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TEST REPORT

Report No.: CQASZ20230400480E-01
Applicant: Shenzhen Piocreat 3d Technology Co., Ltd.
Address of Applicant: Room 1308, Building No. 3, Jincheng Industrial Area, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, China, 518109
Equipment Under Test (EUT):
Product: 3D Printer
Model No.: D133,D136,D150,D190
Test Model No.: D136
Brand Name: N/A
FCC ID: 2A2DOD133D136
Standards: 47 CFR Part 15, Subpart C
Date of Receipt: 2023-04-06
Date of Test: 2023-04-06 to 2023-04-23
Date of Issue: 2023-05-05
Test Result : **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By:

Lewis Zhou

(Lewis Zhou)

Reviewed By:

Timo Lei

(Timo Lei)

Approved By:

Jack Ai

(Jack Ai)



The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

1 Version

Revision History Of Report

| Report No. | Version | Description | Issue Date |
|----------------------|---------|----------------|------------|
| CQASZ20230400480E-01 | Rev.01 | Initial report | 2023-05-05 |

2 Test Summary

| Test Item | Test Requirement | Test method | Result |
|---|---------------------------|------------------|--------|
| Antenna Requirement | 47 CFR Part 15.203 | N/A | PASS |
| AC Power Line Conducted Emission | 47 CFR Part 15.207 | ANSI C63.10-2013 | PASS |
| Conducted Peak & Average Output Power | 47 CFR Part 15.247 | ANSI C63.10-2013 | PASS |
| 6dB Occupied Bandwidth | 47 CFR Part 15.247 | ANSI C63.10-2013 | PASS |
| Power Spectral Density | 47 CFR Part 15.247 | ANSI C63.10-2013 | PASS |
| Band-edge for RF Conducted Emissions | 47 CFR Part 15.247 | ANSI C63.10-2013 | PASS |
| RF Conducted Spurious Emissions | 47 CFR Part 15.247 | ANSI C63.10-2013 | PASS |
| Radiated Spurious Emissions | 47 CFR Part 15.209 | ANSI C63.10-2013 | PASS |
| Restricted bands around fundamental frequency (Radiated Emission) | 47 CFR Part 15.205/15.209 | ANSI C63.10-2013 | PASS |

Remark:

The tested sample(s) and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application

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4 General Information

4.1 Client Information

| | |
|--------------------------|--|
| Applicant: | Shenzhen Piocreat 3d Technology Co., Ltd. |
| Address of Applicant: | Room 1308, Building No. 3, Jincheng Industrial Area, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, China, 518109 |
| Manufacturer: | Shenzhen Piocreat 3d Technology Co., Ltd. |
| Address of Manufacturer: | Room 1308, Building No. 3, Jincheng Industrial Area, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, China, 518109 |
| Factory: | Shenzhen Piocreat 3d Technology Co., Ltd. |
| Address of Factory: | Room 1308, Building No. 3, Jincheng Industrial Area, Tongsheng Community, Dalang Street, Longhua District, Shenzhen, China, 518109 |

4.2 General Description of EUT

| | |
|----------------------------------|--|
| Product Name: | 3D Printer |
| Model No.: | D133,D136,D150,D190 |
| Test Model No.: | D136 |
| Trade Mark: | N/A |
| Software Version: | V1.0 |
| Hardware Version: | V1.0 |
| Power Supply: | Power supply AC 110V |
| EUT Supports Radios application: | 2.4GHz: Wi-Fi: 802.11b/g/n(HT20): 2412MHz~2462MHz |
| Simultaneous Transmission | <input type="checkbox"/> Simultaneous TX is supported and evaluated in this report. <input checked="" type="checkbox"/> Simultaneous TX is not supported. |

4.3 Product Specification subjective to this standard

| | |
|-----------------------|--|
| Operation Frequency: | IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz |
| Channel Numbers: | IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels |
| Channel Separation: | 5MHz |
| Type of Modulation: | IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Transfer Rate: | IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps |
| Product Type: | <input checked="" type="checkbox"/> Mobile <input type="checkbox"/> Portable |
| Test Software of EUT: | adb |
| Antenna Type: | FPC antenna |
| Antenna Gain: | 2.24dBi |

| Operation Frequency each of channel(802.11b/g/n HT20) | | | | | | | |
|---|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2412MHz | 4 | 2427MHz | 7 | 2442MHz | 10 | 2457MHz |
| 2 | 2417MHz | 5 | 2432MHz | 8 | 2447MHz | 11 | 2462MHz |
| 3 | 2422MHz | 6 | 2437MHz | 9 | 2452MHz | | |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

| Channel | Frequency |
|---------------------|-----------|
| The Lowest channel | 2412MHz |
| The Middle channel | 2437MHz |
| The Highest channel | 2462MHz |

Note:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.4 Test Environment and Mode

| | |
|--|---|
| Operating Environment: | |
| Radiated Emissions: | |
| Temperature: | 25.3 °C |
| Humidity: | 55 % RH |
| Atmospheric Pressure: | 1009 mbar |
| Conducted Emissions: | |
| Temperature: | 25.6 °C |
| Humidity: | 60 % RH |
| Atmospheric Pressure: | 1009 mbar |
| Radio conducted item test (RF Conducted test room): | |
| Temperature: | 25.5 °C |
| Humidity: | 52 % RH |
| Atmospheric Pressure: | 1009 mbar |
| Test mode: | |
| Transmitting mode: | EUT is set in RF test mode in all supported modulation types, bandwidth and data rate, etc. |
| Run Software: | |

```

管理员: C:\WINDOWS\system32\cmd.exe

adb get-state           - prints: offline | bootloader | device
adb get-serialno        - prints: <serial-number>
adb status-window       - continuously print device status for a specified device
adb remount             - remounts the /system partition on the device read-write
adb reboot [bootloader|recovery] - reboots the device, optionally into the bootloader or recovery program
adb reboot-bootloader   - reboots the device into the bootloader
adb root                - restarts the adbd daemon with root permissions
adb usb                 - restarts the adbd daemon listening on USB
adb tcpip <port>        - restarts the adbd daemon listening on TCP on the specified port
networking:
adb ppp <tty> [parameters] - Run PPP over USB.
Note: you should not automatically start a PPP connection.
<tty> refers to the tty for PPP stream. Eg. dev:/dev/omap_csmi_tty1
[parameters] - Eg. defaultroute debug dump local notty usepeerdns

adb sync notes: adb sync [ <directory> ]
<localdir> can be interpreted in several ways:

- If <directory> is not specified, both /system and /data partitions will be updated.

- If it is "system" or "data", only the corresponding partition
  is updated.

environmental variables:
ADB_TRACE              - Print debug information. A comma separated list of the following values
                        1 or all, adb, sockets, packets, rx, usb, sync, sysdeps, transport, jdwp
ANDROID_SERIAL         - The serial number to connect to. -s takes priority over this if given.
ANDROID_LOG_TAGS       - When used with the logcat option, only these debug tags are printed.

C:\Users\REF>AS

```

4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

| Description | Manufacturer | Model No. | Certification | Supplied by |
|-------------|--------------|-----------|---------------|-------------|
| | | | | |

2) Cable

| Cable No. | Description | Manufacturer | Cable Type/Length | Supplied by |
|-----------|-------------|--------------|-------------------|-------------|
| / | / | / | / | / |

4.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

4.7 Test Facility

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

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen 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. Registration No.:522263

4.8 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

| No. | Item | Uncertainty | Notes |
|-----|------------------------------------|--------------------|-------|
| 1 | Radiated Emission (Below 1GHz) | 5.12dB | (1) |
| 2 | Radiated Emission (Above 1GHz) | 4.60dB | (1) |
| 3 | Conducted Disturbance (0.15~30MHz) | 3.34dB | (1) |
| 4 | Radio Frequency | 3×10^{-8} | (1) |
| 5 | Duty cycle | 0.6 %. | (1) |
| 6 | Occupied Bandwidth | 1.1% | (1) |
| 7 | RF conducted power | 0.86dB | (1) |
| 8 | RF power density | 0.74 | (1) |
| 9 | Conducted Spurious emissions | 0.86dB | (1) |
| 10 | Temperature test | 0.8℃ | (1) |
| 11 | Humidity test | 2.0% | (1) |
| 12 | Supply voltages | 0.5 %. | (1) |
| 13 | Frequency Error | 5.5 Hz | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4.9 Deviation from Standards

None.

4.10 Abnormalities from Standard Conditions

None.

4.11 Other Information Requested by the Customer

None.

4.12 Equipment List


| Test Equipment | Manufacturer | Model No. | Instrument No. | Calibration Date | Calibration Due Date |
|---|--------------|------------------------|----------------|------------------|----------------------|
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2022/09/09 | 2023/09/08 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2022/09/09 | 2023/09/08 |
| Spectrum analyzer | R&S | FSU40 | CQA-075 | 2022/09/09 | 2023/09/08 |
| Preamplifier | MITEQ | AFS4-00010300-18-10P-4 | CQA-035 | 2022/09/09 | 2023/09/08 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2022/09/09 | 2023/09/08 |
| Preamplifier | EMCI | EMC184055SE | CQA-089 | 2022/09/09 | 2023/09/08 |
| Loop antenna | Schwarzbeck | FMZB1516 | CQA-060 | 2021/09/16 | 2024/09/15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | CQA-088 | 2021/09/16 | 2024/09/15 |
| Coaxial Cable (Above 1GHz) | CQA | N/A | C007 | 2022/09/09 | 2023/09/08 |
| Coaxial Cable (Below 1GHz) | CQA | N/A | C013 | 2022/09/09 | 2023/09/08 |
| RF cable(9KHz~40GHz) | CQA | RF-01 | CQA-079 | 2022/09/09 | 2023/09/08 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2022/09/09 | 2023/09/08 |
| Power Sensor | KEYSIGHT | U2021XA | CQA-30 | 2022/09/09 | 2023/09/08 |
| N1918A Power Analysis Manager Power Panel | Agilent | N1918A | CQA-074 | 2022/09/09 | 2023/09/08 |
| Power meter | R&S | NRVD | CQA-029 | 2022/09/09 | 2023/09/08 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2022/09/09 | 2023/09/08 |
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2022/09/09 | 2023/09/08 |
| LISN | R&S | ENV216 | CQA-003 | 2022/09/09 | 2023/09/08 |
| Coaxial cable | CQA | N/A | CQA-C009 | 2022/09/09 | 2023/09/08 |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2022/09/09 | 2023/09/08 |

Test software:

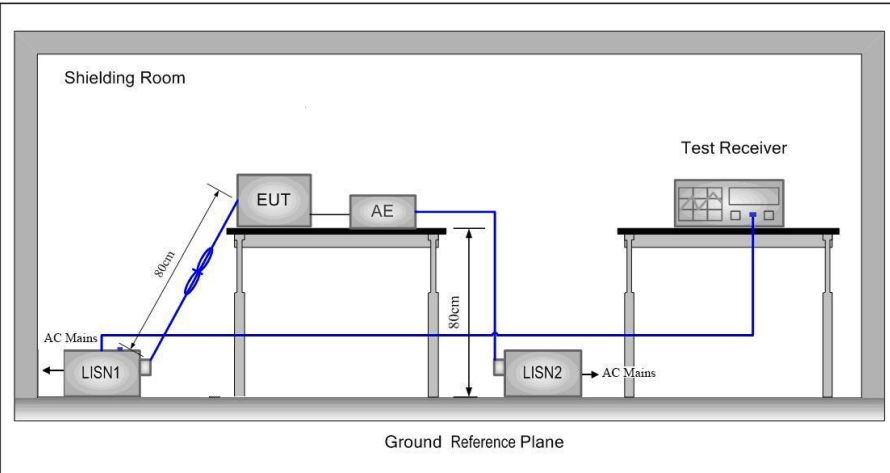
| | Manufacturer | Software brand |
|-----------------------------------|--------------|----------------|
| Radiated Emissions test software | Tonscend | JS1120-3 |
| Conducted Emissions test software | Audix | e3 |
| RF Conducted test software | Audix | e3 |

5 Test results and Measurement Data

5.1 Antenna Requirement

| | |
|--|---|
| Standard requirement: | 47 CFR Part 15C Section 15.203 /247(c) |
| <p>15.203 requirement: 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.</p> <p>15.247(b) (4) requirement: 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.</p> | |
| EUT Antenna: |  |
| <p>The antenna is FPC antenna.</p> <p>The connection/connection type between the antenna to the EUT's antenna port is:Removable .</p> <p>This is either permanently attachment or a unique coupling that satisfies the requirement.</p> | |

5.2 Conducted Emissions

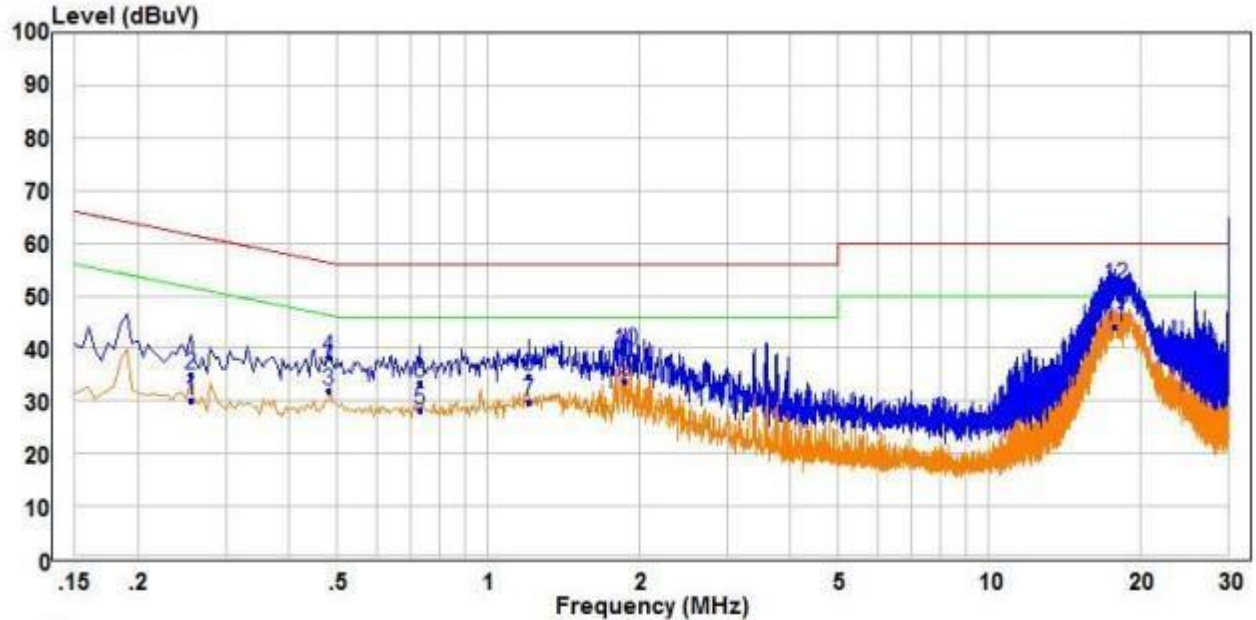
| | | | |
|-----------------------|---|--------------|-----------|
| Test Requirement: | 47 CFR Part 15C Section 15.207 | | |
| Test Method: | ANSI C63.10: 2013 | | |
| Test Frequency Range: | 150kHz to 30MHz | | |
| Limit: | Frequency range (MHz) | Limit (dBuV) | |
| | | Quasi-peak | Average |
| | 0.15-0.5 | 66 to 56* | 56 to 46* |
| | 0.5-5 | 56 | 46 |
| | 5-30 | 60 | 50 |
| | * Decreases with the logarithm of the frequency. | | |
| Test Procedure: | <ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) 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: 2013 on conducted measurement. | | |
| Test Setup: |  | | |

| | |
|------------------------|--|
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. |
| Final Test Mode: | Through Pre-scan, find the 1Mbps of rate of 802.11b at middle channel is the worst case. Only the worst case is recorded in the report. |
| Test Voltage: | AC120V/60Hz |
| Test Results: | Pass |

Measurement Data

1#

Live Line:

