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

| | |
|---|---|
| **Test Standard** | **FCC Part 15.247** |
| **Product name** | **Wireless Handheld Barcode Scanner** |
| **Brand Name** | **ZEBEX** |
| **Model No.** | **Z-3190BT Plus, Z-3192BT Plus** |
| **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:*

Shawn Wu
Supervisor

# Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|---|---|---|---|---|
| 00 | June 7, 2024 | Initial Issue | ALL | Peggy Tsai |
| 01 | July 3, 2024 | See the following Note Rev. (01) | P.4, 6, 9, 11, 12, 33, 35,36 | Peggy Tsai |
| 02 | July 9, 2024 | See the following Note Rev. (02) | P. 1, 4, 9, 16, 25, 32, 34, 37, 39, 45, 65, 66 | Peggy Tsai |
| 03 | July 15, 2024 | See the following Note Rev. (03) | P. A-3 | Peggy Tsai |
| 04 | July 18, 2024 | See the following Note Rev. (04) | P. 4 | Peggy Tsai |

**Note:**
**Rev. (01)**
1. Added EUT Serial #: P90PH000001.
2. Modify antenna gain.
3. Modify instrument calibration in section 1.7.
4. Modify support and EUT accessories equipment in section 1.8.
5. Modify test set up diagram in section 1.9.
6. Modify test procedure in section 4.4.2.
7. Modify test data in section 4.4.4.

**Rev. (02)**
1. Modify model to Z-3190BT Plus, Z-3192BT Plus.
2. Modify HW Version in section 1.1.
3. Modify date of test in section 1.1.
4. Modify instrument calibration in section 1.7.
5. Modify TX test data in section 4.8.4.
6. Modify date of RF Conducted test.

**Rev. (03)**
1. Modify conducted emission set up photo.

**Rev. (04)**
1. Modify SW version.

# Table of contents

# 1. GENERAL INFORMATION

## 1.1 EUT INFORMATION

| | |
|---|---|
| **Applicant** | ZEBEX INDUSTRIES INC.<br>B1F.-1, No. 207, Sec. 3, Beixin Rd, Xindian Dist, New Taipei City 23143, Taiwan |
| **Manufacturer** | ZEBEX INDUSTRIES INC.<br>B1F.-1, No. 207, Sec. 3, Beixin Rd, Xindian Dist, New Taipei City 23143, Taiwan |
| **Equipment** | Wireless Handheld Barcode Scanner |
| **Model** | Z-3190BT Plus, Z-3192BT Plus |
| **Model Discrepancy** | **Z-3190BT Plus:** CCD Wireless Handheld Barcode Scanner<br>**Z-3192BT Plus:** 2D Image Wireless Handheld Barcode Scanner |
| **Brand Name** | ZEBEX |
| **Received Date** | February 22, 2024 |
| **Date of Test** | March 15 ~ June 20, 2024 |
| **Power Supply** | Power from Adapter.<br>BILLION / BA018-050200HXX<br>I/P: 100-240VAC, 0.5A, 50/60Hz<br>O/P: 5.0VDC, 2.0A |
| **EUT Serial #** | P90PH000001 |
| **HW Version** | 023-190BP1-034 & 023-190BP2-034 & 023-190BP3-034 |
| **SW Version** | **Z-3190BT Plus:** Z-3190BT+(H02.x0) 09:27:50 Date:11/28/2023<br>**Z-3192BT Plus:** Z-3192BT+(M01.03) Ver:01.00 Jul 11 2024<br>SN:20240319 BT Controller(H02.B2) BT0103 Jul 12 2024 |

**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: Variant information between/among model numbers / trademarks are provided by the applicant, test results of this report are applicable to the sample EUT received of main test model name.)

# 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

The Rx input bandwidths shift frequencies in synchronization with the transmitted signals.
In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in standard when the transmitter is presented with a continuous data (or information) system.
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 ☒ Chip |
| **Antenna Gain** | Gain: 2.13 dBi |
| **Antenna Connector** | N/A |

**Notes:**
1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

# 1.5 MEASUREMENT UNCERTAINTY

| PARAMETER | UNCERTAINTY |
|---|---|
| AC Powerline Conducted Emission | ± 2.213 dB |
| Channel Bandwidth | ± 2.7 % |
| RF output power (Power Meter + Power sensor) | ± 0.243 dB |
| Power Spectral density | ± 2.739 dB |
| Conducted Bandedge | ± 2.739 dB |
| Conducted Spurious Emission | ± 2.742 dB |
| Radiated Emission_9kHz-30MHz | ± 3.761 dB |
| Radiated Emission_30MHz-200MHz | ± 3.473 dB |
| Radiated Emission_200MHz-1GHz | ± 3.946 dB |
| Radiated Emission_1GHz-6GHz | ± 4.797 dB |
| Radiated Emission_6GHz-18GHz | ± 4.803 dB |
| Radiated Emission_18GHz-26GHz | ± 3.459 dB |
| Radiated Emission_26GHz-40GHz | ± 3.297 dB |

**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.

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan 24803

CAB identifier: TW1309

| Test site | Test Engineer | Remark |
|---|---|---|
| AC Conduction Room | Czerny Lin | - |
| Radiation | Tony Chao、Ray Li | - |
| RF Conducted | Jerry Chang | - |

**Remark:** The lab has been recognized as the FCC accredited lab. 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

# 1.7 INSTRUMENT CALIBRATION

| Conducted_FCC/IC/NCC (All) | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Power Sensor | Anritsu | MA2411B | 1911387 | 2023-07-25 | 2024-07-24 |
| Power Meter | Anritsu | ML2496A | 2136002 | 2023-11-16 | 2024-11-15 |
| EXA Signal Analyzer | Keysight | N9010A | MY54200716 | 2023-10-13 | 2024-10-12 |
| EXA Signal Analyzer | Keysight | N9030B | MY62291089 | 2023-10-13 | 2024-10-12 |
| **Software** | Radio Test Software Ver. 21 & E3-Ver: 6.11-20180413 | | | | |

| 966A_Radiated | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| Signal Analyzer | KEYSIGHT | N9010A | MY54200716 | 2023-10-13 | 2024-10-12 |
| Thermo-Hygro Meter | WISEWIND | 1206 | D07 | 2023-12-08 | 2024-12-07 |
| Loop Antenna | COM-POWER | AL-130 | 121051 | 2023-05-23 | 2024-05-22 |
| Bi-Log Antenna | Sunol Sciences | JB3 | A030105 | 2023-08-08 | 2024-08-07 |
| Preamplifier | EMEC | EM330 | 060609 | 2024-02-21 | 2025-02-20 |
| Cable | Huber+Suhner | 104PEA | 20995+21000+182330 | 2024-02-21 | 2025-02-20 |
| Horn Antenna | ETC | MCTD 1209 | DRH13M02003 | 2023-12-28 | 2024-12-27 |
| Preamplifier | HP | 8449B | 3008A00965 | 2023-12-22 | 2024-12-21 |
| Cable | EMCI | EMC101G | 221213+221011+221012 | 2023-10-17 | 2024-10-16 |
| Attenuator | Mini-Circuits | BW-S9W5 | BWS9W5-09-966A-01 | 2024-02-07 | 2025-02-06 |
| High Pass Filters | Titan Microwave | T04H30001800070S01 | 22011402-4 | 2023-06-17 | 2024-06-16 |
| Horn Antenna | SCHWARZBECK | BBHA9170 | 1047 | 2023-12-13 | 2024-12-12 |
| Pre-Amplifier | EMCI | EMC184045SE | 980860 | 2023-12-12 | 2024-12-11 |
| Turn Table | CCS | CC-T-1F | N/A | N.C.R | N.C.R |
| Controller | CCS | CC-C-1F | N/A | N.C.R | N.C.R |
| Antenna Tower | CCS | CC-A-1F | N/A | N.C.R | N.C.R |
| Site Validation | CCS | 966A | N/A | 2023-07-10 | 2024-07-09 |
| **Software** | e3 V9-210616c | | | | |

**Remark:**
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

| AC Mains Conduction | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Date** | **Calibration Due** |
| EMI Test Receiver | R&S | ESCI | 100064 | 2023-06-07 | 2024-06-06 |
| LISN | TESEQ | LN2-16N | 22012 | 2024-02-29 | 2025-02-27 |
| Cable | EMCI | CFD300-NL | CERF | 2023-06-27 | 2024-06-26 |
| **Software** | e3 V6-110812 | | | | |

**Remark:**
1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R. = No Calibration Required.

# 1.8 SUPPORT AND EUT ACCESSORIES EQUIPMENT

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

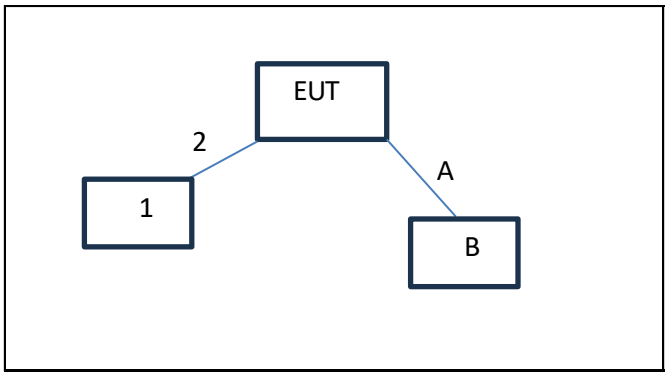
| Support Equipment (Conducted) | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **Series No.** | **FCC ID** |
| 1 | NB(L) | Lenovo | X260 | N/A | N/A |
| 2 | Micro to USB Cable | Pro-Best | MK-USB-MIN5MBM-100 | N/A | N/A |
| A | USB to Type C Cable | WHALETURN | USB A/M TO Type C/M L=1.5M | N/A | N/A |
| B | Adapter | BILLION | BA018-050200HXX | N/A | N/A |

| Support Equipment (Conduction) | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **Series No.** | **FCC ID** |
| 1 | NB(D) | Lenovo | ThinkPad X260 | N/A | N/A |
| 2 | Adapter | BILLION | BA018-050200HXX | N/A | N/A |
| 3 | Micro to USB Cable | Pro-Best | MK-USB-MIN5MBM-100 | N/A | N/A |
| A | Type C Cable | WHALETURN | USB A/M TO Type C/M L=1.5M | N/A | N/A |

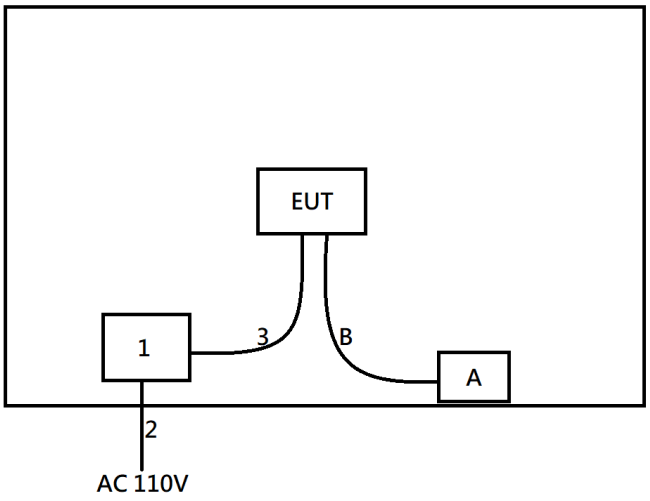
| Support Equipment (RSE) | | | | | |
|---|---|---|---|---|---|
| **No.** | **Equipment** | **Brand** | **Model** | **Series No.** | **FCC ID** |
| 1 | NB(D) | Lenovo | ThinkPad X260 | N/A | N/A |
| 2 | Adapter | Lenovo | ADLX45DLC3A | N/A | N/A |
| 3 | Micro to USB Cable | Smays | SMAYS-6FT | N/A | N/A |
| A | Adapter | BILLION | BA018-050200HXX | N/A | N/A |
| B | Type C Cable | WHALETURN | USB A/M TO Type C/M L=1.5M | N/A | N/A |

## 1.9 TEST SET UP DIAGRAM

**Conducted:**




**RSE:**




## 1.10 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, KDB 558074.

# 2. TEST SUMMERY

| 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) 15.205, 15.209 | 4.8 | Radiation Band Edge | Pass |
| 15.247(d) 15.205, 15.209 | 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>π/4-DQPSK for 2Mbps (2DH5)<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><br>**π/4-DQPSK for 2Mbps:**<br>1.Lowest Channel: 2402MHz<br>2.Middle Channel: 2441MHz<br>3.Highest Channel: 2480MHz<br><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.
2.The system support GFSK ,π/4 DQPSK ,8DPSK , the π/4 DQPSK were reduced since the identical parameters with 8dpsk. In the following test items, frequency hopping, Conducted band edge, radiated band edge and spurious emissions.

## 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 Adapter |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

| Radiated Emission Measurement Above 1G | |
|---|---|
| Test Condition | Radiated Emission Above 1G |
| Power supply Mode | Mode 1: EUT power by Adapter |
| 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 |
| Worst Mode | ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4 |

**Remark:**

1. The worst mode was record in this test report.
2. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.
3. 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

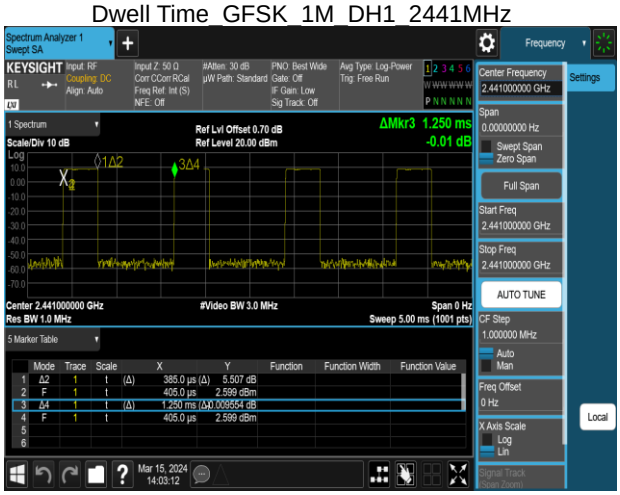
## 3.3 EUT DUTY CYCLE

**Temperature:** 20.4 ~ 22.1℃ **Test date:** March 15 ~ June 20, 2024

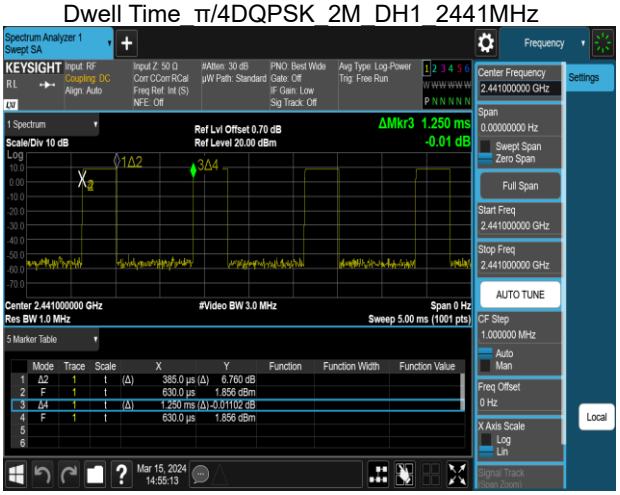
**Humidity:** 57 ~ 59% RH **Tested by:** Jerry Chang

| | Duty Cycle (%) = Ton / (Ton+Toff) | Duty Factor (dB) =10*log ( 1/Duty Cycle ) | 1/T (kHz) | VBW setting (kHz) |
|---|---|---|---|---|
| DH1 | 30.80 | 5.11 | 2.60 | 3.00 |
| DH3 | 65.60 | 1.83 | 0.61 | 1.00 |
| DH5 | 76.80 | 1.15 | 0.35 | 1.00 |
| 2DH1 | 30.80 | 5.11 | 2.60 | 3.00 |
| 2DH3 | 65.60 | 1.83 | 0.61 | 1.00 |
| 2DH5 | 76.80 | 1.15 | 0.35 | 1.00 |
| 3DH1 | 31.20 | 5.06 | 2.56 | 3.00 |
| 3DH3 | 65.60 | 1.83 | 0.61 | 1.00 |
| 3DH5 | 77.20 | 1.12 | 0.35 | 1.00 |

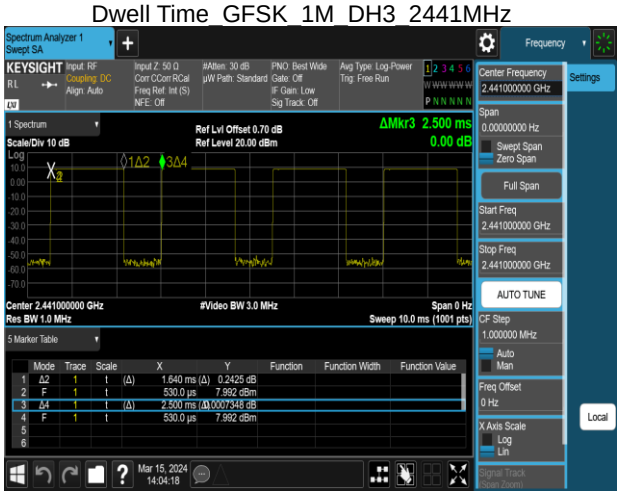
Dwell Time_GFSK_1M_DH1_2441MHz



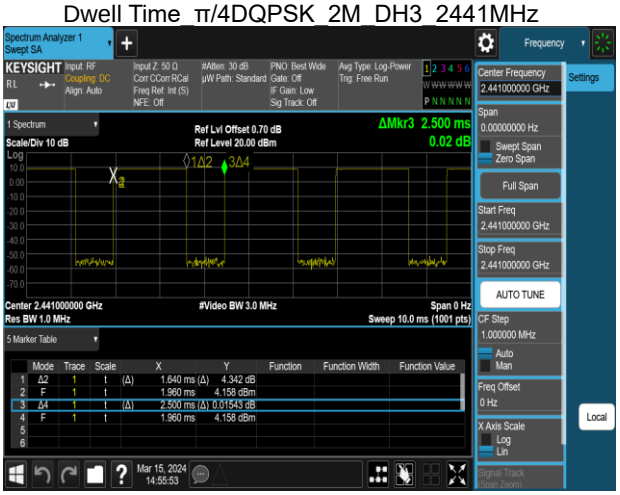

Dwell Time_π/4DQPSK_2M_DH1_2441MHz



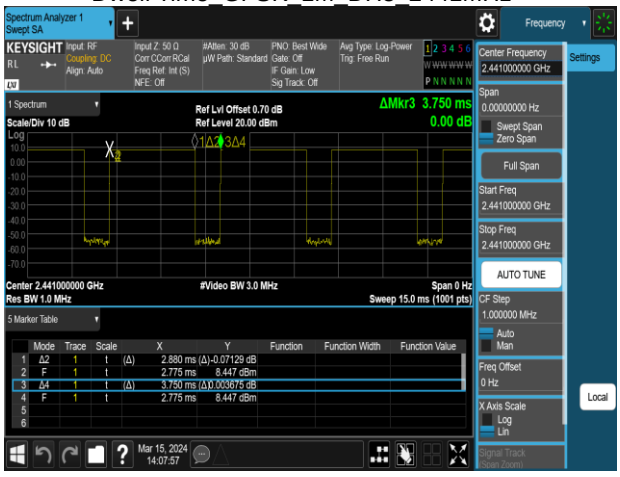

Dwell Time_GFSK_1M_DH3_2441MHz



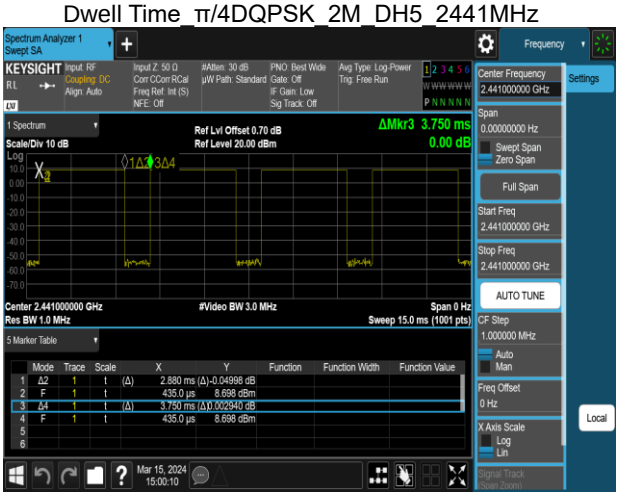

Dwell Time_π/4DQPSK_2M_DH3_2441MHz



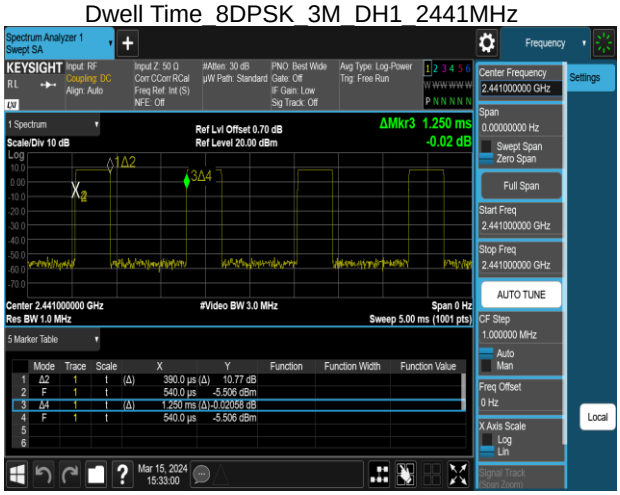

Dwell Time_GFSK_1M_DH5_2441MHz



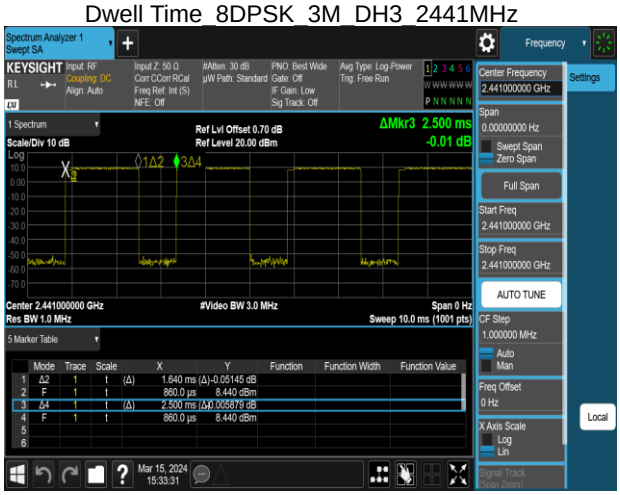

Dwell Time_π/4DQPSK_2M_DH5_2441MHz



Dwell Time_8DPSK_3M_DH1_2441MHz




Dwell Time_8DPSK_3M_DH3_2441MHz




Dwell Time_8DPSK_3M_DH5_2441MHz

# 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 |

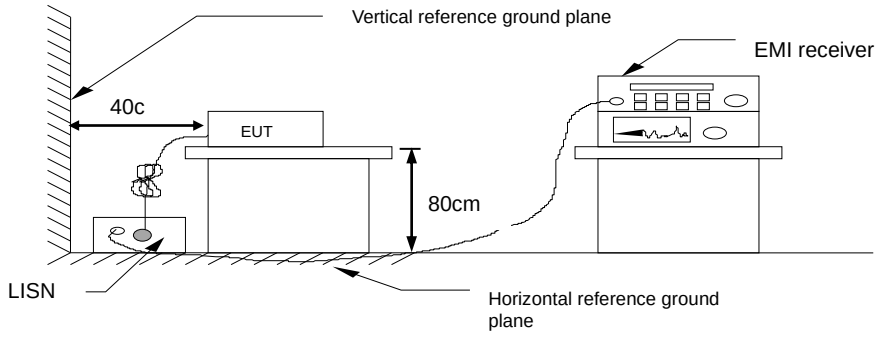
* Decreases with the logarithm of the frequency.

