EMC Test Report

Product Name:

HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G510

Model Number: HUAWEI G510, G510-0200

Report No: SYBH(Z-EMC)073112012-2

FCC ID: FCC ID:QISG510-0200

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice

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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.**
4. **The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.**
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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:	Nov.20, 2012
Start Date of Test:	Nov.20, 2012
End Date of Test:	Nov.27, 2012
Test Result:	Pass

Approved By (Lab Manager)	**2012-11-28**	**Liuchunlin**	Liu Chunlin
	Date	**Name**	**Signature**
Operator	**2012-11-28**	**Zheng Ke**	zheng ke
	Date	**Name**	**Signature**

Modification Record

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

TABLE OF CONTENT

1 General Information

1.1 EUT Description

EUT Description	
Product Name	HSPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; HUAWEI Ascend G510
Model Number	HUAWEI G510, G510-0200
Serials Number	T6N01A92A2300137
TX Frequency	GSM 850:824MHz To 849MHz GSM1900:1850MHz To 1910MHz; Bluetooth: 2402MHz To 2480MHz WIFI: 2412MHz To 2462MHz
RX Frequency	GSM850:869MHz To 894MHz; GSM1900:1930MHz To 1990MHz Bluetooth: 2402MHz To 2480MHz WIFI: 2412MHz To 2462MHz GPS: 1575.42MHz;
HW Version	HD2U8951M
SW Version	G510-0200V100R001C00B156SP01
EUT Accessory	
Data cable	Data Cable USB A Male to Micro Usb, shielded
Adapter	Brand: HUAWEI Model: HW-050100E1W Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V ⎓ 1A Rated Power: 5W S/N: TPACA1667096; S/N: HKAC90246945
Adapter	Brand: HUAWEI Model: HW-050100U1W Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V ⎓ 1A Rated Power: 5W S/N: TPACA1539915; S/N: HKAC12756687
Adapter	Brand: HUAWEI Model: HW-050100A1W Input voltage: ~100-240V 50/60Hz 0.2A Output voltage: 5V ⎓ 1A Rated Power: 5W S/N: HKAC71212045
Rechargeable Li-ion	Brand: HUAWEI Battery Model: HB4W1H Rated capacity: 1750mAh Nominal Voltage: ⎓ +3.7V Charging Voltage: ⎓ +4.2V S/N: MPCC9029191Y1222; S/N: MAIC903XXXX00095

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user 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 15:2011, Subpart B

1.4 Differences Description

The differences between G510-0100 and G510-0200 are as follow list.

a) The mobile phone G510-0100 is a HSDPA/HSUPA/UMTS/GPRS/GSM/EDGE mobile phone with Bluetooth and NFC, which supports GMS850/900/1800/1900 and WCDMA900/2100

b) The mobile phone G510-0200 is a HSDPA/HSUPA/UMTS/GPRS/GSM/EDGE mobile phone with Bluetooth, which supports GMS850/900/1800/1900 and WCDMA900/2100

c) The difference between G510-0100 and G510-0200 is showed in the following table.

	G510-0100	G510-0200
GSM four bands	the same	the same
WCDMA bands	the same	the same
FLASH	the same	the same
Mainboard	With NFC RF circuit	No NFC RF circuit
Appearance	the same	the same
NFC	Have	Without
Bluetooth mode	the same	the same
WLAN mode	the same	the same
BT/ WLAN antenna	the same	the same
GSM/ WCDMA antenna	the same	the same
External camera	the same	the same
internal camera	the same	the same
Adapter	the same	the same
Battery	the same	the same
Chipset	the same	the same
Memory	the same	the same
Form factor	Bar type, Internal antenna	Bar type, Internal antenna
RF Parameter	The same RF Parameter in the same band	The same RF Parameter in the same band
BT RF Parameter	the same	the same
Dimension	the same	the same
Weight	the same	the same
Bluetooth	the same	the same
External camera	the same	the same
Main Frequency NV	The same NV in the same band	The same NV in the same band
BT conducted power	the same	the same
WIFI conducted power	the same	the same

1.5 Necessery Tests

The changes of the appliance do not affect the EMC characteristic, therefore, the EUT is deemed to fulfill the EMC requirements without further tests. For more information about the tests performed on the G510-0100, please refer to the test report of the model G510-0100.

