TECHNICAL REPORT

ISO/IEC17025 Accredited Lab.

| | |
|---|---|
| Report No: | FCC1407138 |
| File reference No: | 2014-07-22 |
| Applicant: | CAPSTONE INDUSTRIES INC |
| Product: | Wireless Remote Control Outlet |
| Model No: | CT-RM411, CT-RM431 |
| Trademark: | N/A |
| 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 22, 2014

**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**

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timewaytech.com

## 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.

Test Report Conclusion

Content

## 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 Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

### 1.2 Applicant Details

Applicant: CAPSTONE INDUSTRIES INC

Address: SUITE 120, 350 JIM MORAN BLVD, DEERFIELD BEACH, FL 33442, USA

Telephone: --

Fax: --

### 1.3 Description of EUT

| | |
|---|---|
| Product: | Wireless Remote Control Outlet |
| Manufacturer: | Jie Du Electronics Technology Co.,LTD |
| Address: | Shui Wei Industrial Area,Tangjiao Village, ChaShan Town, Dongguan, Guangdong, China |
| Brand Name: | N/A |
| Model Number: | CT-RM411, CT-RM431<br>Model Difference Description: All the same except for the color and shape of appearance. |
| Rating: | DC12V (Battery) |
| Operation Frequency: | 315MHz |
| Modulation Type: | ASK |
| Antenna Designation | Integral Antenna with Gain 0dBi |

### 1.4 Submitted Sample

2 Samples

### 1.5 Test Duration

2014-07-04 to 2014-07-21

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tang

Print Name: Terry Tang

| 2.0 | Test Equipments | | | | |
|---|---|---|---|---|---|
| Instrument Type | Manufacturer | Model | Serial No. | Date of Cal. | Due Date |
| Ultra Broadband ANT | ROHDE&SCHWARZ | HL562 | 100157 | 2013-08-23 | 2014-08-22 |
| System Controller | CT | SC100 | - | 2013-08-23 | 2014-08-22 |
| Power Amplifier | AR | 150W1000 | 300999 | 2013-08-23 | 2014-08-22 |
| ESPI Test Receiver | ROHDE&SCHWARZ | ESI26 | 838786/013 | 2013-08-23 | 2014-08-22 |
| 3m OATS | -- | -- | N/A | 2013-08-23 | 2014-08-22 |
| Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-631 | 2013-08-23 | 2014-08-22 |
| RF Cable | Timeway | TW213 | N/A | 2013-08-22 | 2014-08-21 |

## 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 15.203 | Antenna requirements | **PASS** | Compliant |
| FCC Part 15, Paragraph 15.207 | Conducted Emission Test | **PASS** | 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

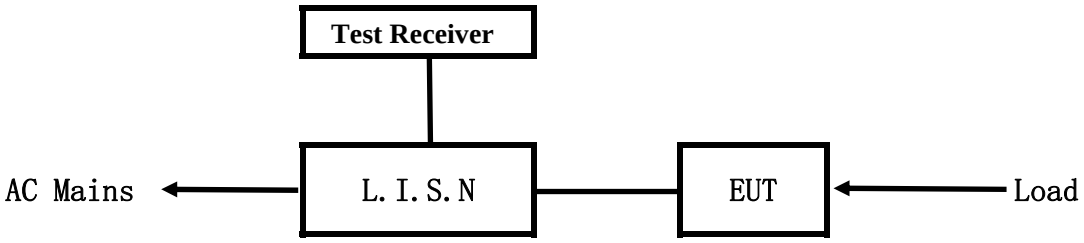
**FCC Part 15 Subpart C, Paragraph 15.231**

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

## 5. Power Line Conducted Emission Test

5.1 Schematics of the test

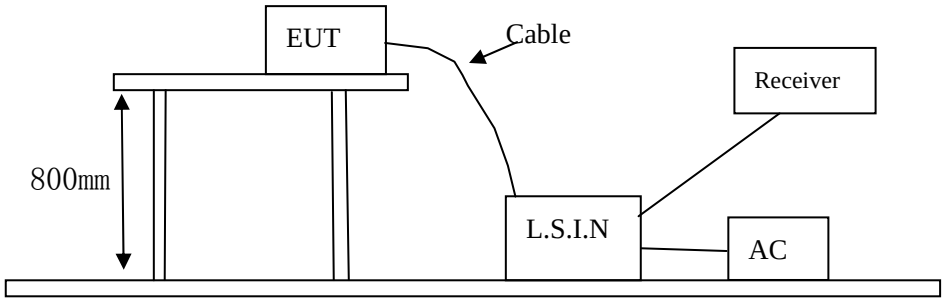



EUT: Equipment Under Test

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 |
|---|---|---|---|
| Wireless Remote Control Outlet | Jie Du Electronics Technology Co., LTD | CT-RM411, CT-RM431 | 2ACN4CT-RM411 |

B. Internal Device

| Device | Manufacturer | Model | FCC ID/DOC |
|---|---|---|---|
| N/A | | | |

C. Peripherals

| Device | Manufacturer | Model | FCC ID/DOC | Cable |
|---|---|---|---|---|
| N/A | | | | |

5.4 EUT Operating Condition

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

5.5 Power line conducted Emission Limit according to Paragraph 15.207

| Frequency (MHz) | Class A Limits (dB μ V) | | Class B Limits (dB μ 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. (The average detector is necessary when the Quasi-peak emission level beyond the average Limit.)

