



# FCC Test Report

**Test report  
On Behalf of  
Shenzhen Zhongxin Shidai Technology Co.,Ltd.  
For  
Security Camera  
Model No.: SQ17, X01, X02, X03, X04**

**FCC ID: 2BFI9-SQ17**

**Prepared For :** Shenzhen Zhongxin Shidai Technology Co.,Ltd.  
201, Building B, Chunenghui, No. 11 Qinghuamei Road, Guanhu Street, Longhua District Shenzhen, China

**Prepared By :** Shenzhen HUAK Testing Technology Co., Ltd.  
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

**Date of Test:** Jun. 03, 2025 ~ Jun. 13, 2025  
**Date of Report:** Jun. 13, 2025  
**Report Number:** HK2506032894-2E

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

## Test Result Certification

**Applicant's name** .....: Shenzhen Zhongxin Shidai Technology Co.,Ltd.  
**Address** .....: 201, Building B, Chunenghui, No. 11 Qinghuamei Road, Guanhu Street, Longhua District Shenzhen, China

**Manufacturer's Name** .....: Shenzhen Zhongxin Shidai Technology Co.,Ltd.  
**Address** .....: 201, Building B, Chunenghui, No. 11 Qinghuamei Road, Guanhu Street, Longhua District Shenzhen, China

### Product description

**Trade Mark:** N/A  
**Product name** .....: Security Camera  
**Model and/or type reference** : SQ17, X01, X02, X03, X04  
**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** .....: Jun. 03, 2025 ~ Jun. 13, 2025

**Date of Issue** .....: Jun. 13, 2025

**Test Result** .....: Pass

Testing Engineer

  
Len Liao

Technical Manager

  
Sliver Wan

Authorized Signatory

  
Jason Zhou

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

| Revision     | Description                 | Issued Data   | Remark     |
|--------------|-----------------------------|---------------|------------|
| Revision 1.0 | Initial Test Report Release | Jun. 13, 2025 | Jason Zhou |
|              |                             |               |            |
|              |                             |               |            |







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## 2. EUT Description

## 2.1. General Description of EUT

|                        |  |
|------------------------|--|
| Equipment:             | Security Camera  |
| Model Name:            | SQ17   |
| Serial Models:         | X01, X02, X03, X04   |
| Model Difference:      | All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample mode: SQ17. |
| Trade Mark:            | N/A  |
| FCC ID:                | 2BFI9-SQ17   |
| Operation Frequency:   | IEEE 802.11a/n (HT20)5.745GHz-5.825GHz<br>IEEE 802.11n (HT40)5.755GHz-5.795GHz   |
| Modulation Technology: | IEEE 802.11a/n   |
| Modulation Type:       | 64QAM, 16QAM, QPSK, BPSK for OFDM  |
| Antenna Type:          | External Antenna   |
| Antenna Gain:          | 3.29dBi  |
| Power Source:          | DC 5V From Type-C  |
| Power Supply:          | DC 5V From Type-C  |
| Hardware Version:      | V2.0   |
| Software Version:      | V2.0   |

Note: 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.  
2. Antenna gain Refer to the antenna specifications.  
3. The cable loss data is obtained from the supplier.  
4. The test results in the report only apply to the tested sample.

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## 2.2. Operation Frequency Each of Channel

| 802.11a/802.11n(HT20) |           | 802.11n(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 (HT20)      |         |                 |
| Channel Number            | Channel | Frequency (MHz) |
| 149                       | Low     | 5745            |
| 157                       | Mid     | 5785            |
| 165                       | High    | 5825            |

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

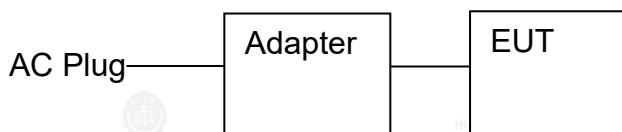


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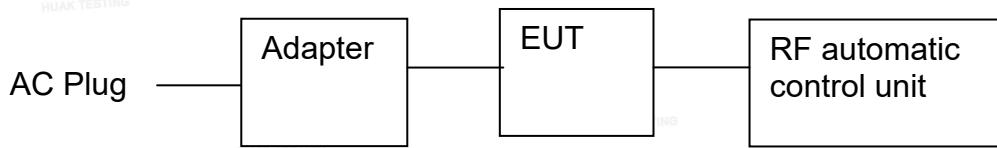
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## 2.4. Description of Test Setup

Operation of EUT during AC conducted testing and radiation testing:



Operation of EUT during RF conducted 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



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## 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    | Security Camera | N/A        | SQ17           | N/A   | EUT        |
| 2    | Adapter         | N/A        | MDY-10-EH      | Input: 100-240V, 50/60Hz, 0.7A<br>Output: 5V, 3A/9V, 3A/12V, 2.25A/20V, 1.35A | Peripheral |
| 3    | Adapter         | N/A        | N/A            | Input: 100-240V, 50/60Hz, 0.5A<br>Output: 5VDC, 2A                            | 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, 6db Emission 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.

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### 3. General Information

### 3.1. Test Environment and Mode

| <b>Operating Environment:</b> |   |
|-------------------------------|---|
| Temperature:                  | 25.0 °C   |
| Humidity:                     | 56 % RH   |
| Atmospheric Pressure:         | 1010 mbar   |
| <b>Test Mode:</b>             |   |
| Engineering mode:             | Keep the EUT in continuous transmitting by select channel and modulations |

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



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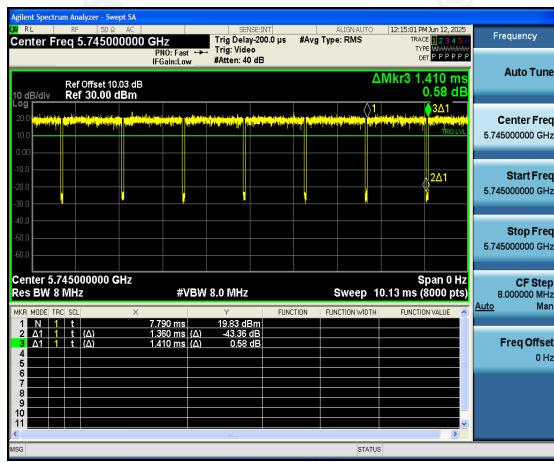
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## Mode Test Duty Cycle:

| Mode          | Duty Cycle |
|---------------|------------|
| 802.11a       | 0.96       |
| 802.11n(HT20) | 0.96       |
| 802.11n(HT40) | 0.93       |

Test plots as follows:

### 802.11a





#### 4. Test Results and Measurement Data

#### 4.1. AC Power Line Conducted Emission

#### 4.1.1. Test Specification

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#### 4.1.2. Test Instruments

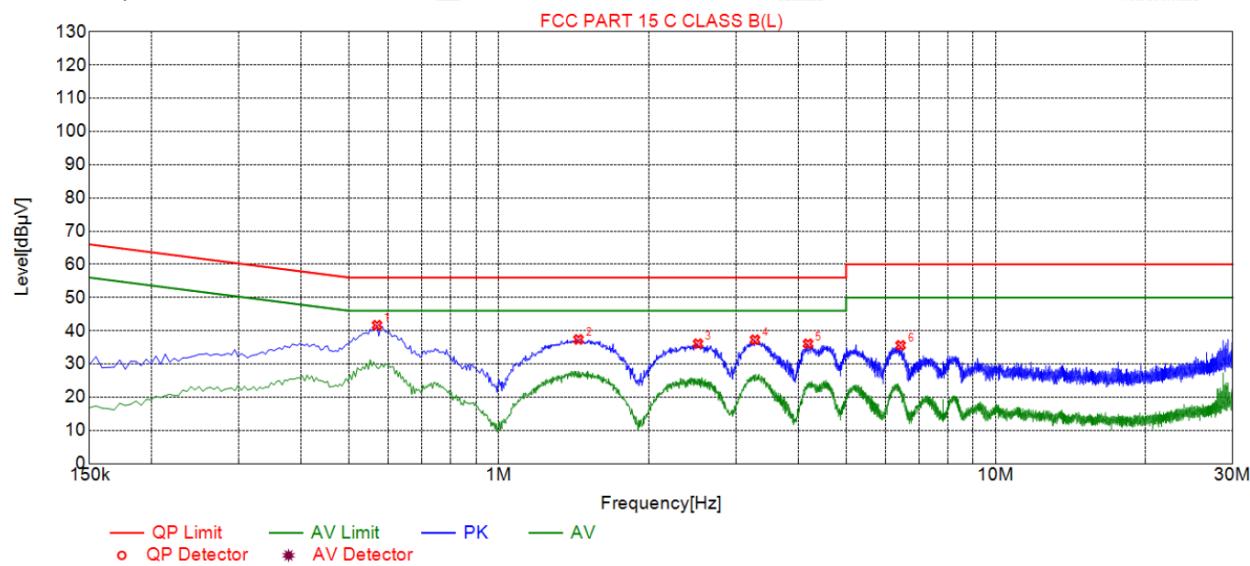
##### Conducted Emission Shielding Room Test Site (843)

