# EMC Test Report

**Product Name:** **IP Phone**

**Product Model:** **eSpace 7910**

**Report Number:** **SYBH (E) 00783300EB**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
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## Notice

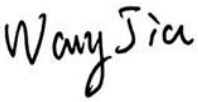
1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.
2. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
3. The test report is invalid if there is any evidence of erasure and/or falsification.
4. The test report is only valid for the test samples.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

| | |
|---|---|
| **Applicant:** | Huawei Technologies Co., Ltd. |
| **Address:** | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |
| **Product Name:** | IP Phone |
| **Product Model:** | eSpace 7910 |

| | |
|---|---|
| **Date of Receipt Sample:** | 2012-11-20 |
| **Start Date of Test:** | 2012-11-24 |
| **End Date of Test:** | 2012-11-30 |

**Test Result:** Pass

| | | | |
|---|---|---|---|
| **Approved by Senior Engineer:** | 2012-12-20 | Zhang Xinghai |  |
| | Date | Name | Signature |

| | | | |
|---|---|---|---|
| **Prepared by:** | 2012-12-19 | Wang Jia |  |
| | Date | Name | Signature |

**Modification Record**

| No. | Last Report No. | Modification Description |
|---|---|---|
| 1 | NA | First report |
| 2 | SYBH(E)00744651EB | Add new adapters, refer to section 3.3 table 4 |

## Content

# 1 General Information

| | |
|---|---|
| **1.1 Applied Standard** | |
| Applied Product Standard: | FCC CFR47 Part 15 Subpart B:2011<br>ICES-003 Issue 5:2012 |
| Test Method: | ANSI C63.4:2003 |
| **1.2 Test Location** | |
| Test Location 8: | Reliability Laboratory of Huawei Technologies Co., Ltd. |
| Address: | No.2222,Xin Jinqiao Road, Pudong New Area, Shanghai, 201206, P.R.C |
| **1.3 Test Environment Condition** | |
| Ambient Temperature: | 20-25°C |
| Relative Humidity: | 45-55% |
| Atmospheric Pressure: | 101kPa |

## 2 Summary of Test Results

Table 1 Test summary

| **EUT Classification:** Class B Digital Device | | | | |
|---|---|---|---|---|
| Test Items | Test Configuration | Limit | Test Result | Location |
| Radiated Emissions Enclosure Port | TC1~TC3 | Class B | Pass | Location1 |
| Conducted Emissions AC Power Port | TC1 and TC2 | Class B | Pass | Location1 |
| Note:<br>1, Measurement taken is within the uncertainty of measurement system.<br>2, TC = Test configuration | | | | |

# 3 Equipment Specification

## 3.1 General Description

eSpace 7910 is a full-featured two-line business IP phone with excellent user experience.
eSpace 7910 has the following features:

- Two lines
- 2.8-inch color Liquid Crystal Display (LCD) screen, 320 x 240 high-resolution
- Advanced Audio Coding-Low Delay (AAC-LD) super-wideband voice codec with a sample rate as high as 48 kHz
- Two GE ports
- Support for Power over Ethernet (PoE)

Ten programmable buttons for various customized services

The difference for the adapters with the same manufacturer and different model numbers in section 3.3 is the plug, so EMC full test was applied on one model only for both manufacturers, other models are deemed to fulfill relevant EMC requirement without further test.

## 3.2 Specification

Table 2 Main equipment specification

| | |
|---|---|
| Rated Input Voltage | ⎓ 5 V (Powered by AC/DC adapter: ~ 100 V to 240 V, 50/60 Hz)<br>⎓ -48 V (Powered over Ethernet) |
| Rated Power (W) | 3.5 W |
| Dimensions (W x D x H) | 231 mm (W) × 208 mm (D) × 103 mm (H) |
| Weight (kg) | 0.85 kg |
| Frequency of the Internal Source (MHz) | 6.7MHz; 24MHz; 25MHz; 125MHz; 150MHz |


Figure 1. EUT Appearance

### 3.3 Board and SubAssembly

Table 3 Board list

| Board Name | Description |
|---|---|
| EP21MPUA | Main Board |
| EP21LKEA | Linekey Board |
| EP21HKEA | Hook Board |

Table 4 Subassembly list

| Subassembly | | | |
|---|---|---|---|
| Subassembly Name | Model | Manufacturer | Description |
| AC/DC Adapter | HW-050200B2W | FUHUA | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, UK plug |
| AC/DC Adapter | HW-050200C2W | FUHUA | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, China plug |
| AC/DC Adapter | HW-050200E2W | FUHUA | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, EU plug |
| AC/DC Adapter | HW-050200U2W | FUHUA | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, USA plug |
| AC/DC Adapter | HKA01205020-4F | Huntkey | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, UK plug |
| AC/DC Adapter | HKA01205020-1F | Huntkey | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, China plug |
| AC/DC Adapter | HKA01205020-3F | Huntkey | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, EU plug |
| AC/DC Adapter | HKA01205020-2F | Huntkey | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, USA plug |
| AC/DC Adapter | HW-050200A2W | Huntkey | Input: 100-240 VAC, 50/60 Hz, 0.5A; Output: +5 VDC, 2.0A, AUS plug |

# 4 System Configuration during EMC Test

The Equipment under Test (EUT) was functioning correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical configuration.

## 4.1 Ports and Cables

Table 5 Ports and cables

| Port | Connector | Board | Length | Qty. | Type of Cable | Remark |
|---|---|---|---|---|---|---|
| Power Port | / | EP21MPUA | 2m | 1 | Unshielded | / |
| WAN (PoE) | RJ45 | EP21MPUA | 10m | 1 | UTP-5, | Indoor signal port |
| LAN | RJ45 | EP21MPUA | 10m | 1 | UTP-5, | Indoor signal port |
| Audio Port | RJ9 | EP21MPUA | 0.5m | 2 | 4-core telephone Unshielded Cable | / |

## 4.2 Auxiliary Equipment

Table 6 Auxiliary equipment

| Equipment | Model | Manufacturer | S/N | Calibration Date | Calibration Interval (month) | Remark |
|---|---|---|---|---|---|---|
| Data network analyzer | Tesgine | Huawei | SZ05000 38428 | 2012-09-03 | 12 | N/A |
| Switch | SmartAX 5616 | Huawei | N/A | N/A | N/A | N/A |
| Enterprise Gateway | EGW 1530 | Huawei | N/A | N/A | N/A | N/A |
| IP Phone | eSpace 7830 | Huawei | N/A | N/A | N/A | N/A |
| Personal Computer | Lenovo/P4/ 2.66G | Lenovo | 3106061 158 | N/A | N/A | N/A |

