EMC Test Report

Product Name:
HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth

Model Number: HUAWEI U8220-6/U8220-6

Report No: SYBHZ(R)E035032010EB-1

FCC ID: QISU8220-6

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Notice 2

Modification Information:

Table 1 Modification Information

Modification Information	1	
	2	
	3	Not Applicable!
	4	
	5	
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	7	

REPORT ON	**EMC TEST OF HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth**
	M/N: HUAWEI U8220-6/U8220-6
REGULATION	**FCC CFR47 Part 15: Subpart B;**
START OF TEST	**Mar.22, 2010**
END OF TEST	**Mar.26, 2010**
Final Judgement:	**Pass**

Approver	**2010-03-30**	张兴海	
	Date	**Name**	**Signature**
Operator	**2010-03-28**	温剑锋	
	Date	**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	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
MANUFACTURERS MODEL NUMBER	HUAWEI U8220-6/U8220-6

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

1.3 Test Site

Site 1:
EMC LABORATORY OF RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES 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**
Radiated Emissions Enclosure Port	TC1 (TM1-TM15)	N/A	Pass	Site1
Conducted Emissions	TC1 (TM1-TM30)	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 HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth-HUAWEI U8220-6/U8220-6 is subscriber equipment in the WCDMA/GSM system. The HSPA/UMTS frequency band is Band I and Band II and Band V, but only Band II and Band V bands test data included in this report. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only GSM850 and PCS1900MHz band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, and WIFI etc. Externally it provides micro SD card interface, earphone port(to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

3.1.1 Main Equipment Technical Data

Description:	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Models:	HUAWEI U8220-6/U8220-6
Input Rated Voltage	3.7V
Extreme Voltage	3.6V and 4.2V
Rated Power	Normal 3W ,Max 8 W
Dimensions	116mm (L)×62.8mm (W)×13.9mm (H)
Weight	<140g（with battery）

Table 3 Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency （MHz）	Receive Frequency （MHz）
GSM	GSM850	824 - 849	869 - 894
	PCS1900	1850-1910	1930-1990
WCDMA	WCDMA850	824 - 849	869 - 894
	WCDMA1900	1850-1910	1930-1990
Bluetooth		2400-2483.5	
WIFI		2400-2483.5	
GPS			1575.42

3.2 Sub-Assembly Identity

Table 4 Sub-Assembly Identity

Board				
Model Name	Qty.	Hardware Version	Serial	Description
HD1U822M	1	VER.D	MT2AC10972800321	Main board of Mobile Phone
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adapter	1	Huawei Technologies Co., Ltd.	HKAA102142698	Adapter Model: HW-050100U1W Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: ⎓ 5.0V 1000 mA Rated Power: 2W
Rechargeable Li-ion	1	Huawei Technologie	SAC9212HI0338991	Battery Model: HB4F1 Rated capacity: 1500mAh

		s Co., Ltd.		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 5 Cable Used during Test

Port	Length	Quantity	Type of Cable
AC Power Port	0.85m	1	Shielded
Earphone	1.25m	1	Unshielded

4.2 Associated Equipment Used during Test

Table 6 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).

Table 7 Configuration table

TC1	TM1~TM30

4.3.2 Test Mode

There were 30 test Modes. TM1 to TM30 were shown in the diagrams below:
TM1: operate in idle GSM850;
TM2: operate in idle GPRS850;
TM3: operate in idle EDGE850;
TM4: operate in idle PCS1900;
TM5: operate in idle GPRS1900;
TM6: operate in idle EDGE1900;
TM7: operate in idle WCDMA850;
TM8: operate in idle HSDPA850;
TM9: operate in idle HSUPA850;
TM10: operate in idle WCDMA1900;
TM11: operate in idle HSDPA1900;
TM12: operate in idle HSUPA1900;
TM13: operate in idle Bluetooth;
TM14: operate in idle WIFI;
TM15: operate in idle GPS;
TM16: operate in traffic GSM850;
TM17: operate in traffic GPRS850;
TM18: operate in traffic EDGE850;
TM19: operate in traffic PCS1900;

TM20: operate in traffic GPRS1900;
TM21: operate in traffic EDGE1900;
TM22: operate in traffic WCDMA850;
TM23: operate in traffic HSDPA850;
TM24: operate in traffic HSUPA850;
TM25: operate in traffic WCDMA1900;
TM26: operate in traffic HSDPA1900;
TM27: operate in traffic HSUPA1900;
TM28: operate in traffic Bluetooth;
TM29: operate in traffic WIFI;
TM30: operate in traffic GPS;

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, GSM see ETSI TS 151.010).

