# RF TEST REPORT

**Report No.:** SET2020-06674

**Product Name:** WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone

**FCC ID:** SRQ-ZTEL210M

**Model No. :** ZTE Blade L210

**Marketing Name:** ZTE BLADE L210, ZTE Blade L210, ZTE blade L210

**Applicant:** ZTE Corporation.

**Address:** ZTE Plaza, Keji Road South, Shenzhen, China.

**Dates of Testing:** 06/10/2020 —06/23/2020

**Issued by:** CCIC Southern Testing Co., Ltd.

**Lab Location:** Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China.
**Tel:** 86 755 26627338 **Fax:** 86 755 26627238

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# Test Report

**Product Name.....:** WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone

**Brand Name.....:** ZTE

**Trade Name.....:** ZTE

**Applicant.....:** ZTE Corporation

**Applicant Address.....:** ZTE Plaza,Keji Road South, Shenzhen, China.

**Manufacturer .....:** ZTE Corporation

**Manufacturer Address .....:** ZTE Plaza,Keji Road South, Shenzhen, China.

**Test Standards.....:** 47 CFR Part 15 Subpart C：Radio Frequency Devices
ANSI C63.10-2013：American National Standard for Testing Unlicensed Wireless Devices

**Test Result.....:** PASS

**Tested by .....:** Vincent 2020.06.23

Vincent, Test Engineer

**Reviewed by .....:** Chris You 2020.06.23

Chris You, Senior Engineer

**Approved by .....:** Shuangwen Zhang 2020.06.23

Shuangwen Zhang, Manager

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| Change History | | |
|---|---|---|
| Issue | Date | Reason for change |
| 1.0 | 2020.06.23 | First edition |
| | | |
| | | |

# 1. General Information

## 1.1. EUT Description

| | | |
|---|---|---|
| EUT Type | WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone | |
| Hardware Version | urvA | |
| Software Version | TEL_MX_ZTE_Blade_L210V1.0 | |
| Frequency Range | Bluetooth EDR v4.2 | 2402MHz~2480MHz |
| Channel Number | Bluetooth EDR v4.2 | 79 |
| Bit Rate of Transmitter | Bluetooth EDR v4.2 | 1/2/3Mbps |
| Modulation Type | Bluetooth EDR v4.2 | GFSK,PI/4DQPSK,8DPSK |
| Antenna Type | Internal | |

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 2: a. When power on, the EUT will scan the whole frequency until aConnection command from the other BT devices.

b. When receiving the signal from the other BT devices, The EUT transmit aresponse signal.

c. The other devices receive the response signal and recognize it, then send aconnection command to establish the connection.

d. After the connection establish successfully, the data transmission is beginning.At the same time, the both devices will shift frequencies in synchronization per asame pseudo randomly ordered list of hopping frequencies, the hopping rate is1600 times per second.

e. The bandwidth of the receiver, which is set to a fixed width by the software.

Note 3: Bluetooth signal has 9 packages 1DH1, 1DH3, 1DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, DH5 package is largest, we are testing DH5 in the document.

## 1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 15 Subpart C | Radio Frequency Devices |
| 2 | ANSI C63.10-2013 | American National Standard for Testing Unlicensed Wireless Devices |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section in CFR 47 | Description | Result |
|---|---|---|---|
| 1 | 15.203 | Antenna Requirement | PASS |
| 2 | 15.247(a) | Number of Hopping Frequency | PASS |
| 3 | 15.247(b) | Peak Output Power | PASS |
| 4 | 15.247(a) | 20dB Bandwidth | PASS |
| 5 | 15.247(a) | Carrier Frequency Separation | PASS |
| 6 | 15.247(a) | Time of Occupancy (Dwell time) | PASS |
| 7 | 15.247(d) | Conducted Spurious Emission | PASS |
| 8 | 15.247(d) | Conducted Band Edge | PASS |
| 9 | 15.207 | Conducted Emission | PASS |
| 10 | 15.209<br>15.205 | Radiated Band Edges and Spurious Emission | PASS |

Note: The test were performed according to the method of measurements prescribed in ANSI C63.10-2013.

## 1.3. Frequency Hopping System Requirements

### 1.3.1. Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the systemhopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equallyon the average by each transmitter. The system receivers shall have input bandwidths that match the hoppingchannel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with thetransmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels duringeach transmission. However, the system, consisting of both the transmitter and the receiver, must be designed tocomply with all of the regulations in this section should the transmitter be presented with a continuous data (orinformation) stream. In addition, a system employing short transmission bursts must comply with the definition ofa frequency hopping system and must distribute its transmissions over the minimum number of hopping channelsspecified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the systemto recognize other users within the spectrum band so that it individually andindependently chooses and adapts itshopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems inany other manner for the express purpose of avoiding the simultaneous occupancy of individual hoppingfrequencies by multiple transmitters is not permitted.

### 1.3.2. Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technologycalled frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitterswitches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devicesparticipating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequencyhopping sequence is determined by the master's device address and the phase of the hopping sequence (thefrequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconetmust know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way fora Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wirelessdevices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. TheAFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of anyidentified bad channels. The devices will then switch to alternative available "good" channels, away from theareas of interference, thus having no impact on the bandwidth used.

This device was tested with a bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for ANSI C63.10-2013 and FCC Part 15.247 rule.

Carrier Frequency and channel List:

| Channel | Frequency(MHz) |
|---|---|
| 0 | 2402 |
| 1 | 2403 |
| … | … |
| 39 | 2441 |
| 40 | 2442 |
| … | … |
| 77 | 2479 |
| 78 | 2480 |

Note: F(MHz)=2402+1*n (0<=n<=78)

## 1.4. Facilities and Accreditations

### 1.4.1. Facilities

**CNAS-Lab Code: L1659**

CCIC-SET is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

**FCC-Registration No.: CN5031**

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2020.

**ISED Registration: 11185A-1**

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 31, 2020.

**NVLAP Lab Code: 201008-0**

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

### 1.4.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature (°C): | 15 - 35 |
| Relative Humidity (%): | 30 -60 |
| Atmospheric Pressure (kPa): | 86KPa-106KPa |

# 2. 47 CFR Part 15C Requirements

## 2.1. Antenna requirement

### 2.1.1. Applicable Standard

According to FCC 15.203, 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.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 2.1.2. Antenna Information

**Antenna Category:** Internal antenna

An Internal antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

**Antenna General Information:**

| No. | EUT | Ant. Type | Ant. Gain |
|---|---|---|---|
| 1 | WCDMA/GSM(GPRS) Multi-Mode Digital Mobile Phone | Internal | -5dBi |

### 2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

## 2.2. Number of Hopping Frequency

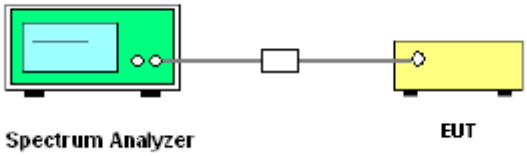
### 2.2.1. Limit of Number of Hopping Frequency

Frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

### 2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.2.3. Test Setup




### 2.2.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.3

2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. Enable the EUT hopping function.

5. Use the following spectrum analyzer settings: Span = the frequency band of operation;
   Set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth,
   Whichever is smaller. VBW≥RBW, Trace = max hold, Sweep=auto, Detector function=peak.

6. The number of hopping frequency used is defined as the number of total channel.

7. Record the measurement data derived from spectrum analyzer.

### 2.2.5. Test Results of Number of Hopping Frequency

Please refer to Appendix A for detail

## 2.3. Peak Output Power

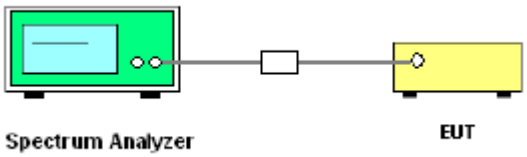
### 2.3.1. Limit of Peak Output Power

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) 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 the5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band0.125 watts.
Requency 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

### 2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.3.3. Test Setup




### 2.3.4. Test Procedures

1. The testing follows ANSI C63.10-2013 Clause 7.8.5
2. The RF output of EUT was connected to Spectrum analyzer by RF cable and attenuator. The pathloss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

### 2.3.5. Test Result of Output Power

Please refer to Appendix A for detail

## 2.4. 20dB Bandwidth

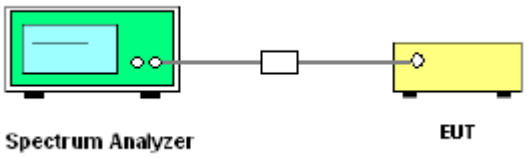
### 2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1% = 20dB) taking the total RF output power.

### 2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3. Test Setup




### 2.4.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 6.9.2
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. Thepath loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.

   Span = approximately 2 to 5 times the OBW, centered on a hopping channel;

   RBW⩾1% to 5% of the OBW; VBW shall be approximately three times RBW;

   Sweep = auto; Detector function = peak; Trace = max hold.
5. Measure and record the results in the test report.

### 2.4.5. Test Results of 20dB Bandwidth

Please refer to Appendix A for detail

## 2.5. Carried Frequency Separation

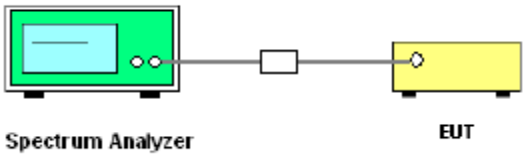
### 2.5.1. Limit of Carried Frequency Separation

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

### 2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.5.3. Test Setup




### 2.5.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

   Span = wide enough to capture the peaks of two adjacent channels; RBW: Start with the RBW set to approximately 30% of the channel spacing;

6. Measure and record the results in the test report.

### 2.5.5. Test Results of Carried Frequency Separation

Please refer to Appendix A for detail

## 2.6. Dwell time

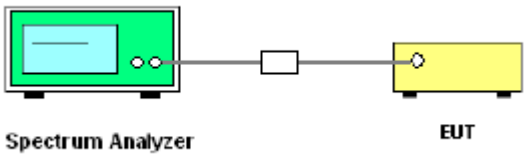
### 2.6.1. Limit of Dwell Time

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.

### 2.6.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.6.3. Test Setup




### 2.6.4. Test Procedure

1. The testing follows ANSI C63.10-2013 Clause 7.8.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings: Span = zero span, centered on a hopping channel; RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel; VBW⩾RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
6. Measure and record the results in the test report.

### 2.6.5. Test Results of Dwell Time

Please refer to Appendix A for detail

## 2.7. Conducted Spurious Emissions

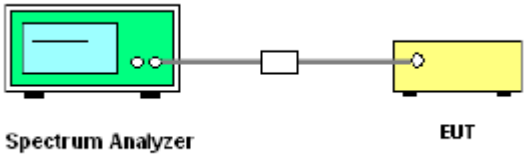
### 2.7.1. Limit of Spurious Emission

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### 2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.7.3. Test Setup




### 2.7.4. Test Procedure

1. The testing follows the guidelines in Spurious RF Conducted Emissions of ANSI C63.10-2013 Clause 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. Thepath loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs mustbe at least 20 dB down from the highest emission level within the authorized band as measuredwith a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

### 2.7.5. Test Results of Conducted Spurious Emissions

Please refer to Appendix A for detail

## 2.8. Conducted Band Edge

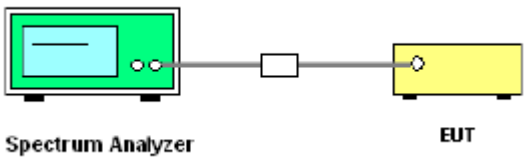
### 2.8.1. Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

### 2.8.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.8.3. Test Setup




### 2.8.1. Test Procedure

1. The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of ANSI C63.10-2013 Clause 7.8.6.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz (≥1% span=10MHz ), VBW = 300kHz (≥RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

### 2.8.2. Test Results of Conducted Band Edge

Please refer to Appendix A for detail

## 2.9. Conducted Emission

### 2.9.1. Limit of Conducted Emission

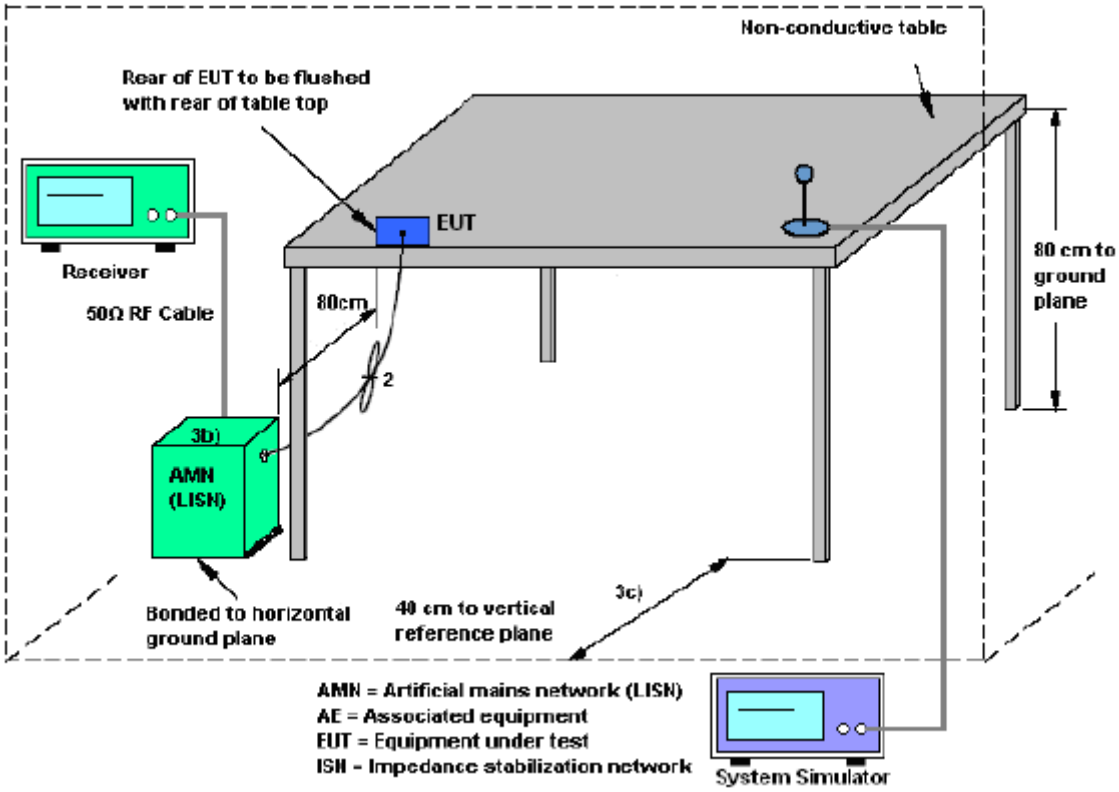
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency range (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quai-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5 | 56 | 46 |
| 0.50 - 30 | 60 | 50 |

