



EMC Test Report

Product Name:
WCDMA Mobile Phone

Model Number:
HUAWEI U1000-5/U1000-5

Report No: SYBHZ(R)E039072010EB-1
FCC ID: QISU1000-5S

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Modification Information:

Modification Information

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

REPORT ON	EMC TEST OF WCDMA Mobile Phone
	M/N: HUAWEI U1000-5/U1000-5
REGULATION	FCC CFR47 Part 15: Subpart B;
	FCC CFR47 Part 22: Subpart H;
START OF TEST	Jul.20, 2010
END OF TEST	Jul.23, 2010
Final Judgement:	Pass

Approver

2010-08-06

Date

张兴海

Name

Signature



Operator

2010-08-06

Date

温剑锋

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	WCDMA Mobile Phone
MANUFACTURERS MODEL NUMBER	HUAWEI U1000-5/U1000-5

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 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/TC2 (TM2)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1 (TM1-TM2)	N/A	Pass	Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	TC1 (TM1)	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

WCDMA Mobile Phone-HUAWEI U1000-5/U1000-5 is subscriber equipment in the WCDMA system. The WCDMA frequency band is Band V, they can be used in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, WCDMA protocol processing, voice etc. Externally it provides earphone port(to provide voice service) and USIM card interface.

3.1.1 Main Equipment Technical Data

Description:	WCDMA Mobile Phone
Models:	HUAWEI U1000-5/U1000-5
Input Rated Voltage	3.7V
Extreme Voltage	3.6V and 4.2V
Dimensions	105.8mm (L)×45.8mm (W)×11.5mm (H)
Weight	<90g (with battery)

Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
WCDMA	WCDMA850	824 - 849	869 - 894

3.2 Sub-Assembly Identity

Sub-Assembly Identity

Sub Assembly Inventory				
Board				
Model Name	Qty.		Serial	Description
HUAWEI U1000-5/ U1000-5	1		020UVJ9M0700068	Main board of Mobile Phone
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adapter	1	Huawei Technologies Co., Ltd.	HKA9A1060543	Adapter Model: HS-050040U6 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: === 5.0V 400mA Rated Power: 2W
Rechargeable Li-ion	1	Huawei Technologies Co., Ltd.	HGY920104350	Battery Model: HBU83S Rated capacity: 800mAh 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 Adapter	1	Unshielded
Earphone	1	Unshielded

4.2 Associated Equipment Used during Test

Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date
Radio Communication Tester	CMU200	R&S	3608105673	2009-10-10

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~TM2
-----	---------

4.3.2 Test Mode

There were 2 test Modes. TM1 to TM2 were shown in the diagrams below:

TM1	operate in traffic mode WCDMA850;
TM2	operate in idle mode WCDMA850;

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

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. (WCDMA see 3GPP TS 34.121).

For WCDMA, the following conditions shall also be met:

Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios:

set and send continuously up power control commands to the UE;

The DTX shall be disabled;

Inner Loop Power Control shall be enabled;

transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbit / s.

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

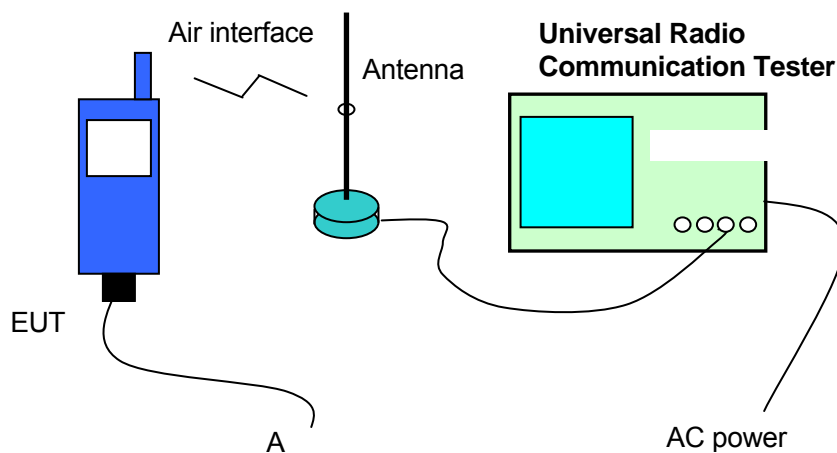


Figure 1.: Test Configuration

Idle Mode:

The EUT is required to be in the idle mode.