## 4.3 Test Configurations

The EUT was connected to auxiliary equipment in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).
There were three test configurations and two test modes which were shown in the following table and figure:

Table 7 Test Configuration and Test Mode

| Configuration | Configuration Description | Mode | Mode Description |
|---|---|---|---|
| TC1 | Power supply by adapter(FUHUA) | TM1 | Calling with handset |
| | | TM2 | Calling with handfree |
| TC2 | Power supply by adapter(Huntkey) | TM1 | Calling with handset |
| | | TM2 | Calling with handfree |
| TC3 | Power supply Over Ethernet | TM1 | Calling with handset |
| | | TM2 | Calling with handfree |

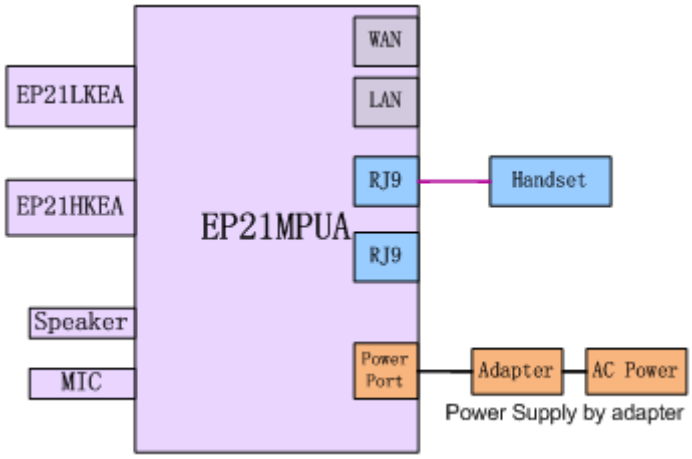



Figure 2. : Test configuration1, 2 (TC1 and TC2)

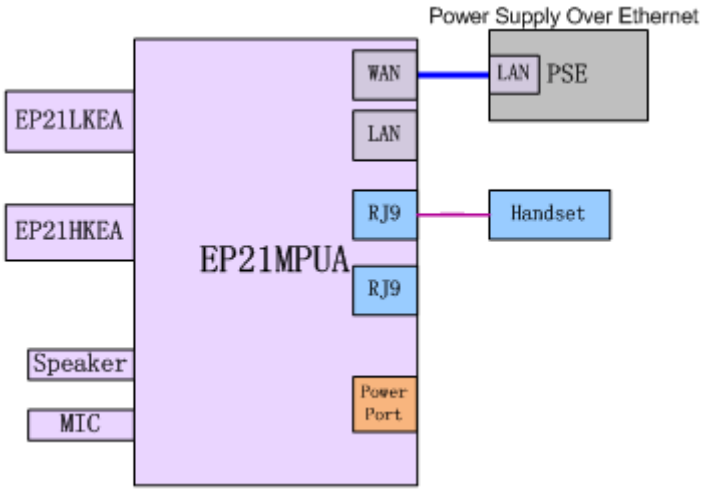



Figure 3. : Test configuration3 (TC3)

### 4.4 Test Conditions and Connections

The eSpace 7910 using the handset or handfree maintained call state with other Ip-phone.
The tesgine generated the broadband service traffic through the LAN port, and then received it.

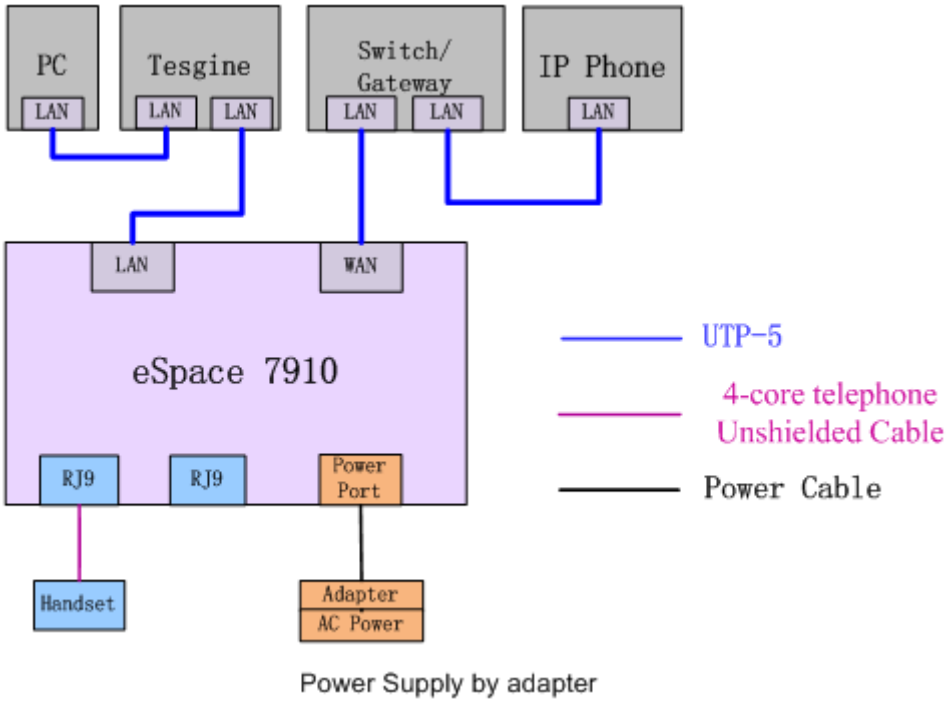



Figure 4. Test connection (TC1 and TC2)

