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Report No.: HK2107162424-E

TEST REPORT

FCC PART 15 SUBPART C 15.247

Test report On Behalf of Haier US Appliance Solutions, Inc. For BLE Module Model No.: RB1762-25

FCC ID: ZKJ-BLEA004

Prepared For :

Haier US Appliance Solutions, Inc.

Appliance Park AP2-226 Louisville, Kentucky 40225 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: July. 16, 2021 ~July. 27, 2021 Date of Report: July. 27, 2021 Report Number: HK2107162424-E

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TEST RESULT CERTIFICATION

Applicant's name:	Haier US Appliance Solutions, Inc.
Address	Appliance Park AP2-226 Louisville, Kentucky 40225 United States
Manufacture's Name	Iton Technology Corp.
Address	3F, Building A, Weixinda Industrial Park, longgang District, Shenzhen, 518100 China

Product description

Trade Mark:	GE Appliances
Product name:	BLE Module
Model and/or type reference:	RB1762-25

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

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Date of Test	
Date (s) of performance of tests:	July. 16, 2021 ~July. 27, 2021
Date of Issue	July. 27, 2021
Test Result	Pass

Prepared by:

Grang Dian

Project Engineer

Reviewed by:

tden

Project Supervisor

Approved by:

ason Mou

Technical Director

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	July. 27, 2021	Jason Zhou
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OK TESTING	STRUCT ON TESTING	INK TESTING	TESTING

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1 TEST SUMMARY

1.1 TEST DESCRIPTION

TEST	W TEST	TESI
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

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

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2 TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

Address 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 Designation Number: CN1229 Test Firm Registration Number: 616276

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT Name:	BLE Module		W
Model No:	RB1762-25	K TESTING	.0
Serial No:	N/A	O HUM	AKTESTIN
Model Difference:	N/A	-6	0
Brand Name:	GE Appliances	MAKTESTIN	
Operation frequency:	2402 MHz to 2480 MHz	1	NG
Channel separation:	2MHz	HUAK	O HUAN
Number Of Channel:	40	<i>w</i>	
Modulation Technology:	GFSK		
Hardware Version:	V1.0	AKTESTING	NYT
Software Version:	V1.0	O HOM	O HUM
Antenna Type:	PCB Antenna	TING	
Antenna Gain:	0dBi	HUAK TED	STING
Power Supply:	DC 1.8V~3.3V		HUAKIL
Note:	-STING	CSTING	w.

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:	14K TESTI	HUAK TEST.
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
UAK 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

Operation of EUT during conducted and radiation below 1GHz testing:

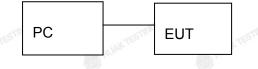
AC Plug

— — —

EUT

Operation of EUT during radiation above 1GHz testing:

PC



PC information Model: ThinkPad X220i Input: 20V, 3.25A/4.5A

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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HUAK TESTING EQUIPMENTS LIST FOR ALL TEST ITEMS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1. KTESTING	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	³ 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	Dec. 10, 2020	1 Year
26.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 10, 2020	₃1 Year

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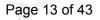


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27.	RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	Dec. 10, 2020	1 Year
28.	RF Cable(above 1GHz)	Times	1-40G	HKE-034	Dec. 10, 2020	1 Year
29.	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	Dec. 10, 2020	1 Year
30.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec.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

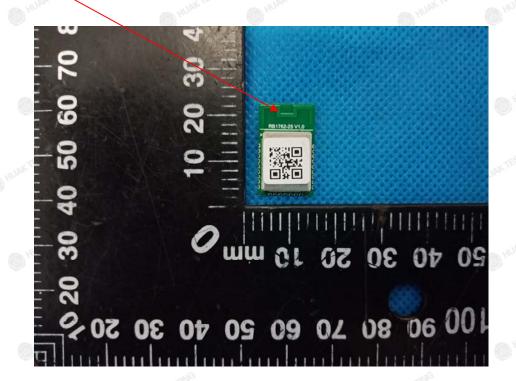
Refer to statement below for compliance.

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.

