



| TE | EST REPORT | |
|--|--|------------------------------------|
| Report Reference No : Project No : FCC ID : | CHTEW19070079 SHT1906076101EW YPVITALCOMGUMBO | Report verification: |
| Applicant's name : Address : Manufacturer : Address : | ITALCOM GROUP 1728 Coral Way, Coral Gables Emocom Technology Co., Limi Unit 17,9/F., Tower A, New Ma Museum Road, Tsimshatsui, K | ted ndarin Plaza, No.14 Science |
| Test item description : Trade Mark : Model/Type reference : Listed Model(s) : | Smart watch NYX Mobile GUMBO | |
| Standard : Date of receipt of test sample Date of testing Date of issue | FCC CFR Title 47 Part 15 Sub Jun 28, 2019 Jun 29, 2019- Jul 17, 2019 Jul 18, 2019 | opart C Section 15.247 |
| Result: Compiled by (Position+Printed name+Signature): Supervised by (Position+Printed name+Signature): | PASS File administrators Silvia Li Project Engineer Aaron Fang | Silvia Li Aaron.Fang |
| Approved by (Position+Printed name+Signature): Testing Laboratory Name: : | RF Manager Hans Hu Shenzhen Huatongwei Intern | Hamsty |
| Address: Shenzhen Huatongwei International I | 1/F, Bldg 3, Hongfa Hi-tech Inc Tianliao, Gongming, Shenzher nspection Co., Ltd. All rights r | , China |

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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:

<u>FCC Rules Part 15.247:</u> Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

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

<u>KDB 558074 D01 15.247 Meas Guidance v05r01:</u> Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

| Revision No. | Date of issue | Description |
|--------------|---------------|-------------|
| N/A | 2019-07-18 | Original |
| | | |
| | | |
| | | |
| | | |

2. TEST DESCRIPTION

| Test Item | Section in CFR 47 | Result | Test Engineer |
|--|-------------------|--------|-----------------|
| Antenna Requirement | 15.203/15.247 (c) | PASS | Jeremy Zhang |
| AC Power Line Conducted Emissions | 15.207 | PASS | Jeremy Zhang |
| Conducted Peak Output Power | 15.247 (b)(1) | PASS | JiongSheng.Feng |
| 20 dB Bandwidth | 15.247 (a)(1) | PASS | JiongSheng.Feng |
| Carrier Frequencies Separation | 15.247 (a)(1) | PASS | JiongSheng.Feng |
| Hopping Channel Number | 15.247 (a)(1) | PASS | JiongSheng.Feng |
| Dwell Time | 15.247 (a)(1) | PASS | JiongSheng.Feng |
| Pseudorandom Frequency Hopping Sequence | 15.247(b)(4) | PASS | JiongSheng.Feng |
| Restricted band | 15.247(d)/15.205 | PASS | Tony Duan |
| Radiated Emissions | 15.247(d)/15.209 | PASS | Tony Duan |

Note: The measurement uncertainty is not included in the test result.

3. <u>SUMMARY</u>

3.1. Client Information

| Applicant: | ITALCOM GROUP |
|--|--|
| Address: 1728 Coral Way, Coral Gables, Miami, Florida, United States | |
| Manufacturer: Emocom Technology Co., Limited | |
| Address: | Unit 17,9/F., Tower A, New Mandarin Plaza, No.14 Science Museum Road, Tsimshatsui, Kowloon, Hong Kong. |

3.2. Product Description

| Name of EUT: | Smart watch | |
|----------------------|--|--|
| Trade Mark: | NYX Mobile | |
| Model No.: | GUMBO | |
| Listed Model(s): | - | |
| Power supply: | DC 3.7V | |
| Adapter information: | Input:100-240Va.c., 50/60Hz, 0.15A Output:5.0Vd.c., 500mA | |
| Hardware version: | NYX_GUMBO_001 | |
| Software version: | GUMBO_AMXNYX_V001R | |
| Bluetooth | | |
| Version: | Supported BT4.0+EDR | |
| Modulation: | GFSK, π/4DQPSK, 8DPSK | |
| Operation frequency: | 2402MHz~2480MHz | |
| Channel number: | 79 | |
| Channel separation: | 1MHz | |
| Antenna type: | PIFA Antenna | |
| Antenna gain: | 1.3dBi | |

3.3. Operation state

Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

| Channel | Frequency (MHz) |
|---------|-----------------|
| 00 | 2402 |
| 01 | 2403 |
| : | : |
| 39 | 2441 |
| : | : |
| 77 | 2479 |
| 78 | 2480 |

> TEST MODE

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated suprious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data recorded in the report.

3.4. EUT configuration

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

- supplied by the manufacturer
- supplied by the lab

| 1 | Manufacturer: | / |
|----------|---------------|---|
| , | Model No.: | / |
| 1 | Manufacturer: | / |
| 7 | Model No.: | / |

3.5. Modifications

No modifications were implemented to meet testing criteria.

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

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.

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

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

| Temperature: | 15~35°C |
|--------------------|-------------|
| Relative Humidity: | 30~60 % |
| Air Pressure: | 950~1050mba |

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 in calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd. quality system according to 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

| Test Items | Measurement Uncertainty | Notes |
|---|-------------------------|-------|
| Transmitter power conducted | 0.51 dB | (1) |
| Conducted spurious emissions 9kHz~40GHz | 0.51 dB | (1) |
| Conducted Disturbance 150kHz~30MHz | 3.02 dB | (1) |
| Radiated Emissions below 1GHz | 4.90 dB | (1) |
| Radiated Emissions above 1GHz | 4.96 dB | (1) |
| Occupied Bandwidth | 70 Hz | (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

| • | Conducted Emission | | | | | | |
|------|-------------------------------------|--------------------|-----------------|------------|------------------------------|------------------------------|--|
| Used | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) | |
| • | Shielded Room | Albatross projects | N/A | N/A | 2018/09/28 | 2023/09/27 | |
| • | EMI Test Receiver | R&S | ESCI | 101247 | 2018/10/27 | 2019/10/26 | |
| • | Artificial Mains | SCHWARZBECK | NNLK 8121 | 573 | 2018/10/27 | 2019/10/26 | |
| • | Pulse Limiter | R&S | ESH3-Z2 | 100499 | 2018/10/27 | 2019/10/26 | |
| • | RF Connection Cable | HUBER+SUHNER | EF400 | N/A | 2018/11/15 | 2019/11/14 | |
| • | Test Software | R&S | ES-K1 | N/A | N/A | N/A | |
| 0 | Single Balanced Telecom Pair ISN | FCC | FCC-TLISN-T2-02 | 20371 | 2018/10/28 | 2019/10/27 | |
| 0 | Two Balanced Telecom Pairs ISN | FCC | FCC-TLISN-T4-02 | 20373 | 2018/10/28 | 2019/10/27 | |
| 0 | Four Balanced Telecom Pairs ISN | FCC | FCC-TLISN-T8-02 | 20375 | 2018/10/28 | 2019/10/27 | |
| 0 | V-Network | R&S | ESH3-Z6 | 100211 | 2018/10/27 | 2019/10/26 | |
| 0 | V-Network | R&S | ESH3-Z6 | 100210 | 2018/10/27 | 2019/10/26 | |
| 0 | 2-Line V-Network | R&S | ESH3-Z5 | 100049 | 2018/10/27 | 2019/10/26 | |

| • | Radiated Emission-6th test site | | | | | |
|------|---------------------------------|--------------------|--------------|------------|------------------------------|------------------------------|
| Used | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| • | Semi-Anechoic Chamber | Albatross projects | SAC-3m-02 | N/A | 2018/09/30 | 2021/09/29 |
| • | EMI Test Receiver | R&S | ESCI | 100900 | 2018/10/28 | 2019/10/27 |
| • | Loop Antenna | R&S | HFH2-Z2 | 100020 | 2017/11/20 | 2020/11/19 |
| • | Ultra-Broadband Antenna | SCHWARZBECK | VULB9163 | 546 | 2017/04/05 | 2020/04/04 |
| • | Pre-Amplifer | SCHWARZBECK | BBV 9742 | N/A | 2018/11/15 | 2019/11/14 |
| • | RF Connection Cable | HUBER+SUHNER | N/A | N/A | 2018/09/28 | 2019/09/27 |
| • | RF Connection Cable | HUBER+SUHNER | SUCOFLEX104 | 501184/4 | 2018/09/28 | 2019/09/27 |
| • | Test Software | R&S | ES-K1 | N/A | N/A | N/A |
| • | Turntable | Maturo Germany | TT2.0-1T | N/A | N/A | N/A |
| • | Antenna Mast | Maturo Germany | CAM-4.0-P-12 | N/A | N/A | N/A |

| • | Radiated emission-7th test site | | | | | | | |
|------|---------------------------------|--------------------|-------------|------------|------------------------------|------------------------------|--|--|
| Used | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) | | |
| • | Semi-Anechoic Chamber | Albatross projects | SAC-3m-01 | N/A | 2018/09/30 | 2021/09/29 | | |
| • | Spectrum Analyzer | R&S | FSP40 | 100597 | 2018/10/27 | 2019/10/26 | | |
| • | Horn Antenna | SCHWARZBECK | 9120D | 1011 | 2017/03/27 | 2020/03/26 | | |
| • | Pre-amplifier | BONN | BLWA0160-2M | 1811887 | 2018/11/14 | 2019/11/13 | | |
| • | Pre-amplifier | CD | PAP-0102 | 12004 | 2018/11/14 | 2019/11/13 | | |
| • | Broadband Pre- amplifier | SCHWARZBECK | BBV 9718 | 9718-248 | 2019/04/26 | 2020/04/25 | | |
| • | RF Connection Cable | HUBER+SUHNER | RE-7-FH | N/A | 2018/11/15 | 2019/11/14 | | |
| • | RF Connection Cable | HUBER+SUHNER | RE-7-FL | N/A | 2018/11/15 | 2019/11/14 | | |
| • | Test Software | Audix | E3 | N/A | N/A | N/A | | |

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| • | Turntable | Maturo Germany | TT2.0-1T | N/A | N/A | N/A |
|---|--------------|----------------|--------------|-----|-----|-----|
| • | Antenna Mast | Maturo Germany | CAM-4.0-P-12 | N/A | N/A | N/A |

| • | RF Conducted Method | | | | | | | |
|------|---------------------------------|--------------|-----------------|------------|------------------------------|------------------------------|--|--|
| Used | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) | | |
| • | Signal and spectrum Analyzer | R&S | FSV40 | 100048 | 2018/10/28 | 2019/10/27 | | |
| • | Spectrum Analyzer | Agilent | N9020A | MY50510187 | 2018/09/29 | 2019/09/28 | | |
| 0 | Radio communication tester | R&S | CMW500 | 137688-Lv | 2018/09/29 | 2019/09/28 | | |
| 0 | Test software | Tonscend | JS1120-1(LTE) | N/A | N/A | N/A | | |
| 0 | Test software | Tonscend | JS1120-2(WIFI) | N/A | N/A | N/A | | |
| 0 | Test software | Tonscend | JS1120-3(WCDMA) | N/A | N/A | N/A | | |
| 0 | Test software | Tonscend | JS1120-4(GSM) | N/A | N/A | N/A | | |

5. TEST CONDITIONS AND RESULTS

5.1. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of anantenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Test Result:

☑ Passed □ Not Applicable

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

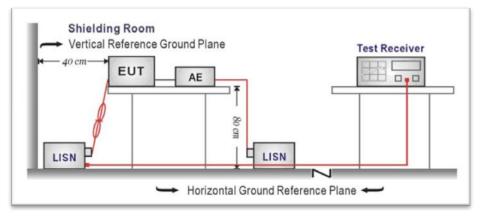
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207

| | Limit (d | lBuV) |
|-----------------------|------------|-----------|
| Frequency range (MHz) | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

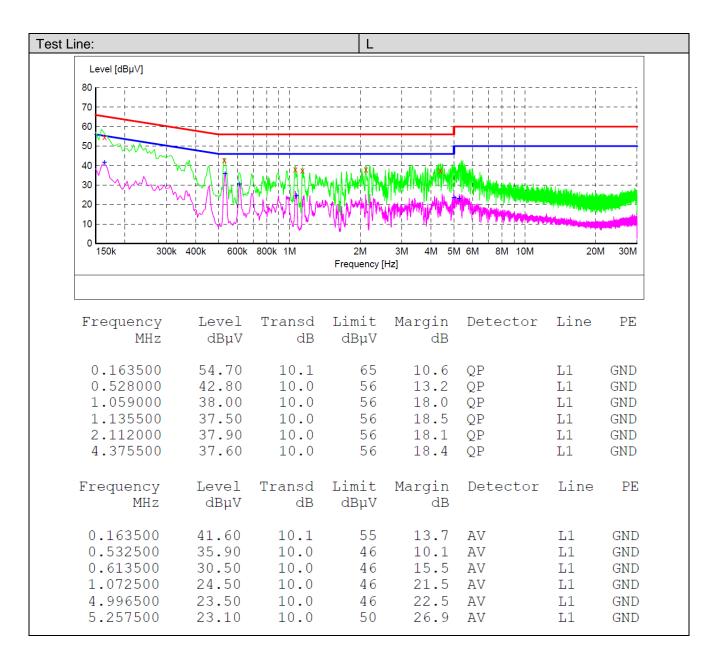
- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
- 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
- 5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 8. During the above scans, the emissions were maximized by cable manipulation.