2 Summary of Results

Summary of Results				
Test Items	**Test Mode**	**Performance Class & Required Performance Criteria**	**Result**	**Site**
Radiated Emissions Enclosure Port	Mode1~ Mode2 Mode4 Mode6 Mode8~ Mode10	CLASS B	Pass	Site1
Conducted Emissions ☐DC Power Port ☒AC Power Port ☐ Telecommunication Ports	Mode1~ Mode5	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

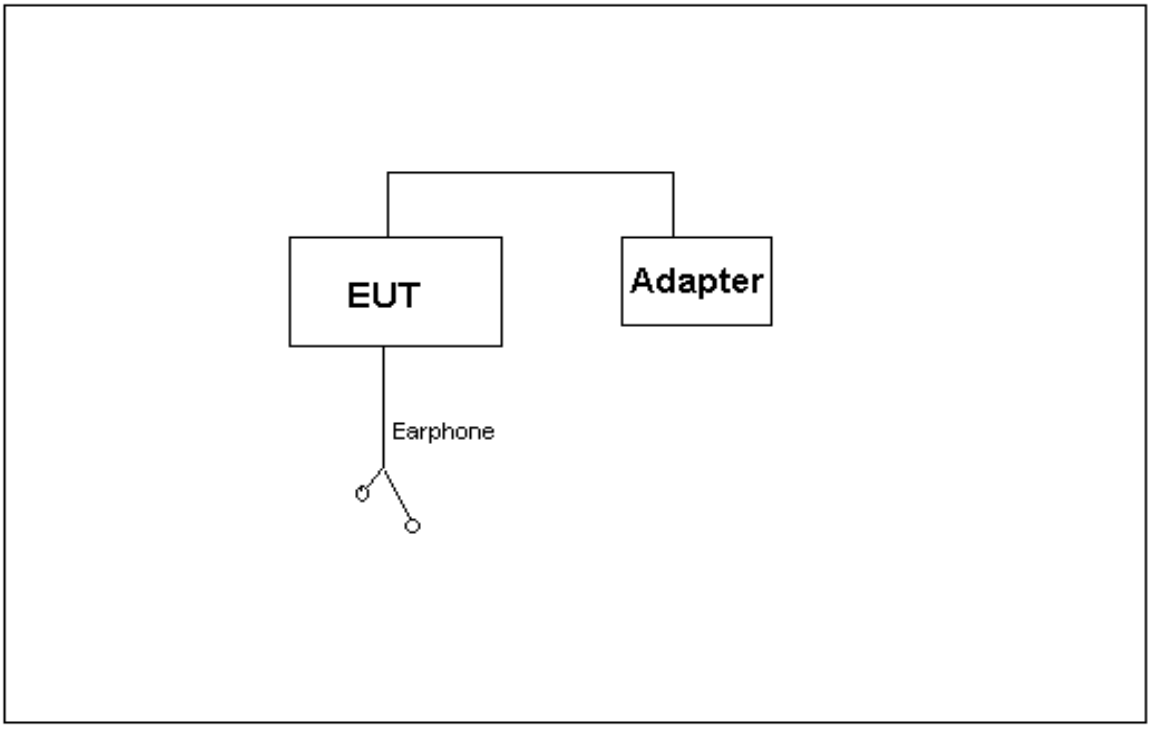
Huawei has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was in this test report and defined as below:

Test Mode	
Mode 1:	Adapter + earphone + Camera On + Idle
Mode 2:	Adapter + earphone + MP3 + Idle
Mode 3:	Adapter + earphone +Traffic
Mode 4:	Adapter + earphone + FM + Idle
Mode 5:	Adapter +Traffic
Mode 6:	USB Copy(EUT with PC) + earphone + Idle
Mode 7:	Traffic
Mode 8:	Camera On + earphone + Idle
Mode 9:	MP3 +Earphone + Idle
Mode 10:	FM + Earphone + Idle

