

**FCC 15.247**  
**(Class II Permissive Change)**  
**2.4 GHz Report**

**for**

**LIVAN TECHNOLOGY CO., LTD.**

**3F., No.3, Ln.113, Baozhong Rd., Xindian Dist.,**  
**New Taipei City 23144, Taiwan**

**Product Name : Bluetooth thermometer**  
**Model Name : BT0512**  
**Brand : Livan**  
**FCC ID : 2AHQNB0512**

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



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## TEST REPORT CERTIFICATION (Class II Permissive Change)

Applicant : LIVAN TECHNOLOGY CO., LTD.  
Manufacture : LIVAN TECHNOLOGY CO., LTD.  
EUT Description  
(1) Product : Bluetooth thermometer  
(2) Model : BT0512  
(3) Brand : Livan  
(4) Power Rating : DC 3V

Applicable Standards:

47 CFR FCC Part 15 Subpart C  
ANSI C63.10:2013  
KDB 558074 D01 DTS Meas Guidance v04

**Audix Technology Corp.** tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

**Audix Technology Corp.** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2018. 01. 15

Reviewed by:

 (Annie Yu/Administrator)

Approved by:

 (Ben Cheng/Manager)

## 1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2018. 01. 15	Original Report	EM-F180002

## 2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	N/A, Note 1
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	6dB Bandwidth	N/A, Note 2
15.247(b)(3)	Maximum Peak Output	PASS
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	N/A, Note 2
15.247 (e)	Peak Power Spectral Density	N/A, Note 2
15.203	Antenna Requirement	Compliance
Note: 1. The EUT only employs battery power for operation, so it is unnecessary to test. 2. The Class II Change Permissive is not influence on this test.		

### 3. GENERAL INFORMATION

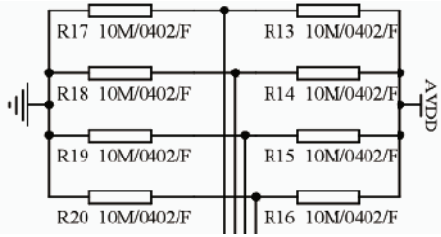
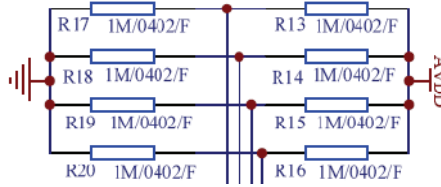
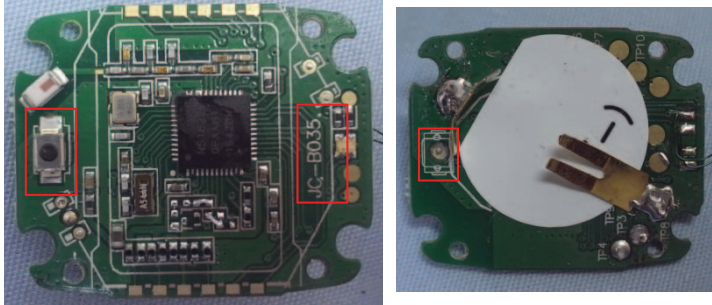
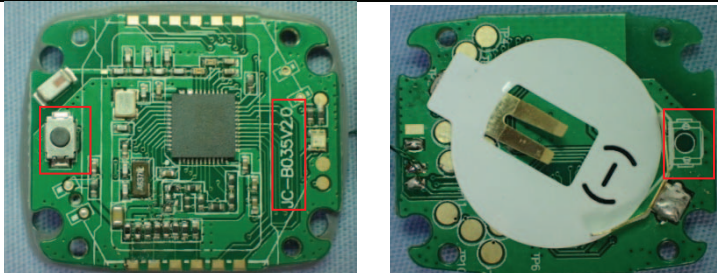
#### 3.1. Description of Application

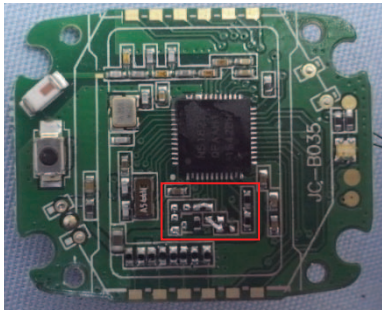
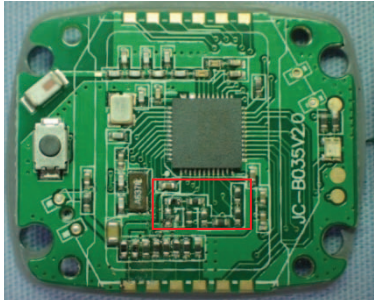
Applicant	LIVAN TECHNOLOGY CO., LTD. 3F., No.3, Ln.113, Baozhong Rd., Xindian Dist., New Taipei City 23144, Taiwan
Manufacturer	LIVAN TECHNOLOGY CO., LTD. 3F., No.3, Ln.113, Baozhong Rd., Xindian Dist., New Taipei City 23144, Taiwan
Product	Bluetooth thermometer
Model	BT0512
Brand	Livan

