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Report No.: HK2108203035-E

TEST REPORT

FCC PART 15 SUBPART C 15.247

Test report On Behalf of NEWBELL INTERNATIONAL ELECTRONIC CO.,LTD For

> Bluetooth Remote Model No.: MI-VLG14-101, AB Shutter 3

> > FCC ID: 2ALZ3-MIVLG14101

Prepared For: NEWBELL INTERNATIONAL ELECTRONIC CO., LTD

Rm 701, BLDG3, NO.19, Du Shi Zhi Gu, FengGang, Dong Guan, China

Prepared By :

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

Date of Test:Aug. 20, 2021 ~Sept. 10, 2021Date of Report:Sept. 10, 2021Report Number:HK2108203035-E

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TEST RESULT CERTIFICATION

Applicant's name:	: NEWBELL INTERNATIONAL ELECTRONIC CO., LTD				
Address:	Rm 701, BLDG3, NO.19, Du Shi Zhi Gu, FengGang, Dong Guan, China				
Manufacture's Name	NEWBELL INTERNATIONAL ELECTRONIC CO., LTD				
Address	Rm 701, BLDG3, NO.19, Du Shi Zhi Gu, FengGang, Dong Guan, China				

Product description

Trade Mark:	Merkury
Product name:	Bluetooth Remote
Model and/or type reference:	MI-VLG14-101, AB Shutter 3

Standards...... 47 CFR FCC Part 15 Subpart C 15.247

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Date (s) of performance of tests:	Aug. 20, 2021 ~Sept. 10, 2021
Date of Issue	Sept. 10, 2021
Test Result	Pass

Prepared by:

Date of Test

Jan

Project Engineer

Reviewed by:

Zden

Project Supervisor

Approved by:

son thou

Technical Director

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** Modified History **

Revision	Description	Issued Data	Remark	
Revision 1.0	Initial Test Report Release	Sept. 10, 2021	Jason Zhou	
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1 TEST SUMMARY

1.1 TEST DESCRIPTION

TES'	TEST TEST	TEST
Test Item	Test Requirement	Result
Antenna Requirement	§15.203/§15.247(b)(4)	PASS
Conducted Emission	FCC Part 15.207	N/A
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

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
HUDKTED	Conducted Emission Test	±2.71dB
2	All emissions, radiated(<1G)	±3.90dB
3	All emissions, radiated(>1G)	±4.28dB

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2 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.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT Name:	Bluetooth Remote	- IG	
Model No.:	MI-VLG14-101	MAKTESTIN	THE
Serial No.:	AB Shutter 3	0	HUAKTES
Model Difference:	All model's the function, softw same, only with a product color different. Test sample model:	or, appearance and m	
Brand Name:	Merkury	HUAKT	C HUAN
Operation frequency:	2402 MHz to 2480 MHz	9	
Channel separation:	2MHz		
NUMBER OF CHANNEL:	40	NG	p
Modulation Technology:	GFSK	O HUM	O HUM
Hardware Version:	V1.8	MNG	
Software Version:	V1.8	HUAKTES	STING
Antenna Type:	PCB Antenna		HUAKTE
Antenna Gain:	0dBi	STING	w.
Power Supply:	DC 3V from battery	HUAK	.0
Note:	WAK TESTING	.ok TE	STING - WAKTE
1 For a more detailed feature	es description please refer to the	manufacturer's spec	ifications or

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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LAK TESTING	AKTESI	Description of	f Channel:	14X TESTI	- HUAKTEST."
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
UAX TED 1	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	o 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
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456	- HUM	

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3.2 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) The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

