


TEST REPORT

Reference No. : WTS15S0122510R1E
FCC ID : GCDAYG6XX0
Applicant : Rosslare Enterprises Limited
Address : Flat 5, 9/F., Wing Fat Ind. Bldg.,12 Wang Tai Road , Kowloon Bay, Kowloon, Hong Kong
Manufacturer : Rosslare Electronics (Shenzhen) Ltd
Address : Block 2, No. A-1 Baiwangxin Industrial Park, XiLi Town, Shenzhen, China
Product Name : O2S Smart Card Reader
Model No. : AY-G6270X+XXX, AY-G6280X+XXX, AY-G6370X+XXX, AY-G6380X+XXX (where, the first X can be B or W; the second X can be P or T; the third X can be R or O; the forth X can be S or O)
Software version : V1.01
Trademark: 
Standards : FCC CFR47 Part 15 Section 15.225: 2016
Date of Receipt sample : Oct. 20, 2016
Date of Test : Oct. 21-25, 2016
Date of Issue : Nov.10, 2016
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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Compiled by:



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Approved by:



Philo Zhong / Manager

2 Test Summary

| Test Items | Test Requirement | Result |
|-----------------------------|-------------------------------|--------|
| Conducted Emissions | 15.207 | PASS |
| Radiated Spurious Emissions | 15.205(a) 15.209 15.225 | PASS |
| Frequency Tolerance | 15.225 | PASS |
| 20dB Bandwidth | 15.215(c) | PASS |
| Antenna Requirement | 15.203 | PASS |

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4 Report Revision History

| Report No. | Report Version | Description | Issue Date |
|------------------|----------------|--|---------------|
| WTS15S0122510E | NONE | Original | Mar. 25, 2015 |
| WTS15S0122510R1E | V1 | Updated Transmitter carrier output level | Oct. 26, 2016 |

5 General Information

5.1 General Description of E.U.T.

Product Name: O2S Smart Card Reader
 Model No.: AY-G6270X+XXX, AY-G6280X+XXX, AY-G6370X+XXX, AY-G6380X+XXX (where, the first X can be B or W; the second X can be P or T; the third X can be R or 0; the forth X can be S or 0)
 Model Difference: AY-G6370B+P is the test model.

| Digit | Description | Code | Options |
|-------|-----------------------|------|------------------------------|
| 1-2 | Reader | AY | Fixed model |
| 3 | Spacer | - | |
| 4 | Mounting Options | H | US/UK/Asia Gang Box |
| | | G | Mullion |
| 5-6 | Keypad Options | 62 | Prox Only |
| | | 63 | Prox & Keypad |
| 7-8 | Credential Technology | 70 | MIFARE Plus / Classic |
| | | 80 | MIFARE DESFire EV1 / Classic |
| 9 | Reader Color | B | Blac |
| | | W | White |
| 10 | Spacer | + | |
| 11 | Termination Type | P | Pigtail |
| | | T | Terminal Blocks |
| 12 | RSDP/OSDP Support | 0 | No |
| | | R | Yes |
| 13 | Special Instructions | 0 | No |
| | | S | Yes |

Type of Modulation: FSK
 Frequency Range: 13.56 MHz
 The Lowest Oscillator: 8 MHz
 Antenna installation: Loop Antenna

5.2 Details of E.U.T.

Technical Data: DC input: 12 V $\overline{\text{---}}$, 110 mA; Class III

5.3 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, October 15, 2015

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) 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 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) 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 328995, December 3, 2014.

6 Equipment Used during Test

6.1 Equipments List

| Conducted Emissions Test Site 1# | | | | | | |
|--|----------------------------|----------------------------------|------------------|-------------------|------------------------------|-----------------------------|
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1. | EMI Test Receiver | R&S | ESCI | 100947 | Sep.14,2016 | Sep.13,2017 |
| 2. | LISN | R&S | ENV216 | 101215 | Sep.14,2016 | Sep.13,2017 |
| 3. | Cable | Top | TYPE16(3.5M) | - | Sep.14,2016 | Sep.13,2017 |
| Conducted Emissions Test Site 2# | | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1. | EMI Test Receiver | R&S | ESCI | 101155 | Sep.14,2016 | Sep.13,2017 |
| 2. | LISN | SCHWARZBECK | NSLK 8128 | 8128-289 | Sep.14,2016 | Sep.13,2017 |
| 3. | Limiter | York | MTS-IMP-136 | 261115-001-0024 | Sep.14,2016 | Sep.13,2017 |
| 4. | Cable | LARGE | RF300 | - | Sep.14,2016 | Sep.13,2017 |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 1# | | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1 | EMC Analyzer | Agilent | E7405A | MY45114943 | Sep.14,2016 | Sep.13,2017 |
| 2 | Active Loop Antenna | Beijing Dazhi | ZN30900A | - | Sep.14,2016 | Sep.13,2017 |
| 3 | Trilog Broadband Antenna | SCHWARZBECK | VULB9163 | 336 | Apr.18,2016 | Apr.17,2017 |
| 4 | Coaxial Cable (below 1GHz) | Top | TYPE16(13M) | - | Sep.14,2016 | Sep.13,2017 |
| 5 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9120 D | 667 | Apr.18,2016 | Apr.17,2017 |
| 6 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9170 | 335 | Apr.18,2016 | Apr.17,2017 |
| 7 | Broadband Preamplifier | COMPLIANCE DIRECTION | PAP-1G18 | 2004 | Mar.16,2016 | Mar.15,2017 |
| 8 | Coaxial Cable (above 1GHz) | Top | 1GHz-25GHz | EW02014-7 | Apr.09,2016 | Apr.08,2017 |
| 3m Semi-anechoic Chamber for Radiation Emissions Test site 2# | | | | | | |
| Item | Equipment | Manufacturer | Model No. | Serial No | Last Calibration Date | Calibration Due Date |
| 1 | Test Receiver | R&S | ESCI | 101296 | Sep.14,2016 | Sep.13,2017 |
| 2 | Trilog Broadband Antenna | SCHWARZBECK | VULB9160 | 9160-3325 | Sep.14,2016 | Sep.13,2017 |
| 3 | Amplifier | Compliance pirection systems inc | PAP-0203 | 22024 | Sep.14,2016 | Sep.13,2017 |
| 4 | Cable | HUBER+SUHNER | CBL2 | 525178 | Sep.14,2016 | Sep.13,2017 |

| RF Conducted Testing | | | | | | |
|----------------------|---------------------------------|--------------|---------------|------------|-----------------------|----------------------|
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Calibration Date | Calibration Due Date |
| 1. | EMC Analyzer (9k~26.5GHz) | Agilent | E7405A | MY45114943 | Sep.14,2016 | Sep.13,2017 |
| 2. | Spectrum Analyzer (9k-6GHz) | R&S | FSL6 | 100959 | Sep.14,2016 | Sep.13,2017 |
| 3. | Signal Analyzer (9k~26.5GHz) | Agilent | N9010A | MY50520207 | Sep.14,2016 | Sep.13,2017 |
| 4. | Humidity Chamber | GF | GTH-225-40-1P | IAA061213 | Sep.14,2016 | Sep.13,2017 |

