

# FCC TEST REPORT

**Product** : WIRELESS DOOR CHIME PUSH BUTTON  
**Trade mark** : N/A  
**Model/Type reference** : 2324TX, 2325TX, 2326TX, 2327TX  
**Serial Number** : N/A  
**Report Number** : EED32I001928R1  
**FCC ID** : 2AEOF-WLDB2327TX  
**Date of Issue** : Aug. 30, 2016  
**Test Standards** : 47 CFR Part 15 Subpart C (2015)  
**Test result** : PASS

Prepared for:

**DONGGUAN SMART HERO ELECTRONIC PRODUCTS CO LTD**  
**118 LI XIANG ROAD WEST, SHUI PING VILLAGE, DALANG,**  
**DONGGUAN, GUANGDONG, CHINA.**

Prepared by:

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Date:

Aug. 30, 2016

Check No.: 2447637977

## 2 Version

| Version No. | Date          | Description          |
|-------------|---------------|----------------------|
| 00          | Aug. 12, 2016 | Original             |
| 01          | Aug. 30, 2016 | Revise product Model |
|             |               |                      |

### 3 Test Summary

| Test Item                                | Test Requirement                                   | Test method      | Result |
|------------------------------------------|----------------------------------------------------|------------------|--------|
| Antenna Requirement                      | 47 CFR Part 15 Subpart C Section 15.203            | ANSI C63.10-2013 | PASS   |
| AC Power Line Conducted Emission         | 47 CFR Part 15 Subpart C Section 15.207            | ANSI C63.10-2013 | N/A    |
| Field Strength of the Fundamental Signal | 47 CFR Part 15 Subpart C Section 15.231 (b)        | ANSI C63.10-2013 | PASS   |
| Spurious Emissions                       | 47 CFR Part 15 Subpart C Section 15.231 (b)/15.209 | ANSI C63.10-2013 | PASS   |
| 20dB Bandwidth                           | 47 CFR Part 15 Subpart C Section 15.231 (c)        | ANSI C63.10-2013 | PASS   |
| Deactivated Time                         | 47 CFR Part 15 Subpart C Section 15.231 (a)        | ANSI C63.10-2013 | PASS   |

Remark:

The tested samples and the sample information are provided by the client.

N/A: Not applicable for test device.

Model No.: 2324TX, 2325TX, 2326TX, 2327TX

Only the model 2324TX, 2326TX was tested, since the PCBA were identical for the above models, with difference being color of appearance, and 2326TX, 2327TX have Metal enclosure.

This test report (Ref. No.: EED32I001928R1) is only valid with the original test report (Ref. No.: EED32I001928).

Review this report and original report, this report just different product Model.

So all the test please refer to original report EED32I001928.

This testing report displaces the original report of No. EED32I001928, and the original one No. EED32I001928 was invalid since the date of this testing report released.

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## 5 General Information

### 5.1 Client Information

|                          |                                                                                |
|--------------------------|--------------------------------------------------------------------------------|
| Applicant:               | DONGGUAN SMART HERO ELECTRONIC PRODUCTS CO LTD                                 |
| Address of Applicant:    | 118 LI XIANG ROAD WEST, SHUI PING VILLAGE, DALANG, DONGGUAN, GUANGDONG, CHINA. |
| Manufacturer:            | UNIVERSAL CONSUMER PRODUCTS                                                    |
| Address of Manufacturer: | 2801 EAST BELTLINE NE, GRAND RAPIDS, MI 49525, USA                             |
| Factory:                 | DONGGUAN SMART HERO ELECTRONIC PRODUCTS CO LTD                                 |
| Address of Factory:      | 118 LI XIANG ROAD WEST, SHUI PING VILLAGE, DALANG, DONGGUAN, GUANGDONG, CHINA. |

### 5.2 General Description of EUT

|                       |                                                                                           |
|-----------------------|-------------------------------------------------------------------------------------------|
| Product Name:         | WIRELESS DOOR CHIME PUSH BUTTON                                                           |
| Mode No.:             | 2324TX, 2325TX, 2326TX, 2327TX                                                            |
| Test Mode No.:        | 2324TX, 2326TX                                                                            |
| Trade Mark:           | N/A                                                                                       |
| EUT Primary Function: | The DOORBELL transmit a 315MHz ASK modulated signal to control the corresponding receiver |
| Power Supply:         | 3.0V DC (3.0V "CR2032" button battery)                                                    |

### 5.3 Product Specification subjective to this standard

|                       |                                |
|-----------------------|--------------------------------|
| Frequency Range:      | 315MHz                         |
| Modulation Type:      | ASK                            |
| Sample Type:          | Portable production            |
| Antenna Type:         | Integral                       |
| Test voltage:         | DC 3.0V                        |
| Sample Received Date: | Jul. 05, 2016                  |
| Sample tested Date:   | Jul. 05, 2016 to Aug. 12, 2016 |

### 5.4 Test Environment and Mode

|                               |                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------|
| <b>Operating Environment:</b> |                                                                                            |
| Temperature:                  | 24°C                                                                                       |
| Humidity:                     | 52% RH                                                                                     |
| Atmospheric Pressure:         | 1010mbar                                                                                   |
| <b>Test mode:</b>             |                                                                                            |
| TX mode:                      | Keep the EUT transmitted the continuous modulation test signal at the specific channel(s). |

### 5.5 Description of Support Units

The EUT has been tested independently.

## 5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

## 5.7 Test Facility

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

### **CNAS-Lab Code: L1910**

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### **A2LA-Lab Cert. No. 3061.01**

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### **FCC-Registration No.: 886427**

Centre Testing International Group 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 886427.

### **IC-Registration No.: 7408A-2**

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A-2 .

### **IC-Registration No.: 7408B-1**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B-1.

### **NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

### **VCCI**

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

## 5.8 Deviation from Standards

None.

## 5.9 Abnormalities from Standard Conditions

None.

## 5.10 Other Information Requested by the Customer

None.

## 5.11 Measurement Uncertainty (95% confidence levels, k=2)

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | $7.9 \times 10^{-8}$    |
| 2   | RF power, conducted             | 0.31dB (30MHz-1GHz)     |
|     |                                 | 0.57dB (1GHz-18GHz)     |
| 3   | Radiated Spurious emission test | 4.5dB (30MHz-1GHz)      |
|     |                                 | 4.8dB (1GHz-12.75GHz)   |
| 4   | Conduction emission             | 3.6dB (9kHz to 150kHz)  |
|     |                                 | 3.2dB (150kHz to 30MHz) |
| 5   | Temperature test                | 0.64°C                  |
| 6   | Humidity test                   | 2.8%                    |
| 7   | DC power voltages               | 0.025%                  |