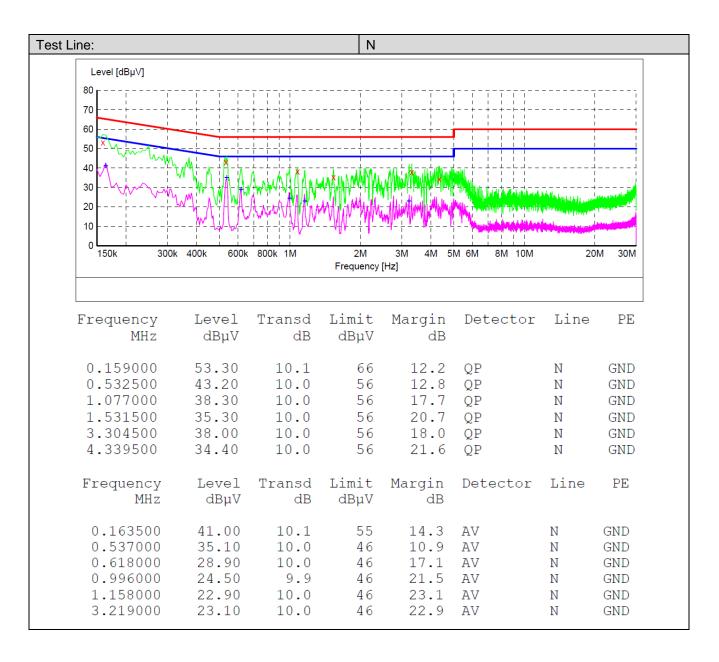
TEST RESULTS

☑ Passed □ Not Applicable

Note:

- 1) Transd= Cable lose + Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit Level



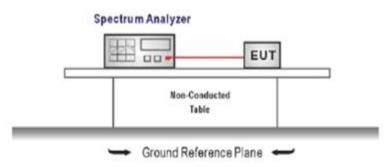


5.3. Conducted Peak Output Power

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 nonoverlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW≥ the 20 dB bandwidth of the emission being measured, VBW≥RBW Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

| Modulation type | Channel | Peak Output power (dBm) | Average Output power (dBm) | Limit (dBm) | Result |
|-----------------|---------|----------------------------|-------------------------------|----------------|--------|
| | 00 | -1.81 | -1.83 | | |
| GFSK | 39 | -2.21 | -2.24 | ≤ 30.00 | Pass |
| | 78 | -2.38 | -2.40 | | |
| | 00 | -1.98 | -2.63 | | |
| π/4DQPSK | 39 | -2.35 | -2.89 | ≤ 21.00 | Pass |
| | 78 | -2.48 | -3.01 | | |
| | 00 | -1.96 | -2.65 | | |
| 8DPSK | 39 | -2.28 | -2.89 | ≤ 21.00 | Pass |
| | 78 | -2.38 | -3.04 | | |

Modulation Type: GFSK Spectrum Ref Level 20.00 dBm Att 30 dB Count 500/500 1Pk View
 Offset
 1.00 dB
 RBW
 1 MHz

 SWT
 1 ms
 VBW
 3 MHz
 Mode
 Auto Sweep
 M1[1] -1.81 dE 2.40213020 G LO dBmм1 0 dBm 10 dBm--20 dBm CH00 30 dBm -40 dBm 50 dBm -60 dBm 70 dBm 691 pts .0 MHz CF 2.402 GH Date:11.JUL.2019 19:41:10 Spectrum
 Ref Level
 20.00 dBm
 Offset
 1.00 dB
 RBW
 1 MHz

 Att
 30 dB
 SWT
 1 ms
 VBW
 3 MHz
 Mode Auto Sweep Count 500/500 M1[1] -2.21 dB 2.44110850 CP 10 dBm 0 dBm--10 dBm -20 dBm CH39 -30 dBm -40 dBm -50 dBm -60 dBm 70 dBm-CF 2.441 GH 691 pts 5.0 MHz Sp 11 A 444 Date:11.JUL.2019 19:43:33 Spectrum RefLevel 20.00 dBm Offset 1.00 dB ● RBW 1 MHz Att 30 dB SWT 1 ms ● VBW 3 MHz Mode Auto Sweep Count 500/500 M1[1] -2.38 dB 2.47985530 GF 10 dBm-0 dBm M1 -10 dBm 20 dBm CH78 30 dBm -40 dBm -50 dBm -60 dBm 70 dBm 691 pts .0 MHz CF 2.48 G III 840 **A** 1 1 1 1 Data:11.JUL.2019 19:44:45

| ulation Type: | π/4DQPSK | |
|---------------|---|--------------|
| | Spectrum Ref Level 20.00 dBm Offset 1.00 dB • RBW 2 MHz Att 30 dB SWT 1 ms • VBW 5 MHz Mode Auto Sweep Count \$300/\$500 Count \$300/\$500 SWT 1 ms • VBW 5 MHz Mode Auto Sweep | |
| | | dBm D GHz |
| | 10 dBm M1 | |
| | -10 dBm | |
| | -20 dBm | _ |
| H00 | -30 dBm | |
| | -40 dBm- | |
| | | |
| | -70 dBm- | |
| | CF 2.402 GHz 691 pts Span 5.0 M | MHz |
| | Dam:11.JUL.2019 194616 | |
| | Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Att 30 dB SWT 1 ms VBW 5 MHz | (♥) |
| | Count 500/500 PIPk View M1[1] -2.35 d | dBm |
| | 10 dBm |) GHz |
| | 0 dBm | |
| | -10 dBm | / |
| СН39 | -30 dBm | |
| | -40 dBm- | |
| | -50 dBm- | |
| | -60 dBm | |
| | CF 2.441 GHz 691 pts Span 5.0 M | MHz |
| | Mesondio (1987) Massado (1987) | |
| | Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz | |
| | Att 30 dB SWT 1 ms ● VBW 5 MHz Mode Auto Sweep Count 500/500 Ptk View | |
| | 10 dBm | dBm D GHz |
| | 0 dBm M1 | |
| | -10 dBm | _ |
| CH78 | -20 dem | |
| | -40 dBm | |
| | -50 dBm | |
| | -60 dBm | |
| | CF 2.48 GHz 691 pts Span 5.0 M | MHz |
| | Daw: 11,JUL2019 194910 | |

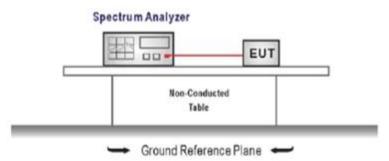
| Modulation Type: | | 8DPSK | | |
|------------------|---|----------------------------|-----------------|-----------------------------|
| <u> </u> | Spectrum | | | |
| | RefLevel 20.00 dBm Att 30 dB | Offset 1.00 dB | Mode Auto Sweep | |
| | Count 500/500 Pk View | | | |
| | | | M1[1] | -1.96 dBm 2.40197110 GHz |
| | 10 dBm | | | |
| | 0 dBm | M: | | |
| | -10 dBm | | | |
| | -20 dBm | | | |
| CH00 | | | | |
| | -30 dBm | | | |
| | -40 dBm | | | |
| | -50 dBm | | | |
| | -60 dBm | | | |
| | -70 dBm | | | |
| | | | | |
| | CF 2.402 GHz | 691 | pts Measuring. | Span 5.0 MHz |
| | Date:11.JUL.2019 19:50:49 | | | |
| | Spectrum | | | |
| | Ref Level 20.00 dBm | Offset 1.00 dB RBW 2 MHz | Mode with Corre | [V] |
| | Att 30 dB Count 500/500 1Pk View | SWT 1 ms 👄 VBW 5 MHz | mode Auto Sweep | |
| | UPR VIEW | | M1[1] | -2.28 dBm 2.44099280 GHz |
| | 10 dBm | | | 2.44099280 GH2 |
| | 0 dBm | M | 1 | |
| | -10 dBm | | | |
| | -20 dBm | | | |
| CH39 | | | | |
| СПЗЭ | -30 dBm | | | |
| | -40 dBm | | | |
| | -50 dBm | | | |
| | -60 dBm | | | |
| | -70 dBm | | | |
| | -70 dbm | | | |
| | CF 2.441 GHz | 691 | pts | Span 5.0 MHz |
| | Date: 11.JUL.2019 19:52:16 | | Steastining. | 4/0 |
| | | | | |
| | Spectrum Ref Level 20.00 dBm | Offset 1.00 dB 🖷 RBW 2 MHz | | |
| | Att 30 dB Count 500/500 | SWT 1 ms VBW 5 MHz | Mode Auto Sweep | |
| | • 1Pk View | | M1[1] | -2.38 dBm |
| | 10 dBm | | | 2.48002890 GHz |
| | | | | |
| | 0 dBm | | 11 | I |
| | 0 dBm | | | |
| | -10 d8m | | * | |
| | | | | |
| CH78 | -10 d8m | | | |
| CH78 | -10 dBm -20 dBm- | | | |
| CH78 | -10 dBm -20 dBm -30 dBm | | | |
| CH78 | -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm | | | |
| CH78 | -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm | | | |
| CH78 | -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm | | | |
| CH78 | -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm | 691 | *1 | Span 5.0 MHz |
| CH78 | -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm | 691 | 1 | Span 5.0 MHz |

5.4. 20 dB Bandwidth

<u>LIMIT</u>

N/A

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- 3. Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW \ge 1% of the 20 dB bandwidth, VBW \ge RBW

Sweep = auto, Detector function = peak, Trace = max hold

4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

🛛 Passed

Not Applicable

| Modulation type | Channel | 20 dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------------|---------|-----------------------|-------------|--------|
| | 00 | 0.93 | | |
| GFSK | 39 | 0.93 | - | Pass |
| | 78 | 0.93 | | |
| | 00 | 1.27 | | |
| π/4DQPSK | 39 | 1.28 | - | Pass |
| | 78 | 1.28 | | |
| | 00 | 1.26 | | |
| 8DPSK | 39 | 1.27 | - | Pass |
| | 78 | 1.27 | | |

