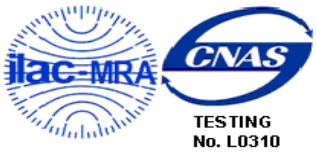





# EMC Test Report

**Product Name: CDMA 1X EVDO Rev.A Module**

**Model Number: MC509**

**Report No: SYBH(Z-EMC)072092014-2**

**FCC ID: QISMC509**

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

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Tel: +86 755 28780808 Fax: +86 755 89652518

# Notice

1. **The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.**
2. **The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.**
3. **The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.**
4. **The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.**
5. **The test report is invalid if not marked with "exclusive stamp for the test report".**
6. **The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing and approving the test report.**
7. **The test report is invalid if there is any evidence of erasure and/or falsification.**
8. **If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.**
9. **Normally, the test report is only responsible for the samples that have undergone the test.**
10. **Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.**

| | |
|---|---|
| **Applicant:** | Huawei Technologies Co., Ltd. |
| **Address:** | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |
| **Date of Receipt Test Item:** | Sep.23,2014 |
| **Start Date of Test:** | Sep.24,2014 |
| **End Date of Test:** | Oct.11,2014 |
| **Test Result:** | Pass |

| | | | |
|---|---|---|---|
| **Approved By (Lab Manager)** | **2014-10-11** | **Liu Chunlin** |  |
| | **Date** | **Name** | **Signature** |
| **Prepared by (Test Engineer)** | **2014-10-11** | **Hu Wenkai** |  |
| | **Date** | **Name** | **Signature** |

# TABLE OF CONTENT

# 1 General Information

## 1.1 EUT Description

| EUT Description | |
|---|---|
| Product Name | CDMA 1X EVDO Rev.A Module |
| Model Number | MC509 |
| Input voltage | DC 3.3V |
| TX Frequency | CDMA800:824MHz to 849MHz<br>CDMA1900:1850MHz to1910MHz |
| RX Frequency | CDMA800:869MHz to 894MHz<br>CDMA1900:1930MHz to 1990MHz<br>GPS:1575.42MHz |
| S/N | H6R0114812000027 |
| HW Version | ME1MC509M |
| SW Version | 11.106.25.00.322 |

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.

## 1.2 Test Site Information

| | |
|---|---|
| Test Site: | RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD. |
| Test Site Location: | Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C |

## 1.3 Applied Standards

APPLIED STANDARD

47 CFR FCC Part 15 : 2013, Subpart B

## 2 Summary of Results

| Summary of Results | | | | |
|---|---|---|---|---|
| **Test Items** | **Test Mode** | **Performance Class & Required Performance Criteria** | **Result** | **Site** |
| Radiated Emissions<br>Enclosure Port | Mode1 | CLASS B | Pass | Site1 |
| Conducted Emissions<br>☐DC Power Port<br>☒AC Power Port<br>☐Telecommunication Ports | Mode 1-Mode 2 | CLASS B | Pass | Site1 |
| Note:<br>1, Measurement taken is within the measurement uncertainty of measurement system.<br>2, ☒ The item has been tested; ☐ The item has not been tested. | | | | |

During the measurement, the environmental conditions complied with the range listed as below.

| **Item** | **Required** |
|---|---|
| Ambient temperature | 15°C～35°C |
| Relative humidity | 25%～75% |
| Atmospheric pressure | 86kPa～106kPa |

# 3 System Configuration during EMC Test

## 3.1 Test Mode

Huawei has verified the construction and function in typical operation. All the test modes were carried out with the EUT under normal operation, which were shown in this test report and defined as below:

| Test Mode | |
|---|---|
| Mode 1: | EUT with PC + Idle Mode |
| Mode 2: | EUT with PC + Traffic Mode |

Remark:

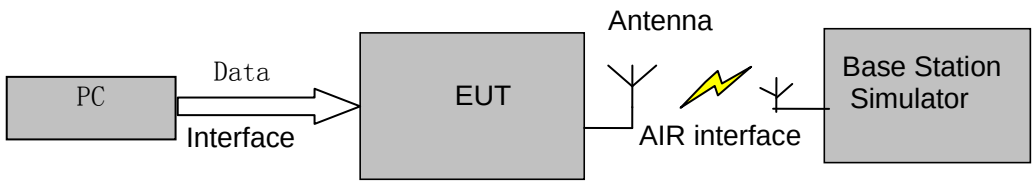
If EUT has more than one typical operation, only the worst test mode will be recorded in this report.

