
FCC Test Report

Report No.: AGC00190170601FE01

FCC ID : ODCHW-S3
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : 2.4G optical wireless transmitter
BRAND NAME : N/A
MODEL NAME : HW-S3, HW-S2, HW-888, HW-N8T, HW-N9T, HW-D8T,
: HW-D9T, HW-398T, HW-399T, HW-933T, S8T
CLIENT : Shenzhen Bada Sheng Electronic Co., Ltd.
DATE OF ISSUE : July 11, 2017
STANDARD(S) : FCC Part 15 Rules
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|-----------------------|--------------------|--------------------|----------------------|-----------------|
| V1.0 | / | July 11, 2017 | Valid | Original Report |

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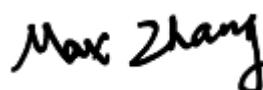
1. VERIFICATION OF CONFORMITY

| | |
|----------------------------------|---|
| Applicant | Shenzhen Bada Sheng Electronic Co., Ltd. |
| Address | Blk 12 Foodstuff Ind Park, Songyuan Village, Guanlan Town, Shenzhen, China |
| Manufacturer | Shenzhen Bada Sheng Electronic Co., Ltd. |
| Address | Blk 12 Foodstuff Ind Park, Songyuan Village, Guanlan Town, Shenzhen, China |
| Product Designation | 2.4G optical wireless transmitter |
| Brand Name | N/A |
| Test Model | HW-S3 |
| Series Model | HW-S2, HW-888, HW-N8T, HW-N9T, HW-D8T, HW-D9T, HW-398T, HW-399T, HW-933T, S8T |
| Declaration of Difference | All the same except for the appearance. |
| Date of test | July 10, 2017 to July 11, 2017 |
| Deviation | None |
| Condition of Test Sample | Normal |
| Test Result | Pass |
| Report Template | AGCRT-US-BR/RF (2013-03-01) |

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2014) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15 subpart B.

Tested by



Max Zhang(Zhang Yi)

July 11, 2017

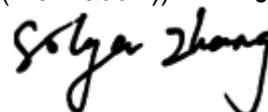
Reviewed by



Bart Xie(Xie Xiaobin))

July 11, 2017

Approved by



Solger Zhang(Zhang Hongyi)

Authorized Officer

July 11, 2017

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

| | |
|-------------------------|-------------------|
| Hardware Version | V04 |
| Software Version | V28 |
| EUT Supply | DC 5V by USB port |

2.2. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: ODCHW-S3** filing to comply with Section 15.107&109 of the FCC Part 15, Subpart B Rules.

2.3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2014). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.4. SPECIAL ACCESSORIES

Refer to section 5.1.

2.5. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

Conducted measurement: $\pm 3.18\text{dB}$

Radiated measurement: $\pm 3.91\text{dB}$

4. DESCRIPTION OF TEST MODES

| NO. | TEST MODE DESCRIPTION |
|-----|-----------------------------------|
| 1 | Connected to PC for data exchange |

5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

| Item | Equipment | Model No. | ID or Specification | Remark |
|------|-----------------------------------|-----------|---------------------|---------|
| 1 | 2.4G optical wireless transmitter | HW-S3 | ODCHW-S3 | EUT |
| 2 | PC | SONY | E1412AYCW | Support |
| 3 | PC adapter | SONY | A13-040A3A | Support |

5.2. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|-----------|---------------------|-----------|
| §15.109 | Radiated Emission | Compliant |
| §15.107 | Conducted Emission | Compliant |

6. TEST FACILITY

| | |
|-----------------------------|--|
| Site | Dongguan Precise Testing Service Co., Ltd. |
| Location | Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China |
| FCC Registration No. | 371540 |
| Description | The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2014. |

ALL TEST EQUIPMENT LIST

| Radiated Emission Test Site | | | | | |
|-------------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 4, 2017 | July 3, 2018 |
| Trilog Broadband Antenna (25M-1GHz) | SCHWARZBECK | VULB9160 | 9160-3355 | July 4, 2017 | July 3, 2018 |
| Signal Amplifier | SCHWARZBECK | BBV 9475 | 9745-0013 | July 4, 2017 | July 3, 2018 |
| RF Cable | SCHWARZBECK | AK9515E | 96221 | July 4, 2017 | July 3, 2018 |
| 3m Anechoic Chamber | CHENGYU | 966 | PTS-001 | July 4, 2017 | July 3, 2018 |
| MULTI-DEVICE Positioning Controller | Max-Full | MF-7802 | MF780208339 | N/A | N/A |
| Active loop antenna (9K-30MHz) | Schwarzbeck | FMZB1519 | 1519-038 | June 6, 2017 | June 5, 2018 |
| Spectrum analyzer | Agilent | E4407B | MY46185649 | June 6, 2017 | June 5, 2018 |
| Horn Antenna (1G-18GHz) | SCHWARZBECK | BBHA9120D | 9120D-1246 | June 2, 2017 | June 1, 2018 |
| Horn Ant (18G-40GHz) | Schwarzbeck | BBHA 9170 | 9170-181 | June 6, 2017 | June 5, 2018 |

| Conducted Emission Test Site | | | | | |
|--------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 4, 2017 | July 3, 2018 |
| Artificial Mains Network | Narda | L2-16B | 000WX31025 | June 2, 2017 | June 1, 2018 |
| Artificial Mains Network (AUX) | Narda | L2-16B | 000WX31026 | June 2, 2017 | June 1, 2018 |
| RF Cable | SCHWARZBECK | AK9515E | 96222 | June 2, 2017 | June 1, 2018 |
| Shielded Room | CHENGYU | 843 | PTS-002 | June 6, 2017 | June 5, 2018 |

7. RADIATED EMISSION

7.1. MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions below 1GHz, use 120KHz RBW and $VBW \geq 3RBW$ for QP reading.
7. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
8. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
9. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
10. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
11. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
12. Only the worst case is reported.