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;

For GSM850 and PCS1900, the following conditions shall also be met:
The EUT shall be commanded to operate at maximum transmit power;
The downlink RXQUAL shall be monitored.
Assign channel frequency to an appropriate channel number.

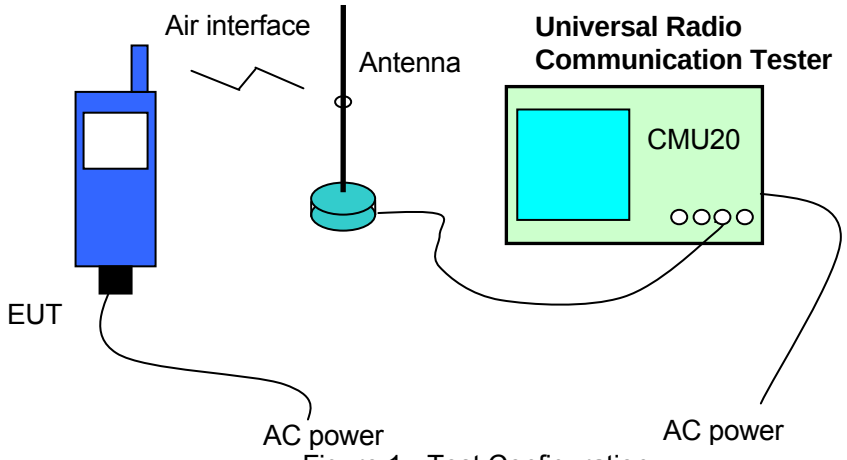
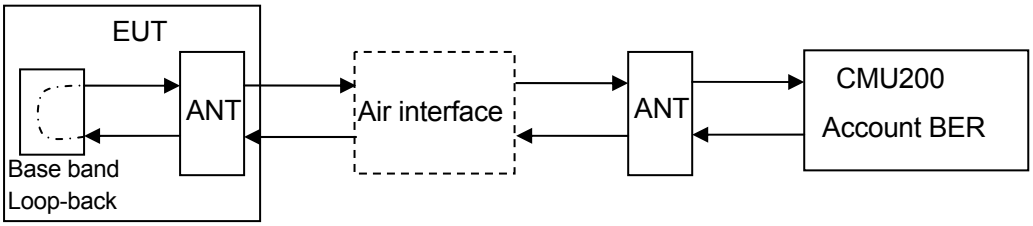


Figure 1.: Test Configuration

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).

For GSM850 and PCS1900, 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.
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 and CAN/CSA-CEI/IEC CISPR 22
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 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:

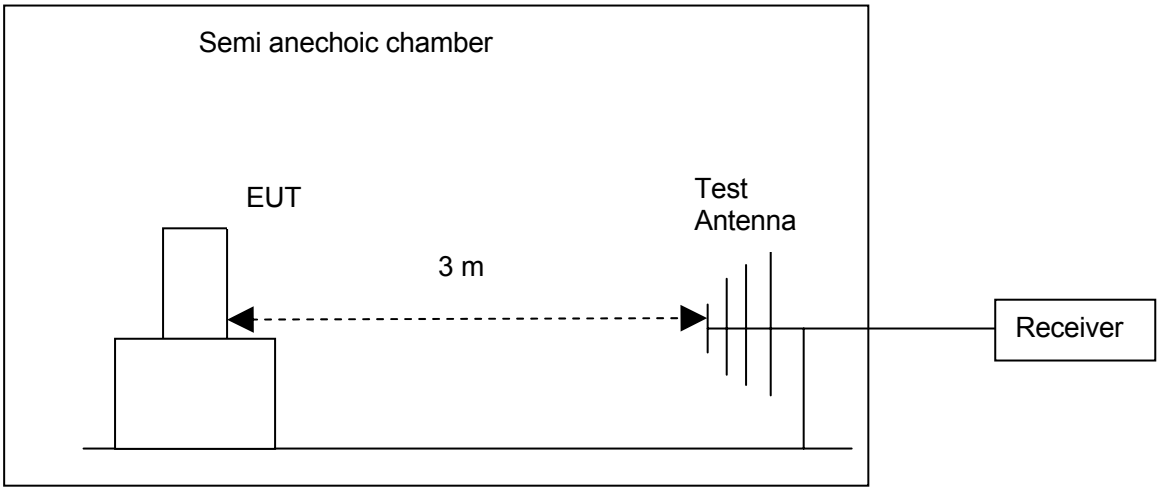


Figure 3. Test set-up

5.1.2 Test Results

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

Table 8 Test Limits

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

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 150kz to 30 MHz: 9 kHz;

