# TEST REPORT

| | |
|---|---|
| **Applicant:** | Technity Solutions Inc. |
| **Address of Applicant:** | 500 Cochrane Dr. Unit 1 Markham ON L3R 8E2 Canada |
| **Manufacturer:** | Technity Solutions Inc. |
| **Address of Manufacturer:** | 500 Cochrane Dr. Unit 1 Markham ON L3R 8E2 Canada |

**Equipment Under Test (EUT)**

| | |
|---|---|
| **Product Name:** | Intelligent Wireless Access Point |
| **Model No.:** | TS-MWI3000C, 1LAN-WAP-9332 |
| **Trade Mark:** | Technity SOLUTIONS |
| **FCC ID:** | 2ATAZ-MWI3000C |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart C Section 15.247 |
| **Date of sample receipt:** | 2023.04.14 |
| **Date of Test:** | 2023.04.23~2023.05.22 |
| **Date of report issued:** | 2023.05.24 |
| **Test Result :** | PASS * |

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

Authorized Signature:

**Robinson Luo**
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *2023.05.24* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Prepared By:*** ***Date:*** *2023.05.24*

***Project Engineer***

***Check By:*** ***Date:*** *2023.05.24*

***Reviewer***

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# 4 Test Summary

| Test Item | Section | Result |
|---|---|---|
| Antenna requirement | FCC part 15.203/15.247 (c) | Pass |
| AC Power Line Conducted Emission | FCC part 15.207 | Pass |
| Conducted Peak Output Power | FCC part 15.247 (b)(3) | Pass |
| Channel Bandwidth & 99% OCB | FCC part 15.247 (a)(2) | Pass |
| Power Spectral Density | FCC part 15.247 (e) | Pass |
| Band Edge | FCC part 15.247(d) | Pass |
| Spurious Emission | FCC part 15.205/15.209 | Pass |

*Remark: Test according to ANSI C63.10:2013*

*Pass: The EUT complies with the essential requirements in the standard.*

**Measurement Uncertainty**

| Test Item | Measurement Uncertainty | Notes |
|---|---|---|
| Radiated Emission | 3.1dB(9kHz-30MHz) | (1) |
| Radiated Emission | 3.8039dB(30MHz-200MHz) | (1) |
| Radiated Emission | 3.9679dB(200MHz-1GHz) | (1) |
| Radiated Emission | 4.29dB(1GHz-18GHz) | (1) |
| Radiated Emission | 3.30dB(18GHz-40GHz) | (1) |
| AC Power Line Conducted Emission | 3.44dB(0.15MHz ~ 30MHz) | (1) |
| Occupied Bandwidth | ±3% | (1) |
| RF conducted power | ±0.75dB | (1) |
| RF power density | ±3dB | (1) |
| Conducted Spurious emissions | ±2.58dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | |

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | Intelligent Wireless Access Point |
| Model No.: | TS-MWI3000C, 1LAN-WAP-9332 |
| Test Model No.: | TS-MWI3000C |
| Model difference: | Only model name is different |
| Test sample(s) ID: | GTSL2023060220-1 |
| Sample(s) Status | Engineer sample |
| S/N: | N/A |
| Operation Frequency: | 802.11b/802.11g/802.11n(HT20)/802.11ax20: 2412MHz~2462MHz<br>802.11n(HT40)/802.11ax40: 2422MHz~2452MHz |
| Channel numbers: | 802.11b/802.11g /802.11n(HT20)/802.11ax20: 11<br>802.11n(HT40)/802.11ax40:7 |
| Channel separation: | 5MHz |
| Modulation technology: | 802.11b: DSSS<br>802.11g/802.11n(HT20)/802.11n(HT40): OFDM<br>802.11ax20/802.11ax40: OFDMA |
| Antenna Type: | Internal Antenna |
| Antenna gain: | Ant1: 4.39dBi, Ant2: 2.75dBi |
| Power supply: | DC 48V from adapter or POE 48V |

Note: For 802.11ax mode only support full RU mode.

| Operation Frequency each of channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| 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:

| **Test channel** | **Frequency (MHz)** | |
|---|---|---|
| | 802.11b/802.11g/802.11n(HT20)/ 802.11ax20 | 802.11n(HT40)/802.11ax40 |
| Lowest channel | 2412MHz | 2422MHz |
| Middle channel | 2437MHz | 2437MHz |
| Highest channel | 2462MHz | 2452MHz |

## 5.2 Test mode

| | |
|---|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode |

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

| Mode | 802.11b | 802.11g | 802.11n | 802.11ax |
|---|---|---|---|---|
| Data rate | 1Mbps | 6Mbps | MCS0 | MCS0 |

## 5.3 Description of Support Units

| No. | Equipment | Manufacturer | Model | Series No |
|---|---|---|---|---|
| 1 | Power adapter | Keli | KL-D540117-K1 | / |
| 2 | Microcomputer | TY510S-07IAB | LENOVO | YLX2QPM7 |
| 3 | Notebook | L450 | Think | / |

## 5.4 Deviation from Standards

None.

## 5.5 Abnormalities from Standard Conditions

None.

## 5.6 Test Facility

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

● **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services 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 files.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

## 5.8 Additional Instructions

Power Setting value

No beamforming

| Test Software | QDART | | |
|---|---|---|---|
| Frequency (MHz) | 2412 | 2437 | 2462 |
| IEEE 802.11b | 11 | 11 | 11 |
| IEEE 802.11g | 6 | 6 | 6 |
| IEEE 802.11n (20MHz) | 6 | 6 | 6 |
| IEEE 802.11ax (20MHz) | 6 | 6 | 6 |
| Frequency (MHz) | 2422 | 2437 | 2452 |
| IEEE 802.11n (40MHz) | 5 | 5 | 5 |
| IEEE 802.11ax(40MHz) | 5 | 5 | 5 |