6.2 Measurement Uncertainty

| Test Item | Frequency Range | Uncertainty | Note |
|-----------------------------|-----------------|-------------|------|
| Conducted Emissions | 150kHz~30MHz | ±3.64dB | (1) |
| Radiated Spurious Emissions | 30MHz~1000MHz | ±5.03dB | (1) |
| | 1000M~5000MHz | ± 5.47 dB | (1) |

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

6.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6.4 Description of Accessory Device

| Equipment | Manufacturer | Model No. | Series No. |
|------------|--|-----------------|------------|
| Mainboard | Rosslare Electronics (Shenzhen) Ltd | AYG/H6XX0 | / |
| AC Adapter | KINGS | KSS12_150_0800G | / |

Remark: The above accessory devices are unmodified and commercially available. AC adapter is used for power supply to mainboard. Mainboard is used for communication with EUT and power supply to it.

7 Conducted Emission

| | |
|-------------------|--|
| Test Requirement: | FCC CFR 47 Part 15 Section 15.207 |
| Test Method: | ANSI C63.10:2013 |
| Test Result: | PASS |
| Frequency Range: | 150kHz to 30MHz |
| Class/Severity: | Class B |
| Limit: | 66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz |
| Detector: | Peak for pre-scan (9kHz Resolution Bandwidth) |

7.1 E.U.T. Operation

Operating Environment :

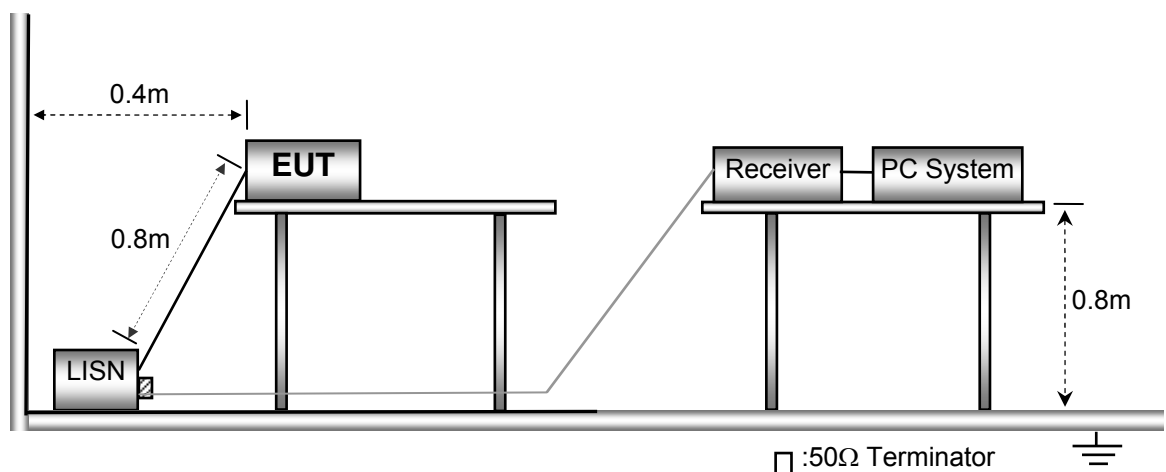
| | |
|-----------------------|----------|
| Temperature: | 25.5 °C |
| Humidity: | 51 % RH |
| Atmospheric Pressure: | 101.2kPa |

EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The EUT was placed on the test table in shielding room.

