

TEST REPORT

FCC PART 15 SUBPART C 15.247

Test report On Behalf of Dayton Audio Division of Parts Express For Bluetooth Hybrid Amplifier Model No.: HTA100BT

FCC ID: 2AV8X-HTA100BT

Prepared for : Dayton Audio Division of Parts Express 725 Pleasant Valley Rd Springboro, Ohio 45066 USA

Prepared By : Shenzhen HUAK Testing Technology Co., Ltd. 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Date of Test: June. 21, 2020 ~ June. 28, 2020

Date of Report: June. 28, 2020

Report Number: HK2006191548-2E



TEST RESULT CERTIFICATION

Applicant's name:	Dayton Audio Division of Parts Express
Address:	725 Pleasant Valley Rd Springboro, Ohio 45066 USA
Manufacture's Name	Juson Technology Co., Limited
Address:	Room 2020-2021, Tiancheng Square, No.2 ShengLong Road, Longcheng Street, Longgang District, Shenzhen, China
Product description	
Trade Mark:	DAYTON AUDIO
Product name:	Bluetooth Hybrid Amplifier
Model and/or type reference:	HTA100BT
Standards	47 CFR FCC Part 15 Subpart C 15.247

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAK Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAK Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test	
Date (s) of performance of tests:	June. 21, 2020 ~ June. 28, 2020
Date of Issue	June. 28, 2020
Test Result:	Pass

Prepared by:

(John Qian

Project Engineer

Reviewed by:

Project Supervisor

Approved by:

ason Zhori

Technical Director



Contents

			Page
С	ONTENTS		
1	TEST S	SUMMARY	6
	1.1 TE	ST DESCRIPTION	
		ASUREMENT UNCERTAINTY	
2	TEST	FACILITY	Q
	_		-
3	_	RAL INFORMATION	-
		NERAL DESCRIPTION OF EUT	
	3.2 DE	SCRIPTION OF TEST CONDITIONS	10
	3.3 DE	SCRIPTION OF TEST SETUP	10
4	EQUIP	MENTS LIST FOR ALL TEST ITEMS	11
5	TEST I	RESULT	
	5.1 AN	TENNA REQUIREMENT	12
	5.1.1	Standard requirement	
	5.1.2	EUT Antenna	
	-	DODUCTION EMISSIONS MEASUREMENT	
	5.2.1	Applied procedures / Limit	
	5.2.2	Test procedure	
	5.2.3	Test setup	
	5.2.4	Test results	
	5.3 RA	DIATED EMISSIONS MEASUREMENT	17
	5.3.1	Applied procedures / Limit	
	5.3.2	Test setup	17
	5.3.3	Test Result	19
	5.4 MA	XIMUM OUTPUT POWER MEASUREMENT	
	5.4.1	Limit	
	5.4.2	Test procedure	
	5.4.3	Deviation from standard	
	5.4.4	Test setup	
	5.4.5	Test results	
		WER SPECTRAL DENSITY	
	5.5.1	Limit	
	5.5.2	Test procedure Deviation from standard	
	5.5.3		
	5.5.4 5.5.5	Test setup	
		Test results B BANDWIDTH	
	5.6 6Di	Limit	
	5.6.2	Test procedure	
	5.6.3	Deviation from standard	
	5.6.4	Test setup	
	5.6.5	Test result	



7 Occ	CUPIED BANDWIDTH	33
5.7.1	Test procedure	33
5.7.2	Deviation from standard	33
5.7.3	Test setup	33
5.7.4	Test result	33
8 BAN	ID EDGE	34
5.8.1	Limit	34
5.8.2	Test procedure	34
5.8.3	Deviation from standard	34
5.8.4	Test setup	34
5.8.5	Test results	35
9 Cor	NDUCTED SPURIOUS EMISSIONS	36
5.9.1	Applied procedures / Limit	36
5.9.2	Test procedure	36
5.9.3	Deviation from standard	36
5.9.4	Test setup	36
5.9.5	Test results	37
TEST S	ETUP PHOTO	42
рното	S OF THE EUT	44
	5.7.1 5.7.2 5.7.3 5.7.4 8 BAN 5.8.1 5.8.2 5.8.3 5.8.4 5.8.5 9 Con 5.9.1 5.9.2 5.9.3 5.9.4 5.9.5 TEST S	5.7.1 Test procedure 5.7.2 Deviation from standard 5.7.3 Test setup 5.7.4 Test result 8 BAND EDGE 5.8.1 Limit 5.8.2 Test procedure 5.8.3 Deviation from standard 5.8.4 Test setup 5.8.5 Test results 9 CONDUCTED SPURIOUS EMISSIONS 5.9.1 Applied procedures / Limit 5.9.2 Test procedure 5.9.3 Deviation from standard 5.9.4 Test setup



