



EMC Test Report

Product Name: LTE CPE

Model Number: B593u-501

Report No: SYBH(Z-EMC)051072012-2

FCC ID: QISB593U-501

IC ID: 6369A-B593U501

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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: June 28, 2012
Start Date of Test: July 02, 2012
End Date of Test: July 08, 2012
Test Result: Pass

**Approved By
(Lab Manager)**

2012-07-12
Date

Liuchunlin
Name

Signature

Operator

2012-07-12
Date

Liulingbin
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	LTE CPE
Model Number	B593u-501
Serials Number	K7M01A9260800103
Working Voltage	12Vdc
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 4: 1710MHz To 1755MHz LTE BAND17: 704MHz To 716MHz WIFI: 2400MHz To 2473MHz
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 4:2110MHz To 2155MHz LTE BAND17: 734MHz To 746MHz WIFI: 2400MHz To 2473MHz
HW Version	B593RW2A and CL2EM930U501M
SW Version	V100R003
EUT Accessory	
Data cable	Manufacturer: Huawei Technologies Co., Ltd. Data Cable USB A Male to USB B Female 18cm,white,
Adapter	Manufacturer: Huntkey Model: HW-120200U1W Input voltage: 100V-240V~50/60Hz, 0.8A Output voltage: 12V ⁻⁻⁻ 2A S/N:2102220121ARC3042000
Adapter	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd. Model: HW-120200U1W Input voltage: 100V-240V~50/60Hz, 0.8A Output voltage: 12V ⁻⁻⁻ 2A S/N:2102220121ARC4000005

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
ICES-003 Issue 4



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	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	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:	EUT + Adapter + LAN+USB Cable+ Wireless Service idle mode
Mode 2:	EUT + Adapter + LAN+USB Cable + Wireless Service traffic 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.

LAN: transmission data (PC1 ping PC2, PC3, PC4)

USB: Data copy (from EUT to memorize)

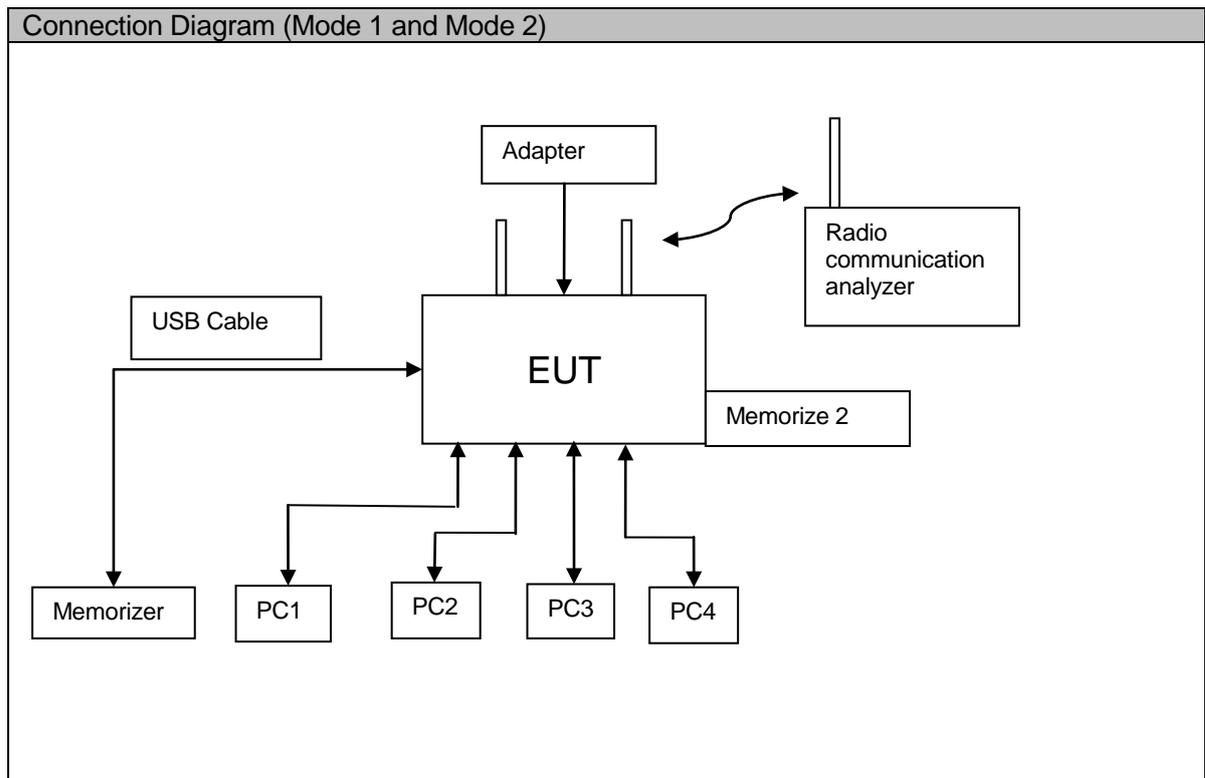
Traffic Mode:

State of EUT when switched on and with Radio Resource Control (RRC) connection established

IDLE Mode:

State of EUT when switched on but with no Radio Resource Control (RRC) connection

3.2 Test System Configurations





3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
AC Power	2	<3m	Unshielded
USB	1	<3m	shielded
LAN Cable	4	<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	3607111817	2012-7-23	12
Notebook	D630	DELL	0W7349	N/A	N/A
Memorizer	/	R&S	/	N/A	N/A
Memorizer	/	SANDISK	/	N/A	N/A

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 receive 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 the worst emission state.

4.1.2 Test setup

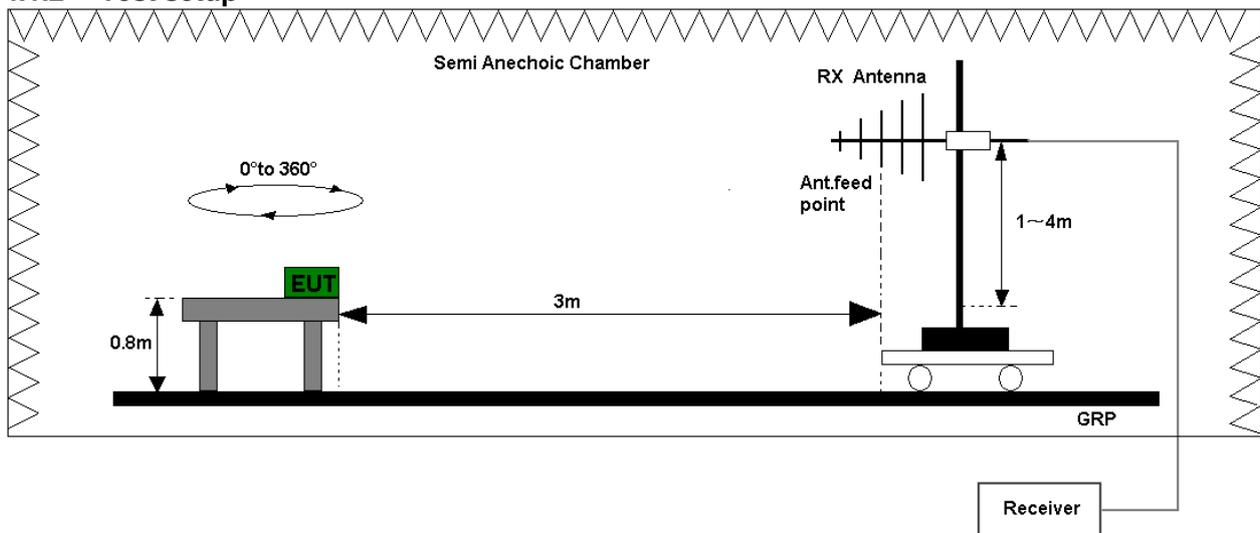


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

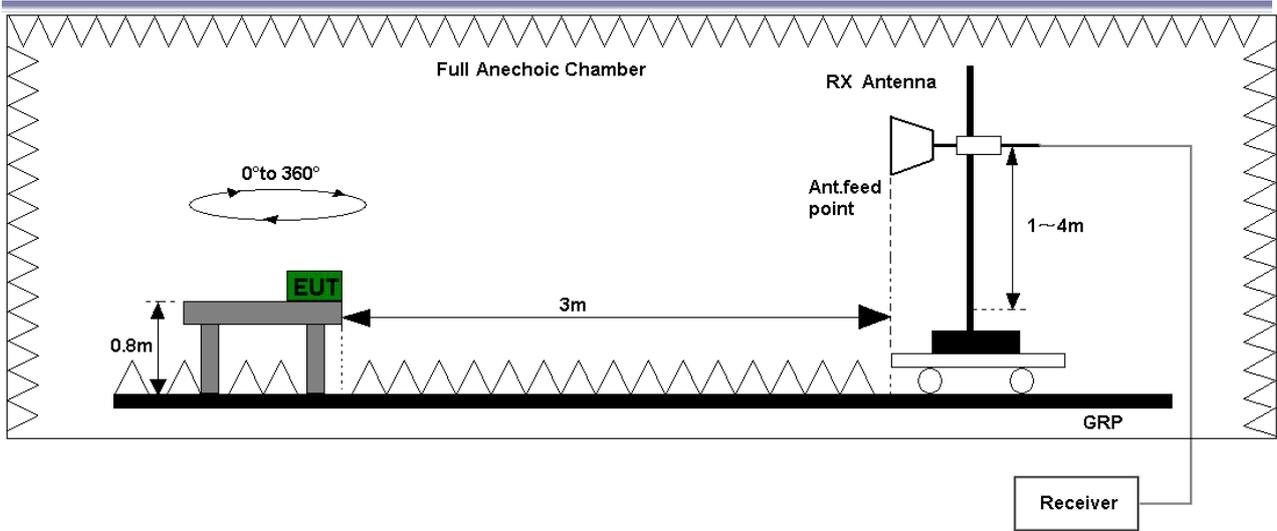


