



Report on EMC Test of CMDA Mobile Terminal M/N: C5330

Report No: SYBH (R)038092007EB-2



Reliability Laboratory of Huawei Technologies Co., Ltd.

Address: Huawei Technologies Co., Ltd. Bantian Longgang District Shenzhen, P.R. China

Post Code: 518129 Tel: +86 755 89651014 Fax: +86 755 89652518

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REPORT ON EMC Test of C5330 PRODUCT CMDA Mobile Terminal
M/N: C5330

REGULATION FCC CFR47 Part 15: Subpart B;

START OF TEST Sept.18, 2007
END OF TEST Sept.20, 2007

Final Judgement: Pass

Approver	<u>2007-09-21</u>	<u>张兴海</u>		
	Date	Name		Signature
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Reviewer	<u>2007-09-21</u>	<u>余辉</u>		
	Date	Name		Signature
	<hr/>			
Operator	<u>2007-09-20</u>	<u>张 飞</u>		
	Date	Name		Signature
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REPORT BODY CONTENT

1	Status.....	5
1.1	Product Information.....	5
1.2	Applied Standard.....	5
1.3	Test Site.....	6
1.4	Test environment condition.....	6
2	Summary of Results.....	7
3	Equipment Specification.....	8
3.1	General Description.....	8
3.2	EUT Identification List.....	8
4	System Configuration during EMC Test.....	9
4.1	Cables Used during Test.....	9
4.2	Associated Equipment Used during Test.....	9
4.3	Test Configurations and Test Mode.....	10
4.4	Test conditions and test connections.....	10
5	Electromagnetic Interference (EMI).....	11
5.1	Radiated Disturbance 30MHz to 1000MHz.....	11
5.2	Conducted Disturbance 0.15 MHz to 30MHz.....	12
5.3	Radiated Spurious Emissions.....	13
6	Main Test Instruments.....	15
7	System Measurement Uncertainty.....	16
8	Graph and Data of Emission Test.....	17
8.1	Radiated Disturbance.....	17
8.2	Conducted Disturbance.....	18
8.3	Radiated Spurious Emission.....	19
9	Photographs of Test Set-ups.....	21
9.1	Radiated Emissions.....	21
9.2	Conducted Emissions.....	23

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 C5330

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 1 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 – 12.75GHz	TC1/TM1, TM2	N/A	Pass	Site1

Note:

- 1, Measurement taken is within the measurement uncertainty of measurement system.
- 2, TC = Test configuration, TM=Test Mode
- 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 C5330 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.

3.2 EUT Identification List

3.2.1 Board Information

800MHz CDMA Mobile Station		
C5330		
Board and Module		
Equipment Designation / Description	Serial Number	Remarks
-Main board	020GDJ1078000320	HCC5330M VER B
-LCD	1707121601011Y	WD-F1722XC-6FLWa
-Battery	HGY6A2825933	HBC85S

3.2.2 Adapter Technical Data

AC/DC Adapter Model :	TPCA-053065E	XQLCHW03
Manufacturer :	Shenzhen OCT xingqiao Technology Co.,Ltd	TECH-POWER ELECTRONICS (SHENZHEN) CO.,LTD
Rated Voltage	~ 120V, 60Hz	~ 120V, 60Hz
Input Voltage :	100-240V ~50/60Hz	100-240V ~50/60Hz
Output Voltage;	 5.3V	 5.3V
Rated Power :	4W	4W
S/N :	ADK721206556	TPI6A2615591

3.2.3 Battery Technical Data

Battery Model:	HBC85S
Rated capacity:	850mAh
Nominal Voltage:	 3.7V
Charging Voltage:	 4.2V

3.2.4 FCC Identification

Grantee Code: QIS
 Product Code: C5330
 FCC Identification: QISC5330

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



Figure 1_EUT Appearance

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 2 Cable Used during Test

Port	Length	Quantity	Type of Cable
AC Power	1.5m	1	Unshielded

4.2 Associated Equipment Used during Test

Table 3 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date	Cal Interval (month)
Radio Communication Tester	CMU200	R&S	3607033573	2007-3-2	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 4 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;

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 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

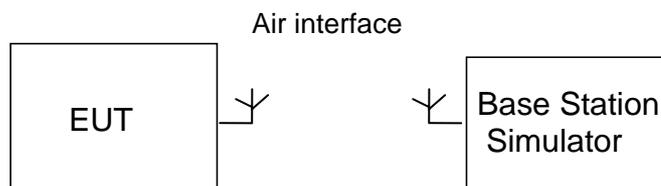


Figure 2. Test Configuration

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.

