



EMC Test Report

Product Name: CDMA Mobile Phone

Model Number: C5588

Report No: SYBH (R) 019022008EB-1

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice 1

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7. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
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11. 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.

Notice 2

Modification Information:

Table 1 Modification Information

| | | |
|--------------------------|---|------------------------|
| Modification Information | 1 | |
| | 2 | |
| | 3 | <i>Not Applicable!</i> |
| | 4 | |
| | 5 | |
| | 6 | |
| | 7 | |

| | |
|------------------|-----------------------------------------------------------------|
| REPORT ON | EMC Test of CDMA Mobile Phone |
| | M/N: C5588 |
| REGULATION | FCC CFR47 Part 15: Subpart B; FCC CFR47 Part 22 Subpart H; : |
| START OF TEST | Feb.26, 2008 |
| END OF TEST | Mar.5, 2008 |
| Final Judgement: | Pass |

Approver

2008-03-31
Date

张兴海
Name

Signature



Reviewer

2008-03-31
Date

余 辉
Name

Signature



Operator

2008-03-30
Date

胡 俊
Name

Signature



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1 Status

1.1 Product Information

CLIENT: Huawei Technologies Co., Ltd.
ADDRESS: Bantian Longgang District Shenzhen, P.R. China
MANUFACTURING DESCRIPTION CDMA Mobile Station
MANUFACTURERS MODEL NUMBER C5588

1.2 Applied Standard

| FCC Measurement Specification | FCC Limits Part(s) | Description | Result |
|-------------------------------|--------------------|---------------------------------------------|--------|
| - | 15.107 | Conducted Emission at Power Port | PASS |
| - | 15.109 | Radiated Emission of Enclosure in Idle Mode | PASS |
| 2.1051 | 22.917 | Spurious Emission at Antenna Terminals | PASS |

1.3 Test Site

Site 1:

EMC LABORATORY OF RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD

Site 2:

EMC LABORATORY OF AUDIX LABORATORY

Site 3:

EMC LABORATORY OF HUATONGWEI INTERNATIONAL INSPECTION CO, Ltd.

1.4 Test environment condition

| | |
|----------------------|---------|
| Ambient temperature | 20~25°C |
| Relative humidity | 40%~52% |
| Atmospheric pressure | 101kPa |

2 Summary of Results

Table 2 below shows a brief summary of the results obtained.

Table 2 Summary of results

| EUT Classification : Wireless Terminal | | | | |
|-----------------------------------------------------------------------|-------------------------------------------|--------------------------------------|---------------|-------------|
| Test Items | Test Configuration & Test Mode | Required Performance Criteria | Result | Site |
| <u>Radiated Emissions</u> Enclosure Port | TC1/TM2 | N/A | Pass | Site1 |
| <u>Conducted Emissions</u> | TC1/TM1 | N/A | Pass | Site1 |
| <u>Radiated Spurious Emissions</u> Enclosure Port 30MHz – 18GHz | TC1/TM1 | N/A | Pass | Site1 |

Note:

- 1, Measurement taken is within the measurement uncertainty of measurement system.
- 2, TC = Test configuration
- 3, NT=no test. Because of not containing devices susceptible to magnetic fields, the EUT has been exempt from immunity test of power frequency magnetic field.

3 Equipment Specification

3.1 General Description

Huawei CDMA Mobile Phone C5588 is subscriber equipment in the CDMA system. The frequency band is US Cellular. The Mobile Phone implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice and SMS service etc. The Mobile Phone uses QSC6030 single chipset and Zero-IF technologies.

3.1.1 Main Equipment Technical Data

| | |
|----------------------|----------------------------------------------------------------------------------------|
| Description: | CDMA 1X Digital Mobile Phone |
| Model: | C5588 |
| Input Rated Voltage: |  3.7V |
| Rated Power: | Normal 3W ,Max 8 W |
| Dimensions: | 47.5 mm (L) × 106 mm (W) × 15.5mm (H) |
| Weight: | <100g (with battery) |

| Mode | Band Class | Frequency | |
|------|--------------|-----------------------------|---------------------------|
| | | Transmitt Frequency (MHz) | Receive Frequency (MHz) |
| CDMA | Band Class 0 | 824-849 | 869-894 |

