

## FCC 15.247 2.4GHz Test Report

for

**Ace Medical Technology Co., Ltd.**

**No. 52, Dinghu Road, Guishan District, Taoyuan City 33378,  
Taiwan**

**Product Name : AceZin GLUGold blood glucose  
monitoring system**  
**Model Name : AM100 plus**  
**Brand : ACEZIN**  
**FCC ID : 2AYCBAM100PLUS**

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



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.

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**Audix Technology Corp.**  
No. 53-11, Dingfu, Linkou, Dist.,  
New Taipei City 244, Taiwan

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

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APPENDIX A TEST DATA AND PLOTS  
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## TEST REPORT

Applicant : Ace Medical Technology Co., Ltd.  
Manufacturer : Living Science Co., Ltd  
EUT Description  
(1) Product : AceZin GLUGold blood glucose monitoring system  
(2) Model : AM100 plus  
(3) Brand : ACEZIN  
(4) Power Rating : DC 3V  
(5) Test Voltage : DC 3V

### Applicable Standards:

Title 47 FCC CFR, 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: 2020.12.01

Reviewed by:



(Sabrina Wang/Administrator)

Approved by:



(Johnny Hsueh/Section Manager)

## 1. REVISION RECORD OF TEST REPORT

Edition No	Issued Date	Revision Summary	Report Number
0	2020.12.01	Original Report	EM-F200553

## 2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	<b>N/A, Note 2</b>
15.247(d)/ 15.205	Radiated Band Edge and Radiated Spurious Emission	<b>PASS</b>
15.247(a)(2)	6dB/Occupied Bandwidth	<b>PASS</b>
15.247(b)(3)	Maximum Peak Output Power	<b>PASS</b>
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	<b>PASS</b>
15.247 (e)	Peak Power Spectral Density	<b>PASS</b>
15.203	Antenna Requirement	<b>Compliance</b>
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.		

### 3. GENERAL INFORMATION

#### 3.1. Description of Application

Applicant	Ace Medical Technology Co., Ltd. No. 52, Dinghu Road, Guishan District, Taoyuan City 33378, Taiwan
Manufacturer	Living Science Co., Ltd No.1428 Xiang Jiang Road, Suzhou New District, Suzhou City 215129, Jiangsu Province, China
Product	AceZin GLUGold blood glucose monitoring system
Brand	ACEZIN
Model	AM100 plus

#### 3.2. Description of EUT

Test Model	AM100 plus						
Sample Unit	#3 ES201098-9						
Power Rating	DC 3V						
Hardware Version	N/A						
Software Version	N/A						
RF Features	BLE						
Transmit Type	1T1R						
Test Sample	<table border="1"><thead><tr><th>Sample No.</th><th>Test Item</th><th>Firmware</th></tr></thead><tbody><tr><td>-03</td><td>AC Conduction, RSE, Output Power</td><td>N/A</td></tr></tbody></table>	Sample No.	Test Item	Firmware	-03	AC Conduction, RSE, Output Power	N/A
Sample No.	Test Item	Firmware					
-03	AC Conduction, RSE, Output Power	N/A					
Sample Status	Trial sample						
Date of Receipt	2020. 11. 10						
Date of Test	2020. 11. 25 ~27						
Interface Ports of EUT	Test Strip Slot x1						
Accessories Supplied	None						

#### 3.3. Reference Test Guidance

None

### 3.4. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
N/A	N/A	PCB Type	2400-2500	2.23

### 3.5. EUT Specifications Assessed in Current Report

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

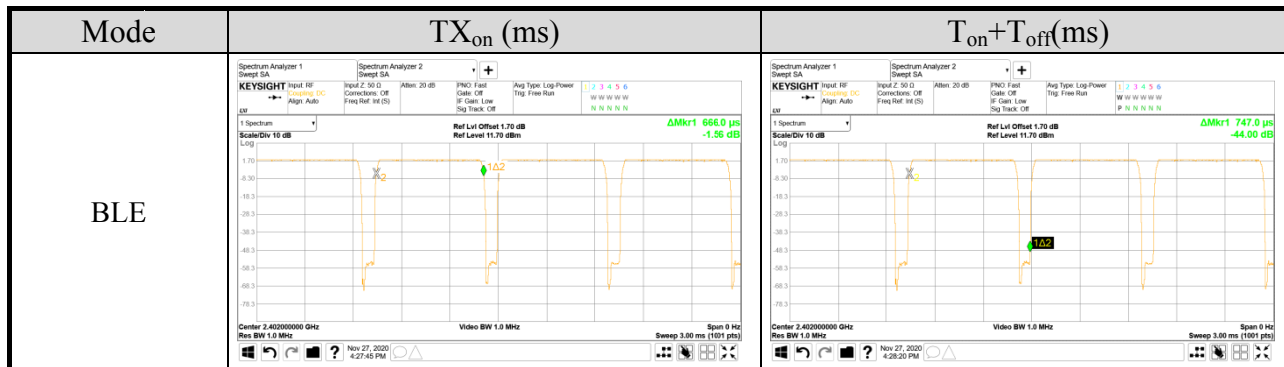
### 3.6. Descriptions of Key Components

Item	Supplier/Brand	Model	Specification
BLE Module	LaBest	LB-BLE-006	BLE



### 3.7. Test Configuration

Mode	TX <sub>on</sub> (ms)	1/ TX <sub>on</sub> (kHz)
BLE	0.666	1.502



Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge	BLE	1Mbps	37/39
	Radiated Spurious Emission			37/17/39
Conducted Test Case	6dB/Occupied Bandwidth			37/17/39
	Peak Output Power			37/17/39
	Band Edge			37/39
	Spurious Emission			37/17/39
Peak Power Spectral Density	37/17/39			

Note:

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

### 3.8. Tested Supporting System List

None

### 3.9. Setup Configuration

#### 3.9.1. EUT Configuration for Radiated Emission

EUT

#### 3.9.2. EUT Configuration for RF Conducted Test Items

EUT

### 3.10. Operating Condition of EUT

To Set EUT RF function on continues transmitting and choosing channel.

### 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 17025:2017 (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

### 3.12.Measurement Uncertainty

Test Items/Facilities		Frequency Range	Uncertainty	
Radiation Test	<input checked="" type="checkbox"/>	No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.1dB
			200MHz-1000MHz, 3m, Horizontal	±3.9dB
			30MHz-200MHz, 3m, Vertical	±4.2dB
			200MHz-1000MHz, 3m, Vertical	±4.1dB
			1GHz-6GHz, 3m	±4.2dB
			6GHz-18GHz, 3m	±4.6dB
	<input type="checkbox"/>	No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.9dB
			200MHz-1000MHz, 3m, Horizontal	±3.9dB
			30MHz-200MHz, 3m, Vertical	±4.4dB
			200MHz-1000MHz, 3m, Vertical	±4.1dB
	<input type="checkbox"/>	No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.3dB
			200MHz-1000MHz, 3m, Horizontal	±4.0dB
			30MHz-200MHz, 3m, Vertical	±4.3dB
			200MHz-1000MHz, 3m, Vertical	±4.4dB
			1GHz-6GHz, 3m	±4.5dB
			6GHz-18GHz, 3m	±4.6dB
	<input type="checkbox"/>	No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.0dB
			200MHz-1000MHz, 3m, Horizontal	±3.9dB
			30MHz-200MHz, 3m, Vertical	±4.2dB
			200MHz-1000MHz, 3m, Vertical	±4.3dB
1GHz-6GHz, 3m			±4.3dB	
6GHz-18GHz, 3m			±4.7dB	
<input checked="" type="checkbox"/>	Fully Anechoic Chamber	30MHz~1000MHz	±4.6dB	
		1GHz~18GHz	±5.4dB	
		18GHz~40GHz	±3.52dB	
		40GHz~260GHz	±3.56dB	

