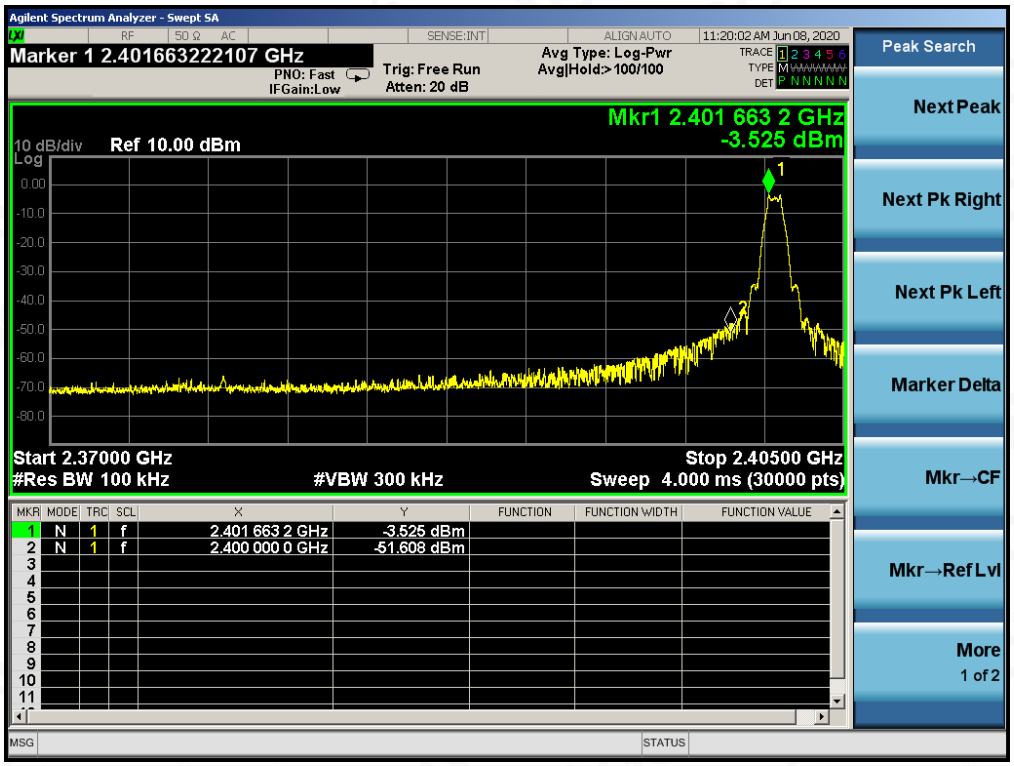
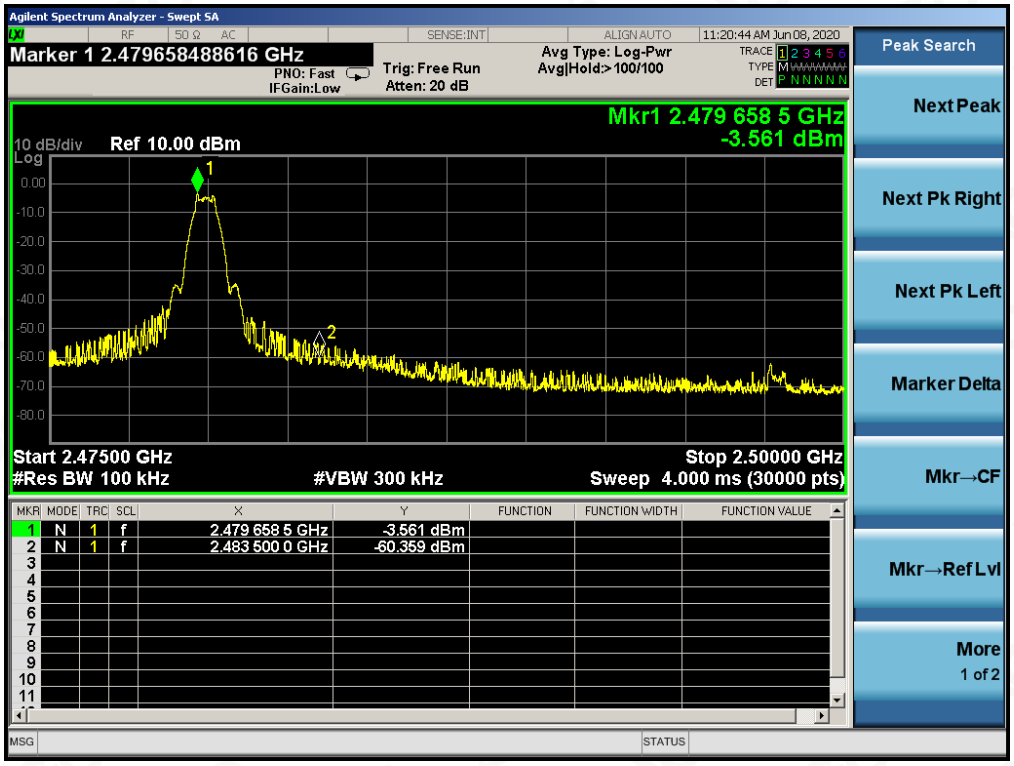
## TEST RESULT FOR BAND EDGE

GFSK MODULATION IN LOW CHANNEL




GFSK MODULATION IN HIGH CHANNEL

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# 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

## 10.1. MEASUREMENT PROCEDURE

(1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
(2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
(3). Set SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 10.2 was used in this testing.

## 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 7.2.

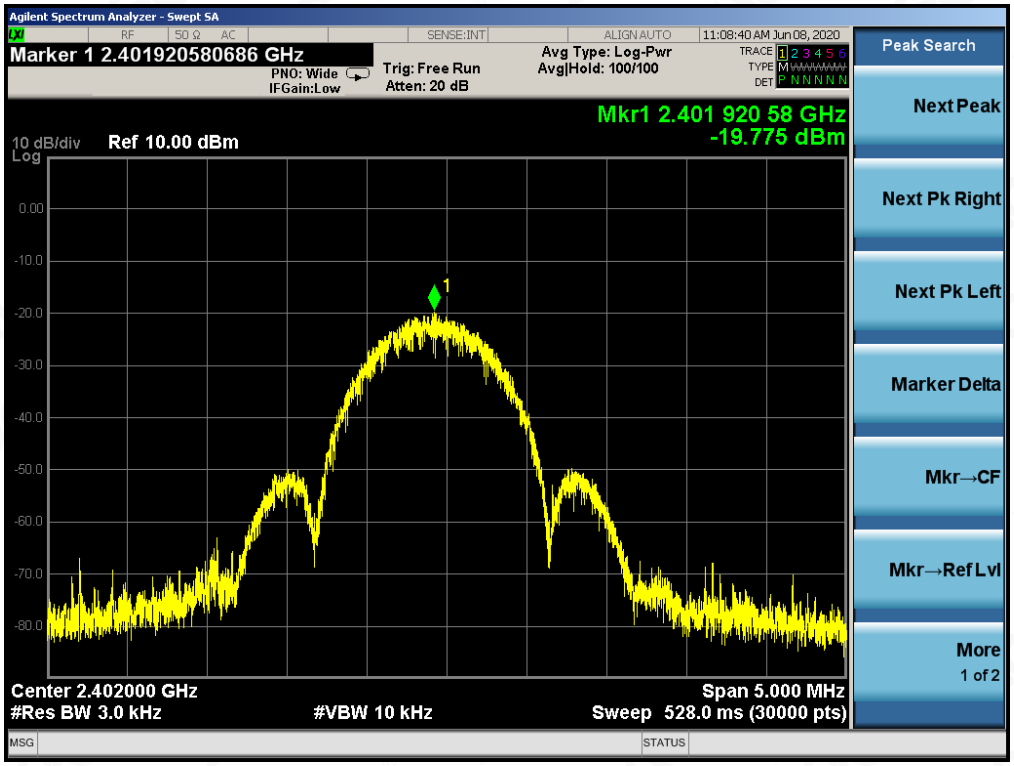
## 10.3. MEASUREMENT EQUIPMENT USED

Refer To Section 6.

## 10.4. LIMITS AND MEASUREMENT RESULT

| Channel No. | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|---|---|---|---|
| Low Channel | -19.775 | 8 | Pass |
| Middle Channel | -19.760 | 8 | Pass |
| High Channel | -19.758 | 8 | Pass |

