# FCC RF Test Report

## (BLE)

| | |
|---|---|
| **Applicant:** | PAX Technology Limited |
| **Address of Applicant:** | Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour, Hong Kong |
| **Equipment Under Test (EUT)** | |
| Product Name: | Mobile Payment Terminal |
| Model No.: | S920 |
| Trade Mark: | PAX |
| **FCC ID:** | V5PS920LBW |
| **Applicable Standards:** | FCC CFR Title 47 Part 15C (§15.247) |
| **Date of Sample Receipt:** | 23 Sep., 2022 |
| **Date of Test:** | 24 Sep., to 23 Nov., 2022 |
| **Date of Report Issued:** | 24 Nov., 2022 |
| **Test Result:** | PASS |

| | | | |
|---|---|---|---|
| ***Tested by:*** | Mike.ou<br>***Test Engineer*** | ***Date:*** | *24 Nov., 2022* |
| ***Reviewed by:*** | Winner Zhang<br>***Project Engineer*** | ***Date:*** | *24 Nov., 2022* |
| ***Approved by:*** | Eric Zhang<br>***Manager*** | ***Date:*** | *24 Nov., 2022* |

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

# 1 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *24 Nov., 2022* | *Original* |
| | | |
| | | |
| | | |
| | | |

# 2 Contents

# 3 General Information

## 3.1 Client Information

| | |
|---|---|
| Applicant: | PAX Technology Limited |
| Address: | Room 2416, 24/F., Sun Hung Kai Centre, 30 Harbour, Hong Kong |
| Manufacturer: | PAX Computer Technology (Shenzhen) Co., Ltd. |
| Address: | 401 and 402, Building 3, Shenzhen Software Park, Nanshan District, Shenzhen City, Guangdong Province, P.R.C |

## 3.2 General Description of E.U.T.

| | |
|---|---|
| Product Name: | Mobile Payment Terminal |
| Model No.: | S920 |
| Operation Frequency: | 2402 MHz - 2480 MHz |
| Channel Numbers: | 40 |
| Channel Separation: | 2MHz |
| Modulation Technology: | GFSK |
| Data Speed: | 1 Mbps (LE 1M PHY) |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | 1.14 dBi (declare by applicant) |
| Antenna transmit mode: | SISO (1TX, 1RX) |
| Power Supply: | Rechargeable Li-ion Battery DC3.63V, 3250mAh |
| AC Adapter: | Model: A18A-050100U-US2<br>Input: AC100-240V, 50/60Hz, Max. 0.2A<br>Output: DC 5.0V, 1A |
| Test Sample Condition: | The test samples were provided in good working order with no visible defects. |

## 3.3 Test Mode and Test Environment

| **Test Mode:** | |
|---|---|
| Transmitting mode | Keep the EUT in continuous transmitting with modulation |
| ***Remark:*** *For AC power line conducted emission and radiated spurious emission (below 1GHz), pre-scan all data speed, found 1 Mbps (LE 1M PHY) was worse case mode. The report only reflects the test data of worst mode.* | |
| **Operating Environment:** | |
| Temperature: | 15℃ ~ 35℃ |
| Humidity: | 20 % ~ 75 % RH |
| Atmospheric Pressure: | 1008 mbar |

## 3.4 Description of Test Auxiliary Equipment

The EUT has been tested as an independent unit.

## 3.5 Measurement Uncertainty

| Parameter | Expanded Uncertainty (Confidence of 95%(U = 2Uc(y))) |
|---|---|
| Conducted Emission for LISN (9kHz ~ 150kHz) | ±3.11 dB |
| Conducted Emission for LISN (150kHz ~ 30MHz) | ±2.62 dB |
| Radiated Emission (30MHz ~ 1GHz) (3m SAC) | ±4.45 dB |
| Radiated Emission (1GHz ~ 18GHz) (3m SAC) | ±5.34 dB |
| Radiated Emission (18GHz ~ 40GHz) (3m SAC) | ±5.34 dB |
| ***Note:*** *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.* | |

## 3.6 Additions to, Deviations, or Exclusions from the Method

No

## 3.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

## 3.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

## 3.9 Test Instruments List

| Radiated Emission(3m SAC): | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Manage No.** | **Cal. Date (mm-dd-yy)** | **Cal. Due date (mm-dd-yy)** |
| 3m SAC | ETS | 9m*6m*6m | WXJ001-1 | 04-14-2021 | 04-13-2024 |
| Loop Antenna | Schwarzbeck | FMZB 1519 B | WXJ002-4 | 03-07-2022 | 03-06-2023 |
| BiConiLog Antenna | Schwarzbeck | VULB9163 | WXJ002 | 03-08-2022 | 03-07-2023 |
| Horn Antenna | Schwarzbeck | BBHA9120D | WXJ002-2 | 03-08-2022 | 03-07-2023 |
| Horn Antenna | Schwarzbeck | BBHA9170 | WXJ002-5 | 04-07-2022 | 04-06-2023 |
| Pre-amplifier (30MHz ~ 1GHz) | Schwarzbeck | BBV9743B | WXJ001-2 | 01-20-2022 | 01-19-2023 |
| Pre-amplifier (1GHz ~ 18GHz) | SKET | LNPA_0118G-50 | WXJ001-3 | 01-20-2022 | 01-19-2023 |
| Pre-amplifier (18GHz ~ 40GHz) | RF System | TRLA-180400G45B | WXJ002-7 | 03-30-2022 | 03-29-2023 |
| EMI Test Receiver | Rohde & Schwarz | ESRP7 | WXJ003-1 | 03-05-2022 | 03-04-2023 |
| Spectrum Analyzer | Rohde & Schwarz | FSP 30 | WXJ004 | 01-20-2022 | 01-19-2023 |
| Spectrum Analyzer | KEYSIGHT | N9010B | WXJ004-2 | 10-27-2021 | 10-26-2022 |
| | | | | 10-17-2022 | 10-16-2023 |
| Coaxial Cable (30MHz ~ 1GHz) | JYTSZ | JYT3M-1G-NN-8M | WXG001-4 | 01-20-2022 | 01-19-2023 |
| Coaxial Cable (1GHz ~ 18GHz) | JYTSZ | JYT3M-18G-NN-8M | WXG001-5 | 01-20-2022 | 01-19-2023 |
| Coaxial Cable (18GHz ~ 40GHz) | JYTSZ | JYT3M-40G-SS-8M | WXG001-7 | 01-20-2022 | 01-19-2023 |
| Band Reject Filter Group | Tonscend | JS0806-F | WXJ089 | N/A | |
| Test Software | Tonscend | TS+ | Version: 3.0.0.1 | | |

| Conducted Emission: | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Manage No.** | **Cal. Date (mm-dd-yy)** | **Cal. Due date (mm-dd-yy)** |
| EMI Test Receiver | Rohde & Schwarz | ESR3 | WXJ003-2 | 07-12-2022 | 07-11-2023 |
| LISN | Schwarzbeck | NSLK 8127 | QCJ001-13 | 02-24-2022 | 02-23-2023 |
| LISN | Rohde & Schwarz | ESH3-Z5 | WXJ005-1 | 03-30-2022 | 03-29-2023 |
| LISN Coaxial Cable (9kHz ~ 30MHz) | JYTSZ | JYTCE-1G-NN-2M | WXG003-1 | 02-24-2022 | 02-23-2023 |
| RF Switch | TOP PRECISION | RSU0301 | WXG003 | N/A | |
| Test Software | AUDIX | E3 | Version: 6.110919b | | |

| Conducted Method: | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Manage No.** | **Cal. Date (mm-dd-yy)** | **Cal. Due date (mm-dd-yy)** |
| Spectrum Analyzer | Keysight | N9010B | WXJ004-3 | 10-27-2021 | 10-26-2022 |
| | | | | 10-17-2022 | 10-16-2023 |
| Temperature Humidity Chamber | ZHONG ZHI | CZ-A-80D | WXJ032-3 | 03-19-2021 | 03-18-2023 |
| Power Detector Box | MWRFTEST | MW100-PSB | WXJ007-4 | 11-19-2021 | 11-18-2022 |
| | | | | 11-19-2022 | 11-18-2023 |
| DC Power Supply | Keysight | E3642A | WXJ025-2 | N/A | |
| RF Control Unit | MWRFTEST | MW100-RFCB | WXG006 | N/A | |
| Test Software | MWRFTEST | MTS 8310 | Version: 2.0.0.0 | | |

# 4 Measurement Setup and Procedure

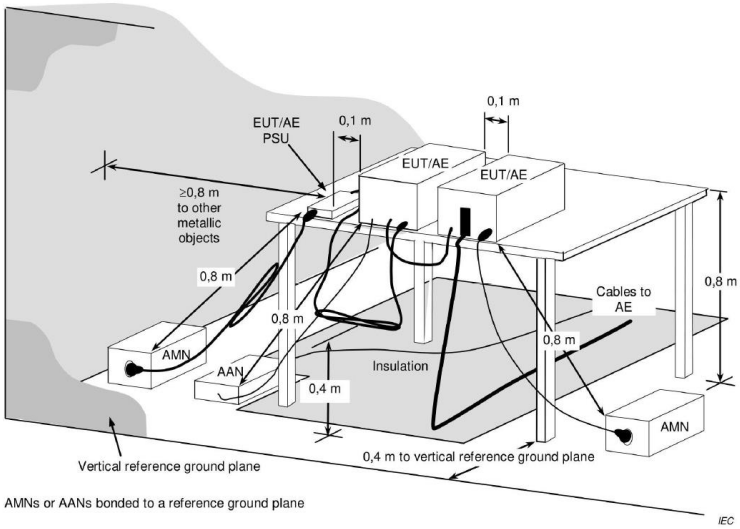
## 4.1 Test Channel

According to ANSI C63.10-2013 chapter 5.6.1 Table 4 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:

| Lowest channel | | Middle channel | | Highest channel | |
|---|---|---|---|---|---|
| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
| 0 | 2402 | 20 | 2442 | 39 | 2480 |

## 4.2 Test Setup

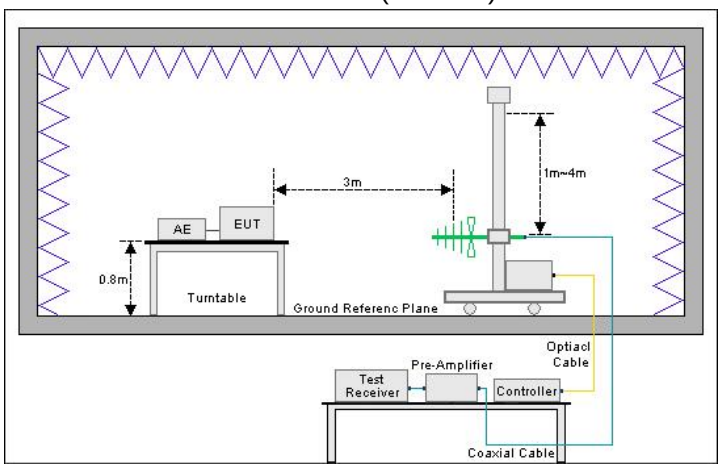
**1) Conducted emission measurement:**



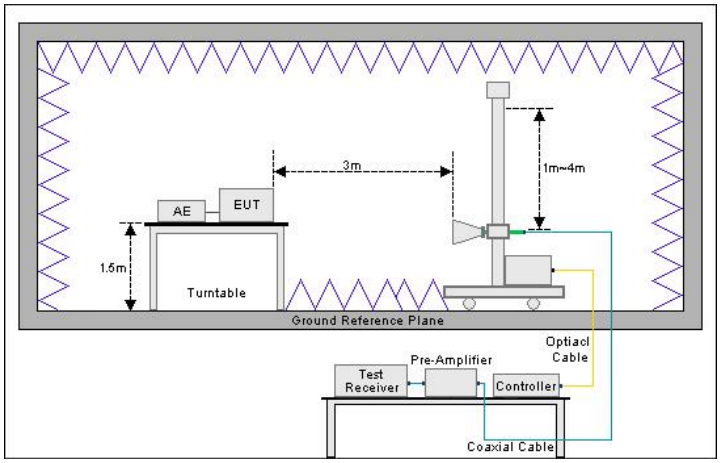

**Note:** The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

**2) Radiated emission measurement:**

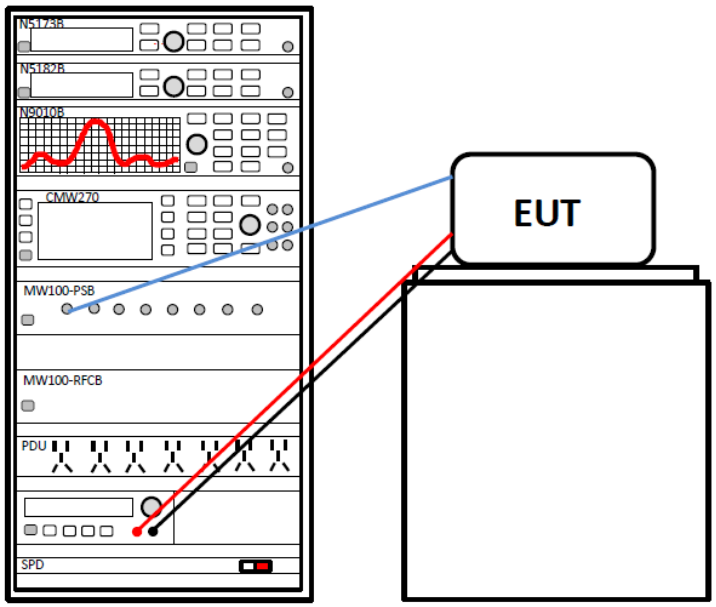
Below 1GHz (3m SAC)



Above 1GHz (3m SAC)




**3) Conducted test method**



## 4.3 Test Procedure

| Test method | Test step |
|---|---|
| Conducted emission | 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.<br>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).<br>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement. |
| Radiated emission | **For below 1GHz:**<br>1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.<br>2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.<br>3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.<br><br>**For above 1GHz:**<br>1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m.<br>2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.<br>3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. |
| Conducted test method | 1. The BLE antenna port of EUT was connected to the test port of the test system through an RF cable.<br>2. The EUT is keeping in continuous transmission mode and tested in all modulation modes.<br>3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software. |