3.2 Sub-Assembly Identity

Table 3 Sub-Assembly Identity

| Board | | | | |
|---------------------|------|--------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Name | Qty. | Hardware Version | Serial | Description |
| HC1C5588M | 1 | Ver.C | 020GPN9M7C000210 | Main board of Mobile Phone |
| Accessory | | | | |
| Name | Qty. | Manufacturer | Serials number | Description |
| Adapter | 1 | SHENZHEN HUNTKEY POWER TECHNOLOGY CO., LTD | HKA7C280087 | voltage nominal: ~120V Input voltage: ~100-240V ;50/60Hz Output voltage:  +5.0V , 0.4A Rate power: 2W |
| Adapter | 1 | SHENZHEN HUNTKEY POWER TECHNOLOGY CO., LTD | HKA7C350035 | voltage nominal: ~120V Input voltage: ~100-240V ;50/60Hz Output voltage:  +5.0V , 0.4A Rate power: 2W |
| Rechargeable Li-ion | 1 | Harbin Coslight Power Co.,Ltd. | HGY7A1100577 | Battery Model: HBL6A Rated capacity: 1050mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V |

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 user installation.

4.1 Cables Used during Test

Table 4 Cable Used during Test

| Port | Length | Quantity | Type of Cable |
|---------------|--------|----------|---------------|
| AC Power Port | 3m | 1 | Unshielded |

4.2 Associated Equipment Used during Test

Table 5 Associated Equipment Used during Test

| Name | Model | Manufacturer | S/N | Cal Date | Cal Interval (month) |
|----------------------------|--------|--------------|------------|------------|----------------------|
| Radio Communication Tester | CMU200 | R&S | 3604091212 | 2007-10-12 | 12 |

4.3 Test Configurations and Test Mode

4.3.1 Test Configuration.

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

Table 6 Configuration table

| | |
|-----|---------|
| TC1 | TM1~TM2 |
|-----|---------|

4.3.2 Test Mode

There were two test Modes. TM1 and TM2 were shown in the diagrams below:

TM1: operate in traffic mode CDMA 800;

TM2: operate in idle mode CDMA 800;

4.4 Test conditions and test connections

4.4.1 Test Conditions

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

4.4.2 Test connections

Traffic Mode:

The EUT is required to be in the traffic mode, a call is set up according to the generic call set up procedure and enter the EUT into loop back test mode.

For CDMA, the following conditions shall also be met:

- The EUT shall be commanded to operate at maximum transmit power;

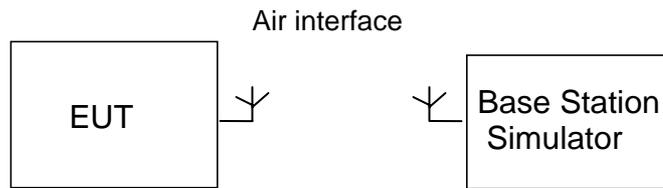


Figure 1. : Test Configuration TC1

Idle Mode:

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

The EUT is required to be in the idle mode.

For CDMA, the following conditions shall be met:

- UE shall be camped on a cell;
- UE shall perform Location Registration (LR) before the test, but not during the test;
- UE's neighbour cell list shall be empty;

For Cellular, the following conditions shall be met:

When the EUT is required to be in the idle mode, the test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages. Periodic Location Updating shall be disabled.

5 Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 30MHz to 1000MHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The test distance was 3m. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. 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 receive antenna has two polarizations V and H.

Huawei Mobile Station was communicated with the BTS simulator through Air interface. The Mobile Station operated on the typical channel and the Mobile Station worked in idle mode, transmitter was not work in this test.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz

Test set up figure:

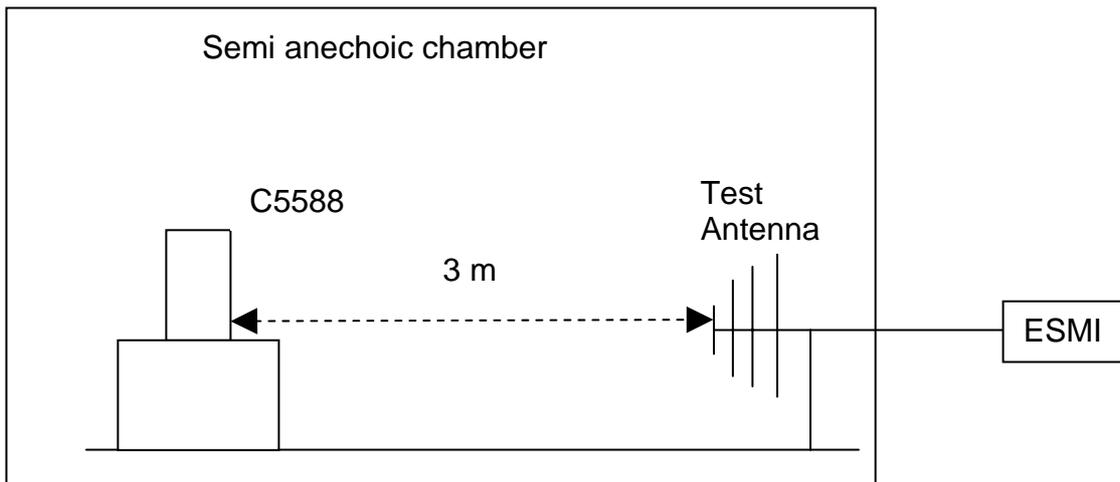


Figure 2. Test set up

5.1.2 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.

The test data is shown in section 8.1 of the report.

Two adapters are all tested in the EMC test, here the worse result are showed.

Table 7 Test Limits

| Frequency of Emission (MHz) | Radiated Limit | |
|-----------------------------|--------------------------------|-----------------------------------------|
| | Unit($\mu\text{V}/\text{m}$) | Unit($\text{dB}\mu\text{V}/\text{m}$) |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| 960-1000 | 500 | 54 |

5.2 Conducted Disturbance 0.15 MHz to 30MHz

5.2.1 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 from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

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.

Huawei Mobile Station was communicated with the BTS simulator through Air interface, the BTS simulator controls the Mobile Station to transmitter the maximum power which defined in specification of product. The Mobile Station operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up figure:

The Mobile Station was setup in the screened chamber and operated under nominal conditions.

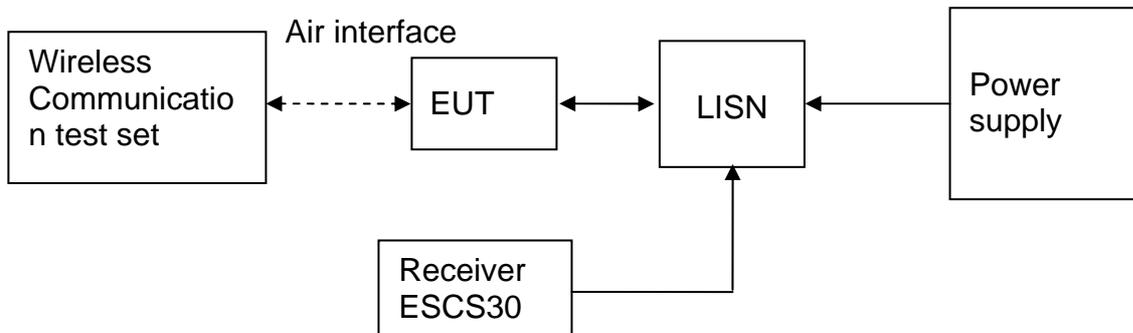


Figure 3. Test Set-up

5.2.2 Test Results

The EUT has met requirements for Conducted disturbance of signal lines.

The test data is shown in section 8.2 of the report.

Two adapters are all tested in the EMC test, here the worse result are showed.

