

Page 1 of 43

Report No.: HK2406042927-2E

# **FCC Test Report**

Test Report On Behalf of AC Infinity Inc. For CONTROLLER 75 PRO Model No.: CTR75P

FCC ID: 2AXMF-CTR75P

Prepared For:

AC Infinity Inc.

21880 Baker Parkway, City of Industry, CA 91789 USA

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. 04, 2024 ~ Jun. 12, 2024

 Date of Report:
 Jun. 12, 2024

 Report Number:
 HK2406042927-2E

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# **Test Result Certification**

Applicant's Name	: AC Infinity Inc.		
Address	.: 21880 Baker Parkway, City of I	ndustry, CA 91789	USA
Manufacturer's Name	.: AC Infinity Inc.		
Address	.: 21880 Baker Parkway, City of	ndustry, CA 91789	USA
Product Description			
Trade Mark	: AC INFINITY		
Product Name	: CONTROLLER 75 PRO		
Model and/or Type Reference.	: CTR75P		
	47 CFR FCC Part 15 Subpart	C 15.247	
Standards	.: KDB 558074 D01 15.247 Mea	s Guidance v05r02	2
	ANSI C63.10: 2013		

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Date of Test	
Date (s) of Performance of Tests	Jun. 04, 2024 ~ Jun. 12, 2024
Date of Issue	Jun. 12, 2024
Test Result	Pass

Testing Engineer

Len lias

Len Liao

Technical Manager

Mari VOV

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. 12, 2024	Jason Zhou
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# 1 Test Summary

# 1.1 Test Description

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

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# **1.2 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	Uncertainty
1	Conducted Emission Test	±2.71dB
2	All emissions, radiated(<1G)	±3.90dB
3	All emissions, radiated(>1G)	±4.28dB
	No. 1 2 3	1Conducted Emission Test2All emissions, radiated(<1G)

# 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 General Information

# 2.1 General Description of EUT

EUT Name:	CONTROLLER 75 PRO	- HUAKTES!
Model No:	CTR75P	0. 0.
Series Model:	N/A	TESTING
Model Difference:	N/A	HUAN WIESTING
Trade Mark:	AC INFINITY	O HUM
Operation Frequency:	2402 MHz to 2480 MHz	overesting
Channel Separation:	2MHz	HON
Number of Channel:	40 1000 1000	HUAK TES
Modulation Technology:	GFSK	
Hardware Version:	V2.0	
Software Version:	V2.0	TESTING
Antenna Type:	PCB Antenna	C HUM
Antenna Gain:	3.18dBi	anG
Power Supply:	100-240V AC, 50/60Hz	WAKTES IN
Hardware Version:	1.02	O'
Software Version:	1.02	TING
Note:	UAKTE	HUAKTE

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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GIG	Description of Channel						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
0	2402	14	2430	28	2458		
-stn1	2404	15	2432	29	2460		
2	2406	16	2434	30	2462		
3	2408	17	2436	31	2464		
4	2410	18	2438	32	2466		
5	2412	19	2440	33	2468		
6	2414	20	2442	34	2470		
7	2416	21	2444	35	2472		
8	2418	22	2446	36	2474		
9	2420	23	2448	37	2476		
10	2422	24	2450	38	2478		
TEST 11	2424	25	2452	39	2480		
12	2426	26	2454		C HOM		
13	2428	27	2456				

The EUT has been operated in modulations: GFSK independently.

	No.		Test Mode Description					
	estil <sup>G</sup>	. A	ESTING O	TESTING	Low channel TX	TESTING	KTESTING O	
O HUAN	2	O HOM		O HUAN	Middle channel TX	D HUAN	D HOLE	
	3				High channel TX			
Note:	.6			-6	6	.6	.0	

1. All the test modes can be supply by Built-in Li-ion battery, only the result of the worst case was recorded in the report if no any records.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

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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