For WCDMA, the following conditions shall be met:

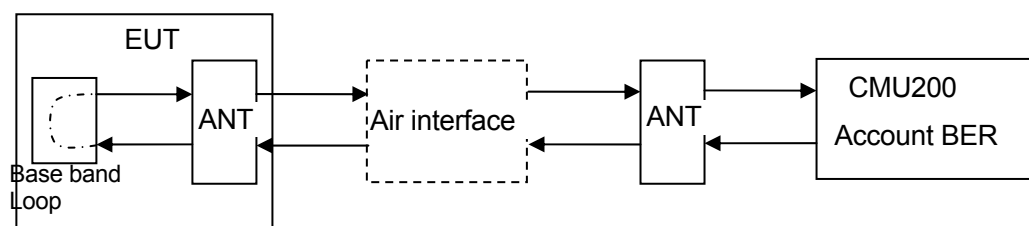
UE shall be camped on a cell;

UE shall perform Location Registration (LR) before the test, but not during the test;

UE's neighbour cell list shall be empty;

Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

Please refer to following figure:



ANT: Antenna

BER: Bit Error Rate

Figure 2. Test Configuration

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:

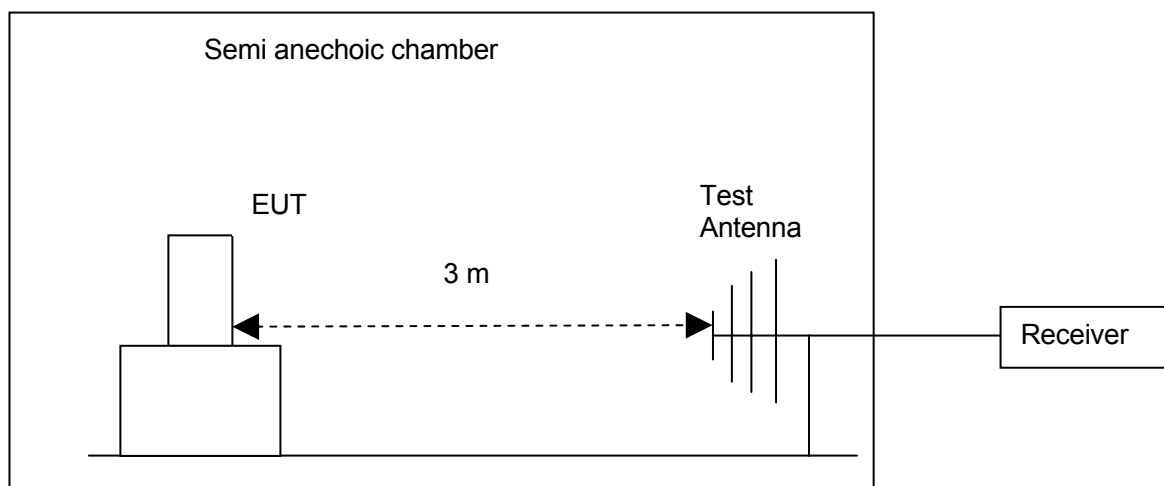


Figure 3. Test set-up

5.1.2 Test Results

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

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.