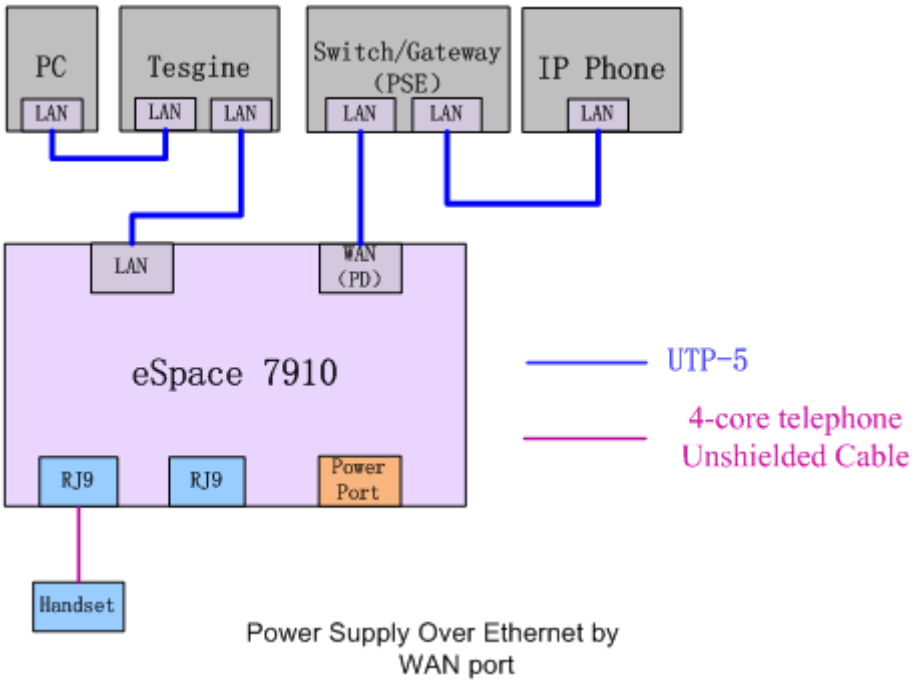



Figure 5. Test connection (TC3)

# 5 Details of Test Items

## 5.1 Radiated Emission 30 MHz to 18 GHz

### 5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standard ANSI C63.4. The test distance was 3m.The set-up and test methods were according to ANSI C63.4.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 18 GHz by using test script of software; the emissions were measured using Quasi-Peak Detector for 30 MHz to1 GHz, Average and Peak detector for above 1 GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1 m to 4 m, the azimuth range of turntable was 0°to 360°, The receive antenna has two polarizations V and H.

The test set-up is shown in diagram as below:

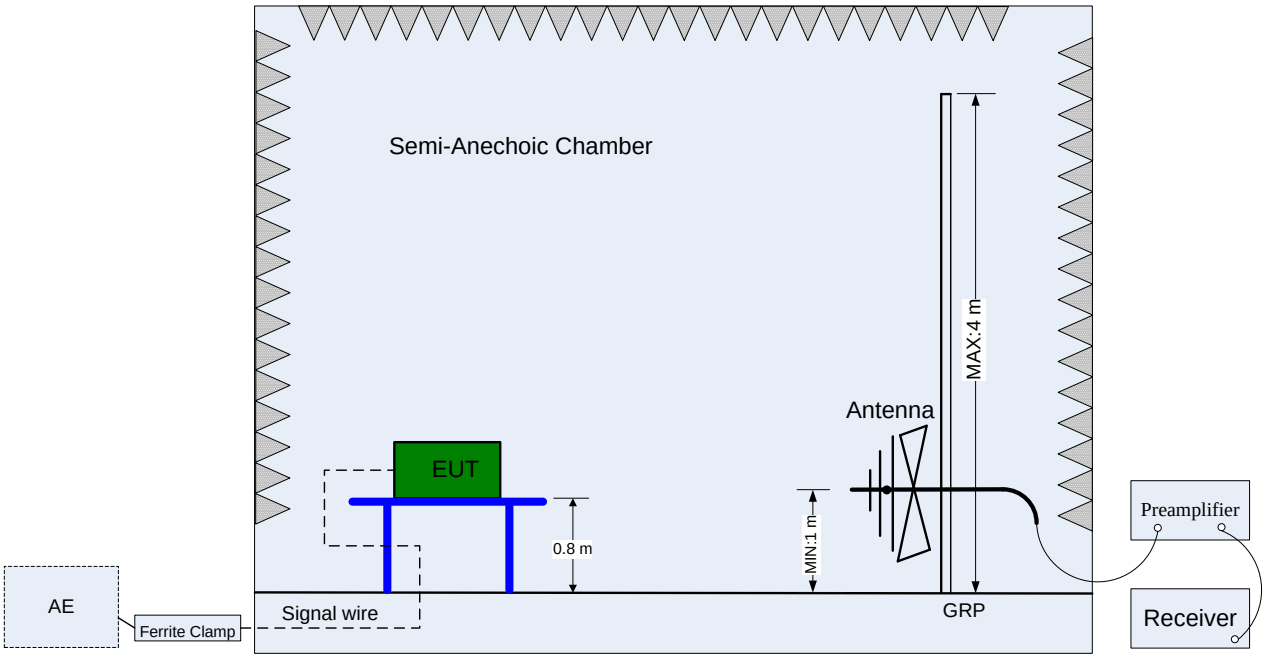



Figure 6. Test set-up of radiated disturbance (30 MHz-1 GHz)