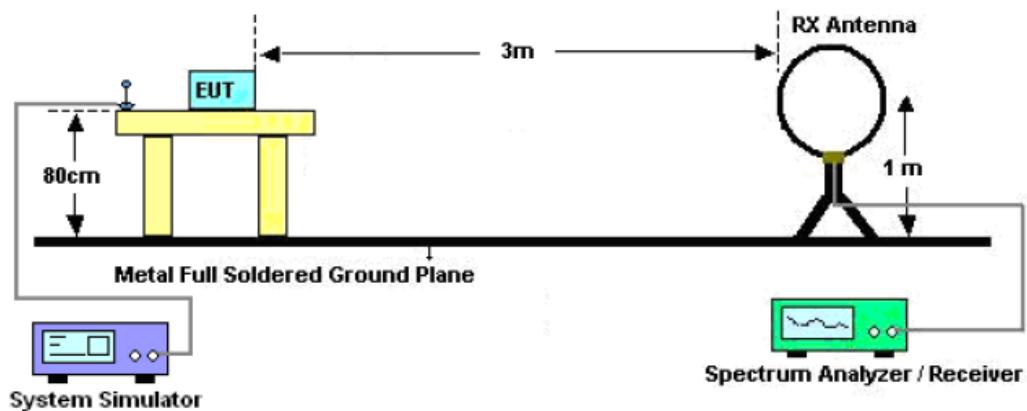
The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---------------------------|---|
| Start ~Stop Frequency | 9KHz~150KHz/RBW 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RBW 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RBW 120KHz for QP |
| Start ~Stop Frequency | 1GHz~12.5GHz 1MHz/3MHz for Peak, 1MHz/10Hz for Average |

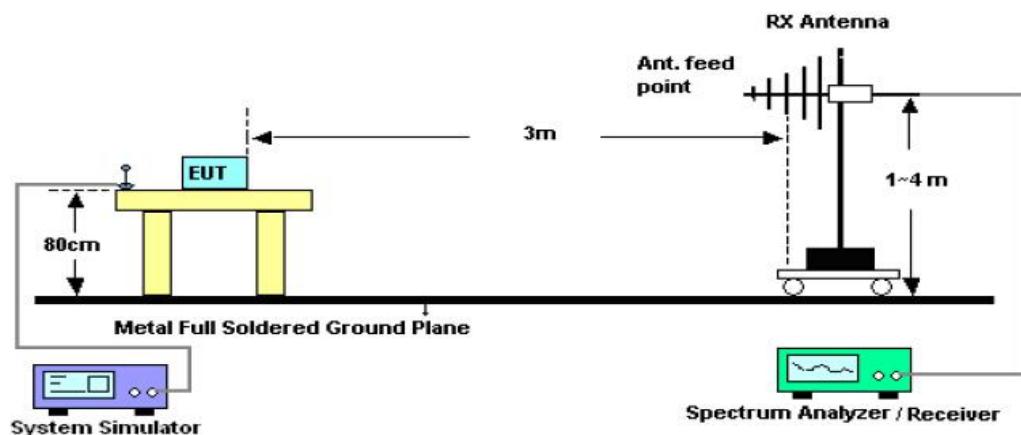
| Receiver Parameter | Setting |
|---------------------------|---------------------------------|
| Start ~Stop Frequency | 9KHz~150KHz/RBW 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RBW 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RBW 120KHz for QP |

7.2. TEST SETUP

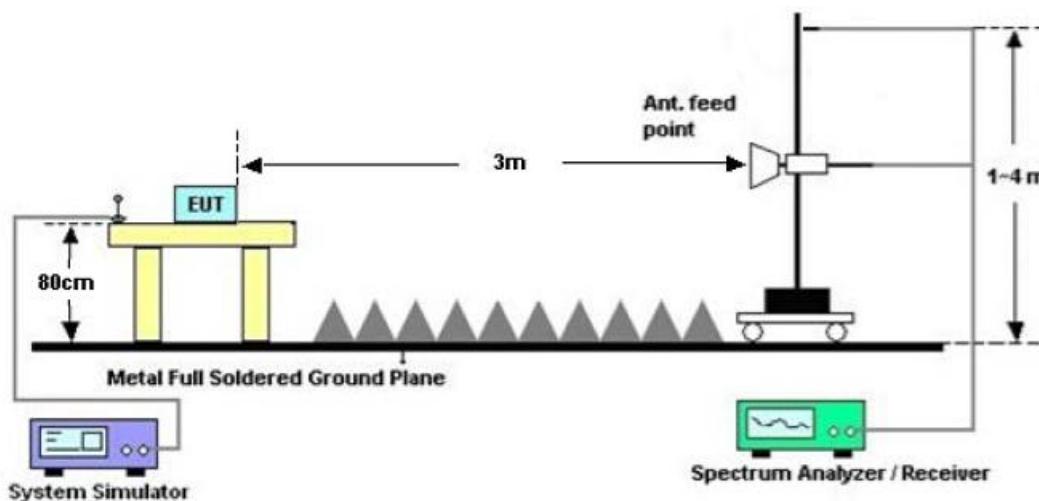
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz

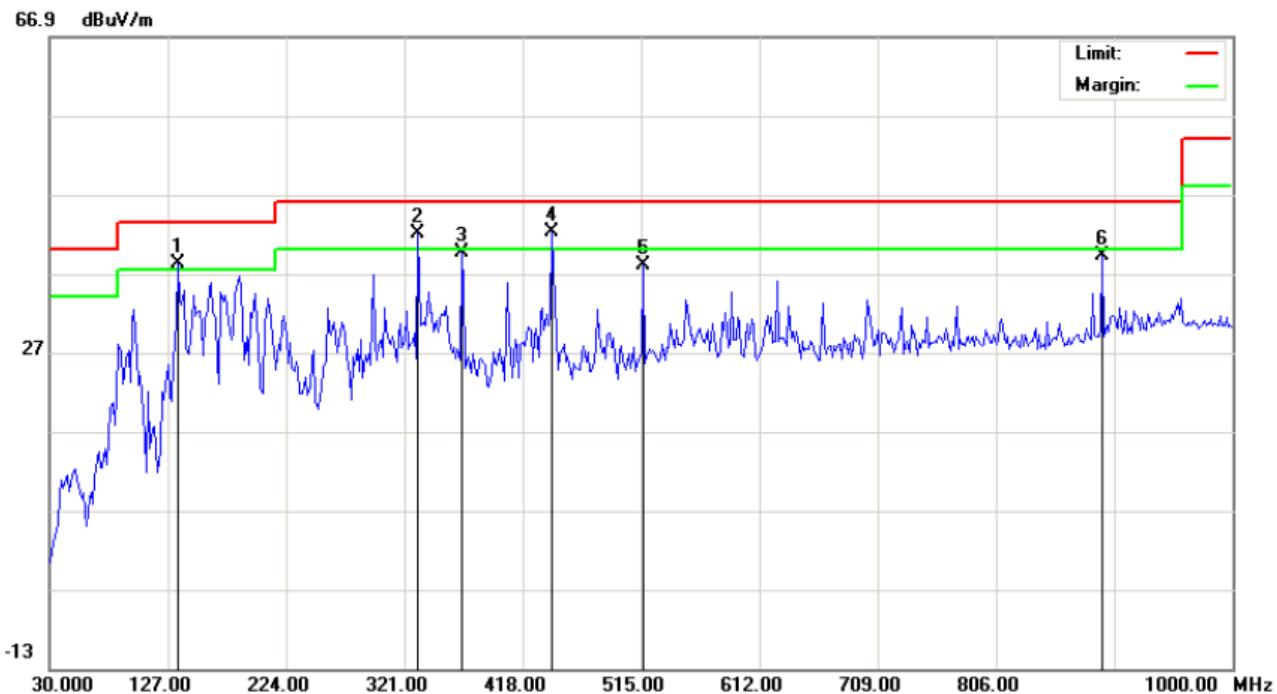


7.3. TEST RESULT

RADIATED EMISSION BELOW 30MHz

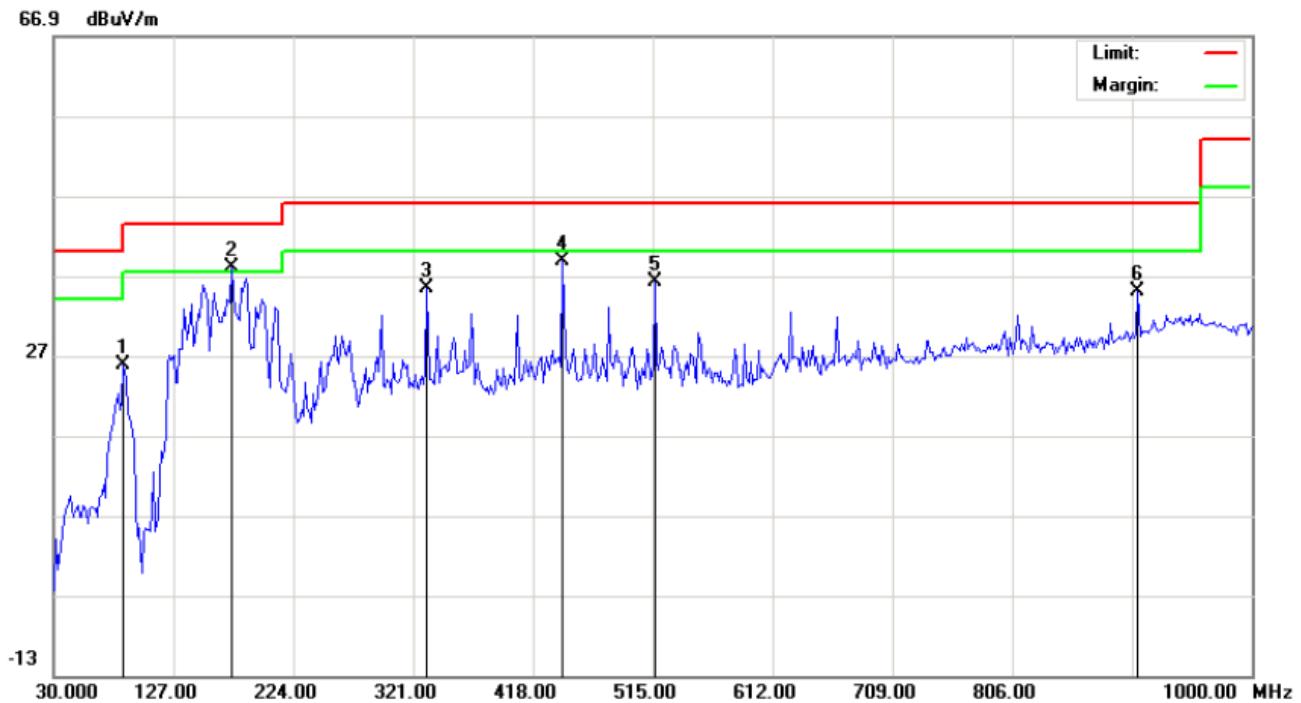
No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|-------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | ! | 135.0833 | 25.25 | 12.90 | 38.15 | 43.50 | -5.35 | peak | | | |
| 2 | ! | 332.3167 | 24.35 | 17.56 | 41.91 | 46.00 | -4.09 | peak | | | |
| 3 | | 367.8833 | 20.78 | 18.86 | 39.64 | 46.00 | -6.36 | peak | | | |
| 4 | * | 442.2500 | 21.88 | 20.35 | 42.23 | 46.00 | -3.77 | peak | | | |
| 5 | | 516.6167 | 16.44 | 21.58 | 38.02 | 46.00 | -7.98 | peak | | | |
| 6 | | 893.2999 | 10.71 | 28.44 | 39.15 | 46.00 | -6.85 | peak | | | |

RADIATED EMISSION BELOW 1GHZ-Vertical



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| 1 | | 86.5832 | 21.59 | 4.16 | 25.75 | 40.00 | -14.25 | peak | | | |
| 2 | * | 173.8833 | 23.47 | 14.46 | 37.93 | 43.50 | -5.57 | peak | | | |
| 3 | | 332.3167 | 17.91 | 17.56 | 35.47 | 46.00 | -10.53 | peak | | | |
| 4 | | 442.2500 | 18.52 | 20.35 | 38.87 | 46.00 | -7.13 | peak | | | |