AK TESTING	lode	K TESTIN	Duty C	ycle	n <sup>G</sup>	Duty (	Cycle F (dB)	actor
В	T-LE	ING	0.87	6			-0.575	
NG	HUAK	1		TESTING		A HI	JAK	
LXI RL	Ref Offset 8.94 dB	IZ NO: Fast ↔→ Gain:Low	SB262.007 Trig Delay-2.000 ms Trig: Video #Atten: 20 dB	ALIGNAUTO #Avg Type: RMS	Mkr3 2.50	00 ms 01 dB	Frequency Auto Tune Center Freq 44000000 GHz	
-11.1 -21.4 -31.1 -41.1 -51.4		anyeliwe			201 dur	2	Start Freq 44000000 GHz	
-61.1 -71.1 Cen	ter 2.440000000 GHz				Spa	an 0 Hz	Stop Freq 440000000 GHz CF Step	
MICR 1 1 2 3 4 5	Δ1 1 t (Δ) 2.1	#VBW : 20 ms 90 ms (Δ) 00 ms (Δ)	8.0 MHz 7.13 dBm -37.03 dB -0.01 dB		5.000 ms (10 FUNCTION V	Aut	8.000000 MHz o Man Freq Offset 0 Hz	
6 7 8 9 10 11								

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# 2.3 Description of Test Setup

Operation of EUT during Conducted and below 1GHz Radiation testing:

AC Main	EUT	ESTING	LED	G
- WAKTES I				

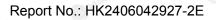
Operation of EUT during above 1GHz Radiation testing:

AC Main	G	EUT	
	K TESTIN		

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.

					100
Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
1	CONTROLLER 75 PRO	AC INFINITY	CTR75P	N/A	EUT
2	LED	N/A	N/A	N/A	Accessory
		UAK TESTING		HAKTESTING	
16	ING AK TESTING	9	ESTING AK TESTING	C resting	K TESTING
HUAR I	O HONO	O HUAN	O HOLE	O HUM	HOW

### 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 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	Feb. 20, 2024	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-059	Feb. 20, 2024	1 Year
3.	EMI Test Receiver	R&S	ESR	HKE-010	Feb. 20, 2024	1 Year
4.	Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	1 Year
5.	Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 20, 2024	1 Year
6.	Preamplifier	EMCI	EMC051845S	HKE-048	Feb. 20, 2024	1 Year
7.	Preamplifier	Schwarzbeck	BBV 9743	HKE-054	Feb. 20, 2024	1 Year
8.	Preamplifier	A.H. Systems	SAS-574	HKE-006	Feb. 20, 2024	1 Year
9.	6dB Attenuator	Pasternack	6db	HKE-012	Feb. 20, 2024	1 Year
10.	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-014	Feb. 20, 2024	1 Year
11.	Broadband Antenna	Schwarzbeck	VULB9168	HKE-013	Feb. 21, 2024	2 Year
12.	Loop Antenna	COM-POWER	AL-130R	HKE-015	Feb. 21, 2024	2 Year
13.	Horn Antenna	Schwarzbeck	9120D	HKE-016	Feb. 21, 2024	2 Year
14.	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-055	Feb. 20, 2024	1 Year
15.	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-081	/	1
16.	RF Automatic control unit	Tonscend	JS0806-2	HKE-060	HUAK TESTING	TESTING C
17.	High pass filter unit	Tonscend	JS0806-F	HKE-083	Feb. 20, 2024	1 Year
18.	Wireless Communication Test Set	R&S	CMU200	HKE-060	Feb. 20, 2024	1 Year
19.	Wireless Communication Test Set	R&S	CMW500	HKE-113	Feb. 20, 2024	1 Year
20.	High-low temperature chamber	Guangke	HT-80L	HKE-114	Jun. 13, 2024	1 Year
21.	Temperature and humidity meter	Boyang	HTC-1	HKE-115	Jun. 13, 2024	1 Year
22.	RF Test Software	Tonscend	JS1120-3 Version 3.3.23	HKE-048	1	1
23	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 20, 2024	1 Year
24	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	1	/

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# 4 Test Result

# 4.1 Antenna Requirement

### 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 3.18dBi.

### 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:

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

\* 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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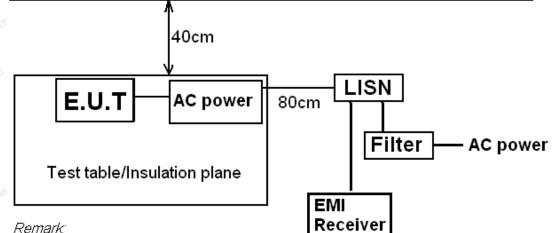


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IE.

