

FCC Test Report

Report No.: RWAZ202300073A

Applicant: Kiddesigns Inc

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

Product Name: XX-207, XX-212 Walkie talkies

Product Model: SW-207DS.EXv23

Multiple Models: TM-212.EXv23MTG

Trade Mark: N/A

FCC ID: IAJ202C10A

Standards: FCC PART 95

Test Date: 2024-01-04 to 2024-02-01

Test Result: Complied

Report Date: 2024/02/05

Reviewed by:

Frank Yin

Frank Yin
Project Engineer

Approved by:

Jacob Kong

Jacob Kong
Manager

Prepared by:

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Revision History

Version No.	Issued Date	Description
00	2024-02-05	Original

Contents

1	General Information	4
1.1	Client Information	4
1.2	Product Description of EUT	4
1.3	Antenna information	4
1.4	Measurement Uncertainty	5
1.5	Laboratory Location.....	5
1.6	Test Methodology	5
2	Description of Measurement.....	6
2.1	Test Configuration.....	6
2.2	Test Auxiliary Equipment	6
2.3	Test Setup.....	7
2.4	Test Procedure	9
2.5	Measurement Method.....	9
2.6	Measurement Equipment	10
3	Test Results	11
3.1	Test Summary.....	11
3.2	Limit Required	12
3.3	RF OUTPUT POWER	13
3.4	Modulation Limit	14
3.5	Audio Frequency Response	16
3.6	Audio Frequency Low Pass Filter Response	18
3.7	Authorized bandwidth and emission mask.....	19
3.8	Radiated spurious emission	20
3.9	Frequency stability.....	22
4	FCC §95.587 FRS Additional Requirements	23
5	Test Setup Photo	24
6	E.U.T Photo	25

1 General Information

1.1 Client Information

Applicant:	Kiddesigns Inc
Address:	1299 Main Street, Rahway New Jersey,United States,07065-0901
Manufacturer:	Kiddesigns Inc
Address:	1299 Main Street, Rahway New Jersey,United States,07065-0901

1.2 Product Description of EUT

Sample Serial Number	Model SW-207DS.EXv23: 3D-2 for RE test, 3D-1 for RF test conducted test; Model TM-212.EXv23MTG: 3D-3 for RE test (assigned by WATC)
Sample Received Date	2023/12/23
Sample Status	Good Condition
Frequency Range	467.6125MHz
ERP Power	9.52dBm
Modulation Technology	FM
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain [#]	-4dBi
Power Supply	Model SW-207DS.EXv23: DC 3V from battery Model TM-212.EXv23MTG: DC 4.5V from battery
Voltage Range:	Model SW-207DS.EXv23: 2.5-3V _{DC} Model TM-212.EXv23MTG: 2.5-4.5V _{DC}
Operating temperature [#]	-20 deg.C to +50 deg.C
Adapter Information	N/A
Modification	Sample No Modification by the test lab

1.3 Antenna information

95.587 (b) requirement: (1)Click to open paragraph tools The antenna must be a non-removable integral part of the FRS transmitter type. (2) The gain of the antenna must not exceed that of a half-wave dipole antenna. (3) The antenna must be designed such that the electric field of the emitted waves is vertically polarized when the unit is operated in the normal orientation.	
Device Antenna information:	
EUT has a non-removable integral vertically ploarized antenna arrangement and the antenna gain is -4dBi (-6.15dBd), please see product EUT photos for details.	

1.4 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Emissions, Radiated	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Conducted Power		0.74dB
Frequency Error		150 Hz
Bandwidth		0.34%
Audio Frequency Response/Low Pass Filter Response		4.04%
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.		

1.5 Laboratory Location

World Alliance Testing and Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.6 Test Methodology

FCC CFR 47 Part 2, General rules and regulations

FCC CFR 47 Part 95, Personal Radio Services

ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

ANSI/TIA 603-E-2016, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards

KDB 888861 D01, Part 95 GMRS FRS v01

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
10	467.6125	/	/	/	/
According to Per C63.26-2015, section 5.1, Channel 10 was selected to test					

