



EMC Test Report

Product Name:LTE USB Rotator

Model Number:E3276s-500

Report No: SYBH(Z-EMC)065092012-2

FCC ID:QISE3276S-500

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: Sep.17, 2012
Start Date of Test: Sep.17, 2012
End Date of Test: Sep.22, 2012

Test Result: Pass

**Approved By
(Lab Manager)**

2012-09-26
Date

Liuchunlin
Name

Liuchunlin

Signature

Operator

2012-09-26
Date

Daniel
Name

Daniel

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
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 USB Rotator
Model Number	E3276s-500
Serials Number	Z2U01A9272600245
TX Frequency	GSM850:824MHz To 849MHz; GSM1900:1850MHz To 1910MHz WCDMA BAND II:1850MHz To 1910MHz WCDMA BAND IV: 1710MHz To 1755MHz WCDMA BNAD 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
RX Frequency	GSM850:869MHz To 894MHz; GSM1900:1930MHz To 1990MHz WCDMA BAND II:1930MHz To 1990MHz WCDMA BAND IV: 2110MHz To 2155MHz WCDMA BNAD V:869MHz To 894MHz LTE BAND 2: 1930MHz To 1990MHz LTE BAND 4:1805MHz To 1880MHz LTE BAND 5: 869MHz To 894MHz 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

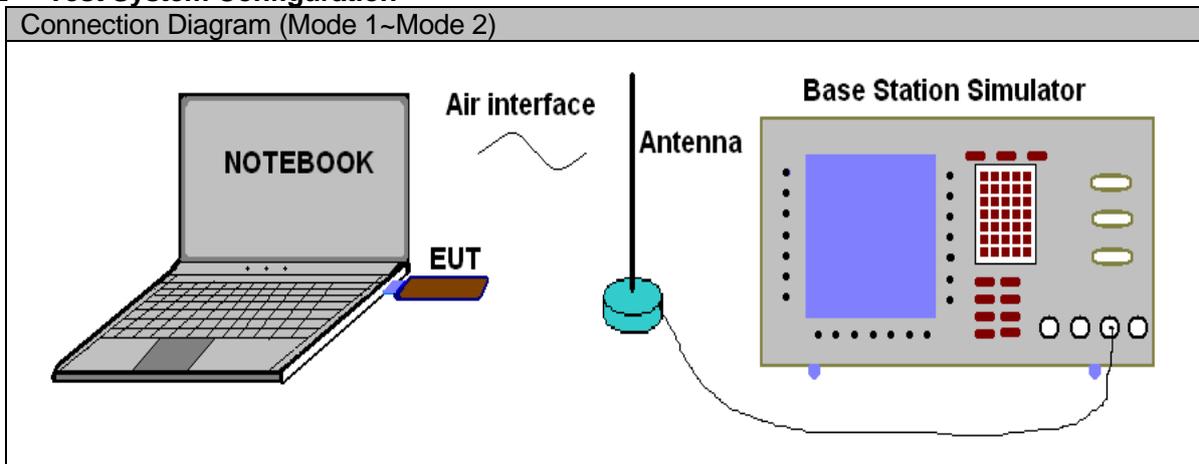
Traffic Mode:

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

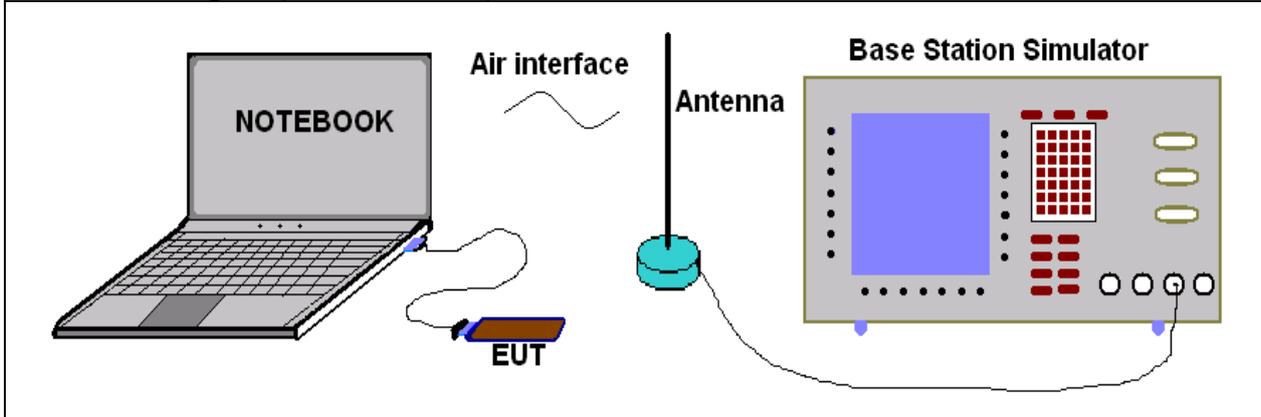
Idle Mode:

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

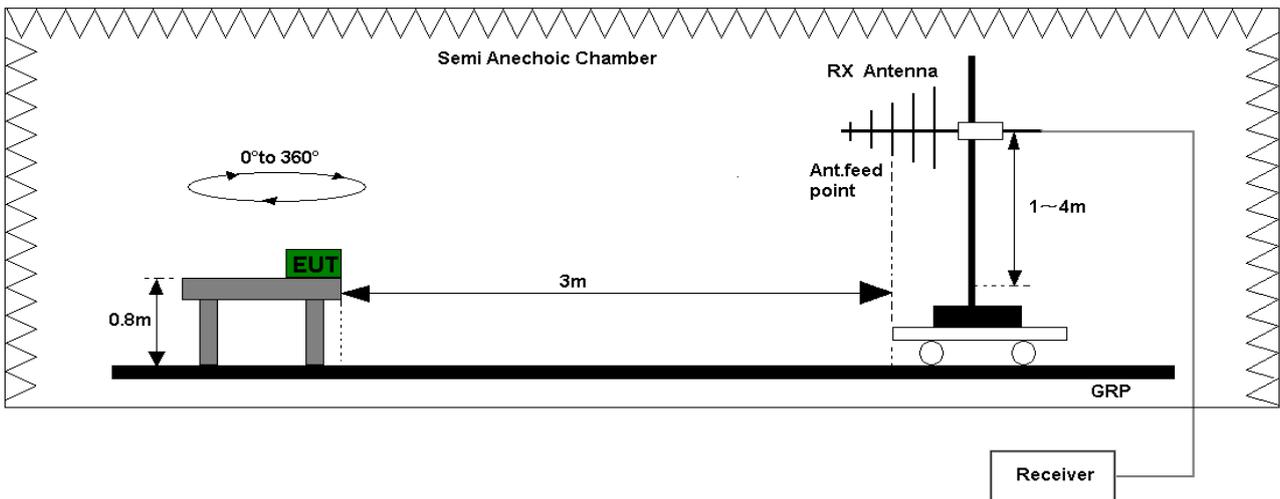


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

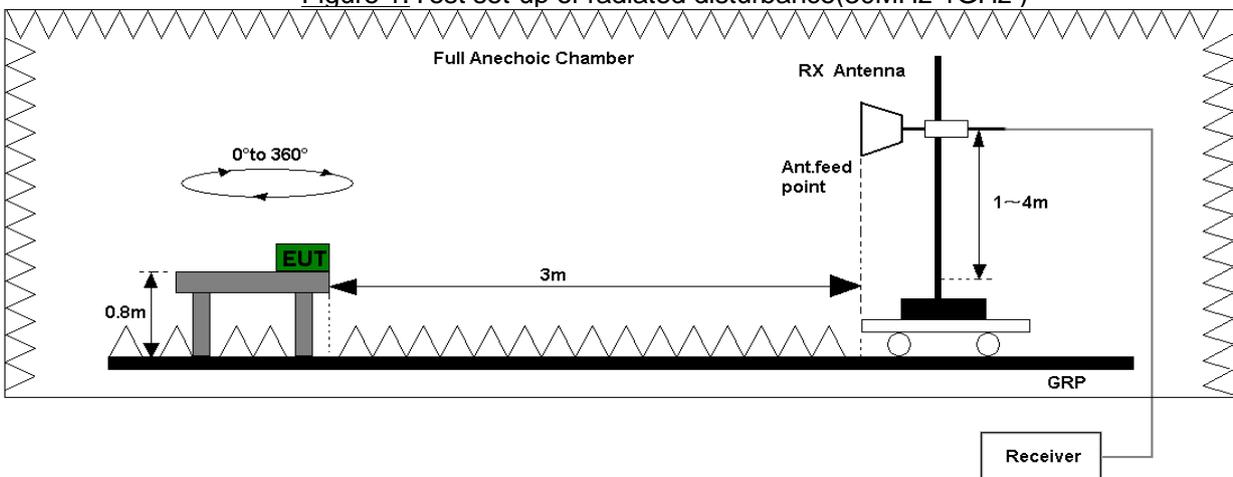


Figure 2. Test set-up of radiated disturbance(above 1GHz)