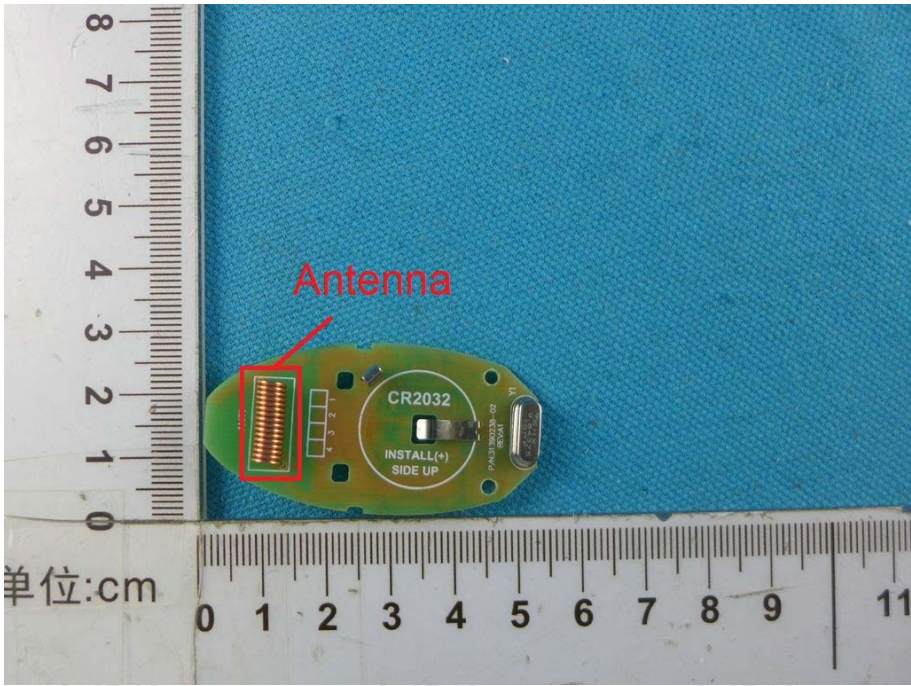
## 6 Equipment List

| 3M Semi/full-anechoic Chamber    |               |                              |               |                        |                            |
|----------------------------------|---------------|------------------------------|---------------|------------------------|----------------------------|
| Equipment                        | Manufacturer  | Mode No.                     | Serial Number | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| 3M Chamber & Accessory Equipment | TDK           | SAC-3                        | ---           | 06-05-2016             | 06-05-2019                 |
| TRILOG Broadband Antenna         | SCHWARZBECK   | VULB9163                     | 9163-484      | 05-23-2016             | 05-22-2017                 |
| Microwave Preamplifier           | Agilent       | 8449B                        | 3008A02425    | 02-04-2016             | 02-03-2017                 |
| Horn Antenna                     | ETS-LINDGREN  | 3117                         | 00057407      | 07-20-2015             | 07-18-2018                 |
| Loop Antenna                     | ETS           | 6502                         | 00071730      | 07-30-2015             | 07-28-2017                 |
| Spectrum Analyzer                | R&S           | FSP40                        | 100416        | 06-16-2016             | 06-15-2017                 |
| Receiver                         | R&S           | ESCI                         | 100435        | 06-16-2016             | 06-15-2017                 |
| Multi device Controller          | maturo        | NCD/070/10711<br>112         | ---           | 01-12-2016             | 01-11-2017                 |
| LISN                             | schwarzbeck   | NNBM8125                     | 81251547      | 06-16-2016             | 06-15-2017                 |
| LISN                             | schwarzbeck   | NNBM8125                     | 81251548      | 06-16-2016             | 06-15-2017                 |
| Signal Generator                 | Agilent       | E4438C                       | MY45095744    | 04-01-2016             | 03-31-2017                 |
| Signal Generator                 | Keysight      | E8257D                       | MY53401106    | 04-01-2016             | 03-31-2017                 |
| Temperature/ Humidity Indicator  | TAYLOR        | 1451                         | 1905          | 04-27-2016             | 04-26-2017                 |
| Communication test set           | Agilent       | E5515C                       | GB47050534    | 04-01-2016             | 03-31-2017                 |
| Cable line                       | Fulai(7M)     | SF106                        | 5219/6A       | 01-12-2016             | 01-11-2017                 |
| Cable line                       | Fulai(6M)     | SF106                        | 5220/6A       | 01-12-2016             | 01-11-2017                 |
| Cable line                       | Fulai(3M)     | SF106                        | 5216/6A       | 01-12-2016             | 01-11-2017                 |
| Cable line                       | Fulai(3M)     | SF106                        | 5217/6A       | 01-12-2016             | 01-11-2017                 |
| Communication test set           | R&S           | CMW500                       | 152394        | 04-01-2016             | 03-31-2017                 |
| High-pass filter                 | Sinoscite     | FL3CX03WG18<br>NM12-0398-002 | ---           | 01-12-2016             | 01-11-2017                 |
| High-pass filter                 | MICRO-TRONICS | SPA-F-63029-4                | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter            | Sinoscite     | FL5CX01CA09C<br>L12-0395-001 | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter            | Sinoscite     | FL5CX01CA08C<br>L12-0393-001 | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter            | Sinoscite     | FL5CX02CA04C<br>L12-0396-002 | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter            | Sinoscite     | FL5CX02CA03C<br>L12-0394-001 | ---           | 01-12-2016             | 01-11-2017                 |

| RF Conducted test     |               |                              |               |                        |                            |
|-----------------------|---------------|------------------------------|---------------|------------------------|----------------------------|
| Equipment             | Manufacturer  | Mode No.                     | Serial Number | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| Spectrum Analyzer     | R&S           | FSP40                        | 100416        | 06-16-2016             | 06-15-2017                 |
| Receiver              | R&S           | ESCI                         | 100435        | 06-16-2016             | 06-15-2017                 |
| Signal Generator      | Agilent       | E4438C                       | MY45095744    | 04-01-2016             | 03-31-2017                 |
| Signal Generator      | Keysight      | E8257D                       | MY53401106    | 04-01-2016             | 03-31-2017                 |
| High-pass filter      | Sinoscite     | FL3CX03WG18<br>NM12-0398-002 | ---           | 01-12-2016             | 01-11-2017                 |
| High-pass filter      | MICRO-TRONICS | SPA-F-63029-4                | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter | Sinoscite     | FL5CX01CA09C<br>L12-0395-001 | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter | Sinoscite     | FL5CX01CA08C<br>L12-0393-001 | ---           | 01-12-2016             | 01-11-2017                 |
| band rejection filter | Sinoscite     | FL5CX02CA04C<br>L12-0396-002 | ---           | 01-12-2016             | 01-11-2017                 |

## 7 Test results and Measurement Data

### 7.1 Antenna Requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 47 CFR Part 15C Section 15.203 |
| <p>15.203 requirement:</p> <p>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, 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.</p> |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                   |                                |
| <p>Result: PCB antenna is used. It is permanently attached antenna and not be replaced by user.</p>                                                                                                                                                                                                                                                                                                                                                                                  |                                |

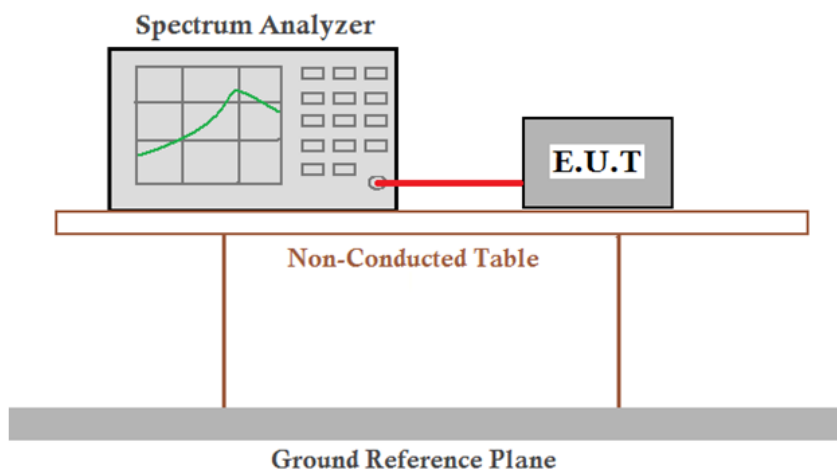
## 7.2 Radiated Transmitter Emissions

### 7.2.1 Duty Cycle

**Test Requirement:** 47 CFR Part 15C Section 15.35 (c)

**Test Method:** ANSI C63.10

**Test Setup:**

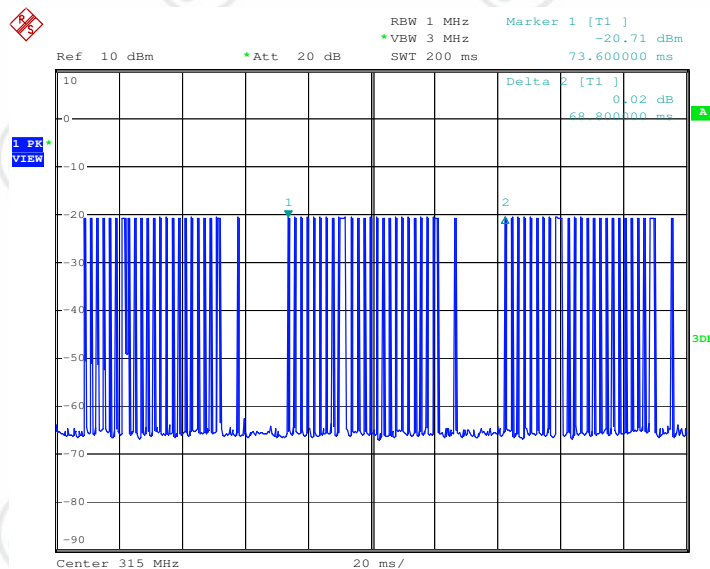


**Limit:** N/A

**Test Mode:** TX mode

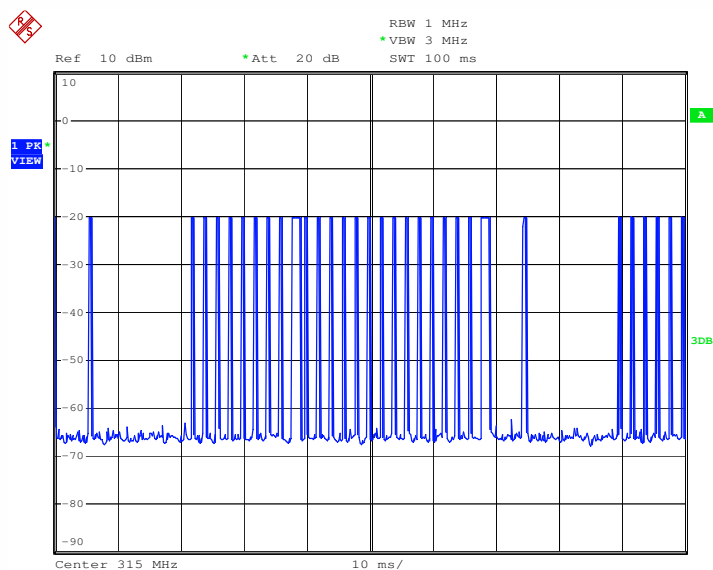
**Instruments Used:** Refer to section 6 for details