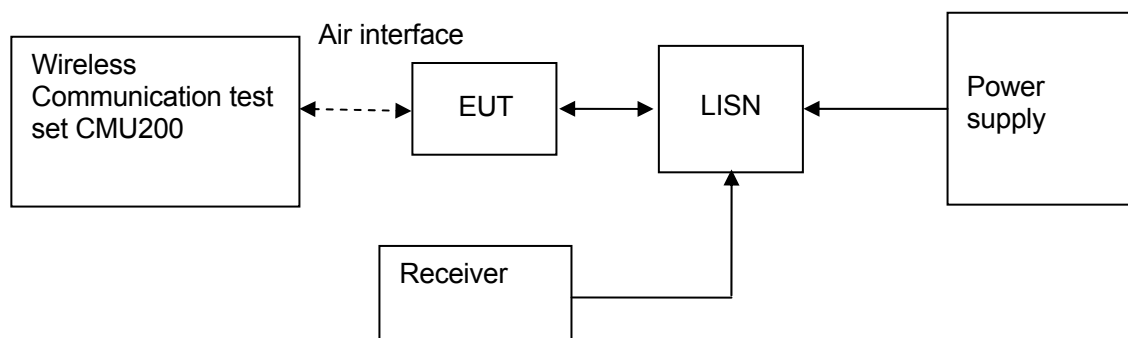


Figure 4. Test Set-up

5.2.2 Test Results

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

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

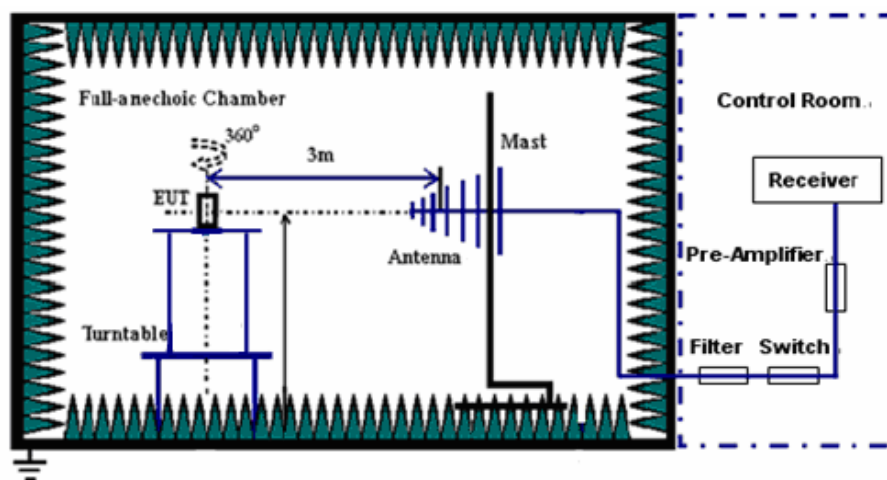
5.3.1 Test Procedure

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:

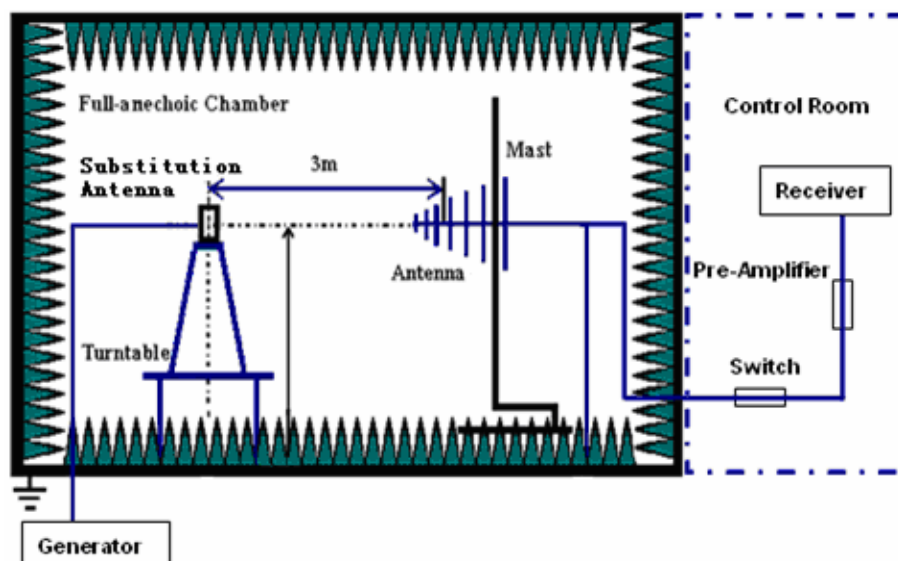
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect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