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 k Hz

Test set up figure:

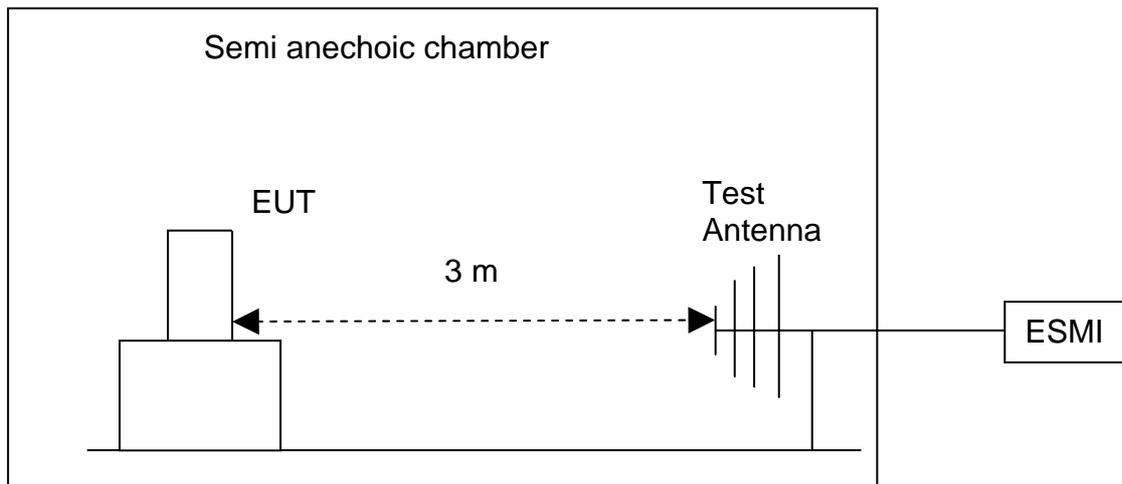


Figure 3. Test set up

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.

Table 5 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.

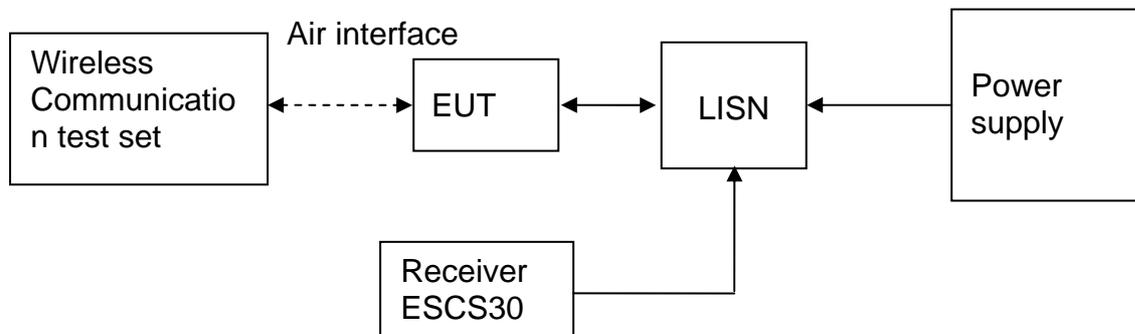


Figure 4. Test Set-up

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.

