



EMC Test Report

**Product Name: cdma2000 Digital Mobile Phone;
Evolution III**

Model Number: HUAWEI CM990, CM990

Report No: SYBH(Z-EMC)077072013-2

FCC ID: QISCM990

Reliability Laboratory of Huawei Technologies Co., Ltd.

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2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
3. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
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Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei
Technologies Co., Ltd., Bantian, Longgang District,
Shenzhen, 518129, P.R.C

Date of Receipt Test Item: Jul.20, 2013
Start Date of Test: Jul.20, 2013
End Date of Test: Jul.25, 2013

Test Result: Pass

**Approved By
(Lab Manager)**

2013-07-26
Date

Liu Chunlin
Name

Signature

**Operator
(Test Engineer)**

2013-07-26
Date

Su Yuguang
Name

Signature



Modification Record

No.	Last Report No.	Modification Description
1	NA	First report



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1 General Information

1.1 EUT Description

EUT Description	
Product Name	cdma2000 Digital Mobile Phone; Evolution III
Model Number	HUAWEI CM990, CM990
TX Frequency	CDMA800: 824MHz To 849MHz Bluetooth: 2402MHz To 2480MHz WIFI: 2412MHz To 2462MHz
RX Frequency	CDMA800: 869MHz To 894MHz Bluetooth: 2402MHz To 2480MHz WIFI: 2412MHz To 2462MHz GPS: 1575.42MHz
S/N	P3T01A9370500116
HW Version	HC1CM990M
SW Version	CM990 V100R001C32B170
EUT Accessory	
Data cable	Data Cable USB A Male to Micro USB, shielded
Adapter	Brand: HUAWEI Model: HW-050100U2W Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V  1A Rated Power: 5W S/N: HWBYAAD52501582; S/N:HWHKAAD60302994
Adapter	Brand: HUAWEI Model: HW-050100U1W Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V  1A Rated Power: 5W S/N: TPACB0658103; S/N:HKAC81696170
Rechargeable Li-ion	Brand: HUAWEI Battery Model: HB4W1 Rated capacity: 1700mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V S/N: CABD62218001597; S/N:BAAD608L18039703 S/N: GAGD515L18000172

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.2 Test Site Information

Site 1:	RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.
Test Site Location:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.3 Applied Standards

APPLIED STANDARD

47 CFR FCC Part 15:2012, Subpart B



2 Summary of Results

Summary of Results				
Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
<u>Radiated Emissions</u> Enclosure Port	Mode 1~ Mode 2 Mode 5 Mode 6~ Mode 7	CLASS B	Pass	Site1
<u>Conducted Emissions</u> <input checked="" type="checkbox"/> AC Power Port	Mode 1~ Mode 4	CLASS B	Pass	Site1

Note:
1, Measurement taken is within the measurement uncertainty of measurement system.
2, The item has been tested; The item has not been tested.

During the measurement, the environmental conditions complied with the range listed as below.

Item	Required
Ambient temperature	15°C ~ 35°C
Relative humidity	25% ~ 75%
Atmospheric pressure	86kPa ~ 106kPa