# 5 Test Results

## 5.1 Summary

### 5.1.1 Clause and Data Summary

| Test items | Standard clause | Test data | Result |
|---|---|---|---|
| Antenna Requirement | 15.203<br>15.247 (b)(4) | See Section 5.2 | Pass |
| AC Power Line Conducted Emission | 15.207 | See Section 5.3 | Pass |
| Conducted Output Power | 15.247 (b)(3) | Appendix A – BLE 1M PHY | Pass |
| 6dB Emission Bandwidth<br>99% Occupied Bandwidth | 15.247 (a)(2) | Appendix A – BLE 1M PHY | Pass |
| Power Spectral Density | 15.247 (e) | Appendix A – BLE 1M PHY | Pass |
| Band-edge Emission<br>Conduction Spurious Emission | 15.247 (d) | Appendix A – BLE 1M PHY | Pass |
| Emissions in Restricted Frequency Bands | 15.205<br>15.247 (d) | See Section 5.4 | Pass |
| Emissions in Non-restricted Frequency Bands | 15.209<br>15.247(d) | See Section 5.5 | Pass |

***Remark:***

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not Applicable.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

| | |
|---|---|
| ***Test Method:*** | *ANSI C63.10-2013*<br>*KDB 558074 D01 15.247 Meas Guidance v05r02* |

### 5.1.2 Test Limit

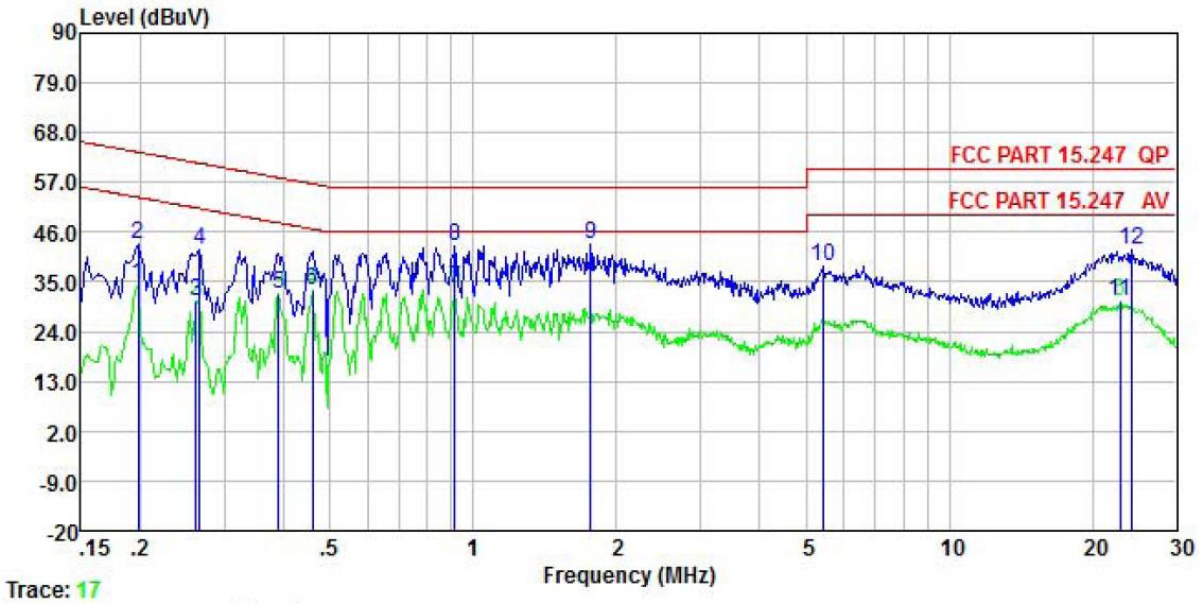
<table>
<tr><th>Test items</th><th>Limit</th></tr>
<tr><td>AC Power Line Conducted Emission</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV)</th></tr>
<tr><th>Quasi-Peak</th><th>Average</th></tr>
<tr><td>0.15 – 0.5</td><td>66 to 56 Note 1</td><td>56 to 46 Note 1</td></tr>
<tr><td>0.5 – 5</td><td>56</td><td>46</td></tr>
<tr><td>5 – 30</td><td>60</td><td>50</td></tr>
<tr><td colspan="3">Note 1: The limit level in dBµV decreases linearly with the logarithm of frequency.<br>Note 2: The more stringent limit applies at transition frequencies.</td></tr>
</table>
</td></tr>
<tr><td>Conducted Output Power</td><td>For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.</td></tr>
<tr><td>6dB Emission Bandwidth</td><td>The minimum 6 dB bandwidth shall be at least 500 kHz.</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>N/A</td></tr>
<tr><td>Power Spectral Density</td><td>For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.</td></tr>
<tr><td>Band-edge Emission<br><br>Conduction Spurious Emission</td><td>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).</td></tr>
<tr><td>Emissions in Restricted Frequency Bands<br><br>Emissions in Non-restricted Frequency Bands</td><td>
<table>
<tr><th rowspan="2">Frequency (MHz)</th><th colspan="2">Limit (dBµV/m)</th><th rowspan="2">Detector</th></tr>
<tr><th>@ 3m</th><th>@ 10m</th></tr>
<tr><td>30 – 88</td><td>40.0</td><td>30.0</td><td>Quasi-peak</td></tr>
<tr><td>88 – 216</td><td>43.5</td><td>33.5</td><td>Quasi-peak</td></tr>
<tr><td>216 – 960</td><td>46.0</td><td>36.0</td><td>Quasi-peak</td></tr>
<tr><td>960 – 1000</td><td>54.0</td><td>44.0</td><td>Quasi-peak</td></tr>
<tr><td colspan="4">Note: The more stringent limit applies at transition frequencies.</td></tr>
<tr><th rowspan="2">Frequency</th><th colspan="3">Limit (dBµV/m) @ 3m</th></tr>
<tr><th colspan="2">Average</th><th>Peake</th></tr>
<tr><td>Above 1 GHz</td><td colspan="2">54.0</td><td>74.0</td></tr>
<tr><td colspan="4">Note: The measurement bandwidth shall be 1 MHz or greater.</td></tr>
</table>
</td></tr>
</table>

## 5.2 Antenna requirement

| **Standard requirement:** | FCC Part 15 C Section 15.203 /247(b)(4) |
|---|---|
| **15.203 requirement:**<br>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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.<br>**15.247(b) (4) requirement:**<br>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. | |
| **E.U.T Antenna:** | |
| The BLE antenna is an Internal antenna which cannot replace by end-user, the best case gain of the antenna is 1.14 dBi. See product internal photos for details. | |

## 5.3 AC Power Line Conducted Emission

| | | | |
|---|---|---|---|
| **Product name:** | Mobile Payment Terminal | **Product model:** | S920 |
| **Test by:** | Mike | **Test mode:** | BLE Tx (LE 1M PHY) |
| **Test frequency:** | 150 kHz ~ 30 MHz | **Phase:** | Line |
| **Test voltage:** | AC 120 V/60 Hz | | |

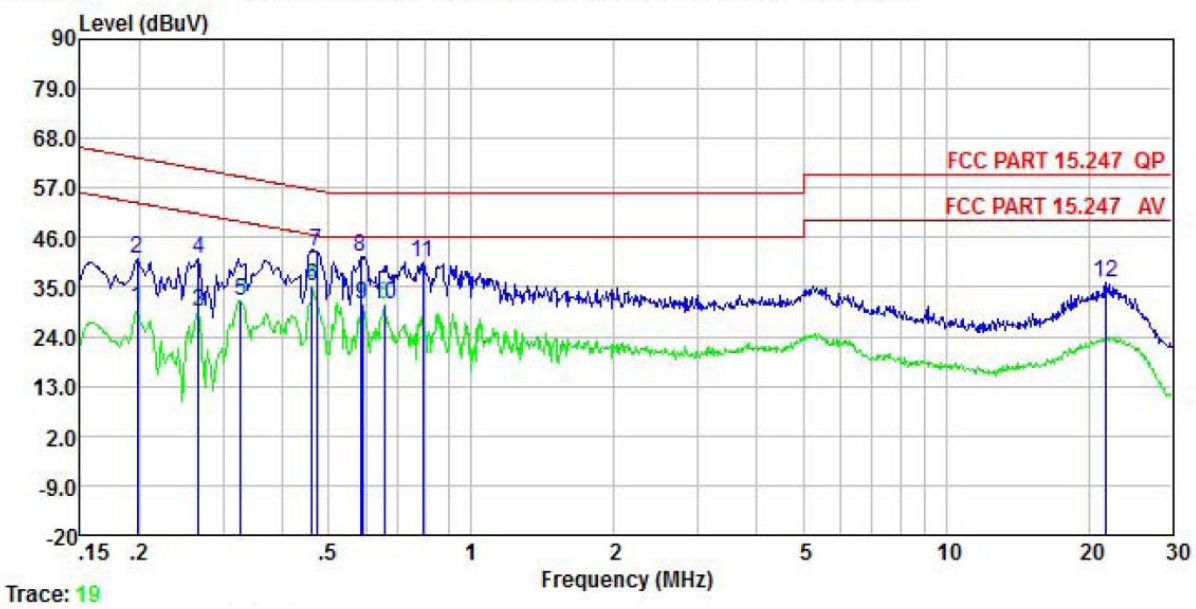



| | Freq | Read Level | LISN Factor | Cable Loss | Aux2 Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.198 | 23.62 | 0.05 | 0.04 | 10.50 | 34.21 | 53.71 | -19.50 | Average |
| 2 | 0.198 | 32.86 | 0.05 | 0.04 | 10.50 | 43.45 | 63.71 | -20.26 | QP |
| 3 | 0.262 | 20.13 | 0.06 | 0.01 | 10.50 | 30.70 | 51.38 | -20.68 | Average |
| 4 | 0.266 | 31.42 | 0.06 | 0.02 | 10.50 | 42.00 | 61.25 | -19.25 | QP |
| 5 | 0.389 | 21.75 | 0.05 | 0.04 | 10.50 | 32.34 | 48.08 | -15.74 | Average |
| 6 | 0.459 | 22.44 | 0.05 | 0.03 | 10.50 | 33.02 | 46.71 | -13.69 | Average |
| 7 | 0.914 | 23.00 | 0.07 | 0.04 | 10.50 | 33.61 | 46.00 | -12.39 | Average |
| 8 | 0.914 | 32.32 | 0.07 | 0.04 | 10.50 | 42.93 | 56.00 | -13.07 | QP |
| 9 | 1.762 | 32.42 | 0.08 | 0.18 | 10.50 | 43.18 | 56.00 | -12.82 | QP |
| 10 | 5.419 | 27.77 | 0.13 | 0.09 | 10.50 | 38.49 | 60.00 | -21.51 | QP |
| 11 | 22.896 | 19.53 | 0.36 | 0.16 | 10.50 | 30.55 | 50.00 | -19.45 | Average |
| 12 | 24.142 | 31.16 | 0.37 | 0.17 | 10.50 | 42.20 | 60.00 | -17.80 | QP |

***Remark:***

*1. Level = Read level + LISN Factor + Cable Loss.*

| Product name: | Mobile Payment Terminal | Product model: | S920 |
|---|---|---|---|
| Test by: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test frequency: | 150 kHz ~ 30 MHz | Phase: | Neutral |
| Test voltage: | AC 120 V/60 Hz | | |



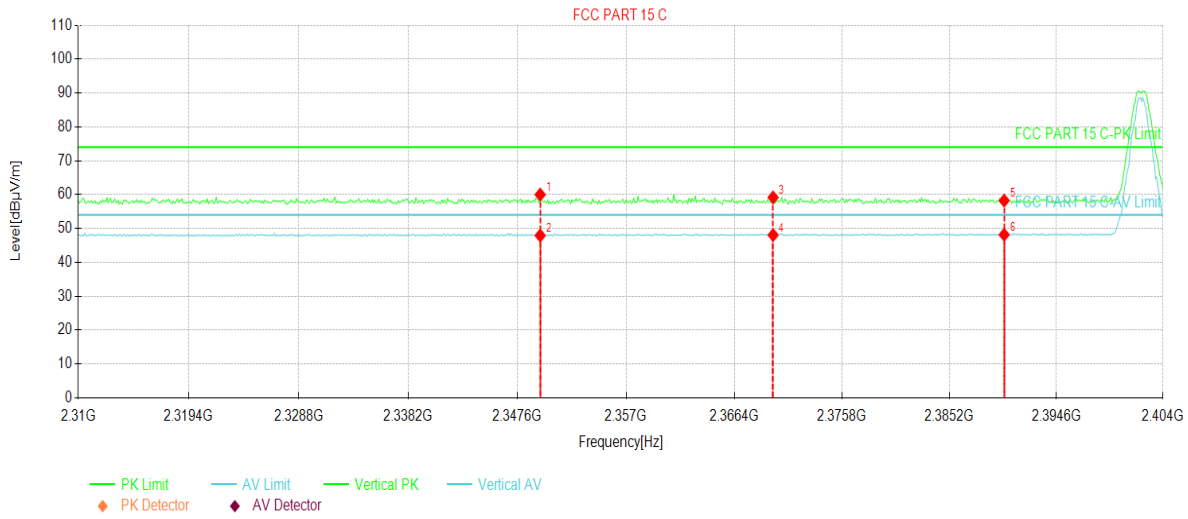

| | Freq | Read Level | LISN Factor | Cable Loss | Aux2 Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.198 | 19.56 | 0.05 | 0.04 | 10.50 | 30.15 | 53.71 | -23.56 | Average |
| 2 | 0.198 | 30.80 | 0.05 | 0.04 | 10.50 | 41.39 | 63.71 | -22.32 | QP |
| 3 | 0.266 | 18.92 | 0.05 | 0.02 | 10.50 | 29.49 | 51.25 | -21.76 | Average |
| 4 | 0.266 | 30.85 | 0.05 | 0.02 | 10.50 | 41.42 | 61.25 | -19.83 | QP |
| 5 | 0.327 | 21.47 | 0.05 | 0.02 | 10.50 | 32.04 | 49.53 | -17.49 | Average |
| 6 | 0.461 | 24.46 | 0.04 | 0.03 | 10.50 | 35.03 | 46.67 | -11.64 | Average |
| 7 | 0.471 | 32.38 | 0.04 | 0.03 | 10.50 | 42.95 | 56.49 | -13.54 | QP |
| 8 | 0.585 | 31.22 | 0.05 | 0.02 | 10.50 | 41.79 | 56.00 | -14.21 | QP |
| 9 | 0.589 | 20.72 | 0.05 | 0.02 | 10.50 | 31.29 | 46.00 | -14.71 | Average |
| 10 | 0.654 | 20.35 | 0.06 | 0.03 | 10.50 | 30.94 | 46.00 | -15.06 | Average |
| 11 | 0.792 | 30.06 | 0.06 | 0.03 | 10.50 | 40.65 | 56.00 | -15.35 | QP |
| 12 | 21.715 | 24.84 | 0.36 | 0.16 | 10.50 | 35.86 | 60.00 | -24.14 | QP |

