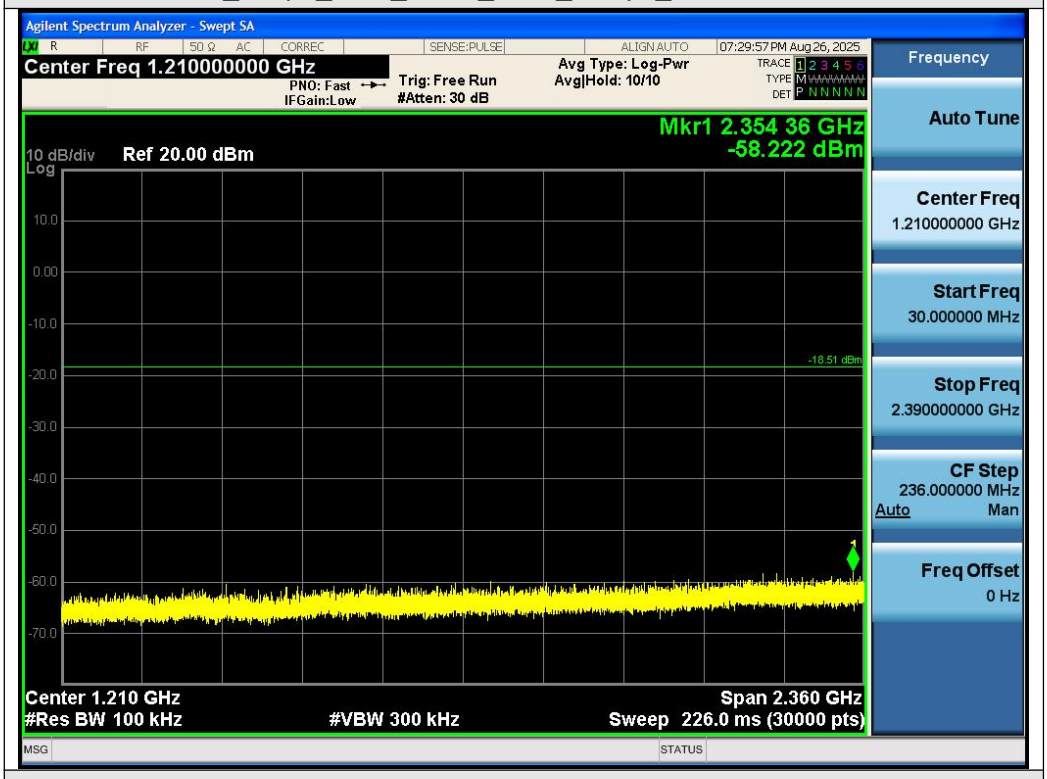
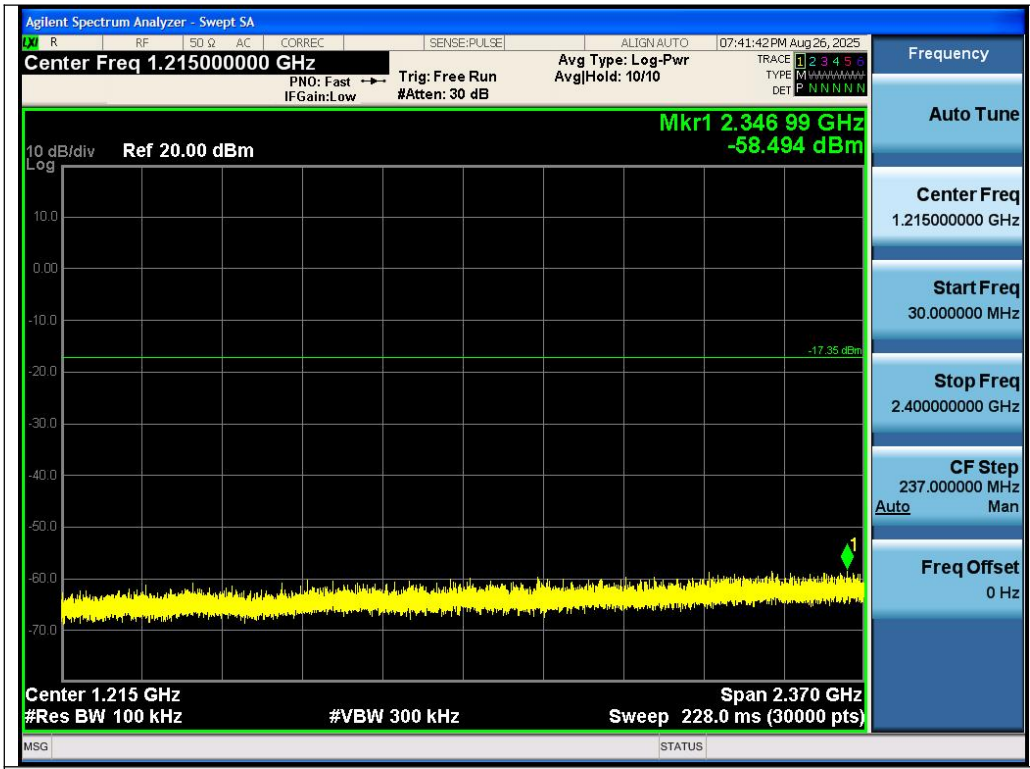

