TEST REPORT

Product Name	:	Holding a walkie-talkie
Brand Name	:	Midd Kacy
Model/HVIN	:	MK108
Series Model	:	N/A
FCC ID	:	2BNUZ-MK108
IC		33612-MK108
Applicant	:	**Shenzhen Xianheyue Trading Co., Ltd**
Address	:	Xinghe WORLD A805, No.1 Yabao Road, Nankeng Community, Bantian Street, Longgang District, Shenzhen
Manufacturer	:	**Shenzhen Xianheyue Trading Co., Ltd**
Address	:	Xinghe WORLD A805, No.1 Yabao Road, Nankeng Community, Bantian Street, Longgang District, Shenzhen
Standard(s)	:	FCC CFR Title 47 Part 95 RSS-210 Issue 11
Date of Receipt	:	Jan.15, 2025
Date of Test	:	Jan.16, 2025~ Feb.23, 2025
Issued Date	:	Feb.24, 2025

Issued By: **Guangdong Asia Hongke Test Technology Limited**
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Reviewed by: Leon Yi
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Note: This device has been tested and found to comply with the standard(s) listed, this test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory. This report shall not be reproduced except in full, without the written approval of Guangdong Asia Hongke Test Technology Limited. If there is a need to alter or revise this document, the right belongs to Guangdong Asia Hongke Test Technology Limited, and it should give a prior written notice of the revision document. This test report must not be used by the client to claim product endorsement.

Report Revise Record

Report Version	Issued Date	Notes
M1	Feb.24, 2025	Initial Release

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

FCC Rules Part 95: PERSONAL RADIO SERVICES.

ANSI C63.10: 2013: American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.26:2015: American National Standard of procedures for compliance testing of transmitters used in licensed radio services.

RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

RSS-210 Issue 11: Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

1.2 Test Summary

Description of Test Item	Standard clause	Verdict
Maximum Transmitter Power	FCC Part 95.567 FCC Part 95.1767 RSS-210 E.1.5	PASS
Modulation Characteristic	FCC Part 2.1047 FCC Part 95.575 FCC Part 95.1775 RSS-210 E.1.3 RSS-210 E.1.7	PASS
Occupied Bandwidth	FCC Part 2.1049 FCC Part 95.573 FCC Part 95.1773 RSS-210 E.1.4	PASS
Emission Mask	FCC Part 95.579 FCC Part 95.1779 RSS-210 E.1.8	PASS
Transmitter unwanted emission	FCC Part 95.579 FCC Part 95.1779 RSS-210 E.1.8	PASS
Frequency Stability	FCC Part 2.1055 FCC Part 95.565 FCC Part 95.1765 RSS-201 E.1.9	PASS

1.3 Test Facility

Test Laboratory:
Guangdong Asia Hongke Test Technology Limited
B1/F, Building 11, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified or accredited by the following organizations:
FCC-Registration No.: 251906 Designation Number: CN1376
Guangdong Asia Hongke Test Technology Limited has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

IC —Registration No.: 31737 CAB identifier: CN0165
The 3m Semi-anechoic chamber of Guangdong Asia Hongke Test Technology Limited has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 31737

A2LA-Lab Cert. No.: 7133.01
Guangdong Asia Hongke Test Technology Limited has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

1.4 Measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the Guangdong Asia Hongke Test Technology Limited’s quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Asia Hongke laboratory is reported:

Test	Measurement Uncertainty	Notes
Power Line Conducted Emission	9KHz~30MHz ±1.20 dB	(1)
Radiated Emission	9KHz~30MHz ±3.10dB	(1)
Radiated Emission	30MHz~1GHz ±3.75dB	(1)
Radiated Emission	1GHz~18GHz ±3.88 dB	(1)
Radiated Emission	18GHz-40GHz ±3.88 dB	(1)
RF power, conducted	30MHz~6GHz ±0.16dB	(1)
RF power density, conducted	±0.24dB	(1)
Spurious emissions, conducted	±0.21dB	(1)
Temperature	±1℃	(1)
Humidity	±3%	(1)
DC and low frequency voltages	±1.5%	(1)
Time	±2%	(1)
Duty cycle	±2%	(1)
Bandwidth	±1.5 x10^{-6}	(1)

The report uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty Multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

2 GENGENERAL INFORMATION

2.1 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Name of EUT	Holding a walkie-talkie
Model Number	MK108
Power Rating:	Input: DC 5V/1A DC 3.7V 1800mAh Rechargeable Li-ion battery
Adapter Information:	Model: BS05A-0501000US Input: 100-240V~50/60Hz 0.25A Max. Output: 5.0V⎓1000mA
Frequency Range	462.5625MHz~462.7125MHz 462.5500MHz~462.7250MHz 467.5625MHz~467.7125MHz
Rate Power	462.5625MHz~462.7125MHz: 2W 462.5500MHz~462.7250MHz: 2W 467.5625MHz~467.7125MHz: 0.5W
Modulation Type	FM
Channel Separation	12.5KHz
Antenna Type	Integral antenna
Antennal Gain	2.0dBi

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

Operation Mode No.	Modulation	Channel Separation	Condition	
	FM	12.5KHz	TX	RX
1	☒	☒	☒	
2	☒	☒		☒

Frequency list

Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	462.5625	12	467.6625
2	462.5875	13	467.6875
3	462.6125	14	467.7125
4	462.6375	15	462.5500
5	462.6625	16	462.5750
6	462.6875	17	462.6000
7	462.7125	18	462.6250
8	467.5625	19	462.6500
9	467.5875	20	462.6750
10	467.6125	21	462.7000
11	467.6375	22	462.7250

2.4 Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Serial No.	Provided by	Other
/	/	/	/	/	/
/	/	/	/	/	/

2.5 Equipment List for the Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI Measuring Receiver	R&S	ESR	101160	2024.09.25	2025.09.24
2	Spectrum Analyzer	R&S	FSV40	101470	2024.09.23	2025.09.22
3	Low Noise Pre Amplifier	SCHWARZBECK	BBV 9745	00282	2024.09.25	2025.09.24
4	Low Noise Pre Amplifier	SCHWARZBECK	BBV 9745	00283	2024.09.25	2025.09.24
5	Low Noise Pre Amplifier	CESHENG	CSKJLNA231016A	CSKJLNA231016A	2024.09.25	2025.09.24
6	Passive Loop	ETS	6512	00165355	2024.08.29	2027.08.28
7	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9168	01434	2024.08.29	2027.08.28
8	Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	452	2024.08.29	2027.08.28
9	Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	453	2024.08.29	2027.08.28
10	Horn Antenna 15-40GHz	SCHWARZBECK	BBHA9170	BBHA9170367	2024.08.28	2027.08.27
11	6dB Attenuator	JFW	50FPE-006	4360846-949-1	2024.09.24	2025.09.23
12	EMI Test Receiver	R&S	ESPI	100771	2024.09.25	2025.09.24
13	LISN	R&S	NNLK 8129	8130179	2024.09.24	2025.09.23
14	LISN	R&S	ESH3-Z5	892785/016	2024.09.23	2025.09.22
15	Pulse Limiter	R&S	ESH3-Z2	102789	2024.09.24	2025.09.23
16	RF Automatic Test system	TST	TSTPASS	21033016	2024.09.25	2025.09.24
17	Vector Signal Generator	Agilent	N5182A	MY50143009	2024.09.25	2025.09.24
18	Analog signal generator	Agilent	E8257	MY51554256	2024.09.25	2025.09.24
19	Spectrum Analyzer	Agilent	N9020A	MY51289843	2024.09.25	2025.09.24
20	Spectrum Analyzer	Agilent	N9020A	MY53421570	2024.09.25	2025.09.24
21	Power Sensor	Agilent	8481A	MY41097697	2024.09.25	2025.09.24
22	Wideband Radio communication tester	R&S	CMW500	1201.0002K50	2024.09.24	2025.09.23

23	DC power supply	ZHAOXIN	RXN-305D-2	28070002559	2024.09.24	2025.09.23
24	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
25	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
26	RF Software	TST	TSTPASS	Version 2.0	N/A	N/A
27	RF Software	cesheng	WCS-WCN	Version 2024.6.20	N/A	N/A
28	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

3 TEST CONDITIONS AND RESULTS

3.1 Maximum Transmitter Power

LIMITS

According to FCC Part 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.

According to FCC Part 95.1767:
(a) 462/467 MHz main channels. The limits in this paragraph apply to stations transmitting on any of the 462 MHz main channels or any of the 467 MHz main channels. Each GMRS transmitter type must be capable of operating within the allowable power range. GMRS licensees are responsible for ensuring that their GMRS stations operate in compliance with these limits.
(1) The transmitter output power of mobile, repeater and base stations must not exceed 50 Watts.
(2) The transmitter output power of fixed stations must not exceed 15 Watts.

