



FCC RADIO TEST REPORT

FCC ID : PKRISGM2000B
Equipment : Wireless Hotspot Modem
Brand Name : Inseego
Model Name : M2000B
Marketing Name : M2000
Applicant : Inseego Corporation
9710 Scranton Road Suite 200, San Diego, CA 92121
Manufacturer : Inseego Corporation
9710 Scranton Road Suite 200, San Diego, CA 92121
Standard : FCC Part 15 Subpart E §15.407

The product was received on Jul. 30, 2020 and testing was started from Aug. 14, 2020 and completed on Sep. 14, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|---------------------|--|--------------------|--|
| - | 15.403 (i) | 6dB & 26dB Bandwidth | Not Required | - |
| - | 2.1049 | 99% Occupied Bandwidth | Not Required | - |
| 3.1 | 15.407 (a) | Maximum Conducted Output Power | Pass | - |
| - | 15.407 (a) | Power Spectral Density | Not Required | - |
| 3.2 | 15.407(b) | Unwanted Emissions | Pass | Under limit 8.39 dB at 888.450 MHz |
| 3.3 | 15.207 | AC Conducted Emission | Pass | Under limit 15.11 dB at 0.154 MHz |
| - | 15.407 (c) | Automatically Discontinue Transmission | Not Required | - |
| 3.4 | 15.203 & 15.407 (a) | Antenna Requirement | Pass | - |

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report, please refer to the Declaration of Similarity Letter provided by the applicant for the deviation against its parent model. All the test cases were performed on original report which can be referred to Sporton Report Number FR041657C as appendix G. Based on the original report, the test cases were verified.

| |
|--|
| Declaration of Conformity: |
| The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. |
| Comments and Explanations: |
| The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. |

Reviewed by: Wii Chang
Report Producer: Amy Chen



1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, and GNSS.

| Product Specification subjective to this standard | |
|---|--|
| Antenna Type | WWAN: Fixed Internal Antenna WLAN: <Ant. 0>: Fixed Internal Antenna <Ant. 1>: Fixed Internal Antenna GPS: Fixed Internal Antenna |

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

| | | |
|--------------------|---|---------|
| Test Site | SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory | |
| Test Site Location | No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978 | |
| Test Site No. | Sporton Site No. | |
| | TH05-HY | CO05-HY |

Note: The test site complies with ANSI C63.4 2014 requirement.

| | | |
|--------------------|---|--|
| Test Site | SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory | |
| Test Site Location | No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855 | |
| Test Site No. | Sporton Site No. | |
| | 03CH15-HY | |

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190 and TW0007



1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

- b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

| Frequency Band | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|--------------------------------------|---------|-------------|---------|-------------|
| 5725-5850 MHz Band 4 (U-NII-3) | 149 | 5745 | 157 | 5785 |
| | 151* | 5755 | 159* | 5795 |
| | 153 | 5765 | 161 | 5805 |
| | 155# | 5775 | 165 | 5825 |

Note:

- 1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
- 2. The above Frequency and Channel in "#n" were 802.11ac VHT80.



2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

| Modulation | Data Rate |
|----------------|-----------|
| 802.11a | 6 Mbps |
| 802.11n HT20 | MCS0 |
| 802.11n HT40 | MCS0 |
| 802.11ac VHT20 | MCS0 |
| 802.11ac VHT40 | MCS0 |
| 802.11ac VHT80 | MCS0 |
| 802.11ax HE20 | MCS0 |
| 802.11ax HE40 | MCS0 |
| 802.11ax HE80 | MCS0 |

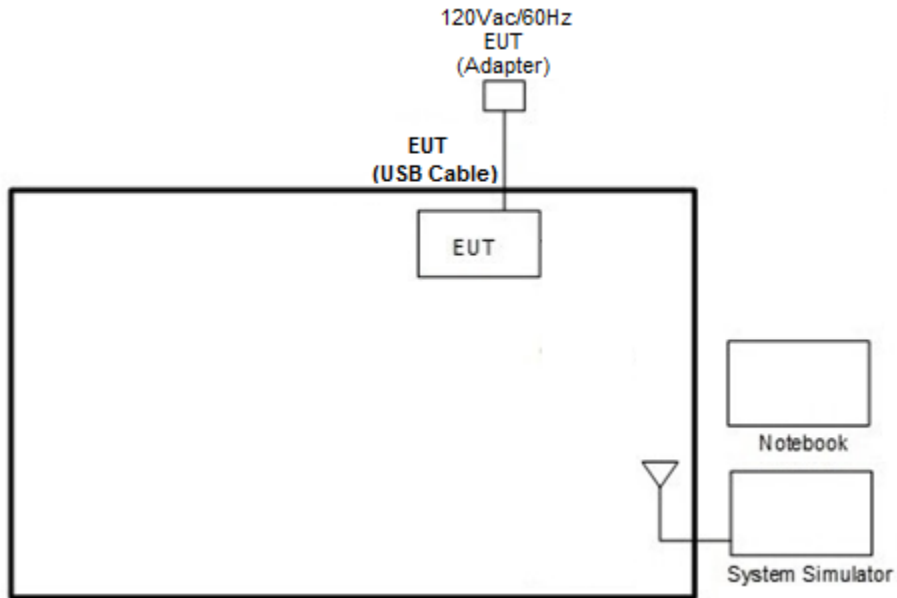
| Test Cases | |
|--|--|
| AC Conducted Emission | Mode 1 : WCDMA Band V Idle + WLAN (5GHz) Link + Battery 1 + USB Cable (Charging from AC Adapter) |
| Remark: For Radiated Test Cases, the tests were performed with Battery 2. | |

| Ch. # | | Band IV : 5725-5850 MHz |
|-------|--------|-------------------------|
| | | 802.11ax HE20 |
| L | Low | - |
| M | Middle | - |
| H | High | 165 |

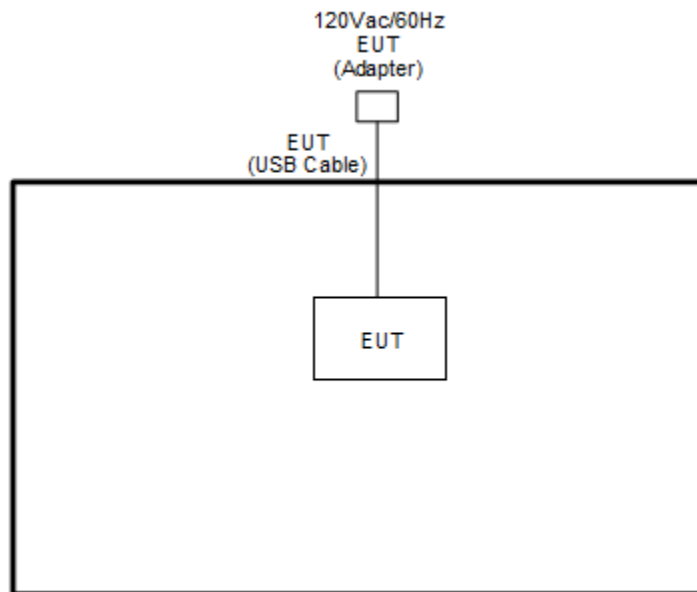
Remark: For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.