**Test plot as follows:**

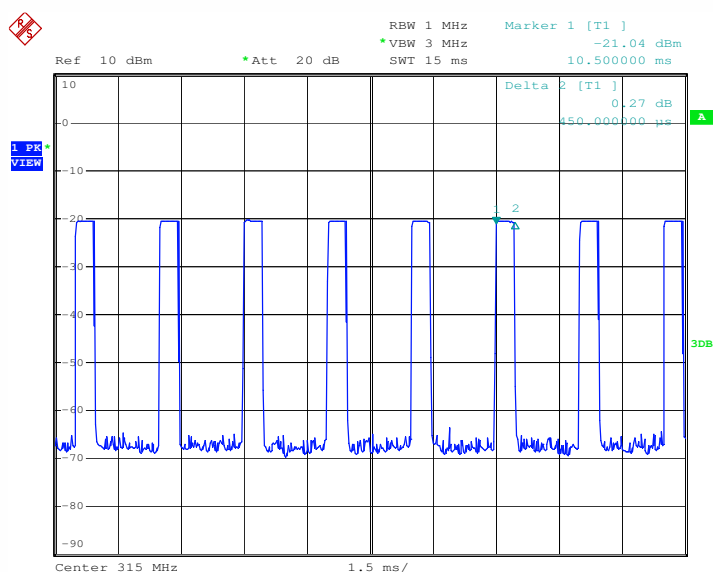


Date: 10.AUG.2016 17:37:21

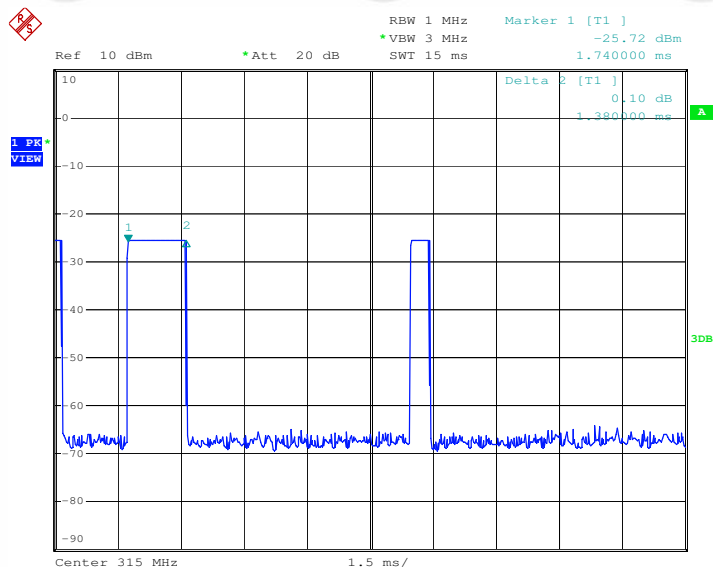
**Time slot:**



Date: 10.AUG.2016 17:36:24



Date: 10.AUG.2016 17:33:57



Date: 10.AUG.2016 17:38:15

| Average factor:            |                                                           |
|----------------------------|-----------------------------------------------------------|
| Calculate Formula:         | Average value=Peak value + PDCF(in 100ms time frame)      |
|                            | PDCF=20 log(Duty cycle in 68.80ms time frame)             |
|                            | Duty cycle(in 100ms time frame)= T on time / 68.80ms      |
| Calculated average factor: | Ton time (the worst case) = (23*0.45+2*1.38)ms=13.11ms    |
|                            | PDCF(in 68.80ms time frame) = 20 log(13.11/68.80)=-14.3dB |

## 7.2.2 Radiated Emissions

**Test Requirement:** 47 CFR Part 15C Section 15.231(b) and 15.209

**Test Method:** ANSI C63.10

**Test Site:** Measurement Distance: 3m (Semi-Anechoic Chamber)

**Receiver Setup:**

| Frequency         | Detector   | RBW    | VBW    | Remark     |
|-------------------|------------|--------|--------|------------|
| 0.009MHz-0.090MHz | Peak       | 10kHz  | 30kHz  | Peak       |
| 0.009MHz-0.090MHz | Average    | 10kHz  | 30kHz  | Average    |
| 0.090MHz-0.110MHz | Quasi-peak | 10kHz  | 30kHz  | Quasi-peak |
| 0.110MHz-0.490MHz | Peak       | 10kHz  | 30kHz  | Peak       |
| 0.110MHz-0.490MHz | Average    | 10kHz  | 30kHz  | Average    |
| 0.490MHz -30MHz   | Quasi-peak | 10kHz  | 30kHz  | Quasi-peak |
| 30MHz-1GHz        | Quasi-peak | 120kHz | 300kHz | Quasi-peak |
| Above 1GHz        | Peak       | 1MHz   | 3MHz   | Peak       |
|                   | Peak       | 1MHz   | 10Hz   | Average    |

### Test Setup:

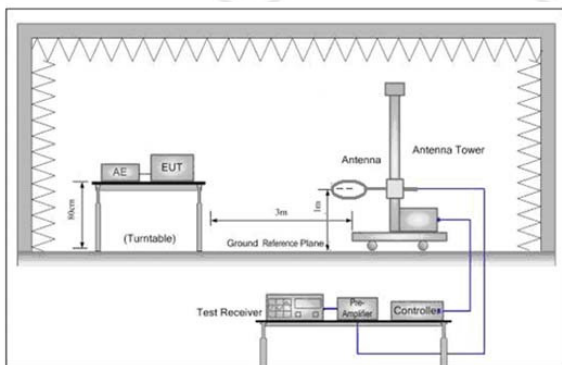


Figure 1. Below 30MHz

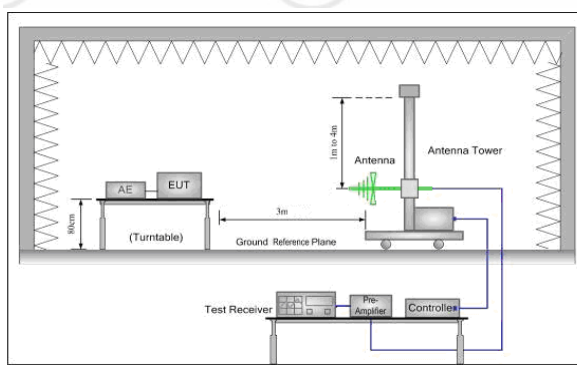


Figure 2. 30MHz to 1GHz

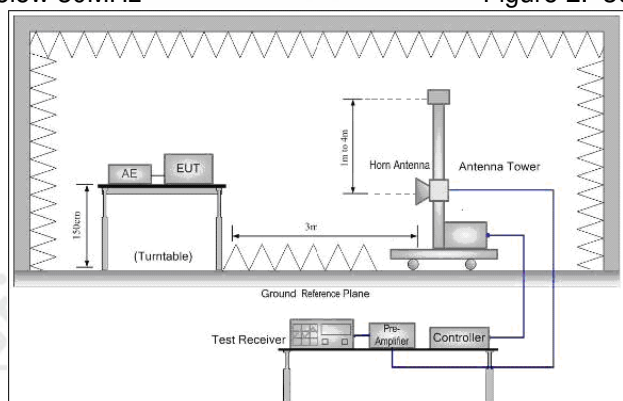


Figure 3. Above 1GHz

**Test Procedure: Below 1GHz test procedure as below:**

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**Above 1GHz test procedure as below:**

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel ,middle channel, the Highest channel
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.