| Equipment               | Manufacturer | Model           | Serial Number | Calibration Date | Calibration Due |
|-------------------------|--------------|-----------------|---------------|------------------|-----------------|
| Receiver                | R&S          | ESR             | HKE-005       | Feb. 19, 2025    | Feb. 18, 2026   |
| LISN                    | R&S          | ENV216          | HKE-002       | Feb. 19, 2025    | Feb. 18, 2026   |
| LISN                    | R&S          | ENV216          | HKE-059       | Feb. 19, 2025    | Feb. 18, 2026   |
| Coax cable (9KHz-30MHz) | Times        | 381806-002      | N/A           | Feb. 19, 2025    | Feb. 18, 2026   |
| EMI Test Software       | Tonscend     | JS32-CE 2.5.0.6 | HKE-081       | N/A              | N/A             |
| 10dB Attenuator         | Schwarzbeck  | VTSD9561F       | HKE-153       | Feb. 19, 2025    | Feb. 18, 2026   |

**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

## Test Specification: Line



## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dB $\mu$ V] | Factor<br>[dB] | Limit<br>[dB $\mu$ V] | Margin<br>[dB] | Reading<br>[dB $\mu$ V] | Detector | Type |
|-----|----------------|-----------------------|----------------|-----------------------|----------------|-------------------------|----------|------|
| 1   | 0.5685         | 41.68                 | 19.79          | 56.00                 | 14.32          | 21.89                   | PK       | L    |
| 2   | 1.4460         | 37.39                 | 19.94          | 56.00                 | 18.61          | 17.45                   | PK       | L    |
| 3   | 2.5170         | 36.12                 | 20.22          | 56.00                 | 19.88          | 15.90                   | PK       | L    |
| 4   | 3.2775         | 37.32                 | 20.30          | 56.00                 | 18.68          | 17.02                   | PK       | L    |
| 5   | 4.1910         | 36.09                 | 20.36          | 56.00                 | 19.91          | 15.73                   | PK       | L    |
| 6   | 6.4365         | 35.62                 | 20.40          | 60.00                 | 24.38          | 15.22                   | PK       | L    |

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

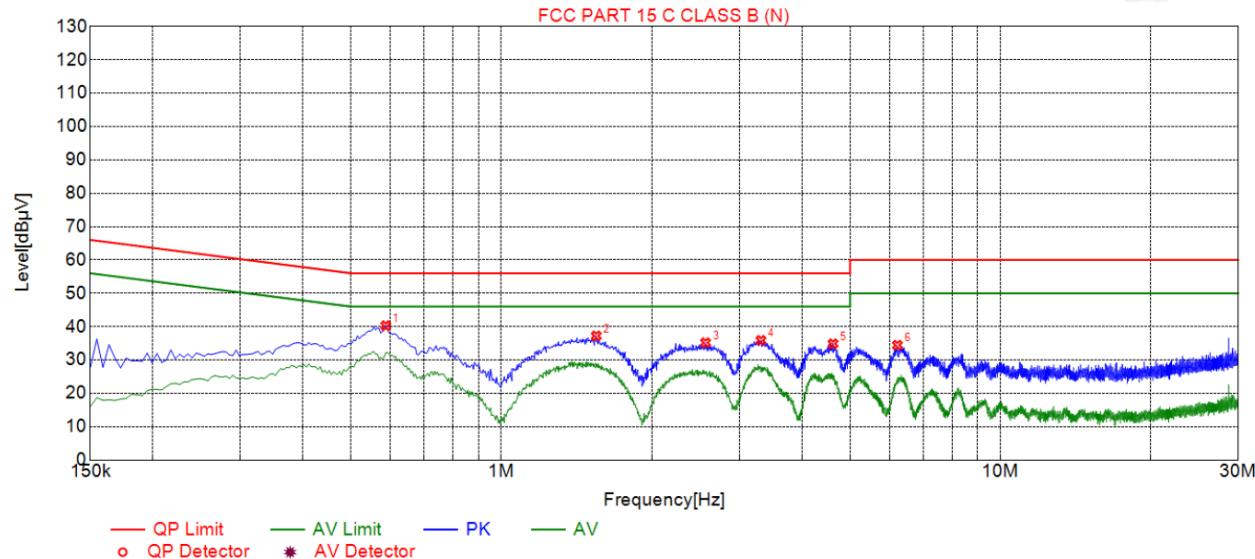


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Test Specification: Neutral



## Suspected List

| NO. | Freq. [MHz] | Level [dBμV] | Factor [dB] | Limit [dBμV] | Margin [dB] | Reading [dBμV] | Detector | Type |
|-----|-------------|--------------|-------------|--------------|-------------|----------------|----------|------|
| 1   | 0.5865      | 40.29        | 19.75       | 56.00        | 15.71       | 20.54          | PK       | N    |
| 2   | 1.5495      | 37.24        | 19.86       | 56.00        | 18.76       | 17.38          | PK       | N    |
| 3   | 2.5665      | 35.19        | 20.03       | 56.00        | 20.81       | 15.16          | PK       | N    |
| 4   | 3.3135      | 35.88        | 20.10       | 56.00        | 20.12       | 15.78          | PK       | N    |
| 5   | 4.6230      | 34.87        | 20.24       | 56.00        | 21.13       | 14.63          | PK       | N    |
| 6   | 6.2205      | 34.44        | 20.42       | 60.00        | 25.56       | 14.02          | PK       | N    |

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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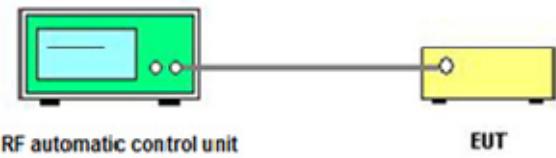
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## 4.2. Maximum Conducted Output Power

### 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 (MHz)  | Band | Limit |
|                          | 5725-5850  |      | 1 W   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. An RF automatic control unit, represented by a green rectangular box with a screen and two buttons, is connected to an EUT (Equipment Under Test), represented by a yellow rectangular box with a circular port, via a black RF cable. The connection is made at the circular port on the EUT side.</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 RF automatic control unit by RF cable. 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  |      |       |

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#### 4.2.2. Test Instruments

| RF Test Room              |              |                               |               |                  |                 |
|---------------------------|--------------|-------------------------------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model                         | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A                        | HKE-025       | Feb. 19, 2025    | Feb. 18, 2026   |
| Power meter               | Agilent      | E4419B                        | HKE-085       | Feb. 19, 2025    | Feb. 18, 2026   |
| Power Sensor              | Agilent      | E9300A                        | HKE-086       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF cable                  | Times        | 1-40G                         | HKE-034       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF automatic control unit | Tonscend     | JS0806-2                      | HKE-060       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF Test Software          | Tonscend     | JS1120-3<br>Version<br>3.5.39 | HKE-083       | 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).