3.3 DESCRIPTION OF TEST SETUP

EUT

Operation of EUT during 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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4 EQUIPMENTS LIST FOR ALL TEST ITEMS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
K TELING	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 10, 2020	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-059	Dec. 10, 2020	1 Year
3.	Receiver	R&S	ESCI 7	HKE-010	Dec. 10, 2020	∍1 Year
4.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	1 Year
5.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 10, 2020	1 Year
6.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	1 Year
7.	High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 10, 2020	1 Year
8.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 10, 2020	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 10, 2020	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 10, 2020	1 Year
11.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 10, 2020	≥1 Year
12.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 10, 2020	1 Year
13.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 10, 2020	1 Year
14.	High pass filter unit	Tonscend	JS0806-F	HKE-055	Dec. 10, 2020	1 Year
15.	Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A
16.	Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A	N/A
17.	RF test software	Tonscend	JS1120-B Version 2.6	HKE-083	N/A	N/A
18.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	3 Year
19.	RF test software	Tonscend	JS1120-4	HKE-113	N/A	N/A
20.	RF test software	Tonscend	JS1120-3	HKE-114	N/A	N/A
21.	RF test software	Tonscend	JS1120-1	HKE-115	N/A	N/A
22.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	1 Year
23.	Signal generator	Agilent	N5182A	HKE-029	Dec. 10, 2020	1 Year
24.	Signal Generator	Agilent	83630A	HKE-028	Dec. 10, 2020	1 Year
25.	Power meter	Agilent	E4419B	HKE-085	³ Dec. 10, 2020	1 Year
26.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 10, 2020	[°] 1 Year

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27	RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	Dec. 10, 2020	1 Year
28	. RF Cable(above 1GHz)	Times	1-40G	HKE-034	Dec. 10, 2020	1 Year
29	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	Dec. 10, 2020	1 Year
30	. Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 17, 2020	3 Year

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5 TEST RESULT

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5.1 ANTENNA REQUIREMENT

5.1.1 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.

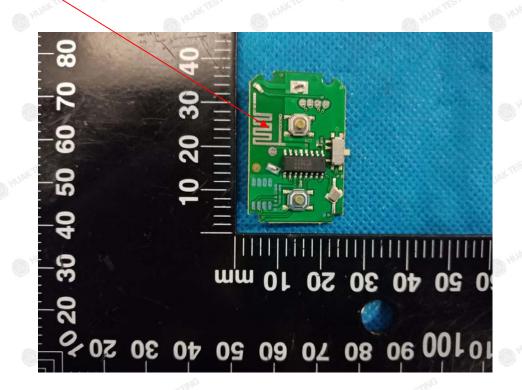
Refer to statement below for compliance.

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

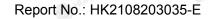
The antenna used in this product is a PCB Antenna, which permanently attached. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.

5.1.2 EUT Antenna



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HUAK TESTING Page 14 of 41 5.2 CONDUCTION EMISSIONS MEASUREMENT

5.2.1 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:

HULAR TESTING	MARTESTING Limi	t (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

* Decreases with the logarithm of the frequency.

5.2.2 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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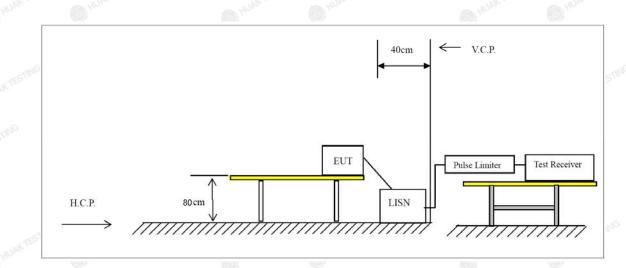
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5.2.3 Test setup



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5.2.4 Test results

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

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5.3 RADIATED EMISSIONS MEASUREMENT

5.3.1 Applied procedures / Limit

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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).

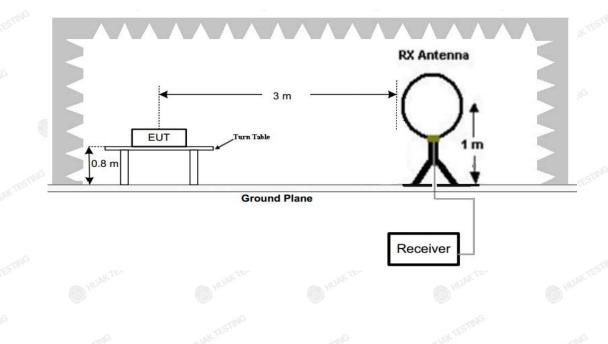
Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

		Rad	diated emission	limits	
Frequen	Frequency (MHz) Distance (Meters)		Rad	diated (dBµV/m)	Radiated (µV/
0.009	-0.49	3	20log(2400	20log(2400/F(KHz))+40log(300/3)	
0.49-	1.705	3	20log(2400	00/F(KHz))+ 40log(30/3)	24000/F(KHz
1.70	5-30	3	20100	g(30)+ 40log(30/3)	30
30-	-88	3	0	40.0	100
88-	216	3 51116		43.5	150
216-	-960	3	TESTING	46.0	200
Abov	e 960	3	HUAN	54.0	500
10.0077			NM#7		NS-177