**Limit:  
(Spurious)**

| Frequency                          | Limit (dBμV/m @3m) | Detector |
|------------------------------------|--------------------|----------|
| 30MHz - 10 <sup>th</sup> harmonics | 55.62              | Average  |
|                                    | 75.62              | Peak     |

**Note:** 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

**Limit:  
(Fundamental)**

| Frequency | Limit (dBμV/m @3m) | Detector |
|-----------|--------------------|----------|
| 315MHz    | 75.62              | Average  |
|           | 95.62              | Peak     |

**Test Mode:** TX mode

**Instruments Used:** Refer to section 6 for details

**Test Results:** PASS

**Test data**

**Fundamental Emission**

**2324TX:**

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBμV) | Peak Level (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|------------------------|-----------------|--------------|
| 315             | 13.92                 | 2.49            | 57.73             | 74.14               | 75.62                  | -1.48           | Horizontal   |
| 315             | 13.92                 | 2.49            | 54.96             | 71.37               | 75.62                  | -4.25           | Vertical     |

**2326TX:**

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBμV) | Peak Level (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|------------------------|-----------------|--------------|
| 315             | 13.92                 | 2.49            | 45.72             | 62.13               | 75.62                  | -13.49          | Horizontal   |
| 315             | 13.92                 | 2.49            | 42.44             | 58.85               | 75.62                  | -16.77          | Vertical     |

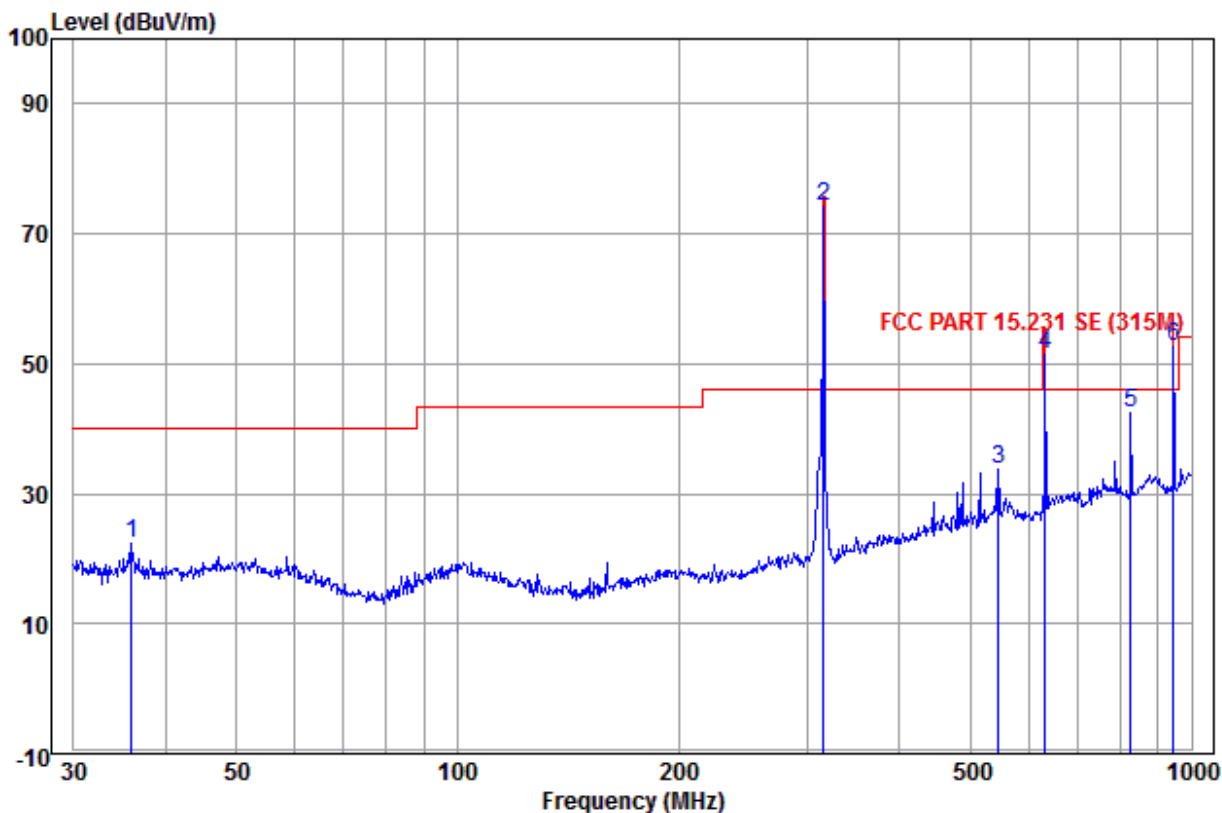
**Remark:** As shown in this section, for field strength of the fundamental signal measurements, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above. So, only the peak value is measured.

## Spurious Emissions

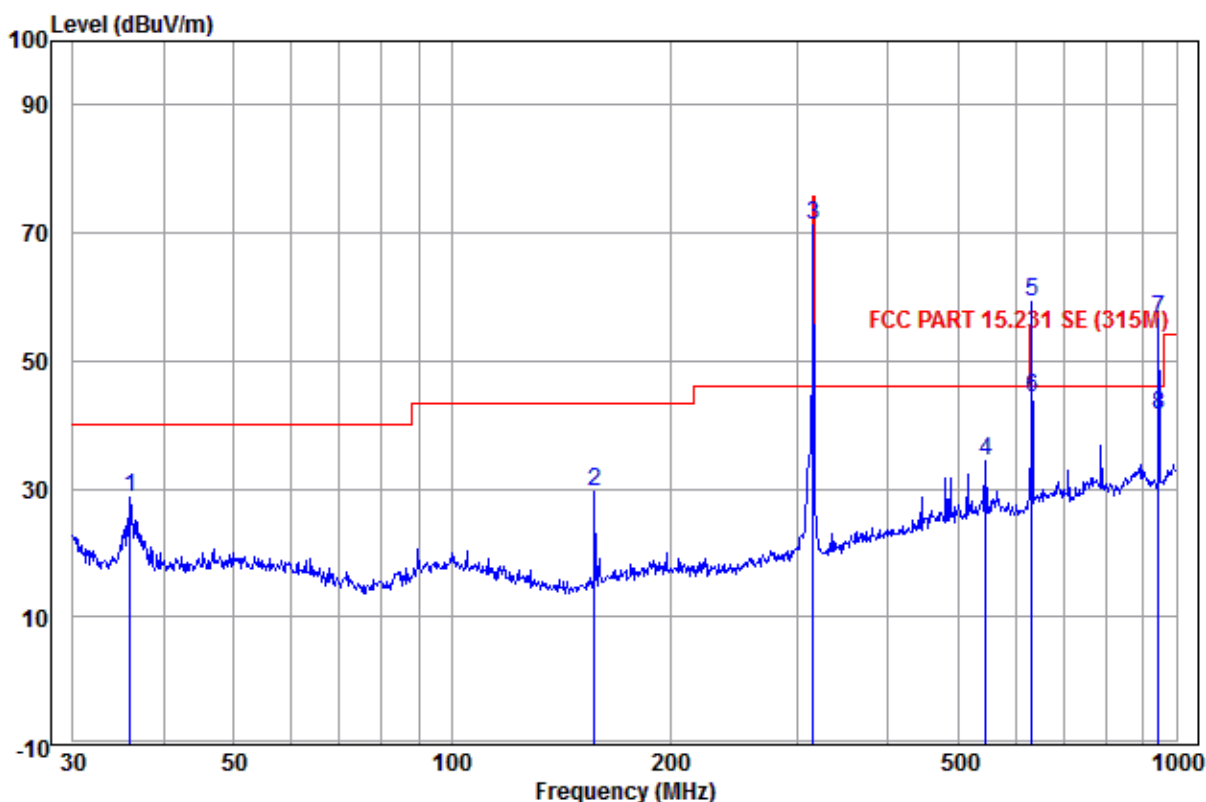
30MHz-1GHz

Peak Detector:

2324TX:



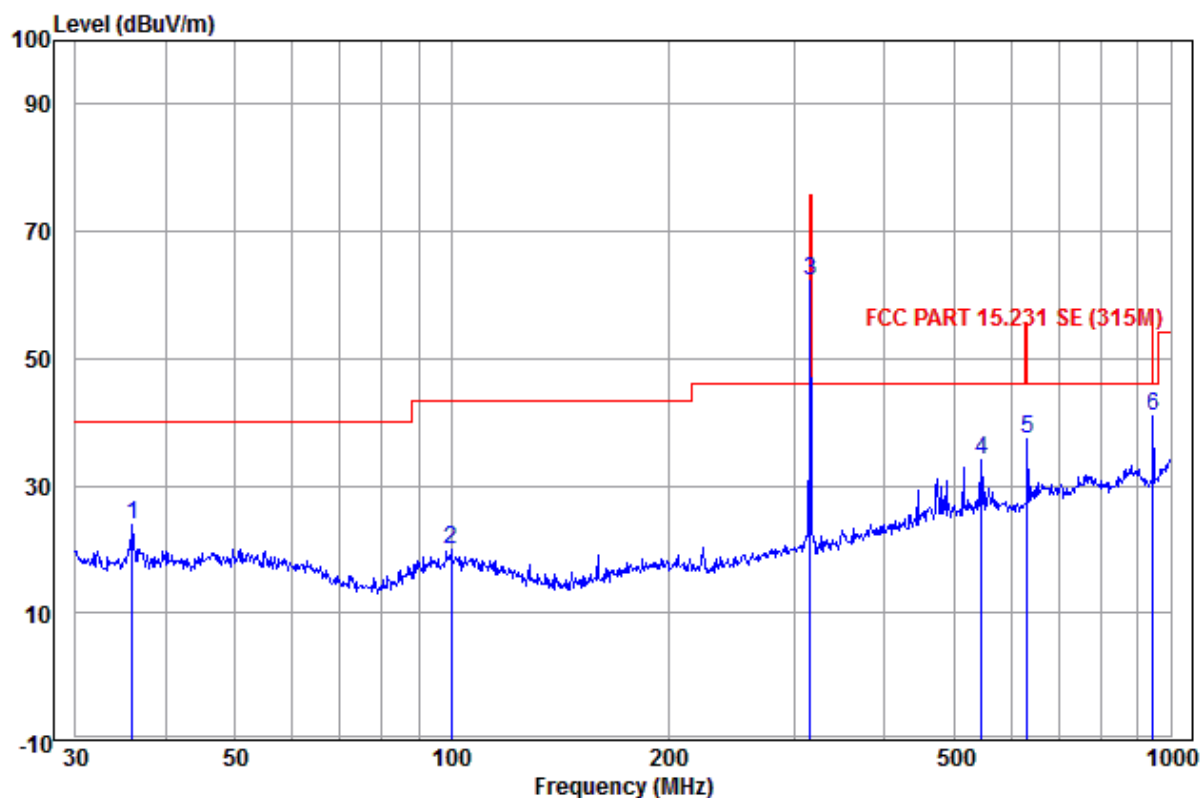
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBuV) | Peak Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|----------------|-----------------|--------------|
| 36.001          | 13.58                 | 0.77            | 8.14              | 22.49               | 40.00 (QP)     | -17.51          | Horizontal   |
| 545.183         | 18.58                 | 3.20            | 11.99             | 33.77               | 46.00 (QP)     | -12.23          | Horizontal   |
| 631.688         | 19.31                 | 3.55            | 28.53             | 51.39               | 55.62 (AVG)    | -4.23           | Horizontal   |
| 827.493         | 21.77                 | 4.03            | 16.70             | 42.50               | 46.00 (QP)     | -3.50           | Horizontal   |
| 945.440         | 22.40                 | 4.32            | 25.79             | 52.51               | 55.62 (AVG)    | -3.11           | Horizontal   |