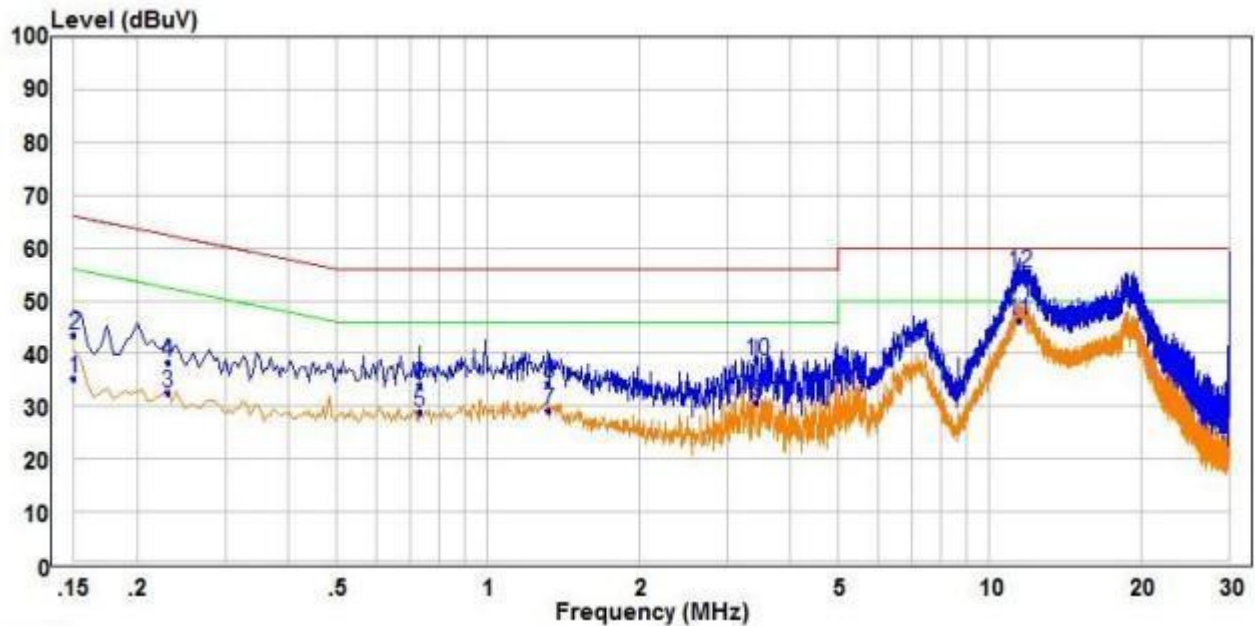


| | Freq | Read | | Limit | Over | | |
|-------|--------|-------|--------|-------|-------|--------|-----------|
| | MHz | Level | Factor | Level | Line | Limit | Remark |
| | | dBuV | dB | dBuV | dBuV | dB | Pol/Phase |
| 1 | 0.255 | 20.54 | 9.54 | 30.08 | 51.59 | -21.51 | Average |
| 2 | 0.255 | 25.58 | 9.54 | 35.12 | 61.59 | -26.47 | QP |
| 3 | 0.480 | 22.28 | 9.68 | 31.96 | 46.34 | -14.38 | Average |
| 4 | 0.480 | 28.54 | 9.68 | 38.22 | 56.34 | -18.12 | QP |
| 5 | 0.730 | 18.30 | 9.88 | 28.18 | 46.00 | -17.82 | Average |
| 6 | 0.730 | 23.47 | 9.88 | 33.35 | 56.00 | -22.65 | QP |
| 7 | 1.205 | 19.60 | 10.22 | 29.82 | 46.00 | -16.18 | Average |
| 8 | 1.205 | 24.44 | 10.22 | 34.66 | 56.00 | -21.34 | QP |
| 9 | 1.880 | 22.29 | 11.47 | 33.76 | 46.00 | -12.24 | Average |
| 10 | 1.880 | 28.14 | 11.47 | 39.61 | 56.00 | -16.39 | QP |
| 11 PP | 17.840 | 34.36 | 9.79 | 44.15 | 50.00 | -5.85 | Average |
| 12 QP | 17.840 | 42.17 | 9.79 | 51.96 | 60.00 | -8.04 | QP |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral Line:



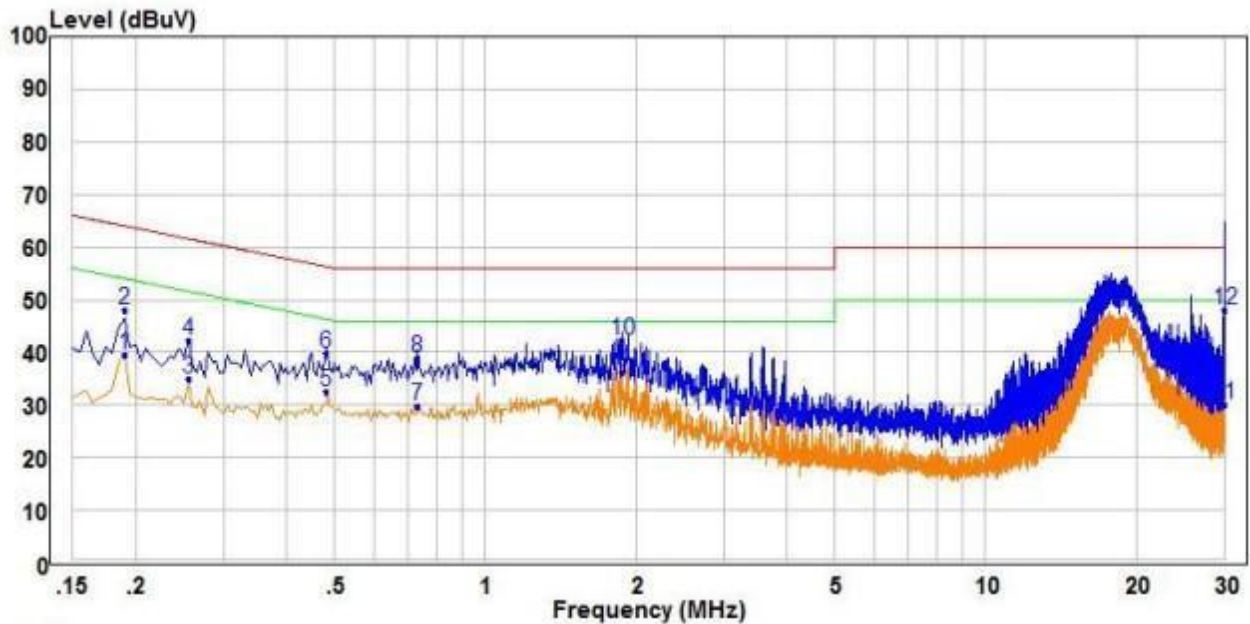
| | Freq | Read | | Limit | Over | | |
|-------|--------|-------|--------|-------|-------|--------|---------|
| | MHz | Level | Factor | Level | Line | Limit | Remark |
| | MHz | dBuV | dB | dBuV | dBuV | dB | |
| 1 | 0.150 | 25.65 | 9.70 | 35.35 | 56.00 | -20.65 | Average |
| 2 | 0.150 | 33.65 | 9.70 | 43.35 | 66.00 | -22.65 | QP |
| 3 | 0.230 | 22.88 | 9.56 | 32.44 | 52.45 | -20.01 | Average |
| 4 | 0.230 | 28.87 | 9.56 | 38.43 | 62.45 | -24.02 | QP |
| 5 | 0.730 | 19.16 | 9.88 | 29.04 | 46.00 | -16.96 | Average |
| 6 | 0.730 | 24.09 | 9.88 | 33.97 | 56.00 | -22.03 | QP |
| 7 | 1.320 | 19.44 | 9.72 | 29.16 | 46.00 | -16.84 | Average |
| 8 | 1.320 | 24.78 | 9.72 | 34.50 | 56.00 | -21.50 | QP |
| 9 | 3.440 | 20.81 | 9.77 | 30.58 | 46.00 | -15.42 | Average |
| 10 | 3.440 | 28.72 | 9.77 | 38.49 | 56.00 | -17.51 | QP |
| 11 PP | 11.475 | 36.44 | 9.85 | 46.29 | 50.00 | -3.71 | Average |
| 12 QP | 11.475 | 45.36 | 9.85 | 55.21 | 60.00 | -4.79 | QP |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

2#

Live Line:

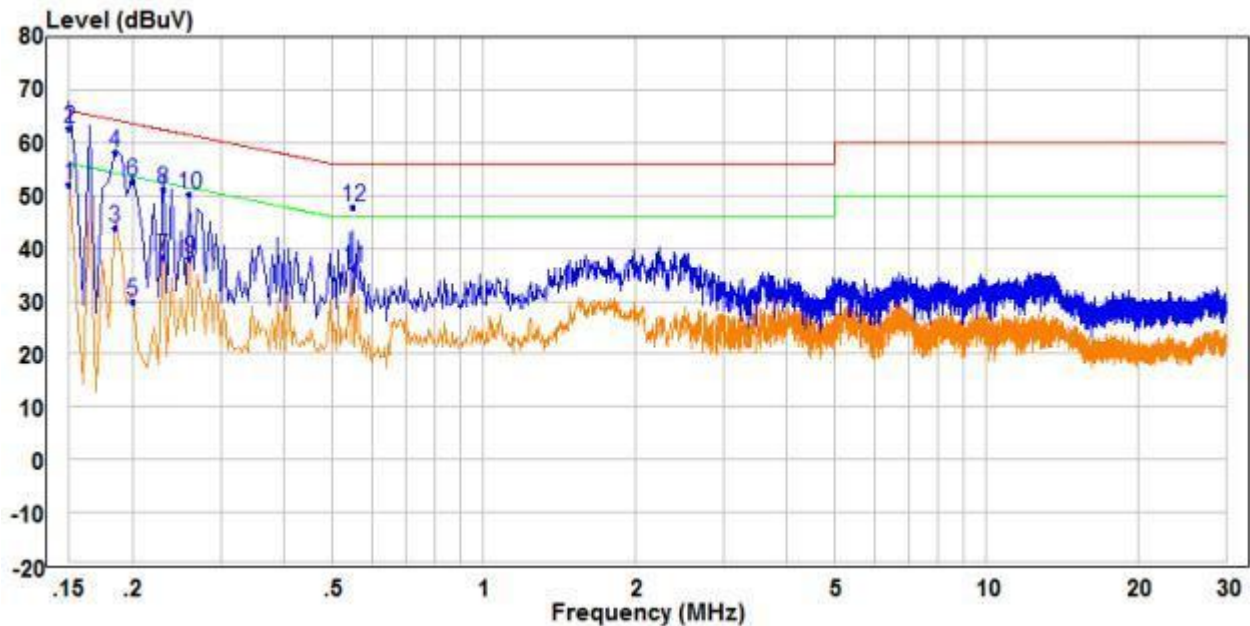


| | Freq | Read | Factor | Level | Limit | Over | Remark | Pol/Phase |
|-------|--------|-------|--------|-------|-------|--------|---------|-----------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | 0.190 | 29.85 | 9.63 | 39.48 | 54.04 | -14.56 | Average | Line |
| 2 | 0.190 | 38.34 | 9.63 | 47.97 | 64.04 | -16.07 | QP | Line |
| 3 | 0.255 | 25.36 | 9.54 | 34.90 | 51.59 | -16.69 | Average | Line |
| 4 | 0.255 | 32.83 | 9.54 | 42.37 | 61.59 | -19.22 | QP | Line |
| 5 | 0.480 | 22.75 | 9.68 | 32.43 | 46.34 | -13.91 | Average | Line |
| 6 | 0.480 | 30.29 | 9.68 | 39.97 | 56.34 | -16.37 | QP | Line |
| 7 | 0.730 | 19.84 | 9.88 | 29.72 | 46.00 | -16.28 | Average | Line |
| 8 | 0.730 | 28.89 | 9.88 | 38.77 | 56.00 | -17.23 | QP | Line |
| 9 PP | 1.880 | 24.67 | 11.47 | 36.14 | 46.00 | -9.86 | Average | Line |
| 10 | 1.880 | 30.76 | 11.47 | 42.23 | 56.00 | -13.77 | QP | Line |
| 11 | 30.000 | 20.07 | 10.12 | 30.19 | 50.00 | -19.81 | Average | Line |
| 12 QP | 30.000 | 37.97 | 10.12 | 48.09 | 60.00 | -11.91 | QP | Line |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral Line:

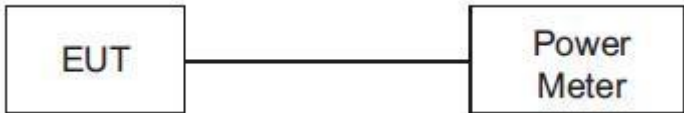
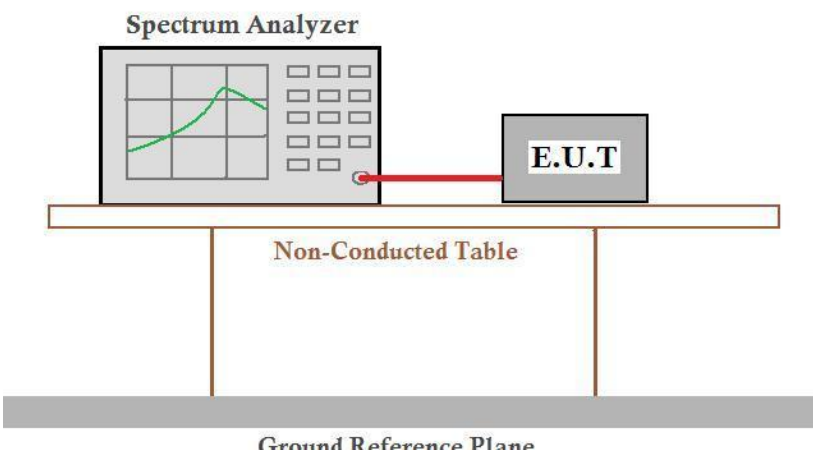


| | | Read | | Limit | Over | | |
|----|------|-------|--------|-------|-------|-------|----------------|
| | Freq | Level | Factor | Level | Line | Limit | Remark |
| | MHz | dBuV | dB | dBuV | dBuV | dB | Pol/Phase |
| 1 | AV | 0.150 | 42.40 | 9.70 | 52.10 | 56.00 | -3.90 Average |
| 2 | PP | 0.150 | 53.11 | 9.70 | 62.81 | 66.00 | -3.19 QP |
| 3 | | 0.185 | 34.32 | 9.63 | 43.95 | 54.26 | -10.31 Average |
| 4 | | 0.185 | 48.52 | 9.63 | 58.15 | 64.26 | -6.11 QP |
| 5 | | 0.200 | 20.26 | 9.61 | 29.87 | 53.61 | -23.74 Average |
| 6 | | 0.200 | 42.97 | 9.61 | 52.58 | 63.61 | -11.03 QP |
| 7 | | 0.230 | 28.88 | 9.56 | 38.44 | 52.45 | -14.01 Average |
| 8 | | 0.230 | 41.70 | 9.56 | 51.26 | 62.45 | -11.19 QP |
| 9 | | 0.260 | 28.44 | 9.53 | 37.97 | 51.43 | -13.46 Average |
| 10 | | 0.260 | 40.71 | 9.53 | 50.24 | 61.43 | -11.19 QP |
| 11 | | 0.550 | 26.47 | 9.75 | 36.22 | 46.00 | -9.78 Average |
| 12 | | 0.550 | 38.08 | 9.75 | 47.83 | 56.00 | -8.17 QP |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

5.3 Conducted Peak & Average Output Power

| | |
|------------------------|--|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (b)(3) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: | <p><i>Setup for Power meter measurement method</i></p>  <p><i>Setup for Spectrum analyser measurement method</i></p>  |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Only the worst case is recorded in the report. |
| Limit: | 30dBm |
| Test Results: | Pass |