Table 6 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

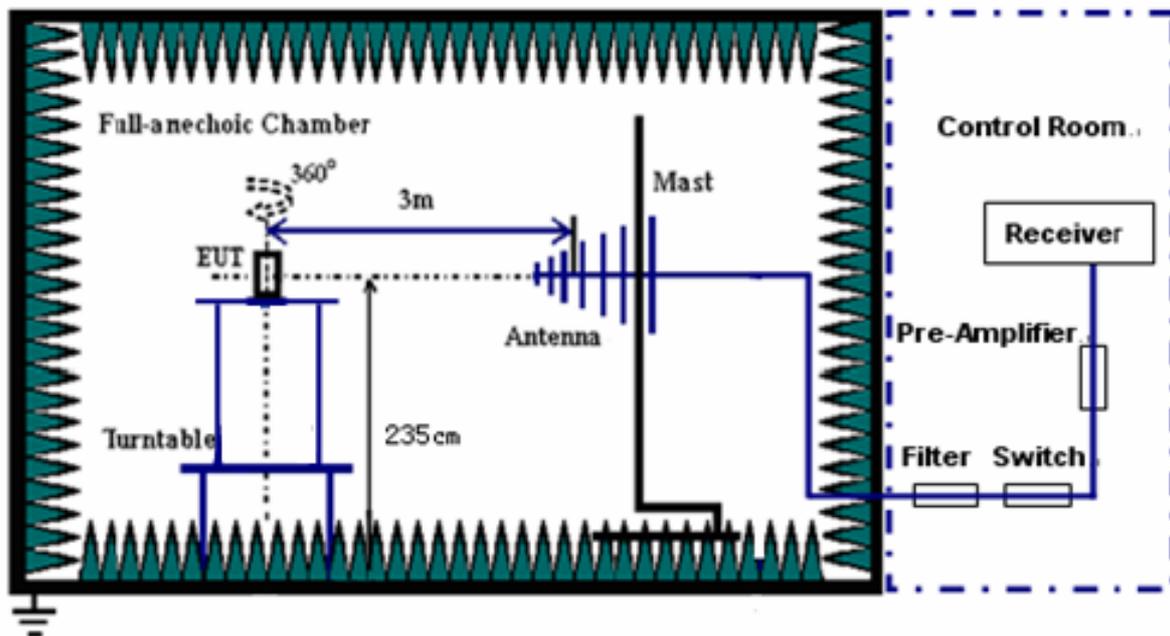
5.3.1 Test Procedure

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:

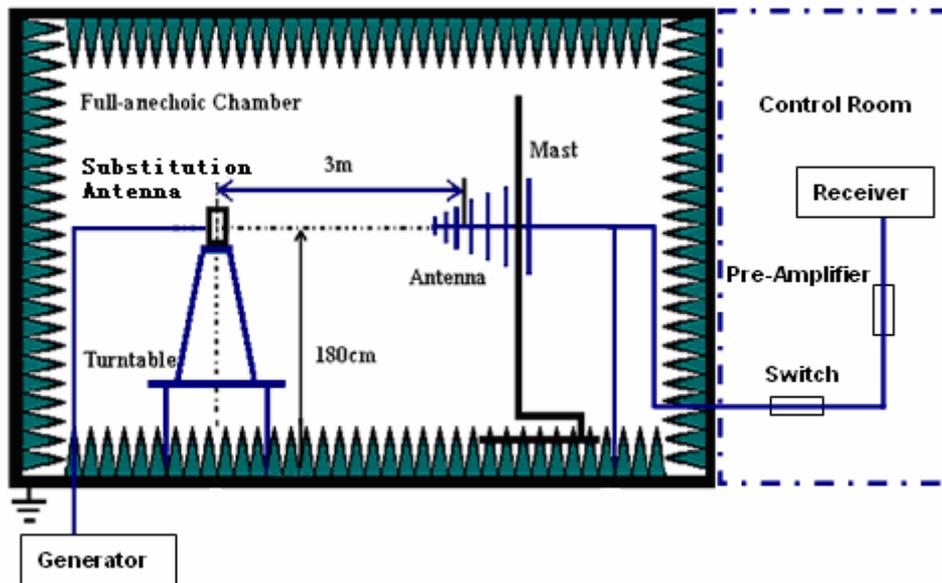
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect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

Test the Radiated maximum output power by the Rohde and Schwarz ESMI 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~12.75GHz 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 12.75GHz: 1MHz;

Table 7 Radiated Spurious Emissions Limits

Frequency band	Minimum requirement (E.R.P) traffic mode
9kHz~12.75GHz	-13dBm

5.3.2 Test Results

The EUT has met the requirements of TS151010-1's requirement.

