



# FCC Test Report

Test report  
On Behalf of  
Shenzhen Haimeilan Technology Co., LTD.  
For  
Smart Phone

Model No.: K60, F5 Pro, F50 Pro, K60 Pro, K60E, M13, M13 Pro,  
M5s Pro, M5s, X5 Pro, F3 Pro, X40, X40 Pro, X40 Edge, F5,  
Note12 Pro, M6 Pro, I14 Pro max, I15 Pro max, G14 Pro, S22Ultra,  
S23 Ultra, G22

FCC ID: 2BDI3-K60

Prepared For : Shenzhen Haimeilan Technology Co., LTD.  
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Date of Test: Aug. 23, 2023 ~ Nov. 13, 2023

Date of Report: Nov. 13, 2023

Report Number: HK2308233869-9E



## Test Result Certification

**Applicant's name** ..... : Shenzhen Haimeilan Technology Co., LTD.  
**Address** ..... : 9V777, East 9th Floor, Building 2, SEG Science Park, Huaqiang North Street, Futian District, Shenzhen, 518000 China  
**Manufacture's Name** ..... : Shenzhen Shengkai Technology Co., Ltd.  
**Address** ..... : 4th floor, Building 7, Hongye Industrial Park, Zhujiao Village, Hangcheng Street, Baoan District, Shenzhen, 518000, China  
**Product description**  
**Trade Mark:** N/A  
**Product name** ..... : Smart Phone  
**Model and/or type reference** : K60, F5 Pro, F50 Pro, K60 Pro, K60E, M13, M13 Pro, M5s Pro, M5s, X5 Pro, F3 Pro, X40, X40 Pro, X40 Edge, F5, Note12 Pro, M6 Pro, I14 Pro max, I15 Pro max, G14 Pro, S22Ultra, S23 Ultra, G22  
**Standards** ..... : FCC Rules and Regulations Part 15 Subpart E Section 15.407  
ANSI C63.10: 2013

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**Date of Test** ..... :  
**Date (s) of performance of tests** ..... : **Aug. 23, 2023 ~ Nov. 13, 2023**  
**Date of Issue** ..... : **Nov. 13, 2023**  
**Test Result** ..... : **Pass**

Testing Engineer :

Gary Qian

(Gary Qian)

Technical Manager :

Zden Hu

(Eden Hu)

Authorized Signatory :

Jason Zhou

(Jason Zhou)





## Table of Contents

|                                                      |           |
|------------------------------------------------------|-----------|
| <b>1. Test Result Summary .....</b>                  | <b>5</b>  |
| 1.1. Test Procedures and Results .....               | 5         |
| 1.2. Information of the Test Laboratory .....        | 5         |
| 1.3. Measurement Uncertainty .....                   | 6         |
| <b>2. EUT Description .....</b>                      | <b>7</b>  |
| 2.1. General Description of EUT .....                | 7         |
| 2.2. Operation Frequency Each of Channel .....       | 8         |
| 2.3. Operation of EUT During Testing .....           | 8         |
| 2.4. Description of Test Setup .....                 | 9         |
| 2.5. Description of Support Units .....              | 10        |
| <b>3. General Information .....</b>                  | <b>11</b> |
| 3.1. Test Environment and Mode .....                 | 11        |
| <b>4. Test Results and Measurement Data .....</b>    | <b>14</b> |
| 4.1. Conducted Emission .....                        | 14        |
| 4.2. Maximum Conducted Output Power .....            | 18        |
| 4.3. 6DB Emission Bandwidth .....                    | 21        |
| 4.4. 26DB Bandwidth and 99% Occupied Bandwidth ..... | 28        |
| 4.5. Power Spectral Density .....                    | 29        |
| 4.6. Band Edge .....                                 | 36        |
| 4.7. Spurious Emission .....                         | 49        |
| 4.8. Frequency Stability Measurement .....           | 62        |
| 4.9. Antenna Requirement .....                       | 64        |
| <b>5. Photographs of Test Setup .....</b>            | <b>65</b> |
| <b>6. Photos of the EUT .....</b>                    | <b>67</b> |



**\*\* Modified History \*\***

| Revision     | Description                 | Issued Data   | Remark     |
|--------------|-----------------------------|---------------|------------|
| Revision 1.0 | Initial Test Report Release | Nov. 13, 2023 | Jason Zhou |
|              |                             |               |            |
|              |                             |               |            |



## 1. Test Result Summary

### 1.1. Test Procedures and Results

| Requirement                                      | CFR 47 Section           | Result |
|--------------------------------------------------|--------------------------|--------|
| Antenna requirement                              | §15.203                  | PASS   |
| AC Power Line Conducted Emission                 | §15.207                  | PASS   |
| Maximum Conducted Output Power                   | §15.407(a)               | PASS   |
| 6dB Emission Bandwidth                           | §15.407(e)               | PASS   |
| 26dB Emission Bandwidth & 99% Occupied Bandwidth | §15.407(a)               | N/A    |
| Power Spectral Density                           | §15.407(a)               | PASS   |
| Band edge                                        | §15.407(b)/15.209/15.205 | PASS   |
| Radiated Emission                                | §15.407(b)/15.209/15.205 | PASS   |
| Frequency Stability                              | §15.407(g)               | PASS   |

**Note:**

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

### 1.2. Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



### 1.3. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| No. | Item                          | MU                        |
|-----|-------------------------------|---------------------------|
| 1   | Conducted Emission            | $\pm 0.37\text{dB}$       |
| 2   | RF power, conducted           | $\pm 3.35\text{dB}$       |
| 3   | Spurious emissions, conducted | $\pm 2.20\text{dB}$       |
| 4   | All emissions, radiated(<1G)  | $\pm 3.90\text{dB}$       |
| 5   | All emissions, radiated(>1G)  | $\pm 4.28\text{dB}$       |
| 6   | Temperature                   | $\pm 0.1^{\circ}\text{C}$ |
| 7   | Humidity                      | $\pm 1.0\%$               |



## 2. EUT Description

### 2.1. General Description of EUT

|                        |                                                                                                                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment:             | Smart Phone                                                                                                                                                                             |
| Model Name:            | K60                                                                                                                                                                                     |
| Serial Model:          | F5 Pro, F50 Pro, K60 Pro, K60E, M13, M13 Pro, M5s Pro, M5s, X5 Pro, F3 Pro, X40, X40 Pro, X40 Edge, F5, Note12 Pro, M6 Pro, I14 Pro max, I15 Pro max, G14 Pro, S22Ultra, S23 Ultra, G22 |
| Model Difference:      | All model's the function, software and electric circuit are the same, only with a product color, appearance and model named different. Test sample model: K60.                          |
| Trade Mark:            | N/A                                                                                                                                                                                     |
| FCC ID:                | 2BDI3-K60                                                                                                                                                                               |
| Operation Frequency:   | IEEE 802.11a/n/ac (HT20)5.745GHz-5.825GHz<br>IEEE 802.11n/ac (HT40)5.755GHz-5.795GHz                                                                                                    |
| Modulation Technology: | IEEE 802.11a/n/ac                                                                                                                                                                       |
| Modulation Type:       | OFDM, OFDMA                                                                                                                                                                             |
| Antenna Type:          | Internal Antenna                                                                                                                                                                        |
| Antenna Gain:          | 1.1dBi                                                                                                                                                                                  |
| Power Source:          | DC 5V From Type-C or DC 3.8V From Battery                                                                                                                                               |
| Power Supply:          | DC 5V From Type-C or DC 3.8V From Battery                                                                                                                                               |



## 2.2. Operation Frequency Each of Channel

| 802.11a/802.11n(HT20)/<br>802.11ac(HT20) |           | 802.11n(HT40)/<br>802.11ac(HT40) |           |
|------------------------------------------|-----------|----------------------------------|-----------|
| Channel                                  | Frequency | Channel                          | Frequency |
| 149                                      | 5745      | 151                              | 5755      |
| 153                                      | 5765      | 159                              | 5795      |
| 157                                      | 5785      |                                  |           |
| 161                                      | 5805      |                                  |           |
| 165                                      | 5825      |                                  |           |

**Note:**

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

## 2.3. Operation of EUT During Testing

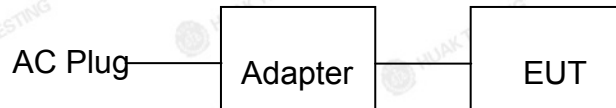
| Band IV (5725 - 5850 MHz) |         |                 |
|---------------------------|---------|-----------------|
| For 802.11a/n/ac (HT20)   |         |                 |
| Channel Number            | Channel | Frequency (MHz) |
| 149                       | Low     | 5745            |
| 157                       | Mid     | 5785            |
| 165                       | High    | 5825            |

| For 802.11n/ac (HT40) |         |                 |
|-----------------------|---------|-----------------|
| Channel Number        | Channel | Frequency (MHz) |
| 151                   | Low     | 5755            |
| 159                   | High    | 5795            |



## 2.4. Description of Test Setup

Operation of EUT during conducted testing and below 1GHz radiation testing:



Operation of EUT during above 1GHz radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



## 2.5. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment   | Trade Mark | Model/Type No. | Specification                                              | Remark     |
|------|-------------|------------|----------------|------------------------------------------------------------|------------|
| 1    | Smart Phone | N/A        | K60            | N/A                                                        | EUT        |
| 2    | USB Cable   | N/A        | N/A            | Length:1.02m                                               | Accessory  |
| 3    | Adapter     | N/A        | APD5-2         | Input: AC 100-240V,<br>50/60Hz, 0.5A<br>Output: 5VDC, 2.4A | Accessory  |
| 4    | RF Cable    | N/A        | N/A            | Length:0.1m                                                | Peripheral |
|      |             |            |                |                                                            |            |

### Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 20dB and 99% Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



### 3. General Information

#### 3.1. Test Environment and Mode

| Operating Environment:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 25.0 °C                                                                   |
| Humidity:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 56 % RH                                                                   |
| Atmospheric Pressure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1010 mbar                                                                 |
| Test Mode:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                           |
| Engineering mode:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Keep the EUT in continuous transmitting by select channel and modulations |
| <p>The sample was placed 0.8m/1.5m for below/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y &amp; Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p> |                                                                           |



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

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

| Mode             | Data rate |
|------------------|-----------|
| 802.11a          | 6 Mbps    |
| 802.11n/ac(HT20) | MCS0      |
| 802.11n/ac(HT40) | MCS0      |

#### Final Test Mode:

Operation mode:

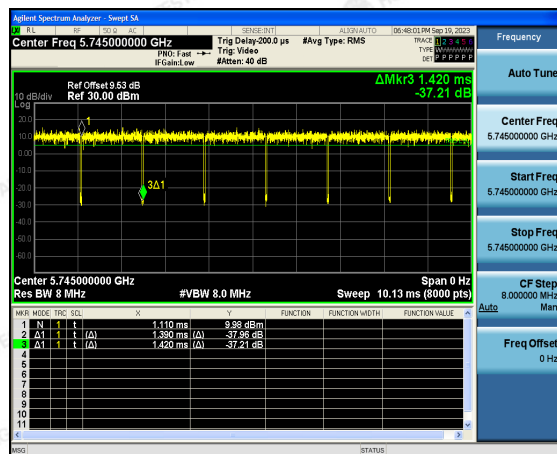
Keep the EUT in continuous transmitting with modulation