5.3.2 Test setup

Test Configuration:

1) 9 kHz to 30 MHz emissions:

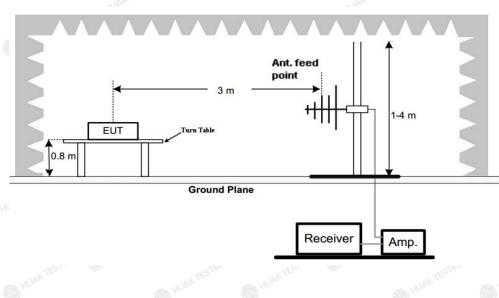


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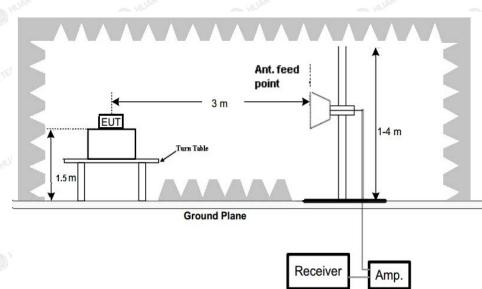
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3) 1 GHz to 25 GHz emissions:



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°C to 360°C 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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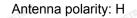


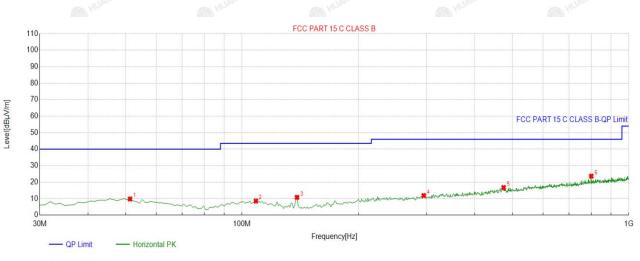
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5.3.3 Test Result

Below 1GHz Test Results:





QP Detector

\leq	Suspe	cted List								
		Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Delevity
	NO.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity
3	1	51.3614	-13.86	23.65	9.79	40.00	30.21	100	161	Horizontal
	2	108.6486	-15.43	23.98	8.55	43.50	34.95	100	336	Horizontal
	3	138.7487	-19.10	29.88	10.78	43.50	32.72	100	220	Horizontal
	4	295.0751	-12.79	24.64	11.85	46.00	34.15	100	217	Horizontal
	5	474.7047	-8.39	25.08	16.69	46.00	29.31	100	50	Horizontal
	6	799.9800	-3.12	26.75	23.63	46.00	22.37	100	122	Horizontal

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

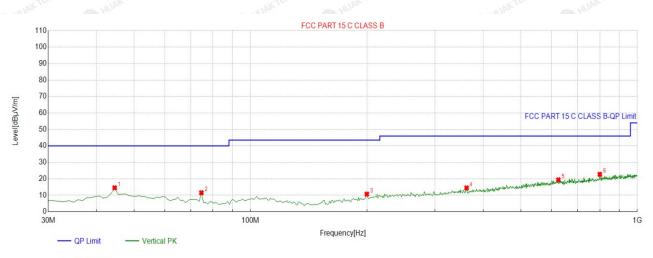
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АР ПР

Antenna polarity: V



QP Detector

Suspe	cted List								
	Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Delevity
NO.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity
1	44.5646	-13.73	28.24	14.51	40.00	25.49	100	143	Vertical
2	74.6647	-18.51	30.02	11.51	40.00	28.49	100	226	Vertical
3	199.9199	-15.07	25.77	10.70	43.50	32.80	100	270	Vertical
4	362.0721	-11.27	25.72	14.45	46.00	31.55	100	80	Vertical
5	625.2052	-5.50	24.86	19.36	46.00	26.64	100	345	Vertical
6	799.9800	-3.12	25.85	22.73	46.00	23.27	100	230	Vertical
Co			a Tha			all a	17 C		

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

Harmonics and Spurious Emissions

Frequency Range (9kHz-30MHz)

Frequency (MHz))	Level@3m (dBµV/m)	Lim	nit@3m (dBµV/m)
	- VG		-JG	
all	NAK ESTIN		NAK TESTIN.	
- WAKTESI	0	- WANTES		- WAKTES
	- NG	•	aNG	(D)

