# RADIO TEST REPORT

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

| | |
|---|---|
| **Test Standard** | **FCC Part 15.247**<br>**IC RSS-247 issue 2 and IC RSS-GEN issue 5** |
| **Product name** | **Computer** |
| **Brand Name** | **ADVANTECH** |
| **Model Name** | **FCC: AIM8IACxxxxxxxxxxxxxxxx; AIM8Ixxxxxxxxxxxxxxxx; AIM-x5ATxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)**<br>**ISED: AIM8IAC** |
| **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)

*Approved by:*

Sam Chuang
Manager

*Tested by:*

Jerry Chuang
Engineer

# Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| 00 | October 30, 2018 | Initial Issue | May Lin |

# Table of contents

# 1. GENERAL INFORMATION

## 1.1 EUT INFORMATION

| | |
|---|---|
| Applicant | Advantech Co.Ltd.<br>No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C. |
| Manufacturer | Advantech Co.Ltd.<br>No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C. |
| Equipment | Computer |
| Model No. | **FCC:** AIM8IACxxxxxxxxxxxxxxxx; AIM8Ixxxxxxxxxxxxxxxx;<br>AIM-x5ATxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)<br>**ISED:** AIM8IAC |
| Model Discrepancy | **FCC:** All the above models are identical except for the designation of model numbers. The suffix of (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions) on model number is just for marketing purpose only. |
| Received Date | May 22, 2018 |
| Date of Test | June 27 ~ 29, 2018 |
| Output Power(W) | GFSK: 0.0036<br>8DPSK: 0.0025 |
| Power Supply | 1. VDC from Power Adapter<br>Brand: Chicony<br>Model name: A16-018N1A<br>Input: 100-240Vac, 50-60Hz, 1A<br>Output: 5.15Vdc, 3A / 9.1Vdc, 2A<br>2. Power from Battery:<br>ADVANTECH / AIM-BAT-8<br>Rating: 3.8Vdc 4900mAh |

# 1.2 INFORMATION ABOUT THE FHSS CHARACTERISTICS

## 1.2.1 Pseudorandom Frequency Hopping Sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; the phase in the hopping sequence is determined by the Bluetooth clock of the master. The channel is divided into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The nominal hop rate is 1 600 hops/s.

## 1.2.2 Equal Hopping Frequency Use

The channels of this system will be used equally over the long-term distribution of the hopsets.

## 1.2.3 Example of a 79 hopping sequence in data mode:

02, 05, 31, 24, 20, 10, 43, 36, 30, 23, 40, 06, 21, 50, 44, 09, 71, 78, 01, 13, 73, 07, 70, 72, 35, 62, 42, 11, 41, 08, 16, 29, 60, 15, 34, 61, 58, 04, 67, 12, 22, 53, 57, 18, 27, 76, 39, 32, 17, 77, 52, 33, 56, 46, 37, 47, 64, 49, 45, 38, 69, 14, 51, 26, 79, 19, 28, 65, 75, 54, 48, 03, 25, 66, 05, 16, 68, 74, 59, 63, 55

## 1.2.4 System Receiver Input Bandwidth

Each channel bandwidth is 1MHz.
The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

## 1.2.5 Equipment Description

15.247(a)(1) that the Rx input bandwidths shift frequencies in synchronization with the transmitted signals.
15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.
15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate it channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

## 1.3 EUT CHANNEL INFORMATION

| | |
|---|---|
| Frequency Range | 2402MHz-2480MHz |
| Modulation Type | 1. GFSK for BR-1Mbps<br>2. 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 1 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 |

## 1.4 ANTENNA INFORMATION

| | |
|---|---|
| **Antenna Type** | ☒ PIFA ☐ PCB ☐ Dipole ☐ Coils |
| **Antenna Gain** | Gain: 0.37dBi |

# 1.5 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| AC Powerline Conducted Emission | +/- 2.96 |
| 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 |

***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.*

## 1.6 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 | Dally Hong | - |
| 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.*

# 1.7 INSTRUMENT CALIBRATION

| RF Conducted Test Site | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal Date** | **Cal Due** |
| Power Meter | Anritsu | ML2495A | 1012009 | 09/18/2017 | 09/17/2018 |
| Power Sensor | Anritsu | MA2411B | 917072 | 09/18/2017 | 09/17/2018 |
| Base Station | R&S | CMW 500 | 116875 | 04/20/2018 | 04/19/2019 |
| Spectrum Analyzer | R&S | FSV 40 | 101073 | 10/02/2017 | 10/01/2018 |
| 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 |

| 3M 966 Chamber Test Site | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal Date** | **Cal Due** |
| Band Reject Filters | MICRO TRONICS | BRM 50702 | 120 | 05/14/2018 | 05/13/2019 |
| Bilog Antenna | Sunol Sciences | JB3 | A030105 | 06/19/2018 | 06/18/2019 |
| Cable | HUBER SUHNER | SUCOFLEX 104PEA | 25157 | 07/31/2017 | 07/30/2018 |
| Cable | HUBER SUHNER | SUCOFLEX 104PEA | 20995 | 07/31/2017 | 07/30/2018 |
| Digital Thermo-Hygro Meter | WISEWIND | 1206 | D07 | 02/08/2018 | 02/07/2019 |
| double Ridged Guide Horn Antenna | ETC | MCTD 1209 | DRH13M02003 | 08/25/2017 | 08/24/2018 |
| Loop Ant | COM-POWER | AL-130 | 121051 | 03/21/2018 | 03/20/2019 |
| Pre-Amplifier | HP | 8449B | 3008A00965 | 06/28/2018 | 06/27/2019 |
| Pre-Amplifier | EMEC | EM330 | 060609 | 07/31/2017 | 07/30/2018 |
| Wideband Radio Communication Tester | R&S | CMW 500 | 116875 | 04/20/2018 | 04/19/2019 |
| PSA Series Spectrum Analyzer | Agilent | E4446A | MY46180323 | 05/31/2018 | 05/30/2019 |
| 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 |

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

| AC Conducted Emissions Test Site | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal Date** | **Cal Due** |
| LISN | R&S | ENV216 | 101054 | 02/06/2018 | 02/05/2019 |
| LISN | SCHWARZBECK | NSLK 8127 | 8127-541 | 02/09/2018 | 02/08/2019 |
| EMI Test Receiver | R&S | ESCI | 101203 | 11/02/2017 | 11/01/2018 |

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

## 1.8 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.** | **FCC ID** |
| | N/A | | | | |

## 1.9 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 5.

# 2. TEST SUMMERY

| FCC Standard Section | IC Standard Section | Report Section | Test Item | Result |
|---|---|---|---|---|
| 15.203 | - | 1.3 | 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 | Pass |
| - | RSS-GEN 6.7 | 4.2 | Occupied Bandwidth (99%) | Pass |
| 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 Spurious 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 |

# 3. DESCRIPTION OF TEST MODES

## 3.1 THE WORST MODE OF OPERATING CONDITION

| | |
|---|---|
| Operation mode | GFSK for BR-1Mbps (DH5)<br>8DPSK for EDR-3Mbps (DH5) |
| Test Channel Frequencies | **GFSK for BR-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.*

## 3.2 THE WORST MODE OF MEASUREMENT

| AC Power Line Conducted Emission | |
|---|---|
| Test Condition | AC Power line conducted emission for line and neutral |
| Power supply Mode | Mode 1: EUT power by AC adapter via power cable.<br>Mode 2: EUT power by battery. |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

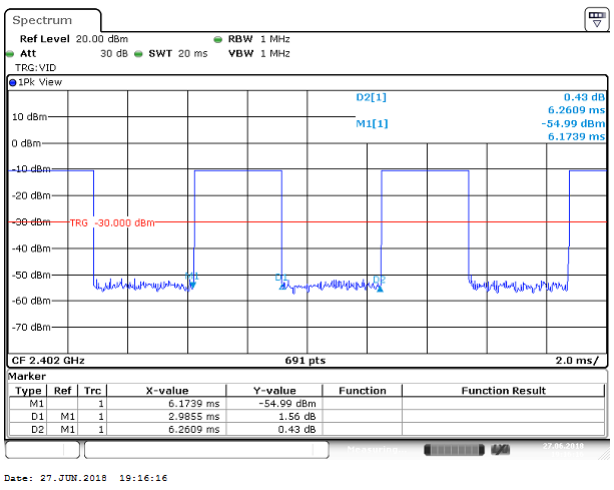
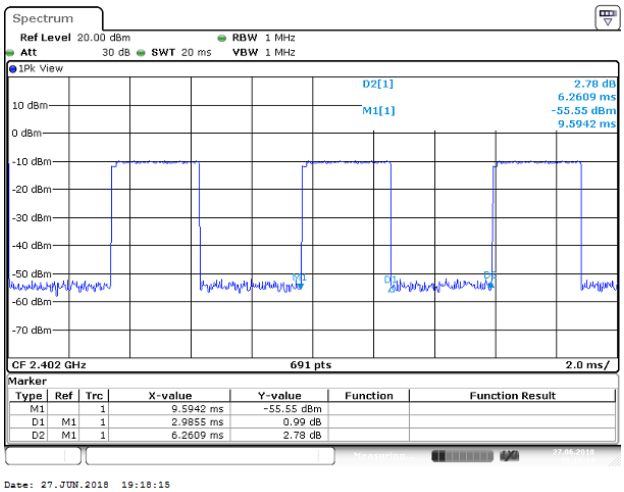
| Radiated Emission Measurement Above 1G | |
|---|---|
| Test Condition | Band edge, Emission for Unwanted and Fundamental |
| Power supply Mode | Mode 1: EUT power by AC adapter via power cable.<br>Mode 2: EUT power by battery. |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |
| Worst Position | ☐ 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 |

| Radiated Emission Measurement Below 1G | |
|---|---|
| Test Condition | Radiated Emission Below 1G |
| Power supply Mode | Mode 1: EUT power by AC adapter via power cable.<br>Mode 2: EUT power by battery. |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

***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 (X-Plane and Horizontal) 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.*

## 3.3 EUT DUTY CYCLE

| Duty Cycle | | | | |
|---|---|---|---|---|
| Configuration | TX ON (ms) | TX ALL (ms) | Duty Cycle (%) | Duty Factor(dB) |
| BR-1Mbps | 2.9855 | 6.2609 | 47.68% | 3.22 |
| EDR-3Mbps | 2.9855 | 6.2609 | 47.68% | 3.22 |

| BR-1Mbps | EDR-3Mbps |
|---|---|
|  |  |

# 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 |

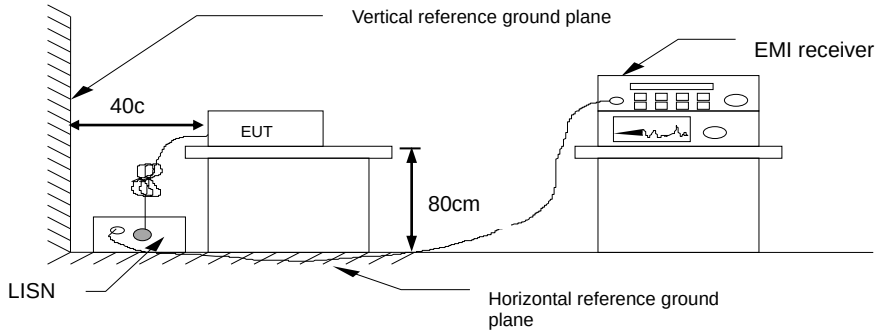
* Decreases with the logarithm of the frequency.

### 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

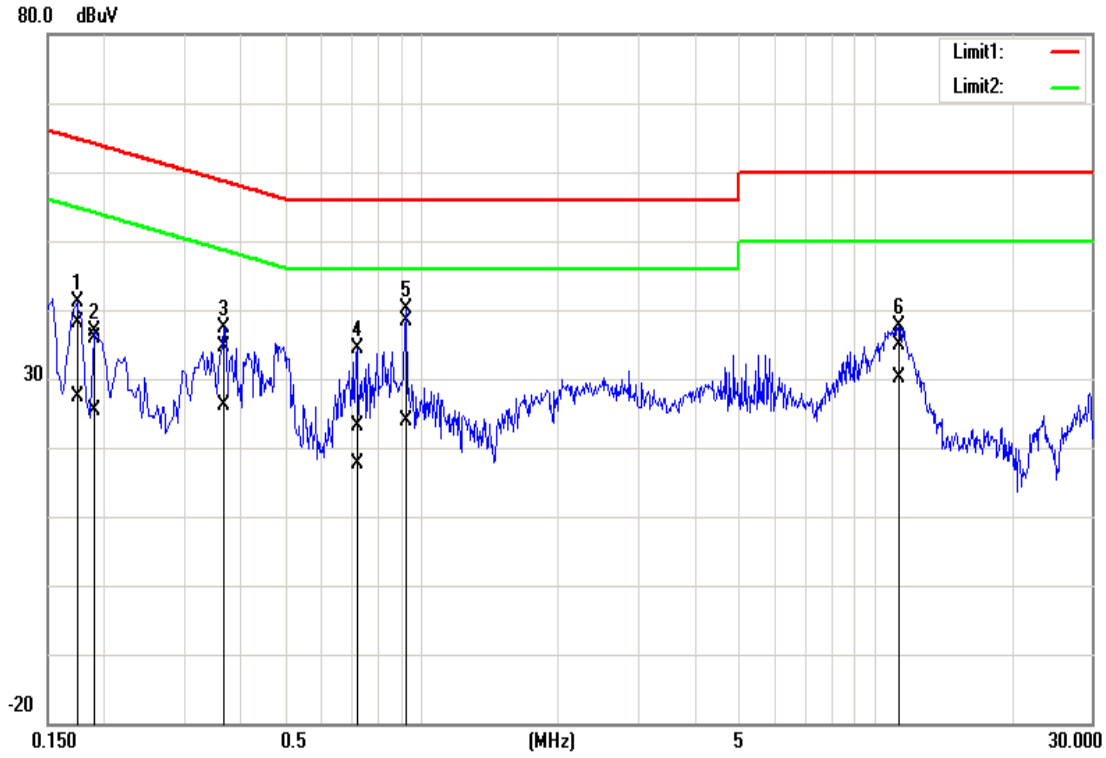



### 4.1.4 Test Result

**Pass.**

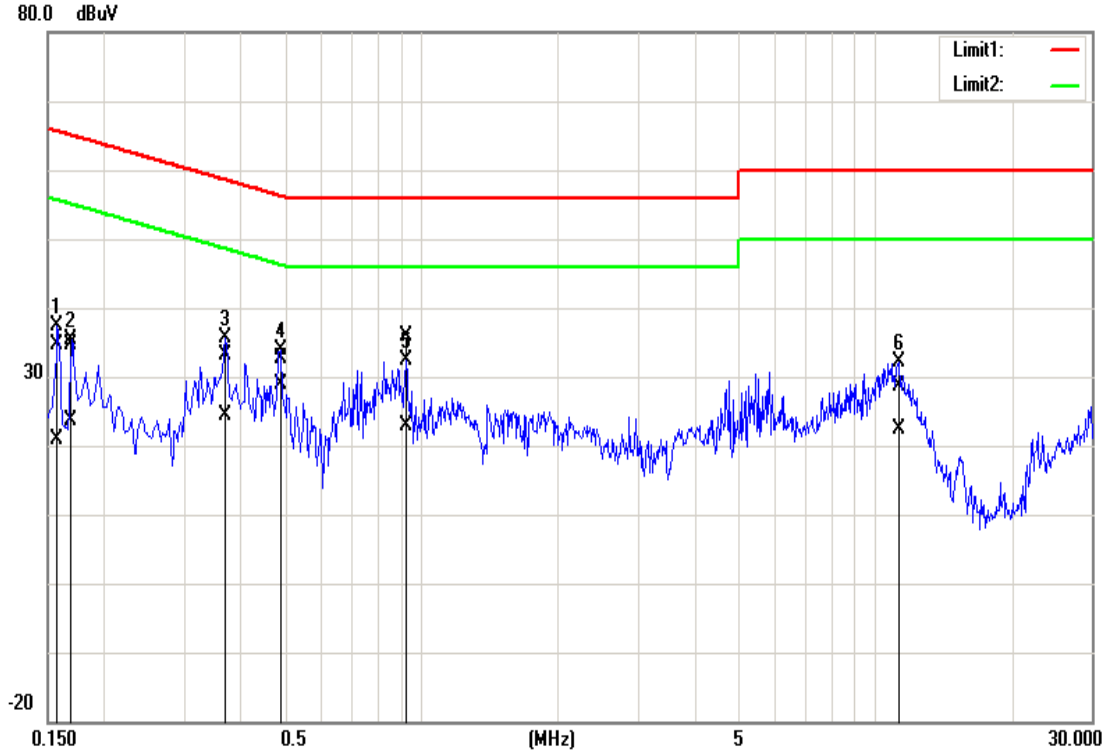
## Test Data

| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
|---|---|---|---|
| Test Voltage: | 120Vac / 60Hz | Test Date | 2018/06/29 |
| Phase: | Line | Test Engineer | Dally Hong |




