass Filter Response

FRS –Channel 11(467.6375 MHz)

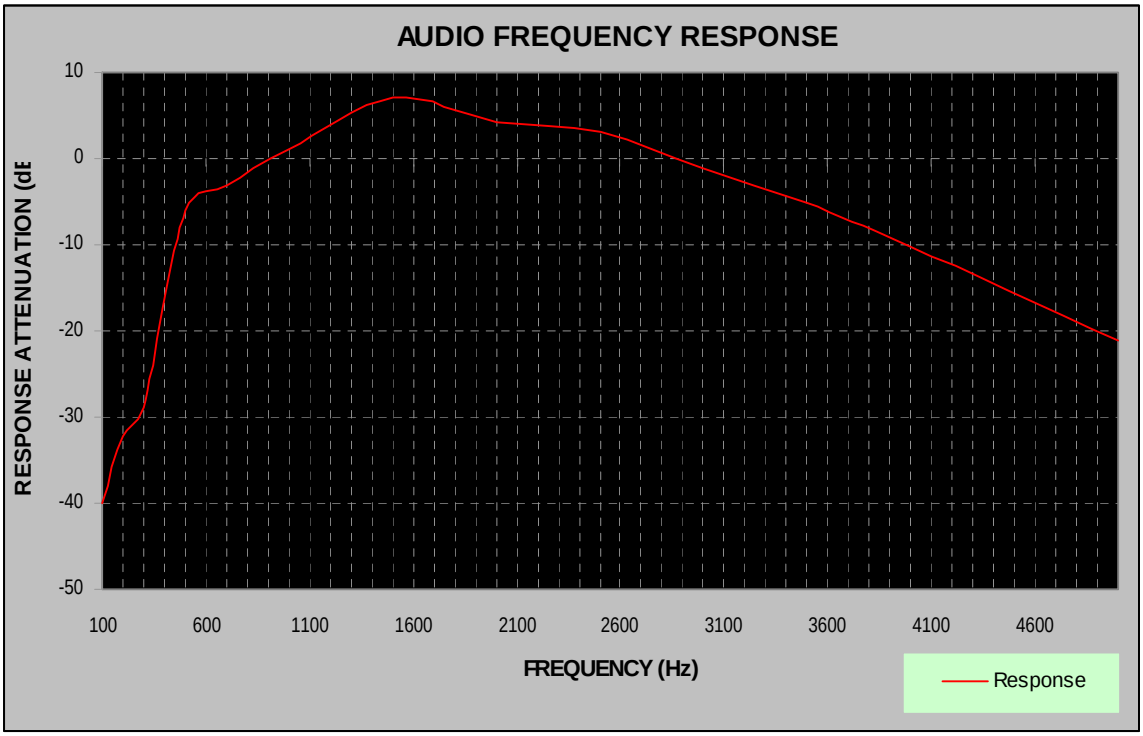
Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
2.5	-0.4	
3.0	-4.73	0.0
3.5	-8.13	-4.0
4.0	-11.33	-7.5
5.0	-16.26	-13.3
7.0	-24.56	-22.1
10.0	-33.73	-31.4
15.0	-52.23	-42.0
20.0	-60.03	-50.0
30.0	-61.33	-50.0
50.0	-62.13	-50.0
70.0	-63.63	-50.0



Audio Frequency Response

GMRS–Channel 18(462.6250 MHz)