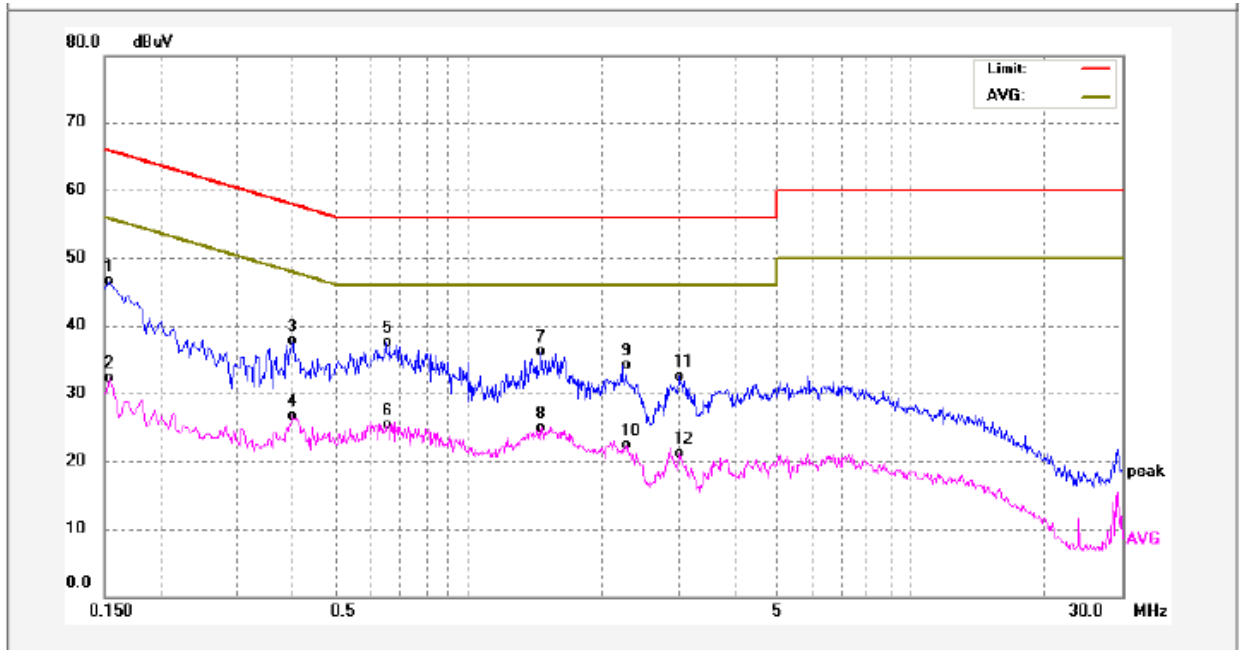


7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

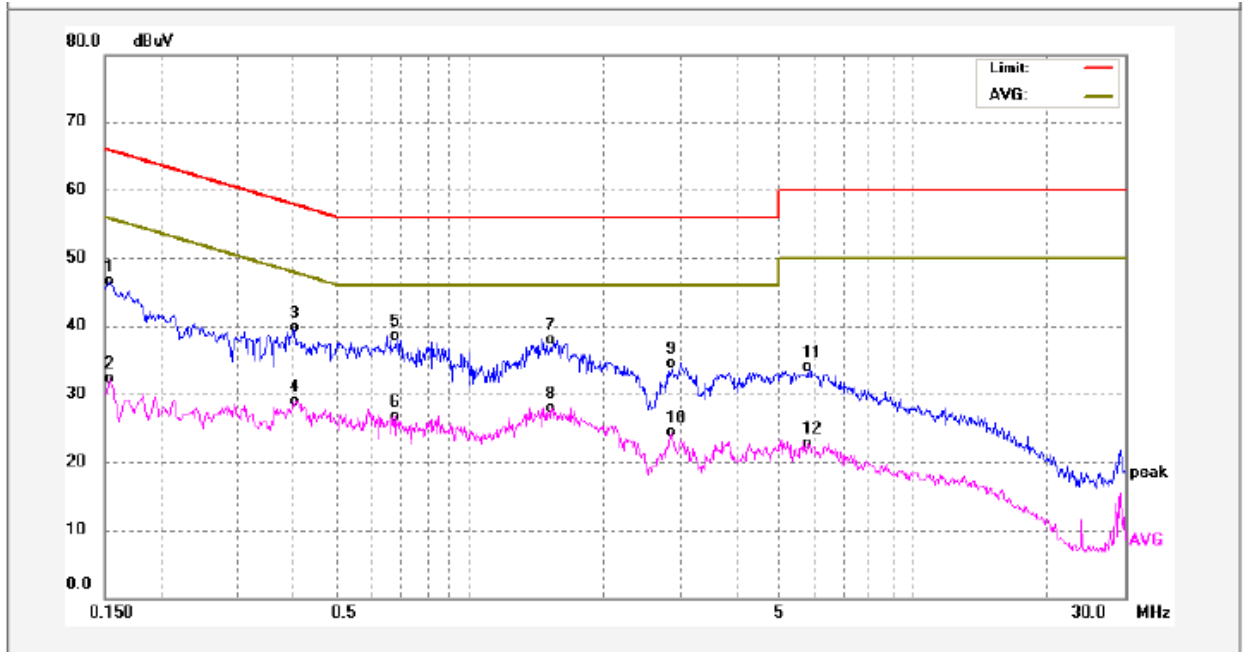
7.4 Conducted Emission Test Result

Live line:



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1 | 0.1539 | 35.35 | 11.18 | 46.53 | 65.78 | -19.25 | QP | |
| 2 | 0.1539 | 21.07 | 11.18 | 32.25 | 55.78 | -23.53 | AVG | |
| 3 | 0.3980 | 26.43 | 11.31 | 37.74 | 57.89 | -20.15 | QP | |
| 4 | 0.3980 | 15.47 | 11.31 | 26.78 | 47.89 | -21.11 | AVG | |
| 5 | 0.6580 | 26.08 | 11.33 | 37.41 | 56.00 | -18.59 | QP | |
| 6 | 0.6580 | 13.92 | 11.33 | 25.25 | 46.00 | -20.75 | AVG | |
| 7 | 1.4700 | 24.90 | 11.19 | 36.09 | 56.00 | -19.91 | QP | |
| 8 | 1.4700 | 13.79 | 11.19 | 24.98 | 46.00 | -21.02 | AVG | |
| 9 | 2.2820 | 22.98 | 11.20 | 34.18 | 56.00 | -21.82 | QP | |
| 10 | 2.2820 | 11.20 | 11.20 | 22.40 | 46.00 | -23.60 | AVG | |
| 11 | 3.0059 | 21.35 | 11.21 | 32.56 | 56.00 | -23.44 | QP | |
| 12 | 3.0059 | 9.98 | 11.21 | 21.19 | 46.00 | -24.81 | AVG | |

Neutral line:



| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|-----|-------------|----------------|-------------|---------------|------------|-------------|----------|--------|
| 1 | 0.1539 | 35.35 | 11.18 | 46.53 | 65.78 | -19.25 | QP | |
| 2 | 0.1539 | 21.07 | 11.18 | 32.25 | 55.78 | -23.53 | AVG | |
| 3 | 0.4060 | 28.43 | 11.31 | 39.74 | 57.73 | -17.99 | QP | |
| 4 | 0.4060 | 17.55 | 11.31 | 28.86 | 47.73 | -18.87 | AVG | |
| 5 | 0.6820 | 27.07 | 11.34 | 38.41 | 56.00 | -17.59 | QP | |
| 6 | 0.6820 | 15.36 | 11.34 | 26.70 | 46.00 | -19.30 | AVG | |
| 7 | 1.5339 | 26.72 | 11.19 | 37.91 | 56.00 | -18.09 | QP | |
| 8 | 1.5339 | 16.72 | 11.19 | 27.91 | 46.00 | -18.09 | AVG | |
| 9 | 2.8540 | 23.35 | 11.21 | 34.56 | 56.00 | -21.44 | QP | |
| 10 | 2.8540 | 13.18 | 11.21 | 24.39 | 46.00 | -21.61 | AVG | |
| 11 | 5.8460 | 22.68 | 11.25 | 33.93 | 60.00 | -26.07 | QP | |
| 12 | 5.8460 | 11.39 | 11.25 | 22.64 | 50.00 | -27.36 | AVG | |

8 Radiated Spurious Emissions

Test Requirement: FCC Part15 Paragraph 15.225

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

FCC Part15 Paragraph 15.209

| Frequency (MHz) | Field Strength | | Field Strength Limit at 3m Measurement Dist | |
|--------------------|----------------|-----------------|---|--------------------------------|
| | uV/m | Distance (m) | uV/m | dBuV/m |
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 | 10000 * 2400/F(kHz) | $20\log^{(2400/F(kHz))} + 80$ |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 | 100 * 24000/F(kHz) | $20\log^{(24000/F(kHz))} + 40$ |
| 1.705 ~ 30 | 30 | 30 | 100 * 30 | $20\log^{(30)} + 40$ |
| 30 ~ 88 | 100 | 3 | 100 | $20\log^{(100)}$ |
| 88 ~ 216 | 150 | 3 | 150 | $20\log^{(150)}$ |
| 216 ~ 960 | 200 | 3 | 200 | $20\log^{(200)}$ |
| Above 960 | 500 | 3 | 500 | $20\log^{(500)}$ |

FCC Part15 Paragraph 15.225

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters, equal to 124dBuV/m at 3 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters, equal to 90.5dBuV/m at 3 meters..

