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## FCC PART 15 SUBPART C TEST REPORT

### FCC Part 15.231

Report Reference No.: CTL1407221699-WF

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( position+printed name+signature): Manager Tracy Qi

Tracy Qi

Date of issue: Aug. 06, 2014

Test Firm: Shenzhen CTL Testing Technology Co., Ltd.

Address: Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China.

Applicant's name: FUZHOU SUNNY ELECTRONIC CO.,LTD.

Address: BLDG 52, JUYUANZHOU INDUSTRIAL GARDEN, 618 JINSHAN ROAD, FUZHOU, FUJIAN, CHINA

#### Test specification:

Standard: FCC Part 15.231: Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

TRF Originator: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF: Dated 2011-01

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Test item description : WRLS DIG D.LINE LCD IN/OUT W.S

Trade Mark : SUNNY

Models/Type reference : GP3209

Modulation : ASK

Work Frequency : 433.92MHz

Antenna Type : internal

FCC ID : 2ACW8GP3209

Result : Positive

**TEST REPORT**

|                          |                         |               |
|--------------------------|-------------------------|---------------|
| <b>Test Report No. :</b> | <b>CTL1407221699-WF</b> | Aug. 06, 2014 |
|                          |                         | Date of issue |

Equipment under Test : WRLS DIG D.LINE LCD IN/OUT W.S

Model /Type : GP3209

**Applicant** : **FUZHOU SUNNY ELECTRONIC CO.,LTD.**

Address : BLDG 52, JUYUANZHOU INDUSTRIAL GARDEN, 618  
JINSHAN ROAD, FUZHOU, FUJIAN, CHINA

**Manufacturer** : **FUZHOU SUNNY ELECTRONIC CO.,LTD.**

Address : BLDG 52, JUYUANZHOU INDUSTRIAL GARDEN, 618  
JINSHAN ROAD, FUZHOU, FUJIAN, CHINA

**Test Result** according to the  
standards on page 4:

**Positive**

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

[FCC Rules Part 15.231:](#) Periodic operation in the band 40.66–40.70 MHz and above 70 MHz.

[ANSI C63.4-2009](#)



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample : July 22, 2014

Testing commenced on : July 22, 2014

Testing concluded on : Aug. 06, 2014

### 2.2. Equipment Under Test

#### Power supply system utilised

Power supply voltage : ☐ 120V / 60 Hz ☐ 115V / 60Hz  
☐ 12 V DC ☐ 24 V DC  
☒ Other (specified in blank below)

DC 3V from battery

### 2.3. Short description of the Equipment under Test (EUT)

The EUT is a remote control work at 433.92MHz.  
For more details, refer to the user's manual of the EUT.  
Serial number: Prototype

### 2.4. EUT operation mode

The EUT has been tested under typical operating condition.

### 2.5. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

- ☐ - supplied by the manufacturer
- ☒ - supplied by the lab

### 2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ACW8GP3209 filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

### 2.7. Modifications

No modifications were implemented to meet testing criteria.

### 2.8. Test Result Summary

| Test Item          | Test Requirement | Standard Paragraph | Result |
|--------------------|------------------|--------------------|--------|
| Radiated Emission  | FCC Part 15      | Section 15.231(b)  | Pass   |
| Occupied Bandwidth | FCC Part 15      | Section 15.231(c)  | Pass   |
| Dwell Time         | FCC Part 15      | Section 15.231(e)  | Pass   |

### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.  
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

#### 3.2. Test Facility

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

##### IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

##### FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. 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 970318, December 19, 2013.

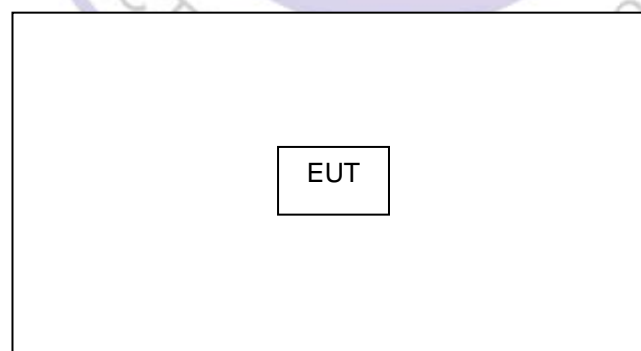
#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

|                       |              |
|-----------------------|--------------|
| Temperature:          | 15-35 ° C    |
| Humidity:             | 30-60 %      |
| Atmospheric pressure: | 950-1050mbar |

#### 3.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|-------------------|------------|---------------------|------------------------|
| /                 | /          | /                   | /                      |



### 3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

| Test                  | Range      | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission     | 30~1000MHz | 4.10dB                  | (1)   |
| Radiated Emission     | 1~26.5GHz  | 4.32dB                  | (1)   |
| Conducted Disturbance | 0.15~30MHz | 3.20dB                  | (1)   |

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .



**3.6. Equipments Used during the Test**

| Test Equipment         | Manufacturer         | Model No.          | Serial No.   | Calibration Date | Calibration Due Date |
|------------------------|----------------------|--------------------|--------------|------------------|----------------------|
| Bilog Antenna          | Sunol Sciences Corp. | JB1                | A061713      | 2014/07/12       | 2015/07/11           |
| EMI Test Receiver      | R&S                  | ESCI3              | 103710       | 2014/07/10       | 2015/07/09           |
| EMI Test Receiver      | R&S                  | ESPI               | 1164.6407.07 | 2014/07/10       | 2015/07/09           |
| Spectrum Analyzer      | Agilent              | E4407B             | MY45108355   | 2014/07/06       | 2015/07/05           |
| Controller             | EM Electronics       | Controller EM 1000 | N/A          | 2014/07/06       | 2015/07/05           |
| Horn Antenna           | Sunol Sciences Corp. | DRH-118            | A062013      | 2014/07/12       | 2015/07/11           |
| Horn Antenna           | SCHWARZBECK          | BBHA9170           | 1562         | 2014/07/12       | 2015/07/11           |
| Active Loop Antenna    | SCHWARZBECK          | FMZB1519           | 1519-037     | 2014/07/12       | 2015/07/11           |
| LISN                   | R&S                  | ENV216             | 101316       | 2014/07/10       | 2015/07/09           |
| LISN                   | SCHWARZBECK          | NSLK8127           | 8127687      | 2014/07/10       | 2015/07/09           |
| Microwave Preamplifier | HP                   | 8349B              | 3155A00882   | 2014/07/10       | 2015/07/09           |
| Amplifier              | HP                   | 8447D              | 3113A07663   | 2014/07/10       | 2015/07/09           |
| Transient Limiter      | Com-Power            | LIT-153            | 532226       | 2014/07/10       | 2015/07/09           |





## **4. TEST CONDITIONS AND RESULTS**

### **4.1. Conducted Emissions Test**

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4.
- 2 Support equipment, if needed, was placed as per ANSI C63.4.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4 If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

**The RBW/VBW for 150KHz to 30MHz: 9KHz**

**CONDUCTED POWER LINE EMISSION LIMIT**

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following :

| Frequency<br>(MHz) | Maximum RF Line Voltage (dBµV) |      |         |        |
|--------------------|--------------------------------|------|---------|--------|
|                    | CLASS A                        |      | CLASS B |        |
|                    | Q.P.                           | Ave. | Q.P.    | Ave.   |
| 0.15 - 0.50        | 79                             | 66   | 66-56*  | 56-46* |
| 0.50 - 5.00        | 73                             | 60   | 56      | 46     |
| 5.00 - 30.0        | 73                             | 60   | 60      | 50     |

\* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

**TEST RESULTS**

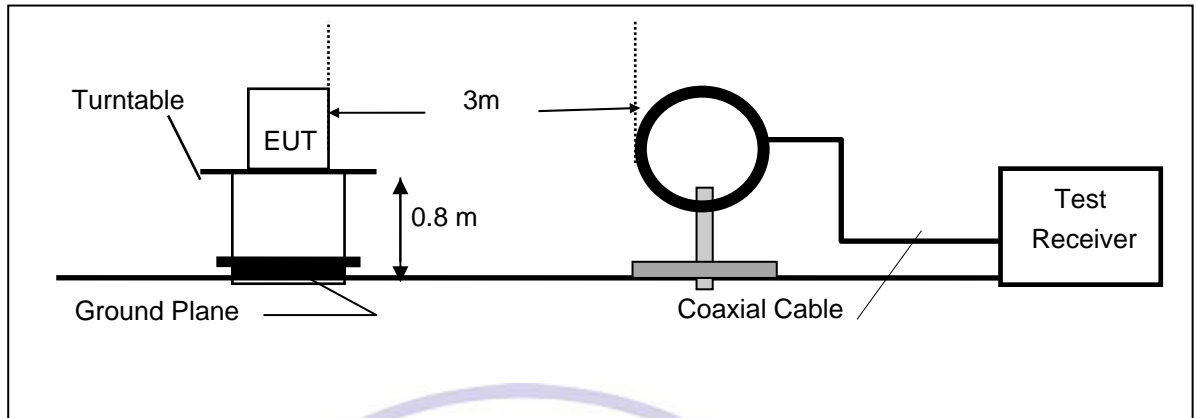
Not applicable to this device.