Page 5 of 44 **Revison History**

Revision	Issue Date	Revisions	Revised By	
V1.0	2020-06-28	Initial Issue	Jason Zhou	



1 Test Summary

1.1 Test Description

Test Item	Test Requirement	Result
Antenna Requirement	§15.203/§15.247 (c)	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



1.2 Measurement Uncertainty

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

No.	Item	Uncertainty
1	Conducted Emission Test	1.20dB
2	All emissions, radiated(<1G)	±3.92dB
3	All emissions, radiated(>1G)	±4.28dB



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.:1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China Designation Number: CN1229 Test Firm Registration Number: 616276

3 General Information

3.1 General Description of EUT

Manufacturer:	Juson Technology Co., Limited
	Room 2020-2021, Tiancheng Square, No.2 ShengLong Road,
Manufacturer Address:	Longcheng Street, Longgang District, Shenzhen, China
EUT Name:	Bluetooth Hybrid Amplifier
Model No:	HTA100BT
Serial No:	N/A
Model Difference:	N/A
Brand Name:	DAYTON AUDIO
Operation frequency:	2402 MHz to 2480 MHz
Channel separation:	2MHz
NUMBER OF CHANNEL:	40
Modulation Technology:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi
Power Supply:	AC 110V, 60Hz
Note:	·
1.For a more detailed feature	s description, please refer to the manufacturer's specifications or the
User's Manual.	



Description of Channel:						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
0	2402	14	2430	28	2458	
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	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			



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 adiated 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.

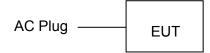
- (2) Frequency range of radiated measurements:The test range will be up to the tenth harmonic of the highest fundamental frequency.
- (3) Pre-test the EUT in all transmitting mode at the lowest (2402 MHz), middle (2440 MHz) and highest (2480 MHz) channel with different data packet and conducted to determine 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 testing and Radiation testing:



Operation of EUT Above1GHz Radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working,

investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



4 Equipments List for All Test Items

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 26, 2019	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-059	Dec. 26, 2019	1 Year
3.	Receiver	R&S	ESCI 7	HKE-010	Dec. 26, 2019	1 Year
4.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 26, 2019	1 Year
5.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 26, 2019	1 Year
6.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 26, 2019	1 Year
7.	High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 26, 2019	1 Year
8.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 26, 2019	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 26, 2019	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 26, 2019	1 Year
11.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 26, 2019	1 Year
12	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 26, 2019	1 Year
13	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 26, 2019	1 Year
14	High pass filter unit	Tonscend	JS0806-F	HKE-055	Dec. 26, 2019	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. 28, 2017	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. 26, 2019	1 Year
23.	Signal generator	Agilent	N5182A	HKE-029	Dec. 26, 2019	1 Year
24.	Signal Generator	Agilent	83630A	HKE-028	Dec. 26, 2019	1 Year
25	Power meter	Agilent	E4419B	HKE-085	Dec. 26, 2019	1 Year
26	Power Sensor	Agilent	E9300A	HKE-086	Dec. 26, 2019	1 Year
27	RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	Dec. 26, 2019	1 Year
28.	RF Cable(above 1GHz)	Times	1-40G	HKE-034	Dec. 26, 2019	1 Year
29	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	Dec. 26, 2019	1 Year
30	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year
31	Horn Antenna	Schewarzbeck	BBHA 9170	HKE-017	Dec. 26, 2019	1 Year



5 Test Result

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.

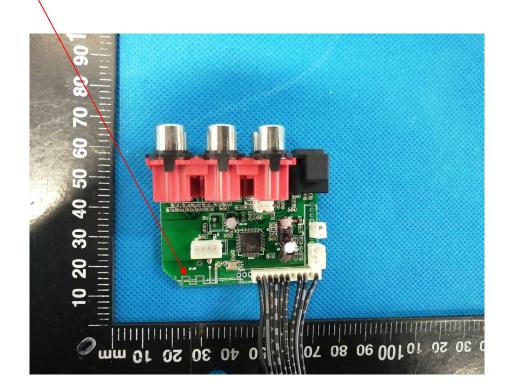
Refer to statement below for compliance.

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 0 dBi.