**Note: Battery operation, this test item not applicable.**

## 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.

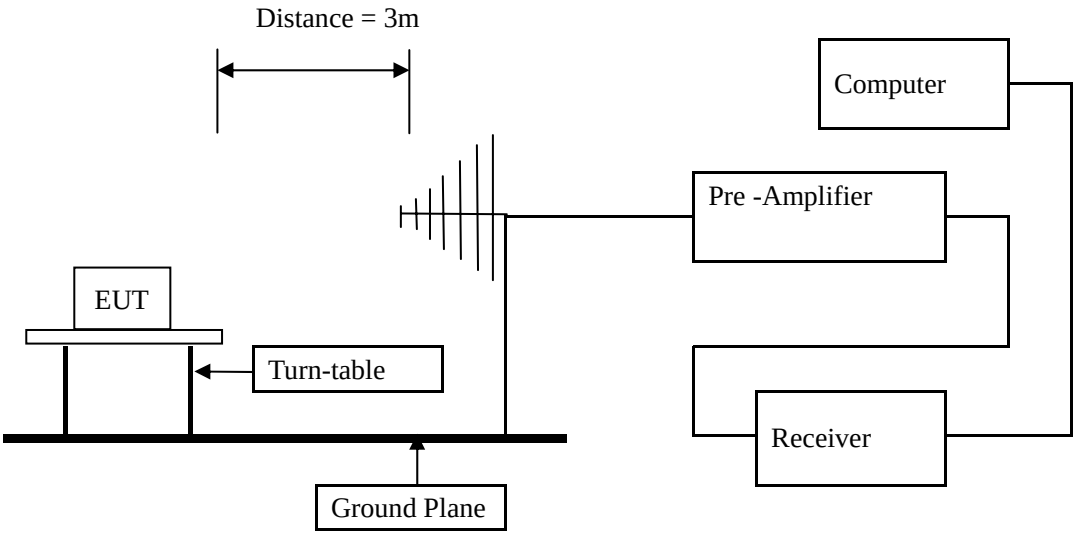
(3) The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.

(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.

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 μ 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 handhold 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-4G, the final emission level got using PK detector.

6. New batteries were installed in the equipment under test for radiated emission testing.

7. This EUT owns 6 buttons. The six buttons is used for control the receiver, press anyone of these will trigger the device to transmit. For more information please refer to the user manual.

6.5 **Test result**

**Fundamental and Harmonics Radiated Emission Data**

| Product: | Wireless Remote Control Outlet | Test Mode: | Keeping Tx transmitting |
|---|---|---|---|
| Test Item: | Fundamental Radiated Emission and Spurious Emission Data | Temperature: | 25℃ |
| Test Voltage: | 12V | Humidity: | 56% |
| Test Result: | Pass | | |

NOTE: 9 kHz-30MHz the measurements were greater than 20dB below the limit.

From 30MHz~1GHz

| Freq. | Ant.Pol. | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|---|---|---|---|---|---|---|---|
| (MHz) | H/V | PK | AV | PK | AV | PK | AV |
| 315.0 | V | 74.92 | -- | 95.6 | 75.6 | -20.68 | -- |
| 315.0 | H | 75.35 | -- | 95.6 | 75.6 | -20.25 | -- |
| 630.0 | V | 51.13 | -- | 75.6 | 55.6 | -24.47 | -- |
| 630.0 | H | 49.39 | -- | 75.6 | 55.6 | -26.21 | -- |
| 945.0 | V | 48.36 | -- | 75.6 | 55.6 | -27.24 | -- |
| 945.0 | H | 46.92 | -- | 75.6 | 55.6 | -28.68 | -- |

**Note:** (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3) For All the Peak value is below the AV limit, If the duty cycle is at the max value(duty cycle=1), the AV value will also Below the AV limit, so no necessary to evaluate the duty factor and the AV value will automatic compliance the limit.

From 1GHz~4GHz

| Freq. | Ant.Pol. | Emission Level(dBuV) | | Limit 3m(dBuV/m) | | Over(dB) | |
|---|---|---|---|---|---|---|---|
| (MHz) | H/V | PK | AV | PK | AV | PK | AV |
| 1260 | V | 50.12 | -- | 75.6 | 55.6 | -25.48 | -- |
| 1260 | H | 49.38 | -- | 75.6 | 55.6 | -26.22 | -- |

**Note:** (1) All Readings are Peak Value and AV.

(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

(3) For All the Peak value is below the AV limit, If the duty cycle is at the max value(duty cycle=1), the AV value will also Below the AV limit, so no necessary to evaluate the duty factor and the AV value will automatic compliance the limit.

