



Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community,  
Fenghuang Street, Guangming District, Shenzhen, China

## FCC PART 15 SUBPART C TEST REPORT

### FCC PART 15.407

Report Reference No..... : GRCTR250502041-02

FCC ID..... : 2BK77-R-W52506

Compiled by

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Date of issue..... : Jun. 27, 2025

Testing Laboratory Name..... : Shenzhen GUOREN Certification Technology Service Co., Ltd.

Address..... : 101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

Applicant's name..... : Chengdu U-speed Information Technology Co., Ltd

Address..... : No.602, 6/F, Unit 1, Building 1, No.168 Huayang Zhongxing Shangjie, Tianfu New District, Chengdu, Sichuan, China

Test specification..... :

Standard..... : FCC Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES

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Test item description..... : AC1200 Gigabit Dual Band Wi-Fi Router

Trade Mark..... : /

Manufacturer..... : Shenzhen Dbit Network Equipment Co., Ltd

Model/Type reference..... : WRAC1200

Listed Models ..... : T18-21K

Firmware Version..... : V1.0

Hardware Version..... : V1.0

Modulation Type..... : DSSS, OFDM, OFDMA

Operation Frequency..... : From 5180MHz to 5240MHz, 5260MHz to 5320MHz, 5500MHz to 5700MHz, 5745MHz to 5825MHz

Rating..... : DC 12V From External Circuit

Result..... : **PASS**



## TEST REPORT

Equipment under Test : AC1200 Gigabit Dual Band Wi-Fi Router

Model /Type : WRAC1200

Listed Models : T18-21K

Applicant : **Chengdu U-speed Information Technology Co., Ltd**

Address : No.602, 6/F, Unit 1, Building 1, No.168 Huayang Zhongxing  
Shangjie, Tianfu New District, Chengdu, Sichuan, China

Manufacturer : **Chengdu U-speed Information Technology Co., Ltd**

Address : No.602, 6/F, Unit 1, Building 1, No.168 Huayang Zhongxing  
Shangjie, Tianfu New District, Chengdu, Sichuan, China

|                     |             |
|---------------------|-------------|
| <b>Test Result:</b> | <b>PASS</b> |
|---------------------|-------------|

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[FCC Rules Part 15.407](#): UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES.

[ANSI C63.10-2020](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 789033 D02](#): GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

[KDB 662911 D01 Multiple Transmitter Output](#): Emissions Testing of Transmitters with Multiple Outputs in the Same Band

## 2. SUMMARY

### 2.1. General Remarks

|                                |   |               |
|--------------------------------|---|---------------|
| Date of receipt of test sample | : | May. 28, 2025 |
|                                |   |               |
| Testing commenced on           | : | May. 28, 2025 |
|                                |   |               |
| Testing concluded on           | : | Jun. 27, 2025 |

### 2.2. Product Description

|                       |   |
|-----------------------|---|
| Product Name:         | AC1200 Gigabit Dual Band Wi-Fi Router   |
| Model/Type reference: | WRAC1200  |
| Listed Models:        | T18-21K(The products are identical in interior structure, electrical circuits and components, just model names is different.)   |
| Power supply:         | DC 12V From External Circuit  |
| Adapter information:  | M/N:RD1201000-225MG<br>Input:AC 100-240V 50/60Hz 0.6A<br>Output:12V $\overline{\text{---}}$ 1.0A  |
| Testing sample ID:    | GRCTR250502041-1# (Engineer sample),<br>GRCTR250502041-2# (Normal sample)   |
| <b>WIFI</b>           |   |
| WLAN                  | Supported 802.11 a/n/ac/ax  |
| Modulation Type       | IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)<br>IEEE 802.11acVHT20/VHT40/VHT80: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11axHE20/HE40/HE80:OFDMA(1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)  |
| Operation frequency   | IEEE 802.11a:5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz<br>IEEE 802.11n HT20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz<br>IEEE 802.11n HT40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz<br>IEEE 802.11acVHT20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz<br>IEEE 802.11acVHT40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz<br>IEEE 802.11acVHT80:5210MHz,5290MHz,5530MHz,5610MHz,5775MHz<br>IEEE 802.11axHE20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz<br>IEEE 802.11axHE40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz<br>IEEE 802.11axHE80:5210MHz,5290MHz,5530MHz,5610MHz,5775MHz |
| Channel number        | 4 Channels for 20MHz bandwidth(5180-5240MHz)<br>4 Channels for 20MHz bandwidth(5260-5320MHz)<br>11 Channels for 20MHz bandwidth(5500-5700MHz)<br>5 channels for 20MHz bandwidth(5745-5825MHz)<br>2 channels for 40MHz bandwidth(5190~5230MHz)<br>2 channels for 40MHz bandwidth(5270~5310MHz)<br>5 Channels for 40MHz bandwidth(5510-5670MHz)   |

|   |  |
|---|--|
|   | 2 channels for 40MHz bandwidth(5755~5795MHz)<br>1 channel for 80MHz bandwidth(5210MHz)<br>1 channel for 80MHz bandwidth(5290MHz)<br>1 Channel for 80MHz bandwidth(5530Hz)<br>1 Channel for 80MHz bandwidth(5610Hz)<br>1 channel for 80MHz bandwidth(5775MHz) |
| Antenna type:   | External antenna   |
| Antenna gain*(Supplied by the customer):  | Ant 1: 5.17 dBi<br>Ant 2: 5.17 dBi<br>Directional gain:8.18  |
| Remark:*When the information provided by the customer was used to calculate test results, if the information provided by the customer is not accurate, shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility. |  |

According to KDB 662911 D01 Multiple Transmitter Output, Directional Gain Calculations for In-Band Measurements:

If transmit signals are correlated, then

Directional gain =  $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{\text{ANT}}]$  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.]

## 2.3. Equipment Under Test

### Power supply system utilised

|                      |   |   |                                   |
|----------------------|---|---|-----------------------------------|
| Power supply voltage | : | <input type="radio"/> 230V / 50 Hz                                | <input type="radio"/> 120V / 60Hz |
|                      |   | <input type="radio"/> 12 V DC                                     | <input type="radio"/> 24 V DC     |
|                      |   | <input checked="" type="radio"/> Other (specified in blank below) |                                   |

DC 12V From External Circuit

## 2.4. Short description of the Equipment under Test (EUT)

This is a AC1200 Gigabit Dual Band Wi-Fi Router.  
For more details, refer to the user's manual of the EUT.

## 2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX.

IEEE 802.11a/nHT20/nHT40/acVHT20/acVHT40/acVHT80/axHE20/axHE40/axHE80:

| U-NI-1  |                 | U-NI-1  |                 | U-NI-1  |                 |
|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 36      | 5180            | 38      | 5190            | 42      | 5210            |
| 40      | 5200            | 46      | 5230            |         |                 |
| 44      | 5220            |         |                 |         |                 |
| 48      | 5240            |         |                 |         |                 |

| U-NI-2A |                 | U-NI-2A |                 | U-NI-2A |                 |
|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 52      | 5260            | 54      | 5270            | 58      | 5290            |
| 56      | 5280            | 62      | 5310            |         |                 |
| 60      | 5300            |         |                 |         |                 |
| 64      | 5320            |         |                 |         |                 |

| U-NI-2C |                 | U-NI-2C |                 | U-NI-2C |                 |
|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 100     | 5500            | 102     | 5510            | 106     | 5530            |
| 104     | 5520            | 110     | 5550            | 122     | 5610            |
| 108     | 5540            | 118     | 5590            |         |                 |
| 112     | 5560            | 126     | 5630            |         |                 |
| 116     | 5580            | 134     | 5670            |         |                 |
| 120     | 5600            |         |                 |         |                 |
| 124     | 5620            |         |                 |         |                 |
| 128     | 5640            |         |                 |         |                 |
| 132     | 5660            |         |                 |         |                 |
| 136     | 5680            |         |                 |         |                 |
| 140     | 5700            |         |                 |         |                 |

| U-NI-3  |                 | U-NI-3  |                 | U-NI-3  |                 |
|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 149     | 5745            | 151     | 5755            | 155     | 5775            |
| 153     | 5765            | 159     | 5795            |         |                 |
| 157     | 5785            |         |                 |         |                 |
| 161     | 5805            |         |                 |         |                 |
| 165     | 5825            |         |                 |         |                 |