| No. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | |
| 1 | 0.1740 | 38.01 | 27.25 | 0.11 | 38.12 | 27.36 | 64.77 | 54.77 | -26.65 | -27.41 | Pass |
| 2 | 0.1900 | 35.72 | 25.38 | 0.11 | 35.83 | 25.49 | 64.04 | 54.04 | -28.21 | -28.55 | Pass |
| 3 | 0.3660 | 34.57 | 25.98 | 0.12 | 34.69 | 26.10 | 58.59 | 48.59 | -23.90 | -22.49 | Pass |
| 4 | 0.7220 | 23.06 | 17.51 | 0.13 | 23.19 | 17.64 | 56.00 | 46.00 | -32.81 | -28.36 | Pass |
| 5 | 0.9260 | 38.34 | 23.82 | 0.13 | 38.47 | 23.95 | 56.00 | 46.00 | -17.53 | -22.05 | Pass |
| 6 | 11.3060 | 34.59 | 29.69 | 0.32 | 34.91 | 30.01 | 60.00 | 50.00 | -25.09 | -19.99 | Pass |

| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
|---|---|---|---|
| Test Voltage: | 120Vac / 60Hz | Test Date | 2018/06/29 |
| Phase: | Neutral | Test Engineer | Dally Hong |




| No. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | |
| 1 | 0.1580 | 34.49 | 20.72 | 0.14 | 34.63 | 20.86 | 65.57 | 55.57 | -30.94 | -34.71 | Pass |
| 2 | 0.1700 | 34.38 | 23.57 | 0.14 | 34.52 | 23.71 | 64.96 | 54.96 | -30.44 | -31.25 | Pass |
| 3 | 0.3700 | 33.05 | 24.26 | 0.13 | 33.18 | 24.39 | 58.50 | 48.50 | -25.32 | -24.11 | Pass |
| 4 | 0.4900 | 32.60 | 28.70 | 0.13 | 32.73 | 28.83 | 56.17 | 46.17 | -23.44 | -17.34 | Pass |
| 5 | 0.9260 | 35.85 | 22.65 | 0.14 | 35.99 | 22.79 | 56.00 | 46.00 | -20.01 | -23.21 | Pass |
| 6 | 11.2660 | 28.19 | 21.98 | 0.32 | 28.51 | 22.30 | 60.00 | 50.00 | -31.49 | -27.70 | Pass |

# 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 6.7,

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

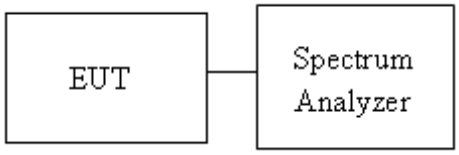
**Occupied Bandwidth(99%)** ：For reporting purposes only.

## 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.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. 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_BR-1Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 0.9030 | 1.0507 |
| Mid | 2441 | 0.8986 | 1.055 |
| High | 2480 | 0.9030 | 1.0507 |

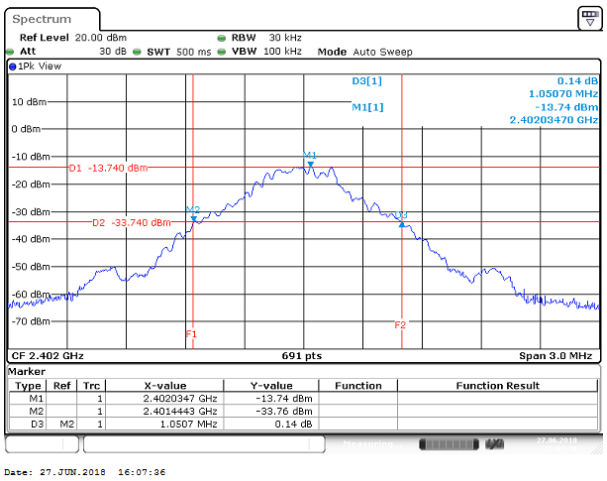
| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 1.2243 | 1.3372 |
| Mid | 2441 | 1.2286 | 1.3372 |
| High | 2480 | 1.2243 | 1.3372 |

# Test Data

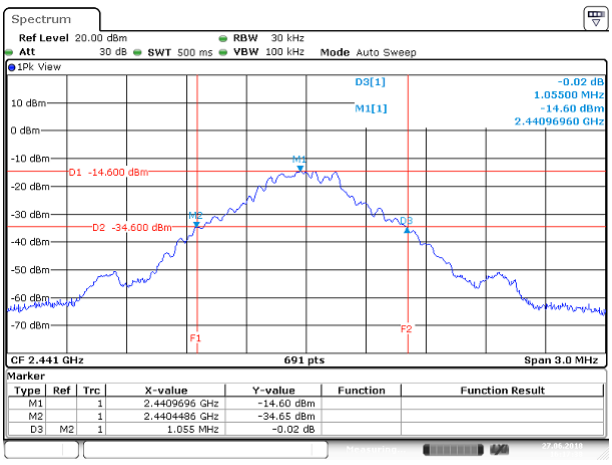
## 20dB

**GFSK_BR-1Mbps mode**

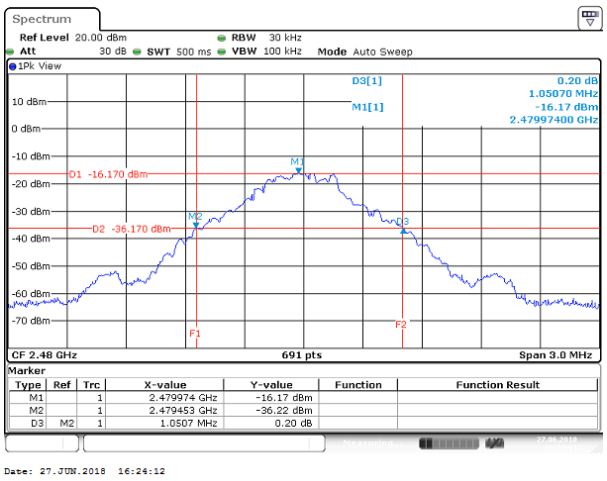
### Low CH




### Mid CH

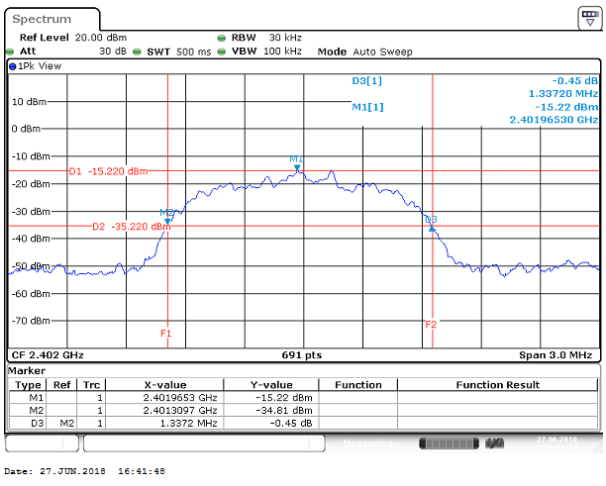



### High CH

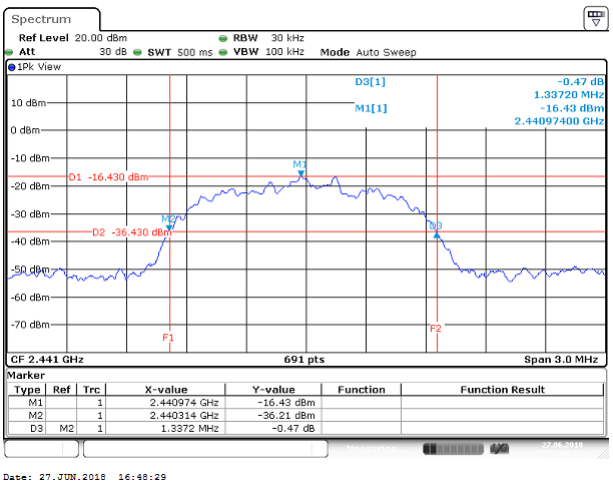


## 8DPSK_EDR-3Mbps mode

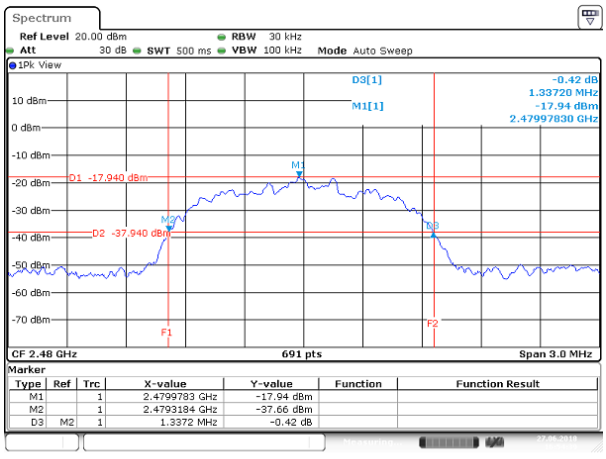
### Low CH



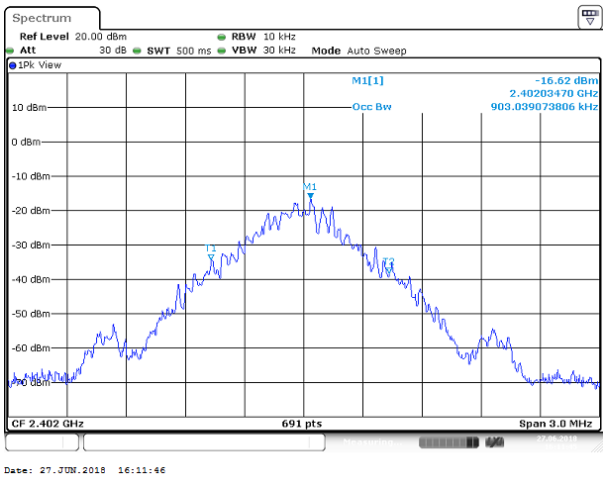
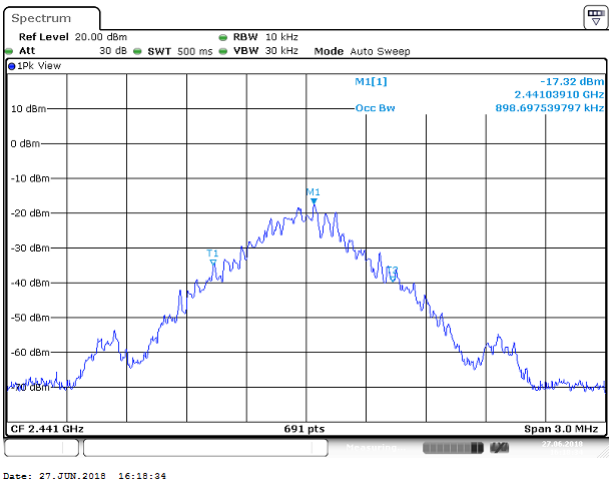
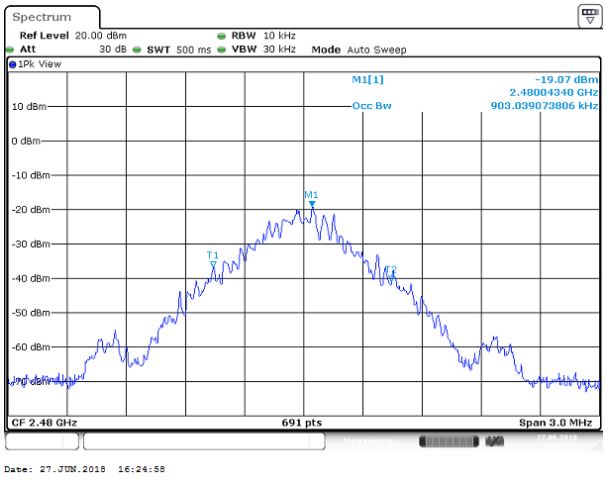

### Mid CH

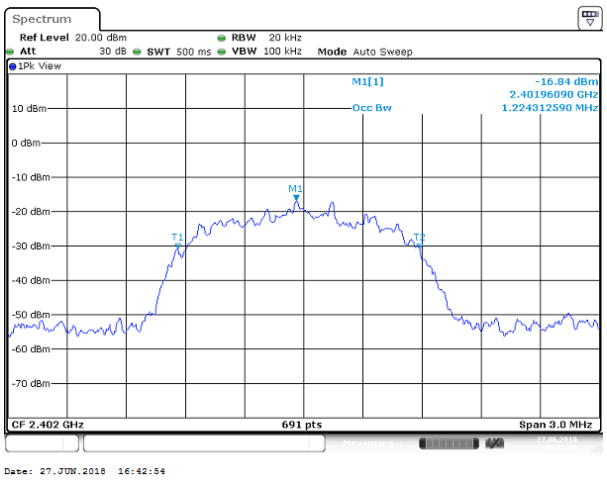
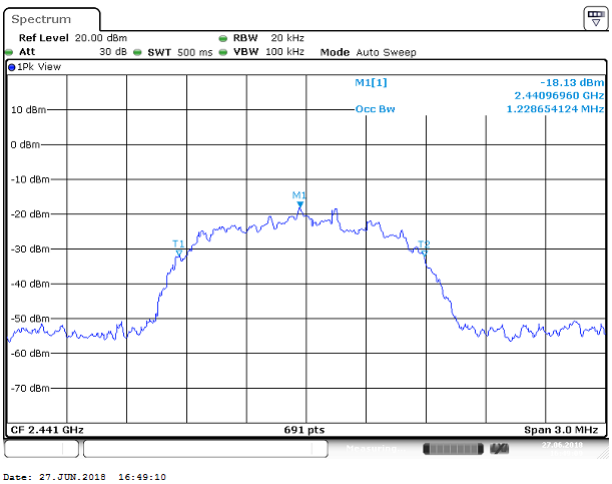
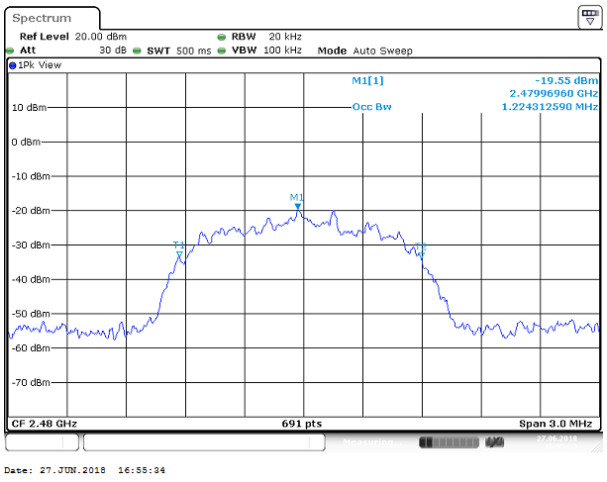



### High CH



## 99%OBW

| GFSK_BR-1Mbps mode | |
|---|---|
| **Low CH** | **Mid CH** |
|  |  |
| **High CH** | |
|  | |

| 8DPSK_EDR-3Mbps mode | |
|---|---|
| **Low CH** | **Mid CH** |
|  |  |
| **High CH** | |
|  | |

# 4.3 OUTPUT POWER MEASUREMENT

## 4.3.1 Test Limit

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

**Peak output power**：

**FCC**

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

**IC**

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels.

