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

FCC 15.247
2.4 GHz Report

for

VOXLAND SARL

CS90234 - 13311 Marseille Cedex 14

Brand	**:**	**BeeWi**
Product Name	**:**	**Smart Ethernet Gateway**
Model Name	**:**	**BEG200**
FCC ID	**:**	**ZKI-BEG200**

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

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

TABLE OF CONTENTS

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

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	:	VOXLAND SARL
Manufacture	:	Dongguan Quan Sheng Electric Co., Ltd.
Product Name	:	Smart Ethernet Gateway
Model No.	:	BEG200
Serial No.	:	N/A
Brand	:	BeeWi
Power Supply	:	DC 5V (Via jig powered by USB)

Applicable Standards:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2014
ANSI C63.4:2003
KDB 558074 D01 DTS Meas Guidance v03r02

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 Test: 2015. 04. 27 ~ 05. 07 Date of Report: 2015. 05. 11

Producer: Tina Huang
(Tina Huang/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

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

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2015. 05. 11	Original Report.	EM-F140823

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
15.207	Conducted Emission	**PASS**
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.247(a)	6dB Bandwidth	**PASS**
15.247(b)	Maximum Peak Output	**PASS**
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.247 (e)	Power Spectral Density	**PASS**
15.203	Antenna Requirement	**PASS**

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 EUT

Product	Smart Ethernet Gateway
Model Number	BEG200
Serial Number	N/A
Brand Name	BeeWi
Applicant	VOXLAND SARL CS90234 - 13311 Marseille Cedex 14
Manufacture	Dongguan Quan Sheng Electric Co., Ltd. CHU-TANG 2nd Industrial Park Hou-Chieh Twon Dongguan, Guangdong China
RF Features	Bluetooth Low Energy (BLE)
Transmit Type	1T1R
Micro USB Cable	Unshielded, Detachable, 0.5m
Ethernet Cable	Unshielded, Undetachable, 0.5m
Interface Ports	Micro USB Port *1
Date of Receipt of Sample	2015. 04. 20

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

3.2. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
BLE	2402-2480	40	GFSK, MSK	1, 2

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

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

Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain (dBi)
---	---	Chip Antenna	2402GHz	0.83
			2441GHz	-0.32
			2480GHz	-1.01

3.4. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
BLE	0.96	10.52	0.18

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.

AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge	BLE	1Mbps	00/39
	Radiated Spurious Emission	BLE	1Mbps	00/19/39
Conducted Test Case	6dB Bandwidth	BLE	1Mbps	00/19/39
	Peak Power Spectral Density	BLE	1Mbps	00/19/39
	Peak Output Power	BLE	1Mbps	00/19/39
	Band Edge	BLE	1Mbps	00/39
	Spurious Emission	BLE	1Mbps	00/19/39

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

3.5. Tested Supporting System List

3.5.1. Support Peripheral Unit

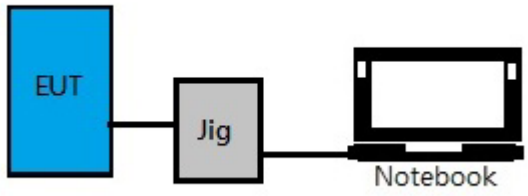
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2362	N/A	PPD-AAR5B225
2.	Test Jig	N/A	N/A	N/A	N/A

3.5.2. Cable Lists

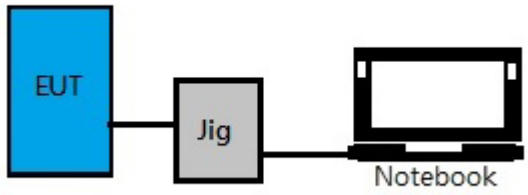
No.	Cable Description Of The Above Support Units
1.	USB Cable: Shielded, Detachable, 1.8m Adapter: Chicony, M/N CPA09-A065N1, DC Cord: Shielded, Undetachable, 1.8m Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.8m
2.	USB Cable: Unshielded, Detachable, 1.5m

3.6. Setup Configuration

3.6.1. EUT Configuration for Power Line and Radiated Emission



3.6.2. EUT Configuration for Conducted Test Items



3.7. Operating Condition of EUT

Test program “SmartRF studio 7” is used for enabling EUT RF function under continues transmitting and choosing data rate/ channel.

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

3.8. Description of Test Facility

Test Firm Name	:	**AUDIX Technology Corporation** **EMC Department** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	**No. 7 Shielded Room** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan **Semi-Anechoic Chamber** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan May 11, 2012 File on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

3.9. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.5dB
Radiation Test (Distance: 3m)	30MHz~300MHz	± 3.64dB
	300MHz~1000MHz	± 4.70dB
	Above 1GHz	± 2.94dB

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

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	2015. 04. 04	1 Year
2.	A.M.N.	R&S	ENV4200	825358/003	2015. 04. 07	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	2015. 01. 14	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	101495	2015. 01. 17	1 Year

4.2. Radiated Emission Measurement

4.2.1. Frequency Range 30MHz~1000MHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2014. 09. 15	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3.	Amplifier	HP	8447D	2944A06305	2015. 02. 12	1 Year
4.	Bilog Antenna	TESEQ	CBL6112D	33821	2014. 08. 02	1 Year

4.2.2. Frequency Range 30MHz~1000MHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2014. 09. 15	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3.	Amplifier	Agilent	8449B	3008A02676	2015. 02. 11	1 Year
4.	2.4GHz Notch Filter	K&L	7NSL10-2441.5E130.5-00	1	2014. 06. 12	1 Year
5.	3G High Pass Filter	Microware Circuits	H3G018G1	484796	2014. 06. 12	1 Year
6.	Horn Antenna	EMCO	3115	9609-4927	2014. 06. 17	1 Year
7.	Horn Antenna	EMCO	3116	2653	2014. 10. 10	1 Year

4.3. RF Conducted Measurement

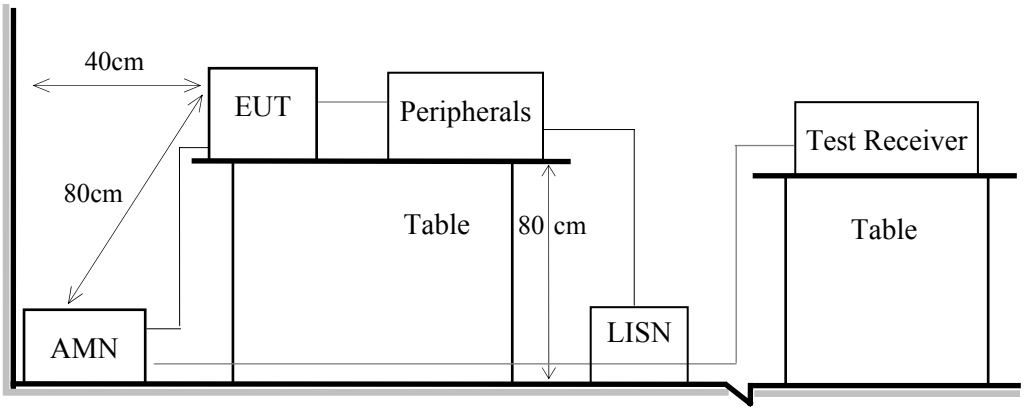
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2014. 07. 24	1 Year
2.	Power Meter	Anritsu	ML2495A	1145008	2014. 10. 17	1 Year
3.	Power Sensor	Anritsu	MA2411B	1126096	2014. 10. 17	1 Year

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

5. CONDUCTED EMISSION MEASUREMET

5.1. Block Diagram of Test Setup

Shielded Room Setup Diagram



Ground Plane

5.2. Power Line 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 63.4. 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.)