5.1.2 EUT Antenna





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:

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

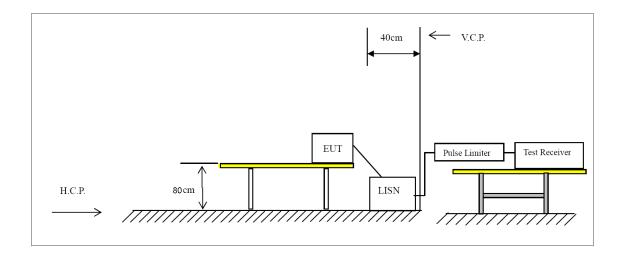
* Decreases with the logarithm of the frequency.

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.



5.2.3 Test setup



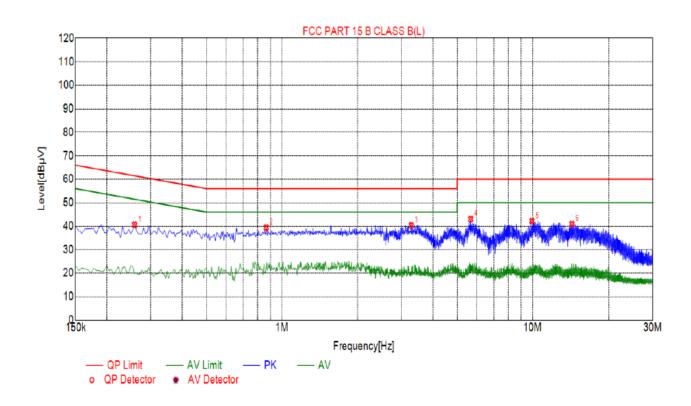


5.2.4 Test results

PASS

All the test modes completed for test. only the worst result of High Channel was reported as below:

Test Specification: Line

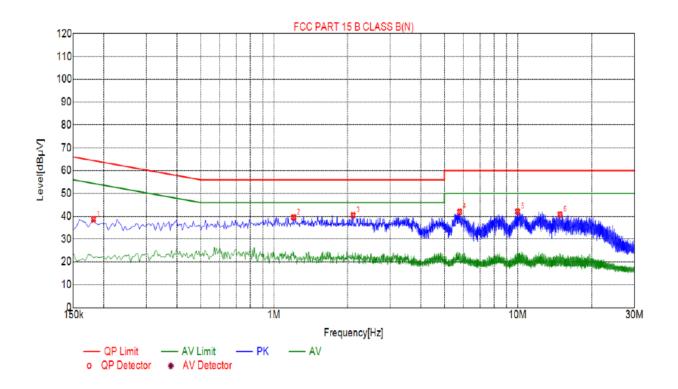


Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
1	0.2580	40.60	10.04	61.50	20.90	30.56	PK	L
2	0.8655	39.42	10.06	56.00	16.58	29.36	PK	L
3	3.2820	40.30	10.24	56.00	15.70	30.06	PK	L
4	5.6715	43.02	10.24	60.00	16.98	32.78	PK	L
5	9.9420	42.21	10.06	60.00	17.79	32.15	PK	L
6	14.2575	40.95	9.95	60.00	19.05	31.00	PK	L

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



Test Specification: Neutral



Sus	spected	l List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
1	0.1815	38.67	10.06	64.42	25.75	28.61	PK	N
2	1.2030	39.54	10.09	56.00	16.46	29.45	PK	N
3	2.1120	40.42	10.16	56.00	15.58	30.26	PK	N
4	5.7795	41.96	10.24	60.00	18.04	31.72	PK	N
5	9.9915	42.05	10.06	60.00	17.95	31.99	PK	N
6	14.8245	40.74	9.95	60.00	19.26	30.79	PK	N

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



5.3 Radiated Emissions Measurement

5.3.1 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 licence 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.

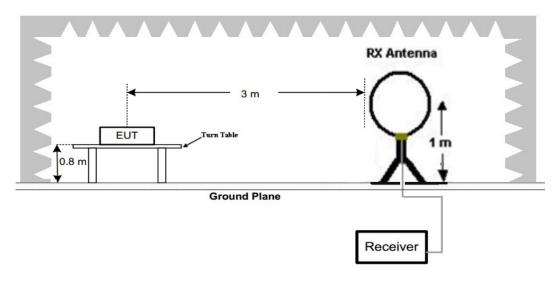
	T d d		
Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Radiated emission limits

5.3.2 Test setup

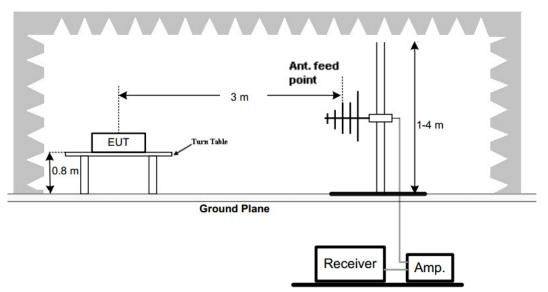
Test Configuration:

1) 9 kHz to 30 MHz emissions:



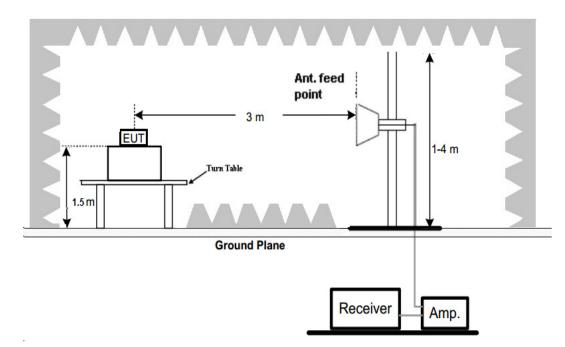


2) 30 MHz to 1 GHz emissions:



3)

1 GHz to 25 GHz emissions:



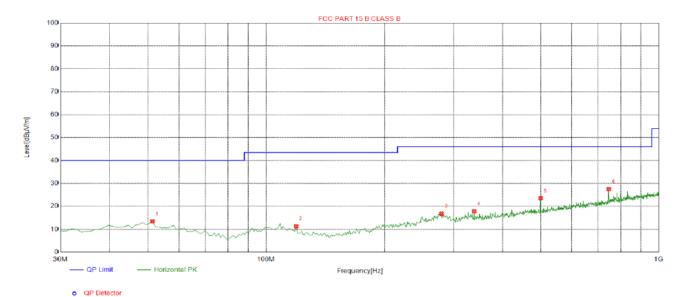
Test Procedure

- 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°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.



5.3.3 Test Result

Below 1GHz Test Results: Antenna polarity: H

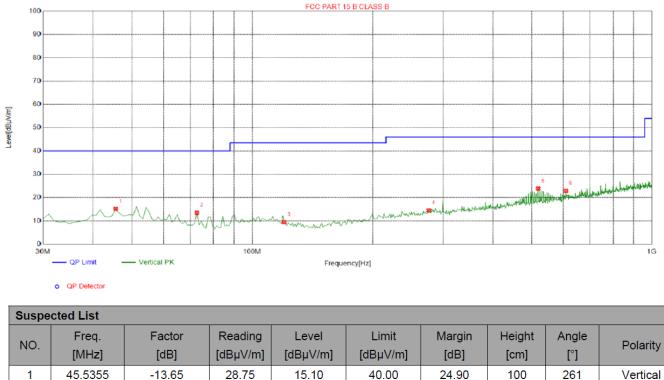


Suspe	Suspected List											
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	51.3614	-13.86	27.28	13.42	40.00	26.58	100	71	Horizontal			
2	119.3293	-16.99	28.24	11.25	43.50	32.25	100	230	Horizontal			
3	279.5395	-13.27	30.05	16.78	46.00	29.22	100	255	Horizontal			
4	338.7688	-11.63	29.46	17.83	46.00	28.17	100	16	Horizontal			
5	499.9500	-8.30	31.82	23.52	46.00	22.48	100	297	Horizontal			
6	745.6056	-3.90	31.39	27.49	46.00	18.51	100	310	Horizontal			

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



Antenna polarity: V



1	45.5355	-13.65	28.75	15.10	40.00	24.90	100	261	Vertical
2	72.7227	-18.16	31.63	13.47	40.00	26.53	100	172	Vertical
3	120.3003	-17.14	26.57	9.43	43.50	34.07	100	284	Vertical
 4	276.6266	-13.39	27.93	14.54	46.00	31.46	100	226	Vertical
5	519.3694	-7.75	31.61	23.86	46.00	22.14	100	0	Vertical
6	609.6697	-5.58	28.45	22.87	46.00	23.13	100	72	Vertical

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

Remark :

(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.

(2) * 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.

(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.



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)	Detector Type
4804	57.99	-3.65	54.34	74.00	-19.66	peak
4804	46.32	-3.65	42.67	54.00	-11.33	AVG
7206	55.71	-0.95	54.76	74.00	-19.24	peak
7206	41.30	-0.95	40.35	54.00	-13.65	AVG
Remark: Facto	or = Antenna Fac	ctor + Cable Lo	oss – Pre-amplifier			

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804	58.62	-3.65	54.97	74.00	-19.03	peak
4804	45.67	-3.65	42.02	54.00	-11.98	AVG
7206	54.98	-0.95	54.03	74.00	-19.97	peak
7206	40.61	-0.95	39.66	54.00	-14.34	AVG
Remark: Facto	or = Antenna Fa	ctor + Cable Lo	oss – Pre-amplifier.			