| Iodulation Type: | GFSK |
|------------------|---|
| | Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 10 kHz |
| | ● Att 30 dB SWT 189.6 µs ● VBW 30 kHz Mode Auto FFT Count 500/500 |
| | ●1Pk View M1[1] -28.18 dBm |
| | 10 dBm 2.40154750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.40156750 GHz 2.4015750 GHz 2.40150 GHz 2.4015750 GHz |
| | 0 dBm 2.40205750 GHz |
| | -10 dBm |
| | -20 dBm 1 -27.602 dBm |
| | |
| CH00 | -40 dBm |
| | |
| | -69,08m |
| | -70 dBm |
| | CF 2.402 GHz 1001 pts Span 2.5 MHz |
| | Marker Type Ref Trc X-value Y-value Function Function Result |
| | M1 1 2.4015475 GHz -28.18 dBm M2 1 2.4020575 GHz -7.60 dBm |
| | D3 M1 1 927.5 kHz -0.48 d8 Measuring |
| | Data: 11.0U.2019 19:41.00 |
| | Spectrum 🕎 |
| | RefLevel 20.00 dBm Offset 1.00 dB 🖷 RBW 10 kHz |
| | ● Att 30 dB SWT 189.6 μs ● VBW 30 kHz Mode Auto FFT Count 500/500 |
| | 1Pk View M1[1] -28.71 dBm |
| | 10 dBm 2.44054750 GHz 7.96 dBm 7.96 dBm |
| | 0 dBm 2.44105750 GHz |
| | -10 dBm |
| | -20 dBm MI ANN WWA A |
| | -30 dBm 01 -27.963 dBm 74 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| CH39 | |
| | |
| | -60,d8h |
| | -70 dBm |
| | CF 2.441 GHz 1001 pts Span 2.5 MHz Marker |
| | Type Ref Trc X-value Y-value Function Function Result |
| | M1 1 2.4405475 GHz -28.71 dBm M2 1 2.4410575 GHz -7.96 dBm D3 M1 927.5 KHz -0.29 dB |
| | Do Intel A Delto Kite OteD GD Di (intel (intel) (intel) (intel) |
| | Dam:11.JUL.2019 19:43:24 |
| | Spectrum 🕎 |
| | RefLevel 20.00 dBm Offset 1.00 dB |
| | Count 500/500 |
| | M1[1] -28.89 dbm |
| | 10 BBM M2[1] -8.09 BBm |
| | |
| | -10 d8m |
| | -20 dBm V V V V V V V V V V V V V V V V V V V |
| 01170 | |
| CH78 | the second se |
| | |
| | -90, dBm |
| | |
| | CF 2.48 GHz 1001 pts Span 2.5 MHz Marker |
| | Type Ref Trc X-value Y-value Function Function Result M1 1 2.4795475 GHz -28.89 dBm |
| | M2 1 2.4800755 GHz -8.09 dBm D3 M1 1 927.5 kHz -0.20 dB |
| | |
| | Dam:11.JUL.2019 19:44:35 |

| odulation Type: | π/4DQPSK |
|-----------------|---|
| | Spectrum (|
| | RefLevel 20.00 dBm Offset 1.00 dB ● RBW 30 kHz ● Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT Count 500/500 |
| | 1Pk View M1[1] -24.66 dBm |
| | 10 dBm 2.40137250 GHz 2.40137250 GHz 4.60 dBm |
| | 0 dBm 2.40216250 GHz |
| | -10 dBm |
| | -20 dBm |
| 01100 | -30 dem |
| CH00 | -40 dBm |
| | -60 dBm |
| | -70 dBm- |
| | CF 2.402 GHz 1001 pts Span 2.5 MHz |
| | Marker Type Ref Trc X-value Y-value Function Function Result |
| | Mi 1 2.4013725 GHz -24.66 dBm M2 1 2.4021625 GHz -4.60 dBm |
| | D3 M1 1 1.2725 MHz -0.02 dB |
| | Data:11.JUL.2019 19:46:06 |
| | Spectrum T |
| | Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz |
| | ● Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT Count 500/500 |
| | PIK View M1[1] -25.45 dBm Out Out |
| | 10 dBm 2.44037000 GHz4.82 dBm4.82 dBm 2.44116250 GHz |
| | |
| | |
| | -20 dBm mg/ 03 03 |
| CU 120 | -30 dBm- |
| CH39 | -50 dBm |
| | -60 dBm |
| | -70 d8m- |
| | CF 2.441 GHz 1001 pts Span 2.5 MHz |
| | Marker |
| | Type Ref Trc X-value Y-value Function Function Result M1 1 2.44037 GHz -25.45 BBn M2 1 2.4411625 GHz -4.82 dBm |
| | D3 M1 1 1.2775 MHz 0.46 dB |
| | Data:11.JUL.2019 1947.36 |
| | |
| | Ref Level 20.00 dBm Offset 1.00 dB RBW 30 kHz |
| | ● Att 30 dB SWT 63.1 µs ● VBW 100 kHz Mode Auto FFT Count 500/500 |
| | Plk View M1[1] -25.67 dBm O 100000000000000000000000000000000 |
| | 10 dBm 2.47937000 GHz -4.97 dBm 2.47937000 GHz -4.97 dBm 2.49846550 GHz |
| | 0 dBm- 2.49016250 GHz |
| | -10 d8m |
| | -20 dBm |
| | -30 dBm |
| CH78 | 40 dbm |
| | -50 dBm |
| | -60 dBm |
| | |
| | CF 2.48 GHz 1001 pts Span 2.5 MHz Marker |
| | Type Ref Trc X-value Y-value Function Function Result M1 1 2.47937 GHz -25.67 dBm -25.67 dBm -25.67 dBm |
| | M2 1 2.4801625 GHz -4.97 dBm D3 M1 1 1.2775 MHz 0.52 dB |
| | Measuring ((HEREE) 40 |
| | Dame:11.JUL.2019 19×49:00 |

| Iodulation Type: | 8DPSK |
|------------------|--|
| | Spectrum Image: Control of the sector of the |
| | Count subjob -24.26 dBm ID dBm M2[1] -3.90 dBm 0 dBm -24.26 dBm -3.90 dBm -10 dBm -2.00 dBm -2.40136000 GHz -20 dBm -10 dBm -0.1 -20 dBm -0.1 -23.905 dBm |
| CH00 | 40 dbm 50 dbm 50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -50 dbm -70 dbm -50 dbm -50 dbm |
| | M2 1 2:40216 GHz -3:90 dBm D3 M1 1 1:265 MHz 0:28 dB 1 Date::11.00L2019 19:60 M0 1 |
| СНЗ9 | Refuevel 20.00 dbm Offset 1.00 dbm RBW 30 kHz Mode Auto FFT Count 500/500 FIPK View -24.23 dbm -24.23 dbm 10 dbm M2[1] 2.443160 cHz -4.13 dbm 0 dbm M2[1] 2.44316250 CHz -4.13 dbm 0 dbm M2 2.44316250 CHz -4.13 dbm -20 dbm M2 -24.23 dbm -4.13 dbm -20 dbm M2 -2.44316250 CHz -4.13 dbm -30 dbm M2 2.44316250 CHz -4.13 dbm -30 dbm M2 2.44316250 CHz -4.13 dbm -30 dbm M2 Span 2.5 MHz -50 dbm -70 dbm 1 2.44316350 CHz -24.25 dbm Marker 100 lpts Span 2.5 MHz Marker 1 2.44116250 CHz -24.25 dbm M3 1 1.27 MHz 0.03 db -24.25 dbm |
| CH78 | Spectrum We Ref Level 20.00 dbm Offset 1.00 db RBW 30 kHz At 30 db SWT 63.1 µs VBW 100 kHz Mode Auto FFT Count 500/500 TPk View -24.37 dbm 24.4736 dbm 10 dbm M2[1] 2.47936 dbm -4.22 dbm 0 dbm 40 M2[1] 2.48016000 cHz -10 dbm 40 40 40 40 -20 dbm 1.24.27 dbm 4.24.20 dbm -4.22 dbm -30 dbm 40 40 40 40 -70 dbm 1.24.27 dbm 100 pts Span 2.5 MHz Marker 10.24.27 dbm -24.37 dbm 50 dbm -70 dbm 1 2.47936 GHz -24.37 dbm Yope Kef Trc X-value Function Result M1 M1 1 2.47936 GHz -24.37 dbm 100 pts |

5.5. Carrier Frequencies Separation

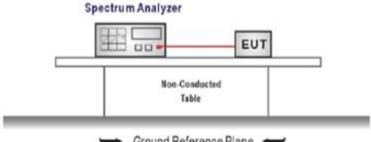
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively,

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST CONFIGURATION



Ground Reference Plane

TEST PROCEDURE

- The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was 1 compensated to the results for each measurement.
- Set to the maximum power setting and enable the EUT transmit continuously 2.
- 3. Use the following spectrum analyzer settings: Span = wide enough to capture the peaks of two adjacent channels RBW \geq 1% of the span, VBW \geq RBW Sweep = auto, Detector function = peak, Trace = max hold
- Measure and record the results in the test report. 4.

TEST MODE:

Please refer to the clause 3.3

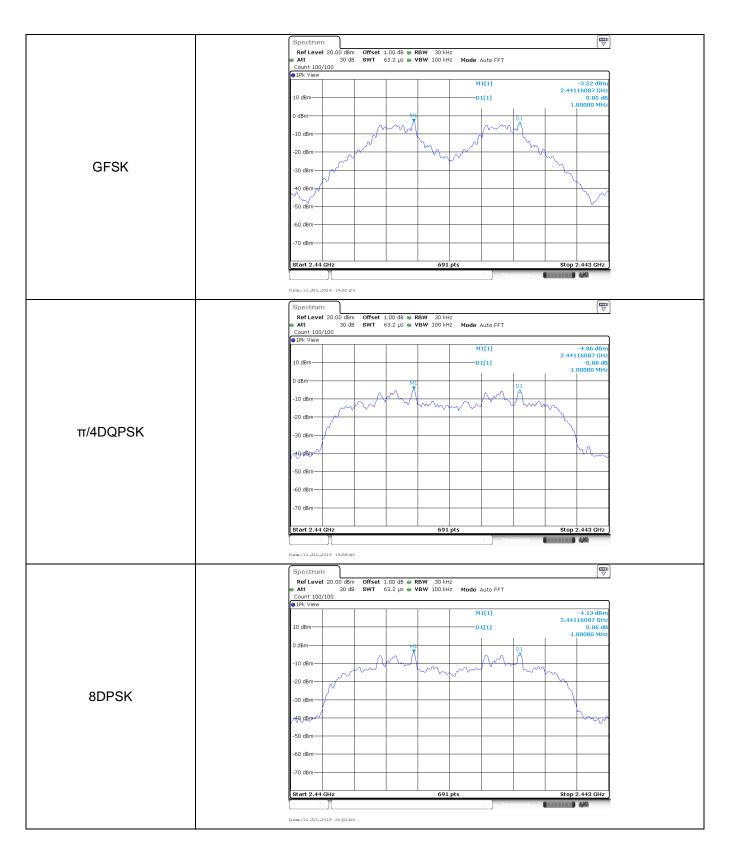
TEST RESULTS

Passed Not Applicable

| Modulation type | Channel | Carrier Frequencies Separation (MHz) | Limit (MHz) * | Result |
|-----------------|---------|---|---------------|--------|
| GFSK | 39 | 1.00 | ≥0.93 | Pass |
| π/4DQPSK | 39 | 1.00 | ≥0.85 | Pass |
| 8DPSK | 39 | 1.00 | ≥0.85 | Pass |

Note:

*: GFSK limit = The maximum 20 dB Bandwidth for GFSK modulation on the section 5.4. π /4DQPSK limit = 2/3 * The maximum 20 dB Bandwidth for π /4DQPSK modulation on the section 5.4. 8DPSK limit = 2/3 * The maximum 20 dB Bandwidth for 8DPSK modulation on the section 5.4

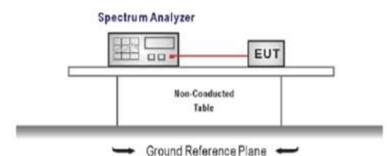


5.6. Hopping Channel Number

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems in the 2400–2483.5 MHz band shall use at least **15** channels.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = the frequency band of operation RBW ≥ 1% of the span, VBW ≥ RBW Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

| Modulation type | Channel number | Limit | Result |
|-----------------|----------------|--------|--------|
| GFSK | 79 | | |
| π/4DQPSK | 79 | ≥15.00 | Pass |
| 8DPSK | 79 | | |

