




TEST REPORT

Report No. : **CHTEW20010040** Report verification : 

Project No. : **SHT1910073401EW**

FCC ID : **2AARFBFTD51501**

Applicant's name : **Fujian BelFone Communications Technology Co., Ltd.**

Address : A15 Huaqiao Economic Development Zone, Shuangyang
Luojiang, Quanzhou, Fujian, China

Manufacturer..... : Fujian BelFone Communications Technology Co., Ltd.

Address..... : A15 Huaqiao Economic Development Zone, Shuangyang
Luojiang, Quanzhou, Fujian, China

Test item description : **DMR RADIO**

Trade Mark : -

Model/Type reference : BF-TD515

Listed Model(s) : -

Standard..... : **FCC CFR Title 47 Part 2**
FCC CFR Title 47 Part 90

Date of receipt of test sample..... : Nov.19, 2019

Date of testing..... : Nov.19, 2019- Jan.03, 2020

Date of issue..... : Jan.06, 2020

Result : **PASS**

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

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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 2](#): Frequency allocations and radio treaty matters; General rules and regulations

[FCC Rules Part 90](#): Private land mobile 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 and Performance Standards

[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 revised information

| Revised No. | Date of issued | Description |
|-------------|----------------|-------------|
| N/A | 2020-01-06 | Original |
| | | |
| | | |
| | | |
| | | |

2 TEST DESCRIPTION

| Test Item | Section in CFR 47 | Result | Test Engineer |
|---|----------------------------------|--------|----------------|
| Conducted Carrier Output Power | Part 90.205 Part 2.1046(a) | Pass | Linshuang Chen |
| 99% Occupied Bandwidth & 26dB bandwidth | Part 90.209 & 210 Part 2.1049 | Pass | Linshuang Chen |
| Emission Mask | Part 90.209 & 210 Part 2.1049 | Pass | Linshuang Chen |
| Modulation Limit | Part 2.1047(b) | N/A | N/A |
| Audio Frequency Response | Part 2.1047(a) | N/A | N/A |
| Frequency Stability VS Temperature | Part 90.213 Part 2.1055 | Pass | Linshuang Chen |
| Frequency Stability VS Voltage | Part 90.213 Part 2.1055 | Pass | Linshuang Chen |
| Transient Frequency Behavior | Part 90.214 | Pass | Linshuang Chen |
| Transmit Conducted Spurious Emission | Part 90.210 Part 2.1051 | Pass | Linshuang Chen |
| Transmit Radiated Spurious Emission | Part 90.210 Part 2.1053 | Pass | Linshuang Chen |

3 SUMMARY

3.1 Client Information

| | |
|---------------|---|
| Applicant: | Fujian BelFone Communications Technology Co., Ltd. |
| Address: | A15 Huaqiao Economic Development Zone, Shuangyang Luojiang, Quanzhou, Fujian, China |
| Manufacturer: | Fujian BelFone Communications Technology Co., Ltd. |
| Address: | A15 Huaqiao Economic Development Zone, Shuangyang Luojiang, Quanzhou, Fujian, China |

3.2 Product Description

| | |
|--------------------------------|--|
| Name of EUT: | DMR RADIO |
| Trade mark: | - |
| Model/Type reference: | BF-TD515 |
| Listed model(s): | - |
| Power supply: | DC 7.4V |
| Charger information: | Model:BF-B42 Input:DC 9.0V Output:DC 8.4V |
| Adapter information: | Model:RSF-DY080-0900800US Input:100-240Va.c.50/60Hz 0.3A Output:9Vd.c.,0.8A |
| Hardware version: | 1915 |
| Software version: | 1701 |
| RF Specification | |
| Support Frequency Range: | 400MHz~480MHz |
| Permitted frequency range: *1 | 400MHz~406MHz, 406.1MHz~480MHz |
| Rated Output Power: | <input checked="" type="checkbox"/> High Power: 4W <input checked="" type="checkbox"/> Low Power: 1W |
| Modulation Type: | Digital : 4FSK |
| Supported Digital Protocol: *2 | DMR |
| Channel Separation: | Digital : <input type="checkbox"/> 6.25kHz <input checked="" type="checkbox"/> 12.5kHz |
| Emission Designator: *3 | Digital: 7K60FXW, 7K60FXD |
| Support data rate: | 9.6kbps |
| Antenna Type: | External |
| Antenna Gain: | 2.0 dBi |

Note:

- (1) ^{*1} Listed frequency range 400MHz~406MHz for Federal use Only.
- (2) ^{*2} The DMR standard specifies two-slot Time Division Multiplexing Technology to split the 12.5 kHz channel into two virtual 6.25kHz communication paths. This equates to an efficiency of one voice channel per 6.25 kHz of bandwidth even though it operates in channels of 12.5 kHz
- (3) ^{*3} According to FCC Part 2.202 requirements, the Necessary Bandwidth is calculated as follows:
- For FM Data Modulation
 Channel Spacing = 12.5 KHz, R = 9600 bps, D = 1944Hz, S = 4, K = 0.72
 $B_n = (R/\log_2 S) + 2DK \cong 7.6 \text{ KHz}$
 Emission designation: 7K60FXW, 7K60FXD

3.3 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 |

| Frequency Bands (MHz) | Test Frequency (MHz) | |
|-----------------------|----------------------|----------|
| 400MHz ~ 406MHz | CH _L | 400.0125 |
| | CH _{M1} | 405.9875 |
| 406.1MHz ~480MHz | CH _{M2} | 406.1125 |
| | CH _{M3} | 443.0125 |
| | CH _H | 479.9875 |

3.4 Operation mode

| Test Mode | Transmitting | Receiving | Digital | Power Level | |
|-----------|--------------|-----------|---------|-------------|-----|
| | | | 12.5kHz | High | Low |
| TX-DNH | ■ | | ■ | ■ | |
| TX-DNL | ■ | | ■ | | ■ |

Note:

■: is operation mode.

Charing: Keep the EUT works at charing and off status

| 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. |
| DM | A 511 bit binary pseudo-random bit sequence based on ITU-T Rec. O.153 |

Pre-scan above all test mode, found below test mode which it was worse case mode, so only show the test data for worse case mode on the test report.

| Test item | Modulation Type | Test mode (Worse case mode) |
|---|-----------------|-----------------------------|
| Conducted Output Power | UM | TX-DNH, TX-DNL, |
| 99% Occupied Bandwidth & 26dB bandwidth | DM | TX-DNH, TX-DNL, |
| Emission Mask | DM | TX-DNH, TX-DNL, |
| Modulation Limit | AM6 | N/A |
| Audio Frequency Response | AM2 | N/A |
| Frequency Stability VS Temperature | UM | TX-DNH, TX-DNL, |
| Frequency Stability VS Voltage | UM | TX-DNH, TX-DNL, |
| Transient Frequency Behavior | UM | TX-DNH, |
| Transmit Conducted Spurious Emission | DM | TX-DNH, |
| Transmit Radiated Spurious Emission | DM | TX-DNH, |

3.5 EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

| | | | |
|---|-------------|----------------|--------------|
| ● | Power Cable | Length (m) : | / |
| | | Shield : | Unshielded |
| | | Detachable : | Undetachable |
| ○ | Multimeter | Manufacturer : | / |
| | | Model No. : | / |

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory 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. Registration 762235.

IC-Registration No.: 5377A

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

4.3 Environmental conditions

| Atmospheric Contions | |
|-----------------------------------|---------------------------------|
| Temperature: | 21°C to 25°C |
| Relative Humidity: | 20 % to 75 %. |
| Atmospheric Pressure: | 860 mbar to 1060 mbar |
| Norminal Test Voltage: | $V_N = \text{DC } 7.4\text{V}$ |
| Extrem Test Voltage @115% V_N : | $V_H = \text{DC } 8.51\text{V}$ |
| Extrem Test Voltage @85% V_N : | $V_L = \text{DC } 6.29\text{V}$ |

4.4 Statement of the 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 acc. 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 Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. 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 Shenzhen Huatongwei laboratory is reported:

| Test Items | Measurement Uncertainty | Notes |
|--|--------------------------------------|-------|
| Frequency stability & Occupied Bandwidth | 15Hz for <1GHz 70Hz for >1GHz | (1) |
| Conducted Output Power | 0.51dB | (1) |
| ERP / EIRP / RSE | 2.66dB for <1GHz 3.44dB for >1GHz | (1) |
| Conducted Emission 9KHz-30MHz | 3.02dB | (1) |
| Radiated Emission 30~1000MHz | 4.90dB | (1) |
| Radiated Emission 1~18GHz | 4.96dB | (1) |
| FM deviation | 25 Hz | (1) |
| Audio level | 0.62 dB | (1) |
| Low Pass Filter Response | 0.76 dB | (1) |
| Modulation Limiting | 0.42 % | (1) |
| Transient Frequency Behavior | 6.8 % | (1) |

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

4.5 Equipments Used during the Test

| ● TS8613 Test system | | | | | | | |
|----------------------|---------------------------------------|--------------|---------------|--------------|------------|---------------------------|---------------------------|
| Used | Test Equipment | Manufacturer | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ● | Spectrum Analyzer | Agilent | HTWE0286 | N9020A | MY50510187 | 2019/10/26 | 2020/10/25 |
| ● | Signal & Spectrum Analyzer | R&S | HTWE0262 | FSW26 | 103440 | 2019/10/26 | 2020/10/25 |
| ● | RF Communication Test Set | HP | HTWE0038 | 8920A | 3813A10206 | 2019/10/26 | 2020/10/25 |
| ● | Digital intercom communication tester | Aeroflex | HTWE0255 | 3920B | 1001682041 | 2019/10/26 | 2020/10/25 |
| ● | Signal Generator | R&S | HTWE0191 | SML02 | 100507 | 2019/10/26 | 2020/10/25 |
| ● | RF Control Unit | Tonscend | HTWE0294 | JS0806-2 | N/A | N/A | N/A |
| ○ | Filter-VHF | Microwave | HTWE0309 | N26460M1 | 498702 | N/A | N/A |
| ● | Filter-UHF | Microwave | HTWE0311 | N25155M2 | 498704 | N/A | N/A |
| ○ | Power Divider | Microwave | HTWE0043 | OPD1040-N-4 | N/A | 2019/05/24 | 2020/05/23 |
| ○ | Attenuator | JFW | HTWE0292 | 50FH-030-100 | N/A | 2019/05/18 | 2020/05/17 |
| ○ | Attenuator | JFW | HTWE0293 | 50-A-MFN-20 | 0322 | 2019/05/18 | 2020/05/17 |
| ● | Test software | HTW | N/A | Radio ATE | N/A | N/A | N/A |

| ● Auxiliary Equipment | | | | | | | |
|-----------------------|-----------------|--------------|---------------|-----------|------------|---------------------------|---------------------------|
| Used | Test Equipment | Manufacturer | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ● | Climate chamber | ESPEC | HTWE0254 | GPL-2 | N/A | 2019/10/23 | 2020/10/22 |
| ● | DC Power Supply | Gwinstek | HTWE0274 | SPS-2415 | GER835793 | N/A | N/A |

| ● Radiated Spurious Emission | | | | | | | |
|------------------------------|-------------------------|--------------------|---------------|-------------------|-------------|---------------------------|---------------------------|
| 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 | 2019/10/26 | 2020/10/25 |
| ● | Loop Antenna | R&S | HTWE0170 | HFH2-Z2 | 100020 | 2018/04/02 | 2021/04/01 |
| ● | Broadband Horn Antenna | SCHWARZBECK | HTWE0103 | BBHA9170 | BBHA9170472 | 2018/10/11 | 2021/10/11 |
| ● | Ultra-Broadband Antenna | SCHWARZBECK | HTWE0123 | VULB9163 | 538 | 2018/04/04 | 2021/04/03 |
| ● | Horn Antenna | SCHWARZBECK | HTWE0126 | 9120D | 1011 | 2017/04/01 | 2020/03/31 |
| ● | Pre-amplifier | CD | HTWE0071 | PAP-0102 | 12004 | 2019/11/14 | 2020/11/13 |
| ● | Broadband Preamplifier | SCHWARZBECK | HTWE0201 | BBV 9718 | 9718-248 | 2019/05/23 | 2020/05/22 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-01 | 6m 18GHz S Serisa | N/A | 2019/05/10 | 2020/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-02 | 6m 3GHz RG Serisa | N/A | 2019/05/10 | 2020/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-03 | 6m 3GHz RG Serisa | N/A | 2019/05/10 | 2020/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0120-04 | 6m 3GHz RG Serisa | N/A | 2019/05/10 | 2020/05/09 |
| ● | RF Connection Cable | HUBER+SUHNER | HTWE0121-01 | 6m 18GHz S Serisa | N/A | 2019/05/10 | 2020/05/09 |
| ● | EMI Test Software | Audix | N/A | E3 | N/A | N/A | N/A |

5 TEST CONDITIONS AND RESULTS

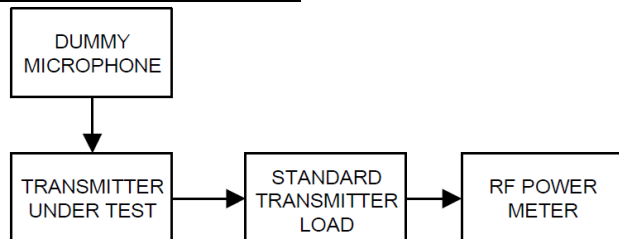
5.1 Conducted Carrier Output Power

LIMIT

FCC Part 90.205, FCC Part 2.1046

Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation.