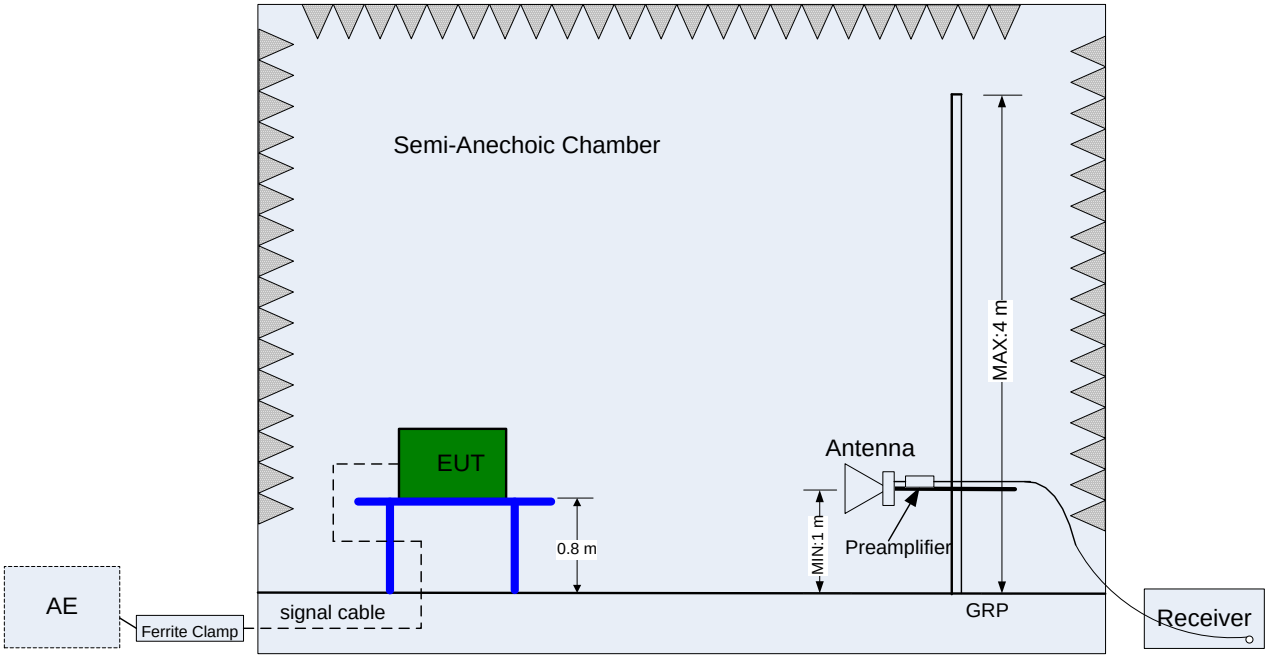



Figure 7. Test set-up of radiated disturbance (above 1 GHz)

### 5.1.2 Test Results

The EUT has met the requirements for radiated emission of enclosure port.
For the test data, see section 8.1.

Table 8 Test limits for 30MHz to 1GHz at a measuring distance of 3m

| | | |
|---|---|---|
| Frequency range | 30 MHz to 1 GHz | |
| Measuring distance | 3 m | |
| Classification | Class B | |
| Limits(Class B) | 30 MHz to 88 MHz<br>88 MHz to 216 MHz<br>216 MHz to 960 MHz<br>960 MHz to 26.5 GHz | 40.0 dBµV/m<br>43.5 dBµV/m<br>46.0 dBµV/m<br>53.9 dBµV/m |

Table 9 Test limits for above 1GHz at a measuring distance of 3m

| | | |
|---|---|---|
| Frequency range | 1 GHz to 18 GHz | |
| Measuring distance | 3 m | |
| Classification | Class B | |
| Limits(Class B) | AV Detector | PK Detector |
| | 53.9 dBµV/m | 73.9 dBµV/m |

Note: The highest frequency of the internal sources of the EUT is 150 MHz, the measurement was made up to 18 GHz.

## 5.2 Conducted Disturbance 0.15 MHz to 30 MHz

### 5.2.1 Test Procedure

The EUT was configured as described in section 4. The mains cable of the EUT must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

The test set-up is shown in diagram as below:

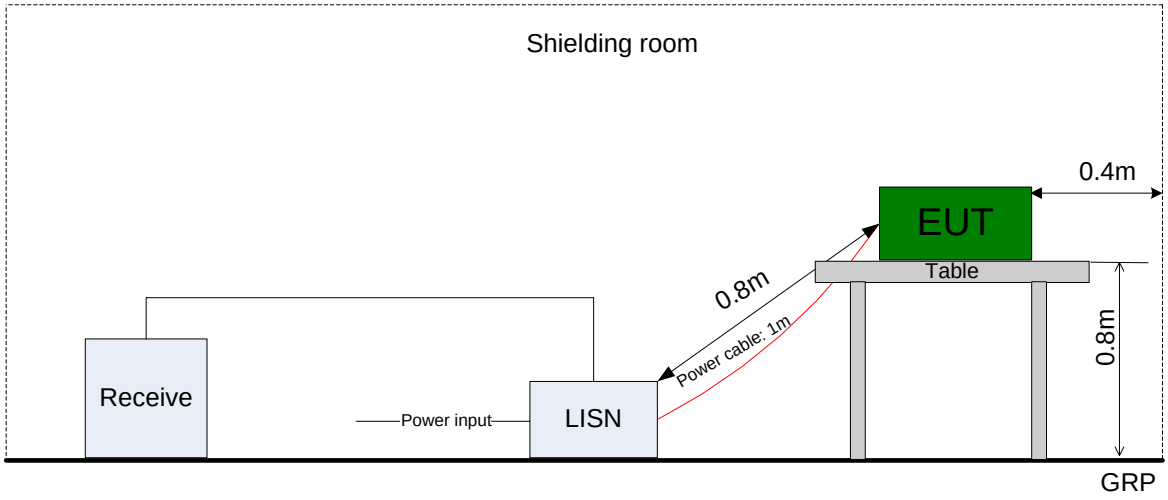



Figure 8. Test set-up of conducted disturbance for AC power port

### 5.2.2 Test Results

The EUT has met the requirements of FCC Part15 and ICES 003 for Conducted Disturbance of AC Power Port
For the test data, see section 8.2.

Table 10 Limits of AC power port

| Frequency range | 150 kHz to 30 MHz | |
|---|---|---|
| Classification | Class B | |
| Limit(Class B) | Voltage limits (dBµV) | |
| | QP | AV |
| 0.15 to 0.5 MHz | 66 to 56 | 56 to 46 |
| 0.5 to 5 MHz | 56 | 46 |
| 5 to 30 MHz | 60 | 50 |

## 6 Main Test Instruments

Table 11 Main test instrument

| Test Item | Test Instrument | Model | Manufacturer | Calibration Date | Calibration Interval (Month) |
|---|---|---|---|---|---|
| Radiated Emission | EMI Test Receiver | ESU40 | R&S | 2011-12-20 | 12 |
| | Bilog antenna | VULB 9163 | SCHWARZBECK | 2012-02-11 | 12 |
| | Horn antenna | 9120D | SCHWARZBECK | 2012-02-11 | 12 |
| | Chamber _NSA | 3m chamber | Albatross | 2011-12-02 | 24 |
| Conducted Emission | EMI test receiver | ESCI 3 | R&S | 2012-02-27 | 12 |
| | Artificial Mains Network | ENV4200 | R&S | 2011-12-20 | 12 |
| Software Information | | | | | |
| Test Item | | Software Name | Manufacturer | Version | |
| Radiated Emission | | EMC32 | R&S | V8.5.1 | |
| Conducted Emission | | EMC32 | R&S | V8.3 | |

