



# FCC Test Report

## Test Report

On Behalf of

**National 2Way, LLC**

For

**Wireless PTT works with Choice Wireless capable PTTs**

**Model No.: CWPTT-KEYTAG**

**FCC ID: 2A2BD-CWPTT-KEYTAG**

**Prepared For:** **National 2Way, LLC**

**4821 N. Grady Ave., Tampa, Florida, 33614, United States**

**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. 16, 2025 ~ Apr. 27, 2025**

**Date of Report:** **Apr. 27, 2025**

**Report Number:** **HK2504161950-E**

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## Test Result Certification

**Applicant's Name** ..... : National 2Way, LLC

Address ..... : 4821 N. Grady Ave., Tampa, Florida, 33614, United States

**Manufacturer's Name** ..... : Onwell Communication Co. , Ltd. Taiwan Branch (Samoa)

Address ..... : 10F. No. 8 , Wuquan 2nd Rd., Xinzhuang Dist., New Taipei City 248020, Taiwan

### Product Description

Trade Mark ..... : N/A

Product Name ..... : Wireless PTT works with Choice Wireless capable PTTs

Model and/or Type Reference ..... : CWPTT-KEYTAG

### 47 CFR FCC Part 15 Subpart C 15.247

**Standards** ..... : **KDB 558074 D01 15.247 Meas Guidance v05r02**  
**ANSI C63.10: 2013**

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**Date of Test** ..... :

Date (s) of Performance of Tests ..... : **Apr. 16, 2025 ~ Apr. 27, 2025**

Date of Issue ..... : **Apr. 27, 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 Date	Remark
Revision 1.0	Initial Test Report Release	Apr. 27, 2025	Jason Zhou
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## 1 Test Summary

## 1.1 Test Description

Test Item	Test Requirement	Result
Antenna Requirement HUAK TESTING	§15.203/§15.247(b)(4) HUAK TESTING	PASS
AC Conducted Emission HUAK TESTING	FCC Part 15.207 HUAK TESTING	N/A HUAK TESTING
Radiated Emissions HUAK TESTING	FCC Part 15.205/15.209 HUAK TESTING	PASS
Maximum Peak Output Power HUAK TESTING	FCC Part 15.247(b) HUAK TESTING	PASS
Power Spectral Density HUAK TESTING	FCC Part 15.247(e) HUAK TESTING	PASS
6dB Bandwidth & 99% Bandwidth HUAK TESTING	FCC Part 15.247(a)(2) HUAK TESTING	PASS
Spurious RF Conducted Emission HUAK TESTING	FCC Part 15.247(d) HUAK TESTING	PASS
Band Edge HUAK TESTING	FCC Part 15.247(d) HUAK TESTING	PASS

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## 1.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties. The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device. The maximum value of the uncertainty as below:

No.	Item	Uncertainty
1	Conducted Emission Test	±2.71dB
2	All emissions, radiated(<1G)	±3.90dB
3	All emissions, radiated(>1G)	±4.28dB

## 1.3 Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

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

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



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## 2.2 Description of Test Conditions

### (1) E.U.T. test conditions:

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

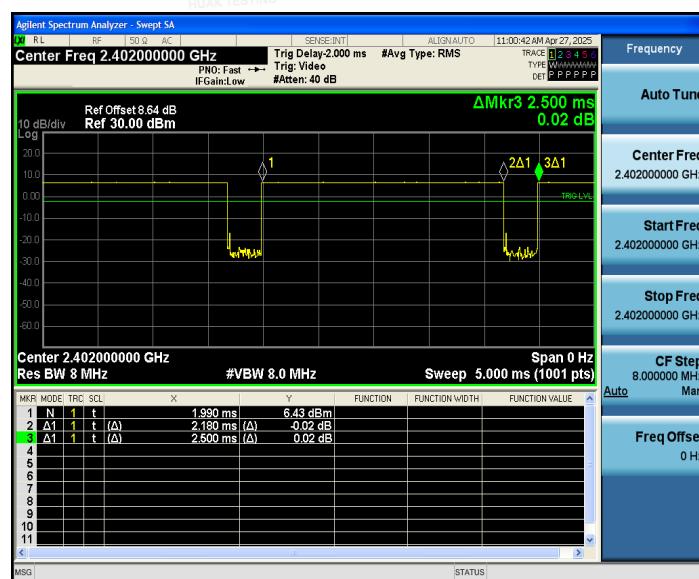
(2) Frequency range of radiated measurements:

The test range will be up to the tenth harmonic of the highest fundamental frequency.

(3) Pre-test the EUT in all transmitting mode at the lowest (2402 MHz), middle (2440 MHz) and highest (2480 MHz) channel with different data packet and conducted to determine the worst-case mode, only the worst-case results are recorded in this report.

#### (4) Mode Test Duty Cycle

Mode	Duty Cycle
BT-LE(1Mbps)	0.87



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## 2.3 Description of Test Setup

Operation of EUT during 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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## 2.4 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	Note
1	Wireless PTT works with Choice Wireless capable PTTs	N/A	CWPTT-KEYTAG	N/A	EUT
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					HUAK TESTING
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**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.



### 3 Equipments List for All Test Items

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	HKE-002	2025/02/19	1 Year
2	L.I.S.N.	R&S	ENV216	HKE-059	2025/02/19	1 Year
3	EMI Test Receiver	R&S	ESR	HKE-005	2025/02/19	1 Year
4	Spectrum analyzer	Agilent	N9020A	HKE-025	2025/02/19	1 Year
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2025/02/19	1 Year
6	Preamplifier	EMCI	EMC05184 5S	HKE-006	2025/02/19	1 Year
7	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	2025/02/19	1 Year
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2025/02/19	1 Year
9	6dB Attenuator	Pasternack	6db	HKE-184	2025/02/19	1 Year
10	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	2025/02/19	1 Year
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2024/02/21	2 Year
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2024/02/21	2 Year
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2 Year
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-2	HKE-060	2025/02/19	1 Year
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2025/02/19	1 Year
18	Wireless Communication Test Set	R&S	CMU200	HKE-026	2025/02/19	1 Year
19	Wireless Communication Test Set	R&S	CMW500	HKE-027	2025/02/19	1 Year
20	High-low temperature chamber	Guangke	HT-80L	HKE-118	2024/06/10	1 Year
21	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2024/06/10	1 Year
22	RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	/	/
23	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	2025/02/19	1 Year
24	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

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## 4 Test Result

## 4.1 Antenna Requirements

#### 4.1.1 Standard Requirement

### **Standard Applicable**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247, 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.