## Test Data

| Configuration Band IV (5725 - 5850 MHz ) |              |                                      |                 |        |
|--|--------------|--------------------------------------|-----------------|--------|
| Mode                                     | Test channel | Maximum Conducted Output Power (dBm) | FCC Limit (dBm) | Result |
| 802.11a                                  | CH149        | 9.95                                 | 30              | PASS   |
| 802.11a                                  | CH157        | 10.96                                | 30              | PASS   |
| 802.11a                                  | CH165        | 9.49                                 | 30              | PASS   |
| 802.11n(HT20)                            | CH149        | 9.98                                 | 30              | PASS   |
| 802.11n(HT20)                            | CH157        | 8.98                                 | 30              | PASS   |
| 802.11n(HT20)                            | CH165        | 9.51                                 | 30              | PASS   |
| 802.11n(HT40)                            | CH151        | 8.04                                 | 30              | PASS   |
| 802.11n(HT40)                            | CH159        | 9.76                                 | 30              | PASS   |

Note: 1.The test results including the cable lose.

### 4.3. 6db Emission Bandwidth

#### 4.3.1. Test Specification

|                          |  |
|--------------------------|--|
| <b>Test Requirement:</b> | FCC CFR47 Part 15 Section 15.407(e)  |
| <b>Test Method:</b>      | KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C  |
| <b>Limit:</b>            | >500kHz  |
| <b>Test Setup:</b>       |  <p><b>Spectrum Analyzer</b>      <b>EUT</b></p>   |
| <b>Test Mode:</b>        | Transmitting mode with modulation  |
| <b>Test Procedure:</b>   | <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> |
| <b>Test Result:</b>      | PASS   |

#### 4.3.2. Test Instruments

| RF Test Room              |              |                            |               |                  |                 |
|---------------------------|--------------|----------------------------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model                      | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A                     | HKE-025       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF cable                  | Times        | 1-40G                      | HKE-034       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF automatic control unit | Tonscend     | JS0806-2                   | HKE-060       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF Test Software          | Tonscend     | JS1120-3<br>Version 3.5.39 | HKE-083       | 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).

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#### 4.3.3. Test data

| Band IV (5725 - 5850 MHz) |              |                 |                      |             |        |
|---------------------------|--------------|-----------------|----------------------|-------------|--------|
| Mode                      | Test Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) | Result |
| 802.11a                   | CH149        | 5745            | 16.36                | 0.5         | PASS   |
| 802.11a                   | CH157        | 5785            | 16.36                | 0.5         | PASS   |
| 802.11a                   | CH165        | 5825            | 16.36                | 0.5         | PASS   |
| 802.11n(HT20)             | CH149        | 5745            | 17.60                | 0.5         | PASS   |
| 802.11n(HT20)             | CH157        | 5785            | 17.52                | 0.5         | PASS   |
| 802.11n(HT20)             | CH165        | 5825            | 17.60                | 0.5         | PASS   |
| 802.11n(HT40)             | CH151        | 5755            | 35.60                | 0.5         | PASS   |
| 802.11n(HT40)             | CH159        | 5795            | 35.52                | 0.5         | PASS   |

**Test plots as follows:**



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## **Band IV (5725 – 5850 MHz)**

802.11a



Low



Mid



High

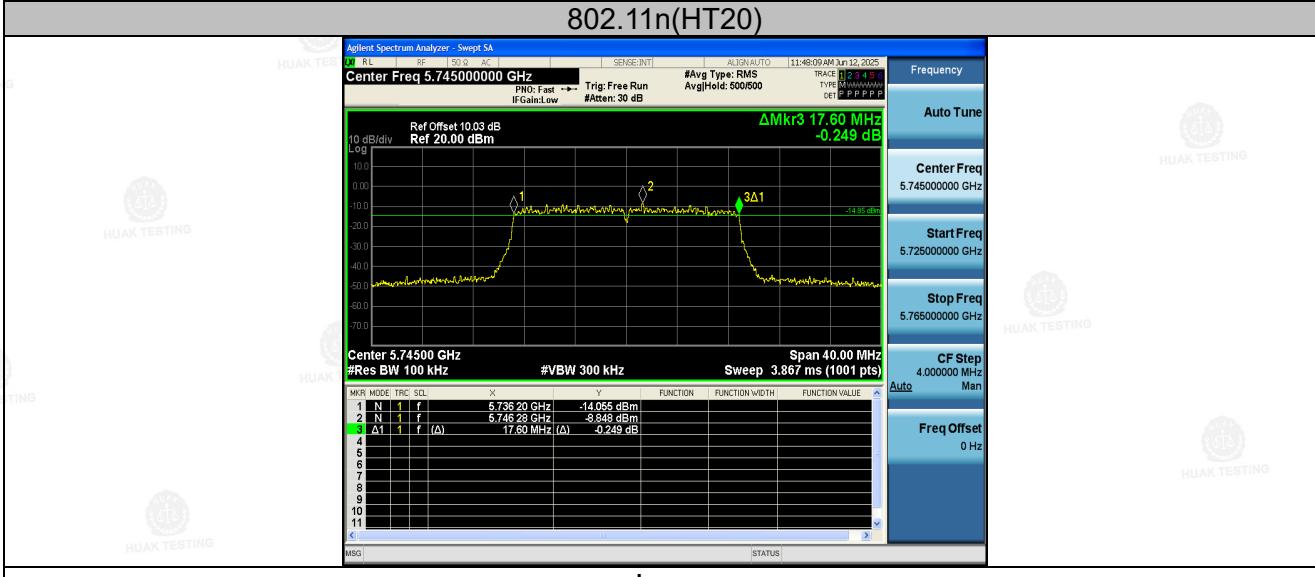
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## 802.11n(HT20)





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

### 4.4.1. Test Specification

|                          |  |
|--------------------------|--|
| <b>Test Requirement:</b> | 47 CFR Part 15C Section 15.407 (a)   |
| <b>Test Method:</b>      | KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C  |
| <b>Limit:</b>            | No restriction limits  |
| <b>Test Setup:</b>       |  <p><b>Spectrum Analyzer</b>      <b>EUT</b></p>   |
| <b>Test Mode:</b>        | Transmitting mode with modulation  |
| <b>Test Procedure:</b>   | <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 = 1% EBW, VBW<math>\geq</math>3RBW, In order to make an accurate measurement.</li> <li>4. Measure and record the results in the test report.</li> </ol> |
| <b>Test Result:</b>      | N/A  |

### 4.4.2. Test Instruments

| RF Test Room              |              |                               |               |                  |                 |
|---------------------------|--------------|-------------------------------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model                         | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A                        | HKE-025       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF cable                  | Times        | 1-40G                         | HKE-034       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF automatic control unit | Tonscend     | JS0806-2                      | HKE-060       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF Test Software          | Tonscend     | JS1120-3<br>Version<br>3.5.39 | HKE-083       | 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).

### 4.4.3. Test Result

N/A

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## 4.5. Power Spectral Density

### 4.5.1. 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 v02r01 Section F   |
| <b>Limit:</b>            | $\leq 30.00 \text{dBm}/500\text{KHz}$ for Band IV 5725MHz-5850MHz   |
| <b>Test Setup:</b>       |  <p>The diagram illustrates the test setup. A green rectangular box labeled "Spectrum Analyzer" is connected to a yellow rectangular box labeled "EUT" (Equipment Under Test) by a horizontal line representing a cable. The "Spectrum Analyzer" has a small blue screen and two knobs on its front panel. The "EUT" has a small circular port on its side panel. The entire setup is placed on a light-colored surface.</p>  |
| <b>Test Mode:</b>        | Transmitting mode with modulation   |
| <b>Test Procedure:</b>   | <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 <math>\geq 3 \times \text{RBW}</math>, 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> |
| <b>Test Result:</b>      | PASS  |

#### 4.5.2. Test Instruments

| RF Test Room              |              |                            |               |                  |                 |
|---------------------------|--------------|----------------------------|---------------|------------------|-----------------|
| Equipment                 | Manufacturer | Model                      | Serial Number | Calibration Date | Calibration Due |
| Spectrum analyzer         | Agilent      | N9020A                     | HKE-025       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF cable                  | Times        | 1-40G                      | HKE-034       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF automatic control unit | Tonscend     | JS0806-2                   | HKE-060       | Feb. 19, 2025    | Feb. 18, 2026   |
| RF Test Software          | Tonscend     | JS1120-3<br>Version 3.5.39 | HKE-083       | 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).

