Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

FCC 15.247 & RSS-247
2.4 GHz Test Report

for

Qisda Corporation

157, Shan-Ying Road, Gueishan,
Taoyuan 333, Taiwan, R.O.C.

Product Name	:	**LCD Monitor**
Model Name	:	**(1)HSD-0015-Q (2)OMEN X 65 (3)Omen X Emperium 65 Display (4)OMEN X Emperium 65 with NVIDIA G-SYNC HDR (5)OMEN X Emperium 65 Big Format Gaming Display with NVIDIA G-SYNC HDR**
Brand		**HP**
REF. No.	:	**RL-24029, RL-24472**
FCC ID	:	**VRSHSD-0015-Q**
IC	:	**8729A-HSD0015Q**

Prepared by: : **AUDIX Technology Corporation, EMC Department**

Testing Laboratory
1724

TESTING
NVLAP LAB CODE 200077-0

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

TABLE OF CONTENTS

Description Page

TEST REPORT CERTIFICATION 4
1. REVISION RECORD OF TEST REPORT 5
2. SUMMARY OF TEST RESULTS 6
3. GENERAL INFORMATION 7
3.1. Description of Application 7
3.2. Description of EUT 8
3.3. Antenna Information 9
3.4. EUT Specifications Assessed in Current Report 10
3.5. Descriptions of Key Components 11
3.6. Data Rate Relative to Output Power 12
3.7. Test Configuration 13
3.8. Tested Supporting System List 15
3.9. Setup Configuration 17
3.10. Operating Condition of EUT 17
3.11. Description of Test Facility 18
3.12. Measurement Uncertainty 18
4. MEASUREMENT EQUIPMENT LIST 19
4.1. Conducted Emission Measurement 19
4.2. Radiated Emission Measurement 19
4.3. RF Conducted Measurement 19
5. CONDUCTED EMISSION 20
5.1. Block Diagram of Test Setup 20
5.2. Conducted Emission Limit 20
5.3. Test Procedure 20
5.4. Test Results 20
6. RADIATED EMISSION 21
6.1. Block Diagram of Test Setup 21
6.2. Radiated Emission Limits 22
6.3. Test Procedure 23
6.4. Measurement Result Explanation 24
6.5. Test Results 24
7. 6dB BANDWIDTH 25
7.1. Block Diagram of Test Setup 25
7.2. Specification Limits 25
7.3. Test Procedure 25
7.4. Test Results 25
8. MAXIMUM PEAK OUTPUT POWER 26
8.1. Block Diagram of Test Setup 26
8.2. Specification Limits 26
8.3. Test Procedure 27
8.4. Test Results 27
9. EMISSION LIMITATIONS 28
9.1. Block Diagram of Test Setup 28
9.2. Specification Limits 28

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

9.3. Test Procedure 28
9.4. Test Results 29
10. POWER SPECTRAL DENSITY 30
10.1. Block Diagram of Test Setup 30
10.2. Specification Limits 30
10.3. Test Procedure 30
10.4. Test Results 30
11. DEVIATION TO TEST SPECIFICATIONS 31

APPENDIX A TEST DATA AND PLOTS
APPENDIX B TEST PHOTOGRAPHS

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

TEST REPORT CERTIFICATION

Applicant	:	Qisda Corporation
Manufacturer	:	Qisda Corporation
Factory #1	:	Qisda (Suzhou) Co., Ltd.
Factory #2	:	Qisda Czech s.r.o.
Factory #3	:	Qisda Czech s.r.o.
Factory #4	:	QisdaOptronics (Suzhou) Co., Ltd.
Factory #5	:	Shanghai Hewiett-Packard Co., Ltd.
Factory #6	:	HP Singapore Personal Service Division Asia.
Factory #7	:	Hewiett-Packard Company
EUT Description		
(1) Product	:	LCD Monitor
(2) Model	:	(1)HSD-0015-Q (2)OMEN X 65 (3)Omen X Emperium 65 Display (4)OMEN X Emperium 65 with NVIDIA G-SYNC HDR (5)OMEN X Emperium 65 Big Format Gaming Display with NVIDIA G-SYNC HDR
(3) Brand	:	HP
(4) Ref. No.	:	RL-24029, RL-24472
(5) Power Rating	:	AC 100-240V, 50/60Hz

Applicable Standards:

47 CFR FCC Part 15 Subpart C
RSS-Gen (Issue 5), April 2018
RSS-247 (Issue 2), February 2017
ANSI C63.10:2013
KDB 558074 D01 DTS Meas Guidance v05