### 2.9.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.9.3. Test Setup

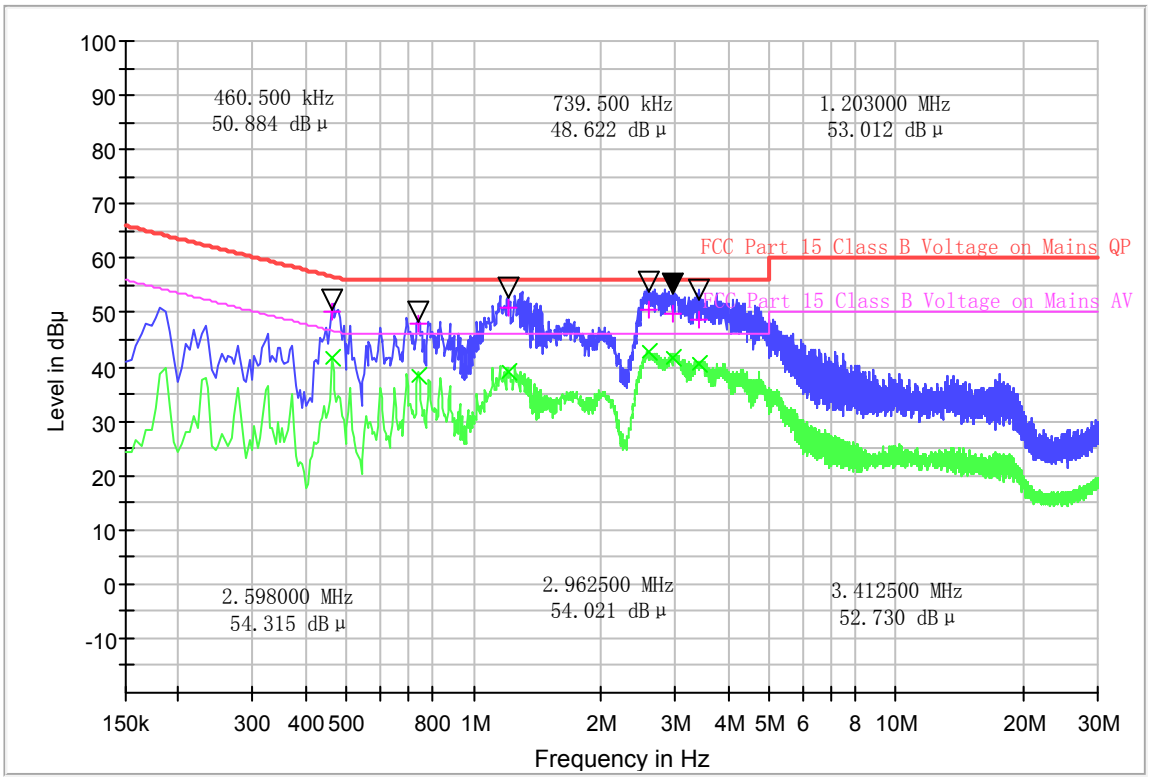


### 2.9.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

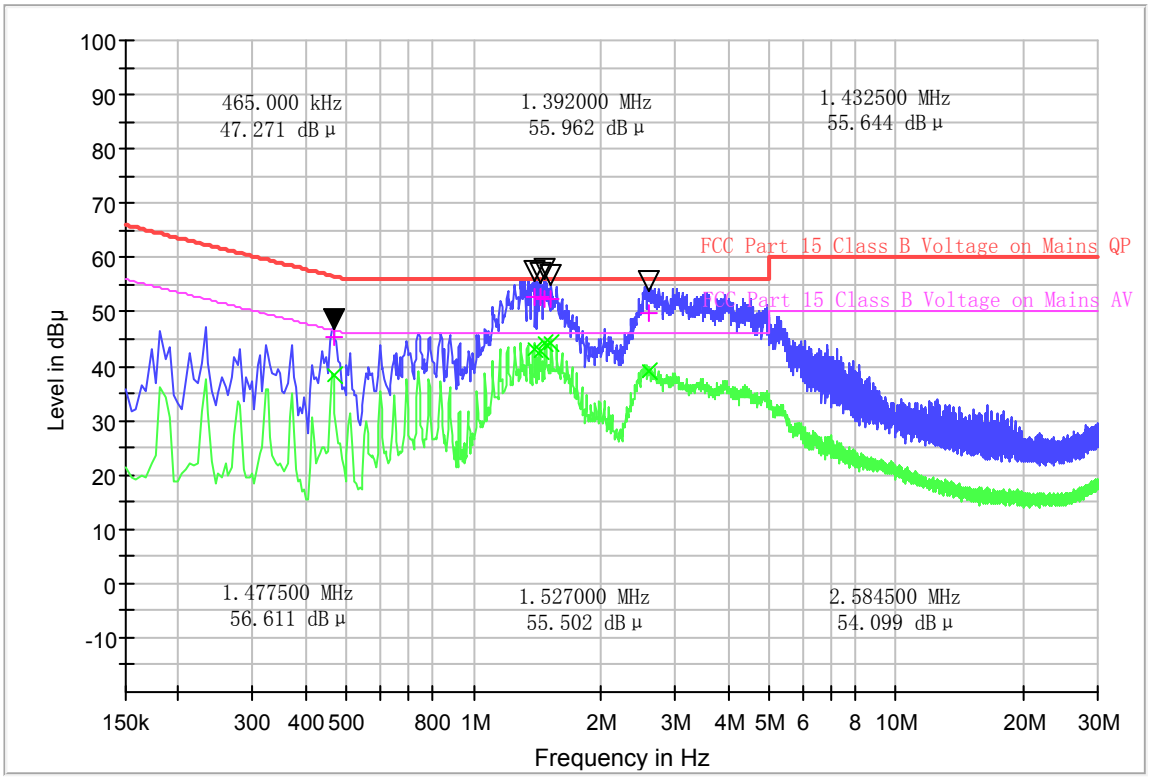
### 2.9.3. Test Results of Conducted Emission

The EUT configuration of the emission tests is Bluetooth Link + USB Cable (Charging from Adapter)




(Plot A: L Phase)

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Cabel Loss (dB) | Corr. (dB) | Margin - QPK | Limit - QPK | Margin - AV | Limit - AV (dBμV) |
|---|---|---|---|---|---|---|---|---|
| 0.460500 | 50.21 | 41.75 | 0.1 | 20.1 | 6.47 | 56.7 | 4.93 | 46.7 |
| 0.739500 | 47.76 | 38.16 | 0.1 | 20.1 | 8.24 | 56.0 | 7.84 | 46.0 |
| 1.203000 | 50.74 | 39.02 | 0.6 | 20.4 | 5.26 | 56.0 | 6.98 | 46.0 |
| 2.598000 | 50.59 | 42.67 | 0.6 | 19.9 | 5.41 | 56.0 | 3.33 | 46.0 |
| 2.962500 | 49.65 | 41.66 | 0.6 | 20.0 | 6.35 | 56.0 | 4.34 | 46.0 |
| 3.412500 | 48.62 | 40.46 | 0.7 | 19.9 | 7.38 | 56.0 | 5.54 | 46.0 |




(Plot B: N Phase)

| Frequency (MHz) | QuasiPeak (dB μ V) | CAverage (dB μ V) | Cabel Loss (dB) | Corr. (dB) | Margin - QPK | Limit - QPK | Margin - AV | Limit - AV (dB μ V) |
|---|---|---|---|---|---|---|---|---|
| 0.465000 | 45.30 | 38.27 | 0.1 | 20.1 | 11.30 | 56.6 | 8.33 | 46.6 |
| 1.392000 | 52.86 | 43.20 | 0.1 | 20.1 | 3.14 | 56.0 | 2.80 | 46.0 |
| 1.432500 | 52.65 | 42.75 | 0.1 | 20.6 | 3.35 | 56.0 | 3.25 | 46.0 |
| 1.477500 | 52.28 | 44.19 | 0.1 | 20.4 | 3.72 | 56.0 | 1.81 | 46.0 |
| 1.527000 | 52.46 | 44.31 | 0.2 | 20.0 | 3.54 | 56.0 | 1.69 | 46.0 |
| 2.584500 | 49.93 | 39.01 | 0.2 | 19.9 | 6.07 | 56.0 | 6.99 | 46.0 |

**Test Result: PASS**

**Note: Correction factor=Cabel loss+ attenuation factor**

**attenuation factor=10dB**

## 2.10. Radiated Band Edges and Spurious Emission

### 2.10.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spuriousmust be at least 20 dB below the highest emission level within the authorized band. In addition,radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209limits as below.

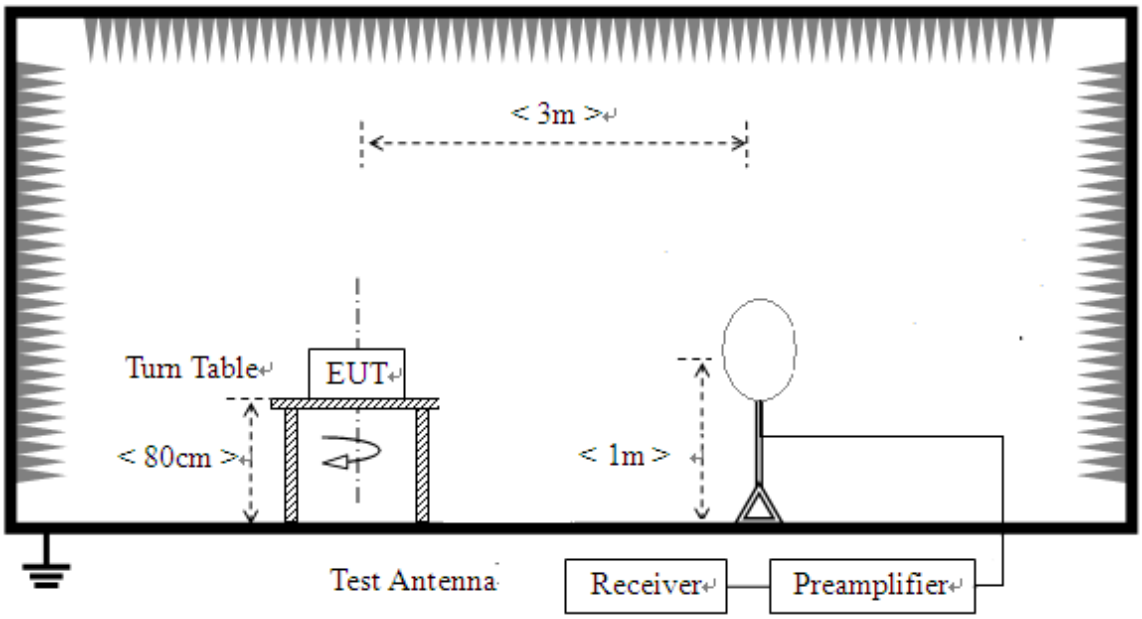
| Frequency (MHz) | Field Strength (μV/m) | Measurement Distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 2.10.2. Measuring Instruments

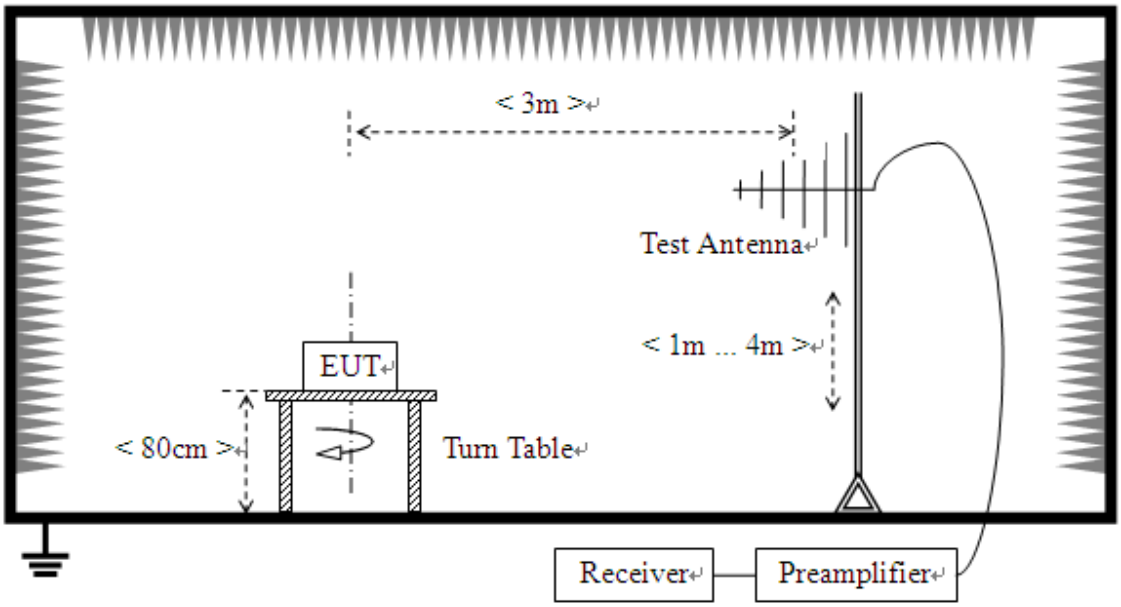
The measuring equipment is listed in the section 3 of this test report.

### 2.10.3. Test Setup

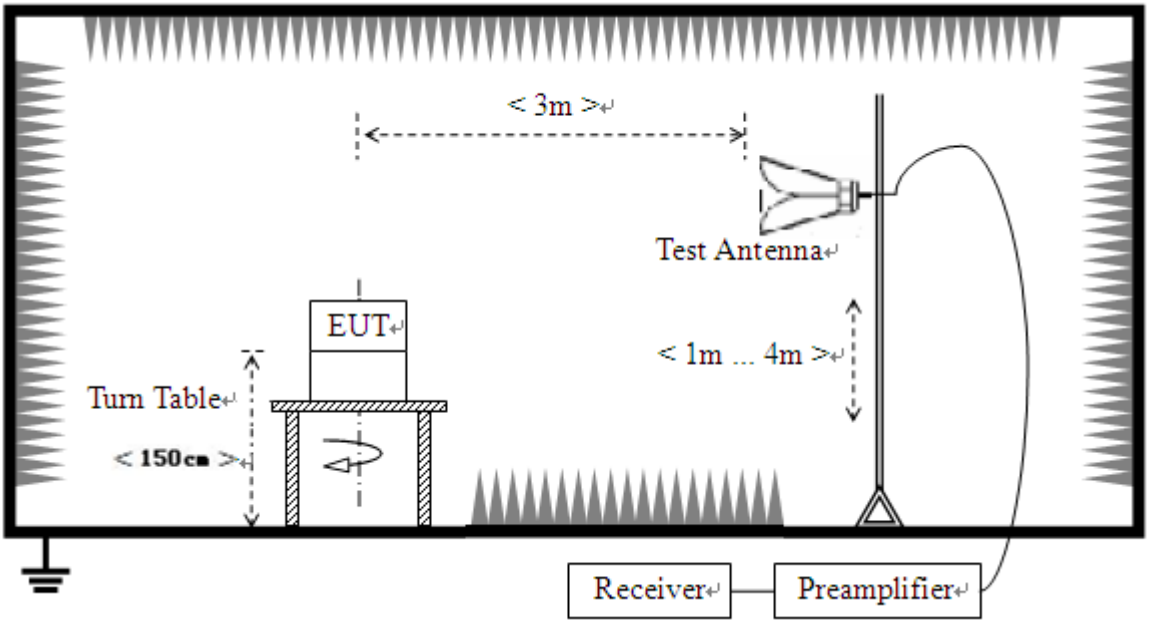
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz




3) For radiated emissions above 1GHz



### 2.10.4. Test Procedure

1. The EUT was placed on a turntable 0.8m below 1GHz and 1.5m above 1GHz above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on thetop of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:

(1) Span shall wide enough to fully capture the emission being measured;

(2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW⩾RBW; Sweep = auto;Detector function = peak; Trace = max hold for peak

(3) For average measurement: use duty cycle correction factor method per 15.35(c).

Duty cycle = On time/100 milliseconds

On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+Nn*Ln$

Where $N_1$ is number of type 1 pulses, L1 is length of type 1 pulses, etc.

Average Emission Level = Peak Emission Level + 20*log(Duty cycle)

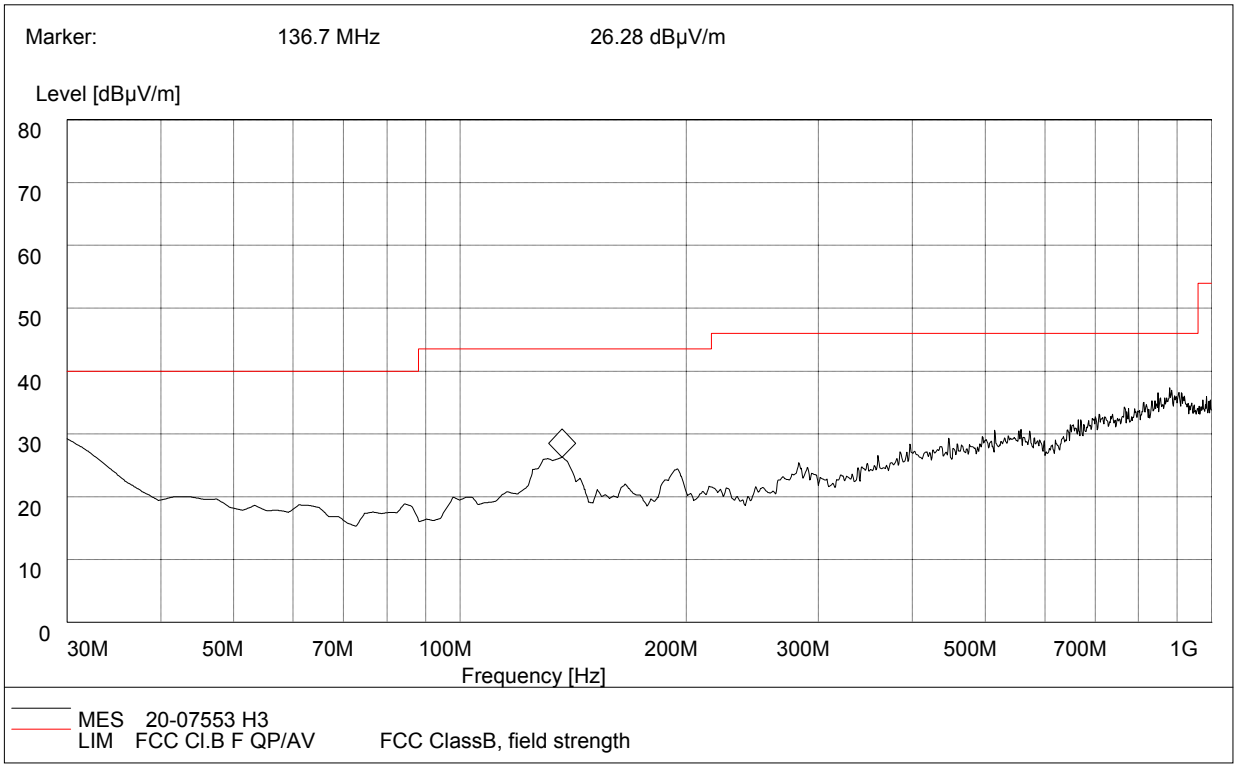
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