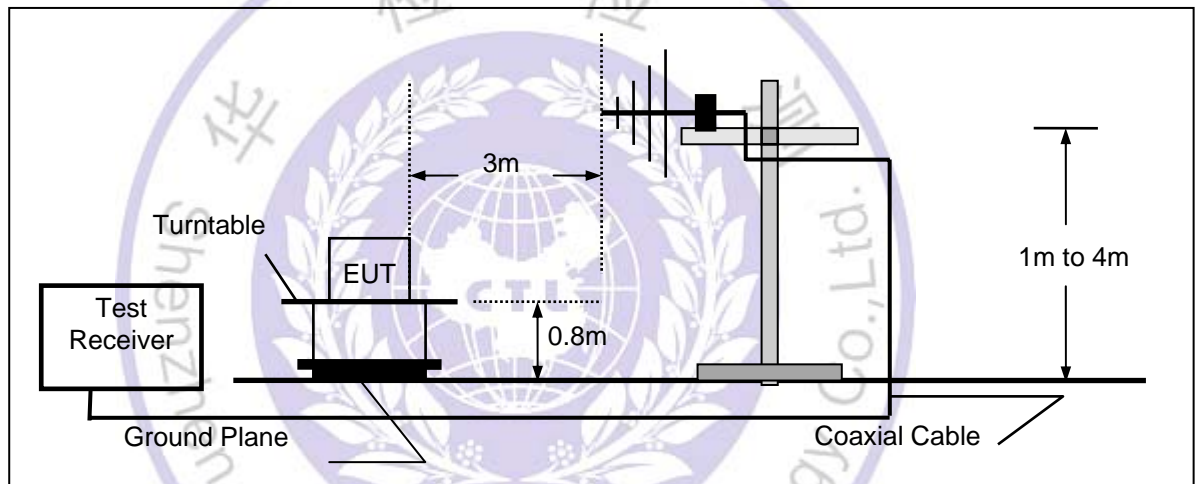
## 4.2. Radiated Emission Test

### TEST CONFIGURATION

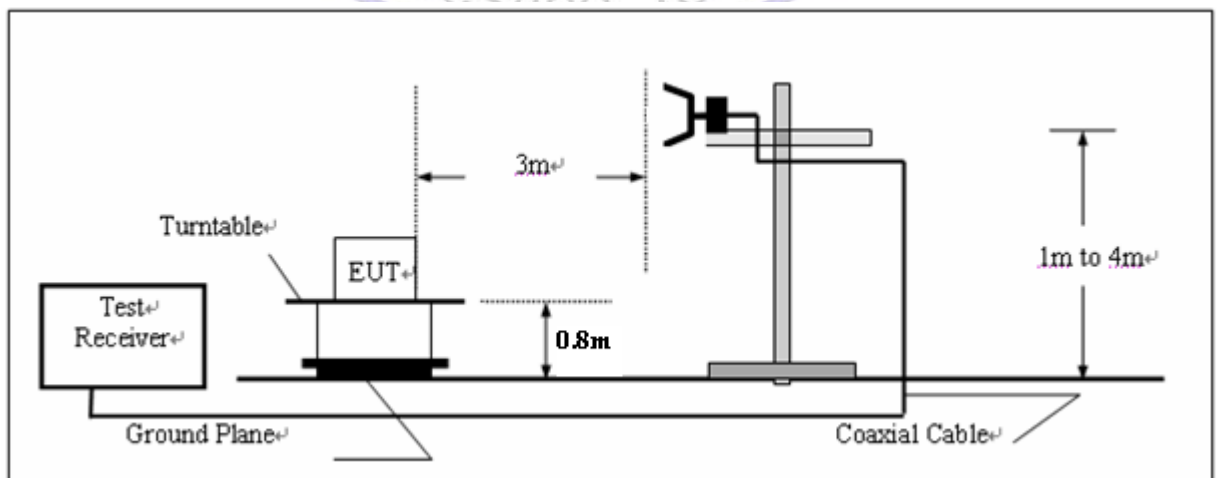
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



