



**ISO/IEC17025 Accredited Lab.**

Report No: FCC 1307022  
File reference No: 2013-07-31

Applicant: Shenzhen Zhihuang Technology Co., Ltd

Product: Radio Transmitter

Model No: ZC121A; ZC122A; ZC123A; ZC124A

Trademark: Zhihuang

Test Standards: FCC Part 15 Subpart C, Paragraph 15.231

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.231 regulations for the evaluation of electromagnetic compatibility

Approved By

*Jack Chung*

Jack Chung  
Manager

Dated: July 31, 2013

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**

**SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD**

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Shenzhen,CHINA.

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### **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

#### **FCC-Registration No.: 899988**

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

#### **IC- Registration No.: IC5205A-02**

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

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Test Report Conclusion

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## 1.0 General Details

### 1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD  
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.  
Telephone: (755) 83448688  
Fax: (755) 83442996  
Site on File with the Federal Communications Commission – United States  
Registration Number: 899988  
For 3m & 10 m OATS  
Site Listed with Industry Canada of Ottawa, Canada  
Registration Number: IC: 5205A-01  
For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: Shenzhen Zhihuang Technology Co., Ltd  
Address: 4F, 3 Building, Yongxin Industrial Park, 89 No., Hengping Road, Henggang Town, LongGang District, ShenZhen, China  
Telephone: 0755-33291908/33291906  
Fax: 0755-89233053

### 1.3 Description of EUT

Product: Radio Transmitter  
Manufacturer: Shenzhen Zhihuang Technology Co., Ltd  
Address: 4F, 3 Building, Yongxin Industrial Park, 89 No., Hengping Road, Henggang Town, LongGang District, ShenZhen, China  
Brand Name: Zhihuang  
Model Number: ZC121A;  
Additional Model Name ZC122A; ZC123A; ZC124A  
Additional Trade Name N/A  
Rating: 3VDC  
Operation Frequency 433.92MHz  
Antenna Designation PCB Printed Antenna

### 1.4 Submitted Sample

2 Sample

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1.5 Test Duration

2013-06-21 to 2013-07-30

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

*Terry Tang*

The sample tested by \_\_\_\_\_

Print Name: Terry Tang

2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
Loop Antenna	EMCO	6502	00042960	2012-08-21	2013-08-20
Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2012-08-21	2013-08-20
3m OATS	--	--	N/A	2012-08-21	2013-08-20
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2012-08-21	2013-08-20
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2012-08-21	2013-08-20
9*6*6 Anechoic	--	--	N/A	2012-08-21	2013-08-20

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### 3.0 Technical Details

#### 3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Emission Test	N/A	N/A
FCC Part 15, Paragraph 15.209	General Requirement	PASS	Compliant
FCC Part 15, Paragraph 15.231 (b)	Radiated Emission Test	PASS	Compliant
FCC Part 15, Paragraph 15.231 (c)	20dB Bandwidth Testing	PASS	Compliant
FCC Part 15, Paragraph 15.231 (a) (1)	Deactivate Testing	PASS	Compliant

#### 3.2 Test Standards

**FCC Part 15 Subpart C, Paragraph 15.231**

#### 4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

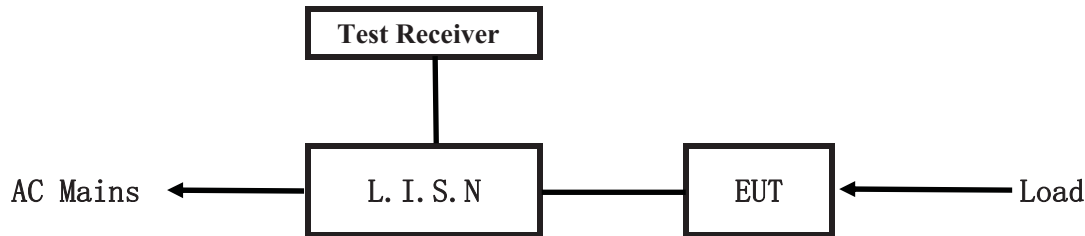
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## 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test

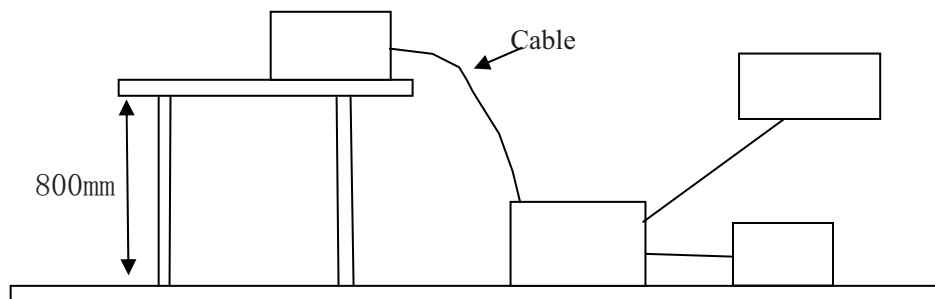


EUT: Equipment Under Test

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Block diagram of Test setup



### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

Device	Manufacturer	Model	FCC ID
Radio Transmitter	Shenzhen Zhihuang Technology Co.,Ltd	ZC121A; ZC122A; ZC123A;ZC124A	2AALU121T129

#### B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

#### C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
N/A				

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#### 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

#### 5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency (MHz)	Class A Limits (dB $\mu$ V)		Class B Limits (dB $\mu$ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

Notes: 1. \*Decreasing linearly with logarithm of frequency.  
2. The tighter limit shall apply at the transition frequencies

#### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Note: **Owing to DC operation of EUT, this test item is not performed**

