



Shenzhen Certification Technologh Service Co., Ltd  
3F, Bldg27,Area A, Tanglang Industrial Zone, Xili Town,  
Nanshan District, ShenZhen, Guangdong, P.R. China.

# TEST REPORT

**FCC ID: ZJO-ST112**

**Applicant** : Win Wireless Network Technology Ltd.  
**Address** : No. 1369 Chengnan Rd., Jiaxing 314001, Zhejiang, China.

**Equipment under Test (EUT):**

**Name** : DWT100-ST112 Wireless Temperature Sensor with DWT100-R02WH base station  
**Model** : DWT100-ST112

**Standards** : FCC PART 15, SUBPART C : 2010 (Section 15.249)

**Report No.** : STE110331242

**Date of Test** : April 14-15, 2011

**Date of Issue** : April 17, 2011

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT complied with the standards specified above

Authorized Signature

A handwritten signature in black ink, appearing to read "Mark Zhu".

(Mark Zhu)  
General Manager

The manufacture should ensure that all the products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of Shenzhen Certification Technology Service Co., Ltd. Or test done by Shenzhen Certification Technology Service Co., Ltd. Approvals in connection with, distribution or use of the product described in this report must be approved by Shenzhen Certification Technology Service Co., Ltd. Approvals in writing.

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## 1 General Information

### 1.1 Description of Device (EUT)

Trade Name : N/A

EUT : DWT100-ST112 Wireless Temperature Sensor with  
: DWT100-R02WH base station

Model No. : DWT100-ST112  
:

Type of Antenna : Integral Antenna

Operation Frequency : 2450MHz

Channel number : 1

Modulation type : GFSK

Power Supply : DC 3V Supply by battery

Rated PF  
output Power : 97.49 dBuV (PK detector)

Applicant : Win Wireless Network Technology Ltd.  
Address : No. 1369 Chengnan Rd., Jiaxing 314001, Zhejiang, China.

Manufacturer : Win Wireless Network Technology Ltd.  
Address : No. 1369 Chengnan Rd., Jiaxing 314001, Zhejiang, China.

## 1.2 Description of Test Facility

Shenzhen Certification Technology Service Co.,Ltd.  
3F, Bldg.27, Area A, Tanglang Industrial Zone, Xili Town, Nanshan District,  
Shenzhen 518055, Guangdong, P.R. China  
FCC Registered No.:305283

## 2 EMC Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	04/06/2011	1Year
Spectrum analyzer	Agilent	E4443A	MY46185649	06/06/2010	1Year
Receiver	R&S	ESCI	100492	04/06/2011	1Year
Receiver	R&S	ESCI	101202	07/01/2010	1Year
Bilog Antenna	Sunol	JB3	A121206	04/06/2011	1Year
L.I.S.N.	R&S	ESH3-Z5	100305	04/06/2011	1Year
Horn Antenna	EMCO	3115	640201028-06	02/23/2011	1Year
Power Meter	Anritsu	ML2487A	6K00001491	08/12/2010	1Year
ETS Horn Antenna	ETS	3160	SEL0076	04/06/2011	1Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	04/06/2011	1Year
Cable	Resenberger	N/A	No.1	04/06/2011	1Year
Cable	SCHWARZBECK	N/A	No.2	04/06/2011	1Year
Cable	SCHWARZBECK	N/A	No.3	04/06/2011	1Year
Pre-amplifier	R&S	AFS42-00101 800-25-S-42	SEL0081	04/06/2011	1Year
Pre-amplifier	R&S	AFS33-18002650 -30-8P-44	SEL0080	04/06/2011	1Year

### 3 Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2003 using a 50  $\mu$  H LISN. Both Lines were observed. The bandwidth of the receiver was 10kHz with an appropriate sweep speed. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**RADIATION INTERFERENCE:** The test procedure used was ANSI Standard C63.4-2003 using a ANRITSU spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100kHz and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3MHz above 1 GHz. The ambient temperature of the EUT was 25°C with a humidity of 58%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer and cable loss. The antenna correction factors and cable loss are stated in terms of dB. The gain of the Pre-selector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF + CABLE = FS  
33.20 dBuV + 10.36 dB + 0.9 dB = 44.46 dBuV/m @ 3m

**ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI Standard C63.4-2003 10.1.7 with the EUT 40 cm from the vertical ground wall.