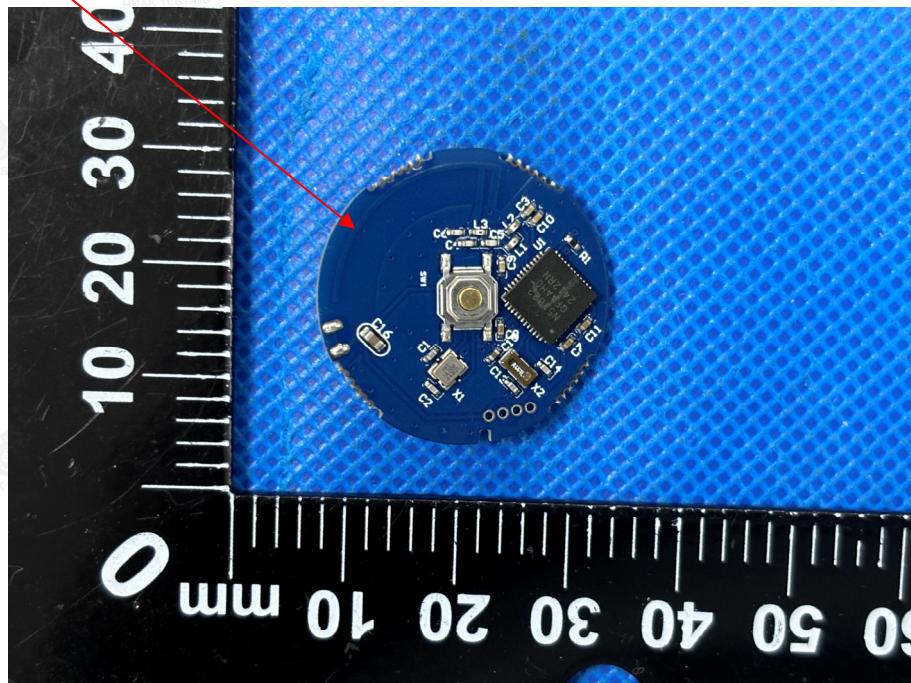
**Refer to statement below for compliance**

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 PCB Antenna, is a permanently attached antenna on the PCB. It conforms to the standard requirements. The directional gains of antenna used for transmitting is -9.26dBi.

#### 4.1.2 EUT Antenna



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## 4.2 Conduction Emissions Measurement

### 4.2.1 Applied Procedures / Limit

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### 4.2.2 Test Procedure

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.



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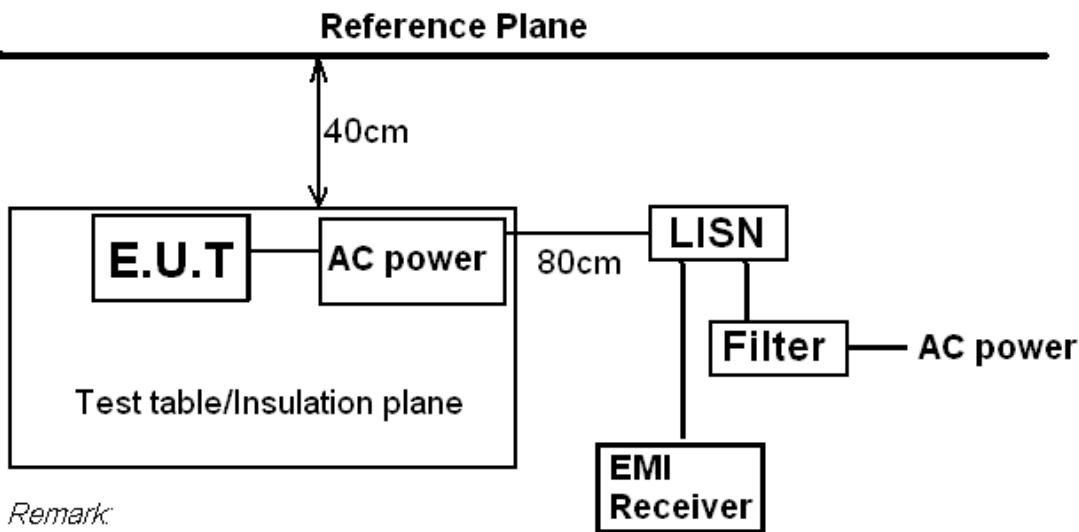
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#### 4.2.3 Test Setup



*Remark:*

*E.U.T: Equipment Under Test*

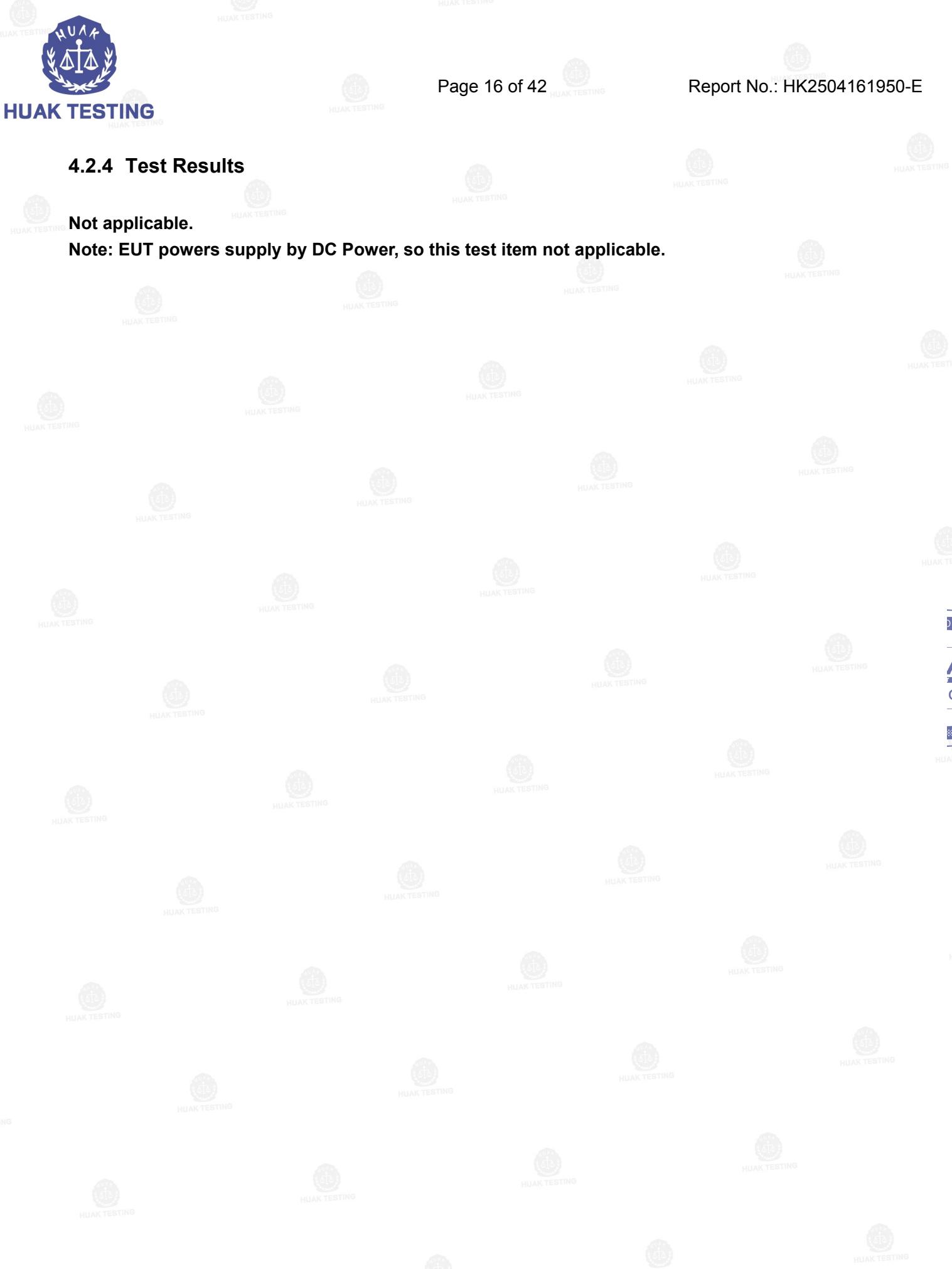
*LISN: Line Impedance Stabilization Network*