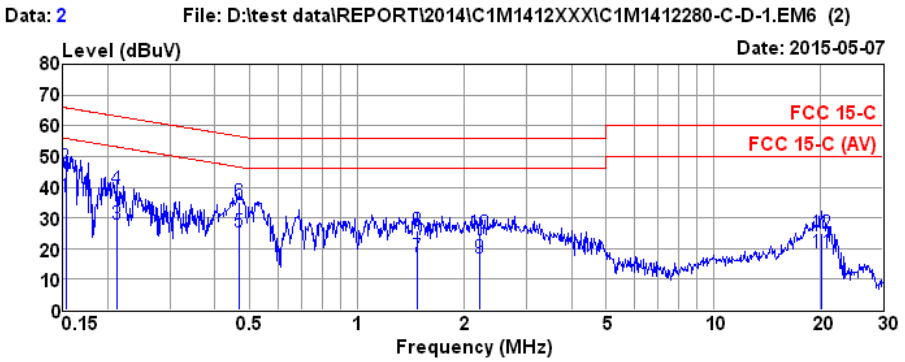
5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

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

5.4. Conducted Emission Measurement Results

PASSED.

Test Date	2015/05/07	Temp./Hum.	21℃/62%
Test Voltage	DC 5V		



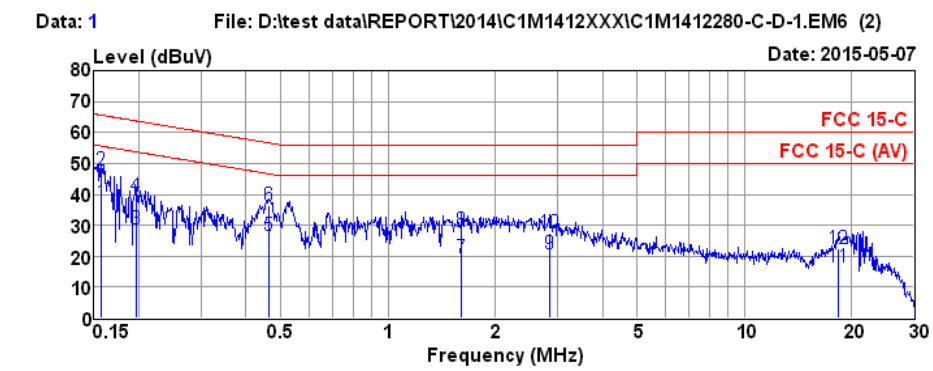
Site no. : No.7 Shielded Room
Data no. : 2
Condition : ENV4200 358 (H)
Phase : NEUTRAL
Limit : FCC 15-C
Env. / Ins. : 21*C / 62% ESCI (1276)
Engineer : Ken
EUT : BEG200
Power Rating : DC 5V(via to USB)
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.152	10.25	0.02	9.85	16.92	37.04	55.87	18.83	Average
2	0.152	10.25	0.02	9.85	26.46	46.58	65.87	19.29	QP
3	0.212	10.26	0.03	9.85	7.78	27.92	53.14	25.22	Average
4	0.212	10.26	0.03	9.85	19.19	39.33	63.14	23.81	QP
5	0.469	10.20	0.03	9.86	5.52	25.61	46.54	20.93	Average
6	0.469	10.20	0.03	9.86	15.24	35.33	56.54	21.21	QP
7	1.472	10.19	0.05	9.86	-2.93	17.17	46.00	28.83	Average
8	1.472	10.19	0.05	9.86	5.86	25.96	56.00	30.04	QP
9	2.213	10.19	0.06	9.86	-3.24	16.87	46.00	29.13	Average
10	2.213	10.19	0.06	9.86	4.80	24.91	56.00	31.09	QP
11	20.162	10.12	0.20	9.95	-1.63	18.64	50.00	31.36	Average
12	20.162	10.12	0.20	9.95	4.80	25.07	60.00	34.93	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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

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



Site no. : No.7 Shielded Room
Data no. : 1
Condition : ENV4200 358 (H)
Phase : LINE
Limit : FCC 15-C
Env. / Ins. : 21*C / 62% ESCI (1276)
Engineer : Ken
EUT : BEG200
Power Rating : DC 5V(via to USB)
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.156	10.26	0.02	9.85	17.35	37.48	55.65	18.17	Average
2	0.156	10.26	0.02	9.85	27.51	47.64	65.65	18.01	QP
3	0.198	10.29	0.03	9.85	8.49	28.66	53.71	25.05	Average
4	0.198	10.29	0.03	9.85	19.04	39.21	63.71	24.50	QP
5	0.464	10.23	0.03	9.86	6.55	26.67	46.63	19.96	Average
6	0.464	10.23	0.03	9.86	16.22	36.34	56.63	20.29	QP
7	1.610	10.21	0.05	9.86	-0.54	19.58	46.00	26.42	Average
8	1.610	10.21	0.05	9.86	8.16	28.28	56.00	27.72	QP
9	2.839	10.21	0.07	9.86	0.80	20.94	46.00	25.06	Average
10	2.839	10.21	0.07	9.86	7.21	27.35	56.00	28.65	QP
11	18.426	10.10	0.19	9.94	-3.71	16.52	50.00	33.48	Average
12	18.426	10.10	0.19	9.94	2.10	22.33	60.00	37.67	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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

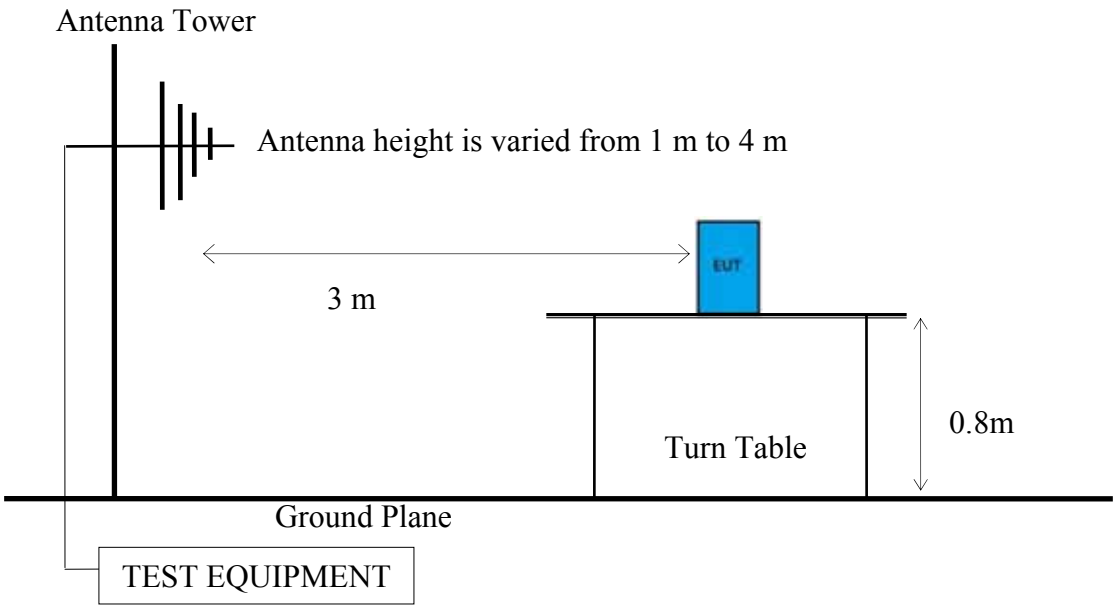
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