Test_Graph_EDR_ANT1_2402_3Mbps_Reference Level



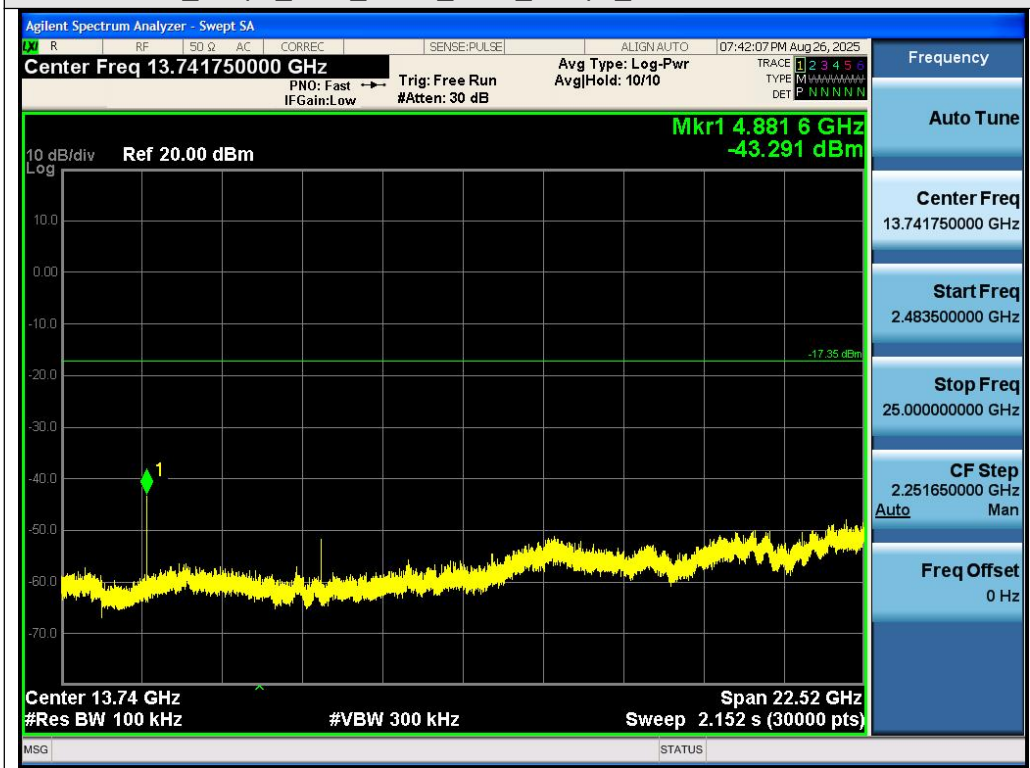

Test_Graph_EDR_ANT1_2402_3Mbps_Lower Band Emissions


Test_Graph_EDR_ANT1_2402_3Mbps_Higher Band Emissions


Test_Graph_EDR_ANT1_2441_3Mbps_Reference Level

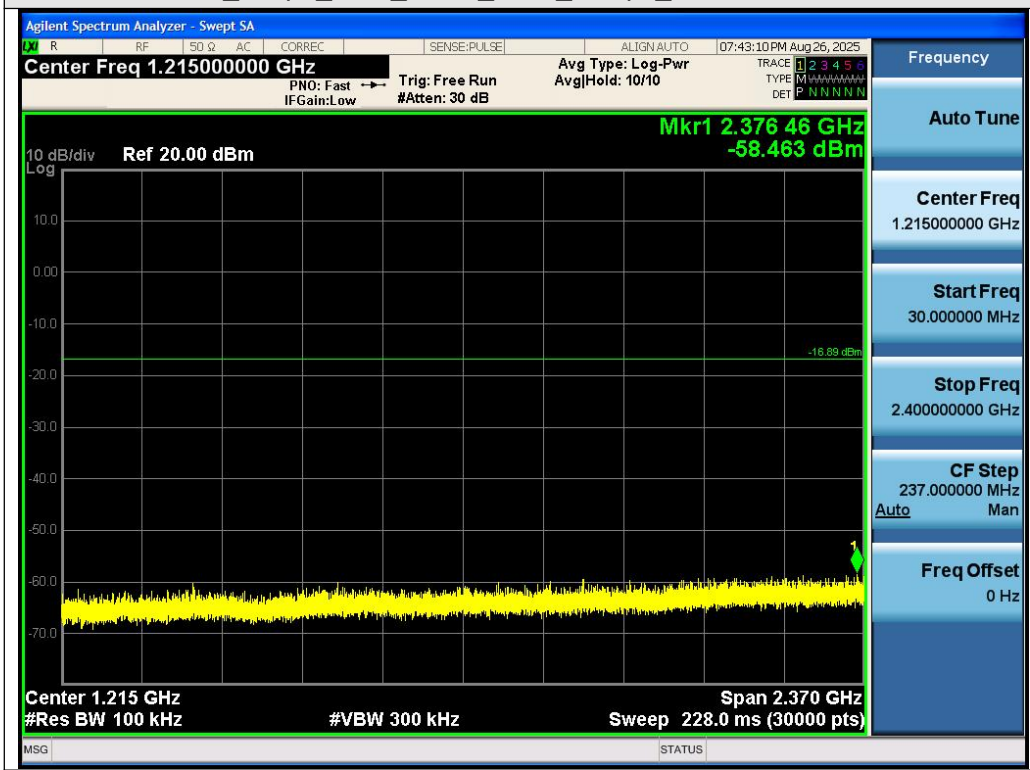



Test_Graph_EDR_ANT1_2441_3Mbps_Lower Band Emissions




Test_Graph_EDR_ANT1_2441_3Mbps_Higher Band Emissions

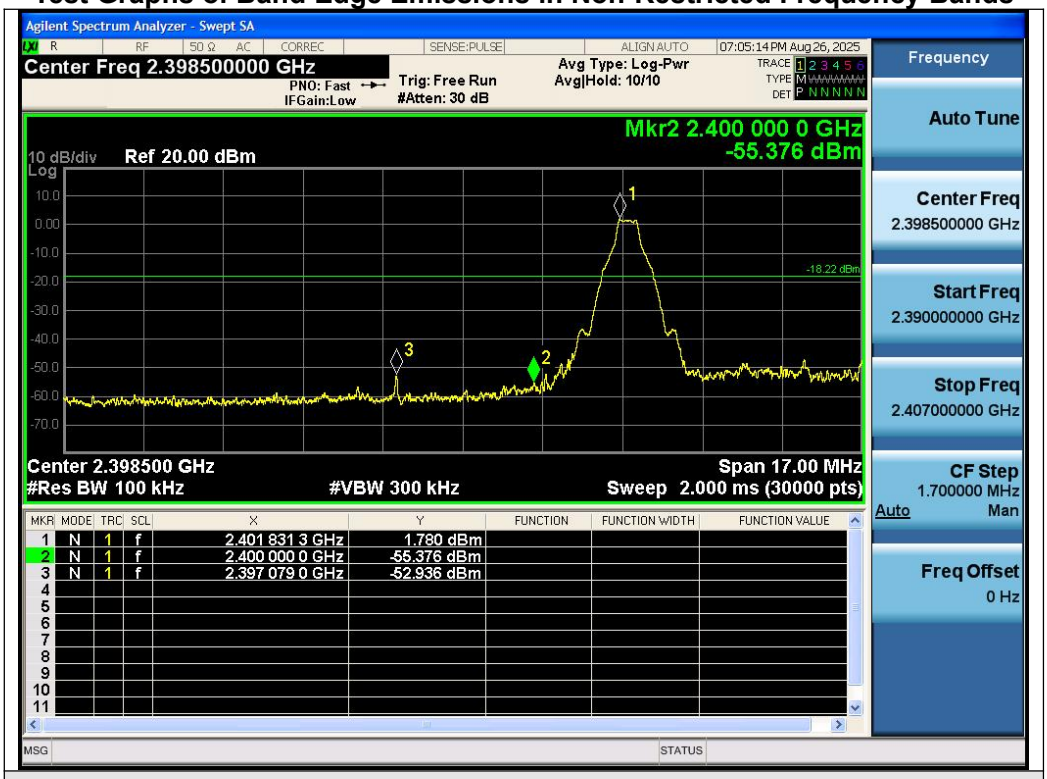

Test_Graph_EDR_ANT1_2480_3Mbps_Reference Level



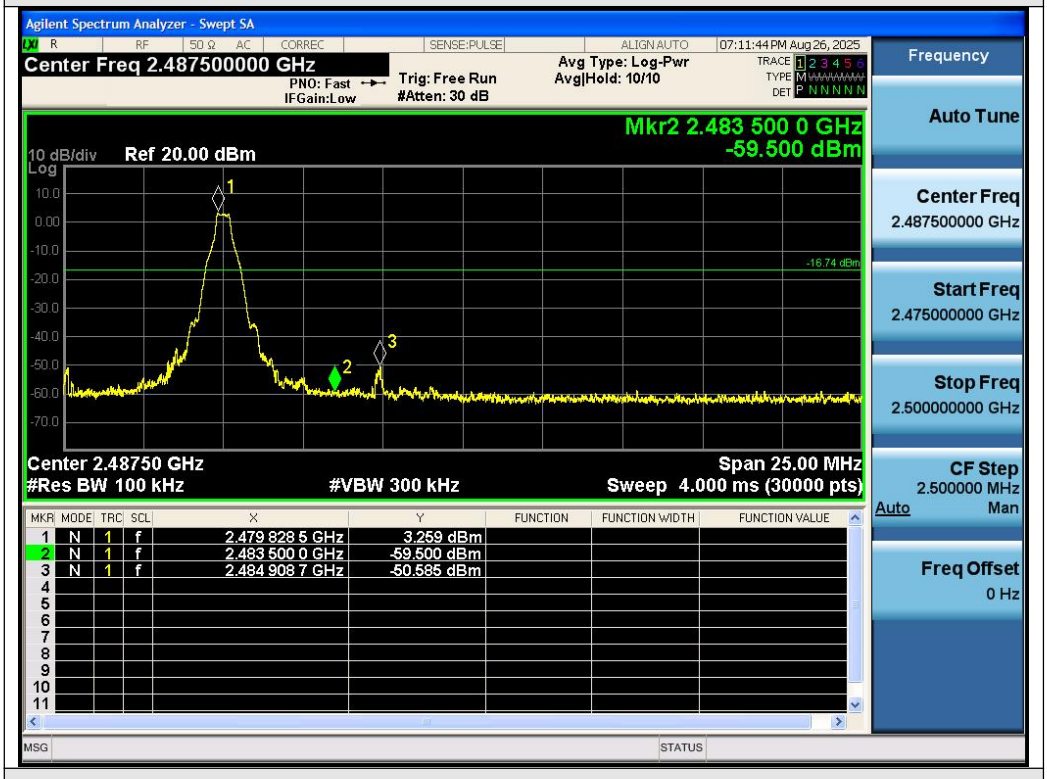

Test_Graph_EDR_ANT1_2480_3Mbps_Lower Band Emissions


Test_Graph_EDR_ANT1_2480_3Mbps_Higher Band Emissions

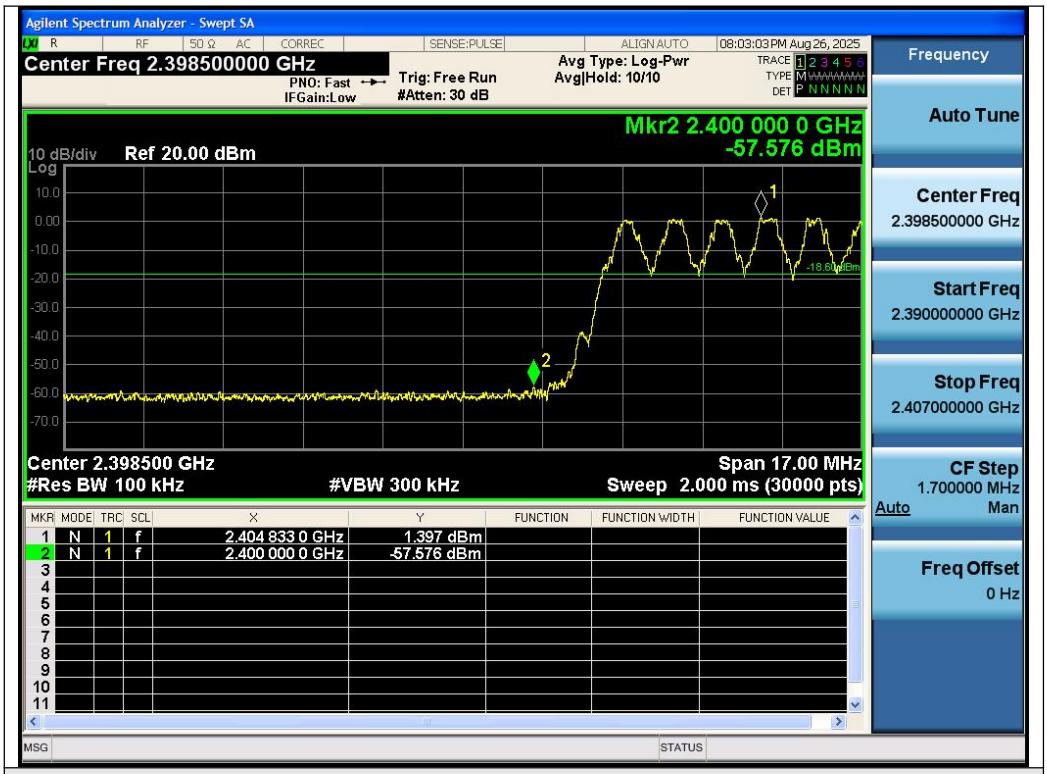
## Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