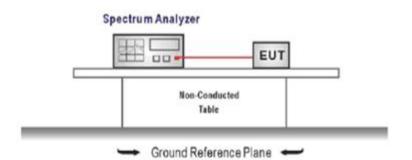
| | Spectrum Image: Constraint of the sector of th |
|----------|--|
| | Att 30 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep IPk View |
| | |
| | 10 dBm- |
| | 0 dBm———————————————————————————————————— |
| | -141640-0010-0010-0010-0010-0010-0010-00 |
| | -50 qgm |
| GFSK | -B0 dBm |
| SI SIX | |
| | -40 dBm |
| | -50 dBm |
| | -60 d8m |
| | -70 dBm |
| | Start 2.4 GHz 691 pts Stop 2.4835 GHz |
| | |
| | Dam:11.JUL.2019 19:56:33 |
| | Spectrum 🕎 |
| | Ref Level 20.00 dBm Offset 1.00 dB RBW 100 Hz Att 30 dB SWT 1 ms VBW 300 Hz Mode Auto Sweep |
| | IPk View |
| | 10 dBm- |
| | 0 dBm |
| | - Maran Manara Manara Manan Manara Manan Mana |
| | |
| | -20 dam- |
| π/4DQPSK | -30 dBm |
| | Λ -40 dBm |
| | -50 dBm |
| | -60 dBm |
| | -70 dBm |
| | |
| | Start 2.4 GHz 691 pts Stop 2.4835 GHz |
| | Date:11.3012019 19:59:37 |
| | Spectrum 🕎 |
| | RefLevel 20.00 dBm Offset 1.00 dB ● RBW 100 kHz ● Att 30 dB SWT 1 ms ● VBW 300 kHz Mode Auto Sweep |
| | ALC SUB SWI THIS VEW SUCKEZ MULE AUCOSWEEP |
| | 10 dBm |
| | |
| | o dem Manualianti wanana wana wana |
| | -to generate the second s |
| | -20 dam |
| 8DPSK | -80 dBm- |
| | 40 dem |
| | -50 dBm |
| | |
| | -60 dBm |
| | -70 dBm- |
| | |
| | Start 2.4 GHz 691 pts Stop 2.4835 GHz |

5.7. Dwell Time

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel, RBW= 1 MHz, VBW ≥ RBW Sweep = as necessary to capture the entire dwell time per hopping channel, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

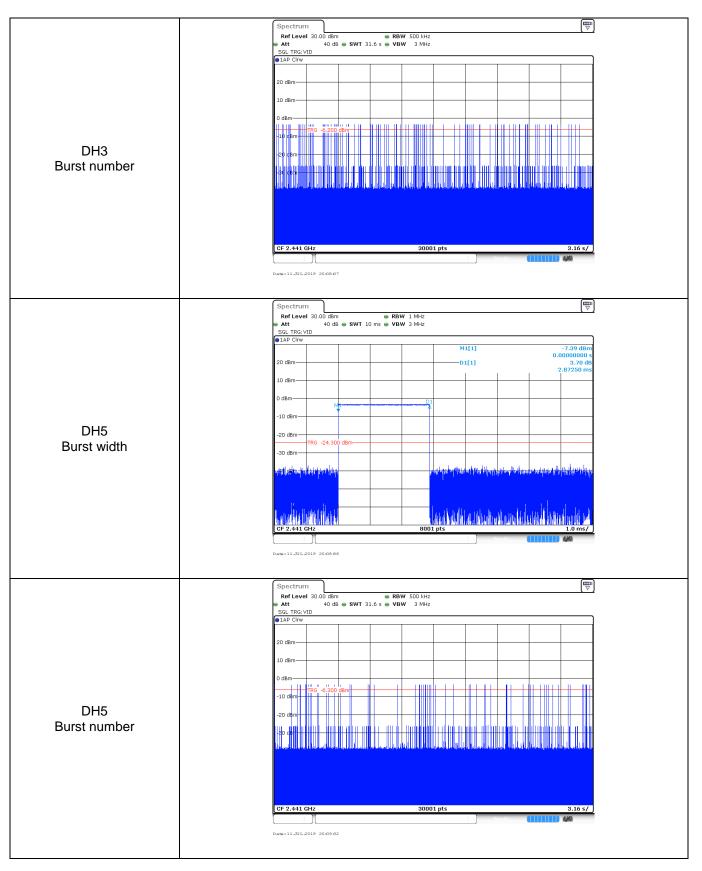
☑ Passed □ Not Applicable

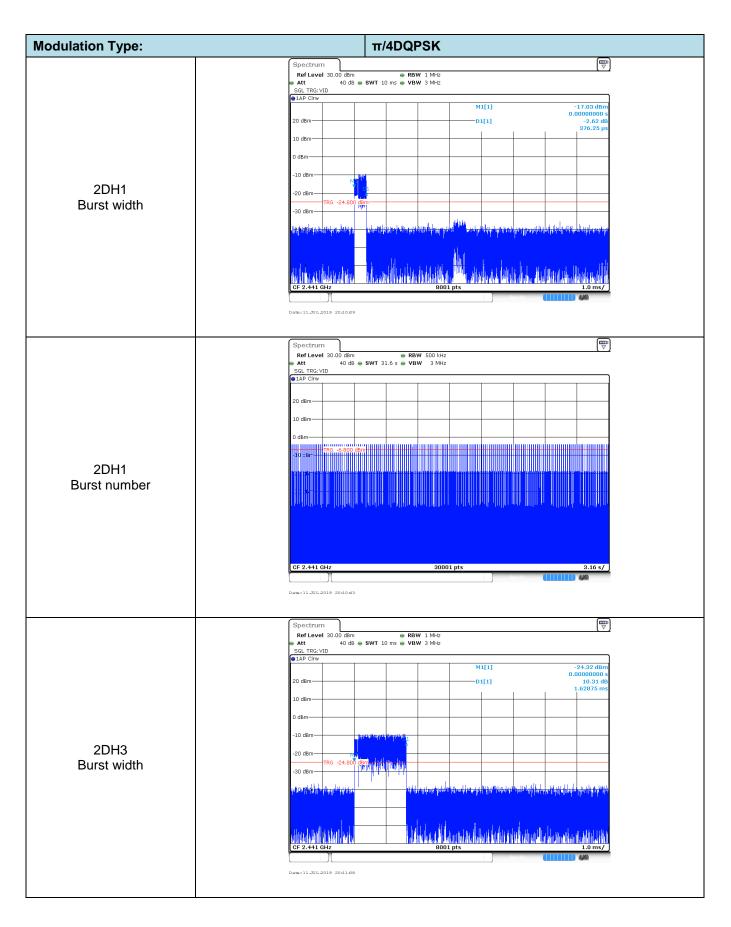
| Modulation type | Channel | Burst Width [ms/hop/ch] | Total Hops[hop*ch] | Dwell time (Second) | Limit (Second) | Result |
|--------------------|---|----------------------------|-----------------------|------------------------|-------------------|--------|
| | DH1 0.37 | | 317.00 | 0.12 | | |
| GFSK | DH3 | 1.63 | 108.00 0.18 ≤ 0.40 | | ≤ 0.40 | Pass |
| | DH5 2.87 | 61.00 | 0.18 | | | |
| | 2DH1 | 0.38 | 316.00 | 0.12 | ≤ 0.40 | |
| π/4DQPSK | 2DH3 | 1.63 | 113.00 | 0.18 | | Pass |
| | 2DH5 | | 67.00 | 0.19 | | 1 |
| | 3DH1 0.38 8DPSK 3DH3 1.63 | | 319.00 | 0.12 | | |
| 8DPSK | | | 99.00 | 0.16 | ≤ 0.40 | Pass |
| | 3DH5 | 2.88 | 72.00 | 0.21 | | |

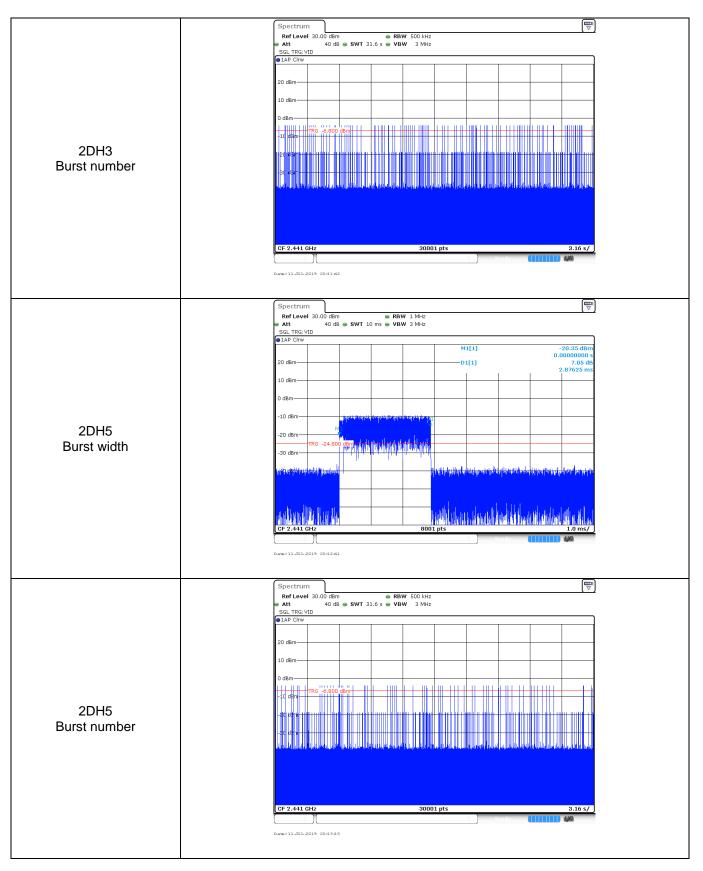
Modulation Type: GFSK ₿ Spectrum
 RefLevel 30.00 dbm
 RBW 1 MHz