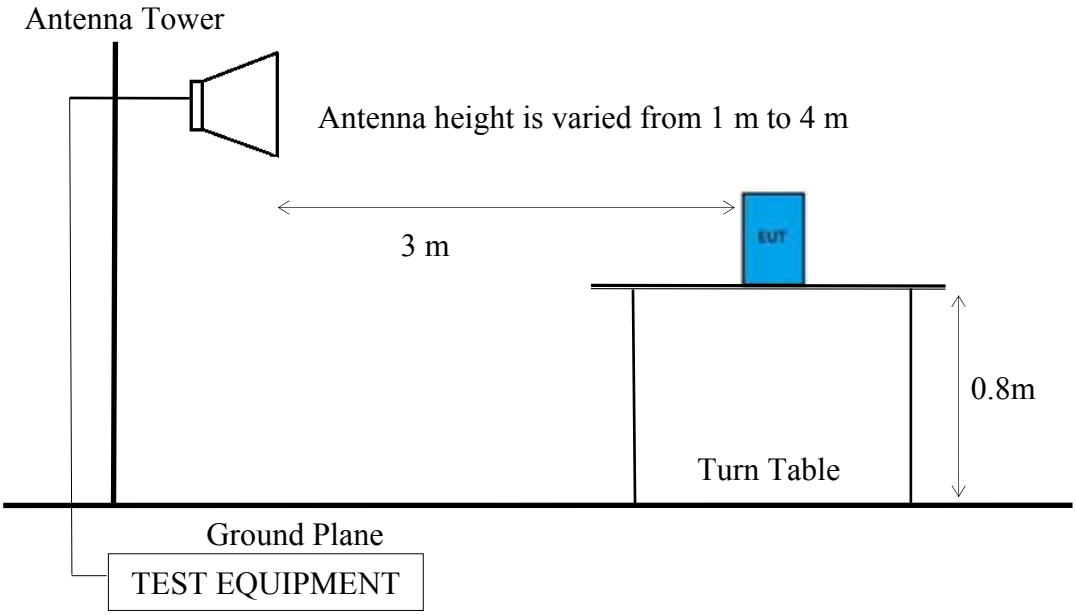
6.1.1. Block Diagram of EUT

Indicated as section 3.6

6.1.2. Setup Diagram for 30-1000 MHz



6.1.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



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, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
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 C63.4: 8.3.1.2, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

6.3. Test Procedure

The EUT setup on the turn table which has 0.8 m 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 C63.4-203 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 finally measurement.

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

Frequency above 1GHz to 10th harmonic:

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 for finally measurement.

Average Measurement:

■**Option 1:**

(1) RBW = 1 MHz
(2) VBW =1/T
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) 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 3.4

6.5. Test Results

PASSED.

Test Date	2015/04/30	Temp./Hum.	26℃/54%
Test Voltage	DC 5V		

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

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

6.5.1. Emissions within Restricted Frequency Bands

6.5.1.1. Frequency Below 1 GHz

Mode	BLE	Frequency	TX 2402MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	22.86	34.56	40.00	5.44	Peak
108.57	11.55	3.29	24.52	39.36	43.50	4.14	Peak
255.04	12.47	4.36	26.38	43.21	46.00	2.79	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
35.82	15.47	2.44	21.14	39.05	40.00	0.95	Peak
48.43	9.08	2.62	27.15	38.85	40.00	1.15	Peak
95.96	10.23	3.19	25.65	39.07	43.50	4.43	Peak

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

Mode	BLE	Frequency	TX 2440MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	23.29	34.99	40.00	5.01	Peak
107.60	11.47	3.28	24.85	39.60	43.50	3.90	Peak
257.95	12.53	4.39	26.86	43.78	46.00	2.22	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
35.82	15.47	2.44	21.14	39.05	40.00	0.95	Peak
47.46	9.56	2.61	26.36	38.53	40.00	1.47	Peak
95.96	10.23	3.19	25.64	39.06	43.50	4.44	Peak

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

Mode	BLE	Frequency	TX 2480MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	23.20	34.90	40.00	5.10	Peak
112.45	11.82	3.32	24.20	39.34	43.50	4.16	Peak
256.98	12.51	4.38	27.27	44.16	46.00	1.84	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
35.82	15.47	2.44	20.33	38.24	40.00	1.76	Peak
47.46	9.56	2.61	26.87	39.04	40.00	0.96	Peak
95.96	10.23	3.19	25.69	39.11	43.50	4.39	Peak

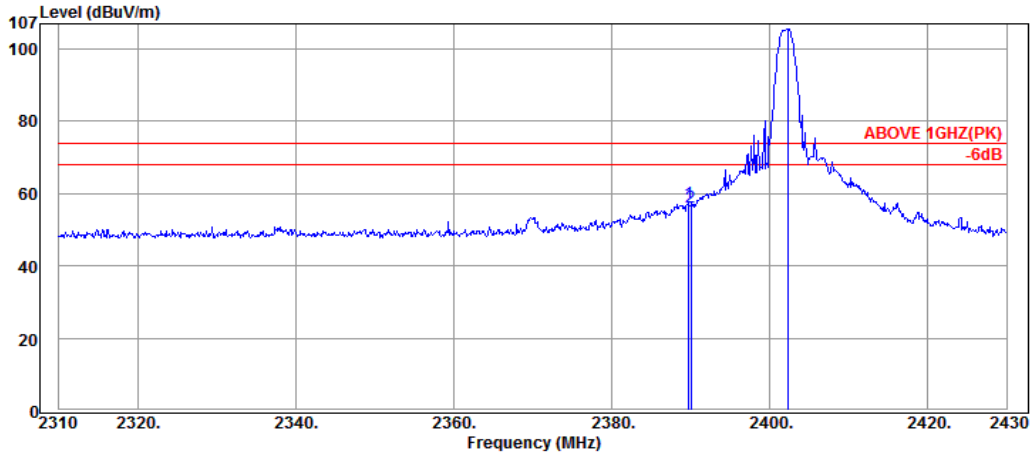
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