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### 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 |
| 802.11a                                 | CH149        | -5.45              | -0.086         | -5.536                 | 30                 | PASS   |
| 802.11a                                 | CH157        | -6.05              | -0.086         | -6.136                 | 30                 | PASS   |
| 802.11a                                 | CH165        | -7.59              | -0.086         | -7.676                 | 30                 | PASS   |
| 802.11n(HT20)                           | CH149        | -4.89              | -0.086         | -4.976                 | 30                 | PASS   |
| 802.11n(HT20)                           | CH157        | -6.71              | -0.086         | -6.796                 | 30                 | PASS   |
| 802.11n(HT20)                           | CH165        | -6.65              | -0.086         | -6.736                 | 30                 | PASS   |
| 802.11n(HT40)                           | CH151        | -7.52              | -0.086         | -7.606                 | 30                 | PASS   |
| 802.11n(HT40)                           | CH159        | -8.25              | -0.086         | -8.336                 | 30                 | PASS   |

**Note: Power Spectral Density= Level [dBm/510kHz]+ (10log(Limit RBW/Test RBW))**

**Test plots as follows:**



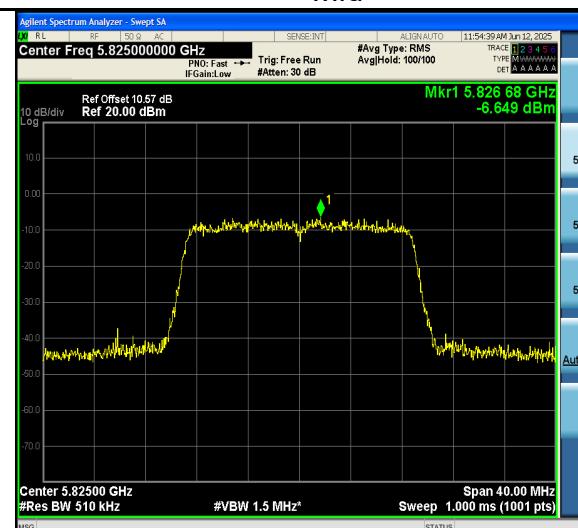
## 802.11n(HT20)



Low



Mid



High

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## 802.11n(HT40)



Low



High

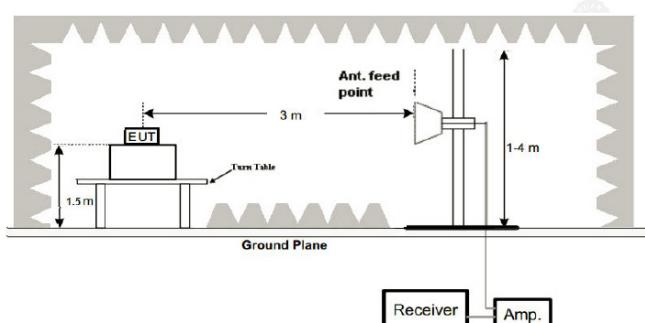
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## 4.6. Band Edge

## 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>            | <p>(1) 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 complies 15.209.</p>   |
| <b>Test Setup:</b>       |   |
| <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> </ol> |



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|                     |  |
|---------------------|--|
|                     | <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p> |
| <b>Test Result:</b> | PASS   |



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#### 4.6.2. Test Instruments

##### Radiated Emission Test Site (966)

| Name of Equipment | Manufacturer    | Model          | Serial Number | Calibration Date | Calibration Due |
|-------------------|-----------------|----------------|---------------|------------------|-----------------|
| Spectrum analyzer | Agilent         | N9020A         | HKE-025       | Feb. 19, 2025    | Feb. 18, 2026   |
| Spectrum analyzer | R&S             | FSV3044        | HKE-126       | Feb. 19, 2025    | Feb. 18, 2026   |
| Preamplifier      | EMCI            | EMC051845S     | HKE-006       | Feb. 19, 2025    | Feb. 18, 2026   |
| Preamplifier      | Schwarzbeck     | BBV 9743       | HKE-016       | Feb. 19, 2025    | Feb. 18, 2026   |
| Preamplifier      | A.H. Systems    | SAS-574        | HKE-182       | Feb. 19, 2025    | Feb. 18, 2026   |
| 6dB Attenuator    | Pasternack      | 6db            | HKE-184       | Feb. 19, 2025    | Feb. 18, 2026   |
| EMI Test Receiver | Rohde & Schwarz | ESR-7          | HKE-010       | Feb. 19, 2025    | Feb. 18, 2026   |
| Broadband Antenna | Schwarzbeck     | VULB9168       | HKE-167       | Feb. 21, 2024    | Feb. 20, 2026   |
| Loop Antenna      | COM-POWER       | AL-130R        | HKE-014       | Feb. 21, 2024    | Feb. 20, 2026   |
| Horn Antenna      | Schwarzbeck     | 9120D          | HKE-013       | Feb. 21, 2024    | Feb. 20, 2026   |
| EMI Test Software | Tonscend        | JS32-RE 5.0.0  | HKE-082       | N/A              | N/A             |
| RSE Test Software | Tonscend        | JS36-RSE 5.0.0 | HKE-184       | 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).



## HUAK TESTING

### 4.6.3. Test Data

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

## Horizontal

| Frequency (MHz) | Meter Reading (dBµV) | Factor (dB) | Emission Level (dBµV/m) | Limits (dBµV/m) | Margin (dB) | Detector Type |
|-----------------|----------------------|-------------|-------------------------|-----------------|-------------|---------------|
| 5650            | 50.29                | -2.06       | 48.23                   | 68.2            | 19.97       | peak          |
| 5700            | 79.9                 | -1.96       | 77.94                   | 105.2           | 27.26       | peak          |
| 5720            | 84.09                | -2.87       | 81.22                   | 110.8           | 29.58       | peak          |
| 5725            | 98.38                | -2.14       | 96.24                   | 122.2           | 25.96       | peak          |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = I limit-I level

## Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 5650               | 50.02                         | -2.06          | 47.96                            | 68.2                     | 20.24          | peak          |
| 5700               | 77.52                         | -1.96          | 75.56                            | 105.2                    | 29.64          | peak          |
| 5720               | 84.66                         | -2.87          | 81.79                            | 110.8                    | 29.01          | peak          |
| 5725               | 100.23                        | -2.14          | 98.09                            | 122.2                    | 24.11          | peak          |

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



## HUAK TESTING

## Operation Mode: TX CH High with 5.8G

## Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5850      | 101.49        | -1.97  | 99.52          | 122.2          | 22.68  | peak          |
| 5855      | 83.57         | -2.13  | 81.44          | 110.8          | 29.36  | peak          |
| 5875      | 82.59         | -2.65  | 79.94          | 105.2          | 25.26  | peak          |
| 5925      | 50.53         | -2.28  | 48.25          | 68.2           | 19.95  | peak          |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = I limit-I level

## Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type<br>HUAK TESTING |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|-------------------------------|
| 5850               | 93.79                         | -1.97          | 91.82                            | 122.2                    | 30.38          | peak                          |
| 5855               | 86.18                         | -2.13          | 84.05                            | 110.8                    | 26.75          | peak                          |
| 5875               | 77.06                         | -2.65          | 74.41                            | 105.2                    | 30.79          | peak                          |
| 5925               | 50.24                         | -2.28          | 47.96                            | 68.2                     | 20.24          | peak                          |