***Remark:***

*1. Level = Read level + LISN Factor + Cable Loss.*

## 5.4 Emissions in Restricted Frequency Bands

| Product Name: | Mobile Payment Terminal | Product Model: | S920 |
|---|---|---|---|
| Test By: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test Channel: | Lowest channel | Polarization: | Vertical |
| Test Voltage: | AC 120/60Hz | | |

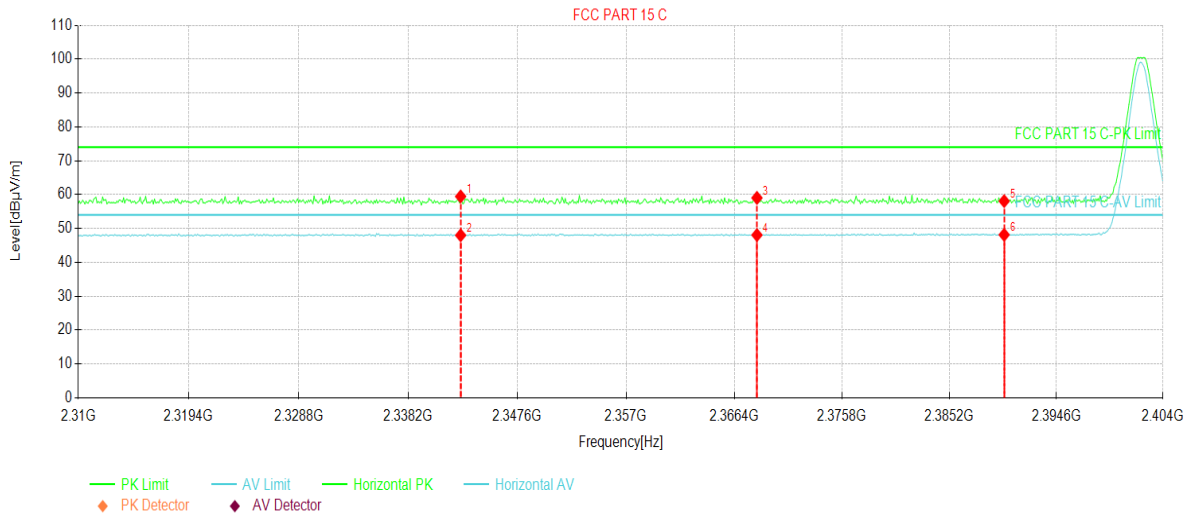



| Suspected Data List | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading [dBµV/m] | Factor [dB] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
| 1 | 2349.57 | 24.73 | 35.29 | 60.02 | 74.00 | 13.98 | PK | Vertical |
| 2 | 2349.57 | 12.64 | 35.29 | 47.93 | 54.00 | 6.07 | AV | Vertical |
| 3 | 2369.78 | 23.73 | 35.44 | 59.17 | 74.00 | 14.83 | PK | Vertical |
| 4 | 2369.78 | 12.63 | 35.44 | 48.07 | 54.00 | 5.93 | AV | Vertical |
| 5 | 2390.00 | 22.63 | 35.60 | 58.23 | 74.00 | 15.77 | PK | Vertical |
| 6 | 2390.00 | 12.56 | 35.60 | 48.16 | 54.00 | 5.84 | AV | Vertical |

***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

| Product Name: | Mobile Payment Terminal | Product Model: | S920 |
|---|---|---|---|
| Test By: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test Channel: | Lowest channel | Polarization: | Horizontal |
| Test Voltage: | AC 120/60Hz | | |



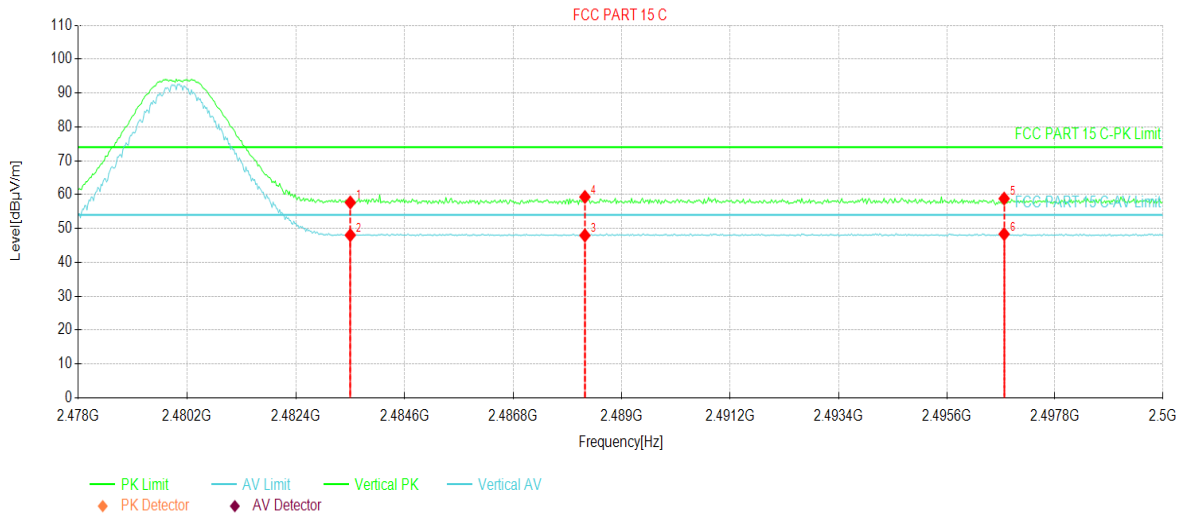

**Suspected Data List**

| NO. | Freq. [MHz] | Reading [dBµV/m] | Factor [dB] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 2342.71 | 24.23 | 35.24 | 59.47 | 74.00 | 14.53 | PK | Horizontal |
| 2 | 2342.71 | 12.76 | 35.24 | 48.00 | 54.00 | 6.00 | AV | Horizontal |
| 3 | 2368.37 | 23.61 | 35.43 | 59.04 | 74.00 | 14.96 | PK | Horizontal |
| 4 | 2368.37 | 12.65 | 35.43 | 48.08 | 54.00 | 5.92 | AV | Horizontal |
| 5 | 2390.00 | 22.49 | 35.60 | 58.09 | 74.00 | 15.91 | PK | Horizontal |
| 6 | 2390.00 | 12.55 | 35.60 | 48.15 | 54.00 | 5.85 | AV | Horizontal |

***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

| Product Name: | Mobile Payment Terminal | Product Model: | S920 |
|---|---|---|---|
| Test By: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test Channel: | Highest channel | Polarization: | Vertical |
| Test Voltage: | AC 120/60Hz | | |



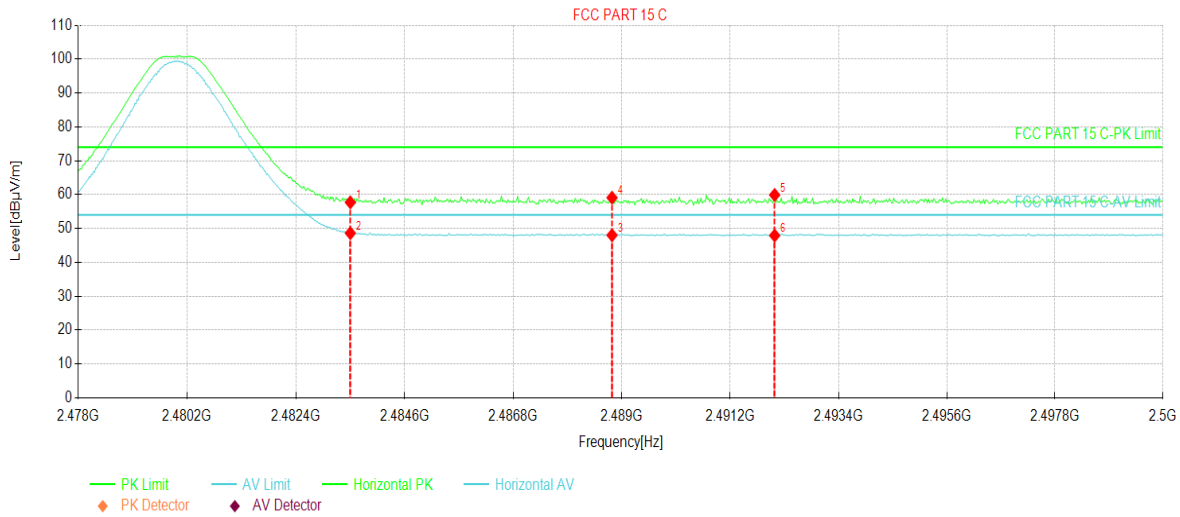

**Suspected Data List**

| NO. | Freq. [MHz] | Reading [dBµV/m] | Factor [dB] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 22.18 | 35.51 | 57.69 | 74.00 | 16.31 | PK | Vertical |
| 2 | 2483.50 | 12.52 | 35.51 | 48.03 | 54.00 | 5.97 | AV | Vertical |
| 3 | 2488.25 | 12.45 | 35.50 | 47.95 | 54.00 | 6.05 | AV | Vertical |
| 4 | 2488.25 | 23.82 | 35.50 | 59.32 | 74.00 | 14.68 | PK | Vertical |
| 5 | 2496.76 | 23.34 | 35.49 | 58.83 | 74.00 | 15.17 | PK | Vertical |
| 6 | 2496.76 | 12.86 | 35.49 | 48.35 | 54.00 | 5.65 | AV | Vertical |

***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

| Product Name: | Mobile Payment Terminal | Product Model: | S920 |
|---|---|---|---|
| Test By: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test Channel: | Highest channel | Polarization: | Horizontal |
| Test Voltage: | AC 120/60Hz | | |




**Suspected Data List**

| NO. | Freq. [MHz] | Reading [dBµV/m] | Factor [dB] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 22.21 | 35.51 | 57.72 | 74.00 | 16.28 | PK | Horizontal |
| 2 | 2483.50 | 13.12 | 35.51 | 48.63 | 54.00 | 5.37 | AV | Horizontal |
| 3 | 2488.80 | 12.51 | 35.50 | 48.01 | 54.00 | 5.99 | AV | Horizontal |
| 4 | 2488.80 | 23.59 | 35.50 | 59.09 | 74.00 | 14.91 | PK | Horizontal |
| 5 | 2492.10 | 24.40 | 35.50 | 59.90 | 74.00 | 14.10 | PK | Horizontal |
| 6 | 2492.10 | 12.44 | 35.50 | 47.94 | 54.00 | 6.06 | AV | Horizontal |

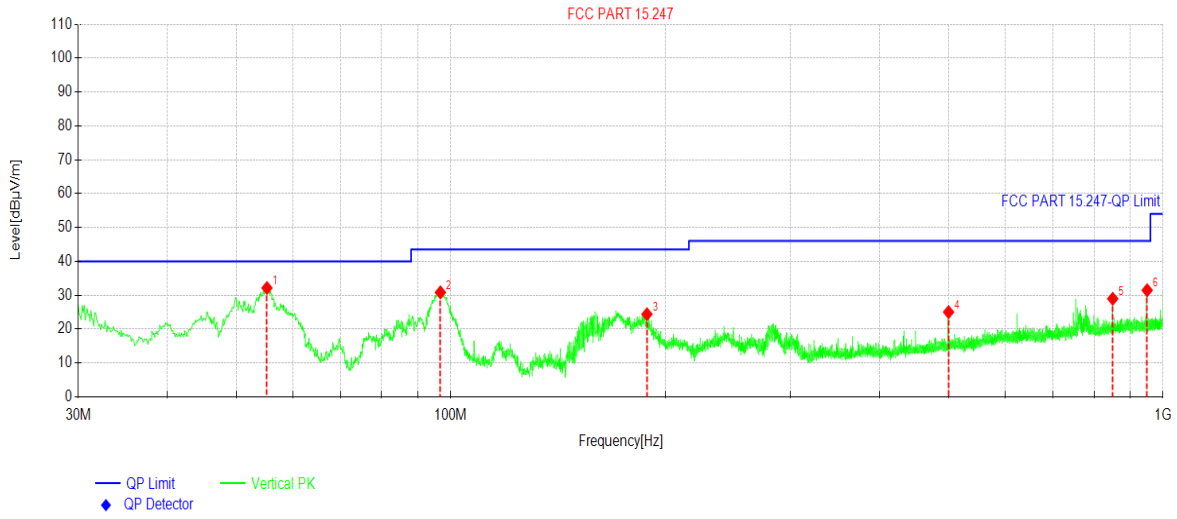
***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

## 5.5 Emissions in Non-restricted Frequency Bands

**Below 1GHz:**

| **Product Name:** | Mobile Payment Terminal | **Product Model:** | S920 |
|---|---|---|---|
| **Test By:** | Mike | **Test mode:** | BLE Tx (LE 1M PHY) |
| **Test Frequency:** | 30 MHz ~ 1 GHz | **Polarization:** | Vertical |
| **Test Voltage:** | AC 120/60Hz | | |