The test data see section 8.3 of this report.

6 Main Test Instruments

Table 8 Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESMI	R&S	April.23, 2007	12
	Broadband Antenna	CBL 6112B (2941)	SCHAFFNER	Feb.26, 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
	Horn Antenna	3117	EMCO	May.20.2007	12
	Broadband Antenna	CBL6112B /2941	SCHAFFNER	Feb.16.2007	12
	Horn Antenna	3160	EMCO	May.20.2007	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:

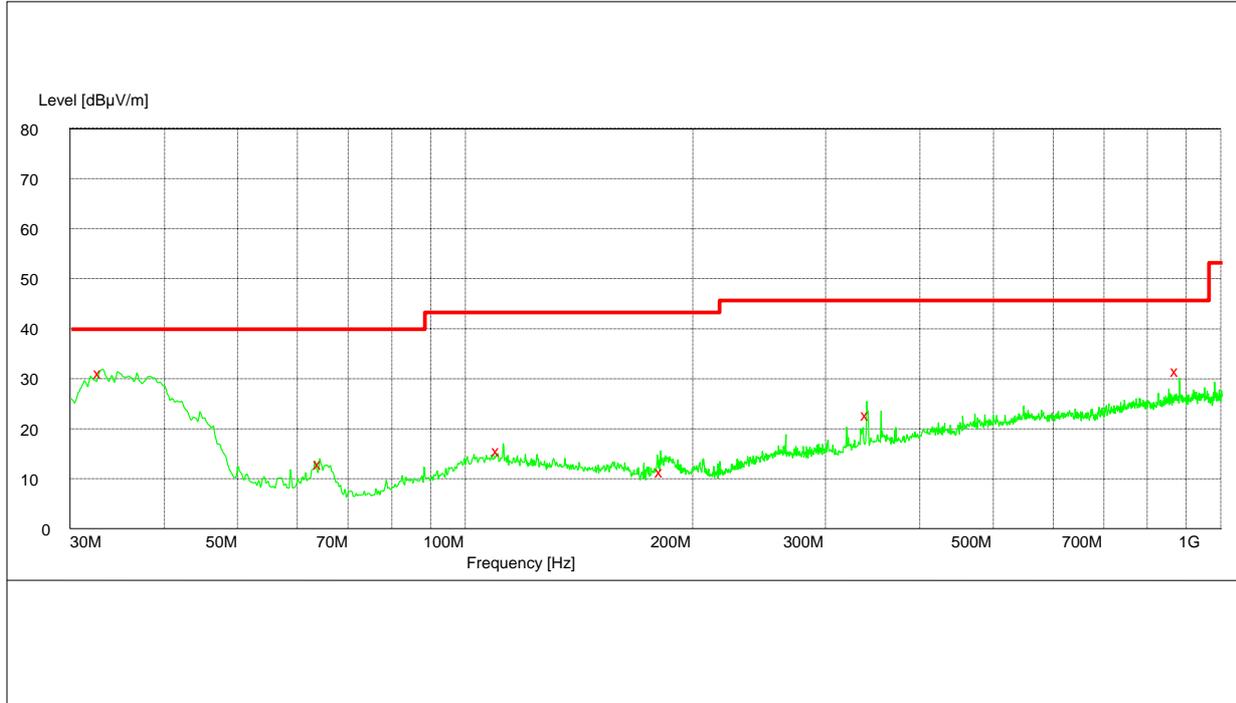
Table 9 System Measurement Uncertainty

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 of

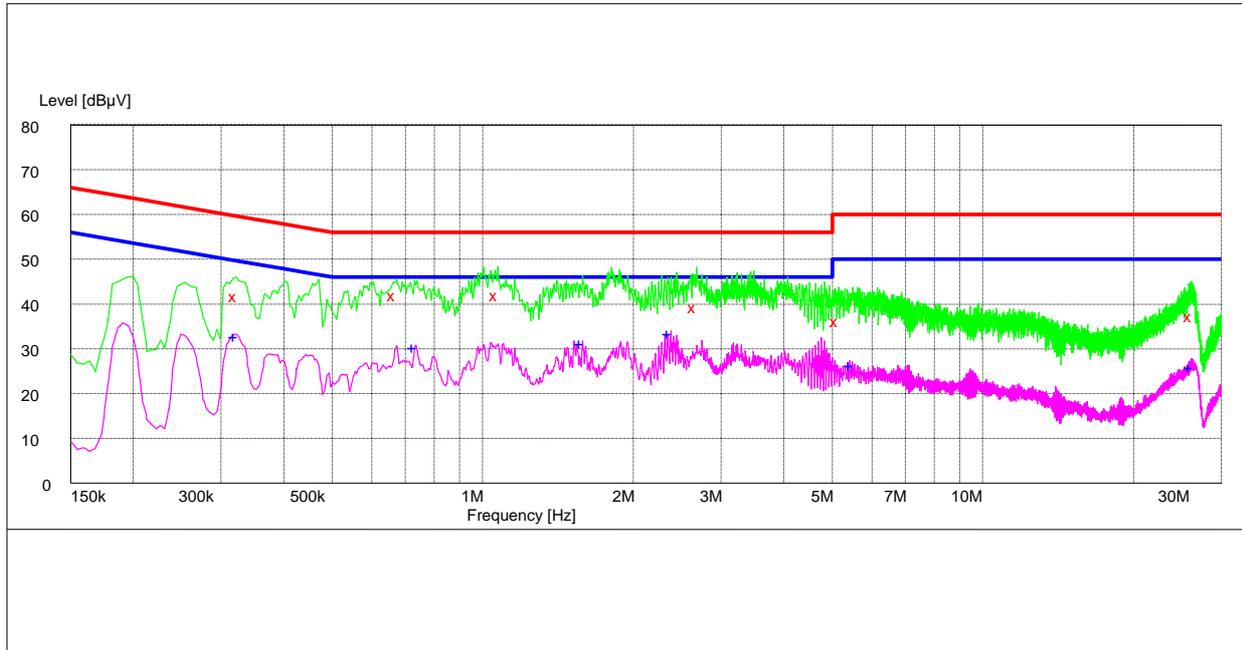


MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.940000	31.20	-6.0	40.0	8.8	100.0	109.00	VERTICAL
64.440000	13.10	-17.0	40.0	26.9	239.0	310.00	VERTICAL
111.000000	14.50	-10.0	43.5	29.0	100.0	142.00	VERTICAL
182.400000	11.60	-12.2	43.5	31.9	154.0	166.00	HORIZONTAL
337.560000	22.90	-6.2	46.0	23.1	100.0	38.00	HORIZONTAL
878.160000	31.60	1.0	54.0	22.4	100.0	247.00	HORIZONTAL

8.2 Conducted Disturbance

8.2.1 AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level $dB\mu V$	Transd dB	Limit $dB\mu V$	Margin dB	Line	PE
0.321000	42.00	10.2	60	17.7	L3	FLO
0.667500	42.20	10.0	56	13.8	L3	FLO
1.068000	42.30	9.9	56	13.7	L3	FLO
2.661000	39.70	10.1	56	16.3	L3	FLO
5.113500	36.40	10.1	60	23.6	L3	FLO
26.065500	37.60	14.2	60	22.4	N	FLO