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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PB PB

For 1GHz to 25GHz

CH Low (2402MHz)

Horizontal:

-	HUAN	HUAN	THUR HURN	M. an	Ibu	HUAN
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804	56.24	-3.65	52.59	74.00	-21.41	peak
4804	44.19	-3.65	40.54	54.00	-13.46	AVG
7206	52.57	-0.95	51.62	74.00	-22.38	peak
7206	41.75	-0.95	40.80	54.00	-13.20	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Datasta
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804	56.79	-3.65	53.14	74.00	-20.86	peak
4804	42.63	-3.65	38.98	54.00	-15.02	AVG
7206	52.44	-0.95	51.49	74.00	-22.51	peak
7206	40.85	-0.95	39.90	54.00	-14.10	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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CH Middle (2440MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4880.00	55.86	-3.54	52.32	74.00	-21.68	peak
4880.00	41.21	-3.54	37.67	54.00	-16.33	AVG
7320.00	50.74	-0.81	49.93	74.00	-24.07	peak
7320.00	40.63	-0.81	39.82	54.00	-14.18	AVG
emark: Facto	r = Antenna Fa	ictor + Cable L	.oss – Pre-amplifier.			

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4880.00	56.46	-3.54	52.92	74.00	-21.08	peak
4880.00	43.27	-3.54	39.73	54.00	-14.27	AVG
7320.00	52.88	-0.81	52.07	74.00	-21.93	peak
7320.00	40.79	-0.81	39.98	54.00	-14.02	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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CH High (2480MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960	56.31	-3.43	52.88	74.00	-21.12	peak
4960		-3.44	39.27	54.00	-14.73	AVG
7440	51.96	-0.77	51.19	74.00	-22.81	peak
7440	40.79	-0.77	40.02	54.00	-13.98	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	🔎 Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960	55.23	-3.43	51.80	74.00	-22.20	peak
4960	42.12	-3.44	38.68	54.00	-15.32	AVG
7440	50.11	-0.77	49.34	74.00	-24.66	peak
7440	41.87	-0.77	41.10	54.00	-12.90	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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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FICATION

Radiated Band Edge Test:

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case):

Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
58.76	-5.81	52.95	74	-21.05	peak
/	-5.81	O H	54	1 🔍	AVG
57.52	-5.84	51.68	74	-22.32	peak
HUAK TES!	-5.84	HUAKTES	54	HUAKTESTIN	AVG
56.39	-5.84	50.55	74	-23.45	peak
/	-5.84	/	54	1	AVG
	Result (dBµV) 58.76 / 57.52 /	Result Factor (dBµV) (dB) 58.76 -5.81 / -5.81 57.52 -5.84 / -5.84 56.39 -5.84	Result Factor Emission Level (dBµV) (dB) (dBµV/m) 58.76 -5.81 52.95 / -5.81 / 57.52 -5.84 51.68 / -5.84 / 56.39 -5.84 50.55	Result Factor Emission Level Limits (dBµV) (dB) (dBµV/m) (dBµV/m) 58.76 -5.81 52.95 74 / -5.81 / 54 57.52 -5.84 51.68 74 / -5.84 51.68 74 / -5.84 50.55 74	Result Factor Emission Level Limits Margin (dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 58.76 -5.81 52.95 74 -21.05 / -5.81 / 54 / 57.52 -5.84 51.68 74 -22.32 / -5.84 51.68 74 -22.32 / -5.84 51.68 74 -22.32 / -5.84 50.55 74 -23.45

Vertical:

Frequency	Reading Result	Factor Emission Level		Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310.00	57.89	-5.81	52.08	74 🕚	-21.92	peak
2310.00	/	-5.81	1	54	1	AVG
2390.00	56.55	-5.84	50.71	^{NG} 74	-23.29	peak
2390.00	1	-5.84		54	1	AVG
2400.00	55.46	-5.84	49.62	74	-24.38	peak
2400.00	TEST	-5.84	MAKTES I	54	1	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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Operation Mode: TX CH High (2480MHz)

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
2483.50	57.36	-5.81	51.55	74	-22.45	peak	
2483.50	TESTING /	-5.81	AK TESTING	54	/	AVG	
2500.00	56.28	-6.06	50.22	74	-23.78	peak	
2500.00	la m	-6.06	1	54	1	AVG	

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2483.50	56.97	-5.81	51.16	74	-22.84	peak
2483.50	/	-5.81	/	54	1	AVG
2500.00	55.41	-6.06	49.35	74	-24.65	peak
2500.00	40.00	-6.06	D	54	HUAM	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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

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5.4 MAXIMUM OUTPUT POWER MEASUREMENT

5.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

5.4.2 Test procedure

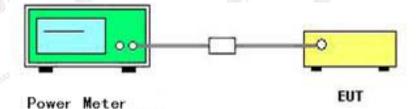
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

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

5.4.3 Deviation from standard

No deviation.