3 System Configuration during EMC Test

3.1 Test Mode

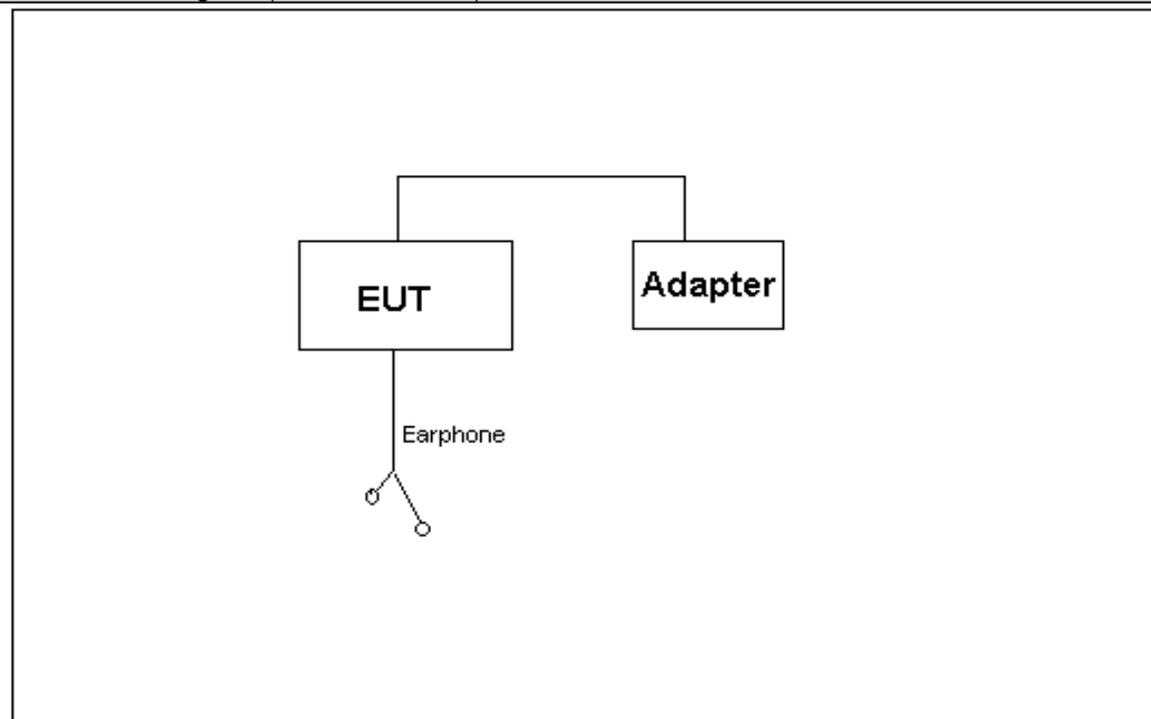
Huawei has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was in this test report and defined as below:

Test Mode	
Mode 1:	Adapter + earphone + Camera On + Idle
Mode 2:	Adapter + earphone + MP3 + Idle
Mode 3:	Adapter + earphone +Traffic
Mode 4:	Adapter +Traffic
Mode 5:	Data Transmitting + earphone + Idle
Mode 6:	Camera On + earphone + Idle
Mode 7:	MP3 +Earphone + Idle

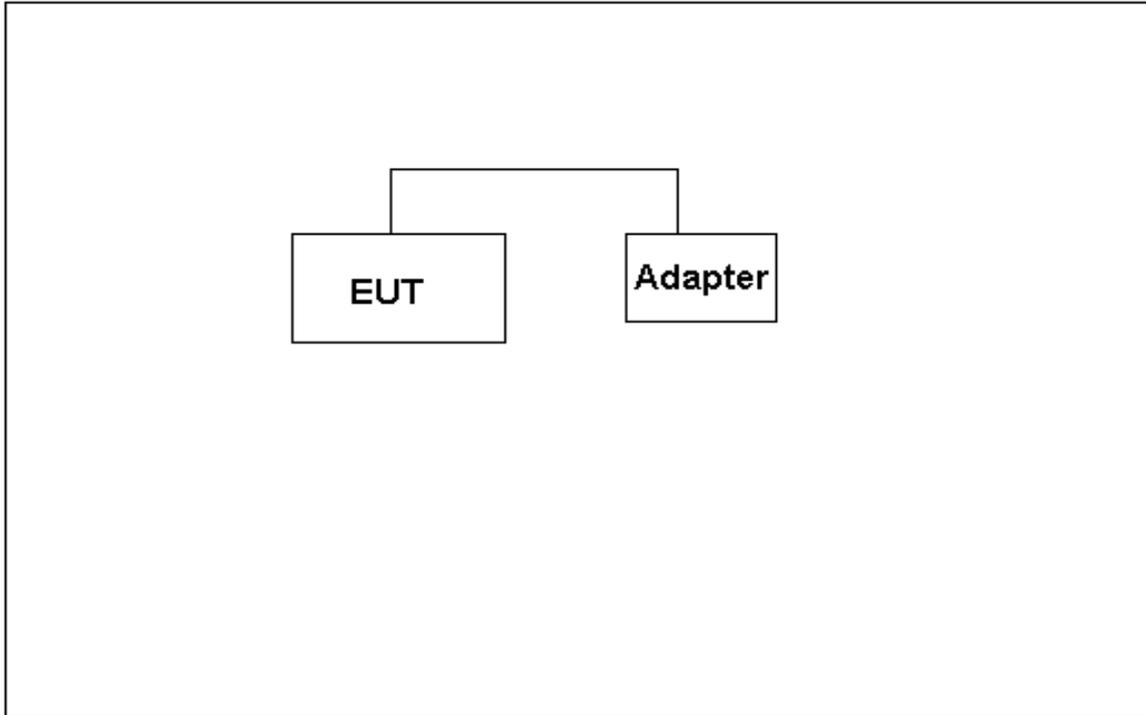
Remark: If there is more than one adapter, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.