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.
Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2018. 12. 22

Reviewed by: Annie Yu (Annie Yu/Administrator)

Approved by: Ben Cheng (Ben Cheng/Manager)

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2018. 12. 22	Original Report	EM-F180509

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	**PASS**
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.247(a)(2)	RSS-247 §5.2(1)	6dB Bandwidth	**PASS**
15.247(b)(3)	RSS-247 §5.4(4)	Maximum Peak Output	**PASS**
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.247 (e)	RSS-247 §5.2(2)	Peak Power Spectral Density	**PASS**
15.203	RSS-Gen §8.3	Antenna Requirement	**Compliance**

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Qisda Corporation 157, Shan-Ying Road, Gueishan,Taoyuan 333, Taiwan, R.O.C.
Manufacturer	Qisda Corporation NO. 157 & 159, SHANYING RD., GUEISHAN DIST., TAOYUAN CITY 33341, TAIWAN, R.O.C.
Factory #1	Qisda (Suzhou) Co., Ltd. No. 169, Zhujiang Road, New District, Suzhou, Jiangsu Province, P.R. China
Factory #2	Qisda Czech s.r.o. Turanka 114, 62700 BmoSlatina Czech Repubilc
Factory #3	Qisda Czech s.r.o. Turanka 98B, 62700 BmoSlatina Czech Repubilc
Factory #4	Qisda Optronics(Suzhou)Co., Ltd No. 169, Zhujiang Road, New District, Suzhou, Jiangsu Province, P.R. China
Factory #5	Shanghai Hewiett-Packard Co., Ltd. 25 Yun Qiao Rd., Pudong, 201206 Shanghai, China.
Factory #6	HP Singapore Personal Service Division Asia. 452 ALEXSNDRA ROAD SINGAPORE 119961
Factory #7	Hewiett-Packard Company 11445 Compaq Center Drive West Houston, TX77070, U.S.A.
Product	LCD Monitor
Brand	HP
Model	(1)HSD-0015-Q (2)OMEN X 65 (3)Omen X Emperium 65 Display (4)OMEN X Emperium 65 with NVIDIA G-SYNC HDR (5)OMEN X Emperium 65 Big Format Gaming Display with NVIDIA G-SYNC HDR The difference between above models is in sales marketing.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

3.2. Description of EUT

<table>
<tr><td>Test Model</td><td>HSD-0015-Q</td></tr>
<tr><td>Serial Number</td><td>N/A</td></tr>
<tr><td>Power Rating</td><td>AC 100-240, 50/60Hz</td></tr>
<tr><td>RF Features</td><td>WLAN:802.11a/b/g/n/ac
Bluetooth: BT and BLE</td></tr>
<tr><td>Transmit Type</td><td>
<table>
<tr><th colspan="2">2.4 GHz</th></tr>
<tr><td>802.11b</td><td>1T1R</td></tr>
<tr><td>802.11g</td><td>1T1R</td></tr>
<tr><td>802.11n-HT20</td><td>2T2R</td></tr>
<tr><td>BT/BLE</td><td>1T1R</td></tr>
<tr><th colspan="2">UNII Bands</th></tr>
<tr><td>802.11a</td><td>1T1R</td></tr>
<tr><td>802.11n-HT20/
802.11ac-VHT20</td><td>2T2R</td></tr>
<tr><td>802.11n-HT40/
802.11ac-VHT40</td><td>2T2R</td></tr>
<tr><td>802.11ac-VHT80</td><td>2T2R</td></tr>
</table>
</td></tr>
<tr><td>Sample Status</td><td>Production</td></tr>
<tr><td>Date of Receipt</td><td>2018. 09. 26</td></tr>
<tr><td>Date of Test</td><td>2018. 10. 08 ~ 12. 22</td></tr>
<tr><td>Interface Ports of EUT</td><td>
Left Side View

One RJ-45 Port
Two USB Type A Down Stream Ports
One Display Port
Two HDMI Ports
One HDMI (ARC) Port
One S/PDIF Port
One Headphone out Port

Right Side View

Two USB Type A Charge Port

Back View

One DC In Port

</td></tr>
<tr><td>Accessories Supplied</td><td>

Display Cable
HDMI Cable
AC Power Cord (3C)
SHIELD Remote (FCC ID:VOB -P2930/IC: 7361A-P2930)

</td></tr>
</table>

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.3. Antenna Information

2.4G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	AEM6Y-100000 (Main)	ACON	PIFA	2400	-0.07
				2450	-0.42
				2500	-0.57
2	AEM6Y-100001 (AUX)	ACON	PIFA	2400	2.73
				2450	2.43
				2500	2.53

