

Test Report

Report No.: MTi190420E140

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 to Apr. 22, 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

Model name: P308.48

Trademark: N/A

Standards:

EN 55032:2015+AC:2016
EN 55035:2017
EN 61000-3-2:2014
EN 61000-3-3:2013

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 EMC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:



Archer Liu

Apr. 22, 2019

Reviewed by:



Blue Zheng

June 19, 2019

Approved by:



Smith Chen

June 19, 2019

1 General Description

1.1 Description of EUT

| | |
|----------------------------|------------------------------------|
| Product name: | Ontario 5W wireless charging stand |
| Model name: | P308.48 |
| Series Model | N/A |
| Different of series model: | N/A |
| Power supply: | 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 |
| <i>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 is showed.</i> | |

1.3 Test setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.4 Ancillary equipment

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

2 Summary of Test Result

| No. | Test Standard | Description of Test | Result | Remark |
|---------------------------|-----------------------|--|--------|--------|
| Emission | | | | |
| 1 | EN 55032:2015+AC:2016 | Conducted emission | Pass | |
| 2 | | Radiated emission | Pass | |
| 3 | EN 61000-3-2:2014 | Harmonic current emission | N/A | |
| 4 | EN 61000-3-3:2013 | Voltage fluctuations & flicker | Pass | |
| Immunity | | | | |
| 1 | EN 55035:2017 | Electrostatic discharges (ESD) | Pass | |
| 2 | | Radiated electromagnetic field disturbances (RS) | Pass | |
| 3 | | Conducted disturbances (CS) | Pass | |
| 4 | | Power frequency magnetic field | N/A | |
| 5 | | Electrical fast transients/burst (EFT/S) | Pass | |
| 6 | | Surges | Pass | |
| 7 | | Voltage dips and interruptions | Pass | |
| 8 | | Broadband Impulse noise disturbances repetitive | N/A | |
| 9 | | Broadband Impulse noise disturbances isolated | N/A | |
| N/A: Mean not applicable. | | | | |

3 Test Facilities and Accreditations

3.1 Test laboratory

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

Note: The item of radiated electromagnetic field immunity was tested by:

| | |
|------------------------|--|
| Test Site | WALTEK SERVICES (SHEN ZHEN) CO., LTD. |
| Test Site Location | 1/F,Fukangtai Building,West Baima Rd., Songgang Street,Baoan District, ShenZhen 518105, Guangdong,China. |
| Telephone: | (86-755)83551033 |
| Fax: | (86-755)83552400 |
| CNAS Registration No.: | CNAS L3110 |

3.2 Environmental conditions

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

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

3.3 Measurement uncertainty

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

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

3.4 Test software

| Software name | Manufacturer | Model | Version |
|-----------------------------------|--------------|-----------------|----------|
| EMI Measurement Software | Farad | EZ-EMC | V1.1.4.2 |
| Conducted immunity test system | Scholder | EN61000-4-6.exe | V1.3.0 |
| Harmonics and flicker test system | TTI | HA-PC Link | V2.02 |
| DIPS Test Firmware | Prima | DRP61011AG | V4.1.2 |

| | | | |
|---------------------|-------|----------|--------|
| EFT Test Firmware | HTEC | HCOMPACT | V1.0.1 |
| Surge Test Firmware | HTEC+ | HCOMPACT | V1.0.1 |

4 List of test equipment

| Radiation emission | | | | | | | |
|--------------------|----------------------------------|---------------|-------------------------------|----------------|-------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | EMI Test Receiver | MTI-E004 | Rohde&schwarz | ESPI | 1000314 | 2018/10/09 | 2019/10/08 |
| 2 | Broadband antenna | MTI-E006 | schwarabeck | VULB9163 | 872 | 2018/10/09 | 2019/10/08 |
| 3 | Horn antenna | MTI-E007 | schwarabeck | BBHA9120D | 1201 | 2018/10/09 | 2019/10/08 |
| 4 | amplifier | MTI-E014 | America | 8447D | 3113A06150 | 2018/10/09 | 2019/10/08 |
| 5 | amplifier | MTI-E034 | Agilent | 8449B | 3008A02400 | 2018/10/09 | 2019/10/08 |
| 6 | 18-40GHz amplifier | MTI-E052 | Chengdu step Micro Technology | ZLNA-18-40G-21 | 1608001 | 2018/10/09 | 2019/10/08 |
| 7 | spectrum analyzer | MTI-E049 | Rohde&schwarz | FSP-38 | 100019 | 2018/10/09 | 2019/10/08 |
| 8 | 15-40G Antenna | MTI-E053 | Schwarzbeck | BBHA9170 | BBHA9170582 | 2018/10/09 | 2019/10/08 |
| 9 | Active Loop Antenna 9kHz - 30MHz | MTI-E051 | Schwarzbeck | FMZB 1519 B | 00044 | 2018/10/09 | 2019/10/08 |

| Conduction emission | | | | | | | |
|---------------------|--------------------------|---------------|---------------|----------|--------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | Artificial power network | MTI-E037 | Schwarzbeck | NSLK8127 | NSLK8127#841 | 2018/10/09 | 2019/10/08 |
| 2 | EMI Test Receiver | MTI-E003 | Rohde&schwarz | ESCI | 101368 | 2018/10/09 | 2019/10/08 |
| 3 | Artificial power network | MTI-E058 | Schwarzbeck | NSLK8127 | NSLK8127#841 | 2018/10/09 | 2019/10/08 |

| Conduction immunity | | | | | | | |
|---------------------|--------------------------------------|---------------|--------------|-----------|---------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | Conduction Immunity Signal Generator | MTI-E015 | Schloder | CDG6000 | 126A1343/2015 | 2018/10/09 | 2019/10/08 |
| 2 | Coupled decoupling network | MTI-E016 | Schloder | M2+M3-16A | A2210332/2015 | 2018/10/09 | 2019/10/08 |

| Voltage dips, short interruptions and voltage variations immunity | | | | | | | |
|---|----------------|---------------|--------------|------------|------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | Drop generator | MTI-E025 | Prima/China | DRP61011AG | PR15056303 | 2018/10/09 | 2019/10/08 |

| Working frequency magnetic field immunity | | | | | | | |
|---|--|---------------|--------------|-----------|------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | power frequency magnetic field generator | MTI-E011 | china HTEC | HPFMF 100 | 153703 | 2018/10/09 | 2019/10/08 |

| Electrostatic discharge immunity | | | | | | | |
|----------------------------------|----------------|---------------|--------------|------------|------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | ESD Simulator | MTI-E008 | Schloder | SESD 30000 | 509325 | 2018/10/09 | 2019/10/08 |

| Surge immunity | | | | | | | |
|----------------|-----------------|---------------|--------------|---------|------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | Surge Generator | MTI-E010 | china HTEC | HCWG 51 | 153702 | 2018/10/09 | 2019/10/08 |

| Harmonic & flicker emissions | | | | | | | |
|------------------------------|---------------------------------|---------------|-------------------|---------|-------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | AC power source | MTI-E023 | shenzhen tongyuan | TY-8205 | 20150916809 | 2018/10/09 | 2019/10/08 |
| 2 | Harmonic scintillation Analyzer | MTI-E013 | Laplace | AC2000A | 311216 | 2018/10/09 | 2019/10/08 |

| Electrical Fast Transient/Burst immunity | | | | | | | |
|--|-------------------------------------|---------------|--------------|---------|------------|------------------|------------|
| Item | Equipment name | Equipment No. | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | Electrical Fast Transient Generator | MTI-E009 | HTEC | HEFT 51 | 153701 | 2018/10/09 | 2019/10/08 |

| Radiated electromagnetic field immunity | | | | | |
|--|-----------------|-----------------|---------------|------------------|------------|
| Equipment | Manufacturer | Model | Serial No. | Calibration date | Due date |
| Signal Generator | R&S | SMB100A | 106148 | 2018/09/10 | 2019/09/09 |
| RF Power Amplifier | BONN Elektronik | STLP9128D | 128740 | 2018/09/10 | 2019/09/09 |
| Gestockte Breitband (S tacked) Log. -per.Antenna | SCHWARZBECK | STLP9128D | 043 | 2018/09/10 | 2019/09/09 |
| Power Meter | R&S | NRP2 | 102031 | 2018/09/10 | 2019/09/09 |
| Amplifier | NJNT | NTWPAS-2560 025 | 2560025 | 2019/04/14 | 2020/04/13 |
| Broad-band Horn Antenna | SCHWARZBECK | BBHA 9120 D | BBHA9120D-667 | 2019/04/06 | 2020/04/05 |