3.2 Test System Configuration

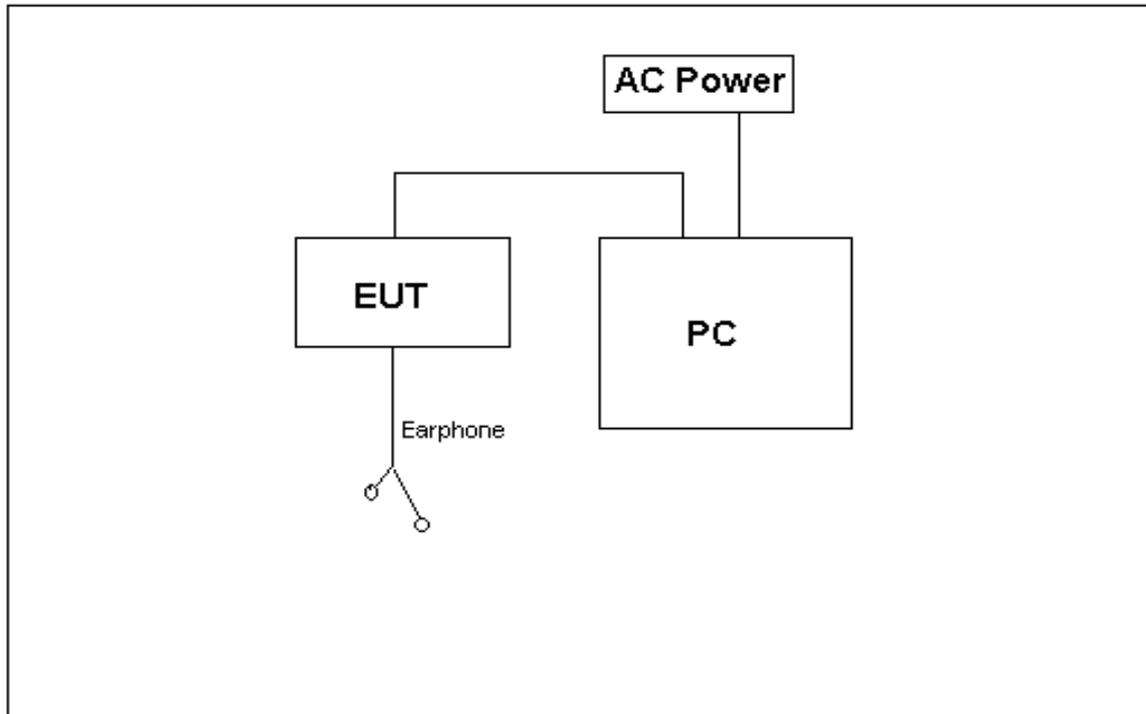
Connection Diagram (Mode 1~Mode 3)