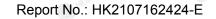
Antenna Connected Construction

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 43 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:

HUM TESTING	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

* 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.
- 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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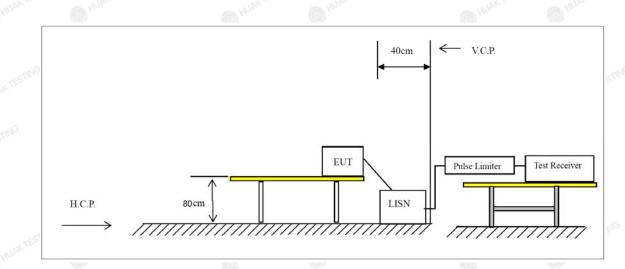
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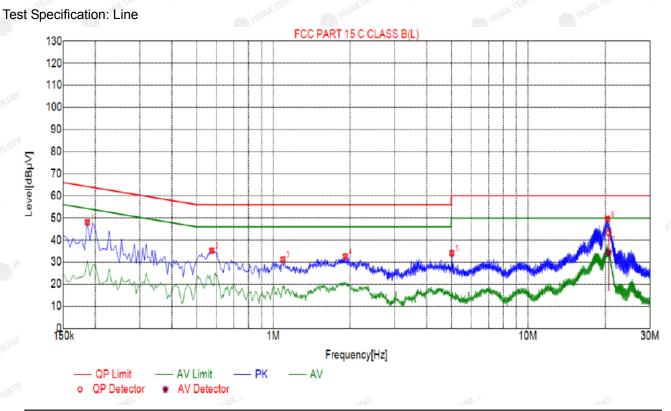
5.2.3 Test setup



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5.2.4 Test results



Su	Suspected List											
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре				
1	0.1860	48.05	20.05	64.21	16.16	28.00	PK	L				
2	0.5730	35.15	20.05	56.00	20.85	15.10	PK	L				
3	1.0905	31.20	20.07	56.00	24.80	11.13	PK	L				
4	1.9185	32.63	20.14	56.00	23.37	12.49	PK	L				
5	5.0280	34.10	20.26	60.00	25.90	13.84	PK	L				
6	20.4180	49.55	20.12	60.00	10.45	29.43	PK	L				

Final	l Data	List									
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	QP Reading [dBµV]	A∨ Value [dBµV]	AV Limit [dBµV]	A∨ Margin [dB]	A∨ Reading [dBµV]	Туре
1	20.6183	20.12	43.34	60.00	16.66	23.22	34.31	50.00	15.69	14.19	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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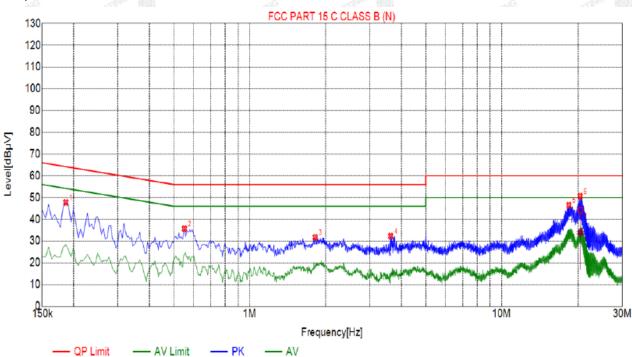
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Test Specification: Neutral

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o QP Detector * AV Detector

	Suspected List											
	NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре			
	1	0.1860	47.75	20.05	64.21	16.46	27.70	PK	N			
8	2	0.5505	35.71	20.06	56.00	20.29	15.65	PK	N			
	3	1.8195	31.70	20.14	56.00	24.30	11.56	PK	N			
2	4	3.6285	32.27	20.25	56.00	23.73	12.02	PK	N			
	5	18.3795	46.44	20.05	60.00	13.56	26.39	PK	N			
	6	20.3730	50.63	20.12	60.00	9.37	30.51	PK	N			

Final Data List

NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	QP Reading [dBµV]	A∨ Value [dBµV]	A∨ Limit [dBµV]	A∨ Margin [dB]	AV Reading [dBµV]	Туре
1	20.4221	20.12	44.18	60.00	15.82	24.06	33.87	50.00	16.13	13.75	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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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).

