



EMC Test Report

Product Name: LTE CPE

Model Number: B593s-516

Report No: SYBH(Z-EMC)057072013-2

FCC ID: QISB593S-516

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: Jul.17, 2013
Start Date of Test: Jul.17, 2013
End Date of Test: Jul.28, 2013

Test Result: Pass

**Approved By
(Lab Manager)**

2013-07-30
Date

Liu Chunlin
Name

Liu Chunlin

Signature

**Operator
(Test Engineer)**

2013-07-30
Date

Xiang Zaiji
Name

Xiang Zaiji

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 CPE
Model Number	B593s-516
Serials Number	J7B01A9370500365
TX Frequency	GSM850: 824MHz To 849MHz GSM1900: 1850MHz To 1910MHz WCDMA Band II: 1850MHz To 1910MHz WCDMA Band IV: 1710MHz To 1755MHz 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 WIFI: 2412MHz To 2462MHz
RX Frequency	GSM850: 869MHz To 894MHz GSM1900: 1930MHz To 1990MHz WCDMA Band II: 1930MHz To 1990MHz WCDMA Band IV: 2110MHz To 2155MHz 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 WIFI: 2412MHz To 2462MHz
HW Version	CL1E5172M
SW Version	V200R001
EUT Accessory	
Adapter	BRAND: HUAWEI Model: HW-120100U6W Input:100-240V~ 50/60Hz, 0.5A Output: 12.0V  1.0A SN: HWHKAAD40600468 SN: HWXQAAD21910070

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 15:2012, Subpart B

2 Summary of Results

Summary of Results				
Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
Radiated Emissions Enclosure Port	Mode1	CLASS B	Pass	Site1
Conducted Emissions <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 is configured, installed, arranged and operated in a manner consistent with typical application. The following mode(s) are applied during the compliance test.

Test Mode	
Mode 1:	EUT+ Adapter+ LAN+ Phone+ USB+ Traffic Mode
Mode 2:	EUT+ Adapter+ LAN+ Phone + USB+ Idle Mode

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.

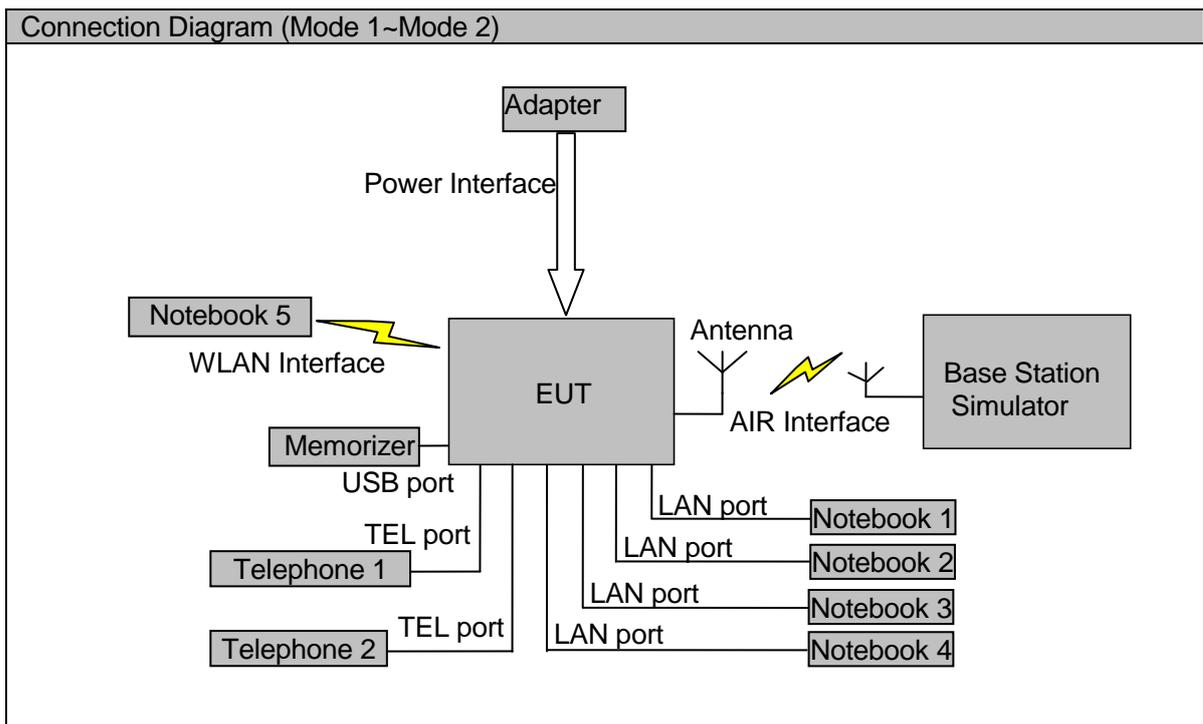
Traffic Mode:

When the EUT state is switched on and with Radio Resource Control (RRC) connection established.

Idle Mode:

When the EUT state is switched on but without Radio Resource Control (RRC) connection.

3.2 Test System Configuration



3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
LAN Cable	4	3m	unshielded
Telephone Cable	2	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	3608082535	2013-09-22	12
Radio Communication tester	CMW500	R&S	A111278719	2013-08-01	12
Notebook 1	X200	Lenovo	A100502902	/	/
Notebook 2	MS2220	Acer	3107084890	/	/
Notebook 3	PCG-7H41	SONY	3106053025	/	/
Notebook 4	E8210	FUJITSU	3107041939	/	/
Notebook 5	DHT300	BenQ	3106093560	/	/
Memorizer	/	DTKT	/	/	/
Telephone 1	HCD8166TSD	HUAWEI	/	/	/
Telephone 2	HCD8166TSD	HUAWEI	/	/	/

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 is 3m. The set-up and test methods are according to ANSI C63.4-2009.

A preliminary scan and a final scan of the emissions are made from 30 MHz to 18 GHz by using test script of software; The emissions are measured using Quasi-Peak Detector (30MHz~1GHz) and AV/PK detector (above 1GHz). The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna is 1m to 4m. The azimuth range of turntable is 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 is configured in idle mode and the test performed at worst emission state.

