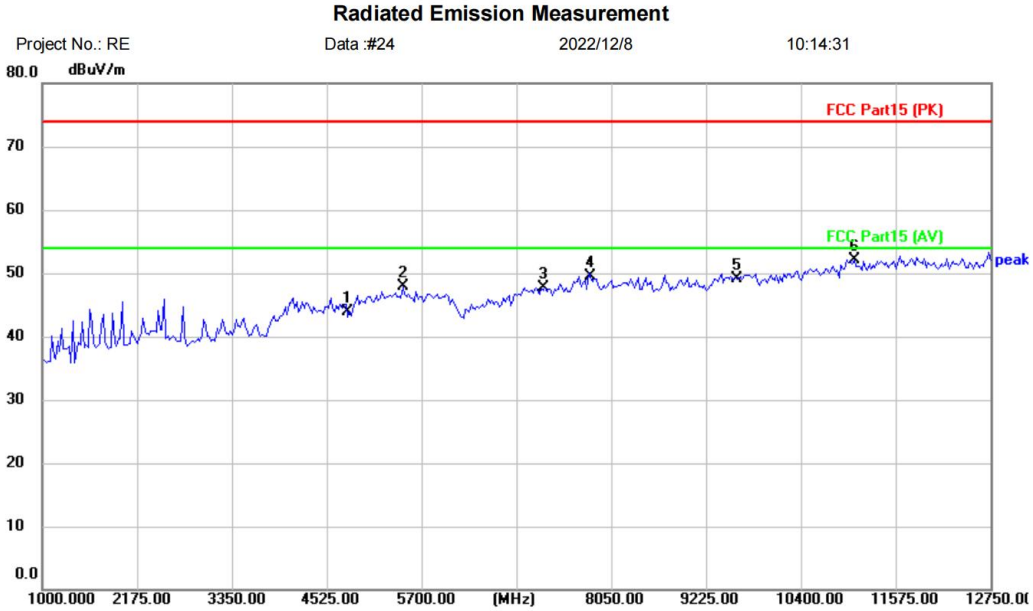
## [TestMode: TX low channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-L
Note:

Polarization: ***Horizontal***
Power:

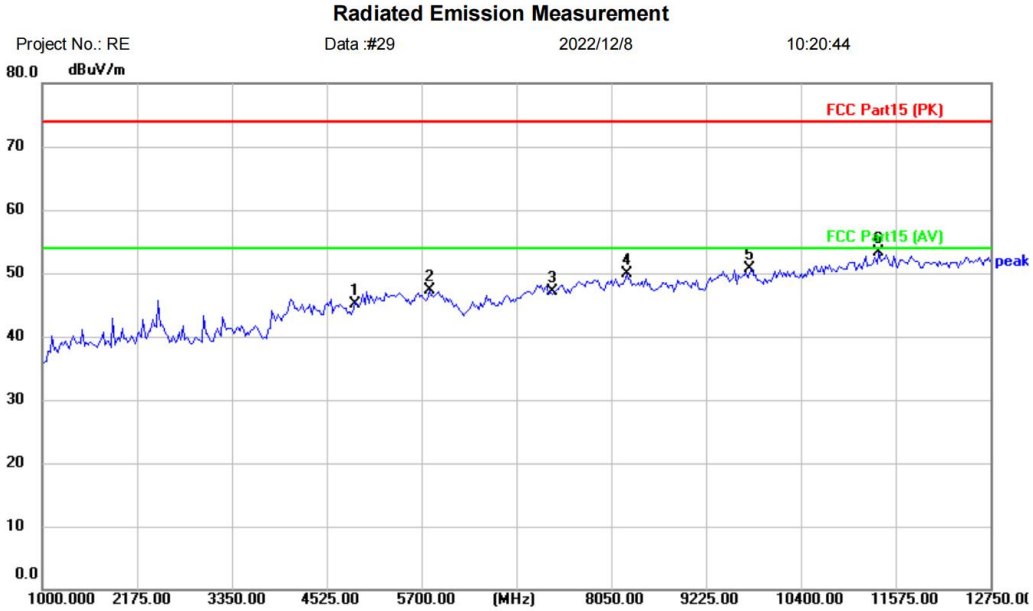
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4804.000 | 39.94 | 4.05 | 43.99 | 74.00 | -30.01 | peak | |
| 2 | | 5465.000 | 40.96 | 6.87 | 47.83 | 74.00 | -26.17 | peak | |
| 3 | | 7206.000 | 39.73 | 7.93 | 47.66 | 74.00 | -26.34 | peak | |
| 4 | | 7791.500 | 40.77 | 8.79 | 49.56 | 74.00 | -24.44 | peak | |
| 5 | | 9608.000 | 38.23 | 10.90 | 49.13 | 74.00 | -24.87 | peak | |
| 6 | * | 11058.000 | 38.70 | 13.48 | 52.18 | 74.00 | -21.82 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX mid channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-M
Note:

Polarization: ***Horizontal***
Power:

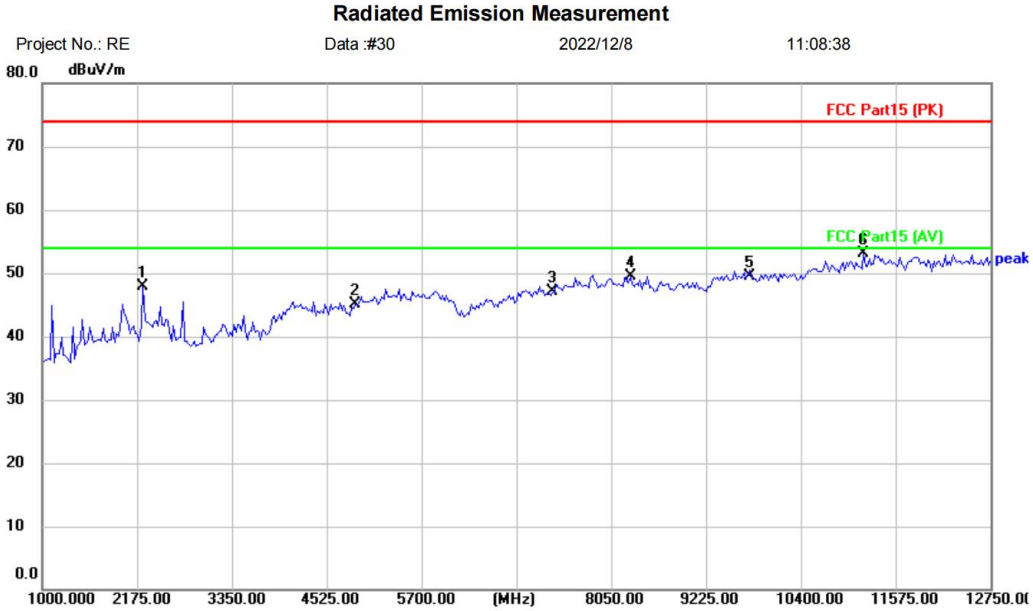
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4884.000 | 40.79 | 4.37 | 45.16 | 74.00 | -28.84 | peak | |
| 2 | | 5794.000 | 40.47 | 6.77 | 47.24 | 74.00 | -26.76 | peak | |
| 3 | | 7326.000 | 38.88 | 8.21 | 47.09 | 74.00 | -26.91 | peak | |
| 4 | | 8238.000 | 40.84 | 9.00 | 49.84 | 74.00 | -24.16 | peak | |
| 5 | | 9768.000 | 39.38 | 11.31 | 50.69 | 74.00 | -23.31 | peak | |
| 6 | * | 11363.500 | 39.72 | 13.62 | 53.34 | 74.00 | -20.66 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX mid channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-M
Note:

Polarization: *Vertical*
Power:

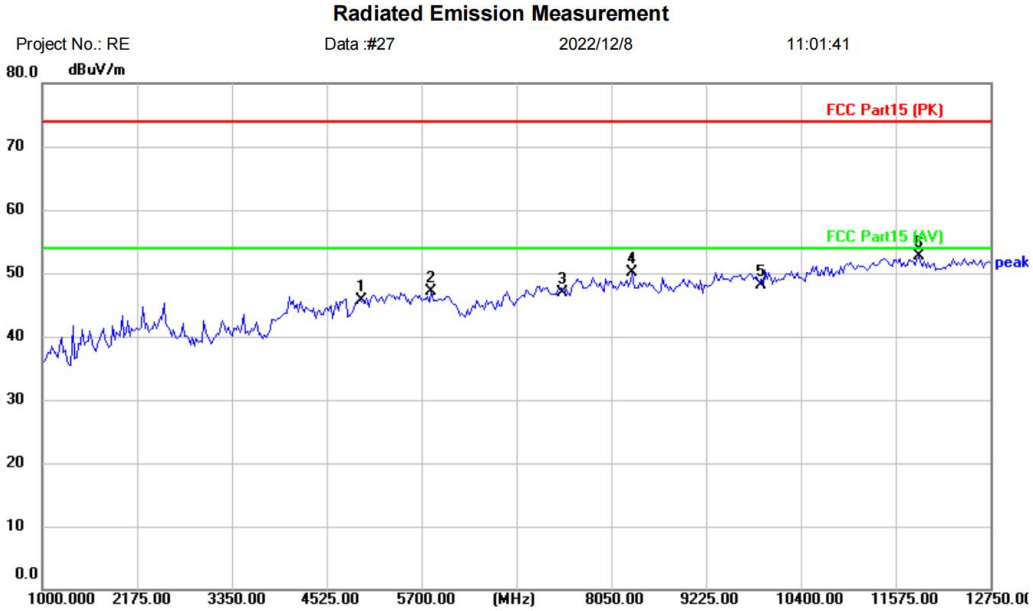
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2245.500 | 51.20 | -3.35 | 47.85 | 74.00 | -26.15 | peak | |
| 2 | | 4884.000 | 40.81 | 4.37 | 45.18 | 74.00 | -28.82 | peak | |
| 3 | | 7326.000 | 38.81 | 8.21 | 47.02 | 74.00 | -26.98 | peak | |
| 4 | | 8285.000 | 40.45 | 9.03 | 49.48 | 74.00 | -24.52 | peak | |
| 5 | | 9768.000 | 38.17 | 11.31 | 49.48 | 74.00 | -24.52 | peak | |
| 6 | * | 11175.500 | 39.54 | 13.53 | 53.07 | 74.00 | -20.93 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX high channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-H
Note:

Polarization: *Vertical*
Power:

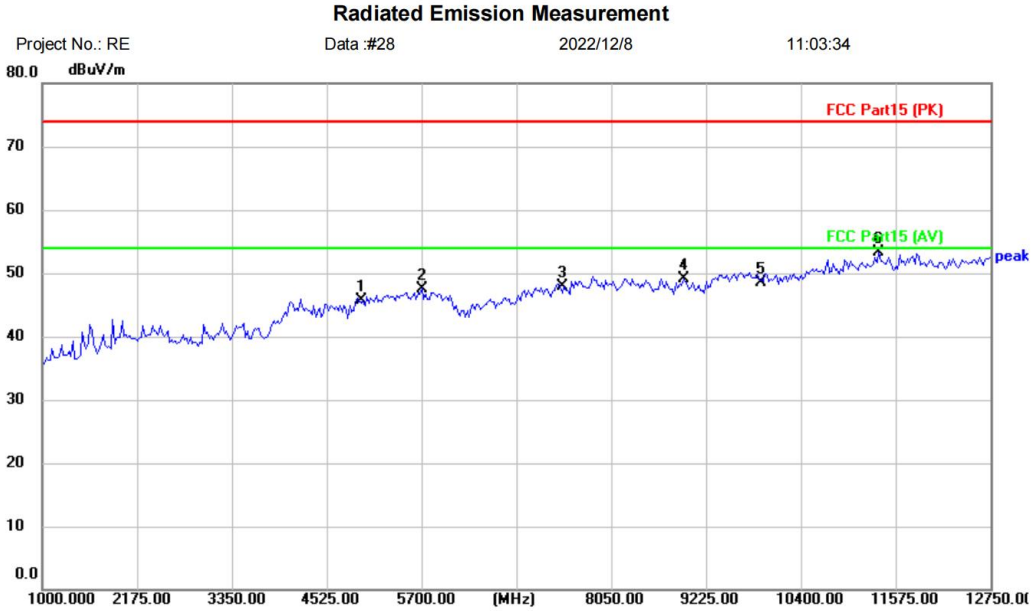
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4960.000 | 40.37 | 5.42 | 45.79 | 74.00 | -28.21 | peak | |
| 2 | | 5817.500 | 40.40 | 6.78 | 47.18 | 74.00 | -26.82 | peak | |
| 3 | | 7440.000 | 38.34 | 8.48 | 46.82 | 74.00 | -27.18 | peak | |
| 4 | | 8308.500 | 41.15 | 9.04 | 50.19 | 74.00 | -23.81 | peak | |
| 5 | | 9920.000 | 36.51 | 11.69 | 48.20 | 74.00 | -25.80 | peak | |
| 6 | * | 11857.000 | 38.81 | 13.84 | 52.65 | 74.00 | -21.35 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX high channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-H
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4960.000 | 40.32 | 5.42 | 45.74 | 74.00 | -28.26 | peak | |
| 2 | | 5700.000 | 40.79 | 6.81 | 47.60 | 74.00 | -26.40 | peak | |
| 3 | | 7440.000 | 39.34 | 8.48 | 47.82 | 74.00 | -26.18 | peak | |
| 4 | | 8943.000 | 39.88 | 9.32 | 49.20 | 74.00 | -24.80 | peak | |
| 5 | | 9920.000 | 36.91 | 11.69 | 48.60 | 74.00 | -25.40 | peak | |
| 6 | * | 11363.500 | 39.60 | 13.62 | 53.22 | 74.00 | -20.78 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

# 18 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

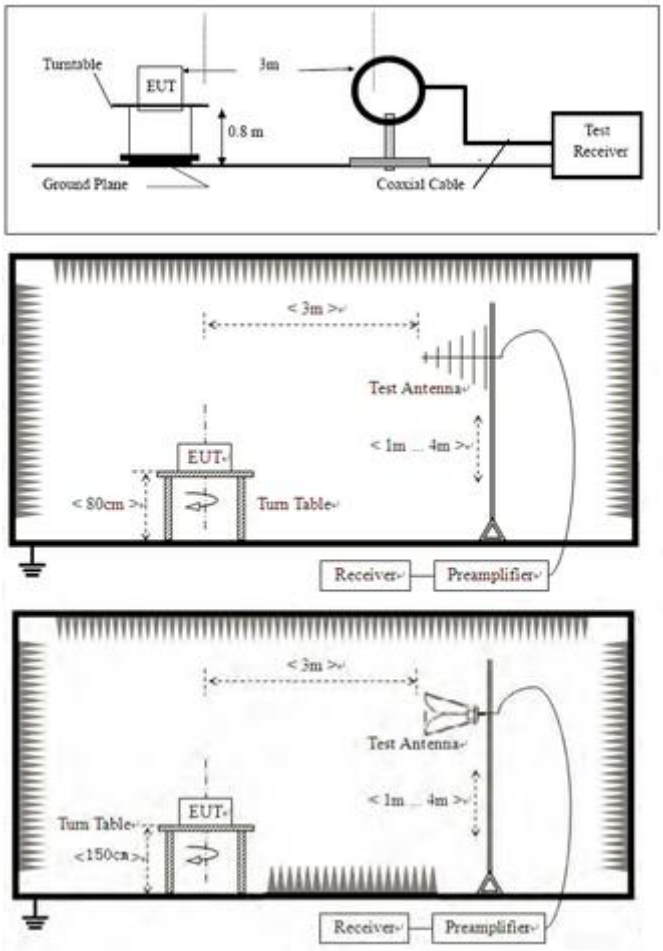
| | |
|---|---|
| **Test Standard** | 47 CFR Part 15, Subpart C 15.247 |
| **Test Method** | ANSI C63.10 (2013) Section 6.10.5 |
| **Test Mode (Pre-Scan)** | TX |
| **Test Mode (Final Test)** | TX |
| **Tester** | Jozu |
| **Temperature** | 25℃ |
| **Humidity** | 60% |

## 18.1 LIMITS

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

## 18.2 BLOCK DIAGRAM OF TEST SETUP




## 18.3 PROCEDURE

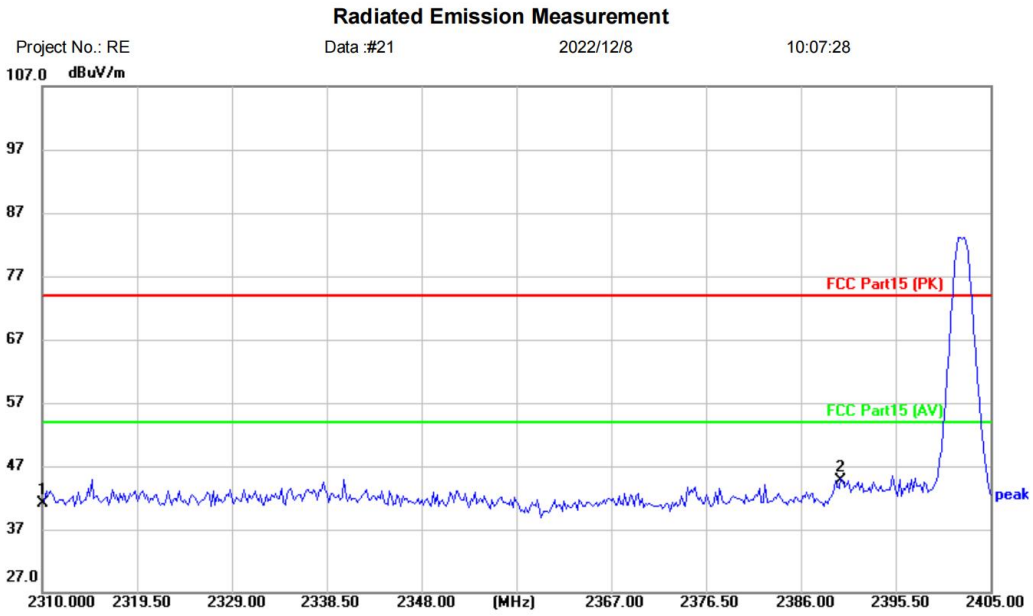
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

### 18.4 TEST DATA

*Remark: During the test, pre-scan the BLE1M, BLE2M, and found the BLE1M which it is worse case.*

[TestMode: TX low channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-L
Note:

Polarization: *Vertical*
Power:

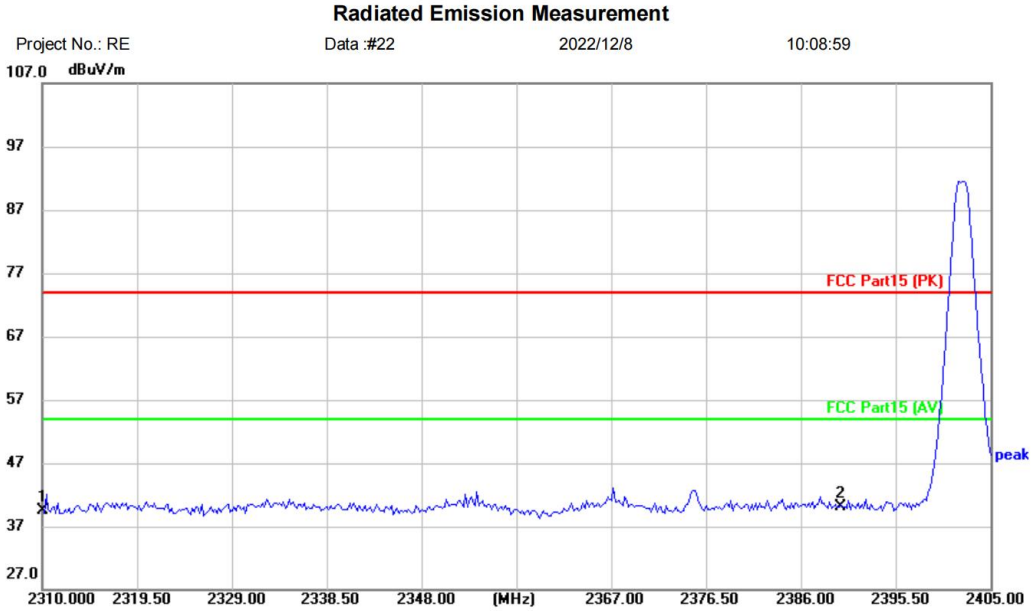
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2310.000 | 45.33 | -4.27 | 41.06 | 74.00 | -32.94 | peak | |
| 2 | * | 2390.000 | 48.56 | -3.82 | 44.74 | 74.00 | -29.26 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX low channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-L
Note:

Polarization: ***Horizontal***
Power:

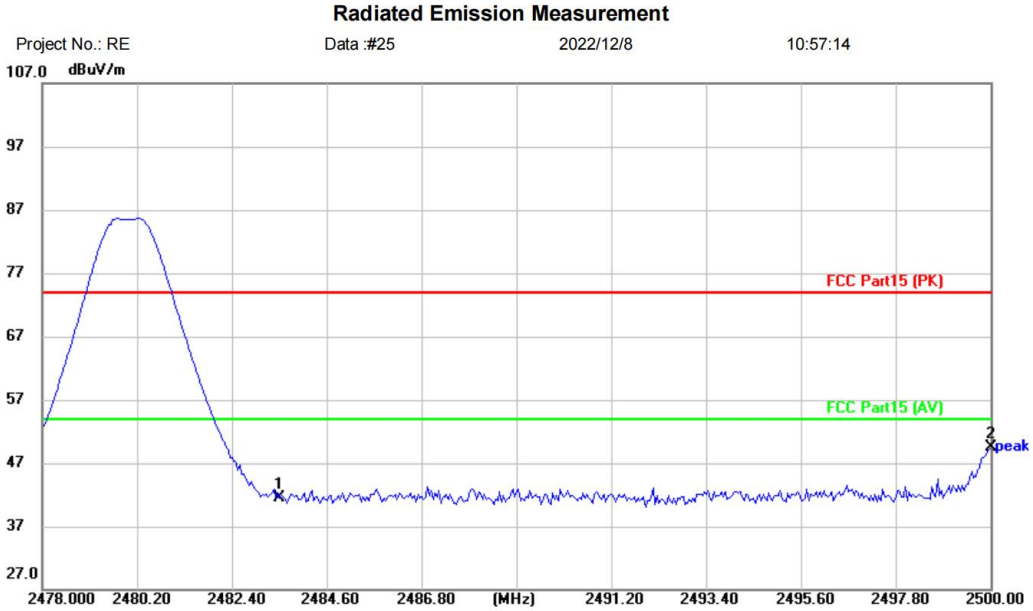
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2310.000 | 43.71 | -4.27 | 39.44 | 74.00 | -34.56 | peak | |
| 2 | * | 2390.000 | 43.85 | -3.82 | 40.03 | 74.00 | -33.97 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX high channel]; [Polarity: Vertical]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-H
Note:

Polarization: *Vertical*
Power:

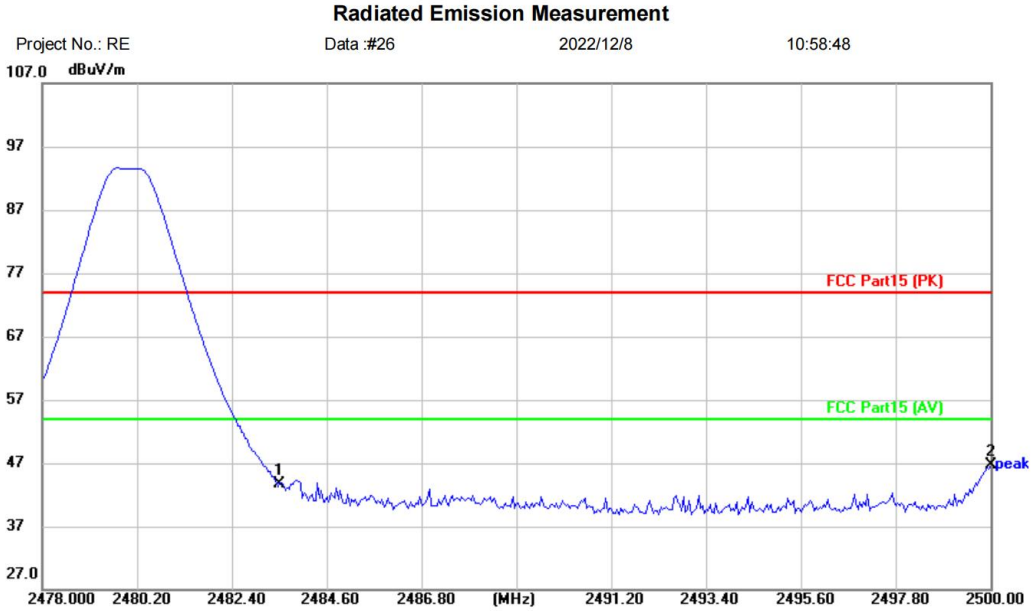
Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2483.500 | 45.41 | -3.96 | 41.45 | 74.00 | -32.55 | peak | |
| 2 | * | 2500.000 | 53.41 | -4.00 | 49.41 | 74.00 | -24.59 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

## [TestMode: TX high channel]; [Polarity: Horizontal]




Site
Limit: FCC Part15 (PK)
EUT: WIFI&BT Module
M/N: RW8822-50B1
Mode: BLE1M TX-H
Note:

Polarization: ***Horizontal***
Power:

Temperature: (C)
Humidity: %RH

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2483.500 | 47.76 | -3.96 | 43.80 | 74.00 | -30.20 | peak | |
| 2 | * | 2500.000 | 50.69 | -4.00 | 46.69 | 74.00 | -27.31 | peak | |

*:Maximum data x:Over limit !:over margin 〈Reference Only

**Test Result: Pass**

Remark:

1. Final Level =Receiver Read level + Correct factor
2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

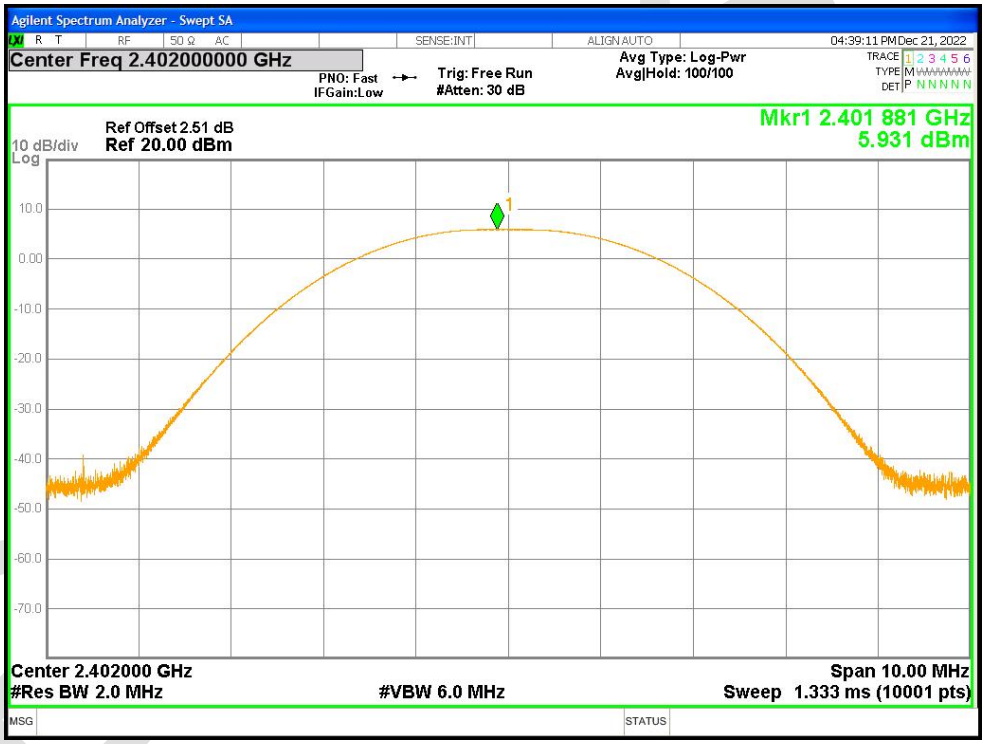
# 19 APPENDIX

## Appendix1

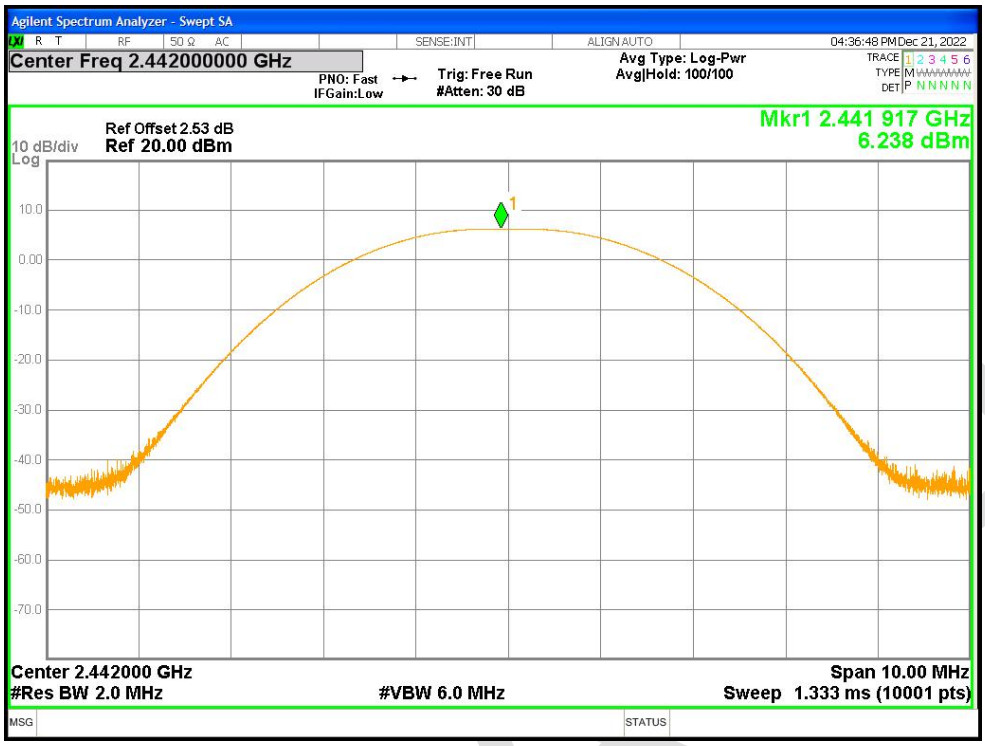
**Maximum Conducted Output Power**

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 5.931 | 30 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | 6.238 | 30 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 6.689 | 30 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | 6.083 | 30 | Pass |
| NVNT | BLE 2M | 2442 | Ant1 | 6.392 | 30 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | 6.732 | 30 | Pass |

