

# Test Report

Report No.: MTi190415E084

Date of issue: June 19, 2019

Sample Description: Ontario 5W wireless charging stand

Model(s): P308.48

Applicant:

Address:

Date of Test: Apr. 09, 2019 - Apr. 20, 2019

Shenzhen Microtest Co., Ltd.  
<http://www.mtitest.com>



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| Test Result Certification    |  |
|------------------------------|--|
| Applicant's name:            |  |
| Address:                     |  |
| Manufacture's name:          |  |
| Address:                     |  |
| Product name:                | Ontario 5W wireless charging stand   |
| Trademark:                   | N/A  |
| Model name:                  | P308.48  |
| Series model:                | N/A  |
| Difference in series models: | N/A  |
| Standards:                   | (Draft) EN 301 489-1 V2.2.1 (2019-03)<br>(Draft) EN 301 489-3 V2.1.1 (2017-03) |

*This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the Radio equipment directive requirements. And it is applicable only to the tested sample identified in the report.*

Tested by:



Demi Mu

Apr. 20, 2019

Reviewed by:



Blue Zheng

June 19, 2019

Approved by:



Smith Chen

June 19, 2019

## Summary of Test Result

| Item         | Description of Test                           | Result |
|--------------|---|--------|
| EMC emission |   |        |
| 1            | Conducted emission                            | Pass   |
| 2            | Radiated emission                             | Pass   |
| 3            | Harmonic current emission                     | N/A*   |
| 4            | Voltage fluctuations & flicker                | Pass   |
| Immunity     |   |        |
| 1            | Electrostatic discharge immunity (ESD)        | Pass   |
| 2            | Radiated electromagnetic field immunity(RS)   | Pass   |
| 3            | Fast transients / burst immunity (EFT)        | Pass   |
| 4            | Surge immunity                                | Pass   |
| 5            | Conducted disturbance immunity (CS)           | Pass   |
| 6            | Voltage interruptions & voltage Dips immunity | Pass   |

\*Not Applicable.

## 1 General description

### 1.1 Feature of equipment under test (EUT)

|                              |                                    |
|------------------------------|------------------------------------|
| Product name:                | Ontario 5W wireless charging stand |
| Model name:                  | P308.48                            |
| Series model:                | N/A                                |
| Difference in series models: | N/A                                |
| Power source:                | DC 5V from adapter                 |
| Adapter information:         | N/A                                |

### 1.2 Test mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Test mode | Description       |
|-----------|-------------------|
| Mode 1    | Wireless charging |

NOTE: The test modes were carried out for all operation modes. The final test mode of the EUT was the worst test mode for EMI, and its test data was showed.

Note: Pre-scan above all test mode, found below test mode which it was worse case mode.

| Test item                    | Test mode (Worse case mode) |
|------------------------------|-----------------------------|
| Conducted emission           | Mode 1                      |
| Radiated emission below 1GHz | Mode 1                      |
| Radiated emission above 1GHz | Mode 1                      |

### 1.3 Test conditions

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

- Temperature: 15°C~35°C
- Humidity: 20%~75% (30%~60% for ESD test)
- Atmospheric pressure: 98kPa~101kPa

### 1.4 Ancillary equipment list

| Equipment | Model | S/N | Manufacturer |
|-----------|-------|-----|--------------|
| Adapter   | /     | /   | /            |
| Load      | /     | /   | /            |

## 1.5 Measurement Uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2 \times U_c(y)$

|                                  |                |
|----------------------------------|----------------|
| Conducted emission(150kHz~30MHz) | $\pm 2.5$ dB   |
| Radiated emission(30MHz~1GHz)    | $\pm 4.2$ dB   |
| Radiated emission (above 1GHz)   | $\pm 4.3$ dB   |
| Temperature                      | $\pm 1$ degree |
| Humidity                         | $\pm 5$ %      |

## 2 Testing site

|                        |   |
|------------------------|---|
| Test laboratory:       | Shenzhen Microtest Co., Ltd.  |
| Laboratory location:   | No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China |
| CNAS Registration No.: | L5868   |
| Telephone:             | (86-755)88850135  |
| Fax:                   | (86-755)88850136  |

### 3 List of test equipment

Emission test:

| Equipment                           | Manufacturer  | Model       | Serial No. | Calibration Due |
|-------------------------------------|---------------|-------------|------------|-----------------|
| LISN(MTI-E037)                      | Schwarzbeck   | NSLK8127    | #841       | 2019/08/25      |
| LISN(MTI-E058)                      | Schwarzbeck   | NSLK8127    | #841       | 2019/08/25      |
| EMI Test Receiver                   | Rohde&schwarz | ESCI3       | 101368     | 2019/08/25      |
| Broadband TRILOG Antenna            | Schwarzbeck   | VULB9163    | 9163-872   | 2019/08/25      |
| Horn Antenna                        | Schwarzbeck   | BBHA 9120 D | 9120D-1145 | 2019/08/25      |
| Amplifier                           | HP            | 8447D       | 3113A06150 | 2019/08/25      |
| Amplifier                           | Agilent       | 8449B       | 3008A02400 | 2019/08/25      |
| Test Receiver                       | Schwarzbeck   | ESPI7       | 100314     | 2019/08/25      |
| Spectrum analyzer                   | Agilent       | E4407B      | MY41441082 | 2019/08/25      |
| Harmonics, Flicker & Power Analyser | Laplace       | AC 2000A    | 311216     | 2019/08/25      |

Immunity test:

| Equipment                          | Manufacturer    | Model       | Serial No.    | Calibration Due |
|------------------------------------|-----------------|-------------|---------------|-----------------|
| ESD Generator                      | Schloder        | SESD 3000   | 509325        | 2019/11/14      |
| Surge Generator                    | HTEC            | HCWG 51     | 153702        | 2019/11/14      |
| EFT Generator                      | HTEC            | HEFT 51     | 153701        | 2019/11/14      |
| Cycle SAG Simulator                | Prima           | DRP61011AG  | PR15056303    | 2019/11/14      |
| Conducted Disturbances Test System | Schloder        | CDG-6000-25 | 126A1343/2015 | 2019/11/14      |
| CDN                                | Schloder        | CDN-M2+3    | A2210332/2015 | 2019/11/14      |
| Log-Bicon Antenna                  | MESS-ELEKTRONIK | VULB 9160   | 3058          | 2019/11/14      |
| Signal Generator                   | Agilent         | E4438C      | MY49070163    | 2019/11/14      |
| Power Amplifier                    | AR              | SESD 3000   | 509325        | 2019/11/14      |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

## 4 EMC emission test

### 4.1 Conducted emission

#### 4.1.1 Limits

| Frequency (MHz) | Class A (dB $\mu$ V) |         | Class B (dB $\mu$ V) |           |
|-----------------|----------------------|---------|----------------------|-----------|
|                 | Quasi-peak           | Average | Quasi-peak           | Average   |
| 0.15 -0.5       | 79                   | 66      | 66 - 56 *            | 56 - 46 * |
| 0.5 -5          | 73                   | 60      | 56                   | 46        |
| 5 -30           | 73                   | 60      | 60                   | 50        |

#### 4.1.2 Test Procedures

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through an Artificial mains networks (AMN). All other support equipment powered from additional AMN. The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

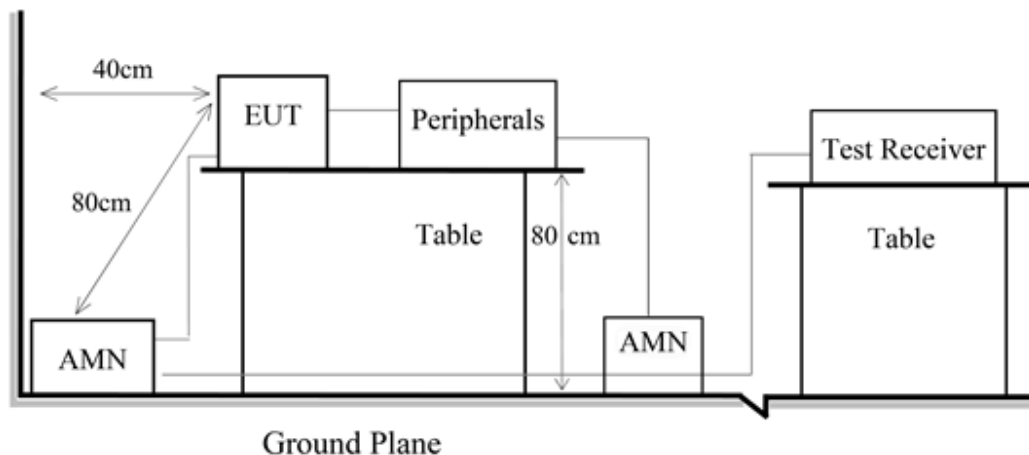
I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

AMN is at least 80 cm from nearest part of EUT chassis.