### 4.2.3 Test Setup

**Reference Plane** 



Remark: E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m

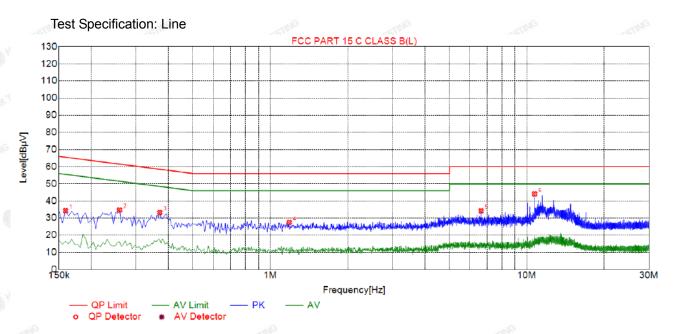
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### 4.2.4 Test Results

All modes have been tested, only the worst result was reported as below:

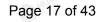


Sus	spected	l List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
1	0.1590	34.28	19.57	65.52	31.24	14.71	PK	L
2	0.2580	34.71	19.57	61.50	26.79	15.14	PK	L
3	0.3705	33.27	19.69	58.49	25.22	13.58	PK	L
4	1.1850	27.45	19.90	56.00	28.55	7.55	PK	L
5	6.6390	34.14	20.07	60.00	25.86	14.07	PK	L
6	10.7340	44.11	19.93	60.00	15.89	24.18	PK	L

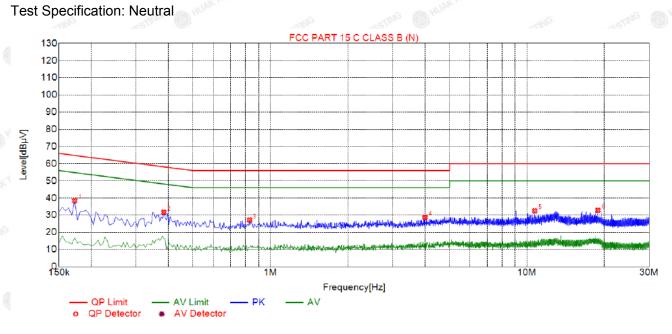
Remark: Margin = Limit – Level Correction factor = Cable lose + LISN insertion loss Level=Test receiver reading + correction factor

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Y	Sus	spected	List						
Z	NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
3	1	0.1725	38.41	19.68	64.84	26.43	18.73	PK	N
	2	0.3840	31.71	19.67	58.19	26.48	12.04	PK	N
	3	0.8295	27.20	19.83	56.00	28.80	7.37	PK	N
8	4	4.0065	28.71	20.12	56.00	27.29	8.59	PK	N
	5	10.7340	32.50	19.97	60.00	27.50	12.53	PK	N
Ŷ	6	18.9330	32.83	20.00	60.00	27.17	12.83	РК	N

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

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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).