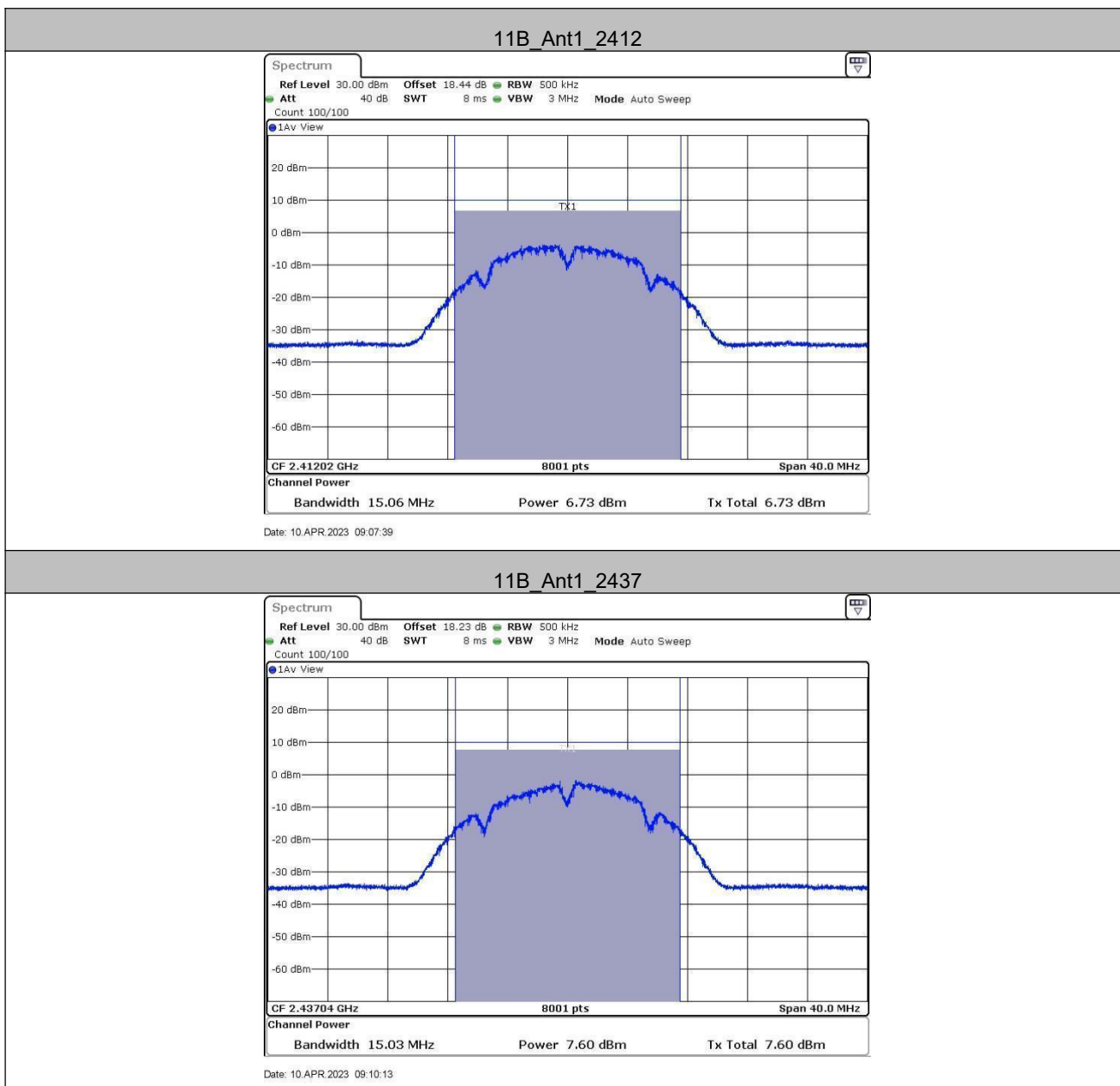
Test Result

| Test Mode | Antenna | Frequency [MHz] | Measured Result[dBm] | Limit[dBm] | Verdict |
|-----------|---------|--------------------|-------------------------|------------|---------|
| 11B | Ant1 | 2412 | 6.73 | ≤30 | PASS |
| | | 2437 | 7.60 | ≤30 | PASS |
| | | 2462 | 7.78 | ≤30 | PASS |
| 11G | Ant1 | 2412 | 2.85 | ≤30 | PASS |
| | | 2437 | 3.47 | ≤30 | PASS |
| | | 2462 | 3.81 | ≤30 | PASS |
| 11N20SISO | Ant1 | 2412 | 2.54 | ≤30 | PASS |
| | | 2437 | 3.67 | ≤30 | PASS |
| | | 2462 | 4.01 | ≤30 | PASS |

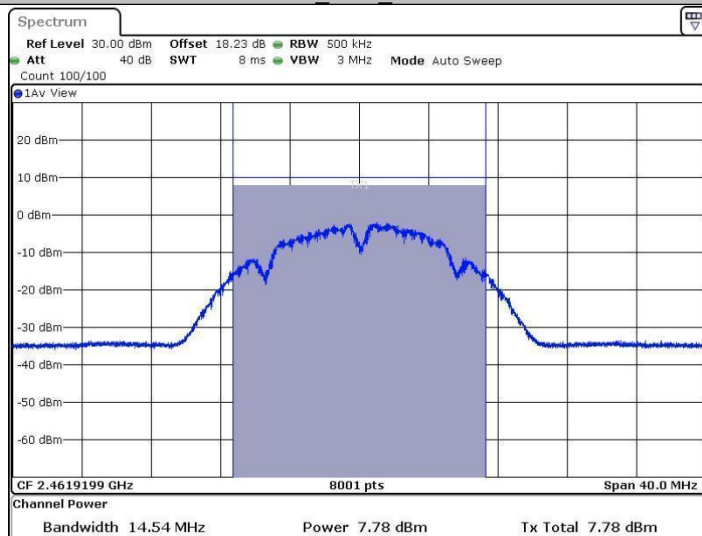
Note:

When Duty cycle >98%, D.C.F is not required.