Setup of the receiver

| Frequency       | Detector | Setting            |
|-----------------|----------|--------------------|
| 0.15MHz – 30MHz | QP       | IF bandwidth: 9kHz |

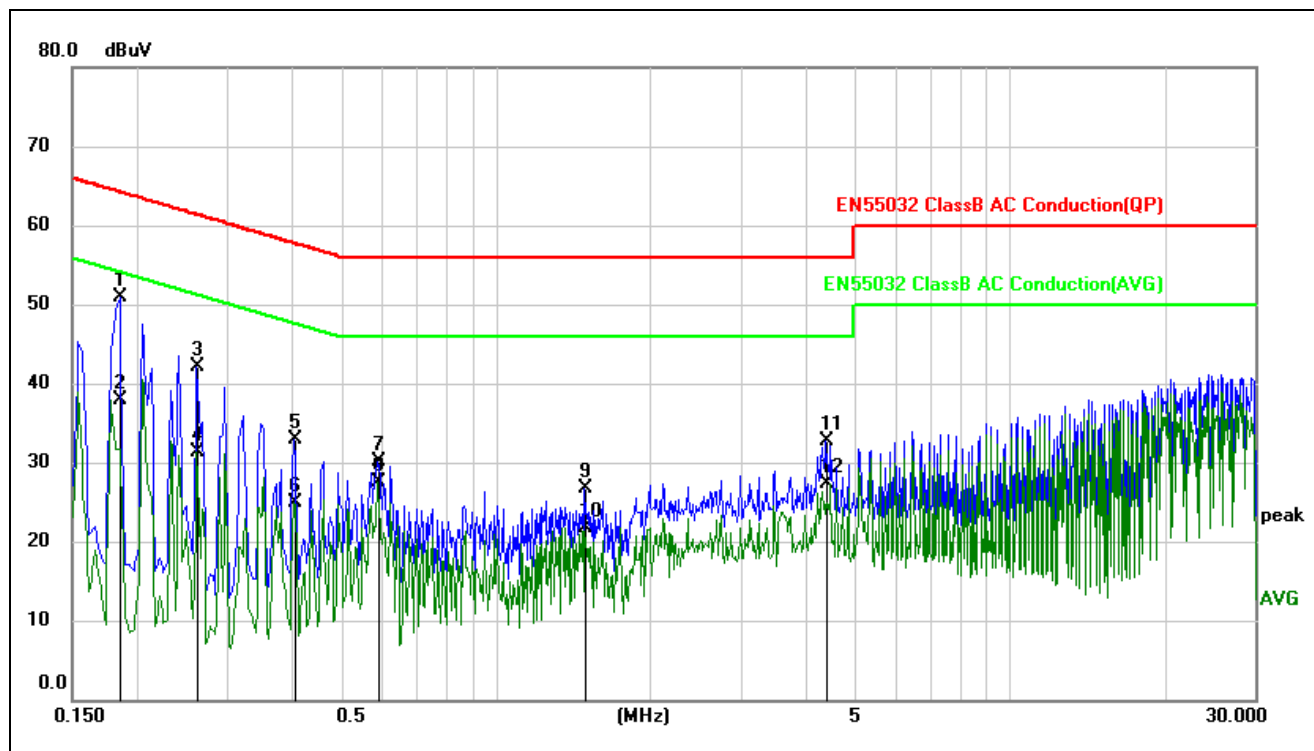
#### 4.1.3 Test setup





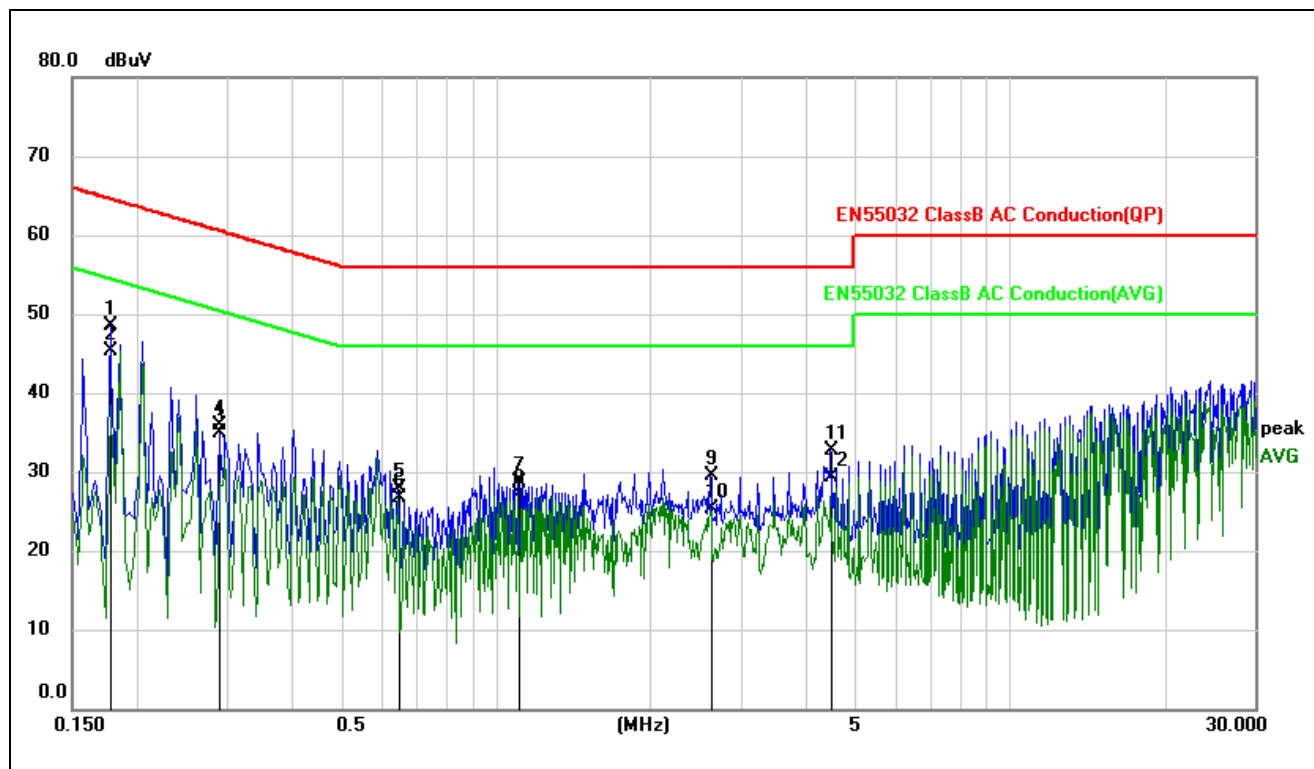
## 4.1.4 Test Result

|               |                                    |                    |        |
|---------------|------------------------------------|--------------------|--------|
| Temperature:  | 25.9℃                              | Relative Humidity: | 72%    |
| Pressure:     | 101kPa                             | Phase:             | L      |
| Test voltage: | DC 5V form adapter AC<br>230V/50Hz | Test mode:         | Mode 1 |



| No. | Mk. | Freq.  | Reading | Correct | Measure- | Limit | Over   |          |         |
|-----|-----|--------|---------|---------|----------|-------|--------|----------|---------|
|     |     | MHz    | dBuV    | Factor  | ment     | dBuV  | dB     | Detector | Comment |
| 1   | *   | 0.1860 | 40.59   | 10.23   | 50.82    | 64.21 | -13.39 | QP       |         |
| 2   |     | 0.1860 | 27.72   | 10.23   | 37.95    | 54.21 | -16.26 | AVG      |         |
| 3   |     | 0.2620 | 31.85   | 10.23   | 42.08    | 61.37 | -19.29 | QP       |         |
| 4   |     | 0.2620 | 21.10   | 10.23   | 31.33    | 51.37 | -20.04 | AVG      |         |
| 5   |     | 0.4060 | 22.58   | 10.23   | 32.81    | 57.73 | -24.92 | QP       |         |
| 6   |     | 0.4060 | 14.60   | 10.23   | 24.83    | 47.73 | -22.90 | AVG      |         |
| 7   |     | 0.5899 | 19.81   | 10.23   | 30.04    | 56.00 | -25.96 | QP       |         |
| 8   |     | 0.5899 | 17.35   | 10.23   | 27.58    | 46.00 | -18.42 | AVG      |         |
| 9   |     | 1.4940 | 16.43   | 10.21   | 26.64    | 56.00 | -29.36 | QP       |         |
| 10  |     | 1.4940 | 11.40   | 10.21   | 21.61    | 46.00 | -24.39 | AVG      |         |
| 11  |     | 4.3980 | 22.43   | 10.23   | 32.66    | 56.00 | -23.34 | QP       |         |
| 12  |     | 4.3980 | 16.99   | 10.23   | 27.22    | 46.00 | -18.78 | AVG      |         |