Traffic Mode:
When the EUT state is switched on and with Radio Resource Control (RRC) connection established.

Idle Mode:
When the EUT state is switched on but without Radio Resource Control (RRC) connection.

## 3.2 Test System Configuration

Connection Diagram(Mode 1~Mode 2)



### 3.3 Cables Used during Test

| Cable | Quantity | Length | Type of Cable |
|---|---|---|---|
| USB | 1 | 1m | Shielded |

### 3.4 Associated Equipment Used during Test

| Name | Model | Manufacturer | S/N | Calibrated Deadline | Cal interval (month) |
|---|---|---|---|---|---|
| Radio Communication Tester | CMU200 | R&S | 3607033573 | 2014-10-14 | 12 |
| Radio Communication Tester | CMW500 | R&S | 126855 | 2015-07-10 | 12 |
| Notebook | X200 | ThinkPad | 31090403588 | / | / |

# 4 Electromagnetic Interference (EMI)

## 4.1 Radiated Disturbance 30MHz to 18GHz

### 4.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4-2009. The test distance was 3m.The set-up and test methods were according to ANSI C63.4-2009.
A preliminary scan and a final scan of the emissions were made from 30 MHz to18 GHz by using test script of software; The emissions were measured using Quasi-Peak Detector (30MHz~1GHz) and AV/PK detector (above 1GHz). 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 1m to 4m. The azimuth range of turntable was 0°to 360°. The receiving antenna has two polarizations V and H.
Measurement bandwidth (RBW) for 30MHz to 1000 MHz: 120 kHz;
Measurement bandwidth (RBW) for 1000MHz to 18000 MHz: 1MHz;
EUT was configured in idle mode and the test performed at worst emission state.

### 4.1.2 Test setup

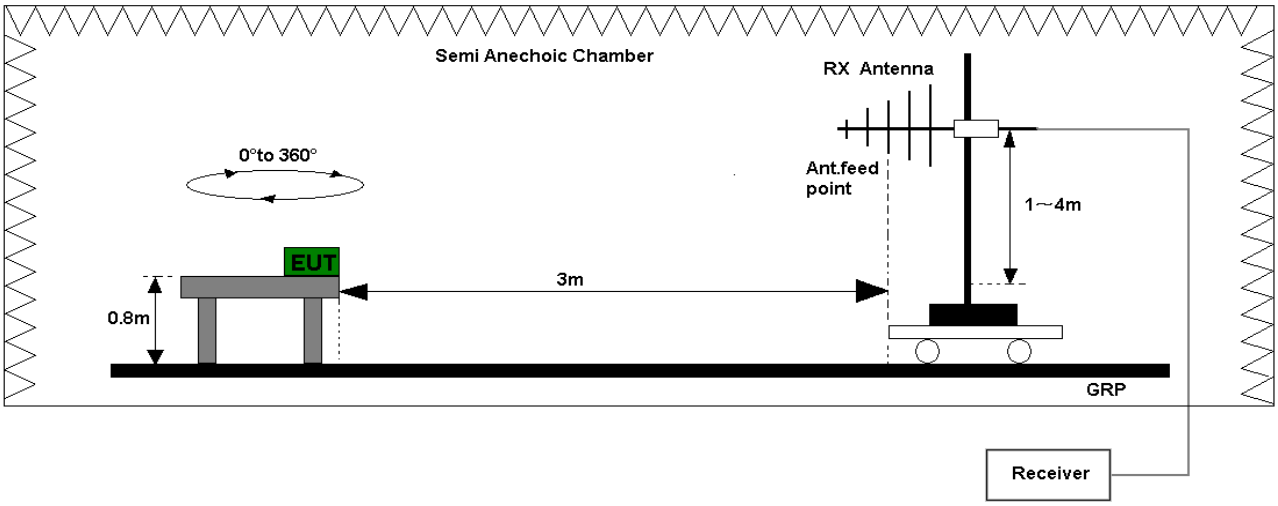



Figure 1.Test set-up of radiated disturbance(30MHz-1GHz )

