FCC PART 95

MEASUREMENT AND TEST REPORT

For

Shenzhen Jizhida Technology Co., Ltd

1902E.,BLDG.C6,HENGFENG IND. CITY,NO.739,ZHOUSHI RD.,HEZHOU COMMUNITY,BAOAN DIST.,SHENZHEN,CHINA

FCC ID: 2AQJJT20

Report Type:	**Product Type:**
Original Report	Walkie Talkie (FRS)

Report Number:	RGMA191119001-00
Report Date:	2019-12-18
Reviewed By:	Xiangguang Kong Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third 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

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Product	Walkie Talkie (FRS)
Tested Model	JT20
Multiple Models	JT20-1, KD10, RB16, RB616, JT20-2, JT20-3, JT20-4, JT20-5, JT20-6
Frequency Range	FRS: 462.5625MHz, 467.5625 MHz
Transmit Power	17.28dBm
Testing Bandwidth	9.776kHz
Modulation Technique	FM
Antenna Specification	Integrated Antenna
Voltage Range	DC 1.5V*2 AAA battery
Date of Test	2019/11/29~2019/12/17
Sample serial number	RGMA191119001-RF-S1 (Assigned by BACL Shenzhen)
Received date	2019/11/19
Sample/EUT Status	Good condition

Notes: This series products model: JT20-1, KD10, RB16, RB616, JT20-2, JT20-3, JT20-4, JT20-5, JT20-6 and JT20 are electrically identical. Model JT20 was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the manufacturer.

Objective

This report is prepared on behalf of *Shenzhen Jizhida Technology Co., Ltd* 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		±0.73dB
RF conducted test with spectrum		±1.6dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

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. : 342867,the FCC Designation No. : CN1221.

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).

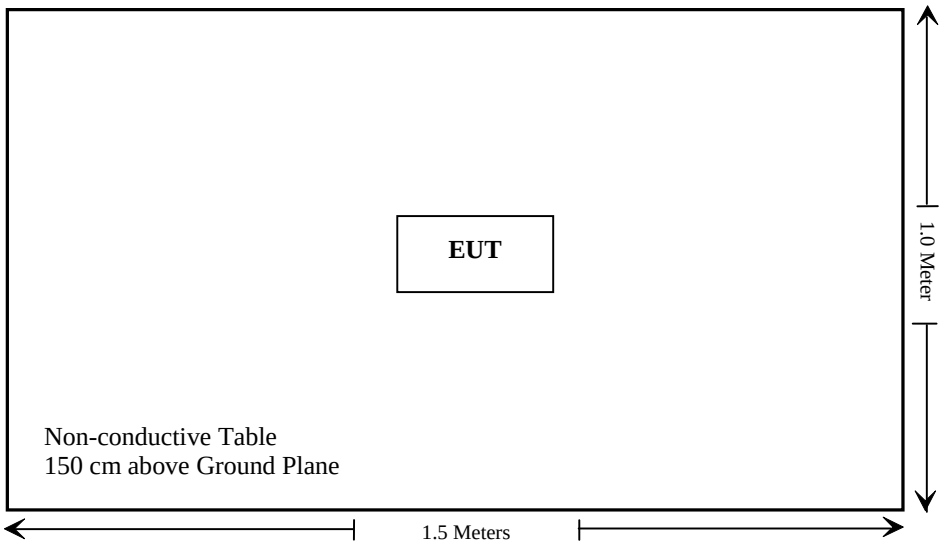
Equipment Modifications

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
§1.1307, §2.1093	RF Exposure (SAR)	Compliance*
§95.587(b)(1)	Antenna Requirement	Compliance
§2.1046, §95.567	RF Output Power	Compliance
§2.1047, §95.575	Modulation Characteristic	Compliance
§2.1049, §95.573	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.579	Spurious Radiated Emissions	Compliance
§2.1055(d), §95.565	Frequency Stability	Compliance

