



TEST REPORT

Report No. : **CHTEW20100099** Report Verification: 

Project No...... : **SHT2008103307EW**

FCC ID..... : **2ASNSRB26**

Applicant's name..... : **Shenzhen Retevis Technology Co., Ltd.**

Address..... : Room 700, 7/F, 13-C, Zhonghaixin Science&Technology Park,
No.12 Ganli 6th Road, Jihua Street, Longgang District, Shenzhen,
China

Test item description : **Two Way Radio**

Trade Mark : RETEVIS

Model/Type reference..... : RB26

Listed Model(s) : -

Standard : **FCC CFR Title 47 Part 95 Subpart E**

Date of receipt of test sample..... : Oct.09, 2020

Date of testing..... : Oct.09, 2020- Oct.26, 2020

Date of issue..... : Oct.27, 2020

Result..... : **PASS**

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Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao,
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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- [FCC Rules Part 95](#): PERSONAL RADIO SERVICES
- [FCC Rules Part 2](#): Frequency allocations and radio treaty matters; General rules and regulations
- [ANSI C63.26-2013](#): American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
- [ANSI C63.4-2014](#): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2. Report version

| Revision No. | Date of issue | Description |
|--------------|---------------|-------------|
| N/A | 2020-10-26 | Original |
| | | |
| | | |
| | | |
| | | |

2. TEST DESCRIPTION

| Report clause | Test Items | Standard Requirement | Result |
|---------------|---|-----------------------------|--------|
| 5.1 | Carrier Output Power (ERP) | Part 95.1767 Part 2.1046 | PASS |
| 5.2 | 99% Occupied Bandwidth & 26dB bandwidth | Part 95.1773 Part 2.1049 | PASS |
| 5.3 | Emission Mask | Part 95.1779 Part 2.1049 | PASS |
| 5.4 | Modulation Limit | Part 95.1775 Part 2.1047 | PASS |
| 5.5 | Audio Frequency Response | Part 95.1775 Part 2.1047 | PASS |
| 5.6 | Audio Low Pass Filter Response | Part 95.1775 Part 2.1047 | PASS |
| 5.7 | Frequency Stability V.S. Temperature | Part 95.1765 Part 2.1055 | PASS |
| 5.8 | Frequency Stability V.S. Voltage | Part 95.1765 Part 2.1055 | PASS |
| 5.9 | Transmit Radiated Spurious Emission | Part 95.1779 Part 2.1053 | PASS |

Note:

- The measurement uncertainty is not included in the test result.

3. SUMMARY

3.1. Client Information

| | |
|---------------|--|
| Applicant: | Shenzhen Retevis Technology Co., Ltd. |
| Address: | Room 700, 7/F, 13-C, Zhonghaixin Science&Technology Park, No.12 Ganli 6th Road, Jihua Street, Longgang District, Shenzhen, China |
| Manufacturer: | Shenzhen Retevis Technology Co., Ltd. |
| Address: | Room 700, 7/F, 13-C, Zhonghaixin Science&Technology Park, No.12 Ganli 6th Road, Jihua Street, Longgang District, Shenzhen, China |

3.2. Product Description

| | |
|----------------------|---|
| Name of EUT: | Two Way Radio |
| Trade Mark: | RETEVIS |
| Model No.: | RB26 |
| Listed Model(s): | - |
| Power supply: | DC 3.7V |
| Battery information: | Model: BL26 Voltage: DC 3.7V Capacity: 2000mAh(7.4Wh) |
| Charger information: | Model: DC26 Input: DC5Va.c.,1000mA Output: DC4.2Va.c.,300mA |
| Hardware version: | RB26-v3.0 |
| Software version: | RB26-v3.0 |

3.3. Radio Specification Description

| | | |
|--------------------------|------------------------------|---|
| Support Frequency Range: | 462MHz Main channel: | 462.5500, 462.5750, 462.6000, 462.6250, 462.6500, 462.6750, 462.7000, 462.7250MHz |
| | 462MHz interstitial channel: | 462.5625, 462.5875, 462.6125, 462.6375, 462.6625, 462.6875, 462.7125 MHz |
| | 467MHz Main channel: | 467.5500, 467.5750, 467.6000, 467.6250, 467.6500, 467.6750, 467.7000, 467.7250MHz |
| | 467MHz interstitial channel: | 467.5675, 467.5875, 467.6125, 467.6375, 467.6625, 467.6875, 467.7125MHz |
| Modulation Type: | FM | |
| Emission Designator: *1 | 16K0F3E, 11K0F3E | |
| Antenna Type: | Integral | |
| Antenna Gain: | 2.15dBi | |

Note:

(1) *1 According to FCC Part 2.202 requirements, the Necessary Bandwidth is calculated as follows:

- For FM Voice Modulation

Channel Spacing = 12.5 KHz, D = 2.5 KHz max, K = 1, M = 3 KHz

$B_n = 2M + 2DK = 2*3 + 2*2.5*1 = 11 \text{ KHz}$

Emission designation: 11K0F3E

Channel Spacing = 25 KHz, D = 5 KHz max, K = 1, M = 3 KHz

$B_n = 2M + 2DK = 2 \times 3 + 2 \times 5 \times 1 = 16 \text{ KHz}$

Emission designation: 16K0F3E

(2) The device only supports voice communication.

3.4. Testing Laboratory Information

| Laboratory Name | Shenzhen Huatongwei International Inspection Co., Ltd. | |
|---------------------|--|----------------------|
| Laboratory Location | 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China | |
| Qualifications | Type | Accreditation Number |
| | CNAS | L1225 |
| | A2LA | 3902.01 |
| | FCC | 762235 |
| | Canada | 5377A |

4. TEST CONFIGURATION

4.1. Test frequency list

According to ANSI C63.26 section 5.1.2.1:

Measurements of transmitters shall be performed and, if required, reported for each frequency band in which the EUT can be operated with the device transmitting at the number of frequencies in each band specified in Table 2.

| Frequency range over which EUT operates | Number of frequencies | Location in frequency range of operation |
|---|-----------------------|--|
| 1 MHz or less | 1 | Middle |
| 1 MHz to 10 MHz | 2 | 1 near top and 1 near bottom |
| More than 10 MHz | 3 | 1 near top, 1 near middle, and 1 near bottom |

| Test Channel | Frequency range | Type | Frequency (MHz) |
|------------------|-----------------|--------------|-----------------|
| CH _{M1} | 462MHz | Main | 462.6500 |
| CH _{M2} | 467MHz | Main | 467.6500 |
| CH _{M3} | 462MHz | Interstitial | 462.6375 |
| CH _{M4} | 467MHz | Interstitial | 467.6375 |

The Product channel frequency table:

| Frequency Band | Type | Frequency (MHz) | Frequency Band | Type | Frequency (MHz) |
|----------------|--------------|-----------------|----------------|--------------|-----------------|
| 462MHz | Main | 462.5500 | 467MHz | Main | 467.5500 |
| | | 462.5750 | | | 467.5750 |
| | | 462.6000 | | | 467.6000 |
| | | 462.6250 | | | 467.6250 |
| | | 462.6500 | | | 467.6500 |
| | | 462.6750 | | | 467.6750 |
| | | 462.7000 | | | 467.7000 |
| 462MHz | Interstitial | 462.7250 | 467MHz | Interstitial | 467.7250 |
| | | 462.5625 | | | 467.5675 |
| | | 462.5875 | | | 467.5875 |
| | | 462.6125 | | | 467.6125 |
| | | 462.6375 | | | 467.6375 |
| | | 462.6625 | | | 467.6625 |
| | | 462.6875 | | | 467.6875 |
| | 462.7125 | 467.7125 | | | |

4.2. Test mode

| Test mode | Transmitting | GMRS |
|-----------|--------------|------|
| TX-GMRS | √ | √ |

Note:

√: is operation mode.

| Modulation Type | Description |
|-----------------|---|
| UM | Un-modulation |
| AM2 | Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation. |
| AM6 | Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation, then increase the level from the audio generator by 20 dB |
| AM5 | Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation. |

| Test item | Modulation Type | Test mode |
|---|-----------------|-----------|
| Output Power(ERP) | UM | TX-GMRS |
| 99% Occupied Bandwidth & 26dB bandwidth | AM6 | TX-GMRS |
| Emission Mask | AM5 | TX-GMRS |
| Modulation Limit | AM6 | TX-GMRS |
| Audio Frequency Response | AM2 | TX-GMRS |
| Audio Low Pass Filter Response | AM2 | TX-GMRS |
| Frequency Stability VS Temperature | UM | TX-GMRS |
| Frequency Stability VS Voltage | UM | TX-GMRS |
| Transmit Radiated Spurious Emission | AM5 | TX-GMRS |

4.3. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

| Whether support unit is used? | | | | | |
|-------------------------------|-----------|------------|-----------|--------|------------|
| √ No | | | | | |
| Item | Equipment | Trade Name | Model No. | FCC ID | Power cord |
| 1 | | | | | |
| 2 | | | | | |