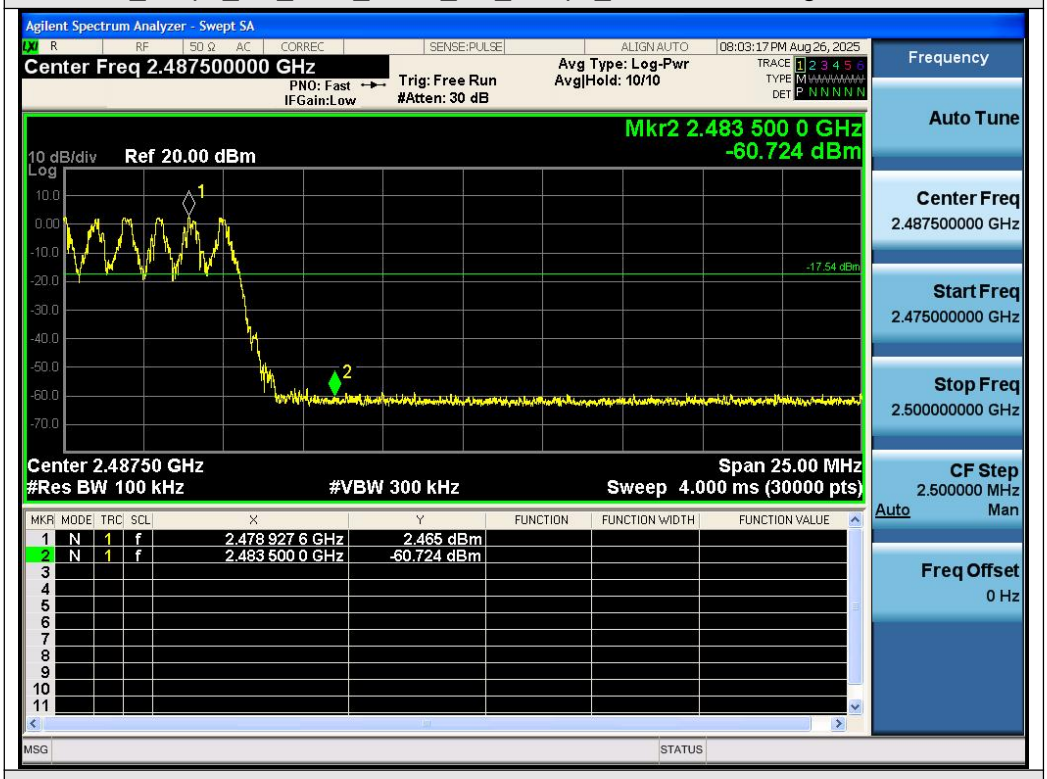

Test_Graph_BR_ANT1_2402_1Mbps_Lower Band Edge Emissions



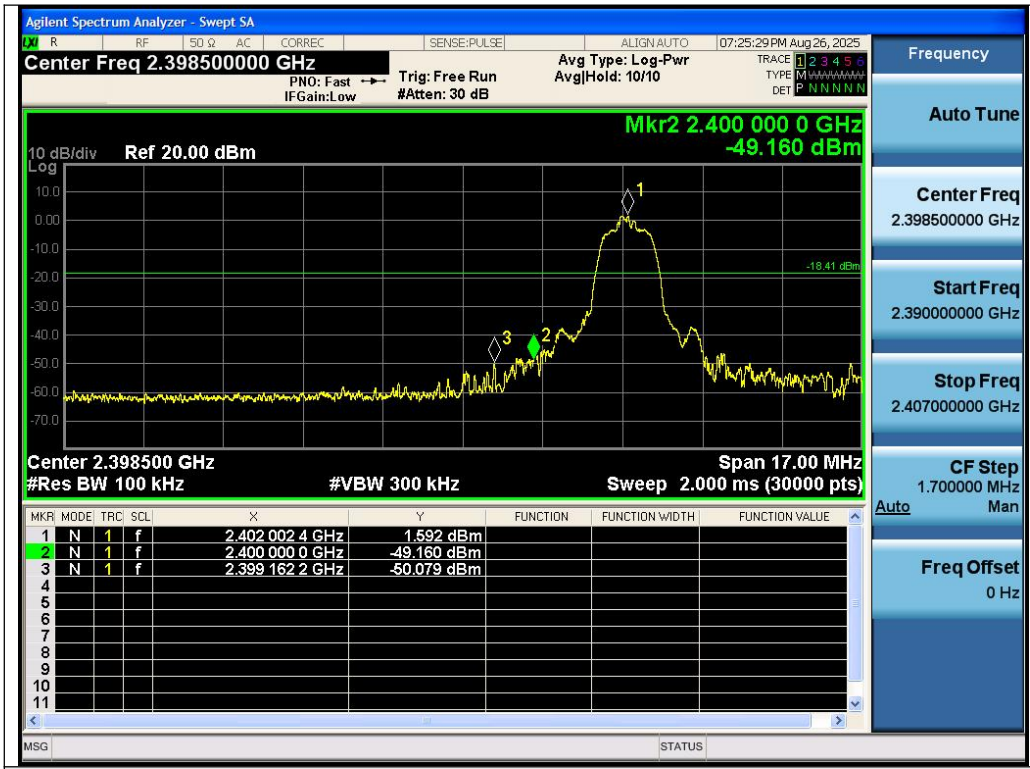

Test_Graph_BR_ANT1_2480_1Mbps_Higher Band Edge Emissions



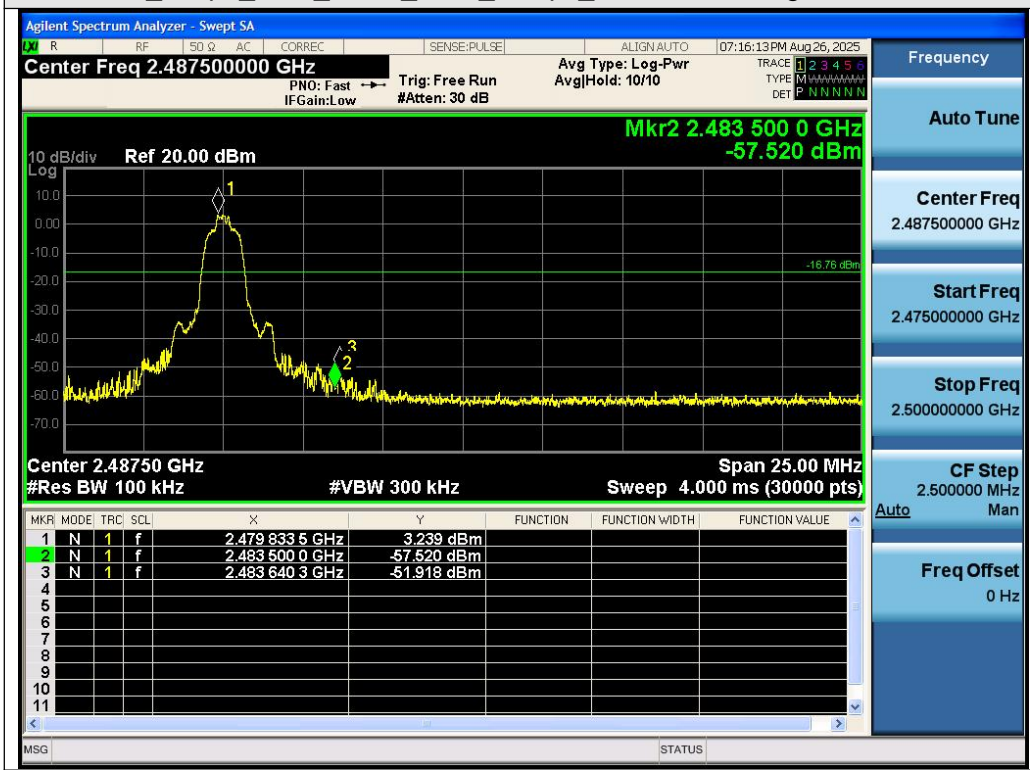

Test_Graph_BR_HOP_ANT1_NA_1Mbps_Lower Band Edge Emissions



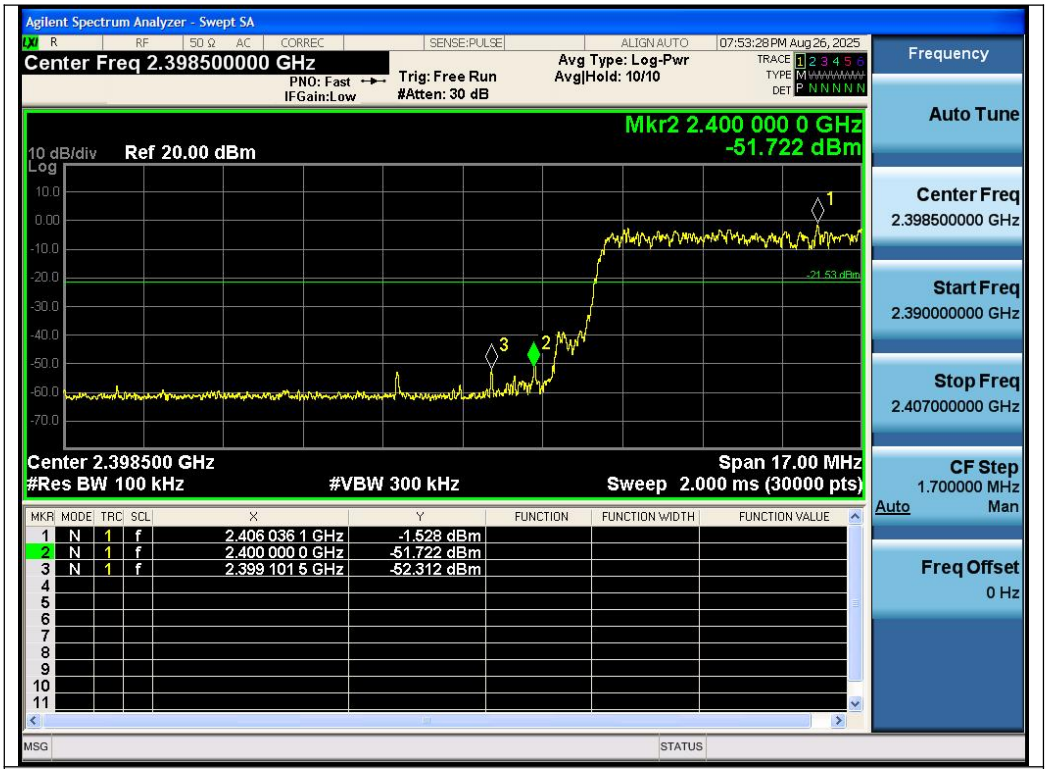

Test_Graph_BR_HOP_ANT1_NA_1Mbps_Higher Band Edge Emissions



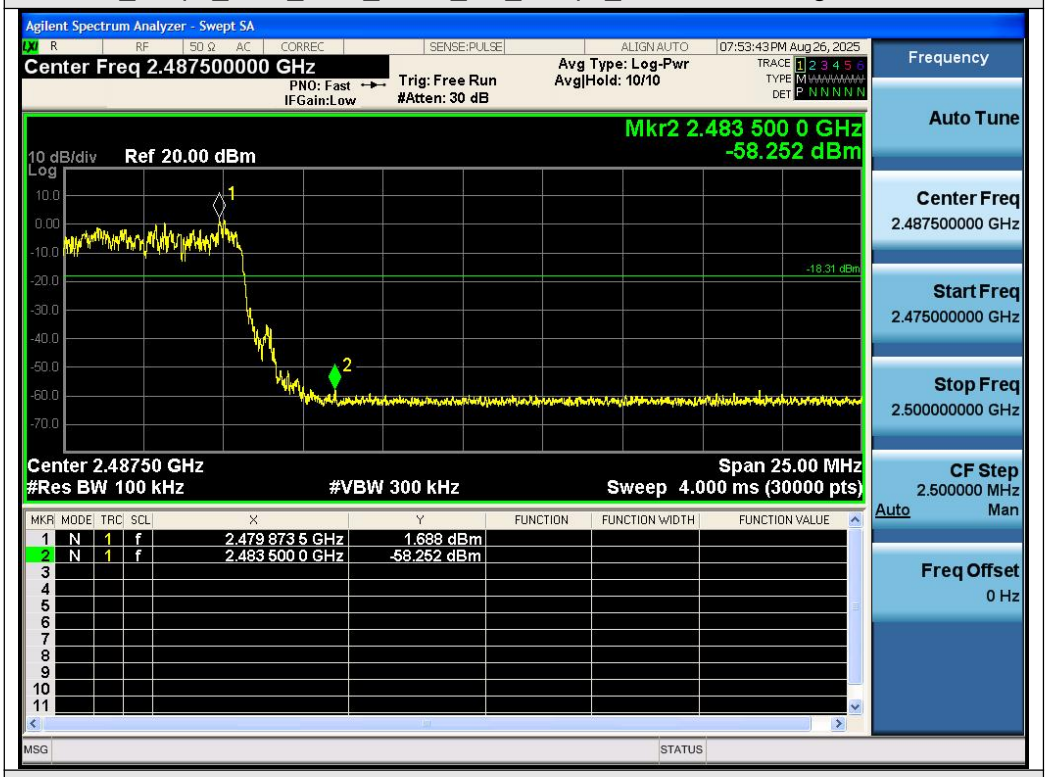

Test_Graph_EDR_ANT1_2402_2Mbps_Lower Band Edge Emissions



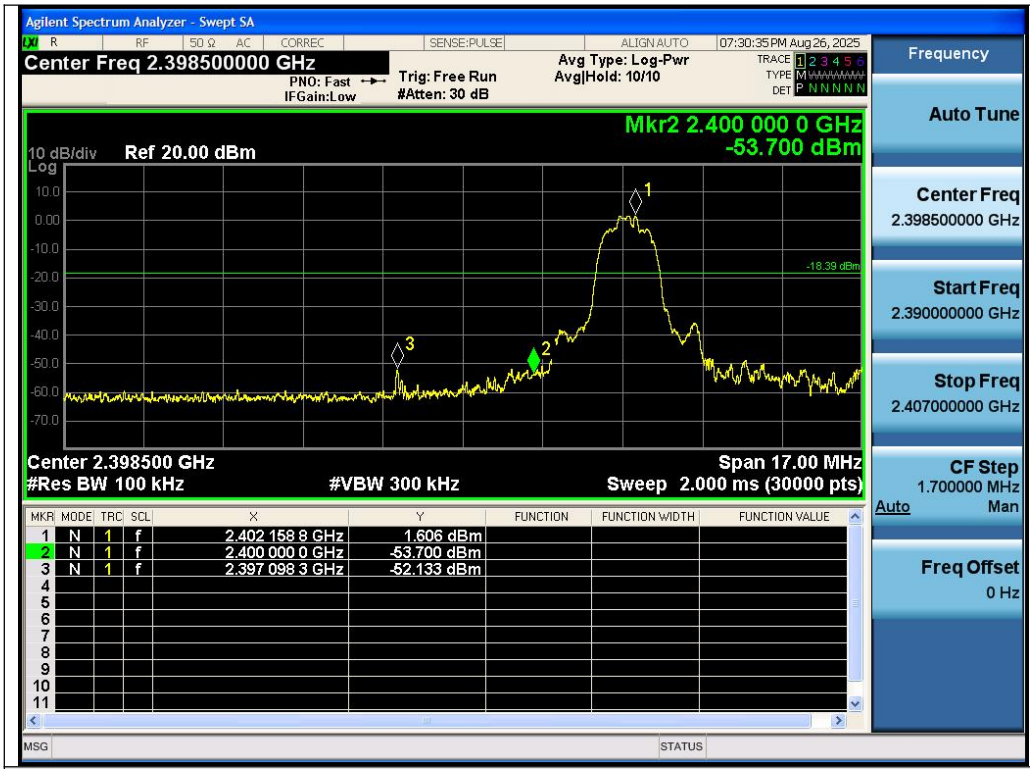

Test_Graph_EDR_ANT1_2480_2Mbps_Higher Band Edge Emissions



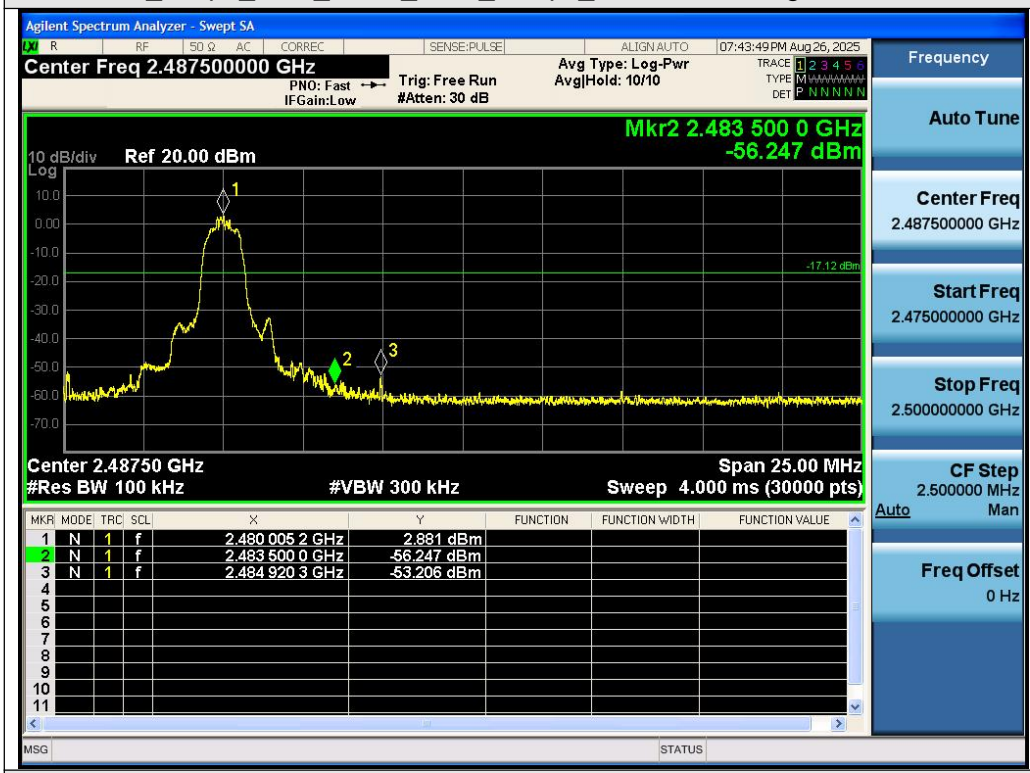

Test_Graph_EDR_HOP_ANT1_NA_2Mbps_Lower Band Edge Emissions



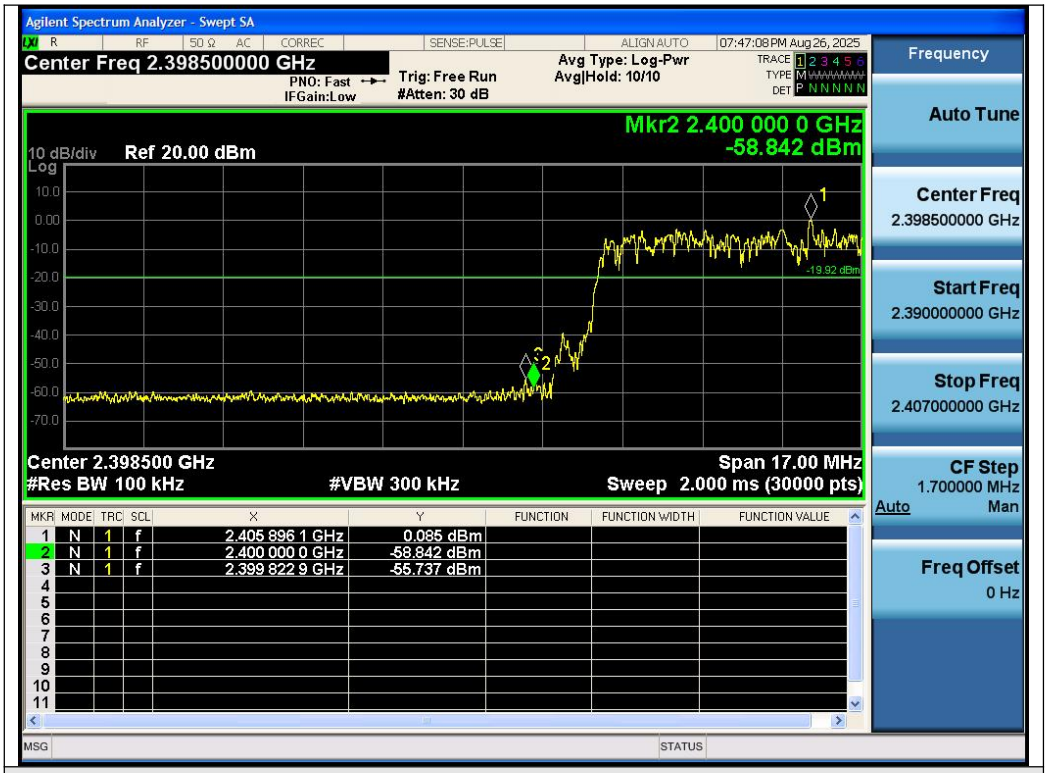

Test_Graph_EDR_HOP_ANT1_NA_2Mbps_Higher Band Edge Emissions




Test_Graph_EDR_ANT1_2402_3Mbps_Lower Band Edge Emissions




Test_Graph_EDR_ANT1_2480_3Mbps_Higher Band Edge Emissions




Test_Graph_EDR_HOP_ANT1_NA_3Mbps_Lower Band Edge Emissions


Test_Graph_EDR_HOP_ANT1_NA_3Mbps_Higher Band Edge Emissions