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters, equal to 80.5dBuV/m at 3 meters..

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

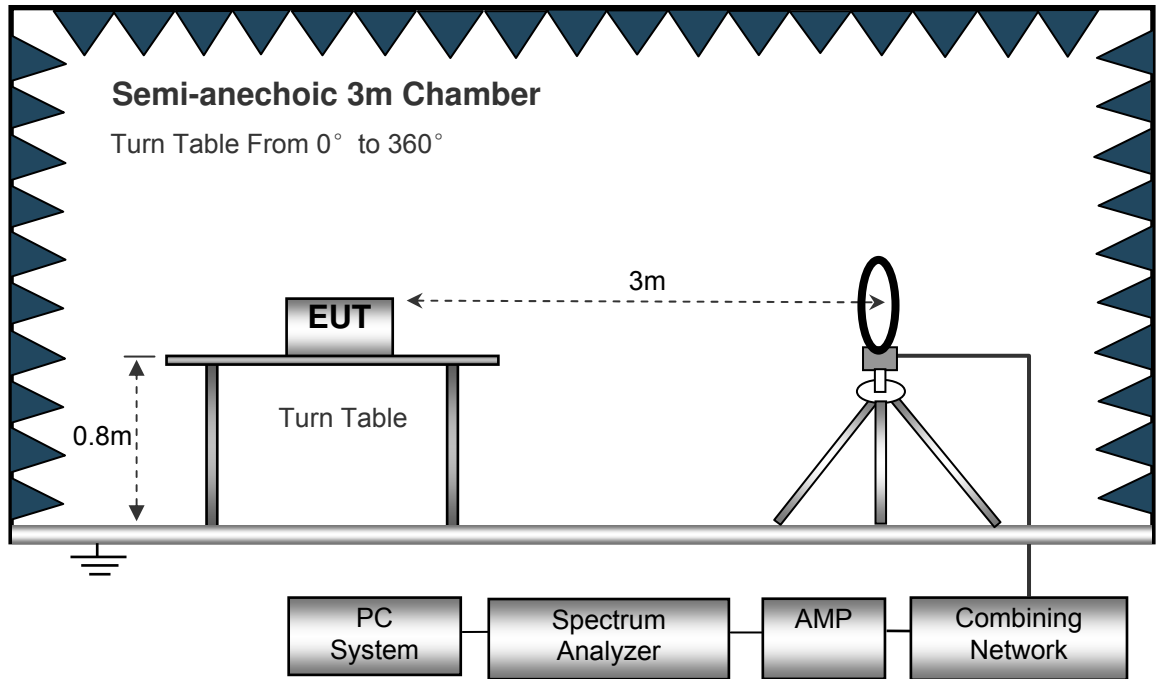
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

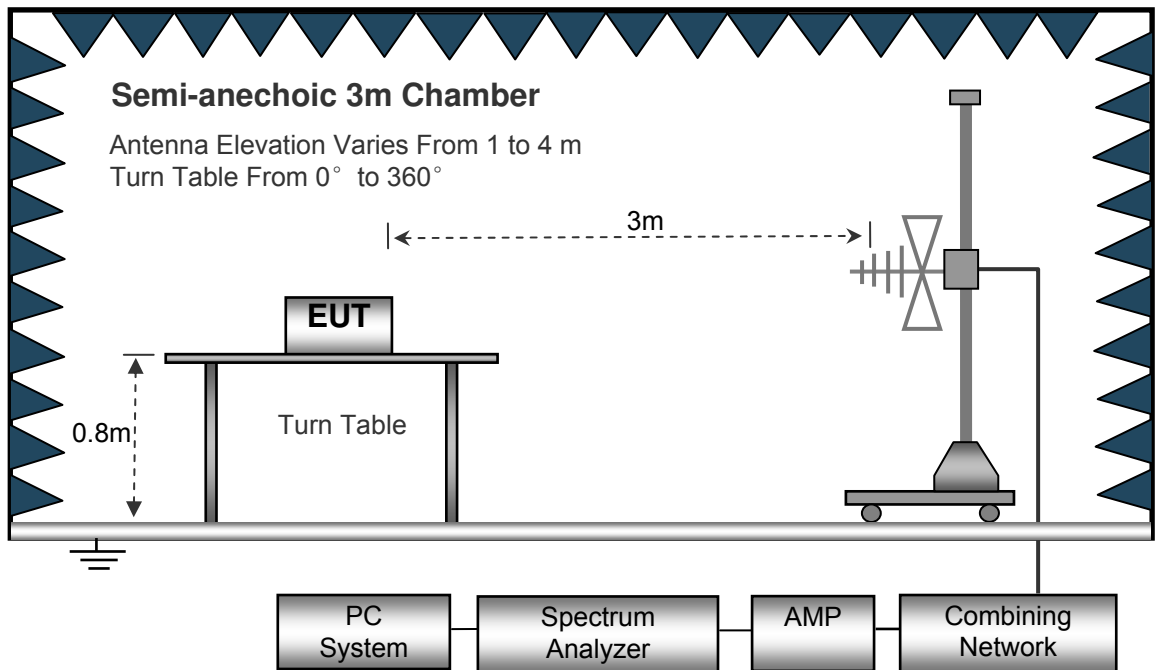
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed Auto
Detector PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

8.4 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 moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
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. The radiation measurements are tested under 3-axes(X, Y, Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8.5 Summary of Test Results