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

## 4. MEASUREMENT EQUIPMENTLIST

### 4.1. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-526	MY53400071	2020.01.16	1 Year
2.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2020.04.29	1 Year
3.	Test Receiver	R&S	ESCS30	100338	2020.06.10	1 Year
4.	Amplifier	HP	8447D	2944A06305	2020.01.16	1 Year
5.	Amplifier	HP	8449B	3008A02678	2020.02.27	1 Year
6.	Amplifier	HP	8449B	3008A01284	2020.05.26	1 Year
7.	Amplifier	Keysight	83051A	MY53010042	2020.08.05	1 Year
8.	Loop Antenna	R&S	HFH2-Z2	891847/27	2019.12.26	2 Years
9.	Bilog Antenna	TESEQ	CBL6112D	33821	2020.01.17	1 Year
10.	Horn Antenna	EMCO	3115	9609-4927	2020.06.23	1 Year
11.	Horn Antenna	EMCO	3117	00135902	2020.03.20	1 Year
12.	Horn Antenna	COM-POWER	AH-840	101092	2020.05.08	1 Year
13.	2.4GHz Notch Filter	K&L	7NSL10-2441.5/E 130.5-O/O	1	2020.07.24	1 Year
14.	3GHz Notch Filter	Microwave	H3G018G1	484796	2020.08.20	1 Year
15.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2020.01.31	1 Year
16.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 106	RE-14	2020.01.31	1 Year
17.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104	RE-29	2020.09.19	1 Year
18.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2020.09.19	1 Year
19.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2020.04.17	1 Year
20.	Digital Thermo-Hygro Meter	EVERY DAY	E-512	RF-02	2020.04.17	1 Year
21.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
22.	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	N9020B-544	MY57120357	2020.01.10	1 Year
2.	Power Meter	Anritsu	ML2487A	6K00005406	2020.04.29	1 Year
3.	Power Sensor	Anritsu	MA2491A	030873	2020.04.29	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2020.04.17	1 Year

## **5. CONDUCTED EMISSION**

The conducted emission voltage limits are not required for EUT which only employ DC power for operation.