*Test table height=0.8m*

#### 4.2.4 Test Results

**Not applicable.**

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



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### 4.3 Radiated Emissions Measurement

#### 4.3.1 Applied Procedures / Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

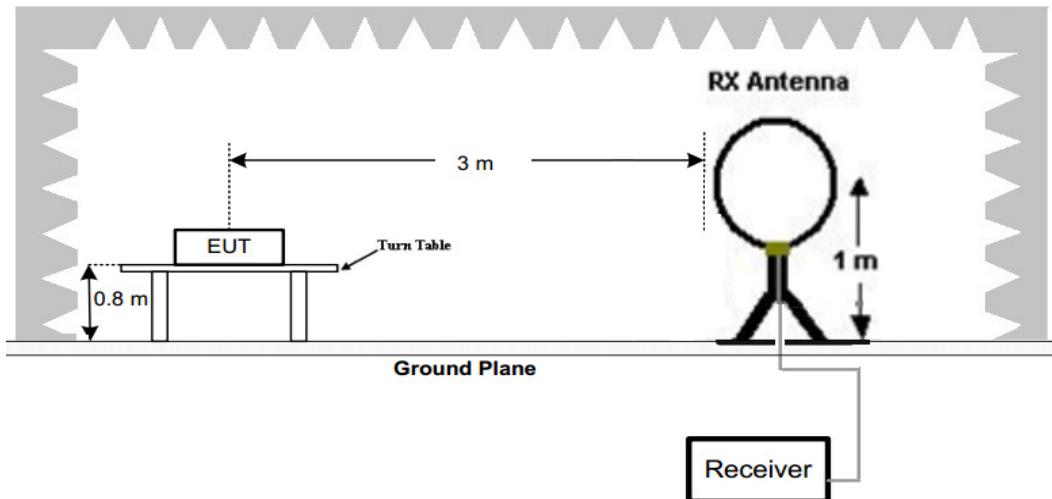
HUAK TESTI Radiated emission limits

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

### 4.3.2 Test Setup

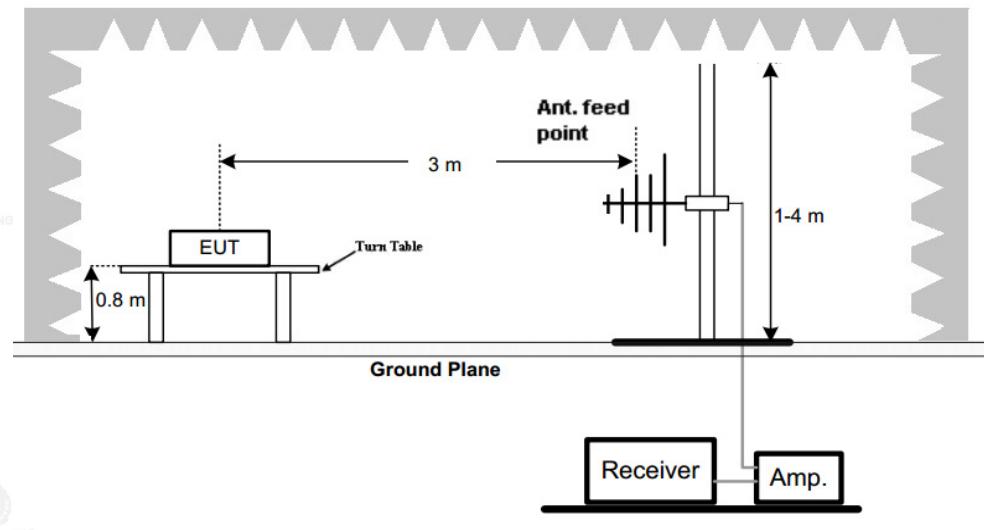
## Test Configuration:

### 1) 9 kHz to 30 MHz emissions:

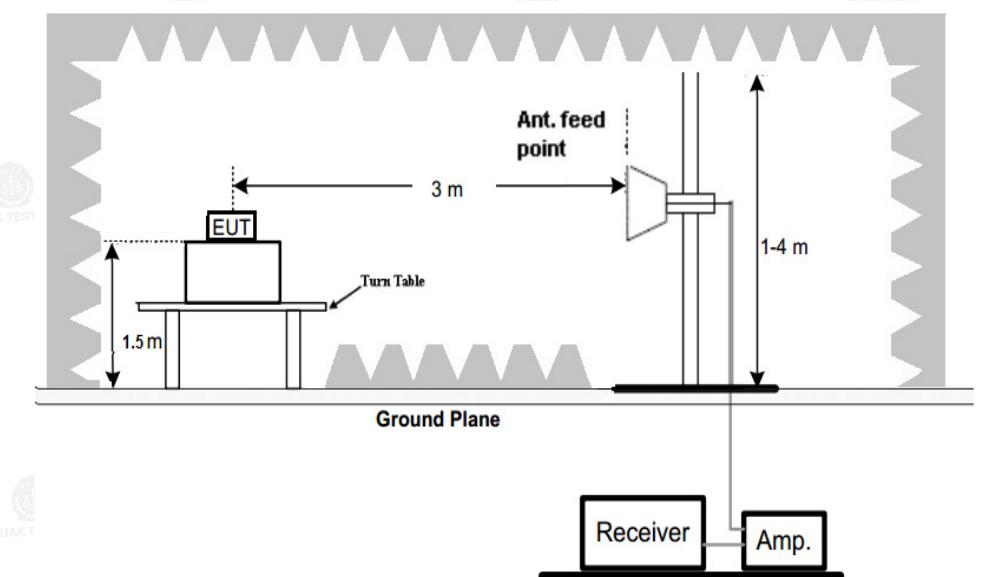


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## 2) 30 MHz to 1 GHz emissions:



### 3) 1 GHz to 25 GHz emissions:



## Test Procedure

1. The EUT was placed on turn table which is 0.8m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 1.5m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0 degrees to 360 degrees to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

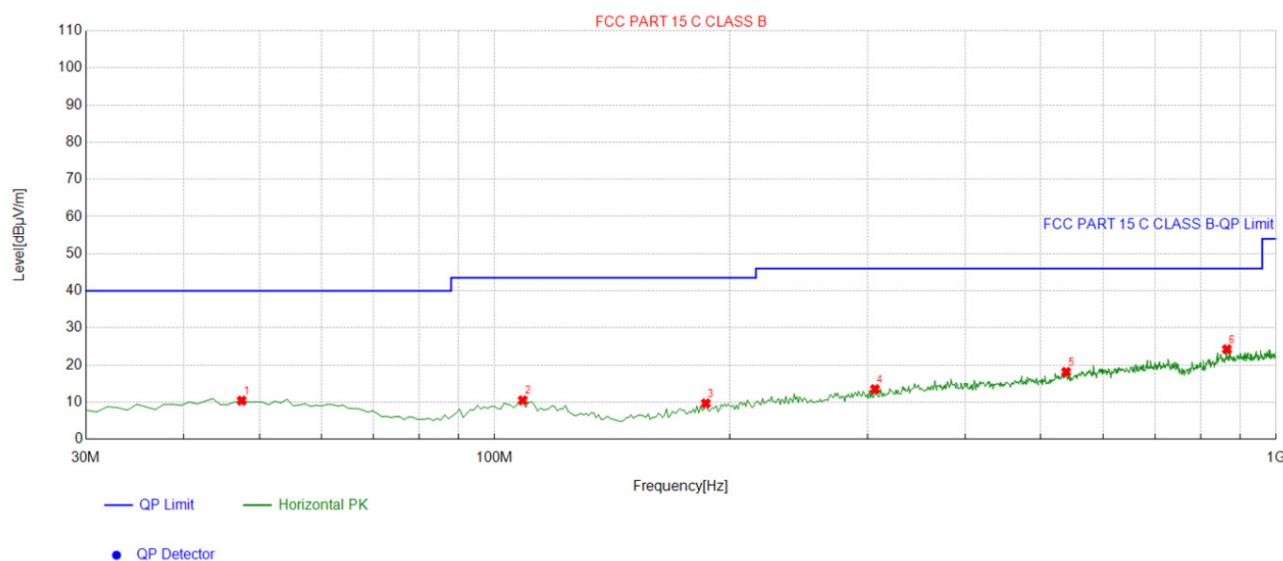
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### 4.3.3 Test Result

## Below 1GHz Test Results:

All modes have been tested, only the worst mode of GFSK Low channel TX is reflected.

## Antenna polarity: H



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.477477	-13.86	24.28	10.42	40.00	29.58	100	135	Horizontal
2	108.64864	-14.02	24.52	10.50	43.50	33.00	100	276	Horizontal
3	186.32632	-15.96	25.65	9.69	43.50	33.81	100	31	Horizontal
4	306.72672	-11.89	25.40	13.51	46.00	32.49	100	343	Horizontal
5	538.78878	-7.14	25.30	18.16	46.00	27.84	100	73	Horizontal
6	865.03503	-1.40	25.65	24.25	46.00	21.75	100	132	Horizontal

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



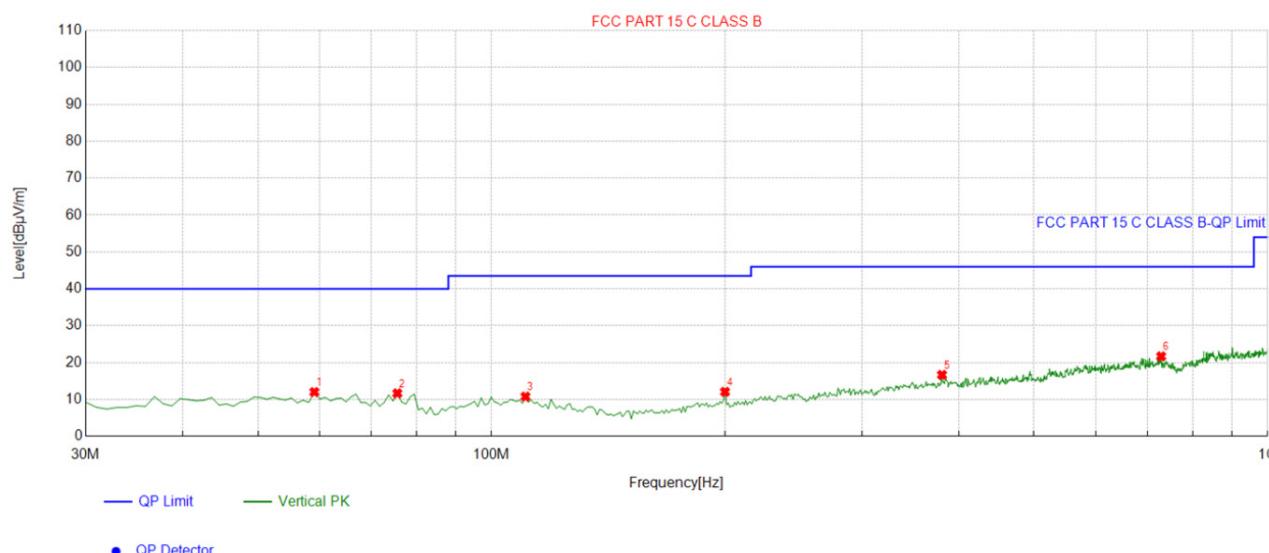
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Antenna polarity: V



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	59.129129	-13.54	25.56	12.02	40.00	27.98	100	84	Vertical
2	75.635636	-17.98	29.65	11.67	40.00	28.33	100	10	Vertical
3	110.59059	-14.50	25.27	10.77	43.50	32.73	100	98	Vertical
4	199.91992	-15.09	27.17	12.08	43.50	31.42	100	139	Vertical
5	380.52052	-9.28	25.96	16.68	46.00	29.32	100	38	Vertical
6	729.09909	-3.57	25.26	21.69	46.00	24.31	100	10	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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**For 1GHz to 25GHz****CH Low (2402MHz)**

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**Horizontal:**

Frequency	Meter Reading	Factor	Emission Level	HUAK TESTING Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
4804.00	53.13	-3.65	49.48	74.00	24.52	peak
4804.00	45.17	-3.65	41.52	54.00	12.48	AVG
7206.00	54.97	-0.95	54.02	74.00	19.98	peak
7206.00	43.80	-0.95	42.85	54.00	11.15	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)	
4804.00	54.85	-3.65	51.20	74.00	22.80	peak
4804.00	45.17	-3.65	41.52	54.00	12.48	AVG
7206.00	55.47	-0.95	54.52	74.00	19.48	peak
7206.00	44.02	-0.95	43.07	54.00	10.93	AVG