# 9. Radiated Spurious Emission

## 9.1 Measurement Limit

- 15.209 Limit in the below table has to be followed

| Frequencies (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

## 9.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |
| Start ~Stop Frequency | 1GHz~26.5GHz<br>1MHz/3MHz for Peak, 1MHz/3MHz for Average |

| Receiver Parameter | Setting |
|---|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |

- **Quasi-Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as shown in the table above
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

- **Peak Measurements above 1GHz**

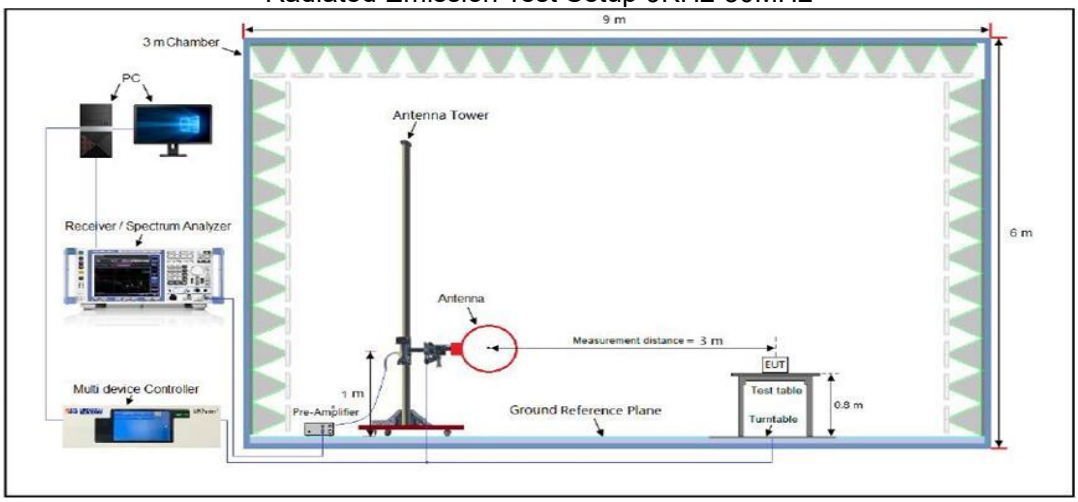
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

- **Average Measurements above 1GHz**

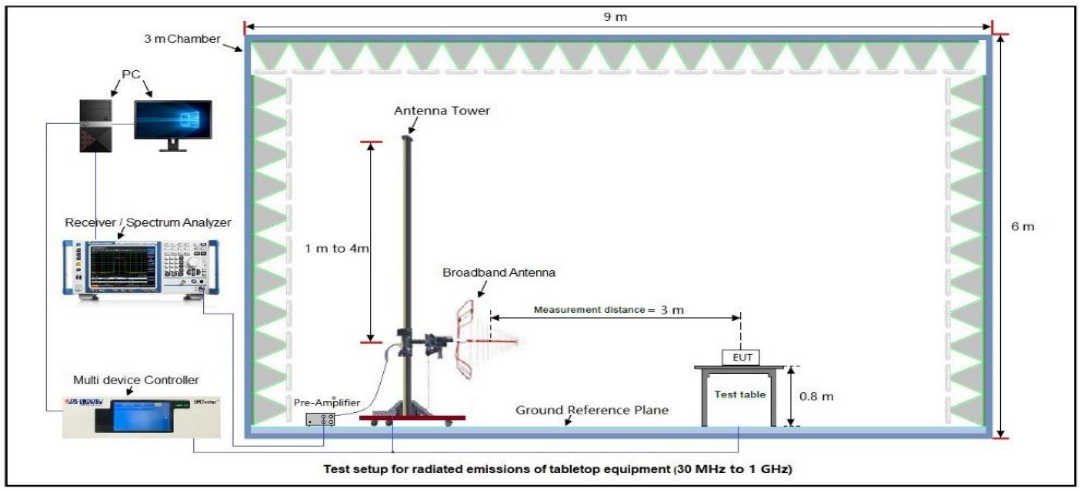
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ [3 × RBW]
4. Detector = Power averaging (rms)
5. Averaging type = power (i.e., rms)
6. Sweep time = auto
7. Perform a trace average of at least 100 traces.
8. The applicable correction factor is [10*log (1 / D)], where D is the duty cycle. The factor had been edited in the “Input Correction” of the Spectrum Analyzer.