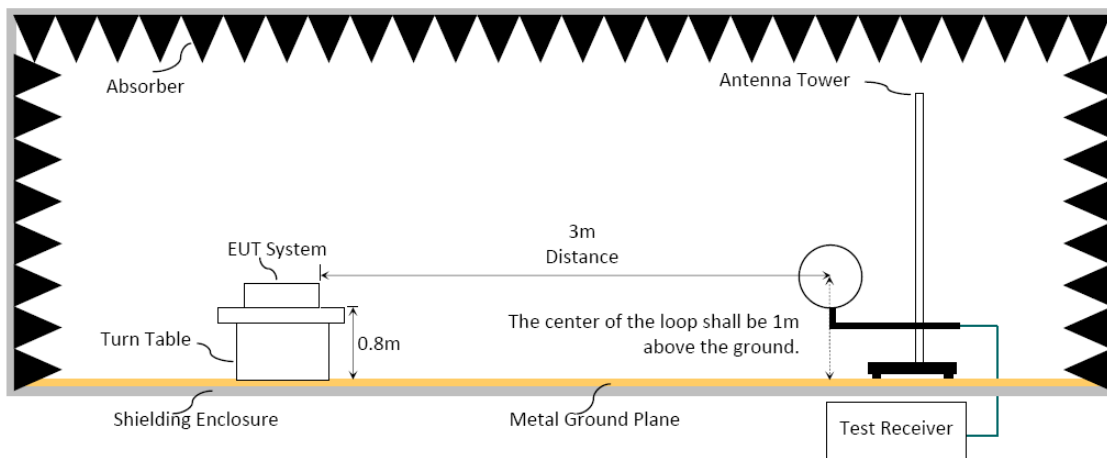
## 6. RADIATED EMISSION

### 6.1. Block Diagram of Test Setup

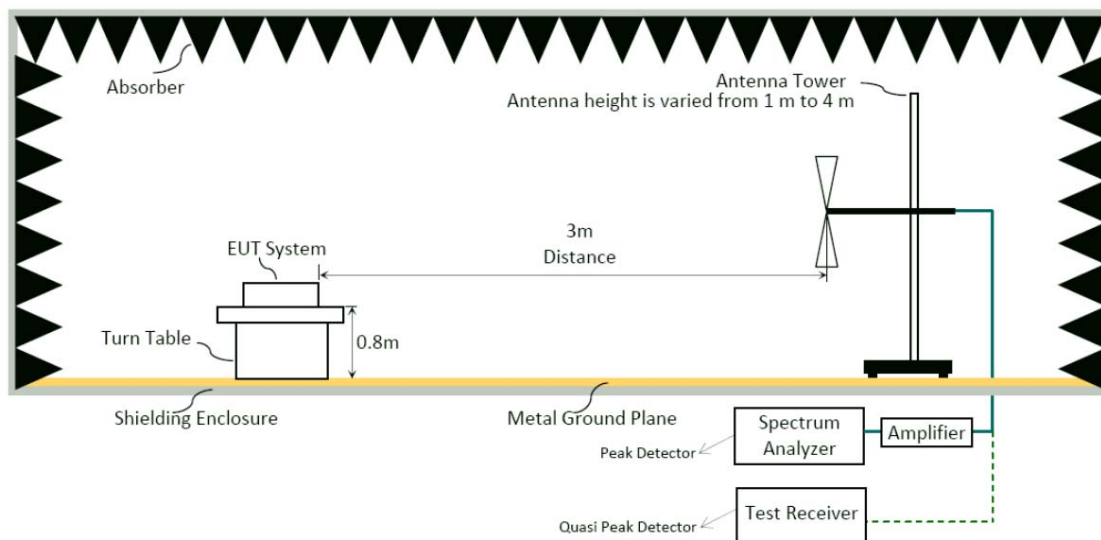
#### 6.1.1. Block Diagram of EUT

Indicated as section 3.9

#### 6.1.2. Setup Diagram for 9kHz-30MHz

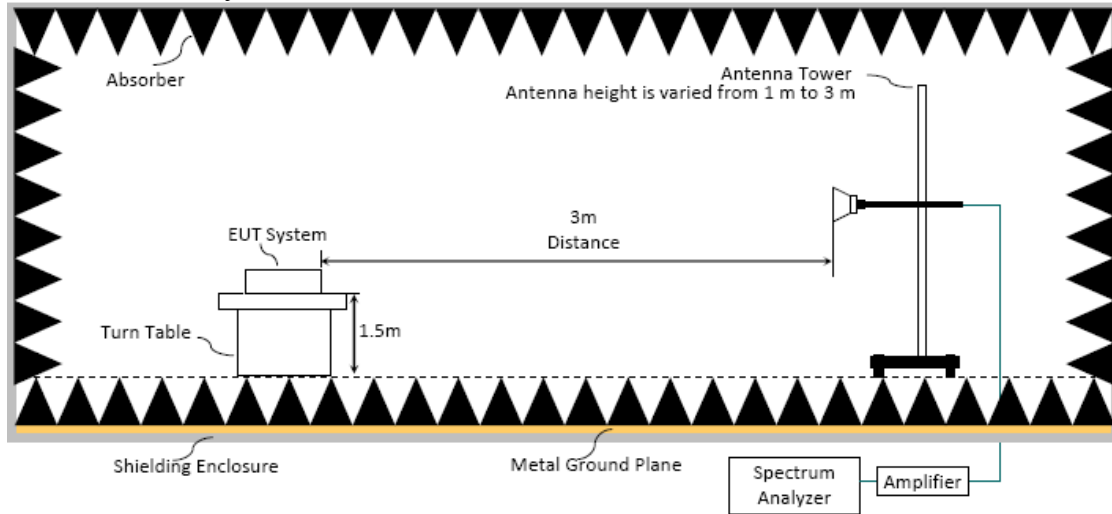


#### 6.1.3. Setup Diagram for 30-1000MHz

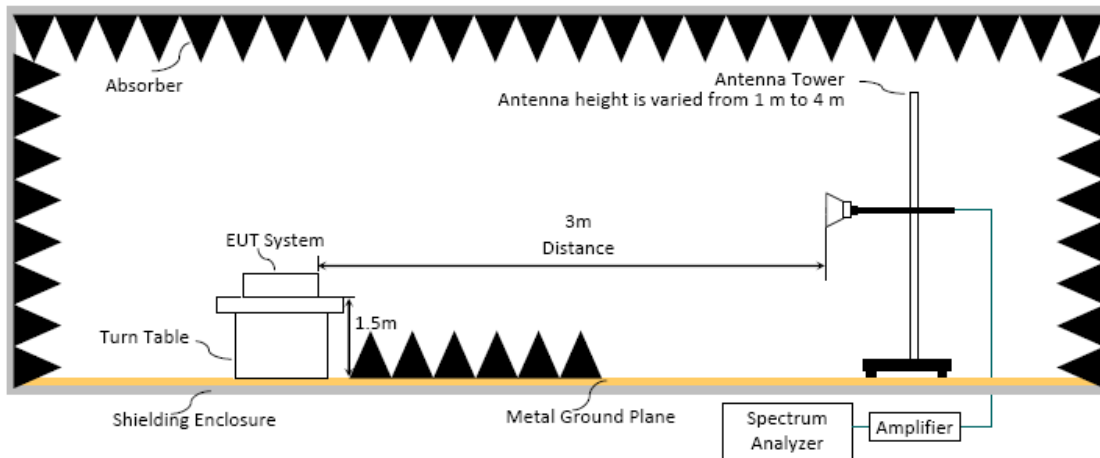


### 6.1.4. Setup Diagram for above 1GHz

#### Fully Anechoic Chamber



#### Semi Anechoic Chamber



## 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	
		dB $\mu$ V/m	$\mu$ V/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 dB $\mu$ V/m (Peak) 54.0 dB $\mu$ V/m (Average)	

Remark : (1) dB $\mu$ V/m = 20 log ( $\mu$ V/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.



### 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 C63.10-2013 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 80cm (for 30-1000MHz) 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) and from 1m to 3m (for above 1GHz at fully Anechoic Chamber) or from 1 m to 4 m (for above 1GHz at Semi Anechoic Chamber) 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 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW  $\geq 3 \times$  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 the Q.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  $\geq 3 \times$  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.

**Average Detector:** **Option 1:**

(1) RBW = 1MHz

(2) VBW  $\geq$  1/ T.

Modulation Type	TX <sub>on</sub> (ms)	1/ TX <sub>on</sub> (kHz)	VBW Setting(Hz)
BLE	0.666	1.502	1.6kHz

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is  $\geq$ 98%.

(1) Detector = Peak.

(2) Sweep time = auto.

(3) Trace mode = max hold.

(4) Allow sweeps to continue until the trace stabilizes.

 **Option 2:**

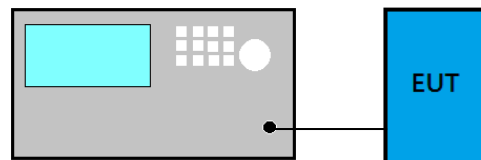
Average Emission Level = Peak Emission Level + D.C.C.F.

**6.4. Measurement Result Explanation** Peak Emission Level = Antenna Factor + Cable Loss + Meter Reading (including Preamp factor if test used) Average Emission Level = Antenna Factor + Cable Loss + Meter Reading (including Preamp factor if test used) Average Emission Level = Peak Emission Level + DCCFDuty Cycle Correction Factor (DCCF) =  $20\log(\text{TX}_{\text{on}}/\text{TX}_{\text{on+off}})$  presented in section 3.7 ERP = Peak Emission Level - 95.2dB - 2.14dB**6.5. Test Results**

Please refer to Appendix A.

## 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:

#### For 6dB Bandwidth

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW)  $\geq 3 \times$  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 power to record the final bandwidth..

#### For 99% Occupied Bandwidth

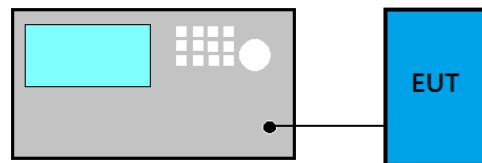
- (1) Set Span range 1.5~5 times the OBW
- (2) Set RBW close to 1% to 5% of OBW.
- (3) Set  $VBW \geq 3 \times RBW$ .
- (4) Detector = Peak.
- (5) Trace mode = Max hold
- (6) Sweep = Auto couple.
- (7) Allow the trace to stabilize.

### 7.4. Test Results

Please refer to Appendix A

## 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)

### 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  $\geq$  DTS bandwidth
- (2) Set VBW  $\geq 3 \times$  RBW
- (3) Set span  $\geq 3 \times$  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)

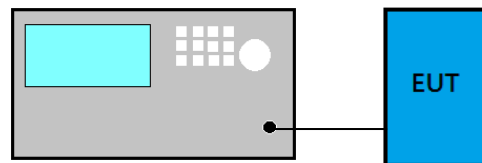
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5%of OBW
- (3) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the 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

## 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 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  $\geq 3 \times$  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

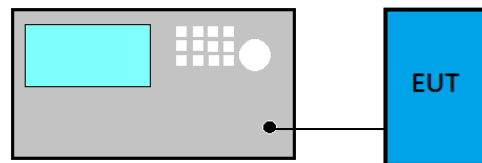
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW  $\geq 3 \times$  RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully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

### 9.4. Test Results

Please refer to Appendix A

## 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:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- (4) Set the VBW  $\geq 3 \times \text{RBW}$ .
- (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



## **11.DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**



*Audix Technology Corp.  
No. 53-11, Dingfu, Linkou, Dist.,  
New Taipei City 244, Taiwan*

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

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# APPDNDIX A

## TEST DATA AND PLOTS

(Model: AM100 plus)

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## A.1 RADIATED EMISSION

Test Date	2020/11/27	Temp./Hum.	21~25°C/56~65%
Test Voltage	DC 3V	Tested By	Martin Chen

### 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
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#### Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
31.940	23.35	1.26	26.53	27.86	25.94	40.00	14.06	Peak
114.390	18.22	2.61	26.23	28.91	23.51	43.50	19.99	Peak
515.000	23.71	6.94	27.26	29.08	32.47	46.00	13.53	Peak
775.930	25.86	8.01	27.43	28.73	35.17	46.00	10.83	Peak
846.740	26.46	8.40	27.28	28.55	36.13	46.00	9.87	Peak
979.630	27.28	9.07	26.90	28.49	37.94	54.00	16.06	Peak