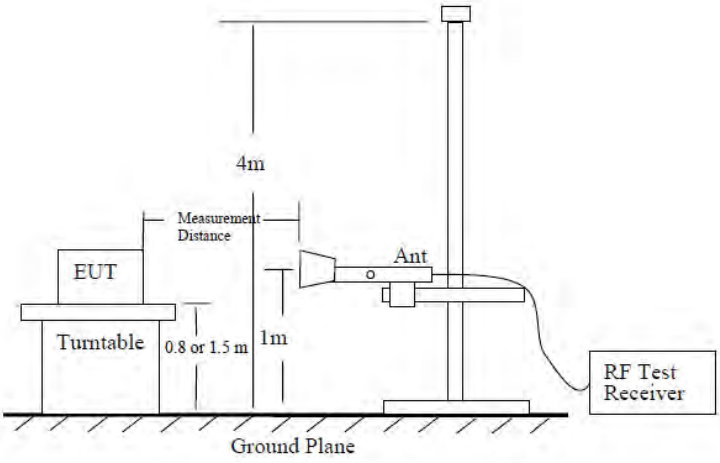
(b) 462 MHz interstitial channels. The effective radiated power (ERP) of mobile, hand-held portable and base stations transmitting on the 462 MHz interstitial channels must not exceed 5 Watts.

(c) 467 MHz interstitial channels. The effective radiated power (ERP) of hand-held portable units transmitting on the 467 MHz interstitial channels must not exceed 0.5 Watt. Each GMRS transmitter type capable of transmitting on these channels must be designed such that the ERP does not exceed 0.5 Watt.

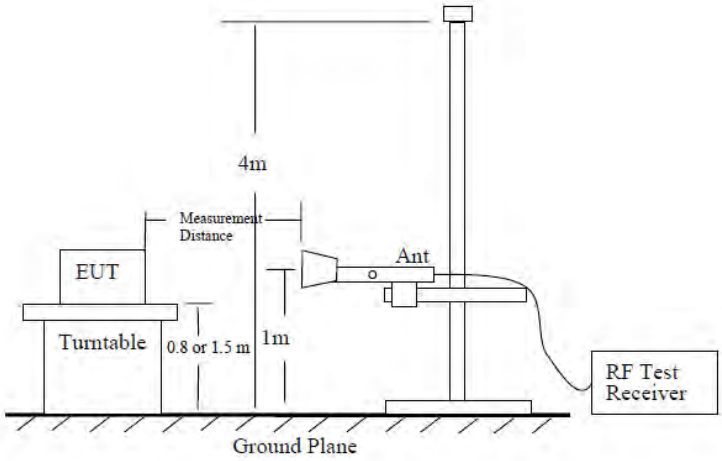
According to RSS-210 E.1.5:
The maximum permissible transmitted effective radiated power (e.r.p.) of the equipment under any operating conditions shall not exceed 0.5 W for channels 8-14 and 2 W for other channels.

TEST CONFIGURATION

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP/EIRP



Measurement Procedure

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all test transmit frequencies were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
5. An amplifier may be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=$P_{Mea+}P_{Ag}$ - P_{cl} + G_a
6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

TEST RESULTS

Remark;
The field strength of radiation emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis and receiver antenna at vertical polarization was reported.

Test Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dBi)	P_{Ag} (dB)	ERP (dBm)	ERP (W)	Limit (W)	Polarization
462.6375	-1.82	2.41	6.9	31.89	32.41	1.742	2	V
462.6500	-2.24	2.41	6.9	31.89	31.99	1.581	2	V
467.6375	-7.5	2.42	6.9	31.91	26.74	0.472	0.5	V

Remark:

1. *$EIRP=P_{Mea}(dBm)+P_{Ag}(dB)-P_{cl}(dB)+G_a(dBi)$*
2. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*

3.2 Occupied Bandwidth and Emission Mask

LIMITS

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

According to FCC 95.1773:
Each GMRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the channels used. Operation of GMRS stations must also be in compliance with these requirements.

(a) Main channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz main channels (see §95.1763(a)) or any of the 467 MHz main channels (see §95.1763(c)).

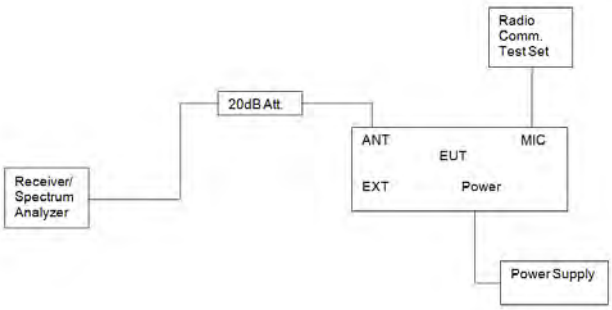
(b) Interstitial channels. The authorized bandwidth is 20 kHz for GMRS transmitters operating on any of the 462 MHz interstitial channels (see §95.1763(b)) and is 12.5 kHz for GMRS transmitters operating on any of the 467 MHz interstitial channels (see §95.1763(d)).

(c) Digital data transmissions. Digital data transmissions are limited to the 462 MHz main channels and interstitial channels in the 462 MHz and 467 MHz bands.

RSS-210 E.1.4:
The maximum permissible occupied bandwidth is 12.5 kHz for channels 8-14 and 20 kHz for other channels.

According to FCC 95.579, 1779 & RSS-210 E.1.8:
At least 25dB (decibels) on any frequency removed from the centre of the authorized bandwidth by more than 50 % up to and including 100 % of the authorized bandwidth.
At least 35 dB on any frequency removed from the centre of the authorized bandwidth by more than 100 % up to and including 250 % of the authorized bandwidth.
At least 43 + 10 log10 (T) dB on any frequency removed from the centre of the authorized bandwidth by more than 250 %.

TEST CONFIGURATION



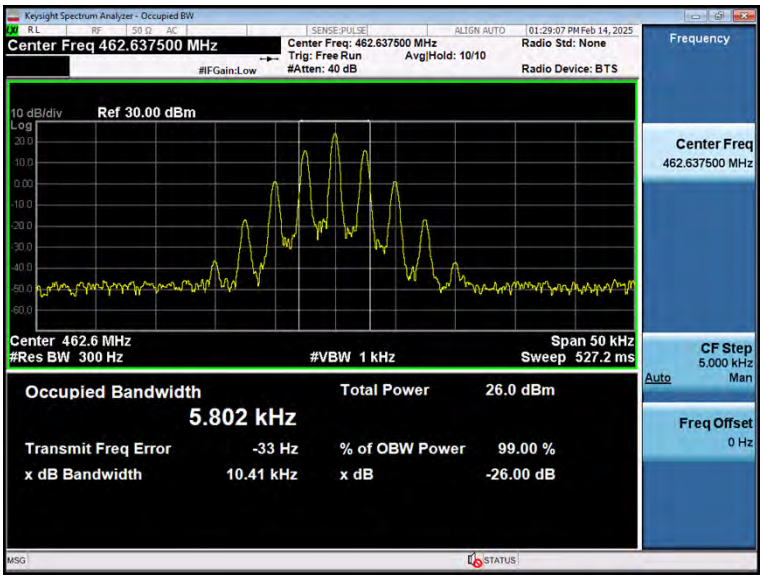
TEST PROCEDURE

1 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).
2 Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW= 3 KHz, span =50 KHz.
3 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

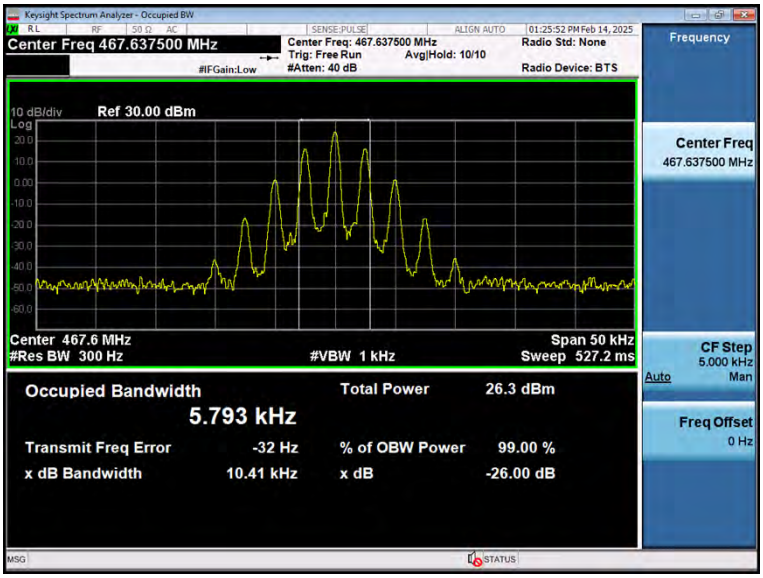
TEST RESULTS

Emission Bandwidth:

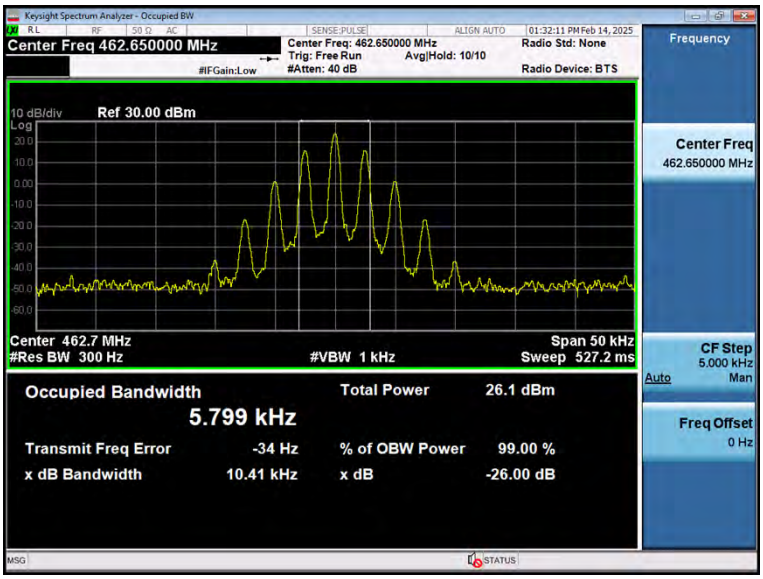
Modulation	Channel	Occupied Bandwidth (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	CH4	5.802	10.41	20	Pass



Modulation	Channel	Occupied Bandwidth (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	CH11	5.793	10.41	12.5	Pass

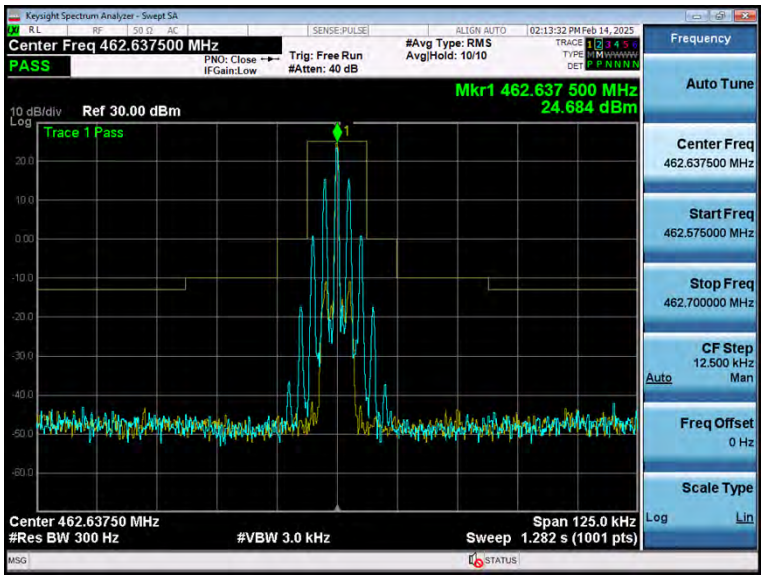


Modulation	Channel	Occupied Bandwidth (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	CH19	5.799	10.41	20	Pass

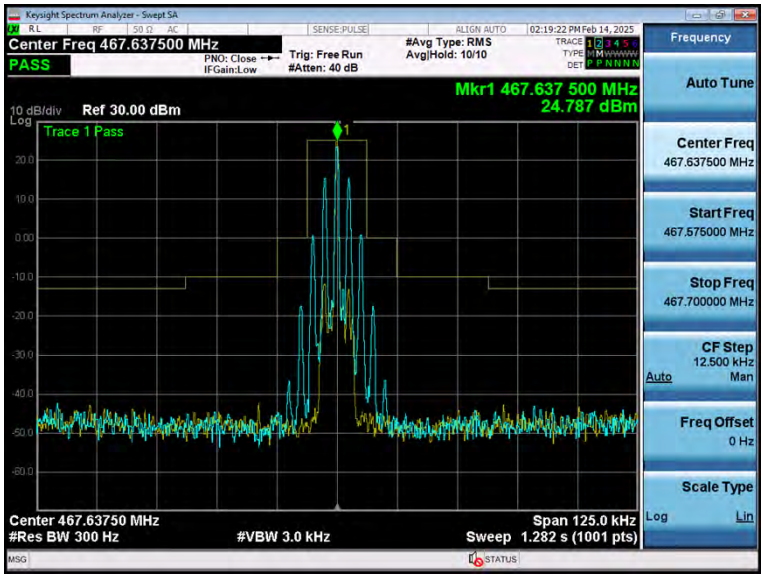


Emission Mask:

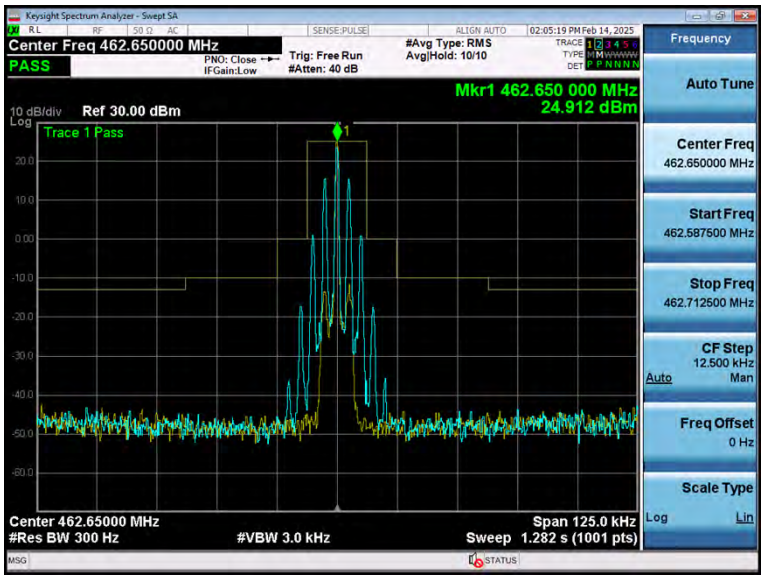
Ch4/462.6375MHz



Ch11/467.6375MHz



Ch19/462.6500MHz



3.3 Modulation Characteristic

LIMITS

According to FCC 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.

According to FCC 95.1775:
(a) Main channels. The peak frequency deviation for emissions to be transmitted on the main channels must not exceed ± 5 kHz.

(b) 462 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 462 MHz interstitial channels must not exceed ± 5 kHz.

(c) 467 MHz interstitial channels. The peak frequency deviation for emissions to be transmitted on the 467 MHz interstitial channels must not exceed ± 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

(d) Overmodulation. Each GMRS transmitter type, except for a mobile station transmitter type with a transmitter power output of 2.5 W or less, must automatically prevent a higher than normal audio level from causing overmodulation.

(e) Audio filter. Each GMRS transmitter type must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of § 95.1779 (without filtering).

(1) The filter must be between the modulation limiter and the modulated stage of the transmitter.

(2) At any frequency (f in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least 60 log (f/3) dB more than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB more than the attenuation at 1 kHz.

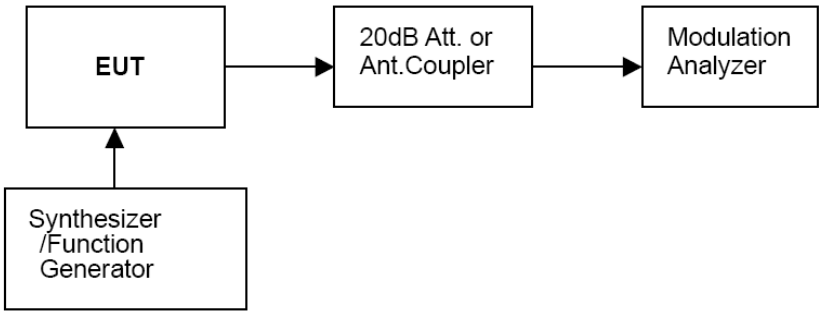
RSS-210 E.1.3:
For frequency modulation and phase modulation, the peak frequency deviation shall not exceed ±2.5 kHz for channels 8-14 and ±5 kHz for other channels.
For emission type A3E, the modulation shall be greater than 85% and shall not exceed 100%. For other amplitude modulation, the modulation shall not exceed 100%.

RSS-210 E.1.7:
FRS/GMRS devices shall include an audio frequency low-pass filter, unless they comply with the emission masks without filter in section E.1.8. The filter shall be between the modulation limiter and the modulated stage of the transmitter and its attenuation shall comply with the limits in table E2.

Table E2: Audio frequency filter attenuation for FRS/GMRS devices

Frequency, f (kHz)	Attenuation greater than the attenuation at 1 kHz (dB)
$3 \le f \le 20$	$60 \log_{10}(f/3)$
$f > 20$	50

TEST CONFIGURATION



TEST PROCEDURE

Modulation Limit

1 Configure the EUT as shown in test configuration, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

2 Repeat step 1 with input frequency changing to 300, 1004, 1500 and 2500Hz in sequence.

Audio Frequency Response

1 Configure the EUT as shown in test configuration.

2 Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).

3 Vary the Audio frequency from 100 Hz to 3125KHz and record the frequency deviation.

4 Audio Frequency Response =20log10 (Deviation of test frequency/Deviation of 1 KHz reference).

Audio Low Pass Filter Response

1 Connect the equipment as illustrated.

2 Connect the Audio Generator as close as possible the input of the post limiter low pass filter

3 within the transmitter under test.

