



FCC PART 95
MEASUREMENT AND TEST REPORT

For

Kiddesigns Inc

1299 Main Street, Rahway New Jersey 07065-0901 United States

FCC ID: IAJ212

Report Type: Original Report	Product Type: XX-212 FRS 2-way Radio (Walkie Talkies)
Report Number: RSZ180102K01-00A	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Equipment Name	XX-212 FRS 2-way Radio (Walkie Talkies)
Tested Model Number	SM-212
Modulation Type	FM
Frequency Range	462.5625 MHz
Power (ERP)	3.60 dBm
Nominal Voltage Supply	DC 4.5V
External Dimension	17 cm (L) x 7 cm (W) x 3.7 cm (H)
Serial Number	180102K01
Received Date	2018-01-02

Notes: This series products model: 99-212, 99-212a, JJ-212, JW-212, MR-212, Ri-212BM, Ri-212SU, SW-212, TF-212 and SM-212 are electrically identical, the difference among them is the position of battery slot and product appearance due to marketing purpose. Model SM-212 was selected for fully testing, the detailed information can be referred to the declaration letter which was stated and guaranteed by the applicant.

Objective

This report is prepared on behalf of *Kiddesigns Inc* in accordance with Part 2 and Part 95, Subpart A & Subpart B 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, Subpart B 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 at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		uncertainty
Occupied Channel Bandwidth		±5%
RF Output Power with Power meter		±0.5dB
RF conducted test with spectrum		±1.5dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±3°C
Humidity		±6%
Supply voltages		±0.4%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 382179, the FCC Designation No.: CN5001.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

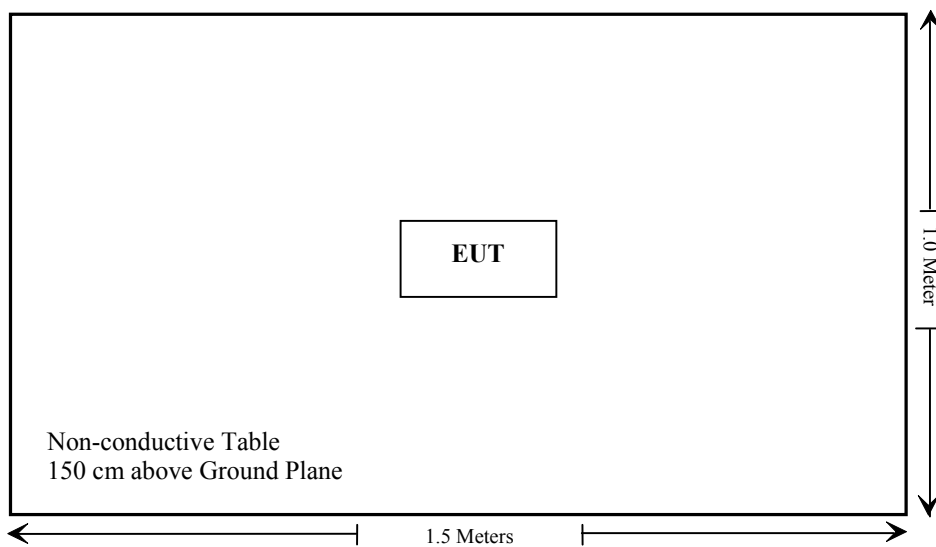
Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§2.1093	RF Exposure	Compliance
§2.1046, §95.567	RF Output Power	Compliance
§2.1047, §95.575	Modulation Characteristic	Compliance
§2.1049, §95.573, §95.579	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.579	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.565	Frequency Stability	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-29	2020-12-28
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2017-04-24	2018-04-24
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-11-19	2018-05-21
Anritsu	Signal Generator	68369B	004114	2017-12-05	2018-12-05
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2017-12-17	2020-12-16
COM POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2017-12-07	2018-12-07
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	104PEA	218124002	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	1	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	2	2017-11-22	2018-05-22
RF Conducted test					
WEINSCHEL	10dB Attenuator	5324	AU 3842	2017-11-23	2018-05-22
HP	RF Communication Test Set	HP8920A	3438A05201	N/A	N/A
N/A	notch filter	SKU 5G3	ATR0205-04-13	N/A	N/A
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-05	2018-12-05
Ducommun technologies	RF Cable	RG-214	3	2017-11-22	2018-05-22
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2017-12-21	2018-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2017-04-09	2018-04-09

* **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).