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 150 kHz: 1 kHz;
Measurement bandwidth (RBW) for 150 kHz up to 30 MHz: 10 kHz;
Measurement bandwidth (RBW) for 30MHz up to 1 GHz: 100 kHz;
Measurement bandwidth (RBW) for 1GHz up to 18GHz: 1MHz;

Radiated Spurious Emissions Limits

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

No peak found in pre- test. All frequency points' margin is bigger than 20dB, so the substitution method isn't used.

Calculation Sample:

Substitution Results

Freq. [MHz]	Measure ment Value [dBm]	Substitution Antenna Type	Gain [dBd]	Cable Loss [dB]	Signal Generator Level [dBm]	Substitution Level [dBm]	FCC limit [dBm]	Result

Note: For get the E.R.P. (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{E.R.P. [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

NOTE: SGP- Signal Generator Level

5.3.2 Test Results

The EUT has met the requirements of FCC Part22 requirement.

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
RSE	EMI Test receiver	ESIB26	R&S	April.22, 2010	12
	Broadband Antenna	CBL6112B	SCHAFFNER	Sep.21.2009	12
	Horn Antenna	3117	ETS-Lindgren	Sep.11.2009	12
	Horn Antenna	3160	ETS-Lindgren	Sep.21.2009	12
Software Information					
Test Item	Software Name	Manufacturer		Version	
RE/CE	ES-K1	R&S		1.7.1	
RSE	EMC32	R&S		V5.10.99	

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

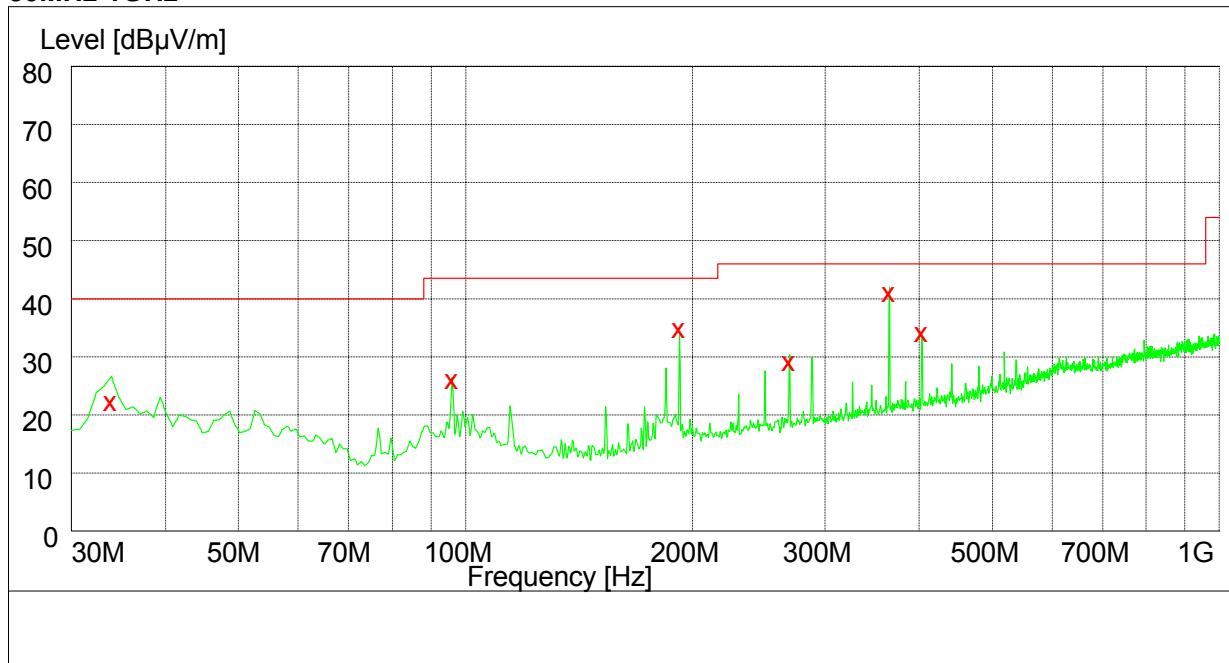
Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(30MHz-1GHz)
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(1GHz-18GHz)
RSE	ERP (dBm)	U=2.2dB; k=2
CE	Disturbance Voltage (dB μ V)	U=3.4dB; k=2