### 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

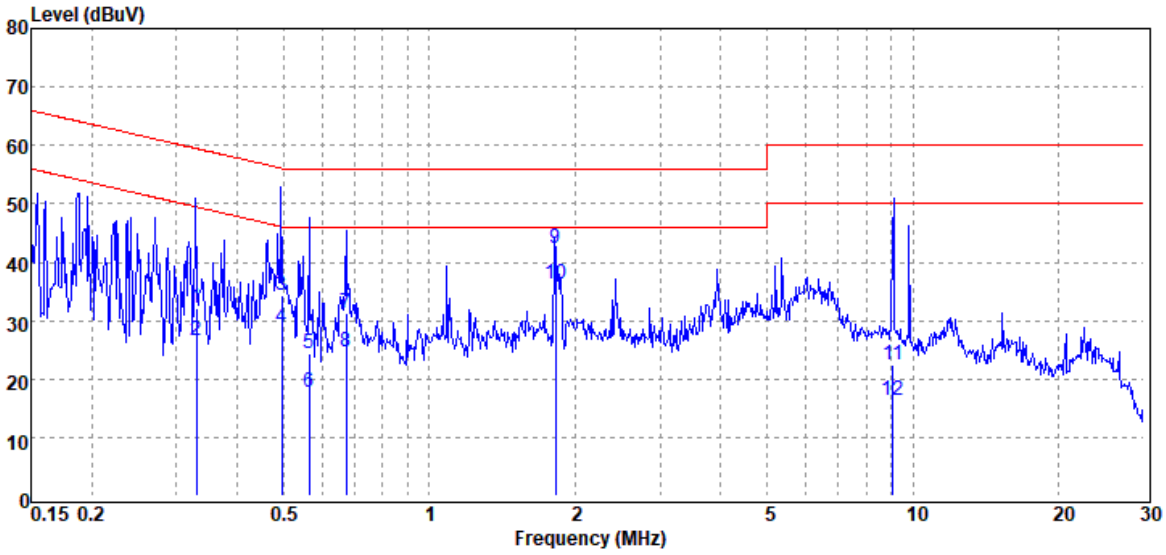



### 4.1.4 Test Result

**PASS**

## Test Data

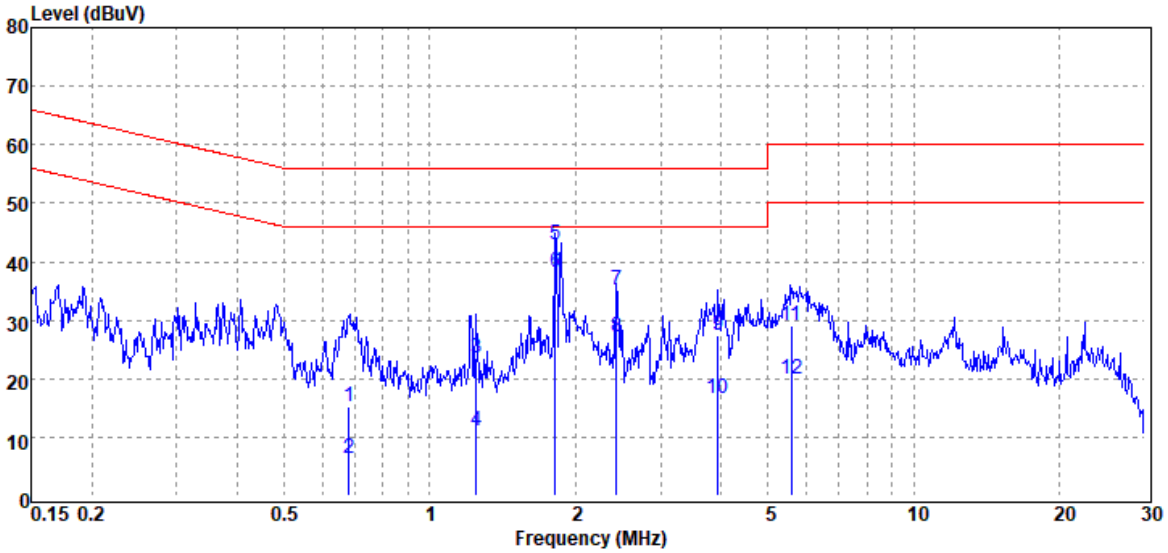
| | | | |
|---|---|---|---|
| Project No | : TM-2403000257P | Test Date | : 2024-03-20 |
| Operation Mode | : BT | Temp./Humi. | : 24.6°C / 54% |
| Test Chamber | : Conduction | Engineer | : Czerny Lin |
| Probe | : LINE | Test Voltage | : AC 120V/60Hz |
| Note | : | | |




| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV | dBµV | dB |
| 0.330 | QP | 31.98 | 0.15 | 32.13 | 59.46 | -27.33 |
| 0.330 | Average | 26.32 | 0.15 | 26.47 | 49.46 | -22.99 |
| 0.496 | QP | 34.14 | 0.15 | 34.29 | 56.07 | -21.78 |
| 0.496 | Average | 28.75 | 0.15 | 28.90 | 46.07 | -17.17 |
| 0.565 | QP | 24.20 | 0.15 | 24.35 | 56.00 | -31.65 |
| 0.565 | Average | 17.60 | 0.15 | 17.75 | 46.00 | -28.25 |
| 0.673 | QP | 31.20 | 0.16 | 31.36 | 56.00 | -24.64 |
| 0.673 | Average | 24.44 | 0.16 | 24.60 | 46.00 | -21.40 |
| 1.821 | QP | 42.24 | 0.21 | 42.45 | 56.00 | -13.55 |
| 1.821 | Average | 36.05 | 0.21 | 36.26 | 46.00 | -9.74 |
| 9.080 | QP | 22.01 | 0.35 | 22.36 | 60.00 | -37.64 |
| 9.080 | Average | 15.98 | 0.35 | 16.33 | 50.00 | -33.67 |

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS – Limit

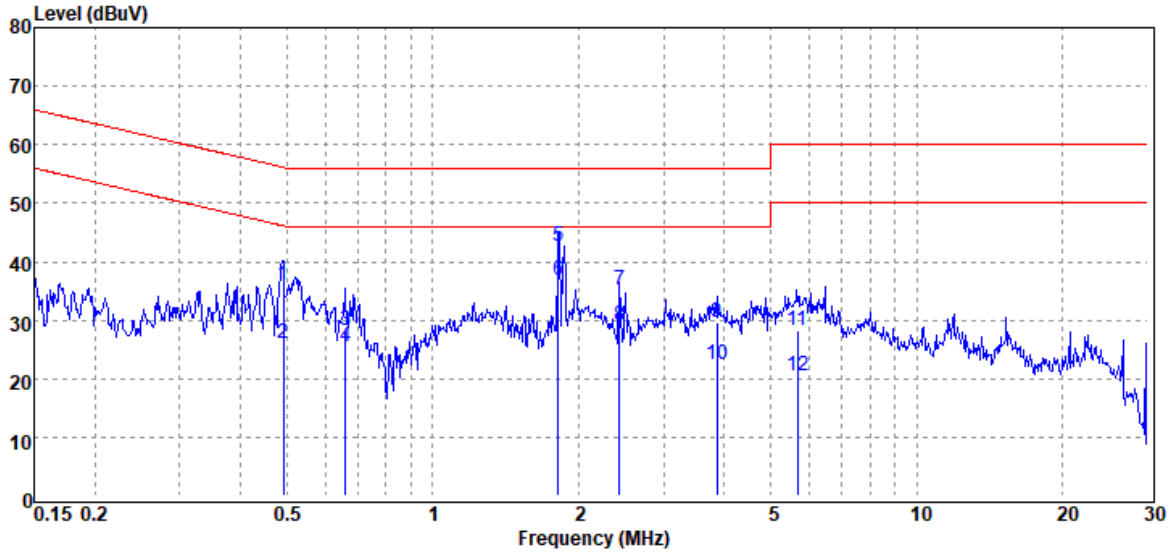
| | | | |
|---|---|---|---|
| Project No | : TM-2403000257P | Test Date | : 2024-03-20 |
| Operation Mode | : BT | Temp./Humi. | : 24.6°C / 54% |
| Test Chamber | : Conduction | Engineer | : Czerny Lin |
| Probe | : NEUTRAL | Test Voltage | : AC 120V/60Hz |
| Note | : | | |




| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV | dBµV | dB |
| 0.680 | QP | 14.91 | 0.21 | 15.12 | 56.00 | -40.88 |
| 0.680 | Average | 6.03 | 0.21 | 6.24 | 46.00 | -39.76 |
| 1.247 | QP | 23.23 | 0.22 | 23.45 | 56.00 | -32.55 |
| 1.247 | Average | 10.90 | 0.22 | 11.12 | 46.00 | -34.88 |
| 1.819 | QP | 42.65 | 0.25 | 42.90 | 56.00 | -13.10 |
| 1.819 | Average | 37.96 | 0.25 | 38.21 | 46.00 | -7.79 |
| 2.429 | QP | 34.97 | 0.28 | 35.25 | 56.00 | -20.75 |
| 2.429 | Average | 26.72 | 0.28 | 27.00 | 46.00 | -19.00 |
| 3.940 | QP | 27.02 | 0.31 | 27.33 | 56.00 | -28.67 |
| 3.940 | Average | 16.38 | 0.31 | 16.69 | 46.00 | -29.31 |
| 5.575 | QP | 28.67 | 0.34 | 29.01 | 60.00 | -30.99 |
| 5.575 | Average | 19.70 | 0.34 | 20.04 | 50.00 | -29.96 |

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS – Limit

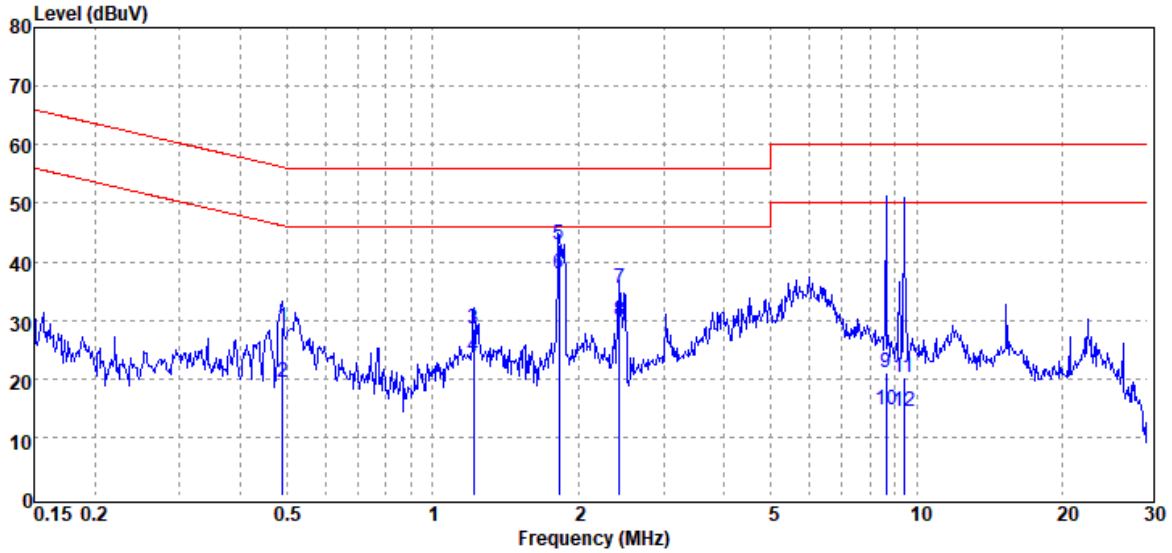
| | | | |
|---|---|---|---|
| Project No | : TM-2403000257P | Test Date | : 2024-03-20 |
| Operation Mode | : BT | Temp./Humi. | : 24.6°C / 54% |
| Test Chamber | : Conduction | Engineer | : Czerny Lin |
| Probe | : LINE | Test Voltage | : AC 240V/60Hz |
| Note | : | | |




| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV | dBµV | dB |
| 0.491 | QP | 35.70 | 0.15 | 35.85 | 56.16 | -20.31 |
| 0.491 | Average | 25.94 | 0.15 | 26.09 | 46.16 | -20.07 |
| 0.660 | QP | 28.17 | 0.16 | 28.33 | 56.00 | -27.67 |
| 0.660 | Average | 25.31 | 0.16 | 25.47 | 46.00 | -20.53 |
| 1.819 | QP | 42.46 | 0.21 | 42.67 | 56.00 | -13.33 |
| 1.819 | Average | 36.48 | 0.21 | 36.69 | 46.00 | -9.31 |
| 2.426 | QP | 34.96 | 0.24 | 35.20 | 56.00 | -20.80 |
| 2.426 | Average | 28.78 | 0.24 | 29.02 | 46.00 | -16.98 |
| 3.861 | QP | 29.45 | 0.26 | 29.71 | 56.00 | -26.29 |
| 3.861 | Average | 22.10 | 0.26 | 22.36 | 46.00 | -23.64 |
| 5.661 | QP | 27.84 | 0.30 | 28.14 | 60.00 | -31.86 |
| 5.661 | Average | 20.18 | 0.30 | 20.48 | 50.00 | -29.52 |

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS – Limit

| | | | |
|---|---|---|---|
| Project No | : TM-2403000257P | Test Date | : 2024-03-20 |
| Operation Mode | : BT | Temp./Humi. | : 24.6°C / 54% |
| Test Chamber | : Conduction | Engineer | : Czerny Lin |
| Probe | : NEUTRAL | Test Voltage | : AC 240V/60Hz |
| Note | : | | |




| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV | dBµV | dB |
| 0.489 | QP | 28.54 | 0.19 | 28.73 | 56.18 | -27.45 |
| 0.489 | Average | 19.28 | 0.19 | 19.47 | 46.18 | -26.71 |
| 1.213 | QP | 28.20 | 0.22 | 28.42 | 56.00 | -27.58 |
| 1.213 | Average | 23.58 | 0.22 | 23.80 | 46.00 | -22.20 |
| 1.822 | QP | 42.74 | 0.25 | 42.99 | 56.00 | -13.01 |
| 1.822 | Average | 37.60 | 0.25 | 37.85 | 46.00 | -8.15 |
| 2.426 | QP | 35.06 | 0.28 | 35.34 | 56.00 | -20.66 |
| 2.426 | Average | 29.62 | 0.28 | 29.90 | 46.00 | -16.10 |
| 8.651 | QP | 20.69 | 0.38 | 21.07 | 60.00 | -38.93 |
| 8.651 | Average | 14.33 | 0.38 | 14.71 | 50.00 | -35.29 |
| 9.413 | QP | 19.86 | 0.39 | 20.25 | 60.00 | -39.75 |
| 9.413 | Average | 14.07 | 0.39 | 14.46 | 50.00 | -35.54 |

Note: 1. Actual FS= Spectrum Read Level + Factor
Note: 2. Margin= Actual FS – Limit

# 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.

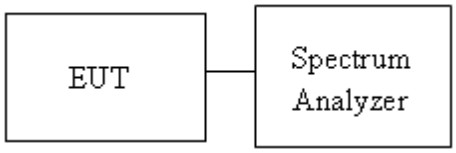
**Occupied Bandwidth(99%)** ：For reporting purposes only.

## 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 and 99% Bandwidth.
4. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. In the test report.

## 4.2.3 Test Setup



## 4.2.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 20.4 ~ 22.1℃ | **Test date:** | March 15 ~ June 20, 2024 |
| **Humidity:** | 57 ~ 59% RH | **Tested by:** | Jerry Chang |

## 20dB BANDWIDTH

**GFSK**

| CH | 20 dB BW (MHz) | 2/3 BW (MHz) |
|---|---|---|
| Low | 0.9567 | 0.64 |
| Mid | 0.9562 | 0.64 |
| High | 0.9562 | 0.64 |

**π/4-DQPSK**

| CH | 20 dB BW (MHz) | 2/3 BW (MHz) |
|---|---|---|
| Low | 0.688 | 0.46 |
| Mid | 0.689 | 0.46 |
| High | 0.684 | 0.46 |

**8-DPSK**

| CH | 20 dB BW (MHz) | 2/3 BW (MHz) |
|---|---|---|
| Low | 0.690 | 0.46 |
| Mid | 0.694 | 0.46 |
| High | 0.692 | 0.46 |

## BANDWIDTH 99%

**GFSK**

| CH | 99% BW (MHz) |
|---|---|
| Low | 0.86862 |
| Mid | 0.872 |
| High | 0.86767 |

**π/4-DQPSK**

| CH | 99% BW (MHz) |
|---|---|
| Low | 0.8190 |
| Mid | 0.8306 |
| High | 0.8251 |

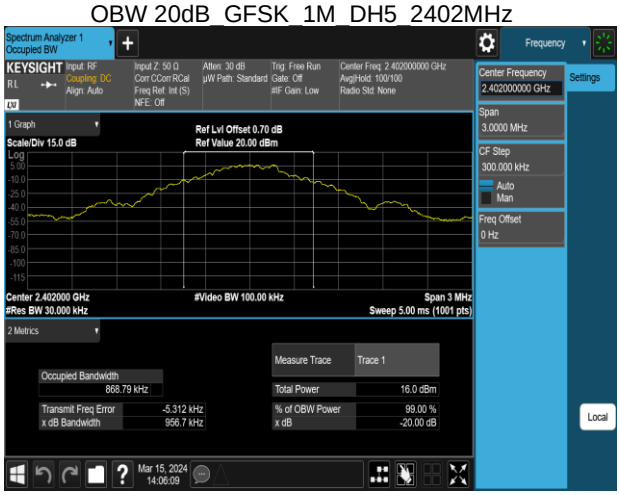
**8-DPSK**

| CH | 99% BW (MHz) |
|---|---|
| Low | 0.7719 |
| Mid | 0.7795 |
| High | 0.7726 |