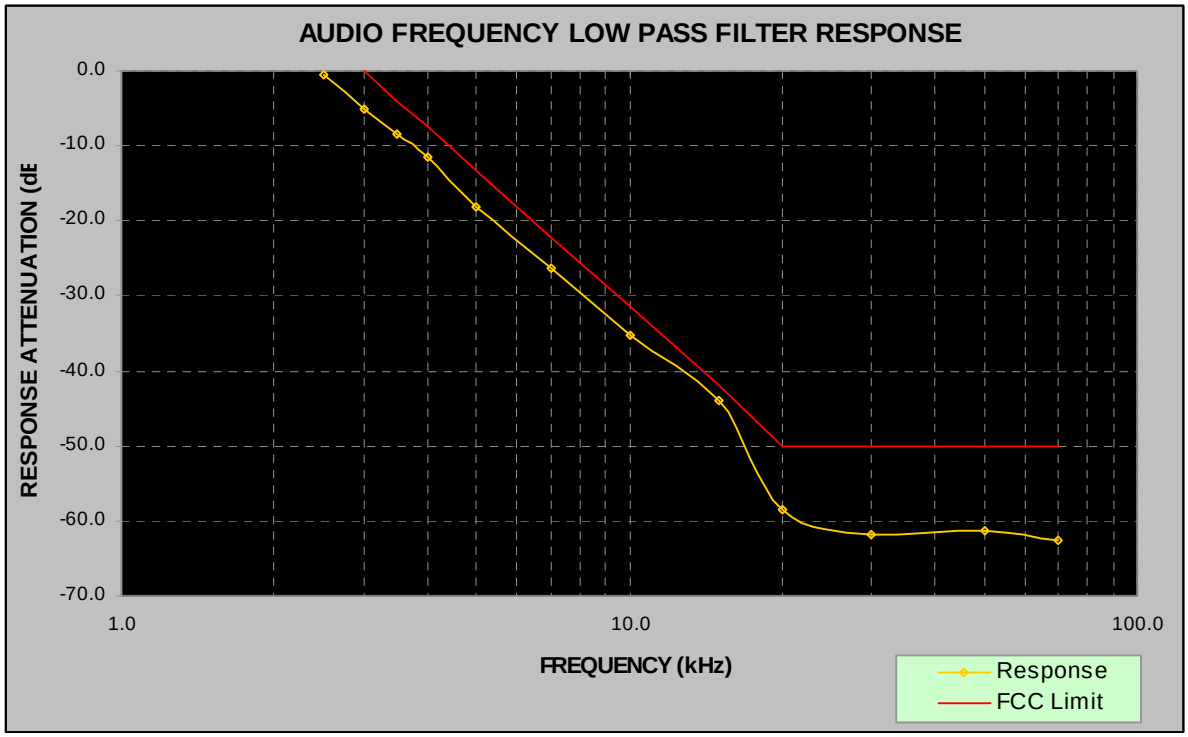
Audio Frequency (Hz)	Response Attenuation (dB)
100	-39.99
200	-32.19
300	-28.90
500	-5.89
700	-3.20
1000	1.10
1500	7.01
2000	4.20
2500	3.10
3000	-1.20
3500	-5.00
4000	-10.20
5000	-21.10



Audio frequency Low Pass Filter Response

GMRS–Channel 18(462.6250 MHz)

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
2.5	-0.6	
3.0	-4.99	0.0
3.5	-8.49	-4.0
4.0	-11.59	-7.5
5.0	-18.19	-13.3
7.0	-26.19	-22.1
10.0	-35.29	-31.4
15.0	-43.99	-42.0
20.0	-58.49	-50.0
30.0	-61.89	-50.0
50.0	-61.29	-50.0
70.0	-62.59	-50.0



§2.1049, § 95.631 and § 95.633(a) (c) - OCCUPIED BANDWIDTH AND EMISSION MASK

Applicable Standard

Per FCC §2.1049 §95.631 and FCC §95.633(a) (c), A GMRS transmitter must transmit only emission types A1D, F1D, G1D, H1D, J1D, R1D, A3E, F3E, G3E, H3E, J3E or R3E. An FRS unit may transmit only emission type F3E or F2D. The authorized bandwidth for emission type F3E or F2D transmitted by an FRS Unit is 12.5 kHz.and the authorized bandwidth for emission type F1D, G1D, F3E or G3E transmitted by a GMRS Unit is 20 kHz.

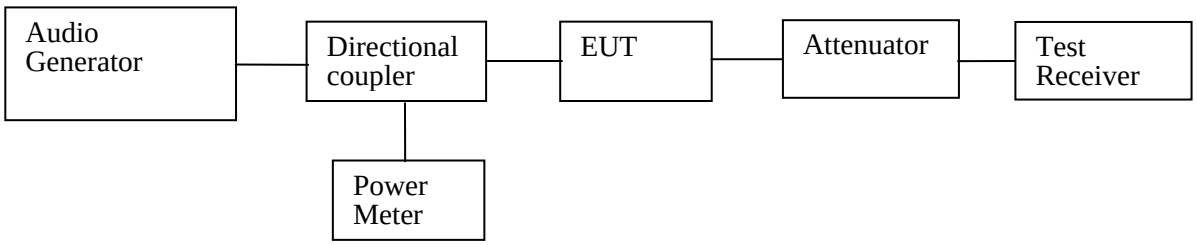
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
NANYAN	Audio Generator	NY2201	019829	2007-12-23	2008-12-23
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

1) Set-up the test equipment in the following configuration:



2) Set the level of audio signal Generator to obtain 16 dB greater than required for 50% modulation.
3) The Occupied Bandwidth is measured within the Spectrum Analyzer set at 5 kHz/div scan and 10dB/div.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Phoenix Liu on 2008-04-02, 2008-04-17.

Test result: Compliant.