Test Set-up figure:

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

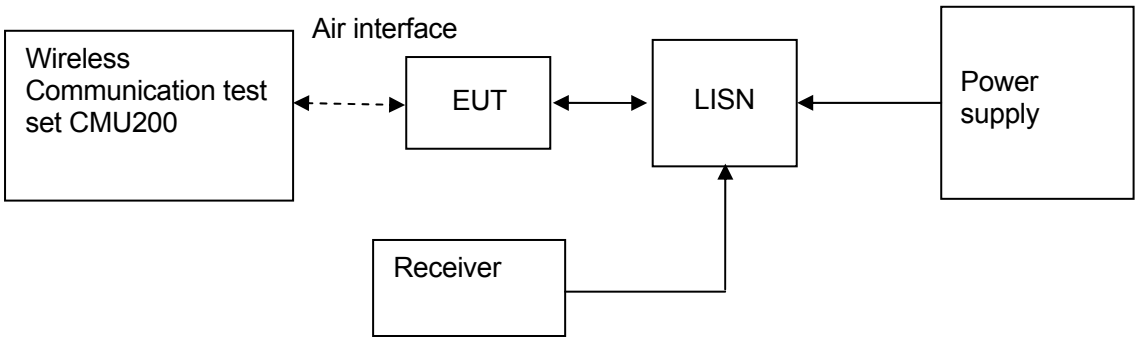


Figure 4. Test Set-up

5.2.2 Test Results

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

Table 9 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 dBμV	56~46 dBμV
0.5MHz~5MHz	56 dBμV	46 dBμV
5MHz~30MHz	60 dBμV	50 dBμV

6 Main Test Instruments

Table 10 Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESU40	R&S	Apr.22, 2009	12
	Broadband Antenna	CBL 6112B	SCHAFFNER	Jun.08, 2009	12
	Horn Antenna	HF906	R&S	Mar.27, 2009	
CE	EMI Test receiver	ESCS30	R&S	Apr.22, 2009	12
	Artificial Mains Network	ENV4200	R&S	May.12, 2009	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:

Table 11 System Measurement Uncertainty

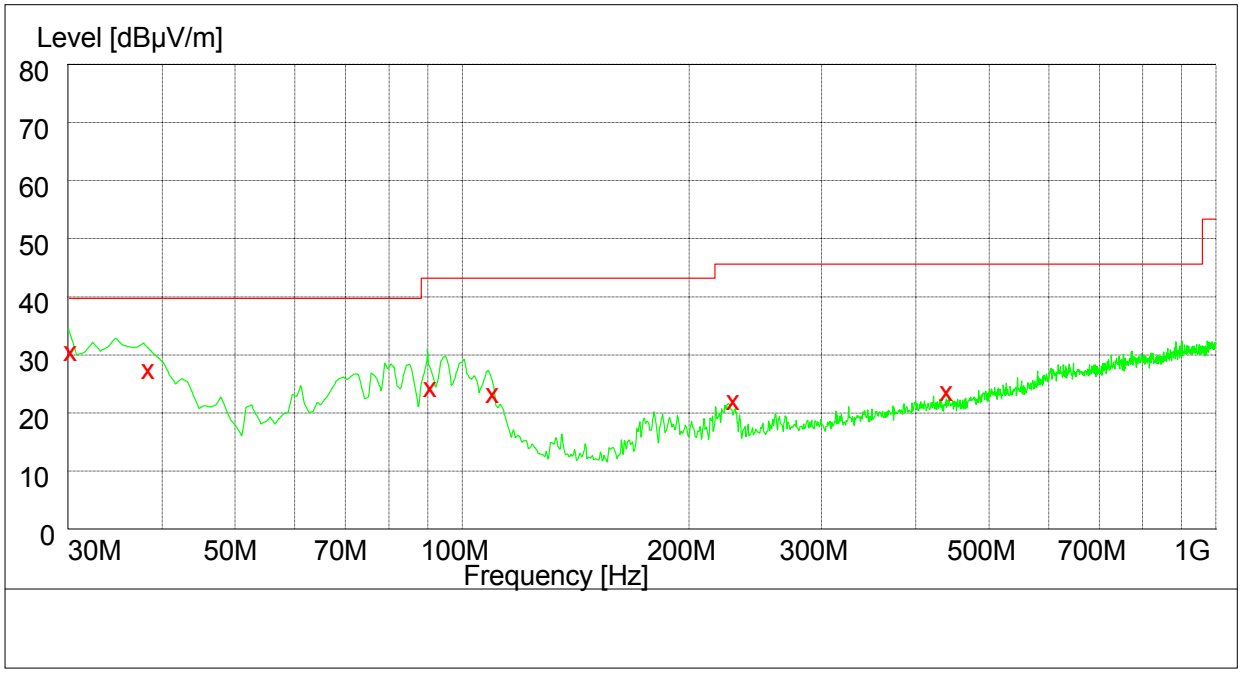
Items		Extended Uncertainty
RE	Field strength (dBμV/m)	U=4.2dB; k=2(30MHz-1GHz)
RE	Field strength (dBμV/m)	U=3.6dB; k=2(1GHz-18GHz)
CE	Disturbance Voltage (dBμV)	U=3.3dB; k=2