Test Mode:	
Transmitting mode:	Keep the EUT in continuous transmitting

Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report

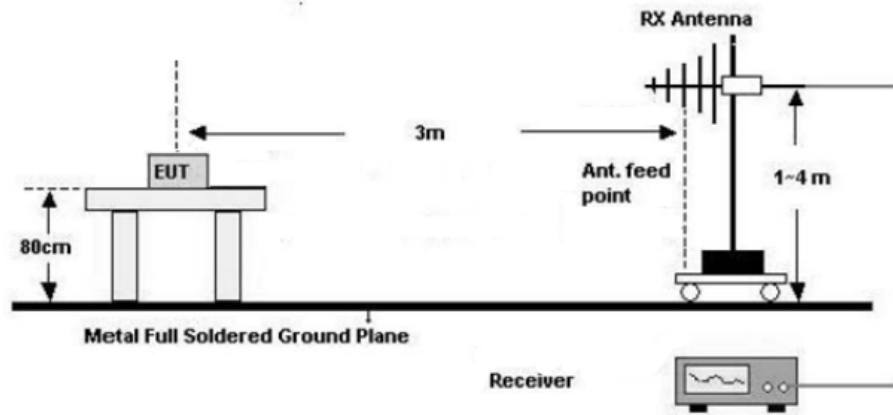
2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
UNI-T	DC power supply	UTP1310S	Unknown

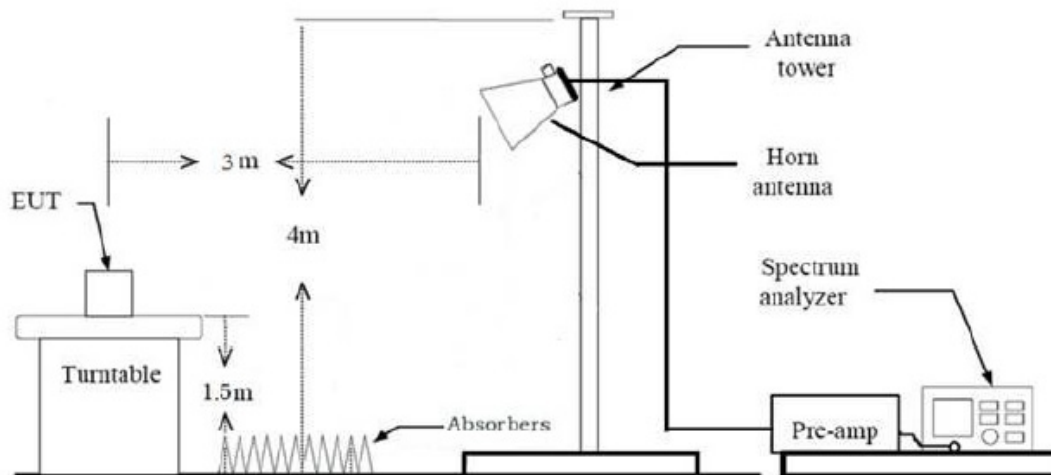
2.3 Test Setup

1) Radiated emission measurement:

0MHz-1GHz (3m SAC)

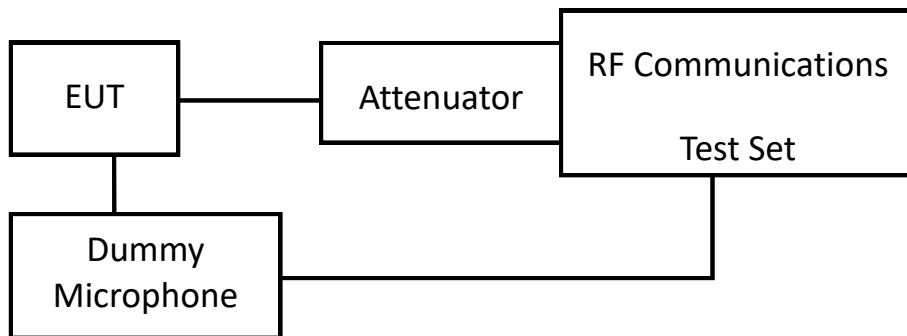


1GHz-5GHz(3m FAC)

