



EMC Test Report

Product Name:LTE USB Rotator

Model Number:E3276s-151

Report No:SYBH(Z-EMC)177082012-2

FCC ID:QISE3276S-151

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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.
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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: Aug.28, 2012
Start Date of Test: Aug.28, 2012
End Date of Test: Aug.30, 2012

Test Result: Pass

**Approved By
(Lab Manager)**

2012-09-04
Date

Liuchunlin
Name

Liuchunlin

Signature

Operator

2012-09-04
Date

Daniel
Name

Daniel

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 USB Rotator
Model Number	E3276s-151
Serials Number	Z2U01A9272600245
TX Frequency	GSM850:824MHz To 849MHz; GSM1900:1850MHz To 1910MHz WCDMA BAND II:1850MHz To 1910MHz WCDMA BAND AWS:1710MHz To 1755MHz LTE BAND 4:1710MHz To 1755MHz LTE BAND 7:2500MHz To 2570MHz
RX Frequency	GSM850:869MHz To 894MHz; GSM1900:1930MHz To 1990MHz WCDMA BAND II:1930MHz To 1990MHz WCDMA BAND AWS:2110MHz To 2155MHz LTE BAND 4: 2110MHz To 2155MHz LTE BAND 7:2620MHz To 2690MHz
HW Version	CH1E3276SM
SW Version	21.182.03.00.00
EUT Accessory	
Data cable	Data Cable USB A Male to Micro USB, shielded

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



2 Summary of Results

Summary of Results				
Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
<u>Radiated Emissions</u> Enclosure Port	Mode2 Mode4	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 Mode3	CLASS B	Pass	Site1
Note: 1, Measurement taken is within the measurement uncertainty of measurement 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

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:

Test Mode	
Mode 1:	USB Copy(EUT with PC)+ Traffic
Mode 2:	USB Copy(EUT with PC)+Idle
Mode 3:	USB Cable + USB Copy(EUT with PC)+ Traffic
Mode 4:	USB Cable + USB Copy(EUT with PC)+Idle

Remark: When the EUT have multiple Data cable, need separate test with Data cable. Here only the worst cases are recorded in this report.

USB Copy:

State of EUT when transferred the data between the EUT and PC

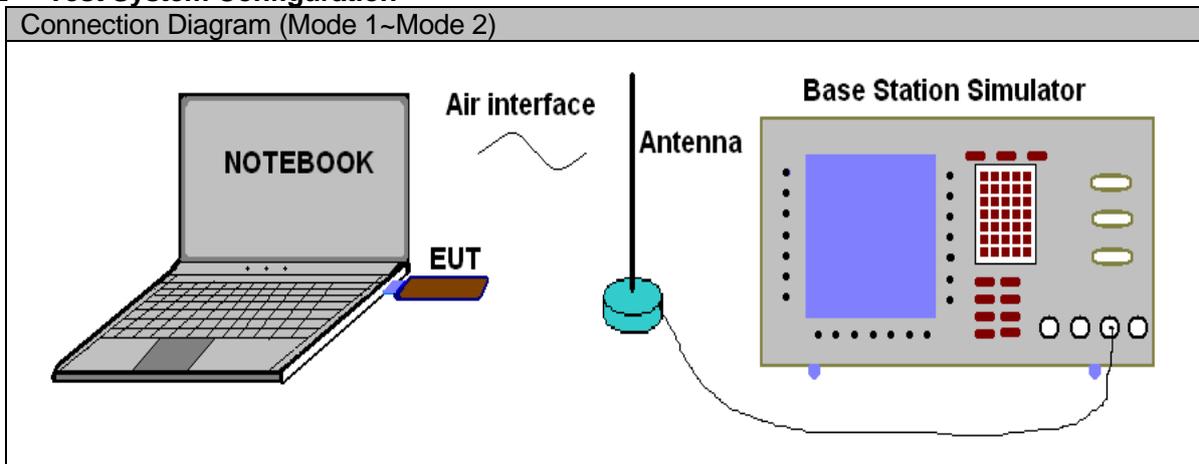
Traffic Mode:

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

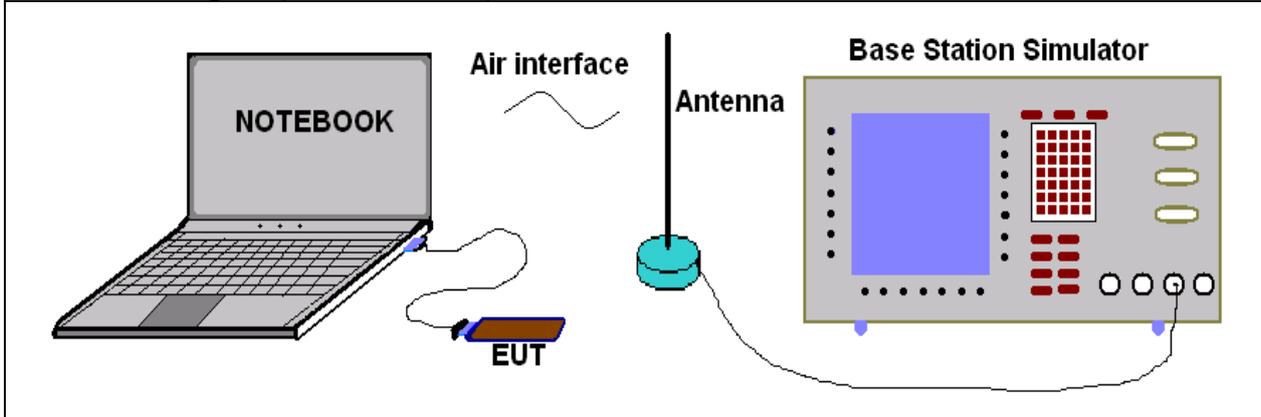
Idle Mode:

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

3.2 Test System Configuration



Connection Diagram (Mode 3/ Mode 4)



3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
USB	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	3608105673	2012-11-06	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

