# RADIO TEST REPORT
## FCC 47 CFR PART 15 SUBPART C

| | |
|---|---|
| **Test Standard** | **FCC Part 15.247** |
| **Product name** | **SyncUP Kids Watch** |
| **Brand Name** | **T-Mobile** |
| **Model No.** | **TMUS-SKW-1, TMUS-SKW-M** |
| **Test Result** | **Pass** |
| **Statements of Conformity** | **Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.** |

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:

Kevin Tsai
Deputy Manager

**Report No.:** T200825W02-RP1

# Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|---|---|---|---|---|
| 00 | March 25, 2021 | Initial Issue | ALL | Doris Chu |
| 01 | June 8, 2021 | See the following Note Rev. (01) | P.8, P.37 | Doris Chu |

*Rev. (01)*
1. Added FCC register lab number in section 1.6.
2. Added AFH mode test data in section 4.7.4.

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# 1. GENERAL INFORMATION

## 1.1 EUT INFORMATION

| | |
|---|---|
| Applicant / Manufacturer | T-mobile Usa, Inc.<br>12920 Se 38th Street, Bellevue, Washington, United States, 98006. |
| Equipment | SyncUP Kids Watch |
| Model No. | TMUS-SKW-1, TMUS-SKW-M |
| Model Discrepancy | Preload profiles in SIM IC are different, but the SIM IC is the same.<br>TMUS-SKW-1 is T-Mobile SKU, TMUS-SKW-M is MPCS SKU. |
| Trade Name | T-Mobile |
| Received Date | August 25, 2020 |
| Date of Test | September 11 ~ 16, 2020; ~ January 7, 2021 |
| Power Operation | 1. Power from Adapter.<br>PHIHONG TECHNOLOGY / AN05A-050E<br>I/P: 100-240VAC, 0.2A, 50-60Hz<br>O/P: 5.0VDC, 1.0A<br>2. Power from Battery.<br>EVE / P0963<br>Rated Capacity: 3.85V, 495mAh, 1.91Wh |

**Remark:**
1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.

# 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 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 C63.10: 2013 clause 5.6.1 Table 4 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** | -2.55 dBi |
| **Antenna Connector** | N/A |

# 1.5 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| AC Powerline Conducted Emission | +/- 1.2575 |
| Emission bandwidth, 20dB bandwidth | +/- 0.0014 |
| RF output power, conducted | +/- 1.14 |
| Power density, conducted | +/- 1.40 |
| 3M Semi Anechoic Chamber / 30M~200M | +/- 4.12 |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 4.68 |
| 3M Semi Anechoic Chamber / 1G~8G | +/- 5.18 |
| 3M Semi Anechoic Chamber / 8G~18G | +/- 5.47 |
| 3M Semi Anechoic Chamber / 18G~26G | +/- 3.81 |
| 3M Semi Anechoic Chamber / 26G~40G | +/- 3.87 |

**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, Taiwan. (R.O.C.)

The lab has been recognized as the FCC accredited lad under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

| Test site | Test Engineer | Remark |
|---|---|---|
| AC Conduction Room | Rick Lee | - |
| Radiation | Jerry Chang | - |
| RF Conducted | Rick Lee | - |

**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

| Conducted Emission Room # B | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| CABLE | EMCI | CFD300-NL | CERF | 06/29/2020 | 06/28/2021 |
| EMI Test Receiver | R&S | ESCI | 100064 | 07/17/2020 | 07/16/2021 |
| LISN | SCHAFFNER | NNB 41 | 03/10013 | 02/13/2020 | 02/12/2021 |
| Software | EZ-EMC(CCS-3A1-CE) | | | | |

**Test Date for September 11 ~ 16, 2020**

| RF Conducted Test Site | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Coaxial Cable | Woken | WC12 | CC001 | 06/29/2020 | 06/28/2021 |
| Signal Analyzer | R&S | FSV 40 | 101073 | 09/25/2019 | 09/24/2020 |
| Power Meter | Anritsu | ML2487A | 6K00003260 | 05/21/2020 | 05/20/2021 |
| Power Seneor | Anritsu | MA2490A | 032910 | 05/21/2020 | 05/20/2021 |
| Software | N/A | | | | |

**Test Date for January 7, 2021**

| RF Conducted Test Site | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Coaxial Cable | Woken | WC12 | CC001 | 06/29/2020 | 06/28/2021 |
| Signal Analyzer | R&S | FSV 40 | 101073 | 09/17/2020 | 09/16/2021 |
| Power Meter | Anritsu | ML2487A | 6K00003260 | 05/21/2020 | 05/20/2021 |
| Power Seneor | Anritsu | MA2490A | 032910 | 05/21/2020 | 05/20/2021 |
| Software | N/A | | | | |

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

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| 3M 966 Chamber Test Site | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **S/N** | **Cal Date** | **Cal Due** |
| Band Reject Filters | MICRO TRONICS | BRM 50702 | 120 | 02/25/2020 | 02/24/2021 |
| Bilog Antenna | Sunol Sciences | JB3 | A030105 | 07/24/2020 | 07/23/2021 |
| Coaxial Cable | HUBER SUHNER | SUCOFLEX 104PEA | 20995 | 02/25/2020 | 02/24/2021 |
| Coaxial Cable | EMCI | EMC105 | 190914+25111 | 09/20/2019 | 09/19/2020 |
| Digital Thermo-Hygro Meter | WISEWIND | 1206 | D07 | 01/15/2020 | 01/14/2021 |
| double Ridged Guide Horn Antenna | ETC | MCTD 1209 | DRH13M02003 | 10/04/2019 | 10/03/2020 |
| Loop Ant | COM-POWER | AL-130 | 121051 | 03/27/2020 | 03/26/2021 |
| Pre-Amplifier | EMEC | EM330 | 060609 | 02/25/2020 | 02/24/2021 |
| Pre-Amplifier | HP | 8449B | 3008A00965 | 02/25/2020 | 02/24/2021 |
| PSA Series Spectrum Analyzer | Agilent | E4446A | MY46180323 | 07/24/2020 | 07/23/2021 |
| 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 |
| Software | e3 6.11-20180413 | | | | |

**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** |
| 1 | NB(J) | TOSHIBA | PT345T-00L002 | N/A | PD97260H |
| 2 | DC Power Supplies | GW Instek | SPS-3610 | GPE880163 | 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.

# 2. TEST SUMMARY

| FCC Standard Section | Report Section | Test Item | Result |
|---|---|---|---|
| 15.203 | 1.3 | Antenna Requirement | Pass |
| 15.207(a) | 4.1 | AC Conducted Emission | Pass |
| 15.247(a)(1) | 4.2 | 20 dB Bandwidth | Pass |
| - | 4.2 | Occupied Bandwidth (99%) | Pass |
| 15.247(b)(1) | 4.3 | Output Power Measurement | Pass |
| 15.247(a)(1) | 4.4 | Frequency Separation | Pass |
| 15.247(a)(1)(iii) | 4.5 | Number of Hopping | Pass |
| 15.247(d) | 4.6 | Conducted Band Edge | Pass |
| 15.247(d) | 4.6 | Conducted Spurious Emission | Pass |
| 15.247(a)(1)(iii) | 4.7 | Time of Occupancy | Pass |
| 15.247(d) | 4.8 | Radiation Band Edge | Pass |
| 15.247(d) | 4.8 | Radiation Spurious Emission | Pass |

# 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 (3DH5) |
| 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.

## 3.2 THE WORST MODE OF MEASUREMENT

| Radiated Emission Measurement Above 1G | |
|---|---|
| **Test Condition** | **Radiated Emission Above 1G** |
| **Power supply Mode** | **Mode 1: EUT power by Adapter**<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)** |

| Radiated Emission Measurement Below 1G | |
|---|---|
| **Test Condition** | **Radiated Emission Below 1G** |
| **Power supply Mode** | **Mode 1: EUT power by Adapter**<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, for radiated measurement. The worst case(Y-Plane) were recorded in this report*

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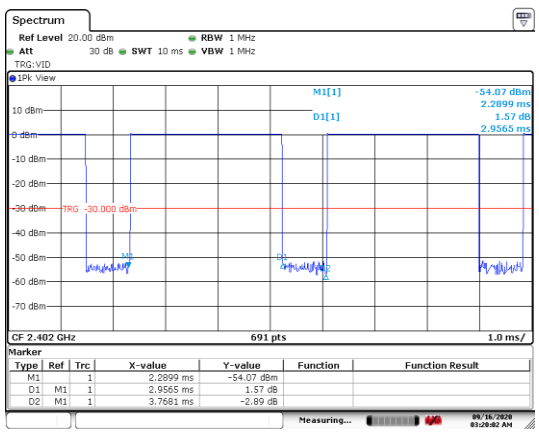
## 3.3 EUT DUTY CYCLE

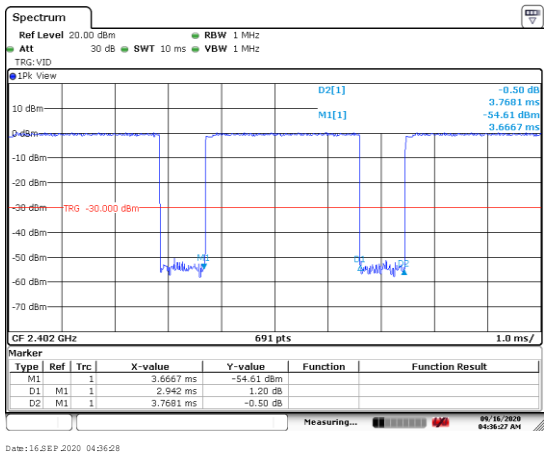
| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

| Duty Cycle | | | | |
|---|---|---|---|---|
| Configuration | Duty Cycle (%) | Duty Factor (dB) =10*log (1/Duty Cycle) | 1/T (kHz) | VBW setting (kHz) |
| BDR-1Mbps | 78.46 | 1.05 | 0.27 | 1.00 |
| EDR-3Mbps | 78.08 | 1.07 | 0.27 | 1.00 |

BDR-1Mbps




EDR-3Mbps



# 4. TEST RESULT

## 4.1 AC POWER LINE CONDUCTED EMISSION

### 4.1.1 Test Limit

According to §15.207(a),

| 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 |

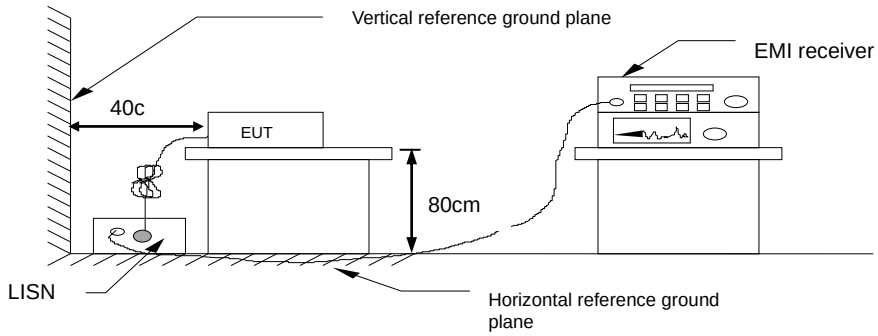
* Decreases with the logarithm of the frequency.

### 4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 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**

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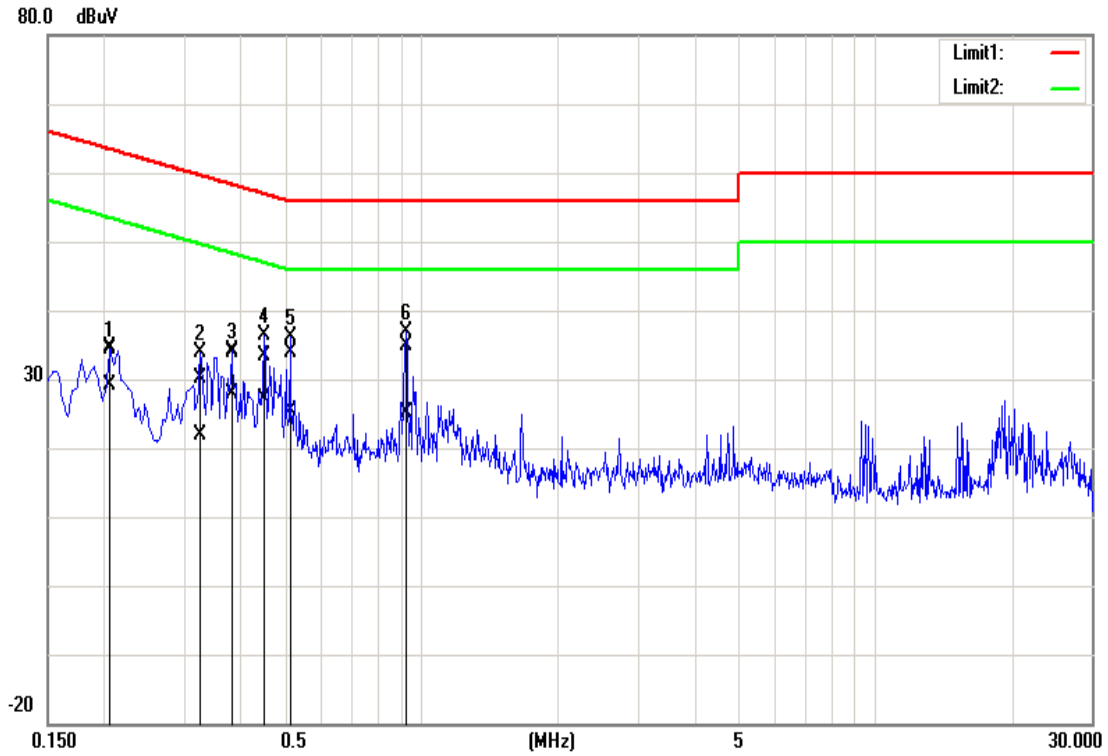
## Test Data

| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
|---|---|---|---|
| Phase: | Line | Test Date | September 15, 2020 |
| | | Test Engineer | Rick 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.2060 | 24.52 | 18.93 | 10.21 | 34.73 | 29.14 | 63.37 | 53.37 | -28.64 | -24.23 | Pass |
| 0.3260 | 19.89 | 11.55 | 10.22 | 30.11 | 21.77 | 59.55 | 49.55 | -29.44 | -27.78 | Pass |
| 0.3820 | 23.78 | 17.65 | 10.22 | 34.00 | 27.87 | 58.24 | 48.24 | -24.24 | -20.37 | Pass |
| 0.4500 | 23.22 | 16.96 | 10.22 | 33.44 | 27.18 | 56.88 | 46.88 | -23.44 | -19.70 | Pass |
| 0.5140 | 23.78 | 15.06 | 10.22 | 34.00 | 25.28 | 56.00 | 46.00 | -22.00 | -20.72 | Pass |
| 0.9260 | 24.75 | 14.79 | 10.24 | 34.99 | 25.03 | 56.00 | 46.00 | -21.01 | -20.97 | Pass |