**FIELD STRENGTH CALCULATION**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

|                           |                                            |
|---------------------------|--------------------------------------------|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude    | AG = Amplifier Gain                        |
| AF = Antenna Factor       |                                            |

**RADIATION LIMIT**

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency<br>(MHz) | Distance<br>(Meters) | Radiated<br>(dBμV/m) | Radiated<br>(μV/m) |
|--------------------|----------------------|----------------------|--------------------|
| 30-88              | 3                    | 40.0                 | 100                |
| 88-216             | 3                    | 43.5                 | 150                |
| 216-960            | 3                    | 46.0                 | 200                |
| Above 960          | 3                    | 54.0                 | 500                |

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

**TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. Based on the Frequency Generator in the device include 32.768KHz, 433.92MHz. The test frequency range from 9KHz to 5GHz per FCC PART 15.33(a).

**Note:**

Three axes are chosen for pretest, the Y axis is the worst mode for final test.

For battery operated equipment, the equipment tests shall be performed using a new battery.

**TEST RESULTS**

| Freq.<br>(MHz) | Ant.Pol.<br>H/V | DetectorMode<br>(PK/AV) | Reading<br>(dBUV) | Ant./CL/<br>Amp. CF(dB) | Actual FS<br>(dBUV/m) | Limit3m<br>(dBUV/m) | Safe Margin<br>(dB) | Note |
|----------------|-----------------|-------------------------|-------------------|-------------------------|-----------------------|---------------------|---------------------|------|
| 433.92         | V               | Peak                    | 57.76             | 13.80                   | 71.56                 | 72.87               | -1.31               | F    |
| 433.92         | H               | Peak                    | 54.81             | 13.80                   | 68.61                 | 72.87               | -4.26               | F    |
| 867.84         | V               | Peak                    | 28.56             | 22.90                   | 51.46                 | 52.87               | -1.41               | H    |
| 867.84         | H               | Peak                    | 27.27             | 22.90                   | 50.17                 | 52.87               | -2.70               | H    |
| 1301.76        | V               | Peak                    | 24.56             | 25.40                   | 49.96                 | 52.87               | -2.91               | H    |
| 1301.76        | H               | Peak                    | 20.74             | 25.40                   | 46.14                 | 52.87               | -6.73               | H    |
| 1735.68        | V               |                         | ---               |                         |                       |                     |                     | H    |
| 1735.68        | H               |                         | ---               |                         |                       |                     |                     | H    |
| 138.70         | H               | Peak                    | 21.77             | 15.60                   | 37.37                 | 43.50               | -6.13               |      |
| 138.70         | V               | Peak                    | 19.85             | 15.60                   | 35.45                 | 43.50               | -8.05               |      |
| Others         |                 |                         | ---               |                         |                       |                     |                     |      |

## Remark:

- (1) Measuring frequencies from 9 KHz to the 5 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) Datas of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

### 4.3. Occupied Bandwidth

#### Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Based on FCC Part15 C Section 15.231: RBW= 100KHz, VBW= 300KHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

#### Test SET-UP (Block Diagram of Configuration)

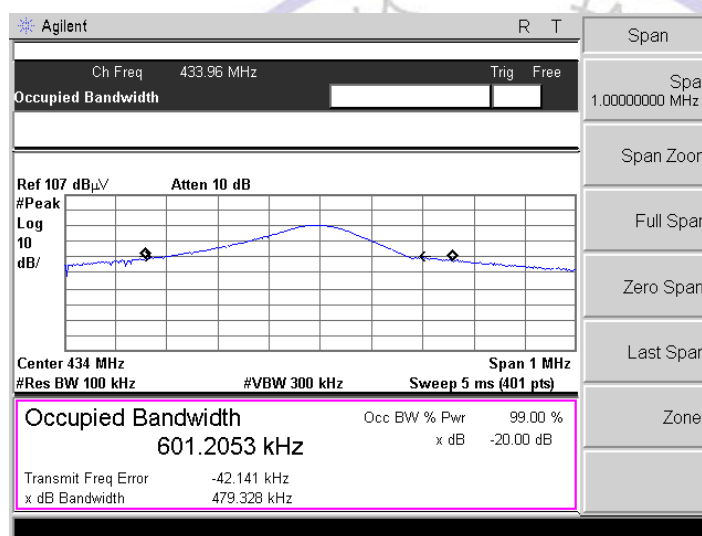
Same as Radiated Emission Measurement.