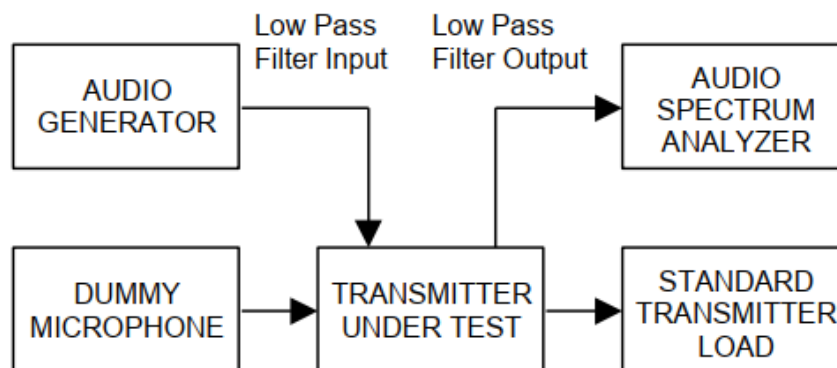


2) RF Conducted Test

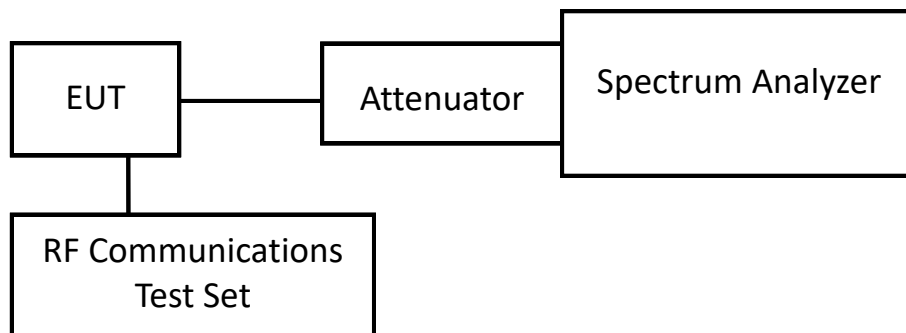
For Modulation Limiting/Audio Frequency Response test



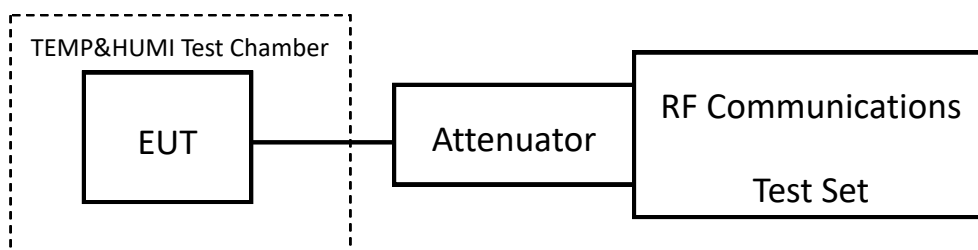
For Audio frequency filter test



For Authorized Bandwidth and Emission Mask test



For Frequency Stability test



2.4 Test Procedure

Radiated Emission Procedure:

a) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

b) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-5GHz).
2. EUT works in each mode of operation that needs to be tested, and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment through Attenuator and RF cable.
2. The cable assembly insertion loss of 10.5dB (including 10dB Attenuator and 0.5dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 0.5dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode.

2.5 Measurement Method

Description of Test	Measurement Method
RF Output Power	Per FCC §2.1046 and ANSI C63.26-2015 §5.2.7
Modulation Limit	Per FCC §2.1047 and ANSI/TIA-603-E-2016 §2.2.3, 2.2.6, 2.2.15
Audio Frequency Response	ANSI/TIA-603-E-2016 §2.2.6
Authorized Bandwidth & Emission Mask	Per FCC §2.1049 and ANSI C63.26-2015 §5.4
Radiated Spurious Emission	Per FCC §2.1053 and ANSI C63.26-2015 §5.5
Frequency Stability	Per FCC §2.1055(d) and ANSI C63.26-2015 §5.6

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2023/7/3	2024/7/2
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2023/7/3	2024/7/2
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2023/7/12	2024/7/11
COM-POWER	preamplifier	PAM-118A	18040152	2023/8/21	2024/8/20
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2024/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2024/7/5
N/A	Coaxial Cable	N/A	NO.9	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.10	2023/8/8	2024/8/7
N/A	Coaxial Cable	N/A	NO.11	2023/8/8	2024/8/7
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2023/7/12	2024/7/11
MARCONI	10dB Attenuator	1692595	2942	2023/10/25	2024/10/24
BACL	TEMP&HUMI Test Chamber	BTH-150	30022	2023/7/12	2024/7/11
FLUKE	Digital Multimeter	15B+	N/A	2023/7/12	2024/7/11
HP	RF communication test set	HP8920A	T-01-EM046	2023/7/12	2024/7/11

