



## HUAK TESTING

# FCC Test Report

**Test Report**  
**On Behalf of**  
**Advanced Electronic Solutions Global Ltd.**  
**HUAK TESTING**  
**For**  
**OPYN-MON**  
**Model No.: OPYN-MON**

**FCC ID: 2ALPX-OPYN-MON**

Prepared For: **Advanced Electronic Solutions Global Ltd.**  
**Unit 4C, Kilcronagh Business Park Cookstown, County Tyrone, United Kingdom**

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:** Apr. 24, 2025 ~ Jul. 22, 2025  
**Date of Report:** Jul. 22, 2025  
**Report Number:** HK2504242136-2E

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

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jul. 22, 2025	Jason Zhou
			
			



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### 1.3. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expended 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	$\pm 0.37$ dB
2	RF power, conducted	$\pm 3.35$ dB
3	Spurious emissions, conducted	$\pm 2.20$ dB
4	All emissions, radiated(<1G)	$\pm 3.90$ dB
5	All emissions, radiated(>1G)	$\pm 4.28$ dB
6	Temperature	$\pm 0.1$ °C
7	Humidity	$\pm 1.0$ %

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## 2. EUT Description

### 2.1. General Description of EUT

Equipment	OPYN-MON
Model Name	OPYN-MON
Series Model(s):	N/A
Model Difference	N/A
Trade Mark	AES
FCC ID	2ALPX-OPYN-MON
Operation Frequency:	IEEE 802.11a/n(HT20) 5.180GHz-5.240GHz IEEE 802.11n(HT40) 5.190GHz-5.230GHz
Modulation Technology:	IEEE 802.11a/n
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Antenna Type	FPC Antenna
Antenna Gain	3.25dBi
Power Source	DC12-15V or DC48V from POE Adapter
Power Supply:	DC12-15V or DC48V from POE Adapter
Hardware Version	94F5WMPT VER.B
Software Version	Apr 27 2025 12:06:59
<p>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.</p>	

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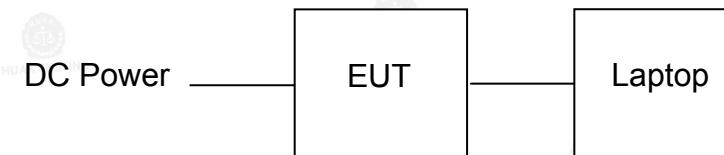
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## 2.4. Description of Test Setup

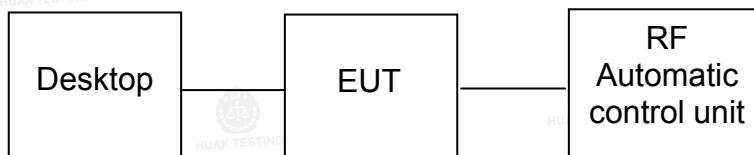
Operation of EUT during Radiation below 1GHz testing:



Operation of EUT during Radiation below 1GHz 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









## 4. Test Results and Measurement Data

### 4.1. AC Power Line Conducted Emission

#### 4.1.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 C Section 15.207																
<b>Test Method:</b>	ANSI C63.10: 2020																
<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>	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			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
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>Reference Plane</p> <p>40cm</p> <p>E.U.T</p> <p>AC power</p> <p>Test table/Insulation plane</p> <p>LISN</p> <p>Filter</p> <p>AC power</p> <p>EMI Receiver</p> <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
<b>Test Mode:</b>	Tx Mode																
<b>Test Procedure:</b>	<ol style="list-style-type: none"> <li>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>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>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: 2020 on conducted measurement.</li> </ol>																
<b>Test Result:</b>	N/A																

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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).



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#### 4.1.3. Test Data

Not applicable.

Note: EUT power supply by DC Power, so this test item not applicable.

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## 4.2. Maximum Conducted Output Power

#### 4.2.1. Test Specification

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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
Spectrum analyzer	Agilent	N9020A	HKE-117	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 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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### 4.3.1. Test Specification

### 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
Spectrum analyzer	Agilent	N9020A	HKE-117	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 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).