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.

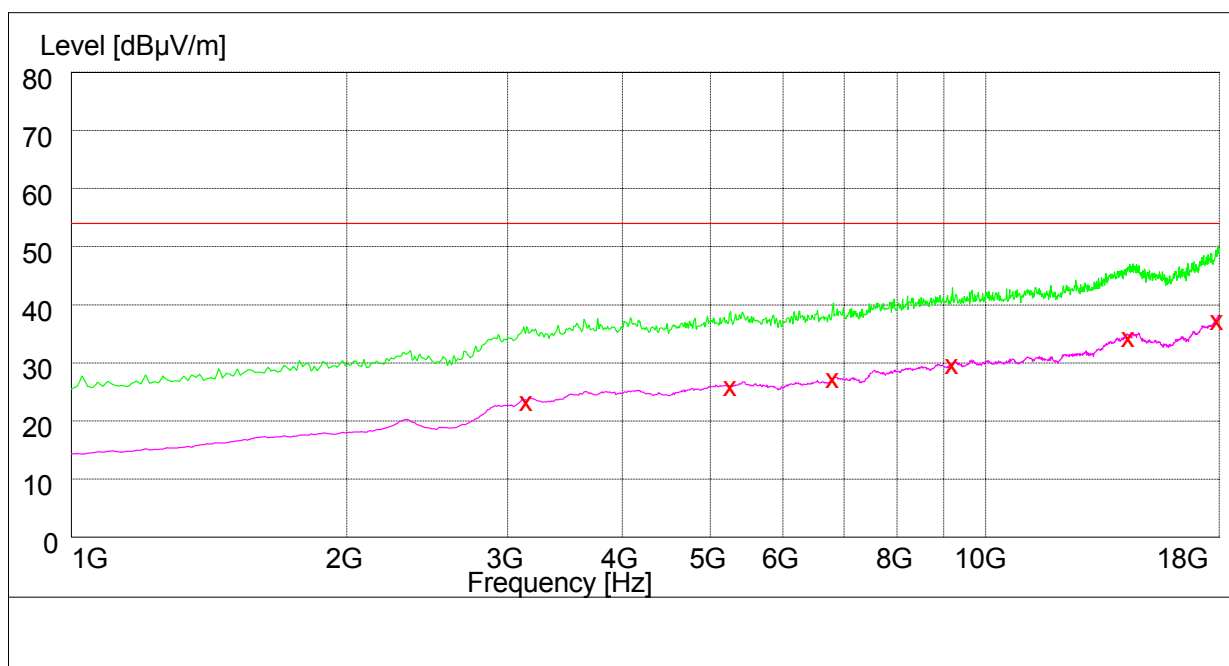
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.840000	22.10	11.7	40.0	17.9	100.0	0.00	VERTICAL
96.000000	25.90	12.8	43.5	17.6	100.0	66.00	VERTICAL
192.000000	34.60	11.9	43.5	8.9	175.0	314.00	HORIZONTAL
268.800000	29.00	14.5	46.0	17.0	102.0	139.00	HORIZONTAL
364.800000	40.90	17.4	46.0	5.1	100.0	123.00	HORIZONTAL
403.200000	34.00	18.2	46.0	12.0	101.0	138.00	HORIZONTAL