## 4 Summary of Measurement

Test Item	Test Requirement	Stanadard Paragraph	Result
Spurious Emission	FCC PART 15 : 2010	Section 15.249&15.209	Compliance
Conduction Emission	FCC PART 15: 2010	Section 15.207	Not applicable
Occupied bandwidth	FCC PART 15: 2010	Section 15.249	Not applicable
Band edge Requirement	FCC PART 15: 2010	Section 15.249	Not applicable
Antenna Requirement	FCC PART 15 : 2010	Section 15.203	Compliance

Note: The EUT has been tested as an independent unit. And Continual transmitting in maximum power (The new battery be used during Test).

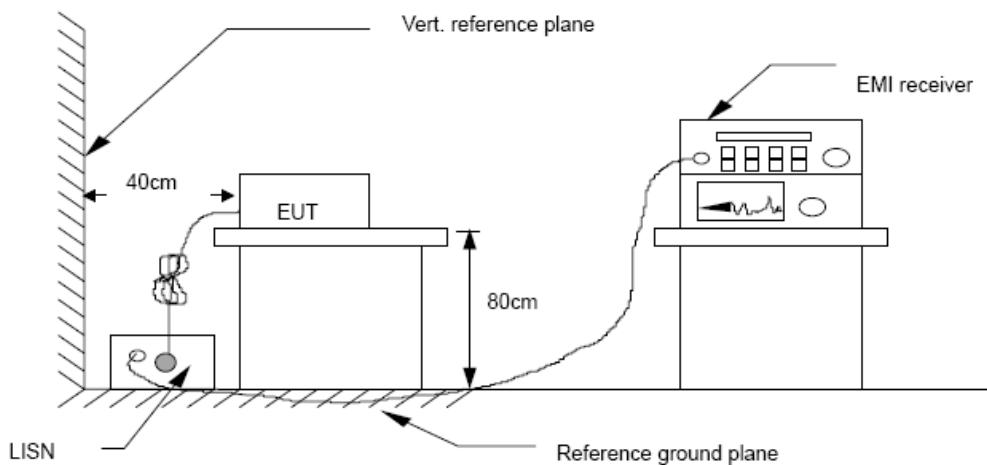
## 5 POWER LINE CONDUCTED EMISSION

### 5.1 Conducted Emission Limits(15.209&249)

Frequency MHz	Limits dB( $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
 2. The lower limit shall apply at the transition frequencies.  
 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 5.2 Test Setup



### 5.3 Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9 kHz.

### 5.4 Test Results

The EUT power is supply by battery, the test is not applicable.

## 6 Radiation Emission

### 6.1 Radiation Emission Limits(15.209&249 (a))

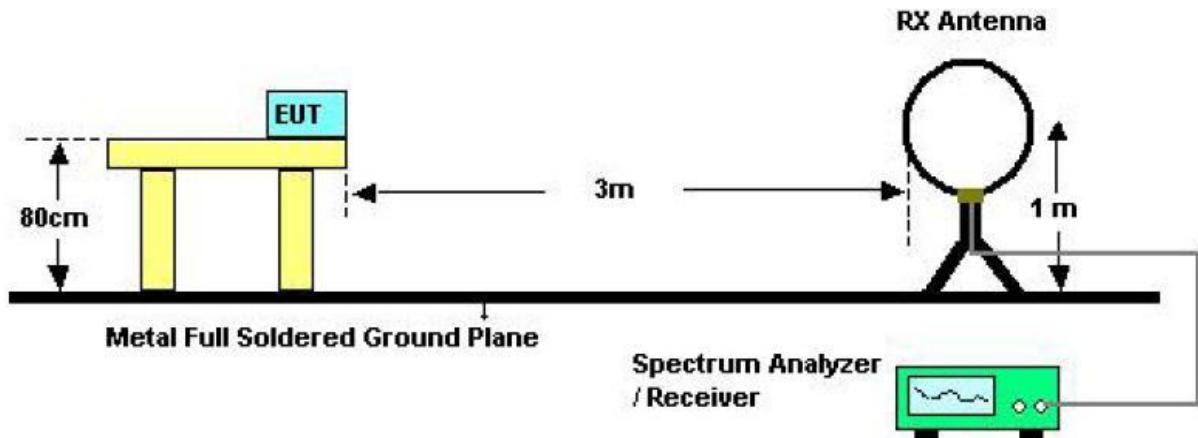
Frequency (MHZ)	Field Strength Limits at 3 metres (watts,e.i.r.p.)		
	uV/m	dB uV/m	Measurement distance(m)
0.009-0.490	2400/F(kHz)	XX	300
0.490-1.705	24000/F(kHz)	XX	30
1.705-30	30	29.5	30
30~88	100(3nW)	40	3
88~216	150(6.8nW)	43.5	3
216~960	200(12nW)	46	3
Above960	500(75nW)	54	3
Carrier frequency		93.97(AV)	3
Carrier frequency		113.97(PK)	3

