



TEST REPORT

Report Reference No..... : TRE1612020301 R/C.....: 11759

FCC ID..... : 2AK5H-Z3-Z5

Applicant's name..... : AvantSonic Technology Co.,Ltd.

Address..... : No.394 Jingdongfang Avenue Beibei District, Chongqing, China

Manufacturer..... : AvantSonic Technology Co.,Ltd.

Address..... : No.394 Jingdongfang Avenue Beibei District, Chongqing, China

Test item description : Bladder Scanner

Trade Mark : AvantSonic

Model/Type reference..... : PadScan Z5

Listed Model(s) : PadScan Z3

Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of receipt of test sample..... : Feb. 24, 2017

Date of testing..... : Feb. 27, 2017 – Mar. 20, 2017

Date of issue..... : Mar. 20, 2017

Result..... : PASS

Compiled by
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Lion Cai

Approved by
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Hans Hu

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

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

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1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): 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 Devices

1.2. Report version

| Version No. | Date of issue | Description |
|-------------|---------------|-------------|
| 00 | Mar. 20, 2017 | Original |
| | | |
| | | |
| | | |
| | | |

2. Test Description

| Test Item | Section in CFR 47 | sResult |
|---|--|---------|
| Antenna Requirement | 15.203/15.247 (c) | Pass |
| AC Power Line Conducted Emission | 15.207 | Pass |
| Conducted Peak Output Power | 15.247 (b)(1) | Pass |
| 20dB Occupied Bandwidth | 15.247 (a)(1) | Pass |
| Carrier Frequencies Separation | 15.247 (a)(1) | Pass |
| Hopping Channel Number | 15.247 (a)(1) | Pass |
| Dwell Time | 15.247 (a)(1) | Pass |
| Pseudorandom Frequency Hopping Sequence | 15.247(b)(4)&TCB Exclusion List (7 July 2002) | Pass |
| Restricted band | 15.247(d)/15.205 | Pass |
| Radiated Emission | 15.247(d)/15.209 | Pass |

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

3. SUMMARY

3.1. Client Information

| | |
|---------------|--|
| Applicant: | AvantSonic Technology Co.,Ltd. |
| Address: | No.394 Jingdongfang Avenue Beibei District, Chongqing, China |
| Manufacturer: | AvantSonic Technology Co.,Ltd. |
| Address: | No.394 Jingdongfang Avenue Beibei District, Chongqing, China |

3.2. Product Description

| | |
|----------------------|---|
| Name of EUT | Bladder Scanner |
| Trade Mark: | AvantSonic |
| Model No.: | PadScan Z5 |
| Listed Model(s): | PadScan Z3 |
| Power supply: | DC 11.1V from internal battery |
| Adapter information: | Model: FY1355000 Input: 100-240Va.c., 50/60Hz, 1.2A Output: 13.5Vd.c., 5000mA |
| Bluetooth | |
| Version: | Supported BT2.0+EDR |
| Modulation: | GFSK, $\pi/4$ DQPSK, 8DPSK |
| Operation frequency: | 2402MHz~2480MHz |
| Channel number: | 79 |
| Channel separation: | 1MHz |
| Antenna type: | Integral Antenna |
| Antenna gain: | 0 dBi |

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) |
|---------|-----------------|
| 0 | 2402 |
| 1 | 2403 |
| : | : |
| 39 | 2441 |
| : | : |
| 77 | 2479 |
| 78 | 2480 |

➤ Test mode Note: Model PadScan Z5 and PadScan Z3 all have been tested, only worse case Model PadScan Z5 is reported

| |
|---|
| For RF test items |
| The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle > 98%). |
| For AC power line conducted emissions: |
| The EUT was set to connect with the Bluetooth instrument under large package sizes transmission. |
| For RF test axis |
| 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

| | | |
|--|----------------|---|
| | Length (m) : | / |
| | Shield : | / |
| | Detachable : | / |
| | Manufacturer : | / |
| | 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

Phone: 86-755-26748019 Fax: 86-755-26748089

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, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

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. Valid time is until February 27, 2018.

FCC-Registration No.: 317478

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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377B

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. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

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 within the 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 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 |
|---|-------------------------|-------|
| Transmitter power conducted | 0.57 dB | (1) |
| Transmitter power Radiated | 2.20 dB | (1) |
| Conducted spurious emission 9KHz-40 GHz | 1.60 dB | (1) |
| Radiated spurious emission 9KHz-40 GHz | 2.20 dB | (1) |
| Conducted Emission 9KHz-30MHz | 3.39 dB | (1) |
| Radiated Emission 30~1000MHz | 4.24 dB | (1) |
| Radiated Emission 1~18GHz | 5.16 dB | (1) |
| Radiated Emission 18-40GHz | 5.54 dB | (1) |
| Occupied Bandwidth | ----- | (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 (AC Main) | | | | | |
|------------------------------|-------------------|---------------|-------------|------------|------------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal |
| 1 | Artificial Mains | Rohde&Schwarz | ESH2-Z5 | 100028 | 2016/11/13 |
| 2 | EMI Test Receiver | Rohde&Schwarz | ESCI3 | 100038 | 2016/11/13 |
| 3 | Pulse Limiter | Rohde&Schwarz | ESHSZ2 | 100044 | 2016/11/13 |
| 4 | EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | N/A | N/A |

| Radiated Emission | | | | | |
|-------------------|-------------------------|------------------------------|--------------------|------------|------------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal |
| 1 | Ultra-Broadband Antenna | ShwarzBeck | VULB9163 | 538 | 2016/11/13 |
| 2 | EMI TEST RECEIVER | Rohde&Schwarz | ESI 26 | 100009 | 2016/11/13 |
| 3 | EMI TEST Software | Audix | E3 | N/A | N/A |
| 4 | TURNTABLE | ETS | 2088 | 2149 | N/A |
| 5 | ANTENNA MAST | ETS | 2075 | 2346 | N/A |
| 6 | EMI TEST Software | Rohde&Schwarz | ESK1 | N/A | N/A |
| 7 | HORNANTENNA | ShwarzBeck | 9120D | 1011 | 2016/11/13 |
| 8 | Amplifer | Sonoma | 310N | E009-13 | 2016/11/13 |
| 9 | JS amplifer | Rohde&Schwarz | JS4-00101800-28-5A | F201504 | 2016/11/13 |
| 10 | High pass filter | Compliance Direction systems | BSU-6 | 34202 | 2016/11/13 |
| 11 | HORNANTENNA | ShwarzBeck | 9120D | 1012 | 2016/11/13 |
| 12 | Amplifer | Compliance Direction systems | PAP1-4060 | 120 | 2016/11/13 |
| 13 | Loop Antenna | Rohde&Schwarz | HFH2-Z2 | 100020 | 2016/11/13 |
| 14 | TURNTABLE | MATURO | TT2.0 | ---- | N/A |
| 15 | ANTENNA MAST | MATURO | TAM-4.0-P | ---- | N/A |
| 16 | Horn Antenna | SCHWARZBECK | BBHA9170 | 25841 | 2016/11/13 |
| 17 | ULTRA-BROADBAND ANTENNA | Rohde&Schwarz | HL562 | 100015 | 2016/11/13 |

| Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission | | | | | |
|---|-------------------|---------------|-----------|--------------|------------|
| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal |
| 1 | Spectrum Analyzer | Rohde&Schwarz | FSP | 1164.4391.40 | 2016/11/13 |

The Cal.Interval was one year

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 an antenna 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.