Beamforming

| Test Software | QDART | | |
|---|---|---|---|
| Frequency (MHz) | 2412 | 2437 | 2462 |
| IEEE 802.11b | 9 | 9 | 9 |
| IEEE 802.11g | 4 | 4 | 4 |
| IEEE 802.11n (20MHz) | 4 | 4 | 4 |
| IEEE 802.11ax (20MHz) | 4 | 4 | 4 |
| Frequency (MHz) | 2422 | 2437 | 2452 |
| IEEE 802.11n (40MHz) | 3 | 3 | 3 |
| IEEE 802.11ax(40MHz) | 3 | 3 | 3 |

# 6 Test Instruments list

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | June 23, 2021 | June 22, 2024 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | April 14, 2023 | April 13, 2024 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9168 | GTS640 | March 19, 2023 | March 18, 2025 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120 D | GTS208 | April 17, 2023 | April 16, 2025 |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Coaxial Cable | GTS | N/A | GTS213 | April 21, 2023 | April 20, 2024 |
| 8 | Coaxial Cable | GTS | N/A | GTS211 | April 21, 2023 | April 20, 2024 |
| 9 | Coaxial cable | GTS | N/A | GTS210 | April 21, 2023 | April 20, 2024 |
| 10 | Coaxial Cable | GTS | N/A | GTS212 | April 21, 2023 | April 20, 2024 |
| 11 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS575 | April 14, 2023 | April 13, 2024 |
| 12 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | Nov. 29, 2022 | Nov. 28, 2023 |
| 13 | Broadband Preamplifier | SCHWARZBECK | BBV9718 | GTS535 | April 14, 2023 | April 13, 2024 |
| 14 | Amplifier(1GHz-26.5GHz) | HP | 8449B | GTS601 | April 14, 2023 | April 13, 2024 |
| 15 | Horn Antenna (18-26.5GHz) | / | UG-598A/U | GTS664 | Oct. 30, 2022 | Oct. 29, 2023 |
| 16 | Horn Antenna (26.5-40GHz) | A.H Systems | SAS-573 | GTS665 | Oct. 30, 2022 | Oct. 29, 2023 |
| 17 | FSV·Signal Analyzer (10Hz-40GHz) | Keysight | FSV-40-N | GTS666 | March 13, 2023 | March 12, 2024 |
| 18 | Amplifier | / | LNA-1000-30S | GTS650 | April 14, 2023 | April 13, 2024 |
| 19 | CDNE M2+M3-16A | HCT | 30MHz-300MHz | GTS668 | Dec. 20,2022 | Dec.19,2023 |

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | GTS252 | July 12, 2022 | July 11, 2027 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | April 14, 2023 | April 13, 2024 |
| 3 | LISN | ROHDE & SCHWARZ | ENV216 | GTS226 | April 14, 2023 | April 13, 2024 |
| 4 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 5 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 6 | Thermo meter | JINCHUANG | GSP-8A | GTS639 | April 18, 2023 | April 17, 2024 |
| 7 | Absorbing clamp | Elektronik-Feinmechanik | MDS21 | GTS229 | April 14, 2023 | April 13, 2024 |
| 8 | ISN | SCHWARZBECK | NTFM 8158 | GTS565 | April 14, 2023 | April 13, 2024 |
| 9 | High voltage probe | SCHWARZBECK | TK9420 | GTS537 | April 14, 2023 | April 13, 2024 |
| 10 | Antenna end assembly | Weinschel | 1870A | GTS560 | April 14, 2023 | April 13, 2024 |

| RF Conducted Test: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | MXA Signal Analyzer | Agilent | N9020A | GTS566 | April 14, 2023 | April 13, 2024 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | April 14, 2023 | April 13, 2024 |
| 3 | Spectrum Analyzer | KEYSIGHT | N9010A-44 | MY51440158 | April 14, 2023 | April 13, 2024 |
| 4 | MXG vector Signal Generator | Agilent | N5182A | GTS567 | April 14, 2023 | April 13, 2024 |
| 5 | ESG Analog Signal Generator | Agilent | E4428C | GTS568 | April 14, 2023 | April 13, 2024 |
| 6 | USB RF Power Sensor | DARE | RPR3006W | GTS569 | April 14, 2023 | April 13, 2024 |
| 7 | RF Switch Box | Shongyi | RFSW3003328 | GTS571 | April 14, 2023 | April 13, 2024 |
| 8 | Programmable Constant Temp & Humi Test Chamber | WEWON | WHTH-150L-40-880 | GTS572 | April 14, 2023 | April 13, 2024 |

| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | KTJ | TA328 | GTS243 | April 18, 2023 | April 17, 2024 |
| 2 | Barometer | KUMAO | SF132 | GTS647 | April 19, 2023 | April 18, 2024 |

# 7 Test results and Measurement Data

## 7.1 Antenna requirement

| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|---|---|
| **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(c) (1)(i) requirement:**<br>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi. | |
| **EUT Antenna:** | |
| The antenna is Internal antenna, reference to the appendix II for details | |

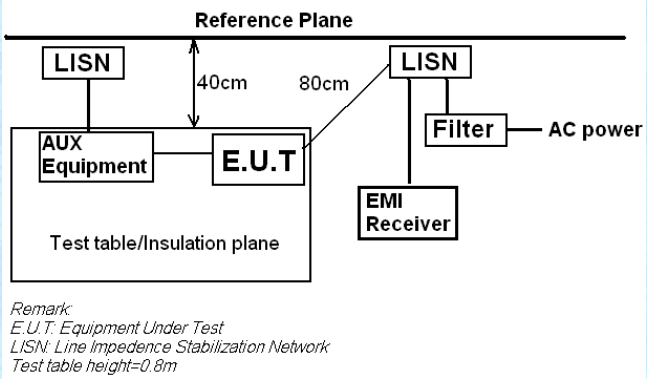
## 7.2 Conducted Emissions

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.207 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 150KHz to 30MHz |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto |
| 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 setup:




Test procedure:

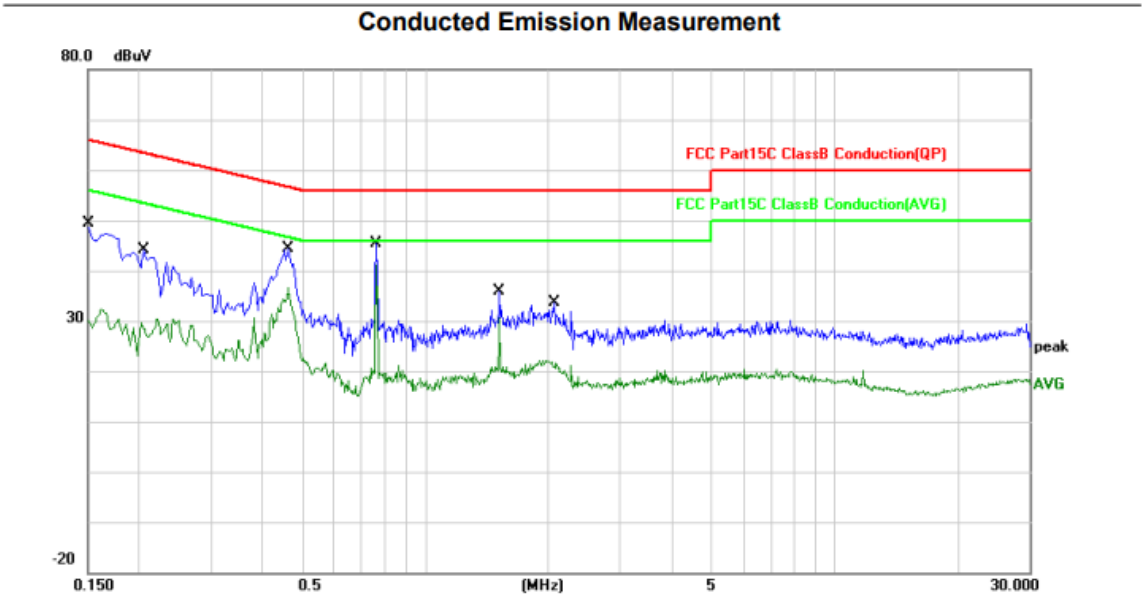
1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
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 C63.10:2013 on conducted measurement.

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.2 for details | | | | | |
| Test environment: | Temp.: | 23.9 °C | Humid.: | 52% | Press.: | 1012mbar |
| Test voltage: | AC 120V, 60Hz | | | | | |
| Test results: | Pass | | | | | |

**Measurement data**

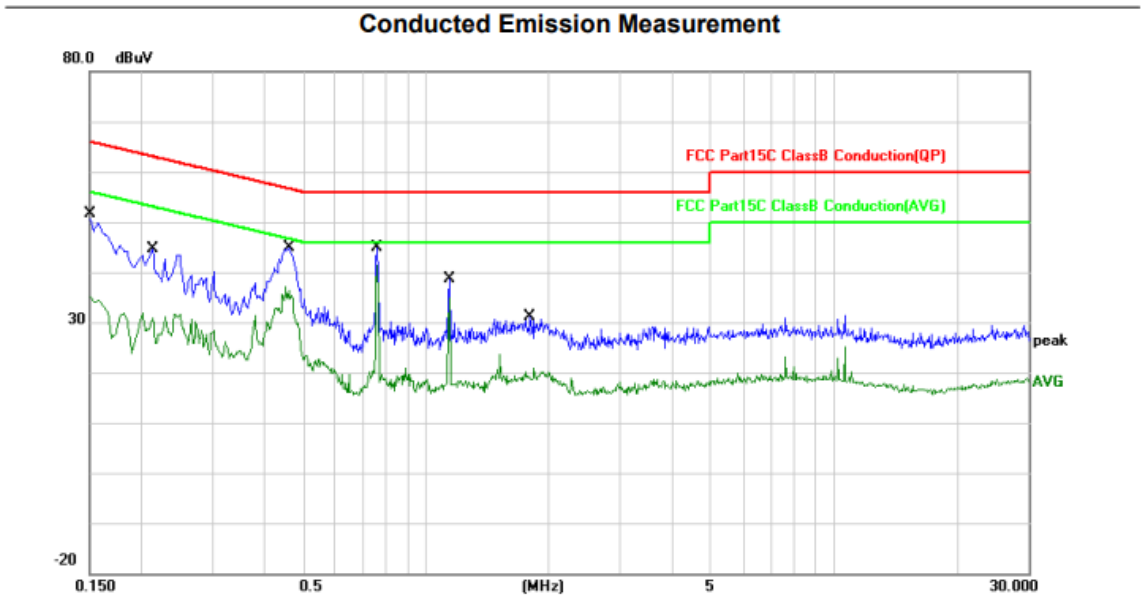
We only recorded the data of the worst mode. Please see the following:

**Line:**




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1500 | 26.17 | 19.88 | 46.05 | 66.00 | -19.95 | QP | |
| 2 | | 0.1500 | 10.64 | 19.88 | 30.52 | 56.00 | -25.48 | AVG | |
| 3 | | 0.2060 | 19.28 | 19.88 | 39.16 | 63.37 | -24.21 | QP | |
| 4 | | 0.2060 | 6.79 | 19.88 | 26.67 | 53.37 | -26.70 | AVG | |
| 5 | | 0.4620 | 22.40 | 19.88 | 42.28 | 56.66 | -14.38 | QP | |
| 6 | | 0.4620 | 14.73 | 19.88 | 34.61 | 46.66 | -12.05 | AVG | |
| 7 | | 0.7620 | 22.81 | 19.88 | 42.69 | 56.00 | -13.31 | QP | |
| 8 | * | 0.7620 | 21.35 | 19.88 | 41.23 | 46.00 | -4.77 | AVG | |
| 9 | | 1.5220 | 12.29 | 19.90 | 32.19 | 56.00 | -23.81 | QP | |
| 10 | | 1.5220 | 4.47 | 19.90 | 24.37 | 46.00 | -21.63 | AVG | |
| 11 | | 2.0740 | 6.11 | 19.91 | 26.02 | 56.00 | -29.98 | QP | |
| 12 | | 2.0740 | 0.53 | 19.91 | 20.44 | 46.00 | -25.56 | AVG | |