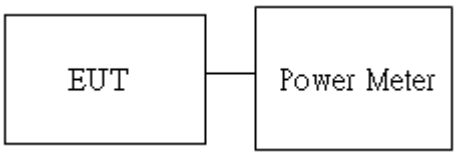
| | |
|---|---|
| Limit | ☒ Antenna not exceed 6 dBi：21dBm<br>☐ Antenna with DG greater than 6 dBi：21dBm<br>[ Limit = 30 – (DG – 6)] |

**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



### 4.3.4 Test Result

**Peak output power：**

| BT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Config. | CH | Freq. (MHz) | PK Power (dBm) | EIRP PK Power (dBm) | PK Power (W) | EIRP PK Power (W) | FCC/IC Limit (dBm) | IC EIRP Limit (dBm) |
| GFSK BR-1Mbps (DH5) | 0 | 2402 | 5.52 | 5.89 | 0.0036 | 0.0039 | 21 | 36 |
| | 39 | 2441 | 5.07 | 5.44 | 0.0032 | 0.0035 | | |
| | 78 | 2480 | 3.15 | 3.52 | 0.0021 | 0.0022 | | |
| 8DPSK EDR-3Mbps (DH5) | 0 | 2402 | 3.92 | 4.29 | 0.0025 | 0.0027 | | |
| | 39 | 2441 | 3.02 | 3.39 | 0.0020 | 0.0022 | | |
| | 78 | 2480 | 1.14 | 1.51 | 0.0013 | 0.0014 | | |

**Average output power：**

| BT | | | |
|---|---|---|---|
| Config. | CH | Freq. (MHz) | AV Power (dBm) |
| GFSK BR-1Mbps (DH5) | 0 | 2402 | 5.09 |
| | 39 | 2441 | 4.66 |
| | 78 | 2480 | 2.76 |
| 8DPSK EDR-3Mbps (DH5) | 0 | 2402 | 3.76 |
| | 39 | 2441 | 2.80 |
| | 78 | 2480 | 0.90 |

# 4.4 FREQUENCY SEPARATION

## 4.4.1 Test Limit

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

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

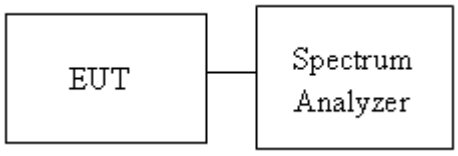
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

| | |
|---|---|
| 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



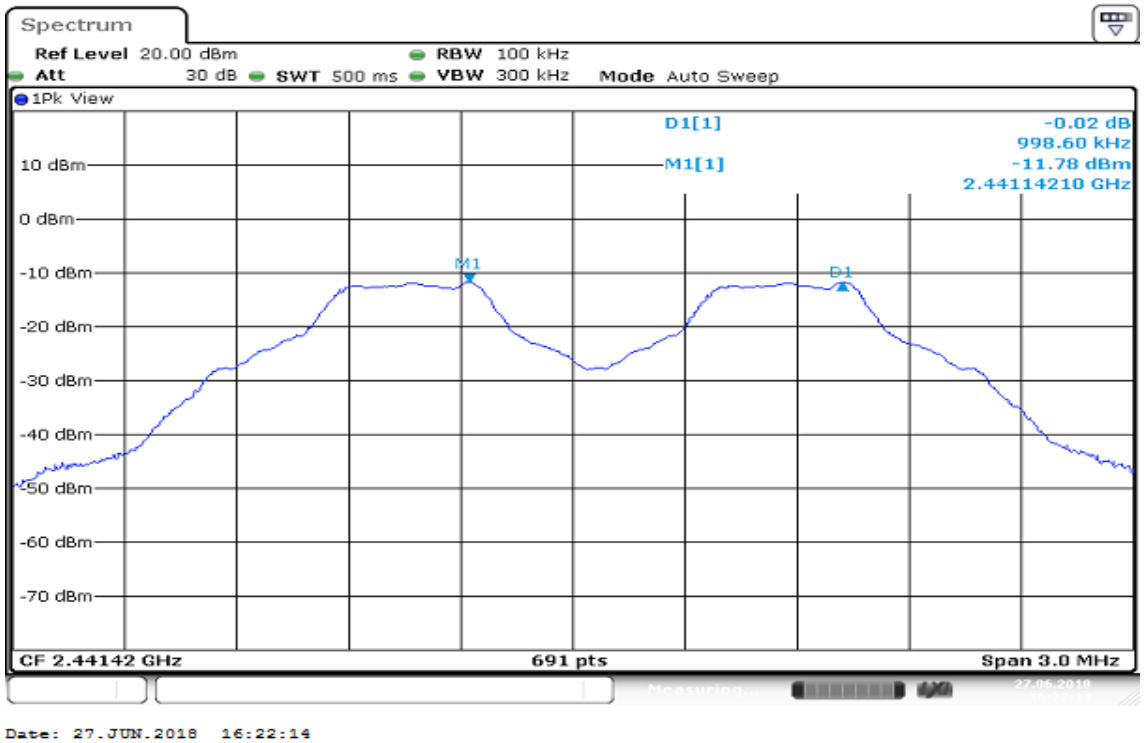
### 4.4.4 Test Result

| Test mode: GFSK_BR-1Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 0.9986 | 0.700 | PASS |
| Mid | 2441 | 0.9986 | 0.703 | PASS |
| High | 2480 | 0.9986 | 0.700 | PASS |

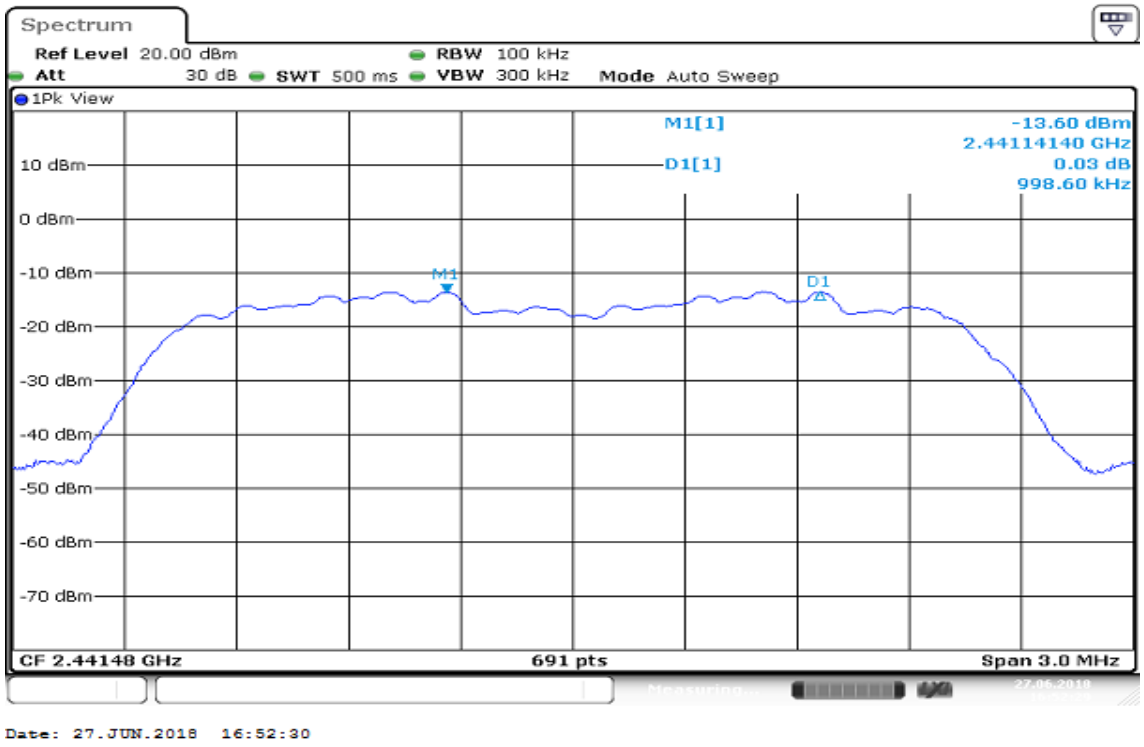
| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 0.9986 | 0.891 | PASS |
| Mid | 2441 | 0.9986 | 0.891 | PASS |
| High | 2480 | 0.9986 | 0.891 | PASS |

## Test Data

**GFSK_BR-1Mbps mode**



**8DPSK_EDR-3Mbps mode**



# 4.5 NUMBER OF HOPPING

## 4.5.1 Test Limit

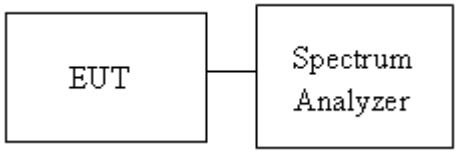
According to §15.247(a)(1)(iii) and RSS-247 section 5.1(d)

Frequency hopping system in the 2400-2483.5MHz 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.

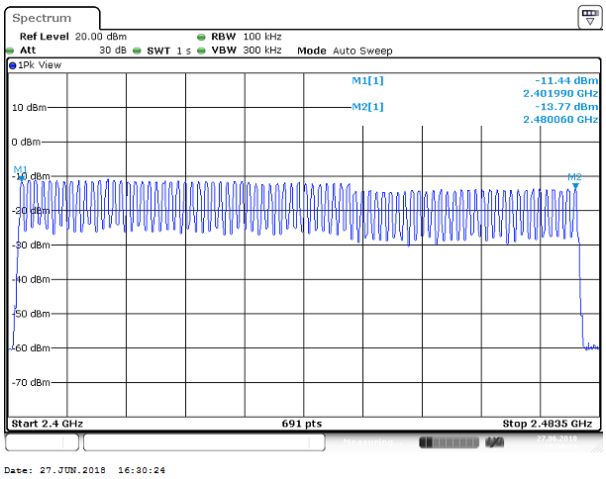
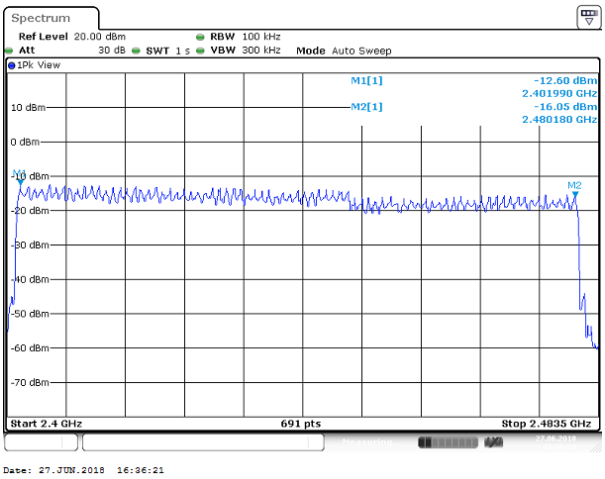
## 4.5.3 Test Setup




## 4.5.4 Test Result

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

## Test Data

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

# 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 |

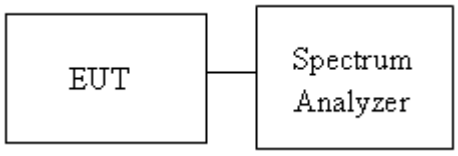
## 4.6.2 Test Procedure

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.

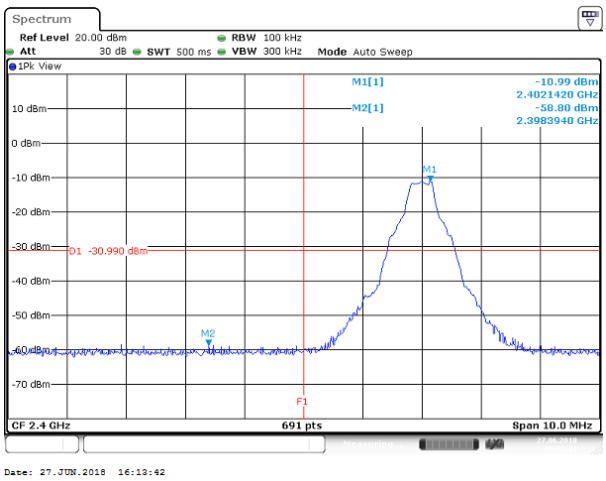
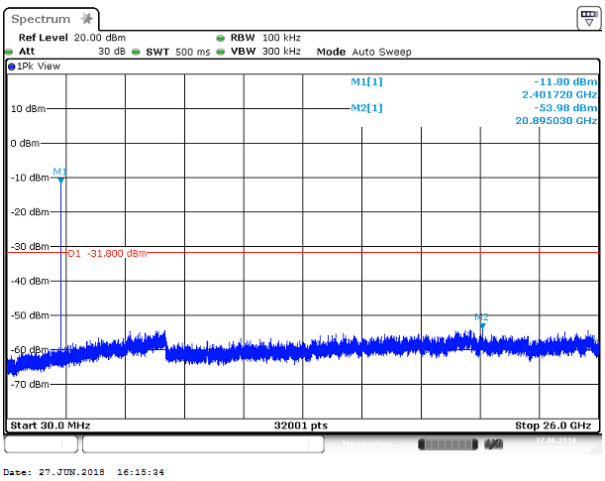
3. The Band Edge at 2.4GHz and 2.4835GHz are investigated with both hopping “ON” and “OFF” modes “.

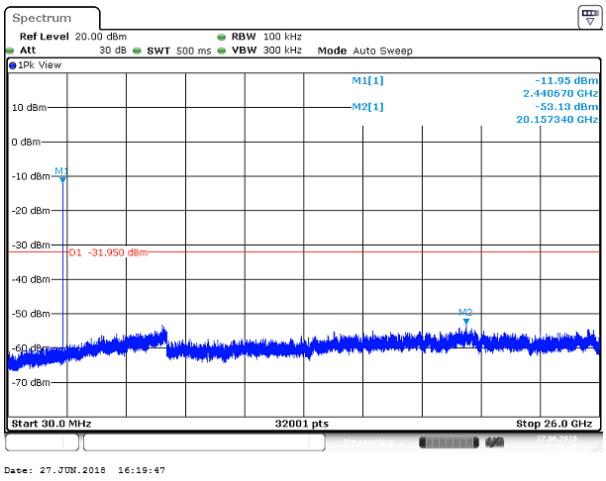
## 4.6.3 Test Setup

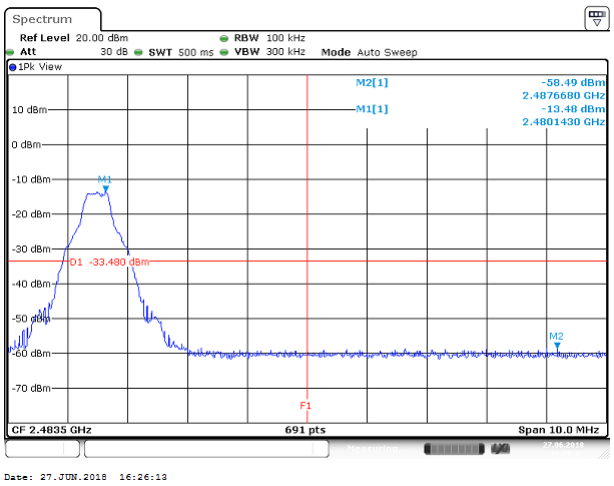
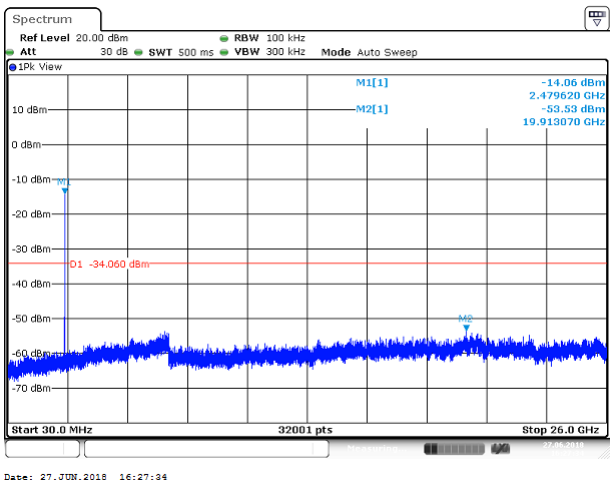


### 4.6.4 Test Result

**Test Data**

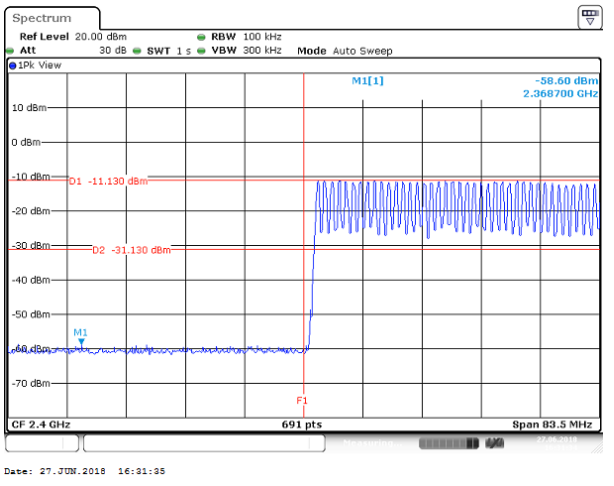
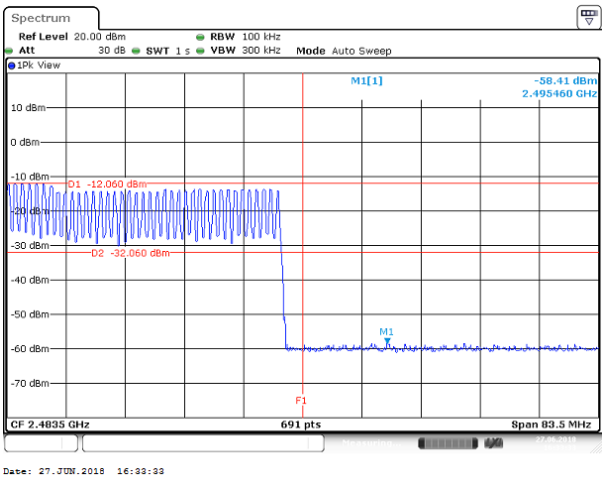
| GFSK_BR-1Mbps mode Low CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |

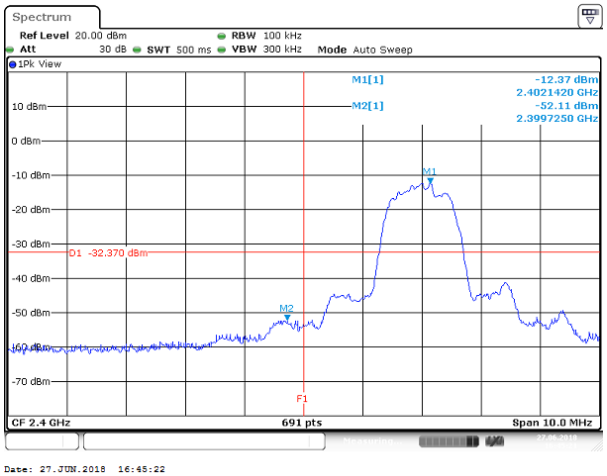
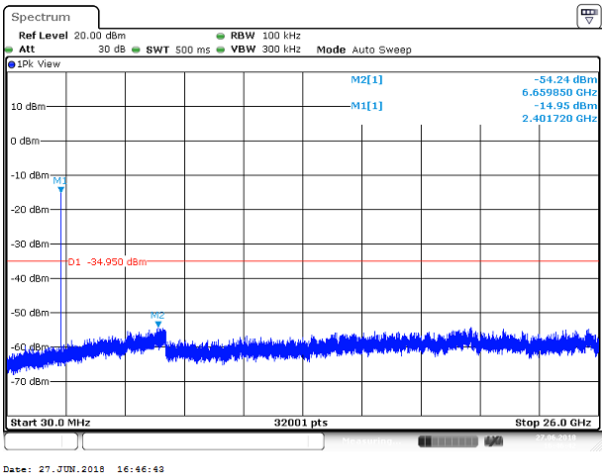
| GFSK_BR-1Mbps mode Mid CH |
|---|
| **Spurious Emission 30MHz-25GHz** |
|  |

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



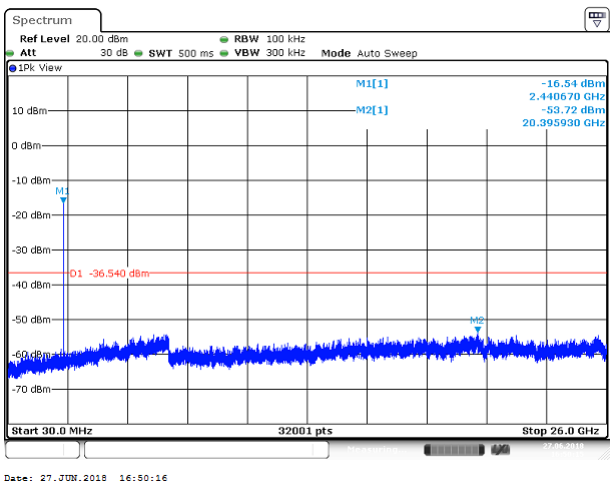


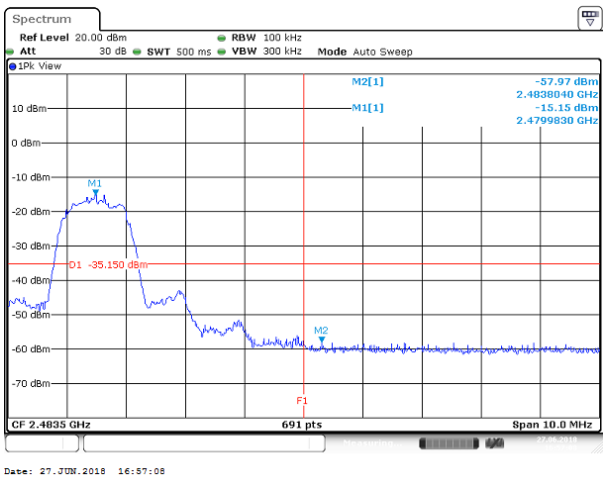
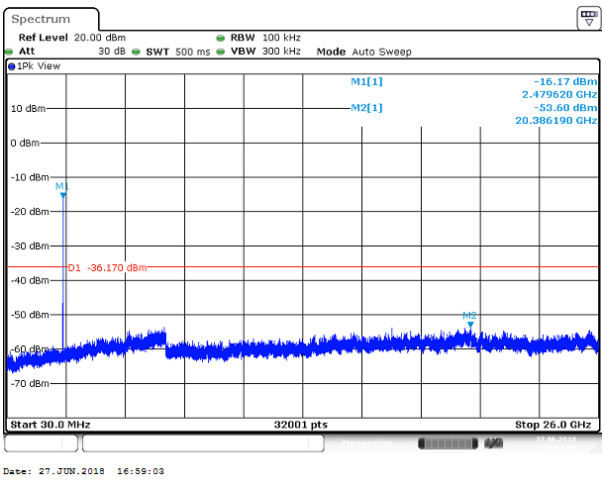
| GFSK_BR-1Mbps Hopping mode | |
|---|---|
| **Low Band Edge** | **High Band Edge** |
|  |  |

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



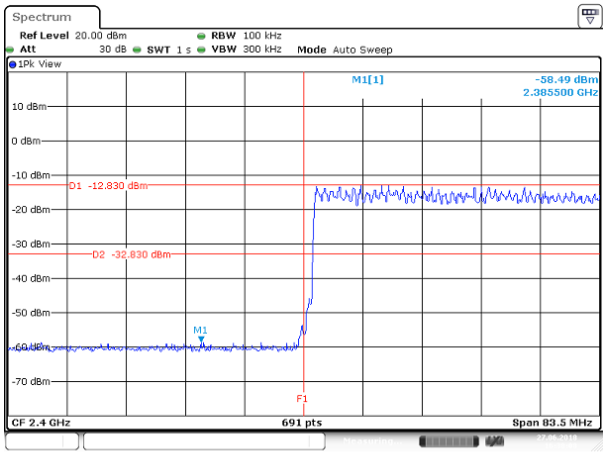
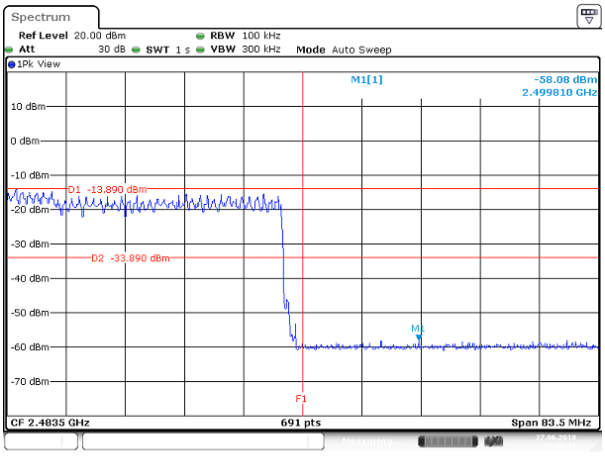


| 8DPSK_EDR-3Mbps mode Mid CH |
|---|
| **Spurious Emission 30MHz-25GHz** |
|  |

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





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

# 4.7 TIME OF OCCUPANCY (DWELL TIME)

## 4.7.1 Test Limit

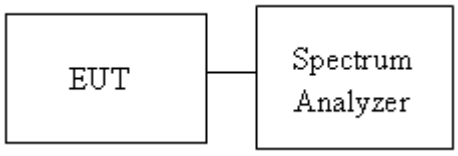
According to §15.247(a)(1)(iii) and RSS-247 section 5.1(d).

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

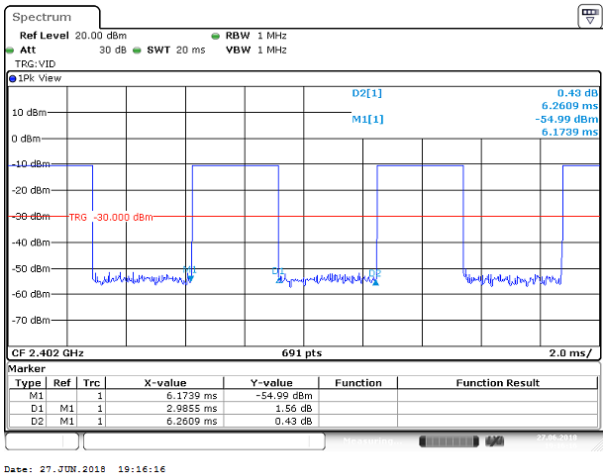
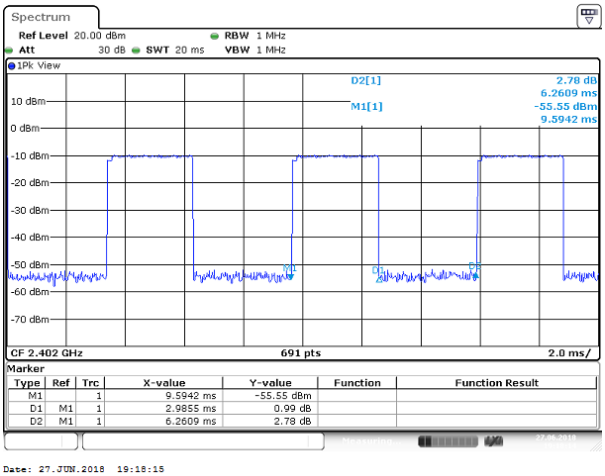
## 4.7.3 Test Setup




## 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 |
| BR-1Mbps | 2441 | 2.9855 | 79 | 106.67 | 0.3185 | 0.4 | Pass |
| EDR-3Mbps | 2441 | 2.9855 | 79 | 106.67 | 0.3185 | 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 | | | | | | | |

## Test Data

| Time of Occupancy (Dwell Time) | |
|---|---|
| **GFSK_BR-1Mbps mode** | **8DPSK_EDR-3Mbps mode** |
|  |  |

# 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 414788.

### 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.

Remark:

1. 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 414788.
2. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

4. 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.

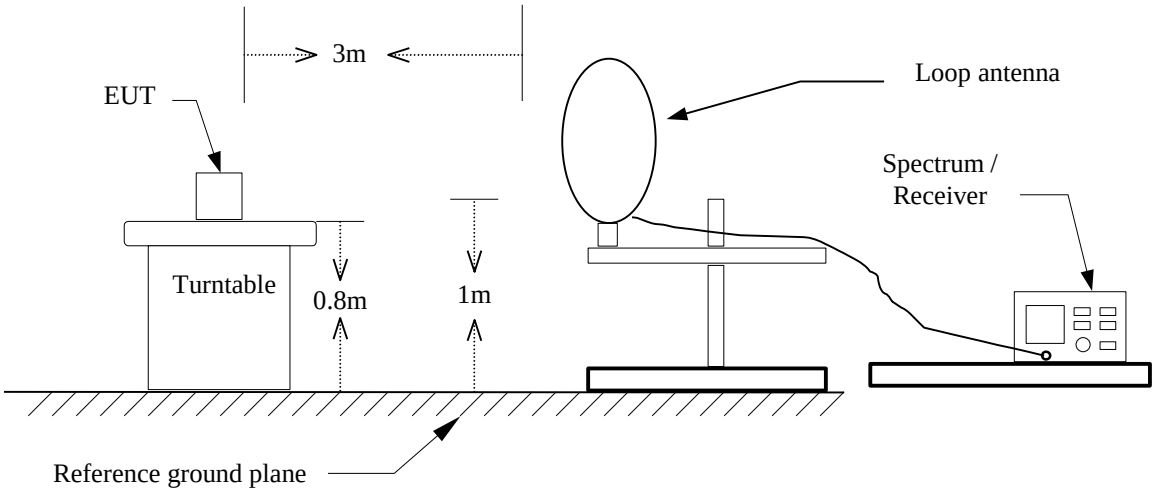
(2.2) For Average measurement：RBW = 1MHz, VBW

- If Duty Cycle ≥ 98%, VBW=10Hz.
- If Duty Cycle < 98%, VBW=1/T.

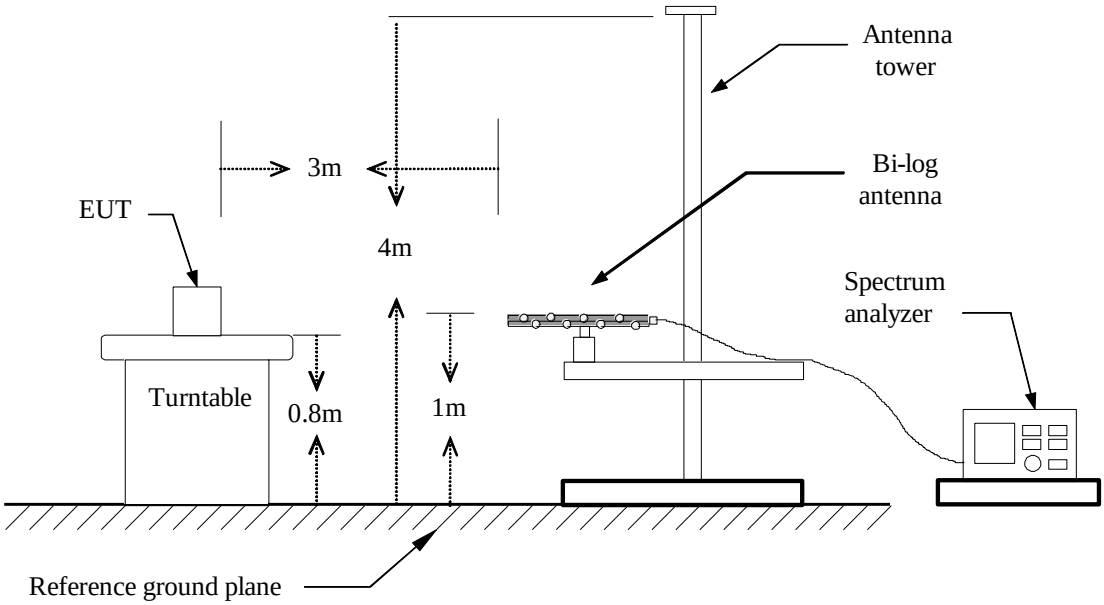
| Configuration | Duty Cycle (%) | T(ms) | 1/T (kHz) | VBW setting |
|---|---|---|---|---|
| GFSK_BR-1Mbps | 48% | 2.9855 | 0.335 | 360Hz |
| 8DPSK_EDR-3Mbps | 48% | 2.9855 | 0.335 | 360Hz |

