



EMC Test Report

Product Name: LTE Wireless Gateway

Model Number: B890-66

Report No: SYBH(Z-EMC)109082012-2

FCC ID: QISB890

Reliability Laboratory of Huawei Technologies Co., Ltd.

Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District,
Shenzhen, 518129, P.R.C

Tel: +86 755 28780808 Fax: +86 755 89652518

Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
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.
5. The test report is invalid if not marked with "exclusive stamp for the test report".
6. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
7. The test report is invalid if there is any evidence of erasure and/or falsification.
8. If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.
9. Normally, the test report is only responsible for the samples that have undergone the test.
10. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.



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: Aug.21, 2012
Start Date of Test: Aug.23, 2012
End Date of Test: Aug.31, 2012

Test Result: Pass

**Approved By
(Lab Manager)**

2012-09-03
Date

Liuchunlin
Name

Liuchunlin

Signature

Operator

2012-09-03
Date

Caozhimin
Name

Caozhimin

Signature



Modification Record

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



TABLE OF CONTENT

1	General Information	6
1.1	EUT Description	6
1.2	Test Site Information	7
1.3	Applied Standards	7
2	Summary of Results.....	8
3	System Configuration during EMC Test.....	9
3.1	Test Mode	9
3.2	Test System Configuration.....	9
3.3	Cables Used during Test.....	10
3.4	Associated Equipment Used during Test.....	10
4	Electromagnetic Interference (EMI).....	11
4.1	Radiated Disturbance 30MHz to 18GHz	11
4.2	Conducted Disturbance 0.15 MHz to 30MHz.....	13
5	Main Test Instruments.....	14
6	System Measurement Uncertainty	14
7	Test Data and Graph.....	15
7.1	Radiated Disturbance.....	15
7.2	Conducted Disturbance.....	17



1 General Information

1.1 EUT Description

EUT Description	
Product Name	LTE Wireless Gateway
Model Number	B890-66
Serials Number	N/A
Working Voltage	12Vdc
TX Frequency	WCDMA Band II: 1850MHz To 1910MHz WCDMA Band IV:1712MHz To1753MHz WCDMA Band V: 824MHz To 849MHz LTE BAND 2:1850MHz To 1910MHz LTE BAND 4:1710MHz To 1755MHz LTE BAND 5:824MHz To 849MHz LTE BAND 7:2500MHz To 2570MHz LTE BAND12:689MHz To 716MHz LTE BAND 13:777MHz To787MHz LTE BAND 17:704MHz To 716MHz WIFI: 2400MHz To 2483.5MHz
RX Frequency	WCDMA Band II: 1930MHz To 1990MHz WCDMA Band IV: 2122MHz To 2183MHz WCDMA Band V: 869MHz To 894MHz LTE BAND 2:1930MHz To 1990MHz LTE BAND 4:2110MHz To 2155MHz LTE BAND 5:869MHz To 894MHz LTE BAND 7:2620MHz To 2690MHz LTE BAND12:728MHz To 746MHz LTE BAND 13:746MHz To 756MHz LTE BAND 17:734MHz To 746MHz WIFI: 2400MHz To 2483.5MHz
HW Version	WL1B890I
SW Version	1281.11.994.04.103T1 1
EUT Accessory	
Adapter	BRAND: HUAWEI Model:HW-120200U6W Input voltage: 100V-240V~50/60Hz, 0.8A Output voltage: +12V $\overline{\text{---}}$ 2A SN:HWHKABC72600031

Remark: The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.



1.2 Test Site Information

Test 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

2 Summary of Results

Summary of Results				
Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
<u>Radiated Emissions</u> Enclosure Port	Mode1 Mode2	CLASS B	Pass	Site1
<u>Conducted Emissions</u> <input checked="" type="checkbox"/> DC Power Port <input checked="" type="checkbox"/> AC Power Port <input type="checkbox"/> Telecommunication Ports	Mode1 Mode2	CLASS B	Pass	Site1
Note: 1, Measurement taken is within the uncertainty of test system. 2, <input checked="" type="checkbox"/> The item has been tested; <input type="checkbox"/> 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