**NOTE:**

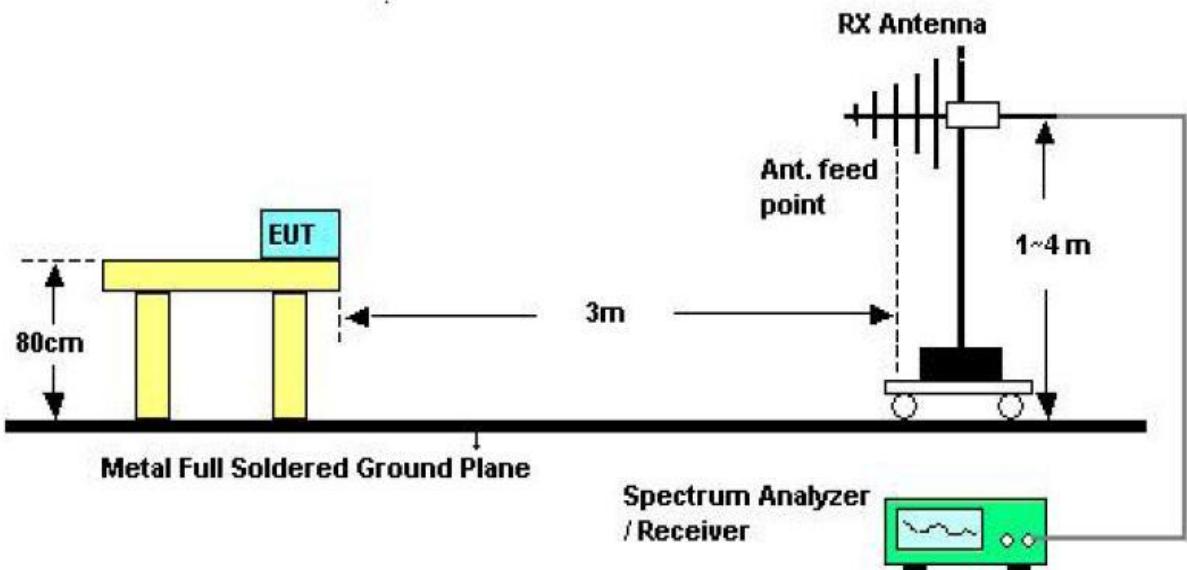
- a) The tighter limit applies at the band edges.
- b) Emission Level(dB uV/m)=20log Emission Level(Uv/m)