| 5 | | 516.6167 | 14.53 | 21.58 | 36.11 | 46.00 | -9.89 | peak | | | |
| 6 | | 907.8500 | 6.08 | 28.83 | 34.91 | 46.00 | -11.09 | peak | | | |

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
 2. The "Factor" value can be calculated automatically by software of measurement system.
 3. Emissions range from 1GHz to 12.5GHz have 20dB margin. No recording in the test report.
 4. Only the data of the worst case would be record in this test report.

8. FCC LINE CONDUCTED EMISSION TEST

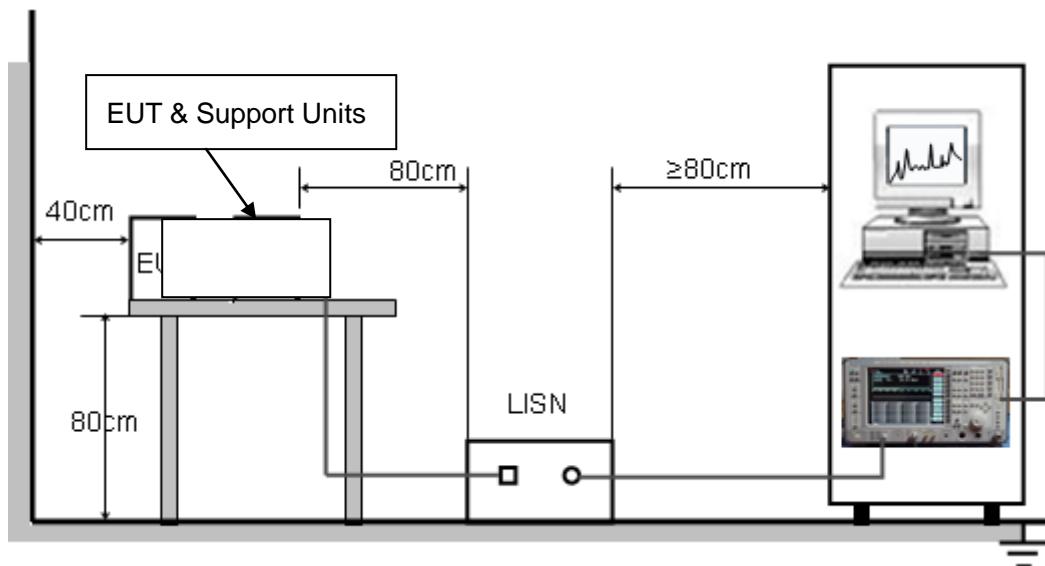
8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

| Frequency | Maximum RF Line Voltage | |
|---------------|-------------------------|----------------|
| | Q.P. (dBuV) | Average (dBuV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



8.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
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. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC charging voltage by PC which received 120V/60Hz power by a LISN..
6. The 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.
9. The test mode(s) were scanned during the preliminary test.