4.4. Testing environmental condition

| Type | Requirement | Actual |
|--------------------|-----------------------------------|----------|
| Temperature: | 15~35°C | 25°C |
| Relative Humidity: | 25~75% | 50% |
| Air Pressure: | 860~1060mbar | 1000mbar |
| Test voltage: | Normal voltage (V_N): | |
| | Extreme lower voltage (V_L): | |
| | Extreme higher voltage (V_H): | |

4.5. Measurement uncertainty

| Test Item | Measurement Uncertainty |
|---|-------------------------|
| Frequency stability | 25 Hz |
| Carrier output power (ERP) | 2.20 dB |
| Occupied Bandwidth | 35 Hz |
| Modulation Limiting | 0.42 % |
| FM deviation | 25 Hz |
| Audio level | 0.62 dB |
| Radiated Spurious Emission 30~1000MHz | 4.65 dB |
| Radiated Spurious Emission 1~18GHz | 5.16 dB |
| AC power line Conducted Emission 9KHz-30MHz | 3.39 dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

4.6. Equipment Used during the Test

| ● Radiated Emission-6th test site | | | | | | | |
|-----------------------------------|-------------------------|--------------------|---------------|-------------|------------|---------------------------|---------------------------|
| Used | Test Equipment | Manufacturer | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ● | Semi-Anechoic Chamber | Albatross projects | HTWE0127 | SAC-3m-02 | C11121 | 2018/09/30 | 2021/09/29 |
| ● | EMI Test Receiver | R&S | HTWE0099 | ESCI | 100900 | 2020/10/19 | 2021/10/18 |
| ● | Loop Antenna | R&S | HTWE0170 | HFH2-Z2 | 100020 | 2018/04/02 | 2021/04/01 |
| ● | Ultra-Broadband Antenna | SCHWARZBECK | HTWE0123 | VULB9163 | 538 | 2018/04/04 | 2021/04/03 |
| ● | Pre-Amplifier | SCHWARZBECK | HTWE0295 | BBV 9742 | N/A | 2019/11/14 | 2020/11/13 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0062-01 | N/A | N/A | 2020/05/27 | 2021/05/26 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0062-02 | SUCOFLEX104 | 501184/4 | 2020/05/27 | 2021/05/26 |
| ● | Test Software | R&S | N/A | ES-K1 | N/A | N/A | N/A |

| ● Radiated emission-7th test site | | | | | | | |
|-----------------------------------|-------------------------|--------------------|---------------|-------------------|-------------|---------------------------|---------------------------|
| Used | Test Equipment | Manufacturer | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ● | Semi-Anechoic Chamber | Albatross projects | HTWE0122 | SAC-3m-01 | N/A | 2018/09/27 | 2021/09/26 |
| ● | Spectrum Analyzer | R&S | HTWE0098 | FSP40 | 100597 | 2020/10/20 | 2021/10/19 |
| ● | Horn Antenna | SCHWARZBECK | HTWE0126 | 9120D | 1011 | 2020/04/01 | 2023/03/31 |
| ● | Broadband Horn Antenna | SCHWARZBECK | HTWE0103 | BBHA9170 | BBHA9170472 | 2018/10/11 | 2021/10/11 |
| ● | Pre-amplifier | CD | HTWE0071 | PAP-0102 | 12004 | 2019/11/14 | 2020/11/13 |
| ● | Broadband Pre-amplifier | SCHWARZBECK | HTWE0201 | BBV 9718 | 9718-248 | 2020/05/23 | 2021/05/22 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-01 | 6m 18GHz S Serisa | N/A | 2020/05/10 | 2021/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-02 | 6m 3GHz RG Serisa | N/A | 2020/05/10 | 2021/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-03 | 6m 3GHz RG Serisa | N/A | 2020/05/10 | 2021/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-04 | 6m 3GHz RG Serisa | N/A | 2020/05/10 | 2021/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0121-01 | 6m 18GHz S Serisa | N/A | 2020/05/10 | 2021/05/09 |
| ● | Test Software | Audix | N/A | E3 | N/A | N/A | N/A |

| ● RF Conducted Method | | | | | | | |
|-----------------------|------------------------------|--------------|---------------|-----------|------------|---------------------------|---------------------------|
| Used | Test Equipment | Manufacturer | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ● | Signal and spectrum Analyzer | R&S | HTWE0242 | FSV40 | 100048 | 2020/10/19 | 2021/10/18 |
| ● | Signal & Spectrum Analyzer | R&S | HTWE0262 | FSW26 | 103440 | 2020/10/19 | 2021/10/18 |
| ● | Spectrum Analyzer | Agilent | HTWE0286 | N9020A | MY50510187 | 2020/10/19 | 2021/10/18 |
| ● | Radio communication tester | R&S | HTWE0287 | CMW500 | 137688-Lv | 2020/10/19 | 2021/10/18 |
| ● | Test software | Tonscend | N/A | JS1120 | N/A | N/A | N/A |

5. TEST CONDITIONS AND RESULTS

5.1. Carrier Output Power (ERP)

LIMIT

FCC Part FCC Part 95.1767, FCC Part 2.1046

(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**.

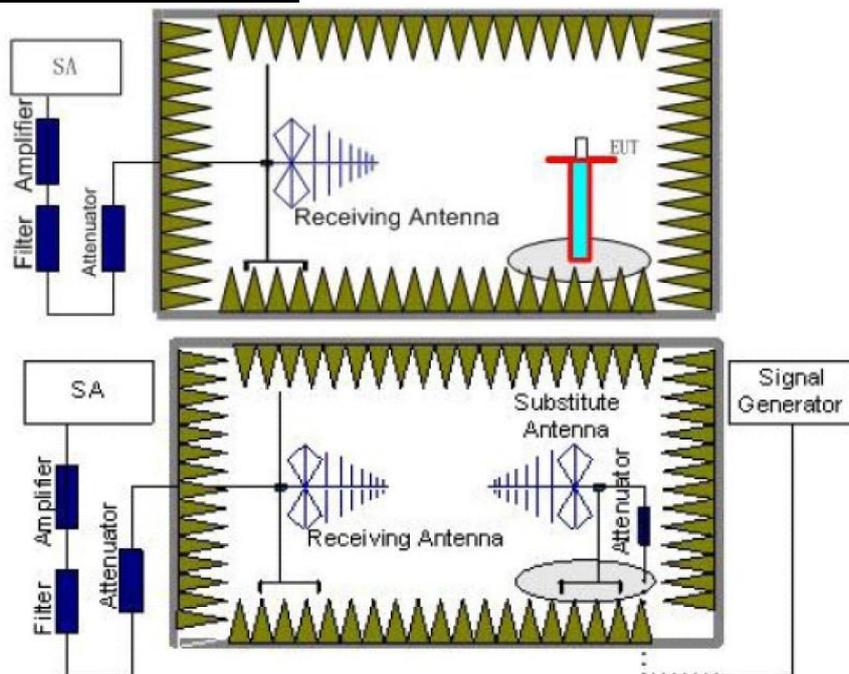
(b) 462 MHz interstitial channels.

The effective radiated power (ERP) of mobile, hand-held portable and base stations transmitting on the 462MHz 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.

TEST CONFIGURATION



TEST PROCEDURE

- 1) The measuring distance of at 3m shall be used for measurements
- 2) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- 3) The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) The spectrum setting for Equivalent Isotropically Radiated Power (EIRP) is RBW = 100kHz, VBW = 300kHz. Detector Mode is Positive Peak
- 5) Record the field strength level of the EUT from the spectrum
- 6) The substitution antenna is substituted for EUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be moved height from 1m to 4m to find the highest radiation. Adjust the S.G. output level and repeat this step to get the same field strength level as the EUT
- 7) The EIRP level = S.G. output level(dBm)- TX cable(dB) + Substituted Antenna Gain(dBi)
- 8) The ERP level = EIRP-2.15

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed **Not Applicable**

TEST Data

Please refer to appendix A on the appendix report

5.2. 99% Occupied Bandwidth & 26dB Bandwidth

LIMIT

FCC Part 95.1773, FCC Part 2.1049

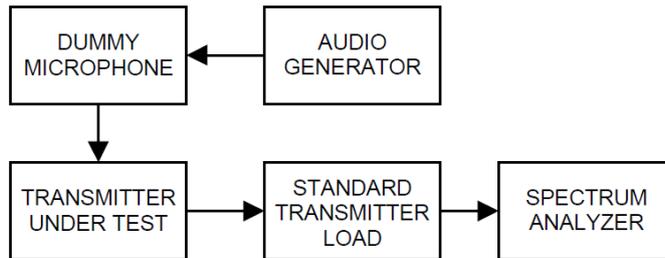
(a) Main channels.

The authorized bandwidth is **20 kHz** for GMRS transmitters operating on any of the 462 MHz main channels or any of the 467 MHz main channels.

(b) Interstitial channels.

