



EMC Test Report

Product Name: LTE USB Rotator

Model Number: E3276s-505

Report No: SYBH(Z-EMC) 037072013-2

FCC ID: QISE3276S-505

Reliability Laboratory of Huawei Technologies Co., Ltd.

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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: Jul.10, 2013
Start Date of Test: Jul.15, 2013
End Date of Test: Jul.22, 2013

Test Result: Pass

**Approved By
(Lab Manager)**

2013-07-23
Date

Liu Chunlin
Name

Signature

**Operator
(Test Engineer)**

2013-07-23
Date

Kong Xiangdeng
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 USB Rotator
Model Number	E3276s-505
Input voltage	5V
TX Frequency	GSM 850: 824 MHz To 849 MHz GSM1900: 1850 MHz To 1910 MHz WCDMA BAND II: 1850 MHz To 1910 MHz WCDMA BAND IV: 1710 MHz To 1755 MHz WCDMA BAND V: 824 MHz To 849 MHz LTE Band 2: 1850 MHz To 1910 MHz LTE Band 4: 1710 MHz To 1755 MHz LTE Band 5: 824 MHz To 849 MHz LTE Band 12: 699 MHz To 716 MHz LTE Band 17: 704 MHz To 716 MHz
RX Frequency	GSM850: 869 MHz To 894 MHz GSM1900: 1930 MHz To 1990 MHz WCDMA BAND II:1930 MHz To 1990 MHz WCDMA BAND IV:2110 MHz To 2155 MHz WCDMA BAND V: 869 MHz To 894 MHz LTE Band 2: 1930 MHz To 1990 MHz LTE Band 4: 2110MHz to 2155 MHz LTE Band 5: 869 MHz To 894 MHz LTE Band 12: 729 MHz To 746 MHz LTE Band 17: 734 MHz To 746 MHz
S/N	X2B01A9362800019
HW Version	CH5E3276SM
SW Version	21.436.05.02.00
EUT Accessory	
USB 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's 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 15:2012, 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	Mode 2 Mode 4	CLASS B	Pass	Site1
<u>Conducted Emissions</u> <input checked="" type="checkbox"/> AC Power Port	Mode 3~Mode 4	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 below:

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

USB Copy:

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

Traffic Mode:

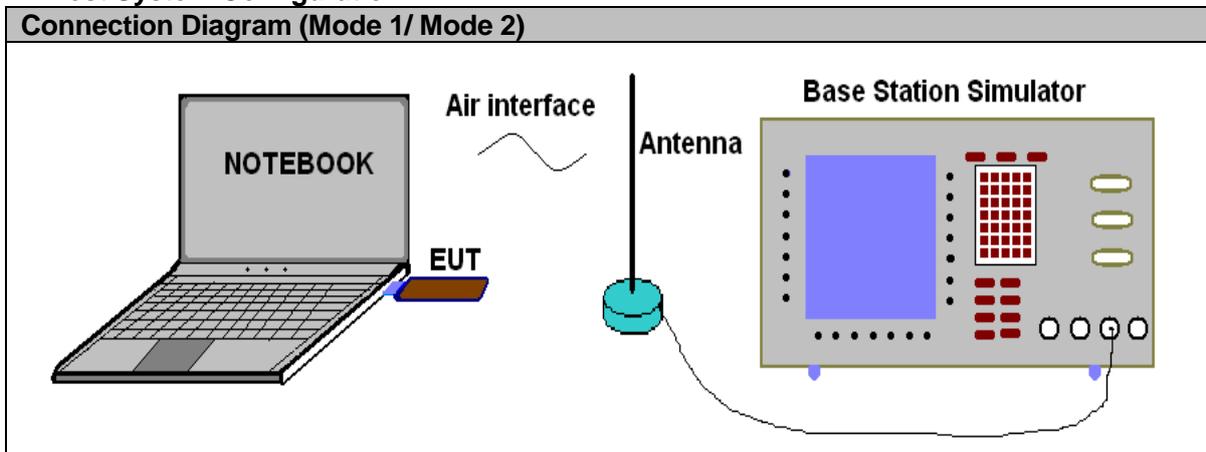
State of EUT when switched on and with Radio Resource Control (RRC) connection established