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

5 Emission test

5.1 Conducted emission

5.1.1 Limits

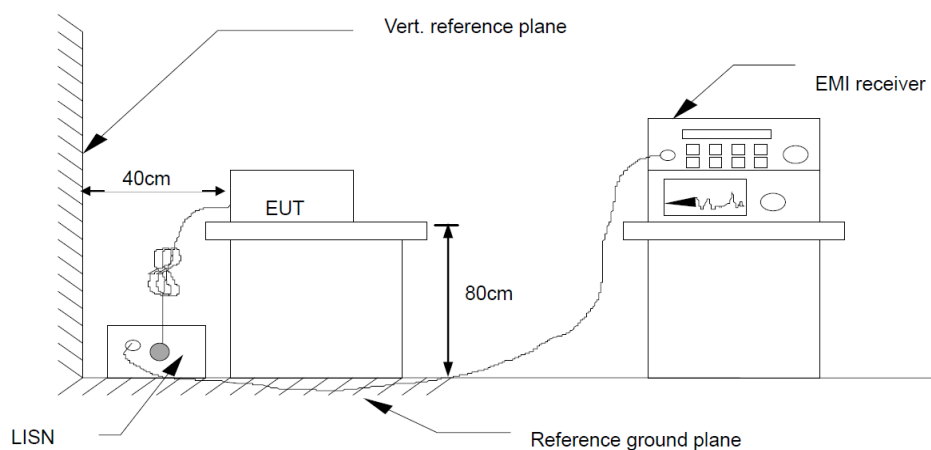
| Frequency (MHz) | Class A (dBμV) | | Class B (dBμV) | |
|-----------------|----------------|---------|----------------|-----------|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 -0.5 | 79 | 66 | 66 - 56 * | 56 - 46 * |
| 0.5 -5 | 73 | 60 | 56 | 46 |
| 5 -30 | 73 | 60 | 60 | 50 |

Note 1: the tighter limit applies at the band edges.
*Note 2: the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.*

5.1.2 Test Procedures

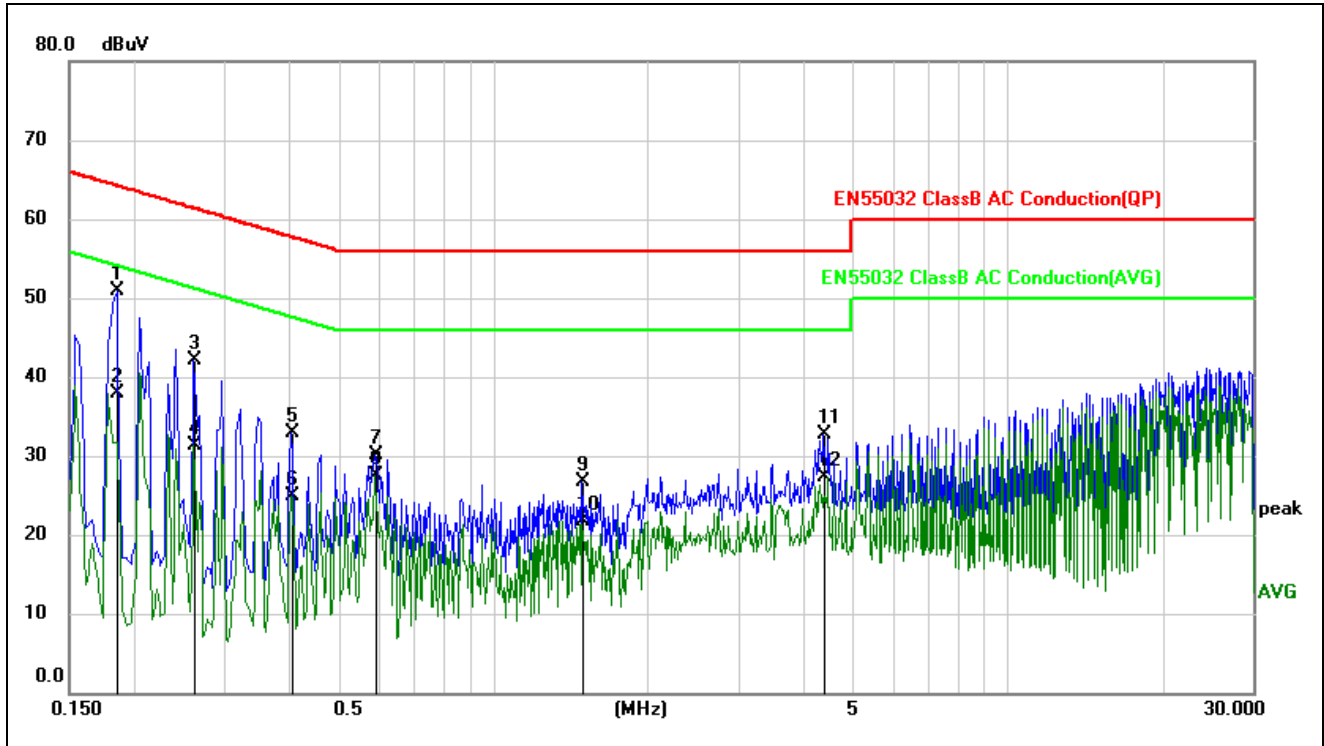
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- LISN is at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item – photographs of the test setup.