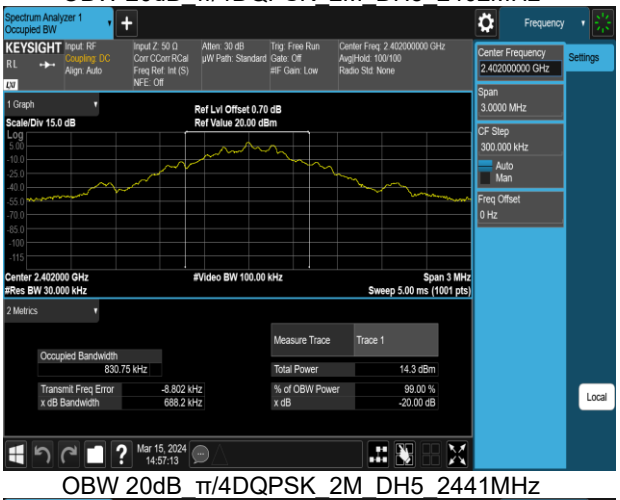
# Test Data

## 20dB BANDWIDTH

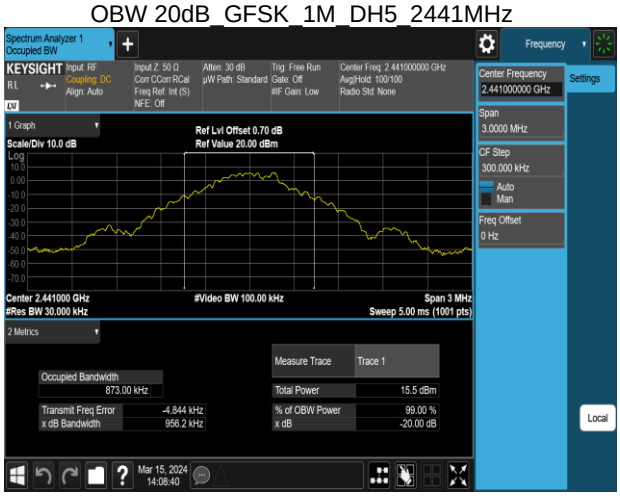
OBW 20dB_GFSK_1M_DH5_2402MHz



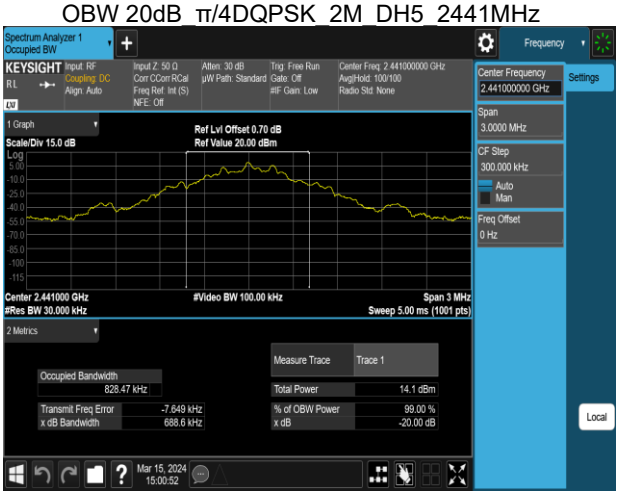

OBW 20dB_π/4DQPSK_2M_DH5_2402MHz



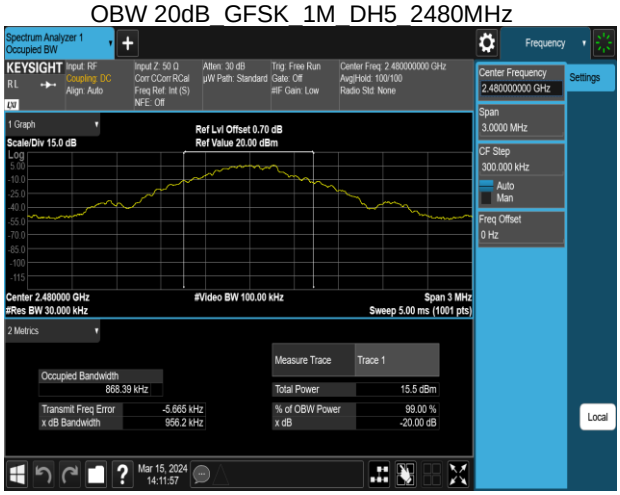

OBW 20dB_GFSK_1M_DH5_2441MHz




OBW 20dB_π/4DQPSK_2M_DH5_2441MHz

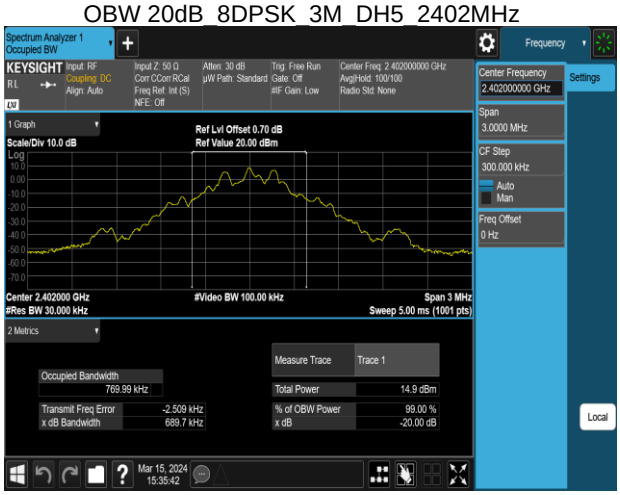



OBW 20dB_GFSK_1M_DH5_2480MHz

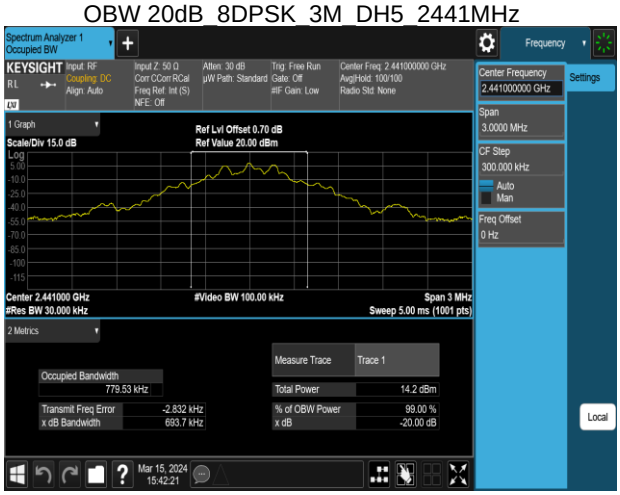



OBW 20dB_π/4DQPSK_2M_DH5_2480MHz

OBW 20dB_8DPSK_3M_DH5_2402MHz




OBW 20dB_8DPSK_3M_DH5_2441MHz

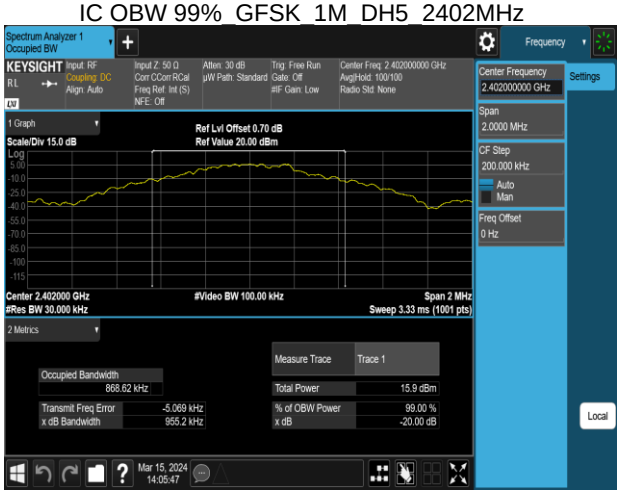



OBW 20dB_8DPSK_3M_DH5_2480MHz

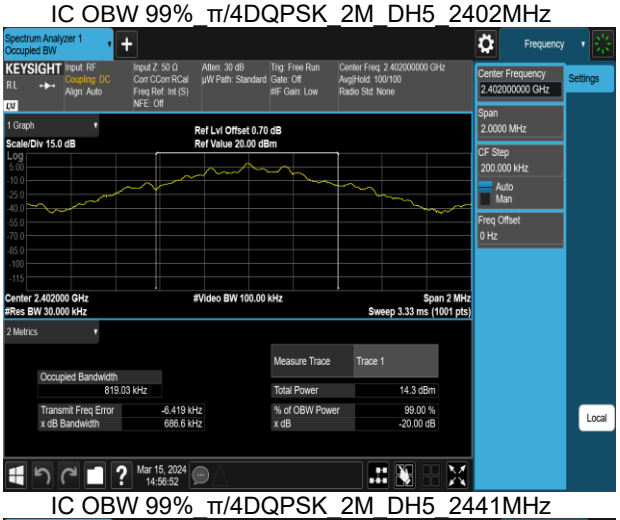
# Test Data

## BANDWIDTH 99%

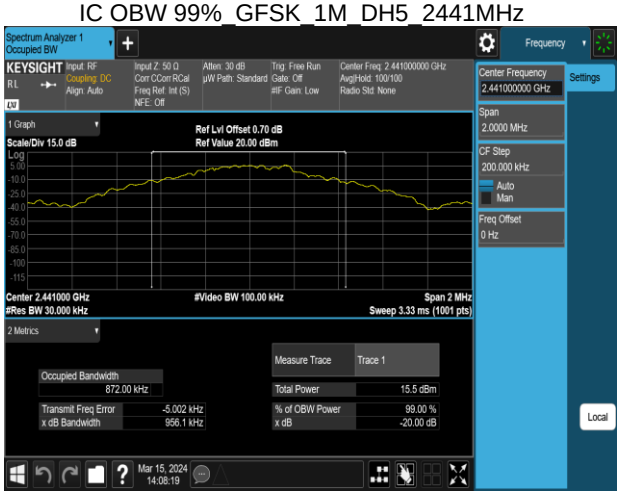
IC OBW 99%_GFSK_1M_DH5_2402MHz



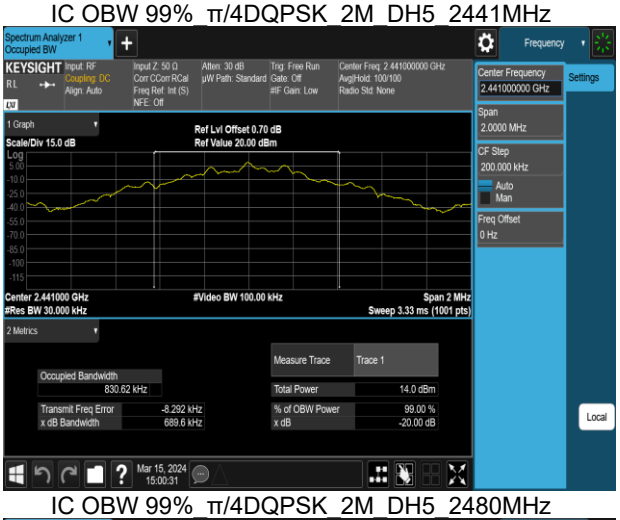

IC OBW 99%_π/4DQPSK_2M_DH5_2402MHz




IC OBW 99%_GFSK_1M_DH5_2441MHz



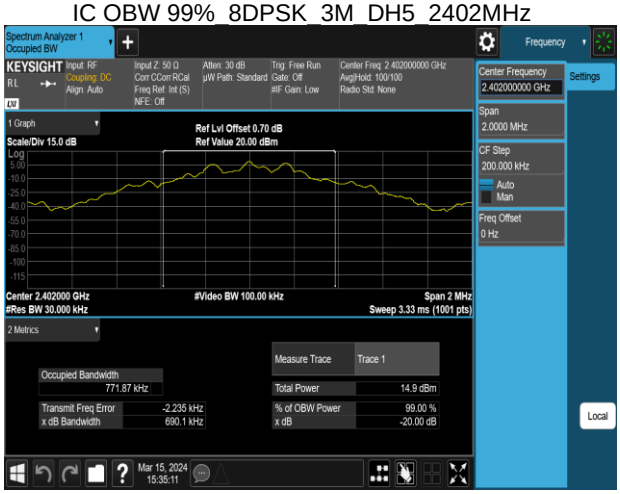

IC OBW 99%_π/4DQPSK_2M_DH5_2441MHz



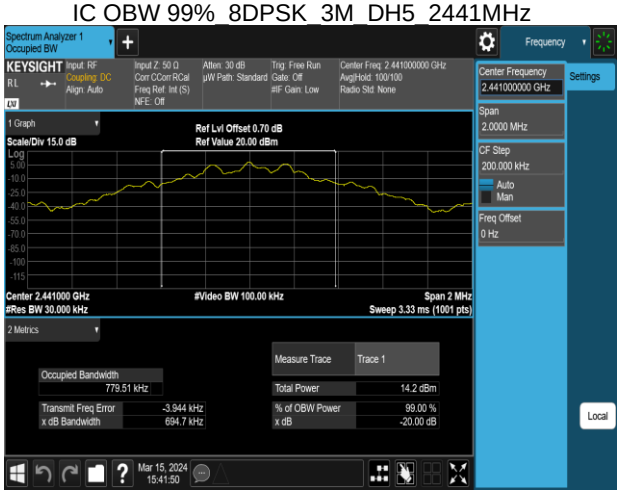

IC OBW 99%_GFSK_1M_DH5_2480MHz


IC OBW 99%_π/4DQPSK_2M_DH5_2480MHz

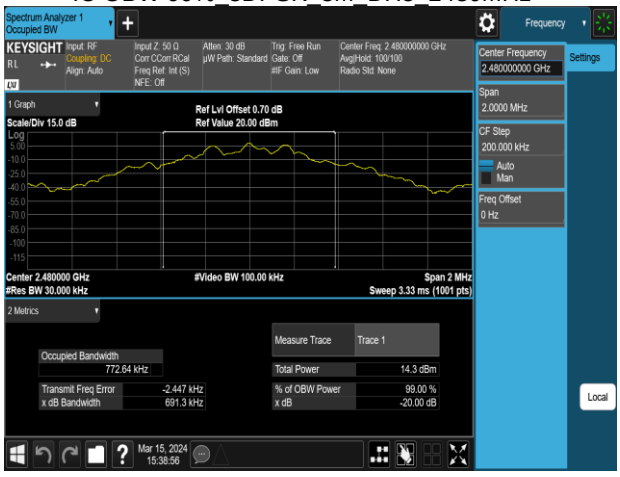
IC OBW 99%_8DPSK_3M_DH5_2402MHz




IC OBW 99%_8DPSK_3M_DH5_2441MHz




IC OBW 99%_8DPSK_3M_DH5_2480MHz



# 4.3 OUTPUT POWER MEASUREMENT

## 4.3.1 Test Limit

According to §15.247(a)(1),

**Peak output power**：

**FCC**

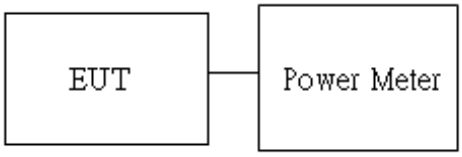
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

**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

| | | | |
|---|---|---|---|
| **Temperature:** | 20.4 ~ 22.1℃ | **Test date:** | March 15 ~ June 20, 2024 |
| **Humidity:** | 57 ~ 59% RH | **Tested by:** | Jerry Chang |

**Peak & Average output power：**

**1M BR mode (Peak):**

| CH | Freq. (MHz) | Power Setting | Peak Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | **8.08** | 6.427 | 1000 |
| Mid | 2441 | default | 7.86 | 6.109 | 1000 |
| High | 2480 | default | 7.88 | 6.138 | 1000 |

**1M BR mode (Average):**

| CH | Freq. (MHz) | Power Setting | Avg. Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | 7.69 | 5.870 | 1000 |
| Mid | 2441 | default | 7.81 | 6.034 | 1000 |
| High | 2480 | default | 7.83 | 6.062 | 1000 |

**2M EDR mode (Peak):**

| CH | Freq. (MHz) | Power Setting | Peak Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | **8.38** | 6.887 | 125 |
| Mid | 2441 | default | 7.87 | 6.124 | 125 |
| High | 2480 | default | 7.78 | 5.998 | 125 |

**2M EDR mode (Average):**

| CH | Freq. (MHz) | Power Setting | Avg. Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | 7.98 | 6.275 | 125 |
| Mid | 2441 | default | 7.83 | 6.062 | 125 |
| High | 2480 | default | 7.73 | 5.924 | 125 |

**3M EDR mode (Peak):**

| CH | Freq. (MHz) | Power Setting | Peak Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | **8.54** | 7.145 | 125 |
| Mid | 2441 | default | 7.91 | 6.180 | 125 |
| High | 2480 | default | 7.87 | 6.124 | 125 |

**3M EDR mode (Average):**

| CH | Freq. (MHz) | Power Setting | Avg. Output Power (dBm) | Output Power (mW) | Limit (mW) |
|---|---|---|---|---|---|
| Low | 2402 | default | 7.97 | 6.272 | 125 |
| Mid | 2441 | default | 7.85 | 6.101 | 125 |
| High | 2480 | default | 7.83 | 6.073 | 125 |

Note: Measured by power meter, cable loss + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

# 4.4 FREQUENCY SEPARATION

## 4.4.1 Test Limit

According to §15.247(a)(1),

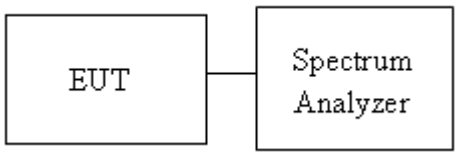
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 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: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
   VBW ≥ RBW, 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

**Temperature:** 20.4 ~ 22.1℃ **Test date:** March 15 ~ June 20, 2024

**Humidity:** 57 ~ 59% RH **Tested by:** Jerry Chang

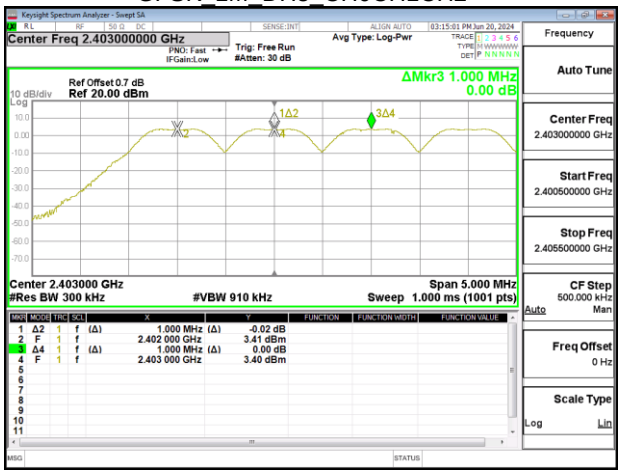
| Test mode: GFSK_BDR-1Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 1.000 | 0.64 | PASS |
| Mid | 2441 | 1.000 | 0.64 | PASS |
| High | 2480 | 1.000 | 0.64 | PASS |

| Test mode: π/4-DQPSK_2Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 1.000 | 0.46 | PASS |
| Mid | 2441 | 1.000 | 0.46 | PASS |
| High | 2480 | 1.000 | 0.46 | PASS |

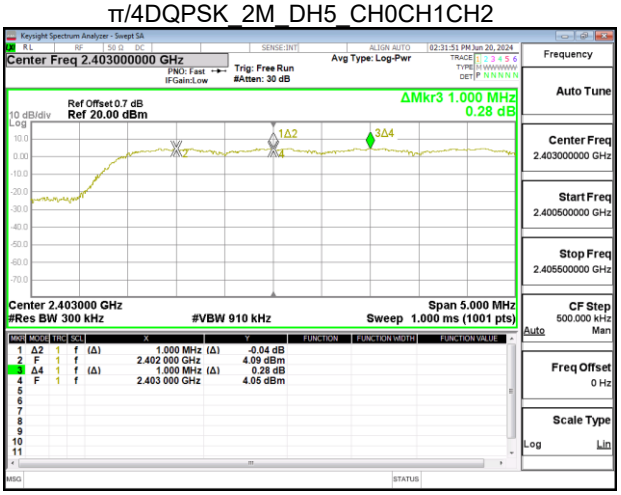
| Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz | | | | |
|---|---|---|---|---|
| **Channel** | **Frequency (MHz)** | **Channel Separation (MHz)** | **Channel Separation Limits (MHz)** | **Result** |
| Low | 2402 | 1.000 | 0.46 | PASS |
| Mid | 2441 | 1.000 | 0.46 | PASS |
| High | 2480 | 1.000 | 0.46 | PASS |

# Test Data

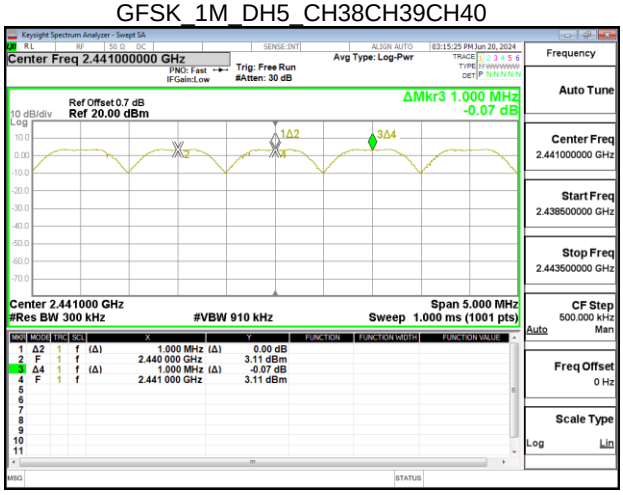
GFSK_1M_DH5_CH0CH1CH2




π/4DQPSK_2M_DH5_CH0CH1CH2

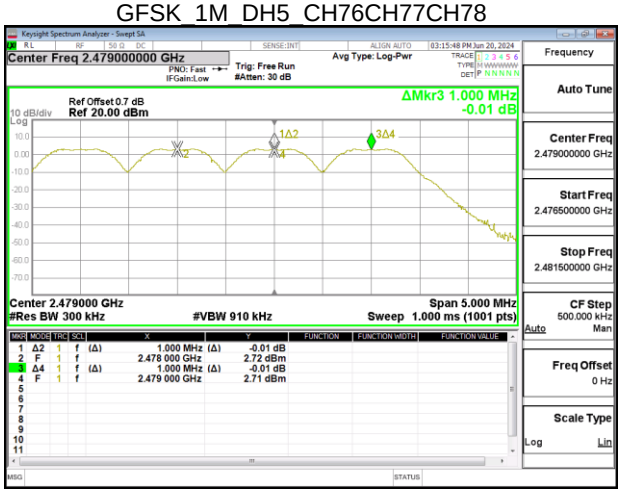



GFSK_1M_DH5_CH38CH39CH40

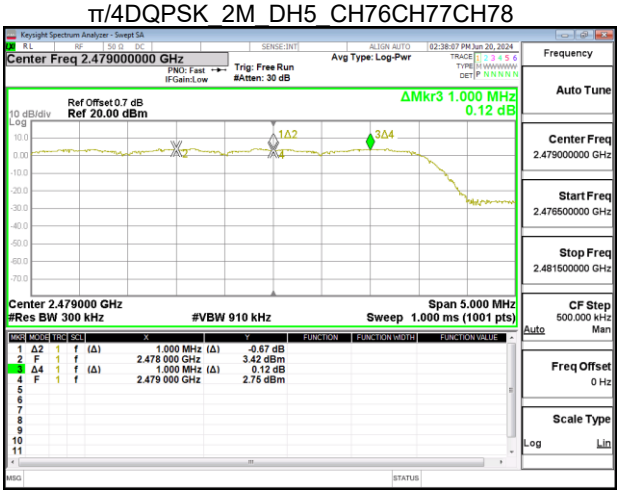



π/4DQPSK_2M_DH5_CH38CH39CH40

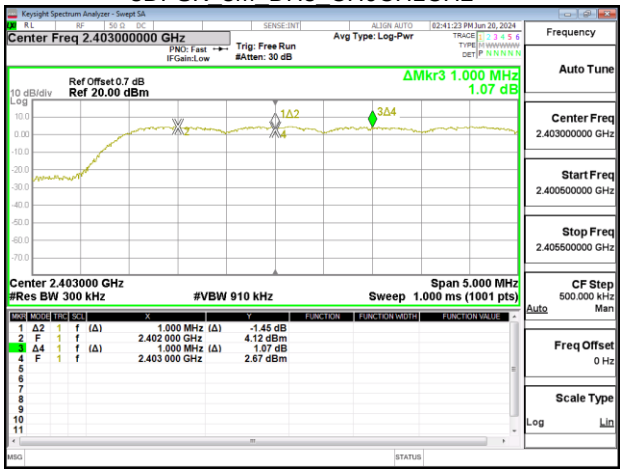

GFSK_1M_DH5_CH76CH77CH78



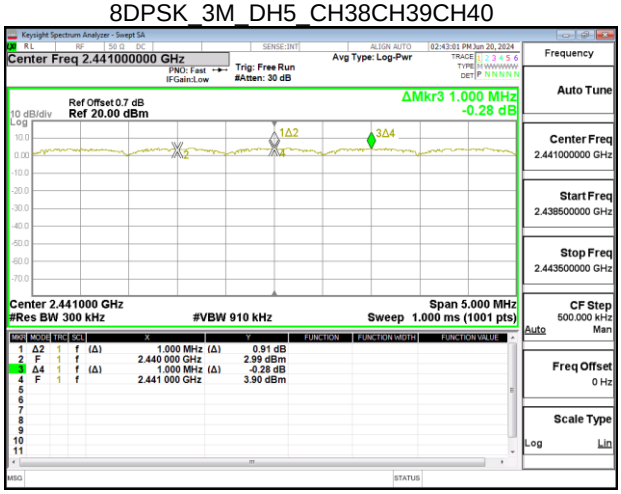

π/4DQPSK_2M_DH5_CH76CH77CH78



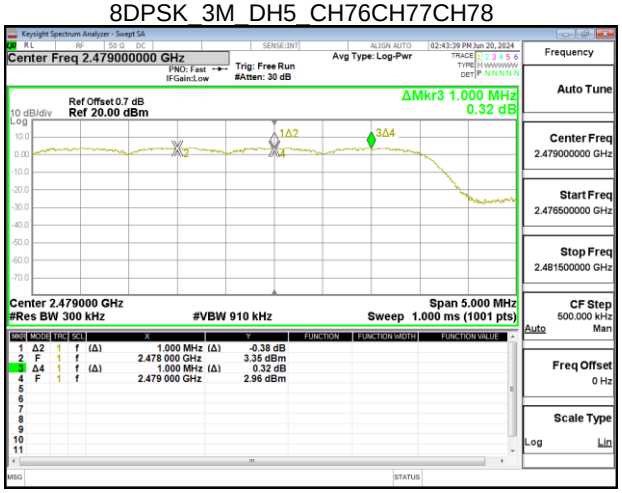
8DPSK_3M_DH5_CH0CH1CH2




8DPSK_3M_DH5_CH38CH39CH40




8DPSK_3M_DH5_CH76CH77CH78



# 4.5 NUMBER OF HOPPING

## 4.5.1 Test Limit

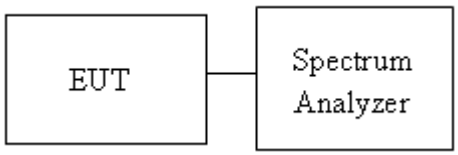
According to §15.247(a)(1)(iii),

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. = 2441 MHz, RBW=300KHz, VBW =910kHz for left half.
4. Set spectrum analyzer Start Freq. = 2441 MHz, Stop Freq. = 2483.5 MHz, RBW=300KHz, VBW =910kHz for right half.
5. Max hold, view and count how many channel in the band.