2.3 Connection Diagram of Test System

<AC Conducted Emission Mode>



<WLAN Tx Mode>





2.4 Support Unit used in test configuration and system

| Item | Equipment | Brand Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|---------------|---------|------------|--|
| 1. | System Simulator | Anritsu | MT8820C | N/A | N/A | Unshielded, 1.8 m |
| 2. | Notebook | Dell | Latitude 3400 | FCC DoC | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |

2.5 EUT Operation Test Setup

The RF test items, utility "QRCT V4.0.00156.0" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

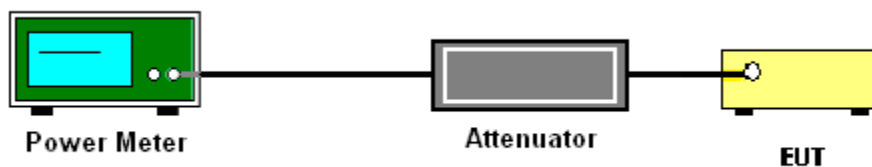
3.1.3 Test Procedures

The testing follows Method PM-G of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Method PM-G (Measurement using a gated RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit at its maximum power control level.
3. Measure the average power of the transmitter
4. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.2 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5.725-5.85 GHz band:
 15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

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

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$



| EIRP (dBm) | Field Strength at 3m (dBμV/m) |
|------------|-------------------------------|
| - 27 | 68.3 |

(3) KDB789033 D02 v02r01 G)2)c)

- (i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.
- (ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

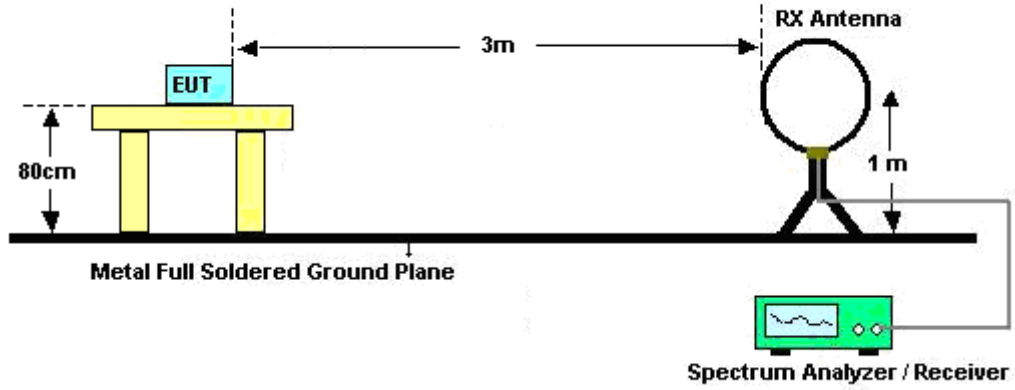
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



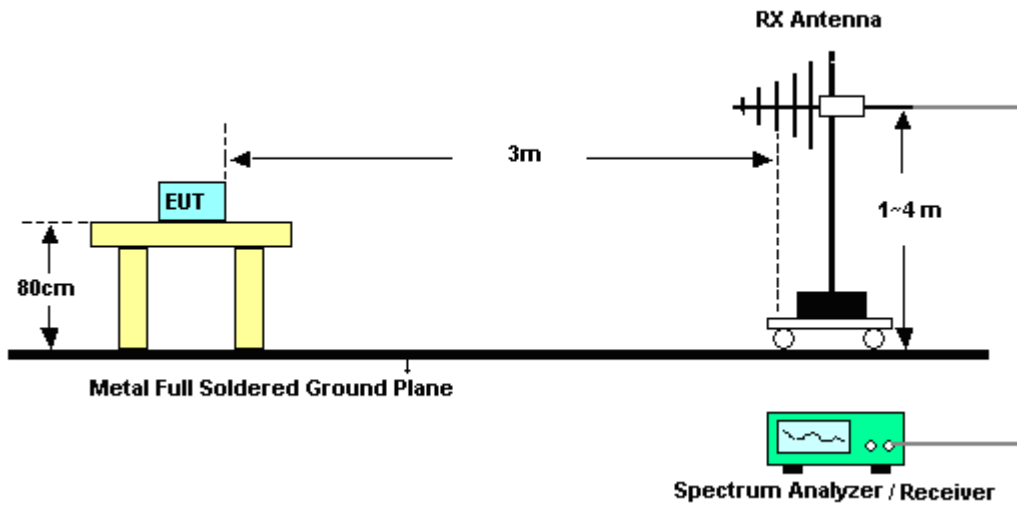
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.4 Test Setup

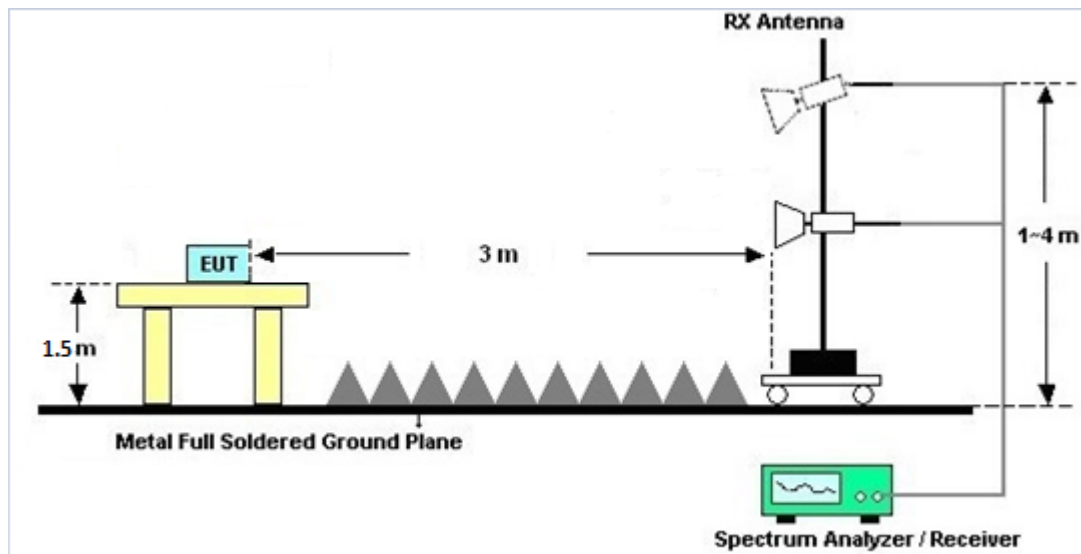
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.2.6 Test Result of Radiated Band Edges

Please refer to Appendix C and D.

3.2.7 Duty Cycle

Please refer to Appendix E.

3.2.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.



3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dB μ V) | |
|-----------------------------|------------------------------|-----------|
| | 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.

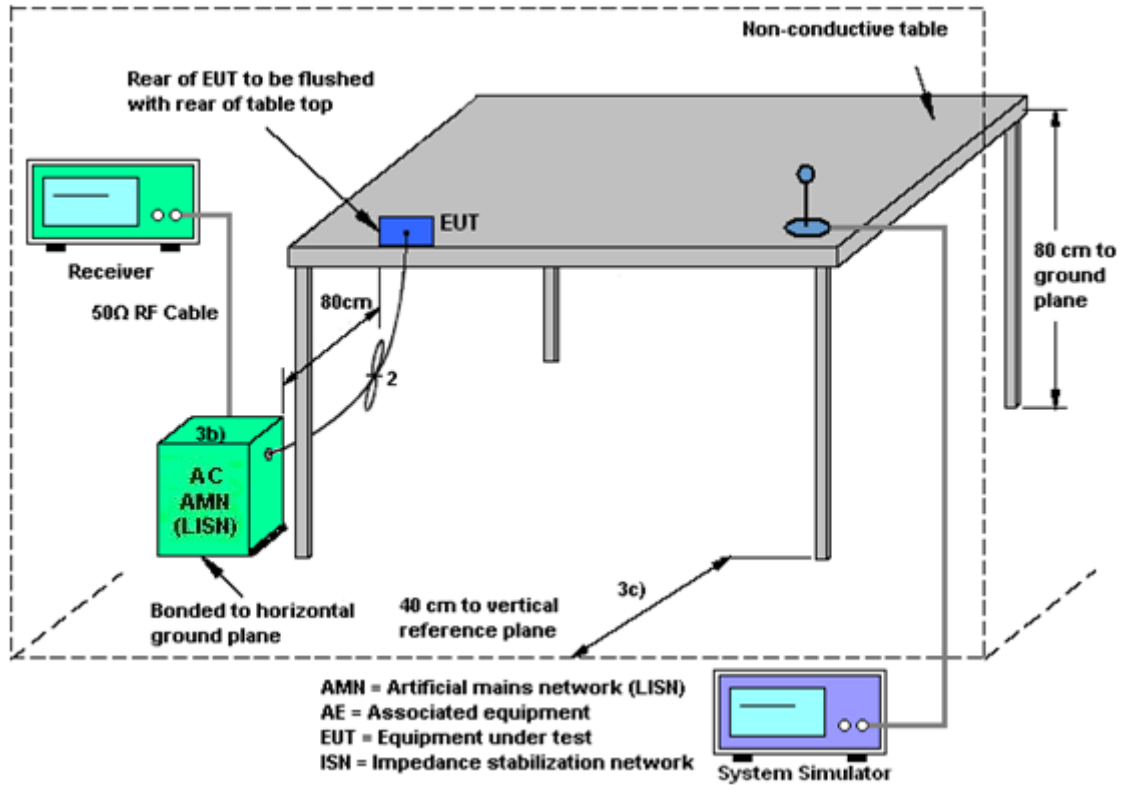
3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