## 4.8.3 Test Setup

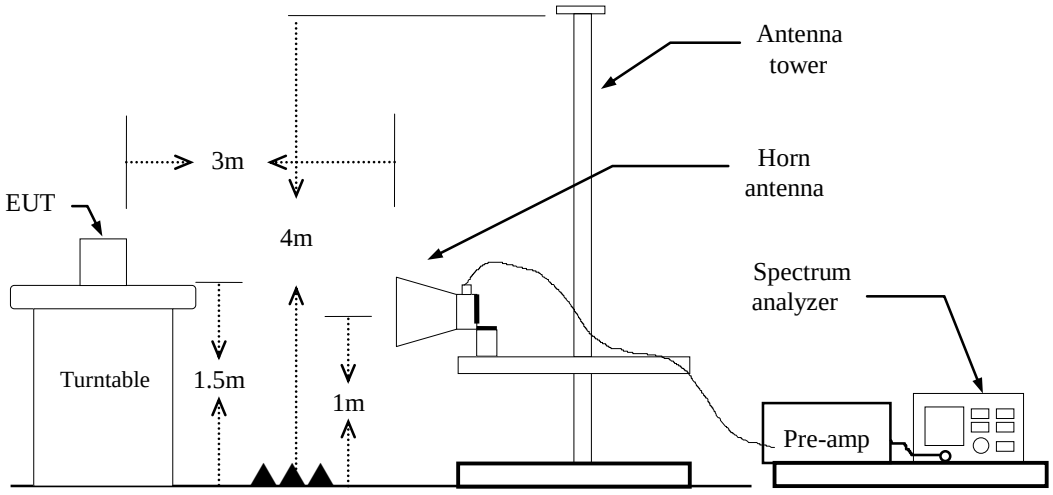
**9kHz ~ 30MHz**




**30MHz ~ 1GHz**



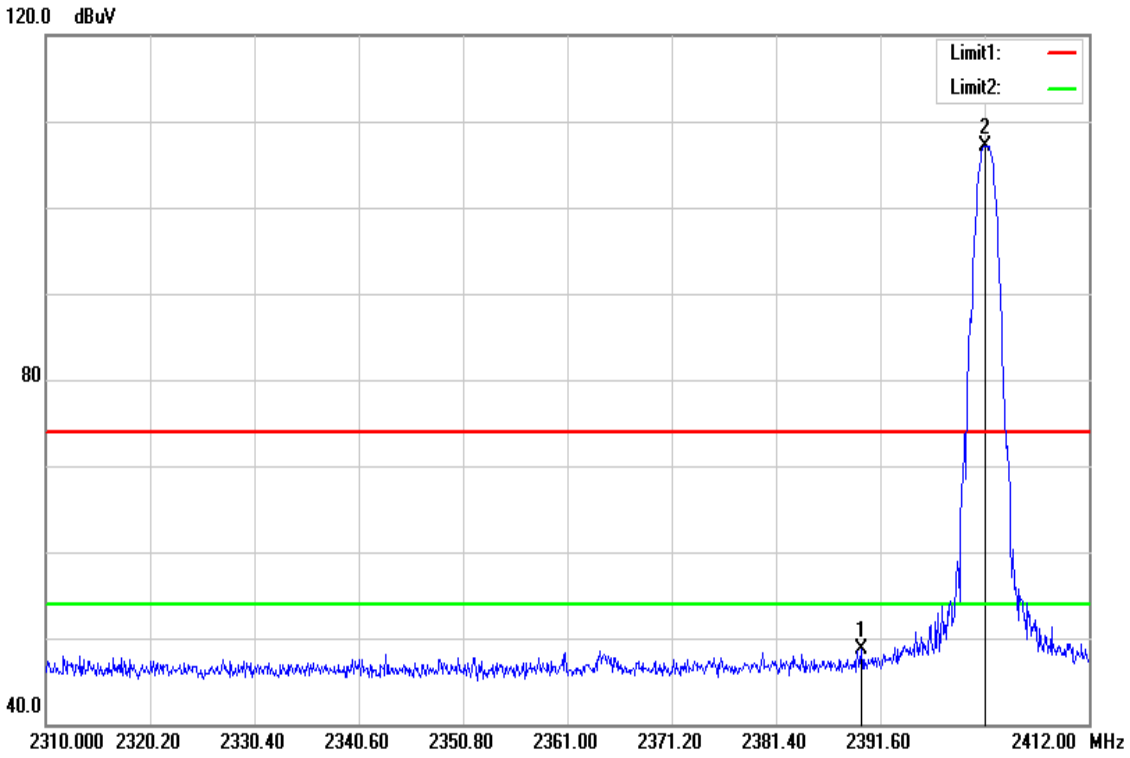
**Above 1 GHz**



## 4.8.4 Test Result

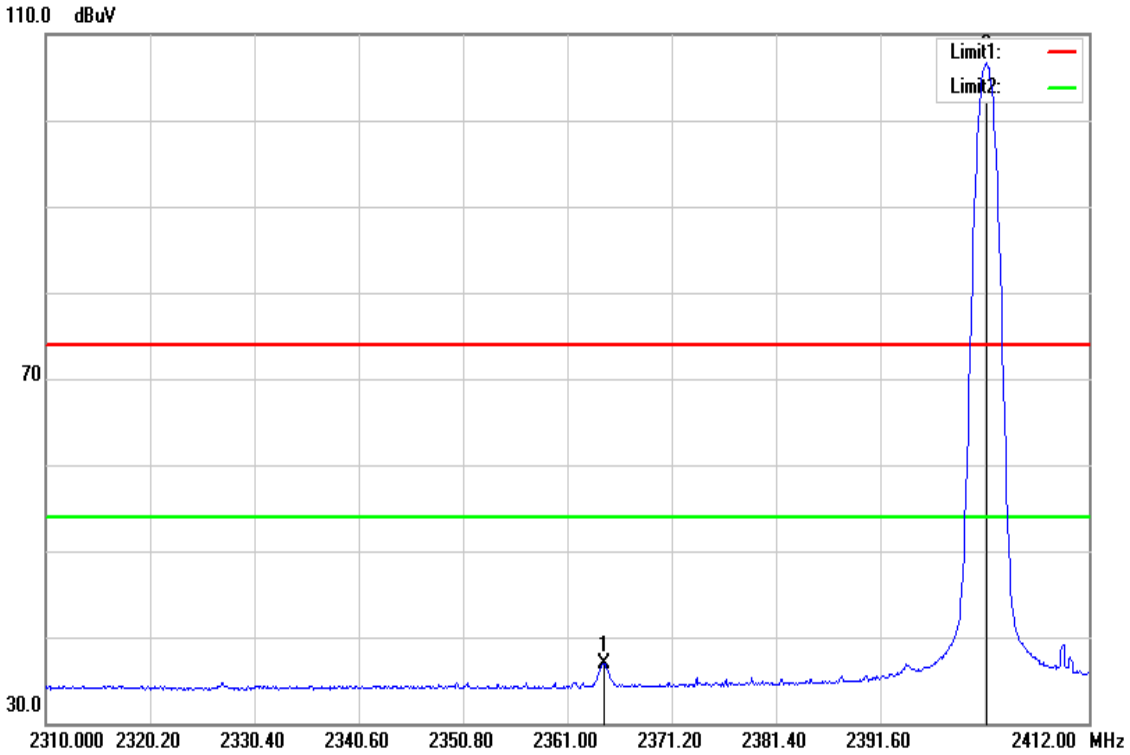
**Band Edge Test Data**

| Test Mode: | GFSK_BR-1Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak | | |



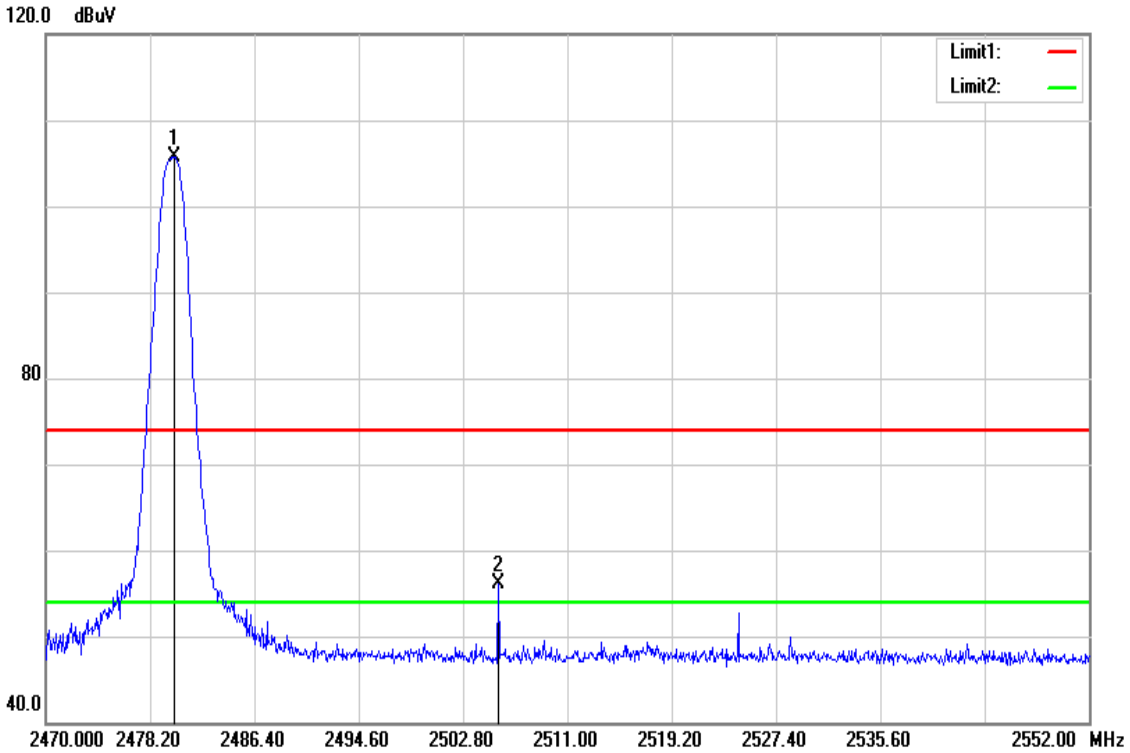

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2389.764 | 51.63 | -2.98 | 48.65 | 74.00 | -25.35 | peak |
| 2 | 2401.800 | 110.06 | -2.95 | 107.11 | - | - | peak |

| Test Mode: | GFSK_BR-1Mbps<br>Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Average | | |



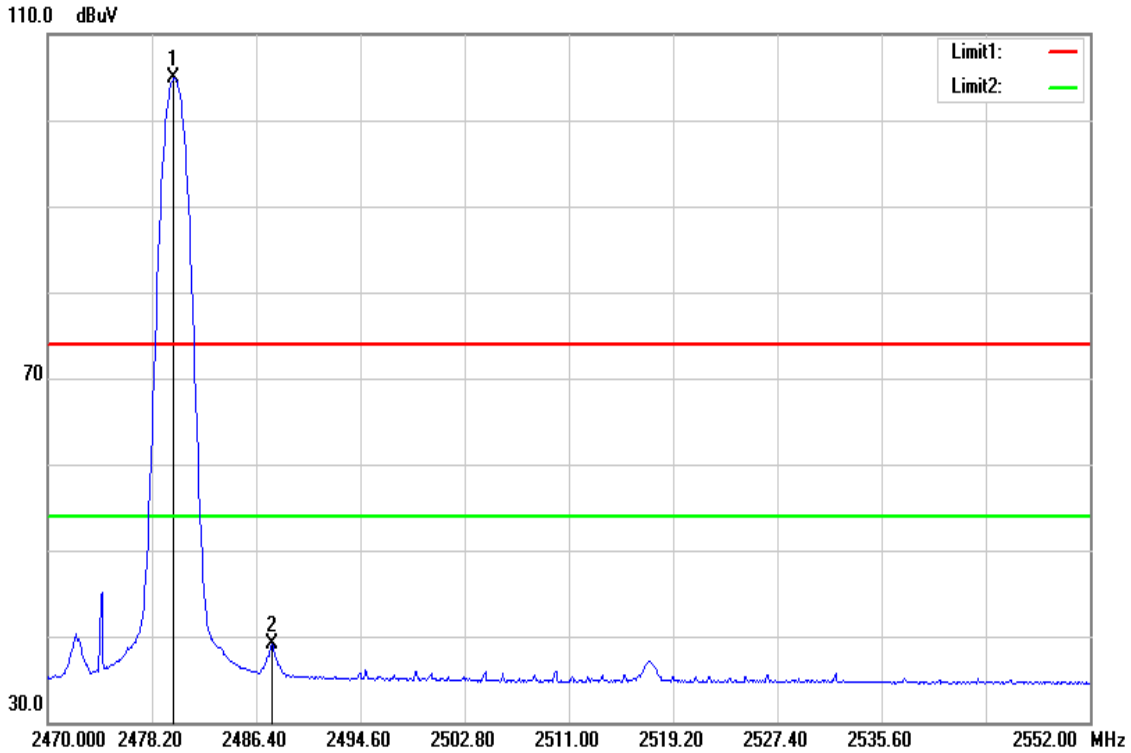

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2364.570 | 40.04 | -3.07 | 36.97 | 54.00 | -17.03 | AVG |
| 2 | 2402.004 | 109.66 | -2.95 | 106.71 | - | - | AVG |

| Test Mode: | GFSK_BR-1Mbps<br>High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak | | |



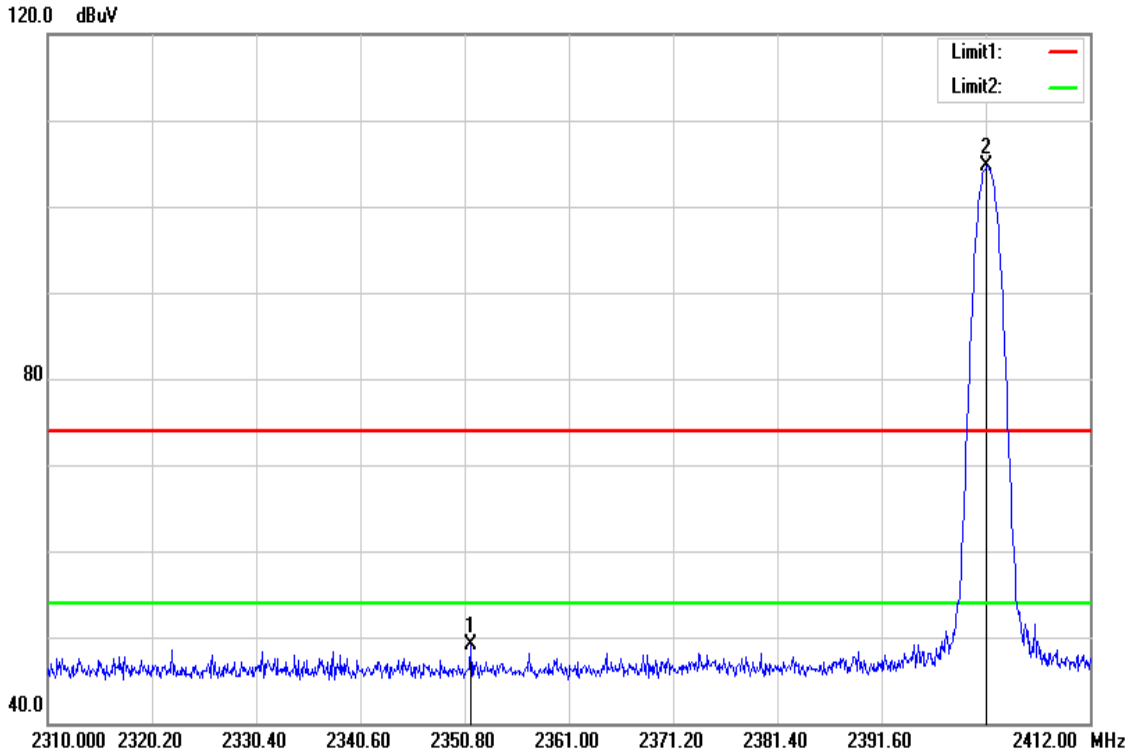

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2480.086 | 108.44 | -2.70 | 105.74 | - | - | peak |
| 2 | 2505.588 | 58.79 | -2.63 | 56.16 | 74.00 | -17.84 | peak |

| Test Mode: | GFSK_BR-1Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Average | | |



