# TEST REPORT

| | | |
|---|---|---|
| **Report Reference No. ..... :** | **TRE1510017003** | R/C…….: 32128 |
| **FCC ID ..... :** | 2AEHF-SMARTLITE | |
| **Applicant's name ..... :** | **NOBUX, LLC** | |
| Address.....: | 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 | |
| Manufacturer.....: | NOBUX LLC | |
| Address.....: | 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 | |
| **Test item description ..... :** | **Smart Lite** | |
| Trade Mark .....: | NOBUX | |
| Model/Type reference.....: | S3501 | |
| Listed Model(s) .....: | -- | |
| **Standard ..... :** | **FCC CFR Title 47 Part 15 Subpart C Section 15.247** | |
| Date of receipt of test sample……..: | Oct 28,2015 | |
| Date of testing……: | Oct 29,2015- Nov 08,2015 | |
| Date of issue……...: | Nov 10,2015 | |
| **Result..... ……..:** | **PASS** | |

| | | |
|---|---|---|
| Compiled by<br>( position+printed name+signature)..: | File administrators Candy Liu | Candy Liu |
| Supervised by<br>( position+printed name+signature)..: | Project Engineer Lion Cai | Lion Cai |
| Approved by<br>( position+printed name+signature)..: | RF Manager Hans Hu | 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 |

# Contents

# 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 Devicese

## 1.2. Test Description

| Report Section | Test Item | Section in CFR 47 | Result |
|---|---|---|---|
| 4.1 | Antenna Requirement | 15.203/15.247 (c) | Pass |
| 4.2 | AC Power Line Conducted Emission | 15.207 | Pass |
| 4.3 | Conducted Peak Output Power | 15.247 (b)(1) | Pass |
| 4.4 | 20dB Occupied Bandwidth | 15.247 (a)(1) | Pass |
| 4.5 | Carrier Frequencies Separation | 15.247 (a)(1) | Pass |
| 4.6 | Hopping Channel Number | 15.247 (a)(1) | Pass |
| 4.7 | Dwell Time | 15.247 (a)(1) | Pass |
| 4.8 | Pseudorandom Frequency Hopping Sequence | 15.247(b)(4)&TCB Exclusion List (7 July 2002) | Pass |
| 4.9 | Restricted band | 15.247(d)/15.205 | Pass |
| 4.10/4.11 | Radiated Emission | 15.247(d)/15.209 | Pass |

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

# 2. SUMMARY

## 2.1. Client Information

| | |
|---|---|
| Applicant: | NOBUX, LLC |
| Address: | 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 |
| Manufacturer: | NOBUX, LLC |
| Address: | 8600 NW SOUTH RIVER DR #103 MIAMI, FLORIDA 33166 |

## 2.2. Product Description

| | |
|---|---|
| Name of EUT | Smart Lite |
| Trade Mark: | NOBUX |
| Model No.: | S3501 |
| Listed Model(s): | -- |
| Power supply: | DC 5V From internal battery |
| Adapter information: | Input:AC 100-240V 50/60Hz 0.15A<br>Output:5Vd.c., 500mA |
| **Bluetooth** | |
| Version: | Supported BT4.0+EDR |
| Modulation: | GFSK, π/4DQPSK, 8DPSK |
| Operation frequency: | 2402MHz~2480MHz |
| Channel number: | 79 |
| Channel separation: | 1MHz |
| Antenna type: | Internal Antenna |
| Antenna gain: | 0.0 dBi |

## 2.3. 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**

For RF test items:

the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions:

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

## 2.4. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

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

## 2.5. Modifications

No modifications were implemented to meet testing criteria.

# 3. TEST ENVIRONMENT

## 3.1. 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

## 3.2. 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 December 31, 2016.

**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.: 5377A&5377B**
The 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 on Dec. 31, 2013, valid time is until Dec. 31, 2016.
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.

**VCCI**
The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

**DNV**
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

## 3.3. Environmental conditions

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

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

## 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to 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 compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

| Test Items | Measurement Uncertainty | Notes |
|---|---|---|
| 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 Emissio 1~18GHz | 5.16 dB | (1) |
| Radiated Emissio 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.

## 3.5. 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 | 2015/11/02 |
| 2 | EMI Test Receiver | Rohde&Schwarz | ESCI3 | 100038 | 2015/11/02 |
| 3 | Pulse Limiter | Rohde&Schwarz | ESHSZ2 | 100044 | 2015/11/02 |
| 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 | 2015/11/02 |
| 2 | EMI TEST RECEIVER | Rohde&Schwarz | ESI 26 | 100009 | 2015/11/02 |
| 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 | HORN ANTENNA | ShwarzBeck | 9120D | 1011 | 2015/11/02 |
| 8 | Amplifer | Sonoma | 310N | E009-13 | 2015/11/02 |
| 9 | JS amplifer | Rohde&Schwarz | JS4-00101800-28-5A | F201504 | 2015/11/02 |
| 10 | High pass filter | Compliance Direction systems | BSU-6 | 34202 | 2015/11/02 |
| 11 | HORN ANTENNA | ShwarzBeck | 9120D | 1012 | 2015/11/02 |
| 12 | Amplifer | Compliance Direction systems | PAP1-4060 | 120 | 2015/11/02 |
| 13 | Loop Antenna | Rohde&Schwarz | HFH2-Z2 | 100020 | 2015/11/02 |
| 14 | TURNTABLE | MATURO | TT2.0 | ---- | N/A |
| 15 | ANTENNA MAST | MATURO | TAM-4.0-P | ---- | N/A |
| 16 | Horn Antenna | SCHWARZBECK | BBHA9170 | 25841 | 2015/11/02 |
| 17 | ULTRA-BROADBAND ANTENNA | Rohde&Schwarz | HL562 | 100015 | 2015/11/02 |

| 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 | 2015/11/02 |

The Cal.Interval was one year

# 4. TEST CONDITIONS AND RESULTS

## 4.1. Antenna requirement

**Requirement**

**FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

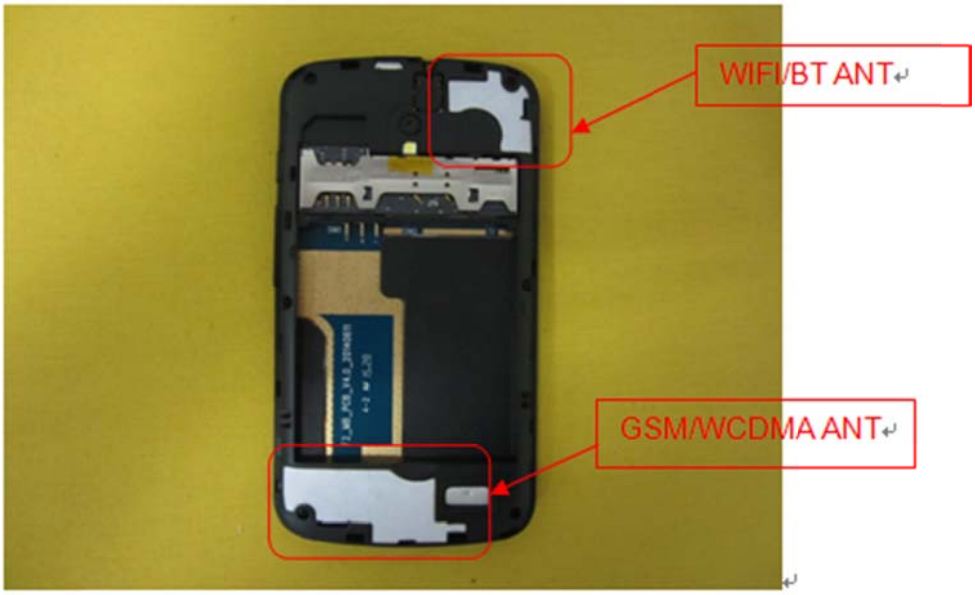
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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:**

The antenna is integral antenna, the best case gain of the antenna is 0.0dBi



## 4.2. Conducted Emission (AC Main)

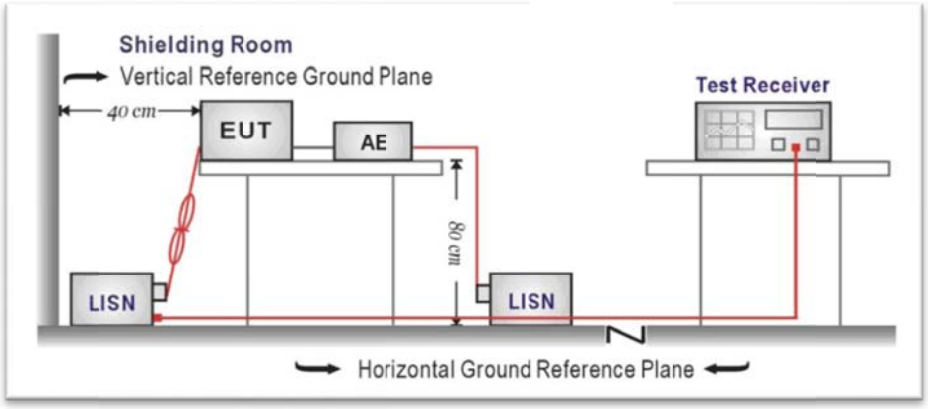
**LIMIT**

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**

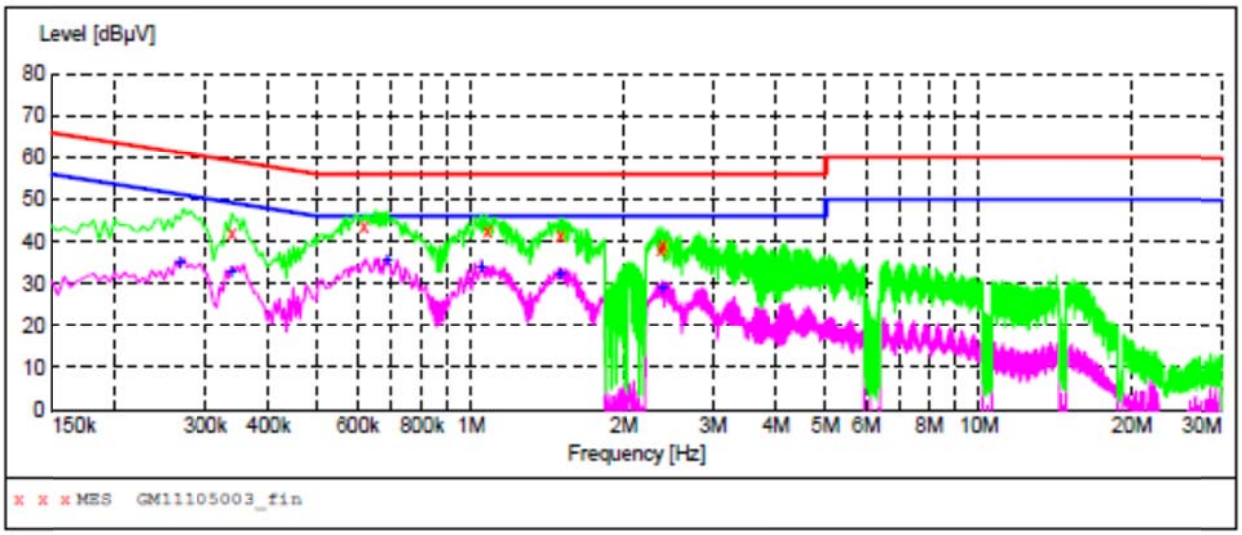



**TEST PROCEDURE**

1. The EUT was setup and tested 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.

**TEST RESULTS**

| Test mode:AC 120V | BT | Polarization | L |
|---|---|---|---|




***MEASUREMENT RESULT: "GM11105003_fin"***

11/10/2015 10:10AM

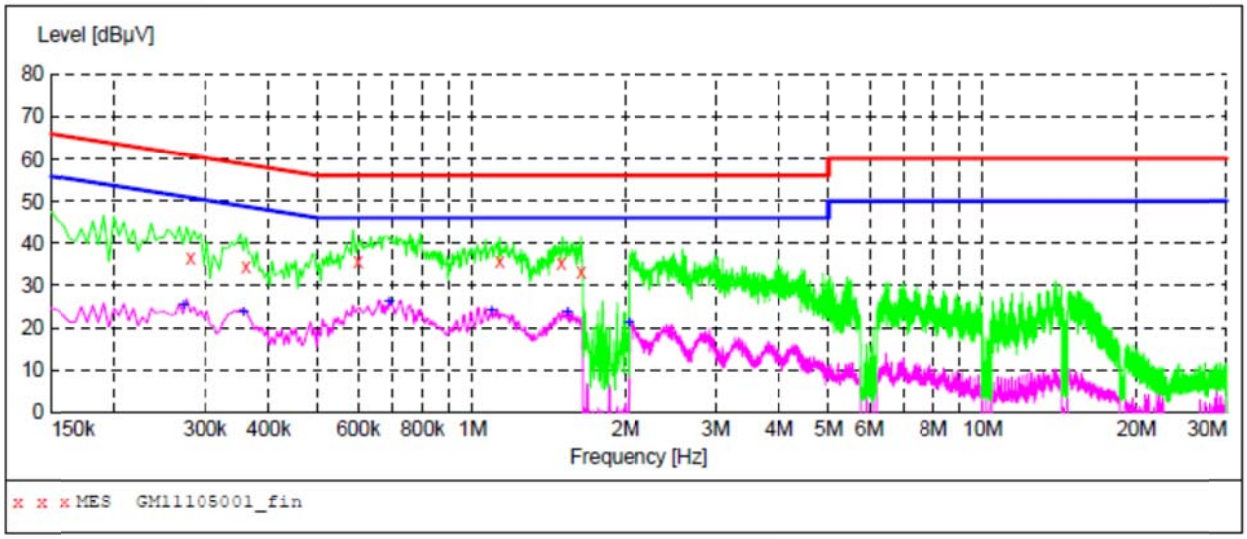
| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.339000 | 42.00 | 10.2 | 59 | 17.2 | QP | L1 | GND |
| 0.618000 | 43.40 | 10.2 | 56 | 12.6 | QP | L1 | GND |
| 1.077000 | 42.70 | 10.2 | 56 | 13.3 | QP | L1 | GND |
| 1.500000 | 41.30 | 10.2 | 56 | 14.7 | QP | L1 | GND |
| 2.373000 | 38.40 | 10.3 | 56 | 17.6 | QP | L1 | GND |
| 2.391000 | 39.00 | 10.3 | 56 | 17.0 | QP | L1 | GND |

***MEASUREMENT RESULT: "GM11105003_fin2"***

11/10/2015 10:10AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.267000 | 35.30 | 10.2 | 51 | 15.9 | AV | L1 | GND |
| 0.339000 | 33.30 | 10.2 | 49 | 15.9 | AV | L1 | GND |
| 0.685500 | 35.90 | 10.2 | 46 | 10.1 | AV | L1 | GND |
| 1.045500 | 34.20 | 10.2 | 46 | 11.8 | AV | L1 | GND |
| 1.495500 | 32.60 | 10.2 | 46 | 13.4 | AV | L1 | GND |
| 2.386500 | 29.20 | 10.3 | 46 | 16.8 | AV | L1 | GND |

| Test mode: AC 120V | BT | Polarization | N |
|---|---|---|---|




***MEASUREMENT RESULT: "GM11105001_fin"***

11/10/2015 9:58AM

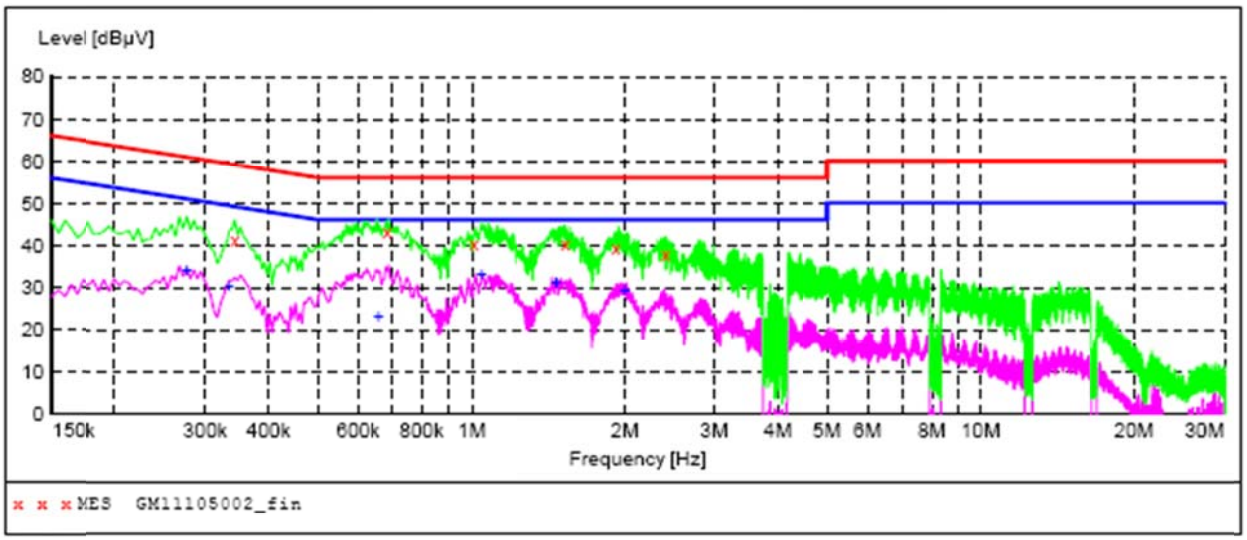
| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.280500 | 36.60 | 10.2 | 61 | 24.2 | QP | N | GND |
| 0.361500 | 34.70 | 10.2 | 59 | 24.0 | QP | N | GND |
| 0.600000 | 35.60 | 10.2 | 56 | 20.4 | QP | N | GND |
| 1.135500 | 35.70 | 10.2 | 56 | 20.3 | QP | N | GND |
| 1.495500 | 35.20 | 10.2 | 56 | 20.8 | QP | N | GND |
| 1.635000 | 33.30 | 10.2 | 56 | 22.7 | QP | N | GND |