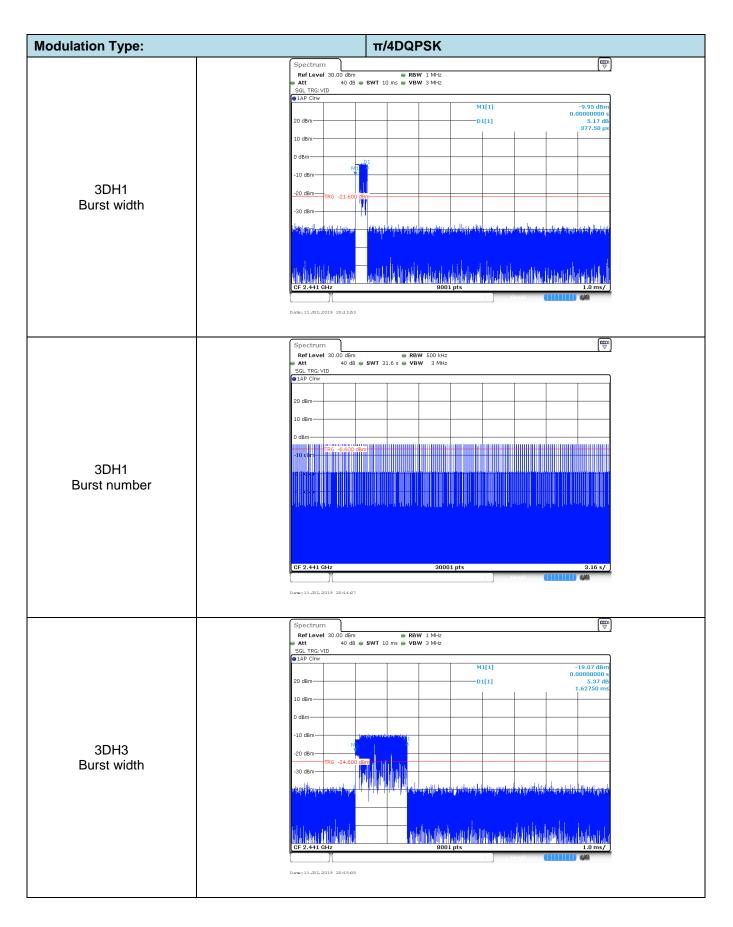
 Att
 40 db e
 SWT 10 ms
 VBW 3 MHz

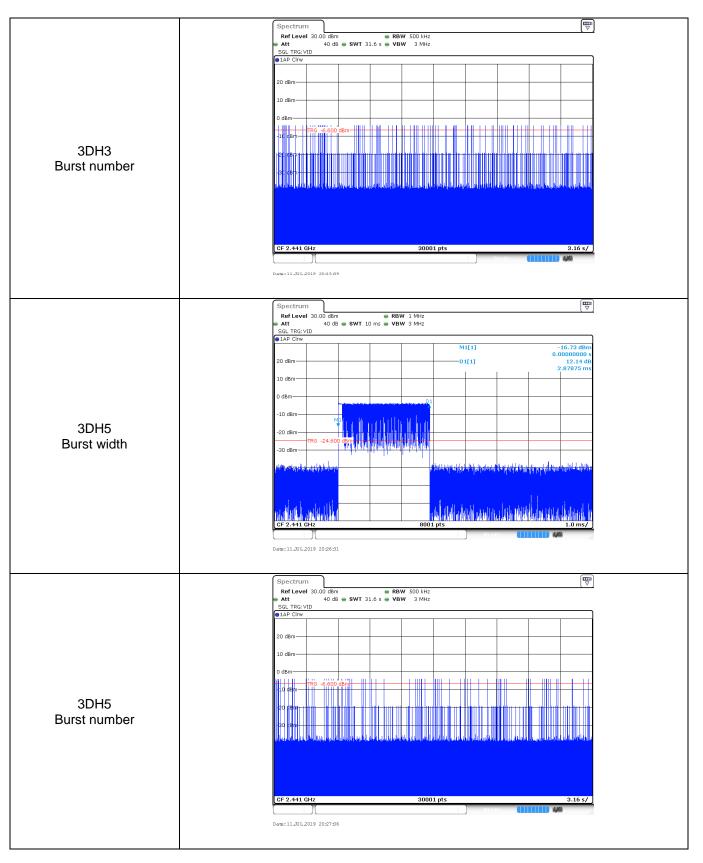
 SGL TRG:VID
 14P CInv
 14P CInv
 14P CInv
 M1[1] 20.33 dE 0.000000 20 dBm 16.64 (370.00 D1[1] 10 dBm 0 dBm -10 dBm DH1 -20 dBm RG -24.30 Burst width dB 30 dBm Lan takakén délakatén dénékénén véladat Date:11.JUL.2019 20:06:02 opectrum Ref Level 30.00 d8m Att 40 d8 ● SWT 31.6 s ● VBW 3 MHz SGL TRG:VID ●1AP CIrw □ 20 dBm-10 dBm 0 dBn 10 ce..... DH1 eo a Burst number CF 2.441 GHz 30001 pts 3.16 s/ Date:11.JUL.2019 20:06:36 Spectrum RefLevel 30.00 dBm Att 40 dB SGL TRG: VID -23.15 dE M1[1] 20 dBm-D1[1] 4.60 10 dBm 0 dBm--10 dBm DH3 -20 dBm Burst width RG -24.20 30 dBm t a ba dhalladh a th' dhallad ann an an bhalladh i i nantis. Date:11.JUL.2019 20:07:33











5.8. Pseudorandom Frequency Hopping Sequence

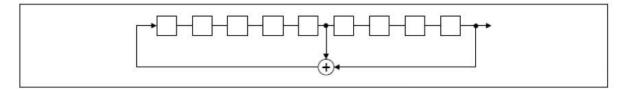
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):Frequency hopping systems shall have hopping channel carrier fre-quencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-ternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier fre-quencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to chan-nel frequencies that are selected at the system hopping rate from a pseudo ran-domly ordered list of hopping fre-quencies. Each frequency must be used equally on the average by each trans-mitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their cor-responding transmitters and shall shift frequencies in synchronization with the transmitted signals.

TEST RESULTS

The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage.And the result is fed back to the input of the friststage.The sequence begins with the frist one of 9 consecutive ones,forexample:the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An explame of pseudorandom frequency hopping sequence as follows:

| 0 | 2 | 4 | 6 | 62 | 64 | - | 78 | 1 | 73 | 75 7 |
|---|---|---|---|-----------|----|---|----------|---|---------|------|
| ٦ | | | | ····· | | | 1 | | - T | П |
| | | | | | | | i i | | | |
| | | | | 1 | | | 1 | | | |
| | | | | | | | <u>i</u> | | _Ĺ_ | |

Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

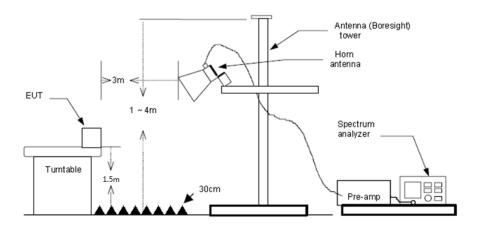
5.9. Restricted band (radiated)

<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

- 1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
- 2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- 3. The EUT waspositioned such that the distance from antenna to the EUT was 3 meters.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
- The receiver set as follow: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

Note:

- 1) Final level= Read level + Factor
- 2) Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report.
- 3) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

Report No.: CHTEW19070079

| Test channe | l: | | СН | СН00 | | | | | | |
|--------------------|----------------------|------------------|-------------------|------------------------|----------------|--------------|---------------|--|--|--|
| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin (dB) | Polarization | Test value | | | |
| 2310.00 | 52.43 | -2.34 | 50.09 | 74.00 | 23.91 | Horizontal | Peak | | | |
| 2390.00 | 51.87 | -2.41 | 49.46 | 74.00 | 24.54 | Horizontal | Peak | | | |
| 2310.00 | 52.46 | -2.34 | 50.12 | 74.00 | 23.88 | Vertical | Peak | | | |
| 2390.00 | 53.72 | -2.41 | 51.31 | 74.00 | 22.69 | Vertical | Peak | | | |
| 2310.00 | 42.29 | -2.34 | 39.95 | 54.00 | 14.05 | Horizontal | Average | | | |
| 2390.00 | 41.85 | -2.41 | 39.44 | 54.00 | 14.56 | Horizontal | Average | | | |
| 2310.00 | 42.28 | -2.34 | 39.94 | 54.00 | 14.06 | Vertical | Average | | | |
| 2390.00 | 41.86 | -2.41 | 39.45 | 54.00 | 14.55 | Vertical | Average | | | |

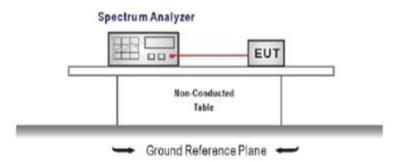
| Test channe | l: | | CH | CH78 | | | | | | |
|--------------------|----------------------|------------------|-------------------|------------------------|----------------|--------------|---------------|--|--|--|
| Frequency (MHz) | Read Level (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin (dB) | Polarization | Test value | | | |
| 2483.50 | 54.04 | -2.15 | 51.89 | 74.00 | 22.11 | Horizontal | Peak | | | |
| 2500.00 | 53.31 | -2.10 | 51.21 | 74.00 | 22.79 | Horizontal | Peak | | | |
| 2483.50 | 52.52 | -2.15 | 50.37 | 74.00 | 23.63 | Vertical | Peak | | | |
| 2500.00 | 52.21 | -2.10 | 50.11 | 74.00 | 23.89 | Vertical | Peak | | | |
| 2483.50 | 42.74 | -2.15 | 40.59 | 54.00 | 13.41 | Horizontal | Average | | | |
| 2500.00 | 42.21 | -2.10 | 40.11 | 54.00 | 13.89 | Horizontal | Average | | | |
| 2483.50 | 43.54 | -2.15 | 41.39 | 54.00 | 12.61 | Vertical | Average | | | |
| 2500.00 | 42.15 | -2.10 | 40.05 | 54.00 | 13.95 | Vertical | Average | | | |

5.10. Band edge and Spurious Emissions (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

TEST CONFIGURATION



TEST PROCEDURE

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic. Sweep = auto, Detector function = peak, Trace = max hold
- 4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

| Test Item: | Band edge | Modulation type: GFSK |
|-------------------------|-----------|--|
| | | Spectrum Image: Construction of first 1.00 dB • RBW 100 kHz Ref Level 20.00 dBm Offset 1.00 dB • RBW 100 kHz Att 30 dB SWT 1.1 ms • VBW 300 kHz Mode Auto Sweep Count 500/500 • Max • • • • |
| | | M1[1] -2.30 dBm 10 dBm 2.402100 GHz 0 dBm M2[1] -55.03 dBm -10 dBm - - |
| CH00 | | -20 dBm 01 -22.300 dBm |
| No hopping mode | | Stort 2.31 GHz 691 pts Storp 2.405 GHz |
| | | Marker Yupe Ref Trc X-value Yu-value Function Function Result M1 1 2.40218 GHz -2.30 dBm Function Function Result M2 1 2.40 GHz -55.03 dBm Function Function M3 1 2.39 GHz -55.71 dBm Function Function M4 1 2.31 GHz -54.92 dBm Function Function |
| | | Massurinow Massurinow Date:11.JUL2019 1941.24 Spectrum Image: 11.JUL2019 |
| | | Ref Level 20:00 dBm Offset 1:00 dB RBW 100 kHz Att 30 dB SWT 1:1 ms VBW 300 kHz Court S00/500 IPK Max M1[1] -2.85 dBm |
| | | 10 dBm 2.402040 GHz 0 dBm 2.400000 GHz -10 dBm 2.400000 GHz |
| CH00 | | -20 dBm 01 -22.850 dBm |
| Hopping mode | | Start 2.31 GHz 691 pts Stop 2.405 GHz |
| | | Marker Yupe Ref Trc X-value Y-value Function Function Result M1 1 2.40204 GHz -2.85 dBm Function Function Result M2 1 2.4 GHz -5.58 dBm Function Function M3 1 2.39 GHz -55.34 dBm Function Function M4 1 2.33 CHz -55.34 dBm Function Function M4 1 2.325007 GHz -53.71 dBm Function Function |
| | | Date:11.2012.2019 1956.61 |
| | | Ref Level 20.00 dbm Offset 1.00 db RBW 100 HHz Att 30 db SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 PPk Max |
| | | 10 dBm |
| CH78 No hopping mode | | -20 dBm D1 -22.500 dBm |
| | | -50 dBm |
| | | Stop 2.5 GH2 Stop 2.5 GH2 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.479631 GH2 ~2.50 dBm M2 1 2.498631 GH2 ~56.39 dBm M3 1 2.95 GH2 ~56.01 dBm M4 1 2.4963971 GH2 ~57.83 dBm |
| | | Date: 11.2012 2019 19:44:59 |

Report No.: CHTEW19070079

| | Spectrum [] Ref Level 20.00 dBm Offset 1.00 dB ● RBW 100 kHz |
|----------------------|---|
| | Att 30 dB SWT 56.9 μs 	VBW 300 kHz Mode Auto FFT Count 500/500 |
| | DPk Max |
| | 10 dBm M1[1] -2.88 dBm 2.4788440 GHz |
| | 0 dgm M2[1] -60.13 dBm 2.4835000 GHz |
| | |
| | -20 dsm 01 -22.880 dBm |
| | -30 dBm |
| CH78 Hopping mode | -40 dBm |
| hopping mode | -60 dBm - M2 |
| | -70 dBm |
| | Start 2.478 GHz 691 pts Stop 2.5 GHz |
| | Marker |
| | Type Ref Trc X-value Y-value Function Function Result M1 1 2.478844 GHz -2.88 dBm -2.88 dBm -2.88 dBm |
| | M2 1 2.49394 GHZ -2.60 UBM M2 1 2.4935 GHZ -60.13 dBm |
| | M3 1 2.5 GHz -59.41 dbm |
| | M4 1 2.4930174 GHz -56.58 dBm |
| | Measuring |
| | M4 1 2.4930174 GHz -56.58 dBm |

Shenzhen Huatongwei International Inspection Co., Ltd.