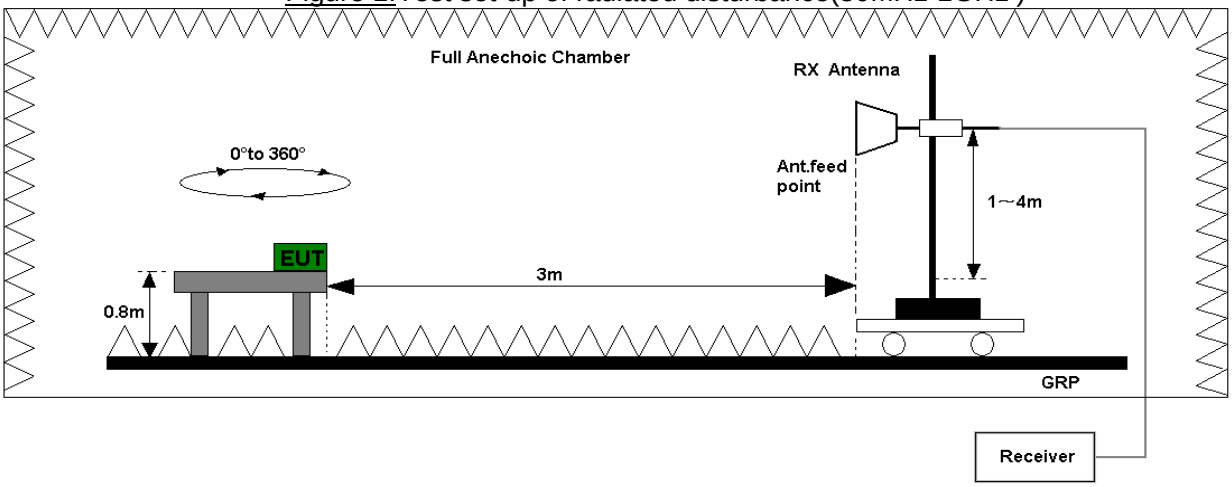



Figure 2.Test set-up of radiated disturbance(above 1GHz)

### 4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.
Refer to the section 7.1 of this report for test data..

| Test Limits（Class B） | | | | |
|---|---|---|---|---|
| Frequency of Emission (MHz) | Radiated Limit | | | |
| | Unit(μV/m) | | Unit(dBμV/m) | |
| 30-88 | 100 | | 40 | |
| 88-216 | 150 | | 43.5 | |
| 216-960 | 200 | | 46 | |
| Above 960 | 500 | | 54 | |
| Above 1000 | AV | PK | AV | PK |
| | 500 | 5000 | 54 | 74 |

## 4.2 Conducted Disturbance 0.15 MHz to 30MHz

### 4.2.1 Test Procedure

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm away from LISN. The set-up and test methods were according to ANSI C63.4-2009. Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.
EUT was communicated with the simulator through Air interface, the simulator controls the EUT to transmitter the maximum power which defined in specification of product. The EUT operated on the typical channel.
Measurement bandwidth (RBW) for 150 kHz to 30 MHz: 9 kHz;
The EUT was set in the shielded chamber and operated under nominal conditions.

### 4.2.2 Test Setup

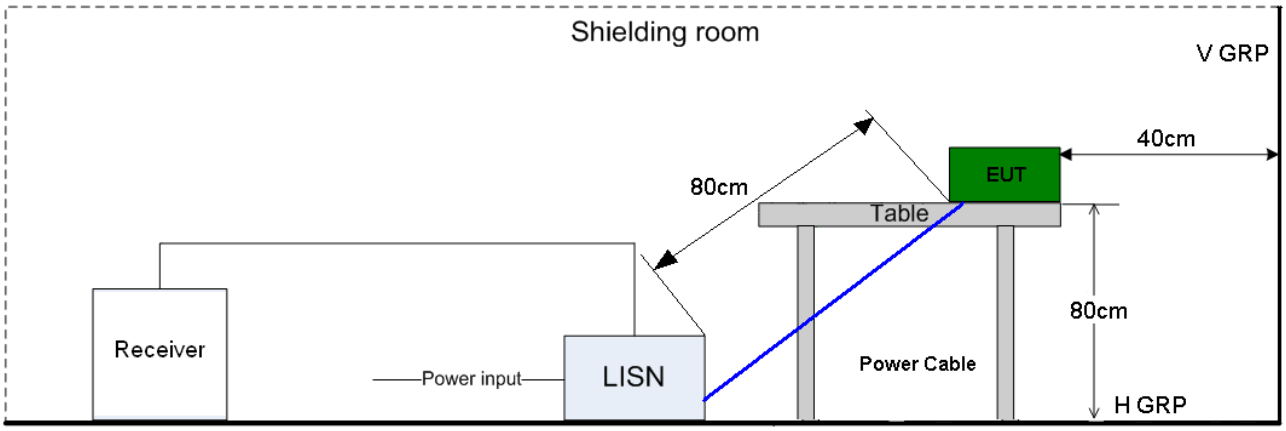



Figure 3.Test Set-up of conducted disturbance

### 4.2.3 Test Results

The EUT has met requirements for Conducted disturbance.
Refer to the section 7.2 of this report for test data.