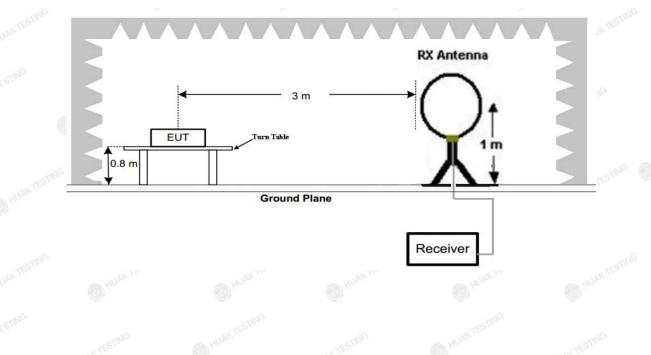
Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

		Rac	liated emission limits	
Q.	Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
	0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
	0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
14	1.705-30	3	20log(30)+ 40log(30/3)	30
	30-88	3	40.0	100
15	88-216	3 restruc	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:

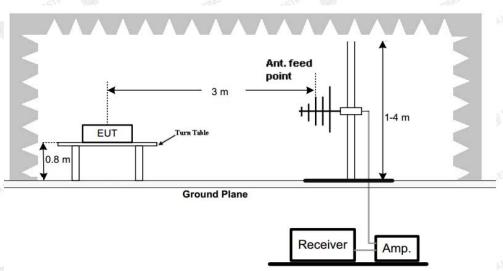


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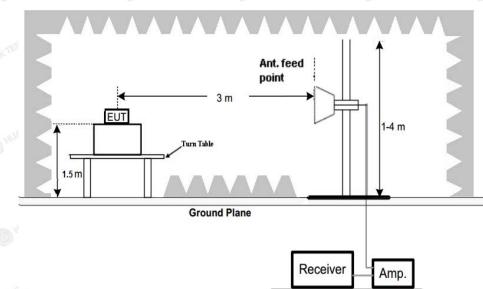
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2) 30 MHz to 1 GHz emissions:



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° to 360° 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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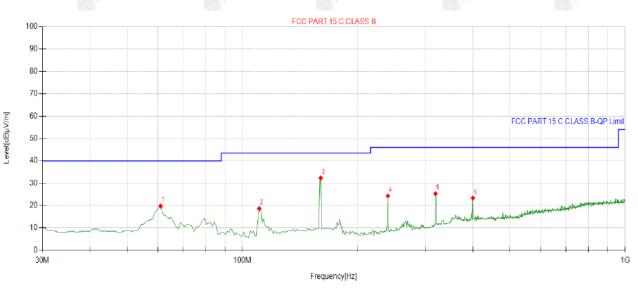


### 4.3.3 Test Result

#### Below 1GHz Test Results:

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

#### Antenna polarity: H



QP Limit     QP Detector	Horizontal PK			

	ouspe	cicu Eist								
4000	NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
	1	61.071071	-18.39	38.20	19.81	40.00	20.19	100	171	Horizontal
	2	110.59059	-20.42	39.09	18.67	43.50	24.83	100	263	Horizontal
ġ	3	160.11011	-17.16	49.51	32.35	43.50	11.15	100	207	Horizontal
	4	239.72973	-19.54	43.84	24.30	46.00	21.70	100	71	Horizontal
<	5	319.34934	-17.06	42.43	25.37	46.00	20.63	100	121	Horizontal
	6	399.93994	-15.07	38.44	23.37	46.00	22.63	100	164	Horizontal

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

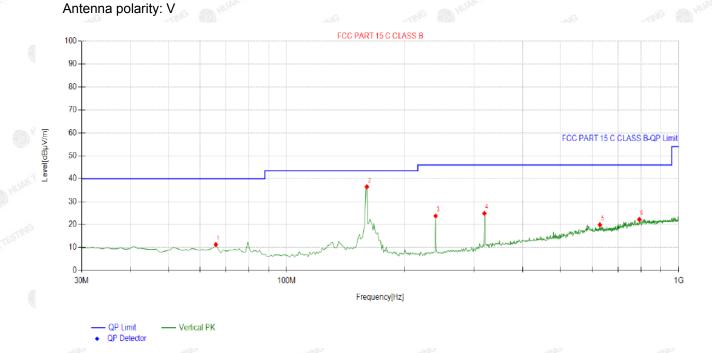
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4	Suspe	cted List								
Y.	NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
5	1	65.925926	-19.02	30.34	11.32	40.00	28.68	100	9	Vertical
	2	160.11011	-17.16	53.63	36.47	43.50	7.03	100	117	Vertical
	3	239.72973	-19.54	43.30	23.76	46.00	22.24	100	275	Vertical
	4	319.34934	-17.06	41.96	24.90	46.00	21.10	100	32	Vertical
1	5	629.08908	-10.52	30.43	19.91	46.00	26.09	100	262	Vertical
	6	793.18318	-7.82	30.04	22.22	46.00	23.78	100	320	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 (dBµV/m)	Limit@3m (dBµV/m)
لامل	HUAK TEL	WARTESIN	HUARTESIN - HUARTES
		)	, <u> </u>
			- 3m-

