

# Test Report

**Report No.:** MTi220606027-01E1

**Date of issue:** 2022-07-19

**Applicant:** Shenzhen Tongka Zhilv Technology Co., Ltd.

**Product:** Earbuds + Speaker 2 in 1

**Model(s):** E 16

**FCC ID:** 2A75X-E16E

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

## Instructions

1. This test report shall not be partially reproduced without the written consent of the laboratory.
2. The test results in this test report are only responsible for the samples submitted
3. This test report is invalid without the seal and signature of the laboratory.
4. This test report is invalid if transferred, altered, or tampered with in any form without authorization.
5. Any objection to this test report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

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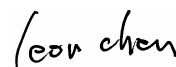
| Test Result Certification  |                                                                                                                                    |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>          | <b>Shenzhen Tongka Zhilv Technology Co., Ltd.</b>                                                                                  |
| <b>Address:</b>            | Room 102-104, Building 1, Zaimao Industrial Park, No. 12, Xuexiang Baoji Road, Bantian Street, Longgang District, Shenzhen         |
| <b>Manufacturer:</b>       | <b>Shenzhen EAR-BUS Technology co., Ltd</b>                                                                                        |
| <b>Address:</b>            | Room 307, Office Building A, No.107 Yongfu Road, Heping Community, Fuhai Street, Baoan District, Shenzhen city, Guangdong Province |
| <b>Product description</b> |                                                                                                                                    |
| <b>Product name:</b>       | Earbuds + Speaker 2 in 1                                                                                                           |
| <b>Trademark:</b>          | PIONELE                                                                                                                            |
| <b>Model name:</b>         | E 16                                                                                                                               |
| <b>Serial Model:</b>       | N/A                                                                                                                                |
| <b>Standards:</b>          | FCC 47 CFR Part 15 Subpart C                                                                                                       |
| <b>Test method:</b>        | ANSI C63.10-2013                                                                                                                   |
| <b>Date of Test</b>        |                                                                                                                                    |
| <b>Date of test:</b>       | 2022-06-22 ~ 2022-07-18                                                                                                            |
| <b>Test result:</b>        | Pass                                                                                                                               |

Test Engineer :



(Yanice Xie)

Reviewed By :



(Leon Chen)

Approved By :



(Tom Xue)

## 1 General Description

### 1.1 Description of the EUT

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| Product name:                     | Earbuds + Speaker 2 in 1               |
| Model name:                       | E 16                                   |
| Series Model:                     | N/A                                    |
| Model difference:                 | N/A                                    |
| Electrical rating:                | Input: DC 5V<br>Output: DC 5V          |
| Hardware version:                 | V1.0                                   |
| Software version:                 | V1.0                                   |
| Accessories:                      | N/A                                    |
| EUT serial number:                | MTi220606027-01-S0001                  |
| <b>RF specification:</b>          |                                        |
| Bluetooth version:                | V5.0                                   |
| Operation frequency:              | 2402 MHz ~ 2480 MHz                    |
| Modulation type:                  | GFSK, $\pi/4$ -DQPSK, 8DPSK            |
| Antenna designation:              | Ceramic antenna, antenna Gain: 2.5 dBi |
| Max. peak conducted output power: | 3.83 dBm                               |

### 1.2 Description of test modes

#### 1.2.1 Operation channel list

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 0       | 2402            | 20      | 2422            | 40      | 2442            | 60      | 2462            |
| 1       | 2403            | 21      | 2423            | 41      | 2443            | 61      | 2463            |
| 2       | 2404            | 22      | 2424            | 42      | 2444            | 62      | 2464            |
| 3       | 2405            | 23      | 2425            | 43      | 2445            | 63      | 2465            |
| 4       | 2406            | 24      | 2426            | 44      | 2446            | 64      | 2466            |
| 5       | 2407            | 25      | 2427            | 45      | 2447            | 65      | 2467            |
| 6       | 2408            | 26      | 2428            | 46      | 2448            | 66      | 2468            |
| 7       | 2409            | 27      | 2429            | 47      | 2449            | 67      | 2469            |
| 8       | 2410            | 28      | 2430            | 48      | 2450            | 68      | 2470            |
| 9       | 2411            | 29      | 2431            | 49      | 2451            | 69      | 2471            |
| 10      | 2412            | 30      | 2432            | 50      | 2452            | 70      | 2472            |
| 11      | 2413            | 31      | 2433            | 51      | 2453            | 71      | 2473            |
| 12      | 2414            | 32      | 2434            | 52      | 2454            | 72      | 2474            |

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| 13      | 2415            | 33      | 2435            | 53      | 2455            | 73      | 2475            |
| 14      | 2416            | 34      | 2436            | 54      | 2456            | 74      | 2476            |
| 15      | 2417            | 35      | 2437            | 55      | 2457            | 75      | 2477            |
| 16      | 2418            | 36      | 2438            | 56      | 2458            | 76      | 2478            |
| 17      | 2419            | 37      | 2439            | 57      | 2459            | 77      | 2479            |
| 18      | 2420            | 38      | 2440            | 58      | 2460            | 78      | 2480            |
| 19      | 2421            | 39      | 2441            | 59      | 2461            | -       | -               |

### 1.2.2 Test channels

| Channel        | Frequency |
|----------------|-----------|
| Lowest (CH0)   | 2402MHz   |
| Middle (CH39)  | 2441MHz   |
| Highest (CH78) | 2480MHz   |

Note: The test software has been used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

### 1.2.3 Description of support units

| Support equipment list |       |            |              |
|------------------------|-------|------------|--------------|
| Description            | Model | Serial No. | Manufacturer |
| /                      | /     | /          | /            |

### 1.3 Measurement uncertainty

| Parameter                                       | Measurement uncertainty |
|-------------------------------------------------|-------------------------|
| AC power line conducted emission (9 kHz~30 MHz) | ±2.5 dB                 |
| Occupied Bandwidth                              | ±3 %                    |
| Conducted RF output power                       | ±0.16 dB                |
| Conducted spurious emissions                    | ±0.21 dB                |
| Radiated emission (9 kHz ~ 30 MHz)              | ±4.0 dB                 |
| Radiated emission (30 MHz~1 GHz)                | ±4.2 dB                 |
| Radiated emission (above 1 GHz)                 | ±4.3 dB                 |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2 Summary of Test Result

| No. | FCC reference | Description of test                    | Result |
|-----|---------------|----------------------------------------|--------|
| 1   | § 15.203      | Antenna requirement                    | Pass   |
| 2   | § 15.207      | AC power line conducted emissions      | N/A    |
| 3   | 15.247(a)(1)  | 20dB occupied bandwidth                | Pass   |
| 4   | 15.247(b)(1)  | Conducted peak output power            | Pass   |
| 5   | 15.247(a)(1)  | Carrier Frequencies Separation         | Pass   |
| 6   | 15.247(a)(1)  | Average time of occupancy (Dwell time) | Pass   |
| 7   | 15.247(a)(1)  | Number of hopping channels             | Pass   |
| 8   | 15.247(d)     | Conducted emission at the band edge    | Pass   |
| 9   | 15.247(d)     | Conducted spurious emissions           | Pass   |
| 10  | 15.247(d)     | Radiated spurious emissions            | Pass   |

**Note:** N/A means not applicable.

### 3 Test Facilities and Accreditations

#### 3.1 Test laboratory

|                        |                                                                                                                                       |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Test laboratory:       | Shenzhen Microtest Co., Ltd.                                                                                                          |
| Test site location:    | 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| Telephone:             | (86-755)88850135                                                                                                                      |
| Fax:                   | (86-755)88850136                                                                                                                      |
| CNAS Registration No.: | CNAS L5868                                                                                                                            |
| FCC Registration No.:  | 448573                                                                                                                                |

## 4 Equipment List

| No.       | Equipment                | Manufacturer    | Model                  | Serial No.   | Cal. date  | Cal. Due   |
|-----------|--------------------------|-----------------|------------------------|--------------|------------|------------|
| MTi-E002  | EMI Test Receiver        | R&S             | ESCI3                  | 101368       | 2022/05/05 | 2023/05/04 |
| MTi-E023  | Artificial power network | Schwarzbeck     | NSLK8127               | NSLK8127#841 | 2022/05/05 | 2023/05/04 |
| MTi-E025  | Artificial power network | Schwarzbeck     | NSLK8127               | 8127183      | 2022/05/05 | 2023/05/04 |
| MTi-E043  | EMI test receiver        | R&S             | ESCI7                  | 101166       | 2022/05/05 | 2023/05/04 |
| MTi-E046  | Active Loop Antenna      | Schwarzbeck     | FMZB 1519 B            | 00044        | 2021/05/30 | 2023/05/29 |
| MTi-E044  | Broadband antenna        | Schwarzbeck     | VULB9163               | 9163-1338    | 2021/05/30 | 2023/05/29 |
| MTi-E045  | Horn antenna             | Schwarzbeck     | BBHA9120D              | 9120D-2278   | 2021/05/30 | 2023/05/29 |
| MTi-E047  | Pre-amplifier            | Hewlett-Packard | 8447F                  | 3113A06184   | 2022/05/05 | 2023/05/04 |
| MTi-E048  | Pre-amplifier            | Agilent         | 8449B                  | 3008A01120   | 2022/05/05 | 2023/05/04 |
| MTi-E120  | Broadband antenna        | Schwarzbeck     | VULB9163               | 9163-1419    | 2021/05/30 | 2023/05/29 |
| MTi-E121  | Pre-amplifier            | Hewlett-Packard | 8447D                  | 2944A09365   | 2022/04/15 | 2023/04/14 |
| MTi-E123  | Pre-amplifier            | Agilent         | 8449B                  | 3008A04723   | 2022/05/05 | 2023/05/04 |
| MTi-E135  | Horn antenna             | Schwarzbeck     | BBHA 9170              | 00987        | 2021/05/30 | 2023/05/29 |
| MTi-E136  | Pre-amplifier            | Space-Dtronics  | EWLAN1840G-G45         | 210405001    | 2022/05/05 | 2023/05/04 |
| MTi-E062  | PXA Signal Analyzer      | Agilent         | N9030A                 | MY51350296   | 2022/05/05 | 2023/05/04 |
| MTi-E067  | RF Control Unit          | Tonscend        | JS0806-1               | 19D8060152   | 2022/05/05 | 2023/05/04 |
| MTi-E068  | RF Control Unit          | Tonscend        | JS0806-2               | 19D8060153   | 2022/05/05 | 2023/05/04 |
| MTi-E069  | Band Reject Filter Group | Tonscend        | JS0806-F               | 19D8060160   | 2022/05/05 | 2023/05/04 |
| MTi-E010S | EMI Measurement Software | Farad           | EZ-EMC Ver. EMEC-3A1   | /            | /          | /          |
| MTi-E014S | RF Test System           | Tonscend        | TS®JS1120 V2.6.88.0330 | /            | /          | /          |