Table 8 Test Limit of DC&AC Power Port

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

5.3 Radiated Spurious Emissions

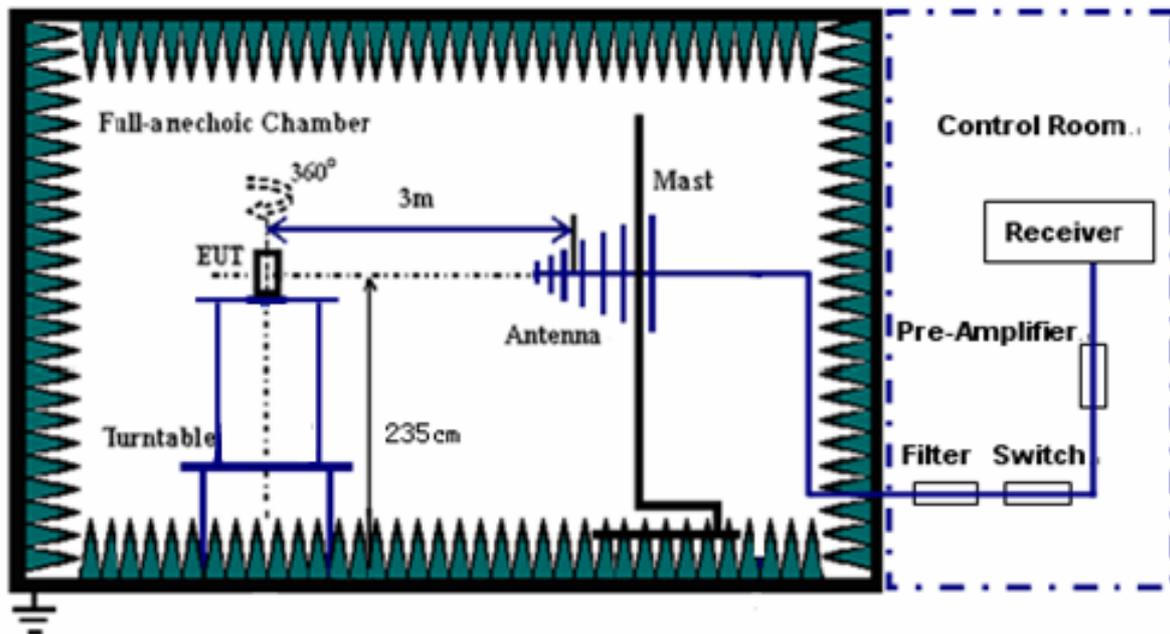
5.3.1 Test Procedure

A test site fulfilling the requirements of ITU-R Recommendation SM329-10 was used. The EUT was placed on a non-conducting support in the anechoic chamber and was operated from a power source via an RF filter to avoid radiation from the power leads.

Step 1:

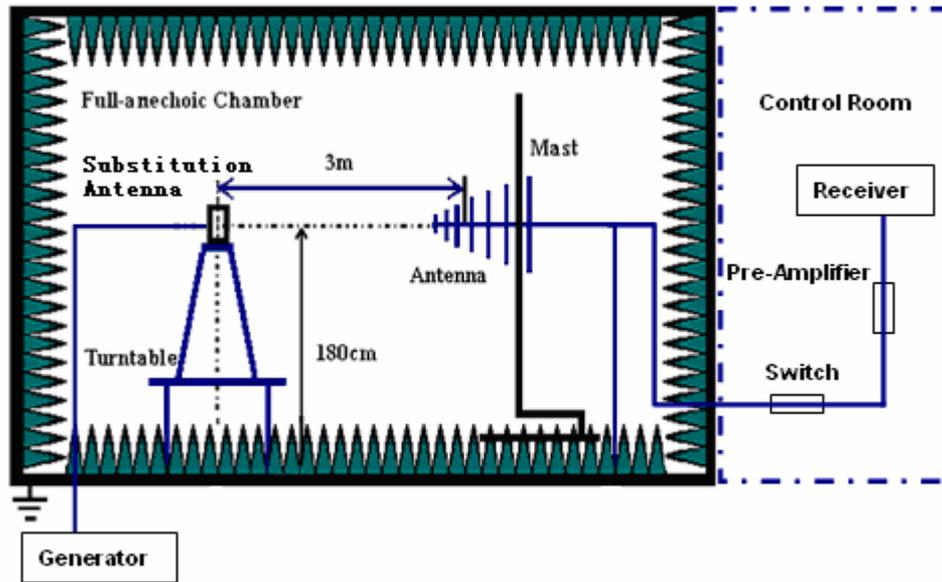
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the BTS simulator via the air interface.

Test the Radiated maximum output power by the Rohde and Schwarz ESIB26 Test Receiver from test antenna.



Step 2:

Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step1 on ESIB26 Test Receiver, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.



Test should be performed in normal voltage condition.

The received power shall be measured for frequencies within 30MHz~18GHz for CDMA,, shown below, are applicable for frequencies in the spurious domain.

According to part 22.917, the defined measurement bandwidth as following:

22.917(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

Measurement bandwidth (RBW) for 9 kHz up to 1 GHz: 100 kHz;
Measurement bandwidth (RBW) for 1GHz up to 18GHz: 1MHz;

Table 9 Radiated Spurious Emissions Limits

| Frequency band | Minimum requirement (E.R.P) traffic mode |
|----------------|------------------------------------------|
| 9KHz~18GHz | -13dBm |

5.3.2 Test Results

The EUT has met the requirements of FCC Part22 requirement.