CH Middle (2440MHz) Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4880.00	57.68	-3.54	54.14	74.00	-19.86	peak
4880.00	43.67	-3.54	40.13	54.00	-13.87	AVG
7320.00	56.24	-0.81	55.43	74.00	-18.57	peak
7320.00	43.32	-0.81	42.51	54.00	-11.49	AVG
Remark: Facto	or = Antenna Fac	ctor + Cable Lo	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	58.03	-3.54	54.49	74.00	-19.51	peak
4880.00	46.35	-3.54	42.81	54.00	-11.19	AVG
7320.00	53.66	-0.81	52.85	74.00	-21.15	peak
7320.00	40.72	-0.81	39.91	54.00	-14.09	AVG
Remark: Facto	or = Antenna Fao	ctor + Cable Lo	oss – Pre-amplifier.			



CH High (2480MHz) Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960	58.11	-3.43	54.68	74.00	-19.32	peak
4960	45.67	-3.44	42.23	54.00	-11.77	AVG
7440	55.78	-0.77	55.01	74.00	-18.99	peak
7440	40.32	-0.77	39.55	54.00	-14.45	AVG
Remark: Facto	r = Antenna Fa	ctor + Cable Lo	oss – Pre-amplifier			

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960	58.46	-3.43	55.03	74.00	-18.97	peak
4960	45.32	-3.44	41.88	54.00	-12.12	AVG
7440	57.71	-0.77	56.94	74.00	-17.06	peak
7440	38.03	-0.77	37.26	54.00	-16.74	AVG
			Dra analifian			

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

Remark:

(1) Measuring frequencies from 1 GHz to the 25 GHz $_{\circ}$

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



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	59.62	-5.81	53.81	74	-20.19	peak
2310.00	/	-5.81	/	54	1	AVG
2390.00	56.47	-5.84	50.63	74	-23.37	peak
2390.00	/	-5.84	1	54	1	AVG
2400.00	57.88	-5.84	52.04	74	-21.96	peak
2400.00	/	-5.84	/	54	1	AVG
Remark: Facto	or = Antenna Fa	ctor + Cable Lo	ss – Pre-amplifier		-	-

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310.00	57.82	-5.81	52.01	74	-21.99	peak
2310.00	/	-5.81	1	54	1	AVG
2390.00	55.49	-5.84	49.65	74	-24.35	peak
2390.00	/	-5.84	1	54	1	AVG
2400.00	58.33	-5.84	52.49	74	-21.51	peak
2400.00	/	-5.84	1	54	1	AVG
Remark: Facto	or = Antenna Fa	ctor + Cable Lo	oss – Pre-amplifier		•	•



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	56.62	-5.81	50.81	74	-23.19	peak			
2483.50	/	-5.81	/	54	/	AVG			
2500.00	53.64	-6.06	47.58	74	-26.42	peak			
2500.00	/	-6.06	/	54	/	AVG			
Remark: Facto	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)	Туре			
2483.50	54.28	-5.81	48.47	74	-25.53	peak			
2483.50	/	-5.81	/	54	1	AVG			
2500.00	55.67	-6.06	49.61	74	-24.39	peak			
2500.00	/	-6.06	/	54	/	AVG			
Remark: Facto	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								
Remark: All the	emark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.								



5.4 Maximum Output Power Measurement

5.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

5.4.2 Test procedure

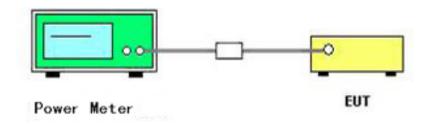
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF power meter with a thermocouple derector 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	2.486		Pass
Middle	2440	1.878	30	Pass
High	2480	1.663		Pass



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

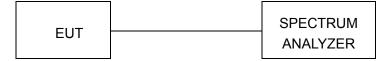
Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

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.