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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 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.

The 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 150kHz to 30 MHz: 9 kHz;

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

4.2.2 Test Setup

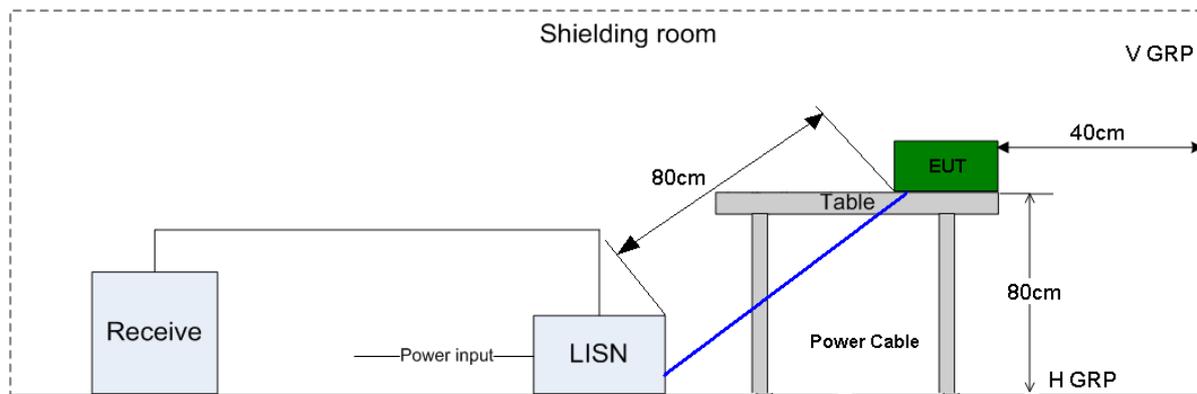


Figure 3. Test Set-up of conducted disturbance

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	100150	R&S	May.27, 2013	12
	Broadband Antenna	VULB 9163	9163-941	SCHWARZBECK	May.15, 2013	24
	Horn Antenna	HF906	100683	R&S	May.15, 2013	24
CE	Artificial Mains Network	ENV216	100382	R&S	Mar.05, 2013	12
	EMI Test receiver	ESCI	101163	R&S	Mar.05, 2013	12
	Artificial Mains Network	EN4200	100134	R&S	Mar.05, 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 (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