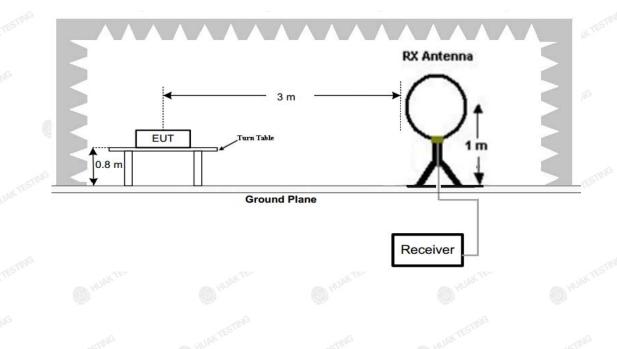
Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

		Rad	liated emission limits	
4	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)
8	1.705-30	3	20log(30)+ 40log(30/3)	30
	30-88	3	40.0	100
ST	» ⁶ 88-216	3 csmig	43.5	150
	216-960	3	46.0	200
	Above 960	3	54.0	500

5.3.2 Test setup

Test Configuration:

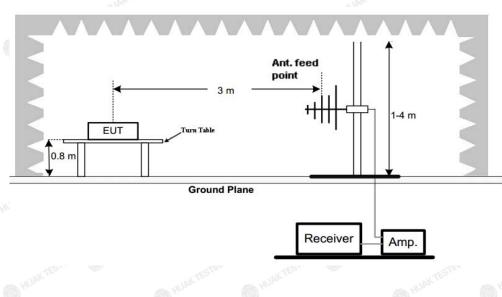
1) 9 kHz to 30 MHz emissions:



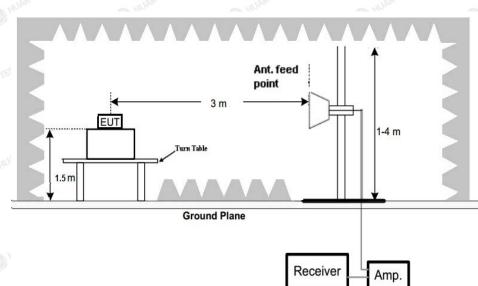
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3) 1 GHz to 25 GHz emissions:



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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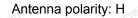
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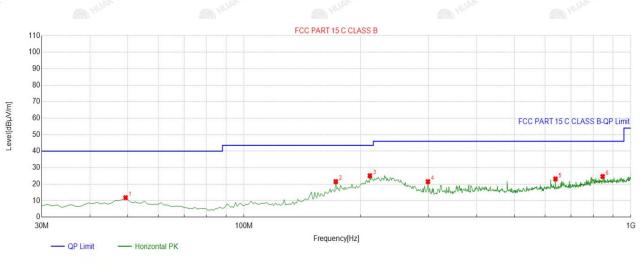
Report No.: HK2107162424-E

EST F

5.3.3 Test Result

Below 1GHz Test Results:





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
2	1	49.4194	-13.65	25.41	11.76	40.00	28.24	100	24	Horizontal
	2	172.7327	-17.18	38.69	21.51	43.50	21.99	100	80	Horizontal
	3	211.5716	-14.76	39.84	25.08	43.50	18.42	100	88	Horizontal
	4	298.9590	-12.75	34.25	21.50	46.00	24.50	100	279	Horizontal
	5	638.7988	-5.63	28.79	23.16	46.00	22.84	100	28	Horizontal
	6	845.6156	-2.62	27.26	24.64	46.00	21.36	100	28	Horizontal

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

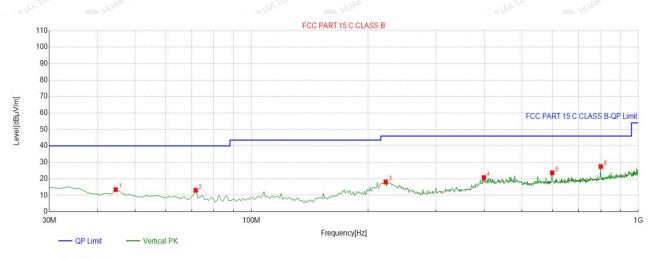
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Antenna polarity: V



