# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C
## INDUSTRY CANADA RSS-247

| | |
|---|---|
| **Test Standard** | **FCC Part 15.247 and IC RSS-247 issue 2** |
| **FCC ID** | **PPQ-WCBN3507R** |
| **ISED No.** | **4491A-WCBN3507R** |
| **Product name** | **802.11a/b/g/n/ac 2Tx2R+BT V4.2LE USB Combo Module** |
| **Brand Name** | **LITE-ON** |
| **Model No.** | **WCBN3507R** |
| **Test Result** | **Pass** |

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.
The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.( Wugu Laboratory)

Testing Laboratory
1309

*Approved by:*

Sam Chuang
Manager

*Reviewed by:*

Jerry Chuang
Engineer


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| 00 | December 7, 2017 | Initial Issue | May Lin |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# Table of contents

1. GENERAL INFORMATION ..... 4
1.1 EUT INFORMATION ..... 4
1.2 EUT CHANNEL INFORMATION ..... 5
1.3 ANTENNA INFORMATION ..... 5
1.4 MEASUREMENT UNCERTAINTY ..... 6
1.5 FACILITIES AND TEST LOCATION ..... 7
1.6 INSTRUMENT CALIBRATION ..... 7
1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT ..... 8
1.8 TEST METHODOLOGY AND APPLIED STANDARDS ..... 8
2. TEST SUMMERY ..... 9
3. DESCRIPTION OF TEST MODES ..... 10
3.1 THE WORST MODE OF OPERATING CONDITION ..... 10
3.2 THE WORST MODE OF MEASUREMENT ..... 11
3.3 EUT DUTY CYCLE ..... 12
4. TEST RESULT ..... 13
4.1 AC POWER LINE CONDUCTED EMISSION ..... 13
4.2 20DB BANDWIDTH AND OCCUPIED BANDWIDTH (99%) ..... 16
4.3 OUTPUT POWER MEASUREMENT ..... 19
4.4 FREQUENCY SEPARATION ..... 21
4.5 NUMBER OF HOPPING ..... 24
4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION ..... 26
4.7 TIME OF OCCUPANCY (DWELL TIME) ..... 31
4.8 RADIATION BANDEDGE AND SPURIOUS EMISSION ..... 33
APPENDIX 1 - PHOTOGRAPHS OF EUT


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 1. GENERAL INFORMATION

## 1.1 EUT INFORMATION

| | |
|---|---|
| Applicant | LITE-ON Technology Corp.<br>Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C |
| Manufacturer | LITE-ON TECHNOLOGY (Changzhou) CO., LTD<br>A9 Building,No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone ,Changzhou City,Jiangsu Province 213100 China |
| Equipment | 802.11a/b/g/n/ac 2Tx2R+BT V4.2LE USB Combo Module |
| Model No. | WCBN3507R |
| Model Discrepancy | N/A |
| Trade Name | LITE-ON |
| Received Date | November 29, 2017 |
| Date of Test | December 1 ~ 4, 2017 |
| Output Power (W) | GFSK : 0.01028<br>8DPSK : 0.01059 |
| Power Operation | Powered from host device: DC 5V |
| HW Version | V01 |
| FW Version | JEDI.MT76x2 |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## 1.2 EUT CHANNEL INFORMATION

| | |
|---|---|
| Frequency Range | 2402MHz-2480MHz |
| Modulation Type | 1. GFSK for BDR-1Mbps<br>2. π/4-DQPSK for EDR-2Mbps<br>3. 8DPSK for EDR-3Mbps |
| Number of channel | 79 Channels |

**Remark:**
Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 and RSS-GEN Table A1 for test channels

| Number of frequencies to be tested | | |
|---|---|---|
| **Frequency range in which device operates** | **Number of frequencies** | **Location in frequency range of operation** |
| ☐ 1 MHz or less | 1 | Middle |
| ☐ 1 MHz to 10 MHz | 2 | 1 near top and 1 near bottom |
| ☒ More than 10 MHz | 3 | 1 near top, 1 near middle, and 1 near bottom |

## 1.3 ANTENNA INFORMATION

| | |
|---|---|
| **Antenna Type** | ☒ PIFA<br>☐ PCB<br>☐ Dipole<br>☐ Coils |
| **Antenna Gain** | |

| Brand | P/N | Type | Cable length | Peak Gain | Worst case |
|---|---|---|---|---|---|
| HongBo | 290-10569 | PIFA | 300mm | 3.74dBi | V |

*1. Power Directional Gain: 3.74*
*2. Power Density Directional Gain: 3.74*

**Other antenna information:**

| Brand | P/N | Type | Cable length | Peak Gain |
|---|---|---|---|---|
| HongBo | 290-10310 | PIFA | 500mm | 3.60dBi |
| Walsin | RFMTA401032IMLB702 | PIFA | 320mm | 2.6dBi |
| Walsin | RFMTA401080IMLB701 | PIFA | 800mm | 1.72dBi |
| Walsin | RFMTA401082IMLB701 | PIFA | 820mm | 1.62dBi |

***Notes:***
*1. Power Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))*
*2. Power Density Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))+10log(NTX/NSS)*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 1.4 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| AC Powerline Conducted Emission | +/- 1.2575 |
| Emission bandwidth, 20dB bandwidth | +/- 1.4003 |
| RF output power, conducted | +/- 1.1372 |
| Power density, conducted | +/- 1.4003 |
| 3M Semi Anechoic Chamber / 30M~200M | +/- 4.0138 |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483 |
| 3M Semi Anechoic Chamber / 1G~8G | +/- 2.5975 |
| 3M Semi Anechoic Chamber / 8G~18G | +/- 2.6112 |
| 3M Semi Anechoic Chamber / 18G~26G | +/- 2.7389 |
| 3M Semi Anechoic Chamber / 26G~40G | +/- 2.9683 |
| 3M Semi Anechoic Chamber / 40G~60G | +/- 1.8509 |
| 3M Semi Anechoic Chamber / 60G~75G | +/- 1.9869 |
| 3M Semi Anechoic Chamber / 75G~110G | +/- 2.9651 |
| 3M Semi Anechoic Chamber / 110G~170G | +/- 2.7807 |
| 3M Semi Anechoic Chamber / 170G~220G | +/- 3.6437 |
| 3M Semi Anechoic Chamber / 220G~325G | +/- 4.2982 |

***Remark**:*
*1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2*
*2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

*No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)*

| Test site | Test Engineer | Remark |
|---|---|---|
| AC Conduction Room | Eric Lee | |
| Radiation | Jerry Chuang | |
| RF Conducted | Jerry Chuang | |

***Remark:*** *The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.*

# 1.6 INSTRUMENT CALIBRATION

| RF Conducted Test Site | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Power Meter | Anritsu | ML2495A | 1033009 | 04/11/2017 | 04/10/2018 |
| Power Sensor | Anritsu | MA2411B | 917072 | 07/03/2017 | 07/02/2018 |
| Spectrum Analyzer | R&S | FSV 40 | 101073 | 10/02/2017 | 10/01/2018 |
| Thermostatic/Hrgrosatic Chamber | GWINSTEK | GTC-288MH-CC | TH160402 | 05/23/2017 | 05/22/2018 |
| Directional Coupler | Agilent | 87301D | MY44350252 | 07/25/2017 | 07/24/2018 |
| SUCOFLEX Cable | HUBER SUHNER | SUCOFLEX 104PEA | 25157 | 07/31/2017 | 07/30/2018 |
| Divider | Solvang Technology | 2-18GHz 4Way | STI08-0015 | 07/26/2017 | 07/25/2018 |

| Wugu 966 Chamber A | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Bilog Antenna | Sunol Sciences | JB3 | A030105 | 06/20/2017 | 06/19/2018 |
| Horn Antenna | EMCO | 3117 | 00055165 | 02/20/2017 | 02/19/2018 |
| Pre-Amplifier | EMCI | EMC 012635 | 980151 | 08/01/2017 | 07/31/2018 |
| Pre-Amplifier | EMEC | EM330 | 060609 | 06/07/2017 | 06/06/2018 |
| Spectrum Analyzer | Agilent | E4446A | US42510252 | 11/26/2017 | 11/25/2018 |
| Antenna Tower | CCS | CC-A-1F | N/A | N.C.R | N.C.R |
| Controller | CCS | CC-C-1F | N/A | N.C.R | N.C.R |
| Turn Table | CCS | CC-T-1F | N/A | N.C.R | N.C.R |

| Conducted Emission Room # B | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| LISN | R&S | ENV216 | 101054 | 05/18/2017 | 05/17/2018 |
| LISN | SCHWARZBECK | NSLK 8127 | 8127-541 | 02/14/2017 | 02/13/2018 |
| EMI Test Receiver | R&S | ESCI | 100064 | 05/17/2017 | 05/16/2018 |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

| EUT Accessories Equipment | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **Series No.** | **FCC ID** |
| | N/A | | | | |

| Support Equipment | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **Series No.** | **BSMI ID** |
| 1 | NB(H) | Acer | Aspire 4320 series | N/A | QDS-BRCM1018 |

## 1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, RSS-247 Issue 2 and RSS-GEN Issue 4.


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 2. TEST SUMMERY

| FCC Standard Section | IC Standard Section | Report Section | Test Item | Result |
|---|---|---|---|---|
| 15.203 | - | 1.2 | Antenna Requirement | Pass |
| 15.207(a) | RSS-GEN 8.8 | 4.1 | AC Conducted Emission | Pass |
| 15.247(a)(1) | RSS-247(5.1)(a) | 4.2 | 20 dB Bandwidth | - |
| - | RSS-GEN 6.6 | 4.2 | Occupied Bandwidth (99%) | - |
| 15.247(b)(1) | RSS-247(5.4)(b) | 4.3 | Output Power Measurement | Pass |
| 15.247(a)(1) | RSS-247(5.1)(b) | 4.4 | Frequency Separation | Pass |
| 15.247(a)(1)(iii) | RSS-247(5.1)(d) | 4.5 | Number of Hopping | Pass |
| 15.247(d) | RSS-247(5.5) | 4.6 | Conducted Band Edge | Pass |
| 15.247(d) | RSS-247(5.5) | 4.6 | Conducted Emission | Pass |
| 15.247(a)(1)(iii) | RSS-247(5.1)(d) | 4.7 | Time of Occupancy | Pass |
| 15.247(d) | RSS-GEN 8.9, 8.10 | 4.8 | Radiation Band Edge | Pass |
| 15.247(d) | RSS-GEN 8.9, 8.10 | 4.8 | Radiation Spurious Emission | Pass |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 3. DESCRIPTION OF TEST MODES

## 3.1 THE WORST MODE OF OPERATING CONDITION

| | |
|---|---|
| Operation mode | GFSK for BDR-1Mbps (DH5)<br>8DPSK for EDR-3Mbps (DH5) |
| Test Channel Frequencies | **GFSK for BDR-1Mbps:**<br>1.Lowest Channel : 2402MHz<br>2.Middle Channel : 2441MHz<br>3.Highest Channel : 2480MHz<br>**8DPSK for EDR-3Mbps:**<br>1.Lowest Channel : 2402MHz<br>2.Middle Channel : 2441MHz<br>3.Highest Channel : 2480MHz |

*Remark:*
*1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## 3.2 THE WORST MODE OF MEASUREMENT

| AC Power Line Conducted Emission | |
|---|---|
| Test Condition | AC Power line conducted emission for line and neutral |
| Voltage/Hz | DC 5V |
| Test Mode | Mode 1: EUT power by Host System. |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

| Radiated Emission Measurement Below 1G | |
|---|---|
| Test Condition | Radiated Emission Below 1G |
| Voltage/Hz | DC 5V |
| Test Mode | Mode 1: EUT power by host system. |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

| Radiated Emission Measurement Above 1G | |
|---|---|
| Test Condition | Band edge, Emission for Unwanted and Fundamental |
| Voltage/Hz | DC 5V |
| Test Mode | Mode 1: EUT power by Host System |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |
| Worst Position | ☐ Placed in fixed position.<br>☐ Placed in fixed position at X-Plane (E2-Plane)<br>☐ Placed in fixed position at Y-Plane (E1-Plane)<br>☒ Placed in fixed position at Z-Plane (H-Plane) |
| Worst Polarity | ☐ Horizontal ☒ Vertical |

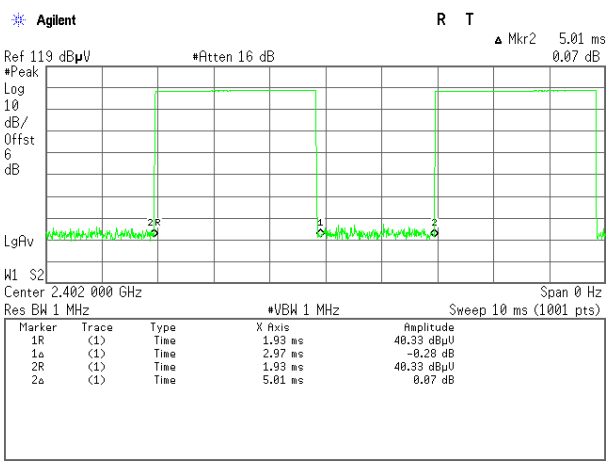
*Remark:*
*1. The worst mode was record in this test report.*
*2. EUT pre-scanned in three axis, X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Z-Plane and Vertical) were recorded in this report*
*3. For below 1G, AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

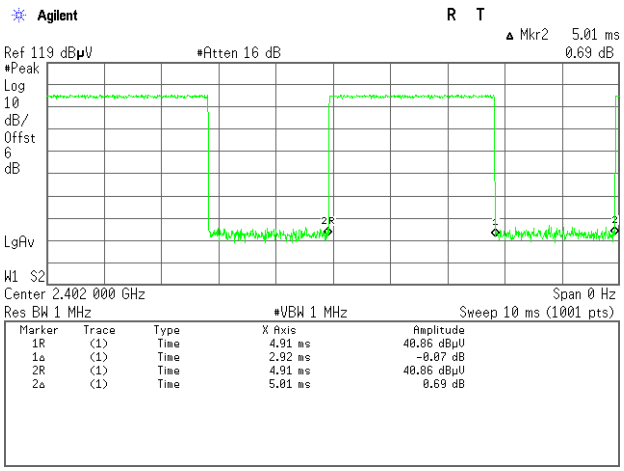
# 3.3 EUT DUTY CYCLE

| Duty Cycle | | | | |
|---|---|---|---|---|
| Configuration | TX ON (ms) | TX ALL (ms) | Duty Cycle (%) | Duty Factor(dB) |
| BDR-1Mbps | 2.9700 | 5.0100 | 59.28% | 2.27 |
| EDR-3Mbps | 2.9200 | 5.0100 | 58.28% | 2.34 |

BDR-1Mbps




EDR-3Mbps





*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 4. TEST RESULT

## 4.1 AC POWER LINE CONDUCTED EMISSION

### 4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

| Frequency Range (MHz) | Limits(dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56* | 56 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

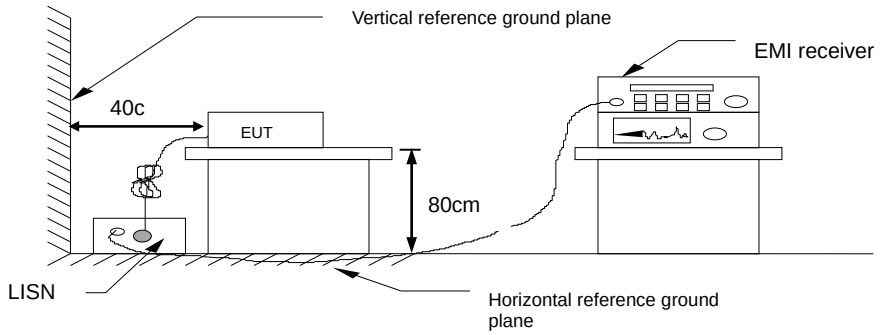
* Decreases with the logarithm of the frequency.