Test Frequency :8MHz ~ 30MHz Note: Correct factor = Cable loss + Antenna factor

| Frequency | Receiver Reading (PK) | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude (PK) | FCC Part 15.231/15.209/205 | |
|-----------|-----------------------|------------------|------------|-------|------------------|--------------------------|----------------------------|--------|
| | | | Height | Polar | | | Limit | Margin |
| (MHz) | (dB μ V) | Degree | (m) | (H/V) | (dB/m) | (dB μ V/m) | (dB μ V/m) | (dB) |
| 13.56 | 44.44 | 125 | 2 | H | 19.68 | 64.12 | 124 | -62.88 |
| 13.56 | 30.67 | 357 | 1.5 | V | 29.71 | 60.38 | 124 | -63.62 |

| Frequency (MHz) | Receiver Reading | Detector | Correct factor | Extrapolation factor | Measurement results (calculated) | Limits | Margin |
|-----------------|------------------|----------|----------------|----------------------|----------------------------------|--------------------|--------|
| | dB μ V@3m | PK/QP | dB/m | dB | dB μ V/m @300m&30m | dB μ V/m @300m | dB |
| 27.12 | 25.29 | Qp | 19.90 | 40.00 | 5.19 | 29.54 | -24.35 |

| Frequency Range (MHz) | Frequency (MHz) | Receiver Reading | Detector | Correct factor | Extrapolation factor | Measurement results (calculated) | Limits | Margin |
|-----------------------|-----------------|------------------|----------|----------------|----------------------|----------------------------------|-------------------|--------------|
| | dB μ V @3m | dB μ V/m | PK/QP | dB | dB | dB μ V/m @30m | dB μ V/m @30m | dB μ V/m |
| 13.110~13.41 | 13.381 | 20.18 | QP | 22.46 | 40 | 2.64 | 40.50 | -37.86 |
| 13.410~13.553 | 13.551 | 26.54 | QP | 22.46 | 40 | 9 | 50.50 | -41.50 |
| 13.553~13.567 | 13..559 | 37.12 | QP | 22.46 | 40 | 19.58 | 84.00 | -64.42 |
| 13.567~13.71 | 13.569 | 24.33 | QP | 22.46 | 40 | 6.79 | 50.50 | -43.71 |
| 13.710~14.01 | 13.902 | 20.89 | QP | 22.46 | 40 | 3.35 | 40.50 | -37.15 |

Test Frequency : 30MHz ~ 1GHz

| Frequency | Receiver Reading | Detector | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude | FCC Part 15.225/209/205 | |
|-----------|------------------|--------------|------------------|------------|-------|------------------|---------------------|-------------------------|--------|
| | | | | Height | Polar | | | Limit | Margin |
| (MHz) | (dB μ V) | (PK/QP /Ave) | Degree | (m) | (H/V) | (dB) | (dB μ V/m) | (dB μ V /m) | (dB) |
| 54.21 | 20.38 | QP | 100 | 1.5 | H | 14.14 | 34.52 | 40 | -5.48 |
| 54.21 | 15.25 | QP | 5 | 1.7 | V | 14.14 | 29.39 | 40 | -10.61 |
| 213.43 | 19.31 | QP | 273 | 1.5 | H | 12.50 | 31.81 | 43.5 | -11.69 |
| 213.43 | 14.29 | QP | 204 | 1.7 | V | 12.50 | 26.79 | 43.5 | -16.71 |
| 493.67 | 11.33 | QP | 139 | 1.5 | H | 21.65 | 32.98 | 46 | -13.02 |
| 493.67 | 7.67 | QP | 18 | 1.7 | V | 21.65 | 29.32 | 46 | -16.68 |

9 Frequency Tolerance

Test Requirement: FCC Part15.225

Test Method: ANSI C63.10:2013

Limit The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

9.1 Test Procedure

- 1.The EUT was placed on a turn table which is 0.8m above ground plane.
- 2.Set EUT as normal operation
- 3.Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.
- 4.Set SPA Max hold. Mark peak.

9.2 Test Result

| Power Supply | Temperature (°C) | Measured Frequency (MHz) | Frequency Error | Part 15.225 Limit |
|--------------|------------------|--------------------------|-----------------|-------------------|
| DC 12.0V | -20 | 13.560346 | 0.0025% | ±0.01% |
| | 20 | 13.560219 | 0.0016% | ±0.01% |
| | 50 | 13.560163 | 0.0012% | ±0.01% |
| DC 10.2V | -20 | 13.560680 | 0.0050% | ±0.01% |
| | 20 | 13.560329 | 0.0024% | ±0.01% |
| | 50 | 13.560412 | 0.0030% | ±0.01% |
| DC 13.8V | -20 | 13.560350 | 0.0026% | ±0.01% |
| | 20 | 13.560134 | 0.0010% | ±0.01% |
| | 50 | 13.559945 | -0.0004% | ±0.01% |

11 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, 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 to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product use a permanent Loop antenna, fulfill the requirement of this section