#### 3.2. Description of EUT

Test Model	BT0512
Serial Number	N/A
Power Rating	DC 3V
RF Features	BLE
Transmit Type	1T1R
Date of Receipt	2017. 12. 12
Date of Test	2017. 12. 20 ~ 2018. 01. 15
Information for Class II Change Permissive	<p>The EUT is an addition version with original FCC ID: 2AHQNB0512.</p> <p>The difference with original report are as follow:</p> <ol style="list-style-type: none"><li>1. To change the micro switch (TS-1116AS,160GF to TS-1116NS,180H2).</li><li>2. To change the spec of resistance (R13, R14, R15, R16, R17, R18, R19, R20).</li><li>3. To fill a hole under the micro switch on the PCB.</li><li>4. To simplify jumper circuit and to update software.</li></ol> <p>The detail information please see following list (the blue word is for this time).</p>

● Information for Permissive Change  
(the blue word is for this time)

No	Q'ty	Components	Description	Size/Type/Spec	Vendor	Part Name
1	8	R13, R14, R15, R16, R17, R18, R19, R20	Resistor	10M, 1/20W, Accuracy5 %	SHENZHEN Gdkyddz	0201J0106TCE
						
				1M, 1/20W, Accuracy5%	SHENZHEN Gdkyddz	0201J0106TCE
						
2	1	SW	Micro Switch	2.5x3x1.6 160g	Shenzhen Chunhong	TS-1116AS,
						
				3x4x2 180H2	Shenzhen Chunhong	TS-1116NS,180
						

No	Q'ty	Components	Description	Size/Type/Spec	Vendor	Part Name
3	1	---	PCB	FR4 sheet, thickness 1.0 , immersion gold , double sided	Shenzhen JHY PCB	JC-B035
				FR4 sheet, thickness 1.0 , immersion gold , double sided	Shenzhen JHY PCB	JC-B035V2.0
4	---	---	PCB	Original circuit Software:V134		
						
				To simplify jumper circuit is for improving the thermistor response speed. Software:V149		
4	---	---	PCB			

### 3.3. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	AT3216	ACX	Multilayer Chip Antenna	2400~2500	0.5

### 3.4. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number
BLE	2402-2480	40

Mode	Modulation	Data Rate (Mbps)
BLE	GFSK	1



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

### 3.5. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
BLE	28.9	0.15	5.39

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

Item	Mode	Test Channel
Radiated Test Case	Radiated Band Edge <sup>Note1</sup>	BLE
	Radiated Spurious Emission <sup>Note1</sup>	BLE
Conducted Test Case	Peak Output Power	BLE

Note 1:

☐ Mobile Device.

☒ Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow:

☒ Lie

☐ Side

☐ Stand

### 3.6. Tested Supporting System List

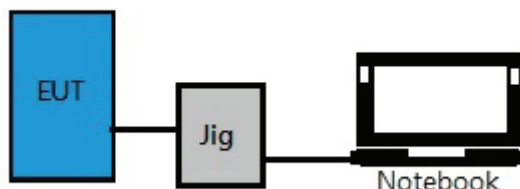
#### 3.6.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2362	N/A	Contains FCC ID: PPD-AR5B22 Contains IC: 4104A-AR5B22
2.	Test JIG	N/A	N/A	N/A	N/A

#### 3.6.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	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, 0.15m

### 3.7. Setup Configuration



### 3.8. Operating Condition of EUT

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

### 3.9. 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 : <a href="http://www.audixtech.com">www.audixtech.com</a> Contact e-mail: <a href="mailto:attemc_report@audixtech.com">attemc_report@audixtech.com</a>
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724 (3) FCC OET Designation No. TW1004 & TW1090
Test Facilities	(1) Semi-Anechoic Chamber (IC Test Site Registration No.: 5183B-1) (2) Fully Anechoic Chamber (IC Test Site Registration No.: 5183B-4)

### 3.10.Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~1000MHz	$\pm 3.68\text{dB}$
	Above 1GHz	$\pm 5.82\text{dB}$