| est Item: | Band edge | | Modul | ation ty | pe: | π/4DQP | SK |
|-----------------|-----------|---|--|--|--|--|--------------|
| | | Spectrum Ref Level 20.00 dBm | Offset 1.00 dB 👄 | RBW 100 kHz | | | |
| | | Att 30 dB Count 500/500 | SWT 1.1 ms 🖷 | VBW 300 kHz | Mode Auto Sweep | | |
| | | 1Pk Max | | | M1[1] | -3.14 | dBm |
| | | 10 dBm | | | M2[1] | 2.402180 -54.37 | dBm |
| | | 0 dBm | | | | 2.400000 | CH2 |
| | | -10 dBm | | | | | |
| | | -20 dBm D1 -23.140 | dBm | | | | |
| CH00 | | -40 dBm | | | | | NY |
| No hopping mode | | -50 dBm | where where we wanted | | manna | M3 M4 | H |
| no nopping mode | P | -60 dBm | the both both both and both an | | - and an and a start of the sta | ananantala lata dika Tanaka ang m | |
| | | -70 dBm | | | | | |
| | | Start 2.31 GHz 1arker | | 691 pts | | Stop 2.405 | GHz |
| | | Type Ref Trc M1 1 | X-value 2.40218 GHz | Y-value -3.14 dBm | Function | Function Result | _ |
| | - | M2 1 M3 1 | 2.4 GHz 2.39 GHz | -54.37 dBm -56.13 dBm | | | |
| | | M4 1 M5 1 | 2.31 GHz 2.325558 GHz | -55.92 dBm -53.65 dBm | | | |
| | | | | | Mela | 4/4 | |
| | D | ate:11.JUL.2019 19:46:30 | | | | | _ |
| | | Spectrum Ref Level 20.00 dBm | Offset 1.00 dB 👄 | PBW 100 kHz | | | |
| | | Att 30 dB Count 500/500 | | VBW 300 kHz | Mode Auto Sweep | | |
| | | 1Pk Max | | | M1[1] | -4.21 | dBm |
| | | 10 dBm | | | M2[1] | 2.403010 -55.75 |) GHz |
| | | 0 dBm | | | | 2.40000 | |
| | | -10 dBm | | | | | MW |
| | | -20 dBm | dBm | | | | |
| CL 100 | | -30 dBm | | | | | N |
| CH00 | | -50 dBm | MS | | | | |
| Hopping mode | | -60 dBm | methorofinement | manunuhan | ungulu sugar denno | Marken Bausen un | |
| | | -70 dBm | | | | | |
| | | Start 2.31 GHz | | 691 pts | | Stop 2.405 | GHz |
| | | 1arker Type Ref Trc | X-value | Y-value | Function | Function Result | |
| | | M1 1 M2 1 | 2.40301 GHz 2.4 GHz | -4.21 dBm -55.75 dBm | | | |
| | - | M3 1 M4 1 M5 1 | 2.39 GHz 2.31 GHz 2.336022 GHz | -56.29 dBm -55.27 dBm -53.72 dBm | | | |
| | | | 2.330022 GH2 | -53.72 UBII | Mela | | |
| | D | ate:11.JUL.2019 20:00:18 | | | | | |
| | ſ | Spectrum | | | | | |
| | | | Offset 1.00 dB 👄 SWT 56.9 μs 👄 | | Mode Auto FFT | | |
| | | Count 500/500 1Pk Max | | | | | |
| | l l | 10 dBm | | | M1[1] | -3.18 2.4801490 |) GHz |
| | | 0 dBm ML | | | M2[1] | -59.38 2.4835000 | dBm) GHz |
| | | -10 dBm | | | | | |
| | | -20 dBm - D1 - 22 190 | dBm | | | | |
| | | -30 dBm | | | | | |
| CH78 | | | | + + | | | _ |
| No hopping mode | | 50 dBm | M2 M2 | 14 X | | | |
| | | -60 dBm | - Alter a programmer | Afr | | and the second | ~~~ |
| | | -70 dBm | | | | | |
| | | | | | | 1 1 1 | |
| | | Start 2.478 GHz | | 691 pts | | Stop 2.5 | GHZ |
| | | larker Type Ref Trc | X-value | Y-value | Function | Stop 2.5 Function Result | |
| | | Narker Type Ref Trc M1 1 M2 1 | 2.480149 GHz 2.4835 GHz | Y-value -3.18 dBm -59.38 dBm | | | GHz |
| | | Narker Type Ref Trc M1 1 | 2.480149 GHz | Y-value -3.18 dBm | | | GHz |

Report No.: CHTEW19070079

| | Spectrum Image: Constraint of the sector of t |
|----------------------|---|
| | |
| | 20 dBm |
| CH78 Hopping mode | -30 dBm 01 - 25.990 dBm 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| Hopping mode | -50 dBm |
| | Start 2.478 GHz 691 pts Stop 2.5 GHz Marker |
| | Type Ref Trc X-value Y-value Function Function M1 1 2.478016 GHz -5.99 dBm M2 1 2.478016 GHz -5.22 dBm M3 1 2.5 GHz -59.51 dBm M4 1 2.48955 GHz -57.16 dBm |
| | Imm 1 2.4663603 GnZ ~57.10 U000 If or online If on on online If on online |

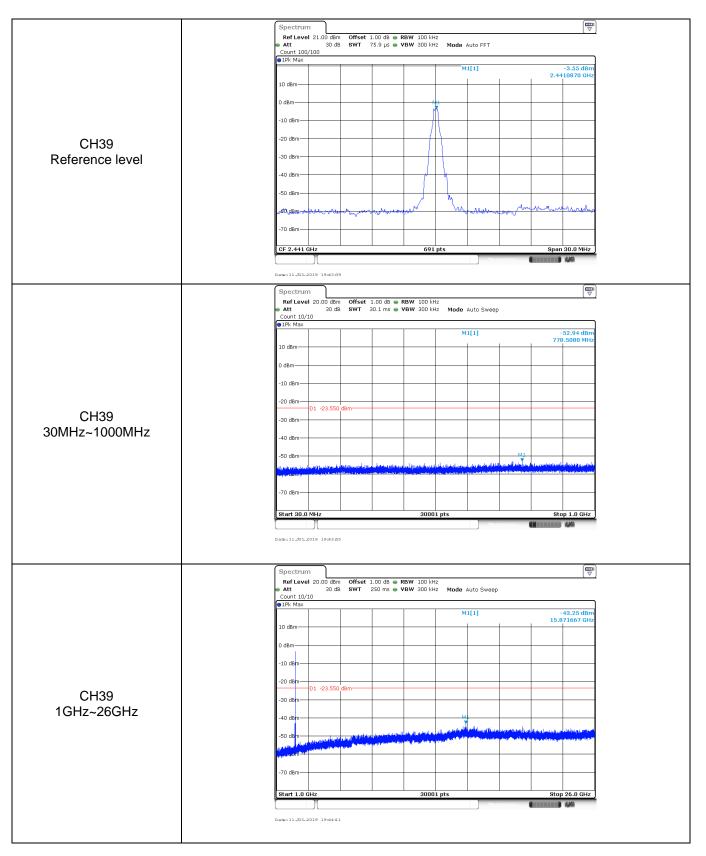
| est Item: | Band edge | | Modula | ation ty | /pe: | 8 | DPSK | | | |
|-------------------------|-----------|---|--|---|----------------|---------------|--------------|--------|--|--|
| | | Spectrum Image: Constraint of the second seco | | | | | | | | |
| | | 10 dBm | | | M1[1] M2[1] | | 2.4021 | 52 dBm | | |
| CH00 No hopping mode | | -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm | Bm | | | | M3 P | | | |
| | | -70 dBm Start 2.31 GHz Marker Type Ref Trc | X-value | 691 p | Function | Funct | Stop 2.40 | 5 GHz | | |
| | | M1 1 M2 1 M3 1 M4 1 M5 1 | 2.40218 GHz 2.4 GHz 2.39 GHz 2.31 GHz 2.399493 GHz | -3.14 dBm -54.52 dBm -56.45 dBm -56.56 dBm -53.51 dBm | | asuring | | | | |
| | | Spectrum Ref Level 20.00 dBm Att 30 dB Count 500/500 | Offset 1.00 dB SWT 1.1 ms | RBW 100 kHz VBW 300 kHz | Mode Auto Swee | p | | | | |
| | | 1Pk Max 10 dBm 0 dBm | | | M1[1] M2[1] | | 2.4021 | 56 dBm | | |
| CH00 | | -10 dBm -20 dBm -30 dBm -40 dBm | Bm | | | | | R | | |
| Hopping mode | | -50 dBm -60 dBm -70 dBm Start 2.31 GHz | rtantelle-hijselett kontenensjonende | (ut | M5. | harrowstation | 5top 2.40 | | | |
| | | Marker Type Ref Trc M1 1 M2 1 M3 1 M4 1 | X-value 2.40218 GHz 2.4 GHz 2.39 GHz 2.31 GHz | 691 p -3.18 dBm -55.56 dBm -55.79 dBm -55.41 dBm | Function | Funct | ion Result | | | |
| | | M5 1 Date:11.JUL.2019 20:04:05 | 2.364659 GHz | -53.42 dBm | Me | asuring 🚺 | 1 <i>1</i> 0 | | | |
| | | | Offset 1.00 dB ● SWT 56.9 µs ● | | | | | | | |
| | | 10 dBm 0 dBm -10 dBm | | | M1[1] M2[1] | | 2.48014 | 94 dBm | | |
| CH78 o hopping mode | | -20 dBm D1 -23.160 d -30 dBm | M2 M | 4 | | | | | | |
| | | -60 dBm | | 691 p | | Erre- | Stop 2. | 5 GHz | | |
| | | Type Ref Trc M1 1 M2 1 M3 1 M4 1 | X-value 2.480149 GHz 2.4835 GHz 2.5 GHz 2.486513 GHz | Y-value -3.16 dBm -57.94 dBm -59.58 dBm -57.52 dBm | | | ion Result | | | |
| | | Data:11.JUL.2019 19:53:41 | | | | | | | | |

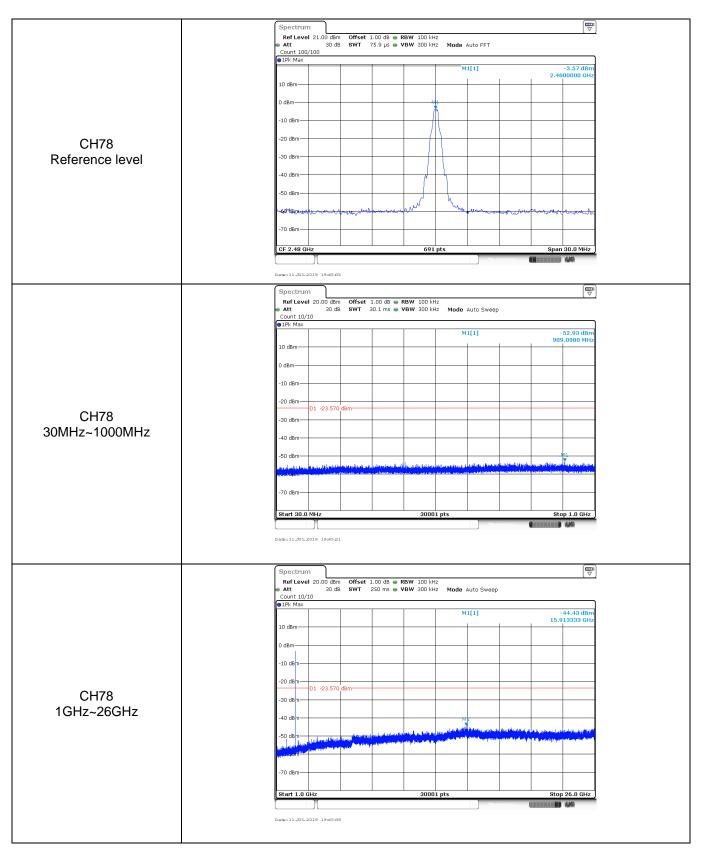
Report No.: CHTEW19070079

Page: 43 of 58

| | Spectrum 🕎 |
|---------------------|--|
| | Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Mode Auto FFT Att 30 dB SWT 56.9 μs VBW 300 kHz Mode Auto FFT Count 500/500 Count 500/500 State 100 kHz State 100 kHz State 100 kHz |
| | IPk Max |
| | 10 dBm M1[1] -3.14 dBm 2.4791620 GH2 M2[1] -58.88 dBm |
| | 0 dBm |
| | |
| | -20 dBm 01 -23.140 dBm |
| CH78 | -30 dBm |
| CH78 Hoppig mode | -40 dBm |
| | -60 dBm - Manufacture and an and a second and a |
| | -70 dBm- |
| | Start 2.478 GHz 691 pts Stop 2.5 GHz |
| | Marker |
| | Type Ref Trc X-value Y-value Function Function Result M1 1 2.479162 GHz -3.14 dBm |
| | M1 1 2.499102 GH2 -3.14 04m M2 1 2.4935 GH2 -58.88 08m |
| | M3 1 2.5 GHz -59.74 dBm |
| | M4 1 2.4943884 GHz -56.11 dBm |
| | Measuring. (REALING MA |
| | Date:11_JUL_2019 20:05:02 |