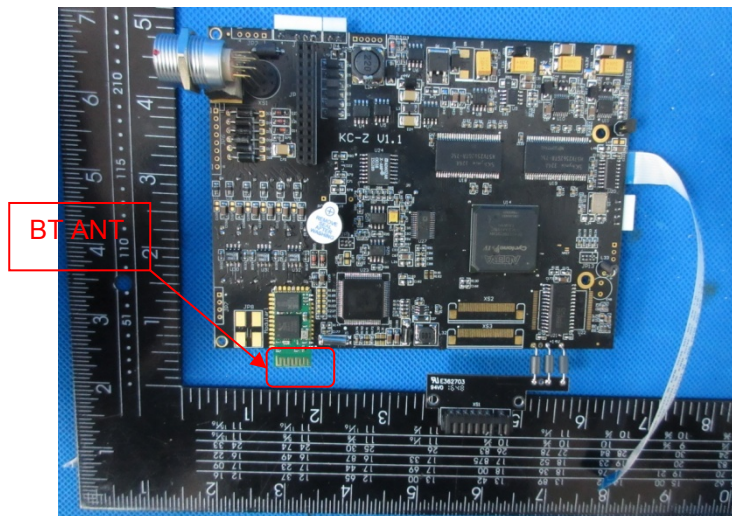
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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 6dBi 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 6dBi.

Test Result:

☒ **Passed** ☐ **Not Applicable**

The antenna is integral antenna, the best case gain of the antenna is 0dBi



5.2. Conducted Emission (AC Main)

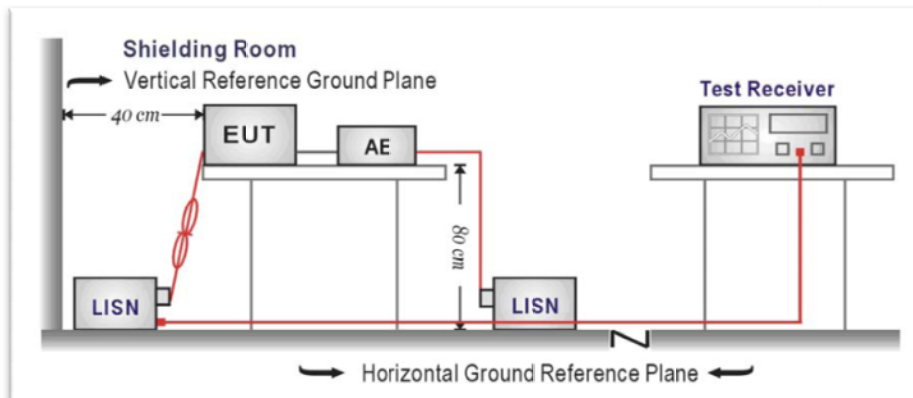
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | 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 for compliance to FCC 47CFR 15.247 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 impedance 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.
- 9.

TEST RESULTS

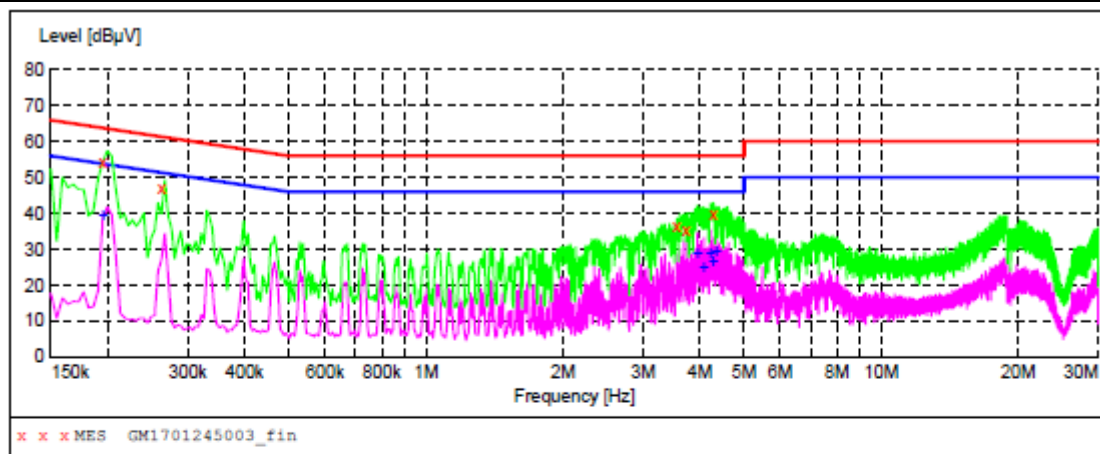
☒ **Passed** ☐ **Not Applicable**

Note:

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

Test Line:

L

**MEASUREMENT RESULT: "GM1701245003_fin"**

1/24/2017 9:47AM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.195000 | 54.10 | 10.3 | 64 | 9.7 | QP | L1 | GND |
| 0.262500 | 47.10 | 10.3 | 61 | 14.3 | QP | L1 | GND |
| 3.556500 | 36.60 | 10.3 | 56 | 19.4 | QP | L1 | GND |
| 3.727500 | 35.50 | 10.3 | 56 | 20.5 | QP | L1 | GND |
| 4.276500 | 39.70 | 10.3 | 56 | 16.3 | QP | L1 | GND |

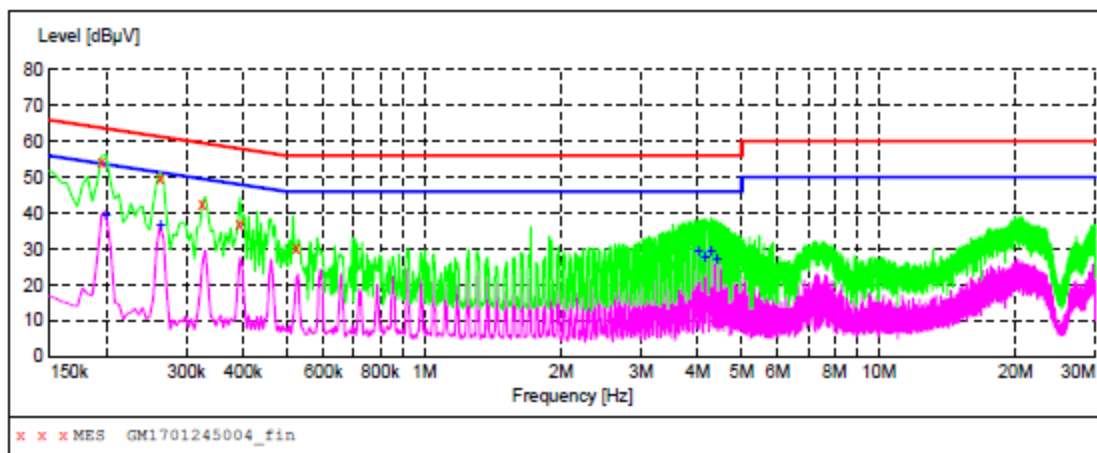
MEASUREMENT RESULT: "GM1701245003_fin2"

1/24/2017 9:47AM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.195000 | 39.60 | 10.3 | 54 | 14.2 | AV | L1 | GND |
| 3.952500 | 29.00 | 10.3 | 46 | 17.0 | AV | L1 | GND |
| 4.069500 | 25.50 | 10.3 | 46 | 20.5 | AV | L1 | GND |
| 4.209000 | 29.40 | 10.3 | 46 | 16.6 | AV | L1 | GND |
| 4.267500 | 26.90 | 10.3 | 46 | 19.1 | AV | L1 | GND |
| 4.344000 | 29.50 | 10.3 | 46 | 16.5 | AV | L1 | GND |

Test Line:

N

**MEASUREMENT RESULT: "GM1701245004_fin"**

1/24/2017 9:50AM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.195000 | 54.50 | 10.3 | 64 | 9.3 | QP | N | GND |
| 0.262500 | 50.10 | 10.3 | 61 | 11.3 | QP | N | GND |
| 0.325500 | 42.70 | 10.2 | 60 | 16.9 | QP | N | GND |
| 0.393000 | 37.00 | 10.2 | 58 | 21.0 | QP | N | GND |
| 0.523500 | 30.20 | 10.2 | 56 | 25.8 | QP | N | GND |

MEASUREMENT RESULT: "GM1701245004_fin2"

1/24/2017 9:50AM

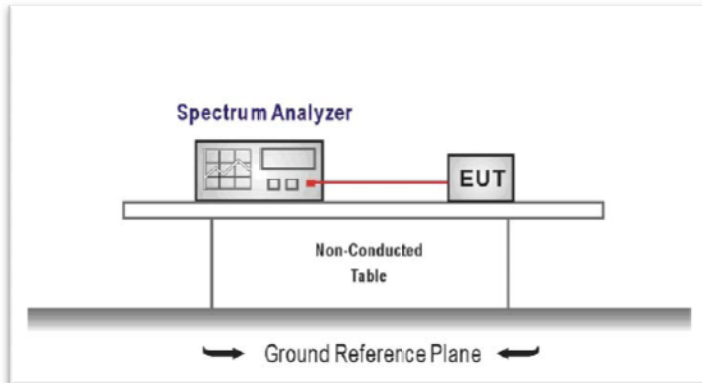
| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.199500 | 39.70 | 10.3 | 54 | 13.9 | AV | N | GND |
| 0.262500 | 37.00 | 10.3 | 51 | 14.4 | AV | N | GND |
| 4.015500 | 29.60 | 10.3 | 46 | 16.4 | AV | N | GND |
| 4.146000 | 28.00 | 10.3 | 46 | 18.0 | AV | N | GND |
| 4.281000 | 29.90 | 10.3 | 46 | 16.1 | AV | N | GND |
| 4.411500 | 27.70 | 10.3 | 46 | 18.3 | AV | N | GND |

5.3. Conducted Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): **30dBm**

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
3. Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW \geq the 20 dB bandwidth of the emission being measured, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

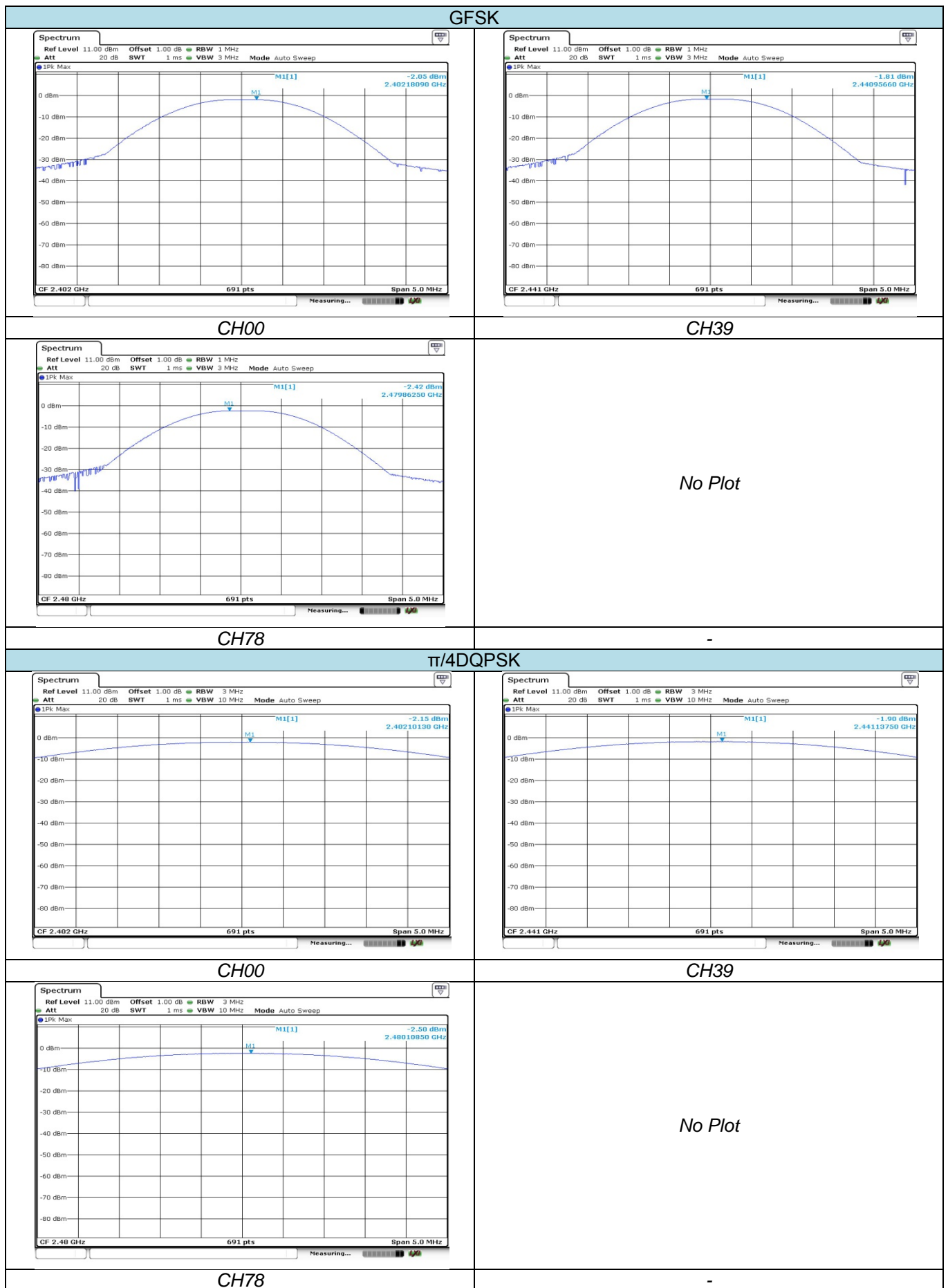
TEST MODE:

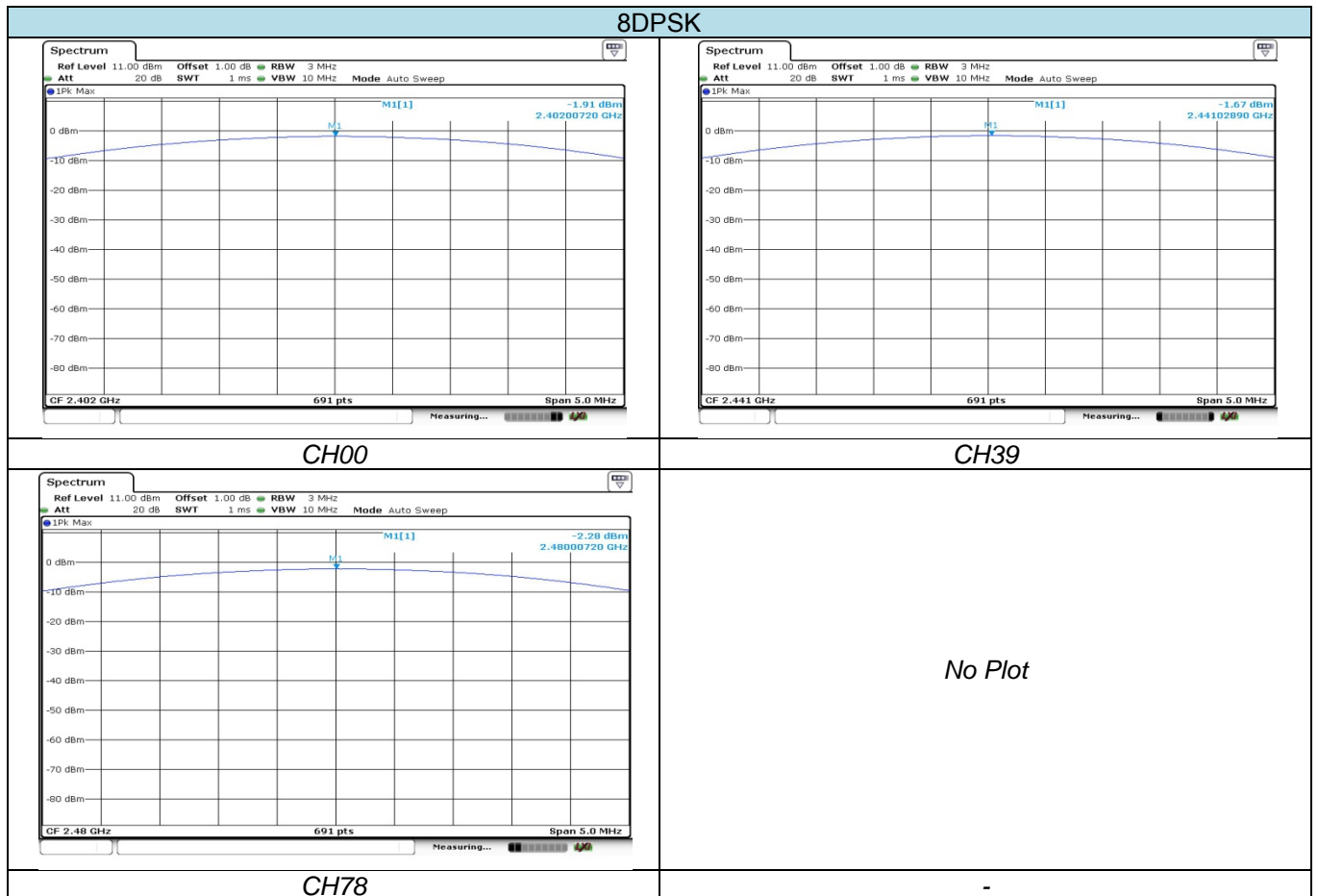
Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

| Modulation type | Channel | Output power (dBm) | Limit (dBm) | Result |
|-----------------|---------|--------------------|-------------|--------|
| GFSK | 00 | -2.05 | 30.00 | Pass |
| | 39 | -1.81 | | |
| | 78 | -2.42 | | |
| $\pi/4$ DQPSK | 00 | -2.15 | 21.00 | Pass |
| | 39 | -1.90 | | |
| | 78 | -2.50 | | |
| 8DPSK | 00 | -1.91 | 21.00 | Pass |
| | 39 | -1.67 | | |
| | 78 | -2.28 | | |



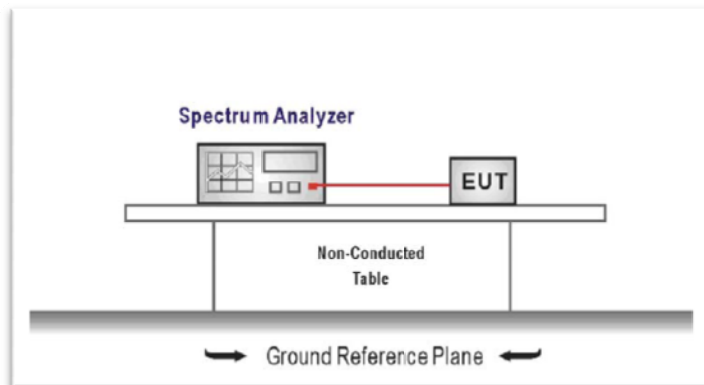


5.4. 20dB Emission Bandwidth

LIMIT

N/A

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
3. Use the following spectrum analyzer settings:
 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
 RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW
 Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

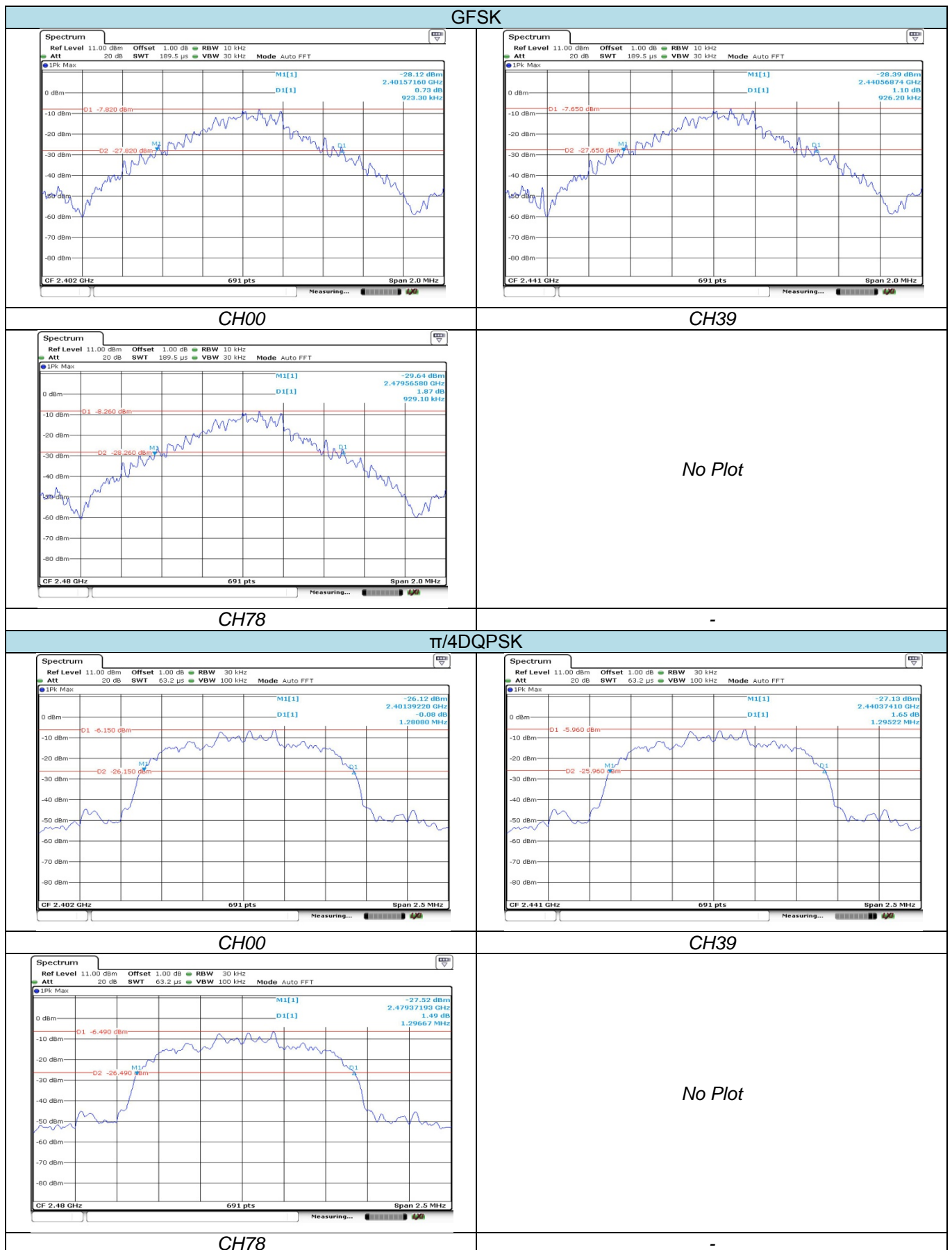
TEST MODE:

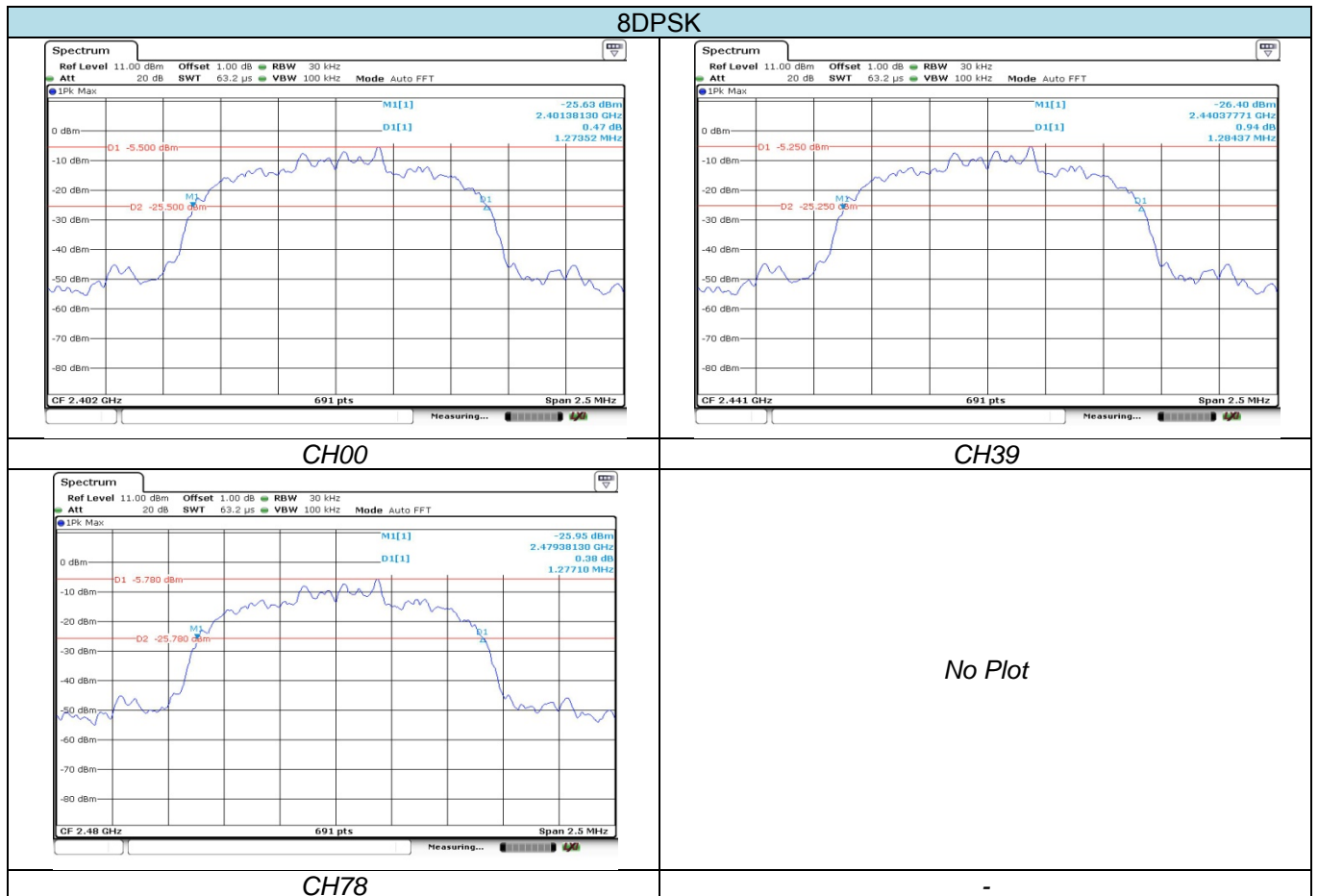
Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

| Modulation type | Channel | 20dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------------|---------|----------------------|-------------|--------|
| GFSK | 00 | 0.923 | - | Pass |
| | 39 | 0.926 | | |
| | 78 | 0.929 | | |
| $\pi/4$ DQPSK | 00 | 1.281 | - | Pass |
| | 39 | 1.295 | | |
| | 78 | 1.297 | | |
| 8DPSK | 00 | 1.274 | - | Pass |
| | 39 | 1.284 | | |
| | 78 | 1.277 | | |



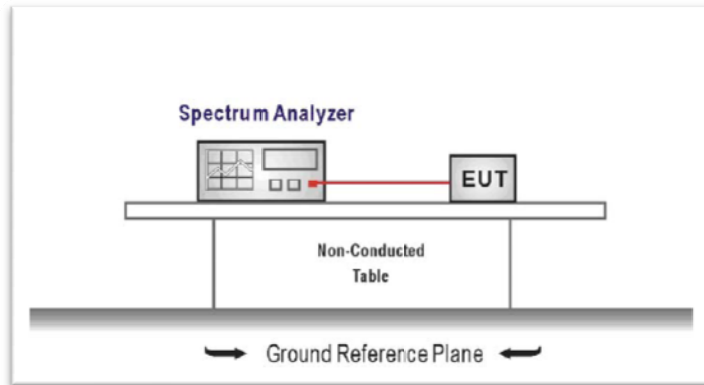


5.5. Carrier Frequencies Separation

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 minimum of 25KHz
or the $\frac{2}{3} \times 20\text{dB}$ bandwidth of the hopping channel, whichever is greater.

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

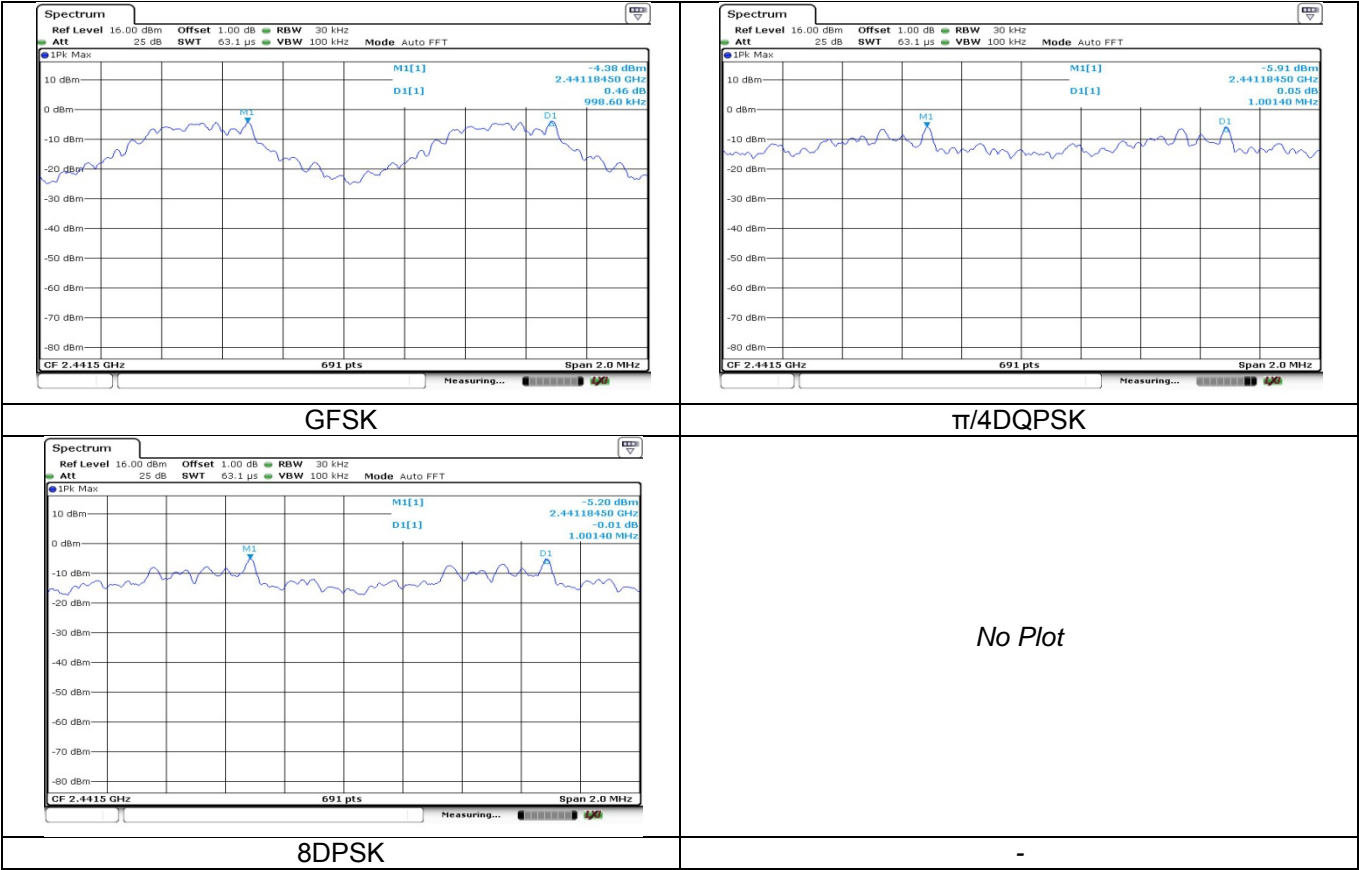
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