Test Graphs

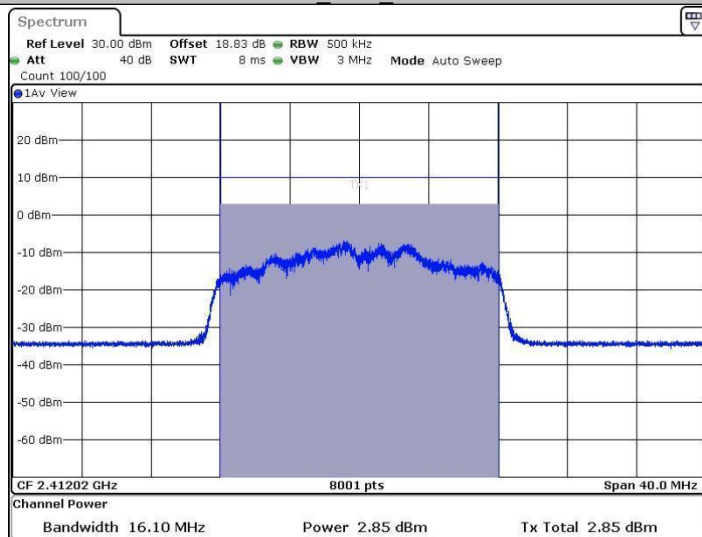


11B_Ant1_2462

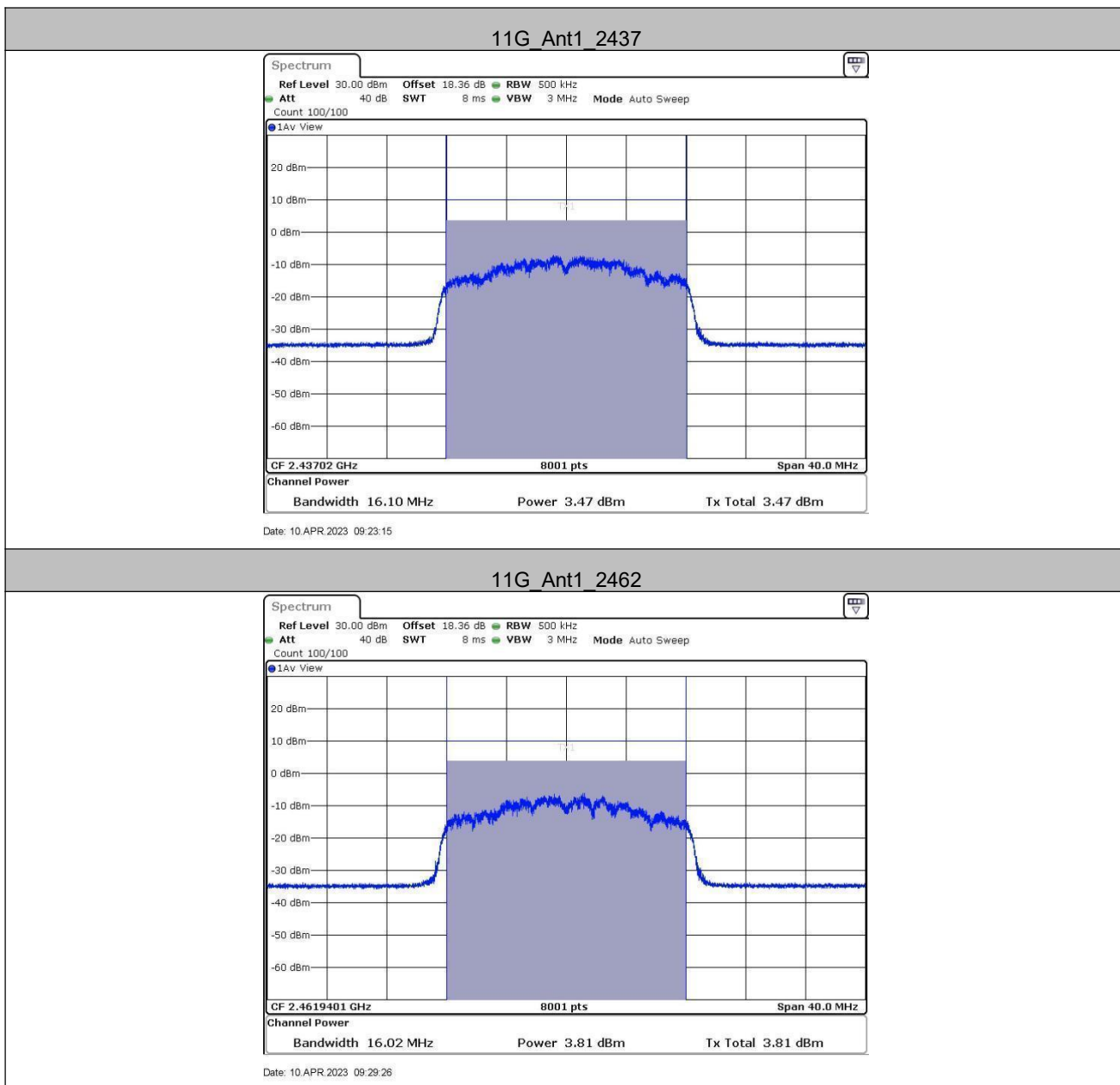


Date: 10 APR 2023 09:11:46

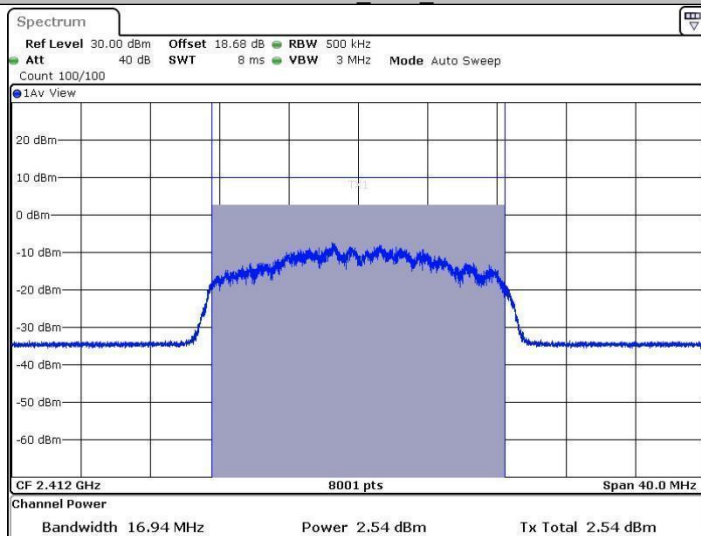
11G_Ant1_2412



Date: 10 APR 2023 09:13:49

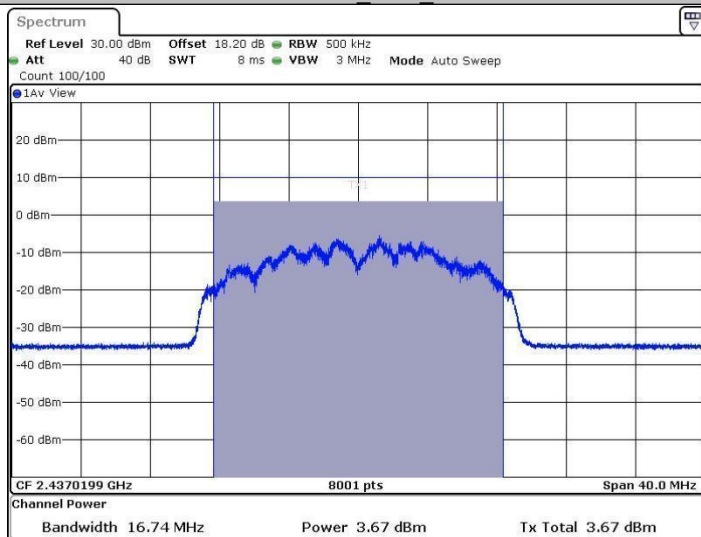


11N20SISO_Ant1_2412

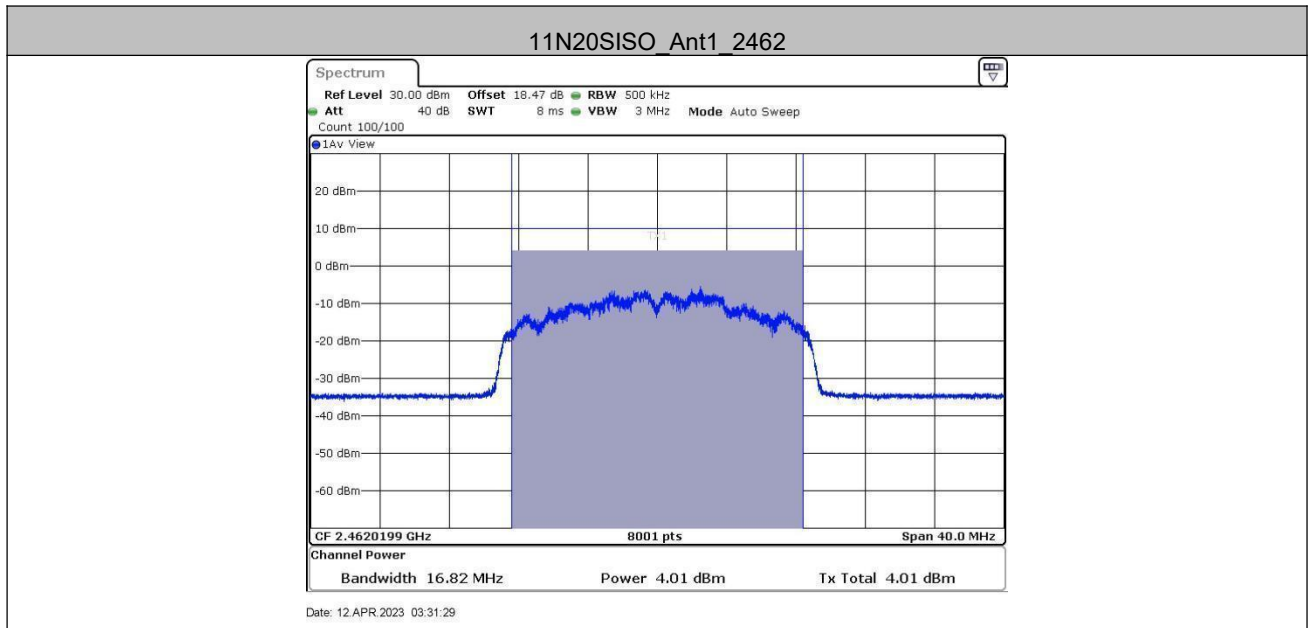


Date: 10 APR 2023 09:36:39

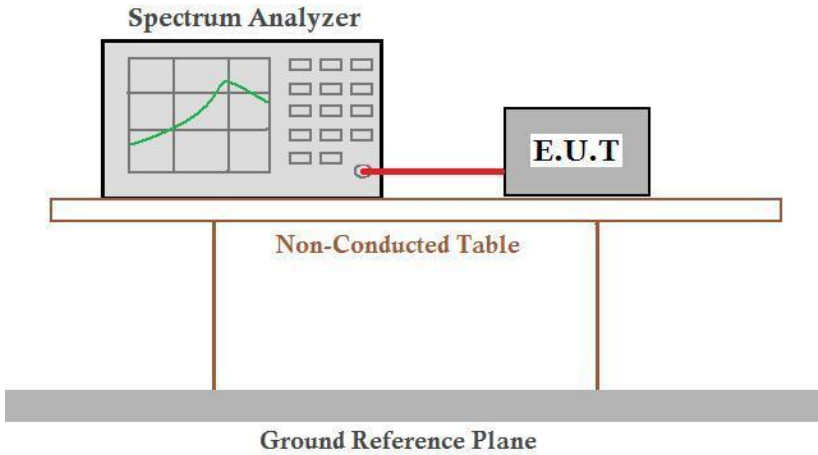
11N20SISO_Ant1_2437



Date: 12 APR 2023 03:29:51



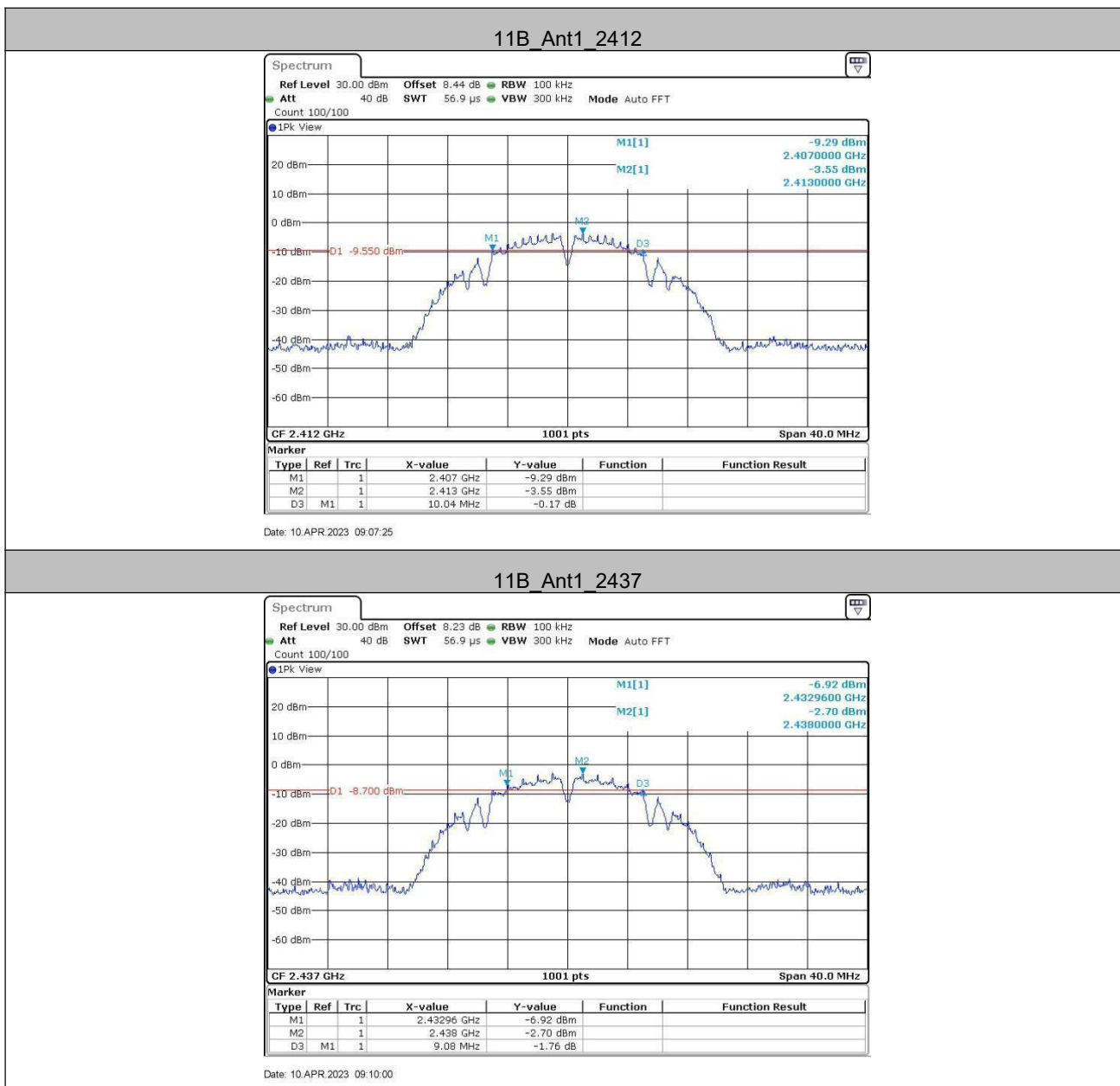
5.4 6dB Occupied Bandwidth

| | |
|------------------------|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (a)(2) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <p>Offset=cable loss+ attenuation factor</p> |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Only the worst case is recorded in the report. |
| Limit: | ≥ 500 kHz |
| Test Results: | Pass |

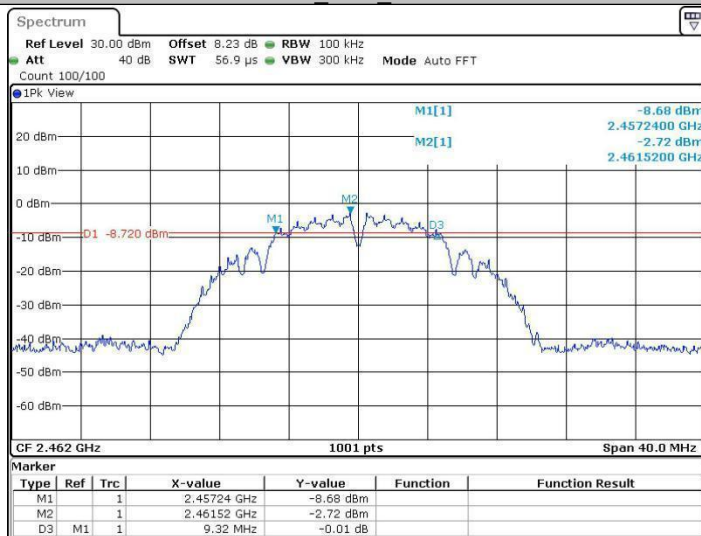
Test Result

| TestMode | Antenna | Channel | DTS BW [MHz] | Limit[MHz] | Verdict |
|-----------|---------|---------|--------------|------------|---------|
| 11B | Ant1 | 2412 | 10.04 | 0.5 | PASS |
| | | 2437 | 9.08 | 0.5 | PASS |
| | | 2462 | 9.32 | 0.5 | PASS |
| 11G | Ant1 | 2412 | 13.80 | 0.5 | PASS |
| | | 2437 | 12.56 | 0.5 | PASS |
| | | 2462 | 13.80 | 0.5 | PASS |
| 11N20SISO | Ant1 | 2412 | 13.80 | 0.5 | PASS |
| | | 2437 | 11.28 | 0.5 | PASS |
| | | 2462 | 15.08 | 0.5 | PASS |
| 11N40SISO | Ant1 | 2422 | 10.04 | 0.5 | PASS |
| | | 2437 | 9.08 | 0.5 | PASS |
| | | 2452 | 9.32 | 0.5 | PASS |

Test Graphs

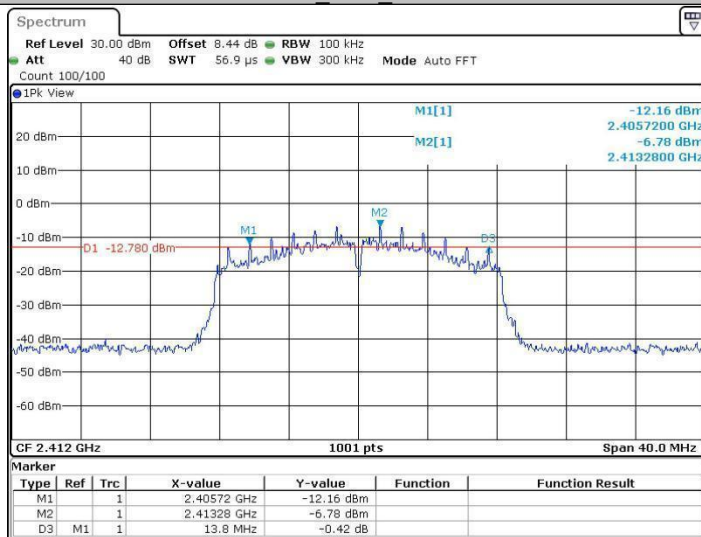


11B Ant1_2462



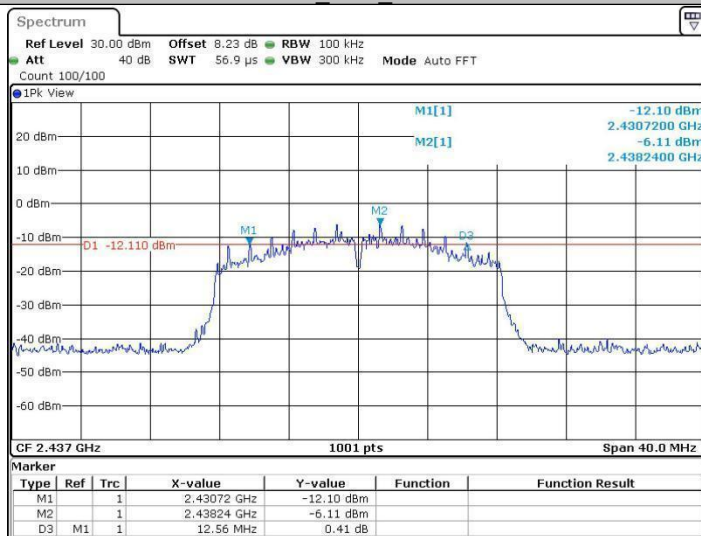
Date: 10 APR 2023 09:11:33

11G Ant1_2412



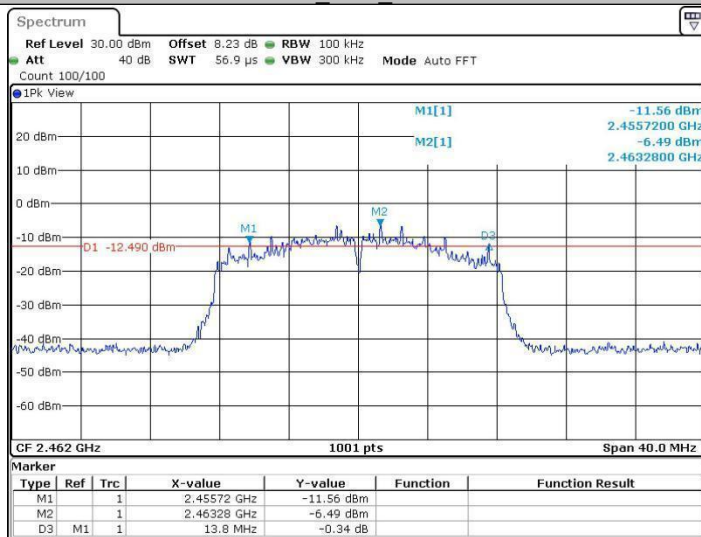
Date: 10 APR 2023 09:13:35

11G_Ant1_2437



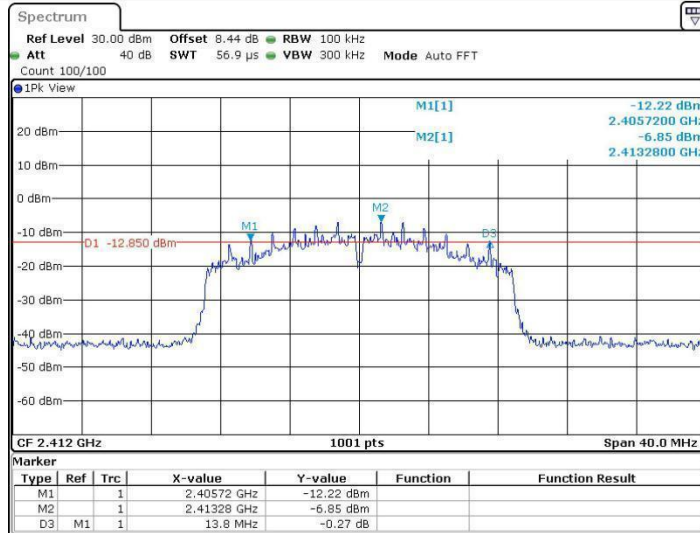
Date: 10 APR 2023 09:23:01

11G_Ant1_2462



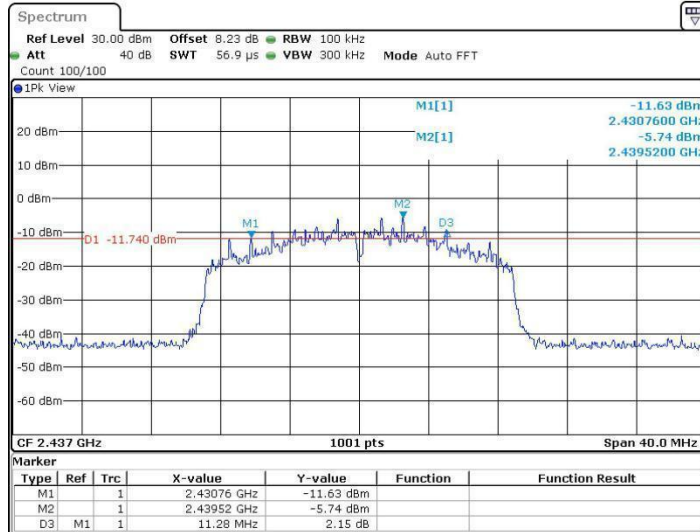
Date: 10 APR 2023 09:29:13

11N20SISO_Ant1_2412

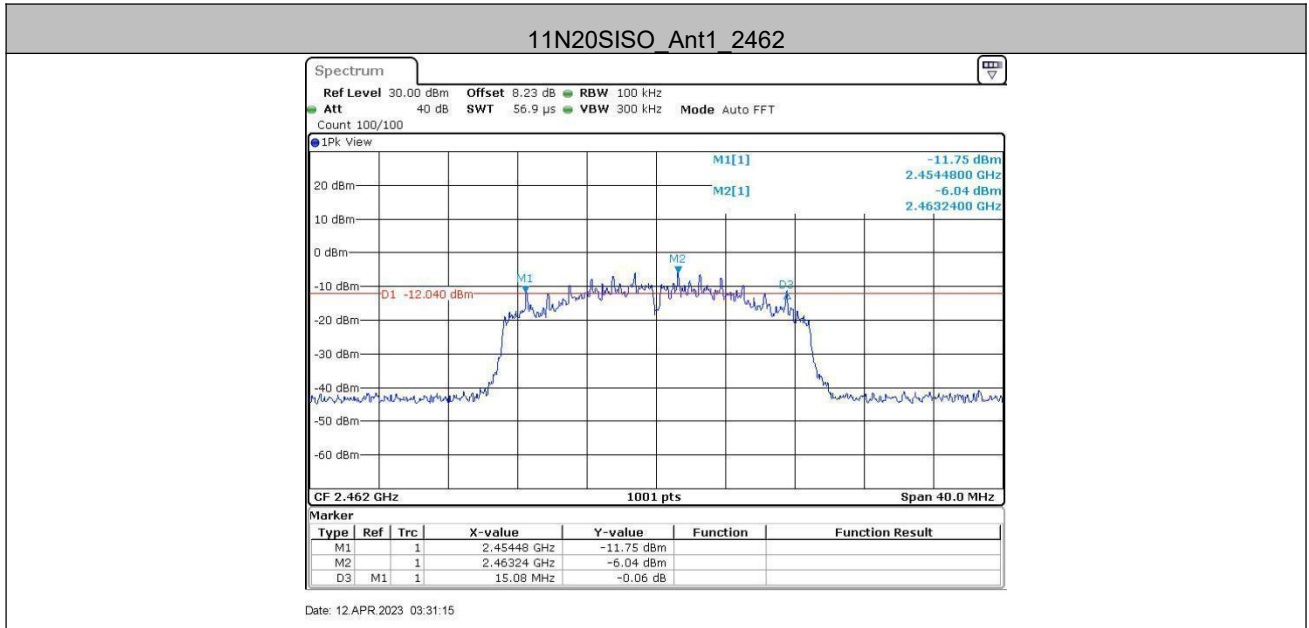


Date: 10 APR 2023 09:36:25

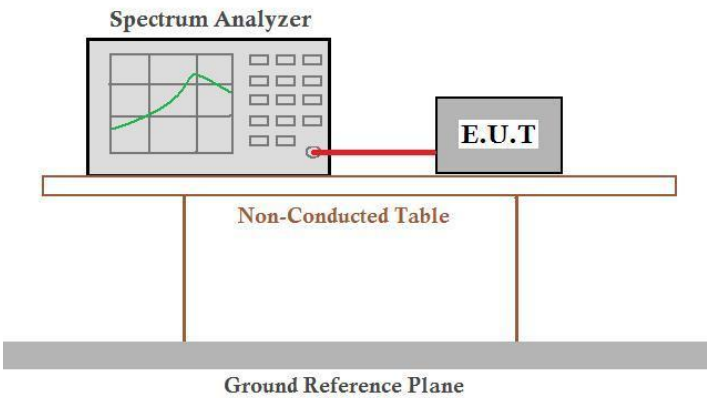
11N20SISO_Ant1_2437



Date: 12 APR 2023 03:29:37



5.5 Power Spectral Density

| | |
|------------------------|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (e) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <p>Offset=cable loss+ attenuation factor</p> |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Only the worst case is recorded in the report. |
| Limit: | ≤8.00dBm/3kHz |
| Test Results: | Pass |