Idle Mode:

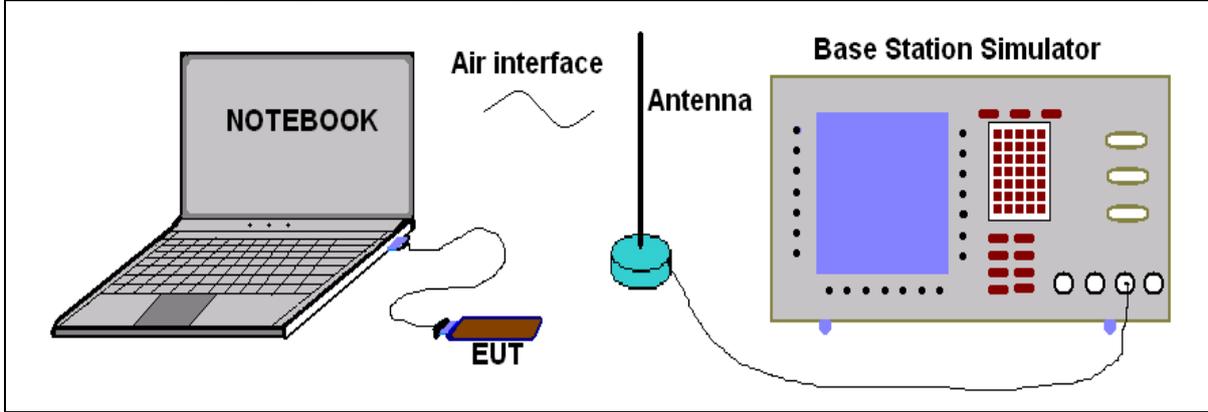
State of EUT when switched on but with no Radio Resource Control (RRC) connection

3.2 Test System Configuration

Connection Diagram (Mode 1/ Mode 2)



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	117057	2013-09-22	12
Radio Communication Tester	CMW500	R&S	115624	2013-08-01	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