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

6.5.1.2. Frequency Above 1 GHz to 10th harmonics

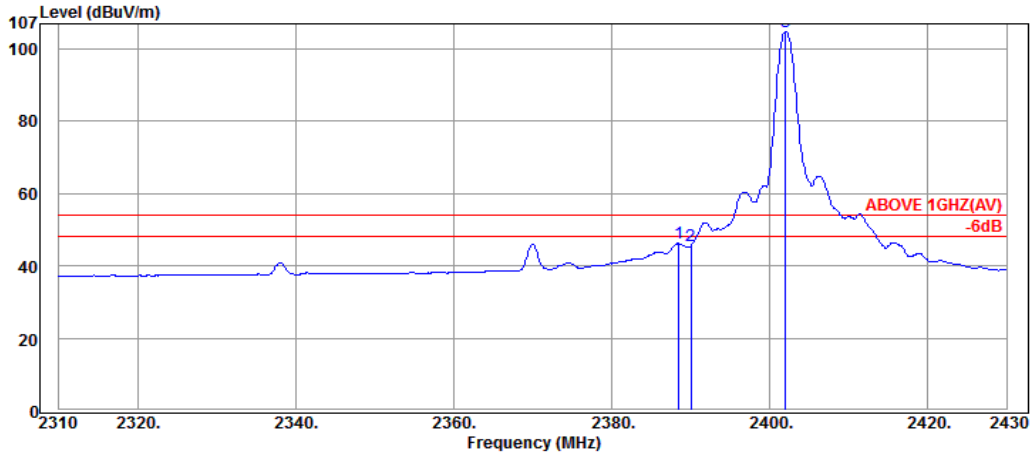
Band Edge:

Mode	BLE	Frequency	TX 2402MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	27.95	5.24	24.19	57.38	74.00	16.62	Peak
2390.04	27.95	5.24	23.07	56.26	74.00	17.74	Peak
2402.28	27.93	5.26	72.51	105.70	---	---	Peak

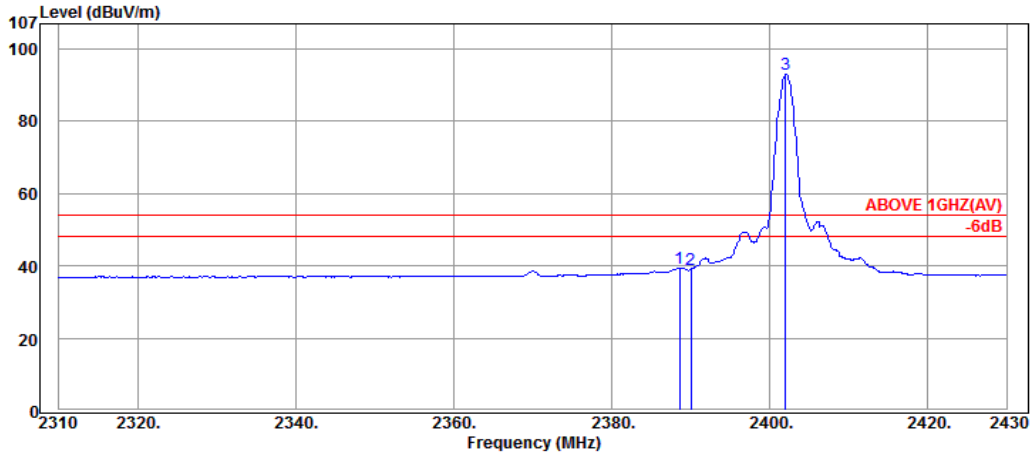


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.48	27.95	5.24	12.99	46.18	54.00	7.82	Average
2390.04	27.95	5.24	12.36	45.55	54.00	8.45	Average
2402.04	27.93	5.26	71.70	104.89	---	---	Average

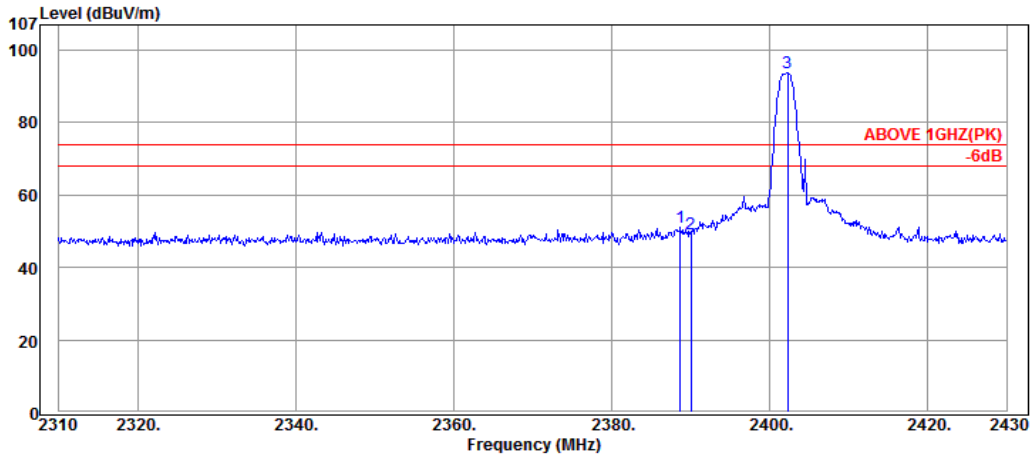
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	TX 2402MHz



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.72	27.95	5.24	17.82	51.01	74.00	22.99	Peak
2390.04	27.95	5.24	16.05	49.24	74.00	24.76	Peak
2402.28	27.93	5.26	60.59	93.78	---	---	Peak



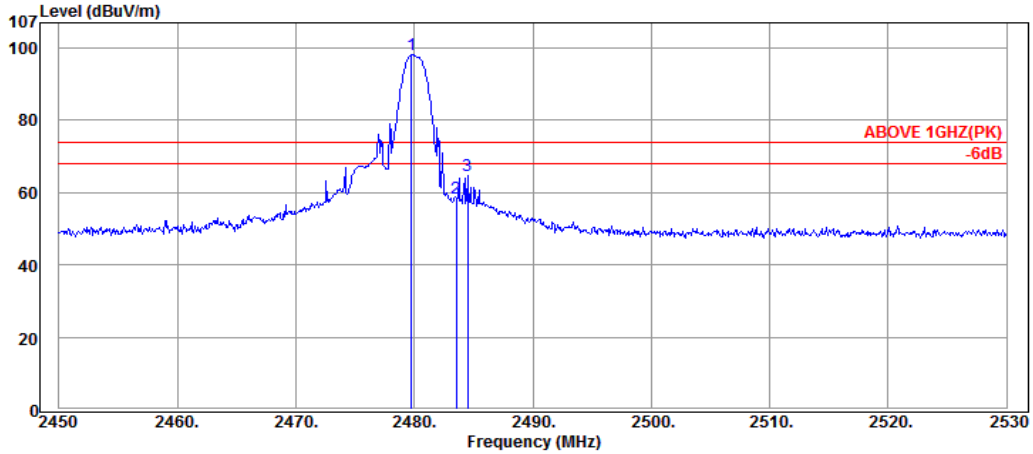
Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.60	27.95	5.24	6.23	39.42	54.00	14.58	Average
2390.04	27.95	5.24	5.77	38.96	54.00	15.04	Average
2402.04	27.93	5.26	59.69	92.88	---	---	Average