## 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

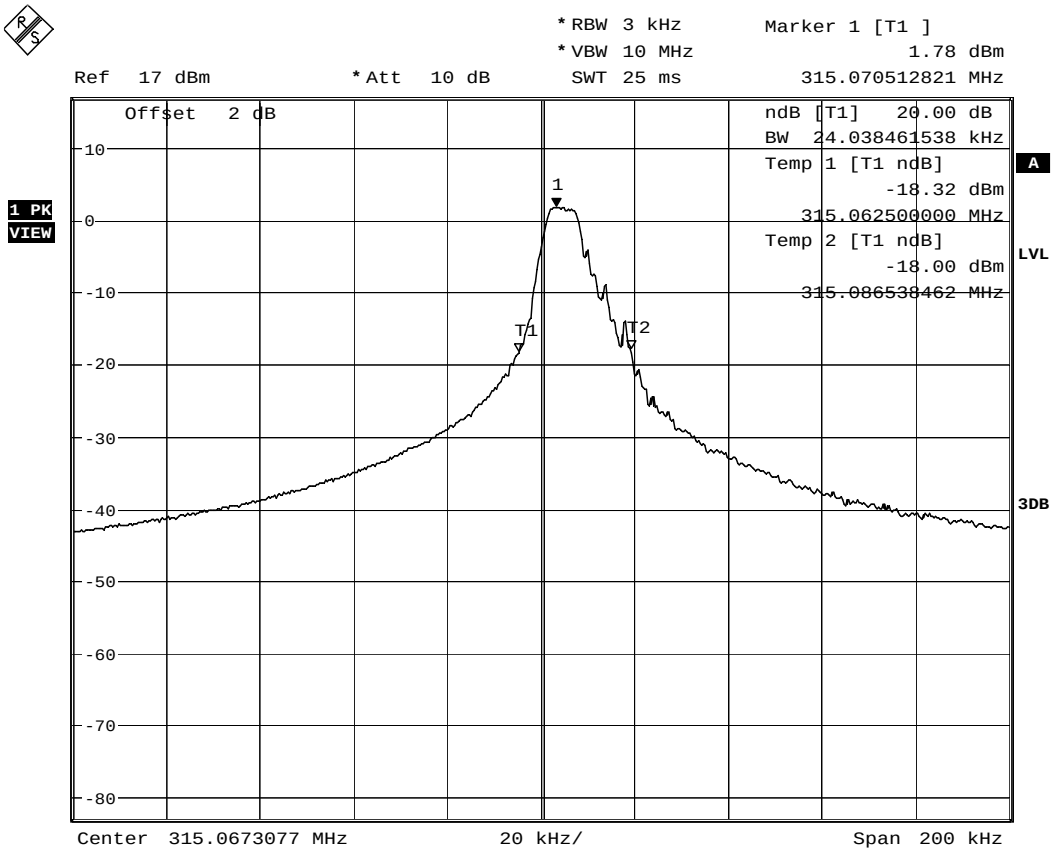
With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

### 7.3 Test Data

| Frequency （MHz） | 20dB Bandwidth Emission (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 315 | 24.038 | 787.50 | Pass |

Limit=Frequency x 0.25%=315 x 0.25%=787.5kHz

Refer to attached plots:

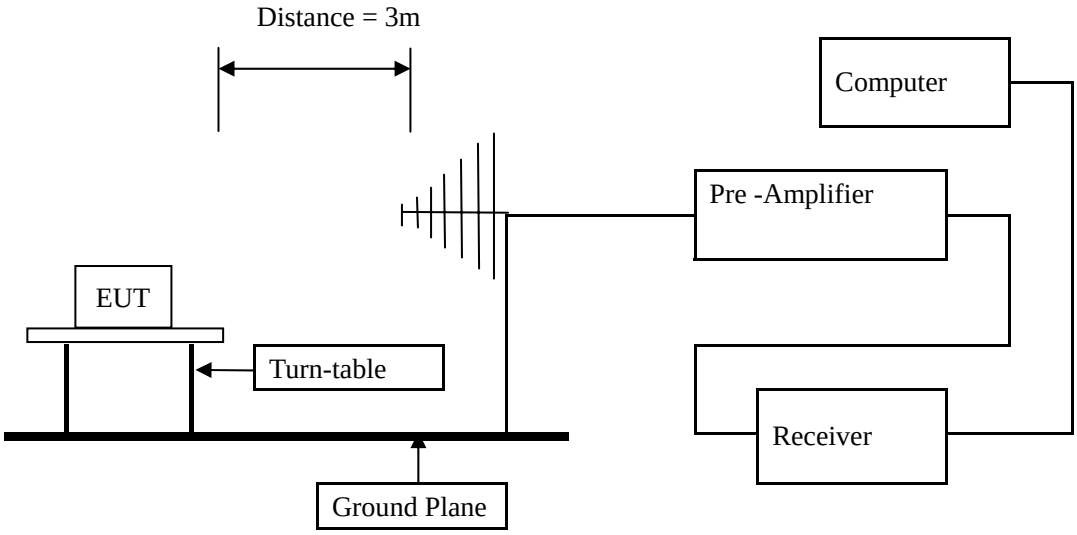


## 8.0 Deactivate Test

## 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.

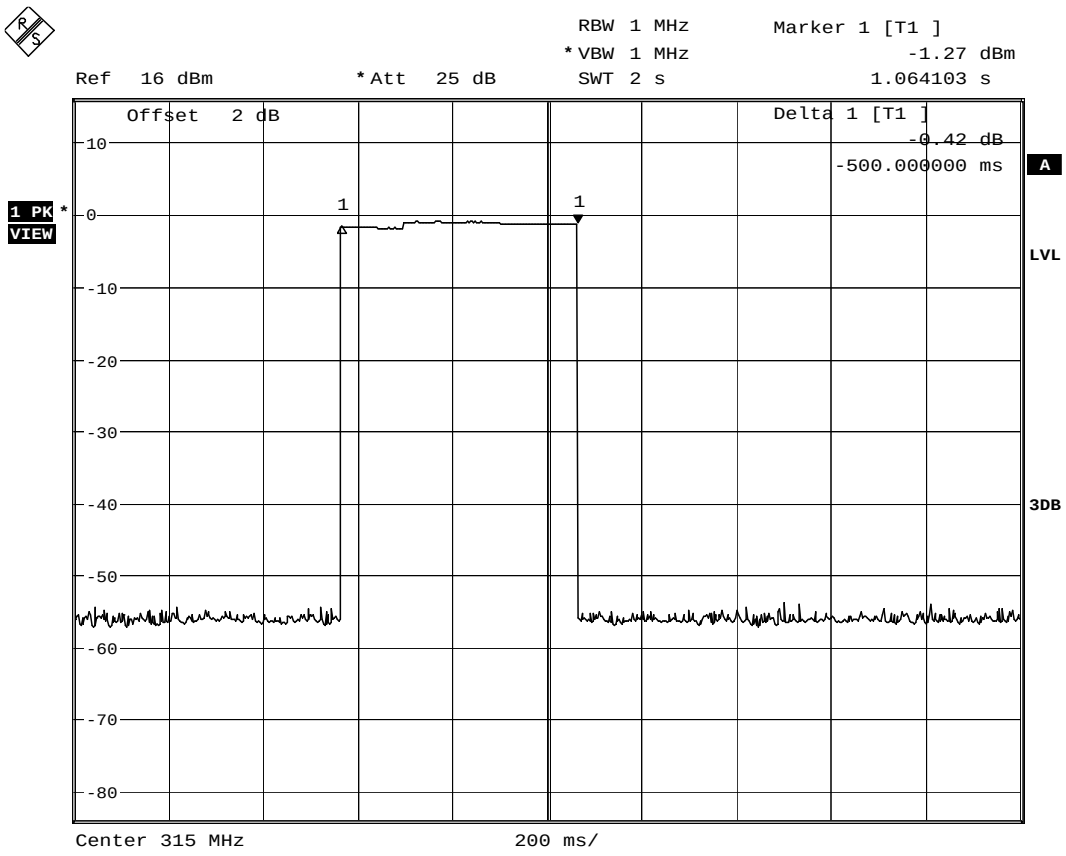
## 8.3 Test Procedure

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:**

| Release time (sec.) | Limit(sec.) | conclusion |
|---|---|---|
| 0.5 | 5 | Pass |




Date: 5.JUL.2014 11:57:03

## 9 **Antenna Requirements**

9.1 Standard Applicable

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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

10.2 Antenna Connected constructions

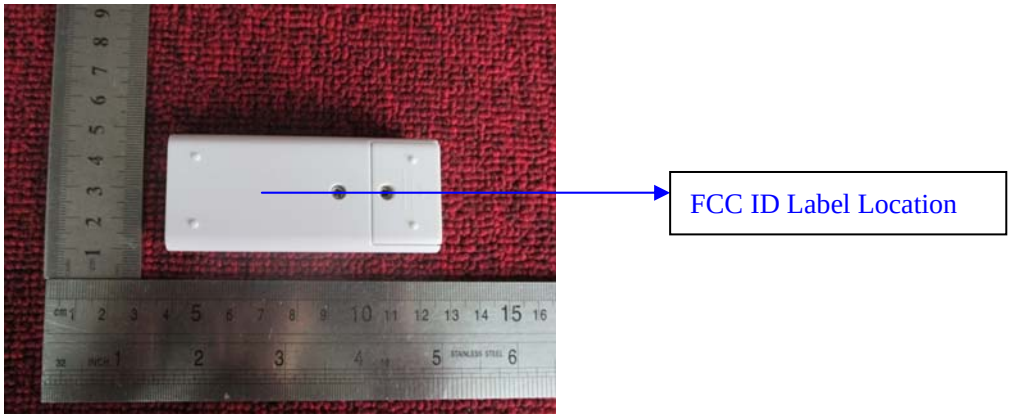
The antenna is an integral one. The antenna gain is 0dBi. So it meets the requirement of 15.203

## 10.0 FCC ID Label

**FCC ID: 2ACN4CT-RM411**

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.

