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

FCC 15.247
2.4GHz Test Report

for

MD Biomedical, Inc.

8F., No.222, Sec 4, Chengde Rd., Taipei City 111, Taiwan

Product Name	**:**	**ECG Pen**
Model Name	**:**	**(1)880E (2)870E**
Brand		**(1)Vion (2)Vian**
FCC ID	**:**	**W3L4713809663050**

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.

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	:	MD Biomedical, Inc.
Manufacturer	:	MD Biomedical, Inc.
EUT Description		
(1) Product	:	ECG Pen
(2) Model	:	(1)880E (2)870E
(3) Brand	:	(1)Vion (2)Vian
(4) Power Supply	:	DC 6V (Batteries)

Applicable Standards:

47CFRFCC Part 15 Subpart C
ANSI C63.10:2013

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: 2019. 10. 07

Reviewed by: Sabrina Wang (Sabrina Wang/Administrator)

Approved by: Johnny Hsueh (Johnny Hsueh/Section Manager)

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 Date	Revision Summary	Report Number
0	2019. 10. 07	Original Report	EM-F190380

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	**N/A Note 2**
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.247(a)(2)	6dB Bandwidth	**PASS**
15.247(b)(3)	Maximum Peak Output Power	**PASS**
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.247 (e)	Peak Power Spectral Density	**PASS**
15.203	Antenna Requirement	**Compliance**
Note: 1. The uncertainties value is not used in determining the result. 2. The EUT only employs battery power for operation, so it is unnecessary to test.		

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	MD Biomedical, Inc. 8F., No.222, Sec 4, Chengde Rd., Taipei City 111, Taiwan
Manufacturer	MD Biomedical, Inc. 8F., No.222, Sec 4, Chengde Rd., Taipei City 111, Taiwan
Product	ECG Pen
Brand	(1)Vion (2)Vian
Model	(1)880E (2)870E The details of differences description refer to below table.

Table: Model different list

Model	Brand	Bluetooth 4.0 (BLE)	USB Port	USB Extend Seat
880E	(1)Vion (2)Vian	Yes	Yes	Yes
870E	(1)Vion (2)Vian	Yes	No	No

3.2. Description of EUT

Test Model	880E
Serial Number	N/A
Power Rating	DC 6V (Batteries)
Hardware Version	N/A
Software Version	N/A
Sample Status	Mass production
RF Features	Bluetooth Low Energy (BLE)
Date of Receipt	2019. 09. 12
Date of Test	2019. 10. 02 ~ 03
Interface Ports of EUT	**For ECG Pen** ● One Micro USB Port **For USB Extend Seat** ● One Micro USB Port ● One USB Port
Accessories Supplied	● USB Extend Seat: Shielded, Undetachable, 0.1m

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

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain(dBi)
1	---	---	PCB Antenna	2400~2500	-6.54

3.4. EUT Specifications Assessed in Current Report

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

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

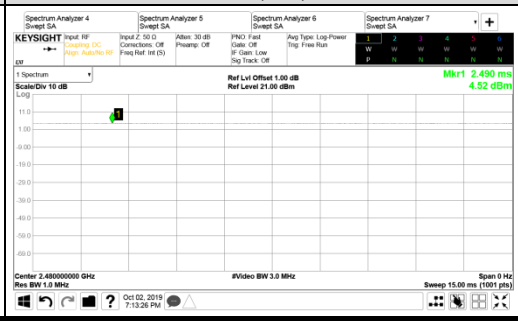
3.5. Descriptions of Key Components

None

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

3.6. Test Configuration

Mode	TX_{on} (ms)	1/ TX_{on} (kHz)	Duty Cycle (x)
BLE	---	---	1.00

Mode	T (ms)
BLE	

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	BLE	1Mbps	37/39
	Radiated Spurious Emission Note1 & 2	BLE	1Mbps	37/17/39
Conducted Test Case	Emission Bandwidth	BLE	1Mbps	37/17/39
	Peak Output Power	BLE	1Mbps	37/17/39
	Band Edge	BLE	1Mbps	37/17/39
	Spurious Emission	BLE	1Mbps	37/17/39
	Peak Power Spectral Density	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

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

3.7. Tested Supporting System List

3.7.1. Support Peripheral Unit

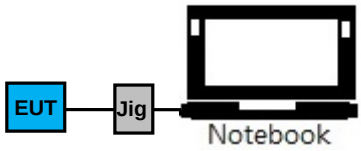
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook PC	acer	MS2362	N/A	FCC ID: PPD-AAR5B22
2.	Test Jig	N/A	N/A	N/A	N/A

3.7.2. Cable Lists

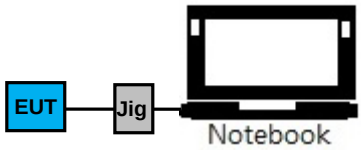
No.	Cable Description Of The Above Support Units
1.	USB Cable: Shielded, Detachable, 1.0m Adapter: Chicony, M/N CPA09-A065N1 AC Power Cord: Shielded, Detachable, 1.8m DC Power Cord: Undshielded, Undetachable, 1.8m
2.	Bus Cable: Unshielded, Detachable, 0.06m

3.8. Setup Configuration

3.8.1. EUT Configuration for Radiated Emission



3.8.2. EUT Configuration for RF Conducted Test Items



3.9. Operating Condition of EUT

Test program “Smart Studio” is used for enabling EUT RF function under continues transmitting and choosing channel.

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

3.10.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 17025:2017 (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 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.1 3m Semi Anechoic Chamber (2) Fully Anechoic Chamber

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

3.11.Measurement Uncertainty

Test Items/Facilities	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.9dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.5dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	1GHz-6GHz, 3m	±5.1dB
	6GHz-18GHz, 3m	±5.5dB
No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.7dB
	200MHz-1000MHz, 3m, Horizontal	±4.5dB
	30MHz-200MHz, 3m, Vertical	±4.3dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.1dB
	200MHz-1000MHz, 3m, Horizontal	±4.4dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±5.0dB
	1GHz-6GHz, 3m	±4.4dB
	6GHz-18GHz, 3m	±4.1dB
No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.0dB
	200MHz-1000MHz, 3m, Horizontal	±4.0dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±4.2dB
	1GHz-6GHz, 3m	±4.3dB
	6GHz-18GHz, 3m	±4.6dB
Fully Anechoic Chamber	30MHz~1000MHz	±4.7dB
	1GHz~18GHz	±5.3dB

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 EQUIPMENTLIST

4.1. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2019. 09. 11	1 Year
2.	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2019. 01. 30	1 Year
3.	Test Receiver	R & S	ESCS30	100338	2019. 06. 12	1 Year
4.	Amplifier	HP	8447D	2944A06305	2019. 01. 30	1 Year
5.	Amplifier	HP	8449B	3008A02678	2019. 03. 07	1 Year
6.	Amplifier	Keysight	83051A	MY53010042	2019. 08. 08	1 Year
7.	Bilog Antenna	TESEQ	CBL6112D	33821	2019. 01. 19	1 Year
8.	Loop Antenna	R&S	HFH2-Z2	891847/27	2017.12. 18	2 Years
9	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2019. 03. 13	1 Year
10.	Horn Antenna	COM-POWER	AH-840	101092	2019 .05. 14	1 Year
11.	2.4GHz Notch Filter	K&L	7NSL10-2441. 5/E130.5-O/O	1	2019. 07. 23	1 Year
12.	3GHz Notch Filter	Microwave	H3G018G1	484796	2019. 08. 21	1 Year
13.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2019. 02. 01	1 Year
14.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104	RF CABLE-01	2019. 09. 20	1 Year
15.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	MY1493/2	2019. 09. 20	1 Year
16.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2019. 04. 20	1 Year
17.	Digital Thermo-Hygro Meter	EVERY DAY	E-512	RF-02	2019. 04. 20	1 Year
18.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
19.	Test Software	Audix	e3	V6.110601	N.C.R.	N.C.R.