## 9.3 Measurement Setup (Block Diagram of Configuration)

Radiated Emission Test Setup 9KHz-30MHz

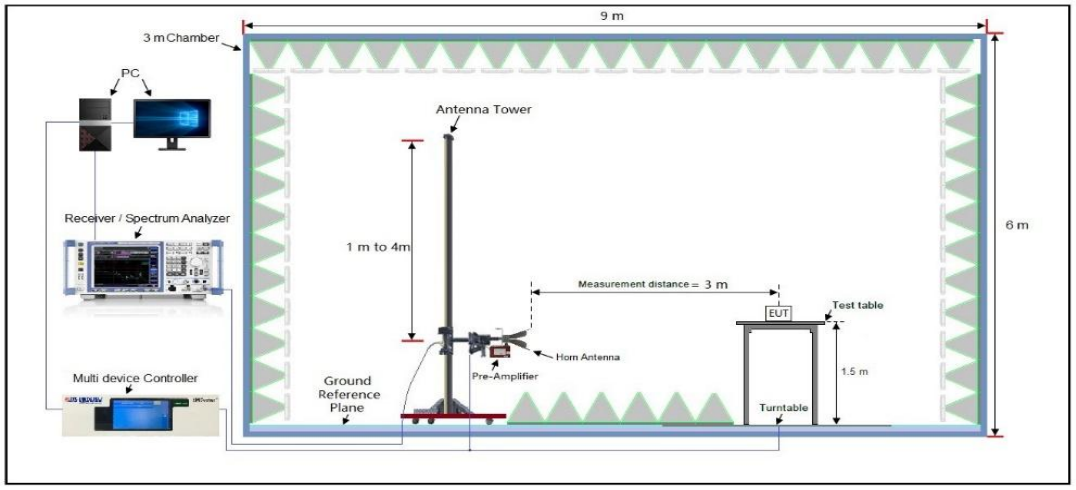



Radiated Emission Test Setup 30MHz-1000MHz




**Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)**

Radiated Emission Test Setup Above 1000MHz

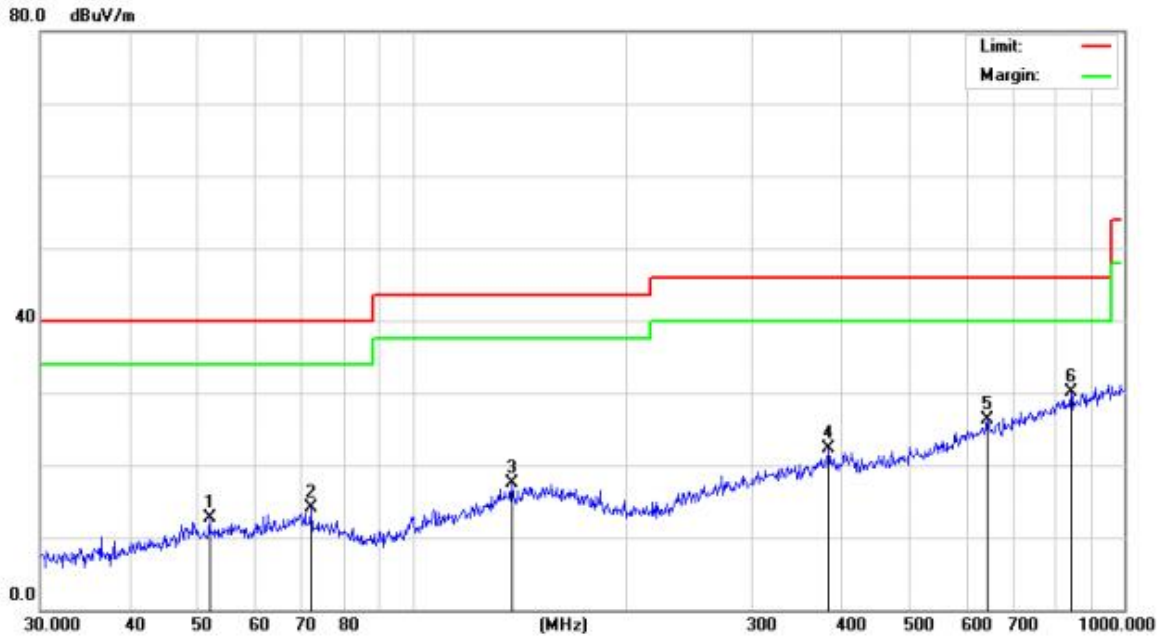


### 9.4 Measurement Result

**Radiated Emission Below 30MHz**

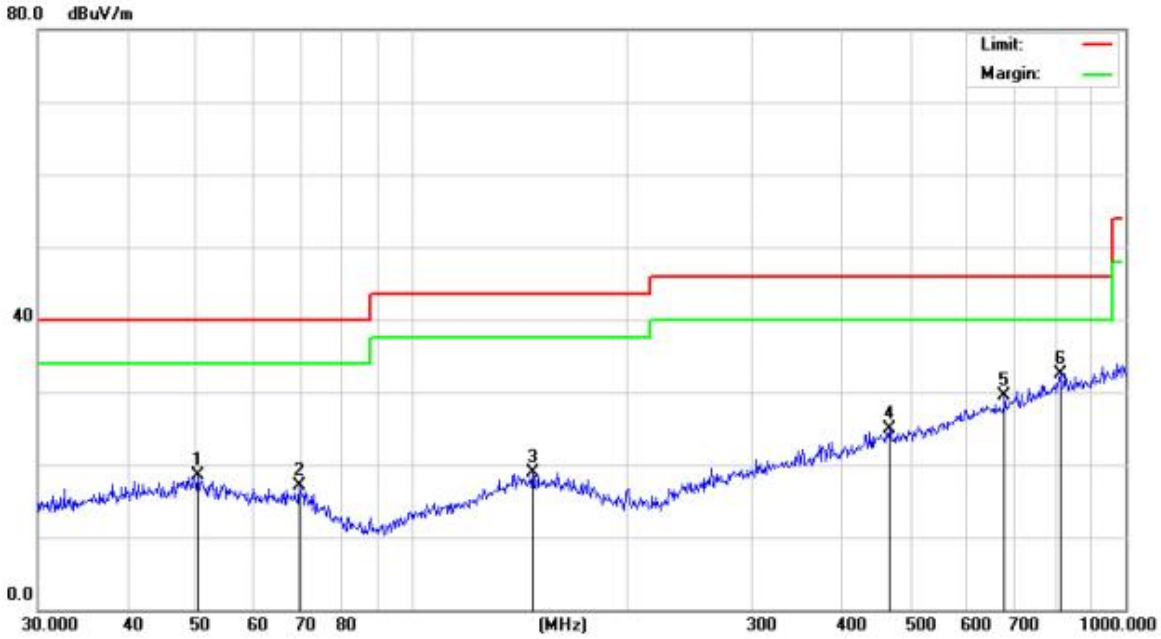
The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

| Radiated Emission Test Results at 30MHz-1GHz | | | |
|---|---|---|---|
| **EUT Name** | TRUE WIRELESS EARBUDS | **Model Name** | BT975 |
| **Temperature** | 21.5℃ | **Relative Humidity** | 53.2 % |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 9 | **Antenna Polarity** | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 51.8430 | 39.19 | -26.58 | 12.61 | 40.00 | -27.39 | peak |
| 2 | | 72.0841 | 39.33 | -25.28 | 14.05 | 40.00 | -25.95 | peak |
| 3 | | 137.9028 | 38.82 | -21.34 | 17.48 | 43.50 | -26.02 | peak |
| 4 | | 383.9318 | 39.92 | -17.70 | 22.22 | 46.00 | -23.78 | peak |
| 5 | | 642.8613 | 39.27 | -12.96 | 26.31 | 46.00 | -19.69 | peak |
| 6 | * | 842.1295 | 39.52 | -9.47 | 30.05 | 46.00 | -15.95 | peak |

| Radiated Emission Test Results at 30MHz-1GHz | | | |
|---|---|---|---|
| **EUT Name** | TRUE WIRELESS EARBUDS | **Model Name** | BT975 |
| **Temperature** | 21.5℃ | **Relative Humidity** | 53.2 % |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 9 | **Antenna Polarity** | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 50.2324 | 39.72 | -21.15 | 18.57 | 40.00 | -21.43 | peak |
| 2 | | 69.6005 | 39.82 | -22.70 | 17.12 | 40.00 | -22.88 | peak |
| 3 | | 147.9214 | 38.59 | -19.75 | 18.84 | 43.50 | -24.66 | peak |
| 4 | | 467.2349 | 39.71 | -14.90 | 24.81 | 46.00 | -21.19 | peak |
| 5 | | 677.5798 | 39.79 | -10.21 | 29.58 | 46.00 | -16.42 | peak |
| 6 | * | 810.2654 | 39.99 | -7.45 | 32.54 | 46.00 | -13.46 | peak |

**RESULT: Pass**

**Note:**

1. Factor=Antenna Factor + Cable loss - Pre-amplifier, Over=Measurement-Limit.
2. All test modes had been pre-tested. The mode 9 is the worst case and recorded in the report.

## Radiated Emissions Test Results Above 1GHz

| EUT Name | TRUE WIRELESS EARBUDS | Model Name | BT975 |
|---|---|---|---|
| Temperature | 21.5℃ | Relative Humidity | 53.2 % |
| Pressure | 960hPa | Test Voltage | DC 3.7V by battery |
| Test Mode | Mode 7 | Antenna Polarity | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4804.000 | 46.13 | 0.08 | 46.21 | 74 | -27.79 | peak |
| 4804.000 | 37.32 | 0.08 | 37.40 | 54 | -16.60 | AVG |
| 7206.000 | 41.34 | 2.21 | 43.55 | 74 | -30.45 | peak |
| 7206.000 | 32.66 | 2.21 | 34.87 | 54 | -19.13 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| EUT Name | TRUE WIRELESS EARBUDS | Model Name | BT975 |
|---|---|---|---|
| Temperature | 21.5℃ | Relative Humidity | 53.2 % |
| Pressure | 960hPa | Test Voltage | DC 3.7V by battery |
| Test Mode | Mode 7 | Antenna Polarity | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4804.000 | 46.55 | 0.08 | 46.63 | 74 | -27.37 | peak |
| 4804.000 | 37.30 | 0.08 | 37.38 | 54 | -16.62 | AVG |
| 7206.000 | 41.28 | 2.21 | 43.49 | 74 | -30.51 | peak |
| 7206.000 | 32.11 | 2.21 | 34.32 | 54 | -19.68 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RESULT: PASS**

## Radiated Emissions Test Results for Above 1GHz

| EUT Name | TRUE WIRELESS EARBUDS | Model Name | BT975 |
|---|---|---|---|
| Temperature | 21.5℃ | Relative Humidity | 53.2 % |
| Pressure | 960hPa | Test Voltage | DC 3.7V by battery |
| Test Mode | Mode 8 | Antenna Polarity | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4882.000 | 46.78 | 0.08 | 46.86 | 74 | -27.14 | peak |
| 4882.000 | 37.07 | 0.08 | 37.15 | 54 | -16.85 | AVG |
| 7323.000 | 41.24 | 2.21 | 43.45 | 74 | -30.55 | peak |
| 7323.000 | 32.44 | 2.21 | 34.65 | 54 | -19.35 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| EUT Name | TRUE WIRELESS EARBUDS | Model Name | BT975 |
|---|---|---|---|
| Temperature | 21.5℃ | Relative Humidity | 53.2 % |
| Pressure | 960hPa | Test Voltage | DC 3.7V by battery |
| Test Mode | Mode 8 | Antenna Polarity | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4882.000 | 46.05 | 0.08 | 46.13 | 74 | -27.87 | peak |
| 4882.000 | 37.92 | 0.08 | 38.00 | 54 | -16.00 | AVG |
| 7323.000 | 41.33 | 2.21 | 43.54 | 74 | -30.46 | peak |
| 7323.000 | 32.63 | 2.21 | 34.84 | 54 | -19.16 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RESULT: PASS**

**Radiated Emissions Test Results for Above 1GHz**

| | | | |
|---|---|---|---|
| **EUT Name** | TRUE WIRELESS EARBUDS | **Model Name** | BT975 |
| **Temperature** | 21.5℃ | **Relative Humidity** | 53.2 % |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 9 | **Antenna Polarity** | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4960.000 | 46.80 | 0.08 | 46.88 | 74 | -27.12 | peak |
| 4960.000 | 37.37 | 0.08 | 37.45 | 54 | -16.55 | AVG |
| 7440.000 | 41.25 | 2.21 | 43.46 | 74 | -30.54 | peak |
| 7440.000 | 32.93 | 2.21 | 35.14 | 54 | -18.86 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| | | | |
|---|---|---|---|
| **EUT Name** | TRUE WIRELESS EARBUDS | **Model Name** | BT975 |
| **Temperature** | 21.5℃ | **Relative Humidity** | 53.2 % |
| **Pressure** | 960hPa | **Test Voltage** | DC 3.7V by battery |
| **Test Mode** | Mode 9 | **Antenna Polarity** | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4960.000 | 46.53 | 0.08 | 46.61 | 74 | -27.39 | peak |
| 4960.000 | 37.25 | 0.08 | 37.33 | 54 | -16.67 | AVG |
| 7440.000 | 41.11 | 2.21 | 43.32 | 74 | -30.68 | peak |
| 7440.000 | 32.66 | 2.21 | 34.87 | 54 | -19.13 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

**RESULT: PASS**

**Note:**

1. The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.
2. Factor = Antenna Factor + Cable loss – Pre-amplifier gain, Margin =Emission Level-Limit.
3. The “Factor” value can be calculated automatically by software of measurement system.
4. All mode rates are tested and evaluated, 8DPSK modulated 3DH5 mode is the worst case and documented in the report.