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

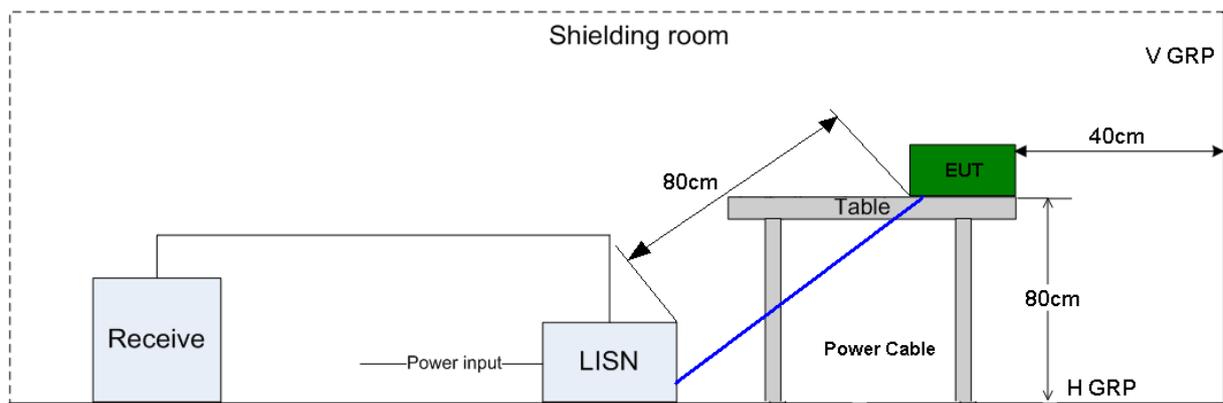


Figure 3. Test Set-up of conducted disturbance

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

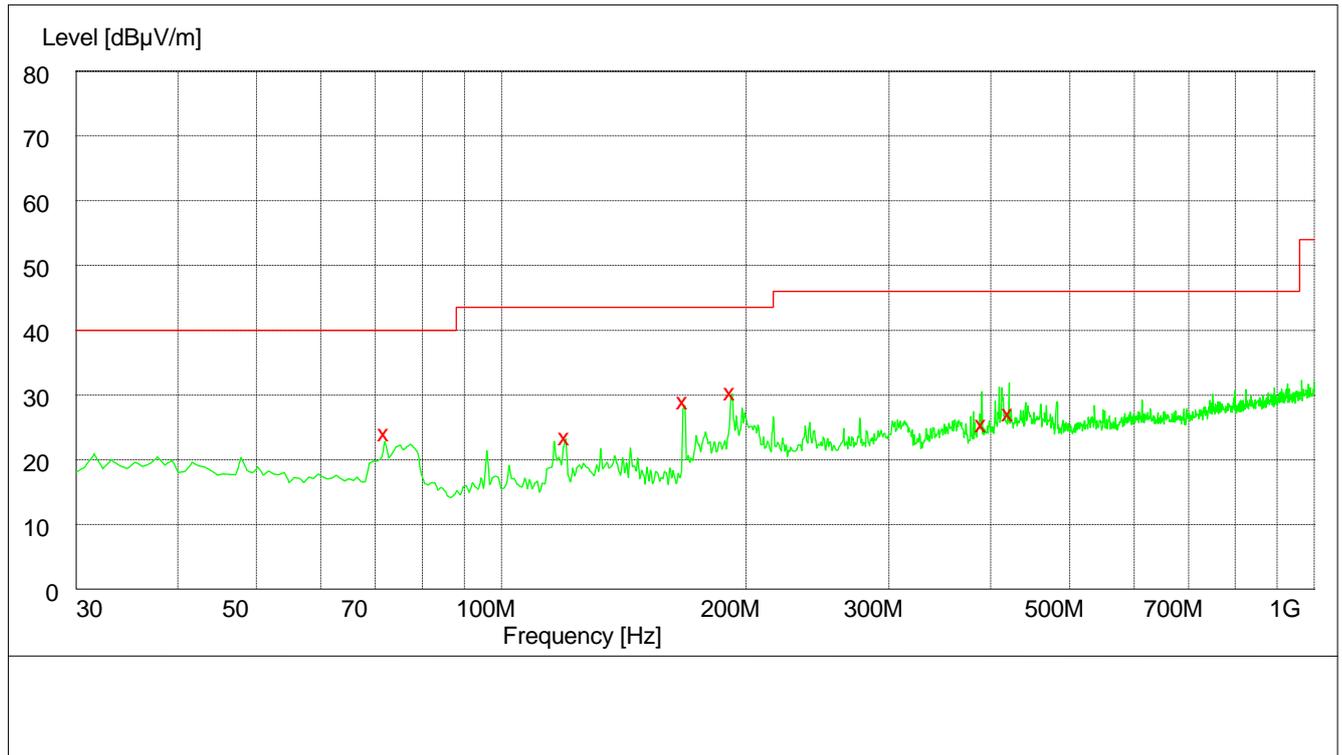


7 Test Data and Graph

Only the worst test result was shown in this report.

7.1 Radiated Disturbance

30MHz~1GHz



MEASUREMENT RESULT: QP Detector

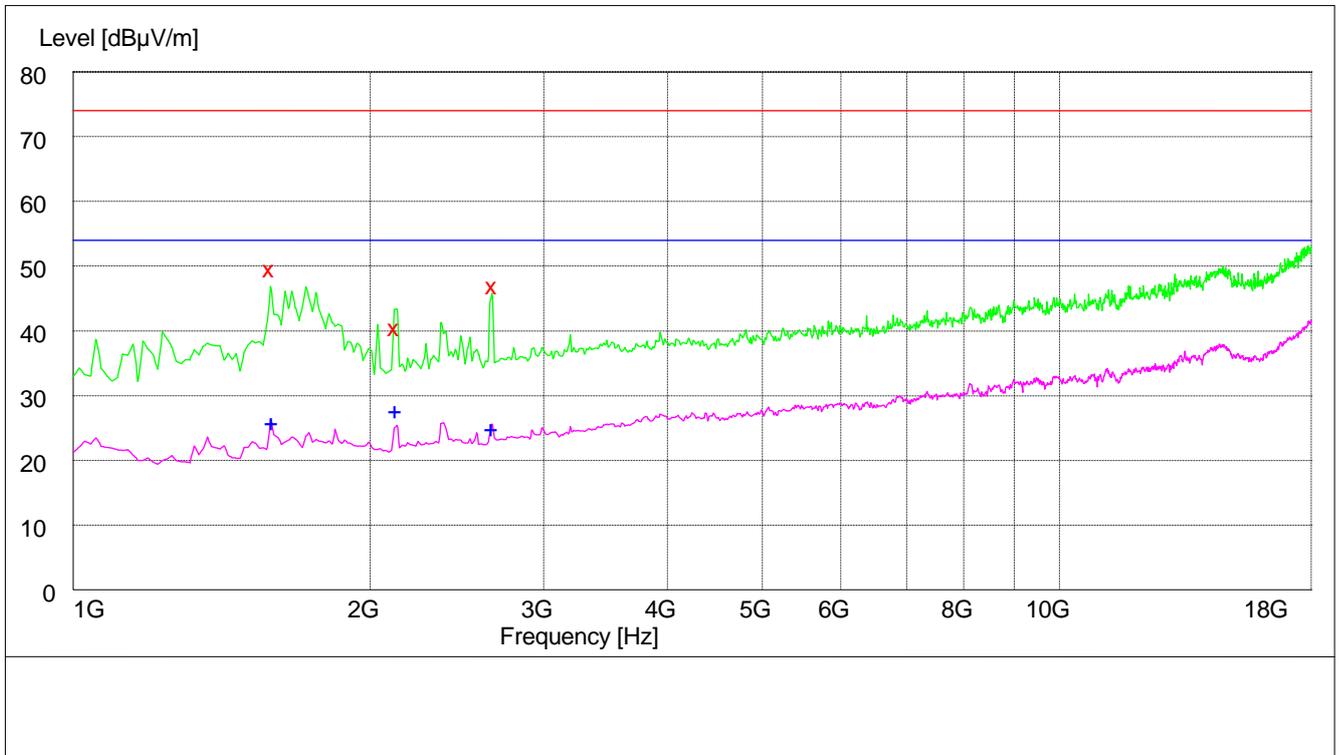
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
72.000000	24.70	10.7	40.0	15.3	142.0	17.00	VERTICAL
120.060000	24.10	11.4	43.5	19.4	200.0	254.00	HORIZONTAL
168.000000	29.60	10.5	43.5	13.9	147.0	311.00	HORIZONTAL
192.000000	30.90	12.1	43.5	12.6	168.0	342.00	HORIZONTAL
390.780000	26.00	17.1	46.0	20.0	137.0	189.00	VERTICAL
421.260000	27.70	17.9	46.0	18.3	120.0	47.00	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
1585.300000	50.10	14.0	74.0	23.9	124.0	107.00	VERTICAL
2122.700000	41.00	11.4	74.0	33.0	112.0	11.00	VERTICAL
2664.200000	47.40	9.6	74.0	26.6	100.0	105.00	VERTICAL