TEST CONFIGURATION



TEST PROCEDURE

- (1) Connect the equipment as illustrated
- (2) Correct for all losses in the RF path
- (3) Measure the transmitter output power
- (4) If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix A on the section 8 appendix report

5.2 99% Occupied Bandwidth & 26dB Bandwidth

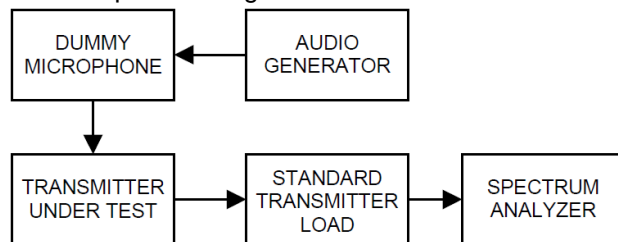
LIMIT

FCC Part 90.209, FCC Part 2.1049

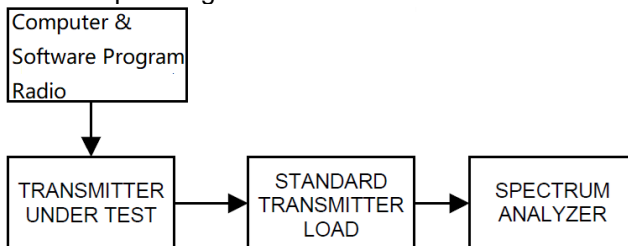
| Frequency band (MHz) | Channel spacing (kHz) | Authorized bandwidth (kHz) |
|---------------------------------------|-----------------------|----------------------------|
| Below 25 ² | | |
| 25-50 | 20 | 20 |
| 72-76 | 20 | 20 |
| 150-174 | 17.5 | ¹ 320/11.25/6 |
| 216-220 ⁵ | 6.25 | 20/11.25/6 |
| 220-222 | 5 | 4 |
| 406-512 ² | ¹ 6.25 | ¹³⁶ 20/11.25/6 |
| 806-809/851-854 | 12.5 | 20 |
| 809-824/854-869 | 25 | ⁶ 20 |
| 896-901/935-940 | 12.5 | 13.6 |
| 902-928 ⁴ | | |
| 929-930 | 25 | 20 |
| 1427-1432 ⁵ | 12.5 | 12.5 |
| ³ 2450-2483.5 ² | | |
| Above 2500 ² | | |

TEST CONFIGURATION

Test setup for Analog:



Test setup for Digital:



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 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix B on the section 8 appendix report

5.3 Emission Mask

LIMIT

FCC Part 90.210, FCC Part 2.1049

| Frequency band (MHz) | Mask for equipment with audio low pass filter | Mask for equipment without audio low pass filter |
|--------------------------------|---|--|
| Below 25 ¹ | A or B | A or C |
| 25-50 | B | C |
| 72-76 | B | C |
| 150-174 ² | B, D, or E | C, D or E |
| 150 paging only | B | C |
| 220-222 | F | F |
| 421-512 ^{2 5} | B, D, or E | C, D, or E |
| 450 paging only | B | G |
| 806-809/851-854 ⁶ | B | H |
| 809-824/854-869 ^{3 5} | B | G |
| 896-901/935-940 | I | J |
| 902-928 | K | K |
| 929-930 | B | G |
| 4940-4990 MHz | L or M | L or M |
| 5850-5925 ⁴ | | |
| All other bands | B | C |

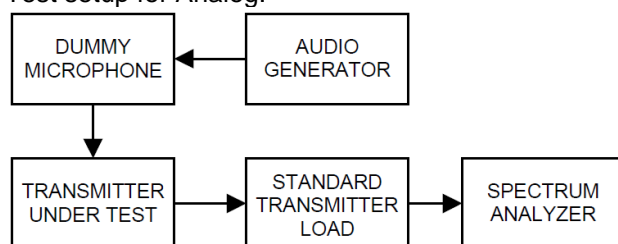
Emission Mask D — 12.5 kHz channel bandwidth equipment

For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

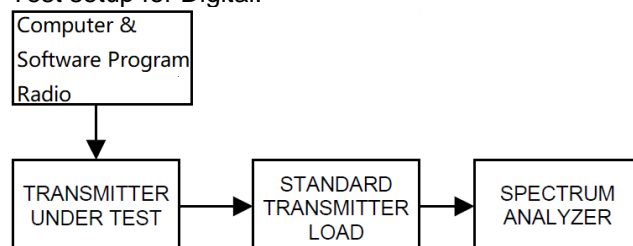
- (1) On any frequency from the centre of the authorized bandwidth f_0 to 5.625 kHz removed from f_0 : 0dB
- (2) On any frequency removed from the centre of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
- (3) On any frequency removed from the centre of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

TEST CONFIGURATION

Test setup for Analog:



Test setup for Digital:



TEST PROCEDURE

- 1) Connect the equipment as illustrated.
- 2) Spectrum set as follow:
Centre frequency = fundamental frequency, span=120kHz for 12.5kHz channel spacing,
RBW=100Hz, 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 3.4
- 5) Measure and record the results in the test report.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix C on the section 8 appendix report

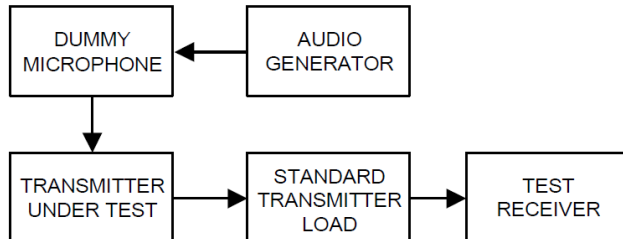
5.4 Modulation Limit

LIMIT

FCC Part 2.1047(b)

2.5kHz for 12.5 KHz Channel Spacing System

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 Input Modulation Signal to EUT according to Section 3.4 and vary the input level from -20 to $+20$ dB.
- 5) Measure both the instantaneous and steady-state deviation at and after the time of increasing the audio input level
- 6) Repeat step 4-5 with input frequency changing to 300Hz, 1004Hz, 1500Hz and 2500Hz in sequence.

TEST MODE

Please reference to the section 3.4

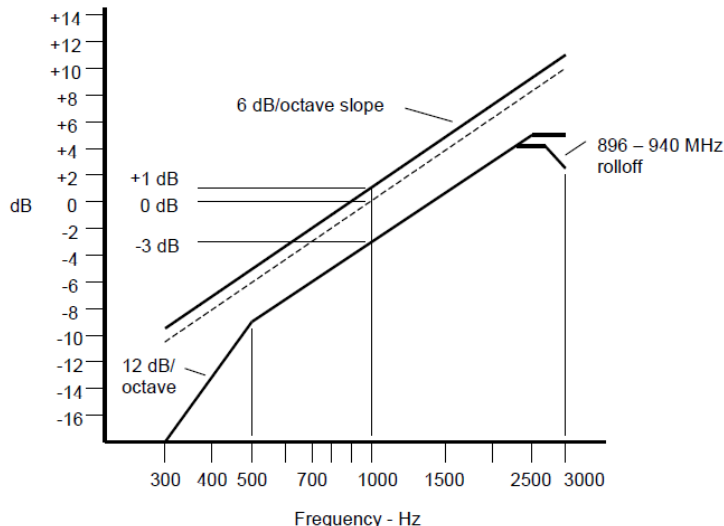
TEST RESULTS

☐ Passed ☒ Not Applicable

5.5 Audio Frequency Response

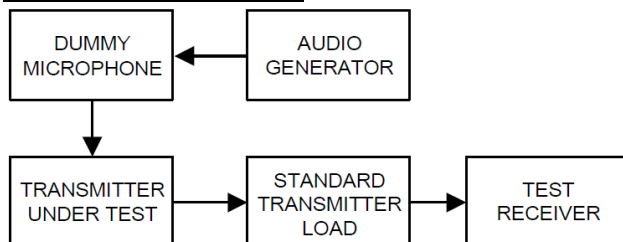
LIMIT

2.1047(a): 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. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage 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 Input Modulation Signal to EUT according to Section 3.4
- 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 = $20 \log_{10} (V_{FREQ}/V_{REF})$.
- 12) Repeat steps 8) through 11) for all the desired test frequencies

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☐ Passed ☒ Not Applicable

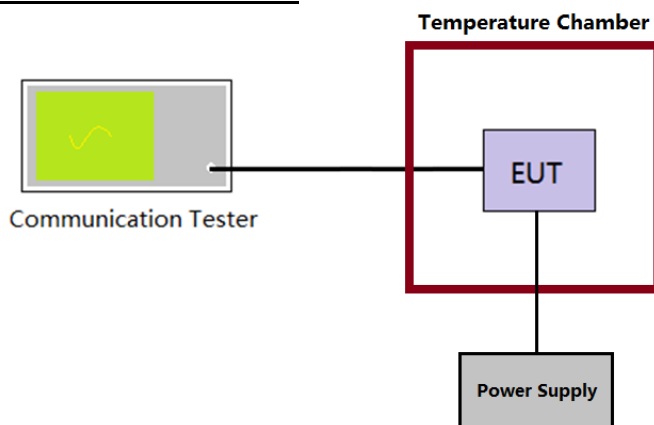
5.6 Frequency stability VS Temperature

LIMIT

FCC Part 90.213, FCC Part 2.1055

| Frequency range (MHz) | Fixed and base stations | Mobile stations | |
|--------------------------|-------------------------|---------------------------|------------------------------|
| | | Over 2 watts output power | 2 watts or less output power |
| Below 25 | 1 2 3 100 | 100 | 200 |
| 25-50 | 20 | 20 | 50 |
| 72-76 | 5 | | 50 |
| 150-174 | 5 11 5 | 6 5 | 4 6 50 |
| 216-220 | 1.0 | | 1.0 |
| 220-222 ¹² | 0.1 | 1.5 | 1.5 |
| 421-512 | 7 11 14 2.5 | 8 5 | 8 5 |
| 806-809 | 14 1.0 | 1.5 | 1.5 |
| 809-824 | 14 1.5 | 2.5 | 2.5 |
| 851-854 | 1.0 | 1.5 | 1.5 |
| 854-869 | 1.5 | 2.5 | 2.5 |
| 896-901 | 14 0.1 | 1.5 | 1.5 |
| 902-928 | 2.5 | 2.5 | 2.5 |
| 902-928 ¹³ | 2.5 | 2.5 | 2.5 |
| 929-930 | 1.5 | | |
| 935-940 | 0.1 | 1.5 | 1.5 |
| 1427-1435 | 9 300 | 300 | 300 |
| Above 2450 ¹⁰ | | | |

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 3.4

TEST RESULTS

☒ Passed ☐ Not Applicable

Please refer to appendix D on the section 8 appendix report

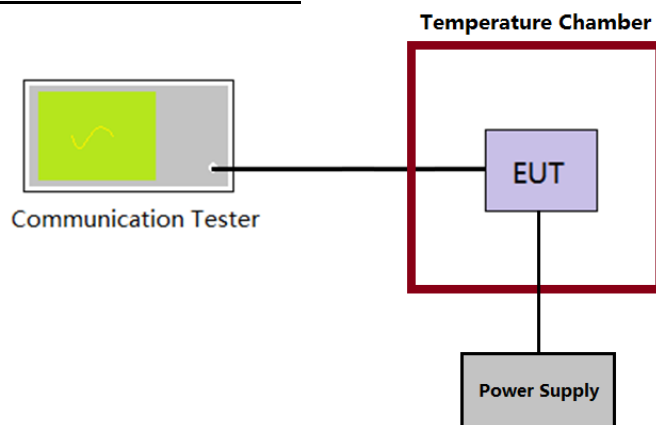
5.7 Frequency stability VS Voltage

LIMIT

FCC Part 90.213, FCC Part 2.1055

| Frequency range (MHz) | Fixed and base stations | Mobile stations | |
|--------------------------|-------------------------|---------------------------|------------------------------|
| | | Over 2 watts output power | 2 watts or less output power |
| Below 25 | 1 2 3 100 | 100 | 200 |
| 25-50 | 20 | 20 | 50 |
| 72-76 | 5 | | 50 |
| 150-174 | 5 11 5 | 6 5 | 4 6 50 |
| 216-220 | 1.0 | | 1.0 |
| 220-222 ¹² | 0.1 | 1.5 | 1.5 |
| 421-512 | 7 11 14 2.5 | 8 5 | 8 5 |
| 806-809 | 14 1.0 | 1.5 | 1.5 |
| 809-824 | 14 1.5 | 2.5 | 2.5 |
| 851-854 | 1.0 | 1.5 | 1.5 |
| 854-869 | 1.5 | 2.5 | 2.5 |
| 896-901 | 14 0.1 | 1.5 | 1.5 |
| 902-928 | 2.5 | 2.5 | 2.5 |
| 902-928 ¹³ | 2.5 | 2.5 | 2.5 |
| 929-930 | 1.5 | | |
| 935-940 | 0.1 | 1.5 | 1.5 |
| 1427-1435 | 9 300 | 300 | 300 |
| Above 2450 ¹⁰ | | | |

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 3.4

TEST RESULTS

☒ Passed ☐ Not Applicable

Please refer to appendix E on the section 8 appendix report

5.8 Transmitter Frequency Behavior

LIMIT

FCC part 90.214

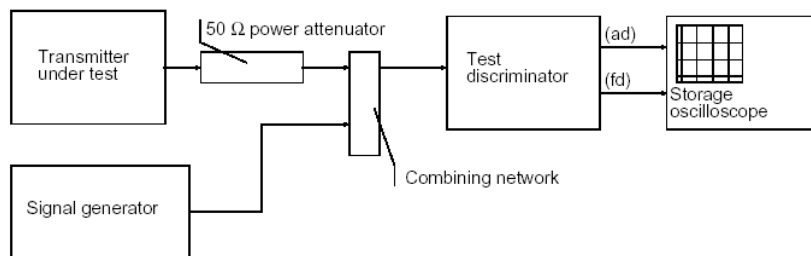
Transmitters designed to operate in the 150-174 MHz and 421-512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

| Time intervals ^{1 2} | Maximum frequency difference ³ | All equipment | |
|---|---|----------------|----------------|
| | | 150 to 174 MHz | 421 to 512 MHz |
| Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels | | | |
| t ₁ ⁴ | ±25.0 kHz | 5.0 ms | 10.0 ms |
| t ₂ | ±12.5 kHz | 20.0 ms | 25.0 ms |
| t ₃ ⁴ | ±25.0 kHz | 5.0 ms | 10.0 ms |
| Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels | | | |
| t ₁ ⁴ | ±12.5 kHz | 5.0 ms | 10.0 ms |
| t ₂ | ±6.25 kHz | 20.0 ms | 25.0 ms |
| t ₃ ⁴ | ±12.5 kHz | 5.0 ms | 10.0 ms |
| Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels | | | |
| t ₁ ⁴ | ±6.25 kHz | 5.0 ms | 10.0 ms |
| t ₂ | ±3.125 kHz | 20.0 ms | 25.0 ms |
| t ₃ ⁴ | ±6.25 kHz | 5.0 ms | 10.0 ms |

Note:

- On is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.
 - t_1 is the time period immediately following t_{on} .
 - t_2 is the time period immediately following t_1 .
 - t_3 is the time period from the instant when the transmitter is turned off until t_{off} .
 - t_{off} is the instant when the 1 kHz test signal starts to rise.
- During the time from the end of t_2 to the beginning of t_3 , the frequency difference must not exceed the limits specified in §90.213.
- Difference between the actual transmitter frequency and the assigned transmitter frequency.
- If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

TEST CONFIGURATION



TEST PROCEDURE

- Connect DUT into Test discriminator and Storage Oscilloscope and keep DUT stats ON;
- Input 1kHz signal into DUT;
- Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signals;
- Keep DUT in OFF state and Key the PTT;
- Observe the stored oscilloscope of modulation domain analyzer. The signal trace shall be maintained within the allowable limits during the periods t_1 and t_2 , and shall also remain within limits following t_2 ;
- Adjust the modulation domain analyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transmitter of the transmitter signal.
- Keep the digital portable radio in ON state and unkey the PTT;
- Observe the stored oscilloscope of modulation domain analyzer, The signal trace shall be maintained within the allowable limits during the period t_3 .
- Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at ±12.5 kHz deviation and set its output level to -100dBm.
- Turn on the transmitter.