| Test Limit of AC Power Port | | |
|---|---|---|
| Frequency range | 150kHz ~ 30MHz | |
| Frequency | Voltage limits | |
| | QP | AV |
| 0.15MHz~0.5MHz | 66-56dBμV | 56-46 dBμV |
| 0.5MHz-5MHz | 56dBμV | 46 dBμV |
| 5MHz~30MHz | 60dBμV | 50 dBμV |

## 5 Main Test Instruments

| Main Test Equipments | | | | | | |
|---|---|---|---|---|---|---|
| **Test item** | **Test Instrument** | **Model** | **S/N** | **Manufacturer** | **Calibrated deadline** | **Cal interval (month)** |
| RE | EMI Test receiver | ESU26 | 100150 | R&S | May.8, 2015 | 12 |
| | Broadband Antenna | VULB 9163 | 9163-520 | SCHWARZBECK | Dec.20 2015 | 24 |
| | Horn Antenna | HF906 | 100683 | R&S | Feb.01, 2015 | 24 |
| CE | EMI Test receiver | ESCI | 101163 | R&S | Dec. 23, 2014 | 12 |
| | Artificial Mains Network | ENV216 | 100382 | R&S | Dec. 23, 2014 | 12 |
| **Software Information** | | | | | | |
| Test Item | Software Name | | Manufacturer | | Version | |
| RE | ES-K1 | | R&S | | 1.7.1 | |
| CE | EMC32 | | R&S | | V8.40.0 | |

## 6 System Measurement Uncertainty

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

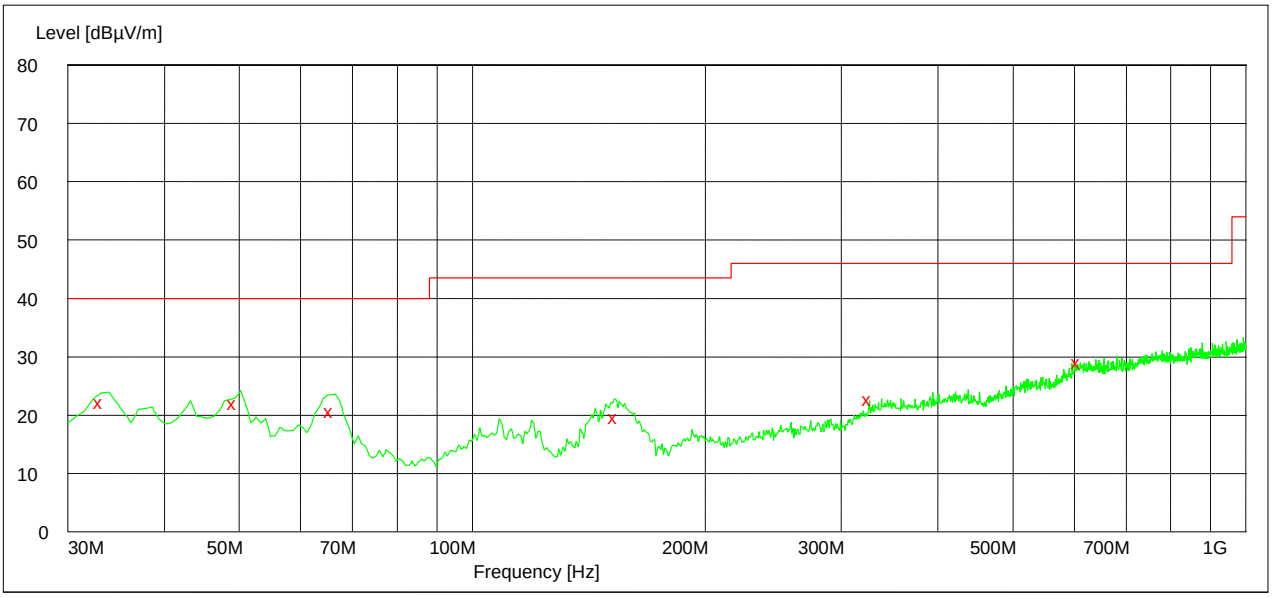
| System Measurement Uncertainty | | |
|---|---|---|
| **Items** | | **Extended Uncertainty** |
| RE(30MHz-1GHz) | Field strength (dBμV/m) | U=4.1dB; k=2 |
| RE(1GHz-18GHz) | Field strength (dBμV/m) | U=5.1dB; k=2 |
| CE | Disturbance Voltage (dBμV) | U=2.6dB; k=2 |

# 7 Test Data and Graph

Only the worst test result was shown in this report.