### 2.10.5. Test Results of Radiated Band Edge and Spurious Emission

**For 9 KHz to 30MHz**

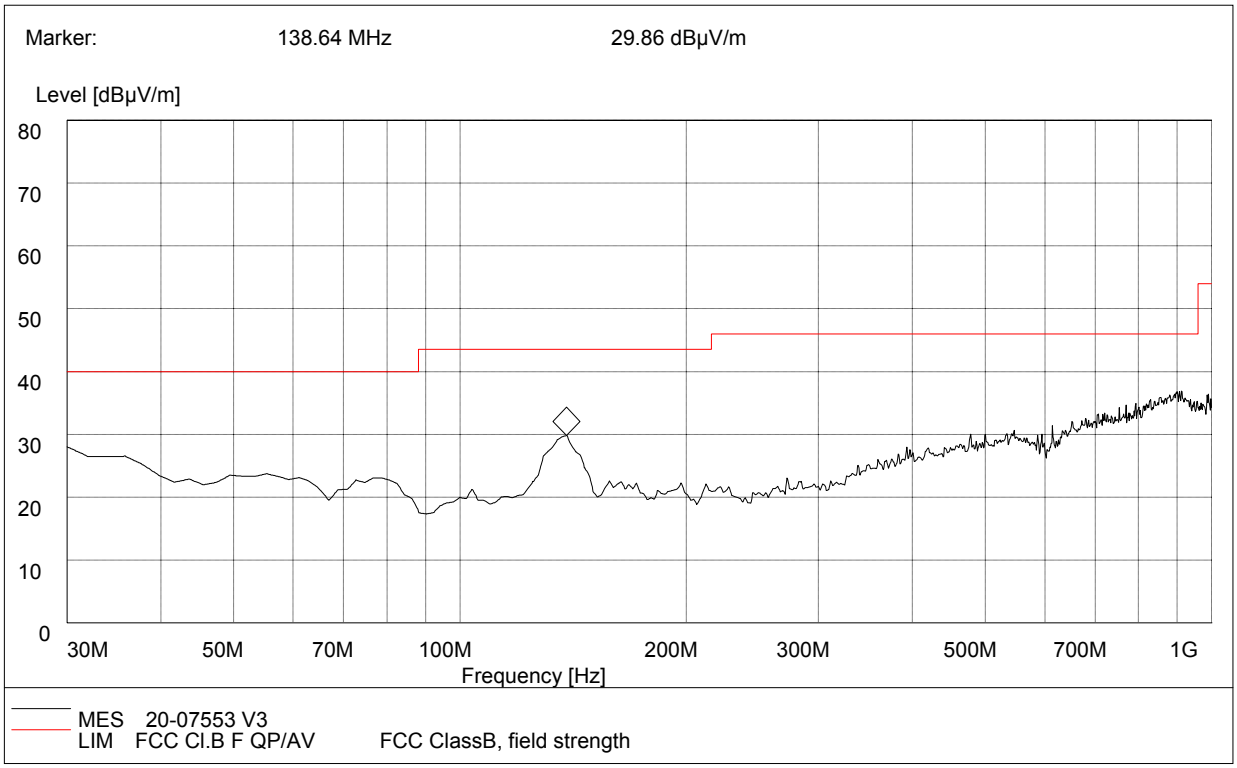
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**For 30MHz to 1000MHz**




| Frequency (MHz) | QuasiPeak (dB µ V/m) | Bandwidth (kHz) | Correction Factor (dB/m) | Antenna height (cm) | Limit (dB µ V/m) | Margin | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 30.00000 | 28.95 | 120.000 | 17.9 | 100.0 | 40.0 | 11.05 | Horizontal | Pass |
| 136.70000 | 26.28 | 120.000 | 12.9 | 100.0 | 43.5 | 17.22 | Horizontal | Pass |
| 281.65000 | 24.95 | 120.000 | 12.5 | 100.0 | 46.0 | 21.05 | Horizontal | Pass |
| 508.941000 | 30.15 | 120.000 | 19.3 | 100.0 | 46.0 | 15.85 | Horizontal | Pass |
| 705.650000 | 32.33 | 120.000 | 22.0 | 100.0 | 46.0 | 13.67 | Horizontal | Pass |
| 889.620000 | 36.95 | 120.000 | 24.8 | 100.0 | 46.0 | 9.05 | Horizontal | Pass |

(Plot A: 30MHz to 1GHz, Antenna Horizontal)




| Frequency (MHz) | QuasiPeak (dB µ V/m) | Bandwidth (kHz) | Correction Factor (dB/m) | Antenna height (cm) | Limit (dB µ V/m) | Margin | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 30.00000 | 28.12 | 120.000 | 17.90 | 100.0 | 40.0 | 11.88 | Vertical | Pass |
| 35.84000 | 26.49 | 120.000 | 10.80 | 100.0 | 40.0 | 13.51 | Vertical | Pass |
| 138.64000 | 29.86 | 120.000 | 12.90 | 100.0 | 43.5 | 13.64 | Vertical | Pass |
| 398.65000 | 27.48 | 120.000 | 17.50 | 100.0 | 46.0 | 18.52 | Vertical | Pass |
| 486.95000 | 30.03 | 120.000 | 19.30 | 100.0 | 46.0 | 15.97 | Vertical | Pass |
| 893.420000 | 35.42 | 120.000 | 24.80 | 100.0 | 46.0 | 10.58 | Vertical | Pass |

(Plot B: 30MHz to 1GHz, Antenna Vertical)

**For 1GHz to 25GHz**

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（GFSK_2402MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Fre. (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 49.65 | PK | 74.00 | -24.35 | 1.50 | 260.00 | 48.35 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 38.28 | AV | 54.00 | -15.72 | 1.50 | 260.00 | 36.98 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 51.66 | PK | 74.00 | -22.34 | 1.50 | 260.00 | 45.26 | 7.40 | 30.40 | 31.40 | 6.40 |
| 4 | 4804.00 | 39.79 | AV | 54.00 | -14.21 | 1.50 | 260.00 | 33.39 | 7.40 | 30.40 | 31.40 | 6.40 |
| 5 | 7206.00 | 52.31 | PK | 74.00 | -21.69 | 1.50 | 260.00 | 43.01 | 9.90 | 31.50 | 32.10 | 9.30 |
| 6 | 7206.00 | 40.19 | AV | 54.00 | -13.81 | 1.50 | 260.00 | 30.89 | 9.90 | 31.50 | 32.10 | 9.30 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（GFSK_2402MHz）** | | | | | | | | | | | | |
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 49.65 | PK | 74.00 | -24.35 | 1.60 | 180.00 | 48.35 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 38.36 | AV | 54.00 | -15.64 | 1.60 | 180.00 | 37.06 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 50.36 | PK | 74.00 | -23.64 | 1.60 | 180.00 | 43.96 | 7.40 | 30.40 | 31.40 | 6.40 |
| 4 | 4804.00 | 38.36 | AV | 54.00 | -15.64 | 1.60 | 180.00 | 31.96 | 7.40 | 30.40 | 31.40 | 6.40 |
| 5 | 7206.00 | 51.62 | PK | 74.00 | -22.38 | 1.60 | 180.00 | 42.32 | 9.90 | 31.50 | 32.10 | 9.30 |
| 6 | 7206.00 | 39.65 | AV | 54.00 | -14.35 | 1.60 | 180.00 | 30.35 | 9.90 | 31.50 | 32.10 | 9.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（GFSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Fre. (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 50.33 | PK | 74.00 | -23.67 | 1.50 | 300.00 | 43.93 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 38.59 | AV | 54.00 | -15.41 | 1.50 | 300.00 | 32.19 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 50.97 | PK | 74.00 | -23.03 | 1.50 | 300.00 | 41.57 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 39.43 | AV | 54.00 | -14.57 | 1.50 | 300.00 | 30.03 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（GFSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 49.65 | PK | 74.00 | -24.35 | 1.60 | 330.00 | 43.25 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 37.78 | AV | 54.00 | -16.22 | 1.60 | 330.00 | 31.38 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 51.88 | PK | 74.00 | -22.12 | 1.60 | 330.00 | 42.48 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 39.23 | AV | 54.00 | -14.77 | 1.60 | 330.00 | 29.83 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（GFSK_2480MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 49.87 | PK | 74.00 | -24.13 | 1.50 | 180.00 | 47.27 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 39.76 | AV | 54.00 | -14.24 | 1.50 | 180.00 | 37.16 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 50.32 | PK | 74.00 | -23.68 | 1.50 | 180.00 | 43.62 | 7.00 | 31.20 | 31.50 | 6.70 |
| 4 | 4960.00 | 39.19 | AV | 54.00 | -14.81 | 1.50 | 180.00 | 32.49 | 7.00 | 31.20 | 31.50 | 6.70 |
| 5 | 7440.00 | 50.97 | PK | 74.00 | -23.03 | 1.50 | 180.00 | 41.47 | 10.20 | 31.60 | 32.40 | 9.50 |
| 6 | 7440.00 | 38.99 | AV | 54.00 | -15.01 | 1.50 | 180.00 | 29.49 | 10.20 | 31.60 | 32.40 | 9.50 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（GFSK_2480MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 49.65 | PK | 74.00 | -24.35 | 1.60 | 330.00 | 47.05 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 38.63 | AV | 54.00 | -15.37 | 1.60 | 330.00 | 36.03 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 50.36 | PK | 74.00 | -23.64 | 1.60 | 330.00 | 43.66 | 7.00 | 31.20 | 31.50 | 6.70 |
| 4 | 4960.00 | 40.26 | AV | 54.00 | -13.74 | 1.60 | 330.00 | 33.56 | 7.00 | 31.20 | 31.50 | 6.70 |
| 5 | 7440.00 | 51.25 | PK | 74.00 | -22.75 | 1.60 | 330.00 | 41.75 | 10.20 | 31.60 | 32.40 | 9.50 |
| 6 | 7440.00 | 40.19 | AV | 54.00 | -13.81 | 1.60 | 330.00 | 30.69 | 10.20 | 31.60 | 32.40 | 9.50 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（pi/4DQPSK_2402MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 48.95 | PK | 74.00 | -25.05 | 1.80 | 300.00 | 47.65 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 35.98 | AV | 54.00 | -18.02 | 1.80 | 300.00 | 34.68 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 50.36 | PK | 74.00 | -23.64 | 1.80 | 300.00 | 43.96 | 6.70 | 31.20 | 31.50 | 6.40 |
| 4 | 4804.00 | 38.38 | AV | 54.00 | -15.62 | 1.80 | 300.00 | 31.98 | 6.70 | 31.20 | 31.50 | 6.40 |
| 5 | 7206.00 | 51.84 | PK | 74.00 | -22.16 | 1.80 | 300.00 | 36.94 | 16.00 | 30.90 | 32.00 | 14.90 |
| 6 | 7206.00 | 40.00 | AV | 54.00 | -14.00 | 1.80 | 300.00 | 25.10 | 16.00 | 30.90 | 32.00 | 14.90 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（pi/4DQPSK_2402MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 47.65 | PK | 74.00 | -26.35 | 1.60 | 260.00 | 46.35 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 34.51 | AV | 54.00 | -19.49 | 1.60 | 260.00 | 33.21 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 52.32 | PK | 74.00 | -21.68 | 1.60 | 260.00 | 45.92 | 6.70 | 31.20 | 31.50 | 6.40 |
| 4 | 4804.00 | 40.34 | AV | 54.00 | -13.66 | 1.60 | 260.00 | 33.94 | 6.70 | 31.20 | 31.50 | 6.40 |
| 5 | 7206.00 | 53.21 | PK | 74.00 | -20.79 | 1.60 | 260.00 | 38.31 | 16.00 | 30.90 | 32.00 | 14.90 |
| 6 | 7206.00 | 42.16 | AV | 54.00 | -11.84 | 1.60 | 260.00 | 27.26 | 16.00 | 30.90 | 32.00 | 14.90 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（pi/4DQPSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 50.62 | PK | 74.00 | -23.38 | 1.80 | 260.00 | 44.22 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 38.88 | AV | 54.00 | -15.12 | 1.80 | 260.00 | 32.48 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 51.65 | PK | 74.00 | -22.35 | 1.80 | 260.00 | 42.25 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 40.50 | AV | 54.00 | -13.50 | 1.80 | 260.00 | 31.10 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（pi/4DQPSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 49.65 | PK | 74.00 | -24.35 | 1.60 | 300.00 | 43.25 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 38.59 | AV | 54.00 | -15.41 | 1.60 | 300.00 | 32.19 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 51.62 | PK | 74.00 | -22.38 | 1.60 | 300.00 | 42.22 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 40.58 | AV | 54.00 | -13.42 | 1.60 | 300.00 | 31.18 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（pi/4DQPSK_2480MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 49.66 | PK | 74.00 | -24.34 | 1.80 | 360.00 | 47.06 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 39.19 | AV | 54.00 | -14.81 | 1.80 | 360.00 | 36.59 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 51.98 | PK | 74.00 | -22.02 | 1.80 | 360.00 | 45.28 | 7.00 | 31.20 | 31.50 | 6.70 |
| 4 | 4960.00 | 40.62 | AV | 54.00 | -13.38 | 1.80 | 360.00 | 33.92 | 7.00 | 31.20 | 31.50 | 6.70 |
| 5 | 7440.00 | 51.99 | PK | 74.00 | -22.01 | 1.80 | 360.00 | 42.49 | 10.20 | 31.60 | 32.40 | 9.50 |
| 6 | 7440.00 | 40.84 | AV | 54.00 | -13.16 | 1.80 | 360.00 | 31.34 | 10.20 | 31.60 | 32.40 | 9.50 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（pi/4DQPSK_2480MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 49.62 | PK | 74.00 | -24.38 | 1.60 | 200.00 | 47.02 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 39.29 | AV | 54.00 | -14.71 | 1.60 | 200.00 | 36.69 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 51.63 | PK | 74.00 | -22.37 | 1.60 | 200.00 | 44.93 | 7.00 | 31.20 | 31.50 | 6.70 |
| 4 | 4960.00 | 41.67 | AV | 54.00 | -12.33 | 1.60 | 200.00 | 34.97 | 7.00 | 31.20 | 31.50 | 6.70 |
| 5 | 7440.00 | 52.06 | PK | 74.00 | -21.94 | 1.60 | 200.00 | 42.56 | 10.20 | 31.60 | 32.40 | 9.50 |
| 6 | 7440.00 | 40.90 | AV | 54.00 | -13.10 | 1.60 | 200.00 | 31.40 | 10.20 | 31.60 | 32.40 | 9.50 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（8DPSK_2402MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 48.65 | PK | 74.00 | -25.35 | 1.70 | 120.00 | 47.35 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 35.46 | AV | 54.00 | -18.54 | 1.70 | 120.00 | 34.16 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 50.33 | PK | 74.00 | -23.67 | 1.70 | 120.00 | 43.93 | 7.40 | 30.40 | 31.40 | 6.40 |
| 4 | 4804.00 | 37.58 | AV | 54.00 | -16.42 | 1.70 | 120.00 | 31.18 | 7.40 | 30.40 | 31.40 | 6.40 |
| 5 | 7206.00 | 51.49 | PK | 74.00 | -22.51 | 1.70 | 120.00 | 42.19 | 9.90 | 31.50 | 32.10 | 9.30 |
| 6 | 7206.00 | 39.50 | AV | 54.00 | -14.50 | 1.70 | 120.00 | 30.20 | 9.90 | 31.50 | 32.10 | 9.30 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（8DPSK_2402MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2390.00 | 48.57 | PK | 74.00 | -25.43 | 1.60 | 200.00 | 47.27 | 5.20 | 28.60 | 32.50 | 1.30 |
| 2 | 2390.00 | 35.23 | AV | 54.00 | -18.77 | 1.60 | 200.00 | 33.93 | 5.20 | 28.60 | 32.50 | 1.30 |
| 3 | 4804.00 | 50.62 | PK | 74.00 | -23.38 | 1.60 | 200.00 | 44.22 | 7.40 | 30.40 | 31.40 | 6.40 |
| 4 | 4804.00 | 38.97 | AV | 54.00 | -15.03 | 1.60 | 200.00 | 32.57 | 7.40 | 30.40 | 31.40 | 6.40 |
| 5 | 7206.00 | 51.89 | PK | 74.00 | -22.11 | 1.60 | 200.00 | 42.59 | 9.90 | 31.50 | 32.10 | 9.30 |
| 6 | 7206.00 | 40.10 | AV | 54.00 | -13.90 | 1.60 | 200.00 | 30.80 | 9.90 | 31.50 | 32.10 | 9.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（8DPSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 48.65 | PK | 74.00 | -25.35 | 1.70 | 300.00 | 42.25 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 37.40 | AV | 54.00 | -16.60 | 1.70 | 300.00 | 31.00 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 51.48 | PK | 74.00 | -22.52 | 1.70 | 300.00 | 42.08 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 40.22 | AV | 54.00 | -13.78 | 1.70 | 300.00 | 30.82 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（8DPSK_2441MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 4882.00 | 50.32 | PK | 74.00 | -23.68 | 1.60 | 260.00 | 43.92 | 6.70 | 31.20 | 31.50 | 6.40 |
| 2 | 4882.00 | 38.97 | AV | 54.00 | -15.03 | 1.60 | 260.00 | 32.57 | 6.70 | 31.20 | 31.50 | 6.40 |
| 3 | 7323.00 | 51.97 | PK | 74.00 | -22.03 | 1.60 | 260.00 | 42.57 | 10.10 | 31.50 | 32.30 | 9.40 |
| 4 | 7323.00 | 40.56 | AV | 54.00 | -13.44 | 1.60 | 260.00 | 31.16 | 10.10 | 31.50 | 32.30 | 9.40 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（8DPSK_2480MHz） | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 49.66 | PK | 74.00 | -24.34 | 1.60 | 320.00 | 47.06 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 37.34 | AV | 54.00 | -16.66 | 1.60 | 320.00 | 34.74 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 51.62 | PK | 74.00 | -22.38 | 1.60 | 320.00 | 45.22 | 6.70 | 31.20 | 31.50 | 6.40 |
| 4 | 4960.00 | 39.63 | AV | 54.00 | -14.37 | 1.60 | 320.00 | 33.23 | 6.70 | 31.20 | 31.50 | 6.40 |
| 5 | 7440.00 | 51.33 | PK | 74.00 | -22.67 | 1.60 | 320.00 | 36.43 | 16.00 | 30.90 | 32.00 | 14.90 |
| 6 | 7440.00 | 40.18 | AV | 54.00 | -13.82 | 1.60 | 320.00 | 25.28 | 16.00 | 30.90 | 32.00 | 14.90 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（8DPSK_2480MHz） | | | | | | | | | | | | |
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV/m) | Cab. Loss (dB) | Ant. Factor (dB) | Pre. Amp. (dB) | Cor. Factor (dB/m) |
| 1 | 2483.50 | 48.54 | PK | 74.00 | -25.46 | 1.50 | 280.00 | 45.94 | 5.70 | 28.70 | 31.80 | 2.60 |
| 2 | 2483.50 | 37.40 | AV | 54.00 | -16.60 | 1.50 | 280.00 | 34.80 | 5.70 | 28.70 | 31.80 | 2.60 |
| 3 | 4960.00 | 50.32 | PK | 74.00 | -23.68 | 1.50 | 280.00 | 43.92 | 6.70 | 31.20 | 31.50 | 6.40 |
| 4 | 4960.00 | 38.90 | AV | 54.00 | -15.10 | 1.50 | 280.00 | 32.50 | 6.70 | 31.20 | 31.50 | 6.40 |
| 5 | 7440.00 | 51.24 | PK | 74.00 | -22.76 | 1.50 | 280.00 | 36.34 | 16.00 | 30.90 | 32.00 | 14.90 |
| 6 | 7440.00 | 39.38 | AV | 54.00 | -14.62 | 1.50 | 280.00 | 24.48 | 16.00 | 30.90 | 32.00 | 14.90 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) − Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level − Limit value