4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2019. 05. 06	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	2019. 04. 20	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

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

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

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

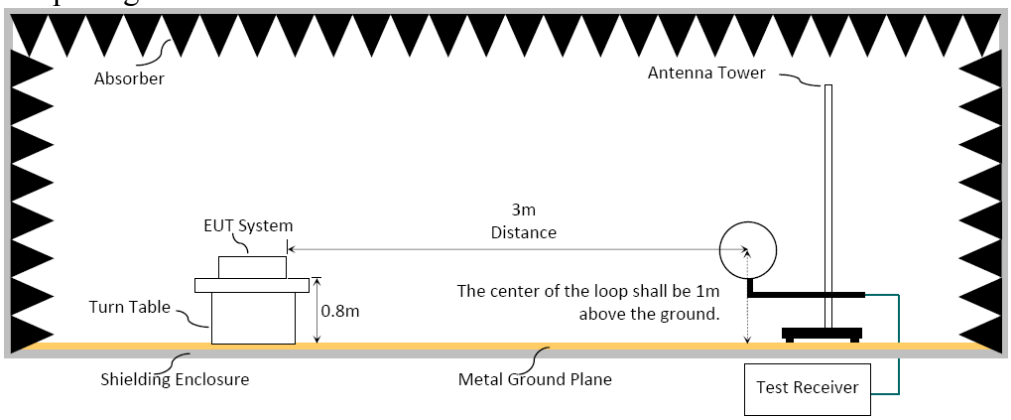
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

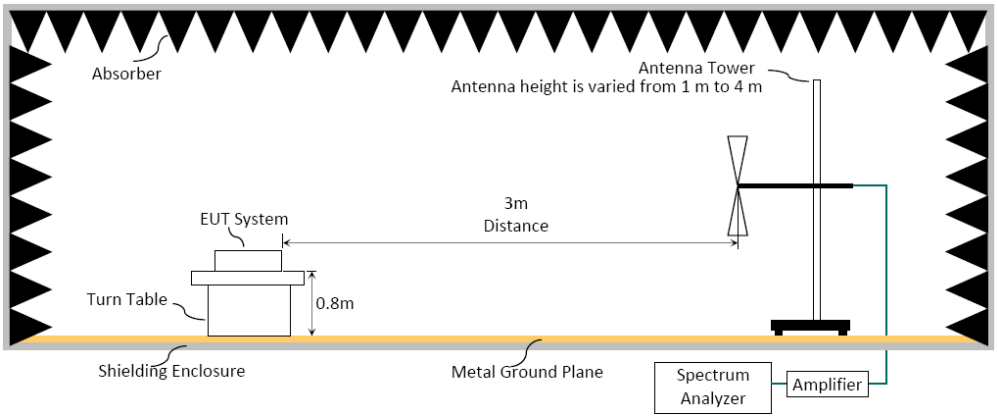
6.1.1. Block Diagram of EUT

Indicated as section 3.9

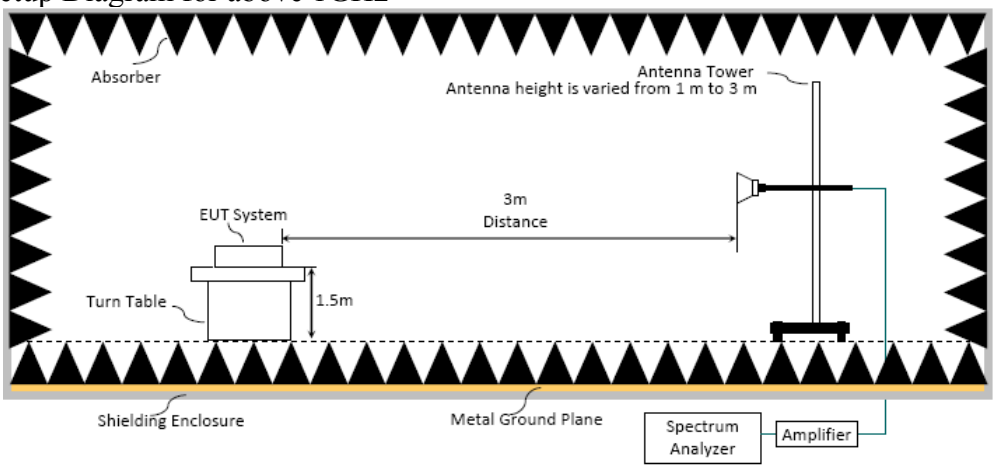
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



6.1.4. Setup Diagram for above 1GHz



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)	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.

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 turntable 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 C63.10-2013regulation.

(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 (for 30-1000MHz) or antenna varied from 1 m to 3 m (for above 1GHz) 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 C63.10-2013regulation.

Frequency below 1GHz:
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.
Note 1: When peak-detected value is lower than limit that the measurement using theQ.P. detector is not required, otherwise using Q.P. for final measurement.
Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

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.
Note: 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.

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
BLE	---	---	10Hz

N/A: 1/ T is not implemented when duty cycle presented in section 3.6 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 (including Preamp factor if test used)

■Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading (including Preamp factor if test used)

□Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= 20log(TX_{on}/TX_{on+off}) presented in section 3.6

□ERP= Peak Emission Level-95.2dB-2.14dB

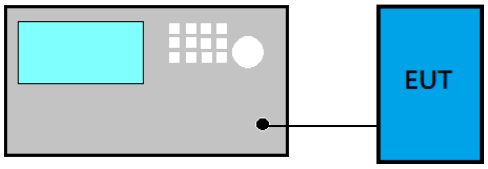
6.5. Test Results

Please refer to Appendix A.

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

7. 6dB/OCCUPIED 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 ANSI C63.10:2013:

(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 to -6dB or 99% power to record the final bandwidth.

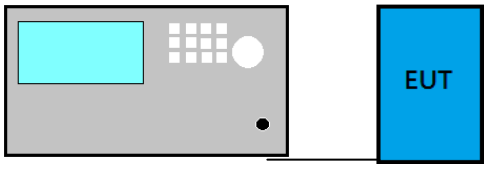
7.4. Test Results

Please refer to Appendix A

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



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)

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 ANSI C63.10:2013:

■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 3.6 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 3.6 is < 98%.