Type of Modulation: 11k0F3E

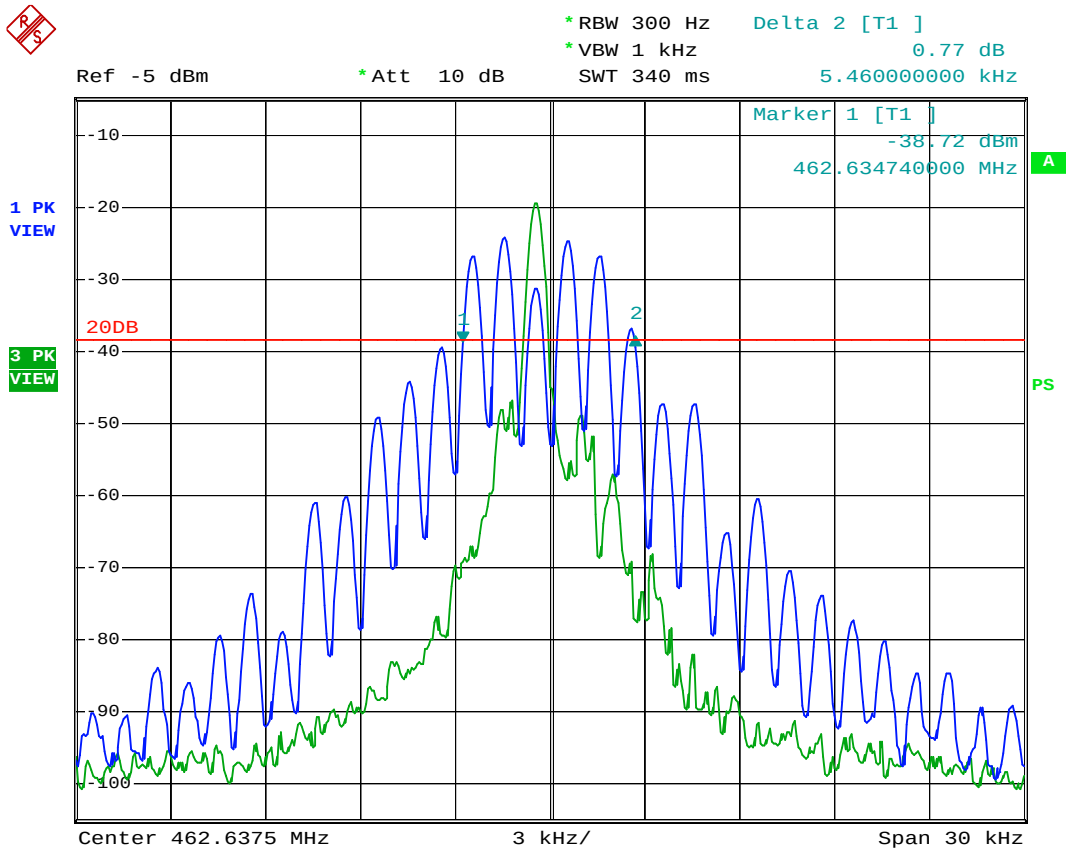
Bn = 2M + 2DK
M = 3000 Hz; D = 2.5 kHz
Bn = 2 (3000) + 2 (2500) = 11 k

Test Mode: Transmitting

Please refer to the following plots.

Occupied bandwith

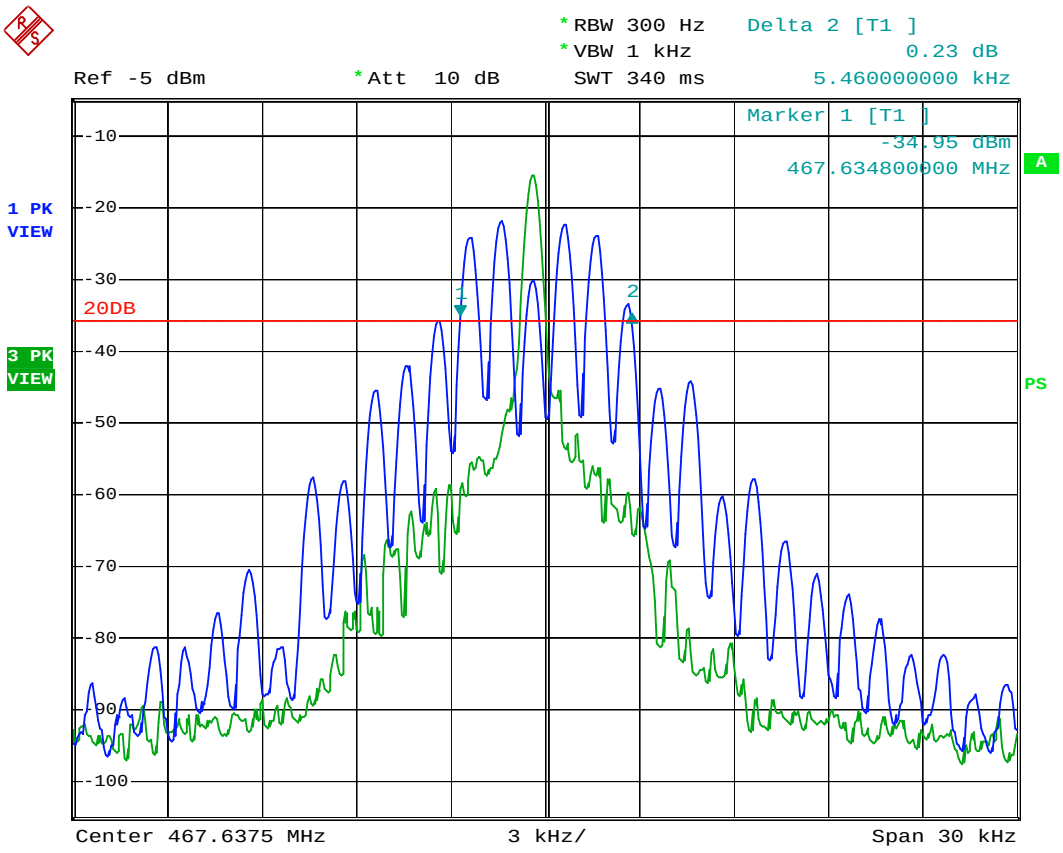
GMRS/FRS –Channel 4 (462.6375 MHz)