- 11) Supply sufficient attenuation via the RF attenuator to provide an input level to the stored oscilloscope
- 12) that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the stored oscilloscope as P_0 .
- 13) Turn off the transmitter.
- 14) Adjust the RF level of the signal generator to provide RF power equal to P_0 . This signal generator RF level shall be maintained throughout the rest of the measurement.
- 15) Remove the attenuation, so the input power to the stored oscilloscope is increased by 30 dB when the transmitter is turned on.
- 16) Adjust the vertical amplitude control of the stored oscilloscope to display the 1000 Hz at ± 4 divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "trigger offset" to -10ms for turn on and -15ms for turn off.
- 17) Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be t_0 . The trace should be maintained within the allowed divisions during the period t_1 and t_2 .
- 18) Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum
- 19) Analyzer. The trace should be maintained within the allowed divisions during the period t_3 .

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Please refer to appendix F on the section 8 appendix report

5.9 Transmit Conducted Spurious Emission

LIMIT

FCC Part 90.210, FCC Part 2.1051

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.

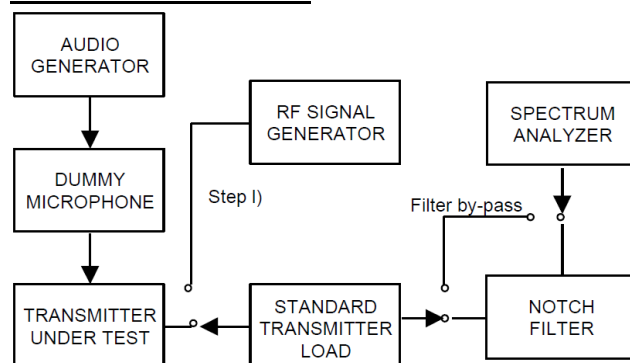
In general, the worse case attenuation requirement shown above was applied.

Calculation: Limit (dBm) = EL - 50 - 10 log (P)

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

Limit (dBm) = P(dBm) - 50 - 10 log (Pwatts) = -20dBm

TEST CONFIGURATION



TEST PROCEDURE

1. Connect the equipment as illustrated, with the notch filter by-passed.
2. Apply Input Modulation Signal to EUT according to Section 3.4
3. Adjust the spectrum analyzer for the following settings:
Below 1GHz: RBW=100kHz, VBW=300kHz
Above 1GHz: RBW=1MHz, VBW=3MHz
Detector=Peak, Sweep time=Auto, Trace=Max hold
4. Scan frequency range up to 10th harmonic.
5. Record the frequencies and levels of spurious emissions

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ Passed ☐ Not Applicable

Please refer to appendix G on the section 8 appendix report

5.10 Transmitter Radiated Spurious Emission

Radiated spurious emissions are emissions from the equipment when transmitting into a nonradiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

LIMIT

FCC Part 90.210, FCC Part 2.1051

Emission Mask D—12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: At least $50 + 10 \log (P)$ dB or 70 dB, whichever is the lesser attenuation.

Emission Mask E—6.25 kHz or less channel bandwidth equipment. For transmitters designed to operate with a 6.25 kHz or less bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: At least $55 + 10 \log (P)$ or 65 dB, whichever is the lesser attenuation.

In general, the worse case attenuation requirement shown above was applied.

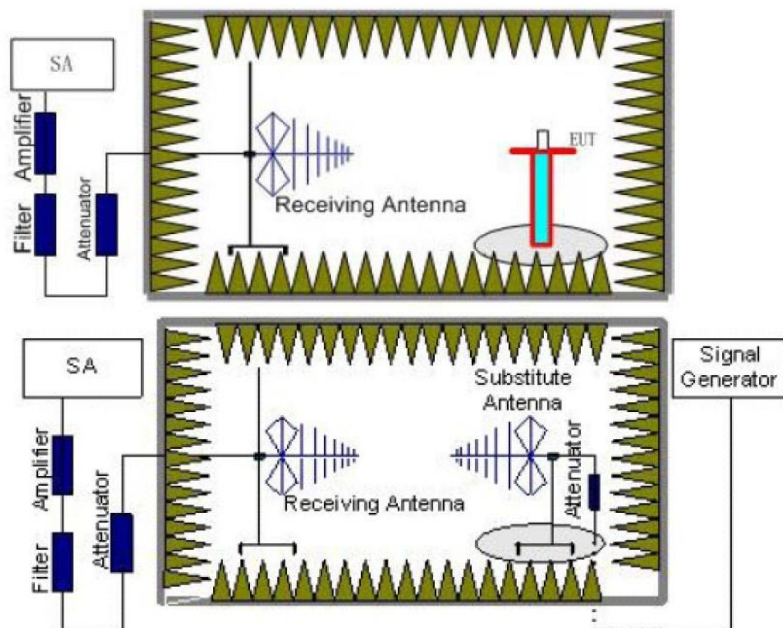
Calculation: Limit (dBm) = EL - 50 - 10 log (P)

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

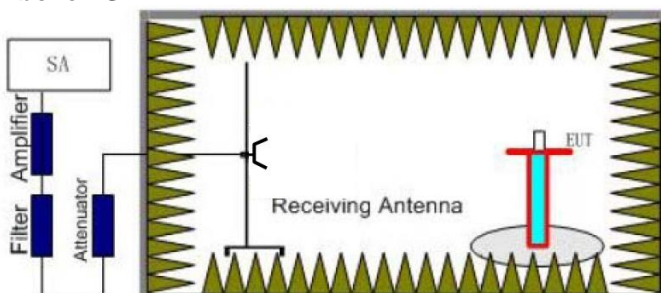
Limit (dBm) = P(dBm) - 50 - 10 log (Pwatts) = -20dBm

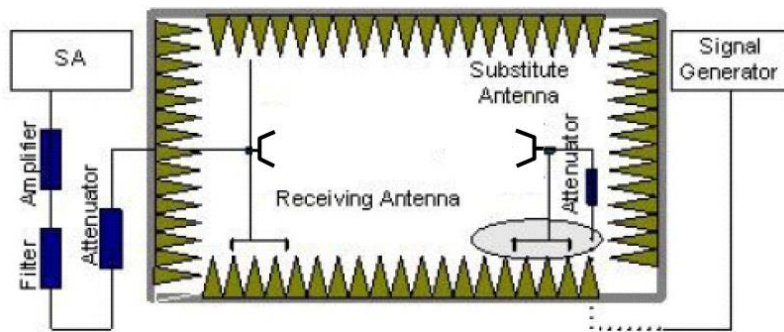
TEST CONFIGURATION

Below 1GHz:



Above 1GHz:





TEST PROCEDURE

1. Place the EUT in the center of the turntable.
 - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
 - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:
Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto
Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
 - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
 - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
 - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
 - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
 - e) Record the measured emission amplitude level and frequency
6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
10. For each emission that was detected and measured in the initial test
 - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
 - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
 - c) Record the output power level of the signal generator when equivalence is achieved in step b).
11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

$$P_e = P_s(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$
 where
 P_e = equivalent emission power in dBm
 P_s = source (signal generator) power in dBm
 NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.
13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from:

$$\text{gain (dBd)} = \text{gain (dBi)} - 2.15 \text{ dB}.$$

If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

TEST MODE

Please reference to the section 3.4

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

| TEST MODE | TX-DNH | Test Channel: | CH _L | Polarity: | Horizontal |
|-----------|--------|---------------|-----------------|-----------|------------|
|-----------|--------|---------------|-----------------|-----------|------------|

Legend: Limit (red line), Final Test (blue square), Horizontal (green line)

| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|------------|----------|
| 1 | 800.0338 | -64.56 | 9.74 | -54.82 | -20.00 | 34.82 | Horizontal | PK |
| 2 | 1200.000 | -56.40 | 4.60 | -51.80 | -20.00 | 31.80 | Horizontal | PK |
| 3 | 1600.000 | -66.80 | 4.78 | -62.02 | -20.00 | 42.02 | Horizontal | PK |
| 4 | 2000.000 | -63.48 | 8.11 | -55.37 | -20.00 | 35.37 | Horizontal | PK |
| 5 | 3200.000 | -65.70 | 13.41 | -52.29 | -20.00 | 32.29 | Horizontal | PK |
| 6 | 4800.500 | -65.74 | 19.10 | -46.64 | -20.00 | 26.64 | Horizontal | PK |

| TEST MODE | TX-DNH | Test Channel: | CH _L | Polarity: | Vertical |
|-----------|--------|---------------|-----------------|-----------|----------|
|-----------|--------|---------------|-----------------|-----------|----------|

Legend: Limit (red line), Final Test (blue square), Vertical (green line)

| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|----------|----------|
| 1 | 800.0338 | -69.11 | 9.26 | -59.85 | -20.00 | 39.85 | Vertical | PK |
| 2 | 1200.000 | -59.35 | 4.71 | -54.64 | -20.00 | 34.64 | Vertical | PK |
| 3 | 1600.000 | -57.14 | 6.58 | -50.56 | -20.00 | 30.56 | Vertical | PK |
| 4 | 2000.000 | -64.09 | 7.31 | -56.78 | -20.00 | 36.78 | Vertical | PK |
| 5 | 2400.500 | -66.26 | 9.30 | -56.96 | -20.00 | 36.96 | Vertical | PK |
| 6 | 4800.500 | -72.03 | 19.08 | -52.95 | -20.00 | 32.95 | Vertical | PK |

| TEST MODE | TX-DNH | Test Channel: | CH _{M1} | Polarity: | Horizontal |
|-----------|--------|---------------|------------------|-----------|------------|
|-----------|--------|---------------|------------------|-----------|------------|

Legend: Limit (Red line), Final Test (Blue dot), Horizontal (Green line)

| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|------------|----------|
| 1 | 812.0390 | -65.66 | 9.84 | -55.82 | -20.00 | 35.82 | Horizontal | PK |
| 2 | 1218.000 | -56.97 | 4.70 | -52.27 | -20.00 | 32.27 | Horizontal | PK |
| 3 | 2030.000 | -64.17 | 8.48 | -55.69 | -20.00 | 35.69 | Horizontal | PK |
| 4 | 2842.000 | -67.48 | 13.93 | -53.55 | -20.00 | 33.55 | Horizontal | PK |
| 5 | 3248.000 | -67.63 | 12.69 | -54.94 | -20.00 | 34.94 | Horizontal | PK |
| 6 | 4872.000 | -67.48 | 19.60 | -47.88 | -20.00 | 27.88 | Horizontal | PK |

| TEST MODE | TX-DNH | Test Channel: | CH _{M1} | Polarity: | Vertical |
|-----------|--------|---------------|------------------|-----------|----------|
|-----------|--------|---------------|------------------|-----------|----------|

Legend: Limit (Red line), Final Test (Blue dot), Vertical (Green line)

| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|----------|----------|
| 1 | 812.0390 | -68.39 | 9.57 | -58.82 | -20.00 | 38.82 | Vertical | PK |
| 2 | 1218.000 | -57.69 | 4.86 | -52.83 | -20.00 | 32.83 | Vertical | PK |
| 3 | 1624.000 | -57.96 | 6.19 | -51.77 | -20.00 | 31.77 | Vertical | PK |
| 4 | 2030.000 | -65.65 | 7.92 | -57.73 | -20.00 | 37.73 | Vertical | PK |
| 5 | 2842.000 | -68.03 | 13.89 | -54.14 | -20.00 | 34.14 | Vertical | PK |
| 6 | 3248.000 | -68.55 | 12.77 | -55.78 | -20.00 | 35.78 | Vertical | PK |

| TEST MODE | TX-DNH | Test Channel: | CH _{M2} | Polarity: | Horizontal |
|-----------|--------|---------------|------------------|-----------|------------|
|-----------|--------|---------------|------------------|-----------|------------|

FCC PART 90

Level [dBm]

Frequency [Hz]

— Limit ■ Final Test — Horizontal

| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|------------|----------|
| 1 | 812.2815 | -65.85 | 9.84 | -56.01 | -20.00 | 36.01 | Horizontal | PK |
| 2 | 1218.500 | -56.54 | 4.71 | -51.83 | -20.00 | 31.83 | Horizontal | PK |
| 3 | 2030.500 | -63.09 | 8.49 | -54.60 | -20.00 | 34.60 | Horizontal | PK |
| 4 | 2843.000 | -66.57 | 13.92 | -52.65 | -20.00 | 32.65 | Horizontal | PK |
| 5 | 3249.000 | -67.15 | 12.68 | -54.47 | -20.00 | 34.47 | Horizontal | PK |
| 6 | 4873.500 | -67.12 | 19.61 | -47.51 | -20.00 | 27.51 | Horizontal | PK |

| TEST MODE | TX-DNH | Test Channel: | CH _{M2} | Polarity: | Vertical |
|-----------|--------|---------------|------------------|-----------|----------|
|-----------|--------|---------------|------------------|-----------|----------|