Remark : Uncertainty =  $k u_c(y)$

Test Item	Uncertainty
Maximum peak output power	$\pm 0.33\text{dB}$

## 4. MEASUREMENT EQUIPMENT LIST

### 4.1. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2017. 09. 13	1 Year
2.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2017. 06. 20	1 Year
3.	Test Receiver	R & S	ESCS30	100338	2017. 06. 19	1 Year
4.	Amplifier	HP	8447D	2944A06305	2017. 02. 16	1 Year
5.	Amplifier	HP	8449B	3008A02678	2017. 03. 06	1 Year
6.	Bilog Antenna	TESEQ	CBL6112D	33821	2017. 01. 21	1 Year
7.	Horn Antenna	ETS-Lindgren	3117	00135902	2017. 03. 08	1 Year
8.	2.4GHz Notch Filter	K&L	7NSL10-244 1.5E130.5-00	1	2017. 07. 26	1 Year
9.	3GHz Notch Filter	Microwave	H3G018G1	484798	2017. 08. 24	1 Year
10.	Test Software	Audix	e3	V.6.1206197	N.C.R.	N.C.R.
11.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

### 4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Power Meter	Anritsu	ML2495A	1145008	2017. 10. 26	1 Year
2.	Power Sensor	Anritsu	MA2411B	1126096	2017. 10. 26	1 Year