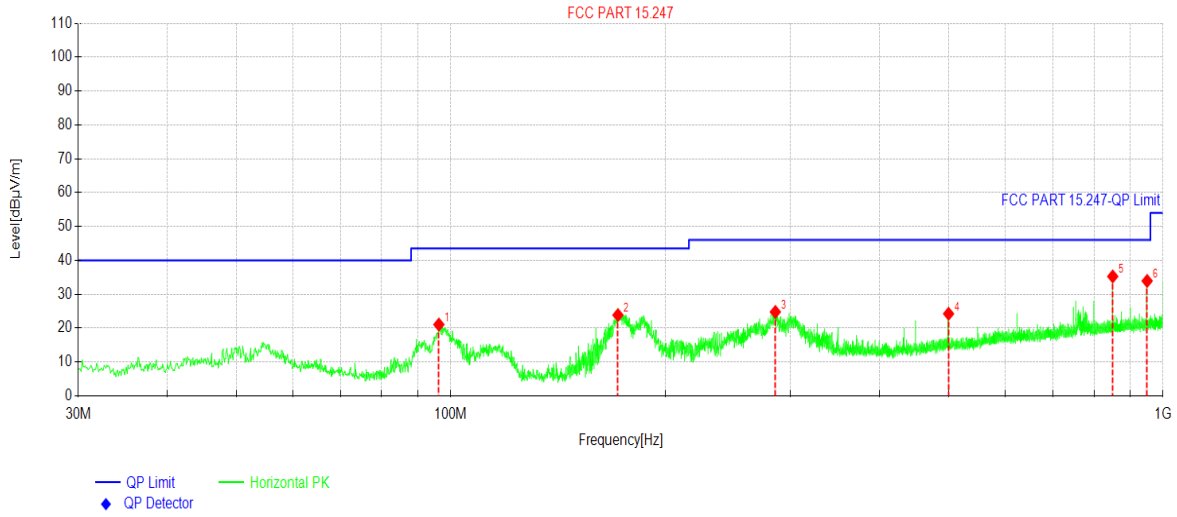



| **Suspected Data List** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | Freq. [MHz] | Reading[dBµV/m] | Level [dBµV/m] | Factor [dB] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
| 1 | 55.2225 | 45.40 | 32.15 | -13.25 | 40.00 | 7.85 | PK | Vertical |
| 2 | 96.7427 | 45.95 | 30.85 | -15.10 | 43.50 | 12.65 | PK | Vertical |
| 3 | 188.610 | 40.52 | 24.41 | -16.11 | 43.50 | 19.09 | PK | Vertical |
| 4 | 500.012 | 34.03 | 25.04 | -8.99 | 46.00 | 20.96 | PK | Vertical |
| 5 | 850.023 | 32.23 | 28.96 | -3.27 | 46.00 | 17.04 | PK | Vertical |
| 6 | 950.040 | 33.72 | 31.49 | -2.23 | 46.00 | 14.51 | PK | Vertical |

***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

| Product Name: | Mobile Payment Terminal | Product Model: | S920 |
|---|---|---|---|
| Test By: | Mike | Test mode: | BLE Tx (LE 1M PHY) |
| Test Frequency: | 30 MHz ~ 1 GHz | Polarization: | Horizontal |
| Test Voltage: | AC 120/60Hz | | |




**Suspected Data List**

| NO. | Freq. [MHz] | Reading[dBµV/m] | Level [dBµV/m] | Factor [dB] | Limit [dBµV/m] | Margin [dB] | Trace | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1 | 96.2576 | 36.22 | 21.06 | -15.16 | 43.50 | 22.44 | PK | Horizontal |
| 2 | 171.731 | 41.35 | 23.86 | -17.49 | 43.50 | 19.64 | PK | Horizontal |
| 3 | 285.620 | 38.16 | 24.79 | -13.37 | 46.00 | 21.21 | PK | Horizontal |
| 4 | 500.012 | 33.23 | 24.24 | -8.99 | 46.00 | 21.76 | PK | Horizontal |
| 5 | 850.023 | 38.52 | 35.25 | -3.27 | 46.00 | 10.75 | PK | Horizontal |
| 6 | 950.040 | 36.16 | 33.93 | -2.23 | 46.00 | 12.07 | PK | Horizontal |

***Remark:***

*1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*

**Above 1GHz:**

| BLE Tx (LE 1M PHY) | | | | | | |
|---|---|---|---|---|---|---|
| Test channel: Lowest channel | | | | | | |
| Detector: Peak Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4804.00 | 53.86 | -9.60 | 44.26 | 74.00 | 29.74 | Vertical |
| 4804.00 | 54.03 | -9.60 | 44.43 | 74.00 | 29.57 | Horizontal |
| Detector: Average Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4804.00 | 46.75 | -9.60 | 37.15 | 54.00 | 16.85 | Vertical |
| 4804.00 | 47.75 | -9.60 | 38.15 | 54.00 | 15.85 | Horizontal |
| | | | | | | |
| Test channel: Middle channel | | | | | | |
| Detector: Peak Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4884.00 | 53.40 | -9.04 | 44.36 | 74.00 | 29.64 | Vertical |
| 4884.00 | 53.97 | -9.04 | 44.93 | 74.00 | 29.07 | Horizontal |
| Detector: Average Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4884.00 | 46.47 | -9.04 | 37.43 | 54.00 | 16.57 | Vertical |
| 4884.00 | 48.15 | -9.04 | 39.11 | 54.00 | 14.89 | Horizontal |
| | | | | | | |
| Test channel: Highest channel | | | | | | |
| Detector: Peak Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4960.00 | 53.16 | -8.45 | 44.71 | 74.00 | 29.29 | Vertical |
| 4960.00 | 53.55 | -8.45 | 45.10 | 74.00 | 28.90 | Horizontal |
| Detector: Average Value | | | | | | |
| Frequency (MHz) | Read Level (dBμV) | Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Polarization |
| 4960.00 | 46.33 | -8.45 | 37.88 | 54.00 | 16.12 | Vertical |
| 4960.00 | 48.47 | -8.45 | 40.02 | 54.00 | 13.98 | Horizontal |

***Remark:***

*1. Level = Reading + Factor.*

2. *Test Frequency up to 25GHz, and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.*

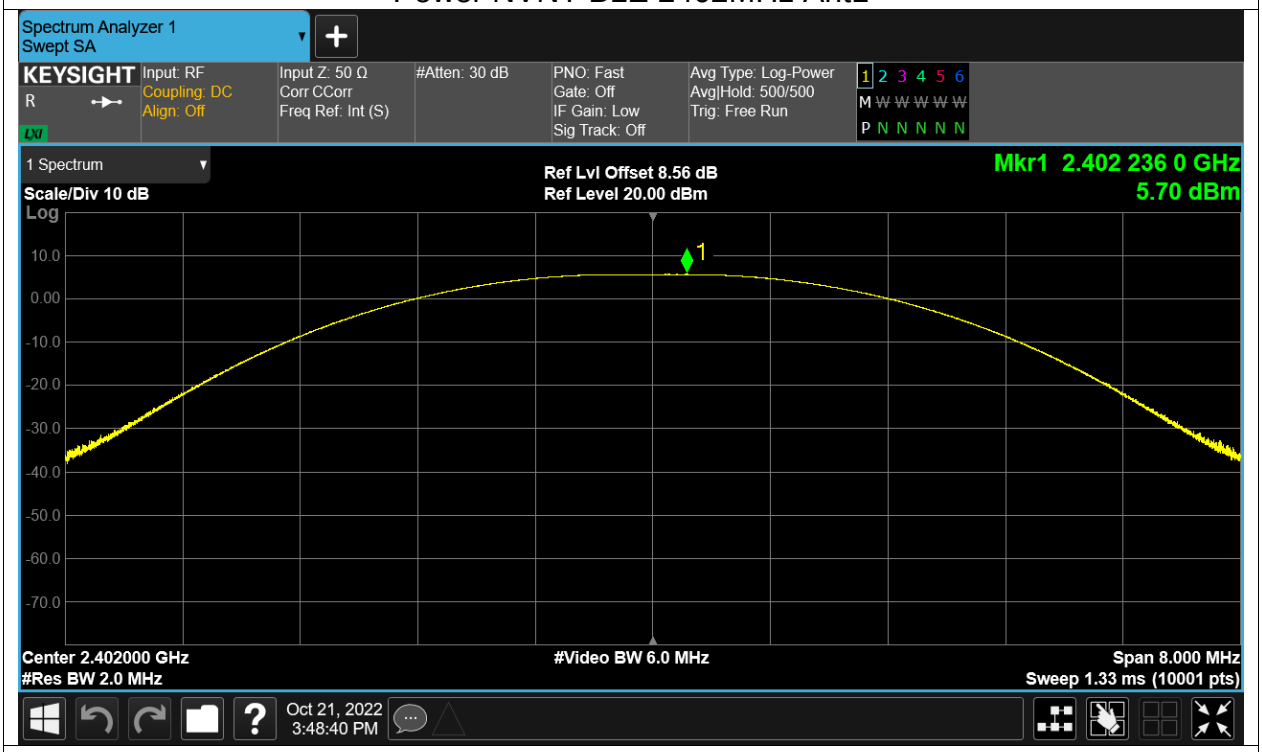
# Appendix A – BLE-1M PHY

## Maximum Conducted Output Power

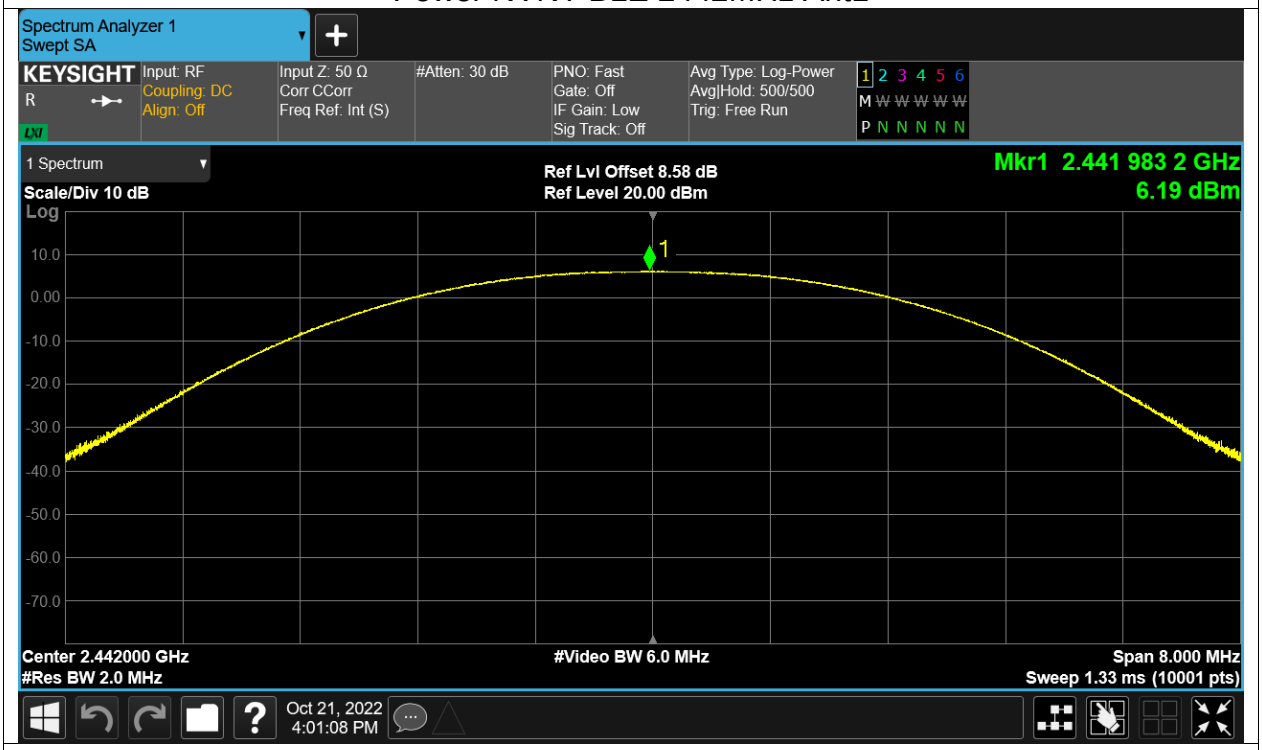
| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | 5.705 | 30 | Pass |
| NVNT | BLE | 2442 | Ant1 | 6.195 | 30 | Pass |
| NVNT | BLE | 2480 | Ant1 | 5.968 | 30 | Pass |

Test Graphs

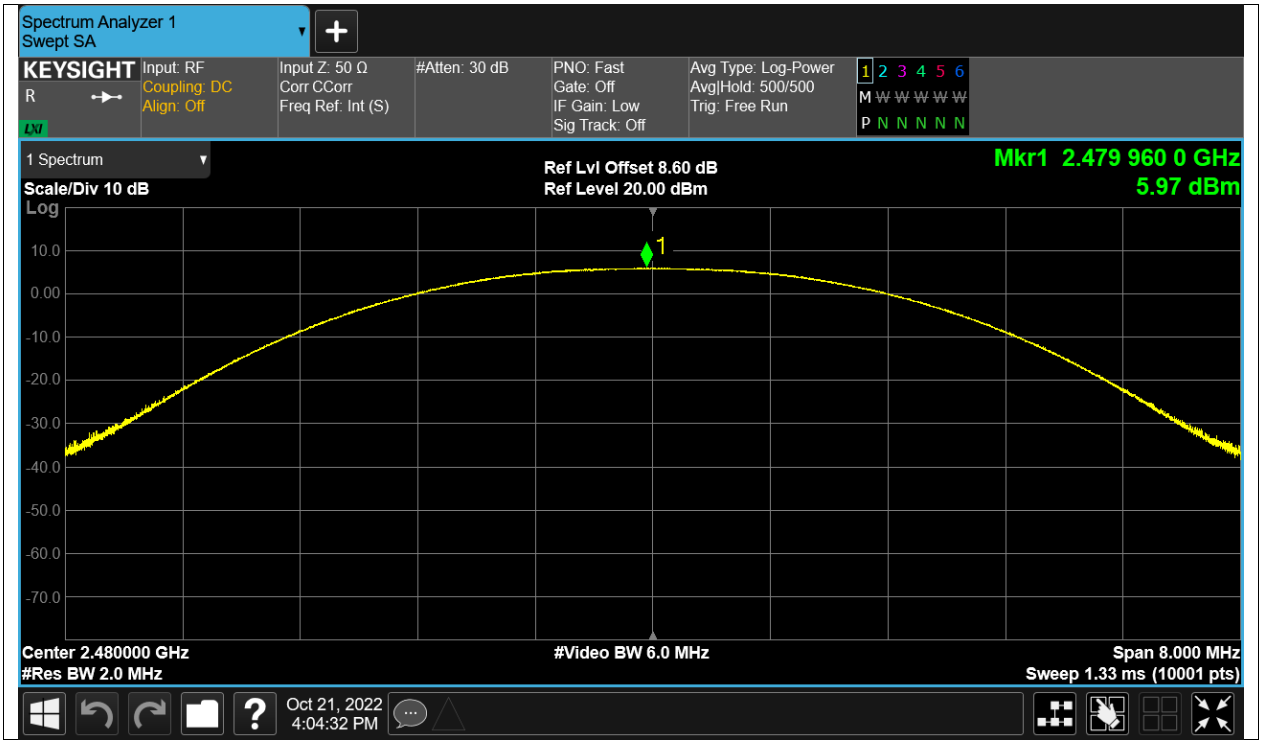
Power NVNT BLE 2402MHz Ant1




Power NVNT BLE 2442MHz Ant1




Power NVNT BLE 2480MHz Ant1


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Off
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 500/500
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Log
Ref Lvl Offset 8.60 dB
Ref Level 20.00 dBm
Mkr1 2.479 960 0 GHz
5.97 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 2.0 MHz
#Video BW 6.0 MHz
Span 8.000 MHz
Sweep 1.33 ms (10001 pts)
Oct 21, 2022
4:04:32 PM