Compliance*: Please refer to SAR report released by BACL, report number: RGMA191119001-20A.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	SPECTRUM ANALYZER	FSV40-N	102259	2019-07-22	2020-07-21
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2019-11-29	2020-11-28
Sonoma Instrument	Amplifier	310N	186238	2019-04-20	2020-04-20
Agilent	Signal Generator	N5183A	MY51040755	2018-12-03	2019-12-03
COM POWER	Dipole Antenna	AD-100	41000	NCR	NCR
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2019-07-09	2020-07-08
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2019-11-12	2020-11-12
Ducommun Technologies	RF Cable	104PEA	218124002	2019-11-12	2020-11-12
Ducommun Technologies	RF Cable	RG-214	1	2019-11-19	2020-05-21
Ducommun technologies	RF Cable	RG-214	2	2019-11-12	2020-11-12
RF Conducted test					
WEINSCHEL	10dB Attenuator	5324	AU3842	Each Time	
HP Agilent	RF Communication Test Set	8920B	3325U00859	2019-01-15	2020-01-15
HP	Microwave frequency counter	5343A	2232A00827	2019-08-29	2022-08-29
Fluke	Digital Multimeter	287	19000011	2019-04-12	2020-04-12
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019-01-05	2020-01-05
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2019-03-02	2020-03-01
Long Wei	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Ducommun Technologies	RF Cable	RG-214	3	Each Time	

*** 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 §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RGMA191119001-20A.

FCC §95.587(b)(1) – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 95.587, (b) Antenna. The antenna of each FRS transmitter type must meet the following requirements.
(1) The antenna must be a non-removable integral part of the FRS transmitter type.

Antenna Connector Construction

The EUT has an integral antenna arrangement, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

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:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Zero Yan on 2019-11-29.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Ant.		Substituted			Absolute Level (dBm)	ERP (mW)	Limit (mw)
Frequency (MHz)	S.A. Reading (dBµV)		Height (m)	Polar (H/V)	Substituted level (dBm)	Cable Loss (dB)	Ant. Gain (dB)			
462.5625MHz										
462.5625	78.95	29	1.2	H	4.1	1.32	0.0	2.78	1.90	2000
462.5625	89.12	267	1.9	V	18.6	1.32	0.0	17.28	53.46	2000
467.5625MHz										
467.5625	78.31	294	2.1	H	2.8	1.28	0.0	1.52	1.42	500
467.5625	88.42	232	1.2	V	16.8	1.28	0.0	15.52	35.65	500

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:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang on 2019-12-03.

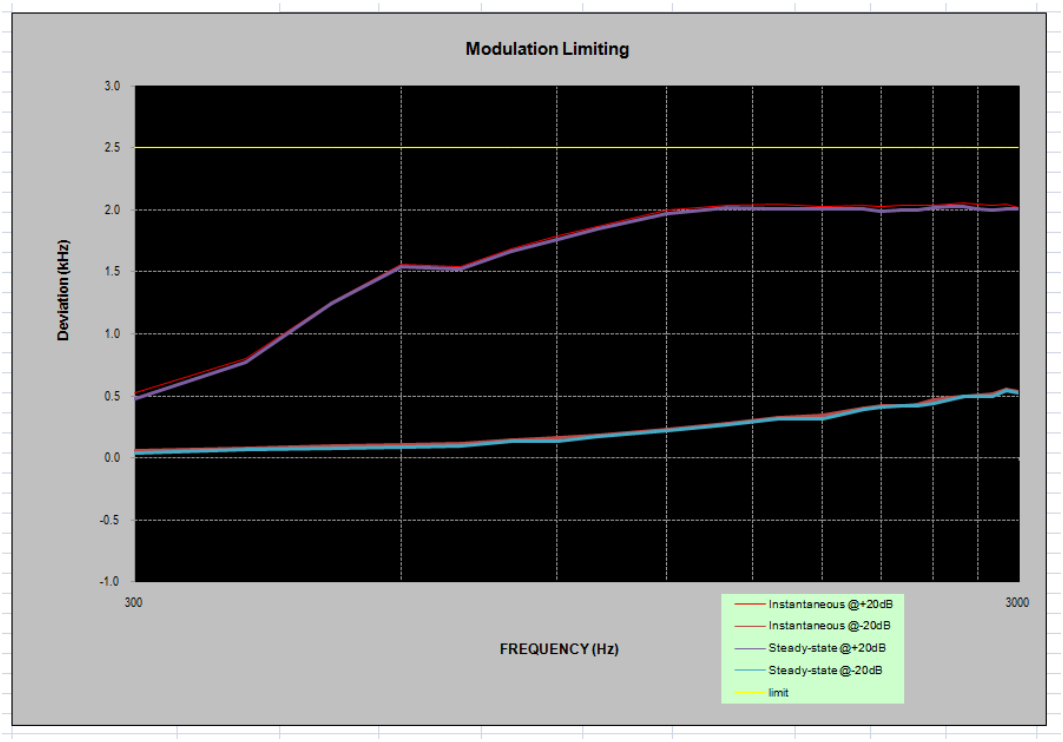
Please refer to the following tables and plots.