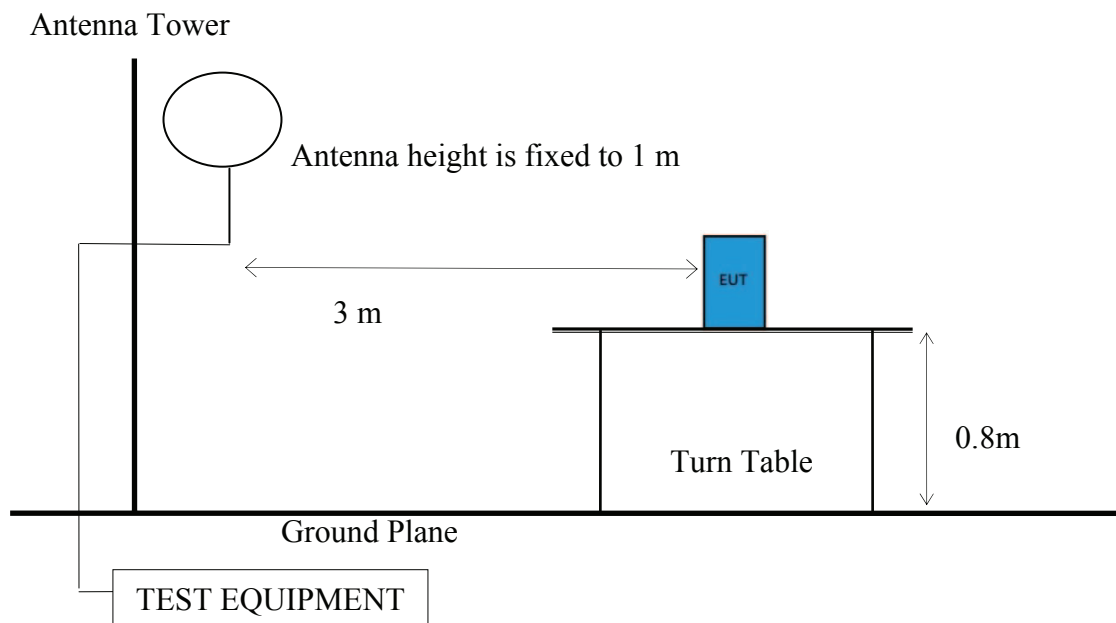
## 5. RADIATED EMISSION

### 5.1. Block Diagram of Test Setup

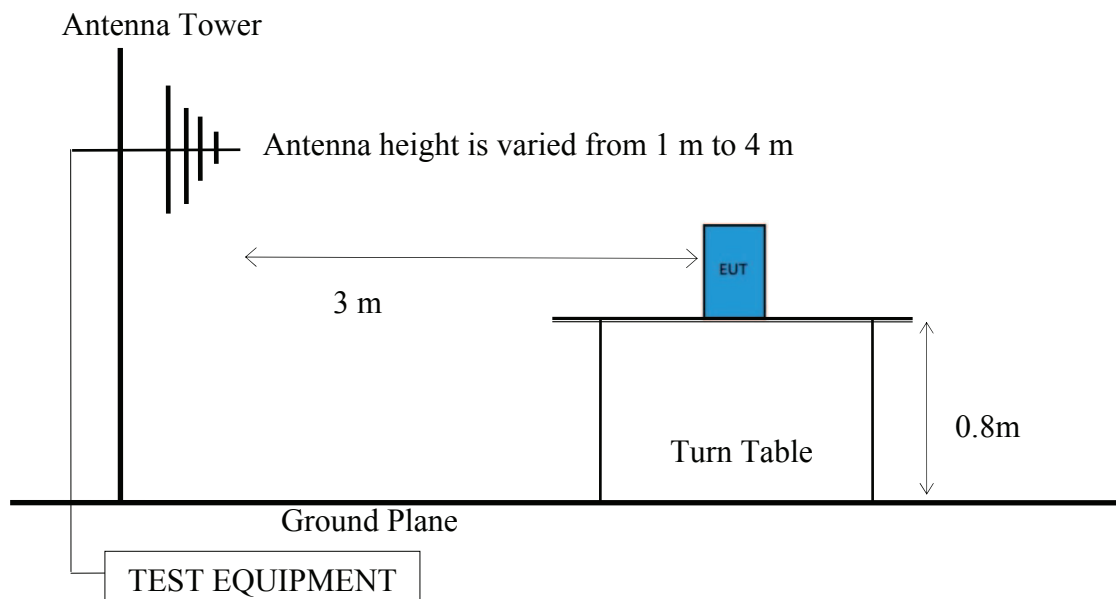
#### 5.1.1. Block Diagram of EUT

Indicated as section 3.7

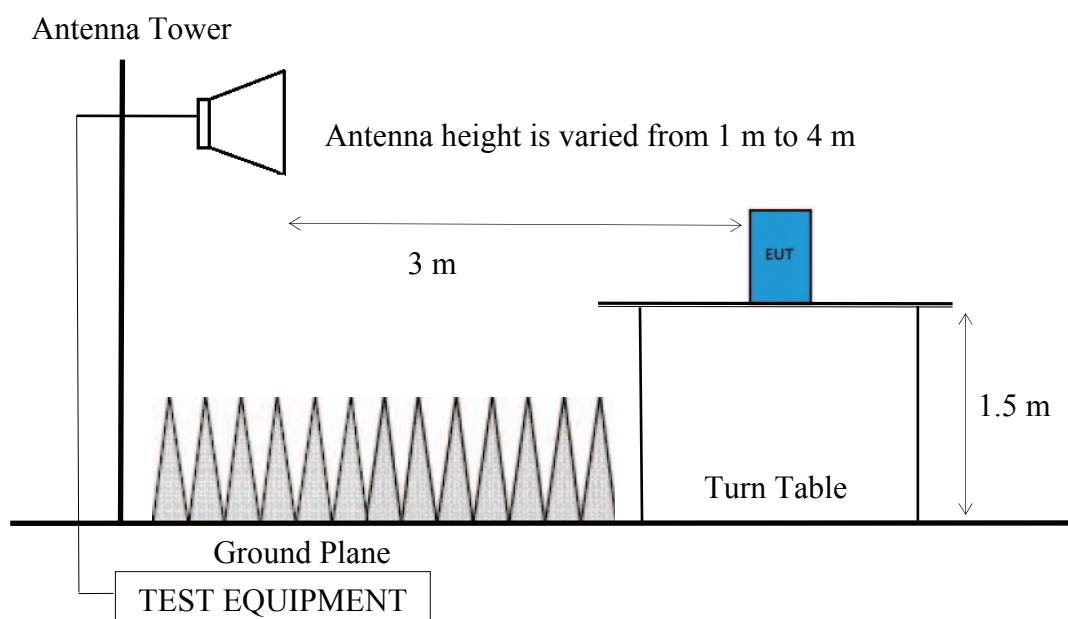
#### 5.1.2. Setup Diagram for 9kHz-30MHz



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



#### 5.1.4. Setup Diagram for above 1GHz



## 5.2. Radiated Emission Limits

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

Frequency (MHz)	Distance (m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/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)  $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

- (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.

### 5.3. Test Procedure

#### **Frequency Range 9kHz~30MHz:**

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

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

#### **Frequency Range 30MHz ~ 25GHz:**

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

#### **Frequency below 1 GHz:**

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

- (1) RBW = 120KHz
- (2) VBW  $\geq 3 \times$  RBW.
- (3) Detector = Peak.
- (4) Sweep time = auto.
- (5) Trace mode = max hold.
- (6) Allow sweeps to continue until the trace stabilizes.
- (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.

#### **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.
- (7) When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average detector for finally measurement.



**Average Detector:**☒ **Option 1:**

(1) RBW = 1MHz

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

Modulation Type	T (ms)	1/T (kHz)	VBW Setting (kHz)
BLE	0.15	6.67	5.6

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.

**5.4. Measurement Result Explanation**☒ Peak Emission Level = Antenna Factor + Cable Loss + Meter Reading☒ Average Emission Level = Antenna Factor + Cable Loss + Meter Reading☐ Average Emission Level = Peak Emission Level + DCCFDuty Cycle Correction Factor (DCCF) =  $20 \log (TX_{on}/TX_{on+off})$  presented in section 3.7☐ ERP = Peak Emission Level - 95.2dB - 2.14dB**5.5. Test Results**

Please refer to Appendix A.

## 6. MAXIMUM PEAK OUTPUT POWER

### 6.1. Block Diagram of Test Setup



### 6.2. 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)

### 6.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v04:

#### ■ 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 3.6 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)  $\geq 3 \times$  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 3.6 is < 98%.