***MEASUREMENT RESULT: "GM11105001_fin2"***

11/10/2015 9:58AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.271500 | 25.30 | 10.2 | 51 | 25.8 | AV | N | GND |
| 0.357000 | 23.80 | 10.2 | 49 | 25.0 | AV | N | GND |
| 0.690000 | 26.40 | 10.2 | 46 | 19.6 | AV | N | GND |
| 1.090500 | 24.10 | 10.2 | 46 | 21.9 | AV | N | GND |
| 1.536000 | 23.70 | 10.2 | 46 | 22.3 | AV | N | GND |
| 2.026500 | 21.30 | 10.2 | 46 | 24.7 | AV | N | GND |

| Test mode:AC 240V | BT | Polarization | L |
|---|---|---|---|




***MEASUREMENT RESULT: "GM11105002_fin"***

11/10/2015 10:05AM

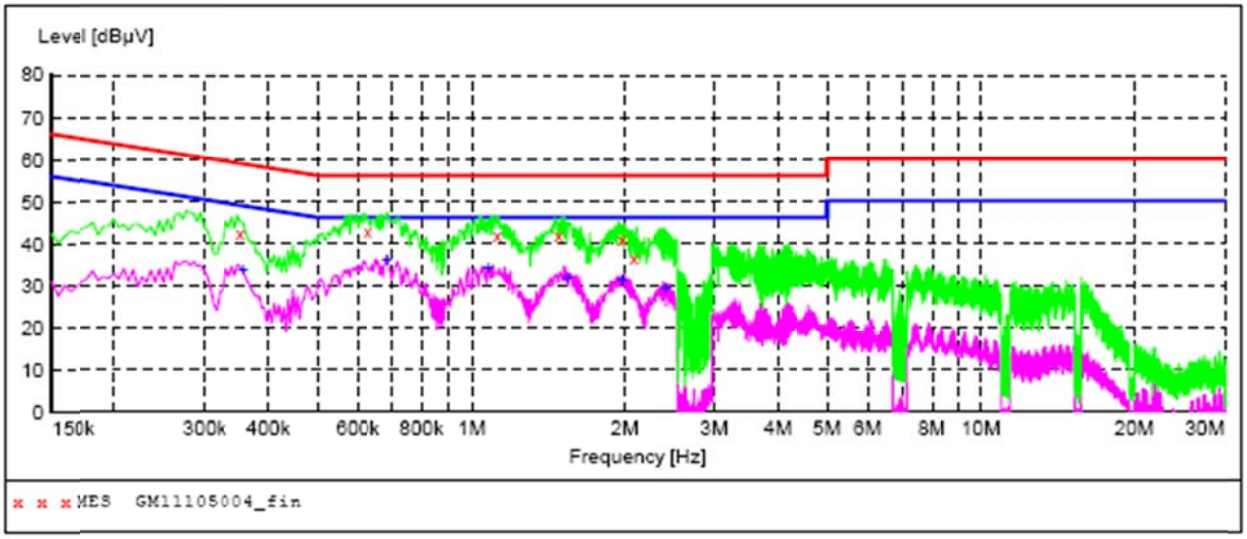
| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.343500 | 41.40 | 10.2 | 59 | 17.7 | QP | L1 | GND |
| 0.685500 | 43.10 | 10.2 | 56 | 12.9 | QP | L1 | GND |
| 1.009500 | 40.50 | 10.2 | 56 | 15.5 | QP | L1 | GND |
| 1.527000 | 40.30 | 10.2 | 56 | 15.7 | QP | L1 | GND |
| 1.918500 | 39.40 | 10.2 | 56 | 16.6 | QP | L1 | GND |
| 2.413500 | 37.90 | 10.3 | 56 | 18.1 | QP | L1 | GND |

***MEASUREMENT RESULT: "GM11105002_fin2"***

11/10/2015 10:05AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.276000 | 34.10 | 10.2 | 51 | 16.8 | AV | L1 | GND |
| 0.334500 | 30.40 | 10.2 | 49 | 18.9 | AV | L1 | GND |
| 0.658500 | 23.00 | 10.2 | 46 | 23.0 | AV | L1 | GND |
| 1.045500 | 33.00 | 10.2 | 46 | 13.0 | AV | L1 | GND |
| 1.468500 | 31.30 | 10.2 | 46 | 14.7 | AV | L1 | GND |
| 1.999500 | 29.50 | 10.2 | 46 | 16.5 | AV | L1 | GND |

| Test mode: AC 240V | BT | Polarization | N |
|---|---|---|---|




***MEASUREMENT RESULT: "GM11105004_fin"***

11/10/2015 10:19AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.352500 | 42.30 | 10.2 | 59 | 16.6 | QP | N | GND |
| 0.627000 | 42.90 | 10.2 | 56 | 13.1 | QP | N | GND |
| 1.122000 | 41.70 | 10.2 | 56 | 14.3 | QP | N | GND |
| 1.482000 | 41.60 | 10.2 | 56 | 14.4 | QP | N | GND |
| 1.972500 | 40.60 | 10.2 | 56 | 15.4 | QP | N | GND |
| 2.080500 | 36.40 | 10.2 | 56 | 19.6 | QP | N | GND |

***MEASUREMENT RESULT: "GM11105004_fin2"***

11/10/2015 10:19AM

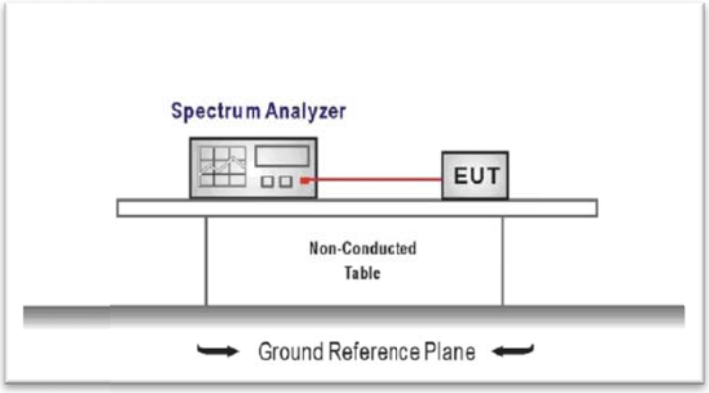
| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.357000 | 33.80 | 10.2 | 49 | 15.0 | AV | N | GND |
| 0.685500 | 36.10 | 10.2 | 46 | 9.9 | AV | N | GND |
| 1.077000 | 34.20 | 10.2 | 46 | 11.8 | AV | N | GND |
| 1.545000 | 32.00 | 10.2 | 46 | 14.0 | AV | N | GND |
| 1.977000 | 31.20 | 10.2 | 46 | 14.8 | AV | N | GND |
| 2.418000 | 29.20 | 10.3 | 46 | 16.8 | AV | N | GND |

## 4.3. Conducted Peak Output Power

**LIMIT**

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

**TEST CONFIGURATION**



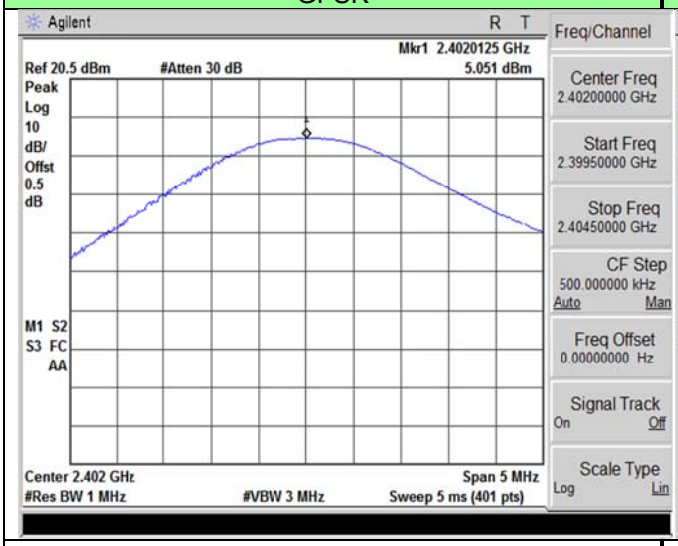
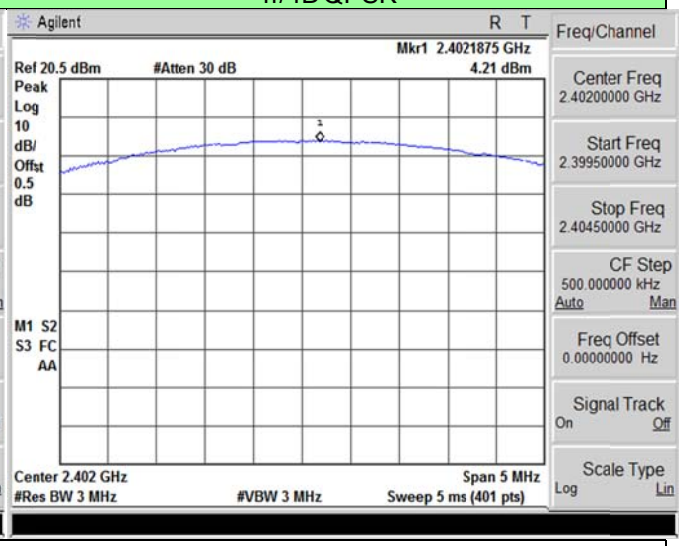
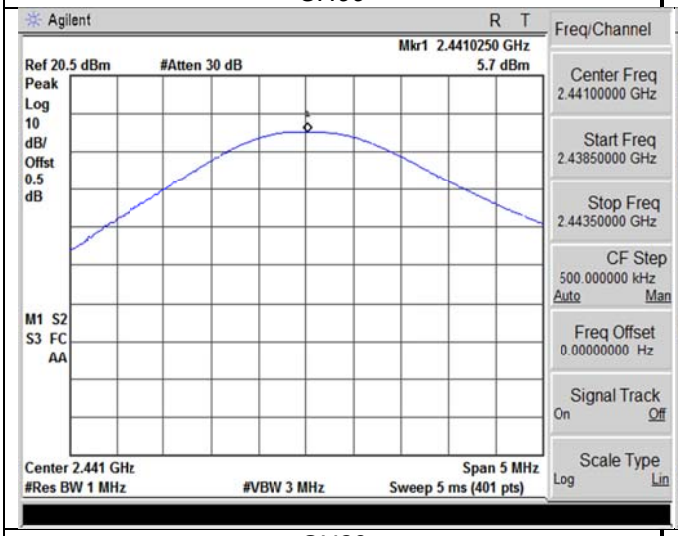
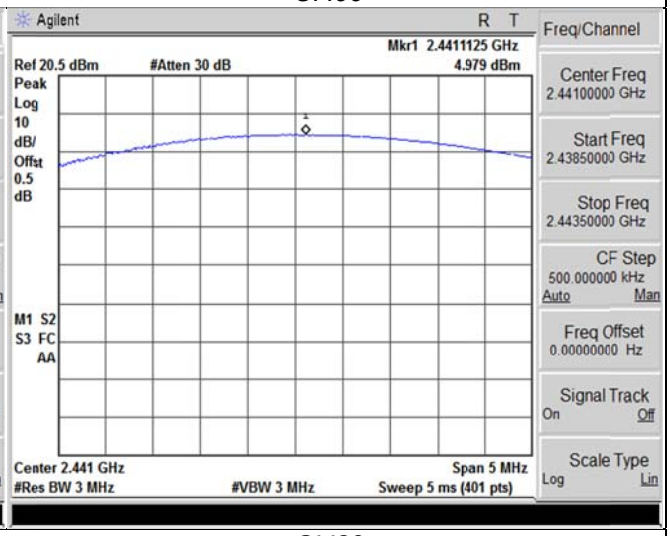
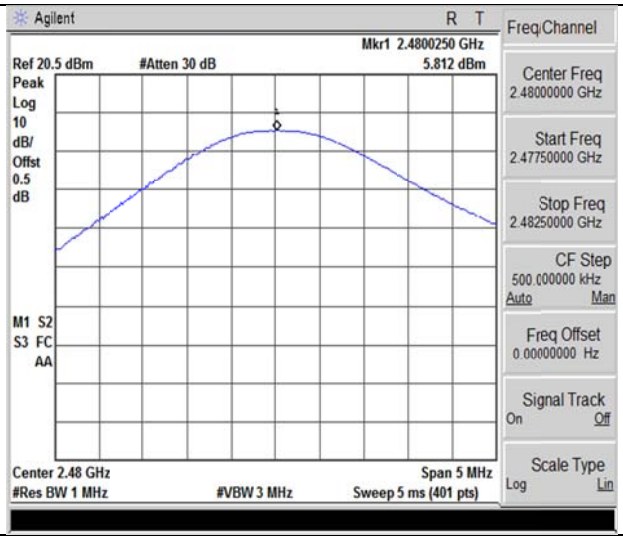
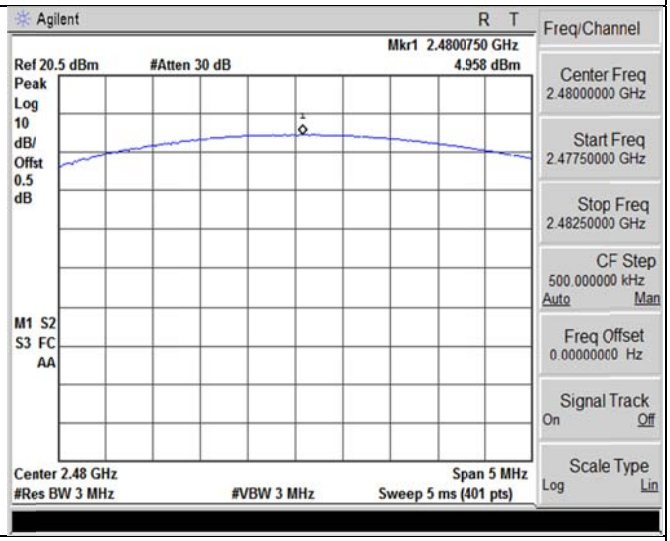

**TEST PROCEDURE**

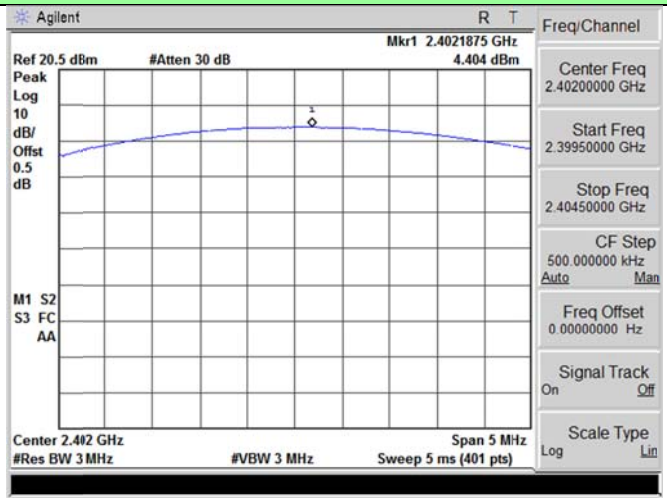
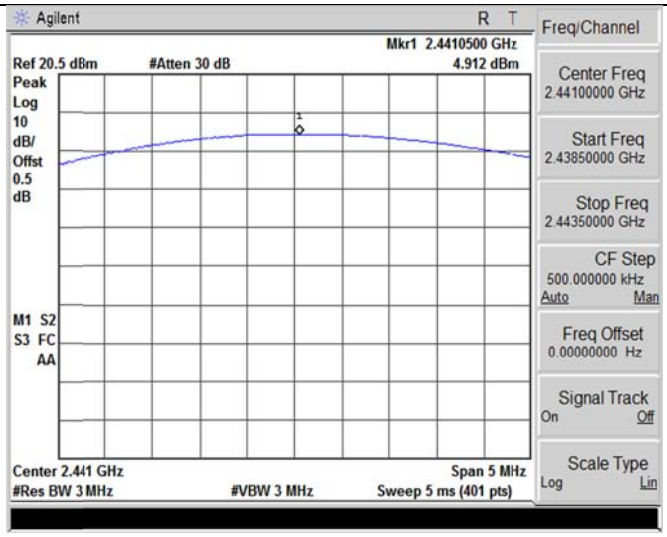
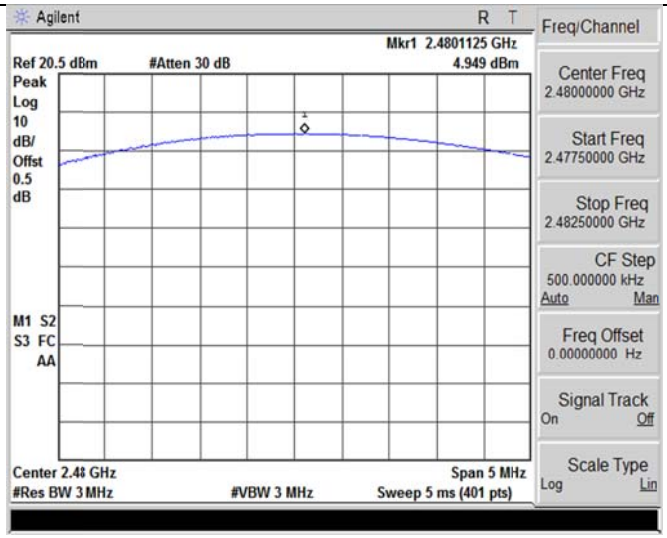
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.