## 4.5.3 Test Setup



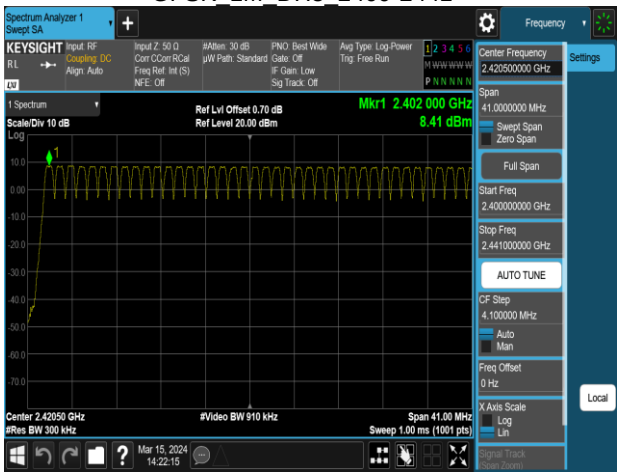

## 4.5.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 20.4 ~ 22.1℃ | **Test date:** | March 15 ~ June 20, 2024 |
| **Humidity:** | 57 ~ 59% RH | **Tested by:** | Jerry Chang |

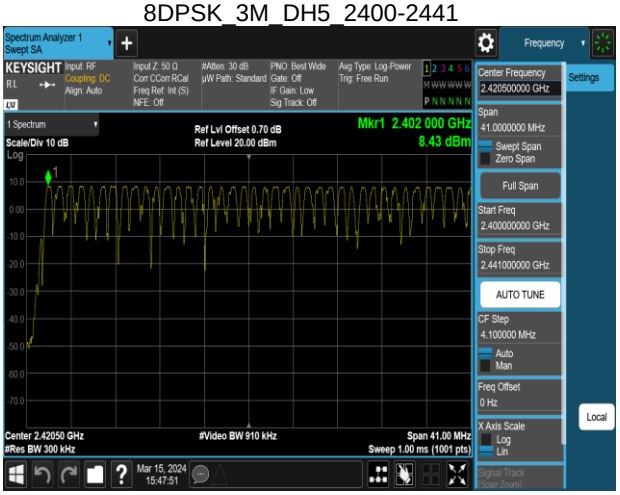
| Number of Hopping | | | | |
|---|---|---|---|---|
| **Mode** | **Frequency (MHz)** | **Hopping Channel Number** | **Hopping Channel Number Limits** | **Result** |
| BDR-1Mbps | 2402-2480 | 79 | 15 | Pass |
| EDR-3Mbps | 2402-2480 | 79 | 15 | |

# Test Data

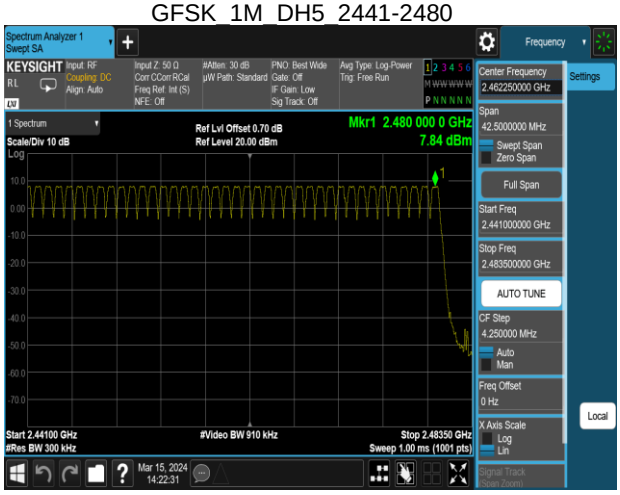
GFSK_1M_DH5_2400-2441



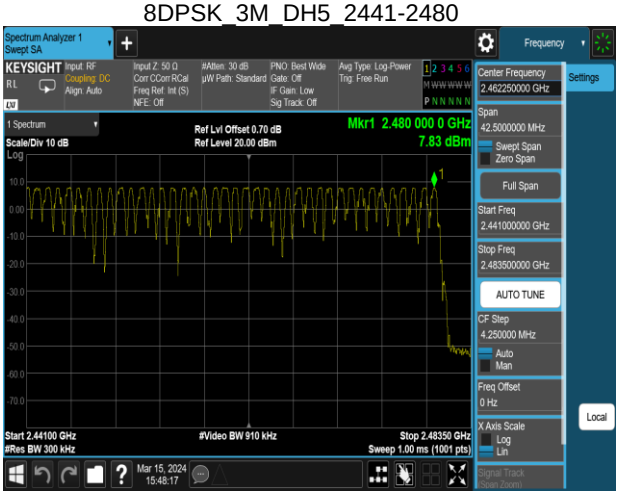

8DPSK_3M_DH5_2400-2441




GFSK_1M_DH5_2441-2480




8DPSK_3M_DH5_2441-2480



# 4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

## 4.6.1 Test Limit

According to §15.247(d),

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

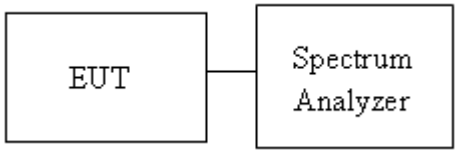
## 4.6.2 Test Procedure

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




## 4.6.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 20.4 ~ 22.1℃ | **Test date:** | March 15 ~ June 20, 2024 |
| **Humidity:** | 57 ~ 59% RH | **Tested by:** | Jerry Chang |

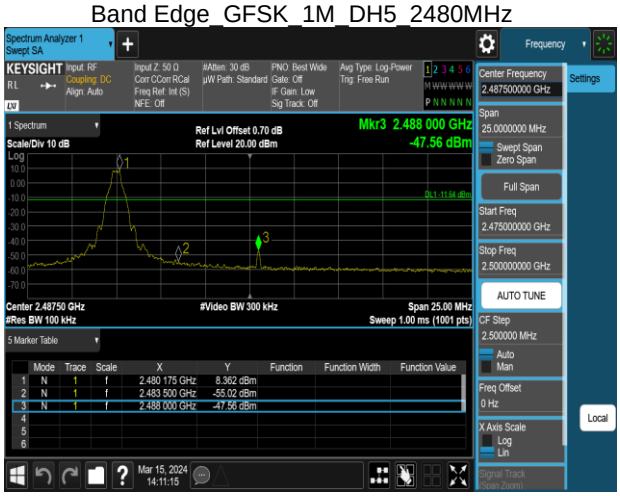
# Test Data

## Band Edge

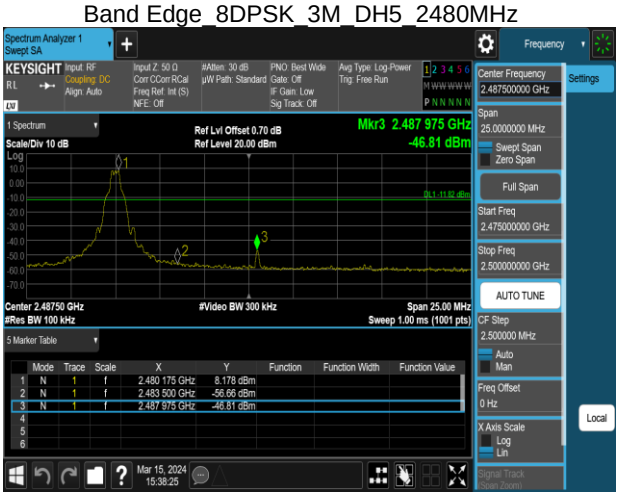
Band Edge_GFSK_1M_DH5_2402MHz


Band Edge_8DPSK_3M_DH5_2402MHz


Band Edge_GFSK_1M_DH5_2480MHz



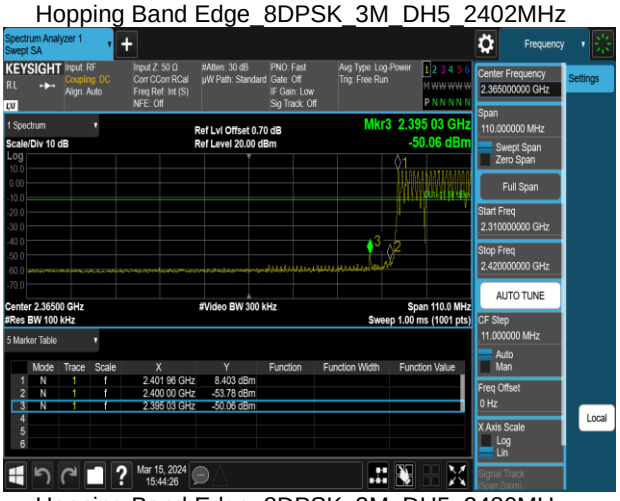

Band Edge_8DPSK_3M_DH5_2480MHz



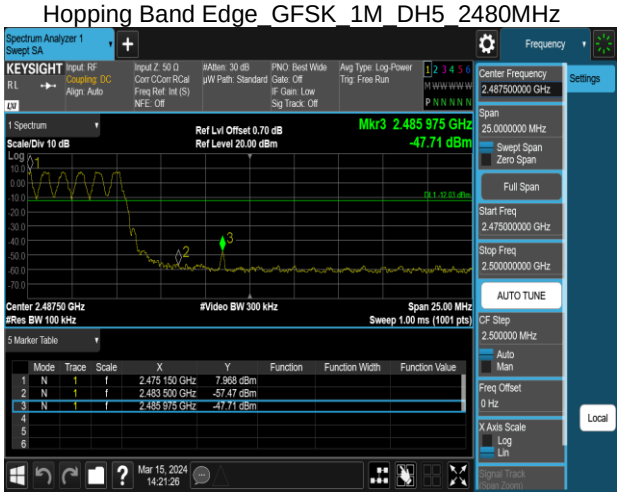
## Hopping mode

Hopping Band Edge_GFSK_1M_DH5_2402MHz

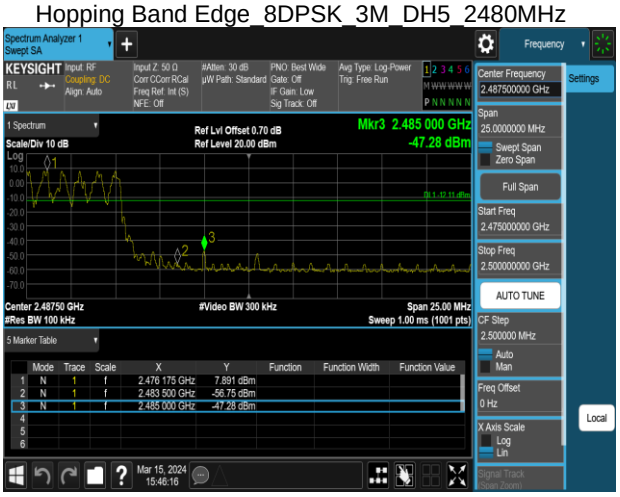

Hopping Band Edge_8DPSK_3M_DH5_2402MHz




Hopping Band Edge_GFSK_1M_DH5_2480MHz

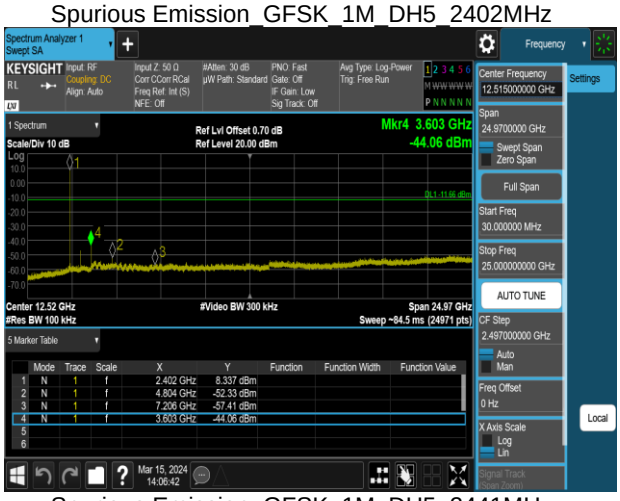



Hopping Band Edge_8DPSK_3M_DH5_2480MHz

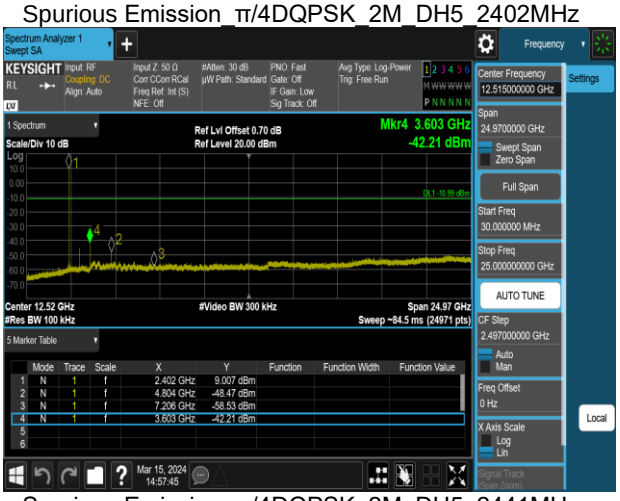


## Spurious Emission

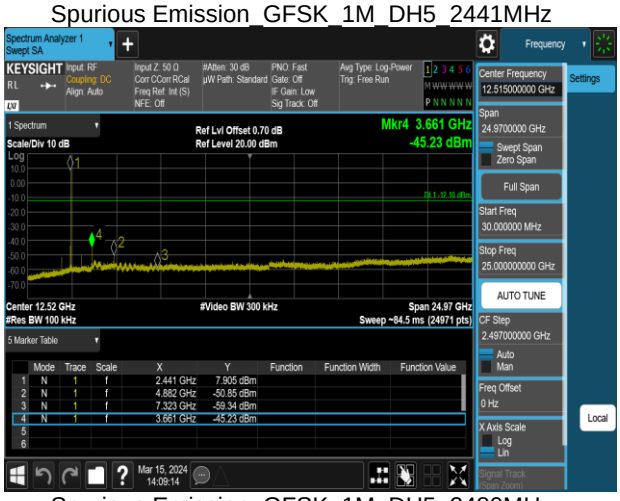
Spurious Emission_GFSK_1M_DH5_2402MHz



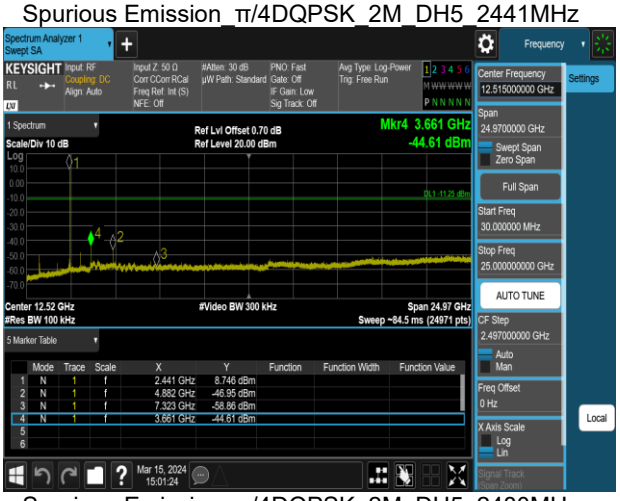

Spurious Emission_π/4DQPSK_2M_DH5_2402MHz



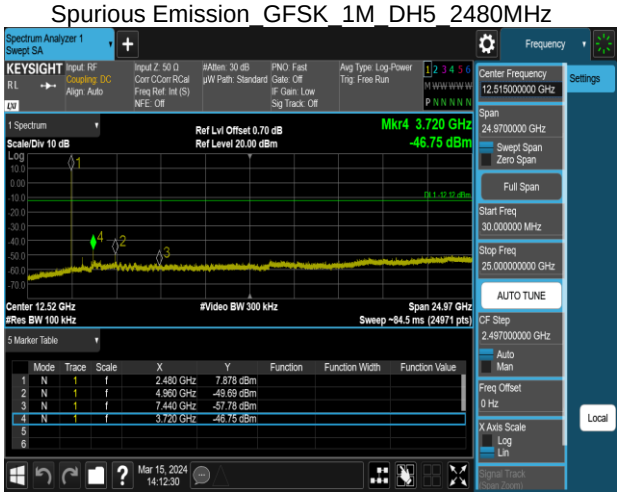

Spurious Emission_GFSK_1M_DH5_2441MHz



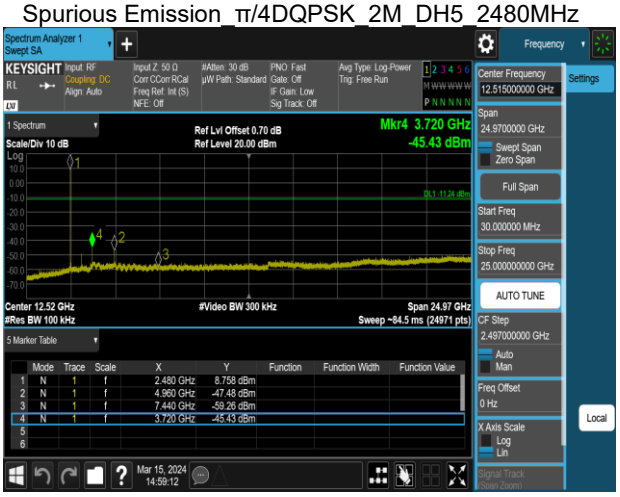

Spurious Emission_π/4DQPSK_2M_DH5_2441MHz



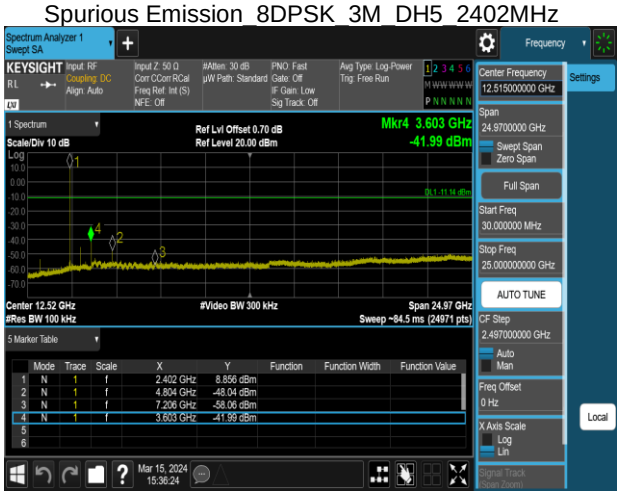

Spurious Emission_GFSK_1M_DH5_2480MHz



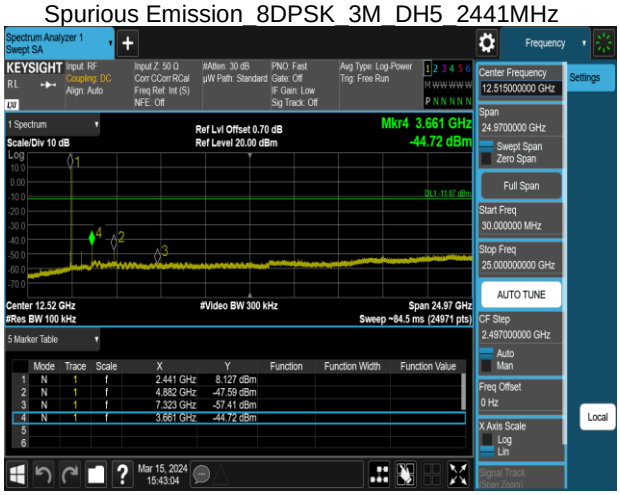

Spurious Emission_π/4DQPSK_2M_DH5_2480MHz



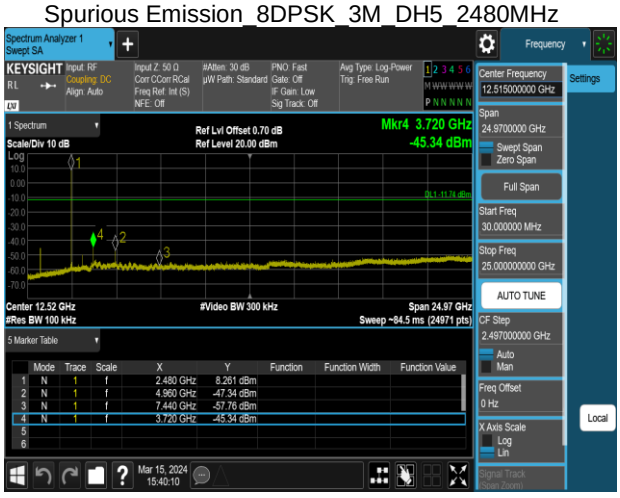
Spurious Emission_8DPSK_3M_DH5_2402MHz




Spurious Emission_8DPSK_3M_DH5_2441MHz




Spurious Emission_8DPSK_3M_DH5_2480MHz



# 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.

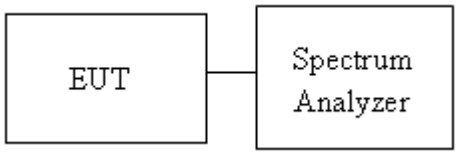
## 4.7.2 Test Procedure

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=1MHz, VBW=3MHz, Sweep = 5 ms ~15ms(Depends on signal characteristics)

## 4.7.3 Test Setup



## 4.7.4 Test Result

| | | | |
|---|---|---|---|
| **Temperature:** | 20.4 ~ 22.1℃ | **Test date:** | March 15 ~ June 20, 2024 |
| **Humidity:** | 57 ~ 59% RH | **Tested by:** | Jerry Chang |

**GFSK (1Mbps)**

| Channel | PACKET TYPE | Measurement Result (ms) | Limit (ms) |
|---|---|---|---|
| Mid | DH1 | 123.20 | 400 |
| | DH3 | 262.40 | 400 |
| | DH5 | 307.20 | 400 |

**π/4 DQPSK (2Mbps)**

| Channel | PACKET TYPE | Measurement Result (ms) | Limit (ms) |
|---|---|---|---|
| Mid | 2DH1 | 123.20 | 400 |
| | 2DH3 | 262.40 | 400 |
| | 2DH5 | 307.20 | 400 |

**8-DPSK (3Mbps)**

| Channel | PACKET TYPE | Measurement Result (ms) | Limit (ms) |
|---|---|---|---|
| Mid | 3DH1 | 124.80 | 400 |
| | 3DH3 | 262.40 | 400 |
| | 3DH5 | 308.80 | 400 |

