# FCC Test Report

Report No.: AGC12060220301FE02

| | | |
|---|---|---|
| **FCC ID** | : | 2AY4C-GM03 |
| **APPLICATION PURPOSE** | : | Original Equipment |
| **PRODUCT DESIGNATION** | : | Mini PC |
| **BRAND NAME** | : | GEEKOM |
| **MODEL NAME** | : | GM11i7T, GMXXXXX(X=0-9 or A-Z or a-z） |
| **APPLICANT** | : | Shenzhen Jiteng Network Technology Co., Ltd |
| **DATE OF ISSUE** | : | Apr. 07, 2022 |
| **STANDARD(S)** | : | FCC Part 15.247 |
| **REPORT VERSION** | : | V1.0 |

***A**ttestation of **G**lobal **C**ompliance (Shenzhen) Co., Ltd*

## REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Apr. 07, 2022 | Valid | Initial Release |

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## 1. VERIFICATION OF COMPLIANCE

| | |
|---|---|
| **Applicant** | Shenzhen Jiteng Network Technology Co., Ltd |
| **Address** | No.1202, Bitian Pavilion, Bizhong Garden, No.10 Bibo First Street, Bibo Community Huangbei Street, Luohu District, Shenzhen City, China |
| **Manufacturer** | Shenzhen Jiteng Network Technology Co., Ltd |
| **Address** | No.1202, Bitian Pavilion, Bizhong Garden, No.10 Bibo First Street, Bibo Community Huangbei Street, Luohu District, Shenzhen City, China |
| **Product Designation** | Mini PC |
| **Brand Name** | GEEKOM |
| **Test Model** | GM11i7T |
| **Series Model** | GMXXXXX(X=0-9 or A-Z or a-z） |
| **Declaration of Difference** | Different sales models, different product appearance colors and configurations lead to different model names, which does not affect safety and electromagnetic compatibility |
| **Date of test** | Mar. 10, 2022~Apr. 07, 2022 |
| **Deviation** | No any deviation from the test method |
| **Condition of Test Sample** | Normal |
| **Test Result** | Pass |
| **Report Template** | AGCRT-US-BLE/RF |

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

| | | |
|---|---|---|
| Prepared By | Eder Zhan | |
| | Eder Zhan<br>(Project Engineer) | Apr. 07, 2022 |
| Reviewed By | Calvin Liu | |
| | Calvin Liu<br>(Reviewer) | Apr. 07, 2022 |
| Approved By | Max Zhang | |
| | Max Zhang<br>Authorized Officer | Apr. 07, 2022 |

# 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

The EUT is designed as a “Mini PC”. It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

| | |
|---|---|
| **Operation Frequency** | 2.402 GHz to 2.480GHz |
| **RF Output Power** | Ant 1:-0.585dBm (Max)<br>Ant 2:3.616dBm (Max) |
| **Bluetooth Version** | V5.2 |
| **Modulation** | BR ☐GFSK, EDR ☐π /4-DQPSK, ☐8DPSK<br>BLE ☒GFSK 1Mbps ☐GFSK 2Mbps |
| **Number of channels** | 40 Channel |
| **Antenna Designation** | PIFA Antenna (Comply with requirements of the FCC part 15.203) |
| **Antenna Gain** | 2.5dBi |
| **Hardware Version** | NUCTL01_MB_V20 |
| **Software Version** | 21H2 |
| **Power Supply** | DC 19.0V |

## 2.2. TABLE OF CARRIER FREQUENCYS

| Frequency Band | Channel Number | Frequency |
|---|---|---|
| 2400~2483.5MHz | 0 | 2402 MHz |
| | 1 | 2404 MHz |
| | : | : |
| | 38 | 2478 MHz |
| | 39 | 2480 MHz |

### 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2AY4C-GM03** filing to comply with the FCC Part 15.247 requirements.

### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

## 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

| Item | Measurement Uncertainty |
|---|---|
| Uncertainty of Conducted Emission for AC Port | $U_c$ = ±3.1 dB |
| Uncertainty of Radiated Emission below 1GHz | $U_c$ = ±4.0 dB |
| Uncertainty of Radiated Emission above 1GHz | $U_c$ = ±4.8 dB |
| Uncertainty of total RF power, conducted | $U_c$ = ±0.8 dB |
| Uncertainty of RF power density, conducted | $U_c$ = ±2.6 dB |
| Uncertainty of spurious emissions, conducted | $U_c$ = ±2 % |
| Uncertainty of Occupied Channel Bandwidth | $U_c$ = ±2 % |

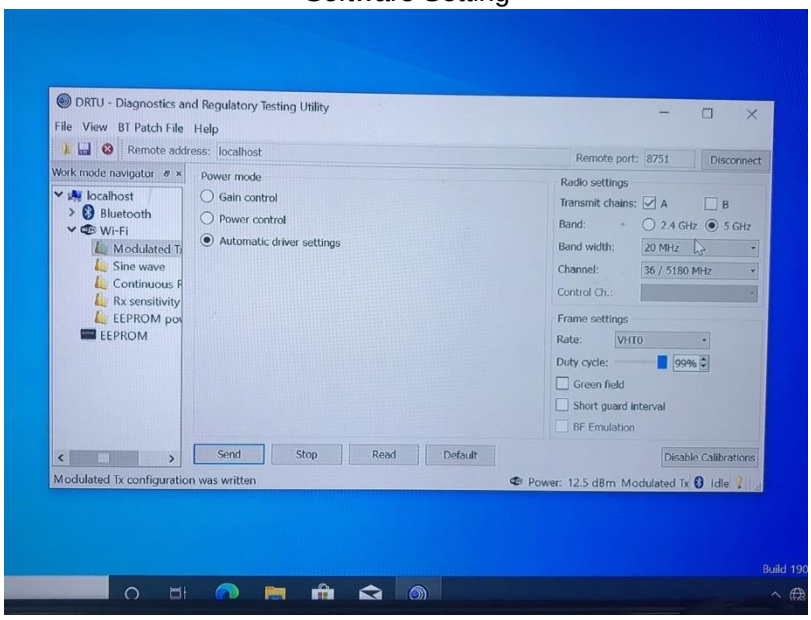
## 4. DESCRIPTION OF TEST MODES

| NO. | TEST MODE DESCRIPTION |
|---|---|
| 1 | Low channel TX |
| 2 | Middle channel TX |
| 3 | High channel TX |

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

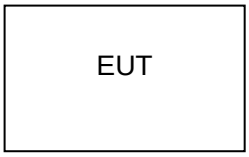
Software Setting



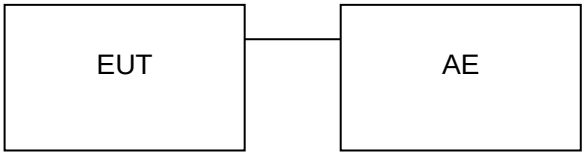
# 5. SYSTEM TEST CONFIGURATION

## 5.1. CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:




Conducted Emission Configure:




## 5.2. EQUIPMENT USED IN TESTED SYSTEM

| Item | Equipment | Model No. | ID or Specification | Remark |
|---|---|---|---|---|
| 1 | Mini PC | GM11i7T | 2AY4C-GM03 | EUT |
| 2 | Adapter | HKA09019047-6U | Input: AC 100-240V 50/60Hz, 1.5A<br>Output: DC 19V 4.74A | AE |
| 3 | Adapter | A1001-1904740DI | Input: AC 100-240V 50/60Hz, 2.5A<br>Output: DC 19V 4.74A | AE |

## 5.3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|---|---|---|
| 15.247 (b)(3) | Peak Output Power | Compliant |
| 15.247 (a)(2) | 6 dB Bandwidth | Compliant |
| 15.247 (d) | Conducted Spurious Emission | Compliant |
| 15.247 (e) | Maximum Conducted Output Power Density | Compliant |
| 15.209 | Radiated Emission | Compliant |
| 15.207 | Conducted Emission | Compliant |

## 6. TEST FACILITY

| | |
|---|---|
| **Test Site** | Attestation of Global Compliance (Shenzhen) Co., Ltd |
| **Location** | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| **Designation Number** | CN1259 |
| **FCC Test Firm Registration Number** | 975832 |
| **A2LA Cert. No.** | 5054.02 |
| **Description** | Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA |

**TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| TEST RECEIVER | R&S | ESPI | 101206 | May 11, 2021 | May 10, 2022 |
| LISN | R&S | ESH2-Z5 | 100086 | Jun. 09, 2021 | Jun. 08, 2022 |
| Test software | R&S | ES-K1(Ver.V1.71) | N/A | N/A | N/A |

**TEST EQUIPMENT OF RADIATED EMISSION TEST**

| Equipment | Manufacturer | Model | S/N | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| TEST RECEIVER | R&S | ESCI | 10096 | Apr. 14, 2021 | Apr. 13, 2022 |
| EXA Signal Analyzer | Aglient | N9010A | MY53470504 | Nov. 17, 2021 | Nov. 16, 2022 |
| 2.4GHz Filter | EM Electronics | 2400-2500MHz | N/A | N/A | N/A |
| Attenuator | ZHINAN | E-002 | N/A | Sep. 03, 2020 | Sep. 02, 2022 |
| Horn antenna | SCHWARZBECK | BBHA 9170 | #768 | Oct. 31, 2021 | Oct. 30, 2023 |
| Active loop antenna (9K-30MHz) | ZHINAN | ZN30900C | 18051 | May 22, 2020 | May 21, 2022 |
| Double-Ridged Waveguide Horn | ETS LINDGREN | 3117 | 00034609 | Apr. 23, 2021 | Apr. 22, 2023 |
| Broadband Preamplifier | ETS LINDGREN | 3117PA | 00225134 | Sep. 03, 2020 | Sep. 02, 2022 |
| ANTENNA | SCHWARZBECK | VULB9168 | 494 | Jan. 08, 2021 | Jan. 07, 2023 |
| Test software | Tonscend | JS32-RE (Ver.2.5) | N/A | N/A | N/A |

# 7. PEAK OUTPUT POWER

## 7.1. MEASUREMENT PROCEDURE

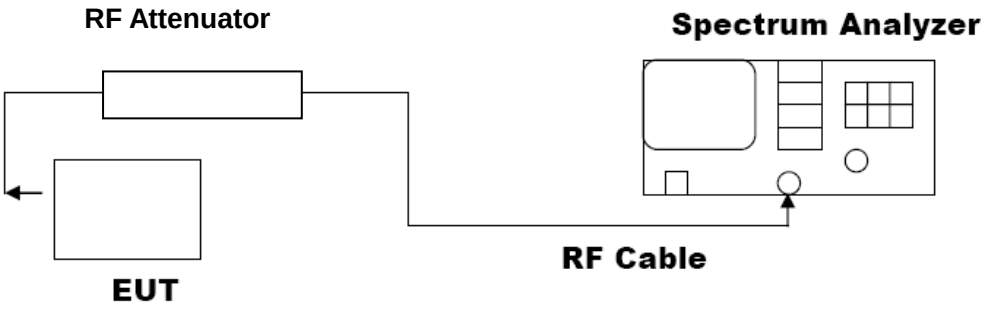
For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. RBW≥DTS bandwidth
3. VBW≥3*RBW.
4. SPAN≥VBW.
5. Sweep: Auto.
6. Detector function: Peak.
7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