**TEST RESULTS**

| Modulation type | Channel | Output power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| GFSK | 00 | 5.05 | 30.00 | Pass |
| | 39 | 5.70 | | |
| | 78 | 5.81 | | |
| π/4DQPSK | 00 | 4.21 | 21.00 | Pass |
| | 39 | 4.97 | | |
| | 78 | 4.95 | | |
| 8DPSK | 00 | 4.40 | 21.00 | Pass |
| | 39 | 4.91 | | |
| | 78 | 4.94 | | |

Test plot as follows:

| GFSK | π/4DQPSK |
|---|---|
|  |  |
| *CH00* | *CH00* |
|  |  |
| *CH39* | *CH39* |
|  |  |
| *CH78* | *CH78* |

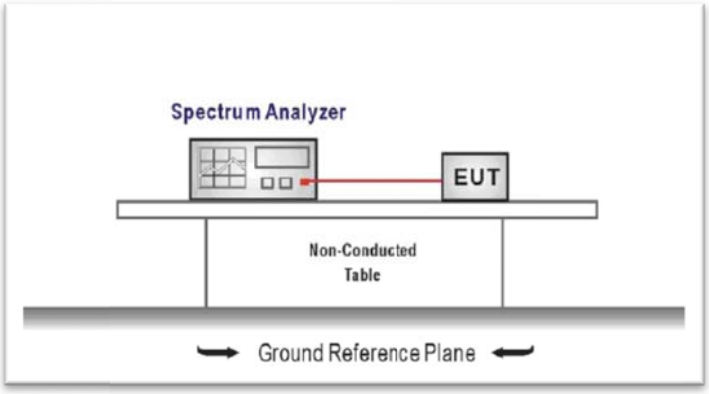
| 8DPSK |
| --- |
|  |
| *CH00* |
|  |
| *CH39* |
|  |
| *CH78* |

## 4.4. 20dB Emission Bandwidth

**LIMIT**

N/A

**TEST CONFIGURATION**



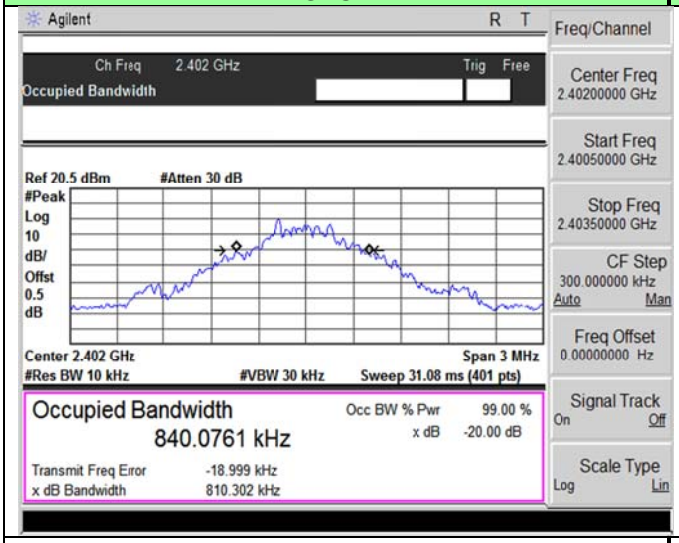
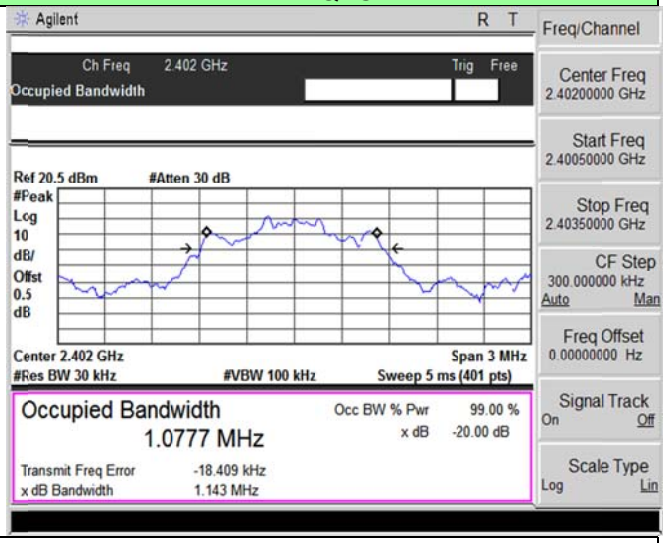
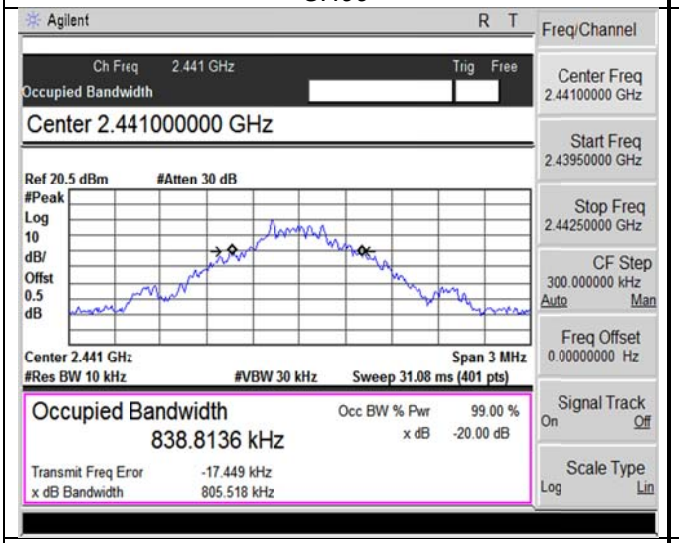
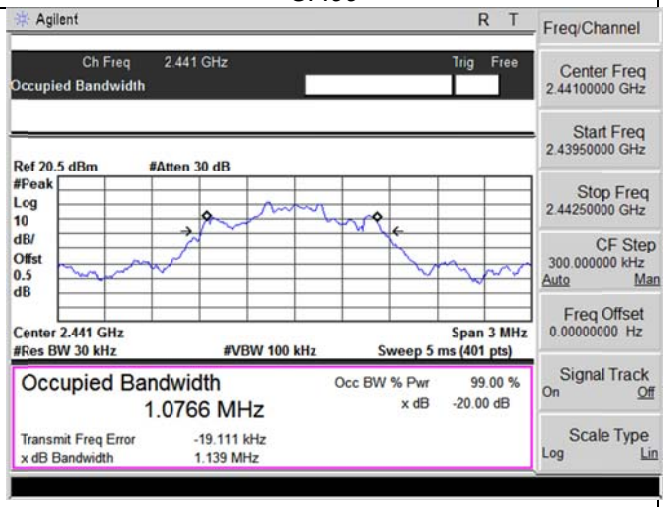
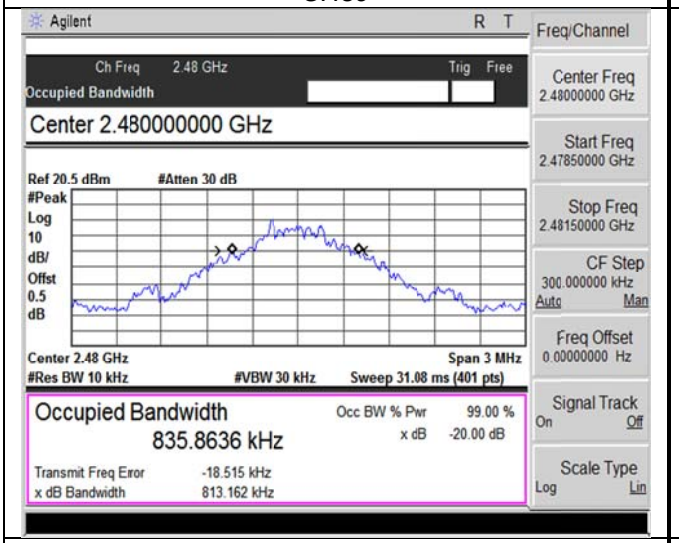
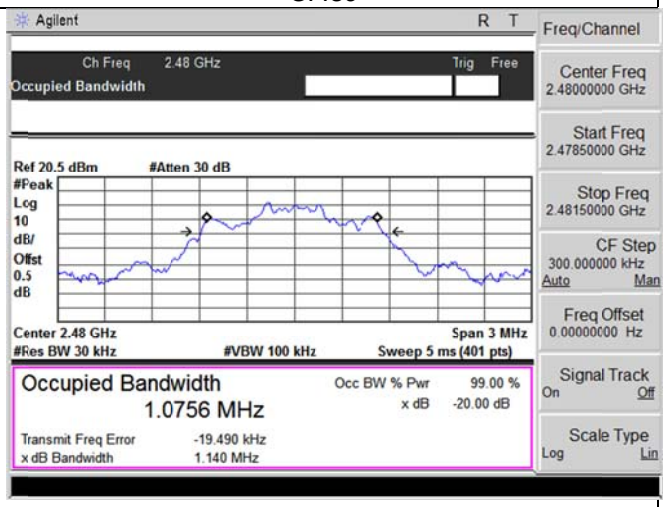

**TEST PROCEDURE**

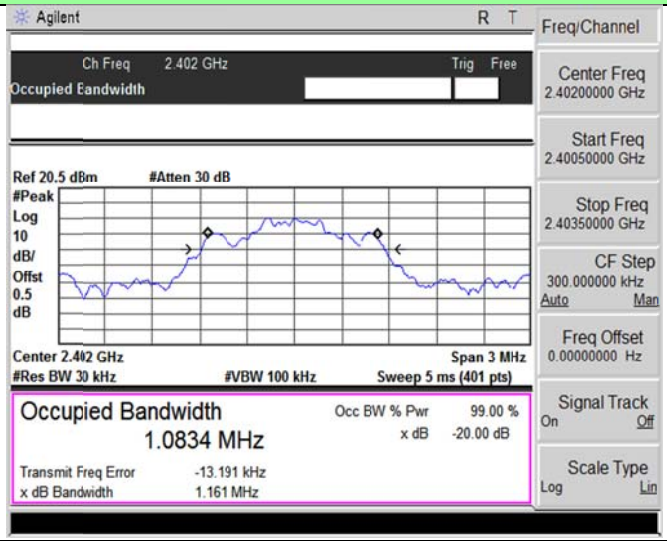
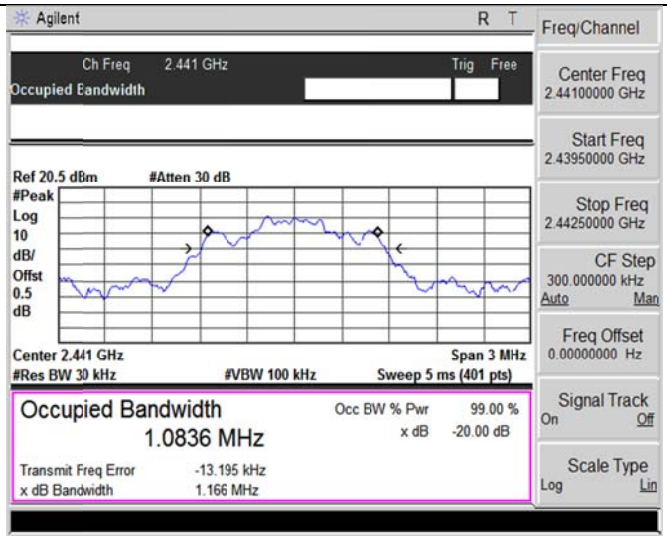
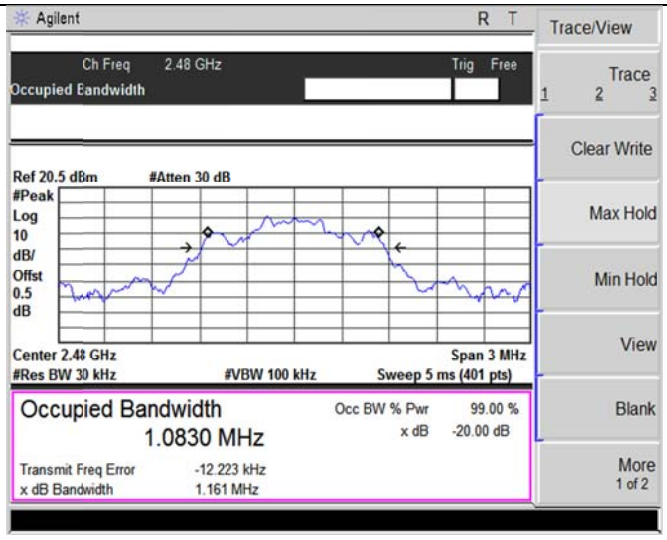
1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW≥1% of the 20 dB bandwidth and VBW≥ RBW.
3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

**TEST RESULTS**

| Modulation type | Channel | 20dB Bandwidth (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| GFSK | 00 | 0.810 | / | Pass |
| | 39 | 0.805 | | |
| | 78 | 0.813 | | |
| π/4DQPSK | 00 | 1.143 | / | Pass |
| | 39 | 1.139 | | |
| | 78 | 1.140 | | |
| 8DPSK | 00 | 1.161 | / | Pass |
| | 39 | 1.166 | | |
| | 78 | 1.161 | | |

Test plot as follows:

| GFSK | π/4DQPSK |
|---|---|
|  |  |
| *CH00* | *CH00* |
|  |  |
| *CH39* | *CH39* |
|  |  |
| *CH78* | *CH78* |

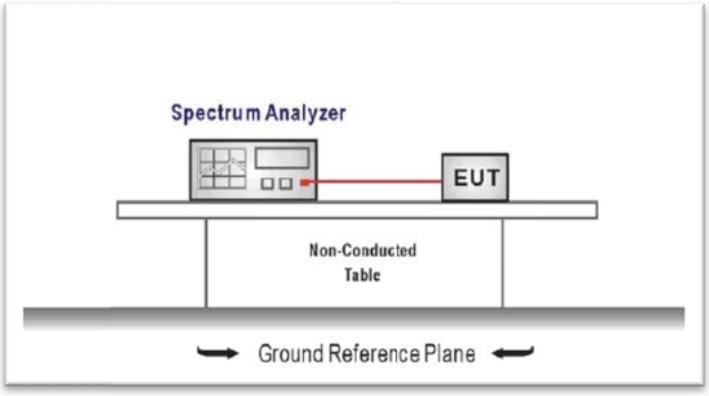
| 8DPSK |
| --- |
|  |
| *CH00* |
|  |
| *CH39* |
|  |
| *CH78* |

## 4.5. 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 2/3*20dB bandwidth of the hopping channel, whichever is greater.

**TEST CONFIGURATION**



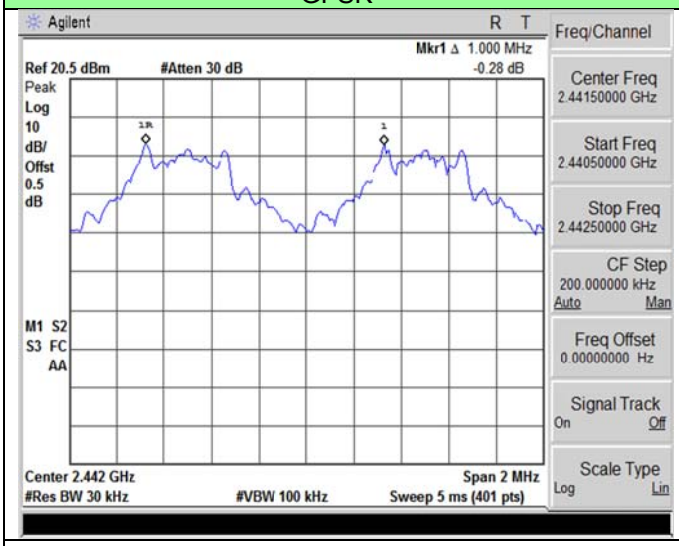
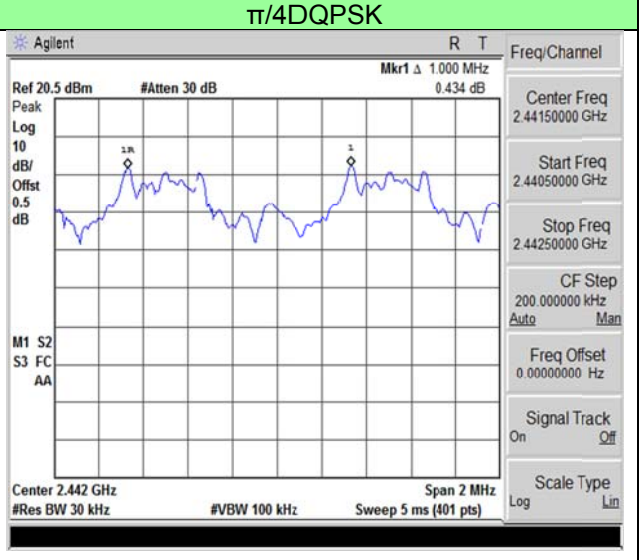
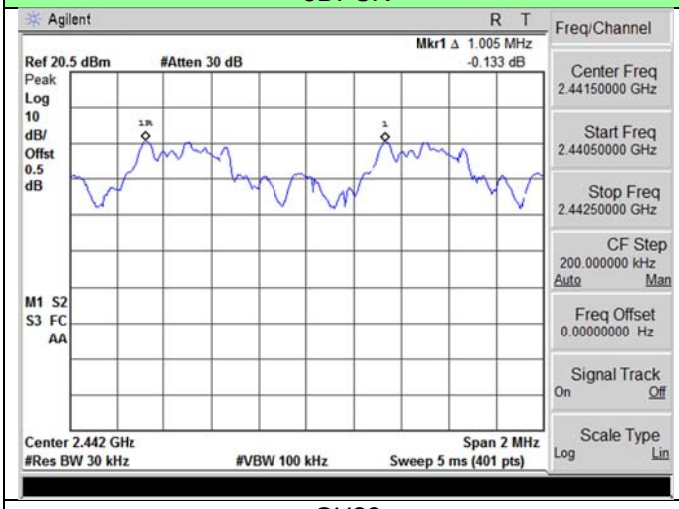

**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz.

**TEST RESULTS**

| Modulation type | Channel | Carrier Frequencies Separation (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| GFSK | 39 | 1.000 | 0.813 | Pass |
| π/4DQPSK | 39 | 1.000 | 0.762 | Pass |
| 8DPSK | 39 | 1.005 | 0.777 | Pass |

Test plot as follows:

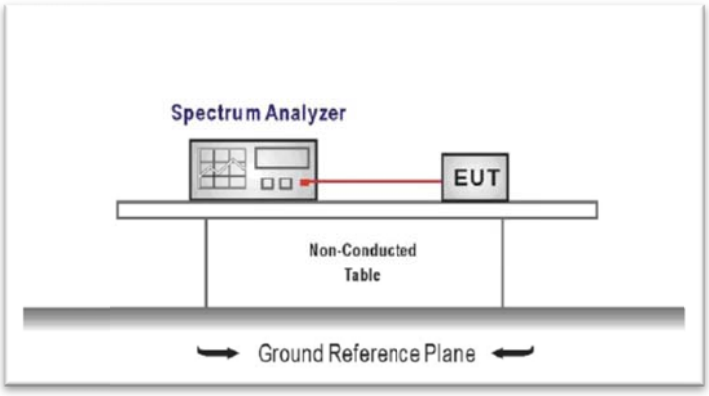
| GFSK | π/4DQPSK |
|---|---|
|  |  |
| *CH39* | *CH39* |
| 8DPSK | |
|  | |
| *CH39* | |

## 4.6. 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**



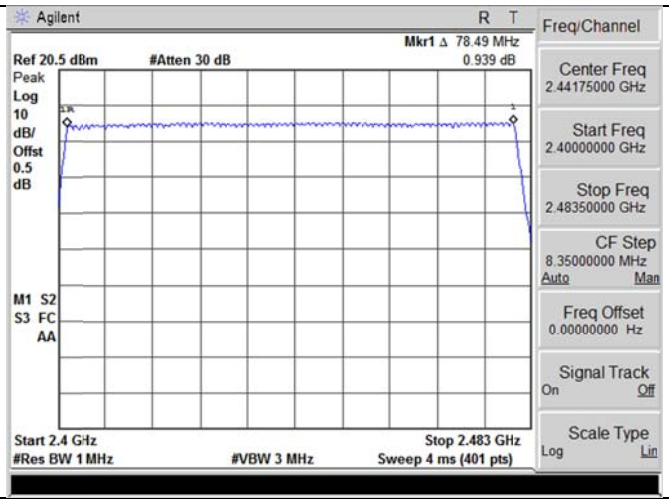

**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=1MHz and VBW=3MHz.

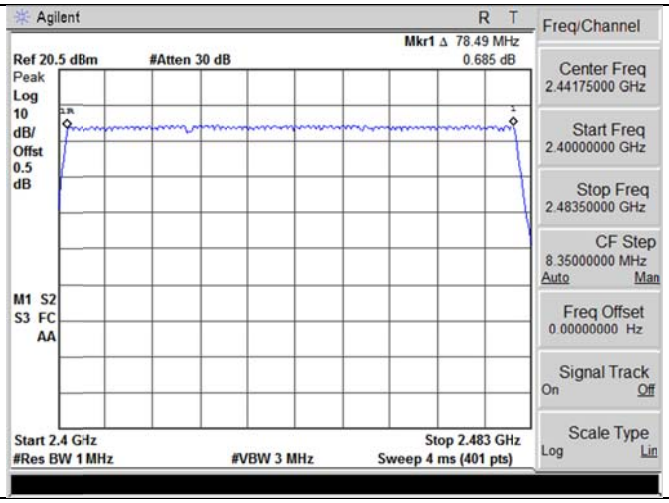
**TEST RESULTS**

| Modulation type | Channel number | Limit (MHz) | Result |
|---|---|---|---|
| GFSK | 79 | 15 | Pass |
| π/4DQPSK | 79 | | |
| 8DPSK | 79 | | |