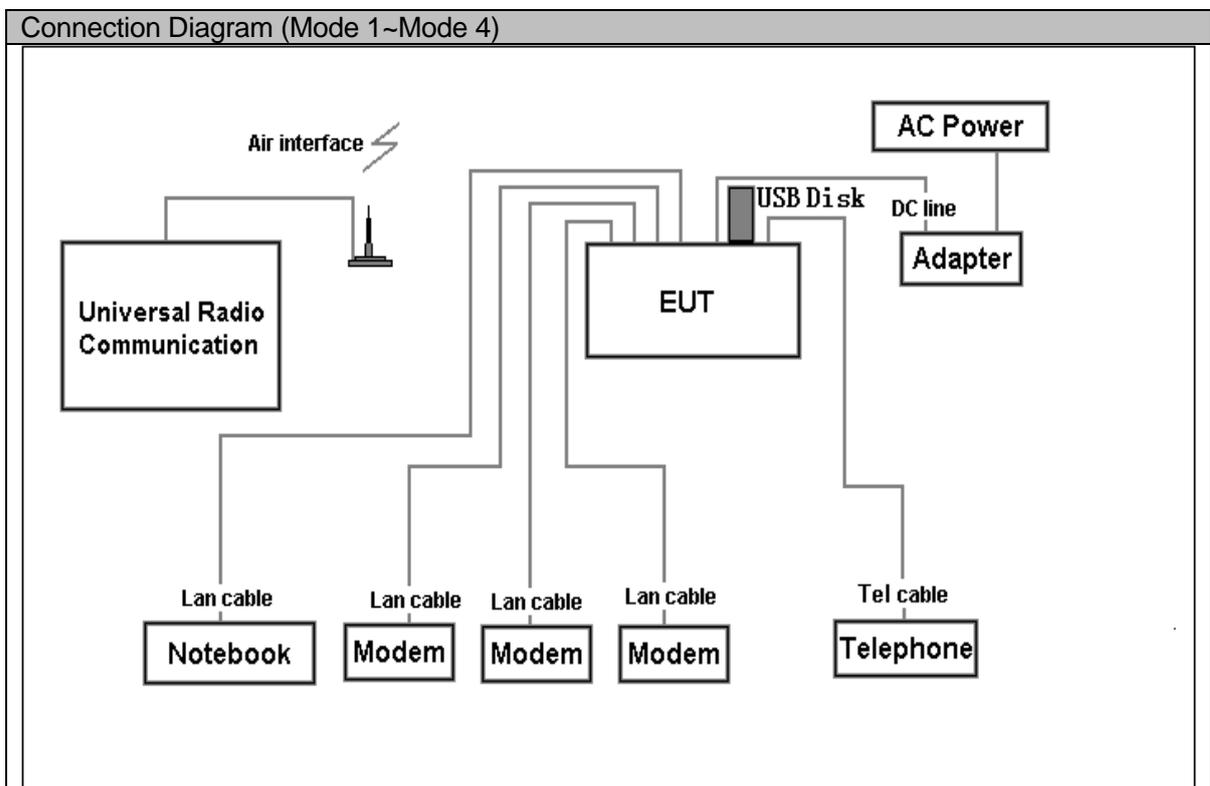
3.1 Test Mode

The EUT was configured, installed, arranged and operated in a manner consistent with typical application. The following mode(s) were applied during the compliance test.

Test Mode	
Mode 1:	Adapter + USB Disk + Traffic + LAN + Telephone
Mode 2:	Adapter + USB Disk + Idle + LAN + Telephone

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



3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
DC Power Cable	1	<3m	unshielded
LAN Cable	4	<3m	unshielded
Telephone Cable	1	<3m	unshielded
Antenna Cable	1	<3m	shielded

3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval (month)
Radio Communication Tester	CMU200	R&S	1117057	2012-09-03	12
Notebook	PCG-7H4P	SONY	282404909002221	/	/
USB Disk	Data Traveler	Kingston	N/A	/	/
Modem	MT800b	HUAWEI	21500802378068000074	/	/
Modem	MT800b	HUAWEI	21500802378068000075	/	/
Modem	MT800b	HUAWEI	2199040XWC7S86146674	/	/
Telephone	HCD8166 TSD	HUAWEI	21990482848X65001901	/	/