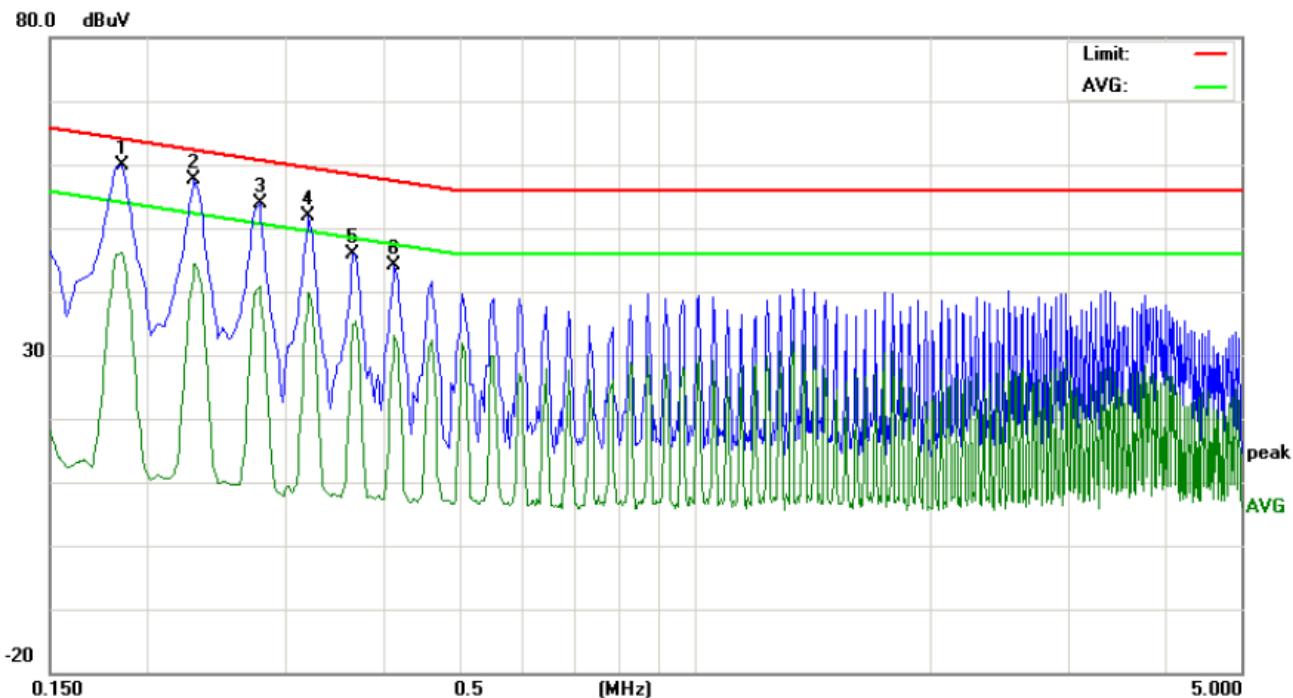
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