4 Connect the RF Communications Test Set to the output of the post limiter low pass filter within

5 the transmitter under test.

6 Apply a 1000 Hz tone from the audio frequency generator and adjust the level permanufacturer's specifications.

7 Record the dB level of the 1000 Hz spectral line on the RF Communications Test Set as LEV_{REF}.

8 Set the audio frequency generator to the desired test frequency between 3000 Hz and the upper low pass filter limit.

9 Record RF Communications Test Set levels, at the test frequency in step 8)

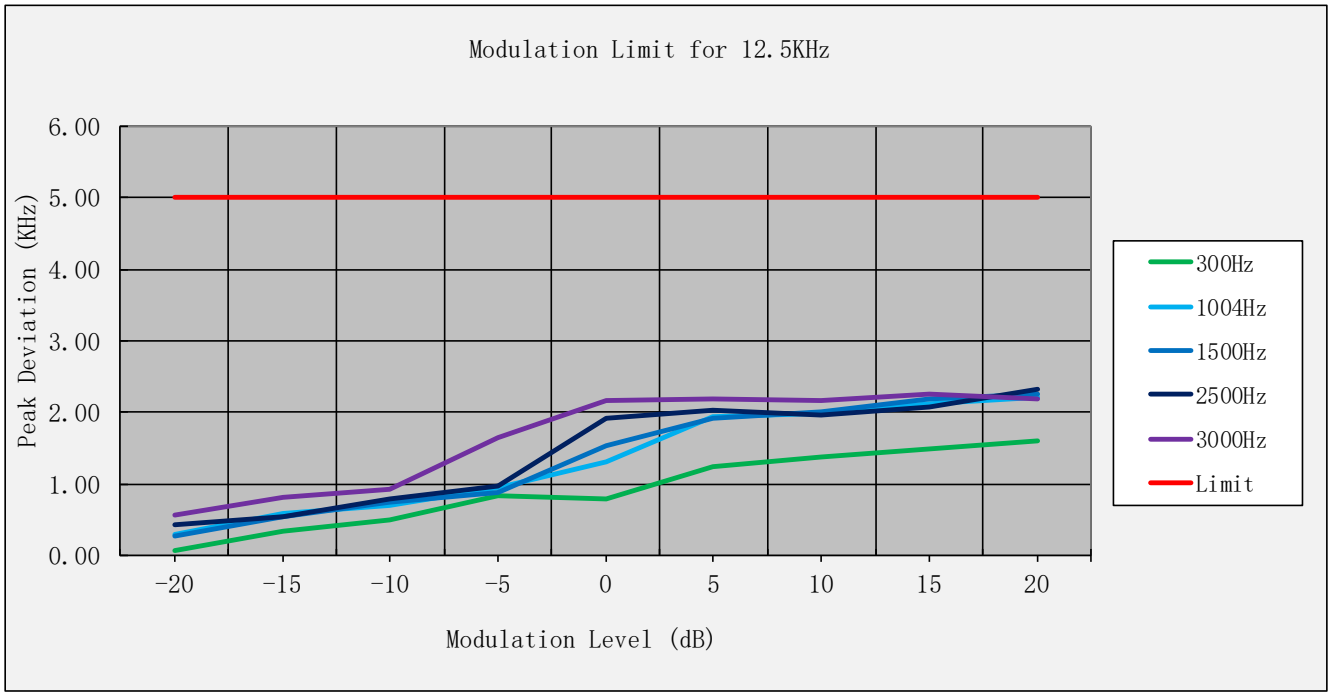
10 Record the dB level on the RF Communications Test Set as LEV_{FREQ}.

TEST RESULTS

a) **Modulation Limit:**

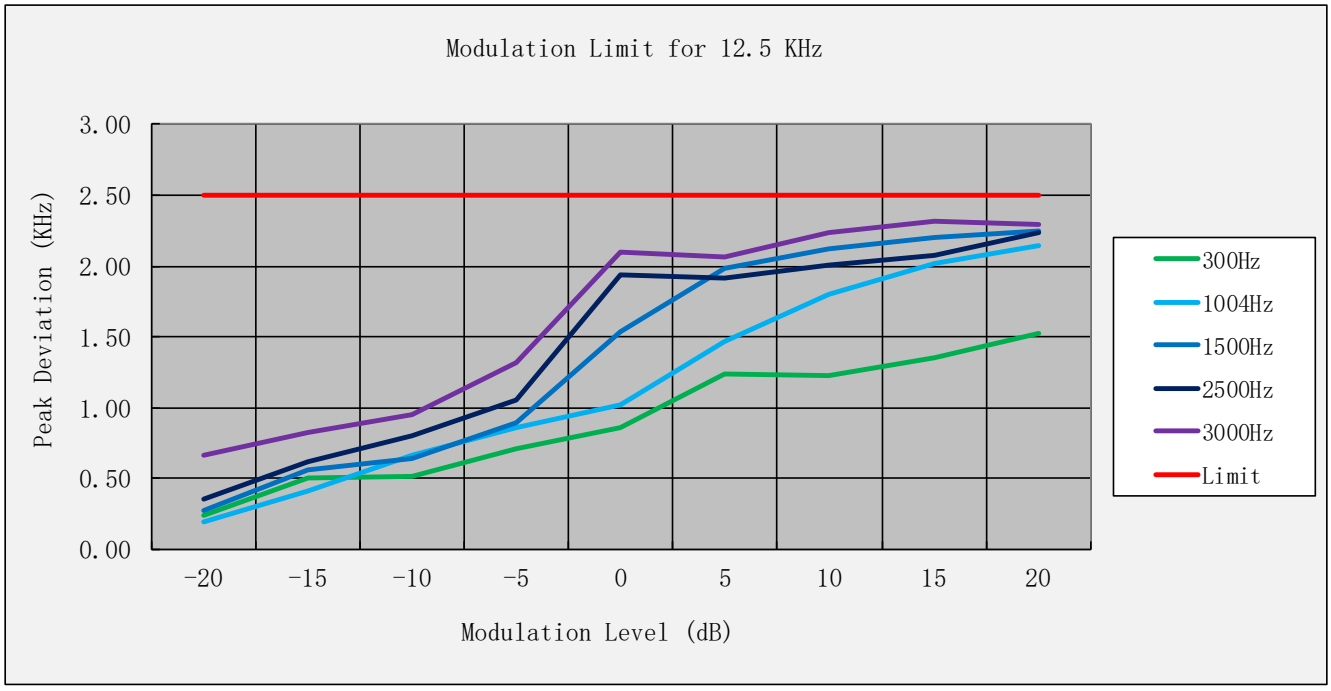
Ch4/462.6375MHz

Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 Hz(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 2500 Hz(KHz)	Peak Freq. Deviation At 3000 Hz(KHz)
-20	0.08	0.29	0.27	0.43	0.57
-15	0.35	0.59	0.55	0.54	0.82
-10	0.51	0.70	0.75	0.79	0.93
-5	0.83	0.95	0.88	0.97	1.66
0	0.80	1.32	1.53	1.92	2.17
+5	1.24	1.94	1.92	2.03	2.18
+10	1.37	1.98	2.01	1.97	2.17
+15	1.49	2.13	2.18	2.08	2.25
+20	1.61	2.21	2.26	2.33	2.20