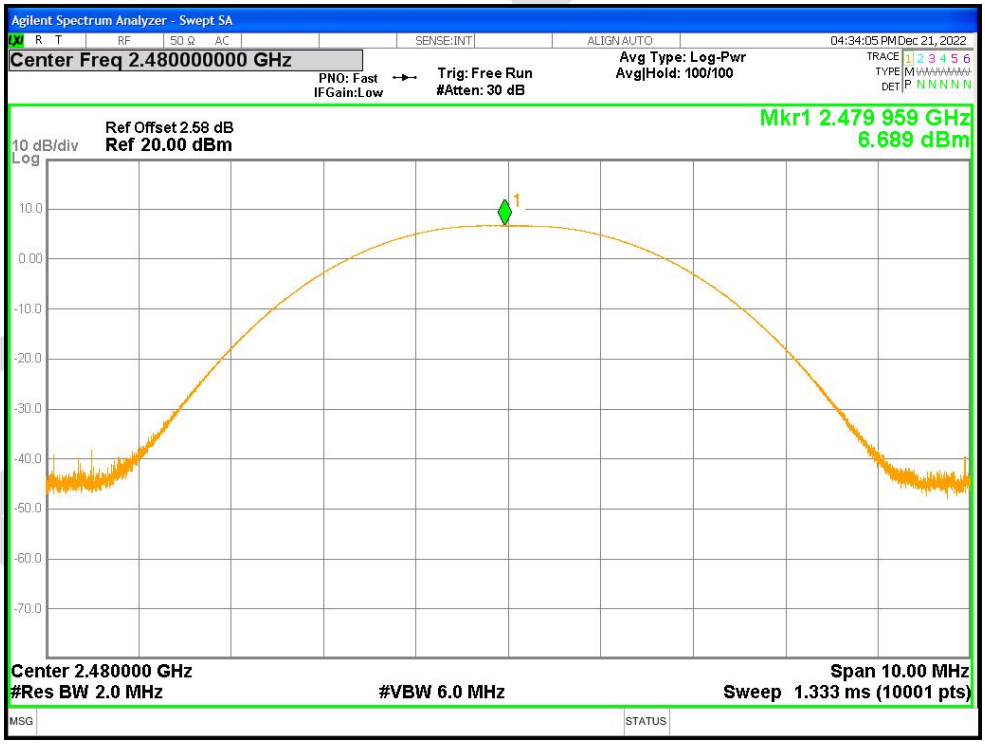
Power NVNT BLE 1M 2402MHz Ant1



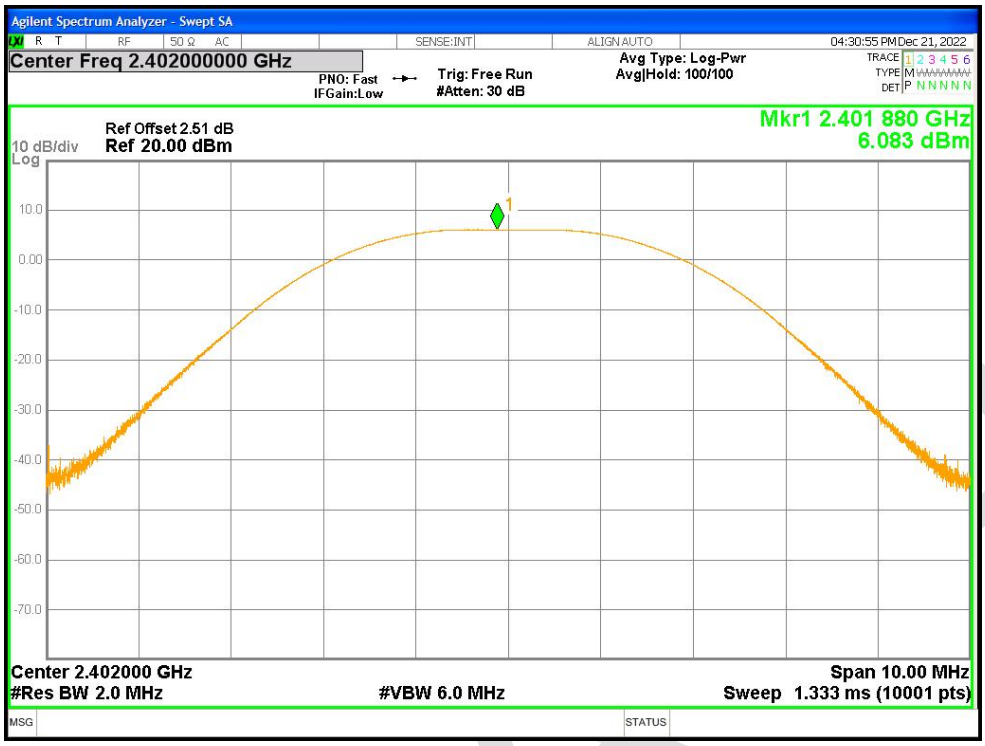

Power NVNT BLE 1M 2442MHz Ant1



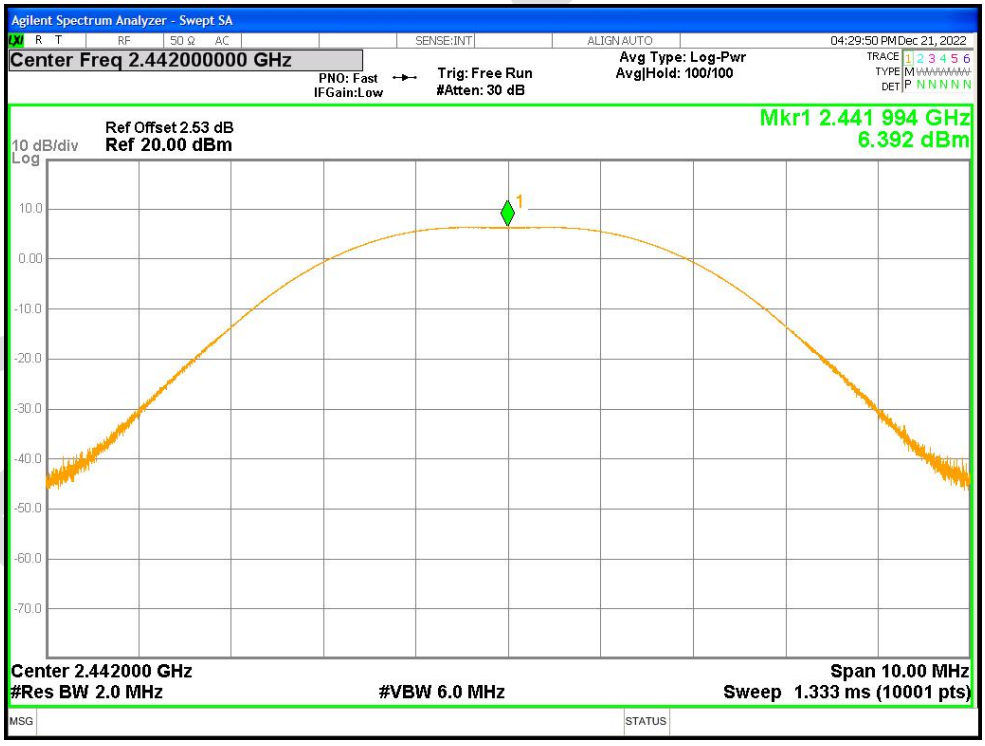

Power NVNT BLE 1M 2480MHz Ant1



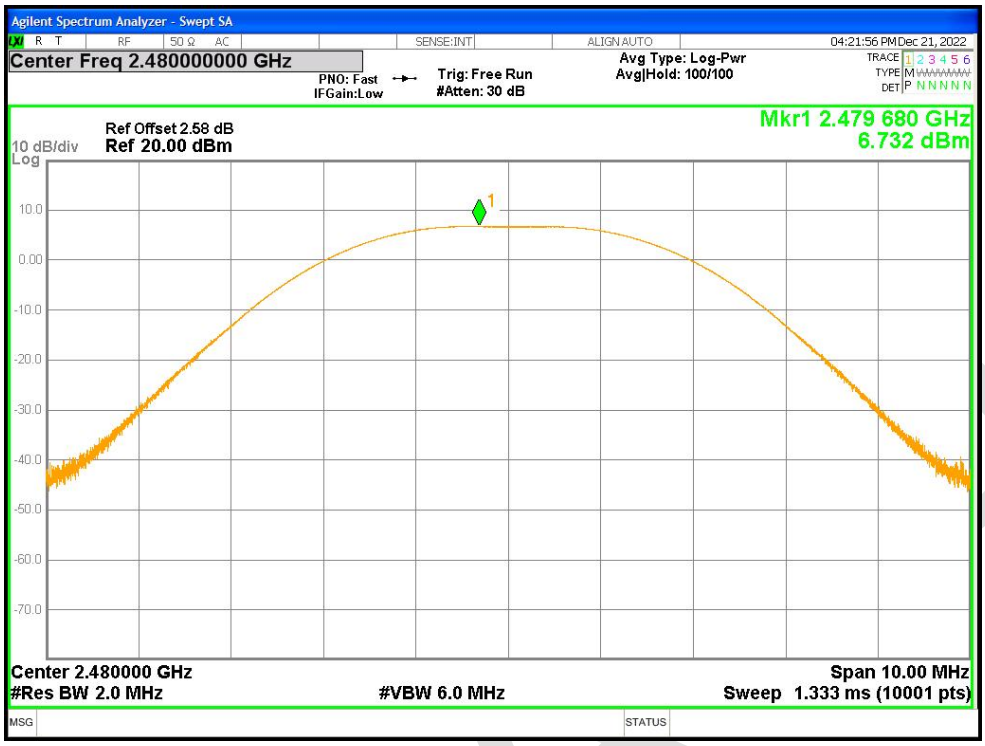

Power NVNT BLE 2M 2402MHz Ant1




Power NVNT BLE 2M 2442MHz Ant1



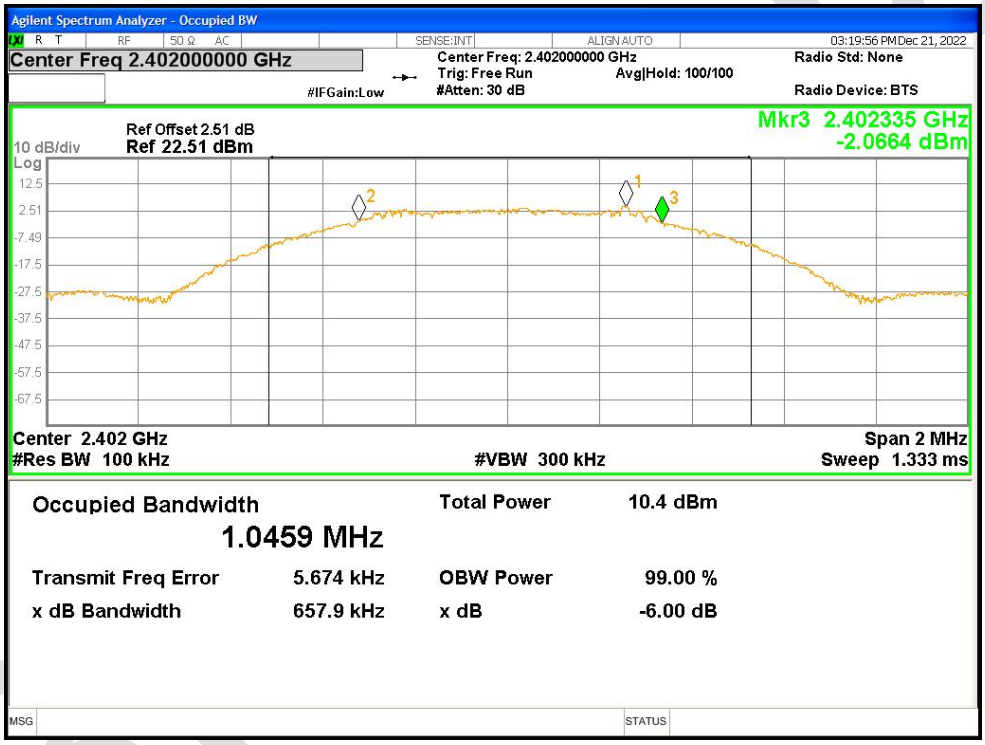

Power NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
04:21:56 PM Dec 21, 2022
Ref Offset 2.58 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.479 680 GHz
6.732 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 6.0 MHz
Span 10.00 MHz
Sweep 1.333 ms (10001 pts)