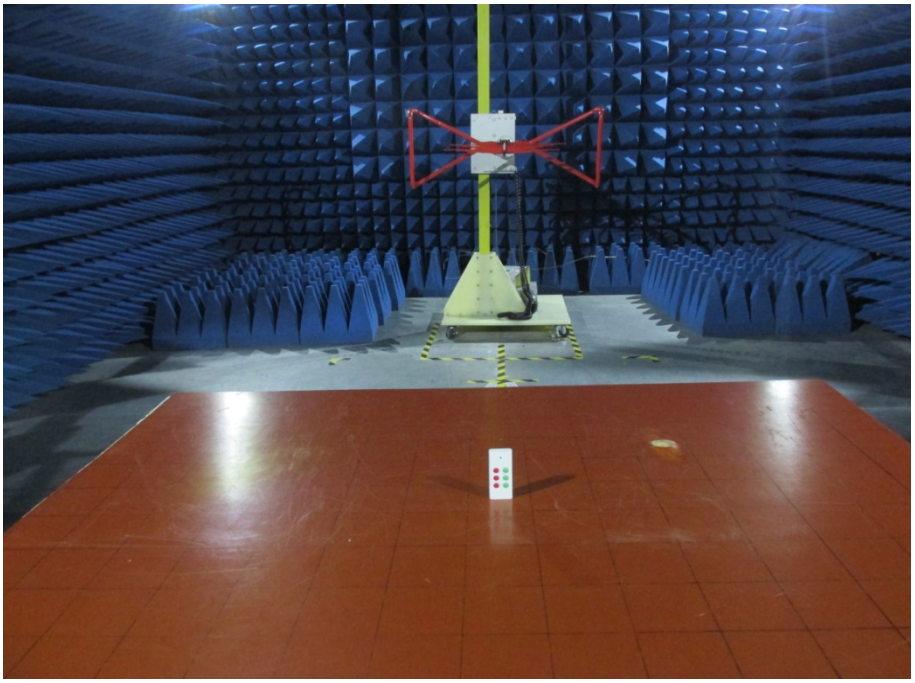
**Mark Location:**



## 11.0. Photo of testing

Conducted test View—N/A

Radiated emission test view