Ch11/467.6375MHz

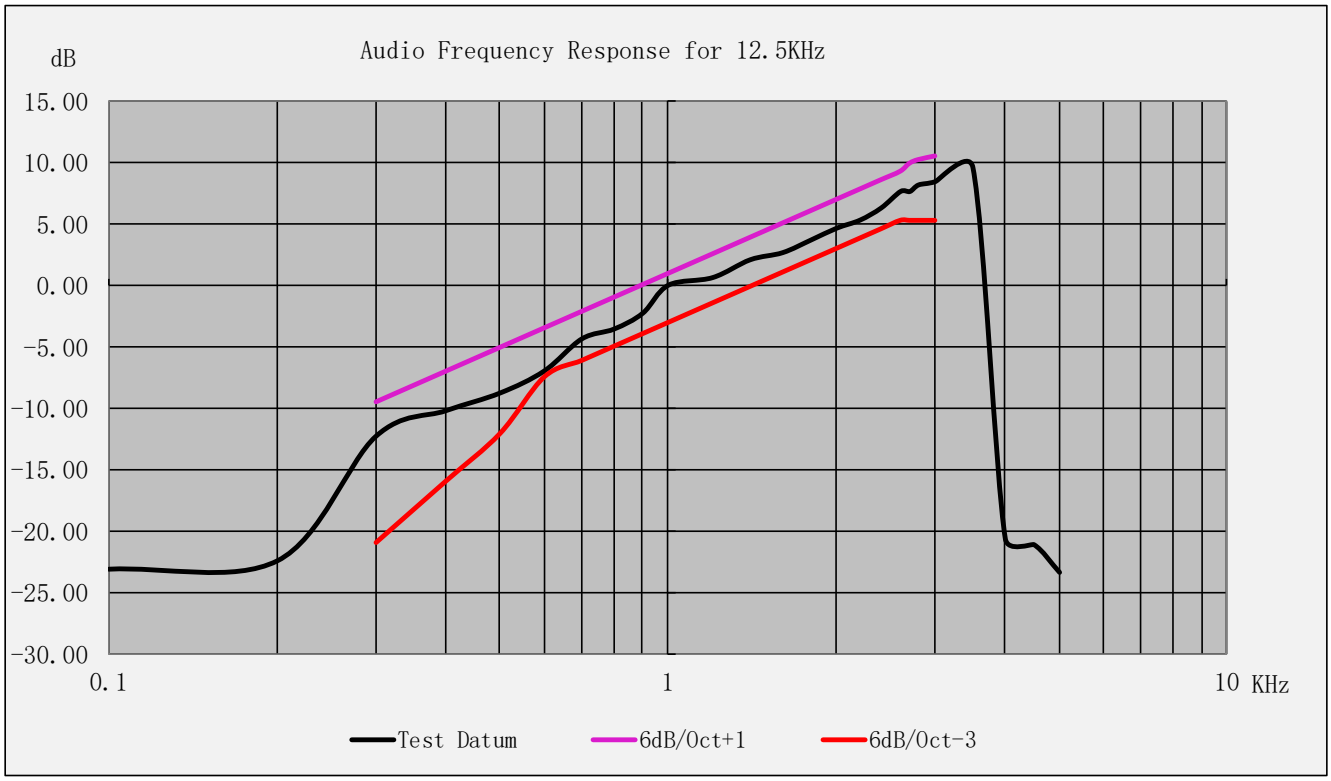
Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 Hz(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 2500 Hz(KHz)	Peak Freq. Deviation At 3000 Hz(KHz)
-20	0.24	0.19	0.28	0.36	0.67
-15	0.51	0.41	0.56	0.62	0.83
-10	0.52	0.66	0.64	0.80	0.95
-5	0.71	0.86	0.90	1.05	1.32
0	0.86	1.02	1.54	1.94	2.10
+5	1.24	1.47	1.99	1.92	2.07
+10	1.23	1.80	2.12	2.01	2.24
+15	1.35	2.02	2.20	2.08	2.32
+20	1.53	2.15	2.25	2.24	2.29



b) Audio Frequency Response:

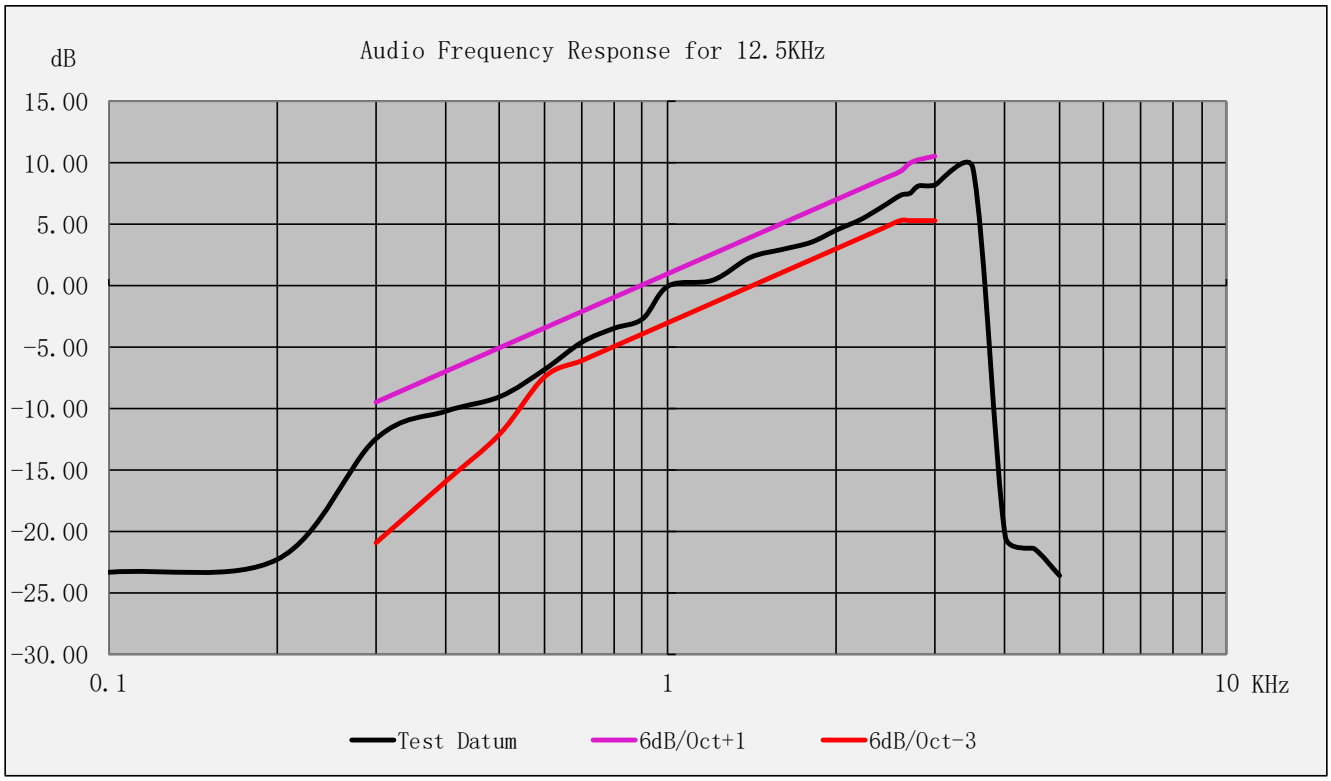
Ch4/462.6375MHz

Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.06	0.88	-23.14
0.2	0.07	0.88	-22.46
0.3	0.21	0.88	-12.32
0.4	0.27	0.88	-10.23
0.5	0.32	0.88	-8.79
0.6	0.39	0.88	-6.99
0.7	0.53	0.88	-4.38
0.8	0.58	0.88	-3.57
0.9	0.68	0.88	-2.28
1.0	0.88	0.88	0.00
1.2	0.95	0.88	0.62
1.4	1.12	0.88	2.07
1.6	1.19	0.88	2.65
1.8	1.35	0.88	3.69
2.0	1.50	0.88	4.65
2.2	1.62	0.88	5.30
2.4	1.82	0.88	6.29
2.6	2.12	0.88	7.64
2.7	2.12	0.88	7.63
2.8	2.25	0.88	8.17
3.0	2.33	0.88	8.44
3.5	2.65	0.88	9.59
4.0	0.08	0.88	-20.67
4.5	0.08	0.88	-21.14
5.0	0.06	0.88	-23.40



Ch11/467.6375MHz

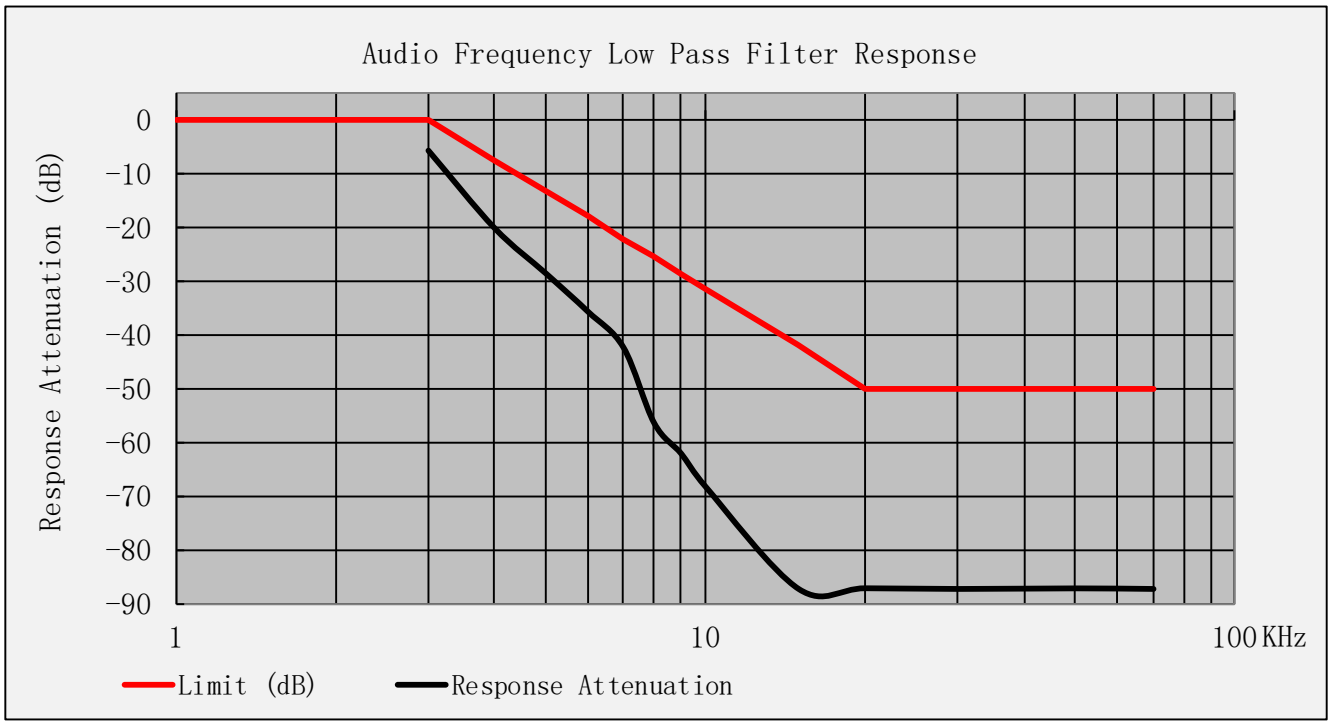
Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.06	0.84	-23.30
0.2	0.06	0.84	-22.25
0.3	0.20	0.84	-12.45
0.4	0.26	0.84	-10.20
0.5	0.30	0.84	-9.01
0.6	0.38	0.84	-6.82
0.7	0.50	0.84	-4.59
0.8	0.56	0.84	-3.45
0.9	0.62	0.84	-2.67
1.0	0.84	0.84	0.00
1.2	0.89	0.84	0.46
1.4	1.10	0.84	2.31
1.6	1.18	0.84	2.97
1.8	1.26	0.84	3.55
2.0	1.42	0.84	4.56
2.2	1.56	0.84	5.37
2.4	1.75	0.84	6.38
2.6	1.96	0.84	7.37
2.7	2.00	0.84	7.52
2.8	2.14	0.84	8.13
3.0	2.16	0.84	8.22
3.5	2.53	0.84	9.57
4.0	0.08	0.84	-20.41
4.5	0.07	0.84	-21.37
5.0	0.06	0.84	-23.57