5.4.4 Test setup



5.4.5 Test results

NR	Channel	Channel frequency (MHz)	Output power (dBm)	Limit (dBm)	Result
	Low	2402	-0.95		Pass
T	Middle	2440	-1.24	30	Pass
Ī	High 🌑 🐩	2480	-1.88	O HO.	Pass

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5.5 POWER SPECTRAL DENSITY

5.5.1 Limit

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

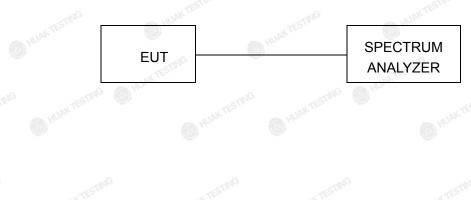
5.5.2 Test procedure

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance. Set the RBW =3 kHz. Set the VBW =10 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.

5.5.3 Deviation from standard

No deviation.

5.5.4 Test setup



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T ovi

5.5.5 Test results

Channel	Channel frequency (MHz)	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low	2402	-18.18	O m	Pass
Middle	2440	-18.73	8.00	Pass
High	2480	-19.33	HUAKIL	Pass



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CH 19



CH 39



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CATION

5.6 6DB BANDWIDTH

5.6.1 Limit

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

5.6.2 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=300KHz. 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.

5.6.3 Deviation from standard

No deviation.

5.6.4 Test setup

6	No. O	(10)
FUT		SPECTRUM
EUT		ANALYZER
	TING	TIME

5.6.5 Test result

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result	
Low	2402	0.736	STING	Pass	
Middle	2440	0.740	≥500	Pass	
High	2480	0.732	- LAK TEN	Pass	

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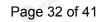


CH 19



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5.7 OCCUPIED BANDWIDTH

5.7.1 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.

5.7.2 Deviation from standard

No deviation.

5.7.3 Test setup



5.7.4 Test result

N/A

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5.8 BAND EDGE

5.8.1 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.

5.8.2 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

5.8.3 Deviation from standard

No deviation.

5.8.4 Test setup



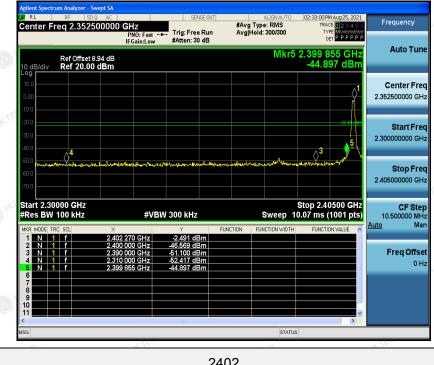
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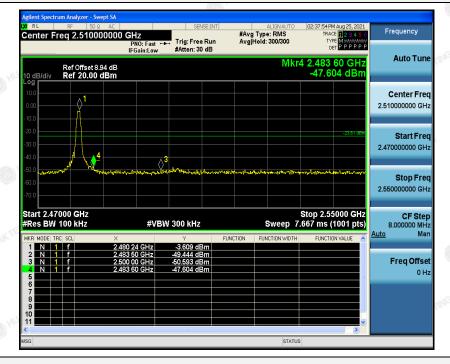


5.8.5 Test results

PASS







2480

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FICATION

5.9 CONDUCTED SPURIOUS EMISSIONS

5.9.1 Applied procedures / Limit

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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.

5.9.2 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, $RBW \ge 1\%$ of the span, $VBW \ge RBW$, Sweep = auto, Detector function = peak, Trace = max hold

5.9.3 Deviation from standard

No deviation.