**GFSK (1Mbps):**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CH Mid | DH1 time slot | = | 0.385 | * | (1600/2/79) | * | 31.6 | = | 123.20 (ms) |
| | DH3 time slot | = | 1.640 | * | (1600/4/79) | * | 31.6 | = | 262.40 (ms) |
| | DH5 time slot | = | 2.880 | * | (1600/6/79) | * | 31.6 | = | 307.20 (ms) |

**π/4 -DQPSK (2Mbps):**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CH Mid | 2DH1 time slot | = | 0.385 | * | (1600/2/79) | * | 31.6 | = | 123.20 (ms) |
| | 2DH3 time slot | = | 1.640 | * | (1600/4/79) | * | 31.6 | = | 262.40 (ms) |
| | 2DH5 time slot | = | 2.880 | * | (1600/6/79) | * | 31.6 | = | 307.20 (ms) |

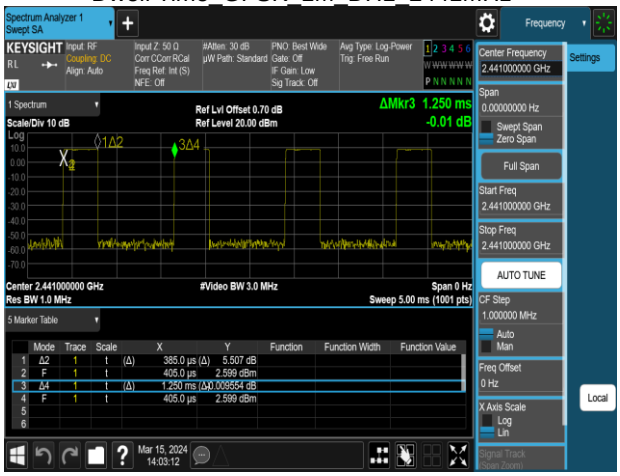
**8-DPSK (3Mbps):**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CH Mid | 3DH1 time slot | = | 0.390 | * | (1600/2/79) | * | 31.6 | = | 124.80 (ms) |
| | 3DH3 time slot | = | 1.640 | * | (1600/4/79) | * | 31.6 | = | 262.40 (ms) |
| | 3DH5 time slot | = | 2.895 | * | (1600/6/79) | * | 31.6 | = | 308.80 (ms) |

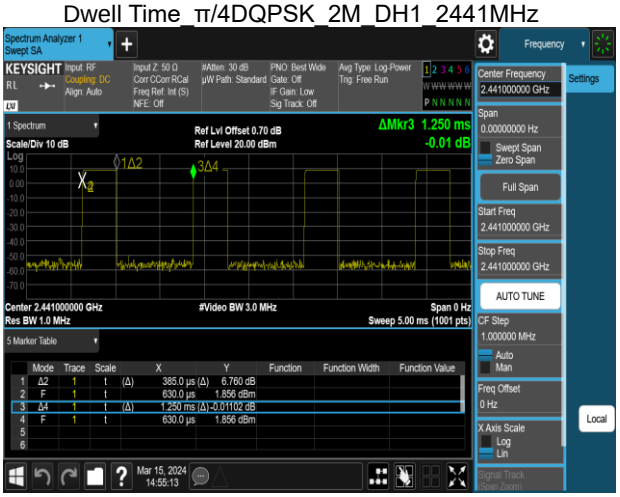
A period time = 0.4 (s) * 79 = 31.6 (s)

# Test Data

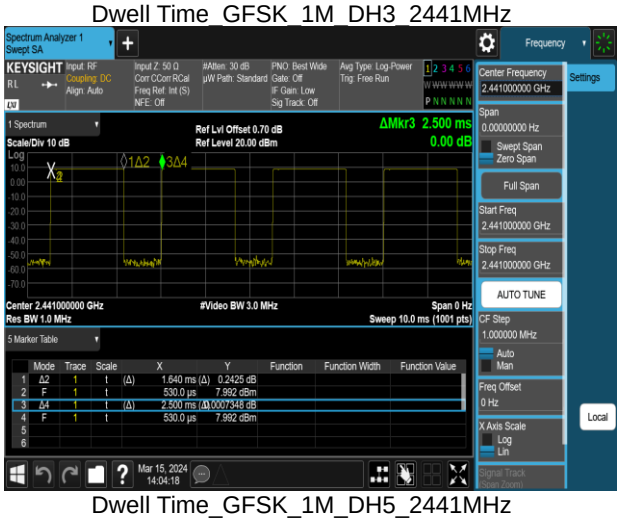
Dwell Time_GFSK_1M_DH1_2441MHz



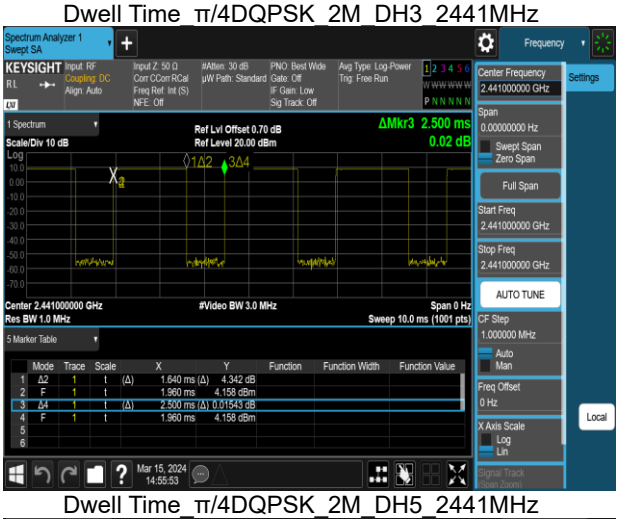

Dwell Time_π/4DQPSK_2M_DH1_2441MHz



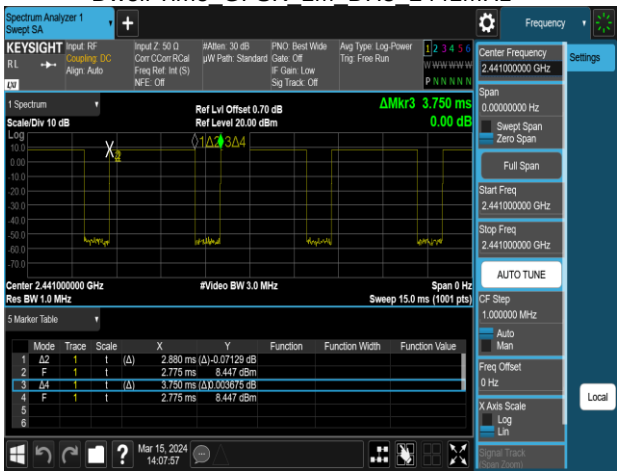

Dwell Time_GFSK_1M_DH3_2441MHz



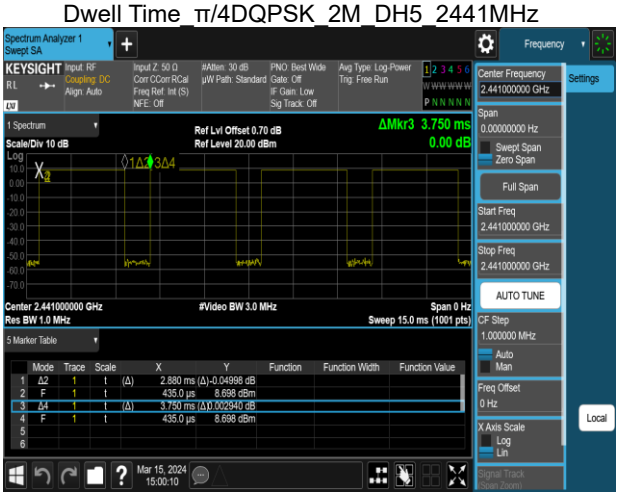

Dwell Time_π/4DQPSK_2M_DH3_2441MHz



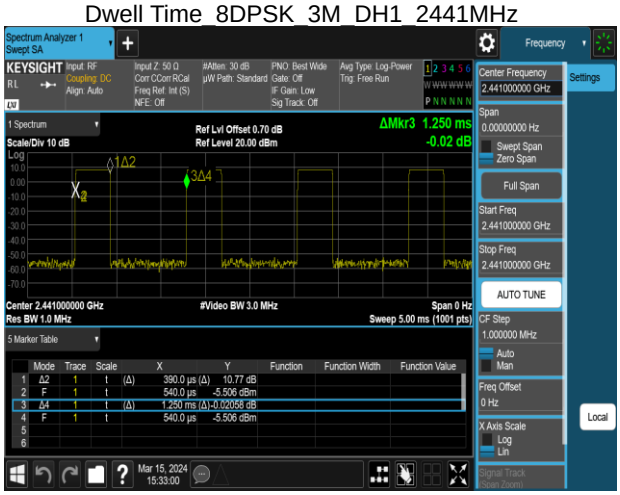

Dwell Time_GFSK_1M_DH5_2441MHz



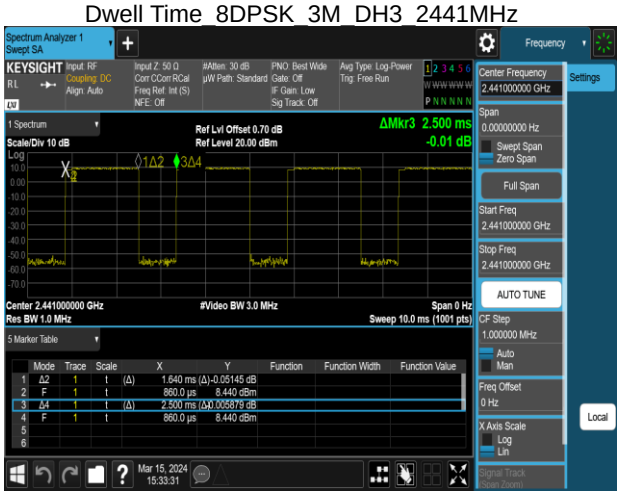

Dwell Time_π/4DQPSK_2M_DH5_2441MHz



Dwell Time_8DPSK_3M_DH1_2441MHz




Dwell Time_8DPSK_3M_DH3_2441MHz




Dwell Time_8DPSK_3M_DH5_2441MHz

# 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. 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.

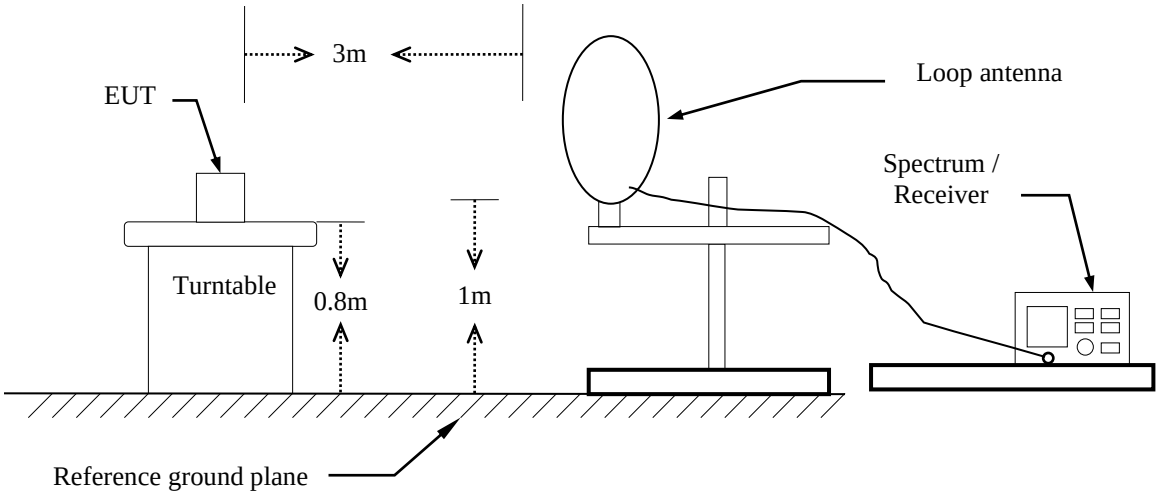
5. Data result

Actual FS=Spectrum Reading Level + Factor

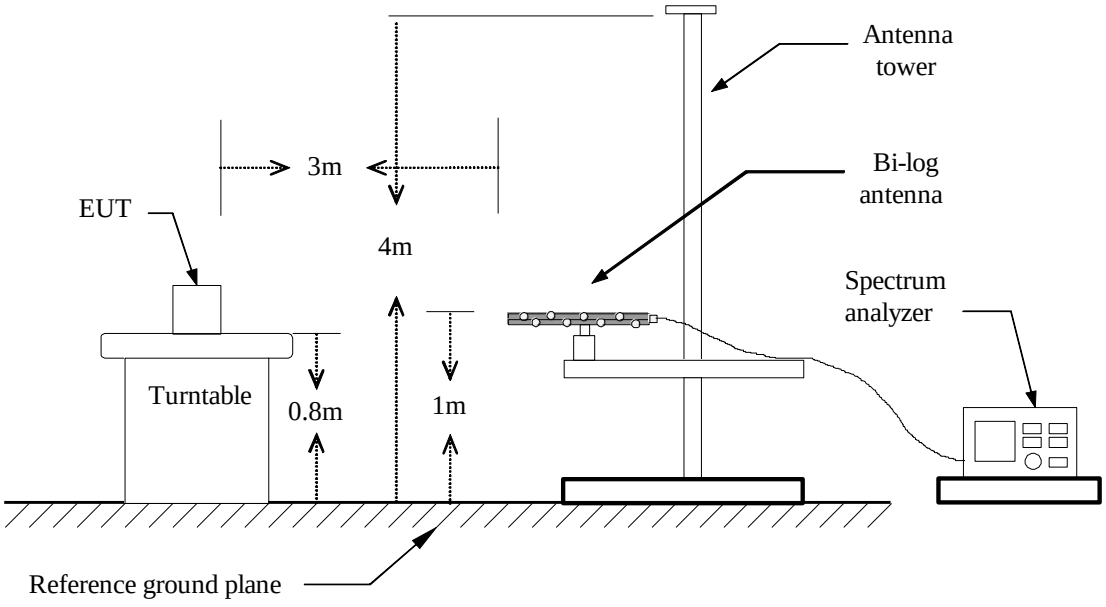
Margin=Actual FS- Limit

## 4.8.3 Test Setup

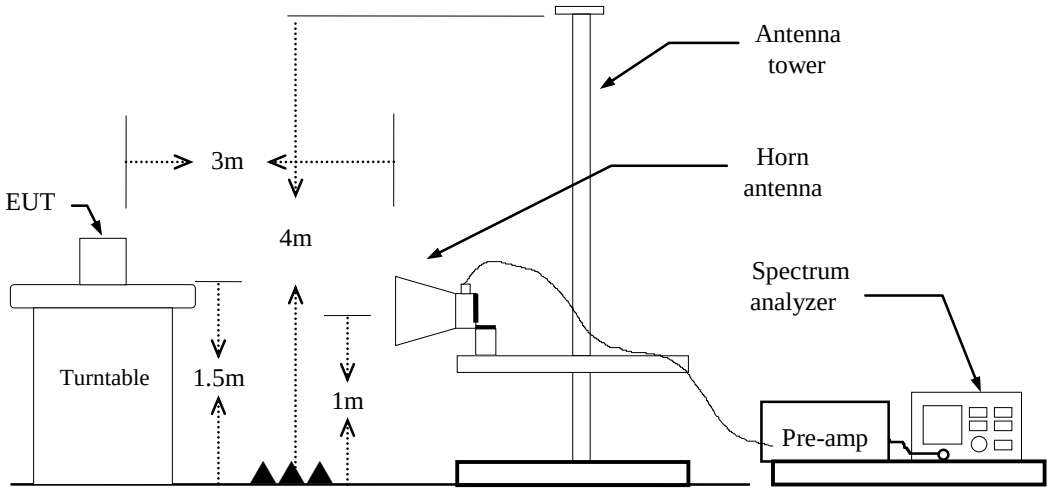
**9kHz ~ 30MHz**




**30MHz ~ 1GHz**



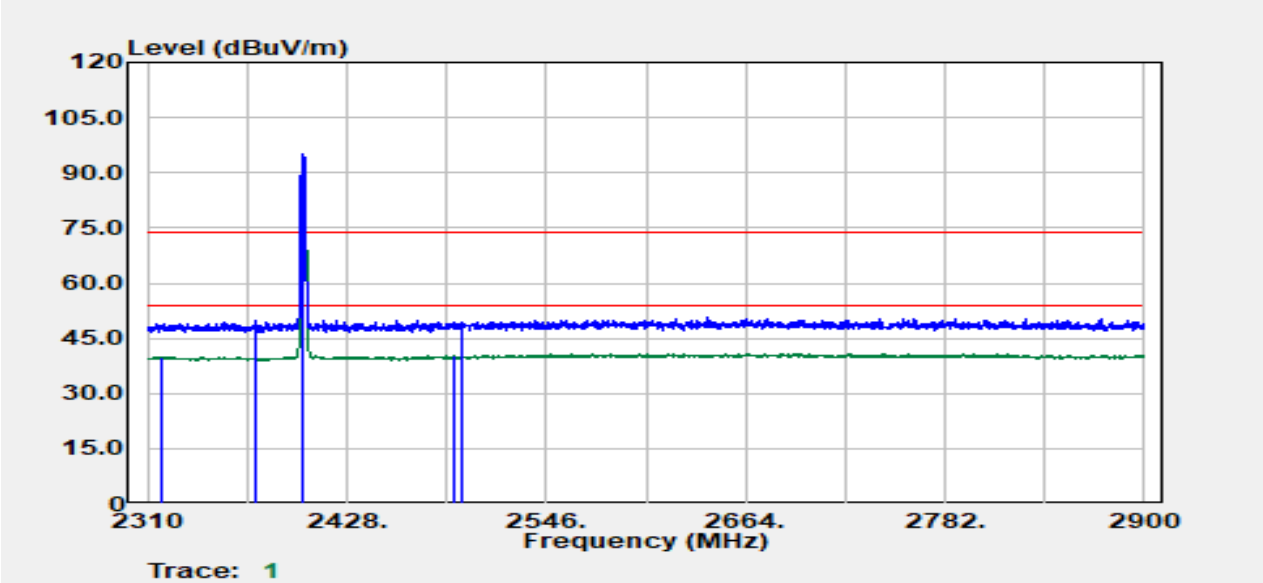
**Above 1 GHz**



## 4.8.4 Test Result

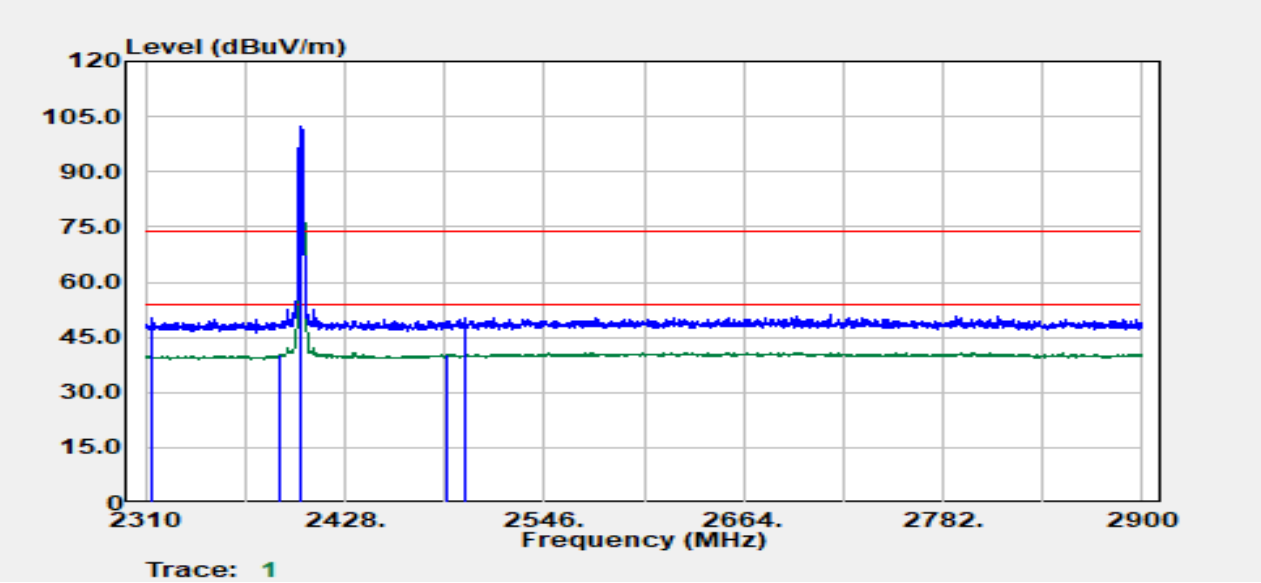
**Band Edge Test Data**

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



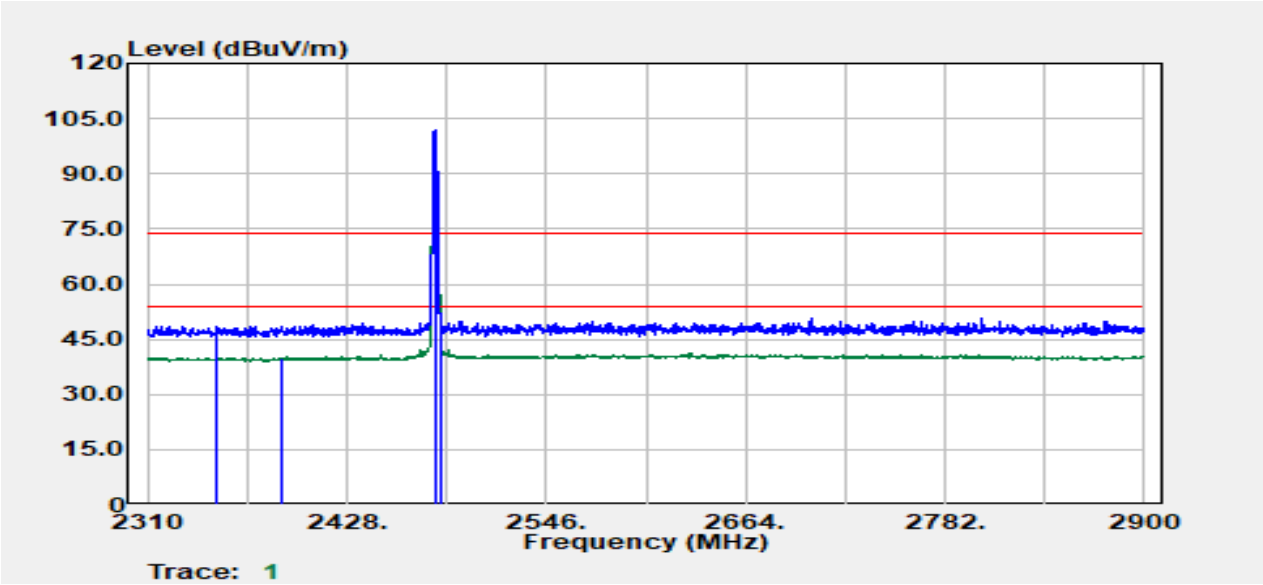

| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 2317.74 | Average | 33.71 | 6.15 | 39.86 | 54.00 | -14.14 |
| 2373.92 | Peak | 43.56 | 6.12 | 49.68 | 74.00 | -24.32 |
| 2402.00 | Peak | 88.93 | 6.29 | 95.22 | -- | -- |
| 2402.00 | Average | 88.90 | 6.29 | 95.19 | -- | -- |
| 2491.52 | Average | 33.38 | 6.81 | 40.19 | 54.00 | -13.81 |
| 2496.01 | Peak | 42.74 | 6.83 | 49.56 | 74.00 | -24.44 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



