



EMC Test Report

Product Name: CDMA 1X Digital Mobile Phone

Model Number: HUAWEI M228

**Report No: SYBHZ (R) E008082010EB-1
FCC ID:QISM228**

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Notice 2

Modification Information:

Modification Information

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

REPORT ON	EMC Test of CDMA1X Digital Mobile Phone
	M/N:HUAWEI M228
REGULATION	FCC CFR47 Part 15: Subpart B;
START OF TEST	Aug. 02, 2010
END OF TEST	Aug. 09, 2010
Final Judgement:	Pass

Approver

2010-08-24
Date

张兴海
Name



Signature

Operator

2010-08-24
Date

温剑锋
Name

温剑锋
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	CDMA1X Digital Mobile Phone
MANUFACTURERS MODEL NUMBER	HUAWEI M228

1.2 **Test Site**

Site 1:

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

1.3 **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.
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 (TM5-TM8)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1 (TM1-TM8)	N/A	Pass	Site1

Note:
1, Measurement taken is within the measurement uncertainty of measurement system.
2, TC = Test configuration

3 Equipment Specification

3.1 General Description

Huawei CDMA Mobile Phone M228 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 QSC6055 single chipset and Zero-IF technologies.

3.1.1 Main Equipment Technical Data

Description:	CDMA 1X Digital Mobile Phone
Models:	HUAWEI M228
Input Rated Voltage	 3.7V
Extreme Voltage	3.6V and 4.2V
Rated Power	2W
Dimensions	109 mm(L) X 45.5mm(W) X 15 mm(H)
Weight	<90g (with battery)

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
CDMA	CDMA 800	824-849	869-894
	CDMA 1900	1850-1910	1930-1990
	AWS 1700	1710-1755	2110-2155
Bluetooth		2400-2483.5	

3.2 Sub-Assembly Identity

Sub-Assembly Identity

Board				
Model Name	Qty.	Serial	Description	
HC1CM229	1	020RBM2099000270	Main board of Mobile Phone	
Accessory				
Name	Qty.	Manufacturer	Serials number	Description
Adapter	1	BYD(HUIZHOU) Co., Ltd	TPAA42100210	Adapter Model: HS-050040U1 voltage nominal: ~120V Input voltage: ~100-240V ;50/60Hz Output voltage:  +5.0V, 0.4A Rate power: 2W
Adapter	1	Tech-power International Co.,Ltd	BYAA42106608	Adapter Model: HS-050040U1 voltage nominal: ~120V Input voltage: ~100-240V ;50/60Hz Output voltage:  +5.3V, 0.65A Rate power: 4W
Rechargeable Li-ion	1	FMT Electronics Co.,Ltd.	GAG9711XC2613411	Battery Model: HB5A2H Rated capacity: 1150mAh 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

Cable Used during Test

Cable	Quantity	Type of Cable
AC Power Port	1	Unshielded
Earphone	1	Unshielded

4.2 Associated Equipment Used during Test

Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date	Cal Interval (month)
Radio Communication Tester	CMU200	R&S	3607033573	2010-03-12	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).

TC1:EUT powered with an adapter and connected to the test system (Base Station Simulator).

Configuration table

TC1	TM1~TM8
-----	---------

4.3.2 Test Mode

There were 8 test Modes. TM1 and TM8 were shown in the diagrams below:

TM1	operate in traffic mode CDMA 800;
TM2	operate in traffic mode PCS 1900;
TM3	operate in traffic mode AWS 1700;
TM4	operate in traffic mode Bluetooth;
TM5	operate in idle mode CDMA 800;
TM6	operate in idle mode PCS 1900;
TM7	operate in idle mode AWS 1700;
TM8	operate in idle mode Bluetooth;

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).

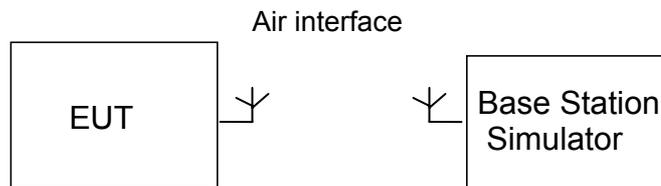
4.4.2 Test connections

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;



: Test Configuration

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, PCS and AWS, 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 18GHz

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. The test distance was 3m. The set-up and test methods were according to ANSI 63.4.