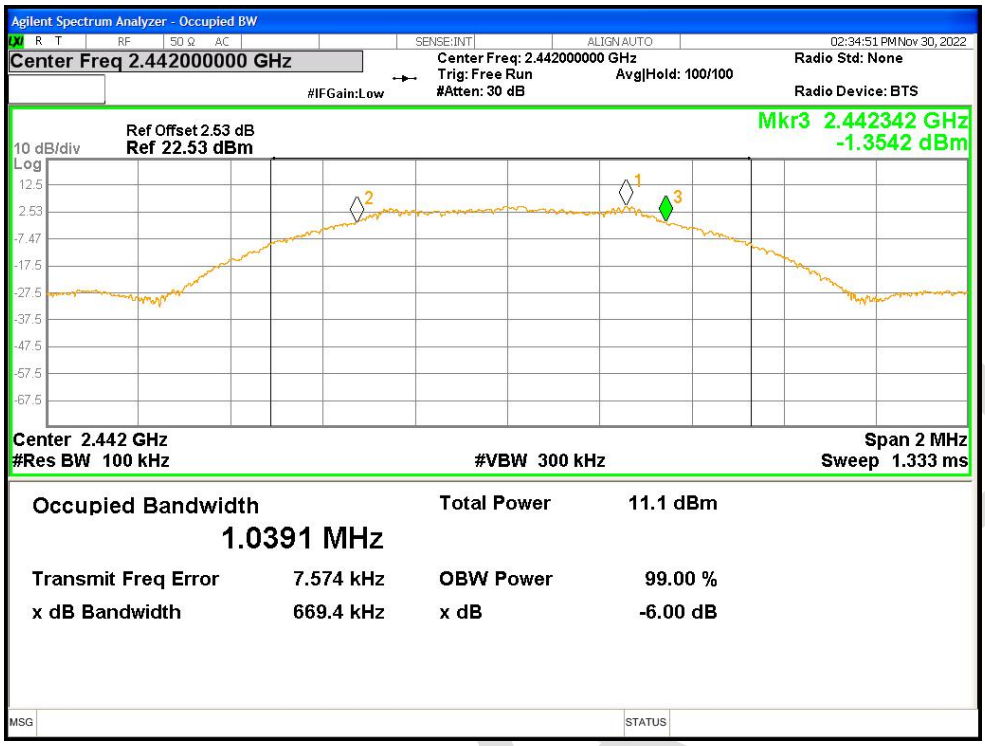
**-6dB Bandwidth**

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 0.658 | 0.5 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | 0.669 | 0.5 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 0.661 | 0.5 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | 1.165 | 0.5 | Pass |
| NVNT | BLE 2M | 2442 | Ant1 | 1.141 | 0.5 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | 1.121 | 0.5 | Pass |

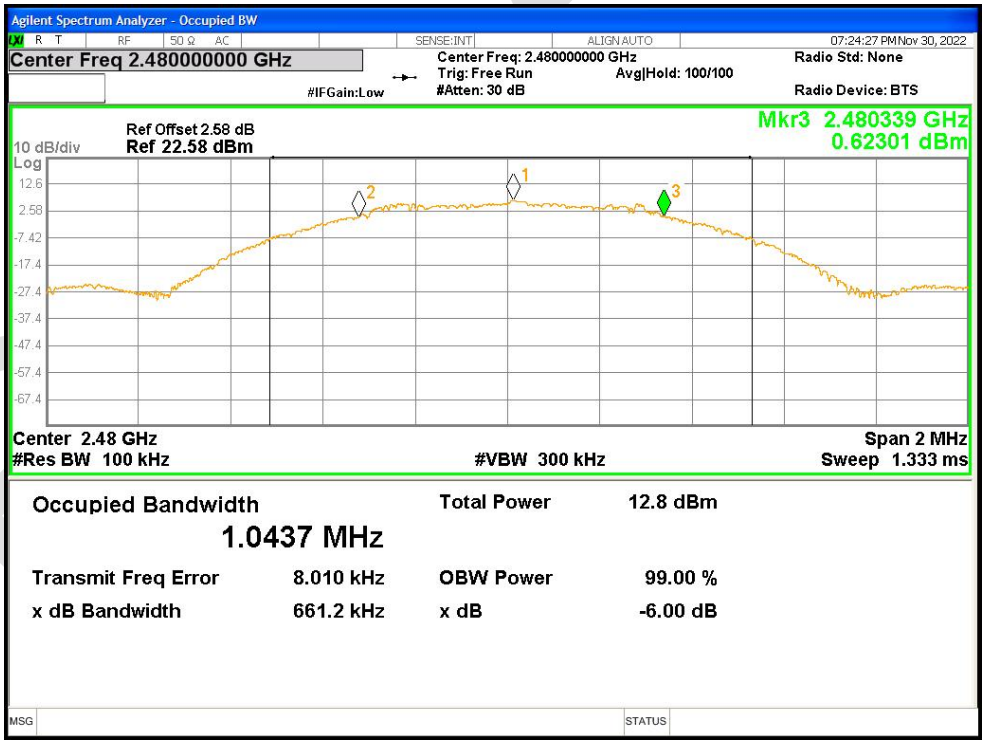
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