The authorized bandwidth is **20 kHz** for GMRS transmitters operating on any of the 462 MHz interstitial channels and is **12.5 kHz** for GMRS transmitters operating on any of the 467 MHz interstitial channels

TEST CONFIGURATION



TEST PROCEDURE

- 1) Connect the equipment as illustrated
- 2) Spectrum set as follow:
Centre frequency = the nominal EUT channel center frequency,
The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient)
RBW = 1% to 5% of the anticipated OBW, VBW $\geq 3 \times \text{RBW}$, Sweep = auto,
Detector function = peak, Trace = max hold
- 3) Set 99% Occupied Bandwidth and 26dB Bandwidth
- 4) Measure and record the results in the test report.

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix B on the appendix report

5.3. Emission Mask

LIMIT

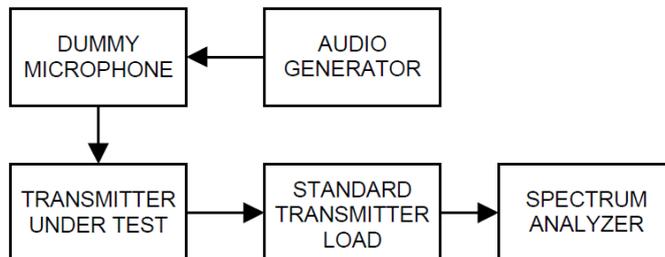
FCC Part 95.1779(b)(1)(2)(7), FCC Part 2.1049

(b) Attenuation requirements.

The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

- (1) **25 dB** (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- (2) **35 dB** on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- (7) **$43 + 10 \log (P)$ dB** on any frequency removed from the center of the authorized bandwidth by more than 250%.

TEST CONFIGURATION



TEST PROCEDURE

- 1) Connect the equipment as illustrated.
- 2) Spectrum set as follow:
Centre frequency = fundamental frequency, RBW=300Hz, VBW=1000Hz, Sweep = auto, Detector function = peak, Trace = max hold
- 3) Key the transmitter, and set the level of the unmodulated carrier to a full scale reference line.
This is the 0dB reference for the measurement.
- 4) Apply Input Modulation Signal to EUT according to Section 4.2
- 5) Measure and record the results in the test report.

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix C on the appendix report

5.4. Modulation Limit

LIMIT

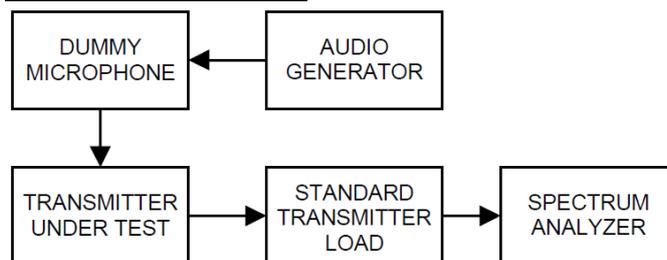
FCC Part 95.1775, FCC Part 2.1047(b)

Each GMRS transmitter type must be designed to satisfy the modulation requirements in this section.

Operation of GMRS stations must also be in compliance with these requirements.

- (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**.

TEST CONFIGURATION



TEST PROCEDURE

- 1) Connect the equipment as illustrated.
- 2) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- 3) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for ≤ 0.25 Hz to $\geq 15,000$ Hz. Turn the de-emphasis function off.
- 4) Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation.
- 5) Increase the level from the audio frequency generator by 20 dB in one step (rise time between the 10% and 90% points shall be 0.1 second maximum).
- 6) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level
- 7) With the level from the audio frequency generator held constant at the level obtained in step 4), slowly vary the audio frequency from 300 Hz to 3000 Hz and observe the steady-state deviation. Record the maximum deviation.

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix D on the appendix report

5.5. Audio Frequency Response

LIMIT

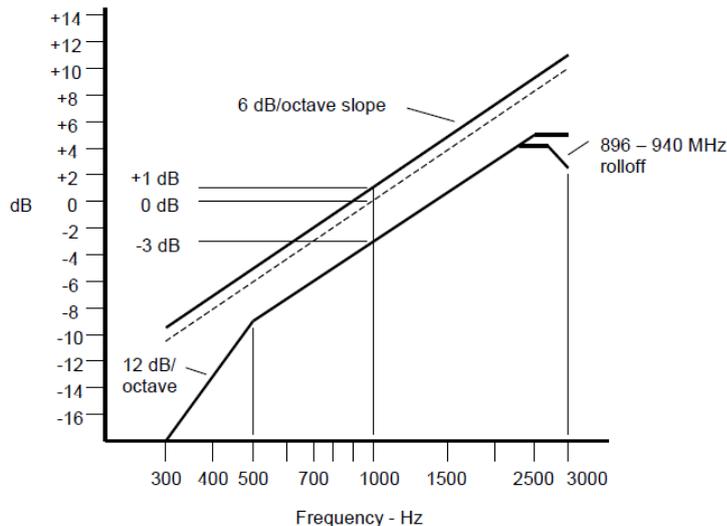
FCC Part 95.1775, FCC Part 2.1047(a)

Each GMRS transmitter type must be designed to satisfy the modulation requirements in this section.

Operation of GMRS stations must also be in compliance with these requirements.

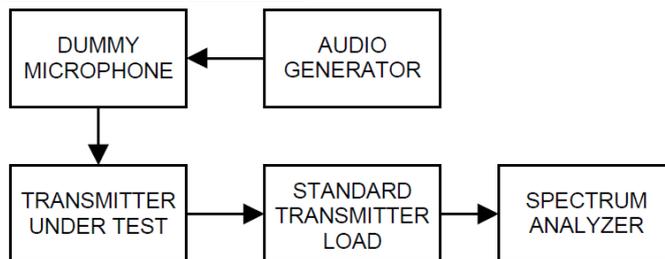
- (d) **Main channels** The peak frequency deviation for emissions to be transmitted on the main channels must **not exceed ± 5 kHz**.
- (e) **462 MHz interstitial channels.** The peak frequency deviation for emissions to be transmitted on the 462 MHz interstitial channels must **not exceed ± 5 kHz**.
- (f) **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**.

Voice modulated communication equipment. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.



An additional 6 dB per octave attenuation is allowed from 2500 Hz to 3000 Hz in equipment operating in the 25 MHz to 869 MHz range.

TEST CONFIGURATION



TEST PROCEDURE

- 1) Connect the equipment as illustrated.
- 2) Set the test receiver to measure peak positive deviation. Set the audio bandwidth for 50 Hz to 15,000 Hz. Turn the de-emphasis function off.
- 3) Set the DMM to measure rms voltage.
- 4) Adjust the transmitter per the manufacturer's procedure for full rated system deviation.
- 5) Apply a 1000 Hz tone and adjust the audio frequency generator to produce 20% of the rated system deviation.
- 6) Set the test receiver to measure rms deviation and record the deviation reading.
- 7) Record the DMM reading as V_{REF} .
- 8) Set the audio frequency generator to the desired test frequency between 300 Hz and 3000 Hz.
- 9) Vary the audio frequency generator output level until the deviation reading that was recorded in step 6) is obtained.
- 10) Record the DMM reading as V_{FREQ} .

- 11) Calculate the audio frequency response at the present frequency as:
audio frequency response= $20\log_{10}(V_{\text{FREQ}}/V_{\text{REF}})$.
- 12) Repeat steps 8) through 11) for all the desired test frequencies

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed **Not Applicable**

TEST Data

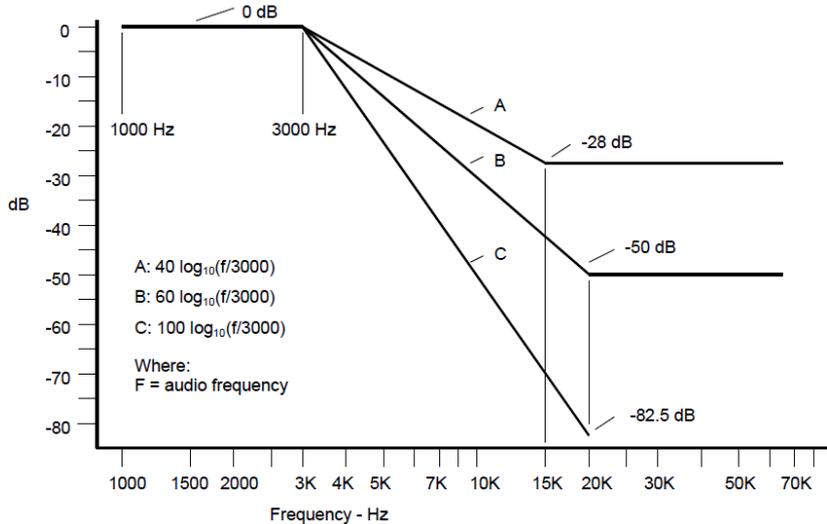
Please refer to appendix E on the appendix report

5.6. Audio Low Pass Filter Response

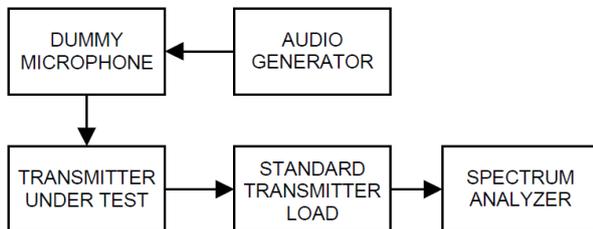
LIMIT

FCC Part 95.1775(e)(1)(2):

- (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.