|               |                                    |                    |        |
|---------------|------------------------------------|--------------------|--------|
| Temperature:  | 25.9℃                              | Relative Humidity: | 72%    |
| Pressure:     | 101kPa                             | Phase:             | N      |
| Test voltage: | DC 5V form adapter AC<br>230V/50Hz | Test mode:         | Mode 1 |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   |     | 0.1780       | 38.19                    | 10.23                   | 48.42                    | 64.58         | -16.16     | QP       |         |
| 2   | *   | 0.1780       | 35.04                    | 10.23                   | 45.27                    | 54.58         | -9.31      | AVG      |         |
| 3   |     | 0.2900       | 24.72                    | 10.23                   | 34.95                    | 60.52         | -25.57     | QP       |         |
| 4   |     | 0.2900       | 25.64                    | 10.23                   | 35.87                    | 50.52         | -14.65     | AVG      |         |
| 5   |     | 0.6460       | 17.64                    | 10.22                   | 27.86                    | 56.00         | -28.14     | QP       |         |
| 6   |     | 0.6460       | 16.49                    | 10.22                   | 26.71                    | 46.00         | -19.29     | AVG      |         |
| 7   |     | 1.1060       | 18.44                    | 10.21                   | 28.65                    | 56.00         | -27.35     | QP       |         |
| 8   |     | 1.1060       | 16.88                    | 10.21                   | 27.09                    | 46.00         | -18.91     | AVG      |         |
| 9   |     | 2.6140       | 19.38                    | 10.22                   | 29.60                    | 56.00         | -26.40     | QP       |         |
| 10  |     | 2.6140       | 15.04                    | 10.22                   | 25.26                    | 46.00         | -20.74     | AVG      |         |
| 11  |     | 4.4780       | 22.41                    | 10.23                   | 32.64                    | 56.00         | -23.36     | QP       |         |
| 12  |     | 4.4780       | 19.13                    | 10.23                   | 29.36                    | 46.00         | -16.64     | AVG      |         |

## 4.2 Radiated emission

### 4.2.1 Limits

| Frequency (MHz) | Class B Limit (dB $\mu$ V/m) |            | Class A Limit (dB $\mu$ V/m) |            |
|-----------------|------------------------------|------------|------------------------------|------------|
|                 | Quasi-peak/Peak              | Average    | Quasi-peak/Peak              | Average    |
| 30 ~ 230        | 40 (at 3m)                   | /          | 50 (at 3m)                   | /          |
| 230 ~ 1000      | 47 (at 3m)                   | /          | 57 (at 3m)                   | /          |
| 1000 ~ 3000     | 70 (at 3m)                   | 50 (at 3m) | 76 (at 3m)                   | 56 (at 3m) |
| 3000 ~ 6000     | 74 (at 3m)                   | 54 (at 3m) | 80 (at 3m)                   | 60 (at 3m) |

### 4.2.2 Test Procedures

The radiated emission tests were performed in the 3 meters.

The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

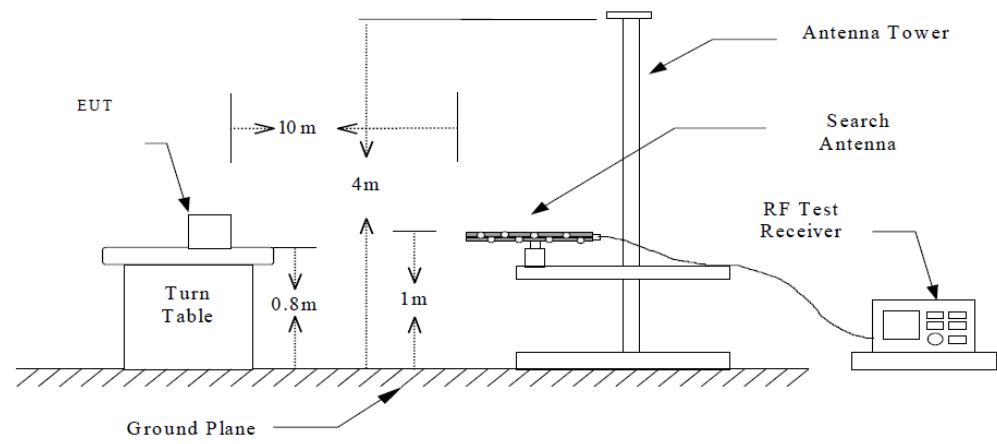
If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.

If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.

Setup of receiver

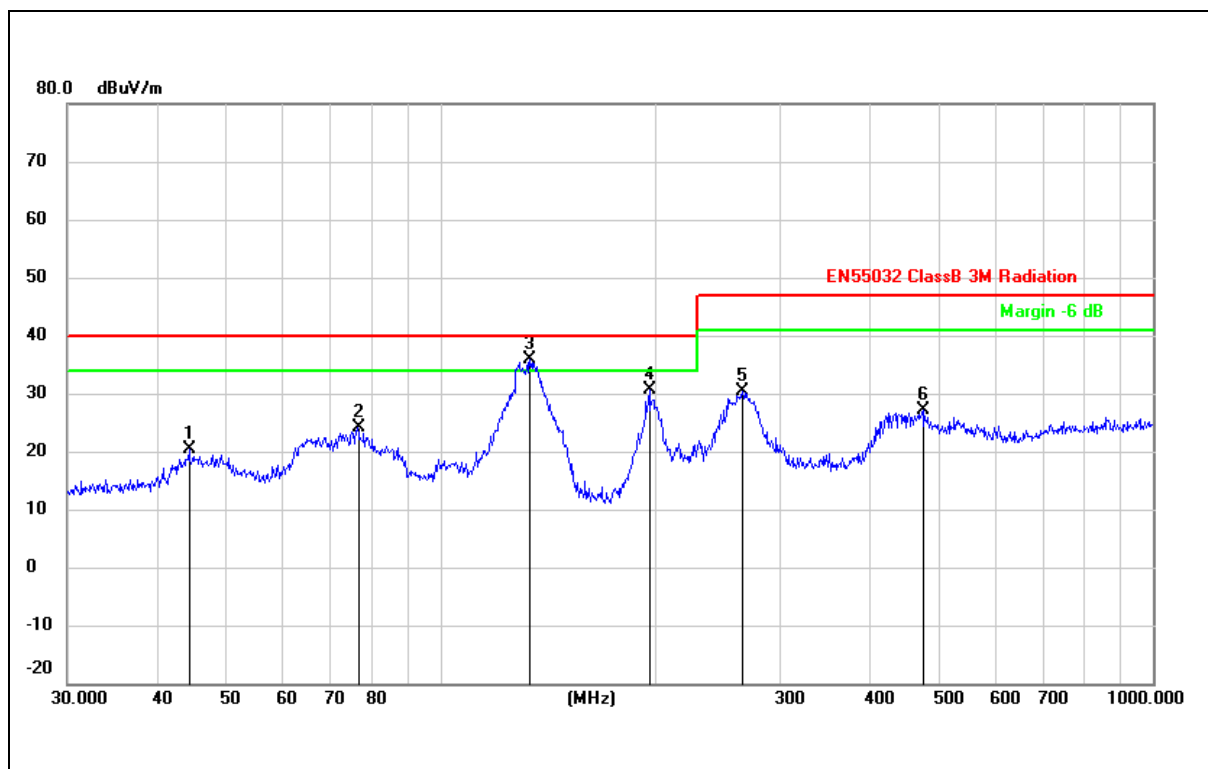
| Frequency    | Detector | Setting              |
|--------------|----------|----------------------|
| 30MHz – 1GHz | QP       | IF bandwidth: 120kHz |
| Above 1GHz   | Peak     | RBW: 1MHz, VBW: 3MHz |
|              | AV       | RBW: 1MHz, VBW: 10Hz |