## 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

**PEAK POWER TEST SETUP**

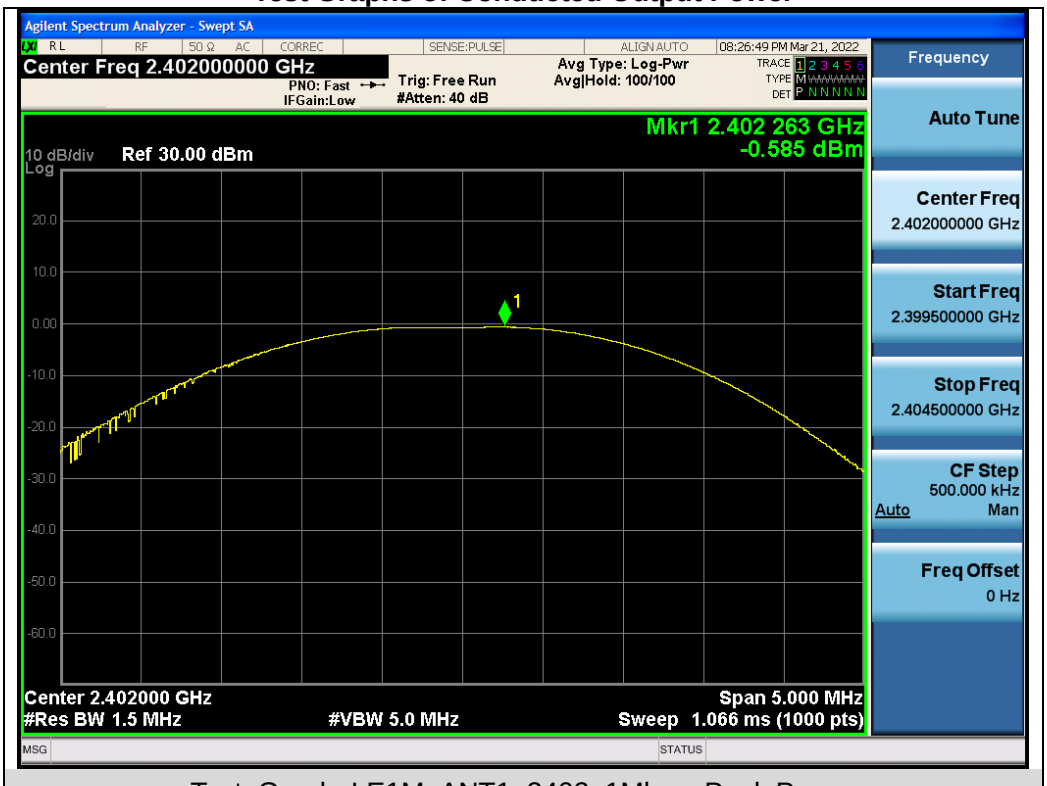


### 7.3. LIMITS AND MEASUREMENT RESULT

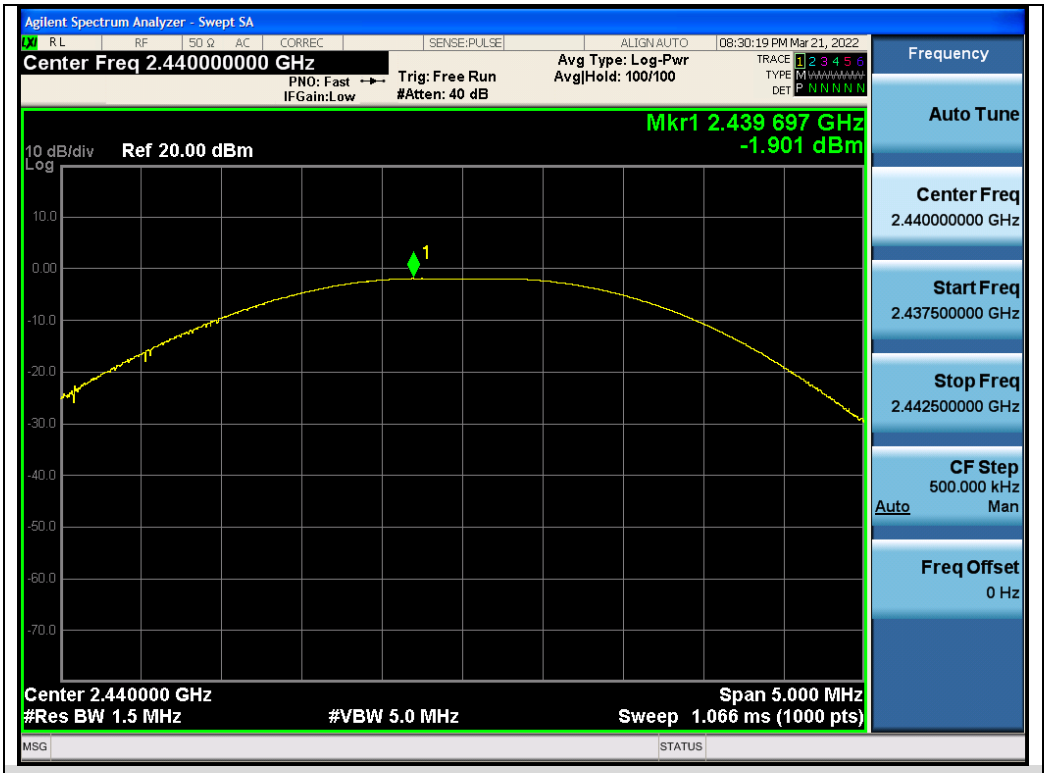
| Test Data of Conducted Output Power-Ant 1 | | | | |
|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| GFSK 1M | 2402 | -0.585 | ≤30 | Pass |
| | 2440 | -1.901 | ≤30 | Pass |
| | 2480 | -2.579 | ≤30 | Pass |

| Test Data of Conducted Output Power-Ant 2 | | | | |
|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | Peak Power (dBm) | Limits (dBm) | Pass or Fail |
| GFSK 1M | 2402 | 0.839 | ≤30 | Pass |
| | 2440 | 2.287 | ≤30 | Pass |
| | 2480 | 3.616 | ≤30 | Pass |

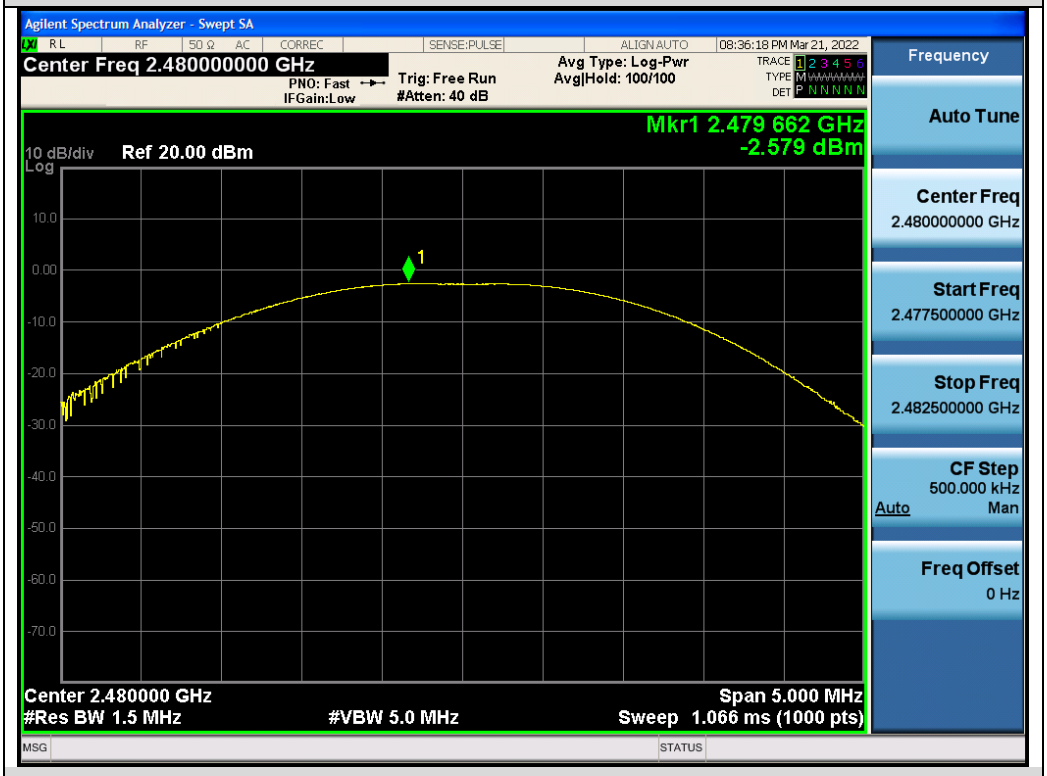
**Test Graphs of Conducted Output Power**




Test_Graph_LE1M_ANT1_2402_1Mbps_Peak Power

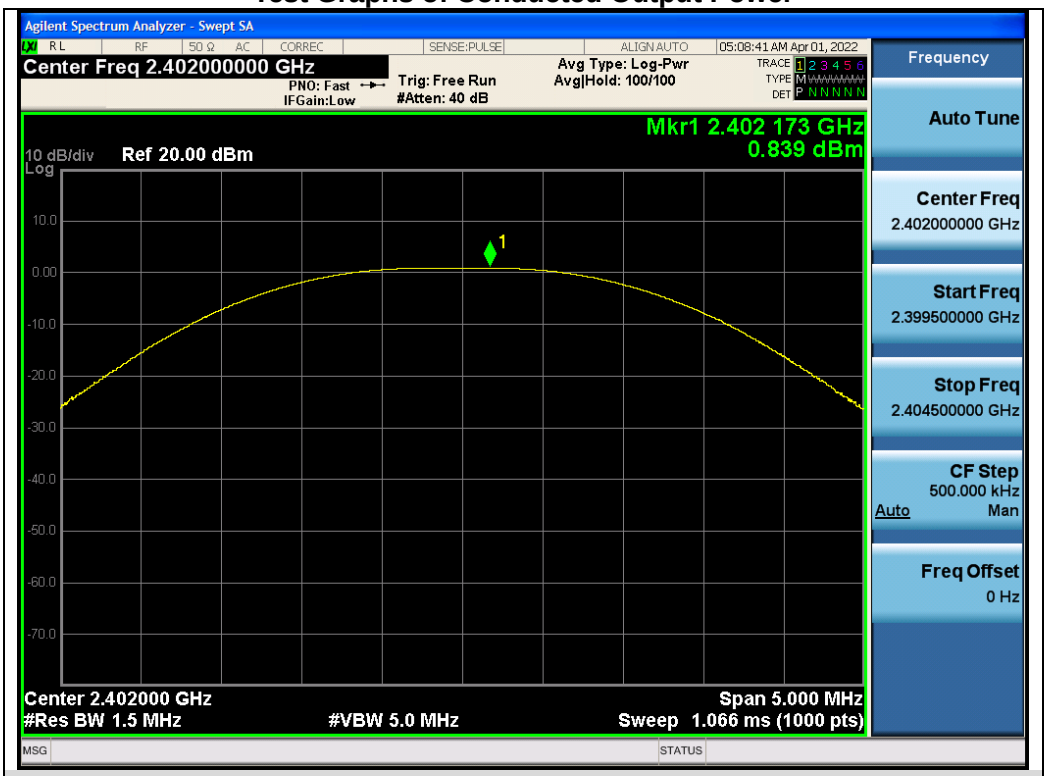



Test_Graph_LE1M_ANT1_2440_1Mbps_Peak Power

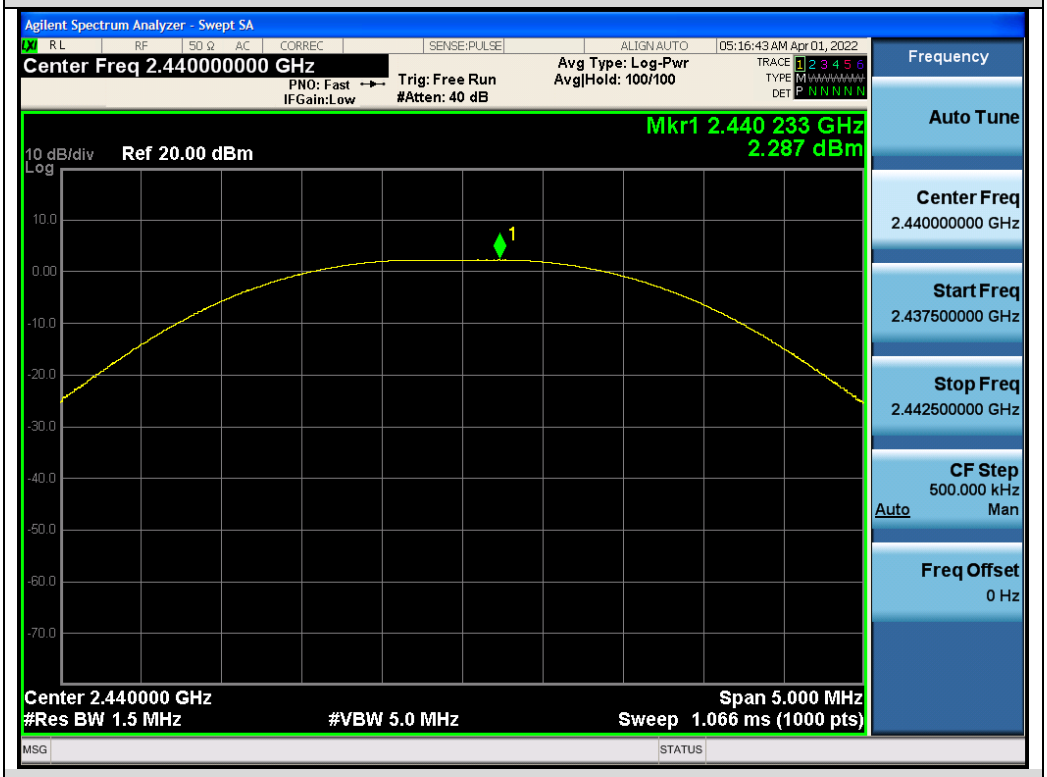



Test_Graph_LE1M_ANT1_2480_1Mbps_Peak Power

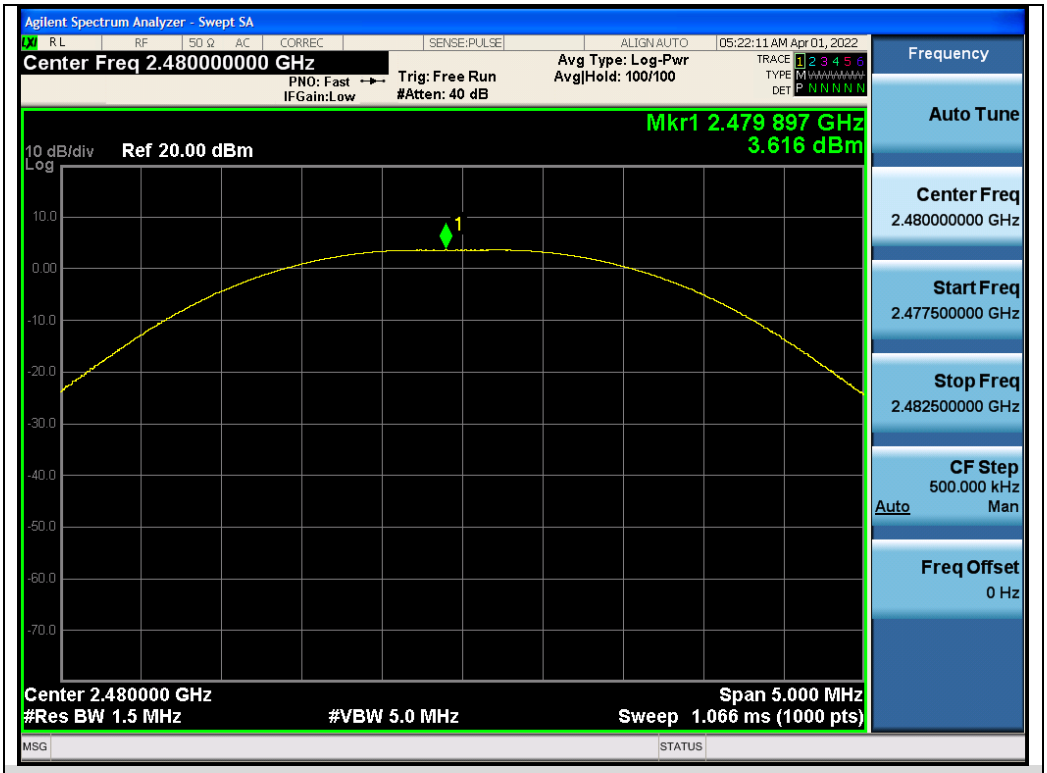
## Test Graphs of Conducted Output Power




Test_Graph_LE1M_ANT2_2402_1Mbps_Peak Power




Test_Graph_LE1M_ANT2_2440_1Mbps_Peak Power




Test_Graph_LE1M_ANT2_2480_1Mbps_Peak Power

# 8. BANDWIDTH

## 8.1. MEASUREMENT PROCEDURE

6dB bandwidth:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW≥3×RBW.
4. Set SPA Trace 1 Max hold, then View.