## 7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

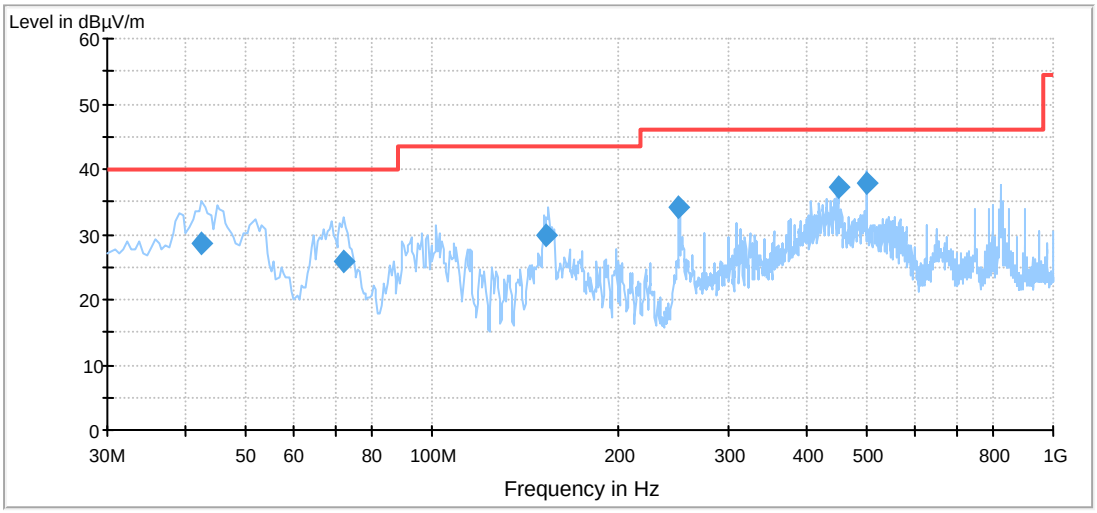
Table 12 System measurement uncertainty

| Items | | Extended Uncertainty |
|---|---|---|
| Radiated emission | Field strength (dBμV/m) | U=4.3 dB; k=2 (30MHz to 1GHz) |
| | | U=3.1 dB; k=2(1Ghz to 18GHz) |
| Conducted emission | Disturbance voltage (dBμV) | U=2.71dB; k=2 |

# 8 Graph and Data of Emission Test

## 8.1 Radiated Disturbance

### 8.1.1 Radiated Disturbance (30MHz~1GHz) of TC1



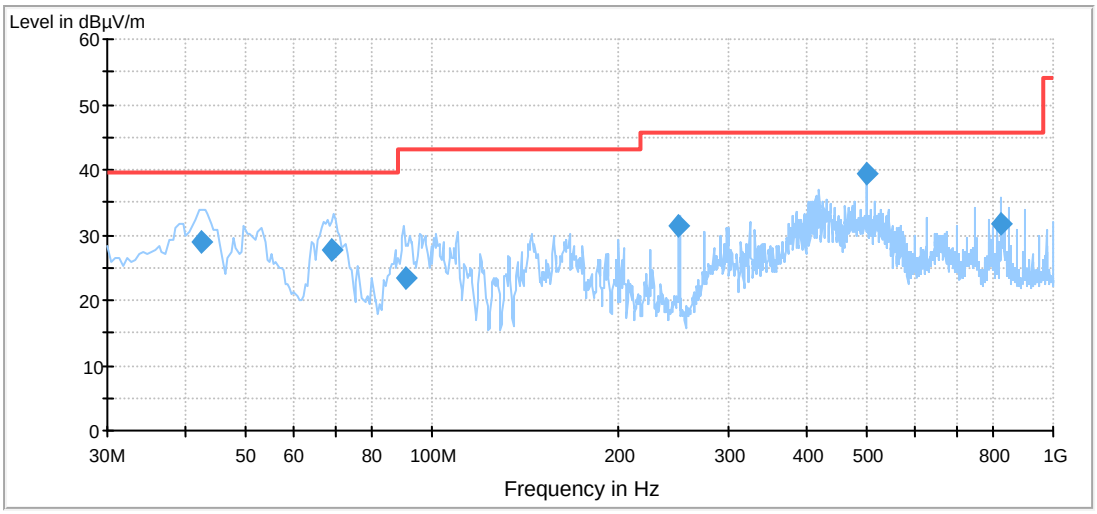

Measurement Result: QP Detector

| Frequency (MHz) | Level (dBµV/m) | Transd (dB) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|---|---|---|---|---|---|---|---|
| 42.543900 | 28.6 | -27.8 | 40.0 | 11.4 | 100.0 | 133.0 | V |
| 72.133000 | 25.8 | -32.9 | 40.0 | 14.2 | 117.0 | 256.0 | V |
| 153.218500 | 30.0 | -31.6 | 43.5 | 13.5 | 208.0 | 58.0 | H |
| 250.028000 | 34.0 | -26.2 | 46.0 | 12.0 | 128.0 | 234.0 | H |
| 450.010000 | 37.3 | -20.8 | 46.0 | 8.7 | 218.0 | 307.0 | H |
| 500.005500 | 37.8 | -19.4 | 46.0 | 8.2 | 100.0 | 289.0 | V |

Note:

1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain), the reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for TC1 were tested, and the diagram supplied is the worst result.