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

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### CH Middle (2440MHz)

### 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)	
4880.00	53.38	-3.54	49.84	74.00	24.16	peak
4880.00	44.51	-3.54	40.97	54.00	13.03	AVG
7320.00	53.62	-0.81	52.81	74.00	21.19	peak
7320.00	43.27	-0.81	42.46	54.00	11.54	AVG

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor;  
Margin = Limit-L 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)	
4880.00	53.10	-3.54	49.56	74.00	24.44	peak
4880.00	45.33	-3.54	41.79	54.00	12.21	AVG
7320.00	54.51	-0.81	53.70	74.00	20.30	peak
7320.00	43.38	-0.81	42.57	54.00	11.43	AVG

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



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Radiated Band Edge Test:

Operation Mode: TX CH Low (2402MHz)

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Report No.: HK2504161950-E

Horizontal (Worst case):

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2310.00	52.97	-5.81	47.16	74	26.84	peak
2310.00	/	-5.81	/	54	/	AVG
2390.00	54.61	-5.84	48.77	74	25.23	peak
2390.00	/	-5.84	/	54	/	AVG
2400.00	55.41	-5.84	49.57	74	24.43	peak
2400.00	/	-5.84	/	54	/	AVG

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

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2310.00	54.71	-5.81	48.9	74	25.1	peak
2310.00	/	-5.81	/	54	/	AVG
2390.00	54.89	-5.84	49.05	74	24.95	peak
2390.00	/	-5.84	/	54	/	AVG
2400.00	55.68	-5.84	49.84	74	24.16	peak
2400.00	/	-5.84	/	54	/	AVG

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

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## HUAK TESTING

Operation Mode: TX CH High (2480MHz)

## Horizontal (Worst case)

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.50	53.25	-5.81	47.44	74	26.56	peak
2483.50	/	-5.81	/	54	/	AVG
2500.00	53.45	-6.06	47.39	74	26.61	peak
2500.00	/	-6.06	/	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
2483.50	54.5	-5.81	48.69	74	25.31	peak
2483.50	/	-5.81	/	54	/	AVG
2500.00	53.65	-6.06	47.59	74	26.41	peak
2500.00	/	-6.06	/	54	/	AVG

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

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.

### Remark:

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



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## 4.4 Maximum Peak Output Power Measurement

### 4.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

### 4.4.2 Test Procedure

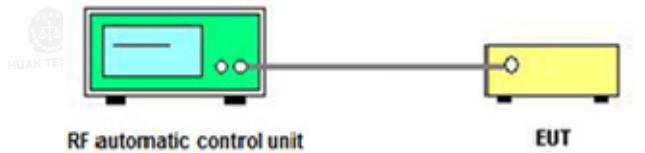
The maximum peak conducted output power may be measured using a broadband peak RF automatic control unit. The RF automatic control unit shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF automatic control unit with a thermocouple detector or equivalent. The RF automatic control unit shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

### 4.4.3 Deviation from Standard

No deviation.

### 4.4.4 Test Setup



### 4.4.5 Test Results

Channel	Channel Frequency (Mhz)	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Low	2402	6.45	30.00	Pass
Middle	2440	6.82		Pass
High	2480	7.06		Pass

Note: The test results including the cable loss.

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## 4.5 Power Spectral Density

### 4.5.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### 4.5.2 Test Procedure

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

Set the RBW =10 kHz.

Set the VBW =30 kHz.

Set the span to 1.5 times the DTS channel bandwidth.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum power level.

If measured value exceeds limit, reduce RBW(no less than 3 kHz)and repeat.

The resulting peak PSD level must be 8 dBm.

### 4.5.3 Deviation from Standard

No deviation.

### 4.5.4 Test Setup





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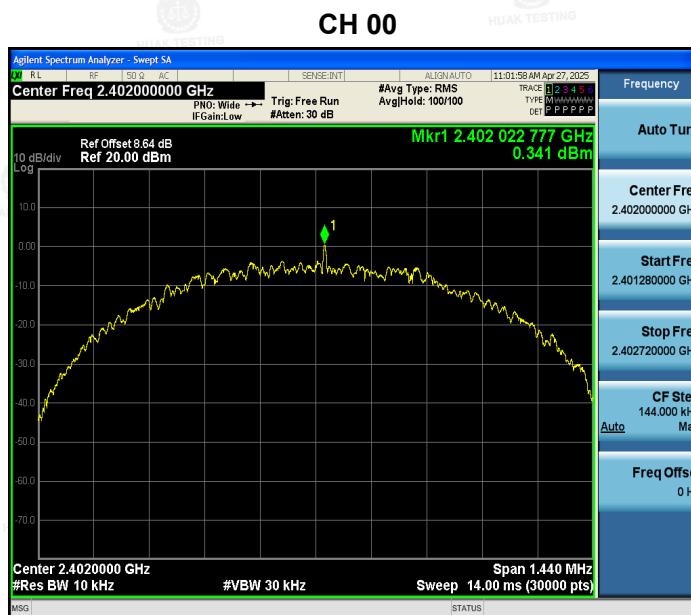
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#### 4.5.5 Test Results

Channel	Channel frequency (MHz)	Result (dBm/10kHz)	10log (3/10)	Test Result (dBm/3kHz)
Low	2402	0.34	-5.23	-4.89
Middle	2440	4.74	-5.23	-0.49
High	2480	5.10	-5.23	-0.13
Limit : 8dBm/3KHz				
Test Result (dBm/3kHz)= Result (dBm/10kHz)+10log (3/10)				
Test Result	PASS			



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## 4.6 6dB Bandwidth

### 4.6.1 Limit

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

## 4.6.2 Test Procedure

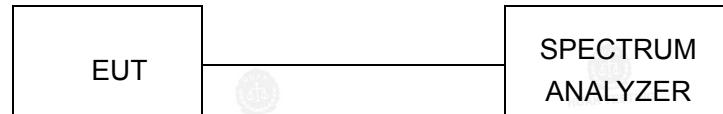
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with  $RBW=100$  KHz and  $VBW=300$  KHz. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

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

#### 4.6.3 Deviation from Standard

No deviation.

#### 4.6.4 Test Setup



## 4.6.5 Test Result

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	2402	0.720	≥500	Pass
Middle	2440	0.656		Pass
High	2480	0.668		Pass

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## 4.7 Occupied Bandwidth

### 4.7.1 Test Procedure

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

RBW=1% to 5% of the OBW

VBW=approximately 3 X RBW

Detector=Peak

Trace Mode: Max Hold

Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recorded.