Occupied bandwidth:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel
   The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

## 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

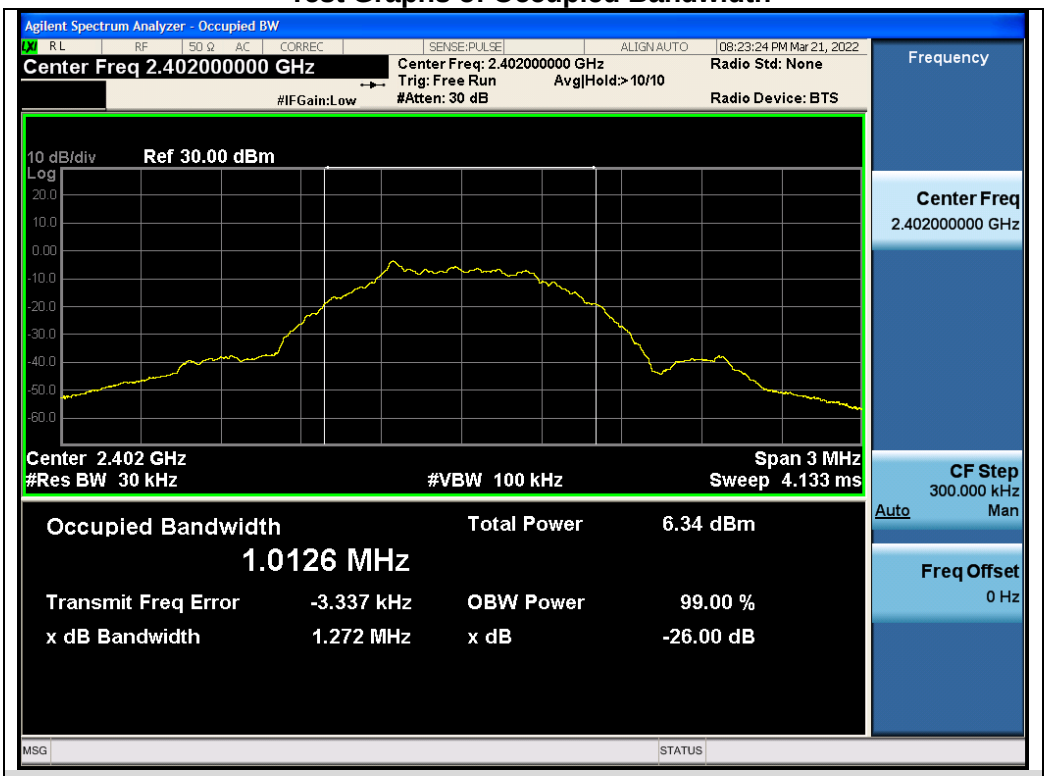
The same as described in section 7.2.

## 8.3. LIMITS AND MEASUREMENT RESULTS

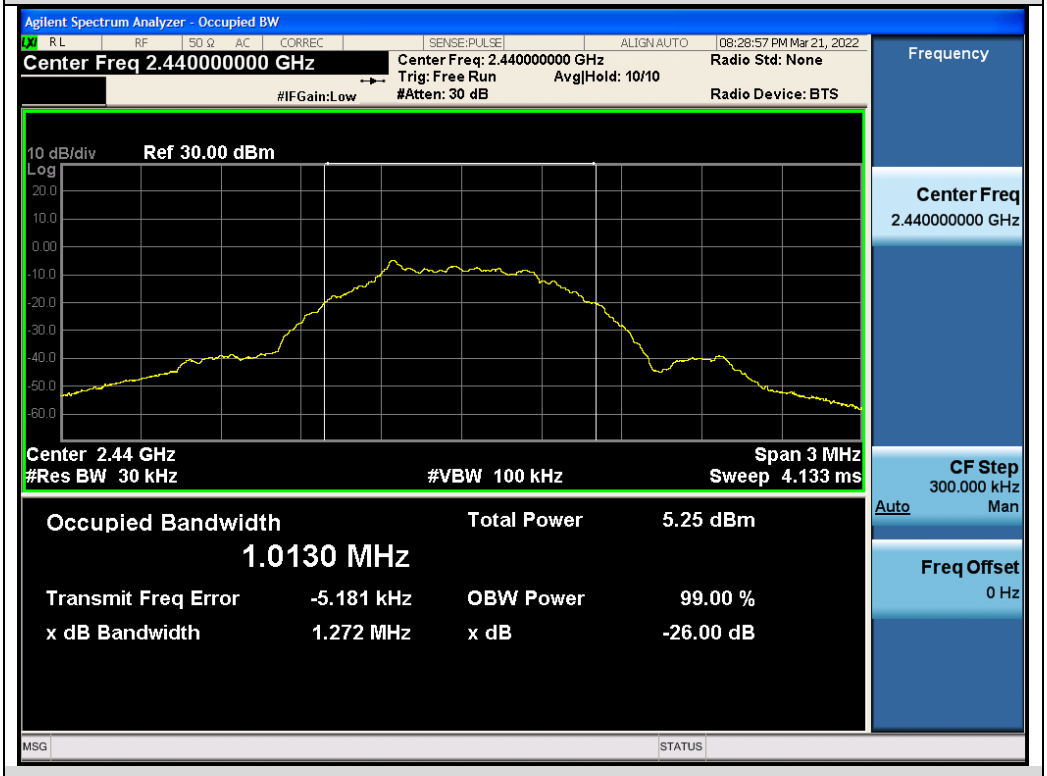
| Test Data of Occupied Bandwidth and DTS Bandwidth-Ant 1 | | | | | |
|---|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | -6dB Bandwidth (MHz) | Limits (MHz) | Pass or Fail |
| GFSK 1M | 2402 | 1.013 | 0.687 | ≥0.5 | Pass |
| | 2440 | 1.013 | 0.684 | ≥0.5 | Pass |
| | 2480 | 1.014 | 0.686 | ≥0.5 | Pass |

| Test Data of Occupied Bandwidth and DTS Bandwidth-Ant 2 | | | | | |
|---|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | -6dB Bandwidth (MHz) | Limits (MHz) | Pass or Fail |
| GFSK 1M | 2402 | 1.047 | 0.677 | ≥0.5 | Pass |
| | 2440 | 1.047 | 0.684 | ≥0.5 | Pass |
| | 2480 | 1.045 | 0.687 | ≥0.5 | Pass |