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:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 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: 4dBm=2.51mW

For PTT function, the duty cycle is 50%.

$(2.51 * 50\% / 5) * \sqrt{0.462} = 0.2 < 3.0$

Result: No need SAR test.

FCC §2.1046 & §95.567 - RF OUTPUT POWER

Applicable Standard

Per FCC §2.1046, and §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.

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:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Rocky Kang on 2018-01-11.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Ant.		Substituted			Absolute Level (dBm)	FCC Part 95	
Frequency (MHz)	S.A. Reading (dBμV)		Height (m)	Polar (H/V)	Substituted level (dBm)	Cable Loss (dB)	Ant. Gain (dB)		Limit (dBm)	Margin (dB)
FRS 462.5625MHz										
462.5625	66.24	99	1.2	H	-9.0	0.5	0	-9.50	33	42.50
462.5625	75.23	340	2.0	V	4.1	0.5	0	3.60	33	29.40

Note: The rated power is 2mW.

Test Result: Compliance.

FCC §2.1047 & §95.575 - MODULATION CHARACTERISTIC**Applicable Standard**

Per FCC §2.1047 and §95.575: 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.

Test Procedure

Test Method: TIA/EIA-603-D

Test Data**Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

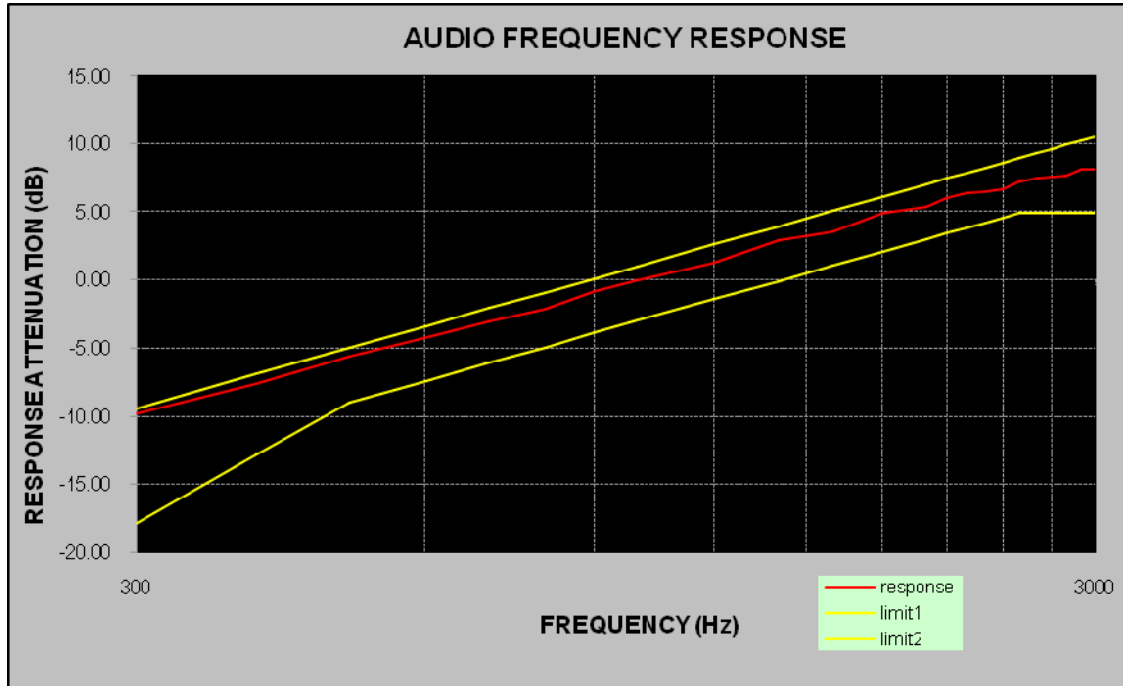
The testing was performed by Rocky Kang on 2018-01-11.