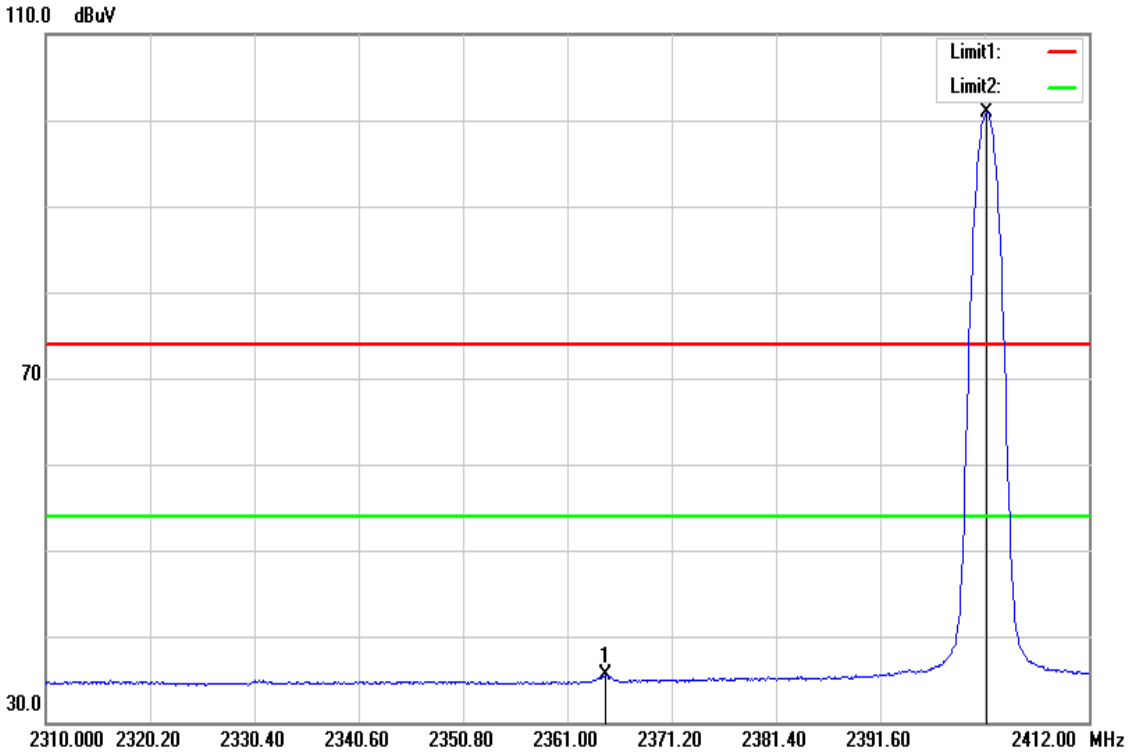

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2479.922 | 107.53 | -2.70 | 104.83 | - | - | AVG |
| 2 | 2487.630 | 41.71 | -2.67 | 39.04 | 54.00 | -14.96 | AVG |

| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak | | |



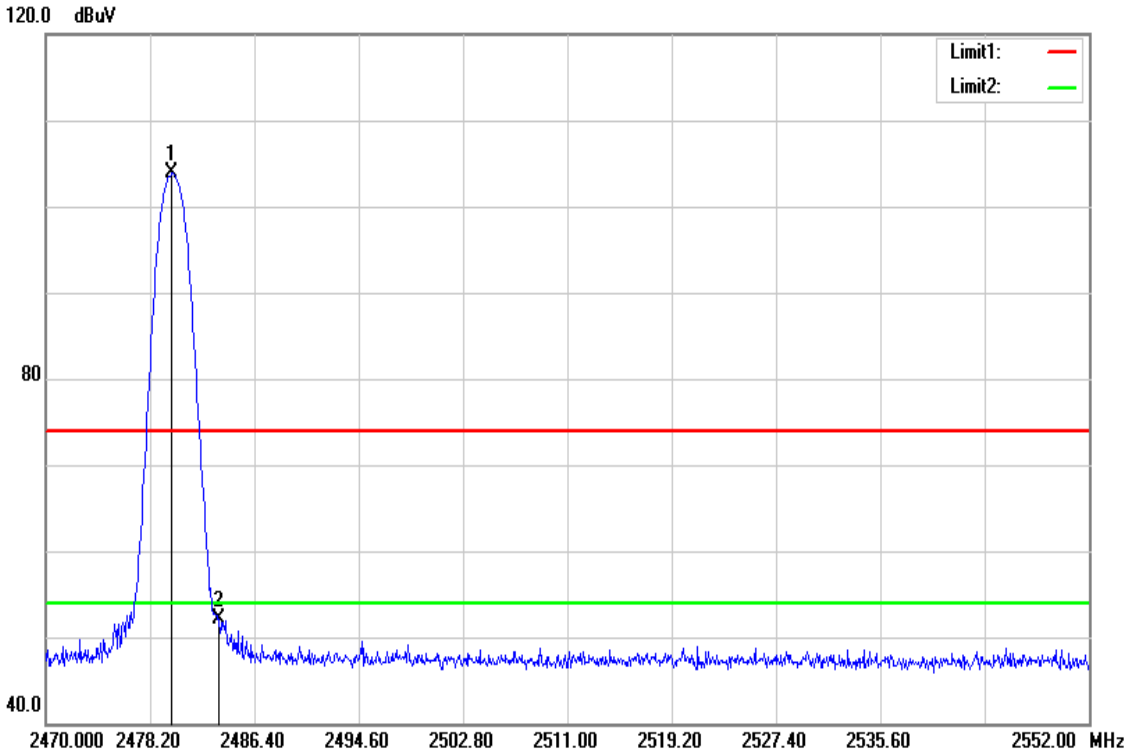

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2351.412 | 52.12 | -3.11 | 49.01 | 74.00 | -24.99 | peak |
| 2 | 2401.902 | 107.59 | -2.95 | 104.64 | - | - | peak |

| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Average | | |



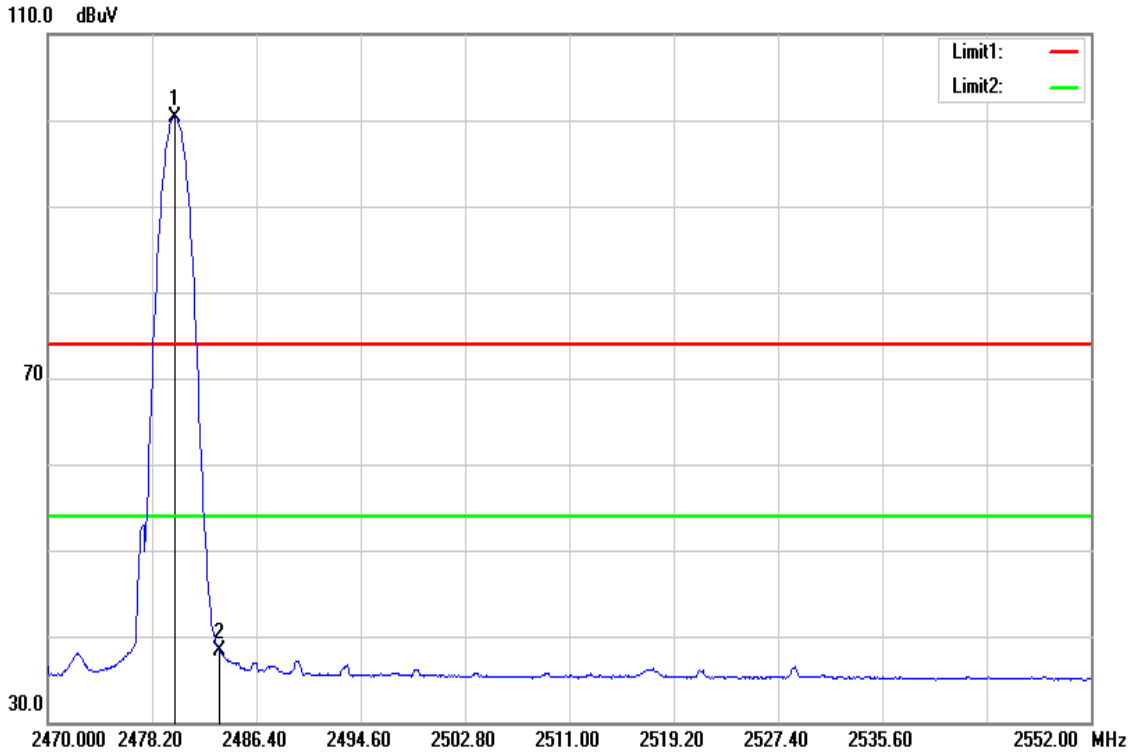

| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2364.774 | 38.56 | -3.07 | 35.49 | 54.00 | -18.51 | AVG |
| 2 | 2402.004 | 103.81 | -2.95 | 100.86 | - | - | AVG |

| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| 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 | 2479.922 | 106.53 | -2.70 | 103.83 | - | - | peak |
| 2 | 2483.612 | 54.88 | -2.69 | 52.19 | 74.00 | -21.81 | peak |

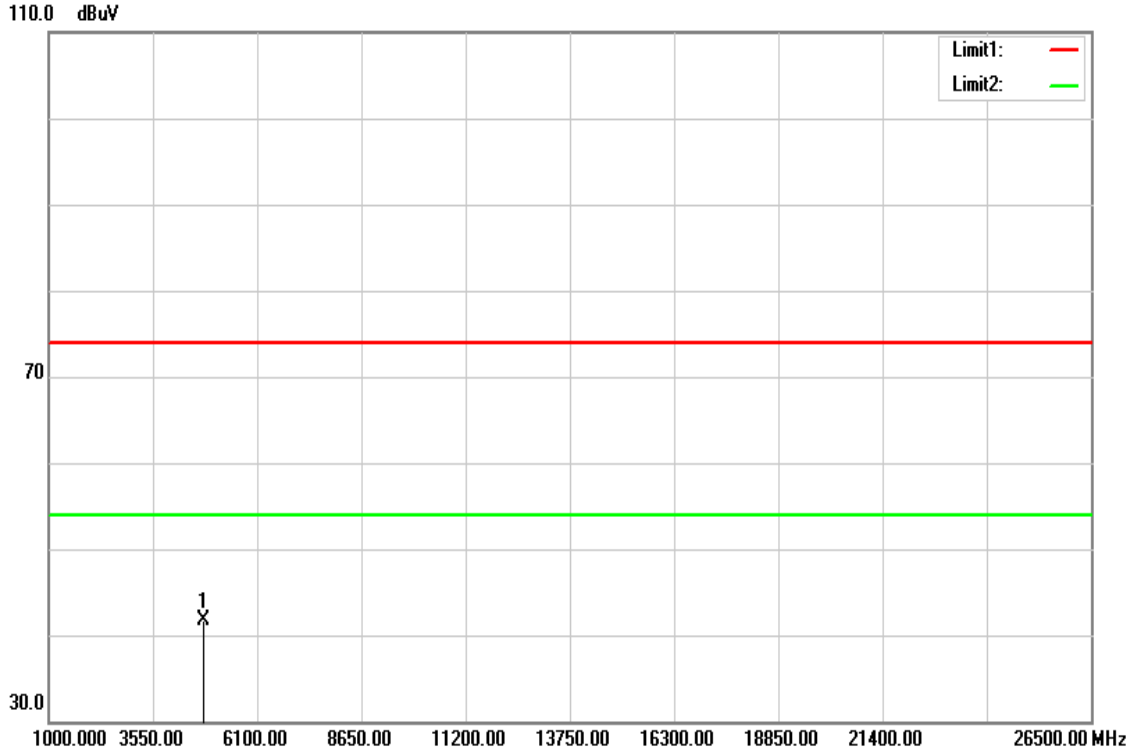
| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Average | | |




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Remark |
|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 2480.004 | 103.05 | -2.70 | 100.35 | - | - | AVG |
| 2 | 2483.530 | 40.92 | -2.69 | 38.23 | 54.00 | -15.77 | AVG |

**Above 1G Test Data**

| Test Mode: | GFSK_BR-1Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4804.000 | 37.34 | 4.34 | 41.68 | 74.00 | -32.32 | peak |
| N/A | | | | | | |
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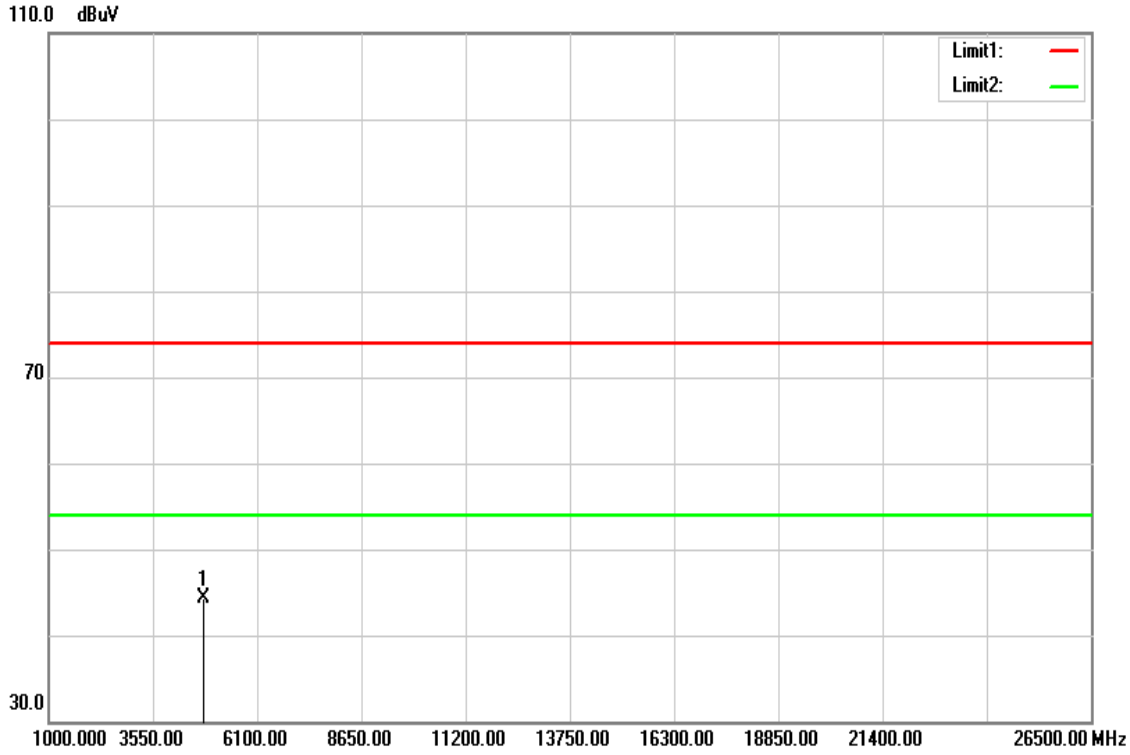
***Remark:***

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*

| Test Mode: | GFSK_BR-1Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4804.000 | 39.96 | 4.34 | 44.30 | 74.00 | -29.70 | peak |
| N/A | | | | | | |
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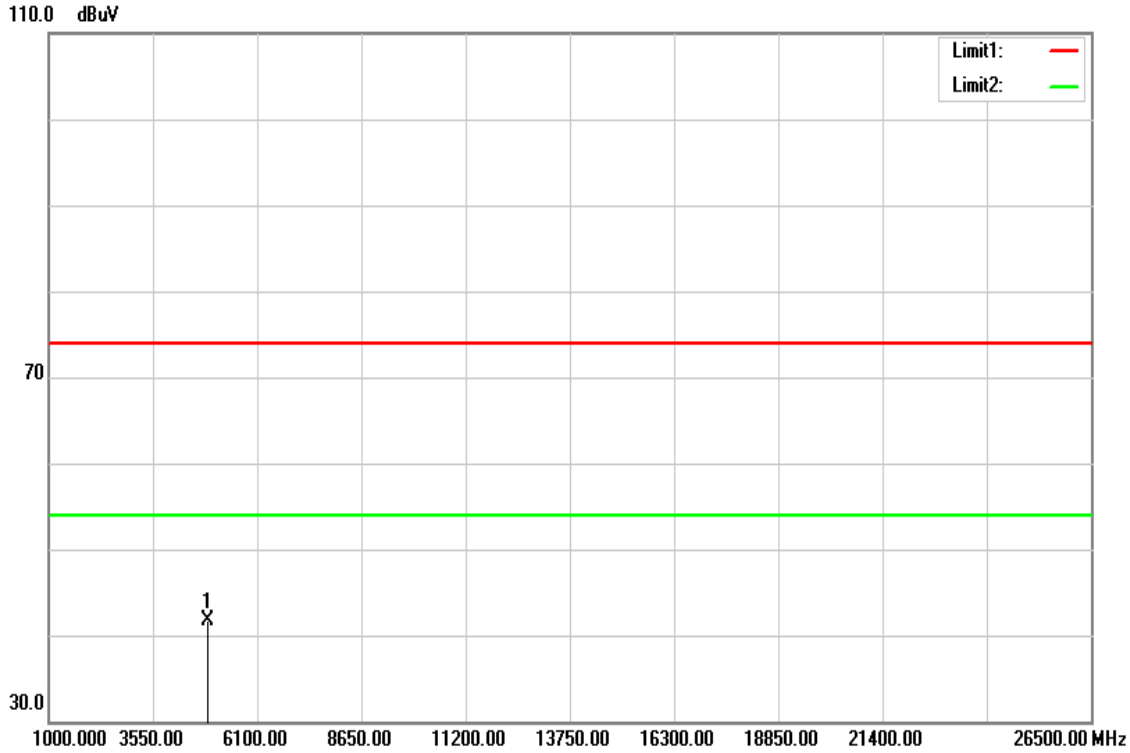
***Remark:***