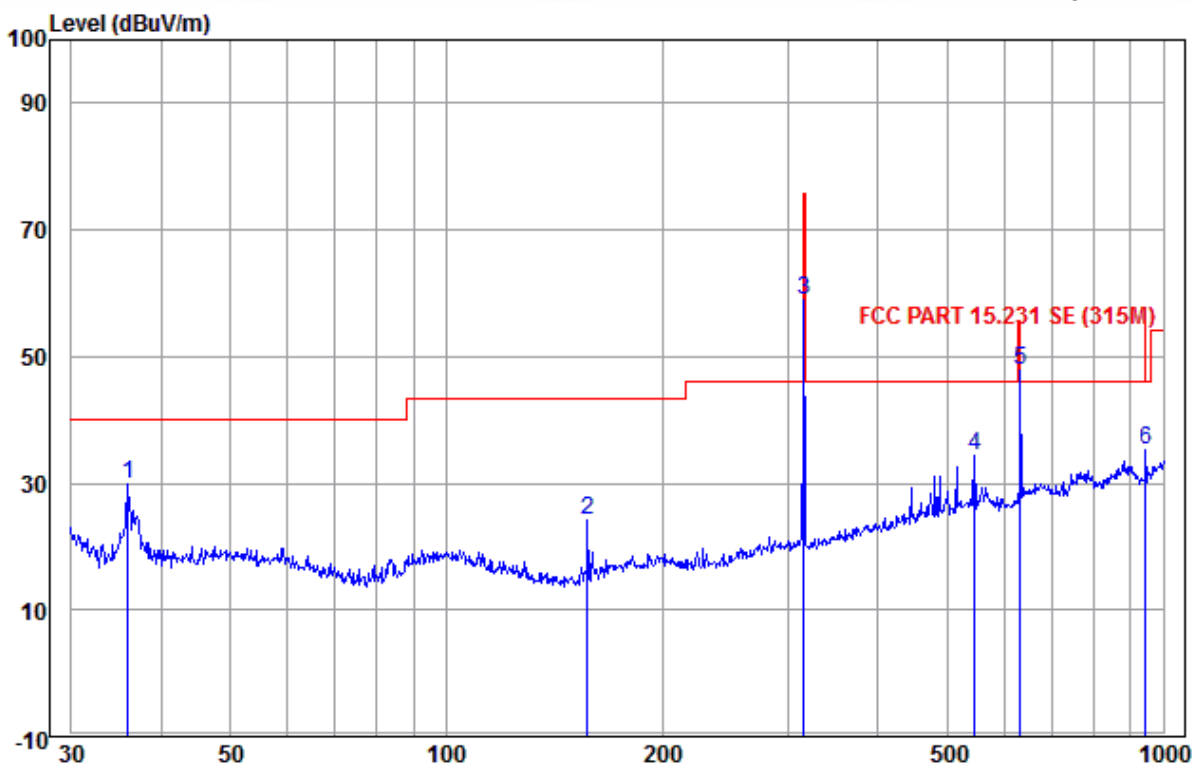
| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBUV) | Peak Level (dBUV/m) | Limit (dBUV/m) | Over Limit (dB) | polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|----------------|-----------------|--------------|
| 36.001          | 13.58                 | 0.77            | 14.40             | 28.75               | 40.00 (QP)     | -11.25          | Vertical     |
| 157.559         | 10.02                 | 1.69            | 17.76             | 29.47               | 43.50 (QP)     | -14.03          | Vertical     |
| 545.183         | 18.58                 | 3.20            | 12.51             | 34.29               | 46.00 (QP)     | -11.71          | Vertical     |

Average value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBUV) | Peak Value (dBUV/m) | PDCF (from P.12) | Calculated Average value (dBUV/m) | Average Limit (dBUV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|------------------|-----------------------------------|------------------------|-----------------|--------------|
| 631.688         | 19.31                 | 3.55            | 36.45             | 59.31               | -14.30           | 45.01                             | 55.62                  | -10.61          | Vertical     |
| 945.440         | 22.40                 | 4.32            | 29.95             | 56.67               | -14.30           | 42.37                             | 55.62                  | -13.25          | Vertical     |



| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBuV) | Peak Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|----------------|-----------------|--------------|
| 36.001          | 13.58                 | 0.77            | 9.57              | 23.92               | 40.00 (QP)     | -16.08          | Horizontal   |
| 99.878          | 13.18                 | 1.57            | 5.29              | 20.04               | 43.50 (QP)     | -23.46          | Horizontal   |
| 545.183         | 18.58                 | 3.20            | 12.26             | 34.04               | 46.00 (QP)     | -11.96          | Horizontal   |
| 631.688         | 19.31                 | 3.55            | 14.58             | 37.44               | 55.62 (AVG)    | -18.18          | Horizontal   |
| 945.440         | 22.40                 | 4.32            | 14.35             | 41.07               | 55.62 (AVG)    | -14.55          | Horizontal   |



| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Read Level (dBuV) | Peak Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-----------------------|-----------------|-------------------|---------------------|----------------|-----------------|--------------|
| 36.001          | 13.58                 | 0.77            | 15.37             | 29.72               | 40.00 (QP)     | -10.28          | Vertical     |
| 157.559         | 10.02                 | 1.69            | 12.60             | 24.31               | 43.50 (QP)     | -19.19          | Vertical     |
| 545.183         | 18.58                 | 3.20            | 12.46             | 34.24               | 46.00 (QP)     | -11.76          | Vertical     |
| 631.688         | 19.31                 | 3.55            | 24.91             | 47.77               | 55.62 (AVG)    | -7.85           | Vertical     |
| 945.440         | 22.40                 | 4.32            | 8.42              | 35.14               | 55.62 (AVG)    | -20.48          | Vertical     |

**Above 1GHz**

**2324TX:**

Peak value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Gain (dB) | Read Level (dBμV) | Level (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|------------------------|-------------------|----------------|------------------------|-----------------|--------------|
| 1764.712        | 31.34                 | 3.05            | 34.46                  | 49.64             | 49.57          | 55.62                  | -6.05           | Horizontal   |
| 2520.728        | 32.78                 | 4.59            | 34.41                  | 52.45             | 55.41          | 55.62                  | -0.21           | Horizontal   |
| 3147.870        | 33.47                 | 5.59            | 34.52                  | 50.97             | 55.51          | 55.62                  | -0.11           | Horizontal   |
| 2837.161*       | 33.34                 | 5.29            | 34.47                  | 48.00             | 52.16          | 54.00                  | -1.84           | Horizontal   |
| 3779.099*       | 32.96                 | 5.48            | 34.58                  | 47.19             | 51.05          | 54.00                  | -2.95           | Horizontal   |
| 1573.520*       | 31.01                 | 2.89            | 34.61                  | 54.68             | 53.97          | 54.00                  | -0.03           | Vertical     |