### 8.1.2 Radiated Disturbance (30MHz~1GHz) of TC2



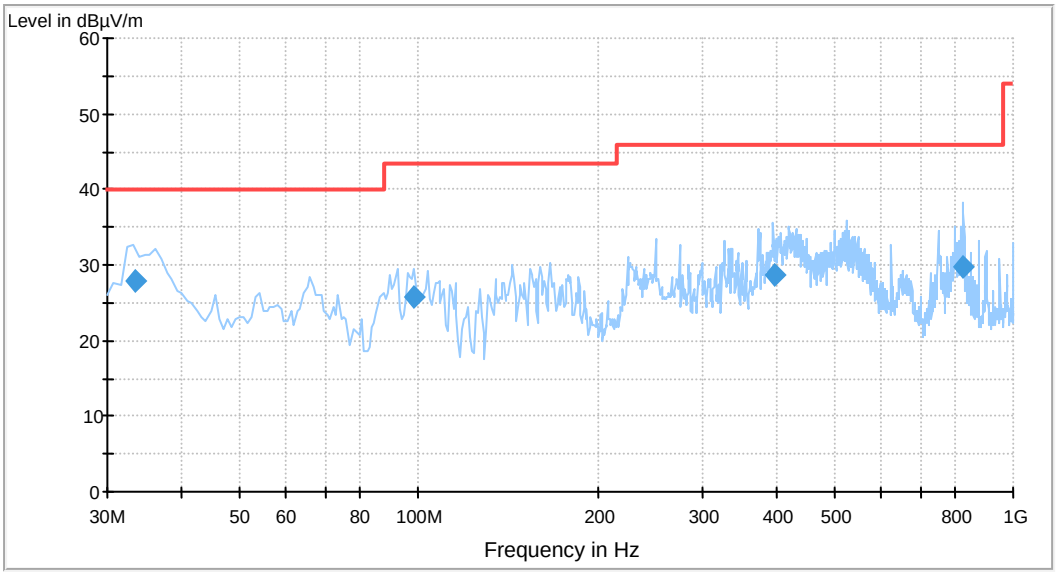

Measurement Result: QP Detector

| Frequency (MHz) | Level (dBµV/m) | Transd (dB) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|---|---|---|---|---|---|---|---|
| 42.603900 | 29.0 | -27.8 | 40.0 | 11.0 | 100.0 | 22.0 | V |
| 68.832000 | 27.8 | -32.1 | 40.0 | 12.2 | 100.0 | 74.0 | V |
| 90.918500 | 23.3 | -28.9 | 43.5 | 20.2 | 190.0 | -38.0 | H |
| 250.028000 | 31.4 | -26.2 | 46.0 | 14.6 | 116.0 | 212.0 | H |
| 500.005500 | 39.4 | -19.4 | 46.0 | 6.6 | 177.0 | 296.0 | H |
| 824.886500 | 31.8 | -13.2 | 46.0 | 14.2 | 100.0 | 168.0 | H |

Note:

1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain), the reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for TC2 were tested, and the diagram supplied is the worst result.

### 8.1.3 Radiated Disturbance (30MHz~1GHz) of TC3

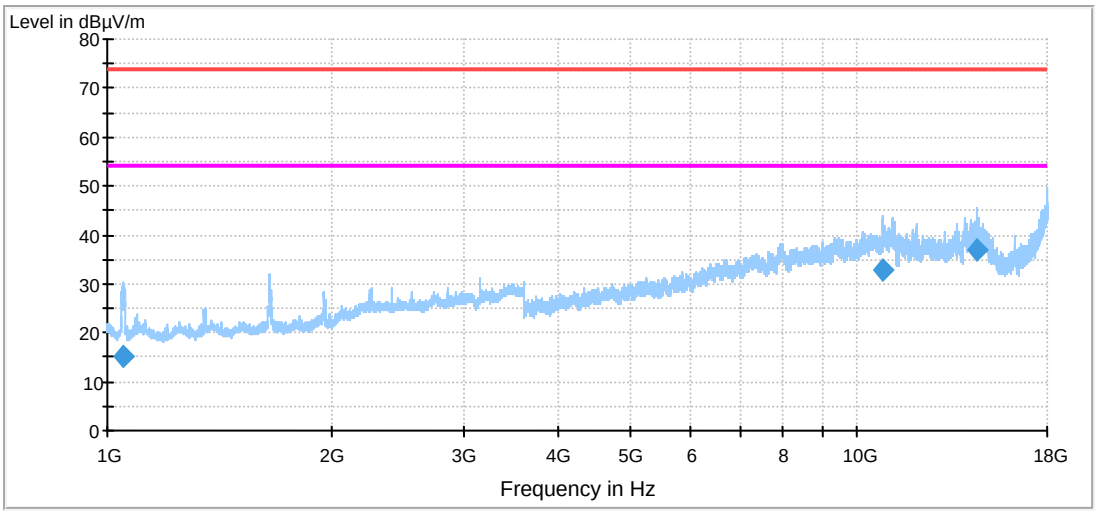



Measurement Result: QP Detector

| Frequency (MHz) | Level (dBµV/m) | Transd (dB) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|---|---|---|---|---|---|---|---|
| 33.435040 | 27.9 | -29.2 | 40.0 | 12.1 | 116.0 | 228.0 | V |
| 98.085000 | 25.8 | -27.9 | 43.5 | 17.7 | 241.0 | 44.0 | H |
| 396.581000 | 28.7 | -21.9 | 46.0 | 17.3 | 100.0 | 171.0 | H |
| 825.606000 | 29.6 | -13.2 | 46.0 | 16.4 | 100.0 | 218.0 | H |

Note:
1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain), the reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for TC3 were tested, and the diagram supplied is the worst result.

### 8.1.4 Radiated Disturbance (1GHz~18GHz) of TC1~TC3




Measurement Result: AV Detector

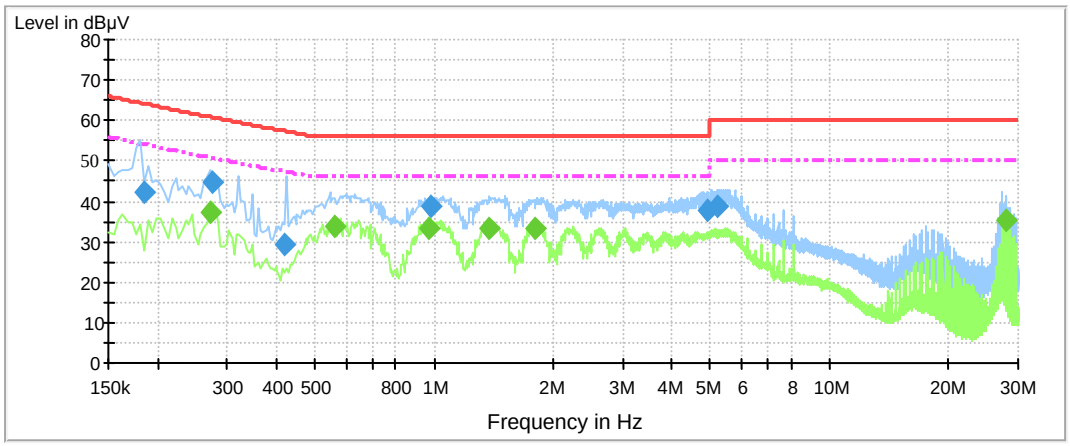
| Frequency (MHz) | Level (dBµV/m) | Transd (dB) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Azimuth (deg) | Polarisation |
|---|---|---|---|---|---|---|---|
| 1049.745000 | 14.9 | -12.8 | 54.0 | 39.1 | 106.0 | 16.0 | V |
| 10873.544667 | 32.9 | 21.0 | 54.0 | 21.1 | 127.0 | 40.0 | V |
| 14481.505833 | 36.9 | 23.8 | 54.0 | 17.1 | 139.0 | 23.0 | V |

Note:

1. Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain), the reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for all the test modes were tested, and the diagram supplied is the worst result.