| Modulation type | Channel | Carrier Frequencies Separation (MHz) | Limit (MHz) | Result |
|-----------------|---------|--------------------------------------|-------------|--------|
| GFSK | 39 | 0.999 | 0.929 | Pass |
| $\pi/4$ DQPSK | 39 | 1.001 | 0.863 | Pass |
| 8DPSK | 39 | 1.001 | 0.851 | Pass |



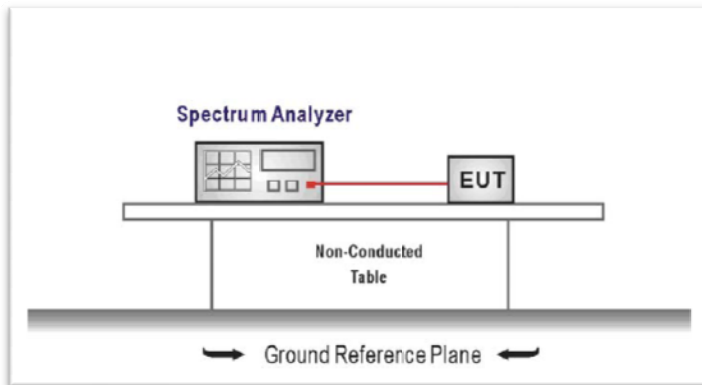
5.6. Hopping Channel Number

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 pathloss 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 = the frequency band of operation
RBW \geq 1% of the span, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

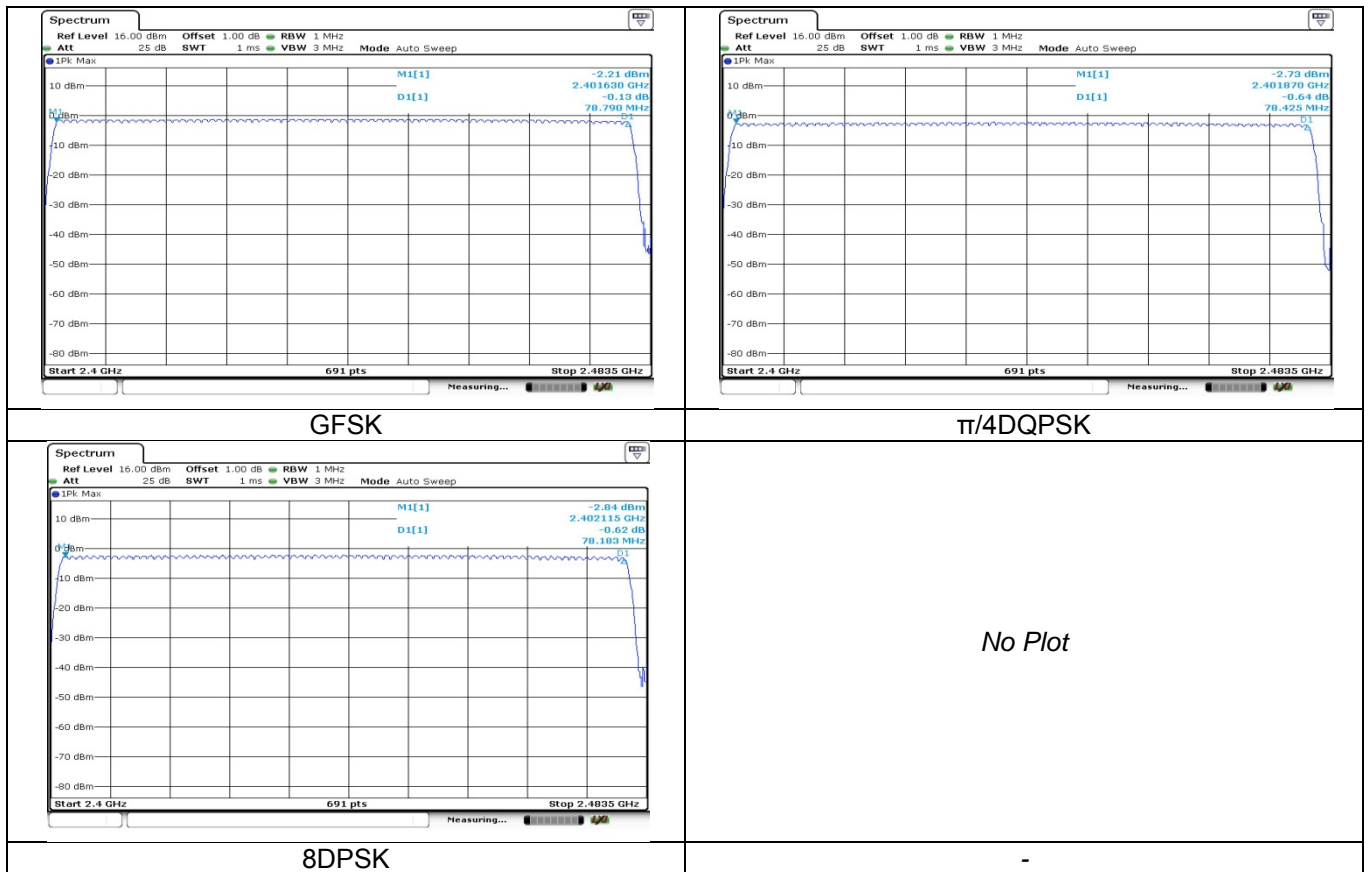
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

| Modulation type | Channel number | Limit | Result |
|-----------------|----------------|-------|--------|
| GFSK | 79 | 15.00 | Pass |
| $\pi/4$ DQPSK | 79 | | |
| 8DPSK | 79 | | |