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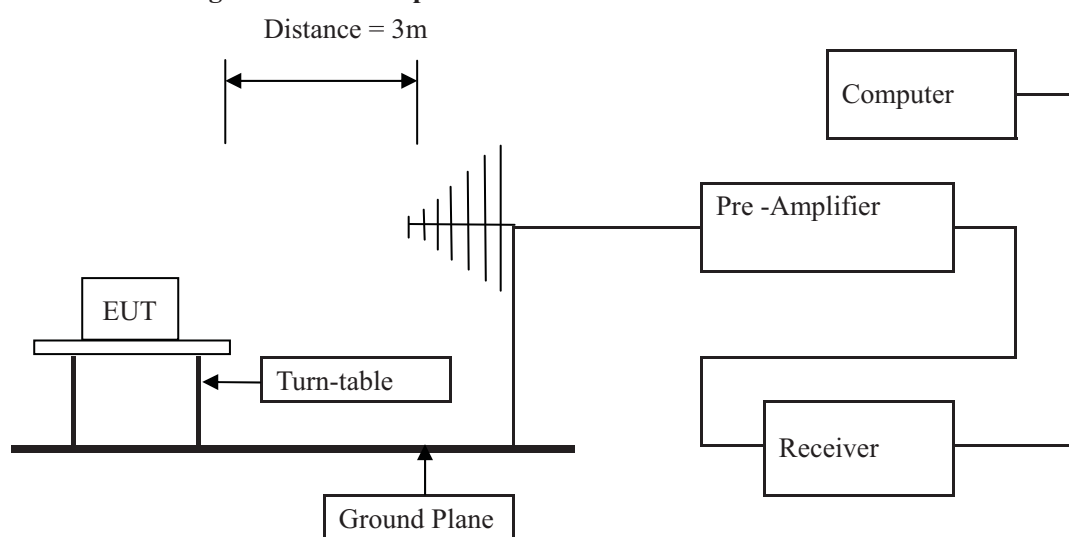


## 6 Radiated Emission Test

### 6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

### Block diagram of Test setup



- 6.2 Configuration of The EUT  
Same as section 5.3 of this report

- 6.3 EUT Operating Condition  
Same as section 5.4 of this report.

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#### 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

##### A FCC Part 15 Subpart C Paragraph 15.231 Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious Emission	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	1250-3370	61.94-70.55	125-375	41.94-51.48
174-260	3750	71.48	375	51.48
260-470	3750-12500	71.48-81.94	375-1250	51.48-61.94
Above 470	12500	81.94	1250	61.94

- Note:
1. RF Field Strength (dBuV) = 20 log RF Voltage (uV)
  2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
  3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.
  4. Linear interpolations for frequency ranges 130-174MHz and 260-470MHz
  5. the above field strength limits are specified at a distance of 3-meters and the tighter limits apply at the band edges

##### B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
  2. In the Above Table, the tighter limit applies at the band edges.
  3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
  4. This is a handheld device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.
  5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz. As to 1G-5G, the final emission level got using PK detector. And Average = peak(dBuV/m) – duty cycle(dB)
  6. New batteries were installed in the equipment under test for radiated emission testing.
  7. Model ZC123A was the selected for the final test and it was the worst case.

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## 6.5 Test result

### A Fundamental and Harmonic Radiated Emission Data

Product:	Radio Transmitter	Test Mode:	Keeping Tx transmitting
Test Item:	Fundamental Radiated Emission and Spurious Emission Data	Temperature:	25°C
Test Voltage:	DC3V	Humidity:	56%
Test Result:	Pass		

Frequency (MHz)	Emission PK/AV (dBuV/m)	Horiz / Vert	Limits PK/AV (dBuV/m)	Margin (dB)
433.80	65.13 (PK)	Horizontal	100.82/80.82	-15.69
433.80	55.98 (PK)	Vertical	100.82/80.82	-24.84
867.56	49.70 (PK)	Horizontal	80.82/60.82	-11.12
867.52	52.63 (PK)	Vertical	80.82/60.82	-8.19
1301.76	47.91 (PK)	Horizontal	74/54	-6.09
1301.76	42.91 (PK)	Vertical	74/54	-11.09
1735.68	46.51 (PK)	Horizontal	80.82/60.82	-14.31
1735.68	42.51 (PK)	Vertical	80.82/60.82	-18.31
2196.60	43.91 (PK)	Horizontal	80.82/60.82	-16.91
2196.60	--	Vertical	80.82/60.82	-
2630.52		Horizontal	80.82/60.82	
2630.52		Vertical	80.82/60.82	
3037.44		Horizontal	80.82/60.82	
3037.44		Vertical	80.82/60.82	
3471.36		Horizontal	80.82/60.82	
3471.36		Vertical	80.82/60.82	
3905.28		Horizontal	80.82/60.82	
3905.28		Vertical	80.82/60.82	
4339.200		Horizontal	80.82/60.82	
4339.200		Vertical	80.82/60.82	

