



FCC PART 95

MEASUREMENT AND TEST REPORT

For

Atomic Monkey Products Ltd.

Workshop 15, 15/F, Wah Yiu Industrial Centre NO.30-32 Au Pui Wan Street, Fo Tan, N.T.,
HongKong

FCC ID: 2AB4XAMP10526

Report Type: Original Report	Product Type: WALKIE TALKIES
Test Engineer: <u>Xiangguang Kong</u> <i>Xiangguang . Kong</i>	
Report Number: <u>RSZ160329830-00</u>	
Report Date: <u>2016-04-21</u>	
Reviewed By: <u>RF Engineer</u> <i>Candy . Li</i> Candy Li	
Test Laboratory: 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 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Atomic Monkey Products Ltd.* 's product, model number: *10526*(FCC ID: *2AB4XAMP10526*) or the "EUT" in this report was a *WALKIE TALKIES*, which was measured approximately: 5.0 cm (L) x 4.0 cm (W) x13.0 cm (H), rated input voltage: DC 4.5 V (1.5V AAA*3) battery.

** All measurement and test data in this report was gathered from production sample serial number: 20160329 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2016-03-29.*

Objective

This report is prepared on behalf of *Atomic Monkey Products Ltd.* in accordance with Part 2 and Part 95, Subpart A & Subpart E 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 and Subpart E of the Federal Communication Commissions rules with TIA-603-D, Land Mobile FM or PM-Communications Equipment-Measurement and Performance Standards.

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 on 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 October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

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.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

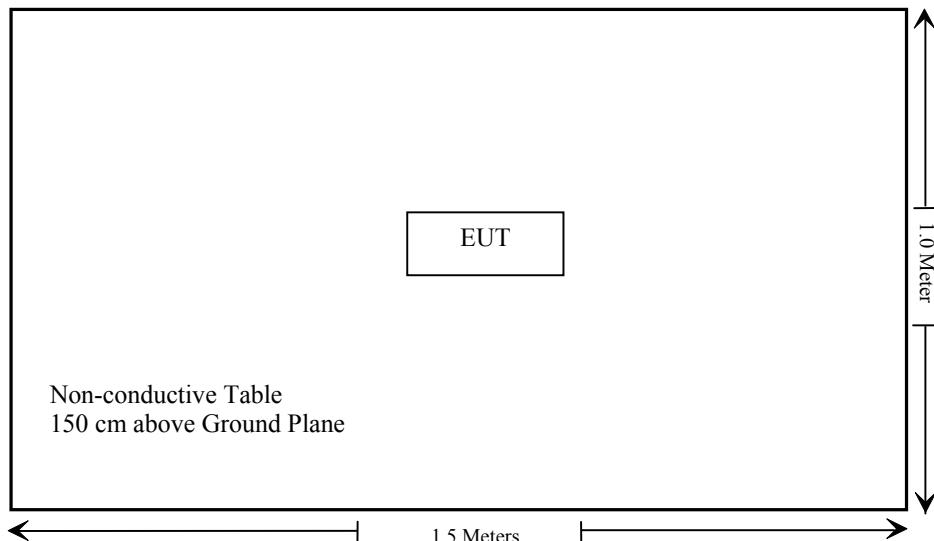
Note:

Single channel was used: GMRS 462.5875MHz

Equipment Modifications

No modification was made to the EUT tested.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§2.1046, §95.639(a),	RF Output Power	Compliance
§2.1047, §95.637(a)	Modulation Characteristic	Compliance
§2.1049, §95.633(a)	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.635(b)	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.621	Frequency Stability	Compliance

FCC §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

According to FCC §2.1093 and §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.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.