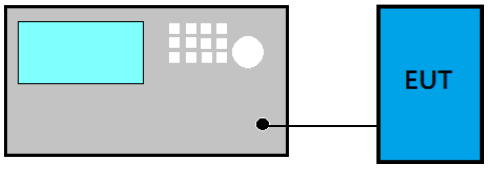
8.4. Test Results

Please refer to Appendix A

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 the100kHz 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) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to ANSI C63.10:2013:

■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.

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: 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.

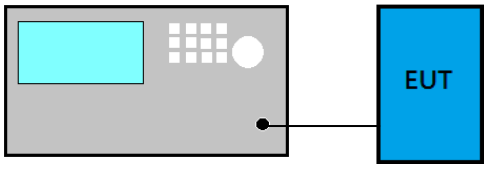
9.4. Test Results

Please refer to Appendix A

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 ANSI C63.10:2013:

■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

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】

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: 880E)

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

A.1 RADIATED EMISSION

Test Date	2019/10/03	Temp./Hum.	23~25℃/51~43%
Test Voltage	DC 6V (Via Batteries)	Tested By	Kuper Hsu
		Test Model	880E

A.1.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1GHz

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
84.32	14.35	2.09	20.84	37.28	40.00	2.72	Peak
87.23	14.87	2.12	20.93	37.92	40.00	2.08	Peak
195.87	16.10	3.38	20.84	40.32	43.50	3.18	Peak
336.52	20.76	4.96	15.74	41.46	46.00	4.54	Peak
888.45	27.21	8.39	6.56	42.16	46.00	3.84	Peak
959.26	27.77	8.80	3.93	40.50	46.00	5.50	Peak

Antenna at Vertical Polarization

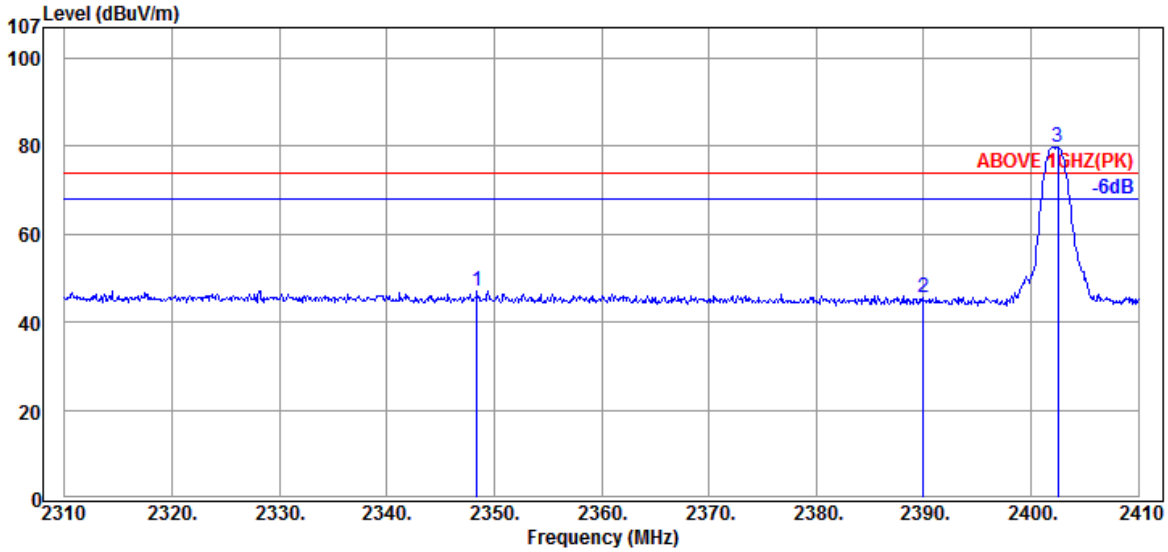
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
85.29	14.53	2.10	17.03	33.66	40.00	6.34	Peak
194.90	16.07	3.37	10.52	29.96	43.50	13.54	Peak
566.41	24.43	6.84	2.19	33.46	46.00	12.54	Peak
667.29	25.24	7.20	4.01	36.45	46.00	9.55	Peak
913.67	27.41	8.53	3.81	39.75	46.00	6.25	Peak
995.15	28.04	9.01	3.32	40.37	54.00	13.63	Peak

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

A.2.1.3 Frequency Above 1 GHz to 10th harmonics

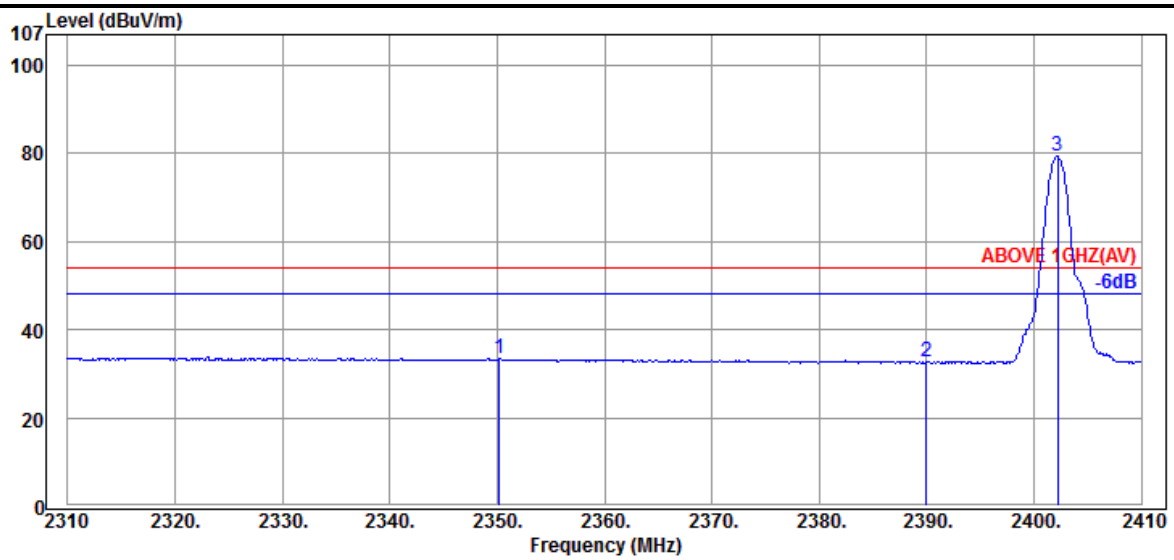
Band Edge:

Mode	BLE	Frequency	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
	2348.40	32.00	8.48	6.76	47.24	74.00	26.76	Peak
	2390.00	32.00	8.52	5.16	45.68	74.00	28.32	Peak
@	2402.50	32.00	8.52	39.23	79.75	---	---	Peak