### 4.7.2 Deviation from Standard

No deviation.

### 4.7.3 Test Setup



### 4.7.4 Test Result

N/A

## 4.8 Band Edge

### 4.8.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under FCC rules in section 5.8.1, the attenuation required shall be 30 dB instead of 20 dB.

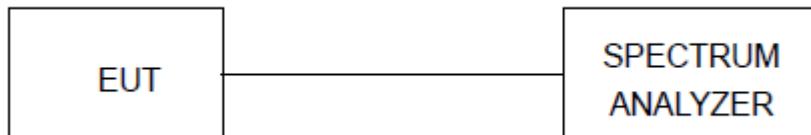
## 4.8.2 Test Procedure

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation, RBW  $\geq$  1% of the span, VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold.

### 4.8.3 Deviation from Standard

No deviation.

#### 4.8.4 Test Setup





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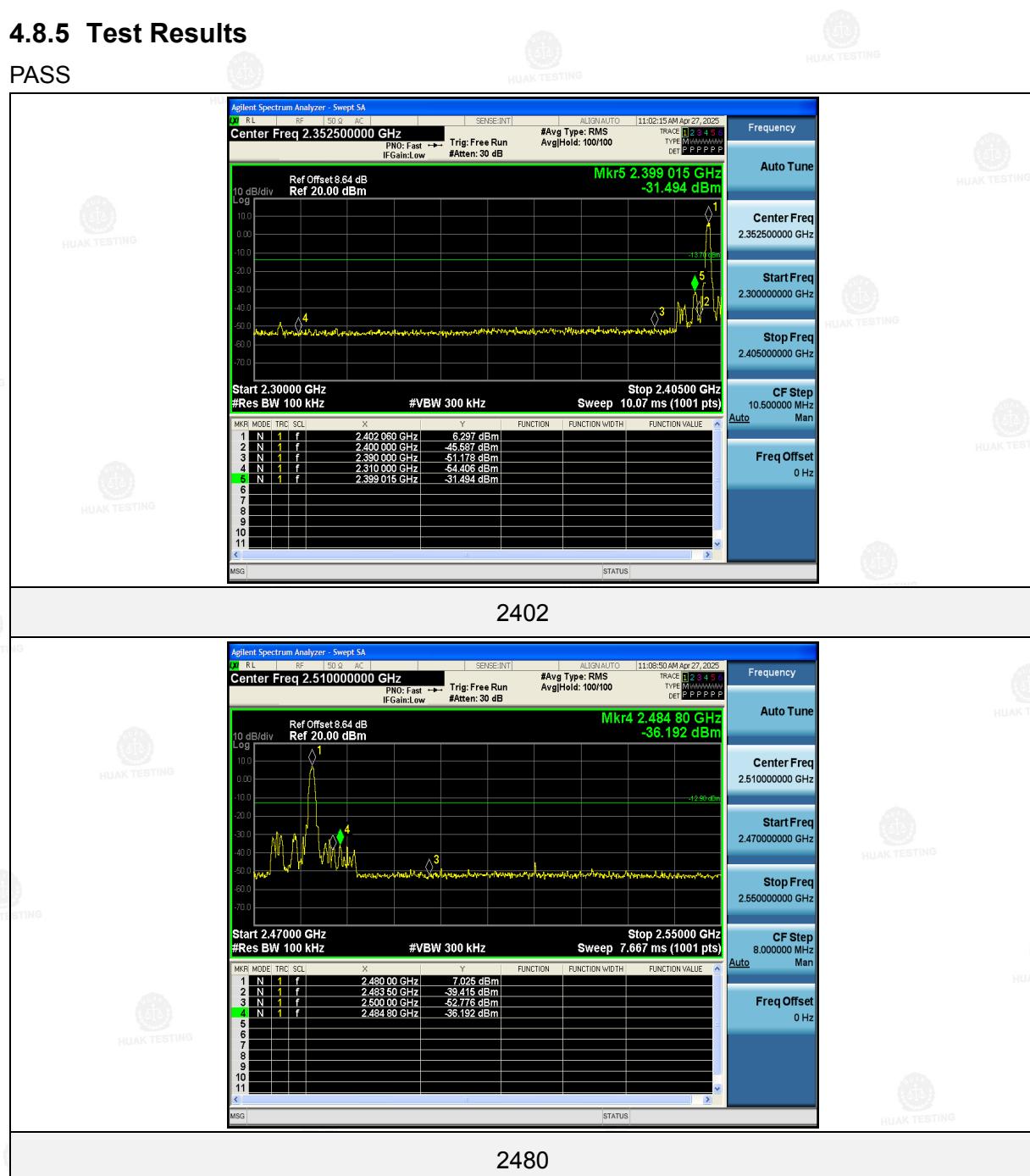
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PASS

#### 4.8.5 Test Results

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## 4.9 Conducted Spurious Emissions

### 4.9.1 Applied Procedures / Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section (b)(3) of RSS 5.4(4), the attenuation required shall be 30 dB instead of 20 dB.

For below 30MHz, For 9KHz-150kHz, 150K-10MHz, We use the RBW 1KHz, 10KHz, So the limit need to calculated by "10lg(BW1/BW2)". for example For 9KHz-150kHz, RBW 1KHz, The Limit= the highest emission level-20-10log(100/1)= the highest emission level-40.

### 4.9.2 Test Procedure

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector function = peak, Trace = max hold.

### 4.9.3 Deviation from Standard

No deviation.

### 4.9.4 Test Setup





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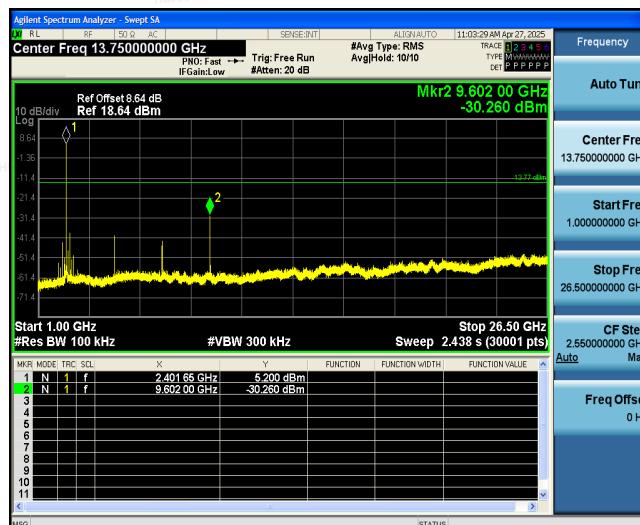
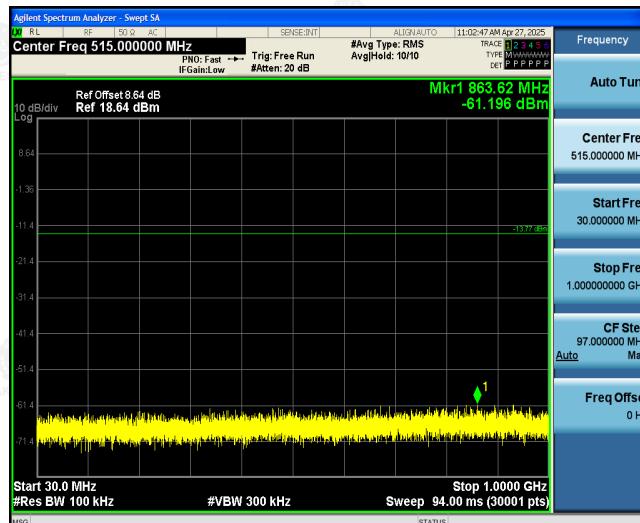
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## 4.9.5 Test Results