5.1.3 Test setup



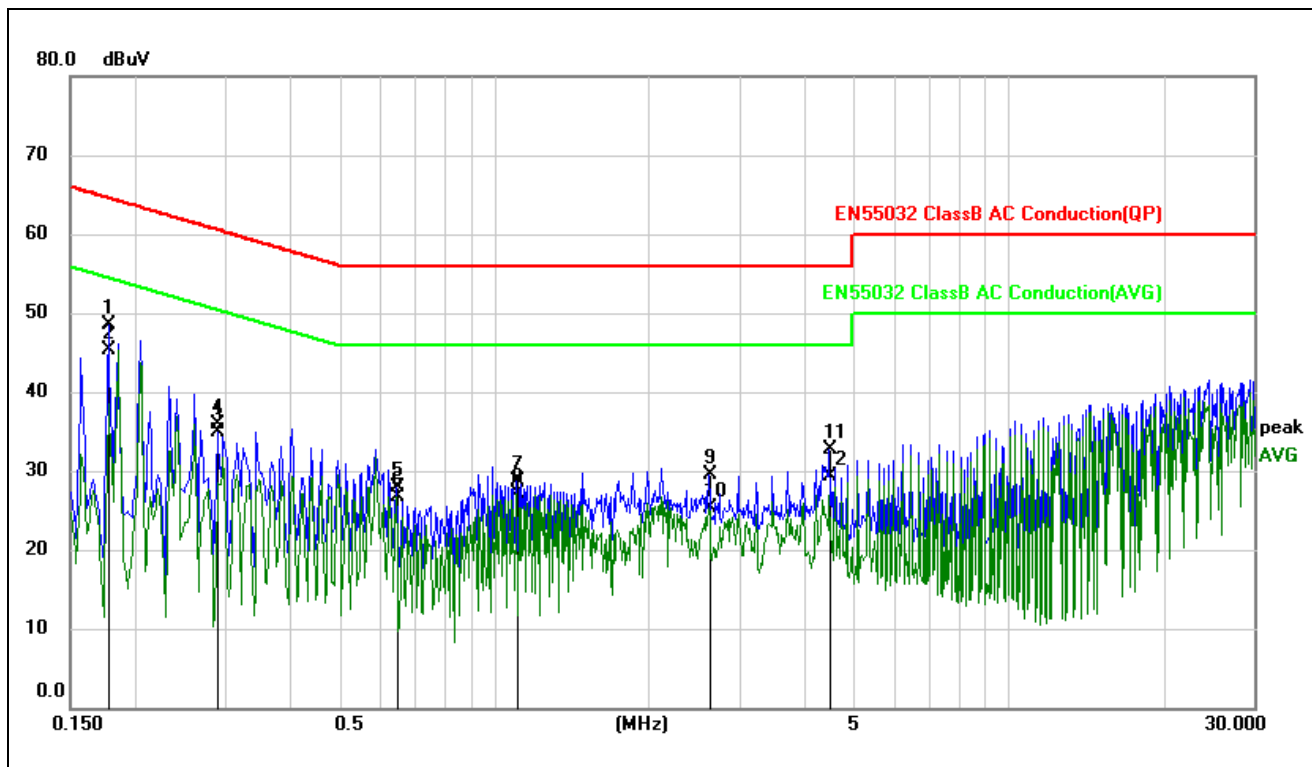
5.1.4 Test Result

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



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over 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 230V/50Hz | Test mode: | Mode 1 |



| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over 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 | |

5.2 adiated emission

5.2.1 Limits

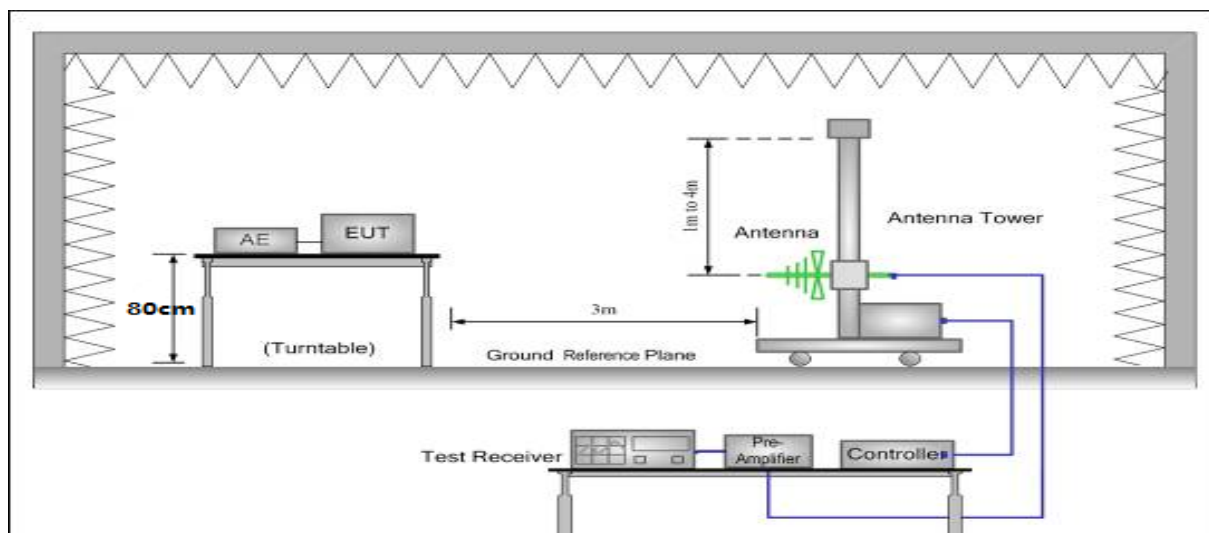
| Frequency (MHz) | Class A (at 3m) dB μ V/m | | Class B (at 3m) dB μ V/m | |
|-----------------|------------------------------|---------|------------------------------|---------|
| | Quasi-peak | | Quasi-peak | |
| 30-230 | 50 | | 40 | |
| 230-1000 | 57 | | 47 | |
| / | Peak | Average | Peak | Average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

5.2.2 Test Procedures

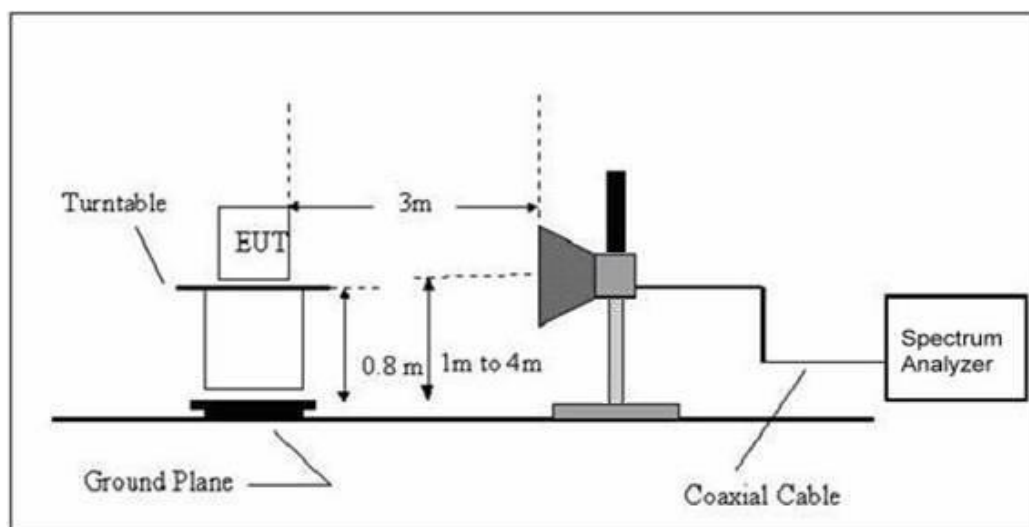
- The radiated emission tests were performed in the 3 meters.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the test antenna shall vary between 1m to 4m. Both horizontal 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.
- For the actual test configuration, please refer to the related item – EUT test photos.

