

# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART C


<b>Test Standard</b>	<b>FCC Part 15.247</b>
<b>Product name</b>	<b>WLAN/BT USB Dongle</b>
<b>Brand Name</b>	<b>Toshiba Tec Corporation</b>
<b>Model No.</b>	<b>CL-8852BU</b>
<b>Test Result</b>	<b>Pass</b>
<b>Statements of Conformity</b>	<b>Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.</b>

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:




---

Dally Hong  
Sr. Engineer

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.  
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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## Revision History

Rev.	Issue Date	Revisions	Revised By
00	November 1, 2023	Initial Issue	Doris Chu

## Table of contents

<b>1. GENERAL INFORMATION .....</b>	<b>4</b>
<b>1.1 EUT INFORMATION .....</b>	<b>4</b>
<b>1.2 INFORMATION ABOUT THE FHSS CHARACTERISTICS.....</b>	<b>5</b>
<b>1.3 EUT CHANNEL INFORMATION .....</b>	<b>6</b>
<b>1.4 ANTENNA INFORMATION .....</b>	<b>6</b>
<b>1.5 MEASUREMENT UNCERTAINTY .....</b>	<b>7</b>
<b>1.6 FACILITIES AND TEST LOCATION.....</b>	<b>8</b>
<b>1.7 INSTRUMENT CALIBRATION.....</b>	<b>9</b>
<b>1.8 SUPPORT AND EUT ACCESSORIES EQUIPMENT.....</b>	<b>10</b>
<b>1.9 TEST METHODOLOGY AND APPLIED STANDARDS .....</b>	<b>10</b>
<b>2. TEST SUMMERY .....</b>	<b>11</b>
<b>3. DESCRIPTION OF TEST MODES .....</b>	<b>12</b>
<b>3.1 THE WORST MODE OF OPERATING CONDITION.....</b>	<b>12</b>
<b>3.2 THE WORST MODE OF MEASUREMENT .....</b>	<b>13</b>
<b>3.3 EUT DUTY CYCLE .....</b>	<b>14</b>
<b>4. TEST RESULT .....</b>	<b>17</b>
<b>4.1 AC POWER LINE CONDUCTED EMISSION.....</b>	<b>17</b>
<b>4.2 20DB BANDWIDTH AND OCCUPIED BANDWIDTH (99%).....</b>	<b>20</b>
<b>4.3 OUTPUT POWER MEASUREMENT.....</b>	<b>27</b>
<b>4.4 FREQUENCY SEPARATION.....</b>	<b>29</b>
<b>4.5 NUMBER OF HOPPING .....</b>	<b>33</b>
<b>4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION .....</b>	<b>35</b>
<b>4.7 TIME OF OCCUPANCY (DWELL TIME).....</b>	<b>39</b>
<b>4.8 RADIATION BANDEDGE AND SPURIOUS EMISSION .....</b>	<b>44</b>
<b>APPENDIX 1 - PHOTOGRAPHS OF EUT.....</b>	<b>A-1</b>

## 1. GENERAL INFORMATION

### 1.1 EUT INFORMATION

Applicant	Toshiba Tec Corporation 6-78, Minami-Cho, Mishima-Shi, Shizuoka-ken 411-8520 Japan
Manufacturer	CC&C Technologies Inc. 8F, 150, Jian Yi Road, Zhonghe District, New Taipei City, Taiwan 235, R. O. C.
Factory	Kunshan CC&C Technologies, Co., Ltd No.9 building,3rd Main Street, Kunshan Free Trade Zone, Jiangsu Province, P. R. China
Equipment	WLAN/BT USB Dongle
Model No.	CL-8852BU
Model Discrepancy	N/A
Trade Name	Toshiba Tec Corporation
Received Date	July 21, 2023
Date of Test	July 26 ~ August 30, 2023
Power Operation	Power from host device.
HW Version	0B
SW Version	01

**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.

## 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

RSS-247, 5.1 (a): The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### 1.3 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	1. GFSK for BDR-1Mbps 2. $\pi/4$ -DQPSK for EDR-2Mbps 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
<input type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input checked="" type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

### 1.4 ANTENNA INFORMATION

Antenna Type	<input type="checkbox"/> PIFA <input checked="" type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils
Antenna Gain	Gain: -13.33 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	± 3.115 dB
Radiated Emission_30MHz-200MHz	± 4.071 dB
Radiated Emission_200MHz-1GHz	± 4.419 dB
Radiated Emission_1GHz-6GHz	± 5.023 dB
Radiated Emission_6GHz-18GHz	± 5.068 dB
Radiated Emission_18GHz-26GHz	± 3.349 dB
Radiated Emission_26GHz-40GHz	± 3.229 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

AC Powerline Conducted Emission and Conducted:

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

Radiated emission 9kHz to 40GHz:

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	Tony Chao	-
Radiation	Czerny Lin	-
RF Conducted	Allen Shen	-

**Remark:** The lab has been recognized as the FCC accredited lab. under the KDB 974614 D01 and is listed in the FCC public 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	1911386	2023-07-25	2024-07-24
Power Sensor	Anritsu	MA2411B	1911387	2023-07-25	2024-07-24
Power Meter	Anritsu	ML2496A	2136002	2022-11-24	2023-11-23
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-02	2024-02-01
Software	Radio Test Software Ver. 21				

Radiated Emission Test Site: 966 D					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Antenna	SHWARZBECK	VULB 9168	1277	2023-01-13	2024-01-12
Pre-Amplifier	EMCI	EMC118A45SE	980820	2022-12-23	2023-12-22
Pre-Amplifier	EMCI	EMC330N	980853	2022-12-23	2023-12-22
Coaxial Cable	EMC	EMC101G-KM-KM-9000	220407+211228+230205	2023-03-21	2024-03-20
EXA Signal Analyzer	Agilent	N9010A	MY52220817	2023-03-09	2024-03-08
Coaxial Cable	EMC	EMCCFD400	211212+211222+211020	2023-03-21	2024-03-20
High Pass Filter	TITAN	T04H30001800070S01	211215-7-1	2023-02-02	2024-02-01
Thermo-Hygro Meter	EDSDS	EDS-A49	966D1	2023-05-11	2024-05-10
Pre-Amplifier	EMCI	EMC184045SE	980872	2023-01-03	2024-01-02
Horn Antenna	RF SPIN	DRH18-E	210301A18ES	2023-02-03	2024-02-02
Horn Antenna	SHWARZBECK	BBHA 9170	1134	2022-12-30	2023-12-29
Loop Antenna	SCHWARZBECK	FMZB 1513-60	1513-60-028	2022-12-27	2023-12-26
Software	e3 V9-210616c				

RF_Conduction(RF)					
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	2023-03-08	2024-03-07
Cable	EMCI	CFD300-NL	CERF	2023-06-27	2024-06-26
Software	EZ-EMC(CCS-3A1-CE-WUGU)				

**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

Conducted_FCC/IC/NCC (All)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
NB(E)	Lenovo	T460	N/A	N/A	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 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)	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

<p>Operation mode</p>	<p>GFSK for BDR-1Mbps (DH5)  <math>\pi/4</math>-DQPSK for 2Mbps (2DH5)              8DPSK for EDR-3Mbps (3DH5)</p>
<p>Test Channel Frequencies</p>	<p><b>GFSK for BDR-1Mbps:</b>              1.Lowest Channel: 2402MHz              2.Middle Channel: 2441MHz              3.Highest Channel: 2480MHz</p> <p><b><math>\pi/4</math>-DQPSK for 2Mbps:</b>              1.Lowest Channel: 2402MHz              2.Middle Channel: 2441MHz              3.Highest Channel: 2480MHz</p> <p><b>8DPSK for EDR-3Mbps:</b>              1.Lowest Channel: 2402MHz              2.Middle Channel: 2441MHz              3.Highest Channel: 2480MHz</p>

*Remark:*

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

### 3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Power supply Mode	Mode 1: EUT Power by System
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT Power by System
Worst Mode	<input checked="" type="checkbox"/> Mode 1
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> 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 System
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> 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(X-Plane) were recorded in this report
3. 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.

### 3.3 EUT DUTY CYCLE

Temperature: 26.2°C

Test date: July 26, 2023

Humidity: 55% RH

Tested by: Allen Shen

#### For GFSK (1Mbps)

Duty Cycle				
Configuration	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
DH1	31.02	5.08	2.63	3.00
DH3	65.73	1.82	0.61	1.00
DH5	77.51	1.11	0.35	1.00

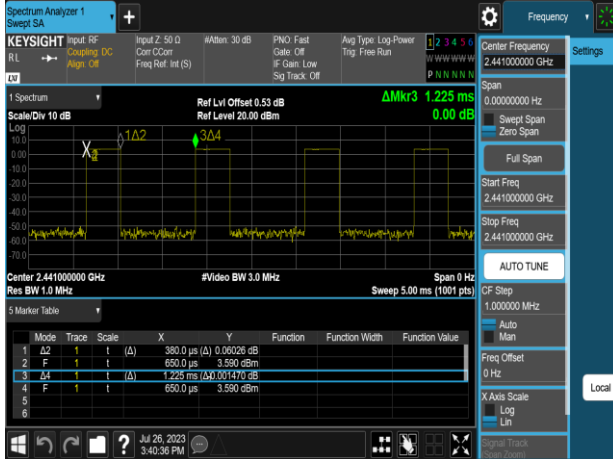
#### For π/4-DQPSK (2Mbps)

Duty Cycle				
Configuration	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
2DH1	31.30	5.04	2.60	3.00
2DH3	65.86	1.81	0.61	1.00
2DH5	77.42	1.11	0.35	1.00

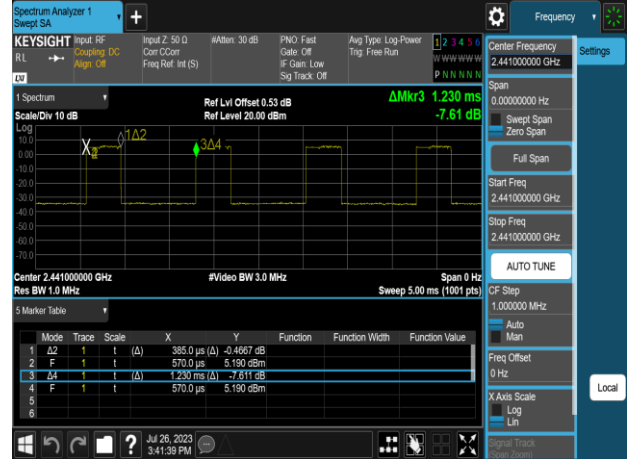
#### For 8-DPSK (3Mbps)

Duty Cycle				
Configuration	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
3DH1	31.17	5.06	2.60	3.00
3DH3	65.86	1.81	0.61	1.00
3DH5	77.51	1.11	0.35	1.00

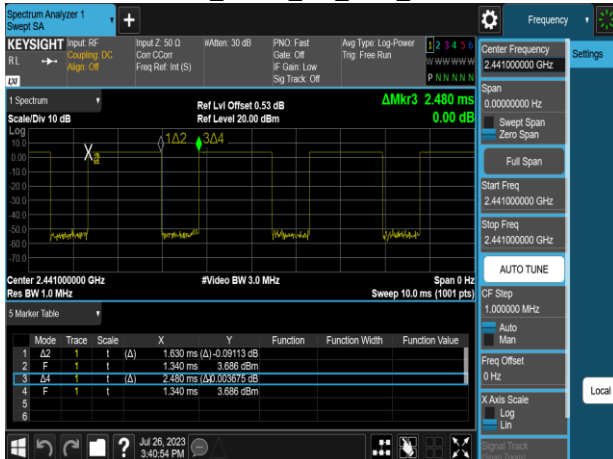
Dwell Time\_GFSK\_1M\_DH1\_2441MHz



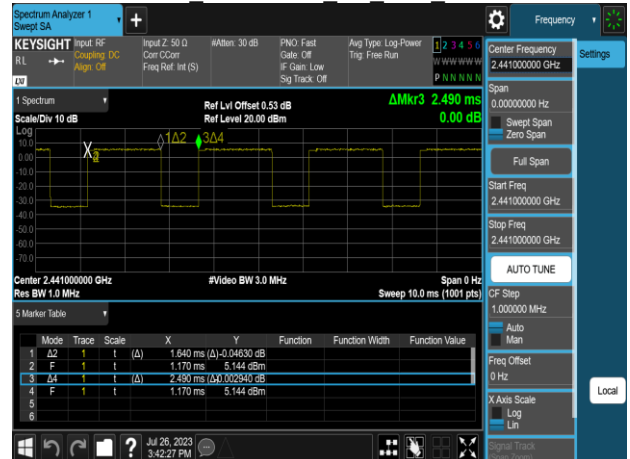
Dwell Time π/4DQPSK 2M\_DH1\_2441MHz



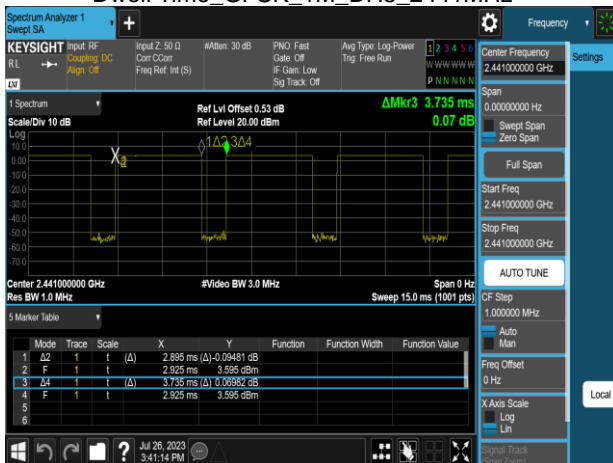
Dwell Time\_GFSK\_1M\_DH3\_2441MHz



Dwell Time π/4DQPSK 2M\_DH3\_2441MHz



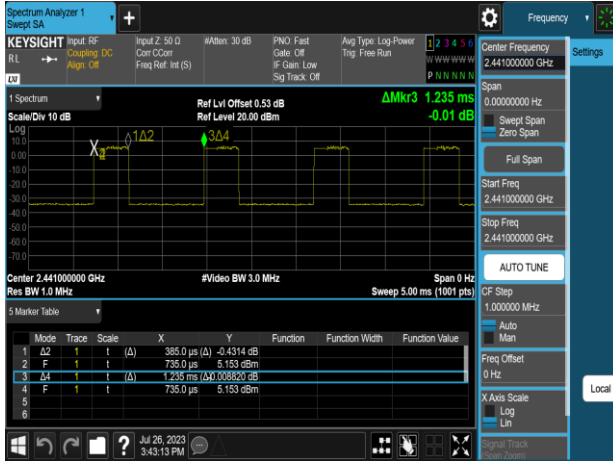
Dwell Time\_GFSK\_1M\_DH5\_2441MHz



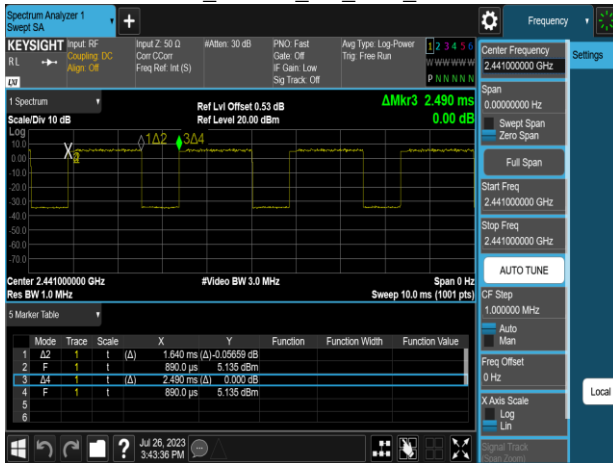
Dwell Time π/4DQPSK 2M\_DH5\_2441MHz



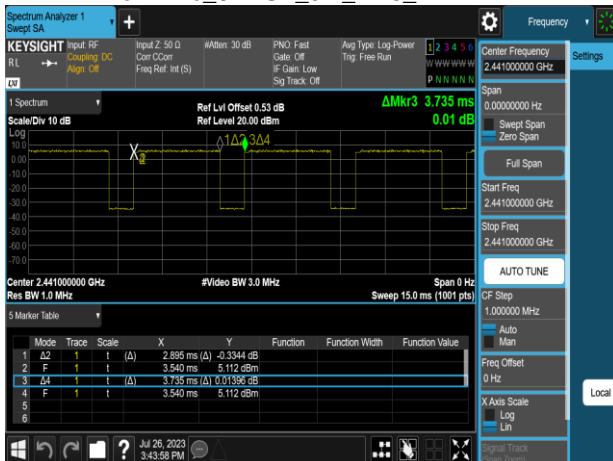
Dwell Time\_8DPSK\_3M\_DH1\_2441MHz



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

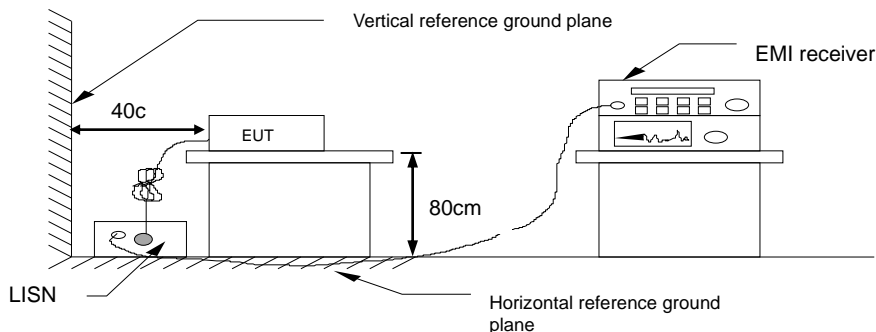
\* Decreases with the logarithm of the frequency.