2. Power and distance are rounded to the nearest mW and mm before calculation.

3. The result is rounded to one decimal place for comparison.

4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

For worst case:

The Max Tune-up Output Power: $12\text{mW} * 50\% = 6\text{mW}$
 $(6/5) * \sqrt{0.462} = 0.8 < 3.0$

Result: No need SAR test

FCC §2.1046 & §95.639(a) - RF OUTPUT POWER

Applicable Standard

Per FCC §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 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 Equipment List and Details

Manufacturer	Description	Model NO.	Serial NO.	Calibration Date	Calibration Due Date
HP	Signal Generator	8648C	3426A01345	2015-06-09	2016-06-09
HP	Amplifier	8447E	1937A01046	2015-05-06	2016-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Com Power	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	23 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Xiangguang Kong on 2016-04-13.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Ant.		Substituted			Absolute Level (dBm)	FCC Part 95	
Frequency (MHz)	S.A. Reading (dB μ V)		Height (m)	Polar (H/V)	S.G. Level (dBm)	Ant. Gain (dBd)	Cable Loss (dB)		ERP (mW)	Limit (Watt)
GMRS 462.5875MHz										
462.5875	94.26	23	1.2	H	-2.7	0.47	0	-3.17	0.48	50
462.5875	107.87	306	1.7	V	10.9	0.47	0	10.43	11.04	50

Test Result: Compliance.

FCC §2.1047 & §95.637(a) - MODULATION CHARACTERISTIC

Applicable Standard

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 Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Due Date
HP	RF Communication Test Set	HP8920A	3438A05201	2015-06-14	2016-06-13
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Procedure

Test Method: TIA/EIA-603-D

Test Data

Environmental Conditions

Temperature:	23 °C
Relative Humidity:	50 %
ATM Pressure:	100.0 kPa

The testing was performed by Xiangguang Kong on 2014-04-13.

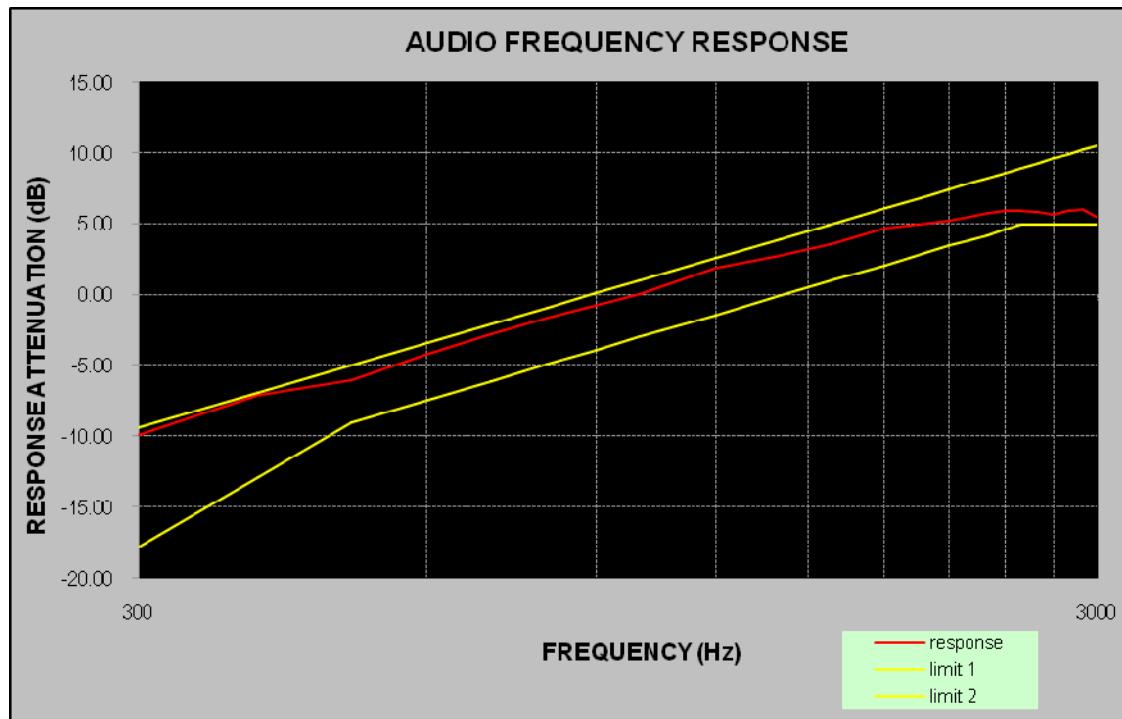
Please refer to the following tables and plots.