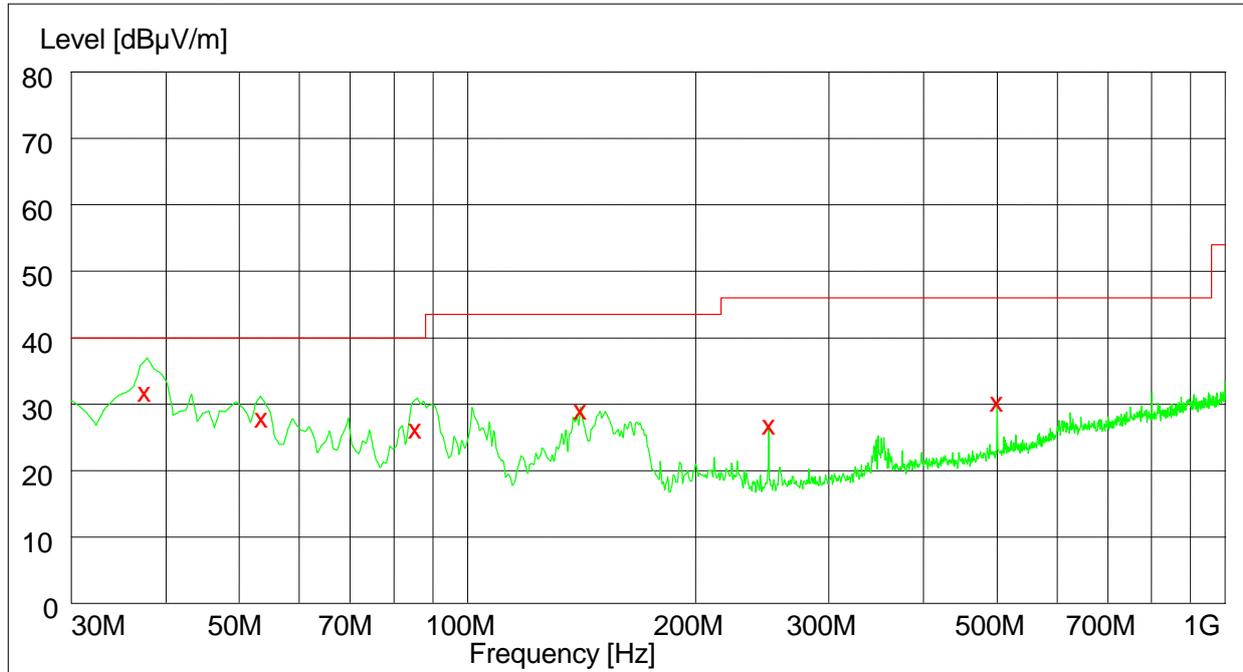


7 Test Data and Graph

Only the worst test results were shown

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz



MEASUREMENT RESULT: QP Detector

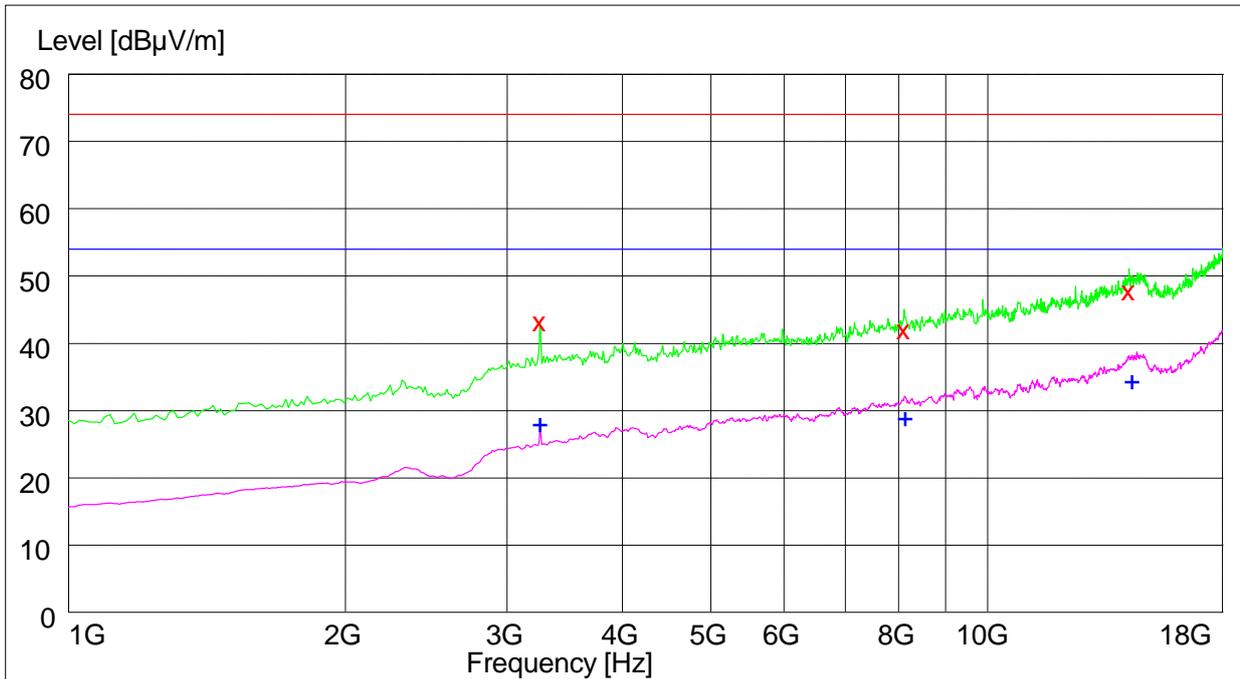
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
37.560000	32.60	15.2	40.0	7.4	100.0	131.00	VERTICAL
53.580000	28.80	14.7	40.0	11.2	100.0	0.00	VERTICAL
85.500000	27.10	11.1	40.0	12.9	101.0	356.00	VERTICAL
141.300000	30.00	9.9	43.5	13.5	100.0	32.00	VERTICAL
250.020000	27.60	14.0	46.0	18.4	121.0	322.00	HORIZONTAL
500.040000	31.20	19.2	46.0	14.8	101.0	26.00	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.