### 4.3.3 Test Data

N/A

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

#### 4.4.1. Test Specification

<b>Test Requirement:</b>	47 CFR Part 15C Section 15.407
<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>	 A diagram showing a test setup. On the left, a green rectangular box represents a 'Spectrum Analyzer' with a blue screen and two red knobs. On the right, a yellow rectangular box represents the 'EUT' (Equipment Under Test) with a single black knob. A black cable connects the two. The background is white with 'HUAKE TESTING' watermark in the top right corner.
<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, <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>
<b>Test Result:</b>	PASS

#### 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
Spectrum analyzer	Agilent	N9020A	HKE-117	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 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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### 4.4.3. Test Data

Mode	Test Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
802.11a	CH36	5180	20.55	PASS
802.11a	CH40	5200	20.51	PASS
802.11a	CH48	5240	20.50	PASS
802.11n(HT20)	CH36	5180	20.79	PASS
802.11n(HT20)	CH40	5200	20.63	PASS
802.11n(HT20)	CH48	5240	20.58	PASS
802.11n(HT40)	CH38	5190	42.97	PASS
802.11n(HT40)	CH46	5230	43.02	PASS

### Test plots as follows:



### Band I (5150 – 5250 MHz)

802.11a



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## 802.11n(HT20)



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## 802.11n(HT40)



High

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## 4.5. Power Spectral Density

#### 4.5.1. Test Specification

#### 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
Spectrum analyzer	Agilent	N9020A	HKE-117	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 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

Mode	Test Channel	Level [dBm/MHz]	Limit (dBm/MHz)	Result
802.11a	CH36	1.81	11	PASS
802.11a	CH40	2.02	11	PASS
802.11a	CH48	1.03	11	PASS
802.11n(HT20)	CH36	0.82	11	PASS
802.11n(HT20)	CH40	1.44	11	PASS
802.11n(HT20)	CH48	0.91	11	PASS
802.11n(HT40)	CH38	-1.32	11	PASS
802.11n(HT40)	CH46	-1.21	11	PASS

Note: Instrument attenuation and cable loss See test diagram

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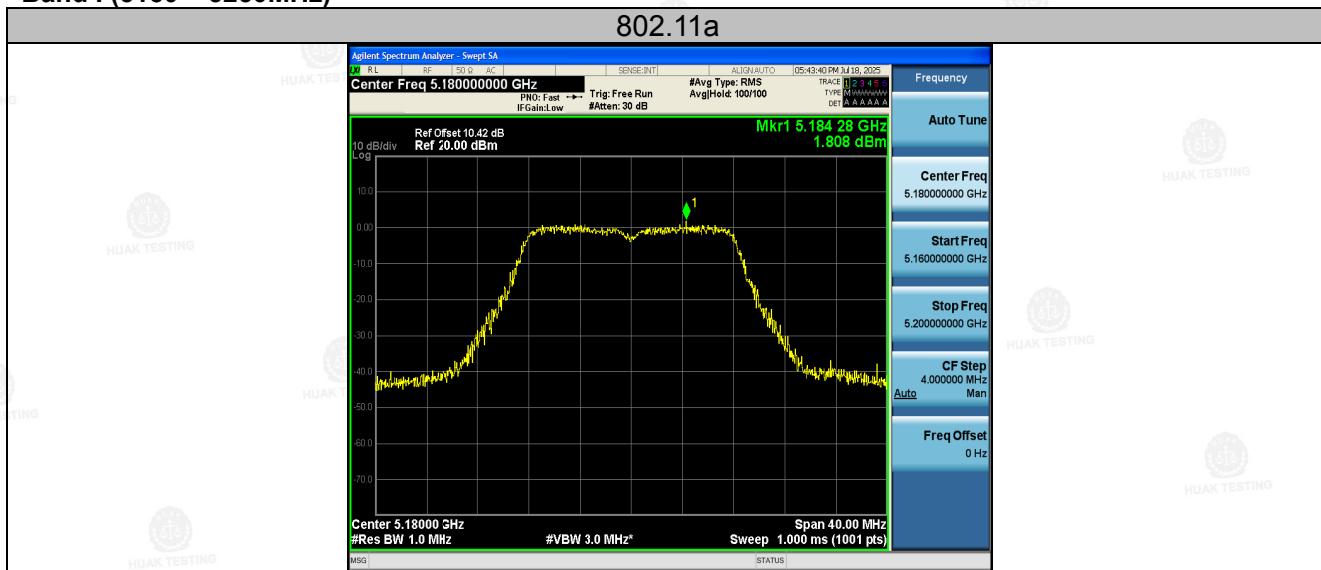
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