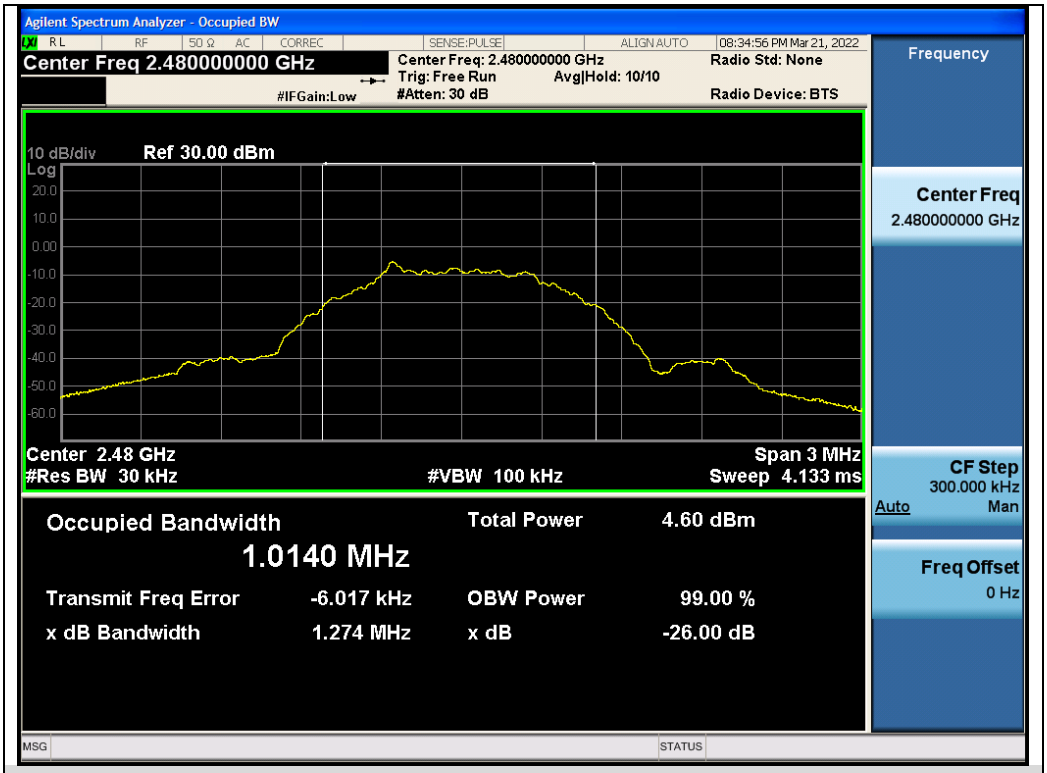
## Test Graphs of Occupied Bandwidth




Test_Graph_LE1M_ANT1_2402_1Mbps_OBW

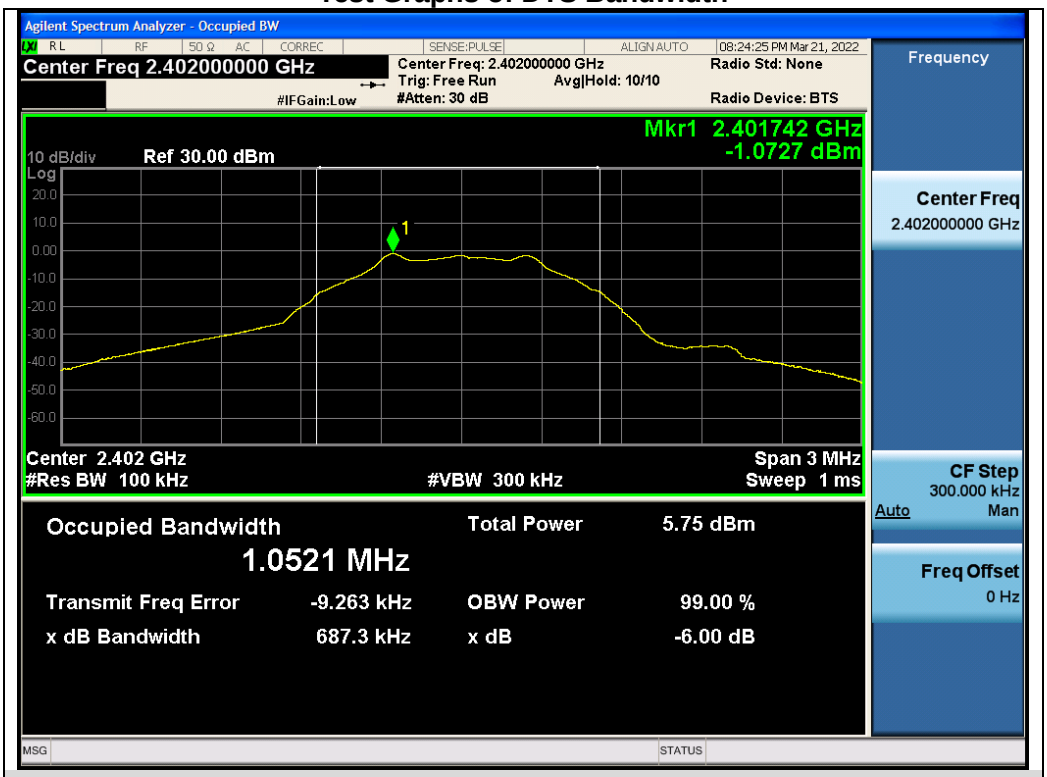



Test_Graph_LE1M_ANT1_2440_1Mbps_OBW

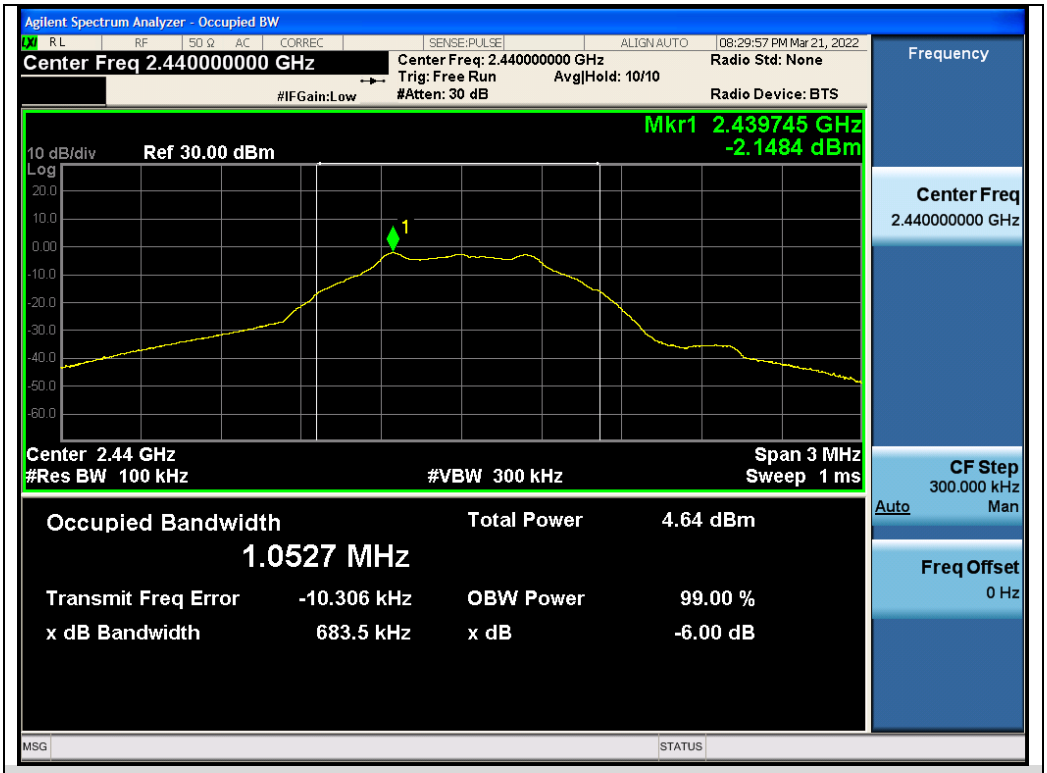



Test_Graph_LE1M_ANT1_2480_1Mbps_OBW

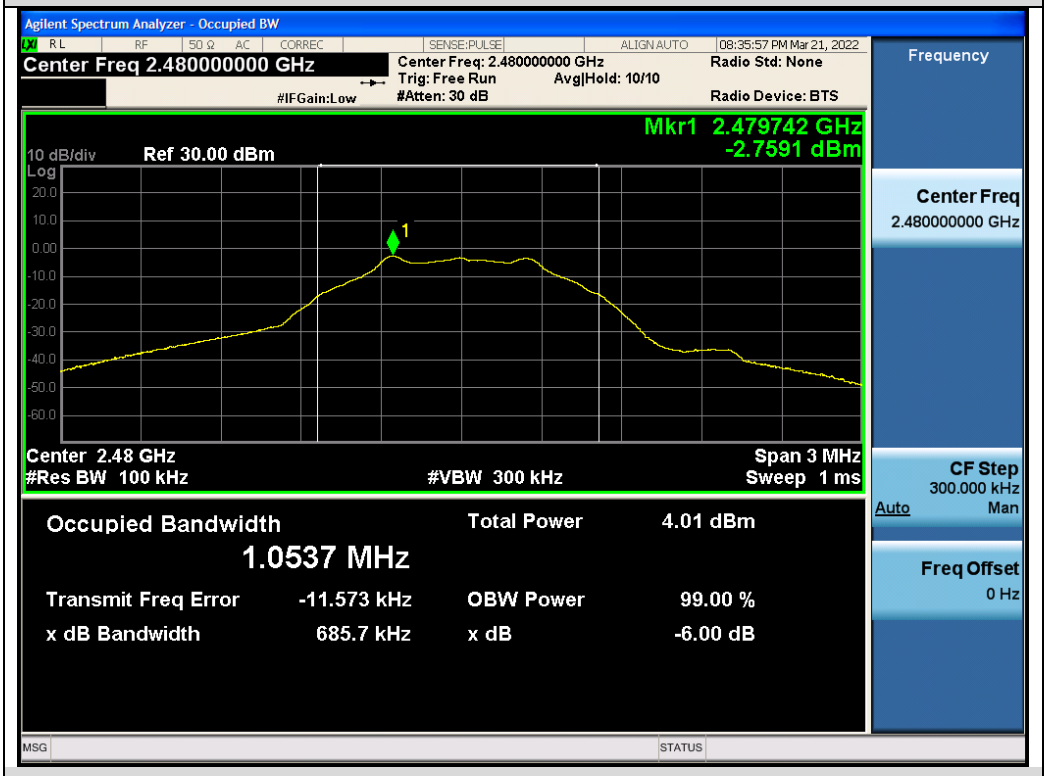
**Test Graphs of DTS Bandwidth**




Test_Graph_LE1M_ANT1_2402_1Mbps_DTSBW

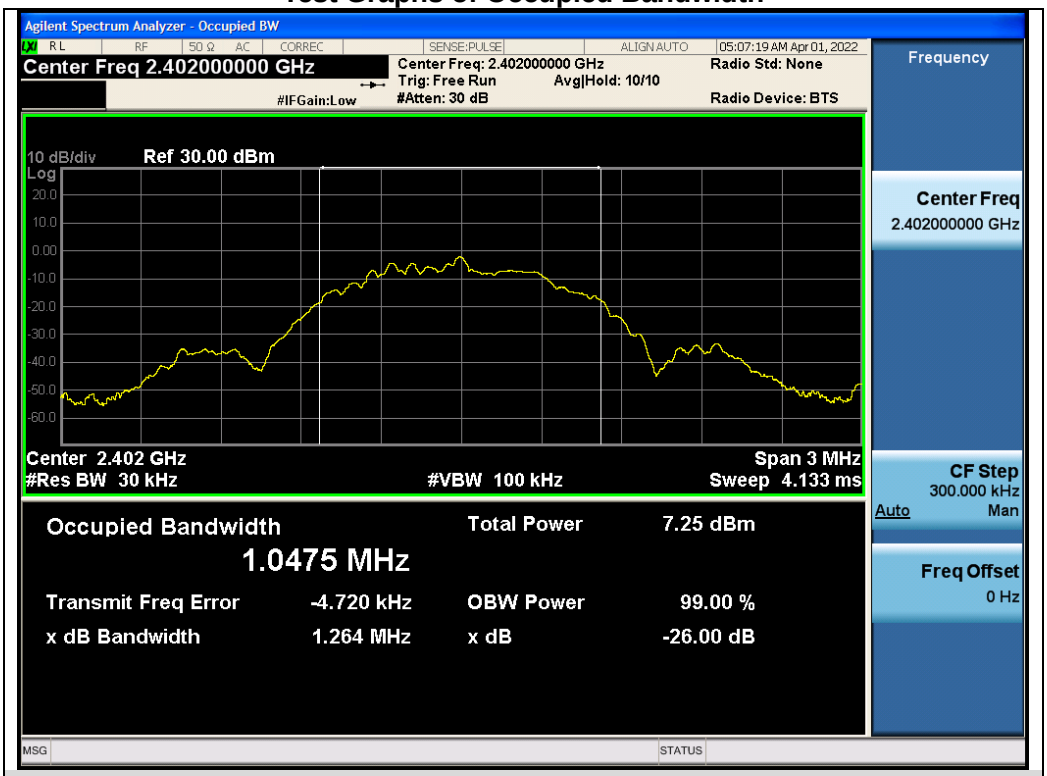



Test_Graph_LE1M_ANT1_2440_1Mbps_DTSBW

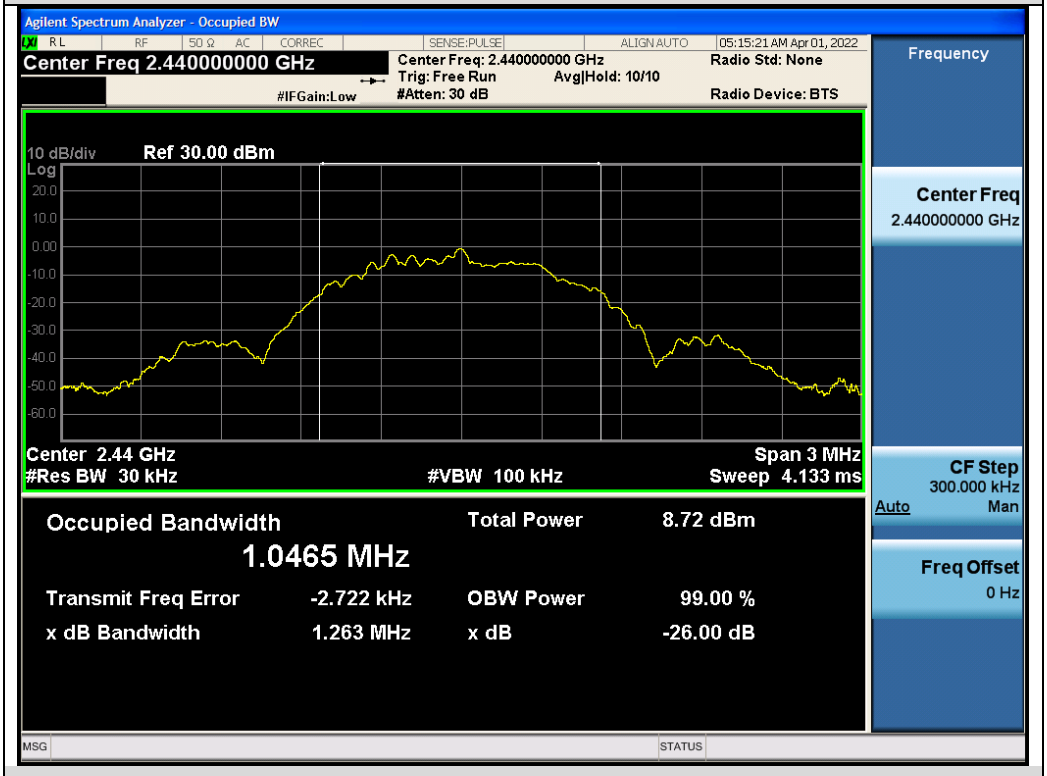



Test_Graph_LE1M_ANT1_2480_1Mbps_DTSBW

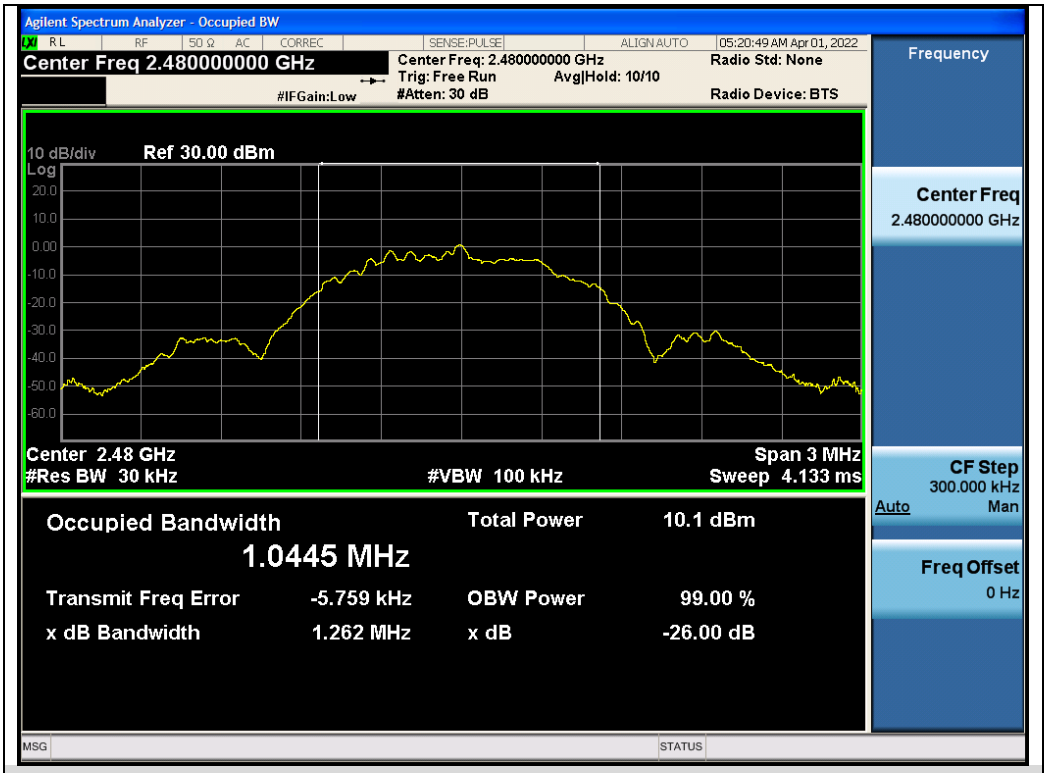
## Test Graphs of Occupied Bandwidth




Test_Graph_LE1M_ANT2_2402_1Mbps_OBW

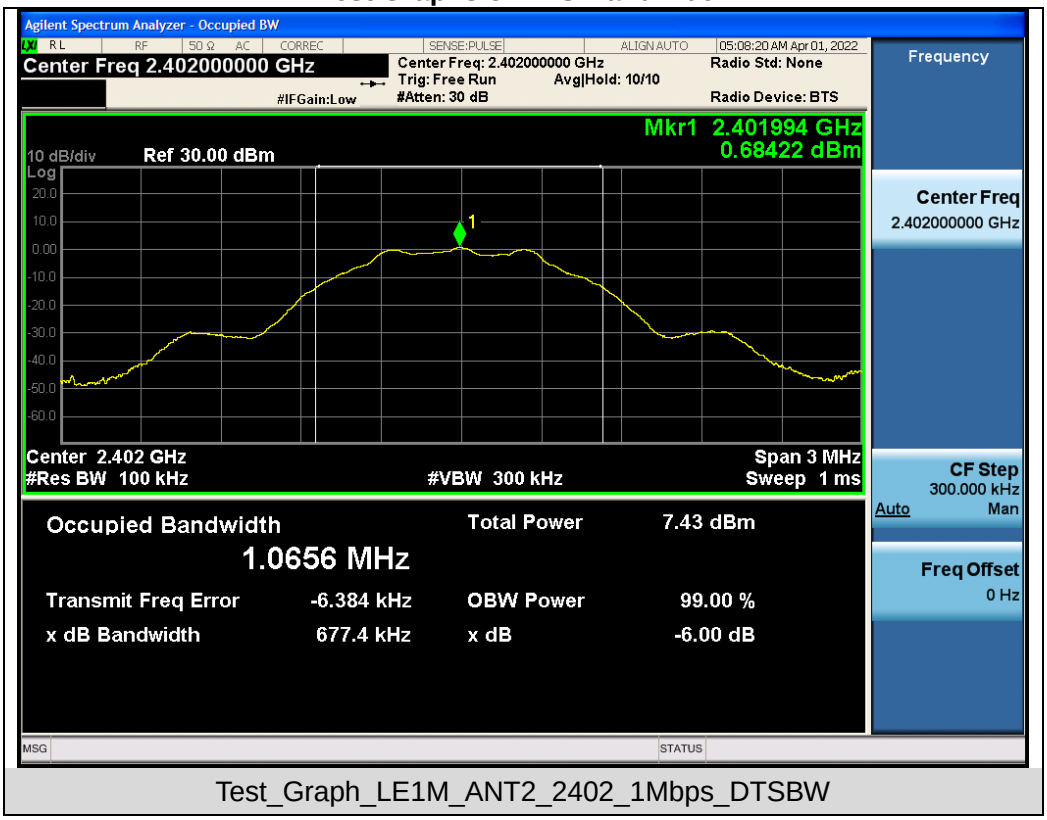



Test_Graph_LE1M_ANT2_2440_1Mbps_OBW

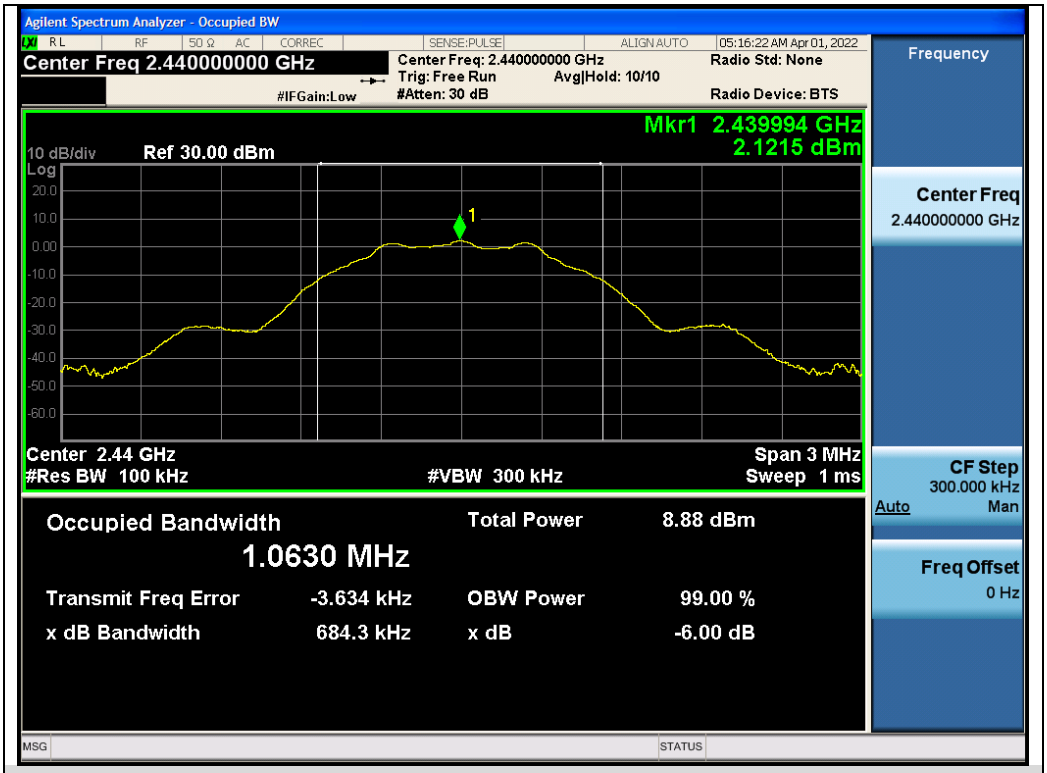