QP Detector

Suspe	cted List								
NO.	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	27.16	13.43	40.00	26.57	100	328	Vertical
2	71.7518	-17.99	30.99	13.00	40.00	27.00	100	324	Vertical
3	222.2523	-14.51	32.61	18.10	46.00	27.90	100	206	Vertical
4	398.9690	-10.43	31.18	20.75	46.00	25.25	100	324	Vertical
5	598.9890	-6.18	29.87	23.69	46.00	22.31	100	28	Vertical
6	799.9800	-3.12	30.58	27.46	46.00	18.54	100	171	Vertical
			crim			erm			

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)	Limit@3m (dBµV/m)
3			
	tala-	ESTIN	TRACTESTING
	O ***	- WUAKTEST	The MARTEST
	·		·

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:

- 10 m	HUAN	HUAN	HUAN	and the	UAN	HUAN
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	- Data ata
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804	55.76	-3.65	52.11	74.00	-21.89	peak
4804	42.73	-3.65	39.08	54.00	-14.92	AVG
7206	50.45	-0.95	49.50	74.00	-24.50	peak
7206	41.22	-0.95	40.27	54.00	-13.73	AVG

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

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detecto
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804	53.89	-3.65	50.24	74.00	-23.76	peak
4804	41.88	-3.65	38.23	54.00	-15.77	AVG
7206	51.72	-0.95	50.77	74.00	-23.23	peak
7206	38.52	-0.95	37.57	54.00	-16.43	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	53.65	-3.54	50.11	74.00	-23.89	peak
4880.00	40.79	-3.54	37.25	54.00	-16.75	AVG
7320.00	55.13	-0.81	54.32	74.00	-19.68	peak
7320.00	41.94	-0.81	41.13	54.00	-12.87	AVG
emark: Factor	r = Antenna Fa	actor + 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	54.18	-3.54	50.64	74.00	-23.36	peak
4880.00	44.69	-3.54			-12.85	AVG
7320.00	51.16	-0.81			-23.65	peak
7320.00	35.81	-0.81	35.00	54.00	-19.00	AVG

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

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CATION

CH High (2480MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	Hz) (dBµV)		(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960	54.33	-3.43	50.90	74.00	-23.10	peak
4960	40.08	-3.44	36.64	54.00	-17.36	AVG
7440	50.78	-0.77	-0.77 50.01 74.0		-23.99	peak
7440	40.94	-0.77	40.17	54.00	-13.83	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	53.03	-3.43	49.60	74.00	-24.40	peak
4960	42.86	-3.44	39.42	54.00	-14.58	AVG
7440	54.98	-0.77	54.21	74.00	-19.79	peak
7440	37.12	-0.77	36.35	54.00	-17.65	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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HUAK TESTING

Radiated Band Edge Test:

Operation Mode: TX CH Low (2402MHz)

Horizontal (Worst case):

Frequency	Reading Result	Factor	Emission Level	Limits Margin		Detector	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
2310.00	56.79	-5.81	50.98	74 MUAN	-23.02	peak	
2310.00	2310.00 /			54	1 🔍	AVG	
2390.00	55.48	-5.84	49.64	19.64 74 -24.		peak	
2390.00	HUAK TES!	-5.84	HUAKTES	54	HUAKTESTIN	AVG	
2400.00	2400.00 54.62		48.78	74	-25.22	peak	
2400.00	1	-5.84	1	54	1	AVG	
Remark: Facto	or = Antenna Fa	actor + Cable Lo	oss – Pre-amplifier.	10-	AKTESTING	HUAKTEST	

Vertical:

Frequency	Reading Result	^o L Eactor LEmission Level L Limits		Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
2310.00	57.28	-5.81	51.47	74 🔘	-22.53	peak	
2310.00	2310.00 /		1	54	1	AVG	
2390.00	56.93	-5.84	51.09	74	-22.91	peak	
2390.00	1	-5.84	-5.84 / 5		1	AVG	
2400.00	2400.00 55.87		50.03 74		-23.97	97 peak	
2400.00	TEST	-5.84	- un ARTES	54	1	AVG	

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

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ΑF



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 °C	55.46	-5.81	49.65	74	-24.35	peak	
2483.50	All the second s		AK TESTING	54	/	AVG	
2500.00			48.76	74	-25.24	peak	
2500.00		-6.06	1	54	1	AVG	

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB) Type	
2483.50	56.25	-5.81	50.44	74	-23.56	peak
2483.50	/	-5.81	/	54	1	AVG
2500.00	00 55.76 -6.06		49.7	74	-24.3 peak	
2500.00	HON I	-6.06		54	HUAN	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

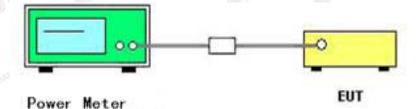
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

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

Channel	Channel frequency (MHz)	Output power (dBm)	Limit (dBm)	Result
Low	2402	5.36		Pass
Middle	2440	4.12	30	Pass
High	2480	4.47	O.M.	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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5.5.5 Test results

Channel	Channel frequency (MHz)	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low	2402	-10.66	O m	Pass
Middle	2440	-7.79	8.00	Pass
High	2480	-10.6	HUAKIL	Pass



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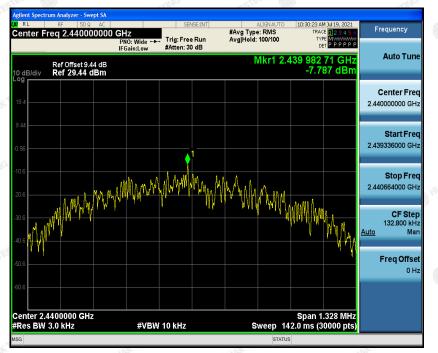
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CH 19



CH 39



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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

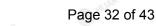
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EUT		SPECTRUM
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5.6.5 Test result

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	2402	0.644	STING	Pass
Middle	2440	0.664	≥500	Pass
High	2480	0.620	TAN TEST	Pass

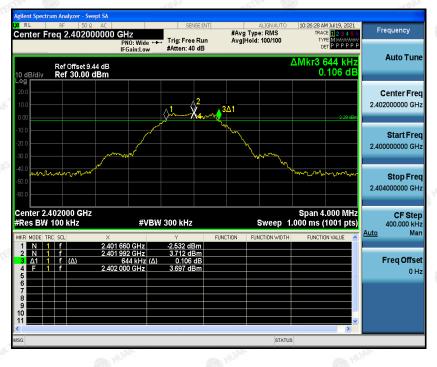
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5.7 OCCUPIED BANDWIDTH

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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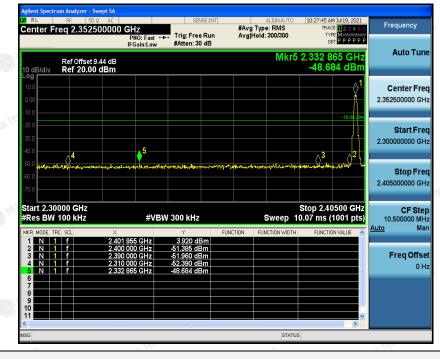
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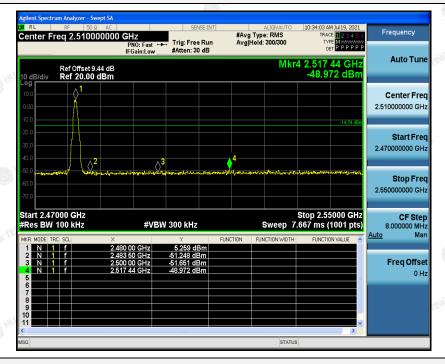
TEICATION

5.8.5 Test results

PASS



2402



2480

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5.9 CONDUCTED SPURIOUS EMISSIONS

5.9.1 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.