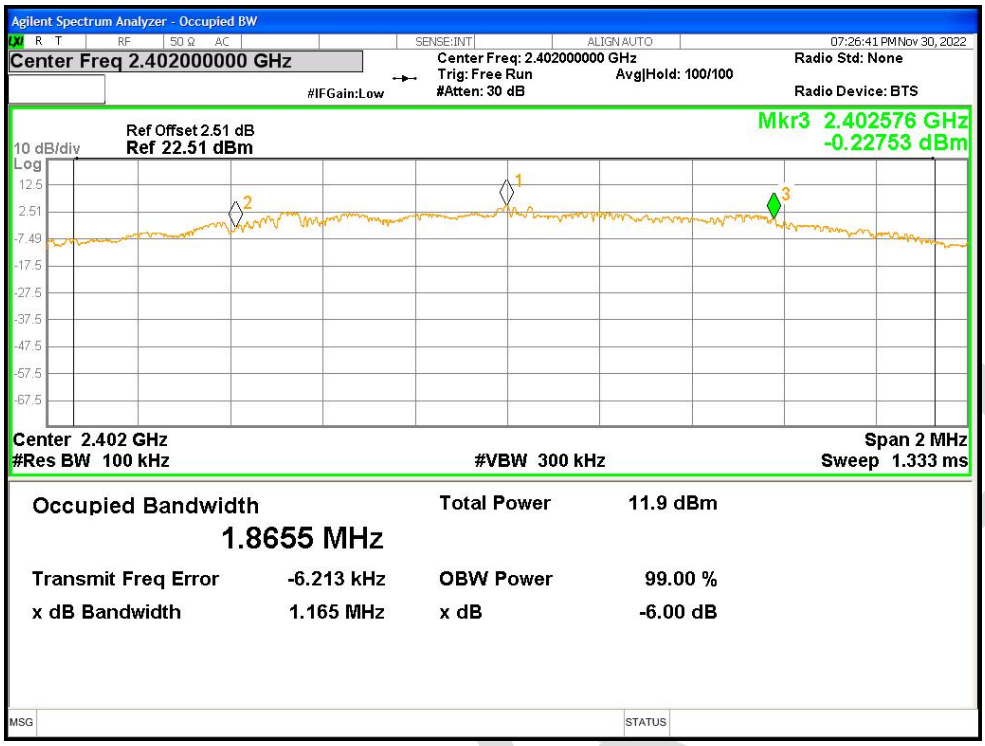

-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



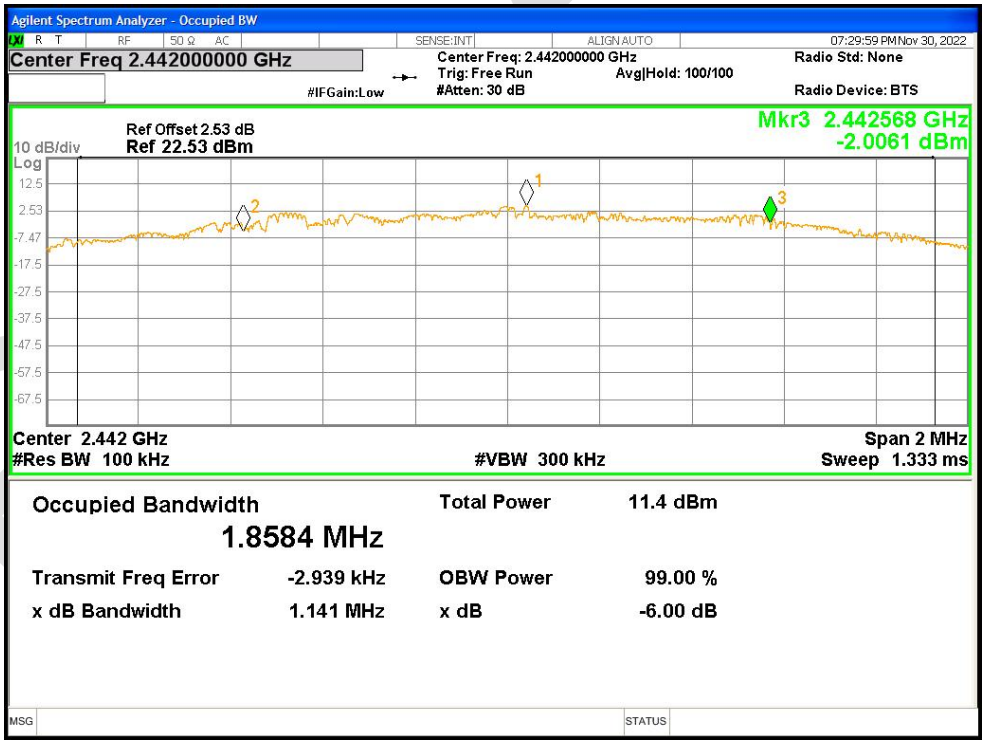

-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



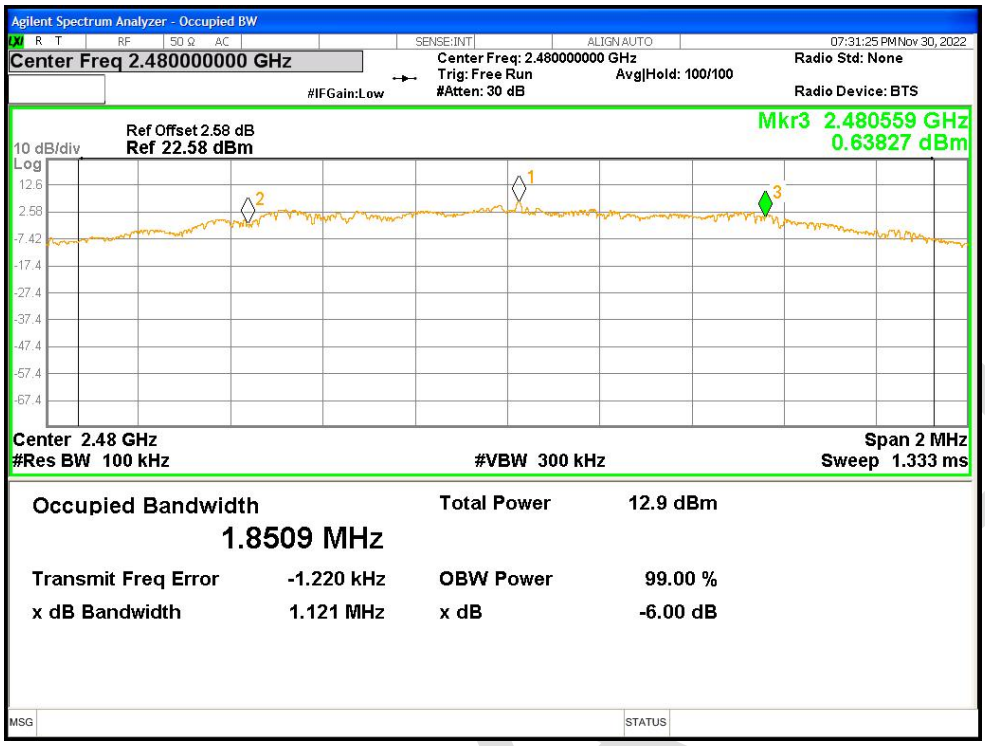

-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1




-6dB Bandwidth NVNT BLE 2M 2442MHz Ant1



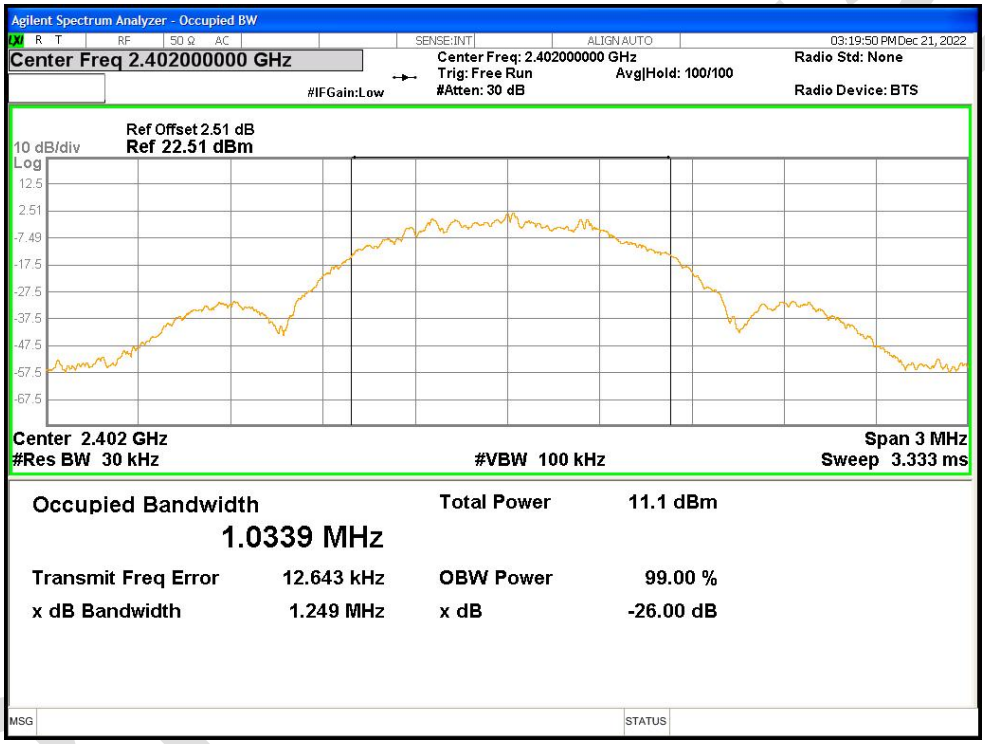

-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
RT
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
07:31:25 PM Nov 30, 2022
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
12.6
2.58
-7.42
-17.4
-27.4
-37.4
-47.4
-57.4
-67.4
Mkr3 2.480559 GHz
0.63827 dBm
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 2 MHz
Sweep 1.333 ms
Occupied Bandwidth
1.8509 MHz
Total Power 12.9 dBm
Transmit Freq Error -1.220 kHz
OBW Power 99.00 %
x dB Bandwidth 1.121 MHz
x dB -6.00 dB
MSG
STATUS

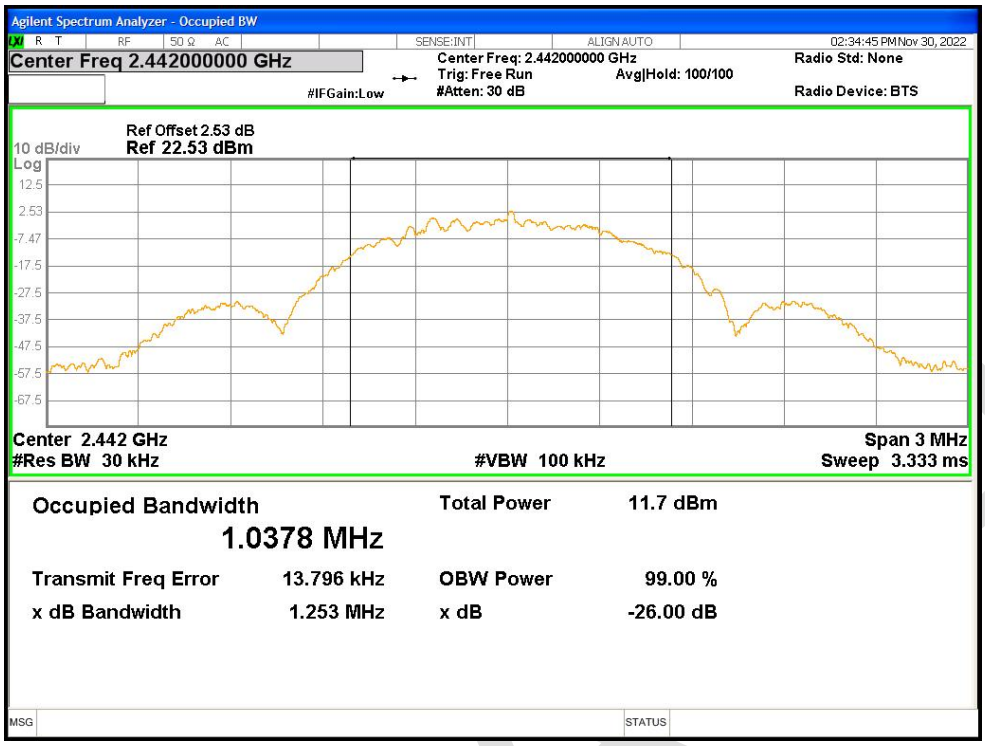
**Occupied Channel Bandwidth**

| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 1.0339 |
| NVNT | BLE 1M | 2442 | Ant1 | 1.0378 |
| NVNT | BLE 1M | 2480 | Ant1 | 1.0343 |
| NVNT | BLE 2M | 2402 | Ant1 | 2.0471 |
| NVNT | BLE 2M | 2442 | Ant1 | 2.0571 |
| NVNT | BLE 2M | 2480 | Ant1 | 2.0603 |