Average value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamplifier Gain (dB) | Peak Value (dBμV/m) | PDCF (from P.12) | Calculated Average value (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|------------------------|---------------------|------------------|-----------------------------------|------------------------|-----------------|--------------|
| 1777.406        | 31.36                 | 3.06            | 34.45                  | 55.89               | -14.30           | 41.59                             | 55.62                  | -14.03          | Vertical     |
| 1889.051        | 31.54                 | 3.15            | 34.37                  | 64.39               | -14.30           | 50.09                             | 55.62                  | -5.53           | Vertical     |
| 2520.728        | 32.78                 | 4.59            | 34.41                  | 64.11               | -14.30           | 49.81                             | 55.62                  | -5.81           | Vertical     |
| 3153.515        | 33.46                 | 5.59            | 34.52                  | 62.94               | -14.30           | 48.64                             | 55.62                  | -6.98           | Vertical     |
| 2203.762*       | 32.15                 | 3.80            | 34.35                  | 54.60               | -14.30           | 40.30                             | 54.00                  | -13.70          | Vertical     |
| 2837.161*       | 33.34                 | 5.29            | 34.47                  | 61.30               | -14.30           | 47.00                             | 54.00                  | -7.00           | Vertical     |

**2326TX:**

Peak value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Gain (dB) | Read Level (dBμV) | Level (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|------------------|-------------------|----------------|------------------------|-----------------|--------------|
| 1889.051        | 31.54                 | 3.15            | 34.37            | 49.11             | 49.43          | 55.62                  | -6.19           | Horizontal   |
| 2203.762*       | 32.15                 | 3.80            | 34.35            | 48.75             | 50.35          | 54.00                  | -3.65           | Horizontal   |
| 3779.099*       | 32.96                 | 5.48            | 34.58            | 47.54             | 51.40          | 54.00                  | -2.60           | Horizontal   |
| 1573.520*       | 31.01                 | 2.89            | 34.61            | 52.10             | 51.39          | 54.00                  | -2.61           | Vertical     |
| 3779.099*       | 32.96                 | 5.48            | 34.58            | 45.85             | 49.71          | 54.00                  | -4.29           | Vertical     |

Average value:

| Frequency (MHz) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Gain (dB) | Peak Value (dBμV/m) | PDCF (from P.12) | Calculated Average value (dBμV/m) | Average Limit (dBμV/m) | Over Limit (dB) | Polarization |
|-----------------|-----------------------|-----------------|------------------|---------------------|------------------|-----------------------------------|------------------------|-----------------|--------------|
| 2520.728        | 32.78                 | 4.59            | 34.41            | 58.32               | -14.30           | 44.02                             | 55.62                  | -11.60          | Horizontal   |
| 3153.515        | 33.46                 | 5.59            | 34.52            | 59.53               | -14.30           | 45.23                             | 55.62                  | -10.39          | Horizontal   |
| 2837.161*       | 33.34                 | 5.29            | 34.47            | 60.72               | -14.30           | 46.42                             | 54.00                  | -7.58           | Horizontal   |
| 1889.051        | 31.54                 | 3.15            | 34.37            | 59.14               | -14.30           | 44.84                             | 55.62                  | -10.78          | Vertical     |
| 2520.728        | 32.78                 | 4.59            | 34.41            | 60.28               | -14.30           | 45.98                             | 55.62                  | -9.64           | Vertical     |
| 3153.515        | 33.46                 | 5.59            | 34.52            | 58.04               | -14.30           | 43.74                             | 55.62                  | -11.88          | Vertical     |
| 2837.161*       | 33.34                 | 5.29            | 34.47            | 62.99               | -14.30           | 48.69                             | 54.00                  | -5.31           | Vertical     |

**Remark:**

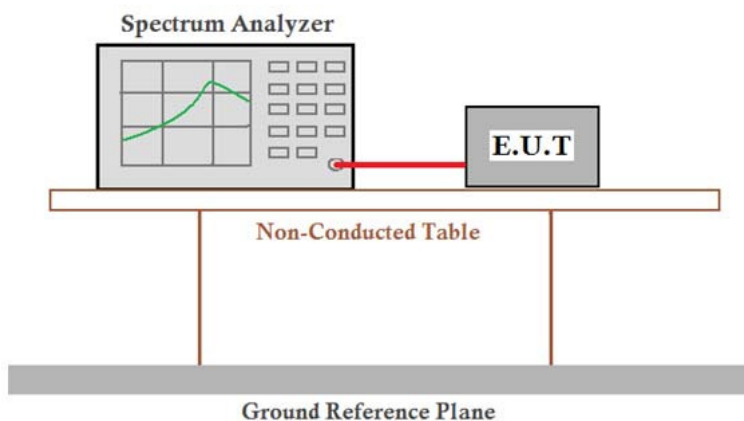
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading - Correct Factor  
Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor
- 2) As shown in this section, for frequencies above 1GHz, the field strength limits 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. So, only the peak values are measured.
- 3) “\*” The emission is falling in FCC restricted band of section 15.205, the general limit of 15.209 shall be used instead of the limit of spurious emission under 15.231(b)
- 4) Scan from 9kHz to 4GHz, the disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

### 7.3 20dB Bandwidth

**Test Requirement:** 47 CFR Part 15C Section 15.231 (c)

**Test Method:** ANSI C63.10

**Test Setup:**



**Limit:** 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. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

**Test Mode:** TX mode

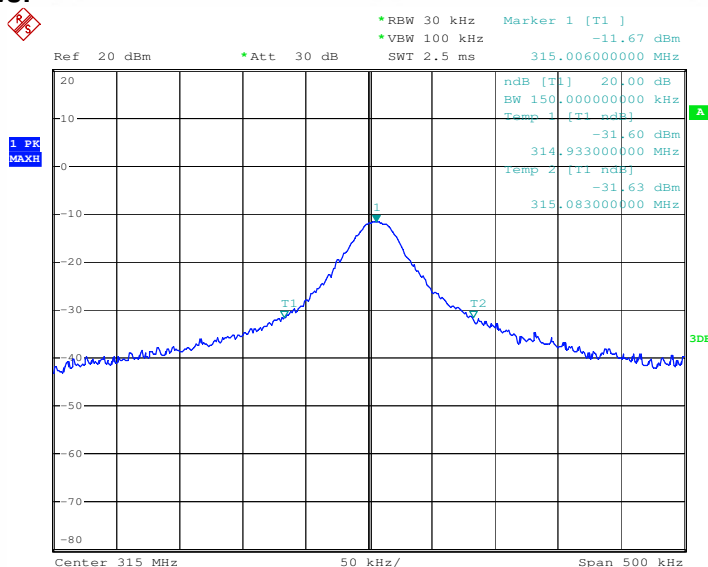
**Instruments Used:** Refer to section 6 for details

**Test Results:** Pass

#### Test data

| 20dB bandwidth (kHz) | Limit (kHz) | Results |
|----------------------|-------------|---------|
| 150                  | 787.5       | Pass    |

**Test plot as follows:**



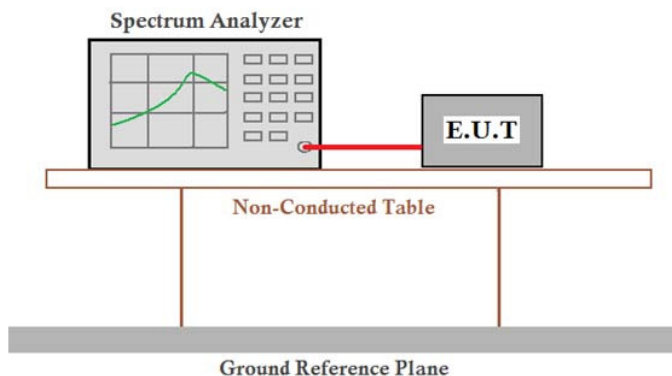
Date: 10.AUG.2016 14:52:05

## 7.4 Deactivated Time

**Test Requirement:** 47 CFR Part 15C Section 15.231 (a)

**Test Method:** ANSI C63.10

**Test Setup:**



**Limit:** Automatically deactivate the transmitter within 5 seconds of being released

**Test Mode:** Press and release the button immediately with the normal sample

**Instruments Used:** Refer to section 6 for details

**Test Results:** **PASS**

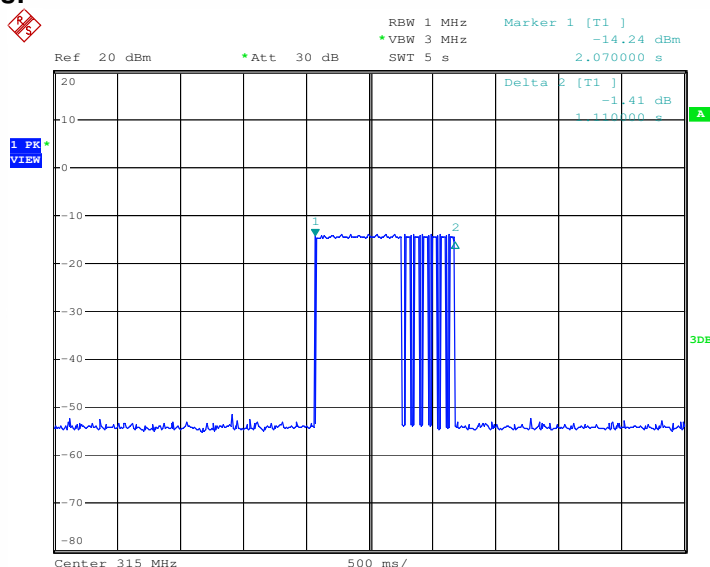
**Remark:**

- 1) Only manually switching and no automatic activation.
- 2) No Periodic transmission
- 3) No emergencies function.
- 4) No transmission of setup-information for security system exceed transmission during limit in (a)(1) and (a)(2).