5.2.3 Test Setup

Radiated emission test-up frequency for 30MHz - 1GHz

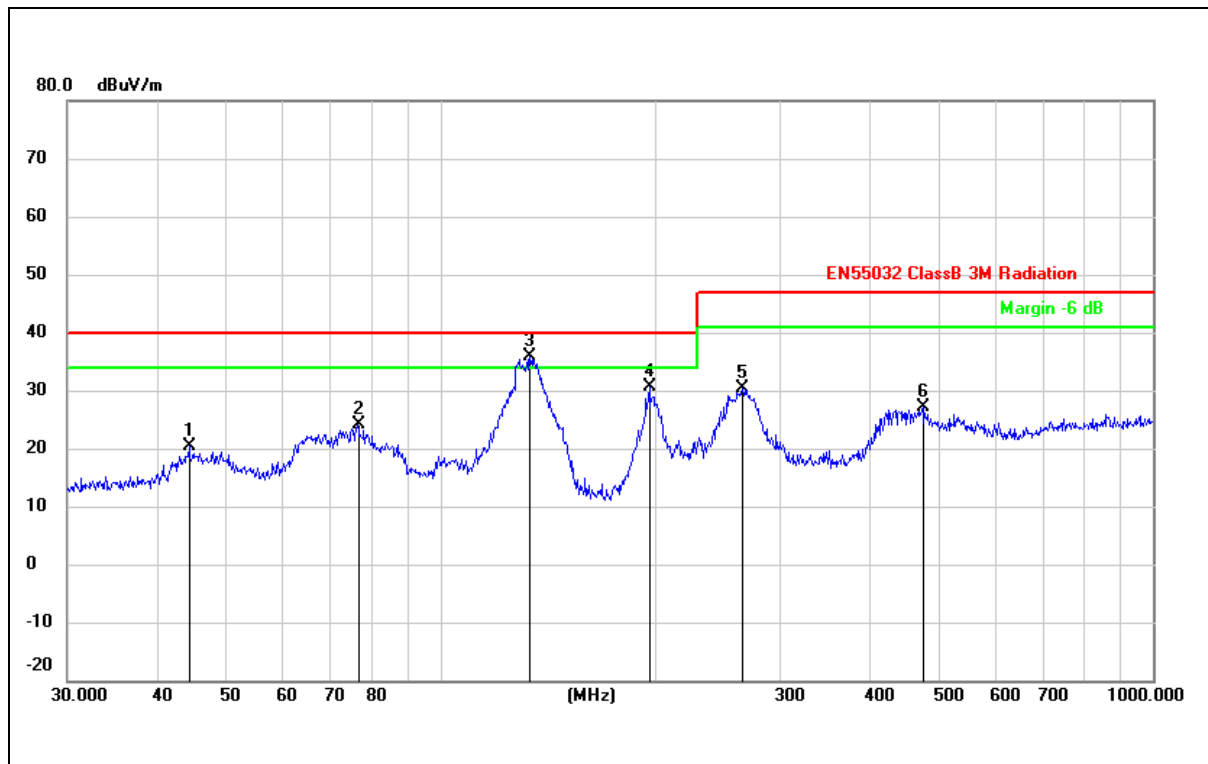


Radiated emission test-up frequency for above 1GHz



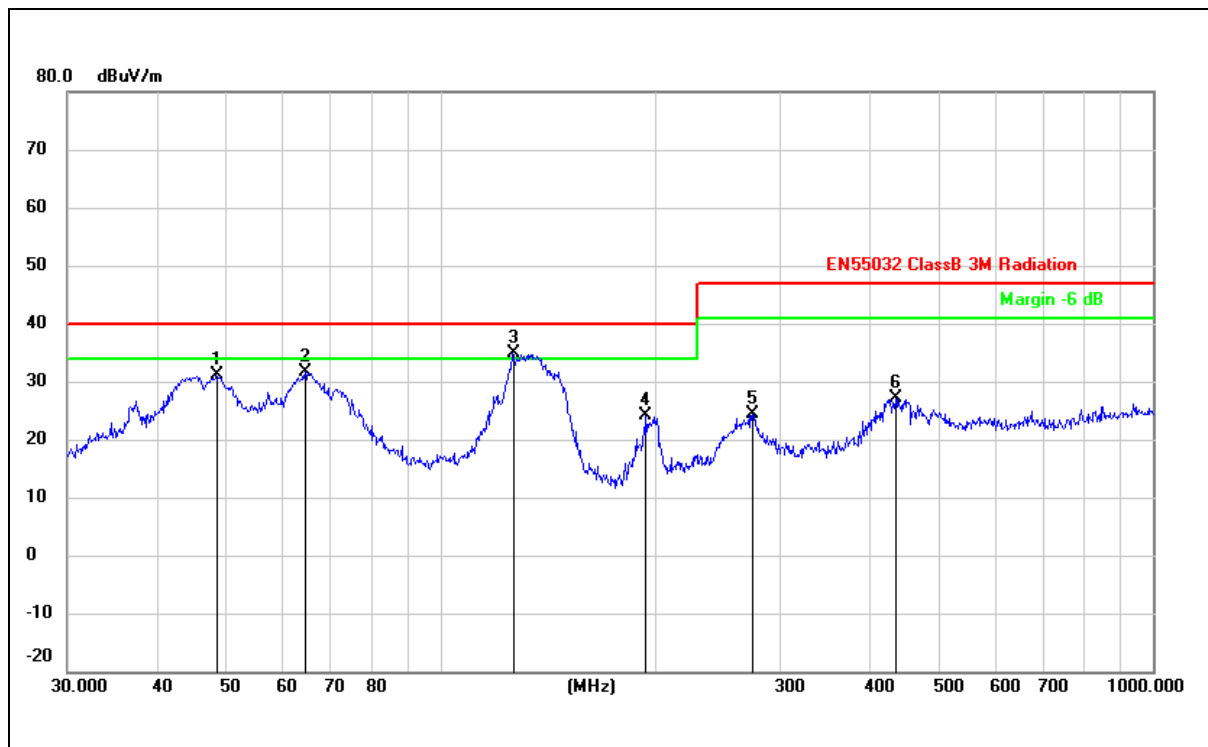
5.2.4 Test Result

| | | | |
|---------------|------------------------------------|--------------------|------------|
| 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. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|-----|-----|----------|---------------|----------------|--------------|--------|--------|----------|
| | | MHz | dBuV | dBuV/m | dBuV/m | dBuV/m | 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 |



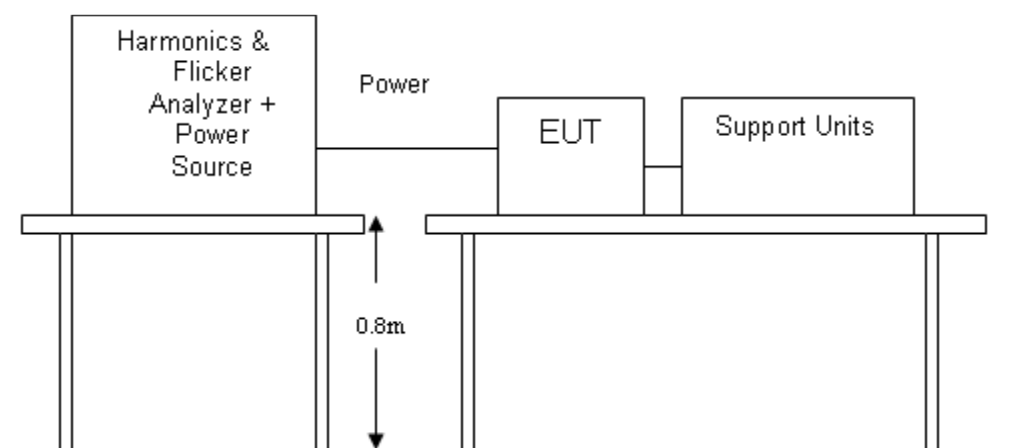
| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dBuV/m | Measure- ment dBuV/m | Limit dBuV/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-----------------------------|----------------------------|-----------------|------------|----------|
| 1 | | 48.5016 | 40.70 | -9.67 | 31.03 | 40.00 | -8.97 | QP |
| 2 | | 64.6594 | 43.97 | -12.34 | 31.63 | 40.00 | -8.37 | QP |
| 3 | * | 126.3286 | 47.93 | -12.96 | 34.97 | 40.00 | -5.03 | QP |
| 4 | | 194.4533 | 34.40 | -10.29 | 24.11 | 40.00 | -15.89 | QP |
| 5 | | 274.1938 | 32.71 | -8.34 | 24.37 | 47.00 | -22.63 | QP |
| 6 | | 435.5898 | 33.18 | -6.02 | 27.16 | 47.00 | -19.84 | QP |

5.3 Harmonic current emission / Voltage fluctuations & flicker

5.3.1 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.

5.3.2 Test Setup



5.3.3 Test Result

Harmonic current emission:

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

Voltage fluctuations & flicker:

| | | | |
|--------------|--------|--------------------|--------|
| Temperature: | 24℃ | Relative Humidity: | 53% |
| Pressure: | 101kPa | Test mode: | Mode 1 |

| | Pst | dc (%) | dmax (%) | d(t) > 3.3% (ms) |
|---------|-------|--------|----------|------------------|
| Limit | 1.000 | 3.300 | 4.000 | 500 |
| Reading | 0.2 | 0.16 | 0.22 | 0 |

6 Immunity test

6.1 Performance criteria

| Performance criteria | |
|--|--|
| Performance criterion | Description |
| A | During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended. |
| B | <p>After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p> <p>If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.</p> |
| C | <p>During and after testing, a temporary loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p> |
| <p>Particular performance criteria:</p> <p>The particular performance criteria which are specified in the normative annexes take precedence over the corresponding parts of the general performance criteria. Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.</p> | |

6.2 Electrostatic discharge (ESD)

6.2.1. Test Procedures

- a) The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second.