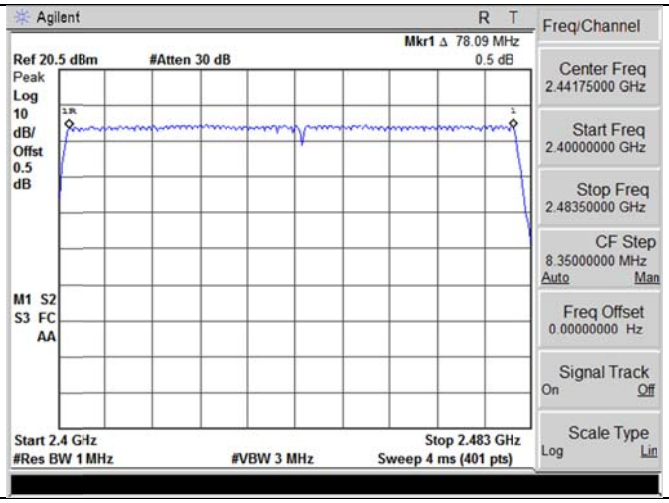
Test plot as follows:




*GFSK*




π/4DQPSK



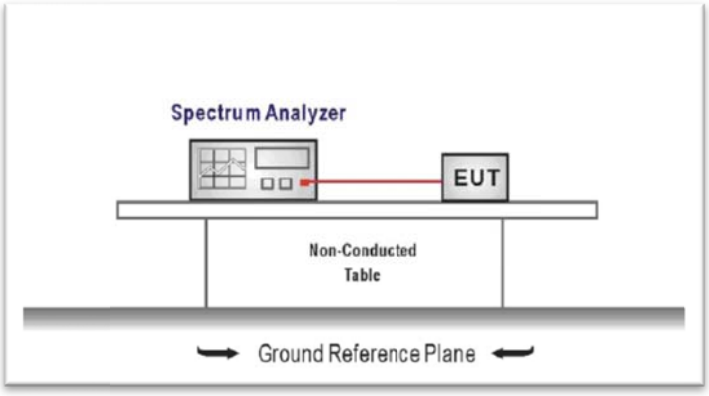

8DPSK

## 4.7. 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 pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.*

**TEST CONFIGURATION**




**TEST PROCEDURE**

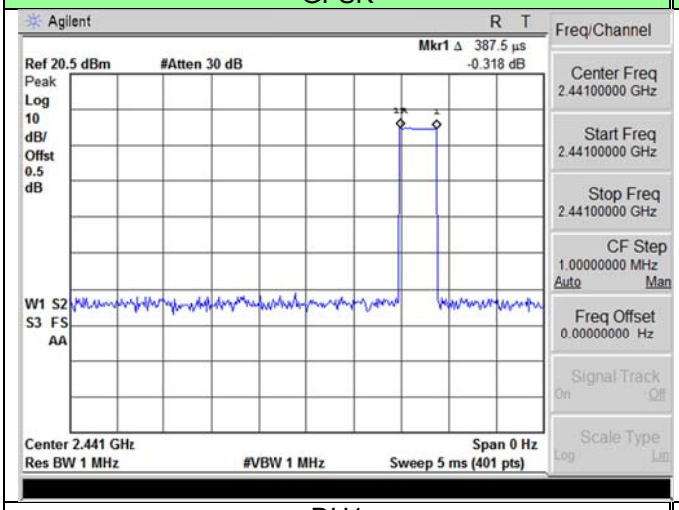
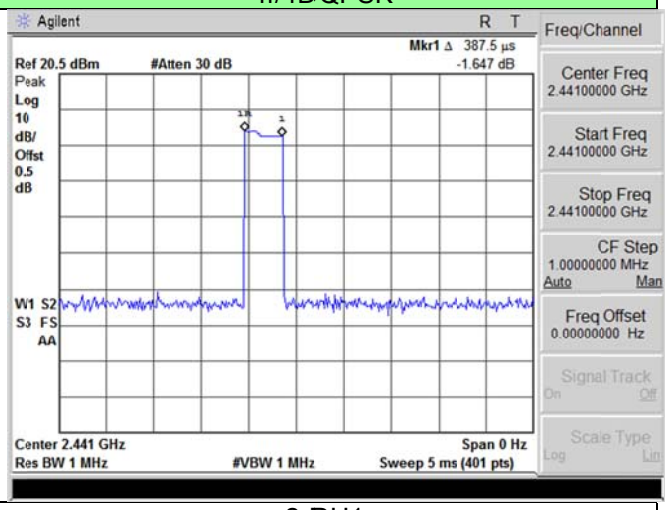
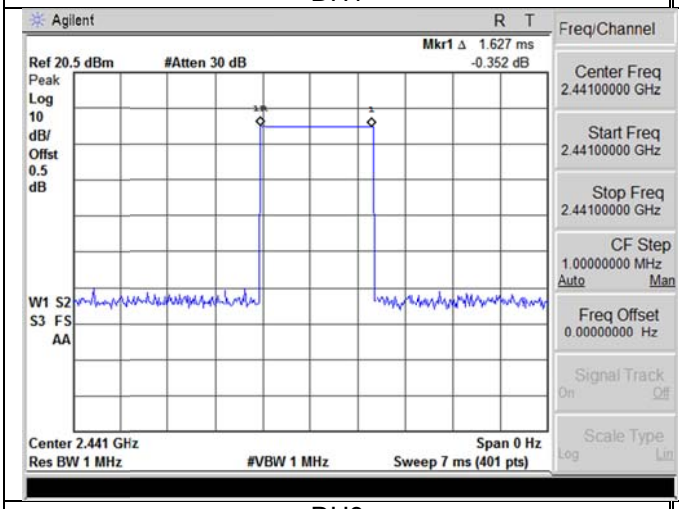
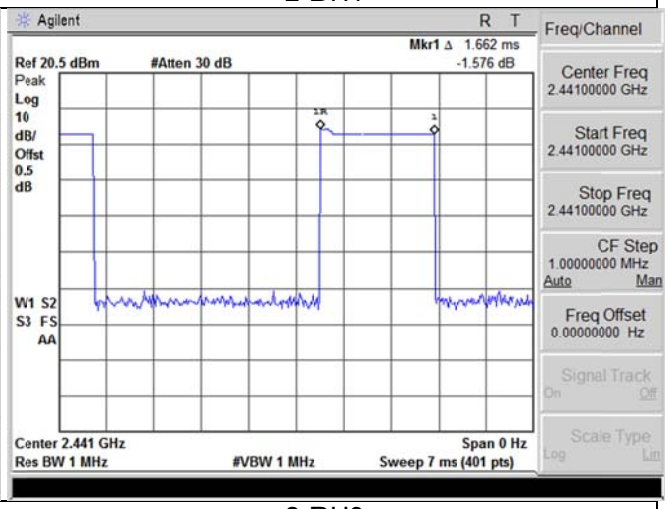
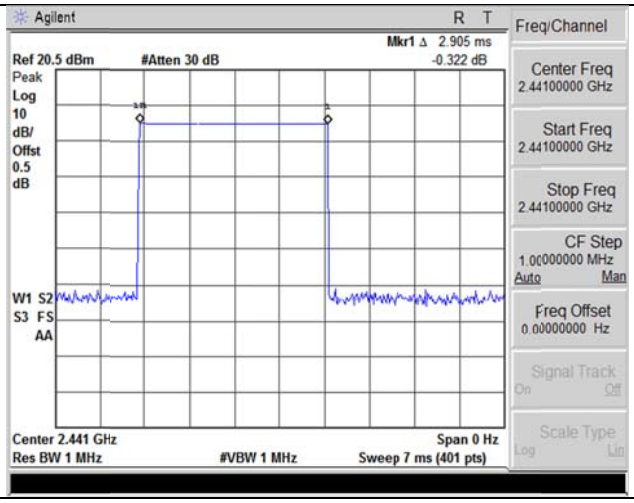
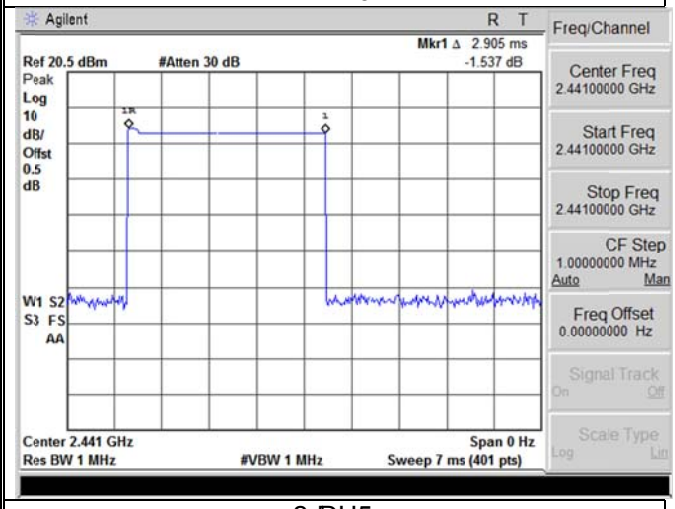
1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set center frequency of spectrum analyzer=operating frequency with RBW=1MHz and VBW=1MHz,Span=0Hz.

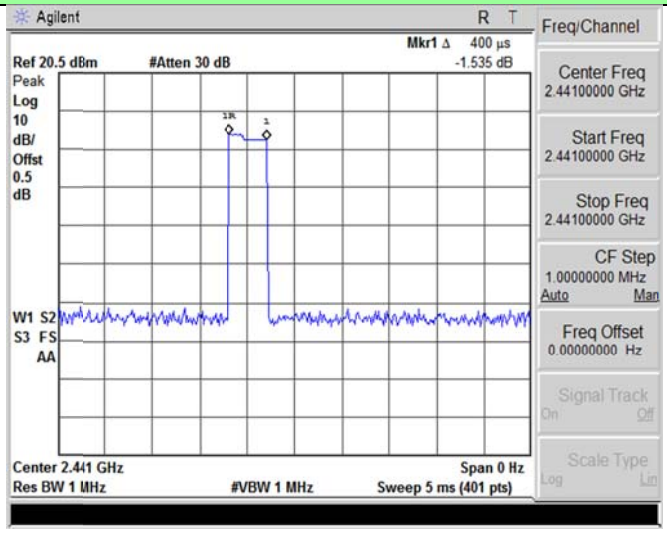
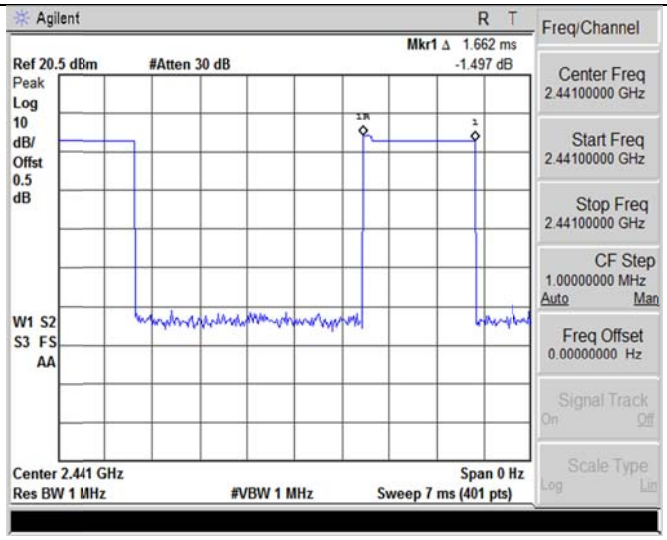
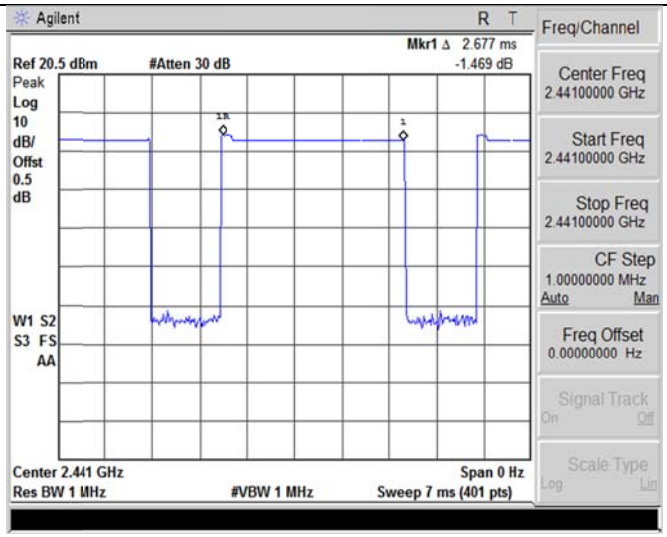
**TEST RESULTS**

| Modulation type | Channel | Dwell time (Second) | Limit (Second) | Result |
|---|---|---|---|---|
| GFSK | DH1 | 0.124 | 0.40 | Pass |
| | DH3 | 0.260 | | |
| | DH5 | 0.310 | | |
| π/4DQPSK | 2-DH1 | 0.124 | 0.40 | Pass |
| | 2-DH3 | 0.266 | | |
| | 2-DH5 | 0.310 | | |
| 8DPSK | 3-DH1 | 0.128 | 0.40 | Pass |
| | 3-DH3 | 0.266 | | |
| | 3-DH5 | 0.286 | | |

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

Test plot as follows:

| GFSK | π/4DQPSK |
|---|---|
|  |  |
| DH1 | 2-DH1 |
|  |  |
| DH3 | 2-DH3 |
|  |  |
| DH5 | 2-DH5 |

| 8DPSK |
| --- |
|  |
| 3-DH1 |
|  |
| 3-DH3 |
|  |
| 3-DH5 |

## 4.8. Pseudorandom Frequency Hopping Sequence

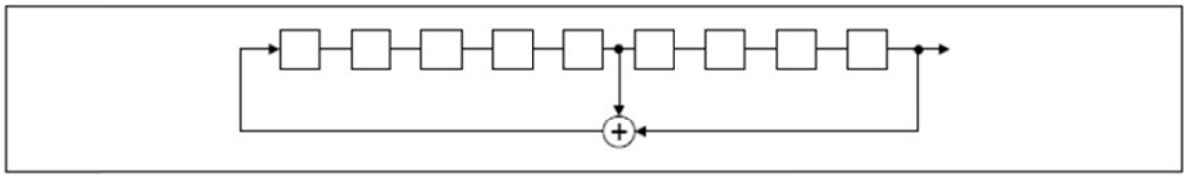
**LIMIT**

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**

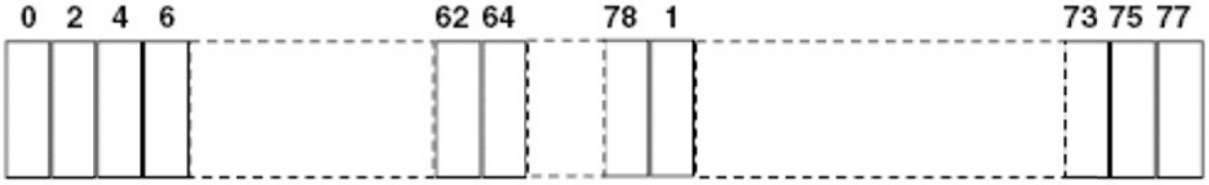
The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage.And the result is fed back to the input of the frist stage.The sequence begins with the frist one of 9 consecutive ones,for example:the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

- Number of shift register stages:9
- Length of pseudo-random sequence: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:




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.

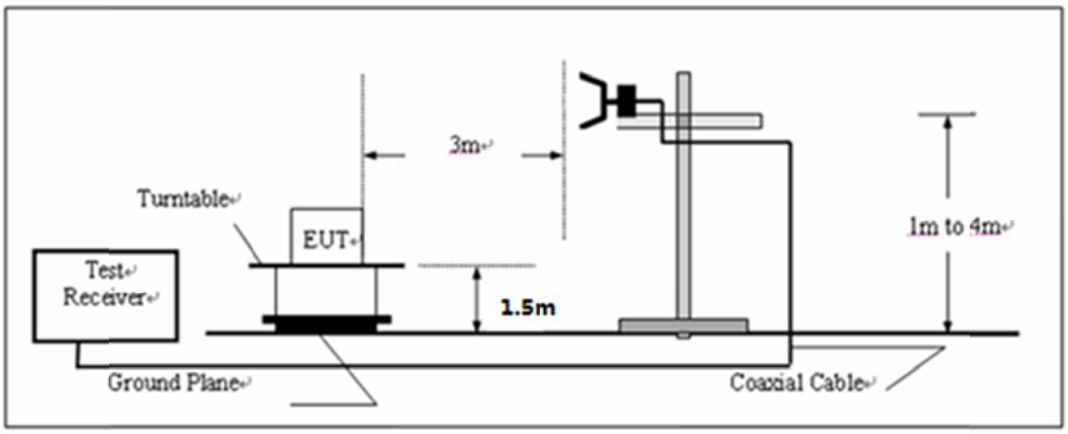
## 4.9. Restricted band (radiated)

**LIMIT**

FCC CFR Title 47 Part 15 Subpart C Section 15.209

| Frequency | Limit (dBuV/m @3m) | Value |
|---|---|---|
| Above 1GHz | 54.00 | Average |
| | 74.00 | Peak |

**TEST CONFIGURATION**

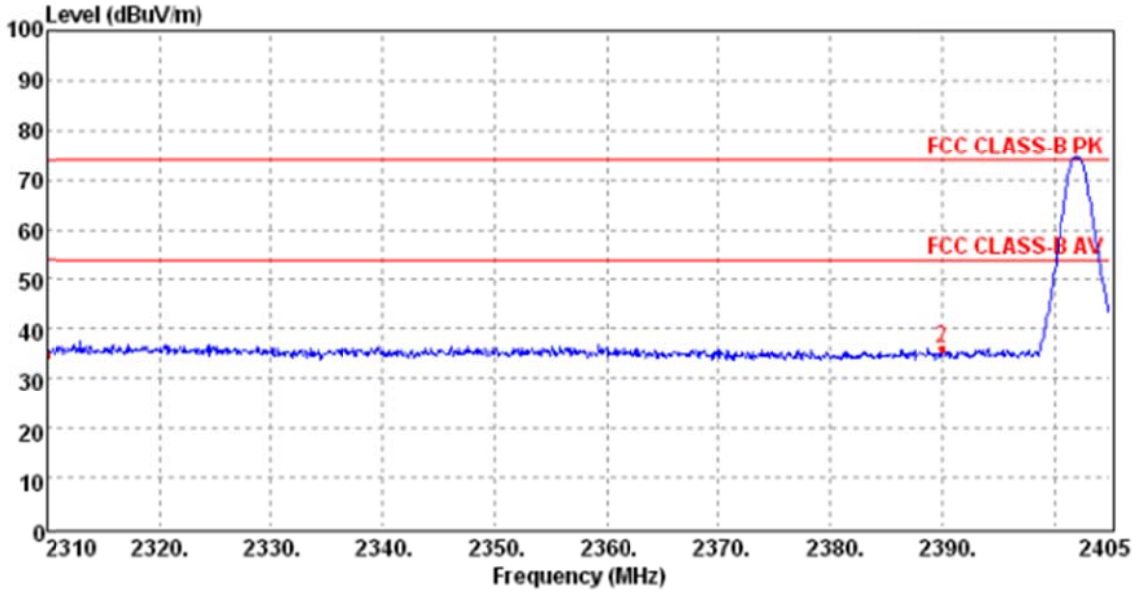



**TEST PROCEDURE**

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 0.8 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 for Average value.
6. The frequency range from 2310MHz to 2483.5MHz harmonic is checked.