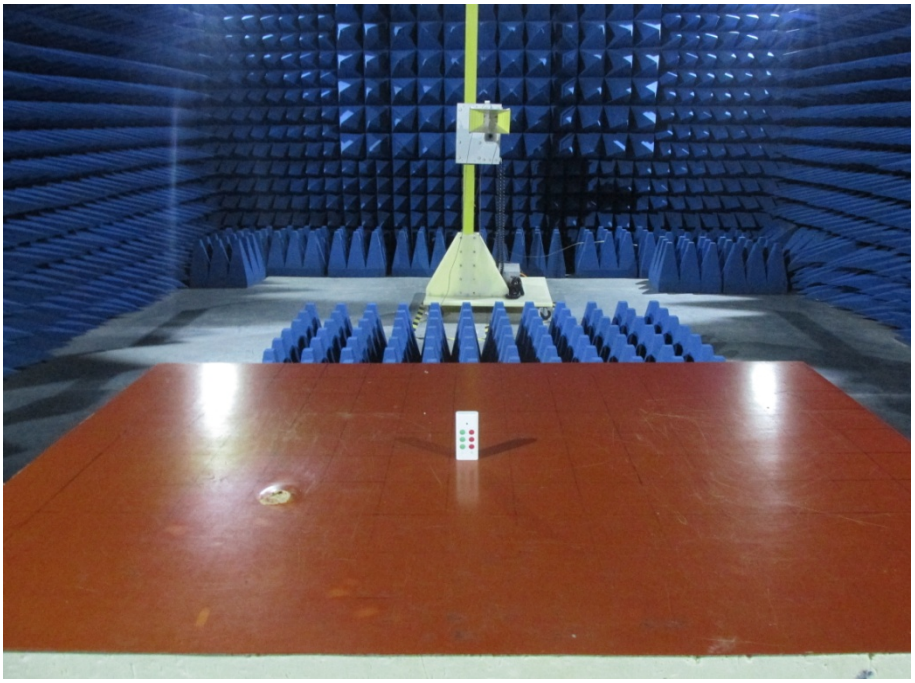
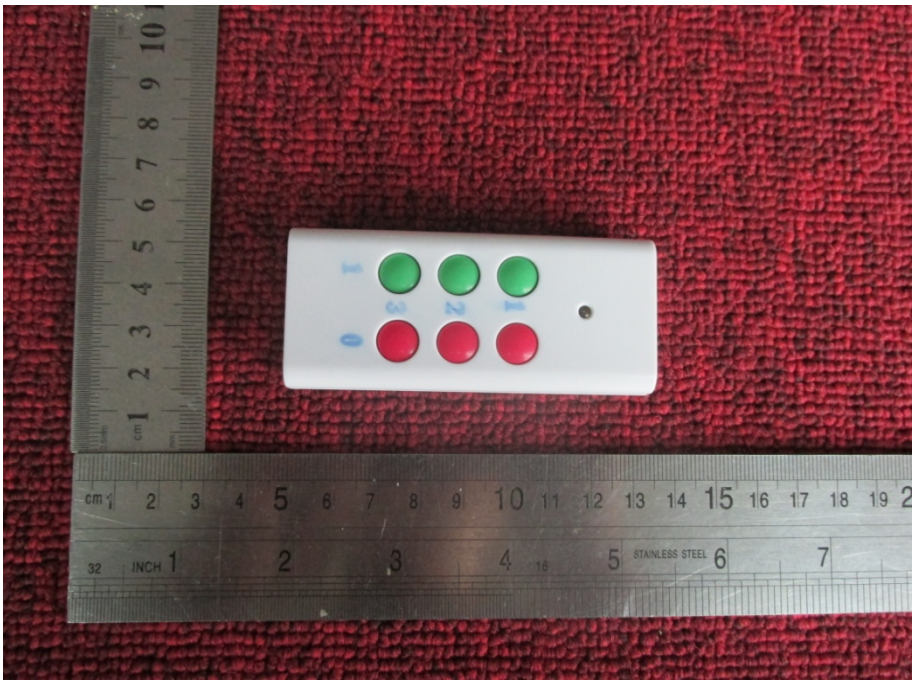
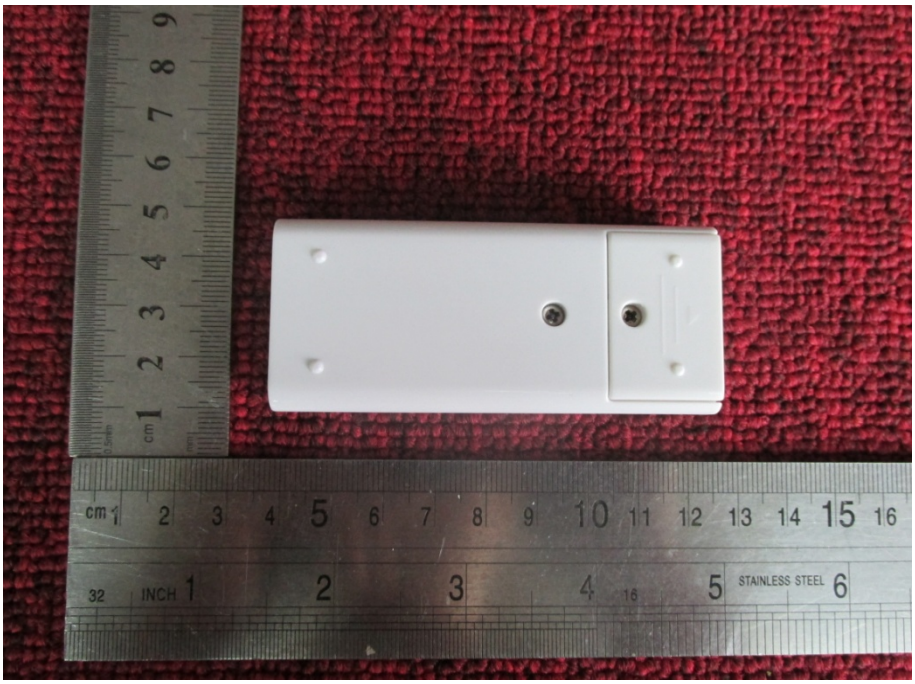