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



## HUAK TESTING

Operation Mode: 802.11n/HT20 Mode with 5.8G TX CH Low

## Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5650      | 50.09         | -2.06  | 48.03          | 68.2           | 20.17  | peak          |
| 5700      | 78.88         | -1.96  | 76.92          | 105.2          | 28.28  | peak          |
| 5720      | 90.04         | -2.87  | 87.17          | 110.8          | 23.63  | peak          |
| 5725      | 101.89        | -2.14  | 99.75          | 122.2          | 22.45  | peak          |

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

Vertical:

| Frequency (MHz) | Meter Reading (dB $\mu$ V) | Factor (dB) | Emission Level (dB $\mu$ V/m) | Limits (dB $\mu$ V/m) | Margin (dB) | Detector Type |
|-----------------|----------------------------|-------------|-------------------------------|-----------------------|-------------|---------------|
| 5650            | 49.3                       | -2.06       | 47.24                         | 68.2                  | 20.96       | peak          |
| 5700            | 87.56                      | -1.96       | 85.6                          | 105.2                 | 19.6        | peak          |
| 5720            | 92.26                      | -2.87       | 89.39                         | 110.8                 | 21.41       | peak          |
| 5725            | 100.95                     | -2.14       | 98.81                         | 122.2                 | 23.39       | peak          |

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

Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5850      | 101.77        | -1.97  | 99.8           | 122.2          | 22.4   | peak          |
| 5855      | 87.75         | -2.13  | 85.62          | 110.8          | 25.18  | peak          |
| 5875      | 82.51         | -2.65  | 79.86          | 105.2          | 25.34  | peak          |
| 5925      | 49.92         | -2.28  | 47.64          | 68.2           | 20.56  | peak          |

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

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5850      | 97.91         | -1.97  | 95.94          | 122.2          | 26.26  | peak          |
| 5855      | 84.85         | -2.13  | 82.72          | 110.8          | 28.08  | peak          |
| 5875      | 80.08         | -2.65  | 77.43          | 105.2          | 27.77  | peak          |
| 5925      | 50.71         | -2.28  | 48.43          | 68.2           | 19.77  | peak          |

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



## HUAK TESTING

Operation Mode: 802.11n/HT40 Mode with 5.8G TX CH Low

## Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5650      | 50.45         | -2.06  | 48.39          | 68.2           | 19.81  | peak          |
| 5700      | 89.86         | -1.96  | 87.9           | 105.2          | 17.3   | peak          |
| 5720      | 81.63         | -2.87  | 78.76          | 110.8          | 32.04  | peak          |
| 5725      | 104.64        | -2.14  | 102.5          | 122.2          | 19.7   | peak          |

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = I limit-I level

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5650      | 49.04         | -2.06  | 46.98          | 68.2           | 21.22  | peak          |
| 5700      | 86.49         | -1.96  | 84.53          | 105.2          | 20.67  | peak          |
| 5720      | 83.1          | -2.87  | 80.23          | 110.8          | 30.57  | peak          |
| 5725      | 99.51         | -2.14  | 97.37          | 122.2          | 24.83  | peak          |

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

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Operation Mode: TX CH High with 5.8G

Horizontal

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5850      | 98.84         | -1.97  | 96.87          | 122.2          | 25.33  | peak          |
| 5855      | 83.64         | -2.13  | 81.51          | 110.8          | 29.29  | peak          |
| 5875      | 81.17         | -2.65  | 78.52          | 105.2          | 26.68  | peak          |
| 5925      | 50.29         | -2.28  | 48.01          | 68.2           | 20.19  | peak          |

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

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 5850      | 99.76         | -1.97  | 97.79          | 122.2          | 24.41  | peak          |
| 5855      | 89.48         | -2.13  | 87.35          | 110.8          | 23.45  | peak          |
| 5875      | 82.03         | -2.65  | 79.38          | 105.2          | 25.82  | peak          |
| 5925      | 50.64         | -2.28  | 48.36          | 68.2           | 19.84  | peak          |

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

**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.

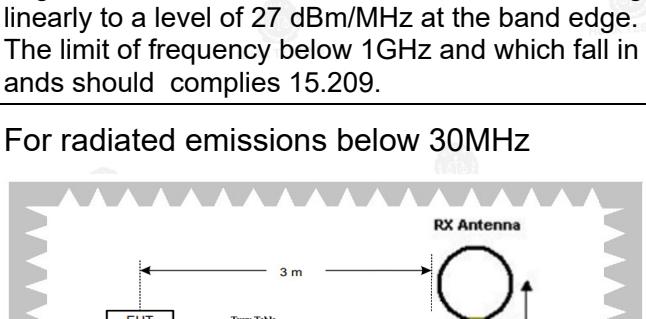
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## 4.7. Spurious Emission

#### 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>                | (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.<br>(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.<br>(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.<br>(4) 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>           | For radiated emissions below 30MHz    |            |        |        |                  |

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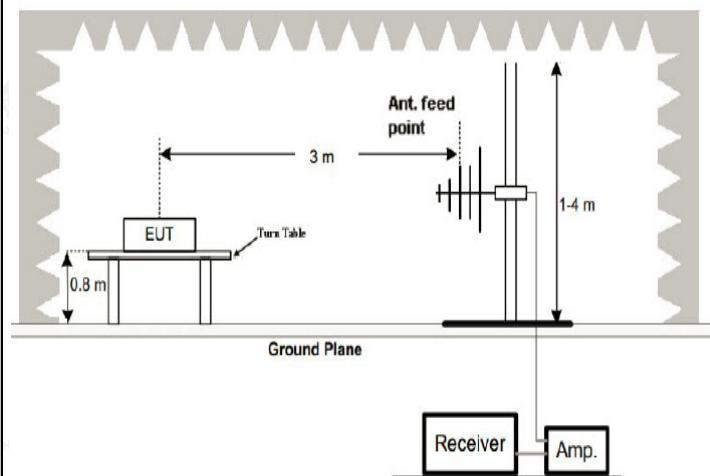


HUAK TEST

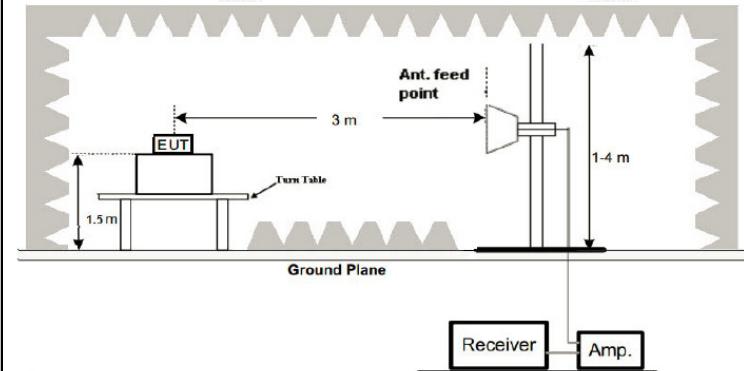


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30MHz to 1GHz



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.