**Test data:**

| Test item             | Test value | Limit (s) | Results |
|-----------------------|------------|-----------|---------|
| Manually press button | 1.11s      | ≤5s       | Pass    |

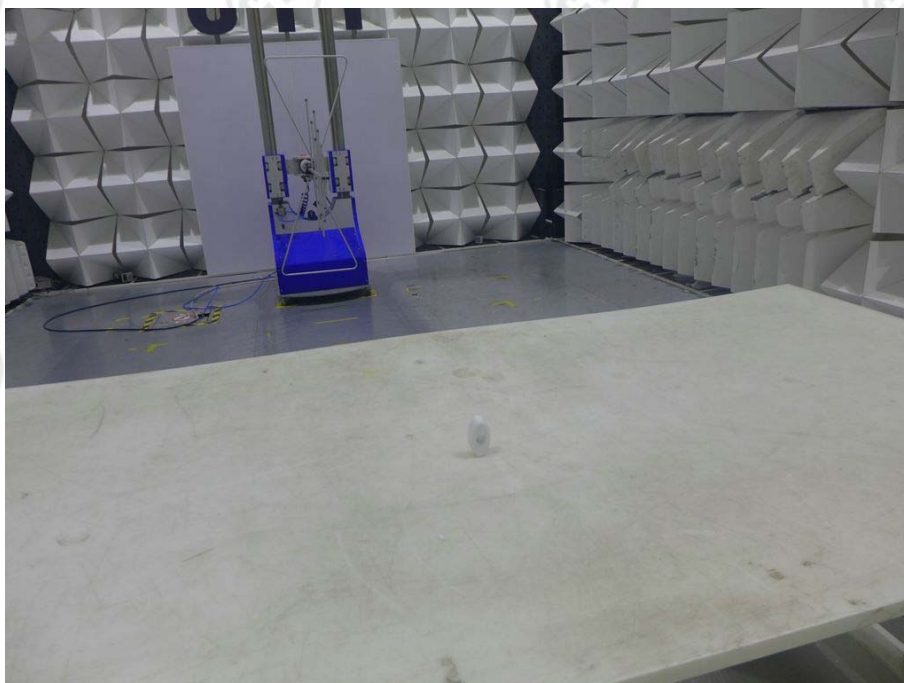
**Test plot as follows:**



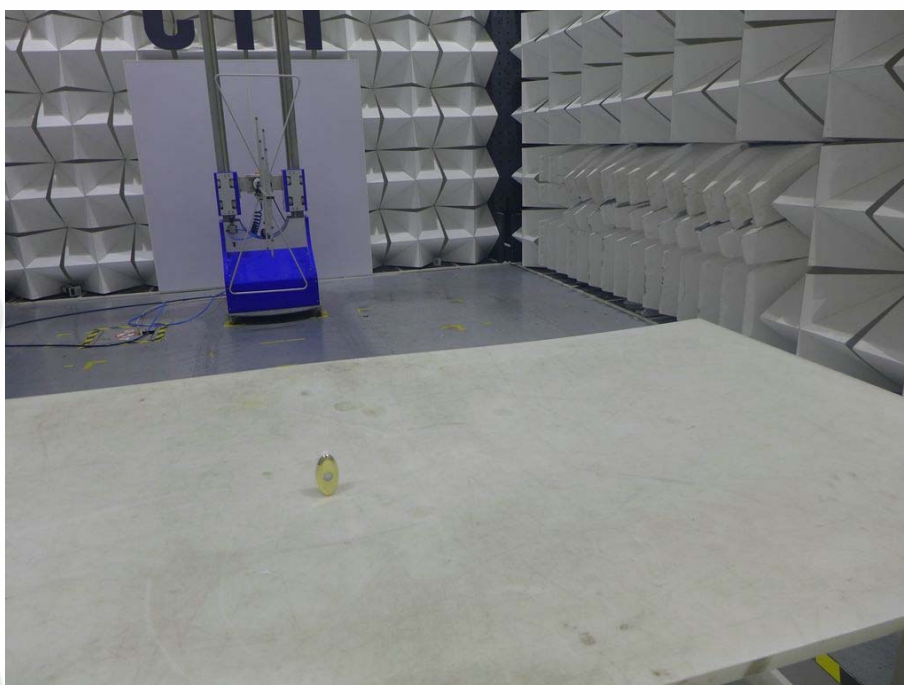
Date: 10.AUG.2016 14:55:59

## APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: 2324TX, 2326TX



**Radiated emission Test Setup for 2324TX -1(30MHz~1GHz)**



**Radiated emission Test Setup for 2326TX -2(30MHz~1GHz)**



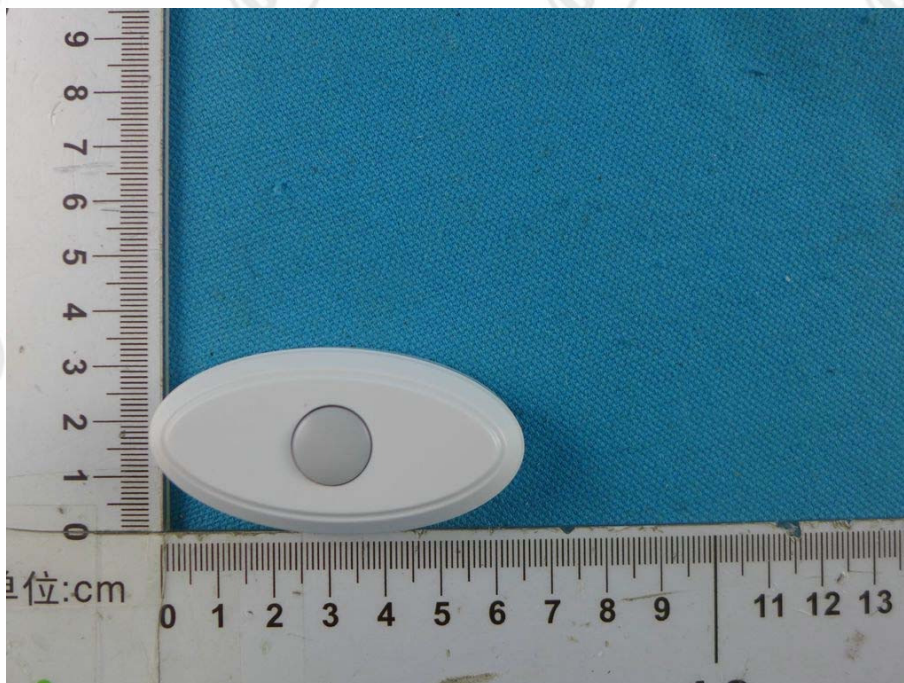
**Radiated spurious emission Test Setup for 2324TX -3(Above 1GHz)**



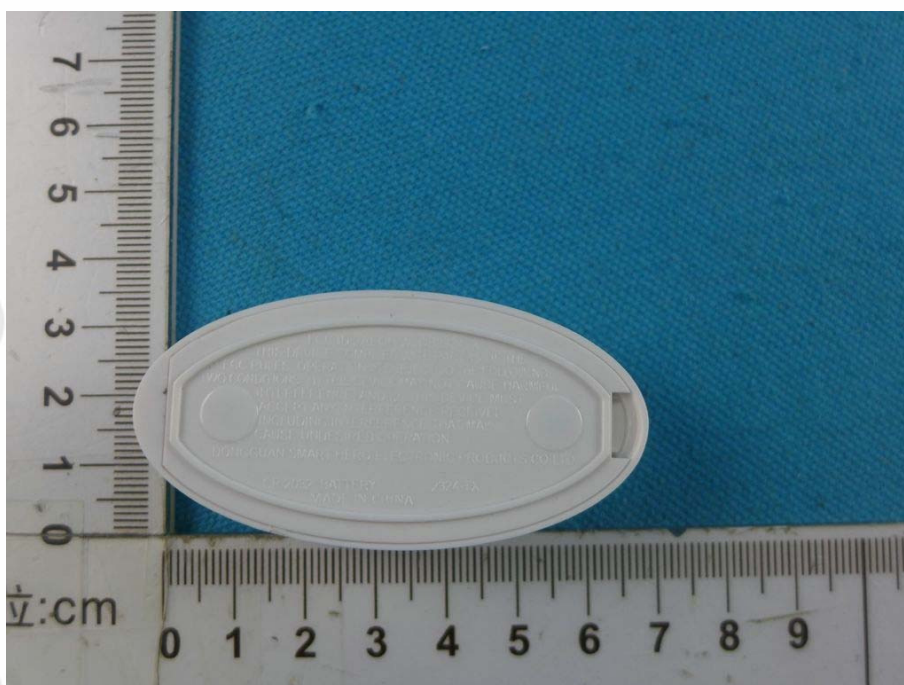
**Radiated spurious emission Test Setup for 2326TX -4(Above 1GHz)**