Photo for the EUT

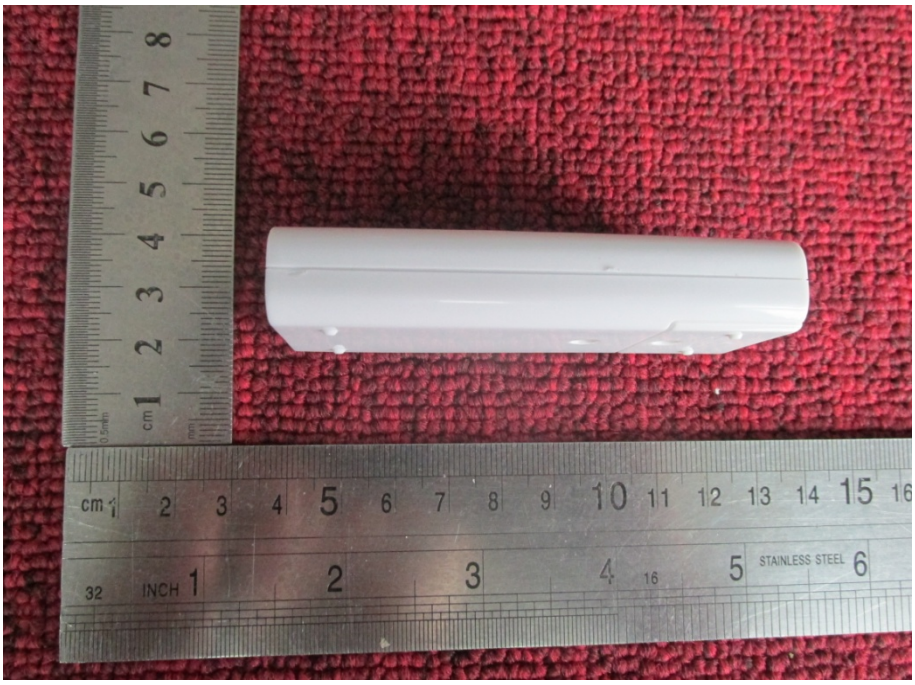
Appearance photograph of EUT



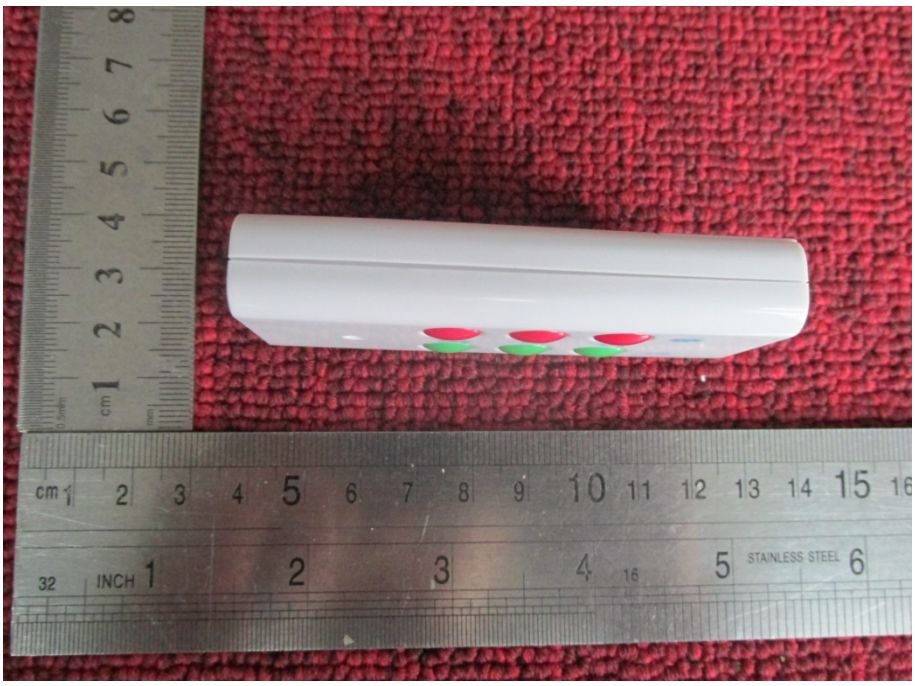
Appearance photograph of EUT



Appearance photograph of EUT



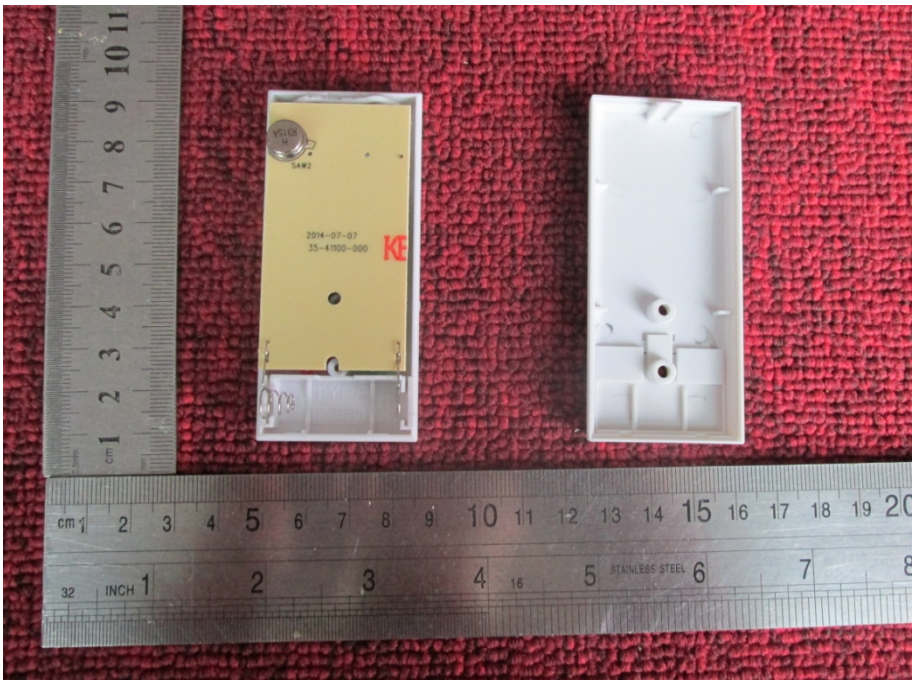

Appearance photograph of EUT



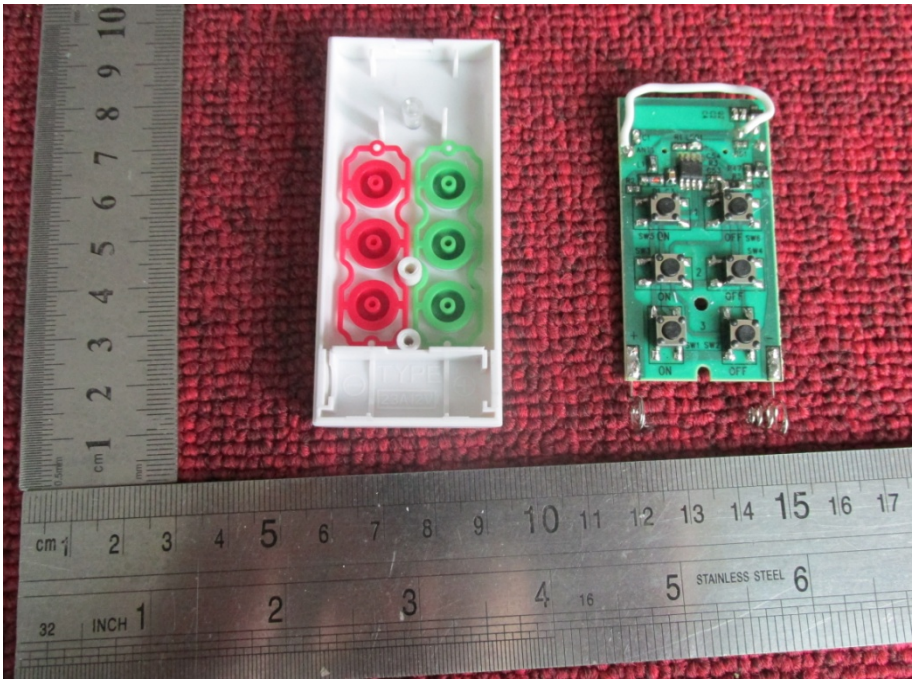