6 Main Test Instruments

Table 10 Main Test Equipments

| Test item | Test Instrument | Model | Manufacturer | Cal-Date | Cal Interval (month) |
|----------------------|--------------------------|-----------------------|--------------|----------------|----------------------|
| RE | EMI Test receiver | ESMI | R&S | April.22, 2007 | 12 |
| | Broadband Antenna | CBL 6112B (2536) | SCHAFFNER | Jun.08, 2007 | 12 |
| CE | EMI Test receiver | ESCS30 | R&S | May.29, 2007 | 12 |
| | Artificial Mains Network | ENV4200 | R&S | May.21, 2007 | 12 |
| RSE | EMI Test receiver | ESIB26 | R&S | May.30.2007 | 12 |
| | Broadband Antenna | CBL6112B (2747) | SCHAFFNER | Oct.17.2007 | 12 |
| | Horn Antenna | 3117 | ETS-Lindgren | May.21.2007 | 12 |
| Software Information | | | | | |
| Test Item | Software Name | Manufacturer | | Version | |
| RE/CE | ES-K1 | R&S | | 1.7.1 | |
| RSE | EMC32 | R&S | | V5.0 | |

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:

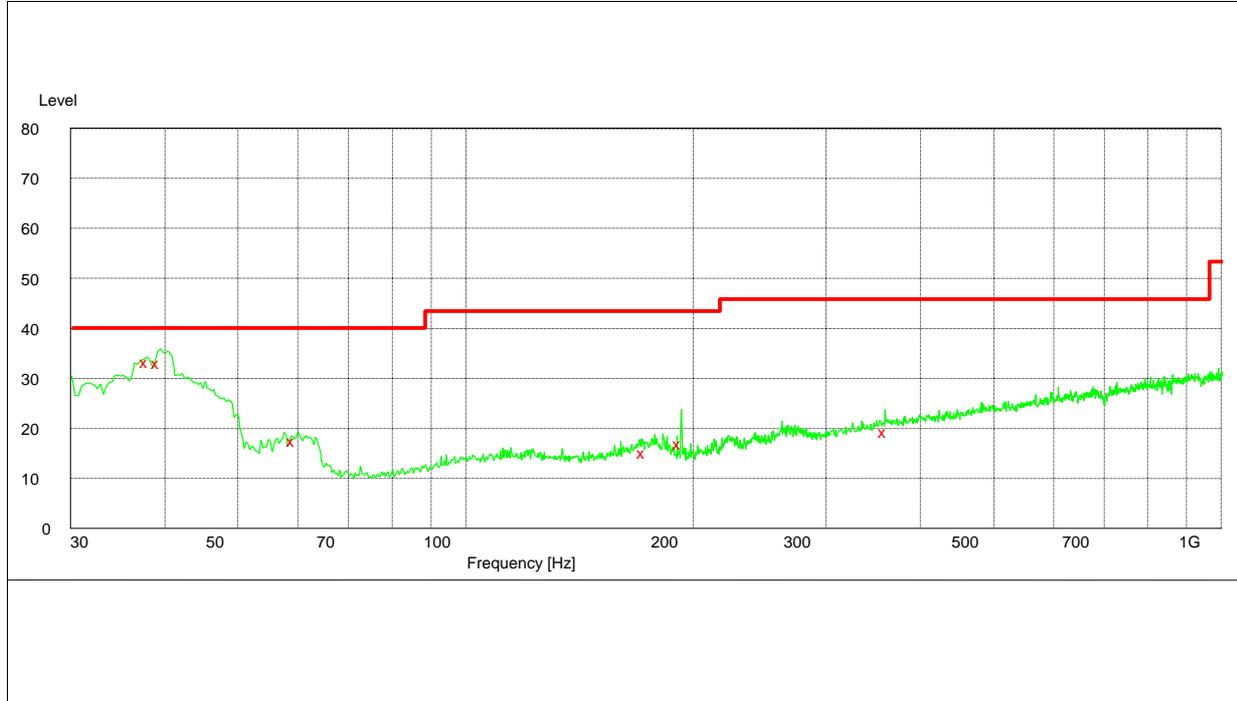
Table 11 System Measurement Uncertainty

| Items | | Extended Uncertainty |
|-------|------------------------------------|--------------------------|
| RE | Field strength (dB μ V/m) | U=4.3dB; k=2(30MHz-1GHz) |
| | | U=3.6dB; k=2(1GHz-18GHz) |
| RSE | ERP (dBm) | U = 2.2dB ; k = 2 |
| CE | Disturbance Voltage (dB μ V) | U=3.6dB; k=2 |