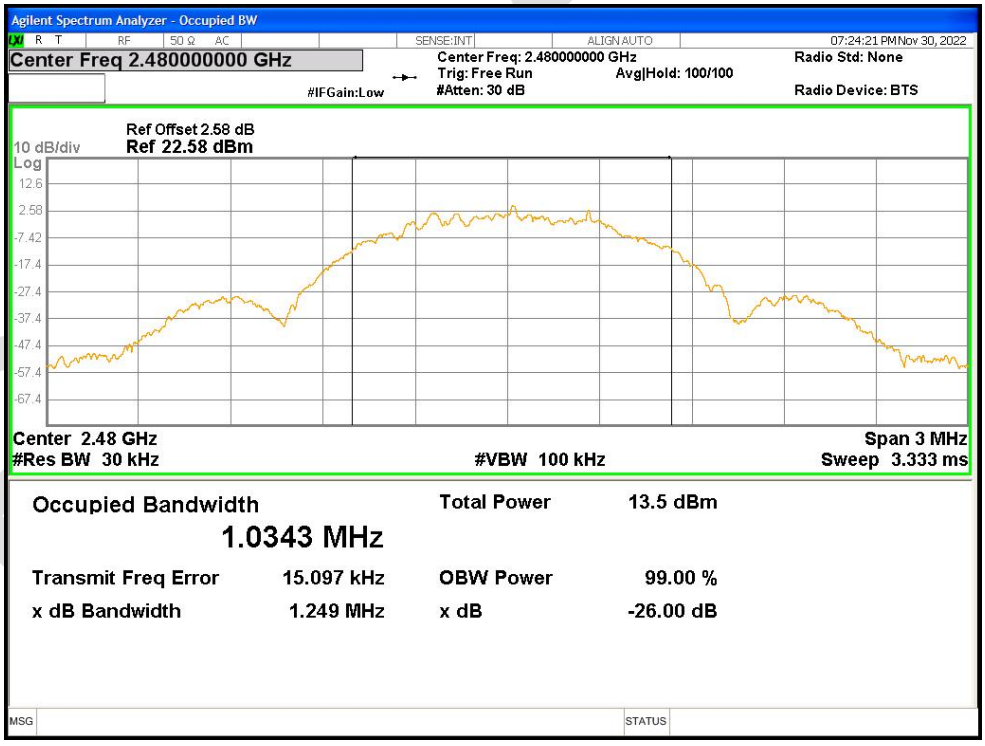
OBW NVNT BLE 1M 2402MHz Ant1



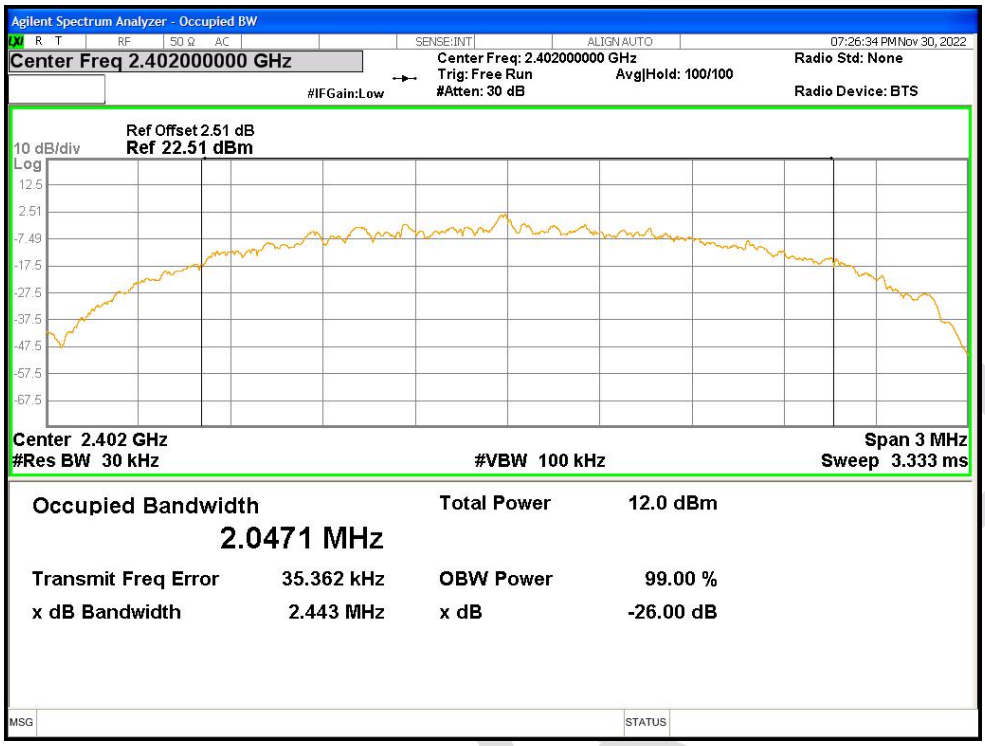

OBW NVNT BLE 1M 2442MHz Ant1



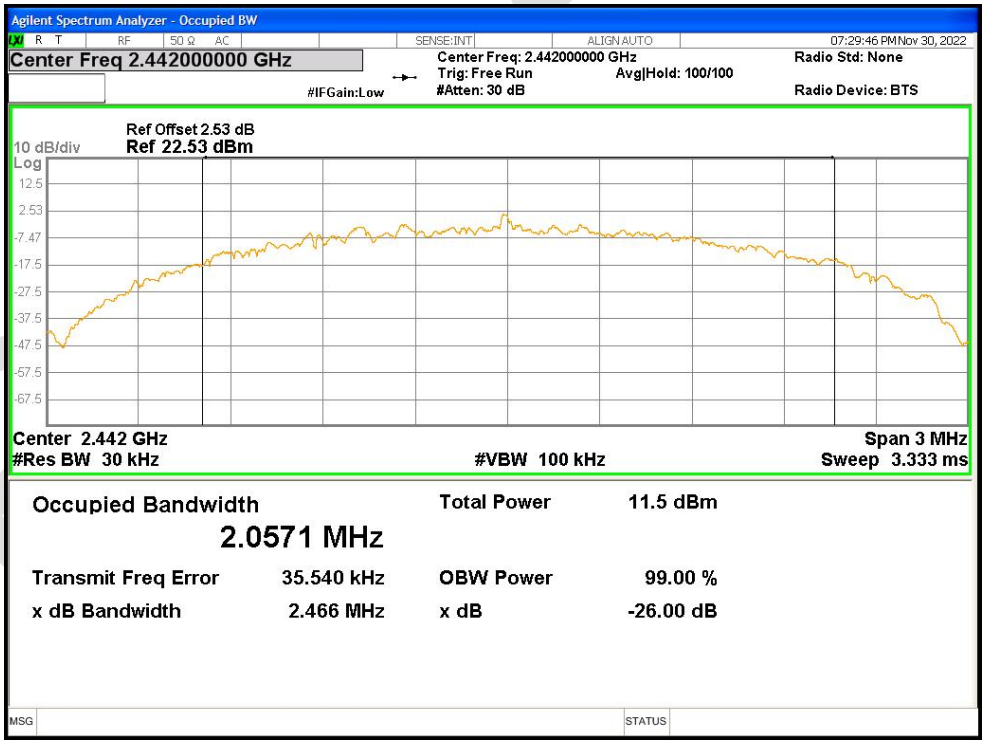

OBW NVNT BLE 1M 2480MHz Ant1



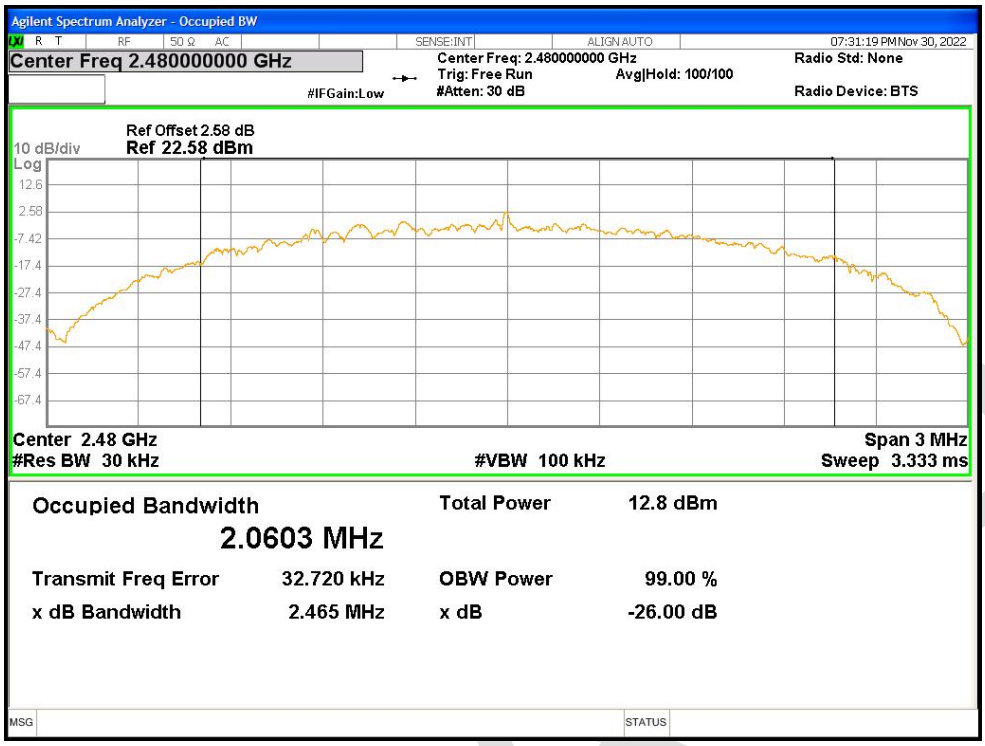

OBW NVNT BLE 2M 2402MHz Ant1




OBW NVNT BLE 2M 2442MHz Ant1



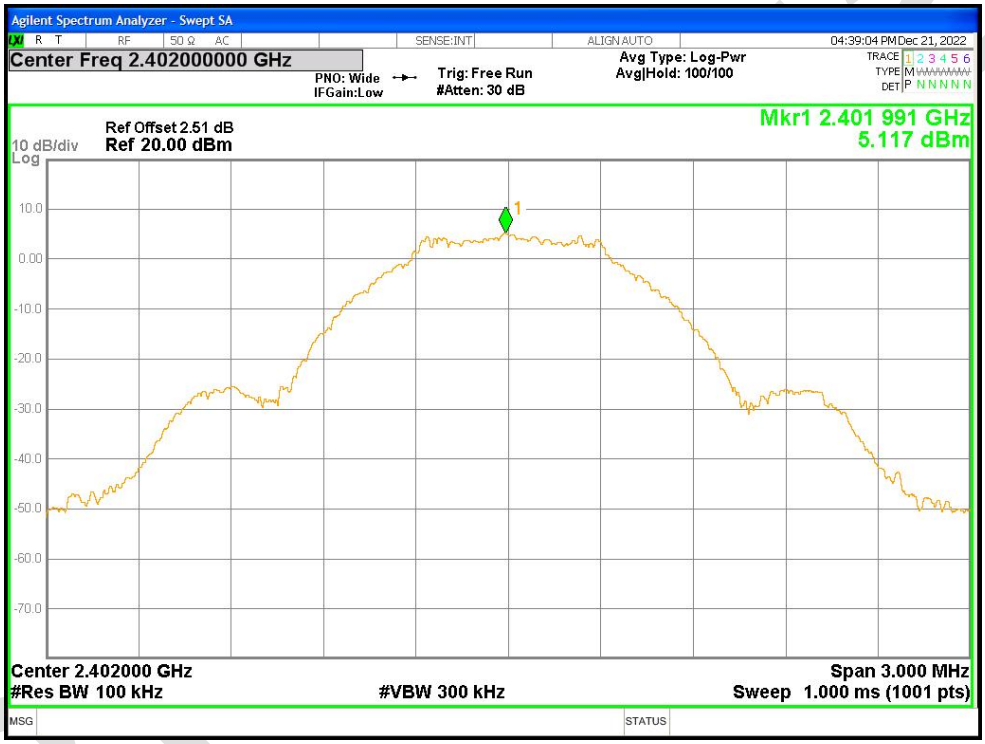

OBW NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Occupied BW
RT
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
07:31:19 PM Nov 30, 2022
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Ref Offset 2.58 dB
10 dB/div
Ref 22.58 dBm
Log
12.6
2.58
-7.42
-17.4
-27.4
-37.4
-47.4
-57.4
-67.4
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.333 ms
Occupied Bandwidth
2.0603 MHz
Total Power
12.8 dBm
Transmit Freq Error
32.720 kHz
OBW Power
99.00 %
x dB Bandwidth
2.465 MHz
x dB
-26.00 dB
MSG
STATUS

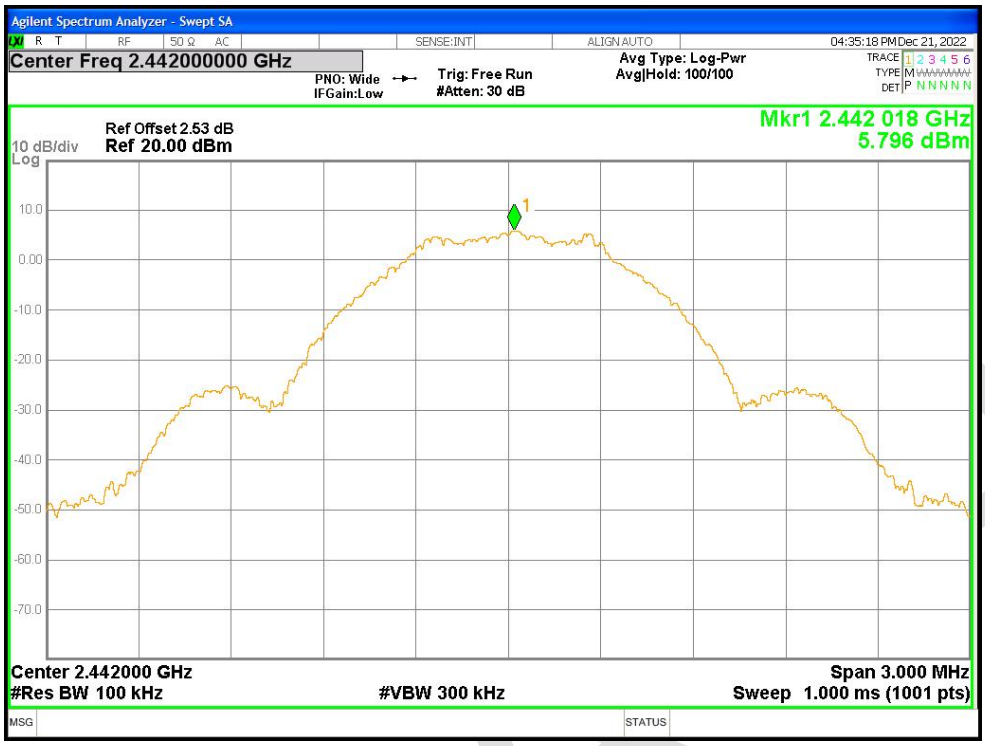
**Maximum Power Spectral Density Level**

| Condition | Mode | Frequency (MHz) | Antenna | Max PSD (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE 1M | 2402 | Ant1 | 5.117 | 8 | Pass |
| NVNT | BLE 1M | 2442 | Ant1 | 5.796 | 8 | Pass |
| NVNT | BLE 1M | 2480 | Ant1 | 5.688 | 8 | Pass |
| NVNT | BLE 2M | 2402 | Ant1 | 5.586 | 8 | Pass |
| NVNT | BLE 2M | 2442 | Ant1 | 5.953 | 8 | Pass |
| NVNT | BLE 2M | 2480 | Ant1 | 3.486 | 8 | Pass |