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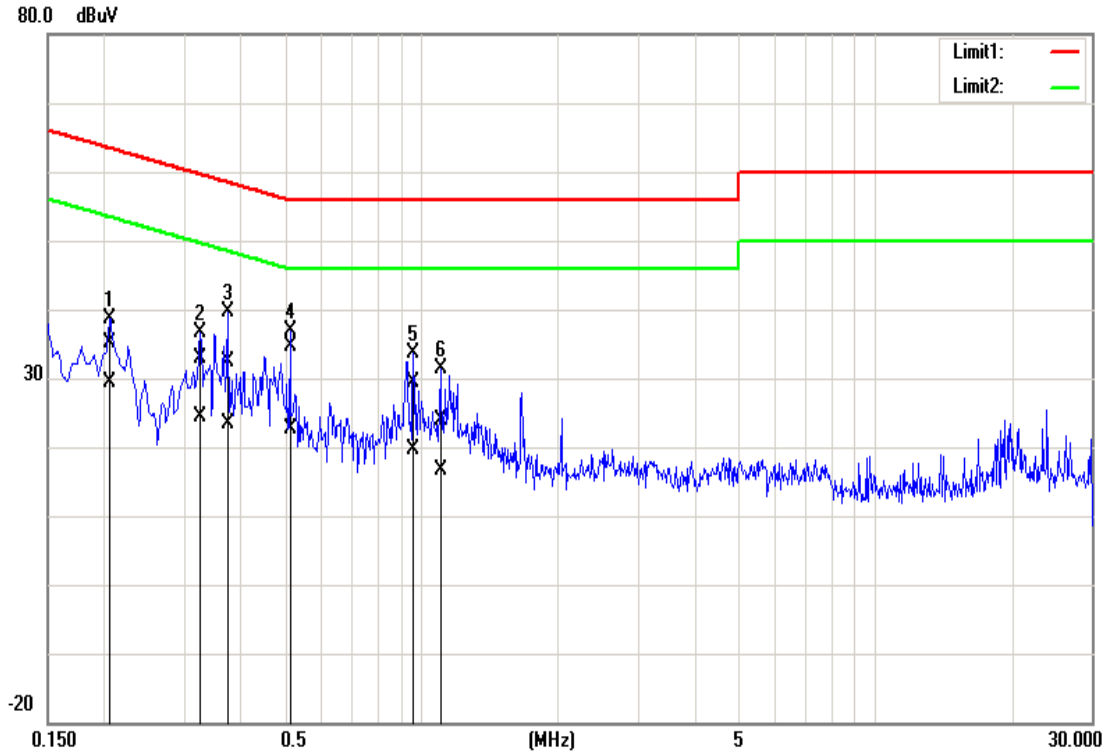
| Test Mode: | Mode 1 | Temp/Hum | 24(℃)/ 50%RH |
|---|---|---|---|
| Phase: | Neutral | Test Date | September 15, 2020 |
| | | Test Engineer | Rick Lee |




| 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.2060 | 24.86 | 19.28 | 10.19 | 35.05 | 29.47 | 63.37 | 53.37 | -28.32 | -23.90 | Pass |
| 0.3260 | 22.63 | 14.28 | 10.19 | 32.82 | 24.47 | 59.55 | 49.55 | -26.73 | -25.08 | Pass |
| 0.3740 | 22.24 | 13.12 | 10.19 | 32.43 | 23.31 | 58.41 | 48.41 | -25.98 | -25.10 | Pass |
| 0.5140 | 24.33 | 12.50 | 10.19 | 34.52 | 22.69 | 56.00 | 46.00 | -21.48 | -23.31 | Pass |
| 0.9620 | 19.18 | 9.47 | 10.21 | 29.39 | 19.68 | 56.00 | 46.00 | -26.61 | -26.32 | Pass |
| 1.1020 | 13.73 | 6.42 | 10.21 | 23.94 | 16.63 | 56.00 | 46.00 | -32.06 | -29.37 | Pass |

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

## 4.2.1 Test Limit

According to §15.247(a) (1),

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

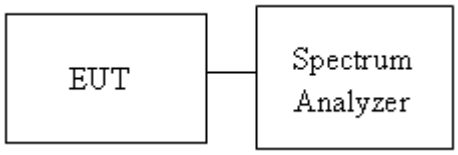
**Occupied Bandwidth(99%)** ：For reporting purposes only.

## 4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 7.8.7,

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

| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

| Test mode: GFSK_BDR-1Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 0.8813 | 0.9508 |
| Mid | 2441 | 0.8205 | 0.9030 |
| High | 2480 | 0.8770 | 0.9508 |

| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | |
|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **OBW(99%) (MHz)** | **20dB BW (MHz)** |
| Low | 2402 | 1.1766 | 1.2764 |
| Mid | 2441 | 1.1766 | 1.2808 |
| High | 2480 | 1.1722 | 0.9074 |

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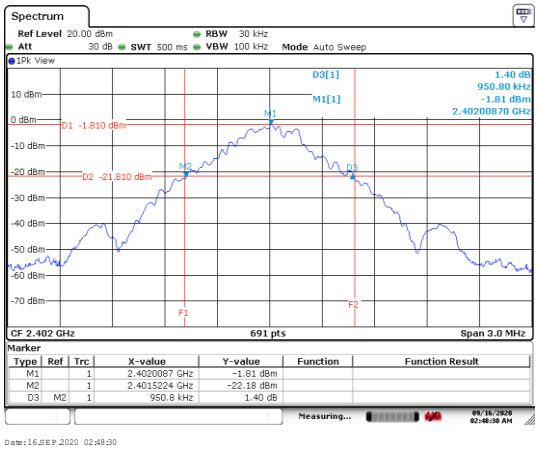
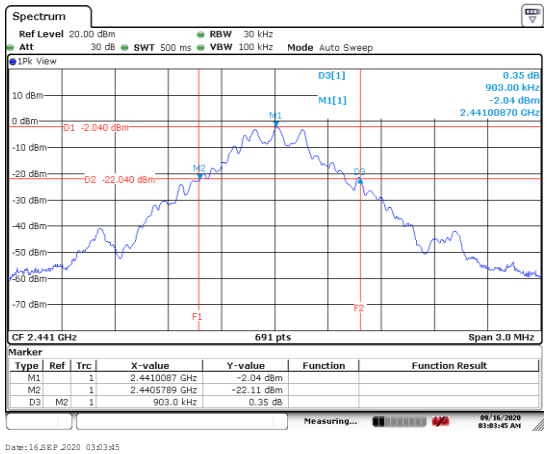
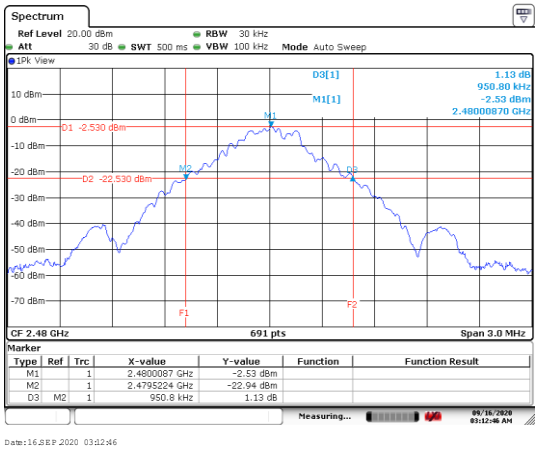
# Test Data

## 20dB BANDWIDTH

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

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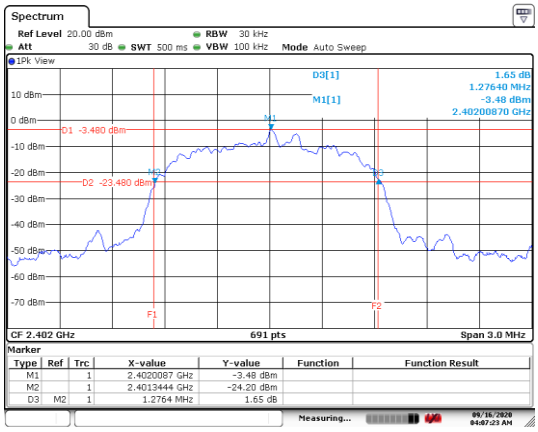
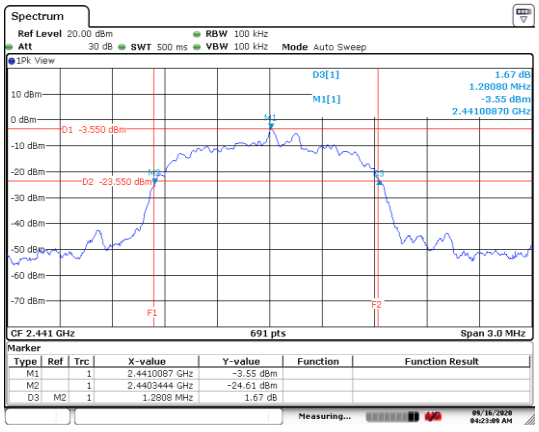
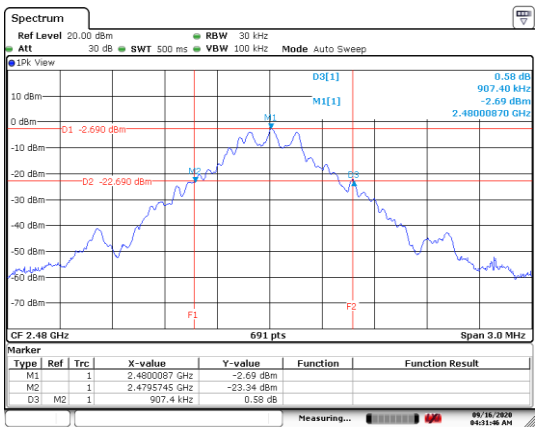
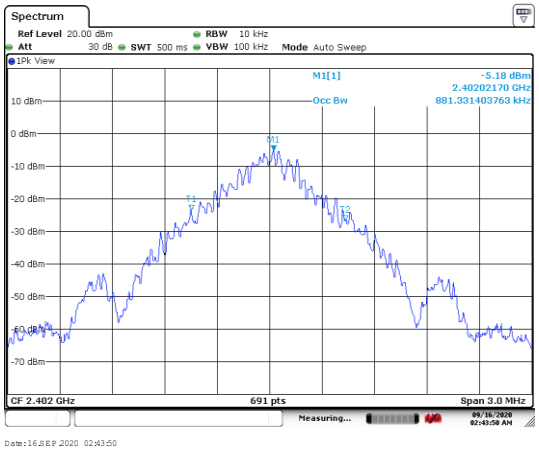
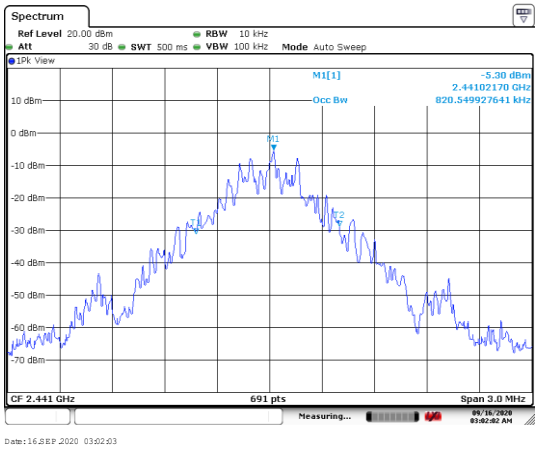
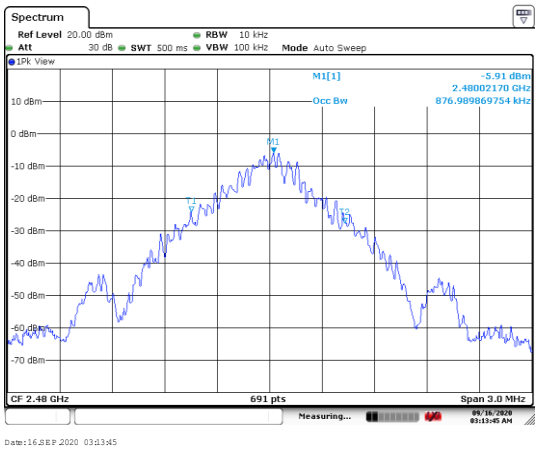
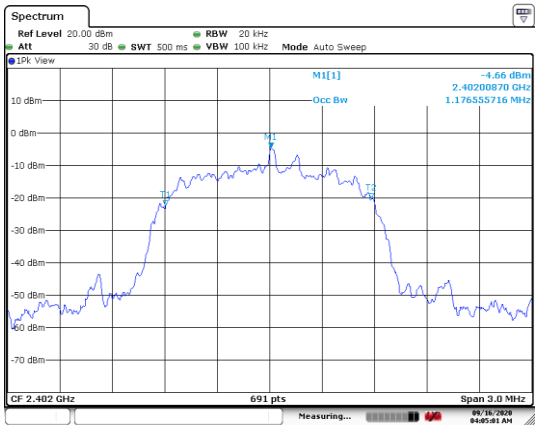
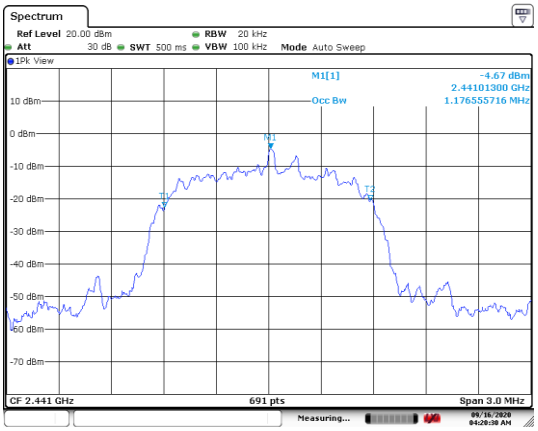
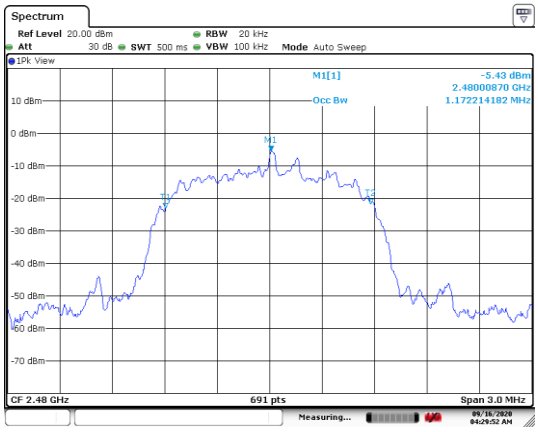
| 8DPSK_EDR-3Mbps mode | |
|---|---|
| **Low CH** | **Mid CH** |
|  |  |
| **High CH** | |
|  | |

**Report No.:** T200825W02-RP1

## Test Data

## BANDWIDTH 99%

| GFSK_BDR-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(a)(1) and

**Peak output power**：

**FCC**

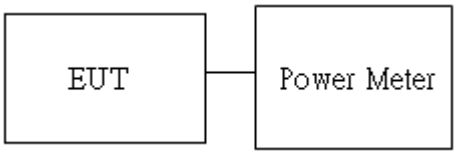
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

**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



**Report No.:** T200825W02-RP1

## 4.3.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

**Peak output power**：

| BT | | | | | | | |
|---|---|---|---|---|---|---|---|
| Config. | CH | Freq. (MHz) | Power Setting | PK Power (dBm) | PK Power (W) | FCC/IC Limit (dBm) | Antenna Gain (dBi) |
| GFSK BR-1Mbps (DH5) | 0 | 2402 | 9 | **12.96** | 0.0198 | 21 | -2.55 |
| | 39 | 2441 | 9 | 12.69 | 0.0186 | | |
| | 78 | 2480 | 9 | 11.97 | 0.0157 | | |
| 8DPSK EDR-3Mbps (3DH5) | 0 | 2402 | 9 | **13.04** | 0.0201 | | |
| | 39 | 2441 | 9 | 12.98 | 0.0199 | | |
| | 78 | 2480 | 9 | 12.31 | 0.0170 | | |

**Average output power**：

| BT | | | |
|---|---|---|---|
| Config. | CH | Freq. (MHz) | AV Power (dBm) |
| GFSK BR-1Mbps (DH5) | 0 | 2402 | 11.77 |
| | 39 | 2441 | 11.45 |
| | 78 | 2480 | 10.76 |
| 8DPSK EDR-3Mbps (3DH5) | 0 | 2402 | 9.20 |
| | 39 | 2441 | 9.14 |
| | 78 | 2480 | 8.46 |

# 4.4 FREQUENCY SEPARATION

## 4.4.1 Test Limit

According to §15.247(a)(1)

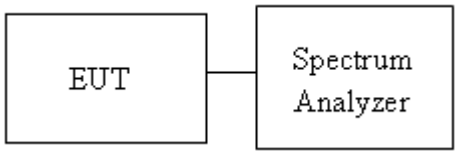
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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