## 5 Test Result

### 5.1 Antenna requirement

#### 15.203 requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

#### Description of the antenna of EUT

The antenna of EUT is Ceramic antenna (Antenna Gain: 2.5 dBi). which is no consideration of replacement.

## 5.2 AC power line conducted emissions

### 5.2.1 Limits

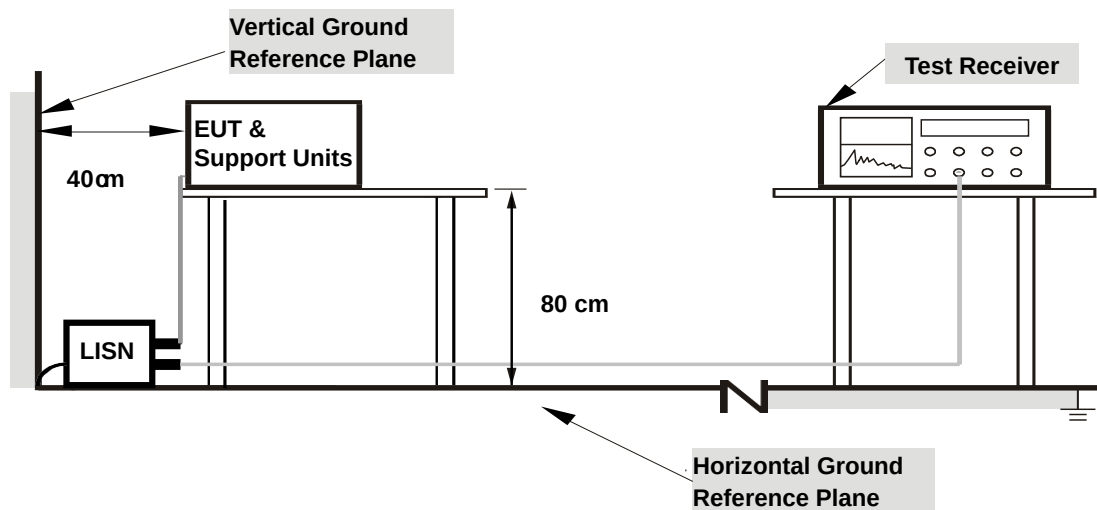
| Frequency (MHz) | Detector type / Bandwidth | Limit-Quasi-peak dB $\mu$ V | Limit-Average dB $\mu$ V |
|-----------------|---------------------------|-----------------------------|--------------------------|
| 0.15 -0.5       | Average / 9 kHz           | 66 to 56                    | 56 to 46                 |
| 0.5 -5          |                           | 56                          | 46                       |
| 5 -30           |                           | 60                          | 50                       |

**Note 1:** the limit decreases with the logarithm of the frequency in the range of 0.15 MHz to 0.5 MHz.

### 5.2.2 Test Procedures

- The test setup is refer to the standard ANSI C63.10-2013.
- The EUT is connected to the main power through a line impedance stabilization network (LISN). All support equipment is powered from additional LISN(s).
- Emissions were measured on each current carrying line of the EUT using an EMI test receiver connected to the LISN powering the EUT.
- The test receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes described in Item 1.2.
- The test data of the worst-case condition(s) was recorded.

### 5.2.3 Test setup



For the actual test configuration, please refer to the related item – Photographs of the test setup.

### 5.2.4 Test Result

#### Notes:

Note: Not applicable. Because the product does not TX when it is charged, so this item not applicable.

#### Calculation formula:

Measurement (dB $\mu$ V) = Reading Level (dB $\mu$ V) + Correct Factor (dB)

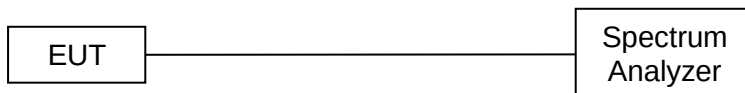
Over (dB) = Measurement (dB $\mu$ V) – Limit (dB $\mu$ V)

### 5.3 20dB occupied bandwidth

#### 5.3.1 Limits

None, for reporting purposes only.

#### 5.3.2 Test setup

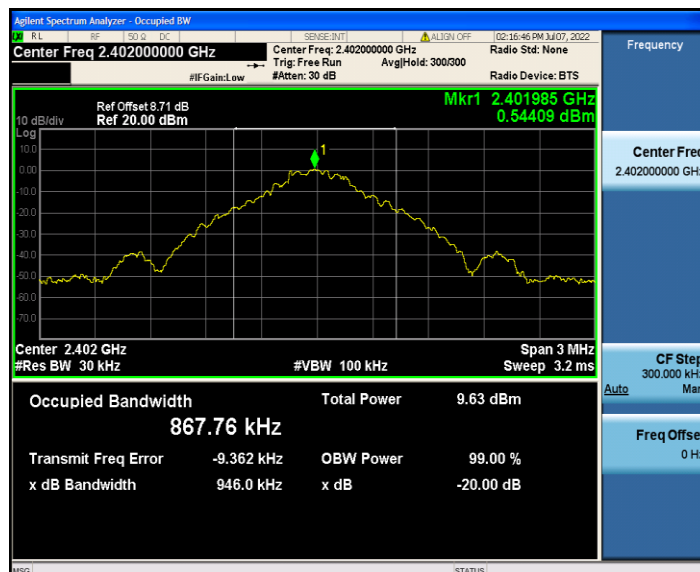


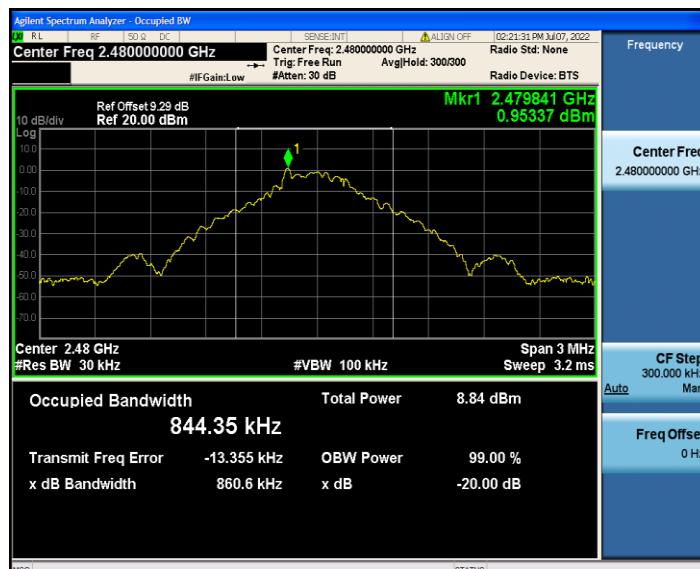
#### 5.3.3 Test procedures

- a) Test method: ANSI C63.10-2013 Section 6.9.2.
- b) The transmitter output of EUT is connected to the spectrum analyzer.
- c) Spectrum analyzer setting: RBW=30 kHz, VBW=100 kHz, detector= Peak

#### 5.3.4 Test results

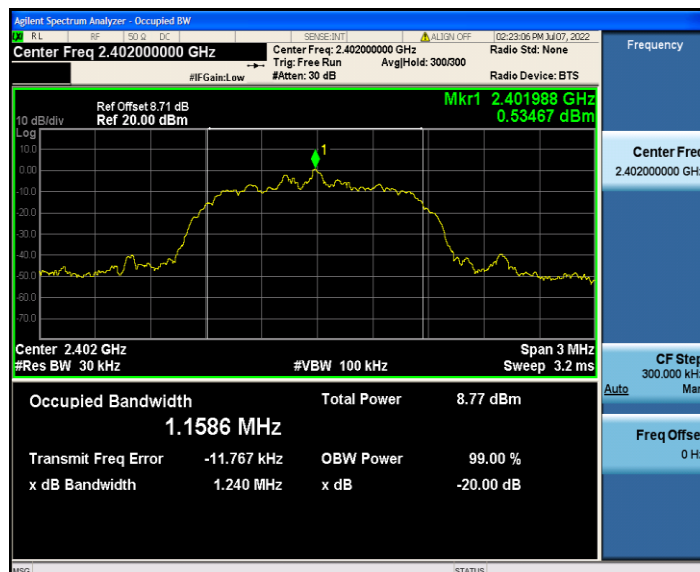
| Mode           | Test channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|----------------|--------------|-----------------|----------------------|
| GFSK           | CH0          | 2402            | 0.9460               |
|                | CH39         | 2441            | 0.9256               |
|                | CH78         | 2480            | 0.8606               |
| $\pi/4$ -DQPSK | CH0          | 2402            | 1.240                |
|                | CH39         | 2441            | 1.257                |
|                | CH78         | 2480            | 1.236                |
| 8DPSK          | CH0          | 2402            | 1.247                |
|                | CH39         | 2441            | 1.201                |
|                | CH78         | 2480            | 1.198                |