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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5.9.5 Test results

CH 00



		um Analyzer - Sv										
N R		eq 515.00	2 AC	Lla.	SB	VSE:INT	#Avg Type	LIGNAUTO	10:28:01 AM	1 3.4 19, 2021	Freq	uency
Cen	ter Fr	eq 515.00	0000 h	PNO: Fast ++-	Trig: Free		Avg Hold:					
				IFGain:Low	#Atten: 20	DdB			De			uto Tune
		Ref Offset 9	.44 dB					N	1kr1 823.	04 MHz	^	uto rune
10 di Log	3/div	Ref 19.44	dBm						-60.3	56 dBm		
											Ca	nter Frea
9.44												00000 MHz
-0.56	<u> </u>											
												Start Freq
-10.6											30.0	00000 MHz
										-16.31 dBn		
-20.6											5	Stop Freq
-30.6											1.0000	00000 GHz
-30.6												
-40.6												CF Step
											97.0 Auto	00000 MHz Man
-50.6											Auto	man
									1		_	
-60.6				ak hutan kanada da ka		a ll a	and the late		land alter state	Laller, La	Pr Pr	eq Offset 0 Hz
	والد أفاقته	an di she di she b	dusati.	distants.						and findings		UHZ
-70.6	di falsio	iyi printiyindi	i si dia ili	en la	List List and List	n denated	the second	a na	un ipalina ka	a per l'étaire.		
Star	t 30.0	MHz							Stop 1.0	000 GHz		
#Re	s BW 1	100 kHz		#VBW	300 kHz		S	weep 9	4.00 ms (3	0001 pts)		

Agilent Spectrum Analyzer - Swept SA							
Center Fr	eq 13.75000		SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:28:39 AM Jul 19, 2021 TRACE 2 3 4 5 6	Frequency	
oonton	oq 10.10000	PNO: Fast	Trig: Free Run #Atten: 20 dB	Avg Hold: 10/10	DET PPPPP		
10 dB/div Log	Ref Offset 9.44 Ref 19.44 dB	dB m		Mkr2	25.734 15 GHz -48.435 dBm	Auto Tune	
9.44	1					Center Freq 13.75000000 GHz	
-0.56					-16.31 454	Start Freq 1.00000000 GHz	
-20.6						Stop Freq 26.50000000 GHz	
-40.6					2	CF Step 2.55000000 GHz <u>Auto</u> Man	
-60.6				the second second		Freq Offset 0 Hz	
Start 1.00		#VBW	300 kHz	Sweep	Stop 26.50 GHz 2.438 s (30001 pts)		
MSG							

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CH 19



Agilent Spectrum Analyzer - Swept					
Center Freq 515.0000		SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:30:39 AM JJ 19, 2021	Frequency
	PNO: Fast +++ IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold: 10/10	TYPE MULTURE	
Ref Offset 9.44 d 10 dB/div Ref 19.44 dB/ Log	n m		MI	kr1 863.88 MHz -59.911 dBm	Auto Tune
9.44					Center Freq 515.00000 MHz
-0.56				-15.42 aths	Start Freq 30.000000 MHz
-20.6					Stop Freq 1.000000000 GHz
-40.6					CF Step 97.000000 MHz <u>Auto</u> Man
-60.6	and the second states and	tera antistatura productore	n <mark>a kulonan dinamikakan</mark>	1 Sugar Mandatar (Signaland	Freq Offset 0 Hz
-70.6 advance.profination (pp) a	lining by post princes of	المتوافقة مشاورتهما	<mark>i, s. _{ele} en persipensionen angeneren ele</mark>		
Start 30.0 MHz #Res BW 100 kHz	#VBW :	300 kHz	Sweep 94	Stop 1.0000 GHz .00 ms (30001 pts)	