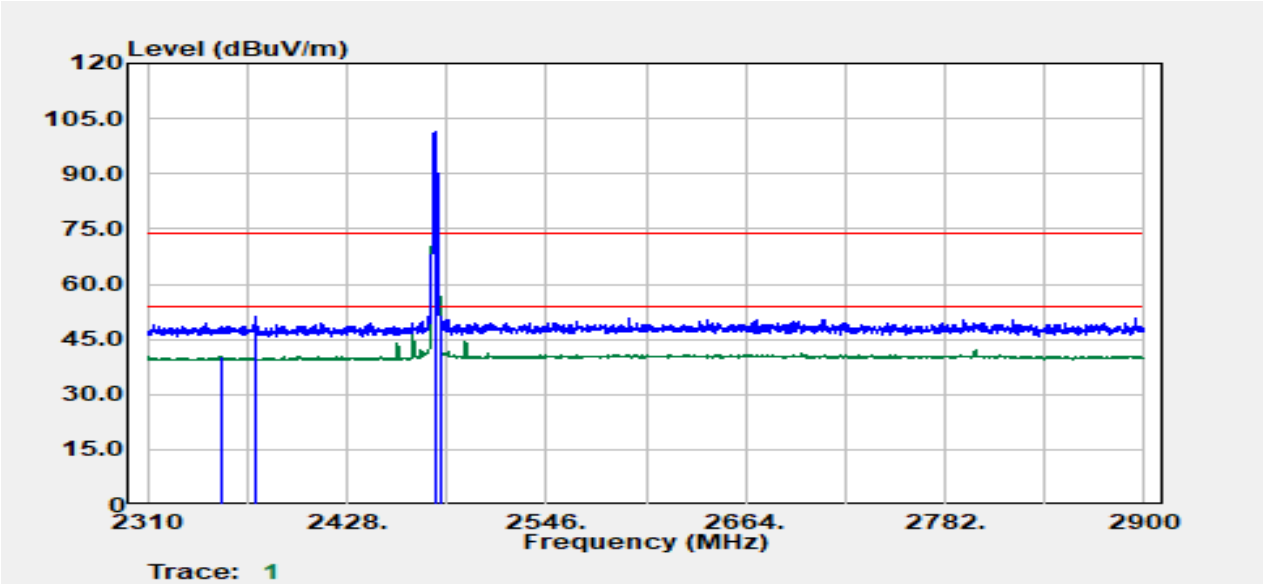

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2313.25 | Peak | 44.01 | 6.14 | 50.15 | 74.00 | -23.85 |
| 2389.90 | Average | 33.91 | 6.28 | 40.19 | 54.00 | -13.81 |
| 2402.00 | Peak | 96.04 | 6.29 | 102.34 | -- | -- |
| 2402.00 | Average | 96.00 | 6.29 | 102.30 | -- | -- |
| 2488.52 | Average | 33.42 | 6.78 | 40.20 | 54.00 | -13.80 |
| 2499.26 | Peak | 43.26 | 6.84 | 50.10 | 74.00 | -23.90 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



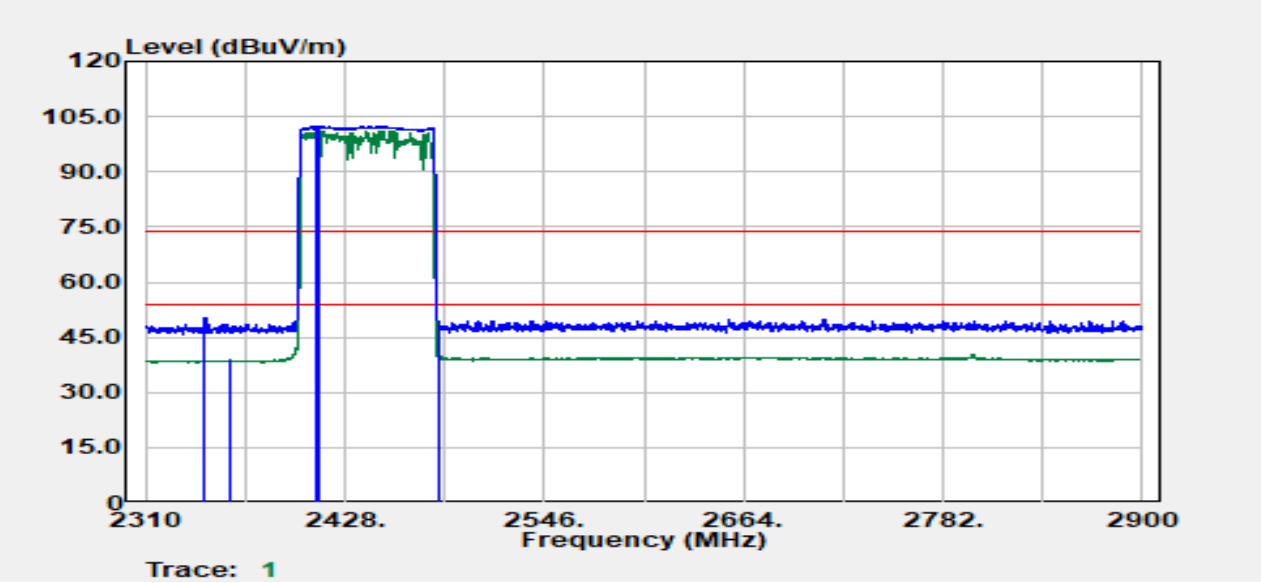

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2351.45 | Peak | 42.43 | 6.24 | 48.67 | 74.00 | -25.33 |
| 2389.40 | Average | 33.71 | 6.27 | 39.97 | 54.00 | -14.03 |
| 2480.00 | Peak | 93.04 | 6.67 | 99.71 | -- | -- |
| 2480.00 | Average | 92.84 | 6.67 | 99.51 | -- | -- |
| 2483.50 | Peak | 43.17 | 6.71 | 49.89 | 74.00 | -24.11 |
| 2483.53 | Average | 39.53 | 6.71 | 46.25 | 54.00 | -7.75 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



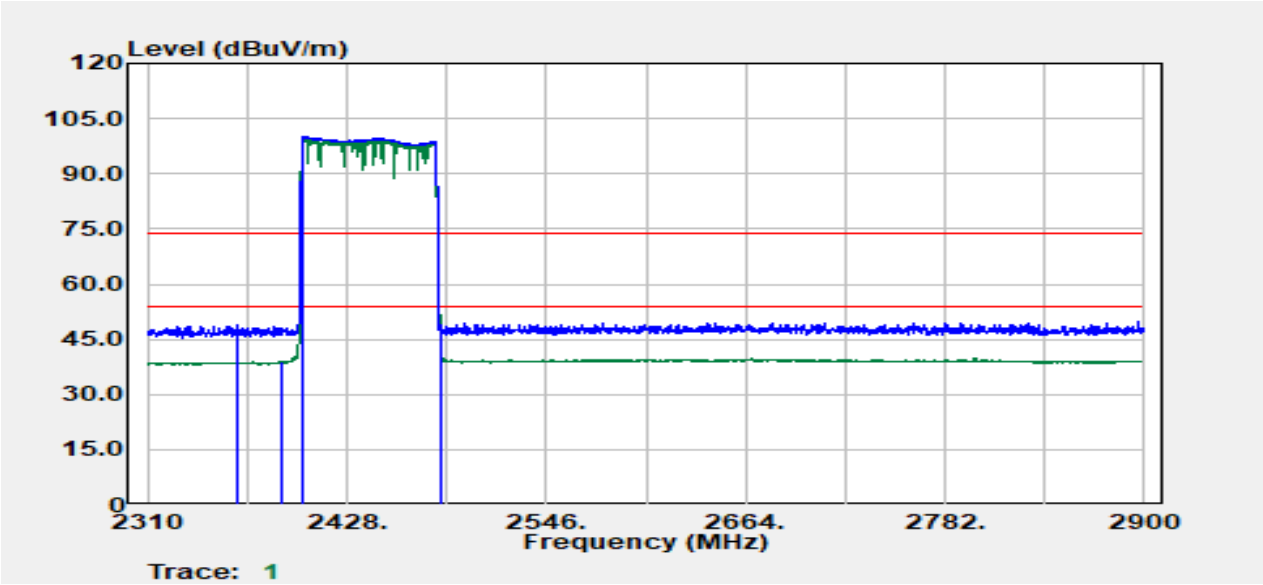

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2354.19 | Average | 33.98 | 6.24 | 40.23 | 54.00 | -13.77 |
| 2374.67 | Peak | 45.19 | 6.12 | 51.31 | 74.00 | -22.69 |
| 2480.00 | Peak | 94.67 | 6.67 | 101.34 | -- | -- |
| 2480.00 | Average | 94.58 | 6.67 | 101.25 | -- | -- |
| 2483.50 | Peak | 43.58 | 6.71 | 50.29 | 74.00 | -23.71 |
| 2483.53 | Average | 38.21 | 6.71 | 44.93 | 54.00 | -9.07 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402~2480 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Hopping | Engineer | :Ray Li |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



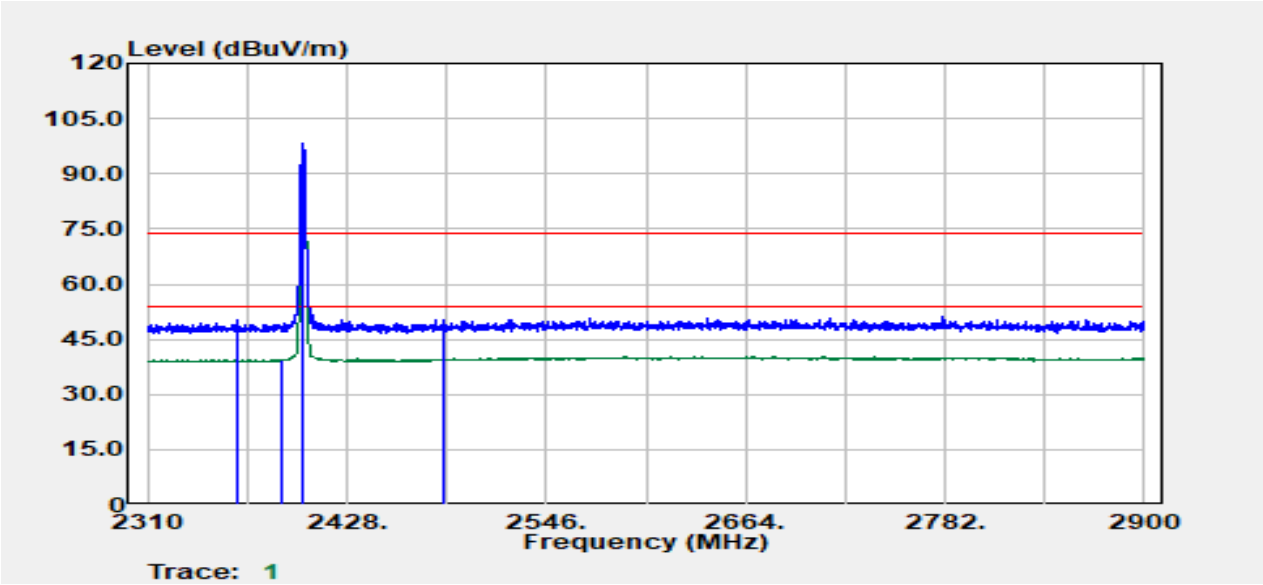

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2345.27 | Peak | 44.91 | 5.41 | 50.32 | 74.00 | -23.68 |
| 2360.02 | Average | 33.47 | 5.48 | 38.95 | 54.00 | -15.05 |
| 2411.04 | Peak | 96.40 | 5.53 | 101.93 | -- | -- |
| 2413.04 | Average | 96.13 | 5.53 | 101.66 | -- | -- |
| 2483.50 | Peak | 43.37 | 5.94 | 49.31 | 74.00 | -24.69 |
| 2484.07 | Average | 33.88 | 5.95 | 39.83 | 54.00 | -14.17 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402~2480 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Hopping | Engineer | :Ray Li |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



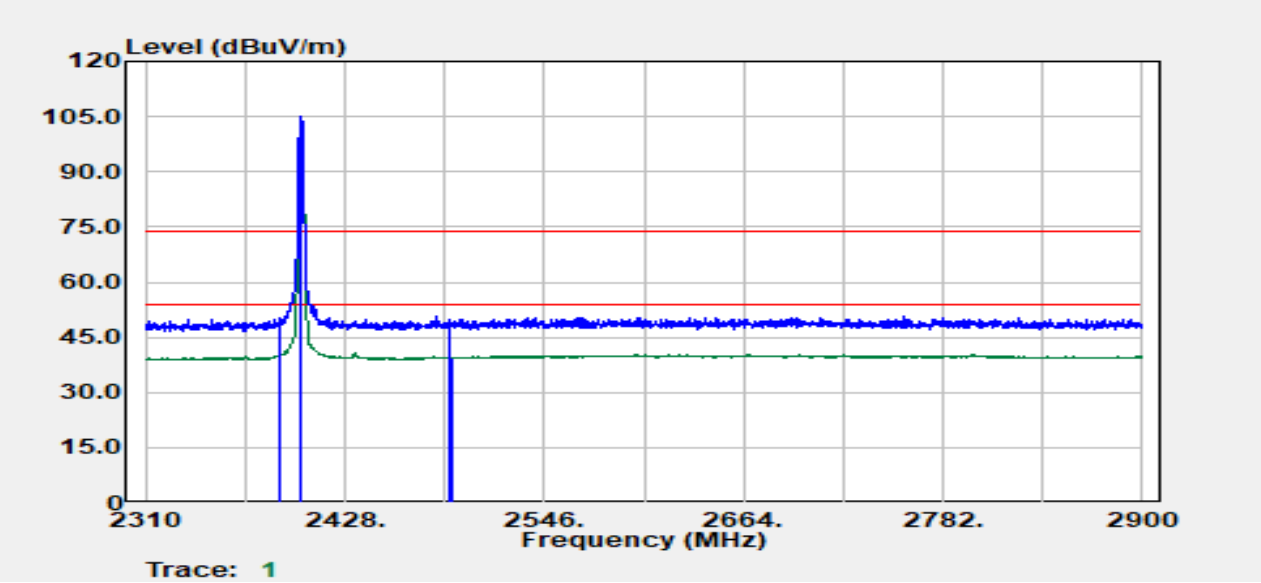

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2362.77 | Peak | 43.41 | 5.46 | 48.87 | 74.00 | -25.13 |
| 2389.78 | Average | 33.24 | 5.51 | 38.74 | 54.00 | -15.26 |
| 2402.04 | Peak | 94.51 | 5.52 | 100.03 | -- | -- |
| 2402.04 | Average | 94.43 | 5.52 | 99.95 | -- | -- |
| 2483.50 | Peak | 43.21 | 5.94 | 49.15 | 74.00 | -24.85 |
| 2483.57 | Average | 35.15 | 5.94 | 41.10 | 54.00 | -12.90 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



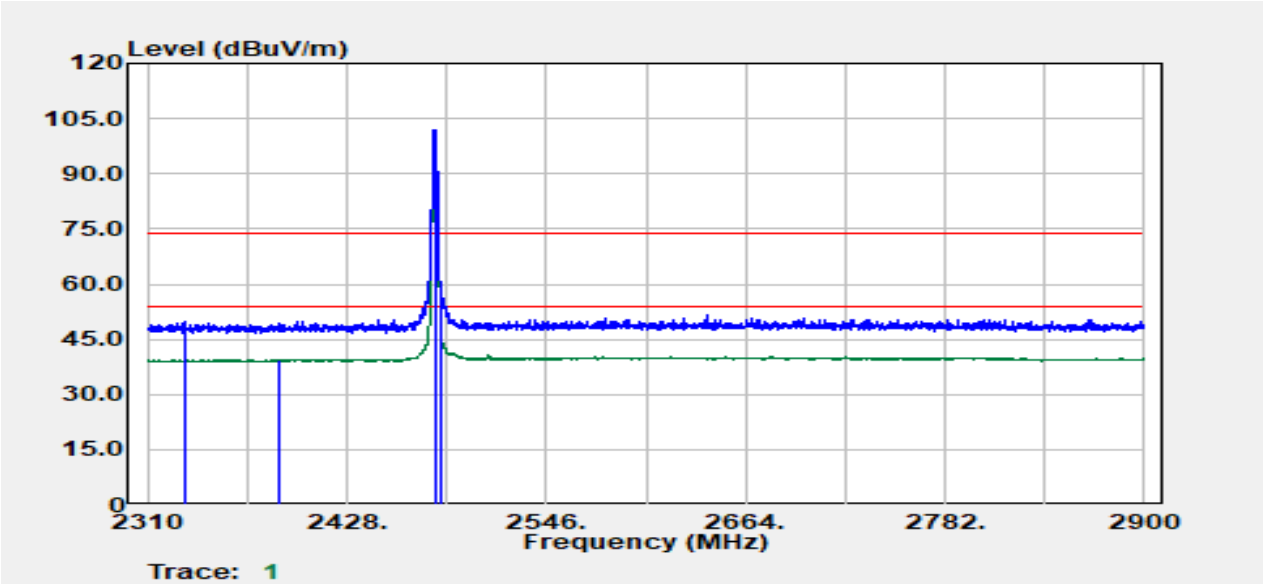

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2363.18 | Peak | 43.90 | 6.22 | 50.12 | 74.00 | -23.88 |
| 2389.40 | Average | 33.14 | 6.27 | 39.40 | 54.00 | -14.60 |
| 2402.00 | Peak | 91.88 | 6.29 | 98.18 | -- | -- |
| 2402.00 | Average | 88.56 | 6.29 | 94.86 | -- | -- |
| 2484.53 | Peak | 43.45 | 6.73 | 50.18 | 74.00 | -23.82 |
| 2485.78 | Average | 32.97 | 6.75 | 39.71 | 54.00 | -14.29 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



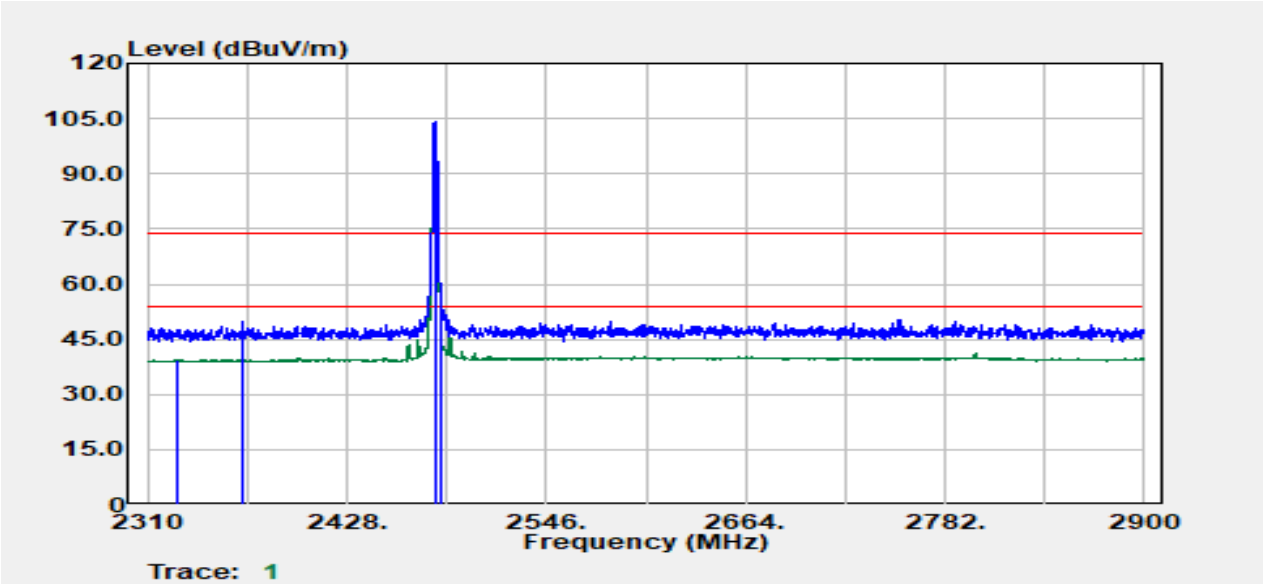

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2388.90 | Peak | 43.97 | 6.26 | 50.23 | 74.00 | -23.77 |
| 2389.40 | Average | 33.89 | 6.27 | 40.16 | 54.00 | -13.84 |
| 2402.00 | Peak | 98.75 | 6.29 | 105.04 | -- | -- |
| 2402.00 | Average | 95.44 | 6.29 | 101.73 | -- | -- |
| 2490.02 | Peak | 43.04 | 6.80 | 49.84 | 74.00 | -24.16 |
| 2491.27 | Average | 32.80 | 6.81 | 39.60 | 54.00 | -14.40 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