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

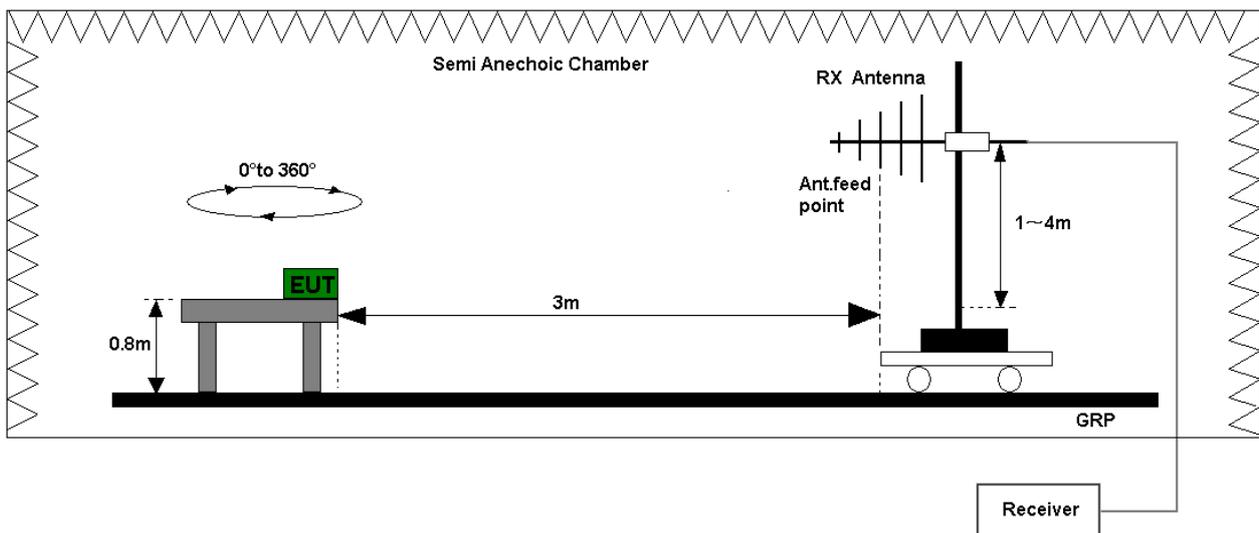


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

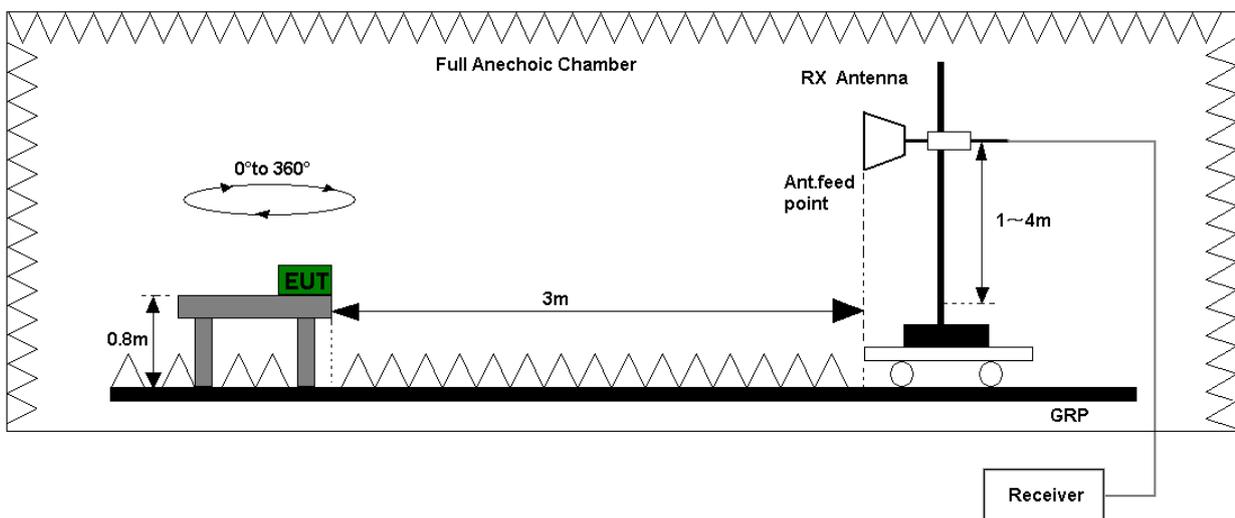


Figure 2. Test set-up of radiated disturbance(above 1GHz)

4.1.3 Test Results

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

Test Limits (Class A)				
Frequency of Emission (MHz)	Radiated Limit			
	Unit(μ V/m)		Unit(dB μ V/m)	
30-88	300		59	
88-216	500		54	
216-960	700		56.4	
Above 960	1000		60	
Above 1000	AV	PK	AV	PK
	1000	10000	60	80

Test Limits (Class B)				
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 setup in the shielded chamber and operated under nominal conditions.