#### 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

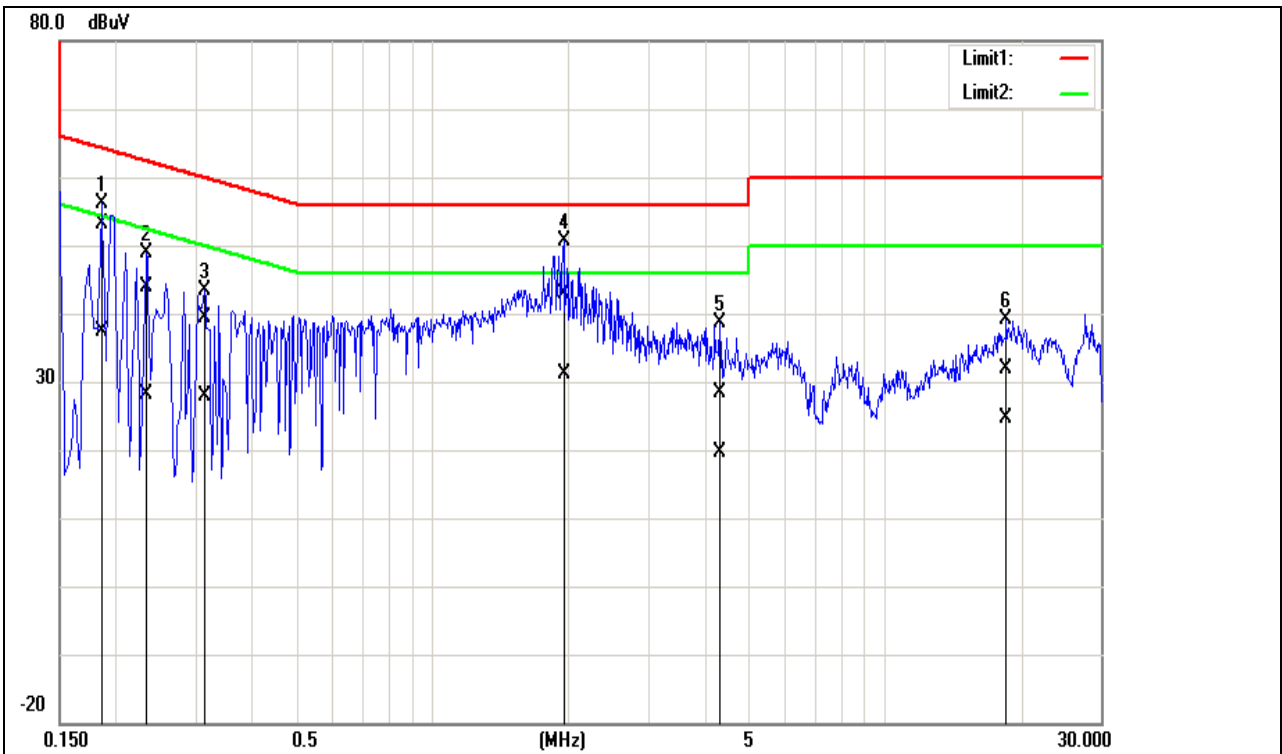


#### 4.1.4 Test Result

**PASS**

## Test Data

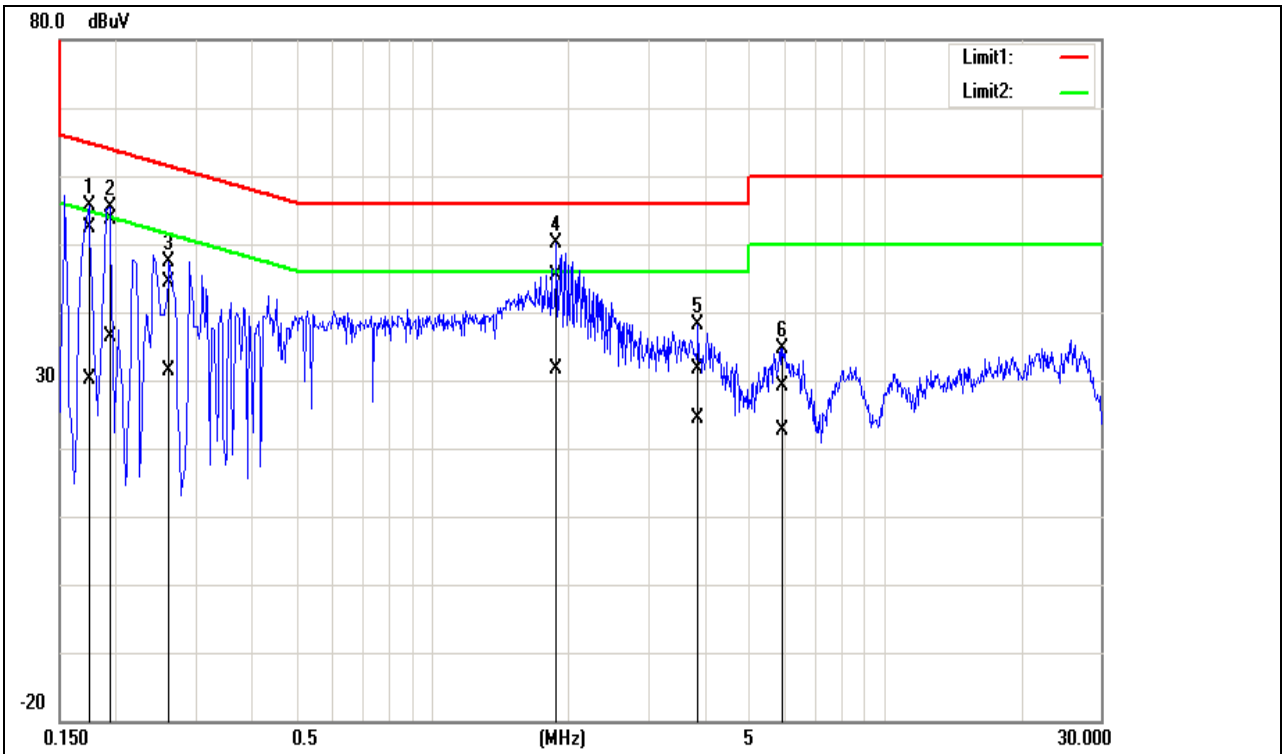
<b>Job No.:</b>	TMWK2307002434KR	<b>Date:</b>	2023/8/24
<b>Company:</b>	Toshiba Tec Corporation	<b>Time:</b>	PM 06:09:55
<b>Standard:</b>	NCC/FCC/IC QP	<b>Temp.(°C)/Hum.(%):</b>	25.5(°C)/53%
<b>Test item:</b>	Conduction test	<b>Test By:</b>	Tony Chao
<b>Line:</b>	L1	<b>Test Voltage:</b>	AC 120V/60Hz
<b>Model:</b>			
<b>Description:</b>			



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1*	0.1860	52.90	37.16	0.15	53.05	37.31	64.21	54.21	-11.16	-16.90	Pass
2	0.2340	43.80	27.86	0.15	43.95	28.01	62.31	52.31	-18.36	-24.30	Pass
3	0.3140	39.35	27.64	0.15	39.50	27.79	59.86	49.86	-20.36	-22.07	Pass
4	1.9540	42.73	30.91	0.22	42.95	31.13	56.00	46.00	-13.05	-14.87	Pass
5	4.3260	28.17	19.33	0.26	28.43	19.59	56.00	46.00	-27.57	-26.41	Pass
6	18.5260	31.46	24.17	0.49	31.95	24.66	60.00	50.00	-28.05	-25.34	Pass

**Note:** 1. Correction factor = LISN loss + Cable loss.

<b>Job No.:</b>	TMWK2307002434KR	<b>Date:</b>	2023/8/24
<b>Company:</b>	Toshiba Tec Corporation	<b>Time:</b>	PM 06:03:12
<b>Standard:</b>	NCC/FCC/IC QP	<b>Temp.(°C)/Hum.(%):</b>	25.5(°C)/53%
<b>Test item:</b>	Conduction test	<b>Test By:</b>	Tony Chao
<b>Line:</b>	N	<b>Test Voltage:</b>	AC 120V/60Hz
<b>Model:</b>			
<b>Description:</b>			



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1740	52.29	30.03	0.19	52.48	30.22	64.77	54.77	-12.29	-24.55	Pass
2*	0.1940	53.35	36.28	0.19	53.54	36.47	63.86	53.86	-10.32	-17.39	Pass
3	0.2620	44.11	31.15	0.19	44.30	31.34	61.37	51.37	-17.07	-20.03	Pass
4	1.8820	45.05	31.48	0.26	45.31	31.74	56.00	46.00	-10.69	-14.26	Pass
5	3.8700	31.35	24.18	0.31	31.66	24.49	56.00	46.00	-24.34	-21.51	Pass
6	5.9380	28.89	22.28	0.34	29.23	22.62	60.00	50.00	-30.77	-27.38	Pass

**Note:** 1. Correction factor = LISN loss + Cable loss.

## 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.

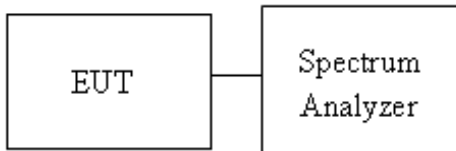
**Occupied Bandwidth(99%)** : For reporting purposes only.

### 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: 26.2°C

Test date: July 26, 2023

Humidity: 55% RH

Tested by: Allen Shen

##### GFSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	0.9632	0.64
Mid	0.9640	0.64
High	0.9627	0.64

##### $\pi/4$ -DQPSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.279	0.85
Mid	1.279	0.85
High	1.279	0.85

##### 8-DPSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.298	0.87
Mid	1.299	0.87
High	1.299	0.87

**GFSK**

<b>CH</b>	<b>99% BW (MHz)</b>
Low	0.86985
Mid	0.87648
High	0.87058

**$\pi/4$ -DQPSK**

<b>CH</b>	<b>99% BW (MHz)</b>
Low	1.1559
Mid	1.1559
High	1.1559

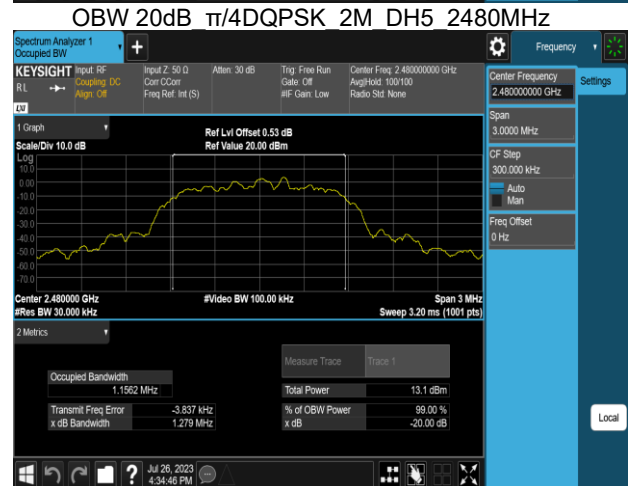
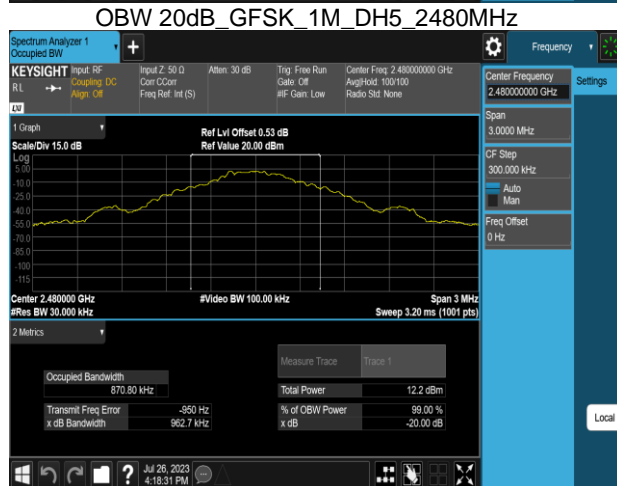
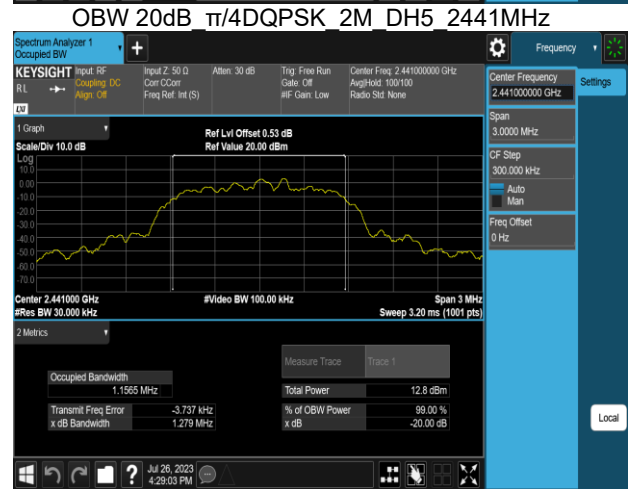
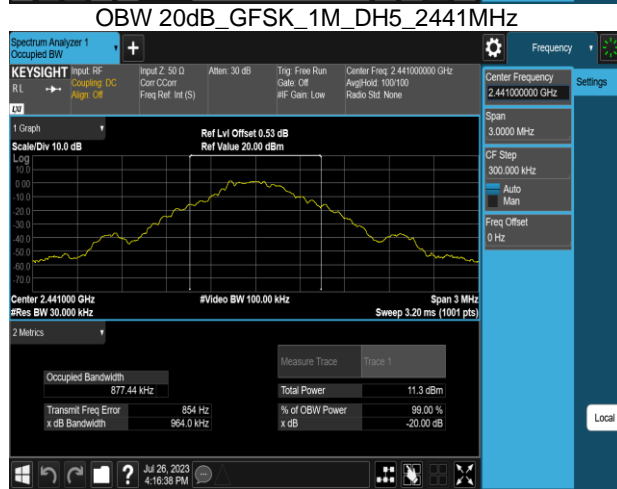
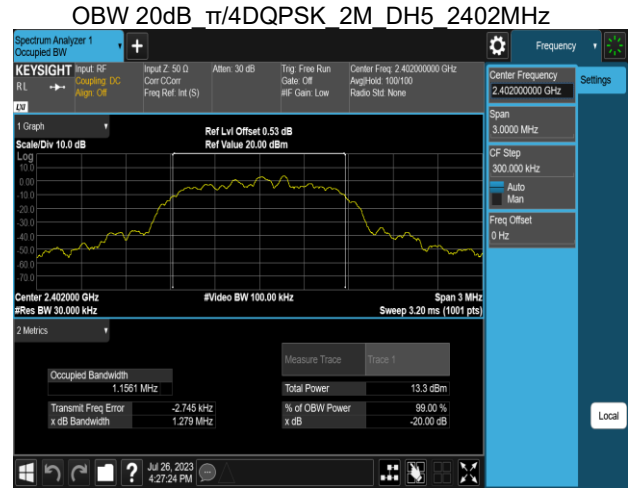
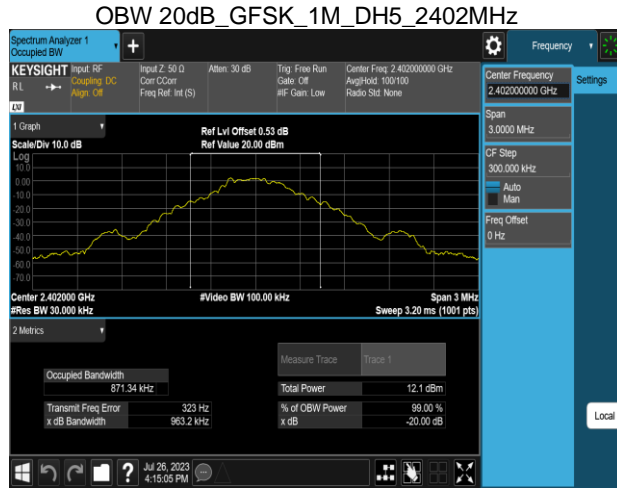
**8-DPSK**