**GFSK mode - 20dB occupied bandwidth**
**CH0**

**CH39**

**CH78**


# $\pi/4$ -DQPSK mode - 20dB occupied bandwidth

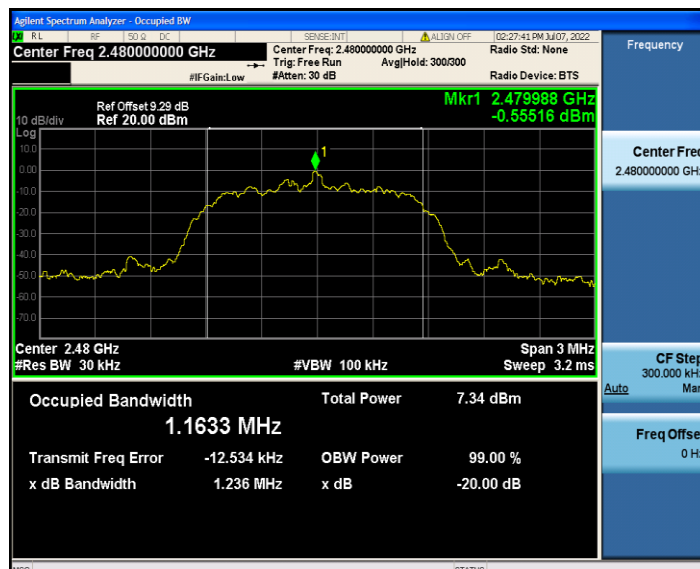
## CH0



## CH39



## CH78



## 8DPSK mode - 20dB occupied bandwidth

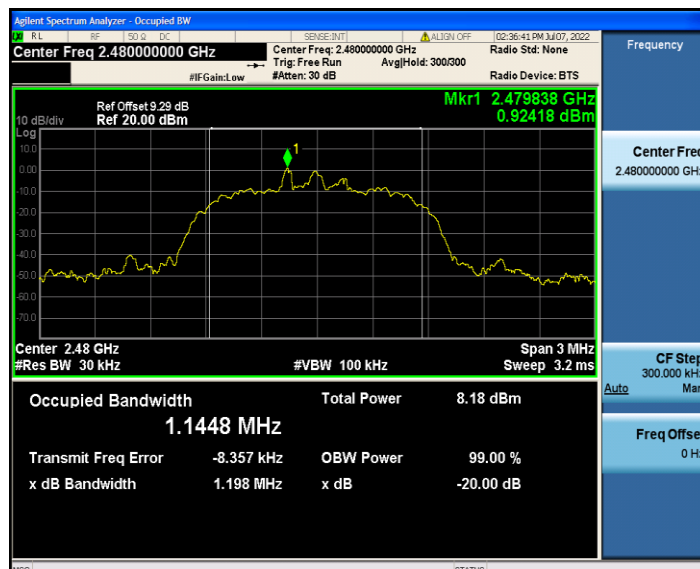
### CH0



### CH39



### CH78

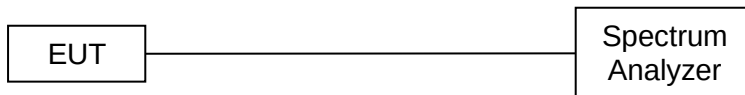


## 5.4 Conducted peak output power

### 5.4.1 Limits

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.

### 5.4.2 Test setup



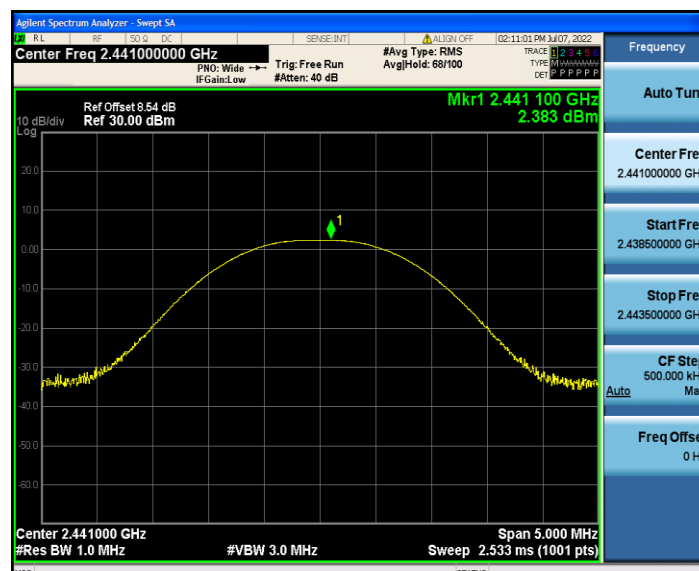
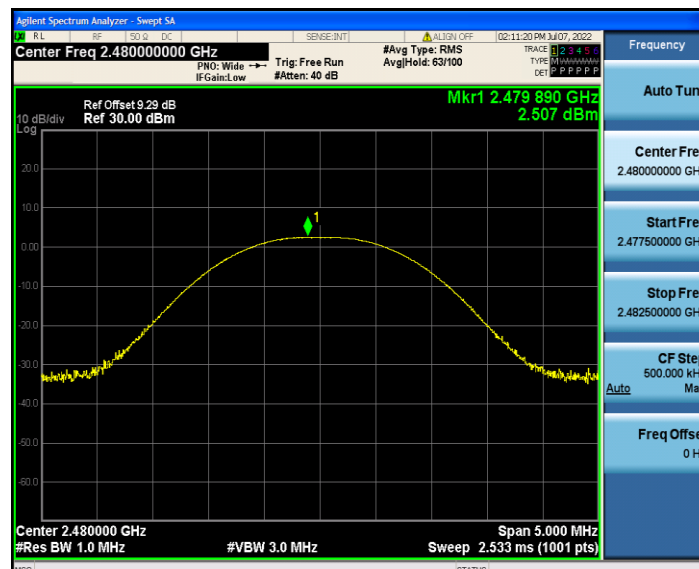
### 5.4.3 Test procedure

- Test method: ANSI C63.10-2013 Section 7.8.5.
- The EUT was set to continuously transmitting in the max power during the test.
- The transmitter output of EUT is connected to the spectrum analyzer.
- Spectrum analyzer setting: RBW > 20dB occupied bandwidth, VBW ≥ RBW, detector= Peak

### 5.4.4 Test results

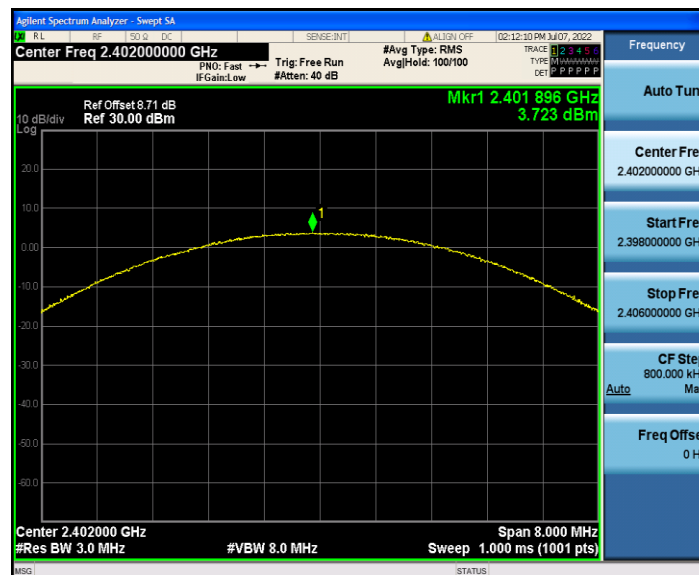
| Mode      | Test channel | Frequency (MHz) | Conducted peak output power (dBm) | Limit (dBm) |
|-----------|--------------|-----------------|-----------------------------------|-------------|
| GFSK      | CH0          | 2402            | 3.67                              | ≤ 20.97     |
|           | CH39         | 2441            | 2.38                              | ≤ 20.97     |
|           | CH78         | 2480            | 2.51                              | ≤ 20.97     |
| π/4-DQPSK | CH0          | 2402            | 3.72                              | ≤ 20.97     |
|           | CH39         | 2441            | 2.57                              | ≤ 20.97     |
|           | CH78         | 2480            | 2.66                              | ≤ 20.97     |
| 8DPSK     | CH0          | 2402            | 3.83                              | ≤ 20.97     |
|           | CH39         | 2441            | 2.41                              | ≤ 20.97     |
|           | CH78         | 2480            | 2.66                              | ≤ 20.97     |