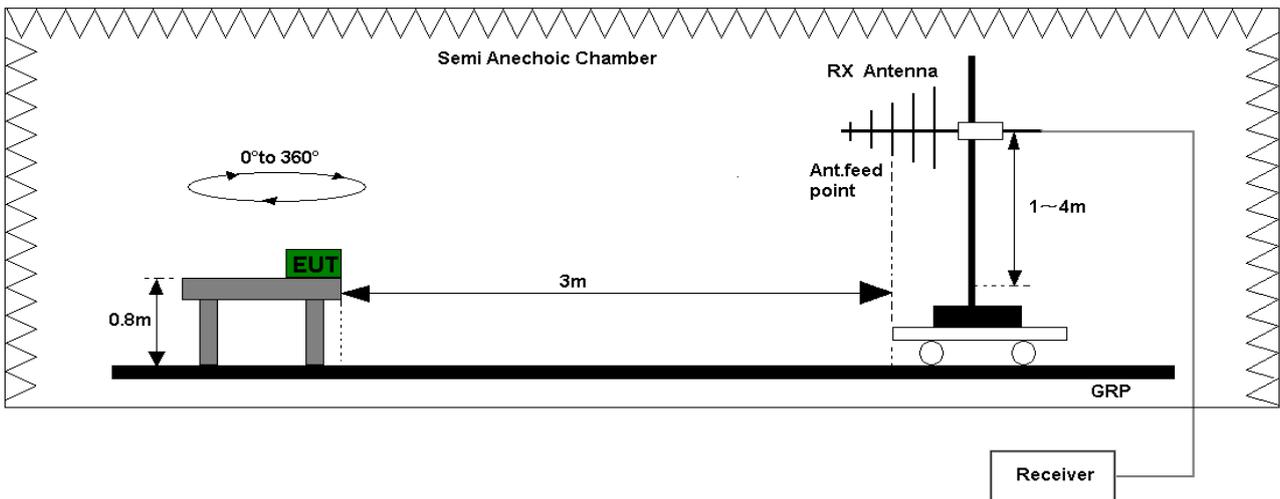


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

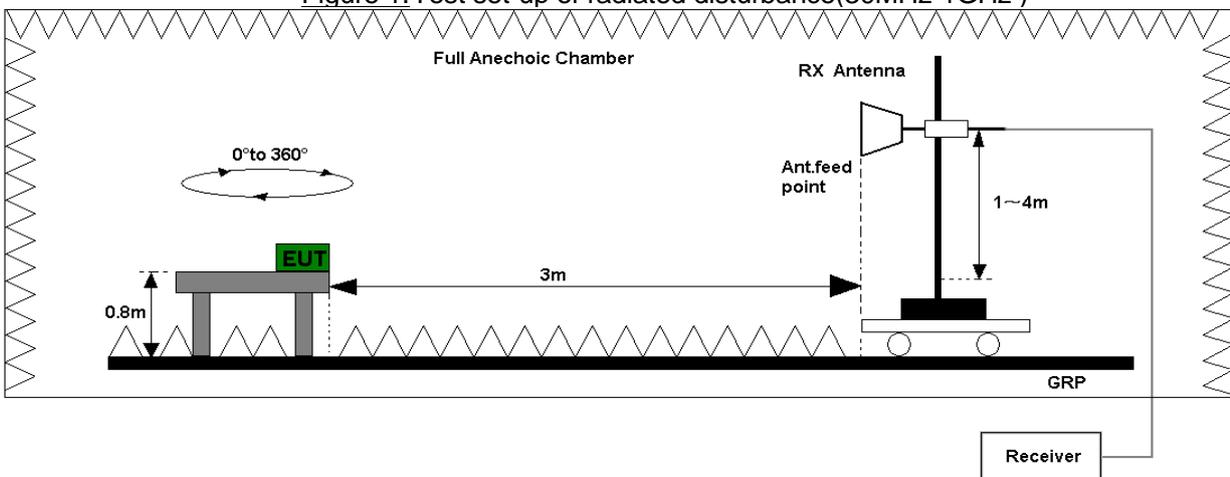


Figure 2. Test set-up of radiated disturbance(above 1GHz)



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

4.1.4 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

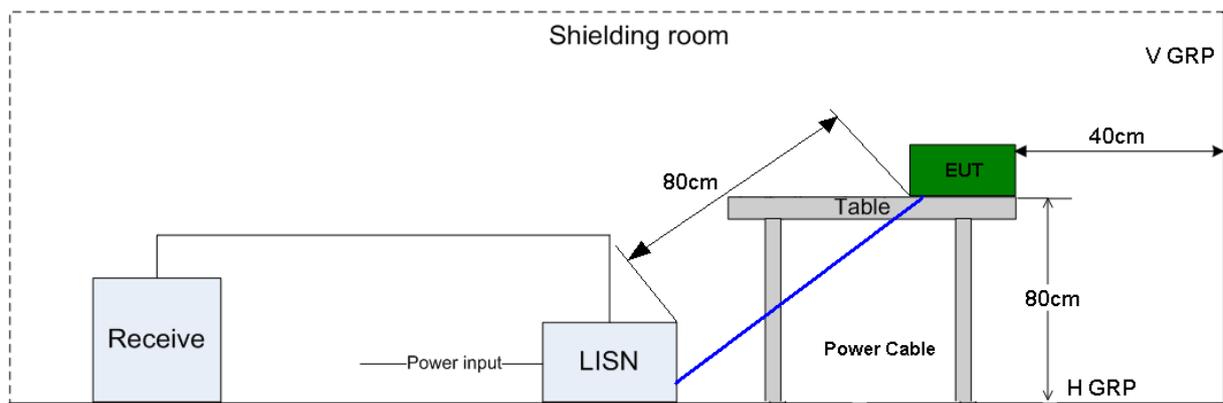


Figure 3. Test Set-up of conducted disturbance

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	66-56dB μ V	56-46 dB μ V
0.5MHz-5MHz	56dB μ V	46 dB μ V
5MHz~30MHz	60dB μ V	50 dB μ V