<b>CH</b>	<b>99% BW (MHz)</b>
Low	1.1626
Mid	1.1625
High	1.1620

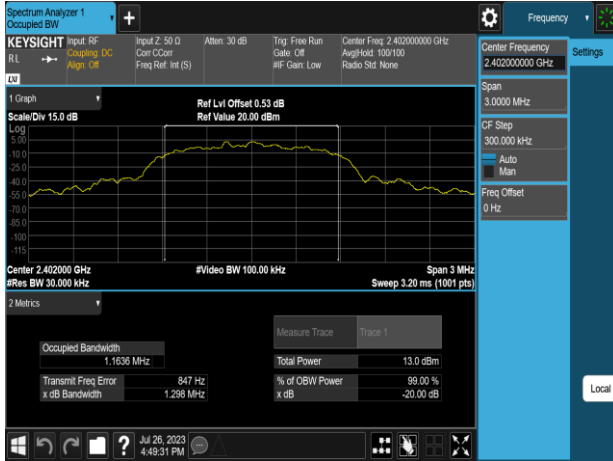
Report No.: TMWK2307002434KR

## Test Data

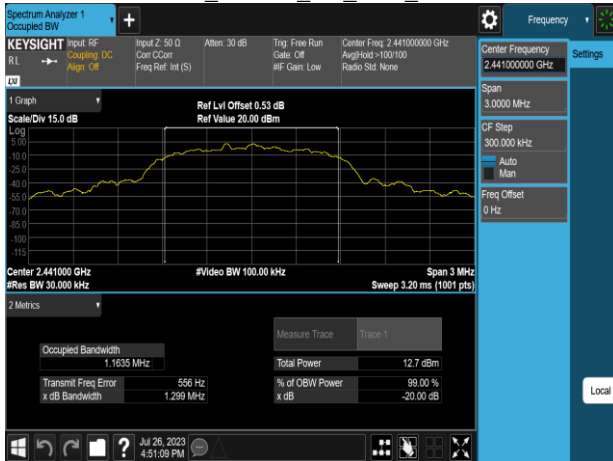
### 20dB BANDWIDTH



OBW 20dB\_8DPSK\_3M\_DH5\_2402MHz



OBW 20dB\_8DPSK\_3M\_DH5\_2441MHz



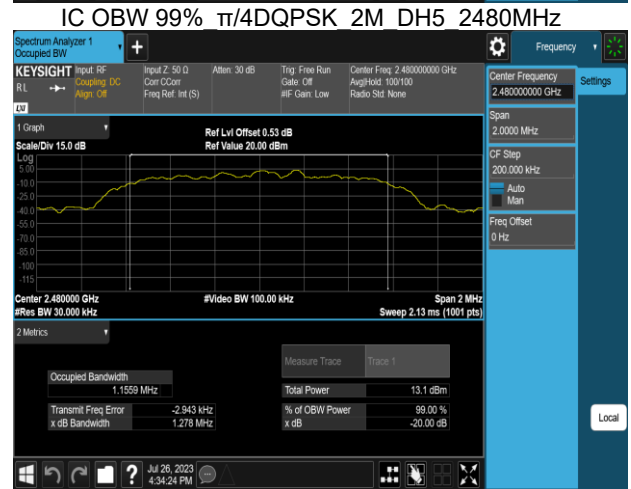
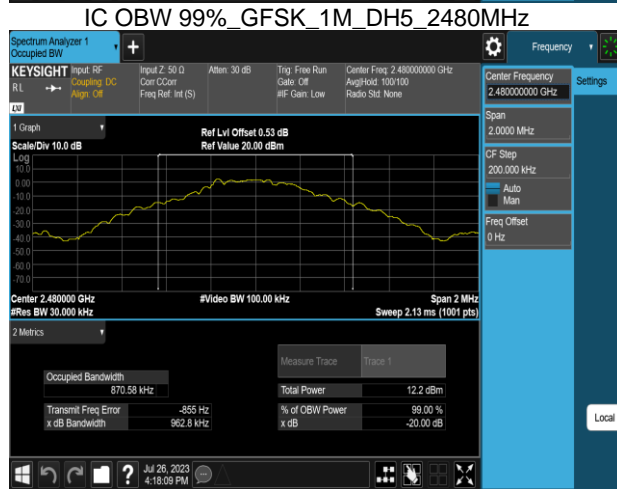
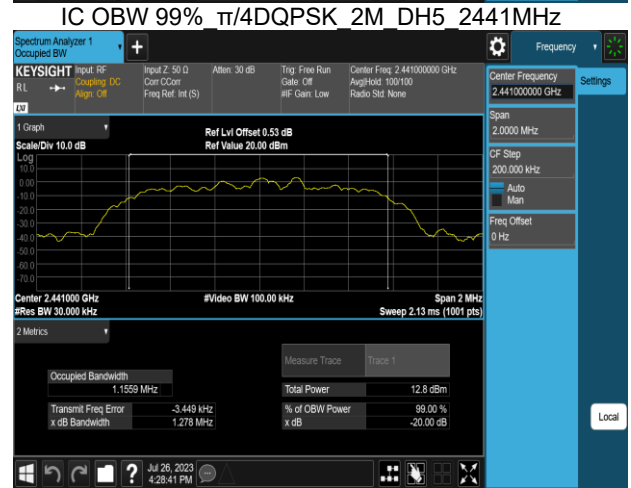
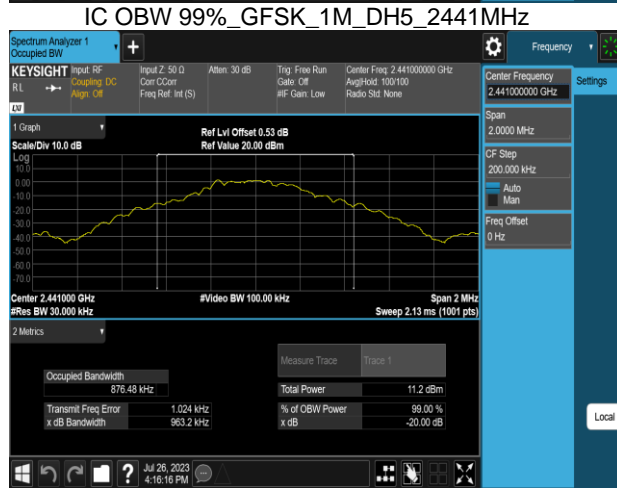
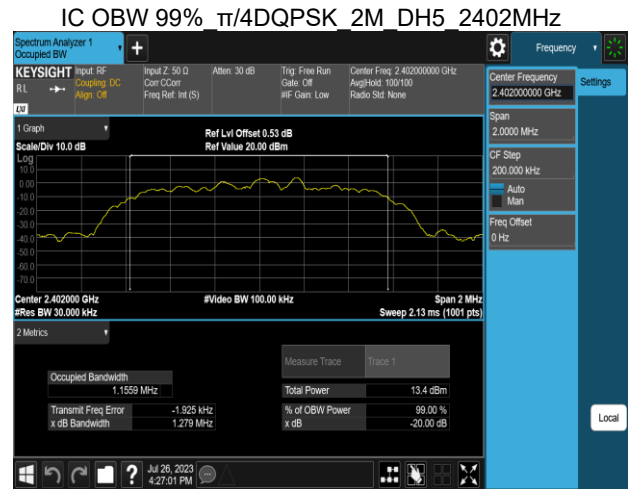
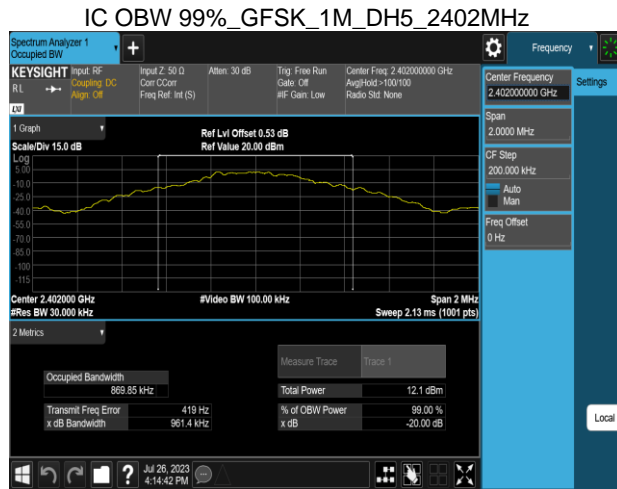
OBW 20dB\_8DPSK\_3M\_DH5\_2480MHz



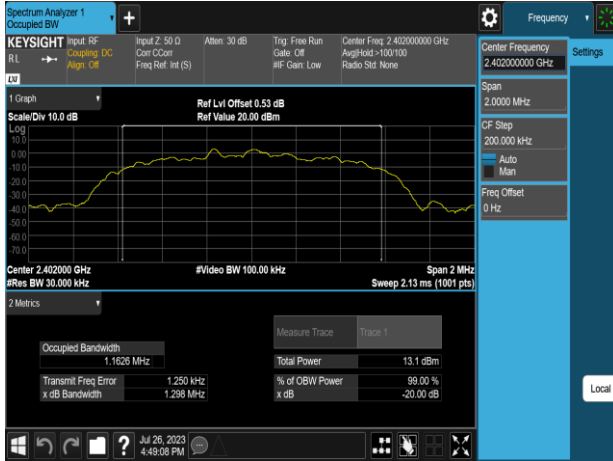


## Test Data

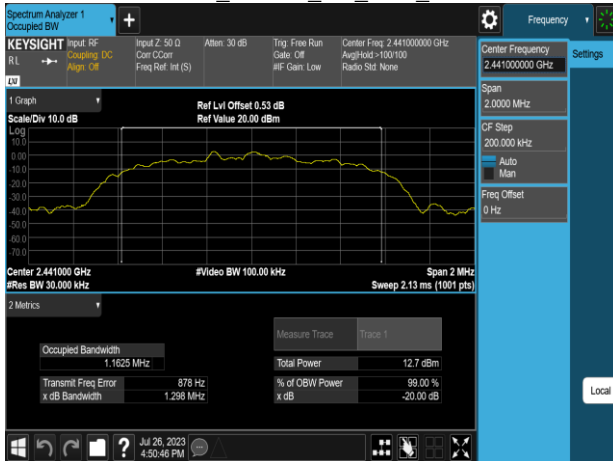
### BANDWIDTH 99



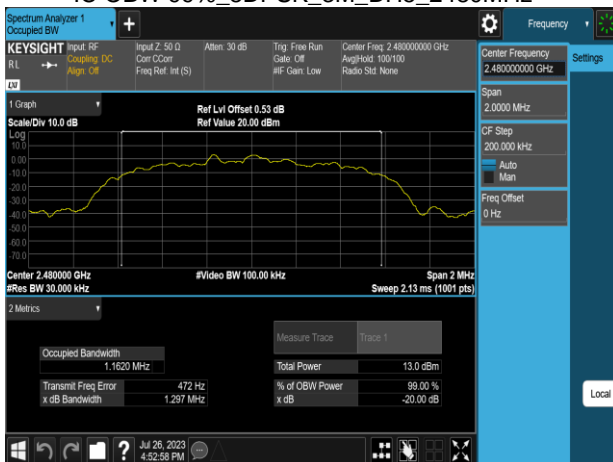
IC OBW 99% 8DPSK 3M\_DH5\_2402MHz



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**

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.

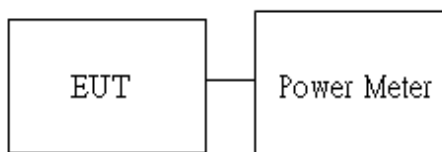
Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 21dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi : 21dBm [ Limit = 30 – (DG – 6)]
-------	--

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

### 4.3.2 Test Procedure

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

### 4.3.3 Test Setup



### 4.3.4 Test Result

Temperature: 26.2°C

Test date: July 26, 2023

Humidity: 55% RH

Tested by: Allen Shen

#### Peak & Average output power :

1M BR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	<b>4.89</b>	3.083	1000
Mid	2441	default	3.87	2.438	1000
High	2480	default	4.86	3.062	1000

1M BR mode (Average):

CH	Freq. (MHz)	Power set	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	4.85	3.052	1000
Mid	2441	default	3.86	2.430	1000
High	2480	default	4.83	3.038	1000

2M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	<b>7.31</b>	5.383	125
Mid	2441	default	6.94	4.943	125
High	2480	default	7.23	5.284	125

2M EDR mode (Average):

CH	Freq. (MHz)	Power set	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	5.00	3.163	125
Mid	2441	default	4.52	2.832	125
High	2480	default	4.86	3.063	125

3M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	<b>7.93</b>	6.209	125
Mid	2441	default	7.53	5.662	125
High	2480	default	7.85	6.095	125

3M EDR mode (Average):

CH	Freq. (MHz)	Power set	Avg. Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	default	5.01	3.167	125
Mid	2441	default	4.53	2.836	125
High	2480	default	4.87	3.066	125

*\*Note: Max. Output include tune up tolerance Power measured by using average detector.*

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

## 4.4 FREQUENCY SEPARATION

### 4.4.1 Test Limit

According to §15.247(a)(1)

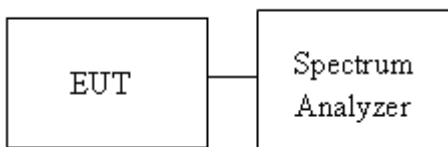
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

Limit	> two-thirds of the 20 dB bandwidth
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### 4.4.2 Test Procedure

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

### 4.4.3 Test Setup



### 4.4.4 Test Result

**Temperature:** 26.2°C

**Test date:** July 26, 2023

**Humidity:** 55% RH

**Tested by:** Allen Shen

## Test Data

GFSK\_1M\_DH5\_CH0CH1CH2



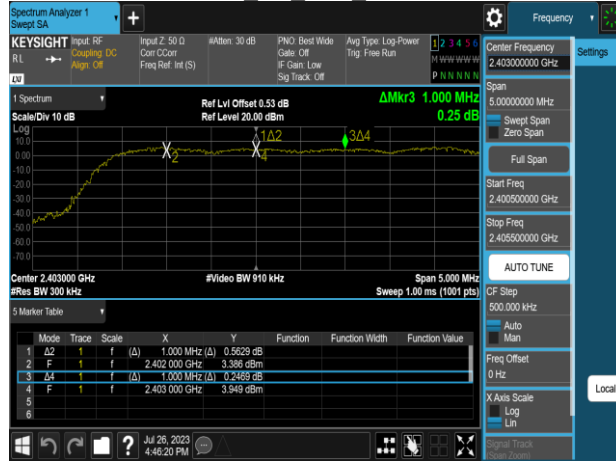
GFSK\_1M\_DH5\_CH38CH39CH40



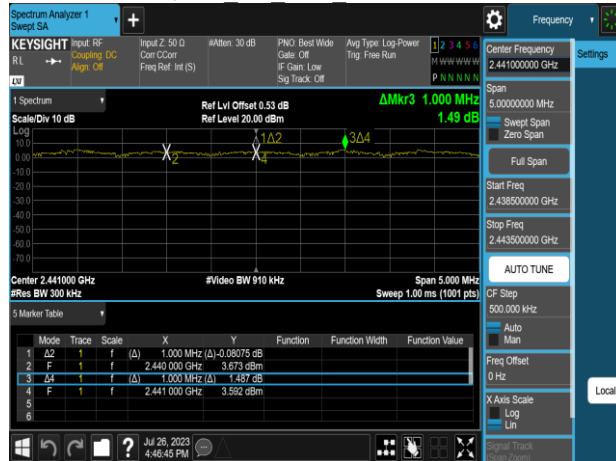
GFSK\_1M\_DH5\_CH76CH77CH78



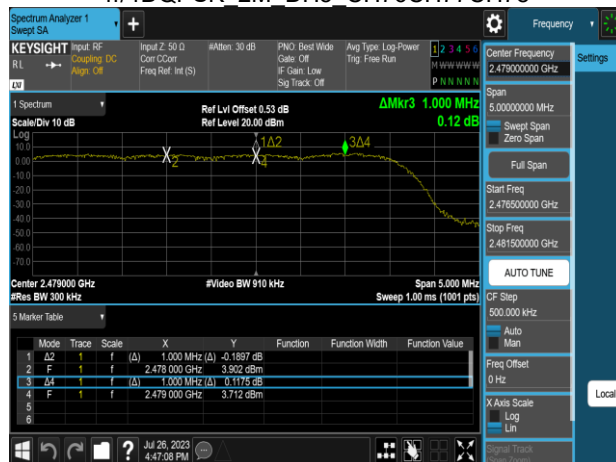
$\pi/4$ DQPSK 2M DH5 CH0CH1CH2



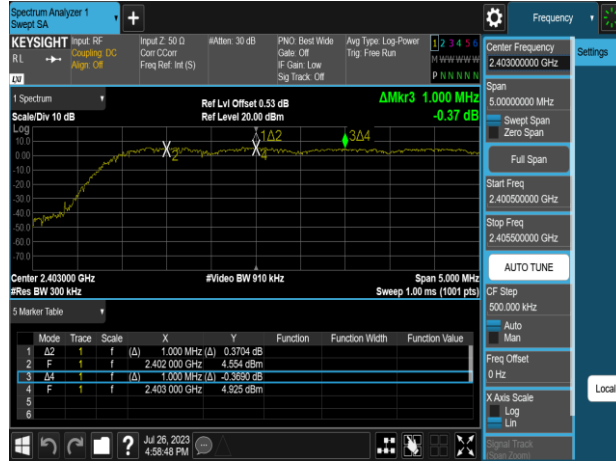
$\pi/4$ DQPSK 2M DH5 CH38CH39CH40



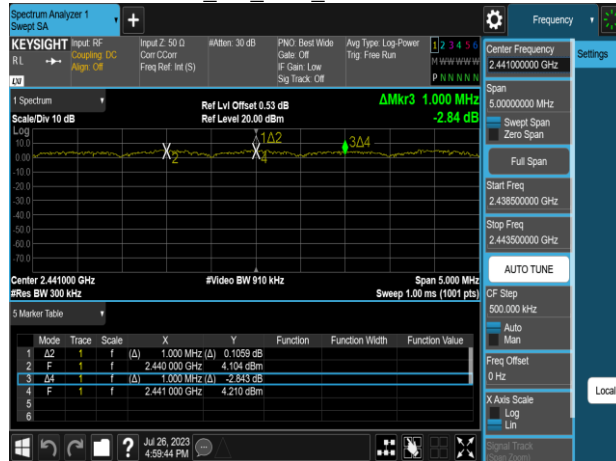
$\pi/4$ DQPSK 2M DH5 CH76CH77CH78



### 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)

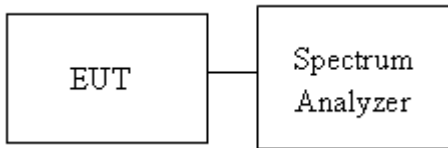
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 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. = 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: 26.2°C

Test date: July 26, 2023

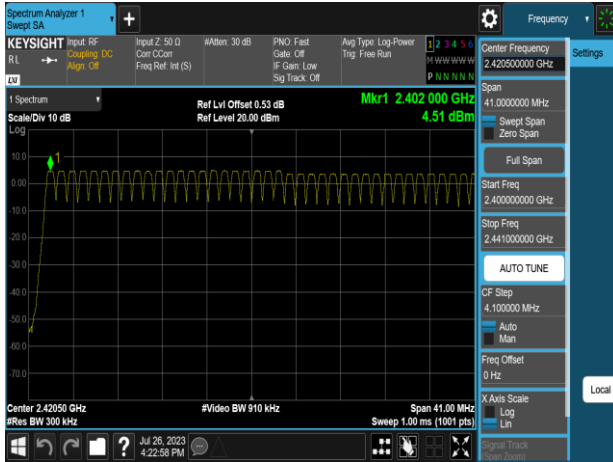
Humidity: 55% RH

Tested by: Allen Shen

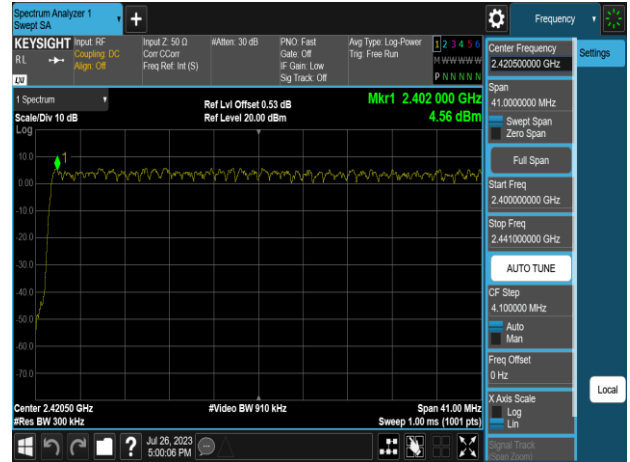
Number of Hopping				
Mode	Frequency (MHz)	Hopping Channel Number	Hopping Channel Number Limits	Result
BDR-1Mbps	2402-2480	79	15	Pass
EDR-3Mbps	2402-2480	79	15	