#### Mode Test Duty Cycle:

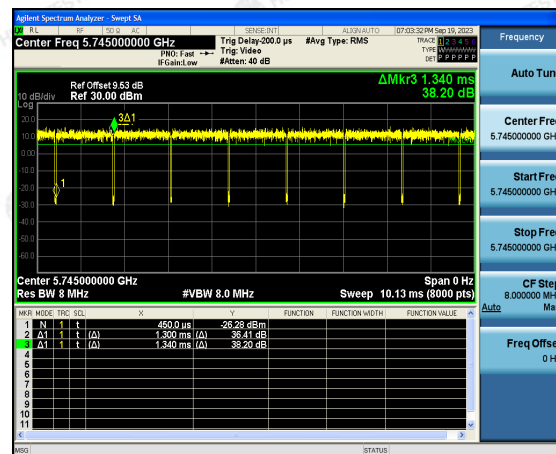
| Mode           | Duty Cycle | Duty Cycle Factor (dB) |
|----------------|------------|------------------------|
| 802.11a        | 0.98       | -0.09                  |
| 802.11n(HT20)  | 0.97       | -0.13                  |
| 802.11n(HT40)  | 0.96       | -0.18                  |
| 802.11ac(HT20) | 0.97       | -0.13                  |
| 802.11ac(HT40) | 0.96       | -0.18                  |

#### Test plots as follows:

##### 802.11a

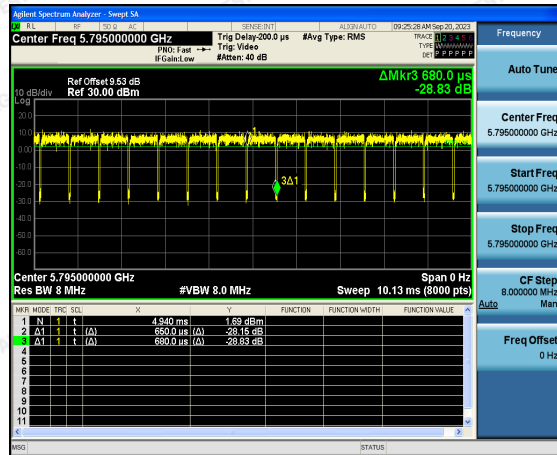


##### 802.11n(HT20)

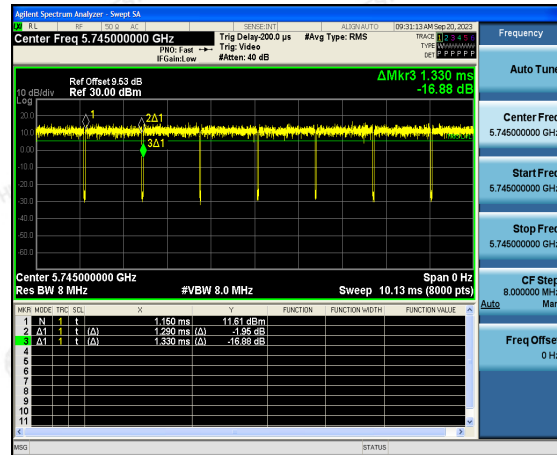




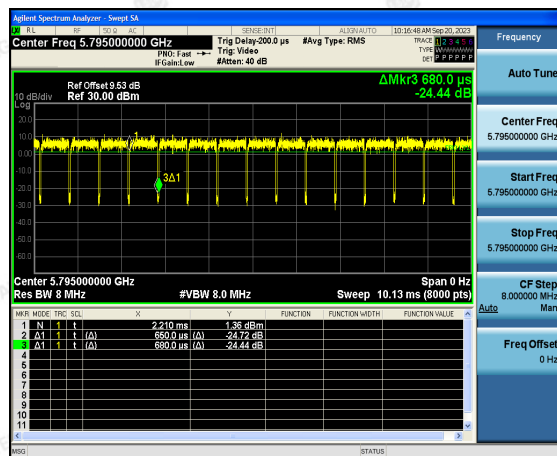
## 802.11n(HT40)



## 802.11ac(HT20)



## 802.11ac(HT40)





## 4. Test Results and Measurement Data

### 4.1. Conducted Emission

#### 4.1.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |           |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| <b>Test Requirement:</b> | FCC Part15 C Section 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |           |
| <b>Test Method:</b>      | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |           |
| <b>Frequency Range:</b>  | 150 kHz to 30 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |           |
| <b>Receiver setup:</b>   | RBW=9 kHz, VBW=30 kHz, Sweep time=auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |           |
| <b>Limits:</b>           | 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        |
| <b>Test Setup:</b>       | <p>Remark:<br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |           |
| <b>Test Mode:</b>        | Tx Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |           |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"><li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li><li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li><li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li></ol> |              |           |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |           |



#### 4.1.2. Test Instruments

| Conducted Emission Shielding Room Test Site (843) |              |                    |               |                  |                 |
|---------------------------------------------------|--------------|--------------------|---------------|------------------|-----------------|
| Equipment                                         | Manufacturer | Model              | Serial Number | Calibration Date | Calibration Due |
| Receiver                                          | R&S          | ESR-7              | HKE-010       | Feb. 17, 2023    | Feb. 16, 2024   |
| LISN                                              | R&S          | ENV216             | HKE-002       | Feb. 17, 2023    | Feb. 16, 2024   |
| Coax cable<br>(9KHz-30MHz)                        | Times        | 381806-00<br>2     | N/A           | Feb. 17, 2023    | Feb. 16, 2024   |
| 10dB Attenuator                                   | Schwarzbeck  | VTSD9561<br>F      | HKE-153       | Feb. 17, 2023    | Feb. 16, 2024   |
| Conducted test<br>software                        | Tonscend     | TS+ Rev<br>2.5.0.0 | HKE-081       | N/A              | N/A             |

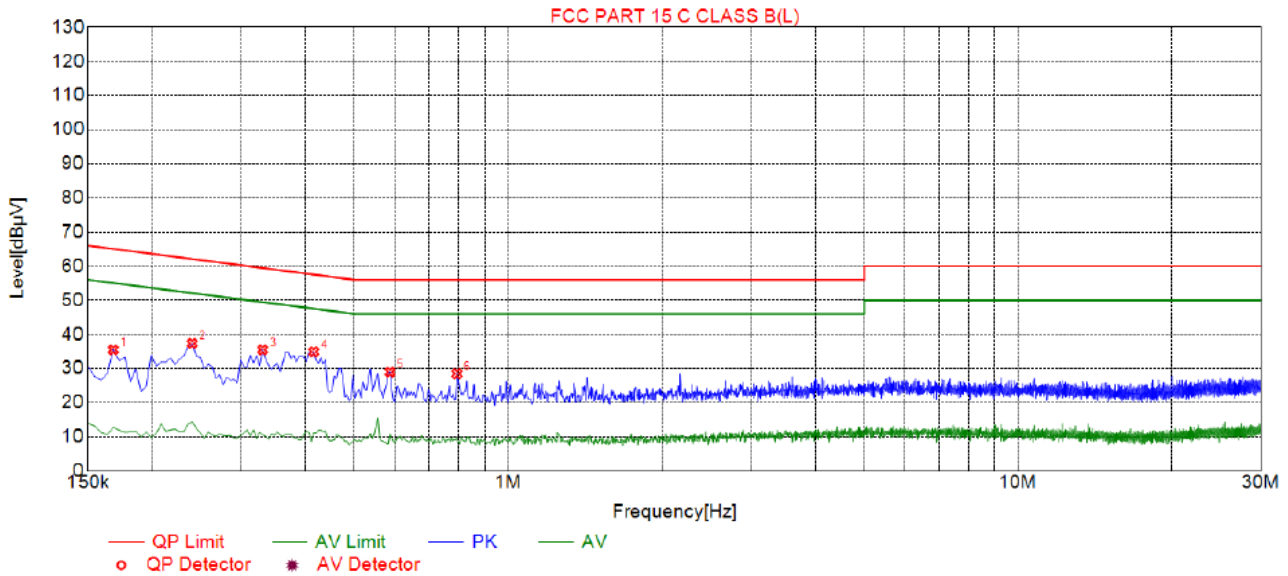
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



#### 4.1.3. Test data

Remark: All the test modes completed for test. only the worst result of 802. 11a was reported as below:

Test Specification: Line



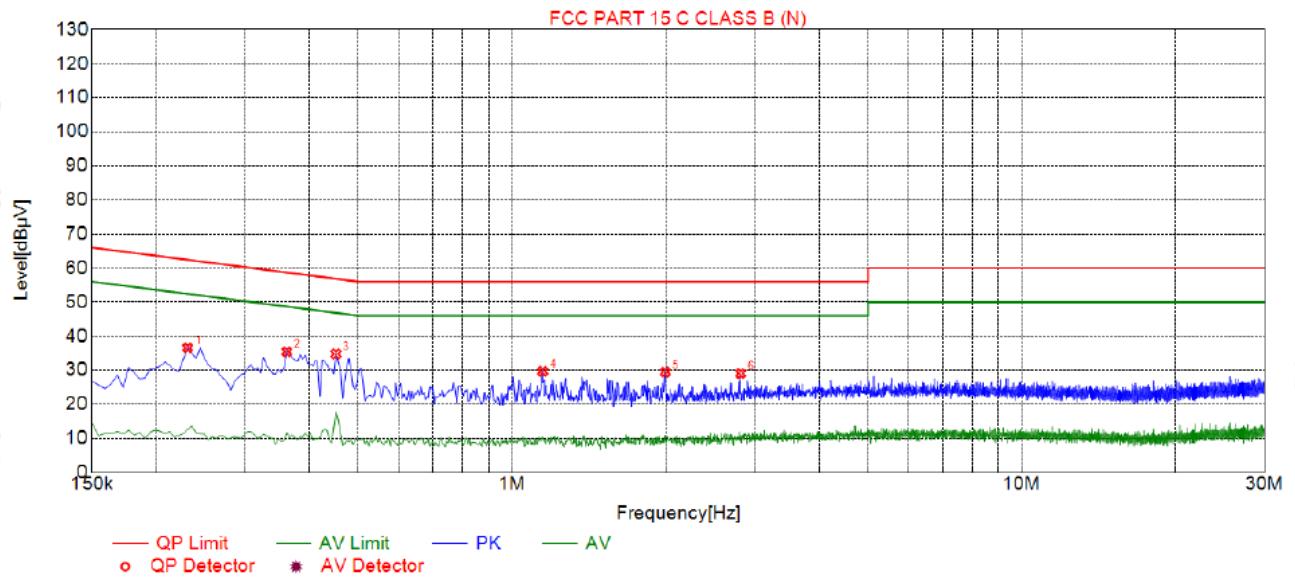
### Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBμV] | Factor<br>[dB] | Limit<br>[dBμV] | Margin<br>[dB] | Reading<br>[dBμV] | Detector | Type |
|-----|----------------|-----------------|----------------|-----------------|----------------|-------------------|----------|------|
| 1   | 0.1680         | 35.49           | 20.01          | 65.06           | 29.57          | 15.48             | PK       | L    |
| 2   | 0.2400         | 37.33           | 20.03          | 62.10           | 24.77          | 17.30             | PK       | L    |
| 3   | 0.3300         | 35.50           | 20.04          | 59.45           | 23.95          | 15.46             | PK       | L    |
| 4   | 0.4155         | 34.89           | 20.03          | 57.54           | 22.65          | 14.86             | PK       | L    |
| 5   | 0.5865         | 28.97           | 20.05          | 56.00           | 27.03          | 8.92              | PK       | L    |
| 6   | 0.7935         | 28.48           | 20.05          | 56.00           | 27.52          | 8.43              | PK       | L    |