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

FCC Rules	Description of Test	Result
§2.1046, §95.567	RF Output Power	Compliance
§2.1047, §95.575	Modulation Limit	Compliance
§2.1047, §95.575	Audio Frequency Response	Compliance
§2.1049, §95.573, §95.579	Authorized Bandwidth & Emission Mask	Compliance
§2.1053, §95.579	Radiated Spurious Emission	Compliance
§2.1055(d), §95.565	Frequency Stability	Compliance
§95.587	FRS additional requirements	Compliance

3.2 Limit Required

Test items	Limit
RF output power	See details §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.
Modulation Limit Audio Frequency Response	See details §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.
Authorized bandwidth and emission mask	See details §95.573 Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz. See details §95.579 (a) Click to open paragraph tools 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.
Radiated Spurious Emission	See details §95.579 (a) Click to open paragraph tools 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.
Frequency stability	See details §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.

3.3 RF OUTPUT POWER

Test Date:	2024-1-4	Test By:	Bard Huang
Environment condition:	Temperature: 24.7°C; Relative Humidity:54%; ATM Pressure: 101.0kPa		

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	EIRP CF	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Remark
467.6125MHz										
Model SW-207DS.EXv23										
467.6125	96.56	Horizontal	-8.09	88.47	-95.2	-6.73	-8.88	27	-35.88	Peak
467.6125	114.96	Vertical	-8.09	106.87	-95.2	11.67	9.52	27	-17.48	Peak
Model TM-212.EXv23MTG										
467.6125	94.76	Horizontal	-8.09	86.67	-95.2	-8.53	-10.68	27	-37.68	Peak
467.6125	112.16	Vertical	-8.09	104.07	-95.2	8.87	6.72	27	-20.28	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = ERP – Limit

ERP=EIRP-2.15

According to ANSI C63.26-2.15 section 5.2.7:

$EIRP (dBm) = E (dBμV/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

Test was performed on 3meters distance, so

Result = Corrected Amplitude + $20\log(3) - 104.8$

= Corrected Amplitude - 95.2

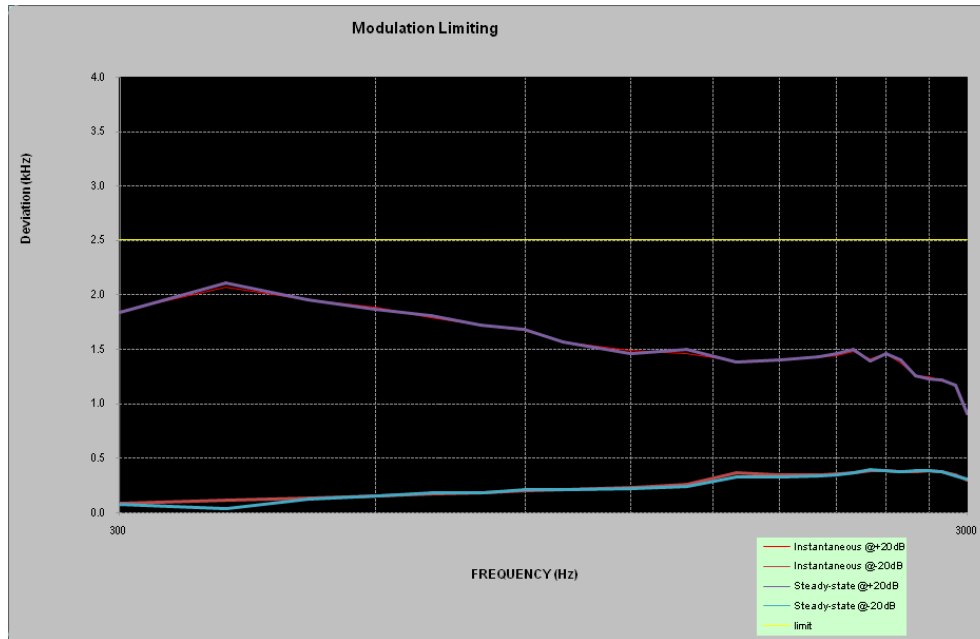
3.4 Modulation Limit

Test Date:	2024-02-01	Test By:	Baylor Li
Environment condition:	Temperature: 25.5°C; Relative Humidity:49%; ATM Pressure: 101.0kPa		