12 Model AY-G6370B+P Photographs of Testing

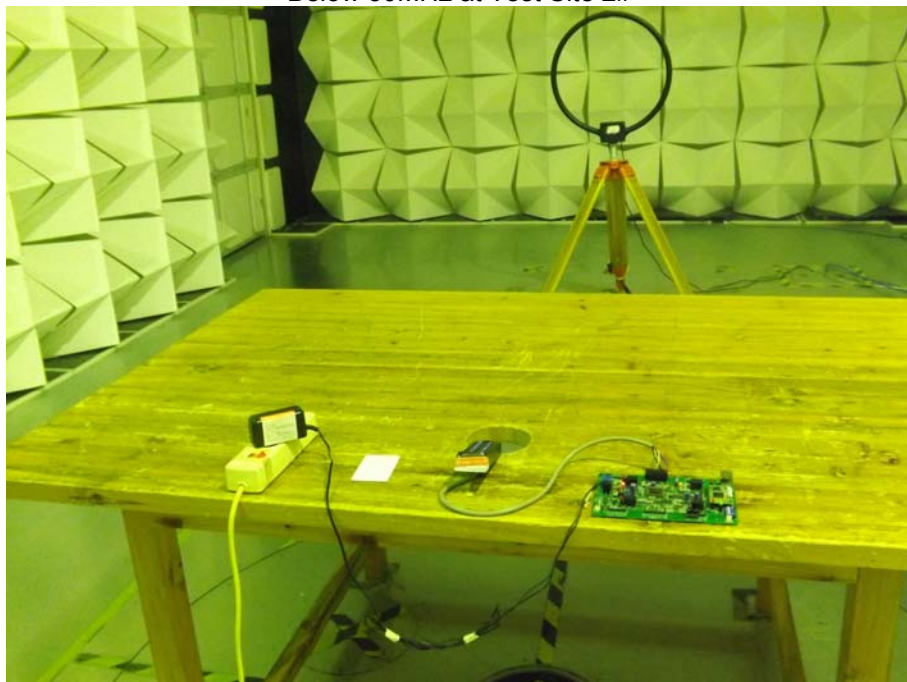
12.1 Conduction Emission Test Setup

Test Site 2#

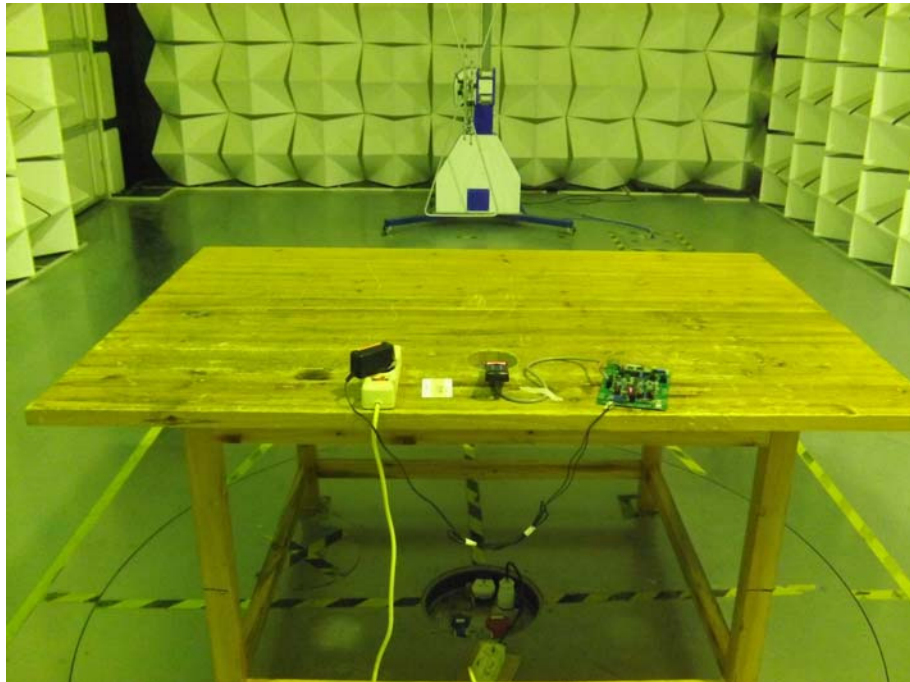


12.2 Radiation Emission Test Setup

Below 30MHz at Test Site 2#



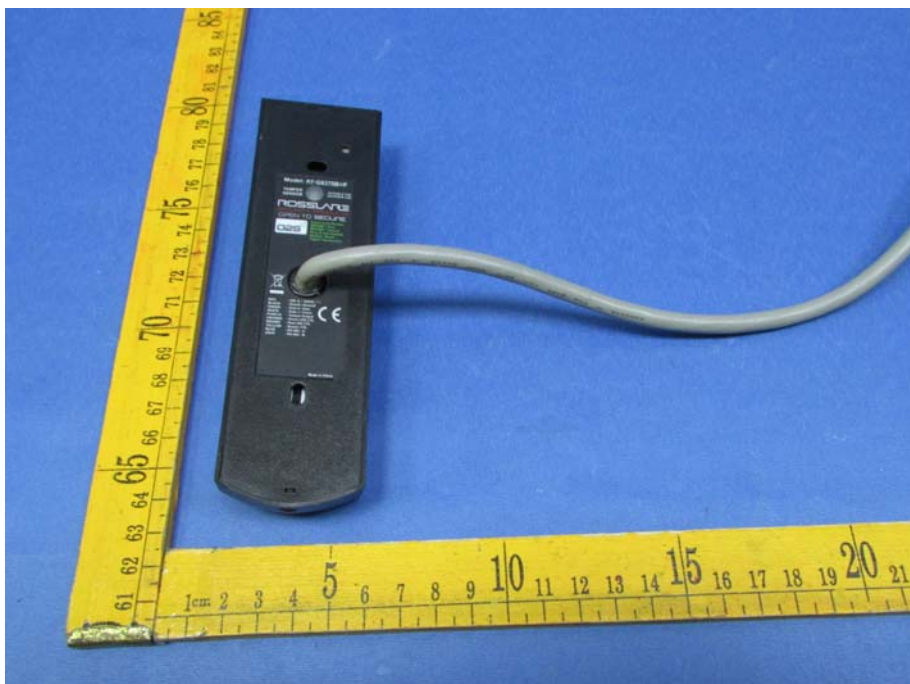