Center Freq 13.75000000 GHz Proprint Fatter Provide and the second se					-C.M.		
Center Freq 13.75000000 GHz Proprint Fatter Provide and the second se	Agilent Spectr	um Analyzer - Swept SA					
Center Pred 15.75000000 GH2 Trig: Free Run Pro: Fat	RL	RF 50 g AC	55	INSE:INT	ALIGNAUTO	10:31:17 AM JJ 19, 2021	-
Ref Offset9.44 dB MKIZ 20.861 43 GHZ 0 dB/div -48.436 GBM 48.436 dBm -48.436 GBM 944 -1 -1 -1 -105 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -206 -1 -207 -1 -208 -1 -208 -1 -208 -1 -208 -1 -209 -1 -200 -1 -200 -1 -200 -1 -200 -1 -200 -1 -200 -1 -200 -1 -25000000 GH -1 -25000000	Center Fi	req 13.7500000	PNO: Fast Trig: Fre	e Run AvgiHo		TYPE MULLING	
944 944 944 945 106 106 107 107 100000000 GH 100000000 GH 10000000 GH 1000000 GH 10000000 GH 1000000000 GH 1000000000000000000000000000000000000	10 dB/div	Ref Offset 9.44 dB Ref 19.44 dBm			Mkr2	25.681 45 GHz -48.436 dBm	Auto Tune
Start Freq Start Freq 206	9.44	, ¹					Center Freq 13.75000000 GHz
CF Step Fre 26.50000000 GF 25.50000000 GF 25.50000000 GF 24.50000000 GF 25.50000000 GF 25.50000000 GF 25.50000000 GF 25.50000000 GF 25.50000000 GF 25.50000000 GF 25.50000000 GF 25.5000000 GF 25.500000 GF 25.5000000 GF 25.5000000 GF 25.50000000 GF 25.500000000000000000000000000000000000						-15-42 dBn	Start Freq 1.00000000 GHz
225 225 225 225 225 225 225 225 225 225							Stop Freq 26.50000000 GHz
Freq Offs						2	CF Step 2.55000000 GHz <u>Auto</u> Man
		and the second second		where we are	<u>jireiti</u>		Freq Offset 0 Hz
Start 1.00 GHz Stop 26.50 GHz	Start 1.00	GHz				Stop 26.50 GHz	
#Res BW 100 kHz	#Res BW	100 kHz	#VBW 300 kH	z	Sweep	2.438 s (30001 pts)	
MSG STATUS	MSG				STATUS	1	

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CH 39



Agilent Spectrum Analyzer - Swept SA					
Center Freq 515.000000 MH		NSE:INT #Ava]	ALIGNAUTO VPe: RMS	10:34:19 AM Jul 19, 202 TRACE 202	Frequency
1	NO: Fast Trig: Free Gain:Low #Atten: 20	e Run Avg H	old: 10/10	TYPE MUNICIPAL P P P P P	
Ref Offset 9.44 dB 10 dB/div Ref 19.44 dBm			Mk	r1 929.38 MH -60.548 dBr	
9.44					Center Freq 515.000000 MHz
-0.58				-14.91 d	Start Freq 30.000000 MHz
-20.6					Stop Freq 1.000000000 GHz
-40.6					CF Step 97.000000 MHz <u>Auto</u> Man
-60.6	and the solution of the	strayers of the state		1	Freq Offset 0 Hz
-70.6 - Philippine and the second	n de reddin of ringer (feitre 1	ntel a litera la principa.			
Start 30.0 MHz #Res BW 100 kHz	#VBW 300 kHz		Sweep 94.	Stop 1.0000 GH 00 ms (30001 pt	z 5)