#### Measurement Equipment Used:

Same as Radiated Emission Measurement.

#### Measurement Results:

The graph as below, represents the emissions take for this device.



Note: Limit= Fundamental frequency $\times$ 0.25%=433.92 MHz $\times$ 0.25%=1.0848MHz



## 4.4. Release Time Measurement

### Measurement Procedure

Release Time Measurement According To FCC Part 15 Section 15.231(e).

The devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

1. Set SPA Center Frequency = Fundamental frequency, RBW = 100 kHz, VBW = 300 kHz, Span = 0 Hz. Sweep time = 20 seconds.
2. Set EUT as normal operation and press Transmitter button.
3. Set SPA View. Delta Mark time.

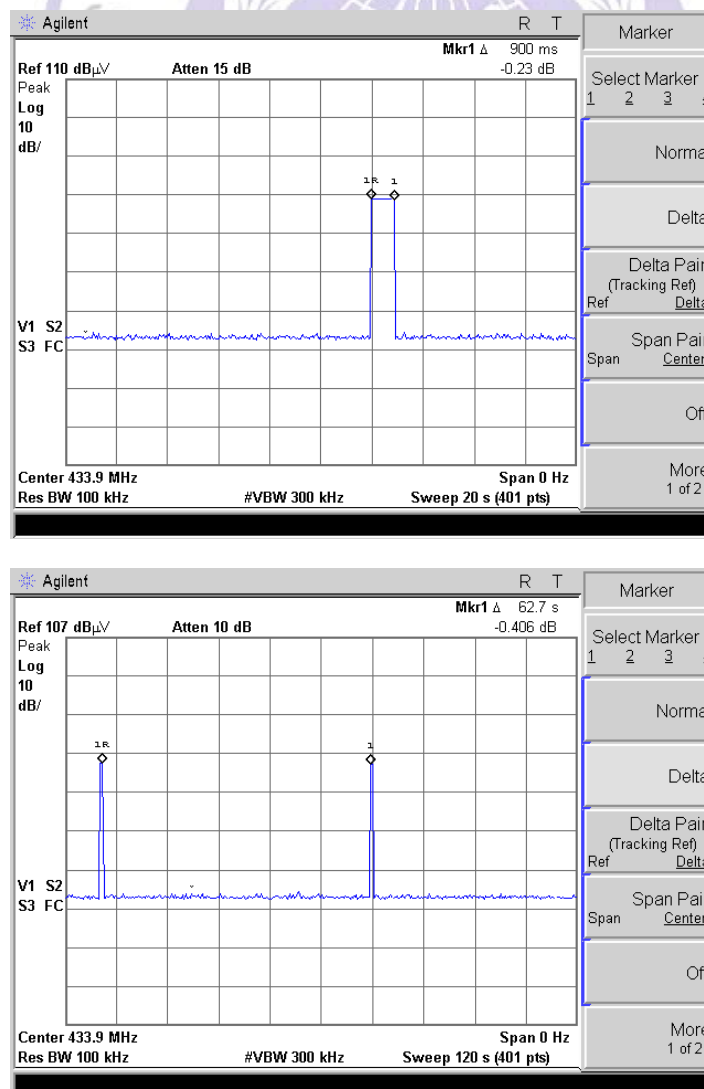
### Test SET-UP (Block Diagram of Configuration)

Same as 5.2 Radiated Emission Measurement.