### 6.4. Test Results

Please refer to Appendix A

## **7. DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**



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

**APPENDIX A**

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

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# APPDNDIX A

## TEST DATA AND PLOTS

(Model: BT0512)



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

**APPENDIX B**

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

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# APPDNDIX B

## TEST PHOTOGRAPHS

(Model: BT0512)

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## A.1 RADIATED EMISSION

Test Date	2017/12/20 ~ 2018/01/15	Temp./Hum.	23 ~ 24°C/50 ~ 51%
Test Voltage	DC 3V (Via Test JIG)		

### 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 1 GHz

Mode	BLE	Frequency	TX 2440MHz
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#### 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
156.10	16.63	2.89	21.01	40.53	43.50	2.97	Peak
288.02	19.41	4.19	20.42	44.02	46.00	1.98	Peak
384.05	21.69	5.38	15.75	42.82	46.00	3.18	Peak
672.14	24.81	7.00	4.75	36.56	46.00	9.44	Peak
784.66	25.77	7.53	7.23	40.53	46.00	5.47	Peak
942.77	27.25	8.46	5.30	41.01	46.00	4.99	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
156.10	16.63	2.89	14.61	34.13	43.50	9.37	Peak
276.38	19.34	4.08	8.53	31.95	46.00	14.05	Peak
372.41	21.41	5.24	5.71	32.36	46.00	13.64	Peak
536.34	23.72	6.55	3.65	33.92	46.00	12.08	Peak
792.42	25.86	7.57	3.12	36.55	46.00	9.45	Peak
917.55	26.98	8.28	1.11	36.37	46.00	9.63	Peak

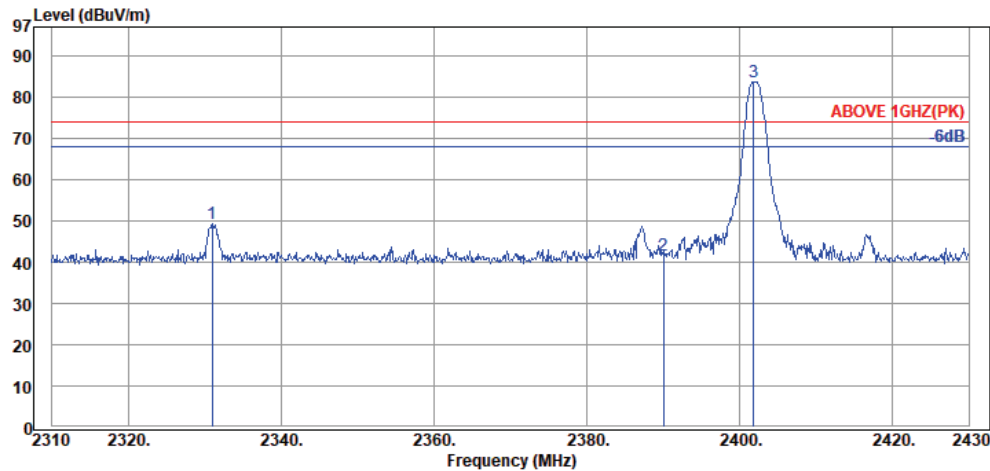
Audix Technology Corp.  
No. 53-11, Dingfu, Linkou, Dist.,  
New Taipei City 244, Taiwan

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

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

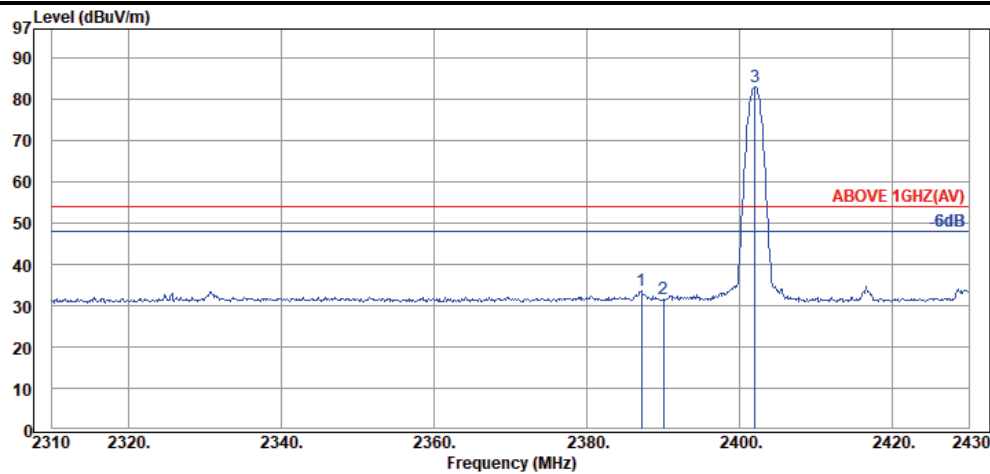
#### Band Edge:

Mode	BLE	Frequency	TX 2402MHz
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#### Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2331.00	32.06	6.49	10.94	49.49	74.00	24.51	Peak
2390.04	32.16	6.57	2.78	41.51	74.00	32.49	Peak
2401.80	32.16	6.57	44.87	83.60	---	---	Peak

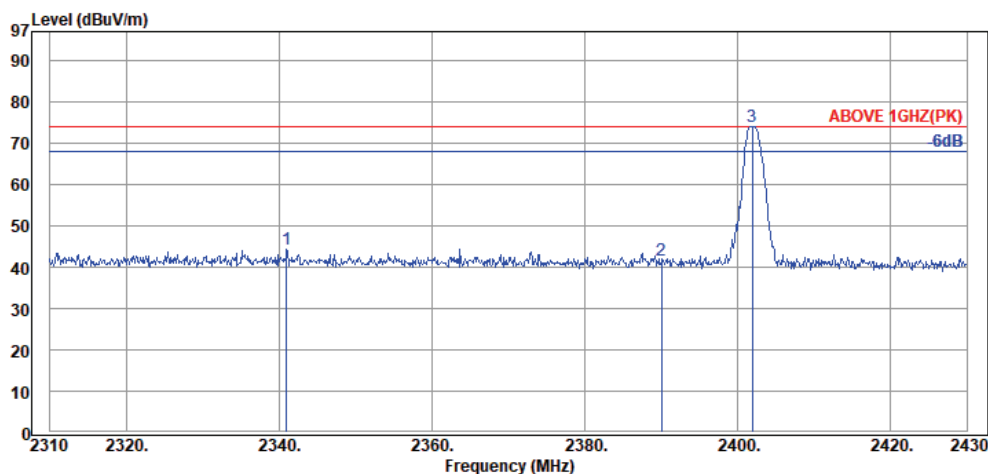


#### Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.16	32.16	6.57	-5.10	33.63	54.00	20.37	Average
2390.04	32.16	6.57	-7.12	31.61	54.00	22.39	Average
2402.04	32.16	6.57	44.34	83.07	---	---	Average

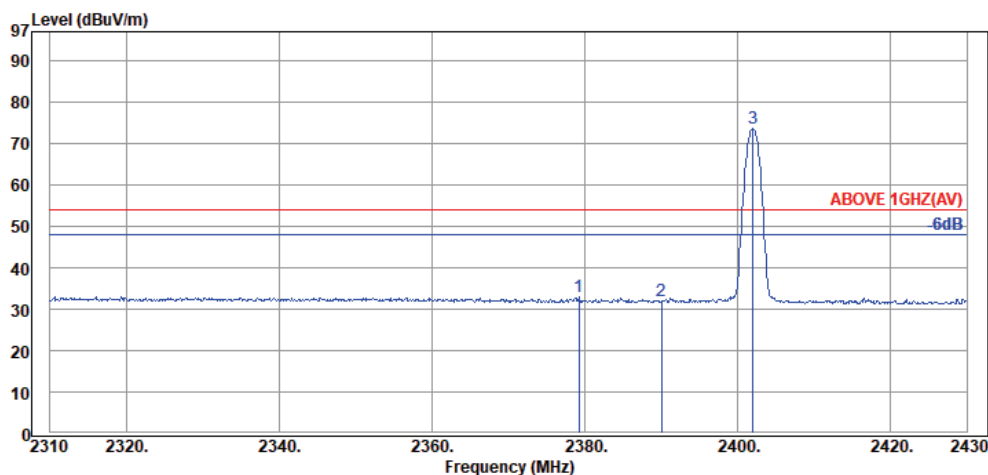


Mode	BLE	Frequency	TX 2402MHz
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## Antenna at Vertical Polarization