# 3. List of measuring equipment

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| 1 | EMI TEST RECEIVER | R&S | ESIB7 | A0501375 | 2019.07.30 | 2020.07.29 |
| 2 | Power Meter | R&S | NRP-Z31 | 102872 | 2020.05.18 | 2021.05.17 |
| 3 | TURNTABLE | ETS | 2088 | 2149 | N/A | N/A |
| 4 | ANTENNA MAST | ETS | 2075 | 2346 | N/A | N/A |
| 5 | EMI TEST Software | R&S | ESK1 | N/A | N/A | N/A |
| 6 | Horn antenna (18GHz~26.5GHz) | AR | AT4002A | 305753 | 2017.11.10 | 2020.11.09 |
| 7 | Amplifer | MILMEGA | 80RF1000-250 | A140901925 | 2017.10.09 | 2020.10.08 |
| 8 | JS amplifer | AR | 25S1G4AM1 | A0304248 | 2017.10.09 | 2020.10.08 |
| 9 | High pass filter | Compliance Direction systems | BSU-6 | 34202 | 2019.11.10 | 2020.11.09 |
| 13 | Horn Antenna | AR | AT4002A | 305753 | 2017.07.12 | 2020.07.11 |
| 14 | Horn Antenna | AR | AT4510 | 325306 | 2018.07.14 | 2020.07.13 |
| 15 | ULTRA-BROADBAND ANTENNA | R&S | HL562 | A0304224 | 2017.07.14 | 2020.07.13 |
| 16 | Passive Loop Antenna | R&S | HFH2-Z2 | 100047 | 2019.04.26 | 2022.04.25 |
| 17 | Temperature chamber | welissom Inc. | SU-642 | A150802409 | 2019.07.18 | 2020.07.17 |
| 18 | Spectrum Analyzer | KEYSIGHT | N9030A | A160702554 | 2019.06.05 | 2020.06.04 |
| 19 | Power Supply | R&S | NGMO1 | 101037 | 2019.08.03 | 2020.08.02 |
| 20 | EMI TEST RECEIVER | KEYSIGHT | ESCI | A0902601 | 2019.07.02 | 2020.07.01 |
| 21 | LISN | ROHDE&SCHWARZ | ENV216 | A140701847 | 2019.11.21 | 2020.11.20 |

# 4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150KHz~30MHz)

| | |
|---|---|
| Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y)) | 2.6dB |

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

| | |
|---|---|
| Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y)) | 2.4dB |

Uncertainty of Radiated Emission Measurement (1GHz~40GHz)

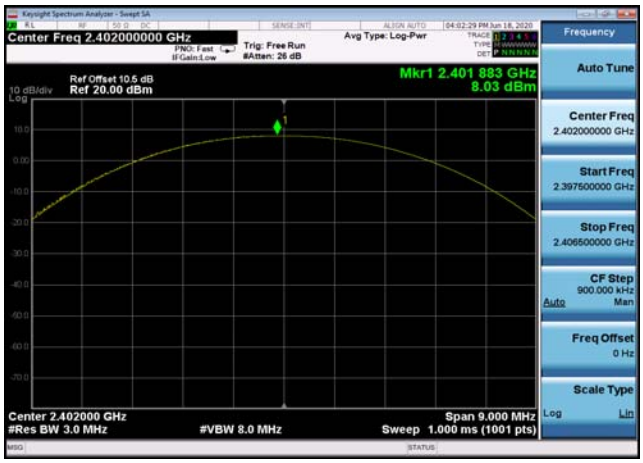
| | |
|---|---|
| Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y)) | 2.8dB |

# Appendix A

**RF Output Power**
**Test Result and Data**

| BT Maximum Output Power | | | | | |
|---|---|---|---|---|---|
| Mode | Test Frequency | Packet Type | Power(dBm) | Limit(dBm) | Result |
| GFSK | 2402 | DH5 | 8.03 | 21 | Pass |
| GFSK | 2441 | DH5 | 7.74 | 21 | Pass |
| GFSK | 2480 | DH5 | 7.09 | 21 | Pass |
| pi/4DQPSK | 2402 | 2DH5 | 8.52 | 21 | Pass |
| pi/4DQPSK | 2441 | 2DH5 | 8.49 | 21 | Pass |
| pi/4DQPSK | 2480 | 2DH5 | 7.86 | 21 | Pass |
| 8DPSK | 2402 | 3DH5 | 8.18 | 21 | Pass |
| 8DPSK | 2441 | 3DH5 | 8.19 | 21 | Pass |
| 8DPSK | 2480 | 3DH5 | 7.69 | 21 | Pass |

Output Power：GFSK,2402MHz,DH5



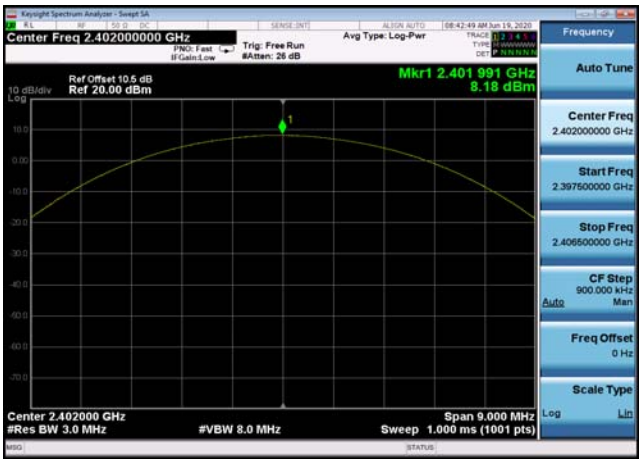
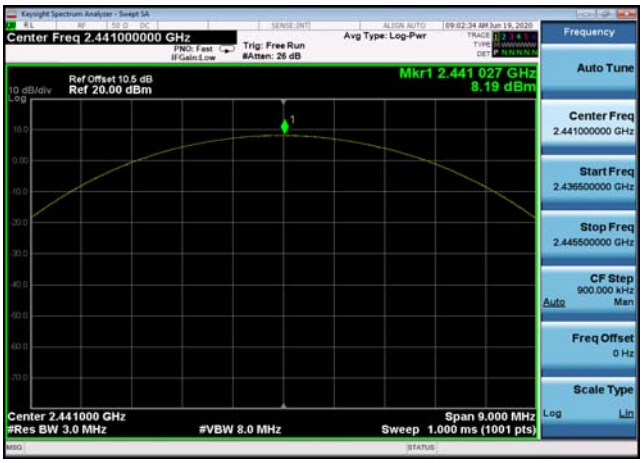

Output Power：GFSK,2441MHz,DH5

Output Power：GFSK,2480MHz,DH5

Output Power：DQPSK,2402MHz,2DH5

Output Power：DQPSK,2441MHz,2DH5

Output Power：DQPSK,2480MHz,2DH5

| Output Power：8DPSK,2402MHz,3DH5 | Output Power：8DPSK,2441MHz,3DH5 |
|---|---|
|  |  |
| Output Power：8DPSK,2480MHz,3DH5 | |
| | |

## 20dB Bandwidth

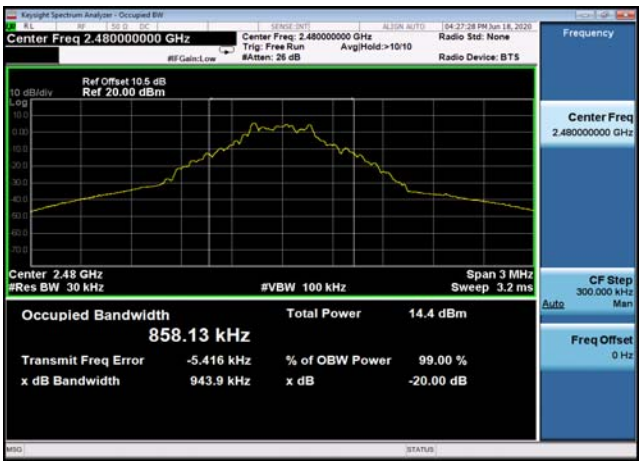
### Test Result and Data

| BT Occupied 20dB Bandwidth | | | | |
|---|---|---|---|---|
| Mode | Test Frequency | Packet Type | -20dB Bandwidth (kHz) | Result |
| GFSK | 2402 | DH5 | 943.328 | Pass |
| GFSK | 2441 | DH5 | 943.9 | Pass |
| GFSK | 2480 | DH5 | 943.898 | Pass |
| DQPSK | 2402 | 2DH5 | 1288.413 | Pass |
| DQPSK | 2441 | 2DH5 | 1288.777 | Pass |
| DQPSK | 2480 | 2DH5 | 1289.06 | Pass |
| 8DPSK | 2402 | 3DH5 | 1293.842 | Pass |
| 8DPSK | 2441 | 3DH5 | 1292.859 | Pass |
| 8DPSK | 2480 | 3DH5 | 1292.443 | Pass |

20dB Bandwidth：GFSK,2402MHz,DH5

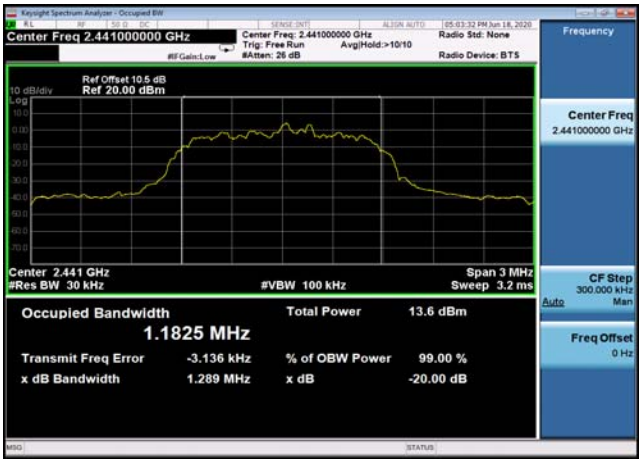
20dB Bandwidth：GFSK,2441MHz,DH5

20dB Bandwidth：GFSK,2480MHz,DH5

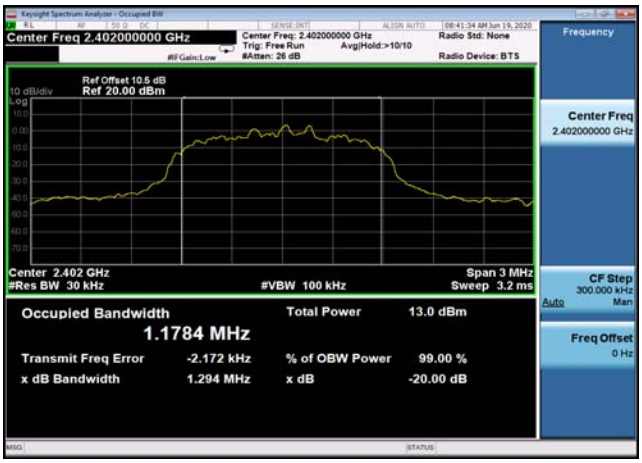
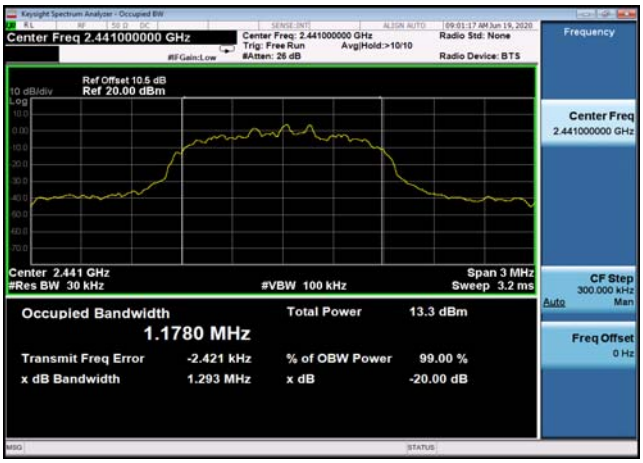
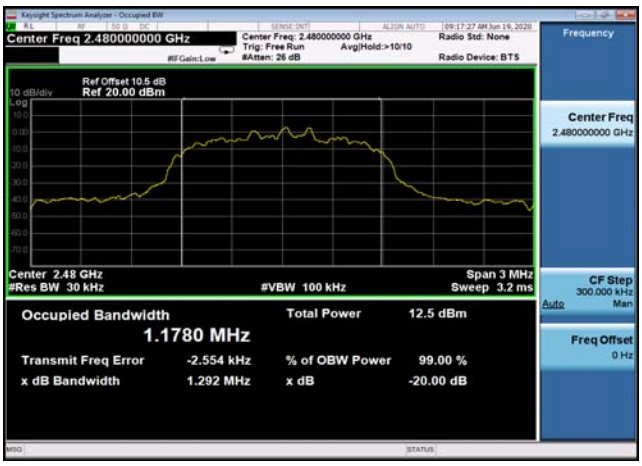



20dB Bandwidth：DQPSK,2402MHz,2DH5

20dB Bandwidth：DQPSK,2441MHz,2DH5



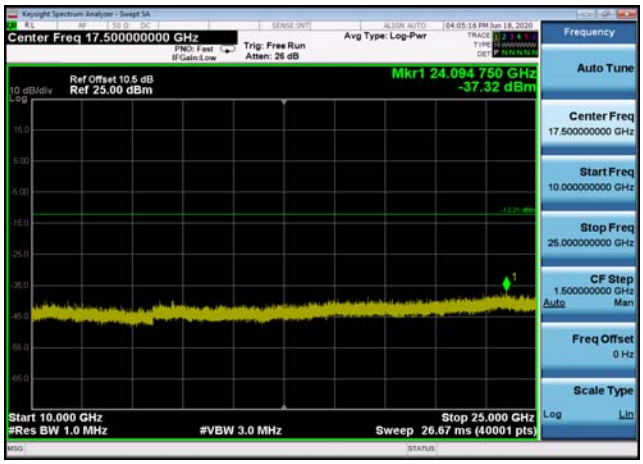

20dB Bandwidth：DQPSK,2480MHz,2DH5

| 20dB Bandwidth：8DPSK,2402MHz,3DH5 | 20dB Bandwidth：8DPSK,2441MHz,3DH5 |
|---|---|
|  |  |
| 20dB Bandwidth：8DPSK,2480MHz,3DH5 | |
|  | |

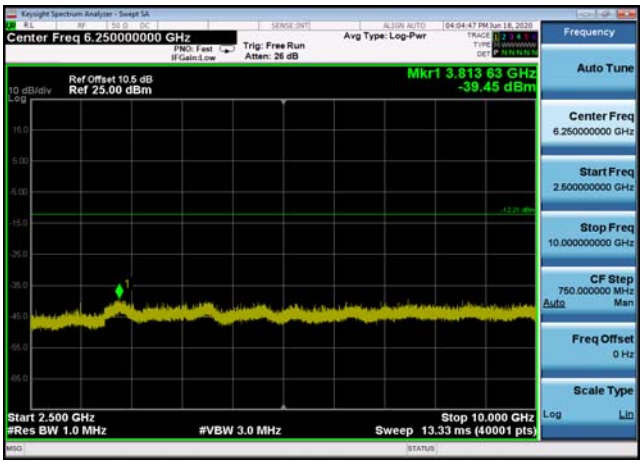
# Transmitter Spurious Emission and Bandedge

## Test Result and Data

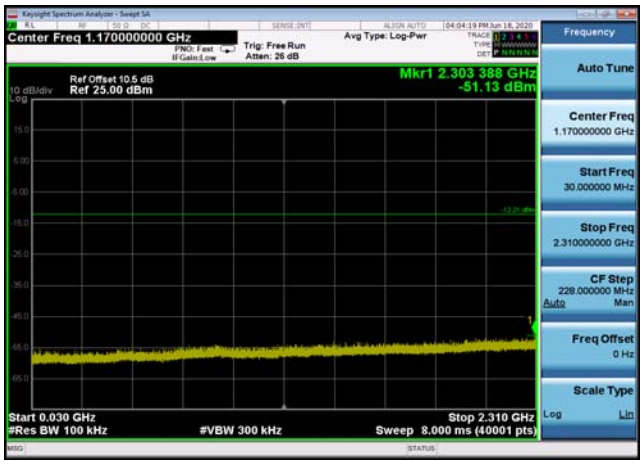
Conducted Emission：GFSK,2402,DH5 ,10000MHz~25000MHz