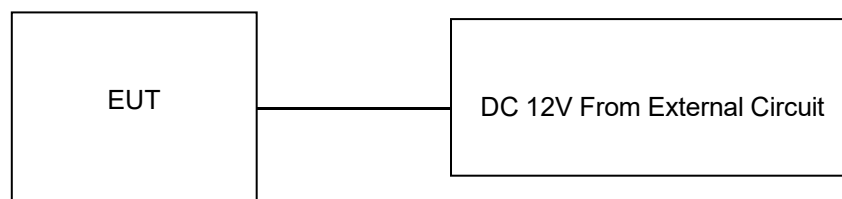
## 2.6. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

| Item               | Manufacturer    | Description | Model              | Certificate | Note |
|--------------------|-----------------|-------------|--------------------|-------------|------|
| 1 <sup>Note1</sup> | Hewlett-Packard | Notebook    | HP ProBook 445 G10 | /           | /    |
| 2 <sup>Note1</sup> | /               | /           | /                  | /           | /    |

Note1: This Auxiliary used during the test is provided by the test laboratory.

## 2.7. Block Diagram of Test Setup



## 2.8. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

## 2.9. Modifications

No modifications were implemented to meet testing criteria.

### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

**Shenzhen GUOREN Certification Technology Service Co., Ltd.**

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

#### 3.2. Test Facility

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

**FCC-Registration No.: 920798    Designation Number: CN1304**

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

**A2LA-Lab Cert. No.: 6202.01**

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

**ISED#: 27264    CAB identifier: CN0115**

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

**CNAS-Lab Code: L15631**

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories for the Competence of Testing and Calibration Laboratories.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

|                       |              |
|-----------------------|--------------|
| Temperature:          | 15-35 ° C    |
|                       |              |
| Humidity:             | 30-60 %      |
|                       |              |
| Atmospheric pressure: | 950-1050mbar |

#### 3.4. Test Description

| Test Specification clause | Test case              | Test Mode                                     | Test Channel  | Recorded In Report                            |   | Pass                                | Fail                     | NA                       | NP                       | Remark   |
|---------------------------|------------------------|---|---|---|---|-------------------------------------|--------------------------|--------------------------|--------------------------|----------|
| §15.203                   | Antenna gain           | 802.11ac                                      | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11ac                                      | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.407(a)                | Power spectral density | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |



|                       |   |  |   |   |   |                                     |                          |                                     |                          |          |
|-----------------------|---|--|---|---|---|-------------------------------------|--------------------------|-------------------------------------|--------------------------|----------|
| §15.407(a)            | Spectrum bandwidth – 26 dB bandwidth    | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(e)            | Spectrum bandwidth – 6 dB bandwidth     | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(a)            | Maximum output power                    | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(b)            | Band edge compliance conducted          | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Highest   | 802.11a/ac20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Highest   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(b)            | Band edge compliance radiated           | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Highest   | 802.11ac                                      | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Highest   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(a)            | TX spurious emissions conducted         | -/-  | -/-   | -/-   | -/-   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.407(a)            | TX spurious emissions radiated          | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | 802.11ac                                      | <input checked="" type="checkbox"/> Lowest<br><input checked="" type="checkbox"/> Middle<br><input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.407(g)            | Frequency Stability                     | -/-  | -/-   | -/-   | -/-   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.109               | RX spurious emissions radiated          | -/-  | -/-   | -/-   | -/-   | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.209(a)            | TX spurious Emissions radiated < 30 MHz | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | -/-   | 802.11ac                                      | -/-   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |
| §15.107(a)<br>§15.207 | Conducted Emissions < 30 MHz            | 802.11a/ac 20/ac40/ac80/ax20/ax40/ax80/n20/n40 | -/-   | 802.11ac                                      | -/-   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | complies |

## Remark:

1. The measurement uncertainty is not included in the test result.

2. NA = Not Applicable; NP = Not Performed

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

### 3.5. Statement of the measurement uncertainty

Tdata 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 TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen GUOREN Certification Technology Service 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 Shenzhen GUOREN Certification Technology Service Co., Ltd.:

| Test                   | Range       | Measurement Uncertainty | Notes |
|------------------------|-------------|-------------------------|-------|
| Radiated Emission      | 30~1000MHz  | 4.06 dB                 | (1)   |
| Radiated Emission      | 1~18GHz     | 5.14 dB                 | (1)   |
| Radiated Emission      | 18-40GHz    | 5.38 dB                 | (1)   |
| Conducted Disturbance  | 0.15~30MHz  | 2.14 dB                 | (1)   |
| Max output power       | 30MHz~18GHz | 0.54 dB                 | (1)   |
| Power spectral density | /           | 0.56 dB                 | (1)   |
| Spectrum bandwidth     | /           | 1.2%                    | (1)   |

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

### 3.6. Equipments Used during the Test

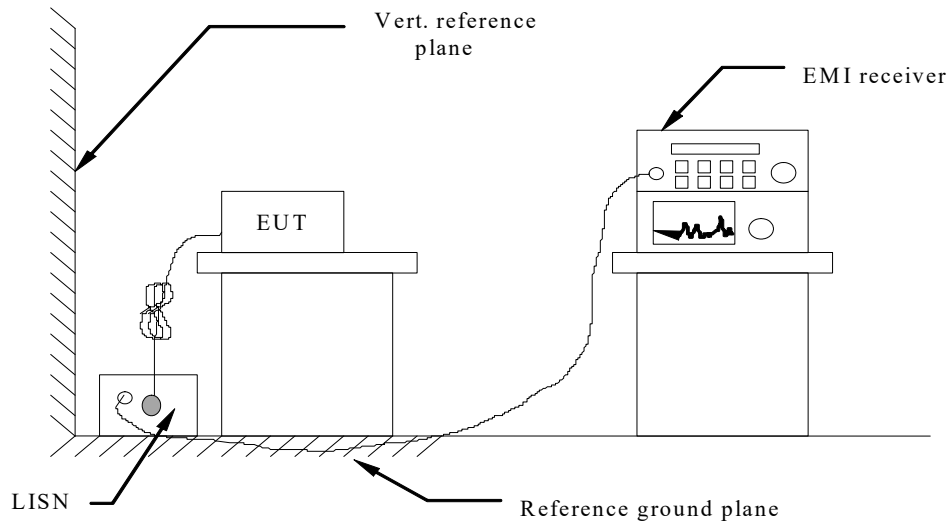
| Test Equipment             | Manufacturer           | Model No.   | Equipment No. | Calibration Date | Calibration Due Date |
|----------------------------|------------------------|-------------|---------------|------------------|----------------------|
| LISN                       | R&S                    | ENV216      | GRCTEE009     | 2024/09/19       | 2025/09/18           |
| LISN                       | R&S                    | ENV216      | GRCTEE010     | 2024/09/19       | 2025/09/18           |
| EMI Test Receiver          | R&S                    | ESPI        | GRCTEE017     | 2024/09/19       | 2025/09/18           |
| EMI Test Receiver          | R&S                    | ESCI        | GRCTEE008     | 2024/09/19       | 2025/09/18           |
| Spectrum Analyzer          | Agilent                | N9020A      | GRCTEE002     | 2024/09/19       | 2025/09/18           |
| Spectrum Analyzer          | R&S                    | FSP         | GRCTEE003     | 2024/09/20       | 2025/09/19           |
| Vector Signal generator    | Agilent                | N5181A      | GRCTEE007     | 2024/09/19       | 2025/09/18           |
| Analog Signal Generator    | R&S                    | SML03       | GRCTEE006     | 2024/09/19       | 2025/09/18           |
| Climate Chamber            | QIYA                   | LCD-9530    | GRCTES016     | 2024/09/19       | 2025/09/18           |
| Ultra-Broadband Antenna    | Schwarzbeck            | VULB9163    | GRCTEE018     | 2023/09/28       | 2026/09/27           |
| Horn Antenna               | Schwarzbeck            | BBHA 9120D  | GRCTEE019     | 2023/09/28       | 2026/09/27           |
| Loop Antenna               | Zhinan                 | ZN30900C    | GRCTEE020     | 2023/10/15       | 2026/10/14           |
| Horn Antenna               | Beijing Hangwei Dayang | OBH100400   | GRCTEE049     | 2023/09/28       | 2026/09/27           |
| Amplifier                  | Schwarzbeck            | BBV 9745    | GRCTEE021     | 2024/09/19       | 2025/09/18           |
| Amplifier                  | Taiwan chengyi         | EMC051845B  | GRCTEE022     | 2024/09/19       | 2025/09/18           |
| Temperature/Humidity Meter | Huaguan                | HG-308      | GRCTES037     | 2024/09/19       | 2025/09/18           |
| Directional coupler        | NARDA                  | 4226-10     | GRCTEE004     | 2024/09/19       | 2025/09/18           |
| High-Pass Filter           | XingBo                 | XBLBQ-GTA18 | GRCTEE053     | 2024/09/19       | 2025/09/18           |