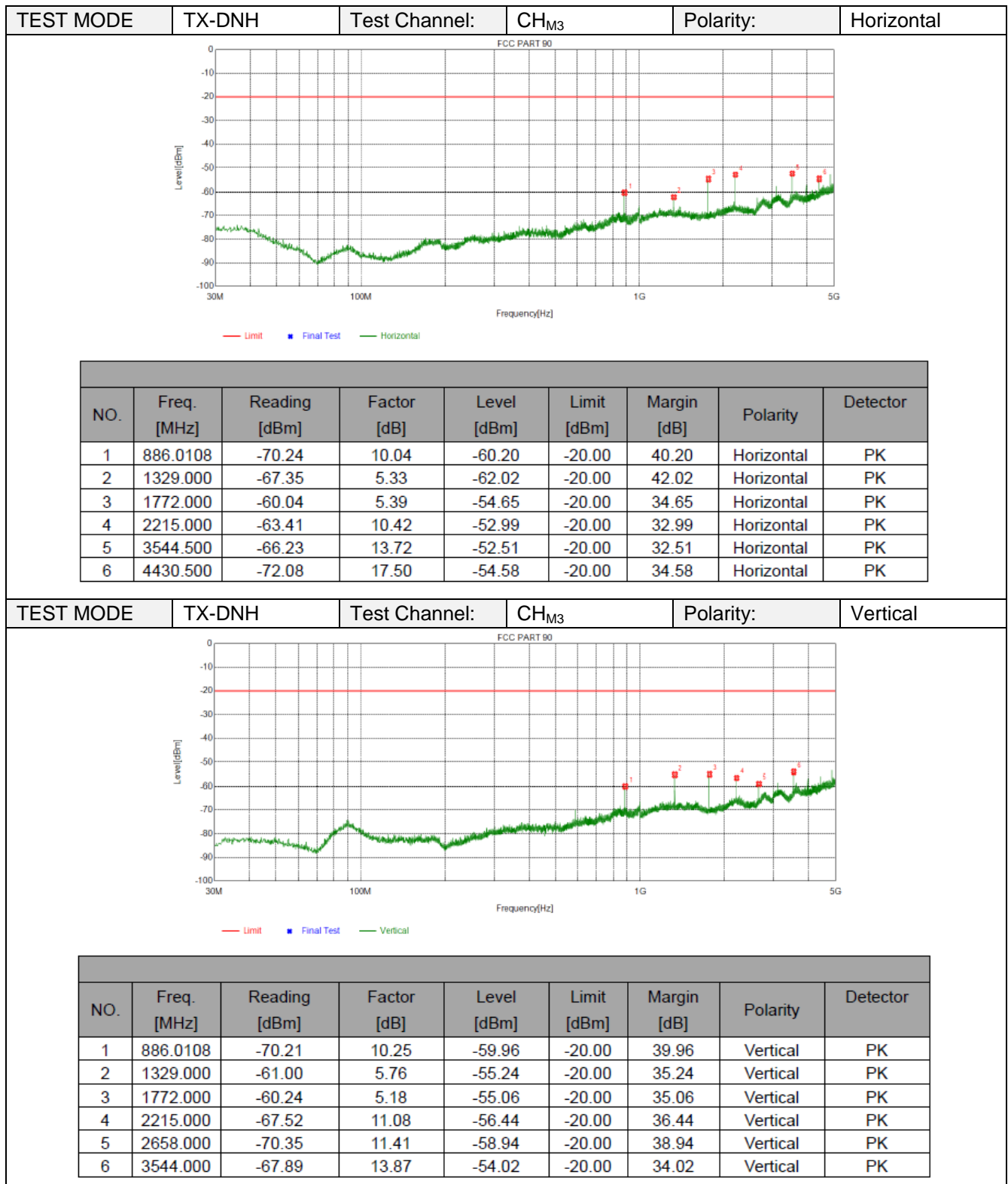
FCC PART 90

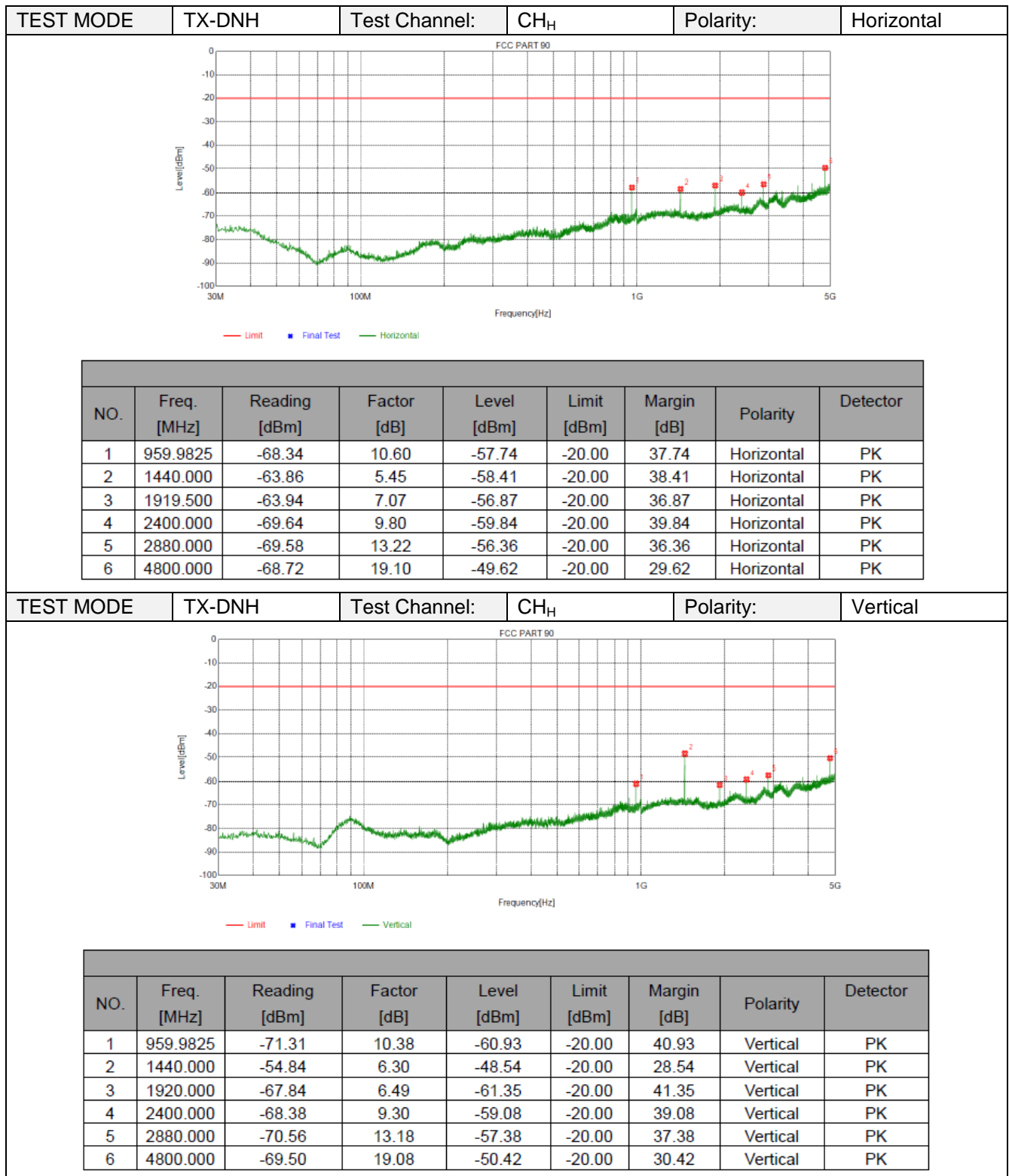
Level [dBm]

Frequency [Hz]

— Limit ■ Final Test — Vertical

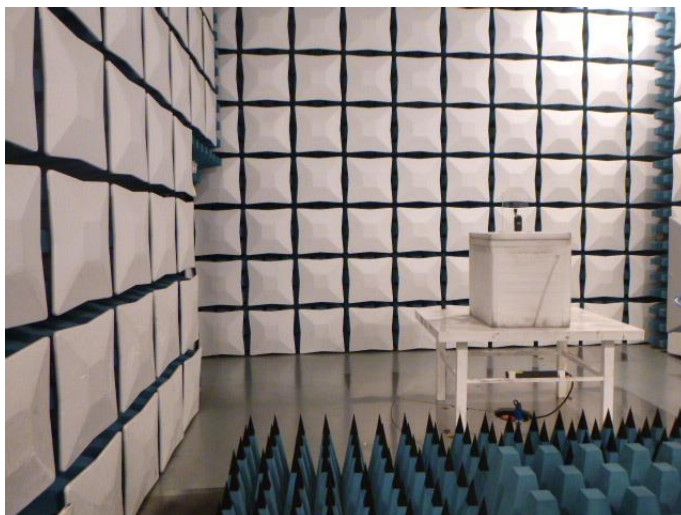
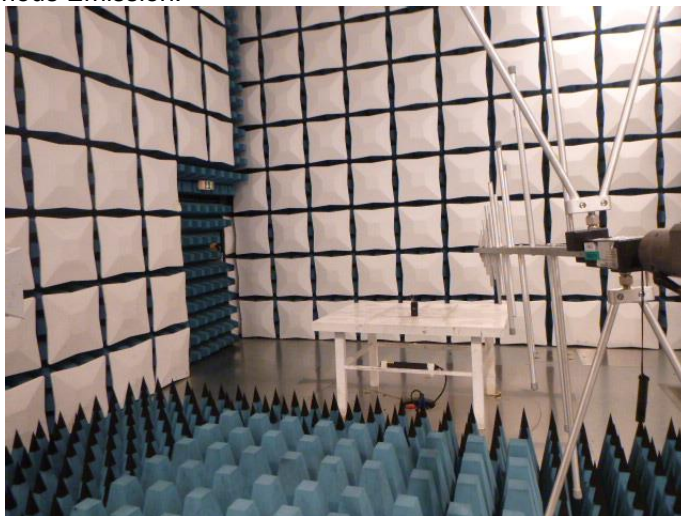
| NO. | Freq. [MHz] | Reading [dBm] | Factor [dB] | Level [dBm] | Limit [dBm] | Margin [dB] | Polarity | Detector |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|----------|----------|
| 1 | 812.2815 | -68.39 | 9.58 | -58.81 | -20.00 | 38.81 | Vertical | PK |
| 2 | 1218.500 | -58.78 | 4.87 | -53.91 | -20.00 | 33.91 | Vertical | PK |
| 3 | 1624.500 | -57.93 | 6.18 | -51.75 | -20.00 | 31.75 | Vertical | PK |
| 4 | 2030.500 | -66.44 | 7.93 | -58.51 | -20.00 | 38.51 | Vertical | PK |
| 5 | 2843.000 | -67.82 | 13.87 | -53.95 | -20.00 | 33.95 | Vertical | PK |
| 6 | 4061.500 | -72.49 | 15.18 | -57.31 | -20.00 | 37.31 | Vertical | PK |





6 TEST SETUP PHOTOS OF THE EUT

Transmitter Radiated Spurious Emission:

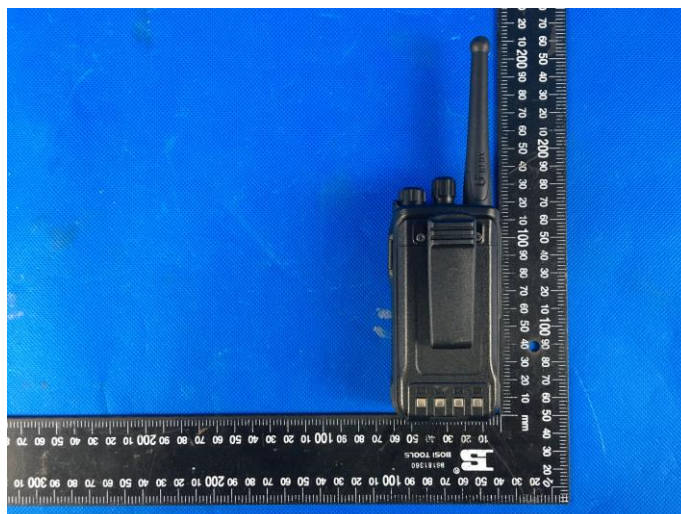
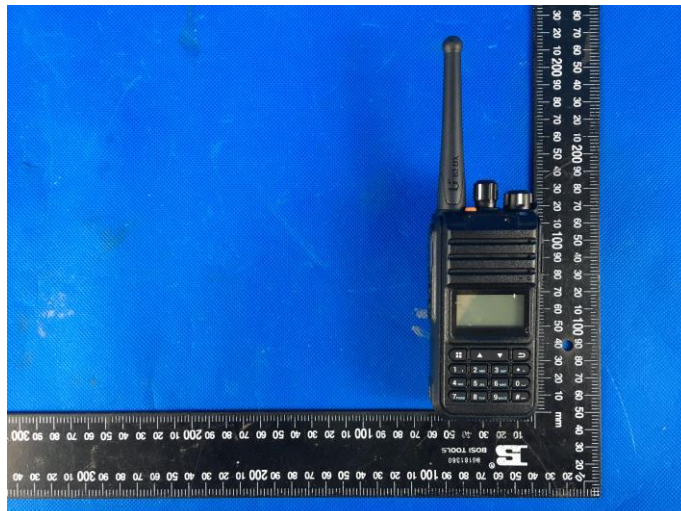