### 4.2.3 Test Setup



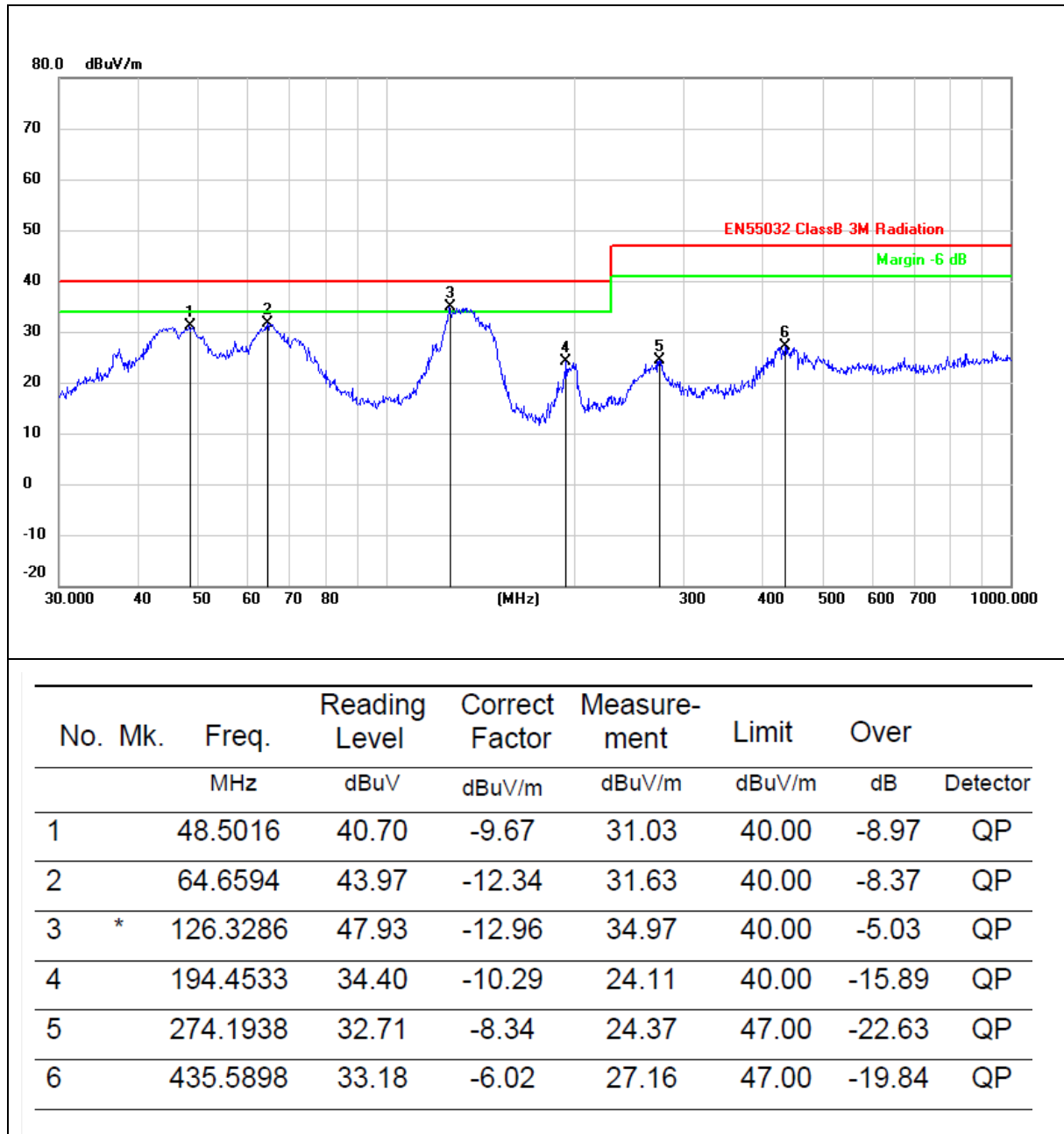
#### 4.2.4 Test Result

|               |                                 |                    |            |
|---------------|---------------------------------|--------------------|------------|
| Temperature:  | 23.5℃                           | Relative Humidity: | 67%        |
| Pressure:     | 101kPa                          | Polarization:      | Horizontal |
| Test voltage: | DC 5V form adapter AC 230V/50Hz | Test mode:         | Mode 1     |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dBuV/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-----------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 44.4307      | 30.25                    | -9.80                       | 20.45                      | 40.00           | -19.55     | QP       |
| 2   |     | 76.5121      | 38.89                    | -14.87                      | 24.02                      | 40.00           | -15.98     | QP       |
| 3   | *   | 133.6188     | 50.47                    | -14.64                      | 35.83                      | 40.00           | -4.17      | QP       |
| 4   |     | 196.5098     | 42.81                    | -12.26                      | 30.55                      | 40.00           | -9.45      | QP       |
| 5   |     | 265.6757     | 40.05                    | -9.59                       | 30.46                      | 47.00           | -16.54     | QP       |
| 6   |     | 475.4990     | 32.63                    | -5.44                       | 27.19                      | 47.00           | -19.81     | QP       |

|               |                                 |                    |          |
|---------------|---------------------------------|--------------------|----------|
| Temperature:  | 23.5℃                           | Relative Humidity: | 67%      |
| Pressure:     | 101kPa                          | Polarization:      | Vertical |
| Test voltage: | DC 5V form adapter AC 230V/50Hz | Test mode:         | Mode 1   |



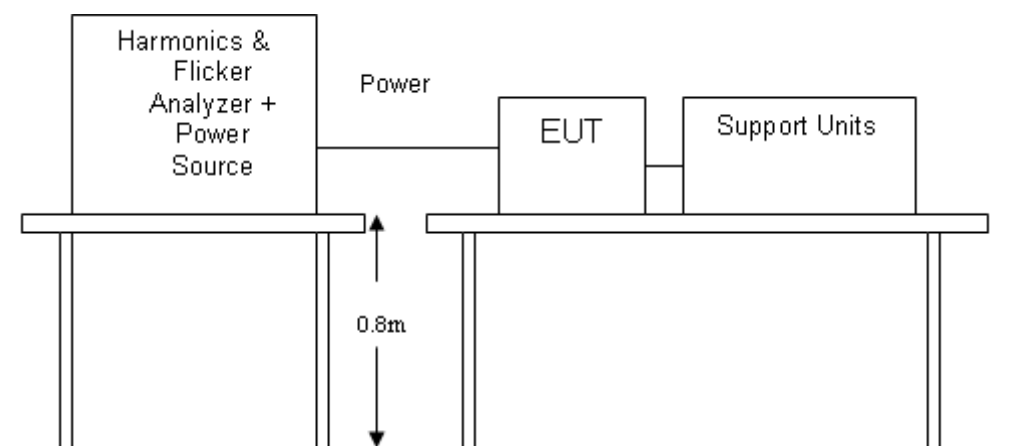
### 4.3 Harmonic current emission / Voltage fluctuations & flicker

#### 4.3.1 Test Procedures

The EUT was installed and placed on a non-conductive table and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The correspondent test program of test instrument to measure the current harmonics / voltage fluctuations & flicker emanated from EUT. The measure time shall be not less than the time necessary for the EUT to be exercised.

#### 4.3.2 Test Setup



#### 4.3.3 Test Result

##### Harmonic current emission:

N/A, the rated power of EUT is below 75W.

##### Voltage fluctuations & flicker:

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

|         | Pst   | dc (%) | dmax (%) | d(t) > 3.3% (ms) |
|---------|-------|--------|----------|------------------|
| Limit   | 1.000 | 3.300  | 4.000    | 500              |
| Reading | 0.27  | 0.34   | 0.92     | 0                |

## 5 Immunity test

### 5.1 Electrostatic discharge immunity (ESD)

#### 5.1.1 Test Method

The test method shall be in accordance with EN 61000-4-2.

For radio equipment and ancillary equipment the following requirements and evaluation of test results shall apply.

The test severity level for contact discharge shall be 4 kV and for air discharge 8kV. All other details, including intermediate test levels, are contained within EN 61000-4-2.

Electrostatic discharges shall be applied to all exposed surfaces of the EUT except where the user documentation specifically indicates a requirement for appropriate protective measures (see EN 61000-4-2).