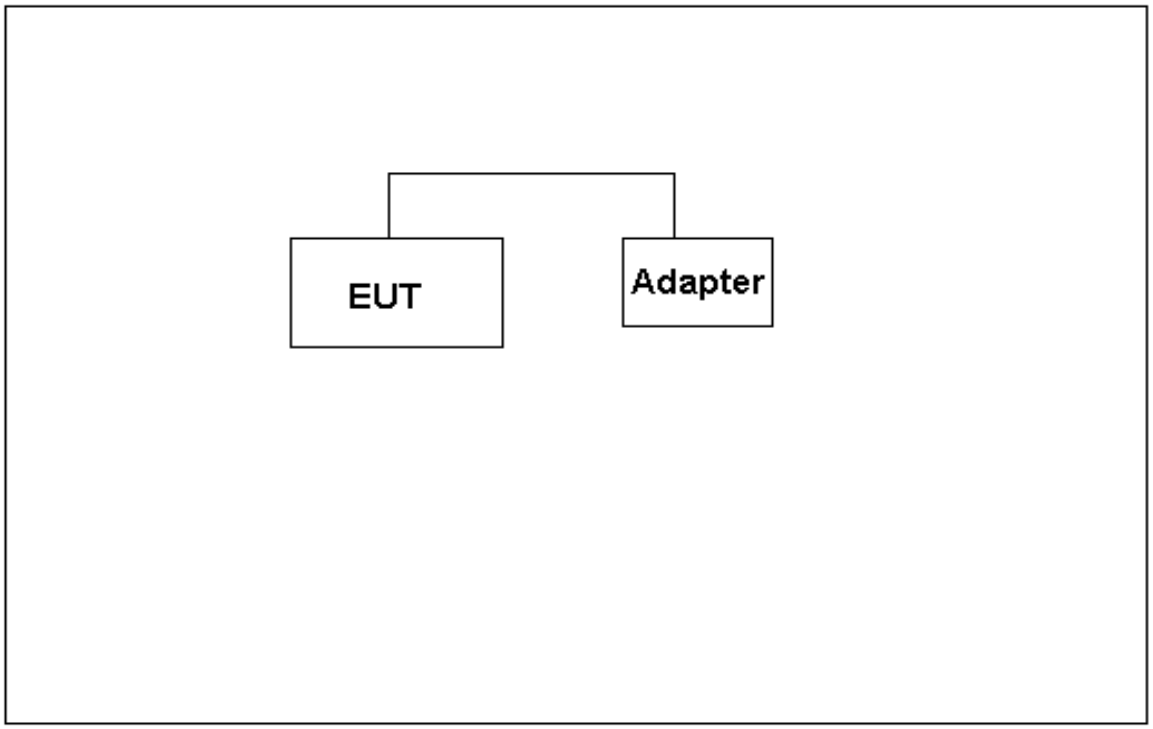
Remark: If there is more than one adapter, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.

3.2 Test System Configuration

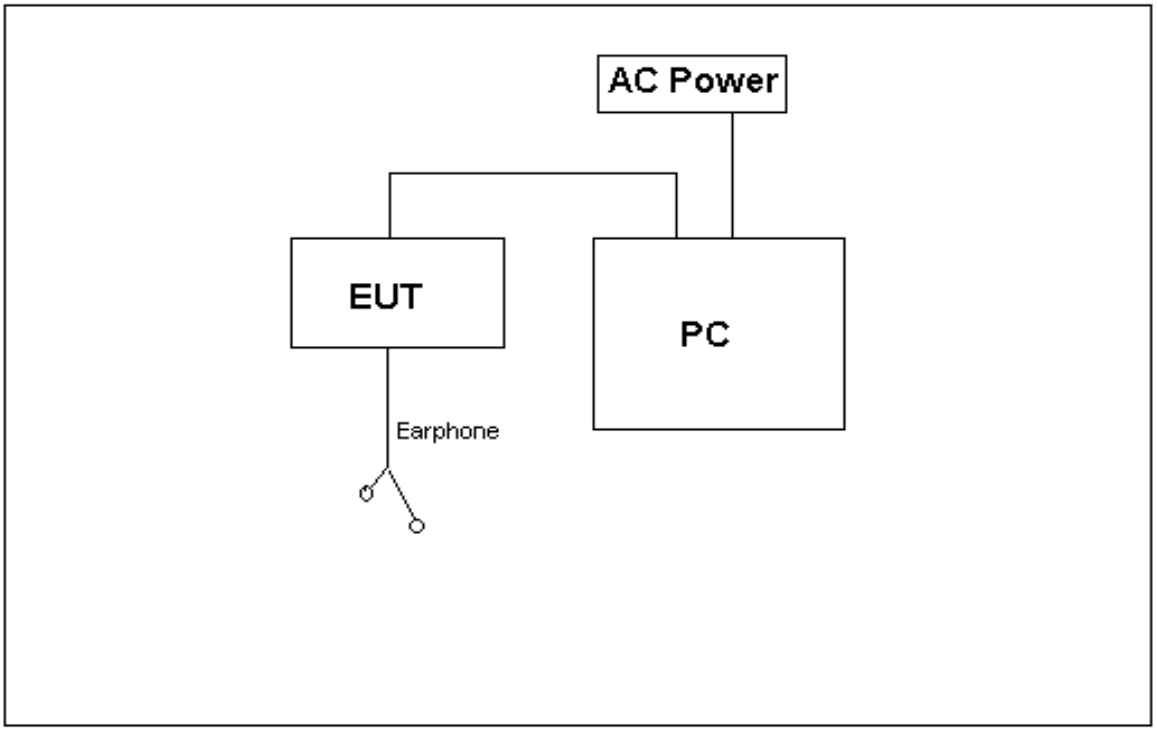
Connection Diagram (Mode 1~Mode 4)