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)

#### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
4804	52.67	-3.65	49.02	74.00	-24.98	peak	
4804	43.35	-3.65	39.70	54.00	-14.30	AVG	
7206	52.38	-0.95	51.43	74.00	-22.57	peak	
7206	38.40	-0.95	37.45	54.00	-16.55	AVG	

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	🐠 (dB)	Туре
4804	52.33	-3.65	48.68	74.00	-25.32	peak
4804	41.65	-3.65	38.00	54.00	-16.00	AVG
7206	49.49	-0.95	48.54	74.00	-25.46	peak
7206	39.93	-0.95	38.98	54.00	-15.02	AVG

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CH Middle (2440MHz)

ш	arizontal	
п	lorizonta	•

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4880.00	51.26	-3.54	47.72	74.00	-26.28	peak
4880.00	42.89	-3.54	39.35	54.00	-14.65	AVG
7320.00	49.49	-0.81	48.68	74.00	-25.32	peak
7320.00	38.22	-0.81	37.41	54.00	-16.59	AVG

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4880.00	50.94	-3.54	47.40	74.00	-26.60	peak
4880.00	42.75	-3.54	39.21	54.00	-14.79	AVG
7320.00	51.38	-0.81	50.57	74.00	-23.43	peak
7320.00	38.92	-0.81	38.11	54.00	-15.89	AVG

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CH High (2480MHz)

#### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4960	53.22	-3.43	49.79	74.00	-24.21	peak
4960	42.10	-3.43	38.67	54.00	-15.33	AVG
7440	51.63	-0.77	50.86	74.00	-23.14	peak
7440	38.60	-0.77	37.83	54.00	-16.17	AVG

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4960	51.76	-3.43	48.33	74.00	-25.67	peak
4960	41.78	-3.43	38.35	54.00	-15.65	AVG
7440	51.30	-0.77	50.53	74.00	-23.47	peak
7440	38.40	-0.77	37.63	54.00	-16.37	AVG

#### Remark:

(1) Measuring frequencies from 1 GHz to the 25 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. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(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.</p>
(7) All modes of operation were investigated and the worst-case emissions are reported.

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Radiated Band Edge Test:

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case):

Detector	Margin	Limits	Emission Level	Factor	Reading Result	Frequency
🖤 Туре	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(dBµV)	(MHz)
peak	-24.79	74	49.21	-5.81	55.02	2310.00
AVG	1 🔍 🖓	54	O HOY	-5.81	/	2310.00
peak	-25.68	74	48.32	-5.84	54.16	2390.00
AVG	HUNK TETT	54	HUAKTES	-5.84	HUAK TEST	2390.00
peak	-23.46	74	50.54	-5.84	56.38	2400.00
AVG	1	54	1	-5.84	1	2400.00
rgiı	1 Ölen	54	/ ss – Pre-amplifier; I	-5.84	l Dire	2400.00

Vertical:

vertical.						
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310.00	54.12	-5.81	48.31	74	-25.69	peak
2310.00	/	-5.81	/	54	1	AVG
2390.00	55.38	-5.84	49.54	74	-24.46	peak
2390.00	HUAKTEST	-5.84	/ HUAK TES	54	TESIM /	AVG
2400.00	56.92	-5.84	51.08	74	-22.92	peak
2400.00	-TING /	-5.84	/	54	·· /	AVG

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Operation Mode: TX CH High (2480MHz)