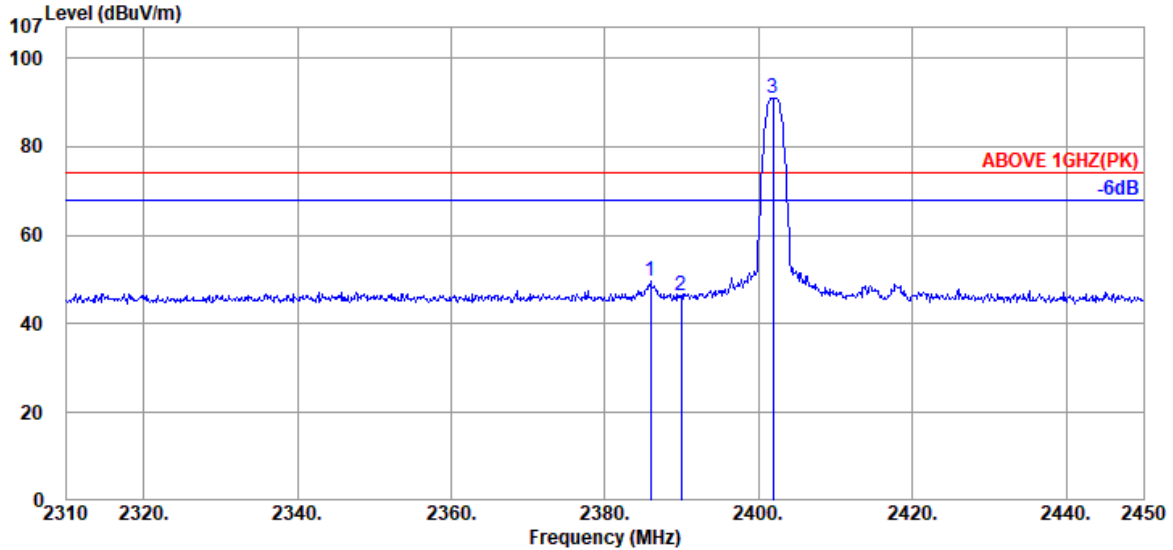
#### Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
32.910	22.98	1.29	26.53	35.60	33.34	40.00	6.66	Peak
79.470	13.11	2.17	26.38	43.01	31.91	40.00	8.09	Peak
483.960	23.25	6.78	27.13	28.94	31.84	46.00	14.16	Peak
738.100	25.42	7.81	27.47	32.34	38.10	46.00	7.90	Peak
911.730	26.90	8.77	27.09	29.39	37.97	46.00	8.03	Peak
982.540	27.30	9.08	26.90	28.44	37.92	54.00	16.08	Peak

A.2.1.3 Frequency Above 1 GHz to 10<sup>th</sup> harmonics

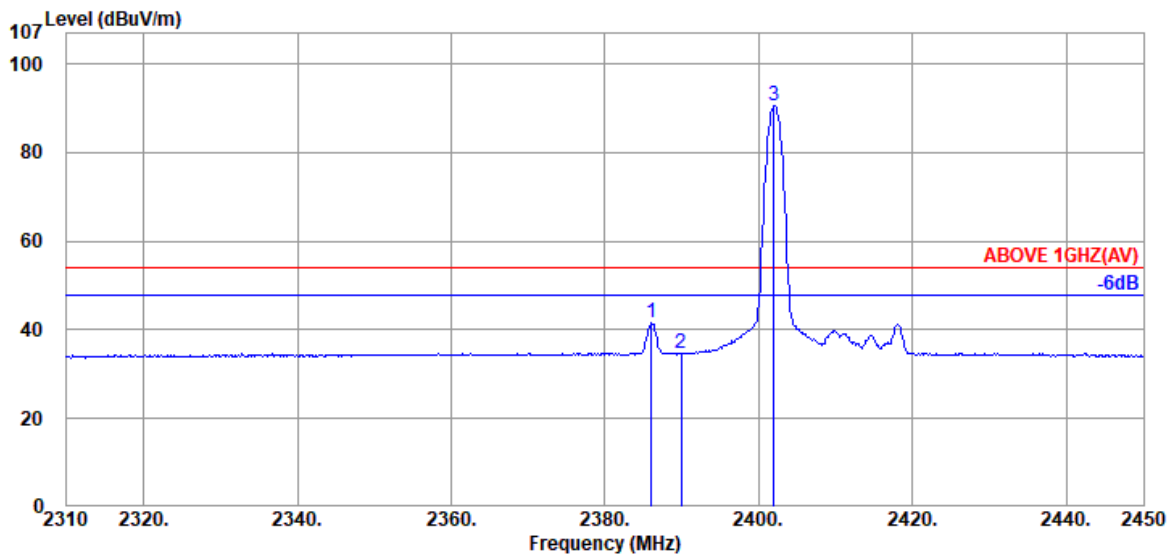
**Band Edge:**

Mode	BLE	Frequency	TX 2402MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2385.880	32.44	7.95	34.58	43.70	49.51	74.00	24.49	Peak
2389.940	32.44	7.95	34.58	40.61	46.42	74.00	27.58	Peak
@ 2401.840	32.50	7.95	34.59	85.00	90.86	---	---	Peak

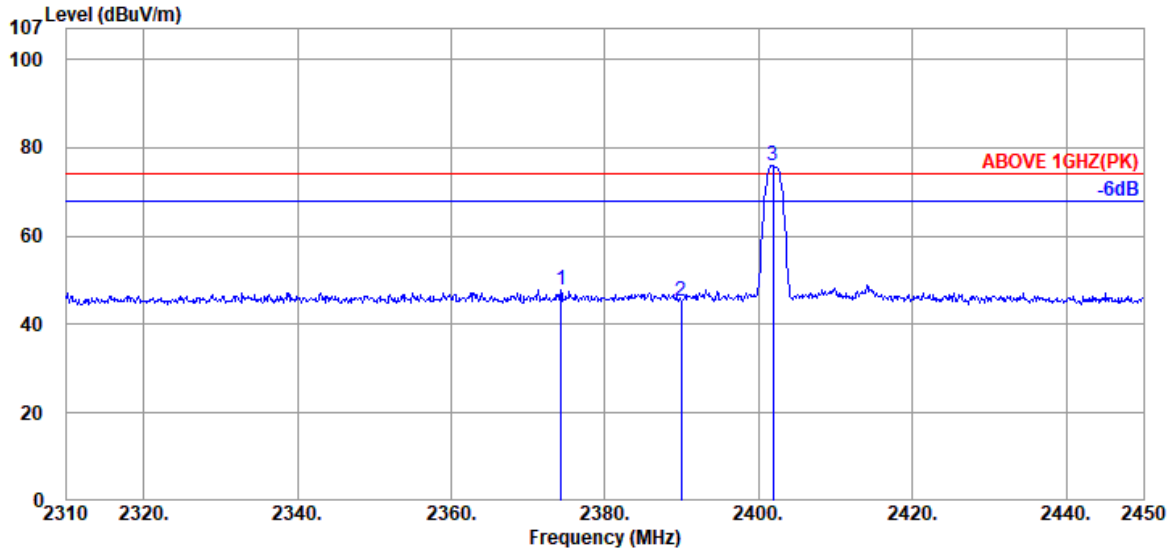


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.020	32.44	7.95	34.58	35.82	41.63	54.00	12.37	Average
2389.940	32.44	7.95	34.58	28.76	34.57	54.00	19.43	Average
@ 2401.980	32.50	7.95	34.59	84.61	90.47	---	---	Average