c) Audio Low Pass Filter Response

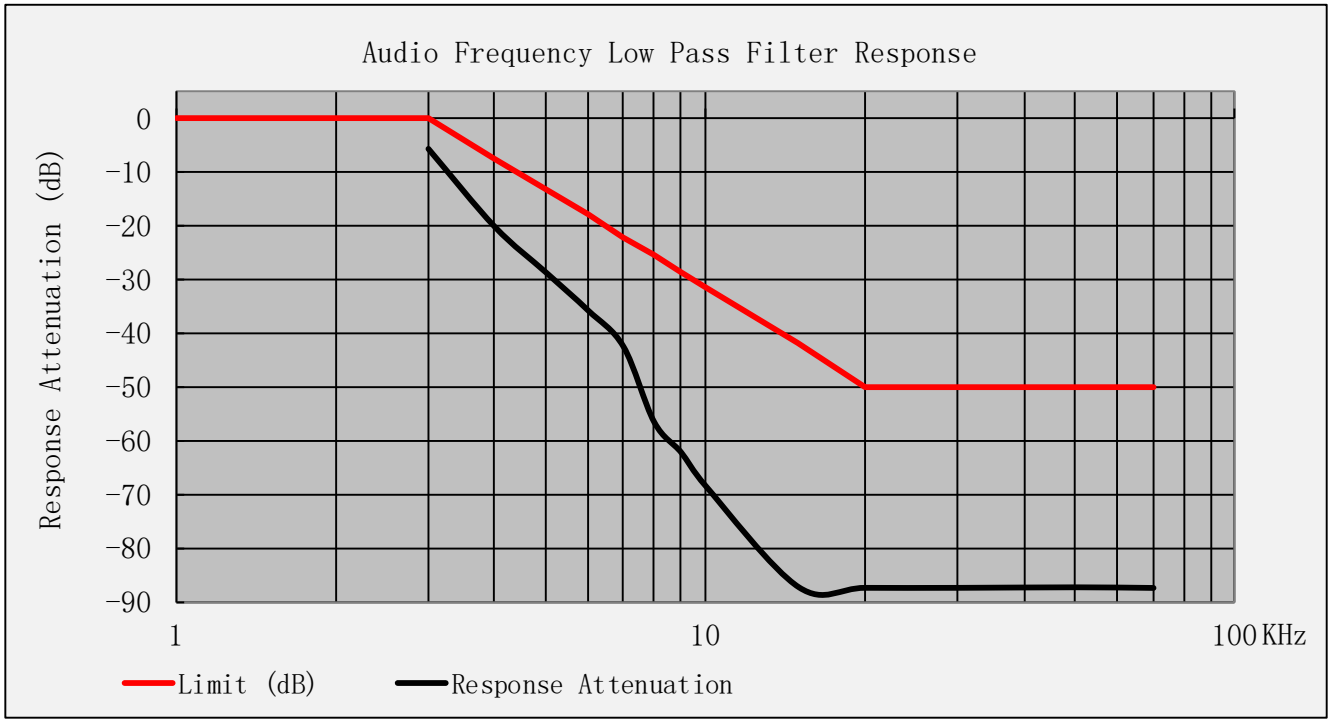
Ch4/462.6375MHz

Audio Frequency (KHz)	Response Attenuation (dB)	Limit (dB)
3	-5.64	0
4	-20.11	-7.5
5	-28.57	-13.31
6	-35.68	-18.06
7	-42.36	-22.08
8	-56.47	-25.56
9	-62.19	-28.63
10	-68.32	-31.37
15	-87.43	-41.94
20	-87.27	-50
30	-87.4	-50
50	-87.29	-50
70	-87.4	-50



Ch11/467.6375MHz

Audio Frequency (KHz)	Response Attenuation (dB)	Limit (dB)
3	0	0
4	-5.59	-7.5
5	-20.08	-13.31
6	-28.61	-18.06
7	-35.66	-22.08
8	-42.42	-25.56
9	-56.48	-28.63
10	-62.16	-31.37
15	-68.35	-41.94
20	-87.25	-50
30	-87.35	-50
50	-87.35	-50
70	-87.25	-50



3.4 Frequency Stability

LIMITS

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.

According to FCC 95.1765

Each GMRS transmitter type must be designed to comply with the frequency accuracy requirements in this section under normal operating conditions. Operators of GMRS stations must also ensure compliance with these requirements.

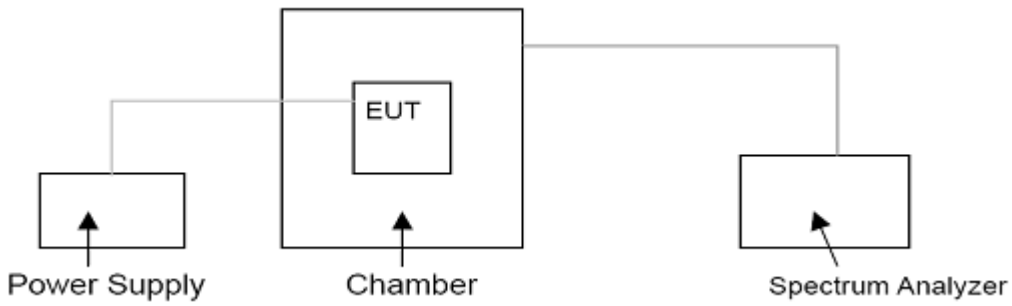
(a) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth greater than 12.5 kHz must remain within 5 parts-per-million (ppm) of the channel center frequencies listed in §95.1763 under normal operating conditions.

(b) The carrier frequency of each GMRS transmitter transmitting an emission with an occupied bandwidth of 12.5 kHz or less must remain within 2.5 ppm of the channel center frequencies listed in §95.1763 under normal operating conditions.

According to RSS-210 E.1.9

The carrier frequency stability shall not exceed ±2.5 ppm.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

TEST RESULTS

Reference Frequency: 462.6375MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
3.70	-30	-69	-0.15	±2.5	Pass
	-20	-156	-0.34		
	-10	158	0.34		
	0	603	1.30		
	10	734	1.59		
	20	429	0.93		
	30	682	1.47		
	40	-654	-1.41		
	50	-172	-0.37		
4.26	25	789	1.71		
3.15	25	-69	-0.15		

Reference Frequency: 462.6500MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
3.70	-30	-214	-0.46	±2.5	Pass
	-20	-291	-0.63		
	-10	147	0.32		
	0	102	0.22		
	10	-766	-1.66		
	20	-113	-0.24		
	30	666	1.44		
	40	335	0.72		
	50	17	0.04		
4.26	25	771	1.67		
3.15	25	-214	-0.46		

Reference Frequency: 467.6375MHz					
Voltage (V)	Temperature (℃)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
3.70	-30	676	1.46	±2.5	Pass
	-20	-298	-0.64		
	-10	-247	-0.53		
	0	422	0.91		
	10	-73	-0.16		
	20	680	1.47		
	30	610	1.32		
	40	-108	-0.23		
	50	-643	-1.39		
4.26	25	-108	-0.23		
3.15	25	676	1.46		