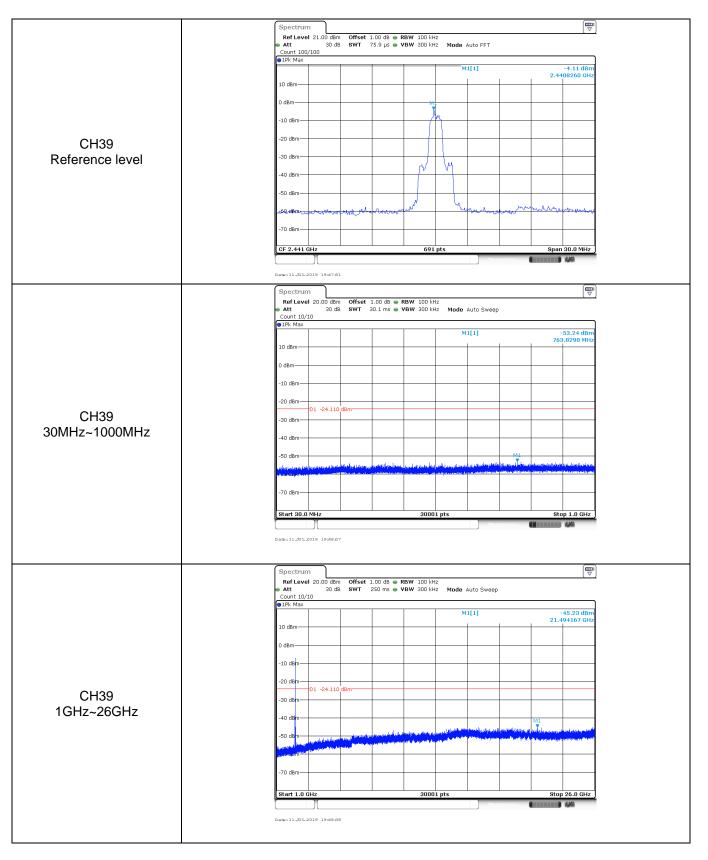
| est Item: | SE | | Modul | ation t | ype: | | GFS | (|
|-----------------|----|--|-----------------------------------|--|---|---|---|--|
| | | Spectrum | | | | | | (TH |
| | | Ref Level 21.00 dBm Att 30 dB | Offset 1.00 dB ● SWT 75.9 µs ● | | | FT | | |
| | | Count 100/100 | | | | | | |
| | | | | | M1[1] | | 2.4 | -3.03 dBn 020000 GH |
| | | 10 dBm | | | | | + | |
| | | 0 dBm | | | 1 | | | |
| | | -10 dBm | | | | | | |
| | | -20 d8m | | | | | | |
| CH00 | | | | | | | | |
| Reference level | | -30 dBm | | | | | | |
| | | -40 dBm | | ľ | | | | |
| | | -50 dBm | | M | | | | |
| | | v6Q.dBmr varmer | we phone the | ww | - Municores | monor | handerand | muntur |
| | | -70 dBm | | | | | | |
| | | CF 2.402 GHz | | 691 | nts | | Sna | n 30.0 MHz |
| | | | | | | Measuring | | |
| | | Date:11.JUL.2019 19:41:31 | | | | | | |
| | | | | | | | | |
| | | Spectrum | | | | | | |
| | | RefLevel 20.00 dBm Att 30 dB | | RBW 100 kH VBW 300 kH | z z Mode Auto S | Sweep | | |
| | | Count 10/10 Ptk Max | | | | | | |
| | | | | | M1[1] | | 87 | -53.10 dBn 8.4790 MH |
| | | 10 dBm | | | | | | |
| | | 0 dBm | | | | | | |
| | | -10 dBm | | | | | | |
| | | -20 dBmD1 -23.030 c | iBm | | | | | |
| CH00 | | -30 dBm | | | | | | |
| 30MHz~1000MHz | | -40 dBm | | | | | | |
| | | -50 dBm | | | | | 641 | |
| | | بالمرجع والمتركبة ومراجع والمراجع والمتلا ومعادل | alesteration and a south | | a sundar da dista | الاعتار بعراجا والعاد | - | and the second state |
| | | | | | | | | |
| | | -70 dBm | | | | | | |
| | | Start 30.0 MHz | | 3000 | L pts | | | op 1.0 GHz |
| | | | | | | | | 4,40 |
| | | Data:11.JUL.2019 19:41:46 | | | | | | |
| | | | | | | | | (= |
| | | Spectrum Ref Level 20.00 dBm | | | | | | |
| | | Att 30 dB Count 10/10 | | | | weep | | |
| | | ● 1Pk Max | | _ | M1[1] | | | -44.60 dBn |
| | | 10 dBm | | | | | 16. | 225000 GH |
| | | 0 dBm | | | | | | |
| | | -10 dBm | | | | | | |
| | | -20 dem | | | | | | |
| CH00 | | D1 -23.030 d | iBm | | | | | |
| 1GHz~26GHz | | -30 dBm | | | | | | |
| | | -40 dBm | | | March 1 and 1 | | - | |
| | | -50 dB m | Note the second second | nalitestaanteilan. Maanta taasanteila | alan Andra dalaman Manakari Manakari | an pina a la chia a bai an Na pina a sa | Alalis - Alabiano Alabiano de la contra de la c | Man Ulikova (Hili) A selector a secondor (hiji) |
| | | and a start of a start | | | | | | |
| | | -70 dBm | | | | | | ļ |
| | | | | 1 | | | | 1 |
| | | | | | | | | |
| | | Start 1.0 GHz | | 3000 | L pts | Measuring | | p 26.0 GHz |
| | | Start 1.0 GHz | | 3000 | L pts | Measuring | Sto | |

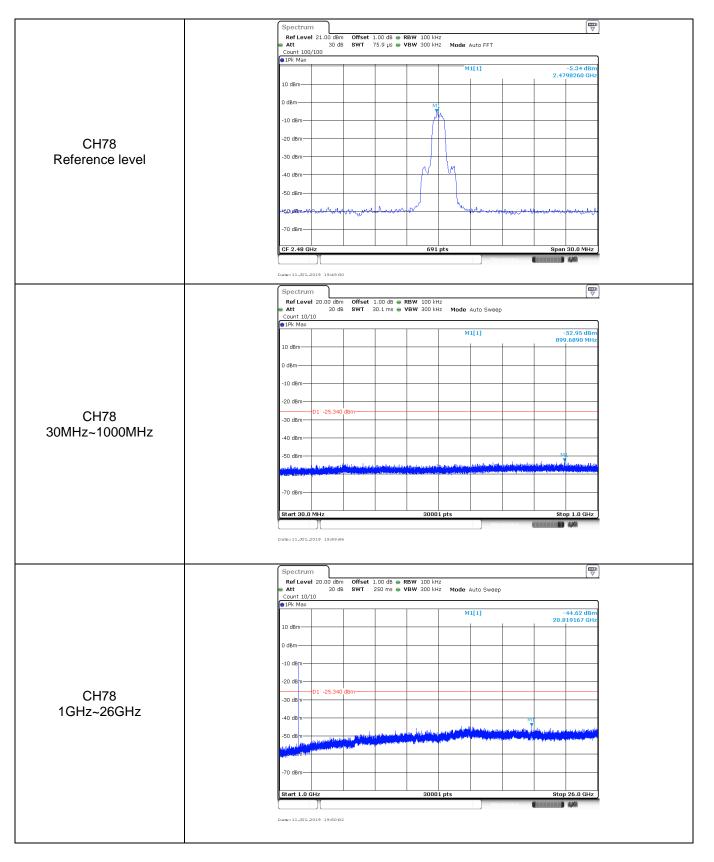




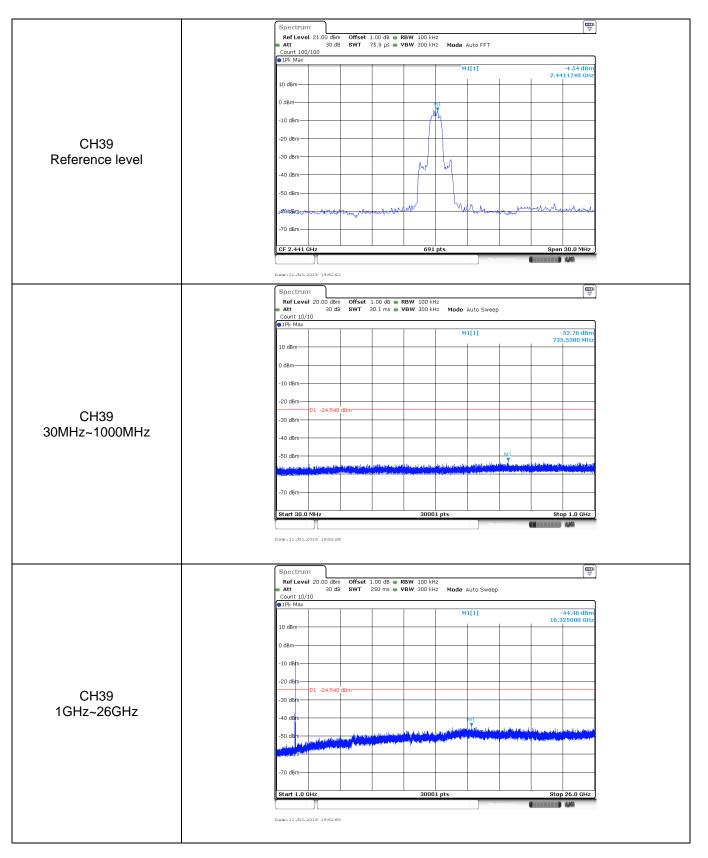
Shenzhen Huatongwei International Inspection Co., Ltd.

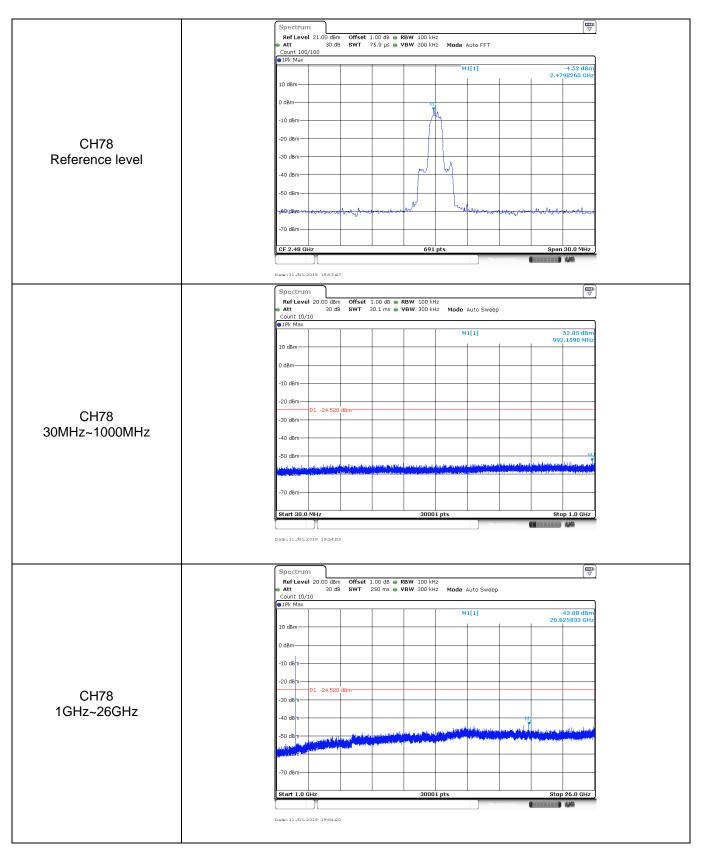
| CH00 eference level | Spectrum Ref Level 21.00 dBm Att 30 dB Count 100/100 • IPk Max 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm -30 dBm | | | | 7FT | 2.401 | ₹ 3.82 dBm 8260 GHz |
|------------------------|--|---|------------------------|-------------------------------|---|--|---------------------------|
| | PIPk Max 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm | | | M1[1] | | 2.401 | 3.82 dBm 8260 GHz |
| | 0 dBm | | | | | 2.401 | 8260 GHz |
| | -10 dBm | | | | | | |
| | -20 dBm | | | | | | |
| | -30 dBm | | | | | 1 1 | |
| | -40 dBm | | | | | | |
| eference level | | | | | | | |
| | -50 dBm | | -r | by | | | |
| | | | | | | | |
| | neederant much | to any appropriate | whole | how | www. | met man | www. |
| | -70 dBm | | | | | | |
| | CF 2.402 GHz | | 691 | pts | | Span (| 30.0 MHz |
| | | | |] | Measuring | | iya. |
| | Date:11.JUL.2019 19:46:36 | | | | | | |
| | Spectrum Ref Level 20.00 dBm | Offset 1.00 dB | DBW 100 ki | | | | |
| | Att 30 dB Count 10/10 | | | | Sweep | | |
| | ● 1Pk Max | | | M1[1] | | -5 | 2.94 dBm |
| | 10 dBm | | | | | 702. | 2040 MHz |
| | 0 dBm | | | | | | |
| | -10 dBm | | | | | | |
| | -20 dBm-01 -23.820 | dBm | | | | | |
| CH00 | -30 dBm | | | | | | |
| MHz~1000MHz | -40 dBm | | | | | | |
| | -50 dBm | | an ol ol rabier | - Jin | 143 Lange Anne Antoniold | | al at the second |
| | | Najad Aline ya gi yang dina katala sa kat | Alta Incore en alleres | anna ailte à anna a' thatanna | na attanti atti centi fildin harjetati. | an parta an | da anti-petremi |
| | -70 dBm | | | | | + | |
| | Start 30.0 MHz | | 3000 | 1 pts | | | 1.0 GHz |
| | Date:11.JUL.2019 19:46:52 | 2 | | | | | l)KI |
| | | | | | | | |
| | Spectrum | 0#- | | - | | | |
| | Ref Level 20.00 dBm Att 30 dB Count 10/10 | | | | Sweep | | |
| | 1Pk Max | | | M1[1] | | -4 | 4.56 dBm |
| | 10 dBm | | | | | 20.03 | 3333 GHz |
| | 0 dBm | | | | | + | |
| | -10 dBm | | | | | + | |
| | -20 dBm | dBm | | | | | |
| CH00 | -30 dBm | | | | | + + | |
| GHz~26GHz | -40 dBm | | | | | | |
| | -50 dB m | and a second | | and their sector design | 1. 1920 - 1. 1930 - | the second second | and a salard |
| | and the second s | | | | | + | |
| | -70 dBm | | | | | | |
| | Start 1.0 GHz | | 3000 | 1 pts | | | 26.0 GHz |
| | Date:11_JUL_2019 19:47:09 | | | | Measuring | | |