5G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	AEM6Y-100000 (Main)	ACON	PIFA	5150	2.89
				5350	2.77
				5470	2.98
				5850	1.32
2	AEM6Y-100001 (AUX)	ACON	PIFA	5150	3.86
				5350	2.93
				5470	2.64
				5850	1.71

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.4. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
802.11b	2412-2462	11	DSSS (DBPSK/DQPSK/CCK)	Up to 11
802.11g		11	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20				Up to 144.4
BLE	2402-2480	40	GFSK	1

Channel List	
802.11 b/g/n-HT20	
Channel Number	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

Channel List							
BLE							
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
37	2402	09	2422	18	2442	28	2462
00	2404	10	2424	19	2444	29	2464
01	2406	38	2426	20	2446	30	2466
02	2408	11	2428	21	2448	31	2468
03	2410	12	2430	22	2450	32	2470
04	2412	13	2432	23	2452	33	2472
05	2414	14	2434	24	2454	34	2474
06	2416	15	2436	25	2456	35	2476
07	2418	16	2438	26	2458	36	2478
08	2420	17	2440	27	2460	39	2480

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

RMS Output Power (dBm)			
Channel	802.11b	802.11g	802.11n-HT20
1	17.61	15.02	16.49
2	19.1	16.7	19.14
3	20.22	19.62	21.56
4	20.25	19.57	21.2
5	20.33	19.56	21.35
6	20.51	19.58	21.93
7	20.37	19.55	21.97
8	20.34	19.6	21.81
9	20.27	19.54	21.82
10	18.7	16.17	18.79
11	17.24	15.6	17.96

3.5. Descriptions of Key Components

None.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.6. Data Rate Relative to Output Power

802.11b			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
1	DBPSK	1	19.87
1	DQPSK	2	19.72
1	CCK	5.5	19.68
1	CCK	11	19.61

802.11g			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
1	BPSK	6	20.82
1	BPSK	9	20.79
1	QPSK	12	20.75
1	QPSK	18	20.77
1	16-QAM	24	20.73
1	16-QAM	36	20.67
1	64-QAM	48	20.69
1	64-QAM	54	20.71

802.11n-HT20			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
1	BPSK	MCS8	23.87
1	QPSK	MCS9	23.81
1	QPSK	MCS10	23.83
1	16-QAM	MCS11	23.79
1	16-QAM	MCS12	23.77
1	64-QAM	MCS13	23.75
1	64-QAM	MCS14	23.76
1	64-QAM	MCS15	23.74

BLE			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
0	GFSK	1	4.56

Note: Above results are assessed in peak power.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