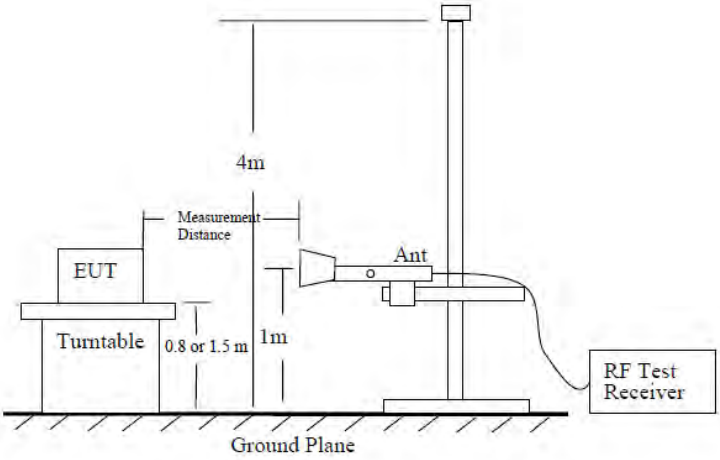
3.5 Transmitter Radiated Spurious Emission

Limit

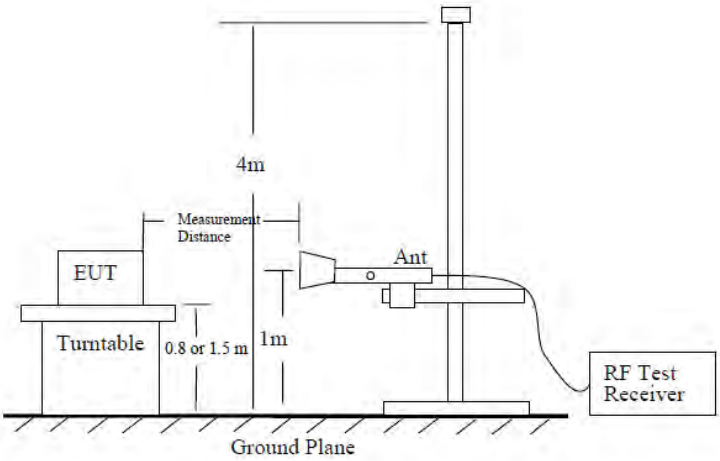
The unwanted emission should be attenuated below TP by at least 43+10log(Transmit Power) dB and unwanted emissions falling within the restricted bands of RSS-Gen shall be attenuated to the limits provided in this section or to the general field strength limits shown in RSS-Gen, whichever are less stringent.

TEST CONFIGURATION

Step 1: Pre-test



Step 2: Substitution method to verify the maximum ERP/EIRP



TEST PROCEDURE

a. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all test transmit frequencies were measured with peak detector.

b. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.

c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as (P_r).

d. The EUT then replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
The measurement results are obtained as described below:

$$\text{Power}_{(EIRP)} = P_{Mea} - P_{cl} + G_a$$

Where;

P_{Mea} is the recorded signal generator level
P_{cl} is the cable loss connect between instruments
G_a Substitution Antenna Gain

e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

f. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

TEST RESULTS

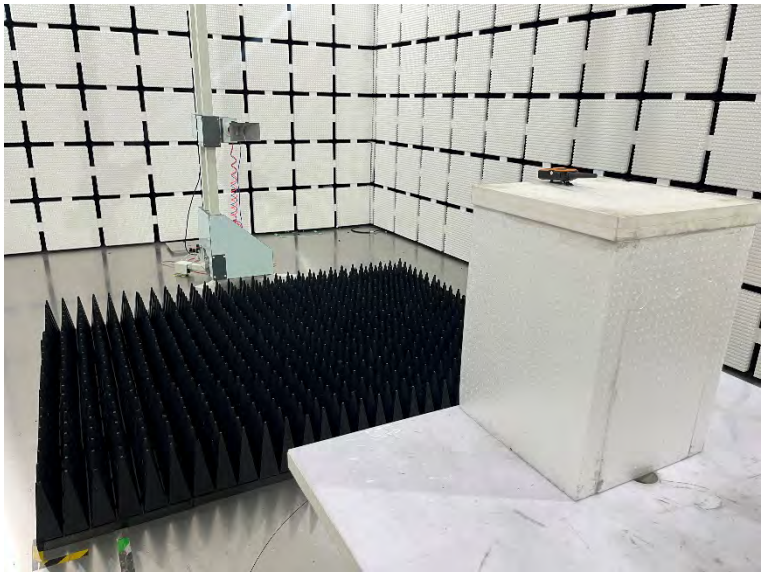
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test Channel 4/462.6375 MHz							
Frequency(MHz)	P_{Mea} (dBm)	G_a Antenna Gain(dBi)	P_{cl} (dB)	Peak EIRP (dBm)	Limit（dBm）	Margin (dBm)	Polarity
926.15	-33.94	5.91	2.82	-30.85	-13.00	-17.85	H
1388.60	-30.39	7.45	2.69	-25.63	-13.00	-12.63	H
1850.75	-39.98	9.94	3.22	-33.26	-13.00	-20.26	H
2314.10	-42.27	10.19	3.81	-35.89	-13.00	-22.89	H
--	--	--	--	--	--	--	H
926.15	-32.84	5.91	2.82	-29.75	-13.00	-16.75	V
1388.60	-29.79	7.45	2.69	-25.03	-13.00	-12.03	V
1850.75	-39.58	9.94	3.22	-32.86	-13.00	-19.86	V
2314.10	-42.00	10.19	3.81	-35.62	-13.00	-22.62	V
--	--	--	--	--	--	--	V
Test Channel 11/467.6375 MHz							
Frequency(MHz)	P_{Mea} (dBm)	G_a Antenna Gain(dBi)	P_{cl} (dB)	Peak EIRP (dBm)	Limit（dBm）	Margin (dBm)	Polarity
935.25	-32.24	5.95	2.84	-29.13	-13.00	-16.13	H
1403.55	-34.42	7.55	2.69	-29.56	-13.00	-16.56	H
1870.40	-40.45	9.95	3.17	-33.67	-13.00	-20.67	H
2339.20	-44.20	10.25	3.83	-37.78	-13.00	-24.78	H
--	--	--	--	--	--	--	H
935.25	-32.23	5.95	2.84	-29.12	-13.00	-16.12	V
1403.55	-33.43	7.55	2.69	-28.57	-13.00	-15.57	V
1870.40	-40.06	9.95	3.17	-33.28	-13.00	-20.28	V
2339.20	-43.99	10.25	3.83	-37.57	-13.00	-24.57	V

Remark:

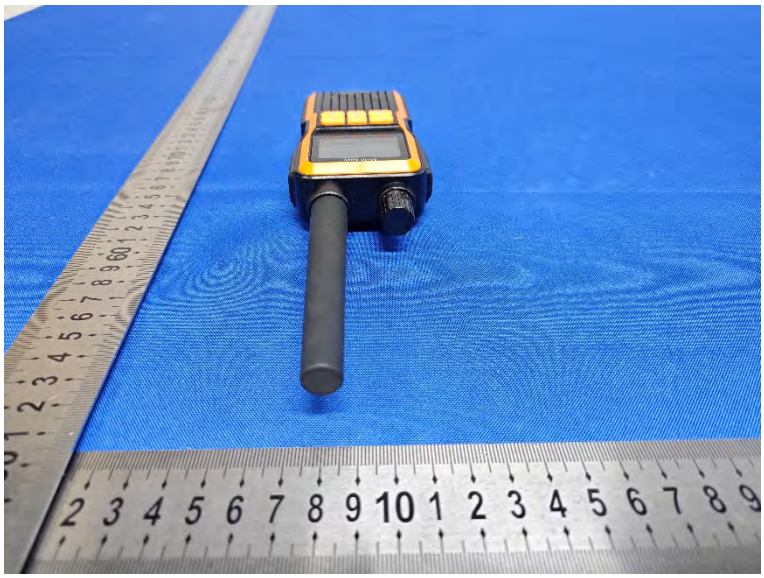
1. *$EIRP=P_{Mea}(dBm)-P_{cl}(dB)+G_a(dBi)$*
2. *-- Means other points for values lower than limits and not recorded.*
3. *Margin = Limit – EIRP*