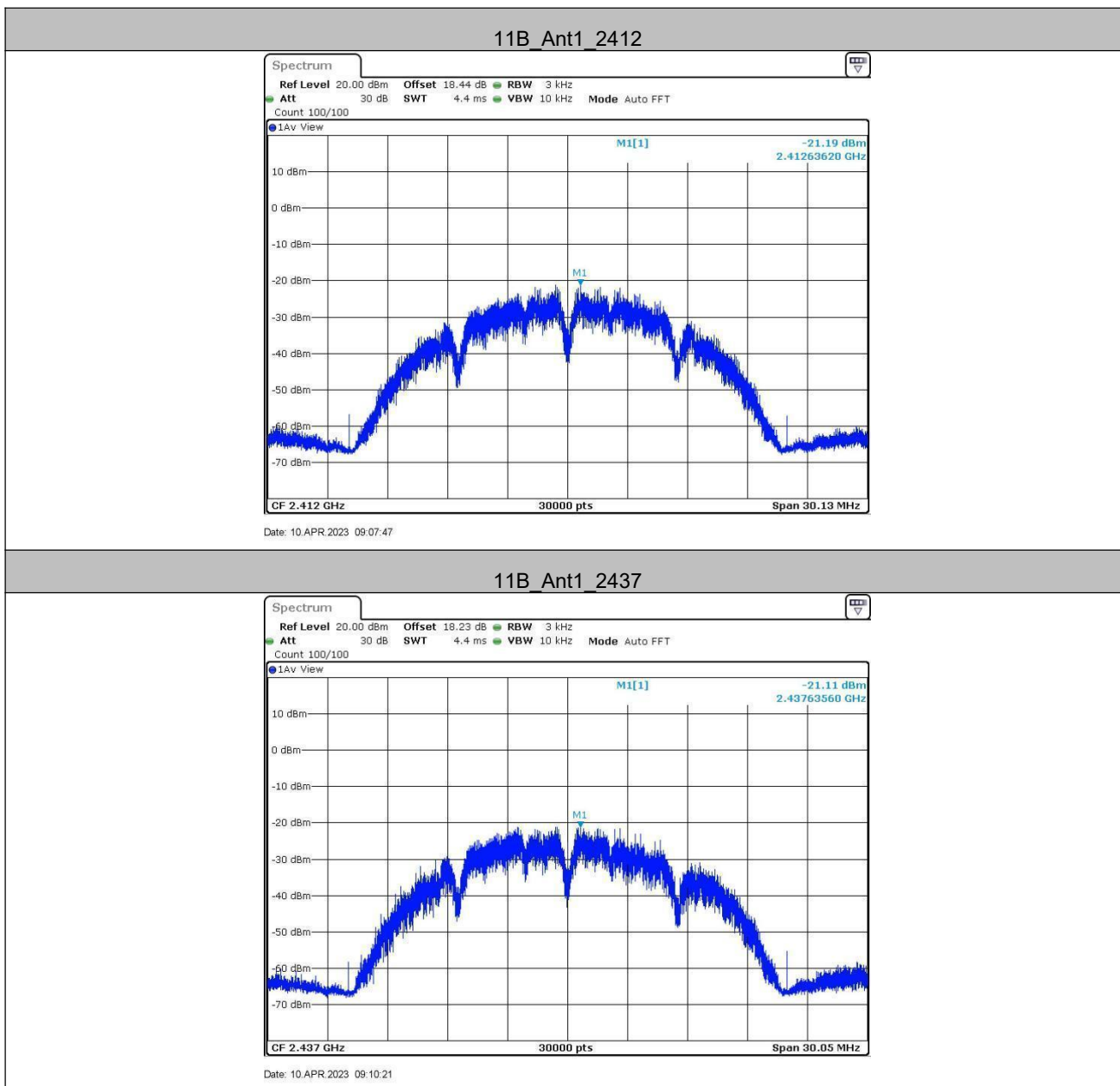
Test Result

| TestMode | Frequency[MHz] | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|-----------|----------------|----------------------|-----------------|---------|
| 11B | 2412 | -21.19 | ≤8.00 | PASS |
| | 2437 | -21.11 | ≤8.00 | PASS |
| | 2462 | -19.76 | ≤8.00 | PASS |
| 11G | 2412 | -22.18 | ≤8.00 | PASS |
| | 2437 | -20.75 | ≤8.00 | PASS |
| | 2462 | -22.2 | ≤8.00 | PASS |
| 11N20SISO | 2412 | -20.08 | ≤8.00 | PASS |
| | 2437 | -23.19 | ≤8.00 | PASS |
| | 2462 | -21.72 | ≤8.00 | PASS |

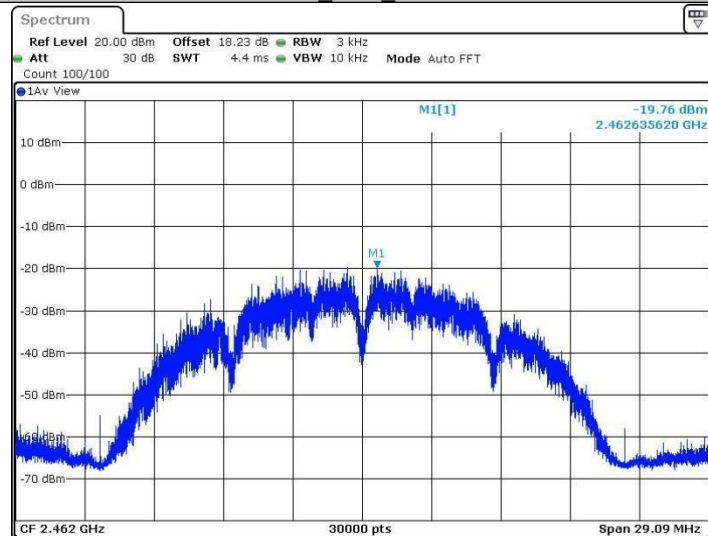
Note:

When Duty cycle >98%, D.C.F is not required.