## Test Data

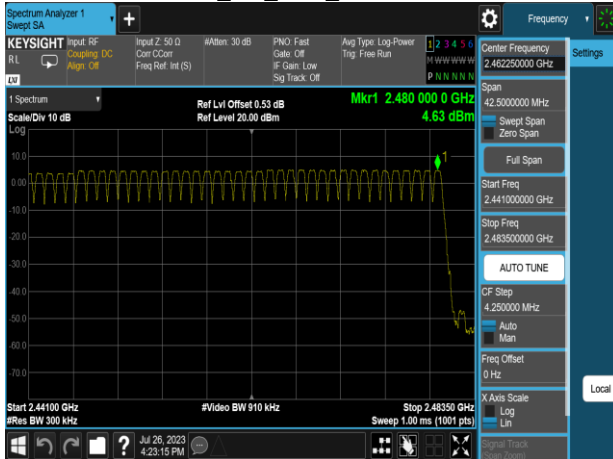
GFSK\_1M\_DH5\_2400-2441



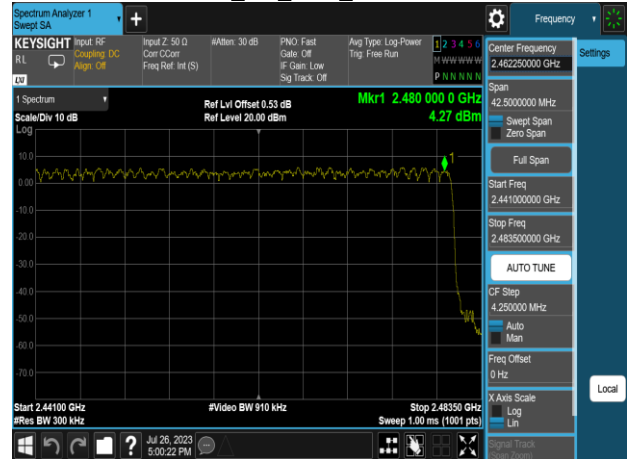
8DPSK\_3M\_DH5\_2400-2441



GFSK\_1M\_DH5\_2441-2480



8DPSK\_3M\_DH5\_2441-2480



## 4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

### 4.6.1 Test Limit

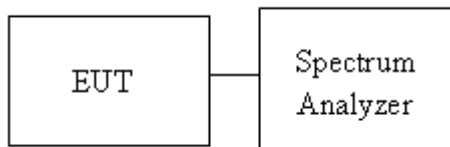
According to §15.247(d)

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:** 26.2°C

**Test date:** July 26, 2023

**Humidity:** 55% RH

**Tested by:** Allen Shen

## Test Data

Band Edge\_GFSK\_1M\_DH5\_2402MHz



Band Edge\_8DPSK\_3M\_DH5\_2480MHz



Band Edge\_GFSK\_1M\_DH5\_2480MHz



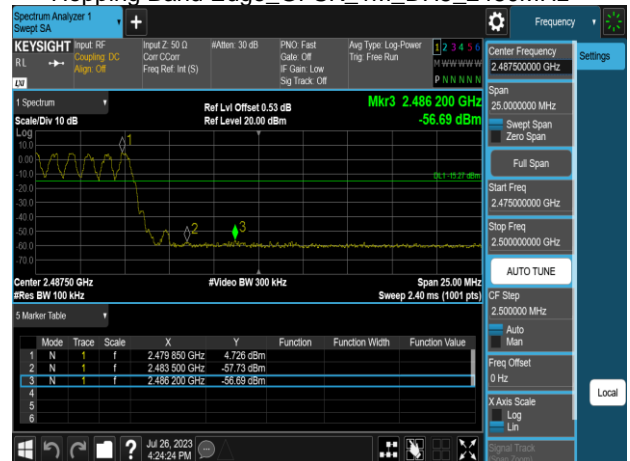
Hopping Band Edge\_GFSK\_1M\_DH5\_2402MHz



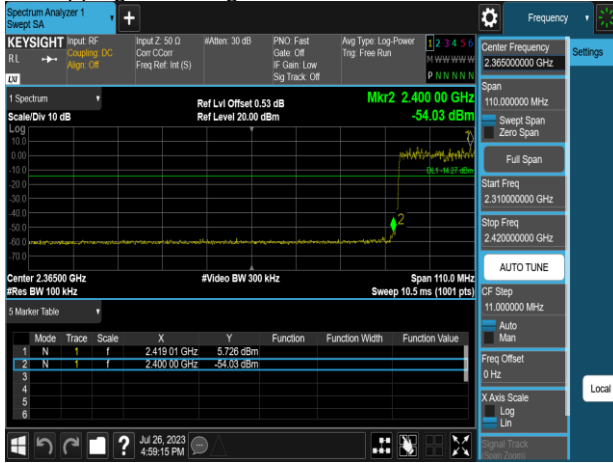
Band Edge\_8DPSK\_3M\_DH5\_2402MHz



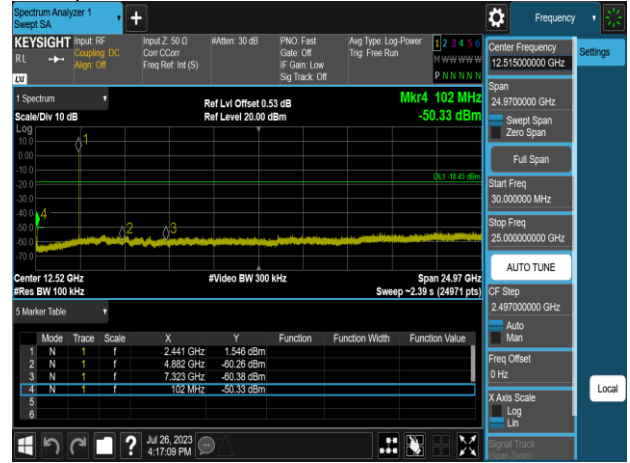
Hopping Band Edge\_GFSK\_1M\_DH5\_2480MHz



Hopping Band Edge\_8DPSK\_3M\_DH5\_2402MHz



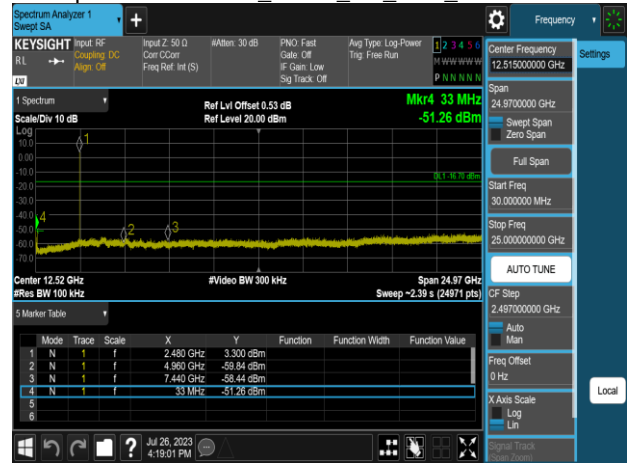
Spurious Emission\_GFSK\_1M\_DH5\_2441MHz



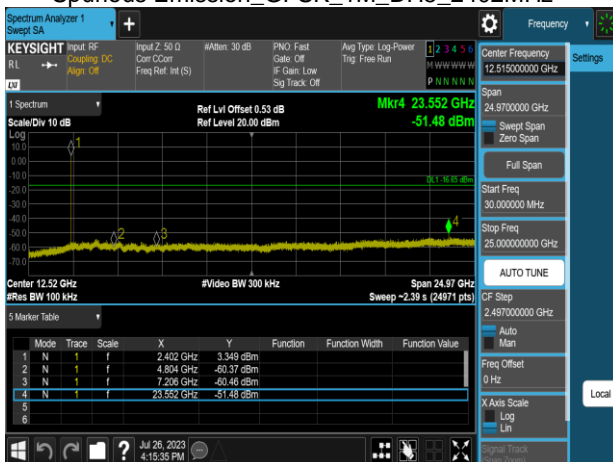
Hopping Band Edge\_8DPSK\_3M\_DH5\_2480MHz



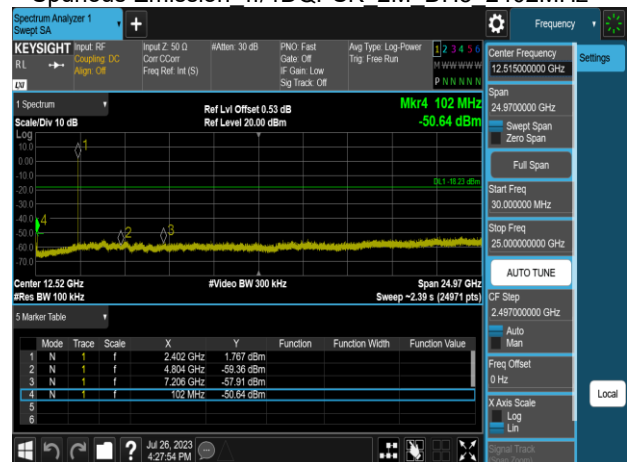
Spurious Emission\_GFSK\_1M\_DH5\_2480MHz



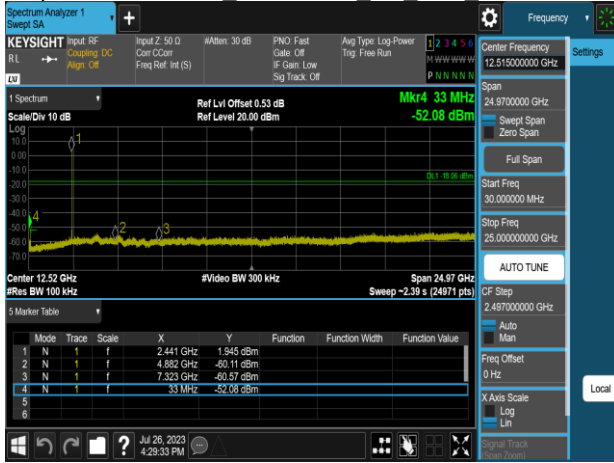
Spurious Emission\_GFSK\_1M\_DH5\_2402MHz



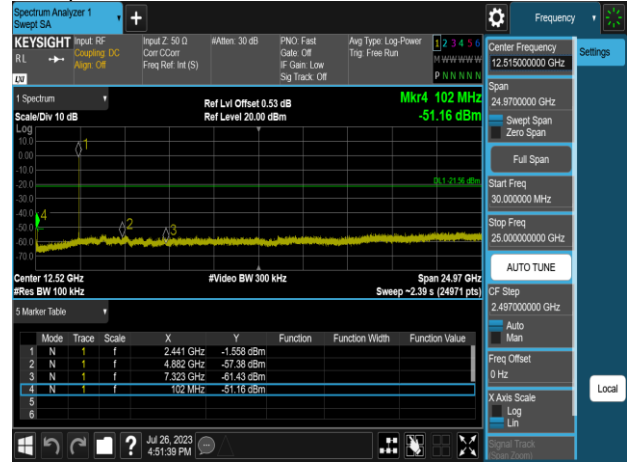
Spurious Emission\_pi/4DQPSK\_2M\_DH5\_2402MHz



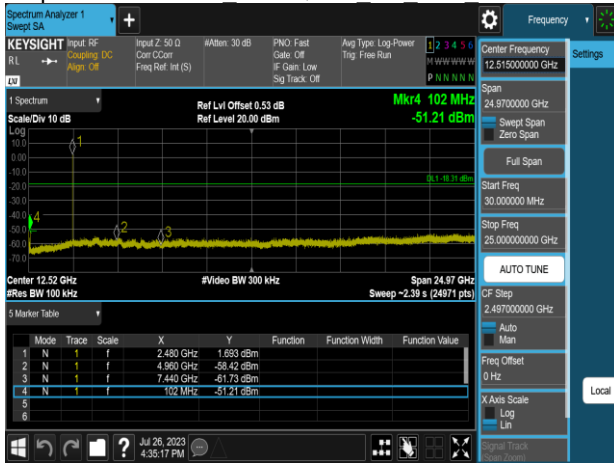
Spurious Emission  $\pi$ /4DQPSK 2M DH5 2441MHz



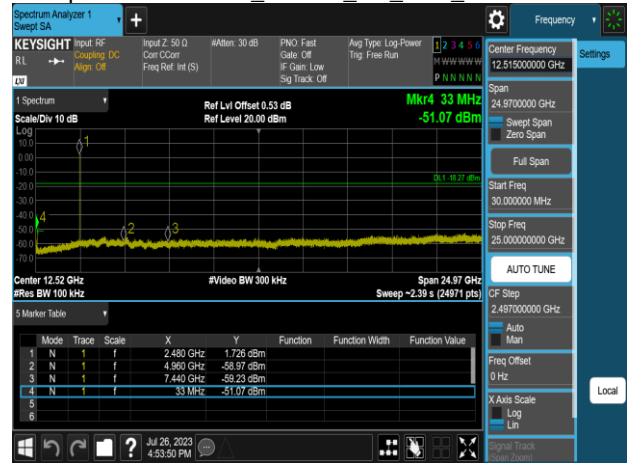
Spurious Emission 8DPSK 3M DH5 2441MHz



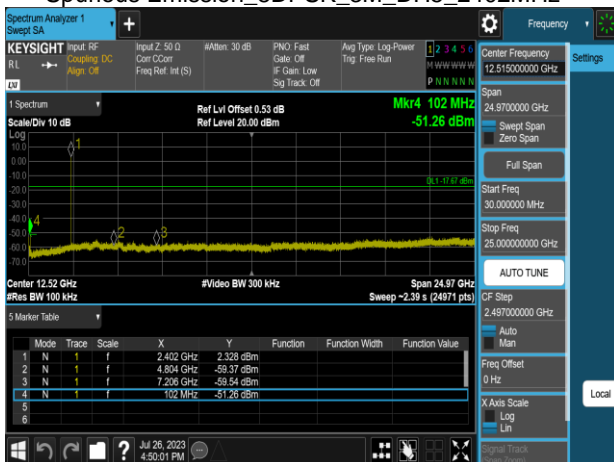
Spurious Emission  $\pi$ /4DQPSK 2M DH5 2480MHz



Spurious Emission 8DPSK 3M DH5 2480MHz



Spurious Emission 8DPSK 3M DH5 2402MHz



## 4.7 TIME OF OCCUPANCY (DWELL TIME)

### 4.7.1 Test Limit

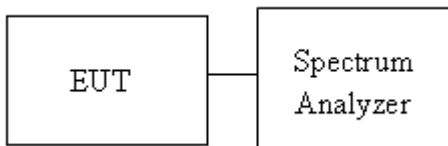
According to §15.247(a)(1)(iii)

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



### 4.7.4 Test Result

**Temperature:** 26.2°C

**Test date:** July 26, 2023

**Humidity:** 55% RH

**Tested by:** Allen Shen

**GFSK (1Mbps)**

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)
Mid	DH1	121.60	400
	DH3	260.80	400
	DH5	308.80	400

**$\pi/4$  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	123.20	400
	3DH3	262.40	400
	3DH5	308.80	400



**GFSK (1Mbps):**

CH Mid	DH1 time slot	=	0.380	*	(1600/2/79)	*	31.6	=	121.60	(ms)
	DH3 time slot	=	1.630	*	(1600/4/79)	*	31.6	=	260.80	(ms)
	DH5 time slot	=	2.895	*	(1600/6/79)	*	31.6	=	308.80	(ms)

**$\pi/4$  -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)

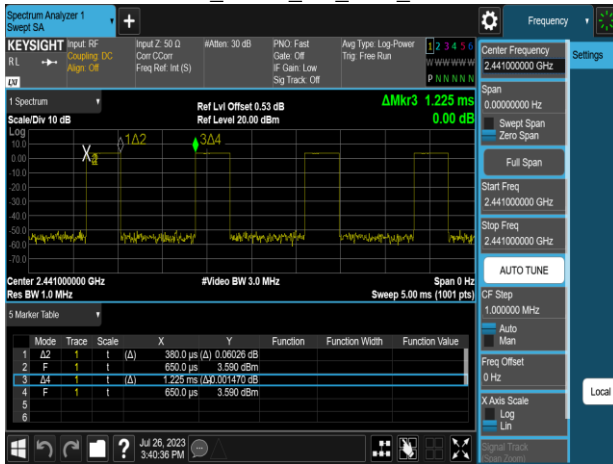
**8-DPSK (3Mbps):**

CH Mid	3DH1 time slot	=	0.385	*	(1600/2/79)	*	31.6	=	123.20	(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)

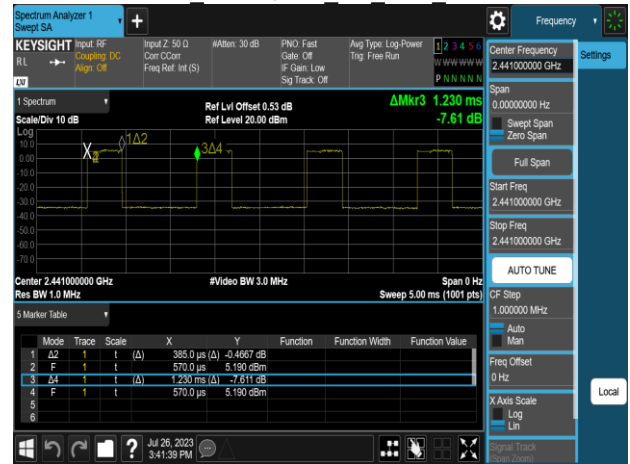
A period time = 0.4 (s) \* 79 = 31.6 (s)