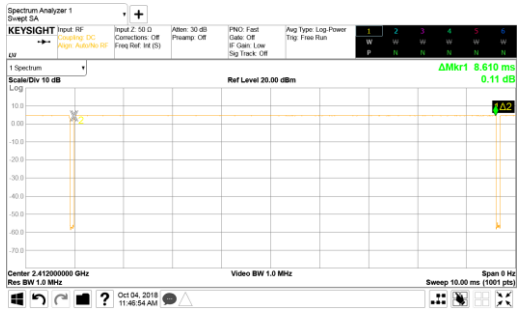
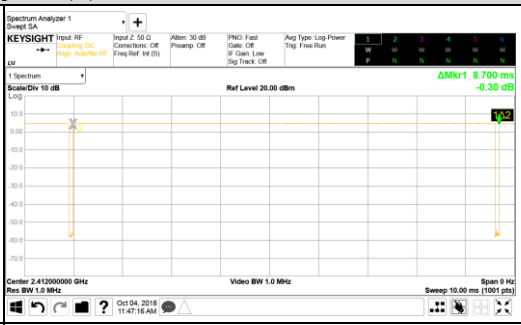
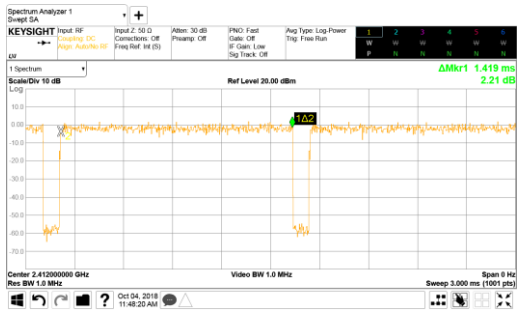
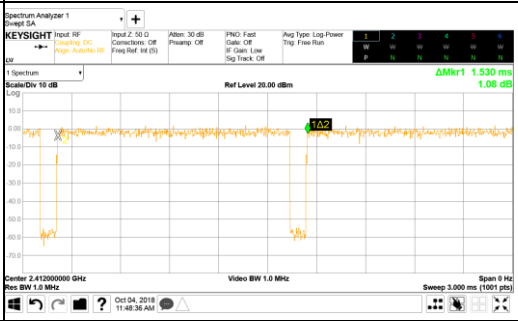
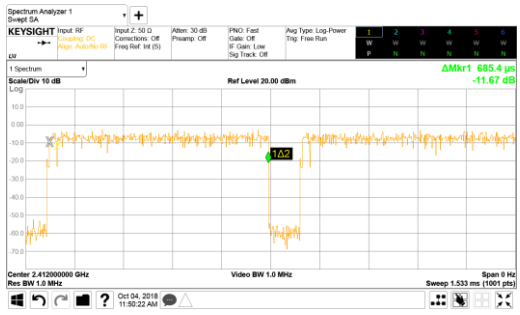
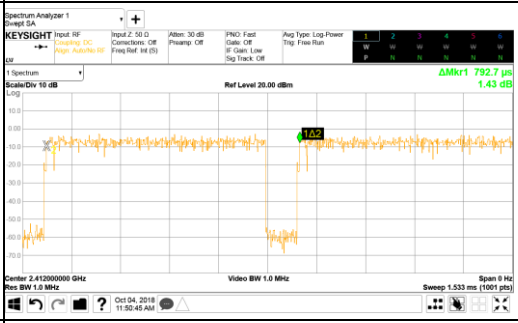
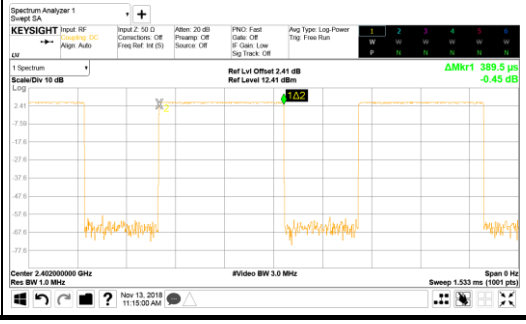
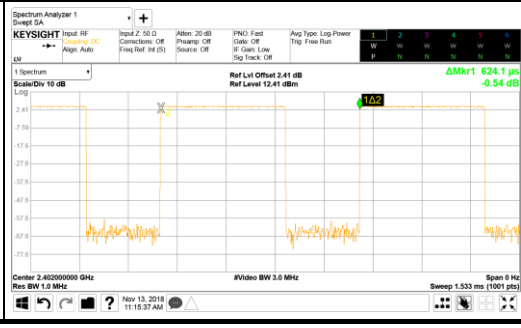
Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

3.7. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11b	0.990	8.61	0
802.11g	0.927	1.419	0.33
802.11n-HT20	0.865	0.6854	0.63
BLE	0.624	0.3895	2.05

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.

Mode	Duty Cycle (x)	
802.11b		
802.11g		
802.11n-HT20		
BLE		

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS8	1/11
		BLE	1Mbps	37/39
	Radiated Spurious Emission Note1 & 2	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11
		BLE	1Mbps	37/17/39
Conducted Test Case	6dB Bandwidth	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11/13
		BLE	1Mbps	37/17/39
	Peak Output Power	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11
		BLE	1Mbps	37/17/39
	Band Edge	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS8	1/11
		BLE	1Mbps	37/39
	Spurious Emission	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11
		BLE	1Mbps	37/17/39
	Peak Power Spectral Density	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS8	1/6/11
		BLE	1Mbps	37/17/39

Note 1: ■Mobile Device
□Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: □ Lie □ Side□ Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.8. Tested Supporting System List