MODULATION LIMITING

Carrier Frequency: 467.6125MHz

Audio Frequency (Hz)	Instantaneous		Steady-state		Limit [kHz]
	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	DEVIATION (@+20dB) [kHz]	DEVIATION (@-20dB) [kHz]	
300	1.849	0.082	1.833	0.077	2.500
400	2.072	0.110	2.106	0.030	2.500
500	1.952	0.134	1.948	0.124	2.500
600	1.882	0.149	1.863	0.153	2.500
700	1.785	0.173	1.804	0.177	2.500
800	1.721	0.175	1.716	0.179	2.500
900	1.668	0.198	1.679	0.205	2.500
1000	1.563	0.210	1.566	0.211	2.500
1200	1.484	0.225	1.459	0.219	2.500
1400	1.461	0.254	1.497	0.233	2.500
1600	1.385	0.360	1.384	0.326	2.500
1800	1.399	0.342	1.400	0.327	2.500
2000	1.426	0.341	1.432	0.333	2.500
2100	1.435	0.351	1.455	0.345	2.500
2200	1.475	0.364	1.501	0.368	2.500
2300	1.412	0.384	1.394	0.389	2.500
2400	1.459	0.382	1.458	0.383	2.500
2500	1.370	0.375	1.399	0.369	2.500
2600	1.255	0.373	1.256	0.380	2.500
2700	1.242	0.378	1.226	0.384	2.500
2800	1.205	0.372	1.215	0.375	2.500
2900	1.181	0.340	1.163	0.330	2.500
3000	0.897	0.298	0.904	0.301	2.500

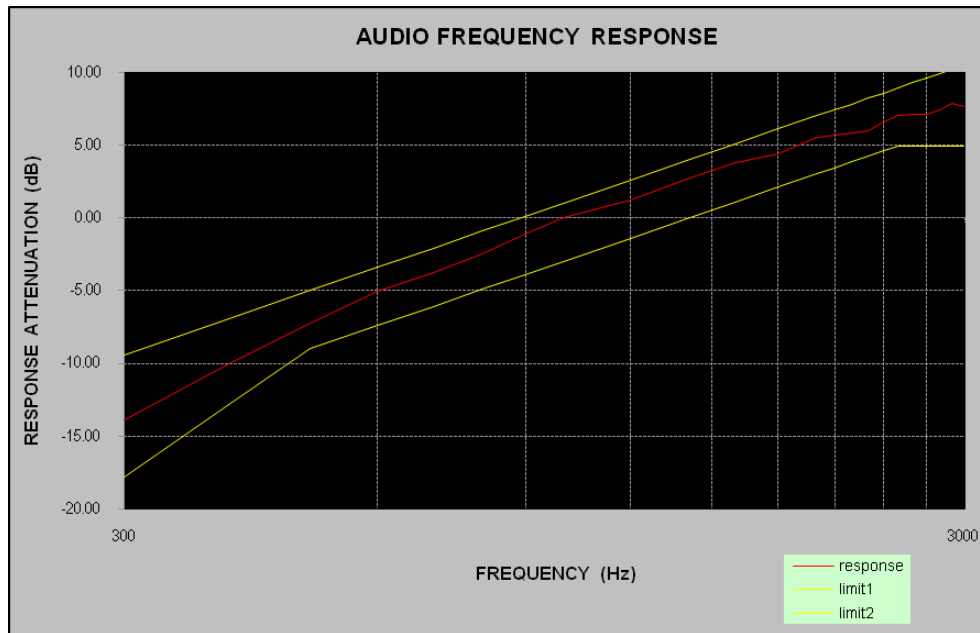


3.5 Audio Frequency Response

Test Date:	2024-02-01	Test By:	Baylor Li
Environment condition:	Temperature: 25.5°C; Relative Humidity:49%; ATM Pressure: 101.0kPa		

Carrier Frequency: 467.6125MHz

Audio Frequency (Hz)	Response Attenuation (dB)
300	-13.89
400	-10.06
500	-7.25
600	-5.07
700	-3.77
800	-2.52
900	-1.13
1000	0.00
1200	1.18
1400	2.65
1600	3.78
1800	4.37
2000	5.51
2100	5.69
2200	5.79
2300	6.01
2400	6.59
2500	7.00
2600	7.12
2700	7.12
2800	7.44
2900	7.89
3000	7.65