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

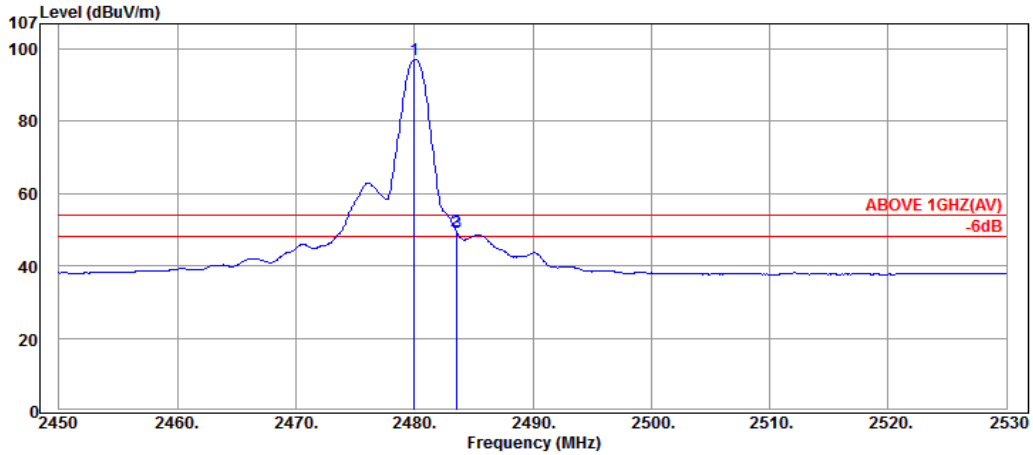
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	TX 2480MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2479.76	27.83	5.36	64.89	98.08	---	---	Peak
2483.52	27.82	5.37	25.39	58.58	74.00	15.42	Peak
2484.48	27.82	5.37	31.38	64.57	74.00	9.43	Peak

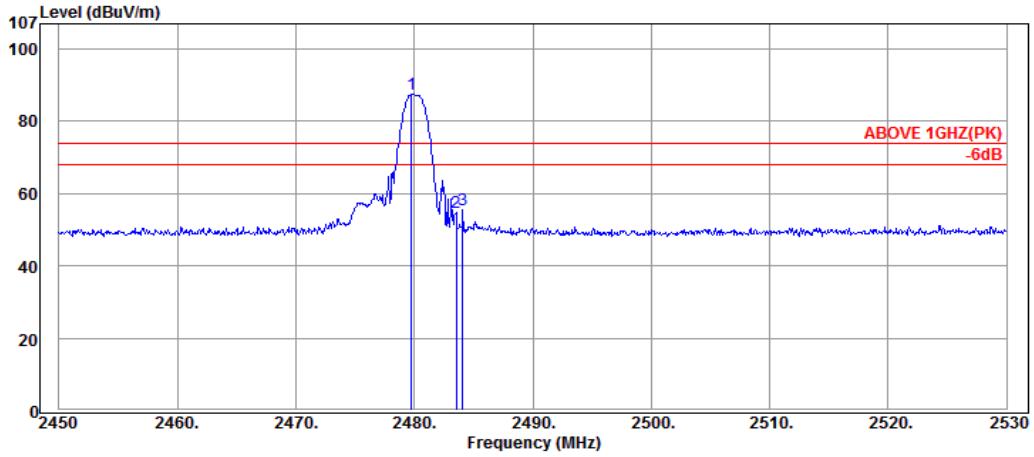


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2480.00	27.83	5.36	64.01	97.20	---	---	Average
2483.52	27.82	5.37	16.55	49.74	54.00	4.26	Average
2483.60	27.82	5.37	16.03	49.22	54.00	4.78	Average

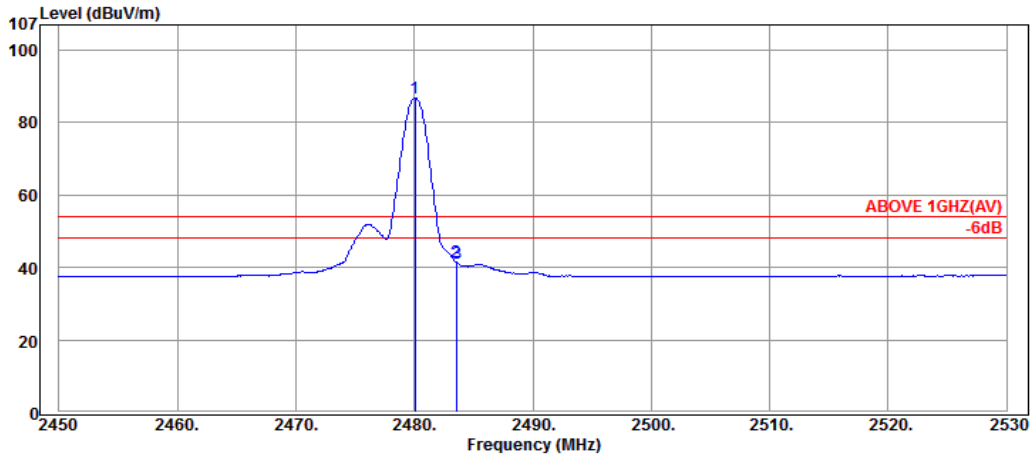
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	TX 2480MHz



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2479.76	27.83	5.36	54.37	87.56	---	---	Peak
2483.52	27.82	5.37	21.73	54.92	74.00	19.08	Peak
2484.08	27.82	5.37	22.43	55.62	74.00	18.38	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2480.08	27.83	5.36	53.57	86.76	---	---	Average
2483.52	27.82	5.37	8.27	41.46	54.00	12.54	Average
2483.60	27.82	5.37	8.07	41.26	54.00	12.74	Average

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

6.5.2. Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Mode	BLE	Frequency	TX 2402MHz

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
1994.56	27.97	4.61	21.05	53.63	54.00	0.37	Peak

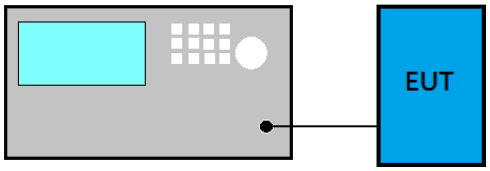
6.5.3. Emissions in Non-restricted Frequency Bands

Pursuant to KDB 558074 D01 v03r02 that emission levels below the 15.209 general radiated emissions limits is not required.