8.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

8.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

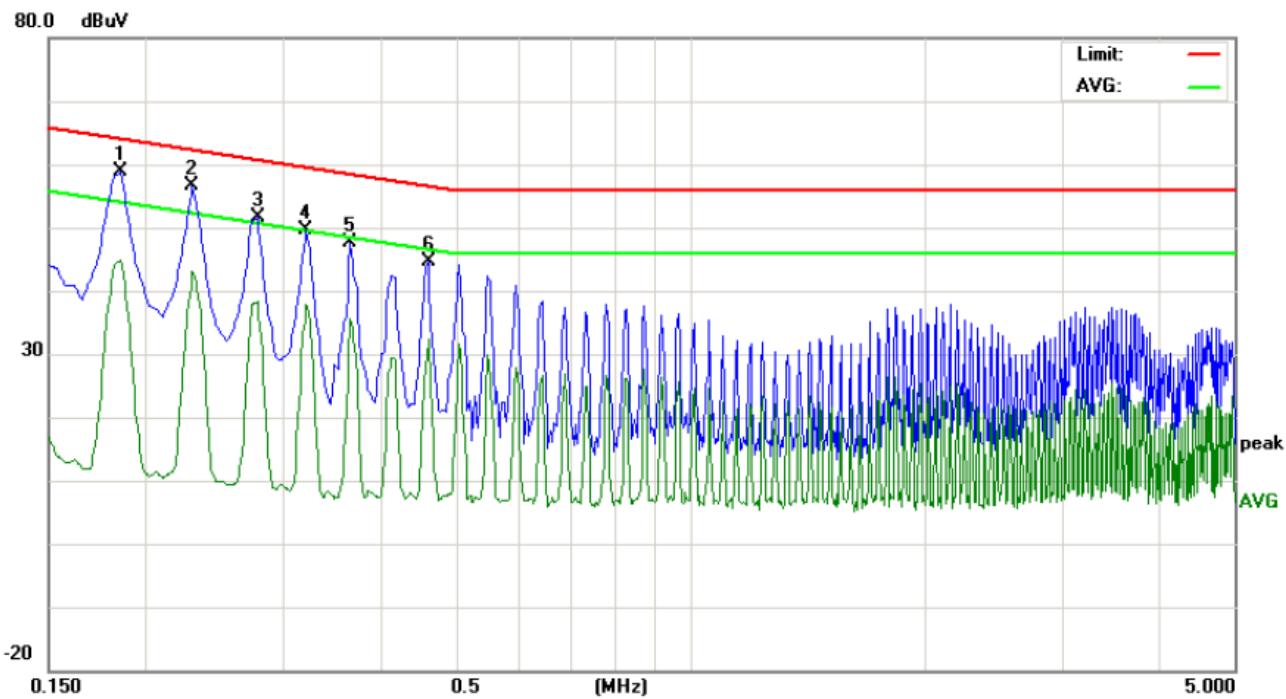
Line Conducted Emission Test Line 1-L



| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|-------------------|-----------------------|------|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | AVG | | dB | Peak | QP | AVG | QP | AVG | QP | AVG | |
| 1 | 0.1860 | 49.58 | | 35.90 | 10.20 | 59.78 | | 46.10 | 64.21 | 54.21 | -4.43 | -8.11 | P | |
| 2 | 0.2300 | 47.38 | | 34.19 | 10.25 | 57.63 | | 44.44 | 62.45 | 52.45 | -4.82 | -8.01 | P | |
| 3 | 0.2779 | 43.63 | | 30.70 | 10.28 | 53.91 | | 40.98 | 60.88 | 50.88 | -6.97 | -9.90 | P | |
| 4 | 0.3220 | 41.68 | | 29.54 | 10.30 | 51.98 | | 39.84 | 59.65 | 49.65 | -7.67 | -9.81 | P | |
| 5 | 0.3660 | 35.55 | | 24.54 | 10.32 | 45.87 | | 34.86 | 58.59 | 48.59 | -12.72 | -13.73 | P | |
| 6 | 0.4140 | 33.90 | | 22.81 | 10.34 | 44.24 | | 33.15 | 57.57 | 47.57 | -13.33 | -14.42 | P | |