Please refer to the following tables and plots.

*Test Mode: Transmitting***Audio Frequency Response**

Carrier Frequency: 462.5625 MHz

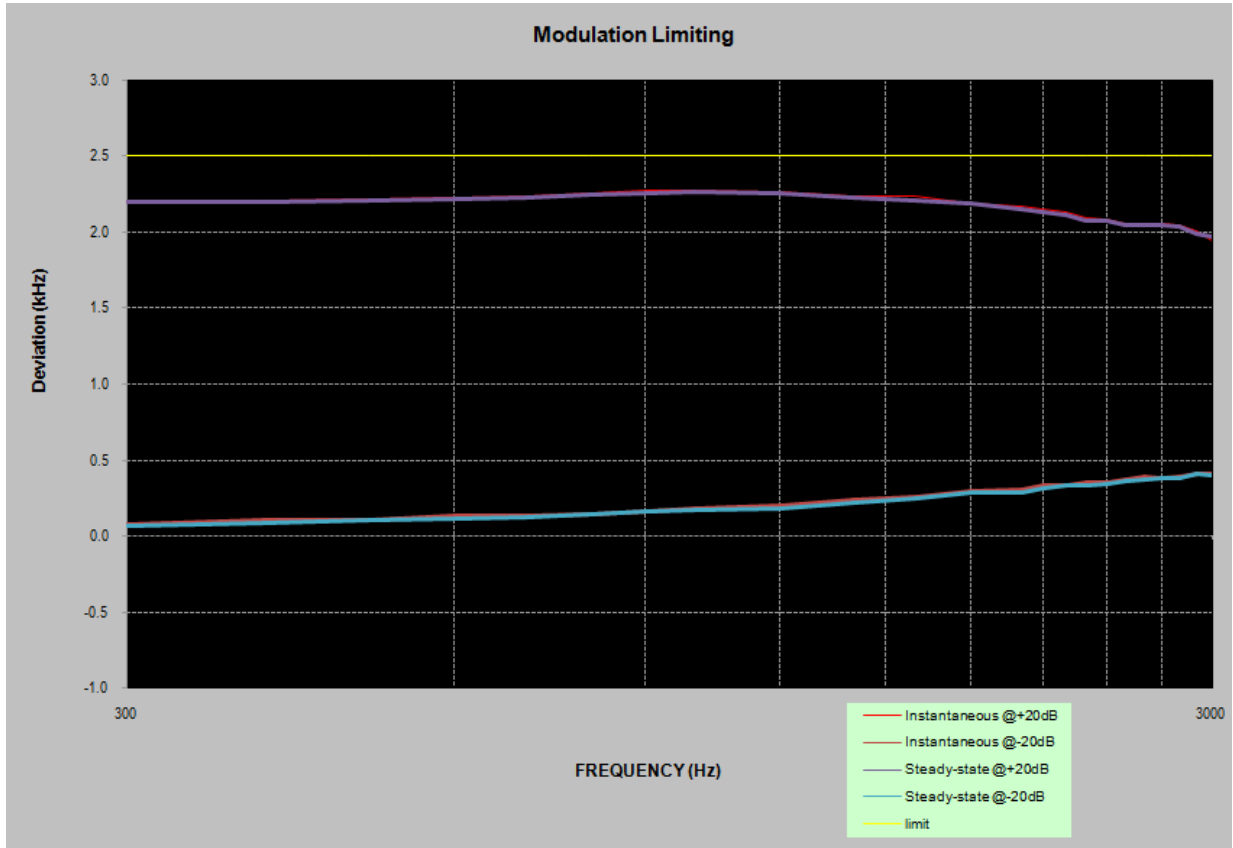
Audio Frequency (Hz)	Response Attenuation (dB)
300	-9.79
400	-7.62
500	-5.58
600	-4.24
700	-3.05
800	-2.18
900	-0.90
1000	0
1200	1.29
1400	2.86
1600	3.56
1800	4.86
2000	5.40
2100	5.98
2200	6.37
2300	6.50
2400	6.62
2500	7.17
2600	7.49
2700	7.55
2800	7.68
2900	8.08
3000	8.07