Test Mode: Transmitting

MODULATION LIMITING

Carrier Frequency: 462.5625MHz

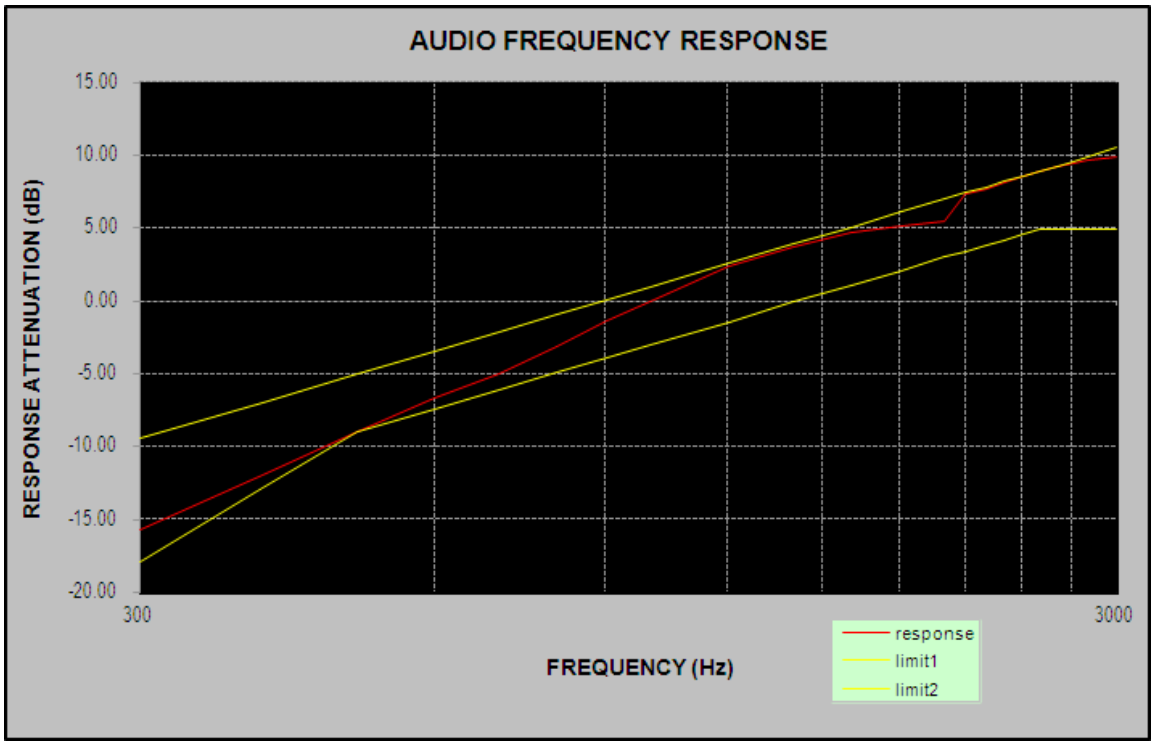
Audio Frequency (Hz)	Instantaneous		Steady-state		FCC Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	0.526	0.057	0.477	0.038	2.500
400	0.795	0.076	0.770	0.067	2.500
500	1.258	0.092	1.246	0.073	2.500
600	1.557	0.104	1.544	0.081	2.500
700	1.539	0.115	1.523	0.098	2.500
800	1.689	0.145	1.670	0.131	2.500
900	1.790	0.159	1.759	0.137	2.500
1000	1.868	0.184	1.844	0.171	2.500
1200	1.998	0.230	1.971	0.219	2.500
1400	2.038	0.275	2.015	0.267	2.500
1600	2.046	0.320	2.005	0.310	2.500
1800	2.031	0.339	2.006	0.315	2.500
2000	2.038	0.398	2.012	0.386	2.500
2100	2.024	0.415	1.992	0.410	2.500
2200	2.034	0.423	1.995	0.416	2.500
2300	2.032	0.428	2.000	0.423	2.500
2400	2.038	0.462	2.017	0.437	2.500
2500	2.042	0.483	2.026	0.462	2.500
2600	2.053	0.494	2.022	0.491	2.500
2700	2.043	0.502	2.007	0.492	2.500
2800	2.038	0.513	1.995	0.497	2.500
2900	2.042	0.548	2.009	0.539	2.500
3000	2.021	0.533	2.007	0.525	2.500