5.9.4 Test setup



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HUAK

5.9.5 Test results

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		um Analyzer - Sv	vept SA								
N R		eq 515.00	2 AC	4.2	SB	NSE:INT	#Avg Type	RMS	02:33:15PM TRAC	Aug 25, 2021	Frequency
Cel				PNO: Fast	Trig: Free #Atten: 20		AvgiHold: 10/10 TYPE M DET PPP			PPPPP	P
10 di Log	B/div	Ref Offset 8. Ref 18.94						Μ	kr1 800. -57.8	89 MHz 18 dBm	Auto Tune
8.94											Center Freq 515.000000 MHz
-1.06											Start Freq 30.000000 MHz
-21.1 -31.1										23.0	Stop Freq 1.00000000 GHz
-41.1											CF Step 97.000000 MHz <u>Auto</u> Man
-61.1	and _{the} Res	e.d., id. inf. interes	ailan (fyr)	Abdition and the	No. of Contraction	descentario a	oh sills	ada ana	1 Idinika far		Freq Offset 0 Hz
-71.1	na h	Received griefe	n de la consecuencia de la consecu Inde la consecuencia de	uan di kateri	يو <mark>ي با والعام</mark> ين	indis foneting for	Pérsene a	v _{al} kaniki			
	t 30.0 s BW	MHz 100 kHz		#VBW	300 kHz		s	weep 9	Stop 1.0 4.00 ms (3	0000 GHz 0001 pts)	

Agilent Spectrum Analyzer - Swept SA					
Center Freg 13.750000000	GHz	SENSE:INT	#Avg Type: RMS	02:33:53PM Aug 25, 2021 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast Trig: F	reeRun :20 dB	Avg Hold: 10/10	DET PPPPP	
Ref Offset 8.94 dB 10 dB/div Ref 18.94 dBm			Mkr	2 4.003 05 GHz -41.895 dBm	Auto Tune
8.94					Center Freq 13.75000000 GHz
-1.06					Start Freq 1.00000000 GHz
-21.1					Stop Freq 26.50000000 GHz
-41.1 -51.1					CF Step 2.55000000 GHz <u>Auto</u> Man
-51.1 provide the state	الأشراب المالية الم	****	in _{the sector of the sector o}		Freq Offset 0 Hz
-71.1 Start 1.00 GHz #Res BW 100 kHz	#VBW 300 ki	łz	Sweep	Stop 26.50 GHz 2.438 s (30001 pts)	
MSG			STATUS	5	

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CH 19



RL RF Center Freq 515	5.000000 M	PNO: Fast ++-	Trig: Free		#Avg Type Avg Hold: 1		TR	PM Aug 25, 2021 ACE 2 3 4 5 6 YPE MUNICIPALITY	Frequency	/
0 dB/div Ref 18	set 8.94 dB 8.94 dBm	IFGain:Low	#Atten: 20) dB		M	kr1 813	.44 MHz 121 dBm	Auto T	une
8.94									Center F 515.000000	
1.06									Start F 30.000000	
31.1								-2550 dbm	Stop F 1.000000000	
41.1									CF S 97.000000 Auto	
61.1 <mark>here al al 100 parti</mark>	Hereinser						1 10miyihad	des a residua	FreqOf	ffset 0 Hz
	^{na} ktainestiitäin]t	a basela a pa	alujeta je	lahd, Angler	enternet (hereis)	nidens), Lipsk				
tart 30.0 MHz Res BW 100 kH	2	#VBW	300 KHz		SV	veep 94		.0000 GHz 30001 pts)		

gilent Spectrum Analyzer - Swept SA				
RL RF 50 Q AC	SENSE:INT	ALIGNAUTO	02:36:16 PM Aug 25, 2021	F
enter Freq 13.75000000	PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 20 dB	#Avg Type: RMS Avg Hold: 10/10	TRACE 2 3 4 5 6 TYPE M	Frequency
Ref Offset 8.94 dB dB/div Ref 18.94 dBm		Mkr	2 4.066 80 GHz -44.100 dBm	Auto Tune
94				Center Freq 13.75000000 GHz
.1				Start Freq 1.00000000 GHz
			-43.00 684	Stop Freq 26.50000000 GHz
.1 2				CF Step 2.55000000 GHz <u>Auto</u> Mar
a <mark>manana kataka ka</mark>	WAANINA MARIA	inter _{den} tereter		Freq Offset 0 Hz
tart 1.00 GHz Res BW 100 kHz	#VBW 300 kHz	Sween	Stop 26.50 GHz 2.438 s (30001 pts)	
		STATUS	-	