Remark: Margin = Limit - Level  
Correction factor = Cable lose + LISN insertion loss  
Level=Test receiver reading + correction factor



Test Specification: Neutral



## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBμV] | Factor<br>[dB] | Limit<br>[dBμV] | Margin<br>[dB] | Reading<br>[dBμV] | Detector | Type |
|-----|----------------|-----------------|----------------|-----------------|----------------|-------------------|----------|------|
| 1   | 0.2310         | 36.59           | 20.03          | 62.41           | 25.82          | 16.56             | PK       | N    |
| 2   | 0.3615         | 35.44           | 20.04          | 58.69           | 23.25          | 15.40             | PK       | N    |
| 3   | 0.4515         | 34.78           | 20.04          | 56.85           | 22.07          | 14.74             | PK       | N    |
| 4   | 1.1490         | 29.66           | 20.09          | 56.00           | 26.34          | 9.57              | PK       | N    |
| 5   | 1.9995         | 29.47           | 20.14          | 56.00           | 26.53          | 9.33              | PK       | N    |
| 6   | 2.8095         | 29.04           | 20.21          | 56.00           | 26.96          | 8.83              | PK       | N    |

Remark: Margin = Limit - Level

Correction factor = Cable loss + LISN insertion loss

Level = Test receiver reading + correction factor



## 4.2. Maximum Conducted Output Power

### 4.2.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| <b>Test Requirement:</b> | FCC Part15 E Section 15.407(a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| <b>Test Method:</b>      | KDB789033 D02 General UNII Test Procedures New Rules v02.r01 Section E                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |
| <b>Limit:</b>            | Frequency Band (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Limit |
|                          | 5725-5850                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 W   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. On the left is a green rectangular box labeled 'Power meter'. A line connects it to a small white square labeled 'Attenuator'. Another line connects the attenuator to a yellow rectangular box labeled 'EUT' (Equipment Under Test).</p>                                                                                                                                                         |       |
| <b>Test Mode:</b>        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"><li>1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a.</li><li>2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li><li>3. Set to the maximum power setting and enable the EUT transmit continuously.</li><li>4. Measure the conducted output power and record the results in the test report.</li></ol> |       |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |
| <b>Remark:</b>           | Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0<br>Conducted output power= measurement power                                                                                                                                                                                                                                                                                                                                                                                           |       |



#### 4.2.2. Test Instruments

| RF Test Room              |              |          |               |                  |                 |
|---------------------------|--------------|----------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model    | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A   | HKE-048       | Feb. 17, 2023    | Feb. 16, 2024   |
| Power meter               | Agilent      | E4419B   | HKE-085       | Feb. 17, 2023    | Feb. 16, 2024   |
| Power Sensor              | Agilent      | E9300A   | HKE-086       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                  | Times        | 1-40G    | HKE-034       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF automatic control unit | Tonscend     | JS0806-2 | HKE-060       | Feb. 17, 2023    | Feb. 16, 2024   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

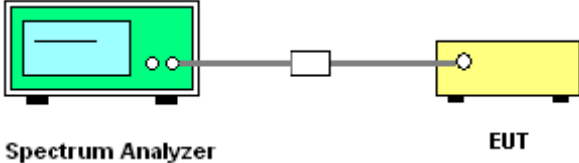
**Test Data**

| Configuration Band IV (5725 - 5850 MHz )           |              |                                      |                 |        |
|----------------------------------------------------|--------------|--------------------------------------|-----------------|--------|
| Mode                                               | Test channel | Maximum Conducted Output Power (dBm) | FCC Limit (dBm) | Result |
| 11a                                                | CH149        | 9.88                                 | 30              | PASS   |
| 11a                                                | CH157        | 8.22                                 | 30              | PASS   |
| 11a                                                | CH165        | 9.25                                 | 30              | PASS   |
| 11n HT20                                           | CH149        | 8.83                                 | 30              | PASS   |
| 11n HT20                                           | CH157        | 8.26                                 | 30              | PASS   |
| 11n HT20                                           | CH165        | 7.95                                 | 30              | PASS   |
| 11n HT40                                           | CH151        | 9.78                                 | 30              | PASS   |
| 11n HT40                                           | CH159        | 8.13                                 | 30              | PASS   |
| 11ac HT20                                          | CH149        | 8.87                                 | 30              | PASS   |
| 11ac HT20                                          | CH157        | 8.51                                 | 30              | PASS   |
| 11ac HT20                                          | CH165        | 9.09                                 | 30              | PASS   |
| 11ac HT40                                          | CH151        | 9.42                                 | 30              | PASS   |
| 11ac HT40                                          | CH159        | 8.34                                 | 30              | PASS   |
| Note: 1.The test results including the cable lose. |              |                                      |                 |        |



### 4.3. 6DB Emission Bandwidth

#### 4.3.1. Test Specification

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC CFR47 Part 15 Section 15.407(e)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test Method:      | KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Limit:            | >500kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test Setup:       |  <p>Spectrum Analyzer                      EUT</p>                                                                                                                                                                                                                                                                                                                                                                                |
| Test Mode:        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Test Procedure:   | <ol style="list-style-type: none"><li>1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C.</li><li>2. Set to the maximum power setting and enable the EUT transmit continuously.</li><li>3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.</li><li>4. Measure and record the results in the test report.</li></ol> |
| Test Result:      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

#### 4.3.2. Test Instruments

| RF Test Room              |              |          |               |                  |                 |
|---------------------------|--------------|----------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model    | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A   | HKE-048       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                  | Times        | 1-40G    | HKE-034       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF automatic control unit | Tonscend     | JS0806-2 | HKE-060       | Feb. 17, 2023    | Feb. 16, 2024   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



#### 4.3.3. Test data

| Band IV (5725 - 5850 MHz ) |              |                 |                      |             |        |
|----------------------------|--------------|-----------------|----------------------|-------------|--------|
| Mode                       | Test channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) | Result |
| 11a                        | CH149        | 5745            | 15.12                | 0.5         | PASS   |
| 11a                        | CH157        | 5785            | 15.44                | 0.5         | PASS   |
| 11a                        | CH161        | 5825            | 15.48                | 0.5         | PASS   |
| 11n(HT20)                  | CH149        | 5745            | 15.08                | 0.5         | PASS   |
| 11n(HT20)                  | CH157        | 5785            | 15.92                | 0.5         | PASS   |
| 11n(HT20)                  | CH161        | 5825            | 15.08                | 0.5         | PASS   |
| 11n(HT40)                  | CH151        | 5755            | 35.12                | 0.5         | PASS   |
| 11n(HT40)                  | CH159        | 5795            | 35.20                | 0.5         | PASS   |
| 11ac(HT20)                 | CH149        | 5745            | 15.12                | 0.5         | PASS   |
| 11ac(HT20)                 | CH157        | 5785            | 15.12                | 0.5         | PASS   |
| 11ac(HT20)                 | CH165        | 5825            | 15.12                | 0.5         | PASS   |
| 11ac(HT40)                 | CH151        | 5755            | 35.20                | 0.5         | PASS   |
| 11ac(HT40)                 | CH159        | 5795            | 35.20                | 0.5         | PASS   |

Note: RBW setting for 99% bandwidth is 1%-5% OBW

Test plots as follows:



## Band IV (5725 – 5850 MHz)





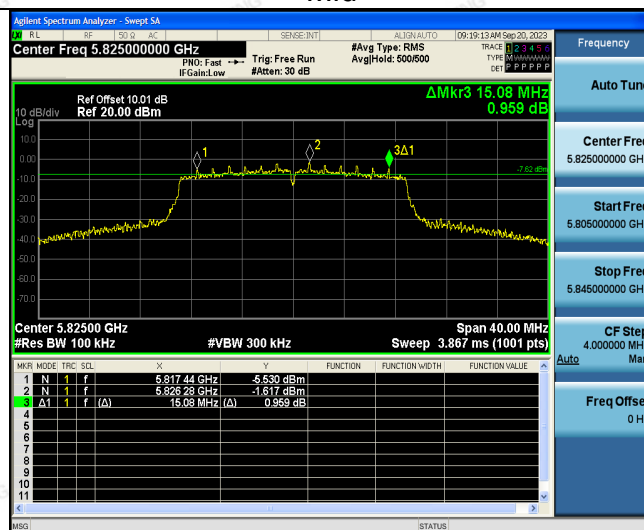
## 802.11n HT20



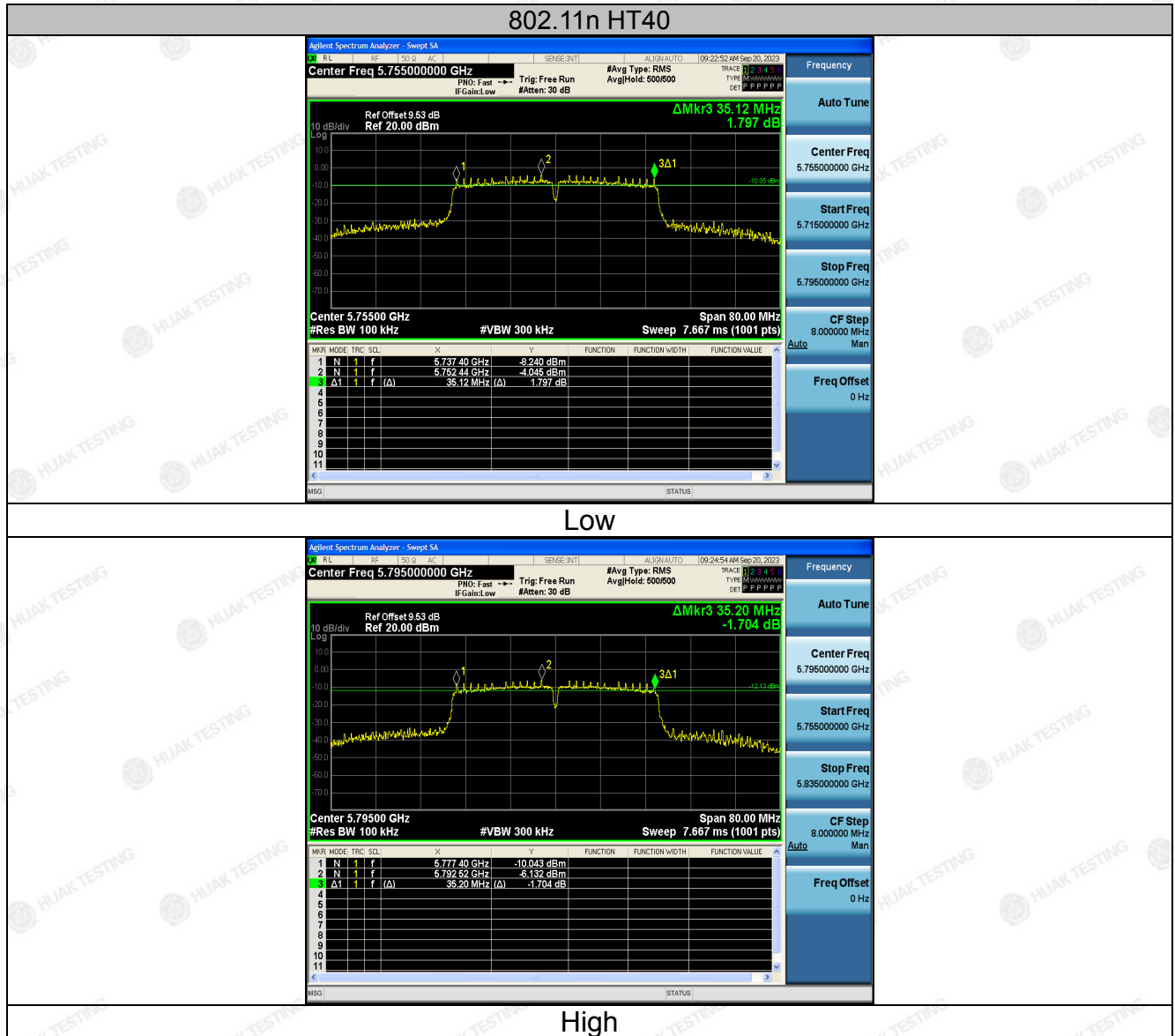
## Low



## Mid



## High

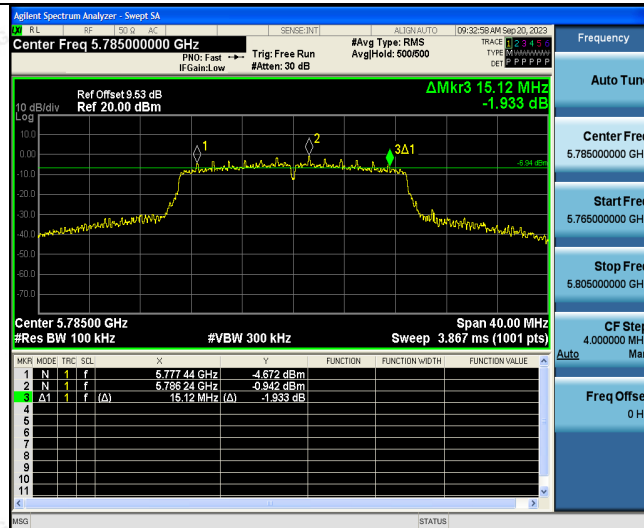




## 802.11ac HT20



Low



Mid

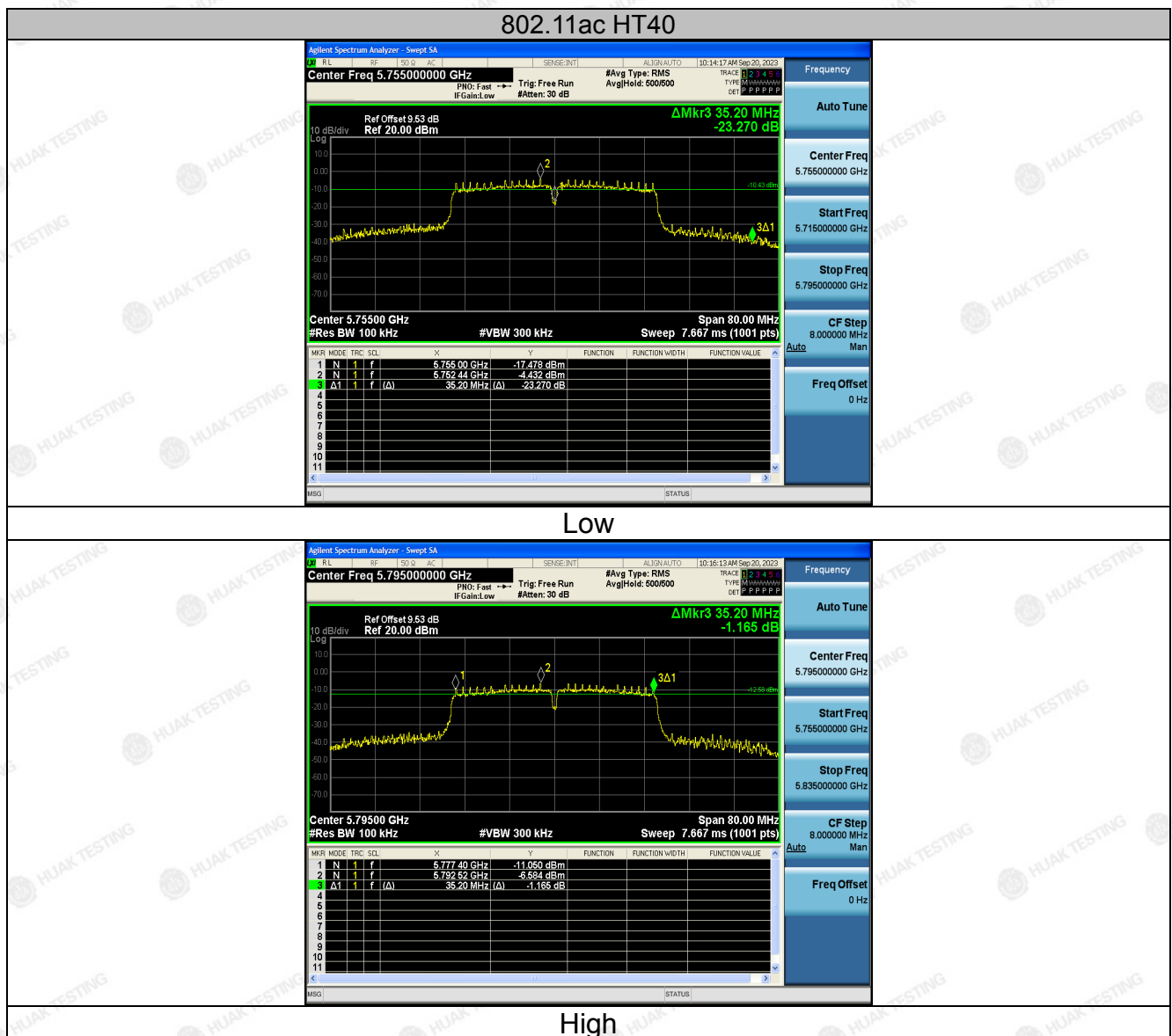


High

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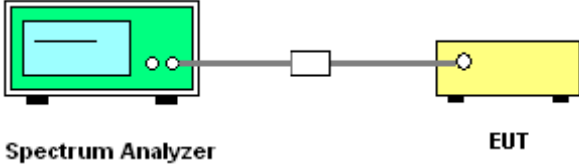
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China





#### 4.4. 26DB Bandwidth and 99% Occupied Bandwidth

##### 4.4.1. Test Specification

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | 47 CFR Part 15C Section 15.407 (a)                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Method:      | KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C                                                                                                                                                                                                                                                                                                                                                                                                     |
| Limit:            | No restriction limits                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test Setup:       |  <p>Spectrum Analyzer                      EUT</p>                                                                                                                                                                                                                                                                                                                                      |
| Test Mode:        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Procedure:   | <ol style="list-style-type: none"><li>1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C.</li><li>2. Set to the maximum power setting and enable the EUT transmit continuously.</li><li>3. Make the measurement with the spectrum analyzer's resolution bandwidth <math>RBW = 1\% \text{ EBW}</math>, <math>VBW \geq 3RBW</math>, In order to make an accurate measurement.</li><li>4. Measure and record the results in the test report.</li></ol> |
| Test Result:      | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

##### 4.4.2. Test Instruments

| RF Test Room              |              |          |               |                  |                 |
|---------------------------|--------------|----------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model    | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A   | HKE-048       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                  | Times        | 1-40G    | HKE-034       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF automatic control unit | Tonscend     | JS0806-2 | HKE-060       | Feb. 17, 2023    | Feb. 16, 2024   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

##### 4.4.3. Test Result

N/A



## 4.5. Power Spectral Density

### 4.5.1. Test Specification

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test Method:      | KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Limit:            | ≤30.00dBm/500KHz for Band IV 5725MHz-5850MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Test Setup:       | <br>Spectrum Analyzer                      EUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Test Mode:        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Test Procedure:   | <ol style="list-style-type: none"><li>1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.</li><li>2. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS.</li><li>3. Allow the sweeps to continue until the trace stabilizes.</li><li>4. Use the peak marker function to determine the maximum amplitude level.</li><li>5. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.</li></ol> |
| Test Result:      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

### 4.5.2. Test Instruments

| RF Test Room              |              |          |               |                  |                 |
|---------------------------|--------------|----------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model    | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A   | HKE-048       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                  | Times        | 1-40G    | HKE-034       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF automatic control unit | Tonscend     | JS0806-2 | HKE-060       | Feb. 17, 2023    | Feb. 16, 2024   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