Test_Graph_LE1M_ANT2_2480_1Mbps_OBW

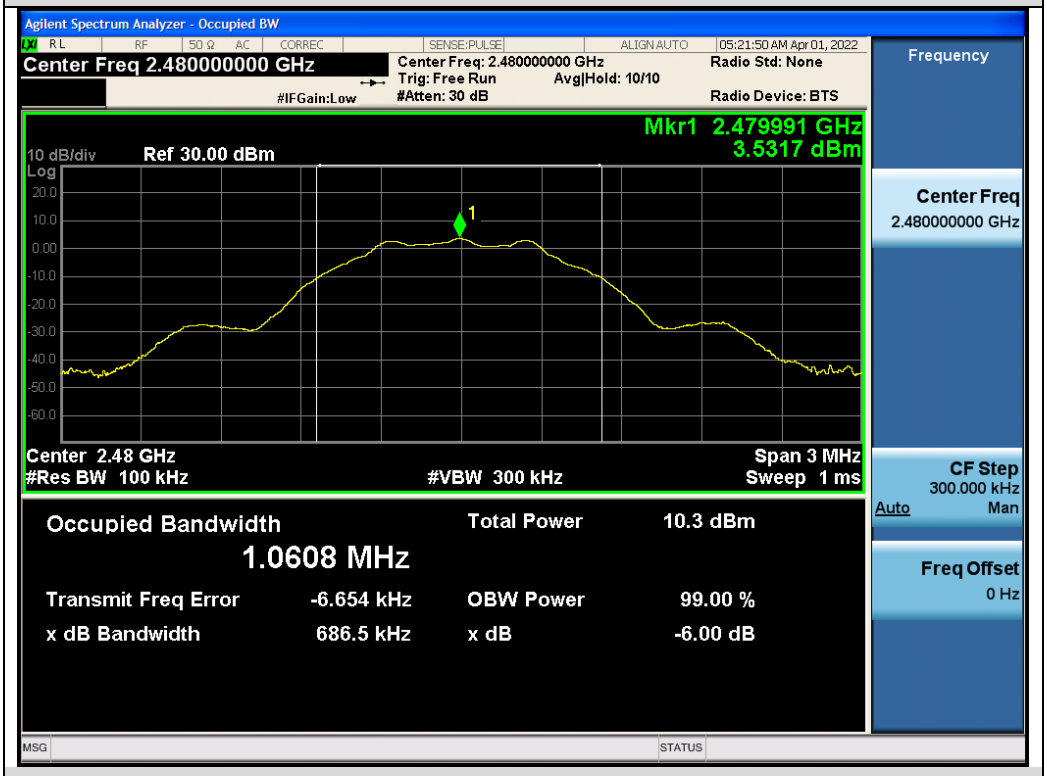
## Test Graphs of DTS Bandwidth




Test_Graph_LE1M_ANT2_2402_1Mbps_DTSBW




Test_Graph_LE1M_ANT2_2440_1Mbps_DTSBW




Test_Graph_LE1M_ANT2_2480_1Mbps_DTSBW

# 9. CONDUCTED SPURIOUS EMISSION

## 9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

## 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

## 9.3. MEASUREMENT EQUIPMENT USED

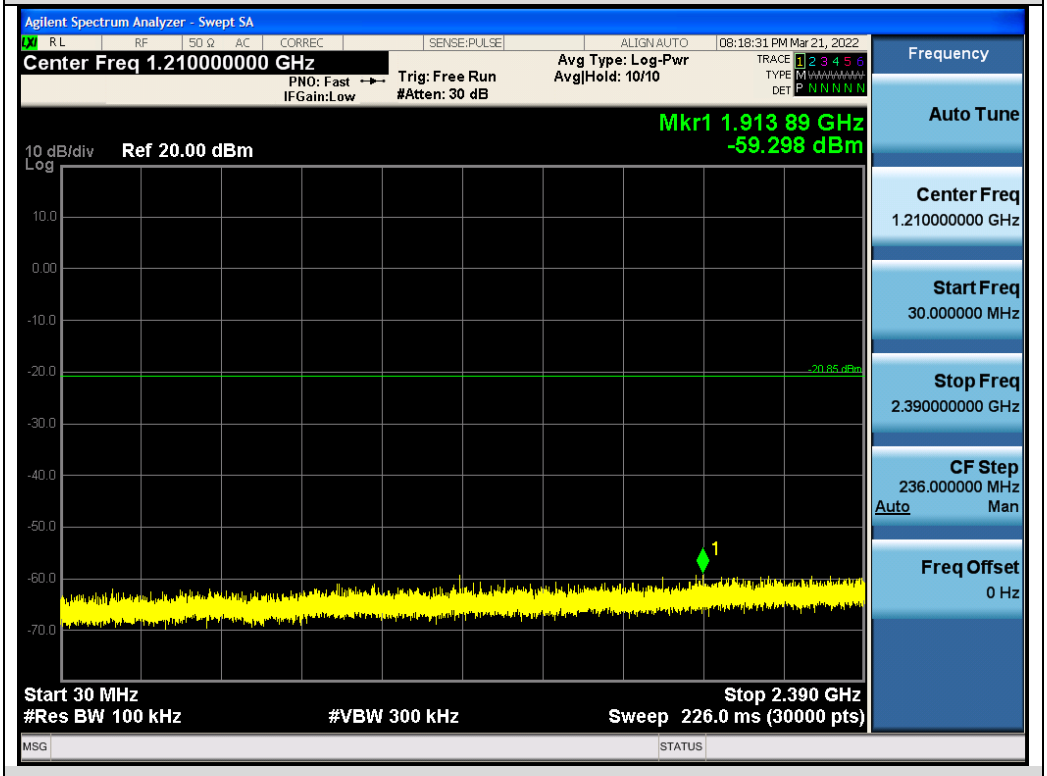
The same as described in section 6.

## 9.4. LIMITS AND MEASUREMENT RESULT

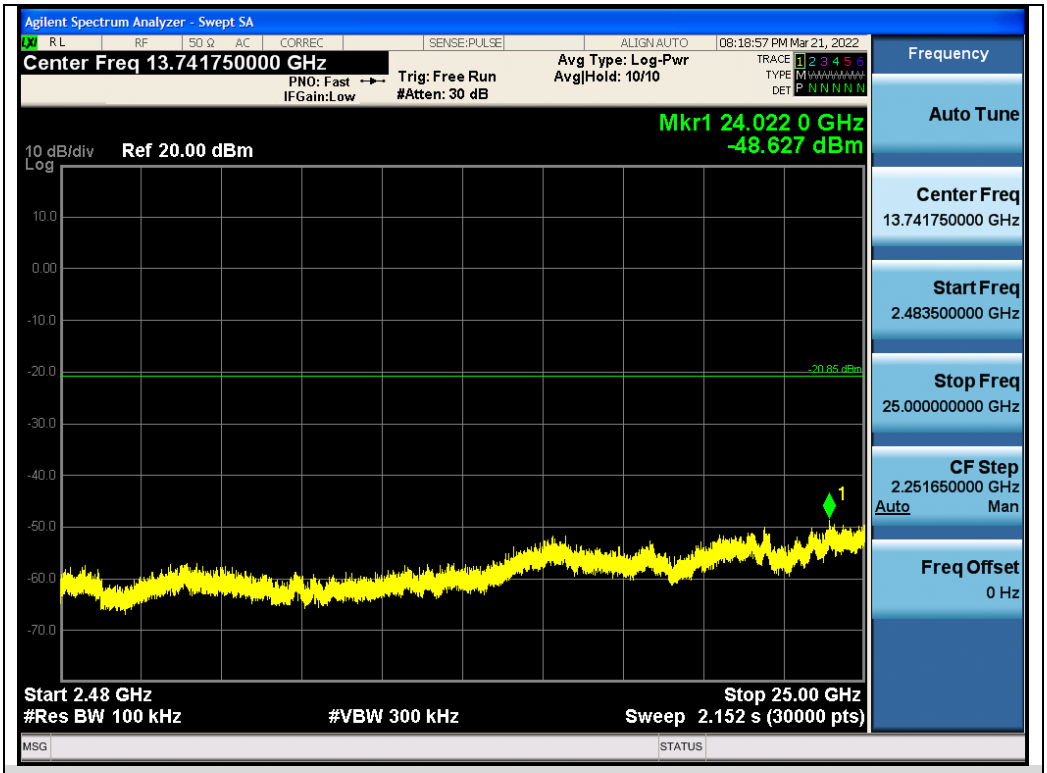
| LIMITS AND MEASUREMENT RESULT | | |
|---|---|---|
| **Applicable Limits** | **Measurement Result** | |
| | **Test Data** | **Criteria** |
| In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. | At least -20dBc than the reference level | PASS |

## Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands


Test_Graph_LE1M_ANT1_2402_1Mbps_Reference Level

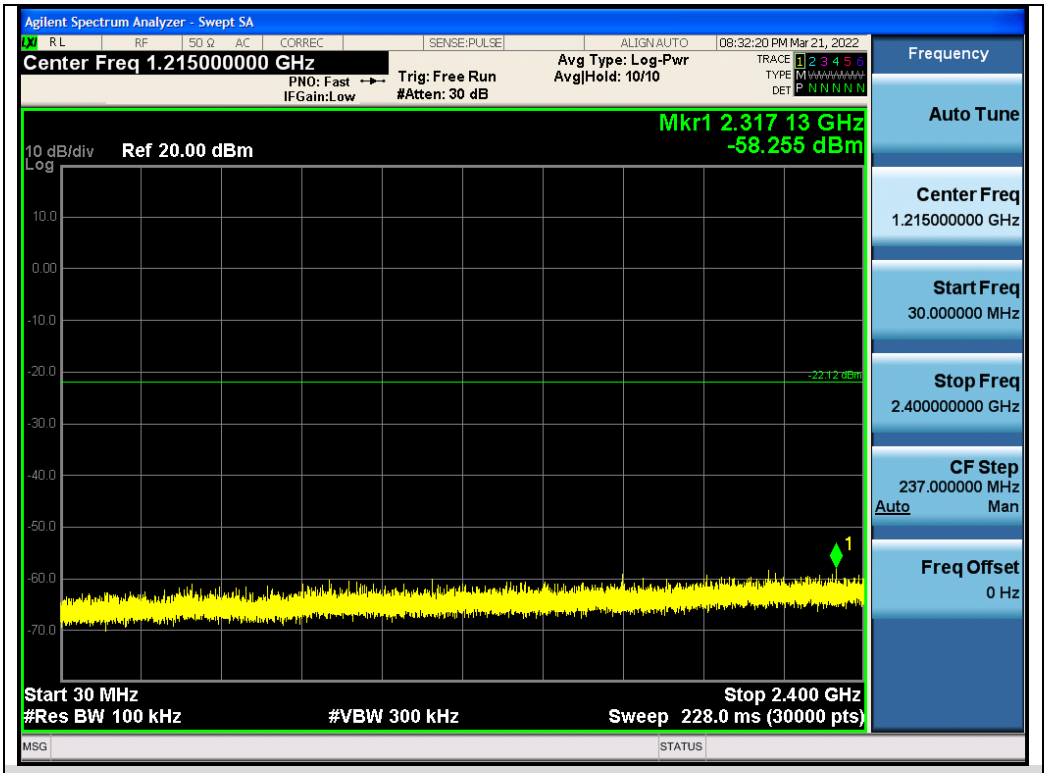



Test_Graph_LE1M_ANT1_2402_1Mbps_Lower Band Emissions

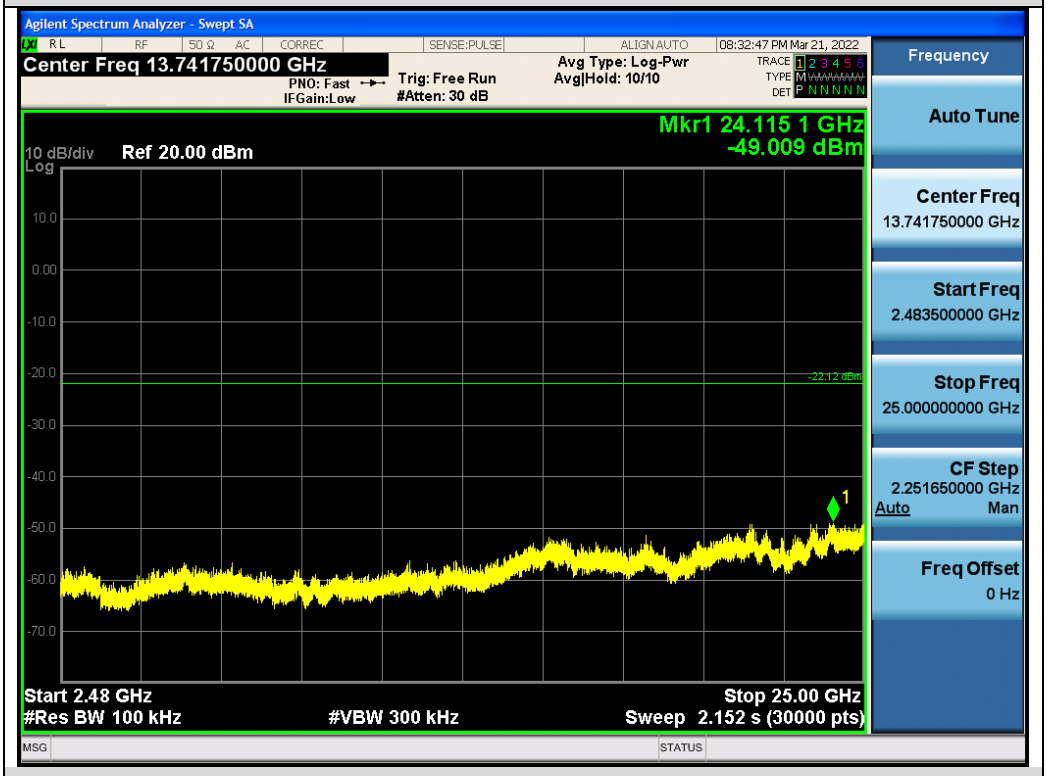



Test_Graph_LE1M_ANT1_2402_1Mbps_Higher Band Emissions


Test_Graph_LE1M_ANT1_2440_1Mbps_Reference Level

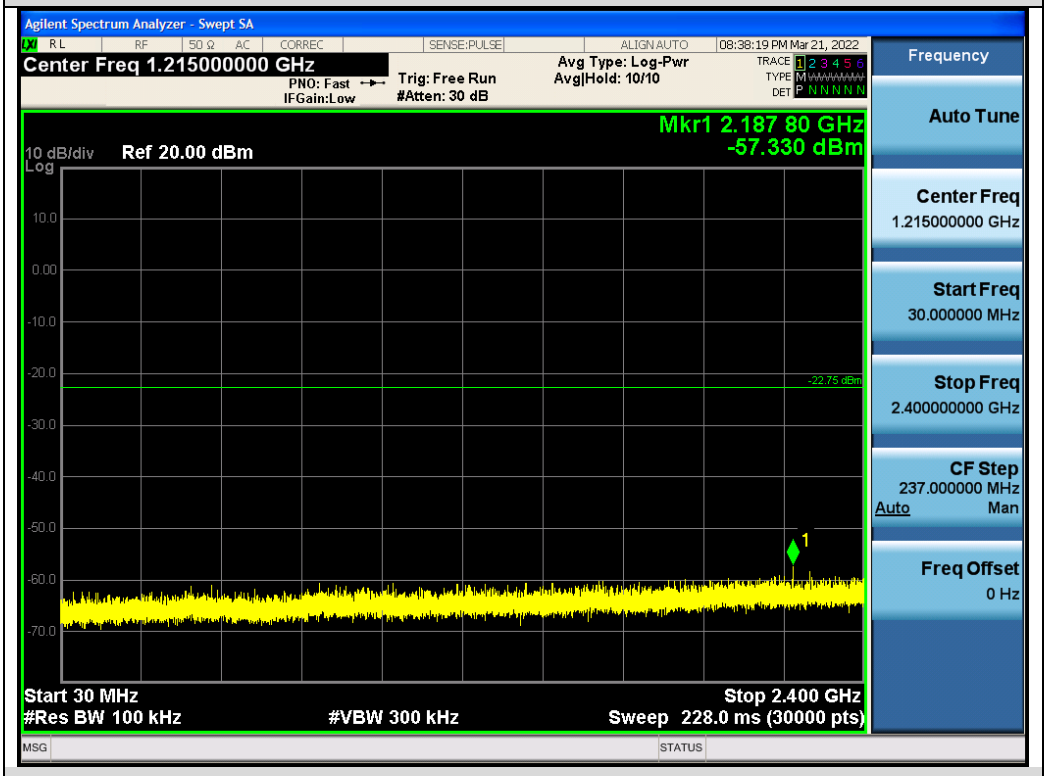



Test_Graph_LE1M_ANT1_2440_1Mbps_Lower Band Emissions




Test_Graph_LE1M_ANT1_2440_1Mbps_Higher Band Emissions

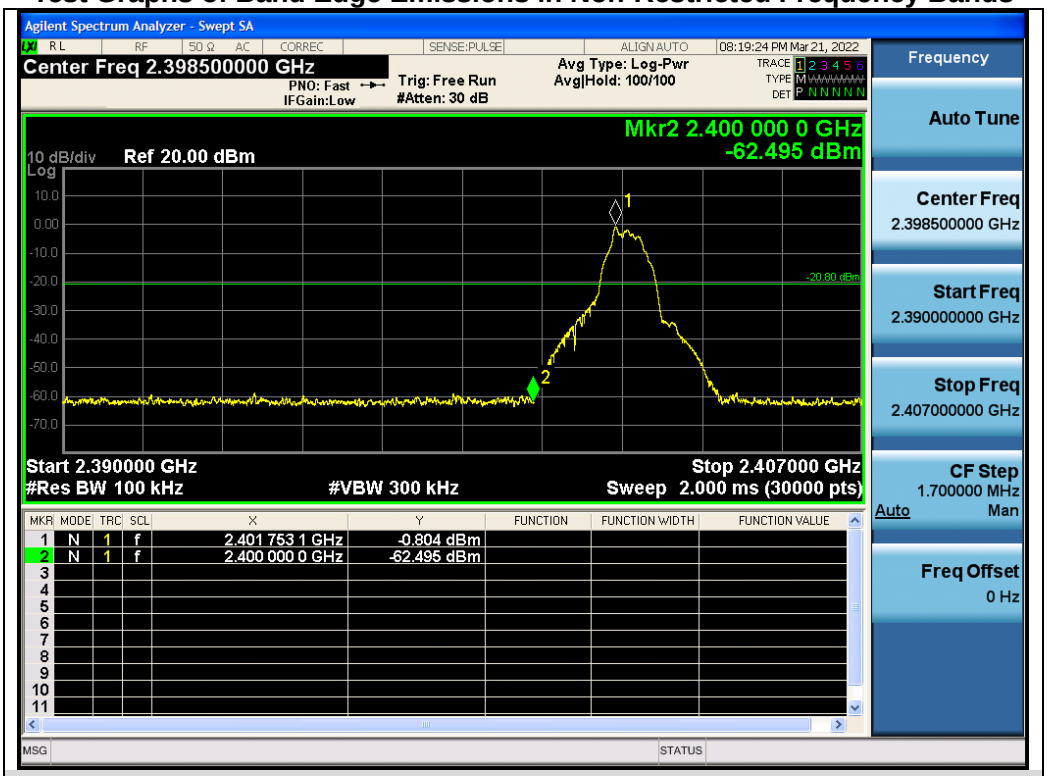

Test_Graph_LE1M_ANT1_2480_1Mbps_Reference Level



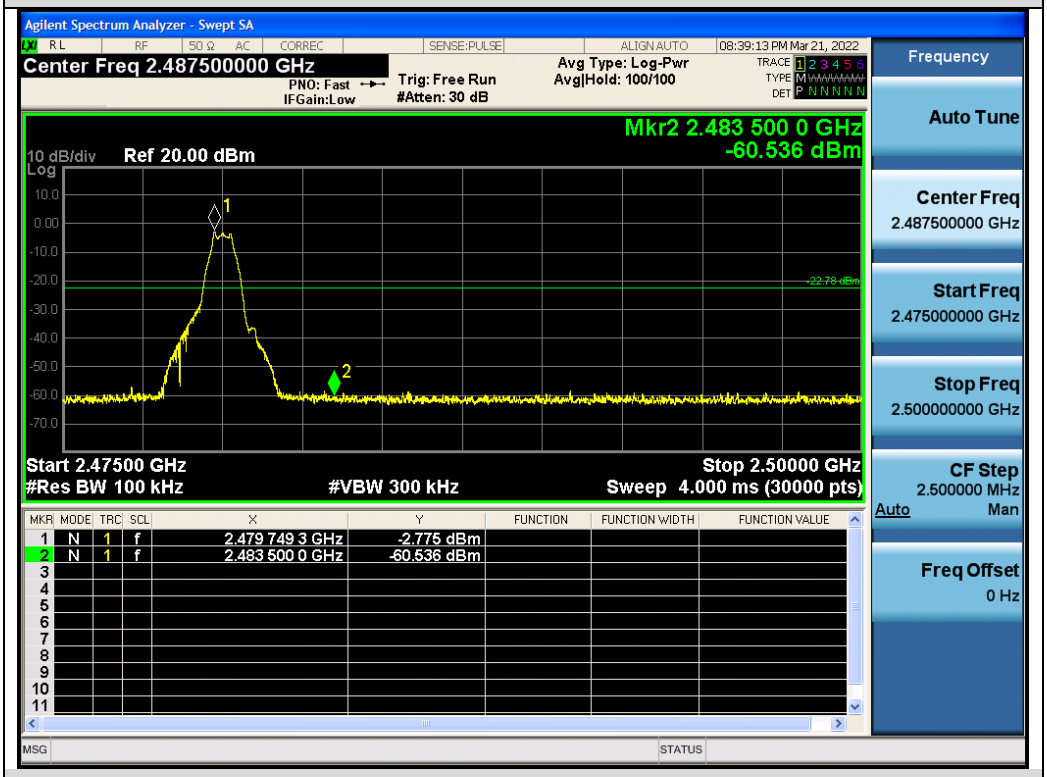

Test_Graph_LE1M_ANT1_2480_1Mbps_Lower Band Emissions


Test_Graph_LE1M_ANT1_2480_1Mbps_Higher Band Emissions

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



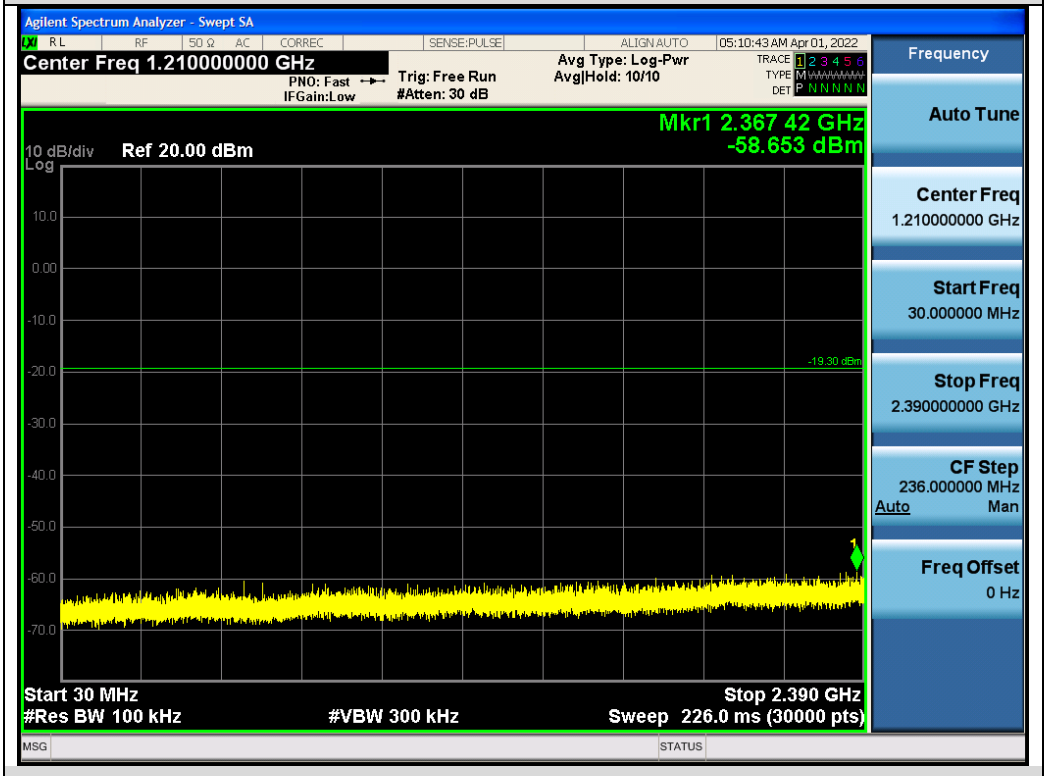

Test_Graph_LE1M_ANT1_2402_1Mbps_Lower Band Edge Emissions



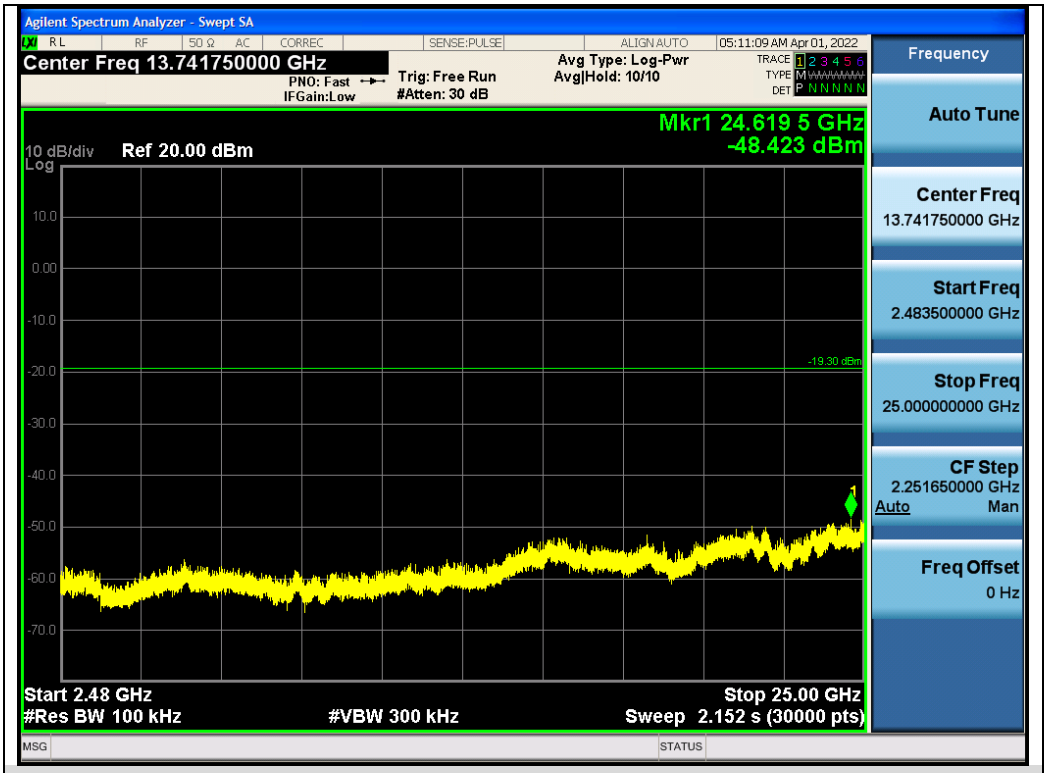

Test_Graph_LE1M_ANT1_2480_1Mbps_Higher Band Edge Emissions

## Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands


Test_Graph_LE1M_ANT2_2402_1Mbps_Reference Level