## 8.2 Conducted Disturbance

### 8.2.1 AC Power Port Test Data of TC1




Measurement Result: QP Detector

| Frequency (MHz) | Level (dBµV) | Transd (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.186000 | 42.0 | 10.6 | 64.1 | 22.1 | L3 |
| 0.276000 | 44.5 | 10.5 | 60.7 | 16.2 | N |
| 0.420000 | 29.3 | 10.4 | 57.3 | 28.0 | N |
| 0.982110 | 38.7 | 10.4 | 56.0 | 17.3 | N |
| 4.917878 | 37.9 | 10.4 | 56.0 | 18.1 | L3 |
| 5.226892 | 38.9 | 10.4 | 60.0 | 21.1 | L3 |

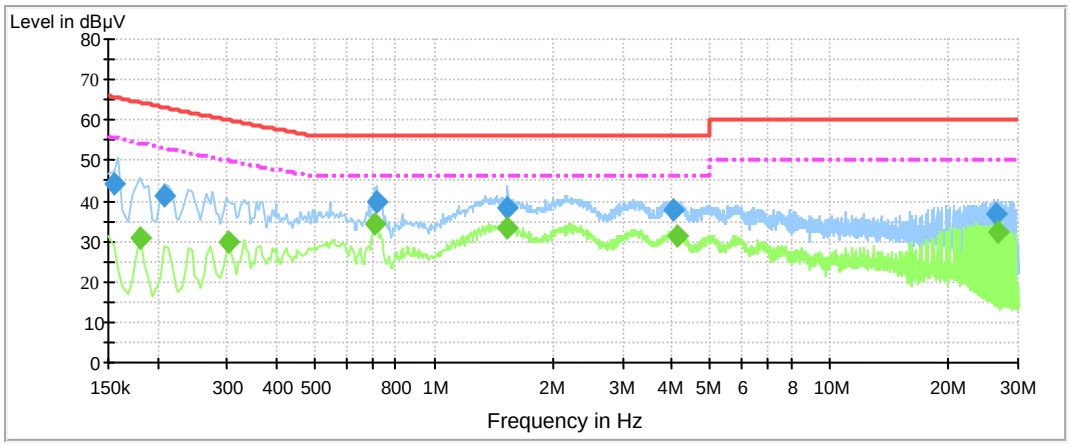
Measurement Result: AV Detector

| Frequency (MHz) | Level (dBµV) | Transd (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.271500 | 37.1 | 10.5 | 50.8 | 13.7 | N |
| 0.564000 | 34.0 | 10.4 | 46.0 | 12.0 | N |
| 0.968655 | 33.2 | 10.4 | 46.0 | 12.8 | N |
| 1.380585 | 33.3 | 10.4 | 46.0 | 12.7 | N |
| 1.801463 | 33.2 | 10.4 | 46.0 | 12.8 | N |
| 27.955222 | 35.4 | 10.2 | 50.0 | 14.6 | L3 |

Note:

1. Level= Reading level+ Transd (cable loss + correction factor), The reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for TC1 were tested, and the diagram supplied is the worse result.

### 8.2.2 AC Power Port Test Data of TC2




Measurement Result: QP Detector

| Frequency (MHz) | Level (dBµV) | Transd (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.154500 | 44.2 | 10.6 | 65.7 | 21.5 | L3 |
| 0.208500 | 41.2 | 10.5 | 63.1 | 21.9 | N |
| 0.712500 | 39.6 | 10.4 | 56.0 | 16.4 | N |
| 1.532820 | 38.1 | 10.4 | 56.0 | 17.9 | L3 |
| 4.008443 | 37.7 | 10.4 | 56.0 | 18.3 | N |
| 26.374620 | 36.8 | 10.3 | 60.0 | 23.2 | N |

Measurement Result: AV Detector

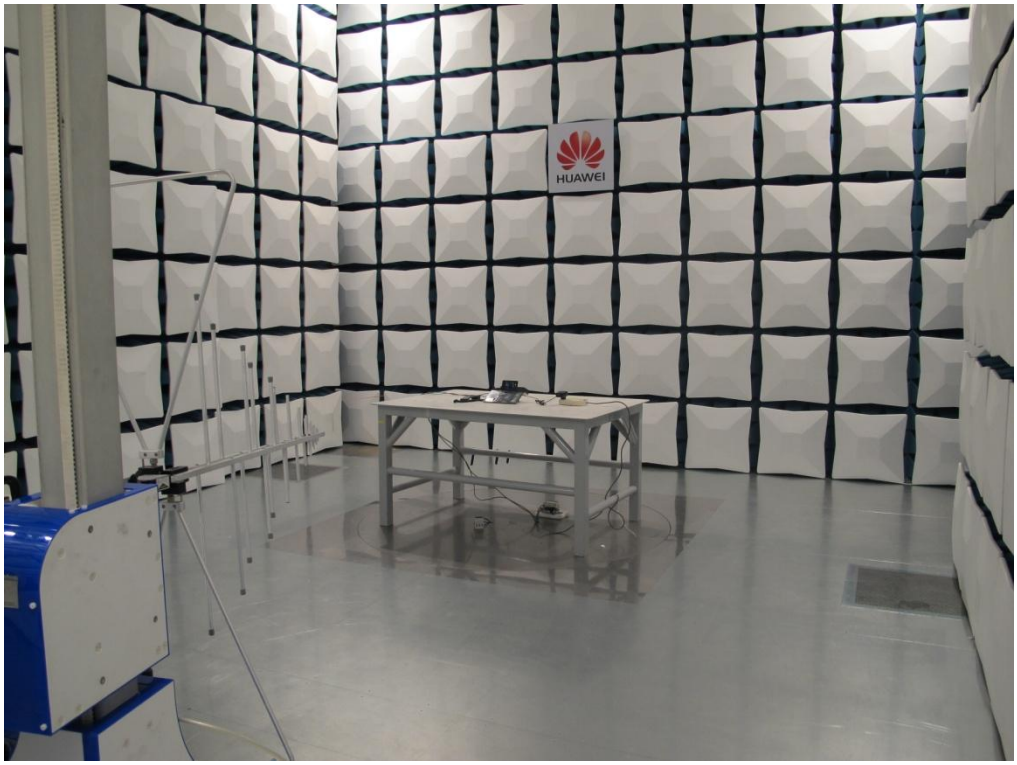
| Frequency (MHz) | Level (dBµV) | Transd (dB) | Limit (dBµV) | Margin (dB) | Line |
|---|---|---|---|---|---|
| 0.181500 | 30.7 | 10.6 | 54.3 | 23.6 | N |
| 0.303000 | 29.9 | 10.5 | 49.9 | 20.0 | N |
| 0.708000 | 34.5 | 10.4 | 46.0 | 11.5 | N |
| 1.532865 | 33.3 | 10.4 | 46.0 | 12.7 | N |
| 4.125315 | 31.4 | 10.4 | 46.0 | 14.6 | N |
| 26.683590 | 32.1 | 10.3 | 50.0 | 17.9 | N |