### 4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

### 4.1.3 Test Setup



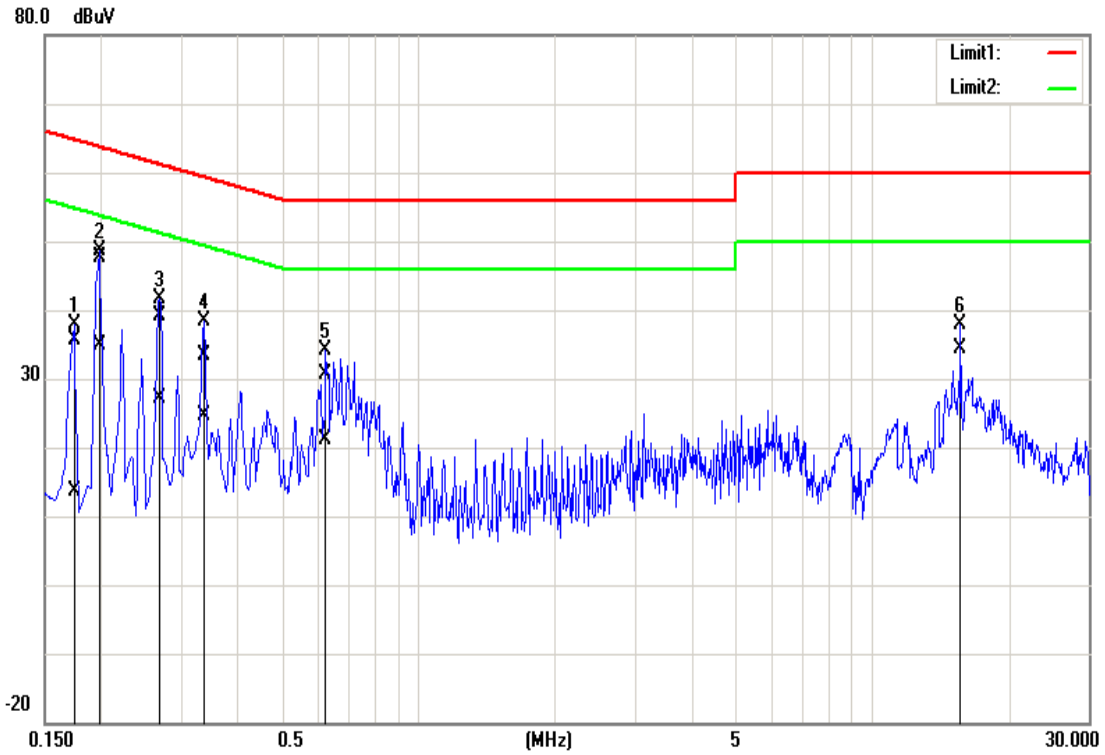

### 4.1.4 Test Result

**PASS**


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## Test Data

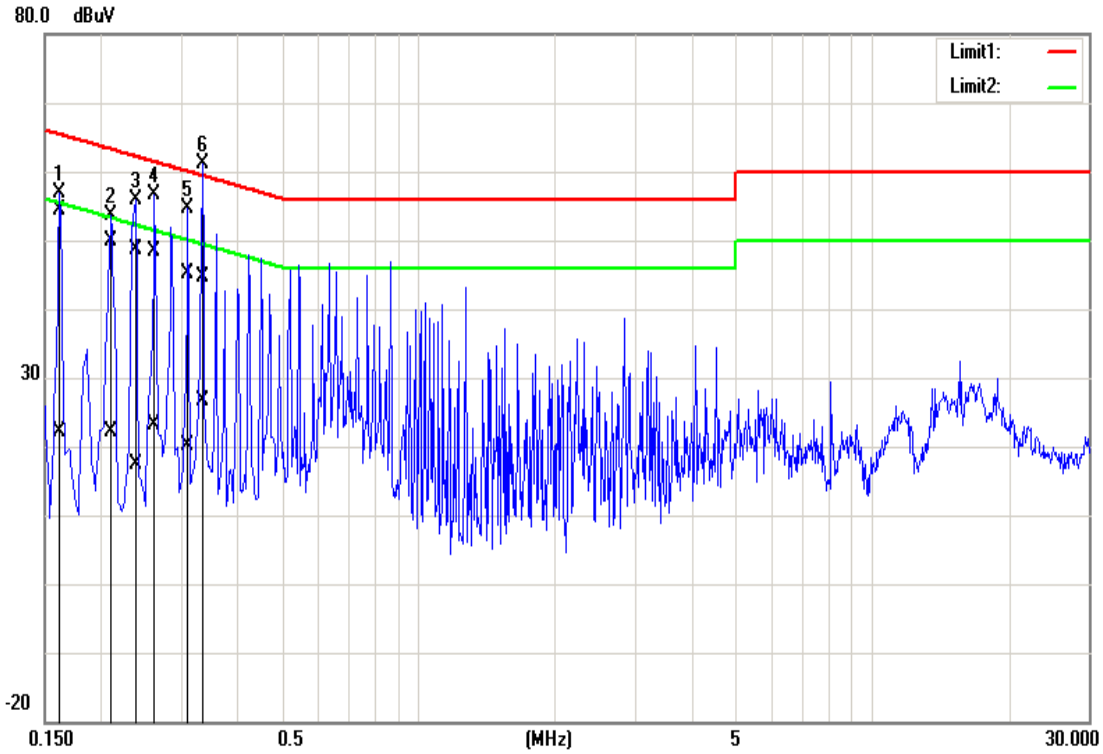
| | | | |
|---|---|---|---|
| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date | December 1, 2017 |
| Phase: | Line | Test Engineer | Eric Lee |




| Frequency (MHz) | Quasi Peak reading (dBuV) | Average reading (d uV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.1740 | 35.69 | 13.64 | 0.05 | 35.74 | 13.69 | 64.77 | 54.77 | -29.03 | -41.08 | Pass |
| 0.1980 | 47.55 | 34.77 | 0.05 | 47.60 | 34.82 | 63.69 | 53.69 | -16.09 | -18.87 | Pass |
| 0.2700 | 39.17 | 26.98 | 0.05 | 39.22 | 27.03 | 61.12 | 51.12 | -21.90 | -24.09 | Pass |
| 0.3380 | 33.35 | 24.53 | 0.05 | 33.40 | 24.58 | 59.25 | 49.25 | -25.85 | -24.67 | Pass |
| 0.6260 | 30.52 | 21.14 | 0.06 | 30.58 | 21.20 | 56.00 | 46.00 | -25.42 | -24.80 | Pass |
| 15.7100 | 37.66 | 34.16 | 0.24 | 37.90 | 34.40 | 60.00 | 50.00 | -22.10 | -15.60 | Pass |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
| Test Voltage: | 120Vac / 60Hz | Test Date | December 1, 2017 |
| Phase: | Neutral | Test Engineer | Eric Lee |




| Frequency (MHz) | Quasi Peak reading dBuV) | Average reading (dBuV) | Correction factor (dB) | Quasi Peak result (dBuV) | Average result (dBuV) | Quasi Peak limit (dBuV) | Average limit (dBuV) | Quasi Peak margin (dB) | Average margin (dB) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.1620 | 54.20 | 21.98 | 0.12 | 54.32 | 22.10 | 65.36 | 55.36 | -11.04 | -33.26 | Pass |
| 0.2100 | 49.73 | 22.12 | 0.12 | 49.85 | 22.24 | 63.21 | 53.21 | -13.36 | -30.97 | Pass |
| 0.2380 | 48.47 | 17.15 | 0.12 | 48.59 | 17.27 | 62.17 | 52.17 | -13.58 | -34.90 | Pass |
| 0.2620 | 48.27 | 23.03 | 0.12 | 48.39 | 23.15 | 61.37 | 51.37 | -12.98 | -28.22 | Pass |
| 0.3100 | 45.10 | 19.92 | 0.13 | 45.23 | 20.05 | 59.97 | 49.97 | -14.74 | -29.92 | Pass |
| 0.3340 | 44.47 | 26.57 | 0.13 | 44.60 | 26.70 | 59.35 | 49.35 | -14.75 | -22.65 | Pass |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 4.2 20DB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

## 4.2.1 Test Limit

According to §15.247(a) (1), RSS-247 section 5.1(a) and RSS-GEN 6.6,

**20 dB Bandwidth** ：For reporting purposes only.

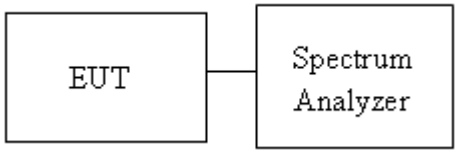
**Occupied Bandwidth(99%)** ：For reporting purposes only.

## 4.2.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 11.8.1,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 30kHz, VBW = 100kHz and Detector = Peak, to measurement 20 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.

## 4.2.3 Test Setup




## 4.2.4 Test Result

| Test mode: GFSK_BDR-1Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 0.8986 | 1.0304 |
| Mid | 2441 | 0.8943 | 0.9695 |
| High | 2480 | 0.8943 | 1.0260 |

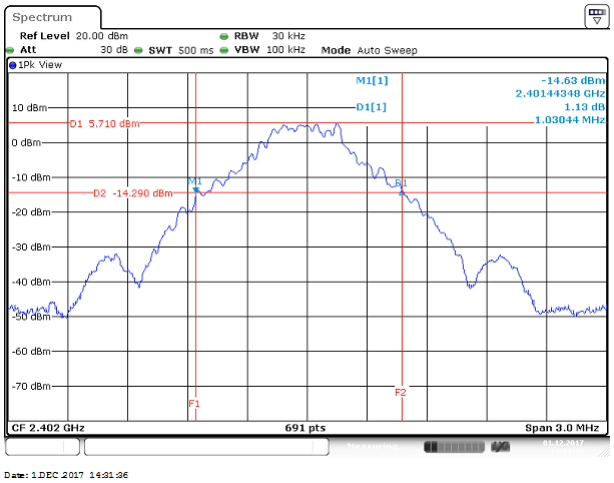
| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 1.1808 | 1.2913 |
| Mid | 2441 | 1.1765 | 1.2913 |
| High | 2480 | 1.1765 | 1.2913 |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

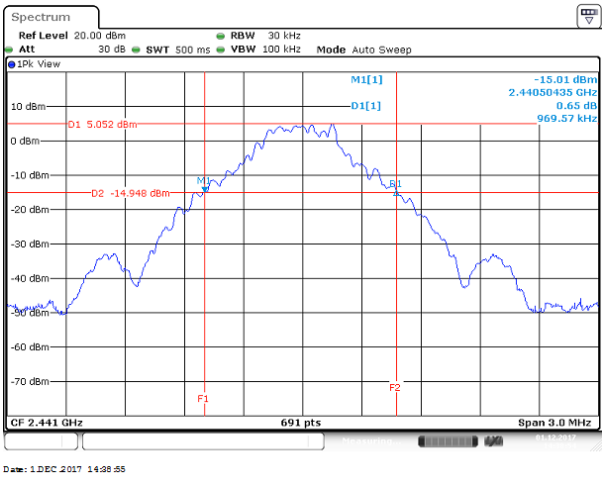
# Test Data

## GFSK_BDR-1Mbps mode

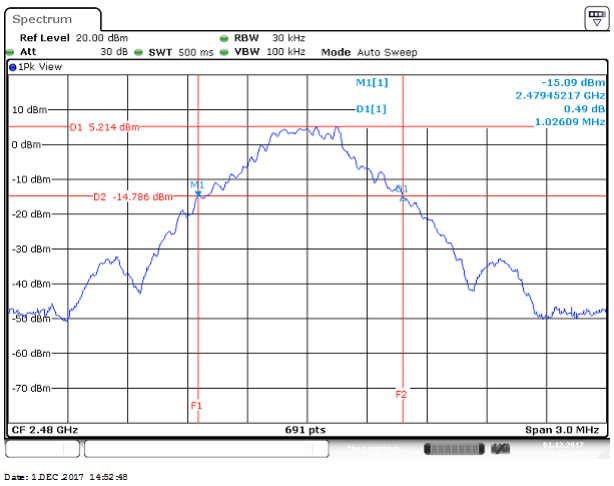
### Low CH




### Mid CH




### High CH

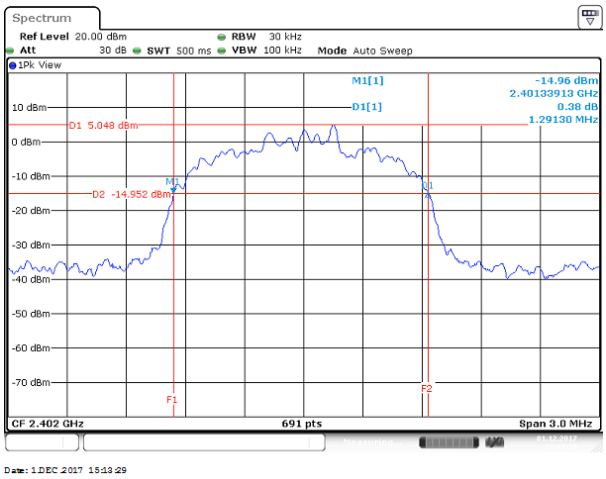




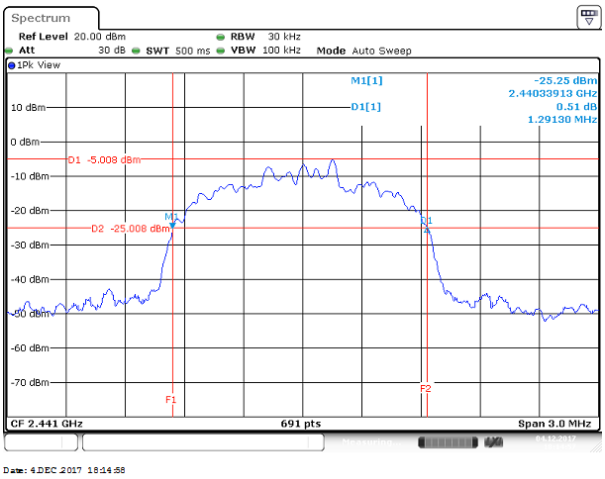
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## 8DPSK_EDR-3Mbps mode

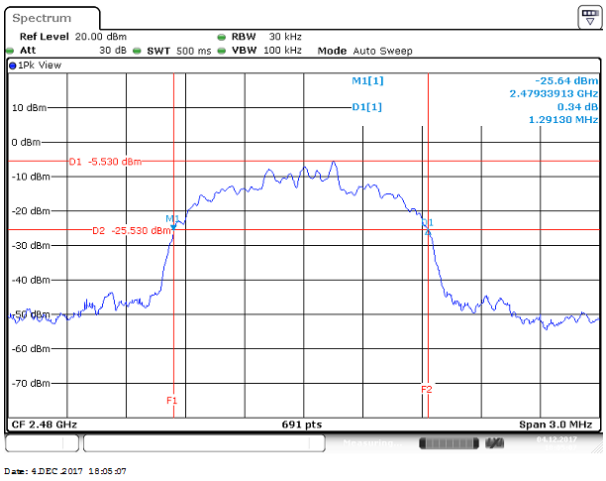
### Low CH




### Mid CH




### High CH





This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

# 4.3 OUTPUT POWER MEASUREMENT

## 4.3.1 Test Limit

According to §15.247(a)(1) and RSS-247 section 5.4(b)

**Peak output power**：

**FCC**

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.

**IC**

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels.