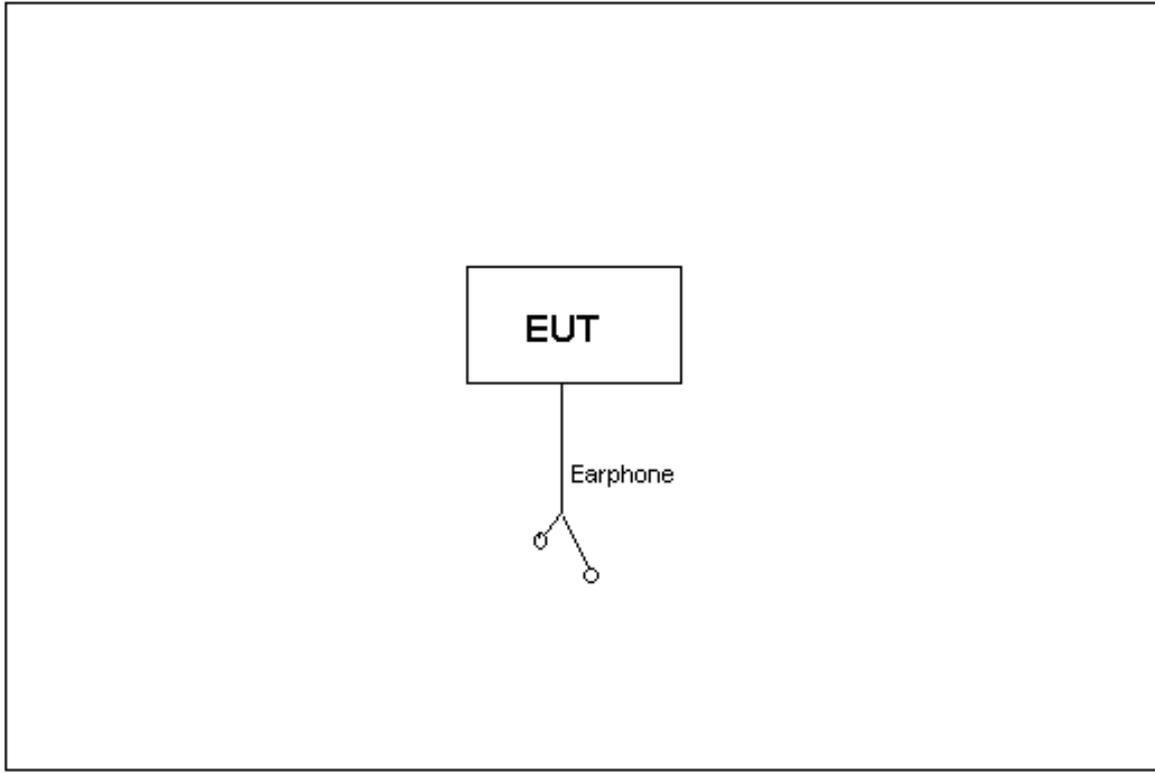
Connection Diagram (Mode 4)



Connection Diagram (Mode 5)



Connection Diagram (Mode 6~Mode 7)





3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
USB	1	<3m	Shielded
Earphone	1	<3m	Unshielded

3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval (month)
Radio Communication Tester	CMU200	R&S	3608105673	2013-12-22	12
Notebook	X200	ThinkPad	31090403588	/	/

4 Electromagnetic Interference (EMI)

4.1 Radiated Disturbance 30MHz to 18GHz

4.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4-2009. The test distance was 3m. The set-up and test methods were according to ANSI C63.4-2009.

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/PK 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 receiving antenna has two polarizations V and H.

Measurement bandwidth (RBW) for 30MHz to 1000 MHz: 120 kHz;

Measurement bandwidth (RBW) for 1000MHz to 18000 MHz: 1MHz;