Test Graphs

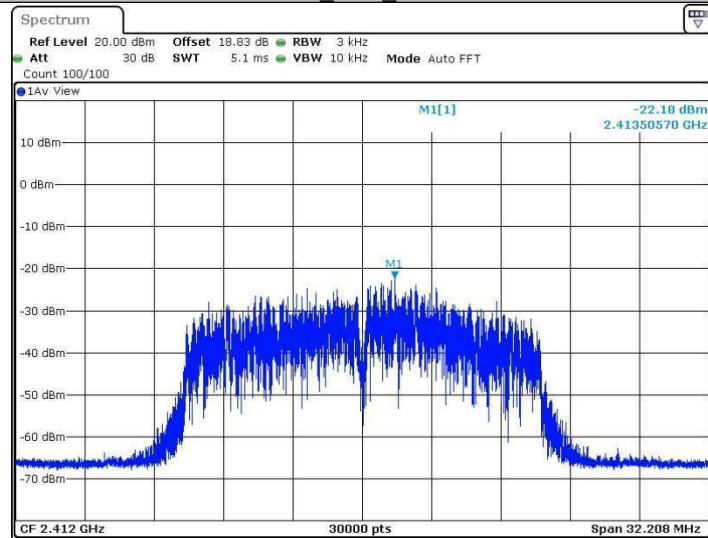


11B_Ant1_2462



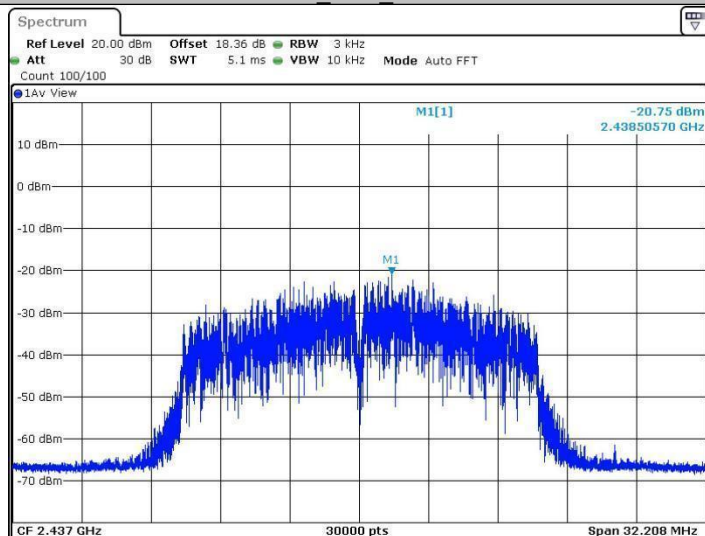
Date: 10 APR 2023 09:11:54

11G_Ant1_2412



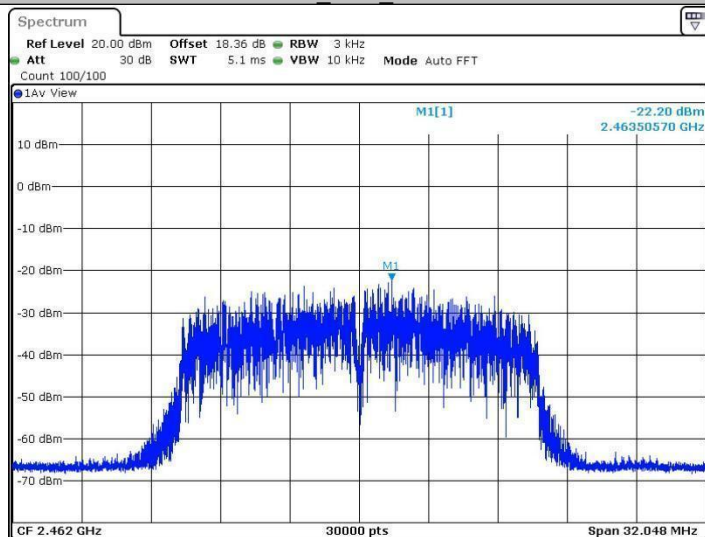
Date: 10 APR 2023 09:13:57

11G_Ant1_2437



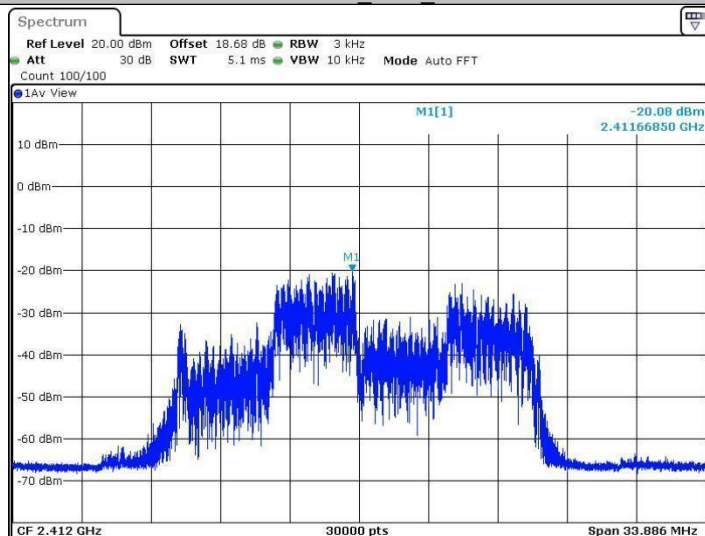
Date: 10 APR 2023 09:23:23

11G_Ant1_2462



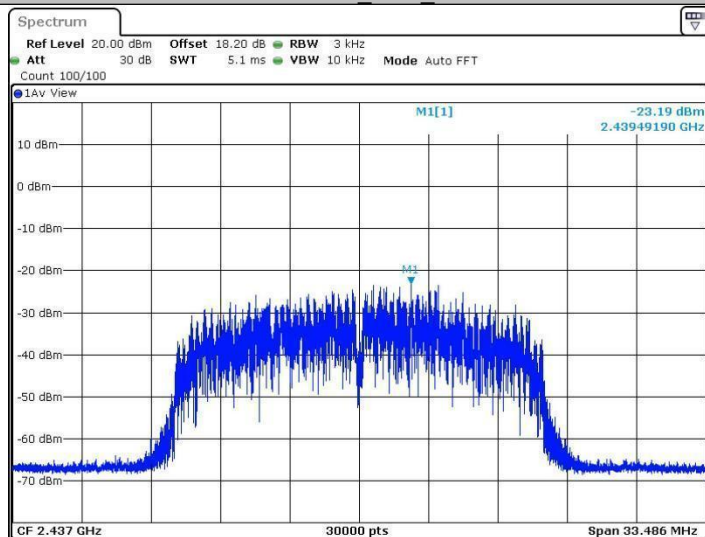
Date: 10 APR 2023 09:29:35

11N20SISO_Ant1_2412

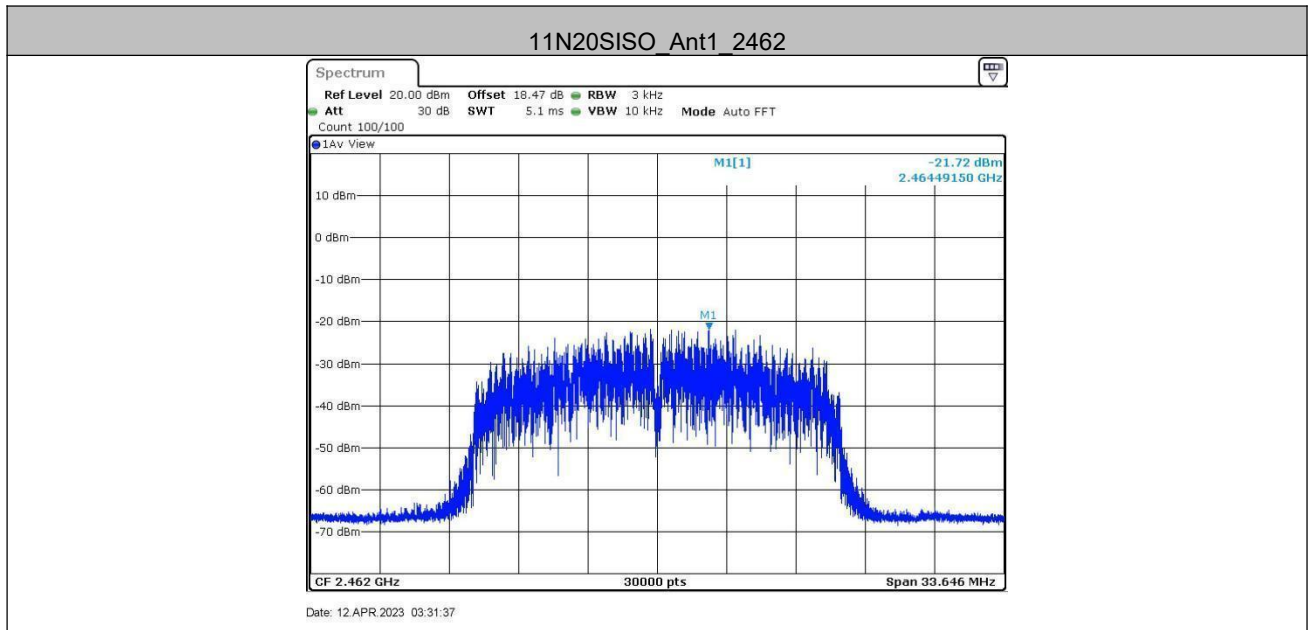


Date: 10 APR 2023 09:36:47

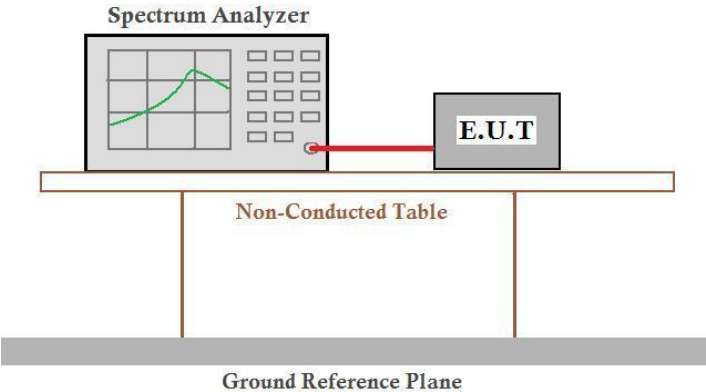
11N20SISO_Ant1_2437



Date: 12 APR 2023 03:29:59



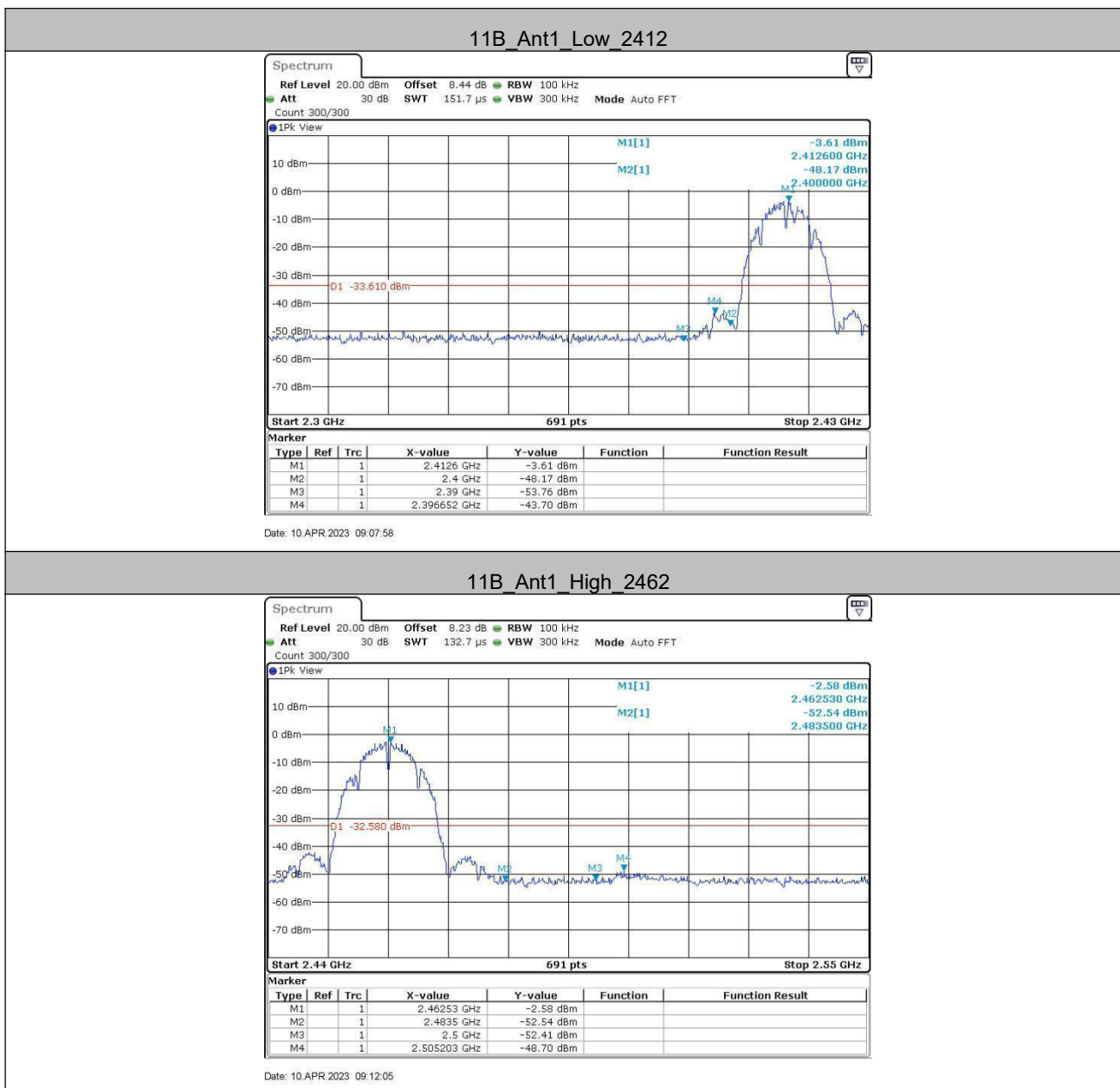
5.6 Band-edge for RF Conducted Emissions

| | |
|------------------------|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (d) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <p>Offset=cable loss+ attenuation factor</p> |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Only the worst case is recorded in the report. |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test Results: | Pass |

Test Result

| TestMode | ChName | Frequency[MHz] | RefLevel[dBm] | Result[dBm] | Limit[dBm] | Verdict |
|-----------|--------|----------------|---------------|-------------|---------------|---------|
| 11B | Low | 2412 | -3.61 | -43.7 | ≤ -33.61 | PASS |
| | High | 2462 | -2.58 | -48.7 | ≤ -32.58 | PASS |
| 11G | Low | 2412 | -9.18 | -50.22 | ≤ -39.18 | PASS |
| | High | 2462 | -5.55 | -48.75 | ≤ -35.55 | PASS |
| 11N20SISO | Low | 2412 | -6.82 | -50.33 | ≤ -36.82 | PASS |
| | High | 2462 | -5.50 | -48.74 | ≤ -35.5 | PASS |

5.6.1 Test Graphs



11G_Ant1_Low_2412



Date: 10 APR 2023 09:14:07

11G_Ant1_High_2462



Date: 10 APR 2023 09:29:45

11N20SISO_Ant1_Low_2412



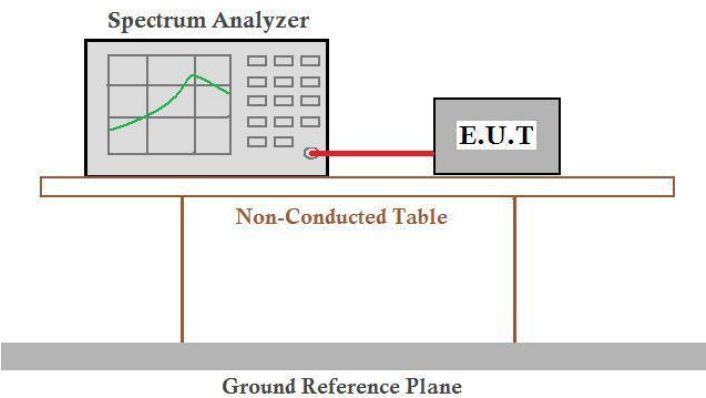
Date: 10 APR 2023 09:36:57

11N20SISO_Ant1_High_2462



Date: 12 APR 2023 03:31:47

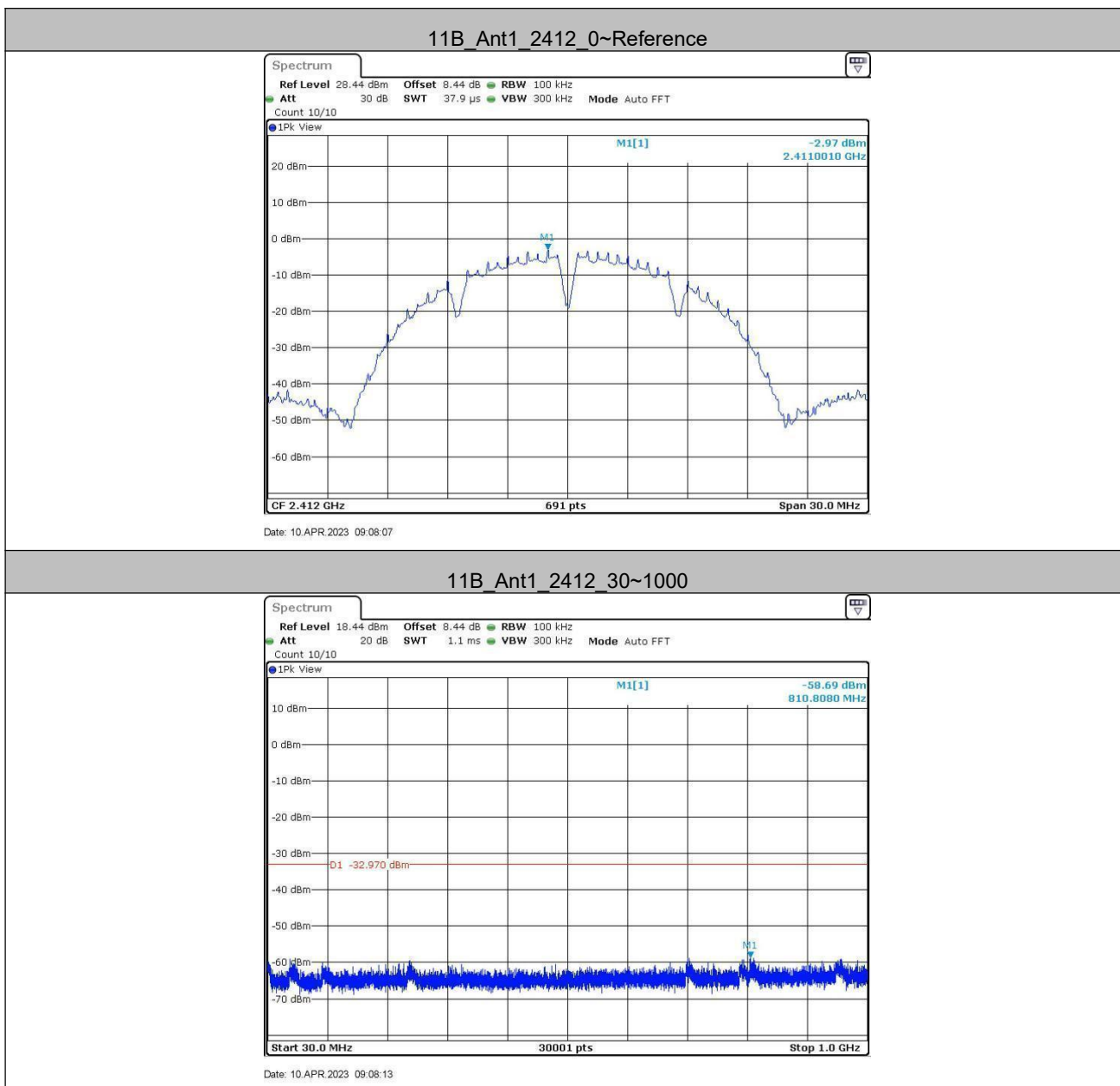
5.7 RF Conducted Spurious Emissions

| | |
|------------------------|---|
| Test Requirement: | 47 CFR Part 15C Section 15.247 (d) |
| Test Method: | ANSI C63.10: 2013 |
| Test Setup: |  <p>Offset=cable loss+ attenuation factor</p> |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Only the worst case is recorded in the report. |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test Results: | Pass |

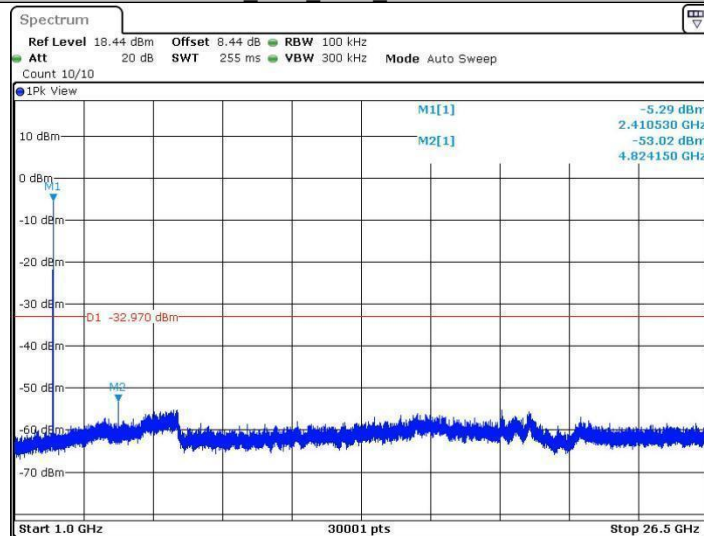
Test Result

| TestMode | Frequency[MHz] | FreqRange [Mhz] | RefLevel [dBm] | Result [dBm] | Limit [dBm] | Verdict |
|-----------|----------------|--------------------|-------------------|-----------------|----------------|---------|
| 11B | 2412 | Reference | -2.97 | -2.97 | --- | PASS |
| | | 30~1000 | -2.97 | -58.69 | ≤ -32.97 | PASS |
| | | 1000~26500 | -2.97 | -53.02 | ≤ -32.97 | PASS |
| | 2437 | Reference | -2.79 | -2.79 | --- | PASS |
| | | 30~1000 | -2.79 | -58.39 | ≤ -32.79 | PASS |
| | | 1000~26500 | -2.79 | -54.88 | ≤ -32.79 | PASS |
| | 2462 | Reference | -2.39 | -2.39 | --- | PASS |
| | | 30~1000 | -2.39 | -58.08 | ≤ -32.39 | PASS |
| | | 1000~26500 | -2.39 | -53.45 | ≤ -32.39 | PASS |
| 11G | 2412 | Reference | -6.74 | -6.74 | --- | PASS |
| | | 30~1000 | -6.74 | -57.85 | ≤ -36.74 | PASS |
| | | 1000~26500 | -6.74 | -54.75 | ≤ -36.74 | PASS |
| | 2437 | Reference | -5.72 | -5.72 | --- | PASS |
| | | 30~1000 | -5.72 | -58.13 | ≤ -35.72 | PASS |
| | | 1000~26500 | -5.72 | -55.35 | ≤ -35.72 | PASS |
| | 2462 | Reference | -5.58 | -5.58 | --- | PASS |
| | | 30~1000 | -5.58 | -57.45 | ≤ -35.58 | PASS |
| | | 1000~26500 | -5.58 | -55.06 | ≤ -35.58 | PASS |
| 11N20SISO | 2412 | Reference | -6.74 | -6.74 | --- | PASS |
| | | 30~1000 | -6.74 | -57.37 | ≤ -36.74 | PASS |
| | | 1000~26500 | -6.74 | -54.15 | ≤ -36.74 | PASS |
| | 2437 | Reference | -5.31 | -5.31 | --- | PASS |
| | | 30~1000 | -5.31 | -58.84 | ≤ -35.31 | PASS |
| | | 1000~26500 | -5.31 | -54.9 | ≤ -35.31 | PASS |
| | 2462 | Reference | -5.20 | -5.20 | --- | PASS |
| | | 30~1000 | -5.20 | -58.67 | ≤ -35.2 | PASS |
| | | 1000~26500 | -5.20 | -55.51 | ≤ -35.2 | PASS |