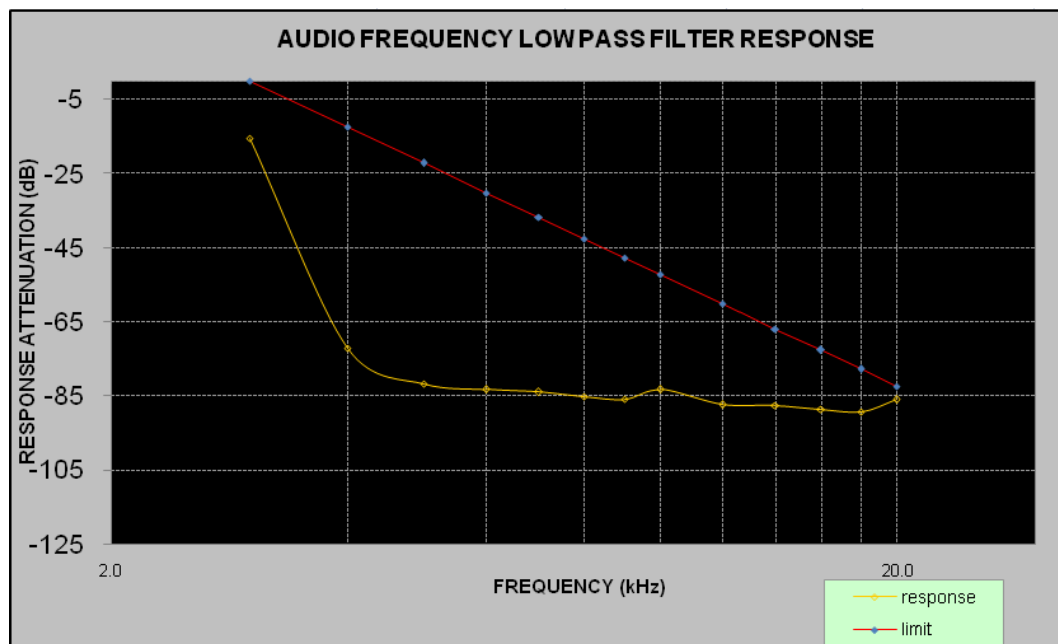


3.6 Audio Frequency Low Pass Filter Response

Test Date:	2024-02-01	Test By:	Baylor Li
Environment condition:	Temperature: 25.5°C; Relative Humidity:49%; ATM Pressure: 101.0kPa		

Carrier Frequency: 467.6125MHz

Audio Frequency (kHz)	Response Attenuation (dB)	Limit (dB)
1.0	0.0	/
3.0	-15.45	0.0
4.0	-72.25	-12.5
5.0	-81.74	-22.2
6.0	-83.35	-30.1
7.0	-84.03	-36.8
8.0	-85.17	-42.6
9.0	-86.02	-47.7
10.0	-83.33	-52.3
12.0	-87.46	-60.2
14.0	-87.58	-66.9
16.0	-88.7	-72.7
18.0	-89.4	-77.8
20.0	-86.1	-82.4



3.7 Authorized bandwidth and emission mask

Test Date:	2024-02-01	Test By:	Baylor Li
Environment condition:	Temperature: 25.5°C; Relative Humidity:49%; ATM Pressure: 101.0kPa		

Test Frequency (MHz)	99% Occupied Bandwidth (kHz)	20 dB Bandwidth (kHz)	Limit (kHz)
467.6125	9.936	10.337	≤12.5

Note:

Emission bandwidth was based on calculation method instead of measurement.

Emission Designator

$$BW = 2M + 2D$$

For FM Mode (Channel Spacing: 12.5 kHz)