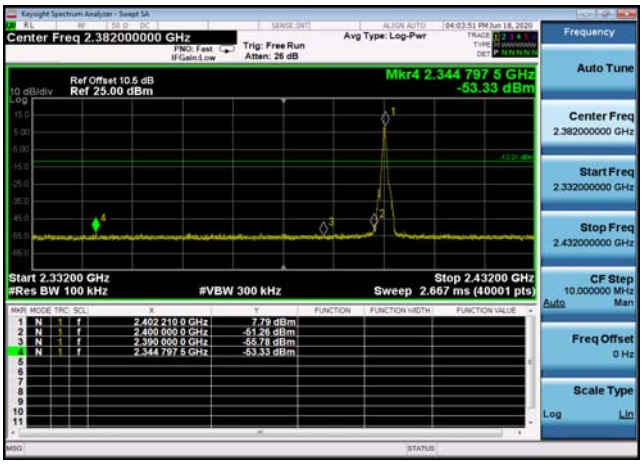

Conducted Emission：GFSK,2402,DH5 ,2500MHz~10000MHz



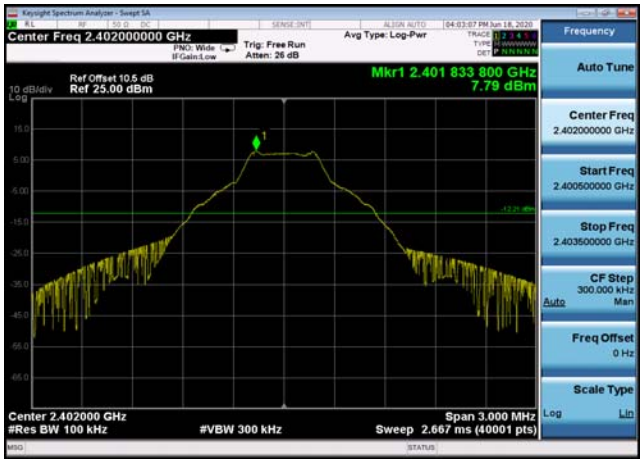

Conducted Emission：GFSK,2402,DH5 ,30MHz~2310MHz



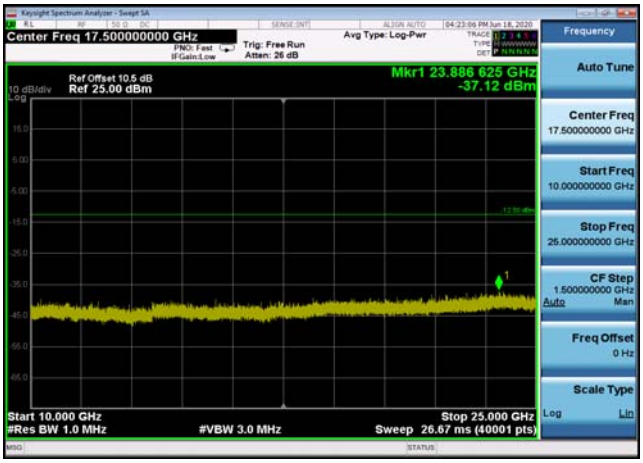

Conducted Emission：GFSK,2402,DH5 ,Band Edge HoppingOFF



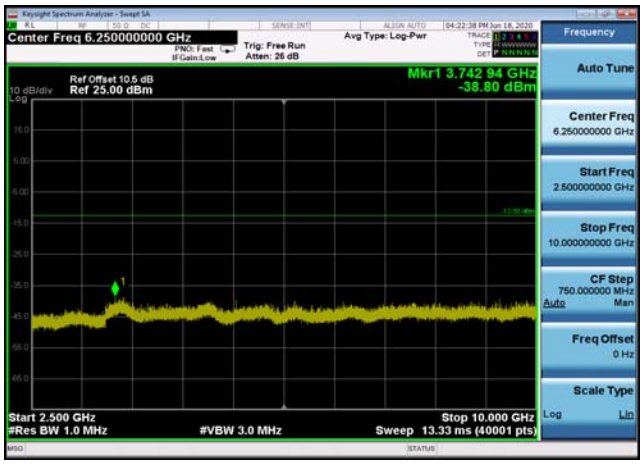

Conducted Emission：GFSK,2402,DH5 ,Reference Level



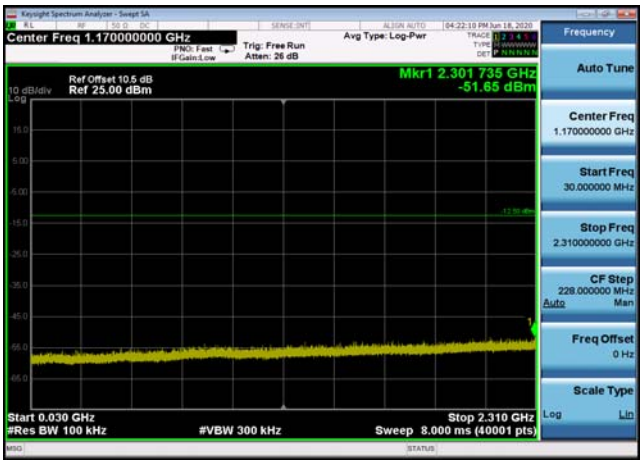

Conducted Emission：GFSK,2441,DH5 ,10000MHz~25000MHz



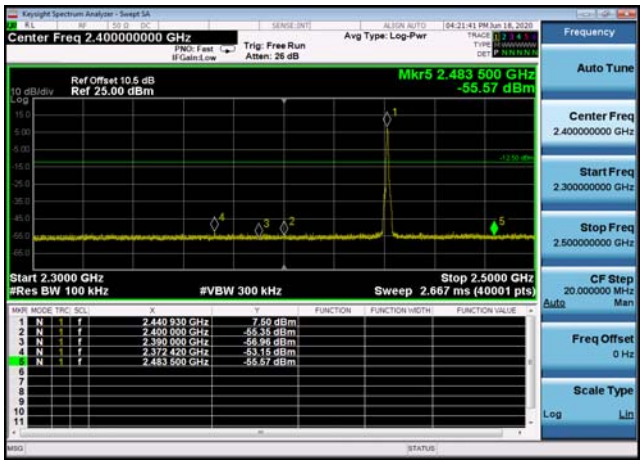
Conducted Emission：GFSK,2441,DH5 ,2500MHz~10000MHz



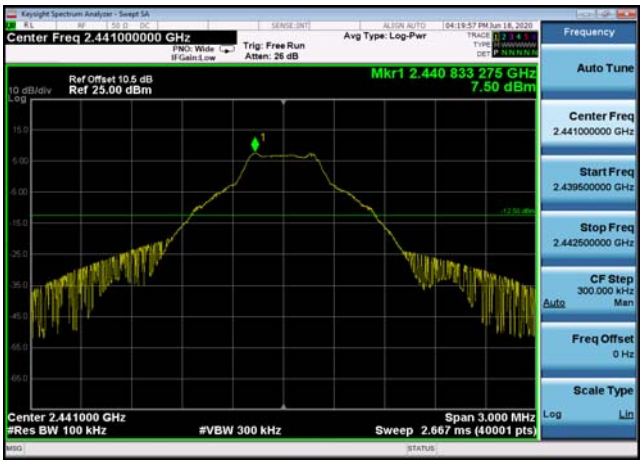

Conducted Emission：GFSK,2441,DH5 ,30MHz~2310MHz



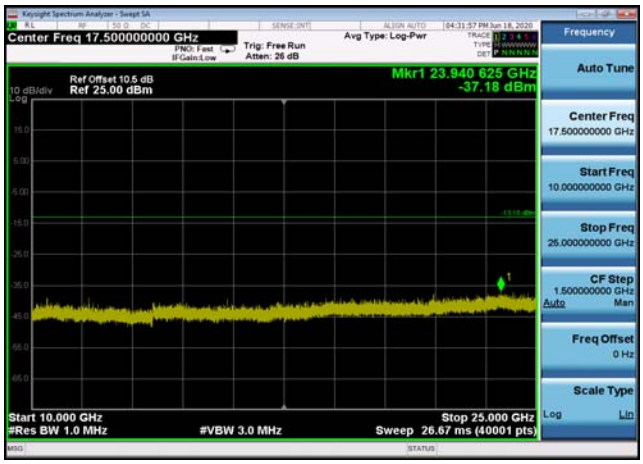

Conducted Emission：GFSK,2441,DH5 ,Band Edge HoppingOFF



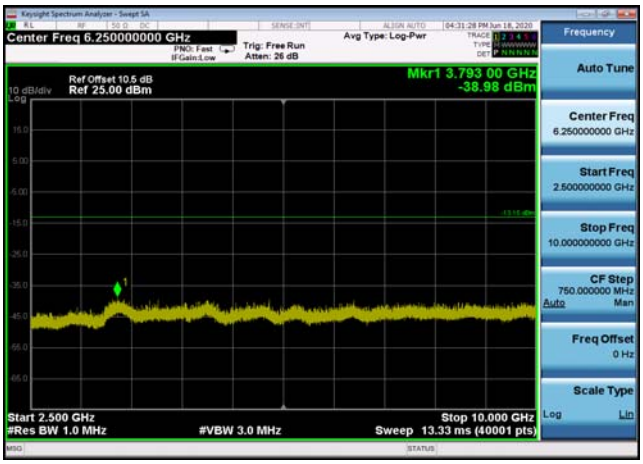

Conducted Emission：GFSK,2441,DH5 ,Reference Level



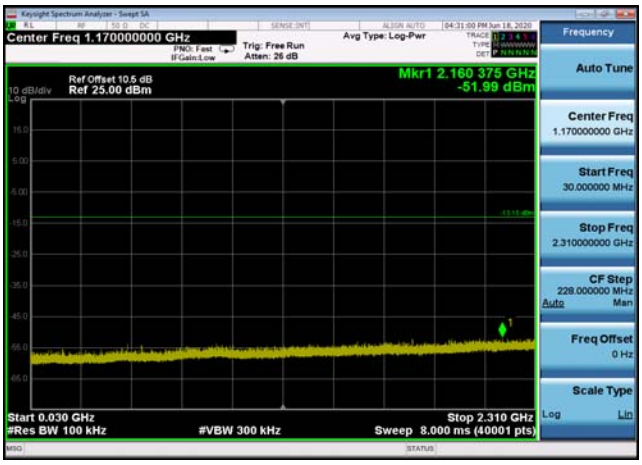

Conducted Emission：GFSK,2480,DH5 ,10000MHz~25000MHz



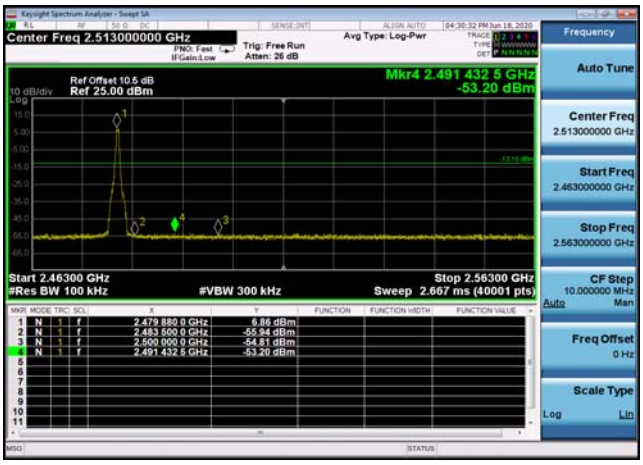

Conducted Emission：GFSK,2480,DH5 ,2500MHz~10000MHz



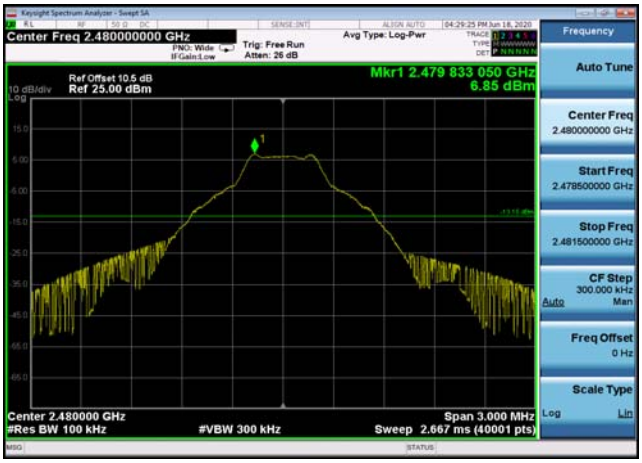
Conducted Emission：GFSK,2480,DH5 ,30MHz~2310MHz



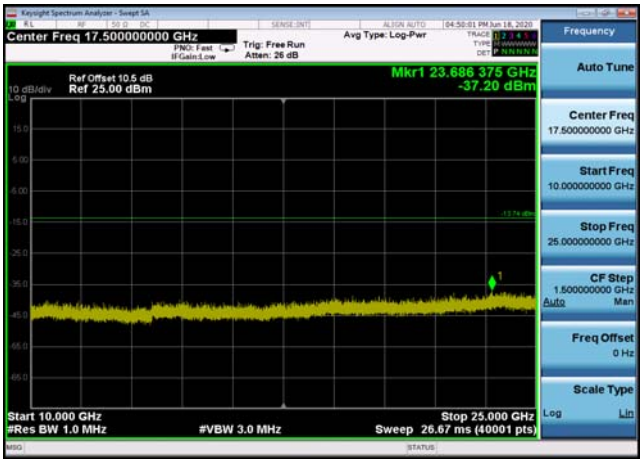

Conducted Emission：GFSK,2480,DH5 ,Band Edge HoppingOFF



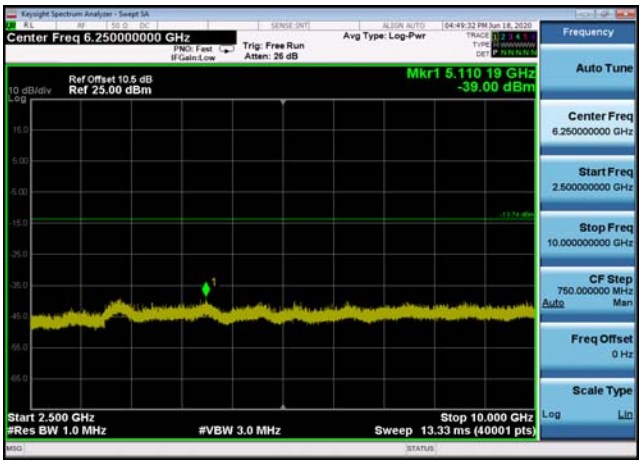

Conducted Emission：GFSK,2480,DH5 ,Reference Level



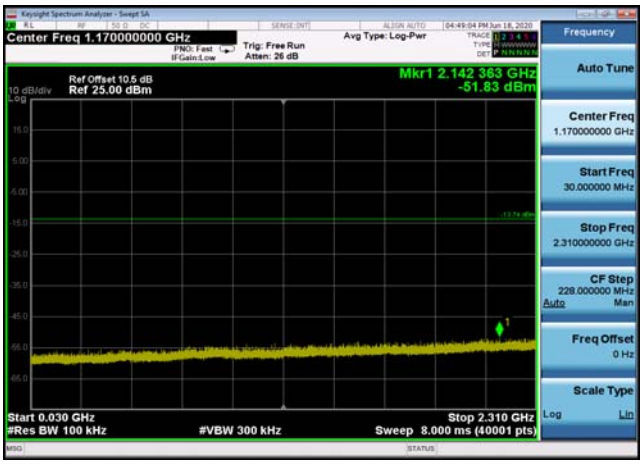

Conducted Emission：DQPSK,2402,2DH5 ,10000MHz~25000MHz



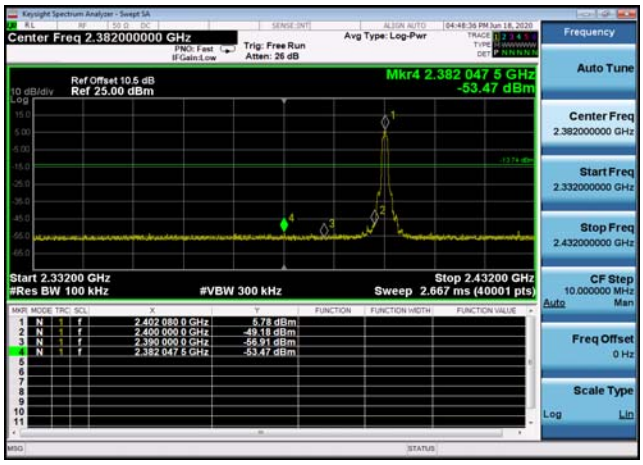

Conducted Emission：DQPSK,2402,2DH5 ,2500MHz~10000MHz



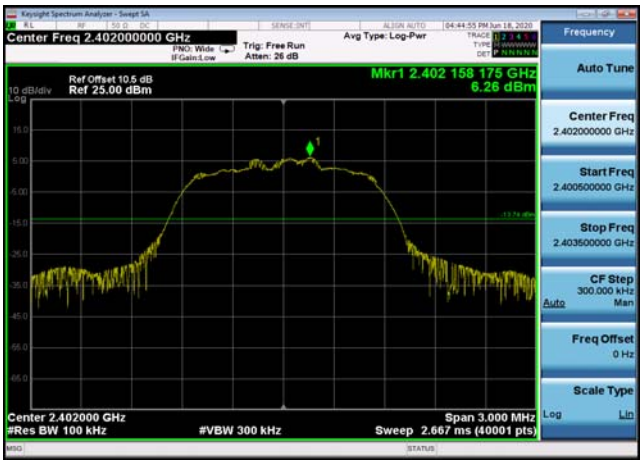

Conducted Emission：DQPSK,2402,2DH5 ,30MHz~2310MHz



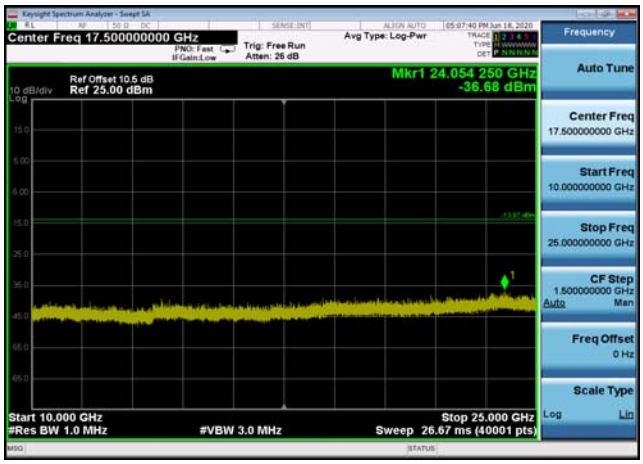
Conducted Emission：DQPSK,2402,2DH5 ,Band Edge HoppingOFF