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*

| Test Mode: | GFSK_BR-1Mbps Mid CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4882.000 | 37.25 | 4.49 | 41.74 | 74.00 | -32.26 | peak |
| N/A | | | | | | |
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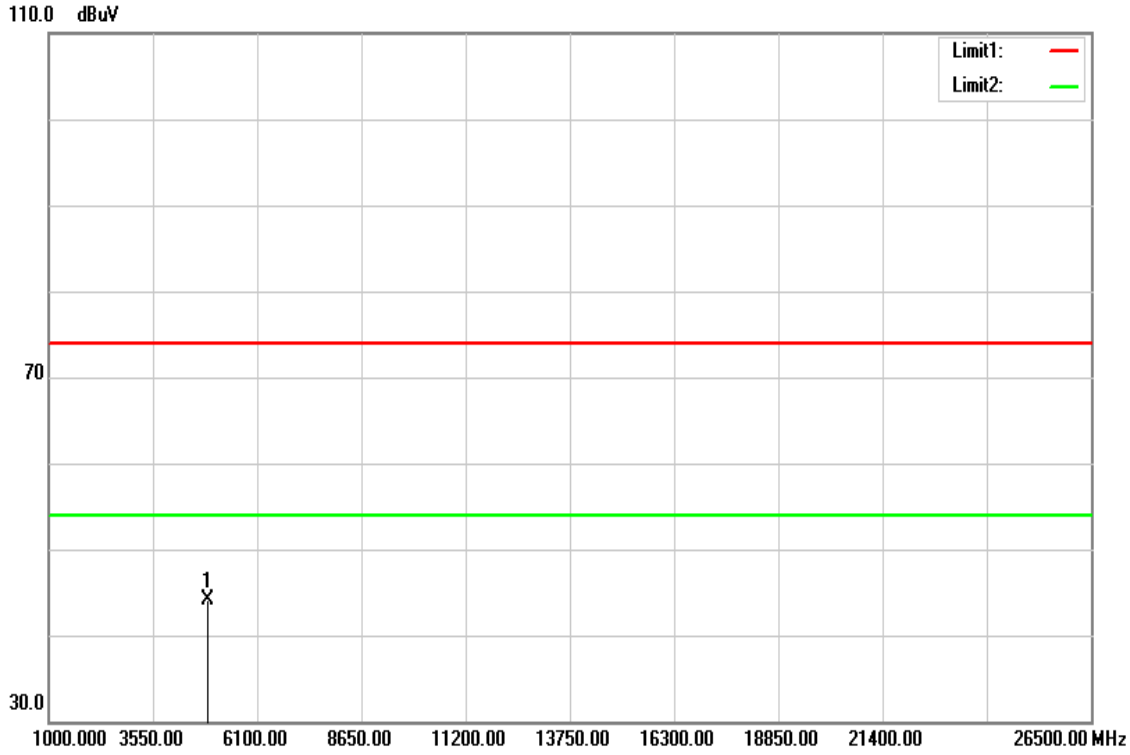
***Remark:***

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*

| Test Mode: | GFSK_BR-1Mbps Mid CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4882.000 | 39.63 | 4.49 | 44.12 | 74.00 | -29.88 | peak |
| N/A | | | | | | |
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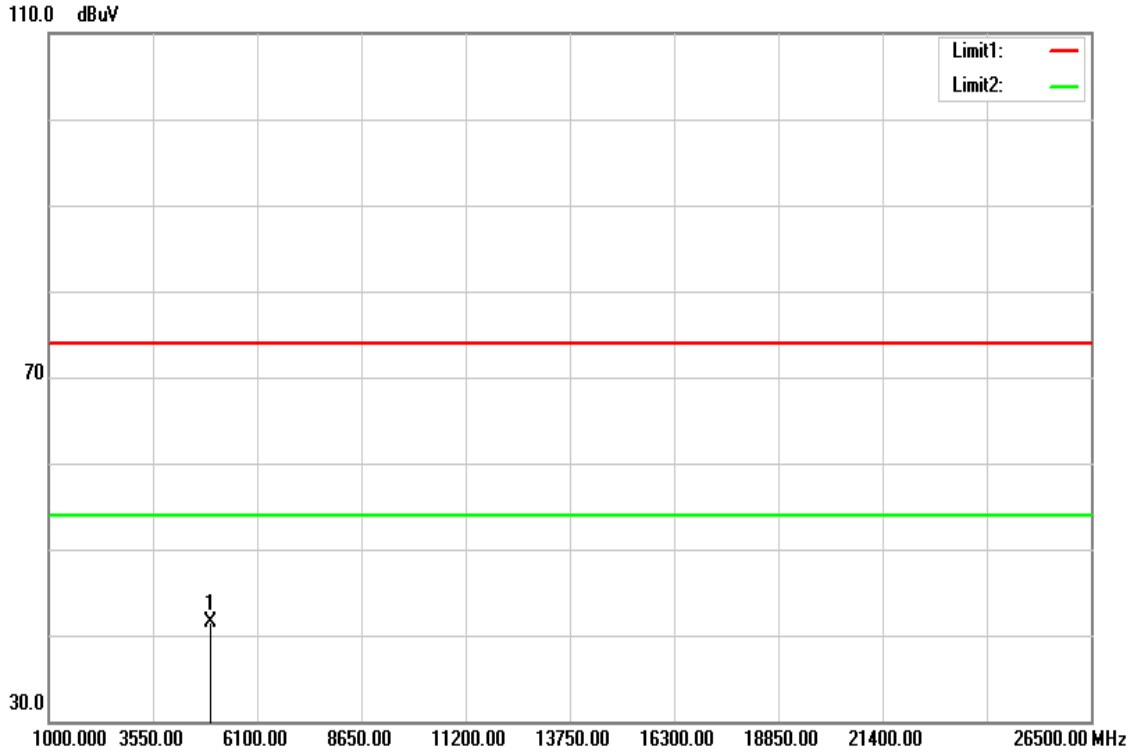
***Remark:***

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*

| Test Mode: | GFSK_BR-1Mbps<br>High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4960.000 | 36.85 | 4.61 | 41.46 | 74.00 | -32.54 | peak |
| N/A | | | | | | |
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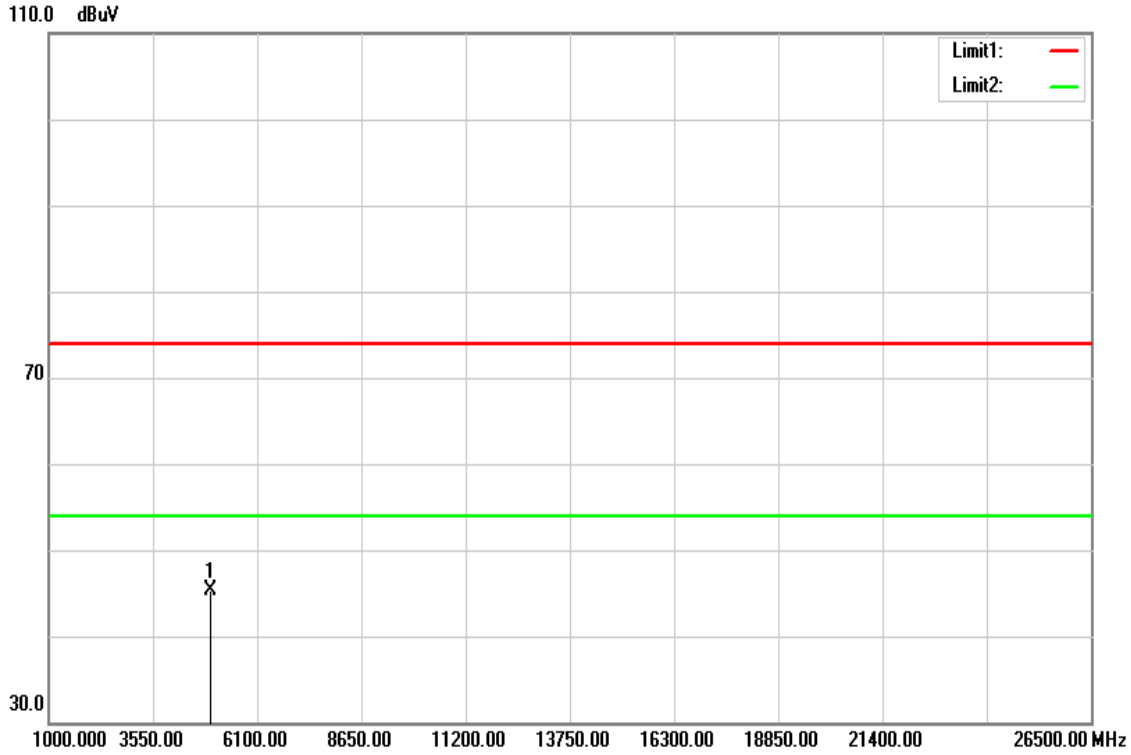
***Remark:***

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*

| Test Mode: | GFSK_BR-1Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4960.000 | 40.67 | 4.61 | 45.28 | 74.00 | -28.72 | peak |
| N/A | | | | | | |
| | | | | | | |
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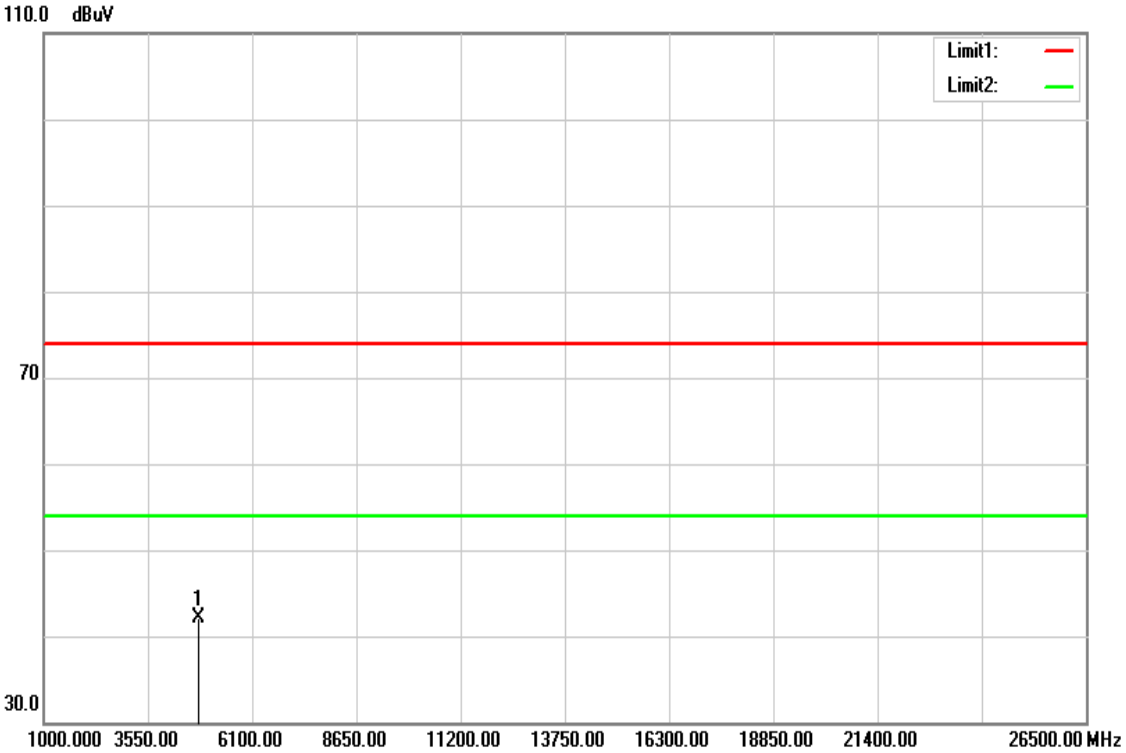
***Remark:***

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*

| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4804.000 | 37.69 | 4.34 | 42.03 | 74.00 | -31.97 | peak |
| N/A | | | | | | |
| | | | | | | |
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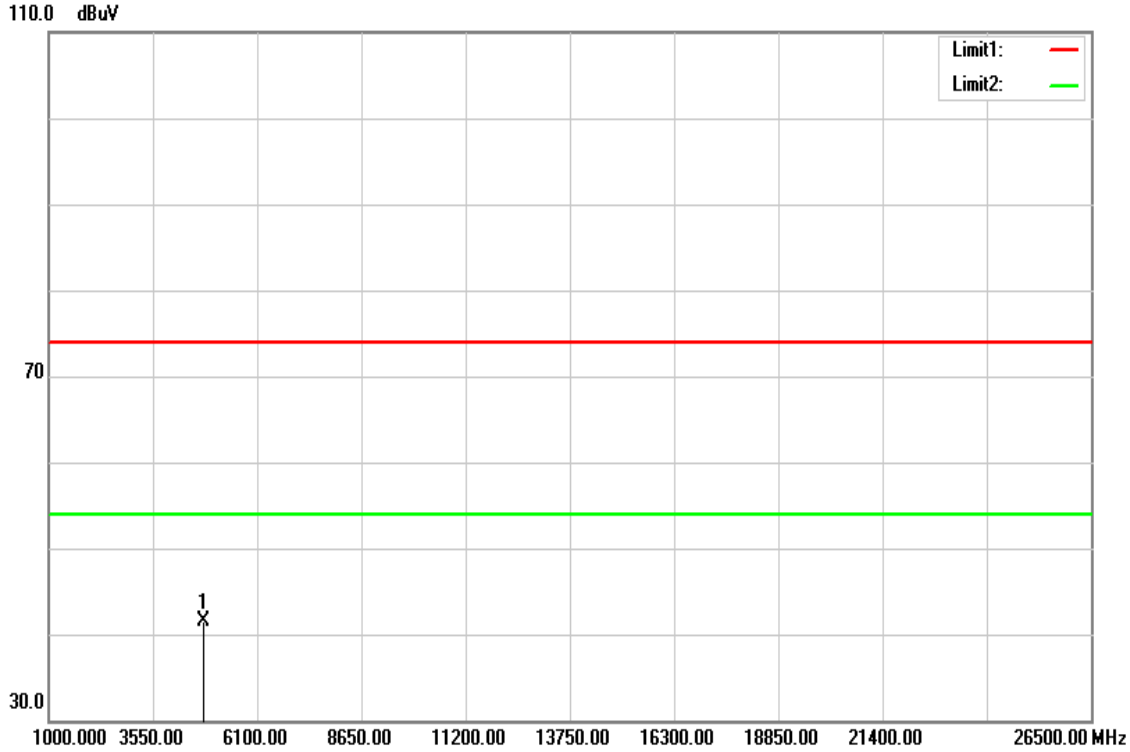
***Remark:***

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*

| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4804.000 | 37.11 | 4.34 | 41.45 | 74.00 | -32.55 | peak |
| N/A | | | | | | |
| | | | | | | |
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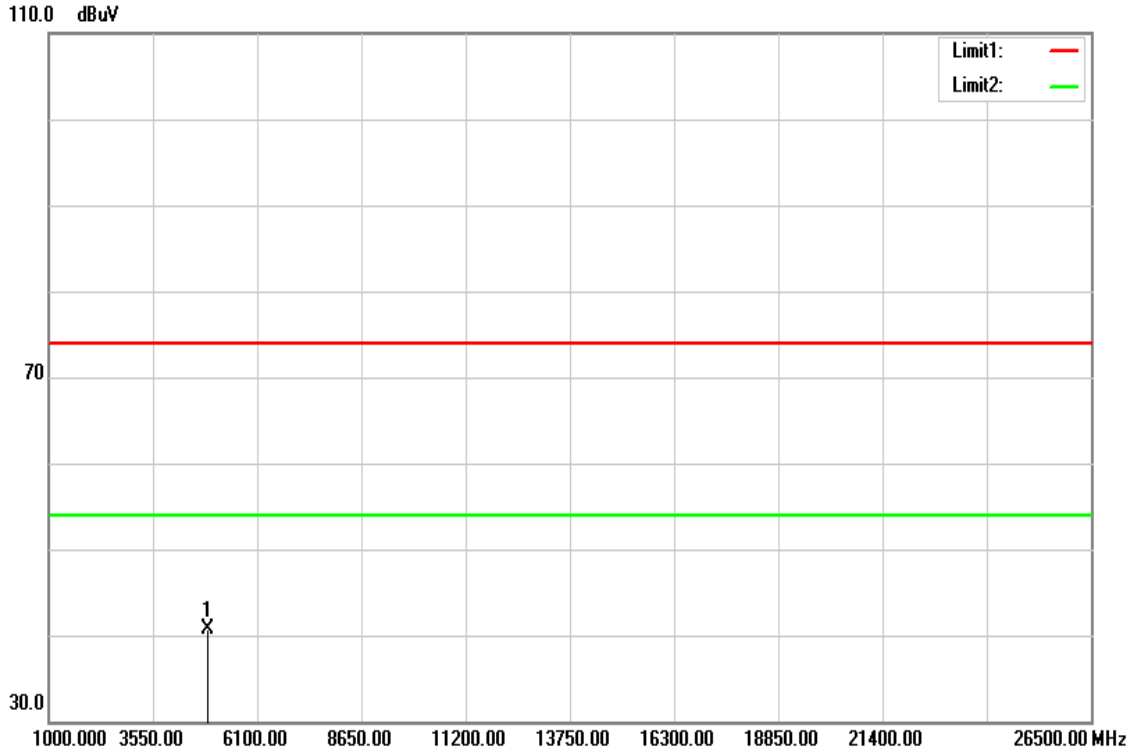
| | | | | | | |