Note:

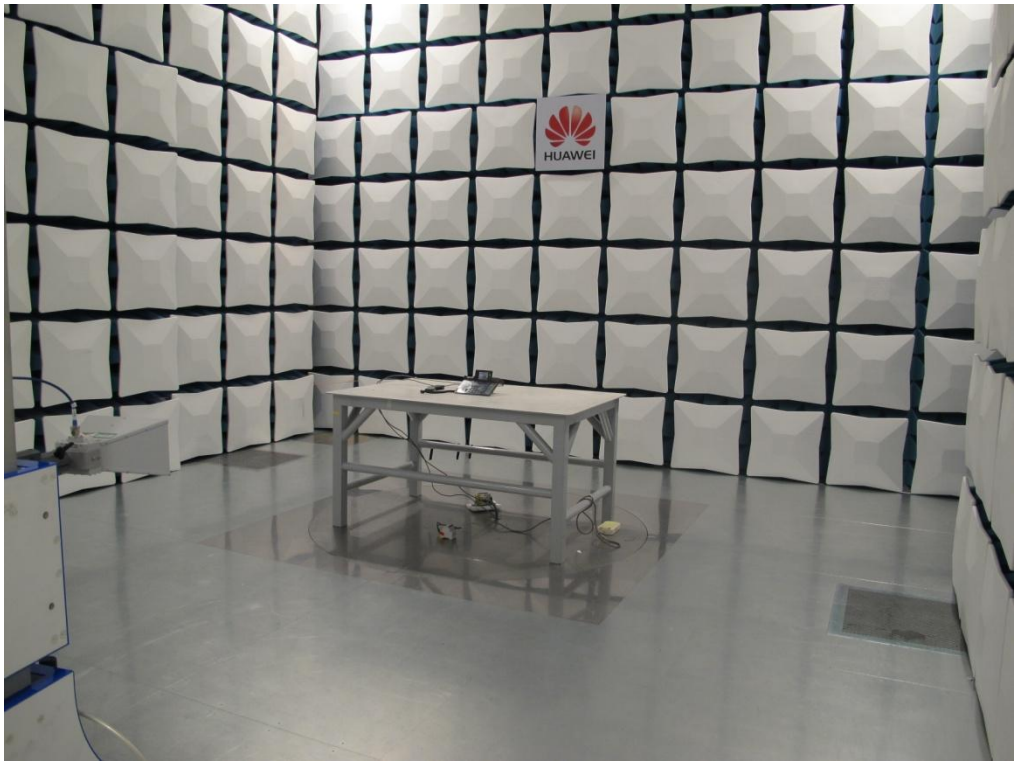
1. Level= Reading level+ Transd (cable loss + correction factor), the reading level is used to calculate by software which is not shown in the sheet.
2. Both the TM1 and TM2 for TC2 were tested, and the diagram supplied is the worse result.

# 9 Photographs of Test Set-up

## 9.1 Radiated Emission

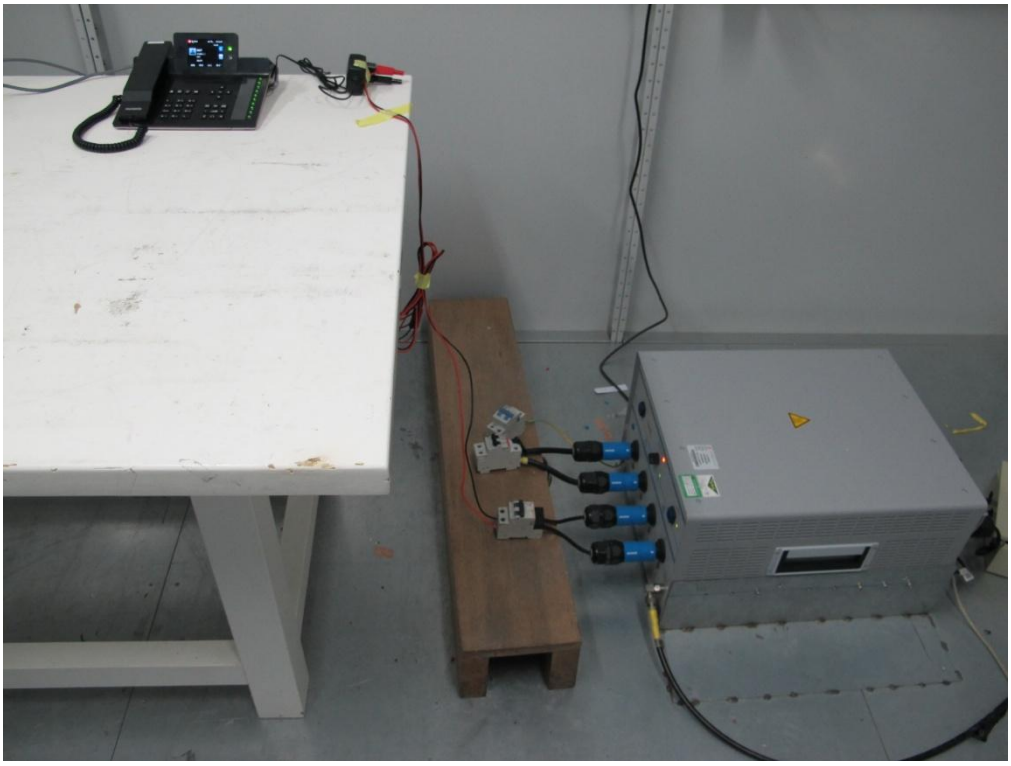



Radiated emission for 30 MHz-1 GHz




Radiated emission for 1GHz to 18GHz

## 9.2 Conducted Emission



Conducted emissions of AC power port

## Appendix: Abbreviation

Table 13 Abbreviation

| Abbreviation | Full Name |
|---|---|
| EMC | Electromagnetic Compatibility |
| EMI | Electromagnetic Interference |
| EUT | Equipment Under Test |
| AE | Auxiliary Equipment |
| AC | Alternate Current |
| NSA | Normalized Site Attenuation |
| LISN | Line Impedance Stabilization Network |
| TC | Test configuration |
| N/A | Not Applicable |

END