**Report No.:** T200825W02-RP1

### 4.4.4 Test Result

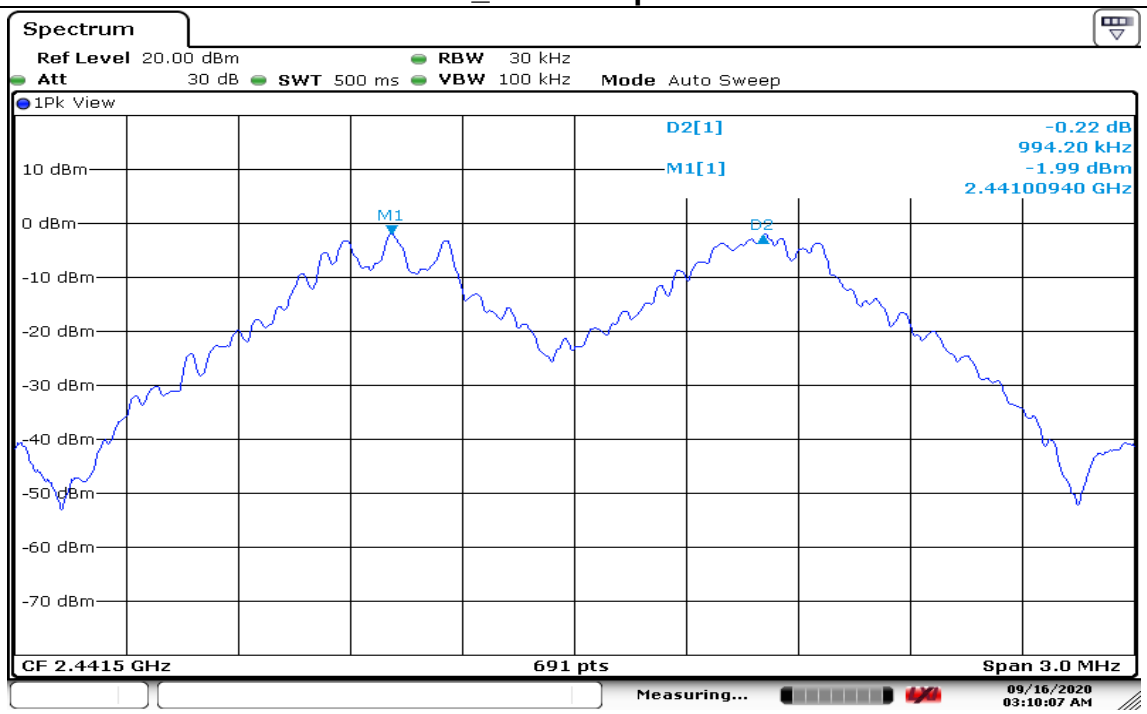
| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

| Test mode: GFSK_BDR-1Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 0.9942 | 0.6339 | PASS |
| Mid | 2441 | 0.9942 | 0.6020 | PASS |
| High | 2480 | 0.9942 | 0.6339 | 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 | 0.8509 | PASS |
| Mid | 2441 | 0.9986 | 0.8539 | PASS |
| High | 2480 | 0.9986 | 0.6049 | PASS |

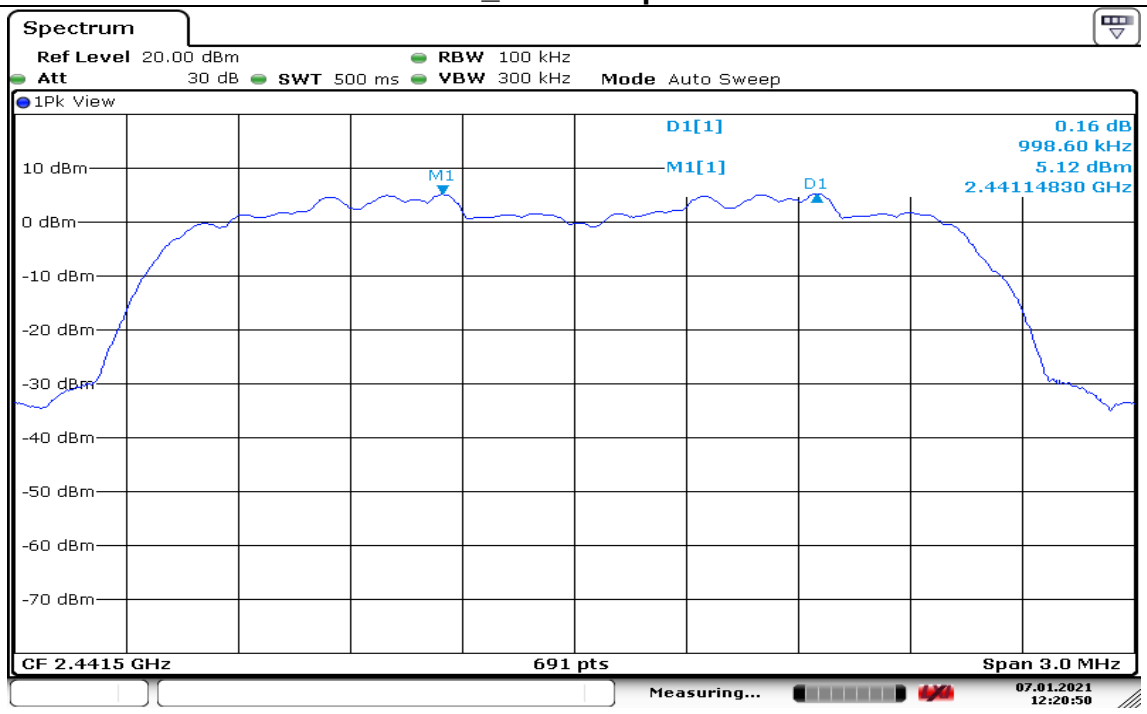
## Test Data

### GFSK_BDR-1Mbps mode




Date:16.SEP.2020 03:10:07

### 8DPSK_EDR-3Mbps mode




Date: 7.JAN.2021 12:20:50

**Note: We selected worst case to performed test in middle channel, The results can be meet other channel.**

# 4.5 NUMBER OF HOPPING

## 4.5.1 Test Limit

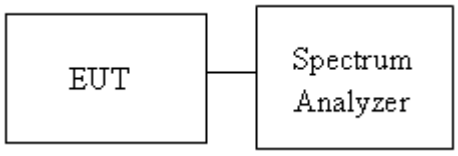
According to §15.247(a)(1)(iii)

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 C63.10: 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

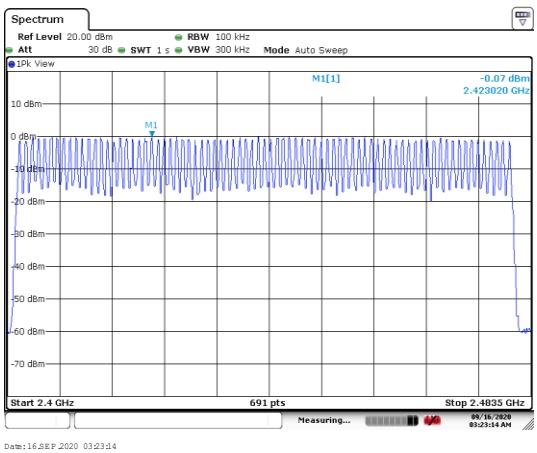
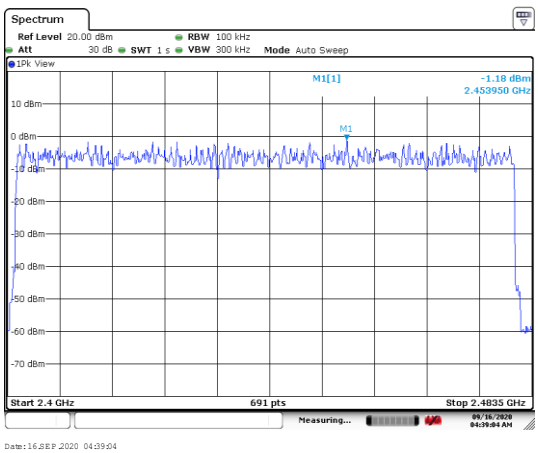


## 4.5.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

| 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 | |

## Test Data

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

# 4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

## 4.6.1 Test Limit

According to §15.247(d)

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

.

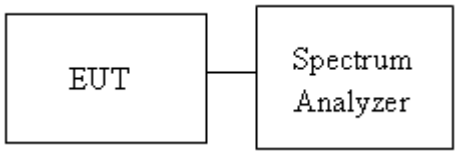
## 4.6.2 Test Procedure

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

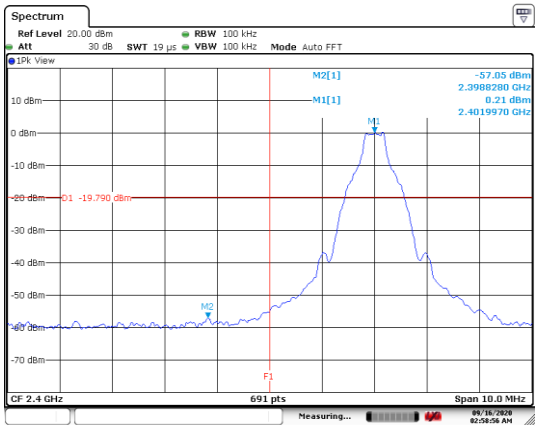
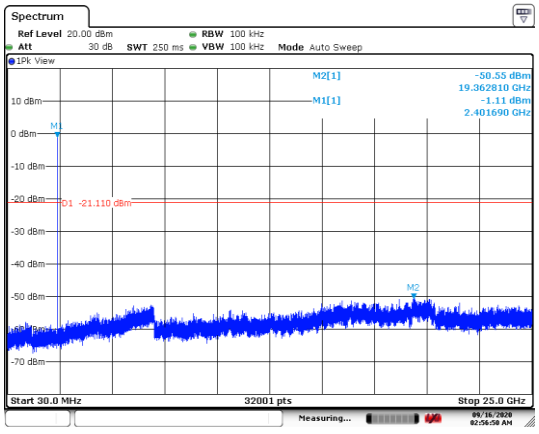


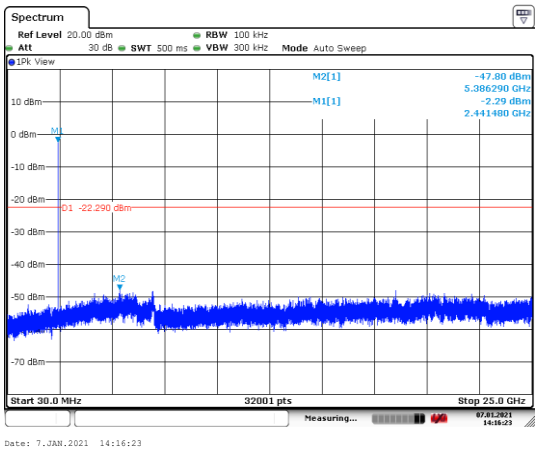
**Report No.:** T200825W02-RP1

## 4.6.4 Test Result

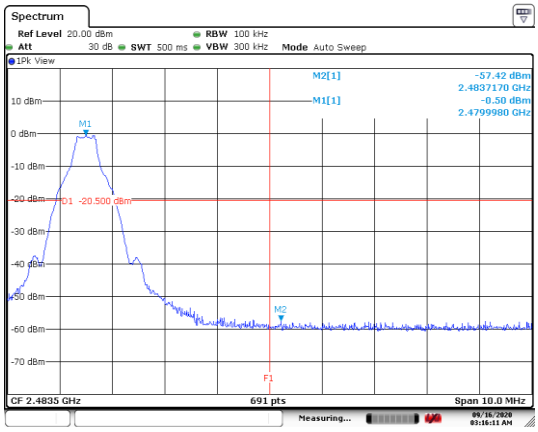
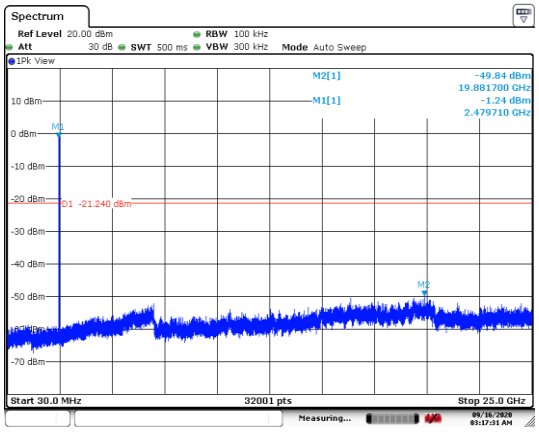
| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

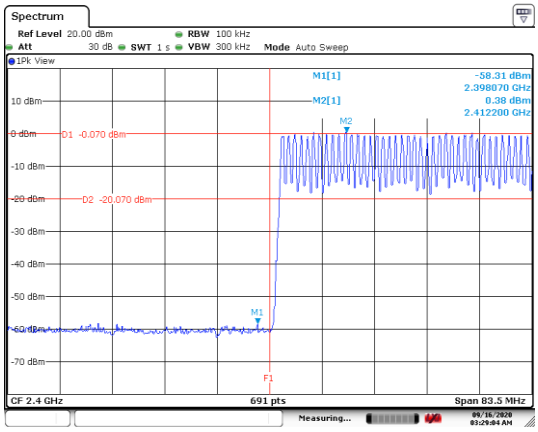
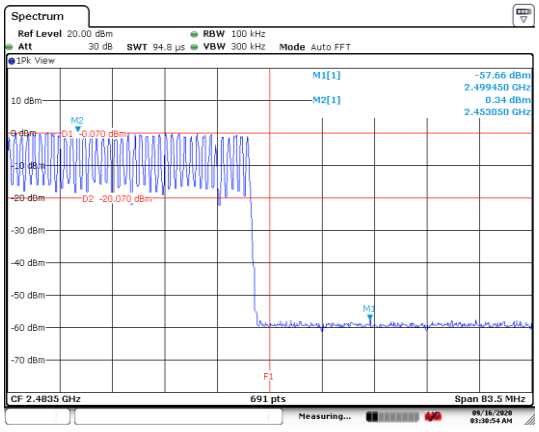
## Test Data

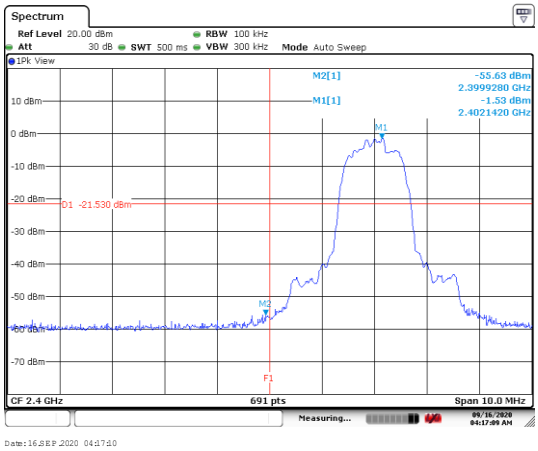
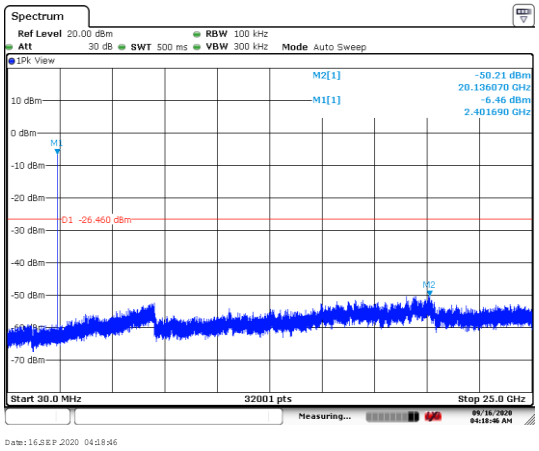
| GFSK_BDR-1Mbps mode Low CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |

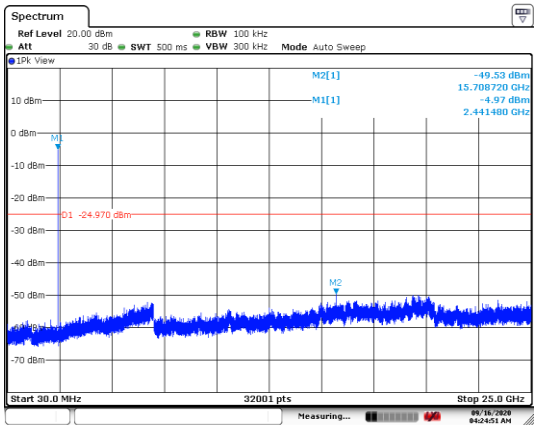
| GFSK_BDR-1Mbps mode Mid CH | |
|---|---|
| **Spurious Emission 30MHz-25GHz** | |
|  | |

**Report No.:** T200825W02-RP1

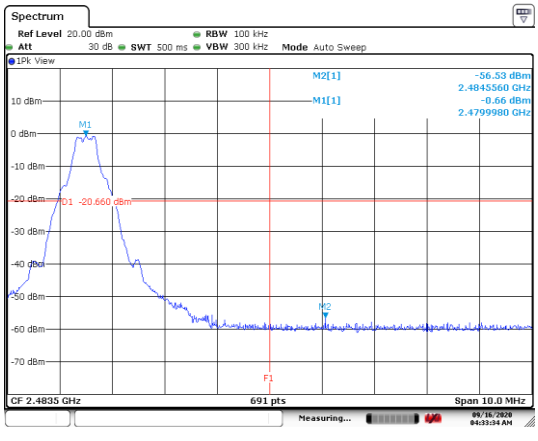
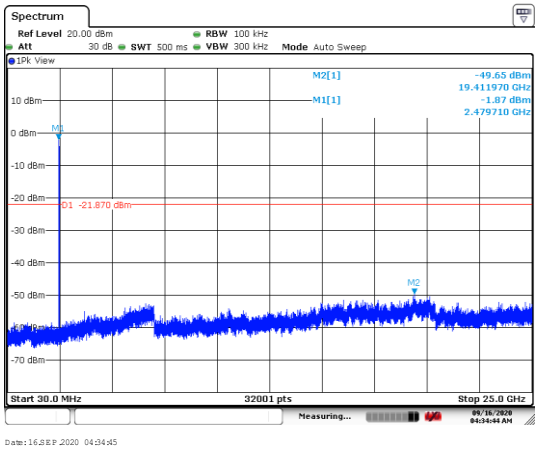
| GFSK_BDR-1Mbps mode High CH | |
|---|---|
| **Band Edge** | **Spurious Emission 30MHz-25GHz** |
|  |  |