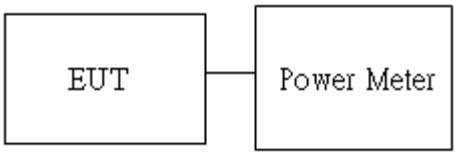
| | |
|---|---|
| Limit | ☒ Antenna not exceed 6 dBi：21dBm<br>☐ Antenna with DG greater than 6 dBi：21dBm<br>[ Limit = 30 – (DG – 6)] |

**Average output power**：For reporting purposes only.

## 4.3.2 Test Procedure

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

## 4.3.3 Test Setup





This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## 4.3.4 Test Result

**Peak output power**：

**For GFSK / DH5**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2402 | 10.12 | ***0.01028** | 0.125 | PASS |
| Mid | 2441 | 9.49 | 0.00889 | | PASS |
| High | 2480 | 9.63 | 0.00918 | | PASS |

**For 8DPSK / DH5**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---|---|---|---|---|---|
| Low | 2402 | 10.25 | ***0.01059** | 0.125 | PASS |
| Mid | 2441 | 9.72 | 0.00938 | | PASS |
| High | 2480 | 9.82 | 0.00959 | | PASS |

**Average output power**：

**For GFSK / DH5**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | EIRP Power (dBm) | EIRP Power (W) |
|---|---|---|---|---|---|
| Low | 2402 | 7.89 | 0.00615 | 13.91 | 0.02460 |
| Mid | 2441 | 7.23 | 0.00528 | 13.25 | 0.02113 |
| High | 2480 | 7.22 | 0.00527 | 13.24 | 0.02109 |

**For 8DPSK / DH5**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | EIRP Power (dBm) | EIRP Power (W) |
|---|---|---|---|---|---|
| Low | 2402 | 5.96 | 0.00394 | 11.99 | 0.01581 |
| Mid | 2441 | 5.18 | 0.00330 | 11.21 | 0.01321 |
| High | 2480 | 5.35 | 0.00343 | 11.38 | 0.01374 |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 4.4 FREQUENCY SEPARATION

## 4.4.1 Test Limit

According to §15.247(a)(1) and RSS-247 section 5.1(b)

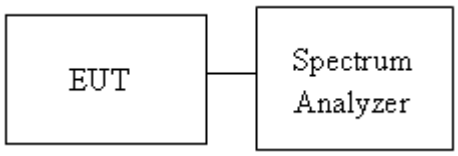
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

| | |
|---|---|
| Limit | > two-thirds of the 20 dB bandwidth |

## 4.4.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto. Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency

## 4.4.3 Test Setup




## 4.4.4 Test Result

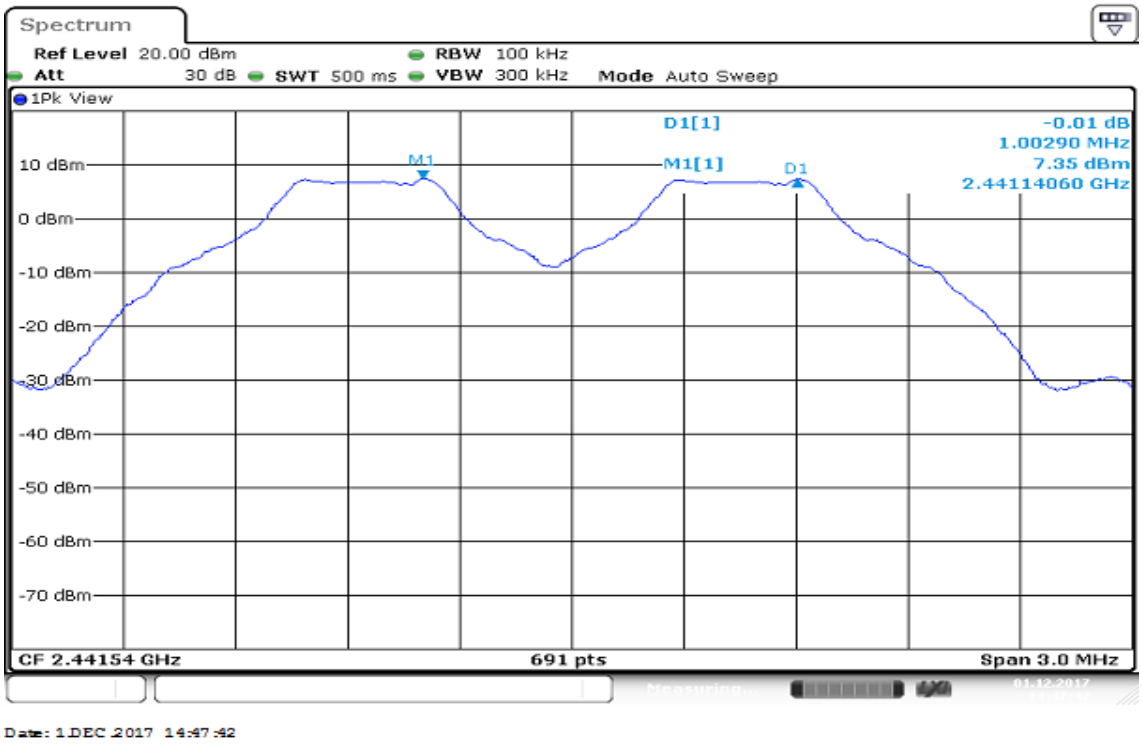
| Test mode: GFSK_BDR-1Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 1.0029 | 0.687 | PASS |
| Mid | 2441 | 1.0029 | 0.646 | PASS |
| High | 2480 | 1.0029 | 0.684 | PASS |

| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 0.9986 | 0.861 | PASS |
| Mid | 2441 | 0.9986 | 0.861 | PASS |
| High | 2480 | 0.9986 | 0.861 | PASS |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# Test Data

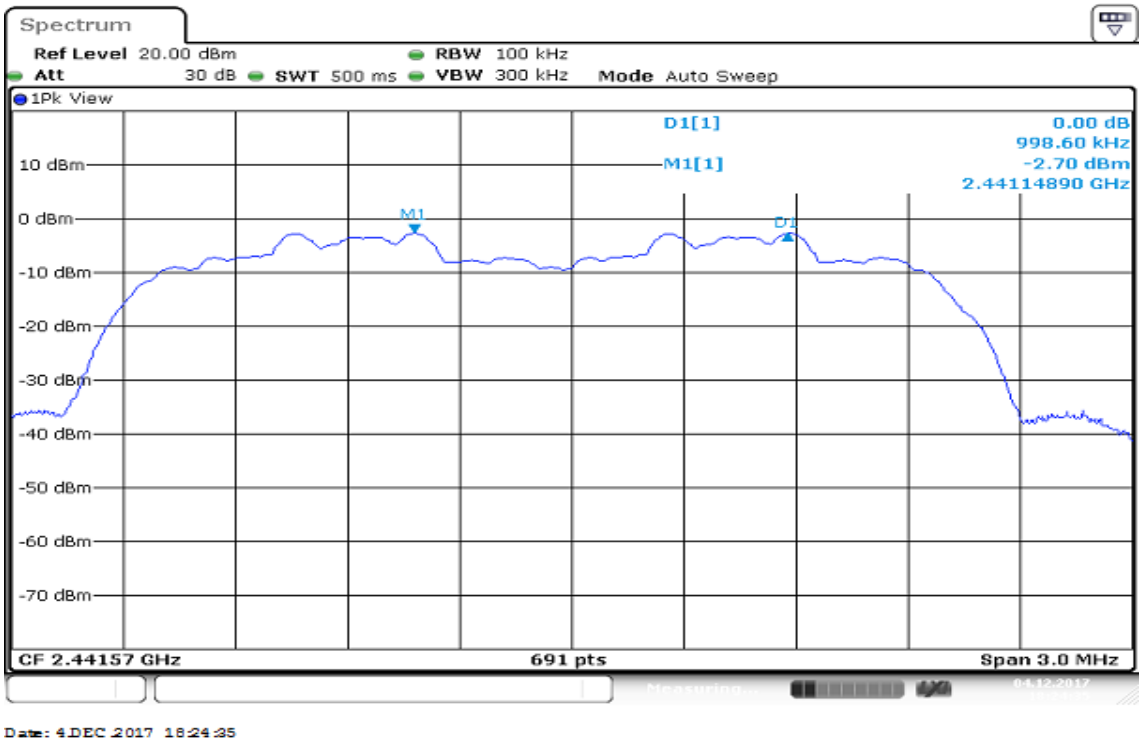
## GFSK_BDR-1Mbps mode





*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## 8DPSK_EDR-3Mbps mode





*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 4.5 NUMBER OF HOPPING

## 4.5.1 Test Limit

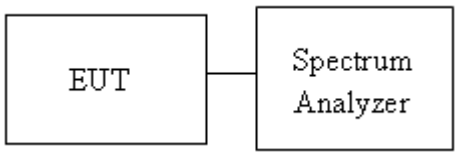
According to §15.247(a)(1)(iii) and RSS-247 section 5.1(d)

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

## 4.5.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 7.8.3
1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set spectrum analyzer Start Freq. = 2400 MHz, Stop Freq. = 2483.5 MHz, RBW =100KHz, VBW = 300KHz.
4. Max hold, view and count how many channel in the band.

## 4.5.3 Test Setup




## 4.5.4 Test Result

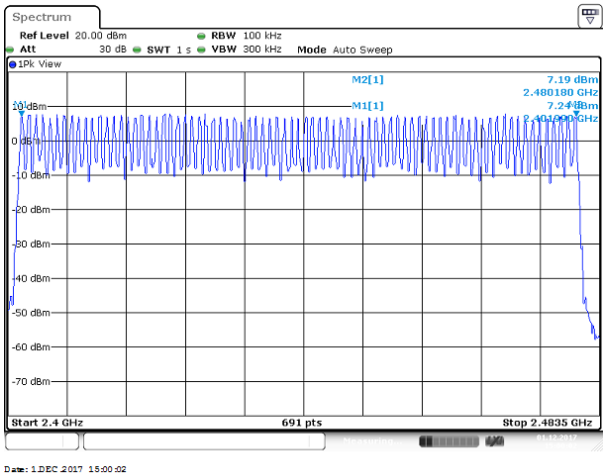
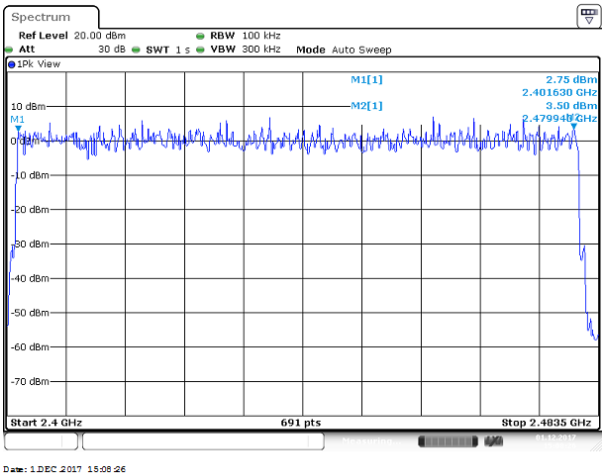
| Number of Hopping | | | | |
|---|---|---|---|---|
| **Mode** | **Frequency (MHz)** | **Hopping Channel Number** | **Hopping Channel Number Limits** | **Result** |
| BDR-1Mbps | 2402-2480 | 79 | 15 | Pass |
| EDR-3Mbps | 2402-2480 | 79 | 15 | |

***REMARK:***

The frequency spectrum was broken up in to two sub-range to clearly show all of the hopping frequencies. In the AFH mode, this device operation was using 20 channels, so the requirement for minimum number of hopping channels is satisfied


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# Test Data

| Number of Hopping | |
|---|---|
| GFSK_BDR-1Mbps mode | 8DPSK_EDR-3Mbps mode |
|  |  |






This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

# 4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

## 4.6.1 Test Limit

According to §15.247(d) and RSS-247 section 5.5

| | |
|---|---|
| Limit | -20 dBc |

.

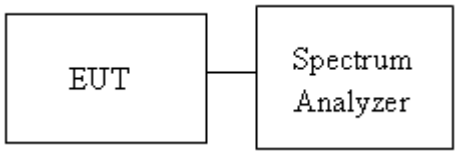
## 4.6.2 Test Procedure

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

3. The Band Edge at 2.4GHz and 2.4835GHz are investigated with normal hopping mode.

## 4.6.3 Test Setup

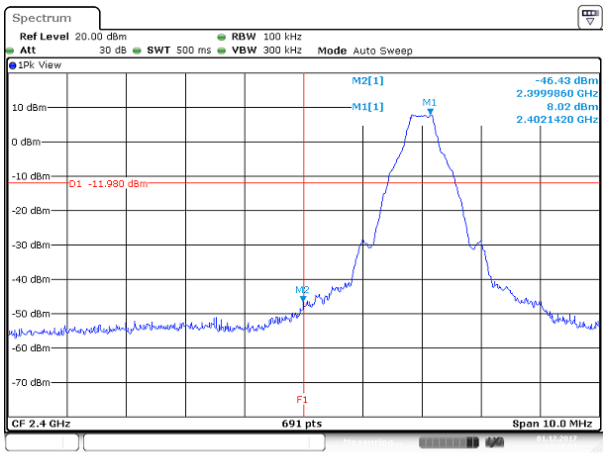
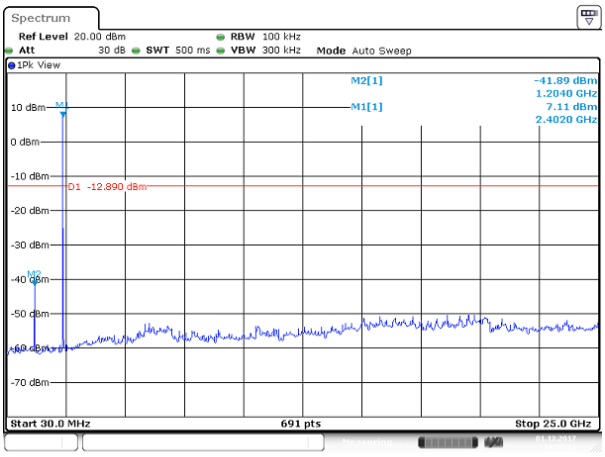




This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

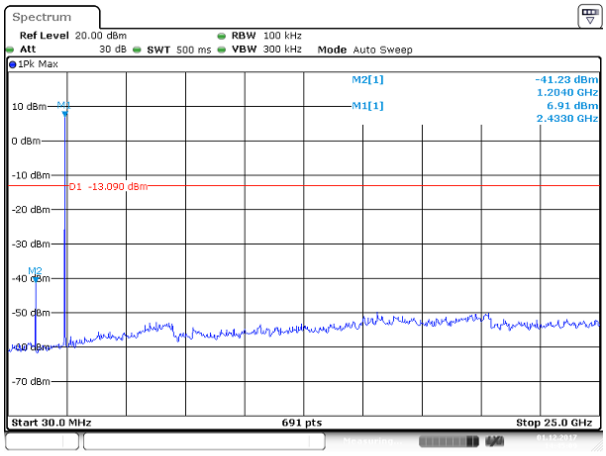
## 4.6.4 Test Result

**Test Data**

| GFSK_BDR-1Mbps mode Low CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |

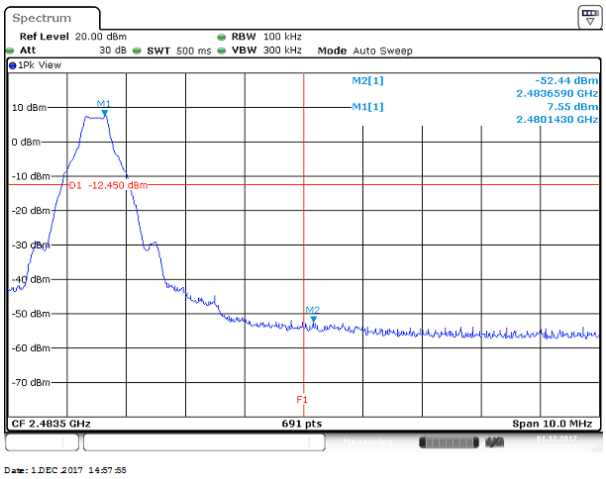
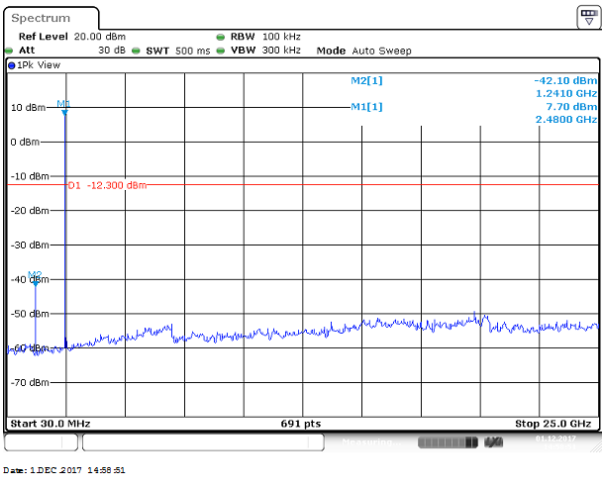




| GFSK_BDR-1Mbps mode Mid CH | |
|---|---|
| **Spurious Emission 30MHz-25GHz** | |
|  | |

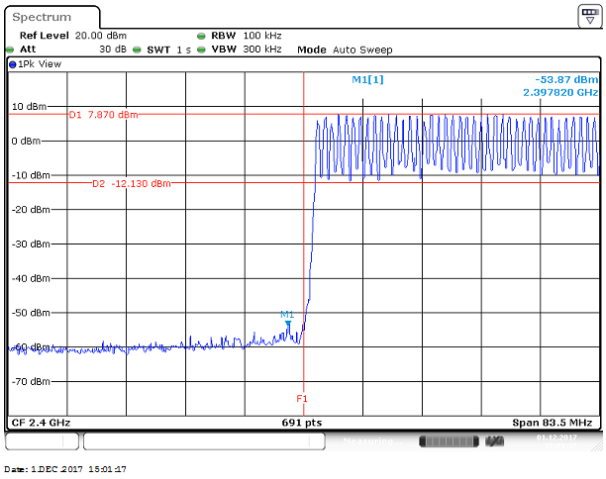
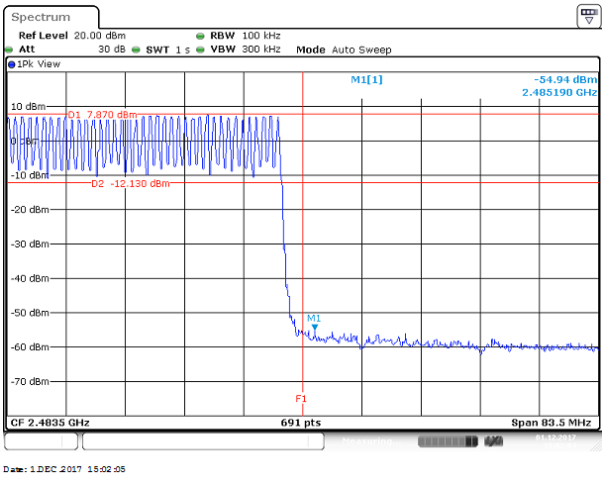