**Neutral:**

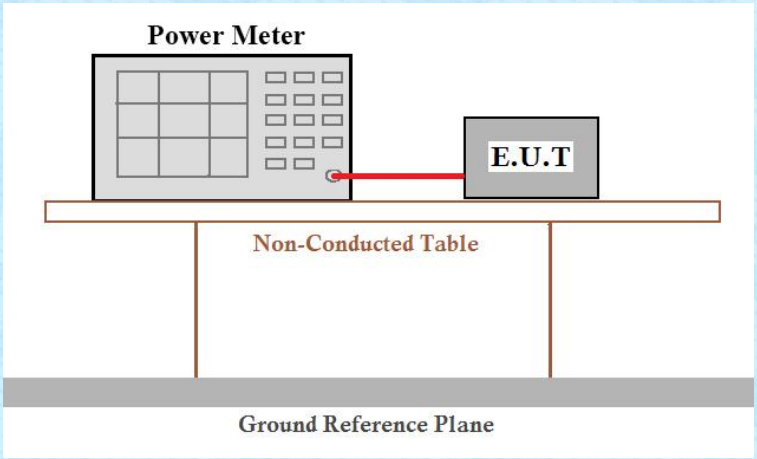



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1500 | 26.29 | 19.88 | 46.17 | 66.00 | -19.83 | QP | |
| 2 | | 0.1500 | 11.58 | 19.88 | 31.46 | 56.00 | -24.54 | AVG | |
| 3 | | 0.2140 | 19.01 | 19.88 | 38.89 | 63.05 | -24.16 | QP | |
| 4 | | 0.2140 | 7.80 | 19.88 | 27.68 | 53.05 | -25.37 | AVG | |
| 5 | | 0.4620 | 23.29 | 19.88 | 43.17 | 56.66 | -13.49 | QP | |
| 6 | | 0.4620 | 15.67 | 19.88 | 35.55 | 46.66 | -11.11 | AVG | |
| 7 | | 0.7620 | 23.26 | 19.88 | 43.14 | 56.00 | -12.86 | QP | |
| 8 | * | 0.7620 | 21.87 | 19.88 | 41.75 | 46.00 | -4.25 | AVG | |
| 9 | | 1.1420 | 15.49 | 19.89 | 35.38 | 56.00 | -20.62 | QP | |
| 10 | | 1.1420 | 3.97 | 19.89 | 23.86 | 46.00 | -22.14 | AVG | |
| 11 | | 1.8060 | 2.95 | 19.90 | 22.85 | 56.00 | -33.15 | QP | |
| 12 | | 1.8060 | -2.02 | 19.90 | 17.88 | 46.00 | -28.12 | AVG | |

Notes:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement – Limit
4. Simultaneous transmitting: 2.4G Wifi transmitting + 5G Wifi transmitting
5. Worst Case Operating Mode: Simultaneous transmitting

## 7.3 Conducted Output Power

| | |
|---|---|
| Test Requirement : | FCC Part15 C Section 15.247 (b)(3) |
| Test Method : | KDB558074 D01 15.247 Meas Guidance v05r02<br>FCC KDB 662911 D01 Multiple Transmitter Output v02r01 |
| Limit: | 30dBm |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:**

No beamforming

| Test Mode | Antenna | Frequency[MHz] | Peak power[dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| 11B-CDD | Ant1 | 2412 | 16.41 | ≤29.34 | PASS |
| | Ant2 | 2412 | 15.13 | ≤29.34 | PASS |
| | total | 2412 | **18.83** | ≤29.34 | PASS |
| | Ant1 | 2437 | 16.39 | ≤29.34 | PASS |
| | Ant2 | 2437 | 15.01 | ≤29.34 | PASS |
| | total | 2437 | 18.76 | ≤29.34 | PASS |
| | Ant1 | 2462 | 16.16 | ≤29.34 | PASS |
| | Ant2 | 2462 | 14.95 | ≤29.34 | PASS |
| | total | 2462 | 18.61 | ≤29.34 | PASS |
| 11G-CDD | Ant1 | 2412 | 16.39 | ≤29.34 | PASS |
| | Ant2 | 2412 | 14.51 | ≤29.34 | PASS |
| | total | 2412 | 18.56 | ≤29.34 | PASS |
| | Ant1 | 2437 | 16.37 | ≤29.34 | PASS |
| | Ant2 | 2437 | 15.00 | ≤29.34 | PASS |
| | total | 2437 | 18.75 | ≤29.34 | PASS |
| | Ant1 | 2462 | 16.07 | ≤29.34 | PASS |
| | Ant2 | 2462 | 15.32 | ≤29.34 | PASS |
| | total | 2462 | 18.72 | ≤29.34 | PASS |
| 11N20MIMO | Ant1 | 2412 | 16.60 | ≤29.34 | PASS |
| | Ant2 | 2412 | 14.63 | ≤29.34 | PASS |
| | total | 2412 | 18.74 | ≤29.34 | PASS |
| | Ant1 | 2437 | 16.30 | ≤29.34 | PASS |
| | Ant2 | 2437 | 14.89 | ≤29.34 | PASS |
| | total | 2437 | 18.66 | ≤29.34 | PASS |