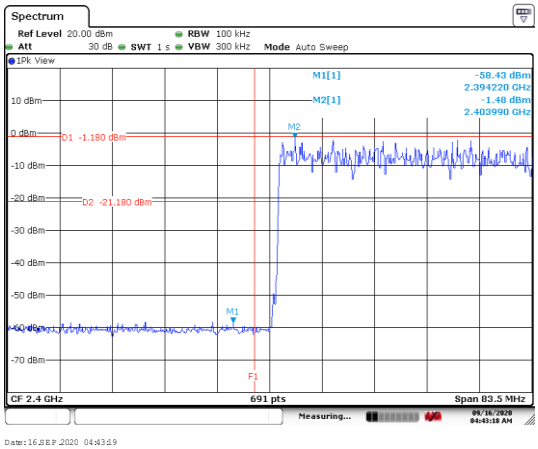
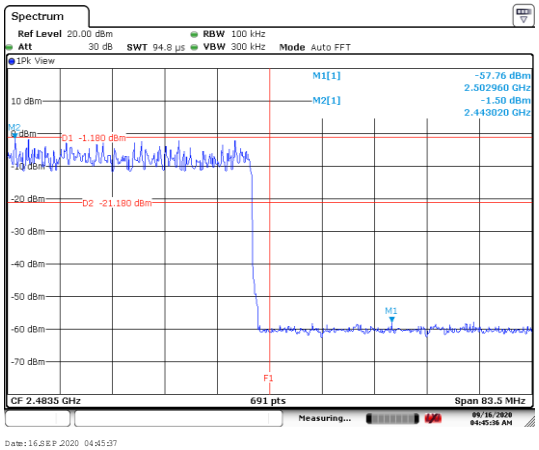
| GFSK_BDR-1Mbps Hopping mode | |
|---|---|
| **Low Band Edge** | **High Band Edge** |
|  |  |

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

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

**Report No.:** T200825W02-RP1

| 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

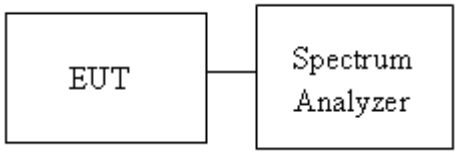
According to §15.247(a)(1)(iii)

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



**Report No.:** T200825W02-RP1

## 4.7.4 Test Result

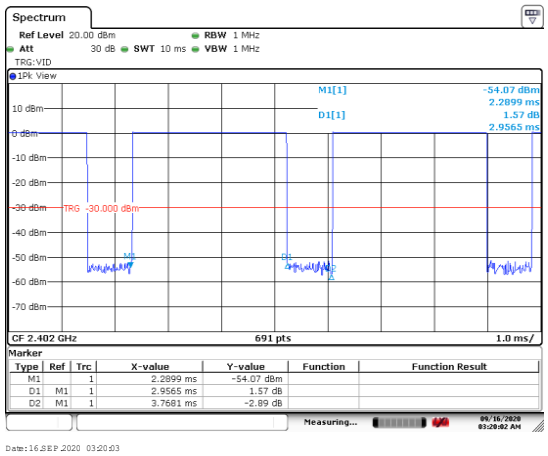
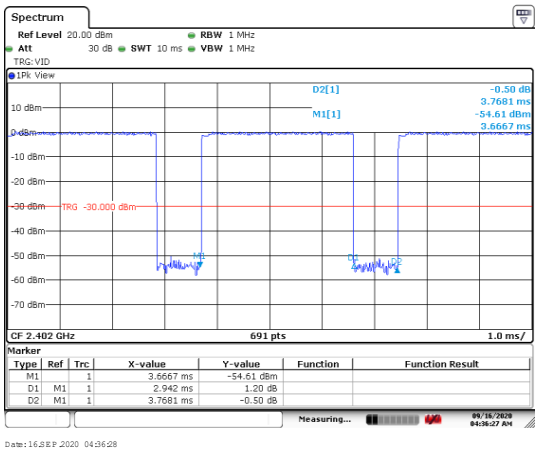
| | | | |
|---|---|---|---|
| **Temperature:** | 24℃ | **Humidity:** | 50% RH |
| **Tested by:** | Rick Lee | **Test date:** | September 16, 2020 |

| 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 | 2.9565 | 79 | 106.67 | 0.3154 | 0.4 | Pass |
| EDR-3Mbps | 2441 | 2.9420 | 79 | 106.67 | 0.3138 | 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 | | | | | | | |

| GFSK for AFH Mode | | | |
|---|---|---|---|
| **Hopping Channel Number** | **Packet Type** | **Measurement Result (ms)** | **Limit (ms)** |
| 20 | DH5 | 157.67 | 400 |
| Hopping Channel Number | Packet Type | Measurement Result (ms) | Limit (ms) |
| 20 | 3DH5 | 156.90 | 400 |

Remark:
In AFH mode, hopping rate is 800 hop/s with 6 slot in 20 hopping channels with channel hopping rate(800/6/20) in Cccupancy Time Limit (0.4*20)(S), Hop Over Occupancy Time comes to (800/6/20)*(0.4*20)=53.33
DH5=2.9565*53.33=157.67ms
3DH5=2.9420*53.33=156.89ms

## Test Data

| Time of Occupancy (Dwell Time) | |
|---|---|
| **GFSK_BDR-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,

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: 2013, 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：

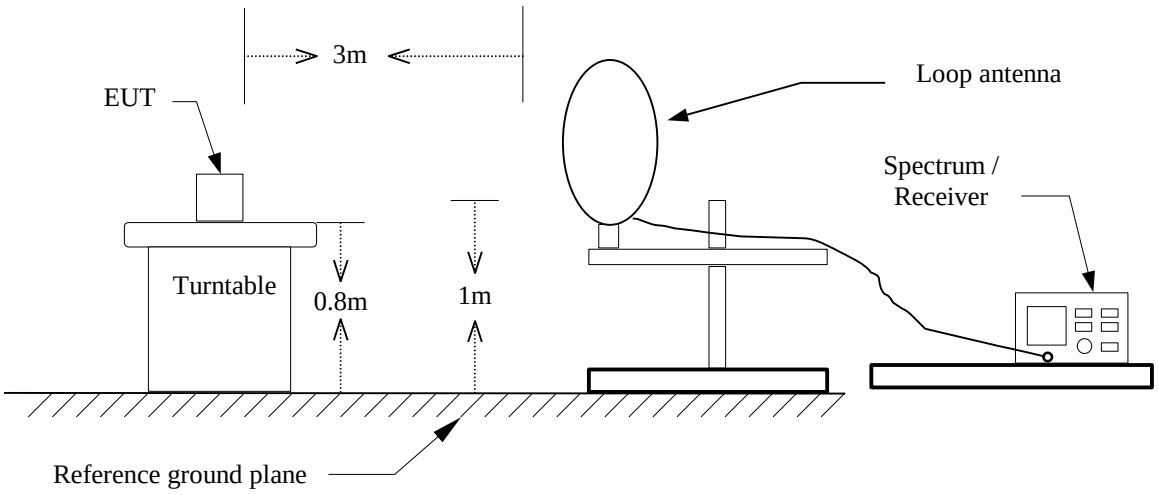
(2.1) For Peak measurement：RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

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

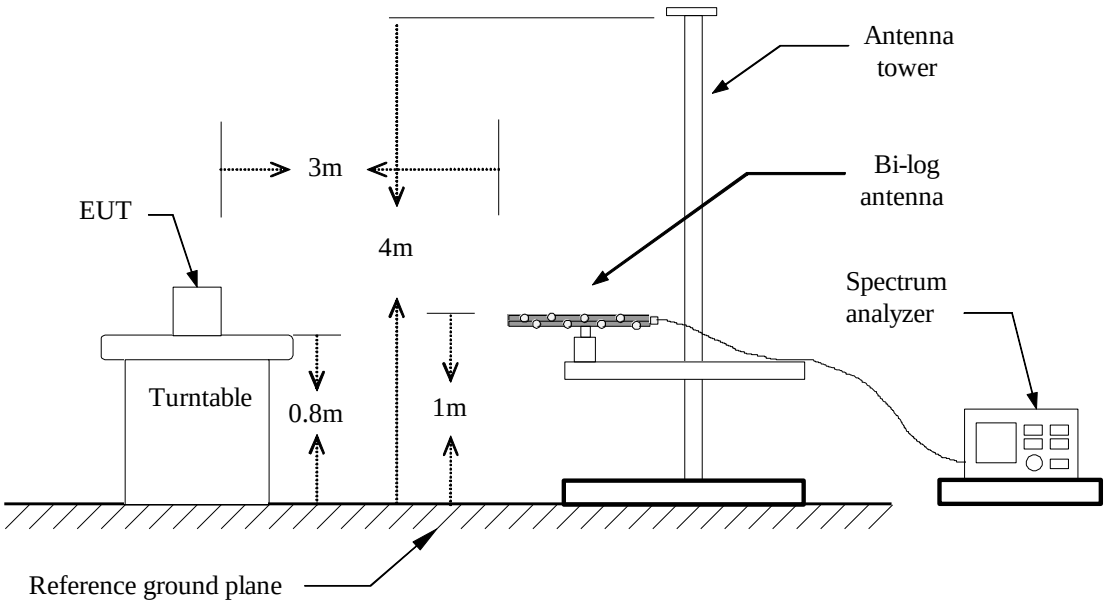
- If Duty Cycle ≥ 98%, VBW=10Hz.
- If Duty Cycle < 98%, VBW≥1/T.

## 4.8.3 Test Setup

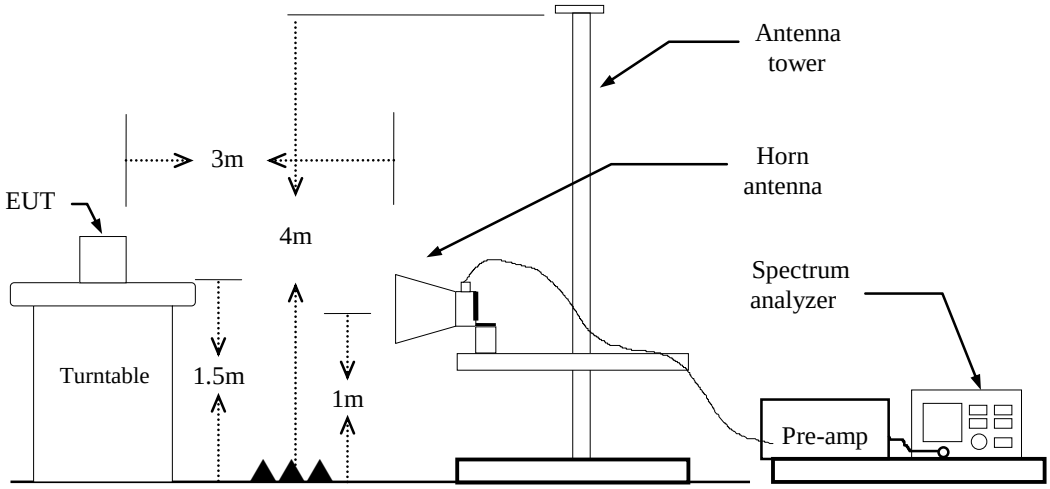
**9kHz ~ 30MHz**




**30MHz ~ 1GHz**



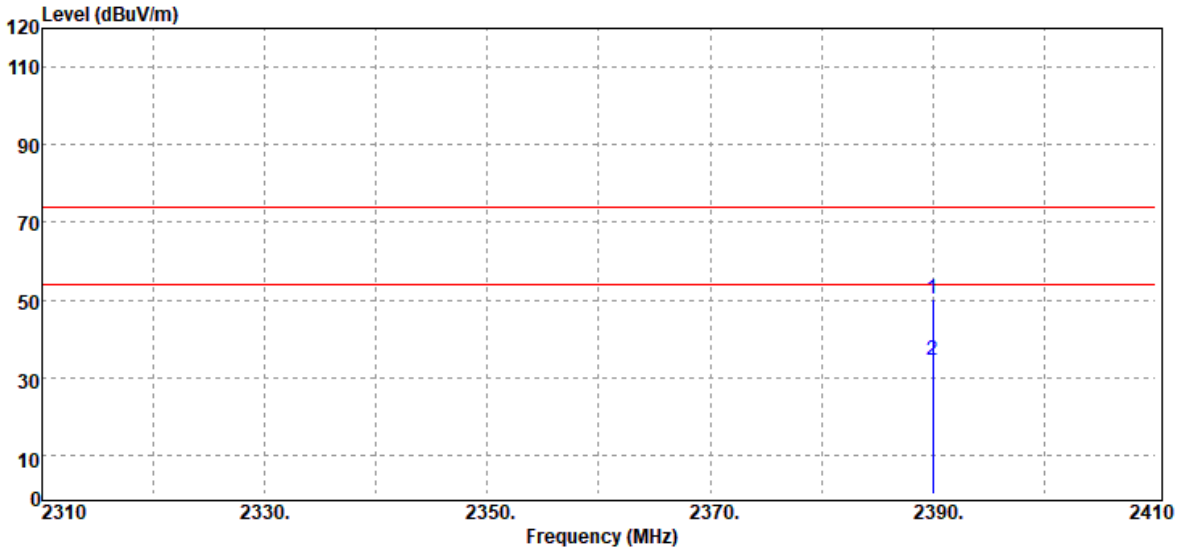
## Above 1 GHz



## 4.8.4 Test Result

**Band Edge Test Data**

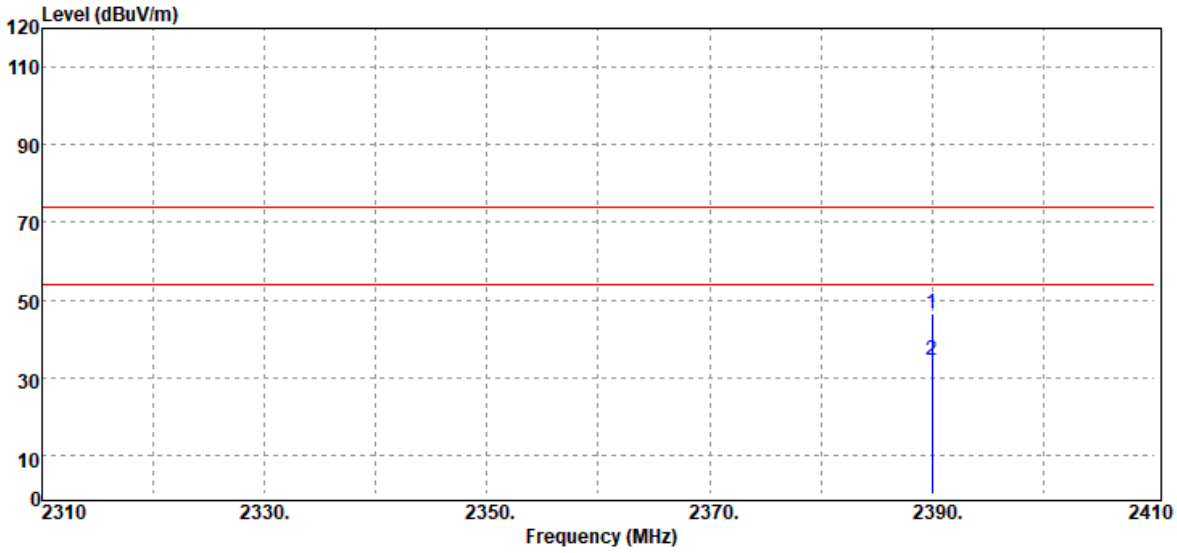
| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 53.51 | -3.17 | 50.34 | 74.00 | -23.66 |
| 2390.00 | Average | 37.83 | -3.17 | 34.66 | 54.00 | -19.34 |