## 4.5.3. Test data

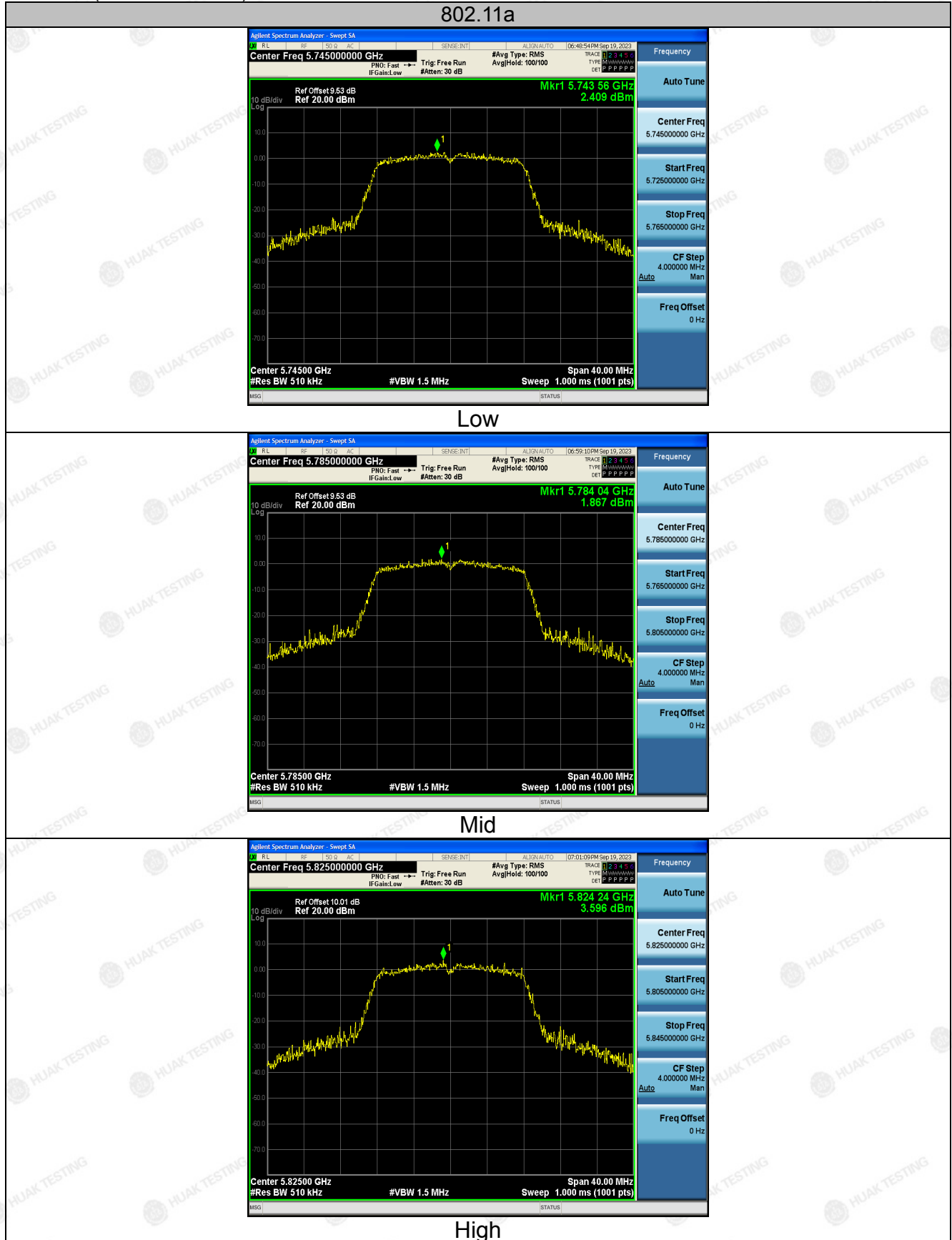
| Configuration Band IV (5725 - 5850 MHz ) |              |                    |                |                        |                    |        |
|------------------------------------------|--------------|--------------------|----------------|------------------------|--------------------|--------|
| Mode                                     | Test channel | Level [dBm/510kHz] | 10log(500/510) | Power Spectral Density | Limit (dBm/500kHz) | Result |
| 11a                                      | CH149        | 2.41               | -0.086         | 2.324                  | 30                 | PASS   |
| 11a                                      | CH157        | 1.87               | -0.086         | 1.784                  | 30                 | PASS   |
| 11a                                      | CH165        | 3.6                | -0.086         | 3.514                  | 30                 | PASS   |
| 11n HT20                                 | CH149        | 3.05               | -0.086         | 2.964                  | 30                 | PASS   |
| 11n HT20                                 | CH157        | 1.92               | -0.086         | 1.834                  | 30                 | PASS   |
| 11n HT20                                 | CH165        | 2.11               | -0.086         | 2.024                  | 30                 | PASS   |
| 11n HT40                                 | CH151        | 0.09               | -0.086         | 0.004                  | 30                 | PASS   |
| 11n HT40                                 | CH159        | -1.62              | -0.086         | -1.706                 | 30                 | PASS   |
| 11ac HT20                                | CH149        | 2.82               | -0.086         | 2.734                  | 30                 | PASS   |
| 11ac HT20                                | CH157        | 2.87               | -0.086         | 2.784                  | 30                 | PASS   |
| 11ac HT20                                | CH165        | 3.68               | -0.086         | 3.594                  | 30                 | PASS   |
| 11ac HT40                                | CH151        | 0.35               | -0.086         | 0.264                  | 30                 | PASS   |
| 11ac HT40                                | CH159        | -0.34              | -0.086         | -0.426                 | 30                 | PASS   |

Note: 1. Power Spectral Density= Level [dBm/510kHz]+ ( 10log(Limit RBW/Test RBW) )  
 2. Instrument attenuation and cable loss See test diagram

Test plots as follows:



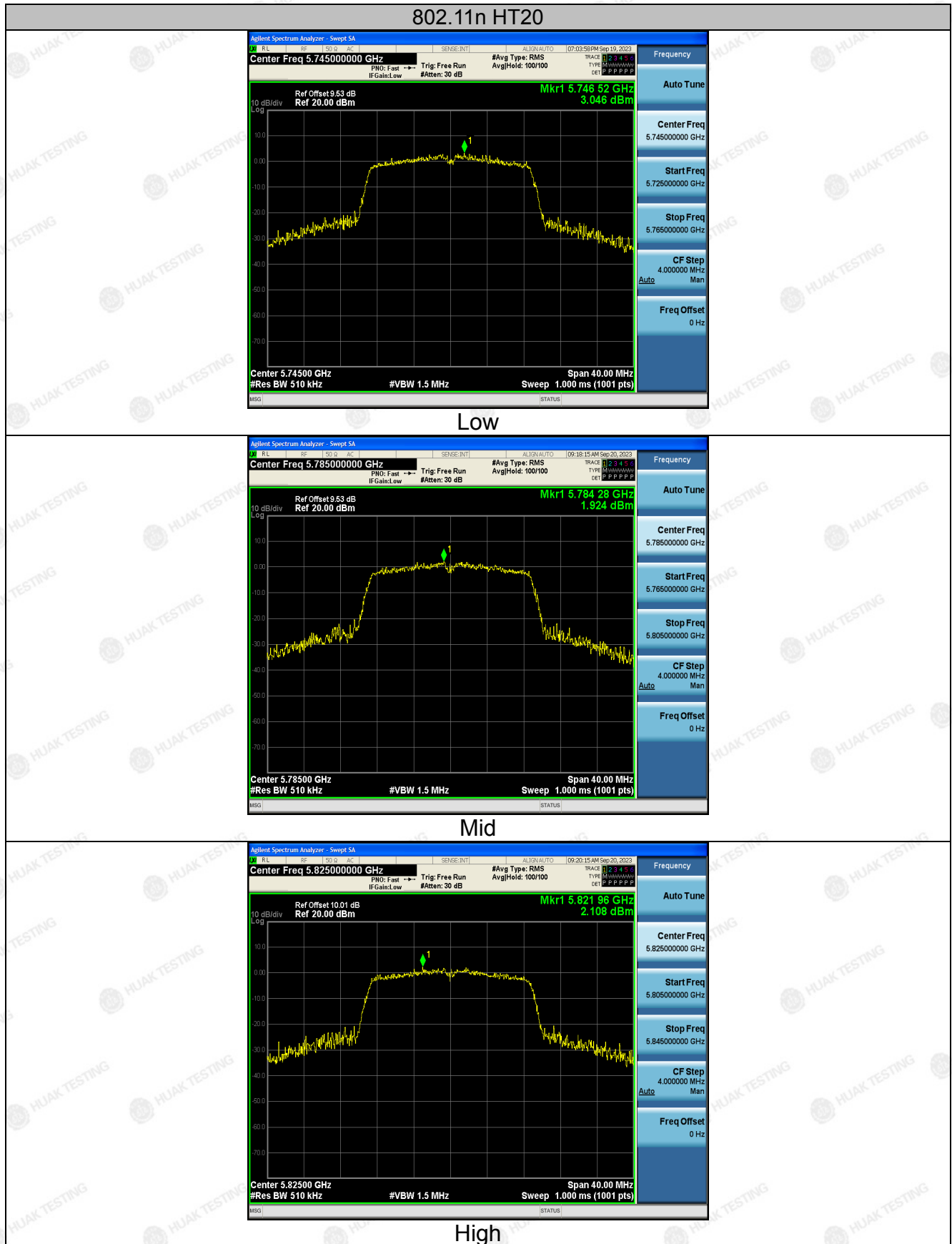
Band IV (5725-5850 MHz)



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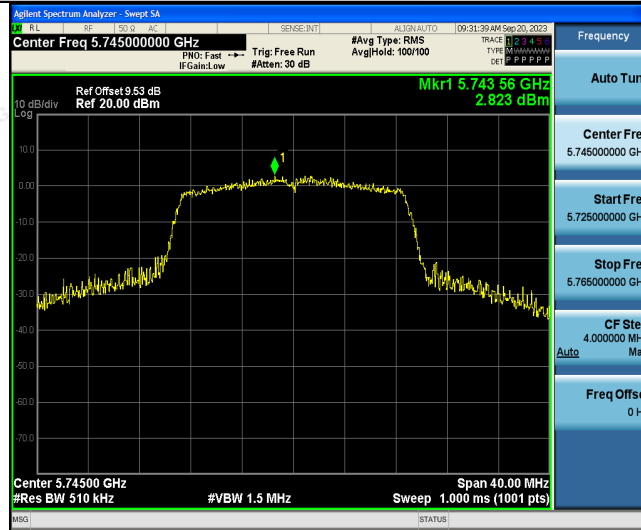
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## 802.11ac HT20



Low



Mid



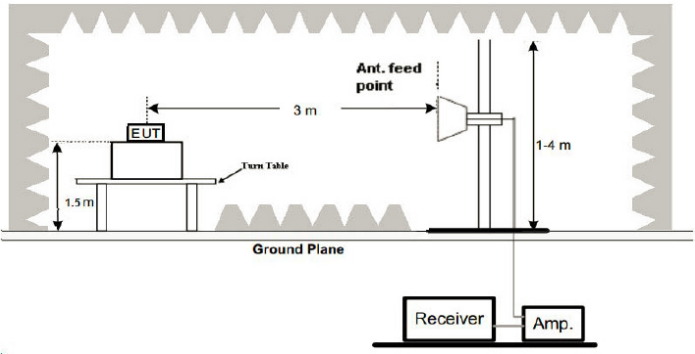
High





## 4.6. Band Edge

### 4.6.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC CFR47 Part 15E Section 15.407                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Test Method:</b>      | ANSI C63.10 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Limit:</b>            | (1)For transmitters operating in the 5.725-5.85 GHz band:<br>(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.<br>The limit of frequency below 1GHz and which fall in restricted bands should complies 15.209.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a turn table at a height of 1.5 m. The turn table is 3 m away from an antenna tower. The antenna tower has an antenna feed point at a height of 1-4 m. The antenna is connected to a receiver and an amplifier (Amp.) system. The entire setup is on a ground plane.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Test Mode:</b>        | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Test Procedure:</b>   | <ol style="list-style-type: none"><li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li></ol> |

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|              |                                                                                                                                                                                                                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi peak or average method as specified and then reported in a data sheet. |
| Test Result: | PASS                                                                                                                                                                                                                                                                                                                                                   |



## 4.6.2. Test Instruments

## Radiated Emission Test Site (966)

| Name of Equipment       | Manufacturer | Model              | Serial Number | Calibration Date | Calibration Due |
|-------------------------|--------------|--------------------|---------------|------------------|-----------------|
| Receiver                | R&S          | ESRP3              | HKE-005       | Feb. 17, 2023    | Feb. 16, 2024   |
| Spectrum analyzer       | Agilent      | N9020A             | HKE-048       | Feb. 17, 2023    | Feb. 16, 2024   |
| Preamplifier            | EMCI         | EMC051845S<br>E    | HKE-015       | Feb. 17, 2023    | Feb. 16, 2024   |
| Preamplifier            | Agilent      | 83051A             | HKE-016       | Feb. 17, 2023    | Feb. 16, 2024   |
| Loop antenna            | Schwarzbeck  | FMZB 1519 B        | HKE-014       | Feb. 17, 2023    | Feb. 16, 2024   |
| Broadband antenna       | Schwarzbeck  | VULB 9163          | HKE-012       | Feb. 17, 2023    | Feb. 16, 2024   |
| Horn antenna            | Schwarzbeck  | 9120D              | HKE-013       | Feb. 17, 2023    | Feb. 16, 2024   |
| Antenna Mast            | Keleto       | CC-A-4M            | N/A           | N/A              | N/A             |
| Position controller     | Taiwan MF    | MF7802             | HKE-011       | Feb. 17, 2023    | Feb. 16, 2024   |
| Radiated test software  | Tonscend     | TS+ Rev<br>2.5.0.0 | HKE-082       | N/A              | N/A             |
| RF cable<br>(9KHz-1GHz) | Times        | 381806-001         | N/A           | N/A              | N/A             |
| Hf antenna              | Schwarzbeck  | LB-180400-KF       | HKE-031       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                | Tonscend     | 1-18G              | HKE-099       | Feb. 17, 2023    | Feb. 16, 2024   |
| RF cable                | Times        | 1-40G              | HKE-034       | Feb. 17, 2023    | Feb. 16, 2024   |
| Horn Antenna            | Schwarzbeck  | BBHA 9170          | HKE-017       | Feb. 17, 2023    | Feb. 16, 2024   |
| Spectrum analyzer       | R&S          | FSP40              | HKE-025       | Feb. 17, 2023    | Feb. 16, 2024   |