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.

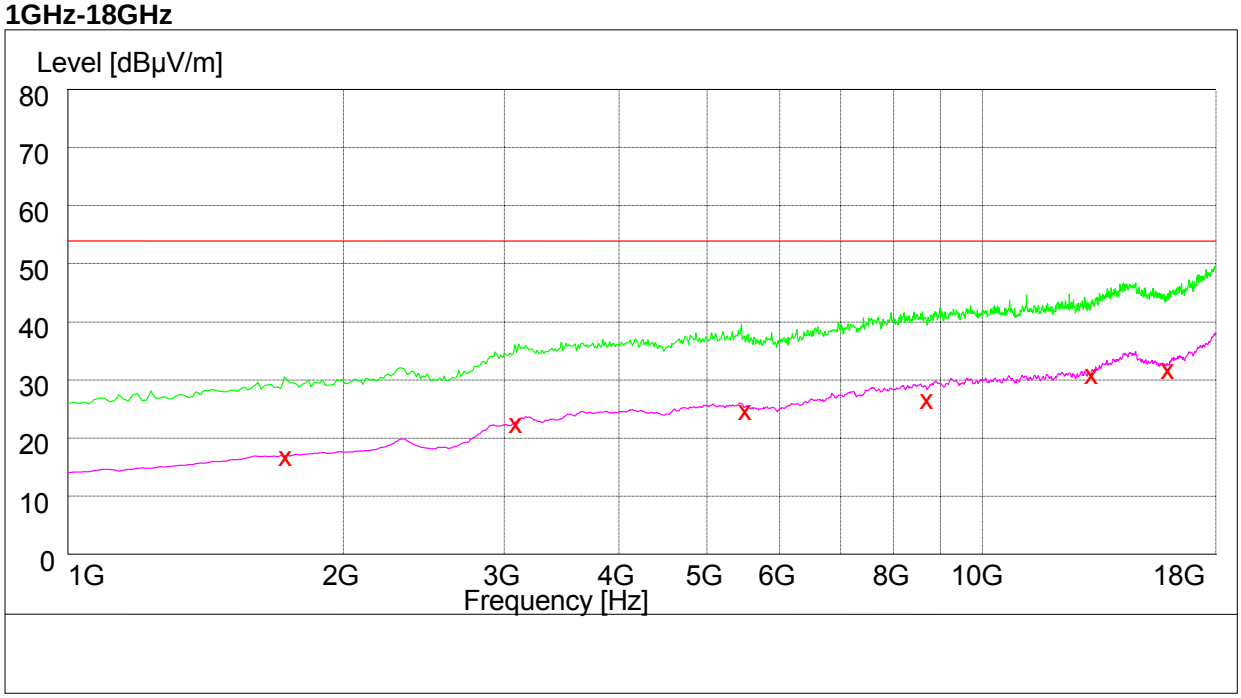
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
30.300000	30.40	11.8	40.0	9.6	100.0	72.00	HORIZONTAL
38.400000	27.70	12.7	40.0	12.3	100.0	194.00	HORIZONTAL
90.840000	24.50	11.9	43.5	19.0	209.0	171.00	VERTICAL
109.920000	23.50	12.3	43.5	20.0	100.0	132.00	HORIZONTAL
229.620000	22.30	13.5	46.0	23.7	100.0	325.00	VERTICAL
440.400000	23.30	18.9	46.0	22.7	100.0	62.00	VERTICAL