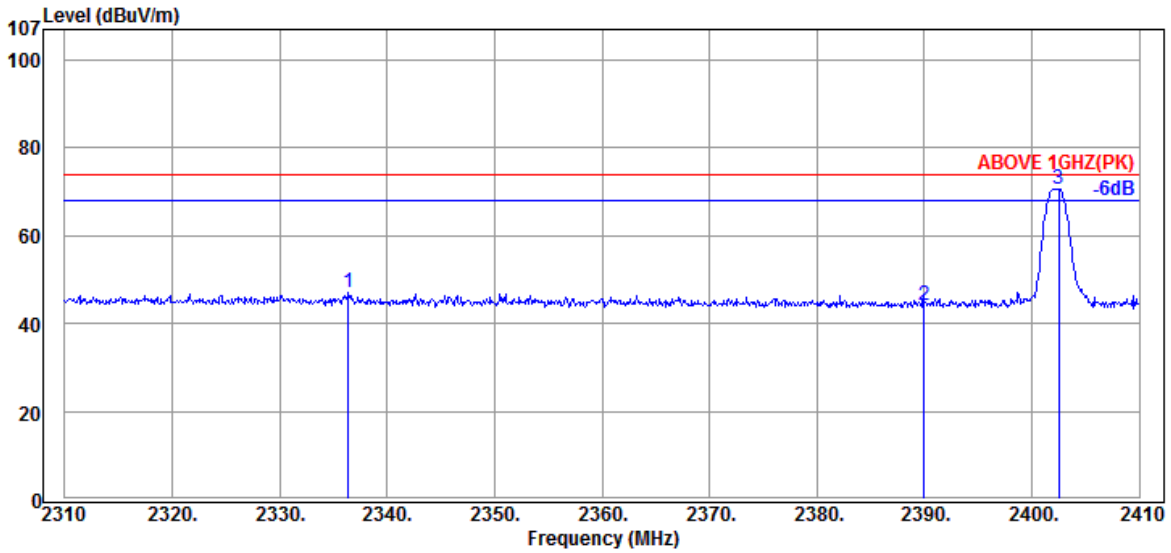
Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	2350.20	32.00	8.48	-7.12	33.36	54.00	20.64	Average
	2390.00	32.00	8.52	-7.88	32.64	54.00	21.36	Average
@	2402.20	32.00	8.52	38.76	79.28	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

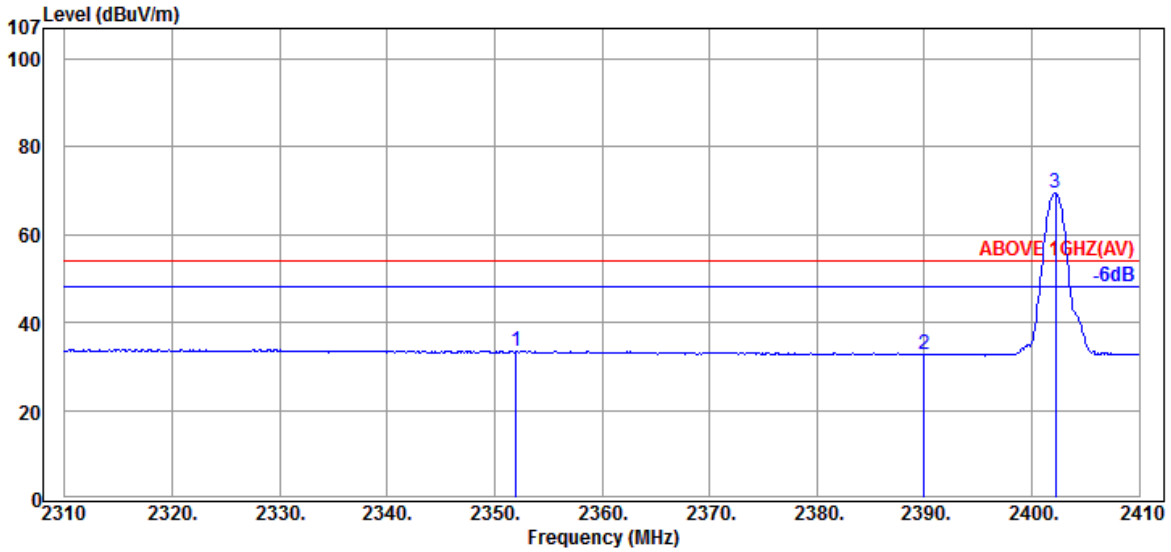
Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	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
	2336.40	32.00	8.48	6.48	46.96	74.00	27.04	Peak
	2390.00	32.00	8.52	3.77	44.29	74.00	29.71	Peak
@	2402.50	32.00	8.52	30.18	70.70	---	---	Peak



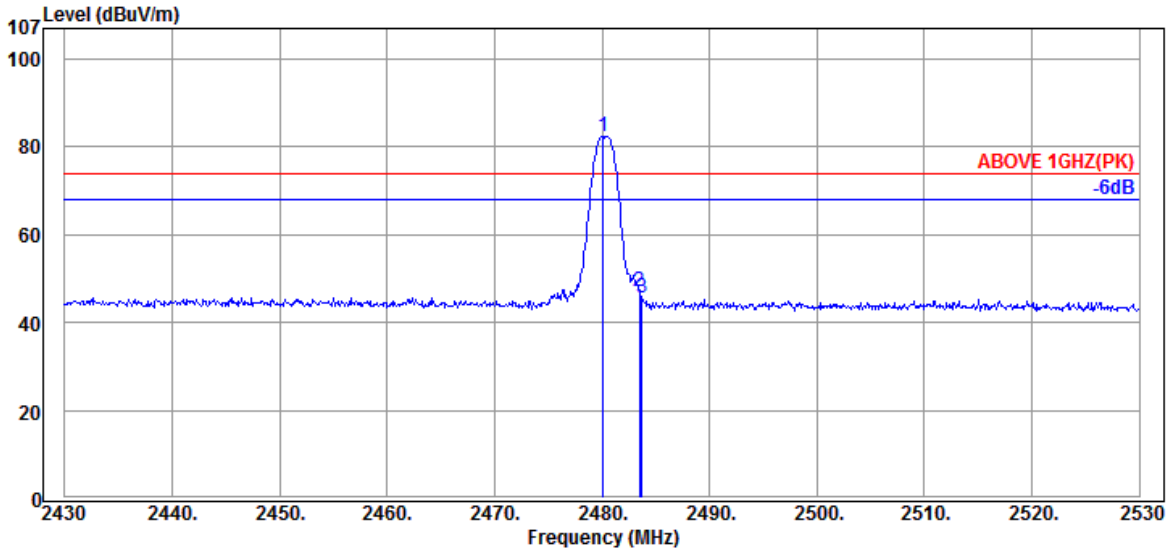
Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	2352.00	32.00	8.49	-6.93	33.56	54.00	20.44	Average
	2390.00	32.00	8.52	-7.84	32.68	54.00	21.32	Average
@	2402.20	32.00	8.52	28.89	69.41	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