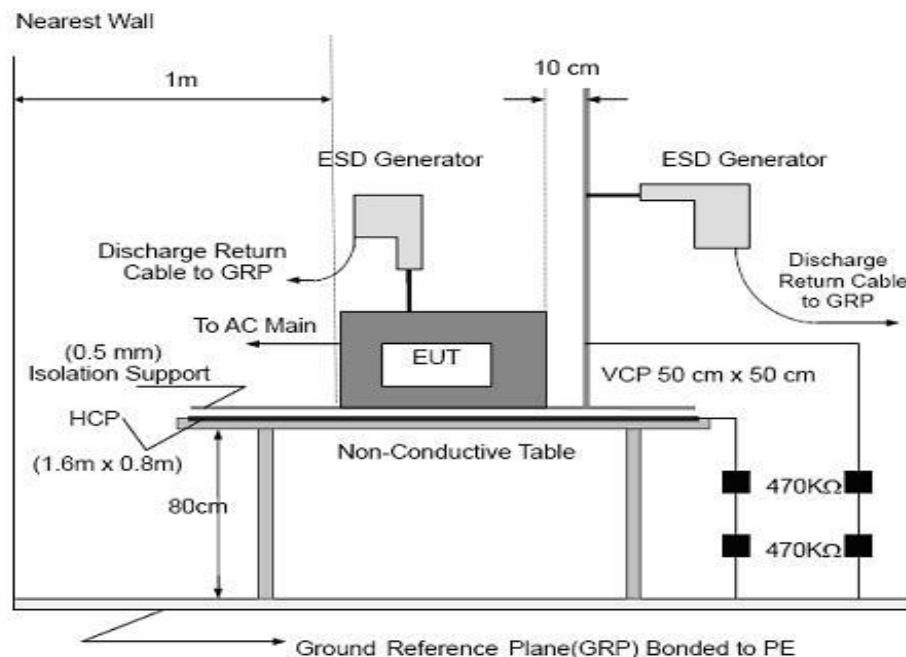
#### 5.1.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitter shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

#### 5.1.3 Test Setup



#### 5.1.4 Test Result

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 21.4℃  | Relative Humidity: | 55%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

#### Indirect discharge

| Test Point        | Contact discharge level (kV)   | Number and polarity | Criterion met | Criterion Required |
|-------------------|--|---------------------|---------------|--------------------|
| 1. VCP-Front side | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+)              | A             | B                  |
|                   | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | A             |                    |
| 2.VCP-Rear side   | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+)              | A             |                    |
|                   | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | A             |                    |
| 3.VCP-Left side   | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+)              | A             |                    |
|                   | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | A             |                    |
| 4. VCP-Right side | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+)              | A             |                    |
|                   | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | A             |                    |
| 5. HCP            | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+)              | A             |                    |
|                   | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | A             |                    |

**Result: Compliance.**

#### Direct discharge

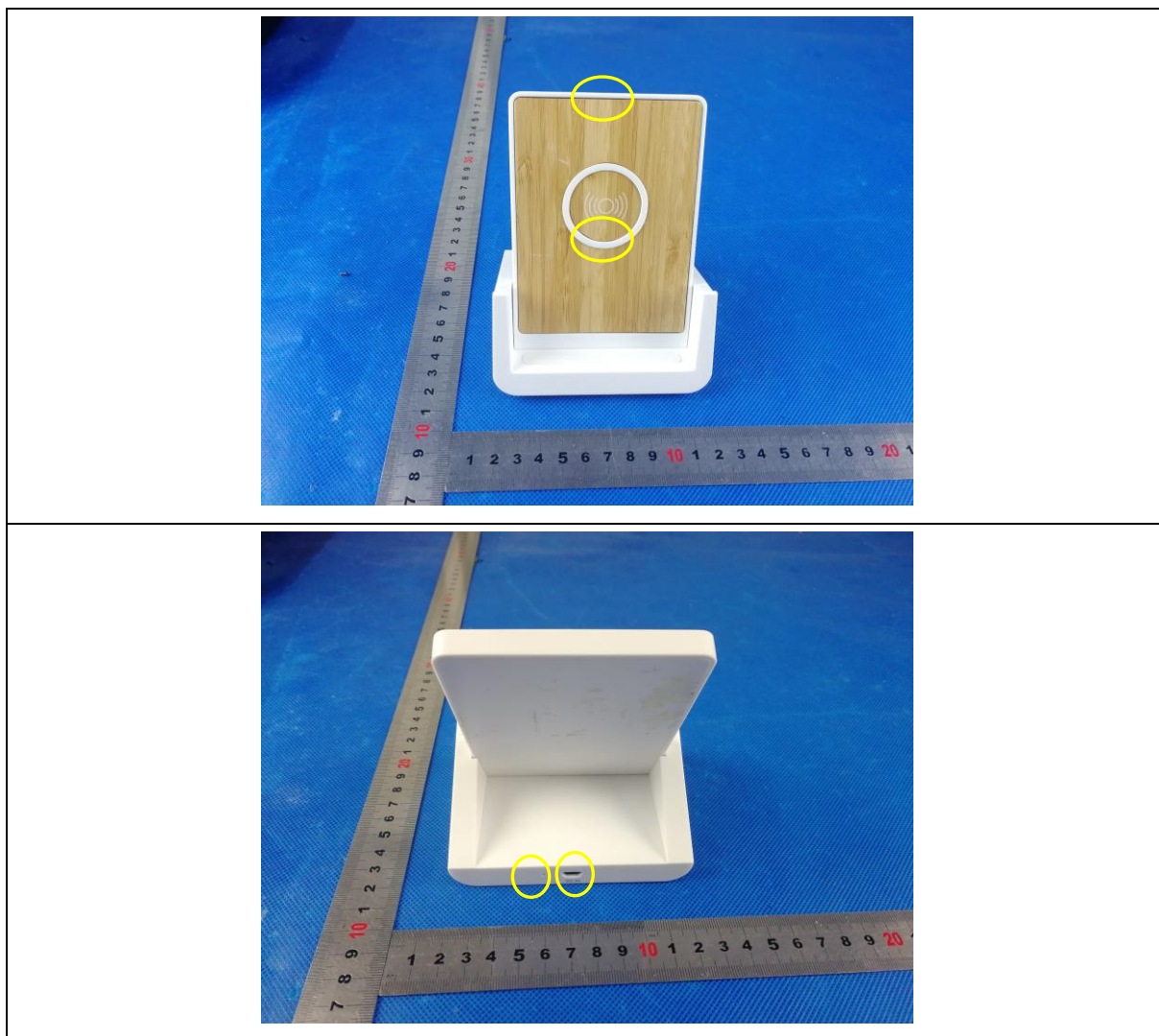
| Test Point                                       | discharge level (kV)                                      | Air discharge level (kV)   | Number and polarity | Criterion met | Criterion Required |
|--|---|--|---------------------|---------------|--------------------|
| 1. Each nonconductive location touchable by hand | <input type="checkbox"/> ..2 <input type="checkbox"/> ..4 | <input type="checkbox"/> ..2 <input type="checkbox"/> ..4            | 10 (+)              | A             | B                  |
|  | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8 | <input type="checkbox"/> ..6 <input checked="" type="checkbox"/> ..8 | 10 (-)              | A             |                    |
| 1. Each conductive location touchable by hand    | <input type="checkbox"/> ..2 <input type="checkbox"/> ..4 | <input type="checkbox"/> ..2 <input type="checkbox"/> ..4            | 10 (+)              | N/A           |                    |
|  | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8 | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8            | 10 (-)              | N/A           |                    |

**Result: compliance.**

Note1: Please see the photographs below about the details of test points.



## Test location



Note: Yellow circle for Air Discharge, Red circle for Contact Discharge

## 5.2 RF electromagnetic field immunity (RS)

### 5.2.1 Test Method

The test method shall be in accordance with EN 61000-4-3.