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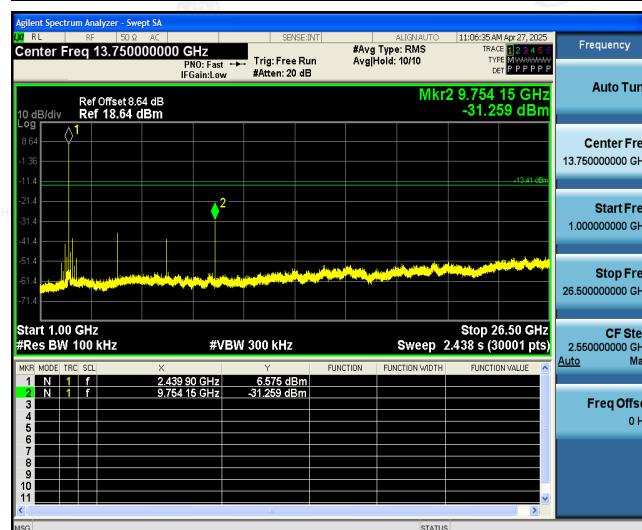
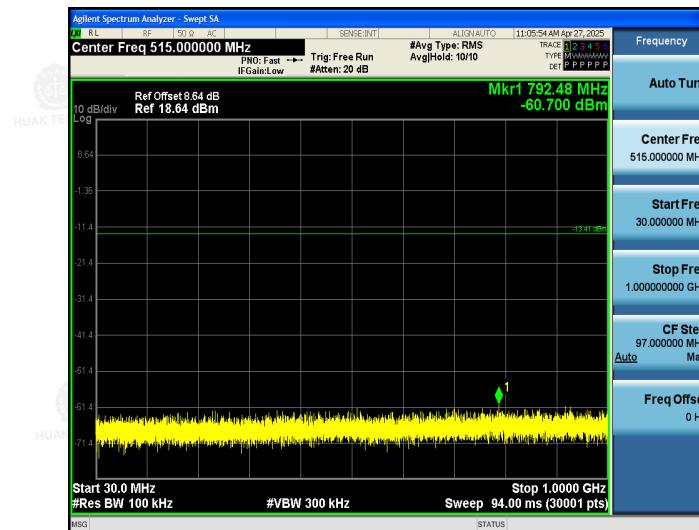
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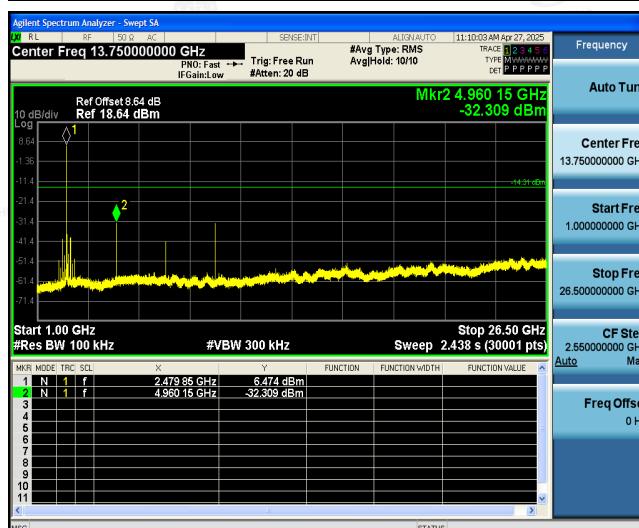
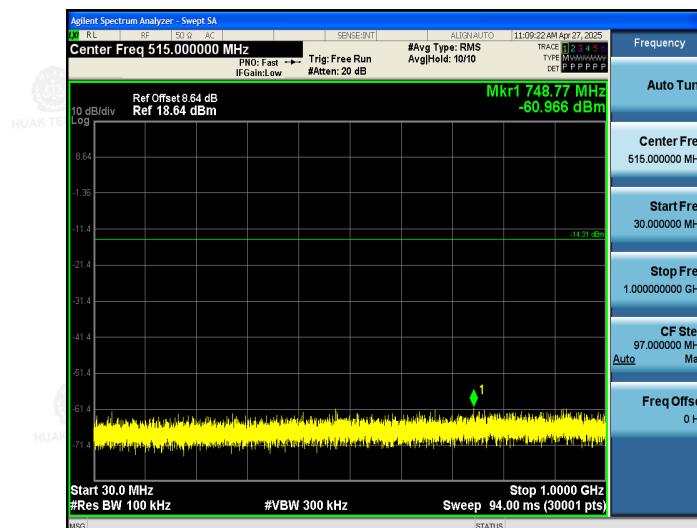


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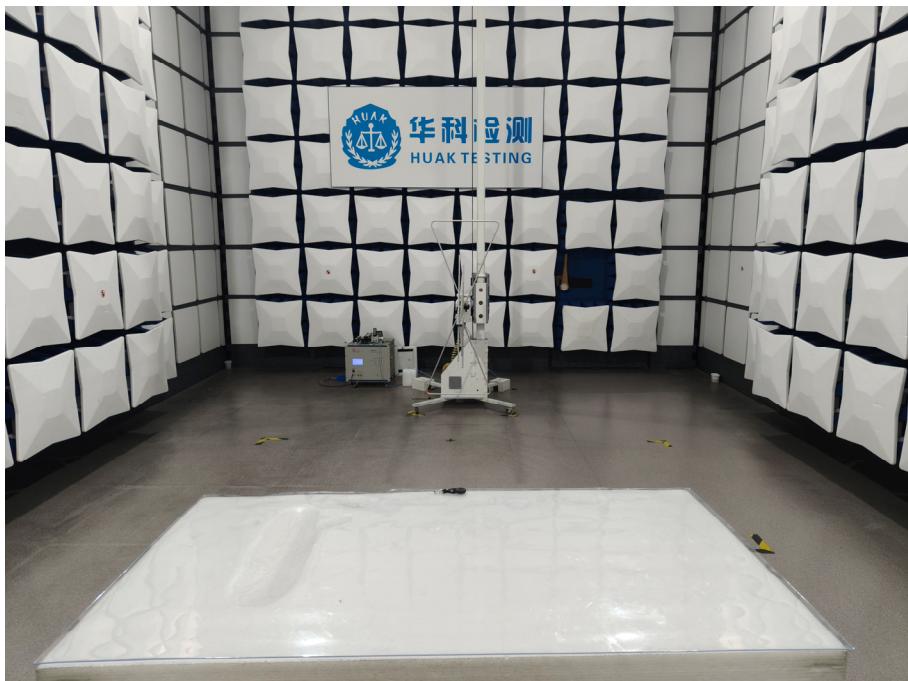
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## 5 Test Setup Photos