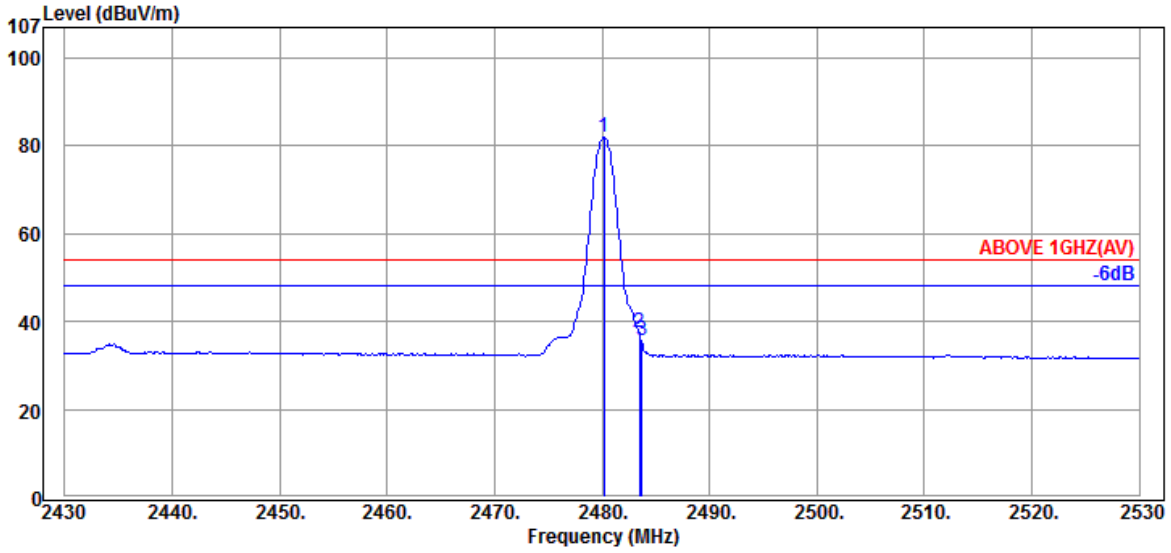
Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	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
@	2480.10	32.57	8.58	41.15	82.30	---	---	Peak
	2483.50	32.57	8.58	5.93	47.08	74.00	26.92	Peak
	2483.70	32.57	8.58	4.54	45.69	74.00	28.31	Peak



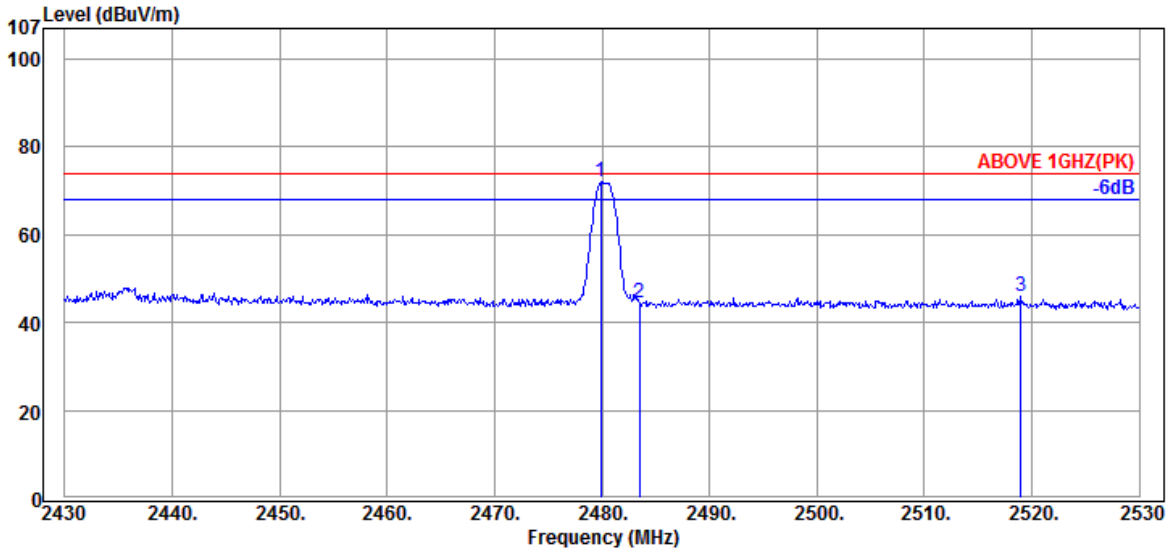
Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@	2480.20	32.57	8.58	40.84	81.99	---	---	Average
	2483.50	32.57	8.58	-3.78	37.37	54.00	16.63	Average
	2483.70	32.57	8.58	-5.65	35.50	54.00	18.50	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

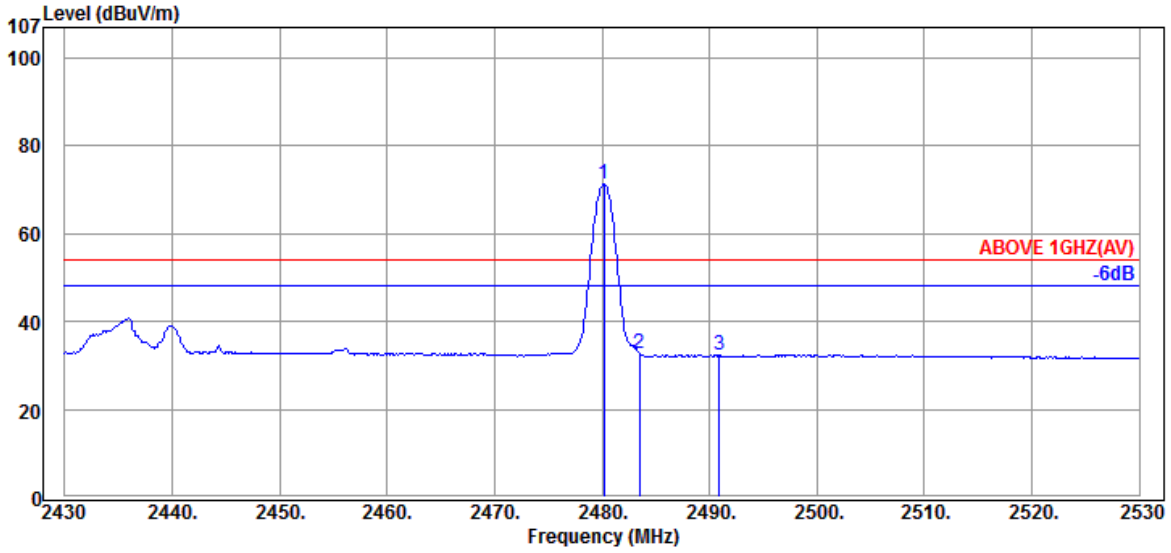
Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

Mode	BLE	Frequency	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
@	2479.90	32.57	8.58	30.81	71.96	---	---	Peak
	2483.50	32.57	8.58	3.31	44.46	74.00	29.54	Peak
	2519.00	32.30	8.59	5.01	45.90	74.00	28.10	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
@	2480.20	32.57	8.58	30.12	71.27	---	---	Average
	2483.50	32.57	8.58	-8.29	32.86	54.00	21.14	Average
	2490.90	32.50	8.59	-8.64	32.45	54.00	21.55	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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

A.1.2 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 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
4804.00	33.90	10.22	2.93	47.05	54.00	6.95	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
4804.00	33.90	10.22	-1.00	43.12	54.00	10.88	Peak

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
4880.00	34.37	10.24	5.31	49.92	54.00	4.08	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
4880.00	34.37	10.24	2.78	47.39	54.00	6.61	Peak

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
4960.00	34.27	10.27	6.39	50.93	54.00	3.07	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
4960.00	34.27	10.27	0.03	44.57	54.00	9.43	Peak

A.1.3 Emissions in Non-restricted Frequency Bands:

Pursuant to ANSI C63.10:2013 that emission levels below the FCC 15.209(a)table 4 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