RESULT: PASS

Line Conducted Emission Test Line 2-N

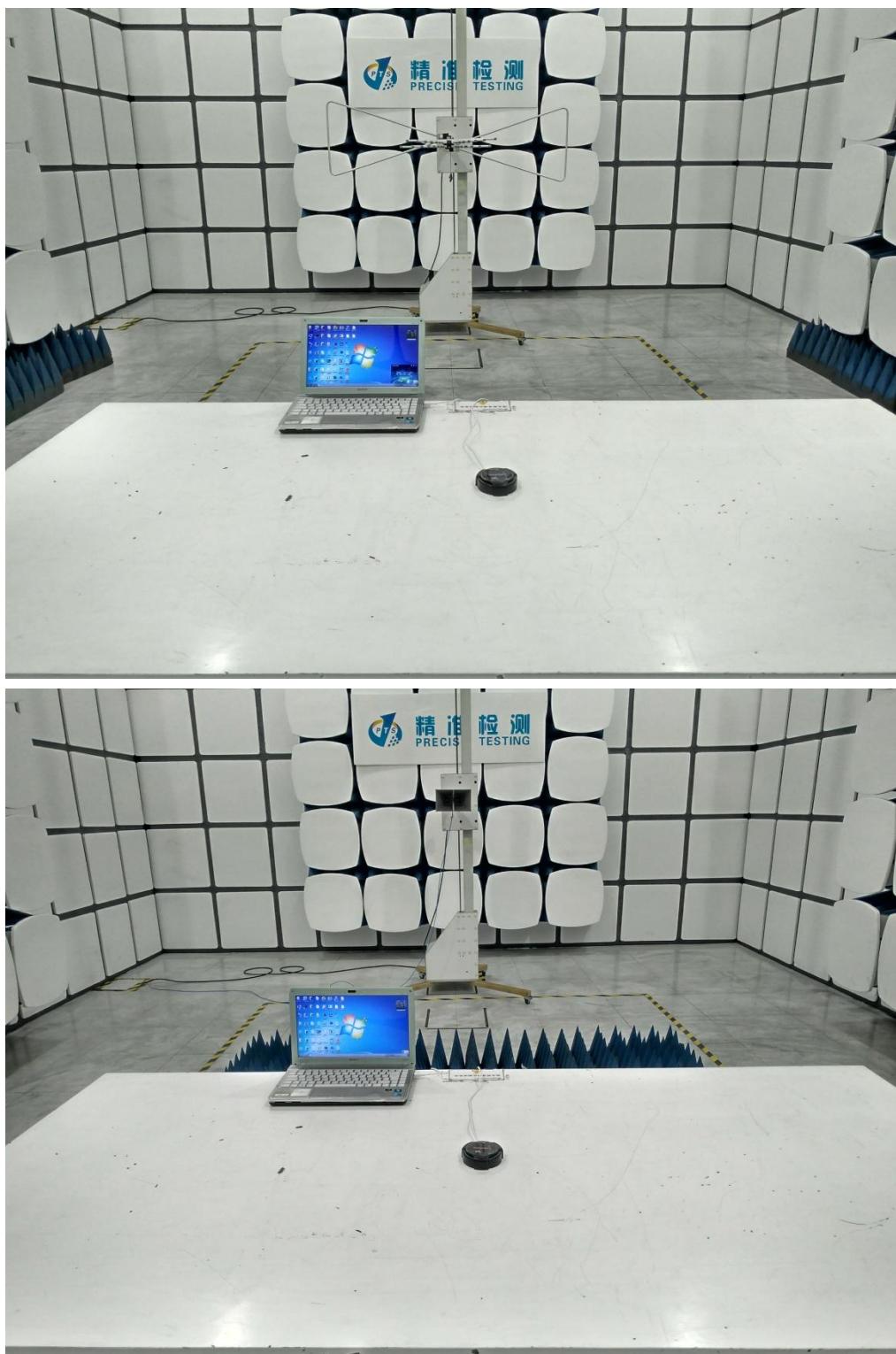


| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|-------------------|-----------------------|------|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | AVG | | dB | Peak | QP | AVG | QP | AVG | QP | AVG | |
| 1 | 0.1860 | 48.64 | | 34.77 | 10.20 | 58.84 | | 44.97 | 64.21 | 54.21 | -5.37 | -9.24 | P | |
| 2 | 0.2300 | 46.27 | | 32.80 | 10.25 | 56.52 | | 43.05 | 62.45 | 52.45 | -5.93 | -9.40 | P | |
| 3 | 0.2779 | 41.29 | | 28.05 | 10.28 | 51.57 | | 38.33 | 60.88 | 50.88 | -9.31 | -12.55 | P | |
| 4 | 0.3220 | 39.37 | | 27.48 | 10.30 | 49.67 | | 37.78 | 59.65 | 49.65 | -9.98 | -11.87 | P | |
| 5 | 0.3660 | 37.36 | | 25.40 | 10.32 | 47.68 | | 35.72 | 58.59 | 48.59 | -10.91 | -12.87 | P | |
| 6 | 0.4620 | 34.22 | | 21.94 | 10.37 | 44.59 | | 32.31 | 56.66 | 46.66 | -12.07 | -14.35 | P | |