**Report No.:** T200825W02-RP1

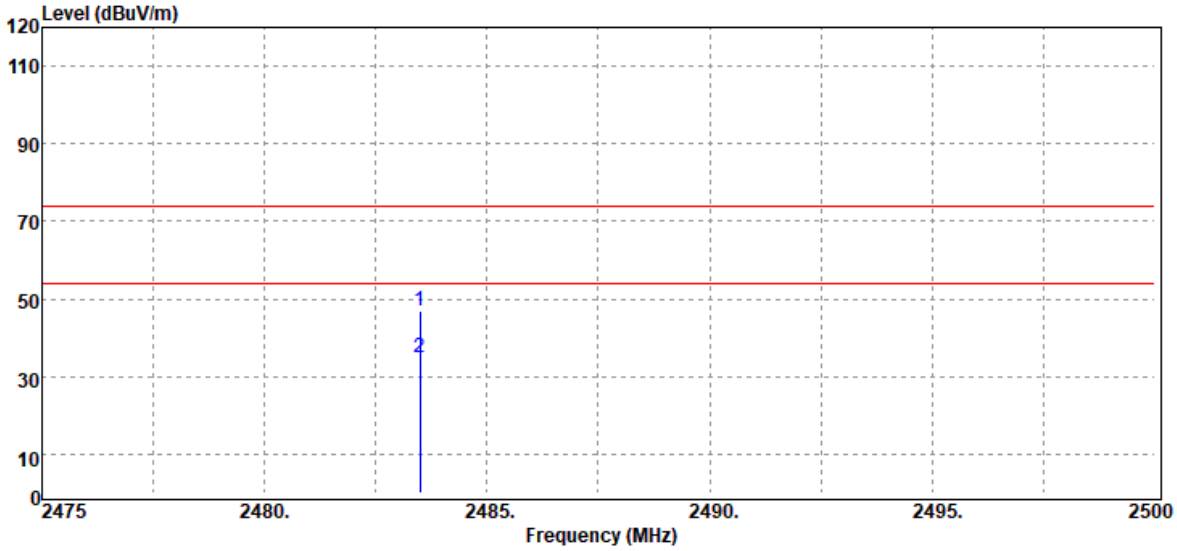
| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 49.49 | -3.17 | 46.32 | 74.00 | -27.68 |
| 2390.00 | Average | 37.44 | -3.17 | 34.27 | 54.00 | -19.73 |

**Report No.:** T200825W02-RP1

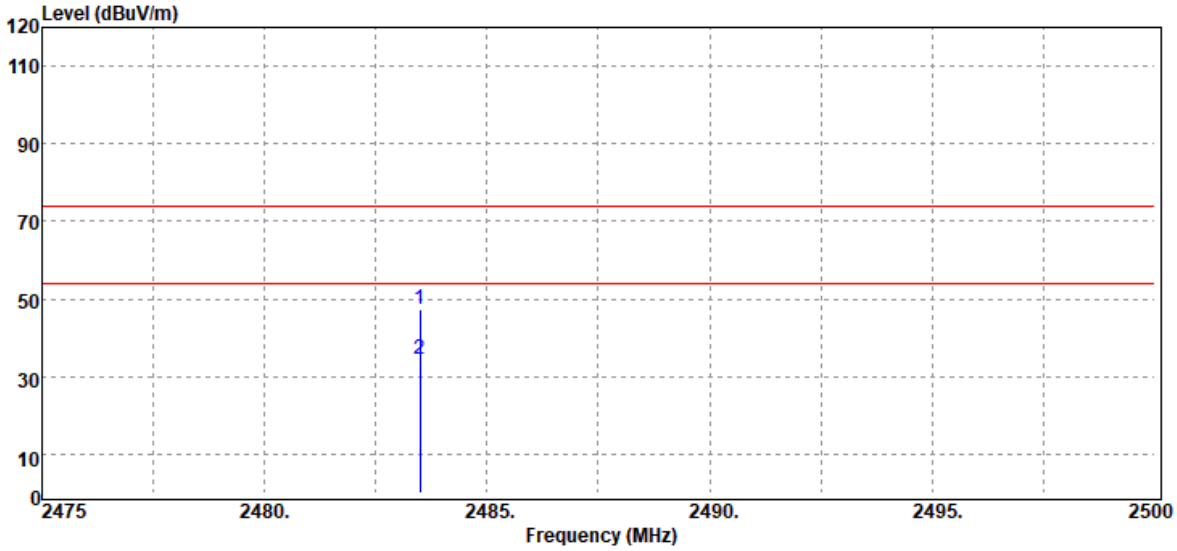
| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.57 | -2.71 | 46.86 | 74.00 | -27.14 |
| 2483.50 | Average | 37.51 | -2.71 | 34.80 | 54.00 | -19.20 |

**Report No.:** T200825W02-RP1

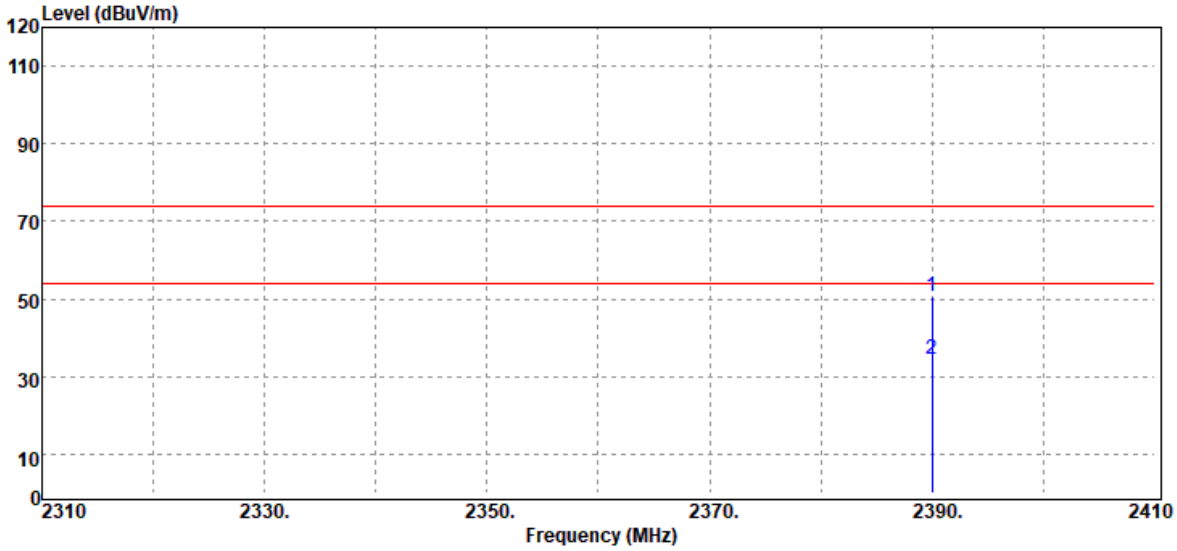
| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.88 | -2.71 | 47.17 | 74.00 | -26.83 |
| 2483.50 | Average | 37.26 | -2.71 | 34.55 | 54.00 | -19.45 |

**Report No.:** T200825W02-RP1

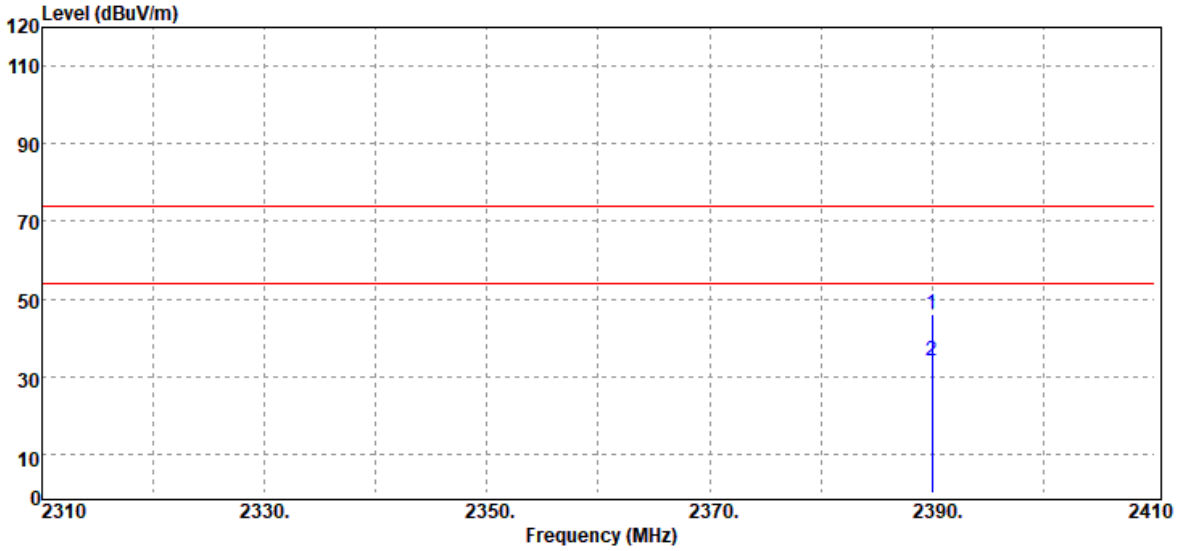
| Test Mode: | GFSK_BDR-1Mbps Low CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 54.03 | -3.17 | 50.86 | 74.00 | -23.14 |
| 2390.00 | Average | 37.44 | -3.17 | 34.27 | 54.00 | -19.73 |

**Report No.:** T200825W02-RP1

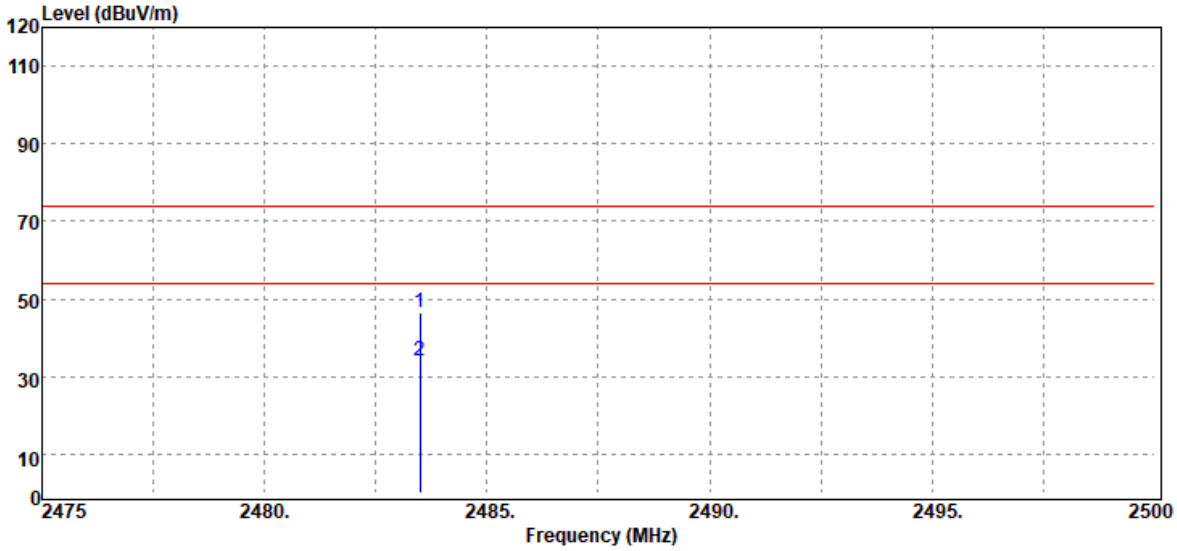
| Test Mode: | GFSK_BDR-1Mbps<br>Low CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 49.36 | -3.17 | 46.19 | 74.00 | -27.81 |
| 2390.00 | Average | 37.16 | -3.17 | 33.99 | 54.00 | -20.01 |

**Report No.:** T200825W02-RP1

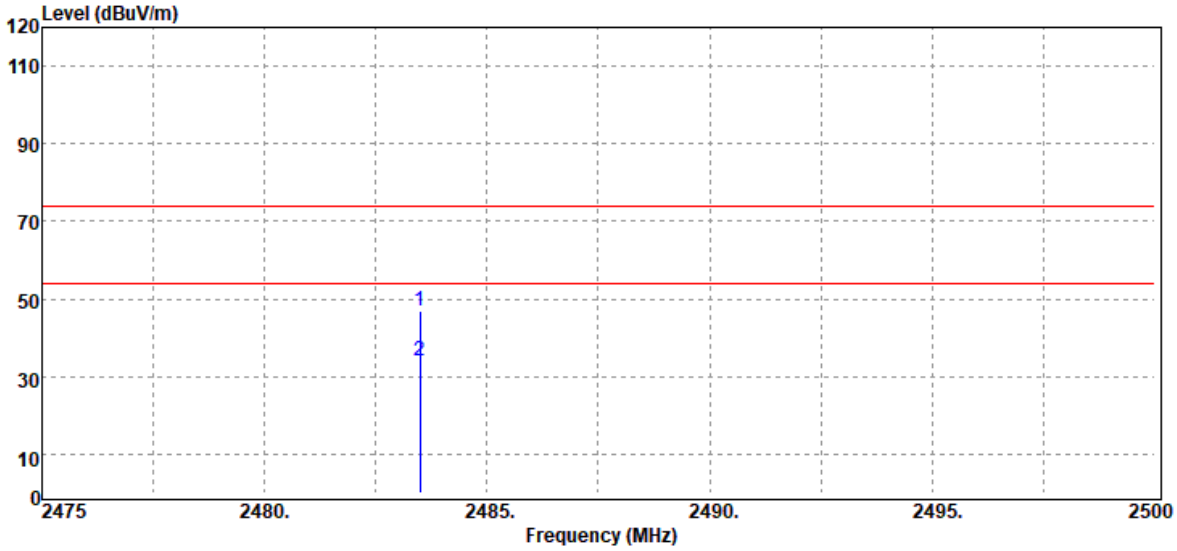
| Test Mode: | GFSK_BDR-1Mbps High CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.08 | -2.71 | 46.37 | 74.00 | -27.63 |
| 2483.50 | Average | 36.95 | -2.71 | 34.24 | 54.00 | -19.76 |

**Report No.:** T200825W02-RP1

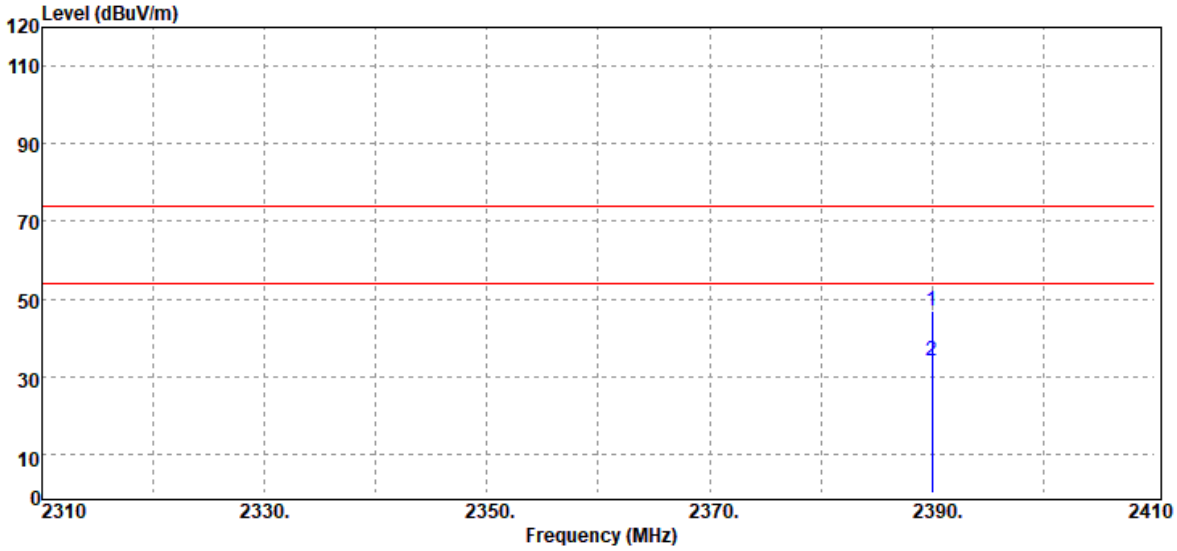
| Test Mode: | GFSK_BDR-1Mbps High CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.55 | -2.71 | 46.84 | 74.00 | -27.16 |
| 2483.50 | Average | 36.94 | -2.71 | 34.23 | 54.00 | -19.77 |