A.2 6dB/Occupied Bandwidth

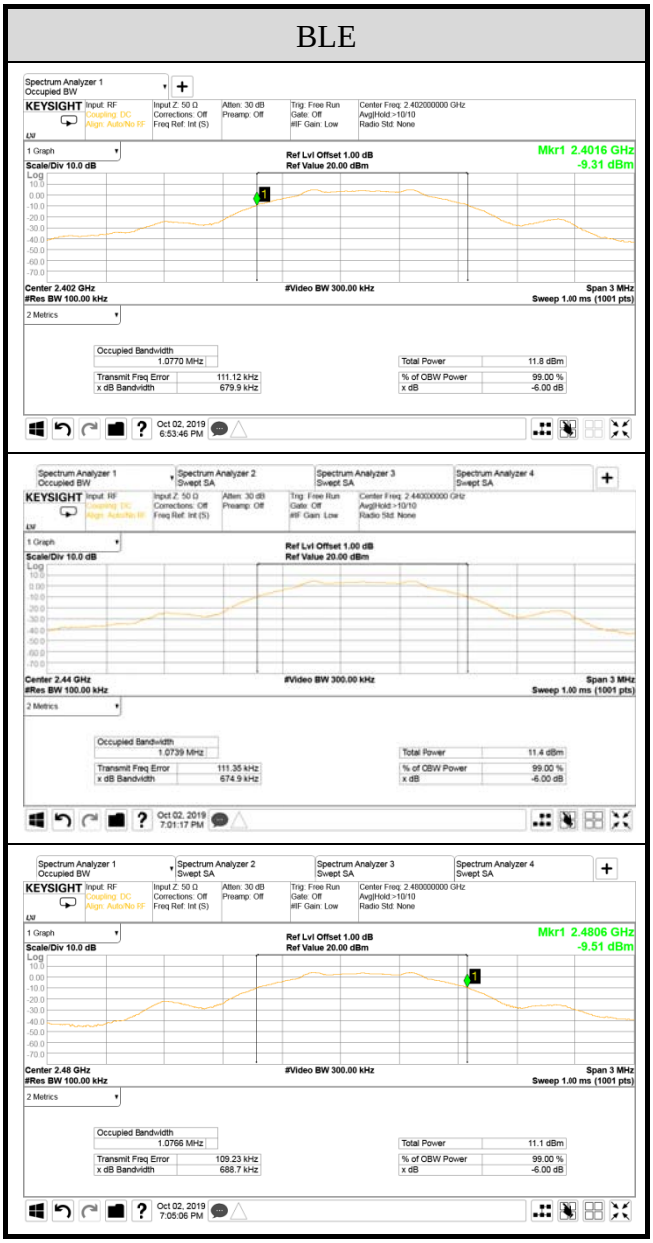
Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E

A.2.1 Emission Bandwidth Result

Mode	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied (99%) Bandwidth (MHz) (Reference only)	Limit
BLE	2402	0.6799	1.0770	>500kHz
	2440	0.6749	1.0739	
	2480	0.6887	1.0766	

A.2.2 Measurement Plots

BLE



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

A.3 MAXIMUM PEAK OUTPUT POWER

Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E

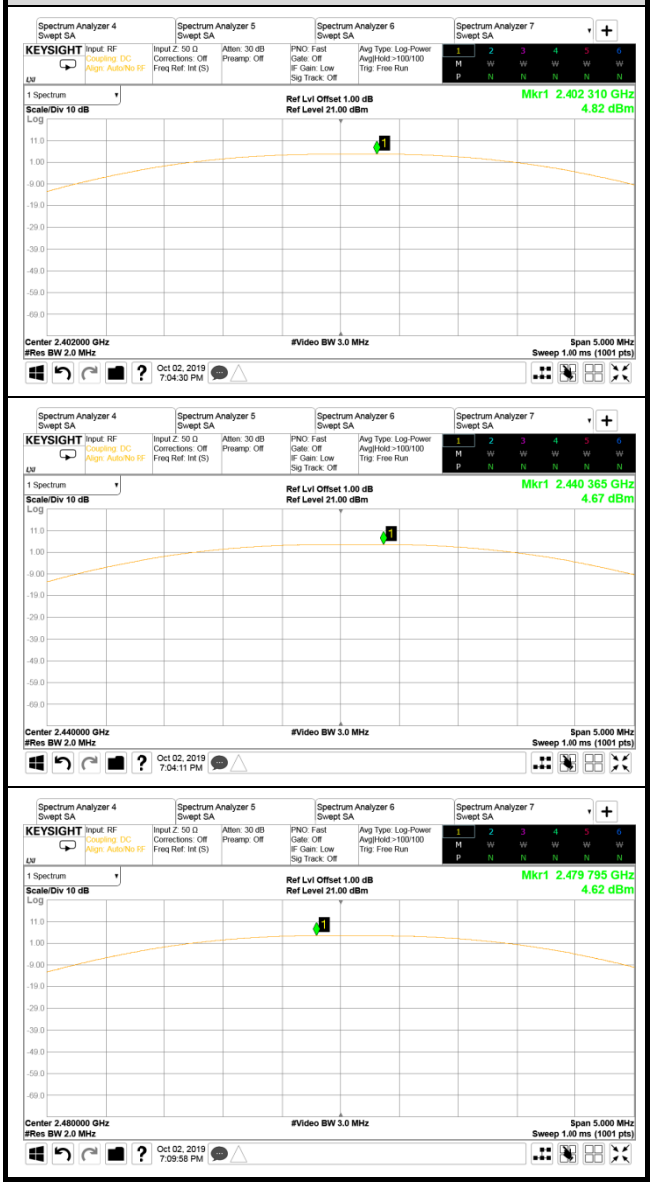
A.3.1 Peak Output Power

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Limit
		(dBm)	(W)	
BLE	2402	4.82	0.003	<30dBm (1W) (Maximum Peak Output Power) <36dBm (4W) (E.I.R.P)
	2440	4.67	0.003	
	2480	4.62	0.003	

Note: The results have been included cable loss.

A.3.2 Measurement Plots

BLE

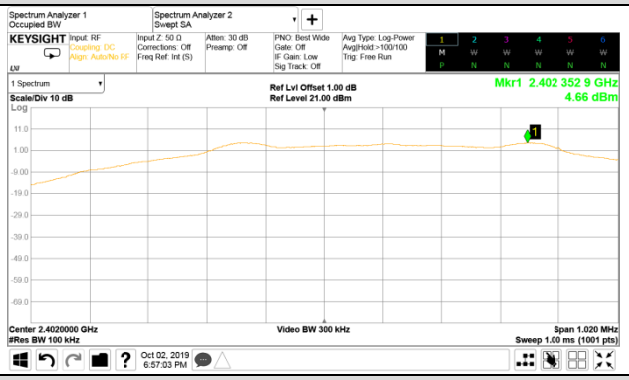


Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan
Tel: +886 2 26099301
Fax: +886 2 26099303