TEST CONFIGURATION



TEST PROCEDURE

- 1) Configure the EUT as shown in figure .
- 2) Apply a 1000 Hz tone from the audio signal generator and adjust the level per manufacturer’s specifications. Record the dB level of the 1000 Hz tone as LEV_{REF} .
- 3) Set the audio signal generator to the desired test frequency between 3000 Hz and the upper low pass filter limit. Record the dB level at the test frequency as LEV_{FREQ} .
- 4) Calculate the audio frequency response at the test frequency as:
 low pass filter response = $LEV_{FREQ} - LEV_{REF}$

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix F on the appendix report

5.7. Frequency stability VS Temperature

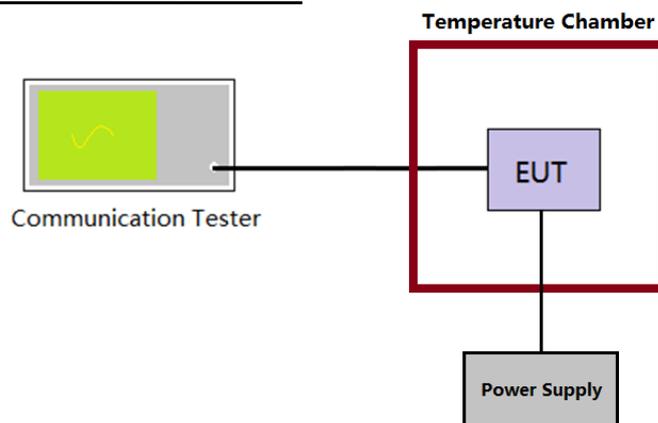
LIMIT

FCC Part 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 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.

TEST CONFIGURATION



TEST PROCEDURE

- 1) The EUT output port was connected to communication tester.
- 2) The EUT was placed inside the temperature chamber.
- 3) Turn EUT off and set the chamber temperature to -30°C . After the temperature stabilized for approximately 30 minutes recorded the frequency as MCF_{MHz} .
- 4) Calculate the ppm frequency error by the following:

$$\text{ppm error} = (MCF_{\text{MHz}} / ACF_{\text{MHz}} - 1) * 10^6$$
 where
 MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz
- 5) Repeat step 3 measure with 10°C increased per stage until the highest temperature of $+50^{\circ}\text{C}$ reached.

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix G on the appendix report

5.8. Frequency stability VS Voltage

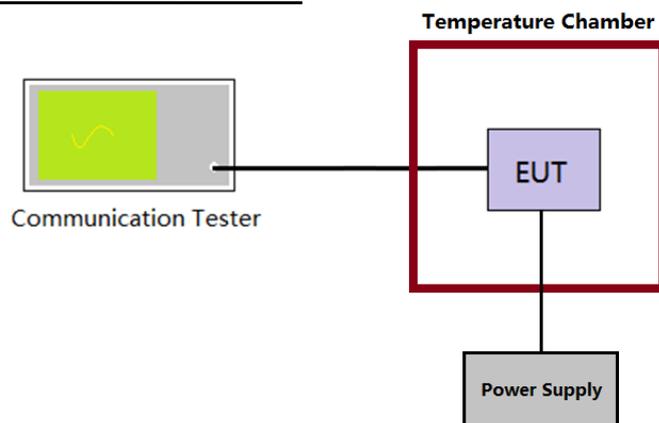
LIMIT

FCC Part 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 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.

TEST CONFIGURATION



TEST PROCEDURE

- 1) The EUT output port was connected to communication tester.
- 2) The EUT was placed inside the temperature chamber at 25°C
- 3) Record the carrier frequency of the transmitter as MCF_{MHz}
- 4) Calculate the ppm frequency error by the following:

$$ppm\ error = (MCF_{MHz} / ACF_{MHz} - 1) * 10^6$$

where
 MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz
- 5) Repeat step 3 measure with varied $\pm 15\%$ of the nominal value measured at the input to the EUT

TEST MODE

Please reference to the section 4.2

TEST RESULTS

Passed Not Applicable

TEST Data

Please refer to appendix H on the appendix report

5.9. Transmit Radiated Spurious Emission

LIMIT

FCC Part 95.1779(b)(1)(2)(7), FCC Part 2.1049

(c) Attenuation requirements.

The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) by at least:

- (1) **25 dB** (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- (2) **35 dB** on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- (7) **43 + 10 log (P) dB** on any frequency removed from the center of the authorized bandwidth by more than 250%.

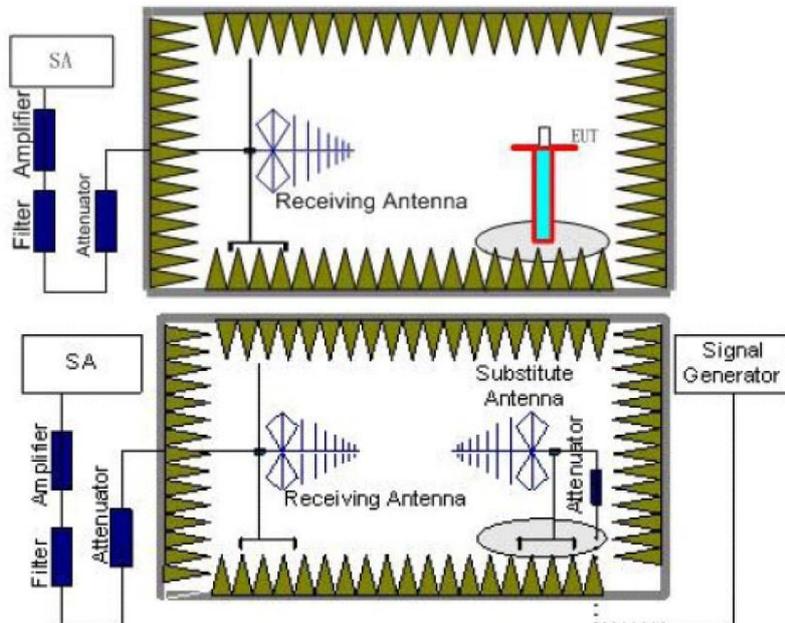
Note:

Limit (dBm)=EL-[43+10log(P)] =10log(P*1000)-[43+10log(P)] = 10log(P)+30-43-10log(P)=**-13dBm**

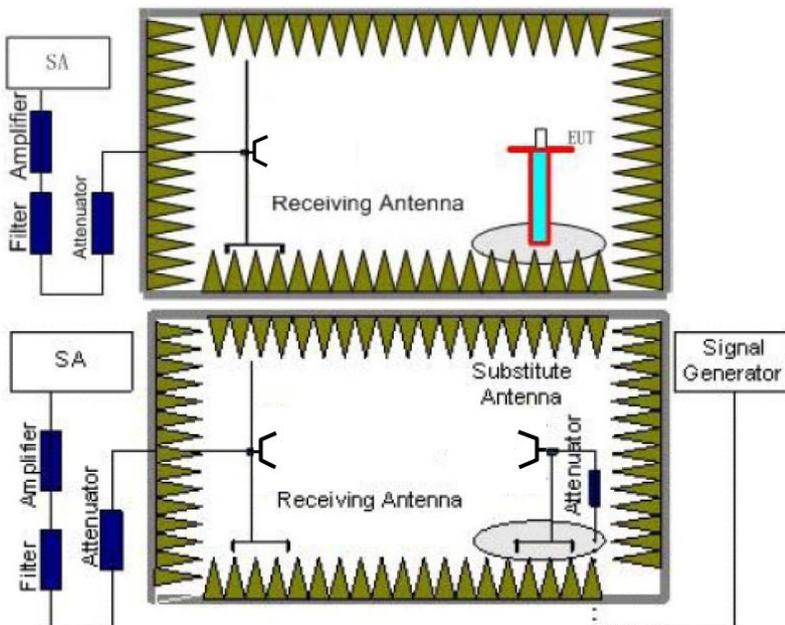
EL is the emission level of the Output Power expressed in dBm,

TEST CONFIGURATION

Below 1GHz:



Above 1GHz:



TEST PROCEDURE

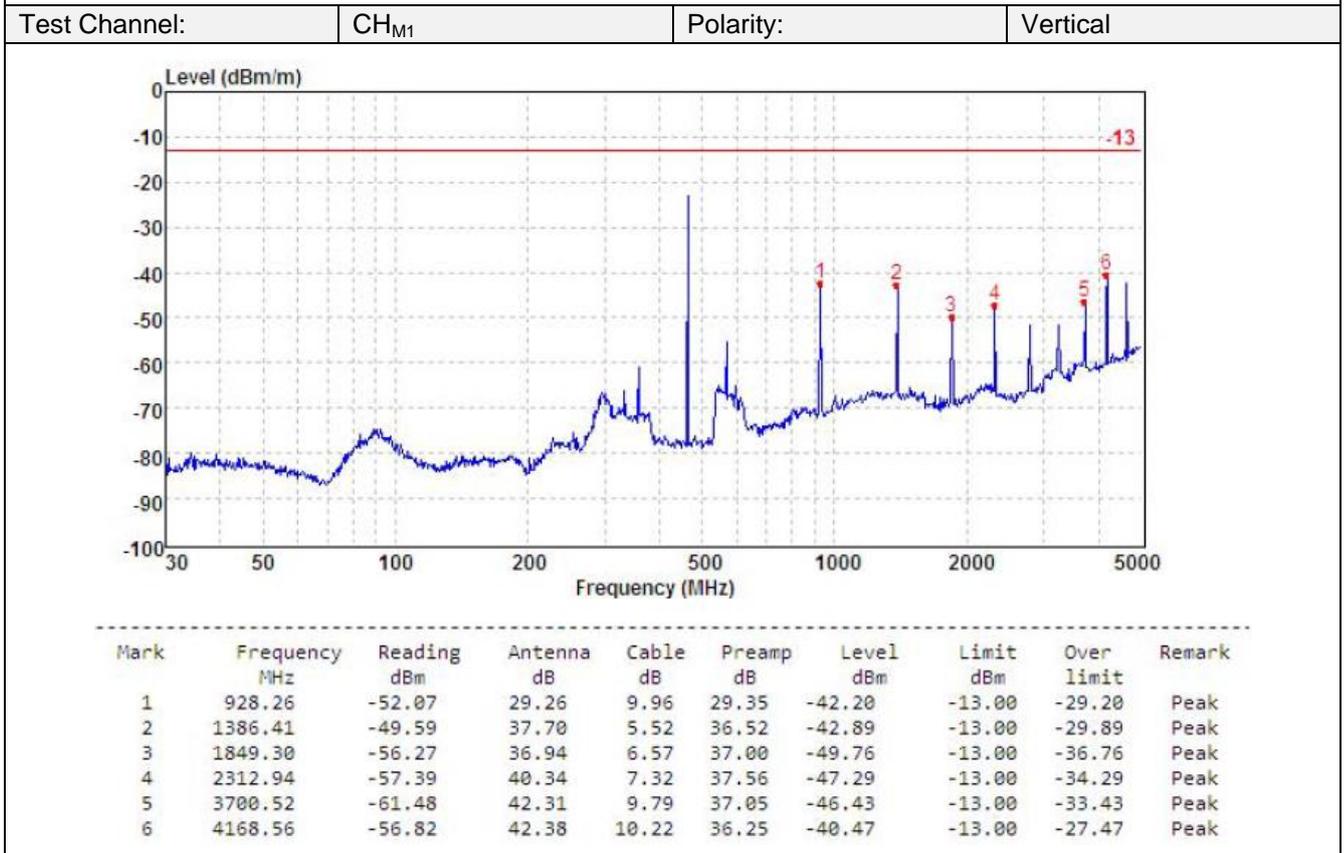
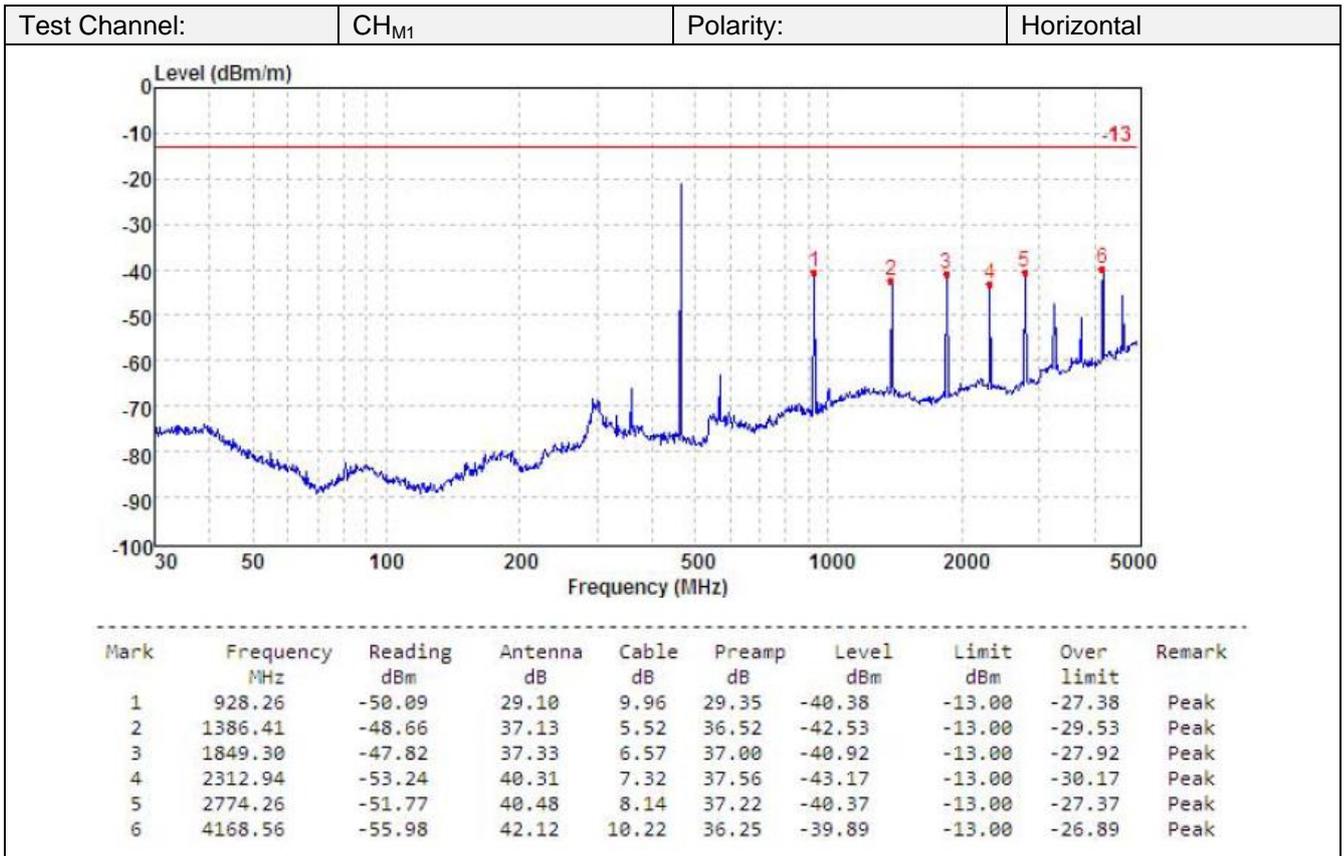
- 1) The measuring distance of at 3m shall be used for measurements
- 2) The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The table was rotated 360 degrees to determine the position of the highest radiation
- 3) The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) The spectrum setting as follow
Below 1 GHz: RBW=120kHz, VBW=300kHz, Sweep time=auto, Detector =peak, Trace=max hold;
Above 1GHz: RBW=1MHz, VBW=3MHz Sweep time=auto, Detector=peak, Trace=max hold
- 5) Record the field strength level of the EUT from the spectrum
- 6) The substitution antenna is substituted for EUT at the same position and signals generator (S.G) export the CW signal to the substitution antenna via a TX cable. The receiver antenna shall be moved height from 1m to 4m to find the highest radiation. Adjust the S.G. output level and repeat this step to get the same field strength level as the EUT
- 7) The EIRP level = S.G. output level(dBm)- TX cable(dB) + Substituted Antenna Gain(dBi)
- 8) Record the ERP value for below 1GHz, ERP value = EIRP-2.15; Record the EIRP for above 1GHz.