7.1.2 1GHz~18GHz



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3256.100000	44.00	-7.2	74.0	30.0	100.0	138.00	VERTICAL
8112.800000	42.80	4.9	74.0	31.2	200.0	359.00	HORIZONTAL
14240.400000	48.60	14.1	74.0	25.4	159.0	68.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3256.100000	28.90	-7.2	54.0	25.1	100.0	140.00	VERTICAL
8136.000000	29.80	5.1	54.0	24.2	200.0	300.00	VERTICAL
14345.600000	35.30	14.8	54.0	18.7	200.0	172.00	VERTICAL

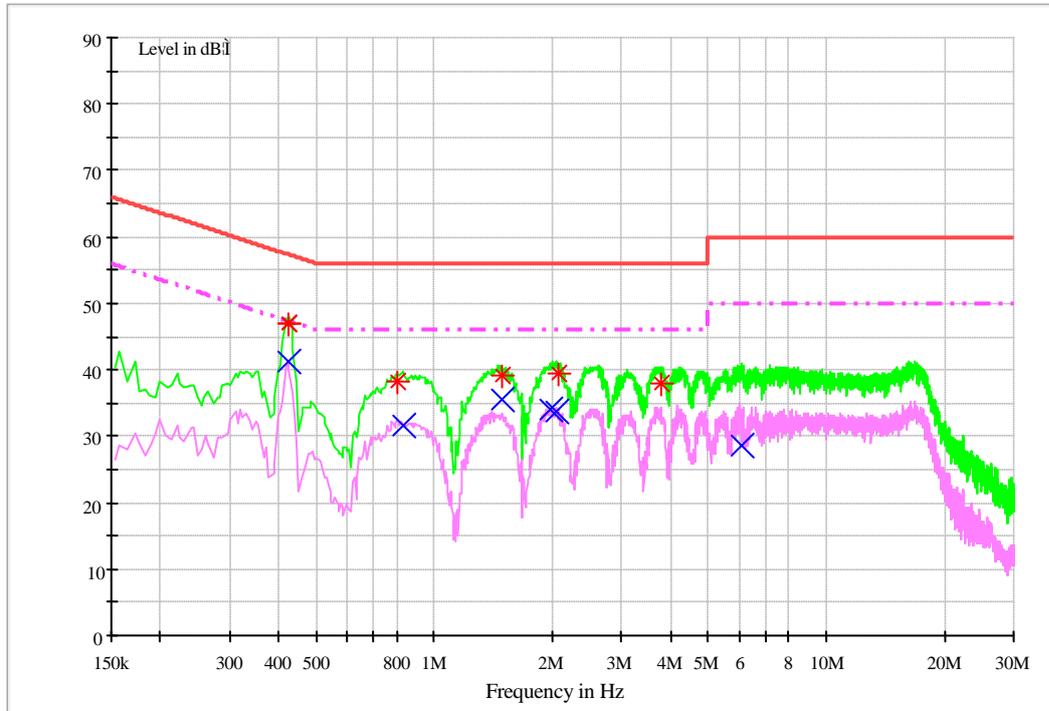
Note:

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.



7.2 Conducted Disturbance

7.2.1 AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency	Level	Transducer	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
0.425329	46.9	9.7	57.3	10.4	N	FLO
0.427080	46.8	9.7	57.3	10.5	N	FLO
0.808031	38.2	9.7	56.0	17.8	L1	FLO
1.479810	39.1	9.7	56.0	16.9	N	FLO
2.067071	39.3	9.7	56.0	16.7	N	FLO
3.805208	38.0	9.7	56.0	18.0	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency	Level	Transducer	Limit	Margin	Line	PE
MHz	dBμV	dB	dBμV	dB		
0.423956	41.3	9.7	47.4	6.1	N	FLO
0.829586	31.7	9.7	46.0	14.3	L1	FLO
1.483080	35.4	9.7	46.0	10.6	N	FLO
1.978927	34.1	9.7	46.0	11.9	N	FLO
2.038320	33.7	9.7	46.0	12.3	N	FLO
6.074896	28.5	9.9	50.0	21.5	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