occupied bandwidth CH4 (Note:the line is 20dB down to the peak)

Date: 15.APR.2008 21:27:36

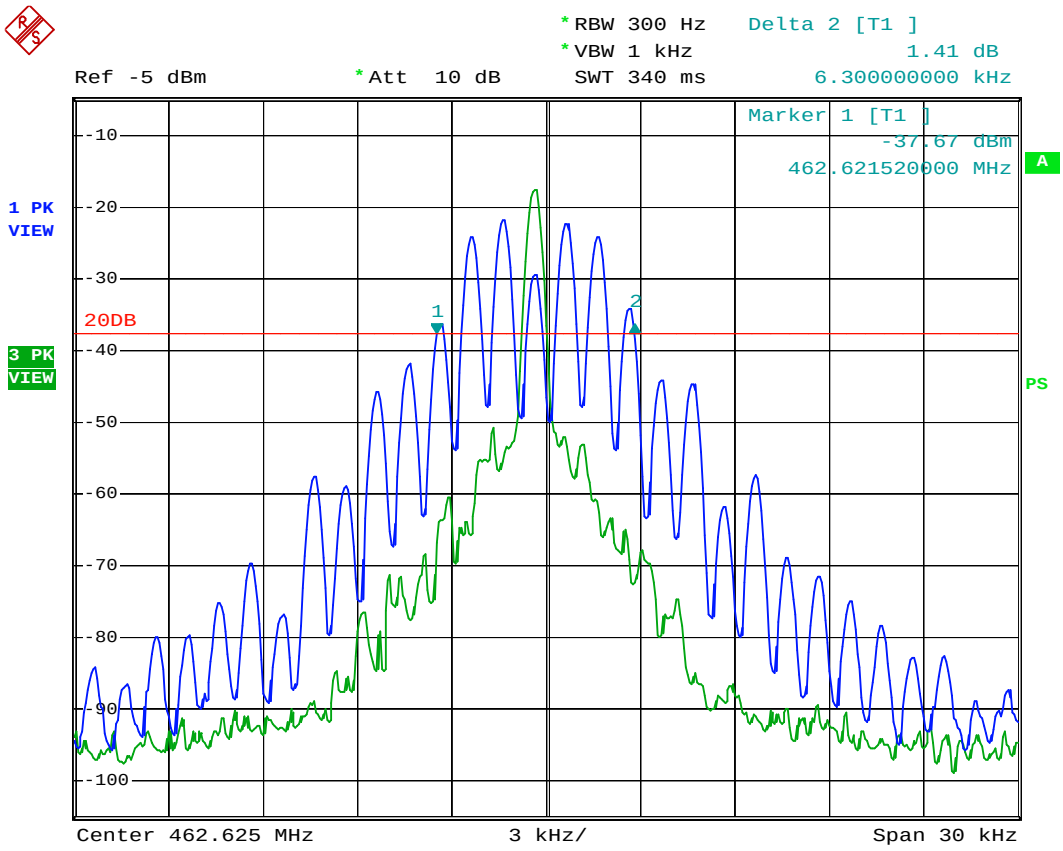
FRS –Channel 11(467.6375 MHz)



occupied bandwidth CH11 (Note:the line is 20dB down to the p
eak)

Date: 15.APR.2008 21:30:49

GMRS–Channel 18 (462.6250 MHz)