Modulation Limiting
Deviation (kHz)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
300
3000
FREQUENCY (Hz)
Instantaneous @+20dB
Instantaneous @-20dB
Steady-state @+20dB
Steady-state @-20dB
limit

Audio Frequency Response

Carrier Frequency: 462.5625 MHz

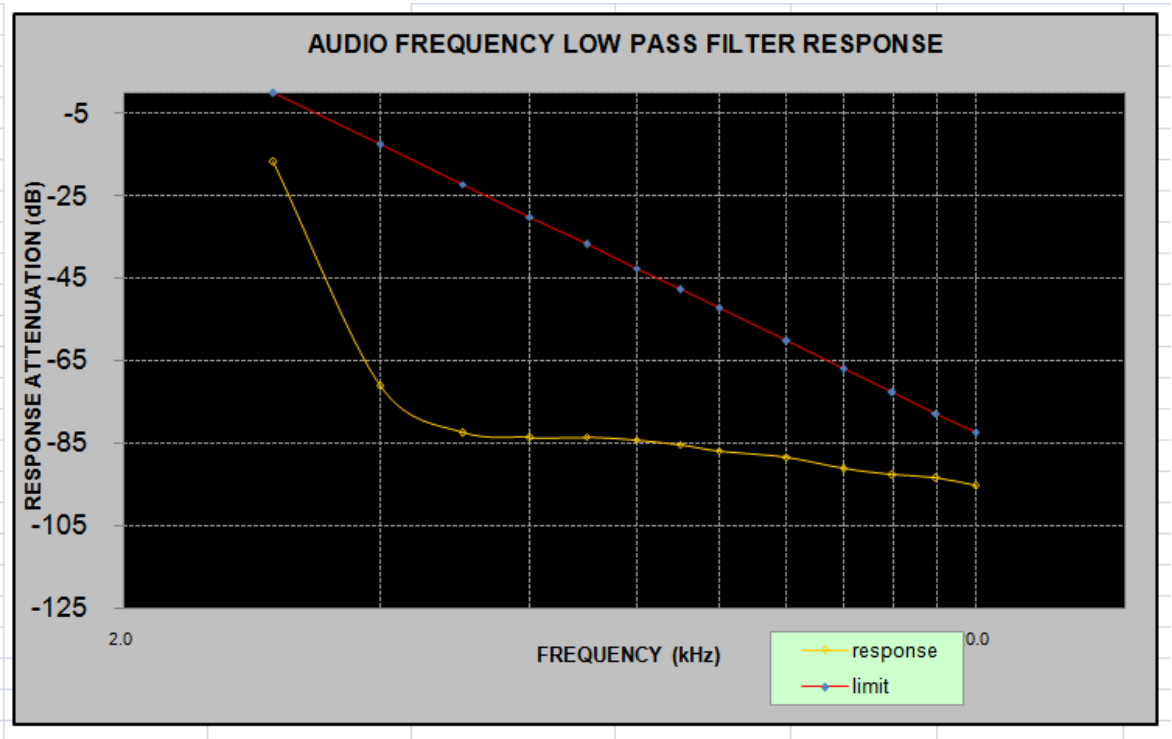
Audio Frequency (Hz)	Response Attenuation (dB)
300	-15.70
400	-11.97
500	-8.97
600	-6.60
700	-5.01
800	-3.12
900	-1.35
1000	0
1200	2.44
1400	3.71
1600	4.67
1800	5.13
2000	5.46
2100	7.35
2200	7.72
2300	8.14
2400	8.56
2500	8.86
2600	9.25
2700	9.44
2800	9.68
2900	9.75
3000	9.93


AUDIO FREQUENCY RESPONSE
RESPONSE ATTENUATION (dB)
15.00
10.00
5.00
0.00
-5.00
-10.00
-15.00
-20.00
300
3000
FREQUENCY (Hz)
response
limit1
limit2

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	0.0	/
3.0	-16.7	0.0
4.0	-71.2	-12.5
5.0	-82.4	-22.2
6.0	-83.6	-30.1
7.0	-83.5	-36.8
8.0	-84.2	-42.6
9.0	-85.3	-47.7
10.0	-86.8	-52.3
12.0	-88.3	-60.2
14.0	-91.2	-66.9
16.0	-92.6	-72.7
18.0	-93.5	-77.8
20.0	-95.4	-82.5



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:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang on 2019-12-17.