4.1.2 Test setup

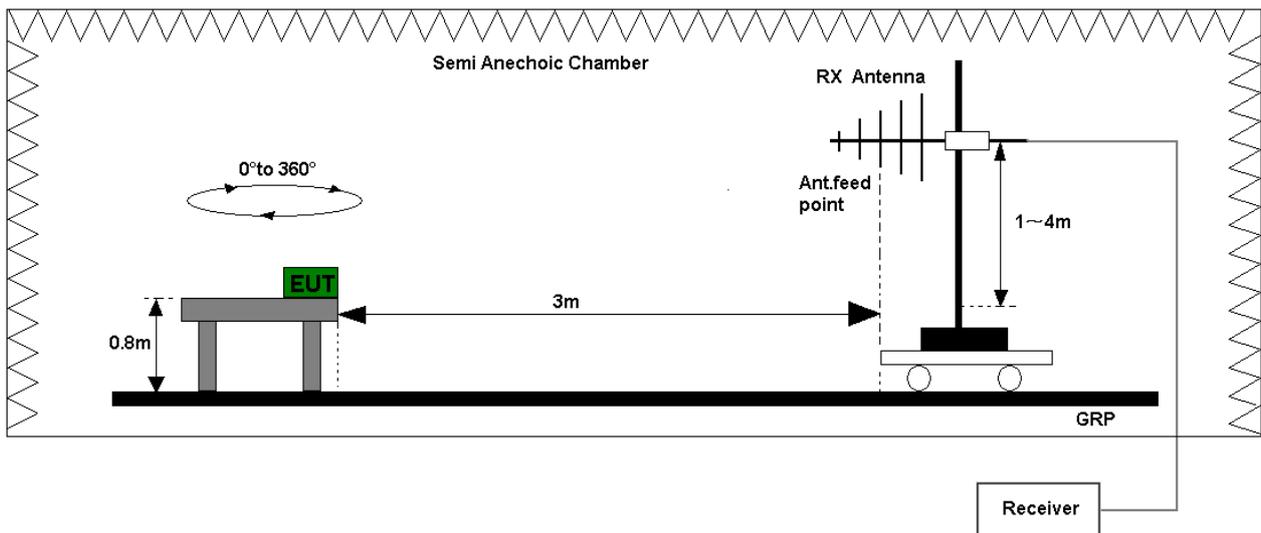


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

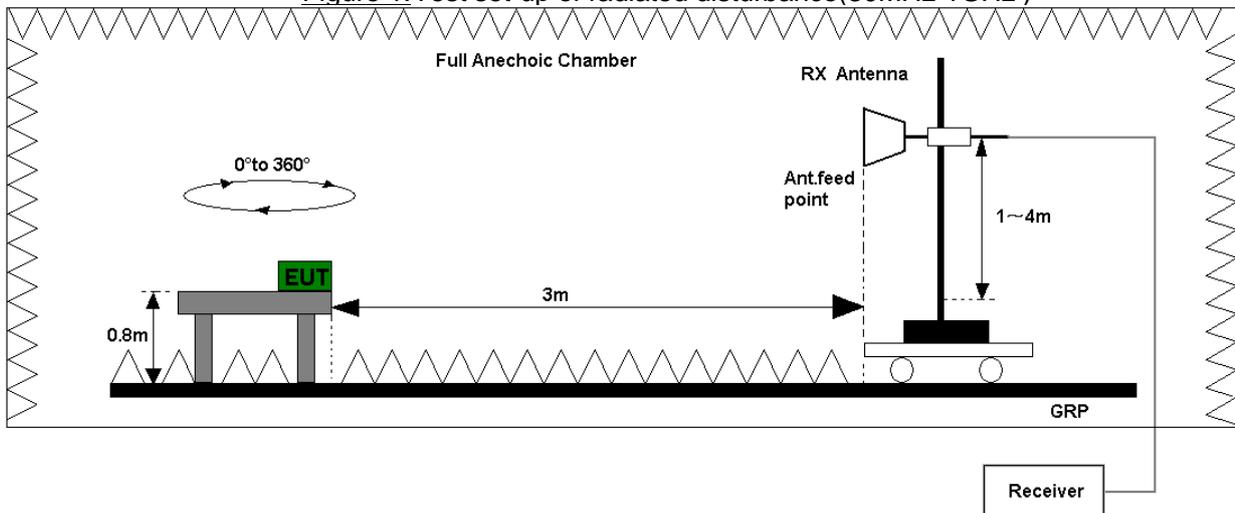


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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 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 is placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT is connected to LISN and LISN is connected to reference Ground Plane. EUT was 80cm away from LISN. The set-up and test methods are according to ANSI C63.4-2009.

Conducted Disturbance at AC Port measurements are undertaken on the L and N Lines. The emissions are 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 is set in the shielded chamber and operated under nominal conditions.