## Test Data

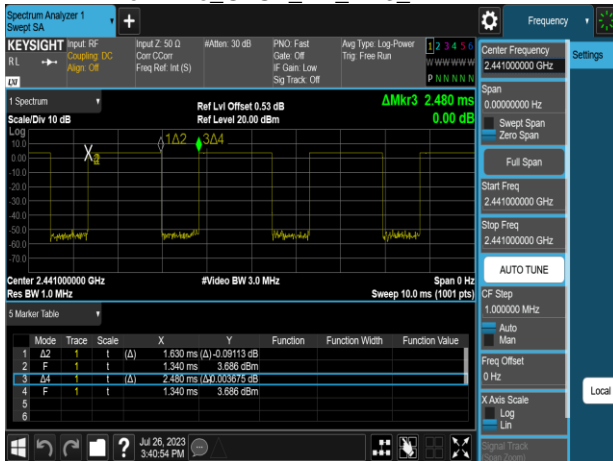
Dwell Time\_GFSK\_1M\_DH1\_2441MHz



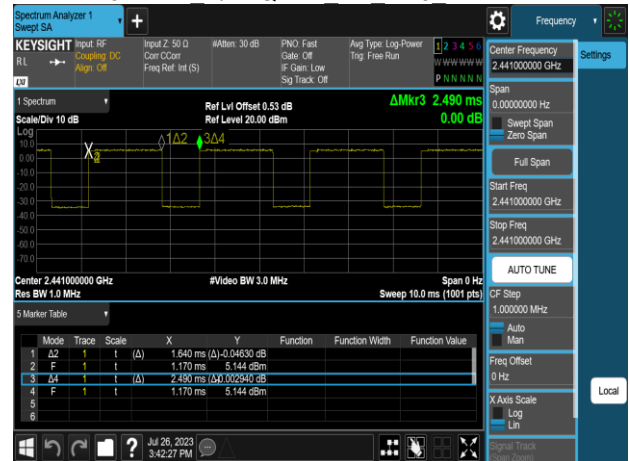
Dwell Time π/4DQPSK\_2M\_DH1\_2441MHz



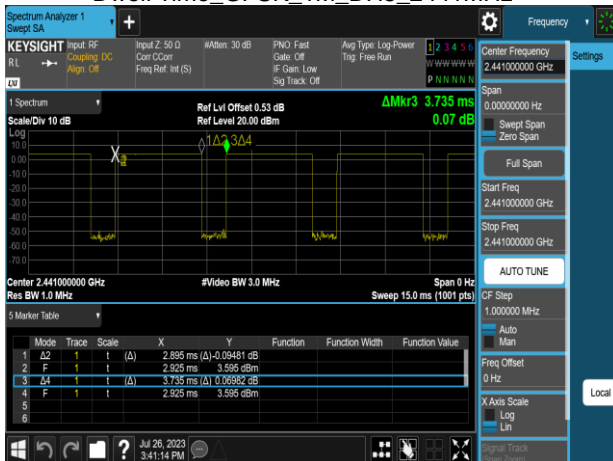
Dwell Time\_GFSK\_1M\_DH3\_2441MHz



Dwell Time π/4DQPSK\_2M\_DH3\_2441MHz



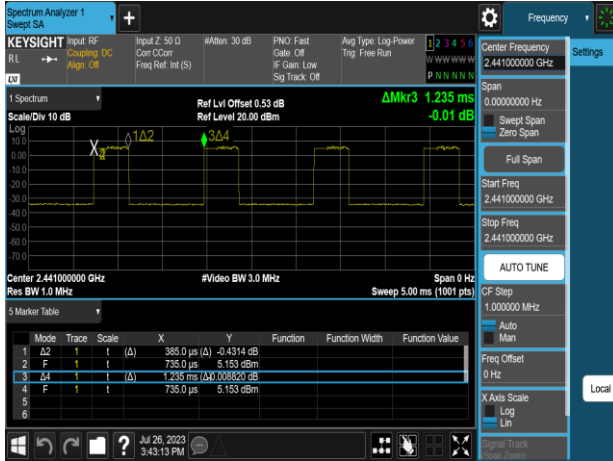
Dwell Time\_GFSK\_1M\_DH5\_2441MHz



Dwell Time π/4DQPSK\_2M\_DH5\_2441MHz



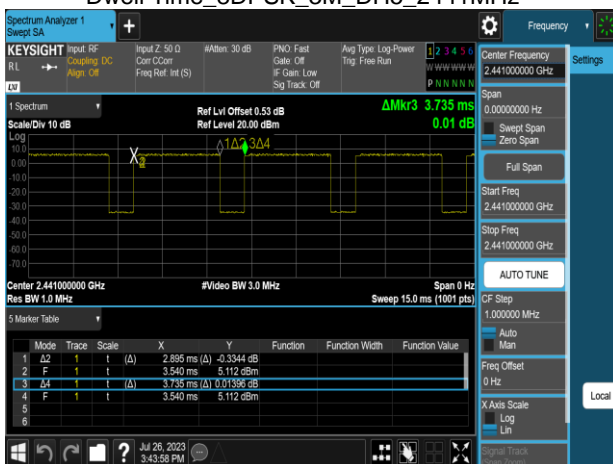
Dwell Time\_8DPSK\_3M\_DH1\_2441MHz



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  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
- (2) Above 1G :
  - (2.1) For Peak measurement : RBW = 1MHz, VBW  $\geq$  3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
  - (2.2) For Average measurement : RBW = 1MHz, VBW
    - If Duty Cycle  $\geq$  98%, VBW=10Hz.
    - If Duty Cycle < 98%, VBW $\geq$ 1/T.

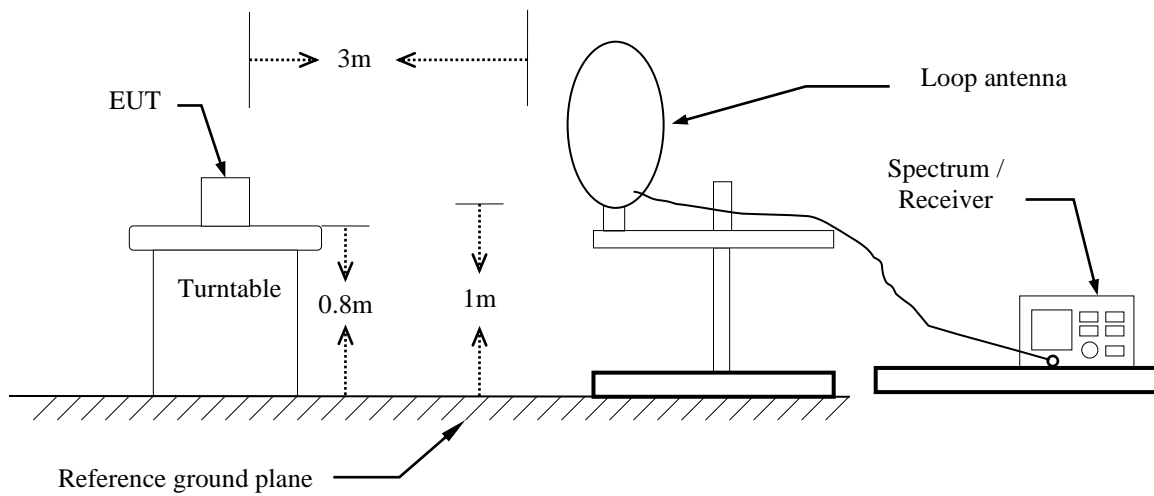
### 5. Data result

Actual FS=Spectrum Reading Level + Factor

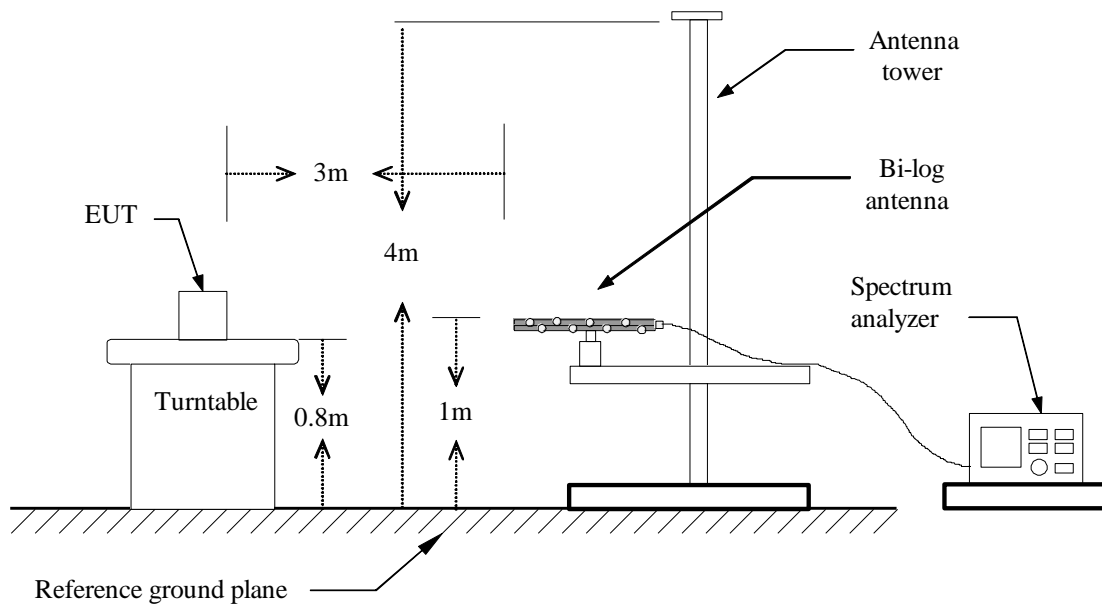
Margin=Actual FS- Limit

## 4.8.3 Test Setup

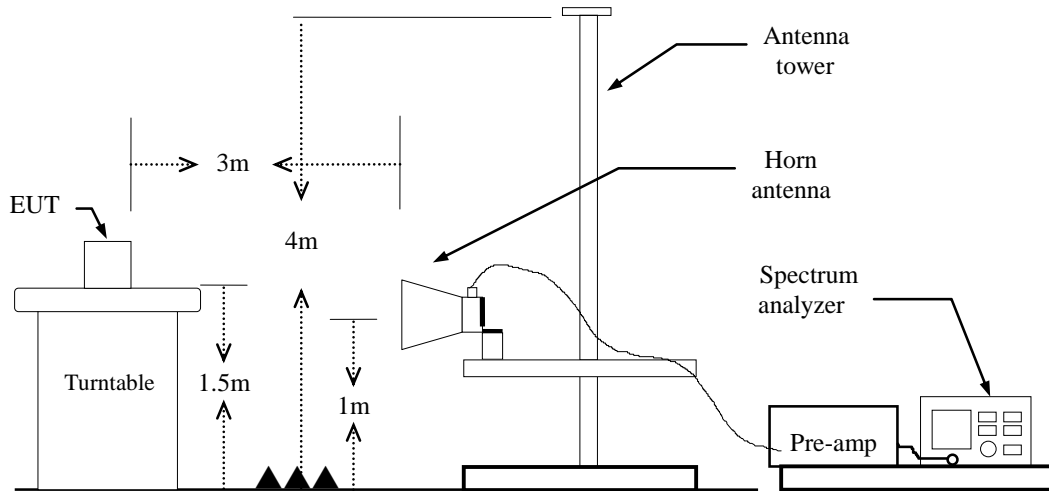
### 9kHz ~ 30MHz



### 30MHz ~ 1GHz



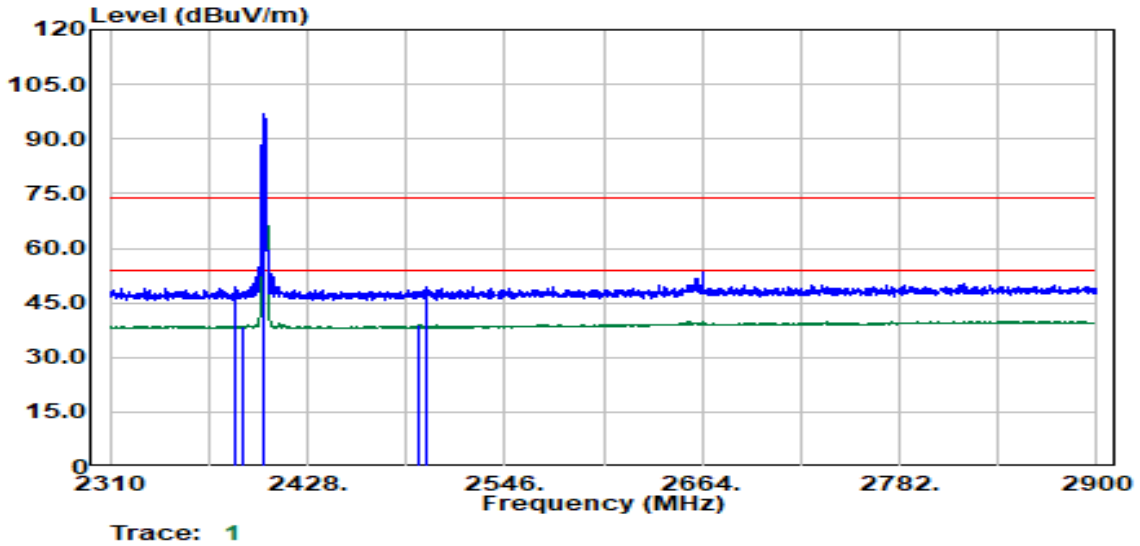
## Above 1 GHz



## 4.8.4 Test Result

### Band Edge Test Data

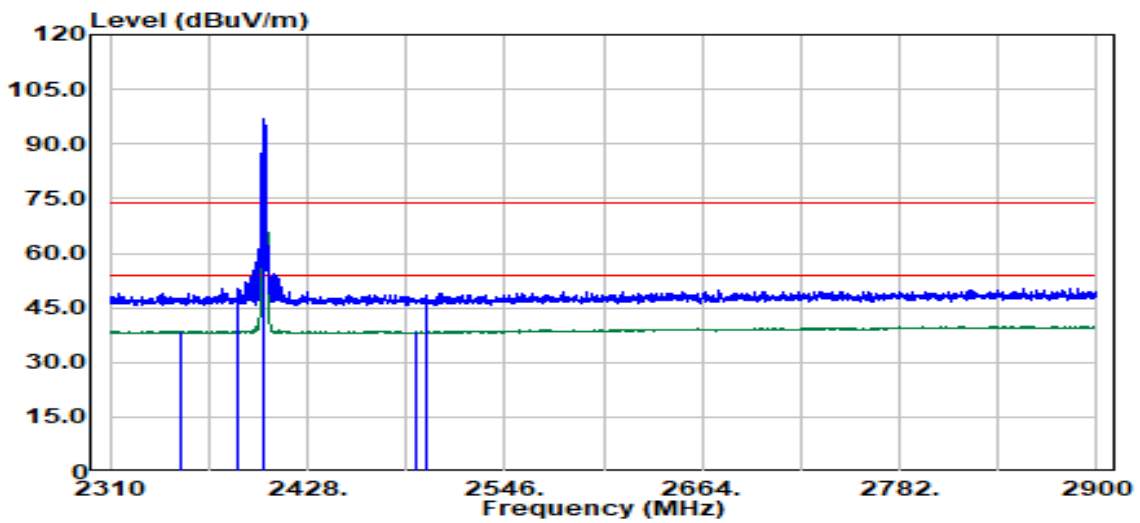
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2384.53	Peak	44.47	4.80	49.27	74.00	-24.73
2390.00	Average	33.78	4.80	38.59	54.00	-15.41
2402.00	Peak	93.02	4.51	97.53	--	--
2402.00	Average	92.87	4.51	97.38	--	--
2495.08	Average	34.41	4.60	39.01	54.00	-14.99
2499.58	Peak	44.58	4.65	49.22	74.00	-24.78



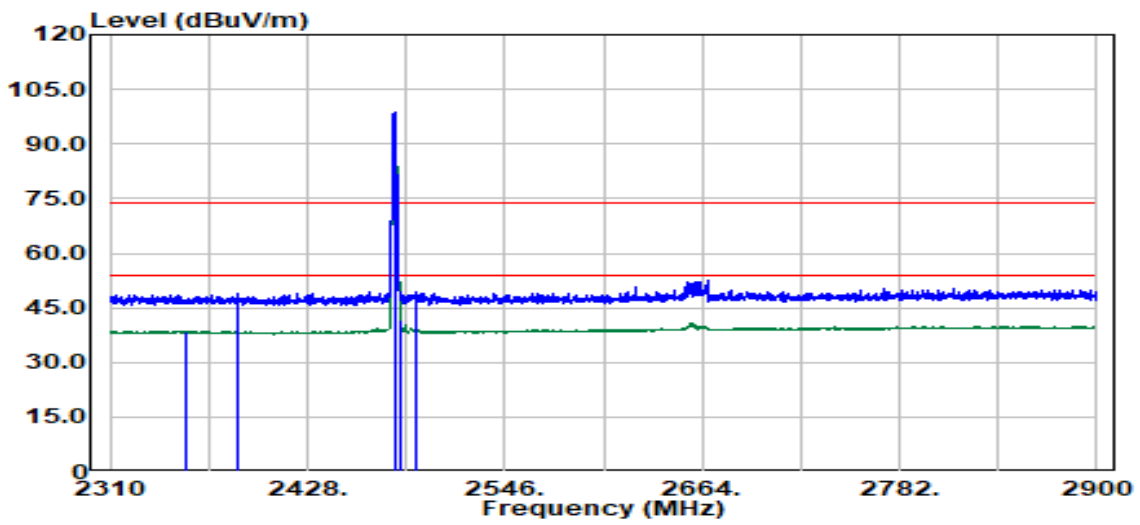
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Trace: 1