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## Test plots as follows:

### **Band I (5150 – 5250MHz)**



## Low



Mid



High

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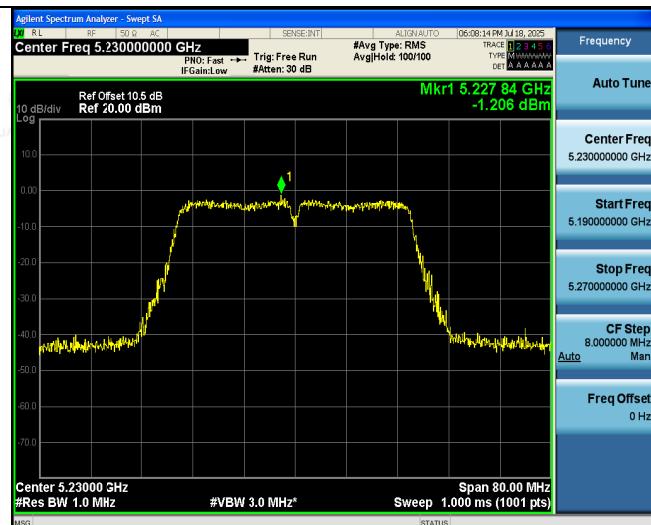




## 802.11n(HT40)



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: 2020
<b>Limit:</b>	<p>For band I&amp;II&amp;III: <math>E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}</math>, for EIRP(dBm)= <b>-27dBm</b></p> <p>For transmitters operating in the 5.725-5.85 GHz band:</p> <p>All emissions shall be limited to a level of <math>-27 \text{ dBm}/\text{MHz}</math> at 75 MHz or more above or below the band edge increasing linearly to <math>10 \text{ dBm}/\text{MHz}</math> 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 <math>15.6 \text{ dBm}/\text{MHz}</math> 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 <math>27 \text{ dBm}/\text{MHz}</math> at the band edge.</p> <p>For band IV(5715-5725MHz&amp;5850-5860MHz): <math>E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}</math></p>
<b>Test Setup:</b>	<p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a turntable 1.5m from a vertical antenna. The antenna is mounted on a 3m mast. The receiver and amplifier are connected to the antenna. The entire setup is positioned above a ground plane.</p>
<b>Test Mode:</b>	Transmitting mode with modulation



<b>Test Procedure:</b>	<p>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>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.</p> <p>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.</p> <p>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.</p> <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



#### 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	Agilent	N9020A	HKE-117	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).



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#### 4.6.3. Test Data

Operation Mode: 802.11a Mode with 5.2G 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)	
5150	55.37	-2.49	52.88	74	21.12	peak
5150	/	-2.49	/	54	/	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)	
5150	54.25	-2.49	51.76	74	22.24	peak
5150	/	-2.49	/	54	/	AVG

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

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Operation Mode: 802.11n/HT20 Mode with 5.2G TX CH Low

### Horizontal:

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
5150	54.09	-2.49	51.6	74	22.4	peak
5150	/	-2.49	/	54	/	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-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
5150	53.13	-2.49	50.64	74	23.36	peak
5150	/	-2.49	/	54	/	AVG

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

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Operation Mode: TX CH High with 5.2G

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)	
5350	55.22	-2.11	53.11	74	20.89	peak
5350	/	-2.11	/	54	/	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)	
5350	53.9	-2.11	51.79	74	22.21	peak
5350	/	-2.11	/	54	/	AVG

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

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**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)	
5150	53.28	-2.49	50.79	74	23.21	peak
5150	/	-2.49	/	54	/	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)	
5150	51.01	-2.49	48.52	74	25.48	peak
5150	/	-2.49	/	54	/	AVG

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

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Operation Mode: TX CH High with 5.2G