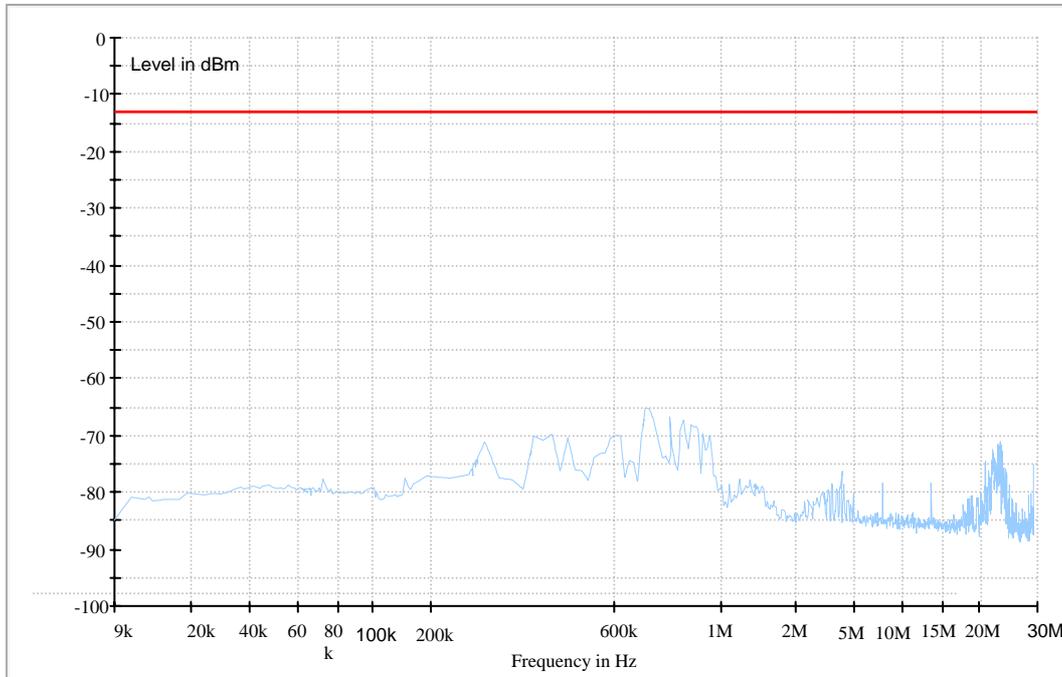
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level $dB\mu V$	Transd dB	Limit $dB\mu V$	Margin dB	Line	PE
0.321000	33.10	10.2	50	16.6	L3	FLO
0.730500	30.80	9.9	46	15.2	L3	FLO
1.581000	31.60	9.9	46	14.4	L3	FLO
2.368500	33.80	10.1	46	12.2	L3	FLO
5.469000	26.70	10.2	50	23.3	L3	FLO
26.124000	26.20	14.2	50	23.8	N	FLO

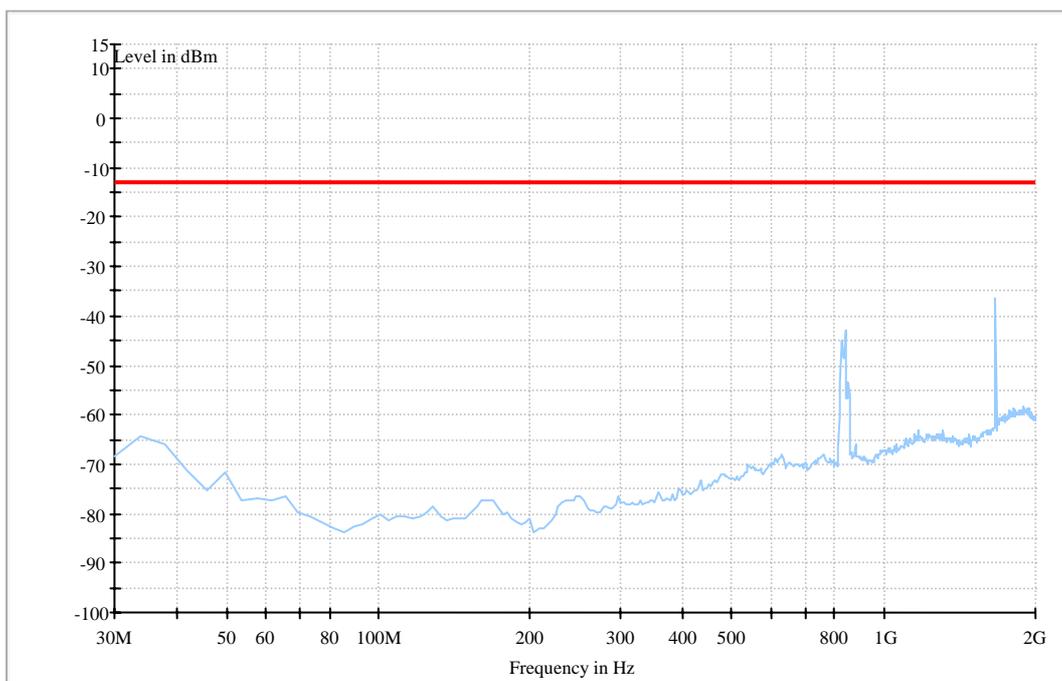
8.3 Radiated Spurious Emission

8.3.1 For GSM900

Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-12.75GHz)