## APPENDIX 2 PHOTOGRAPHS OF EUT

Test mode No.: 2324TX



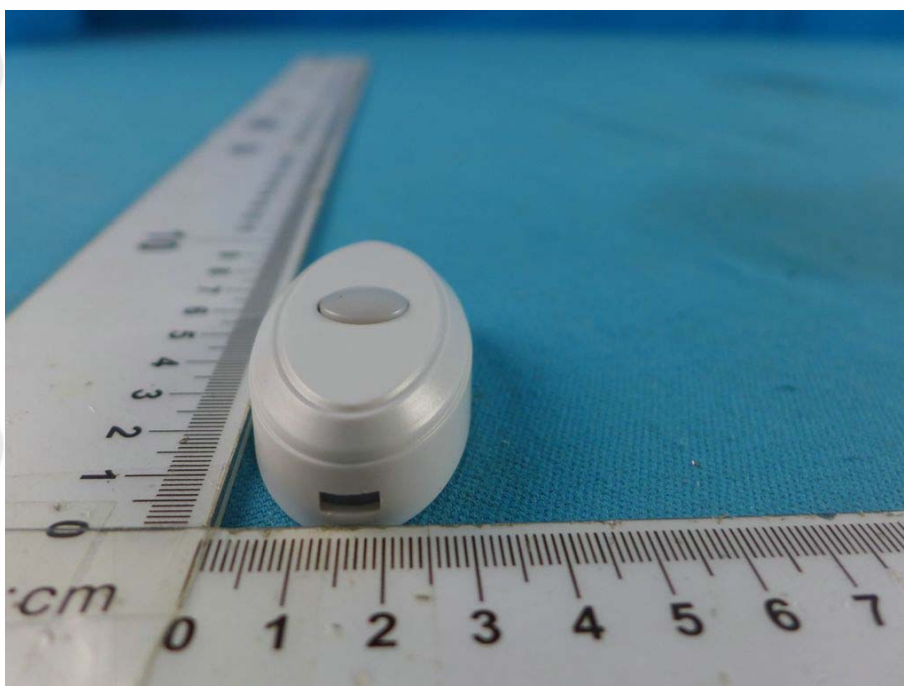
View of Product-1



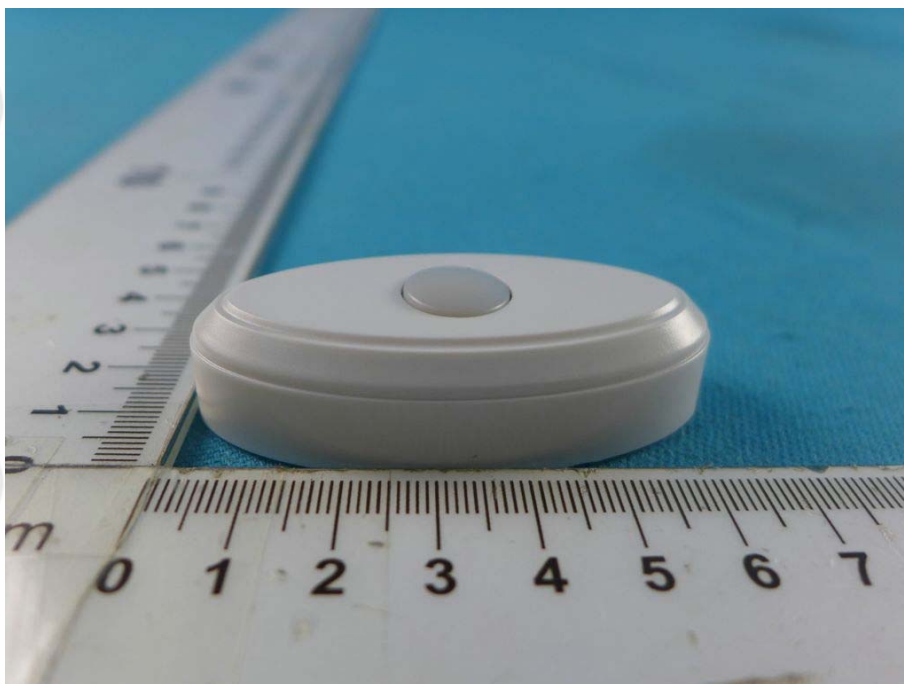
View of Product-2



View of Product-3



View of Product-4



View of Product-5



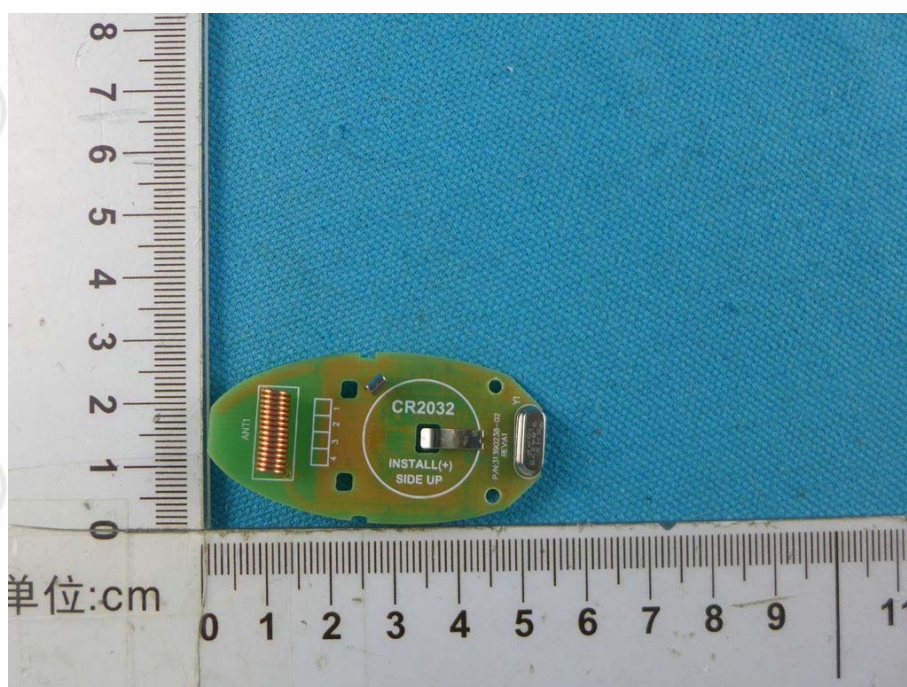
View of Product-6



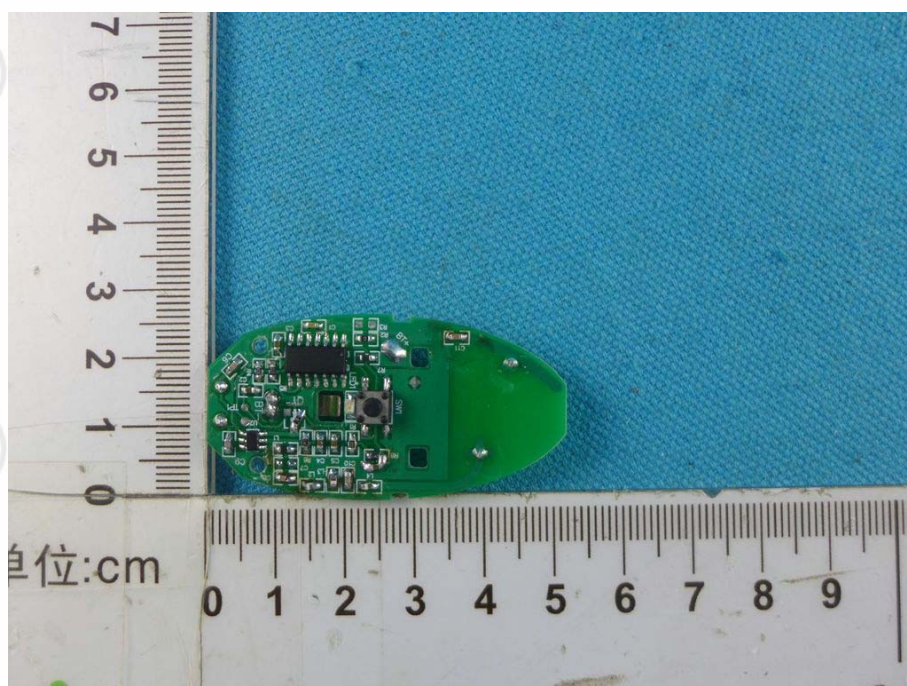
View of Product-7



View of Product-8



View of Product-9



View of Product-10

\*\*\* End of Report \*\*\*

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