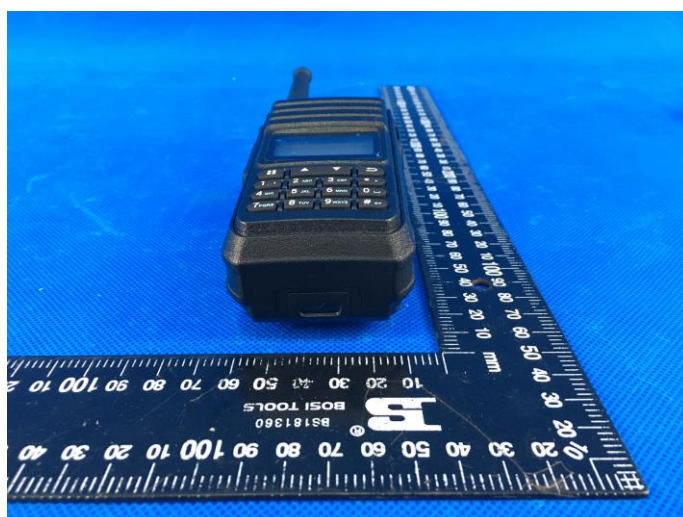
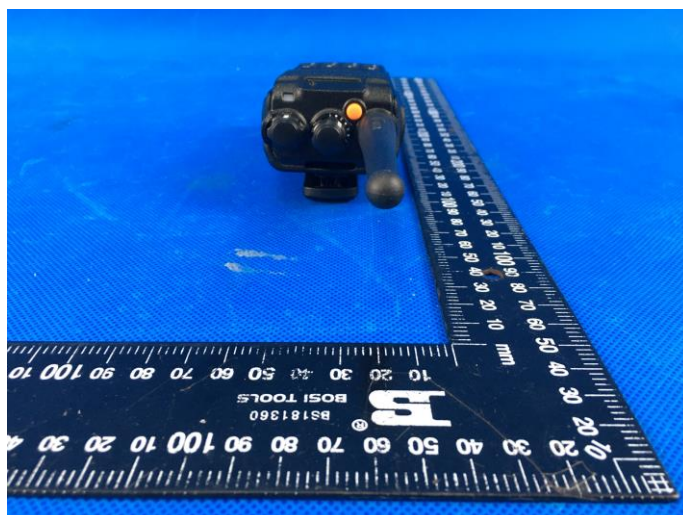
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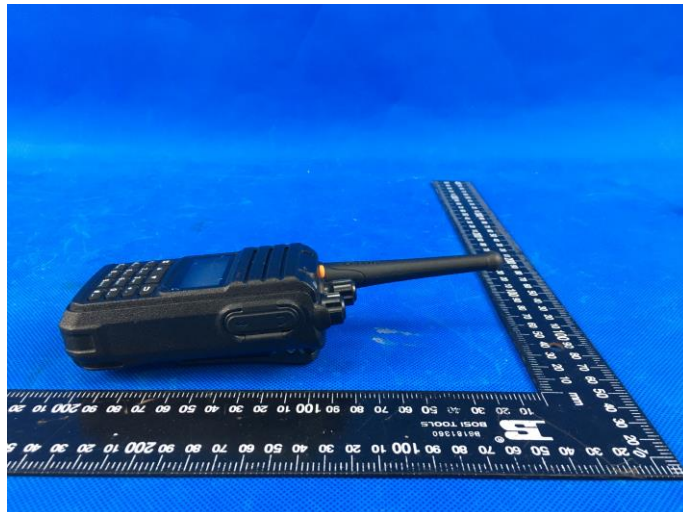


7 EXTERNAL AND INTERNAL PHOTOS OF THE EUT

External Photos of the EUT

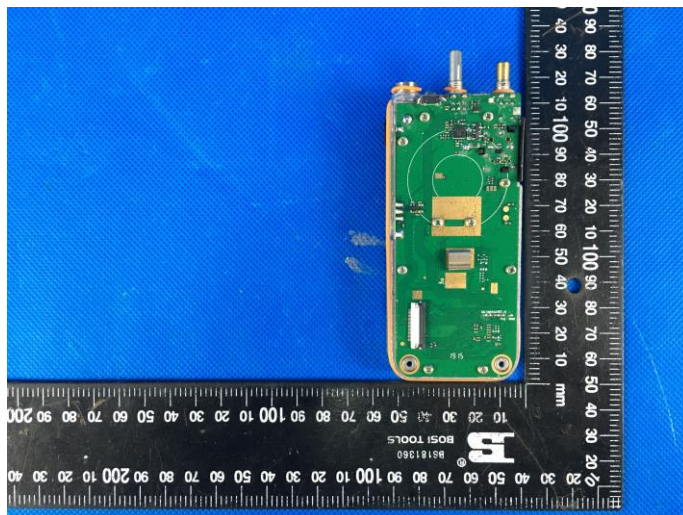
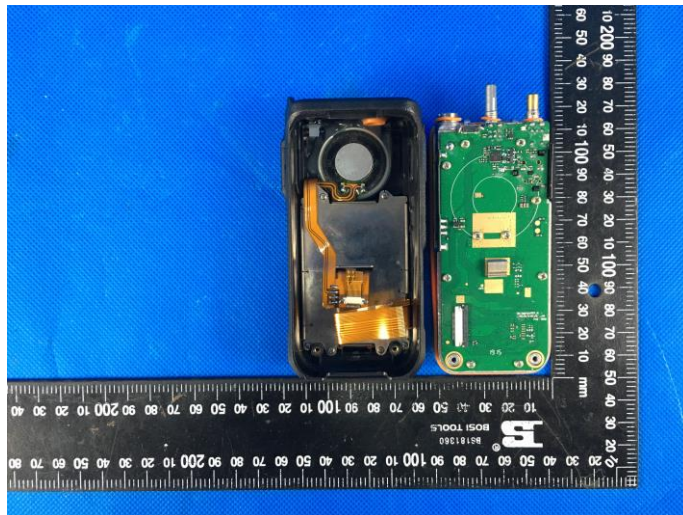


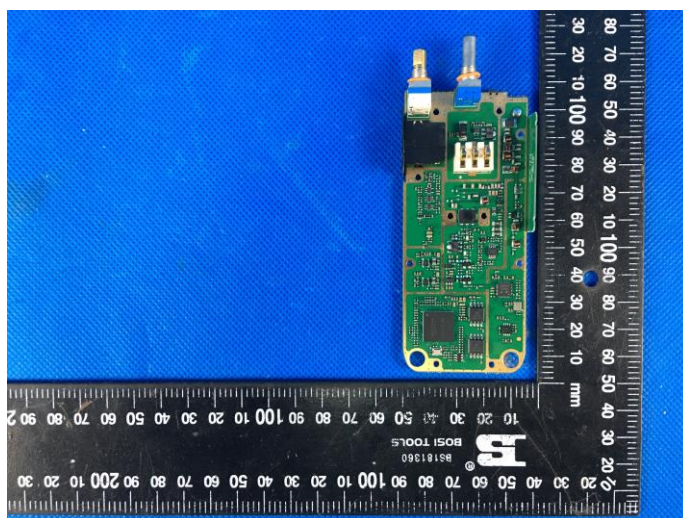
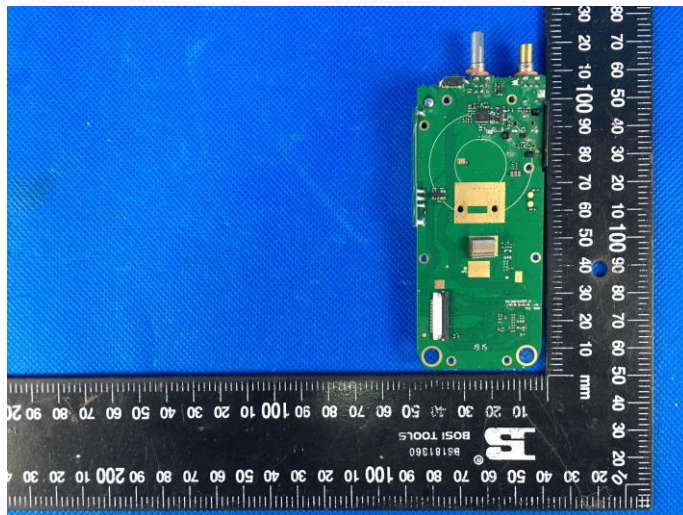
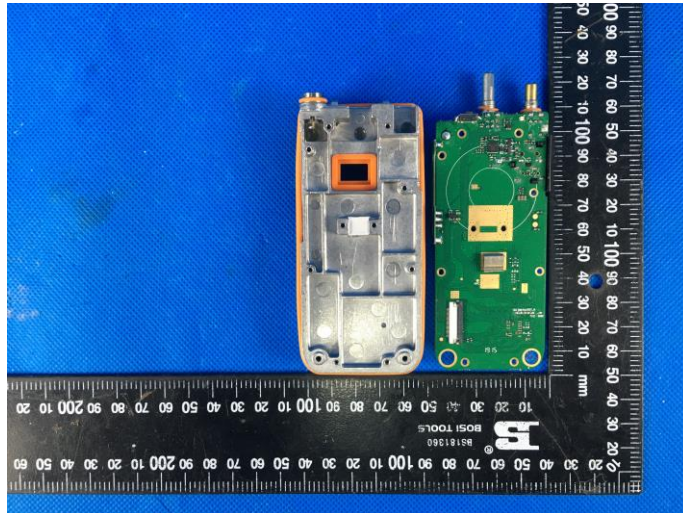


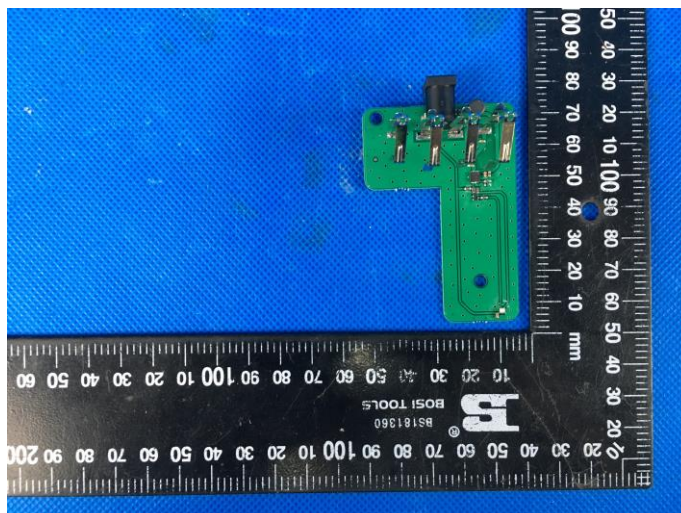
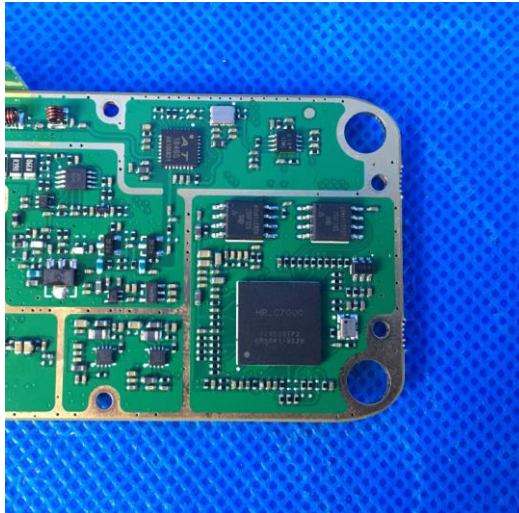




Internal Photos of the EUT







8 APPENDIX REPORT

| | | | |
|-----------------|-----------------|-------------|---------------------|
| Project No. | SHT1910073401EW | | |
| Test sample No. | YPHT19100734001 | Model No. | BF-TD515 |
| Start test date | 2019/12/12 | Finish date | 2019/12/13 |
| Temperature | 24.8 | Humidity | 39 |
| Test Engineer | Linshuang.Chen | Auditor | <i>William.wang</i> |

| Appendix clause | Test Item | Test date (M/D) | Test Result (PASS/FAIL) |
|-----------------|--|-----------------|-------------------------|
| A | Maximum Transmitter Power | 2019/12/12 | PASS |
| B | Occupied Bandwidth | 2019/12/13 | PASS |
| C | Emission Mask | 2019/12/13 | PASS |
| D | Frequency Stability Test & Temperature | 2019/12/12 | PASS |
| E | Frequency Stability Test & Voltage | 2019/12/12 | PASS |
| F | Transmitter Frequency Behavior | 2019/12/13 | PASS |
| G | Spurious Emission On Antenna Port | 2019/12/13 | PASS |
| Note | | | |
| | | | |

**Appendix A:Maximum Transmitter Power**

| Operation Mode | Modulation Type | Test Channel | Measured Power(dBm) | Measured Power(W) | Rated Power(W) | Percentage (%) | Limit (%) | Result |
|----------------|-----------------|------------------|---------------------|-------------------|----------------|----------------|-----------|--------|
| TX-DNH | 4FSK | CH _L | 36.1 | 4.04 | 4.00 | 1.0 | ±20 | PASS |
| TX-DNH | 4FSK | CH _{M1} | 36.2 | 4.12 | 4.00 | 3.0 | ±20 | PASS |
| TX-DNH | 4FSK | CH _{M2} | 36.1 | 4.07 | 4.00 | 1.8 | ±20 | PASS |
| TX-DNH | 4FSK | CH _{M3} | 36.4 | 4.37 | 4.00 | 9.1 | ±20 | PASS |
| TX-DNH | 4FSK | CH _H | 36.1 | 4.04 | 4.00 | 1.0 | ±20 | PASS |
| TX-DNL | 4FSK | CH _L | 29.8 | 0.96 | 1.00 | -3.9 | ±20 | PASS |
| TX-DNL | 4FSK | CH _{M1} | 29.7 | 0.93 | 1.00 | -6.8 | ±20 | PASS |
| TX-DNL | 4FSK | CH _{M2} | 29.6 | 0.91 | 1.00 | -8.5 | ±20 | PASS |
| TX-DNL | 4FSK | CH _{M3} | 29.6 | 0.91 | 1.00 | -8.8 | ±20 | PASS |
| TX-DNL | 4FSK | CH _H | 29.7 | 0.93 | 1.00 | -7.2 | ±20 | PASS |

**Appendix B:Occupied Bandwidth**

| Operation Mode | Modulation Type | Test Channel | Occupied Bandwidth | | 99% Limit(kHz) | Result |
|----------------|-----------------|------------------|--------------------|-----------|----------------|--------|
| | | | 99%(kHz) | 26dB(kHz) | | |
| TX-DNH | 4FSK | CH _L | 6.765 | 9.674 | ≤11.25 | PASS |
| TX-DNH | 4FSK | CH _{M1} | 7.044 | 9.901 | ≤11.25 | PASS |
| TX-DNH | 4FSK | CH _{M2} | 6.939 | 9.201 | ≤11.25 | PASS |
| TX-DNH | 4FSK | CH _{M3} | 7.075 | 9.682 | ≤11.25 | PASS |
| TX-DNH | 4FSK | CH _H | 6.861 | 9.186 | ≤11.25 | PASS |
| TX-DNL | 4FSK | CH _L | 7.068 | 9.441 | ≤11.25 | PASS |
| TX-DNL | 4FSK | CH _{M1} | 6.958 | 9.402 | ≤11.25 | PASS |
| TX-DNL | 4FSK | CH _{M2} | 7.009 | 9.290 | ≤11.25 | PASS |
| TX-DNL | 4FSK | CH _{M3} | 6.822 | 9.383 | ≤11.25 | PASS |
| TX-DNL | 4FSK | CH _H | 7.081 | 9.755 | ≤11.25 | PASS |