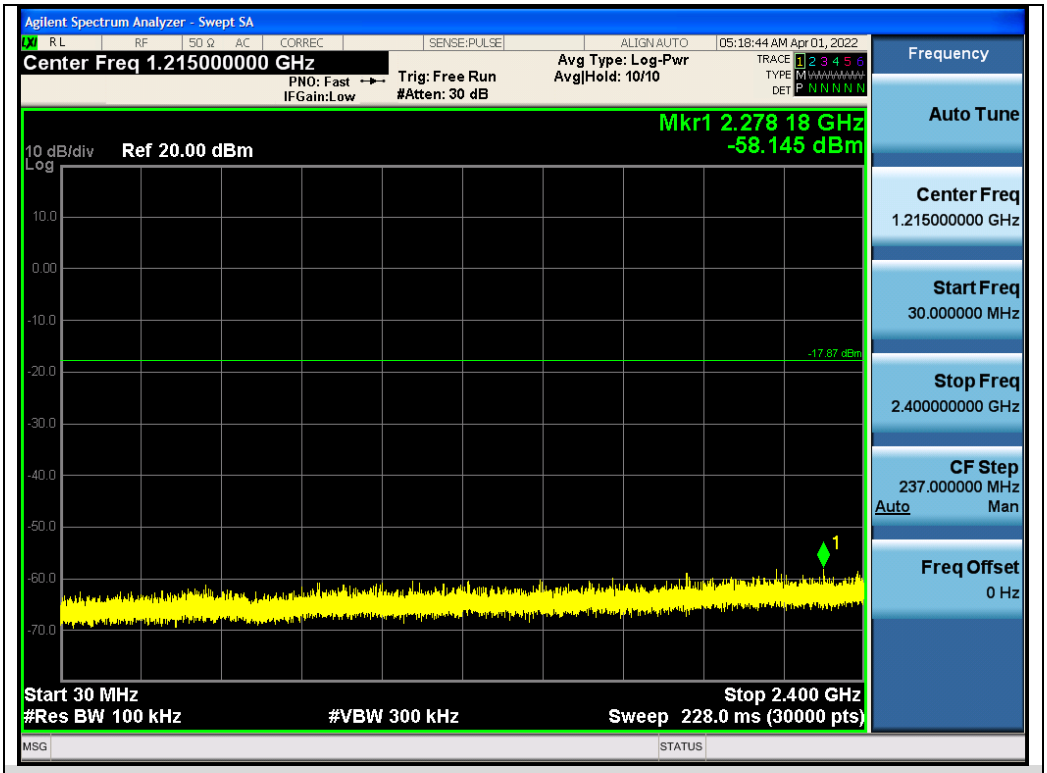



Test_Graph_LE1M_ANT2_2402_1Mbps_Lower Band Emissions

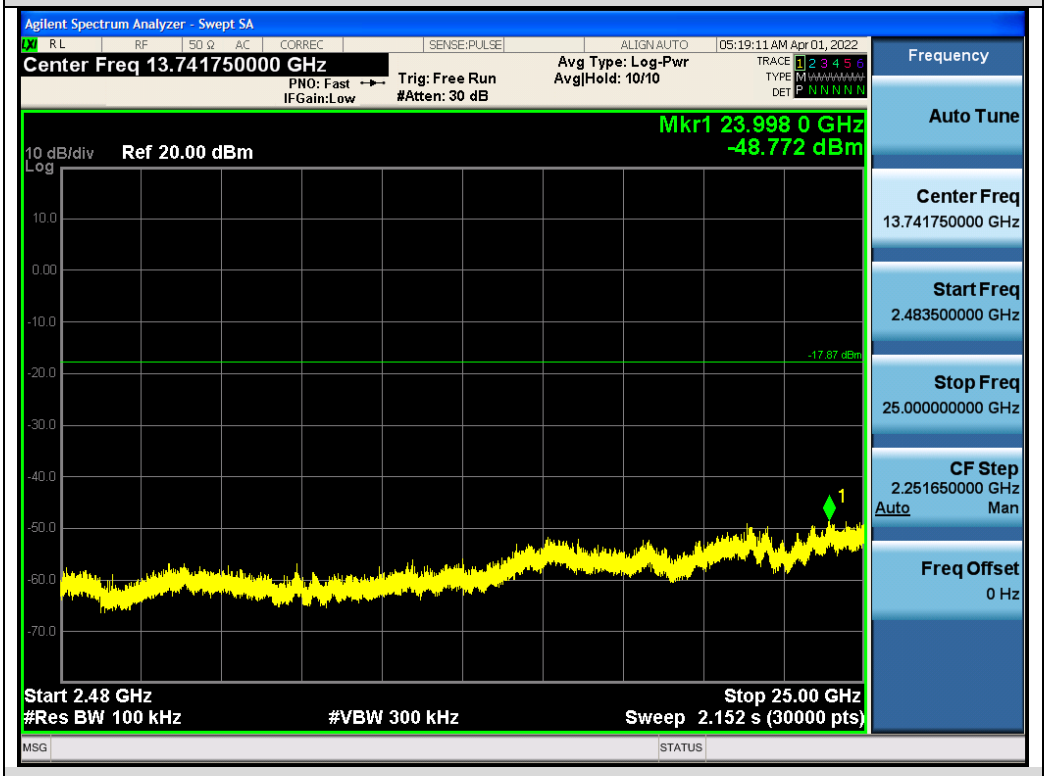



Test_Graph_LE1M_ANT2_2402_1Mbps_Higher Band Emissions


Test_Graph_LE1M_ANT2_2440_1Mbps_Reference Level

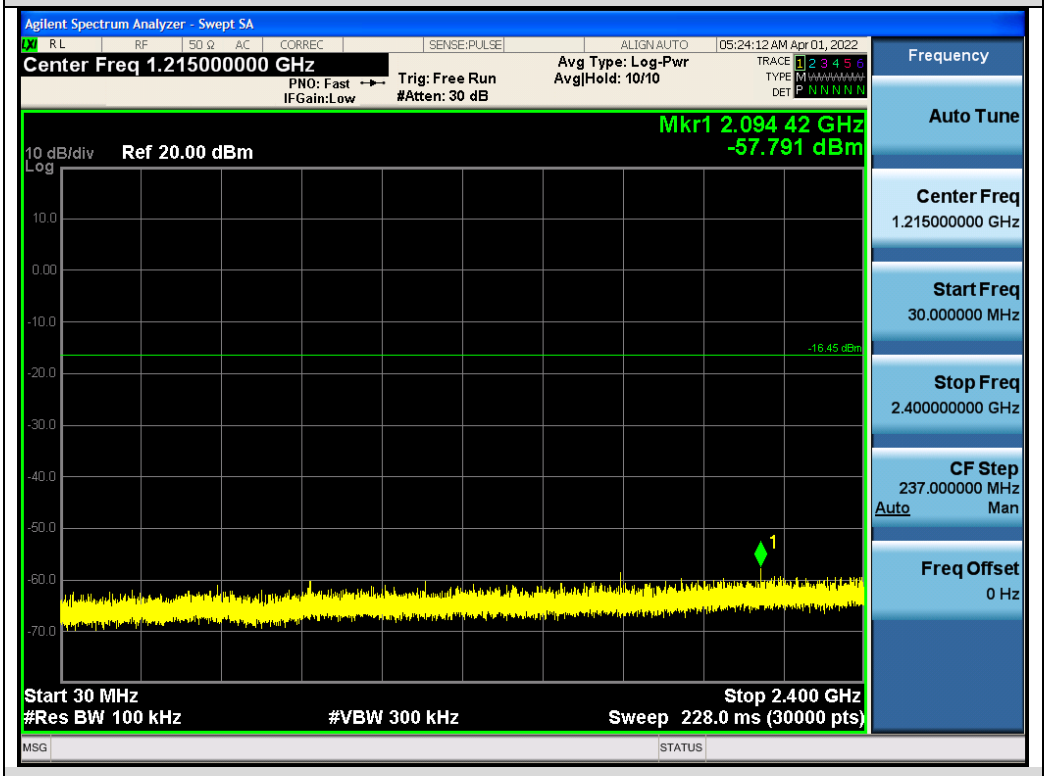



Test_Graph_LE1M_ANT2_2440_1Mbps_Lower Band Emissions

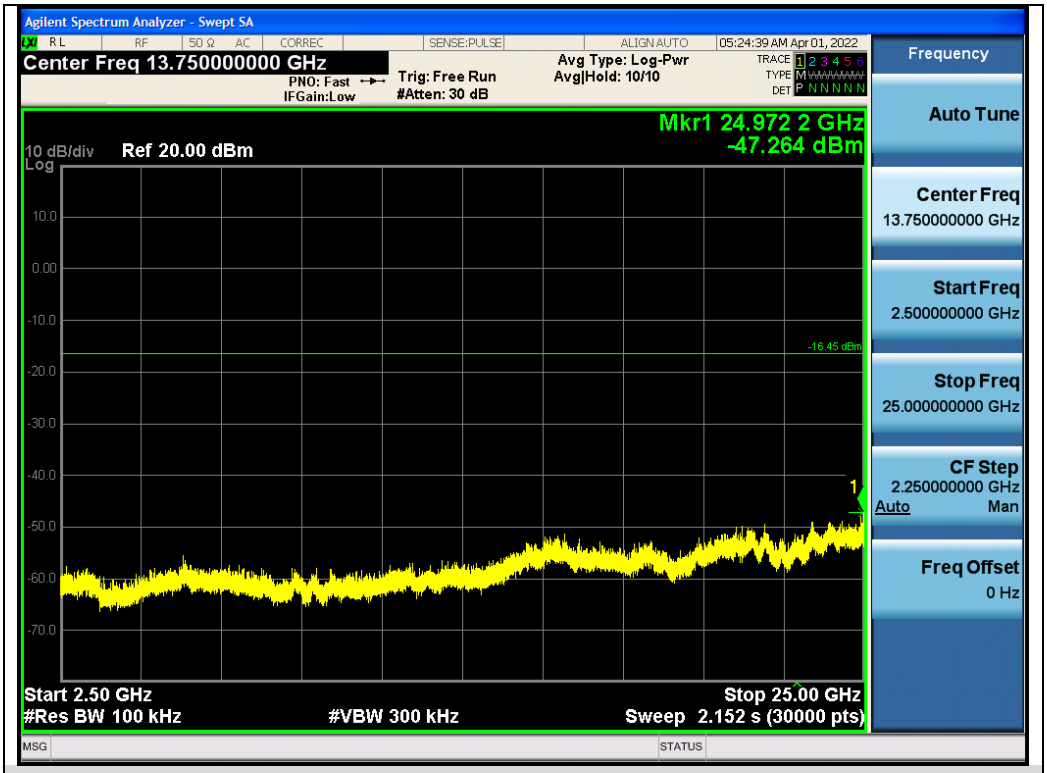



Test_Graph_LE1M_ANT2_2440_1Mbps_Higher Band Emissions


Test_Graph_LE1M_ANT2_2480_1Mbps_Reference Level

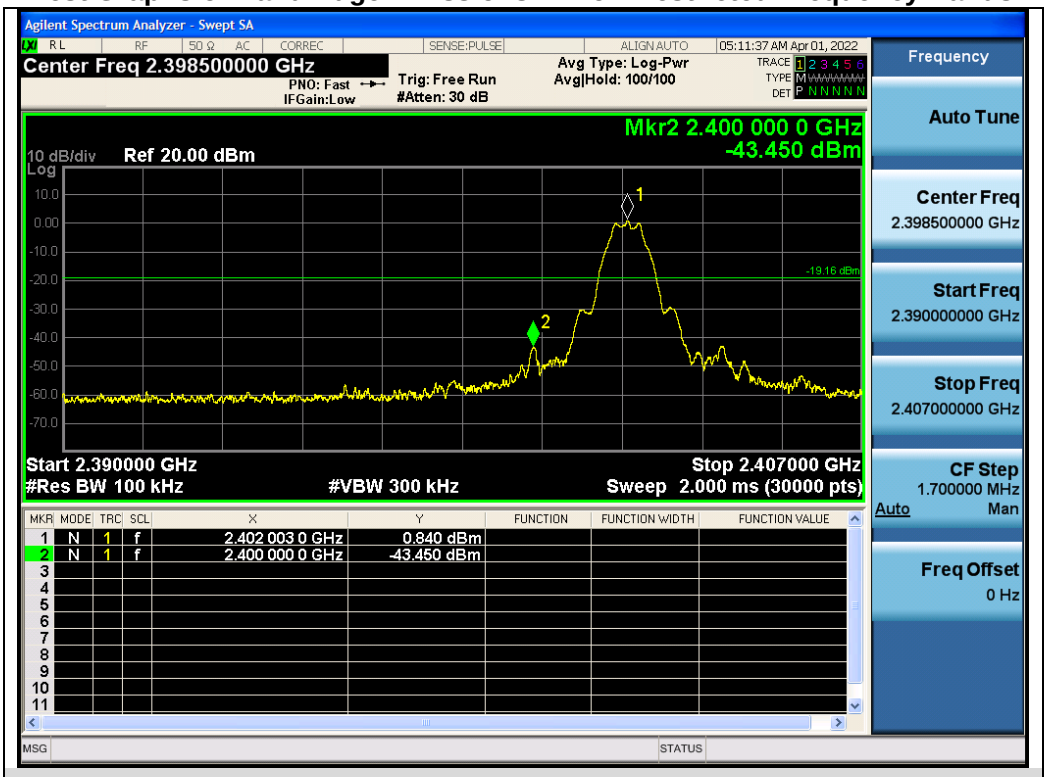



Test_Graph_LE1M_ANT2_2480_1Mbps_Lower Band Emissions

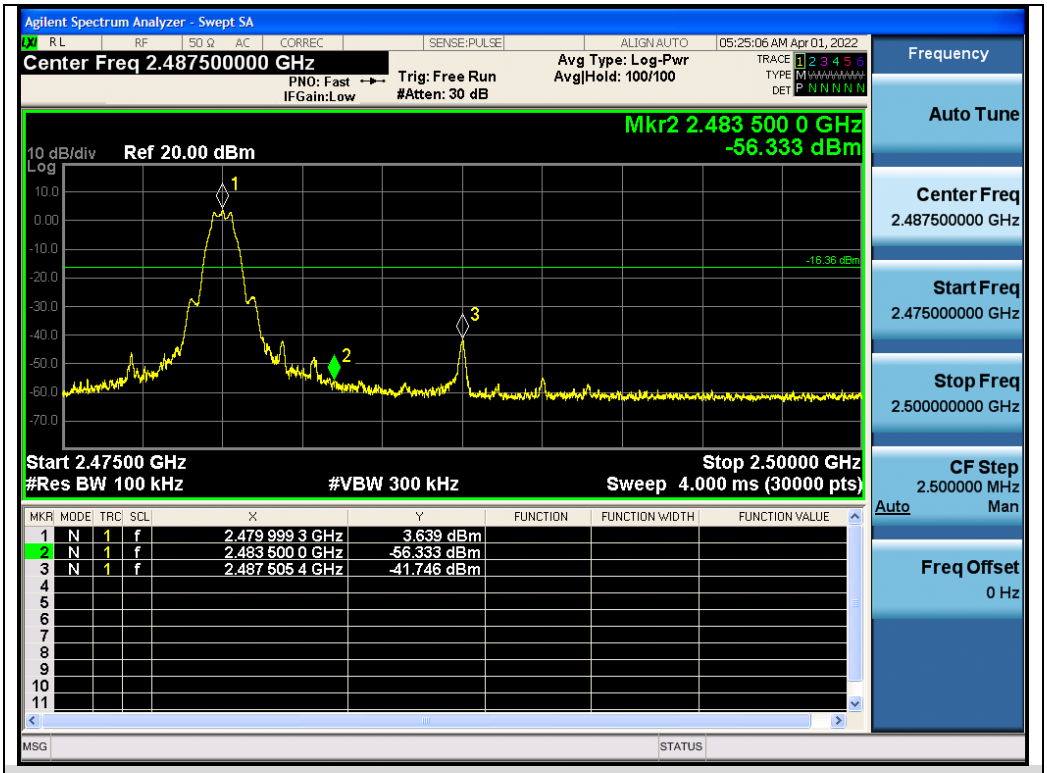



Test_Graph_LE1M_ANT2_2480_1Mbps_Higher Band Emissions

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




Test_Graph_LE1M_ANT2_2402_1Mbps_Lower Band Edge Emissions




Test_Graph_LE1M_ANT2_2480_1Mbps_Higher Band Edge Emissions

# 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

## 10.1. MEASUREMENT PROCEDURE

(1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator

(2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.