8 Graph and Data of Emission Test

8.1 Radiated Disturbance

8.1.1 Radiated Disturbance

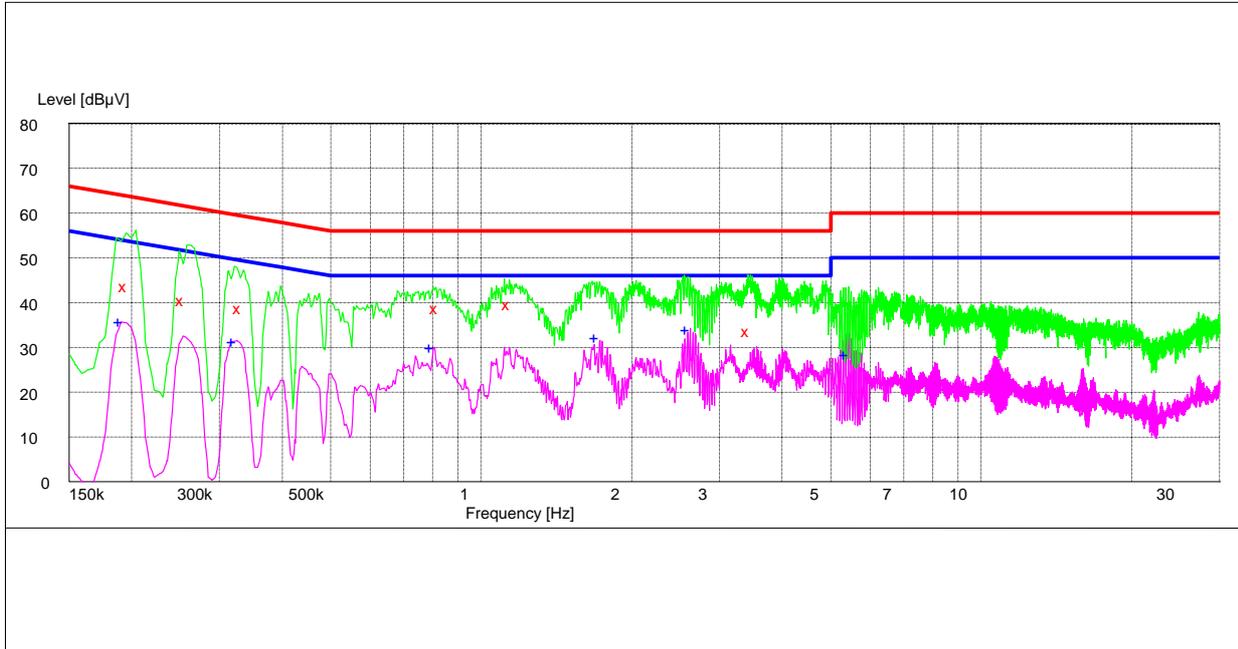


MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBμV/m | Transd dB | Limit dBμV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|--------------|
| 37.860000 | 33.40 | -8.5 | 40 | 6.6 | 107.0 | 104.00 | VERTICAL |
| 39.300000 | 33.20 | -9.3 | 40 | 6.8 | 100.0 | 34.00 | VERTICAL |
| 59.280000 | 17.60 | -16.2 | 40 | 22.4 | 142.0 | 280.00 | VERTICAL |
| 172.320000 | 15.20 | -11.9 | 43.5 | 28.3 | 141.0 | 360.00 | HORIZONTAL |
| 192.300000 | 17.10 | -12.1 | 43.5 | 26.4 | 166.0 | 343.00 | HORIZONTAL |
| 359.760000 | 19.40 | -5.4 | 46 | 26.6 | 110.0 | 62.00 | VERTICAL |