The following requirements and evaluation of test results shall apply:

- the test level shall be 3V/m (measured unmodulated). The test signal shall be amplitude modulated to a depth of 80% by a sinusoidal audio signal of 1000Hz. If the wanted signal is modulated at 1000Hz, then an audio signal of 400Hz shall be used;
- The test shall be performed over the frequency range 80 MHz to 6 000 MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers, as appropriate;
- for receivers and transmitters the stepped frequency increments shall be 1% frequency increment of the momentary used frequency;
- responses on receivers occurring at discrete frequencies, which are narrow band responses, shall be disregarded from the test;

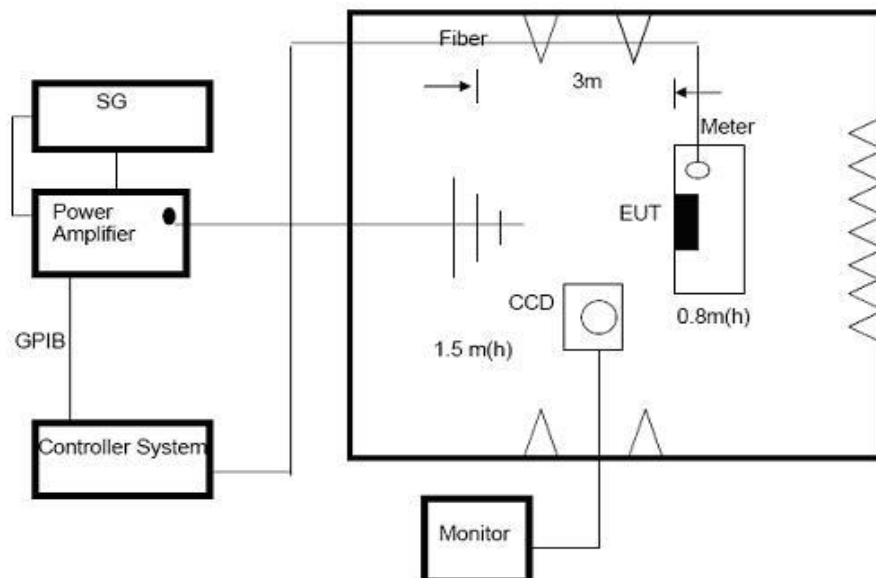
### 5.2.2 Performance criteria

For transmitters the performance criteria for continuous phenomena for transmitters shall apply.

For receivers the performance criteria for continuous phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

### 5.2.3 Test setup



#### 5.2.4 Test Result

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

| Frequency Range<br>(MHz) | RF Field<br>Position | R.F.<br>Field Strength                     | Azimuth | Criterion<br>met | Criterion<br>Required |
|--------------------------|----------------------|--|---------|------------------|-----------------------|
| 80~6000                  | H / V                | 3 V/m (rms)<br>AM Modulated<br>1000Hz, 80% | Front   | A                | A                     |
|                          |                      |  | Rear    |                  |                       |
|                          |                      |  | Left    |                  |                       |
|                          |                      |  | Right   |                  |                       |

**Result: compliance.**

## 5.3 Fast transients immunity (EFT)

### 5.3.1 Test Procedures

The test method shall be in accordance with EN 61000-4-4.

The following requirements and evaluation of test results shall apply:

- the test level for signal ports, telecommunication ports, and control ports shall be 0.5kV open circuit voltage at a repetition rate of 5kHz as given in EN 61000-4-4;
- the test level for DC power input ports shall be 0.5kV open circuit voltage as given EN 61000-4-4;
- the test level for AC mains power input ports shall be 1kV open circuit voltage as given EN 61000-4-4.

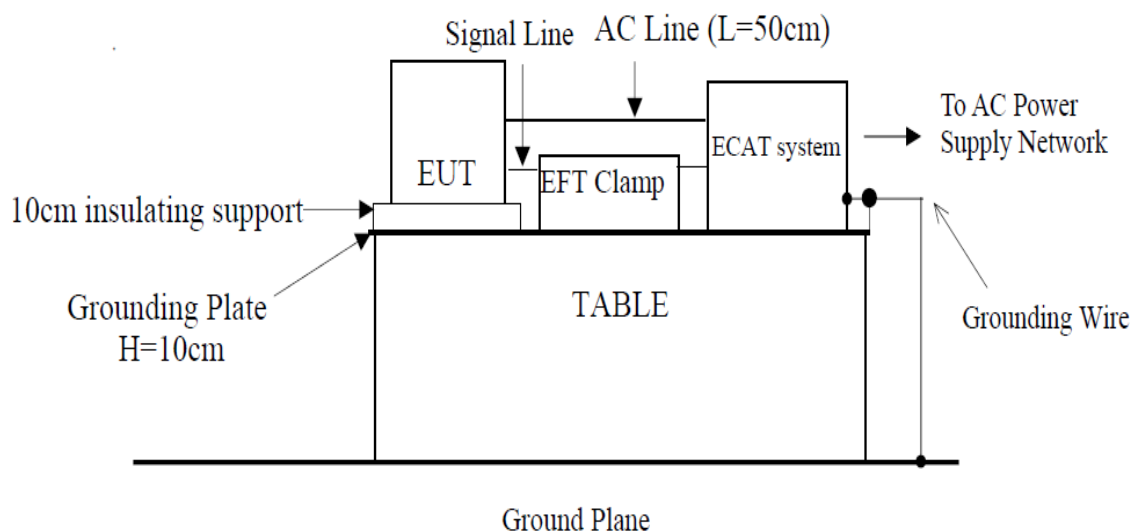
### 5.3.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitter shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria shall apply.

### 5.3.3 Test Setup



5.3.4 Test Result

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

| Port Type | Injected Line | Test Voltage | Criterion met | Criterion Required |
|-----------|---------------|--------------|---------------|--------------------|
| AC Mains  | L             | ±1kV         | A             | B                  |
|           | N             | ±1kV         | A             |                    |
|           | L+N           | ±1kV         | A             |                    |

Result: compliance.

## 5.4 Surges immunity

### 5.4.1 Test Method

The test method shall be in accordance with EN 61000-4-5.

#### Test method for telecommunication ports directly connected to outdoor cables:

The test level for telecommunications ports, intended to be directly connected to the telecommunications network via outdoor cables, shall be 1kV line to ground as given in EN 61000-4-5, however, in telecommunications centres 0.5kV line to ground shall be used. In this case the total output impedance of the surge generator shall be in accordance with the basic standard EN 61000-4-5. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

#### Test method for telecommunication ports connected to indoor cables:

The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10m) shall be 0.5kV line to ground. In this case the total output impedance of the surge generator shall be in accordance with the basic standard EN 61000-4-5. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

#### Test method for mains ports:

The test level for ac mains power input ports shall be 2kV line to ground, and 1kV line to line, with the output impedance of the surge generator as given in EN 61000-4-5. In telecom centres 1kV line to ground and 0.5kV line to line shall be used. The test generator shall provide the 1.2/50µs pulse as defined in EN 61000-4-5.

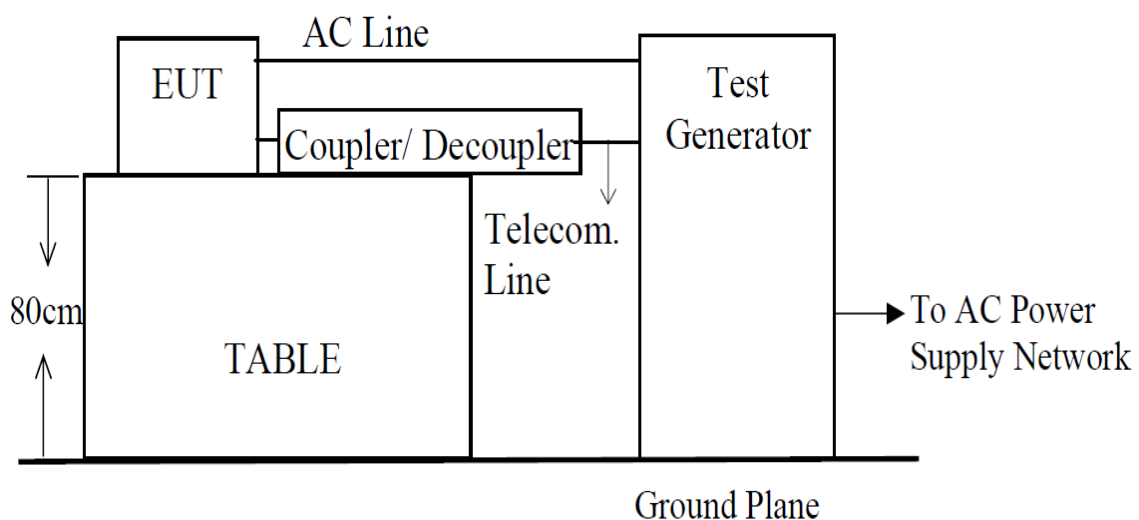
### 5.4.2 Performance criteria

For transmitters the performance criteria for transient phenomena for transmitters shall apply.