3.3.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.3.4 Test Setup



3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.4 Antenna Requirements

3.4.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

| Instrument | Brand Name | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|----------------------------|-------------------|--------------------------------------|----------------------|-----------------------------|------------------|---------------------------------|---------------|--------------------------|
| Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 100488 | 9 kHz~30 MHz | Jan. 09, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Jan. 08, 2021 | Radiation (03CH15-HY) |
| Bilog Antenna | TESEQ | CBL6111D&008 00N1D01N-06 | 41912&05 | 30MHz to 1GHz | Feb. 09, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Feb. 08, 2021 | Radiation (03CH15-HY) |
| Amplifier | SONOMA | 310N | 363440 | 9kHz~1GHz | Dec. 27, 2019 | Sep. 13, 2020~ Sep. 14, 2020 | Dec. 26, 2020 | Radiation (03CH15-HY) |
| Horn Antenna | SCHWARZBE CK | BBHA 9120 D | 9120D-1620 | 1-18GHz | Oct. 28, 2019 | Sep. 13, 2020~ Sep. 14, 2020 | Oct. 27, 2020 | Radiation (03CH15-HY) |
| SHF-EHF Horn Antenna | SCHWARZBE CK | BBHA 9170 | BBHA917058 4 | 18GHz- 40GHz | Dec. 10, 2019 | Sep. 13, 2020~ Sep. 14, 2020 | Dec. 09, 2020 | Radiation (03CH15-HY) |
| Preamplifier | Jet-Power | JPA0118-55-303 | 1710001800 055006 | 1GHz~18GHz | May 07, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | May 06, 2021 | Radiation (03CH15-HY) |
| Preamplifier | Keysight | 83017A | MY53270195 | 1GHz~26.5GHz | Aug. 21, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Aug. 20, 2021 | Radiation (03CH15-HY) |
| Preamplifier | EMEC | EM18G40G | 060715 | 18GHz ~ 40GHz | Dec. 13, 2019 | Sep. 13, 2020~ Sep. 14, 2020 | Dec. 12, 2020 | Radiation (03CH15-HY) |
| EMI Test Receiver | Keysight | N9038A(MXE) | MY54130085 | 20MHz~8.4GHz | Nov. 01, 2019 | Sep. 13, 2020~ Sep. 14, 2020 | Oct. 31, 2020 | Radiation (03CH15-HY) |
| Spectrum Analyzer | Agilent | E4446A | MY50180136 | 3Hz~44GHz | May 04, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | May 03, 2021 | Radiation (03CH15-HY) |
| Antenna Mast | ChainTek | MBS-520-1 | N/A | 1m~4m | N/A | Sep. 13, 2020~ Sep. 14, 2020 | N/A | Radiation (03CH15-HY) |
| Turn Table | ChainTek | T-200-S-1 | N/A | 0~360 Degree | N/A | Sep. 13, 2020~ Sep. 14, 2020 | N/A | Radiation (03CH15-HY) |
| Software | Audix | E3 6.2009-8-24(k5) | RK-000451 | N/A | N/A | Sep. 13, 2020~ Sep. 14, 2020 | N/A | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY36980/4 | 30M-18G | Apr. 14, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Apr. 13, 2021 | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY9838/4PE | 30M-18G | Apr. 14, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Apr. 13, 2021 | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY37710/4 | 30M-18G | Apr. 17, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Apr. 16, 2021 | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 102 | 505134/2 | 30MHz-40GHz | Feb. 25, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Feb. 24, 2021 | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 102 | 800740/2 | 30MHz-40GHz | Feb. 25, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Feb. 24, 2021 | Radiation (03CH15-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 104 | MY9837/4PE | 9kHz~30MHz | Mar. 12, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Mar. 11, 2021 | Radiation (03CH15-HY) |
| Filter | Wainwright | WLK4-1000-153 0-8000-40SS | SN4 | 1.53G Low Pass | Jul. 03, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Jul. 02, 2021 | Radiation (03CH15-HY) |
| Filter | Wainwright | WHKX8-5872.5- 6750-18000-40S T | SN6 | 6.75GHz High Pass Filter | Jul. 03, 2020 | Sep. 13, 2020~ Sep. 14, 2020 | Jul. 02, 2021 | Radiation (03CH15-HY) |



| Instrument | Brand Name | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------------|-----------------|--------------|-------------------|-----------------|------------------|---------------------------------|---------------|----------------------|
| AC Power Source | ChainTek | APC-1000W | N/A | N/A | N/A | Aug. 14, 2020 | N/A | Conduction (CO05-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESR3 | 102388 | 9kHz~3.6GHz | Nov. 15, 2019 | Aug. 14, 2020 | Nov. 14, 2020 | Conduction (CO05-HY) |
| Hygrometer | Testo | 608-H1 | 34913912 | N/A | Nov. 07, 2019 | Aug. 14, 2020 | Nov. 06, 2020 | Conduction (CO05-HY) |
| LISN | Rohde & Schwarz | ENV216 | 100081 | 9kHz~30MHz | Nov. 15, 2019 | Aug. 14, 2020 | Nov. 14, 2020 | Conduction (CO05-HY) |
| Software | Rohde & Schwarz | EMC32 V10.30 | N/A | N/A | N/A | Aug. 14, 2020 | N/A | Conduction (CO05-HY) |
| LF Cable | HUBER + SUHNER | RG-214/U | LF01 | N/A | Jan. 02, 2020 | Aug. 14, 2020 | Jan. 01, 2021 | Conduction (CO05-HY) |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100851 | N/A | Jan. 02, 2020 | Aug. 14, 2020 | Jan. 01, 2021 | Conduction (CO05-HY) |
| Hygrometer | Testo | 608-H1 | 34893241 | N/A | Mar. 02, 2020 | Sep. 10, 2020~ Sep. 12, 2020 | Mar. 01, 2021 | Conducted (TH05-HY) |
| Power Sensor | DARE | RPR3006W | 16I00054SN O10 | 10MHz~6GHz | Dec. 23, 2019 | Sep. 10, 2020~ Sep. 12, 2020 | Dec. 22, 2020 | Conducted (TH05-HY) |
| Signal Analyzer | Rohde & Schwarz | FSV40 | 101397 | 10Hz~40GHz | Nov. 15, 2019 | Sep. 10, 2020~ Sep. 12, 2020 | Nov. 14, 2020 | Conducted (TH05-HY) |
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100055 | 9kHz~40GHz | Dec. 30, 2019 | Sep. 10, 2020~ Sep. 12, 2020 | Dec. 29, 2020 | Conducted (TH05-HY) |
| Switch Box & RF Cable | EM Electronics | EMSW18SE | SW200302 | N/A | Mar. 17, 2020 | Sep. 10, 2020~ Sep. 12, 2020 | Mar. 16, 2021 | Conducted (TH05-HY) |