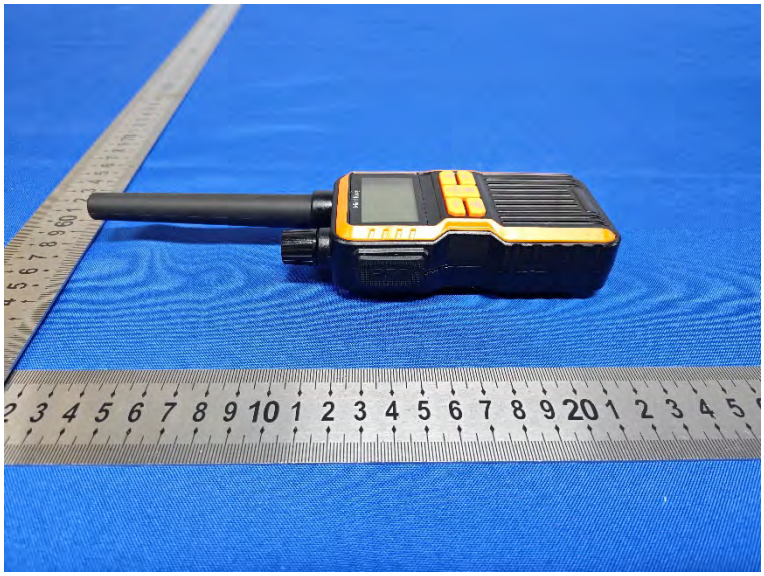
4 Test Setup Photos of the EUT

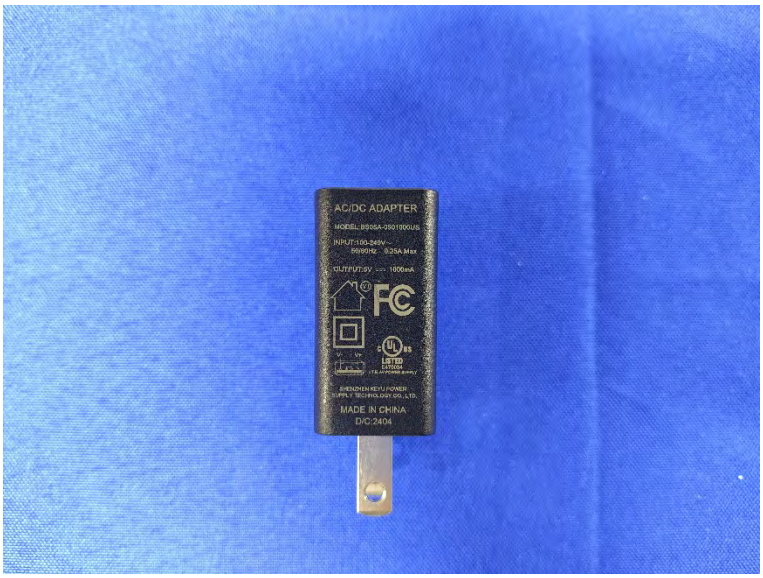


5 Photos of the EUT

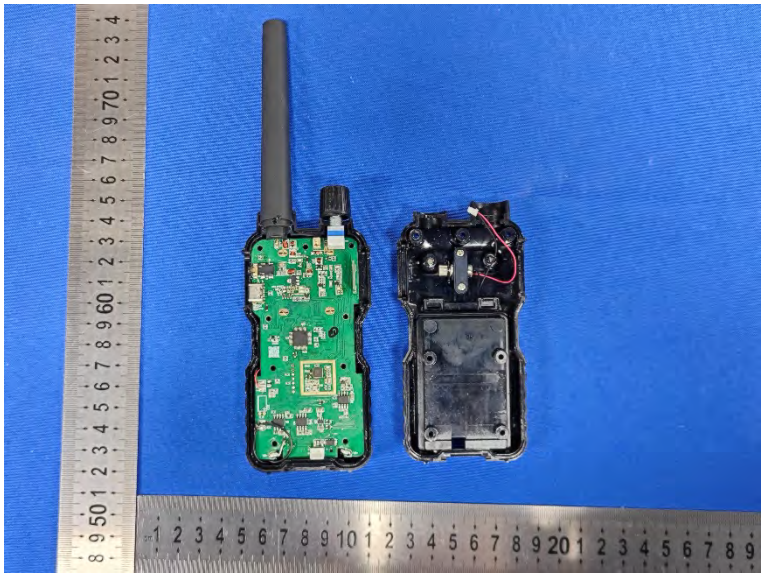
External Photos of EUT

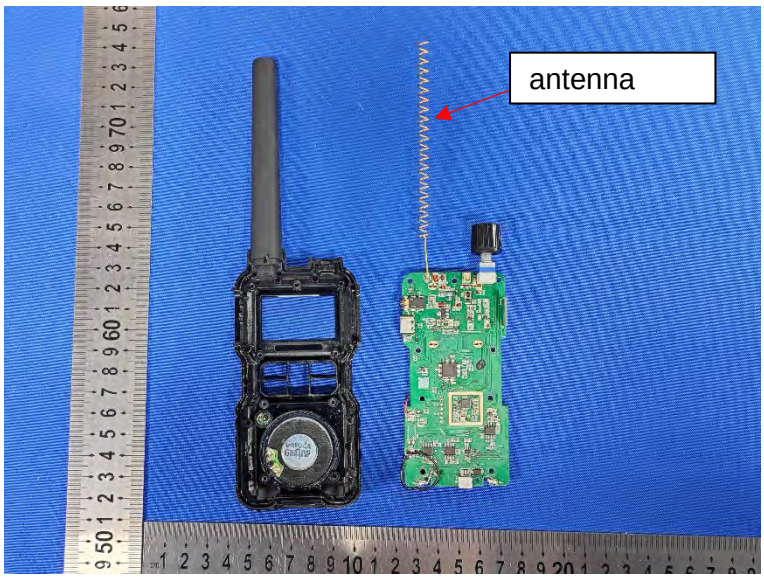


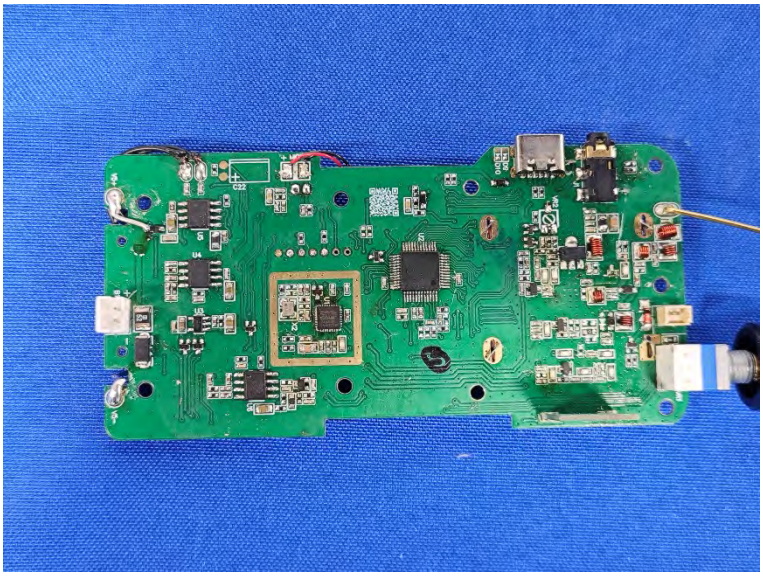


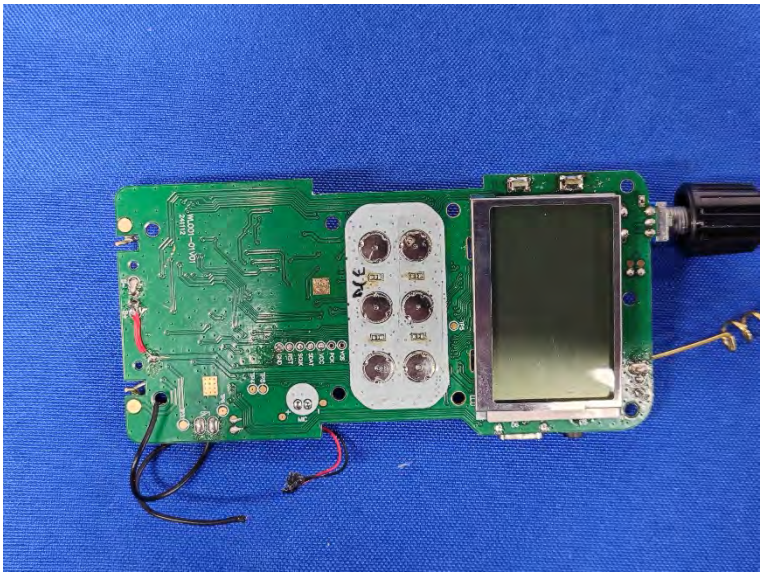

AC/DC ADAPTER
MADE IN CHINA
D/C:2404

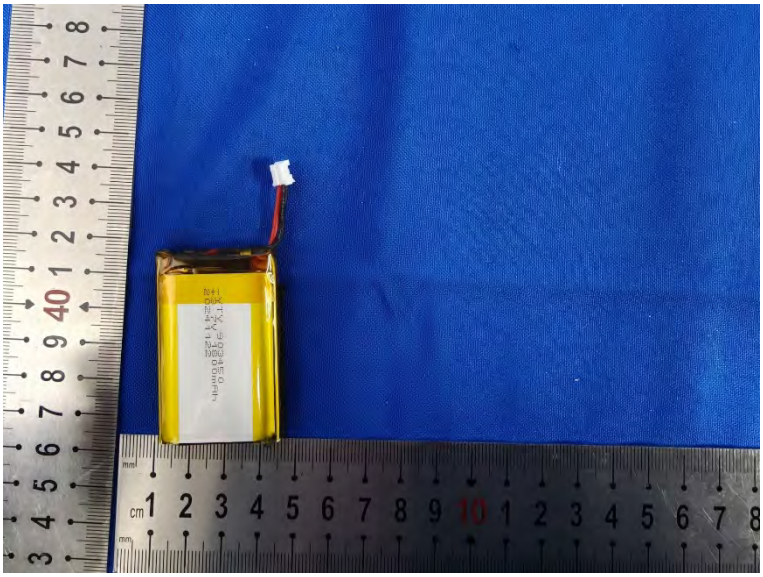
Internal Photos of EUT











************************** End of Report **************************