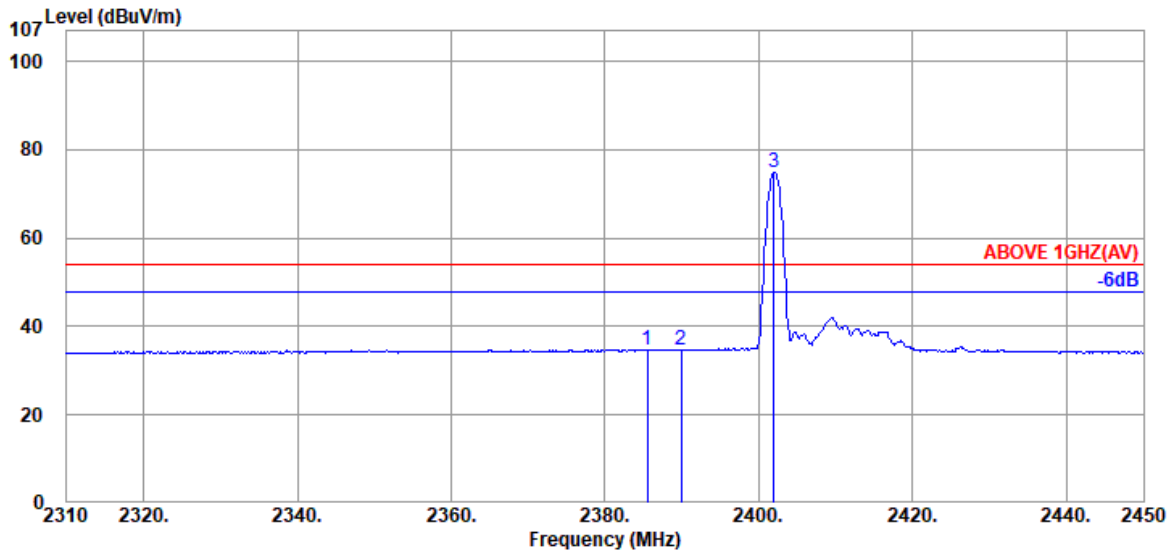
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	BLE	Frequency	TX 2402MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2374.260	32.39	7.94	34.58	42.22	47.97	74.00	26.03	Peak
2389.940	32.44	7.95	34.58	39.61	45.42	74.00	28.58	Peak
@ 2401.840	32.50	7.95	34.59	69.96	75.82	---	---	Peak

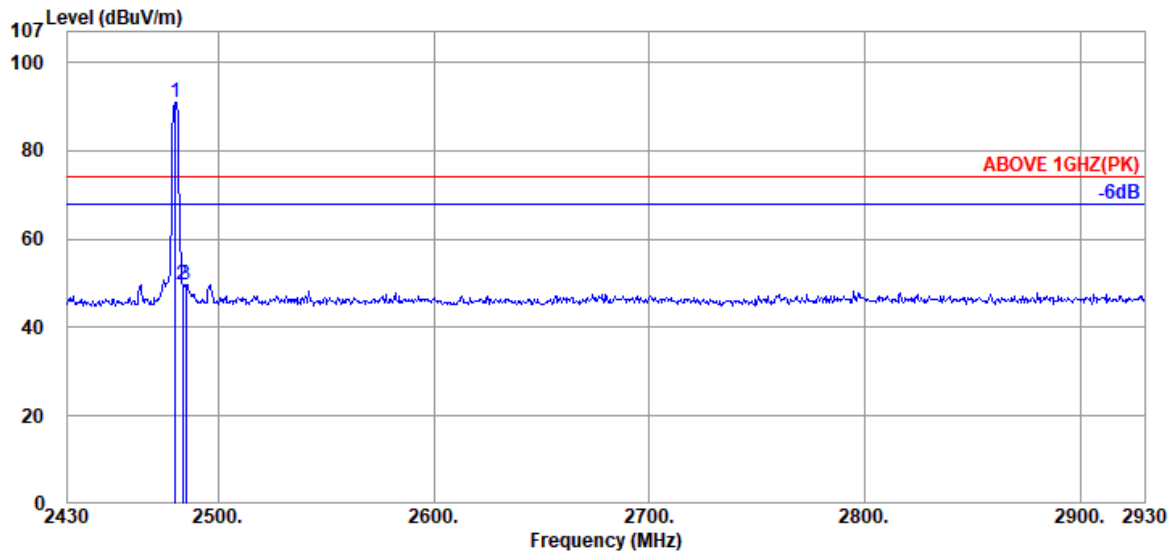


Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2385.460	32.44	7.95	34.58	29.05	34.86	54.00	19.14	Average
2389.940	32.44	7.95	34.58	28.84	34.65	54.00	19.35	Average
@ 2401.980	32.50	7.95	34.59	68.93	74.79	---	---	Average

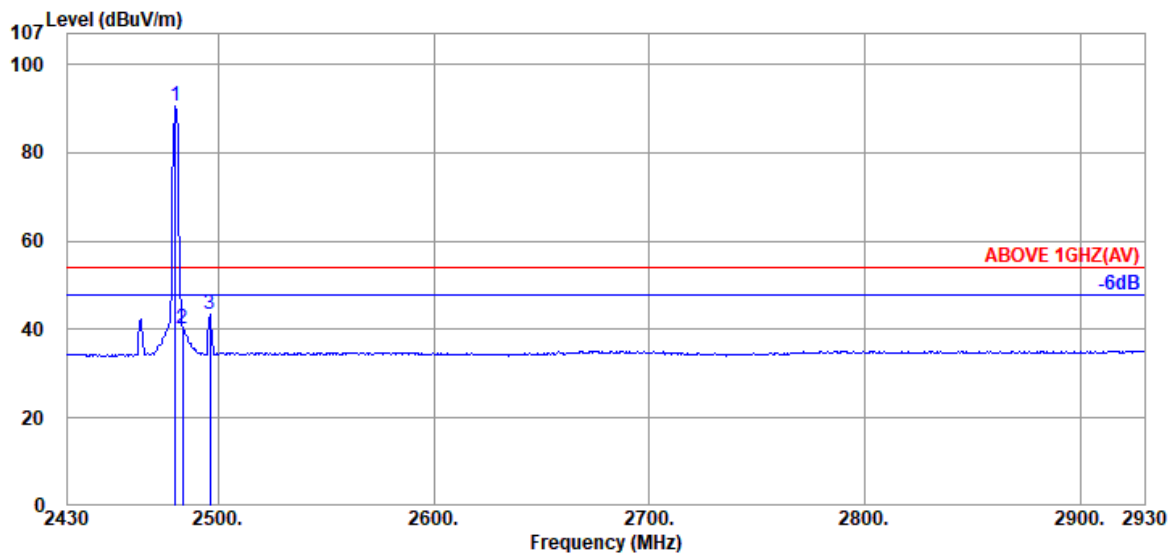
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	BLE	Frequency	TX 2480MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.000	32.11	7.99	34.60	85.42	90.92	---	---	Peak
2483.500	32.14	7.99	34.61	43.97	49.49	74.00	24.51	Peak
2485.000	32.14	7.99	34.61	44.18	49.70	74.00	24.30	Peak

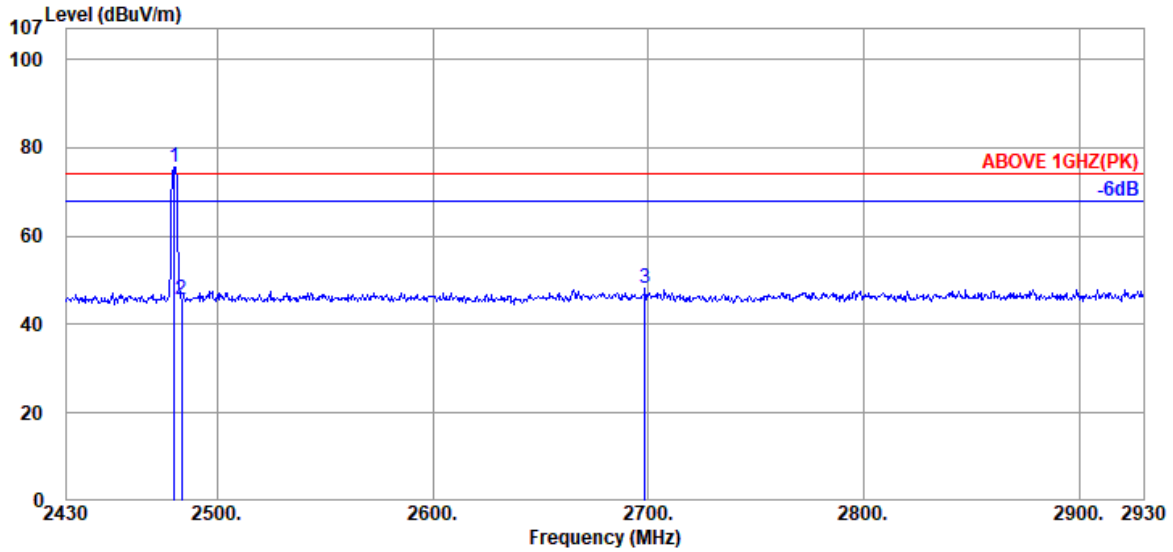


Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.000	32.11	7.99	34.60	85.05	90.55	---	---	Average
2483.500	32.14	7.99	34.61	34.69	40.21	54.00	13.79	Average
2496.000	32.17	8.00	34.61	37.77	43.33	54.00	10.67	Average