8.2 Conducted Disturbance

8.2.1 AC Port Test Data



MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.195000 | 43.90 | 10.1 | 64 | 20.1 | N | FLO |
| 0.253500 | 40.80 | 10.0 | 62 | 21.2 | N | FLO |
| 0.330000 | 39.10 | 10.1 | 59 | 19.9 | N | FLO |
| 0.816000 | 39.10 | 10.0 | 56 | 16.9 | L3 | FLO |
| 1.140000 | 40.00 | 10.1 | 56 | 16.0 | L3 | FLO |
| 3.426000 | 33.90 | 10.1 | 56 | 22.1 | L3 | FLO |

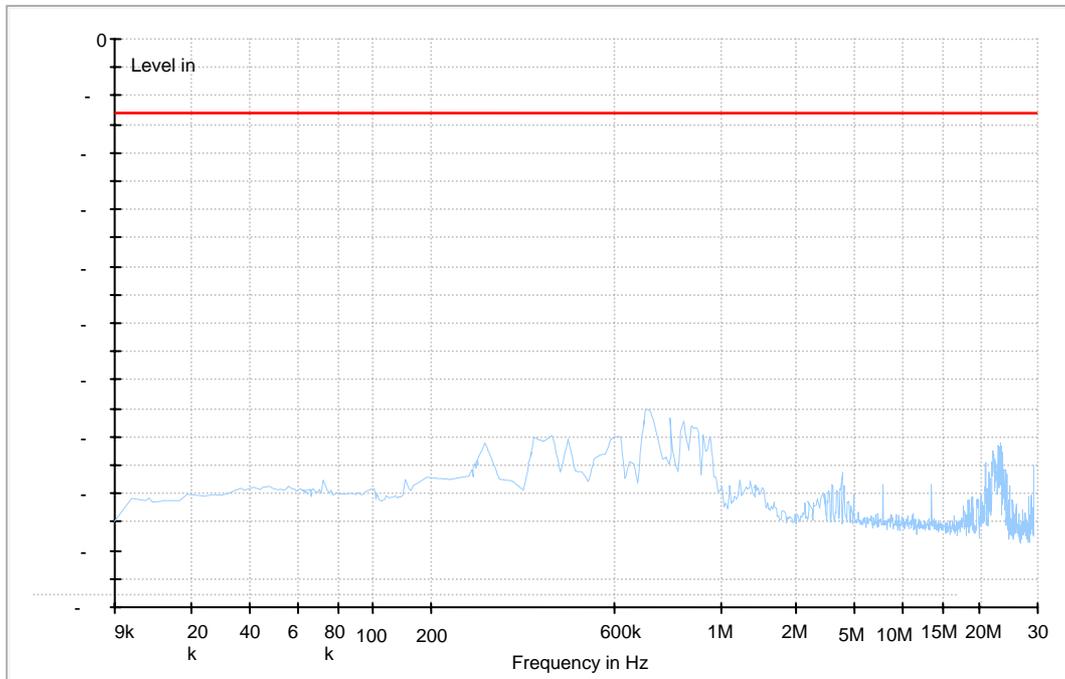
MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.190500 | 36.20 | 10.1 | 54 | 17.8 | L3 | FLO |
| 0.321000 | 31.80 | 10.1 | 50 | 18.2 | L3 | FLO |
| 0.798000 | 30.30 | 10.0 | 46 | 15.7 | L3 | FLO |
| 1.707000 | 32.60 | 10.0 | 46 | 13.4 | L3 | FLO |
| 2.593500 | 34.40 | 10.1 | 46 | 11.6 | L3 | FLO |
| 5.379000 | 28.90 | 10.1 | 50 | 21.1 | L3 | FLO |