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

4.1.2 Test setup

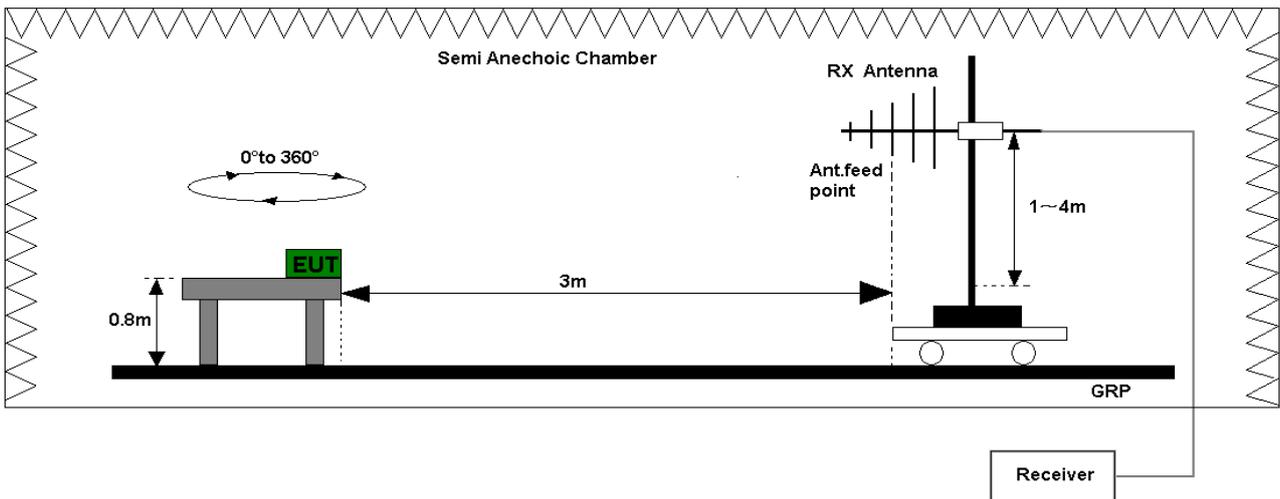


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

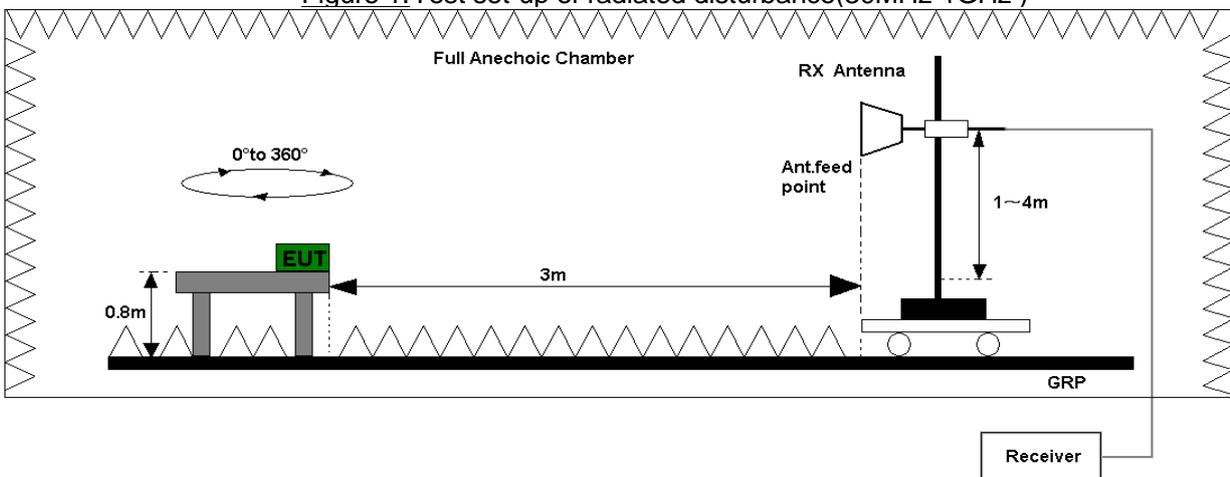


Figure 2. Test set-up of radiated disturbance(above 1GHz)



4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.
The test data see section 7.1 of this report.

Test Limits				
Frequency of Emission (MHz)	Radiated Limit			
	Unit(μ V/m)		Unit(dB μ V/m)	
30-88	100		40	
88-216	150		43.5	
216-960	200		46	
Above 960	500		54	
Above 1000	AV	PK	AV	PK
	500	5000	54	74

4.2 Conducted Disturbance 0.15 MHz to 30MHz

4.2.1 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 away from LISN. The set-up and test methods were according to ANSI C63.4-2009. 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.

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

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

The EUT was set in the shielded chamber and operated under nominal conditions.

4.2.2 Test Setup

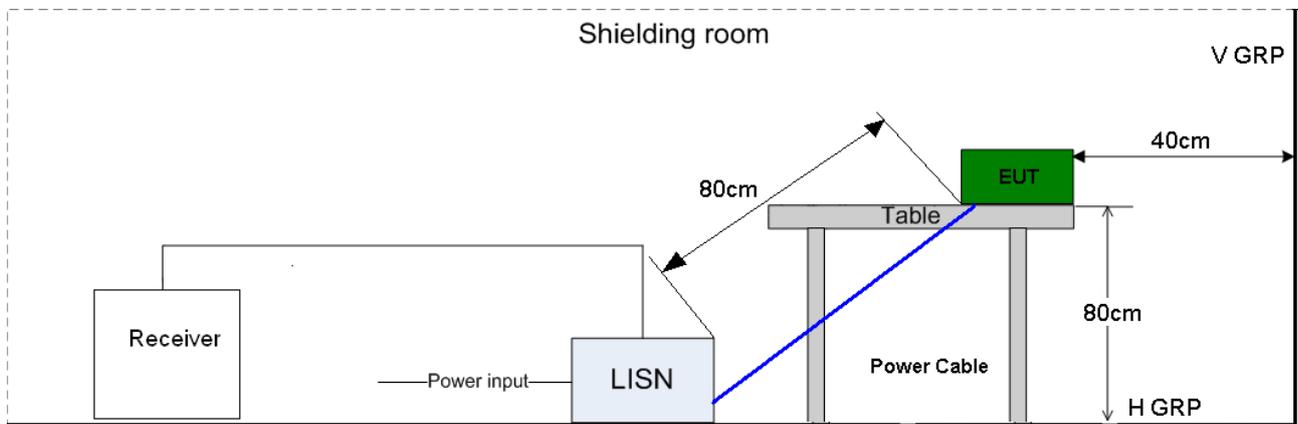


Figure 3. Test Set-up of conducted disturbance

4.2.3 Test Results

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

The test data see section 7.2 of this report.