*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| GFSK_BDR-1Mbps mode High CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |





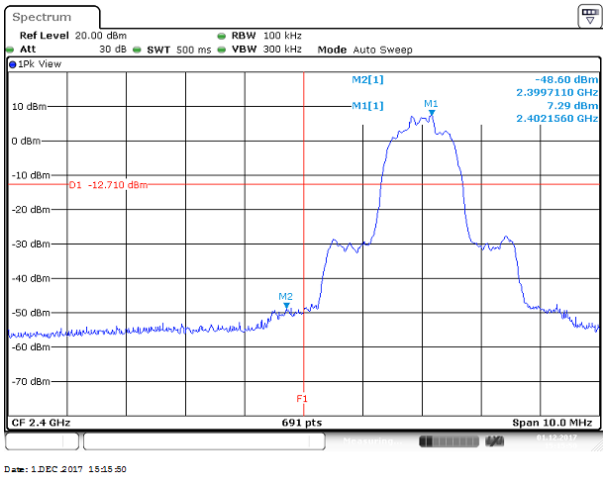
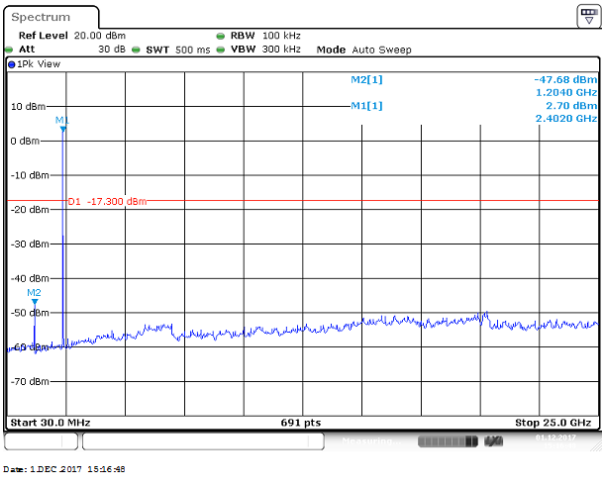
| GFSK_BDR-1Mbps Hopping mode | |
|---|---|
| **Low Band Edge** | **High Band Edge** |
|  |  |






*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

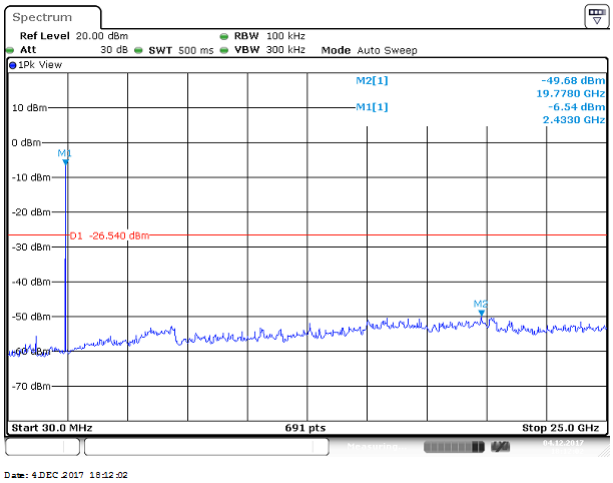
## 8DPSK_EDR-3Mbps mode Low CH

| Band Edge | Spurious Emission 30MHz-25GHz |
|---|---|
|  |  |



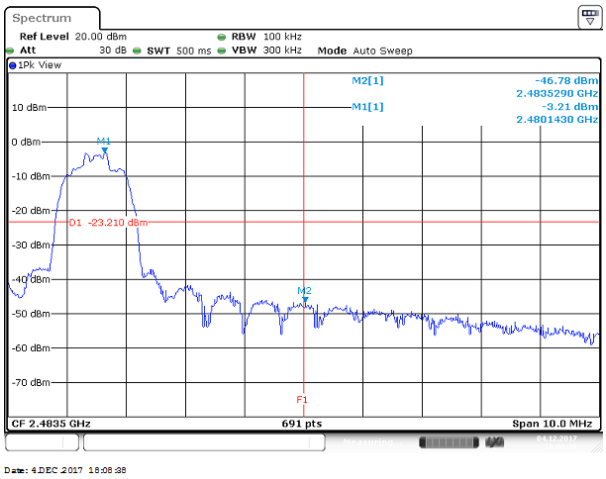
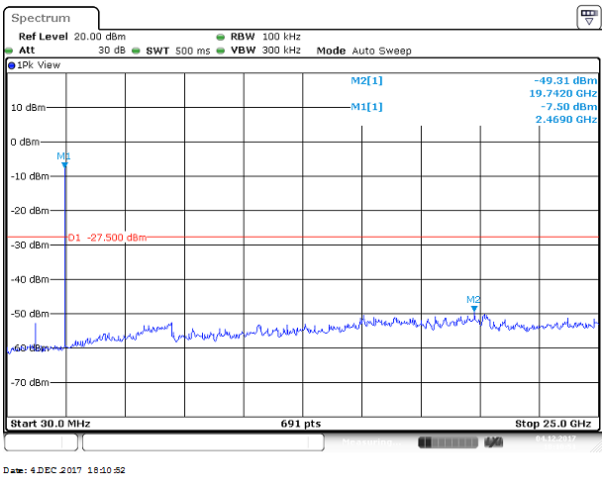


## 8DPSK_EDR-3Mbps mode Mid CH

| Spurious Emission 30MHz-25GHz |
|---|
|  |

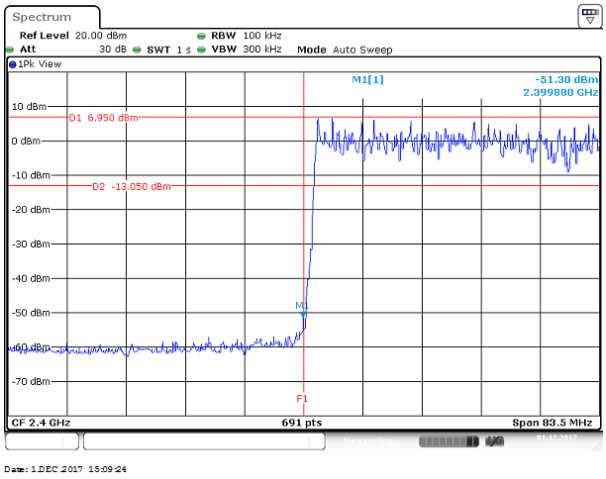
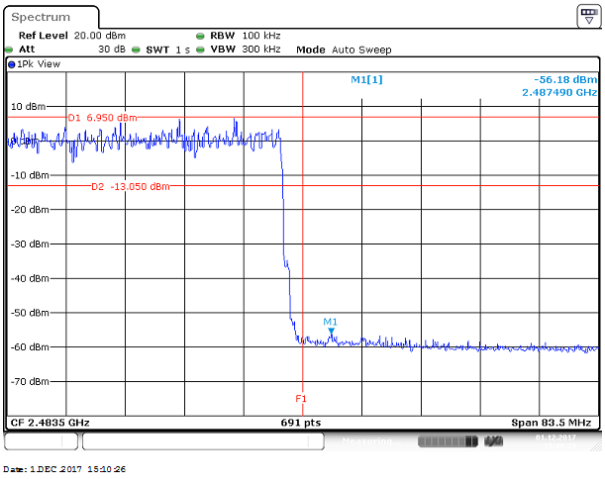



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

| 8DPSK_EDR-3Mbps mode High CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |





| 8DPSK_EDR-3Mbps Hopping mode | |
|---|---|
| **Low Band Edge** | **High Band Edge** |
|  |  |






*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

# 4.7 TIME OF OCCUPANCY (DWELL TIME)

## 4.7.1 Test Limit

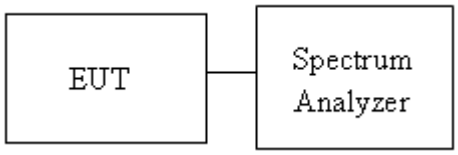
According to §15.247(a)(1)(iii)and RSS-247 section 5.1(d)

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.

## 4.7.2 Test Procedure

1. EUT RF output port connected to the SA by RF cable.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=1MHz, Sweep = 1 ms

## 4.7.3 Test Setup




## 4.7.4 Test Result

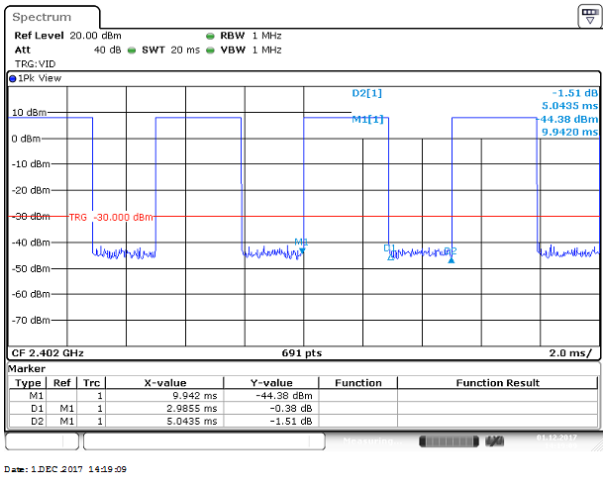
| Time of Occupancy (Dwell Time) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mode** | **Frequency (MHz)** | **Pulse Time Per Hopping (ms)** | **Minimum Number of Hopping Freq.** | **Number of pulse in (0.4 * N sec)** | **Dwell Time IN (0.4 * N sec)** | **Dwell Time Limits (s)** | **Result** |
| BDR-1Mbps | 2441 | 2.9855 | 79 | 106.67 | 0.3185 | 0.4 | Pass |
| EDR-3Mbps | 2441 | 2.9565 | 79 | 106.67 | 0.3154 | 0.4 | |
| Non-AFH: DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 * 0.4 *79 = 106.6 | | | | | | | |
| AFH: DH5 Packet permit maximum 800/ 20 / 6 = 6.666 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 6.666*0.4*20 = 53.33 | | | | | | | |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

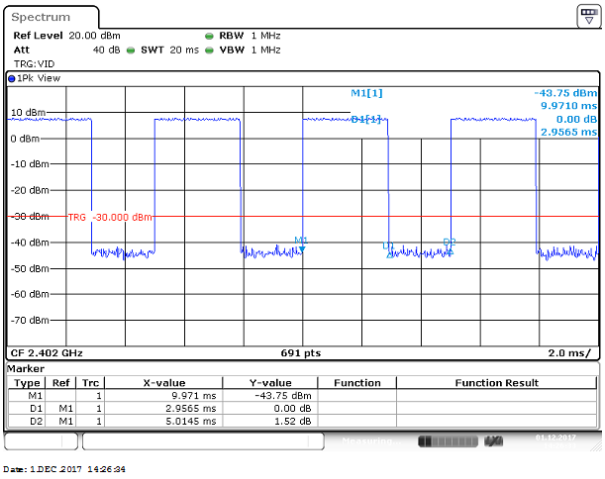
# Test Data

## Time of Occupancy (Dwell Time)

### GFSK_BDR-1Mbps mode




### 8DPSK_EDR-3Mbps mode





This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

# 4.8 RADIATION BANDEDGE AND SPURIOUS EMISSION

## 4.8.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

IC according to RSS-247 section 5.5, RSS-Gen, Section 8.9 and 8.10

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

**Below 30 MHz**

| Frequency | Field Strength (microvolts/m) | Magnetic H-Field (microamperes/m) | Measurement Distance (metres) |
|---|---|---|---|
| 9-490 kHz | 2,400/F (F in kHz) | 2,400/F (F in kHz) | 300 |
| 490-1,705 kHz | 24,000/F (F in kHz) | 24,000/F (F in kHz) | 30 |
| 1.705-30 MHz | 30 | N/A | 30 |

**Above 30 MHz**

| Frequency (MHz) | Field Strength microvolts/m at 3 metres (watts, e.i.r.p.) | |
|---|---|---|
| | Transmitters | Receivers |
| 30-88 | 100 (3 nW) | 100 (3 nW) |
| 88-216 | 150 (6.8 nW) | 150 (6.8 nW) |
| 216-960 | 200 (12 nW) | 200 (12 nW) |
| Above 960 | 500 (75 nW) | 500 (75 nW) |

Remark:
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## 4.8.2 Test Procedure

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.

3. Span shall wide enough to full capture the emission measured. The SA from 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

4. For harmonic, the worst case of output power was BDR-1Mbps. Therefore only BDR-1Mbps record in the report.

5. The SA setting following：

(1) Below 1G：RBW = 100kHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2) Above 1G：

(2.1) For Peak measurement：RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2.2) For Average measurement：RBW = 1MHz, VBW

˙If Duty Cycle ≥ 98%, VBW=10Hz.

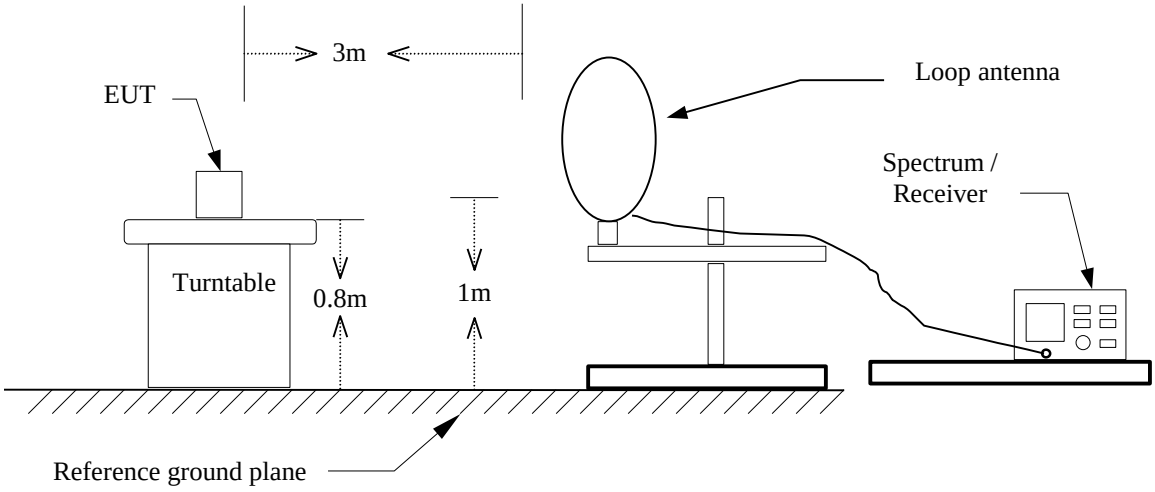
˙If Duty Cycle < 98%, VBW≥1/T.

| Configuration | Duty Cycle (%) | T(ms) | 1/T (Hz) | VBW setting |
|---|---|---|---|---|
| GFSK_BDR-1Mbps | 79% | 2.9600 | 0.338 | 360Hz |
| 8DPSK_EDR-3Mbps | 79% | 2.9600 | 0.338 | 360Hz |