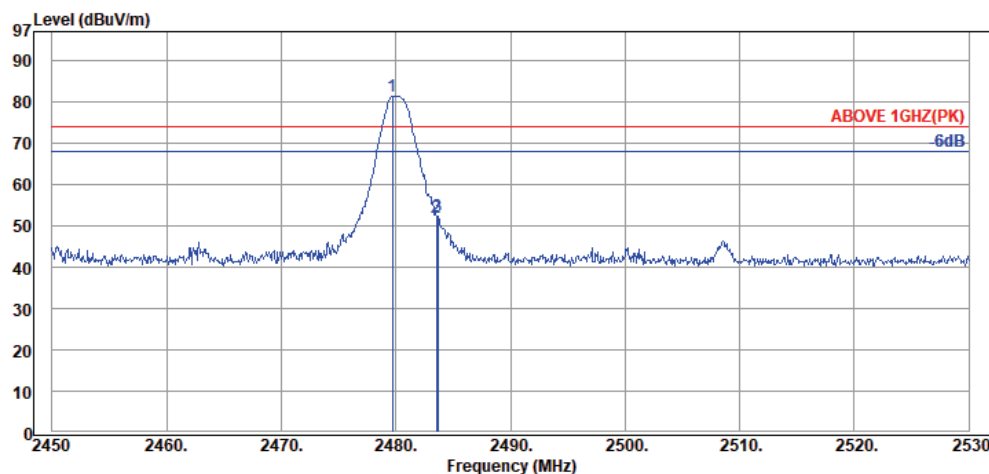
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2340.96	32.08	6.51	5.78	44.37	74.00	29.63	Peak
2390.04	32.16	6.57	3.02	41.75	74.00	32.25	Peak
2401.92	32.16	6.57	35.39	74.12	---	---	Peak



## Antenna at Vertical Polarization

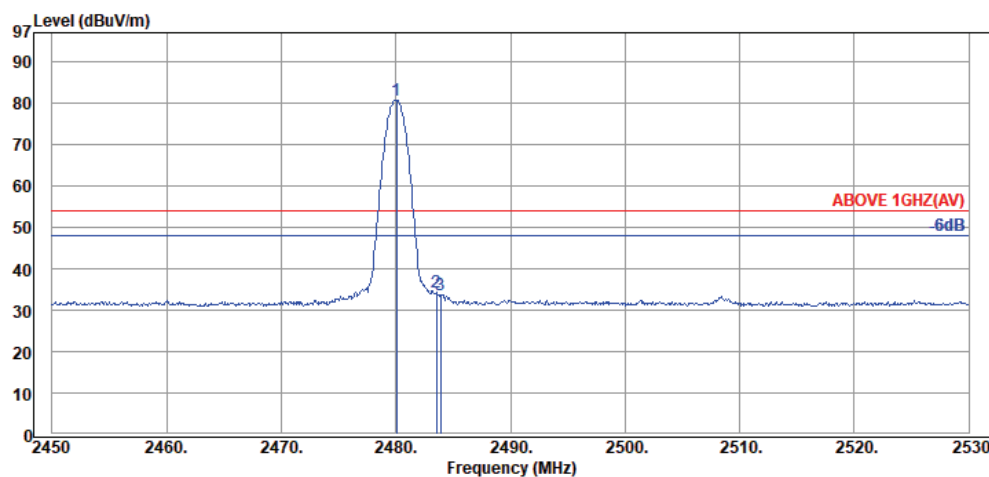
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.24	32.13	6.55	-5.76	32.92	54.00	21.08	Average
2390.04	32.16	6.57	-6.77	31.96	54.00	22.04	Average
2402.04	32.16	6.57	34.84	73.57	---	---	Average

Mode	BLE	Frequency	TX 2480MHz
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## Antenna at Horizontal Polarization

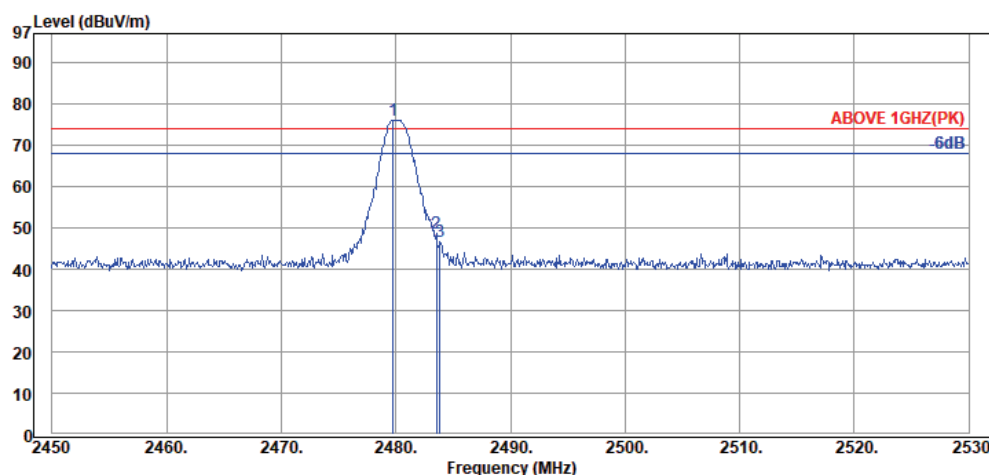
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2479.68	32.28	6.67	42.43	81.38	---	---	Peak
2483.52	32.28	6.67	13.14	52.09	74.00	21.91	Peak
2483.68	32.28	6.67	13.38	52.33	74.00	21.67	Peak