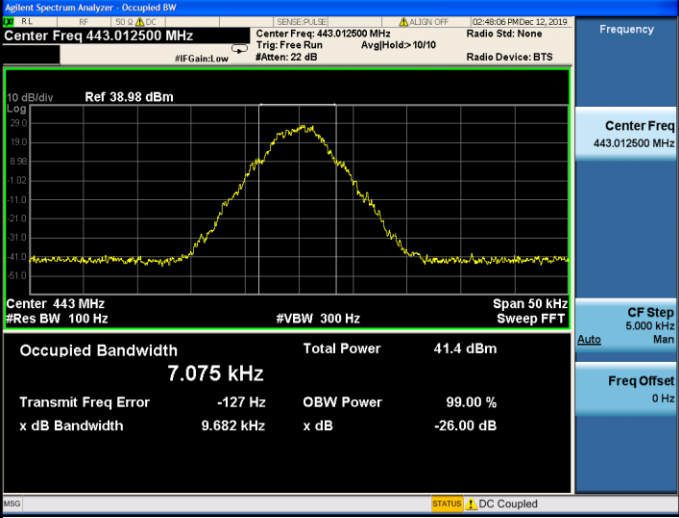
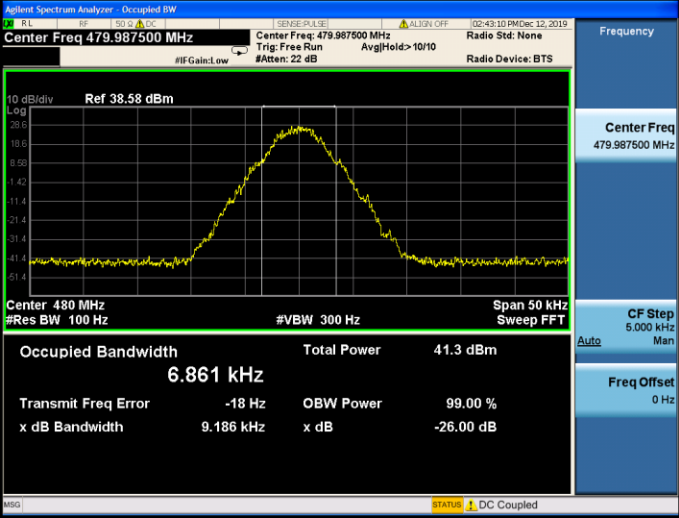
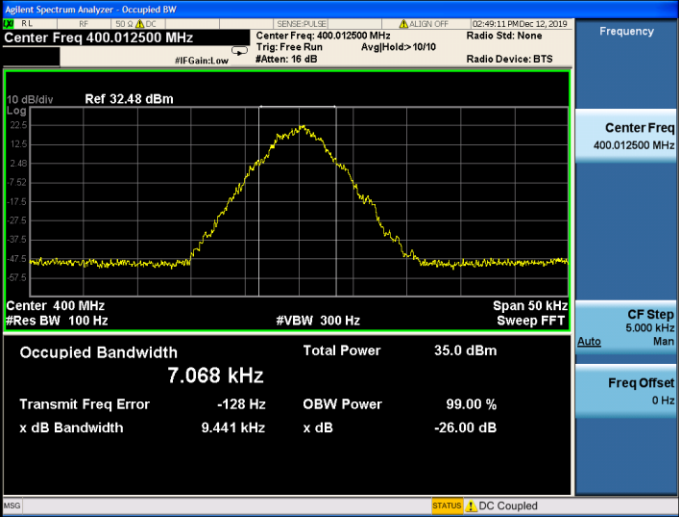


Appendix B:Occupied Bandwidth

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|---|
| TX-DNH | 4FSK | CH _L | <p>Agilent Spectrum Analyzer - Occupied BW Center Freq 400.012500 MHz #Res BW 100 Hz #VBW 300 Hz Span 50 kHz Sweep FFT Ref 38.63 dBm Occupied Bandwidth 6.765 kHz Total Power 41.2 dBm Transmit Freq Error -122 Hz x dB Bandwidth 9.674 kHz OBW Power 99.00 % x dB -26.00 dB Radio Device: BTS Status: DC Coupled</p> |
| TX-DNH | 4FSK | CH _{M1} | <p>Agilent Spectrum Analyzer - Occupied BW Center Freq 405.987500 MHz #Res BW 100 Hz #VBW 300 Hz Span 50 kHz Sweep FFT Ref 38.71 dBm Occupied Bandwidth 7.044 kHz Total Power 41.3 dBm Transmit Freq Error -31 Hz x dB Bandwidth 9.901 kHz OBW Power 99.00 % x dB -26.00 dB Radio Device: BTS Status: DC Coupled</p> |
| TX-DNH | 4FSK | CH _{M2} | <p>Agilent Spectrum Analyzer - Occupied BW Center Freq 406.112500 MHz #Res BW 100 Hz #VBW 300 Hz Span 50 kHz Sweep FFT Ref 38.65 dBm Occupied Bandwidth 6.939 kHz Total Power 41.4 dBm Transmit Freq Error 23 Hz x dB Bandwidth 9.201 kHz OBW Power 99.00 % x dB -26.00 dB Radio Device: BTS Status: DC Coupled</p> |

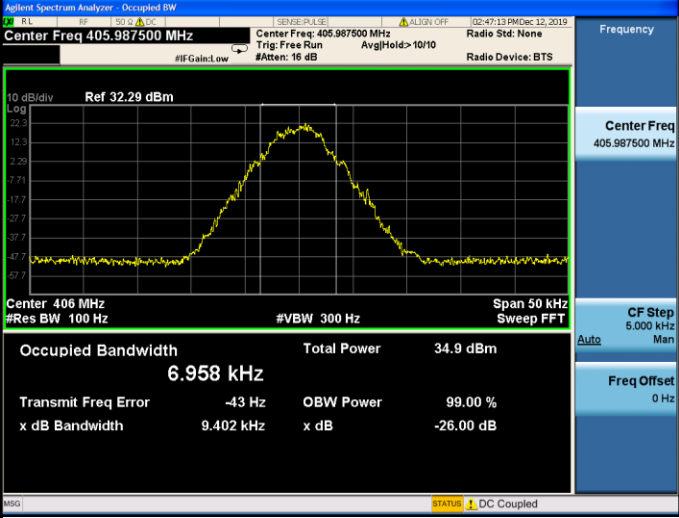
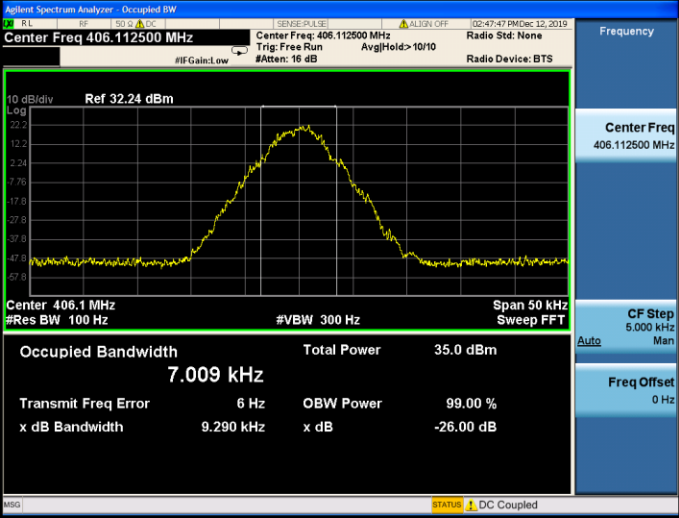
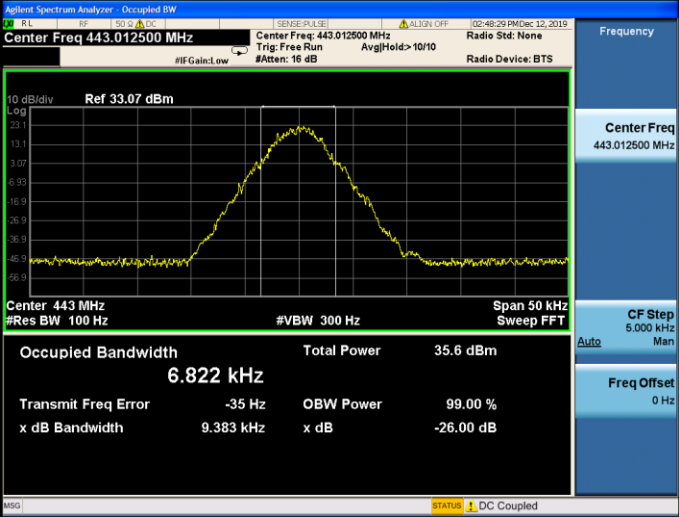


Appendix B:Occupied Bandwidth

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|--|
| TX-DNH | 4FSK | CH _{M3} |  |
| TX-DNH | 4FSK | CH _H |  |
| TX-DNL | 4FSK | CH _L |  |

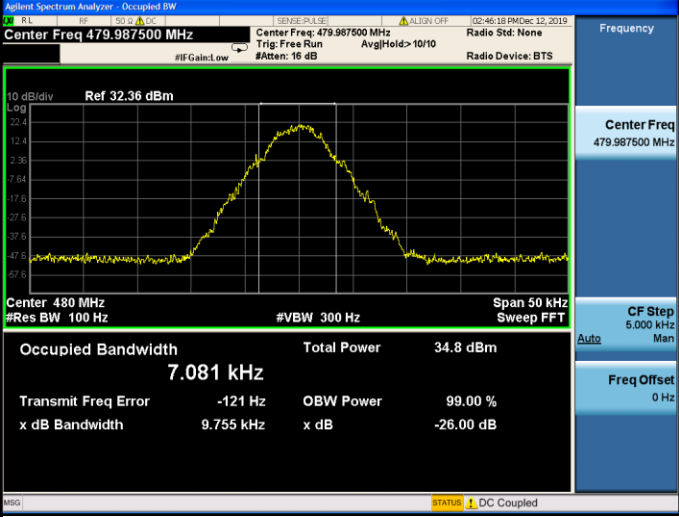


Appendix B:Occupied Bandwidth

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|--|
| TX-DNL | 4FSK | CH _{M1} |  |
| TX-DNL | 4FSK | CH _{M2} |  |
| TX-DNL | 4FSK | CH _{M3} |  |

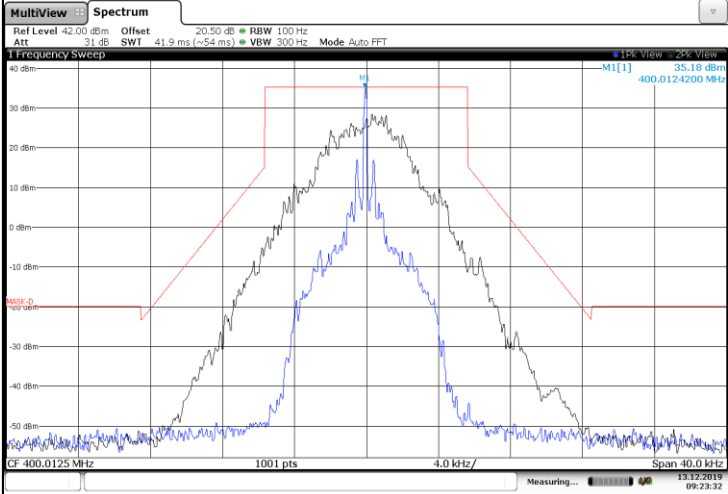
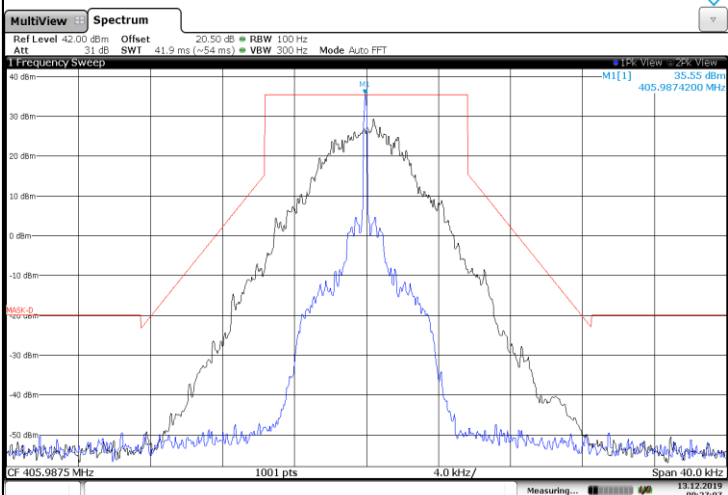
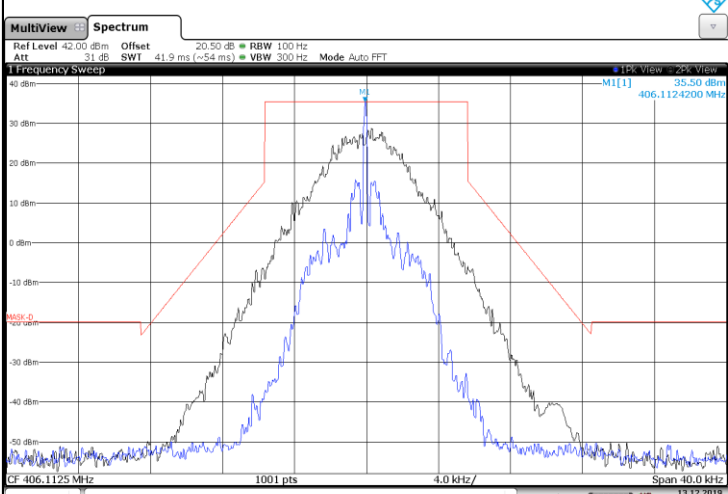


Appendix B:Occupied Bandwidth

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|-----------------|---|
| TX-DNL | 4FSK | CH _H | <div><p>Agilent Spectrum Analyzer - Occupied BW</p><p>Center Freq 479.987500 MHz</p><p>Ref 32.36 dBm</p><p>Occupied Bandwidth 7.081 kHz</p><p>Total Power 34.8 dBm</p><p>Transmit Freq Error -121 Hz</p><p>OBW Power 99.00 %</p><p>x dB Bandwidth 9.755 kHz</p><p>x dB -26.00 dB</p></div>  |