Test Graphs

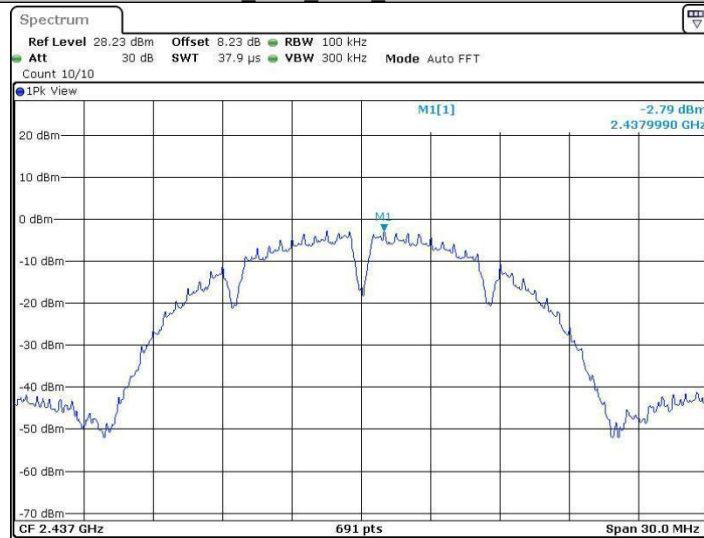


11B_Ant1_2412_1000~26500



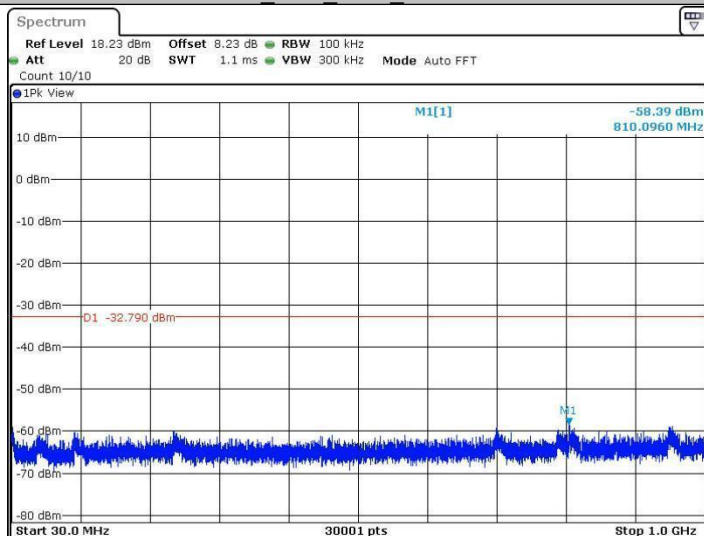
Date: 10 APR 2023 09:08:35

11B_Ant1_2437_0~Reference



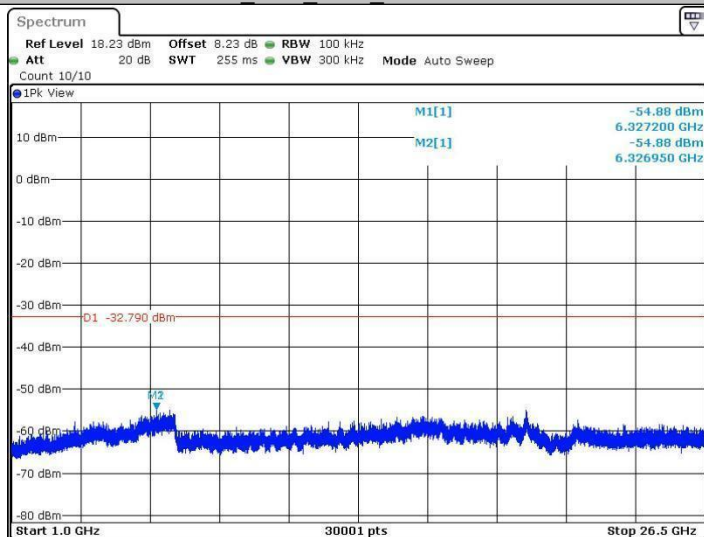
Date: 10 APR 2023 09:10:30

11B_Ant1_2437_30~1000



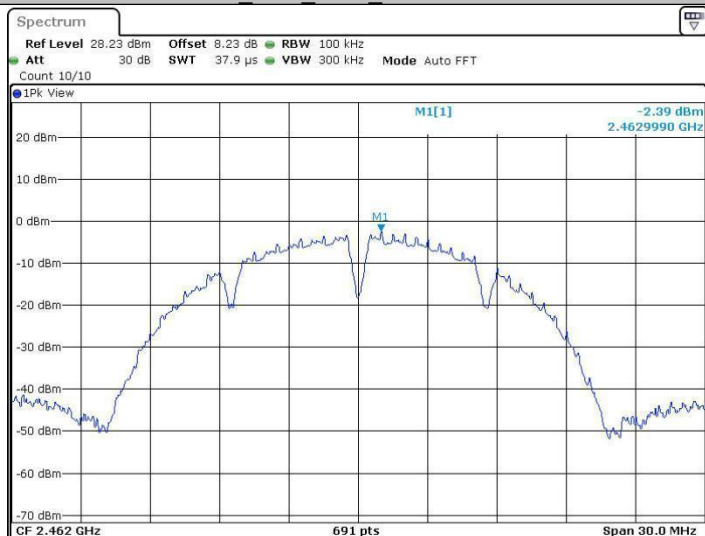
Date: 10 APR 2023 09:10:36

11B_Ant1_2437_1000~26500



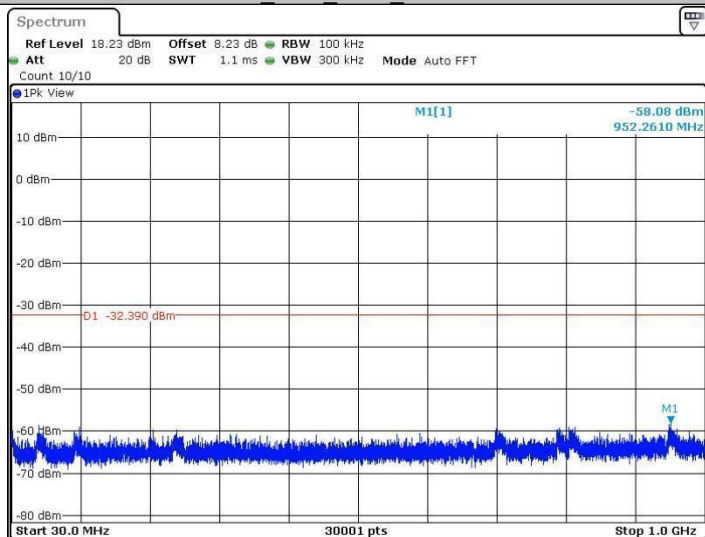
Date: 10 APR 2023 09:10:59

11B_Ant1_2462_0~Reference



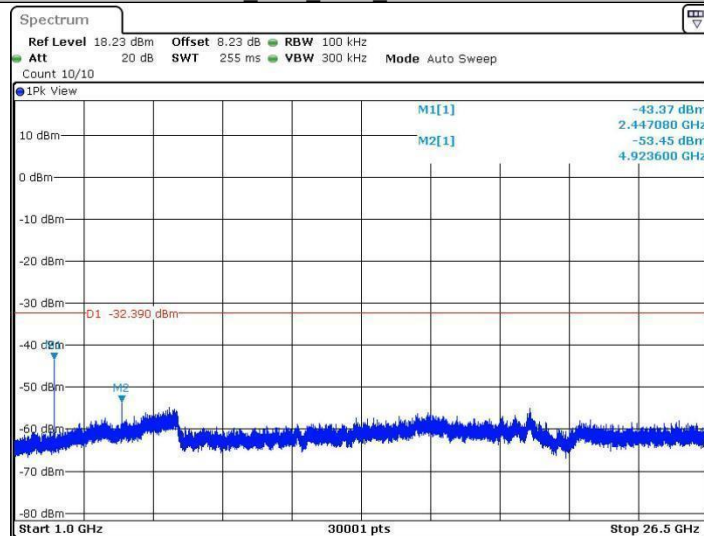
Date: 10 APR 2023 09:12:14

11B_Ant1_2462_30~1000



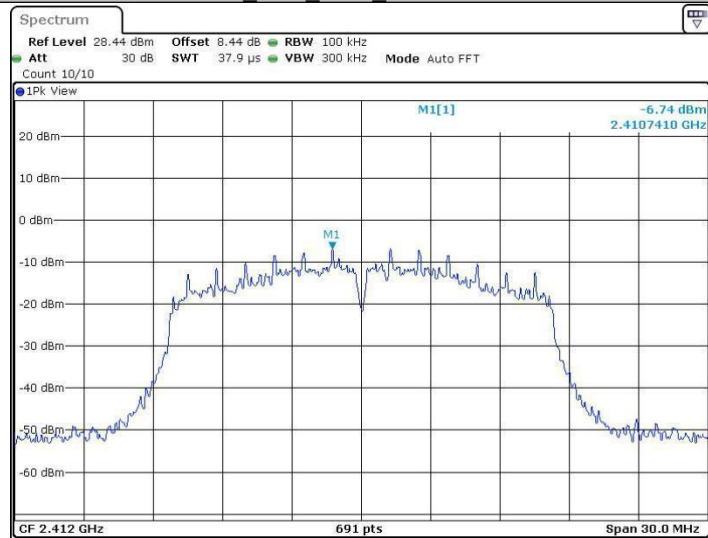
Date: 10 APR 2023 09:12:20

11B_Ant1_2462_1000~26500



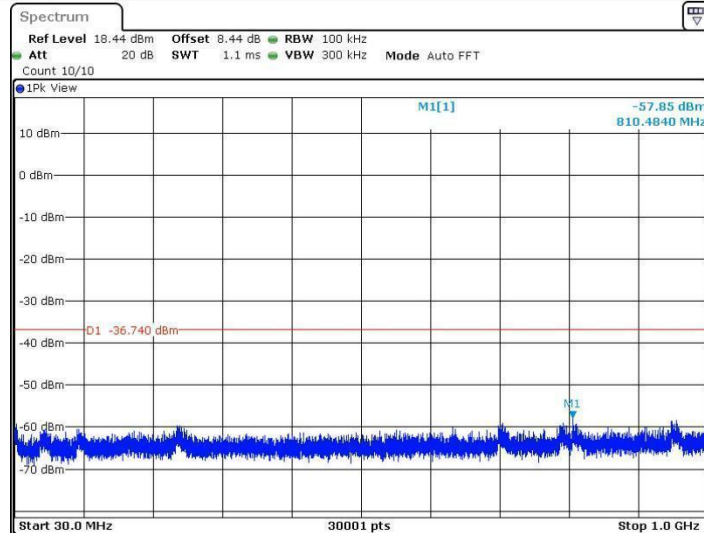
Date: 10 APR 2023 09:12:42

11G_Ant1_2412_0~Reference



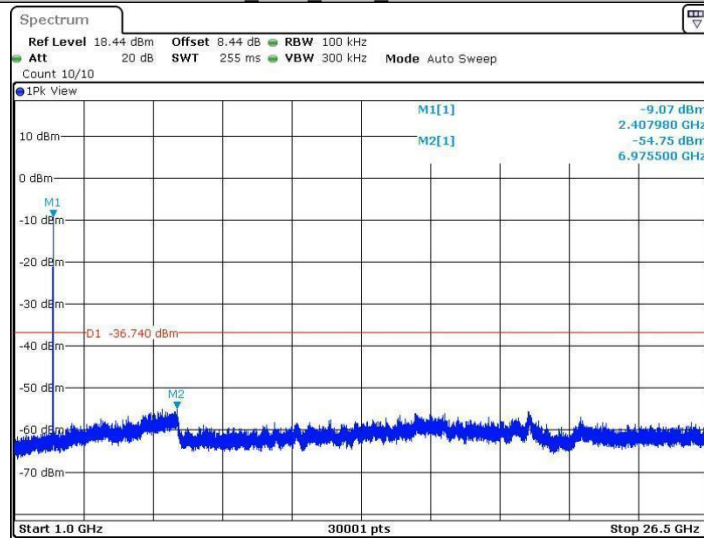
Date: 10 APR 2023 09:14:16

11G_Ant1_2412_30~1000



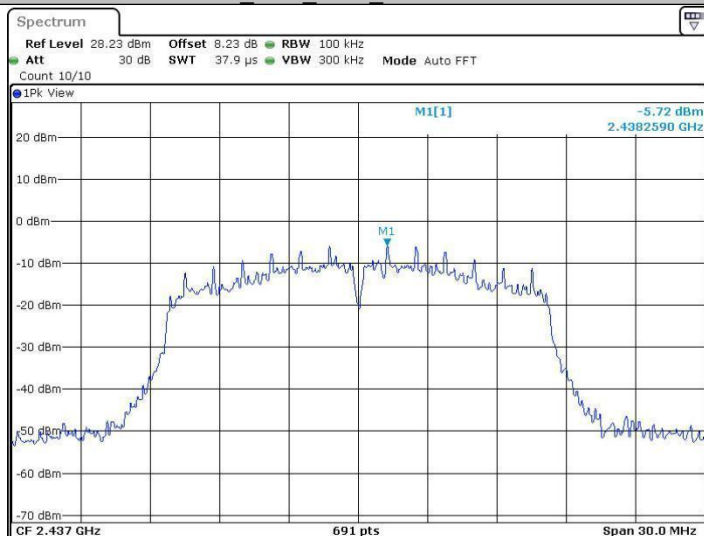
Date: 10 APR 2023 09:14:23

11G_Ant1_2412_1000~26500



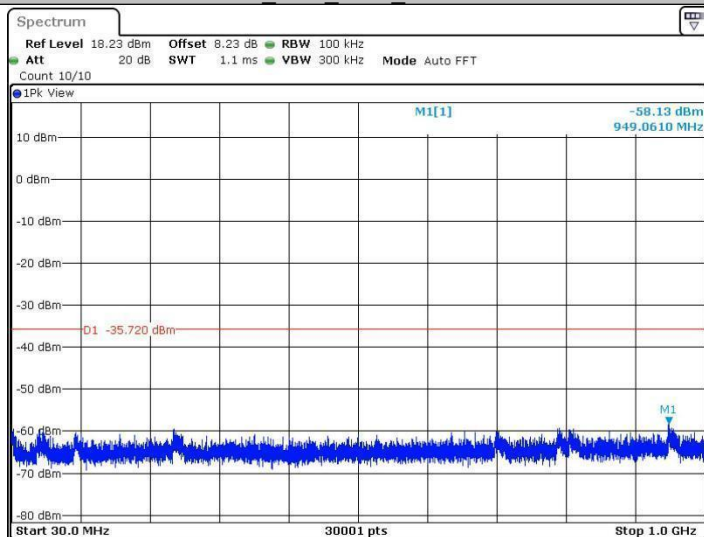
Date: 10 APR 2023 09:14:45

11G_Ant1_2437_0~Reference



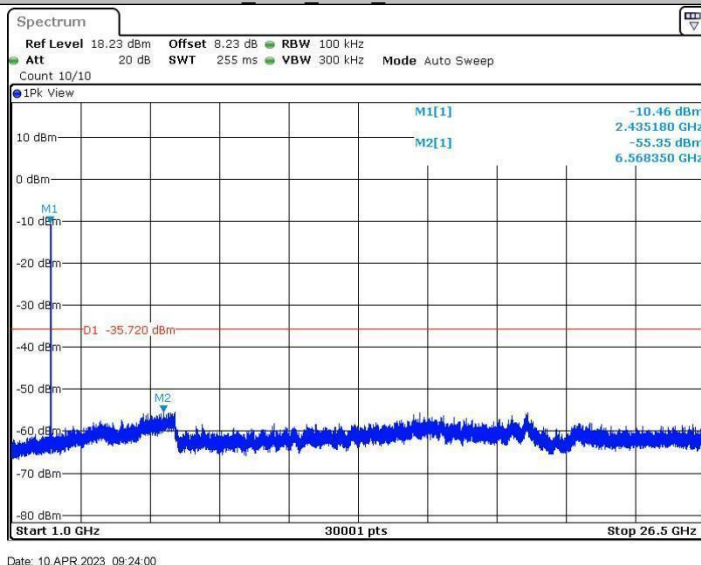
Date: 10 APR 2023 09:23:32

11G_Ant1_2437_30~1000

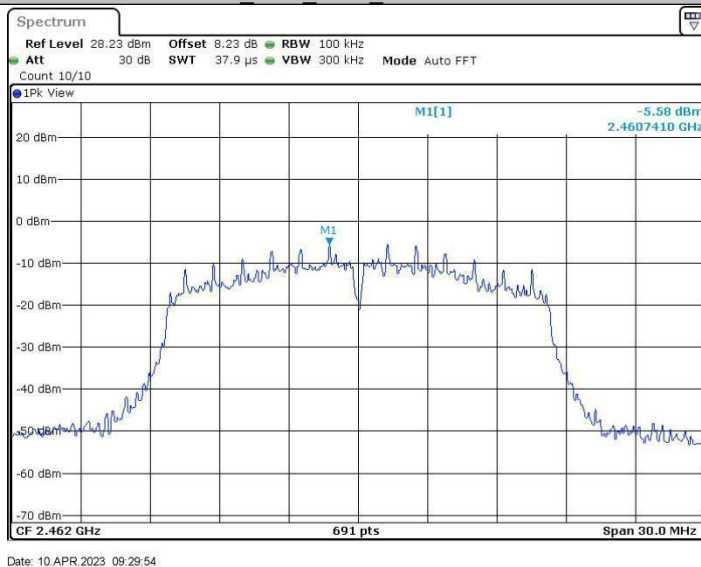


Date: 10 APR 2023 09:23:38

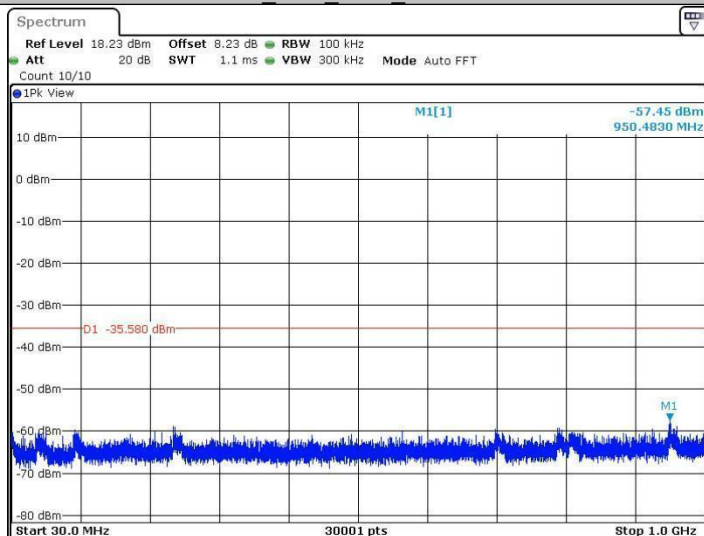
11G_Ant1_2437_1000~26500



11G_Ant1_2462_0~Reference

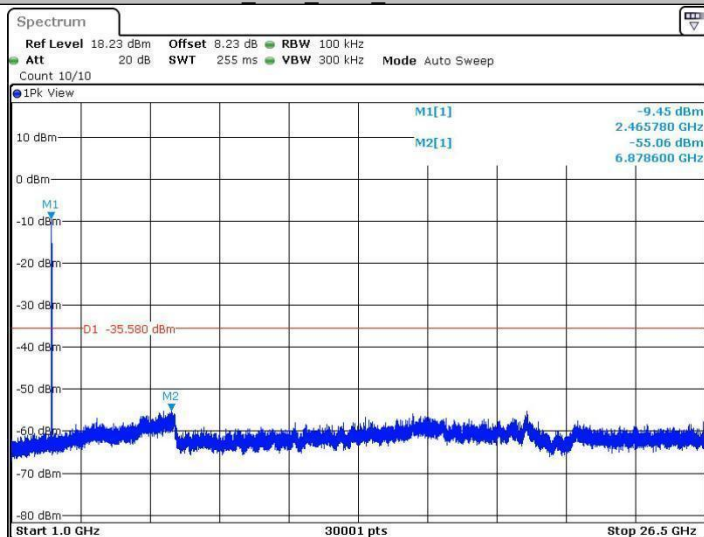


11G_Ant1_2462_30~1000



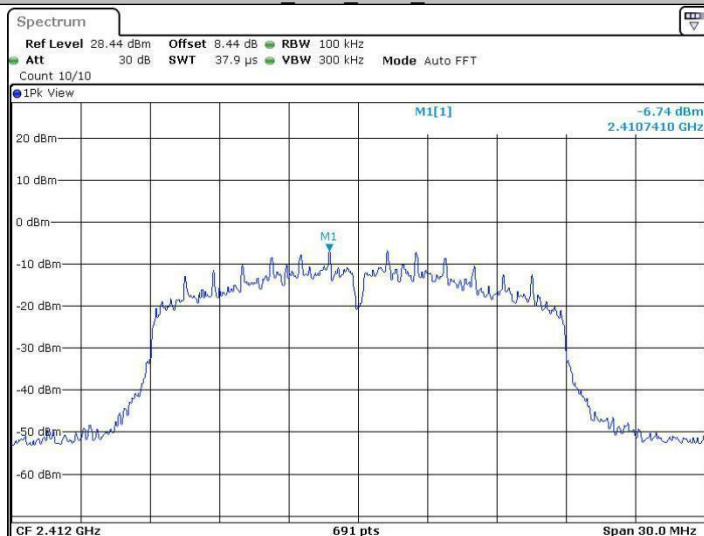
Date: 10 APR 2023 09:30:00

11G_Ant1_2462_1000~26500



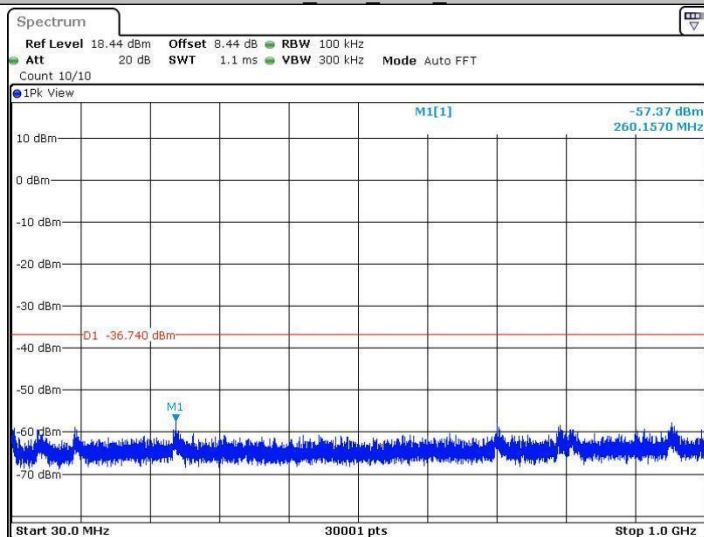
Date: 10 APR 2023 09:30:22

11N20SISO_Ant1_2412_0~Reference



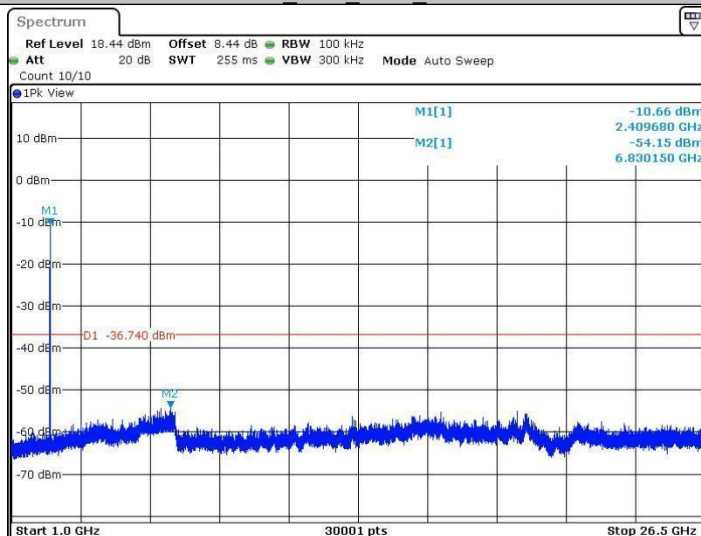
Date: 10 APR 2023 09:37:06

11N20SISO_Ant1_2412_30~1000



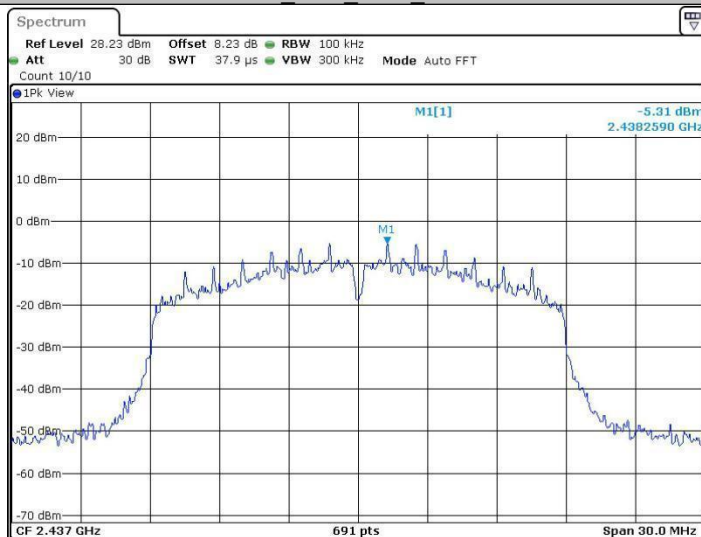
Date: 10 APR 2023 09:37:13

11N20SISO_Ant1_2412_1000~26500



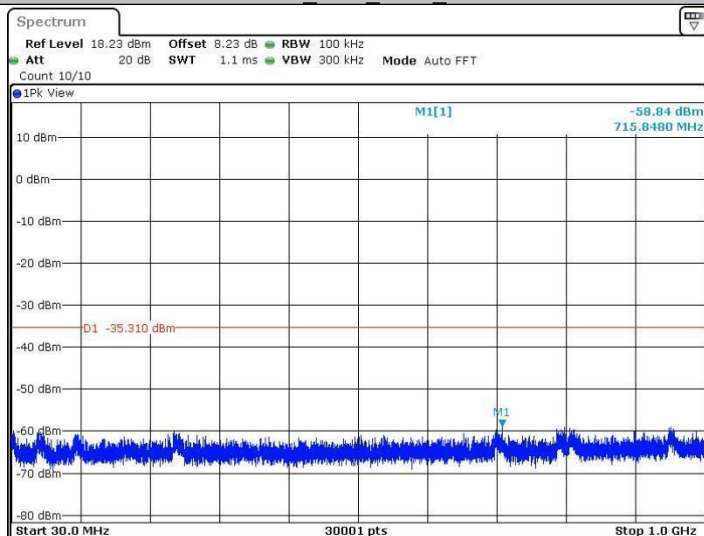
Date: 10 APR 2023 09:37:35

11N20SISO_Ant1_2437_0~Reference



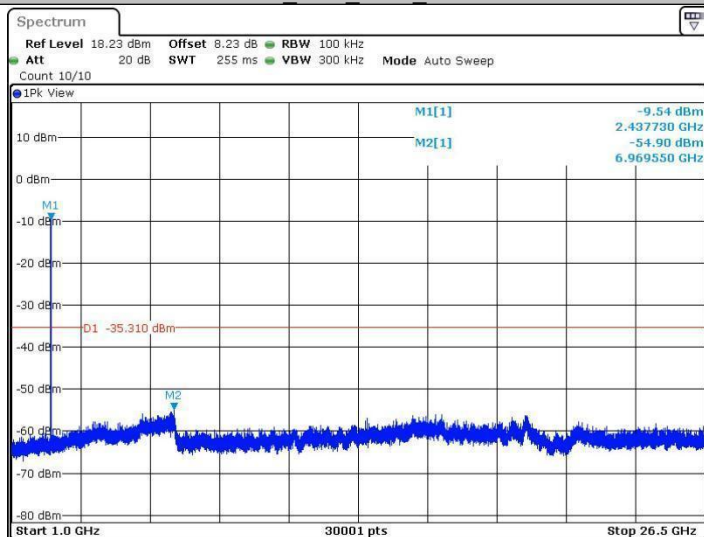
Date: 12 APR 2023 03:30:08

11N20SISO_Ant1_2437_30~1000



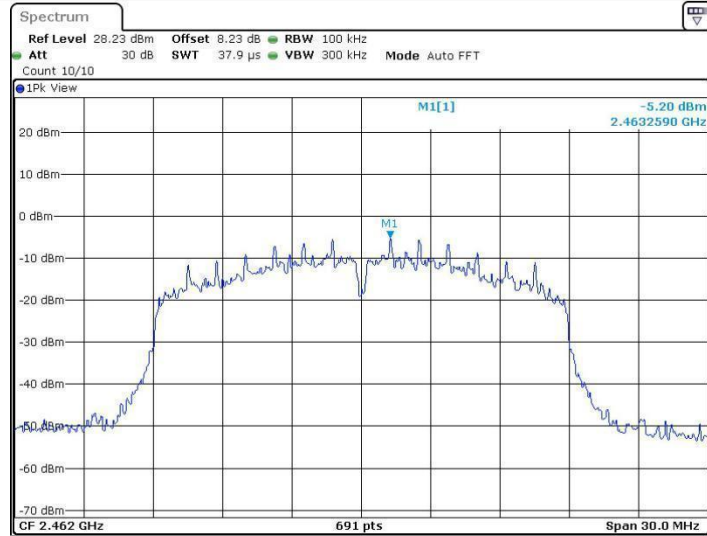