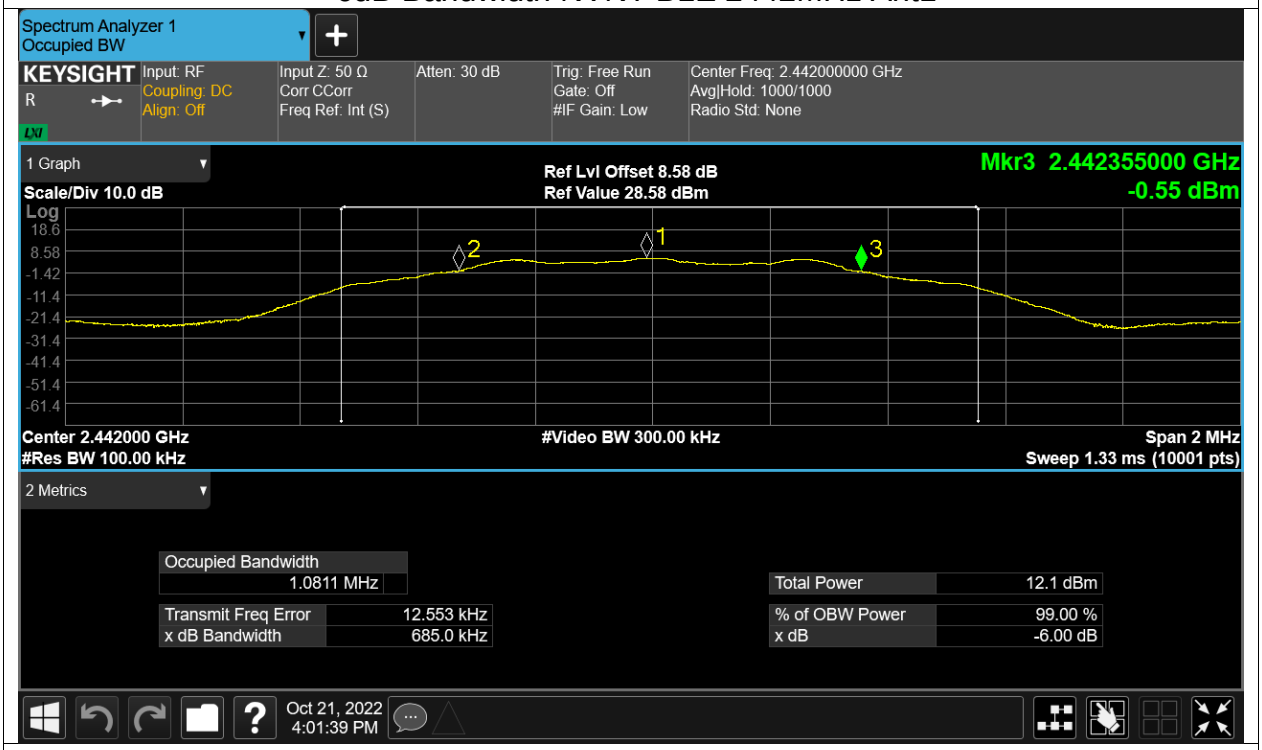
# -6dB Bandwidth

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | limit | Verdic |
|---|---|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | 0.73 | 0.5 | Pass |
| NVNT | BLE | 2442 | Ant1 | 0.685 | 0.5 | Pass |
| NVNT | BLE | 2480 | Ant1 | 0.686 | 0.5 | Pass |

Test Graphs

-6dB Bandwidth NVNT BLE 2402MHz Ant1


-6dB Bandwidth NVNT BLE 2442MHz Ant1




-6dB Bandwidth NVNT BLE 2480MHz Ant1

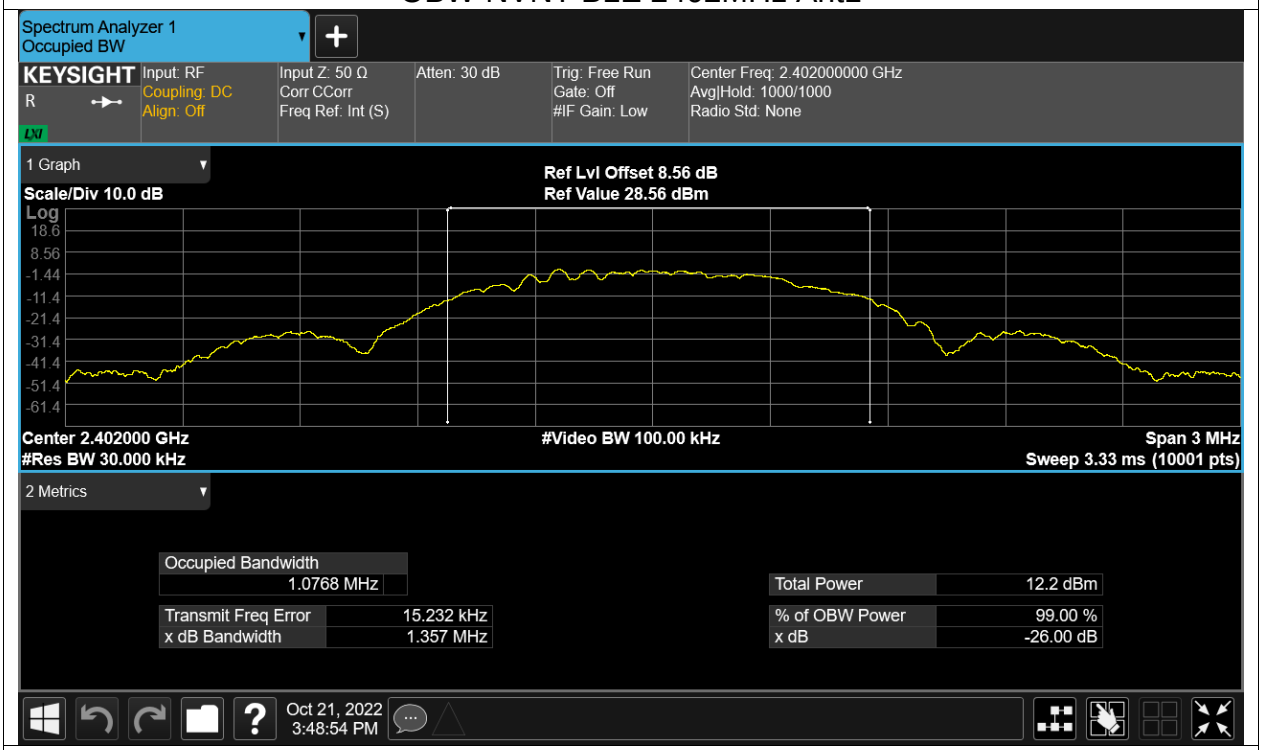

Spectrum Analyzer 1
Occupied BW
KEYSIGHT
Input: RF
Coupling: DC
Align: Off
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
Atten: 30 dB
Trig: Free Run
Gate: Off
#IF Gain: Low
Center Freq: 2.480000000 GHz
Avg|Hold: 1000/1000
Radio Std: None
1 Graph
Ref Lvl Offset 8.60 dB
Ref Value 28.60 dBm
Mkr3 2.480354000 GHz
-0.91 dBm
Scale/Div 10.0 dB
Log
18.6
8.60
-1.40
-11.4
-21.4
-31.4
-41.4
-51.4
-61.4
Center 2.480000 GHz
#Res BW 100.00 kHz
#Video BW 300.00 kHz
Span 2 MHz
Sweep 1.33 ms (10001 pts)
2 Metrics
Occupied Bandwidth
1.0802 MHz
Transmit Freq Error 11.093 kHz
x dB Bandwidth 686.2 kHz
Total Power 11.9 dBm
% of OBW Power 99.00 %
x dB -6.00 dB
Oct 21, 2022
4:04:59 PM

# Occupied Channel Bandwidth

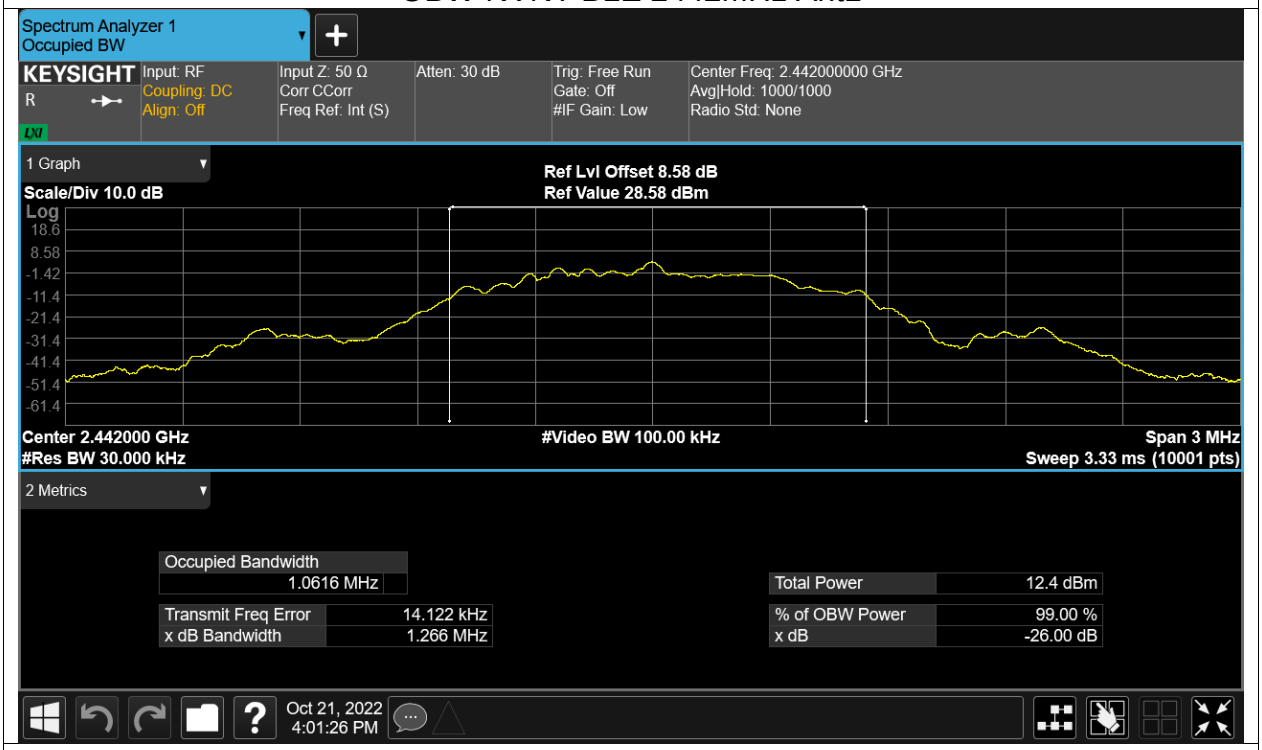
| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | 1.077 |
| NVNT | BLE | 2442 | Ant1 | 1.062 |
| NVNT | BLE | 2480 | Ant1 | 1.062 |