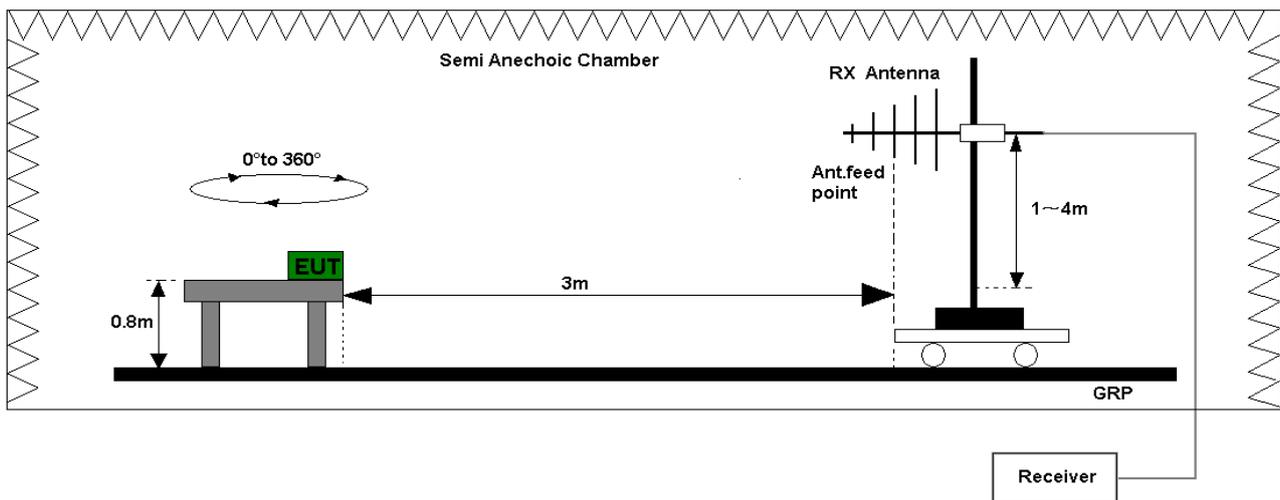


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

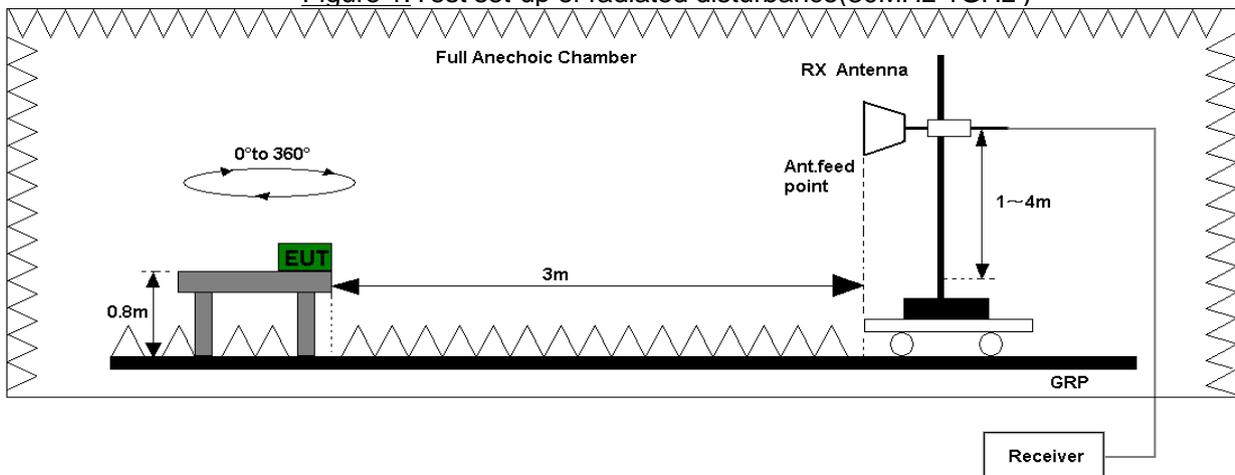


Figure 2. Test set-up of radiated disturbance(above 1GHz)



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

4.2 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 set in the shielded chamber and operated under nominal conditions.