## 7.1 Radiated Disturbance

**30MHz~1GHz**

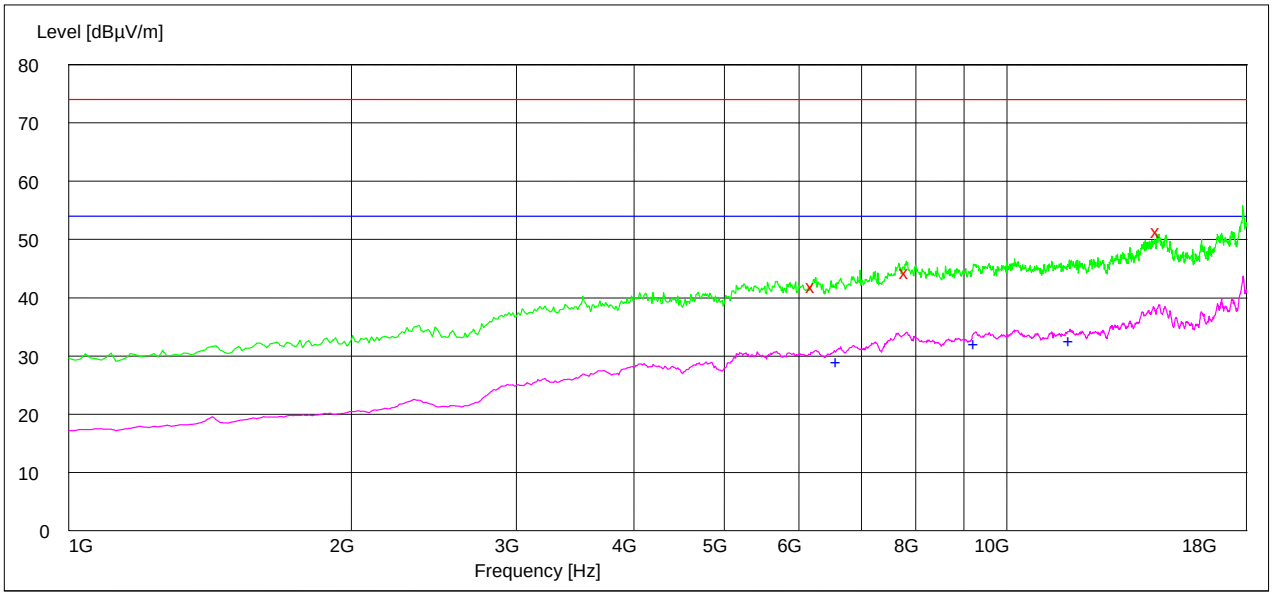



MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 33.160000 | 22.40 | 14.2 | 40.0 | 17.6 | 100.0 | 246.00 | VERTICAL |
| 49.276000 | 22.20 | 15.3 | 40.0 | 17.8 | 100.0 | 291.00 | VERTICAL |
| 65.752000 | 20.70 | 11.4 | 40.0 | 19.3 | 100.0 | 78.00 | VERTICAL |
| 153.208000 | 19.70 | 10.0 | 43.5 | 23.8 | 100.0 | 1.00 | VERTICAL |
| 326.556000 | 22.90 | 15.9 | 46.0 | 23.1 | 100.0 | 74.00 | HORIZONTAL |
| 608.116000 | 29.20 | 21.5 | 46.0 | 16.8 | 189.0 | 95.00 | VERTICAL |

Note:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is calculated by software which is not shown in the sheet.

**1GHz~18GHz**




MEASUREMENT RESULT: PK Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 6218.900000 | 42.20 | 1.2 | 74.0 | 31.8 | 121.0 | 220.00 | HORIZONTAL |
| 7821.600000 | 44.40 | 5.5 | 74.0 | 29.6 | 100.0 | 133.00 | HORIZONTAL |
| 14512.000000 | 51.50 | 17.2 | 74.0 | 22.5 | 150.0 | 44.00 | VERTICAL |