4.2.2 Test Setup

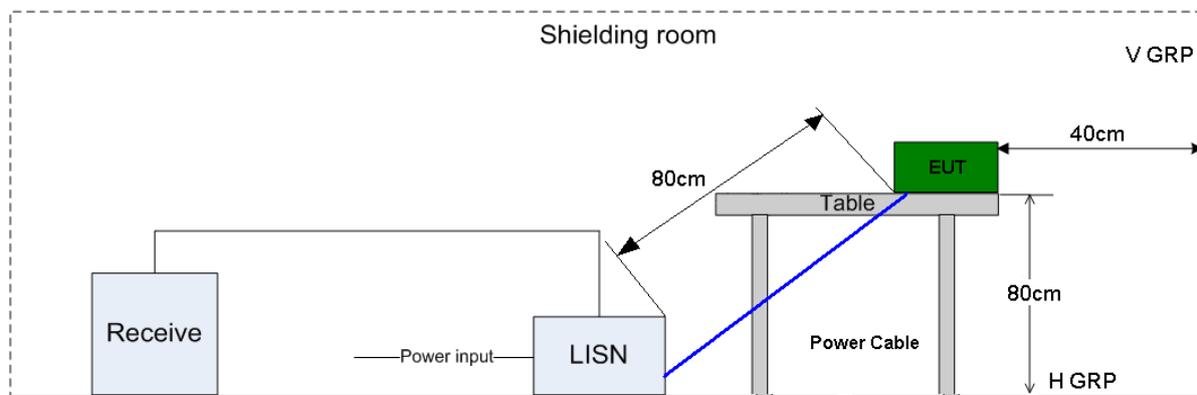


Figure 3. Test Set-up of conducted disturbance

4.2.3 Test Results

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

Refer to the section 7.2 of this report for test data.

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

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	100387	R&S	Nov.23, 2012	12
	Broadband Antenna	VULB 9163	9163-520	SCHWARZBECK	Dec.08, 2013	24
	Double Ridged Horn Antenna	HF907	100365	R&S	Nov.09, 2013	24
CE	EMI Test receiver	ESCI	101163	R&S	Mar.05, 2013	12
	Line Impedance Stabilization Network	ENV216	100382	R&S	Mar.21, 2013	12
	Line Impedance Stabilization Network	ENV4200	100134	R&S	Mar.05, 2013	12
Software Information						
Test Item	Software Name		Manufacturer		Version	
RE	EMC32		R&S		V8.50.10	
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:

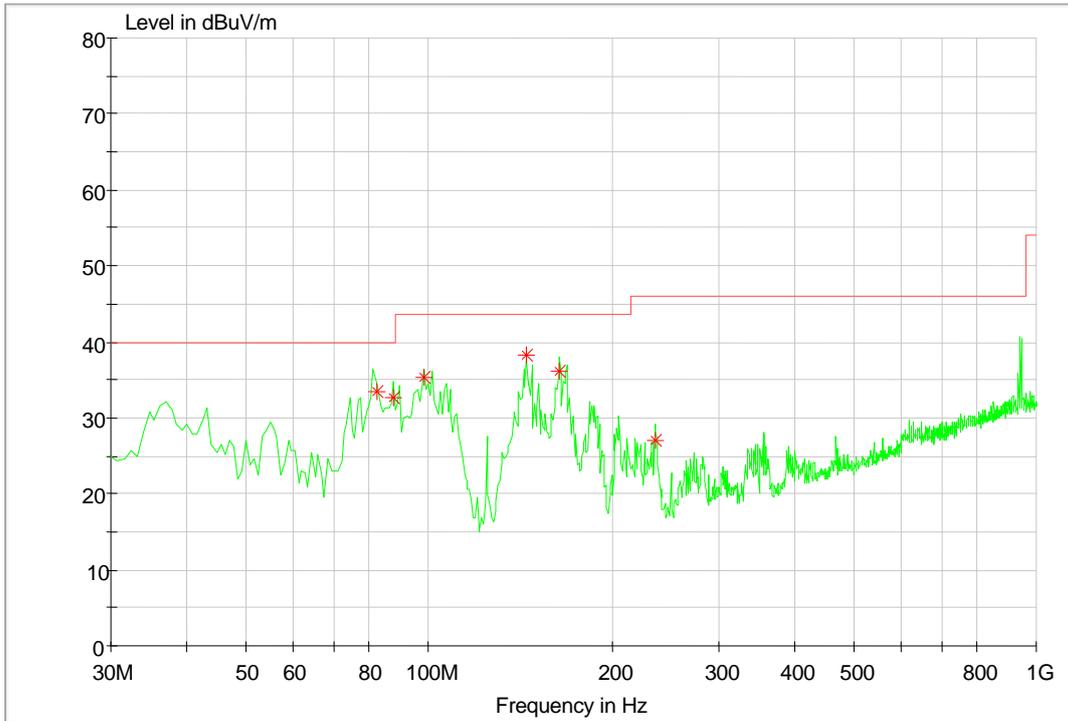
System Measurement Uncertainty		
Items	Extended Uncertainty	
RE(30MHz-1GHz)	Field strength (dB μ V/m)	U=4.2dB; k=2
RE(1GHz-18GHz)	Field strength (dB μ V/m)	U=5.3dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.6dB; k=2