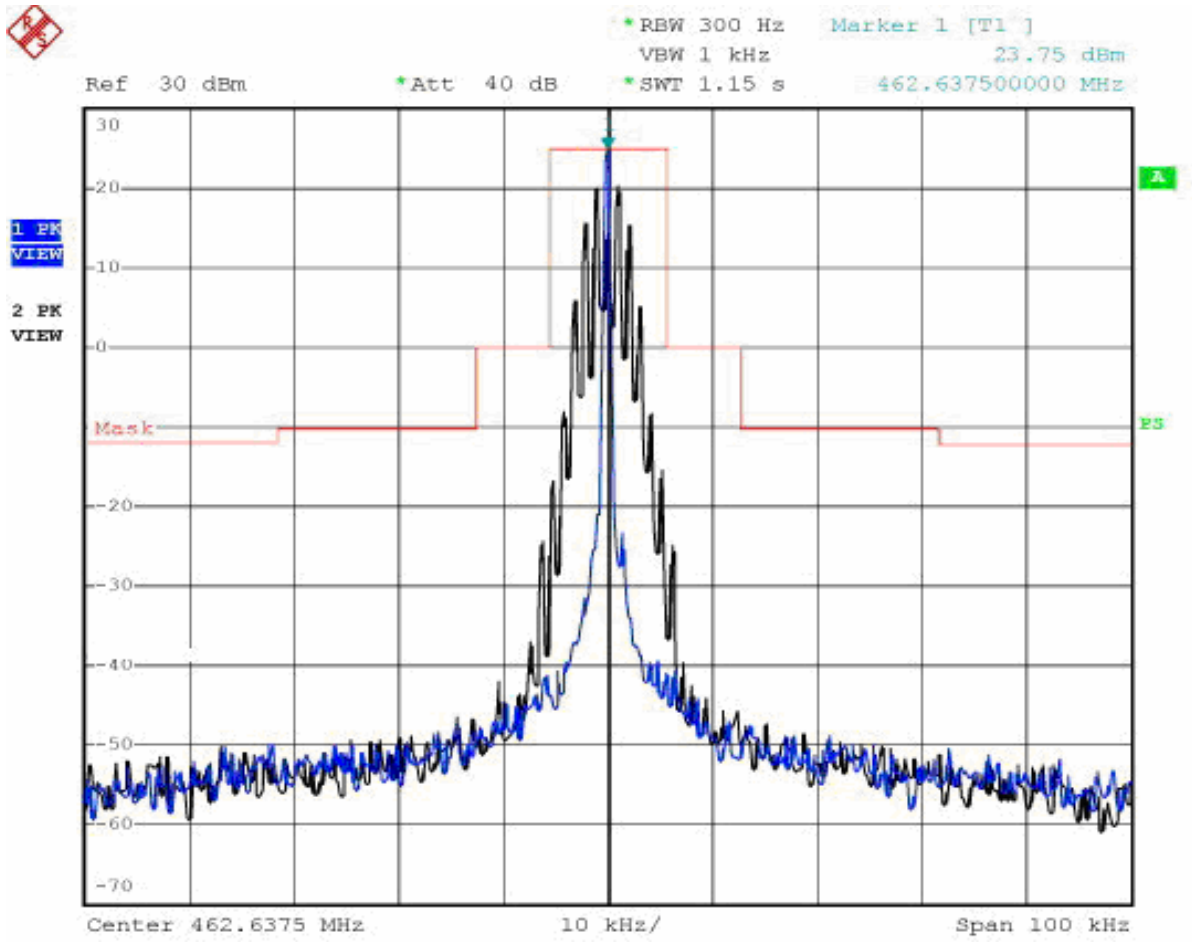


occupied bandwidth CH18 (Note:the line is 20dB down to the p
eak)