## Band Edge Emission Test Results for Restricted Bands

| EUT Name | TRUE WIRELESS EARBUDS | Model Name | BT975 |
|---|---|---|---|
| Temperature | 21.5℃ | Relative Humidity | 53.2 % |
| Pressure | 960hPa | Test Voltage | DC 3.7V by battery |

**Bluetooth Tx CH00_2402 MHz_1Mbps**

| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 36.98 | 29.99 | 30.21 | 8.35 | 45.11 | 74 | 28.89 | Peak | Horizontal |
| 2 | 2390.00 | 26.30 | 29.99 | 30.21 | 8.35 | 34.43 | 54 | 19.57 | AV | Horizontal |
| 3 | 2390.00 | 32.68 | 29.99 | 30.21 | 8.35 | 40.81 | 74 | 33.20 | Peak | Vertical |
| 4 | 2390.00 | 22.37 | 29.99 | 30.21 | 8.35 | 30.50 | 54 | 23.50 | AV | Vertical |

**Bluetooth Tx CH78_2480 MHz_1Mbps**

| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 40.31 | 30.25 | 30.25 | 8.5 | 48.81 | 74 | 25.19 | Peak | Horizontal |
| 2 | 2483.50 | 28.25 | 30.25 | 30.25 | 8.5 | 36.75 | 54 | 17.25 | AV | Horizontal |
| 3 | 2483.50 | 35.34 | 30.25 | 30.25 | 8.5 | 43.84 | 74 | 30.16 | Peak | Vertical |
| 4 | 2483.50 | 24.29 | 30.25 | 30.25 | 8.5 | 32.79 | 54 | 21.22 | AV | Vertical |

**Bluetooth Tx CH00_2402 MHz_2Mbps**

| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2390.00 | 37.37 | 29.99 | 30.21 | 8.35 | 45.50 | 74 | 28.50 | Peak | Horizontal |
| 2 | 2390.00 | 26.41 | 29.99 | 30.21 | 8.35 | 34.54 | 54 | 19.46 | AV | Horizontal |
| 3 | 2390.00 | 34.15 | 29.99 | 30.21 | 8.35 | 42.28 | 74 | 31.72 | Peak | Vertical |
| 4 | 2390.00 | 23.51 | 29.99 | 30.21 | 8.35 | 31.64 | 54 | 22.36 | AV | Vertical |

**Bluetooth Tx CH78_2480 MHz_2Mbps**

| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 52.45 | 30.25 | 30.25 | 8.5 | 60.95 | 74 | 13.05 | Peak | Horizontal |
| 2 | 2483.50 | 28.55 | 30.25 | 30.25 | 8.5 | 37.05 | 54 | 16.95 | AV | Horizontal |
| 3 | 2483.50 | 48.92 | 30.25 | 30.25 | 8.5 | 57.42 | 74 | 16.58 | Peak | Vertical |
| 4 | 2483.50 | 25.47 | 30.25 | 30.25 | 8.5 | 33.97 | 54 | 20.03 | AV | Vertical |

| Bluetooth Tx CH00_2402 MHz_3Mbps | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
| 1 | 2390.00 | 37.31 | 29.99 | 30.21 | 8.35 | 45.44 | 74 | 28.56 | Peak | Horizontal |
| 2 | 2390.00 | 26.25 | 29.99 | 30.21 | 8.35 | 34.38 | 54 | 19.62 | AV | Horizontal |
| 3 | 2390.00 | 33.59 | 29.99 | 30.21 | 8.35 | 41.72 | 74 | 32.29 | Peak | Vertical |
| 4 | 2390.00 | 22.83 | 29.99 | 30.21 | 8.35 | 30.96 | 54 | 23.04 | AV | Vertical |
| **Bluetooth Tx CH78_2480 MHz_3Mbps** | | | | | | | | | | |
| Item (Mark) | Freq. MHz | Reading dBμV | Ant. Fac. dB/m | PRM Factor dB | Cable Loss dB | Level dBμV/m | Limit dBμV/m | Margin dB | Detector | Pol. |
| 1 | 2483.50 | 49.27 | 30.25 | 30.25 | 8.5 | 57.77 | 74 | 16.23 | Peak | Horizontal |
| 2 | 2483.50 | 28.55 | 30.25 | 30.25 | 8.5 | 37.05 | 54 | 16.95 | AV | Horizontal |
| 3 | 2483.50 | 45.98 | 30.25 | 30.25 | 8.5 | 54.48 | 74 | 19.52 | Peak | Vertical |
| 4 | 2483.50 | 24.42 | 30.25 | 30.25 | 8.5 | 32.92 | 54 | 21.08 | AV | Vertical |

Remark:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.
2. The other emission levels were very low against the limit.
3. Margin = Limit - Emission Level.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=3MHz/Sweep time=Auto/Detector=Average.

**RESULT: PASS**

# 10. Number of Hopping Frequency Measurement

## 10.1 Provisions Applicable

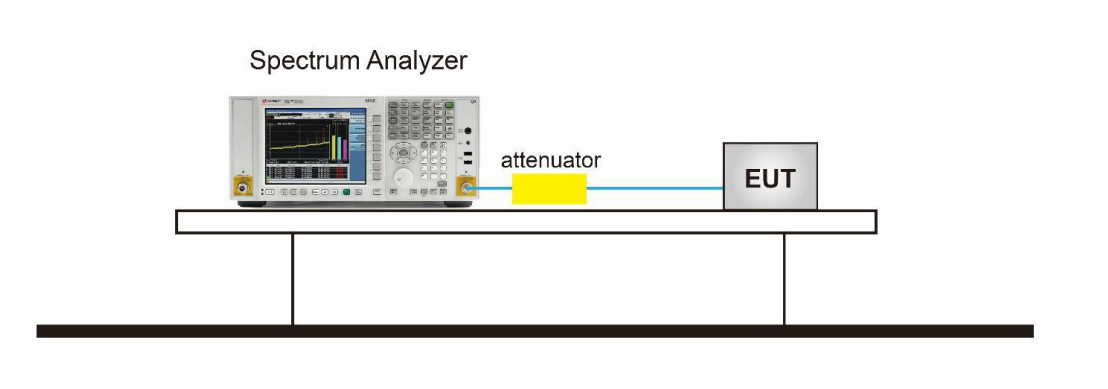
This frequency hopping system must employ a minimum of 15 hopping channels.

## 10.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span = The frequency band of operation. Depending on the number of channels the device
2. supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
3. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
4. VBW ⩾ RBW
5. Sweep time = Auto couple
6. Detector = Peak
7. Trace mode = Max hold
8. Allow the trace to stabilize

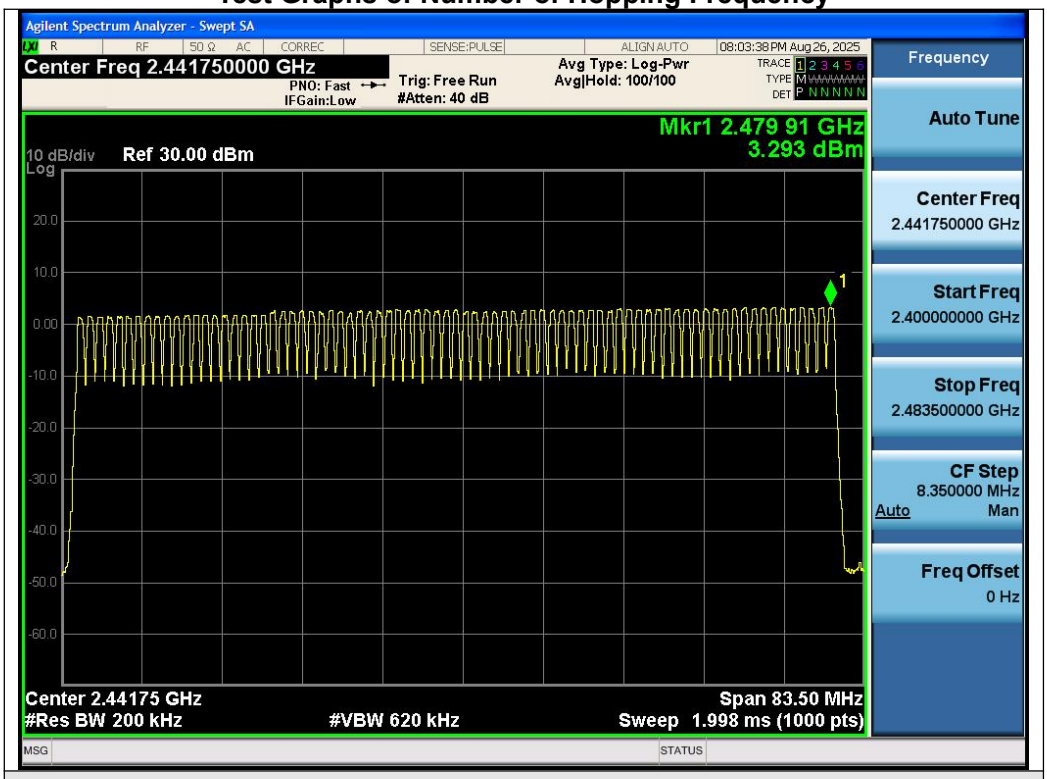
## 10.3 Measurement Setup (Block Diagram of Configuration)



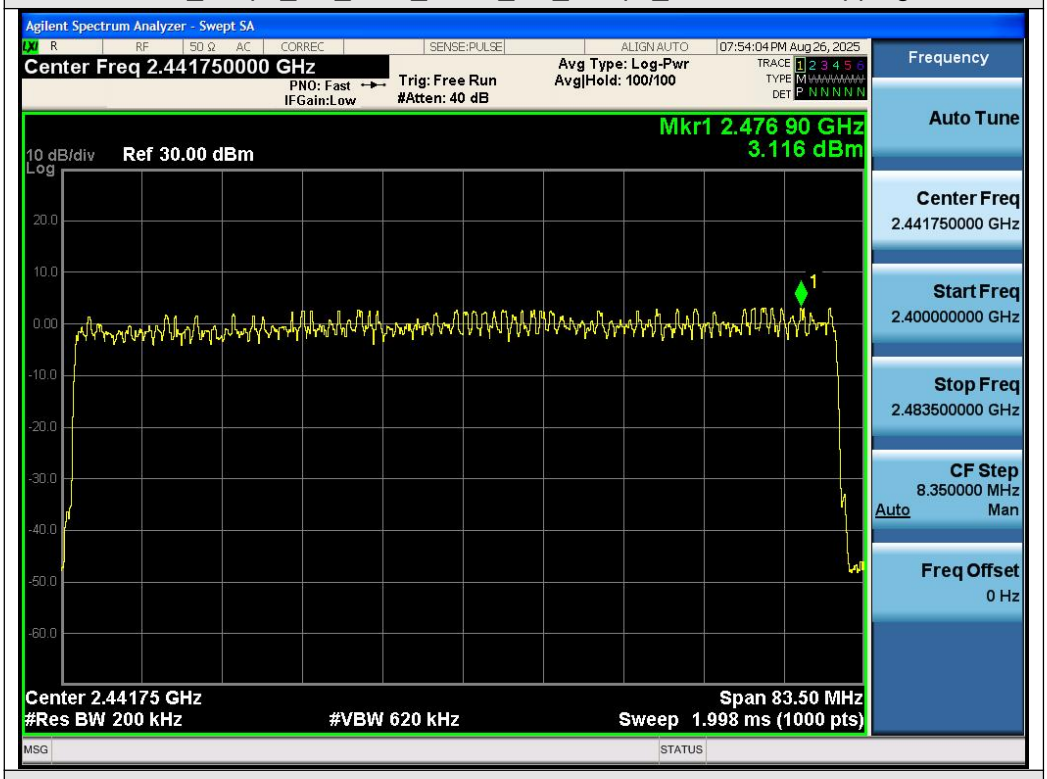

## 10.4 Measurement Result

| Test Data of Number of Hopping Frequency | | | |
|---|---|---|---|
| Test Mode | Number of Hopping Frequency | Limits | Pass or Fail |
| GFSK Hopping | 79 | >=15 | Pass |
| π /4-DQPSK Hopping | 79 | >=15 | Pass |
| 8DPSK Hopping | 79 | >=15 | Pass |