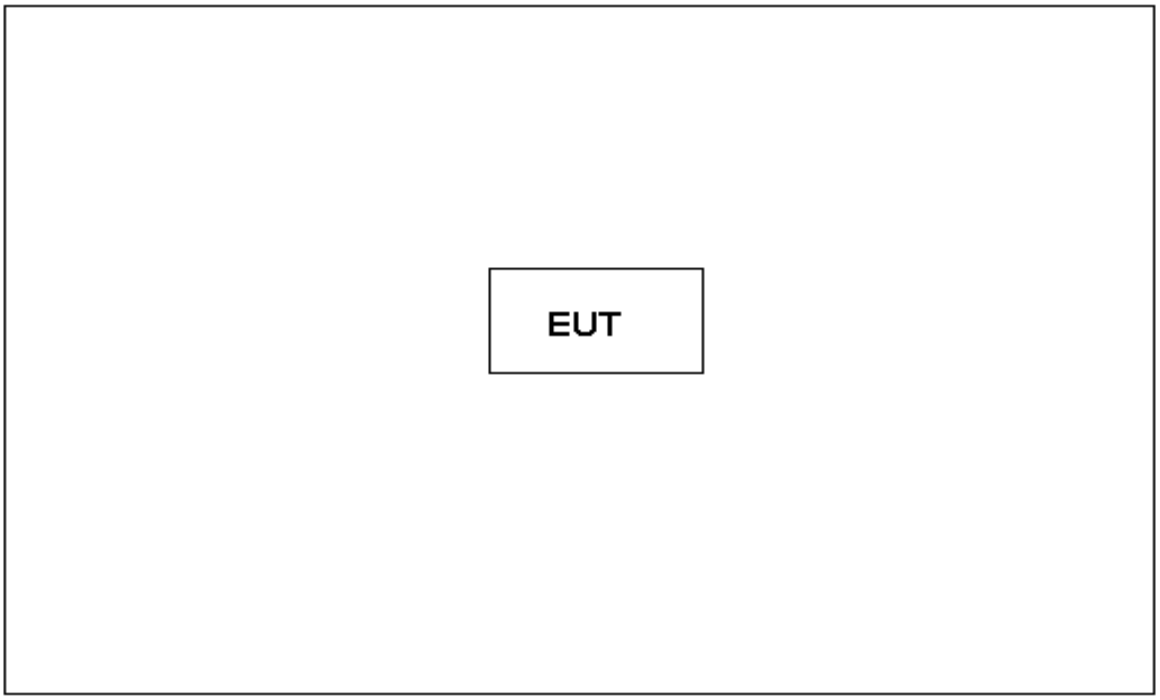
Connection Diagram (Mode 5)



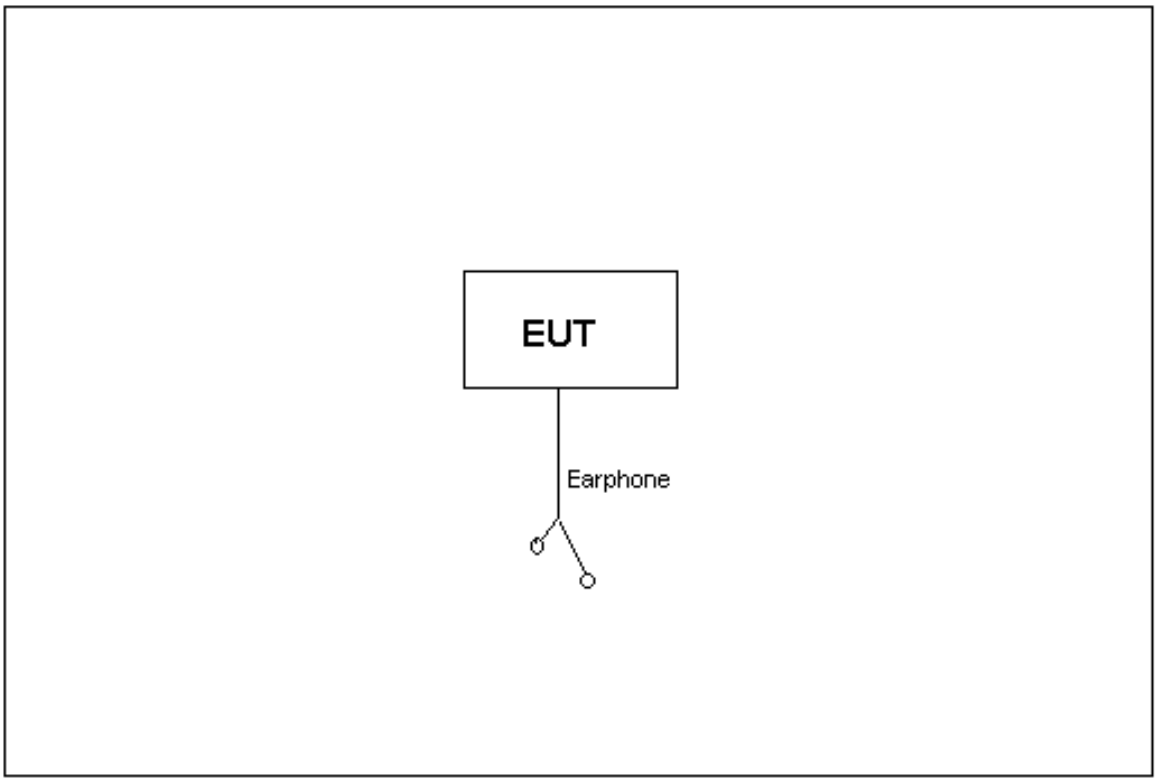
Connection Diagram (Mode 6)