1GHz-18GHz



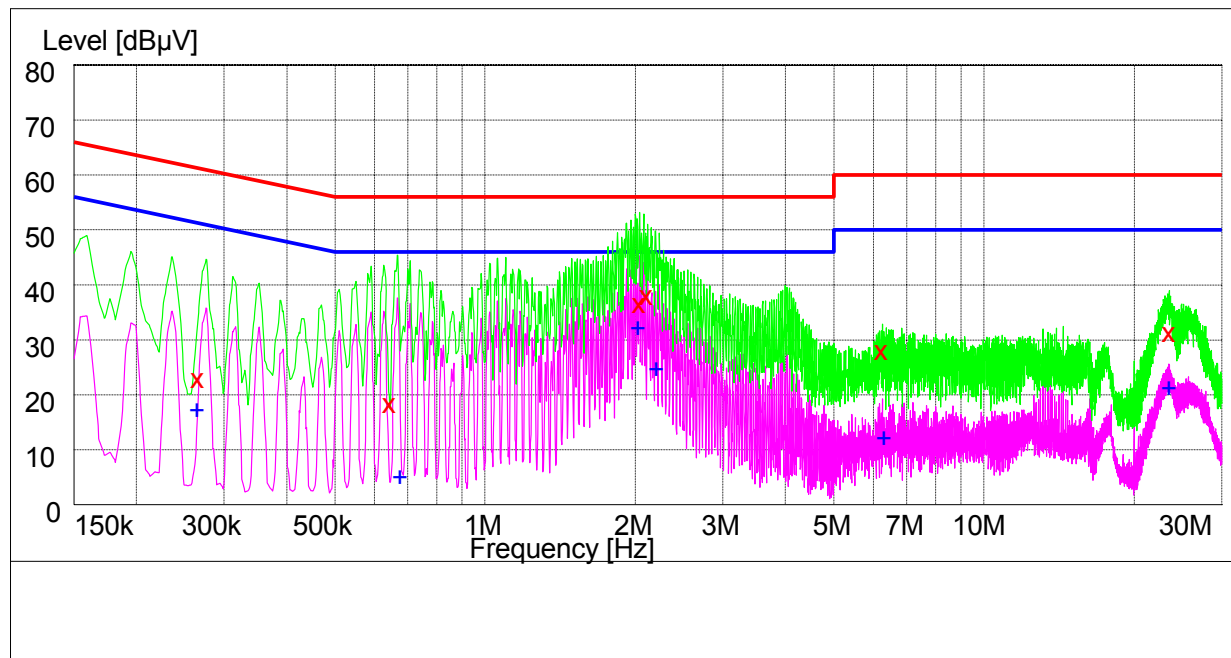
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3147.500000	23.10	-8.5	54.0	30.9	100.0	151.00	VERTICAL
5261.000000	25.80	-2.9	54.0	28.2	100.0	320.00	VERTICAL
6802.500000	27.00	-0.4	54.0	27.0	140.0	275.00	VERTICAL
9199.000000	29.50	4.5	54.0	24.5	197.0	180.00	VERTICAL
14328.500000	34.20	11.8	54.0	19.8	134.0	360.00	VERTICAL
17925.000000	37.10	16.8	54.0	16.9	105.0	312.00	VERTICAL

8.2 Conducted Disturbance

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

AC Power Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.266000	24.30	10.0	61	36.7	N	FLO
0.644000	19.80	10.1	56	36.2	N	FLO
2.040000	37.90	10.1	56	18.1	L1	FLO
2.110000	39.40	10.1	56	16.6	L1	FLO
6.252000	29.50	10.2	60	30.5	N	FLO
23.534000	32.60	10.4	60	27.4	N	FLO