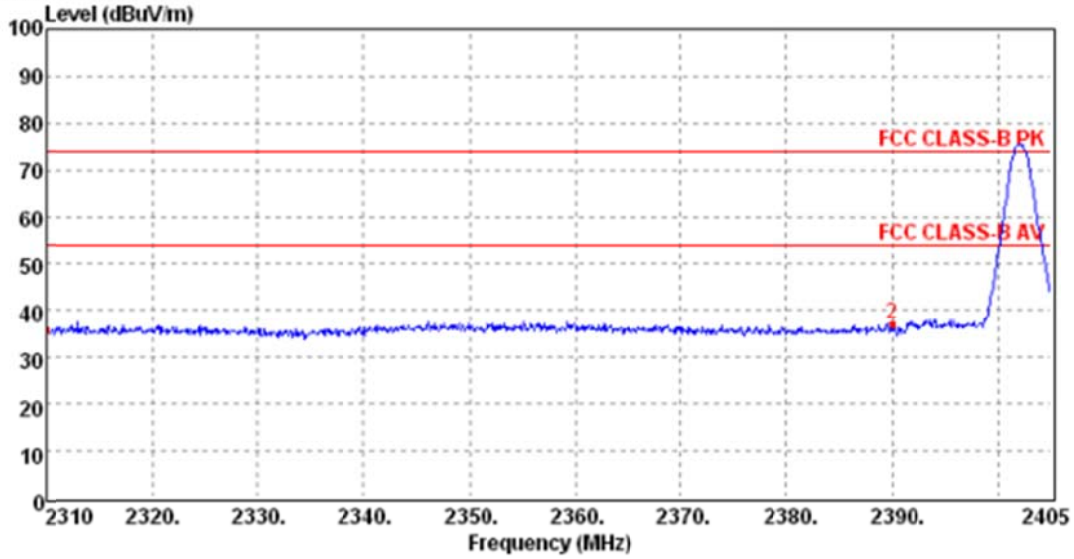
**TEST RESULTS**

| | | | |
|---|---|---|---|
| *Worst mode:* | *GFSK Modulation* | *Test Channel:* | *00* |
| *Deteccter:* | *Peak* | *Polarization:* | *Horizontal* |



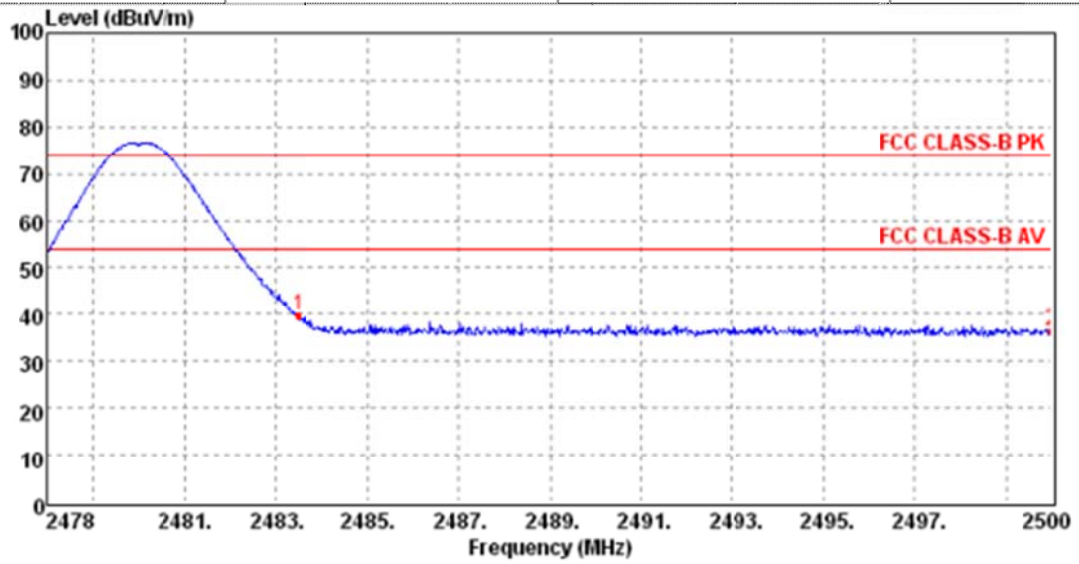

| Mark | Frequency MHz | Reading dBuV | Antenna dB | Cable dB | Preamp dB | Level dBuV | Limit dBuV | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.00 | 38.79 | 26.99 | 6.68 | 37.51 | 34.95 | 74.00 | -39.05 | Peak |
| 2 | 2389.99 | 39.76 | 27.23 | 6.81 | 37.57 | 36.23 | 74.00 | -37.77 | Peak |

| | | | |
|---|---|---|---|
| *Worst mode:* | *GFSK Modulation* | *Test Channel:* | *00* |
| *Deteccter:* | *Peak* | *Polarization:* | *Vertical* |



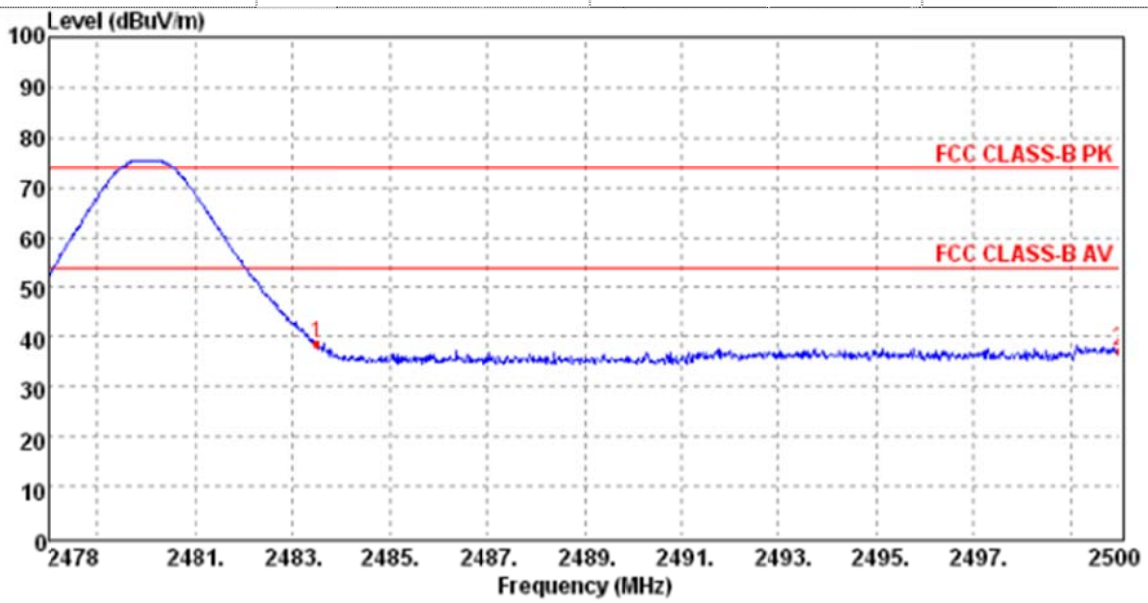

| Mark | Frequency MHz | Reading dBuV | Antenna dB | Cable dB | Preamp dB | Level dBuV | Limit dBuV | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.00 | 39.79 | 26.99 | 6.68 | 37.51 | 35.95 | 74.00 | -38.05 | Peak |
| 2 | 2389.99 | 40.76 | 27.23 | 6.81 | 37.57 | 37.23 | 74.00 | -36.77 | Peak |

| | | | |
|---|---|---|---|
| *Worst mode:* | *GFSK Modulation* | *Test Channel:* | *78* |
| *Deteccter:* | *Peak* | *Polarization:* | *Horizontal* |




| Mark | Frequency MHz | Reading dBuV | Antenna dB | Cable dB | Preamp dB | Level dBuV | Limit dBuV | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 42.81 | 27.54 | 6.96 | 37.65 | 39.66 | 74.00 | -34.34 | Peak |
| 2 | 2500.00 | 39.35 | 27.58 | 6.98 | 37.66 | 36.25 | 74.00 | -37.75 | Peak |

| | | | |
|---|---|---|---|
| *Worst mode:* | *GFSK Modulation* | *Test Channel:* | *78* |
| *Deteccter:* | *Peak* | *Polarization:* | *Vertical* |




| Mark | Frequency MHz | Reading dBuV | Antenna dB | Cable dB | Preamp dB | Level dBuV | Limit dBuV | Over limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 41.81 | 27.54 | 6.96 | 37.65 | 38.66 | 74.00 | -35.34 | Peak |
| 2 | 2500.00 | 40.35 | 27.58 | 6.98 | 37.66 | 37.25 | 74.00 | -36.75 | Peak |

*Note: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.and the Peak Level result is lower than the AV limit, so the AV result is not require.*

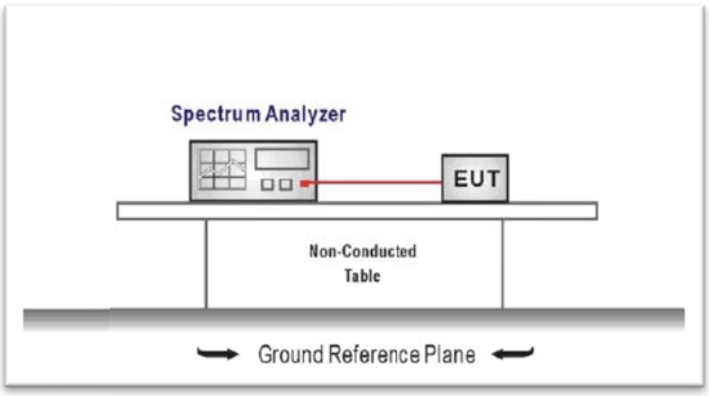
## 4.10. Bandedge and Spurious Emission (conducted)

**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**



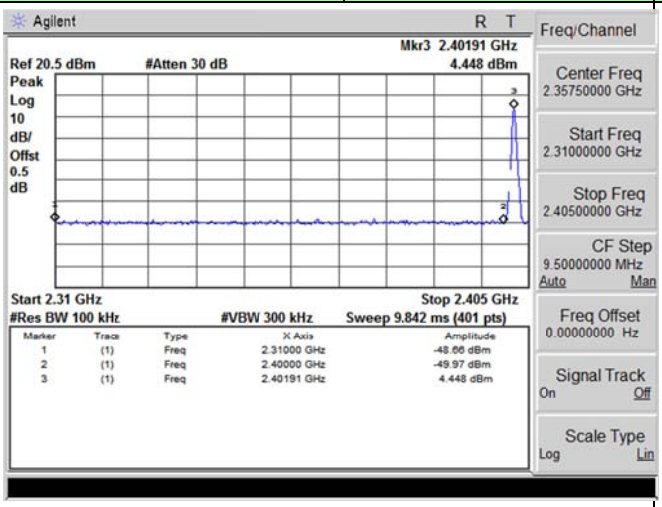

**TEST PROCEDURE**

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Conducted spurious emission the bandwidth of the fundamental frequency was measured by spectrum analyzer withRBW=100 KHz and VBW=300KHz.
3. Below -20dB of the highest emission level in operating band.

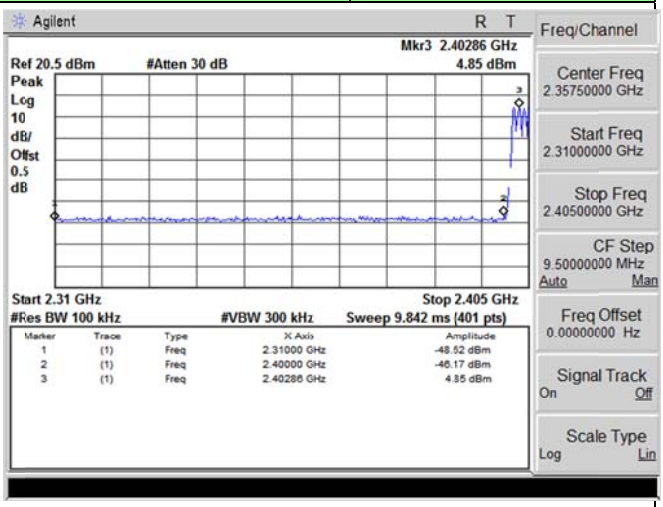
**TEST RESULTS**

Test plot as follows:

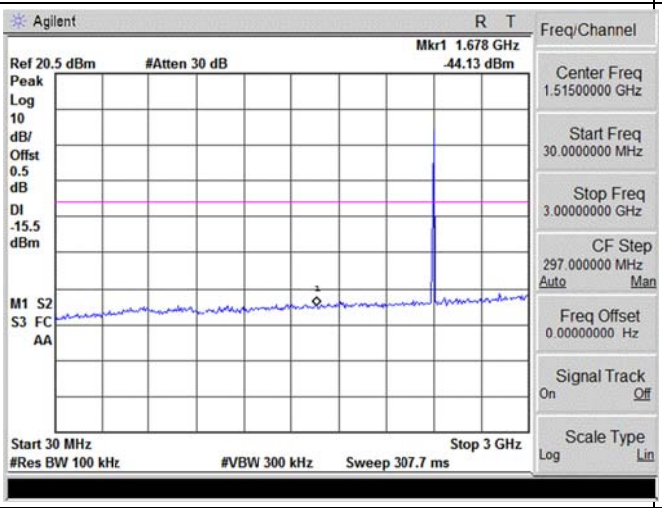
| Modulaiton: | GFSK | Test channel: | 00 |
|---|---|---|---|



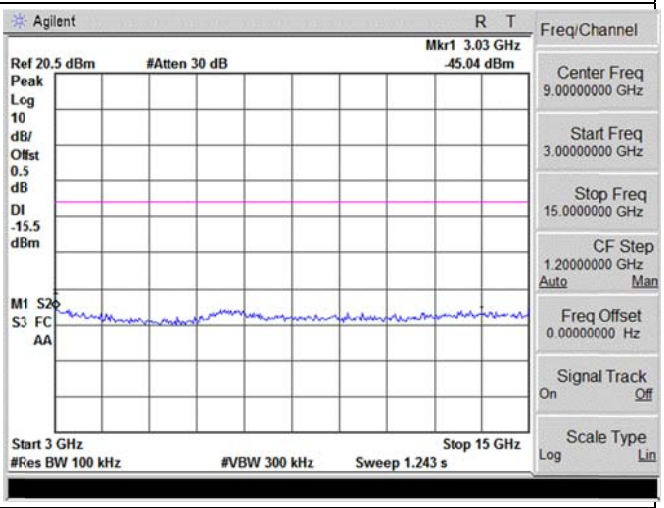

Bandedge- no hopping mode



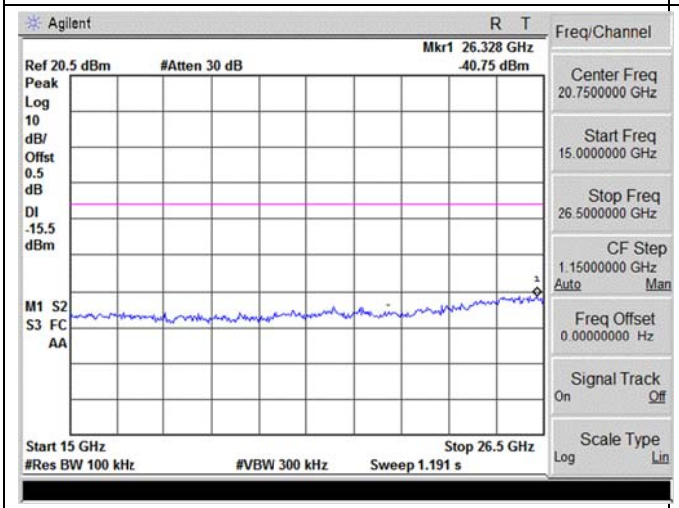

Bandedge- hopping mode




30 MHz~3GHz

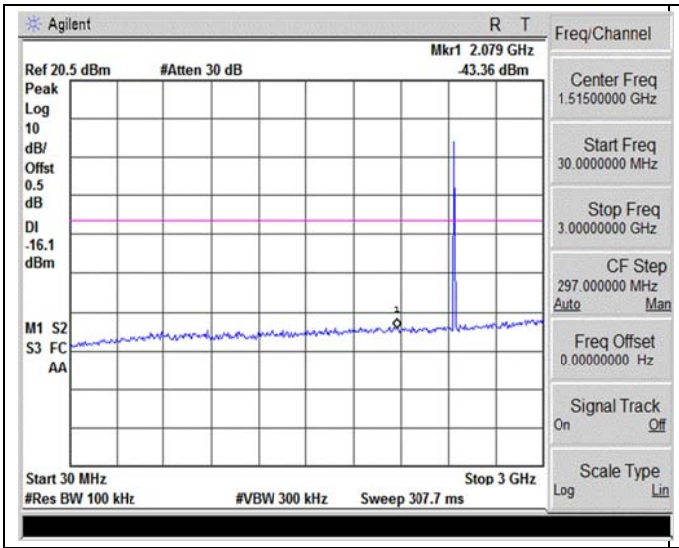



3GHz~15GHz

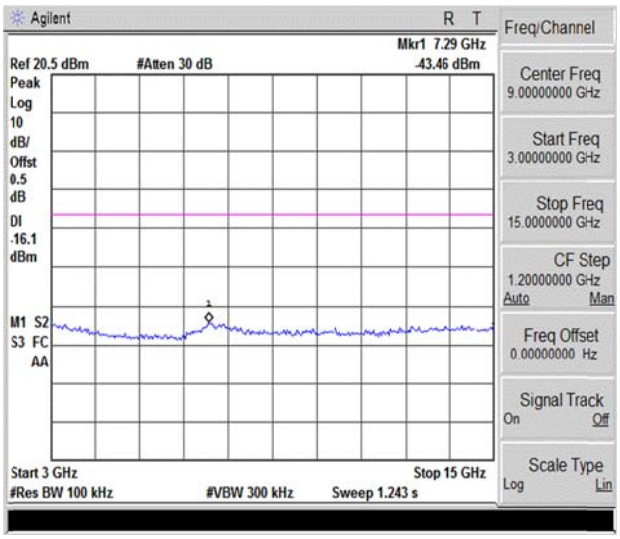



15GHz~26.5GHz

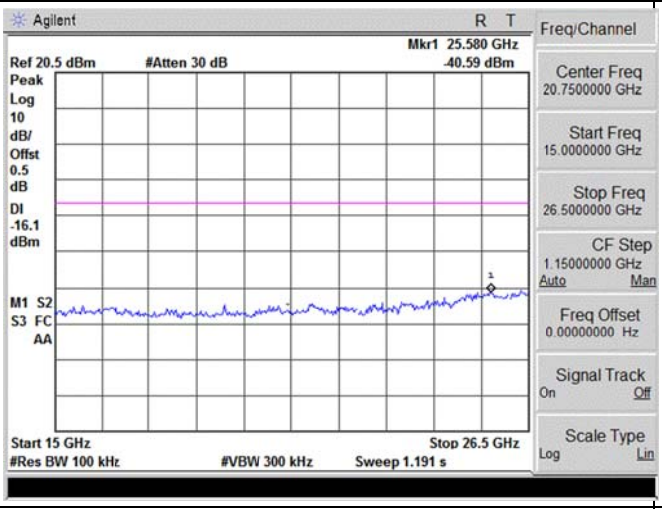
| Modulaiton: | GFSK | Test channel: | 39 |
|---|---|---|---|