Date: 12 APR 2023 03:30:14

11N20SISO_Ant1_2437_1000~26500



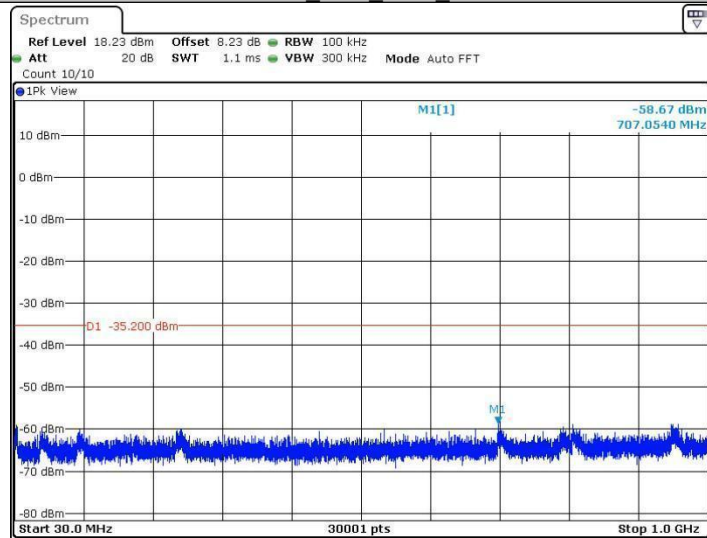
Date: 12 APR 2023 03:30:36

11N20SISO_Ant1_2462_0~Reference

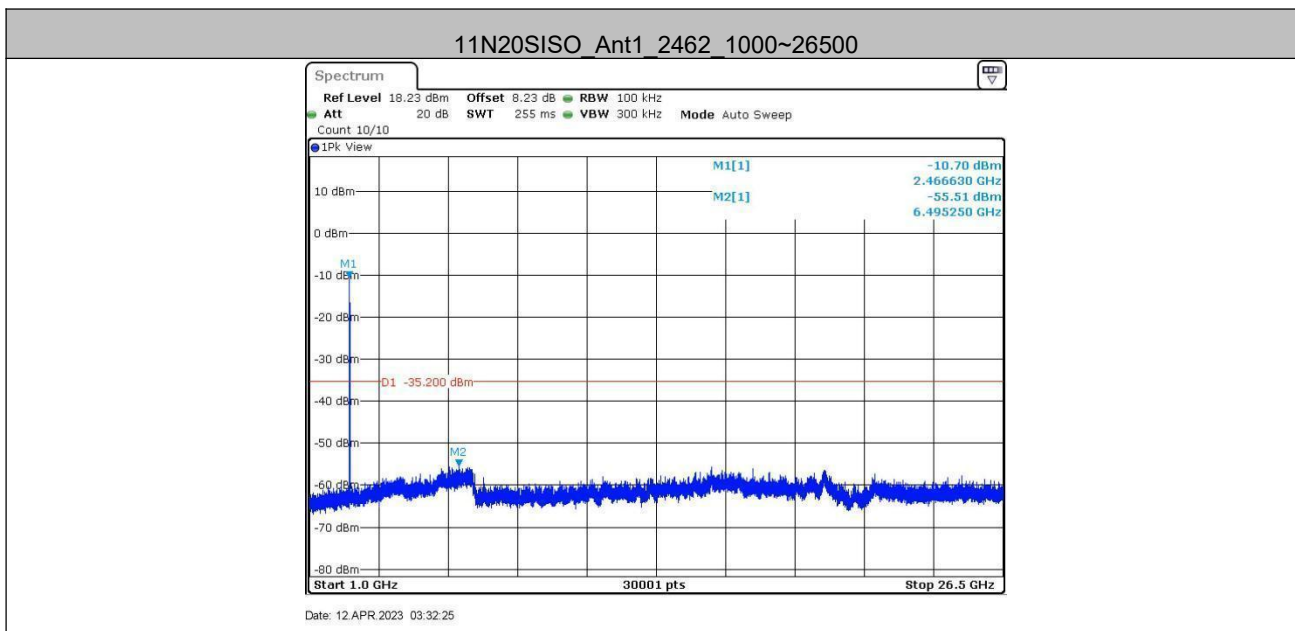


Date: 12 APR 2023 03:31:56

11N20SISO_Ant1_2462_30~1000



Date: 12 APR 2023 03:32:03



Remark:

Pretest 9kHz to 25GHz, find the highest point when testing, so only the worst data were shown in the test report. Per FCC Part 15.33 (a) and 15.31 (o) ,The amplitude of spurious emissions from intentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this part.

5.8 Radiated Spurious Emissions

| | | | | | |
|-------------------|---|-------------------------------------|-------------------|------------|-----------------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.209 and 15.205 | | | | |
| Test Method: | ANSI C63.10 2013 | | | | |
| Test Site: | Measurement Distance: 3m (Semi-Anechoic Chamber) | | | | |
| Receiver Setup: | Frequency | Detector | RBW | VBW | Remark |
| | 0.009MHz-0.090MHz | Peak | 10kHz | 30kHz | Peak |
| | 0.009MHz-0.090MHz | Average | 10kHz | 30kHz | Average |
| | 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| | 0.110MHz-0.490MHz | Peak | 10kHz | 30kHz | Peak |
| | 0.110MHz-0.490MHz | Average | 10kHz | 30kHz | Average |
| | 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| | 30MHz-1GHz | Quasi-peak | 100 kHz | 300kHz | Quasi-peak |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | | Peak | 1MHz | 10Hz | Average |
| Limit: | Frequency | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| | 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| | 1.705MHz-30MHz | 30 | - | - | 30 |
| | 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| | 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| | 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| | 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1GHz | 500 | 54.0 | Average | 3 |
| | Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device. | | | | |