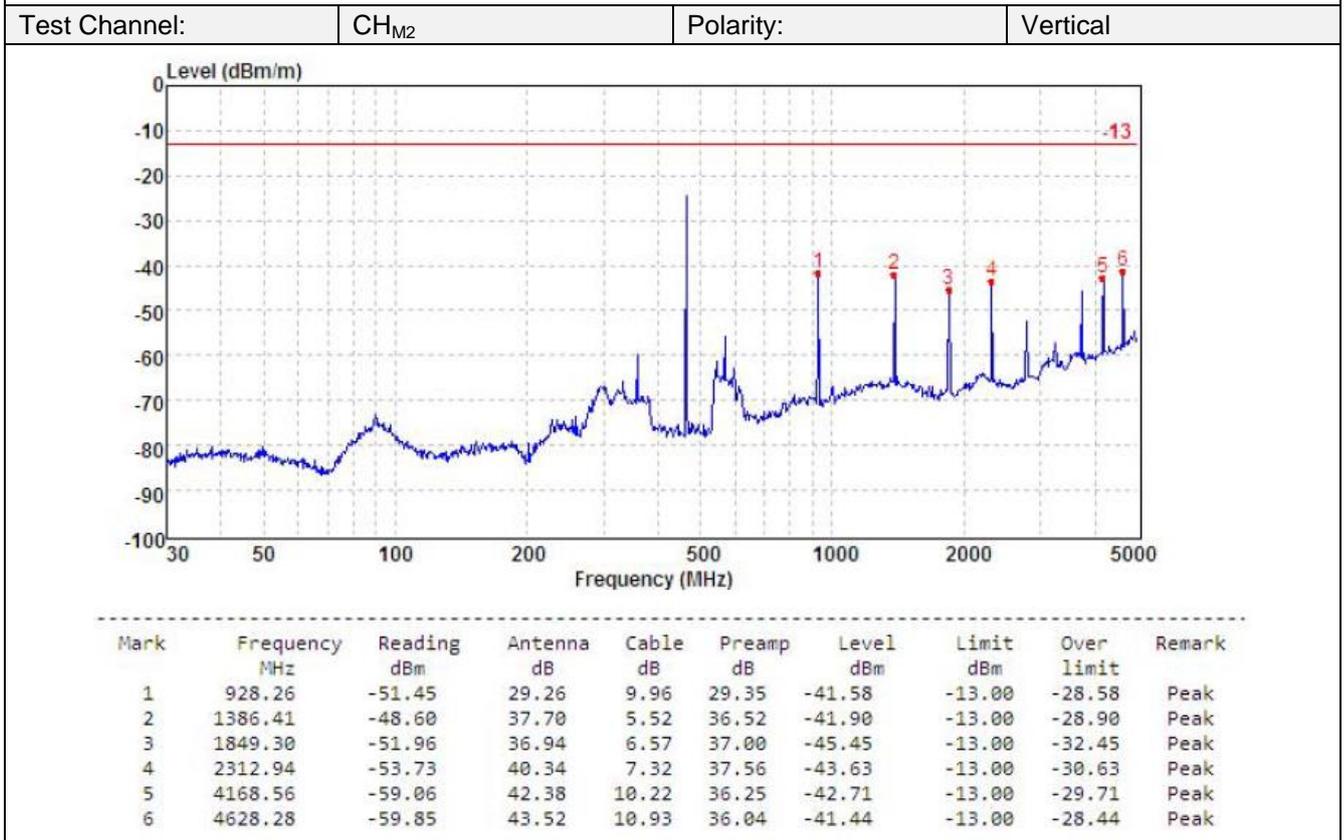
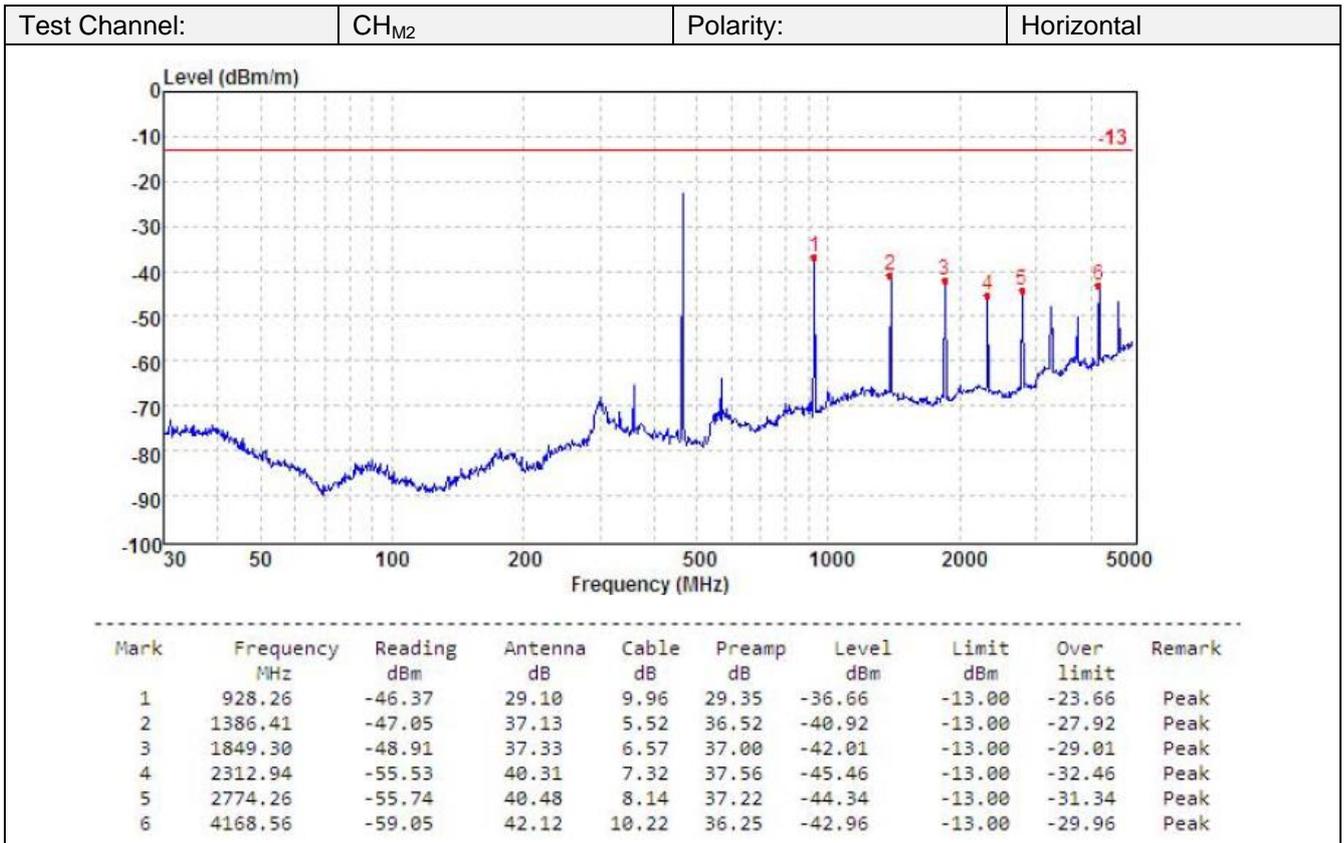
TEST MODE