- b) Vertical Coupling Plane (VCP):

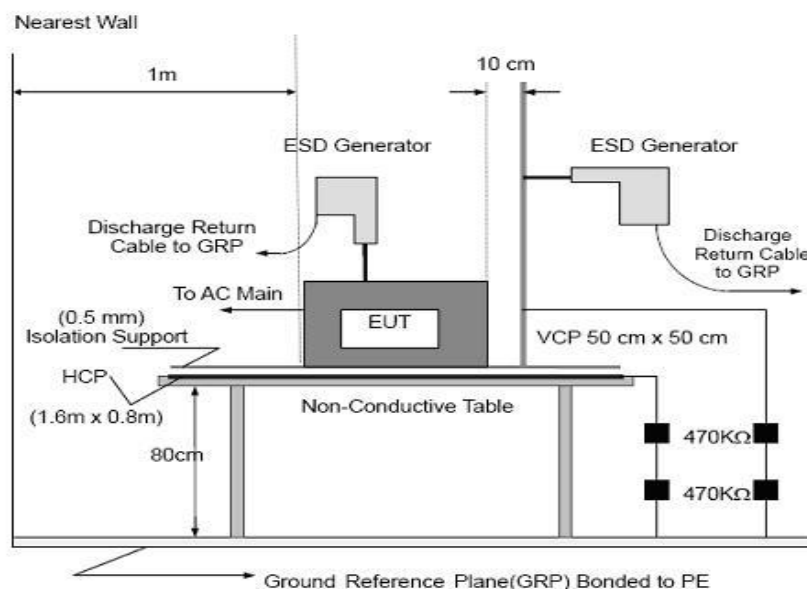
The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

- c) Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

Air discharges at insulation surfaces of the EUT. It was at least ten single discharges with positive and negative at the same selected point. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.2.2. Test Setup



6.2.3. Test Result

Indirect discharge

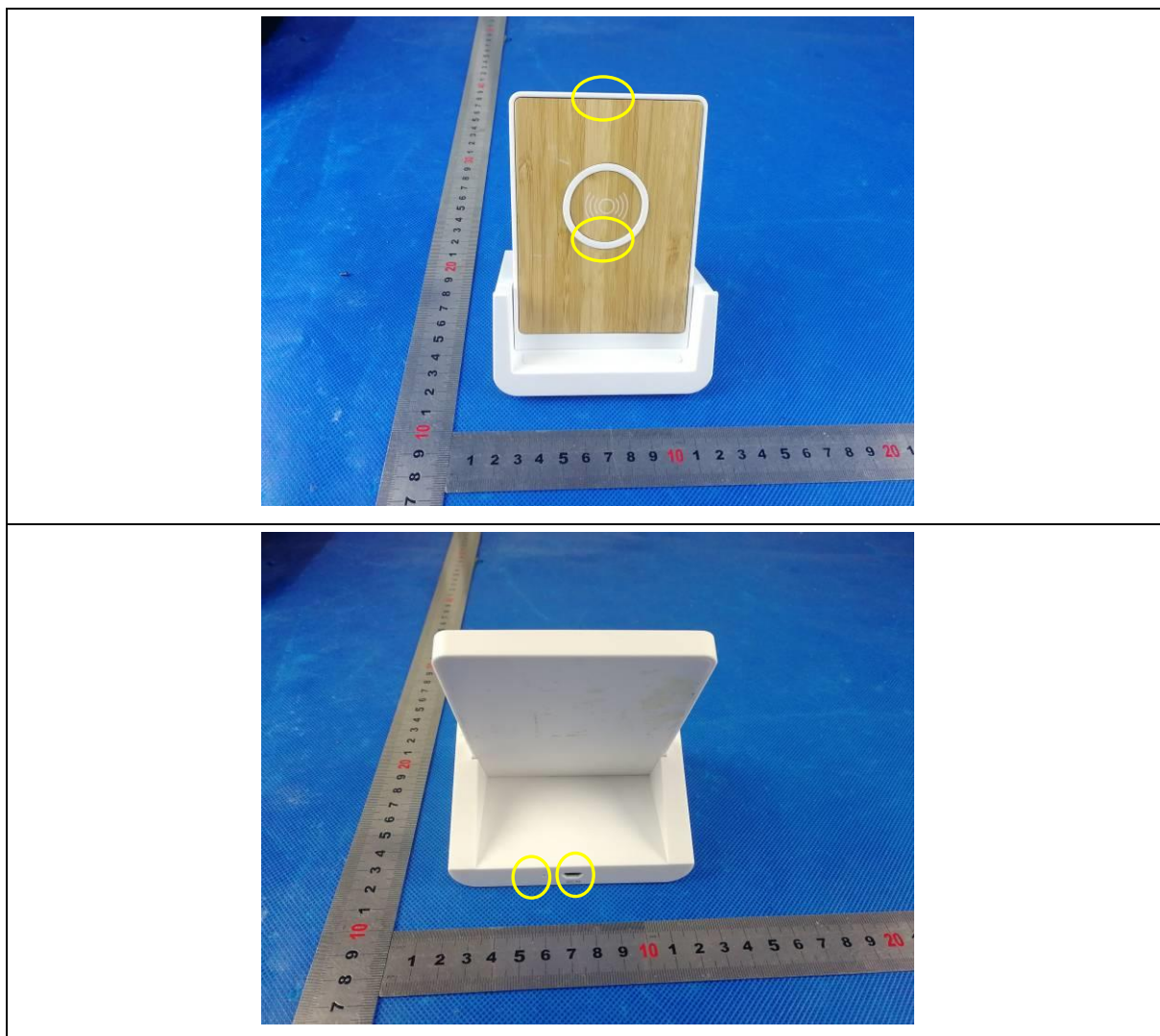
| | | | |
|--------------|--------|--------------------|--------|
| Temperature: | 21.4℃ | Relative Humidity: | 55% |
| Pressure: | 101kPa | Test mode: | Mode 1 |

| No. | Test Point | Contact discharge level (kV) | Number and polarity | Criterion met | Criterion Required | Result |
|-----|----------------|--|---------------------|---------------|--------------------|------------|
| 1 | VCP-Front side | <input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 | 10 (+) | A | B | Compliance |
| | | <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 | | |

Direct discharge

| No. | Test Point | Contact discharge level (kV) | Air discharge level (kV) | Number and polarity | Criterion met | Criterion Required | Result |
|--|---|---|--|---------------------|---------------|--------------------|------------|
| 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 | Compliance |
| | | <input type="checkbox"/> ..6 <input type="checkbox"/> ..8 | <input type="checkbox"/> ..6 <input checked="" type="checkbox"/> ..8 | 10 (-) | A | | |
| 2 | 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 | | |
| Note1: Please see the photographs blew about the details of test points. | | | | | | | |

Test location:



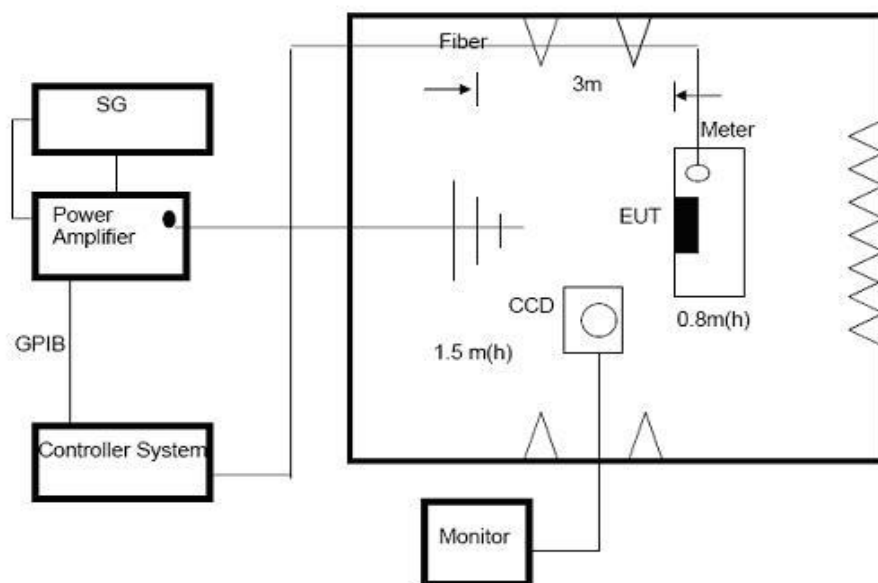
Note: Yellow circle for Air Discharge; Red circle for Contact Discharge.