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

7. 6dB BANDWIDTH MEASUREMENT

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 v03r02:

■ Option 2

(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

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Cable Loss	2dB	Test Voltage	DC 5V

7.4.1. 6dB Bandwidth Result

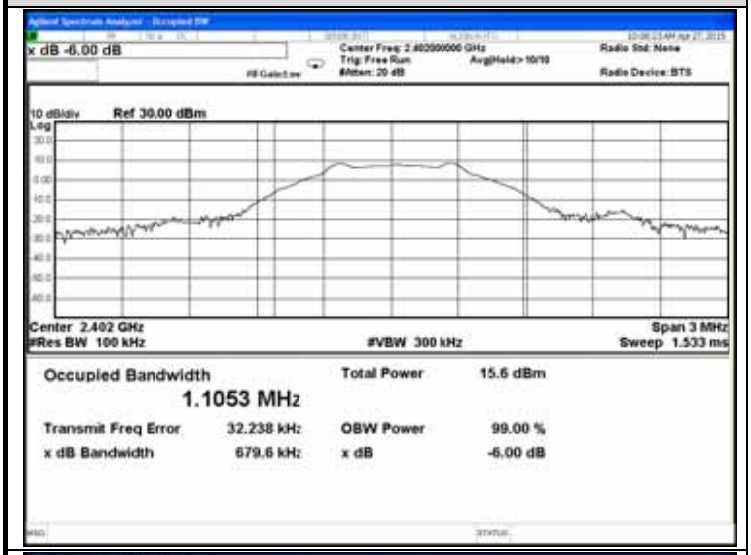
Modulation Type	Centre Frequency (MHz)	6 dB Bandwidth (MHz)
BLE	2402	0.6796
	2440	0.6919
	2480	0.6743

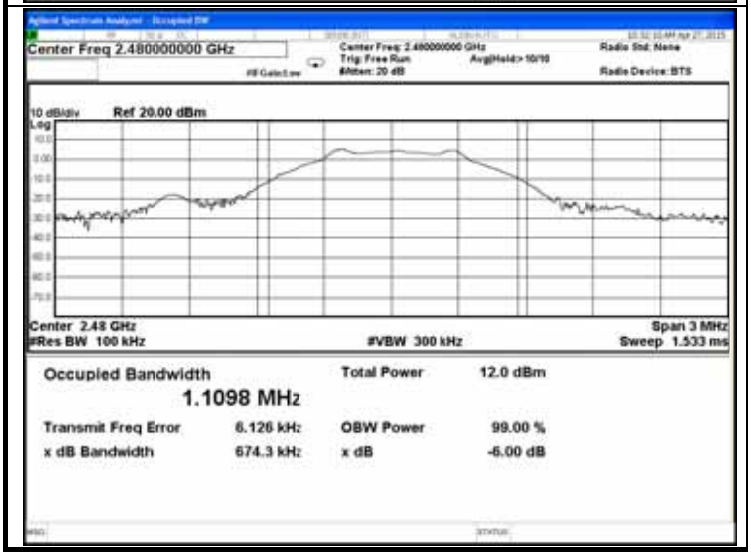
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

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

7.4.2. Measurement Plots

BLE





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 MEASUREMENT

8.1. Block Diagram of Test Setup

8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm)

8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r02:

■**PKPM1 Peak power meter method:**

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

□**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 3.5.1 is < 98%.

□**RBW≥DTS bandwidth**

(1) Set span to at least 3 times the OBW
(2) Set RBW ≥ OBW
(3) Set the video bandwidth (VBW) ≥ 3 × RBW.
(4) Detector = Peak
(5) Trace mode = max hold
(6) Sweep = auto couple.
(7) To find the peak amplitude level.

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

8.4. Test Results

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Cable Loss	2dB	Test Voltage	DC 5V

Modulation Type	Centre Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	
BLE	2402	9.24	0.008395	< 30 dBm (1 W)
	2440	7.94	0.006223	
	2480	6.77	0.004753	

Note: The results have been included cable loss.

(Reference only)

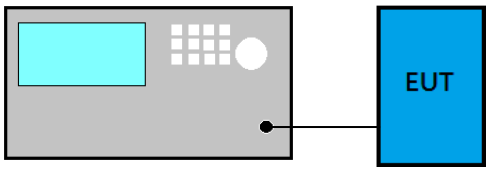
Modulation Type	Centre Frequency (MHz)	Average Output Power				Limit
		(dBm)	10log(1/x)	(dBm)	(W)	
BLE	2402	8.43	0.18	8.61	0.007261	< 30 dBm (1 W)
	2440	6.99	0.18	7.17	0.005212	
	2480	5.00	0.18	5.18	0.003296	

Note: The results have been included cable loss.

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

9. EMISSION LIMITATIONS MEASUREMENT

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. 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

■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.

■Emission Level Measurement

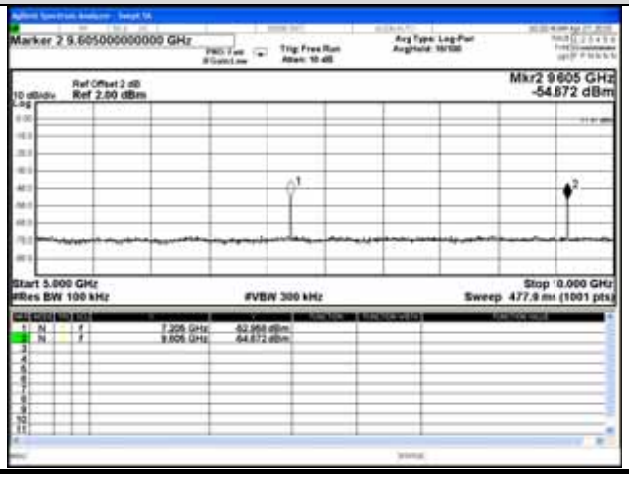
(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize to find the max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

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

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

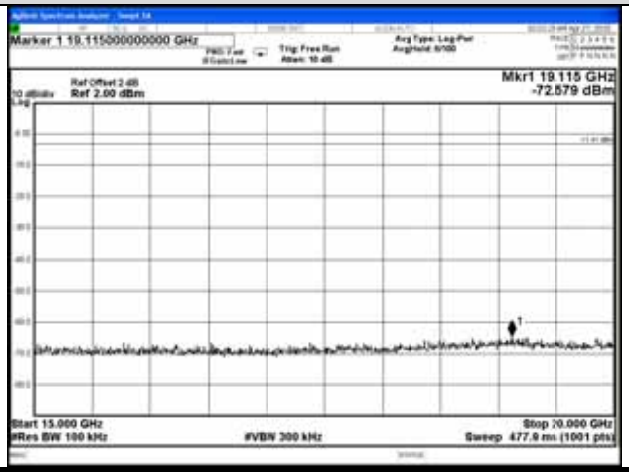
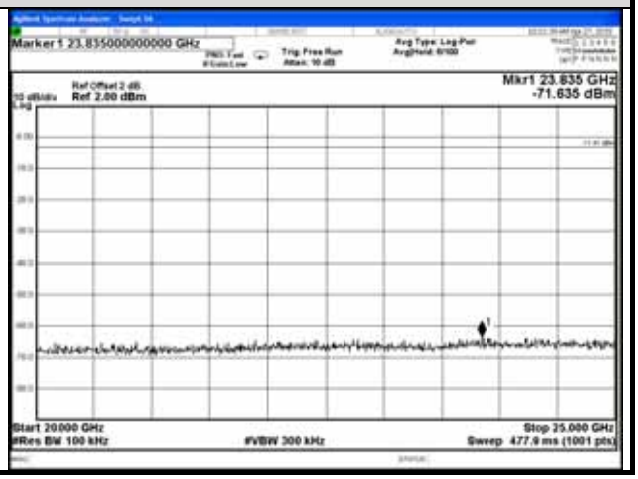
9.4. Test Results