|                       |                 |             |           |            |            |
|-----------------------|-----------------|-------------|-----------|------------|------------|
| High-Pass Filter      | XingBo          | XBLBQ-GTA27 | GRCTEE054 | 2024/09/19 | 2025/09/18 |
| Automated filter bank | Tonscend        | JS0806-F    | GRCTEE055 | 2024/09/19 | 2025/09/18 |
| Power Sensor          | Agilent         | U2021XA     | GRCTEE070 | 2024/09/19 | 2025/09/18 |
| Cable                 | Times           | Cable-CE    | GRCTEE086 | 2024/09/19 | 2025/09/18 |
| Cable                 | Times           | Cable-RE-1  | GRCTEE087 | 2024/09/19 | 2025/09/18 |
| Cable                 | Times           | Cable-RE-2  | GRCTEE088 | 2024/09/19 | 2025/09/18 |
| EMI Test Software     | ROHDE & SCHWARZ | ESK1-V1.71  | GRCTEE060 | N/A        | N/A        |
| EMI Test Software     | Fera            | EZ-EMC      | GRCTEE061 | N/A        | N/A        |

## 4. TEST CONDITIONS AND RESULTS

### 4.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2020
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020
- 4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| 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        |

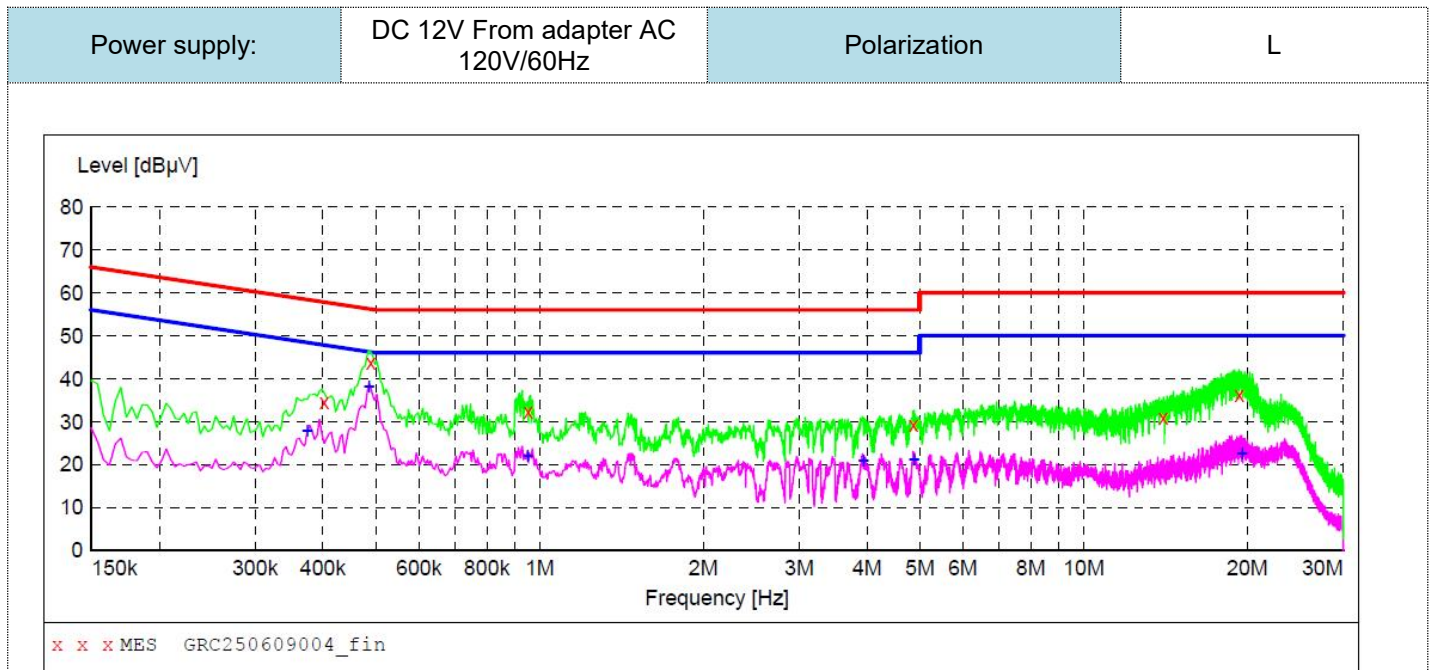
\* Decreases with the logarithm of the frequency.

#### TEST RESULTS

Remark:

1. All modes were tested at Low, Middle, and High channel; only the worst result of 802.11 ac CH36 for antenna 1 was reported as below:

2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:



#### MEASUREMENT RESULT: "GRC250609004\_fin"

6/9/2025 9:19AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.402000         | 34.50         | 10.3         | 58            | 23.3         | QP       | L1   | GND |
| 0.490000         | 43.80         | 10.2         | 56            | 12.4         | QP       | L1   | GND |
| 0.954000         | 32.30         | 10.3         | 56            | 23.7         | QP       | L1   | GND |
| 4.866000         | 29.20         | 10.2         | 56            | 26.8         | QP       | L1   | GND |
| 14.022000        | 30.90         | 10.6         | 60            | 29.1         | QP       | L1   | GND |
| 19.326000        | 36.20         | 10.5         | 60            | 23.8         | QP       | L1   | GND |

#### MEASUREMENT RESULT: "GRC250609004\_fin2"

6/9/2025 9:19AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.374000         | 28.00         | 10.4         | 48            | 20.4         | AV       | L1   | GND |
| 0.486000         | 38.20         | 10.2         | 46            | 8.0          | AV       | L1   | GND |
| 0.950000         | 22.10         | 10.3         | 46            | 23.9         | AV       | L1   | GND |
| 3.934000         | 20.90         | 10.5         | 46            | 25.1         | AV       | L1   | GND |
| 4.878000         | 21.30         | 10.2         | 46            | 24.7         | AV       | L1   | GND |
| 19.554000        | 22.70         | 10.5         | 50            | 27.3         | AV       | L1   | GND |