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

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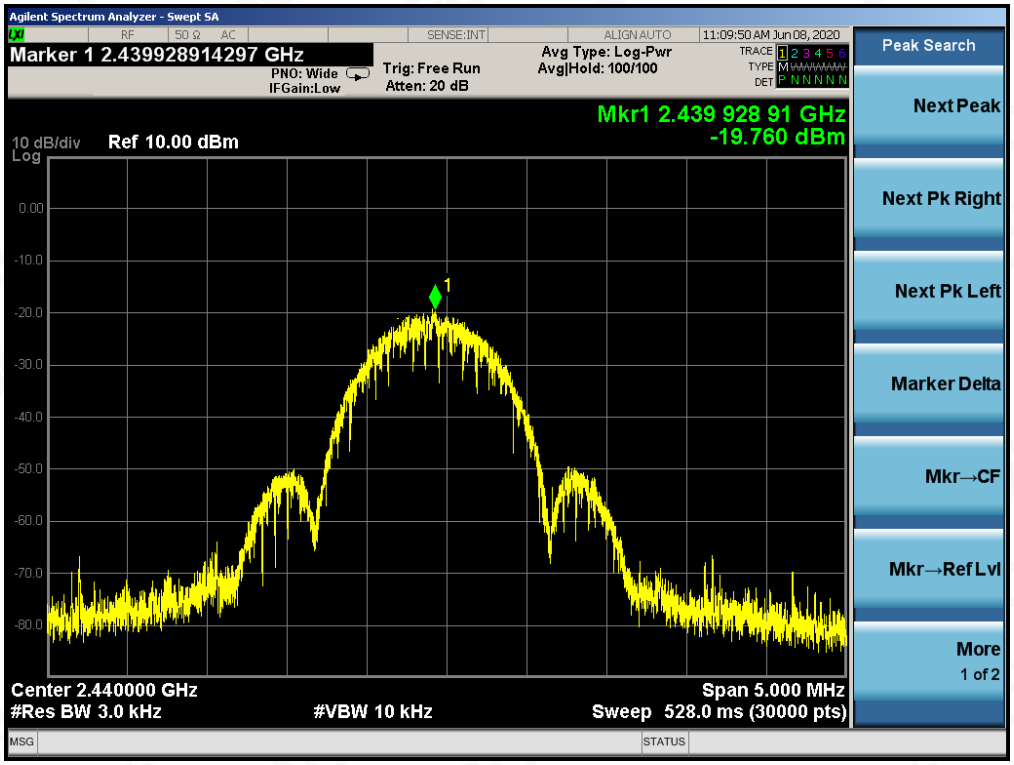
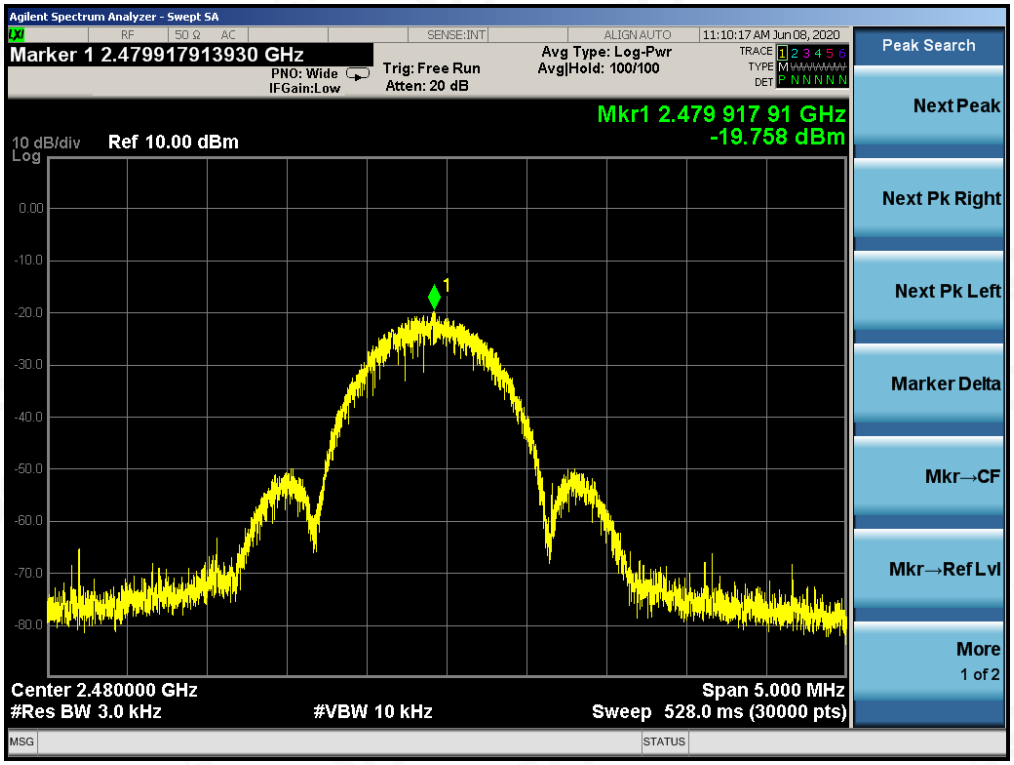
TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL




TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

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# 11. RADIATED EMISSION

## 11.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 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 above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. 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.
8. 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.
9. 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.
10. 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.

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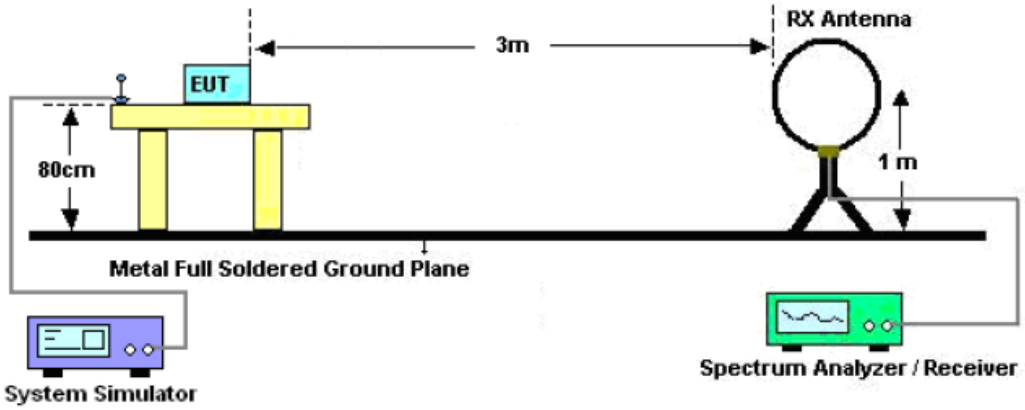
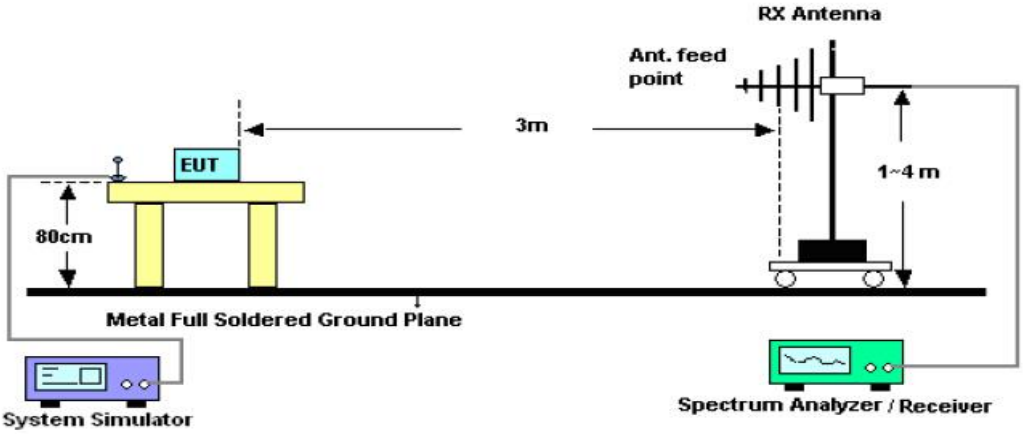
## 11.2. TEST SETUP

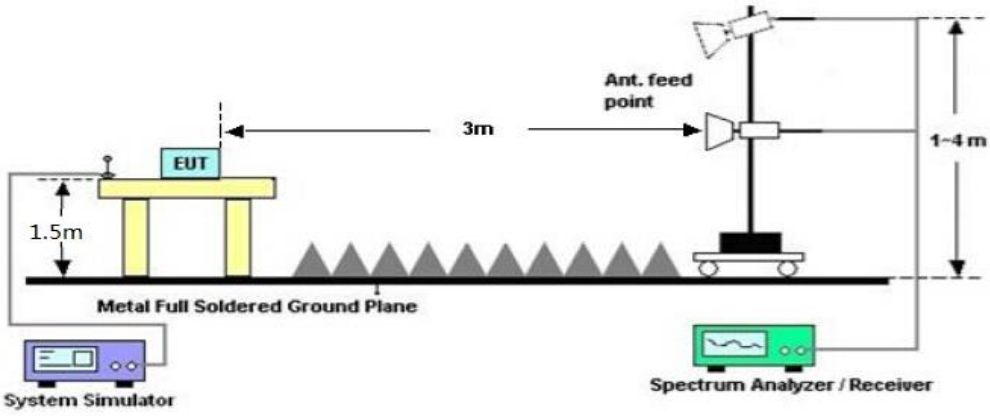
Radiated Emission Test-Setup Frequency Below 30MHz




RADIATED EMISSION TEST SETUP 30MHz-1000MHz




RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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## 11.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note: All modes were tested For restricted band radiated emission, the test records reported below are the worst result compared to other modes.

## 11.4. TEST RESULT

**RADIATED EMISSION BELOW 30MHZ**

Emissions are attenuated more than 20 dB below the permissible value.

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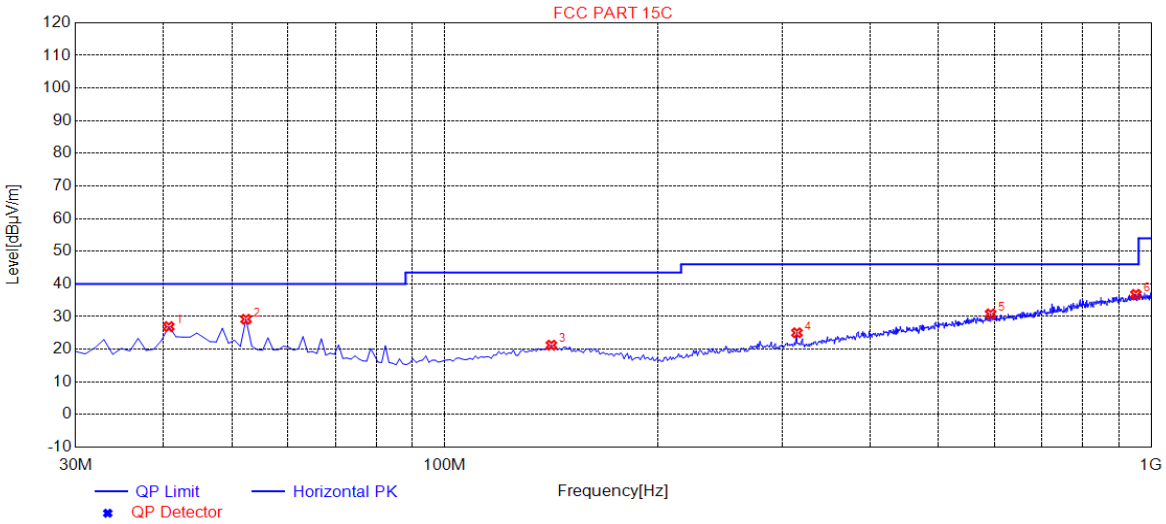
## RADIATED EMISSION BELOW 1GHZ

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 2 | **Antenna** | Horizontal |




| NO. | Freq. [MHz] | Level [dBµV/m] | Factor [dB] | Limit [dBµV/m] | Margin [dB] | Polarity |
|---|---|---|---|---|---|---|
| 1 | 40.6700 | 26.93 | 14.91 | 40.00 | 13.07 | Horizontal |
| 2 | 52.3100 | 29.19 | 14.49 | 40.00 | 10.81 | Horizontal |
| 3 | 141.5500 | 21.24 | 14.88 | 43.50 | 22.26 | Horizontal |
| 4 | 315.1800 | 25.04 | 16.48 | 46.00 | 20.96 | Horizontal |
| 5 | 592.6000 | 30.82 | 24.18 | 46.00 | 15.18 | Horizontal |
| 6 | 951.5000 | 36.79 | 30.66 | 46.00 | 9.21 | Horizontal |