***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*

| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4882.000 | 36.31 | 4.49 | 40.80 | 74.00 | -33.20 | peak |
| N/A | | | | | | |
| | | | | | | |
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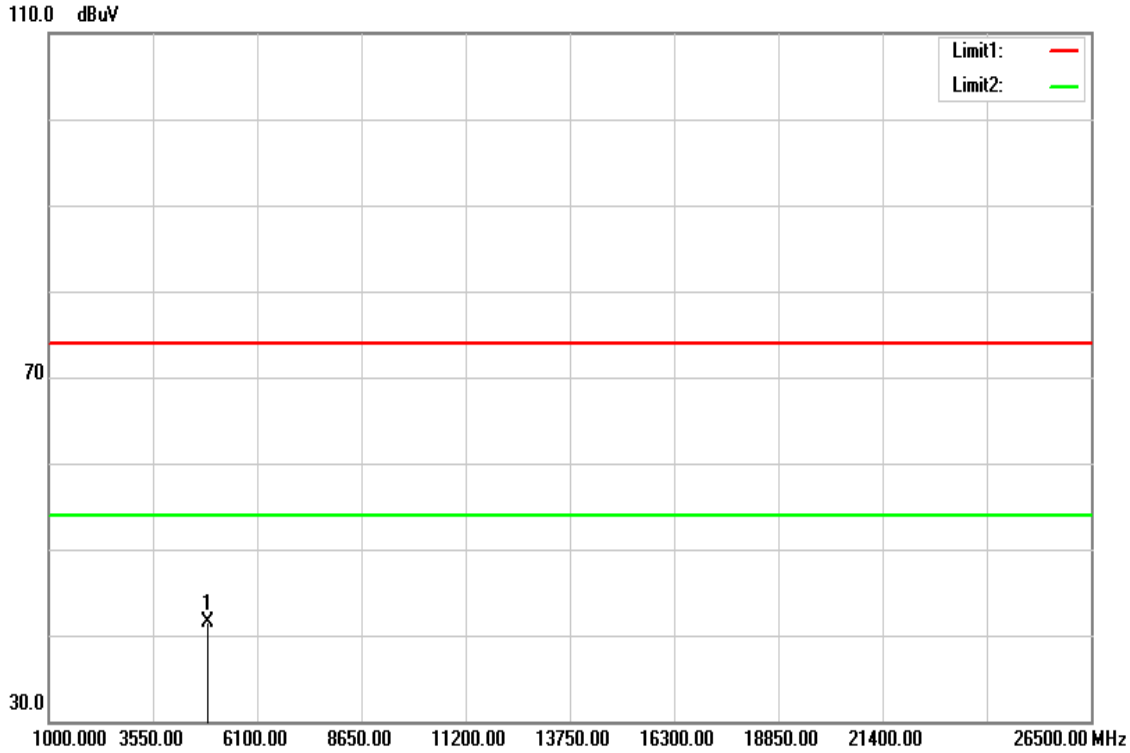
***Remark:***

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*

| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4882.000 | 36.99 | 4.49 | 41.48 | 74.00 | -32.52 | peak |
| N/A | | | | | | |
| | | | | | | |
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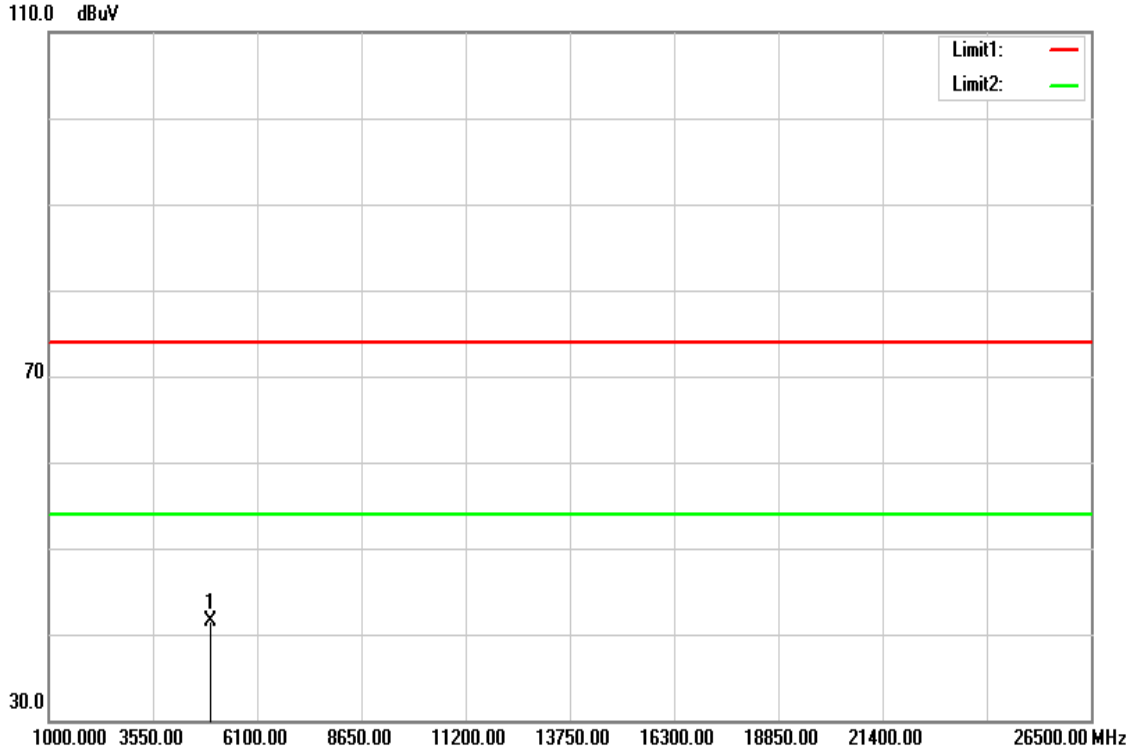
| | | | | | | |

***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*

| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4960.000 | 36.94 | 4.61 | 41.55 | 74.00 | -32.45 | peak |
| N/A | | | | | | |
| | | | | | | |
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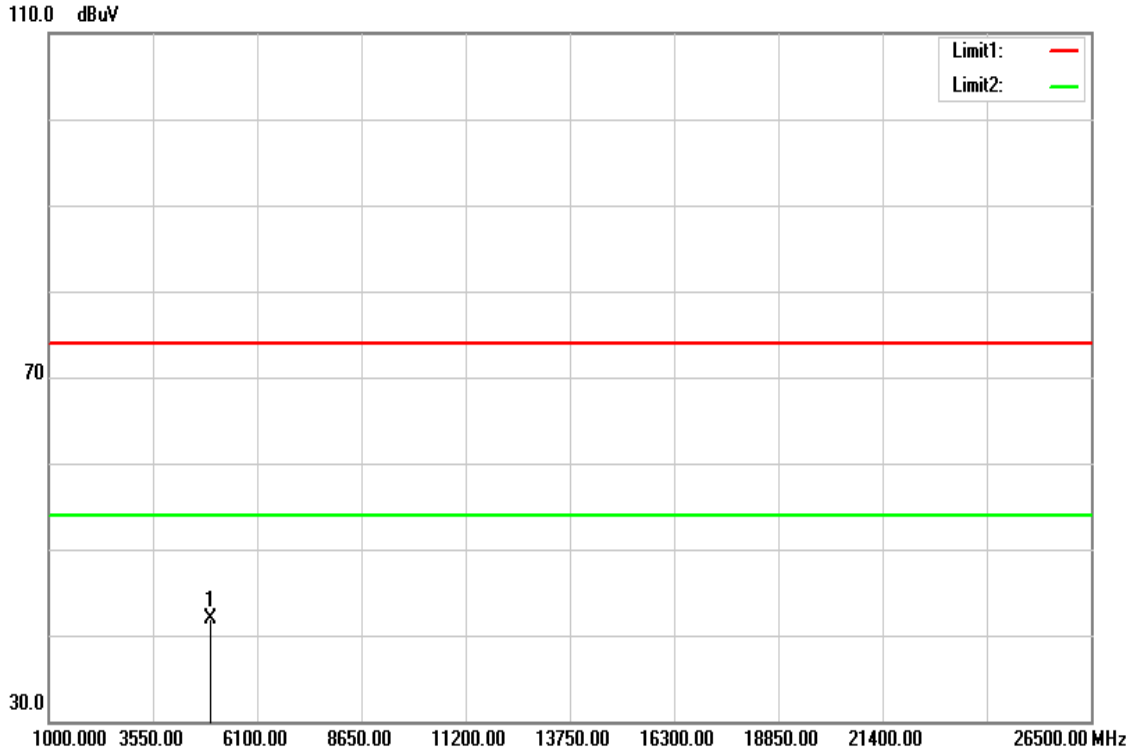
| | | | | | | |

***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*

| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | June 28, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Average | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 4960.000 | 37.30 | 4.61 | 41.91 | 74.00 | -32.09 | peak |
| N/A | | | | | | |
| | | | | | | |
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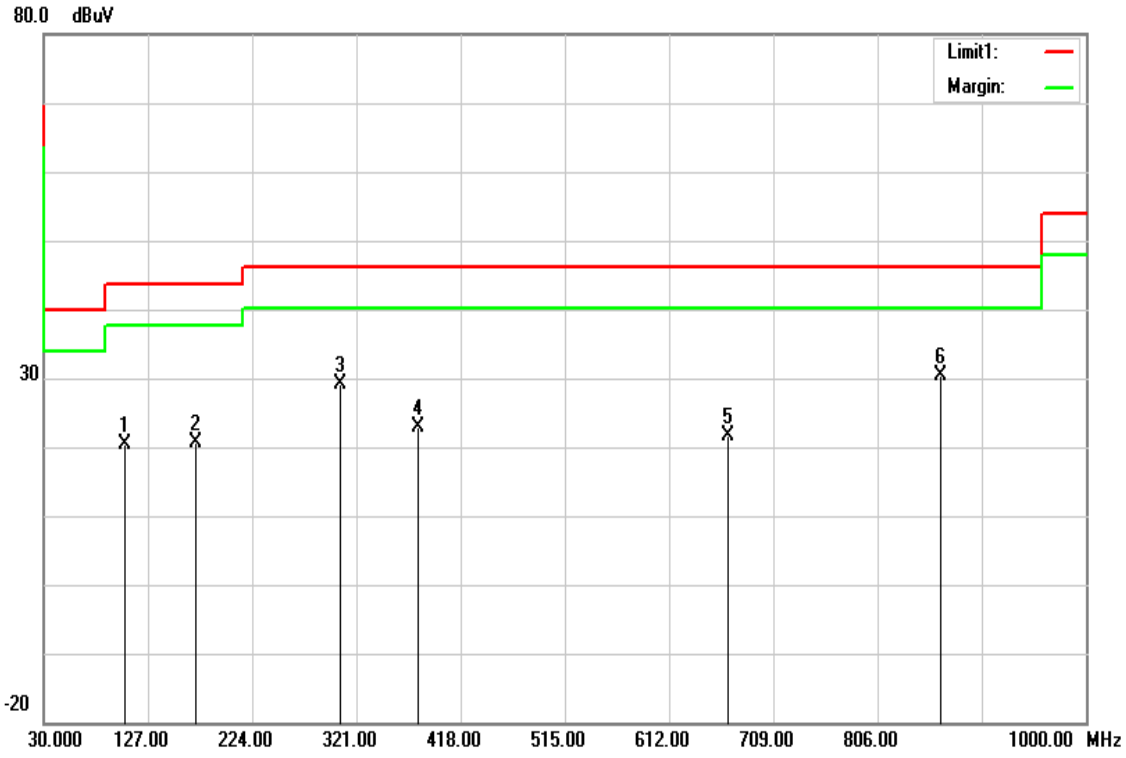
***Remark:***

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*

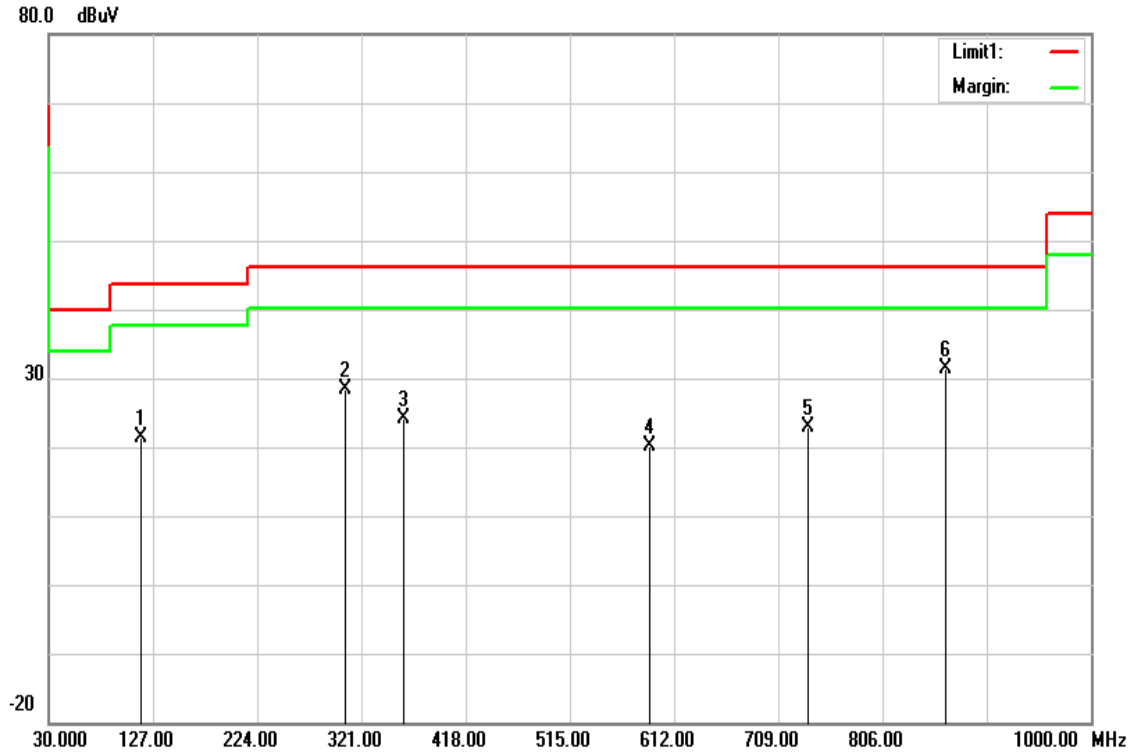
## Below 1G Test Data

| Test Mode: | Mode 1 | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | June 27, 2018 |
| Polarize | Vertical | Test Engineer | Jerry Chuang |
| Detector | Peak and Quasi-peak | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 105.6600 | 38.06 | -17.56 | 20.50 | 43.52 | -23.02 | peak |
| 171.6200 | 37.21 | -16.66 | 20.55 | 43.52 | -22.97 | peak |
| 306.4500 | 43.04 | -13.93 | 29.11 | 46.02 | -16.91 | peak |
| 378.2300 | 35.02 | -12.08 | 22.94 | 46.02 | -23.08 | peak |
| 666.3200 | 26.93 | -5.34 | 21.59 | 46.02 | -24.43 | peak |
| 864.2000 | 33.04 | -2.62 | 30.42 | 46.02 | -15.60 | peak |

| Test Mode: | Mode 1 | Temp/Hum | 22(℃)/ 34%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | June 27, 2018 |
| Polarize | Horizontal | Test Engineer | Jerry Chuang |
| Detector | Peak and Quasi-peak | | |




| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 115.3600 | 37.17 | -15.82 | 21.35 | 43.52 | -22.17 | peak |
| 305.4800 | 42.42 | -13.94 | 28.48 | 46.02 | -17.54 | peak |
| 359.8000 | 36.70 | -12.67 | 24.03 | 46.02 | -21.99 | peak |
| 588.7200 | 27.08 | -7.07 | 20.01 | 46.02 | -26.01 | peak |
| 737.1300 | 27.26 | -4.44 | 22.82 | 46.02 | -23.20 | peak |
| 864.2000 | 34.01 | -2.62 | 31.39 | 46.02 | -14.63 | peak |

**--End of Report--**