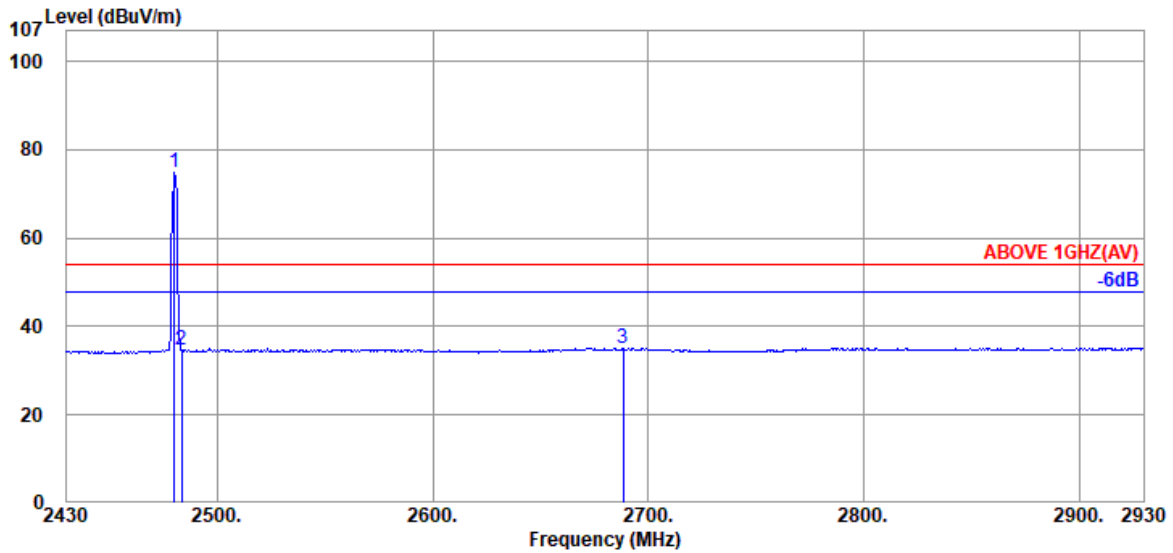
Remark: The “@” means fundamental frequency, it is ignored in this section.

Mode	BLE	Frequency	TX 2480MHz
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Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.000	32.11	7.99	34.60	70.08	75.58	---	---	Peak
2483.500	32.14	7.99	34.61	40.27	45.79	74.00	28.21	Peak
2698.500	32.37	8.09	34.65	42.36	48.17	74.00	25.83	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
@ 2480.000	32.11	7.99	34.60	69.45	74.95	---	---	Average
2483.500	32.14	7.99	34.61	29.02	34.54	54.00	19.46	Average
2688.500	32.34	8.09	34.65	29.37	35.15	54.00	18.85	Average

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



**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
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4804.000	34.10	10.49	34.47	40.24	50.36	54.00	3.64	Peak
7205.000	35.60	12.25	34.60	32.97	46.22	54.00	7.78	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4804.000	34.10	10.49	34.47	36.78	46.90	54.00	7.10	Peak
7205.000	35.60	12.25	34.60	33.25	46.50	54.00	7.50	Peak

Mode	BLE	Frequency	TX 2440MHz
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**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4880.000	34.05	10.54	34.45	40.84	50.98	54.00	3.02	Peak
7319.000	35.60	12.29	34.68	35.69	48.90	54.00	5.10	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4880.000	34.05	10.54	34.45	37.63	47.77	54.00	6.23	Peak
7319.000	35.60	12.29	34.68	34.65	47.86	54.00	6.14	Peak

Mode	BLE	Frequency	TX 2480MHz
------	-----	-----------	------------

**Antenna at Horizontal Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4960.000	34.10	10.60	34.44	42.30	52.56	54.00	1.44	Peak
7439.000	35.63	12.36	34.78	36.06	49.27	54.00	4.73	Peak

**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4960.000	34.10	10.60	34.44	35.38	45.64	54.00	8.36	Peak
7439.000	35.63	12.36	34.78	35.67	48.88	54.00	5.12	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) general radiated emissions limits is not required.

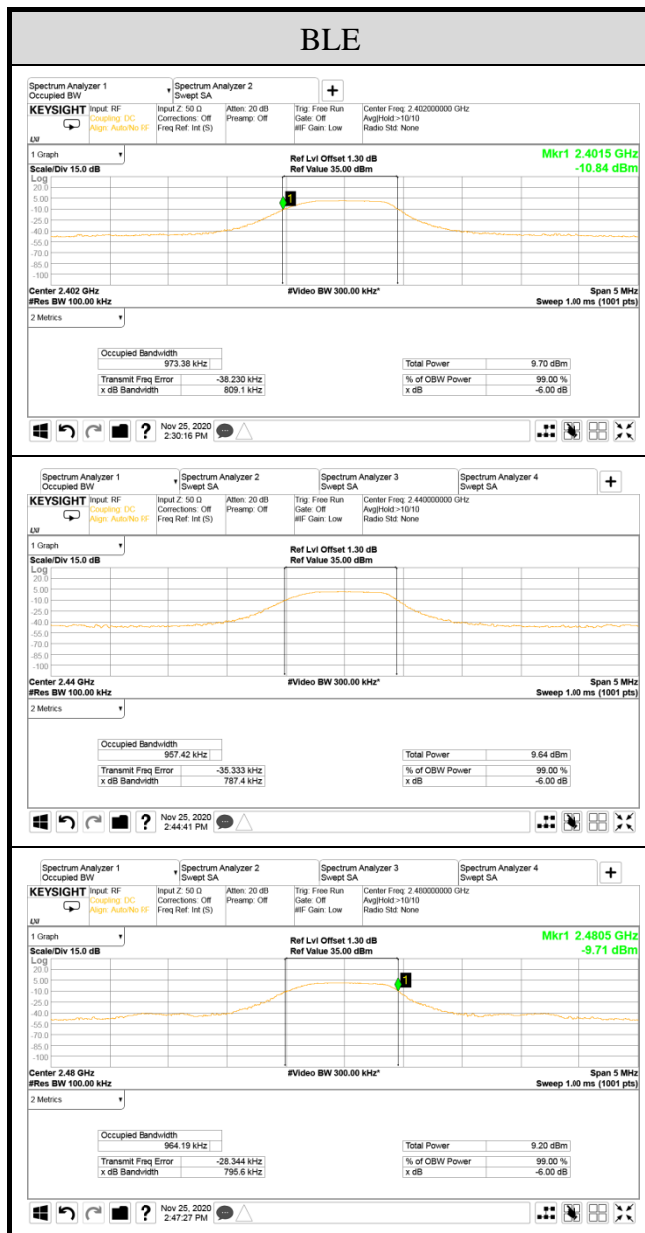
## A.2 6dB/OCCUPIED BANDWIDTH

Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Test Voltage	DC 3V		

### A.2.1 Emission Bandwidth Result

Mode	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	Occupied (99%) Bandwidth (MHz)	Limit
BLE (1M)	2402	0.8091	0.97338	>500kHz
	2440	0.7874	0.95742	
	2480	0.7956	0.96419	