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|                      |  |
|----------------------|--|
|                      | <p>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p> |
| <b>Test results:</b> | PASS   |



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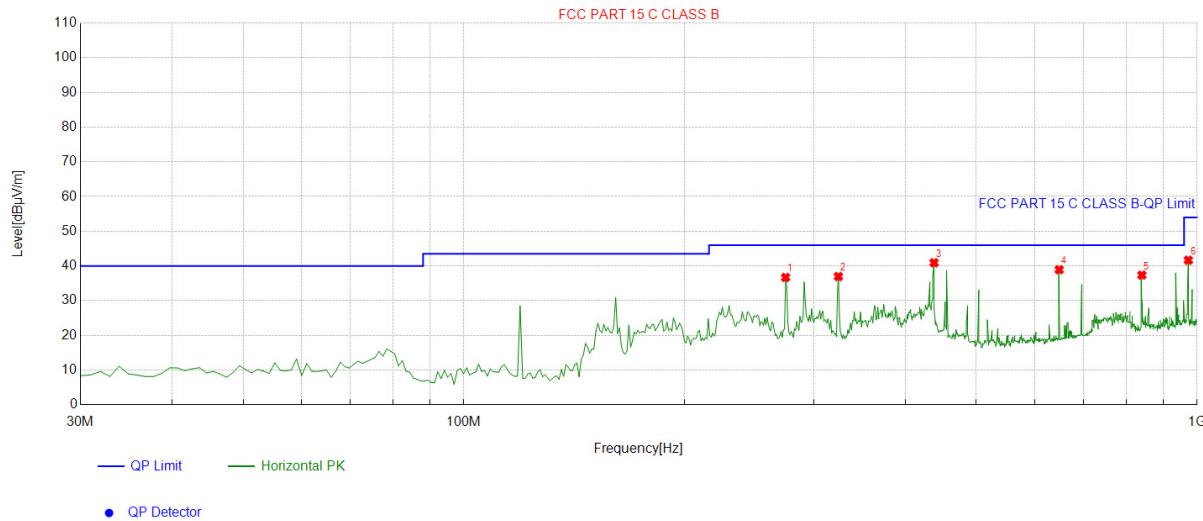
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## 4.7.2. Test Data

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

### Below 1GHz

#### Horizontal



| Suspected List |             |             |                  |                |                |             |             |           |            |
|----------------|-------------|-------------|------------------|----------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Factor [dB] | Reading [dBμV/m] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 274.6847    | -12.70      | 49.40            | 36.70          | 46.00          | 9.30        | 100         | 289       | Horizontal |
| 2              | 324.2042    | -11.03      | 47.99            | 36.96          | 46.00          | 9.04        | 100         | 109       | Horizontal |
| 3              | 437.8078    | -8.84       | 49.75            | 40.91          | 46.00          | 5.09        | 100         | 2         | Horizontal |
| 4              | 648.5085    | -5.07       | 43.99            | 38.92          | 46.00          | 7.08        | 100         | 217       | Horizontal |
| 5              | 840.7608    | -2.05       | 39.41            | 37.36          | 46.00          | 8.64        | 100         | 97        | Horizontal |
| 6              | 972.8128    | -0.72       | 42.38            | 41.66          | 54.00          | 12.34       | 100         | 326       | Horizontal |

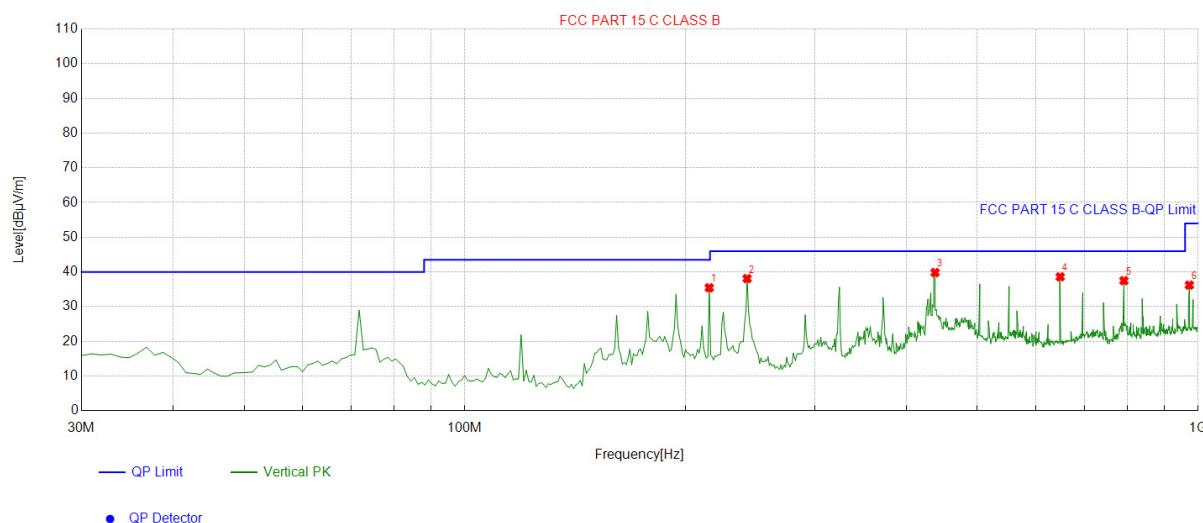
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

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

**Vertical**



| <b>Suspected List</b> |             |             |                        |                      |                      |             |             |           |          |
|-----------------------|-------------|-------------|------------------------|----------------------|----------------------|-------------|-------------|-----------|----------|
| NO.                   | Freq. [MHz] | Factor [dB] | Reading [dB $\mu$ V/m] | Level [dB $\mu$ V/m] | Limit [dB $\mu$ V/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1                     | 215.4555    | -14.72      | 50.17                  | 35.45                | 43.50                | 8.05        | 100         | 141       | Vertical |
| 2                     | 242.6426    | -13.42      | 51.52                  | 38.10                | 46.00                | 7.90        | 100         | 11        | Vertical |
| 3                     | 437.8078    | -8.84       | 48.67                  | 39.83                | 46.00                | 6.17        | 100         | 167       | Vertical |
| 4                     | 648.5085    | -5.07       | 43.68                  | 38.61                | 46.00                | 7.39        | 100         | 162       | Vertical |
| 5                     | 792.2122    | -3.25       | 40.75                  | 37.50                | 46.00                | 8.50        | 100         | 340       | Vertical |
| 6                     | 972.8128    | -0.72       | 36.94                  | 36.22                | 54.00                | 17.78       | 100         | 1         | Vertical |

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

**Harmonics and Spurious Emissions**

**Frequency Range (9 kHz-30MHz)**

| Frequency (MHz) | Level@3m (dB $\mu$ V/m) | Limit@3m (dB $\mu$ V/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.



## HUAK TESTING

## Above 1GHz

## RADIATED EMISSION TEST

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

### Horizontal:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3368               | 51.55                         | -4.59          | 46.96                            | 68.2                     | 21.24          | peak          |
| 11096              | 41.91                         | 4.21           | 46.12                            | 74                       | 27.88          | peak          |
| 11096              | 40.42                         | 4.21           | 44.63                            | 54                       | 9.37           | AVG           |

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

Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3368               | 51.86                         | -4.59          | 47.27                            | 68.2                     | 20.93          | peak          |
| 11096              | 43.16                         | 4.21           | 47.37                            | 74                       | 26.63          | peak          |
| 11096              | 39.43                         | 4.21           | 43.64                            | 54                       | 10.36          | AVG           |

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



## HUAK TESTING

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

### Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 3172      | 55.32         | -4.59  | 50.73          | 68.2           | 17.47  | peak          |
| 10523     | 51.48         | 4.21   | 55.69          | 68.2           | 12.51  | peak          |

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

## Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3172               | 53.19                         | -4.59          | 48.6                             | 68.2                     | 19.6           | peak          |
| 10523              | 51.88                         | 4.21           | 56.09                            | 68.2                     | 12.11          | peak          |

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



## HUAK TESTING

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

### Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 2705      | 58.29         | -4.59  | 53.7           | 74             | 20.3   | peak          |
| 2705      | 43.18         | -4.59  | 38.59          | 54             | 15.41  | AVG           |
| 11717     | 53.88         | 4.84   | 58.72          | 74             | 15.28  | peak          |
| 11717     | 40.18         | 4.84   | 45.02          | 54             | 8.98   | AVG           |

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

Vertical:

| Frequency (MHz) | Meter Reading (dBµV) | Factor (dB) | Emission Level (dBµV/m) | Limits (dBµV/m) | Margin (dB) | Detector Type |
|-----------------|----------------------|-------------|-------------------------|-----------------|-------------|---------------|
| 2705            | 53.48                | -4.59       | 48.89                   | 74              | 25.11       | peak          |
| 2705            | 44.09                | -4.59       | 39.5                    | 54              | 14.5        | AVG           |
| 11717           | 52.11                | 4.84        | 56.95                   | 74              | 17.05       | peak          |
| 11717           | 39.85                | 4.84        | 44.69                   | 54              | 9.31        | AVG           |

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

**Remark:**

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.