Connection Diagram (Mode 7)



Connection Diagram (Mode 8~Mode 10)



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	3607111924	2013-06-07	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 to18 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

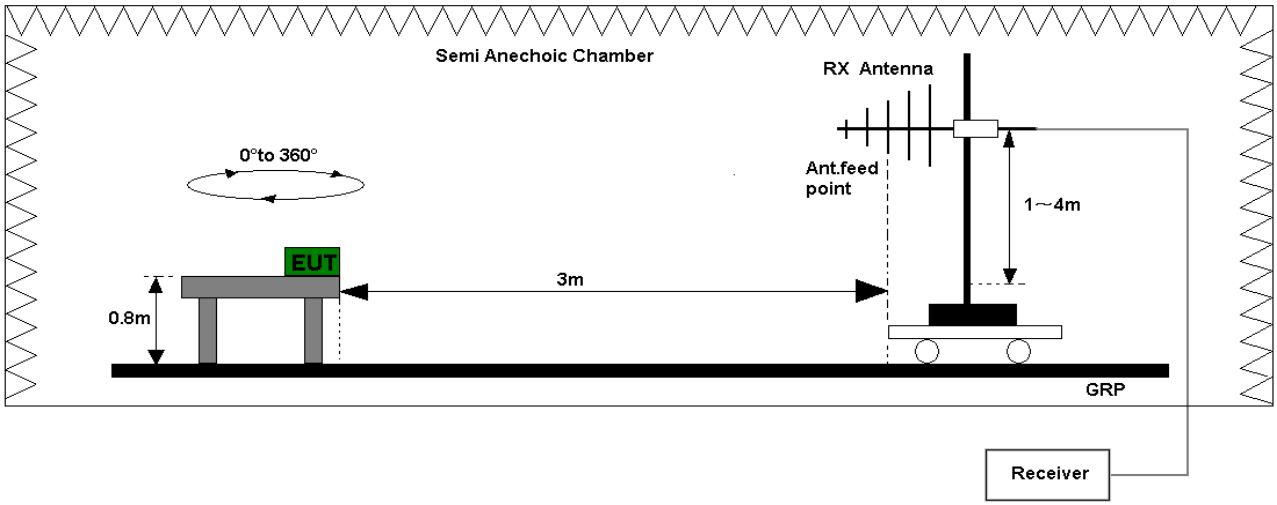


Figure 1.Test set-up of radiated disturbance(30MHz-1GHz)

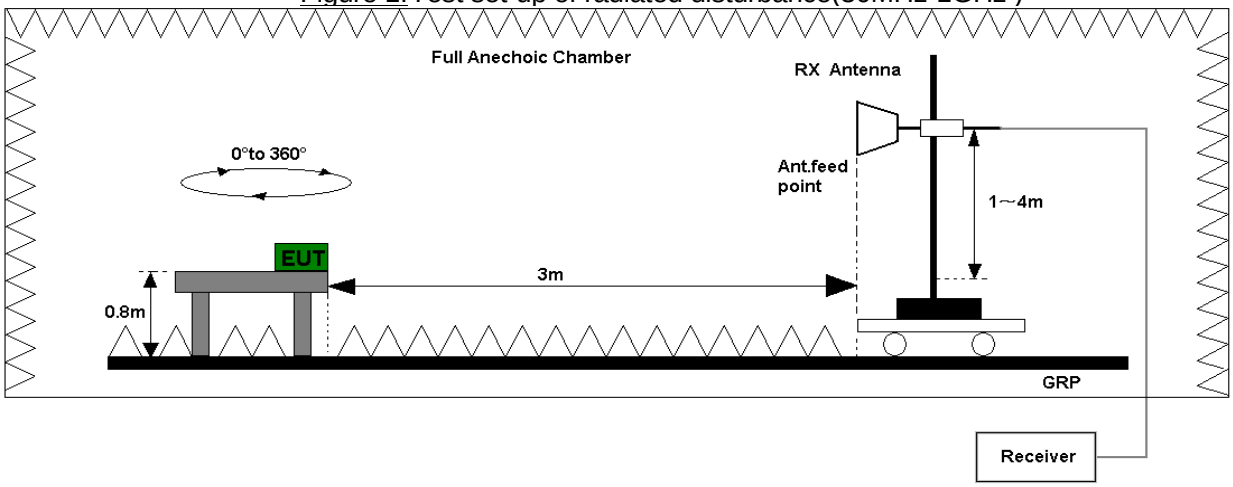


Figure 2.Test set-up of radiated disturbance(above 1GHz)

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(μV/m)		Unit(dBμV/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

4.1.4 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.