MODULATION LIMITING

Carrier Frequency: 462.5625 MHz

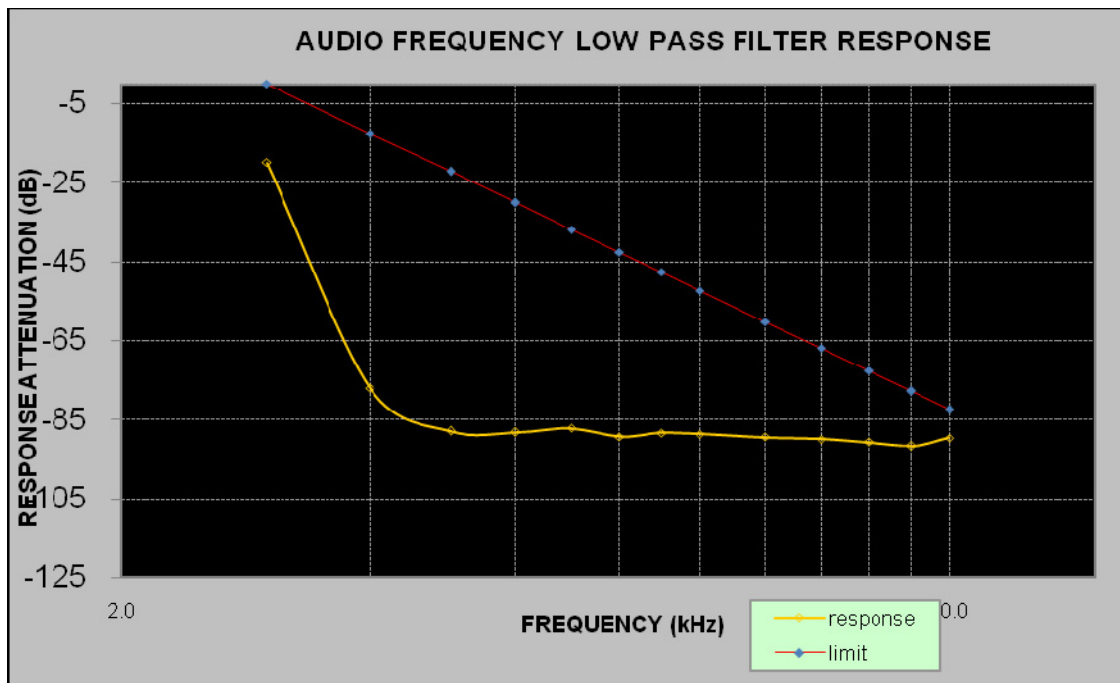
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	2.212	0.074	2.198	0.071	2.5
400	2.209	0.101	2.196	0.085	2.5
500	2.221	0.103	2.208	0.101	2.5
600	2.224	0.132	2.218	0.112	2.5
700	2.238	0.131	2.231	0.126	2.5
800	2.252	0.147	2.248	0.138	2.5
900	2.274	0.161	2.251	0.158	2.5
1000	2.278	0.181	2.262	0.174	2.5
1200	2.269	0.203	2.257	0.179	2.5
1400	2.239	0.242	2.229	0.221	2.5
1600	2.241	0.257	2.210	0.251	2.5
1800	2.193	0.298	2.185	0.285	2.5
2000	2.169	0.303	2.149	0.289	2.5
2100	2.147	0.332	2.132	0.314	2.5
2200	2.132	0.336	2.110	0.332	2.5
2300	2.098	0.352	2.075	0.333	2.5
2400	2.084	0.348	2.071	0.341	2.5
2500	2.058	0.367	2.046	0.357	2.5
2600	2.053	0.386	2.043	0.374	2.5
2700	2.054	0.383	2.042	0.377	2.5
2800	2.046	0.389	2.038	0.385	2.5
2900	2.010	0.412	1.985	0.408	2.5
3000	1.946	0.412	1.919	0.401	2.5