Test Mode: Transmitting

Audio Frequency Response

Carrier Frequency: 462.5875 MHz

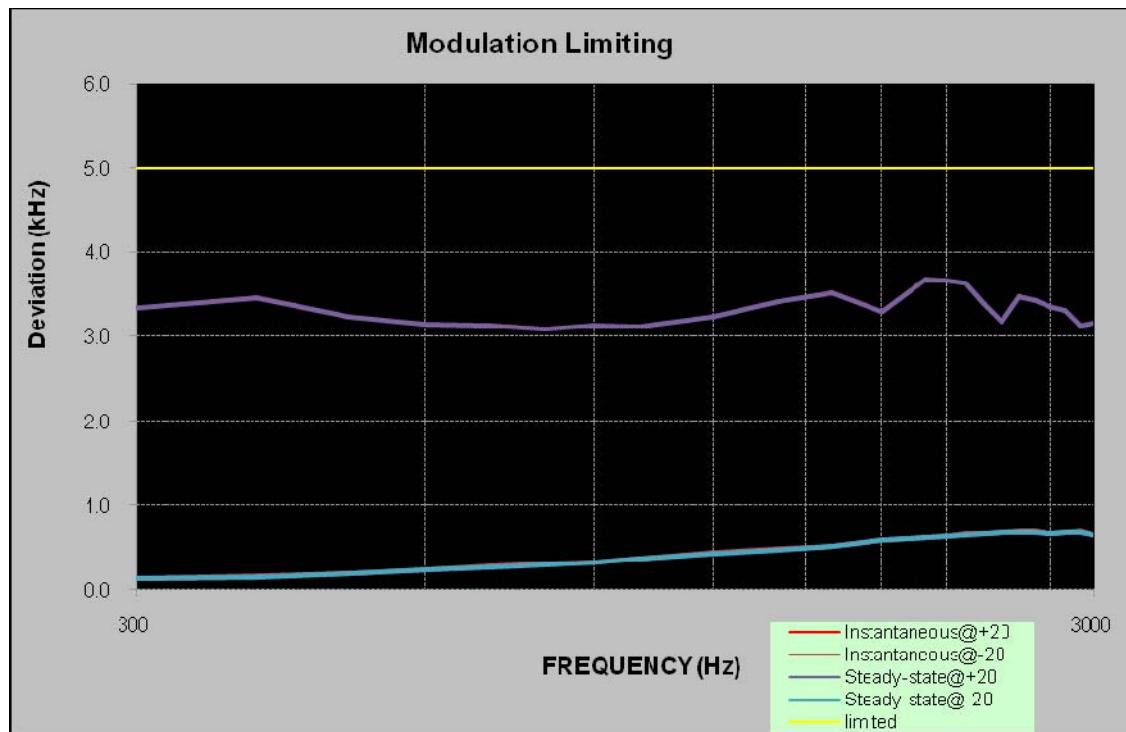
Audio Frequency (Hz)	Response Attenuation (dB)
300	-9.92
400	-7.09
500	-6.07
600	-4.17
700	-2.75
800	-1.66
900	-0.79
1000	0.00
1200	1.92
1400	2.79
1600	3.66
1800	4.72
2000	5.08
2100	5.20
2200	5.45
2300	5.76
2400	5.91
2500	5.94
2600	5.81
2700	5.70
2800	5.95
2900	5.98
3000	5.52