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)	
5350	54.15	-2.11	52.04	74	21.96	peak
5350	/	-2.11	/	54	/	AVG

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

Vertical:

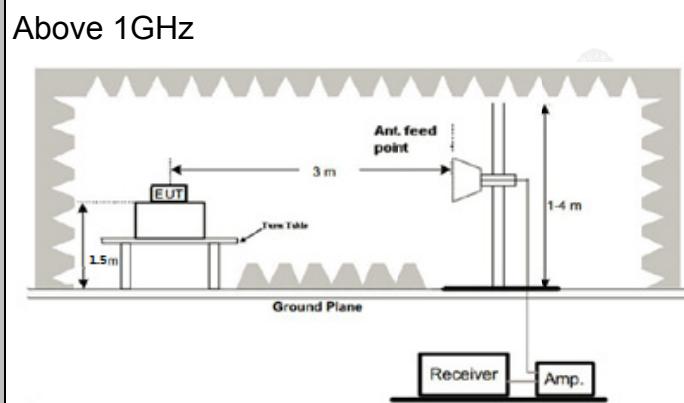
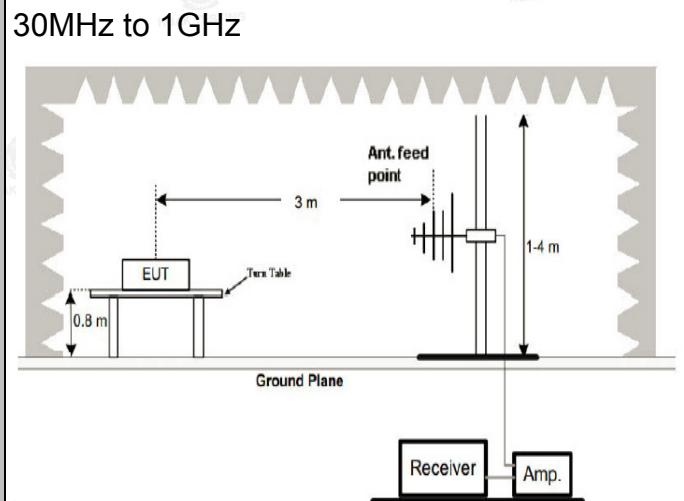
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
5350	52.34	-2.11	50.23	74	23.77	peak
5350	/	-2.11	/	54	/	AVG

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.





## 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.



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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.
<b>Test results:</b>	PASS



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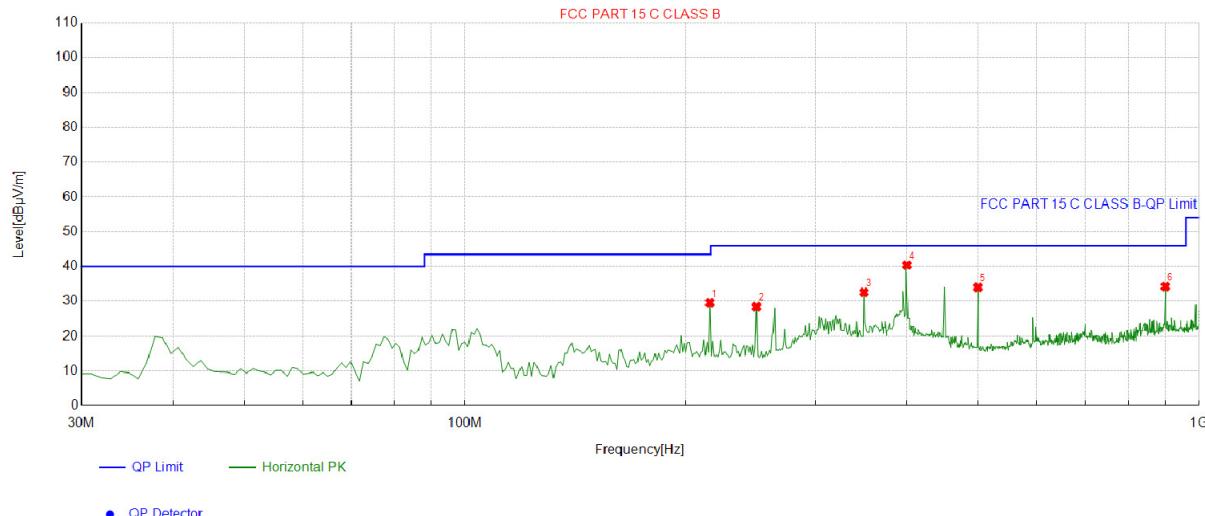
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#### 4.7.2. Test Data