| | | | | | |
|---|---|---|---|---|---|
| | Ant1 | 2462 | 16.19 | ≤29.34 | PASS |
| | Ant2 | 2462 | 15.19 | ≤29.34 | PASS |
| | total | 2462 | 18.73 | ≤29.34 | PASS |
| 11N40MIMO | Ant1 | 2422 | 16.16 | ≤29.34 | PASS |
| | Ant2 | 2422 | 14.69 | ≤29.34 | PASS |
| | total | 2422 | 18.50 | ≤29.34 | PASS |
| | Ant1 | 2437 | 16.44 | ≤29.34 | PASS |
| | Ant2 | 2437 | 14.71 | ≤29.34 | PASS |
| | total | 2437 | 18.67 | ≤29.34 | PASS |
| | Ant1 | 2452 | 16.21 | ≤29.34 | PASS |
| | Ant2 | 2452 | 14.67 | ≤29.34 | PASS |
| | total | 2452 | 18.52 | ≤29.34 | PASS |
| 11AX20MIMO | Ant1 | 2412 | 15.87 | ≤29.34 | PASS |
| | Ant2 | 2412 | 14.19 | ≤29.34 | PASS |
| | total | 2412 | 18.12 | ≤29.34 | PASS |
| | Ant1 | 2437 | 15.66 | ≤29.34 | PASS |
| | Ant2 | 2437 | 14.08 | ≤29.34 | PASS |
| | total | 2437 | 17.95 | ≤29.34 | PASS |
| | Ant1 | 2462 | 15.07 | ≤29.34 | PASS |
| | Ant2 | 2462 | 14.41 | ≤29.34 | PASS |
| | total | 2462 | 17.76 | ≤29.34 | PASS |
| 11AX40MIMO | Ant1 | 2422 | 16.31 | ≤29.34 | PASS |
| | Ant2 | 2422 | 14.11 | ≤29.34 | PASS |
| | total | 2422 | 18.36 | ≤29.34 | PASS |
| | Ant1 | 2437 | 15.62 | ≤29.34 | PASS |
| | Ant2 | 2437 | 14.01 | ≤29.34 | PASS |
| | total | 2437 | 17.90 | ≤29.34 | PASS |
| | Ant1 | 2452 | 15.57 | ≤29.34 | PASS |
| | Ant2 | 2452 | 13.99 | ≤29.34 | PASS |
| | total | 2452 | 17.86 | ≤29.34 | PASS |

| Frequency[MHz] | ANT 1 Antenna Gain (dBi) | ANT 2 Antenna Gain (dBi) | Correlated chains directional gain (dBi) | Peak Power Limit (dBm) |
|---|---|---|---|---|
| 2412-2462 | 4.39 | 2.75 | 6.66 | 29.34 |

Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1$, $G_2$, …, $G_N$ dBi
If transmit signals are correlated, then Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi
[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]
2412-2462: Directional gain = 10log[$(10^{4.39/20} + 10^{2.75/20})^2/N_{ANT}$] dBi=6.66

**Beamforming**

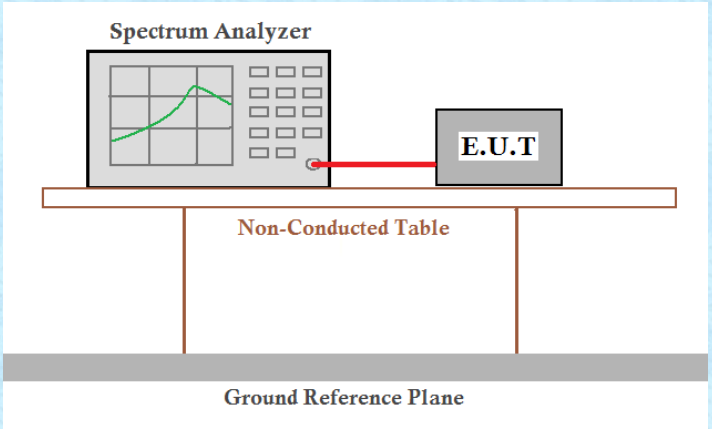
| Test Mode | Antenna | Frequency[MHz] | Peak power[dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|
| 11B-CDD | Ant1 | 2412 | 12.36 | ≤26.84 | PASS |
| | Ant2 | 2412 | 11.86 | ≤26.84 | PASS |
| | total | 2412 | 17.63 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.36 | ≤26.84 | PASS |
| | Ant2 | 2437 | 11.86 | ≤26.84 | PASS |
| | total | 2437 | 17.60 | ≤26.84 | PASS |
| | Ant1 | 2462 | 12.67 | ≤26.84 | PASS |
| | Ant2 | 2462 | 11.99 | ≤26.84 | PASS |
| | total | 2462 | 17.85 | ≤26.84 | PASS |
| 11G-CDD | Ant1 | 2412 | 12.58 | ≤26.84 | PASS |
| | Ant2 | 2412 | 12.28 | ≤26.84 | PASS |

| | | | | | |
|---|---|---|---|---|---|
| | total | 2412 | 17.94 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.67 | ≤26.84 | PASS |
| | Ant2 | 2437 | 12.02 | ≤26.84 | PASS |
| | total | 2437 | 17.87 | ≤26.84 | PASS |
| | Ant1 | 2462 | 12.83 | ≤26.84 | PASS |
| | Ant2 | 2462 | 12.38 | ≤26.84 | PASS |
| | total | 2462 | 18.12 | ≤26.84 | PASS |
| 11N20MIMO | Ant1 | 2412 | 12.49 | ≤26.84 | PASS |
| | Ant2 | 2412 | 11.98 | ≤26.84 | PASS |
| | total | 2412 | 17.75 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.49 | ≤26.84 | PASS |
| | Ant2 | 2437 | 12.08 | ≤26.84 | PASS |
| | total | 2437 | 17.80 | ≤26.84 | PASS |
| | Ant1 | 2462 | 12.73 | ≤26.84 | PASS |
| | Ant2 | 2462 | 12.30 | ≤26.84 | PASS |
| | total | 2462 | 18.03 | ≤26.84 | PASS |
| 11N40MIMO | Ant1 | 2422 | 12.44 | ≤26.84 | PASS |
| | Ant2 | 2422 | 11.99 | ≤26.84 | PASS |
| | total | 2422 | 17.73 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.38 | ≤26.84 | PASS |
| | Ant2 | 2437 | 11.90 | ≤26.84 | PASS |
| | total | 2437 | 17.66 | ≤26.84 | PASS |
| | Ant1 | 2452 | 12.67 | ≤26.84 | PASS |
| | Ant2 | 2452 | 12.11 | ≤26.84 | PASS |
| | total | 2452 | 17.91 | ≤26.84 | PASS |
| 11AX20MIMO | Ant1 | 2412 | 12.66 | ≤26.84 | PASS |
| | Ant2 | 2412 | 12.26 | ≤26.84 | PASS |
| | total | 2412 | 17.97 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.45 | ≤26.84 | PASS |
| | Ant2 | 2437 | 11.86 | ≤26.84 | PASS |
| | total | 2437 | 17.67 | ≤26.84 | PASS |
| | Ant1 | 2462 | 12.32 | ≤26.84 | PASS |
| | Ant2 | 2462 | 11.99 | ≤26.84 | PASS |
| | total | 2462 | 17.67 | ≤26.84 | PASS |
| 11AX40MIMO | Ant1 | 2422 | 12.50 | ≤26.84 | PASS |
| | Ant2 | 2422 | 12.09 | ≤26.84 | PASS |
| | total | 2422 | 17.81 | ≤26.84 | PASS |
| | Ant1 | 2437 | 12.52 | ≤26.84 | PASS |
| | Ant2 | 2437 | 12.10 | ≤26.84 | PASS |
| | total | 2437 | 17.83 | ≤26.84 | PASS |
| | Ant1 | 2452 | 12.57 | ≤26.84 | PASS |
| | Ant2 | 2452 | 12.06 | ≤26.84 | PASS |
| | total | 2452 | 17.84 | ≤26.84 | PASS |