**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

**4.6.3. Test Data**

Operation Mode: 802.11a Mode with 5.8G TX CH Low

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 44.86         | -2.06  | 42.8           | 68.2     | -25.4  | peak          |
| 5700                                                                                                           | 85.93         | -1.96  | 83.97          | 105.2    | -21.23 | peak          |
| 5720                                                                                                           | 89.45         | -2.87  | 86.58          | 110.8    | -24.22 | peak          |
| 5725                                                                                                           | 100.01        | -2.14  | 97.87          | 122.2    | -24.33 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 45.62         | -2.06  | 43.56          | 68.2     | -24.64 | peak          |
| 5700                                                                                                           | 85.39         | -1.96  | 83.43          | 105.2    | -21.77 | peak          |
| 5720                                                                                                           | 91.45         | -2.87  | 88.58          | 110.8    | -22.22 | peak          |
| 5725                                                                                                           | 96.29         | -2.14  | 94.15          | 122.2    | -28.05 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 97.39         | -1.97  | 95.42          | 122.2    | -26.78 | peak          |
| 5855                                                                                                           | 88.94         | -2.13  | 86.81          | 110.8    | -23.99 | peak          |
| 5875                                                                                                           | 83.61         | -2.65  | 80.96          | 105.2    | -24.24 | peak          |
| 5925                                                                                                           | 48.32         | -2.28  | 46.04          | 68.2     | -22.16 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 100.57        | -1.97  | 98.6           | 122.2    | -23.6  | peak          |
| 5855                                                                                                           | 87.25         | -2.13  | 85.12          | 110.8    | -25.68 | peak          |
| 5875                                                                                                           | 85.19         | -2.65  | 82.54          | 105.2    | -22.66 | peak          |
| 5925                                                                                                           | 50.58         | -2.28  | 48.3           | 68.2     | -19.9  | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: 802.11n20 Mode with 5.8G TX CH Low

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 47.95         | -2.06  | 45.89          | 68.2     | -22.31 | peak          |
| 5700                                                                                                           | 85.62         | -1.96  | 83.66          | 105.2    | -21.54 | peak          |
| 5720                                                                                                           | 92.22         | -2.87  | 89.35          | 110.8    | -21.45 | peak          |
| 5725                                                                                                           | 100.68        | -2.14  | 98.54          | 122.2    | -23.66 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 44.21         | -2.06  | 42.15          | 68.2     | -26.05 | peak          |
| 5700                                                                                                           | 85.56         | -1.96  | 83.6           | 105.2    | -21.6  | peak          |
| 5720                                                                                                           | 91.57         | -2.87  | 88.7           | 110.8    | -22.1  | peak          |
| 5725                                                                                                           | 98.44         | -2.14  | 96.3           | 122.2    | -25.9  | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 97.28         | -1.97  | 95.31          | 122.2    | -26.89 | peak          |
| 5855                                                                                                           | 89.61         | -2.13  | 87.48          | 110.8    | -23.32 | peak          |
| 5875                                                                                                           | 85.24         | -2.65  | 82.59          | 105.2    | -22.61 | peak          |
| 5925                                                                                                           | 48.48         | -2.28  | 46.2           | 68.2     | -22    | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 98.76         | -1.97  | 96.79          | 122.2    | -25.41 | peak          |
| 5855                                                                                                           | 90.06         | -2.13  | 87.93          | 110.8    | -22.87 | peak          |
| 5875                                                                                                           | 85.83         | -2.65  | 83.18          | 105.2    | -22.02 | peak          |
| 5925                                                                                                           | 48.35         | -2.28  | 46.07          | 68.2     | -22.13 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: 802.11n40 Mode with 5.8G TX CH Low

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 45.27         | -2.06  | 43.21          | 68.2     | -24.99 | peak          |
| 5700                                                                                                           | 84.95         | -1.96  | 82.99          | 105.2    | -22.21 | peak          |
| 5720                                                                                                           | 88.66         | -2.87  | 85.79          | 110.8    | -25.01 | peak          |
| 5725                                                                                                           | 99.17         | -2.14  | 97.03          | 122.2    | -25.17 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 44.26         | -2.06  | 42.2           | 68.2     | -26    | peak          |
| 5700                                                                                                           | 83.92         | -1.96  | 81.96          | 105.2    | -23.24 | peak          |
| 5720                                                                                                           | 92.34         | -2.87  | 89.47          | 110.8    | -21.33 | peak          |
| 5725                                                                                                           | 98.51         | -2.14  | 96.37          | 122.2    | -25.83 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 97.31         | -1.97  | 95.34          | 122.2    | -26.86 | peak          |
| 5855                                                                                                           | 88.98         | -2.13  | 86.85          | 110.8    | -23.95 | peak          |
| 5875                                                                                                           | 83.89         | -2.65  | 81.24          | 105.2    | -23.96 | peak          |
| 5925                                                                                                           | 49.12         | -2.28  | 46.84          | 68.2     | -21.36 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 97.39         | -1.97  | 95.42          | 122.2    | -26.78 | peak          |
| 5855                                                                                                           | 88.95         | -2.13  | 86.82          | 110.8    | -23.98 | peak          |
| 5875                                                                                                           | 83.24         | -2.65  | 80.59          | 105.2    | -24.61 | peak          |
| 5925                                                                                                           | 51.16         | -2.28  | 48.88          | 68.2     | -19.32 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: 802.11ac20 Mode with 5.8G TX CH Low

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 46.45         | -2.06  | 44.39          | 68.2     | -23.81 | peak          |
| 5700                                                                                                           | 85.53         | -1.96  | 83.57          | 105.2    | -21.63 | peak          |
| 5720                                                                                                           | 89.75         | -2.87  | 86.88          | 110.8    | -23.92 | peak          |
| 5725                                                                                                           | 98.62         | -2.14  | 96.48          | 122.2    | -25.72 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 43.81         | -2.06  | 41.75          | 68.2     | -26.45 | peak          |
| 5700                                                                                                           | 84.26         | -1.96  | 82.3           | 105.2    | -22.9  | peak          |
| 5720                                                                                                           | 90.74         | -2.87  | 87.87          | 110.8    | -22.93 | peak          |
| 5725                                                                                                           | 96.71         | -2.14  | 94.57          | 122.2    | -27.63 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 98.31         | -1.97  | 96.34          | 122.2    | -25.86 | peak          |
| 5855                                                                                                           | 88.89         | -2.13  | 86.76          | 110.8    | -24.04 | peak          |
| 5875                                                                                                           | 84.44         | -2.65  | 81.79          | 105.2    | -23.41 | peak          |
| 5925                                                                                                           | 48.49         | -2.28  | 46.21          | 68.2     | -21.99 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 98.19         | -1.97  | 96.22          | 122.2    | -25.98 | peak          |
| 5855                                                                                                           | 90.12         | -2.13  | 87.99          | 110.8    | -22.81 | peak          |
| 5875                                                                                                           | 86.22         | -2.65  | 83.57          | 105.2    | -21.63 | peak          |
| 5925                                                                                                           | 49.54         | -2.28  | 47.26          | 68.2     | -20.94 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: 802.11ac40 Mode with 5.8G TX CH Low

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 44.72         | -2.06  | 42.66          | 68.2     | -25.54 | peak          |
| 5700                                                                                                           | 84.77         | -1.96  | 82.81          | 105.2    | -22.39 | peak          |
| 5720                                                                                                           | 89.24         | -2.87  | 86.37          | 110.8    | -24.43 | peak          |
| 5725                                                                                                           | 99.63         | -2.14  | 97.49          | 122.2    | -24.71 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5650                                                                                                           | 43.25         | -2.06  | 41.19          | 68.2     | -27.01 | peak          |
| 5700                                                                                                           | 83.61         | -1.96  | 81.65          | 105.2    | -23.55 | peak          |
| 5720                                                                                                           | 90.63         | -2.87  | 87.76          | 110.8    | -23.04 | peak          |
| 5725                                                                                                           | 98.78         | -2.14  | 96.64          | 122.2    | -25.56 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 96.08         | -1.97  | 94.11          | 122.2    | -28.09 | peak          |
| 5855                                                                                                           | 87.74         | -2.13  | 85.61          | 110.8    | -25.19 | peak          |
| 5875                                                                                                           | 84.42         | -2.65  | 81.77          | 105.2    | -23.43 | peak          |
| 5925                                                                                                           | 47.61         | -2.28  | 45.33          | 68.2     | -22.87 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 5850                                                                                                           | 99.49         | -1.97  | 97.52          | 122.2    | -24.68 | peak          |
| 5855                                                                                                           | 89.66         | -2.13  | 87.53          | 110.8    | -23.27 | peak          |
| 5875                                                                                                           | 84.55         | -2.65  | 81.9           | 105.2    | -23.3  | peak          |
| 5925                                                                                                           | 49.91         | -2.28  | 47.63          | 68.2     | -20.57 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

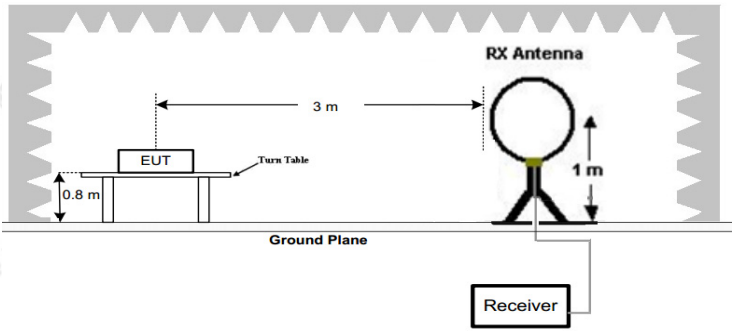
Remark:

1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
2. In restricted bands of operation, the spurious emissions below the permissible value more than 20dB.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