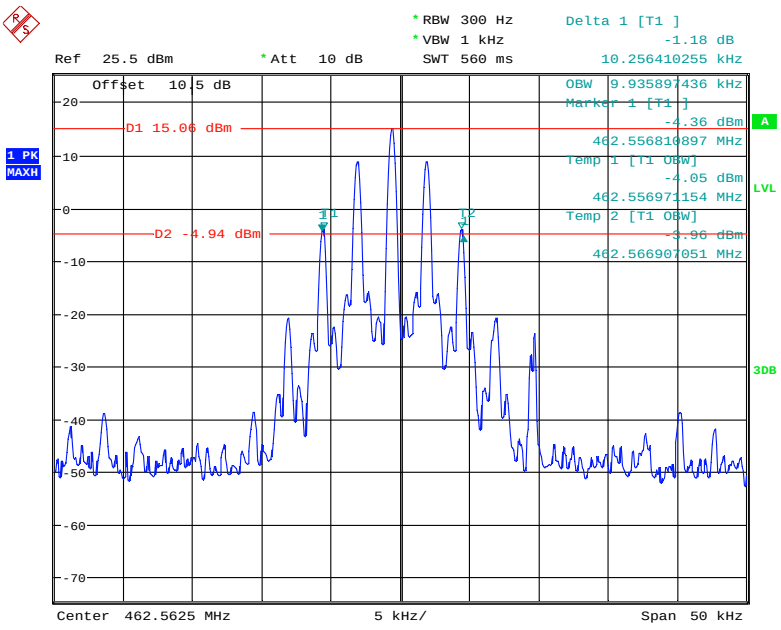
Test Mode: Transmitting

Frequency (MHz)	OBW (kHz)	Limit (kHz)	Result
462.5625	9.936	12.5	Pass
467.5625	9.936	12.5	Pass

Emission Designator Per CFR 47 §2.201& §2.202&, Bn = 2M + 2D:

Emission Designator 11K0F3E In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation. BW = 2(M+D) = 2*(3.0 kHz + 2.5 kHz) = 11 kHz → 11K0
F3E portion of the designator represents an FM voice transmission Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

OBW, 462.5265 MHz



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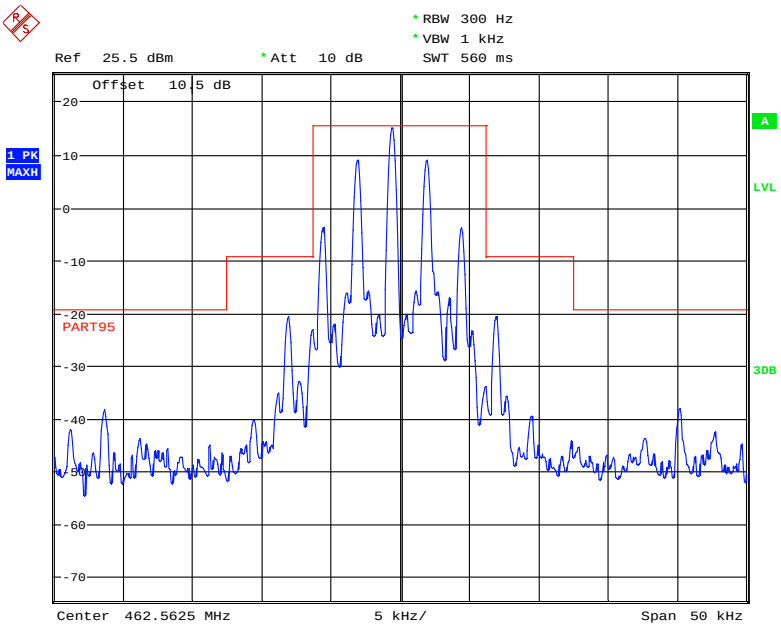
Emission Mask, 462.5265 MHz