| Frequency (MHz) | ANT 1 Antenna Gain (dBi) | ANT 2 Antenna Gain (dBi) | Beamforming gain(dB) | Correlated chains directional gain (dBi) | Power Limit (dBm) |
|---|---|---|---|---|---|
| 2412-2462 | 4.39 | 2.75 | 2.5 | 9.16 | 26.84 |

| |
|---|
| Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1$, $G_2$, …, $G_N$ dBi<br>If transmit signals are correlated, then Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi<br>[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]<br>Directional gain = 10log[$(10^{4.67/20} + 10^{2.75/20})^2/N_{ANT}$] dBi=6.66 |
| Correlated chains directional gain= Directional gain+ Beamforming gain=6.66+2.5=9.16dBi |

## 7.4 Channel Bandwidth

| | |
|---|---|
| Test Requirement : | FCC Part15 C Section 15.247 (a)(2) |
| Test Method : | KDB558074 D01 15.247 Meas Guidance v05r02 |
| Limit: | >500KHz |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:**

DTS Bandwidth

| Test Mode | Antenna | Frequency[MHz] | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| 11B-CDD | Ant1 | 2412 | 7.880 | 2408.160 | 2416.040 | 0.5 | PASS |
| | Ant2 | 2412 | 8.000 | 2407.960 | 2415.960 | 0.5 | PASS |
| | Ant1 | 2437 | 7.400 | 2433.480 | 2440.880 | 0.5 | PASS |
| | Ant2 | 2437 | 7.120 | 2433.440 | 2440.560 | 0.5 | PASS |
| | Ant1 | 2462 | 7.360 | 2458.000 | 2465.360 | 0.5 | PASS |
| | Ant2 | 2462 | 7.240 | 2458.000 | 2465.240 | 0.5 | PASS |
| 11G-CDD | Ant1 | 2412 | 16.280 | 2403.840 | 2420.120 | 0.5 | PASS |
| | Ant2 | 2412 | 16.320 | 2403.840 | 2420.160 | 0.5 | PASS |
| | Ant1 | 2437 | 15.080 | 2429.840 | 2444.920 | 0.5 | PASS |
| | Ant2 | 2437 | 15.280 | 2429.240 | 2444.520 | 0.5 | PASS |
| | Ant1 | 2462 | 15.200 | 2454.320 | 2469.520 | 0.5 | PASS |
| | Ant2 | 2462 | 15.760 | 2453.880 | 2469.640 | 0.5 | PASS |
| 11N20MIMO | Ant1 | 2412 | 15.040 | 2404.480 | 2419.520 | 0.5 | PASS |
| | Ant2 | 2412 | 15.360 | 2404.800 | 2420.160 | 0.5 | PASS |
| | Ant1 | 2437 | 15.440 | 2429.480 | 2444.920 | 0.5 | PASS |
| | Ant2 | 2437 | 15.680 | 2428.840 | 2444.520 | 0.5 | PASS |
| | Ant1 | 2462 | 16.520 | 2453.880 | 2470.400 | 0.5 | PASS |
| | Ant2 | 2462 | 16.920 | 2453.240 | 2470.160 | 0.5 | PASS |
| 11N40MIMO | Ant1 | 2422 | 34.640 | 2404.240 | 2438.880 | 0.5 | PASS |
| | Ant2 | 2422 | 34.640 | 2405.120 | 2439.760 | 0.5 | PASS |
| | Ant1 | 2437 | 35.520 | 2419.240 | 2454.760 | 0.5 | PASS |
| | Ant2 | 2437 | 34.800 | 2419.720 | 2454.520 | 0.5 | PASS |
| | Ant1 | 2452 | 34.480 | 2435.680 | 2470.160 | 0.5 | PASS |
| | Ant2 | 2452 | 34.160 | 2435.360 | 2469.520 | 0.5 | PASS |
| 11AX20MIMO | Ant1 | 2412 | 16.120 | 2403.640 | 2419.760 | 0.5 | PASS |
| | Ant2 | 2412 | 18.720 | 2402.640 | 2421.360 | 0.5 | PASS |
| | Ant1 | 2437 | 17.800 | 2428.360 | 2446.160 | 0.5 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Ant2 | 2437 | 15.400 | 2430.080 | 2445.480 | 0.5 | PASS |
| | Ant1 | 2462 | 15.600 | 2454.800 | 2470.400 | 0.5 | PASS |
| | Ant2 | 2462 | 17.560 | 2452.760 | 2470.320 | 0.5 | PASS |
| 11AX40MIMO | Ant1 | 2422 | 32.480 | 2404.480 | 2436.960 | 0.5 | PASS |
| | Ant2 | 2422 | 35.360 | 2405.680 | 2441.040 | 0.5 | PASS |
| | Ant1 | 2437 | 34.880 | 2420.120 | 2455.000 | 0.5 | PASS |
| | Ant2 | 2437 | 32.400 | 2423.000 | 2455.400 | 0.5 | PASS |
| | Ant1 | 2452 | 34.160 | 2436.400 | 2470.560 | 0.5 | PASS |
| | Ant2 | 2452 | 33.200 | 2433.680 | 2466.880 | 0.5 | PASS |