7 Test Data and Graph

Only the worst test results were shown

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz



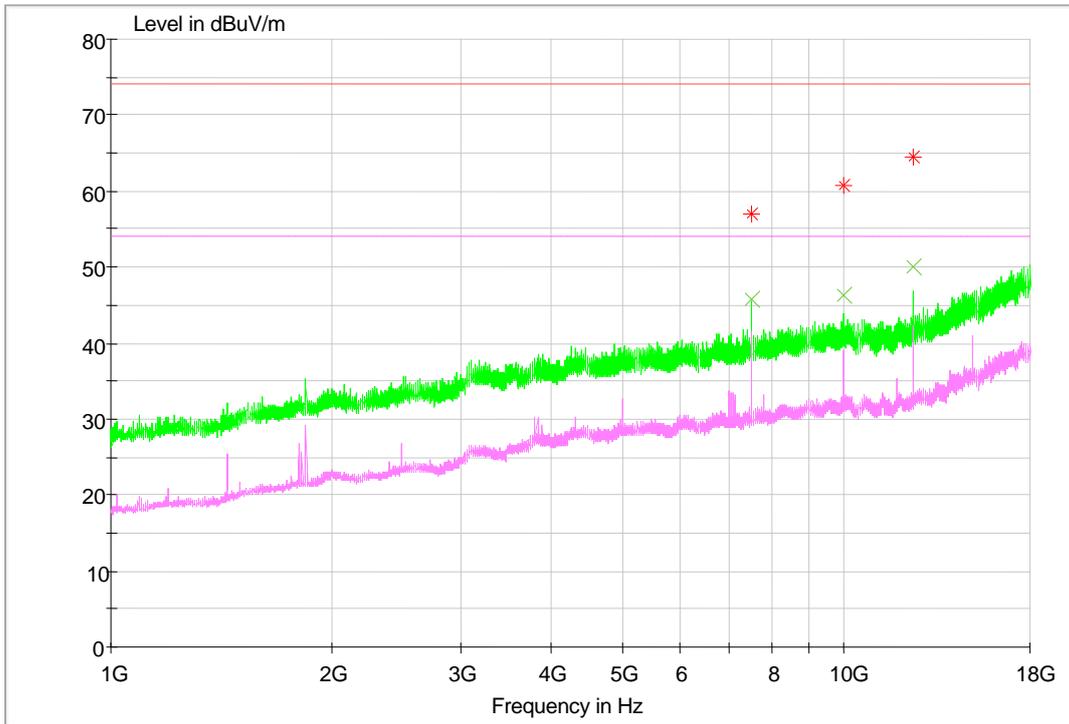
MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dB μ V/m	Transducer dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
82.060800	33.3	9.4	40.0	6.7	138.0	172.0	VERTICAL
87.838720	32.7	11.3	40.0	7.3	121.0	301.0	VERTICAL
98.426240	35.4	13.2	43.5	8.1	100.0	51.0	VERTICAL
145.251200	38.2	9.2	43.5	5.3	100.0	69.0	VERTICAL
163.913920	36.2	10.2	43.5	7.3	100.0	342.0	VERTICAL
235.835840	27.0	14.0	46.0	19.0	121.0	346.0	HORIZONTAL

Note:

Level = Reading level by receiver + Transducer (Antenna factor + cable loss – preamplifier gain)
The reading level is used to calculate by software which is not shown in the sheet.