## 6.2 Test Setup

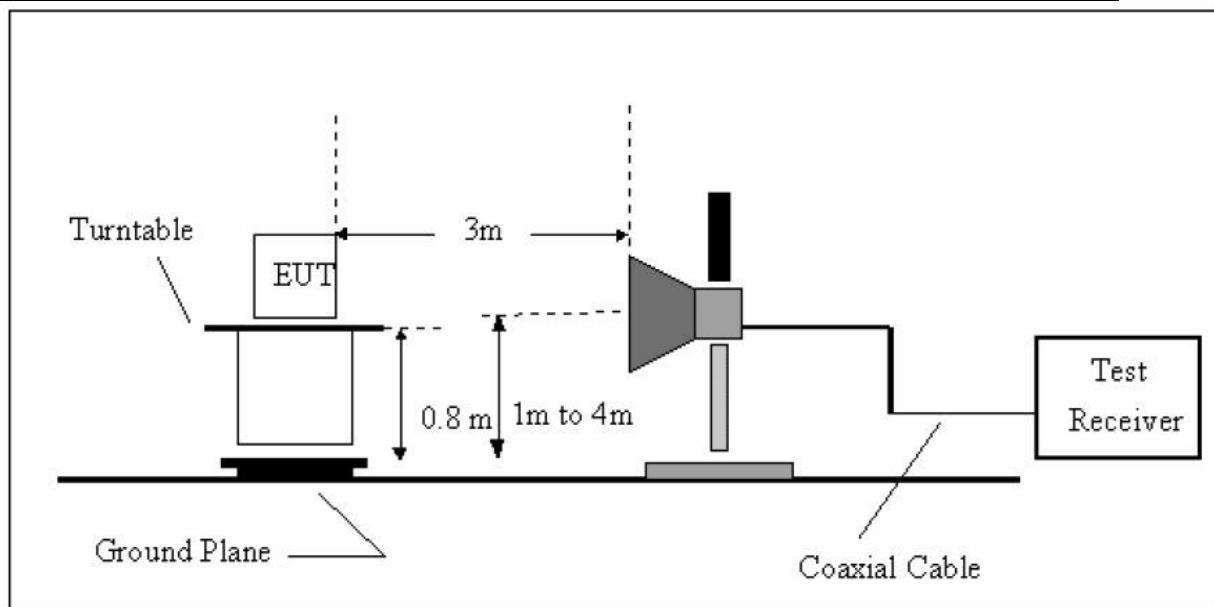
See the next page



Below 30MHz Test Setup



Above 30MHz Test Setup



Above 1GHZ Test Setup

### 6.3 Test Procedure

- a) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1GHz, The EUT was placed on a rotating 0.8 m high above ground,The table was rotated 360 degrees to determine the position of the highest radiation
- b) The Test antenna shall vary between 1m and 4m,Both Horizontal and Vertical antenna are set to make measurement.
- c) The initial step in collecting conducted emission data is a spectrum analyzer Peak detector mode pre-scanning the measurement frequency range.Significant Peaks are then marked.and then Qusia Peak Detector mode remeasured
- d) If Peak value comply with QP limit Below 1GHz.The EUT deemed to comply with QP limit.But the Peak value and average value both need to comply with applicable limit above 1GHz.
- e) For the actual test configuration,please see the test setup photo.

#### 6.4 Test Equipment Setting For emission test.est Result

9KHZ~150KHZ	RBW 200HZ	VBW1KHZ
150KHZ~30MHZ	RBW 9KHZ	VBW 30KHZ
30MHZ~1GHZ	RBW 120KHZ	VBW 300KHZ
Above 1GHZ	RBW 1MHZ	VBW 3MHZ

#### 6.5 Test Condition

Continual Transmitting in maximum power.

#### 6.6 Test Result

Detailed information please see the following page.

## Radiated Emissions Result

<b>EUT</b>	DWT100-ST112 Wireless Temperature Sensor with DWT100-R02WH base station	<b>Model Name</b>	DWT100-ST112
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	56%
<b>Pressure</b>	960hPa	<b>Test voltage</b>	DC 3V supply by Battery
<b>Test Mode</b>	TX		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/OP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
165.810	V	Peak	44.54	-12.8	31.74	43.50	-11.76
200.720	V	Peak	42.32	-12.63	29.69	43.50	-13.81
402.480	V	Peak	44.37	-11.25	33.12	46.00	-12.88
469.410	V	Peak	43.54	-8.83	34.71	46.00	-11.29
596.480	V	Peak	40.58	-7.11	33.47	46.00	-12.53
795.330	V	Peak	36.57	-4.06	32.51	46.00	-13.49

**Notes:** Above is Below 1GHZ test data

Peak value > QP value

<b>EUT</b>	DWT100-ST112 Wireless Temperature Sensor with DWT100-R02WH base station	<b>Model Name</b>	DWT100-ST112
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	56%
<b>Pressure</b>	960hPa	<b>Test voltage</b>	DC 3V supply by Battery
<b>Test Mode</b>	TX		