4.1.5 Test Setup

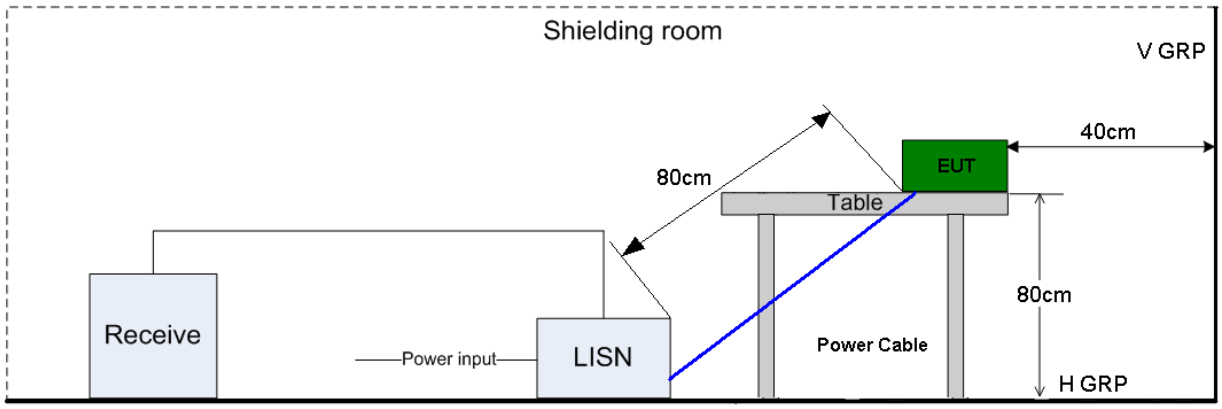


Figure 3. Test Set-up of conducted disturbance

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.27, 2013	12
	Broadband Antenna	VULB 9163	9163-941	SCHWARZBECK	Jul.07, 2013	24
	Horn Antenna	HF906	100683	R&S	May.15, 2013	24
CE	EMI Test receiver	ESCI	101163	R&S	Mar. 05, 2013	12
	Artificial Mains Network	ENV216	100382	R&S	Mar.21, 2013	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:

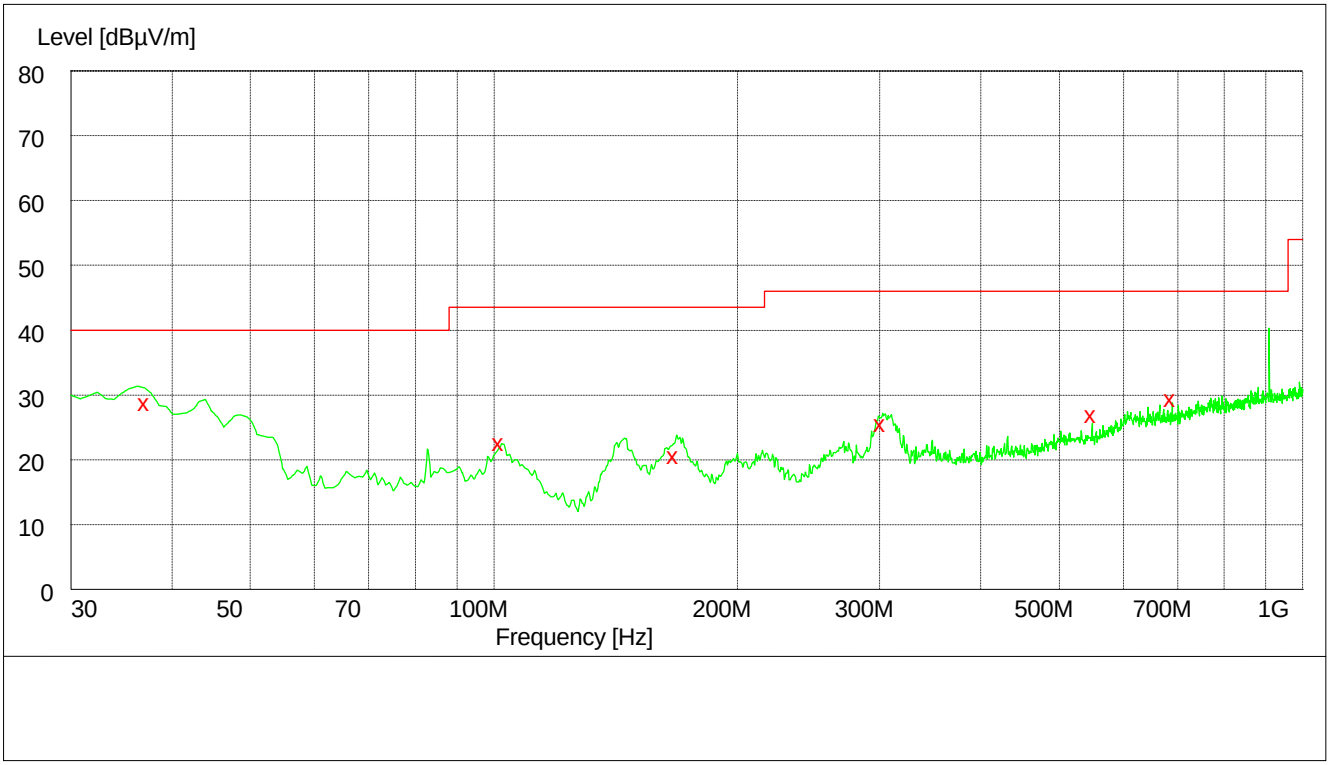
System Measurement Uncertainty		
Items		**Extended Uncertainty**
RE(30MHz-1GHz)	Field strength (dBμV/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dBμV/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dBμV)	U=2.6dB; k=2