**Note: Average value was not recorded because the PK value was less than the AV limit value.**

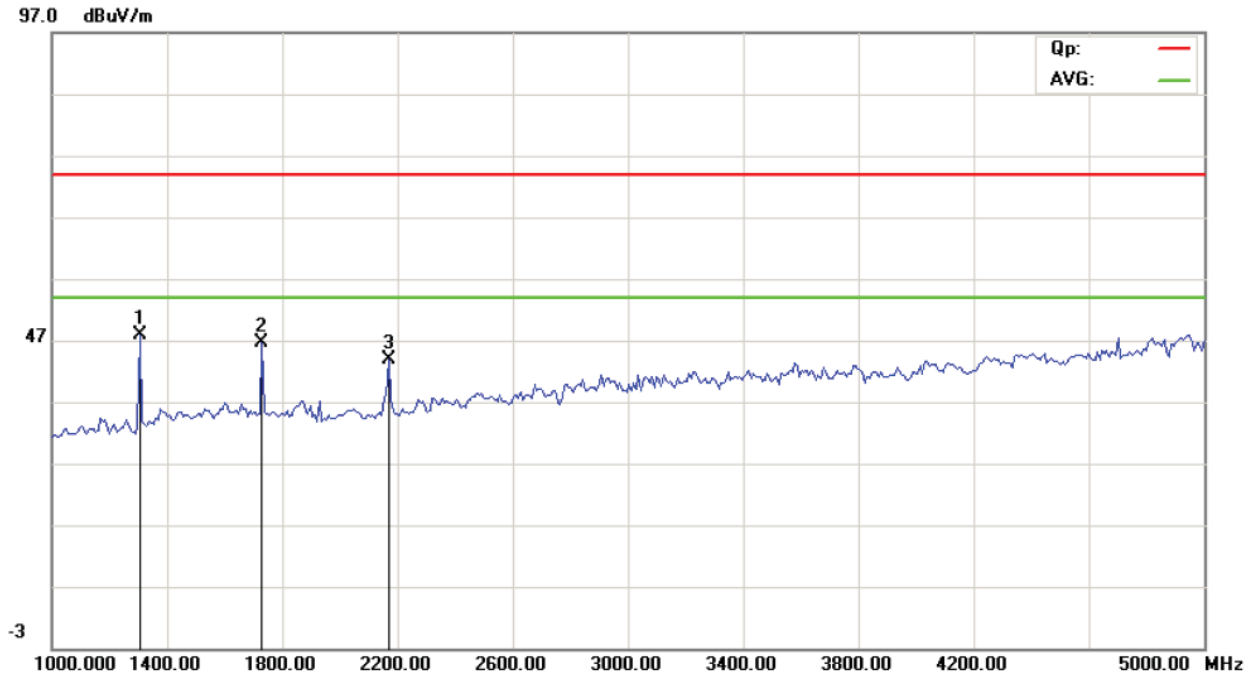
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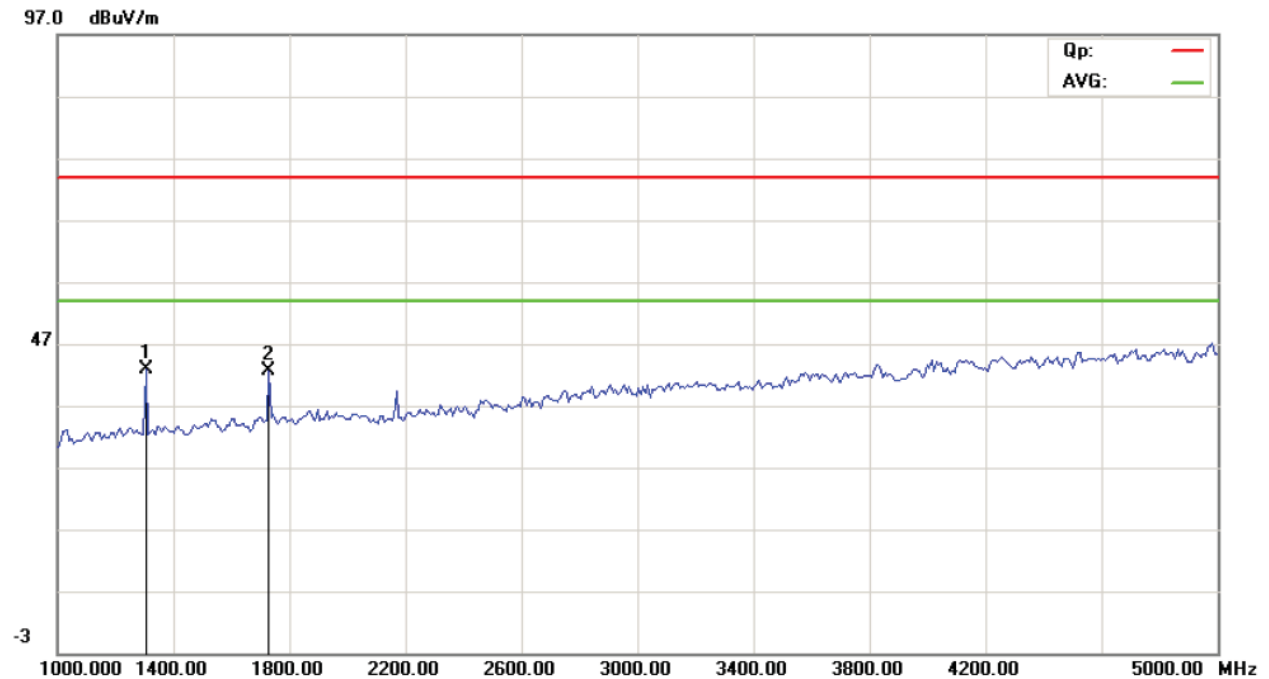
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Test Plot above 1G