Test Limit of AC Power Port		
Frequency range	150kHz ~ 30MHz	
Frequency	Voltage limits	
	QP	AV
0.15MHz~0.5MHz	66-56dBμV	56-46 dBμV
0.5MHz-5MHz	56dBμV	46 dBμV
5MHz~30MHz	60dBμV	50 dBμV



5 Main Test Instruments

Main Test Equipments						
Test item	Test Instrument	Model	S/N	Manufacturer	Calibrated Deadline	Cal interval (month)
RE	EMI Test receiver	ESU26	100150	R&S	May.14, 2014	12
	Broadband Antenna	VULB 9163	9163-491	SCHWARZBECK	Feb.21, 2015	24
	Horn Antenna	HF906	100683	R&S	Feb.01, 2015	24
CE	EMI Test receiver	ESCI	101163	R&S	Jan. 28, 2014	12
	Artificial Mains Network	ENV216	100382	R&S	Jan. 28, 2014	12
Software Information						
Test Item	Software Name	Manufacturer		Version		
RE	ES-K1	R&S		1.7.1		
CE	EMC32	R&S		V8.52.0		

6 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(30MHz-1GHz)	Field strength (dB μ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB μ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.6dB; k=2

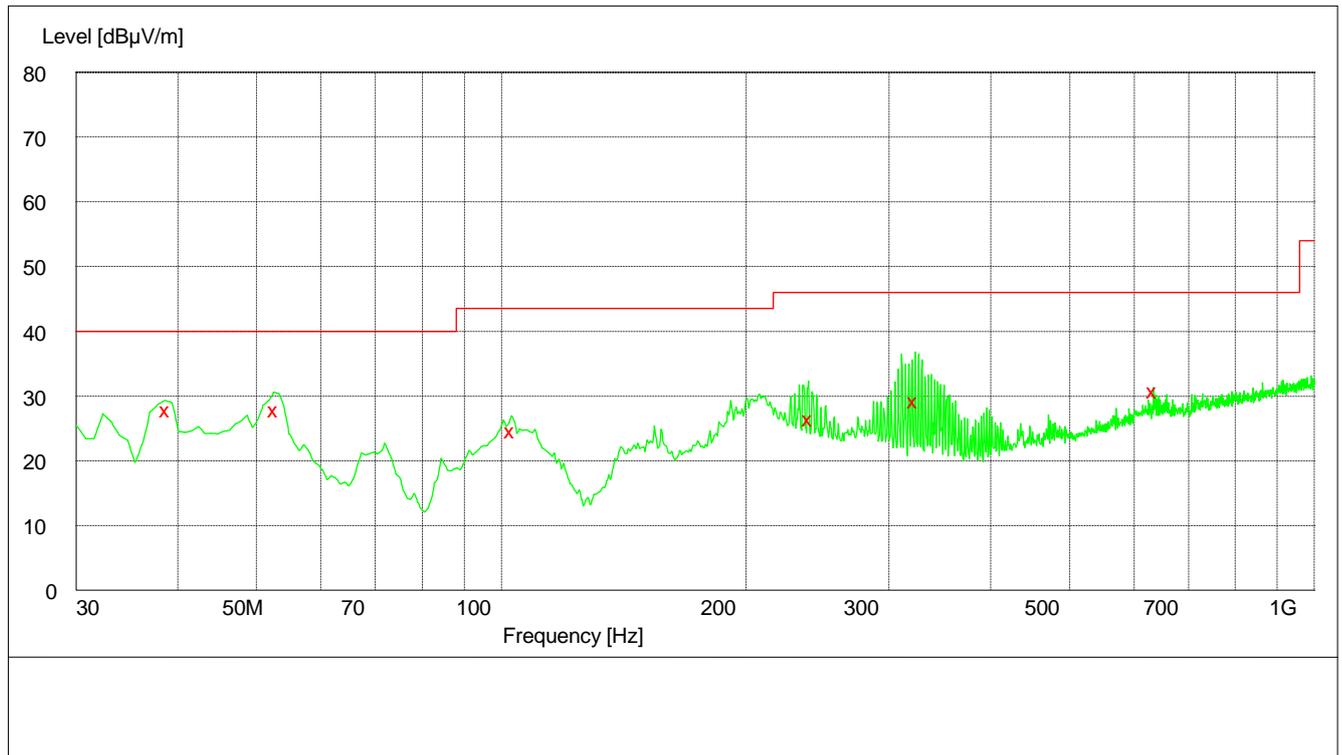


7 Test Data and Graph

Only the worst test result was shown in this report.

7.1 Radiated Disturbance

30MHz~1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
38.820000	28.10	12.8	40.0	11.9	100.0	76.00	VERTICAL
52.740000	28.10	12.8	40.0	11.9	100.0	80.00	VERTICAL
103.080000	24.90	12.9	43.5	18.6	135.0	22.00	VERTICAL
239.580000	26.70	14.1	46.0	19.3	122.0	335.00	HORIZONTAL
322.860000	29.40	16.2	46.0	16.6	117.0	324.00	HORIZONTAL
635.160000	30.90	22.9	46.0	15.1	100.0	207.00	VERTICAL

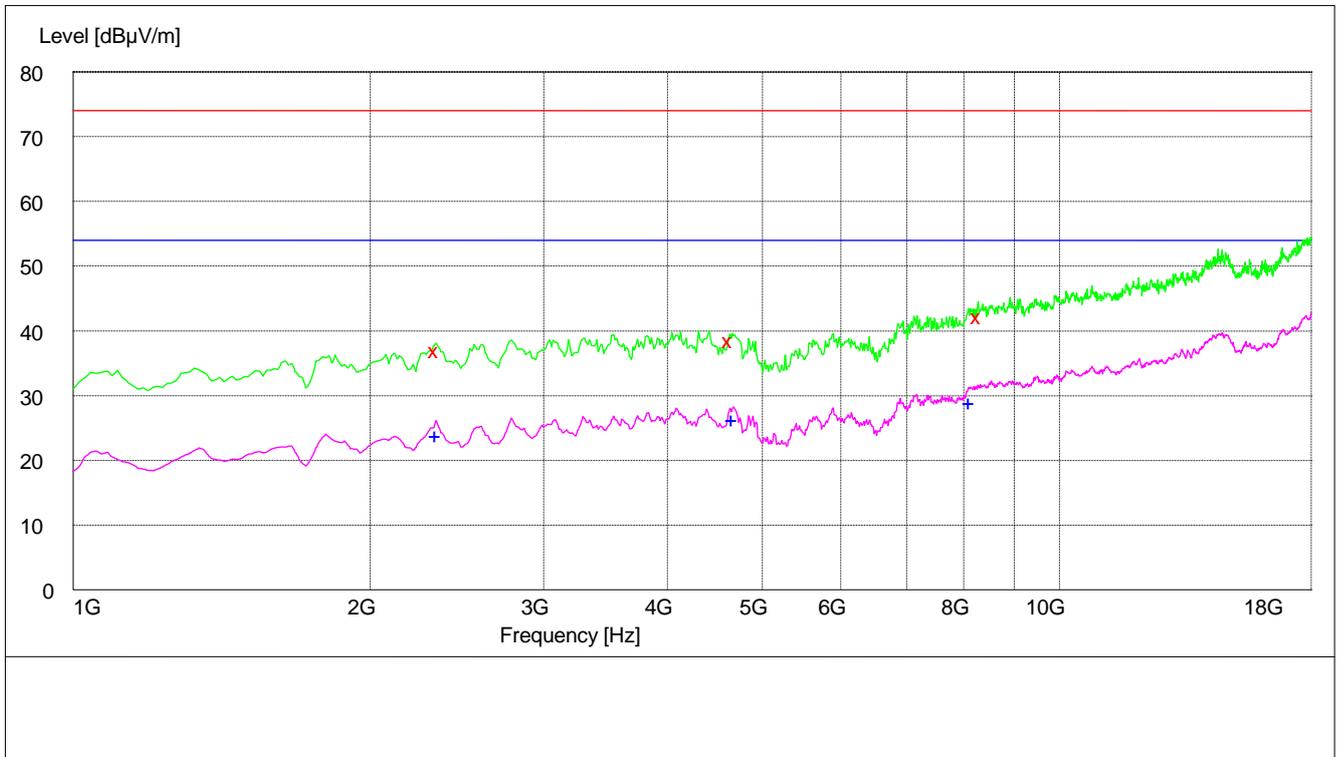
Note:

Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.