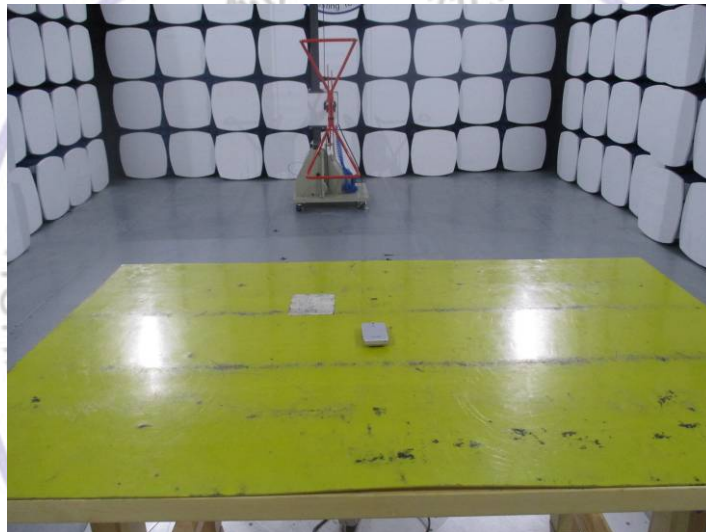
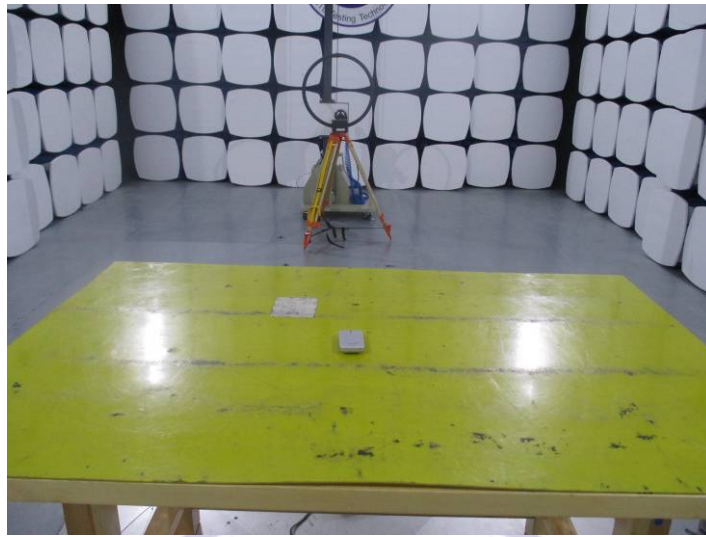
### Measurement Equipment Used:

Same as 5.2 Radiated Emission Measurement.