3.8.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	Approval
1.	PC System	FUJITSU	ESPRIMO P757/E94+	S26361-K1444-V220	FCC By DoC
		HP	HP ProDesk 490 G1 MT Business PC	SGH437TNKC	FCC By DoC
2.	Notebook PC	Lenovo	TP00034A	895097	FCC By DoC
3.	Notebook PC	HP	P7Q52PA	N/A	Contains FCC ID:PD98260NG
4.	USB Keyboard	HP	KB-0316	N/A	FCC By DoC
5.	USB Mouse	HP	M-UAE96	FATSK0K8FYKADW	FCC By DoC
6.	Printer	HP	Deskjet 2000	CN25N13K36	FCC By DoC
7.	I-POD Player	APPLE	A1204	4H722TFVVTE	FCC By DoC
8.	USB 3.0 HDD #1	SONY	HD-B1	BBW3DEK78041FC8	FCC By DoC
	USB 3.0 HDD #2	SONY	HD-B1	BBW3DEK78041FC3	FCC By DoC
	USB 3.0 HDD #3	SONY	HD-B1	BBW3DEK78041FEF	FCC By DoC
	USB 3.0 HDD #4	SONY	HD-B1	BBW3DEK78041FE7	FCC By DoC
9.	DVD Player #1	SONY	BDP-S370	3213944	N/A
	DVD Player #2	SONY	BDP-S780	3201205	N/A
10.	Speaker	Edifier	S330D	N/A	N/A
11.	Earphone	LGITON	FS-99	N/A	N/A
12.	Wireless Router	D-Link	DIR-868L	R3WE1D7002319	FCC ID:KA2IR868LA1 Contains FCC ID: RRK2012060056-1

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.8.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	HDMI Cable: Shielded, Detachable, 1.8m, Bonded two ferrite cores DP Cable: Shielded, Detachable, 1.8m AC Power Cord: Unshielded, Detachable, 1.8m
2.	LAN Cable: Unshielded, Detachable, 3m
3.	USB Cable: Unshielded, Detachable, 1.5m Adapter: HP, M/N HSTNN-CA40, DC Cord：Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord：Unshielded, Detachable, 1.8m
4.	PS2 Cable: Shielded, Detachable, 1.8m
5.	USB Cable: Shielded, Detachable, 1.8m
6.	USB Cable: Unshielded, Detachable, 1.5m
7.	USB Cable: Unshielded, Detachable, 1.0m
8.	USB Cable: Unshielded, Detachable, 1.1m
9.	HDMI Cable: Shielded, Detachable, 1.8m
10.	Optical Cable: Unshielded, Detachable, 1.5m
11.	Audio Cable: Unshielded, Detachable, 1.1m
12.	LAN Cable: Unshielded, Detachable, 10m

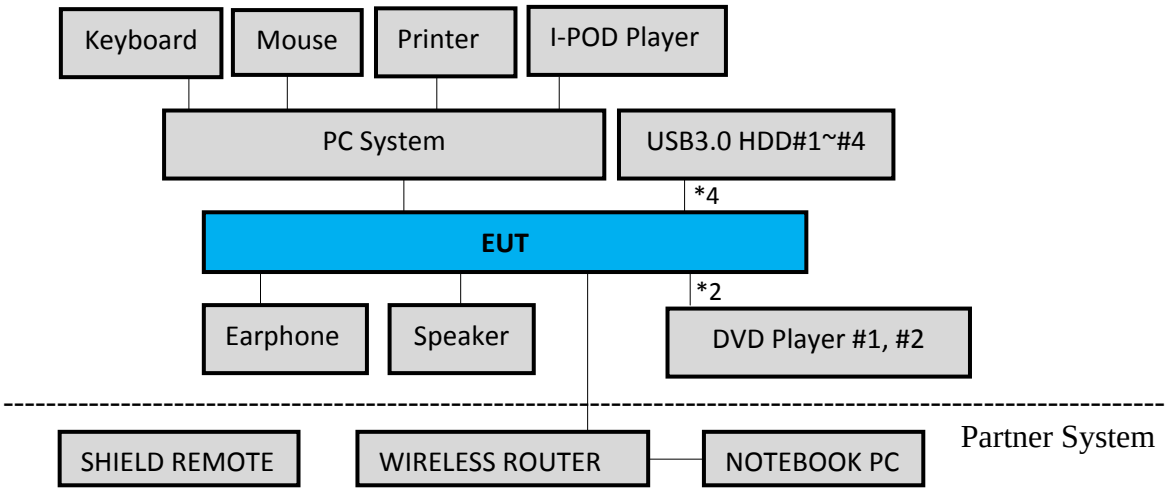
This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

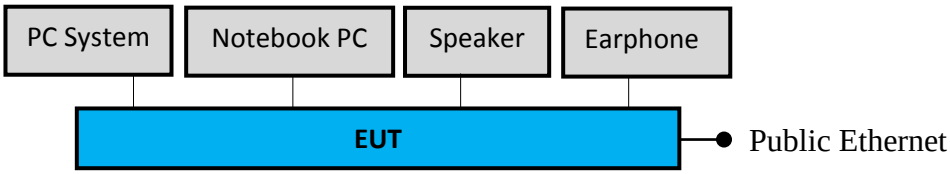
Tel: +886 2 26099301
Fax: +886 2 26099303