4.2.2 Test Setup

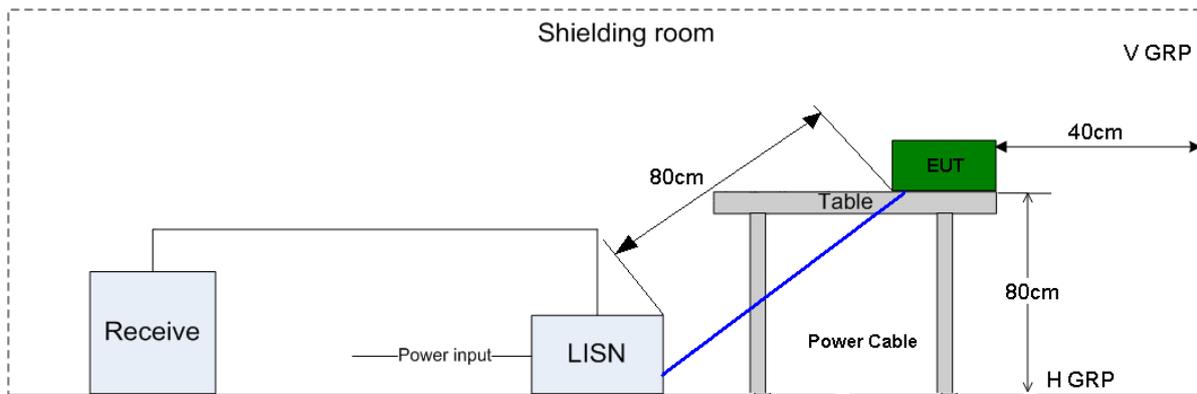


Figure 3. Test Set-up of conducted disturbance

4.2.3 Test Results

The EUT has met requirements for Conducted disturbance of power lines. 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	100150	R&S	May.14, 2014	12
	Broadband Antenna	VULB 9163	9163-356	SCHW ARZBECK	May.27, 2014	24
	Horn Antenna	HF906	100683	R&S	Feb.01, 2015	24
CE	Artificial Mains Network	ENV216	100382	R&S	Jan.28, 2014	12
	Artificial Mains Network	ENV4200	100134	R&S	Jan.28, 2014	12
	EMI Test receiver	ESCI	101163	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 are:

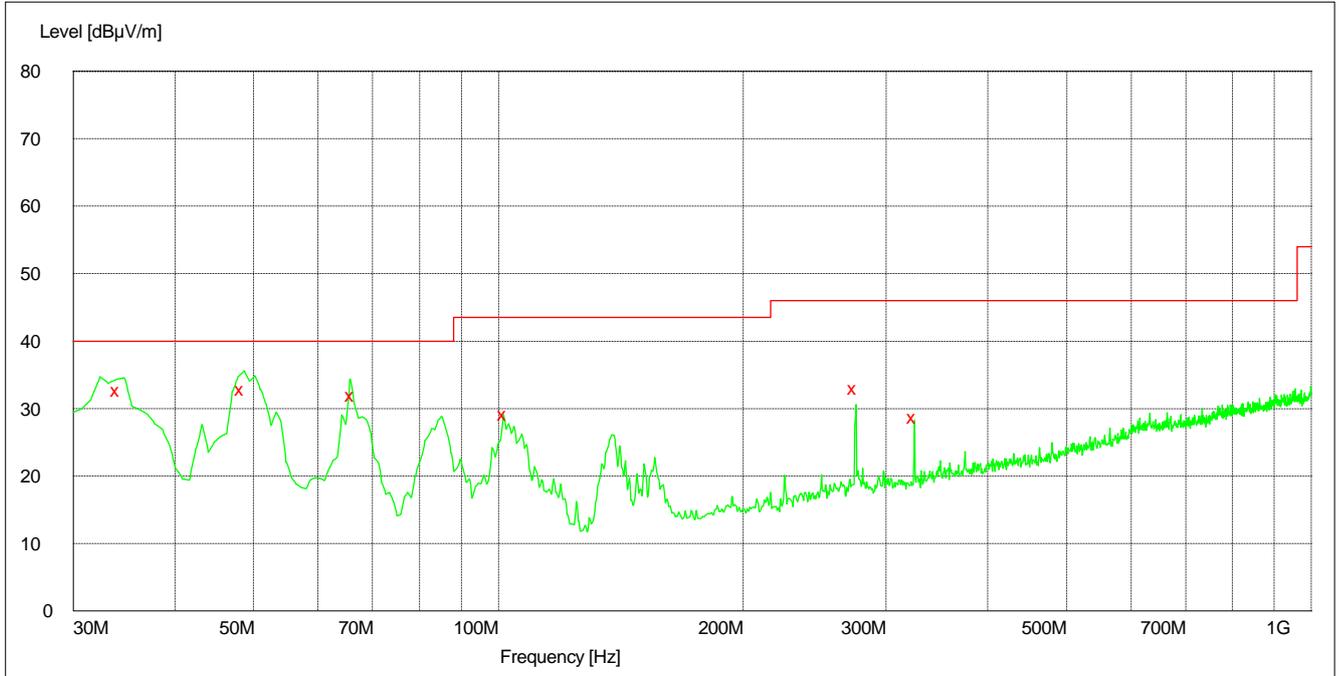
System Measurement Uncertainty		
Items	Extended Uncertainty	
RE(30MHz-1GHz)	Field strength (dB μ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB μ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.6dB; k=2