### Measurement Results:



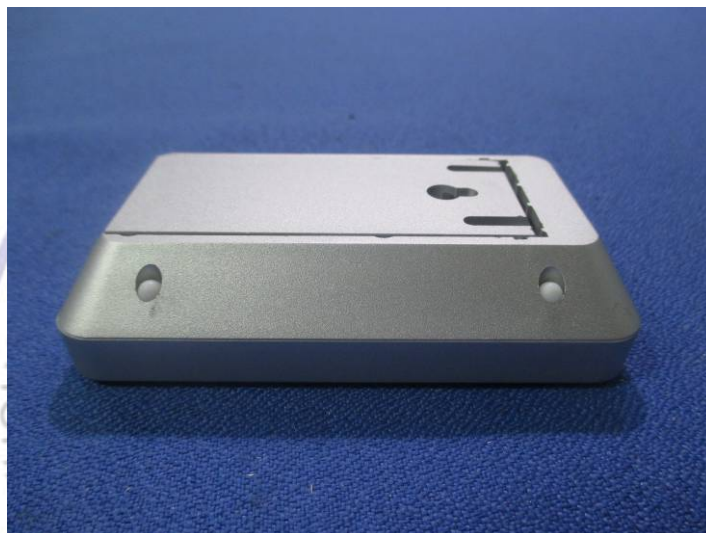
## 5. Test Setup Photos of the EUT



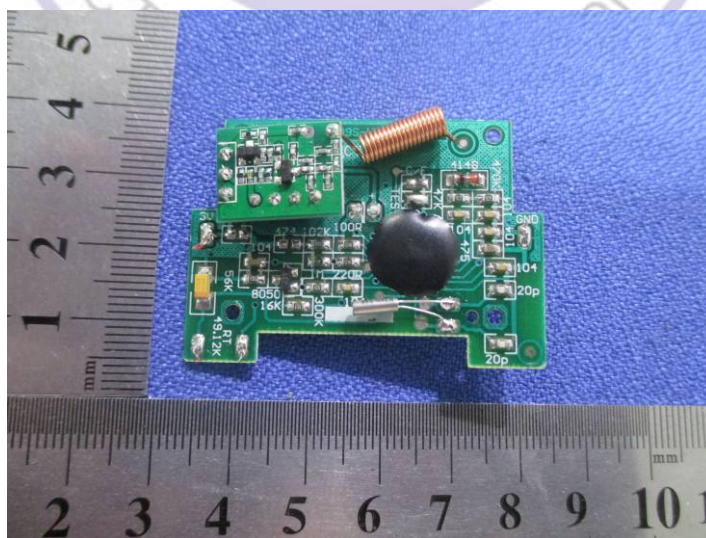
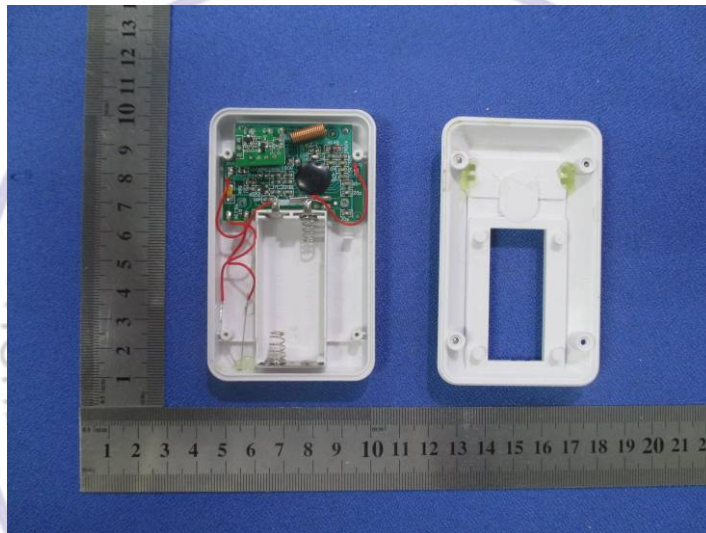
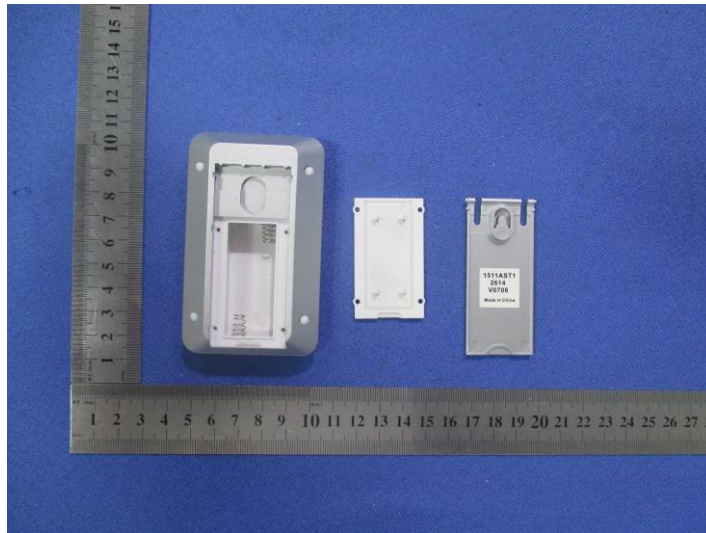
## 6. External and Internal Photos of the EUT