**RESULT: PASS**

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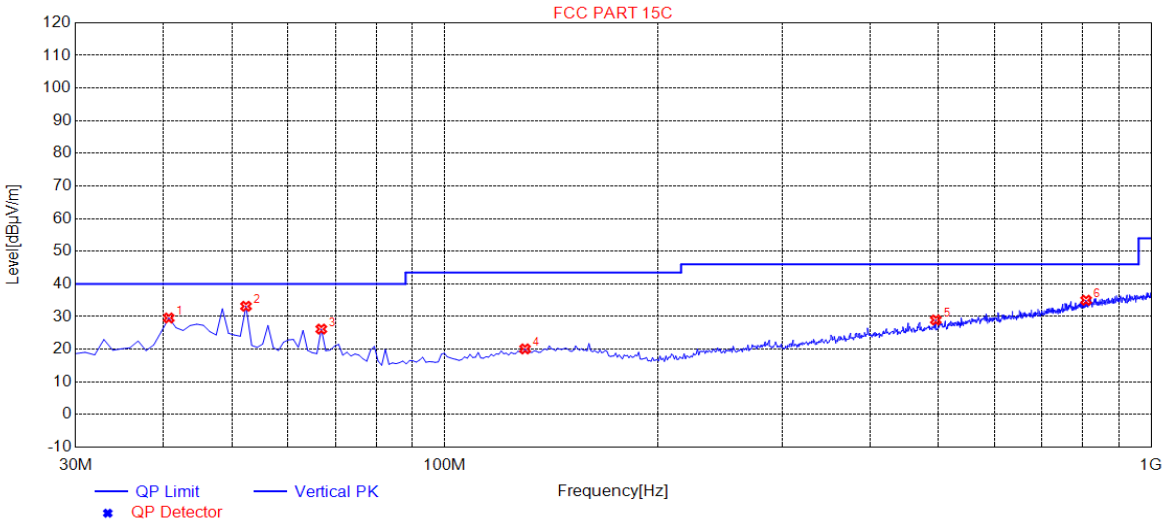
| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 2 | **Antenna** | Vertical |




| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Polarity |
|---|---|---|---|---|---|---|
| 1 | 40.6700 | 29.58 | 14.91 | 40.00 | 10.42 | Vertical |
| 2 | 52.3100 | 33.17 | 14.49 | 40.00 | 6.83 | Vertical |
| 3 | 66.8600 | 26.18 | 12.76 | 40.00 | 13.82 | Vertical |
| 4 | 129.9100 | 20.11 | 14.14 | 43.50 | 23.39 | Vertical |
| 5 | 495.6000 | 28.97 | 22.06 | 46.00 | 17.03 | Vertical |
| 6 | 808.9100 | 35.02 | 28.62 | 46.00 | 10.98 | Vertical |

**RESULT: PASS**

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been tested. The mode 2 is the worst case and recorded in the report.

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## RADIATED EMISSION ABOVE 1GHZ

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 1 | **Antenna** | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4804.000 | 43.97 | 0.08 | 44.05 | 74 | -29.95 | peak |
| 4804.000 | 35.64 | 0.08 | 35.72 | 54 | -18.28 | AVG |
| 7206.000 | 38.24 | 2.21 | 40.45 | 74 | -33.55 | peak |
| 7206.000 | 31.86 | 2.21 | 34.07 | 54 | -19.93 | AVG |
| | | | | | | |
| | | | | | | |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 1 | **Antenna** | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4804.000 | 42.51 | 0.08 | 42.59 | 74 | -31.41 | peak |
| 4804.000 | 34.72 | 0.08 | 34.8 | 54 | -19.2 | AVG |
| 7206.000 | 39.41 | 2.21 | 41.62 | 74 | -32.38 | peak |
| 7206.000 | 31.14 | 2.21 | 33.35 | 54 | -20.65 | AVG |
| | | | | | | |
| | | | | | | |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

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| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 2 | **Antenna** | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4880.000 | 44.61 | 0.14 | 44.75 | 74 | -29.25 | peak |
| 4880.000 | 35.34 | 0.14 | 35.48 | 54 | -18.52 | AVG |
| 7320.000 | 39.8 | 2.36 | 42.16 | 74 | -31.84 | peak |
| 7320.000 | 31.91 | 2.36 | 34.27 | 54 | -19.73 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 2 | **Antenna** | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4880.000 | 42.61 | 0.14 | 42.75 | 74 | -31.25 | peak |
| 4880.000 | 36.08 | 0.14 | 36.22 | 54 | -17.78 | AVG |
| 7320.000 | 38.42 | 2.36 | 40.78 | 74 | -33.22 | peak |
| 7320.000 | 33.48 | 2.36 | 35.84 | 54 | -18.16 | AVG |
| | | | | | | |
| | | | | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 3 | **Antenna** | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4960.000 | 45.34 | 0.22 | 45.56 | 74 | -28.44 | peak |
| 4960.000 | 36.59 | 0.22 | 36.81 | 54 | -17.19 | AVG |
| 7440.000 | 40.79 | 2.64 | 43.43 | 74 | -30.57 | peak |
| 7440.000 | 33.47 | 2.64 | 36.11 | 54 | -17.89 | AVG |
| | | | | | | |
| | | | | | | |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 3 | **Antenna** | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Value Type |
|---|---|---|---|---|---|---|
| 4960.000 | 43.91 | 0.22 | 44.13 | 74 | -29.87 | peak |
| 4960.000 | 37.24 | 0.22 | 37.46 | 54 | -16.54 | AVG |
| 7440.000 | 40.52 | 2.64 | 43.16 | 74 | -30.84 | peak |
| 7440.000 | 34.71 | 2.64 | 37.35 | 54 | -16.65 | AVG |
| | | | | | | |
| | | | | | | |
| Remark: | | | | | | |
| Factor = Antenna Factor + Cable Loss – Pre-amplifier. | | | | | | |

**RESULT: PASS**

**Note:** Other emissions from 1G~25GHz are attenuated more than 20 dB below the permissible value.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

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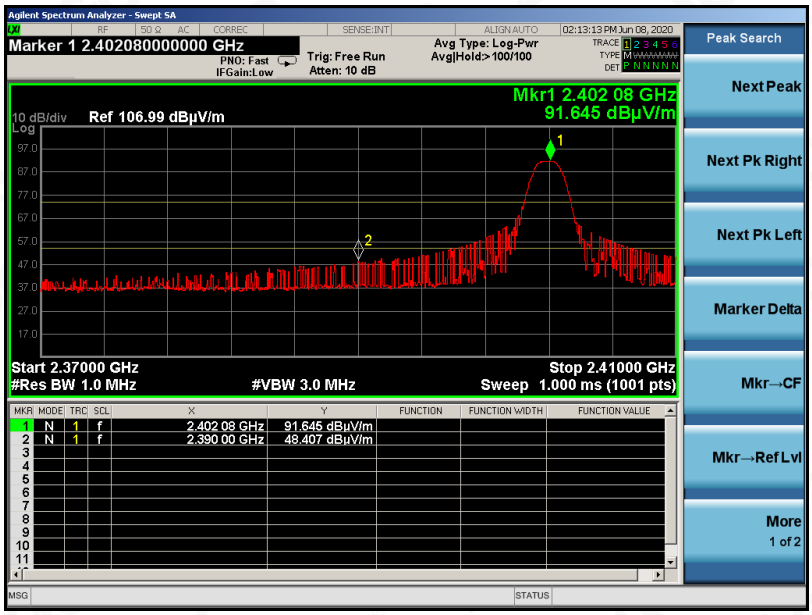
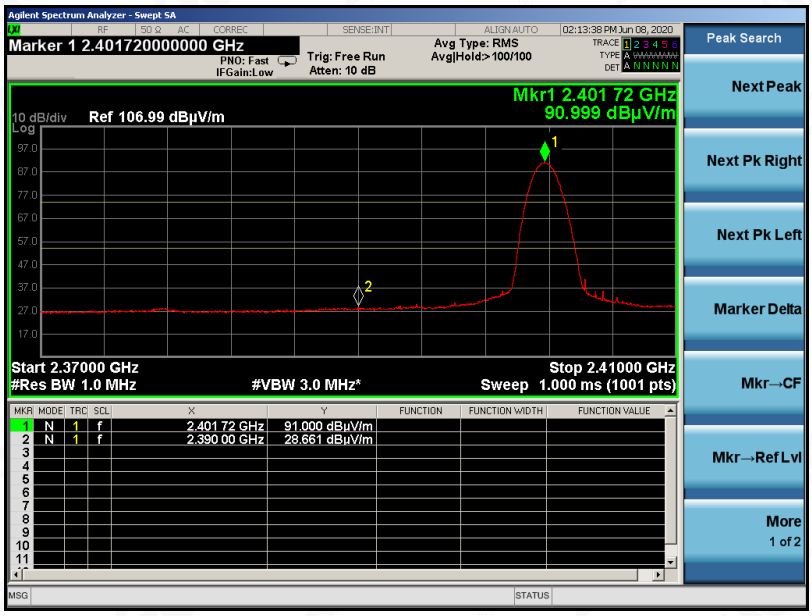
## TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 1 | **Antenna** | Horizontal |