Algent Societram Analyzer Sweet SA Stop Exact Auto Tune 10 dBidly Ref 0ffset 9.44 dB Stop Exact Stop Exact Stop Freq 13.750000000 GHz 13.750000000 GHz 13.75000000 GHz Stop Freq 25.50000000 GHz 10.000000 GHz 10.000000 GHz Stop Freq 25.50000000 GHz 25.50000000 GHz 2.50000000 GHz 2.5									
Center Freq 13.750000000 GHz PROF Batt Frequency Aver Type: FMS Aver T	Agilent	Spectrum Analyz	ter - Swept SA						
Center Pred 13.750000000 GHz Free Run Britan Magnetic Trige Free Run Argitedet Trige Free Run Argitedet Trige Free Run Britan Auto Tune Ref Offset9.44 dB Mkr2 25.751 15 GHz 47.733 dBm Gene Run 47.733 dBm Center Freq 13.75000000 GHz Center Freq 13.75000000 GHz Center Freq 13.75000000 GHz Center Freq 13.75000000 GHz Start Freq 10.000000 GHz Start Freq 10.000000 GHz Start Freq 14.876 S	N RL	RF	50 g AC		SENSE:INT	ALIGNA	UTO 10:34:57	AM 3ul 19, 2021	
Ref Offset 9.44 dB MKI 2 20.75 T 19 GHz 944 47.733 dBm 944 1 944 1 956 1 966 1 976 1 976 1 977 1 978 1 979 1 979 1 979 1 979 1 979 1 979 1 979 1 979 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 970 1 <	Cent	ter Freq 13	.750000000	PNO: Fast			TR.		
944 1	10 dB					Μ	kr2 25.751 -47.1	15 GHz 733 dBm	Auto Tune
106 106 107 108 108 108 108 108 1000000000000000000000000000000000000	9.44	Ŷ							
336 Stop Preq 436 CF Step 437 Stop Preq 440 Man Freq Offset 0 Hz 5top 26.50 CHz Stop 26.50 CHz Start 1.00 CHz #VBW 300 kHz Sweep 2.438 s (30001 pts)								-14.91 (Dn	
255000000 GH2 2656 2666 2705 Start 1.00 GH2 #Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)									
305 Start 1.00 CHz Stop 26.50 CHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)								2	2.55000000 GHz
Start 1.00 GHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)	-60.6				البر المتعين				
#Res BW 100 kHz #VBW 300 kHz Sweep 2.438 s (30001 pts)	Start						Stop	26.50 GHz	
MSG STATUS	#Res	BW 100 kH	z	#VBW	300 kHz	Swe	ep 2.438 s (30001 pts)	
	MED						TATIE		

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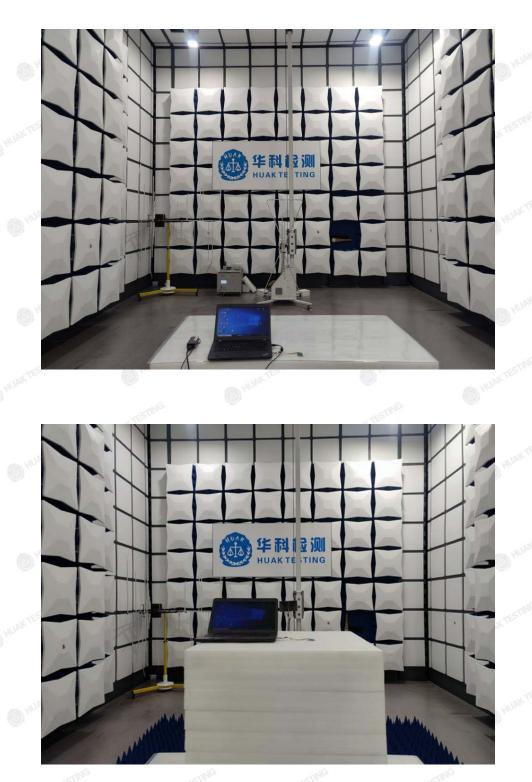
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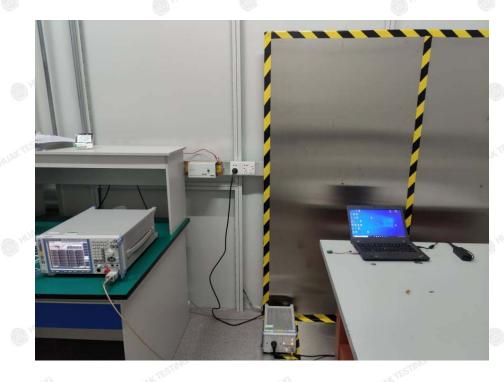
Radiated Emissions



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Conducted Emission



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7 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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