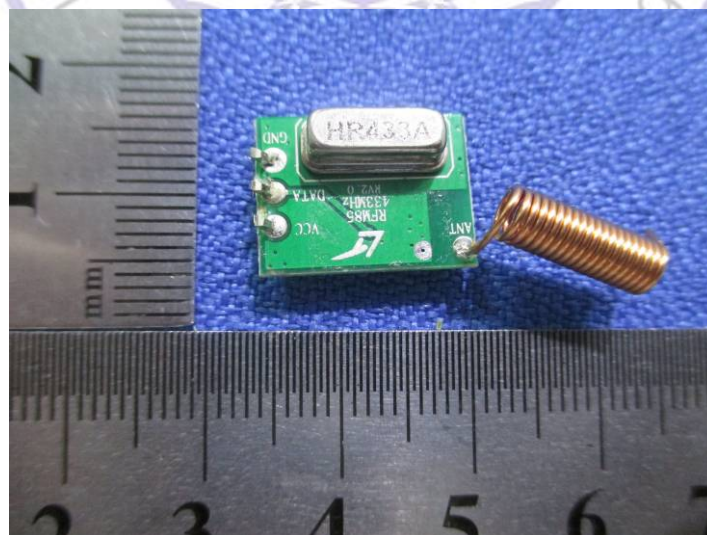
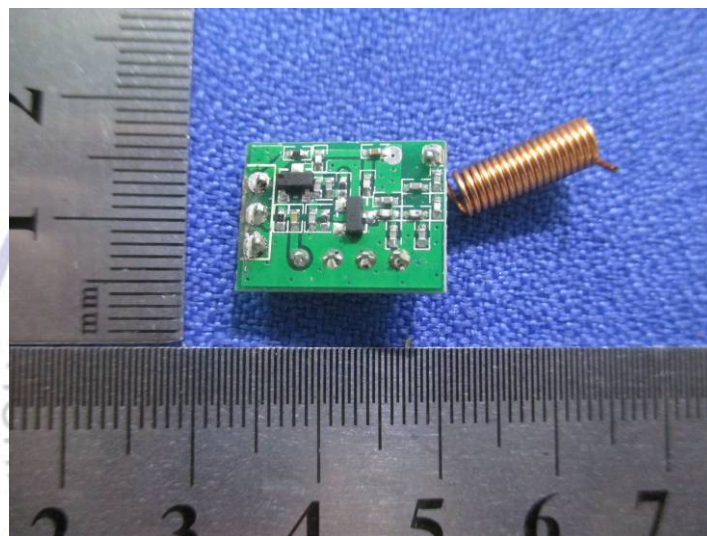
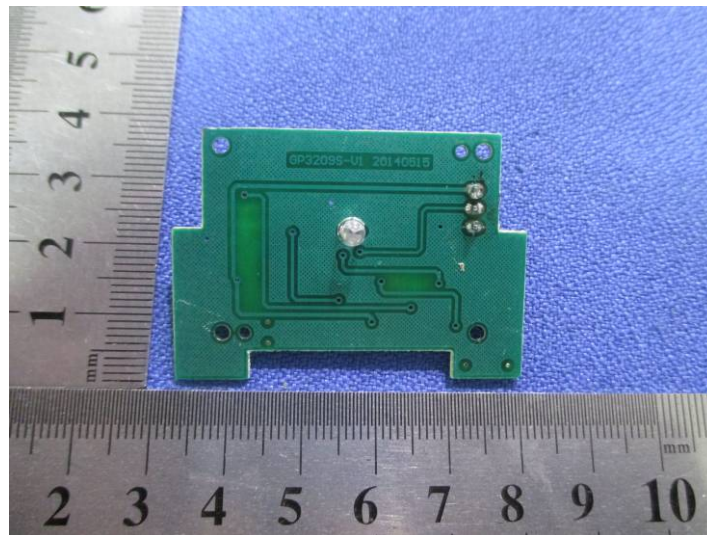
### External Photos of EUT



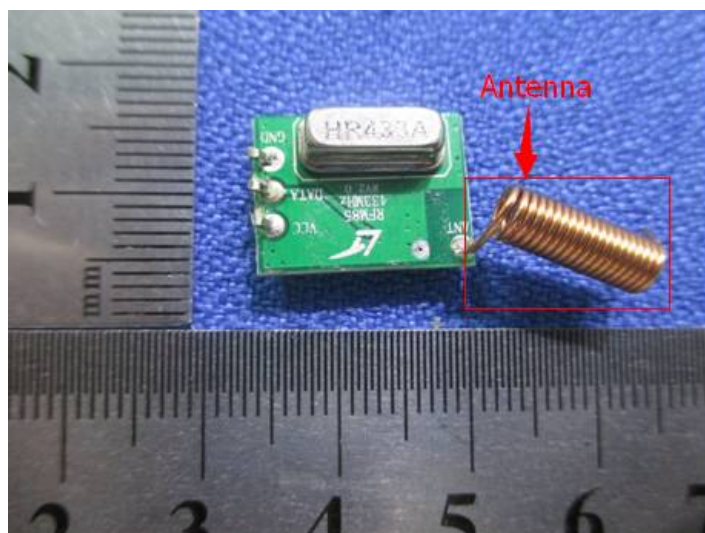




Internal Photos of EUT







.....End of Report.....