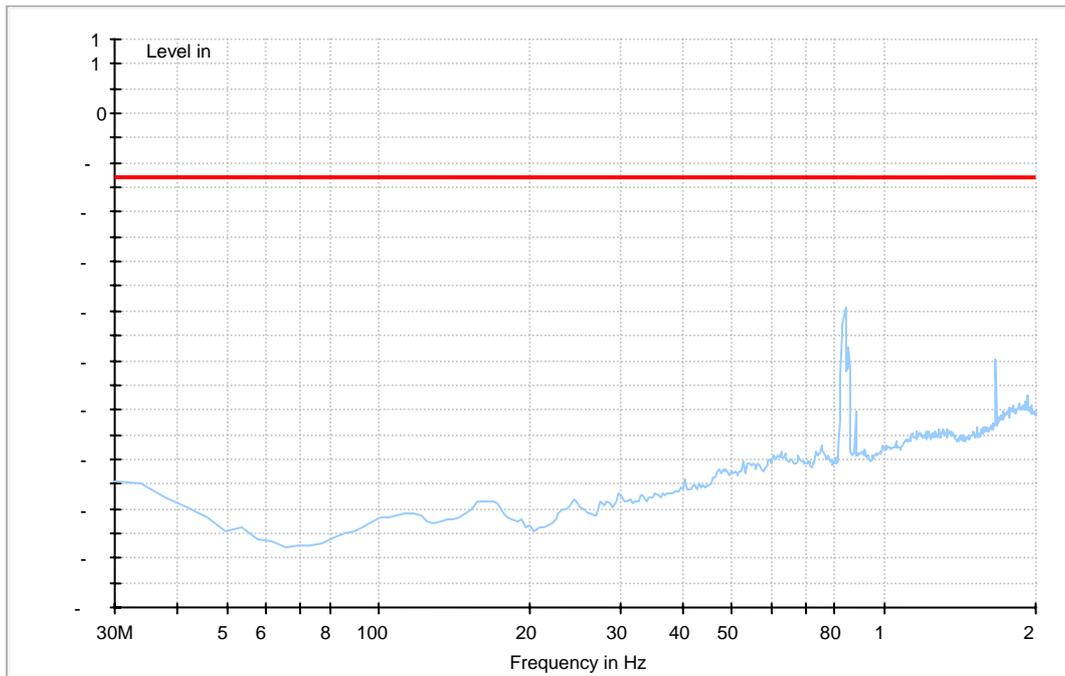
8.3 Radiated Spurious Emission

8.3.1 For CDMA800

Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)

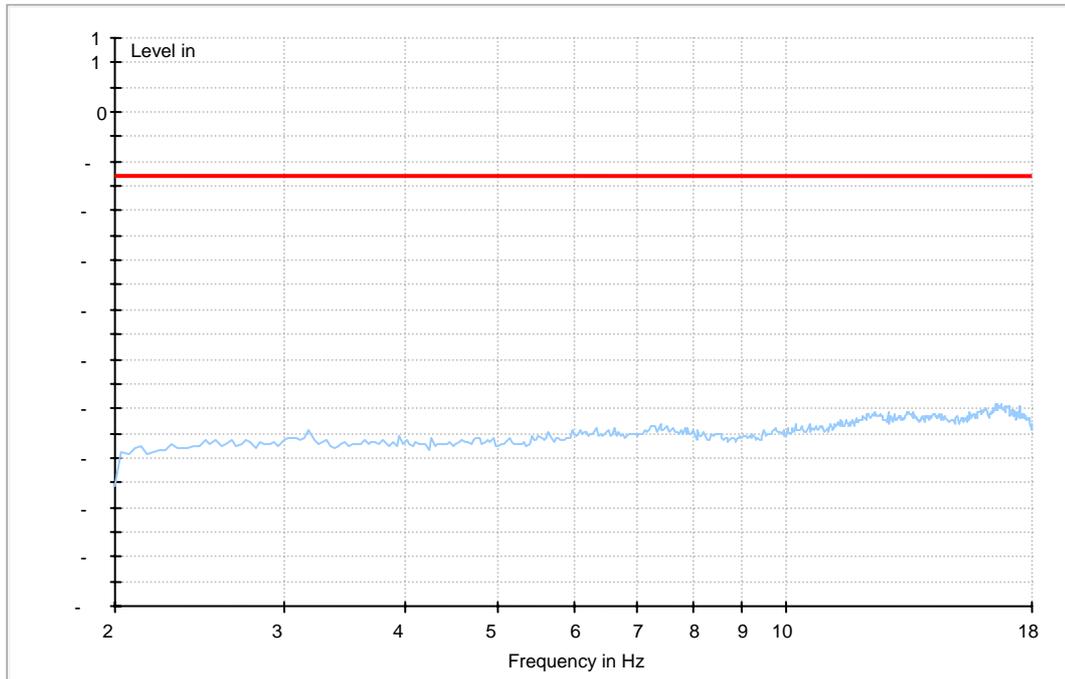


Figure 4. Radiated Disturbance for AC Power Test Result

END