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2352.52	Average	33.68	4.86	38.54	54.00	-15.46
2386.28	Peak	45.54	4.80	50.34	74.00	-23.66
2402.00	Peak	92.27	4.51	96.78	--	--
2402.00	Average	91.08	4.51	95.59	--	--
2492.58	Average	33.77	4.57	38.34	54.00	-15.66
2499.58	Peak	43.65	4.65	48.30	74.00	-25.70

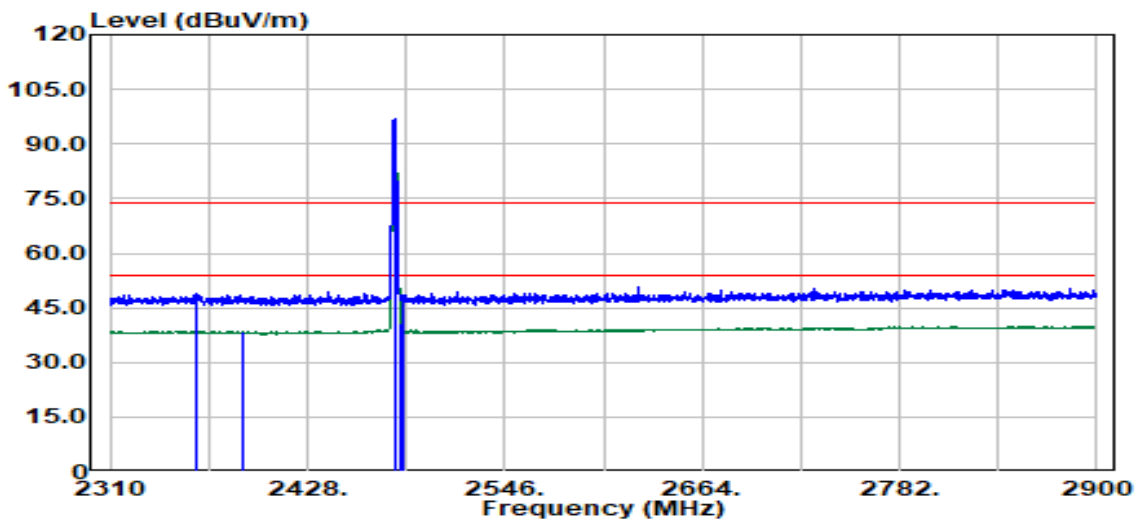
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Trace: 1

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2355.27	Average	33.85	4.83	38.68	54.00	-15.32
2386.28	Peak	44.07	4.80	48.87	74.00	-25.13
2480.00	Peak	93.97	4.65	98.61	--	--
2480.00	Average	93.84	4.65	98.49	--	--
2483.57	Average	37.25	4.61	41.86	54.00	-12.14
2493.08	Peak	44.60	4.58	49.17	74.00	-24.83

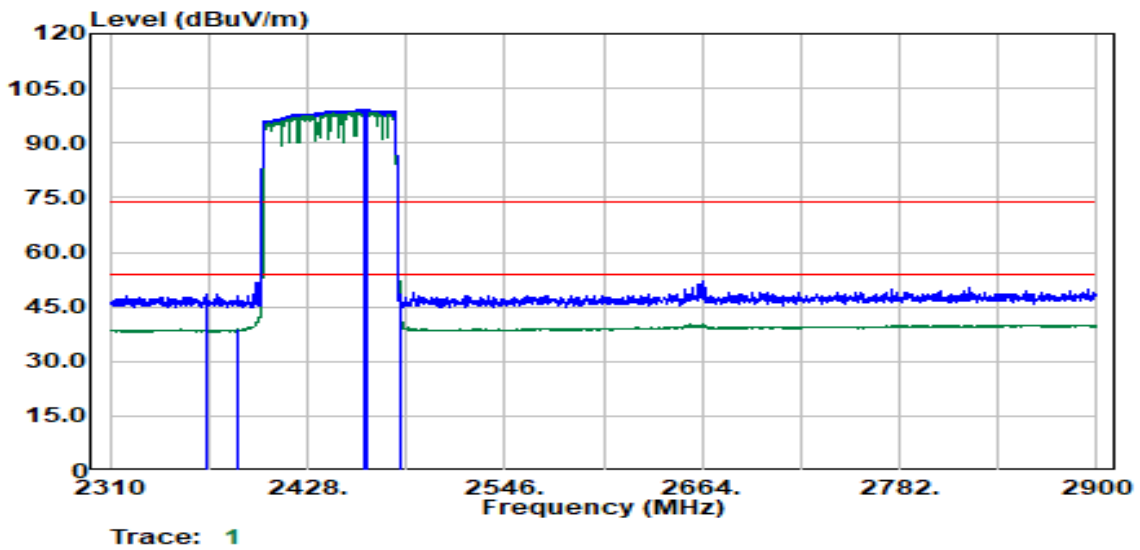
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Trace: 1

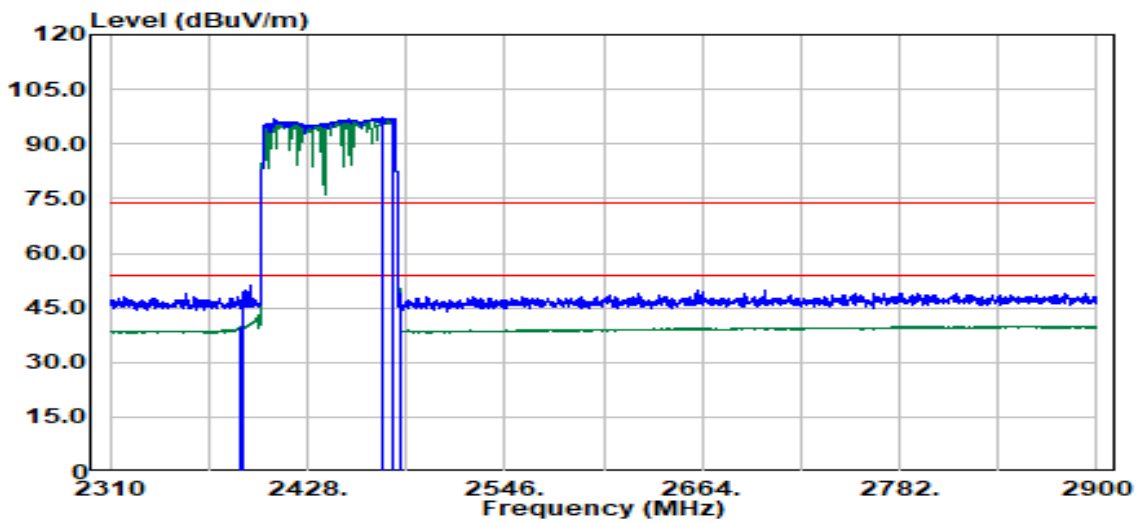
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2361.52	Peak	44.01	4.77	48.78	74.00	-25.22
2389.78	Average	33.72	4.80	38.52	54.00	-15.48
2480.00	Peak	92.20	4.65	96.85	--	--
2480.00	Average	92.07	4.65	96.71	--	--
2483.57	Average	36.20	4.61	40.81	54.00	-13.19
2485.32	Peak	43.81	4.59	48.40	74.00	-25.60

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402-2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Hopping	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



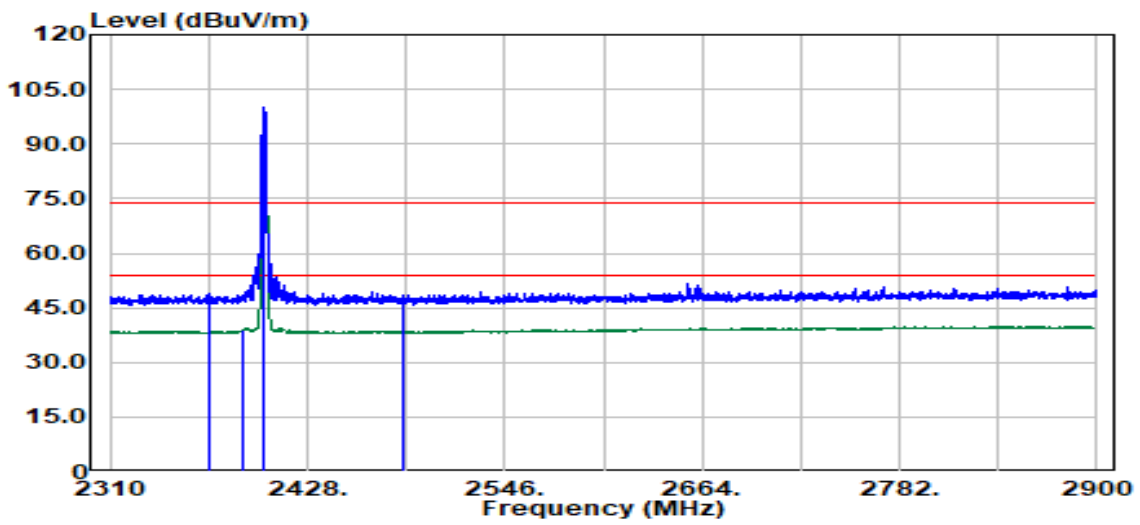
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBuV	Factor dB	Actual FS dBuV/m	Limit dBuV/m	Margin dB
2367.02	Peak	43.71	4.72	48.43	74.00	-25.57
2386.53	Average	34.05	4.80	38.86	54.00	-15.14
2461.31	Peak	94.37	4.66	99.02	--	--
2464.07	Average	94.24	4.68	98.93	--	--
2483.50	Peak	44.45	4.61	49.06	74.00	-24.94
2483.57	Average	37.08	4.61	41.69	54.00	-12.31

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402-2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Hopping	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



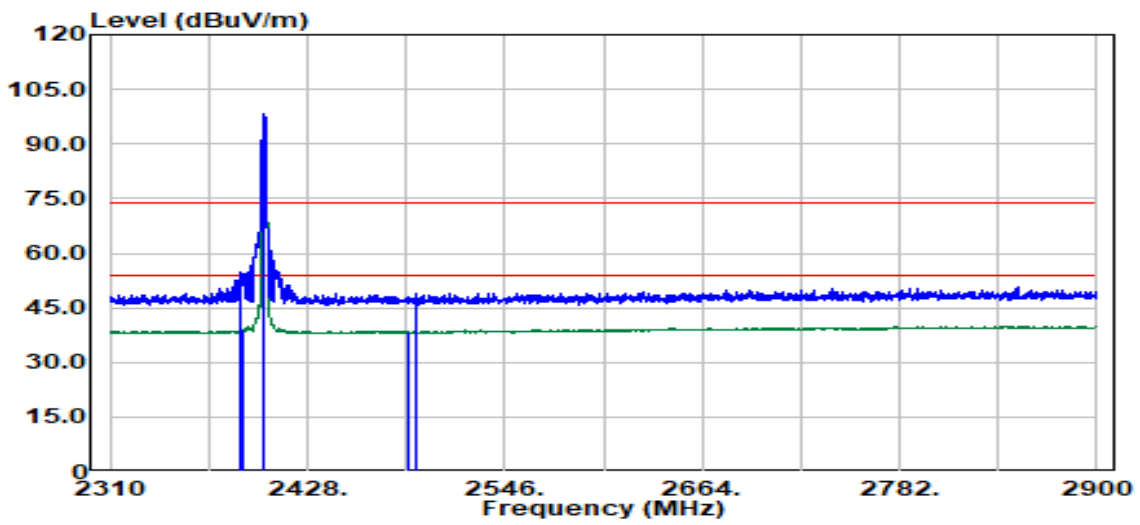
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2388.53	Average	34.95	4.80	39.75	54.00	-14.25
2389.53	Peak	44.71	4.80	49.52	74.00	-24.48
2473.07	Peak	92.50	4.71	97.21	--	--
2479.07	Average	92.24	4.66	96.90	--	--
2483.50	Peak	43.38	4.61	47.99	74.00	-26.01
2483.57	Average	36.08	4.61	40.70	54.00	-13.30

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2369.78	Peak	44.03	4.69	48.72	74.00	-25.28
2389.53	Average	34.36	4.80	39.16	54.00	-14.84
2402.00	Peak	95.35	4.51	99.86	--	--
2402.00	Average	92.04	4.51	96.55	--	--
2484.82	Peak	43.89	4.60	48.49	74.00	-25.51
2485.07	Average	34.00	4.60	38.60	54.00	-15.40

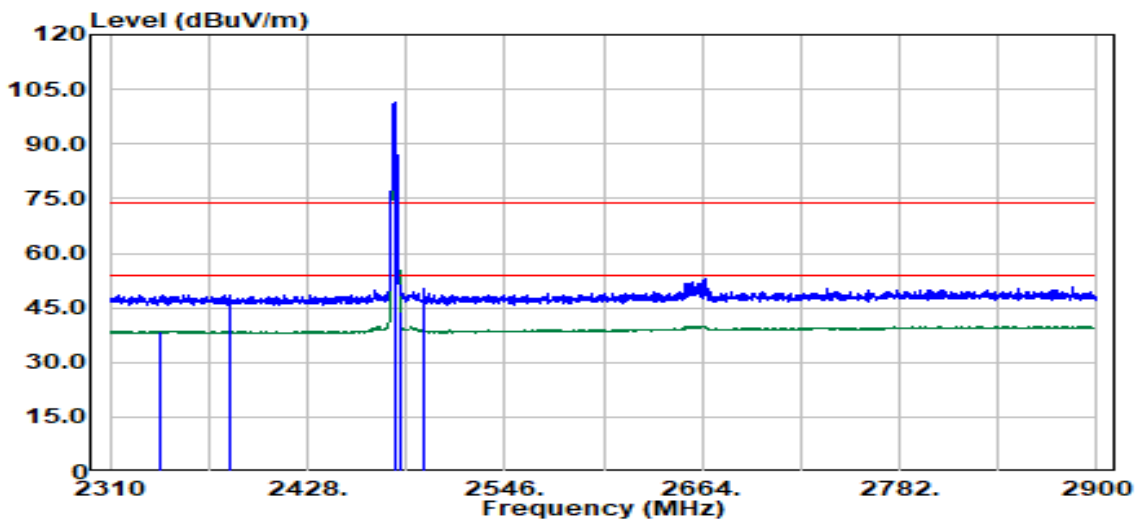
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Trace: 1

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2388.53	Peak	49.82	4.80	54.62	74.00	-19.38
2389.28	Average	34.09	4.80	38.89	54.00	-15.11
2402.00	Peak	93.88	4.51	98.39	--	--
2402.00	Average	90.47	4.51	94.98	--	--
2489.08	Average	33.91	4.56	38.46	54.00	-15.54
2492.58	Peak	44.33	4.57	48.90	74.00	-25.10

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



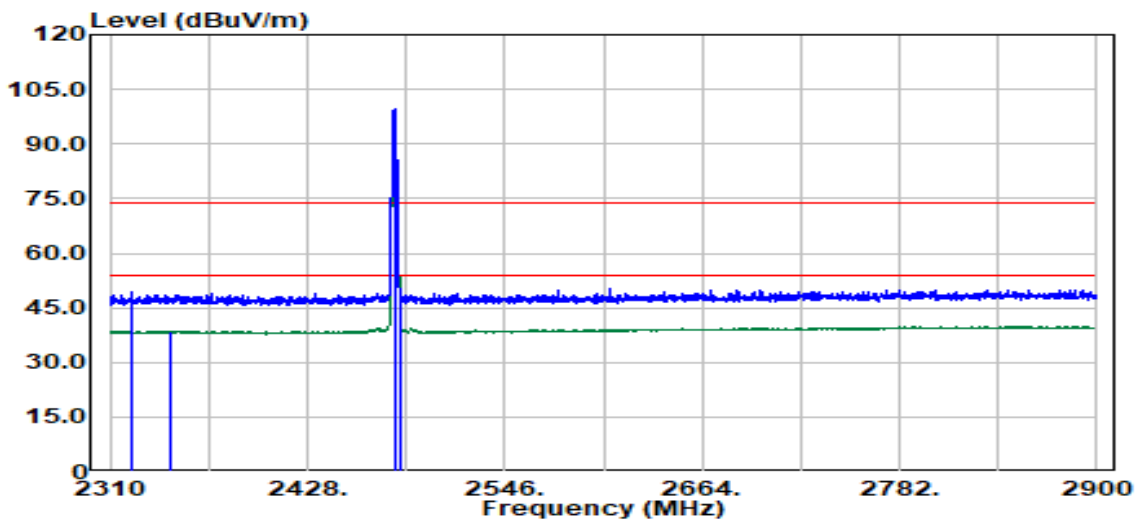
Trace: 1

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2339.26	Average	33.79	4.76	38.55	54.00	-15.45
2382.03	Peak	43.67	4.80	48.47	74.00	-25.53
2480.00	Peak	97.01	4.65	101.65	--	--
2480.00	Average	93.61	4.65	98.25	--	--
2483.57	Average	39.48	4.61	44.09	54.00	-9.91
2497.08	Peak	45.63	4.62	50.26	74.00	-23.74



Report No.: TMWK2307002434KR

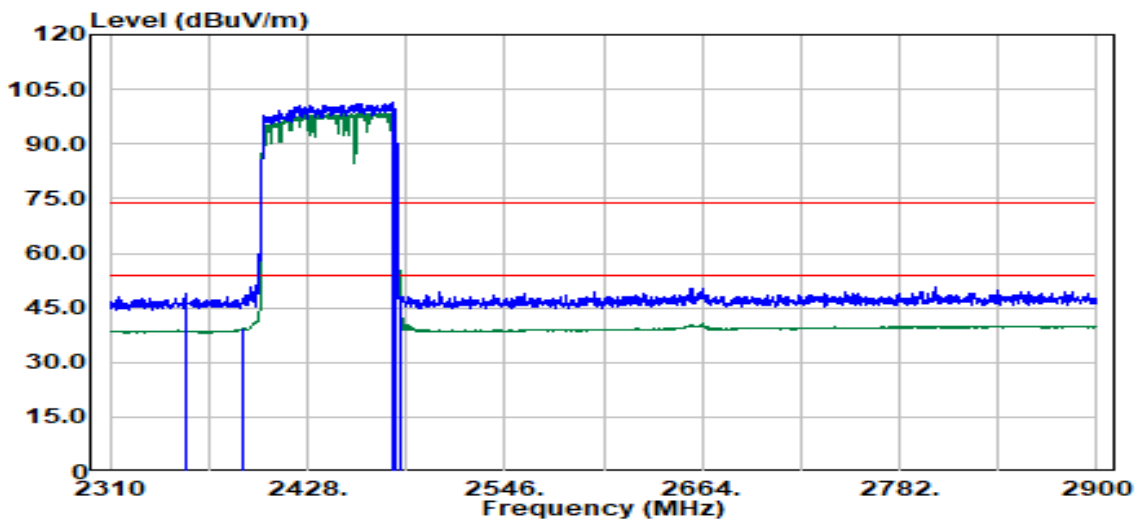
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Bandedge	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Trace: 1