Note: 1). Level (dBμV) = Reading (dBμV) + Transducer (dB)

2). Transducer (dB) = insertion loss of LISN (dB) + Cable loss (dB)

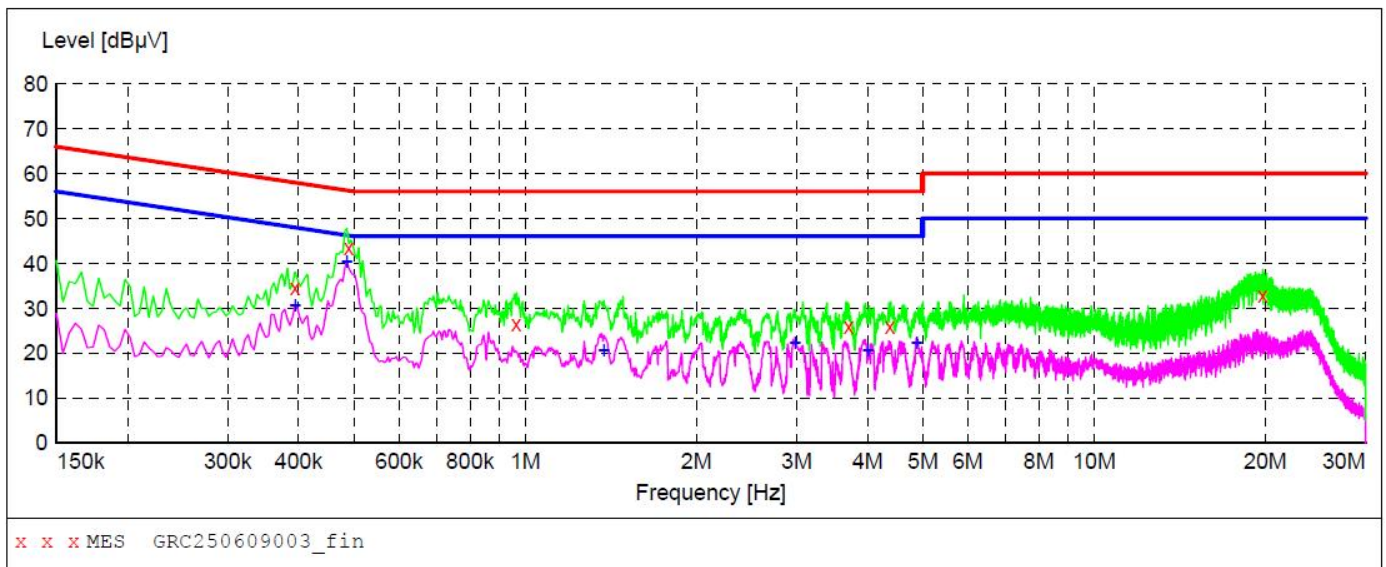
3). Margin (dB) = Limit (dBμV) - Level (dBμV)

Power supply:

DC 12V From adapter AC  
120V/60Hz

Polarization

N

**MEASUREMENT RESULT: "GRC250609003\_fin"**

6/9/2025 9:15AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.394000         | 34.70         | 10.3         | 58            | 23.3         | QP       | N    | GND |
| 0.490000         | 43.60         | 10.2         | 56            | 12.6         | QP       | N    | GND |
| 0.966000         | 26.50         | 10.2         | 56            | 29.5         | QP       | N    | GND |
| 3.702000         | 25.80         | 10.5         | 56            | 30.2         | QP       | N    | GND |
| 4.374000         | 25.80         | 10.4         | 56            | 30.2         | QP       | N    | GND |
| 19.802000        | 32.80         | 10.5         | 60            | 27.2         | QP       | N    | GND |

**MEASUREMENT RESULT: "GRC250609003\_fin2"**

6/9/2025 9:15AM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.394000         | 30.60         | 10.3         | 48            | 17.4         | AV       | N    | GND |
| 0.486000         | 40.40         | 10.2         | 46            | 5.8          | AV       | N    | GND |
| 1.374000         | 20.80         | 10.4         | 46            | 25.2         | AV       | N    | GND |
| 2.978000         | 22.30         | 10.5         | 46            | 23.7         | AV       | N    | GND |
| 4.006000         | 20.60         | 10.5         | 46            | 25.4         | AV       | N    | GND |
| 4.878000         | 22.30         | 10.2         | 46            | 23.7         | AV       | N    | GND |

Note:1).Level (dBμV)= Reading (dBμV)+ Transducer (dB)

2). Transducer (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). Margin(dB) = Limit (dBμV) - Level (dBμV)

## 4.2. Radiated Emission

### Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: 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.

### Undesirable emission limits

| Requirement  | Limit(EIRP)     | Limit (Field strength at 3m) <sup>Note1</sup> |
|--------------|-----------------|---|
| 15.407(b)(1) | PK:-27(dBm/MHz) | PK:68.2(dBμV/m)                               |
| 15.407(b)(2) |                 |   |
| 15.407(b)(3) |                 |   |
| 15.407(b)(4) |                 |   |

Note1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

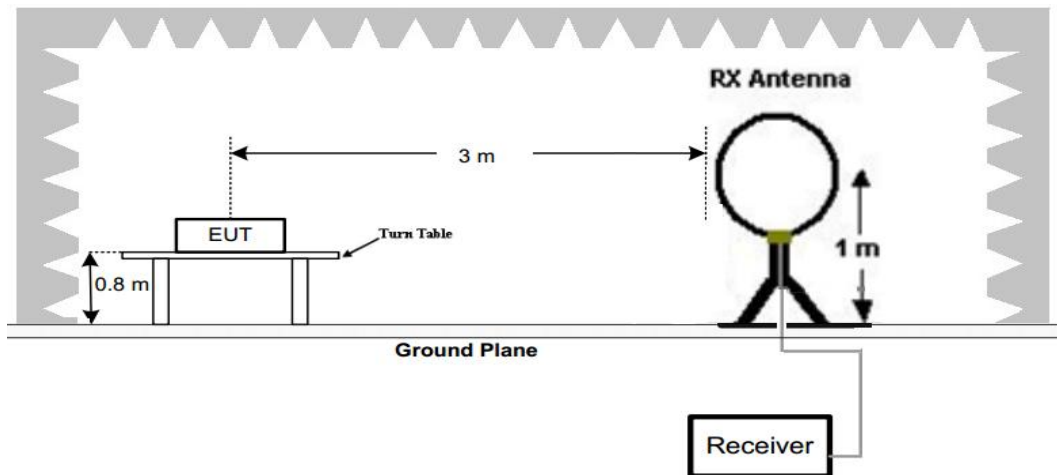
- (5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
- (6) In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