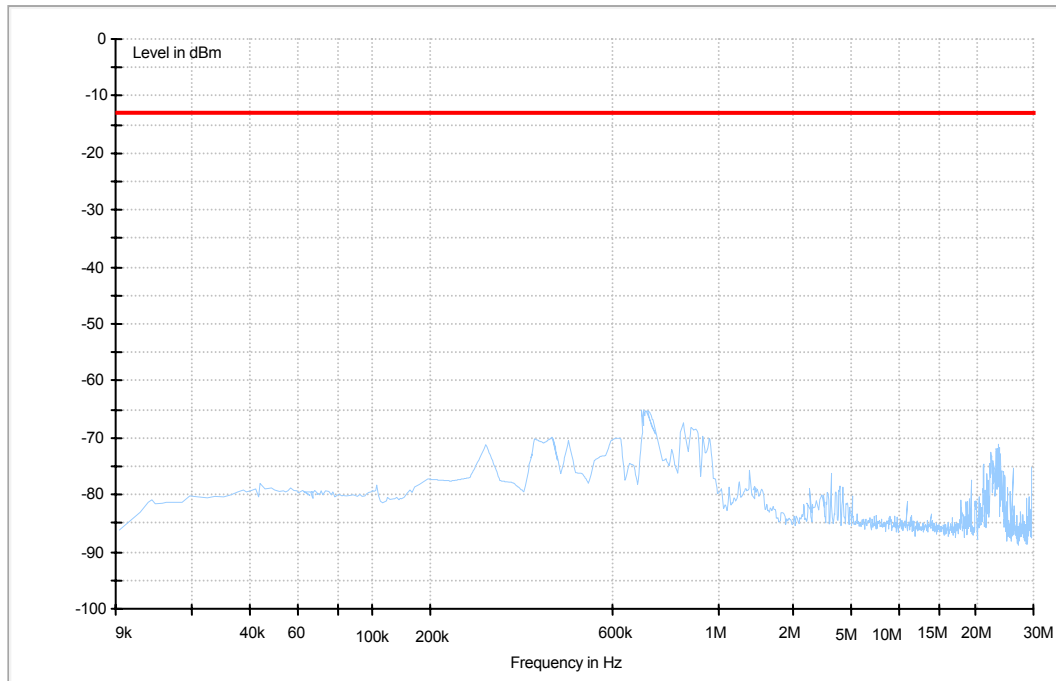
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.264000	18.60	10.0	51	32.4	N	FLO
0.674000	6.30	10.1	46	39.7	N	FLO
2.022000	33.30	10.1	46	12.7	N	FLO
2.204000	25.90	10.1	46	20.1	N	FLO
6.300000	13.40	10.2	50	36.6	N	FLO
23.496000	22.40	10.4	50	27.6	N	FLO