### Horizontal



### Vertical



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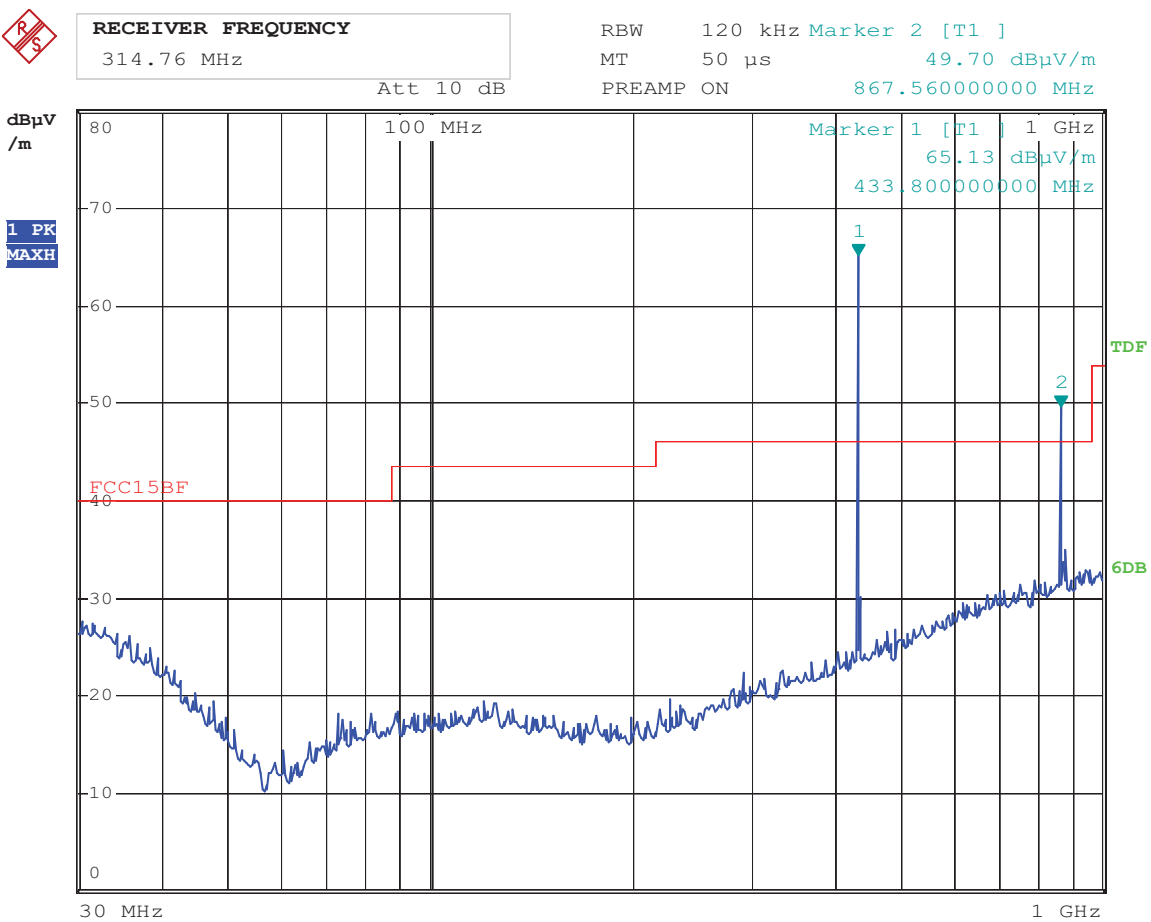
Test Plot below 1GHz

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition:   Keep Tx Transmitting

Results:               Pass

Please refer to following diagram for individual



Date: 15.JUL.2013 19:33:37

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	H	--
--	--	H	--

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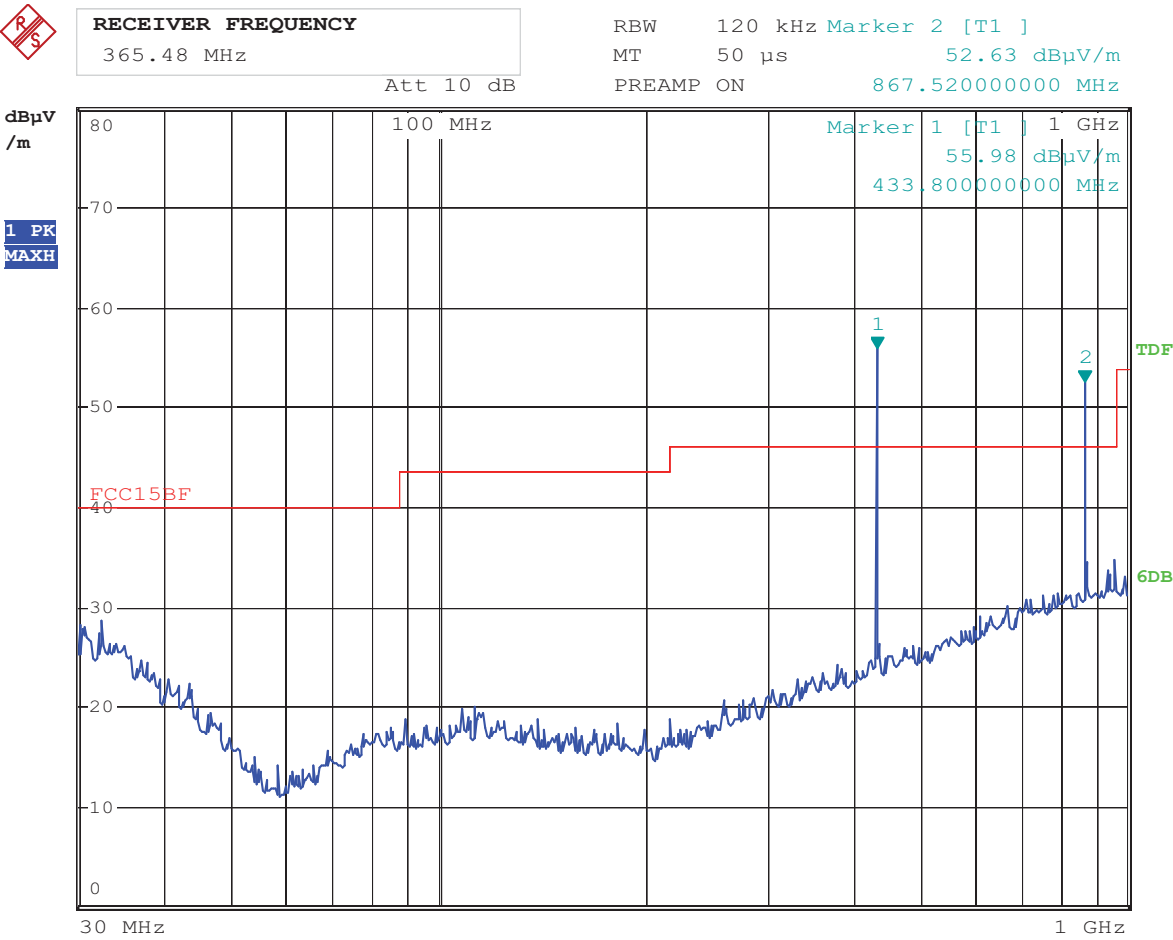
Test Plot below 1GHz

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Tx Transmitting

Results: Pass

Please refer to following diagram for individual



Date: 15.JUL.2013 19:37:25

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	V	--

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## 7.0 20dB Bandwidth Testing

### 7.1 Requirement

Per 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### 7.2 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

### 7.3 Test Data

Frequency (MHz)	20dB Bandwidth Emission (kHz)	Limit (MHz)	Result
433.92	52	1.08	Pass