MODULATION LIMITING

Carrier Frequency: 462.5875MHz

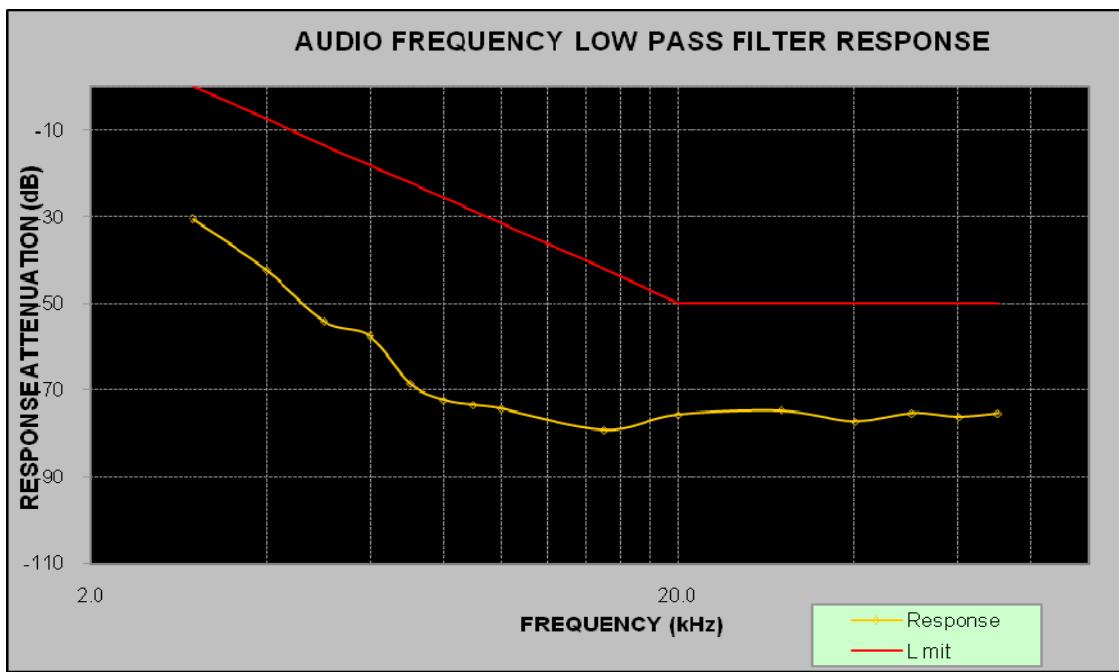
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	3.342	0.139	3.339	0.135	5.000
400	3.471	0.161	3.464	0.154	5.000
500	3.238	0.191	3.234	0.188	5.000
600	3.153	0.243	3.149	0.241	5.000
700	3.146	0.276	3.141	0.272	5.000
800	3.100	0.306	3.090	0.301	5.000
900	3.133	0.325	3.129	0.323	5.000
1000	3.124	0.369	3.121	0.367	5.000
1200	3.239	0.437	3.234	0.431	5.000
1400	3.414	0.484	3.409	0.479	5.000
1600	3.526	0.524	3.521	0.523	5.000
1800	3.293	0.598	3.290	0.593	5.000
2000	3.686	0.621	3.682	0.616	5.000
2100	3.665	0.639	3.662	0.636	5.000
2200	3.639	0.659	3.634	0.653	5.000
2300	3.391	0.667	3.386	0.665	5.000
2400	3.176	0.686	3.171	0.683	5.000
2500	3.486	0.691	3.481	0.687	5.000
2600	3.435	0.689	3.431	0.676	5.000
2700	3.356	0.666	3.351	0.661	5.000
2800	3.315	0.683	3.312	0.677	5.000
2900	3.140	0.689	3.138	0.685	5.000
3000	3.161	0.656	3.157	0.651	5.000



Audio frequency Low Pass Filter Response

Carrier Frequency: 462.5875 MHz

Audio Frequency (kHz)	Response Attenuation (dB)	FCC Limit (dB)
1.0	0.0	/
3.0	-30.5	0.0
4.0	-42.3	-7.5
5.0	-54.1	-13.3
6.0	-57.6	-18.1
7.0	-68.4	-22.1
8.0	-72.3	-25.6
9.0	-73.4	-28.6
10.0	-74.2	-31.4
15.0	-79.2	-41.9
20.0	-75.6	-50.0
30.0	-74.6	-50.0
40.0	-77.2	-50.0
50.0	-75.3	-50.0
60.0	-76.1	-50.0
70.0	-75.4	-50.0



FCC §2.1049 & §95.633(a) - AUTHOURIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.633(a), The authorized bandwidth (maximum permissible bandwidth of a transmission) for emission type H1D, J1D, R1D, H3E, J3E or R3E is 4 kHz. The authorized bandwidth for emission type A1D or A3E is 8 kHz. The authorized bandwidth for emission type F1D, G1D, F3E or G3E is 20 kHz.

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%.