### A.2.2 Measurement Plots



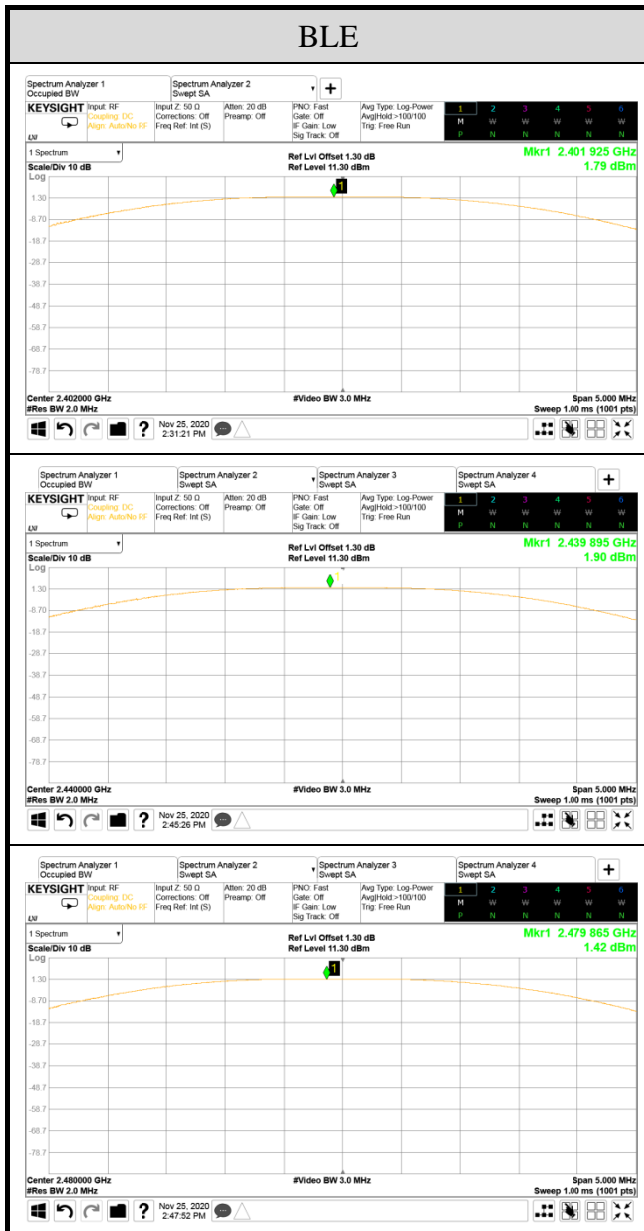
### A.3 MAXIMUM PEAK OUTPUT POWER

Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Test Voltage	DC 3V		

#### A.3.1 Peak Output Power

Mode	Centre Frequency (MHz)	Max. Peak Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
		(dBm)	(W)		(dBm)	(W)	
BLE	2402	1.79	0.0015	2.23	4.02	0.0025	<30dBm (1W) (Maximum Peak Output Power) <36dBm (4W) (E.I.R.P)
	2440	1.90	0.0015		4.13	0.0026	
	2480	1.42	0.0014		3.65	0.0023	

#### A.3.2 Measurement Plots



## A.4 EMISSION LIMITATIONS

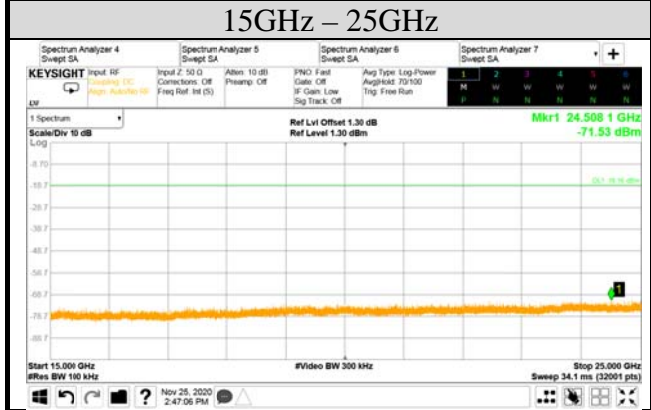
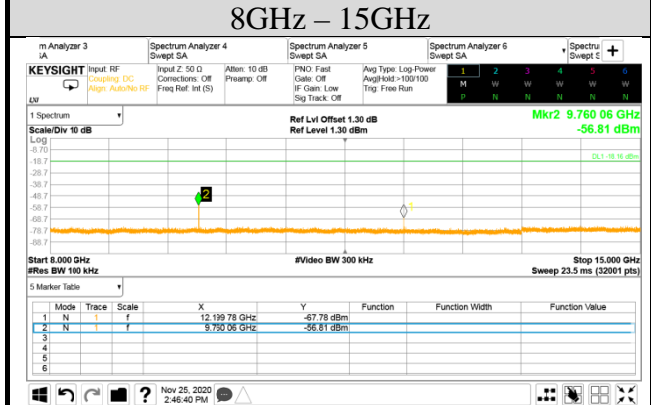
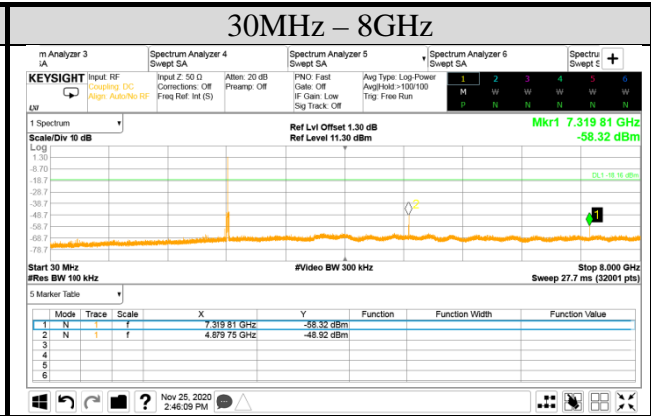
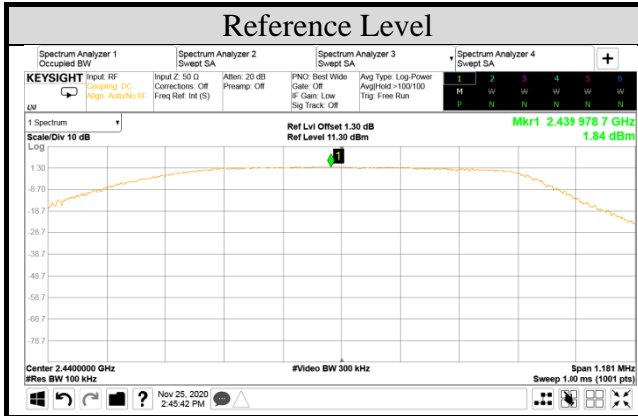
Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Mode	BLE	Tested By	Martin Chen
Frequency	TX 2402MHz		