## 4.7. Spurious Emission

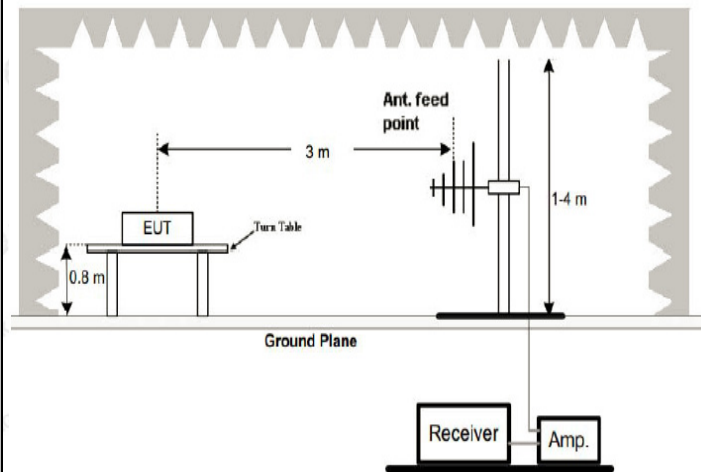
### 4.7.1.1. Test Specification

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |        |        |                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------|--------|------------------|
| <b>Test Requirement:</b>     | FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |        |        |                  |
| <b>Test Method:</b>          | KDB 789033 D02 v02r01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |        |        |                  |
| <b>Frequency Range:</b>      | 9kHz to 40GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |        |        |                  |
| <b>Measurement Distance:</b> | 3 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |        |        |                  |
| <b>Antenna Polarization:</b> | Horizontal & Vertical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |        |        |                  |
| <b>Operation mode:</b>       | Transmitting mode with modulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |        |        |                  |
| <b>Receiver Setup:</b>       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Detector   | RBW    | VBW    | Remark           |
|                              | 9kHz- 150kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Quasi-peak | 200Hz  | 1kHz   | Quasi-peak Value |
|                              | 150kHz- 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Quasi-peak | 9kHz   | 30kHz  | Quasi-peak Value |
|                              | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Quasi-peak | 120KHz | 300KHz | Quasi-peak Value |
|                              | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Peak       | 1MHz   | 3MHz   | Peak Value       |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Peak       | 1MHz   | 10Hz   | Average Value    |
| <b>Limit:</b>                | <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>(4) For transmitters operating in the 5.725-5.85 GHz band:</p> <p>(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.</p> <p>The limit of frequency below 1GHz and which fall in restricted bands should comply 15.209.</p> |            |        |        |                  |
| <b>Test setup:</b>           | <p>For radiated emissions below 30MHz</p>  <p>30MHz to 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |        |        |                  |

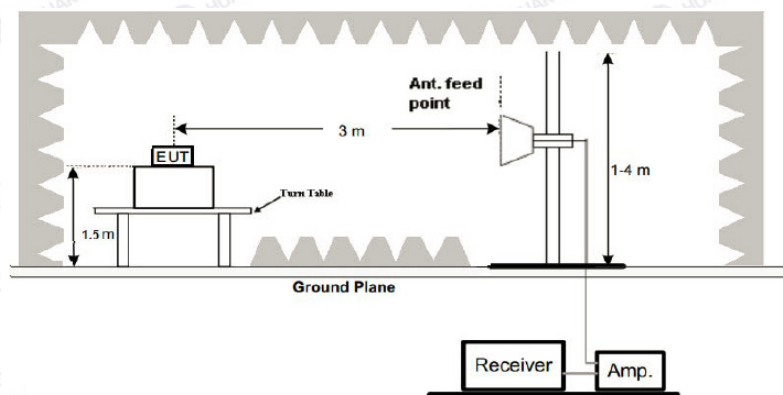
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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Above 1GHz



### Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



|               |                                                                                                                                                                                                                                                                                                                                                        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test results: | PASS                                                                                                                                                                                                                                                                                                                                                   |



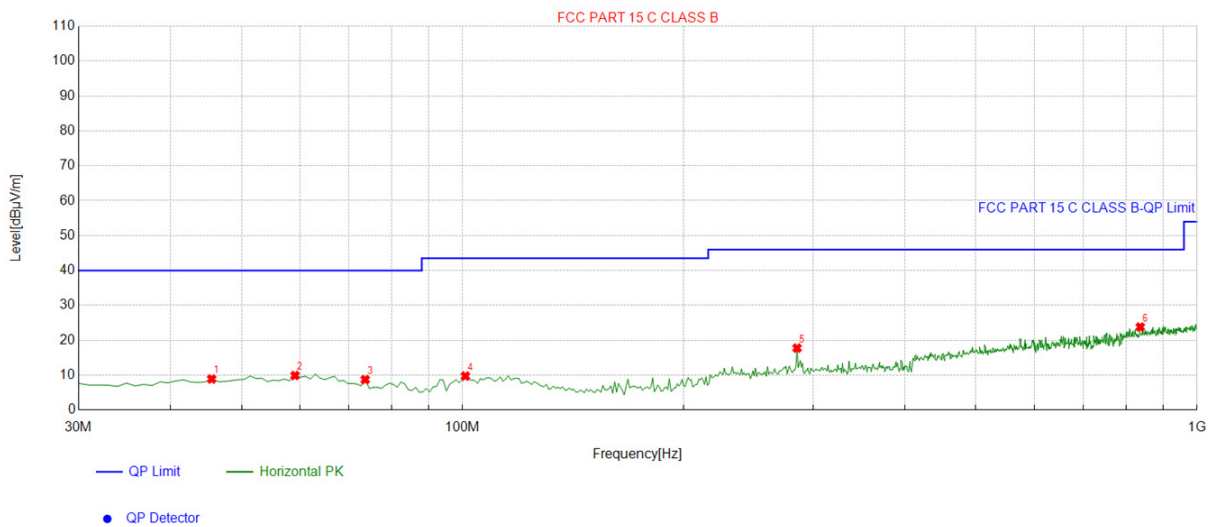
#### 4.7.2. Test Data

test mode: TX 802.11a 5745MHz

Remark: All the test modes completed for test. only the worst result of 802. 11a was reported as below:

##### Below 1GHz

##### Horizontal



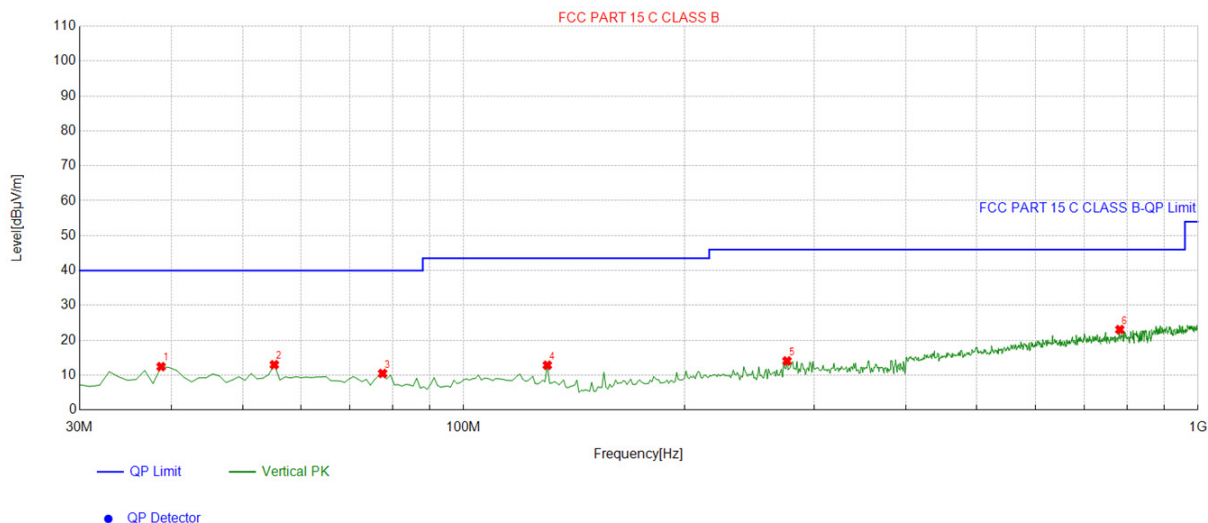
##### Suspected List

| NO. | Freq.<br>[MHz] | Factor<br>[dB] | Reading<br>[dBμV/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Polarity   |
|-----|----------------|----------------|---------------------|-------------------|-------------------|----------------|----------------|--------------|------------|
| 1   | 45.535536      | -14.97         | 23.87               | 8.90              | 40.00             | 31.10          | 100            | 246          | Horizontal |
| 2   | 59.129129      | -14.55         | 24.45               | 9.90              | 40.00             | 30.10          | 100            | 119          | Horizontal |
| 3   | 73.693694      | -16.44         | 25.17               | 8.73              | 40.00             | 31.27          | 100            | 56           | Horizontal |
| 4   | 100.88088      | -15.09         | 24.83               | 9.74              | 43.50             | 33.76          | 100            | 326          | Horizontal |
| 5   | 285.36536      | -12.57         | 30.33               | 17.76             | 46.00             | 28.24          | 100            | 238          | Horizontal |
| 6   | 836.87687      | -1.42          | 25.21               | 23.79             | 46.00             | 22.21          | 100            | 356          | Horizontal |

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



## Vertical



| Suspected List |                |                |                     |                   |                   |                |                |              |          |
|----------------|----------------|----------------|---------------------|-------------------|-------------------|----------------|----------------|--------------|----------|
| NO.            | Freq.<br>[MHz] | Factor<br>[dB] | Reading<br>[dBμV/m] | Level<br>[dBμV/m] | Limit<br>[dBμV/m] | Margin<br>[dB] | Height<br>[cm] | Angle<br>[°] | Polarity |
| 1              | 38.738739      | -15.54         | 27.98               | 12.44             | 40.00             | 27.56          | 100            | 123          | Vertical |
| 2              | 55.245245      | -14.32         | 27.31               | 12.99             | 40.00             | 27.01          | 100            | 170          | Vertical |
| 3              | 77.577578      | -17.16         | 27.64               | 10.48             | 40.00             | 29.52          | 100            | 204          | Vertical |
| 4              | 130.01001      | -17.44         | 30.29               | 12.85             | 43.50             | 30.65          | 100            | 189          | Vertical |
| 5              | 275.65565      | -12.52         | 26.60               | 14.08             | 46.00             | 31.92          | 100            | 277          | Vertical |
| 6              | 782.50250      | -2.32          | 25.38               | 23.06             | 46.00             | 22.94          | 100            | 246          | Vertical |

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

## Harmonics and Spurious Emissions

## Frequency Range (9 kHz-30MHz)

| Frequency (MHz) | Level@3m (dBμV/m) | Limit@3m (dBμV/m) |
|-----------------|-------------------|-------------------|
| --              | --                | --                |
| --              | --                | --                |
| --              | --                | --                |
| --              | --                | --                |

**Note:** 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

**Above 1GHz****RADIATED EMISSION TEST**

LOW CH 149 (802.11 a Mode with 5.8G)/5745

Horizontal:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368                                                                                                           | 57.27         | -4.59  | 52.68          | 68.2     | -15.52 | peak          |
| 11096                                                                                                          | 53.09         | 4.21   | 57.3           | 74       | -16.7  | peak          |
| 11096                                                                                                          | 35.08         | 4.21   | 39.29          | 54       | -14.71 | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368                                                                                                           | 56.06         | -4.59  | 51.47          | 68.2     | -16.73 | peak          |
| 11096                                                                                                          | 51.46         | 4.21   | 55.67          | 74       | -18.33 | peak          |
| 11096                                                                                                          | 35.33         | 4.21   | 39.54          | 54       | -14.46 | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



MID CH157 (802.11 a Mode with 5.8G)/5785

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172      | 57.14         | -4.59  | 52.55          | 68.2     | -15.65 | peak          |
| 10523     | 53.17         | 4.21   | 57.38          | 68.2     | -10.82 | peak          |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172      | 57.37         | -4.59  | 52.78          | 68.2     | -15.42 | peak          |
| 10523     | 50.68         | 4.21   | 54.89          | 68.2     | -13.31 | peak          |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit