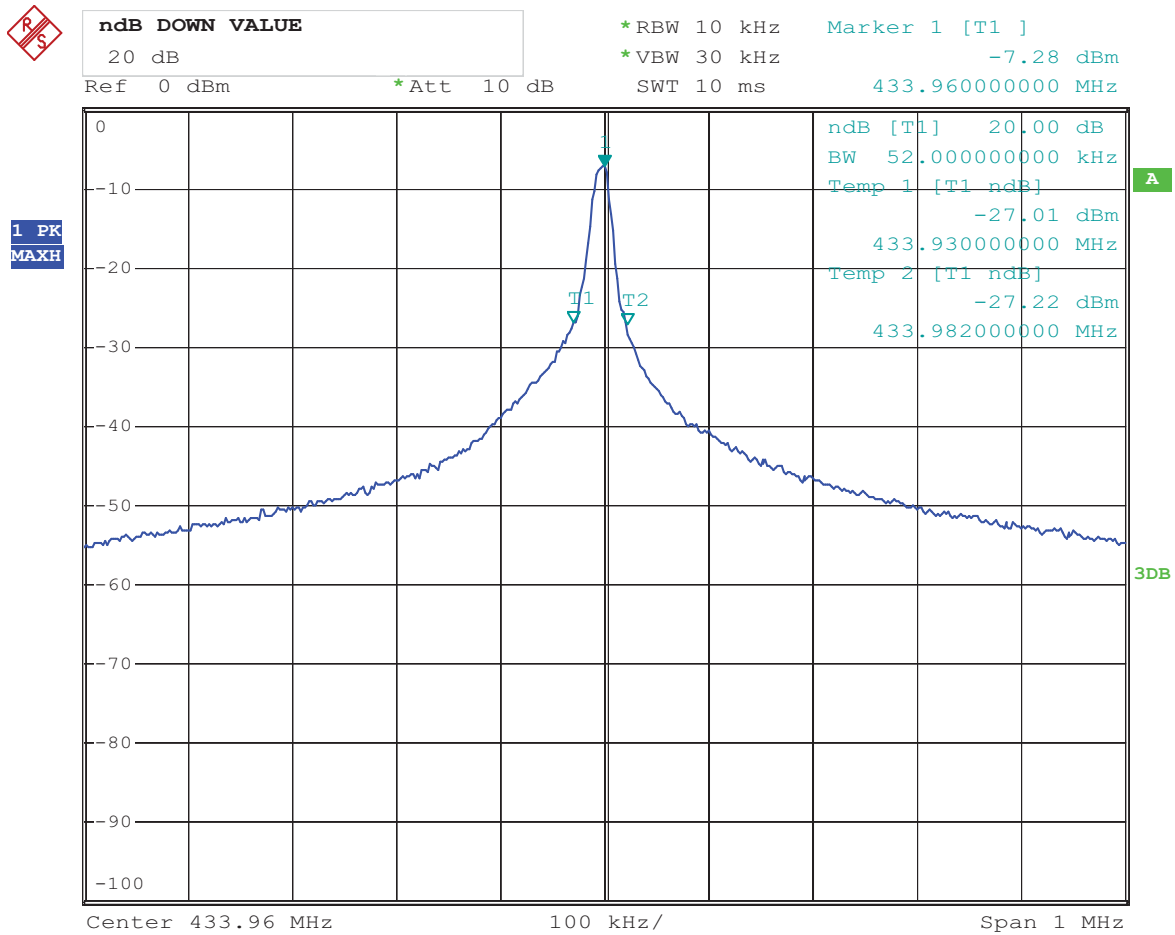
Limit=Frequency x 0.25%=433.92 x 0.25%=1.08MHz

Refer to attached plots:

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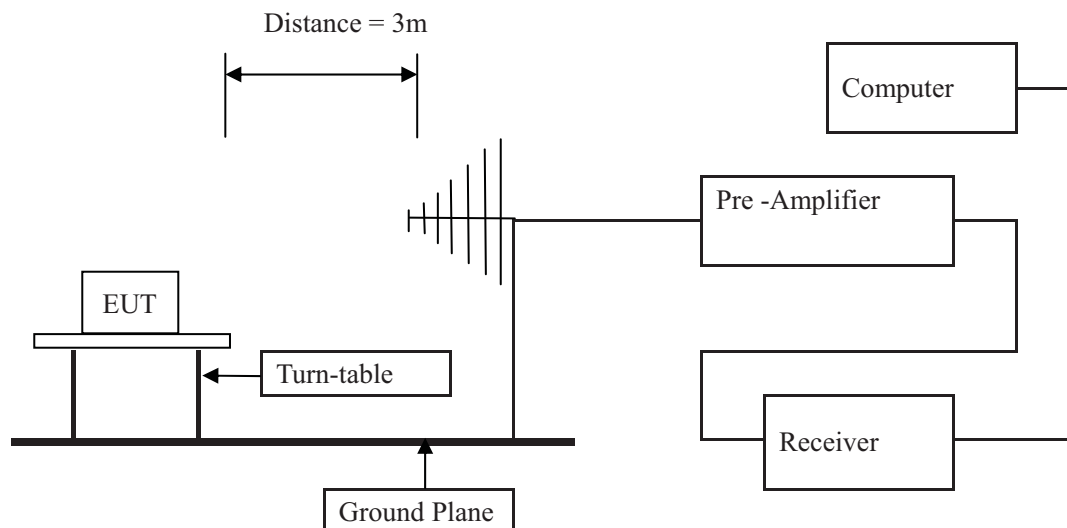


## 8.0 Deactivate Test

### 8.1 Requirement

Per 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### 8.2 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing

The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15.231(a) limits.