Date: 15.APR.2008 21:33:20

Emissions Mask

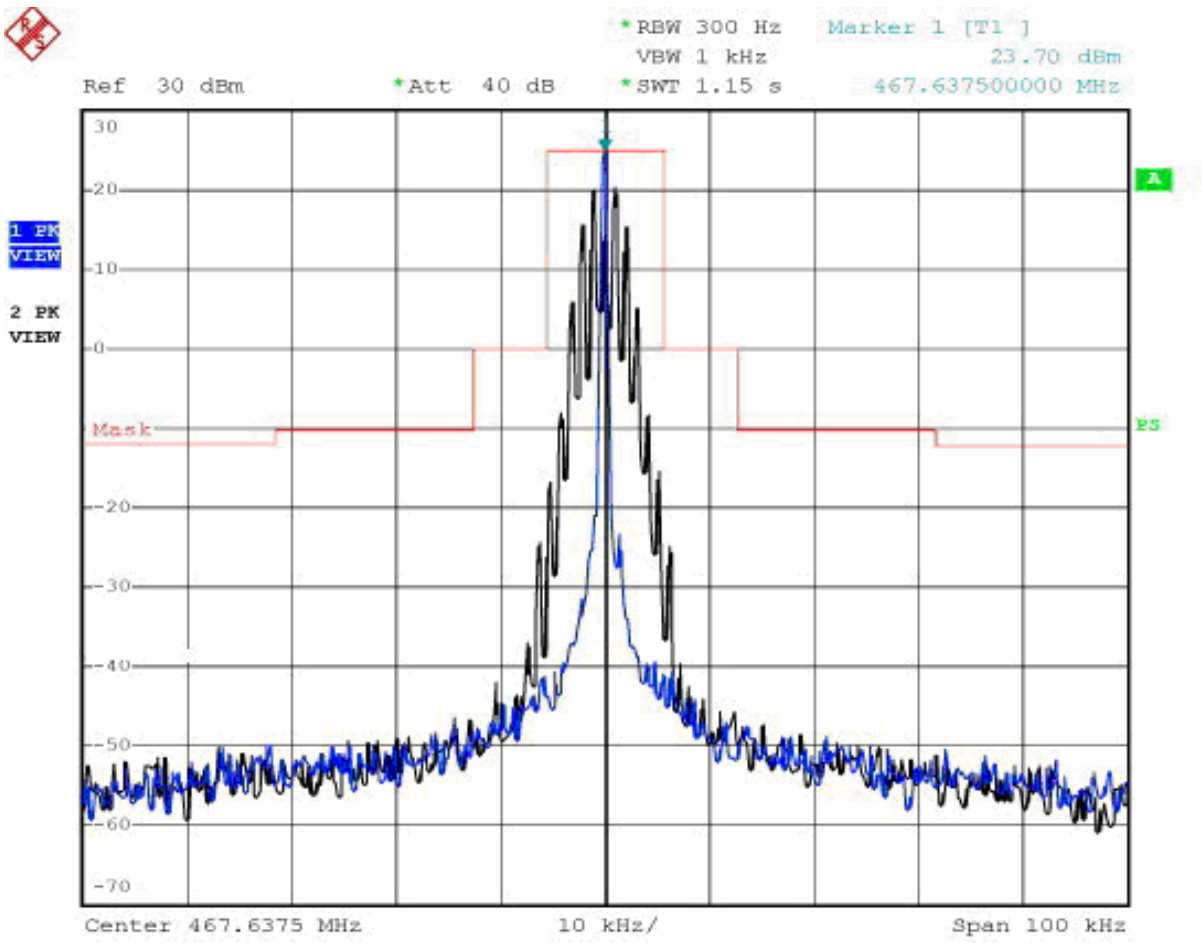
GMRS/FRS –Channel 4 (462.6375 MHz)



Emission Mask (GMRS/FRS Channel 4)

Date:02. APR.2008 22:41:24

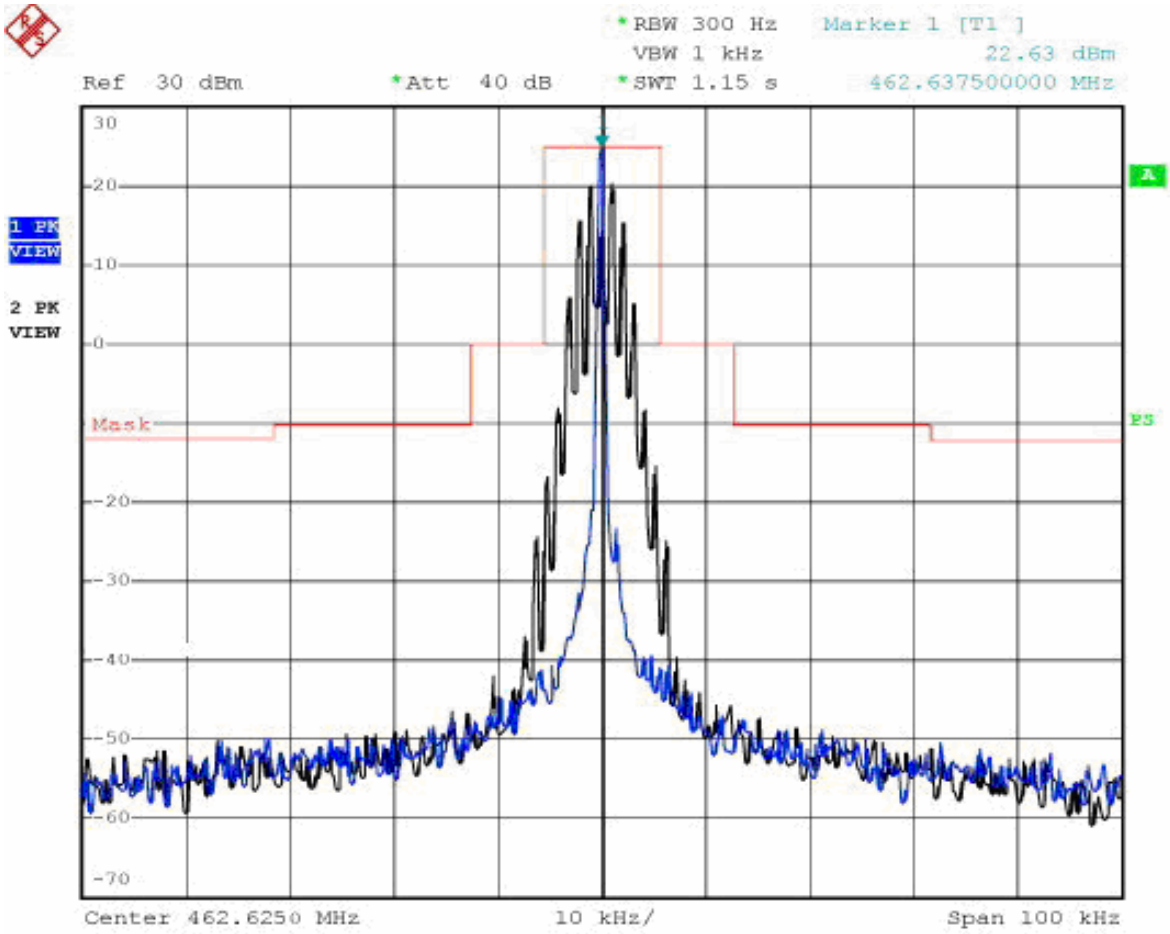
FRS –Channel 11(467.6375 MHz)