**Report No.:** T200825W02-RP1

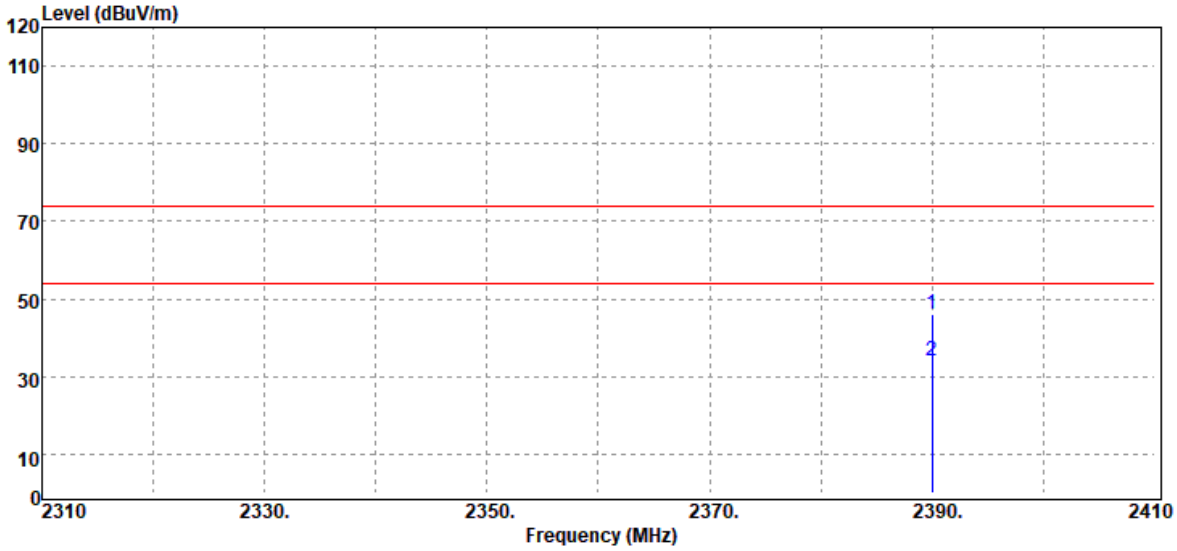
| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 50.06 | -3.17 | 46.89 | 74.00 | -27.11 |
| 2390.00 | Average | 37.07 | -3.17 | 33.90 | 54.00 | -20.10 |

**Report No.:** T200825W02-RP1

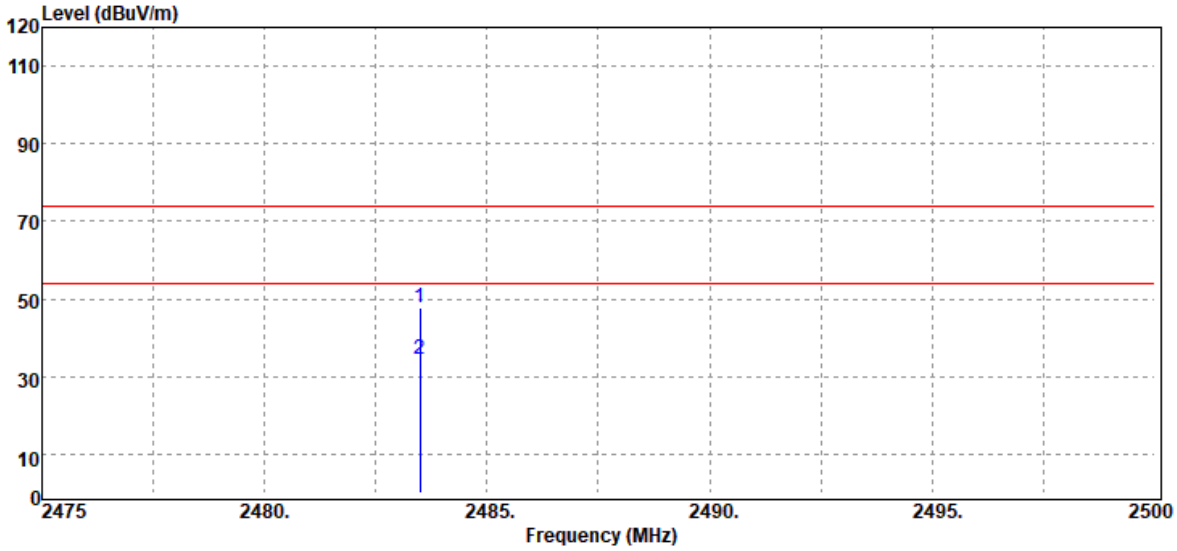
| Test Mode: | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 49.15 | -3.17 | 45.98 | 74.00 | -28.02 |
| 2390.00 | Average | 37.27 | -3.17 | 34.10 | 54.00 | -19.90 |

**Report No.:** T200825W02-RP1

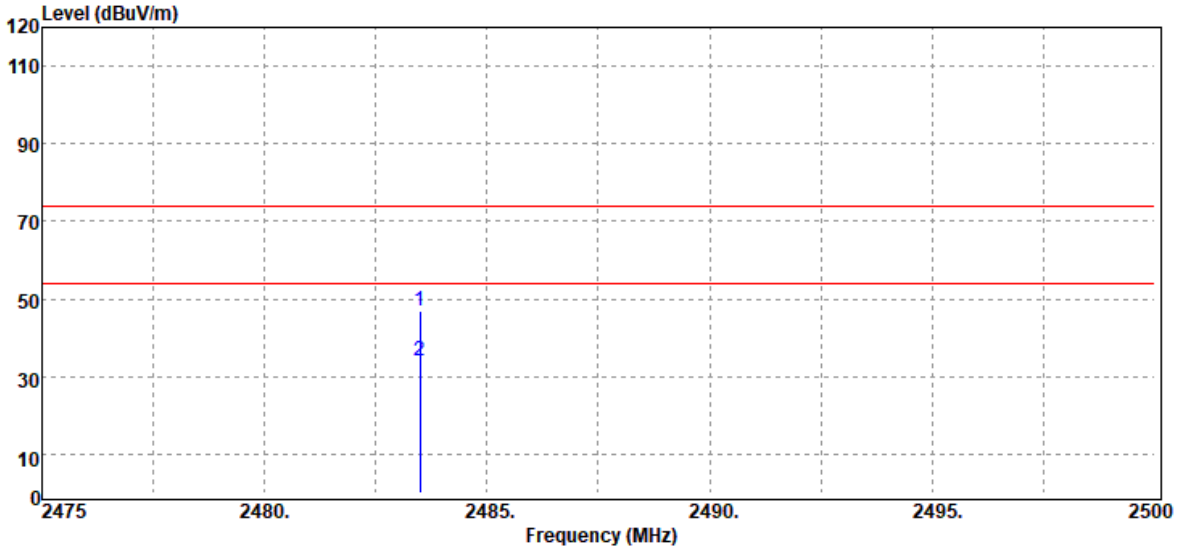
| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 50.48 | -2.71 | 47.77 | 74.00 | -26.23 |
| 2483.50 | Average | 36.98 | -2.71 | 34.27 | 54.00 | -19.73 |

**Report No.:** T200825W02-RP1

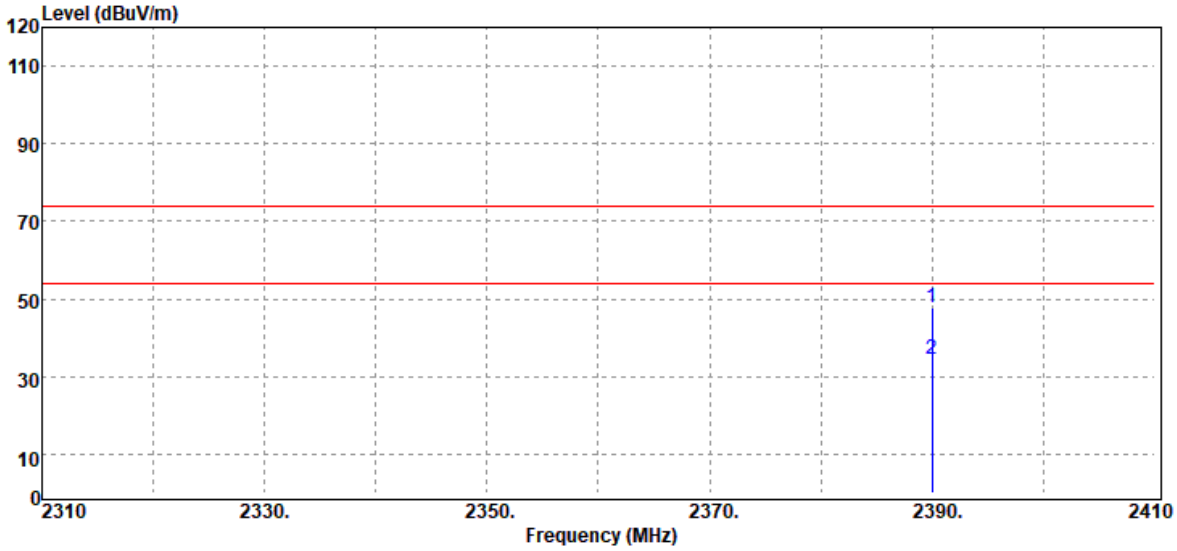
| Test Mode: | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.68 | -2.71 | 46.97 | 74.00 | -27.03 |
| 2483.50 | Average | 36.87 | -2.71 | 34.16 | 54.00 | -19.84 |

**Report No.:** T200825W02-RP1

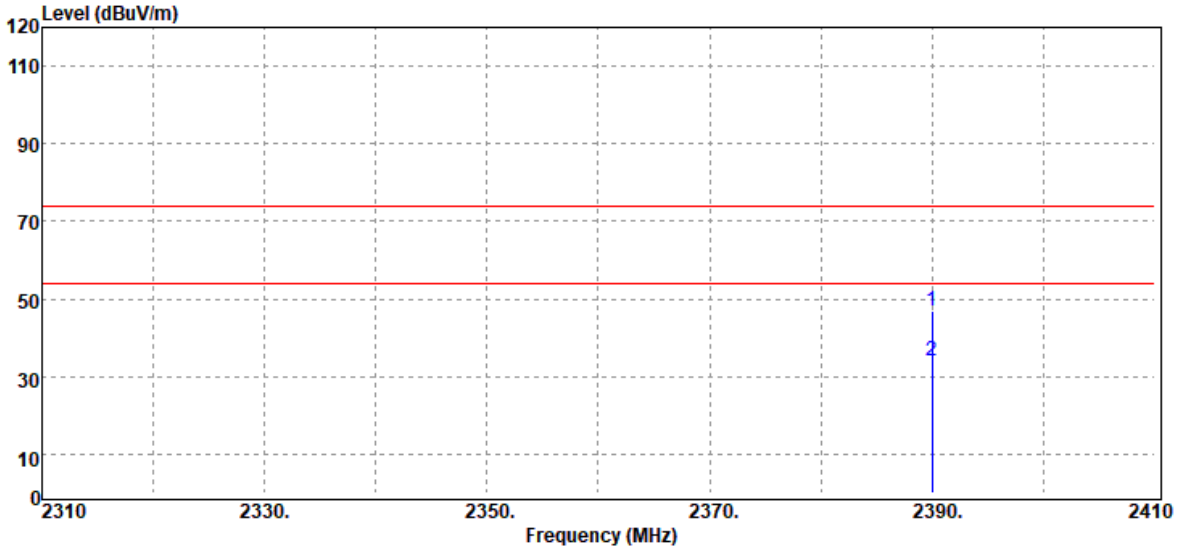
| Test Mode: | 8DPSK_EDR-3Mbps Low CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 51.04 | -3.17 | 47.87 | 74.00 | -26.13 |
| 2390.00 | Average | 37.57 | -3.17 | 34.40 | 54.00 | -19.60 |

**Report No.:** T200825W02-RP1

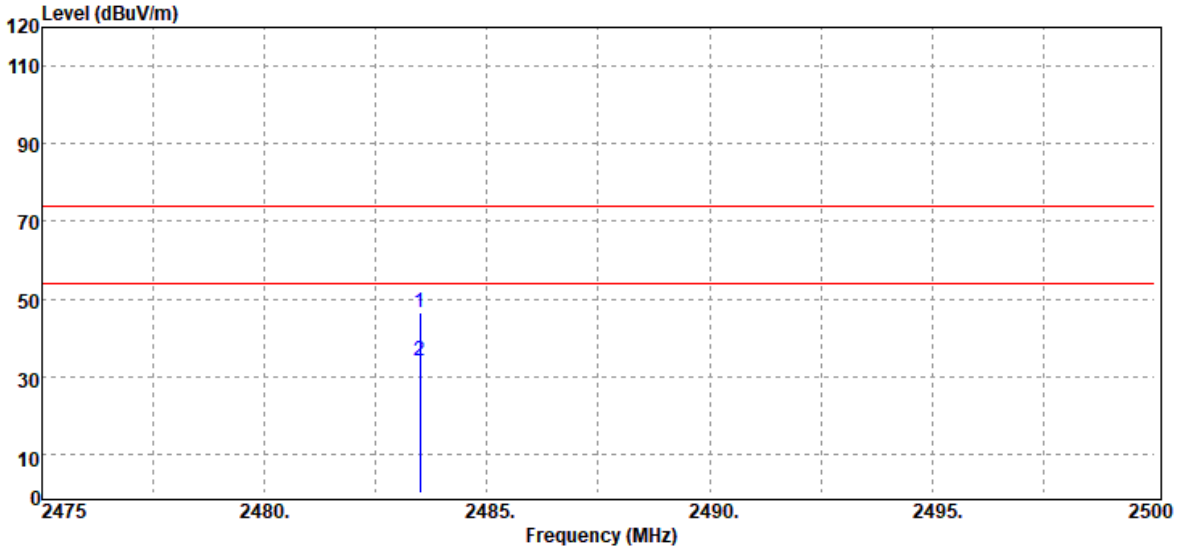
| Test Mode: | 8DPSK_EDR-3Mbps Low CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2390.00 | Peak | 50.03 | -3.17 | 46.86 | 74.00 | -27.14 |
| 2390.00 | Average | 37.04 | -3.17 | 33.87 | 54.00 | -20.13 |

**Report No.:** T200825W02-RP1

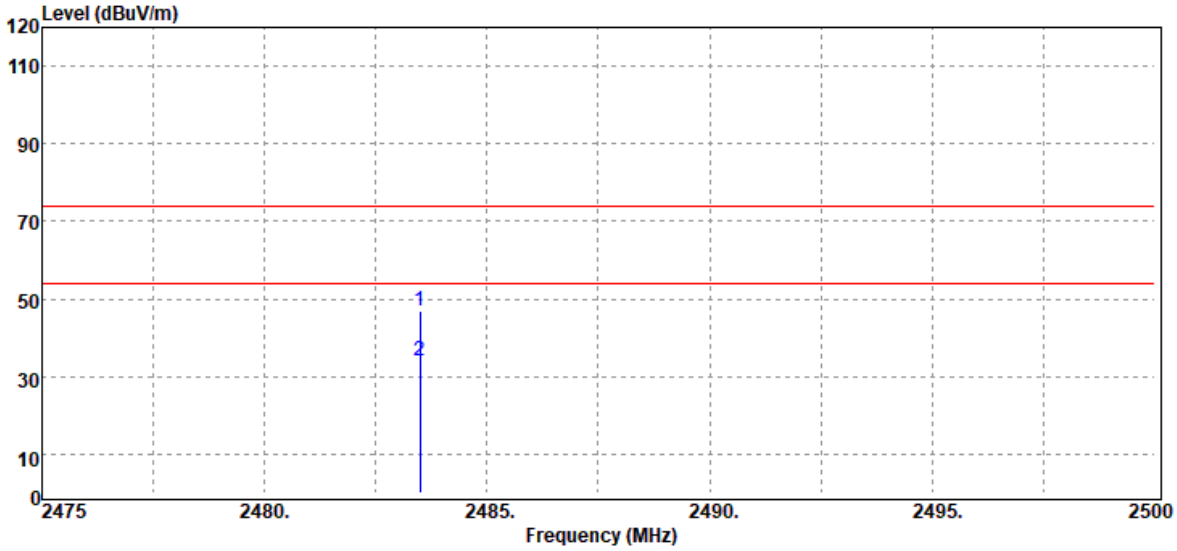
| Test Mode: | 8DPSK_EDR-3Mbps High CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.40 | -2.71 | 46.69 | 74.00 | -27.31 |
| 2483.50 | Average | 36.82 | -2.71 | 34.11 | 54.00 | -19.89 |

**Report No.:** T200825W02-RP1

| Test Mode: | 8DPSK_EDR-3Mbps High CH Hopping | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Band Edge | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak / Average | | |