30MHz~3GHz

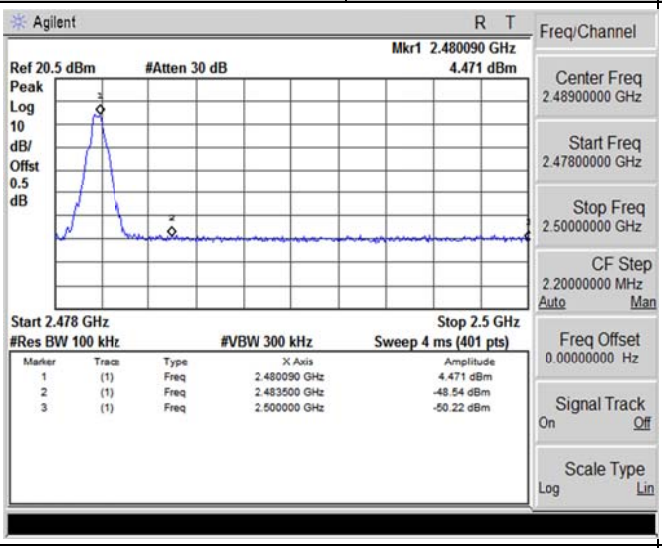



3GHz~15GHz

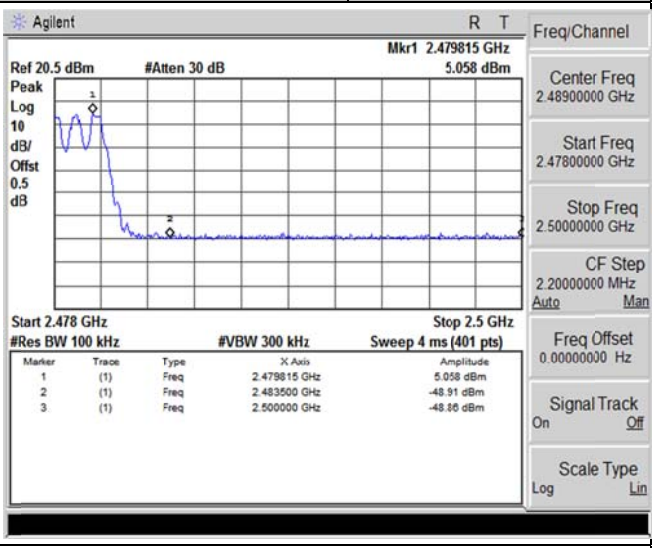



15GHz~26.5GHz

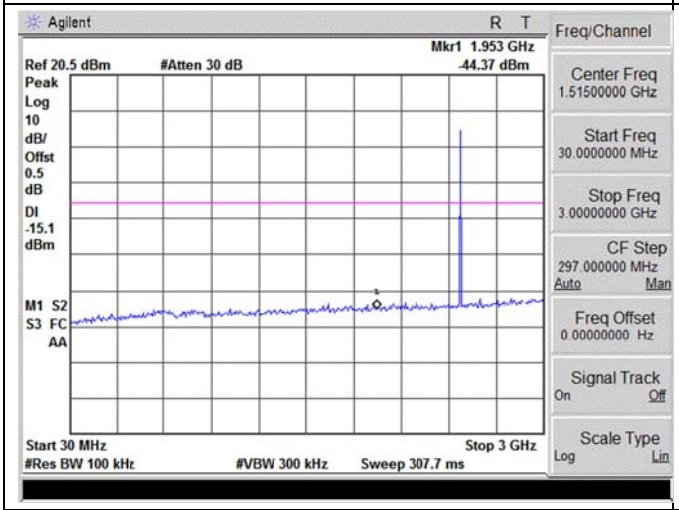
| Modulaiton: | GFSK | Test channel: | 78 |
|---|---|---|---|



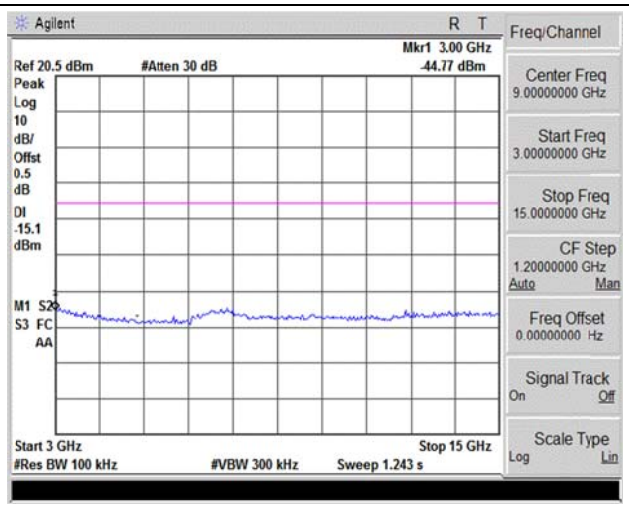

Bandedge- no hopping mode



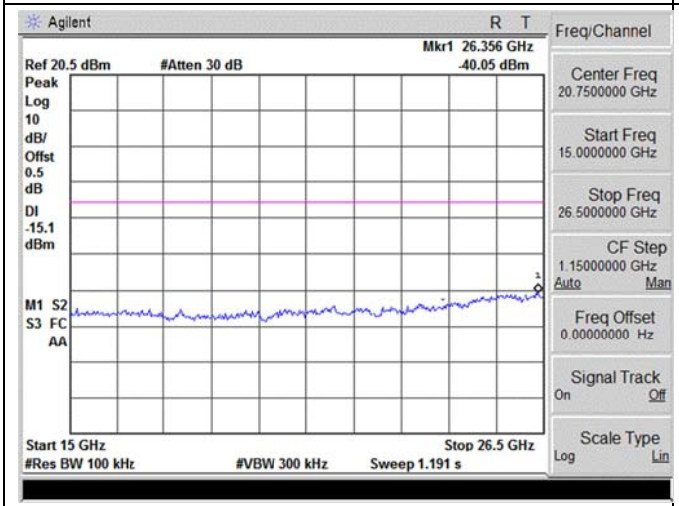

Bandedge- hopping mode




30MHz~3GHz

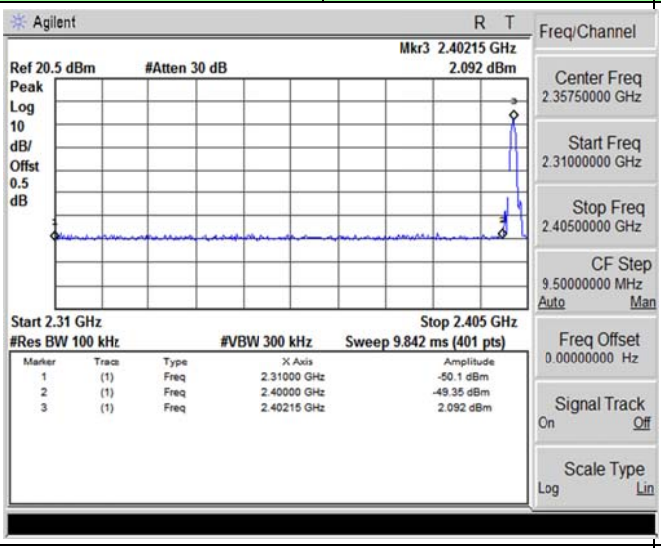



3GHz~15GHz

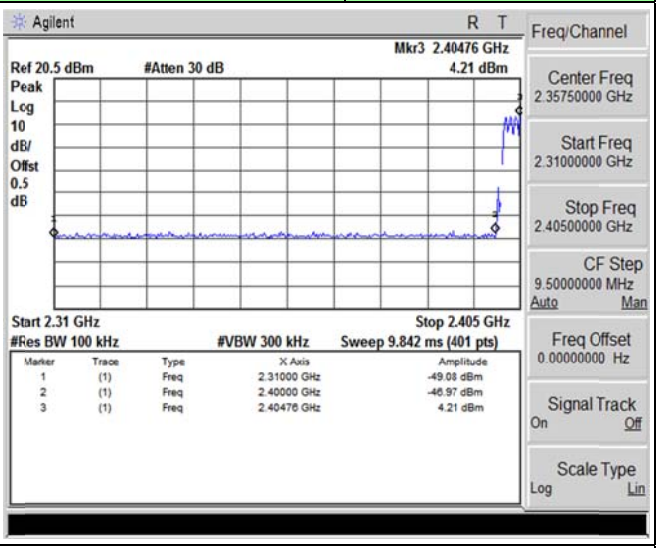



15GHz~26.5GHz

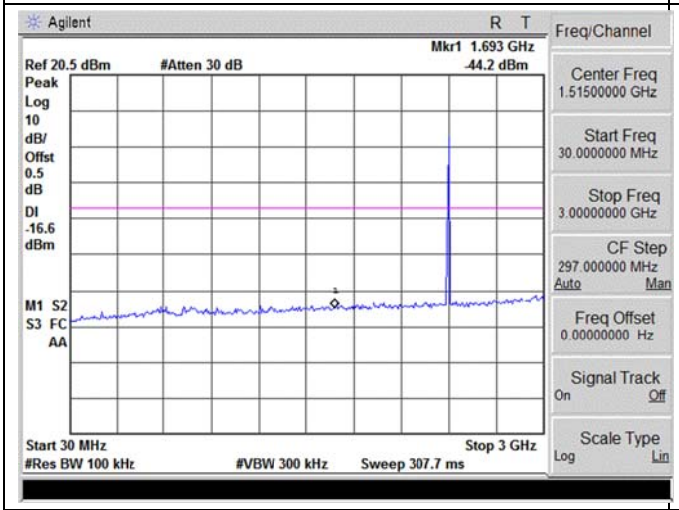
| Modulaiton: | π/4DQPSK | Test channel: | 00 |
|---|---|---|---|



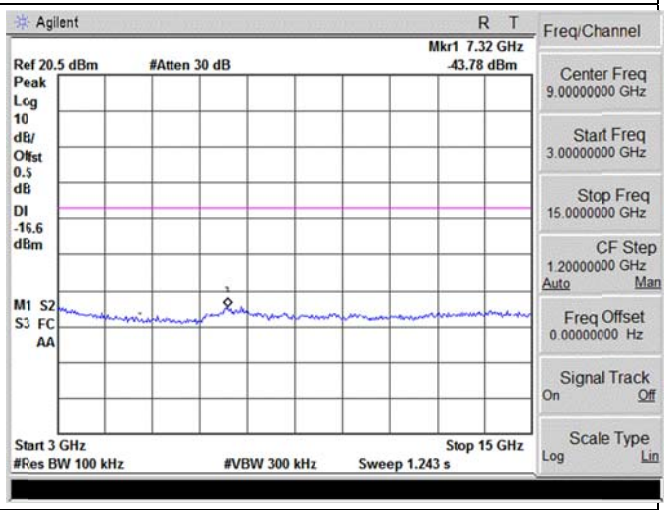

Bandedge- no hopping mode



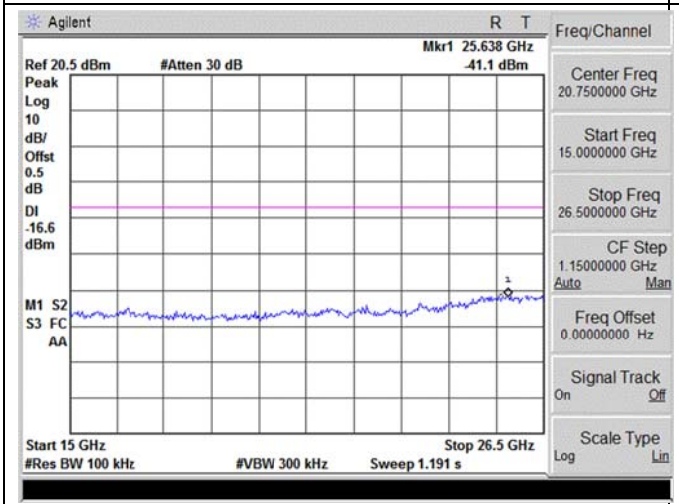

Bandedge- hopping mode




30MHz~3GHz

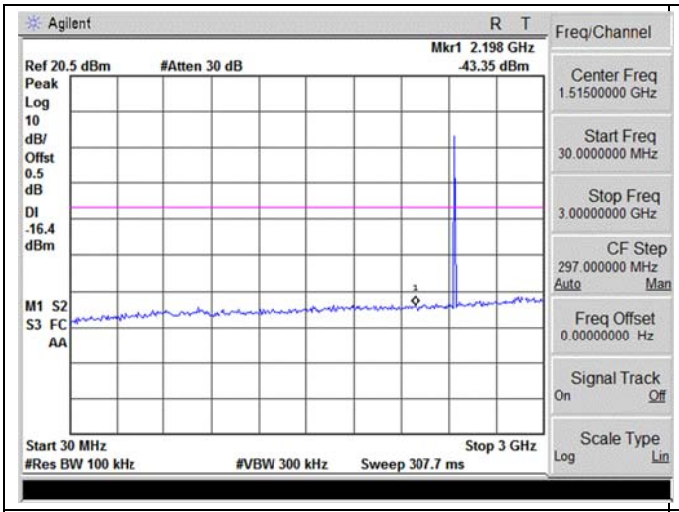



3GHz~15GHz

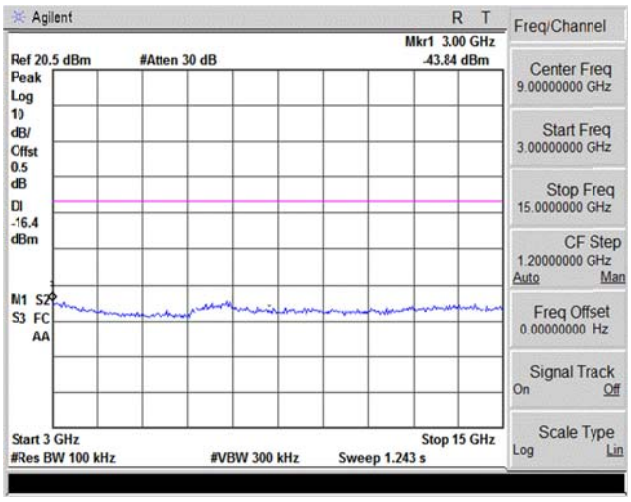



15GHz~26.5GHz

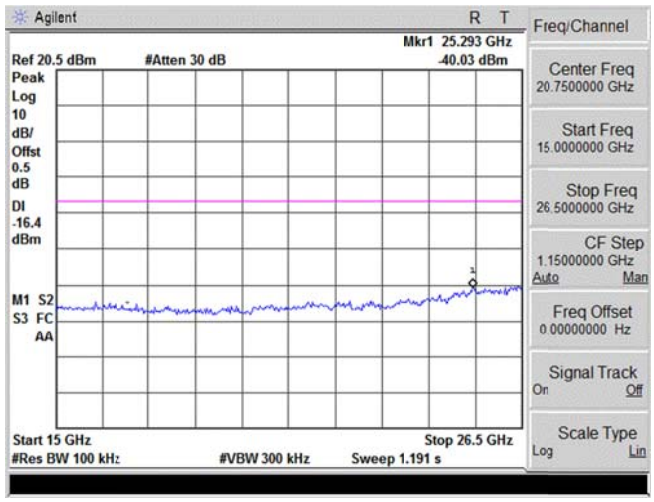
| Modulaiton: | π/4DQPSK | Test channel: | 39 |
|---|---|---|---|




30MHz~3GHz

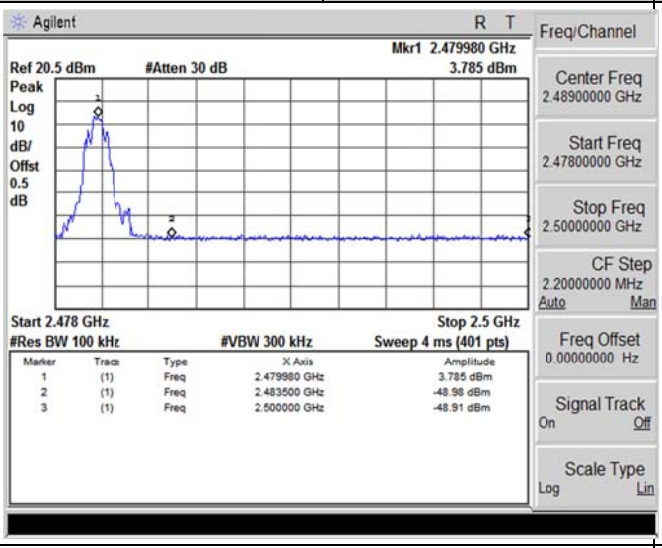



3GHz~15GHz

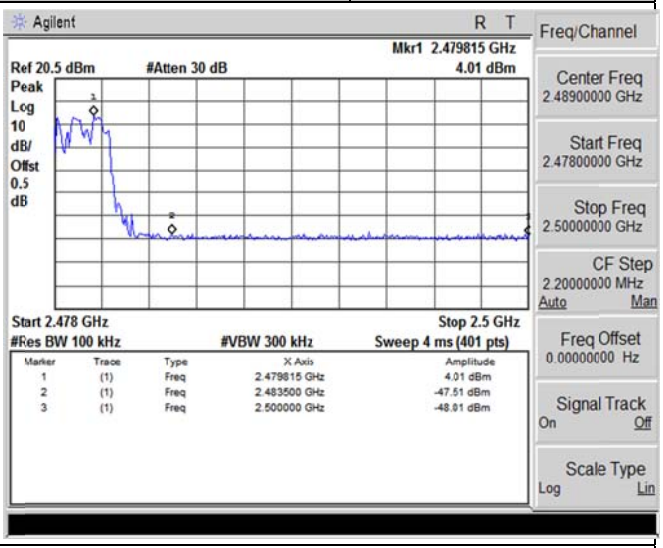



15GHz~26.5GHz

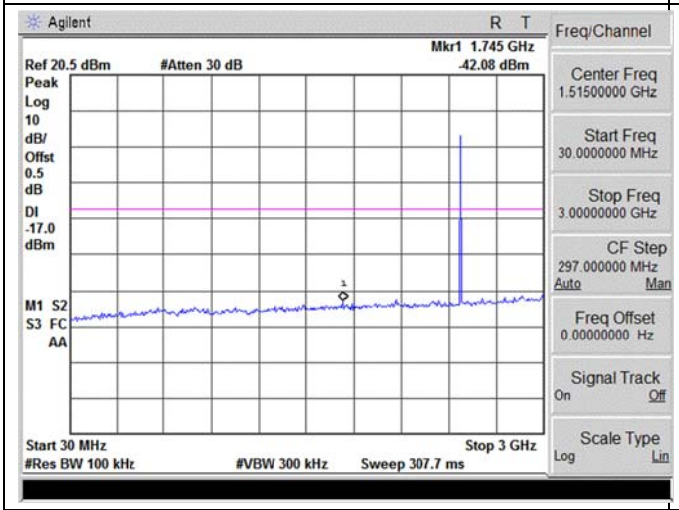
| Modulaiton: | π/4DQPSK | Test channel: | 78 |
|---|---|---|---|