**GFSK mode - peak conducted output power**
**CH0**

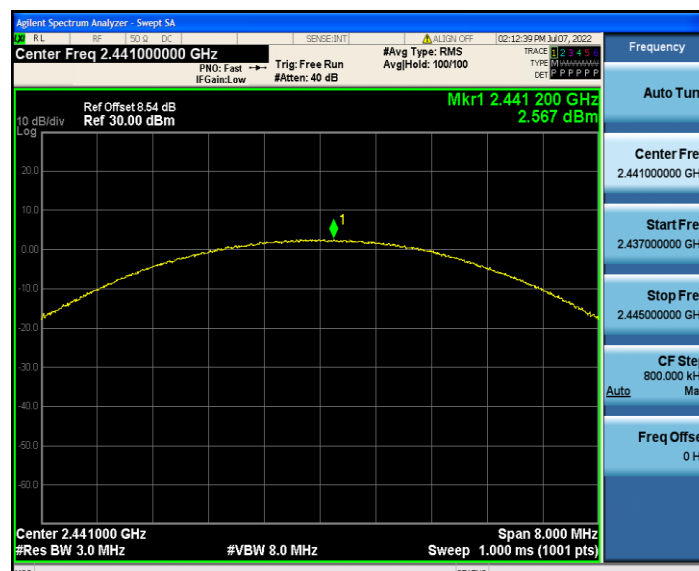
**CH39**

**CH78**


# $\pi/4$ -DQPSK mode - peak conducted output power

## CH0



## CH39

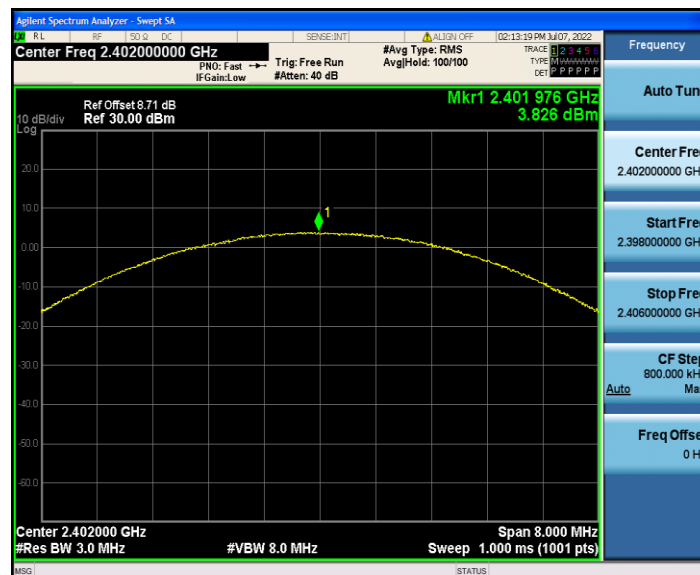


## CH78



## 8DPSK mode – peak conducted output power

### CH0



### CH39



### CH78



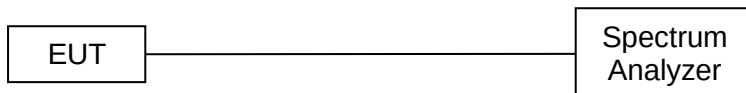
## 5.5 Carrier frequency separation

### 5.5.1 Limits

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

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater

### 5.5.2 Test setup



### 5.5.3 Test procedure

- Test method: ANSI C63.10-2013 Section 7.8.2.
- The EUT was set to hopping mode during the test.
- The transmitter output of EUT is connected to the spectrum analyzer.
- Spectrum Setting: RBW = 30 kHz, VBW = 100 kHz, detector= Peak.

### 5.5.4 Test results

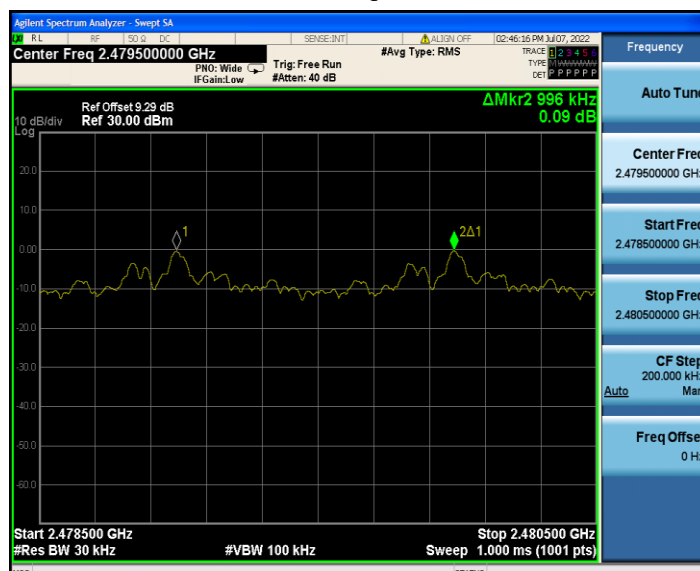
| Mode           | Test channel | Test Result (MHz) | Limit (MHz)  | Result |
|----------------|--------------|-------------------|--------------|--------|
| GFSK           | Hop-mode     | 1                 | $\geq 0.631$ | Pass   |
| $\pi/4$ -DQPSK | Hop-mode     | 0.996             | $\geq 0.838$ | Pass   |
| 8DPSK          | Hop-mode     | 1.002             | $\geq 0.831$ | Pass   |

## Carrier frequency separation

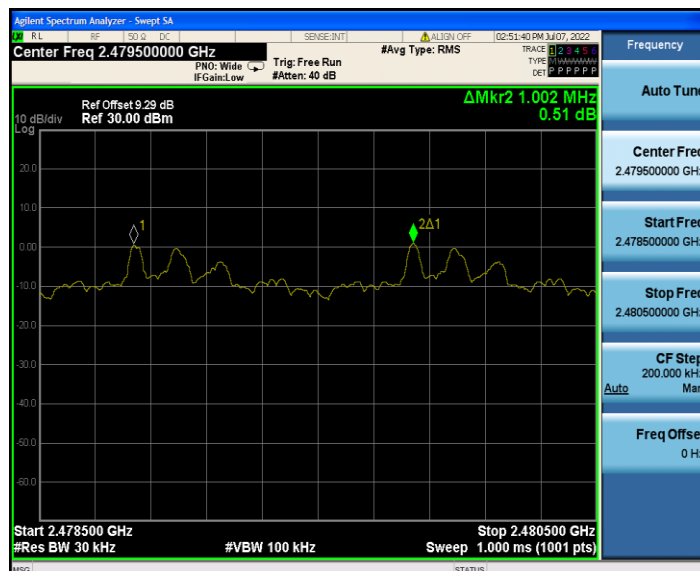
### GFSK



### $\pi/4$ -DQPSK



### 8DPSK

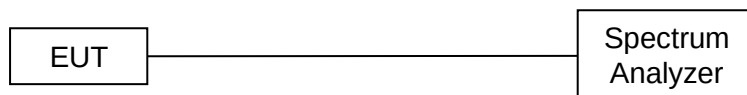


## 5.6 Average time of occupancy

### 5.6.1 Limits

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.

### 5.6.2 Test setup



### 5.6.3 Test procedure

- Test method: ANSI C63.10-2013 Section 7.8.4
- The EUT was set to hopping mode during the test.
- The tranistter output of EUT is connneted to the specturm analyzer.
- Spectrum analyzer setting: RBW = 1MHz, VBW = 3MHz, Span = 0Hz, Detector = Peak, weep time: As necessary to capture the entire dwell time per hopping channel.
- Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:
- The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

### 5.6.4 Test results

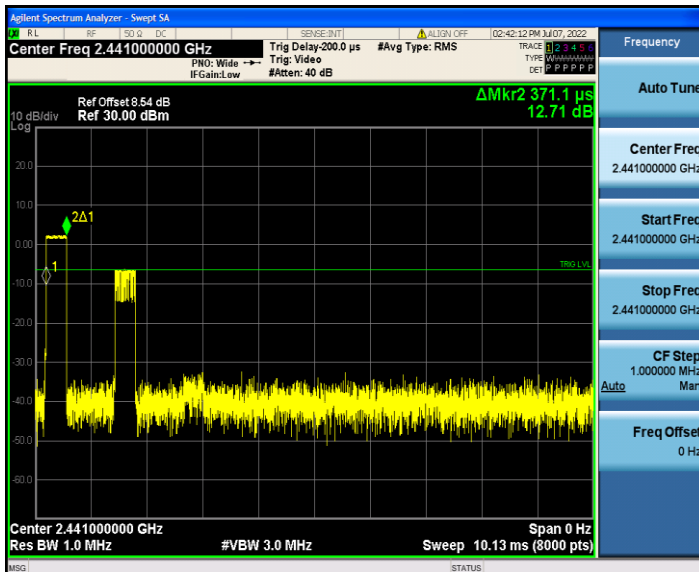
| Mode           | Data Packet | Frequency (MHz) | Pulse width (ms) | Number of pulses in 3.16 s | Average time of occupancy (s) | Limit (s)  | Result |
|----------------|-------------|-----------------|------------------|----------------------------|-------------------------------|------------|--------|
| GFSK           | DH1         | 2441            | 0.37             | 33                         | 0.122                         | $\leq 0.4$ | Pass   |
|                | DH3         | 2441            | 1.62             | 17                         | 0.275                         | $\leq 0.4$ | Pass   |
|                | DH5         | 2441            | 2.87             | 11                         | 0.315                         | $\leq 0.4$ | Pass   |
| $\pi/4$ -DQPSK | 2DH1        | 2441            | 0.38             | 33                         | 0.125                         | $\leq 0.4$ | Pass   |
|                | 2DH3        | 2441            | 1.63             | 17                         | 0.277                         | $\leq 0.4$ | Pass   |
|                | 2DH5        | 2441            | 2.88             | 11                         | 0.317                         | $\leq 0.4$ | Pass   |
| 8DPSK          | 3DH1        | 2441            | 0.38             | 33                         | 0.125                         | $\leq 0.4$ | Pass   |
|                | 3DH3        | 2441            | 1.63             | 17                         | 0.277                         | $\leq 0.4$ | Pass   |
|                | 3DH5        | 2441            | 2.88             | 11                         | 0.317                         | $\leq 0.4$ | Pass   |