For receivers the performance criteria for transient phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

### 5.4.3 Test Setup



5.4.4 Test Result

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

|           |               |              |               |                    |
|-----------|---------------|--------------|---------------|--------------------|
| Port Type | Injected Line | Test Voltage | Criterion met | Criterion Required |
| AC Mains  | L – N         | ±0.5kV, ±1kV | A             | B                  |

Result: Compliance.

## 5.5 Injected current immunity (CS)

### 5.5.1 Test Method

The test method shall be in accordance with EN 61000-4-6.

The following requirements and evaluation of test results shall apply:

- the test level shall be severity level 2 as given in EN 61000-4-6 corresponding to 3V rms unmodulated. The test signal shall then be amplitude modulated to a depth of 80% by a sinusoidal audio signal of 1000Hz. If the wanted signal is modulated at 1000Hz, then the test signal of 400Hz shall be used;
- the test shall be performed over the frequency range 150kHz to 80MHz with the exception of an exclusion band for transmitters, and for receivers and duplex transceivers;
- for receivers and transmitters the stepped frequency increments shall be 1% frequency increment of the momentary frequency in the frequency range 150kHz to 80MHz;
- the injection method to be used shall be selected according to the basic standard EN 61000-4-6;
- responses on receivers or receiver parts of transceivers occurring at discrete frequencies which are narrow band responses (spurious responses), are disregarded from the test;

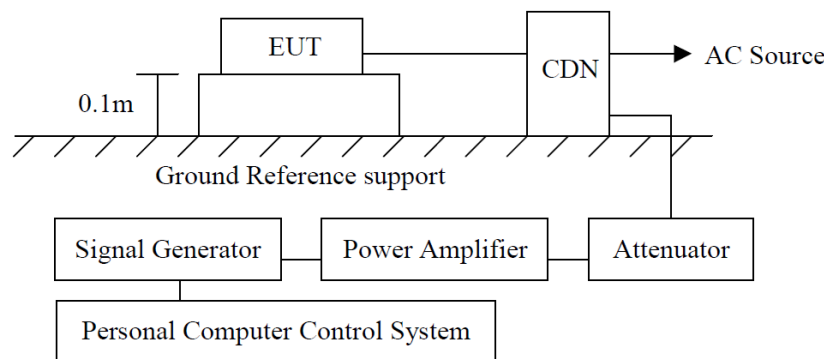
### 5.5.2 Performance criteria

For transmitters the performance criteria for continuous phenomena for transmitter shall apply.

For receivers the performance criteria for continuous phenomena for receivers shall apply.

For ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with receivers or transmitters in which case the corresponding performance criteria above shall apply.

### 5.5.3 Test Setup





5.5.4 Test Result

|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

| Port Type | Frequency (MHz) | Test Voltage                             | Criterion met | Criterion Required |
|-----------|-----------------|--|---------------|--------------------|
| AC Mains  | 0.15 to 80      | 3 V (rms)<br>AM Modulated<br>1000Hz, 80% | A             | A                  |

**Result: Compliance.**

## 5.6 Voltage interruptions voltage Dips

### 5.6.1 Test Method

The test method shall be in accordance with EN 61000-4-11.

The test levels shall be:

- voltage dip: 0% residual voltage for 0.5 cycle;
- voltage dip: 0% residual voltage for 1 cycle;
- voltage dip: 70% residual voltage for 25 cycles (at 50Hz);
- voltage interruption: 0% residual voltage for 250 cycles (at 50 Hz).

### 5.6.2 Performance criteria

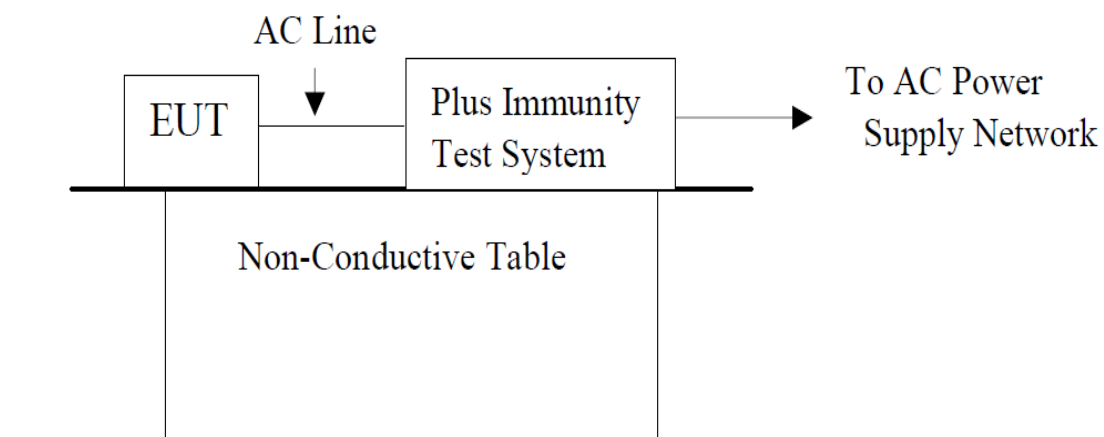
**For a voltage dip the following performance criteria apply:**

- for transmitters the performance criteria for transient phenomena for transmitter shall apply;
- for receivers the performance criteria for transient phenomena for receiver shall apply;
- for ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

**For a voltage interruption the following performance criteria apply:**

- in the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena for transmitters or for receivers shall apply;
- in the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator;
- no unintentional responses shall occur at the end of the test; • in the event of loss of function(s) or in the event of loss of user stored data, this fact shall be recorded in the test report;
- for ancillary equipment the pass/failure criteria supplied by the manufacturer shall apply, unless the ancillary equipment is tested in connection with

### 5.6.3 Test Setup



#### 5.6.4 Test Result

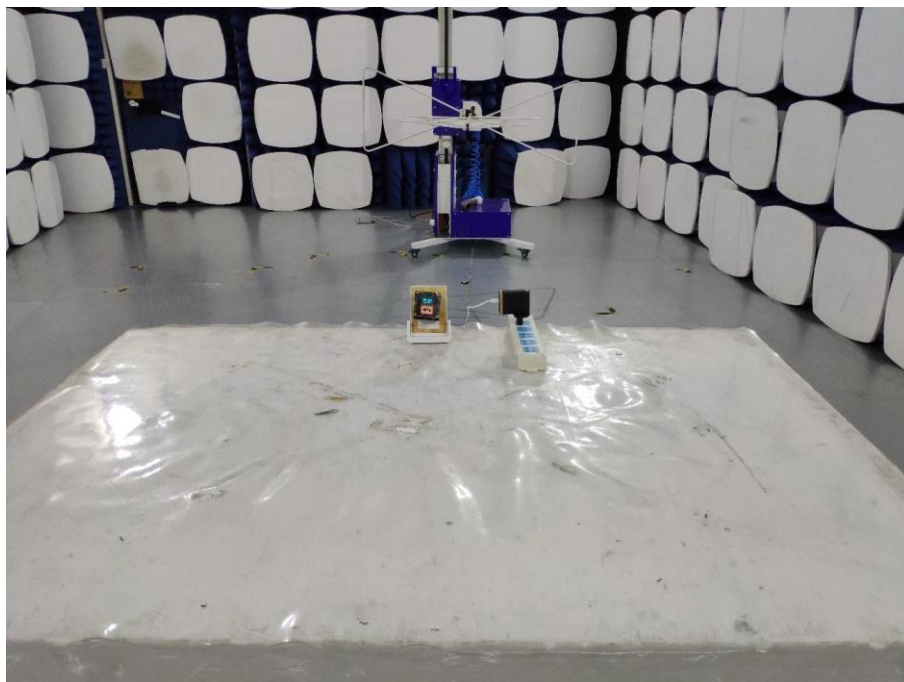
|              |        |                    |        |
|--------------|--------|--------------------|--------|
| Temperature: | 25.6℃  | Relative Humidity: | 63%    |
| Pressure:    | 101kPa | Test mode:         | Mode 1 |

| Test Level in %U <sub>T</sub> | Duration (Period) | Criterion Required | Criterion met |
|-------------------------------|-------------------|--------------------|---------------|
| 0%                            | 0.5               | B                  | A             |
| 0%                            | 1                 | B                  | A             |
| 70%                           | 5                 | B                  | A             |
| 0%                            | 250               | C                  | B             |