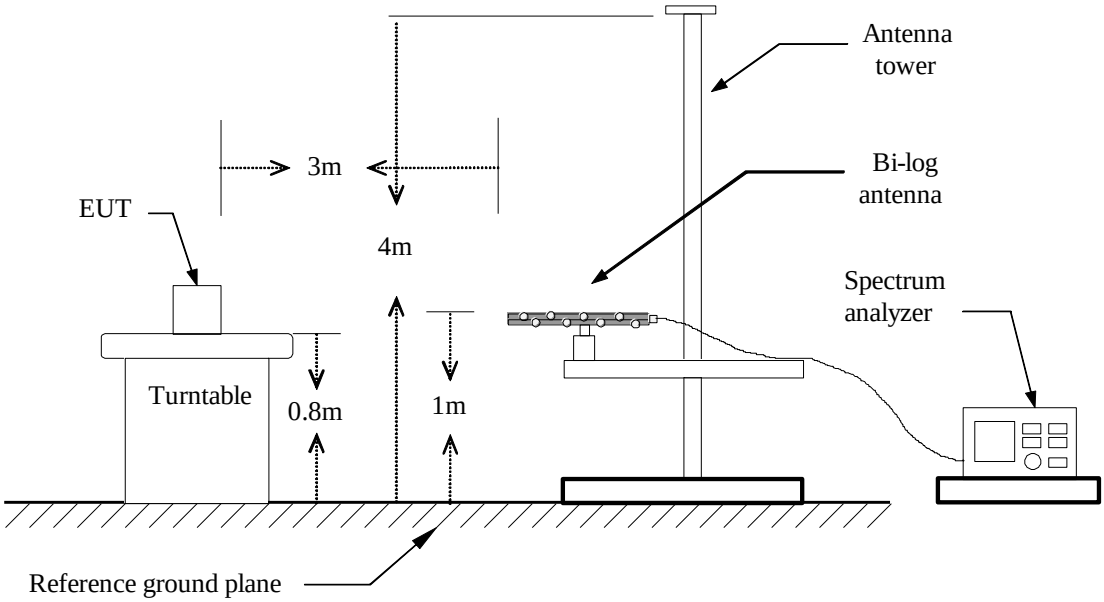

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## 4.8.3 Test Setup

**9kHz ~ 30MHz**



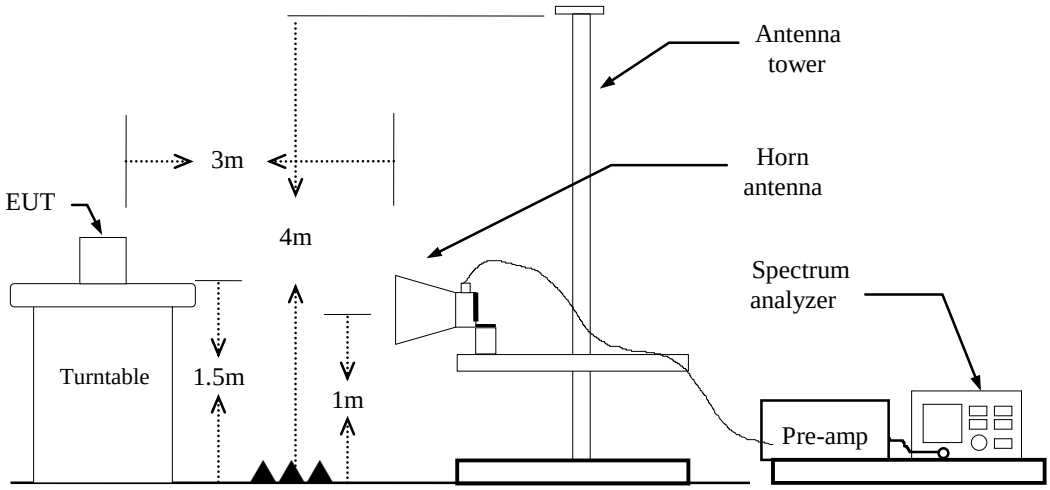

**30MHz ~ 1GHz**





This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## Above 1 GHz



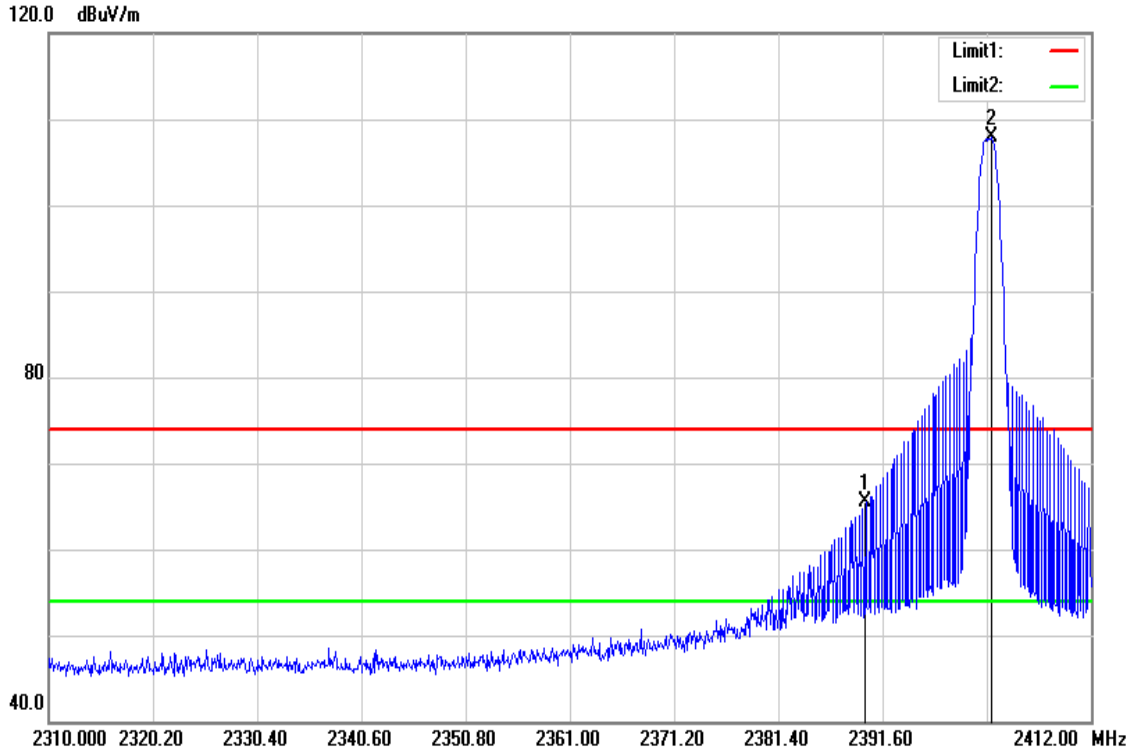


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## 4.8.4 Test Result

**Band Edge Test Data**

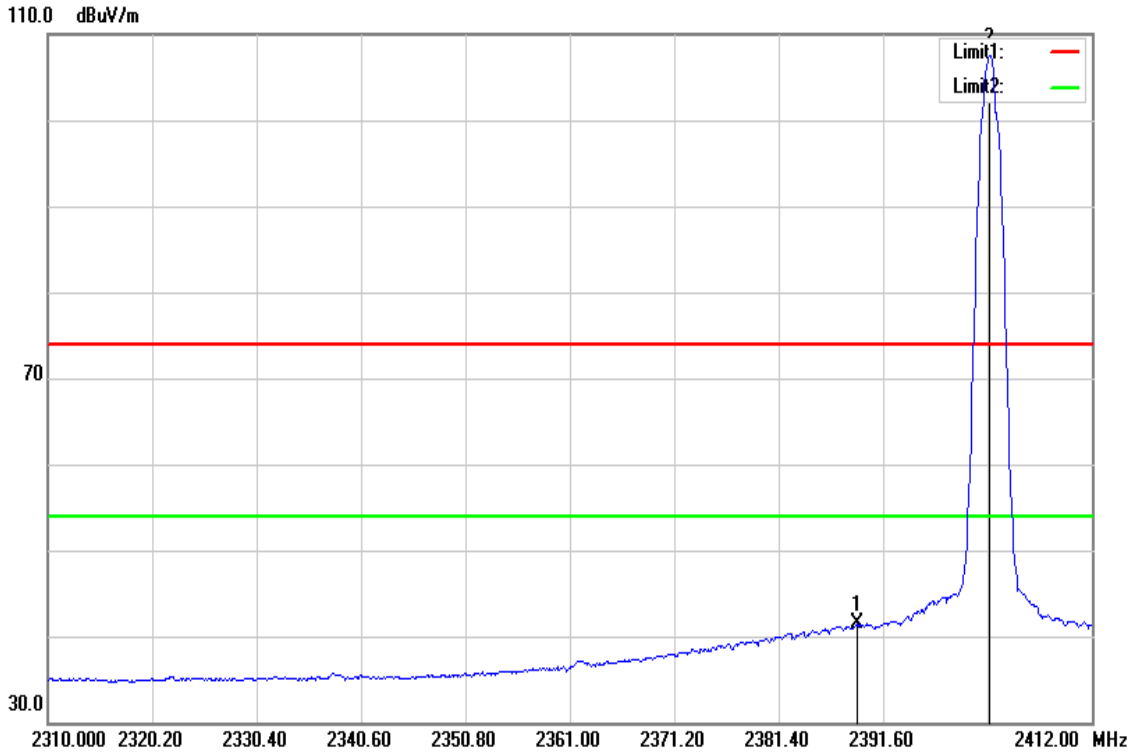
| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2389.968 | 68.39 | -2.98 | 65.41 | 74.00 | -8.59 | peak |
| 2 | 2402.208 | 110.86 | -2.95 | 107.91 | - | - | peak |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

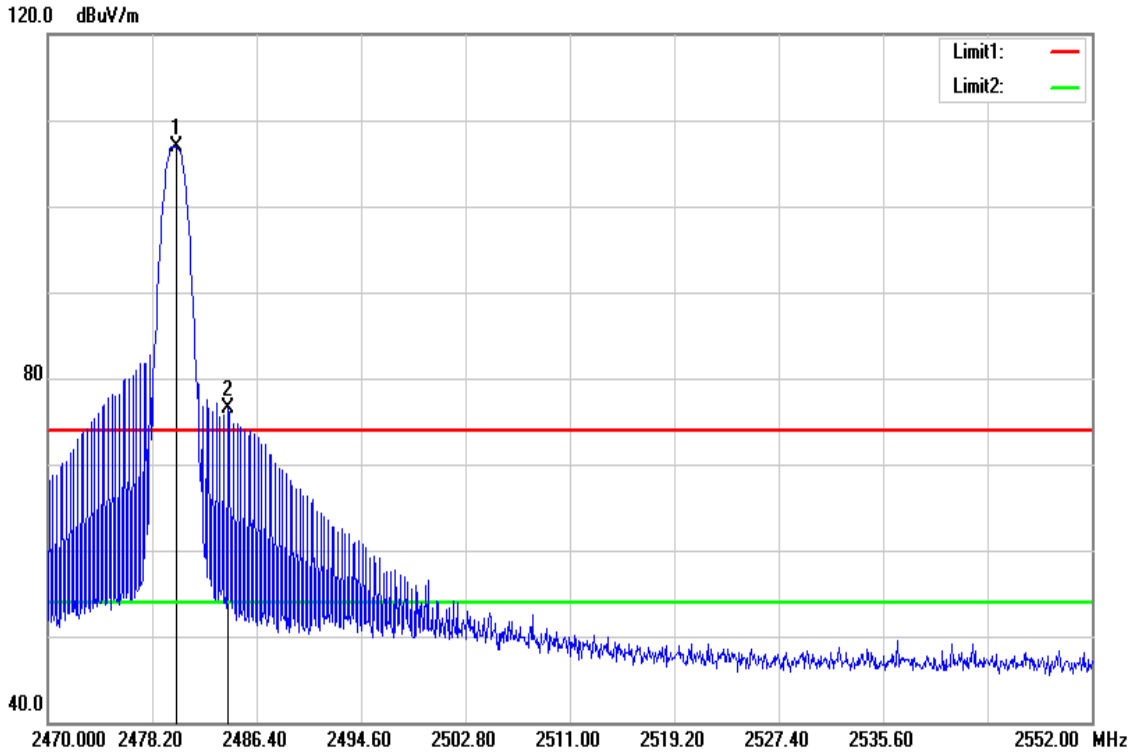
| | | | |
|---|---|---|---|
| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Average | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2389.050 | 44.42 | -2.98 | 41.44 | 54.00 | -12.56 | AVG |
| 2 | 2402.004 | 110.38 | -2.95 | 107.43 | - | - | AVG |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

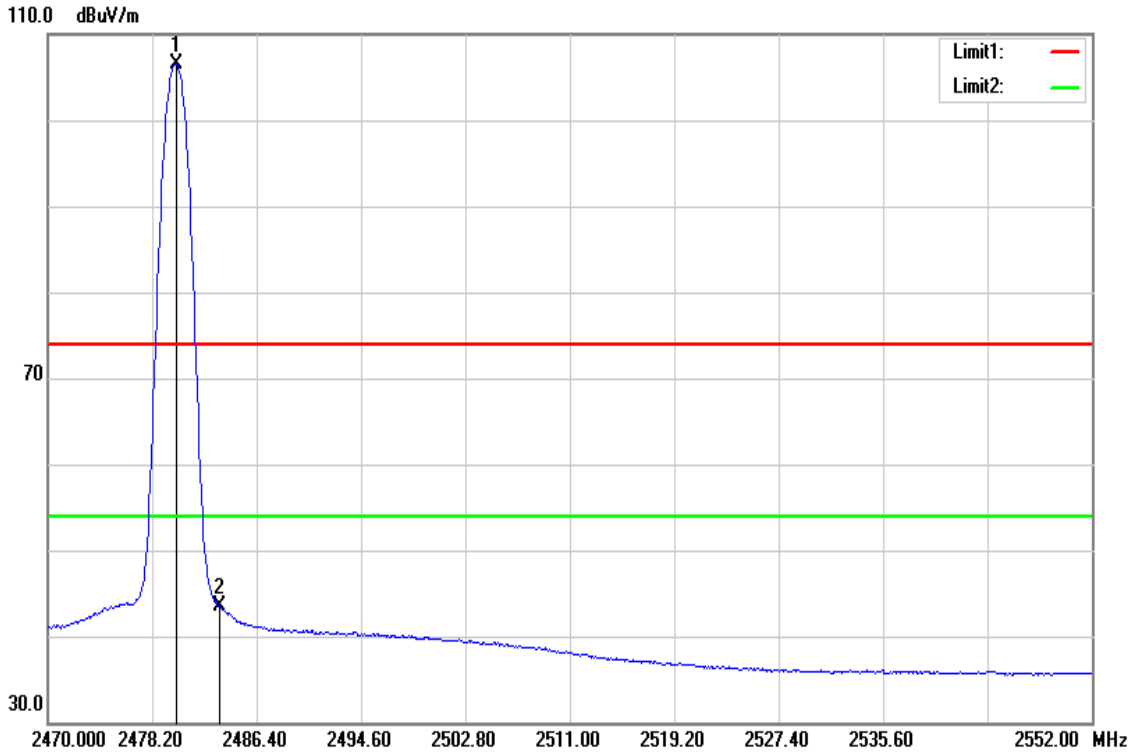
| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak | | |




| No. | Fre uency | R ading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2480.086 | 109.67 | -2.70 | 106.97 | - | - | peak |
| 2 | 2484.104 | 79.24 | -2.69 | 76.55 | 74.00 | 2.55 | peak |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

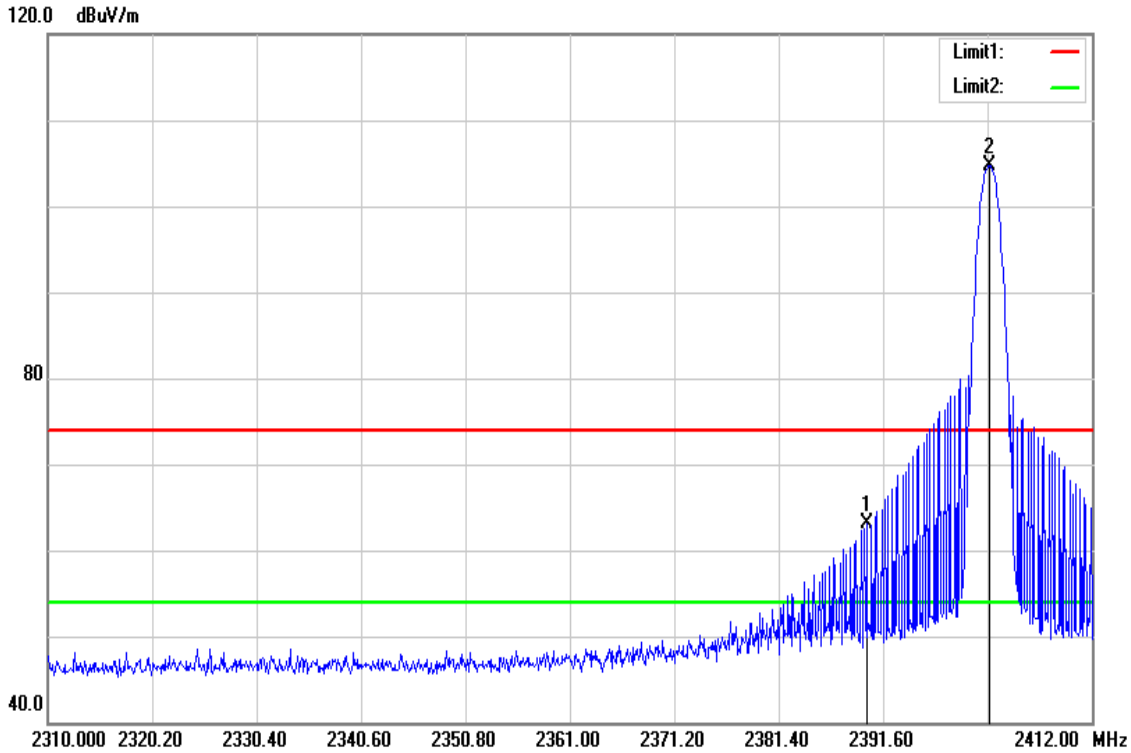
| | | | |
|---|---|---|---|
| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Average | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2480.086 | 109.19 | -2.70 | 106.49 | - | - | AVG |
| 2 | 2483.500 | 46.16 | -2.69 | 43.47 | 54.00 | -10.53 | AVG |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