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Mode	BLE	Frequency	TX 2402MHz
Cable Loss	2dB	Test Voltage	DC 5V

Reference Level	Band Edge
	
30MHz – 1GHz	**1GHz – 5GHz**
	
5GHz – 10GHz	**10GHz – 15GHz**
	

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

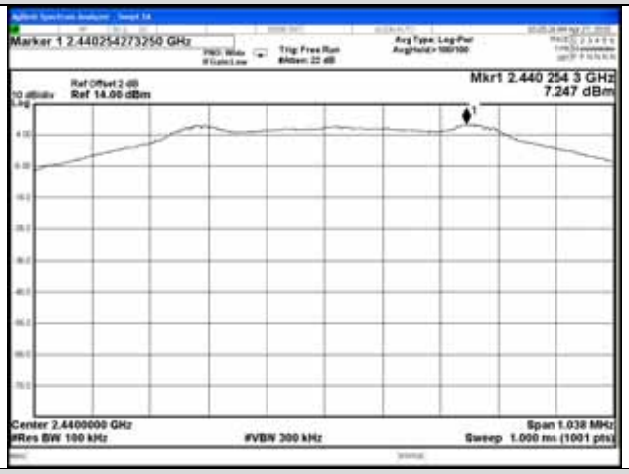
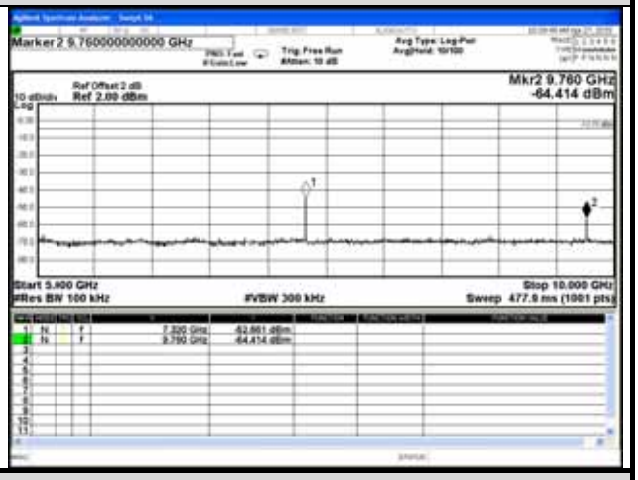
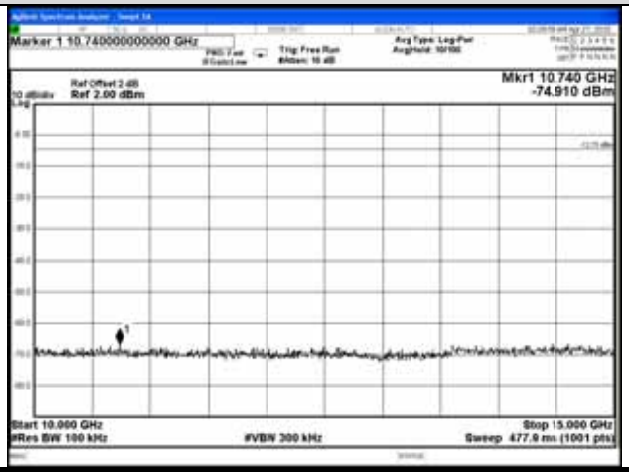
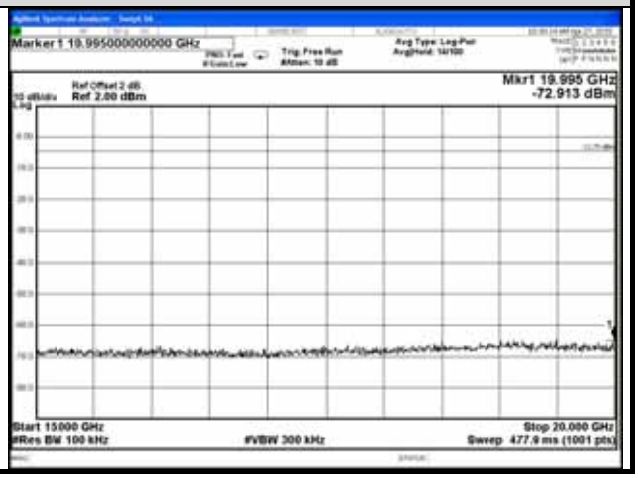
Tel: +886 2 26099301
Fax: +886 2 26099303

15GHz – 20GHz	20GHz – 25GHz
	

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

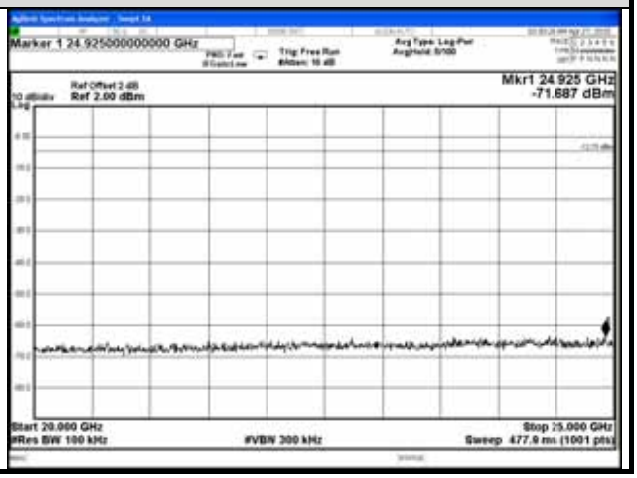
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Mode	BLE	Frequency	TX 2440MHz
Cable Loss	2dB	Test Voltage	DC 5V

Reference Level	30MHz – 1GHz
	
1GHz – 5GHz	**5GHz – 10GHz**
	
10GHz – 15GHz	**15GHz – 20GHz**
	

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

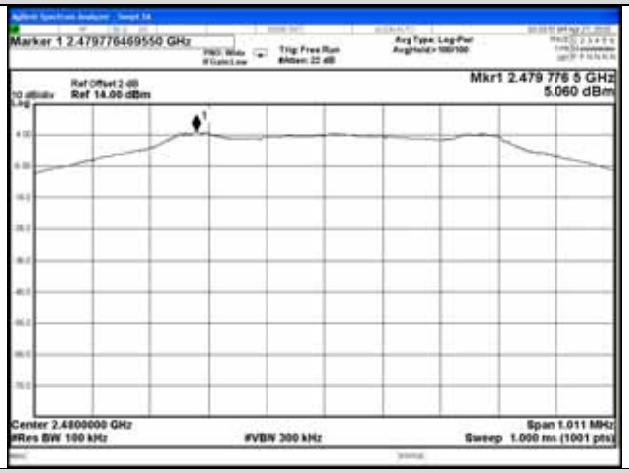
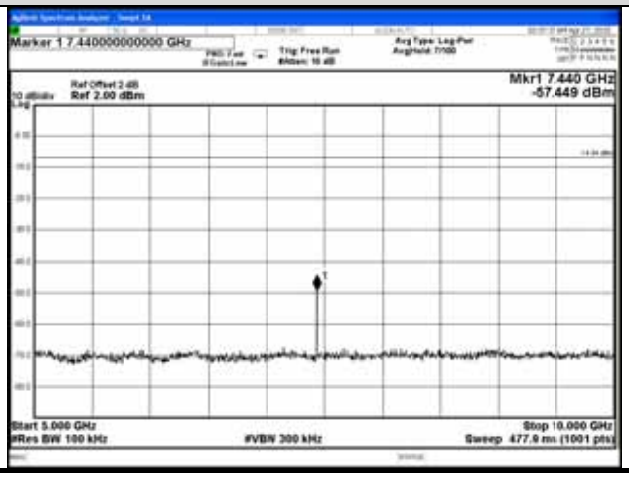
20GHz – 25GHz