1GHz~18GHz



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2333.800000	37.10	-9.5	74.0	36.9	100.0	177.00	VERTICAL
4629.200000	38.60	-2.9	74.0	35.4	100.0	332.00	VERTICAL
8269.000000	42.40	4.0	74.0	31.6	150.0	242.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2335.300000	24.00	-9.5	54.0	30.0	100.0	289.00	VERTICAL
4669.500000	26.50	-2.8	54.0	27.5	118.0	233.00	HORIZONTAL
8115.300000	29.10	3.9	54.0	24.9	108.0	227.00	VERTICAL

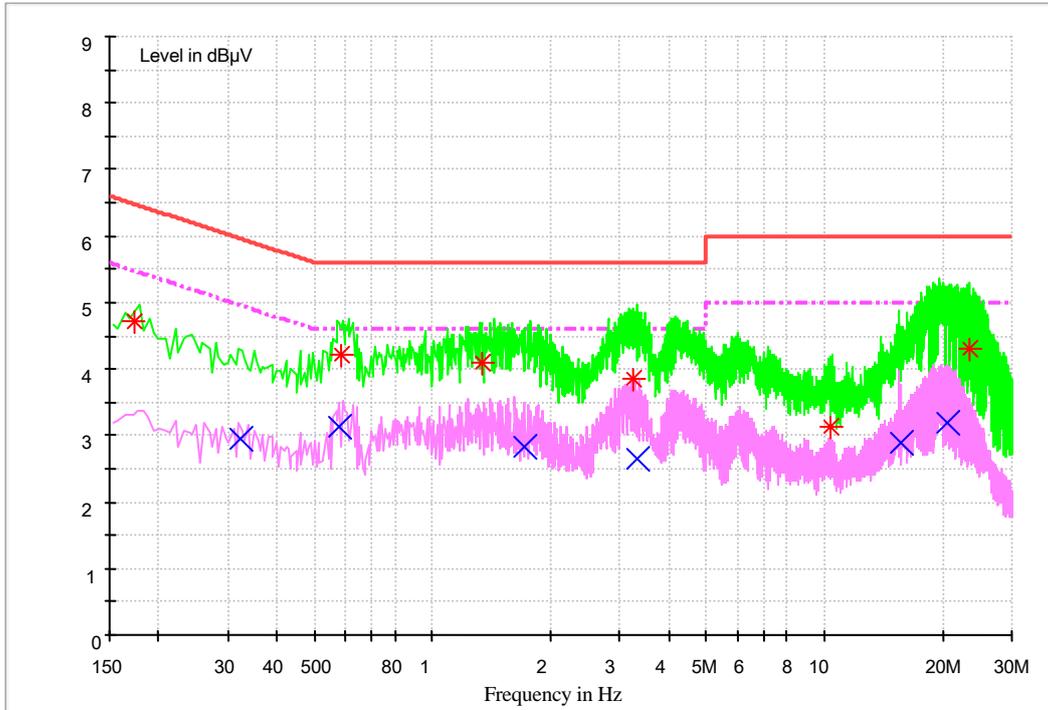
Note:

Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated by software which is not shown in the sheet.



7.2 Conducted Disturbance AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.170629	46.7	L1	9.7	18.2	64.9	FLO
0.585540	42.1	N	9.7	13.9	56.0	FLO
1.339998	40.9	N	9.7	15.1	56.0	FLO
3.263576	38.6	N	9.7	17.4	56.0	FLO
10.338094	31.4	N	9.9	28.6	60.0	FLO
23.388705	43.1	N	10.2	16.9	60.0	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.322486	29.6	N	9.7	20.0	49.6	FLO
0.575580	31.2	N	9.7	14.8	46.0	FLO
1.705680	28.3	N	9.7	17.7	46.0	FLO
3.310260	26.5	N	9.7	19.5	46.0	FLO
15.600570	28.8	N	10.1	21.2	50.0	FLO
20.462711	32.0	N	10.1	18.0	50.0	FLO

Note:

Level= Reading level+ Transd (cable loss + correction factor)

The reading level is calculated by software which is not shown in the sheet.



END