#### Notes:

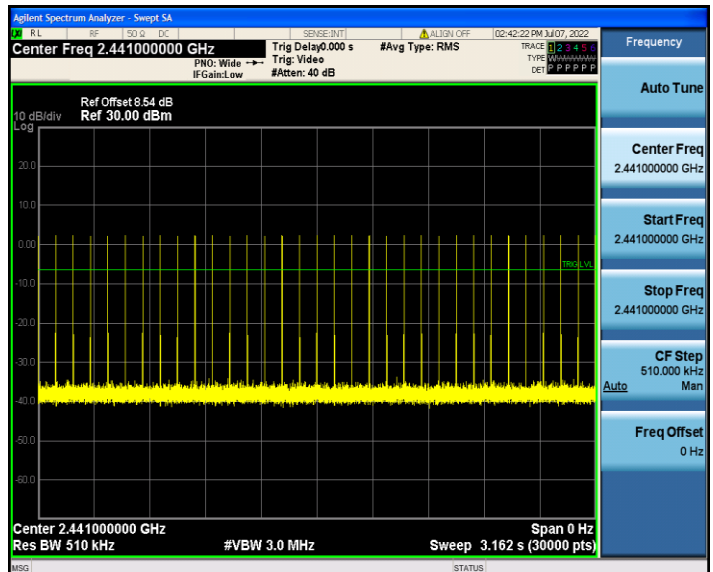
- Period time = 0.4 (s) \* 79 = 31.6(s)
- Average time of occupancy = Pulse width \* Number of pulses in 3.16s \* 10