Test Graphs

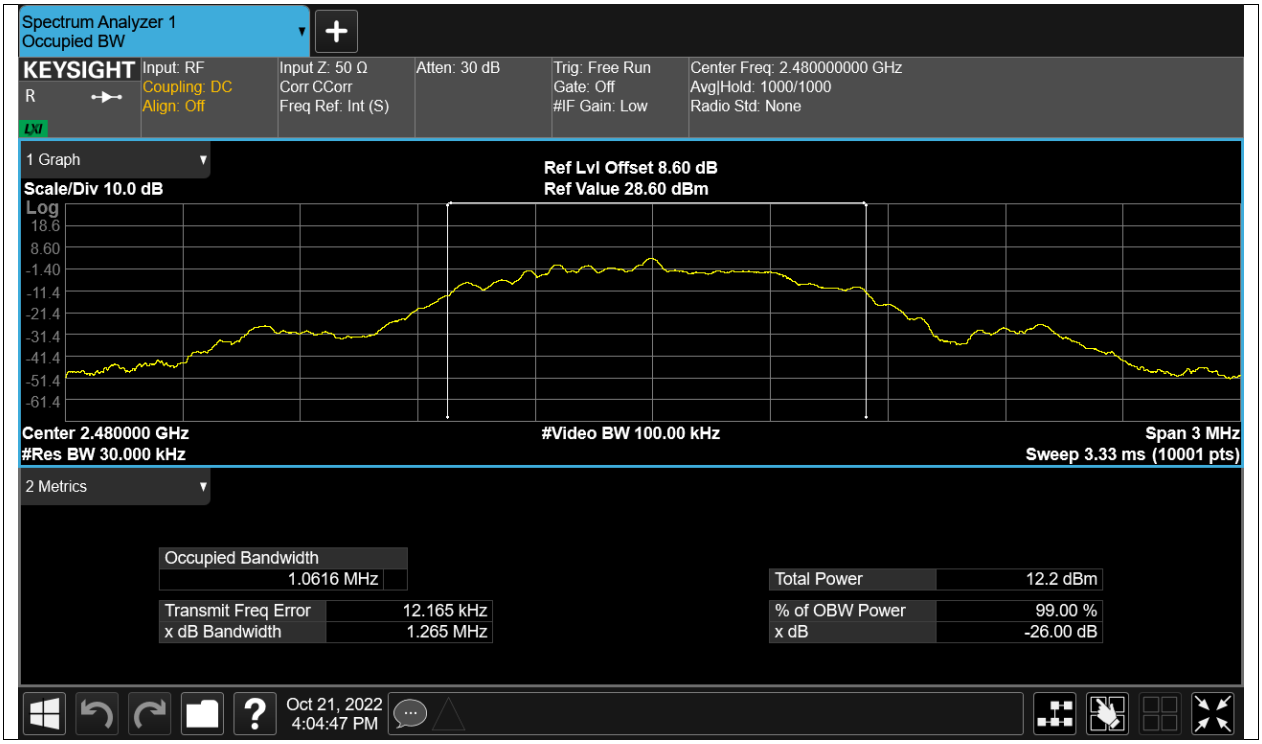
OBW NVNT BLE 2402MHz Ant1




OBW NVNT BLE 2442MHz Ant1




OBW NVNT BLE 2480MHz Ant1

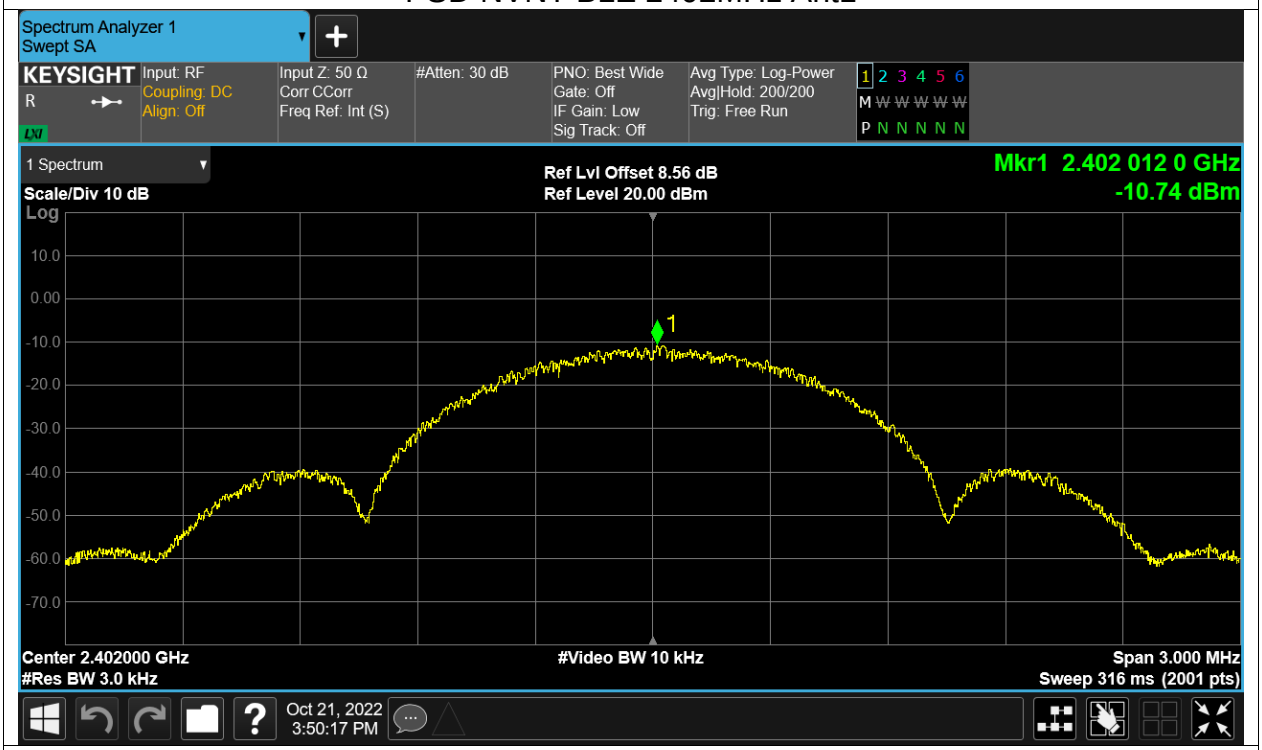

Spectrum Analyzer 1
Occupied BW
KEYSIGHT
Input: RF
Coupling: DC
Align: Off
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
Atten: 30 dB
Trig: Free Run
Gate: Off
#IF Gain: Low
Center Freq: 2.480000000 GHz
Avg|Hold: 1000/1000
Radio Std: None
1 Graph
Ref Lvl Offset 8.60 dB
Ref Value 28.60 dBm
Scale/Div 10.0 dB
Log
18.6
8.60
-1.40
-11.4
-21.4
-31.4
-41.4
-51.4
-61.4
Center 2.480000 GHz
#Res BW 30.000 kHz
#Video BW 100.00 kHz
Span 3 MHz
Sweep 3.33 ms (10001 pts)
2 Metrics
Occupied Bandwidth
1.0616 MHz
Transmit Freq Error 12.165 kHz
x dB Bandwidth 1.265 MHz
Total Power 12.2 dBm
% of OBW Power 99.00 %
x dB -26.00 dB
Oct 21, 2022
4:04:47 PM

# Maximum Power Spectral Density Level

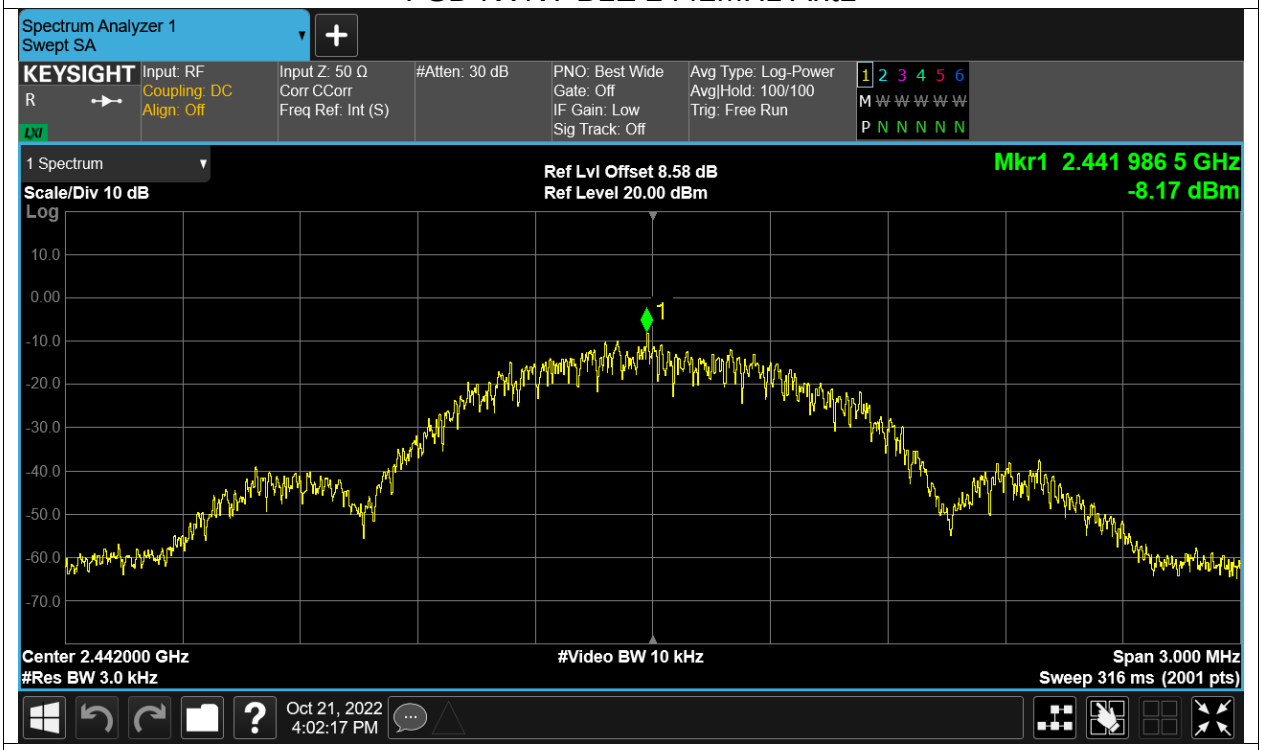
| Condition | Mode | Frequency (MHz) | Antenna | Max PSD (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | -10.744 | 8 | Pass |
| NVNT | BLE | 2442 | Ant1 | -8.174 | 8 | Pass |
| NVNT | BLE | 2480 | Ant1 | -8.449 | 8 | Pass |

Test Graphs

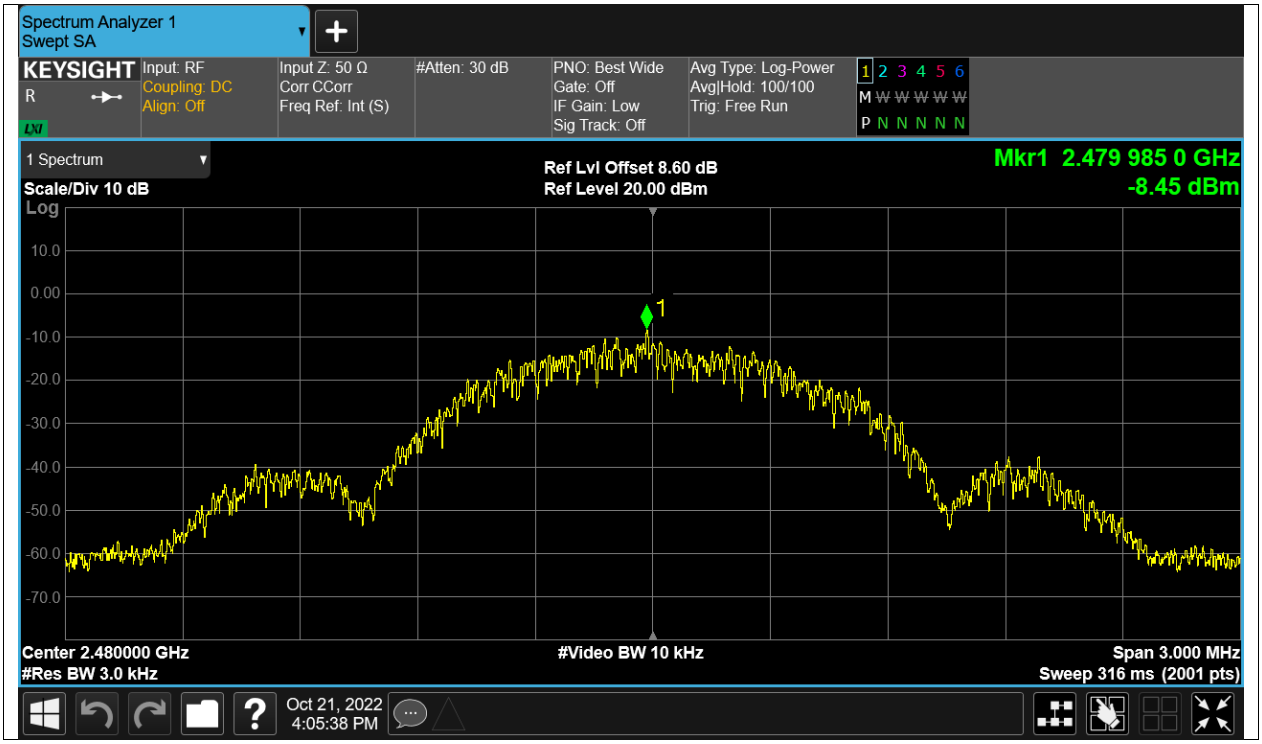
PSD NVNT BLE 2402MHz Ant1




PSD NVNT BLE 2442MHz Ant1




PSD NVNT BLE 2480MHz Ant1

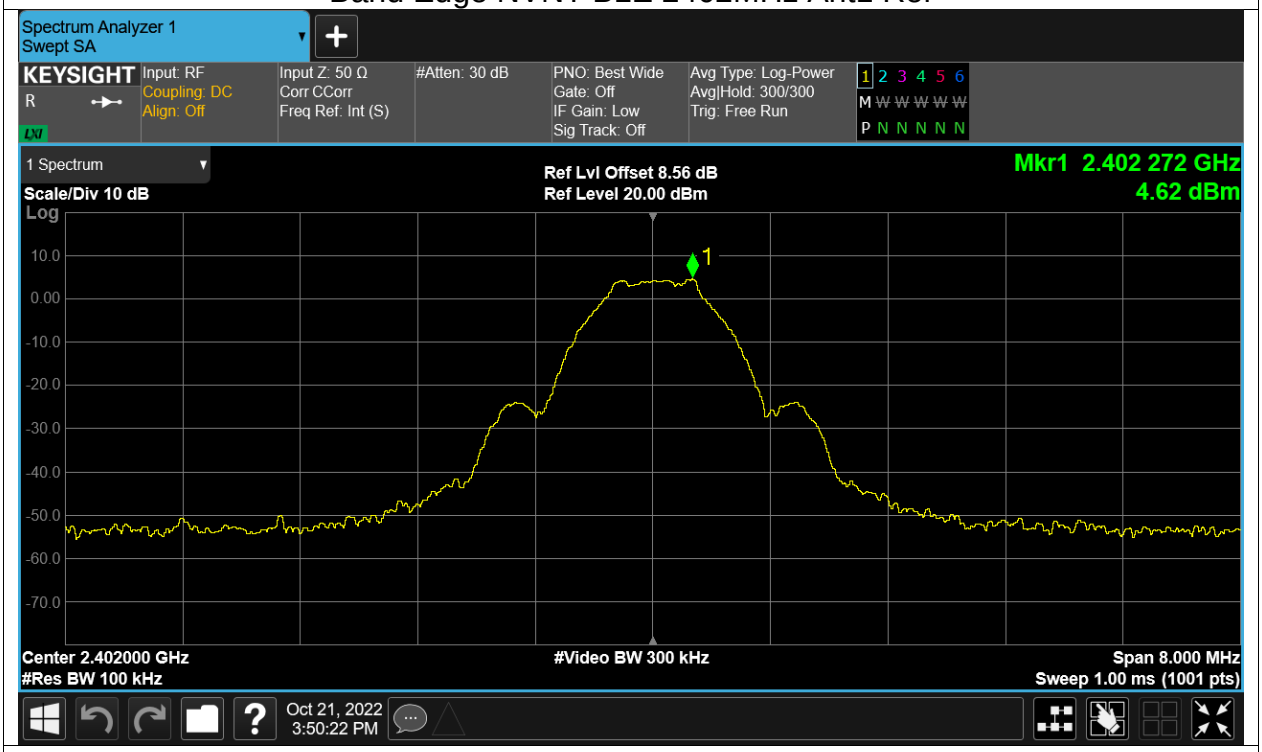

Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Off
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Log
Ref Lvl Offset 8.60 dB
Ref Level 20.00 dBm
Mkr1 2.479 985 0 GHz
-8.45 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 2.480000 GHz
#Res BW 3.0 kHz
#Video BW 10 kHz
Span 3.000 MHz
Sweep 316 ms (2001 pts)
Oct 21, 2022
4:05:38 PM