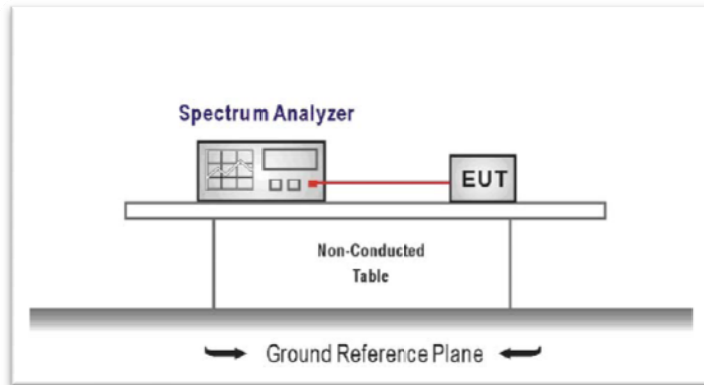
5.7. Dwell Time

LIMIT

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 period 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 pathloss 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 = 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

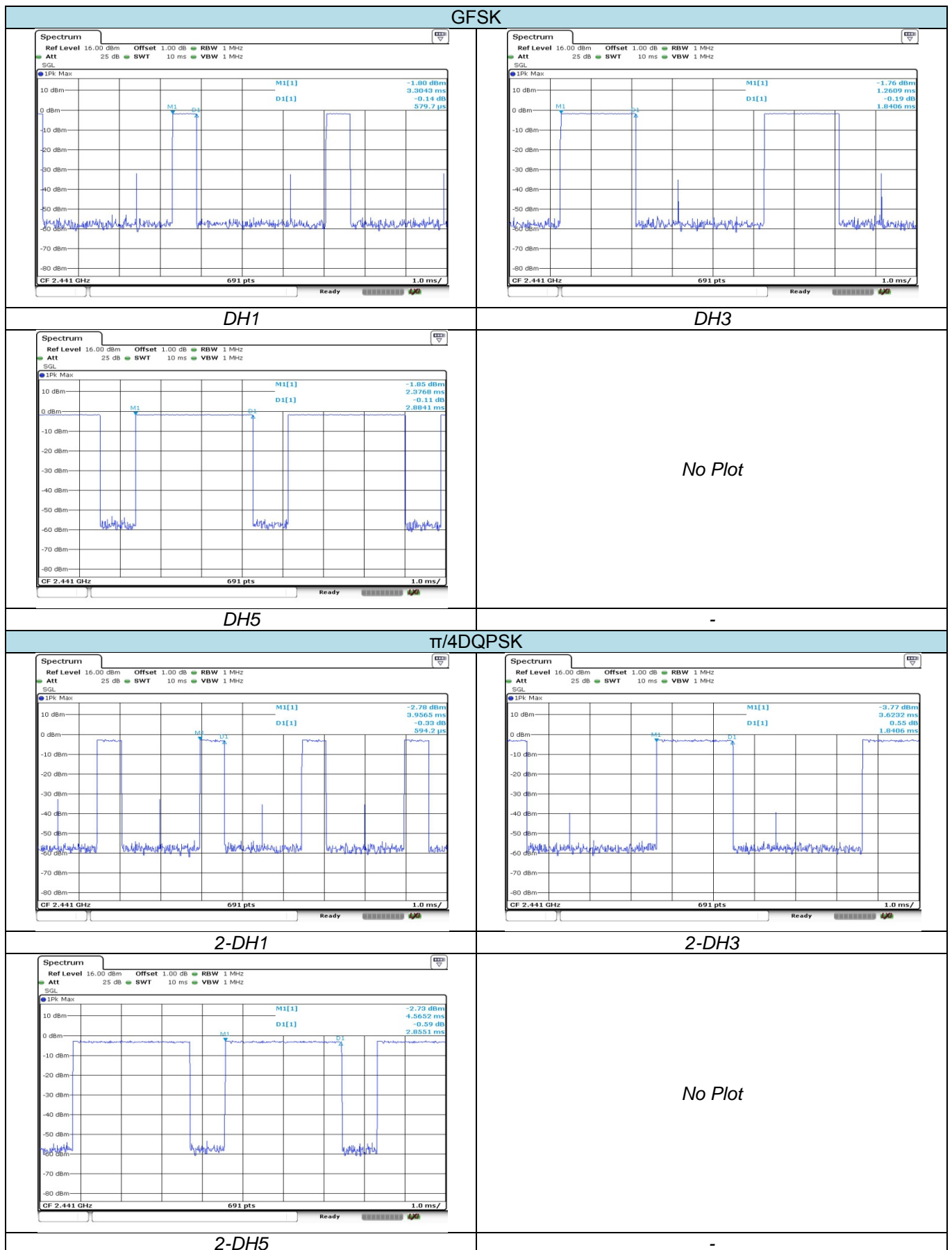
TEST RESULTS

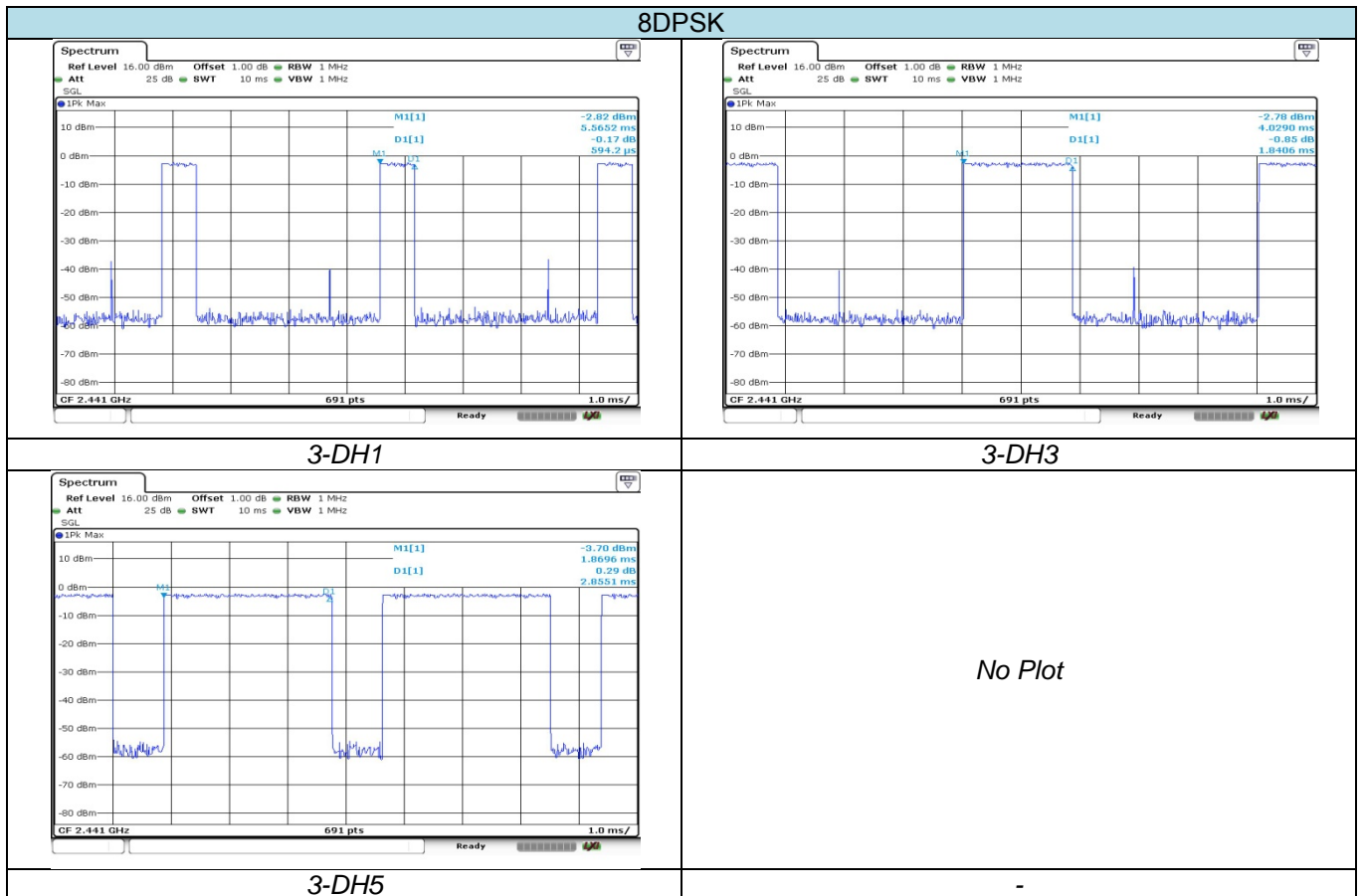
☒ Passed ☐ Not Applicable

| Modulation type | Channel | Dwell time (Second) | Limit (Second) | Result |
|-----------------|---------|---------------------|----------------|--------|
| GFSK | DH1 | 0.186 | 0.40 | Pass |
| | DH3 | 0.294 | | |
| | DH5 | 0.308 | | |
| π/4DQPSK | 2-DH1 | 0.190 | 0.40 | Pass |
| | 2-DH3 | 0.294 | | |
| | 2-DH5 | 0.305 | | |
| 8DPSK | 3-DH1 | 0.190 | 0.40 | Pass |
| | 3-DH3 | 0.294 | | |
| | 3-DH5 | 0.305 | | |

Note:

1. We have tested all mode at high,middle and low channel,and recoreded worst case at middle channel.
2. Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second for DH1, 2-DH1, 3-DH1
Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second for DH3, 2-DH3, 3-DH3
Dwell time=Pulse time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second for DH5, 2-DH5, 3-DH5





5.8. Pseudorandom Frequency Hopping Sequence

LIMIT

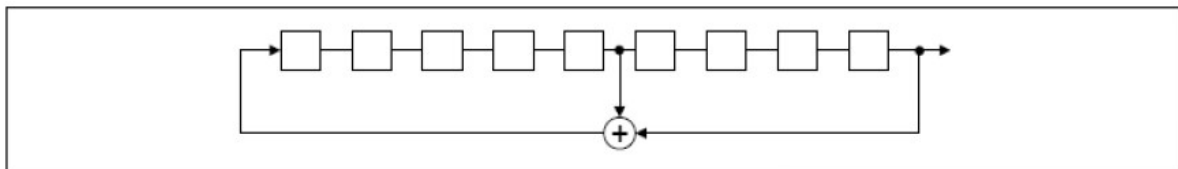
FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1):

Frequency hopping systems shall have hopping channel carrier 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

TEST RESULTS

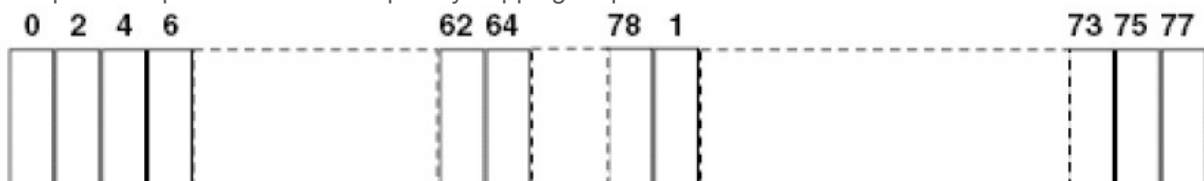
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: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

- Number of shift register stages: 9
- Length of pseudo-random sequence: $2^9 - 1 = 511$ bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally on the average by each transmitter.

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

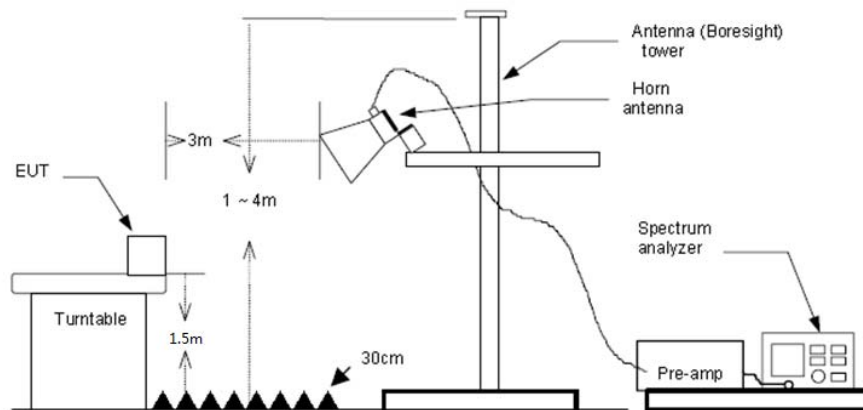
5.9. Restricted band (radiated)