### Radiated emission limits

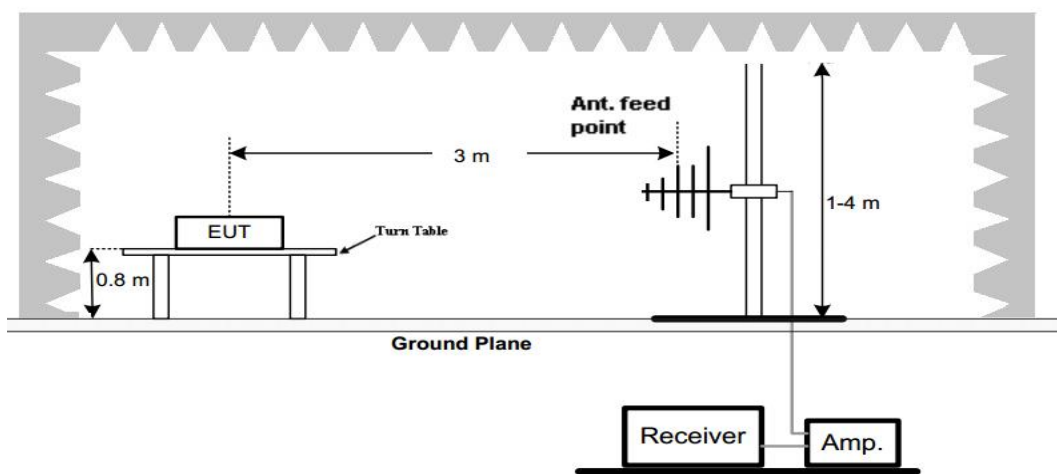
| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m)                          | Radiated (μV/m)       |
|-----------------|-------------------|--|-----------------------|
| 0.009-0.49      | 3                 | $20\log(2400/F(\text{KHz}))+40\log(300/3)$ | $2400/F(\text{KHz})$  |
| 0.49-1.705      | 3                 | $20\log(24000/F(\text{KHz}))+40\log(30/3)$ | $24000/F(\text{KHz})$ |
| 1.705-30        | 3                 | $20\log(30)+40\log(30/3)$                  | 30                    |
| 30-88           | 3                 | 40.0                                       | 100                   |
| 88-216          | 3                 | 43.5                                       | 150                   |
| 216-960         | 3                 | 46.0                                       | 200                   |
| Above 960       | 3                 | 54.0                                       | 500                   |

**TEST CONFIGURATION**

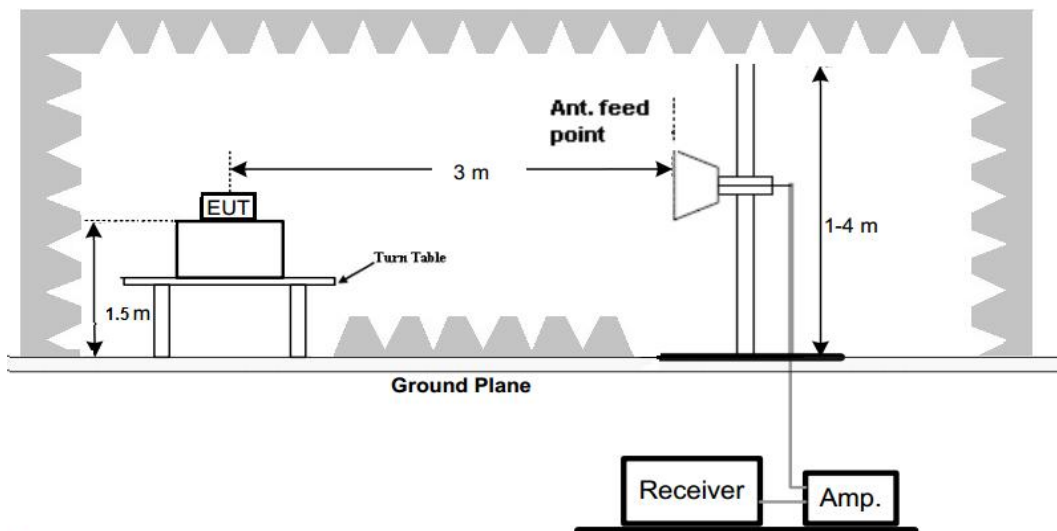
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz





**Test Procedure**

- Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
- Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- Radiated emission test frequency band from 9KHz to 40GHz.
- The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type   | Test Distance |
|----------------------|---------------------|---------------|
| 9KHz-30MHz           | Active Loop Antenna | 3             |
| 30MHz-1GHz           | Bilog Antenna       | 3             |
| 1GHz-18GHz           | Horn Antenna        | 3             |
| 18GHz-25GHz          | Horn Antenna        | 1             |

- Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting  | Detector |
|----------------------|---|----------|
| 9KHz-150KHz          | RBW=200Hz/VBW=3KHz, Sweep time=Auto   | QP       |
| 150KHz-30MHz         | RBW=9KHz/VBW=100KHz, Sweep time=Auto  | QP       |
| 30MHz-1GHz           | RBW=120KHz/VBW=1000KHz, Sweep time=Auto   | QP       |
| 1GHz-40GHz           | Peak Value: RBW=1MHz/VBW=3MHz,<br>Sweep time=Auto<br>Average Value: RBW=1MHz/VBW=10Hz,<br>Sweep time=Auto | Peak     |

**TEST RESULTS**

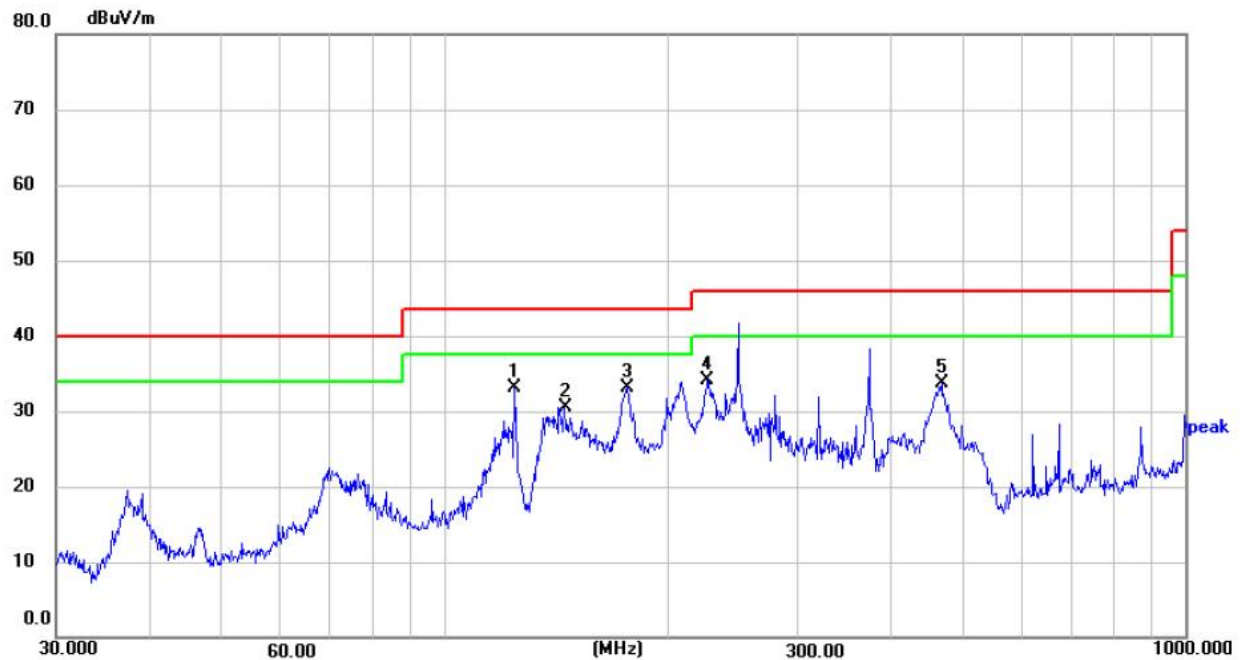
Remark:

- This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
- All modes were tested at Low, Middle, and High channel for above 1GHz test, only the worst case 802.11a CH 36 for antenna 1 was recorded.
- Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal

## Radiated Emission Measurement



Site LAB

Polarization: **Horizontal**

Temperature: 22.5(C)

Limit: FCC Part15 RE-Class B\_30-1000MHz

Power: AC120V/60Hz

Humidity: 54 %

EUT:

Distance: 3m

M/N:

Mode:

Note:

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 124.5690        | 55.00          | -21.86        | 33.14          | 43.50          | -10.36      | peak     | 199         | 63             | P   |        |
| 2   | 145.3506        | 52.28          | -21.75        | 30.53          | 43.50          | -12.97      | peak     | 199         | 45             | P   |        |
| 3 * | 176.8878        | 54.11          | -20.91        | 33.20          | 43.50          | -10.30      | peak     | 199         | 9              | P   |        |
| 4   | 226.8936        | 52.77          | -18.62        | 34.15          | 46.00          | -11.85      | peak     | 100         | 54             | P   |        |
| 5   | 468.8762        | 48.63          | -14.85        | 33.78          | 46.00          | -12.22      | peak     | 199         | 18             | P   |        |

Note:1).Level (dBuV/m)= Reading (dBuV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Level (dBuV/m) - Limit (dBuV/m)

## Vertical

## Radiated Emission Measurement



Site LAB

Polarization: **Vertical**

Temperature: 22.5(C)

Limit: FCC Part15 RE-Class B\_30-1000MHz

Power: AC120V/60Hz

Humidity: 54 %

EUT:

Distance: 3m

M/N:

Mode:

Note:

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg.) | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-------------|----------------|-----|--------|
| 1   | 32.0667         | 49.10          | -19.78        | 29.32          | 40.00          | -10.68      | peak     | 100         | 249            | P   |        |
| 2 * | 37.4165         | 50.18          | -18.76        | 31.42          | 40.00          | -8.58       | peak     | 100         | 3              | P   |        |
| 3   | 70.5836         | 50.69          | -20.64        | 30.05          | 40.00          | -9.95       | peak     | 100         | 351            | P   |        |
| 4   | 124.5690        | 55.36          | -21.86        | 33.50          | 43.50          | -10.00      | peak     | 100         | 58             | P   |        |
| 5   | 138.3873        | 56.11          | -22.07        | 34.04          | 43.50          | -9.46       | peak     | 100         | 103            | P   |        |
| 6   | 467.2349        | 44.45          | -14.88        | 29.57          | 46.00          | -16.43      | peak     | 100         | 158            | P   |        |

Note: 1). Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

2). Factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin (dB) = Level (dBuV/m) - Limit (dBuV/m)

For 1GHz to 40GHz

Note: All modes have been tested for above 1GHz test, only the worst case 802.11ac for antenna 1 was recorded.

### 5150-5250MHz:

#### *U-NII 1 & 802.11ac Mode (above 1GHz)*

| Tested Channel     | Frequency (MHz) | Emission Level (dBuV/m) | Detector Mode | ANT Pol | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre amplifier (dB) | Correction Factor (dB/m) |
|--------------------|-----------------|-------------------------|---------------|---------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| 36.00<br>(5180MHz) | 5150.00         | 51.03                   | PK            | H       | 68.20          | 17.17       | 69.93            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                    | 5150.00         | 36.42                   | AV            | H       | 54.00          | 17.58       | 55.32            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                    | 10360.00        | 51.26                   | PK            | H       | 68.20          | 16.94       | 58.18            | 37.62                 | 10.02             | 54.56              | -6.92                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 40.00<br>(5200MHz) | 10400.00        | 51.84                   | PK            | H       | 68.20          | 16.36       | 58.26            | 37.81                 | 10.14             | 54.37              | -6.42                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 48.00<br>(5240MHz) | 5350.50         | 50.72                   | PK            | H       | 68.20          | 17.48       | 69.29            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                    | 10480.00        | 51.15                   | PK            | H       | 68.20          | 17.05       | 57.67            | 37.95                 | 10.17             | 54.64              | -6.52                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |

| Tested Channel     | Frequency (MHz) | Emission Level (dBuV/m) | Detector Mode | ANT Pol | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre amplifier (dB) | Correction Factor (dB/m) |
|--------------------|-----------------|-------------------------|---------------|---------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| 36.00<br>(5180MHz) | 5150.00         | 51.49                   | PK            | V       | 68.20          | 16.71       | 70.39            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                    | 5150.00         | 38.73                   | AV            | V       | 54.00          | 15.27       | 57.63            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                    | 10360.00        | 51.28                   | PK            | V       | 68.20          | 16.92       | 58.20            | 37.62                 | 10.02             | 54.56              | -6.92                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 40.00<br>(5200MHz) | 10400.00        | 51.67                   | PK            | V       | 68.20          | 16.53       | 58.09            | 37.81                 | 10.14             | 54.37              | -6.42                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 48.00<br>(5240MHz) | 5350.50         | 51.34                   | PK            | V       | 68.20          | 16.86       | 69.91            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                    | 10480.00        | 51.62                   | PK            | V       | 68.20          | 16.58       | 58.14            | 37.95                 | 10.17             | 54.64              | -6.52                    |
|                    | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |

### 5260-5320MHz:

#### *U-NII 1 & 802.11ac Mode (above 1GHz)*

| Tested Channel   | Frequency (MHz) | Emission Level (dBuV/m) | Detector Mode | ANT Pol | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre amplifier (dB) | Correction Factor (dB/m) |
|------------------|-----------------|-------------------------|---------------|---------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| 52.00<br>5260MHz | 5150.00         | 51.38                   | PK            | H       | 68.20          | 16.82       | 70.28            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                  | 5150.00         | 38.02                   | AV            | H       | 54.00          | 15.98       | 56.92            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                  | 10520.00        | 50.88                   | PK            | H       | 68.20          | 17.32       | 38.83            | 38.07                 | 10.21             | 54.58              | -6.30                    |
|                  | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 56.00<br>5280MHz | 10560.00        | 51.24                   | PK            | H       | 68.20          | 16.96       | 57.03            | 38.43                 | 10.23             | 54.45              | -5.79                    |
|                  | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 64.00<br>5320MHz | 5350.50         | 50.47                   | PK            | H       | 68.20          | 17.73       | 69.04            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                  | 5350.50         | 38.25                   | AV            | H       | 54.00          | 15.75       | 56.82            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                  | 10480.00        | 50.62                   | PK            | H       | 68.20          | 17.58       | 55.35            | 39.05                 | 10.78             | 54.56              | -4.73                    |

| Tested Channel   | Frequency (MHz) | Emission Level (dBuV/m) | Detector Mode | ANT Pol | Limit (dBuV/m) | Margin (dB) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre amplifier (dB) | Correction Factor (dB/m) |
|------------------|-----------------|-------------------------|---------------|---------|----------------|-------------|------------------|-----------------------|-------------------|--------------------|--------------------------|
| 52.00<br>5260MHz | 5150.00         | 50.44                   | PK            | V       | 68.20          | 17.76       | 69.34            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                  | 5150.00         | 38.26                   | AV            | V       | 54.00          | 15.74       | 57.16            | 29.91                 | 5.87              | 54.68              | -18.90                   |
|                  | 10520.00        | 50.39                   | PK            | V       | 68.20          | 17.81       | 38.83            | 38.07                 | 10.21             | 54.58              | -6.30                    |
|                  | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 56.00<br>5280MHz | 10560.00        | 50.27                   | PK            | V       | 68.20          | 17.93       | 56.06            | 38.43                 | 10.23             | 54.45              | -5.79                    |
|                  | --              | --                      | --            | --      | --             | --          | --               | --                    | --                | --                 | --                       |
| 64.00<br>5320MHz | 5350.50         | 50.41                   | PK            | V       | 68.20          | 17.79       | 68.98            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                  | 5350.50         | 38.65                   | AV            | V       | 54.00          | 15.35       | 57.22            | 30.24                 | 5.93              | 54.74              | -18.57                   |
|                  | 10480.00        | 50.78                   | PK            | V       | 68.20          | 17.42       | 55.51            | 39.05                 | 10.78             | 54.56              | -4.73                    |