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/OP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
200.720	H	Peak	42.58	-12.63	29.95	43.50	-13.55
216.240	H	Peak	46.13	-13.86	32.27	46.00	-13.73
402.480	H	Peak	42.81	-11.25	31.56	46.00	-14.44
595.510	H	Peak	39.99	-7.13	32.86	46.00	-13.14
805.030	H	Peak	37.73	-4.10	33.63	46.00	-12.37
900.090	H	Peak	35.08	-2.59	32.49	46.00	-13.51

**Notes:** Above is Below 1GHZ test data

Peak value > QP value

## Radiated Emissions Result of Inside band (2450MHz)

<b>EUT</b>	DWT100-ST112 Wireless Temperature Sensor with DWT100-R02WH base station	<b>Model Name</b>	DWT100-ST112
<b>Temperature</b>	25°C	<b>Relative Humidity</b>	56%
<b>Pressure</b>	960hPa	<b>Test voltage</b>	DC 3V supply by Battery
<b>Test Mode</b>	TX Mid	<b>Antenna polarization</b>	Horizontal/Vertical

Channel (2450MHz)										
Fre. MHz	Plority H/V	Reading dBuV	Antenna Factor dB	Cable Loss dB	Amplifier Gain dB	Correct Factor dB	Measure Result dBuV/m	Limit dBuV/m	Margin dB	
2450	H	98.51 (PK)	12.5	2.01	19.37	-4.86	93.65	113.97	-20.32	
2450	H	87.69 (AV)	12.5	2.01	19.37	-4.86	82.83	93.97	-11.14	
--	H	--	--	--	--	--	--	--	--	
2450	V	102.35 (PK)	12.5	2.01	19.37	-4.86	97.49	113.97	-16.48	
2450	V	89.76 (AV)	12.5	2.01	19.37	-4.86	84.90	93.97	-9.07	
--	V	--	--	--	--	--	--	--	--	

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
1458.44	H	51.63	---	-10.27	41.36	---	74.00	54.00	-12.64	Peak
1739.88	H	48.60	---	-9.53	39.07	---	74.00	54.00	-14.93	Peak
2351.33	H	50.72	---	-7.59	43.13	---	74.00	54.00	-10.87	Peak
4897.22	H	45.72	---	0.76	46.48	---	74.00	54.00	-7.52	Peak
N/A										
1379.44	V	53.14	---	-10.43	42.71	---	74.00	54.00	-11.29	Peak
1655.66	V	50.79	---	-9.65	41.14	---	74.00	54.00	-12.86	Peak
1938.44	V	51.12	---	-8.86	42.26	---	74.00	54.00	-11.74	Peak
4897.22	V	43.45	---	0.76	44.21	---	74.00	54.00	-9.79	Peak
N/A										

**Notes:** 1 --Means other frequency and mode comply with standard requirements and at least have 20dB margin.

Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain

Measurement Result=Reading + Correct Factor

Margin=Measurement Result-Limit

2 -Spectrum setting: a. Peak setting 30MHz-1GHz, RBW=120KHz, VBW=300KHz.  
b. AV setting 30MHz-1GHz, RBW=1MHz, VBW=10Hz.

## 7 Occupied bandwidth

### 7.1 Test limit

Please refer section 15.249

### 7.2 Method of measurement

- a) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.
- b) The test receiver RBW set 30KHZ, VBW set 30KHZ, Sweep time set auto.

### 7.3 Test Setup



### 7.4 Test Results

The test not applicable

## 8 Band Edge Check

### 8.1 Test limit

Please refer section 15.249 and section 15.205.

249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209, whichever is the lesser attenuation.

249(e) As shown in section 15.35(b), for frequencies above 1000MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3meters along the antenna azimuth.

### 8.2 Test Procedure

- 8.2.1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 8.2.2. Set spectrum analyzer please see the following test plot.
- 8.2.3. Set the spectrum analyzer as RBW, VBW=1000 KHz,
- 8.2.4. Max hold, view and count how many channel in the band.

### 8.3 Test Setup

Please see the section 6.2 Above 1GHZ Test Setup.

### 8.4 Test Result

The Restricted bands is 2310-2390MHz and 2483.5-2500MHz,  
The EUT operation frequency is 2450MHz, The test is not applicable.