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 (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

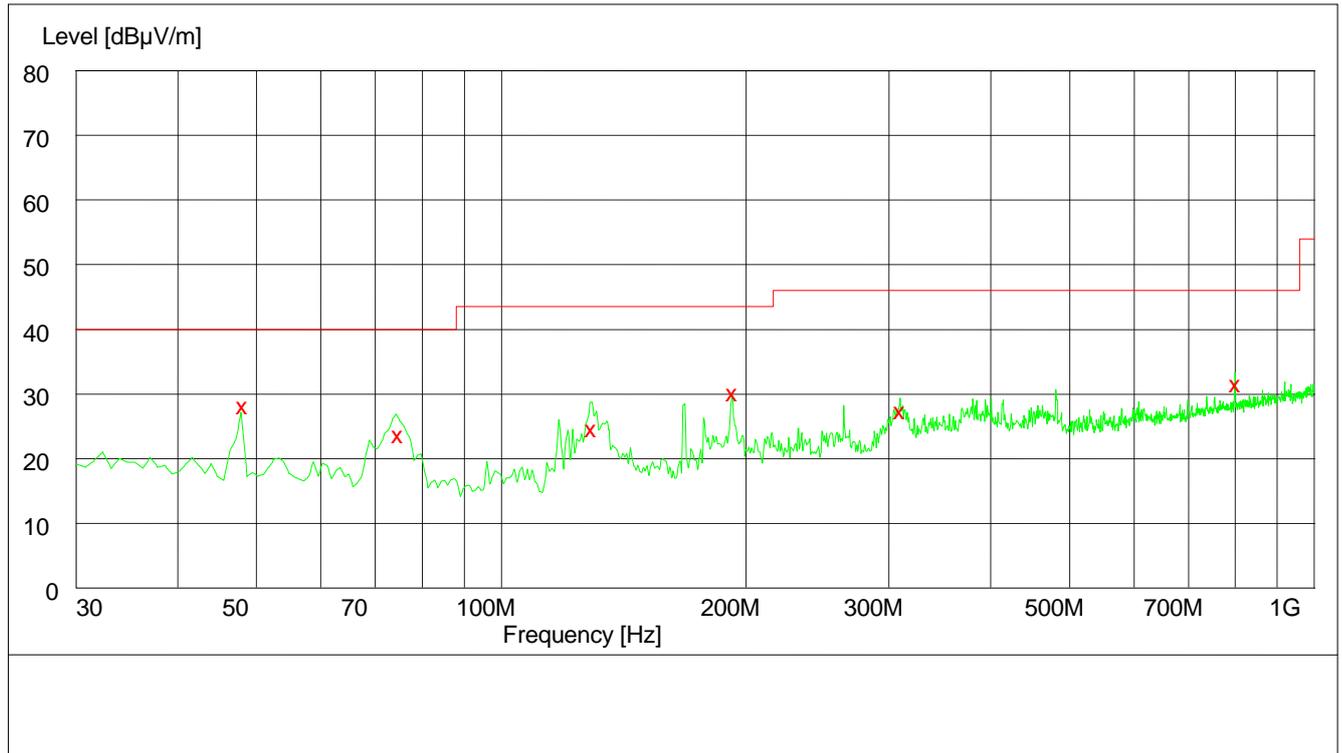
7 Test Data and Graph

Only the worst test result was shown in this report.