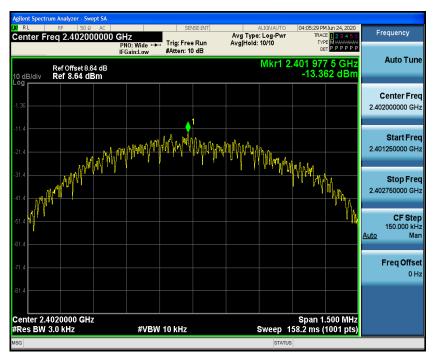
5.5.4 Test setup





5.5.5 Test results

Channel	Channel frequency (MHz)	Power Spectral Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low	2402	-13.36		Pass
Middle	2440	-13.44	8.00	Pass
High	2480	-13.87		Pass



CH 00

CH 19









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



5.6.5 Test result

Channel	Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	2402	0.7166		Pass
Middle	2440	0.7198	≥500	Pass
High	2480	0.7160		Pass

CH 00









Page 32 of 44 CH 39

Agilent Spectrum Analyzer - Occupied BW	/						
Center Freq 2.480000000		SENSE:INT Center Freq: 2.480	000000 GHz	ALIGNAUTO	Radio Std	M Jun 24, 2020 None	Frequency
		Frig: Free Run Atten: 30 dB	Avg Hold	: 1/1	Radio Dev	rice: BTS	
Ref Offset 8.64 dB				Mkr1		255 GHz 68 dBm	
Log 10.0 0.00		1-					Center Freq 2.48000000 GHz
-10.0							
-30.0 -40.0 -50.0 Manylulim/Angunanylulim/Angunanylulim	~~			marper	"programment	Am	
-60.0							
Center 2.48 GHz #Res BW 100 kHz		#VBW 300	kHz			an 6 MHz 1.067 ms	CF Step 600.000 kHz
Occupied Bandwidth	1	Total	Power	7.53	dBm		<u>Auto</u> Man
1.0	0826 MHz	Z					Freq Offset
Transmit Freq Error	7.290 kH	z OBW	Power	99	.00 %		0 Hz
x dB Bandwidth	716.0 kH	z xdB		-6.0	00 dB		
MSG				STATUS			



5.7 Occupied Bandwidth

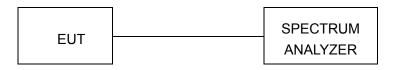
5.7.1 Test procedure

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



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 bandedge, 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.

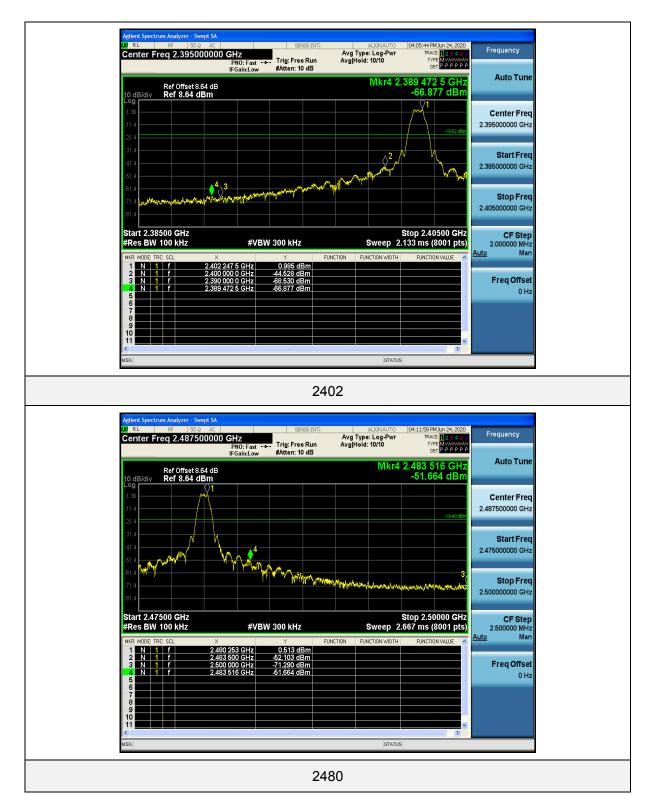
5.8.4 Test setup





5.8.5 Test results

PASS





5.9 Conducted Spurious Emissions

5.9.1 Applied procedures / Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section (b)(3) of RSS 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. For below 30MHz,For 9KHz-150kHz,150K-10MHz,We use the RBW 1KHz,10KHz, So the limit need to

calculated by "10lg(BW1/BW2)". for example For9KHz-150kHz,RBW 1KHz, The Limit= the highest emission level-20-10log(100/1)= the highest emission level-40.