## 9 Antenna Requirement

### 9.1 Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 9.2 Antenna Connected Construction

The directional gains of antenna used for transmitting is 0 dBi, and the antenna connector is de- signed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

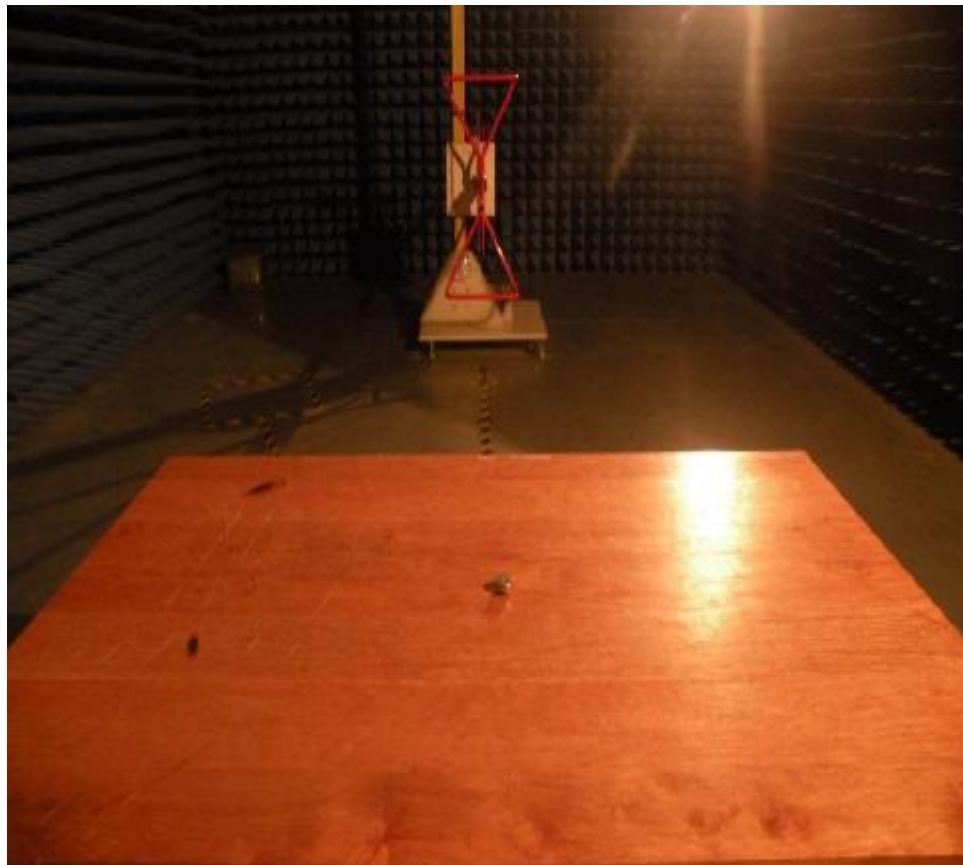
### 9.3 Result

The EUT antenna is integral Antenna. It comply with the standard requirement.