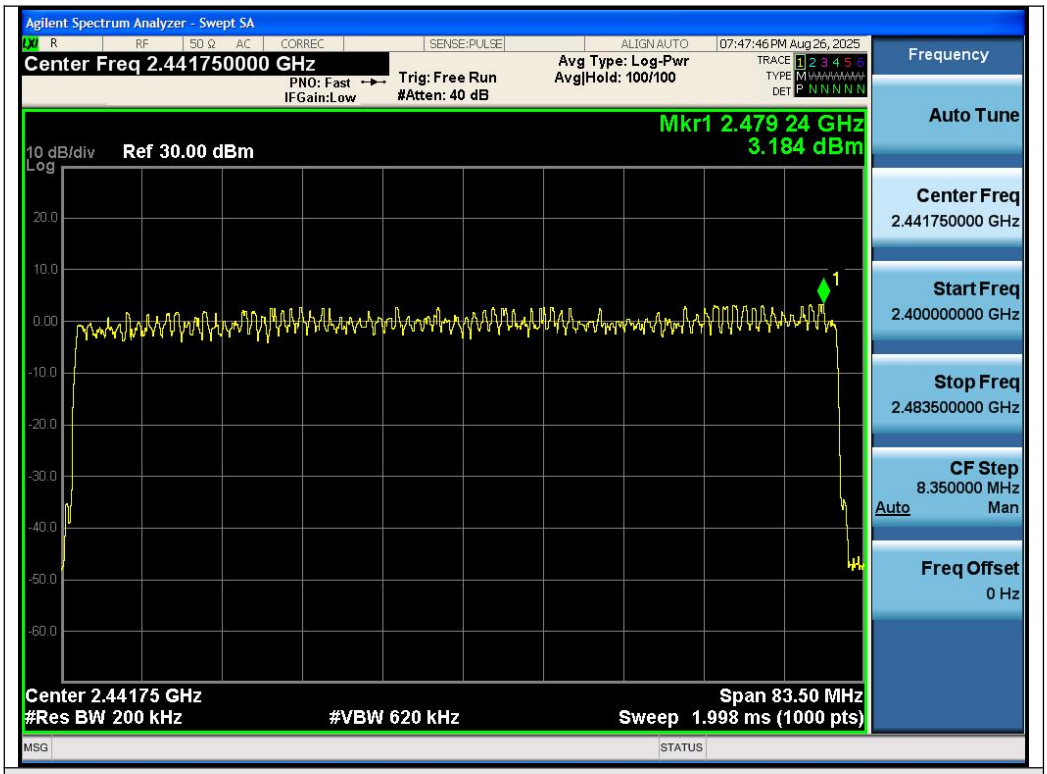
## Test Graphs of Number of Hopping Frequency




Test_Graph_BR_HOP_ANT1_NA_1Mbps_Number of Hopping




Test_Graph_EDR_HOP_ANT1_NA_2Mbps_Number of Hopping




Test_Graph_EDR_HOP_ANT1_NA_3Mbps_Number of Hopping

# 11. Time of Occupancy (Dwell Time) Measurement

## 11.1 Provisions Applicable

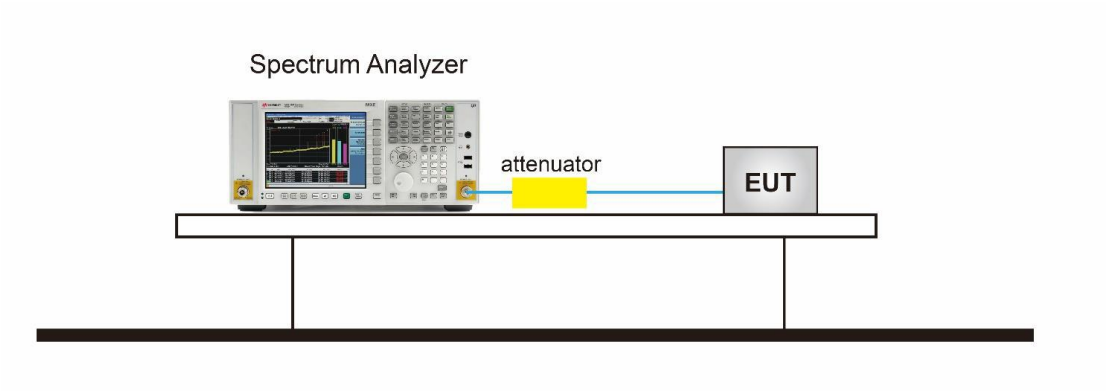
The maximum permissible time of occupancy is 400ms within a period of 400ms multiplied by the number of hopping channels employed.

## 11.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span = Zero span, centered on a hopping channel.
2. RBW shall be ⩽ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3. VBW ⩾ RBW
4. Sweep time = As necessary to capture the entire dwell time per hopping channel
5. Detector = Peak
6. Trace mode = Free Run
7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.

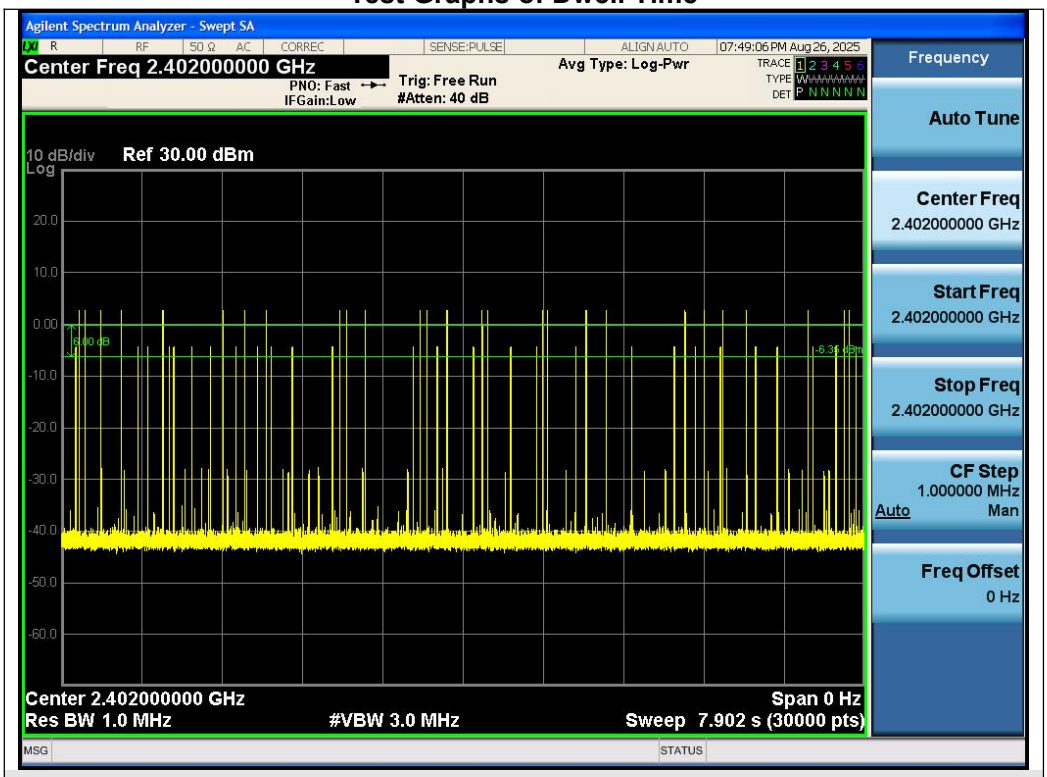
## 11.3 Measurement Setup (Block Diagram of Configuration)



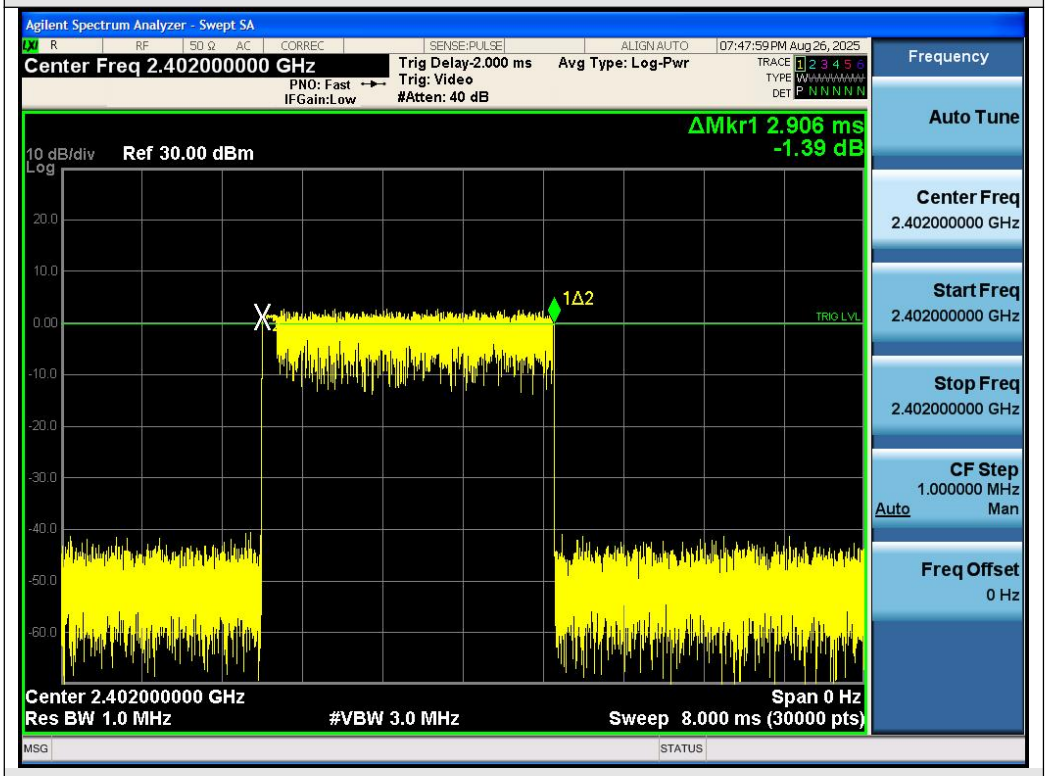

## 11.4 Measurement Result

| Test Data of Dwell Time | | | | | |
|---|---|---|---|---|---|
| Channel | Time of Pulse for 3DH5 (ms) | Number of hops in the period specified in the requirements | Dwell Time (ms) | Limit (ms) | Pass or Fail |
| 2402 | 2.906 | 27.0*4 | 313.848 | 400 | Pass |
| 2441 | 2.906 | 25.0*4 | 290.600 | 400 | Pass |
| 2480 | 2.900 | 25.0*4 | 290.000 | 400 | Pass |