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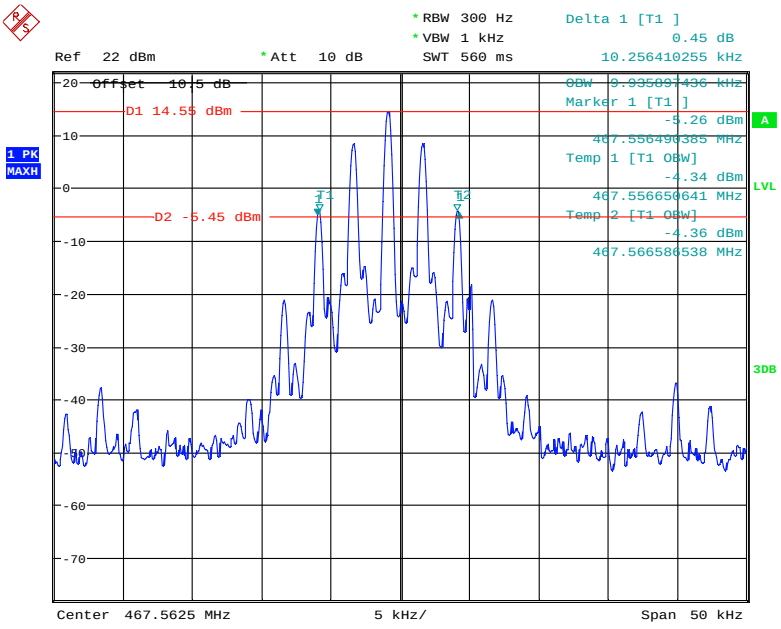
OBW, 467-5625 MHz



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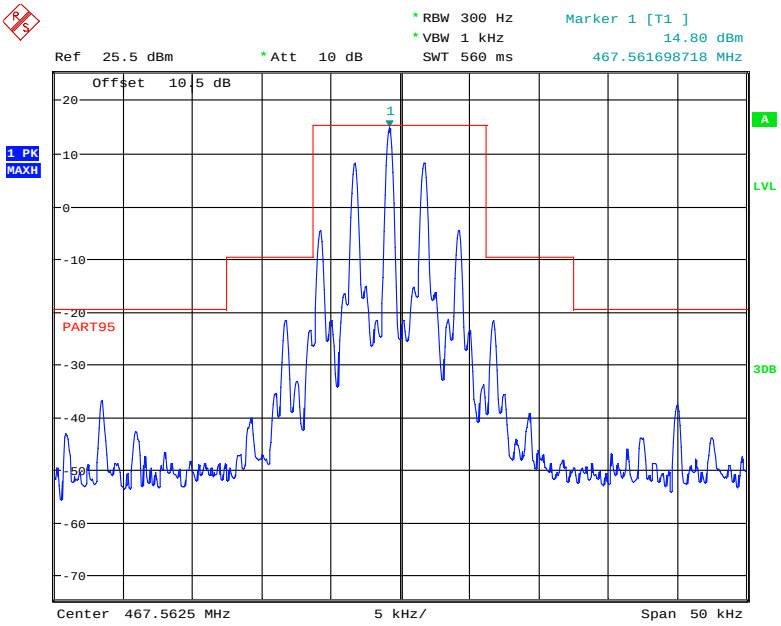
Emission Mask, 467.5625 MHz



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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 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:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Curry Xiang on 2019-11-29.