Emission Designator 11K0F3E

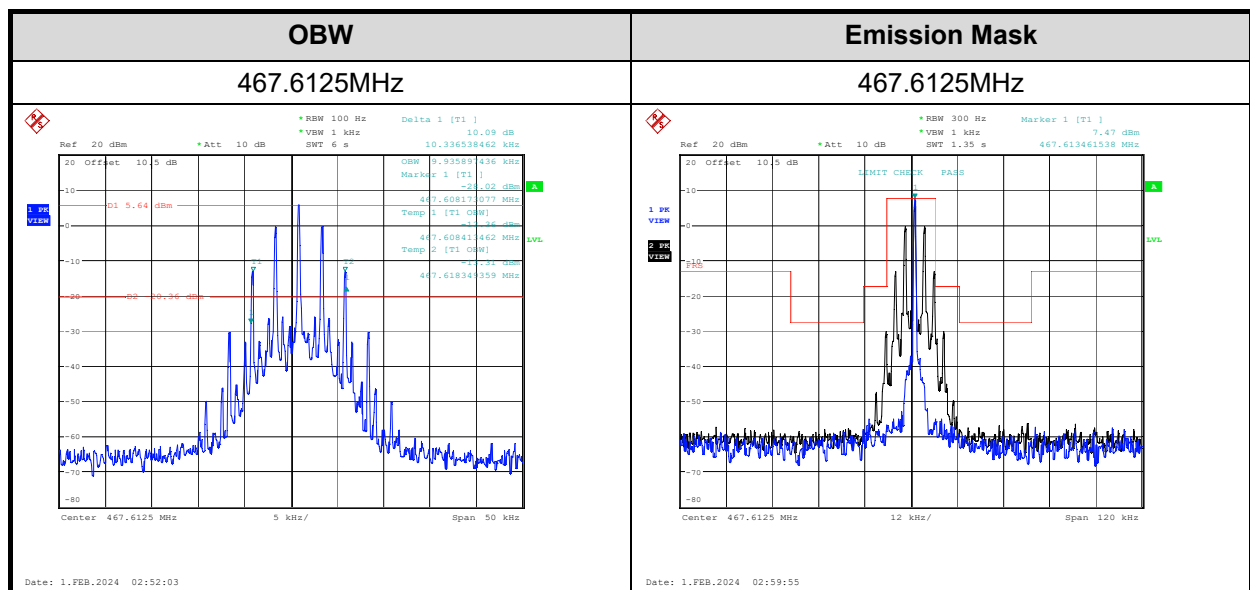
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

$$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} = 11\text{K}$$

F3E portion of the designator represents an FM voice transmission

Therefore, the entire designator for 12.5 kHz channel spacing FM mode is 11K0F3E.

Test Plots



3.8 Radiated spurious emission

Test Date:	2024-01-04~2024-01-05	Test By:	Bard Huang
Environment condition:	Temperature: 24.7°C; Relative Humidity:54%; ATM Pressure: 101.0kPa		

30MHz-5 GHz:

Frequency (MHz)	Reading level (dBμV)	Polar (H/V)	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	EIRP CF	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
Emission(467.6125MHz)									
Model SW-207DS.EXv23									
935.125	52.90	Horizontal	-0.23	52.67	-95.2	-42.53	-13	-29.53	Peak
935.125	53.70	Vertical	-0.23	53.47	-95.2	-41.73	-13	-28.73	Peak
1403.01	63.01	Horizontal	-4.01	59.00	-95.20	-36.20	-13	-23.20	Peak
1403.01	65.71	Vertical	-4.01	61.70	-95.20	-33.50	-13	-20.50	Peak
1870.68	47.45	Horizontal	-2.25	45.20	-95.20	-50.00	-13	-37.00	Peak
1870.68	50.75	Vertical	-2.25	48.50	-95.20	-46.70	-13	-33.70	Peak
2338.35	58.30	Horizontal	-1.80	56.50	-95.20	-38.70	-13	-25.70	Peak
2338.35	60.40	Vertical	-1.80	58.60	-95.20	-36.60	-13	-23.60	Peak
2806.02	45.97	Horizontal	-1.37	44.60	-95.20	-50.60	-13	-37.60	Peak
2806.02	48.37	Vertical	-1.37	47.00	-95.20	-48.20	-13	-35.20	Peak
3273.69	61.21	Horizontal	-1.81	59.40	-95.20	-35.80	-13	-22.80	Peak
3273.69	63.31	Vertical	-1.81	61.50	-95.20	-33.70	-13	-20.70	Peak
3741.36	46.69	Horizontal	-1.59	45.10	-95.20	-50.10	-13	-37.10	Peak
3741.36	46.89	Vertical	-1.59	45.30	-95.20	-49.90	-13	-36.90	Peak
4209.03	57.36	Horizontal	-1.86	55.50	-95.20	-39.70	-13	-26.70	Peak
4209.03	62.56	Vertical	-1.86	60.70	-95.20	-34.50	-13	-21.50	Peak
Model TM-212.EXv23MTG									
935.125	52.50	Horizontal	-0.23	52.27	-95.2	-42.93	-13	-29.93	Peak
935.125	53.40	Vertical	-0.23	53.17	-95.2	-42.03	-13	-29.03	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Result – Limit

According to ANSI C63.26-2.15 section 5.2.7:

$EIRP\ (dBm) = E\ (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.