## GFSK mode - Average time of occupancy

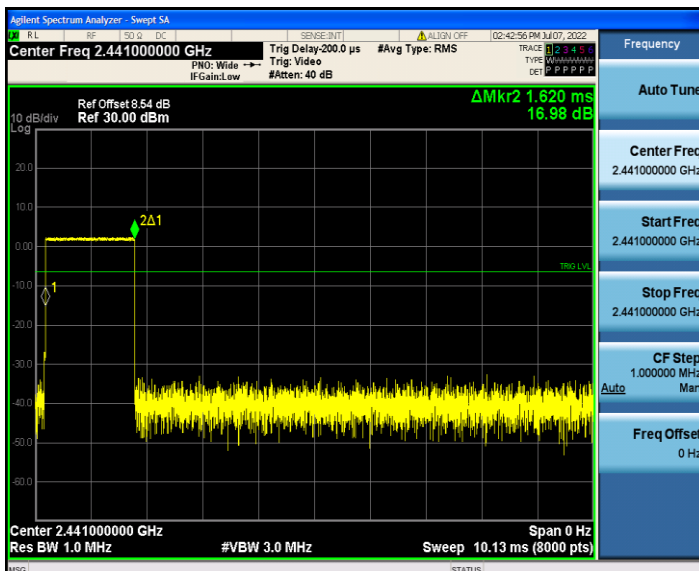
### Pulse width – DH1



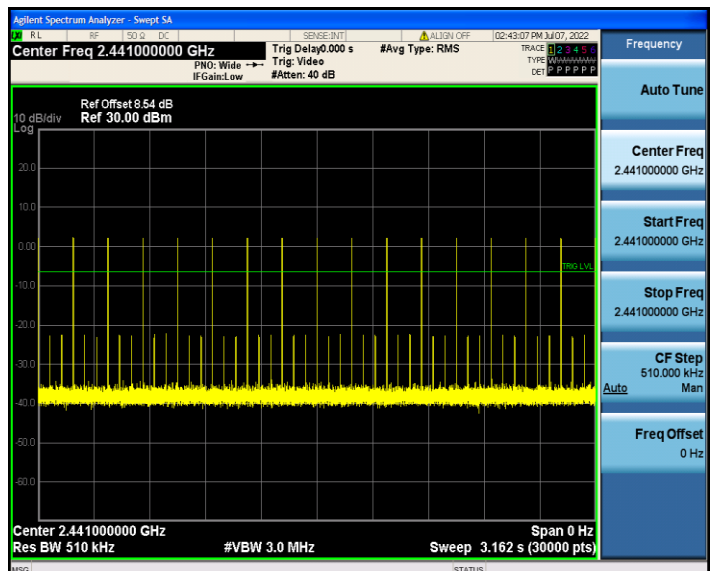
### Number of pulses in 3.16 s – DH1



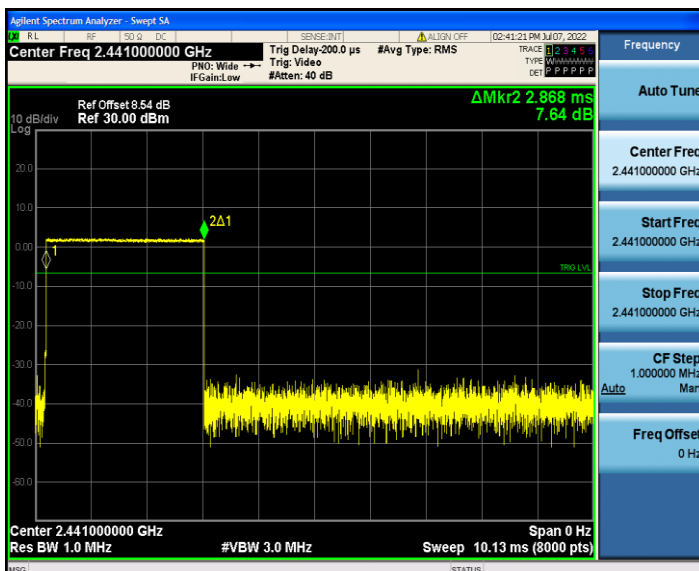
### Pulse width – DH3



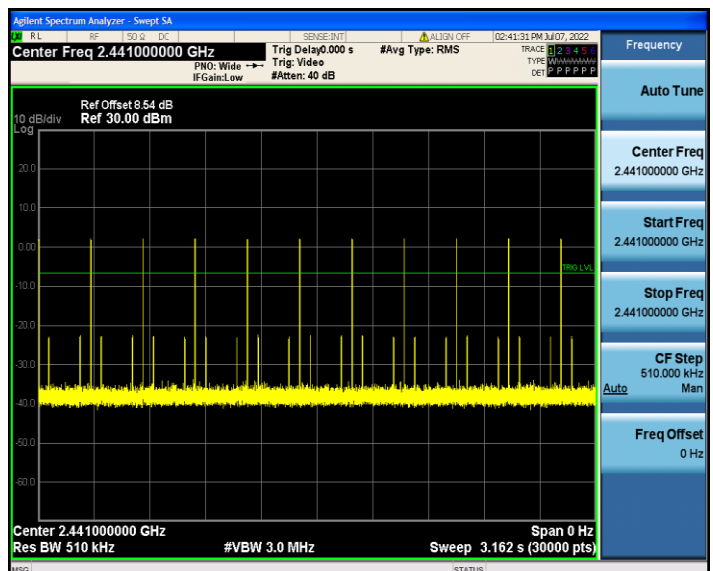
### Number of pulses in 3.16 s – DH3



### Pulse width – DH5

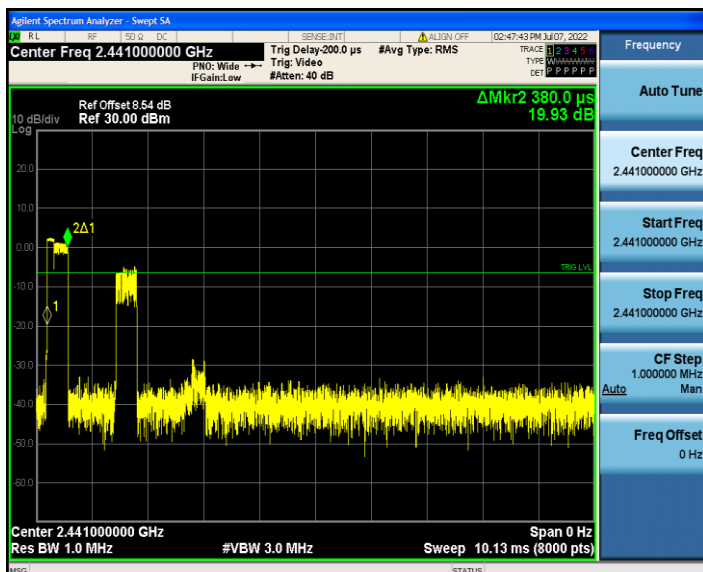


### Number of pulses in 3.16 s – DH5

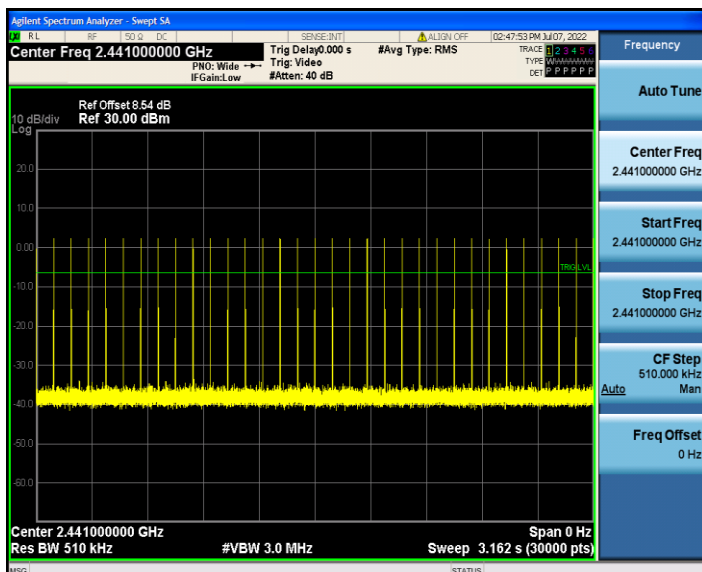


## $\pi/4$ -DQPSK - Average time of occupancy

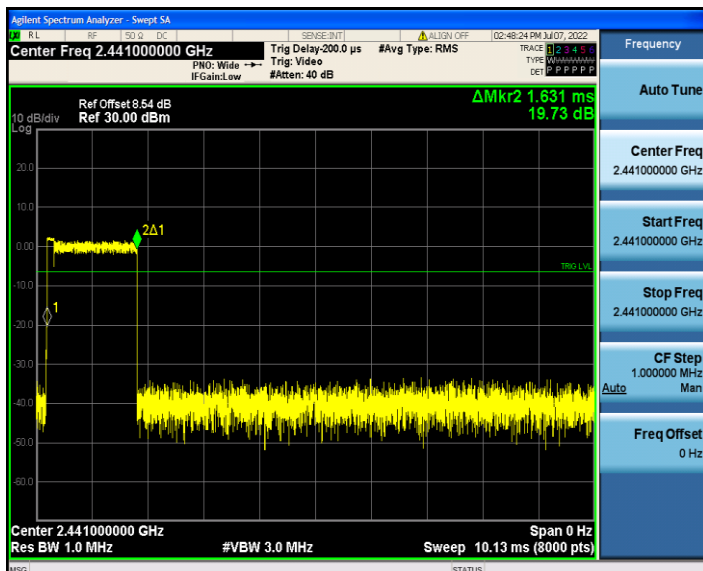
### Pulse width – 2DH1



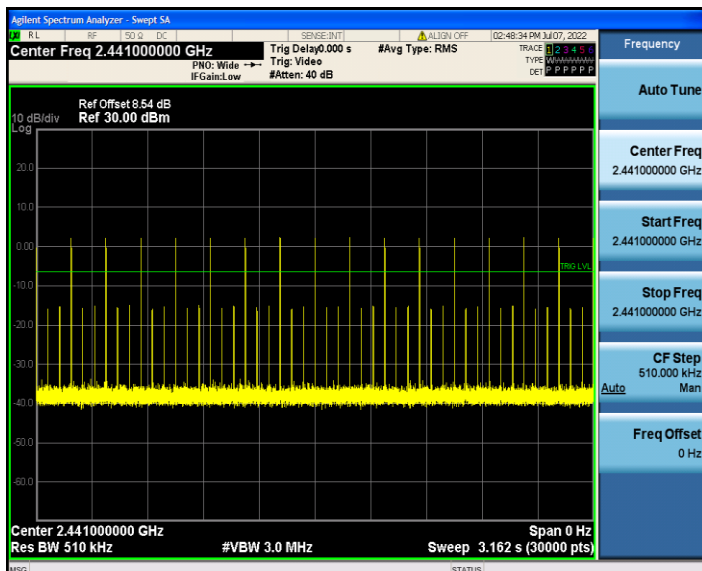
### Number of pulses in 3.16 s – 2DH1



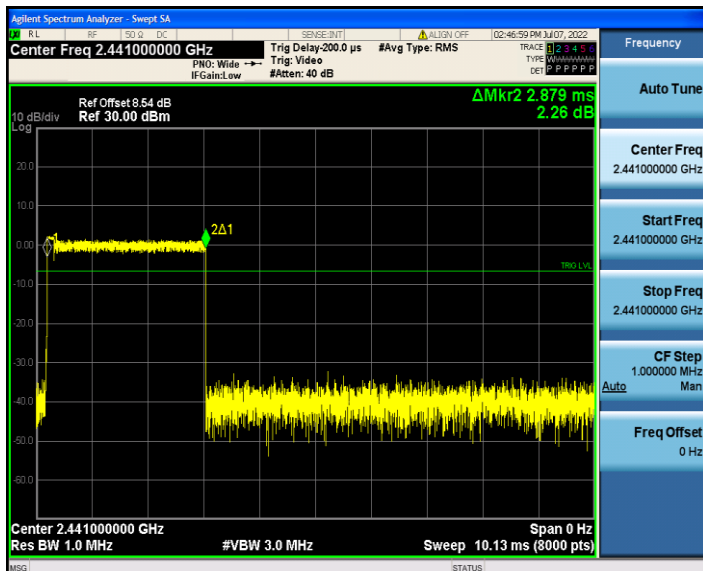
### Pulse width – 2DH3



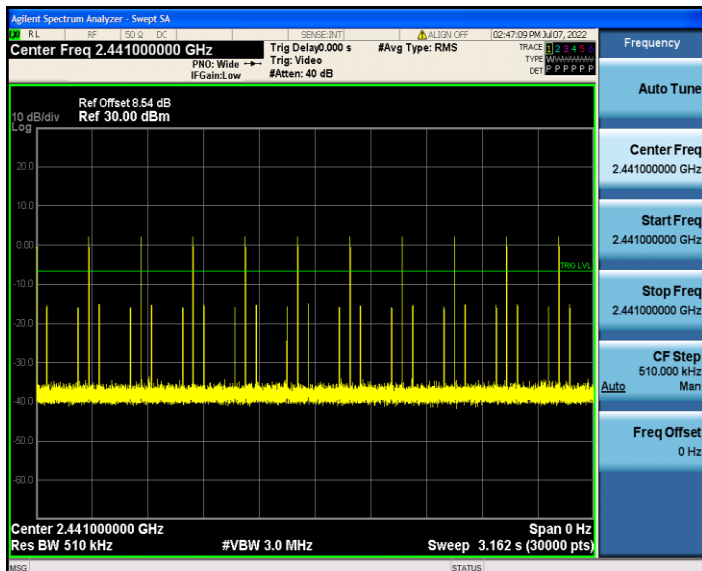
### Number of pulses in 3.16 s – 2DH3



### Pulse width – 2DH5

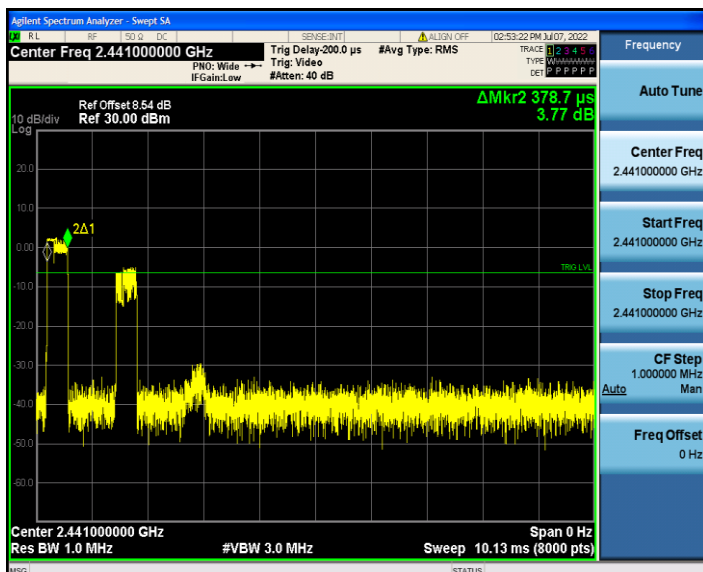


### Number of pulses in 3.16 s – 2DH5

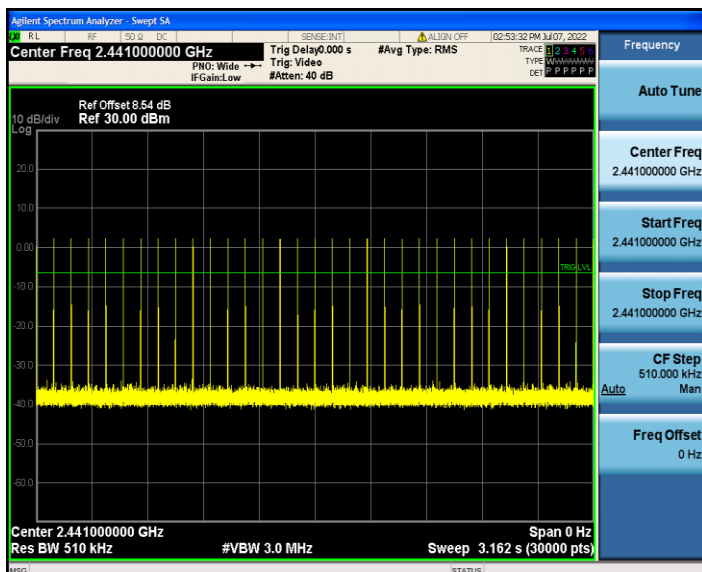


## 8DPSK - Average time of occupancy

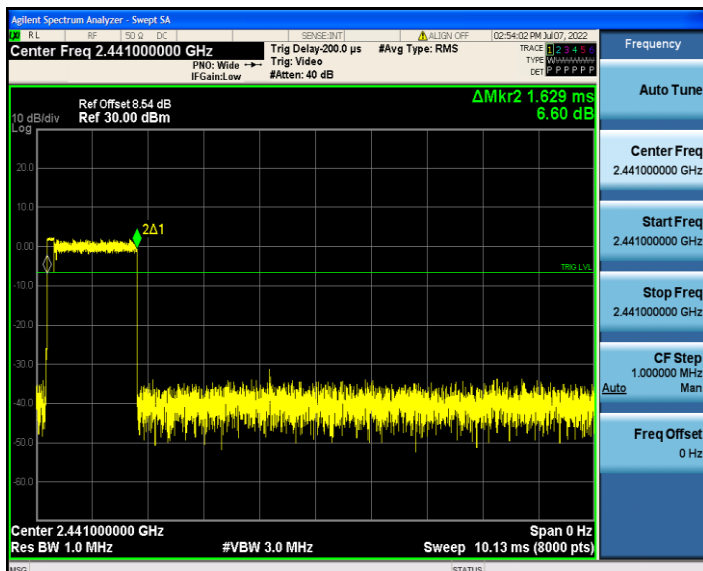
### Pulse width – 3DH1



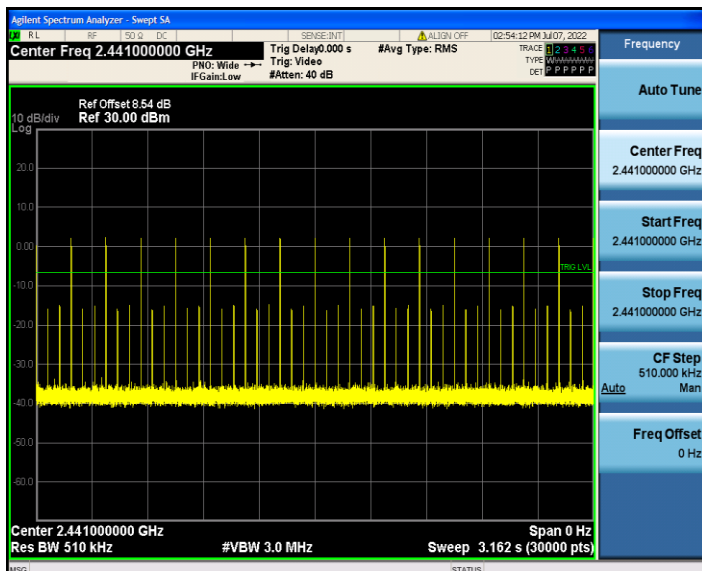