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 2.3 |
|---|-----|

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.0 |
|---|-----|

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.4 |
|---|-----|

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

| | |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 5.0 |
|---|-----|

Appendix A. Test Result of Conducted Test Items

| | | | | |
|----------------|---------------------|--------------------|-------|----|
| Test Engineer: | Hank Hsu | Temperature: | 21~25 | °C |
| Test Date: | 2020/9/10~2020/9/12 | Relative Humidity: | 51~54 | % |

TEST RESULTS DATA
Average Power Table

| Band IV single antenna | | | | | | | | | | | | |
|------------------------|-----------|-----|-----|-------------|-------------------------------|-------|-----|---------------------------------|-------|----------|-------|-----------|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | Average Conducted Power (dBm) | | | FCC Conducted Power Limit (dBm) | | DG (dBi) | | Pass/Fail |
| | | | | | Ant 0 | Ant 1 | SUM | Ant 0 | Ant 1 | Ant 0 | Ant 1 | |
| 11a | 6Mbps | 1 | 149 | 5745 | 11.70 | 11.60 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| 11a | 6Mbps | 1 | 157 | 5785 | 11.30 | 12.20 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| 11a | 6Mbps | 1 | 165 | 5825 | 11.60 | 12.30 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HT20 | MCS0 | 1 | 149 | 5745 | 11.60 | 11.80 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HT20 | MCS0 | 1 | 157 | 5785 | 11.10 | 11.90 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HT20 | MCS0 | 1 | 165 | 5825 | 11.40 | 12.10 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HT40 | MCS0 | 1 | 151 | 5755 | 11.40 | 11.90 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HT40 | MCS0 | 1 | 159 | 5795 | 11.00 | 11.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT20 | MCS0 | 1 | 149 | 5745 | 11.50 | 11.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT20 | MCS0 | 1 | 157 | 5785 | 11.00 | 11.80 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT20 | MCS0 | 1 | 165 | 5825 | 11.30 | 12.00 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT40 | MCS0 | 1 | 151 | 5755 | 11.30 | 11.80 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT40 | MCS0 | 1 | 159 | 5795 | 10.90 | 11.60 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| VHT80 | MCS0 | 1 | 155 | 5775 | 11.70 | 11.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |

| Band IV MIMO | | | | | | | | | | | | |
|--------------|-----------|-----|-----|-------------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|-----------|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | Average Conducted Power (dBm) | | | FCC Conducted Power Limit (dBm) | | DG (dBi) | | Pass/Fail |
| | | | | | Ant 0 | Ant 1 | SUM | Ant 0 | Ant 1 | Ant 0 | Ant 1 | |
| 11a | 6Mbps | 2 | 149 | 5745 | 12.10 | 12.40 | 15.26 | 30.00 | | 4.50 | | Pass |
| 11a | 6Mbps | 2 | 157 | 5785 | 12.20 | 12.60 | 15.41 | 30.00 | | 4.50 | | Pass |
| 11a | 6Mbps | 2 | 165 | 5825 | 12.00 | 13.00 | 15.54 | 30.00 | | 4.50 | | Pass |
| HT20 | MCS0 | 2 | 149 | 5745 | 12.60 | 12.70 | 15.66 | 30.00 | | 4.50 | | Pass |
| HT20 | MCS0 | 2 | 157 | 5785 | 12.20 | 12.20 | 15.21 | 30.00 | | 4.50 | | Pass |
| HT20 | MCS0 | 2 | 165 | 5825 | 11.90 | 12.80 | 15.38 | 30.00 | | 4.50 | | Pass |
| HT40 | MCS0 | 2 | 151 | 5755 | 12.40 | 12.50 | 15.46 | 30.00 | | 4.50 | | Pass |
| HT40 | MCS0 | 2 | 159 | 5795 | 12.00 | 12.50 | 15.27 | 30.00 | | 4.50 | | Pass |
| VHT20 | MCS0 | 2 | 149 | 5745 | 12.50 | 12.60 | 15.56 | 30.00 | | 4.50 | | Pass |
| VHT20 | MCS0 | 2 | 157 | 5785 | 12.10 | 12.10 | 15.11 | 30.00 | | 4.50 | | Pass |
| VHT20 | MCS0 | 2 | 165 | 5825 | 11.80 | 12.70 | 15.28 | 30.00 | | 4.50 | | Pass |
| VHT40 | MCS0 | 2 | 151 | 5755 | 12.30 | 12.40 | 15.36 | 30.00 | | 4.50 | | Pass |
| VHT40 | MCS0 | 2 | 159 | 5795 | 11.90 | 12.40 | 15.17 | 30.00 | | 4.50 | | Pass |
| VHT80 | MCS0 | 2 | 155 | 5775 | 12.20 | 12.60 | 15.41 | 30.00 | | 4.50 | | Pass |

TEST RESULTS DATA
Average Power Table

| Band IV single antenna | | | | | | | | | | | | | |
|------------------------|-----------|-----|-----|-------------|-----------|-------------------------------|-------|-----|---------------------------------|-------|----------|-------|-----------|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | RU Config | Average Conducted Power (dBm) | | | FCC Conducted Power Limit (dBm) | | DG (dBi) | | Pass/Fail |
| | | | | | | Ant 0 | Ant 1 | SUM | Ant 0 | Ant 1 | Ant 0 | Ant 1 | |
| HE20 | MCS0 | 1 | 149 | 5745 | Full | 11.70 | 11.90 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 149 | 5745 | 26/0 | 5.60 | 6.00 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 149 | 5745 | 52/37 | 10.70 | 9.10 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 149 | 5745 | 106/53 | 12.00 | 12.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 157 | 5785 | Full | 11.20 | 12.00 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 157 | 5785 | 26/4 | 5.20 | 5.50 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 165 | 5825 | Full | 11.50 | 12.20 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 165 | 5825 | 26/8 | 5.20 | 4.90 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 165 | 5825 | 52/40 | 8.40 | 8.10 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE20 | MCS0 | 1 | 165 | 5825 | 106/54 | 11.20 | 10.80 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE40 | MCS0 | 1 | 151 | 5755 | Full | 11.80 | 12.10 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE40 | MCS0 | 1 | 151 | 5755 | 242/61 | 11.50 | 11.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE40 | MCS0 | 1 | 159 | 5795 | Full | 11.30 | 12.10 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE40 | MCS0 | 1 | 159 | 5795 | 242/62 | 11.40 | 11.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE80 | MCS0 | 1 | 155 | 5775 | Full | 11.80 | 11.80 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE80 | MCS0 | 1 | 155 | 5775 | 484/65 | 11.00 | 10.70 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |
| HE80 | MCS0 | 1 | 155 | 5775 | 484/66 | 10.30 | 10.20 | | 30.00 | 30.00 | 4.50 | 2.40 | Pass |