All the test modes completed for test. Only the worst result of (802.11a at 5180MHz) was reported

Below 1GHz

Horizontal



#### Suspected List

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	44.33	29.61	43.50	13.89	100	123	Horizontal
2	249.4394	-13.41	41.89	28.48	46.00	17.52	100	14	Horizontal
3	349.4494	-10.04	42.65	32.61	46.00	13.39	100	341	Horizontal
4	399.9399	-9.84	50.23	40.39	46.00	5.61	100	266	Horizontal
5	499.9500	-8.17	42.20	34.03	46.00	11.97	100	188	Horizontal
6	899.9900	-1.01	35.26	34.25	46.00	11.75	100	131	Horizontal

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

## Vertical



Suspected List									
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	84.3744	-17.88	49.31	31.43	40.00	8.57	100	178	Vertical
2	138.7487	-17.98	39.48	21.50	43.50	22.00	100	183	Vertical
3	215.4555	-14.72	37.96	23.24	43.50	20.26	100	140	Vertical
4	399.9399	-9.84	46.62	36.78	46.00	9.22	100	331	Vertical
5	499.9500	-8.17	41.07	32.90	46.00	13.10	100	137	Vertical
6	594.1341	-5.06	33.22	28.16	46.00	17.84	100	83	Vertical

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

## Harmonics and Spurious Emissions

### Frequency Range (9kHz-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.



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## Above 1GHz

LOW CH 36 (802.11 a Mode with 5.2G)/5180

Horizontal:

Frequency (MHz)	Meter Reading (dBµV)	Factor (dB)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Type
3647	55.12	-4.59	50.53	74	23.47	peak
3647	44.91	-4.59	40.32	54	13.68	AVG
10360	48.59	3.74	52.33	74	21.67	peak
10360	38.32	3.74	42.06	54	11.94	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit-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
3647	54.26	-4.59	49.67	74	24.33	peak
3647	43.2	-4.59	38.61	54	15.39	AVG
10360	48.55	3.74	52.29	74	21.71	peak
10360	38.36	3.74	42.1	54	11.9	AVG

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

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MID CH40 (802.11 a Mode with 5.2G)/5200

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)	
3647	54.14	-4.59	49.55	74	24.45	peak
3647	41.26	-4.59	36.67	54	17.33	AVG
10400	48.3	3.74	52.04	74	21.96	peak
10400	38.75	3.74	42.49	54	11.51	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)	
3647	54.11	-4.59	49.52	74	24.48	peak
3647	42.95	-4.59	38.36	54	15.64	AVG
10400	48.02	3.74	51.76	74	22.24	peak
10400	38.55	3.74	42.29	54	11.71	AVG

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

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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)	
3647	53.62	-4.59	49.03	74	24.97	peak
3647	43.1	-4.59	38.51	54	15.49	AVG
10480	48.25	3.75	52	74	22	peak
10480	38.99	3.75	42.74	54	11.26	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)	
3647	54.85	-4.59	50.26	74	23.74	peak
3647	41.31	-4.59	36.72	54	17.28	AVG
10480	48.62	3.75	52.37	74	21.63	peak
10480	38.21	3.75	41.96	54	12.04	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 recorded 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.
- (7) All the test modes completed for test. only the worst result of Mode 1(802.11a Mode )