4.2.2 Test Setup

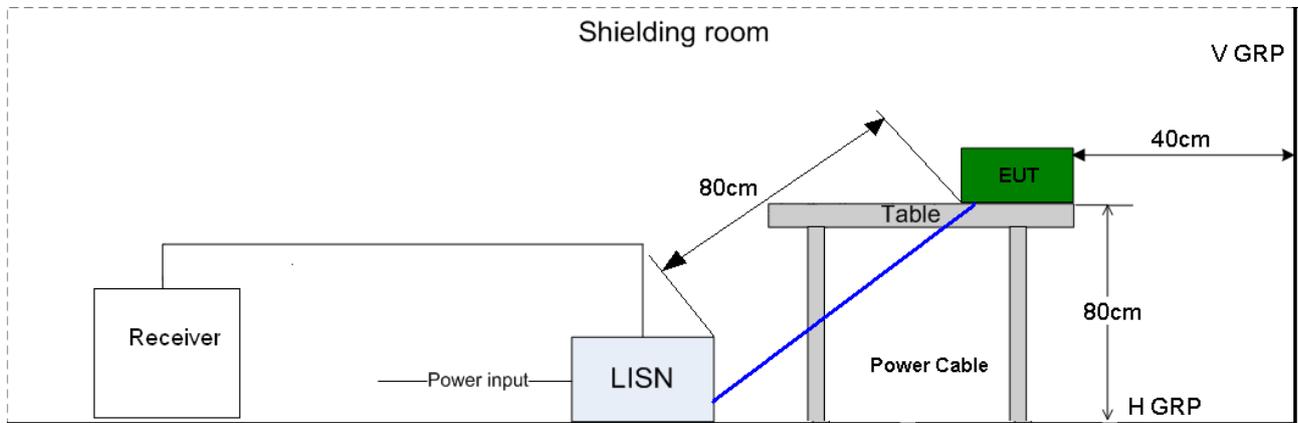


Figure 3. Test Set-up of conducted disturbance

4.2.3 Test Results

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

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.14, 2014	12
	Broadband Antenna	VULB 9163	9163-356	SCHWARZ BECK	May.27, 2014	24
	Horn Antenna	HF906	100683	R&S	Feb.01, 2015	24
CE	EMI Test receiver	ESCI	101163	R&S	Jan. 28, 2014	12
	Artificial Mains Network	ENV216	100382	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 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

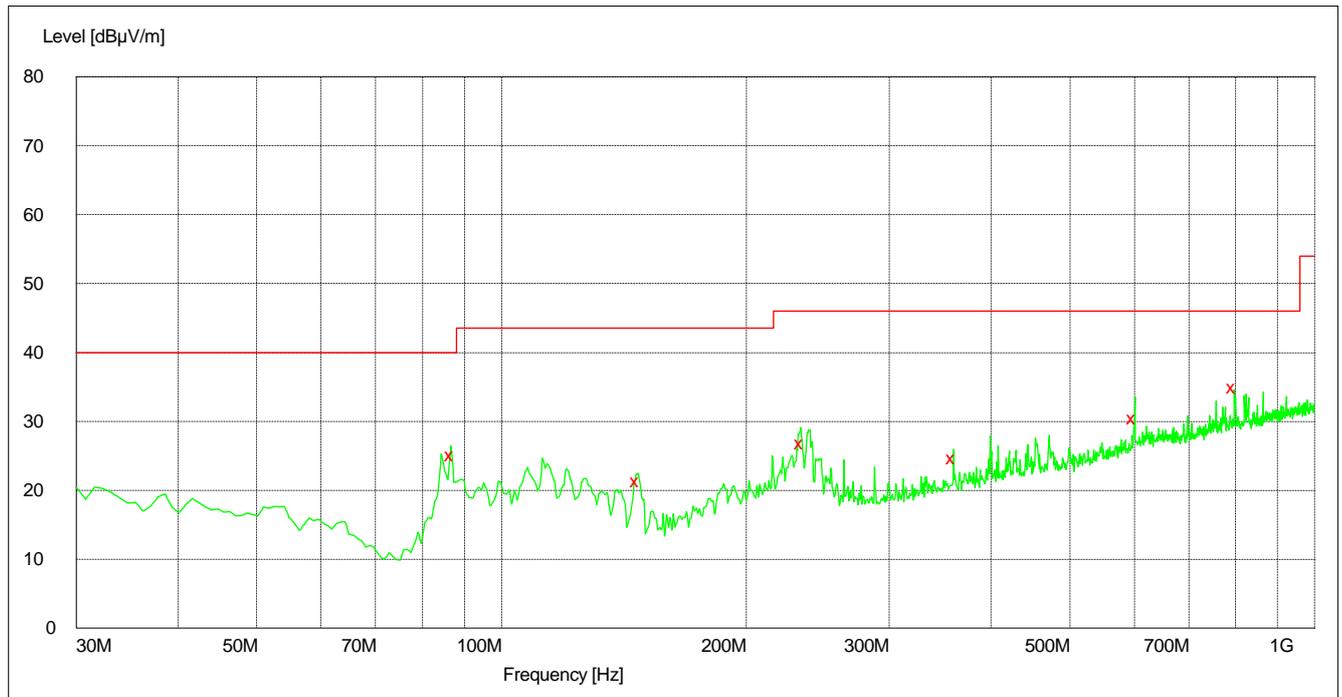


7 Test Data and Graph

Only the worst test result was shown in this report.