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 462.5625MHz										
925.125	50.45	222	1.0	H	-47.8	1.09	0.0	-48.89	-13	35.89
925.125	57.90	352	1.4	V	-38.1	1.09	0.0	-39.19	-13	26.19
1387.69	54.83	111	1.6	H	-53.3	1.60	7.90	-47.00	-13	34.0
1387.69	57.94	172	1.6	V	-50.5	1.60	7.90	-44.20	-13	31.2
1850.25	65.50	348	2.3	H	-37.6	1.30	9.40	-29.50	-13	16.5
1850.25	66.44	38	1.6	V	-36.9	1.30	9.40	-28.80	-13	15.8
2312.81	72.60	141	1.6	H	-32.7	1.30	10.00	-24.00	-13	11.0
2312.81	75.54	237	1.3	V	-29.6	1.30	10.00	-20.90	-13	7.9
2775.38	63.55	331	1.5	H	-40.4	1.80	10.50	-31.70	-13	18.7
2775.38	67.09	304	2.5	V	-36.5	1.80	10.50	-27.80	-13	14.8
3237.94	52.84	157	1.9	H	-47.8	1.60	11.50	-37.90	-13	24.9
3237.94	57.08	280	2.1	V	-43.8	1.60	11.50	-33.90	-13	20.9
3700.50	50.06	5	1.9	H	-52.0	1.60	11.90	-41.70	-13	28.7
3700.50	52.56	252	1.4	V	-48.9	1.60	11.90	-38.60	-13	25.6
4163.06	52.10	178	1.9	H	-49.8	1.50	11.80	-39.50	-13	26.5
4163.06	55.12	199	1.5	V	-46.0	1.50	11.80	-35.70	-13	22.7
4625.63	50.14	308	2.2	H	-50.8	1.60	12.00	-40.40	-13	27.4
4625.63	52.53	204	1.6	V	-47.2	1.60	12.00	-36.80	-13	23.8
FRS 467.5625MHz										
935.125	52.39	339	2.3	H	-47.6	1.08	0.0	-48.68	-13	35.68
935.125	65.19	227	2.3	V	-32.6	1.08	0.0	-33.68	-13	20.68
1402.69	58.33	254	2.3	H	-49.8	1.60	7.90	-43.5	-13	30.5
1402.69	57.66	353	1.9	V	-50.8	1.60	7.90	-44.5	-13	31.5
1870.25	43.99	134	1.6	H	-59.1	1.30	9.40	-51.0	-13	38.0
1870.25	43.41	248	2.4	V	-59.9	1.30	9.40	-51.8	-13	38.8
2337.81	78.92	191	1.4	H	-26.4	1.30	10.00	-17.7	-13	4.7
2337.81	78.66	306	1.1	V	-26.5	1.30	10.00	-17.8	-13	4.8
2805.38	73.51	235	1.8	H	-30.4	1.80	10.50	-21.7	-13	8.7
2805.38	75.83	6	1.2	V	-27.8	1.80	10.50	-19.1	-13	6.1
3272.94	53.67	149	1.5	H	-47.2	1.50	11.70	-37	-13	24
3272.94	54.10	185	1.6	V	-46.8	1.50	11.70	-36.6	-13	23.6
3740.50	62.98	63	1.9	H	-39.1	1.60	11.90	-28.8	-13	15.8
3740.50	65.08	187	1.6	V	-36.4	1.60	11.90	-26.1	-13	13.1
4208.06	60.65	204	1.2	H	-41.3	1.50	11.80	-31	-13	18
4208.06	57.12	258	1.8	V	-44.0	1.50	11.80	-33.7	-13	20.7
4675.63	55.53	359	2.0	H	-45.3	1.70	12.00	-35	-13	22
4675.63	57.17	326	2.4	V	-42.0	1.70	12.00	-31.7	-13	18.7

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2: Absolute Level = SG Level - Cable loss + Antenna Gain
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 ºC to +50 ºC, 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 1or 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:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang on 2019-12-03.

Test Mode: Transmitting

FRS

Reference Frequency: 462.5625 MHz, Limit: ±2.5 ppm			
Environment Temperature (℃)	**Power Supplied (V_{DC})**	**Measurement Frequency (MHz)**	**Frequency Error (ppm)**
Frequency Stability Ver. Temperature			
50	3	462.562512	0.026
40	3	462.562535	0.076
30	3	462.562547	0.102
20	3	462.562523	0.050
10	3	462.562534	0.074
0	3	462.562527	0.058
-10	3	462.562518	0.039
-20	3	462.562530	0.065
-30	3	462.562527	0.058
Frequency Stability Ver. Input Voltage			
20	2.5	462.562531	0.067

Reference Frequency: 467.5625 MHz, Limit: ±2.5 ppm			
Environment Temperature (℃)	**Power Supplied (V_{DC})**	**Measurement Frequency (MHz)**	**Frequency Error (ppm)**
Frequency Stability Ver. Temperature			
50	3	467.562524	0.051
40	3	467.562527	0.058
30	3	467.562532	0.068
20	3	467.562554	0.115
10	3	467.562536	0.077
0	3	467.562495	-0.011
-10	3	467.562521	0.045
-20	3	467.562487	-0.028
-30	3	467.562547	0.101
Frequency Stability Ver. Input Voltage			
20	2.5	467.562612	0.240

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