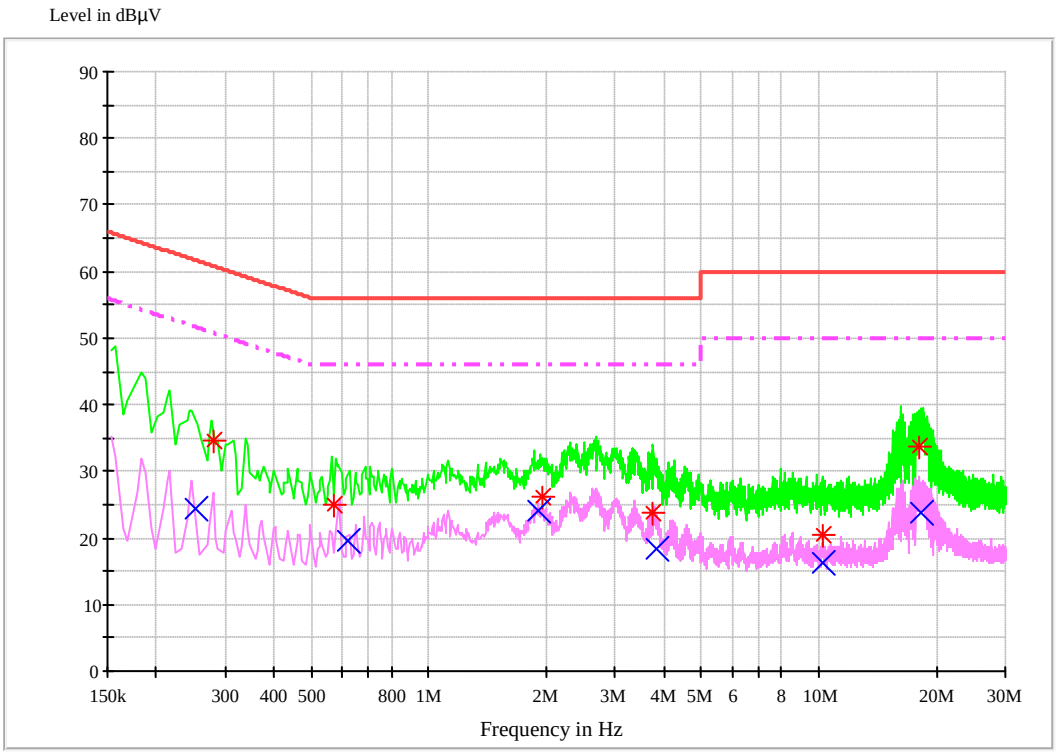
MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---|---|---|---|---|---|---|---|
| 6605.400000 | 29.00 | 0.9 | 54.0 | 25.0 | 113.0 | 312.00 | HORIZONTAL |
| 9263.300000 | 32.20 | 5.9 | 54.0 | 21.8 | 150.0 | 166.00 | VERTICAL |
| 11693.000000 | 32.70 | 8.5 | 54.0 | 21.3 | 100.0 | 315.00 | VERTICAL |

Note:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is calculated by software which is not shown in the sheet.

## 7.2 Conducted Disturbance

### AC Port Test Data




MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV | Line | Transd dB | Margin dB | Limit dBµV | PE |
|---|---|---|---|---|---|---|
| 0.279585 | 34.6 | L1 | 9.7 | 26.2 | 60.8 | FLO |
| 0.572116 | 24.8 | N | 9.7 | 31.2 | 56.0 | FLO |
| 1.962634 | 26.2 | N | 9.7 | 29.8 | 56.0 | FLO |
| 3.726581 | 23.8 | N | 9.7 | 32.2 | 56.0 | FLO |
| 10.262610 | 20.4 | N | 9.9 | 39.6 | 60.0 | FLO |
| 18.058879 | 33.7 | L1 | 10.1 | 26.3 | 60.0 | FLO |

MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV | Line | Transd dB | Margin dB | Limit dBµV | PE |
|---|---|---|---|---|---|---|
| 0.253016 | 24.4 | L1 | 9.7 | 27.3 | 51.7 | FLO |
| 0.620509 | 19.6 | N | 9.7 | 26.4 | 46.0 | FLO |
| 1.906249 | 24.0 | N | 9.7 | 22.0 | 46.0 | FLO |
| 3.845374 | 18.3 | N | 9.7 | 27.7 | 46.0 | FLO |
| 10.169047 | 16.3 | N | 9.9 | 33.7 | 50.0 | FLO |
| 18.200625 | 23.7 | L1 | 10.1 | 26.3 | 50.0 | FLO |

Note:
Level= Reading level+ Transd (cable loss + correction factor)
The reading level is calculated by software which is not shown in the sheet.

**----------END----------**