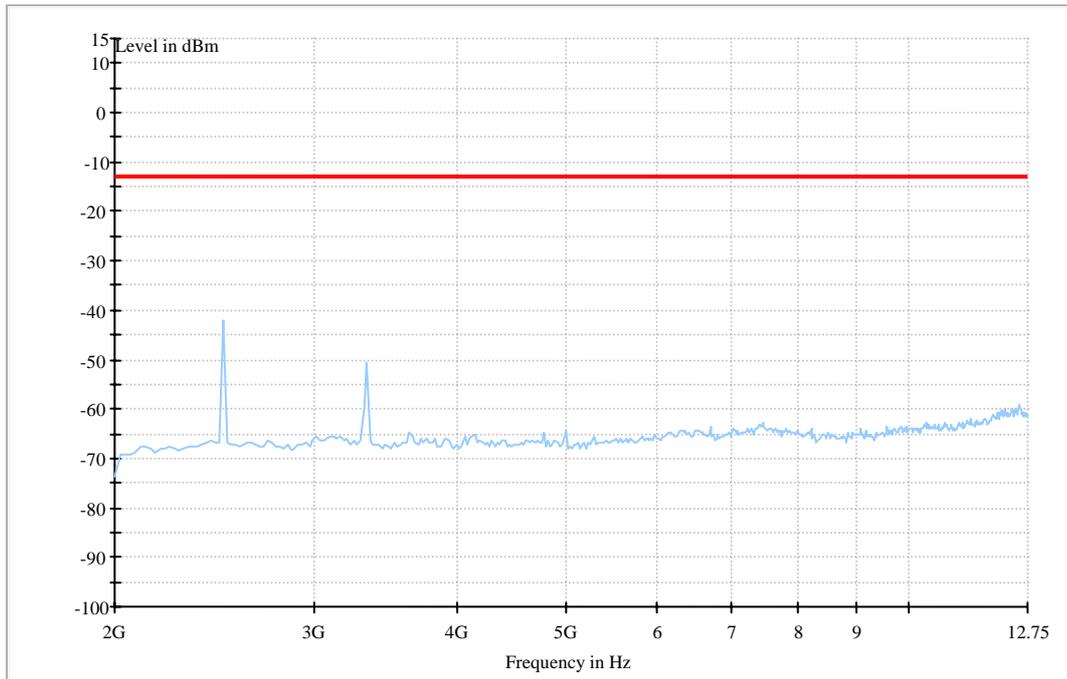


Figure 5. Radiated Disturbance for AC Power Test Result

Substitution test result :

Table 10

Test Mode	Freq. [MHz]	Meas. Level [dBm]	Substitution Antenna Type	SGP [dBm]	Substitution Gain [dBd]	Cable Loss [dB]	Substitution Level (ERP) [dBm]	Result

Note: a, For get the ERP (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]$$

SGP: Signal Generator Level

b, A cdma signal with bandwidth of 1.23MHz are created by the vector generator R&S SMU200A.

c, RBW=10kHz, VBW=300kHz, and integrated by the instrument to 1.23MHz.

9 Photographs of Test Set-ups

9.1 Radiated Emissions



Radiated Disturbance



Radiated Spurious Emission(30MHz~2000MHz)



Radiated Spurious Emission(30MHz~2000MHz)



Radiated Spurious Emission(2GHz~12.75MHz)



Radiated Spurious Emission(2GHz~12.75MHz)

9.2 Conducted Emissions



Conducted Emissions of AC Power Port

-----**END**