| Band IV MIMO | | | | | | | | | | | | | |
|--------------|-----------|-----|-----|-------------|-----------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|-----------|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | RU Config | Average Conducted Power (dBm) | | | FCC Conducted Power Limit (dBm) | | DG (dBi) | | Pass/Fail |
| | | | | | | Ant 0 | Ant 1 | SUM | Ant 0 | Ant 1 | Ant 0 | Ant 1 | |
| HE20 | MCS0 | 2 | 149 | 5745 | Full | 12.80 | 12.80 | 15.81 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 149 | 5745 | 26/0 | 6.10 | 6.10 | 9.11 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 149 | 5745 | 52/37 | 10.20 | 10.20 | 13.21 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 149 | 5745 | 106/53 | 12.50 | 12.60 | 15.56 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 157 | 5785 | Full | 12.30 | 12.30 | 15.31 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 157 | 5785 | 26/4 | 5.60 | 5.70 | 8.66 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 165 | 5825 | Full | 12.10 | 12.90 | 15.53 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 165 | 5825 | 26/8 | 4.70 | 5.70 | 8.24 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 165 | 5825 | 52/40 | 8.00 | 9.00 | 11.54 | 30.00 | | 4.50 | | Pass |
| HE20 | MCS0 | 2 | 165 | 5825 | 106/54 | 10.70 | 11.70 | 14.24 | 30.00 | | 4.50 | | Pass |
| HE40 | MCS0 | 2 | 151 | 5755 | Full | 12.40 | 12.60 | 15.51 | 30.00 | | 4.50 | | Pass |
| HE40 | MCS0 | 2 | 151 | 5755 | 242/61 | 11.70 | 11.90 | 14.81 | 30.00 | | 4.50 | | Pass |
| HE40 | MCS0 | 2 | 159 | 5795 | Full | 12.40 | 12.90 | 15.67 | 30.00 | | 4.50 | | Pass |
| HE40 | MCS0 | 2 | 159 | 5795 | 242/62 | 11.50 | 12.10 | 14.82 | 30.00 | | 4.50 | | Pass |
| HE80 | MCS0 | 2 | 155 | 5775 | Full | 12.20 | 12.70 | 15.47 | 30.00 | | 4.50 | | Pass |
| HE80 | MCS0 | 2 | 155 | 5775 | 484/65 | 10.60 | 11.10 | 13.87 | 30.00 | | 4.50 | | Pass |
| HE80 | MCS0 | 2 | 155 | 5775 | 484/66 | 10.30 | 10.80 | 13.57 | 30.00 | | 4.50 | | Pass |



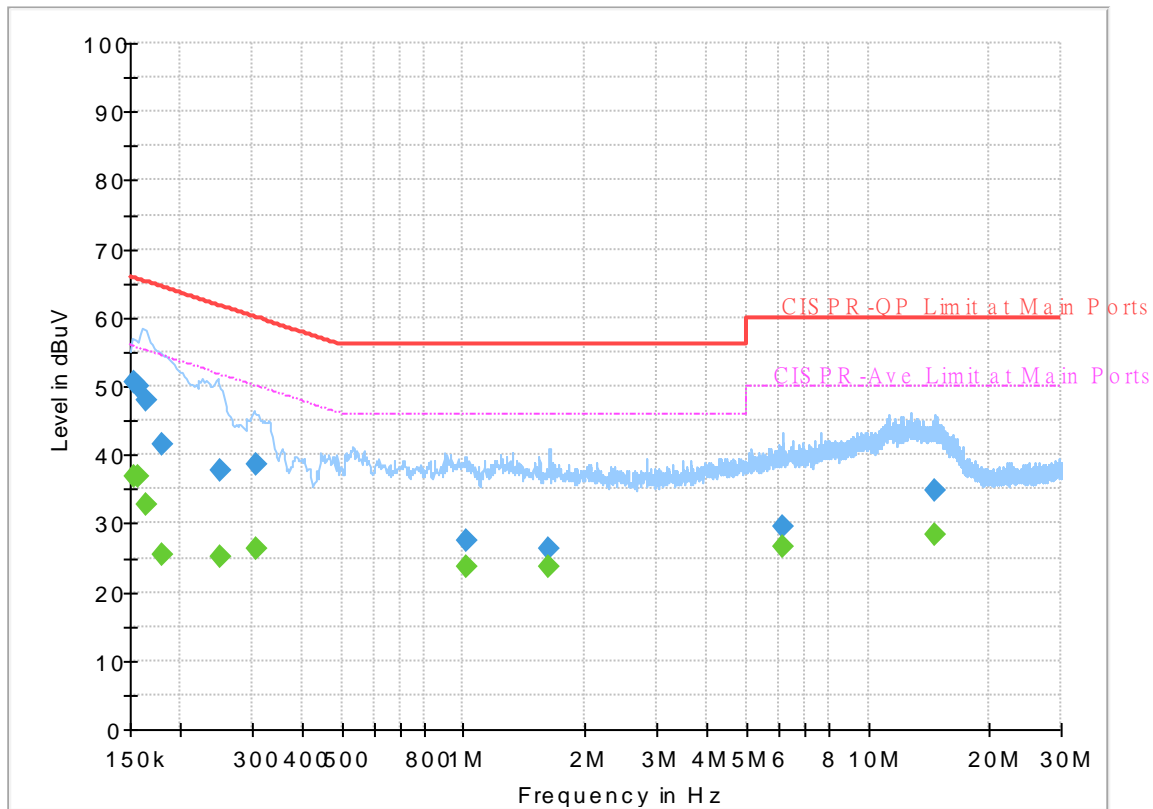
Appendix B. AC Conducted Emission Test Results

| | | | |
|-----------------|--------------|---------------------|---------|
| Test Engineer : | Howard Huang | Temperature : | 23~25°C |
| | | Relative Humidity : | 42~45% |