7 Test Data and Graph

Only the worst test result was shown in this report.

7.1 Radiated Disturbance

30MHz~1GHz

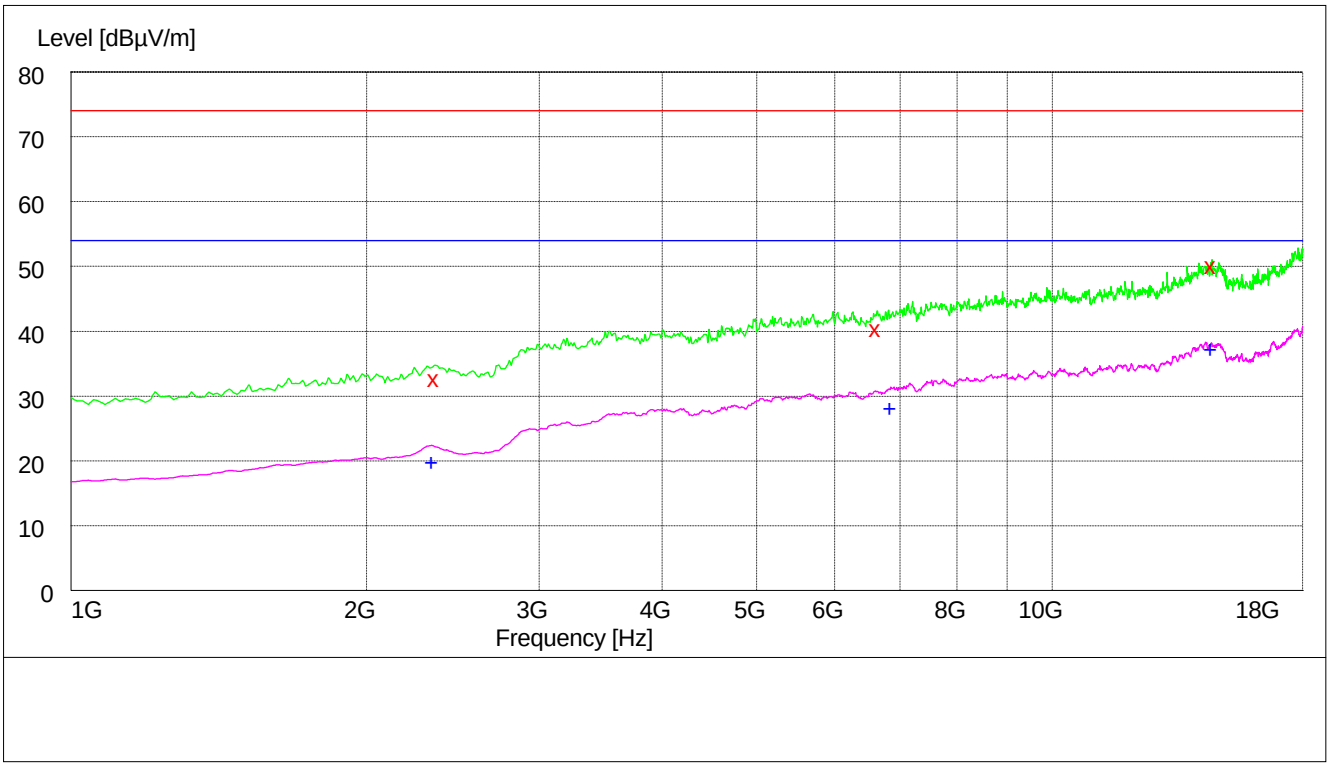


MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
37.080000	29.40	15.2	40.0	10.6	100.0	252.00	VERTICAL
101.820000	23.10	13.5	43.5	20.4	140.0	129.00	VERTICAL
167.340000	21.10	10.5	43.5	22.4	100.0	319.00	VERTICAL
301.680000	26.10	15.2	46.0	19.9	100.0	220.00	HORIZONTAL
549.480000	27.50	20.0	46.0	18.5	133.0	270.00	HORIZONTAL
689.400000	29.90	22.2	46.0	16.1	100.0	70.00	VERTICAL