3.9. Setup Configuration

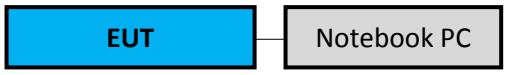
3.9.1. EUT Configuration for Power Line



3.9.2. EUT Configuration for Radiated Emission



3.9.3. EUT Configuration for RF Conducted Test Items



3.10. Operating Condition of EUT

Test program "cmd" is used for enabling EUT BT or WLAN function under continues transmitting and choosing data rate/ channel.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

3.11.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 (1) No. 8 Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.:5183B-1)

3.12.Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	±5.82dB

Remark：Uncertainty = $ku_c(y)$

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESCI	101276	2018. 03. 21	1 Year
2.	A.M.N.	R&S	ESH2-Z5	100366	2018. 07. 18	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-1539-3	2018. 01. 09	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	101495	2018. 01. 16	1 Year
5.	Signal Cable	Thermax/CDT	RG-142	CE-07	2018. 05. 24	1 Year
6.	Digital Thermo- Hygro Meter	iMax	HTC-1	No.7 S/R	2018. 04. 20	1 Year

4.2.Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2018. 09. 13	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2018. 06. 20	1 Year
3.	Amplifier	HP	8447D	2944A06305	2018. 01. 30	1 Year
4.	Amplifier	HP	8449B	3008A02678	2018. 03. 06	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2017. 12. 18	1 Year
6.	Bilog Antenna	CHASE	CBL6112D	33821	2018. 01. 21	1 Year
7.	Horn Antenna	EMCO	3115	9609-4927	2018. 06. 22	1 Year
8.	Horn Antenna	COM-POWER	AH-840	101092	2018. 05. 07	1 Year
9.	2.4GHz Notch Filter	K&L	7NSL10-2441. 5E130.5-00	1	2018. 07. 24	1 Year
10.	3GHz High-pass Filter	Microwave	H3G018G1	484796	2018. 08. 22	1 Year
11.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2018. 04. 20	1 Year
12.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3.RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2018. 04. 26	1 Year
2.	Power Meter	Anritsu	ML2495A	1145008	2018. 11. 07	1 Year
3.	Power Sensor	Anritsu	MA2411B	1126096	2018. 11. 07	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2018. 04. 20	1 Year

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

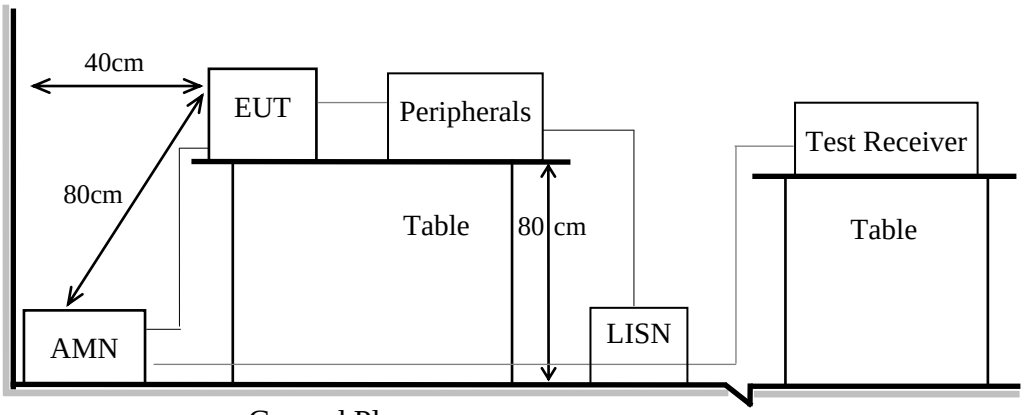
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.9

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.
2.: The lower limit applies to the band edges.

5.3. Test Procedure

5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.

5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).