1GHz-18GHz



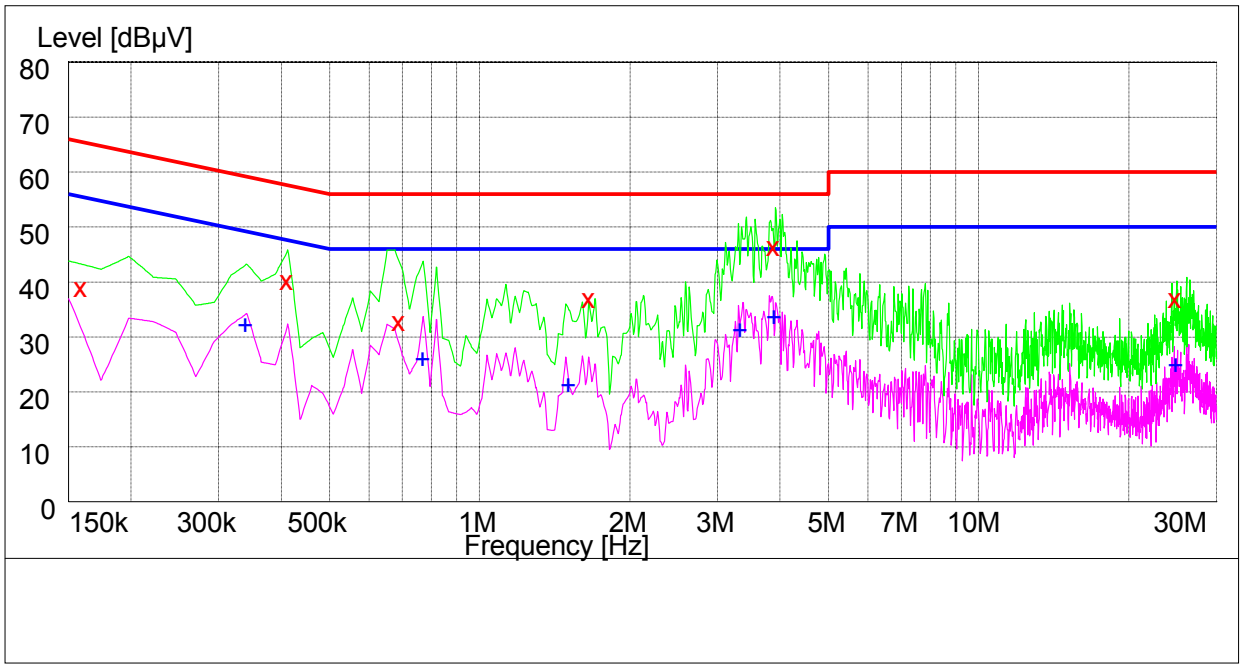
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1732.000000	16.60	-13.8	53.9	37.3	100.0	193.00	VERTICAL
3096.000000	22.60	-8.8	53.9	31.3	152.0	176.00	VERTICAL
5507.500000	24.60	-2.4	53.9	29.3	113.0	133.00	VERTICAL
8714.000000	27.90	3.3	53.9	26.0	165.0	340.00	HORIZONTAL
13170.500000	30.80	9.0	53.9	23.1	100.0	190.00	HORIZONTAL
15963.000000	32.00	10.5	53.9	21.9	112.0	15.00	VERTICAL

9 Conducted Disturbance

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

9.1.1 AC Power Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.159000	39.10	10.1	66	26.9	N	FLO
0.411000	40.10	10.0	58	17.9	N	FLO
0.690000	32.40	10.1	56	23.6	N	FLO
1.657500	38.30	10.1	56	17.7	N	FLO
3.885000	47.50	10.2	56	8.5	N	FLO
25.01500	37.10	10.4	60	22.9	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.339000	32.70	10.0	49	16.3	N	FLO
0.775500	26.80	10.1	46	19.2	N	FLO
1.518000	21.00	10.1	46	25.0	L1	FLO
3.322500	31.10	10.2	46	14.9	N	FLO
3.889500	34.60	10.2	46	11.4	N	FLO
25.211500	25.50	10.4	50	24.5	N	FLO