### Number of pulses in 3.16 s – 3DH1



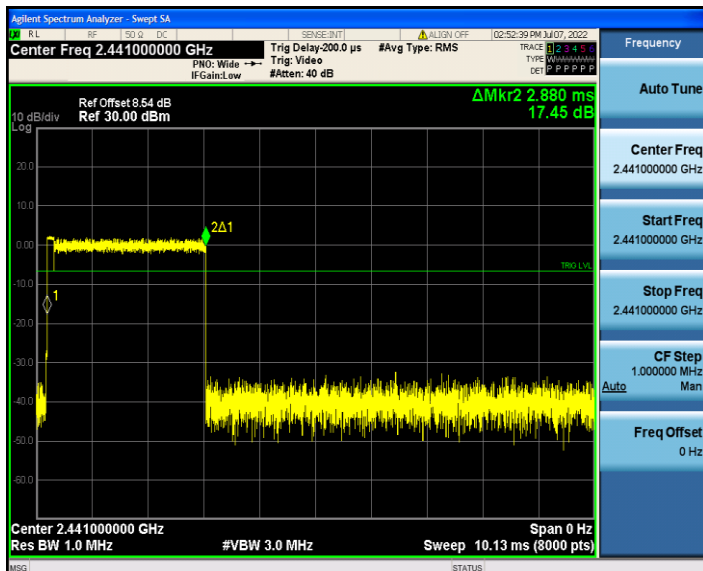
### Pulse width – 3DH3



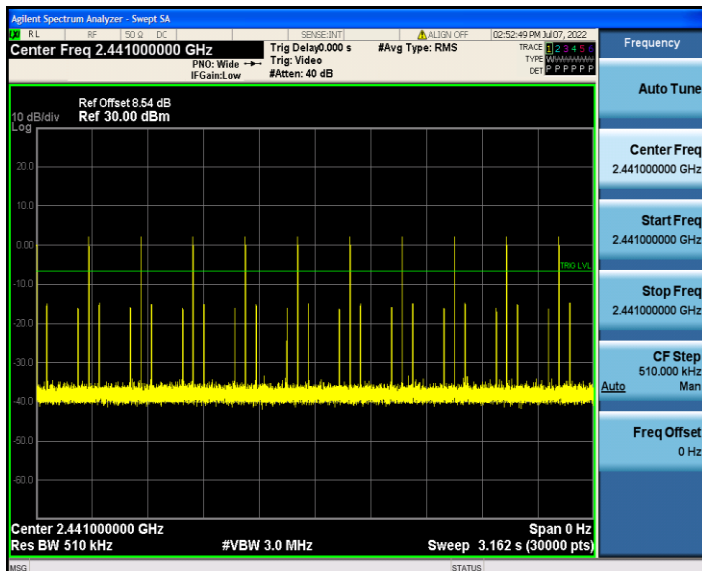
### Number of pulses in 3.16 s – 3DH3



### Pulse width – 3DH5



### Number of pulses in 3.16 s – 3DH5

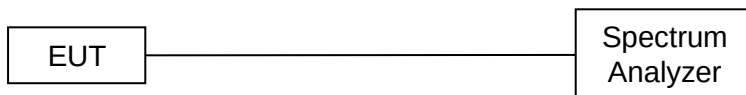


## 5.7 Number of hopping channels

### 5.7.1 Limit

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

### 5.7.2 Test setup



### 5.7.3 Test procedure

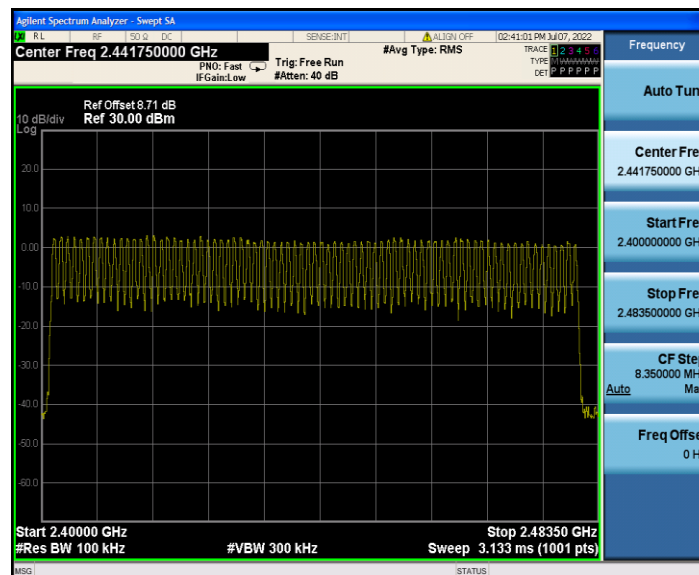
- a) Test method: ANSI C63.10-2013 Section 7.8.3
- b) The EUT was set to hopping mode during the test.
- c) The tranistter output of EUT is connnected to the specturm analyzer.
- d) Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

### 5.7.4 Test results

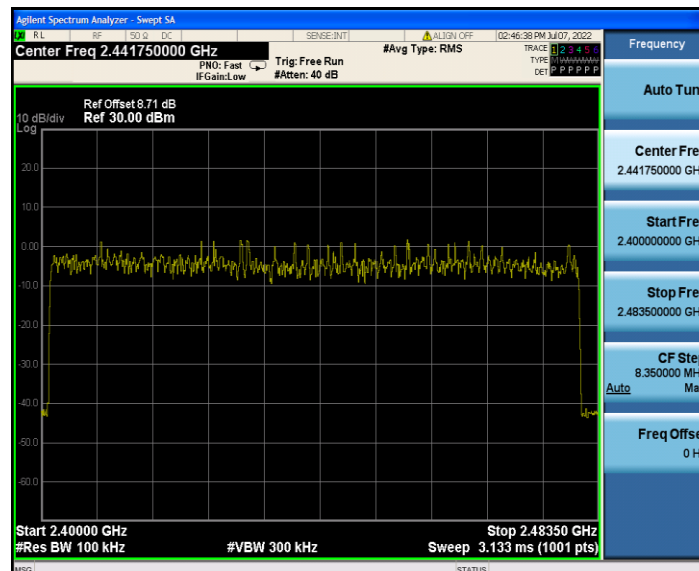
| Mode           | Quantity of Hopping Channel | Limit | Results |
|----------------|-----------------------------|-------|---------|
| GFSK           | 79                          | ≥15   | Pass    |
| $\pi/4$ -DQPSK | 79                          | ≥15   | Pass    |
| 8DPSK          | 79                          | ≥15   | Pass    |