PK




AV




**RESULT: PASS**

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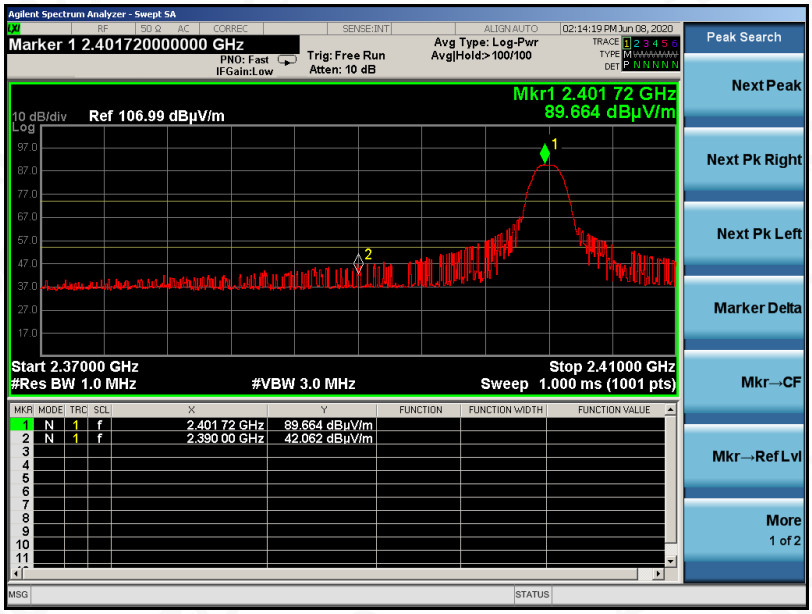
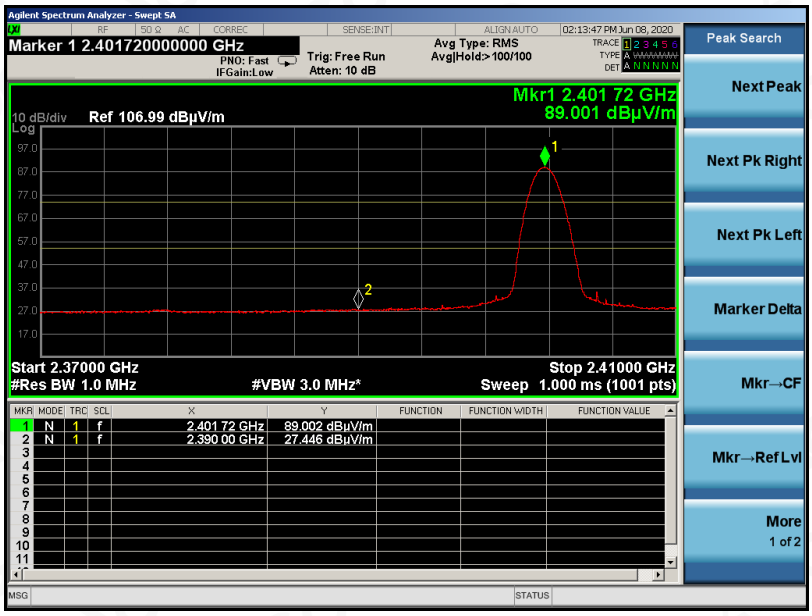
| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 1 | **Antenna** | Vertical |

PK




AV




**RESULT: PASS**

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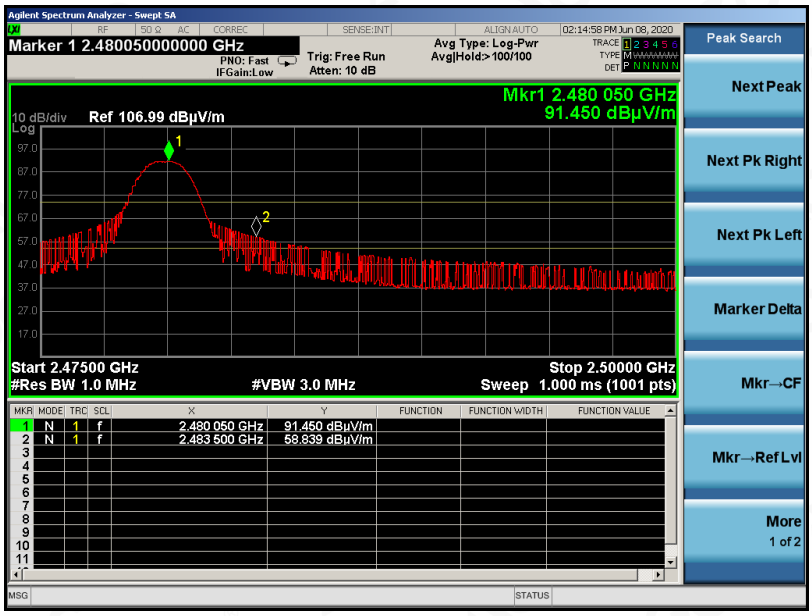
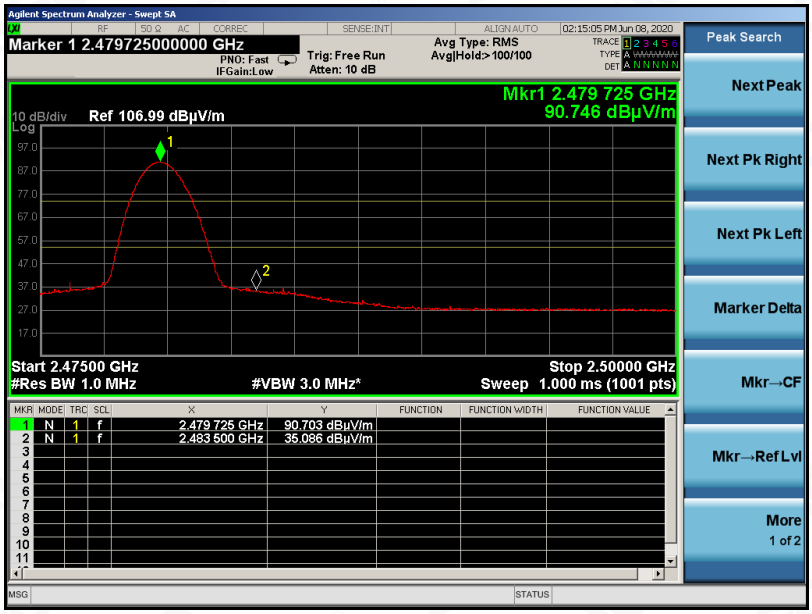
| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 3 | **Antenna** | Horizontal |

PK




AV




**RESULT: PASS**

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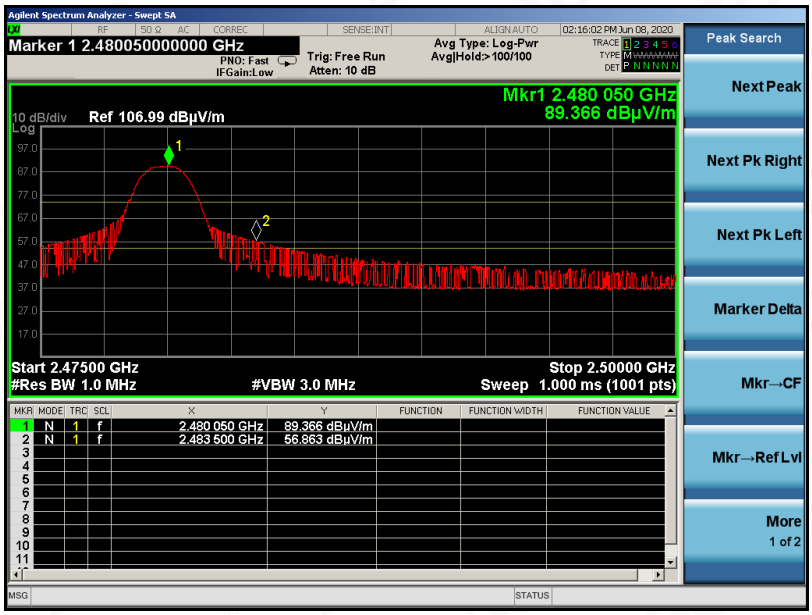
| | | | |
|---|---|---|---|
| **EUT** | Landscape Battery-Power spotlight | **Model Name** | LS-201-WMSR-SPL |
| **Temperature** | 25° C | **Relative Humidity** | 55.4% |
| **Pressure** | 960hPa | **Test Voltage** | Normal Voltage |
| **Test Mode** | Mode 3 | **Antenna** | Vertical |

PK




AV

**RESULT: PASS**

**Note**: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(µV) to represent the Amplitude. Use the F dB(µV/m) to represent the Field Strength. So A=F.

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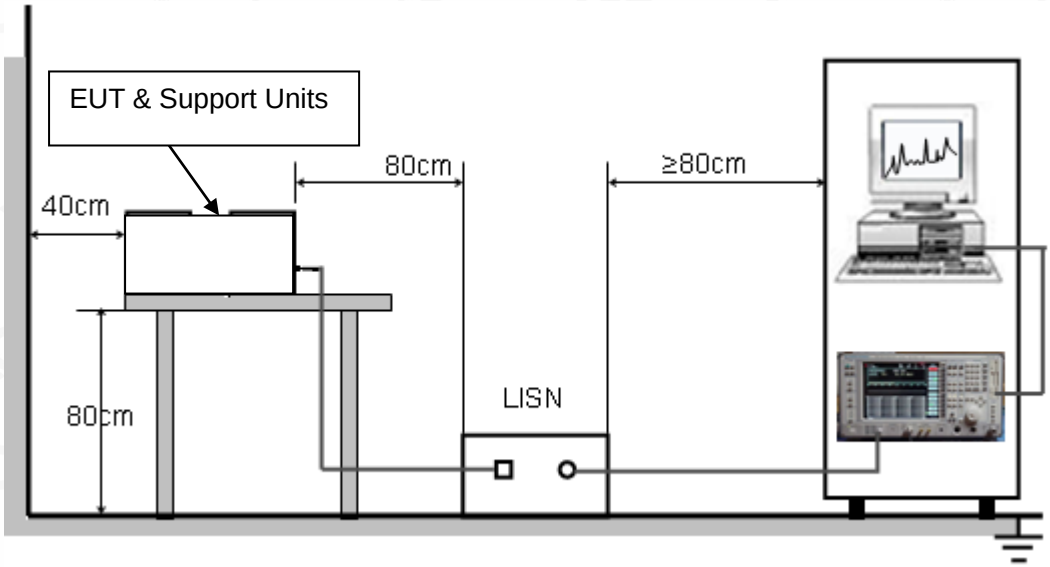
# 14. FCC LINE CONDUCTED EMISSION TEST

## 14.1. 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.

## 14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST

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### 14.3. 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 C63.10 (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 C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received power from which received AC120V/60Hz power from 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.