**HUAK TESTING**

HUAK TESTING

5.8G 802.11n/HT20 Mode

LOW CH 149

Horizontal:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 3368      | 56.33         | -4.59  | 51.74          | 68.2           | 16.46  | peak          |
| 11096     | 51.47         | 4.21   | 55.68          | 74             | 18.32  | peak          |
| 11096     | 42.85         | 4.21   | 47.06          | 54             | 6.94   | AVG           |

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

Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 3368      | 54.29         | -4.59  | 49.7           | 68.2           | 18.5   | peak          |
| 11096     | 51.44         | 4.21   | 55.65          | 74             | 18.35  | peak          |
| 11096     | 38.76         | 4.21   | 42.97          | 54             | 11.03  | AVG           |

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

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



## HUAK TESTING

MID CH157

## Horizontal:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3172               | 54.29                         | -4.59          | 49.7                             | 68.2                     | 18.5           | peak          |
| 10523              | 52.03                         | 4.21           | 56.24                            | 68.2                     | 11.96          | peak          |

## Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 3172      | 53.99         | -4.59  | 49.4           | 68.2           | 18.8   | peak          |
| 10523     | 51.47         | 4.21   | 55.68          | 68.2           | 12.52  | peak          |

HIGH CH165

Horizontal:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 2705               | 56.23                         | -4.59          | 51.64                            | 74                       | 22.36          |               |
| 2705               | 43.22                         | -4.59          | 38.63                            | 54                       | 15.37          | AVG           |
| 11717              | 46.31                         | 4.84           | 51.15                            | 74                       | 22.85          | peak          |
| 11717              | 38.41                         | 4.84           | 43.25                            | 54                       | 10.75          | AVG           |

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

Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 2705               | 53.92                         | -4.59          | 49.33                            | 74                       | 24.67          |               |
| 2705               | 45.22                         | -4.59          | 40.63                            | 54                       | 13.37          | AVG           |
| 11717              | 47.82                         | 4.84           | 52.66                            | 74                       | 21.34          | peak          |
| 11717              | 36.33                         | 4.84           | 41.17                            | 54                       | 12.83          | AVG           |

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

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 73.16dB $\mu$ V/m(PK Value) < 93.98(AV Limit), at harmonic 53.20 dB $\mu$ V/m(PK Value) < 54 dB $\mu$ V/m(AV Limit), the Average Detected not need to completed.

5.8G 802.11n/HT40 Mode

LOW CH 151

Horizontal:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3368               | 53.72                         | -4.59          | 49.13                            | 68.2                     | 19.07          |               |
| 11096              | 51.49                         | 4.21           | 55.7                             | 74                       | 18.3           | peak          |
| 11096              | 38.42                         | 4.21           | 42.63                            | 54                       | 11.37          | AVG           |

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

Vertical:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3368               | 58.43                         | -4.59          | 53.84                            | 68.2                     | 14.36          |               |
| 11096              | 52.19                         | 4.21           | 56.4                             | 74                       | 17.6           | peak          |
| 11096              | 37.55                         | 4.21           | 41.76                            | 54                       | 12.24          | AVG           |

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



## HUAK TESTING

MID CH159

## Horizontal:

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 3172               | 56.37                         | -4.59          | 51.78                            | 68.2                     | 16.42          | peak          |
| 10523              | 51.48                         | 4.21           | 55.69                            | 68.2                     | 12.51          | peak          |

## Vertical:

| Frequency | Meter Reading | Factor | Emission Level | Limits         | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------------|--------|---------------|
| (MHz)     | (dB $\mu$ V)  | (dB)   | (dB $\mu$ V/m) | (dB $\mu$ V/m) | (dB)   |               |
| 3172      | 54.29         | -4.59  | 49.7           | 68.2           | 18.5   | peak          |
| 10523     | 52.03         | 4.21   | 56.24          | 68.2           | 11.96  | peak          |

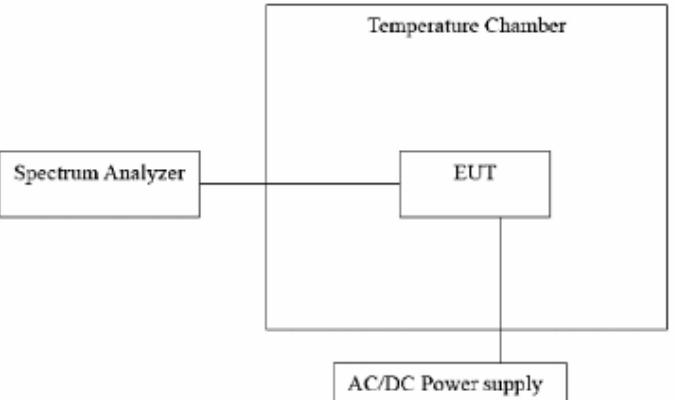
### Remark:

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]     EUT --- ACDC[AC/DC Power supply]     EUT --- TC[Temperature Chamber]   </pre>   |
| <b>Test Procedure:</b>   | <p>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.</p> |
| <b>Test Result:</b>      | PASS  |
| <b>Remark:</b>           | N/A   |

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## Test Result as follows:

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| Mode      | Voltage (V) | FHL (5745MHz) | Deviation (KHz) | FHH (5825MHz) | Deviation (KHz) |
|-----------|-------------|---------------|-----------------|---------------|-----------------|
| 5.8G Band | 4.25V       | 5744.982      | -18             | 5825.022      | 22              |
|           | 5.0V        | 5745.009      | 9               | 5824.988      | -12             |
|           | 5.75V       | 5744.991      | -9              | 5824.973      | -27             |

| Mode      | Temperature (°C) | FHL (5745MHz) | Deviation (KHz) | FHH (5825MHz) | Deviation (KHz) |
|-----------|------------------|---------------|-----------------|---------------|-----------------|
| 5.8G Band | -30              | 5744.974      | -26             | 5825.019      | 19              |
|           | -20              | 5745.009      | 9               | 5825.012      | 12              |
|           | -10              | 5744.981      | -19             | 5824.989      | -11             |
|           | 0                | 5744.973      | -27             | 5824.977      | -23             |
|           | 10               | 5744.969      | -31             | 5825.008      | 8               |
|           | 20               | 5745.011      | 11              | 5824.993      | -7              |
|           | 30               | 5744.975      | -25             | 5824.971      | -29             |
|           | 40               | 5744.985      | -15             | 5824.966      | -34             |
|           | 50               | 5744.972      | -28             | 5825.009      | 9               |

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**Shenzhen HUAK Testing Technology Co., Ltd.** Tel.: +86-0755-2302 9901 E-mail: [info@huak.com](mailto:info@huak.com) Web.: [www.huak.com](http://www.huak.com)