### 8.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

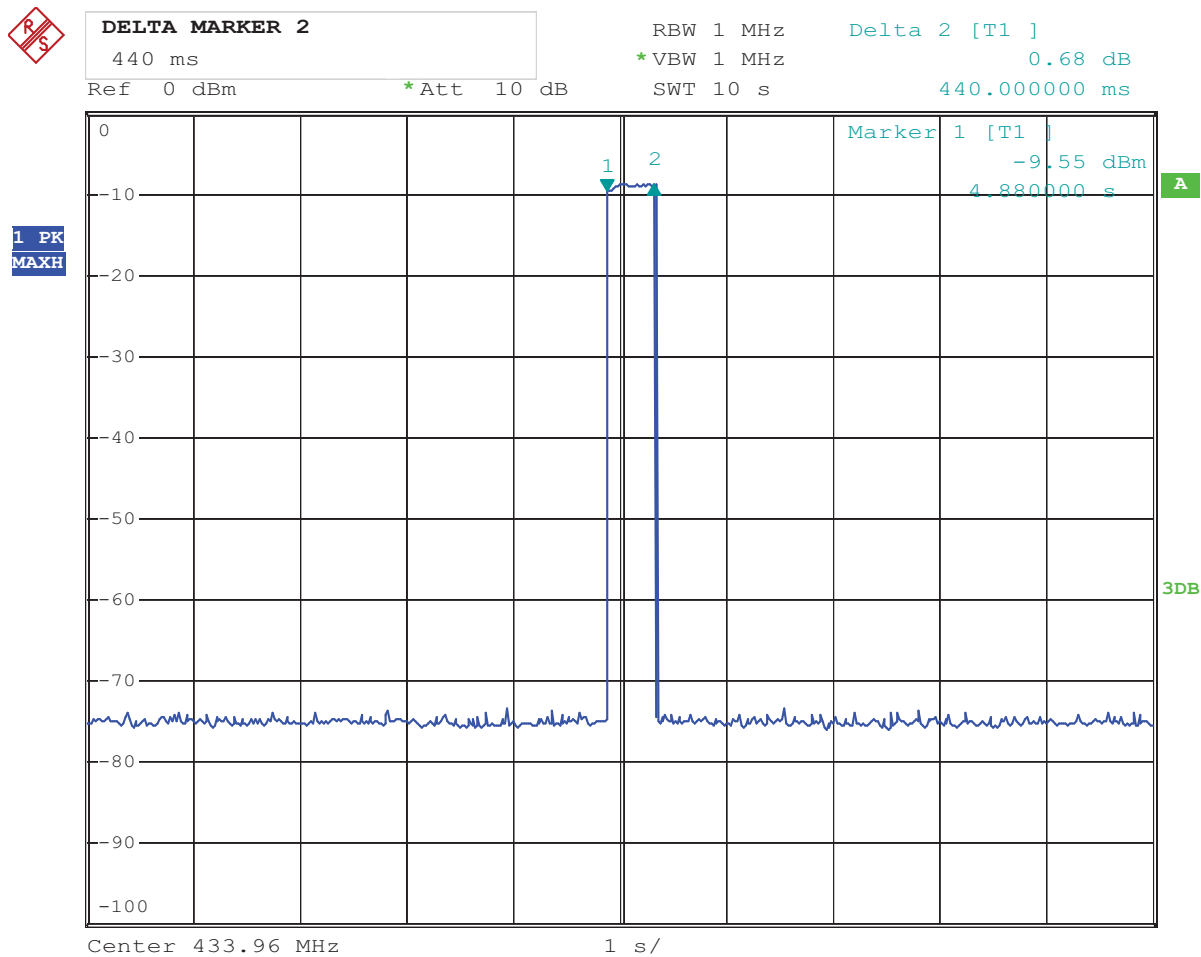
### 8.4 Test Data

**Refer to attached plots:**

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## 9.0 FCC ID Label

**FCC ID: 2AALU121T129**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

### Mark Location:



FCC ID Label Location

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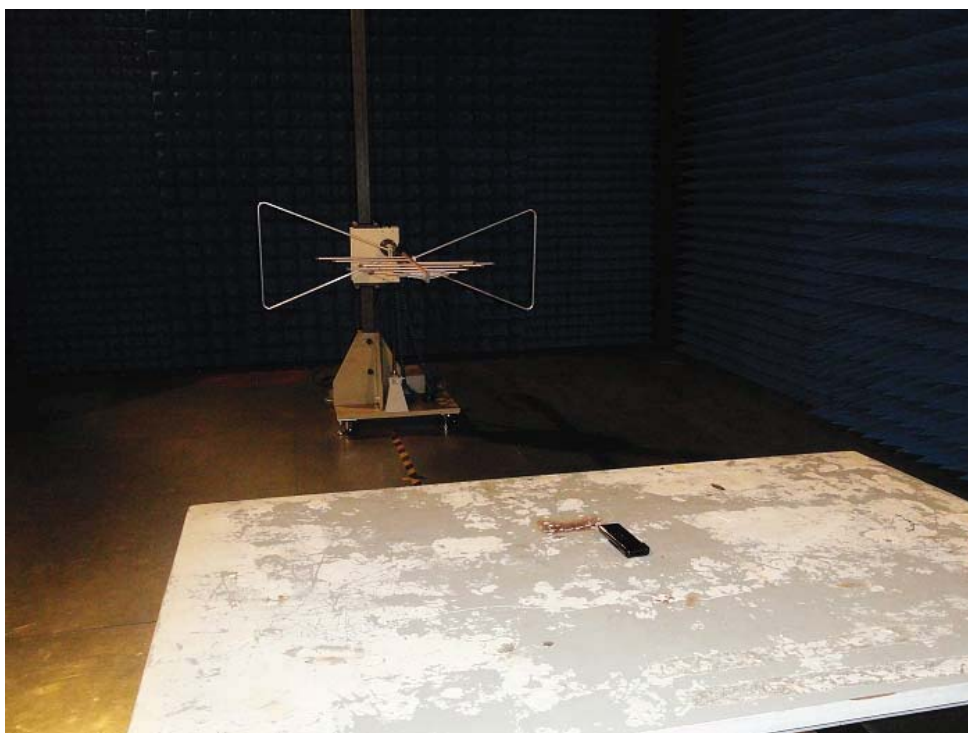
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**10.0. Photo of testing**