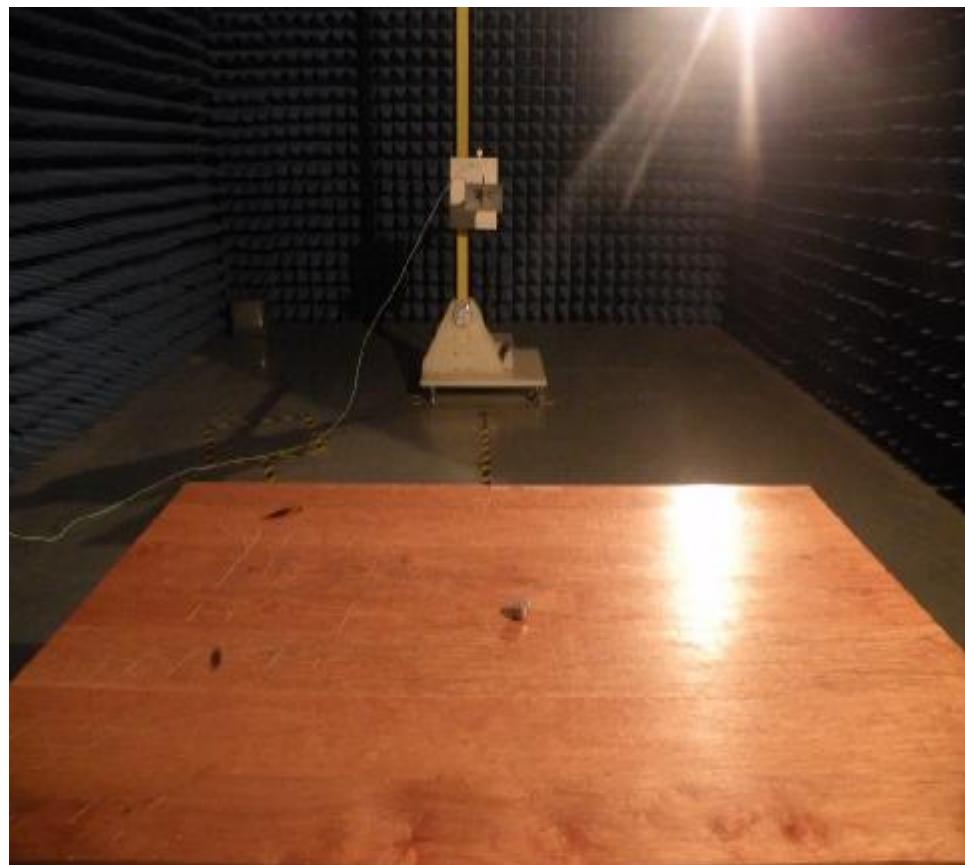
## 10 Photographs of Test Setup

Photographs-Radiated Emission Test Setup in Chamber

Below 1G



Above 1G



## 11 Photographs of EUT

**Figure 1**

Photo of EUT

Front View

Rear View

Full View

Bottom View

Left View

Right View

Full View



**Figure 2**

Photo of EUT

Front View

Rear View

Top View

Bottom View

Left View

Right View

Full View



**Figure 3**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View [  ]

Left View [ ]

Right View [ ]

Full View [ ]



**Figure 4**

Photo of EUT

Front View [  ]

Rear View [ ]

Top View [ ]

Bottom View [ ]

Left View [ ]

Right View [ ]

Internal View [ ]



**Figure 5**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ]

Left View [ √ ]

Right View [ ]

Internal View [ ]



**Figure 6**

Photo of EUT

Front View [ ]

Rear View [ √ ]

Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [ ]



**Figure 7**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ √ ]

Internal View [ ]



**Figure 8**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [ √ ]



**Figure 9**

Photo of EUT

Front View [ ]

Rear View [ ]

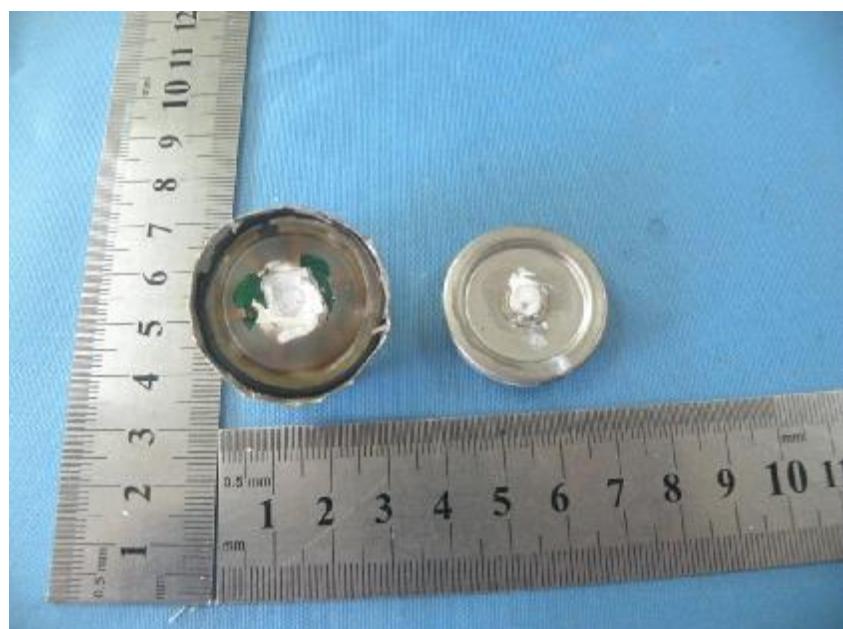
Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [  ]