Audio frequency lows pass filter response

Carrier Frequency: 462.5625 MHz, Channel Separation=12.5 kHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0	/
3.0	-19.9	0
4.0	-77.1	-12.5
5.0	-87.9	-22.2
6.0	-88.2	-30.1
7.0	-87.2	-36.8
8.0	-89.3	-42.6
9.0	-88.3	-47.7
10.0	-88.7	-52.3
12.0	-89.4	-60.2
14.0	-89.9	-66.9
16.0	-90.7	-72.7
18.0	-91.7	-77.8
20.0	-89.6	-82.5



Test result: Compliance.

FCC §2.1049 & §95.573 - AUTHOURIZED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.573. Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz.

Test Procedure

TIA-603-D, section 2.2.11

Test Data

Environmental Conditions

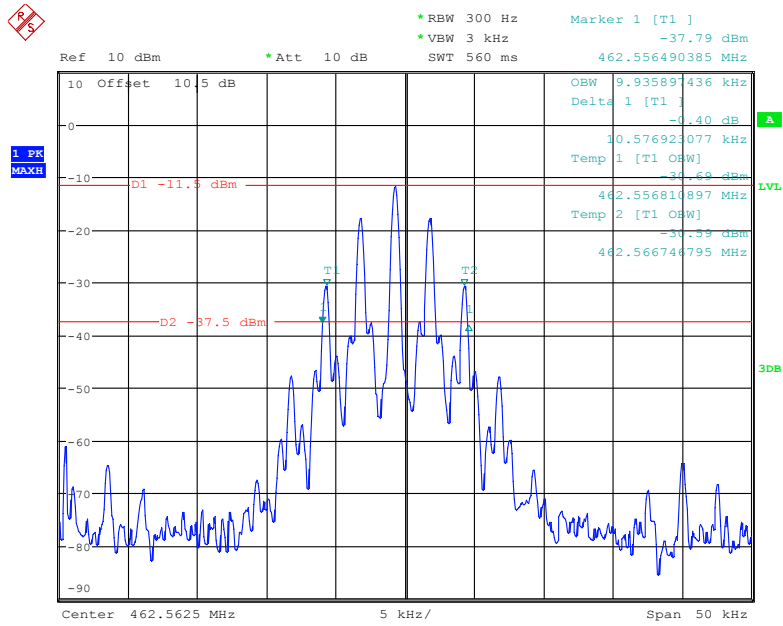
Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Rocky Kang on 2018-01-23.