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CH 39



	t Spectru	m Analy										
Cen		RF 90151		AC 1000 M	17	SB	ISE:INT	#Avg Type	ALIGNAUTO e: RMS	02:38:09 PM TRAC	Aug 25, 2021	Frequency
001		04 01	0.000		PNO: Fast ++ IFGain:Low	Trig: Free #Atten: 20		Avg Hold:		TYF DE	T T P P P P P P P P P P P P P P P P P P	
10 di Log	3/div	Ref Of Ref 1	fset 8.9 8.94 c	4 dB IBM					M	kr1 826. -59.3	53 MHz 67 dBm	Auto Tune
8.94												Center Freq 515.000000 MHz
-1.06 -11.1												Start Freq 30.000000 MHz
-21.1											-23.19 dila	Stop Freq 1.00000000 GHz
-41.1												CF Step 97.000000 MHz <u>Auto</u> Man
-51.1 -61.1	tos og tal a	de mi	فلاداد	ماريد. ماريد ماريد ماريد	ha na tanàna da mandritra da mand	an a	(^{hoj} al-pila	en aller and states	nateris()anie	1 Holefjbourn	and the second	Freq Offset 0 Hz
-71.1			e pita	at of the p	In Marine Back	at the second	al internet	- (Serie alle	i fereni di tala di			
	t 30.0 s BW 1		łz		#VBW	/ 300 kHz		s	weep 94	Stop 1.0 .00 ms (3	000 GHz	
on tes					, TBT	NITE			incep or		pro/	