7.1 Radiated Disturbance

Test configuration: Mode 4(the worst case)

30MHz~1GHz



MEASUREMENT RESULT: QP Detector

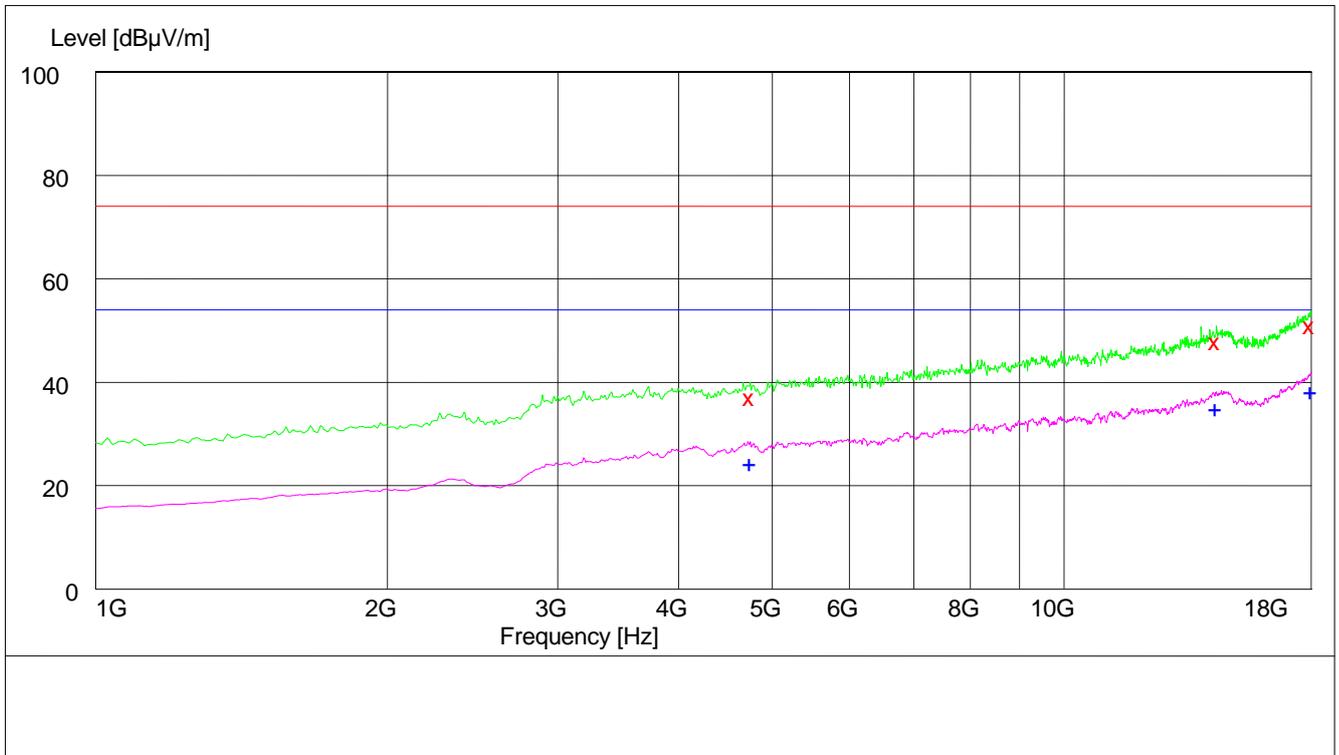
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
48.000000	28.40	15.0	40.0	11.6	100.0	307.00	VERTICAL
74.580000	23.90	10.5	40.0	16.1	136.0	325.00	VERTICAL
128.940000	24.90	10.5	43.5	18.6	100.0	289.00	VERTICAL
192.120000	30.40	12.1	43.5	13.1	100.0	151.00	HORIZONTAL
309.120000	27.60	15.3	46.0	18.4	104.0	336.00	HORIZONTAL
799.020000	31.80	23.5	46.0	14.2	142.0	126.00	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
4743.000000	37.30	-2.9	74.0	36.7	100.0	137.00	VERTICAL
14365.800000	48.20	14.6	74.0	25.8	100.0	89.00	HORIZONTAL
17978.800000	51.10	19.3	74.0	22.9	100.0	92.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
4740.500000	24.60	-2.9	54.0	29.4	100.0	207.00	VERTICAL
14361.800000	35.30	14.7	54.0	18.7	100.0	349.00	VERTICAL
17996.500000	38.40	19.5	54.0	15.6	100.0	112.00	HORIZONTAL