Horizontal (Worst case): Meter Frequency **Emission Level** Factor Limits Margin Detector Reading Туре (dBµV/m) (MHz) (dBµV) (dB) (dBµV/m) (dB) 55.02 49.21 74 -24.79 2483.50 -5.81 peak 2483.50 -5.81 54 / AVG 61 1 2500.00 54.16 -6.06 48.1 74 -25.9 peak 2500.00 1 -6.06 1 54 1 AVG Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier; Level = Reading + Factor; Margin = Level-\_imit.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	🔘 Туре
2483.50	53.16	-5.81	47.35	74	-26.65	peak
2483.50	1	-5.81	C HYNE .	54	1	AVG
2500.00	54.11	-6.06	48.05	74	-25.95	peak
2500.00	TESTYIC O	-6.06	STING / TEST	54	Anse	AVG

Remark: All the other emissions not reported were too low to read and deemed to comply with ISED 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 Output Power Measurement

# 4.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

# 4.4.2 Test Procedure

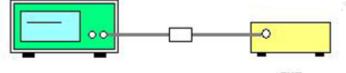
The maximum peak conducted output power may be measured using a broadband peak RF automatic control unit. The RF automatic control unit shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

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



RF automatic control unit

EUT

# 4.4.5 Test Results

Channel	Channel Frequency (Mhz)	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Low	2402	-1.15	C HUAK IL	Pass
Middle	2440	-0.12	30.00	Pass
High	2480	0.46	TESTING	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.





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# 4.5.5 Test Results

	ASIA HIL	10533	100	10501				
Channel	Channel frequency (MHz)	Result (dBm/10kHz)	10log (3/10)	Test Result (dBm/3kHz)				
Low	2402	-11.62	-5.23	-16.85				
Middle	2440	-10.42	-5.23	-15.65 🤍				
High	2480	-9.70	-5.23	-14.93				
Limit : 8dBm/3	Limit : 8dBm/3KHz							
Test Result (dB	3m/3kHz)= Resu	lt (dBm/10kHz)+	10log (3/10)					
Test Result	TESTING	PA	SS	0				

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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

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		SPECTRUM
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ß	STING	STING

### 4.6.5 Test Result

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	2402	0.676	NUAKTESSIN	Pass
Middle	2440	0.676	≥500	Pass
High	2480	0.632	O HUM	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



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# 4.7.4 Test Result

N/A

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# 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 ≥ 1% of the span, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.

### 4.8.3 Deviation from Standard

No deviation.

### 4.8.4 Test Setup



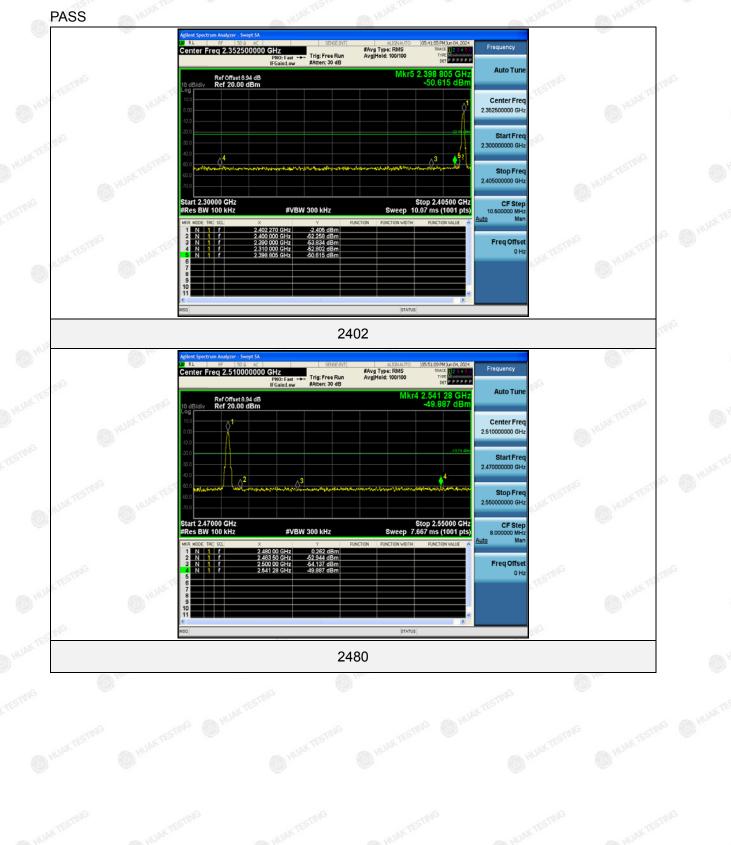
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# 4.8.5 Test Results