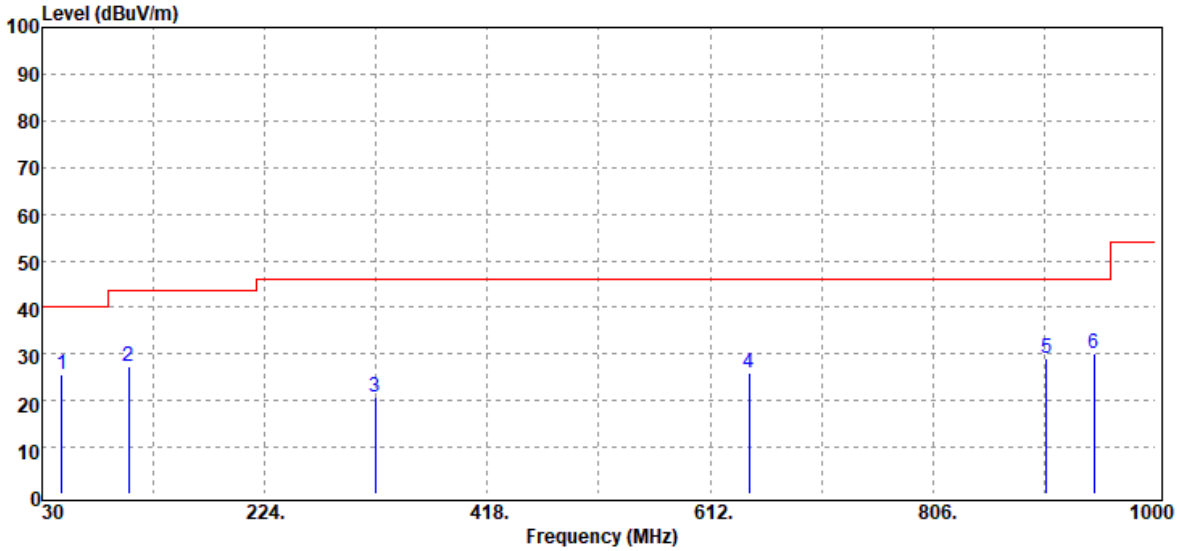



| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2483.50 | Peak | 49.75 | -2.71 | 47.04 | 74.00 | -26.96 |
| 2483.50 | Average | 36.79 | -2.71 | 34.08 | 54.00 | -19.92 |

**Report No.:** T200825W02-RP1

## Below 1G Test Data

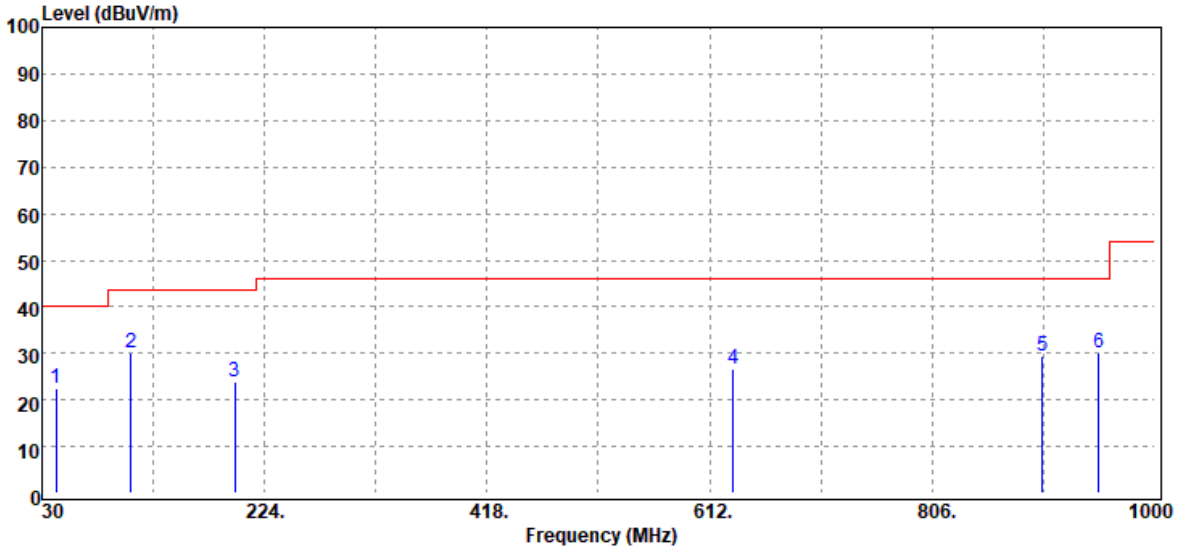
| Test Mode: | BT Mode | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | September 11, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 47.46 | Peak | 39.89 | -14.32 | 25.57 | 40.00 | -14.43 |
| 105.66 | Peak | 38.45 | -11.23 | 27.22 | 43.50 | -16.28 |
| 320.03 | Peak | 28.77 | -7.88 | 20.89 | 46.00 | -25.11 |
| 645.95 | Peak | 26.54 | -0.57 | 25.97 | 46.00 | -20.03 |
| 904.94 | Peak | 26.00 | 3.18 | 29.18 | 46.00 | -16.82 |
| 946.65 | Peak | 25.94 | 4.13 | 30.07 | 46.00 | -15.93 |

**Report No.:** T200825W02-RP1

| Test Mode: | BT Mode | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | 30MHz-1GHz | Test Date | September 11, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |

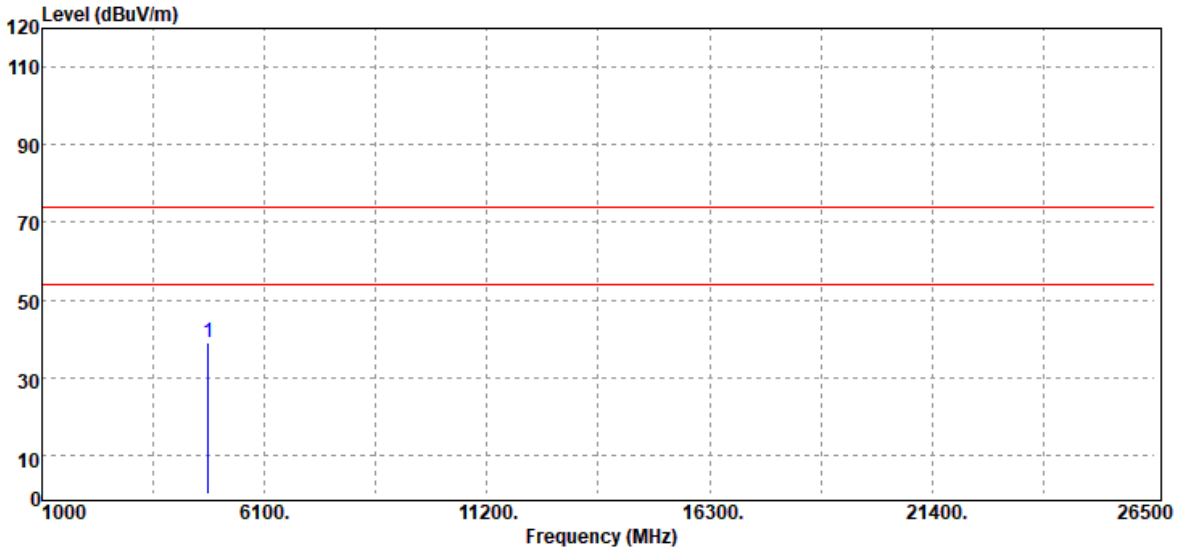



| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 42.61 | Peak | 33.94 | -11.59 | 22.35 | 40.00 | -17.65 |
| 107.60 | Peak | 40.93 | -10.95 | 29.98 | 43.50 | -13.52 |
| 197.81 | Peak | 33.37 | -9.63 | 23.74 | 43.50 | -19.76 |
| 632.37 | Peak | 27.16 | -0.64 | 26.52 | 46.00 | -19.48 |
| 902.03 | Peak | 26.37 | 3.12 | 29.49 | 46.00 | -16.51 |
| 951.50 | Peak | 25.85 | 4.30 | 30.15 | 46.00 | -15.85 |

**Report No.:** T200825W02-RP1

## Above 1G Test Data

| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |



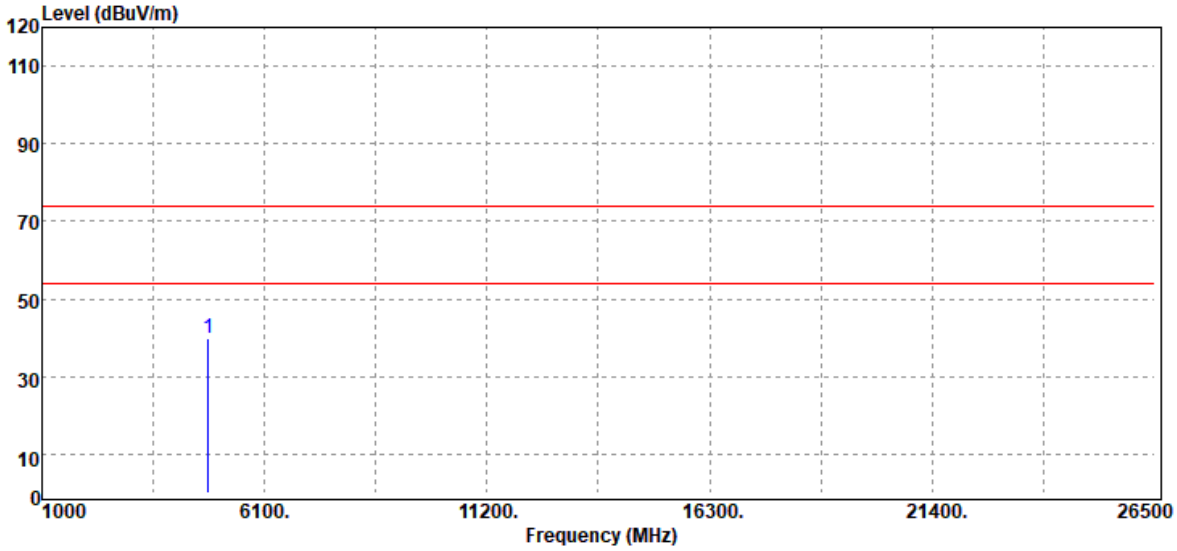

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 35.72 | 3.36 | 39.08 | 74.00 | -34.92 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |

**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

**Report No.:** T200825W02-RP1

| Test Mode: | GFSK_BDR-1Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |



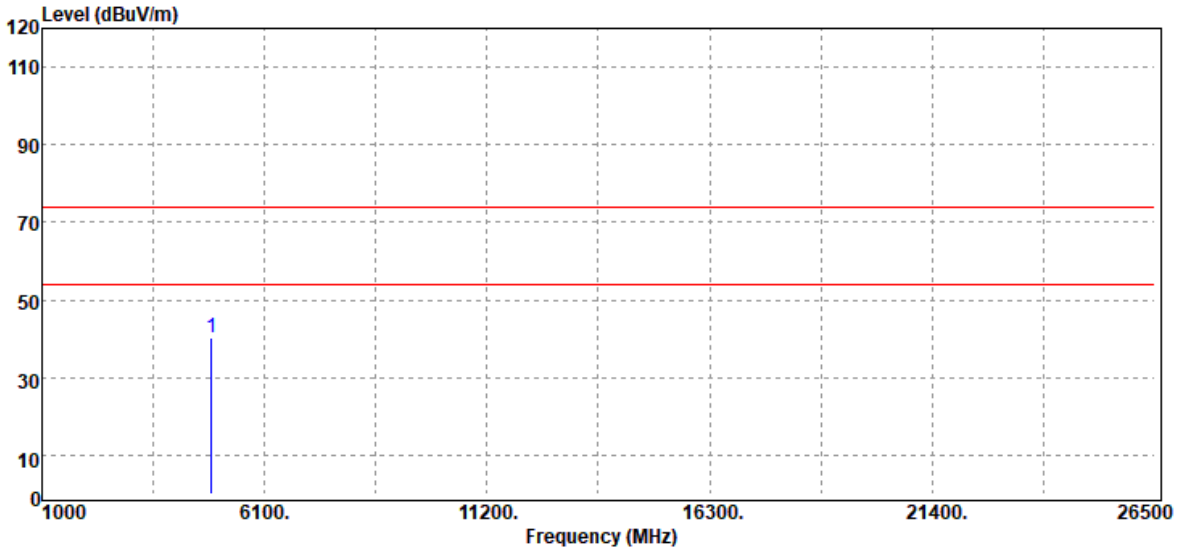

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 36.43 | 3.36 | 39.79 | 74.00 | -34.21 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |

**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

**Report No.:** T200825W02-RP1

| Test Mode: | GFSK_BDR-1Mbps Mid CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 36.89 | 3.52 | 40.41 | 74.00 | -33.59 |
| N/A | | | | | | |
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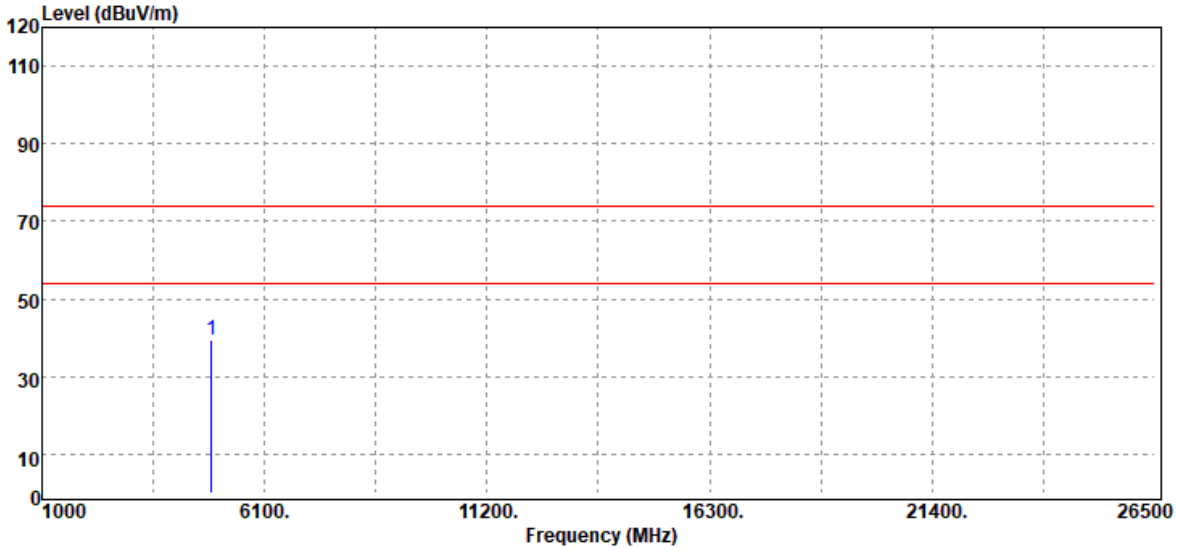
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode: | GFSK_BDR-1Mbps Mid CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 35.96 | 3.52 | 39.48 | 74.00 | -34.52 |
| N/A | | | | | | |
| | | | | | | |
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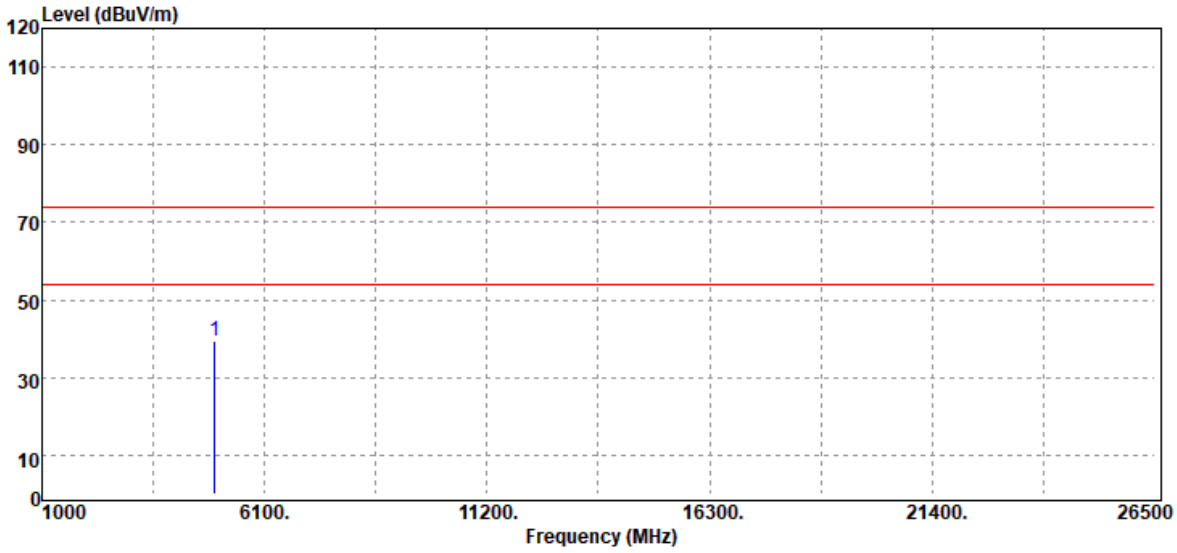
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 35.13 | 4.46 | 39.59 | 74.00 | -34.41 |
| N/A | | | | | | |
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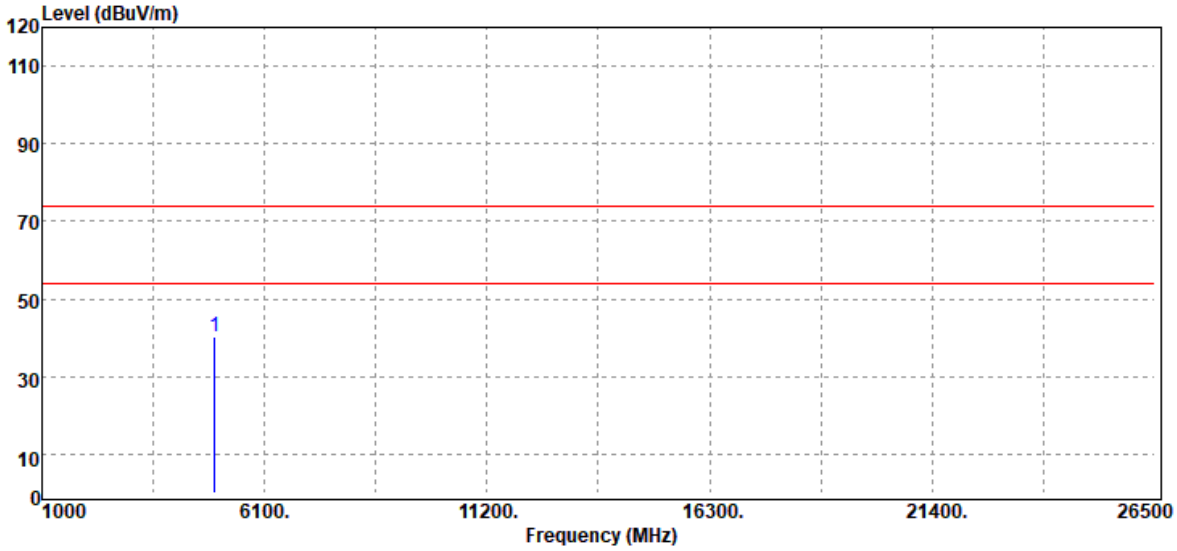
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode: | GFSK_BDR-1Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 35.80 | 4.46 | 40.26 | 74.00 | -33.74 |
| N/A | | | | | | |
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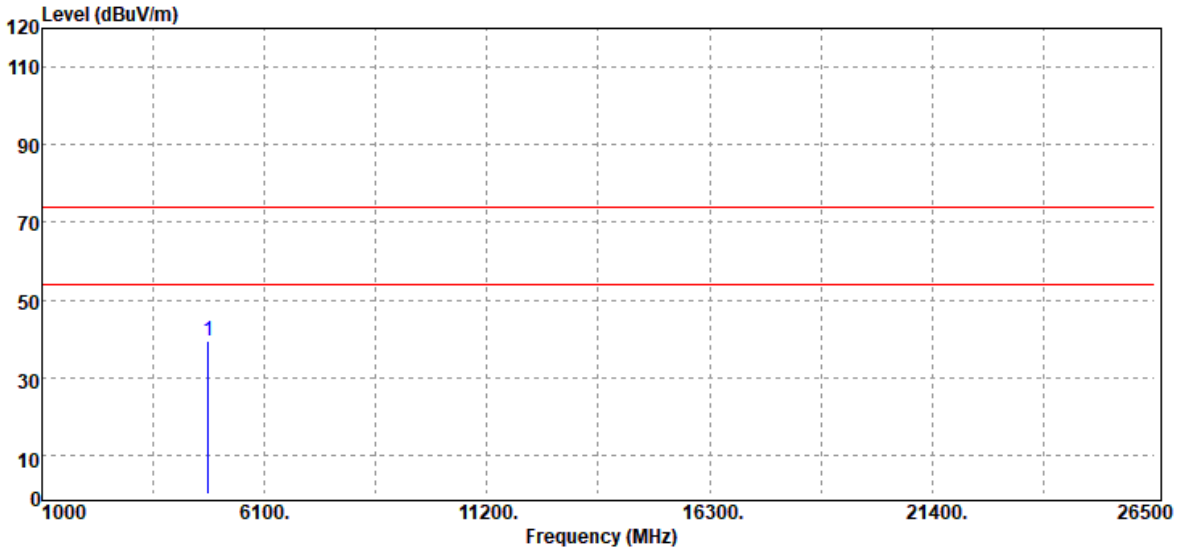
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 36.14 | 3.36 | 39.50 | 74.00 | -34.50 |
| N/A | | | | | | |
| | | | | | | |
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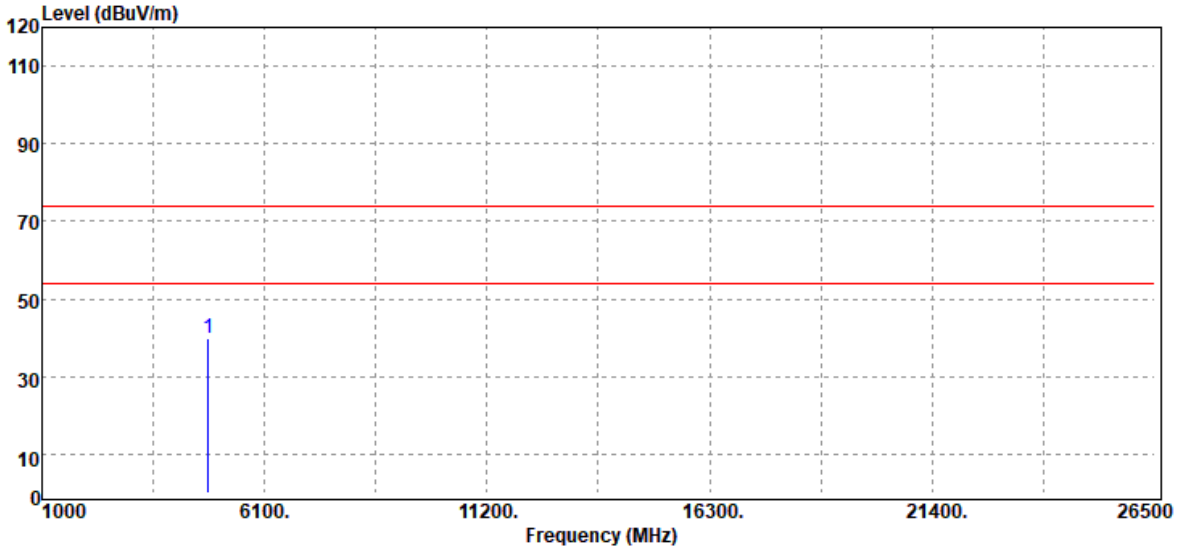
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps Low CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 36.51 | 3.36 | 39.87 | 74.00 | -34.13 |
| N/A | | | | | | |
| | | | | | | |
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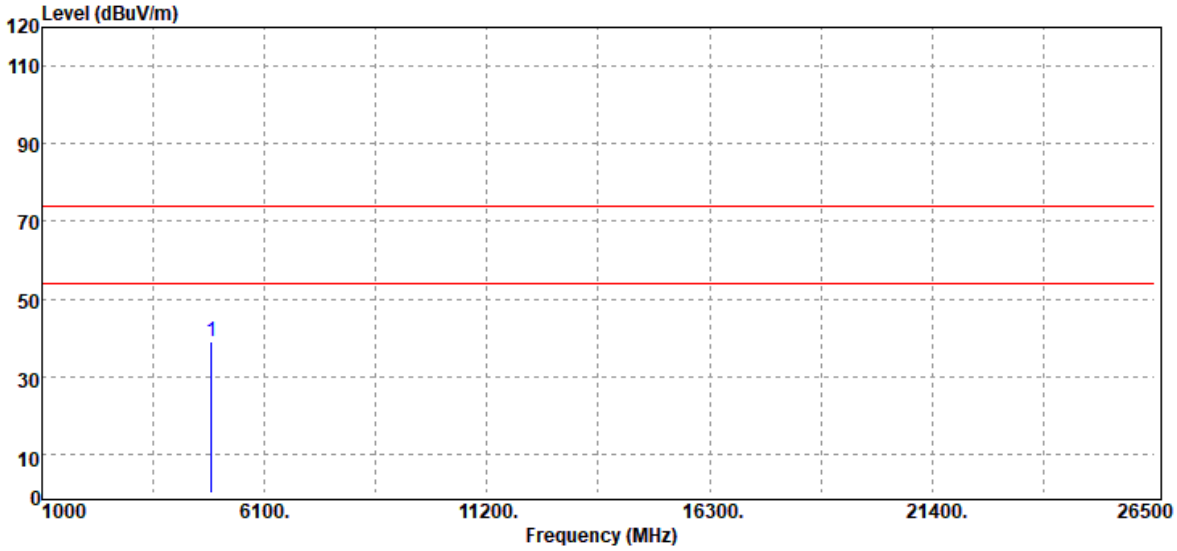
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 35.52 | 3.52 | 39.04 | 74.00 | -34.96 |
| N/A | | | | | | |
| | | | | | | |
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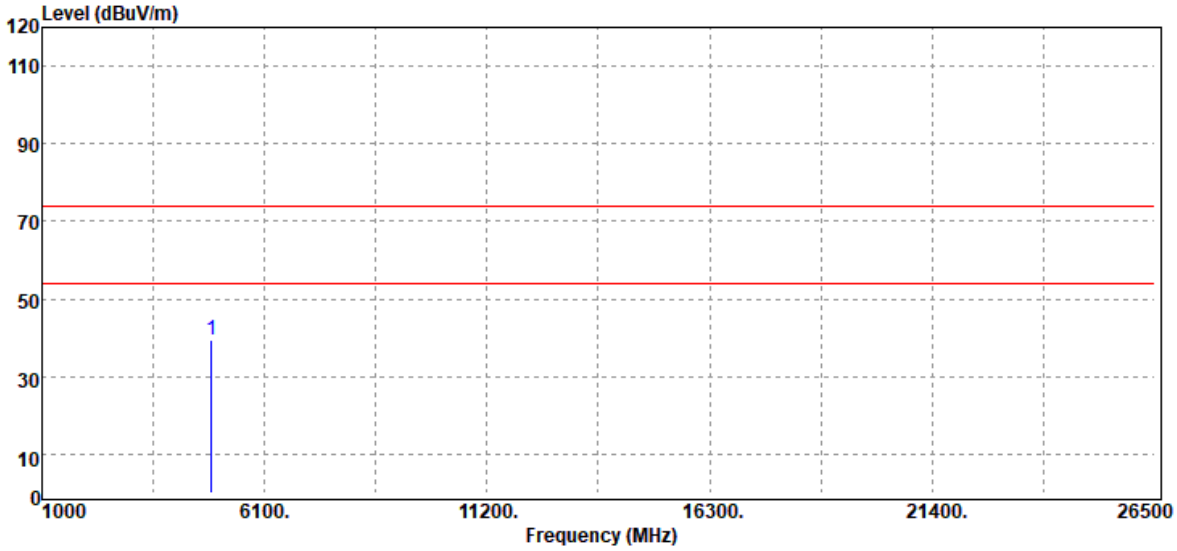
**Remark:**

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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps Mid CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |



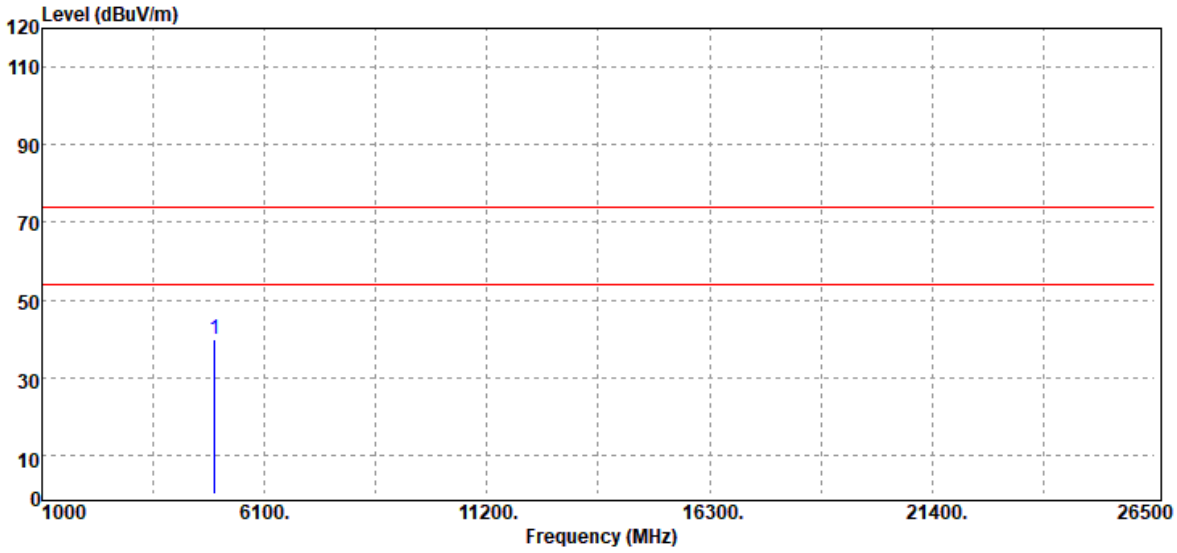

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Reading Level dBµV | Factor dB | Actual FS dBµV/m | Limit @3m dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 35.96 | 3.52 | 39.48 | 74.00 | -34.52 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |

**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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Vertical | Test Engineer | Jerry Chang |
| Detector | Peak | | |



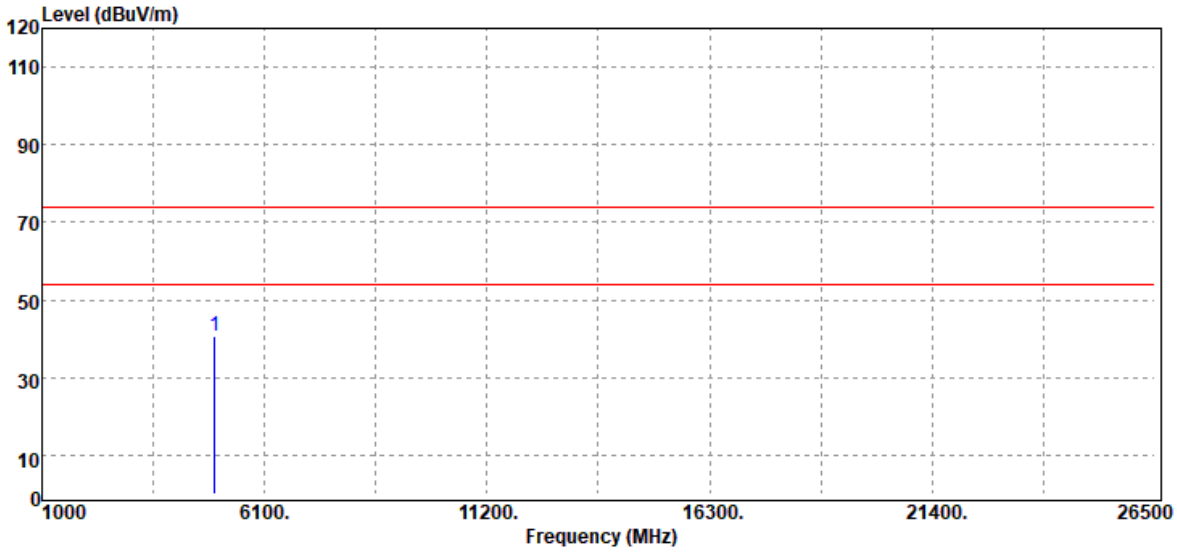

| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 35.28 | 4.46 | 39.74 | 74.00 | -34.26 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |

**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

**Report No.:** T200825W02-RP1

| Test Mode | 8DPSK_EDR-3Mbps High CH | Temp/Hum | 25(℃)/ 42%RH |
|---|---|---|---|
| Test Item | Harmonic | Test Date | September 14, 2020 |
| Polarize | Horizontal | Test Engineer | Jerry Chang |
| Detector | Peak | | |




| Freq.<br>MHz | Detector Mode<br>PK/QP/AV | Spectrum Reading Level<br>dBµV | Factor<br>dB | Actual FS<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 36.05 | 4.46 | 40.51 | 74.00 | -33.49 |
| N/A | | | | | | |
| | | | | | | |
| | | | | | | |

**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

**- End of Test Report -**