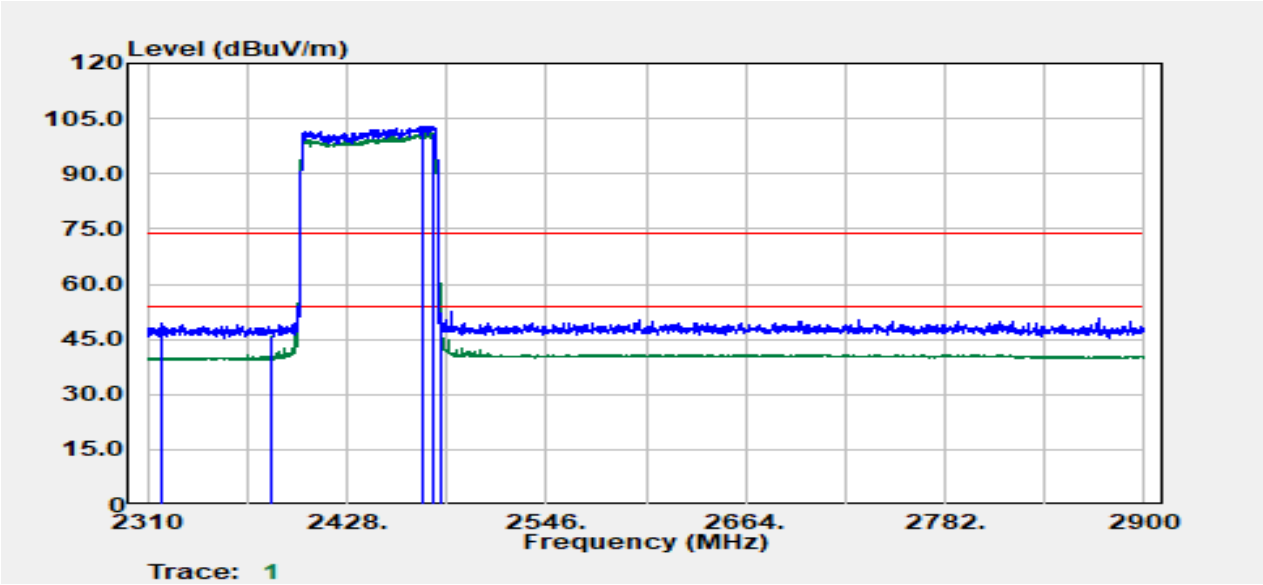

| Freq. | Detector Mode | Spectrum Read Level | Factor | Actual FS | Limit | Margin |
|---|---|---|---|---|---|---|
| MHz | PK/QP/AV | dBµV | dB | dBµV/m | dBµV/m | dB |
| 2331.72 | Peak | 43.75 | 6.17 | 49.92 | 74.00 | -24.08 |
| 2388.40 | Average | 33.17 | 6.25 | 39.42 | 54.00 | -14.58 |
| 2480.00 | Peak | 95.26 | 6.67 | 101.93 | -- | -- |
| 2480.00 | Average | 92.16 | 6.67 | 98.83 | -- | -- |
| 2483.53 | Peak | 51.58 | 6.71 | 58.29 | 74.00 | -15.71 |
| 2483.53 | Average | 41.94 | 6.71 | 48.65 | 54.00 | -5.35 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Bandedge | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



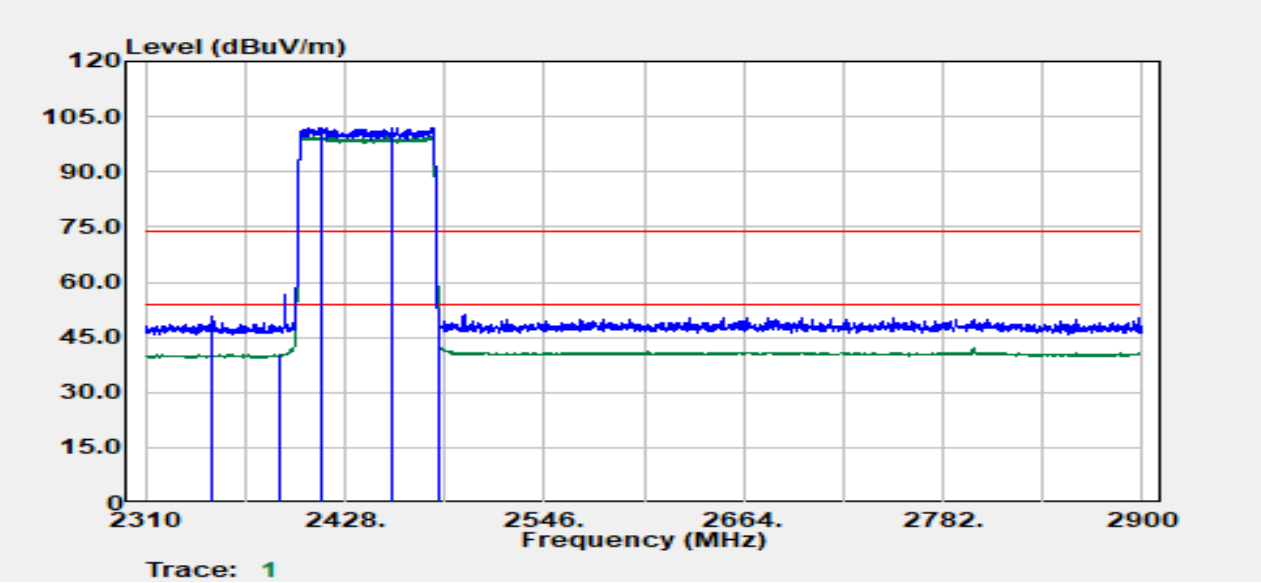

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2328.23 | Average | 33.22 | 6.18 | 39.40 | 54.00 | -14.60 |
| 2366.68 | Peak | 44.19 | 6.19 | 50.38 | 74.00 | -23.62 |
| 2480.00 | Peak | 97.97 | 6.67 | 104.64 | -- | -- |
| 2480.00 | Average | 94.80 | 6.67 | 101.47 | -- | -- |
| 2483.53 | Peak | 50.74 | 6.71 | 57.46 | 74.00 | -16.54 |
| 2483.53 | Average | 40.78 | 6.71 | 47.49 | 54.00 | -6.51 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402~2480 MHz | Antenna Pol. | :VERTICAL |
| Operation Mode | :Hopping | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2318.24 | Peak | 42.99 | 6.15 | 49.15 | 74.00 | -24.85 |
| 2383.41 | Average | 39.46 | 6.14 | 45.60 | 54.00 | -8.40 |
| 2472.29 | Peak | 96.51 | 6.48 | 102.99 | -- | -- |
| 2479.04 | Average | 94.47 | 6.64 | 101.12 | -- | -- |
| 2483.50 | Peak | 45.98 | 6.71 | 52.69 | 74.00 | -21.31 |
| 2483.53 | Average | 42.13 | 6.71 | 48.84 | 54.00 | -5.16 |

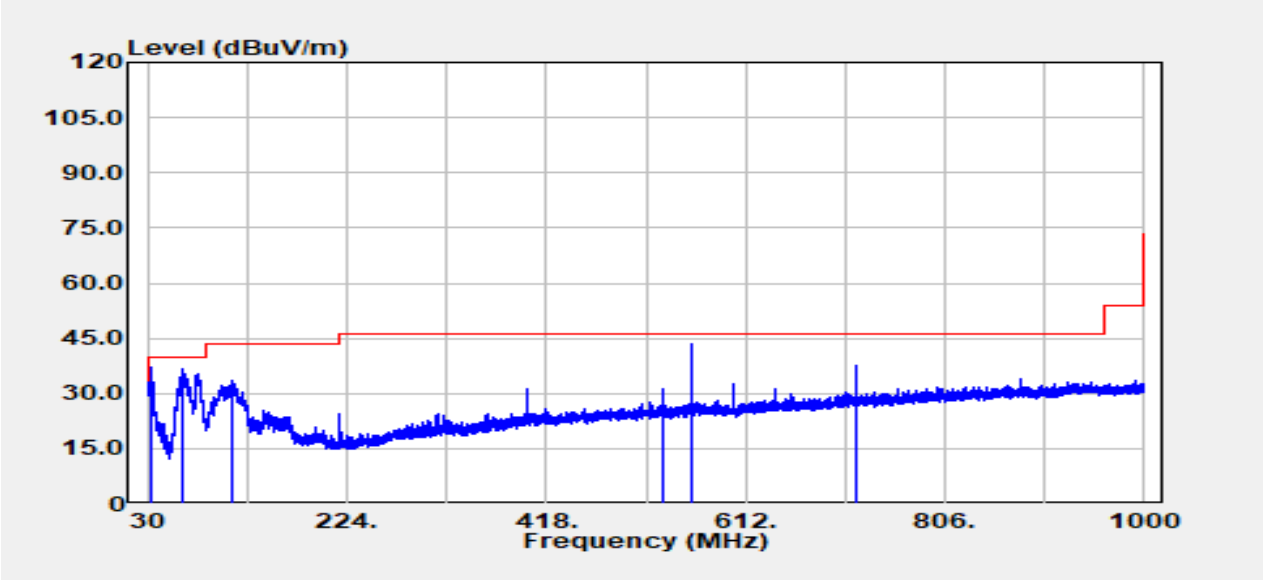
| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402~2480 MHz | Antenna Pol. | :HORIZONTAL |
| Operation Mode | :Hopping | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 2348.70 | Peak | 44.47 | 6.22 | 50.69 | 74.00 | -23.31 |
| 2389.15 | Average | 34.09 | 6.26 | 40.35 | 54.00 | -13.65 |
| 2414.12 | Average | 93.31 | 6.31 | 99.62 | -- | -- |
| 2456.31 | Peak | 95.69 | 6.32 | 102.01 | -- | -- |
| 2483.50 | Peak | 45.10 | 6.71 | 51.81 | 74.00 | -22.19 |
| 2483.53 | Average | 41.01 | 6.71 | 47.72 | 54.00 | -6.28 |

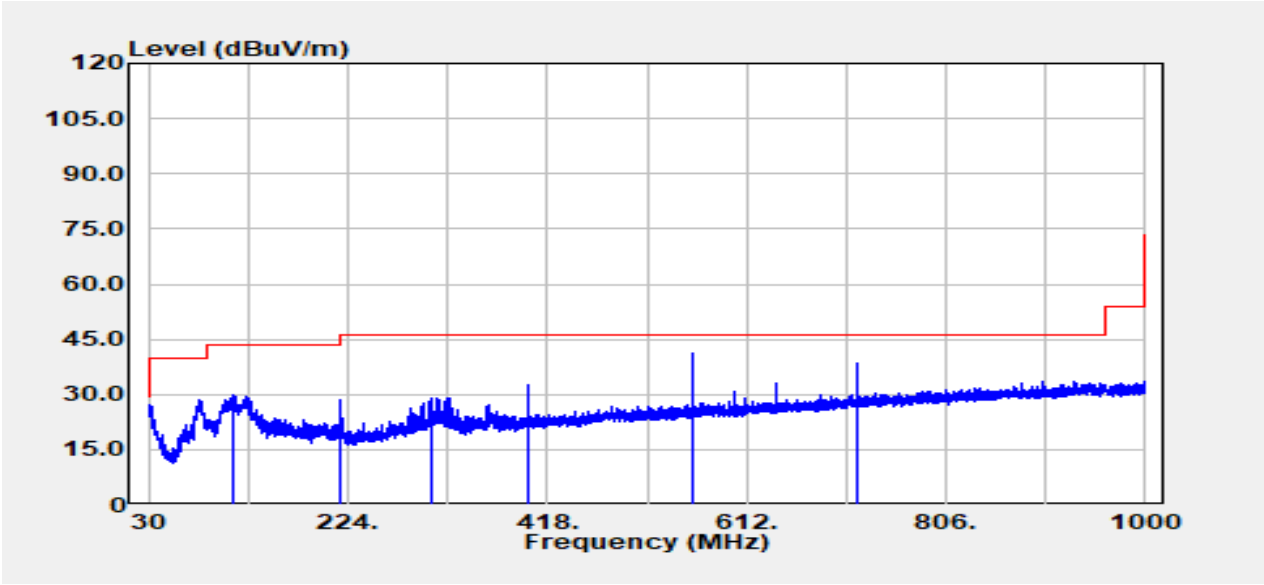
## TX Test Data

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Ray Li |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



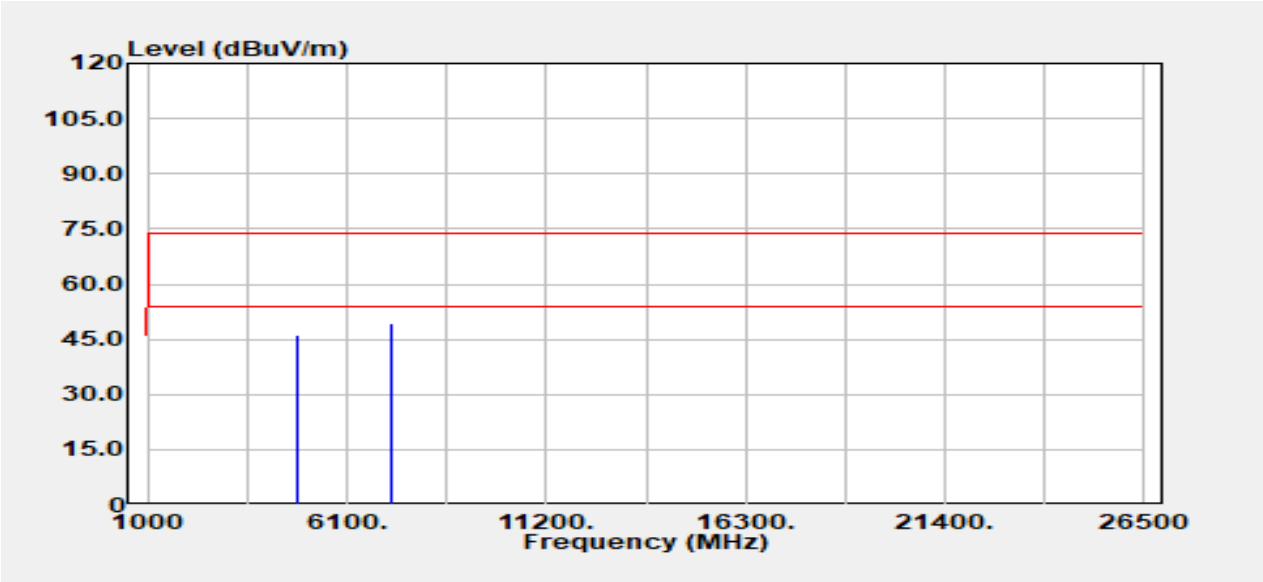

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 33.88 | Peak | 42.37 | -5.04 | 37.34 | 40.00 | -2.66 |
| 65.16 | Peak | 51.93 | -15.30 | 36.63 | 40.00 | -3.37 |
| 112.81 | Peak | 43.18 | -9.79 | 33.38 | 43.50 | -10.12 |
| 531.01 | Peak | 34.40 | -2.96 | 31.44 | 46.00 | -14.56 |
| 559.98 | Peak | 45.91 | -2.44 | 43.47 | 46.00 | -2.53 |
| 720.03 | Peak | 37.26 | 0.36 | 37.62 | 46.00 | -8.38 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Ray Li |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



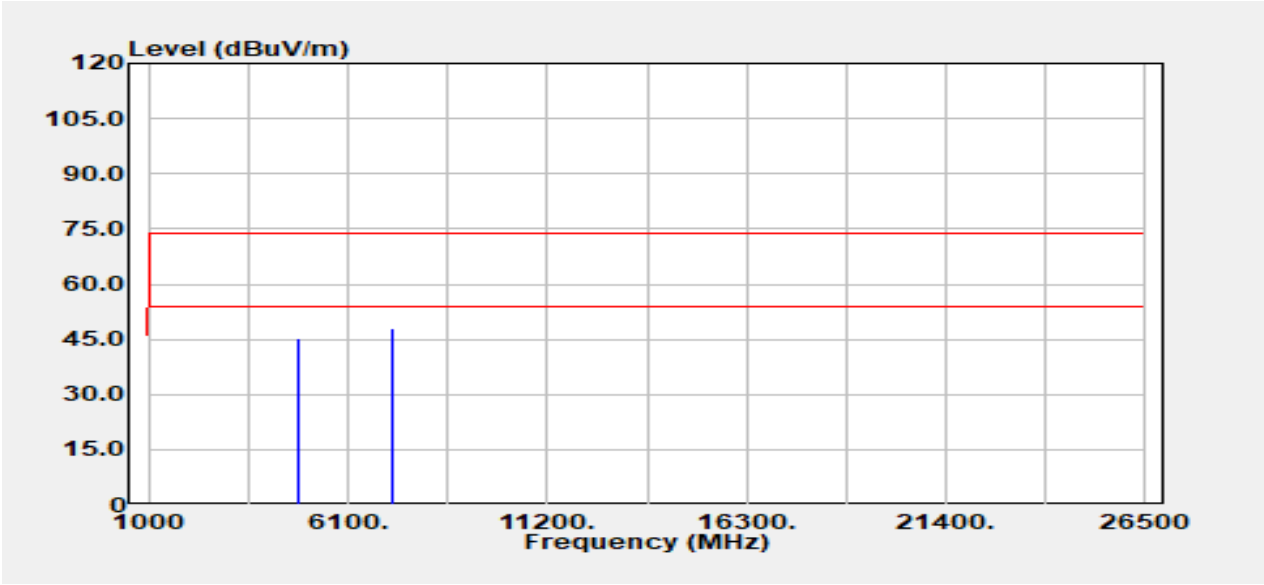

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 112.09 | Peak | 39.48 | -9.74 | 29.75 | 43.50 | -13.75 |
| 216.00 | Peak | 40.46 | -11.79 | 28.67 | 43.50 | -14.83 |
| 305.97 | Peak | 37.63 | -8.44 | 29.19 | 46.00 | -16.81 |
| 400.06 | Peak | 38.20 | -5.80 | 32.41 | 46.00 | -13.59 |
| 559.98 | Peak | 43.71 | -2.44 | 41.27 | 46.00 | -4.73 |
| 720.03 | Peak | 37.94 | 0.36 | 38.30 | 46.00 | -7.70 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



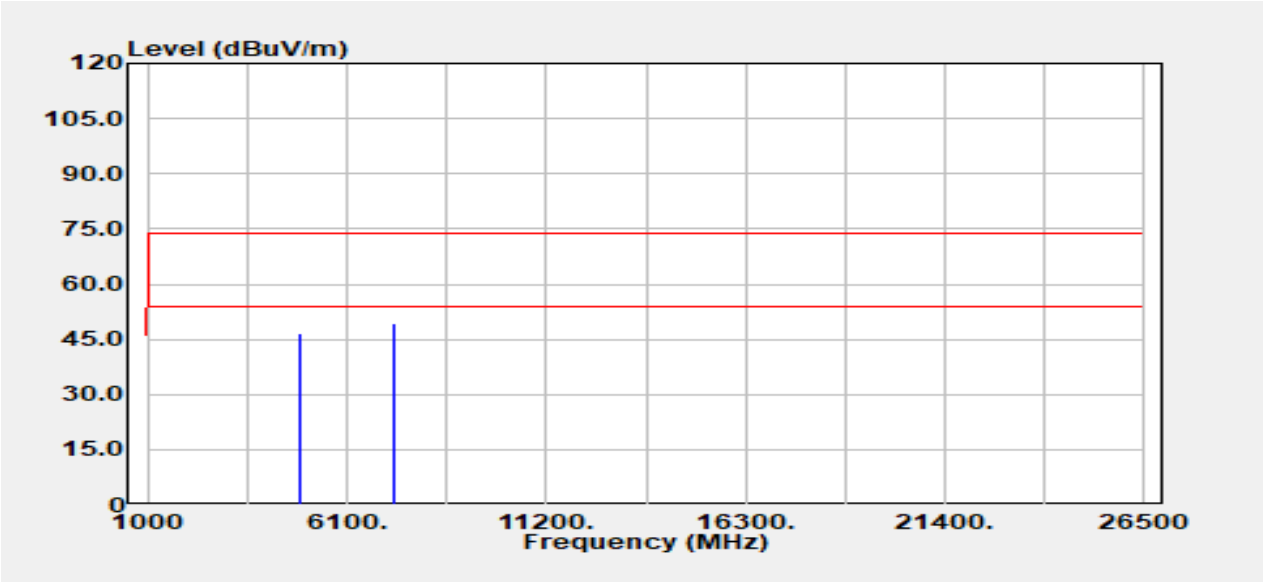

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 43.93 | 2.23 | 46.16 | 74.00 | -27.84 |
| 4804.00 | Average | 39.93 | 2.23 | 42.15 | 54.00 | -11.85 |
| 7206.00 | Peak | 40.23 | 9.01 | 49.24 | 74.00 | -24.76 |
| 7206.00 | Average | 35.38 | 9.01 | 44.39 | 54.00 | -9.61 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



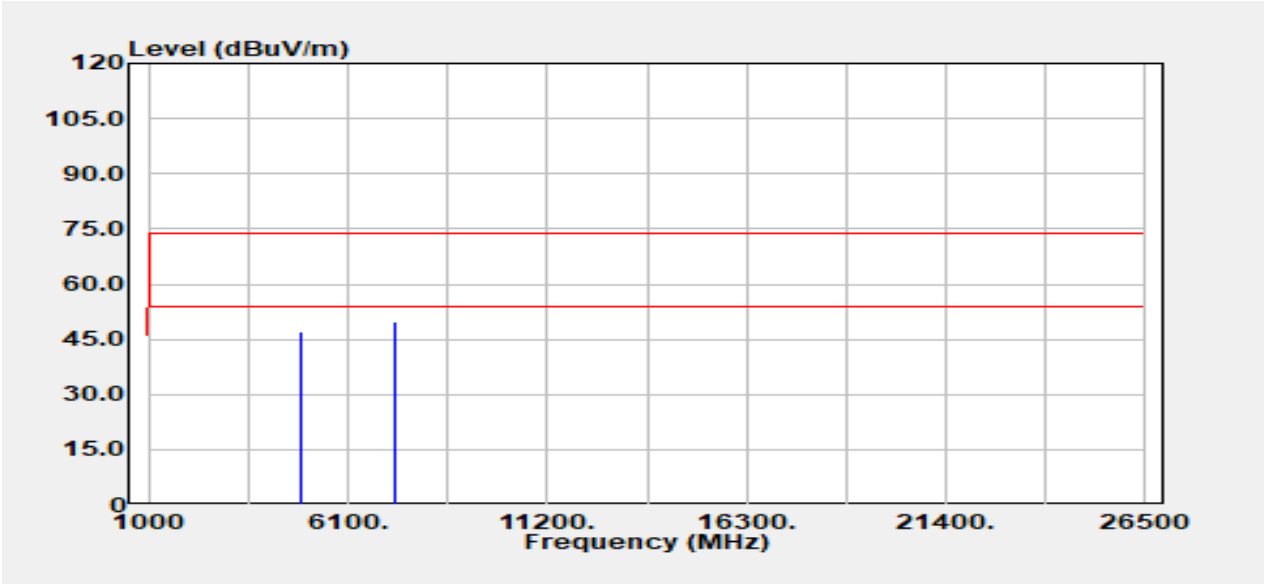

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 43.22 | 2.23 | 45.44 | 74.00 | -28.56 |
| 4804.00 | Average | 39.74 | 2.23 | 41.97 | 54.00 | -12.03 |
| 7206.00 | Peak | 39.01 | 9.01 | 48.02 | 74.00 | -25.98 |
| 7206.00 | Average | 35.33 | 9.01 | 44.34 | 54.00 | -9.66 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2441 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