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### Radiated Emission



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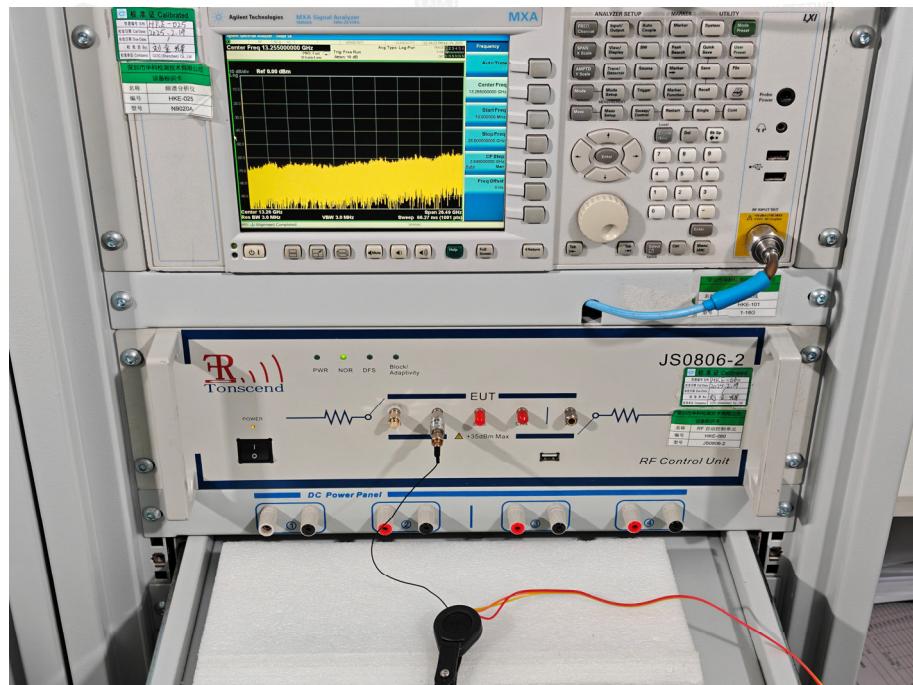
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### RF Conducted Emission



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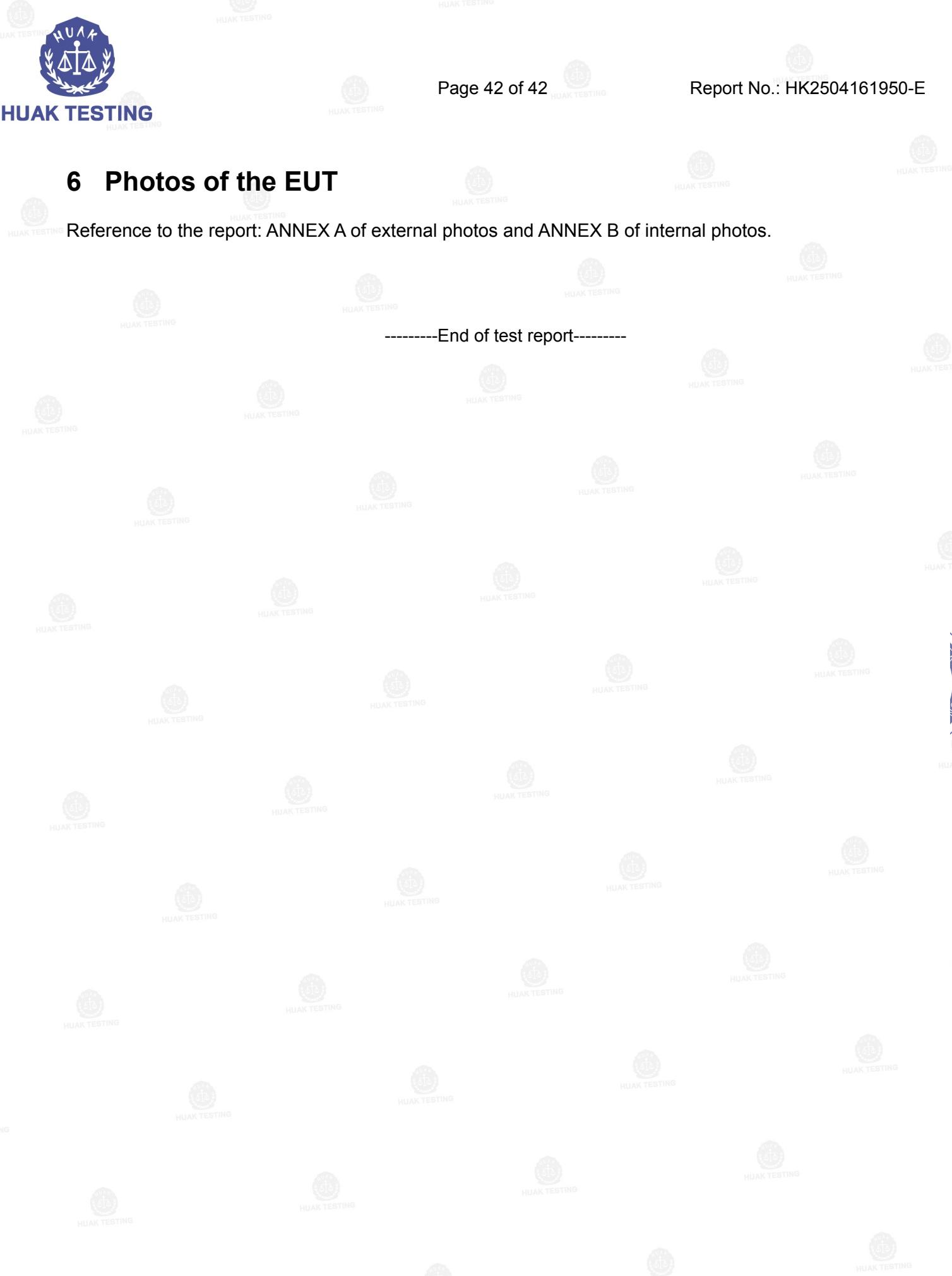
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## 6 Photos of the EUT

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

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



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