7.1.2 1GHz~6GHz



MEASUREMENT RESULT: PK Detector

Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB	dB μ V/m	dB	cm	deg	
7500.412000	57.0	5.6	74.0	17.0	100.0	337.0	HORIZONTAL
10000.428000	60.7	9.3	74.0	13.3	113.0	145.0	HORIZONTAL
12500.542667	64.5	13.1	74.0	9.5	100.0	173.0	HORIZONTAL

MEASUREMENT RESULT: AV Detector

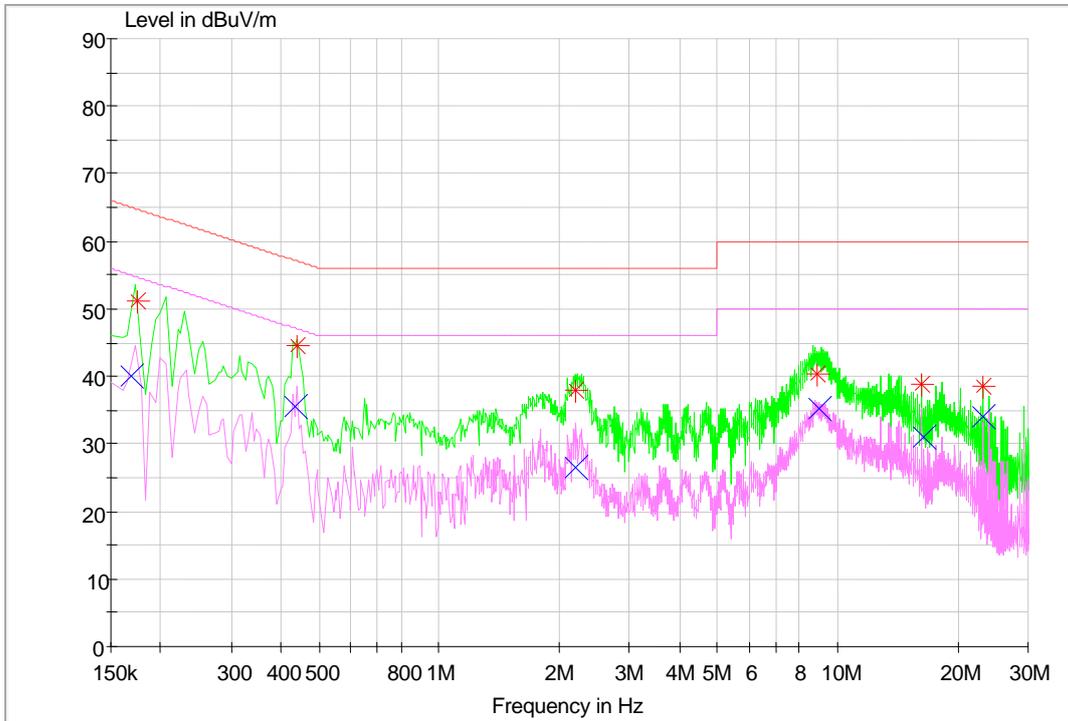
Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB	dB μ V/m	dB	cm	deg	
7500.372000	45.7	5.6	54.0	8.3	100.0	335.0	HORIZONTAL
10015.077334	46.3	9.4	54.0	7.7	100.0	322.0	VERTICAL
12456.769333	50.0	13.0	54.0	4.0	100.0	0.0	HORIZONTAL

Note:

Level = Reading level by receiver + Transducer (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

7.2.1 AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency	Level	Transducer	Limit	Margin	Line	PE
MHz	dB μ V	dB	dB μ V	dB		
0.173953	51.1	9.7	64.8	13.7	L1	FLO
0.437820	44.4	9.7	57.1	12.7	L1	FLO
2.203324	37.8	9.7	56.0	18.2	N	FLO
8.865570	40.2	9.9	60.0	19.8	N	FLO
16.227348	38.9	10.0	60.0	21.1	L1	FLO
23.128856	38.4	10.2	60.0	21.6	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency	Level	Transducer	Limit	Margin	Line	PE
MHz	dB μ V	dB	dB μ V	dB		
0.169120	40.1	9.7	55.0	14.9	L1	FLO
0.435256	35.5	9.7	47.2	11.7	L1	FLO
2.208416	26.5	9.7	46.0	19.5	L1	FLO
9.014655	35.1	9.9	50.0	14.9	N	FLO
16.472333	31.1	10.1	50.0	18.9	L1	FLO
23.130608	34.1	10.2	50.0	15.9	L1	FLO

Note:

Level = Reading level by receiver + Transducer (LISN factor + cable loss)



The reading level is used to calculate by software which is not shown in the sheet.

-----**END**-----