7 Test Data and Graph

Only the worst test results are shown

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz



MEASUREMENT RESULT: QP Detector

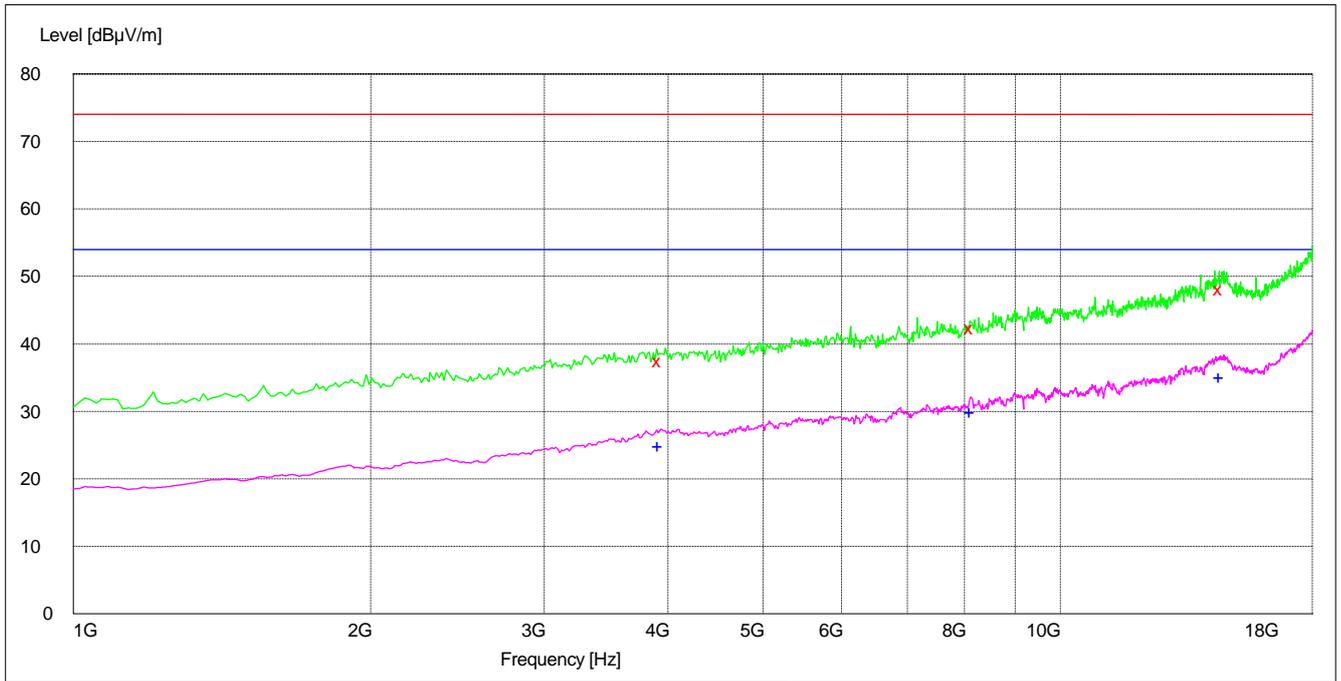
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
34.080000	32.70	11.8	40.0	7.3	100.0	236.00	VERTICAL
48.480000	32.80	13.0	40.0	7.2	100.0	302.00	VERTICAL
66.240000	32.00	9.9	40.0	8.0	111.0	276.00	VERTICAL
101.880000	29.20	13.0	43.5	14.3	100.0	170.00	VERTICAL
274.980000	32.90	14.9	46.0	13.1	122.0	170.00	HORIZONTAL
325.020000	28.80	16.3	46.0	17.2	100.0	151.00	HORIZONTAL