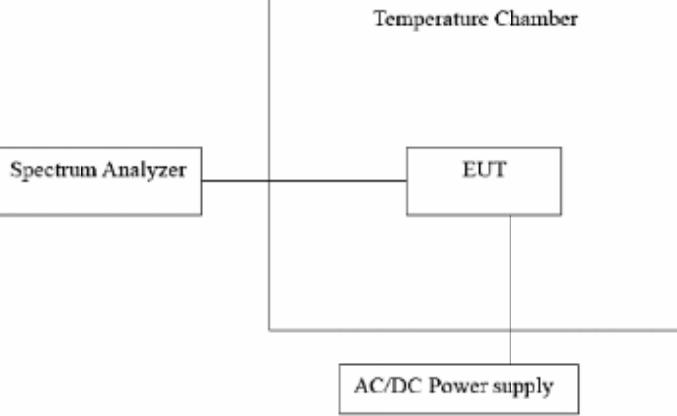
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## 4.8. Frequency Stability Measurement

#### 4.8.1. Test Specification

<b>Test Requirement:</b>	FCC Part15 Section 15.407(g)
<b>Test Method:</b>	ANSI C63.10: 2020
<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>	<ol style="list-style-type: none"> <li>The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.</li> <li>Turn the EUT on and couple its output to a spectrum analyzer.</li> <li>Turn the EUT off and set the chamber to the highest temperature specified.</li> <li>Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.</li> <li>Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.</li> <li>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.</li> </ol>
<b>Test Result:</b>	PASS
<b>Remark:</b>	N/A



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## Test Result as follows:

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	20.4V	5179.963	-37	5239.991	-9
	24.0V	5180.012	12	5239.972	-28
	27.6V	5179.985	-15	5240.021	21

Mode	Temperature (°C)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
5.2G Band	-30	5179.997	-3	5240.008	8
	-20	5180.012	12	5240.012	12
	-10	5179.974	-26	5239.995	-5
	0	5179.989	-11	5239.987	-13
	10	5179.991	-9	5239.975	-25
	20	5180.024	24	5240.016	16
	30	5180.005	5	5239.991	-9
	40	5179.986	-14	5239.984	-16
	50	5180.021	21	5239.986	-14

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## 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.

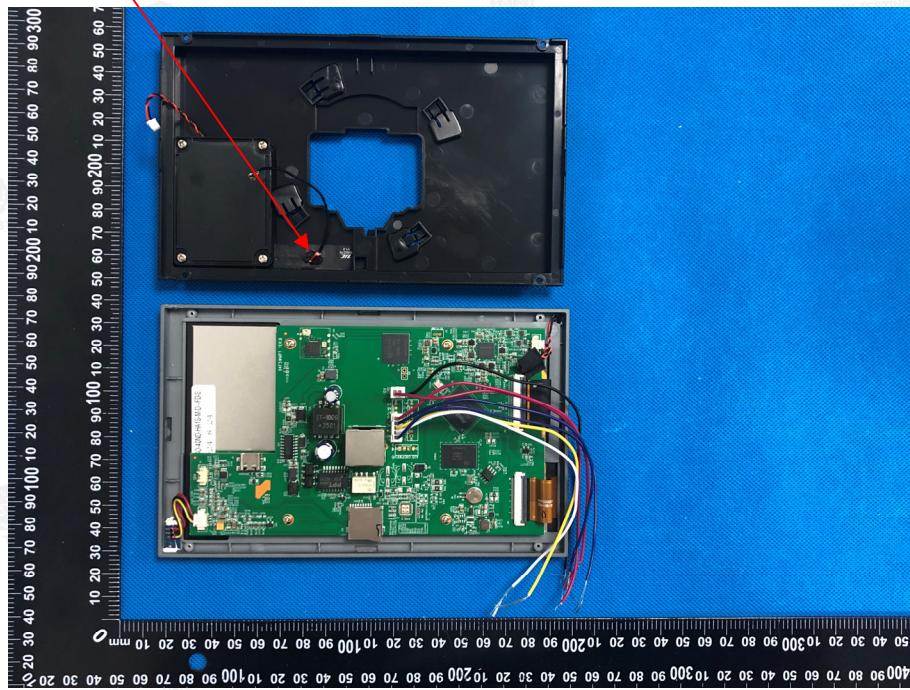
### Refer to statement below for compliance.

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 FPC Antenna, need professional installation, not easy to remove. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 3.25dBi.