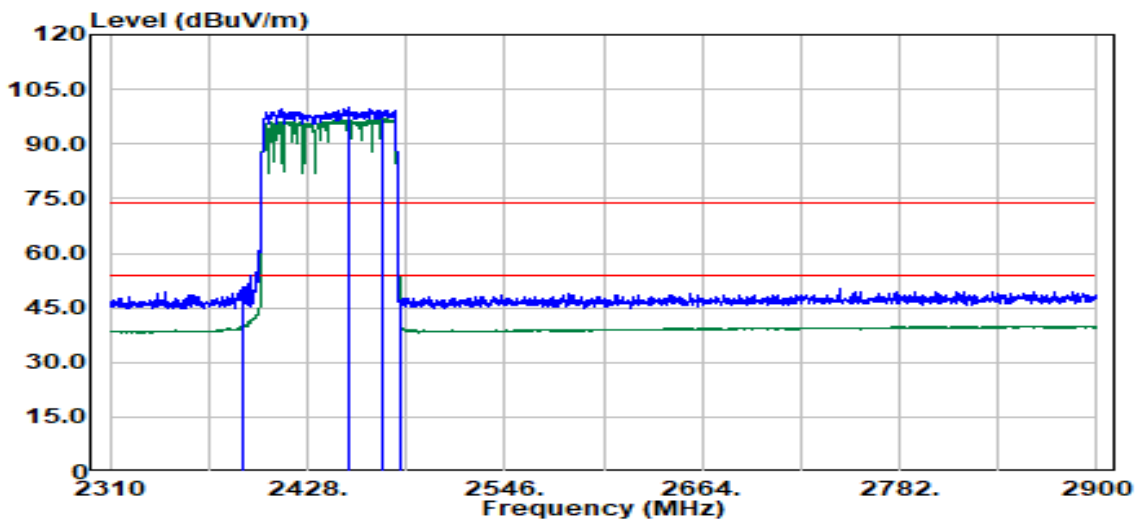
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2322.51	Peak	44.51	4.66	49.17	74.00	-24.83
2345.77	Average	33.77	4.83	38.60	54.00	-15.40
2480.00	Peak	95.20	4.65	99.84	--	--
2480.00	Average	91.80	4.65	96.45	--	--
2483.57	Average	37.88	4.61	42.49	54.00	-11.51
2484.32	Peak	44.45	4.60	49.05	74.00	-24.95

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402-2480 MHz	Antenna Pol.	:Vertical
Operation Mode	:Hopping	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2354.77	Peak	43.99	4.84	48.82	74.00	-25.18
2390.00	Average	34.76	4.80	39.56	54.00	-14.44
2479.07	Peak	96.69	4.66	101.34	--	--
2480.07	Average	93.86	4.65	98.51	--	--
2483.50	Peak	43.64	4.61	48.25	74.00	-25.75
2483.57	Average	39.31	4.61	43.92	54.00	-10.08

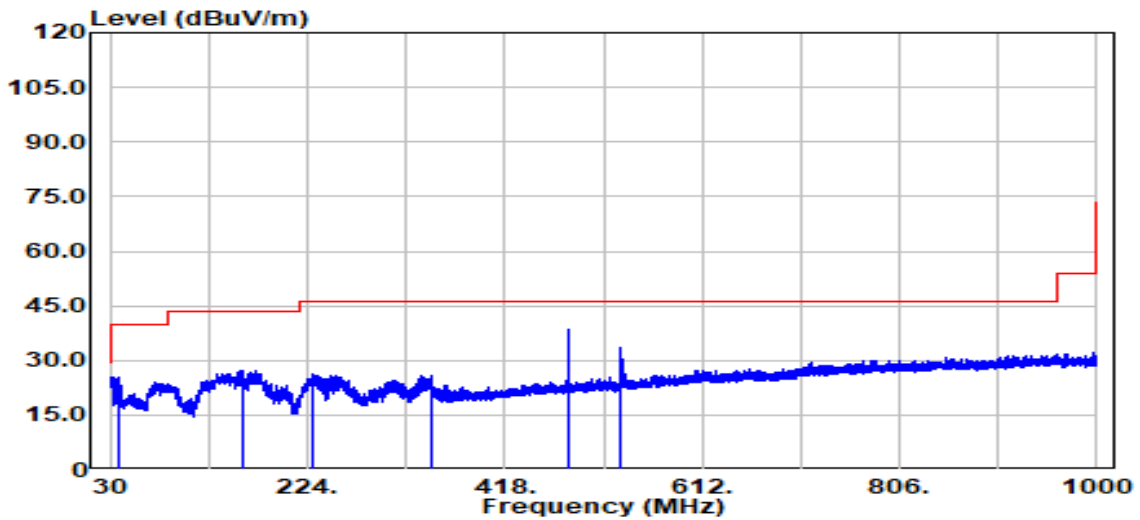
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402-2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:Hopping	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
2389.53	Average	35.23	4.80	40.03	54.00	-13.97
2390.00	Peak	45.70	4.80	50.50	74.00	-23.50
2452.31	Peak	95.35	4.56	99.92	--	--
2473.07	Average	92.06	4.71	96.78	--	--
2483.50	Peak	42.94	4.61	47.55	74.00	-26.45
2483.57	Average	37.32	4.61	41.93	54.00	-12.07

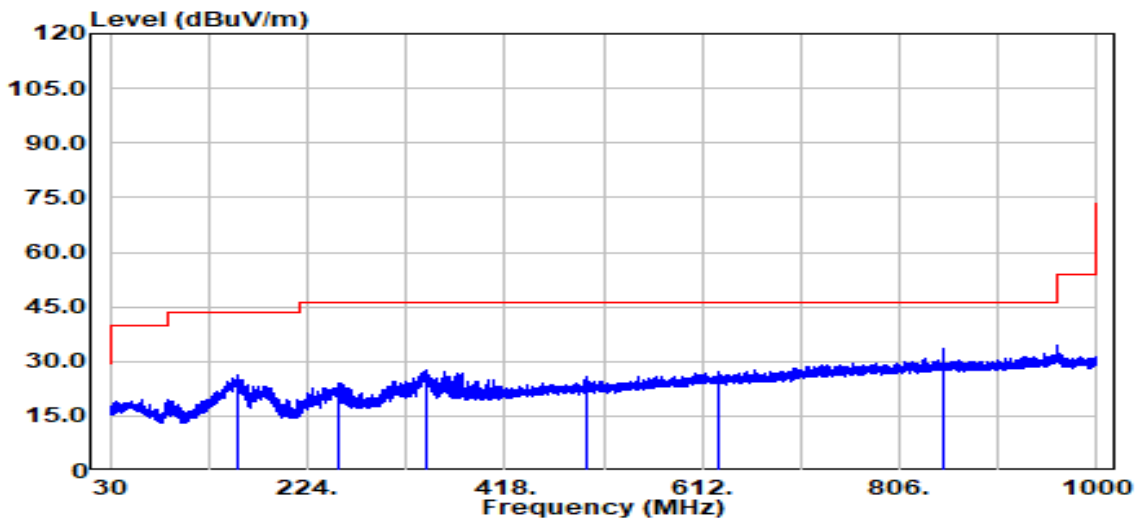
## TX Test Data

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



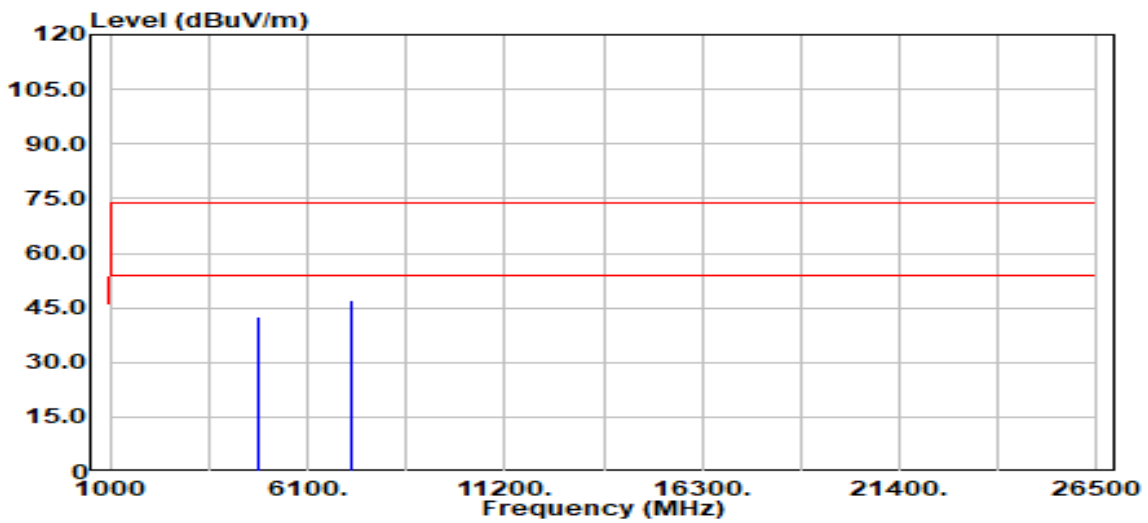
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
39.60	Peak	38.86	-13.37	25.50	40.00	-14.50
160.47	Peak	40.08	-12.88	27.20	43.50	-16.30
229.63	Peak	41.75	-15.67	26.08	46.00	-19.92
345.64	Peak	37.08	-11.18	25.90	46.00	-20.10
479.98	Peak	46.19	-7.82	38.37	46.00	-7.63
531.01	Peak	40.48	-6.89	33.59	46.00	-12.41

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



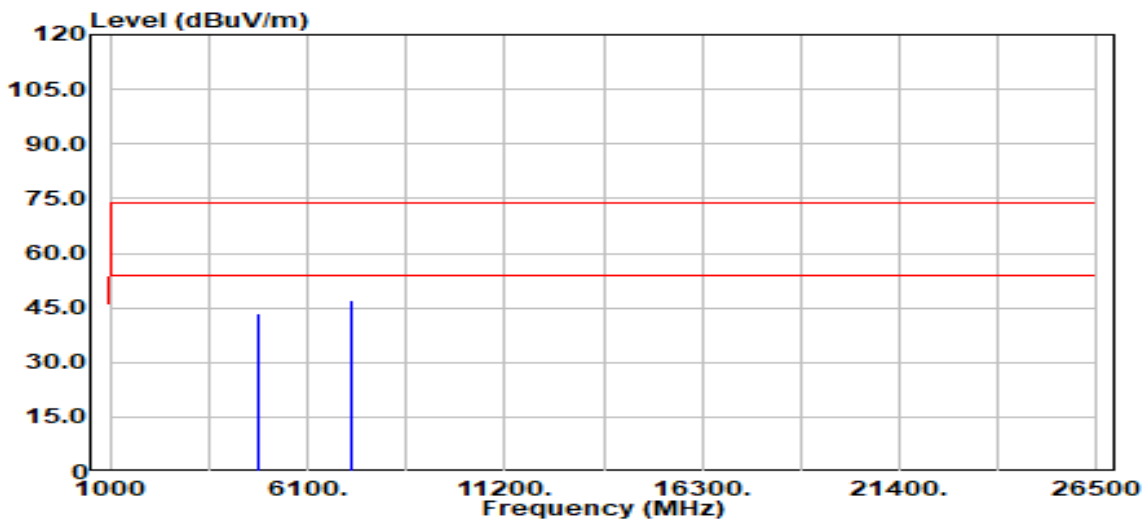
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBuV	Factor dB	Actual FS dBuV/m	Limit dBuV/m	Margin dB
154.45	Peak	38.86	-12.71	26.15	43.50	-17.35
253.78	Peak	37.94	-13.95	24.00	46.00	-22.00
341.95	Peak	38.90	-11.18	27.72	46.00	-18.28
498.51	Peak	33.38	-7.56	25.82	46.00	-20.18
627.81	Peak	31.77	-4.65	27.12	46.00	-18.88
850.04	Peak	34.51	-1.07	33.44	46.00	-12.56

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



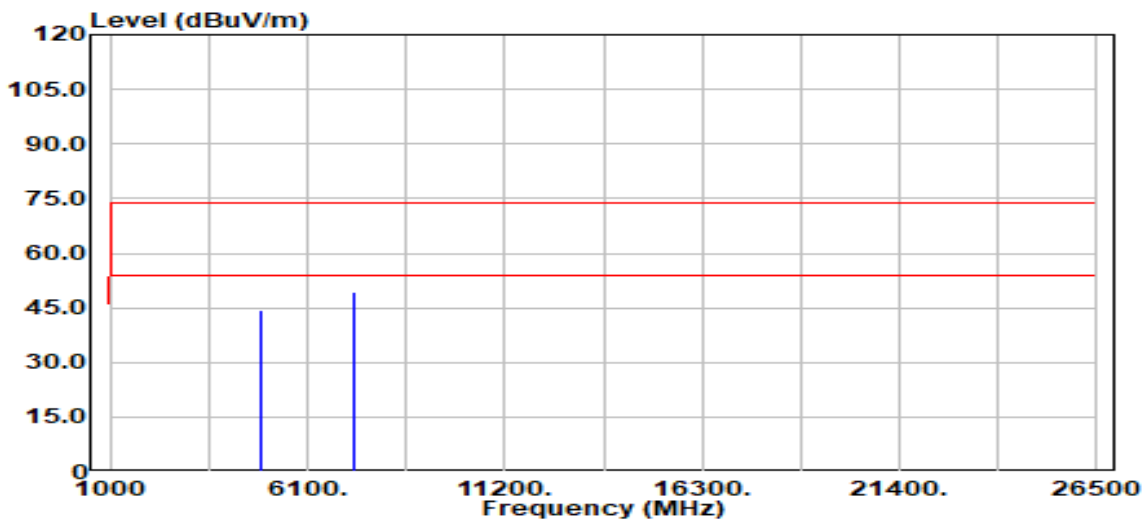
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4804.00	Peak	42.19	0.38	42.58	74.00	-31.42
4804.00	Average	34.92	0.38	35.30	54.00	-18.70
7206.00	Peak	41.76	5.33	47.09	74.00	-26.91
7206.00	Average	32.83	5.33	38.15	54.00	-15.85

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4804.00	Peak	42.99	0.38	43.37	74.00	-30.63
4804.00	Average	34.02	0.38	34.40	54.00	-19.60
7206.00	Peak	41.85	5.33	47.17	74.00	-26.83
7206.00	Average	32.88	5.33	38.21	54.00	-15.79

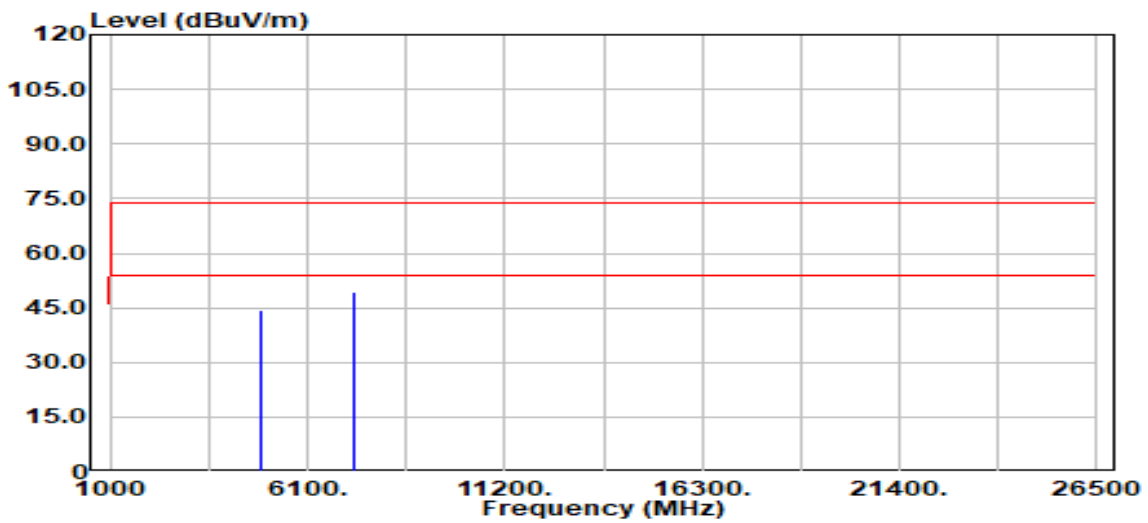
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2441 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4882.00	Peak	43.99	0.49	44.48	74.00	-29.52
4882.00	Average	34.15	0.49	34.64	54.00	-19.36
7323.00	Peak	43.78	5.48	49.26	74.00	-24.74
7323.00	Average	32.86	5.48	38.34	54.00	-15.66