5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)

5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

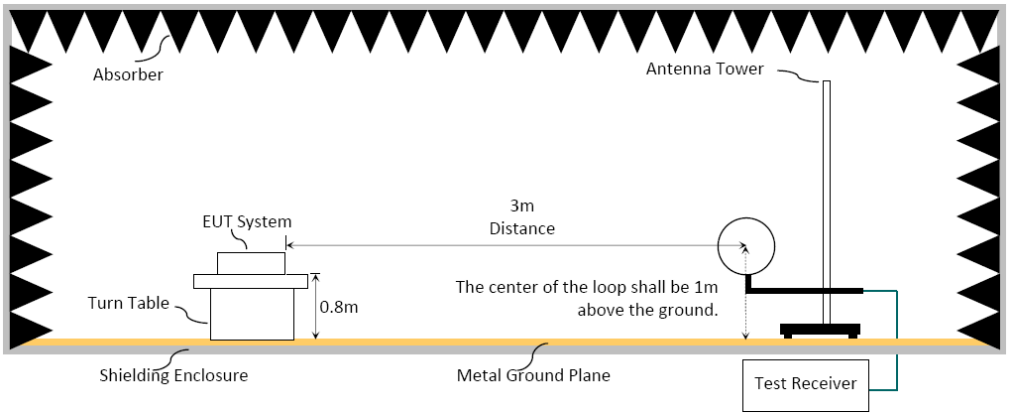
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

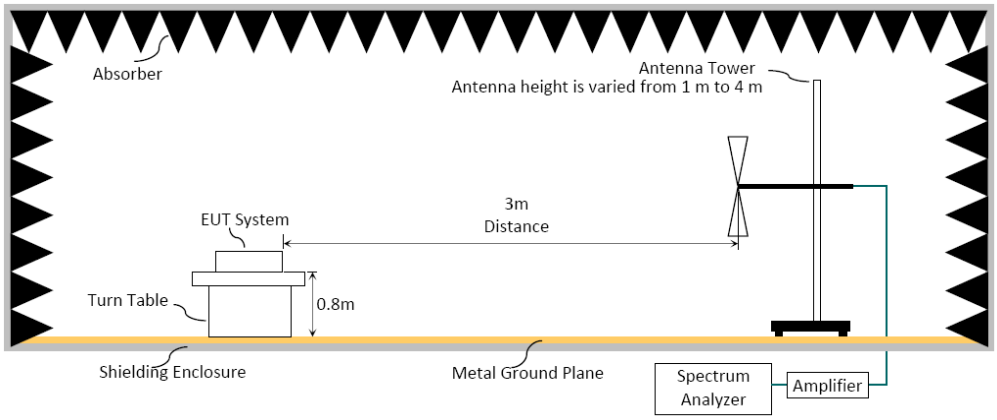
6.1.1. Block Diagram of EUT

Indicated as section 3.9

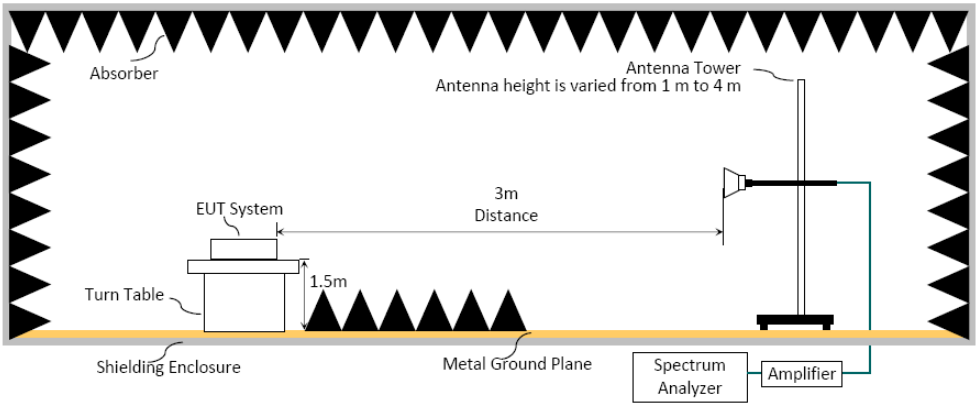
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



6.1.4. Setup Diagram for above 1GHz



This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	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
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)
(2) The tighter limit applies to the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) Fundamental and emission fall within operation band are exempted from this section.
(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.
In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.
(2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 25GHz:
The EUT setup on the turn table which has 80 cm (for 30-1000 MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1 GHz:
Spectrum Analyzer is used for pre-testing with following setting:
(1)RBW = 120KHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
(7)When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Frequency above 1GHz to 10th harmonic (up to 25 GHz):
Peak Detector:
(1)RBW = 1MHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
(7)When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Average Detector:

■Option 1:

(1)RBW = 1MHz
(2)VBW ≥ 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting (kHz)
BLE	0.3895	2.567	2.4
802.11b	8.61	0.116	0.01
802.11g	1.419	0.705	0.68
802.11n-HT20	0.6854	1.459	1.5

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is ≥98 %.
(1)Detector = Peak.
(2)Sweep time = auto.
(3)Trace mode = max hold.
(4)Allow sweeps to continue until the trace stabilizes.