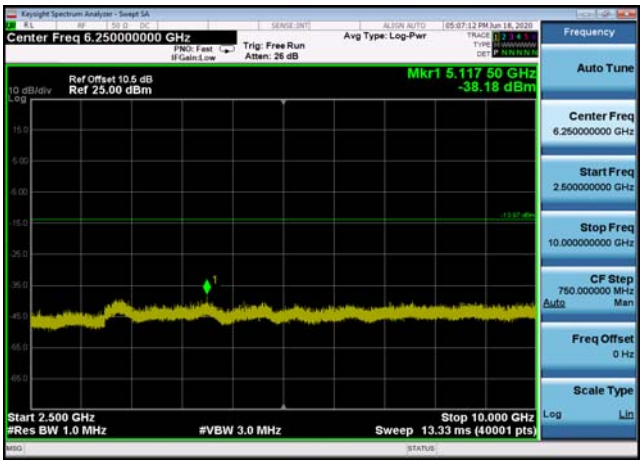

Conducted Emission：DQPSK,2402,2DH5 ,Reference Level



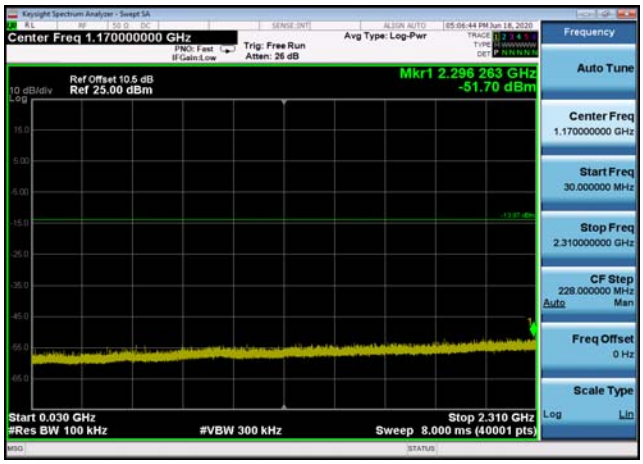

Conducted Emission：DQPSK,2441,2DH5 ,10000MHz~25000MHz



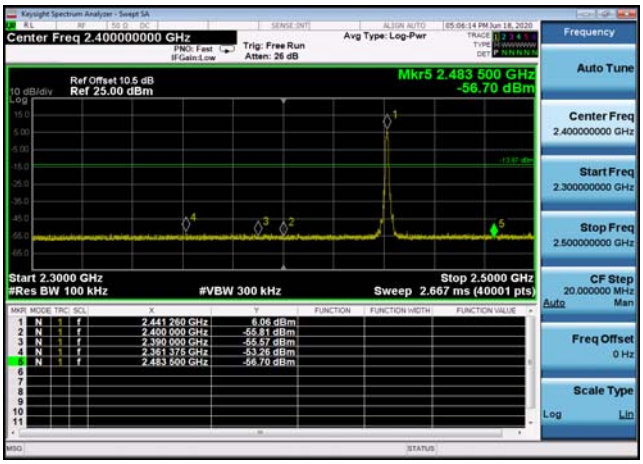

Conducted Emission：DQPSK,2441,2DH5 ,2500MHz~10000MHz



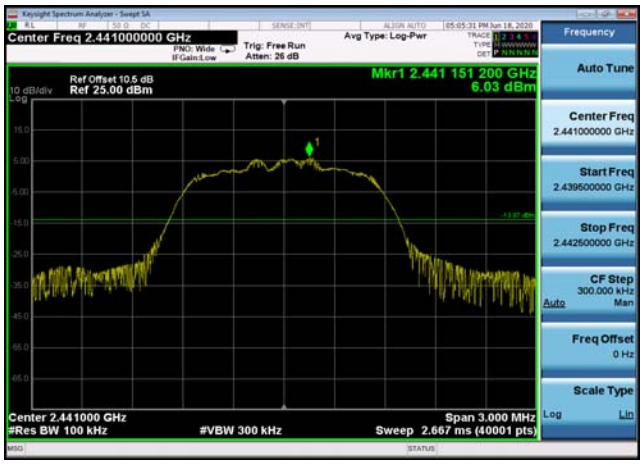

Conducted Emission：DQPSK,2441,2DH5 ,30MHz~2310MHz



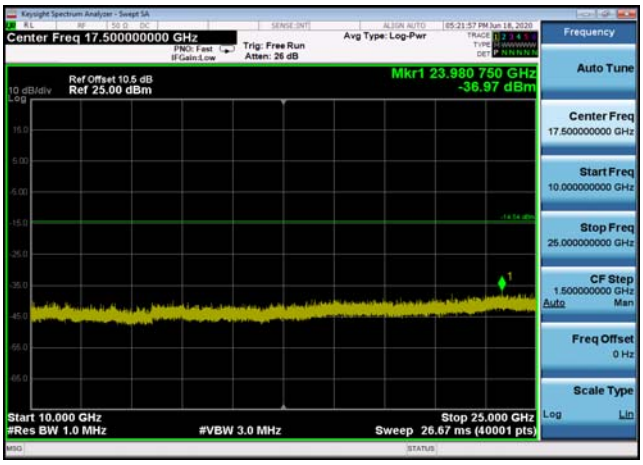

Conducted Emission：DQPSK,2441,2DH5 ,Band Edge HoppingOFF



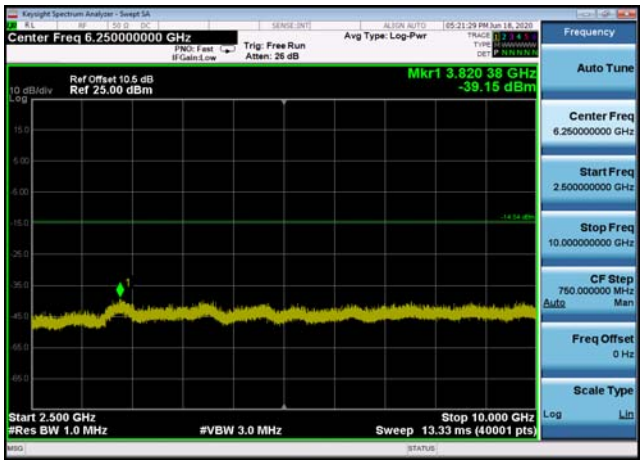
Conducted Emission：DQPSK,2441,2DH5 ,Reference Level



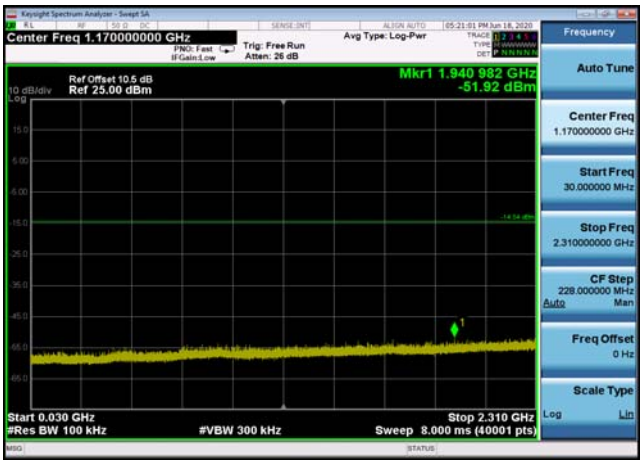

Conducted Emission：DQPSK,2480,2DH5 ,10000MHz~25000MHz



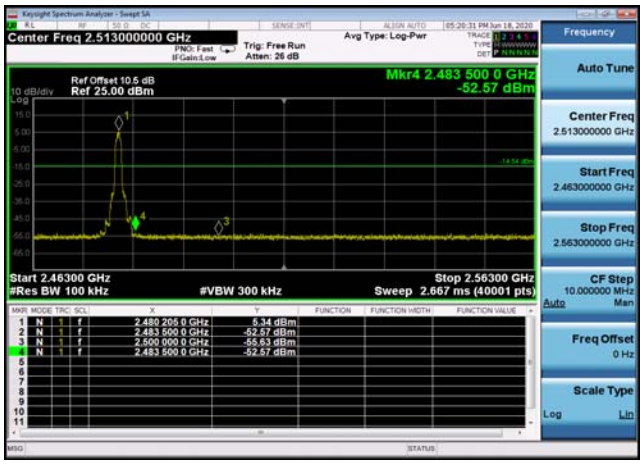

Conducted Emission：DQPSK,2480,2DH5 ,2500MHz~10000MHz



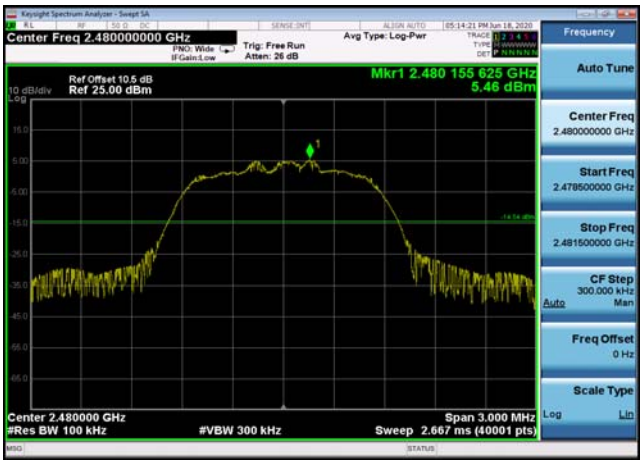

Conducted Emission：DQPSK,2480,2DH5 ,30MHz~2310MHz



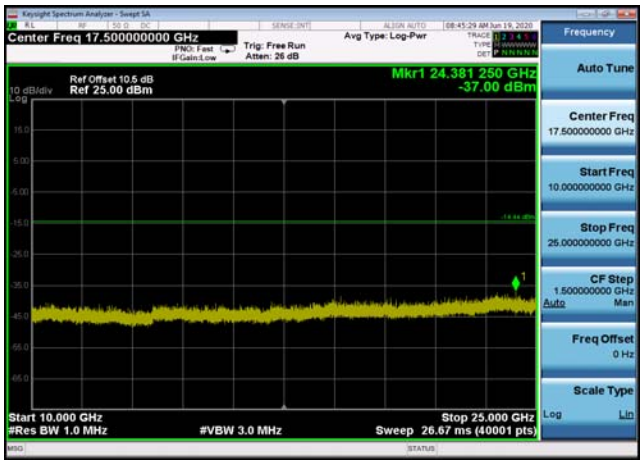

Conducted Emission：DQPSK,2480,2DH5 ,Band Edge HoppingOFF



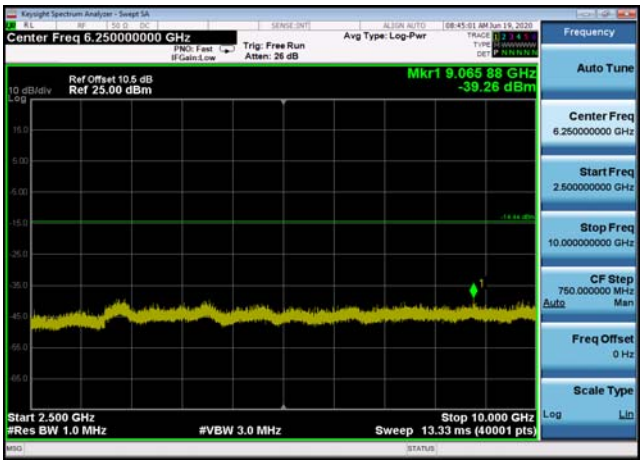

Conducted Emission：DQPSK,2480,2DH5 ,Reference Level



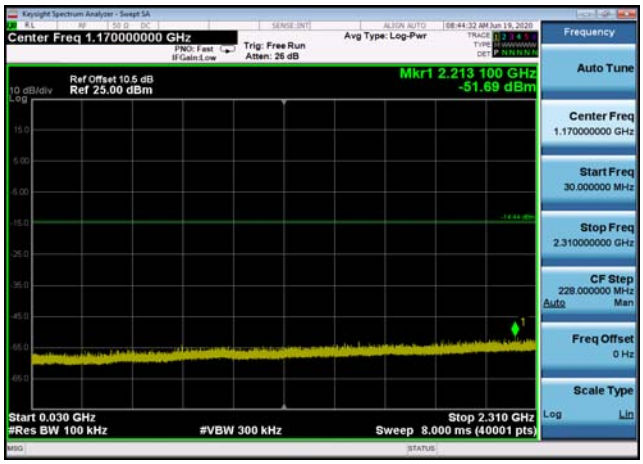
Conducted Emission：8DPSK,2402,3DH5 ,10000MHz~25000MHz



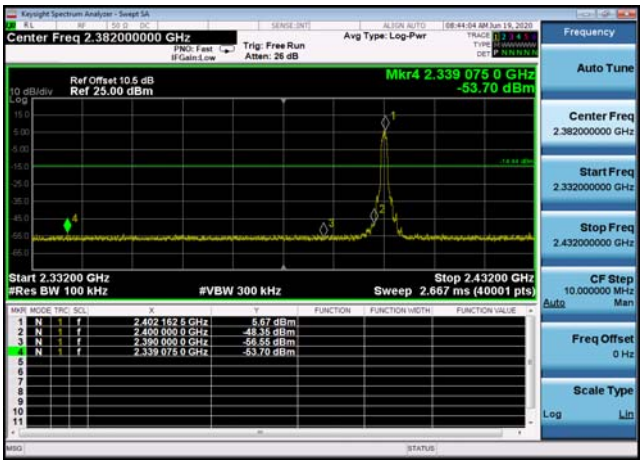

Conducted Emission：8DPSK,2402,3DH5 ,2500MHz~10000MHz



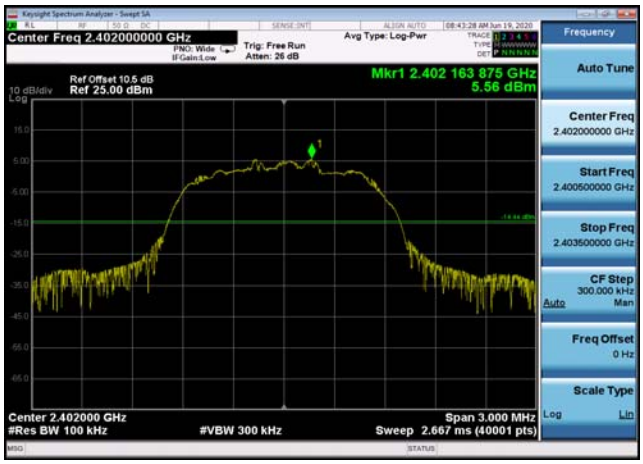

Conducted Emission：8DPSK,2402,3DH5 ,30MHz~2310MHz



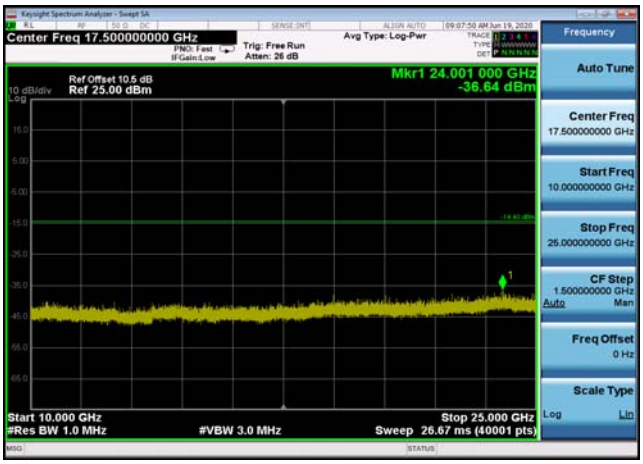

Conducted Emission：8DPSK,2402,3DH5 ,Band Edge HoppingOFF



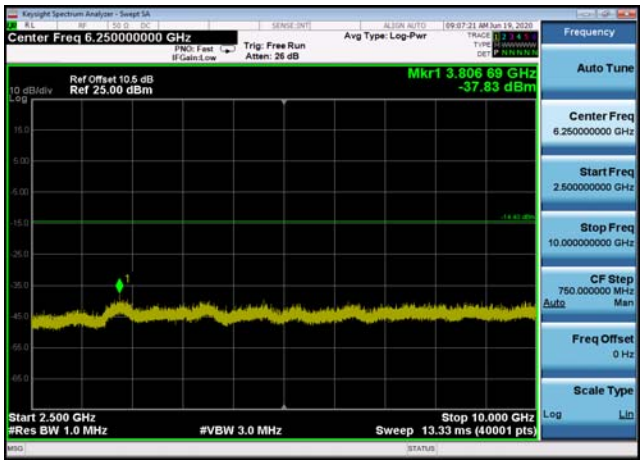

Conducted Emission：8DPSK,2402,3DH5 ,Reference Level



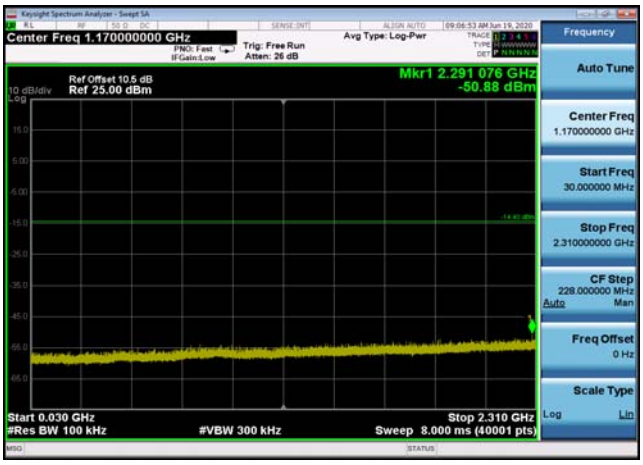

Conducted Emission：8DPSK,2441,3DH5 ,10000MHz~25000MHz



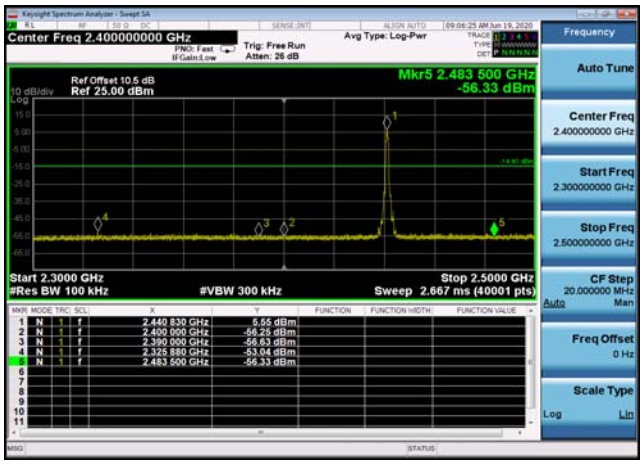
Conducted Emission：8DPSK,2441,3DH5 ,2500MHz~10000MHz