Test Procedure

TIA-603-D, section 2.2.11

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	RF Communication Test Set	HP8920A	3438A05201	2015-06-14	2016-06-13
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

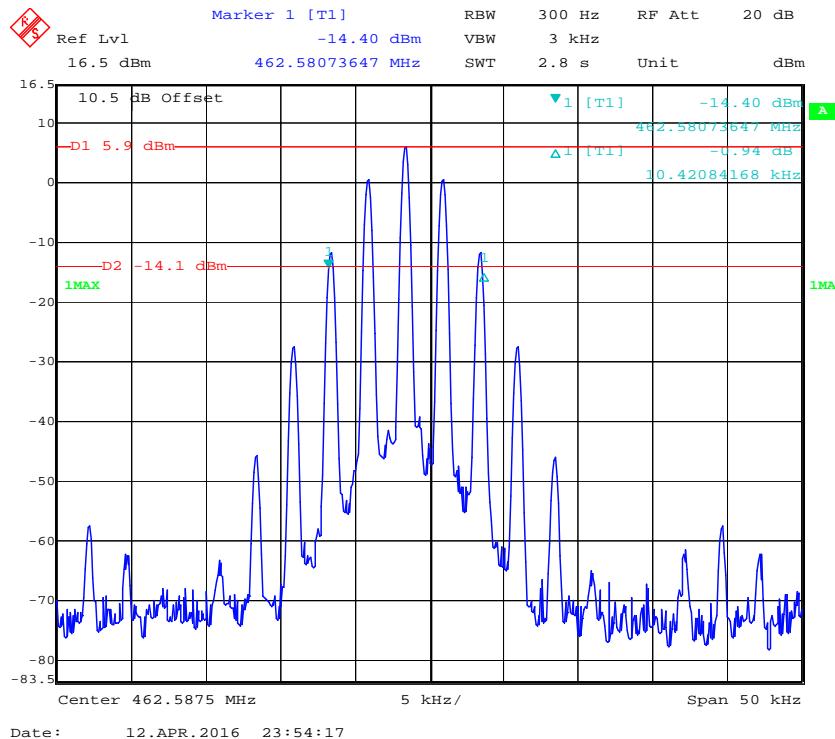
Temperature:	23~25 °C
Relative Humidity:	48~52 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Xiangguang Kong on 2016-04-12 and 2016-04-13.

Test Mode: Transmitting

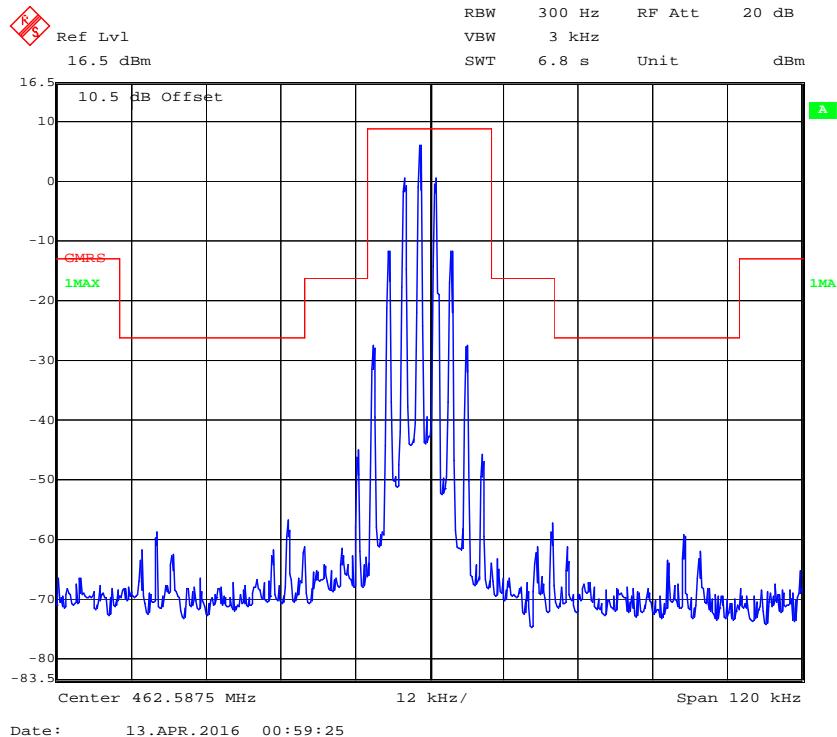
Item	Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
GMRS	462.5875	10.42	20.0	Pass