Note:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate 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
2350.400000	33.10	-9.5	74.0	40.9	102.0	197.00	HORIZONTAL
6626.900000	41.00	1.1	74.0	33.0	109.0	155.00	VERTICAL
14543.600000	50.70	16.5	74.0	23.3	100.0	236.00	VERTICAL

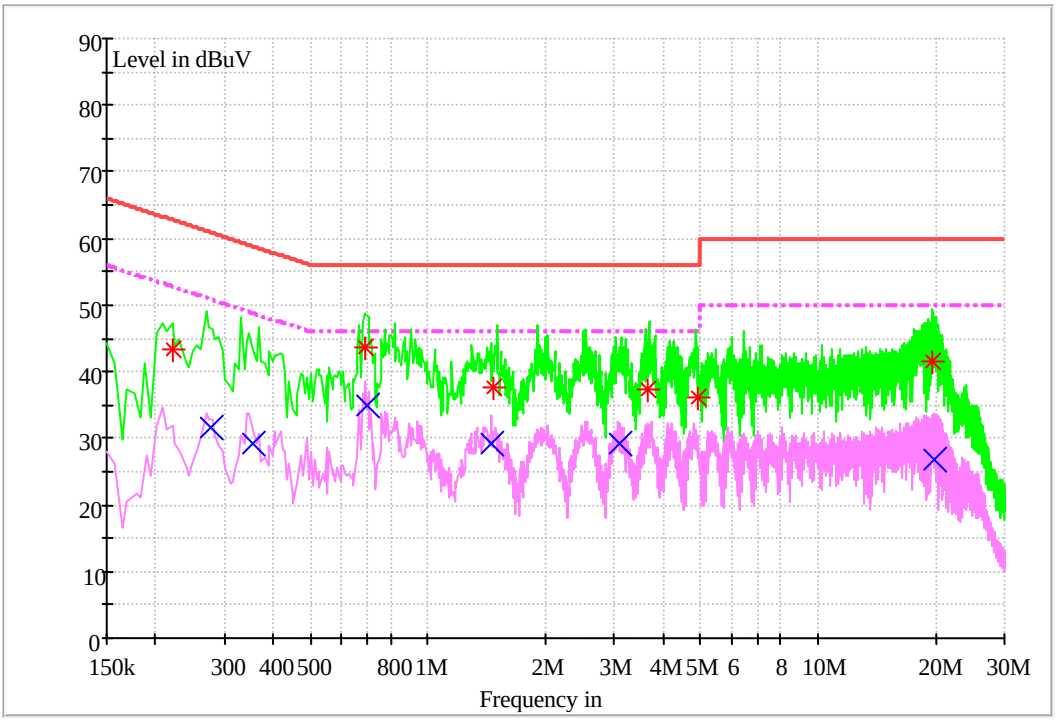
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2334.800000	20.20	-9.5	54.0	33.8	150.0	185.00	VERTICAL
6848.500000	28.50	1.4	54.0	25.5	100.0	87.00	HORIZONTAL
14524.500000	37.60	16.6	54.0	16.4	150.0	102.00	HORIZONTAL

Note:
Level =Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate 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	Transd dB	Limit dBµV	Margin dB	Line	PE
0.222262	43.3	9.7	62.7	19.4	L1	FLO
0.691530	43.7	9.7	56.0	12.3	L1	FLO
1.463130	37.5	9.7	56.0	18.5	L1	FLO
3.671460	37.3	9.8	56.0	18.7	L1	FLO
4.919318	36.1	9.8	56.0	19.9	L1	FLO
19.614120	41.4	10.1	60.0	18.6	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.278910	31.5	9.7	50.8	19.3	L1	FLO
0.354442	29.2	9.7	48.9	19.7	N	FLO
0.698006	35.1	9.7	46.0	10.9	N	FLO
1.450388	29.1	9.7	46.0	16.9	N	FLO
3.099582	29.1	9.7	46.0	16.9	N	FLO
19.929570	26.8	10.1	50.0	23.2	L1	FLO

Note:

Level= Reading level+ Transd (cable loss + correction factor)
The reading level is used to calculate by software which is not shown in the sheet.

----------END----------