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# 4.9 Conducted Spurious Emissions

### 4.9.1 Applied Procedures / Limit

**HUAK TESTING** 

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 For9KHz-150kHz,RBW 1KHz, The Limit= the highest emission level-20-10log(100/1)= the highest emission level-40.

### 4.9.2 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 ≥ 1% of the span, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.

### 4.9.3 Deviation from Standard

No deviation.

### 4.9.4 Test Setup

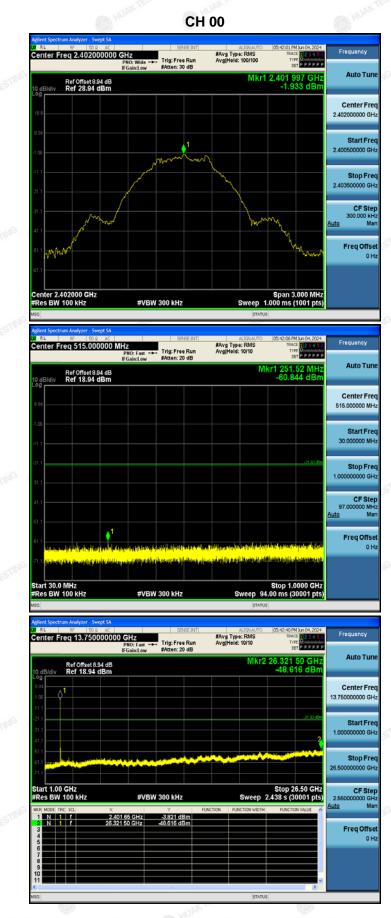


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### Report No.: HK2406042927-2E

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### CH 19



Agilent Spectrum Analyzer - Swept SA				
Center Freq 515.000000 N		#Avg Type: F	110 TYPE MAN	Frequency
	IFGain:Low #Atten: 20		DET P P	Auto Tuno
Ref Offset 8.94 dB 10 dB/div Ref 18.94 dBm			Mkr1 168.03 M -59.271 d	Bm
				Center Freq
8.94				515.000000 MHz
-1.06				Start Freq
-11.1				30.000000 MHz
-21.1				Stop Freq
31.1				1.000000000 GHz
				CF Step
.41.1				97.000000 MHz Auto Man
-51.1				
61.1	والمرور والمراجع المراجع والمراجع والمراجع	al the accurate law the little da	a neglect new galantic by the ball	Freq Offset 0 Hz
-71.1 marthly-theory and the	and the second		. Learning data mining indicated on the	(diata)
Start 30.0 MHz #Res BW 100 kHz	#VBW 300 kHz	Swe	Stop 1.0000 eep 94.00 ms (30001	GHz pts)

	RF 50 Q req 13.7500	000000 GHz	ast Trig: Fr		ALIGNAUTO #Avg Type: RMS Avg Hold: 10/10	05:44:34 PM Jun 04, 2024 TRACE 2 3 4 5 TYPE M	Frequency
dB/div	Ref Offset 8: Ref 18.94	94 dB	Low Protein.	20 00	Mki	2 5.238 95 GHz -43.817 dBm	Auto Tur
94 06	) <sup>1</sup>						Center Fre 13.750000000 Gi
	2					-17.90 dBr	Start Fre 1.000000000 Gi
					<b></b>		Stop Fro 26.50000000 Gi
art 1.00 tes BW	100 kHz	×	#VBW 300 kH	Z.	· · · ·	Stop 26.50 GHz 2.438 s (30001 pts	CF Ste 2.550000000 Gi Auto M
N 1	1	2,439,90 GH 5,238,95 GH	iz 1.599 (	dBm			Freq Offs
			_				