(3). Set the SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 8.4 was used in this testing.

## 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer to Section 7.2.

## 10.3. MEASUREMENT EQUIPMENT USED

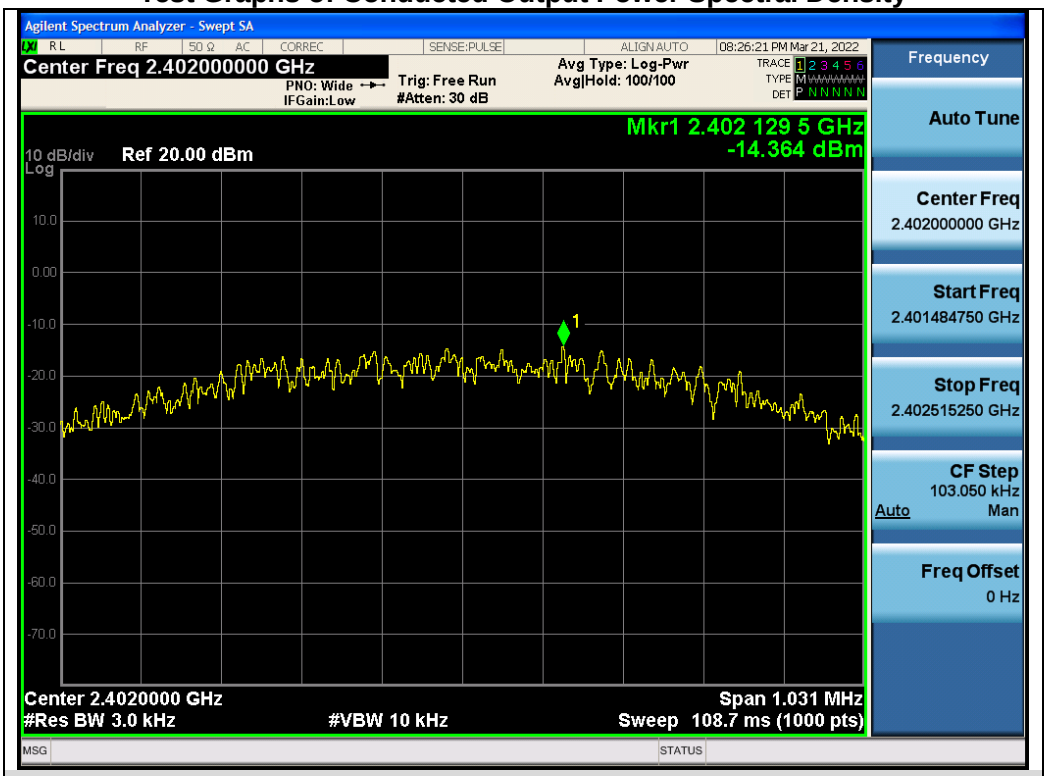
Refer to Section 6.

## 10.4. LIMITS AND MEASUREMENT RESULT

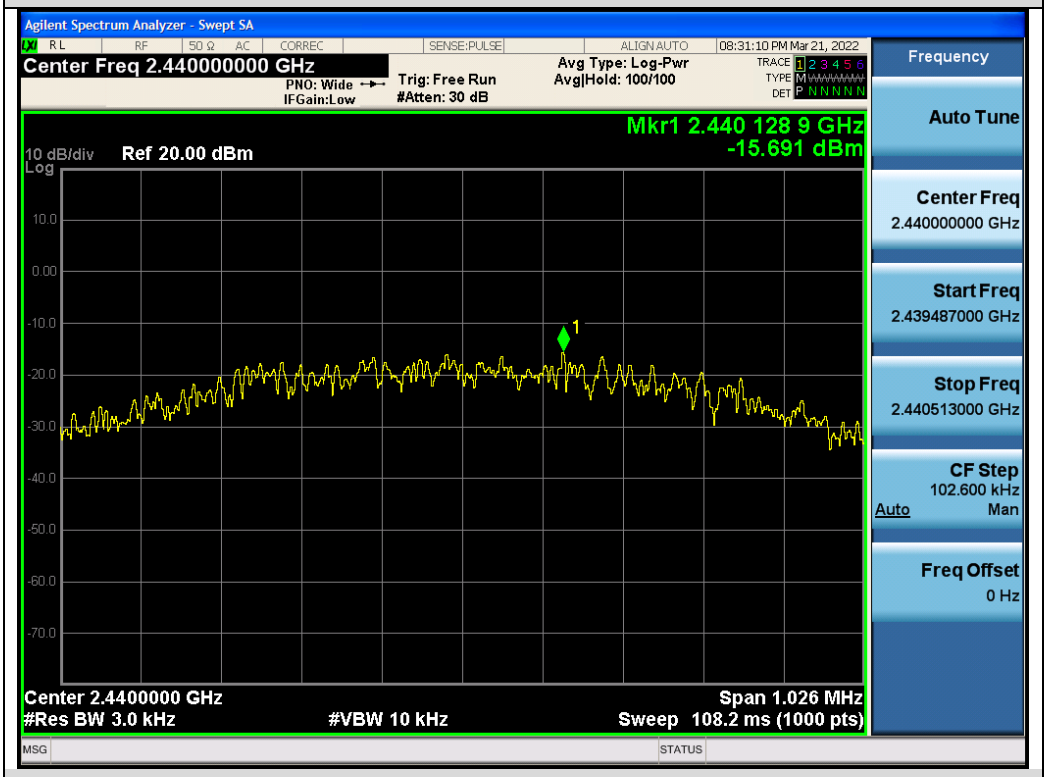
| Test Data of Conducted Output Power Spectral Density-Ant 1 | | | | |
|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | Power density (dBm/3kHz) | Limit (dBm/3kHz) | Pass or Fail |
| GFSK 1M | 2402 | -14.364 | ≤8 | Pass |
| | 2440 | -15.691 | ≤8 | Pass |
| | 2480 | -16.332 | ≤8 | Pass |

| Test Data of Conducted Output Power Spectral Density-Ant 2 | | | | |
|---|---|---|---|---|
| Test Mode | Test Channel (MHz) | Power density (dBm/3kHz) | Limit (dBm/3kHz) | Pass or Fail |
| GFSK 1M | 2402 | -14.138 | ≤8 | Pass |
| | 2440 | -12.805 | ≤8 | Pass |
| | 2480 | -11.852 | ≤8 | Pass |

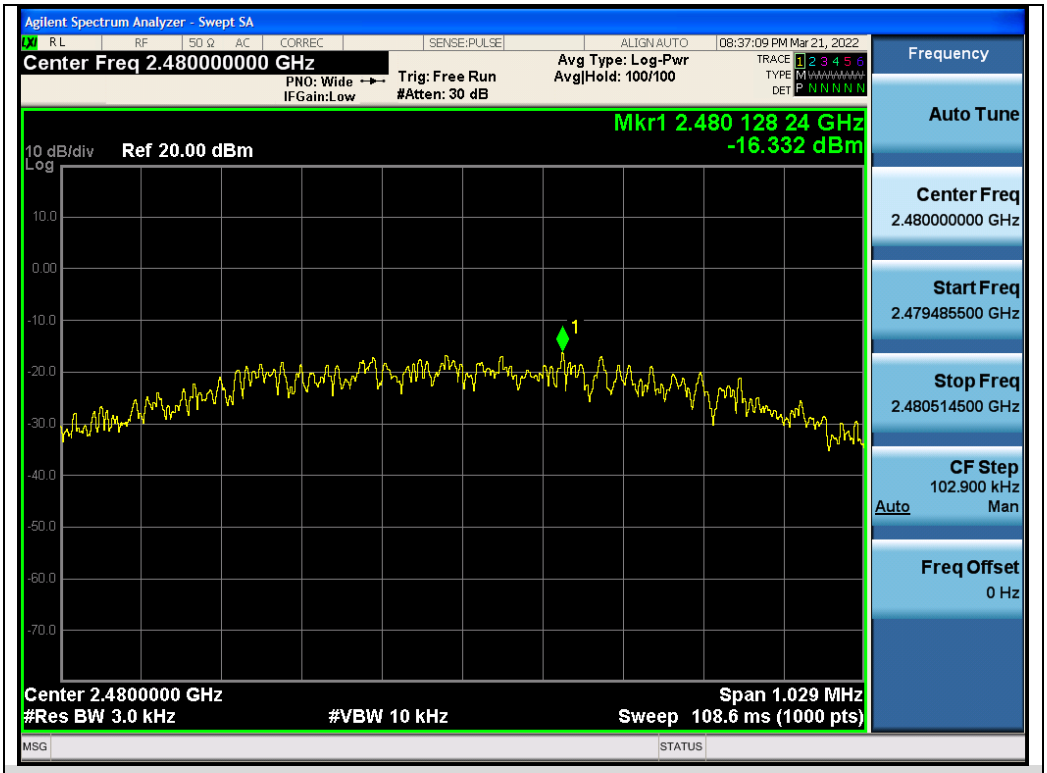
## Test Graphs of Conducted Output Power Spectral Density




Test_Graph_LE1M_ANT1_2402_1Mbps_PSD




Test_Graph_LE1M_ANT1_2440_1Mbps_PSD




Test_Graph_LE1M_ANT1_2480_1Mbps_PSD