□Option 2:

Average Emission Level= Peak Emission Level+ D.C.C.F.

6.4. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading
■Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading
□Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= 20log (TX_{on}/TX_{on+off}) presented in section 3.7
□ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

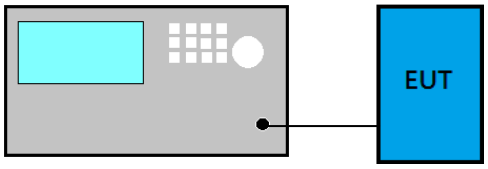
This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

7. 6dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The minimum 6dB bandwidth shall be at least 500kHz.

7.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

(1) Set RBW = 100 kHz.
(2) Set the video bandwidth (VBW) ≥ 3 × RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

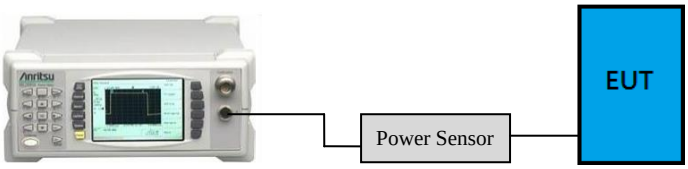
This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

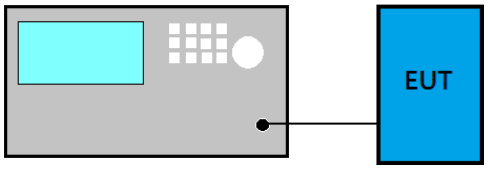
8. MAXIMUM PEAK OUTPUT POWER

8.1. Block Diagram of Test Setup

- For WLAN Function



- For BLE Function



8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■PKPM1 Peak power meter method:

EUT is connected to power sensor and record the maximum output power.

■Maximum peak conducted output power method:

(1) Set the RBW ≥ DTS bandwidth
(2) Set VBW ≥ 3 × RBW
(3) Set span ≥ 3 × RBW.
(4) Sweep time = auto couple
(5) Detector = peak.
(6) Trace mode = max hold.
(7) Allow trace to fully stabilize.
(8) Use peak marker function to determine the peak amplitude level.

■Method AVGPM (Measurement using an RF average power meter):

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

□Method AVGSA-2 (Spectrum channel power)

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 -5% of OBW
(3) Set the video bandwidth (VBW) ≥ 3 × RBW.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
(8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

8.4. Test Results

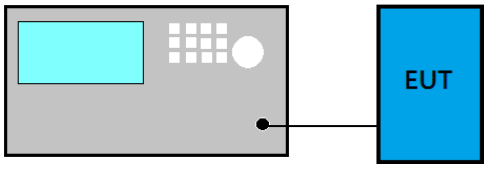
Please refer to Appendix A

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

9. EMISSION LIMITATIONS

9.1. Block Diagram of Test Setup



9.2. Specification Limits

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■Reference Level

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize to find the max PSD as reference level.

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

■Emission Level Measurement

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize to find the max level.

9.4. Test Results

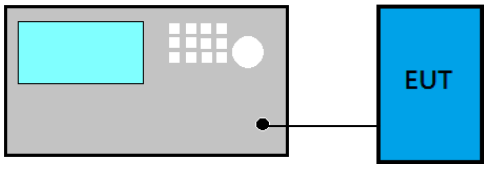
Please refer to Appendix A

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■Method PKPSD (peak PSD)

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize.
(9) Use the peak marker function to determine the maximum amplitude level.
(10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

□Method AVGPSD-2

(1) Using peak PSD procedure step 1 to step 4.
(2) Detector= RMS detector
(3) Sweep time = auto couple
(4) Trace mode = trace averaging over a minimum of 100 traces
(5) Use the peak marker function to determine the maximum amplitude level.
(6) Duty cycle factor is added when duty cycle presented in section 3.7 < 98%.
(7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

10.4. Test Results

Please refer to Appendix A

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

11. DEVIATION TO TEST SPECIFICATIONS

【NONE】

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX A

TEST DATA AND PLOTS

(Model: HSD-0015-Q)

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.

Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
Fax: +886 2 26099303

APPDNDIX B

TEST PHOTOGRAPHS

(Model: HSD-0015-Q)

This test report may be reproduced in full only. The document may only be updated by Audix Technology Corp. personnel. Any changes will be noted in the Document History section of the report.