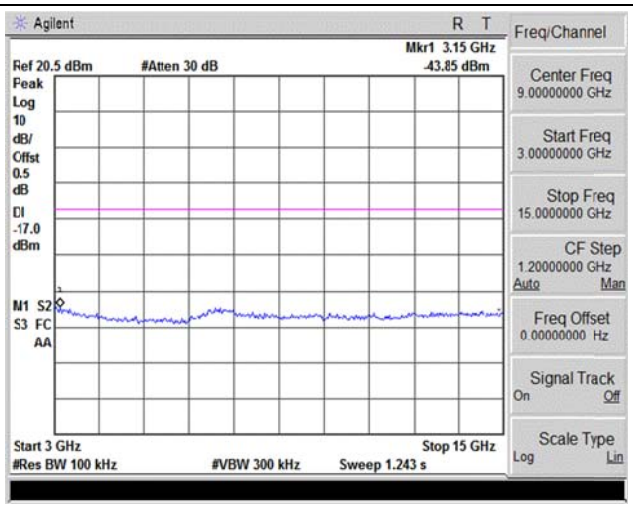

Bandedge- no hopping mode



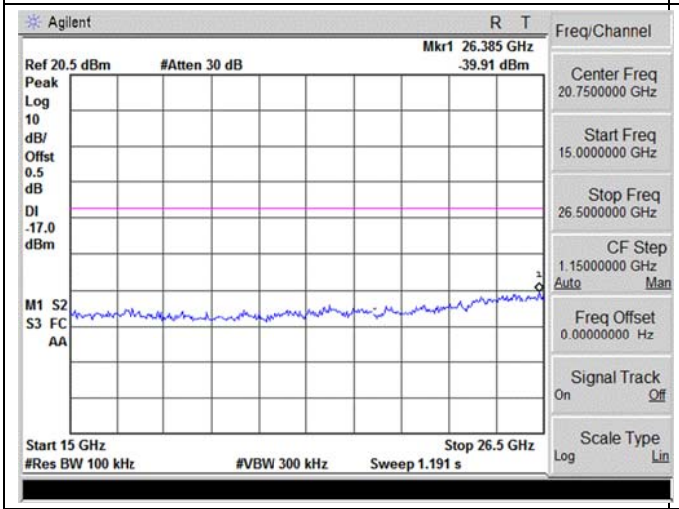

Bandedge- hopping mode




30MHz~3GHz

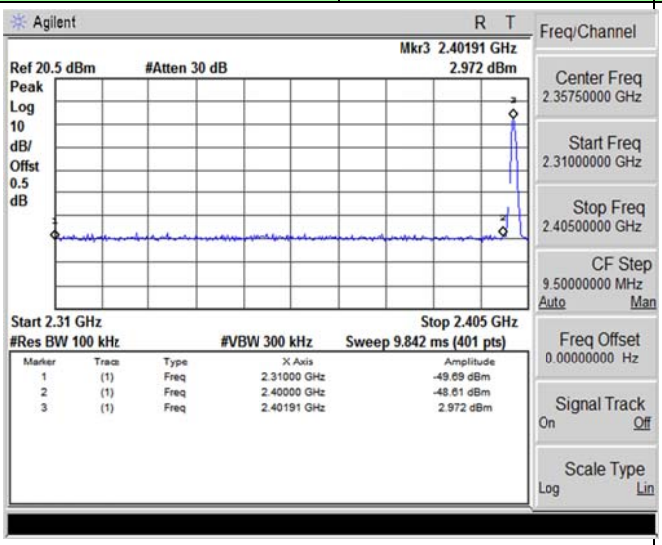



3GHz~15GHz

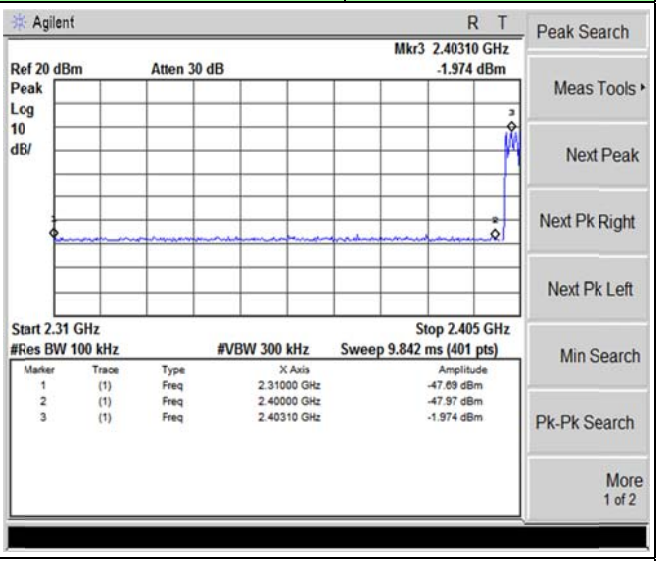



15GHz~26.5GHz

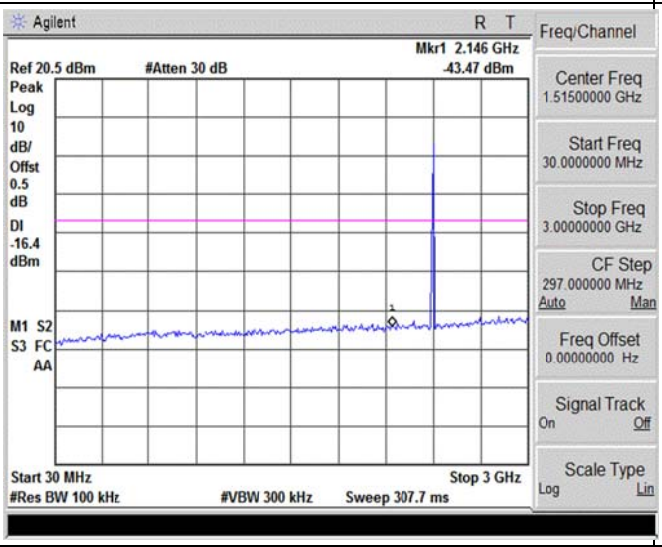
| Modulaiton: | 8DPSK | Test channel: | 00 |
|---|---|---|---|



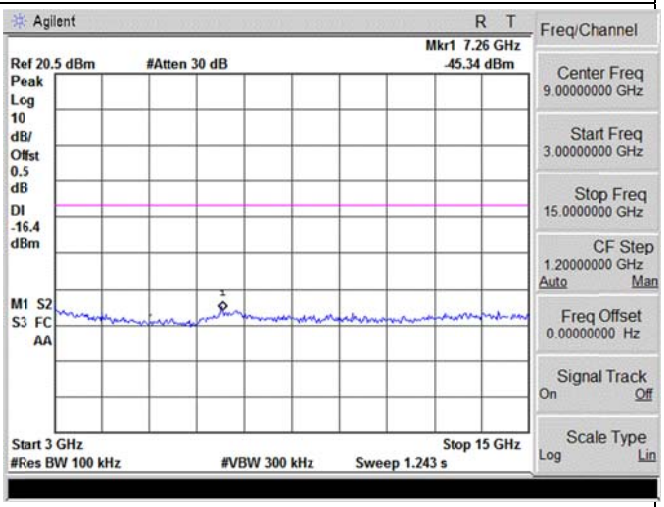

Bandedge- no hopping mode



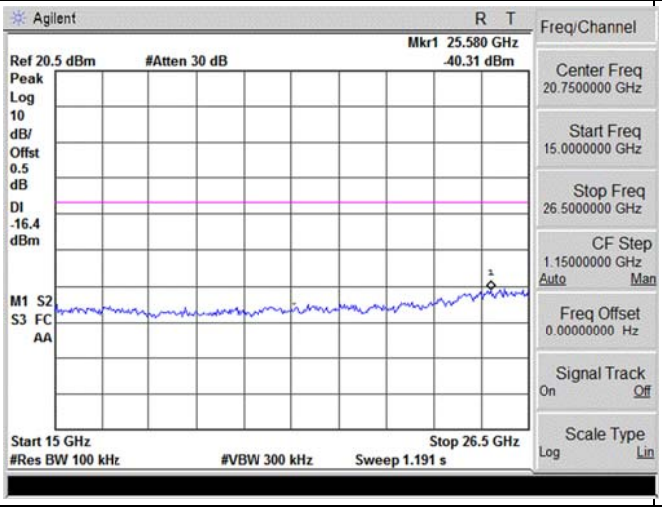

Bandedge- hopping mode




30MHz~3GHz

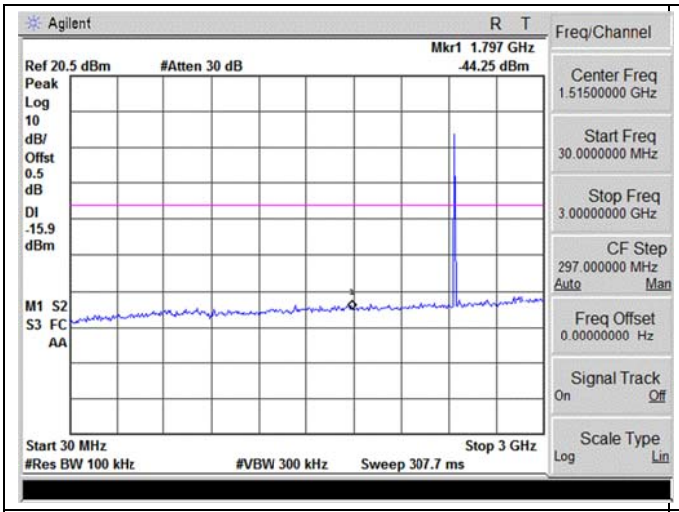



3GHz~15GHz

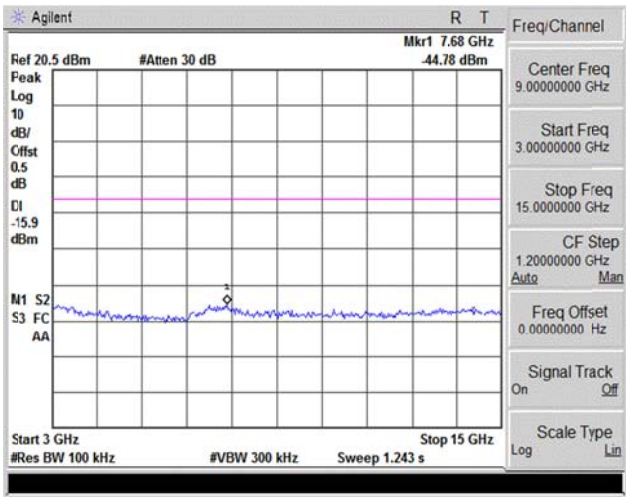



15GHz~26.5GHz

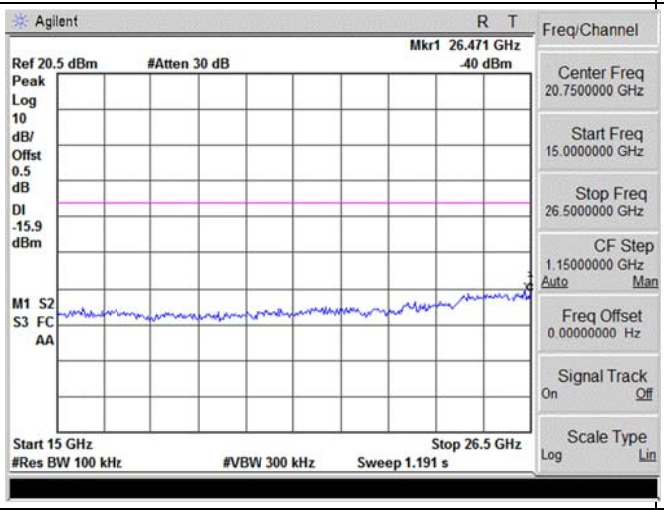
| Modulaiton: | 8DPSK | Test channel: | 39 |
|---|---|---|---|




30MHz~3GHz

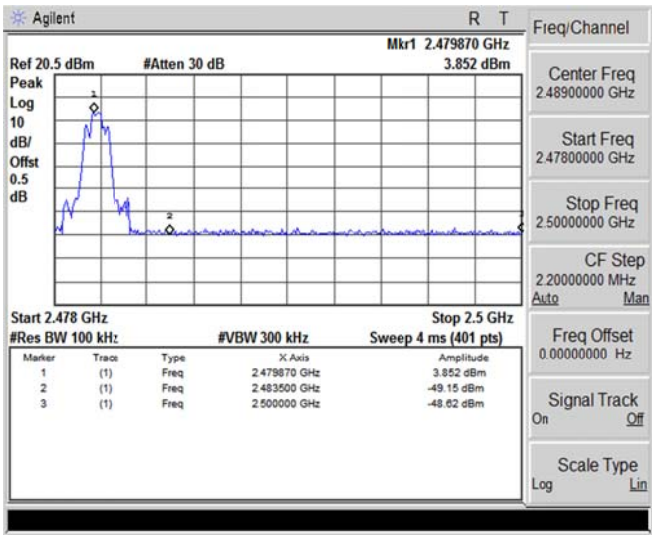



3GHz~15GHz

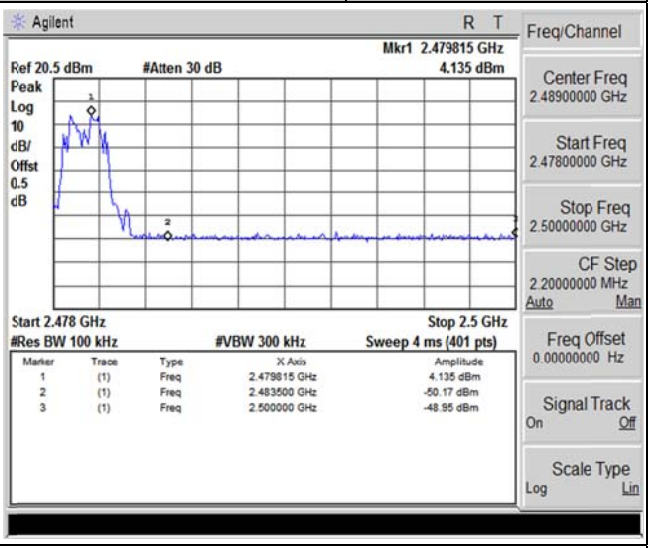



15GHz~26.5GHz

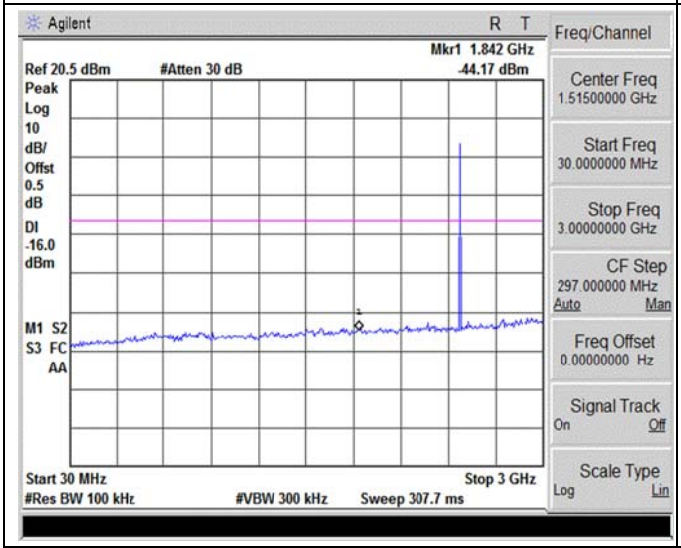
| Modulaiton: | 8DPSK | Test channel: | 78 |
|---|---|---|---|