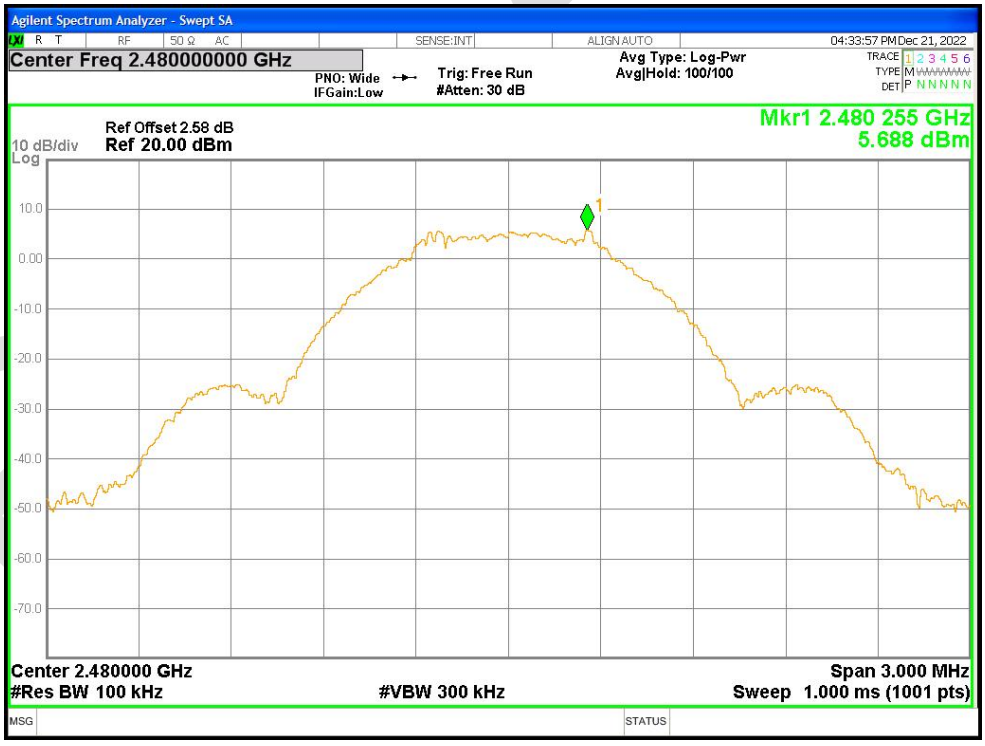
PSD NVNT BLE 1M 2402MHz Ant1



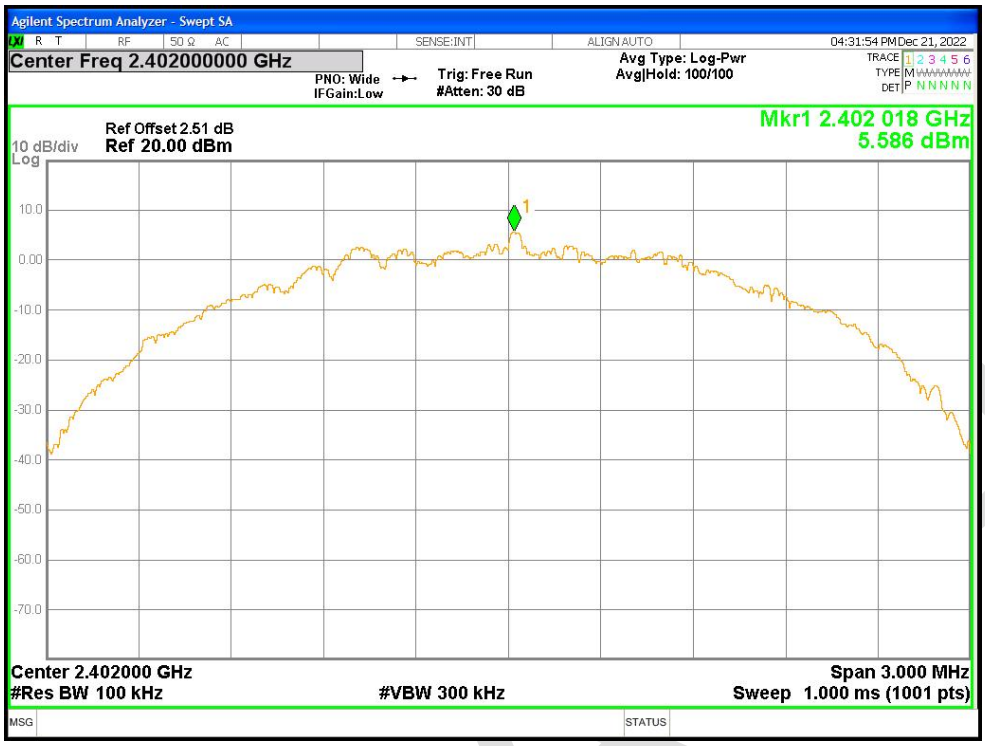

PSD NVNT BLE 1M 2442MHz Ant1



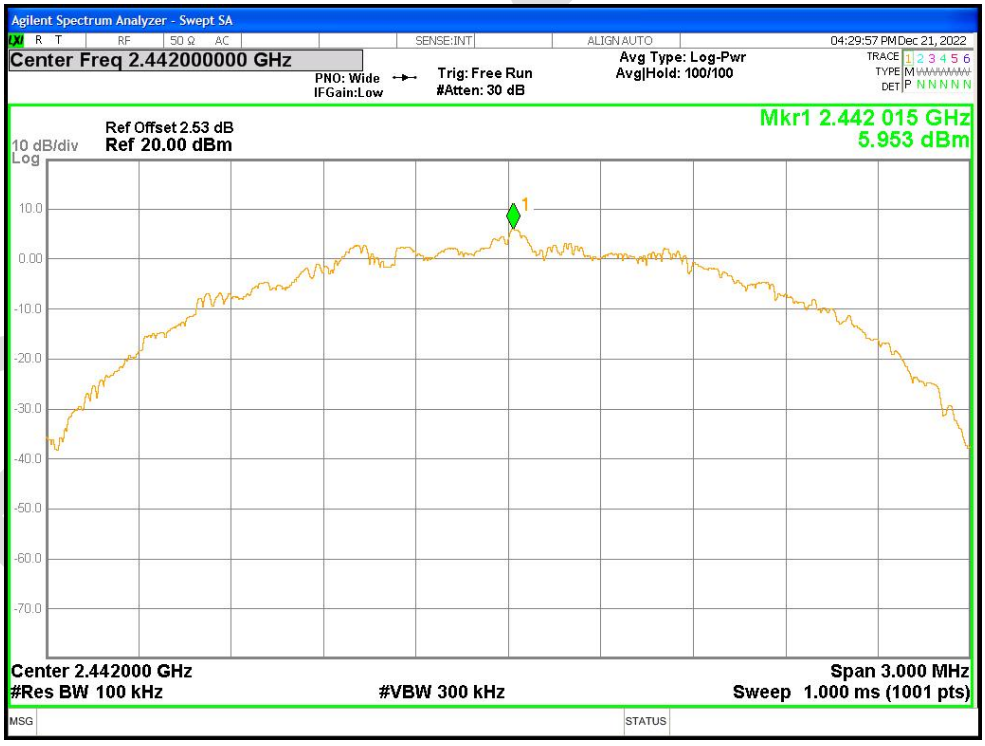

PSD NVNT BLE 1M 2480MHz Ant1



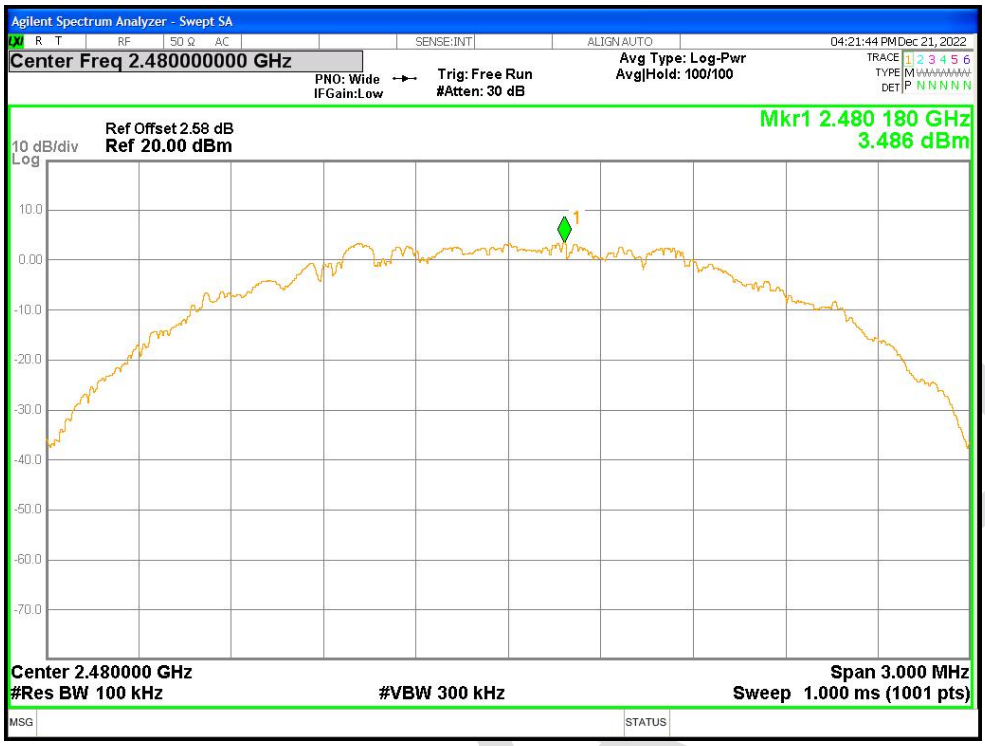

PSD NVNT BLE 2M 2402MHz Ant1




PSD NVNT BLE 2M 2442MHz Ant1




PSD NVNT BLE 2M 2480MHz Ant1


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
04:21:44 PM Dec 21, 2022
Ref Offset 2.58 dB
10 dB/div
Log
Ref 20.00 dBm
Mkr1 2.480 180 GHz
3.486 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 3.000 MHz
Sweep 1.000 ms (1001 pts)