EUT Information

Report NO : 041658
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



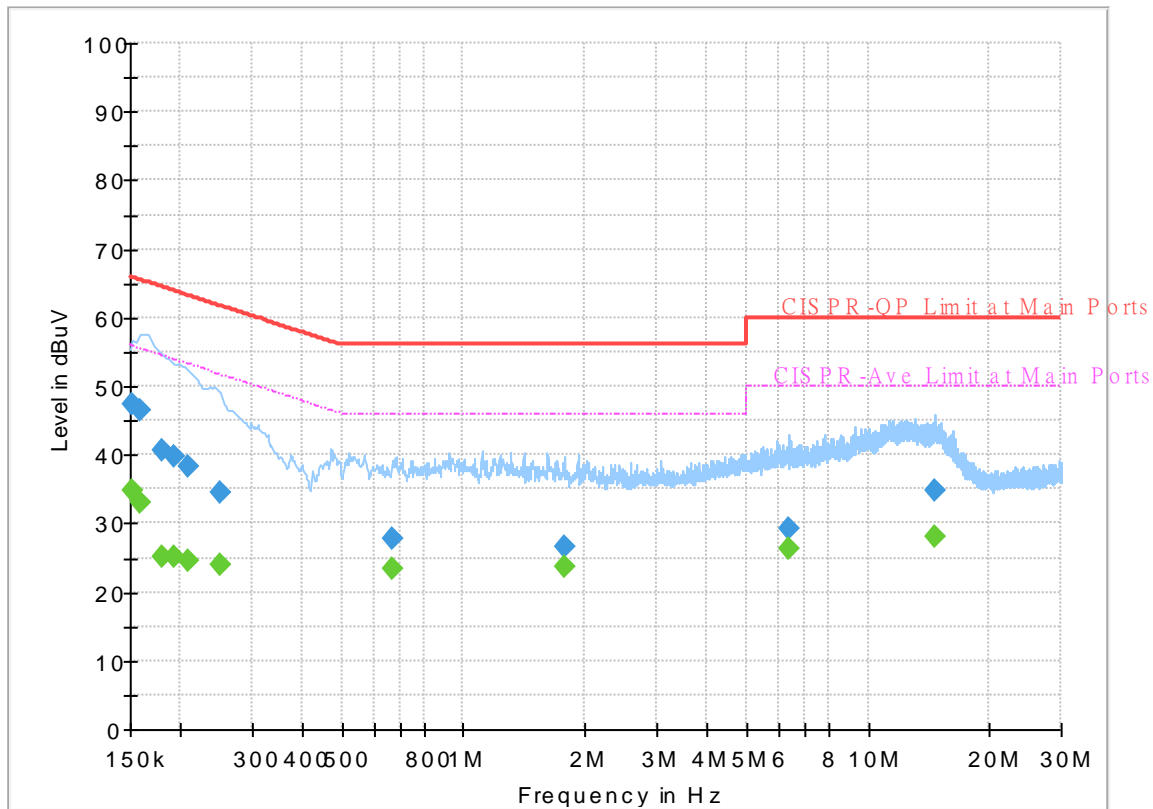
Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.154050 | --- | 36.98 | 55.78 | 18.80 | L1 | OFF | 19.6 |
| 0.154050 | 50.67 | --- | 65.78 | 15.11 | L1 | OFF | 19.6 |
| 0.156750 | --- | 36.79 | 55.63 | 18.84 | L1 | OFF | 19.6 |
| 0.156750 | 50.10 | --- | 65.63 | 15.53 | L1 | OFF | 19.6 |
| 0.163500 | --- | 32.60 | 55.28 | 22.68 | L1 | OFF | 19.6 |
| 0.163500 | 47.88 | --- | 65.28 | 17.40 | L1 | OFF | 19.6 |
| 0.179160 | --- | 25.32 | 54.53 | 29.21 | L1 | OFF | 19.6 |
| 0.179160 | 41.53 | --- | 64.53 | 23.00 | L1 | OFF | 19.6 |
| 0.250710 | --- | 25.01 | 51.73 | 26.72 | L1 | OFF | 19.6 |
| 0.250710 | 37.83 | --- | 61.73 | 23.90 | L1 | OFF | 19.6 |
| 0.306780 | --- | 26.29 | 50.06 | 23.77 | L1 | OFF | 19.6 |
| 0.306780 | 38.57 | --- | 60.06 | 21.49 | L1 | OFF | 19.6 |
| 1.014000 | --- | 23.83 | 46.00 | 22.17 | L1 | OFF | 19.6 |
| 1.014000 | 27.49 | --- | 56.00 | 28.51 | L1 | OFF | 19.6 |
| 1.631580 | --- | 23.62 | 46.00 | 22.38 | L1 | OFF | 19.6 |
| 1.631580 | 26.26 | --- | 56.00 | 29.74 | L1 | OFF | 19.6 |
| 6.186750 | --- | 26.51 | 50.00 | 23.49 | L1 | OFF | 19.9 |
| 6.186750 | 29.49 | --- | 60.00 | 30.51 | L1 | OFF | 19.9 |
| 14.637750 | --- | 28.39 | 50.00 | 21.61 | L1 | OFF | 20.2 |
| 14.637750 | 34.69 | --- | 60.00 | 25.31 | L1 | OFF | 20.2 |

EUT Information

Report NO : 041658
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final_Result

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|--------|------------|
| 0.152363 | --- | 34.84 | 55.87 | 21.03 | N | OFF | 19.5 |
| 0.152363 | 47.48 | --- | 65.87 | 18.39 | N | OFF | 19.5 |
| 0.159000 | --- | 32.93 | 55.52 | 22.59 | N | OFF | 19.5 |
| 0.159000 | 46.41 | --- | 65.52 | 19.11 | N | OFF | 19.5 |
| 0.179250 | --- | 25.12 | 54.52 | 29.40 | N | OFF | 19.5 |
| 0.179250 | 40.63 | --- | 64.52 | 23.89 | N | OFF | 19.5 |
| 0.191940 | --- | 25.20 | 53.95 | 28.75 | N | OFF | 19.5 |
| 0.191940 | 39.77 | --- | 63.95 | 24.18 | N | OFF | 19.5 |
| 0.208500 | --- | 24.48 | 53.27 | 28.79 | N | OFF | 19.5 |
| 0.208500 | 38.45 | --- | 63.27 | 24.82 | N | OFF | 19.5 |
| 0.251250 | --- | 24.00 | 51.72 | 27.72 | N | OFF | 19.5 |
| 0.251250 | 34.52 | --- | 61.72 | 27.20 | N | OFF | 19.5 |
| 0.665250 | --- | 23.52 | 46.00 | 22.48 | N | OFF | 19.5 |
| 0.665250 | 27.85 | --- | 56.00 | 28.15 | N | OFF | 19.5 |
| 1.774230 | --- | 23.64 | 46.00 | 22.36 | N | OFF | 19.6 |
| 1.774230 | 26.52 | --- | 56.00 | 29.48 | N | OFF | 19.6 |
| 6.344340 | --- | 26.40 | 50.00 | 23.60 | N | OFF | 19.7 |
| 6.344340 | 29.10 | --- | 60.00 | 30.90 | N | OFF | 19.7 |
| 14.681490 | --- | 28.13 | 50.00 | 21.87 | N | OFF | 19.9 |
| 14.681490 | 34.77 | --- | 60.00 | 25.23 | N | OFF | 19.9 |



Appendix C. Radiated Spurious Emission

| | | | |
|-----------------|---------------------------------------|---------------------|---------|
| Test Engineer : | Leo Lee, Mancy Chou. and Bigshow Wang | Temperature : | 22~24°C |
| | | Relative Humidity : | 45~58% |

Band 4 - 5725~5850MHz
WIFI 802.11ax HE20_Full (Band Edge @ 3m)

| WIFI Ant. | Note | Frequency | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol. | |
|--|---|-----------|------------|------------|------------|------------|----------------|-----------|---------------|---------|-----------|-----------|---------|---|
| 0+1 | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| 802.11ax HE20 Full CH 165 5825MHz | * | 5825 | 111.34 | - | - | 98.45 | 32.2 | 10.91 | 30.22 | 100 | 9 | P | H | |
| | * | 5825 | 100.95 | - | - | 88.06 | 32.2 | 10.91 | 30.22 | 100 | 9 | A | H | |
| | | 5851 | 56.9 | -63.02 | 119.92 | 43.96 | 32.2 | 10.98 | 30.24 | 100 | 9 | P | H | |
| | | 5855.8 | 52.88 | -57.7 | 110.58 | 39.92 | 32.22 | 10.99 | 30.25 | 100 | 9 | P | H | |
| | | 5903.2 | 53.93 | -30.36 | 84.29 | 40.69 | 32.41 | 11.11 | 30.28 | 100 | 9 | P | H | |
| | | 5931.8 | 53.63 | -14.57 | 68.2 | 40.29 | 32.46 | 11.18 | 30.3 | 100 | 9 | P | H | |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | * | 5825 | 109.18 | - | - | 96.29 | 32.2 | 10.91 | 30.22 | 382 | 143 | P | V | |
| | * | 5825 | 98.66 | - | - | 85.77 | 32.2 | 10.91 | 30.22 | 382 | 143 | A | V | |
| | | 5850.4 | 56.26 | -65.03 | 121.29 | 43.32 | 32.2 | 10.98 | 30.24 | 382 | 143 | P | V | |
| | | 5858 | 53.09 | -56.87 | 109.96 | 40.11 | 32.23 | 11 | 30.25 | 382 | 143 | P | V | |
| | | 5921.2 | 53.16 | -17.84 | 71 | 39.86 | 32.44 | 11.15 | 30.29 | 382 | 143 | P | V | |
| | | 5942 | 54.16 | -14.04 | 68.2 | 40.78 | 32.48 | 11.21 | 30.31 | 382 | 143 | P | V | |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | | |



WIFI 802.11ax HE20 Full (Harmonic @ 3m)

| WIFI Ant. 0+1 | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Path Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) | |
|-----------------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|------------------|----------------------|----------------|-------------------|-----------------|------------|---|
| 802.11ax HE20 Full CH 165 5745MHz | | 11650 | 48.61 | -25.39 | 74 | 54.78 | 39.85 | 15.06 | 61.08 | 100 | 0 | P | H | |
| | | 17475 | 52.31 | -15.89 | 68.2 | 49.1 | 42.5 | 19.24 | 58.53 | 100 | 0 | P | H | |
| | | | | | | | | | | | | | H | |
| | | | | | | | | | | | | | H | |
| | | | 11650 | 48.66 | -25.34 | 74 | 54.83 | 39.85 | 15.06 | 61.08 | 100 | 0 | P | V |
| | | | 17475 | 52.67 | -15.53 | 68.2 | 49.46 | 42.5 | 19.24 | 58.53 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | | |



WIFI 802.11ax HE20_Partial 26 (Band Edge @ 3m)

| WIFI Ant. 0+1 | Note | Frequency (MHz) | Level (dBμV/m) | Over Limit (dB) | Limit Line (dBμV/m) | Read Level (dBμV) | Antenna Factor (dB/m) | Path Loss (dB) | Preamp Factor (dB) | Ant Pos (cm) | Table Pos (deg) | Peak Avg. (P/A) | Pol. (H/V) | |
|---|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11ax HE20 Partial 26/8 CH 165 5825MHz | * | 5825 | 113.02 | - | - | 100.13 | 32.2 | 10.91 | 30.22 | 100 | 10 | P | H | |
| | * | 5825 | 102.65 | - | - | 89.76 | 32.2 | 10.91 | 30.22 | 100 | 10 | A | H | |
| | | 5854.6 | 52.12 | -59.59 | 111.71 | 39.16 | 32.22 | 10.99 | 30.25 | 100 | 10 | P | H | |
| | | 5855.6 | 52.18 | -58.45 | 110.63 | 39.22 | 32.22 | 10.99 | 30.25 | 100 | 10 | P | H | |
| | | 5897 | 53.16 | -35.72 | 88.88 | 39.96 | 32.39 | 11.09 | 30.28 | 100 | 10 | P | H | |
| | | 5937.6 | 53.33 | -14.87 | 68.2 | 39.96 | 32.48 | 11.2 | 30.31 | 100 | 10 | P | H | |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | * | 5825 | 111.79 | - | - | 98.9 | 32.2 | 10.91 | 30.22 | 400 | 139 | P | V | |
| | * | 5825 | 100.63 | - | - | 87.74 | 32.2 | 10.91 | 30.22 | 400 | 139 | A | V | |
| | | 5852.2 | 52.38 | -64.8 | 117.18 | 39.43 | 32.21 | 10.98 | 30.24 | 400 | 139 | P | V | |
| | | 5855.8 | 52.39 | -58.19 | 110.58 | 39.43 | 32.22 | 10.99 | 30.25 | 400 | 139 | P | V | |
| | | 5922.6 | 53.11 | -16.86 | 69.97 | 39.79 | 32.45 | 11.16 | 30.29 | 400 | 139 | P | V | |
| | | 5941 | 52.86 | -15.34 | 68.2 | 39.49 | 32.48 | 11.2 | 30.31 | 400 | 139 | P | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | | |



Emission below 1GHz
WIFI 802.11ax HE20 Full (LF @ 3m)

| WIFI Ant. | Note | Frequency | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Path Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol. | |
|-----------------------------|--|-----------|------------|------------|------------|------------|----------------|-----------|---------------|---------|-----------|-----------|---------|---|
| 0+1 | | (MHz) | (dBµV/m) | (dB) | (dBµV/m) | (dBµV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) | |
| 802.11ax HE20 Full LF | | 78.5 | 25.5 | -14.5 | 40 | 43.36 | 13.48 | 1.19 | 32.53 | - | - | P | H | |
| | | 162.89 | 24.97 | -18.53 | 43.5 | 39.12 | 16.49 | 1.77 | 32.41 | - | - | P | H | |
| | | 189.08 | 26.49 | -17.01 | 43.5 | 41.93 | 14.99 | 1.95 | 32.38 | - | - | P | H | |
| | | 343.31 | 35.04 | -10.96 | 46 | 44.98 | 19.99 | 2.52 | 32.45 | - | - | P | H | |
| | | 746.83 | 34.39 | -11.61 | 46 | 35.37 | 27.66 | 3.82 | 32.46 | - | - | P | H | |
| | | 887.48 | 35.29 | -10.71 | 46 | 34.43 | 28.52 | 4.26 | 31.92 | 100 | 0 | P | H | |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | | H |
| | | | 38.73 | 27.65 | -12.35 | 40 | 39.19 | 20 | 0.8 | 32.34 | - | - | P | V |
| | | | 100.81 | 23.83 | -19.67 | 43.5 | 38.43 | 16.32 | 1.36 | 32.28 | - | - | P | V |
| | | | 191.99 | 25.46 | -18.04 | 43.5 | 40.86 | 15.01 | 1.97 | 32.38 | - | - | P | V |
| | | | 358.83 | 29.9 | -16.1 | 46 | 39.25 | 20.45 | 2.59 | 32.39 | - | - | P | V |
| | | | 730.34 | 34.95 | -11.05 | 46 | 36.31 | 27.31 | 3.77 | 32.44 | - | - | P | V |
| | | | 888.45 | 37.61 | -8.39 | 46 | 36.77 | 28.5 | 4.26 | 31.92 | 100 | 0 | P | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| | | | | | | | | | | | | | V | |
| Remark | 1. No other spurious found. 2. All results are PASS against limit line. | | | | | | | | | | | | | |



Note symbol

| | |
|-----|--|
| * | Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| ! | Test result is over limit line. |
| P/A | Peak or Average |
| H/V | Horizontal or Vertical |



A calculation example for radiated spurious emission is shown as below:

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Path | Preamp | Ant | Table | Peak | Pol. |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 0+1 | | (MHz) | (dBμV/m) | (dB) | (dBμV/m) | (dBμV) | (dB/m) | (dB) | (dB) | (cm) | (deg) | (P/A) | (H/V) |
| 802.11b | | 2390 | 55.45 | -18.55 | 74 | 54.51 | 32.22 | 4.58 | 35.86 | 103 | 308 | P | H |
| CH 01 | | | | | | | | | | | | | |
| 2412MHz | | 2390 | 43.54 | -10.46 | 54 | 42.6 | 32.22 | 4.58 | 35.86 | 103 | 308 | A | H |

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) = Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Radiated Spurious Emission Plots

| | | | |
|-----------------|---------------------------------------|---------------------|---------|
| Test Engineer : | Leo Lee, Mancy Chou. and Bigshow Wang | Temperature : | 22~24°C |
| | | Relative Humidity : | 45~58% |

Note symbol

| | |
|----|-----------------------|
| -L | Low channel location |
| -R | High channel location |

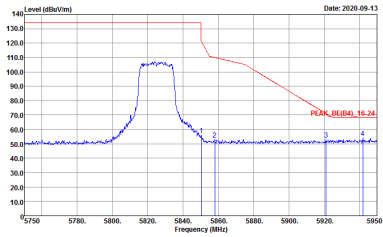
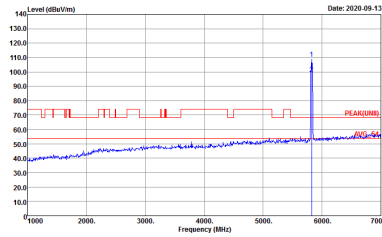


Band 4 - 5725~5850MHz

WIFI 802.11ax HE20 Full (Band Edge @ 3m)

| | | |
|------|---|--|
| WIFI | Band 4 5725~5850MHz Band Edge @ 3m | |
| ANT | 802.11ax HE20 Full CH165 5825MHz | |
| 0+1 | Horizontal | Fundamental |
| Peak | <p>Site : 03CH15-HY Condition : PEAK_BE(84)_16-24 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> | <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> |