## Number of hopping channels

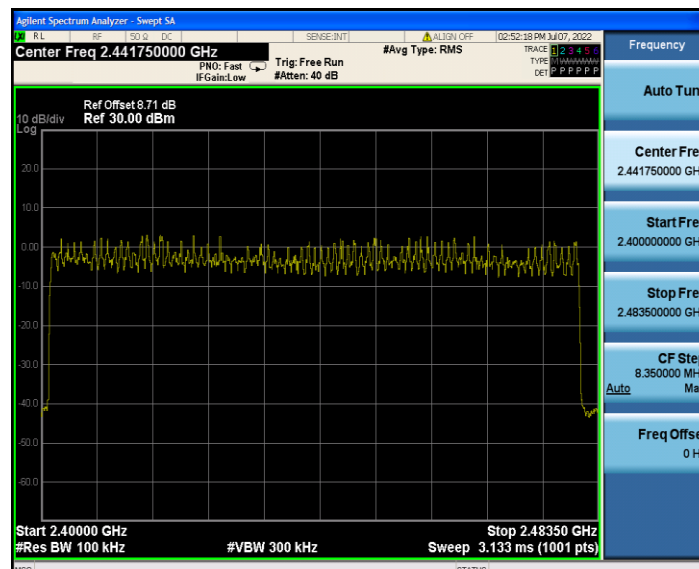
### GFSK



### $\pi/4$ -DQPSK



### 8DPSK

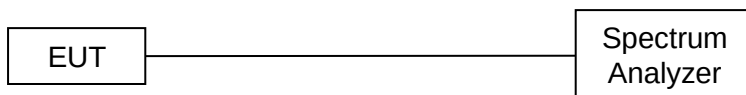


## 5.8 Conducted emissions at the band edge

### 5.8.1 Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

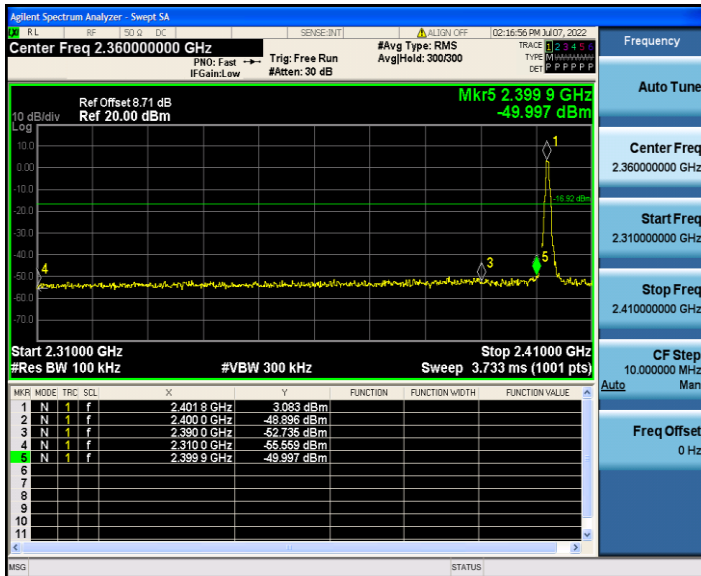
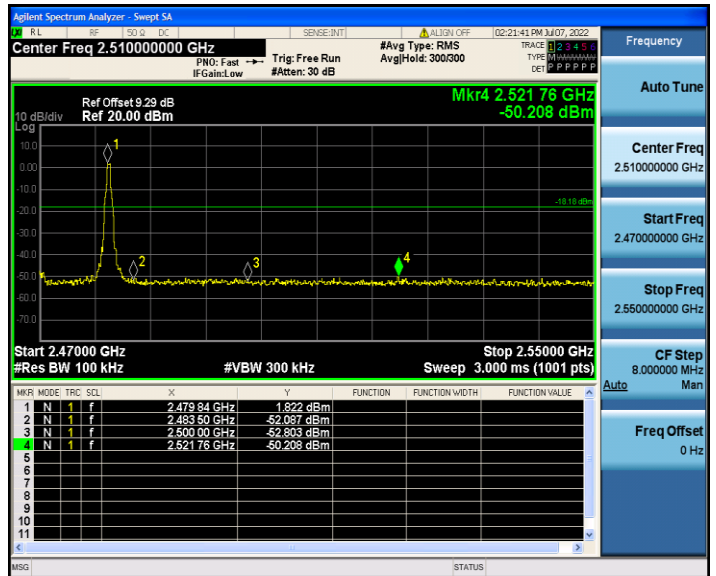
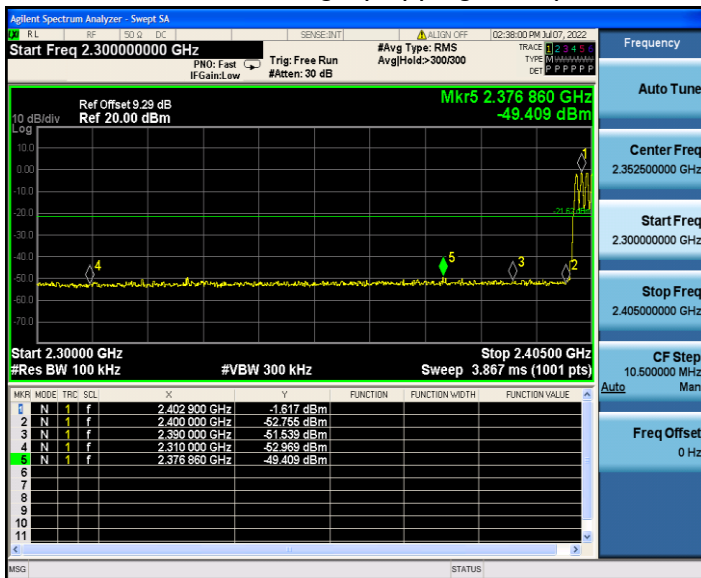
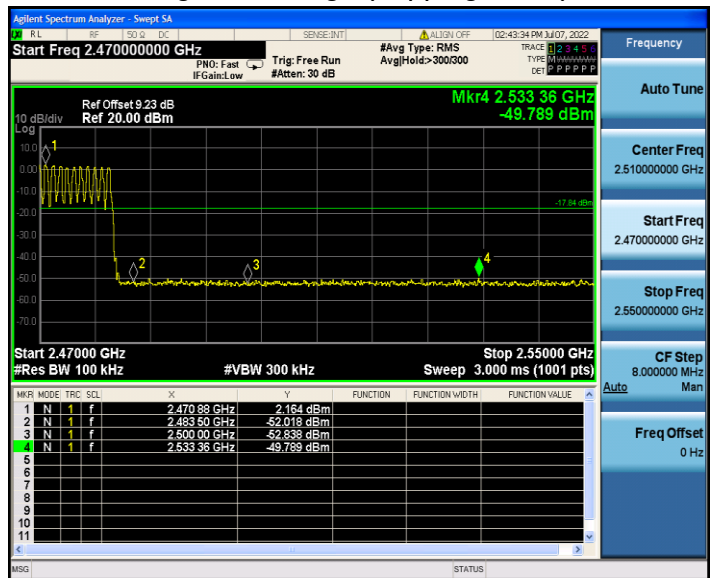
### 5.8.2 Test setup



### 5.8.3 Test procedure

- Test method: ANSI C63.10-2013 Section 6.10.4
- The EUT was set to non-hopping mode & hopping mode during the test.
- The transmitter output of EUT is connected to the spectrum analyzer.
- Spectrum analyzer setting: RBW = 100 kHz, VBW = 300 kHz, Detector = Peak.

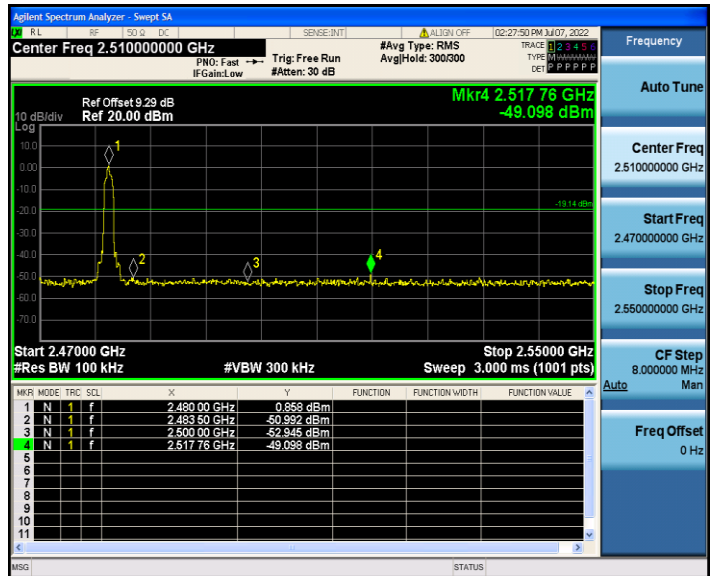
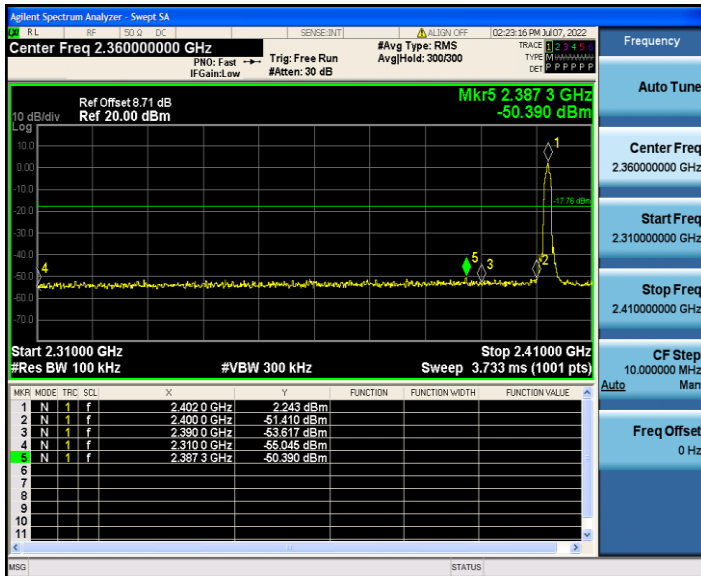
### 5.8.4 Test results

**GFSK mode - conducted emissions at the band edge**
**Low band-edge (no-hopping mode)**

**High band-edge (non-hopping mode)**

**Low band-edge (hopping mode)**

**High band-edge (hopping mode)**


# $\pi/4$ -DQPSK mode - conducted emissions at the band edge

## Low band-edge (non-hopping mode)

## High band-edge (non-hopping mode)



## Low band-edge (hopping mode)

## High band-edge (hopping mode)