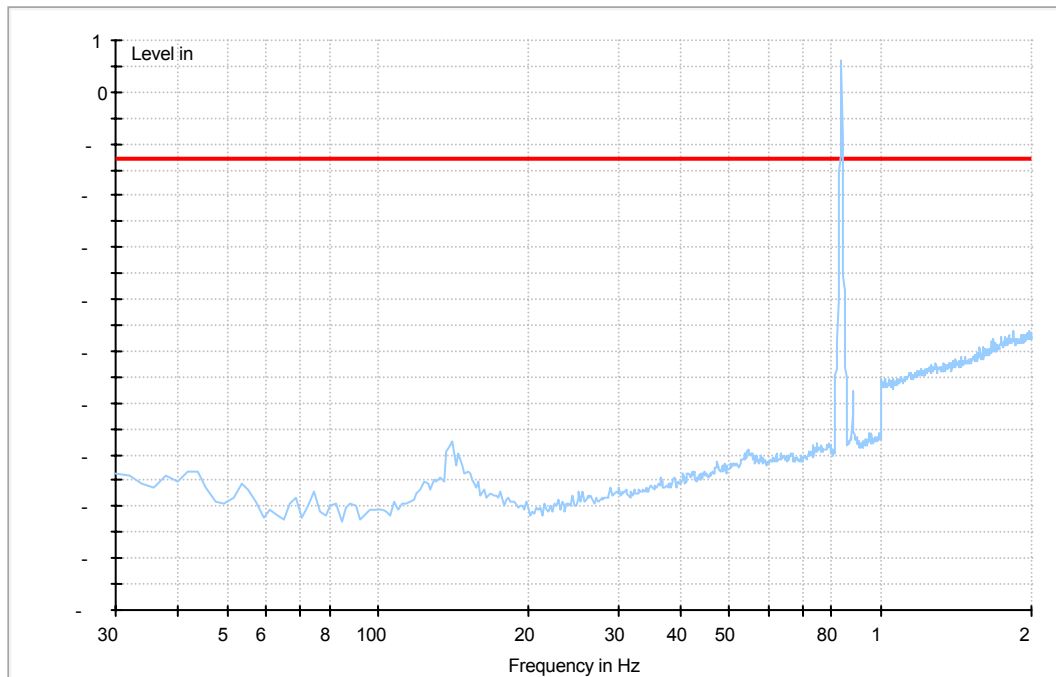
8.3 Radiated Spurious Emission

This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity.

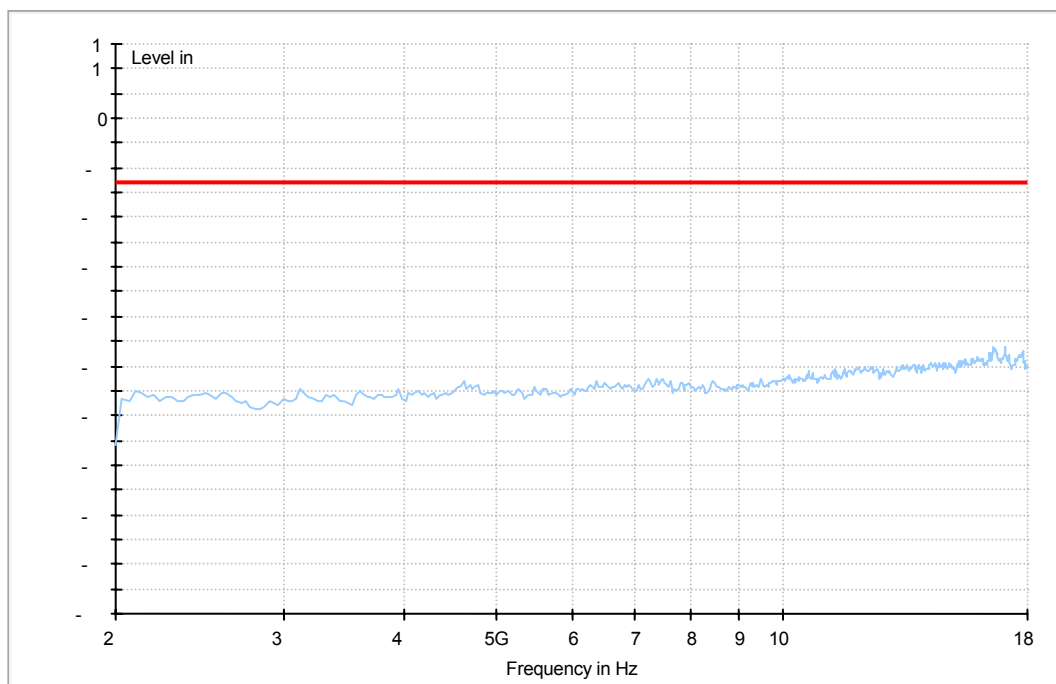
8.3.1 For WCDMA 850 Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



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