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

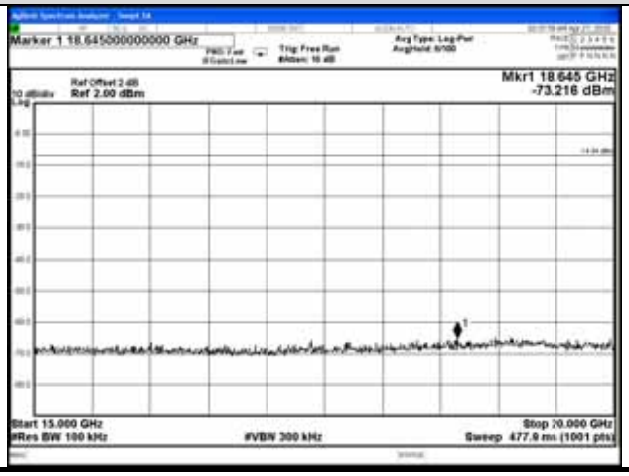
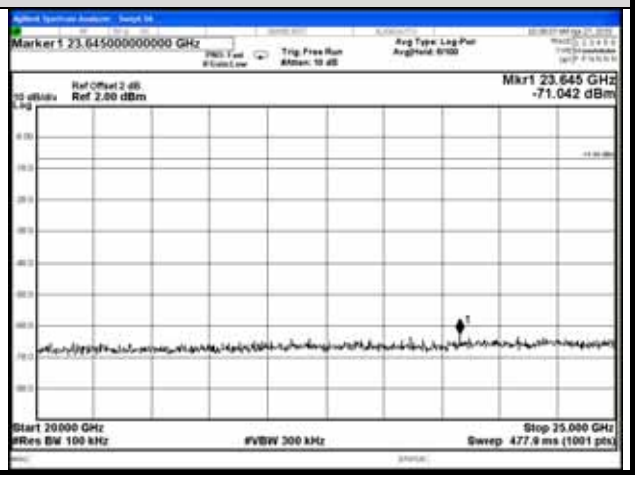
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Mode	BLE	Frequency	TX 2480MHz
Cable Loss	2dB	Test Voltage	DC 5V

Reference Level	Band Edge
	
30MHz – 1GHz	**1GHz – 5GHz**
	
5GHz – 10GHz	**10GHz – 15GHz**
	

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

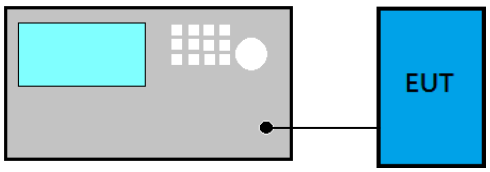
Tel: +886 2 26099301
Fax: +886 2 26099303

15GHz – 20GHz	20GHz – 25GHz
	

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 v03r02:

■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

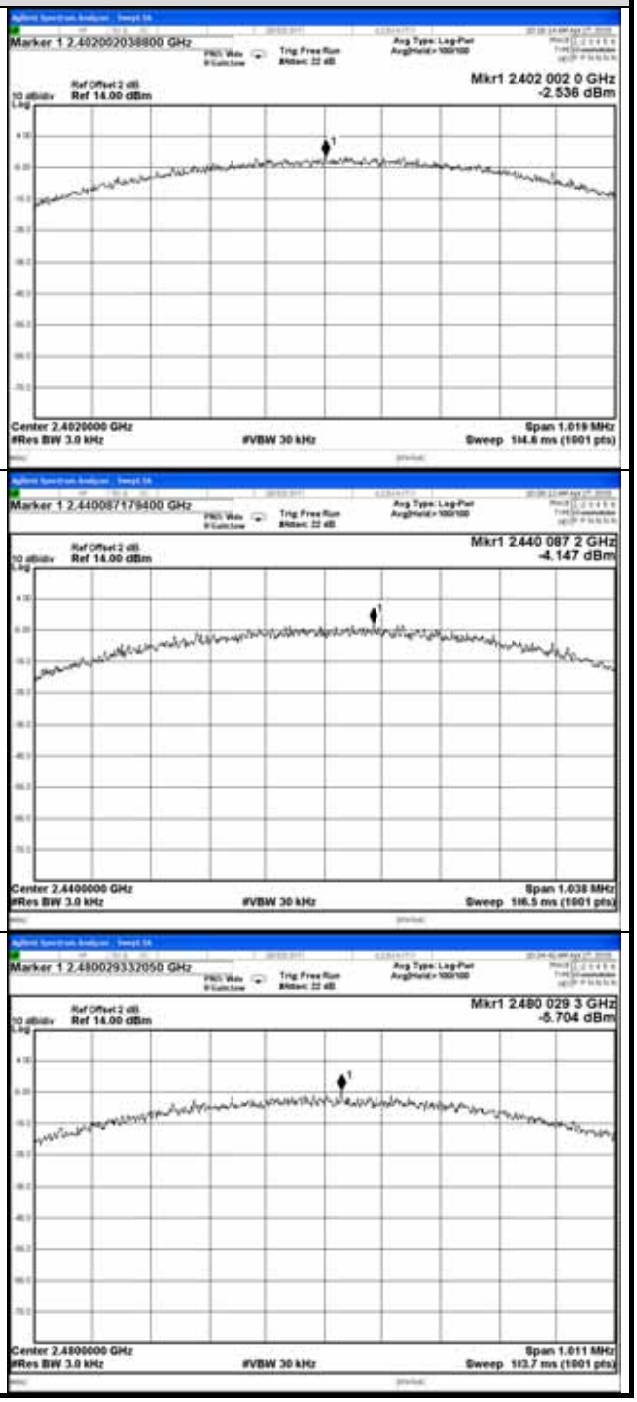
(1) Using peak PSD procedure step 1 to step 4.
(2) Detector= RMS detector
(3) Sweep time = auto couple
(4) Trace mode = trace averaging over a minimum of 100 traces
(5) Use the peak marker function to determine the maximum amplitude level.
(6) Duty cycle factor is added when duty cycle presented in section 3.5.1. < 98%.
(7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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

10.4. Test Results

Test Date	2015/04/27	Temp./Hum.	25℃/43%
Cable Loss	2dB	Test Voltage	DC 5V

BLE



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】