#### WIFI Antenna



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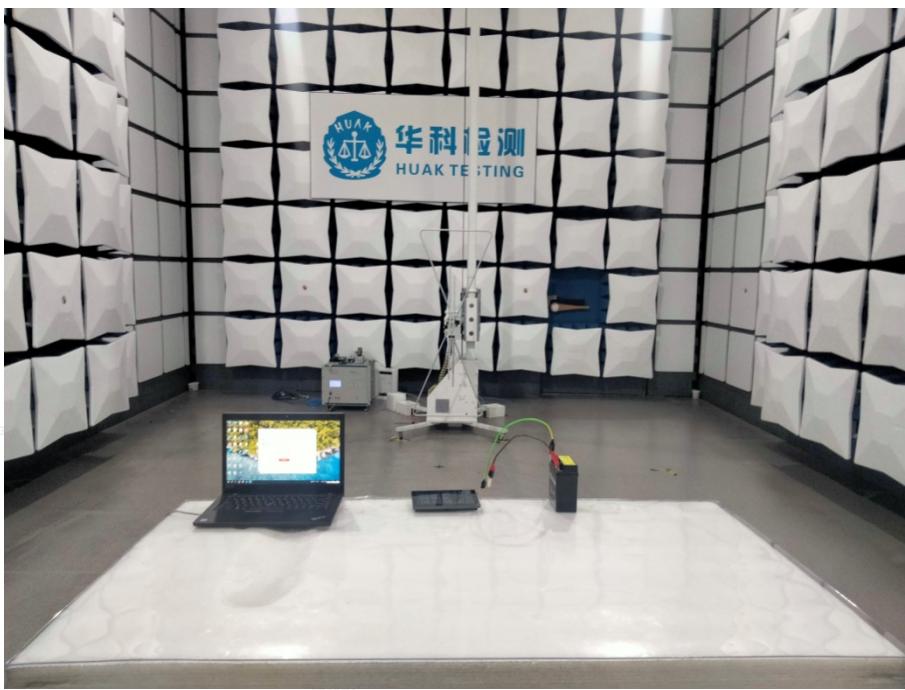
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## 5. Test Setup Photos of the EUT

Radiated Emissions



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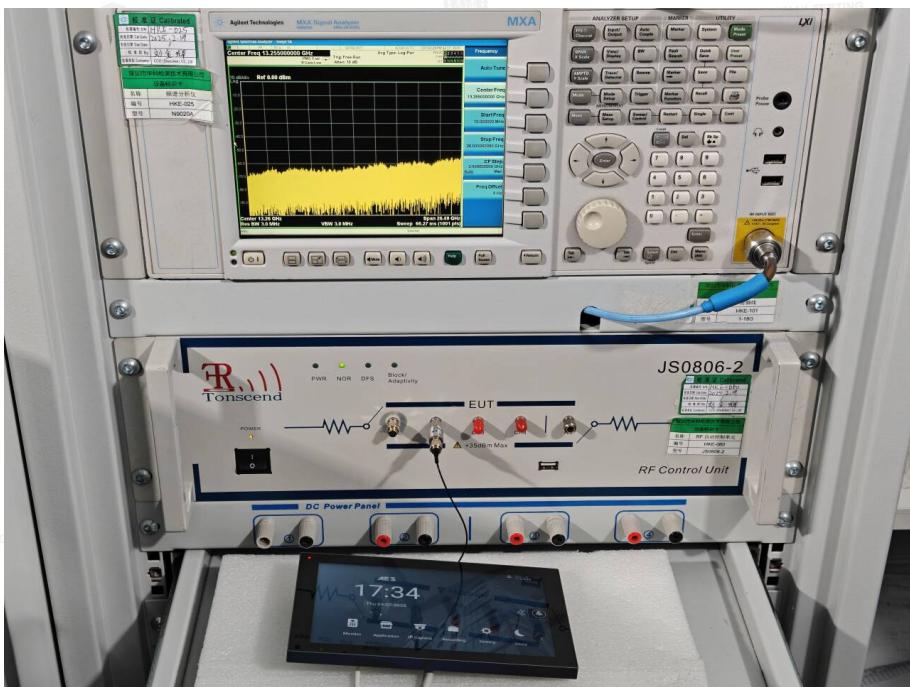
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## RF Conducted Emission





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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-----



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