Emission Mask (FRS Channel 11)

Date:02. APR.2008 22:44:21

GMRS–Channel 18(462.6250 MHz)



Emission Mask (GMRS Channel 18)

Date:02. APR.2008 22:48:24

§2.1053 and §95.635(b) (7) - RADIATED SPURIOUS EMISSION

Applicable Standard

§2.1053 and §95.635

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	HP8657A	2849U00982	2007-10-16	2008-10-16
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2008-03-11	2009-03-11
COM POWER	Dipole Antenna	AD-100	041000	2007-09-25	2008-09-25
SUNOL SCIENCES	Horn Antenna	DRH-118	A052604	2007-09-25	2008-09-25
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2007-10-16	2008-10-16

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 43+10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Phoenix Liu on 2008-03-29.

Test Mode: Transmitting

GMRS/FRS –Channel 4 (462.6375 MHz)

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss (dB)	FCC Part 95		
Freq. (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	S.G Level (dBm)	Ant. Polar (H/V)			Absolute Level (dBm)	Limit (dBm)	Result
925.2760	52.81	0	1.5	V	925.2760	-14.00	V	5.8	15.3	-23.50	-13	Pass
925.2760	48.28	0	1.5	H	925.2760	-22.00	H	5.8	15.3	-31.50	-13	Pass
1388.7775	47.83	0	1.5	V	1388.7775	-57.20	V	6.4	1.21	-52.01	-13	Pass
1388.7775	36.54	0	1.5	H	1388.7775	-65.00	H	6.4	1.21	-59.81	-13	Pass
1851.7034	56.73	0	1.5	V	1851.7034	-45.75	V	6.1	1.31	-40.96	-13	Pass
1851.7034	49.16	0	1.5	H	1851.7034	-54.30	H	6.1	1.31	-49.51	-13	Pass
2312.6252	59.46	0	1.5	V	2312.6252	-42.10	V	7.2	1.62	-36.52	-13	Pass
2312.6252	56.96	0	1.5	H	2312.6252	-51.20	H	7.2	1.62	-45.62	-13	Pass
2777.5551	50.12	0	1.5	V	2777.5551	-52.00	V	7.2	1.91	-46.71	-13	Pass
2777.5551	46.24	0	1.5	H	2777.5551	-57.30	H	7.2	1.91	-52.01	-13	Pass
3701.4028	49.50	0	1.5	V	3701.4028	-54.30	V	7.0	3.01	-50.31	-13	Pass
3701.4028	55.30	0	1.5	H	3701.4028	-52.90	H	7.0	3.01	-48.91	-13	Pass

FRS –Channel 11 (467.6375 MHz)

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss (dB)	FCC Part 95		
Freq. (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	S.G Level (dBm)	Ant. Polar (H/V)			Absolute Level (dBm)	Limit (dBm)	Result
935.2710	39.41	0	1.5	V	935.2710	-44.0	V	5.8	15.3	-53.50	-13	Pass
935.2710	36.80	0	1.5	H	935.2710	-50.0	H	5.8	15.3	-59.50	-13	Pass
1402.8056	51.52	0	1.5	V	1402.8056	-54.3	V	6.4	1.21	-49.11	-13	Pass
1402.8056	39.04	0	1.5	H	1402.8056	-62.9	H	6.4	1.21	-57.71	-13	Pass
1871.7434	55.99	0	1.5	V	1871.7434	-46.5	V	6.1	1.31	-41.71	-13	Pass
1871.7434	49.82	0	1.5	H	1871.7434	-57.4	H	6.1	1.31	-52.61	-13	Pass
2338.6773	58.67	0	1.5	V	2338.6773	-43.8	V	7.2	1.62	-38.22	-13	Pass
2338.6773	51.17	0	1.5	H	2338.6773	-52.8	H	7.2	1.62	-47.22	-13	Pass
2807.6152	44.50	0	1.5	V	2807.6152	-58.2	V	7.2	1.91	-52.91	-13	Pass
2807.6152	44.88	0	1.5	H	2807.6152	-59.0	H	7.2	1.91	-53.71	-13	Pass
3741.4829	47.14	0	1.5	V	3741.4829	-56.8	V	7.0	3.01	-52.81	-13	Pass
3741.4829	53.16	0	1.5	H	3741.4829	-52.0	H	7.0	3.01	-48.01	-13	Pass