RESULT: PASS

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP



CONDUCTED EMISSION TEST SETUP



APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



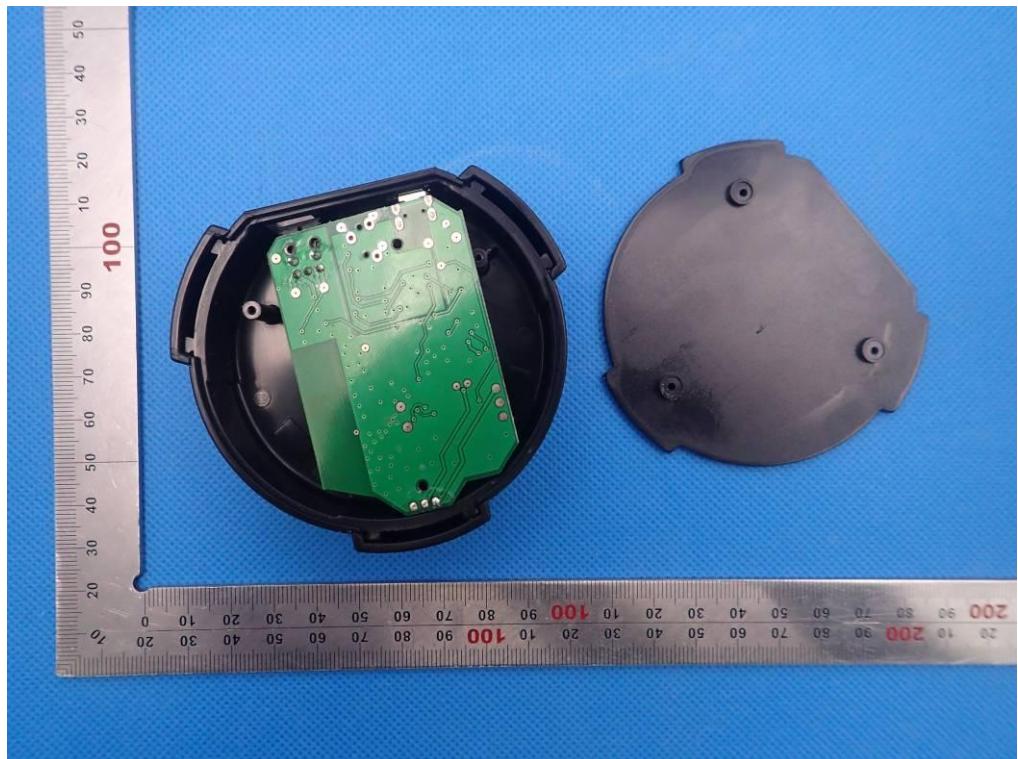
LEFT VIEW OF EUT



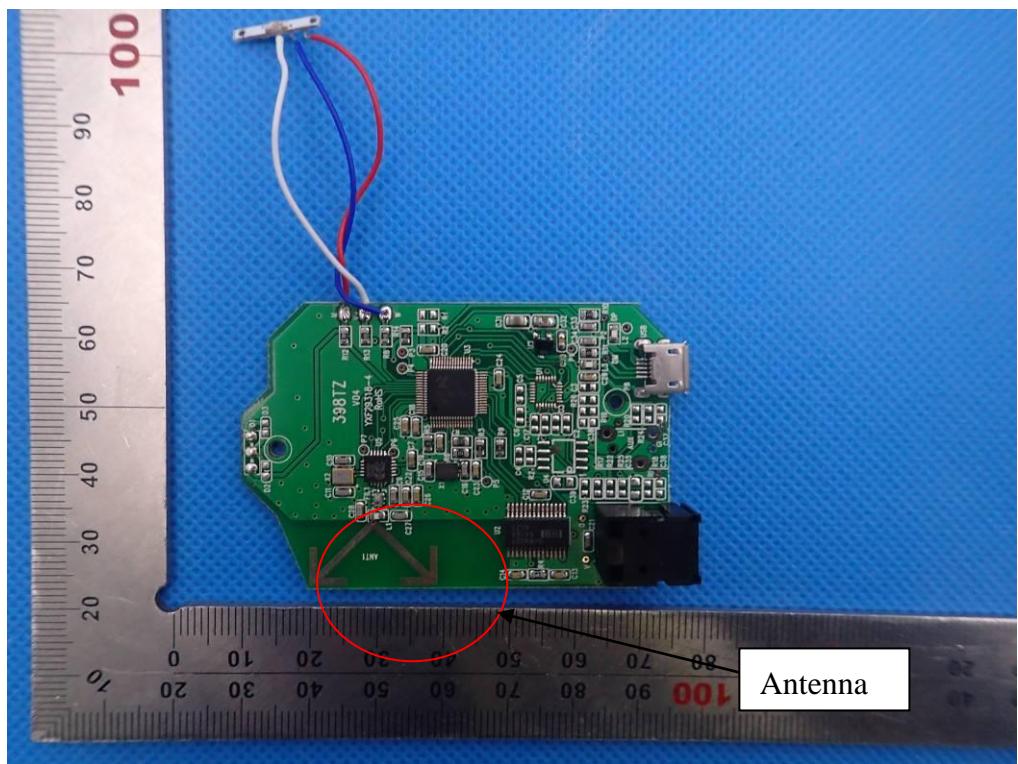
RIGHT VIEW OF EUT



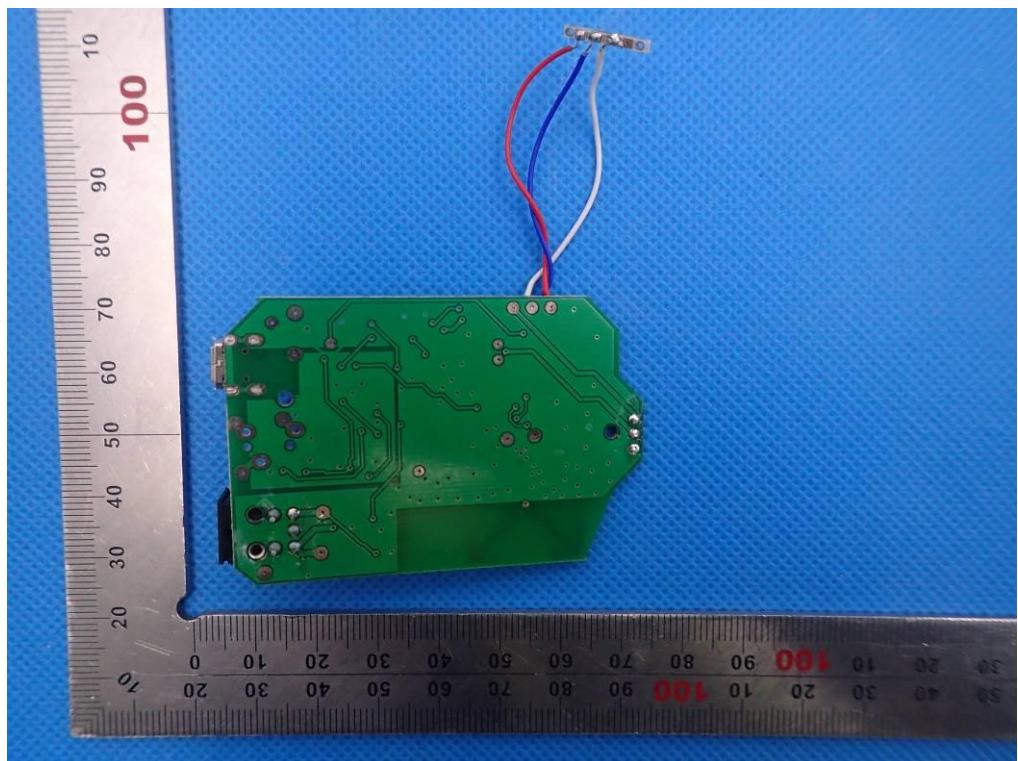
OPEN VIEW OF EUT



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----