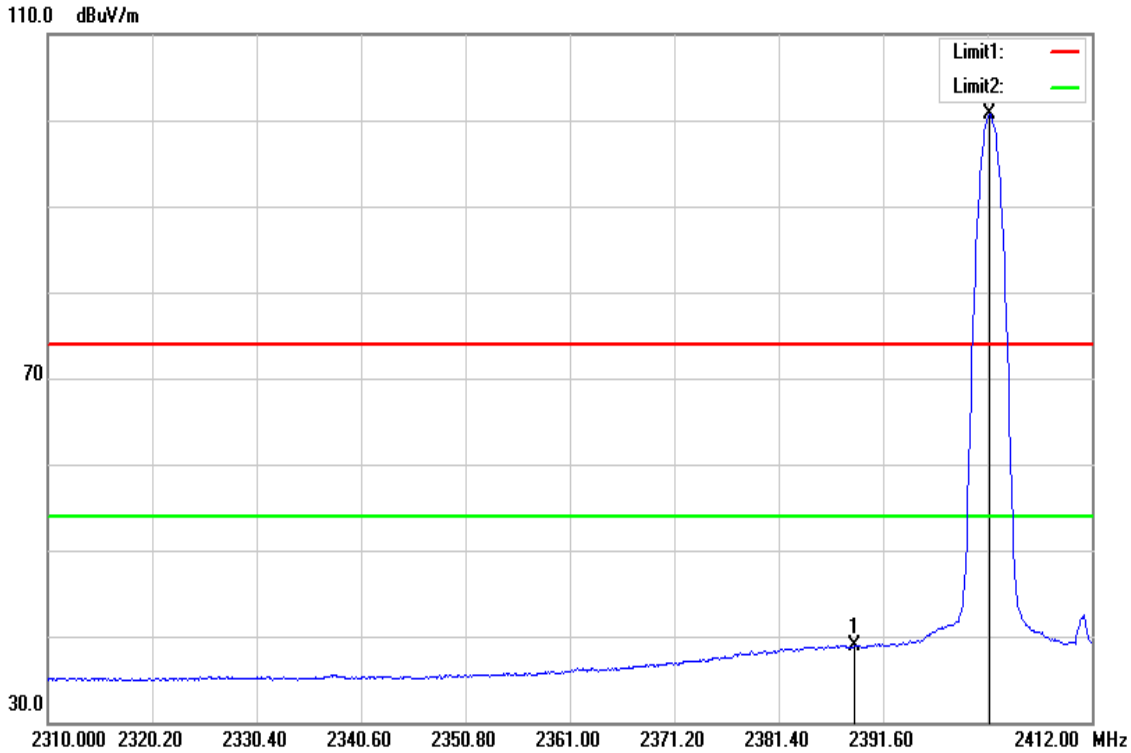
| | | | |
|---|---|---|---|
| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2389.968 | 66.02 | -2.98 | 63.04 | 74.00 | -10.96 | peak |
| 2 | 2402.004 | 107.66 | -2.95 | 104.71 | - | - | peak |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

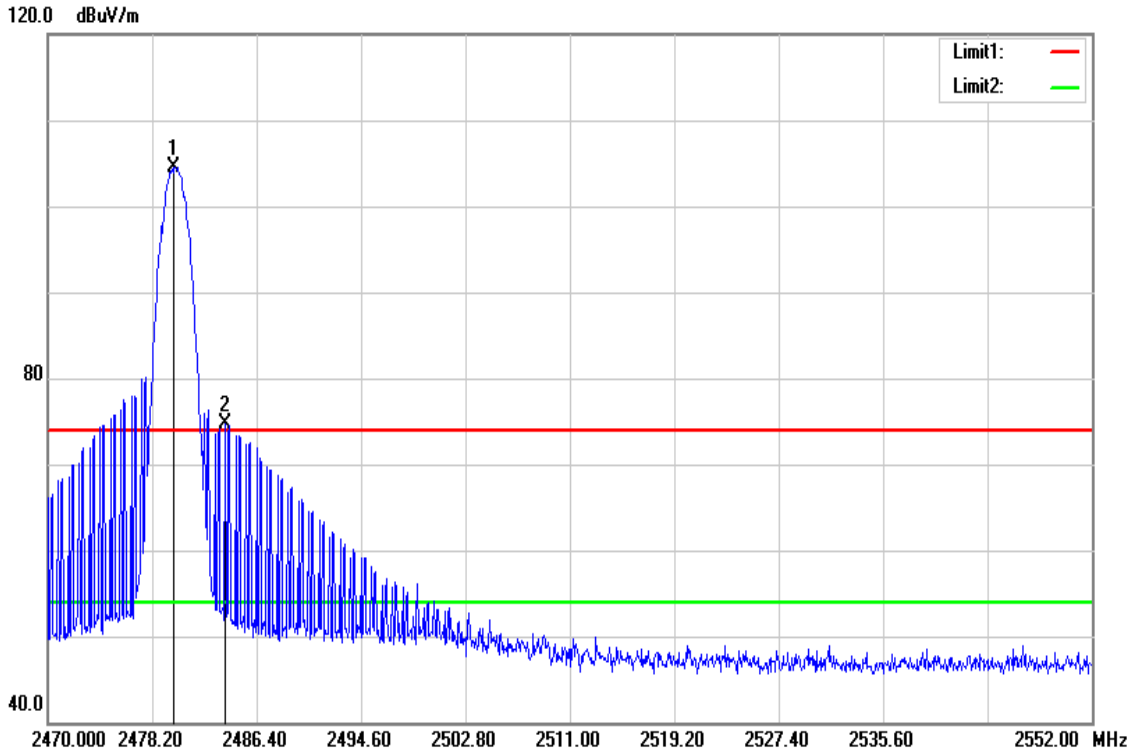
| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Average | | |




| No. | Freque cy | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2388.846 | 41.96 | -2.98 | 38.98 | 54.00 | -15.02 | AVG |
| 2 | 2402.004 | 103.62 | -2.95 | 100.67 | - | - | AVG |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

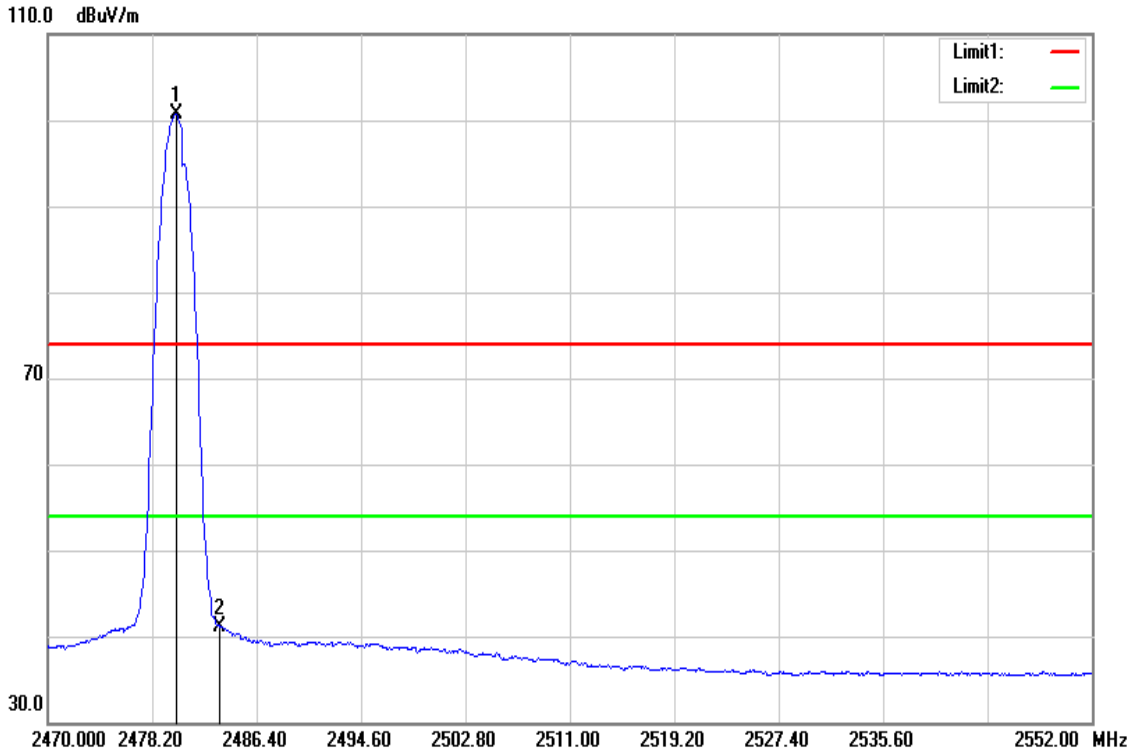
| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2479.922 | 107.18 | -2.70 | 104.48 | - | - | peak |
| 2 | 2483.940 | 77.42 | -2.69 | 74.73 | 74.00 | 0.73 | peak |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Average | | |

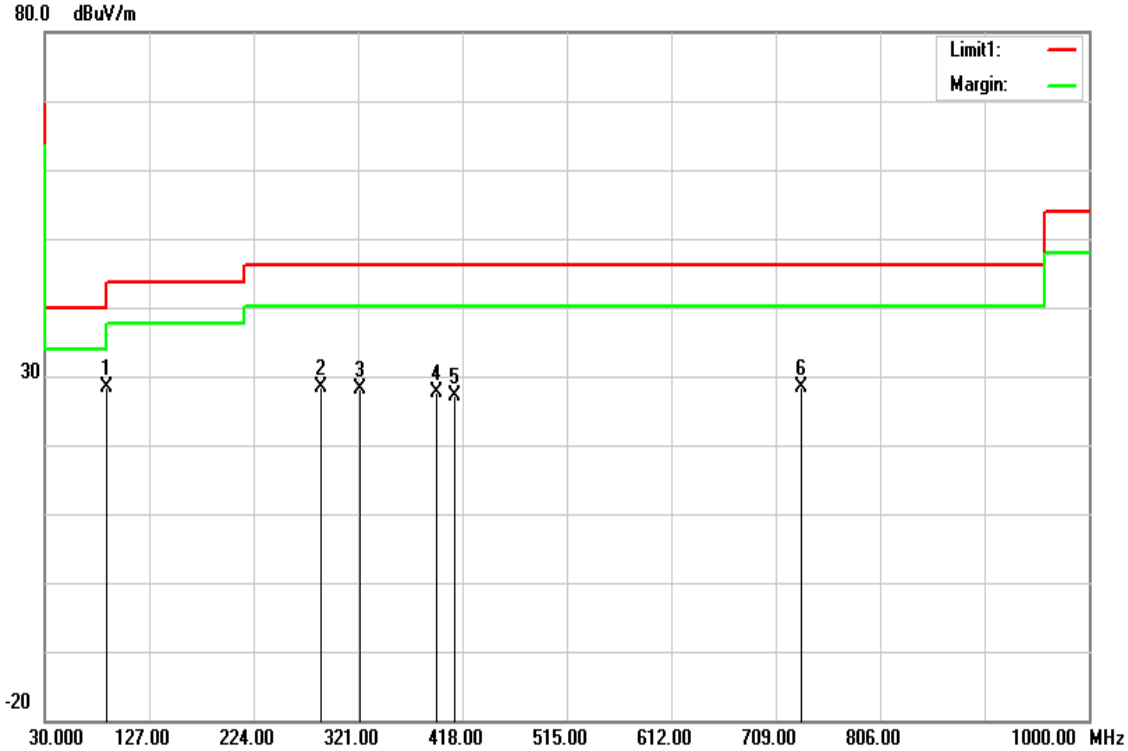



| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2480.086 | 103.34 | -2.70 | 100.64 | - | - | AVG |
| 2 | 2483.500 | 43.81 | -2.69 | 41.12 | 54.00 | -12.88 | AVG |


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.

## Below 1G Test Data

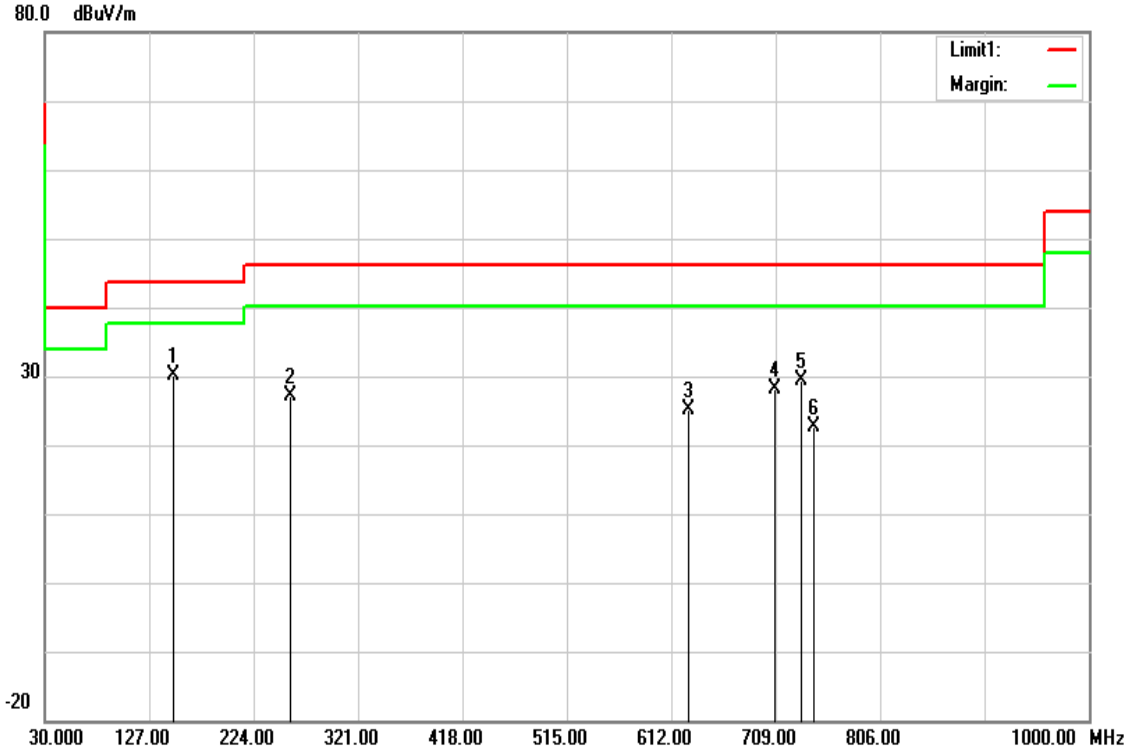
| Test Mode: | BT Mode | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | December 2, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak | | |




| No. | requency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 87.2300 | 49.82 | -21.32 | 28.50 | 40.00 | -11.50 | peak |
| 2 | 286.0800 | 42.52 | -14.21 | 28.31 | 46.02 | -17.71 | peak |
| 3 | 322.9400 | 41.69 | -13.56 | 28.13 | 46.02 | -17.89 | peak |
| 4 | 393.7500 | 39.18 | -11.59 | 27.59 | 46.02 | -18.43 | peak |
| 5 | 411.2100 | 38.21 | -10.99 | 27.22 | 46.02 | -18.80 | peak |
| 6 | 732.2800 | 32.89 | -4.50 | 28.39 | 46.02 | -17.63 | peak |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| Test Mode: | BT Mode | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | December 2, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak | | |

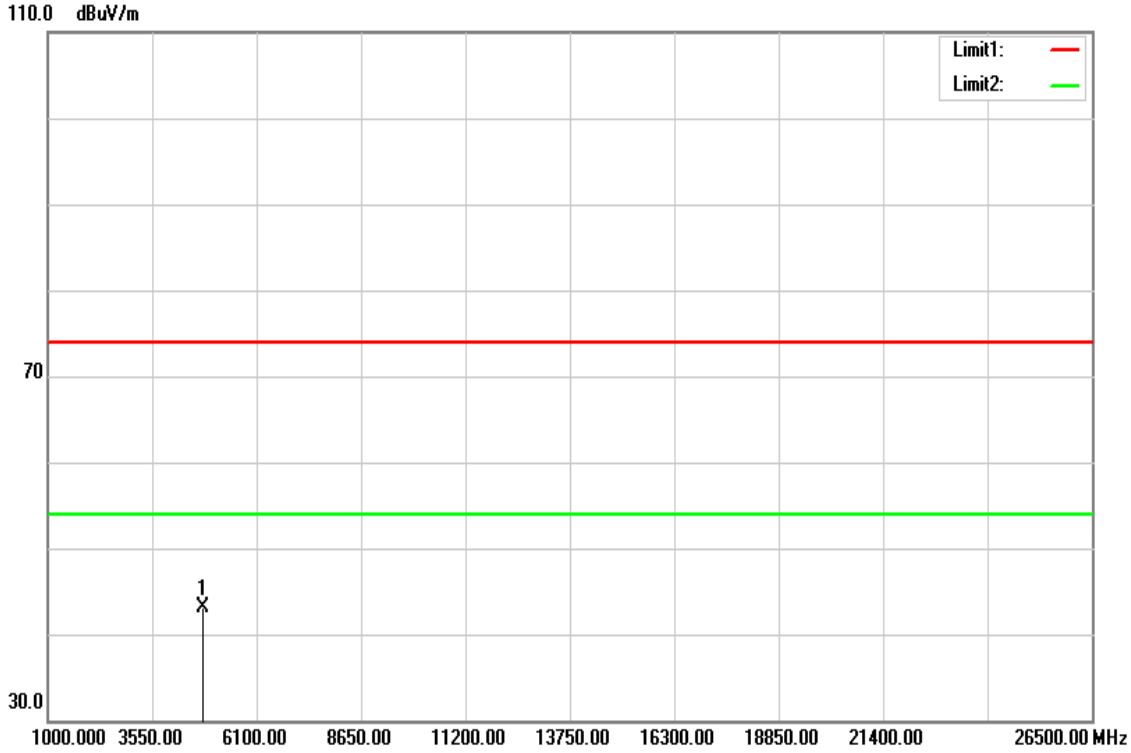



| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 149.3100 | 45.80 | -15.74 | 30.06 | 43.52 | -13.46 | peak |
| 2 | 257.9500 | 42.83 | -15.59 | 27.24 | 46.02 | -18.78 | peak |
| 3 | 628.4900 | 31.30 | -6.14 | 25.16 | 46.02 | -20.86 | peak |
| 4 | 708.0300 | 32.82 | -4.80 | 28.02 | 46.02 | -18.00 | peak |
| 5 | 732.2800 | 33.80 | -4.50 | 29.30 | 46.02 | -16.72 | peak |
| 6 | 743.9200 | 27.02 | -4.36 | 22.66 | 46.02 | -23.36 | peak |


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

## Above 1G Test Data

| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



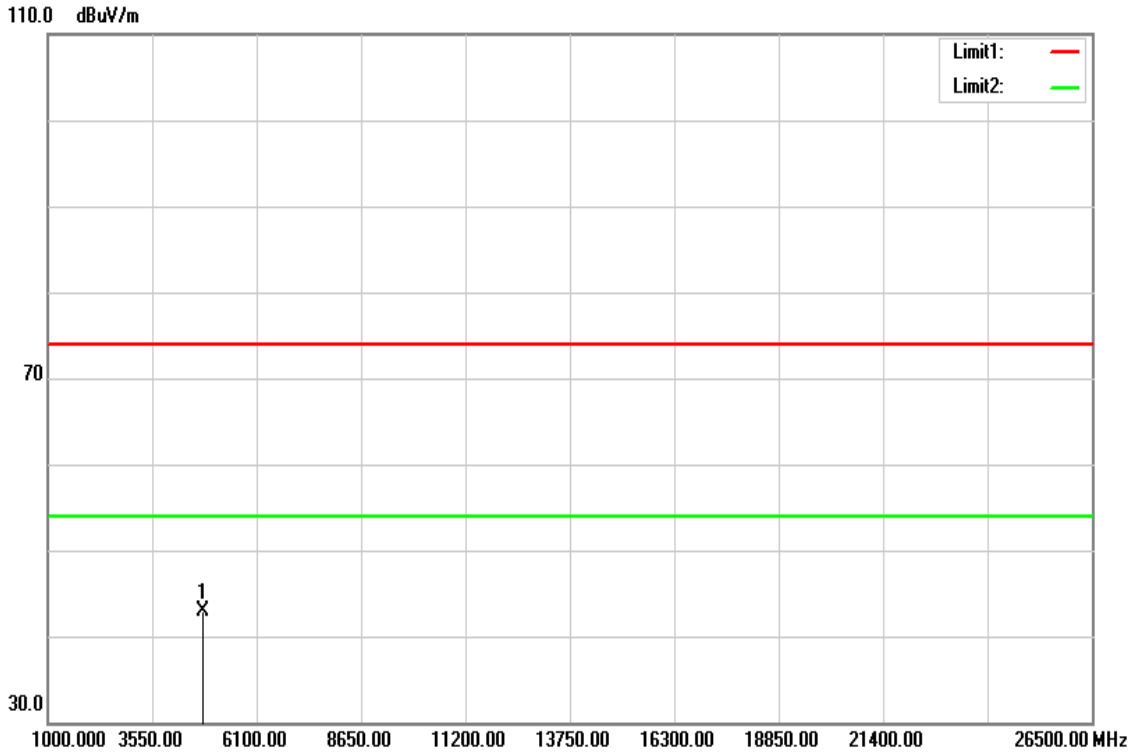

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4804.000 | 38.74 | 4.34 | 43.08 | 74.00 | -30.92 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



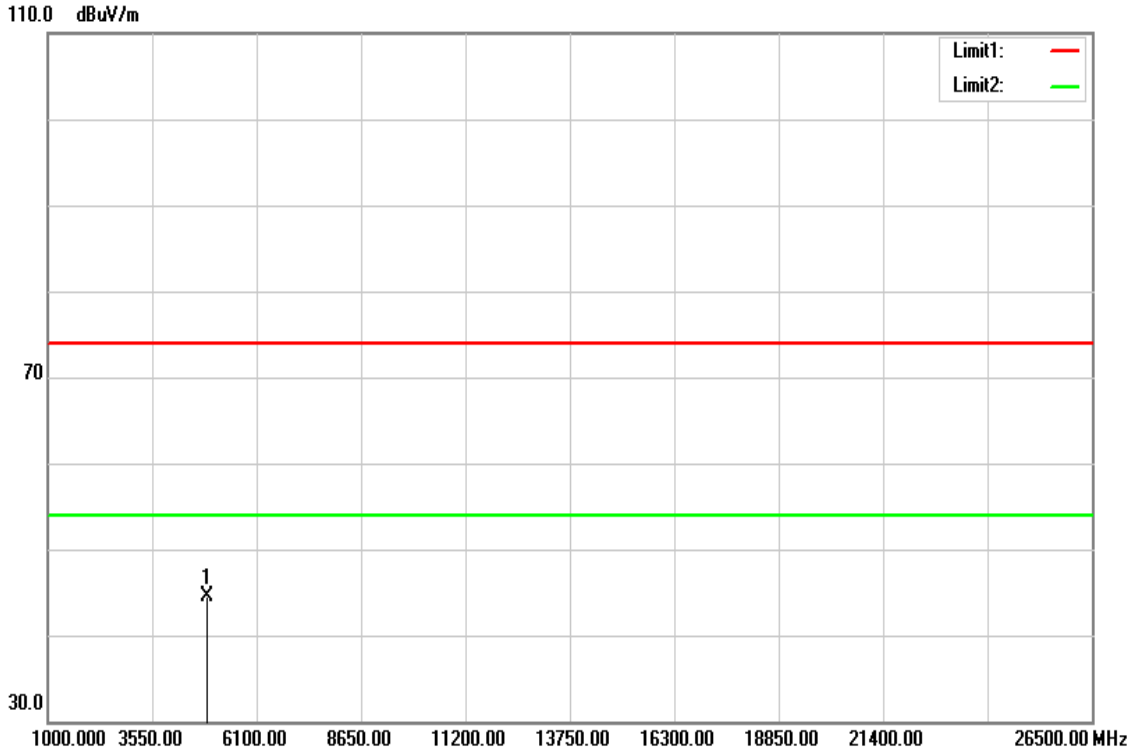

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4804.000 | 38.51 | 4.34 | 42.85 | 74.00 | -31.15 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode: | GFSK_BDR-1Mbps Mid CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



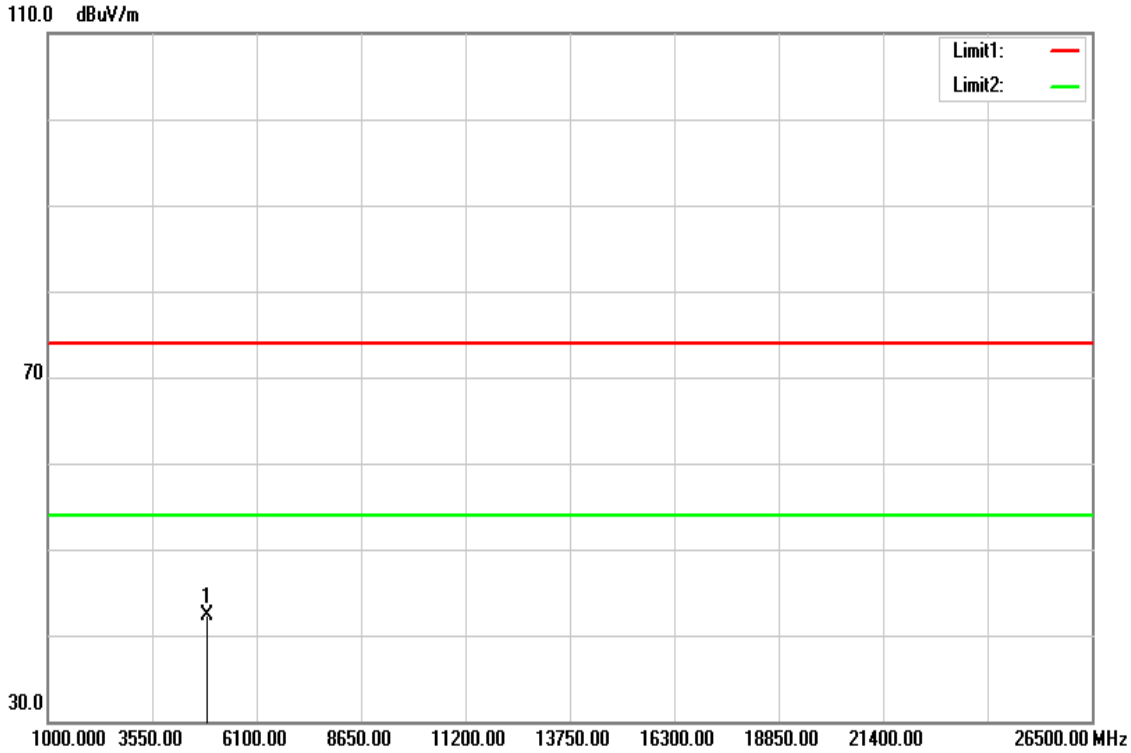

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4882.000 | 39.96 | 4.49 | 44.45 | 74.00 | -29.55 | peak |

*Remark:*

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| Test Mode: | GFSK_BDR-1Mbps Mid CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



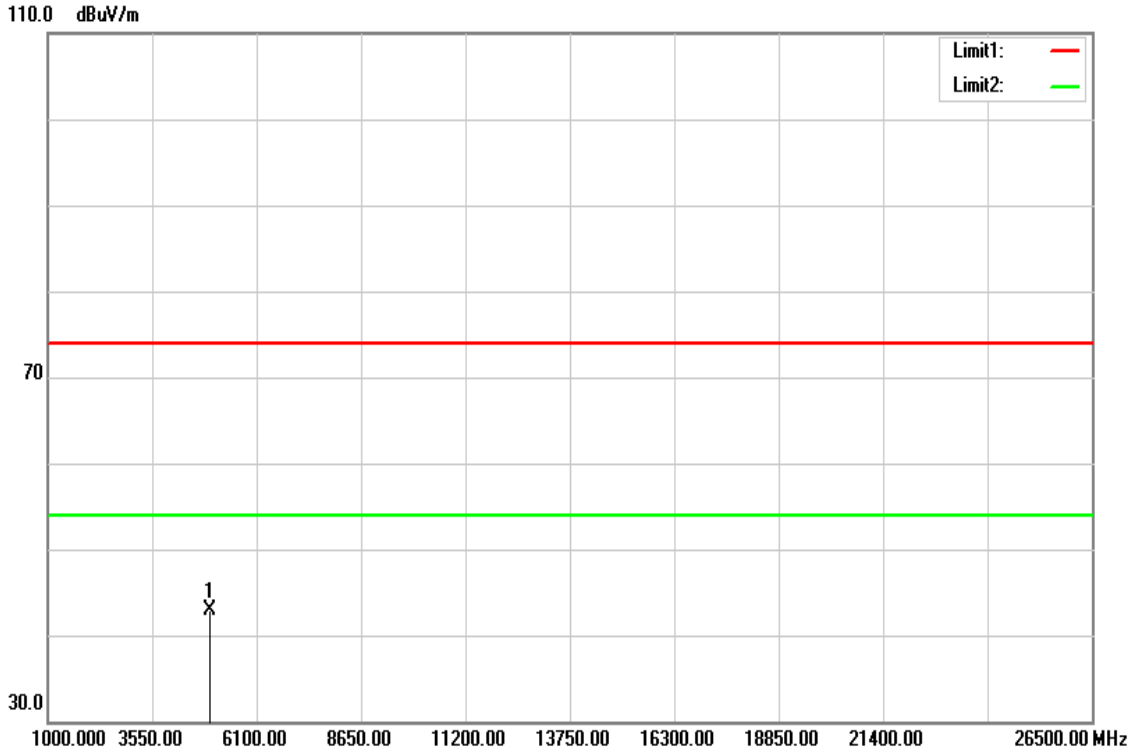

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4882.000 | 37.76 | 4.49 | 42.25 | 74.00 | -31.75 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



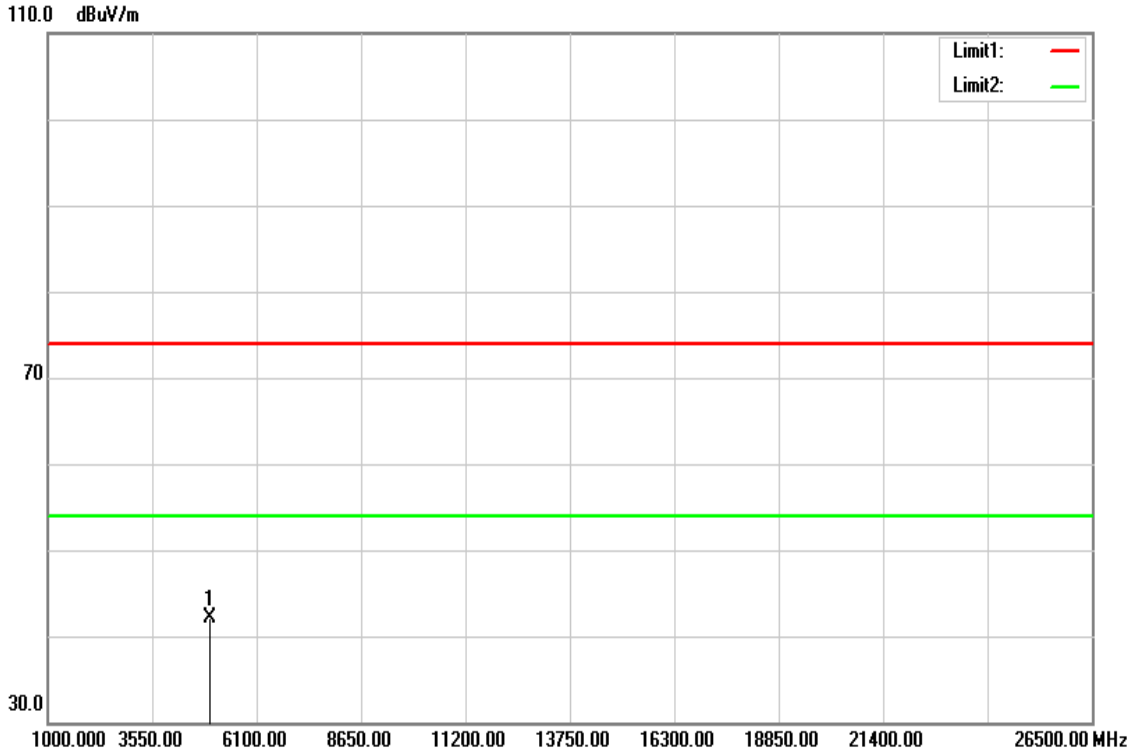

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4960.000 | 38.28 | 4.61 | 42.89 | 74.00 | -31.11 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