10.1 Conducted test View—N/A

10.2 Radiated emission test view



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### 10.3 Photo for the EUT

Outside View (ZC123A)



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Outside View (ZC123A)



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Inside View (ZC123A)



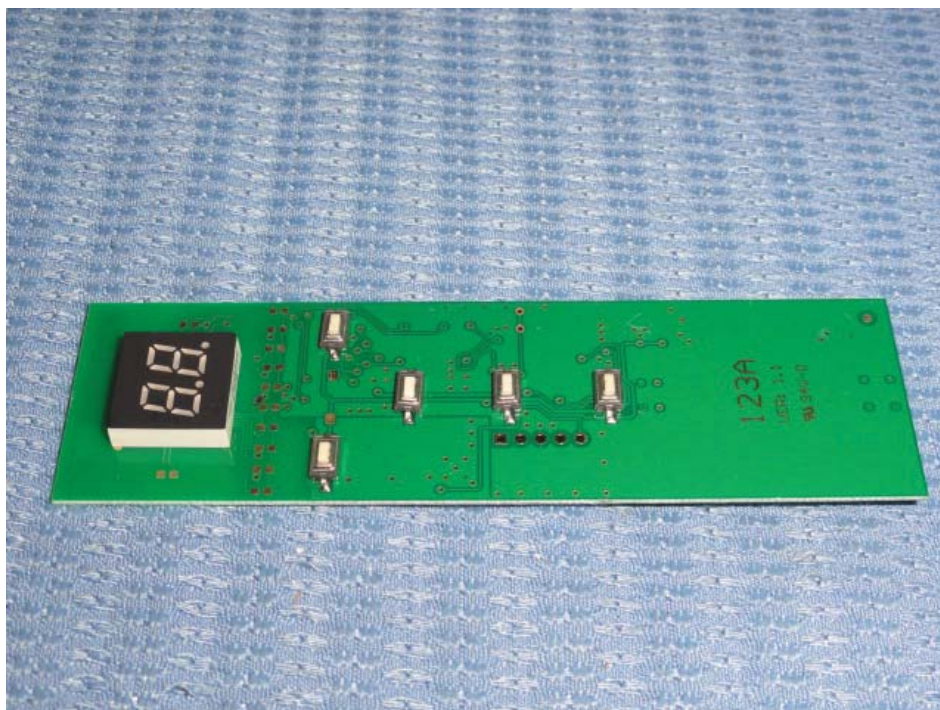
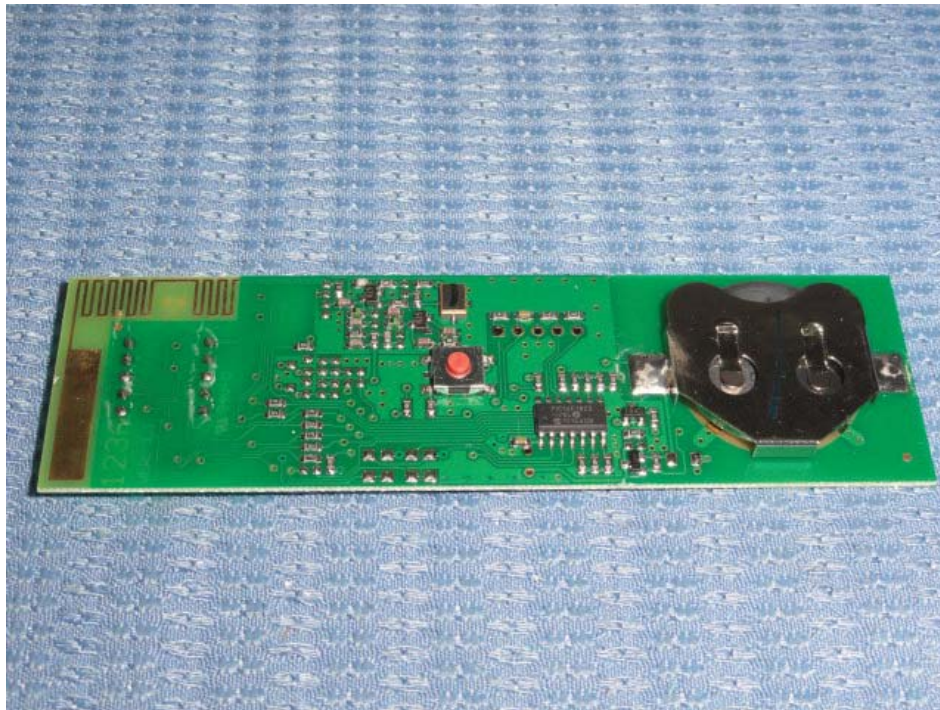
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Inside View (ZC123A)



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Outside View (ZC121A)



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Outside View (ZC121A)