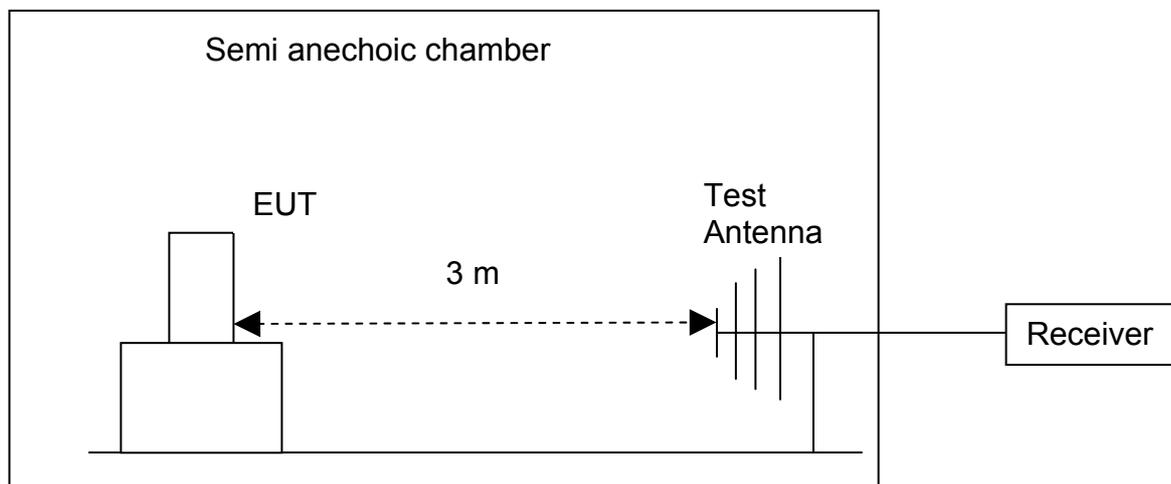
A preliminary scan and a final scan of the emissions were made from 30 MHz to 18 GHz by using test script of software; the emissions were measured using Quasi-Peak Detector (30MHz~1GHz) and AV detector (above 1GHz). The maximal emission value was acquired by adjusting the antenna height, polarisation 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 receive antenna has two polarizations V and H.

EUT was configured in idle mode and the test performed at worst emission state.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 k Hz

Measurement bandwidth: 1GHz – 18GHz: 1MHz

Test set up figure:



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.

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
Above 960	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.

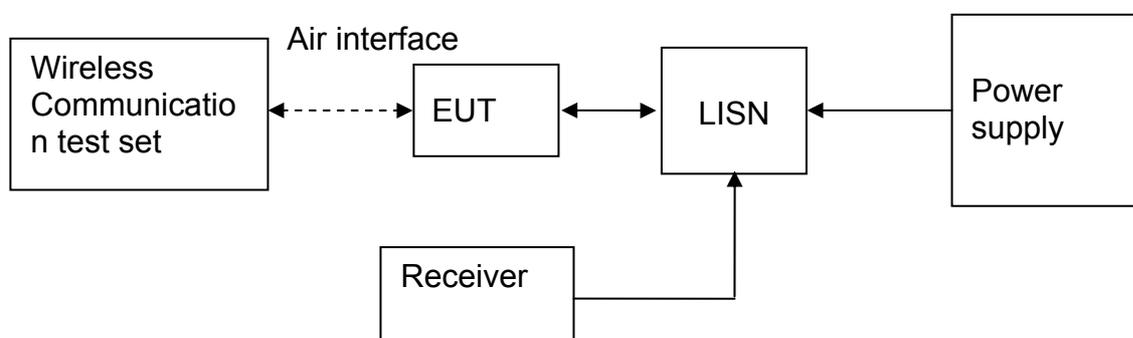
Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

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.



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.

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

6 Main Test Instruments

Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE&CE	EMI Test receiver	ESU26	R&S	Jun.25, 2010	12
	Broadband Antenna	VULB 9163	SCHWARZBECK	May.15, 2010	12
	Horn Antenna	HF906	R&S	May.15, 2010	12
	LISN	ENV216	R&S	Jun.25.2010	12
Software Information					
Test Item	Software Name	Manufacturer		Version	
RE/CE	ES-K1	R&S		1.7.1	

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:

System Measurement Uncertainty

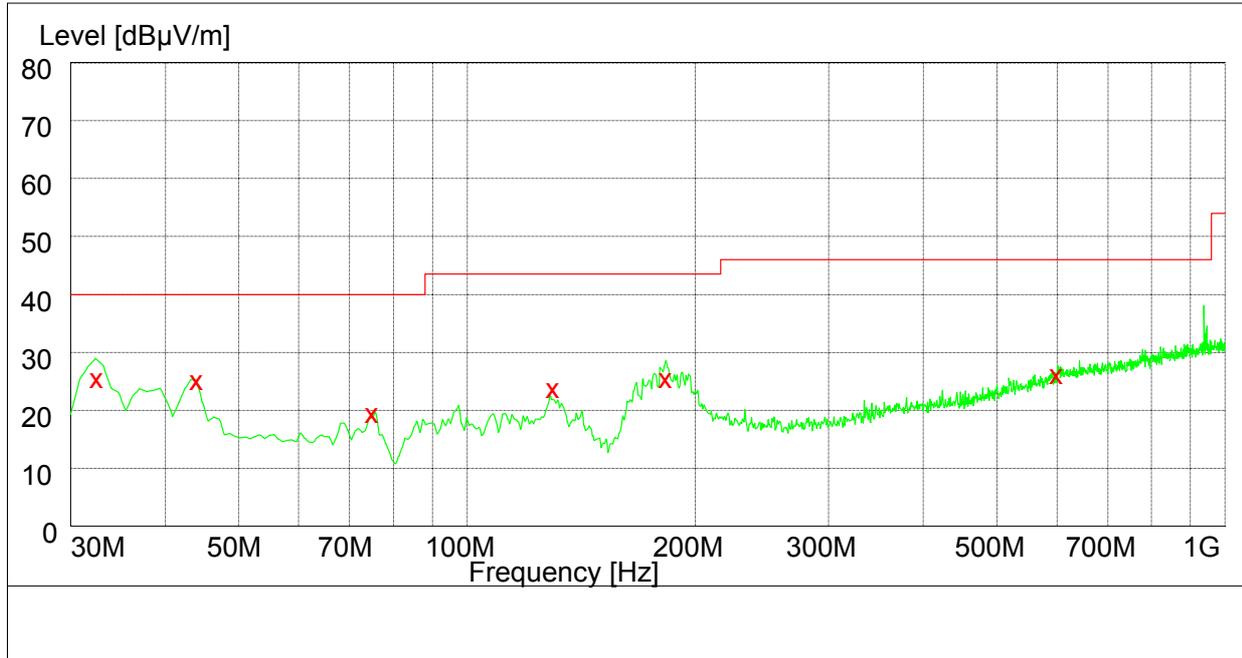
Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(30MHz-1GHz) U=4.1dB; k=2(1GHz-18GHz)
CE	Disturbance Voltage (dB μ V)	U=3.4dB; k=2

8 Graph and Data of Emission Test

8.1 Radiated Disturbance

This test was carried out in all the test modes, Here only the worst test result was shown.

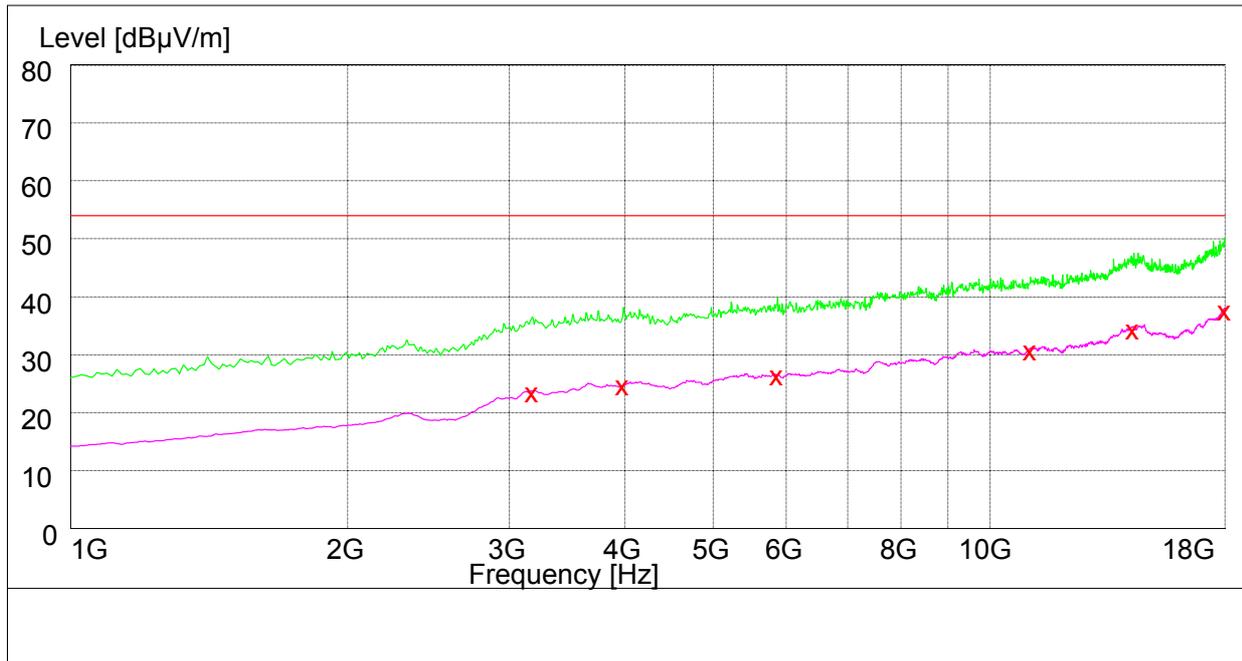
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.500000	25.20	11.7	40.0	14.8	125.0	124.00	HORIZONTAL
44.020000	25.00	13.0	40.0	15.0	154.0	254.00	VERTICAL
75.000000	19.20	7.6	40.0	20.8	105.0	202.00	VERTICAL
130.000000	23.50	9.2	43.5	20.0	156.0	235.00	HORIZONTAL
183.240000	25.20	11.2	43.5	18.3	105.0	202.00	VERTICAL
600.000000	26.00	22.5	46.0	20.0	135.0	156.00	HORIZONTAL