MEASUREMENT RESULT: AV Detector

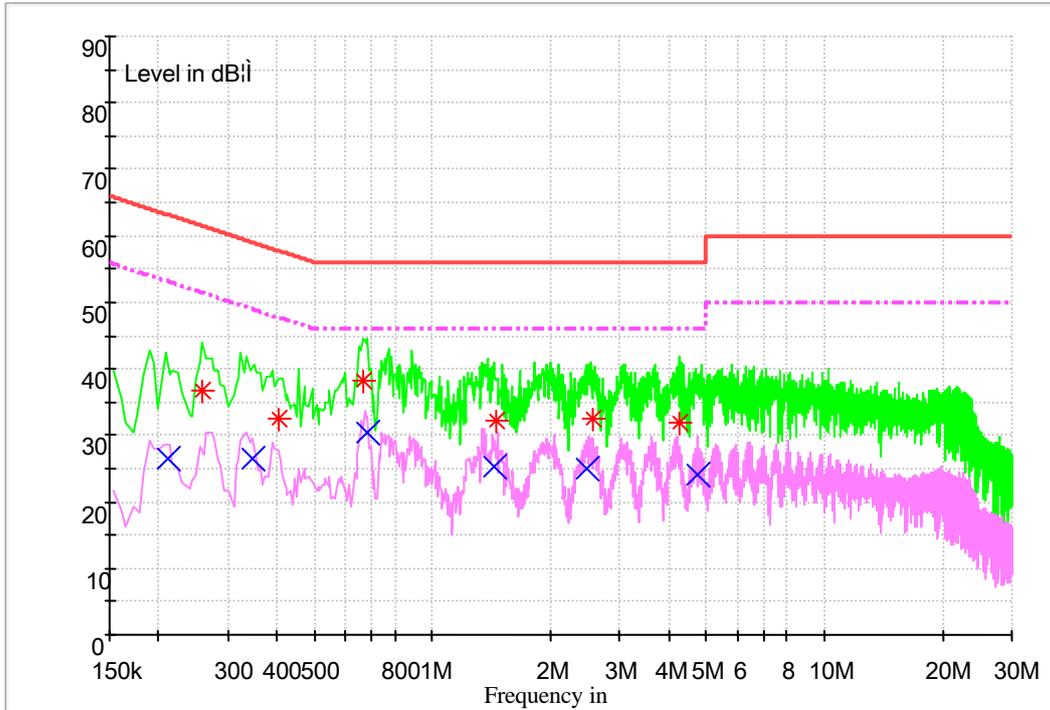
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1592.300000	26.30	-14.0	54.0	27.7	126.0	110.00	VERTICAL
2126.800000	28.20	-11.4	54.0	25.8	111.0	177.00	VERTICAL
2663.700000	25.50	-9.6	54.0	28.5	100.0	101.00	VERTICAL

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

AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.258026	36.7	9.7	61.5	24.8	L1	FLO
0.405134	32.6	9.7	57.7	25.1	L1	FLO
0.663964	38.2	9.7	56.0	17.8	N	FLO
1.450632	32.2	9.7	56.0	23.8	L1	FLO
2.571889	32.4	9.7	56.0	23.6	L1	FLO
4.280250	31.8	9.8	56.0	24.2	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.211121	26.5	9.7	53.2	26.7	L1	FLO
0.346766	26.4	9.7	49.0	22.6	L1	FLO
0.678338	30.3	9.7	46.0	15.7	N	FLO
1.430295	25.3	9.7	46.0	20.7	N	FLO
2.481518	25.0	9.7	46.0	21.0	L1	FLO
4.762605	24.0	9.8	46.0	22.0	N	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**-----