GMRS – 462.5875 MHz



Emission Mask

GMRS -462.5875 MHz



FCC §2.1053 & §95.635(b) - RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.635

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 = $10 \log_{10} (\text{TXpwr in Watts}/0.001)$ - the absolute level
Spurious attenuation limit in dB = $43 + 10 \log_{10} (\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
HP	Signal Generator	HP 8341B	2624A00116	2015-07-02	2016-07-01
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	1	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2016-04-14.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency (MHz)	Receiver Reading (dBuV)		Height (m)	Polar (H/V)	Level (dBm)	Antenna Gain	Cable Loss (dB)			
GMRS: 462.5875 MHz										
925.1750	46.70	133	1.7	H	-50.3	0.70	0	-51.00	-13	38.00
925.1750	64.13	21	1.8	V	-32.9	0.70	0	-33.60	-13	20.60
1387.7625	45.26	12	2.1	H	-63.2	1.20	6.40	-58.00	-13	45.00
1387.7625	48.13	106	1.1	V	-60.3	1.20	6.40	-55.10	-13	42.10
1850.3500	45.89	158	2.1	H	-61.5	1.40	7.30	-55.60	-13	42.60
1850.3500	50.07	182	1.6	V	-57.9	1.40	7.30	-52.00	-13	39.00
2312.9375	48.32	73	1.4	H	-55.1	1.30	8.30	-48.10	-13	35.10
2312.9375	47.21	188	1.8	V	-56.4	1.30	8.30	-49.40	-13	36.40
2775.5250	44.14	49	2.3	H	-60.3	1.60	9.40	-52.50	-13	39.50
2775.5250	45.61	256	2.2	V	-59.0	1.60	9.40	-51.20	-13	38.20
3238.1125	38.41	1	1.8	H	-63.0	1.70	9.70	-55.00	-13	42.00
3238.1125	39.32	223	1.0	V	-62.1	1.70	9.70	-54.10	-13	41.10
3700.7000	48.67	67	1.9	H	-52.6	1.80	10.00	-44.40	-13	31.40
3700.7000	47.43	265	1.7	V	-54.2	1.80	10.00	-46.00	-13	33.00
4163.2875	50.18	226	1.1	H	-51.2	2.00	9.80	-43.40	-13	30.40
4163.2875	53.87	284	1.0	V	-47.9	2.00	9.80	-40.10	-13	27.10
4625.8750	49.13	169	1.8	H	-51.3	2.10	9.90	-43.50	-13	30.50
4625.8750	50.25	143	2.2	V	-49.8	2.10	9.90	-42.00	-13	29.00

Note:

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

FCC§2.1055 (d) & §95.621 - FREQUENCY STABILITY

Applicable Standard

According to FCC §2.1055(a) (1), the frequency stability shall be measured with variation of ambient temperature from -30°C to $+50^{\circ}\text{C}$, 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 §95.621, Each GMRS transmitter for mobile station, small base station and control station operation must be maintained within a frequency tolerance of 0.0005 % (5 ppm).

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 a 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:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

The output frequency was recorded for each voltage.

Test Equipment List and Details

Manufacturer	Description	Model NO.	Serial NO.	Calibration Date	Calibration Due Date
Hewlett-Packard	Frequency Counter	5343A	2232A00827	2013-05-09	2016-05-08
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	NCR	NCR

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Data**Environmental Conditions**

Temperature:	23°C
Relative Humidity:	50%
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2016-04-13.

Test Mode: Transmitting

GMRS

Reference Frequency: 462.5875 MHz, Limit: ± 5 ppm			
Environment Temperature (°C)	Power Supplied (V _{DC})	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	4.5	462.586806	-1.500
40	4.5	462.586732	-1.660
30	4.5	462.586854	-1.396
20	4.5	462.586534	-2.088
10	4.5	462.586651	-1.835
0	4.5	462.586723	-1.680
-10	4.5	462.586902	-1.293
-20	4.5	462.586886	-1.327
-30	4.5	462.586871	-1.360
Frequency Stability Ver. Input Voltage			
20	3.8	462.586739	-1.645

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