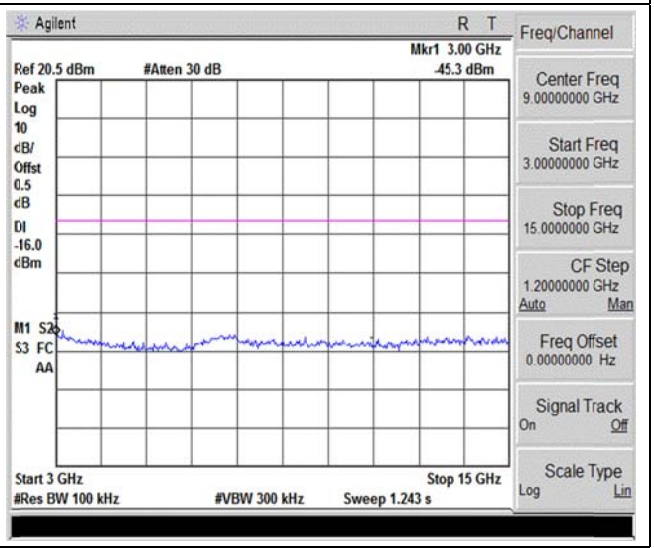

Bandedge- no hopping mode



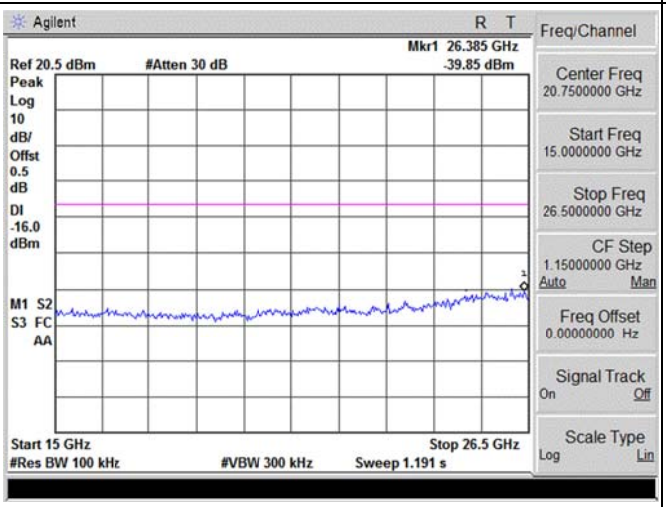

Bandedge- hopping mode




30MHz~3GHz




3GHz~15GHz




15GHz~26.5GHz

## 4.11. Spurious Emission (radiated)

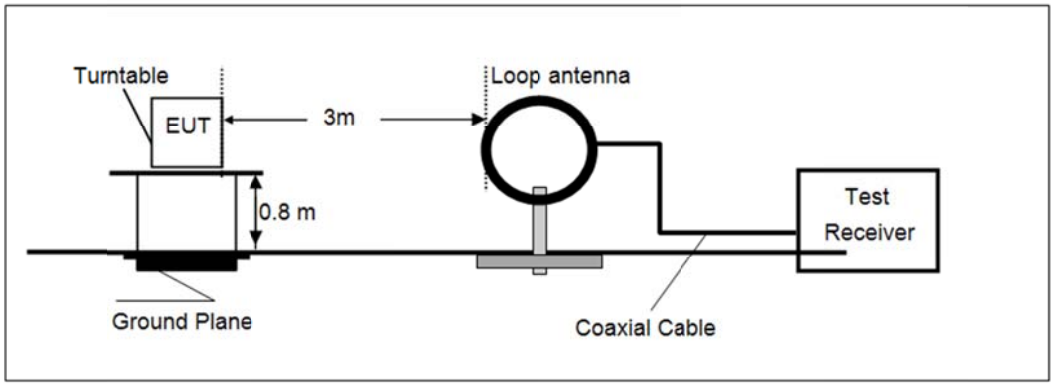
**LIMIT**

FCC CFR Title 47 Part 15 Subpart C Section 15.209

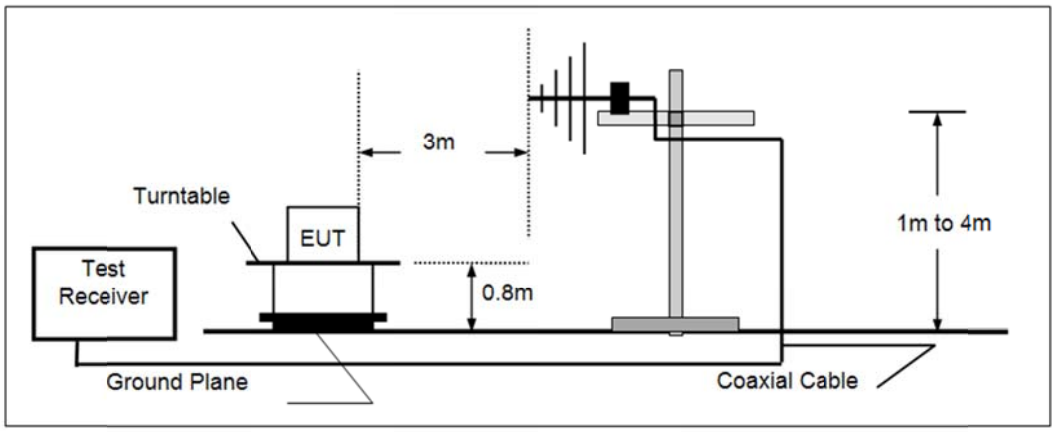
| Frequency | Limit (dBuV/m @3m) | Value |
|---|---|---|
| 30MHz-88MHz | 40.00 | Quasi-peak |
| 88MHz-216MHz | 43.50 | Quasi-peak |
| 216MHz-960MHz | 46.00 | Quasi-peak |
| 960MHz-1GHz | 54.00 | Quasi-peak |
| Above 1GHz | 54.00 | Average |
| | 74.00 | Peak |

**TEST CONFIGURATION**

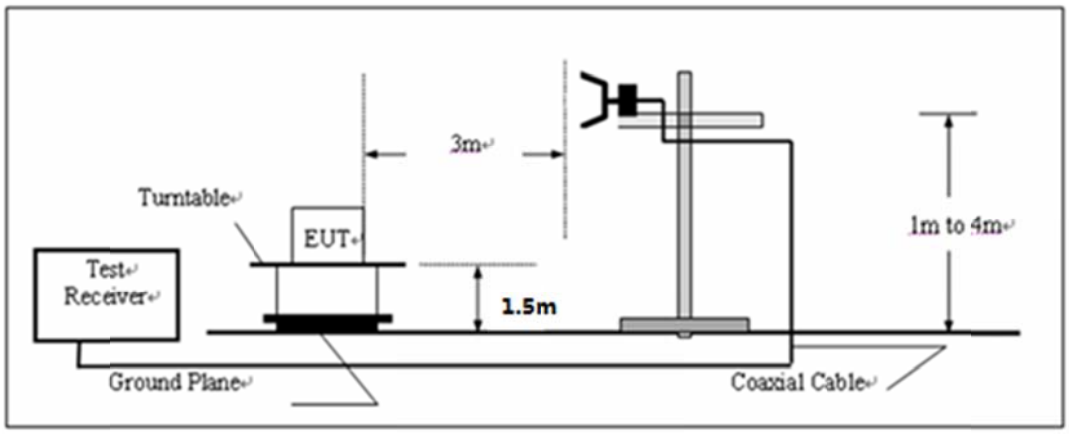
◆ Below 30MHz




◆ 30MHz~1000MHz




◆ Above 1GHz



**TEST PROCEDURE**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings
   a) Span shall wide enough to fully capture the emission being measured;
   b) Below 1GHz, RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;
   *If the emission level of the EUT measured by the peak detector is 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.*
   c) Above 1GHz, RBW=1MHz, VBW=3MHz for Peak value
   RBW=1MHz, VBW=10Hz for Average value.

**TEST RESULTS**

*Noted:*
*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.*

**Measurement data:**

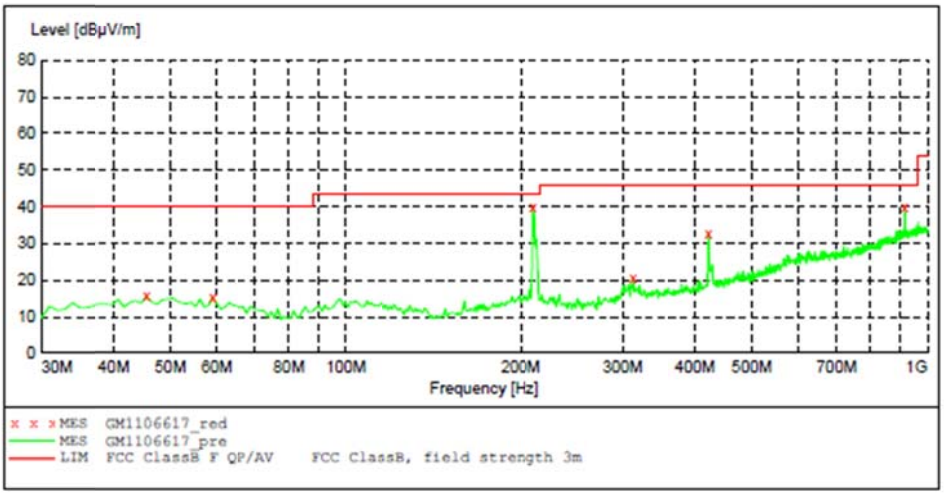
■ **9kHz ~ 30MHz**

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

■ **30MHz ~ 1GHz**

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.2 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 2014 |



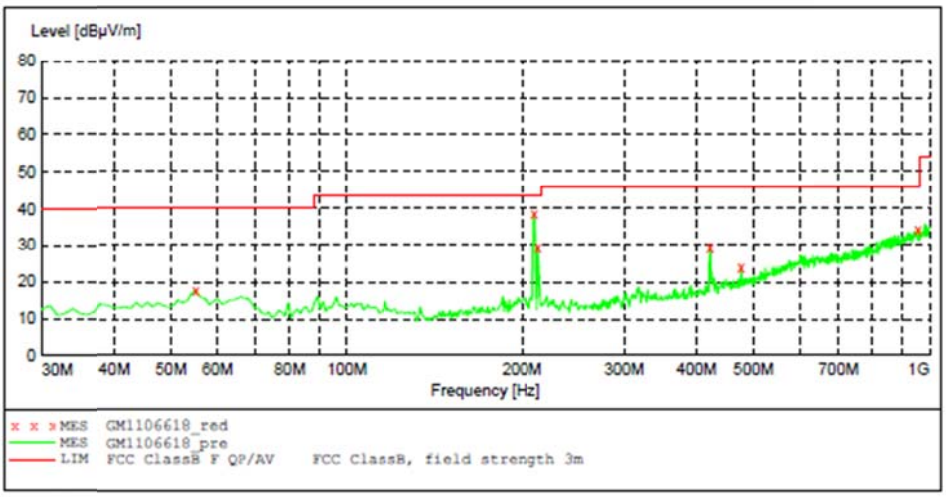

***MEASUREMENT RESULT: "GM1106617_red"***

11/6/2015 10:50AM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 45.520000 | 15.60 | -14.7 | 40.0 | 24.4 | QP | 300.0 | 173.00 | HORIZONTAL |
| 59.100000 | 15.40 | -14.8 | 40.0 | 24.6 | QP | 300.0 | 360.00 | HORIZONTAL |
| 210.420000 | 39.70 | -14.0 | 43.5 | 3.8 | QP | 100.0 | 108.00 | HORIZONTAL |
| 312.270000 | 20.60 | -13.3 | 46.0 | 25.4 | QP | 100.0 | 287.00 | HORIZONTAL |
| 421.860000 | 32.70 | -10.0 | 46.0 | 13.3 | QP | 100.0 | 228.00 | HORIZONTAL |
| 914.640000 | 39.70 | 3.0 | 46.0 | 6.3 | QP | 300.0 | 13.00 | HORIZONTAL |

***SWEEP TABLE: "test (30M-1G)"***

| Short Description: | | | Field Strength | | |
|---|---|---|---|---|---|
| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
| 30.0 MHz | 1.2 GHz | MaxPeak | Coupled | 100 kHz | VULB9163 2014 |




***MEASUREMENT RESULT: "GM1106618_red"***

11/6/2015 10:54AM

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Det. | Height cm | Azimuth deg | Polarization |
|---|---|---|---|---|---|---|---|---|
| 55.220000 | 17.70 | -14.6 | 40.0 | 22.3 | QP | 100.0 | 297.00 | VERTICAL |
| 210.420000 | 38.60 | -14.0 | 43.5 | 4.9 | QP | 100.0 | 175.00 | VERTICAL |
| 213.330000 | 29.30 | -14.1 | 43.5 | 14.2 | QP | 100.0 | 277.00 | VERTICAL |
| 421.860000 | 29.10 | -10.0 | 46.0 | 16.9 | QP | 100.0 | 277.00 | VERTICAL |
| 476.200000 | 24.00 | -8.1 | 46.0 | 22.0 | QP | 100.0 | 297.00 | VERTICAL |
| 956.350000 | 34.10 | 3.8 | 46.0 | 11.9 | QP | 100.0 | 196.00 | VERTICAL |

■ **Above 1GHz**

| CH00 for GFSK | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin Limit (dB) | Polarization | Test value |
| 4804.00 | 38.37 | 31.28 | 5.66 | 35.29 | 40.02 | 74.00 | -33.98 | Vertical | Peak |
| 7206.00 | 36.84 | 36.22 | 6.87 | 35.15 | 44.78 | 74.00 | -29.22 | Vertical | |
| 9608.00 | 36.95 | 37.85 | 8.80 | 35.55 | 48.05 | 74.00 | -25.95 | Vertical | |
| 12010.00 | * | | | | | | | Vertical | |
| 4804.00 | 38.60 | 31.28 | 5.66 | 35.29 | 40.25 | 74.00 | -33.75 | Horizontal | |
| 7206.00 | 37.39 | 36.22 | 6.87 | 35.15 | 45.33 | 74.00 | -28.67 | Horizontal | |
| 9608.00 | 36.74 | 37.85 | 8.80 | 35.55 | 47.84 | 74.00 | -26.16 | Horizontal | |
| 12010.00 | * | | | | | | | Horizontal | |
| 4804.00 | 32.93 | 31.28 | 5.66 | 35.29 | 34.58 | 54.00 | -19.42 | Vertical | Average |
| 7206.00 | 28.65 | 36.22 | 6.87 | 35.15 | 36.59 | 54.00 | -17.41 | Vertical | |
| 9608.00 | 26.76 | 37.85 | 8.80 | 35.55 | 37.86 | 54.00 | -16.14 | Vertical | |
| 12010.00 | * | | | | | | | Vertical | |
| 4804.00 | 33.07 | 31.28 | 5.66 | 35.29 | 34.72 | 54.00 | -19.28 | Horizontal | |
| 7206.00 | 29.00 | 36.22 | 6.87 | 35.15 | 36.94 | 54.00 | -17.06 | Horizontal | |
| 9608.00 | 26.75 | 37.85 | 8.80 | 35.55 | 37.85 | 54.00 | -16.15 | Horizontal | |
| 12010.00 | * | | | | | | | Horizontal | |

| CH39 for GFSK | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin Limit (dB) | Polarization | Test value |
| 4882.00 | 39.94 | 30.88 | 5.70 | 35.27 | 41.25 | 74.00 | -32.75 | Vertical | Peak |
| 7323.00 | 37.29 | 35.82 | 6.91 | 35.13 | 44.89 | 74.00 | -29.11 | Vertical | |
| 9764.00 | 37.76 | 37.45 | 8.84 | 35.53 | 48.52 | 74.00 | -25.48 | Vertical | |
| 12205.00 | * | | | | | | | Vertical | |
| 4882.00 | 39.44 | 30.88 | 5.70 | 35.27 | 40.75 | 74.00 | -33.25 | Horizontal | |
| 7323.00 | 38.08 | 35.82 | 6.91 | 35.13 | 45.68 | 74.00 | -28.32 | Horizontal | |
| 9764.00 | 37.71 | 37.45 | 8.84 | 35.53 | 48.47 | 74.00 | -25.53 | Horizontal | |
| 12205.00 | * | | | | | | | Horizontal | |
| 4882.00 | 33.44 | 30.88 | 5.70 | 35.27 | 34.75 | 54.00 | -19.25 | Vertical | Average |
| 7323.00 | 29.29 | 35.82 | 6.91 | 35.13 | 36.89 | 54.00 | -17.11 | Vertical | |
| 9764.00 | 27.12 | 37.45 | 8.84 | 35.53 | 37.88 | 54.00 | -16.12 | Vertical | |
| 12205.00 | * | | | | | | | Vertical | |
| 4882.00 | 33.66 | 30.88 | 5.70 | 35.27 | 34.97 | 54.00 | -19.03 | Horizontal | |
| 7323.00 | 29.15 | 35.82 | 6.91 | 35.13 | 36.75 | 54.00 | -17.25 | Horizontal | |
| 9764.00 | 27.70 | 37.45 | 8.84 | 35.53 | 38.46 | 54.00 | -15.54 | Horizontal | |
| 12205.00 | * | | | | | | | Horizontal | |

*Remark:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means 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.*

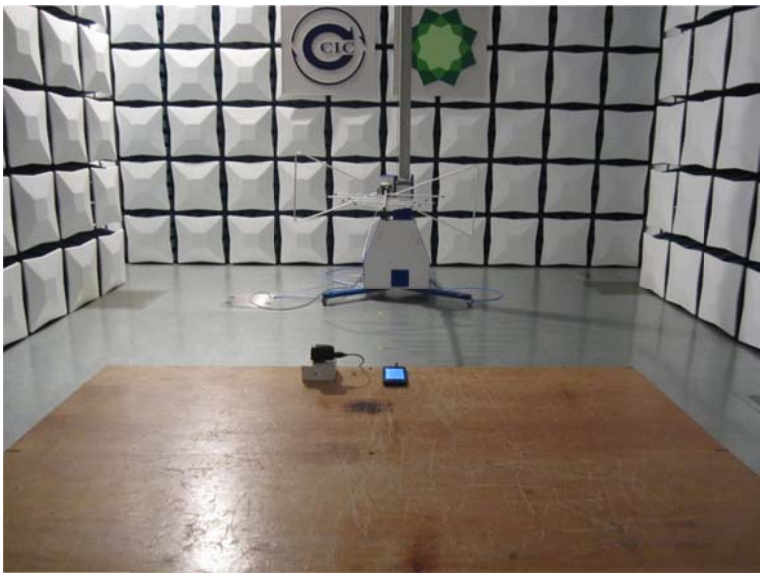
| CH78 for GFSK | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Margin Limit (dB) | Polarization | Test value |
| 4960.00 | 39.29 | 30.98 | 5.73 | 35.32 | 40.68 | 74.00 | -33.32 | Vertical | Peak |
| 7440.00 | 36.90 | 35.92 | 6.94 | 35.18 | 44.58 | 74.00 | -29.42 | Vertical | |
| 9920.00 | 37.05 | 37.55 | 8.87 | 35.58 | 47.89 | 74.00 | -26.11 | Vertical | |
| 12400.00 | * | | | | | | | Vertical | |
| 4960.00 | 38.86 | 30.98 | 5.73 | 35.32 | 40.25 | 74.00 | -33.75 | Horizontal | |
| 7440.00 | 37.06 | 35.92 | 6.94 | 35.18 | 44.74 | 74.00 | -29.26 | Horizontal | |
| 9920.00 | 36.84 | 37.55 | 8.87 | 35.58 | 47.68 | 74.00 | -26.32 | Horizontal | |
| 12400.00 | * | | | | | | | Horizontal | |
| 4960.00 | 33.18 | 30.98 | 5.73 | 35.32 | 34.57 | 54.00 | -19.43 | Vertical | Average |
| 7440.00 | 29.27 | 35.92 | 6.94 | 35.18 | 36.95 | 54.00 | -17.05 | Vertical | |
| 9920.00 | 26.98 | 37.55 | 8.87 | 35.58 | 37.82 | 54.00 | -16.18 | Vertical | |
| 12400.00 | * | | | | | | | Vertical | |
| 4960.00 | 33.55 | 30.98 | 5.73 | 35.32 | 34.94 | 54.00 | -19.06 | Horizontal | |
| 7440.00 | 29.34 | 35.92 | 6.94 | 35.18 | 37.02 | 54.00 | -16.98 | Horizontal | |
| 9920.00 | 27.75 | 37.55 | 8.87 | 35.58 | 38.59 | 54.00 | -15.41 | Horizontal | |
| 12400.00 | * | | | | | | | Horizontal | |

*Remark:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means 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.*

# 5. Test Setup Photos of the EUT

Radiated Emission



Conducted Emission (AC Mains)

## 6. External and Internal Photos of the EUT

*Reference to Test Report TRE1510017001*

.....End of Report.....