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 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 emission 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 was positioned 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.
5. The receiver set as follow:
RBW=1MHz, VBW=3MHz for Peak value
RBW=1MHz, VBW=10Hz PK detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:

- 1) Final level= Read level + Antenna Factor+ Cable Loss- Preamp Factor
- 2) Have pre-scan all modulation mode, found the 8DPSK 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.

| CH00 | | | | | | | | | |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-------------------|--------------|------------|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin Limit (dB) | Polarization | Test value |
| 2310.00 | 32.67 | 27.27 | 6.62 | 37.65 | 28.91 | 74.00 | -45.09 | Vertical | Peak |
| 2389.96 | 32.81 | 27.53 | 6.75 | 37.87 | 29.22 | 74.00 | -44.78 | Vertical | |
| 2310.00 | 33.25 | 27.27 | 6.62 | 37.65 | 29.49 | 74.00 | -44.51 | Horizontal | |
| 2389.96 | 33.71 | 27.53 | 6.75 | 37.87 | 30.12 | 74.00 | -43.88 | Horizontal | |

| CH78 | | | | | | | | | |
|-----------------|-------------------|-----------------------|-----------------|--------------------------|----------------|---------------------|-------------------|--------------|------------|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin Limit (dB) | Polarization | Test value |
| 2483.50 | 36.10 | 27.85 | 6.83 | 37.87 | 32.91 | 74.00 | -41.09 | Vertical | Peak |
| 2500.00 | 34.48 | 27.90 | 6.84 | 37.87 | 31.35 | 74.00 | -42.65 | Vertical | |
| 2483.50 | 36.10 | 27.85 | 6.83 | 37.87 | 32.91 | 74.00 | -41.09 | Horizontal | |
| 2500.00 | 34.48 | 27.90 | 6.84 | 37.87 | 31.35 | 74.00 | -42.65 | Horizontal | |

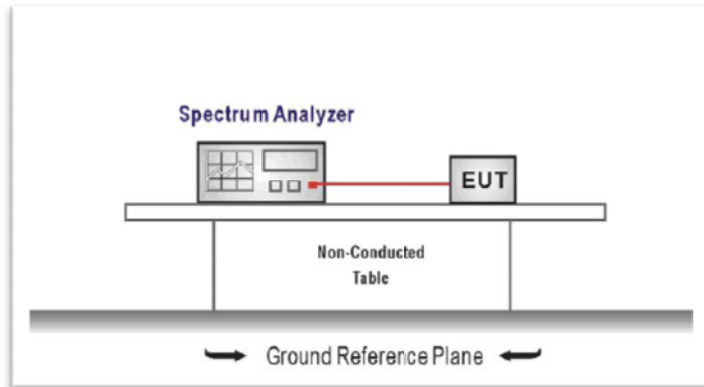
5.10. Bandedge and Spurious Emission (conducted)

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 pathloss 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:
RBW= 100 KHz, VBW \geq 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