HIGH CH 165 (802.11a Mode with 5.8G)/5825

Horizontal:

| Frequency<br>(MHz)                                                                                             | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Detector Type |
|----------------------------------------------------------------------------------------------------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2705                                                                                                           | 57.78                   | -4.59          | 53.19                      | 74                 | -20.81         |               |
| 2705                                                                                                           | 46.39                   | -4.59          | 41.8                       | 54                 | -12.2          | AVG           |
| 11717                                                                                                          | 53.32                   | 4.84           | 58.16                      | 74                 | -15.84         | peak          |
| 11717                                                                                                          | 38.79                   | 4.84           | 43.63                      | 54                 | -10.37         | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |                         |                |                            |                    |                |               |

Vertical:

| Frequency<br>(MHz)                                                                                             | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Detector Type |
|----------------------------------------------------------------------------------------------------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2705                                                                                                           | 58.04                   | -4.59          | 53.45                      | 74                 | -20.55         |               |
| 2705                                                                                                           | 45.27                   | -4.59          | 40.68                      | 54                 | -13.32         | AVG           |
| 11717                                                                                                          | 53.31                   | 4.84           | 58.15                      | 74                 | -15.85         | peak          |
| 11717                                                                                                          | 35.21                   | 4.84           | 40.05                      | 54                 | -13.95         | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |                         |                |                            |                    |                |               |

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11n20 Mode

LOW CH 149

Horizontal:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368                                                                                                           | 56.76         | -4.59  | 52.17          | 68.2     | -16.03 | peak          |
| 11096                                                                                                          | 54.18         | 4.21   | 58.39          | 74       | -15.61 | peak          |
| 11096                                                                                                          | 34.38         | 4.21   | 38.59          | 54       | -15.41 | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368                                                                                                           | 56.57         | -4.59  | 51.98          | 68.2     | -16.22 | peak          |
| 11096                                                                                                          | 50.31         | 4.21   | 54.52          | 74       | -19.48 | peak          |
| 11096                                                                                                          | 35.71         | 4.21   | 39.92          | 54       | -14.08 | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |



MID CH157

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172      | 53.87         | -4.59  | 49.28          | 68.2     | -18.92 | peak          |
| 10523     | 51.24         | 4.21   | 55.45          | 68.2     | -12.75 | peak          |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172      | 60.54         | -4.59  | 55.95          | 68.2     | -12.25 | peak          |
| 10523     | 48.11         | 4.21   | 52.32          | 68.2     | -15.88 | peak          |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit



HIGH CH165

Horizontal:

| Frequency<br>(MHz)                                                                                             | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Detector Type |
|----------------------------------------------------------------------------------------------------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2705                                                                                                           | 58.49                   | -4.59          | 53.9                       | 74                 | -20.1          |               |
| 2705                                                                                                           | 42.24                   | -4.59          | 37.65                      | 54                 | -16.35         | AVG           |
| 11717                                                                                                          | 52.56                   | 4.84           | 57.4                       | 74                 | -16.6          | peak          |
| 11717                                                                                                          | 39.07                   | 4.84           | 43.91                      | 54                 | -10.09         | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |                         |                |                            |                    |                |               |

Vertical:

| Frequency<br>(MHz)                                                                                             | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Detector Type |
|----------------------------------------------------------------------------------------------------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2705                                                                                                           | 58.62                   | -4.59          | 54.03                      | 74                 | -19.97         |               |
| 2705                                                                                                           | 45.63                   | -4.59          | 41.04                      | 54                 | -12.96         | AVG           |
| 11717                                                                                                          | 52.74                   | 4.84           | 57.58                      | 74                 | -16.42         | peak          |
| 11717                                                                                                          | 37.21                   | 4.84           | 42.05                      | 54                 | -11.95         | AVG           |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |                         |                |                            |                    |                |               |

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5.8G 802.11n40 Mode

LOW CH 151

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368      | 58.65         | -4.59  | 54.06          | 68.2     | -14.14 | peak          |
| 11096     | 54.97         | 4.21   | 59.18          | 74       | -14.82 | peak          |
| 11096     | 35.89         | 4.21   | 40.1           | 54       | -13.9  | AVG           |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3368      | 59.25         | -4.59  | 54.66          | 68.2     | -13.54 | peak          |
| 11096     | 51.68         | 4.21   | 55.89          | 74       | -18.11 | peak          |
| 11096     | 35.99         | 4.21   | 40.2           | 54       | -13.8  | AVG           |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit



MID CH159

Horizontal:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172                                                                                                           | 56.06         | -4.59  | 51.47          | 68.2     | -16.73 | peak          |
| 10523                                                                                                          | 50.94         | 4.21   | 55.15          | 68.2     | -13.05 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Vertical:

| Frequency                                                                                                      | Meter Reading | Factor | Emission Level | Limits   | Margin | Detector Type |
|----------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                                          | (dBμV)        | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 3172                                                                                                           | 56.09         | -4.59  | 51.5           | 68.2     | -16.7  | peak          |
| 10523                                                                                                          | 50.33         | 4.21   | 54.54          | 68.2     | -13.66 | peak          |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier; Level = Reading + Factor; Margin = Level - Limit |               |        |                |          |        |               |

Remark:

- (1) Measuring frequencies from 1 GHz to the 40 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



## 4.8. Frequency Stability Measurement

### 4.8.1. Test Specification

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC Part15 Section 15.407(g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Test Method:</b>      | ANSI C63.10: 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Limit:</b>            | The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.                                                                                                                                                                                                                                                                                                                |
| <b>Test Setup:</b>       | <pre>graph LR; SA[Spectrum Analyzer] --- EUT[EUT]; subgraph TC [Temperature Chamber]; EUT; end; P[AC/DC Power supply] --- EUT;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Test Procedure:</b>   | The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record. |
| <b>Test Result:</b>      | PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Remark:</b>           | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Test Result as follows:**

| Mode      | Voltage (V) | FHL (5745MHz) | Deviation (KHz) | FHH (5825MHz) | Deviation (KHz) |
|-----------|-------------|---------------|-----------------|---------------|-----------------|
| 5.8G Band | 4.25V       | 5744.974      | -26             | 5824.981      | -19             |
|           | 5V          | 5744.946      | -54             | 5825.021      | 21              |
|           | 5.75V       | 5744.989      | -11             | 5824.977      | -23             |

| Mode      | Temperature (°C) | FHL (5745MHz) | Deviation (KHz) | FHH (5825MHz) | Deviation (KHz) |
|-----------|------------------|---------------|-----------------|---------------|-----------------|
| 5.8G Band | -30              | 5745.014      | 14              | 5825.026      | 26              |
|           | -20              | 5745.008      | 8               | 5825.003      | 3               |
|           | -10              | 5744.981      | -19             | 5824.968      | -32             |
|           | 0                | 5744.989      | -11             | 5824.959      | -41             |
|           | 10               | 5744.974      | -26             | 5825.024      | 24              |
|           | 20               | 5744.922      | -78             | 5824.951      | -49             |
|           | 30               | 5745.011      | 11              | 5825.017      | 17              |
|           | 40               | 5744.991      | -9              | 5824.989      | -11             |
|           | 50               | 5744.988      | -12             | 5825.012      | 12              |



## 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 15.249, 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.

### Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### Antenna Connected Construction

The antenna used in this product is a Internal Antenna, need professional installation. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 1.1dBi.

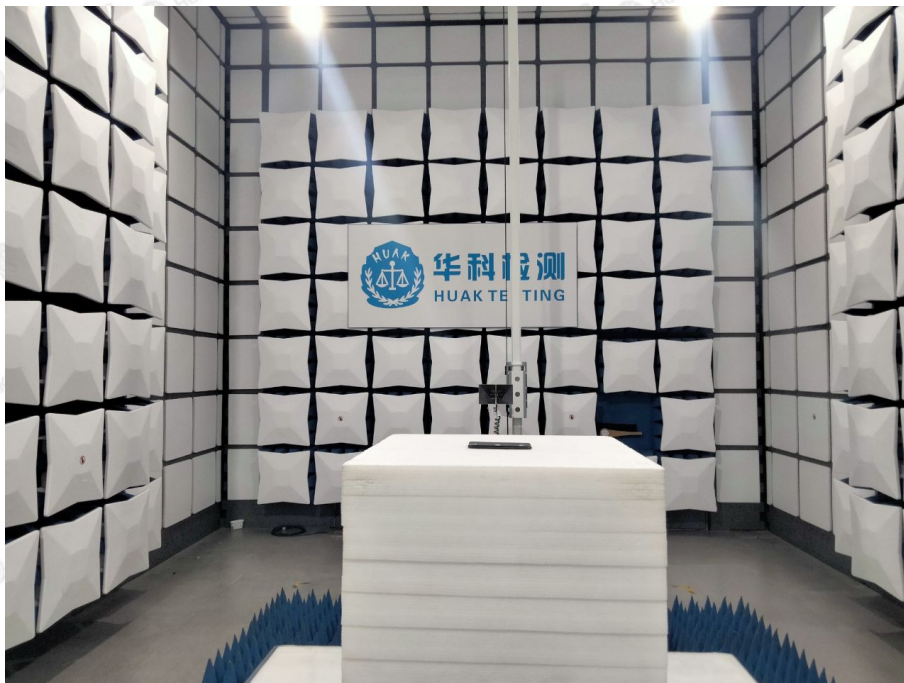
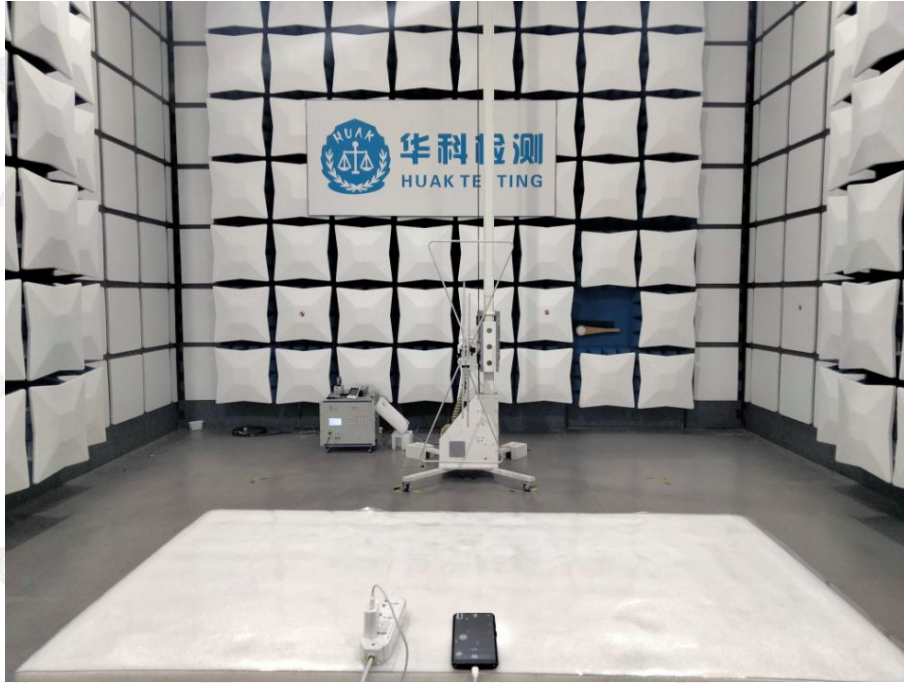
### Antenna





## 5. Photographs of Test Setup

### Radiated Emission



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## Conducted Emission



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## 6. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

-----End of test report-----