Test Mode: Transmitting

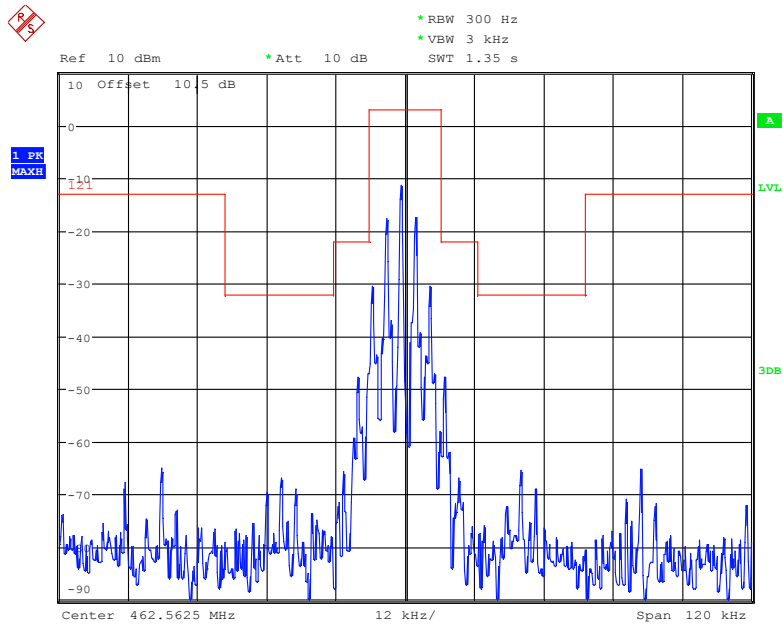
Item	Frequency (MHz)	OBW (kHz)	26 dB Bandwidth (kHz)	Limit (kHz)	Result
FRS	462.5625	9.94	10.58	12.5	Pass

OBW



Date: 23.JAN.2018 18:30:19

Emission Mask



Date: 23.JAN.2018 18:31:04

FCC §2.1053 & §95.579- RADIATED SPURIOUS EMISSION

Applicable Standard

FCC §2.1053 and §95.579. Each FRS transmitter type must be designed to satisfy the applicable unwanted emissions limits in this paragraph.

(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.

(b) *Measurement bandwidths.* The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) and (2) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency range specified in paragraph (a)(3) is measured with a reference bandwidth of at least 30 kHz.

(c) *Measurement conditions.* The requirements in this section apply to each FRS transmitter type both with and without the connection of permitted attachments, such as an external speaker, microphone and/or power cord.

Test Procedure

The transmitter was placed on a wooden 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 = $10 \lg (\text{TXpwr in Watts}/0.001)$ -the absolute level
Spurious attenuation limit in dB = $43 + 10 \text{Log}_{10} (\text{power out in Watts})$

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Rocky Kang on 2018-01-11.

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)	Cable Loss (dB)	Antenna Gain (dB)			
FRS 462.5625 MHz										
925.125	46.19	264	1.5	H	-48.8	0.28	0	-49.08	-13	36.08
925.125	61.77	64	2.3	V	-33.2	0.28	0	-33.48	-13	20.48
1387.6875	47.70	312	1.2	H	-60.3	1.60	8.30	-53.60	-13	40.60
1387.6875	51.07	220	1.2	V	-57.1	1.60	8.30	-50.40	-13	37.40
1850.25	43.08	111	1.2	H	-61.4	1.30	8.50	-54.20	-13	41.20
1850.25	42.85	349	2.3	V	-61.8	1.30	8.50	-54.60	-13	41.60

Note:

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

FCC§2.1055 (d) & §95.565 - 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 °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 §95.565, Each FRS transmitter type must be designed such that the carrier frequencies remain within ± 2.5 parts-per-million of the channel center frequencies specified in §95.563 during normal operating conditions.

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 (item 1 or item 2 will be chosen according to different condition):

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 Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Rocky Kang on 2018-01-11.

Test Mode: Transmitting

FRS

Reference Frequency: 462.5625 MHz, Limit: ±2.5 ppm			
Environment Temperature (°C)	Voltage Supplied (V_{DC})	Measurement Frequency (MHz)	Frequency Error (ppm)
Frequency Stability Ver. Temperature			
50	4.5	462.562453	-0.102
40	4.5	462.562437	-0.136
30	4.5	462.562471	-0.063
20	4.5	462.562438	-0.134
10	4.5	462.562463	-0.080
0	4.5	462.562474	-0.056
-10	4.5	462.562477	-0.050
-20	4.5	462.562437	-0.136
-30	4.5	462.562484	-0.035
Frequency Stability Ver. Input Voltage			
20	3.8	462.562463	-0.080

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