7.1 Radiated Disturbance

30MHz~1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
87.000000	25.00	10.9	40.0	15.0	109.0	196.00	VERTICAL
147.300000	21.30	9.0	43.5	22.2	100.0	27.00	VERTICAL
234.180000	26.80	13.8	46.0	19.2	127.0	176.00	HORIZONTAL
360.000000	24.70	17.4	46.0	21.3	100.0	359.00	HORIZONTAL
600.960000	30.50	22.6	46.0	15.5	100.0	131.00	VERTICAL
796.620000	35.00	24.9	46.0	11.0	100.0	284.00	HORIZONTAL

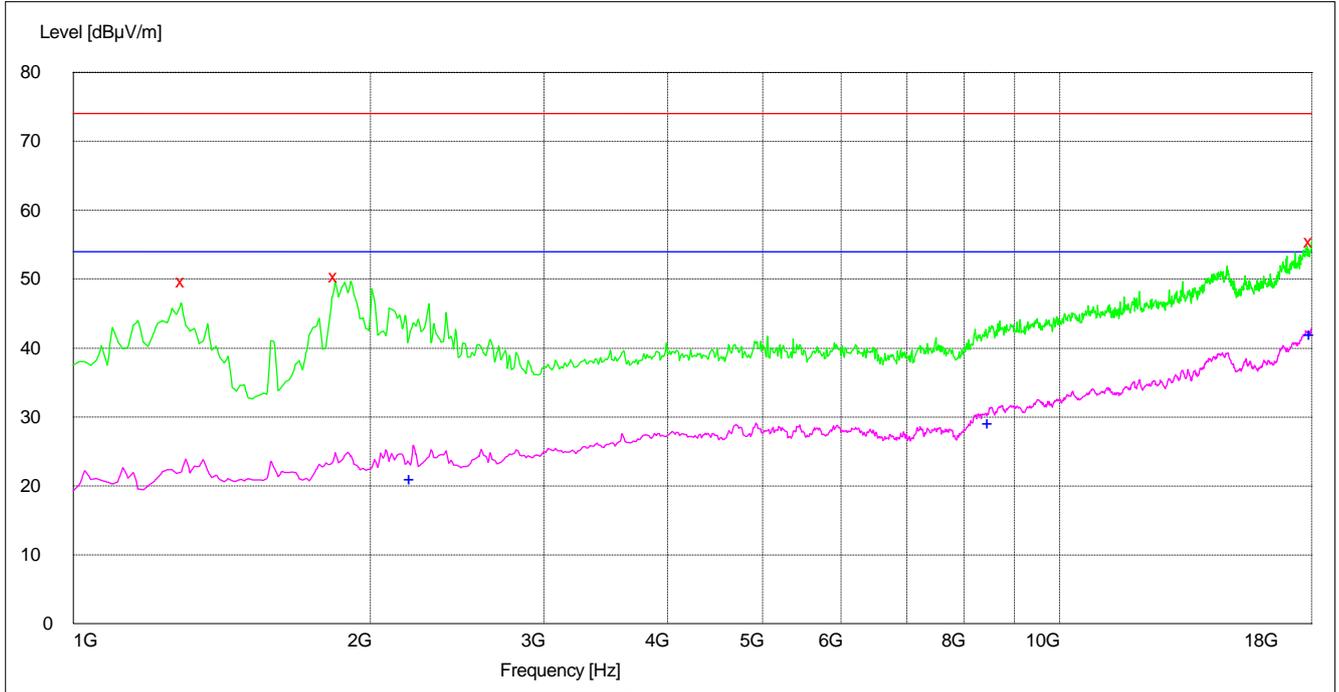
Note:

Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

The reading level is calculated 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
1293.100000	49.70	-14.4	74.0	24.3	100.0	147.00	VERTICAL
1847.700000	50.40	-11.4	74.0	23.6	107.0	116.00	VERTICAL
17998.500000	55.50	21.3	74.0	18.5	148.0	328.00	VERTICAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2203.900000	20.90	-10.0	54.0	33.1	134.0	327.00	VERTICAL
8499.700000	29.10	4.3	54.0	24.9	100.0	177.00	HORIZONTAL
17997.000000	42.00	21.3	54.0	12.0	100.0	181.00	VERTICAL

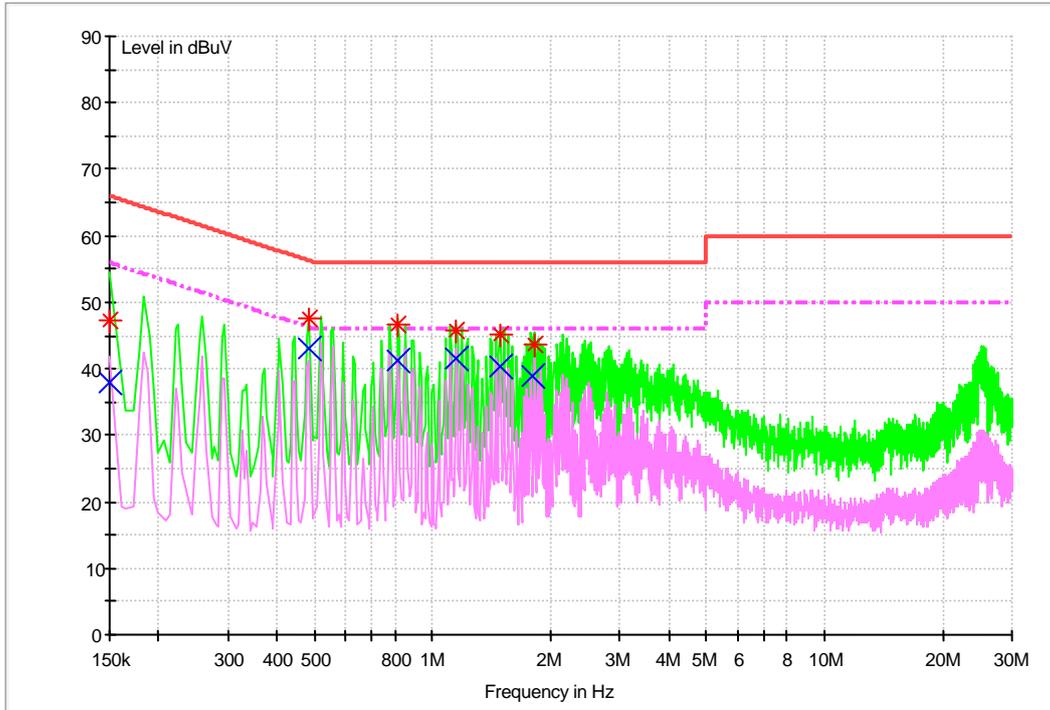
Note:

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



7.2 Conducted Disturbance

AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dB μ V	Line	Transd dB	Margin dB	Limit dB μ V	PE
0.150371	47.4	L1	9.7	18.6	66.0	FLO
0.481662	47.7	L1	9.7	8.6	56.3	FLO
0.816007	46.5	N	9.7	9.5	56.0	FLO
1.149390	45.8	N	9.7	10.2	56.0	FLO
1.481486	45.3	N	9.7	10.7	56.0	FLO
1.819253	43.6	N	9.7	12.4	56.0	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB μ V	Line	Transd dB	Margin dB	Limit dB μ V	PE
0.150602	37.9	N	9.7	18.1	56.0	FLO
0.481302	43.0	N	9.7	3.3	46.3	FLO
0.813161	41.3	L1	9.7	4.7	46.0	FLO
1.145768	41.5	N	9.7	4.5	46.0	FLO
1.479360	40.3	N	9.7	5.7	46.0	FLO
1.815638	38.3	N	9.7	7.7	46.0	FLO

Note:

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



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

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