From 30MHz to 1GHz at Test Site 2#



13 Photographs - Constructional Details

13.1 EUT - Appearance View

Model: AY-G6370B+P00



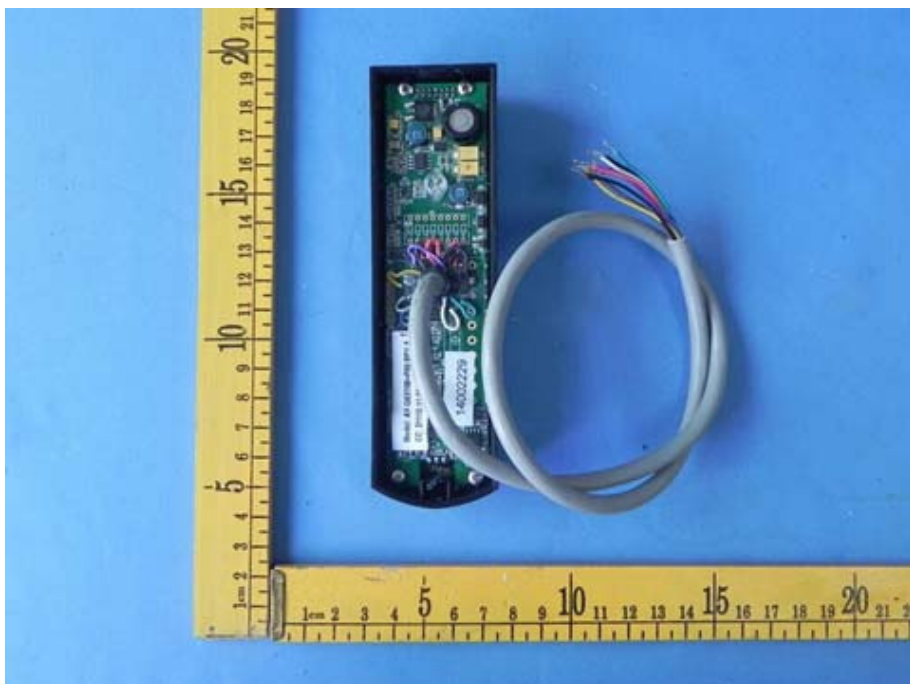


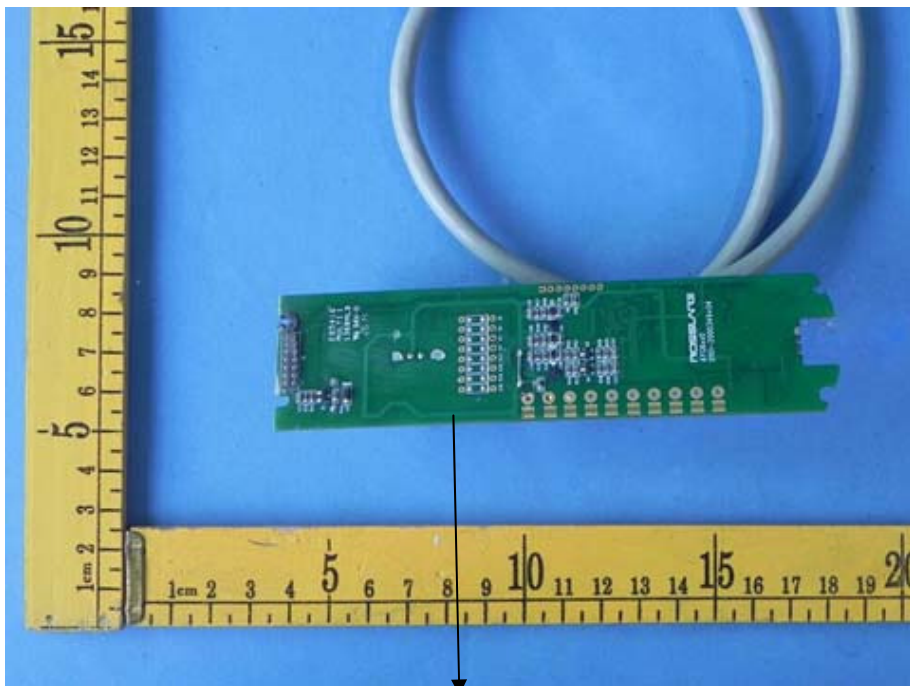
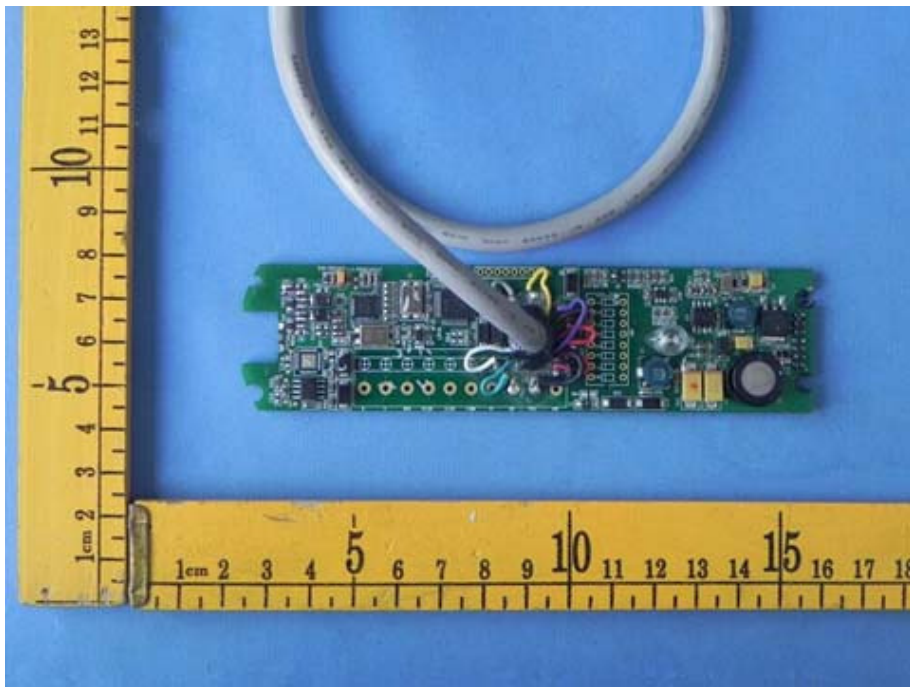
Model: AY-G6380B+TR0