**5500-5700MHz:**

| Tested  | Frequency | Emission | Detector | ANT | Limit    | Margin | Raw    | Antenna | Cable  | Pre       | Correction |
|---------|-----------|----------|----------|-----|----------|--------|--------|---------|--------|-----------|------------|
| Channel | (MHz)     | Level    | Mode     | Pol | (dBuV/m) | (dB)   | Value  | Factor  | Factor | amplifier | Factor     |
|         |           | (dBuV/m) |          |     |          |        | (dBuV) | (dB/m)  | (dB)   | (dB)      | (dB/m)     |
|         | 5460.00   | 50.89    | PK       | H   | 68.20    | 17.31  | 69.03  | 30.52   | 5.95   | 54.61     | -18.14     |
| 100.00  | 5460.00   | 38.54    | AV       | H   | 54.00    | 15.46  | 56.68  | 30.52   | 5.95   | 54.61     | -18.14     |
| 5500MHz | 11000.00  | 50.63    | PK       | H   | 68.20    | 17.57  | 56.02  | 38.54   | 10.45  | 54.38     | -5.39      |
|         | --        | --       | --       | --  | --       | --     | --     | --      | --     | --        | --         |
| 116.00  | 11160.00  | 51.08    | PK       | H   | 68.20    | 17.12  | 56.23  | 38.71   | 10.61  | 54.47     | -5.15      |
| 5580MHz | --        | --       | --       | --  | --       | --     | --     | --      | --     | --        | --         |
| 140.00  | 5855.00   | 51.34    | PK       | H   | 68.20    | 16.86  | 68.88  | 30.94   | 6.15   | 54.63     | -17.54     |
| 5700MHz | 5855.00   | 39.17    | AV       | H   | 54.00    | 14.83  | 56.71  | 30.94   | 6.15   | 54.63     | -17.54     |
|         | 11400.00  | 50.89    | PK       | H   | 68.20    | 17.31  | 55.88  | 39.01   | 10.73  | 54.73     | -4.99      |

| Tested  | Frequency | Emission | Detector | ANT | Limit    | Margin | Raw    | Antenna | Cable  | Pre       | Correction |
|---------|-----------|----------|----------|-----|----------|--------|--------|---------|--------|-----------|------------|
| Channel | (MHz)     | Level    | Mode     | Pol | (dBuV/m) | (dB)   | Value  | Factor  | Factor | amplifier | Factor     |
|         |           | (dBuV/m) |          |     |          |        | (dBuV) | (dB/m)  | (dB)   | (dB)      | (dB/m)     |
|         | 5460.00   | 51.05    | PK       | V   | 68.20    | 17.15  | 69.19  | 30.52   | 5.95   | 54.61     | -18.14     |
| 100.00  | 5460.00   | 39.21    | AV       | V   | 54.00    | 14.79  | 57.35  | 30.52   | 5.95   | 54.61     | -18.14     |
| 5500MHz | 11000.00  | 51.43    | PK       | V   | 68.20    | 16.77  | 56.82  | 38.54   | 10.45  | 54.38     | -5.39      |
|         | --        | --       | --       | --  | --       | --     | --     | --      | --     | --        | --         |
| 116.00  | 11160.00  | 51.21    | PK       | V   | 68.20    | 16.99  | 56.36  | 38.71   | 10.61  | 54.47     | -5.15      |
| 5580MHz | --        | --       | --       | --  | --       | --     | --     | --      | --     | --        | --         |
| 140.00  | 5855.00   | 50.87    | PK       | V   | 68.20    | 17.33  | 68.41  | 30.94   | 6.15   | 54.63     | -17.54     |
| 5700MHz | 5855.00   | 39.02    | AV       | V   | 54.00    | 14.98  | 56.56  | 30.94   | 6.15   | 54.63     | -17.54     |
|         | 11400.00  | 50.76    | PK       | V   | 68.20    | 17.44  | 55.75  | 39.01   | 10.73  | 54.73     | -4.99      |

**5725-5850MHz:**

[illegible][illegible]

## REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the other emission levels were very low against the limit.
5. RBW 1MHz VBW 3MHz Peak detector is for PK value; RBW 1MHz VBW 10Hz Peak detector is for AV value.
6. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20, IEEE 802.11ac VHT40, IEEE 802.11ac VHT80, IEEE 802.11ax HE20, IEEE 802.11ax HE40, IEEE 802.11ac HT80.

For Conducted Band edge Measurement  
The test results have included the antenna gain

*Please refer to Appendix E.*

### 4.3. Duty Cycle

#### TEST CONFIGURATION



#### TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 B Duty Cycle (x), Transmission Duration (T):

- a. A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal
- b. The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set  $RBW \geq EBW$  if possible; otherwise, set RBW to the largest available value. Set  $VBW \geq RBW$ . Set detector = peak or average. The zerospan measurement method shall not be used unless both RBW and VBW are  $> 50/T$ , where T is defined in section II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

#### TEST RESULTS

For reporting purpose only.

**Please refer to Appendix B.**



#### 4.4. Maximum Average Output Power

##### TEST CONFIGURATION



##### TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 Section E3 Measurement using a Power Meter (PM):

- a. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied
  1. The EUT is configured to transmit continuously or to transmit with a constant duty cycle
  2. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
  3. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b. If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B
- c. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

Adjust the measurement in dBm by adding  $10 \log(1/x)$  where x is the duty cycle (e.g.,  $10 \log(1/0.25)$  if the duty cycle is 25 percent).

##### LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

| Frequency Range (MHz)   | Limit  |
|---|--|
| 5150-5250   | Fixed: 1 Watt (30dBm)<br>Mobile and portable: 250mW (23.98dBm) |
| 5250-5350   | 250mW (23.98dBm)   |
| 5470-5725   | 250mW (23.98dBm)   |
| 5725-5850   | 1 Watt (30dBm)   |
| Note: The maximum e.i.r.p at any elevation angle above 30 degrees as measured from the horizon must not exceed 125mW(21dBm) |  |

##### TEST RESULTS

Please refer to Appendix C

## 4.5. Power Spectral Density

### TEST CONFIGURATION



### TEST PROCEDURE

According to KDB 789033 D02 General UNII Test Procedures New Rules v01 F: The rules requires “maximum power spectral density” measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission

- a. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power...”. (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
- b. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
- c. Make the following adjustments to the peak value of the spectrum, if applicable:
  1. If Method SA-2 or SA-2 Alternative was used, add  $10 \log(1/x)$ , where  $x$  is the duty cycle, to the peak of the spectrum.
  2. ) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
- d. The result is the Maximum PSD over 1 MHz reference bandwidth.
- e. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth ( $< 1$  MHz, or  $< 500$  kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:
  1. Set  $RBW \geq 1/T$ , where  $T$  is defined in section II.B.I.a).
  2. Set  $VBW \geq 3$  RBW.
  3. If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10\log(500\text{kHz}/RBW)$  to the measured result, whereas  $RBW (< 500 \text{ KHz})$  is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
  4. If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10\log(1\text{MHz}/RBW)$  to the measured result, whereas  $RBW (< 1 \text{ MHz})$  is the reduced resolution bandwidth of spectrum analyzer set during measurement.
  5. Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since  $RBW=100 \text{ KHz}$  is available on nearly all spectrum analyzers.
- f. Adjust the measurement in dBm by adding  $10 \log(1/x)$  where  $x$  is the duty cycle (e.g.,  $10 \log(1/0.25)$  if the duty cycle is 25 percent).

### LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

| Frequency Range (MHz) | Limit   |
|-----------------------|---|
| 5150-5250             | Other then Mobile and portable:17dBm/MHz<br>Mobile and portable:11dBm/MHz |
| 5250-5350             | 11dBm/MHz   |
| 5470-5725             | 11dBm/MHz   |
| 5725-5850             | 30dBm/500kHz  |

### TEST RESULTS

Please refer to Appendix D.