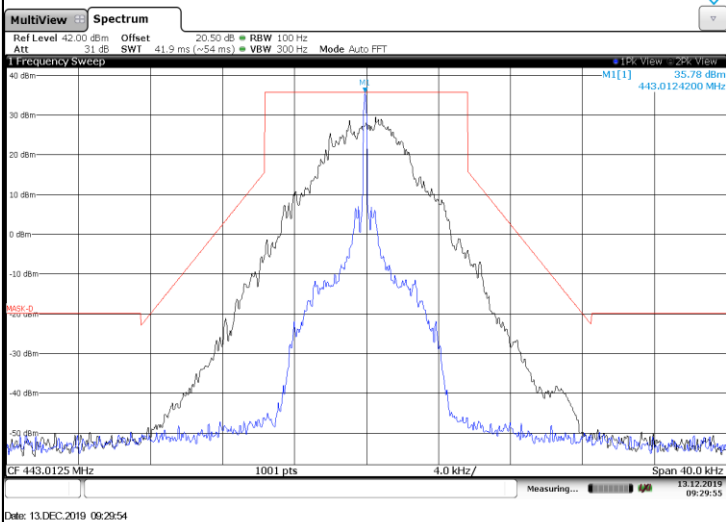
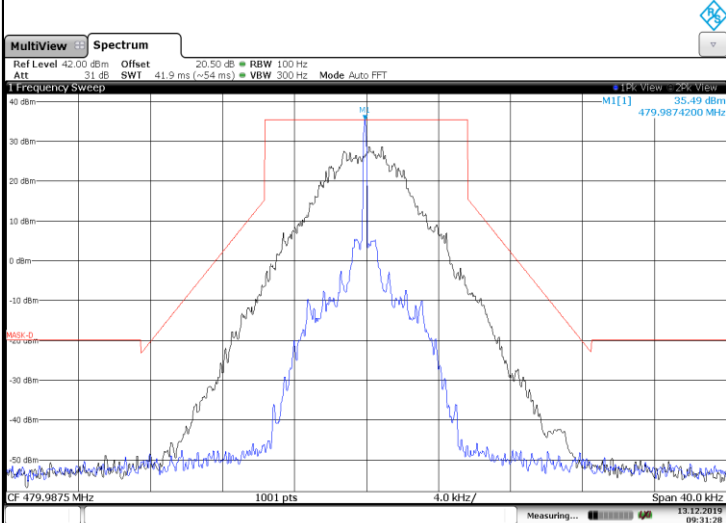
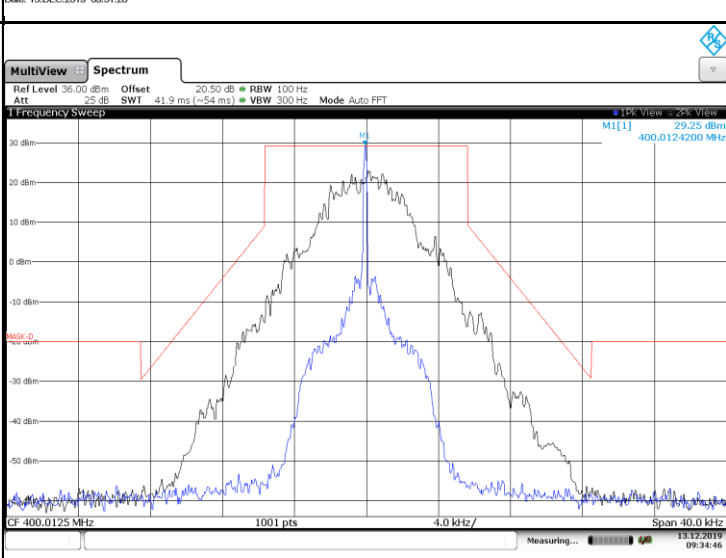


Appendix C:Emission Mask

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|--|
| TX-DNH | 4FSK | CH _L |  |
| TX-DNH | 4FSK | CH _{M1} |  |
| TX-DNH | 4FSK | CH _{M2} |  |

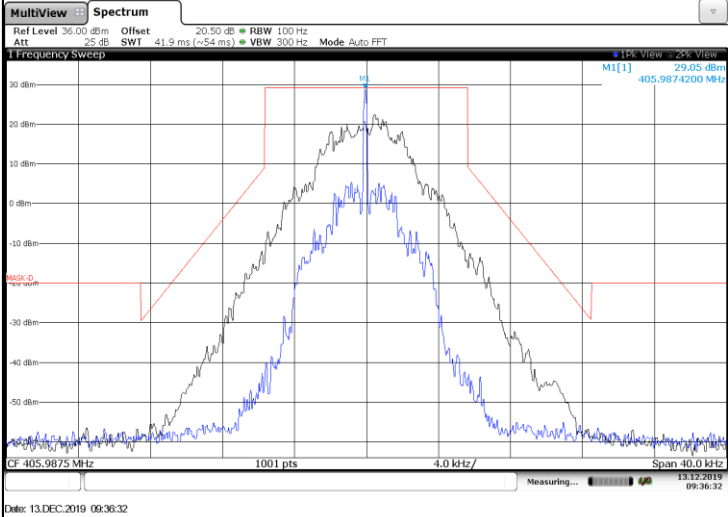
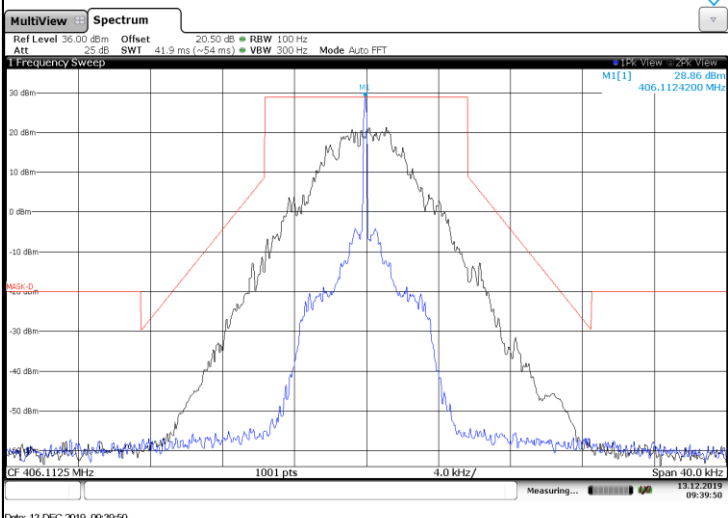
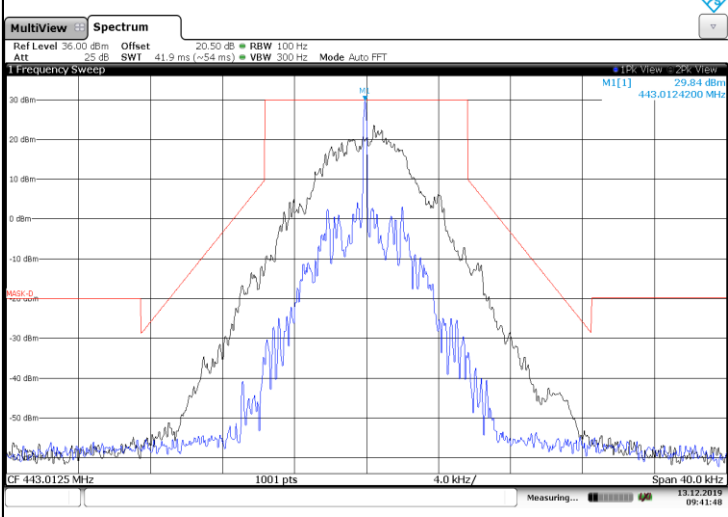


Appendix C:Emission Mask

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|--|
| TX-DNH | 4FSK | CH _{M3} |  |
| TX-DNH | 4FSK | CH _H |  |
| TX-DNL | 4FSK | CH _L |  |

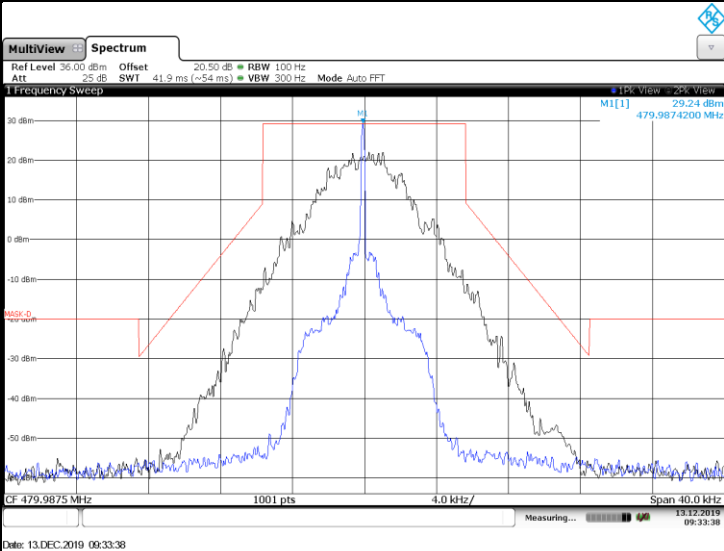


Appendix C:Emission Mask

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|------------------|--|
| TX-DNL | 4FSK | CH _{M1} |  |
| TX-DNL | 4FSK | CH _{M2} |  |
| TX-DNL | 4FSK | CH _{M3} |  |



Appendix C:Emission Mask

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT |
|----------------|-----------------|-----------------|--|
| TX-DNL | 4FSK | CH _H |  |

**Appendix D:Frequency Stability Test & Temperature**

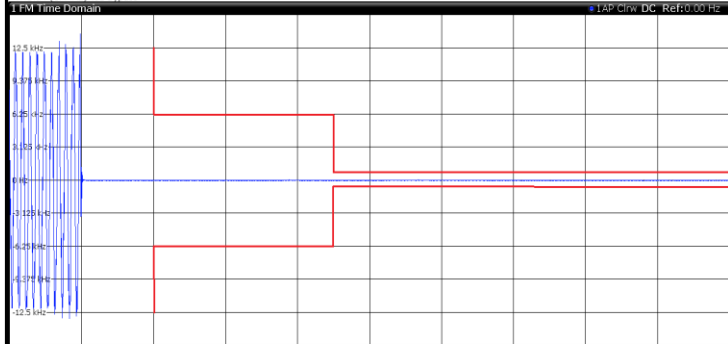
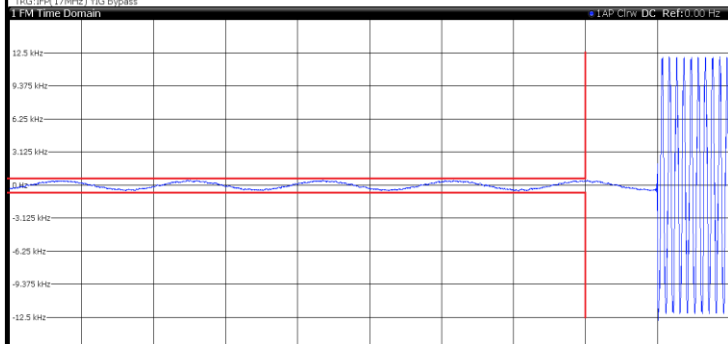
| Operation Mode | Modulation Type | Test Conditions | | Frequency error (ppm) | | | | | Limit (ppm) | Result |
|----------------|-----------------|-----------------|-------------|-----------------------|------------------|------------------|------------------|-----------------|-------------|--------|
| | | Voltage | Temperature | CH _L | CH _{M1} | CH _{M2} | CH _{M3} | CH _H | | |
| TX-DNH | 4FSK | V _N | -30 | -0.124 | -0.098 | -0.107 | -0.126 | -0.127 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | -20 | -0.117 | -0.091 | -0.103 | -0.126 | -0.127 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | -10 | -0.124 | -0.092 | -0.104 | -0.118 | -0.126 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 0 | -0.115 | -0.098 | -0.108 | -0.118 | -0.123 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 10 | -0.121 | -0.094 | -0.106 | -0.121 | -0.132 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 20 | -0.114 | -0.090 | -0.099 | -0.117 | -0.123 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 30 | -0.125 | -0.091 | -0.103 | -0.125 | -0.132 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 40 | -0.115 | -0.094 | -0.101 | -0.125 | -0.130 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _N | 55 | -0.119 | -0.094 | -0.100 | -0.123 | -0.124 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | -30 | -0.097 | -0.114 | -0.095 | -0.110 | -0.123 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | -20 | -0.097 | -0.112 | -0.098 | -0.117 | -0.129 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | -10 | -0.094 | -0.111 | -0.097 | -0.107 | -0.123 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 0 | -0.098 | -0.118 | -0.098 | -0.114 | -0.126 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 10 | -0.097 | -0.111 | -0.093 | -0.110 | -0.121 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 20 | -0.091 | -0.108 | -0.093 | -0.107 | -0.120 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 30 | -0.093 | -0.115 | -0.095 | -0.108 | -0.132 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 40 | -0.092 | -0.115 | -0.100 | -0.109 | -0.124 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | 55 | -0.092 | -0.118 | -0.098 | -0.111 | -0.123 | ±5.0 | PASS |

**Appendix E:Frequency Stability Test & Voltage**

| Operation Mode | Modulation Type | Test Conditions | | Frequency error (ppm) | | | | | Limit (ppm) | Result |
|----------------|-----------------|-----------------|----------------|-----------------------|------------------|------------------|------------------|-----------------|-------------|--------|
| | | Voltage | Temperature | CH _L | CH _{M1} | CH _{M2} | CH _{M3} | CH _H | | |
| TX-DNH | 4FSK | V _N | T _N | -0.114 | -0.090 | -0.099 | -0.117 | -0.123 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _L | T _N | -0.115 | -0.090 | -0.099 | -0.118 | -0.124 | ±5.0 | PASS |
| TX-DNH | 4FSK | V _H | T _N | -0.119 | -0.093 | -0.103 | -0.124 | -0.128 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _N | T _N | -0.091 | -0.108 | -0.093 | -0.107 | -0.120 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _L | T _N | -0.092 | -0.110 | -0.094 | -0.108 | -0.121 | ±5.0 | PASS |
| TX-DNL | 4FSK | V _H | T _N | -0.093 | -0.111 | -0.098 | -0.112 | -0.124 | ±5.0 | PASS |