5.9.2 Test procedure

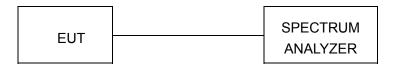
a.The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b.Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, 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





5.9.5 Test results



URL 04:06:09 PM Jun 24, 2020 Center Freq 515.000000 MHz Avg Type: Log-Pwr Avg|Hold: 10/10 PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 16 dB Auto Tune Mkr1 862.38 MHz -64.796 dBm Ref Offset 8.64 dB Ref 14.64 dBm 10 dB/div Log **Center Freq** 515.000000 MHz Start Freq 30.000000 MHz -19.22 d Stop Freq 1.00000000 GHz **CF Step** 97.000000 MHz <u>o</u> Man <u>Auto</u> 1 Freq Offset سامارينه 0 Hz ر) باشتر المعاد أدع ال Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.80 ms (8001 pts) #VBW 300 kHz

CH 00





X RL	rum Analyzer - Swe RF 50 Ω req 13.0000	AC 00000 G	Hz I0: Fast ↔	. Trig: Free			ALIGNAUTO :: Log-Pwr : 5/10	TRAC	1) un 24, 2020 E 1 2 3 4 5 6 E M WWWWWW T P P P P P P	Frequency
10 dB/div Log	Ref Offset 8.64 Ref 14.64 d	4 dB	iain:Low	#Atten: 16	6 dB		М	kr2 24.6	97 GHz 40 dBm	Auto Tune
4.64	↓									Center Fred 13.000000000 GH;
-5.36									-19.22 dBm	Start Free 1.000000000 GH
-25.4										Stop Fre 25.000000000 GH
-45.4										CF Ste 2.40000000 GH <u>Auto</u> Ma
-65.4		te estado de	han an a	al and tail	w~~~^	at and the state of the state o	le distriction de la companya de la La companya de la comp	ut un de		Freq Offse 0 H
-75.4			~					Stop 2		
Start 1.00 #Res BW			#VBW	300 kHz			Sweep status	2.294 s (5.00 GHz 8001 pts)	

CH 19



Report No.: HK2006191548-2E



Page 39 of 44

	um Analyzer - Swept SA							
XXIRL	RF 50 Ω AC		SENSE:INT		ALIGN AUTO		4 Jun 24, 2020 E 1 2 3 4 5 6	Frequency
Center Fi	req 515.00000	DIMITZ PNO: Fast +++	Trig: Free Run	Avg Type Avg Hold:		TYF	E M WARAHARARA	
		IFGain:Low	#Atten: 16 dB			De	ТРРРРР	
	B. (M	kr1 745.	98 MHz	Auto Tune
10 dB/div	Ref Offset 8.64 dE Ref 14.64 dBm		Mkr1 745.98 MHz -64.327 dBm					
	Kei 14.04 übii							
								Center Fred
4.64								515.000000 MH
								010.00000 Min
5.36								
0.00								Start Fred
								30.000000 MHz
-15.4							-19.38 dBm	
25.4								Stop Fred
								1.000000000 GH;
35.4								
45.4								CF Step
								97.000000 MH
55.4								<u>Auto</u> Mar
33.4					. 1			
					•			Freq Offset
-65.4	dagaal (the off story and story	والروابية وتراويه ويراريه	فيروار والمانية وأرامي والمتقارب الروير وأ	and the standing of	n an	Anning and a second	tanjuhandat,	0 Hz
Instantial	niewyji pilot pinalizacją dwibi.	and the second	بالمتصبيط فروساتهم والمروه	م فالمع إخار وما له و	un and a state of the second secon	C all and a state of the	unitelity with the second	
75.4								
	841					2 4		
Start 30.0		40 (0) 10	000 1/11-				0000 GHz	
#Res BW	TUU KHZ	#VBW	300 kHz		sweep 9	2.80 ms (8001 pts)	
MSG					STATUS			

	rum Analyzer - Swe									
Center F	RF 50 Ω Teq 13.0000				ISE:INT		LIGNAUTO	TRAC	1 Jun 24, 2020 E 1 2 3 4 5 6	Frequency
			NO: Fast 🔸 Gain:Low	#Atten: 16		Avginoid.			E MWWWWWW T P P P P P P	Auto Tune
10 dB/div Log	Ref Offset 8.6 Ref 14.64 d						M		97 GHz 42 dBm	
4.64	¢ ¹									Center Freq 13.000000000 GHz
-5.36									-19.38 dBm	Start Freq 1.000000000 GHz
-25.4										Stop Freq 25.000000000 GHz
-45.4									2	CF Step 2.40000000 GHz <u>Auto</u> Man
-65.4		tin in the	tereta da		ار مېرې د مېرونه ولو ولو ولو ولو ولو ولو ولو ولو ولو ول		فالمريانين فيريه	A. Antonia		Freq Offset 0 Hz
-75.4								010		
Start 1.00 #Res BW			#VBW	300 kHz			Sweep		5.00 GHz 8001 pts)	
MSG							STATUS			