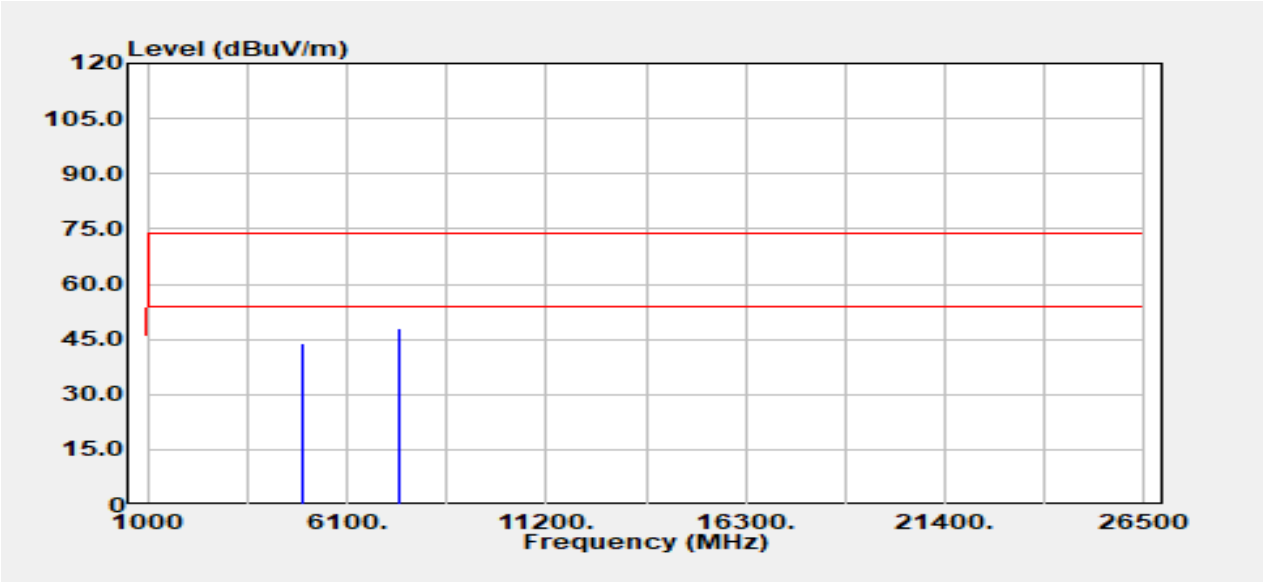

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 44.01 | 2.56 | 46.57 | 74.00 | -27.43 |
| 4882.00 | Average | 40.99 | 2.56 | 43.55 | 54.00 | -10.45 |
| 7323.00 | Peak | 40.20 | 8.96 | 49.16 | 74.00 | -24.84 |
| 7323.00 | Average | 36.61 | 8.96 | 45.57 | 54.00 | -8.43 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2441 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



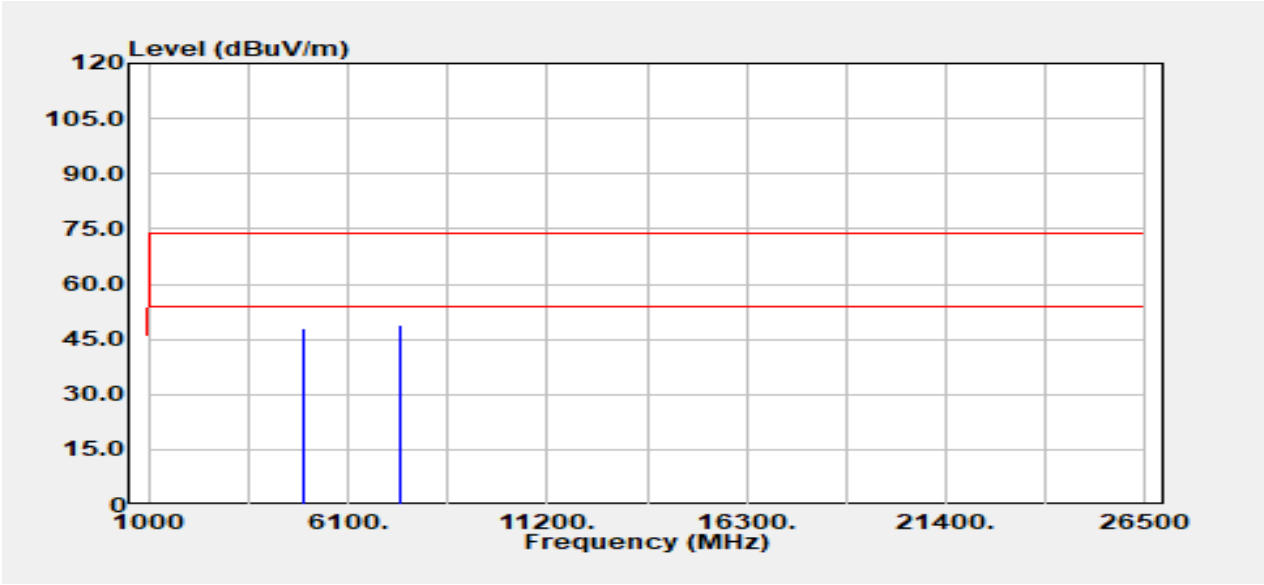

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 44.62 | 2.56 | 47.18 | 74.00 | -26.82 |
| 4882.00 | Average | 42.51 | 2.56 | 45.08 | 54.00 | -8.92 |
| 7323.00 | Peak | 40.99 | 8.96 | 49.95 | 74.00 | -24.05 |
| 7323.00 | Average | 36.22 | 8.96 | 45.18 | 54.00 | -8.82 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



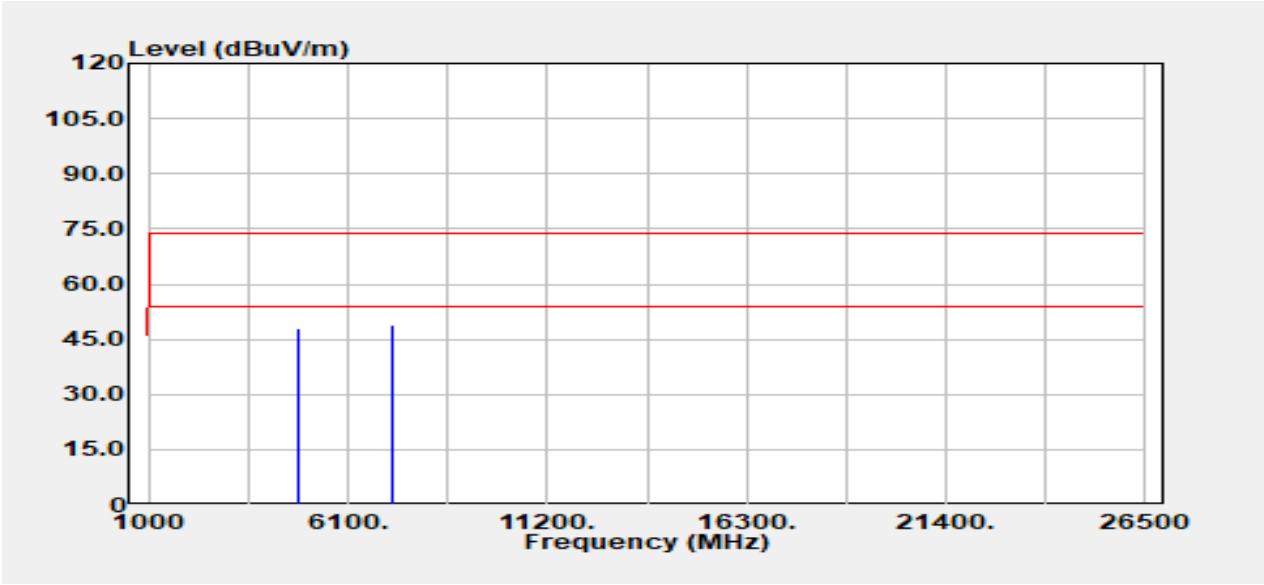

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 40.54 | 3.21 | 43.75 | 74.00 | -30.25 |
| 4960.00 | Average | 35.76 | 3.21 | 38.97 | 54.00 | -15.03 |
| 7440.00 | Peak | 38.89 | 8.92 | 47.81 | 74.00 | -26.19 |
| 7440.00 | Average | 36.32 | 8.92 | 45.24 | 54.00 | -8.76 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_BR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



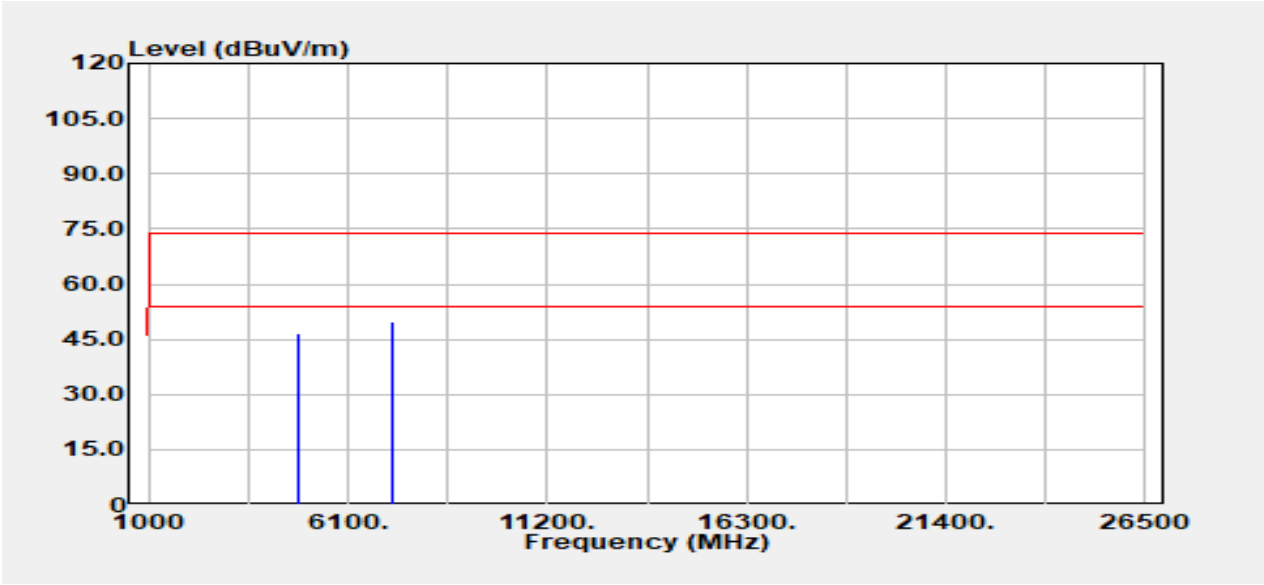

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 44.90 | 3.21 | 48.12 | 74.00 | -25.88 |
| 4960.00 | Average | 41.15 | 3.21 | 44.36 | 54.00 | -9.64 |
| 7440.00 | Peak | 39.84 | 8.92 | 48.76 | 74.00 | -25.24 |
| 7440.00 | Average | 35.26 | 8.92 | 44.18 | 54.00 | -9.82 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



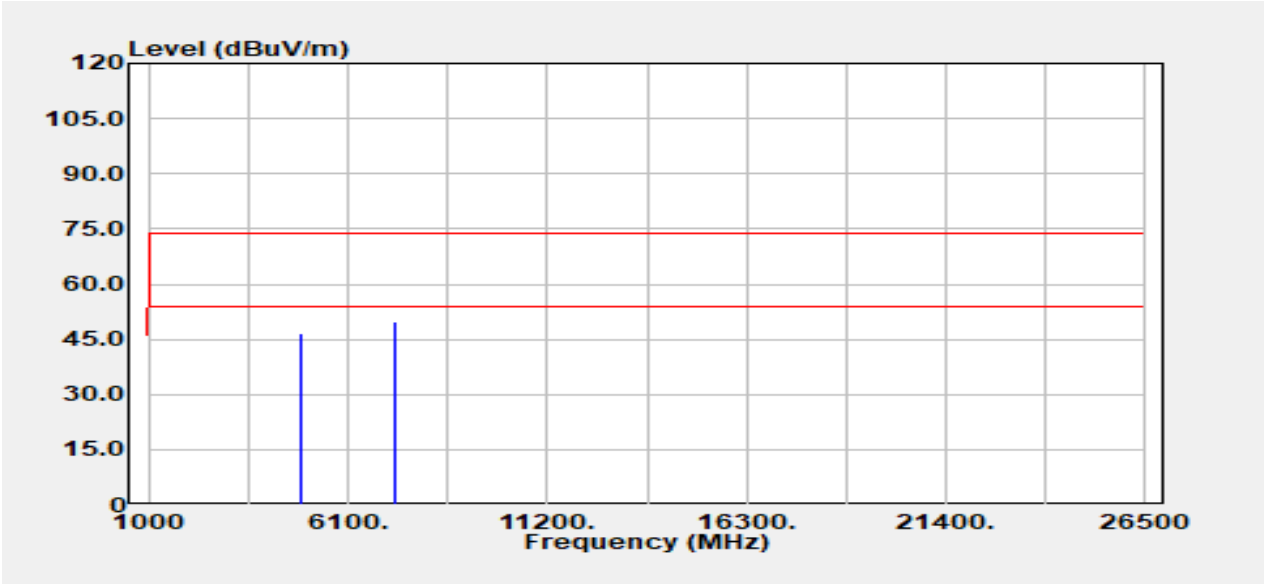

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 45.64 | 2.23 | 47.87 | 74.00 | -26.13 |
| 4804.00 | Average | 39.41 | 2.23 | 41.64 | 54.00 | -12.36 |
| 7206.00 | Peak | 39.78 | 9.01 | 48.79 | 74.00 | -25.21 |
| 7206.00 | Average | 34.05 | 9.01 | 43.06 | 54.00 | -10.94 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2402 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



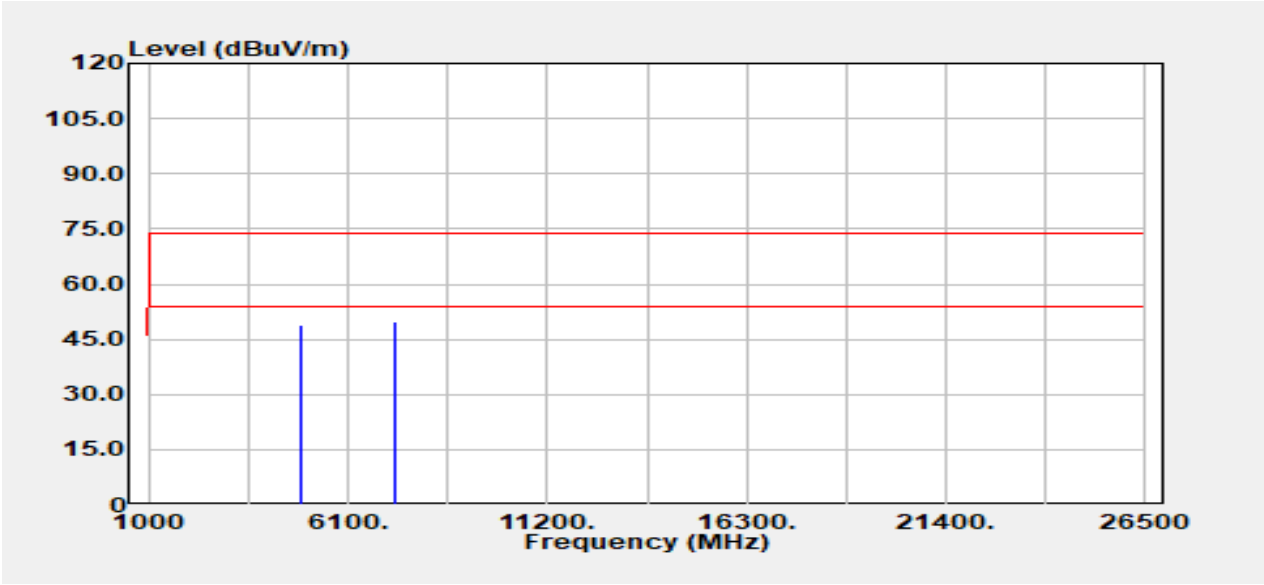

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4804.00 | Peak | 44.50 | 2.23 | 46.72 | 74.00 | -27.28 |
| 4804.00 | Average | 37.99 | 2.23 | 40.21 | 54.00 | -13.79 |
| 7206.00 | Peak | 40.79 | 9.01 | 49.80 | 74.00 | -24.20 |
| 7206.00 | Average | 35.36 | 9.01 | 44.37 | 54.00 | -9.63 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2441 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



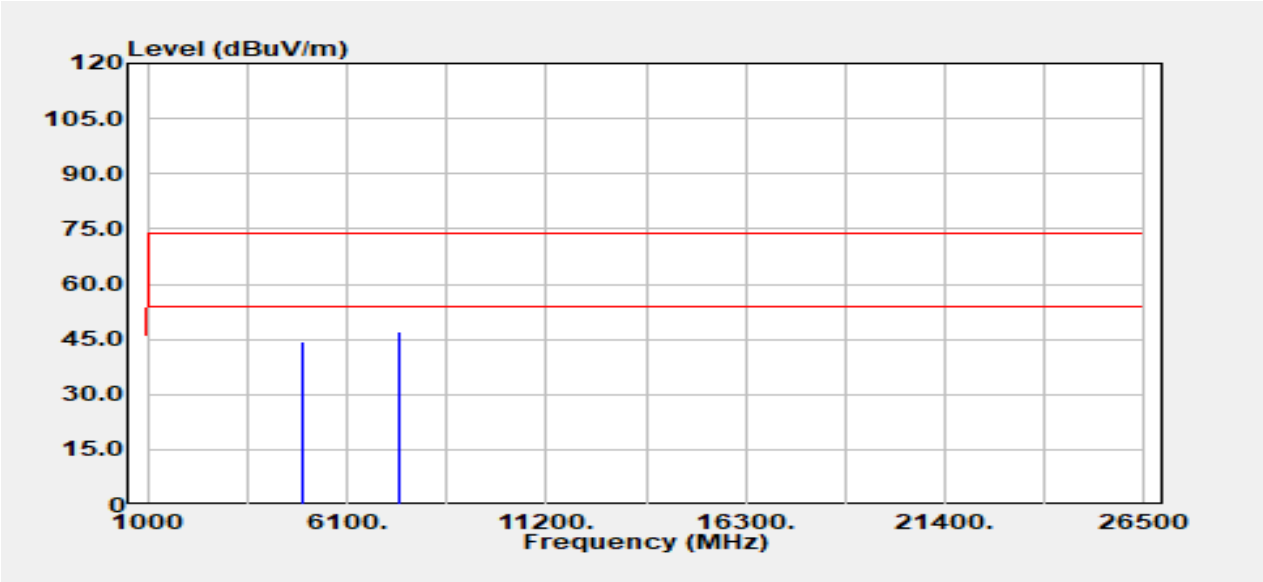

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 43.96 | 2.56 | 46.53 | 74.00 | -27.47 |
| 4882.00 | Average | 40.00 | 2.56 | 42.56 | 54.00 | -11.44 |
| 7323.00 | Peak | 41.03 | 8.96 | 49.98 | 74.00 | -24.02 |
| 7323.00 | Average | 34.99 | 8.96 | 43.95 | 54.00 | -10.05 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2441 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |



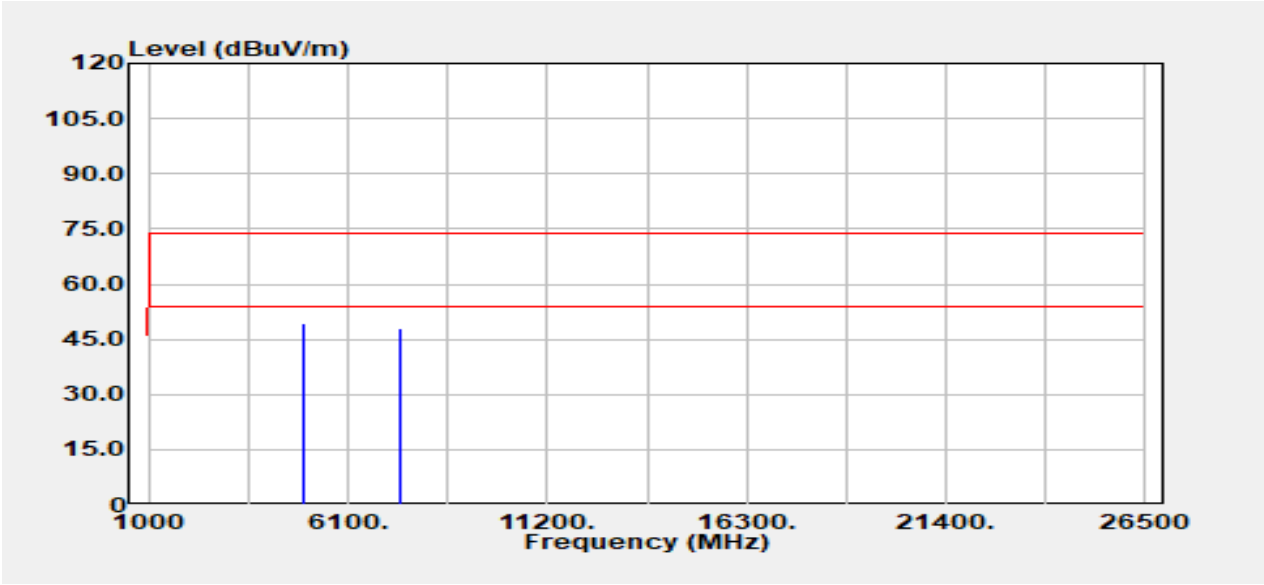

| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4882.00 | Peak | 46.46 | 2.56 | 49.03 | 74.00 | -24.97 |
| 4882.00 | Average | 40.82 | 2.56 | 43.38 | 54.00 | -10.62 |
| 7323.00 | Peak | 40.98 | 8.96 | 49.94 | 74.00 | -24.06 |
| 7323.00 | Average | 35.45 | 8.96 | 44.41 | 54.00 | -9.59 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :Vertical |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 40.95 | 3.21 | 44.17 | 74.00 | -29.83 |
| 4960.00 | Average | 34.53 | 3.21 | 37.74 | 54.00 | -16.26 |
| 7440.00 | Peak | 38.18 | 8.92 | 47.10 | 74.00 | -26.90 |
| 7440.00 | Average | 34.68 | 8.92 | 43.60 | 54.00 | -10.40 |

| | | | |
|---|---|---|---|
| Project No | :TM-2402000257P | Test Date | :2024-03-20 |
| Operation Band | :BT_EDR | Temp./Humi. | :24.5/58 |
| Frequency | :2480 MHz | Antenna Pol. | :Horizontal |
| Operation Mode | :TX | Engineer | :Tony Chao |
| EUT Pol | :E1 | Test Chamber | : 966A |
| Setting | : | | |




| Freq. MHz | Detector Mode PK/QP/AV | Spectrum Read Level dBµV | Factor dB | Actual FS dBµV/m | Limit dBµV/m | Margin dB |
|---|---|---|---|---|---|---|
| 4960.00 | Peak | 46.36 | 3.21 | 49.57 | 74.00 | -24.43 |
| 4960.00 | Average | 41.37 | 3.21 | 44.58 | 54.00 | -9.42 |
| 7440.00 | Peak | 39.10 | 8.92 | 48.02 | 74.00 | -25.98 |
| 7440.00 | Average | 34.23 | 8.92 | 43.15 | 54.00 | -10.85 |

**- End of Test Report -**