| Test Item: | SE | Modulation type: 8DPSK | |
|-------------------------|----|---|--|
| | | Spectrum Image: Constraint of the section of the sectio | |
| | | Count 200 years | |
| | | 0 dBm | |
| CH00 Reference level | | -20 dBm | |
| Reletence level | | -40 dBm | |
| | | | |
| | | CF 2.402 CHz 691 pts Span 30.0 MHz | |
| | | Spectrum [] Ref Level 20.00 dBm Offset 1.00 dB ← RBW 100 kHz | |
| | | Att 30 dB SWT 30.1 ms ● VBW 300 kHz Mode Auto Sweep Count 10/10 P!Pk Max | |
| | | 10 dBm | |
| CH00 | | -20 dBm | |
| 30MHz~1000MHz | | -40 d8m | |
| | | | |
| | | Start 30.0 MHz 30001 pts Stop 1.0 GHz | |
| | | Spectrum | |
| | | RefLevel 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 PIk Max | |
| | | 10 dBm | |
| | | -10 d2m | |
| CH00 1GHz~26GHz | | -30 d2m | |
| | | | |
| | | -70 dBm | |
| | | Date:11.2012/019 19:51:42 | |





5.11. Spurious Emissions (radiated)

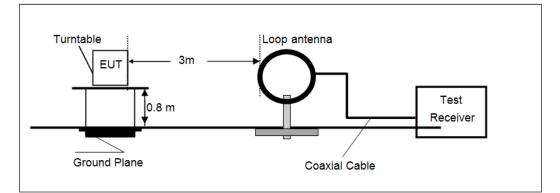
<u>LIMIT</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

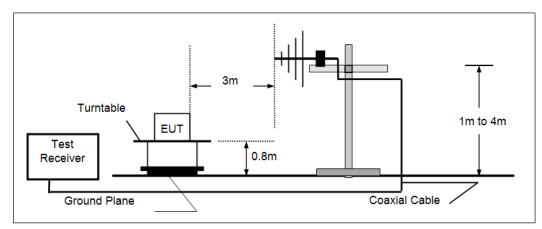
| Frequency | Limit (dBuV/m @3m) | Value |
|-------------------|--------------------|------------|
| 30 MHz ~ 88 MHz | 40.00 | Quasi-peak |
| 88 MHz ~ 216 MHz | 43.50 | Quasi-peak |
| 216 MHz ~ 960 MHz | 46.00 | Quasi-peak |
| 960 MHz ~ 1 GHz | 54.00 | Quasi-peak |
| Above 1 GHz | 54.00 | Average |
| | 74.00 | Peak |

TEST CONFIGURATION

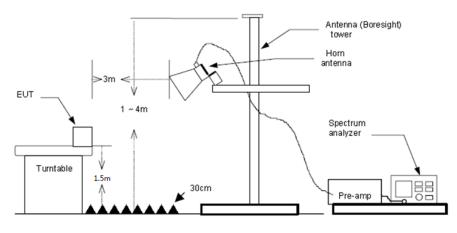
Below 30 MHz



> 30 MHz ~1000 MHz



> Above 1 GHz



TEST PROCEDURE

- 1. The EUT was tested according to ANSI C63.10:2013.
- 2. The EUT is placed on a turn table with 0.8 meter above ground for below 1GHz, 1.5 meter above ground for above 1GHz.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detectoris 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

 (3) From 1 GHz to 10th harmonic: RBW=1 MHz, VBW=3 MHz Peak detector for Peak value RBW=1 MHz, VBW=10 Hz Peak detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☑ Passed □ Not Applicable

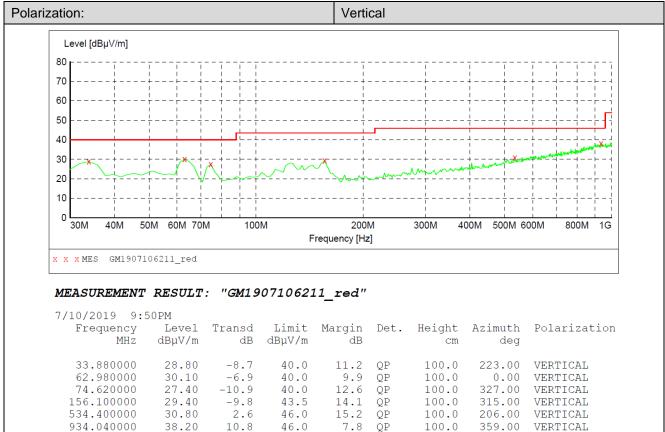
Note:

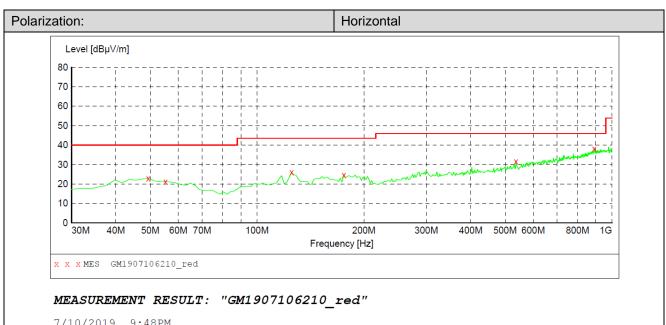
- 1) Final Level = Receiver Read level + Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3) Below 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation High channel which it was worst case, so only the worst case's data on the test report.
- 4) Above 1 GHz, Have pre-scan all modulation mode, found the GFSK modulation which it was worst case, so only the worst case's data on the test report
- 5) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

➢ 9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

➢ 30 MHz ~ 1 GHz





| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| $\begin{array}{r} 49.400000\\ 55.220000\\ 125.060000\\ 175.500000\\ 536.340000\\ 891.360000\end{array}$ | 23.00 | -4.8 | 40.0 | 17.0 | QP | 100.0 | 127.00 | HORIZONTAL |
| | 21.30 | -5.3 | 40.0 | 18.7 | QP | 100.0 | 0.00 | HORIZONTAL |
| | 25.90 | -9.1 | 43.5 | 17.6 | QP | 100.0 | 184.00 | HORIZONTAL |
| | 24.70 | -8.9 | 43.5 | 18.8 | QP | 100.0 | 7.00 | HORIZONTAL |
| | 31.50 | 2.7 | 46.0 | 14.5 | QP | 100.0 | 23.00 | HORIZONTAL |
| | 38.20 | 10.3 | 46.0 | 7.8 | QP | 100.0 | 355.00 | HORIZONTAL |

> 1 GHz ~ 25 GHz

| CH00 | | | | | | | | | | | |
|--------------------|---------------------------|------------------|-------------------|------------------------|----------------|--------------|---------------|--|--|--|--|
| Frequency (MHz) | Read Level (dBuV/m) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin (dB) | Polarization | Test value | | | | |
| 1239.4063 | 37.30 | -5.73 | 31.57 | 74.00 | 42.43 | Vertical | Peak | | | | |
| 1499.3750 | 44.45 | -5.63 | 38.82 | 74.00 | 35.18 | Vertical | Peak | | | | |
| 5146.2813 | 31.56 | 8.88 | 40.44 | 74.00 | 33.56 | Vertical | Peak | | | | |
| 6720.7813 | 31.04 | 13.41 | 44.45 | 74.00 | 29.55 | Vertical | Peak | | | | |
| 1333.4063 | 34.89 | -5.57 | 29.32 | 74.00 | 44.68 | Horizontal | Peak | | | | |
| 3148.7813 | 33.97 | 0.57 | 34.54 | 74.00 | 39.46 | Horizontal | Peak | | | | |
| 5113.9688 | 32.47 | 8.83 | 41.30 | 74.00 | 32.70 | Horizontal | Peak | | | | |
| 6952.8438 | 29.70 | 14.67 | 44.37 | 74.00 | 29.63 | Horizontal | Peak | | | | |

| CH39 | | | | | | | | | | |
|--------------------|---------------------------|------------------|-------------------|------------------------|----------------|--------------|---------------|--|--|--|
| Frequency (MHz) | Read Level (dBuV/m) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin (dB) | Polarization | Test value | | | |
| 1499.3750 | 45.13 | -5.63 | 39.50 | 74.00 | 34.50 | Vertical | Peak | | | |
| 1624.2188 | 37.49 | -6.24 | 31.25 | 74.00 | 42.75 | Vertical | Peak | | | |
| 5625.0938 | 31.40 | 8.83 | 40.23 | 74.00 | 33.77 | Vertical | Peak | | | |
| 7938.3750 | 31.96 | 17.65 | 49.61 | 74.00 | 24.39 | Vertical | Peak | | | |
| 1749.0625 | 37.54 | -5.95 | 31.59 | 74.00 | 42.41 | Horizontal | Peak | | | |
| 3128.2188 | 34.58 | 0.47 | 35.05 | 74.00 | 38.95 | Horizontal | Peak | | | |
| 4671.8750 | 31.16 | 6.21 | 37.37 | 74.00 | 36.63 | Horizontal | Peak | | | |
| 6830.9375 | 30.57 | 13.48 | 44.05 | 74.00 | 29.95 | Horizontal | Peak | | | |

| CH78 | | | | | | | | | | |
|--------------------|---------------------------|------------------|-------------------|------------------------|----------------|--------------|---------------|--|--|--|
| Frequency (MHz) | Read Level (dBuV/m) | Factor (dB/m) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin (dB) | Polarization | Test value | | | |
| 1499.3750 | 45.76 | -5.63 | 40.13 | 74.00 | 33.87 | Vertical | Peak | | | |
| 1750.5313 | 40.67 | -5.95 | 34.72 | 74.00 | 39.28 | Vertical | Peak | | | |
| 4999.4063 | 31.98 | 7.85 | 39.83 | 74.00 | 34.17 | Vertical | Peak | | | |
| 7007.1875 | 31.02 | 15.19 | 46.21 | 74.00 | 27.79 | Vertical | Peak | | | |
| 1301.0938 | 35.01 | -5.57 | 29.44 | 74.00 | 44.56 | Horizontal | Peak | | | |
| 1750.5313 | 36.87 | -5.95 | 30.92 | 74.00 | 43.08 | Horizontal | Peak | | | |
| 4435.4063 | 31.51 | 5.07 | 36.58 | 74.00 | 37.42 | Horizontal | Peak | | | |
| 5263.7813 | 31.29 | 8.64 | 39.93 | 74.00 | 34.07 | Horizontal | Peak | | | |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.

3. The emission levels of other frequencies are very lower than the limit and not show in test report.

6. TEST SETUP PHOTOS

Conducted Emissions (AC Mains)



Radiated Emissions







7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No. CHTEW19070077

-----End of Report------