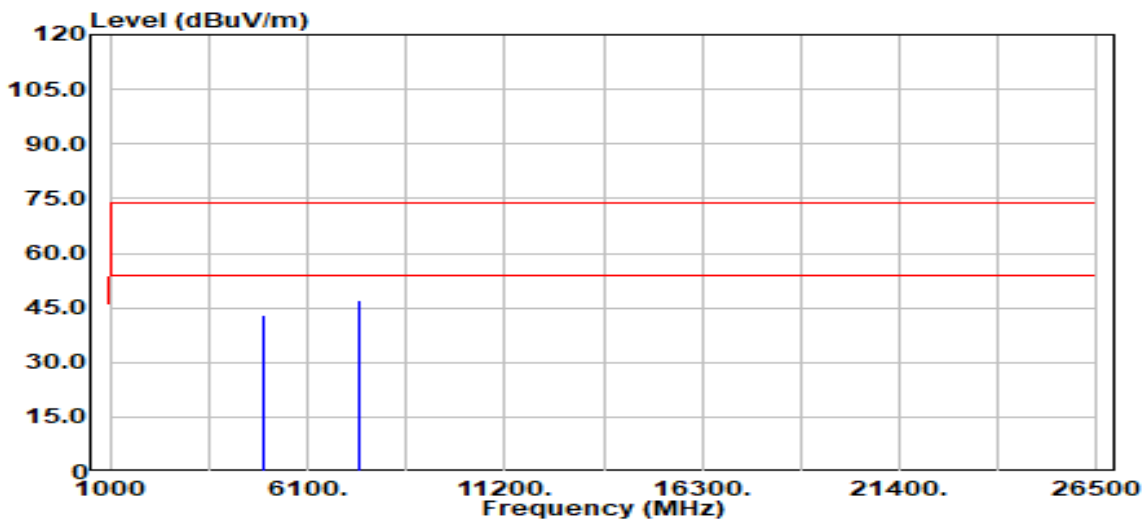


Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2441 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



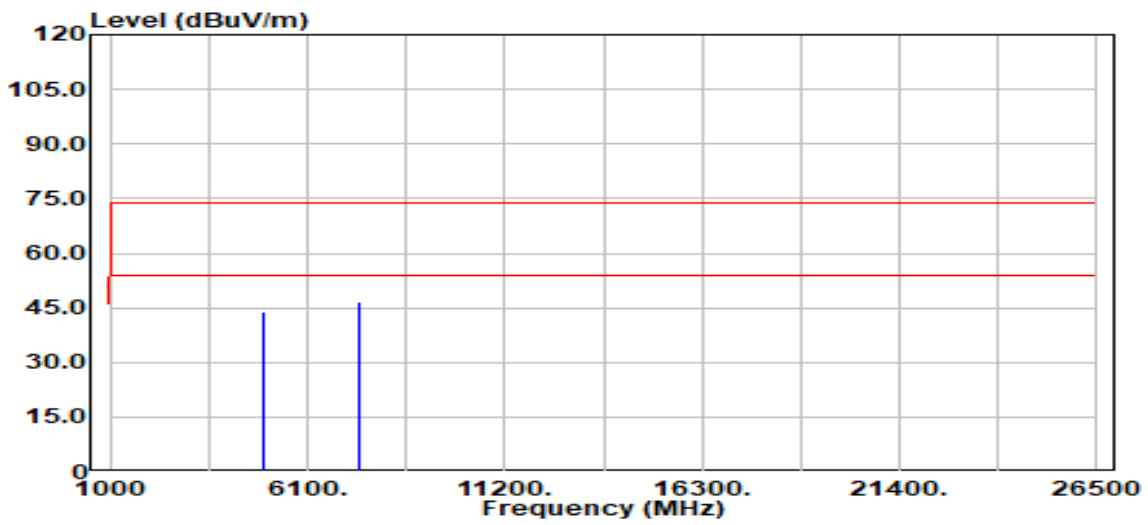
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4882.00	Peak	44.03	0.49	44.52	74.00	-29.48
4882.00	Average	34.02	0.49	34.51	54.00	-19.49
7323.00	Peak	43.77	5.48	49.25	74.00	-24.75
7323.00	Average	32.96	5.48	38.44	54.00	-15.56

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



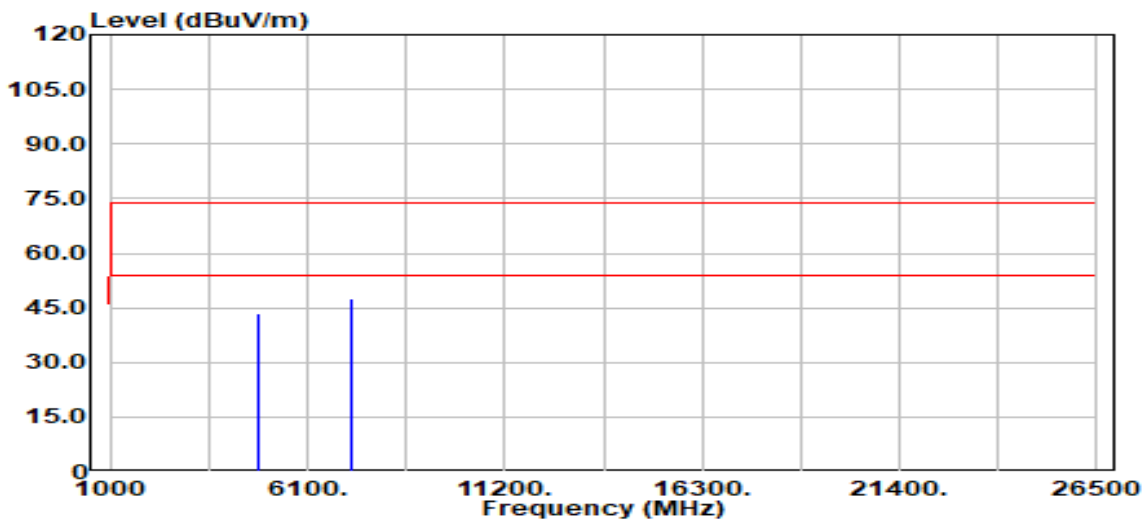
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4960.00	Peak	42.18	0.65	42.83	74.00	-31.17
4960.00	Average	33.52	0.65	34.17	54.00	-19.83
7440.00	Peak	41.46	5.56	47.02	74.00	-26.98
7440.00	Average	32.43	5.56	37.99	54.00	-16.01

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT BR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



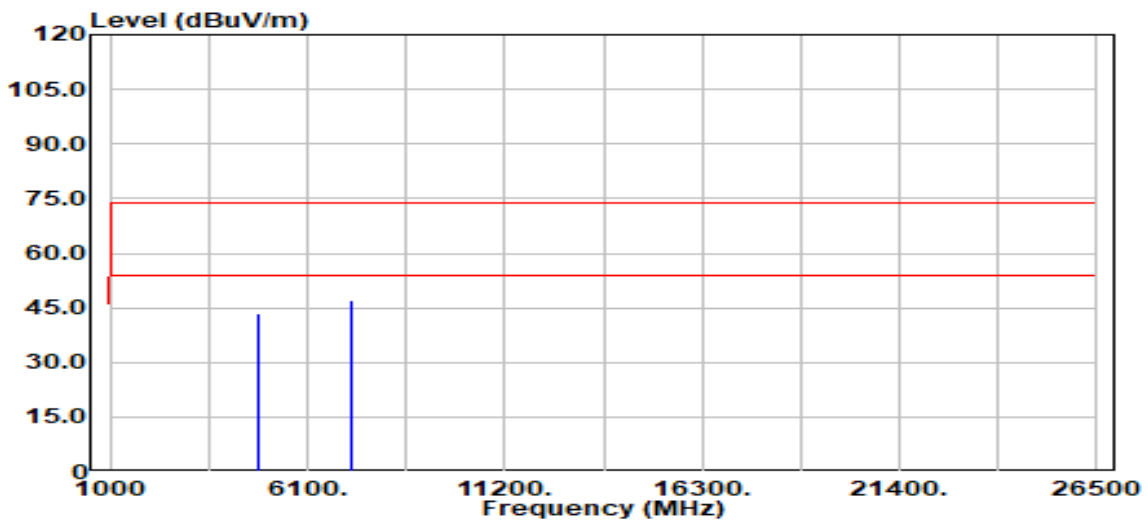
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4960.00	Peak	43.28	0.65	43.93	74.00	-30.07
4960.00	Average	33.38	0.65	34.02	54.00	-19.98
7440.00	Peak	41.01	5.56	46.57	74.00	-27.43
7440.00	Average	35.46	5.56	41.02	54.00	-12.98

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



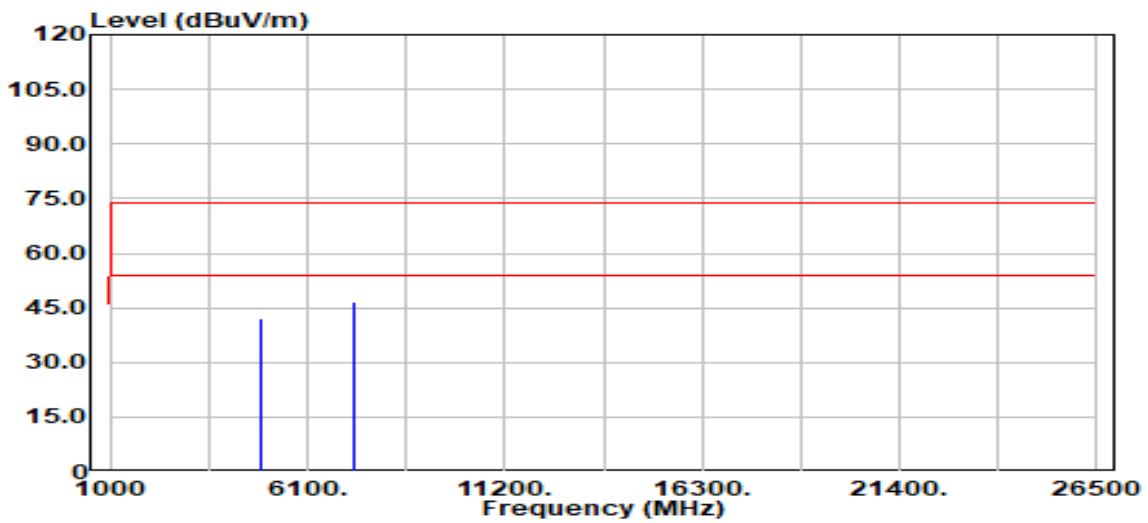
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4804.00	Peak	42.92	0.38	43.30	74.00	-30.70
4804.00	Average	34.09	0.38	34.47	54.00	-19.53
7206.00	Peak	42.14	5.33	47.47	74.00	-26.53
7206.00	Average	32.85	5.33	38.18	54.00	-15.82

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2402 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



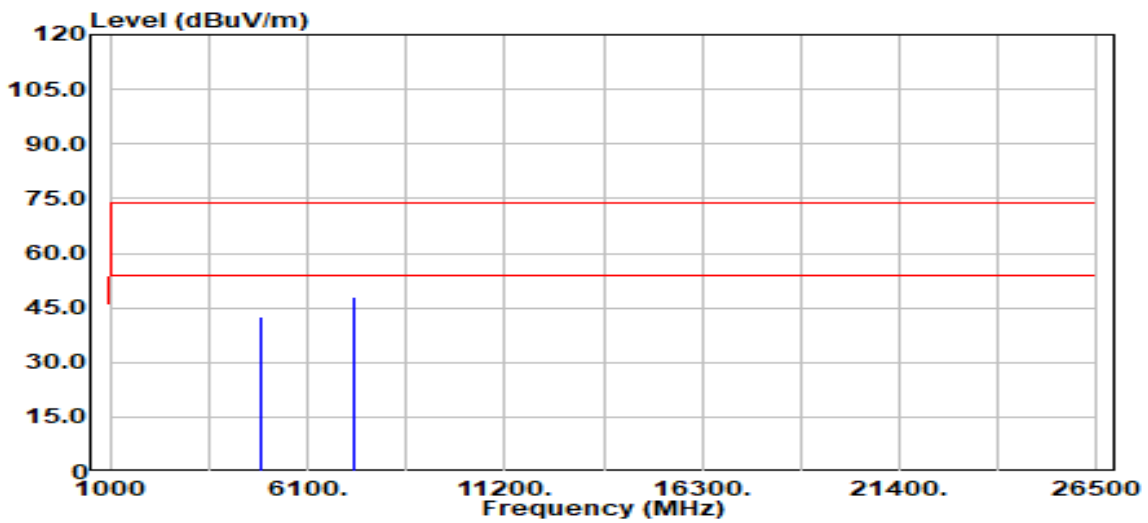
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4804.00	Peak	43.22	0.38	43.60	74.00	-30.40
4804.00	Average	34.01	0.38	34.39	54.00	-19.61
7206.00	Peak	41.83	5.33	47.16	74.00	-26.84
7206.00	Average	32.78	5.33	38.11	54.00	-15.89

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2441 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



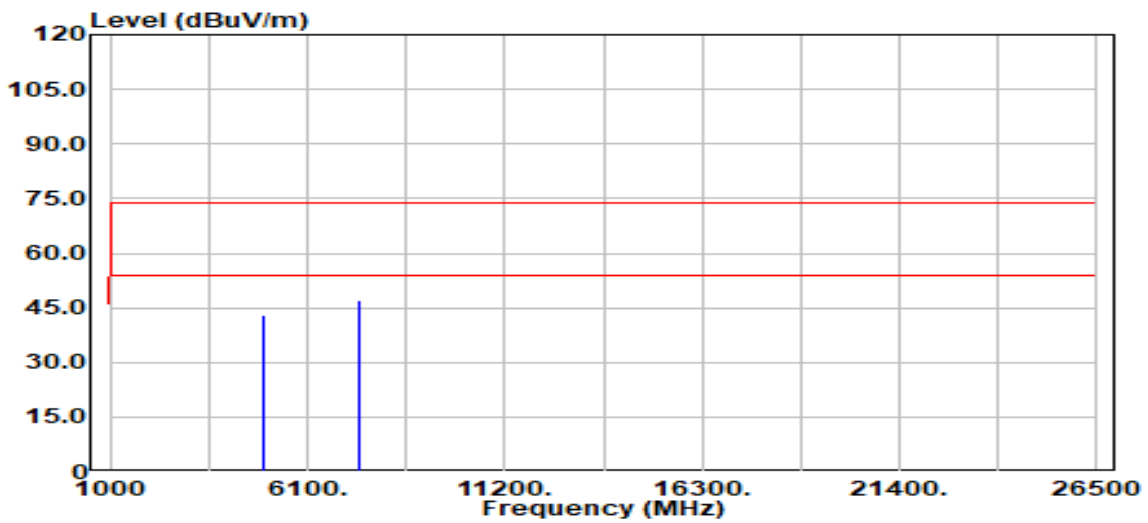
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dBµV	Factor dB	Actual FS dBµV/m	Limit dBµV/m	Margin dB
4882.00	Peak	41.79	0.49	42.27	74.00	-31.73
4882.00	Average	33.32	0.49	33.80	54.00	-20.20
7323.00	Peak	41.14	5.48	46.63	74.00	-27.37
7323.00	Average	33.60	5.48	39.08	54.00	-14.92

Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2441 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
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	42.30	0.49	42.79	74.00	-31.21
4882.00	Average	33.31	0.49	33.79	54.00	-20.21
7323.00	Peak	42.36	5.48	47.84	74.00	-26.16
7323.00	Average	32.89	5.48	38.37	54.00	-15.63

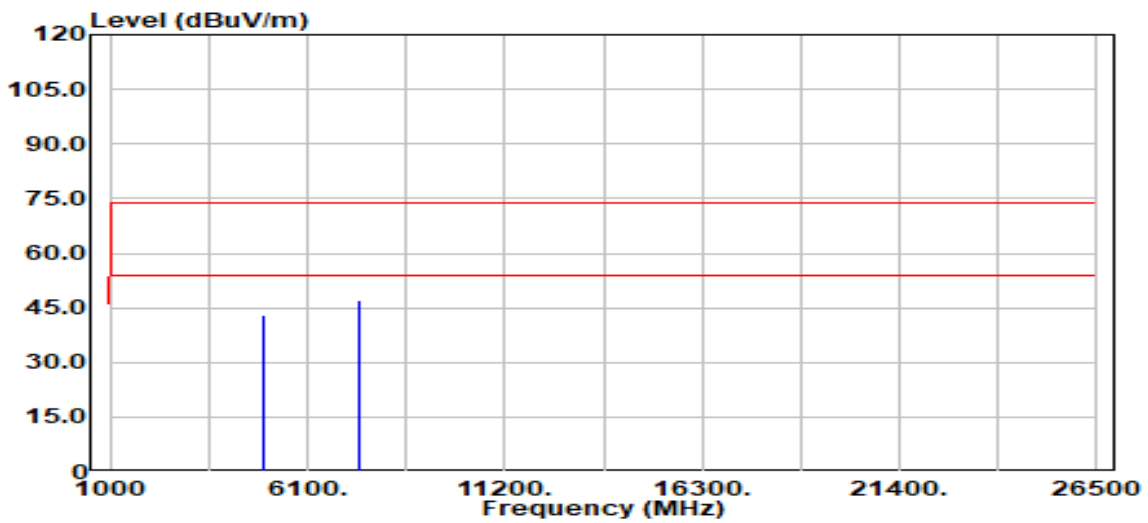
Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:VERTICAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4960.00	Peak	42.46	0.65	43.11	74.00	-30.89
4960.00	Average	33.49	0.65	34.14	54.00	-19.86
7440.00	Peak	41.59	5.56	47.15	74.00	-26.85
7440.00	Average	33.22	5.56	38.78	54.00	-15.22



Report Number	:TMWK2307002434KR	Test Date	:2023-08-30
Operation Band	:BT EDR	Temp./Humi.	:25.3/56
Frequency	:2480 MHz	Antenna Pol.	:HORIZONTAL
Operation Mode	:TX	Engineer	:Czerny Lin
EUT Pol	:E2	Test Chamber	: 966D
Setting	:		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Read Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
4960.00	Peak	42.34	0.65	42.98	74.00	-31.02
4960.00	Average	33.49	0.65	34.14	54.00	-19.86
7440.00	Peak	41.58	5.56	47.14	74.00	-26.86
7440.00	Average	32.86	5.56	38.42	54.00	-15.58

**- End of Test Report -**