# Band Edge

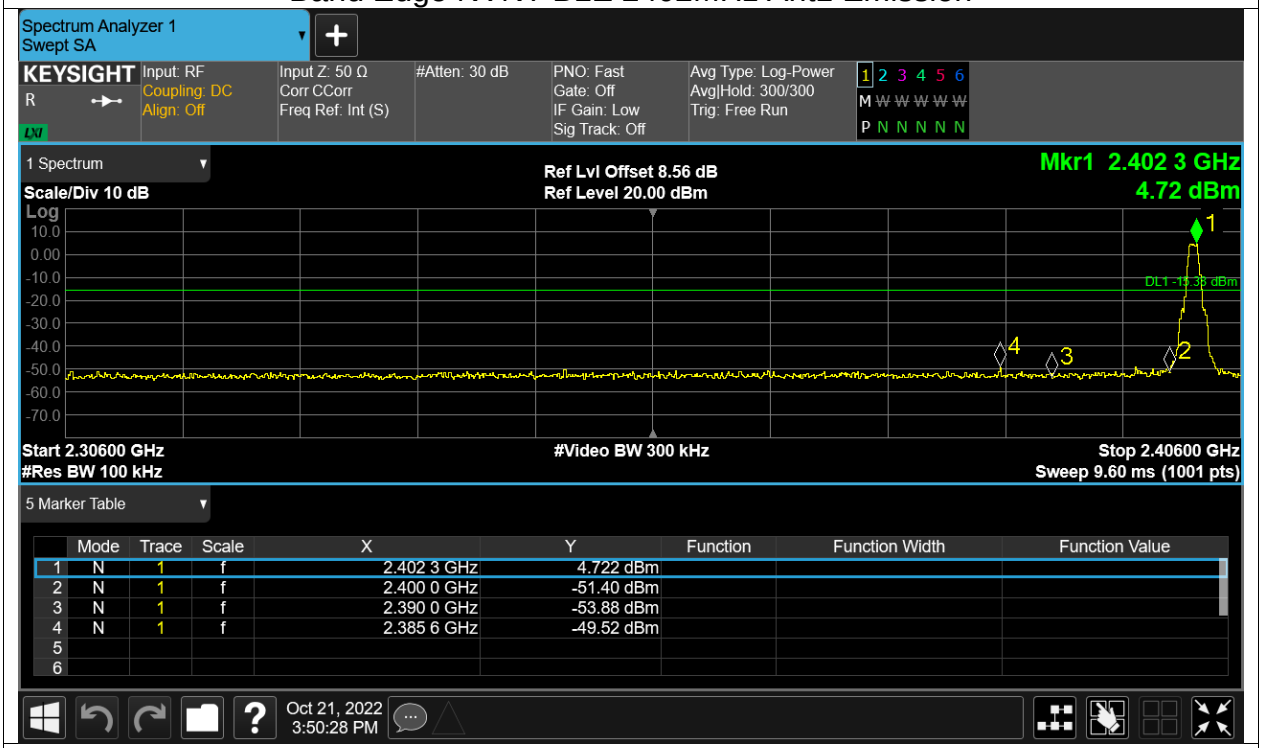
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | -54.14 | -20 | Pass |
| NVNT | BLE | 2480 | Ant1 | -54.6 | -20 | Pass |

Test Graphs

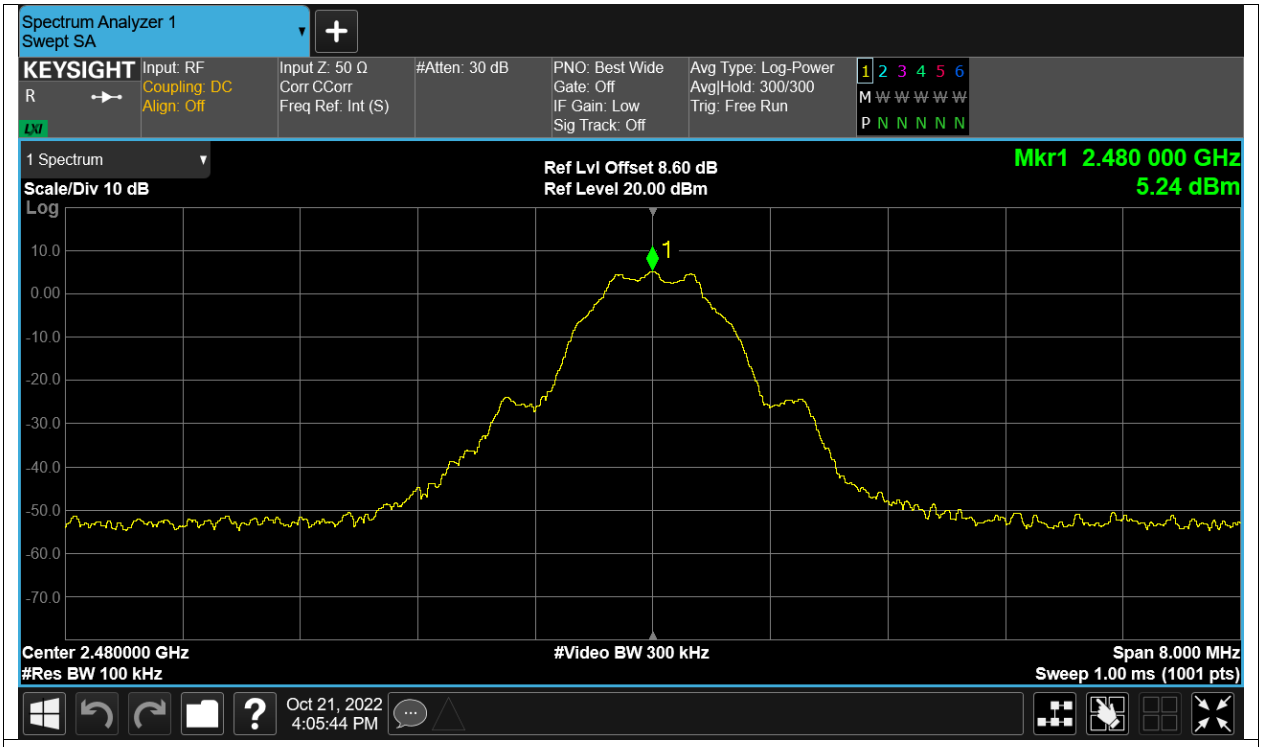
Band Edge NVNT BLE 2402MHz Ant1 Ref



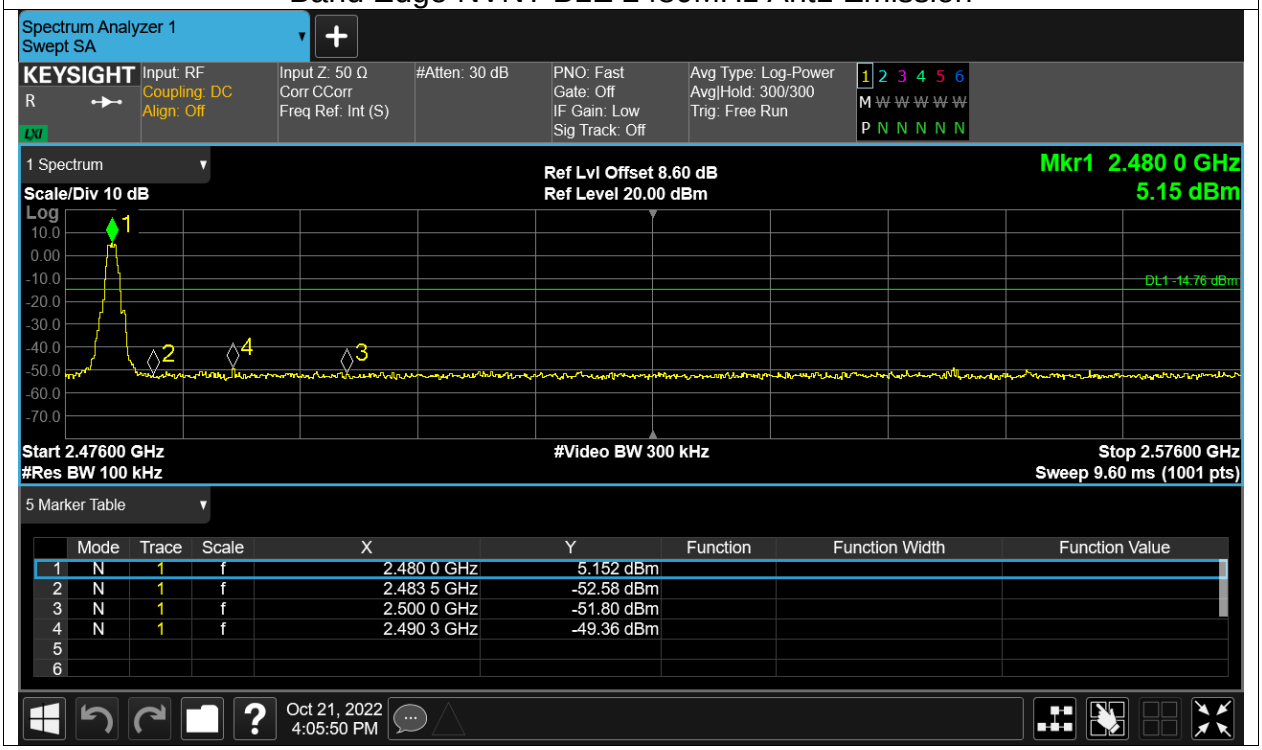

Band Edge NVNT BLE 2402MHz Ant1 Emission




Band Edge NVNT BLE 2480MHz Ant1 Ref




Band Edge NVNT BLE 2480MHz Ant1 Emission

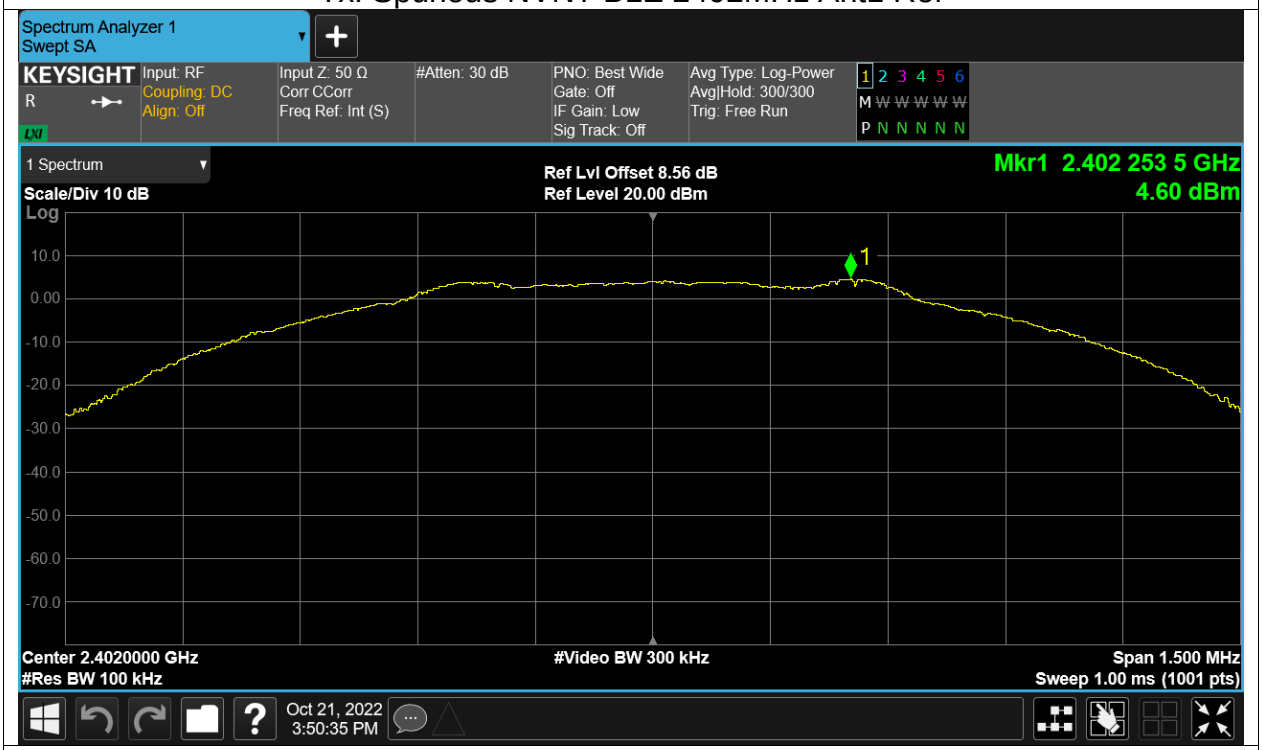


# Conducted RF Spurious Emission

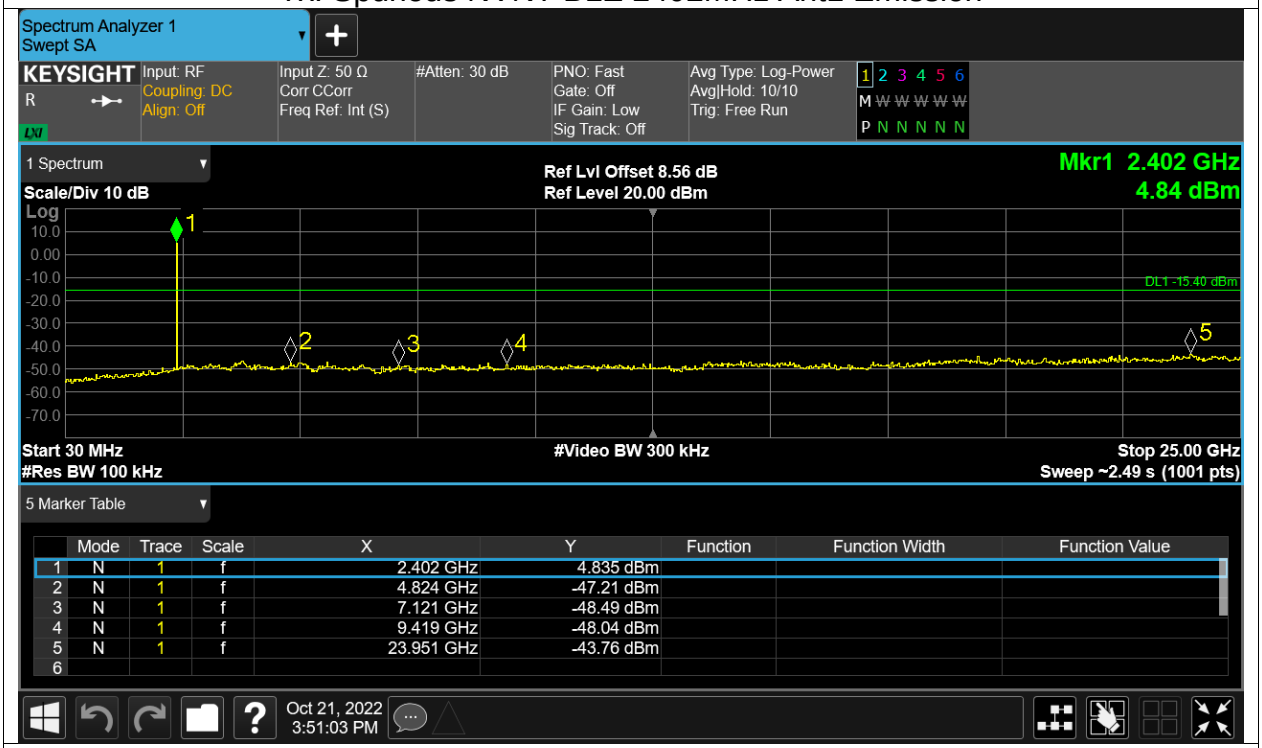
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|---|---|---|---|---|---|---|
| NVNT | BLE | 2402 | Ant1 | -48.36 | -20 | Pass |
| NVNT | BLE | 2442 | Ant1 | -47.95 | -20 | Pass |
| NVNT | BLE | 2480 | Ant1 | -48.84 | -20 | Pass |