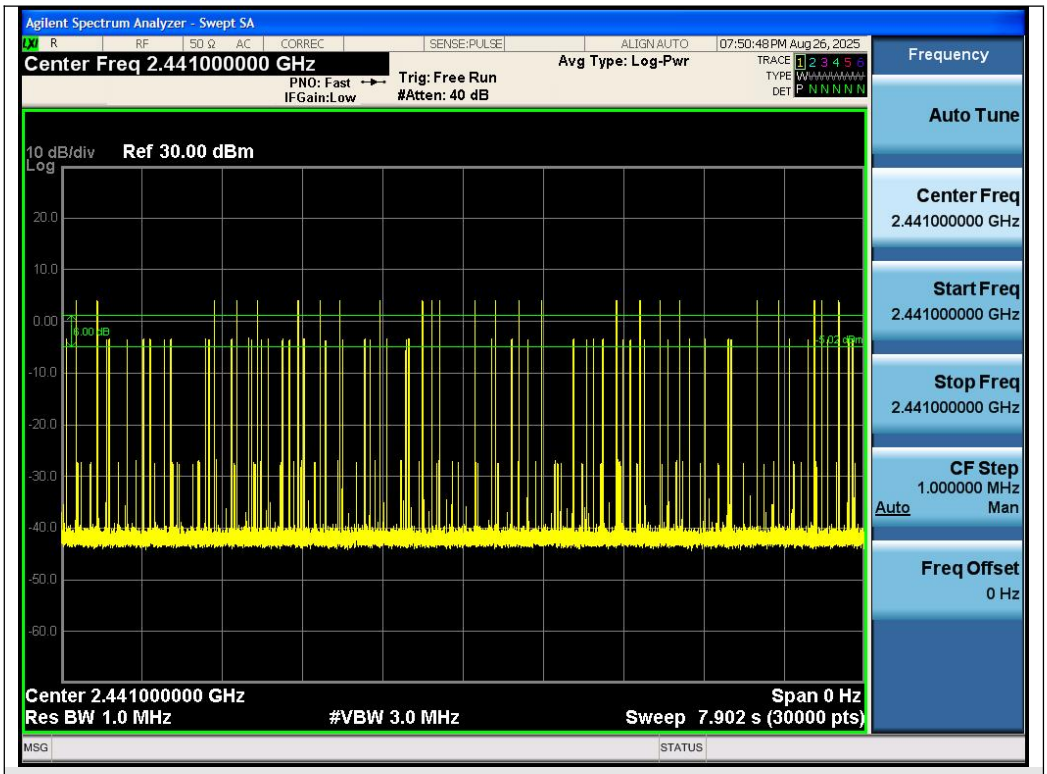
## Test Graphs of Dwell Time



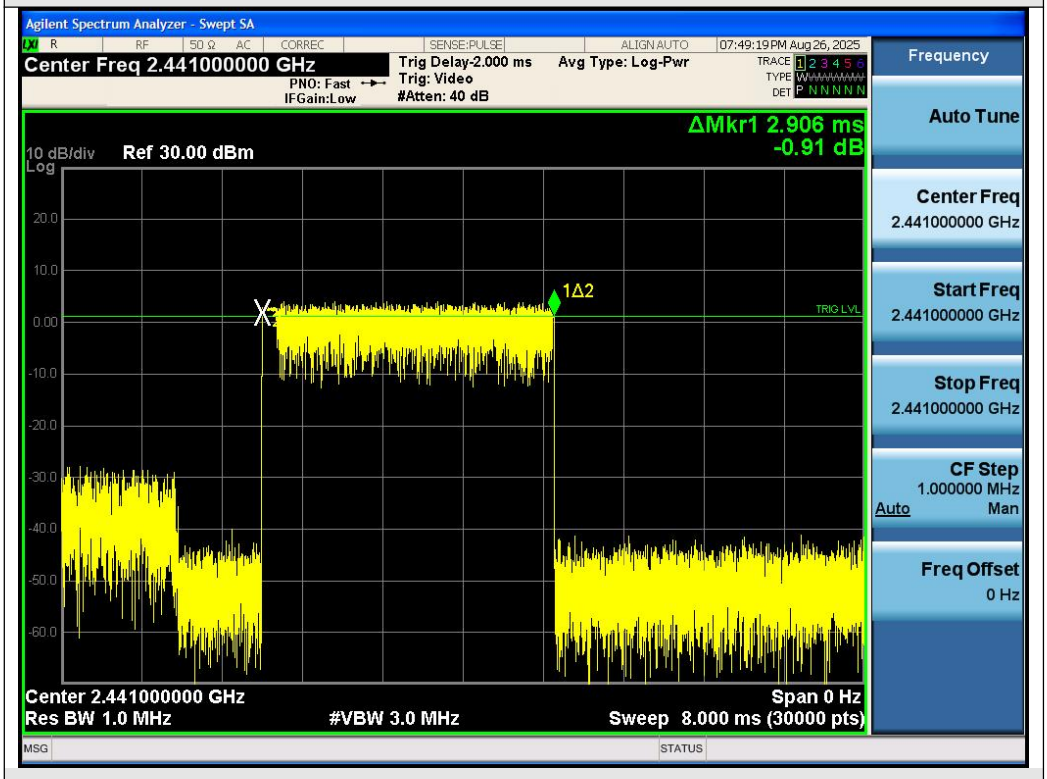

Test_Graph_BR_HOP_ANT1_NA_3Mbps_2402_Number of Busrt



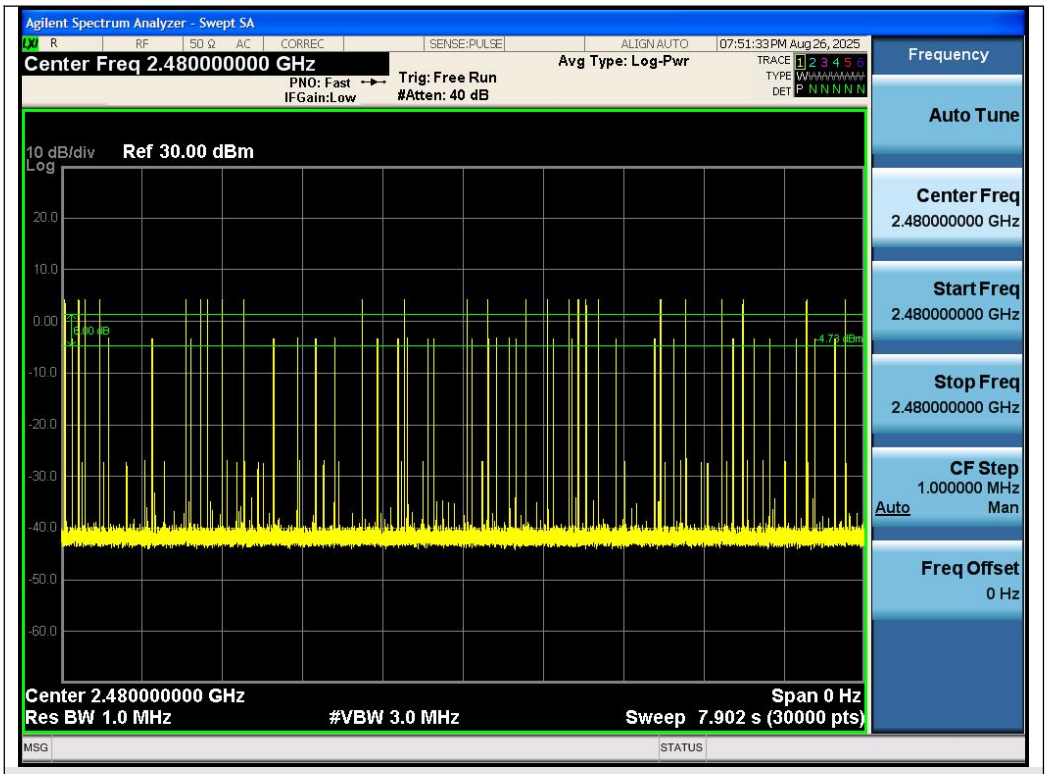

Test_Graph_BR_HOP_ANT1_NA_3Mbps_2402_Time per Burst



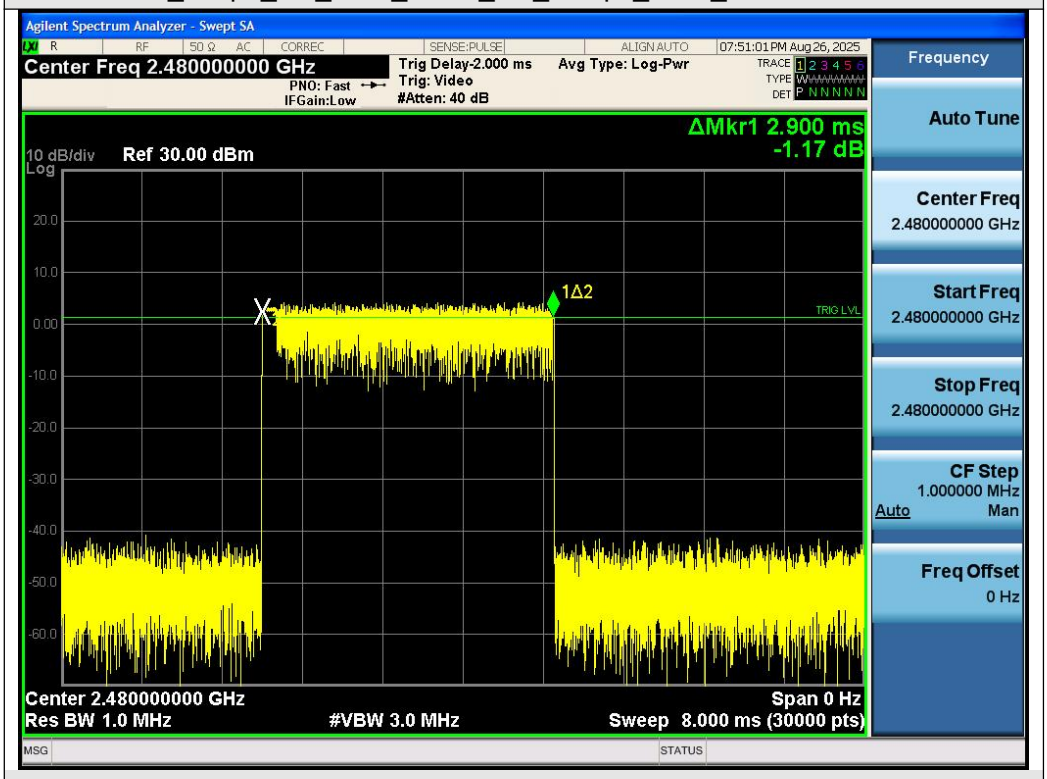

Test_Graph_BR_HOP_ANT1_NA_3Mbps_2441_Number of Busrt




Test_Graph_BR_HOP_ANT1_NA_3Mbps_2441_Time per Burst




Test_Graph_BR_HOP_ANT1_NA_3Mbps_2480_Number of Busrt




Test_Graph_BR_HOP_ANT1_NA_3Mbps_2480_Time per Burst

Note: All mode rates are tested and evaluated, 8DPSK modulated 3DH5 mode is the worst case and documented in the report.

# 12. Frequency Separation Measurement

## 12.1 Provisions Applicable

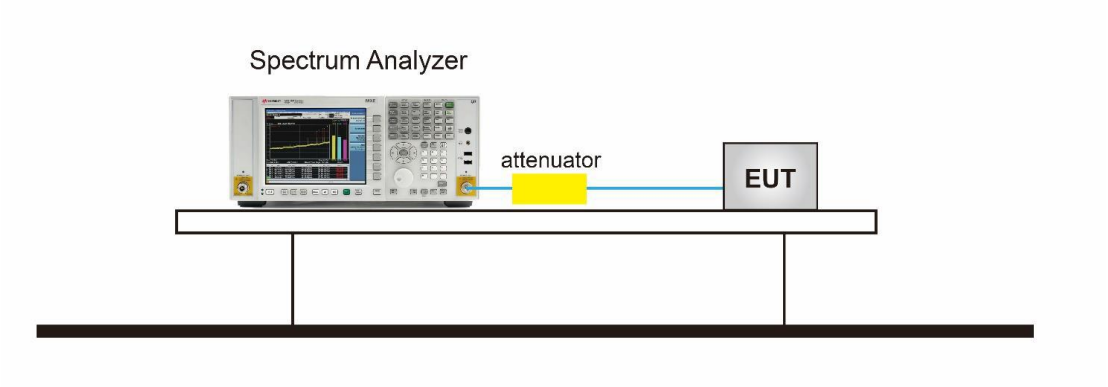
When the power is less than 0.125W: The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.
When the power is less than 1W: The minimum permissible channel separation for this system is 20dB BW.

## 12.2 Measurement Procedure

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or average) bandwidth (VBW) ⩾ RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold. g) Allow the trace to stabilize.
7. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

## 12.3 Measurement Setup (Block Diagram of Configuration)




## 12.4 Measurement Result

| Test Data of Frequency Separation | | | |
|---|---|---|---|
| Test Mode | Channel Separation (MHz) | Limits (MHz) | Pass or Fail |
| GFSK | 0.937 | ≥0.641 | Pass |
| π /4-DQPSK | 0.981 | ≥0.851 | Pass |
| 8DPSK | 1.073 | ≥0.865 | Pass |