Note:

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

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

7.1.2 1GHz~18GHz



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3929.500000	37.50	-4.6	74.0	36.5	100.0	337.00	HORIZONTAL
8140.000000	42.30	5.2	74.0	31.7	100.0	276.00	VERTICAL
14554.200000	48.00	14.5	74.0	26.0	100.0	300.00	HORIZONTAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3930.000000	24.90	-4.6	54.0	29.1	100.0	37.00	HORIZONTAL
8132.500000	29.90	5.1	54.0	24.1	100.0	15.00	HORIZONTAL
14561.700000	35.00	14.5	54.0	19.0	100.0	95.00	HORIZONTAL

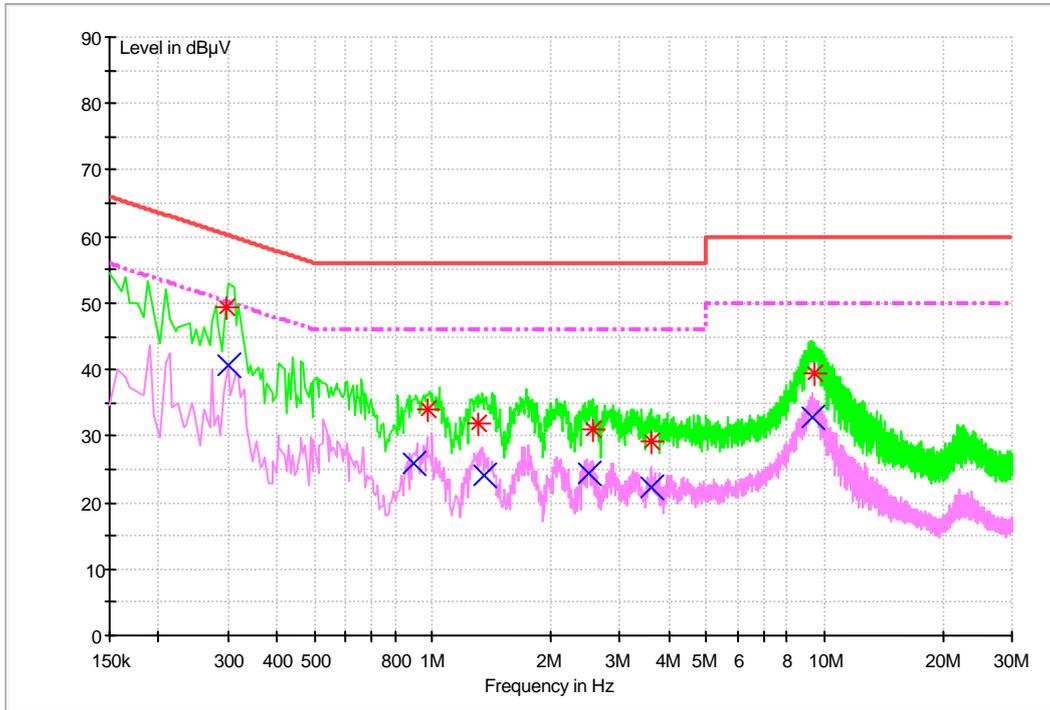
Note:

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

The reading level is calculated 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 MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.297558	49.4	9.7	60.3	10.9	L1	FLO
0.966566	33.9	9.7	56.0	22.1	L1	FLO
1.300530	32.0	9.7	56.0	24.0	N	FLO
2.554804	31.0	9.7	56.0	25.0	L1	FLO
3.619282	29.1	9.8	56.0	26.9	L1	FLO
9.371542	39.4	9.9	60.0	20.6	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.302621	40.6	9.7	50.2	9.6	L1	FLO
0.898110	25.8	9.7	46.0	20.2	L1	FLO
1.358558	24.1	9.7	46.0	21.9	N	FLO
2.492351	24.3	9.7	46.0	21.7	L1	FLO
3.630308	22.3	9.8	46.0	23.7	L1	FLO
9.303990	32.7	9.9	50.0	17.3	N	FLO

Note:

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

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

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