GMRS–Channel 18 (462.6250 MHz)

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction	Cable Loss (dB)	FCC Part 95		
Freq. (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Freq. (MHz)	S.G Level (dBm)	Ant. Polar (H/V)			Absolute Level (dBm)	Limit (dBm)	Result
925.2480	51.05	0	1.5	V	925.2480	-15.5	V	5.8	15.3	-25.00	-13	Pass
925.2480	42.95	0	1.5	H	925.2480	-29.5	H	5.8	15.3	-39.00	-13	Pass
1388.7775	46.70	0	1.5	V	1388.7775	-58.4	V	6.4	1.21	-53.21	-13	Pass
1388.7775	35.52	0	1.5	H	1388.7775	-66.0	H	6.4	1.21	-60.81	-13	Pass
1851.7034	59.46	0	1.5	V	1851.7034	-42.3	V	6.1	1.31	-37.51	-13	Pass
1851.7034	50.71	0	1.5	H	1851.7034	-54.0	H	6.1	1.31	-49.21	-13	Pass
2312.6252	58.48	0	1.5	V	2312.6252	-43.25	V	7.2	1.62	-37.67	-13	Pass
2312.6252	54.60	0	1.5	H	2312.6252	-53.5	H	7.2	1.62	-47.92	-13	Pass
2777.5551	48.21	0	1.5	V	2777.5551	-54.0	V	7.2	1.91	-48.71	-13	Pass
2777.5551	45.24	0	1.5	H	2777.5551	-58.4	H	7.2	1.91	-53.11	-13	Pass
3701.4028	49.92	0	1.5	V	3701.4028	-54.1	V	7.0	3.01	-50.11	-13	Pass
3701.4028	56.30	0	1.5	H	3701.4028	-51.5	H	7.0	3.01	-47.51	-13	Pass

§2.1055 (d), §95.627(b) and §95.621- FREQUENCY STABILITY

Applicable Standard

According to FCC §2.1055(a)(1), the frequency stability shall be measure with variation of ambient temperature from –30ºC to +50ºC, and according to FCC 2.1055(d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to FCC §95.627(b), Each FRS Unit must be maintained within a frequency tolerance of 0.00025%.

According to FCC §95.621, Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005%.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Hewlett-Packard	Frequency Counter	5342A	2317A08289	2008-03-28	2009-03-28
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2007-12-28	2008-12-28

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the frequency counter.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Phoenix Liu on 2008-03-29.

Test result: Compliant.

Test Mode: Transmitting

FRS/GMRS Channel 4

Reference Frequency: 462.6375 MHz, Limit: ±2.5 ppm			
Environment Temperature (°C)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapsed**	
		MCF (MHz)	**Error (ppm)**
50	6.0	462.63805	+ 1.18
	5.1	462.63795	+ 0.97
20	6.0	462.63774	+ 0.51
	5.1	462.63762	+ 0.25
-20	6.0	462.63749	- 0.13
	5.1	462.63758	+ 0.17

FRS Channel 11

Reference Frequency: 462.6375 MHz, Limit: ±2.5 ppm			
Environment Temperature (°C)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapsed**	
		MCF (MHz)	**Error (ppm)**
50	6.0	467.63791	+ 0.87
	5.1	467.63782	+ 0.68
20	6.0	467.63775	+ 0.53
	5.1	467.63762	+ 0.25
-20	6.0	467.63761	+ 0.23
	5.1	467.63741	- 0.20

GMRS Channel 18

Reference Frequency: 462.6375 MHz, Limit: ±2.5 ppm			
Environment Temperature (°C)	**Power Supplied (Vdc)**	**Frequency Measure with Time Elapsed**	
		MCF (MHz)	**Error (ppm)**
50	6.0	462.62545	+ 0.97
	5.1	462.62538	+ 0.82
20	6.0	462.62524	+ 0.51
	5.1	462.62516	+ 0.34
-20	6.0	462.62482	- 0.39
	5.1	462.62478	- 0.48

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