Appearance photograph of EUT

Appearance photograph of EUT

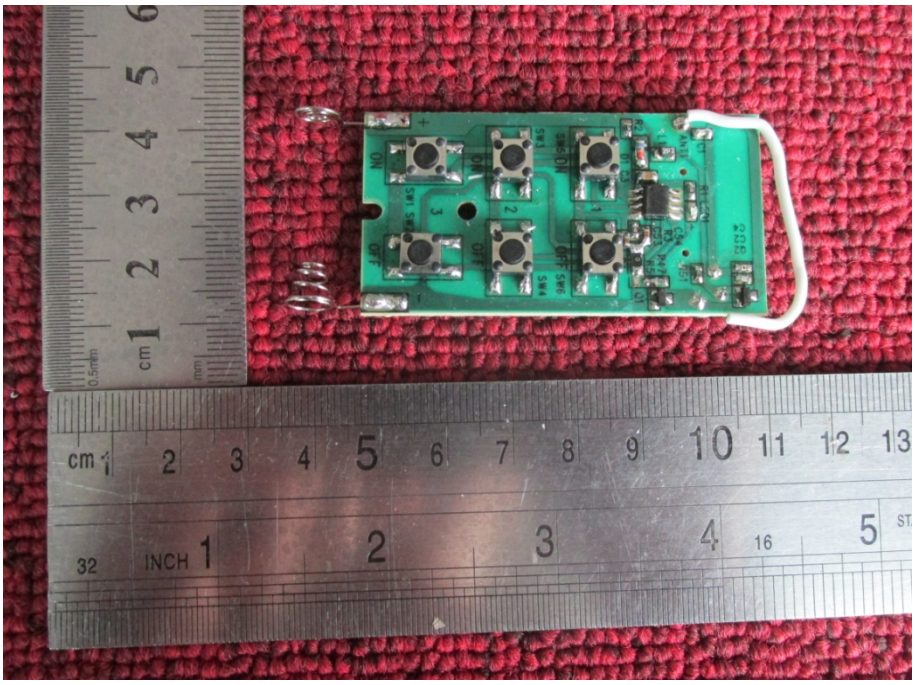
Internal photograph of EUT



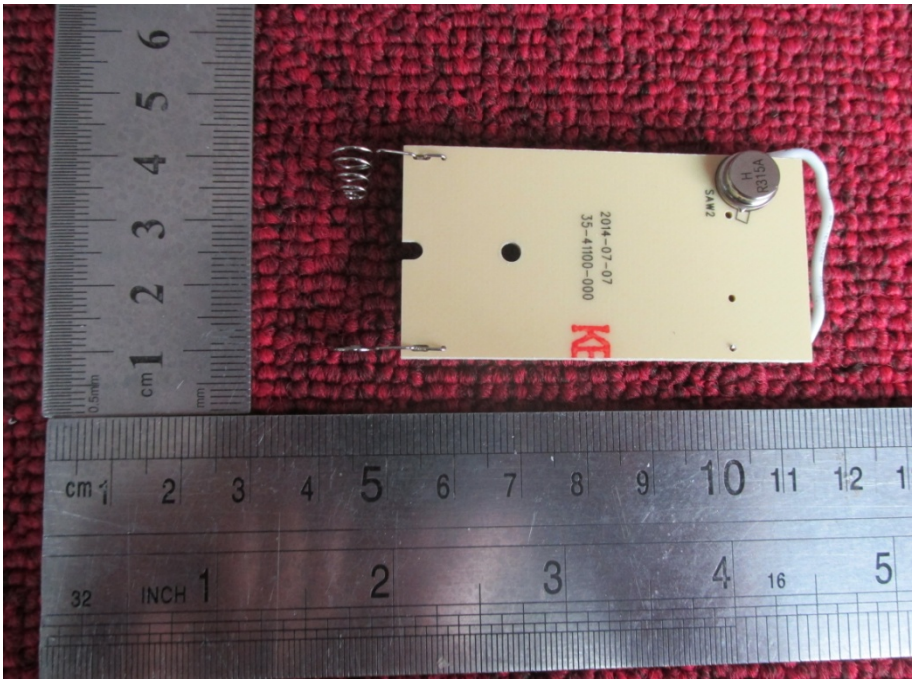
Internal photograph of EUT



Internal photograph of EUT



Internal photograph of EUT



**--End of the report--**