6.3 Radiated electromagnetic field immunity (RS)

6.3.1. Test Procedures

- a) The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully anechoic chamber.
- b) The testing distance from antenna to the EUT was 3 meters.
- c) The other condition as following manner:
 - i. The field strength level was 3V/m.
 - ii. The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- d) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- f) For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.3.2. Test setup



6.3.3. Test Result

| | | | |
|--------------|--------|--------------------|--------|
| Temperature: | 25°C | Relative Humidity: | 55% |
| Pressure: | 101kPa | Test mode: | Mode 1 |

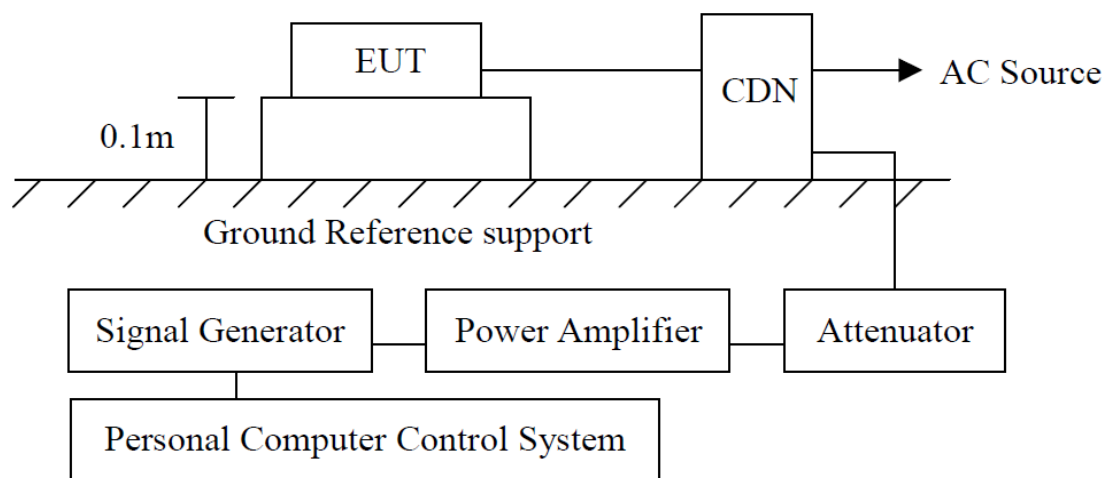
| Frequency Range (MHz) | RF Field Position | R.F. Field Strength | Azimuth | Perform. Criteria | Measurement | Result |
|--|-------------------|--|---------|-------------------|-------------|------------|
| 80- 1000 1800 2600 3500 5000 | H / V | 3 V/m (rms) AM Modulated 1000Hz, 80% | Front | A | A | Compliance |
| | | | Rear | | | |
| | | | Left | | | |
| | | | Right | | | |

6.4 Conducted disturbances (CS)

6.4.1. Test Procedures

- The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- The disturbance signal described below is injected to EUT through CDN.
- The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

6.4.2. Test Setup



6.4.3. Test Result

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

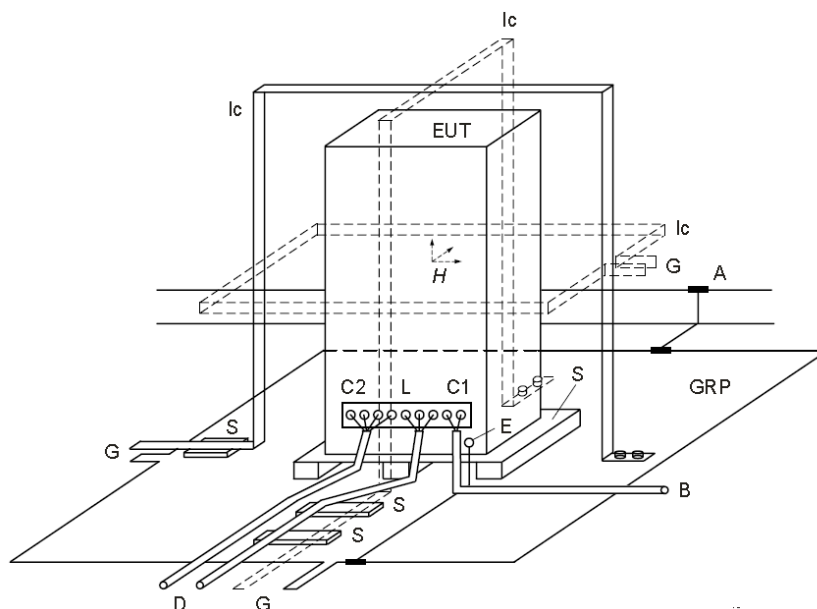
| Port Type | Frequency (MHz) | Test Voltage | Criterion met | Criterion Required | Result |
|-----------|-----------------|--|---------------|--------------------|------------|
| AC Mains | 0.15 to 80 | 3 V (rms) AM Modulated 1000Hz, 80% | A | A | Compliance |

6.5 Power frequency magnetic field

6.5.1. Test Procedures

- EUT connect the wires according to the typical configuration, and switch on the power supply for 15 minutes.
- Turn on the instrument power switch and wait for the instrument to start.
- When the device is started, click the Setup icon to enter the settings screen
- As shown below, for the settings screen, click the test time position and current position to set the test time and current
- Set the correct test time and test current
- Click Start to begin the test, while observing the status of EUT and recording

6.5.2. Test Setup



Components:

| | | | |
|-----|----------------------|----|-----------------------------|
| GRP | Ground plane | A | Safety earth |
| C1 | Power supply circuit | C2 | Signal circuit |
| S | Insulating support | L | Communication line |
| EUT | Equipment under test | B | To power supply source |
| Ic | Inductive coil | D | To signal source, simulator |
| E | Earth terminal | G | To the test generator |

6.5.3. Test Result

N/A

6.6 Electrical fast transients/burst (EFT/S)

6.6.1. Test Procedures

- a) The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

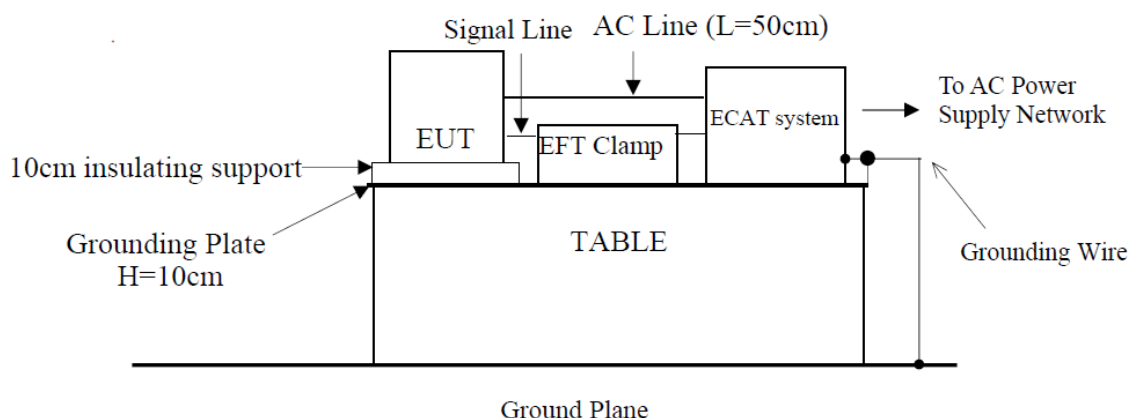
- b) For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

- c) For signal lines and control lines ports:

Ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks, local area networks and similar networks.)