**Audix Technology Corp.**  
 No. 53-11, Dingfu, Linkou, Dist.,  
 New Taipei City 244, Taiwan

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

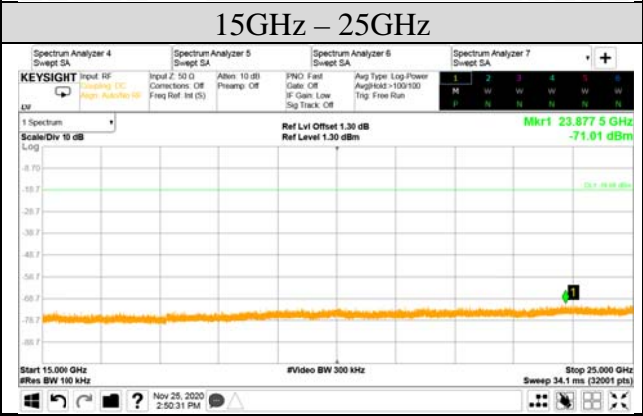
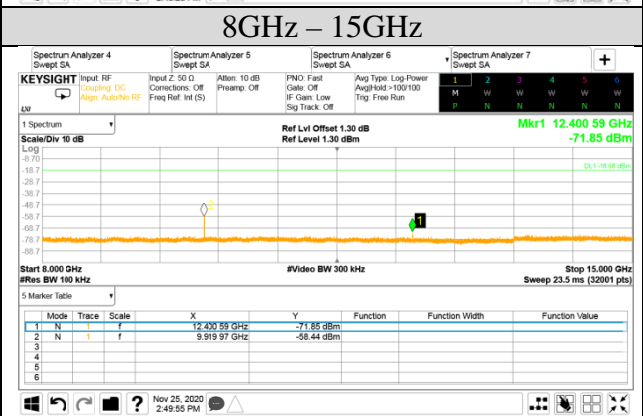
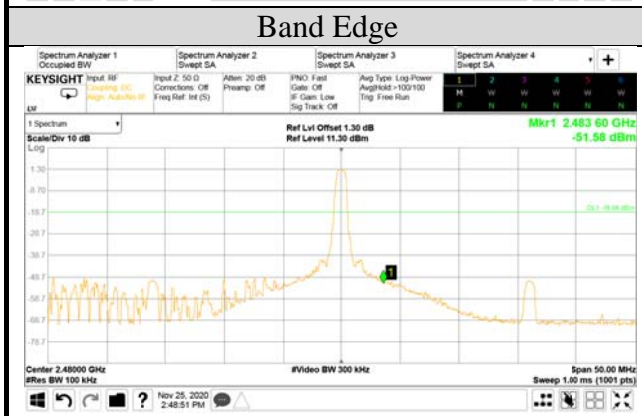
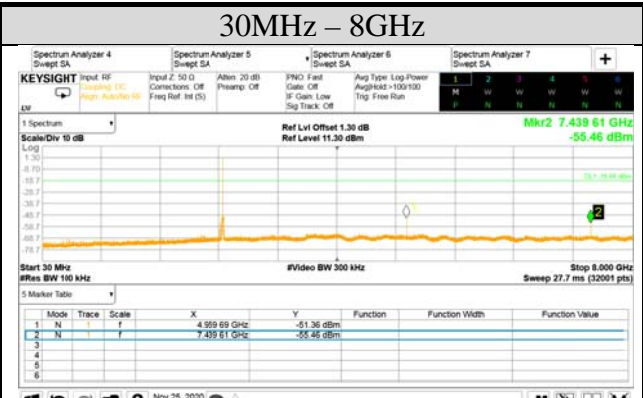
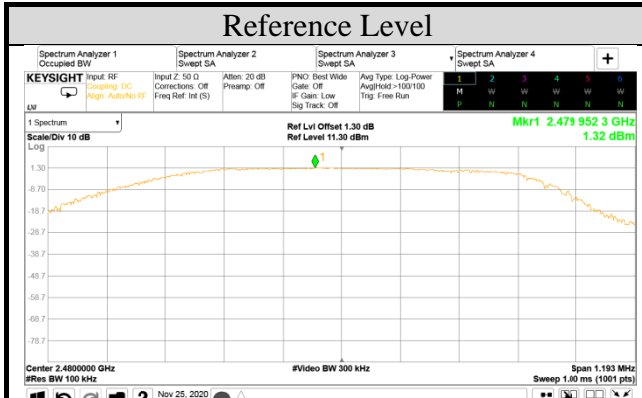
Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Mode	BLE	Tested By	Martin Chen
Frequency	TX 2440MHz		



**Audix Technology Corp.**  
 No. 53-11, Dingfu, Linkou, Dist.,  
 New Taipei City 244, Taiwan

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

Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Mode	BLE	Tested By	Martin Chen
Frequency	TX 2480MHz		



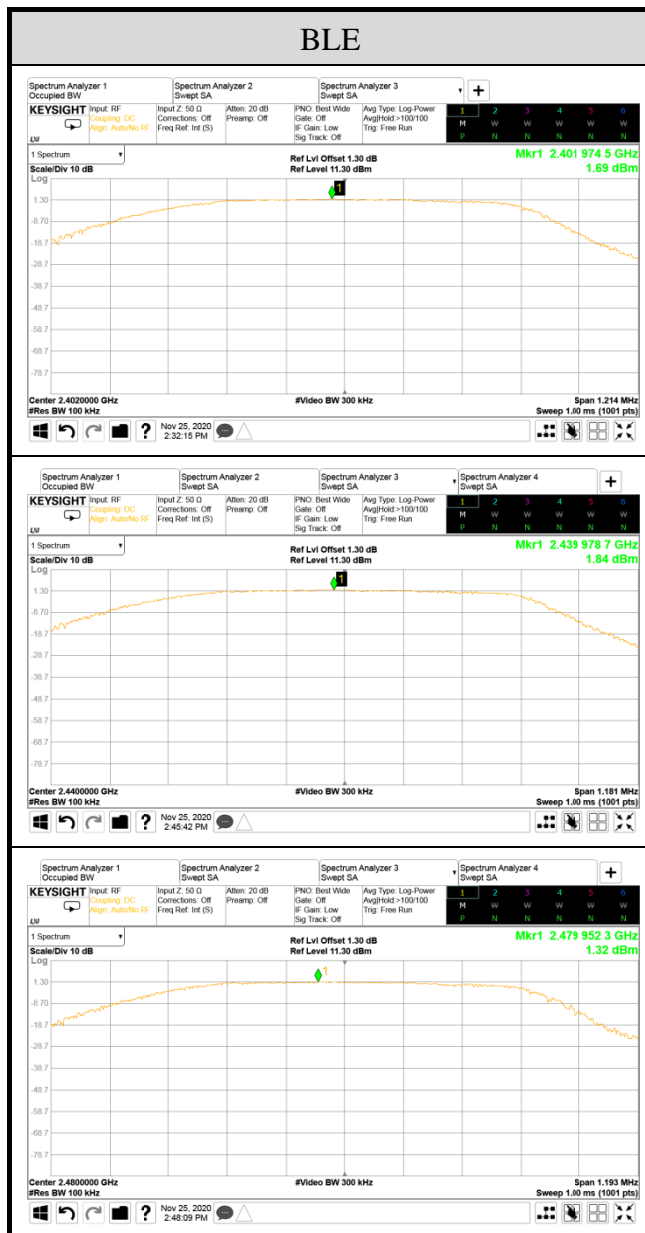
## A.5 POWER SPECTRAL DENSITY

Test Date	2020/11/25	Temp./Hum.	23°C/60%
Cable Loss	1.30dB	Tested By	Martin Chen
Test Voltage	DC 3V		

### A.5.1 Power Spectral Density Result

Mode	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
BLE	2402	1.69	<8 dBm/3kHz
	2440	1.84	
	2480	1.32	

### A.5.2 Measurement Plots



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



*Audix Technology Corp.*  
*No. 53-11, Dingfu, Linkou, Dist.,*  
*New Taipei City 244, Taiwan*

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

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# APPDNDIX B

## TEST PHOTOGRAPHS

(Model: AM100 plus)