CH 3	9
------	---



q 515.0000 Ref Offset 8.64 Ref 14.64 dE	Př IFG dB	NO: Fast ↔ Sain:Low	Trig: Free #Atten: 16		Avg Type Avg Hold:		۲۷۴ DR Ikr1 928.	23456 MMMMM PPPPPP 22 MHz	Frequency Auto Tune
						M	kr1 928.	22 MHz	Auto Tune
							-00.1	64 dBm	
									Center Fre 515.000000 MH
								-19.74 dBm	Start Fre 30.000000 MH
									Stop Fre 1.000000000 G⊦
									CF Ste 97.000000 M⊦ <u>Auto</u> Ma
					4		in this of a contra	♦ ¹	Freq Offse
hiarathranan i Marathranan Marathranan		in an	ana ina mpikalahana Ina muliya di Sada In		n manga di sebagai Anta di sebagai di sebagai Anta di sebagai di sebagai	ing an	na na seria da la posta Della filma (na finale)	aradyar ya patés Manasir	0 H
Hz 10 kHz		#VBW	300 kHz			Sweep			
Í	Hz		els en a poply conta a los plas des entre els de los de	en se a service nomen se service and service and set in a simulation of the service and the set of the service Hz	n et angle en et al fan an episie on ein de fan in de fan en	en er oppensierten kan gin generen en der eine ster einen werden kan der kennen kan der eine kan der eine kan d H 2	ne za populari z konzekto da presidencia da presidenta da presidente da presidente da presidente da presidente Hz 0 kHz #VBW 300 kHz Sweep	en en en provinsi en el a forme de la companya en accessione en el plan en en el plan en de la companya en acce Hz Stop 1.0	Angeling has a second of the s

Report No.: HK2006191548-2E



Page 41 of 44

	um Analyzer - Swept SA								
IRL	RF 50 Ω AC req 13.00000000	SENSE:INT			ALIGN AUTO Avg Type: Log-Pwr		04:12:42 PM Jun 24, 2020 TRACE 1 2 3 4 5 6		Frequency
	leq 15.00000000	PNO: Fast +++ Trig: Free Run			Avg Hold: 5/10		TYPE MWWWWWWWW DET P P P P P P		
		IFGain:Low	#Atten: 10	6 dB					Auto Tun
	Ref Offset 8.64 dB Mkr2 24.709 GH								
0 dB/div Ref 14.64 dBm -53.297 dBm									
.og									
4.64									Center Fre
4.04	\sum								13.000000000 GH
5.36									Start Fre
									1.000000000 GH
15.4								-19.74 dBm	1.000000000000
25.4									Stop Fre
									25.000000000 GH
35.4									
									CF Ste
45.4								2	2.400000000 GH
									<u>Auto</u> Ma
55.4						1.01.001	in the second		
	ridhan	ر م الديد		why hy h	land the state		Y VE NEW		Freq Offse
65.4 10-11 (9)	A PROPERTY OF A PROPERTY OF	Phylography and the state of th		<u>م بالتي التي ا</u>	" <mark>,</mark> "				0 H
distanti									ОП
75.4									
	CH-						Oton 2	5 00 CH2	
Start 1.00 GHz Stop 25.00 GHz Stop 25.00 GHz Res BW 100 kHz #VBW 300 kHz Sweep 2.294 s (8001 pts)									
SIATUS									

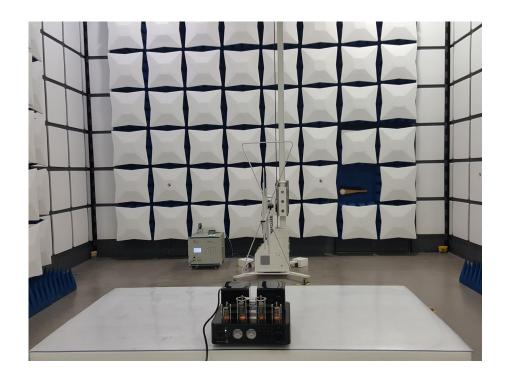


6 Test setup photo

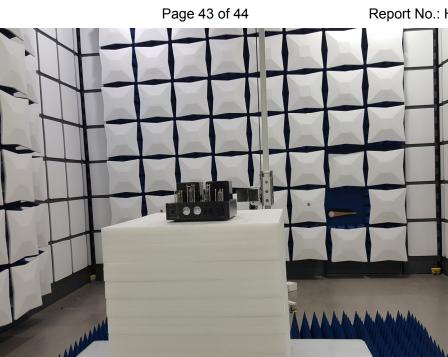
Conducted Emission



Radiated Emissions









7 PHOTOS OF THE EUT

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

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