enter Freq 13.75000000 CHz PROL For + Propuency Trig: Free Run Augineid: 10/10 Max bis second Trig: Free Run Augineid: 10/10 Trig: Free Run Augineid: 10/10 Trig: Free Run Augineid: 10/10 Auto Tune Ref Offset 9.94 dB digRef Mkr2 3.306 90 CHz 465.79 CHm Center Freq 13.750000000 CHz 13.750000000 CHz Center Freq 13.750000000 CHz 10 Imax bis second context Start Freq 13.750000000 CHz Center Freq 13.750000000 CHz 11 Imax bis second context Center Freq 13.750000000 CHz Center Freq 13.750000000 CHz 11 Imax bis second context Imax bis second context Center Freq 13.750000000 CHz 11 Imax bis second context Imax bis second context Imax bis second context Stop Freq 2.55000000 CHz 11 Imax bis second context Imax bis second context Imax bis second context Imax bis second context 11 Imax bis second context 11 Imax bis second context 11 Imax bis second context Imax bis second context Imax bis second context Imax bis second context </th <th></th> <th></th> <th></th> <th>5 A 95</th> <th></th> <th></th> <th> CAR</th> <th></th> <th></th> <th>.0.33</th>				5 A 95			 CAR			.0.33
enter Freq 13.75000000 CHz PROL For + Propuency Trig: Free Run Augineid: 10/10 Max bis second Trig: Free Run Augineid: 10/10 Trig: Free Run Augineid: 10/10 Trig: Free Run Augineid: 10/10 Auto Tune Ref Offset 9.94 dB digRef Mkr2 3.306 90 CHz 465.79 CHm Center Freq 13.750000000 CHz 13.750000000 CHz Center Freq 13.750000000 CHz 10 Imax bis second context Start Freq 13.750000000 CHz Center Freq 13.750000000 CHz 11 Imax bis second context Center Freq 13.750000000 CHz Center Freq 13.750000000 CHz 11 Imax bis second context Imax bis second context Center Freq 13.750000000 CHz 11 Imax bis second context Imax bis second context Imax bis second context Stop Freq 2.55000000 CHz 11 Imax bis second context Imax bis second context Imax bis second context Imax bis second context 11 Imax bis second context 11 Imax bis second context 11 Imax bis second context Imax bis second context Imax bis second context Imax bis second context </td <td>Agilent Spectr</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Agilent Spectr									
Priced T5.750000000 GHZ Trig: Free Run BrGainLow Trig: Free Run Anten: 20 dB Mkr2 3.305 0GHZ Auto Tune Ref Offset 8.94 dB -46.795 dBm -46.795 dBm Center Freq 13.75000000 GHZ dBddiv Ref offset 8.94 dB -46.795 dBm Center Freq 13.75000000 GHZ dBddiv -46.795 dBm -46.795 dBm Center Freq 13.750000000 GHZ dBddiv -46.795 dBm -46.795 dBm -46.795 dBm	RL				SEN	ISE:INT		02:38:47 PM /	kug 25, 2021	E
Ref Offset 9.94 dB IMM2 3.306 SU 0972 dB/div Ref 18.94 dBm Center Freq 9	Center F	req 13.7500	PNO	D: Fast +++				TYPE	123456 Multimeter PPPPPP	
34 Center Freq 35 Start Freq 36 Start Freq 31 Start Freq 32 Stop Freq 33 CF Step 24 CF Step 25 Stop Freq 34 CF Step 35 CF Step 36 CF Step 37 CF Step 255000000 GHz Man 10 CF Step 255000000 GHz Man 11 CF Step 255000000 GHz Man Freq Offset 0Hz 11 Stop 26.50 GHz 12 Stop 26.50 GHz 13 Stop 26.50 GHz 14 Stop 26.50 GHz 15 Stop 26.50 GHz 16 Stop 26.50 GHz 17 Stop 26.50 GHz 18 Stop 26.50 GHz 19 Stop 26.50 GHz 10 Sto	10 dB/div Log	Ref Offset 8.9 Ref 18.94 c	4 dB dBm				Mkr	2 3.306 9 -46.79	0 GHz 5 dBm	Auto Tune
Start Freq Start Freq Start Freq 1.0000000 GHz Stop Freq 26.5000000 GHz 2.500000 GHz 2.5000000 GHz 2.5000000 GHz Auto Man Freq Offset 0 Hz arrt 1.00 GHz Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)	8.94	.1								
Stop Freq 26.5000000 GHz 24.5000000 GHz 24.5000000 GHz 24.5000000 GHz 24.5000000 GHz 25.500000 GHz 0 Hz 0 Hz 0 Hz 8 Stop 26.50 GHz 0 Hz 0 Hz 0 Hz 0 Hz 0 Hz 0 Hz 0 Hz 0	-1.06	2'								
225000000 GH2 Auto Man Freq Offset 0 H2 Stop 26.50 GHz Res BW 100 kHz Stop 2.5.00 Hz Stop 2.5.00 Hz	-21.1								-23.09 dDm	
art 1.00 GHz Stop 26.50 GHz Res BW 100 kHz #VBW 300 kHz	-41.1	2							and state	2.55000000 GHz
art 1.00 GHz Stop 26.50 GHz Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)	-61.1		alat i ya	***		~			and A day	
	Start 1.00	GHz						Stop 26	.50 GHz	
3 STATUS		100 KHZ		#VBW	300 KHZ		sweep 2	.438'5 (30	uu pts)	
	MSG						STATUS			

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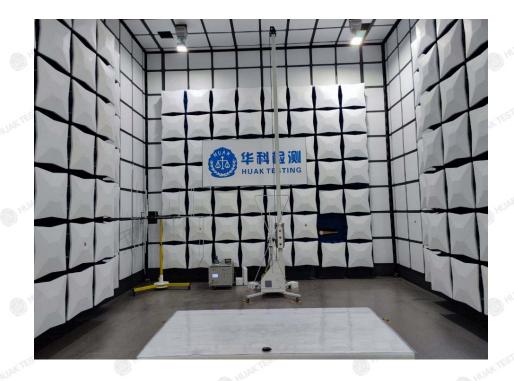
HUAK Testing Lab TEL: +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail: service@cer-mark.com

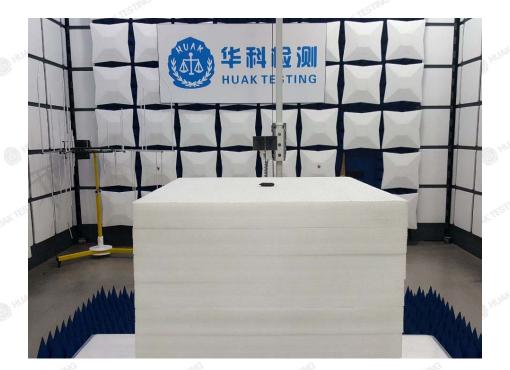


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PRE PAL

Radiated Emissions





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TIFICATION

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

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

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