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### Report No.: HK2406042927-2E

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### CH 39



Agilent S	pectrum Analyzer - Swept SA RF 50.9 AC		CTN.	SE:INT		ALIGNAUTO	05-46-21 58	Dun 04, 2024	
	er Freq 515.00000			Run	#Avg Type Avg Hold:	RMS	TRAC		Frequency
10 dB/d	Ref Offset 8.94 dB div Ref 18.94 dBm					M	(r1 144. -60.20	04 MHz 01 dBm	Auto Tune
8.94									Center Free 515.000000 MHz
-1.06								-17.27.684	Start Free 30.000000 MHz
-21.1 -									Stop Free 1.000000000 GH2
-41.1									CF Step 97.000000 MH2 <u>Auto</u> Mar
-51.1	ุ่₁ เมษะเหล่ม‼องปัตถุ	s),dajijda <sup>j</sup> uosilaris(tu.	<u>a e filosofic</u>	and and	anth Acre	abrij) doze	An she brow	n jaukutututut	Freq Offset 0 Hz
-71.1 <mark>41</mark>		alarisi artari Gili	<mark>, with the second se</mark>	<mark>ie led in</mark> t	nakasaji Nakasaji	i <sub>ti t</sub> ing di di ka			
	30.0 MHz BW 100 kHz	#VBW	300 kHz		S	weep 94	Stop 1.0 .00 ms (3	000 GHz 0001 pts)	

ter Fr	eq 13.750	AC 0000000 GHz PNO: Fast IFGain:Low		#Avg	ALIGNAUTO Type: RMS Hold: 10/10	TYPE	04,2024 23456 PPPPP	Frequency
Bídiv	Ref Offset 8. Ref 18.94	94 dB	shiteli. 20 db		Mkr2	25.978 10 -48.162	dBm	Auto Tur
	1						-13.23.6 <b>5</b> m	Center Fr 13.750000000 G
							2	Start Fr 1.000000000 G
_	uilen airden	*****	w				****	<b>Stop Fr</b> 26.500000000 G
	100 kHz		BW 300 kHz			Stop 26. 438 s (300	01 pts)	CF Sto 2.550000000 G
MODE TRO	r r	× 2.479 85 GHz 25.978 10 GHz	5.789 dBm -48.162 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	ALUE	Freq Offs
								0

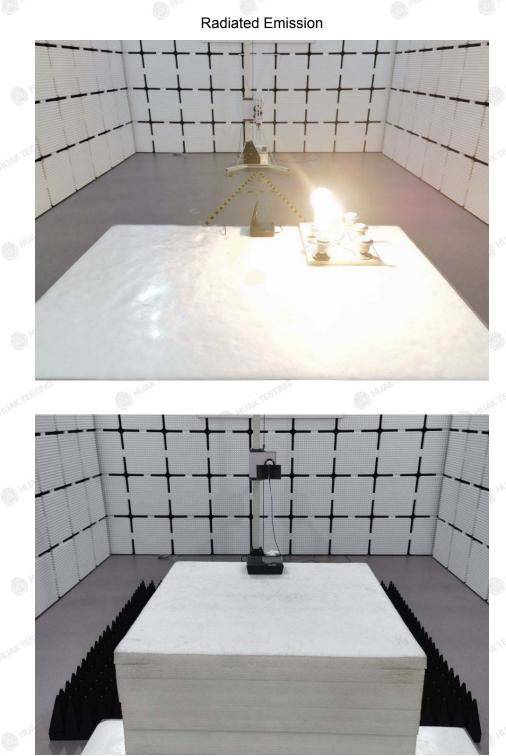
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# 5 Test Setup Photos



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**Conducted Emission** 



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# 6 Photos of the EUT

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

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

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