Test was performed on 3meters distance, so

Result = Corrected Amplitude + $20\log(3) - 104.8$

= Corrected Amplitude - 95.2

The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

3.9 Frequency stability

Test Date:	2024-02-01	Test By:	Baylor Li
Environment condition:	Temperature: 25.5°C; Relative Humidity:49%; ATM Pressure: 101.0kPa		

Model SW-207DS.EXv23

Test Frequency (MHz)	Temperature (°C)	Voltage (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
467.6125	-20	3.0	467.612465	-0.0748	±2.5
	-10	3.0	467.612447	-0.1133	±2.5
	0	3.0	467.612473	-0.0577	±2.5
	10	3.0	467.612474	-0.0556	±2.5
	20	3.0	467.612466	-0.0727	±2.5
	30	3.0	467.612492	-0.0171	±2.5
	40	3.0	467.612486	-0.0299	±2.5
	50	3.0	467.612487	-0.0278	±2.5
	20	2.5	467.612495	-0.0107	±2.5
	20	3.0	467.612489	-0.0235	±2.5

Model TM-212.EXv23MTG

Test Frequency (MHz)	Temperature (°C)	Voltage (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
467.6125	-20	4.5	467.612476	-0.0513	±2.5
	-10	4.5	467.612454	-0.0984	±2.5
	0	4.5	467.612462	-0.0813	±2.5
	10	4.5	467.612456	-0.0941	±2.5
	20	4.5	467.612472	-0.0599	±2.5
	30	4.5	467.612446	-0.1155	±2.5
	40	4.5	467.612482	-0.0385	±2.5
	50	4.5	467.612467	-0.0706	±2.5
	20	2.5	467.612477	-0.0492	±2.5
	20	4.5	467.612495	-0.0107	±2.5

4 FCC §95.587 FRS Additional Requirements

Each FRS transmitter type must be designed to meet the following additional requirements.

(a) Transmit frequency capability. FRS transmitter types must not be capable of transmitting on any frequency or channel other than those listed in § 95.563.

Judgment: Compliance, please refer user manual

(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.

(2) The gain of the antenna must not exceed that of a half-wave dipole antenna.

(3) The antenna must be designed such that the electric field of the emitted waves is vertically polarized when the unit is operated in the normal orientation.

Judgment: Compliance, please refer section 1.2 of report and EUT photo

(c) Digital data transmissions. FRS transmitter types having the capability to transmit digital data must be designed to meet the following requirements.

(1) FRS units may transmit digital data containing location information, or requesting location information from one or more other FRS or GMRS units, or containing a brief text message to another specific FRS or GMRS unit or units.

(2) Digital data transmissions may be initiated by a manual action or command of the operator or on an automatic or periodic basis, and FRS units may be designed to automatically respond with location data upon receiving an interrogation request from another

(3) Digital data transmissions must not exceed one second in duration.

(4) Digital data transmissions must not be sent more frequently than one digital data transmission within a thirty-second period, except that an FRS unit may automatically respond to more than one interrogation request received within a thirty-second period.

Judgment: Not Applicable, no digital modulation function.

(d) Packet mode. FRS transmitter types must not be capable of transmitting data in the store-and-forward packet operation mode.

Judgment: Not Applicable, no digital modulation function.

(e) Effective September 30, 2019, no person shall manufacture or import hand-held portable radio equipment capable of operating under this subpart (FRS) and other licensed or licensed-by-rule services in this chapter (part 15 unlicensed equipment authorizations are permitted if consistent with part 15 rules).

Judgment: Compliance, the devices are not include transmitter(s) (or transmitting modes) operating in other licence and licence-exempt services.

5 Test Setup Photo

Please refer to the attachment RWAZ202300073 Test Setup photo.

6 E.U.T Photo

Please refer to the attachment RWAZ202300073 External Photo and RWAZ202300073 Internal Photo.

---End of Report---