## 4.6. 6dB Bandwidth

### TEST CONFIGURATION



### TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a. Set RBW = 100 kHz.
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Sweep = auto couple.
- f. Allow the trace to stabilize
- g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

### LIMIT

For Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz

### TEST RESULTS

***Please refer to Appendix A3.***

## 4.7. 26dB Bandwidth

### TEST CONFIGURATION



### TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v01 for one of the following procedures may be used for Emission Bandwidth (EBW) measurement:

- Set RBW = 300 kHz (approximately 1% of the emission bandwidth).
- Set the video bandwidth (VBW) = 1000 KHz (VBW > RBW)
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

### LIMIT

No Limits for 26dBc Bandwidth

### TEST RESULTS

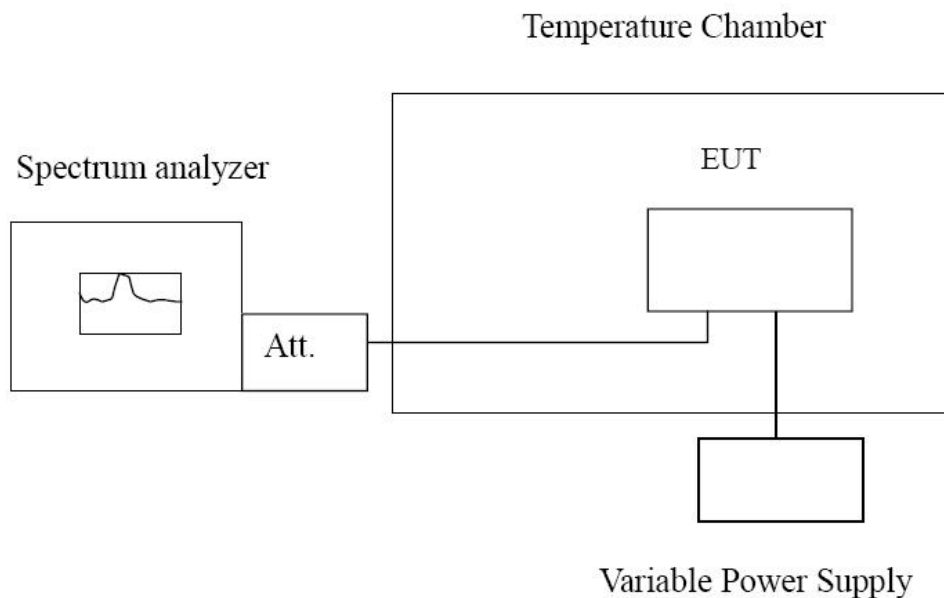
***Please refer to Appendix A1.***

## 4.8. Frequency Stability

### LIMIT

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

### TEST CONFIGURATION



### TEST PROCEDURE

#### **Frequency Stability under Temperature Variations:**

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

#### **Frequency Stability under Voltage Variations:**

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

### TEST RESULTS

***Please refer to Appendix F.***

## 4.9. Antenna Requirement

### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **Antenna Information**

#### Enclosure 1

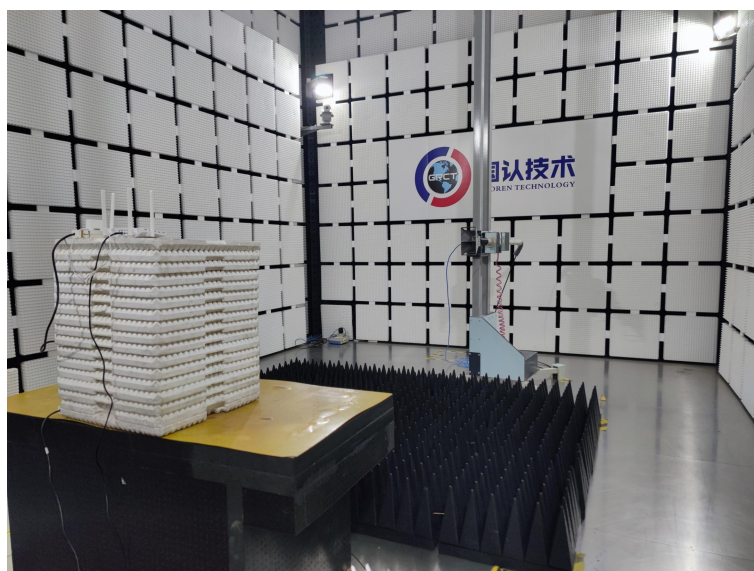
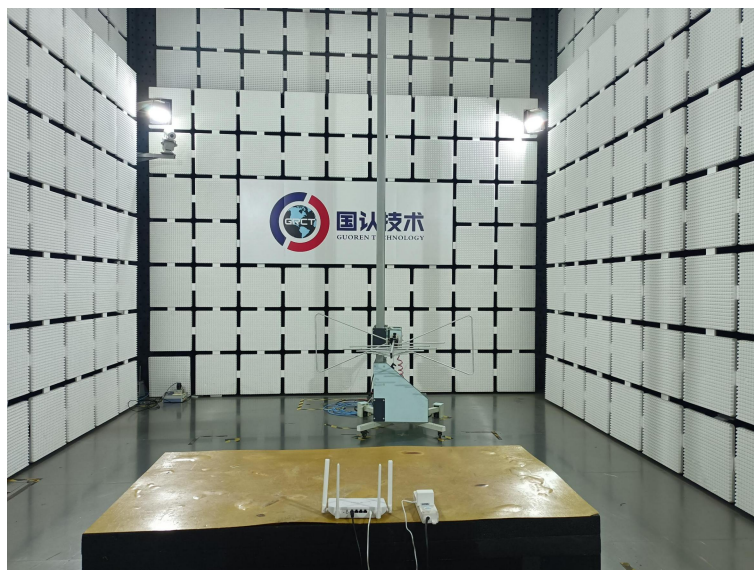
The maximum gain of antenna was 5.17 dBi for 5GHz WIFI Ant 1, the maximum gain of antenna was 5.05 dBi for 5GHz WIFI Ant 2.

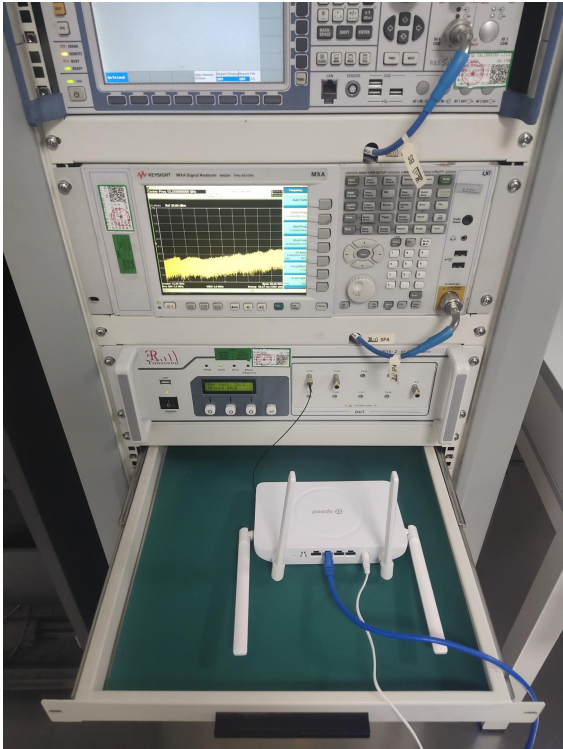
#### Enclosure 2

The maximum gain of antenna was 3.75 dBi for 5GHz WIFI Ant 1, the maximum gain of antenna was 3.65 dBi for 5GHz WIFI Ant 2.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen GUOREN Certification Technology Service Co., Ltd. does not assume any responsibility.

## 5. Test Setup Photos of the EUT





**6. External and Internal Photos of the EUT**

Reference to the test report No.GRCTR250502041-01

.....End of Report.....