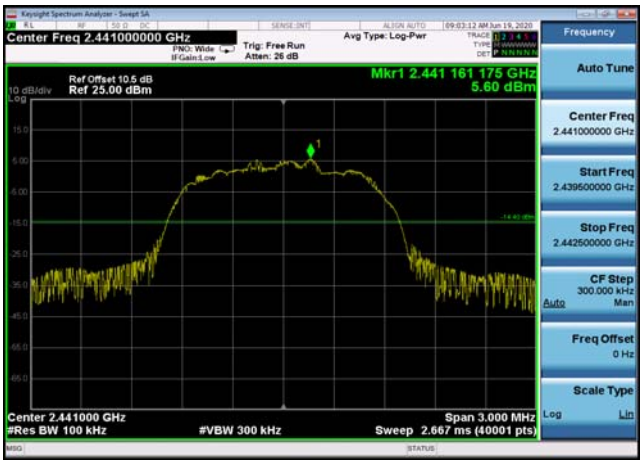

Conducted Emission：8DPSK,2441,3DH5 ,30MHz~2310MHz



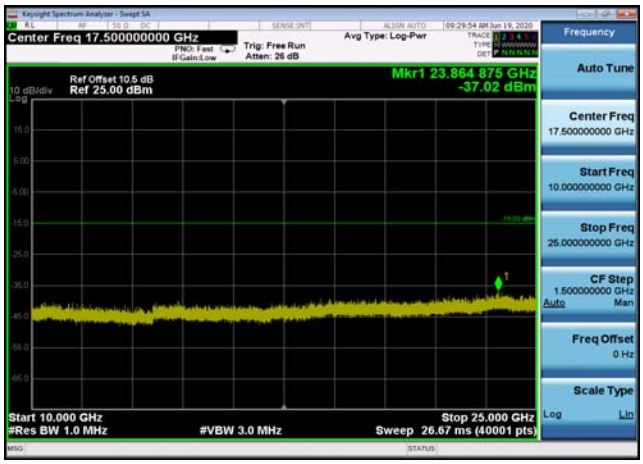

Conducted Emission：8DPSK,2441,3DH5 ,Band Edge HoppingOFF



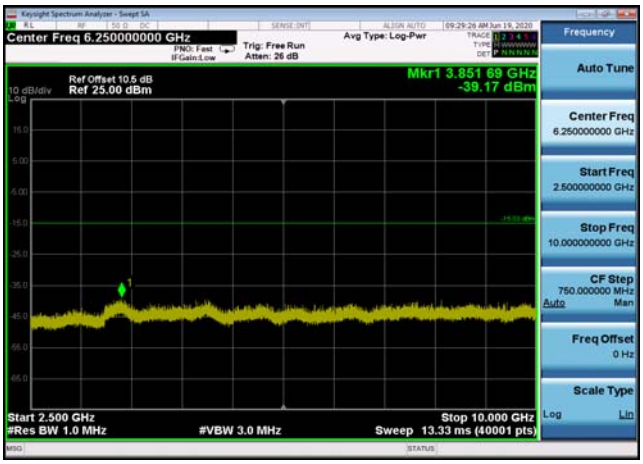

Conducted Emission：8DPSK,2441,3DH5 ,Reference Level

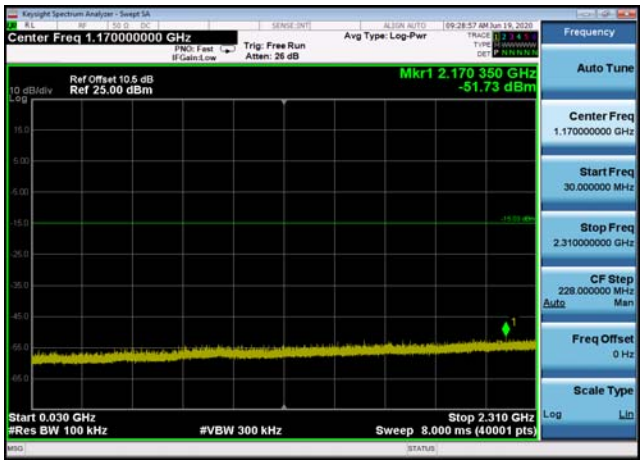
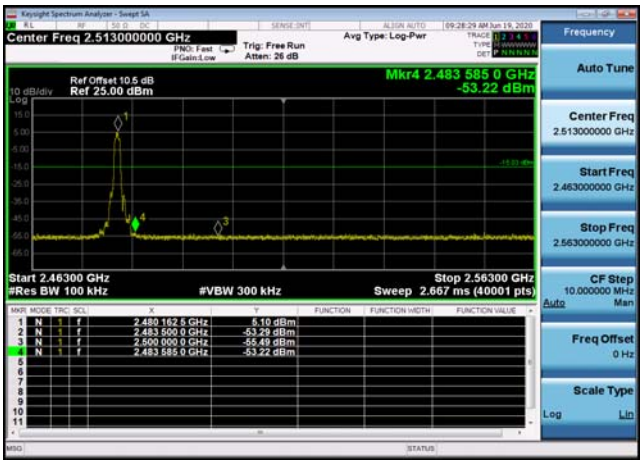
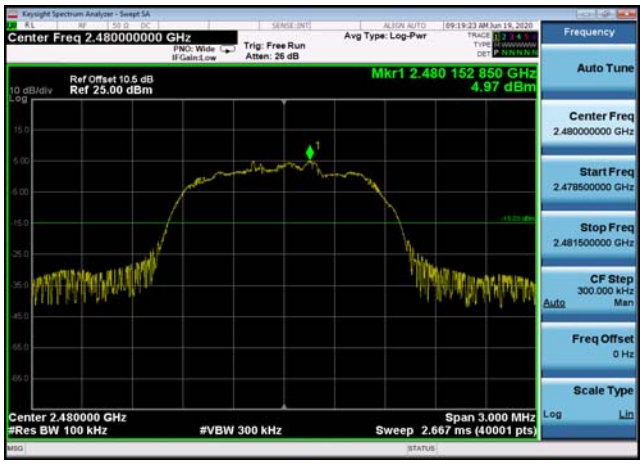



Conducted Emission：8DPSK,2480,3DH5 ,10000MHz~25000MHz

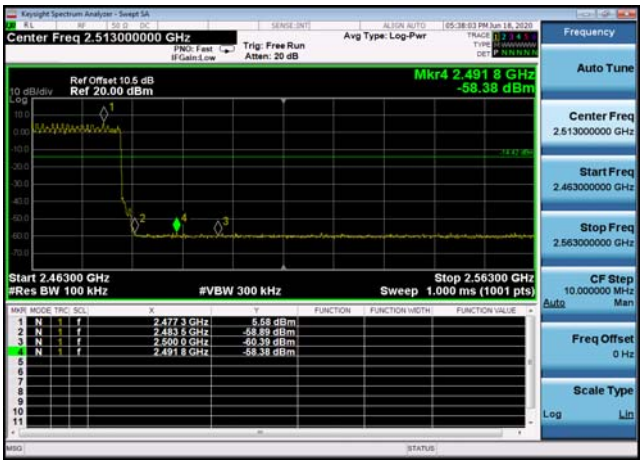
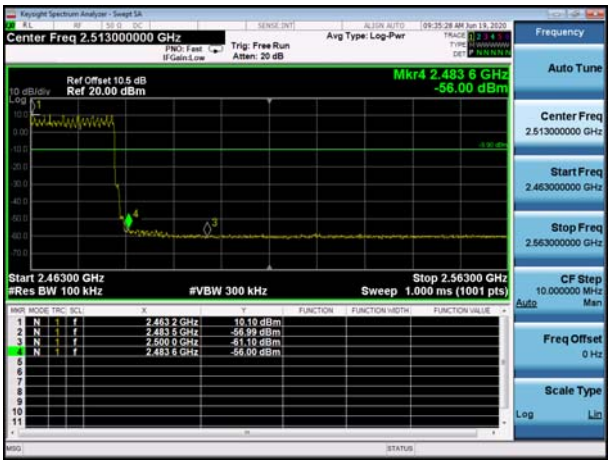



Conducted Emission：8DPSK,2480,3DH5 ,2500MHz~10000MHz



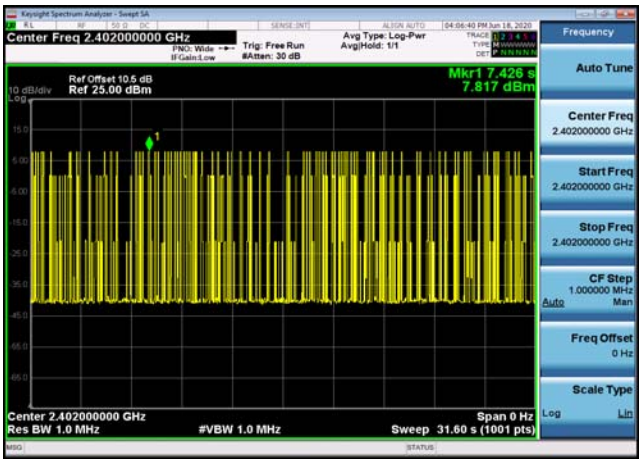
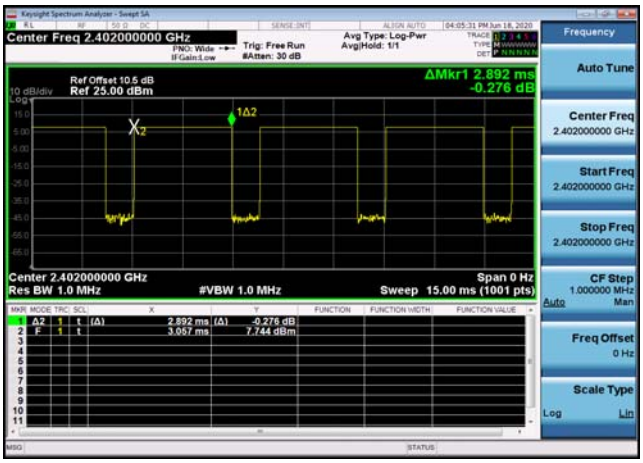
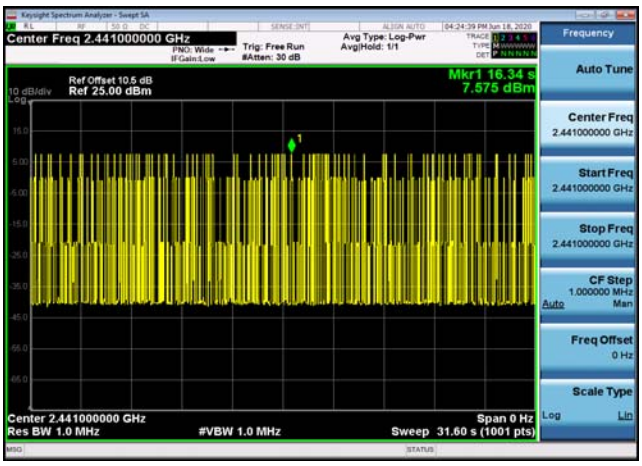
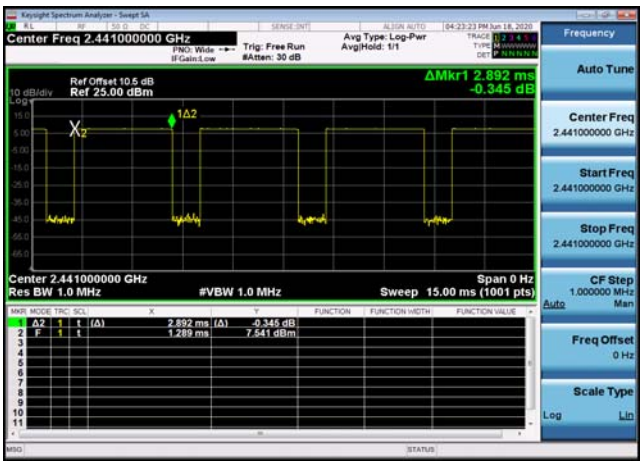
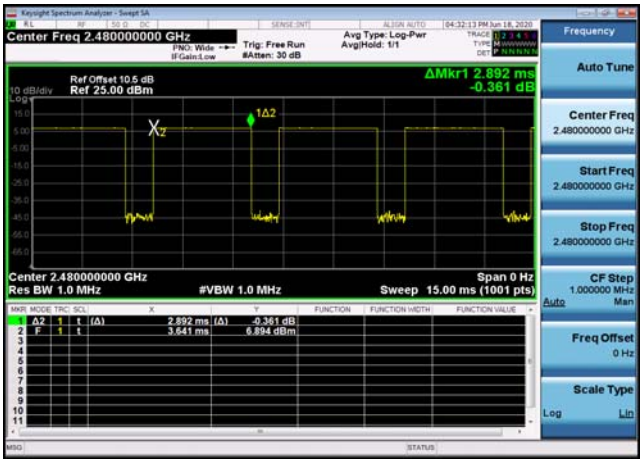
| Conducted Emission：8DPSK,2480,3DH5 ,30MHz~2310MHz | Conducted Emission：8DPSK,2480,3DH5 ,Band Edge HoppingOFF |
|---|---|
|  |  |
| Conducted Emission：8DPSK,2480,3DH5 ,Reference Level | |
|  | |

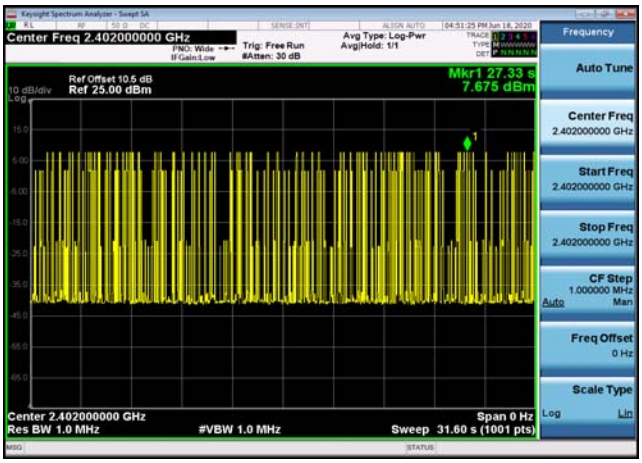
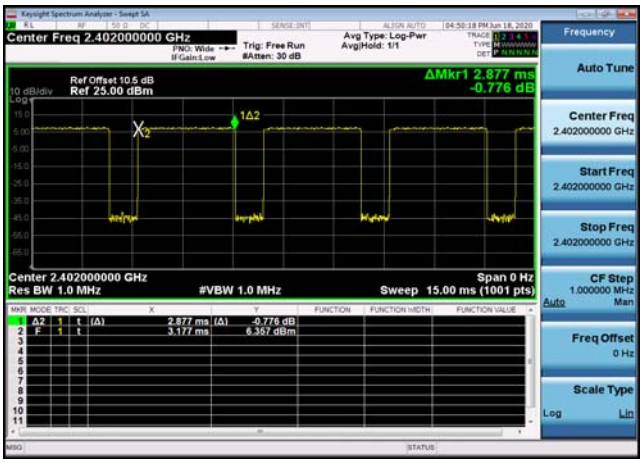
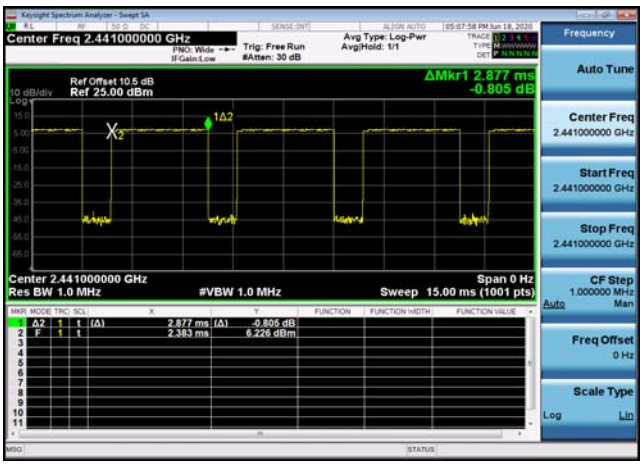
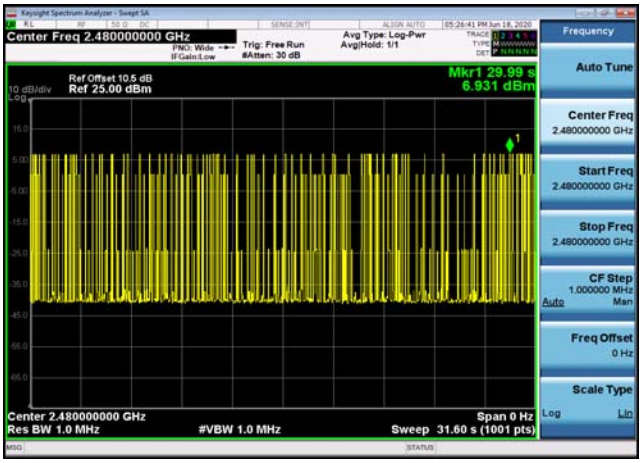
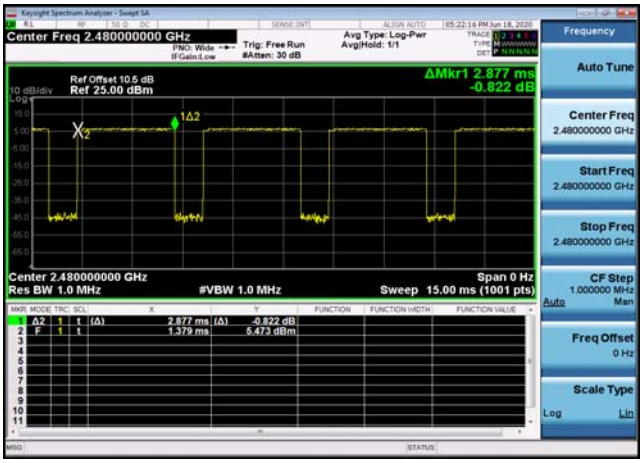
**Hopping On Mode**