Test Graphs

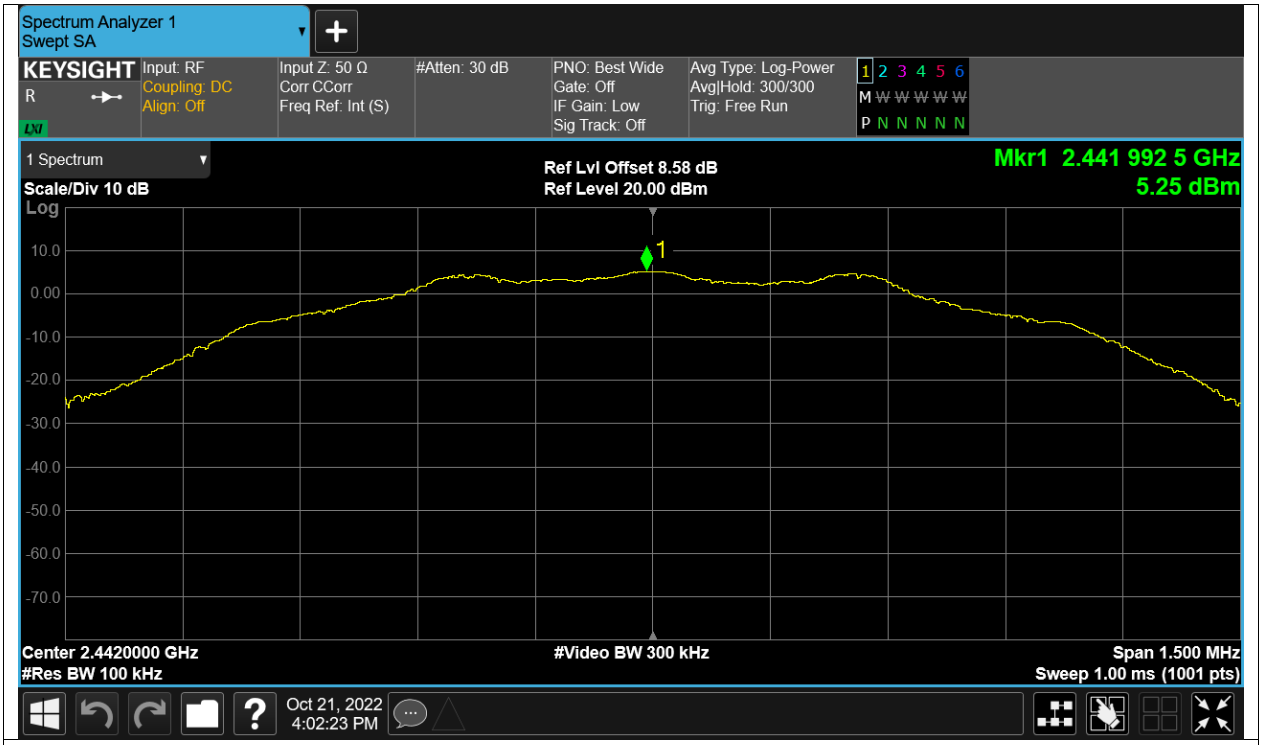
Tx. Spurious NVNT BLE 2402MHz Ant1 Ref



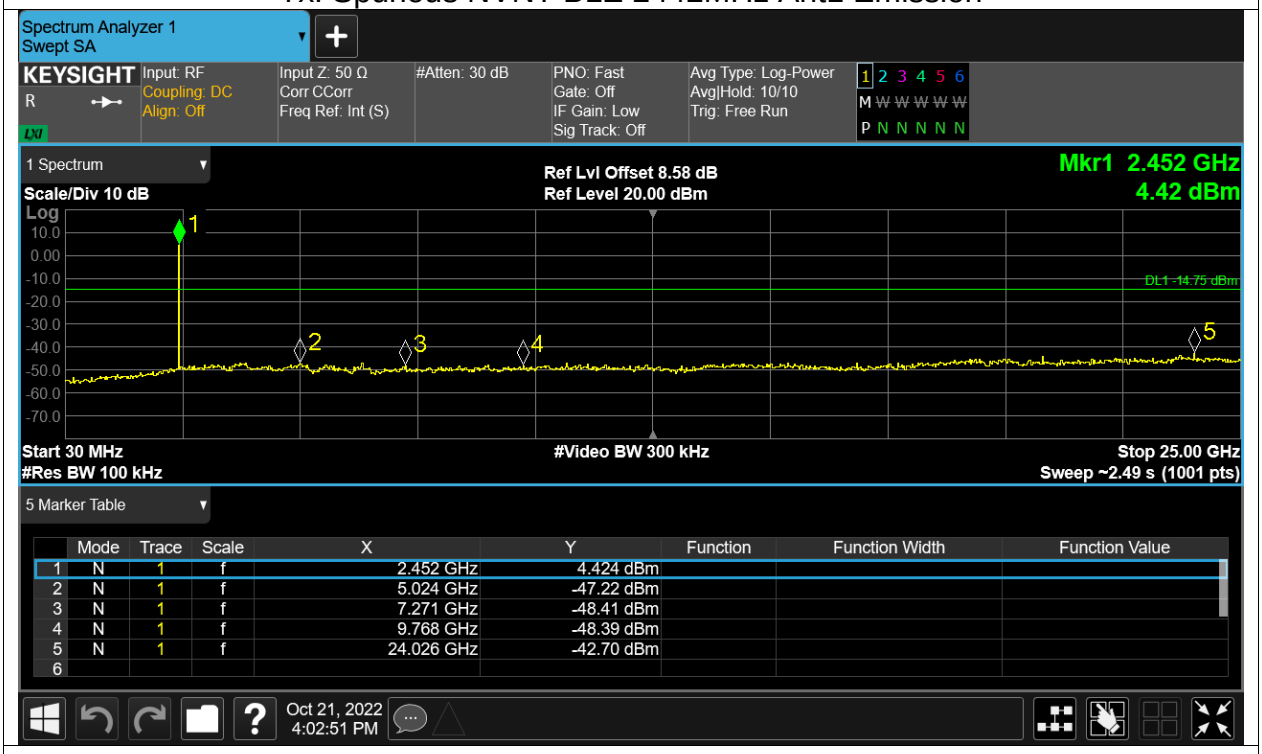

Tx. Spurious NVNT BLE 2402MHz Ant1 Emission



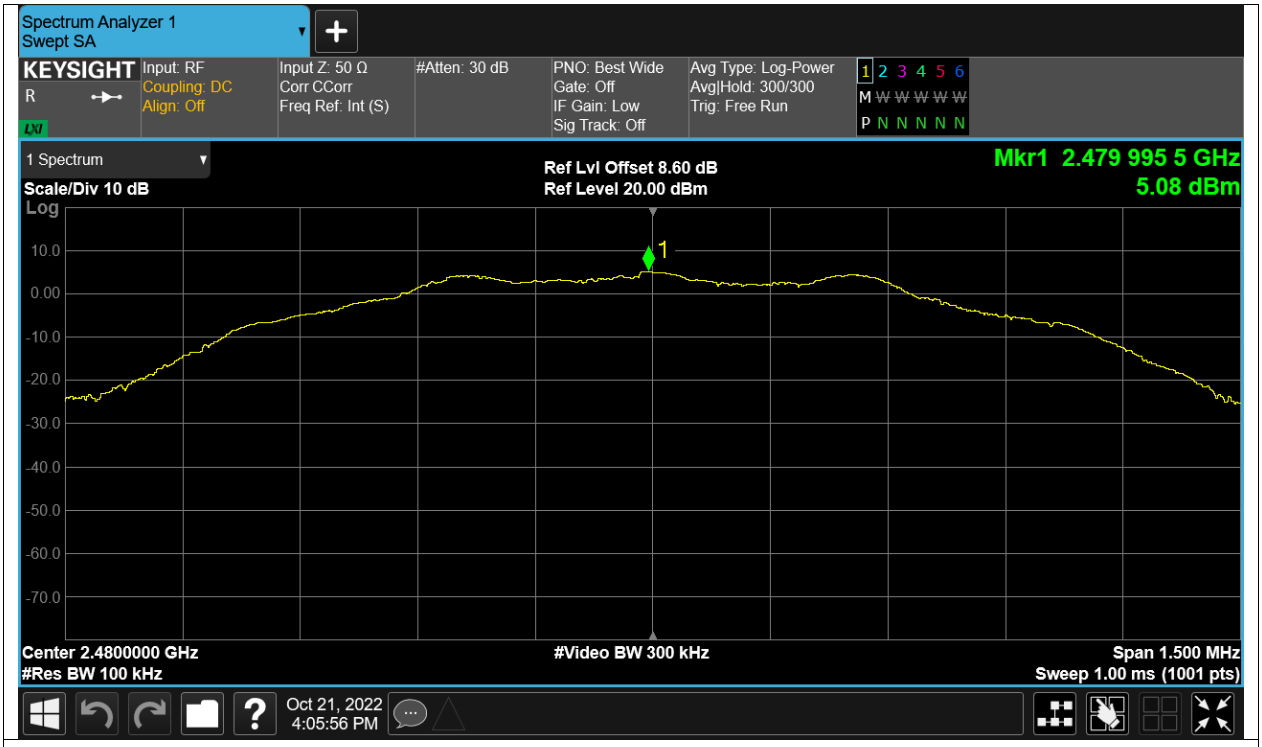

Tx. Spurious NVNT BLE 2442MHz Ant1 Ref



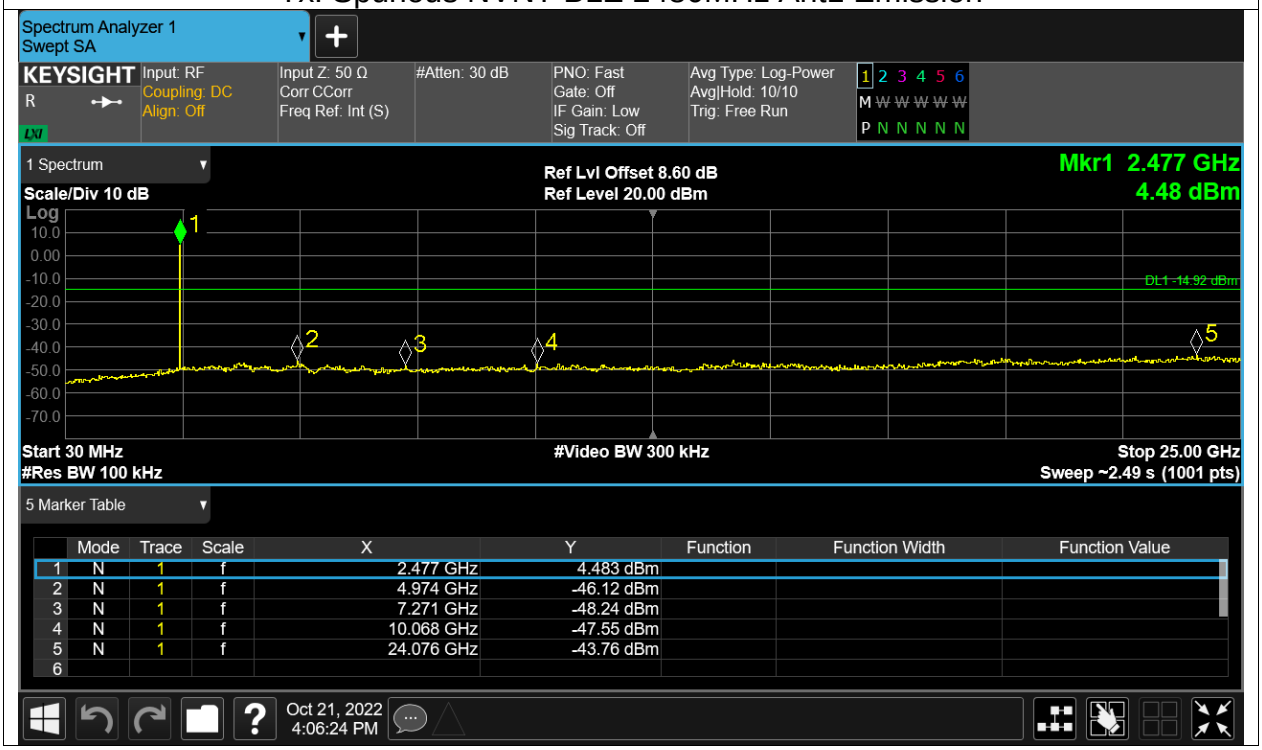

Tx. Spurious NVNT BLE 2442MHz Ant1 Emission




Tx. Spurious NVNT BLE 2480MHz Ant1 Ref




Tx. Spurious NVNT BLE 2480MHz Ant1 Emission

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