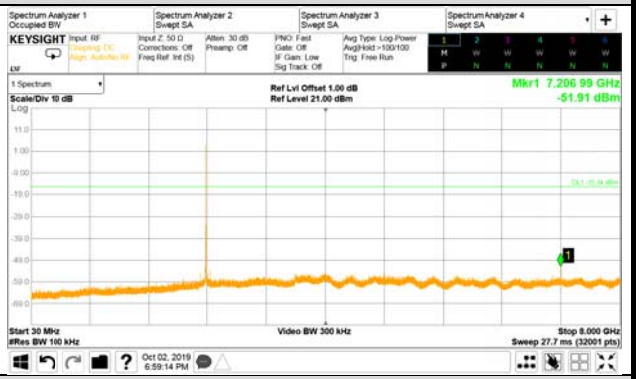
A.4 EMISSION LIMITATIONS

Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E
Mode	BLE	Frequency	TX 2402MHz

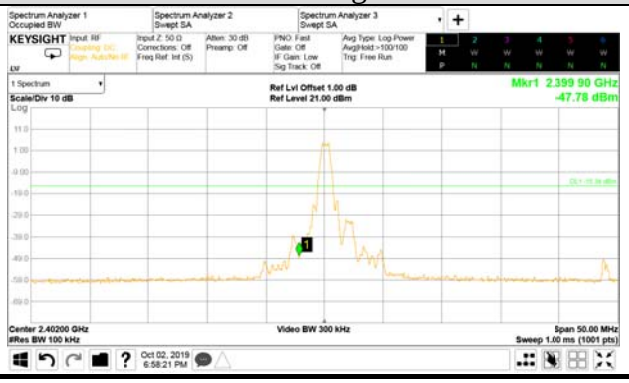
Reference Level



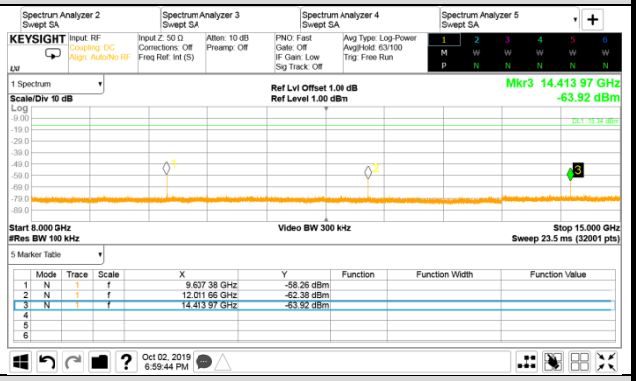
30MHz – 8GHz



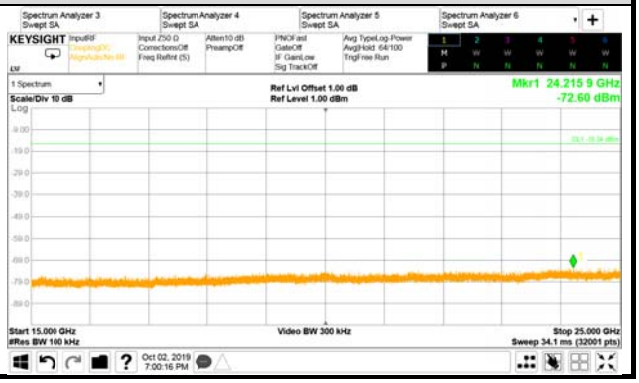
Band Edge



8GHz – 15GHz



15GHz – 25GHz

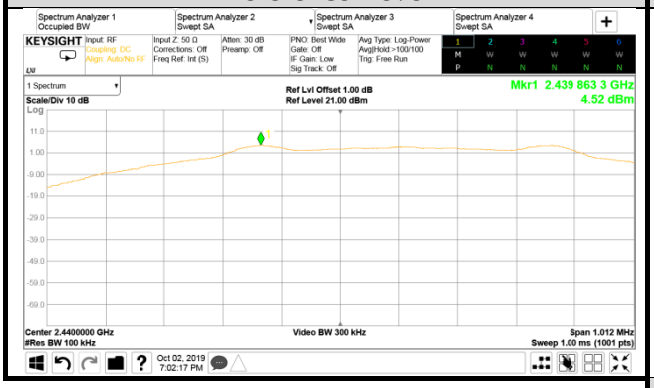


Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

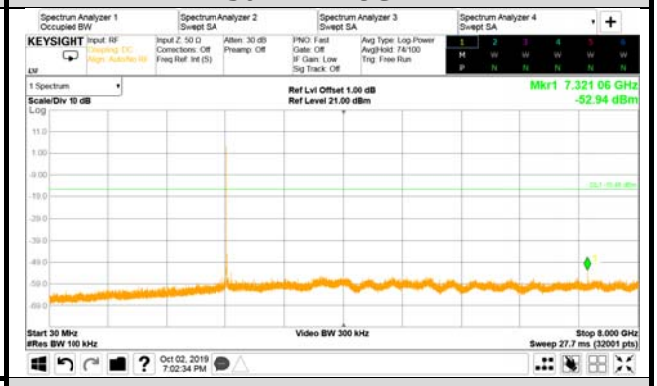
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E
Mode	BLE	Frequency	TX 2440MHz

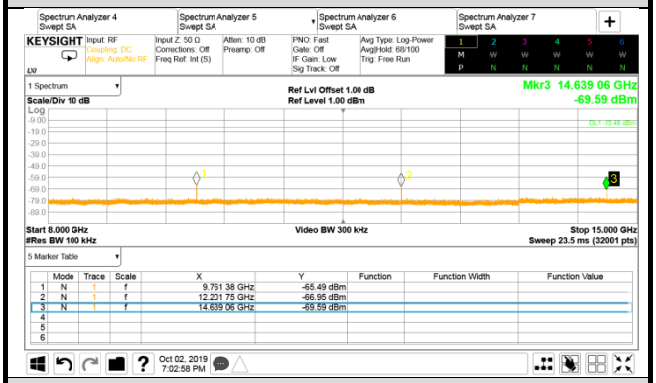
Reference Level



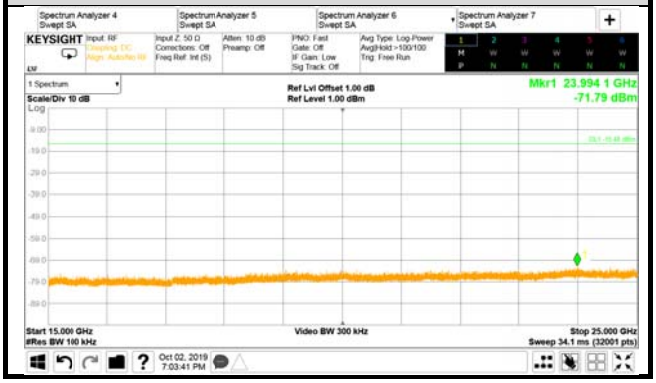
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz

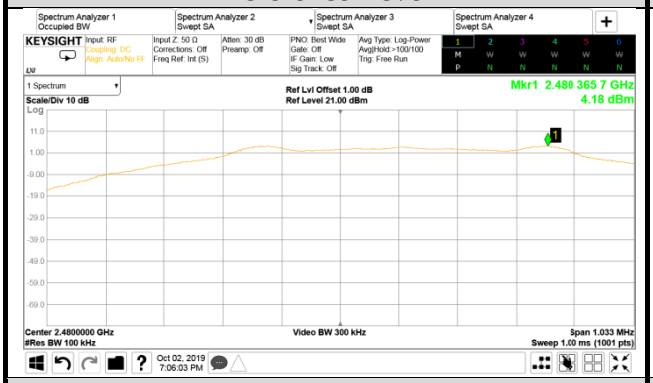


Audix Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

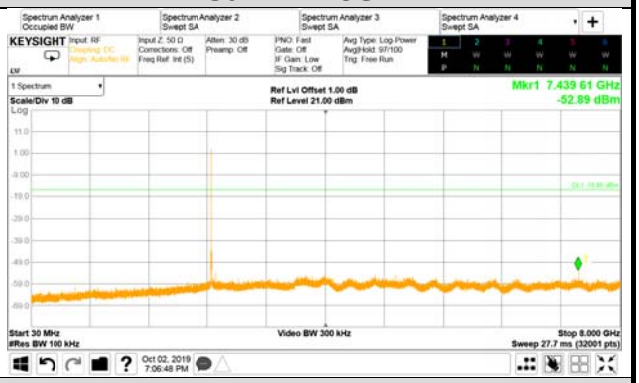
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E
Mode	BLE	Frequency	TX 2480MHz

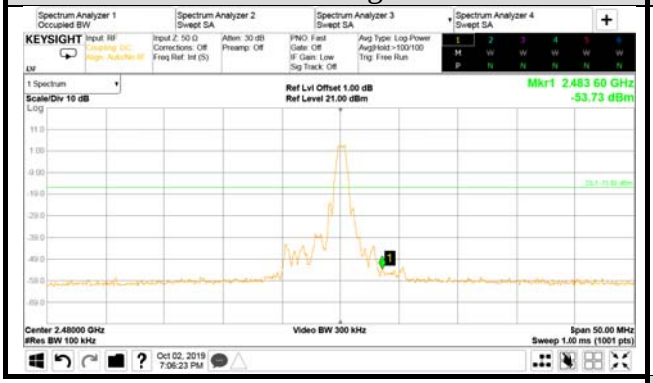
Reference Level



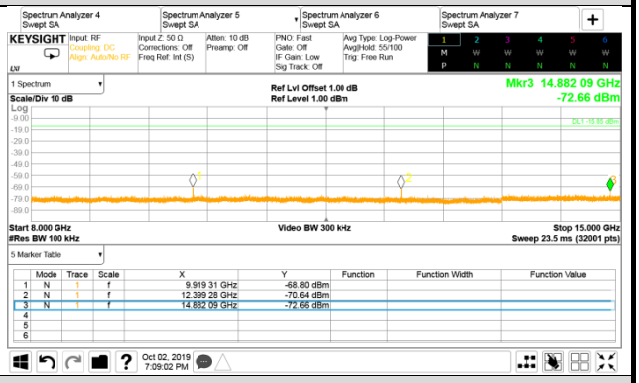
30MHz – 8GHz



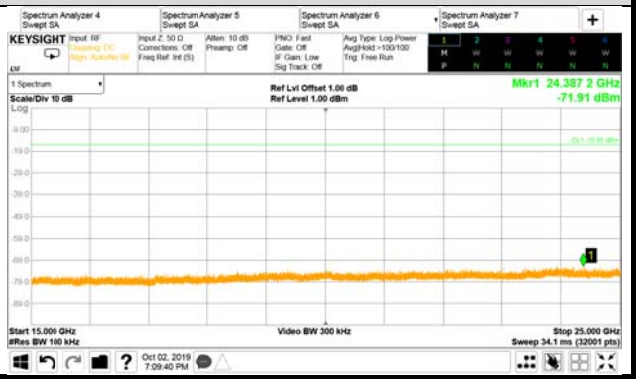
Band Edge



8GHz – 15GHz



15GHz – 25GHz



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

A.5 POWER SPECTRAL DENSITY

Test Date	2019/10/02	Temp./Hum.	23℃/58%
Cable Loss	1.00dB	Tested By	Kuper Hsu
Test Voltage	DC 6V (Via Batteries)	Test Model	880E

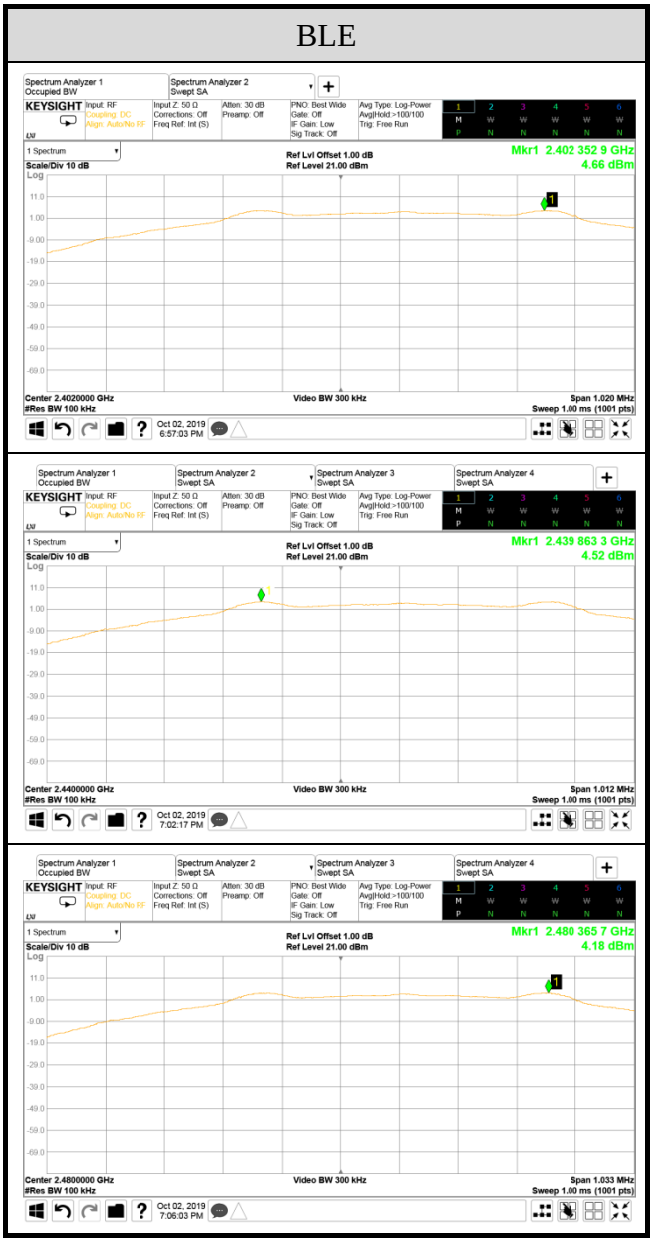
A.5.1 Power Spectral Density Result

Mode	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
BLE	2402	4.66	<8 dBm/3kHz
	2440	4.52	
	2480	4.18	

Note: 1. All results have been included cable loss and Simultaneous Factor.
2. For KDB558074 D01V04, in the test result, when RBW set at 100kHz is stricter than 3kHz.

A.5.2 Measurement Plots

BLE



Note: All results have been included cable loss and Simultaneous Factor.

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: 880E)