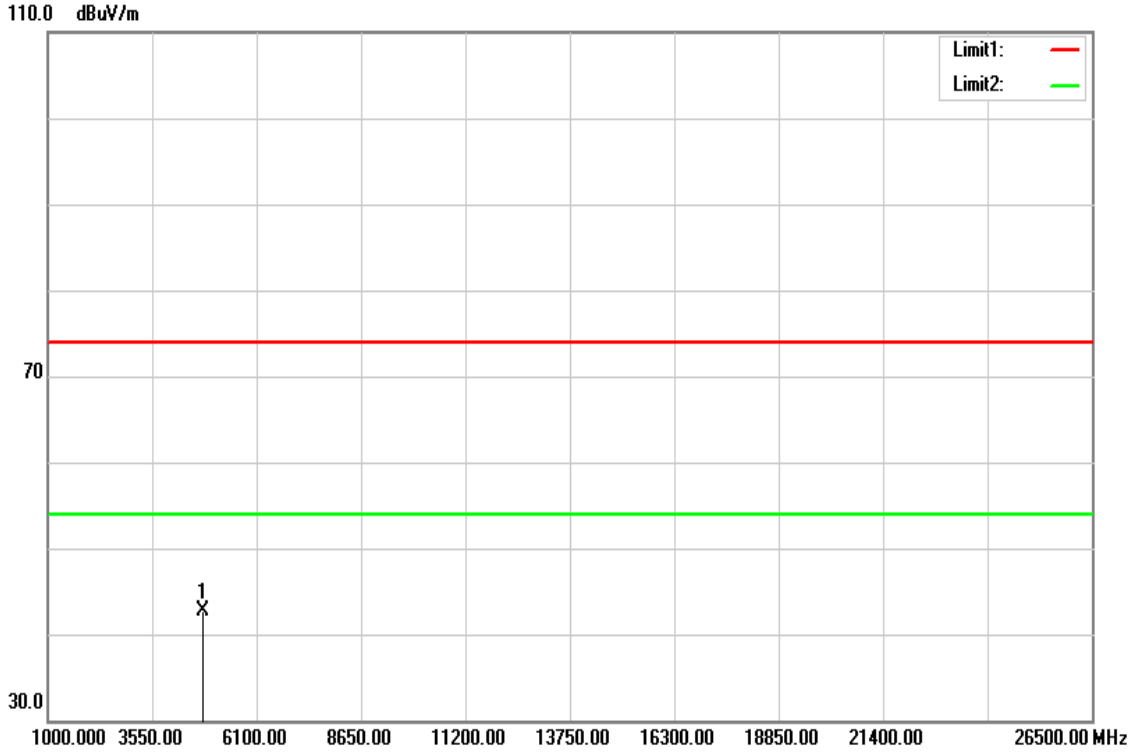

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4960.000 | 37.58 | 4.61 | 42.19 | 74.00 | -31.81 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



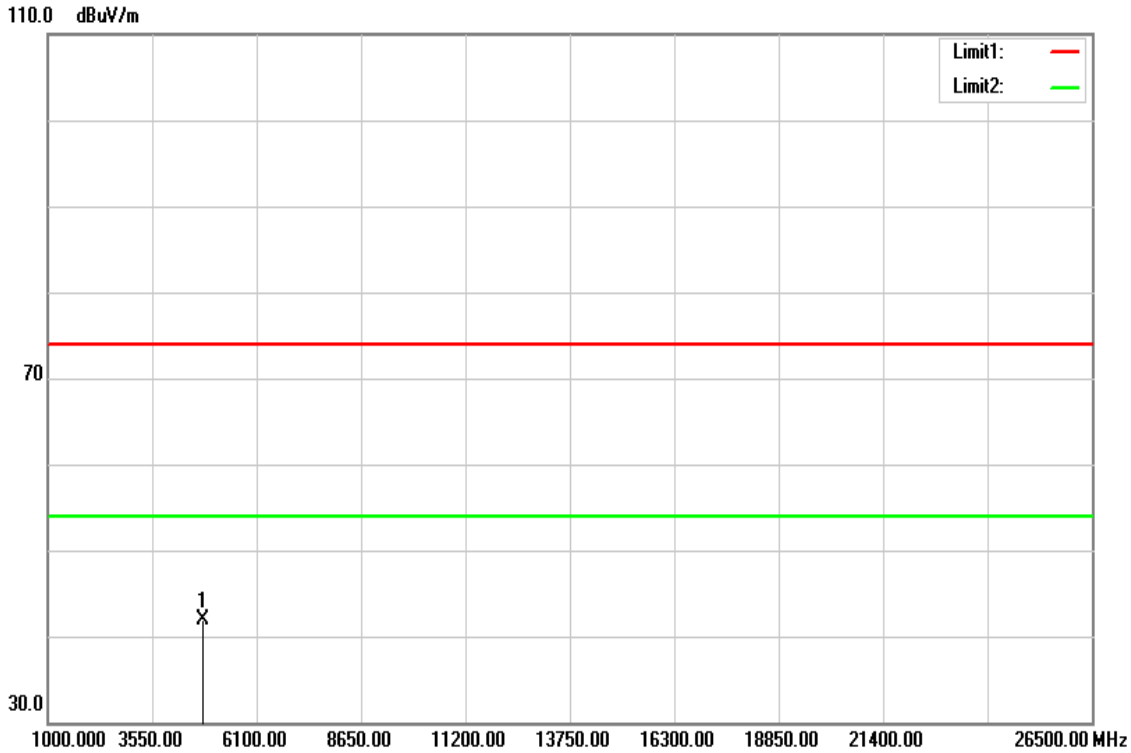

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4804.000 | 38.31 | 4.34 | 42.65 | 74.00 | -31.35 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



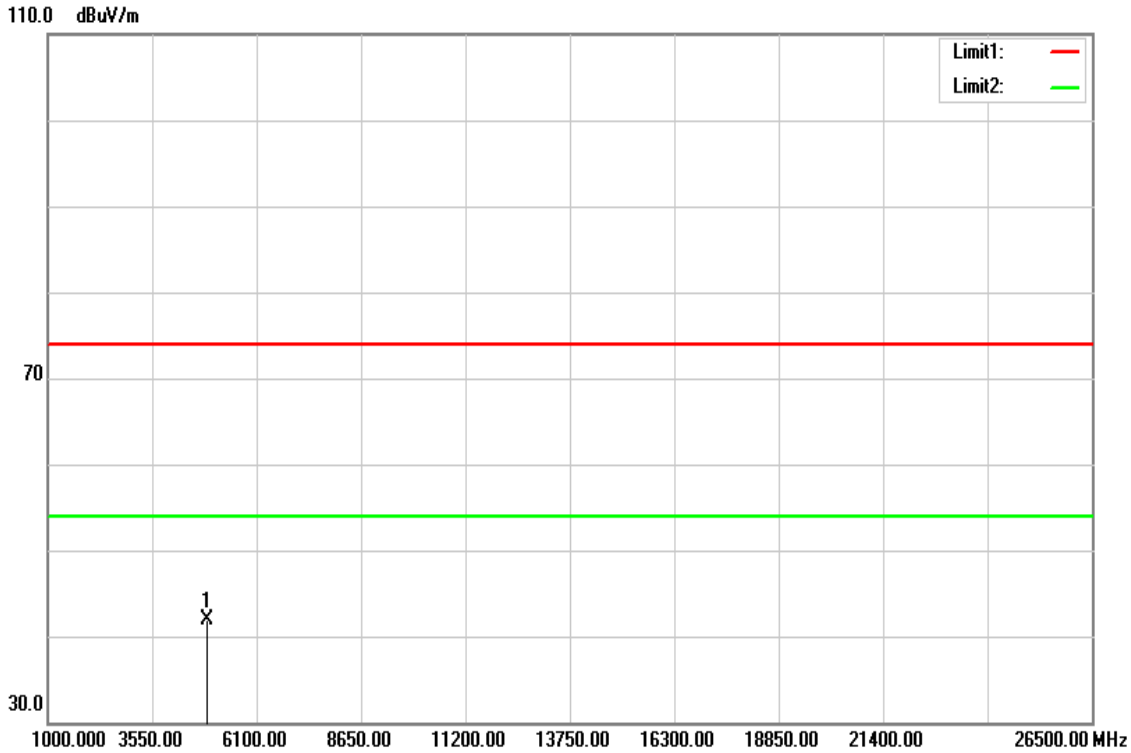

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4804.000 | 37.64 | 4.34 | 41.98 | 74.00 | -32.02 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



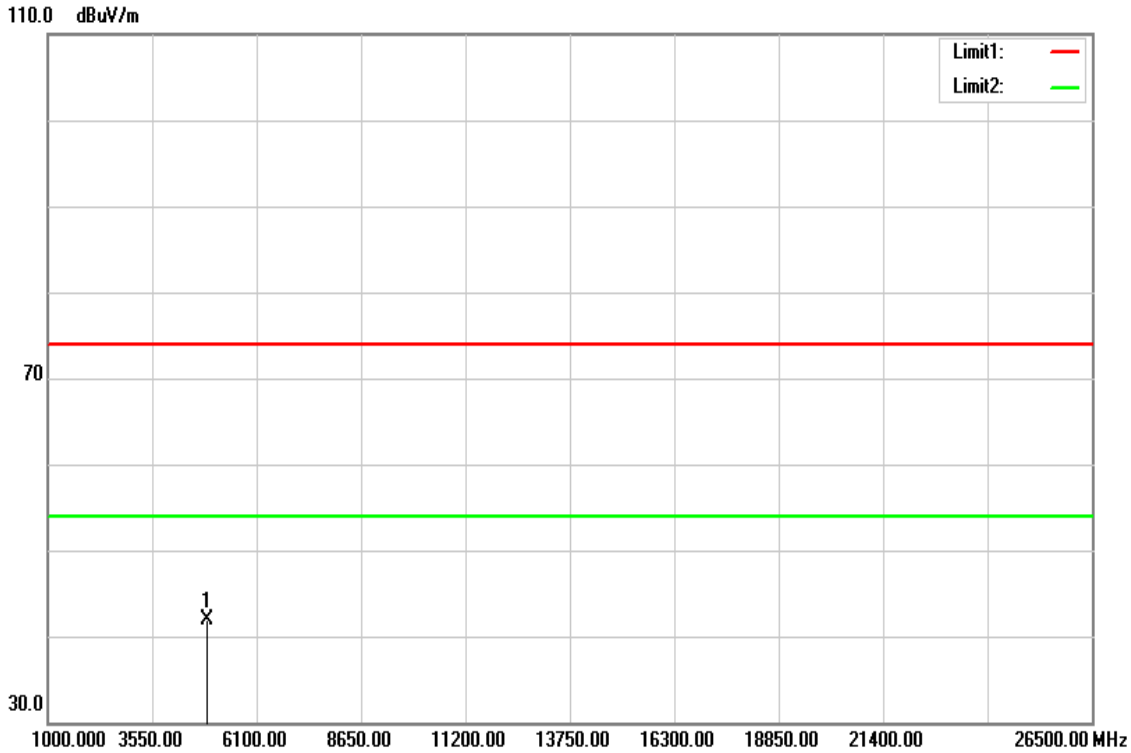

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4882.000 | 37.47 | 4.49 | 41.96 | 74.00 | -32.04 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 24(℃)/ 33%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



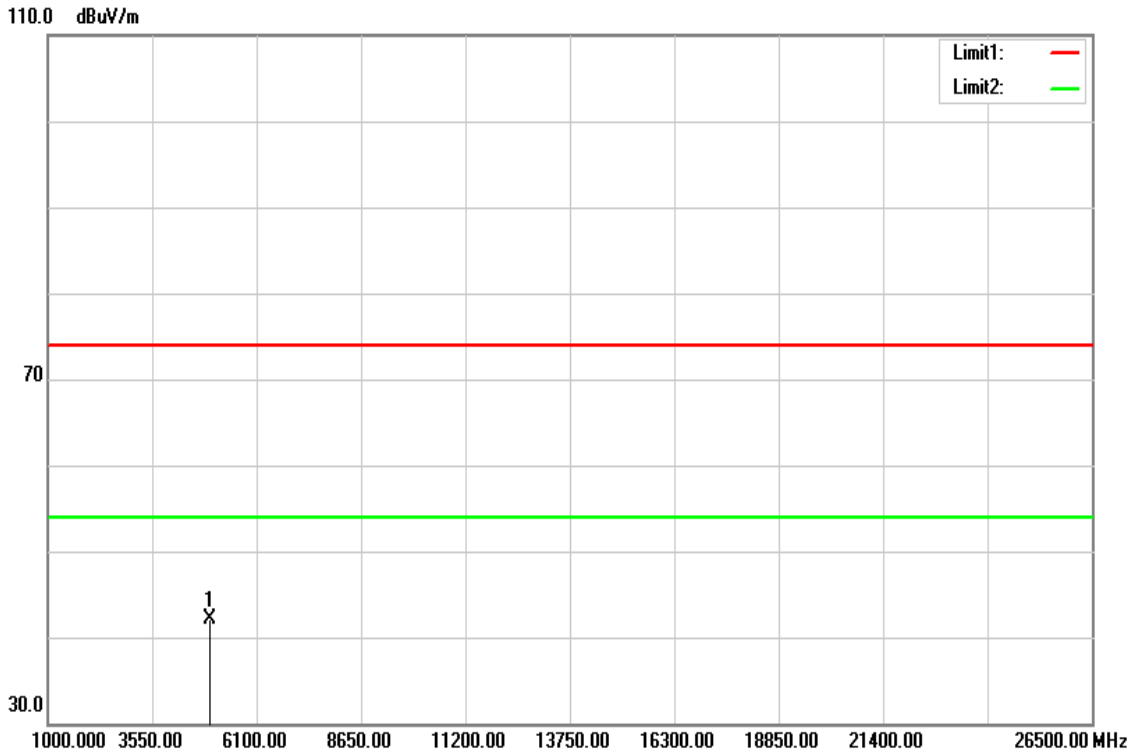

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4882.000 | 37.33 | 4.49 | 41.82 | 74.00 | -32.18 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |



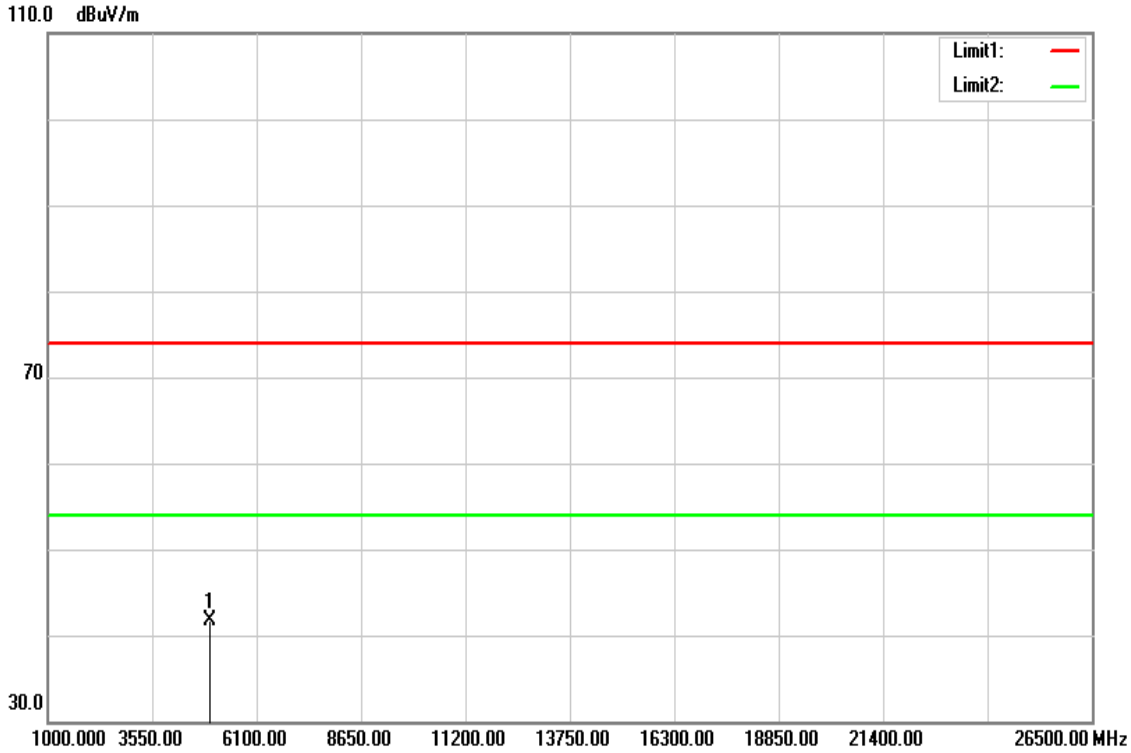

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4960.000 | 37.57 | 4.61 | 42.18 | 74.00 | -31.82 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*

| | | | |
|---|---|---|---|
| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 24(℃)/ 33%RH |
| Test Item | Harmonic | Test Date | December 4, 2017 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 4960.000 | 37.07 | 4.61 | 41.68 | 74.00 | -32.32 | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit*


*This report shall not be reproduced except in full, without the written approval of Compliance Certification Services.*