**Figure 10**

Photo of EUT

Front View [ ]

Rear View [ ]

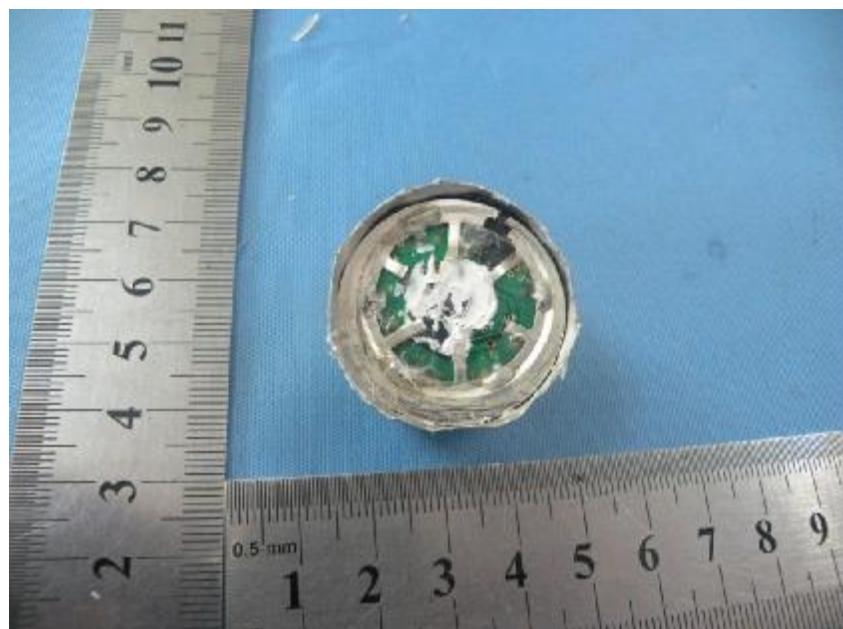
Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [  ]



**Figure 11**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [  ]



**Figure 12**

Photo of EUT

Front View [ ]

Rear View [ ]

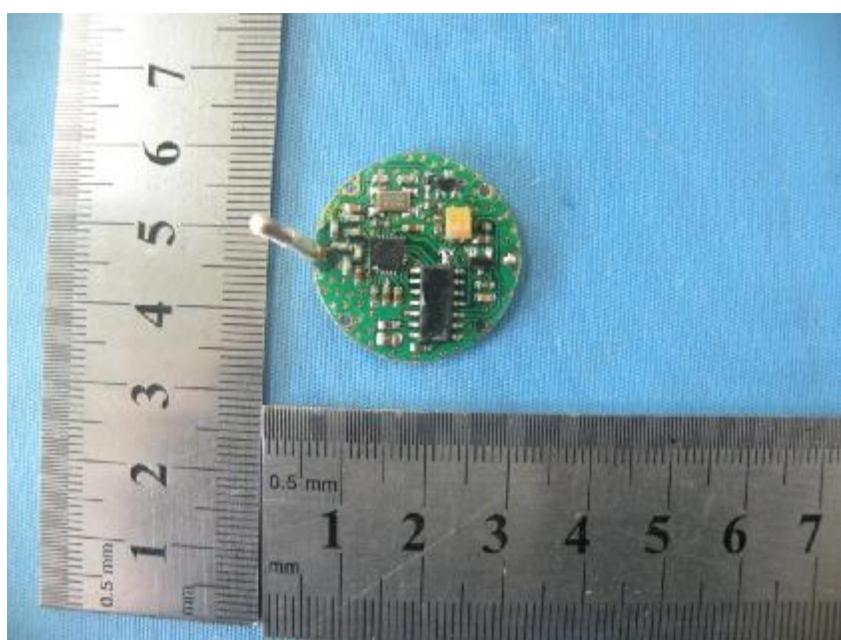
Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [  ]



**Figure 13**

Photo of EUT

Front View [ ]

Rear View [ ]

Top View [ ]

Bottom View[ ]

Left View [ ]

Right View [ ]

Internal View [  ]



-----END OF THE REPORT-----