1GHz-18GHz



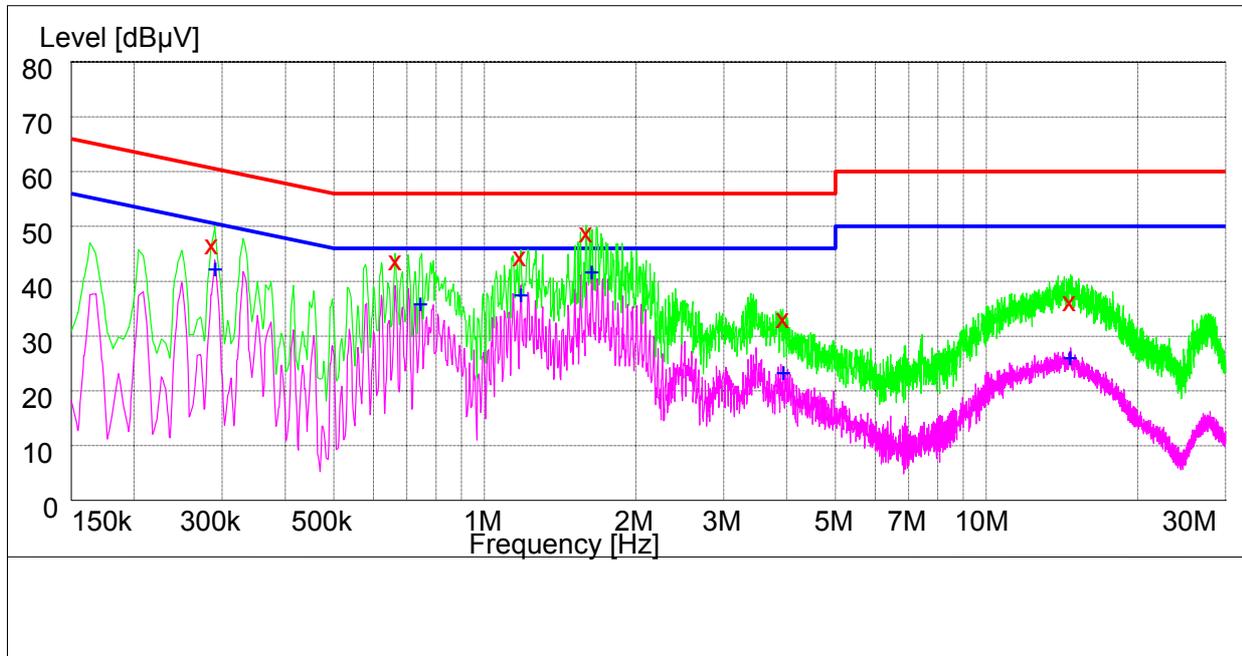
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3176.500000	23.20	-8.4	54.0	30.8	100.0	282.00	HORIZONTAL
3986.500000	24.40	-5.8	54.0	29.6	109.0	44.00	VERTICAL
5863.500000	26.20	-1.8	54.0	27.8	118.0	157.00	VERTICAL
11054.000000	30.50	6.8	54.0	23.5	200.0	345.00	VERTICAL
14298.500000	34.00	11.8	54.0	20.0	168.0	199.00	HORIZONTAL
17990.500000	37.30	17.2	54.0	16.7	112.0	6.00	VERTICAL

8.2 Conducted Disturbance

8.2.1 AC Port Test Data

This test was carried out in all the test modes, Here only the worst test result was shown.



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.286000	46.50	10.0	61	14.5	N	FLO
0.664000	43.60	10.1	56	12.4	N	FLO
1.180000	44.30	10.1	56	11.7	N	FLO
1.596000	48.70	10.1	56	7.3	N	FLO
3.936000	33.10	10.2	56	22.9	N	FLO
14.694000	36.10	10.3	60	23.9	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.290000	42.00	10.0	51	9.0	N	FLO
0.746000	35.70	10.1	46	10.3	N	FLO
1.182000	37.30	10.1	46	8.7	N	FLO
1.636000	41.50	10.1	46	4.5	N	FLO
3.938000	23.00	10.2	46	23.0	N	FLO
14.700000	25.80	10.3	50	24.2	N	FLO

END