6.6.2. Test Setup



6.6.3. Test Result

| | | | |
|--------------|--------|--------------------|-------|
| Temperature: | 25.6℃ | Relative Humidity: | 63% |
| Pressure: | 101kPa | Test mode: | Mode1 |

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

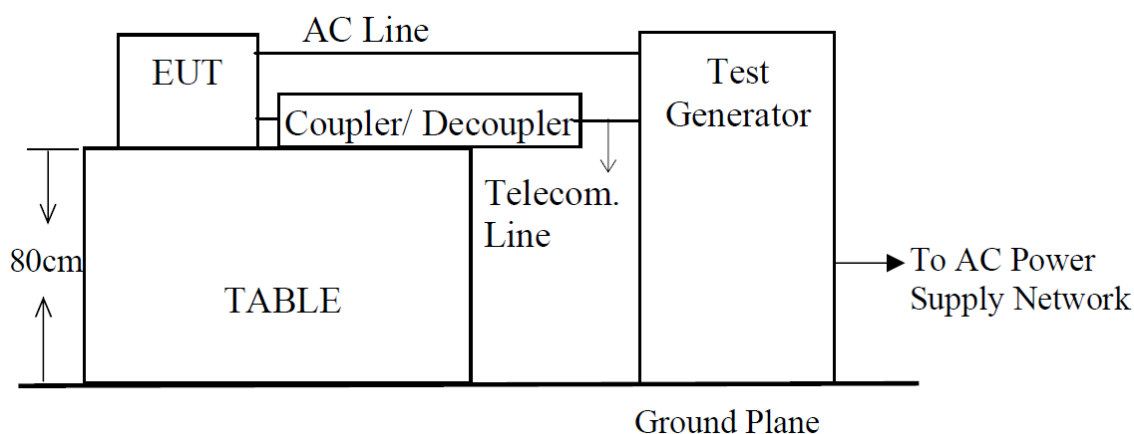
Note: +/- 1KV for AC mains port; +/- 0.5KV for analogue digital data ports and DC network power port.

6.7 Surges

6.7.1. Test Procedures

- For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
- At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- Different phase angles are done individually.
- Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

6.7.2. Test Setup



6.7.3. Test Result

| | | | |
|--------------|--------|--------------------|-------|
| Temperature: | 25.6℃ | Relative Humidity: | 63% |
| Pressure: | 101kPa | Test mode: | Mode1 |

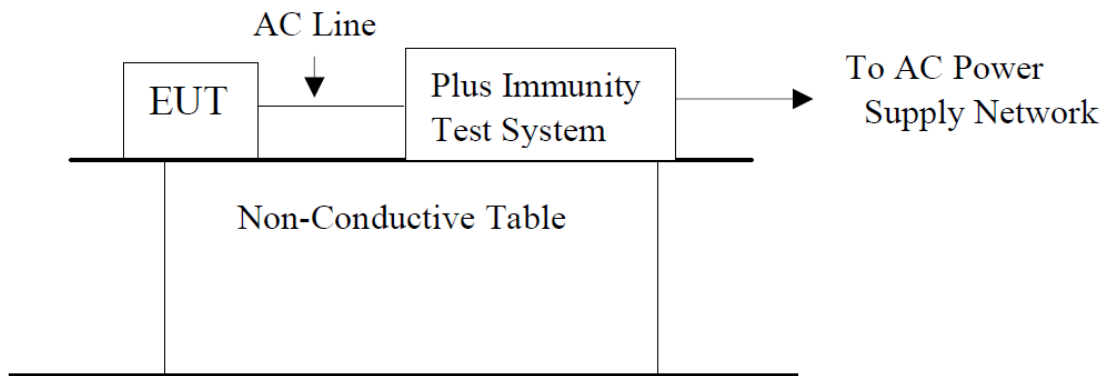
| Port Type | Injected Line | Test Voltage | Criterion met | Criterion Required | Result |
|-----------|---------------|--------------|---------------|--------------------|------------|
| AC Mains | L – N | ±0.5kV, ±1kV | A | A | Compliance |
| | L – PE | ±1kV, ±2kV | N/A | | |
| | N – PE | ±1kV, ±2kV | N/A | | |

6.8 Voltage dips and interruptions

6.8.1. Test procedures

- The interruptions are introduced at selected phase angles with specified duration.
- Record any degradation of performance

6.8.2. Test setup



6.8.3. Test result

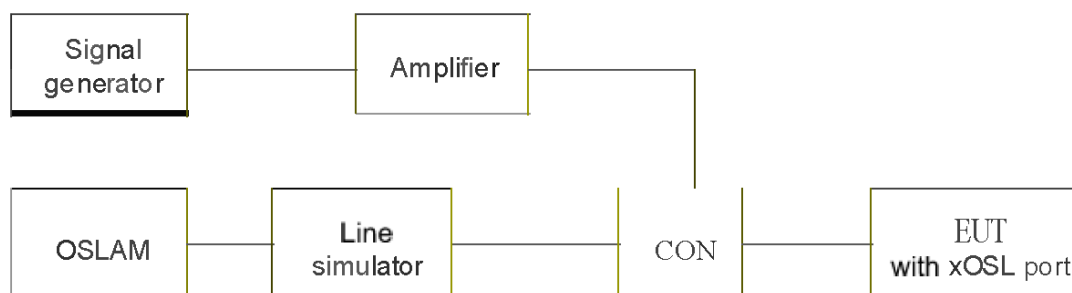
| Test Level in %UT | Period | Criterion | Result | Result |
|-------------------|--------|-----------|--------|------------|
| 0% | 0.5 | B | A | Compliance |
| 70% | 25 | C | A | Compliance |
| 0% | 250 | C | C | Compliance |

6.9 Broadband Impulse noise disturbances repetitive

6.9.1. Test procedures

- The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- The disturbance signal described below is injected to EUT through CDN.
- The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- The xOSL technology or 30 MHz, whichever is the lowest using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 128 kHz sine wave.
- The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

6.9.2. Test setup



6.9.3. Test result

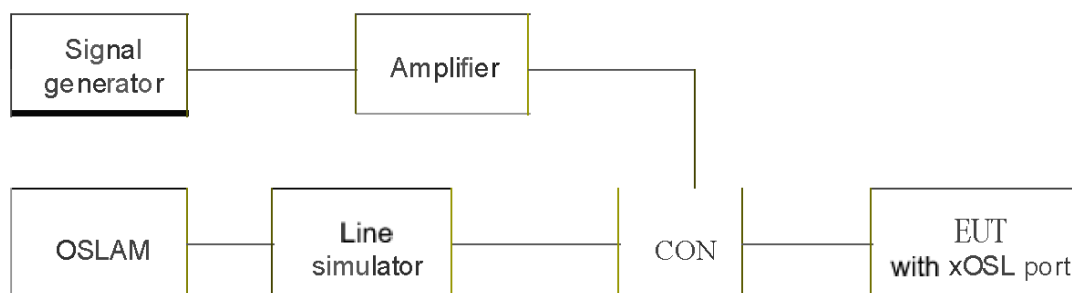
N/A

6.10 Broadband Impulse noise disturbances isolated

6.10.1. Test procedures

- The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- The disturbance signal described below is injected to EUT through CDN.
- The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- The xOSL technology or 30 MHz, whichever is the lowest using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 128 kHz sine wave.
- The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