### 14.4. 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.

### 14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Note: The EUT is powered by battery.

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# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHZ

RADIATED EMISSION TEST SETUP ABOVE 1GHZ

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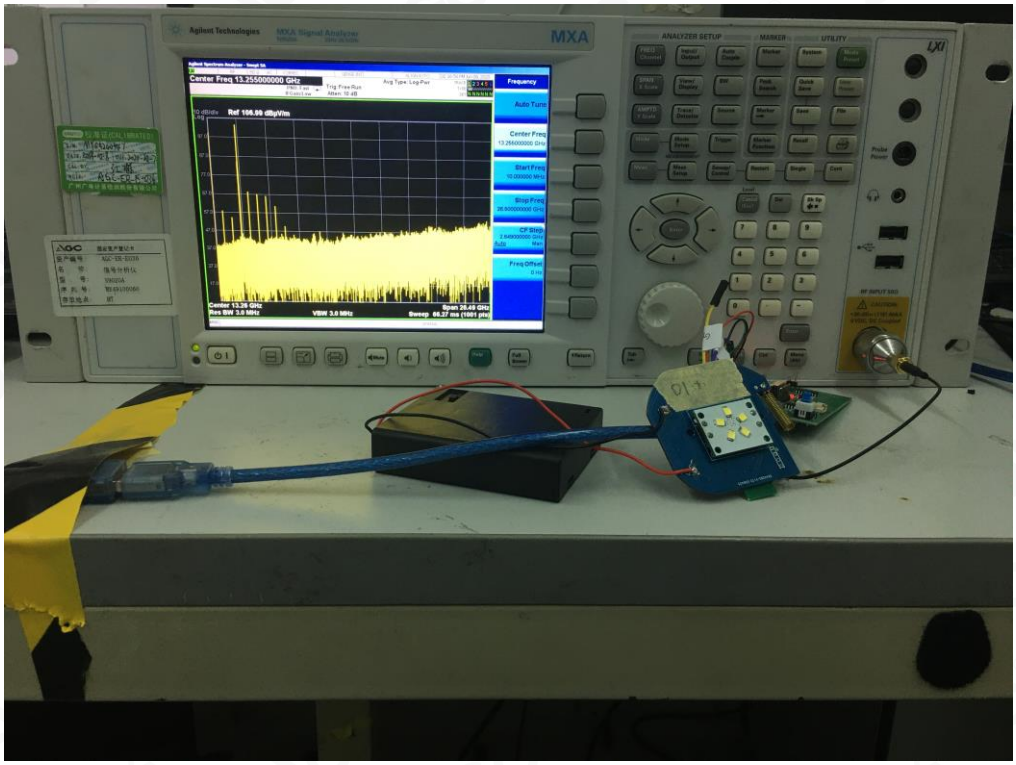
CONDUCTED TEST SETUP

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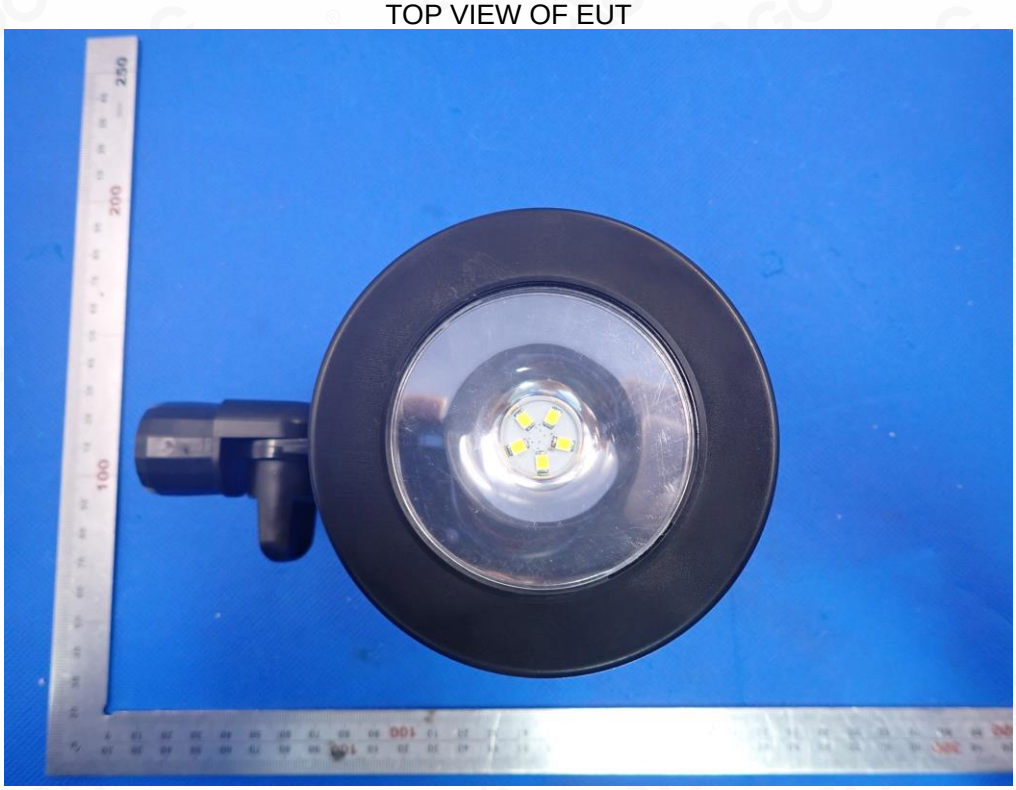
# APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT

TOP VIEW OF EUT



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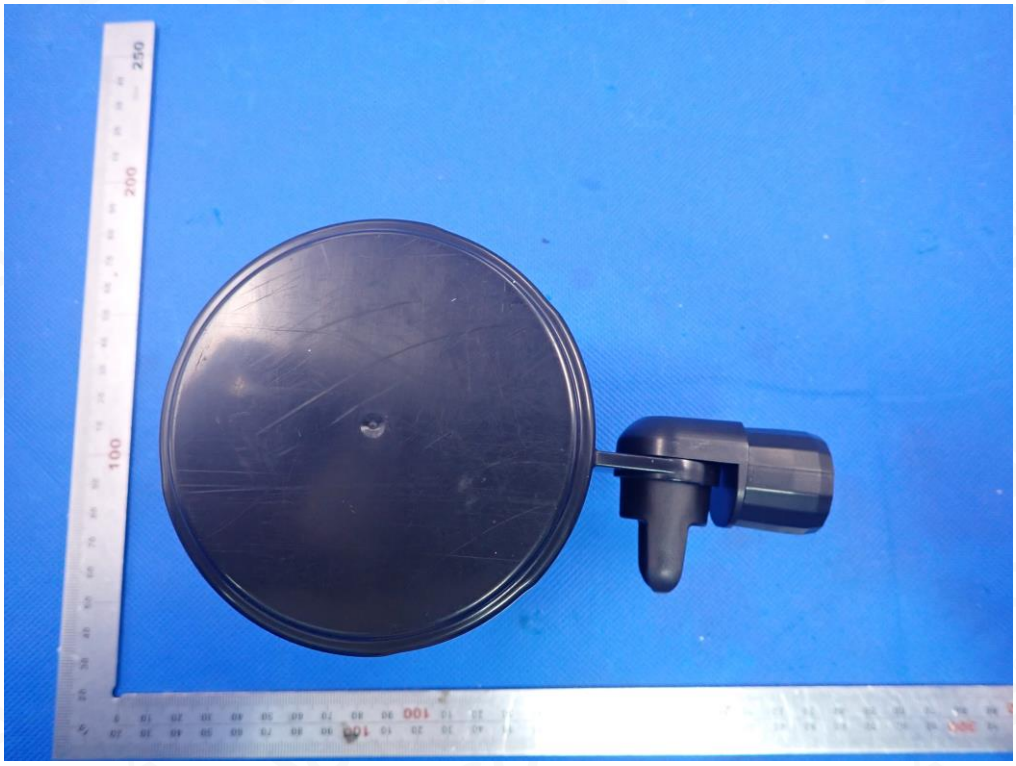
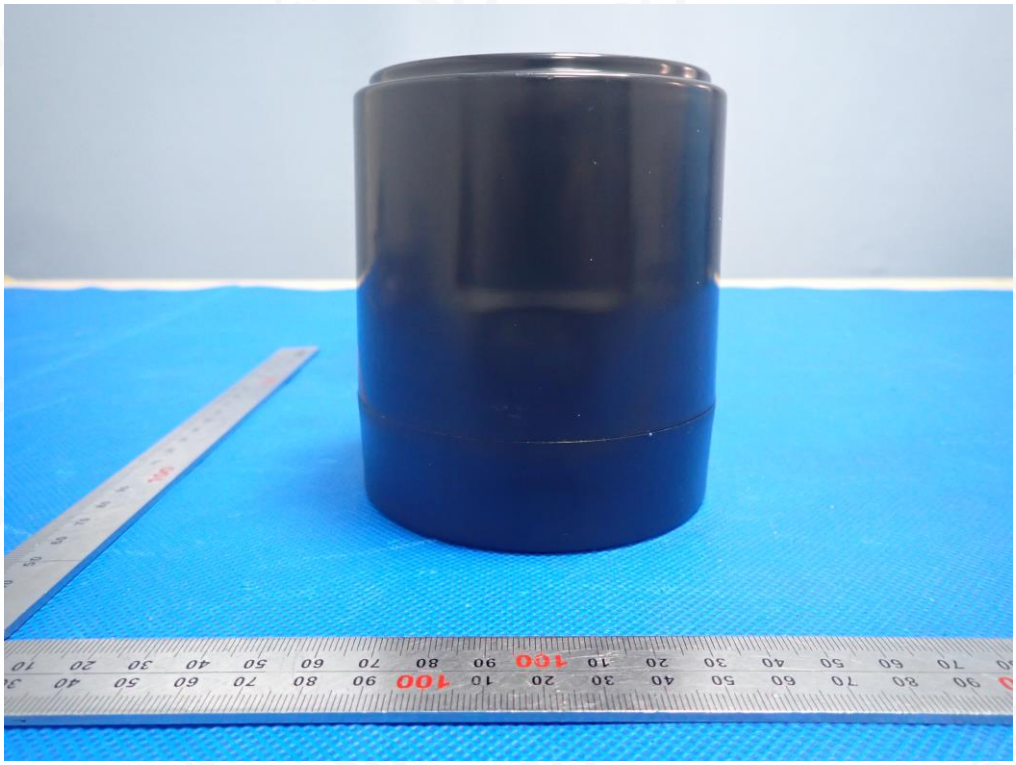
BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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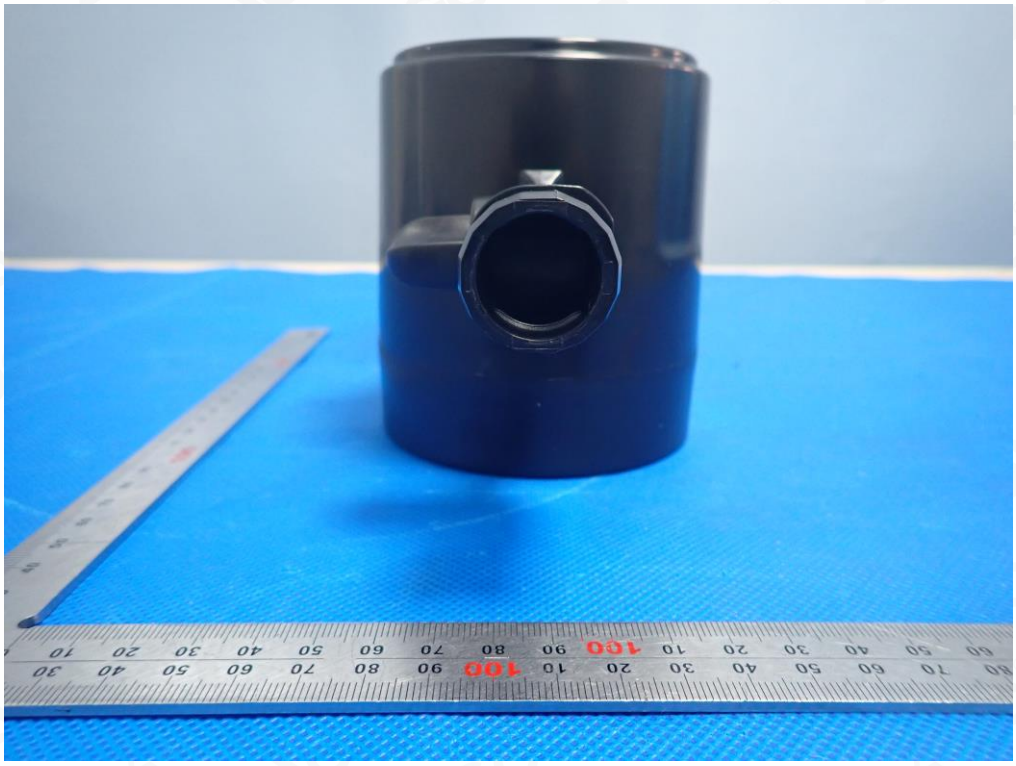
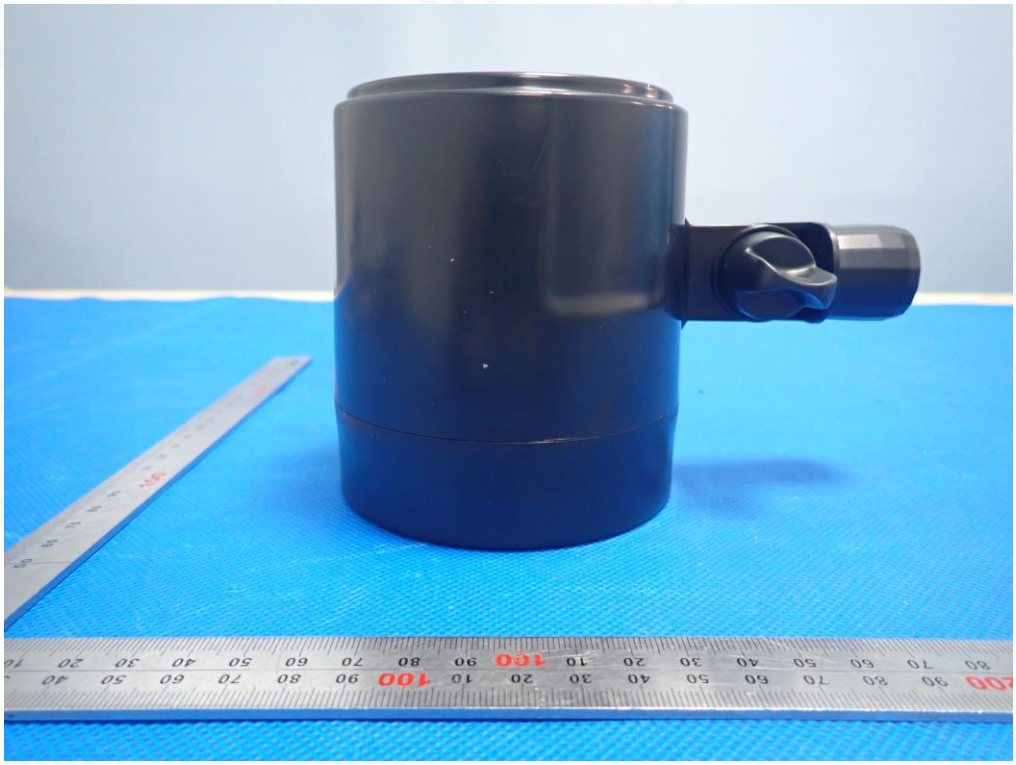
BACK VIEW OF EUT