## Antenna at Horizontal Polarization

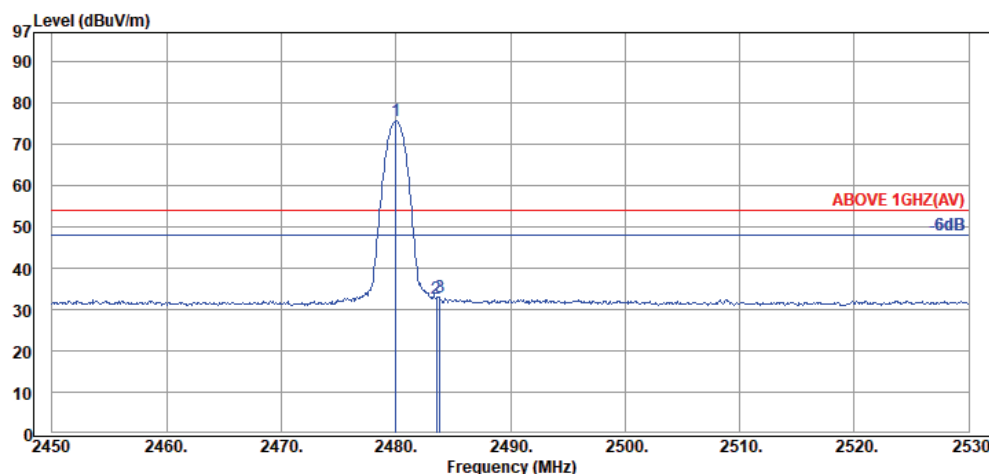
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.08	32.28	6.67	41.83	80.78	---	---	Average
2483.52	32.28	6.67	-4.62	34.33	54.00	19.67	Average
2483.92	32.28	6.67	-5.12	33.83	54.00	20.17	Average

Mode	BLE	Frequency	TX 2480MHz
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## 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	32.28	6.67	37.17	76.12	---	---	Peak
2483.52	32.28	6.67	9.61	48.56	74.00	25.44	Peak
2483.84	32.28	6.67	7.76	46.71	74.00	27.29	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
2480.00	32.28	6.67	36.61	75.56	---	---	Average
2483.52	32.28	6.67	-6.40	32.55	54.00	21.45	Average
2483.84	32.28	6.67	-5.88	33.07	54.00	20.93	Average

#### 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)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4805.00	34.22	9.54	10.13	53.89	74.00	20.11	Peak
7205.00	35.80	11.80	5.04	52.64	54.00	1.36	Average
7205.00	35.80	11.80	8.97	56.57	74.00	17.43	Peak
9610.00	36.82	15.25	0.14	52.21	54.00	1.79	Average
9610.00	36.82	15.25	4.98	57.05	74.00	16.95	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
4805.00	34.22	9.54	5.38	49.14	74.00	24.86	Peak
7205.00	35.80	11.80	3.46	51.06	54.00	2.94	Average
7205.00	35.80	11.80	7.43	55.03	74.00	18.97	Peak
9610.00	36.82	15.25	-2.40	49.67	54.00	4.33	Average
9610.00	36.82	15.25	2.29	54.36	74.00	19.64	Peak

Mode	BLE	Frequency	TX 2440MHz
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**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	34.25	9.56	8.74	52.55	74.00	21.45	Peak
7320.00	35.80	11.92	5.06	52.78	54.00	1.22	Average
7320.00	35.80	11.92	9.05	56.77	74.00	17.23	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	34.25	9.56	4.54	48.35	74.00	25.65	Peak
7320.00	35.80	11.92	3.41	51.13	54.00	2.87	Average
7320.00	35.80	11.92	7.55	55.27	74.00	18.73	Peak

Mode	BLE	Frequency	TX 2480MHz
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**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	34.29	9.60	8.96	52.85	54.00	1.15	Peak
7440.00	35.80	12.04	5.56	53.40	54.00	0.60	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	34.29	9.60	4.29	48.18	54.00	5.82	Peak
7440.00	35.80	12.04	4.55	52.39	54.00	1.61	Peak

**A.1.3 Emissions in Non-restricted Frequency Bands:**

Pursuant to KDB 558074 D01 DTS Meas Guidance v04 that emission levels below the 15.209 general radiated emissions limits is not required.

## A.2 MAXIMUM PEAK OUTPUT POWER

Test Date	2017/12/20	Temp./Hum.	23°C/50%
Cable Loss	1dB	Test Voltage	DC 3V (Via Test JIG)

### A.2.1 Peak Output Power

Mode	Centre Frequency (MHz)	Peak Output Power (dBm)		Limit
		dBm	W	
BLE	2402	1.66	0.001466	< 30dBm (1W)
	2440	1.26	0.001337	
	2480	0.69	0.001172	

Note: The results have been included cable loss.