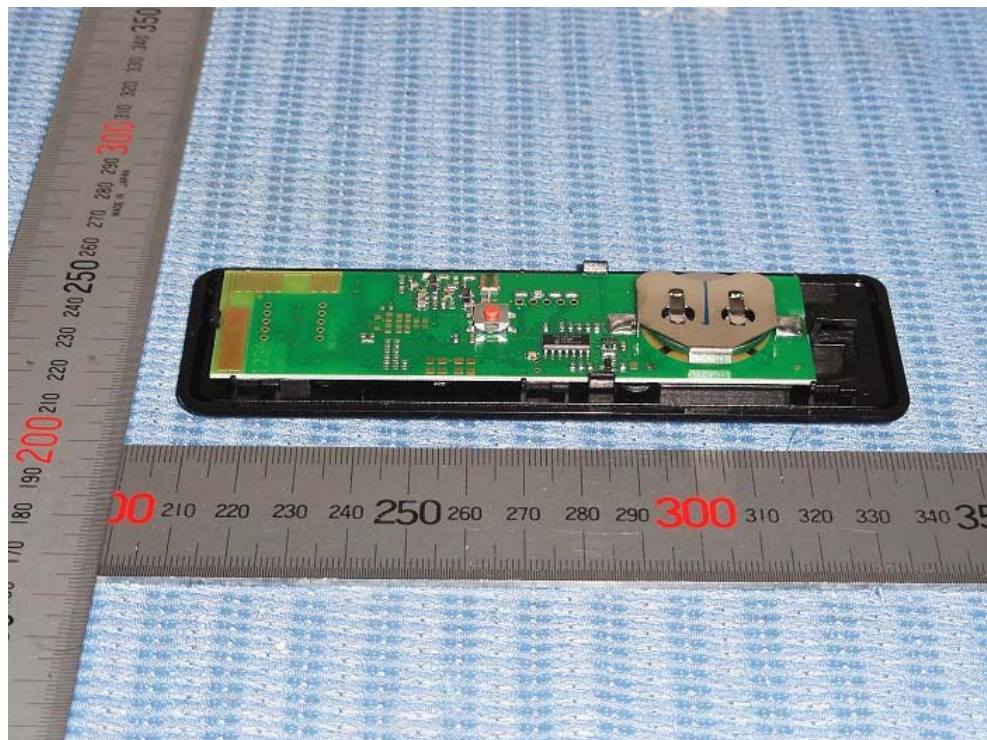
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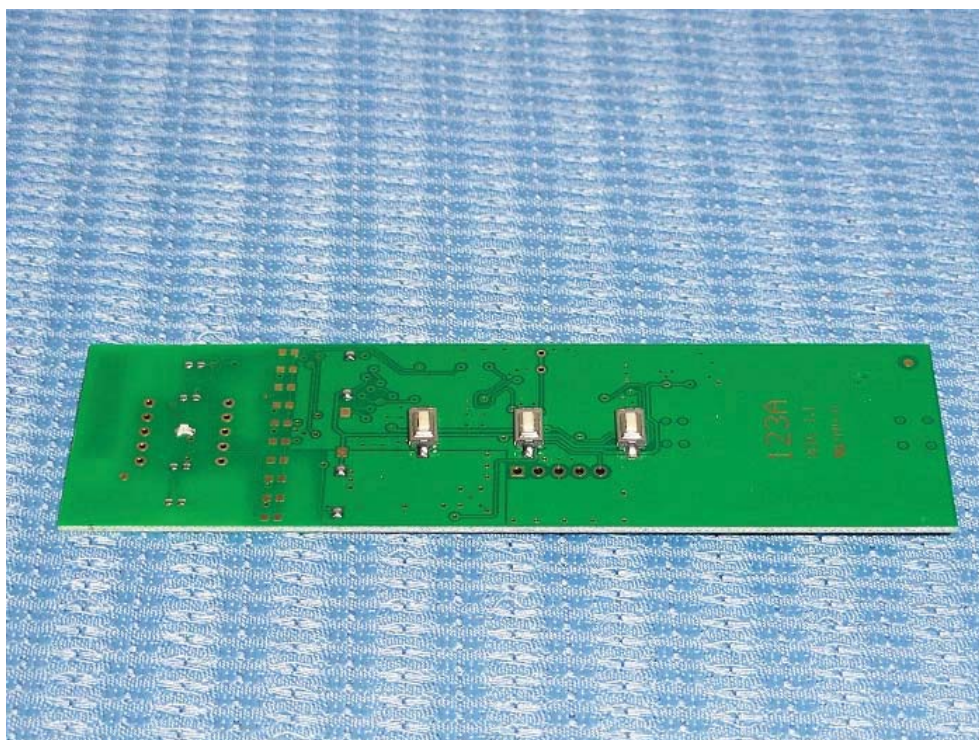
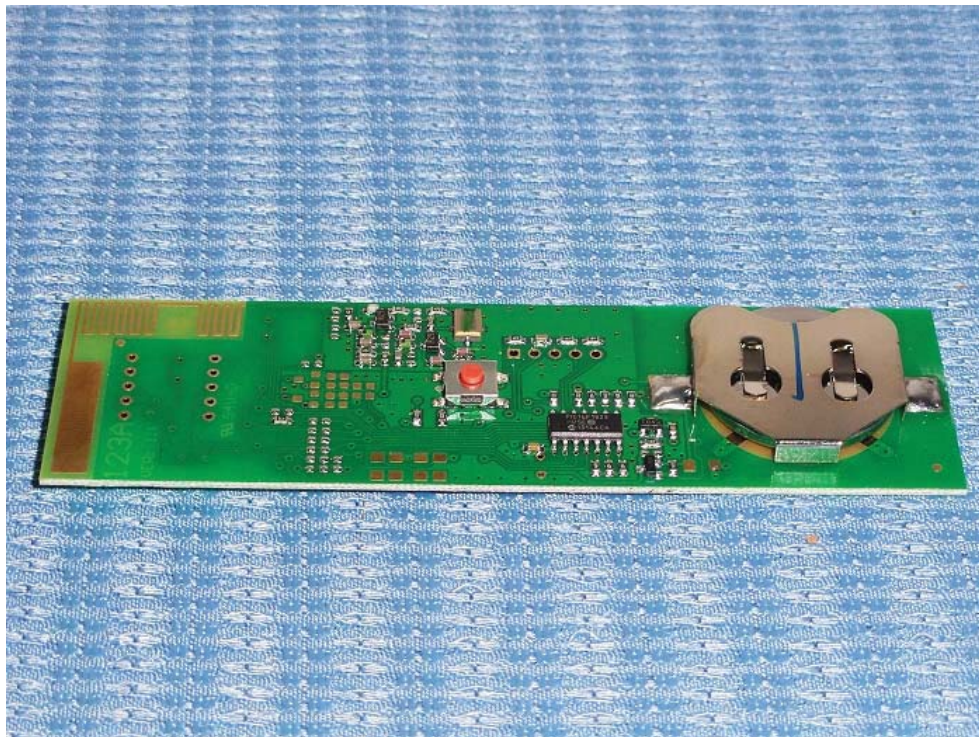
Inside View (ZC121A)



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Inside View (ZC121A)



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