LEFT VIEW OF EUT



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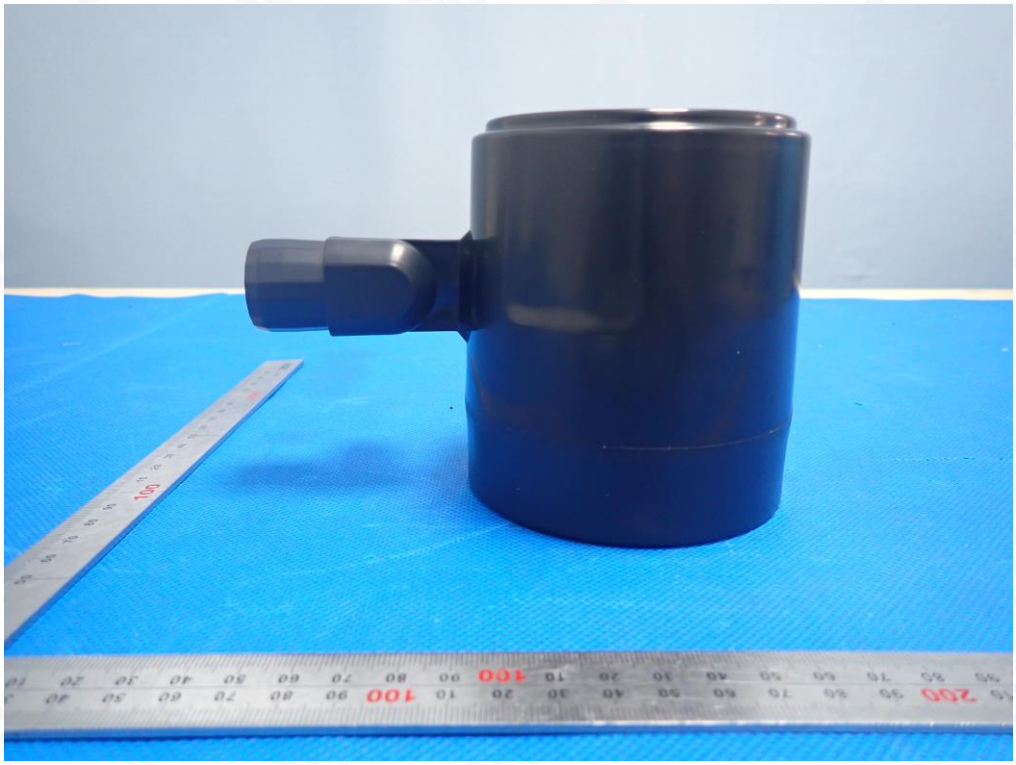
RIGHT VIEW OF EUT



OPEN VIEW OF EUT-1

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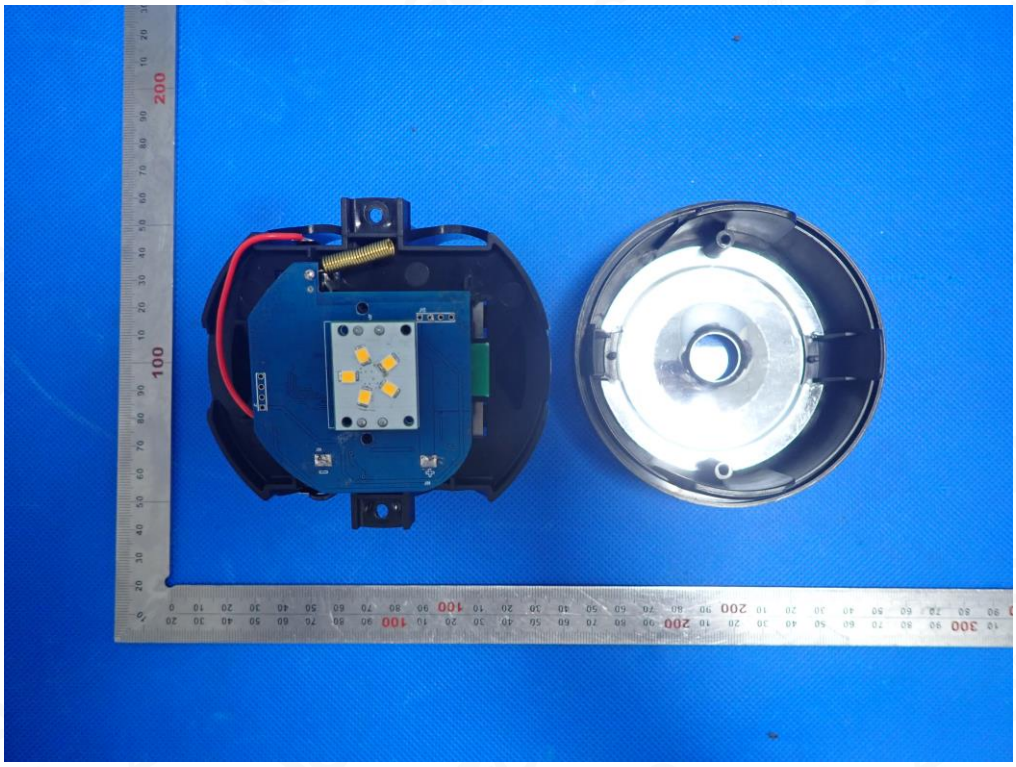
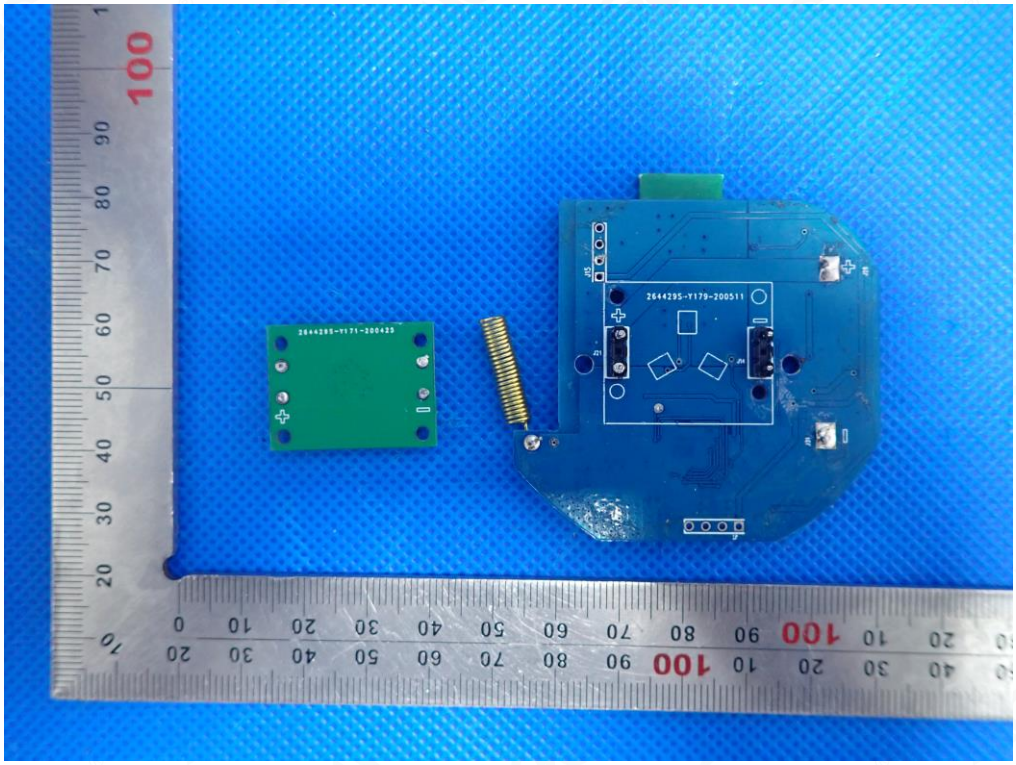
OPEN VIEW OF EUT-2