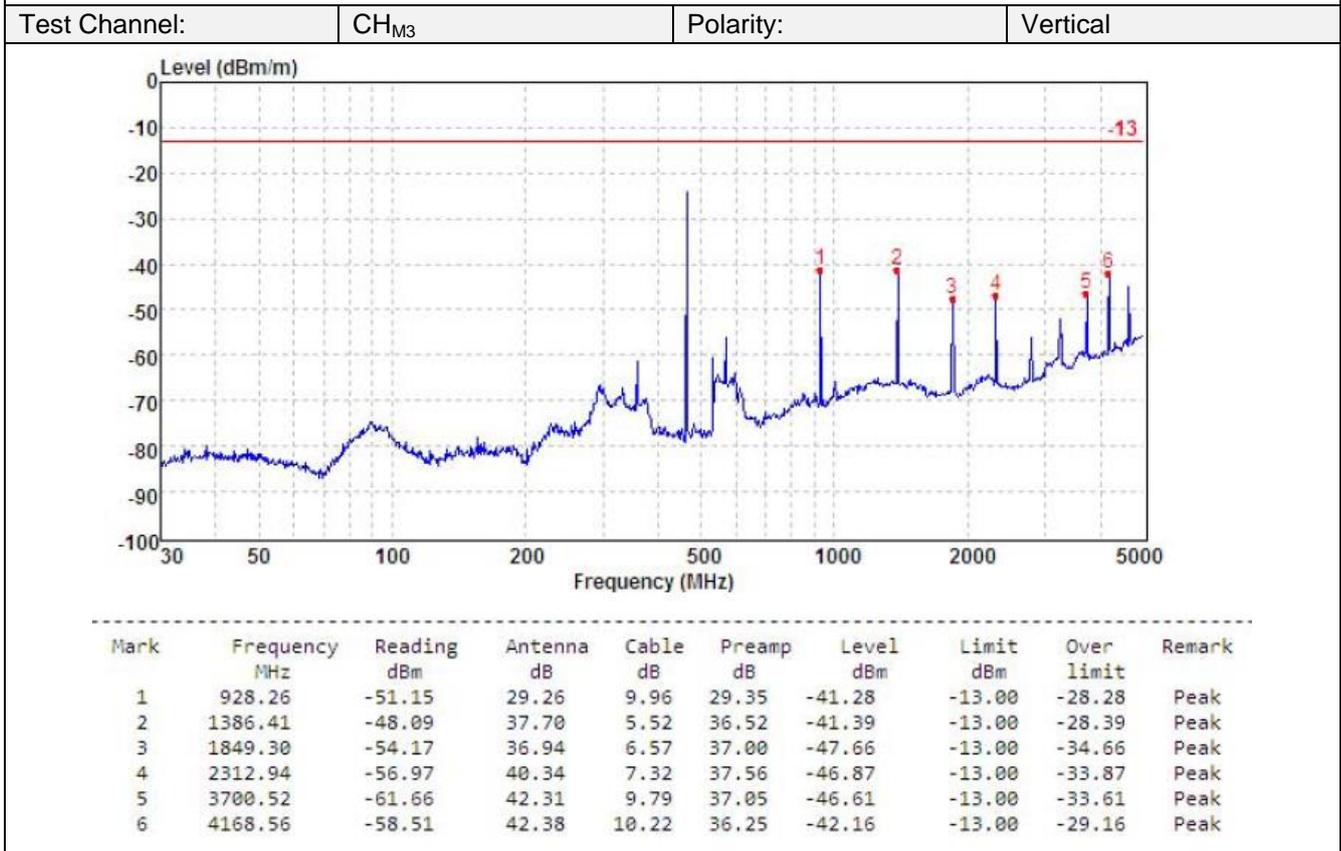
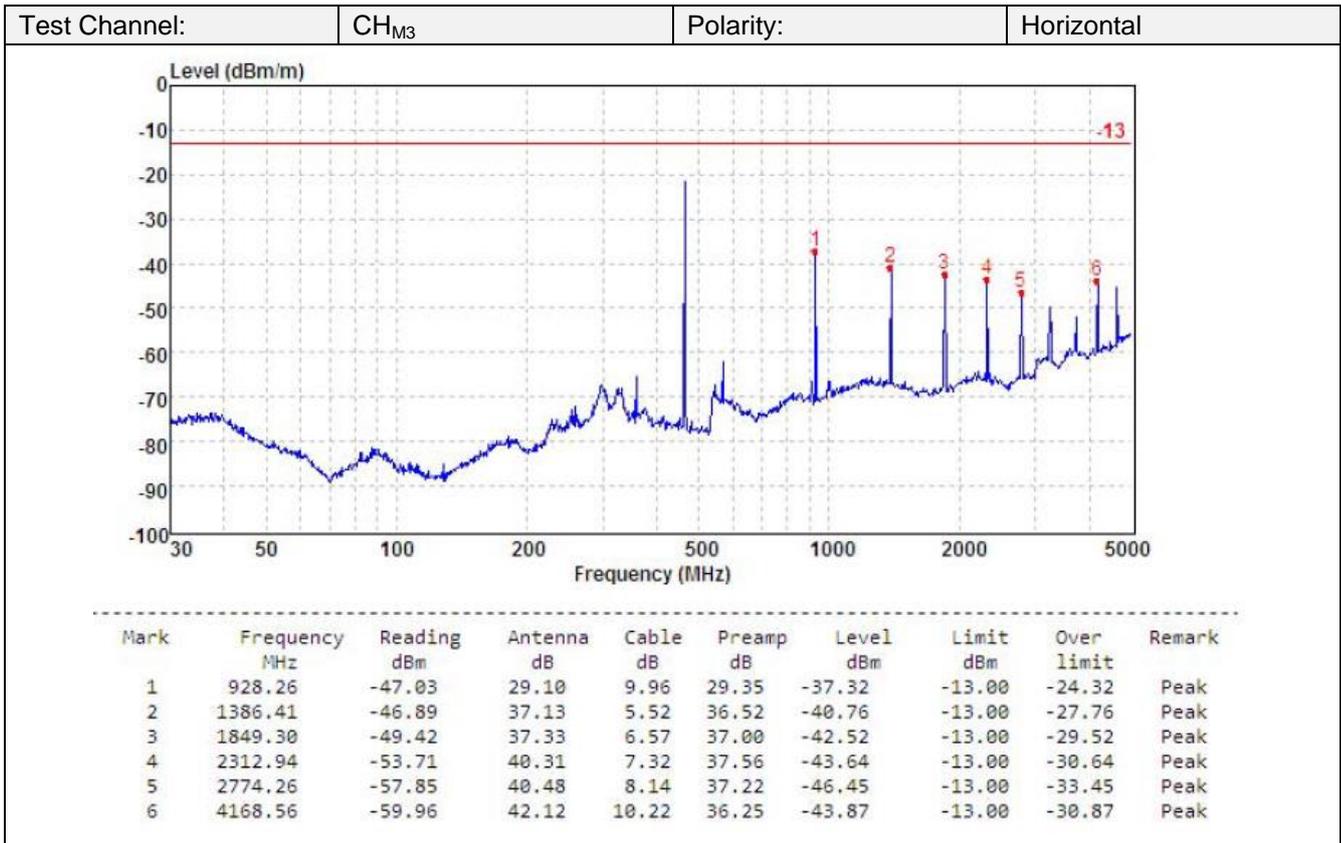
Please reference to the section 4.2