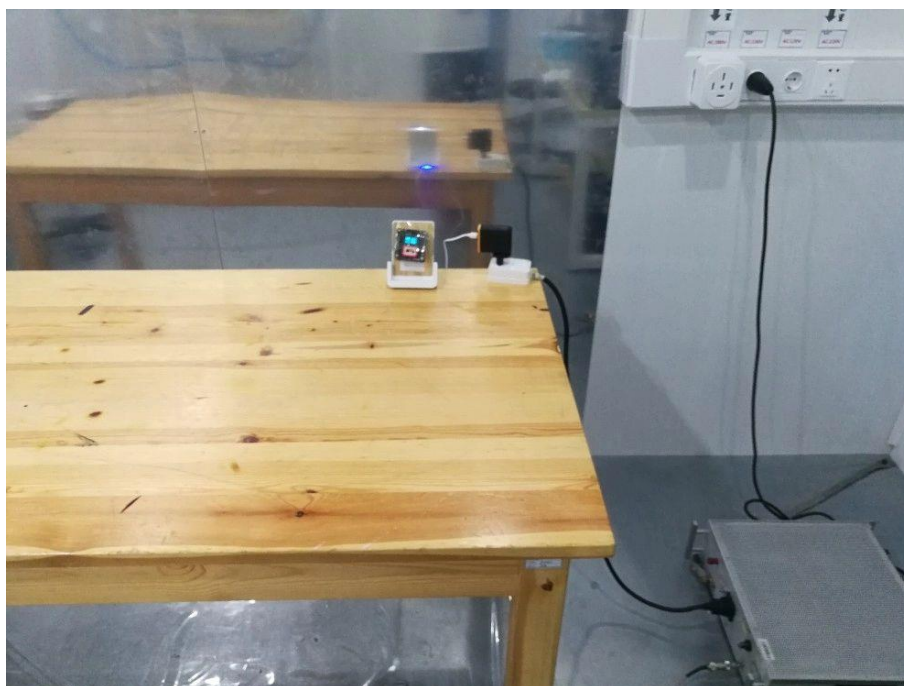
**Result: Compliance.**

## Photographs of the Test Setup

Radiated emission



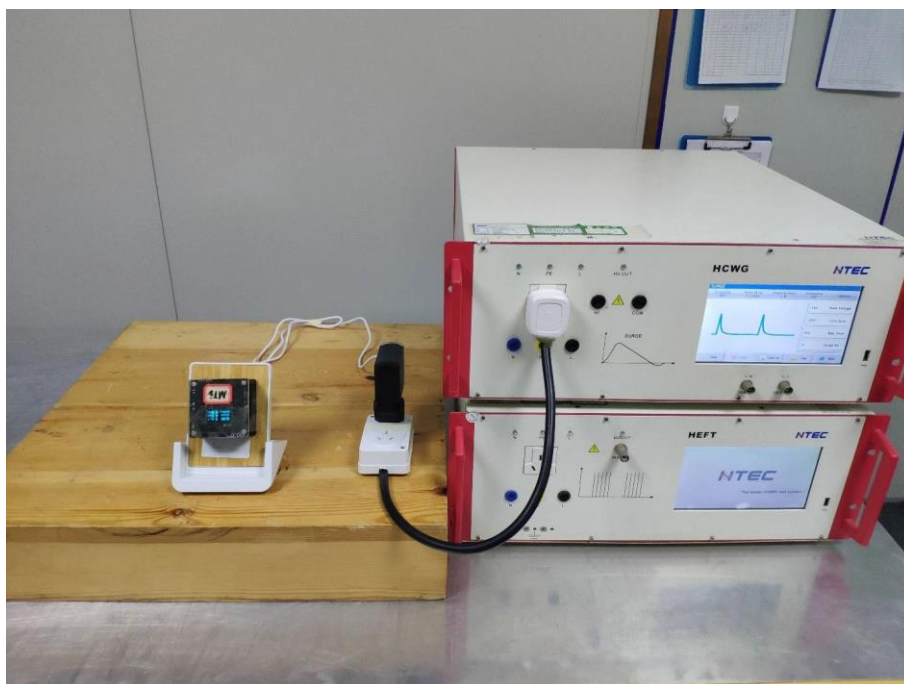
Conducted emission



### EFT

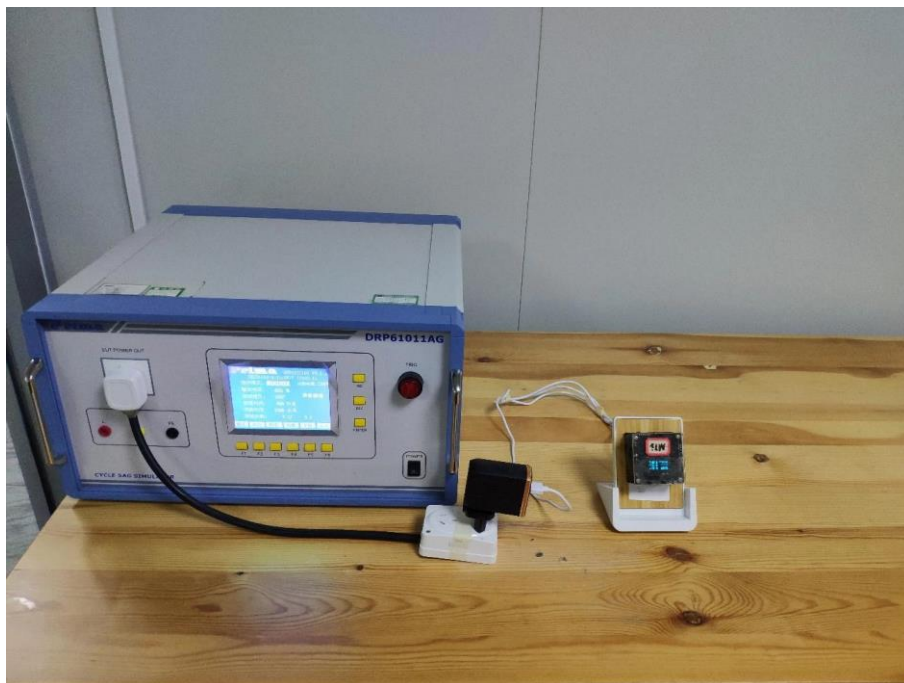


### Surges

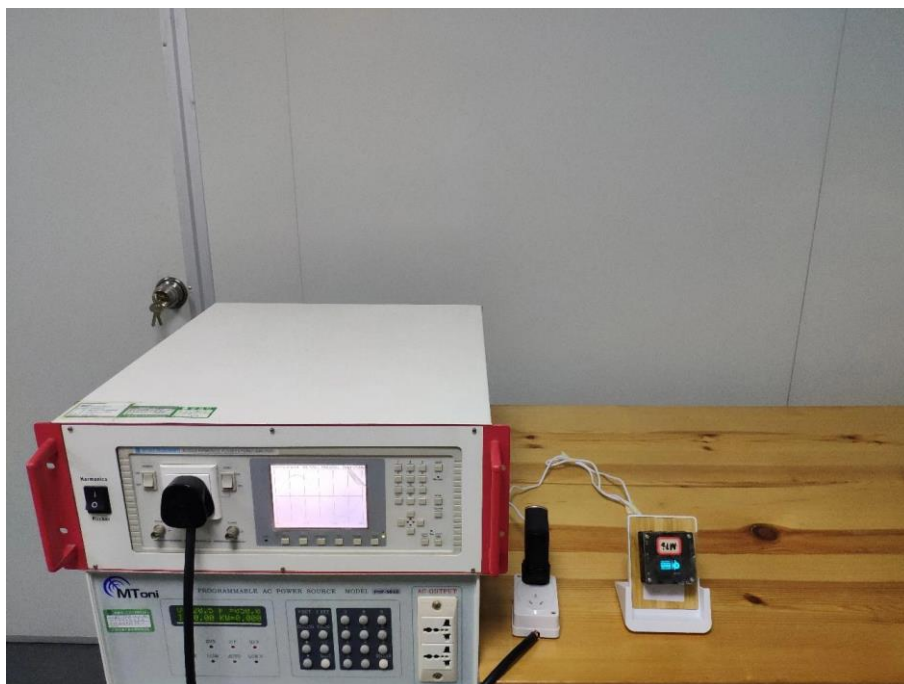




Dips



Flicker



CS



ESD



RS





## Photographs of the EUT

See the APPENDIX 1: EUT PHOTO in the report No.: MTi190415E083-1.

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