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

## 4.9. Antenna Requirement

### **Standard Applicable**

**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.

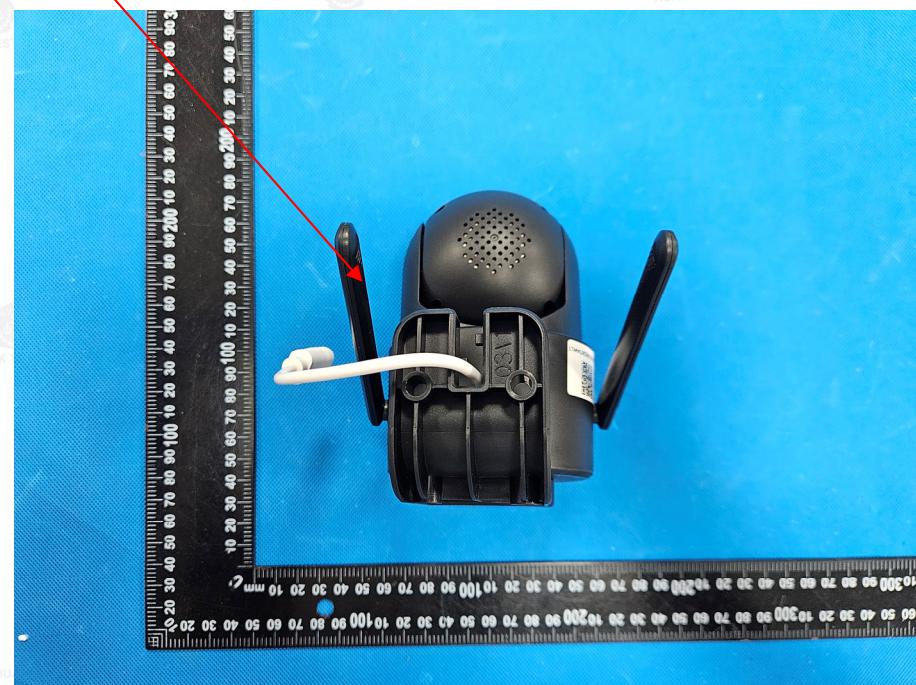
**Refer to statement below for compliance.**

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 External Antenna, need professional installation, not easy to remove. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 3.29dBi.

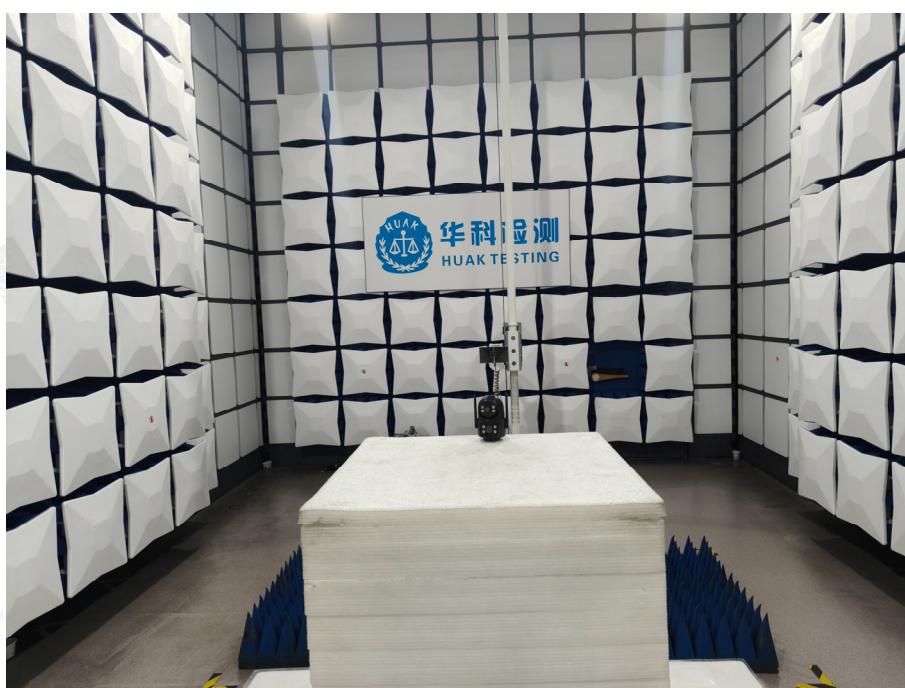
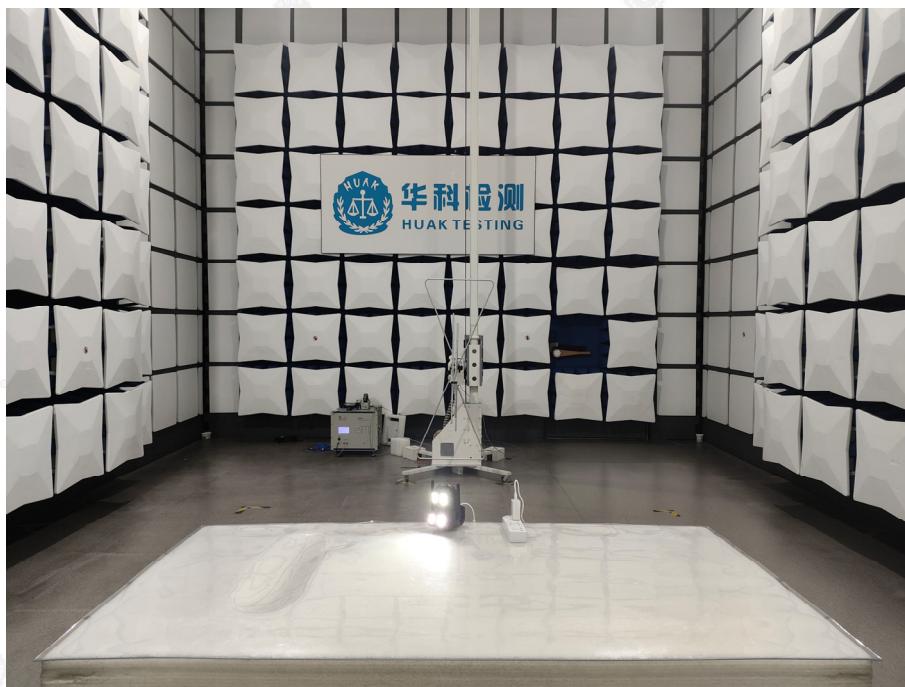
## Antenna



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## 5. Test Setup Photos of the EUT

## &lt;div Radiated Emissions



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Shenzhen HUAK Testing Technology Co., Ltd., Tel : +86-0755-2302 9901 E-mail: info@huak.com Web : www.huak.com

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

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



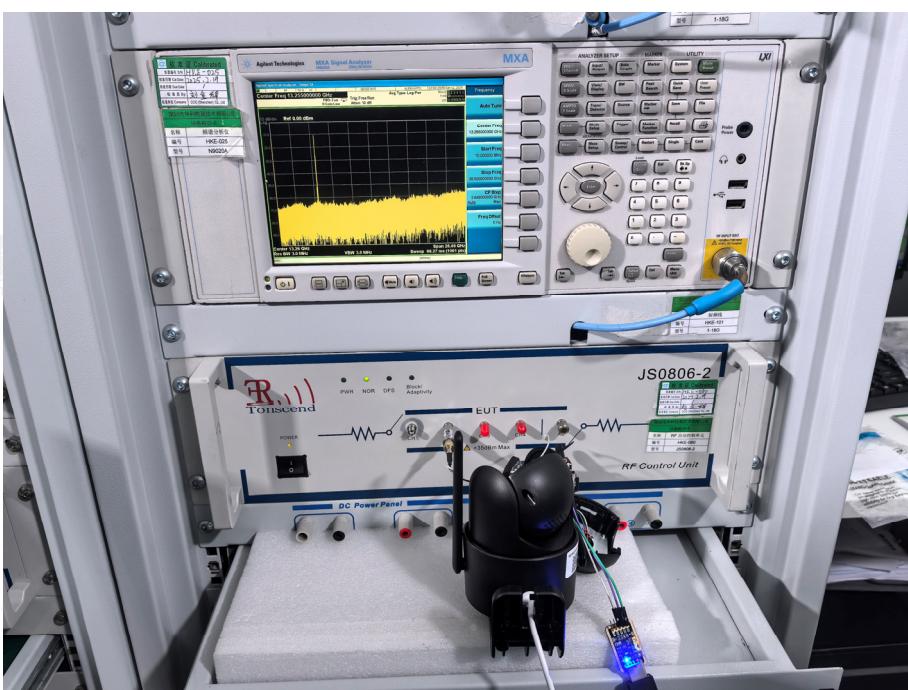
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## AC Conducted Emission



## RF Conducted Emission



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



## 6. Photos of the EUT

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

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