6.10.2. Test setup

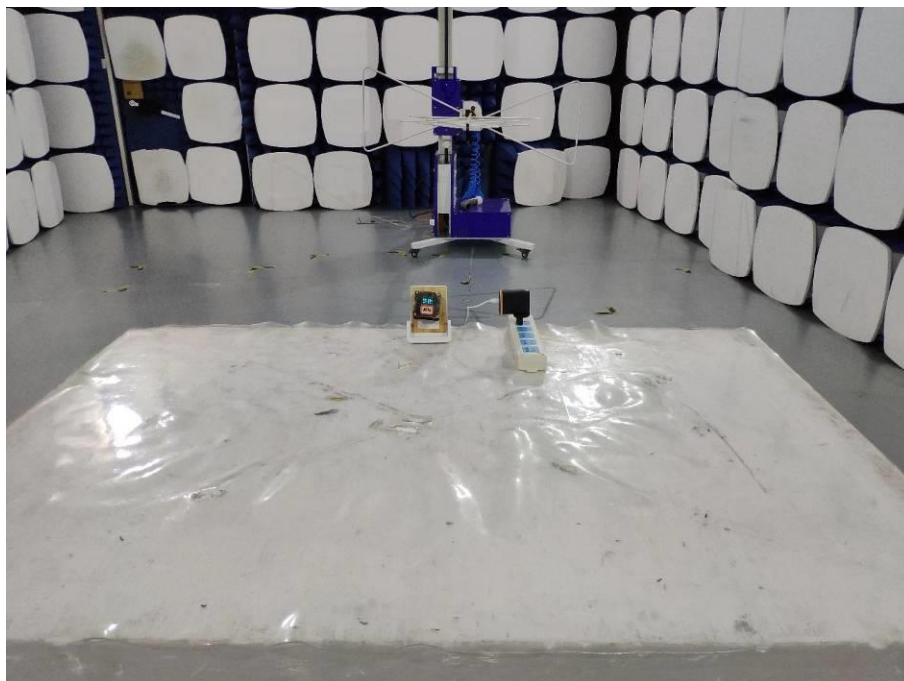


6.10.3. Test result

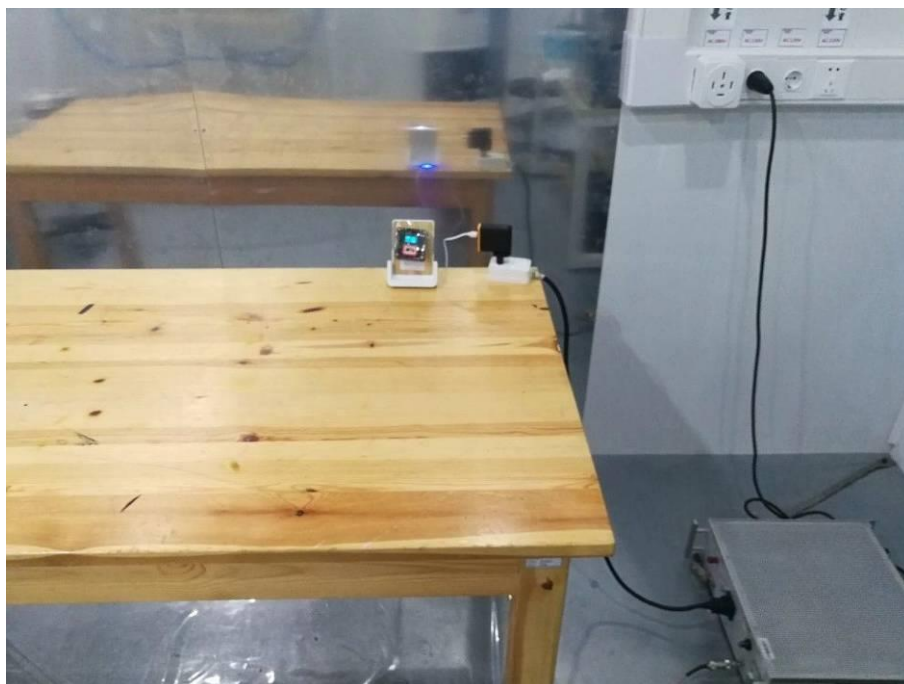
N/A

Photographs of the Test Setup

Radiated emission



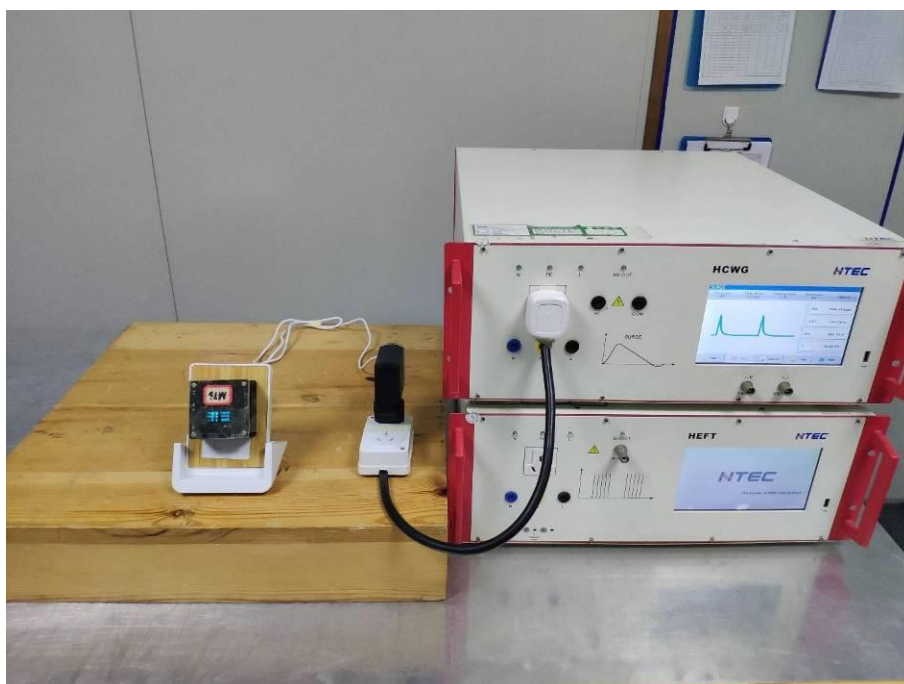
Conducted emission



EFT



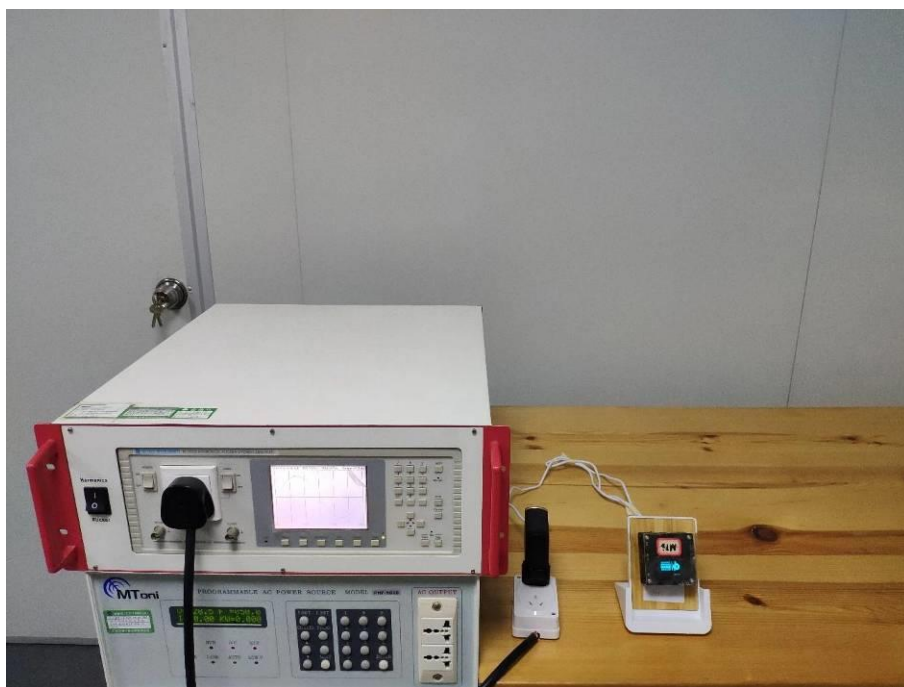
Surges



Dips



Flicker



CS



ESD



RS



Photographs of the EUT

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

----END OF REPORT----