13.2 EUT- Internal View

Model: AY-G6370B+P00

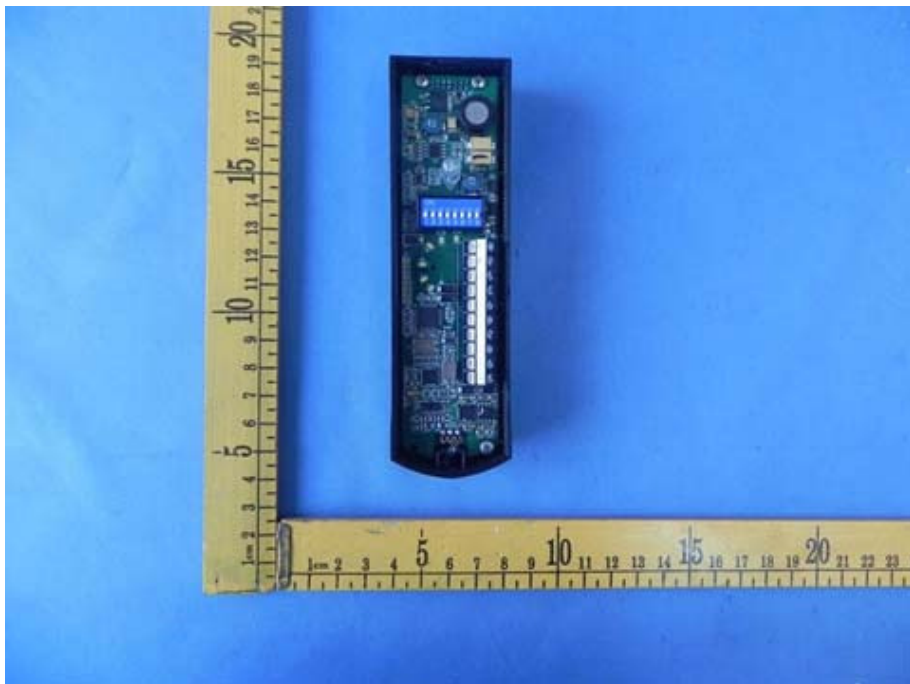


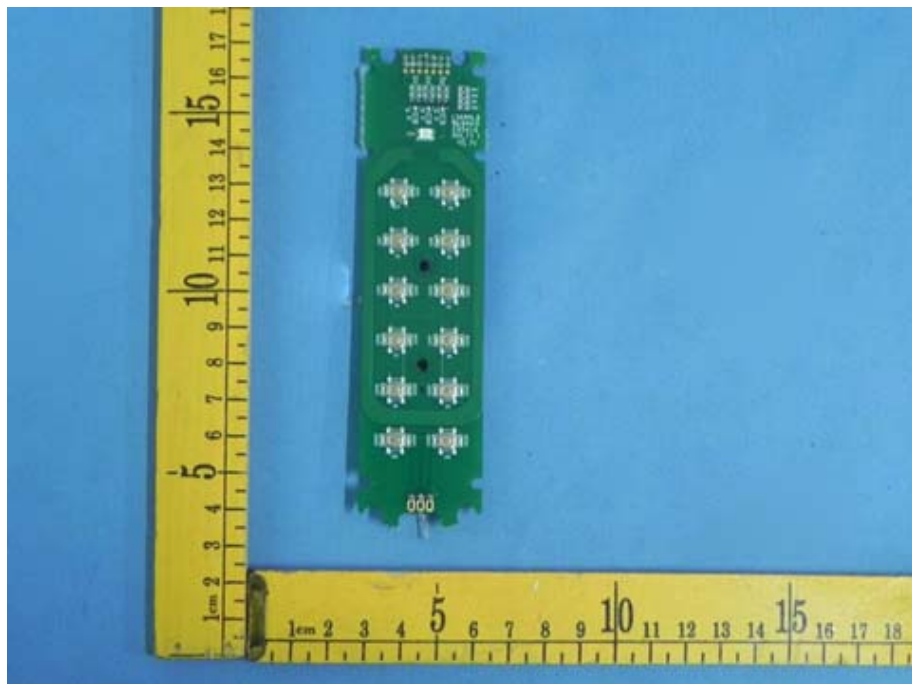
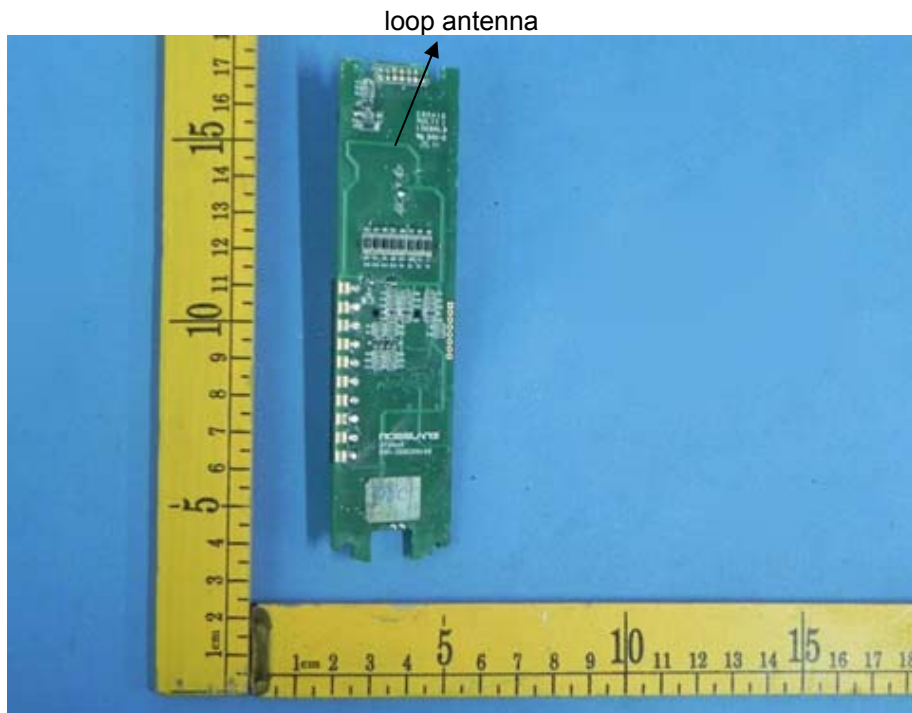


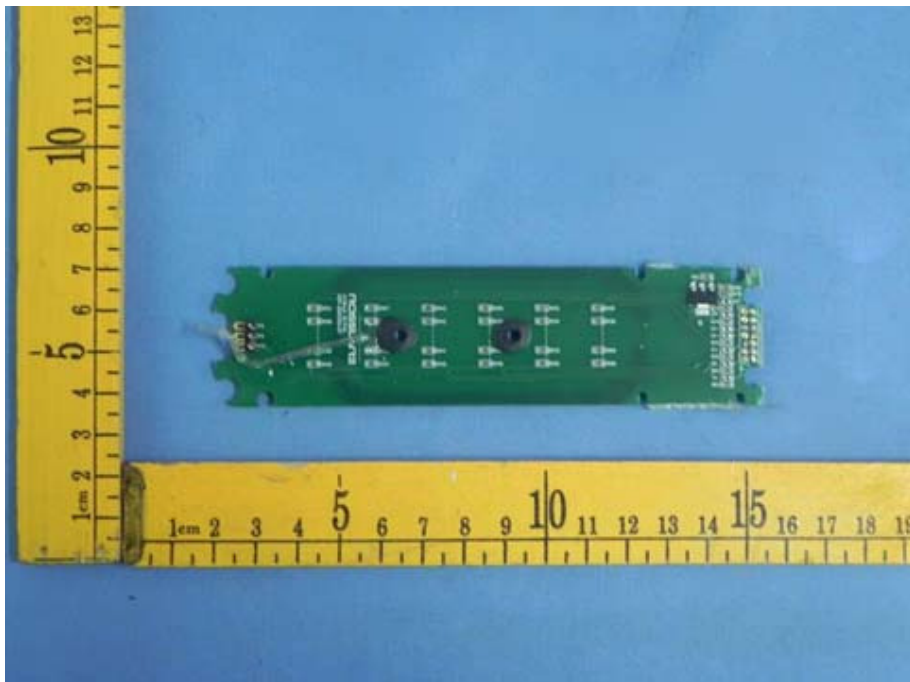
Loop antenna

Model: AY-G6380B+TR0









====End of Report====