Appendix F:Transmitter Frequency Behavior

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----------------|------------------|--|-------------|---------------|------------|----------------|------------|------------|-----|-------|-----|-----|-----|----|-------|------------|-------|-------------|---------|------------|-----|------------|-----------|--|
| TX-DNH | 4FSK | CH _{M2} | <div><div>MultiViewSpectrumAnalog Demod</div><div>Ref Level 37.00 dBm Offset 27.00 dB Att 20 dB AQT 100 ms DBW 25 kHz Freq 406.1125 MHz TRG:IFP(17MHz) YIG Bypass</div><div><div>1 FM Time Domain</div><div><div>TAP Cirw DC Ref:0.00 Hz</div></div><div>CF 406.1125 MHz1001 pts10.0 ms/</div></div><div><div>4 Result Summary</div><table><tr><td></td><td>Carrier Power</td><td>35.61 dBm</td><td>Carrier Offset</td><td>-47.50 Hz</td><td>Mod. Freq.</td><td>---</td><td>SINAD</td><td>---</td><td>THD</td><td>---</td></tr><tr><td>FM</td><td>+Peak</td><td>13.796 kHz</td><td>-Peak</td><td>-13.12 kHz</td><td>+Peak/2</td><td>13.458 kHz</td><td>RMS</td><td>2.754 kHz</td><td></td><td></td></tr></table><div>Analog Demod: Waiting for Trigger...Measuring...13.12.2019 09:49:20</div></div></div> | | Carrier Power | 35.61 dBm | Carrier Offset | -47.50 Hz | Mod. Freq. | --- | SINAD | --- | THD | --- | FM | +Peak | 13.796 kHz | -Peak | -13.12 kHz | +Peak/2 | 13.458 kHz | RMS | 2.754 kHz | | |
| | Carrier Power | 35.61 dBm | Carrier Offset | -47.50 Hz | Mod. Freq. | --- | SINAD | --- | THD | --- | | | | | | | | | | | | | | | |
| FM | +Peak | 13.796 kHz | -Peak | -13.12 kHz | +Peak/2 | 13.458 kHz | RMS | 2.754 kHz | | | | | | | | | | | | | | | | | |
| TX-DNH | 4FSK | CH _{M2} | <div><div>MultiViewSpectrumAnalog Demod</div><div>Ref Level 37.00 dBm Offset 27.00 dB Att 20 dB AQT 100 ms DBW 25 kHz Freq 406.1125 MHz TRG:IFP(17MHz) YIG Bypass</div><div><div>1 FM Time Domain</div><div><div>TAP Cirw DC Ref:0.00 Hz</div></div><div>CF 406.1125 MHz1001 pts10.0 ms/</div></div><div><div>4 Result Summary</div><table><tr><td></td><td>Carrier Power</td><td>35.61 dBm</td><td>Carrier Offset</td><td>-62.46 Hz</td><td>Mod. Freq.</td><td>---</td><td>SINAD</td><td>---</td><td>THD</td><td>---</td></tr><tr><td>FM</td><td>+Peak</td><td>12.116 kHz</td><td>-Peak</td><td>-12.799 kHz</td><td>+Peak/2</td><td>12.458 kHz</td><td>RMS</td><td>8.7339 kHz</td><td>998.82 Hz</td><td></td></tr></table><div>Analog Demod: Waiting for Trigger...Measuring...13.12.2019 09:49:56</div></div></div> | | Carrier Power | 35.61 dBm | Carrier Offset | -62.46 Hz | Mod. Freq. | --- | SINAD | --- | THD | --- | FM | +Peak | 12.116 kHz | -Peak | -12.799 kHz | +Peak/2 | 12.458 kHz | RMS | 8.7339 kHz | 998.82 Hz | |
| | Carrier Power | 35.61 dBm | Carrier Offset | -62.46 Hz | Mod. Freq. | --- | SINAD | --- | THD | --- | | | | | | | | | | | | | | | |
| FM | +Peak | 12.116 kHz | -Peak | -12.799 kHz | +Peak/2 | 12.458 kHz | RMS | 8.7339 kHz | 998.82 Hz | | | | | | | | | | | | | | | | |



Appendix G:Spurious Emission On Antenna Port

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT | | | | | | | | | | | | | | | | | | |
|----------------|-----------------|------------------|--|------------|------------|-----|-----------|-----------|--------|------------|-----------|-------------|---------------|------------|------------|-----------|-----------|-----------|-------------|------------|------------|
| TX-DNH | 4FSK | CH _L | <div><div>MultiViewSpectrum</div><div>Ref Level 20.50 dBmOffset 20.50 dBMode Auto Sweep</div><div>1 Spurious Emissions</div><div><div>M2[1]-46.47 dBm800.0200 MHz</div><div>M1[1]-14.50 dBm399.9980 MHz</div></div><div><div>SPURIOUS_LINE_AAS_001</div></div><div><div>30.0 MHz</div><div>64002 pts</div><div>497.0 MHz/</div><div>5.0 GHz</div></div><div>2 Result Summary</div><table><tr><th>Range Low</th><th>Range Up</th><th>RBW</th><th>Frequency</th><th>Power Abs</th><th>ALimit</th></tr><tr><td>30.000 MHz</td><td>1.000 GHz</td><td>100.000 kHz</td><td>399.99797 MHz</td><td>-14.50 dBm</td><td>-200.00 dB</td></tr><tr><td>1.000 GHz</td><td>5.000 GHz</td><td>1.000 MHz</td><td>4.72007 GHz</td><td>-53.84 dBm</td><td>-200.00 dB</td></tr></table><div>Measuring...13.12.2019 10:07:54</div><div>Date: 13.DEC.2019 10:07:54</div></div> | Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | 30.000 MHz | 1.000 GHz | 100.000 kHz | 399.99797 MHz | -14.50 dBm | -200.00 dB | 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.72007 GHz | -53.84 dBm | -200.00 dB |
| Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | | | | | | | | | | | | | | | | |
| 30.000 MHz | 1.000 GHz | 100.000 kHz | 399.99797 MHz | -14.50 dBm | -200.00 dB | | | | | | | | | | | | | | | | |
| 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.72007 GHz | -53.84 dBm | -200.00 dB | | | | | | | | | | | | | | | | |
| TX-DNH | 4FSK | CH _{M1} | <div><div>MultiViewSpectrum</div><div>Ref Level 20.50 dBmOffset 20.50 dBMode Auto Sweep</div><div>1 Spurious Emissions</div><div><div>M2[1]-46.12 dBm811.9620 MHz</div><div>M1[1]-23.06 dBm405.9690 MHz</div></div><div><div>SPURIOUS_LINE_AAS_001</div></div><div><div>30.0 MHz</div><div>64002 pts</div><div>497.0 MHz/</div><div>5.0 GHz</div></div><div>2 Result Summary</div><table><tr><th>Range Low</th><th>Range Up</th><th>RBW</th><th>Frequency</th><th>Power Abs</th><th>ALimit</th></tr><tr><td>30.000 MHz</td><td>1.000 GHz</td><td>100.000 kHz</td><td>405.96934 MHz</td><td>-23.06 dBm</td><td>-200.00 dB</td></tr><tr><td>1.000 GHz</td><td>5.000 GHz</td><td>1.000 MHz</td><td>4.95244 GHz</td><td>-53.70 dBm</td><td>-200.00 dB</td></tr></table><div>Measuring...13.12.2019 10:08:34</div><div>Date: 13.DEC.2019 10:08:34</div></div> | Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | 30.000 MHz | 1.000 GHz | 100.000 kHz | 405.96934 MHz | -23.06 dBm | -200.00 dB | 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.95244 GHz | -53.70 dBm | -200.00 dB |
| Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | | | | | | | | | | | | | | | | |
| 30.000 MHz | 1.000 GHz | 100.000 kHz | 405.96934 MHz | -23.06 dBm | -200.00 dB | | | | | | | | | | | | | | | | |
| 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.95244 GHz | -53.70 dBm | -200.00 dB | | | | | | | | | | | | | | | | |
| TX-DNH | 4FSK | CH _{M2} | <div><div>MultiViewSpectrum</div><div>Ref Level 20.50 dBmOffset 20.50 dBMode Auto Sweep</div><div>1 Spurious Emissions</div><div><div>M2[1]-46.31 dBm812.2050 MHz</div><div>M1[1]-23.33 dBm406.0910 MHz</div></div><div><div>SPURIOUS_LINE_AAS_001</div></div><div><div>30.0 MHz</div><div>64002 pts</div><div>497.0 MHz/</div><div>5.0 GHz</div></div><div>2 Result Summary</div><table><tr><th>Range Low</th><th>Range Up</th><th>RBW</th><th>Frequency</th><th>Power Abs</th><th>ALimit</th></tr><tr><td>30.000 MHz</td><td>1.000 GHz</td><td>100.000 kHz</td><td>406.09059 MHz</td><td>-23.33 dBm</td><td>-200.00 dB</td></tr><tr><td>1.000 GHz</td><td>5.000 GHz</td><td>1.000 MHz</td><td>4.79082 GHz</td><td>-51.58 dBm</td><td>-200.00 dB</td></tr></table><div>Measuring...13.12.2019 10:09:29</div><div>Date: 13.DEC.2019 10:09:29</div></div> | Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | 30.000 MHz | 1.000 GHz | 100.000 kHz | 406.09059 MHz | -23.33 dBm | -200.00 dB | 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.79082 GHz | -51.58 dBm | -200.00 dB |
| Range Low | Range Up | RBW | Frequency | Power Abs | ALimit | | | | | | | | | | | | | | | | |
| 30.000 MHz | 1.000 GHz | 100.000 kHz | 406.09059 MHz | -23.33 dBm | -200.00 dB | | | | | | | | | | | | | | | | |
| 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.79082 GHz | -51.58 dBm | -200.00 dB | | | | | | | | | | | | | | | | |



Appendix G:Spurious Emission On Antenna Port

| Operation Mode | Modulation Type | Test Channel | TEST PLOT RESULT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----------------|------------------|---|------------|------------|-----------------|-----------|-----------|----------|------------|-----------|-------------|---------------|------------|------------|-----------|-----------|-----------|-------------|------------|------------|------|-----|-----|---------|---------|----------|-----------------|----|---|--|-------------|------------|--|--|----|---|--|-------------|------------|--|--|----|---|--|-------------|------------|--|--|
| TX-DNH | 4FSK | CH _{M3} | <div><div>MultViewSpectrum</div><div>Ref Level 20.50 dBmOffset 20.50 dBMode Auto Sweep</div><div><div>1 Spurious Emissions</div><div><div>M2[1]-55.61 dBm886.0130 MHz</div><div>M1[1]-41.48 dBm443.0100 MHz</div></div></div><div><div>2 Result Summary</div><table><tr><th>Range Low</th><th>Range Up</th><th>RBW</th><th>Frequency</th><th>Power Abs</th><th>At Limit</th></tr><tr><td>30.000 MHz</td><td>1.000 GHz</td><td>100.000 kHz</td><td>443.01006 MHz</td><td>-41.48 dBm</td><td>-200.00 dB</td></tr><tr><td>1.000 GHz</td><td>5.000 GHz</td><td>1.000 MHz</td><td>4.35158 GHz</td><td>-53.03 dBm</td><td>-200.00 dB</td></tr></table></div><div>Date: 13.DEC.2019 10:10:48</div></div> | Range Low | Range Up | RBW | Frequency | Power Abs | At Limit | 30.000 MHz | 1.000 GHz | 100.000 kHz | 443.01006 MHz | -41.48 dBm | -200.00 dB | 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.35158 GHz | -53.03 dBm | -200.00 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Range Low | Range Up | RBW | Frequency | Power Abs | At Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30.000 MHz | 1.000 GHz | 100.000 kHz | 443.01006 MHz | -41.48 dBm | -200.00 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.35158 GHz | -53.03 dBm | -200.00 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TX-DNH | 4FSK | CH _H | <div><div>MultViewSpectrum</div><div>Ref Level 20.50 dBmOffset 20.50 dBMode Auto Sweep</div><div><div>1 Spurious Emissions</div><div><div>M3[1]-48.77 dBm596.2350 MHz</div><div>M1[1]-41.96 dBm126.1030 MHz</div></div></div><div><div>2 Result Summary</div><table><tr><th>Range Low</th><th>Range Up</th><th>RBW</th><th>Frequency</th><th>Power Abs</th><th>At Limit</th></tr><tr><td>30.000 MHz</td><td>1.000 GHz</td><td>100.000 kHz</td><td>126.10278 MHz</td><td>-41.96 dBm</td><td>-200.00 dB</td></tr><tr><td>1.000 GHz</td><td>5.000 GHz</td><td>1.000 MHz</td><td>4.99531 GHz</td><td>-52.67 dBm</td><td>-200.00 dB</td></tr></table><div><div>3 Marker Table</div><table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>126.103 MHz</td><td>-41.96 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>363.715 MHz</td><td>-48.22 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>596.235 MHz</td><td>-48.77 dBm</td><td></td><td></td></tr></table></div></div><div>Date: 13.DEC.2019 10:12:03</div></div> | Range Low | Range Up | RBW | Frequency | Power Abs | At Limit | 30.000 MHz | 1.000 GHz | 100.000 kHz | 126.10278 MHz | -41.96 dBm | -200.00 dB | 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.99531 GHz | -52.67 dBm | -200.00 dB | Type | Ref | Trc | X-Value | Y-Value | Function | Function Result | M1 | 1 | | 126.103 MHz | -41.96 dBm | | | M2 | 1 | | 363.715 MHz | -48.22 dBm | | | M3 | 1 | | 596.235 MHz | -48.77 dBm | | |
| Range Low | Range Up | RBW | Frequency | Power Abs | At Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30.000 MHz | 1.000 GHz | 100.000 kHz | 126.10278 MHz | -41.96 dBm | -200.00 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.000 GHz | 5.000 GHz | 1.000 MHz | 4.99531 GHz | -52.67 dBm | -200.00 dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type | Ref | Trc | X-Value | Y-Value | Function | Function Result | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M1 | 1 | | 126.103 MHz | -41.96 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M2 | 1 | | 363.715 MHz | -48.22 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M3 | 1 | | 596.235 MHz | -48.77 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

----End of Report----