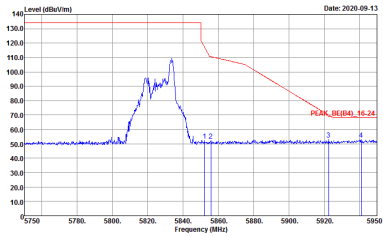
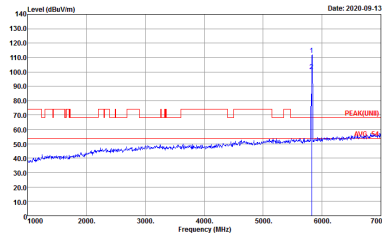
| | | |
|------|---|---|
| WIFI | Band 4 5725~5850MHz Band Edge @ 3m | |
| ANT | 802.11ax HE20 Full CH165 5825MHz | |
| 0+1 | Vertical | Fundamental |
| Peak |  <p>Date: 2020-09-13</p> <p>Site : 03CH15-HY Condition : PEAK_BE(B4)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> |  <p>Date: 2020-09-13</p> <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> |



Band 4 5725~5850MHz
WIFI 802.11ax HE20 Partial 26 (Band Edge @ 3m)

| | | |
|------|---|-------------|
| WIFI | Band 4 5725~5850MHz Band Edge @ 3m | |
| ANT | 802.11ax HE20 Partial 26/8 CH165 5825MHz | |
| 0+1 | Horizontal | Fundamental |
| Peak | <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>Site : 03CH15-HY Condition : PEAK_BE(B4)_16-24 3m 91200_15_1620 HORIZONTAL : RBW:10000.000kHz VBW:30000.000kHz SWT:Auto Detector : Peak Project : 041658</p> </div> <div style="width: 45%;"> <p>Site : 03CH15-HY Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL : RBW:10000.000kHz VBW:30000.000kHz SWT:Auto Detector : Peak Project : 041658</p> </div> </div> | |



| | | |
|------|--|---|
| WIFI | Band 4 5725~5850MHz Band Edge @ 3m | |
| ANT | 802.11ax HE20 Partial 26/8 CH165 5825MHz | |
| 0+1 | Vertical | Fundamental |
| Peak |  <p>Date: 2020-09-13</p> <p>PEAK_BE(B4)_16-24</p> <p>Site : 03CH15-HY Condition : PEAK_BE(B4)_16-24 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> |  <p>Date: 2020-09-13</p> <p>PEAK(FUN)</p> <p>Site : 03CH15-HY Condition : PEAK(FUN) 3m 91200_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 041658</p> |



Band 4 - 5725~5850MHz

WIFI 802.11ax HE20 Full (Harmonic @ 3m)

| | | |
|----------------------------|---|---|
| WIFI | Band 4 5725~5850MHz Harmonic @ 3m | |
| ANT | 802.11ax HE20 Full CH165 5825MHz | |
| 0+1 | Horizontal | Vertical |
| Peak Avg. | <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 041658</p> | <p>Site : 03CH15-HY Condition : PEAK(UNII) 3m 91200_15_1620 VERTICAL Detector : Peak Project : 041658</p> |



Emission below 1GHz
5GHz WIFI 802.11ax HE20 Full (LF)

| WIFI | 5GHz WIFI | |
|--------------|--|--|
| ANT | 802.11ax HE20 Full LF | |
| 0+1 | Horizontal | Vertical |
| QP / Peak | <p>Site : 03CH15-HY Condition : QP 3m BILOG_15_41912 HORIZONTAL Detector : Peak Project : 041658</p> | <p>Site : 03CH15-HY Condition : QP 3m BILOG_15_41912 VERTICAL Detector : Peak Project : 041658</p> |



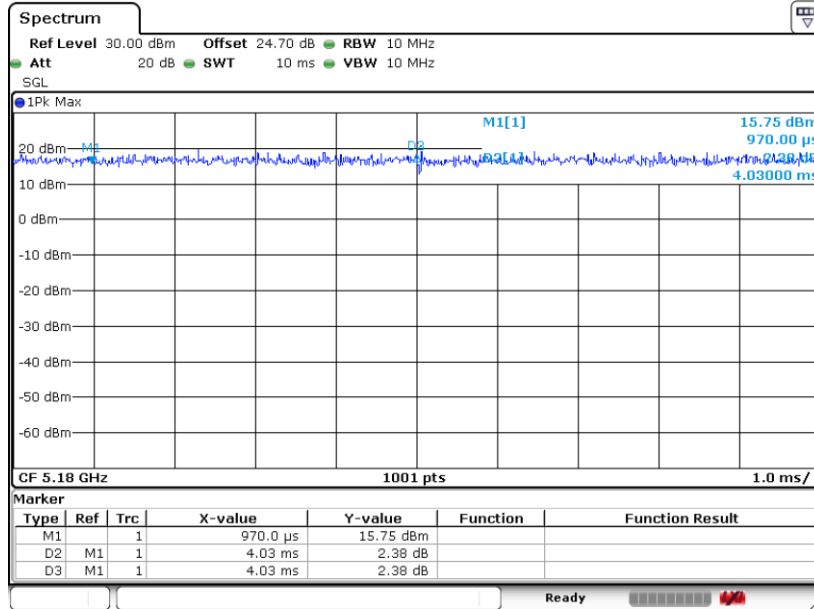
Appendix E. Duty Cycle Plots

| Antenna | Band | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting | Duty Factor(dB) |
|---------|---------------------------------------|---------------|-------|----------|-------------|-----------------|
| 0+1 | 5GHz 802.11ax HE20 Full RU for Ant. 0 | 100.00 | - | - | 10Hz | 0.00 |
| 0+1 | 5GHz 802.11ax HE20 Full RU for Ant. 1 | 100.00 | - | - | 10Hz | 0.00 |



MIMO <Ant. 0>

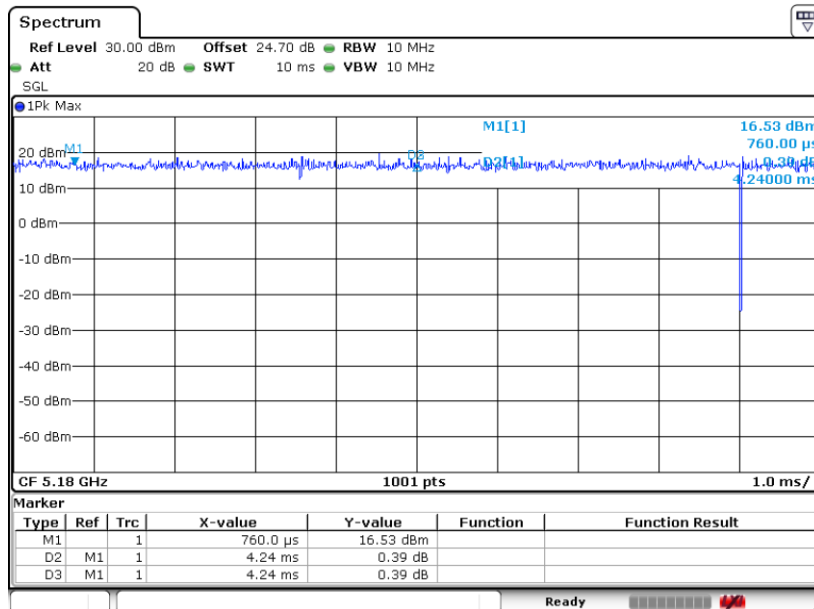
802.11ax HE20 Full RU



Date: 10.SEP.2020 21:36:43

MIMO <Ant. 1>

802.11ax HE20 Full RU



Date: 10.SEP.2020 21:38:21