TEST RESULTS

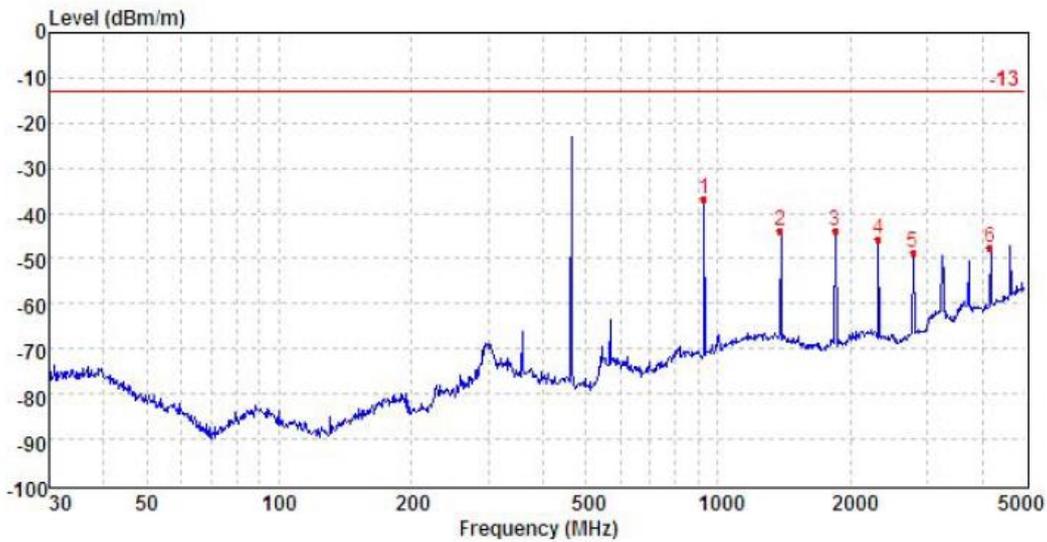
Passed **Not Applicable**





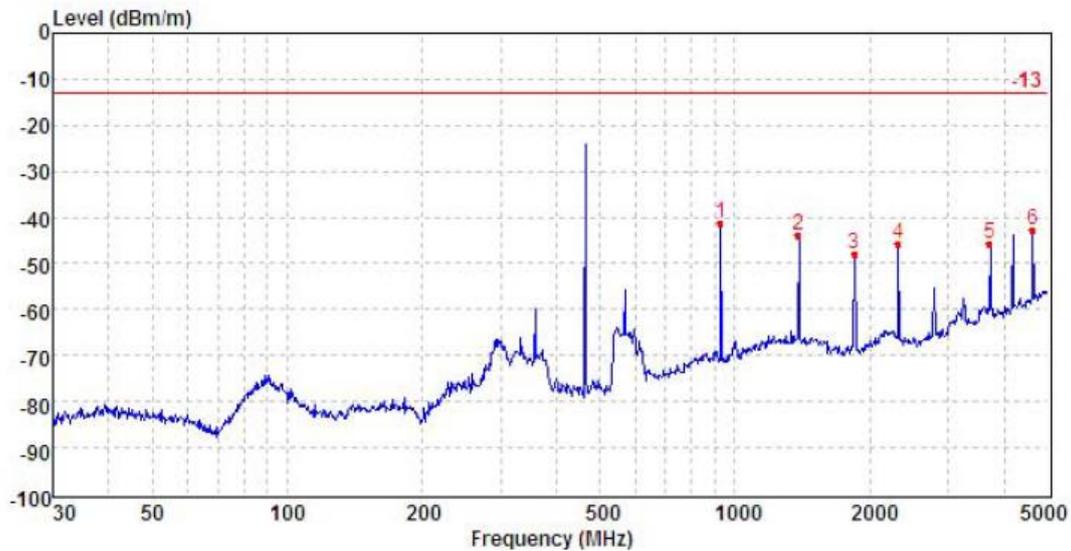


Test Channel: CH_{M4} Polarity: Horizontal



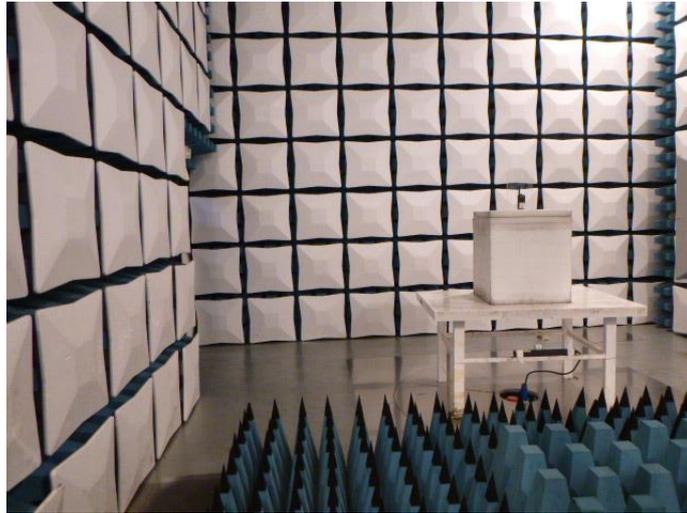
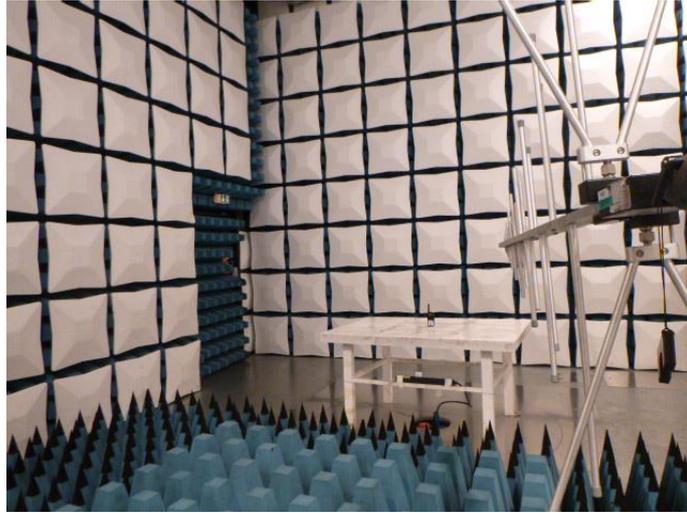
| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|------|---------------|-------------|------------|----------|-----------|-----------|-----------|------------|--------|
| 1 | 928.26 | -46.44 | 29.10 | 9.96 | 29.35 | -36.73 | -13.00 | -23.73 | Peak |
| 2 | 1386.41 | -49.82 | 37.13 | 5.52 | 36.52 | -43.69 | -13.00 | -30.69 | Peak |
| 3 | 1849.30 | -50.60 | 37.33 | 6.57 | 37.00 | -43.70 | -13.00 | -30.70 | Peak |
| 4 | 2312.94 | -55.96 | 40.31 | 7.32 | 37.56 | -45.89 | -13.00 | -32.89 | Peak |
| 5 | 2778.73 | -60.29 | 40.53 | 8.15 | 37.22 | -48.83 | -13.00 | -35.83 | Peak |
| 6 | 4168.56 | -63.78 | 42.12 | 10.22 | 36.25 | -47.69 | -13.00 | -34.69 | Peak |

Test Channel: CH_{M4} Polarity: Vertical



| Mark | Frequency MHz | Reading dBm | Antenna dB | Cable dB | Preamp dB | Level dBm | Limit dBm | Over limit | Remark |
|------|---------------|-------------|------------|----------|-----------|-----------|-----------|------------|--------|
| 1 | 928.26 | -51.14 | 29.26 | 9.96 | 29.35 | -41.27 | -13.00 | -28.27 | Peak |
| 2 | 1386.41 | -50.42 | 37.70 | 5.52 | 36.52 | -43.72 | -13.00 | -30.72 | Peak |
| 3 | 1849.30 | -54.40 | 36.94 | 6.57 | 37.00 | -47.89 | -13.00 | -34.89 | Peak |
| 4 | 2312.94 | -55.79 | 40.34 | 7.32 | 37.56 | -45.69 | -13.00 | -32.69 | Peak |
| 5 | 3700.52 | -60.64 | 42.31 | 9.79 | 37.05 | -45.59 | -13.00 | -32.59 | Peak |
| 6 | 4628.28 | -61.32 | 43.52 | 10.93 | 36.04 | -42.91 | -13.00 | -29.91 | Peak |

6. TEST SETUP PHOTOS

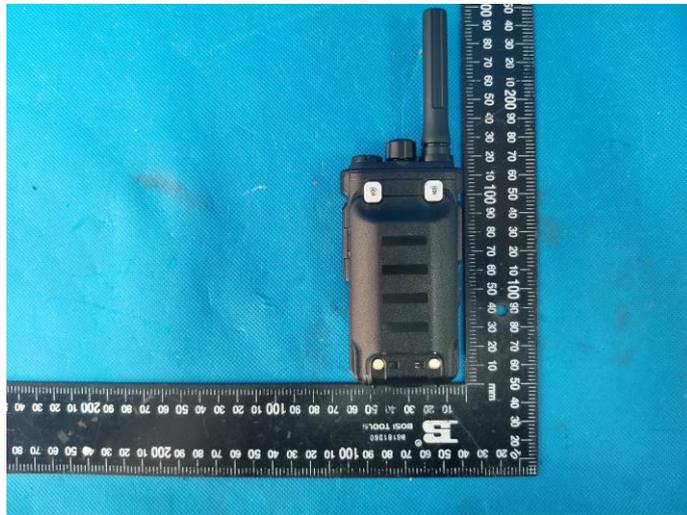


7. EXTERANAL AND INTERNAL PHOTOS

7.1. EXTERANAL PHOTOS

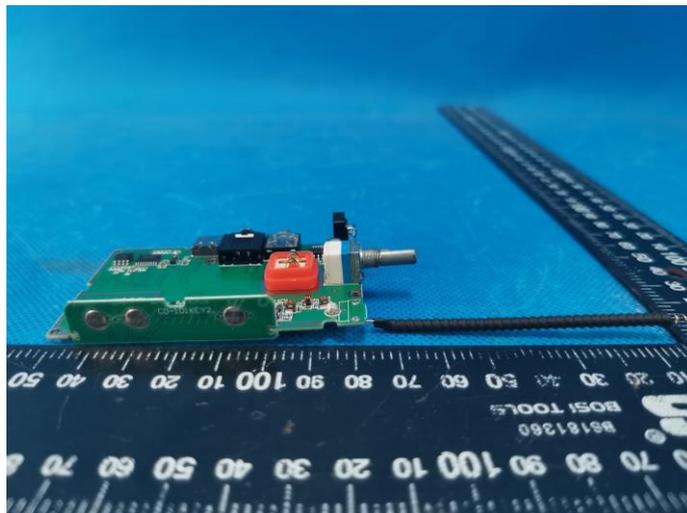
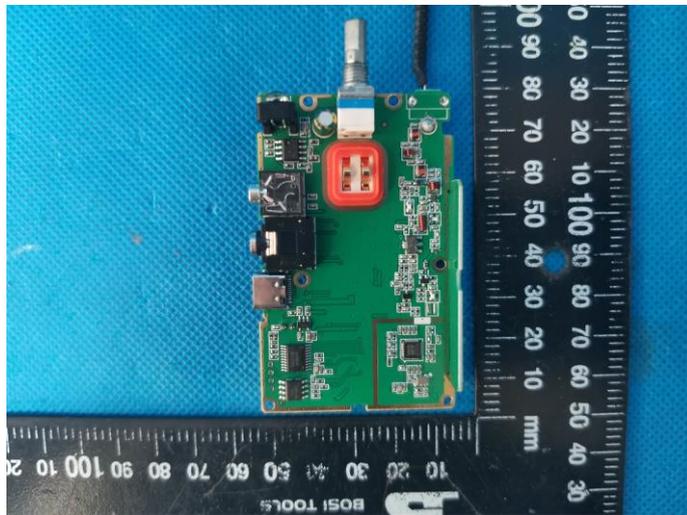


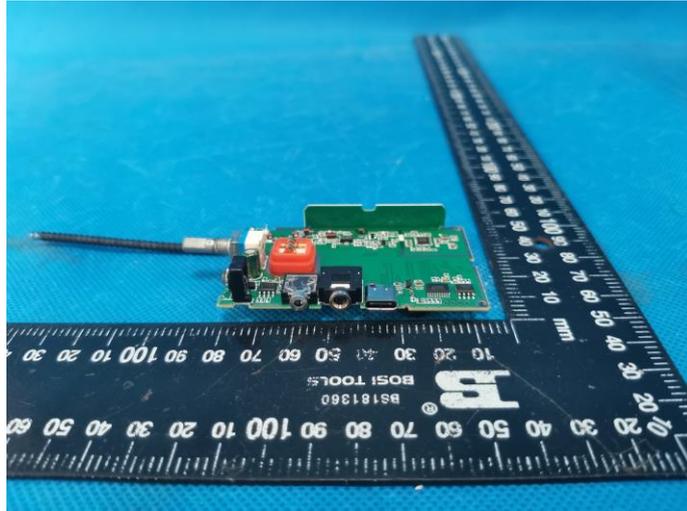




7.2. INTERNAL PHOTOS







8. APPENDIX REPORT