11B-CDD_Ant1_2412

11B-CDD_Ant2_2412

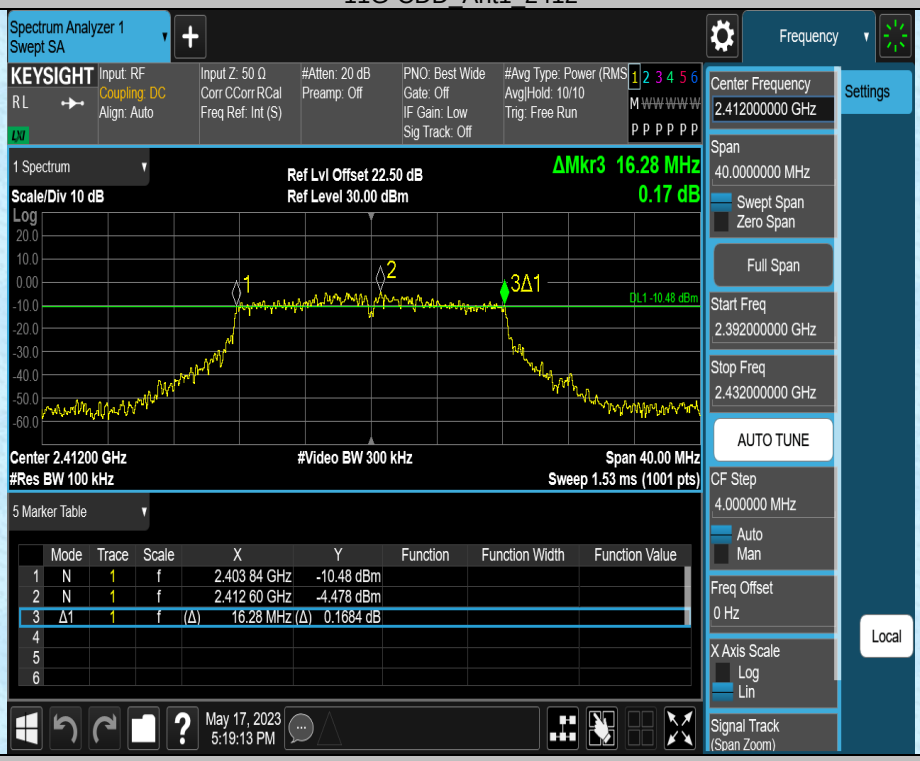
11B-CDD_Ant1_2437

11B-CDD_Ant2_2437

11B-CDD_Ant1_2462

11B-CDD_Ant2_2462

11G-CDD_Ant1_2412




11G-CDD_Ant2_2412

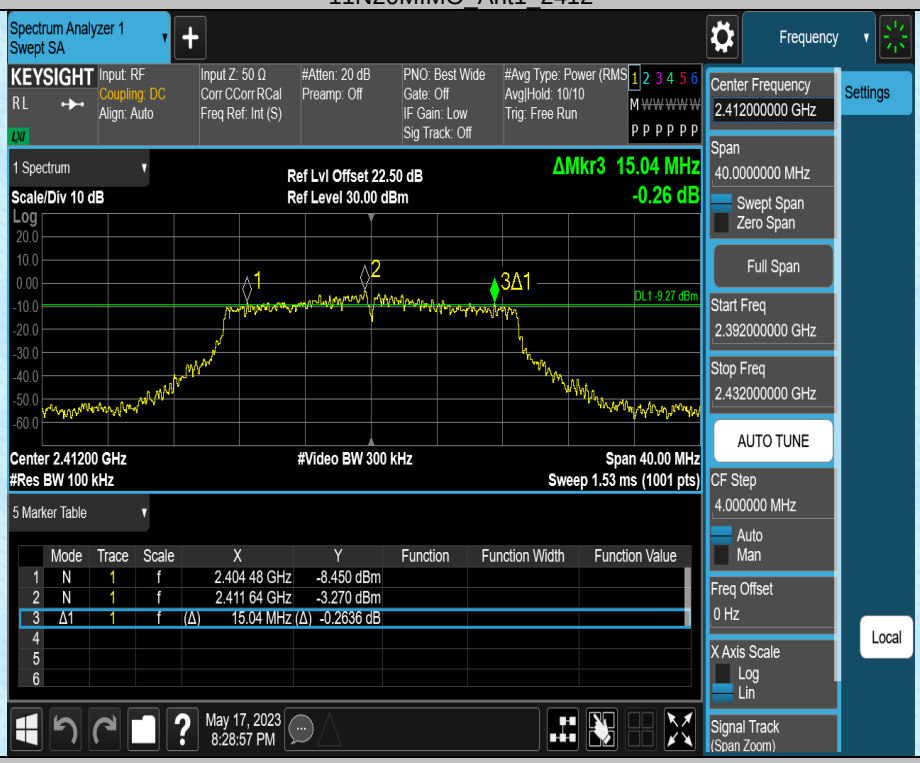
11G-CDD_Ant1_2437

11G-CDD_Ant2_2437

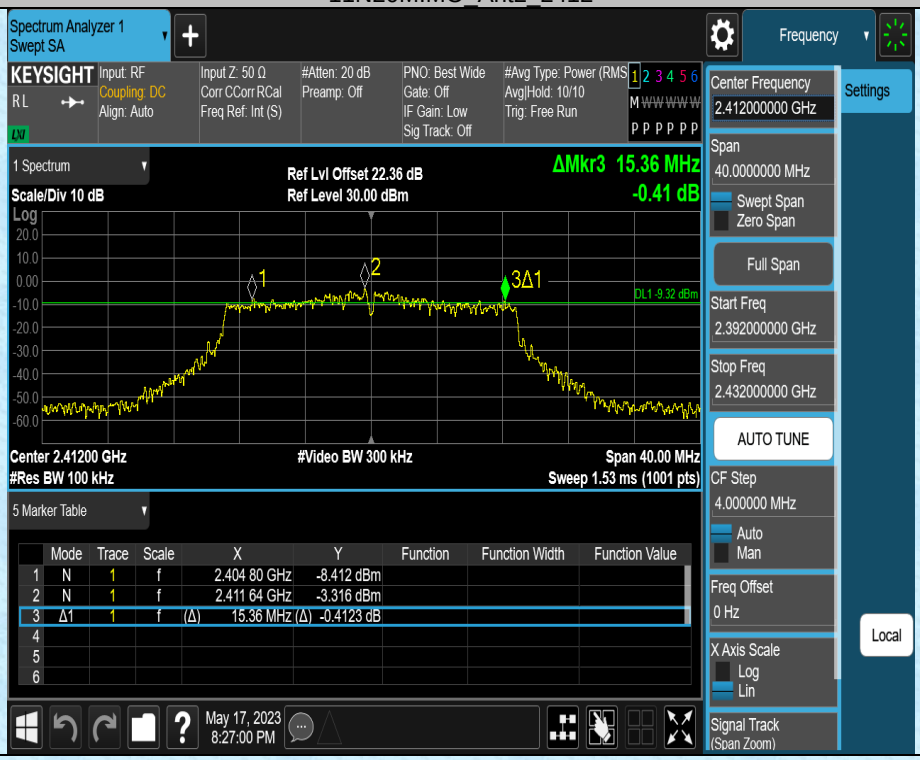