INTERNAL VIEW-1 OF EUT



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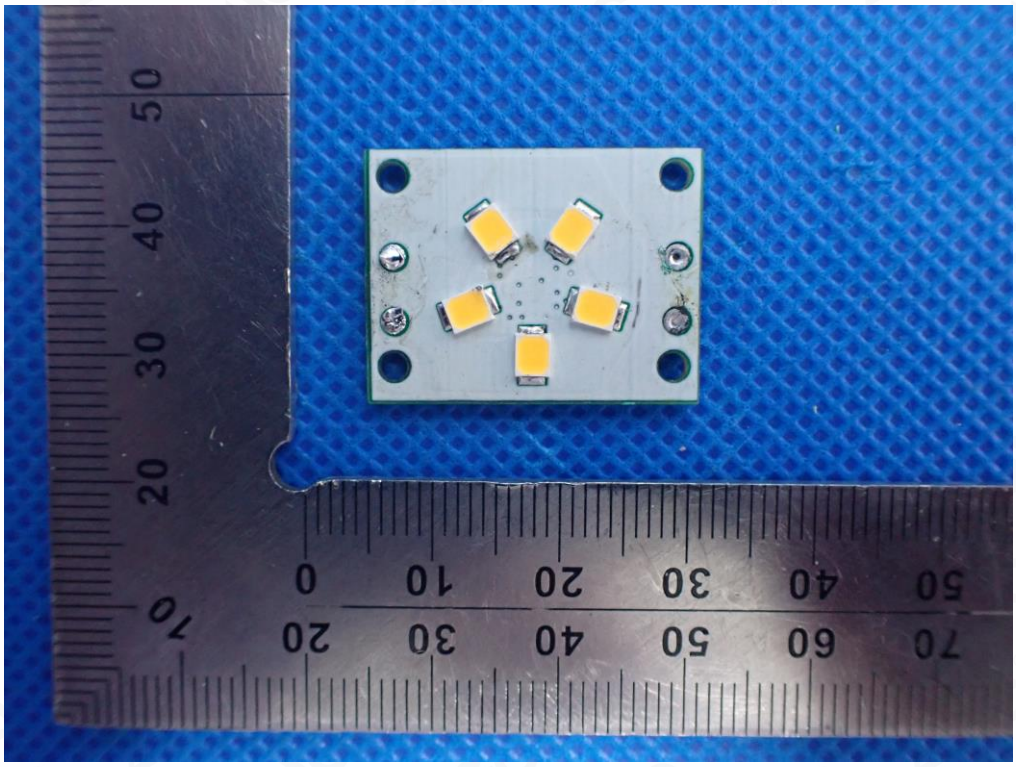
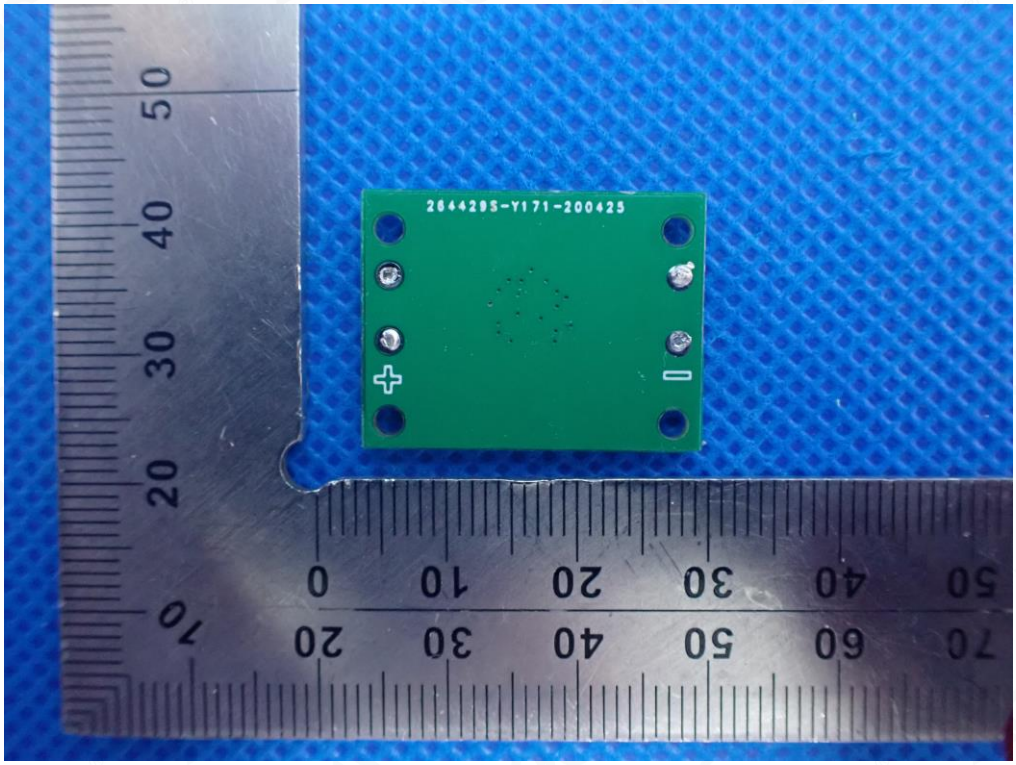
INTERNAL VIEW-2 OF EUT



INTERNAL VIEW-3 OF EUT

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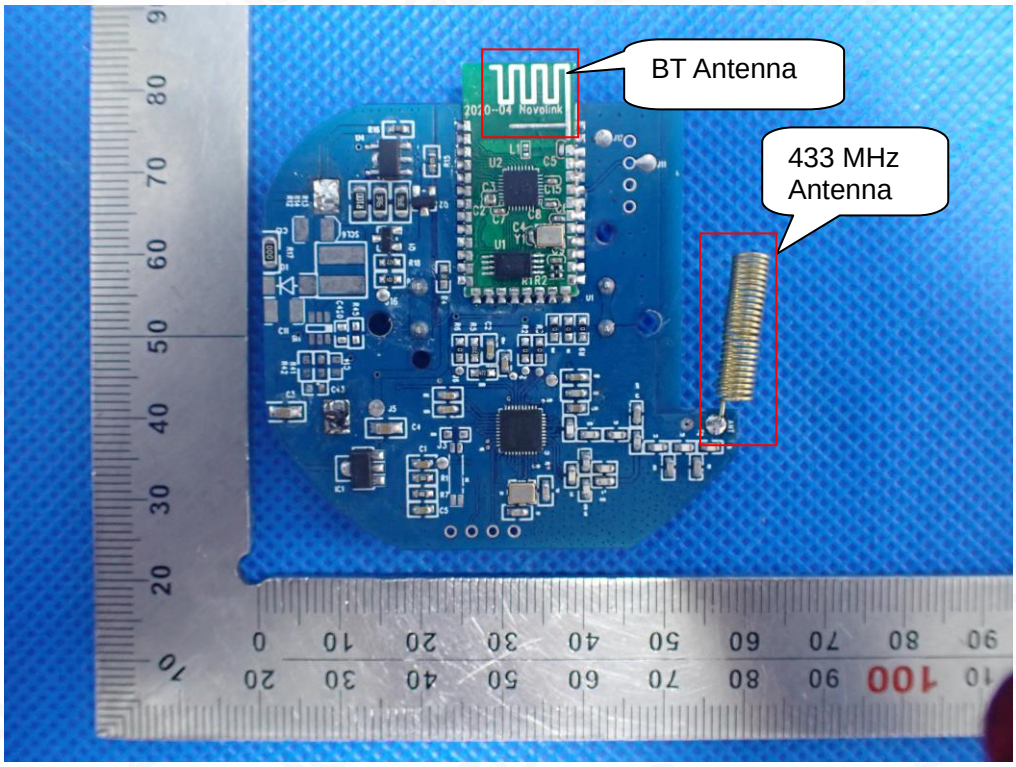
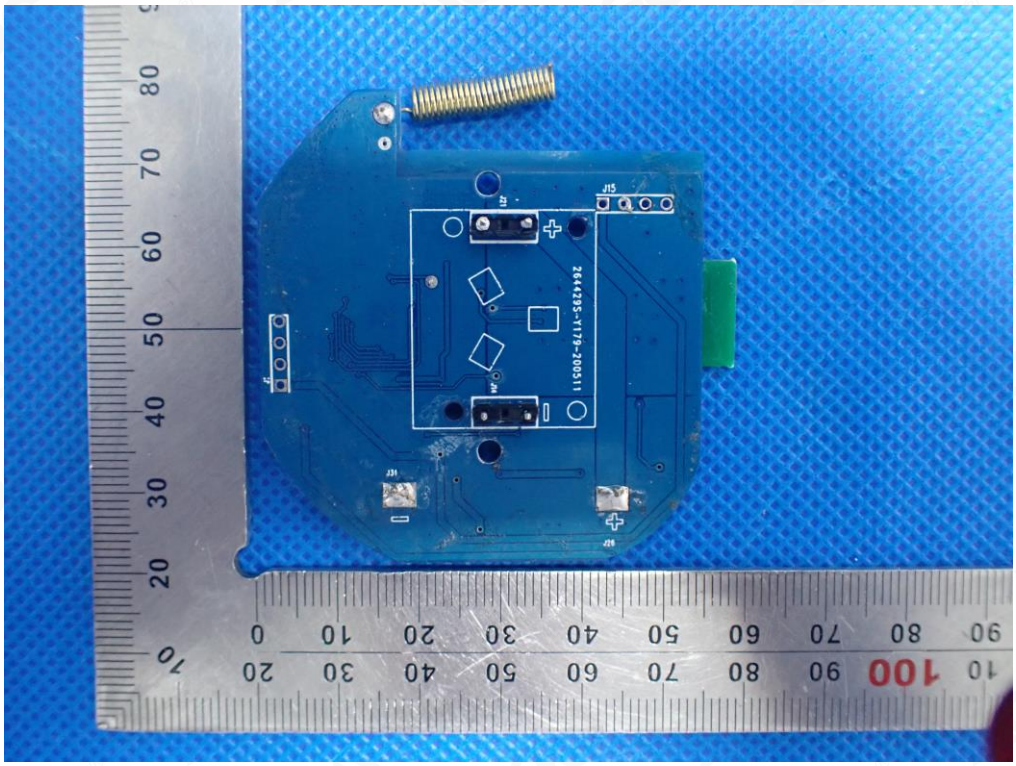
INTERNAL VIEW-4 OF EUT