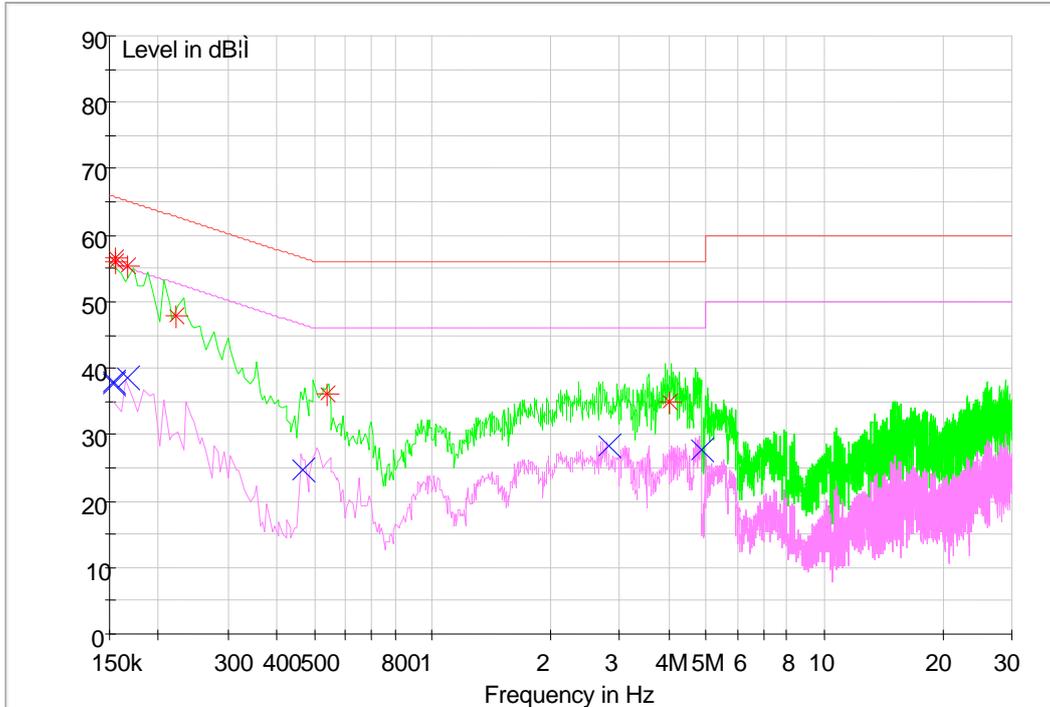
Note:

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

Test configuration: Mode 3(the worst case)

AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.155299	56.0	9.7	65.7	9.7	L1	FLO
0.156095	56.6	9.7	65.7	9.1	N	FLO
0.167101	55.4	9.7	65.1	9.7	L1	FLO
0.220698	47.8	9.7	62.8	15.0	L1	FLO
0.540138	36.0	9.7	56.0	20.0	N	FLO
3.999184	34.8	9.8	56.0	21.2	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.153646	37.8	9.7	55.8	18.0	N	FLO
0.153922	38.0	9.7	55.8	17.8	L1	FLO
0.167208	38.7	9.7	55.1	16.4	N	FLO
0.469140	24.7	9.7	46.5	21.8	L1	FLO
2.808776	28.3	9.7	46.0	17.7	N	FLO
4.879279	27.7	9.8	46.0	18.3	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**-----