11G-CDD_Ant1_2462

11G-CDD_Ant2_2462

11N20MIMO_Ant1_2412




11N20MIMO_Ant2_2412



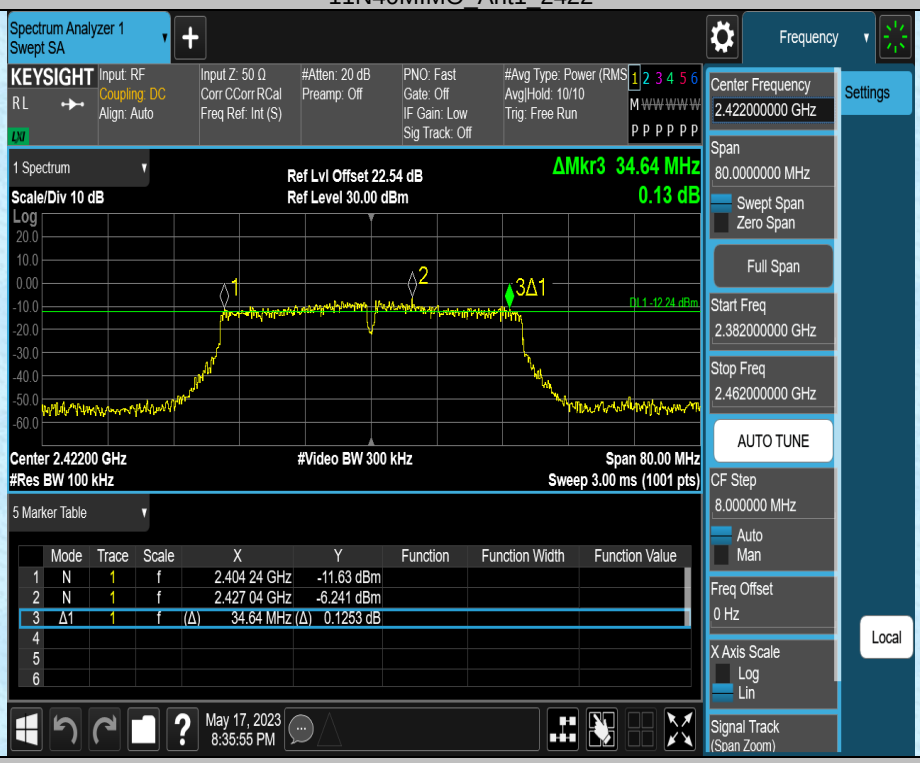
11N20MIMO_Ant1_2437

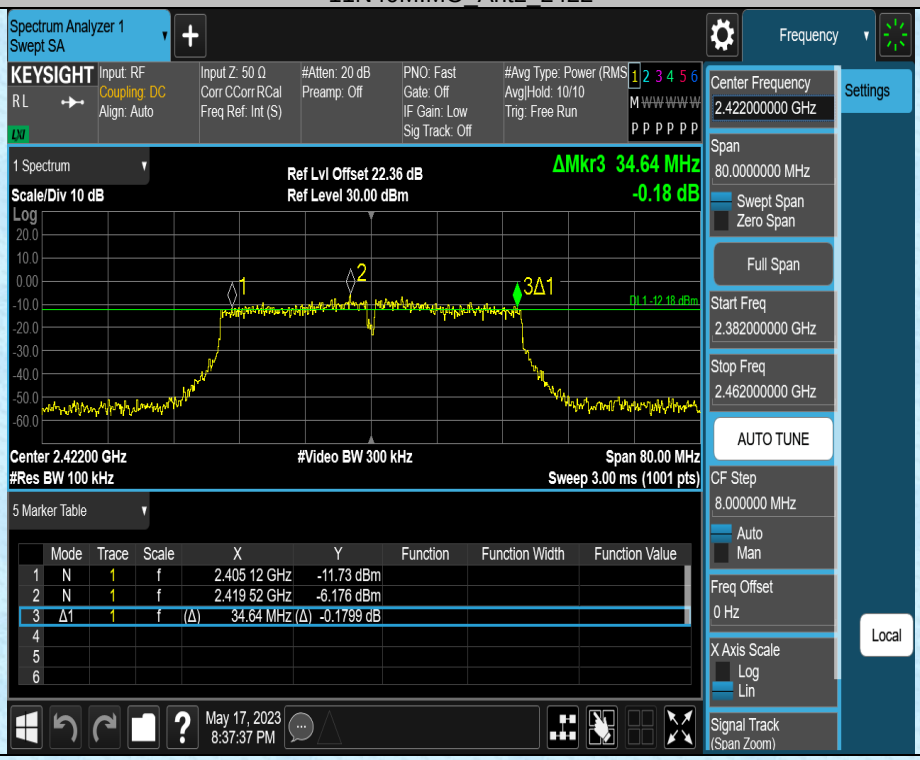
11N20MIMO_Ant2_2437

11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462

11N40MIMO_Ant1_2422




11N40MIMO_Ant2_2422