INTERNAL VIEW-5 OF EUT



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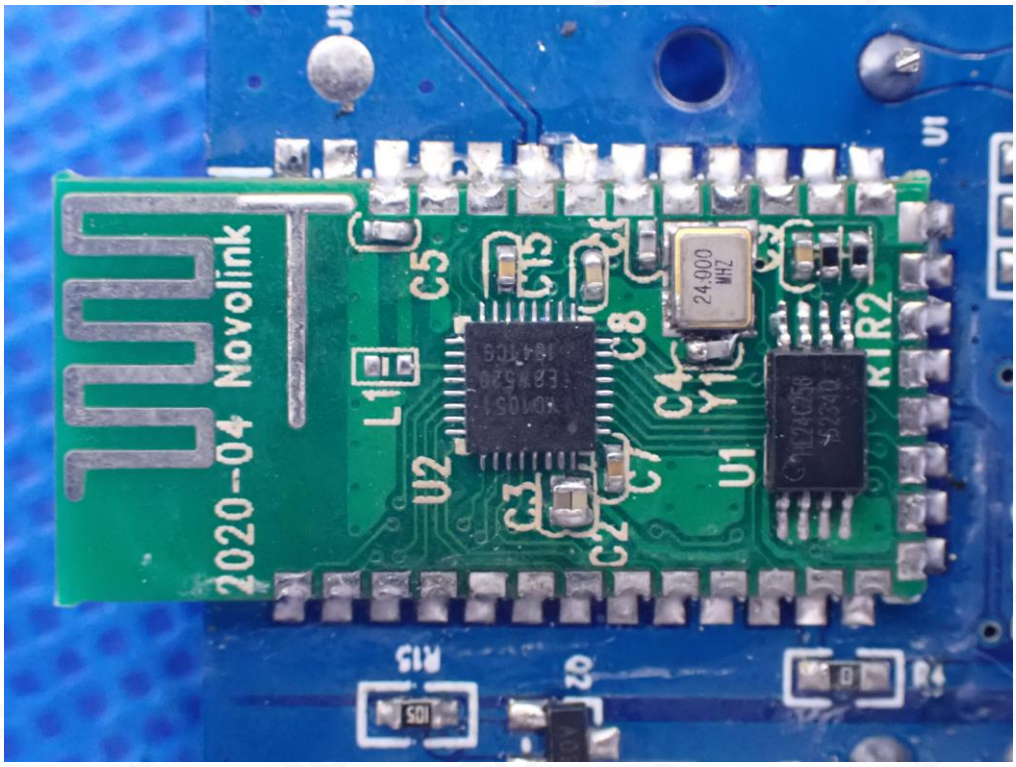
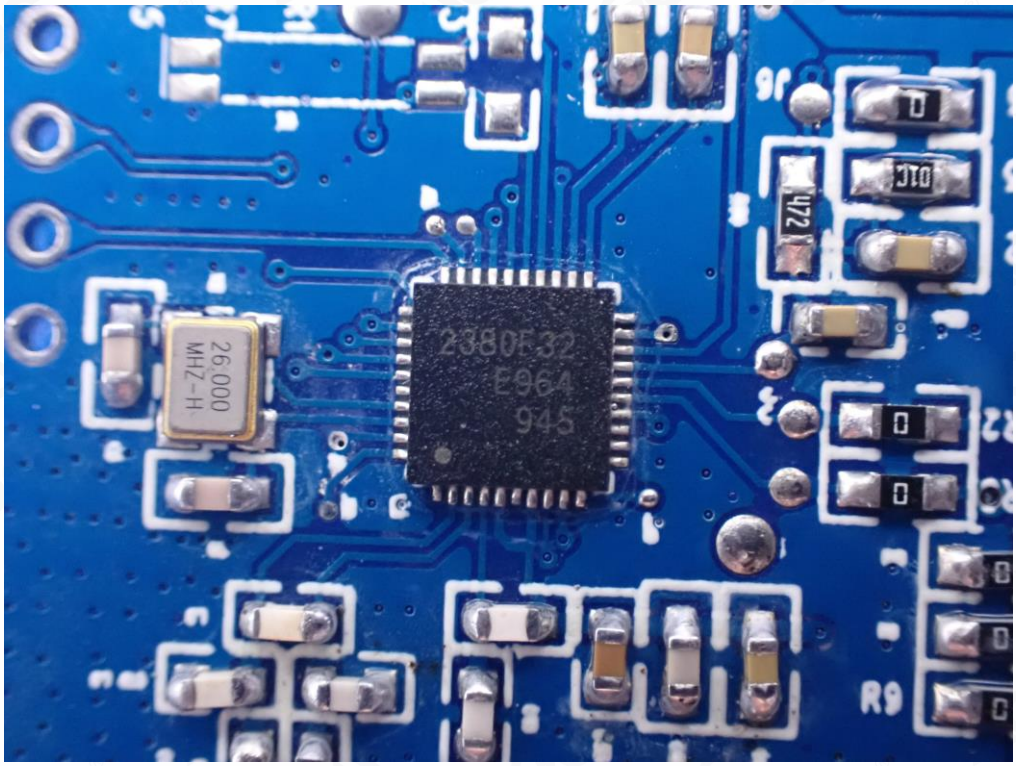
INTERNAL VIEW-6 OF EUT




INTERNAL VIEW-7 OF EUT

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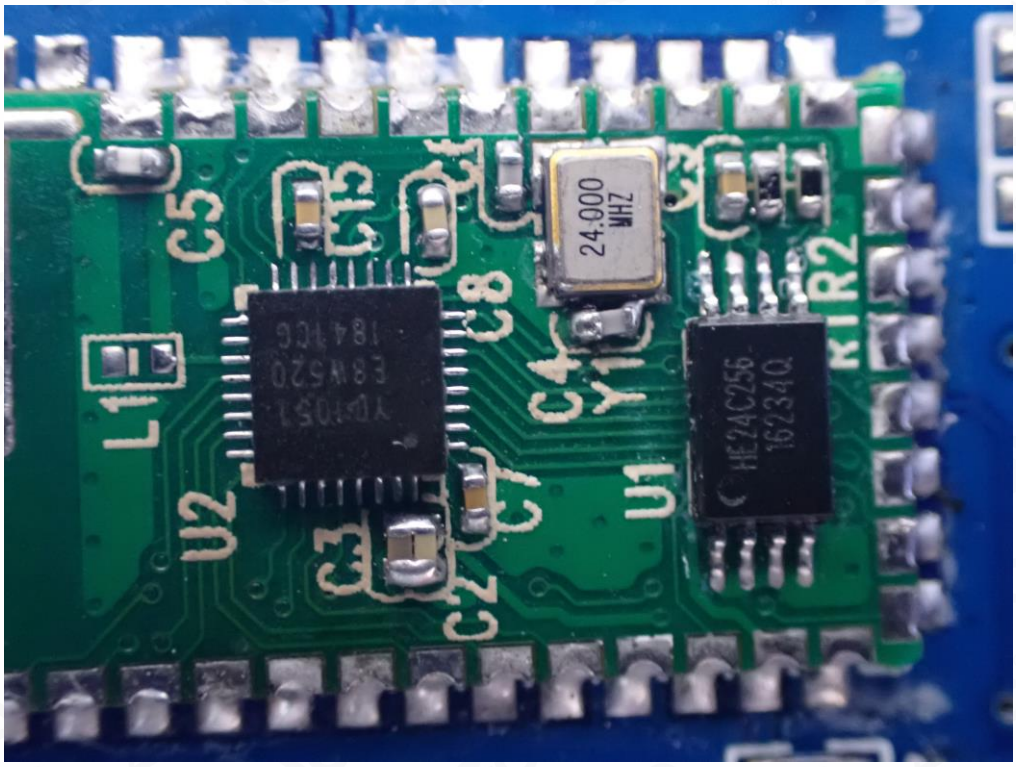
INTERNAL VIEW-8 OF EUT




**----END OF REPORT----**

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.

5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

8.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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