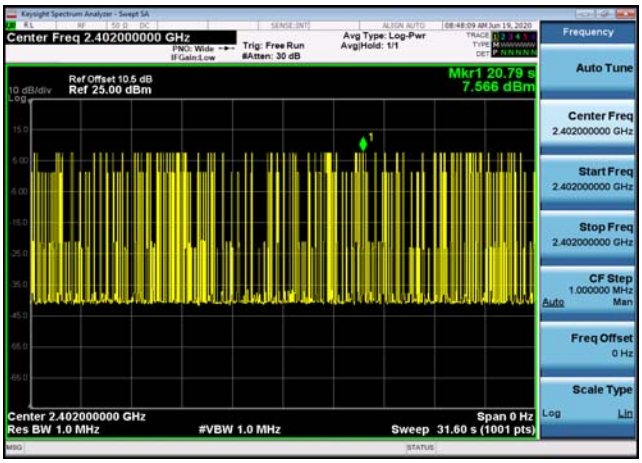
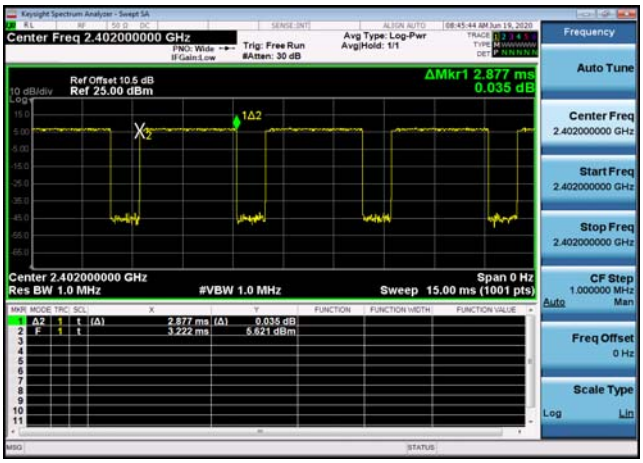
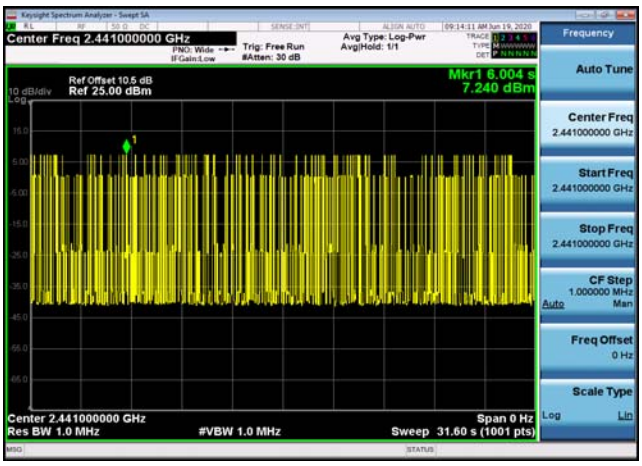
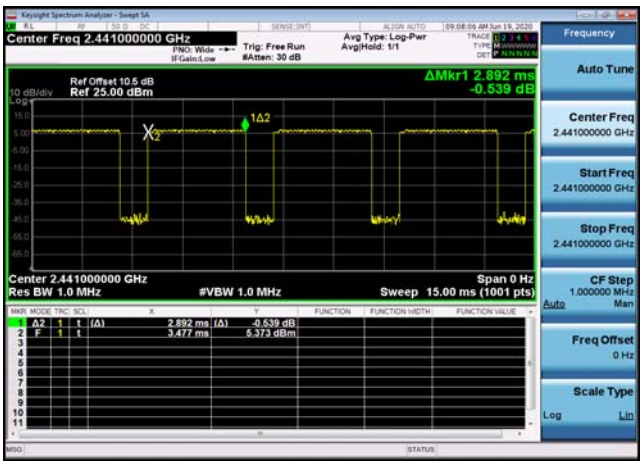
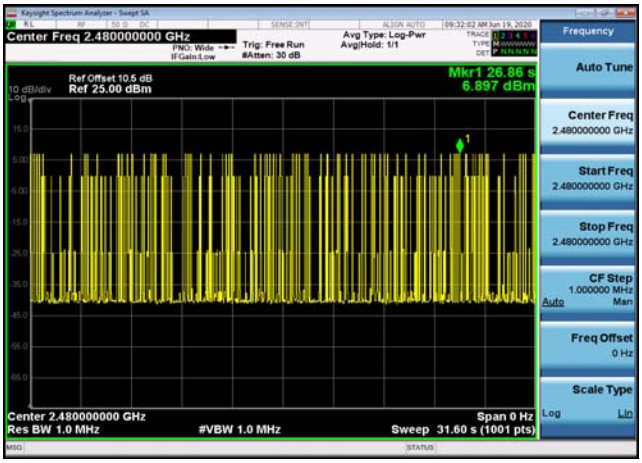
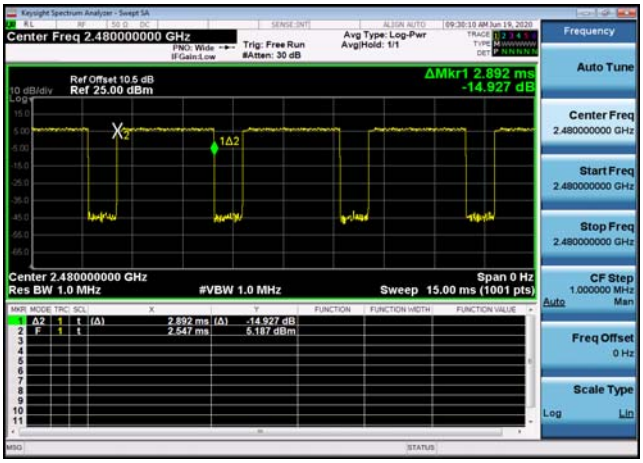
| Conducted Emission：GFSK,2402,DH5 ,Band Edge | Conducted Emission：GFSK,2480,DH5 ,Band Edge |
|---|---|
| | |
| Conducted Emission：DQPSK,2402,2DH5 ,Band Edge | Conducted Emission：DQPSK,2480,2DH5 ,Band Edge |
| |  |
| Conducted Emission：8DPSK,2402,3DH5 ,Band Edge | Conducted Emission：8DPSK,2480,3DH5 ,Band Edge |
| |  |

## Dwell Time
## Test Result and Data

| BT Dwell Time | | | | | | |
|---|---|---|---|---|---|---|
| Mode | Test Frequency | Packet Type | Transmission Time(ms) | Number | Dwell Time(ms) | Result |
| GFSK | 2402 | DH5 | 2.89 | 87 | 251.61 | Pass |
| GFSK | 2441 | DH5 | 2.89 | 87 | 251.61 | Pass |
| GFSK | 2480 | DH5 | 2.89 | 91 | 263.18 | Pass |
| pi/4DQPSK | 2402 | 2DH5 | 2.88 | 86 | 247.43 | Pass |
| pi/4DQPSK | 2441 | 2DH5 | 2.88 | 88 | 253.19 | Pass |
| pi/4DQPSK | 2480 | 2DH5 | 2.88 | 87 | 250.31 | Pass |
| 8DPSK | 2402 | 3DH5 | 2.88 | 90 | 258.94 | Pass |
| 8DPSK | 2441 | 3DH5 | 2.89 | 90 | 260.29 | Pass |
| 8DPSK | 2480 | 3DH5 | 2.89 | 79 | 228.48 | Pass |

| GFSK,2402,DH5,Transmission Number | GFSK,2402,DH5,Transmission Time |
|---|---|
|  |  |
| GFSK,2441,DH5,Transmission Number | GFSK,2441,DH5,Transmission Time |
|  |  |
| GFSK,2480,DH5,Transmission Number | GFSK,2480,DH5,Transmission Time |
| |  |

| DQPSK,2402,2DH5,Transmission Number | DQPSK,2402,2DH5,Transmission Time |
|---|---|
|  |  |
| DQPSK,2441,2DH5,Transmission Number | DQPSK,2441,2DH5,Transmission Time |
| |  |
| DQPSK,2480,2DH5,Transmission Number | DQPSK,2480,2DH5,Transmission Time |
|  |  |

| 8DPSK,2402,3DH5,Transmission Number | 8DPSK,2402,3DH5,Transmission Time |
|---|---|
|  |  |
| **8DPSK,2441,3DH5,Transmission Number** | **8DPSK,2441,3DH5,Transmission Time** |
|  |  |
| **8DPSK,2480,3DH5,Transmission Number** | **8DPSK,2480,3DH5,Transmission Time** |
|  |  |

## CarrierFrequencySeparation
### Test Result and Data

| BT Carrier Frequency Separation | | | | | | |
|---|---|---|---|---|---|---|
| Mode | Test Frequency | Packet Type | Range (MHz~MHz) | Separation (KHz) | (Limit) (KHz) | Result |
| GFSK | Hopping | DH5 | 2401.5MHz~2403.5MHz | 1132.87 | ⩾628.89 | Pass |
| GFSK | Hopping | DH5 | 2440.5MHz~2442.5MHz | 993.01 | ⩾629.27 | Pass |
| GFSK | Hopping | DH5 | 2478.5MHz~2480.5MHz | 945.05 | ⩾629.27 | Pass |
| pi/4DQPSK | Hopping | 2DH5 | 2401.5MHz~2403.5MHz | 1142.86 | ⩾858.94 | Pass |
| pi/4DQPSK | Hopping | 2DH5 | 2440.5MHz~2442.5MHz | 1134.87 | ⩾859.18 | Pass |
| pi/4DQPSK | Hopping | 2DH5 | 2478.5MHz~2480.5MHz | 887.11 | ⩾859.37 | Pass |
| 8DPSK | Hopping | 3DH5 | 2401.5MHz~2403.5MHz | 993.01 | ⩾862.56 | Pass |
| 8DPSK | Hopping | 3DH5 | 2440.5MHz~2442.5MHz | 973.03 | ⩾861.91 | Pass |
| 8DPSK | Hopping | 3DH5 | 2478.5MHz~2480.5MHz | 1142.86 | ⩾861.63 | Pass |

Note：The limit is 2/3 of 20dB bandwidth

GFSK,HoppingDH5,2401.5~2403.5

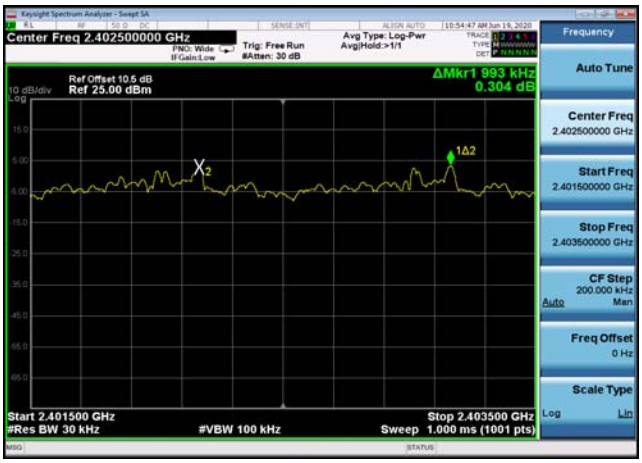
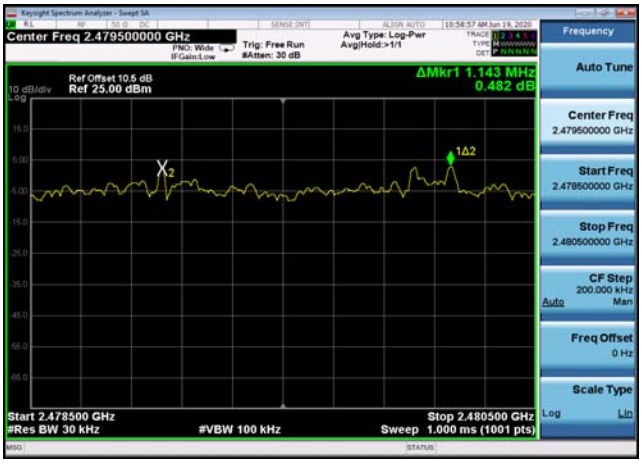
GFSK,HoppingDH5,2440.5~2442.5

GFSK,HoppingDH5,2478.5~2480.5

DQPSK,Hopping2DH5,2401.5~2403.5

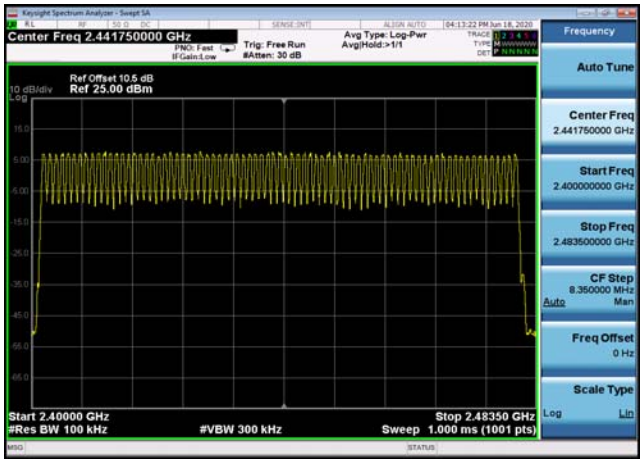
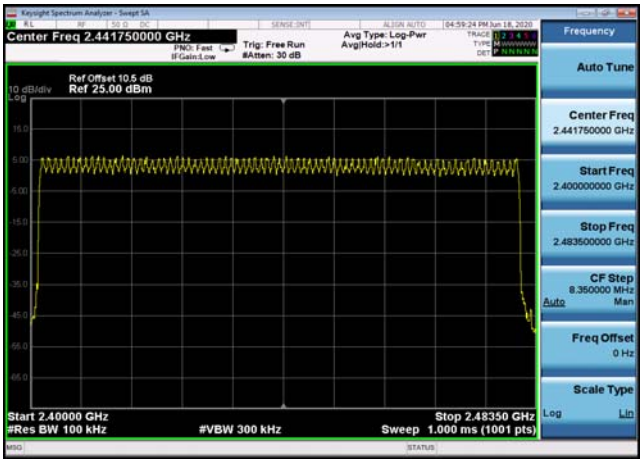
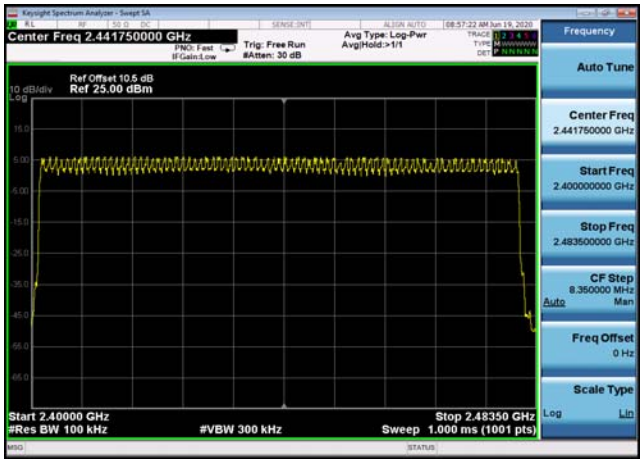
DQPSK,Hopping2DH5,2440.5~2442.5

DQPSK,Hopping2DH5,2478.5~2480.5

| 8DPSK,Hopping3DH5,2401.5~2403.5 | 8DPSK,Hopping3DH5,2440.5~2442.5 |
|---|---|
|  | |
| 8DPSK,Hopping3DH5,2478.5~2480.5 | |
|  | |

# Hopping Channel Numbers
## Test Result and Data

| | BT Number Of Hopping Channels | | | | |
|---|---|---|---|---|---|
| Mode | Test Frequency | Packet Type | Test Range(MHz~MHz) | Limit | Result |
| GFSK | Hopping | DH5 | 2400~2483.5 | ⩾15 | Pass |
| pi/4DQPSK | Hopping | 2DH5 | 2400~2483.5 | ⩾15 | Pass |
| 8DPSK | Hopping | 3DH5 | 2400~2483.5 | ⩾15 | Pass |

| Number Of Hopping Channels：GFSK ,HoppingMhz,DH5__2400~2483.5 | Number Of Hopping Channels：DQPSK ,HoppingMhz,2DH5__2400~2483.5 |
|---|---|
|   |   |
| Number Of Hopping Channels：8DPSK ,HoppingMhz,3DH5__2400~2483.5 | |
|   | |

** END OF REPORT **