



# EMC Test Report

**Product Name: Mobile WiFi**

**Model Number: E589u-512**

**Report No: SYBH(Z-EMC)029072012-2**

**FCC ID: QISE589U-512**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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## 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.
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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.07, 2012  
**Start Date of Test:** Jul.07, 2012  
**End Date of Test:** Jul.08, 2012

**Test Result:** Pass

**Approved By  
(Lab Manager)**

2012-07-11  
Date

Liu Chunlin  
Name



Signature

**Operator**

2012-07-11  
Date

Xiang Zaiji  
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	Mobile WiFi
Model Number	E589u-512
Serials Number	Y3E01A9262900087
TX Frequency	GSM850: 824MHz To 849MHz GSM1900: 1850MHz To 1910MHz WCDMA Band II: 1850MHz To 1910MHz WCDMA Band V: 824MHz To 849MHz LTE BAND 2: 1850MHz To 1910MHz LTE BAND 4: 1710MHz To 1755MHz LTE BAND 7:2500MHz To 2570MHz WIFI: 2400MHz To 2483.5MHz
RX Frequency	GSM850: 869MHz To 894MHz GSM1900: 1930MHz To 1990MHz WCDMA Band II: 1930MHz To 1990MHz WCDMA Band V: 869MHz To 894MHz LTE BAND 2: 1930MHz To 1990MHz LTE BAND 4: 2110MHz To 2155MHz LTE BAND 7:2620MHz To 2690MHz WIFI: 2400MHz To 2483.5MHz
HW Version	CL1E589M22
SW Version	11.433.13.C0.167
EUT Accessory	
Data cable	Manufacturer: Huawei Technologies Co., Ltd. Terminal Accessory, Data Cable, USB A Male to Micro USB 120cm, Black no Braid 360 Degree Rotate Test Standard, Terminal Dedicated.
Adapter	Brand: HUAWEI Model: HW-050200U3W Input Voltage :100-240V~ 50/60Hz, 0.5A MAX Output:  5.0V 2.0A SN: XQAAC41602164 SN: HKAAC50202030
Li-ion Battery	Brand: HUAWEI Model: HB5P1H Rated capacity: 3000mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V

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

## 2 Summary of Results

Summary of Results				
Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
Radiated Emissions Enclosure Port	Mode1 Mode3	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 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 with Adapter+ Idle Mode
Mode 2:	EUT with Adapter+ Traffic Mode
Mode 3:	EUT with PC+ Idle Mode
Mode 4:	EUT with PC+ 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.

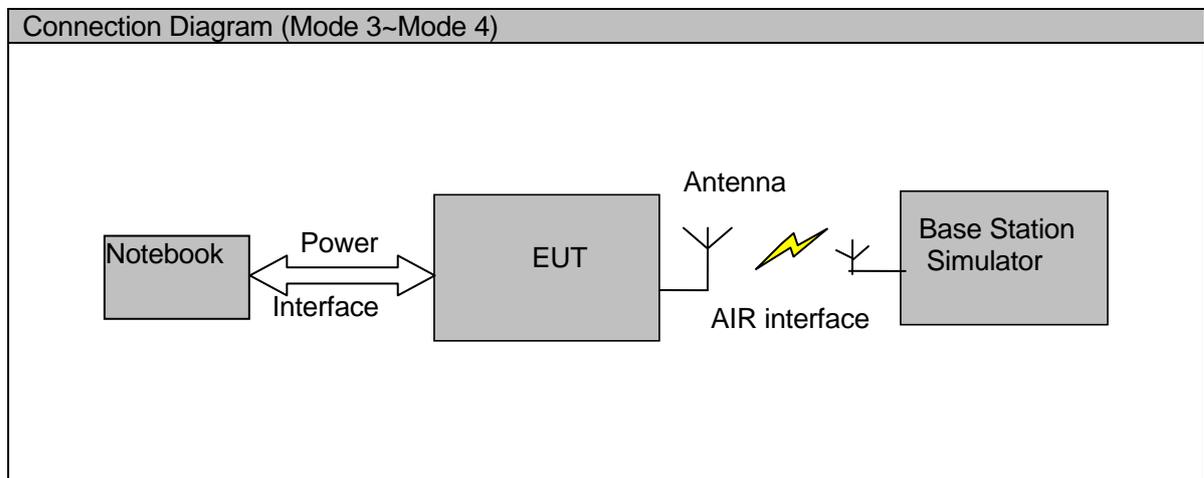
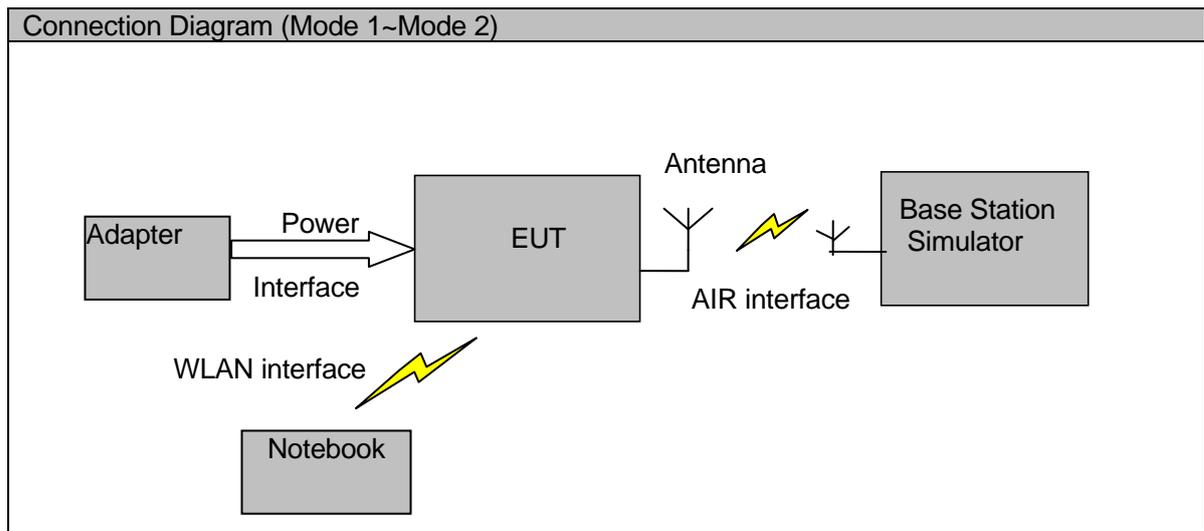
Traffic Mode:

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



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**3.3 Cables Used during Test**

Cable	Quantity	Length	Type of Cable
USB Cable	1	<3m	shielded

**3.4 Associated Equipment Used during Test**

Name	Model	Manufacturer	S/N	Calibrated Deadline
Radio Communication Tester	CMU200	R&S	1117057	2012-9-3
Notebook	D360	DELL	3108061272	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 receiving antenna has two polarizations V and H.

EUT was configured in idle mode and the test performed at worst emission state.

#### 4.1.2 Test setup

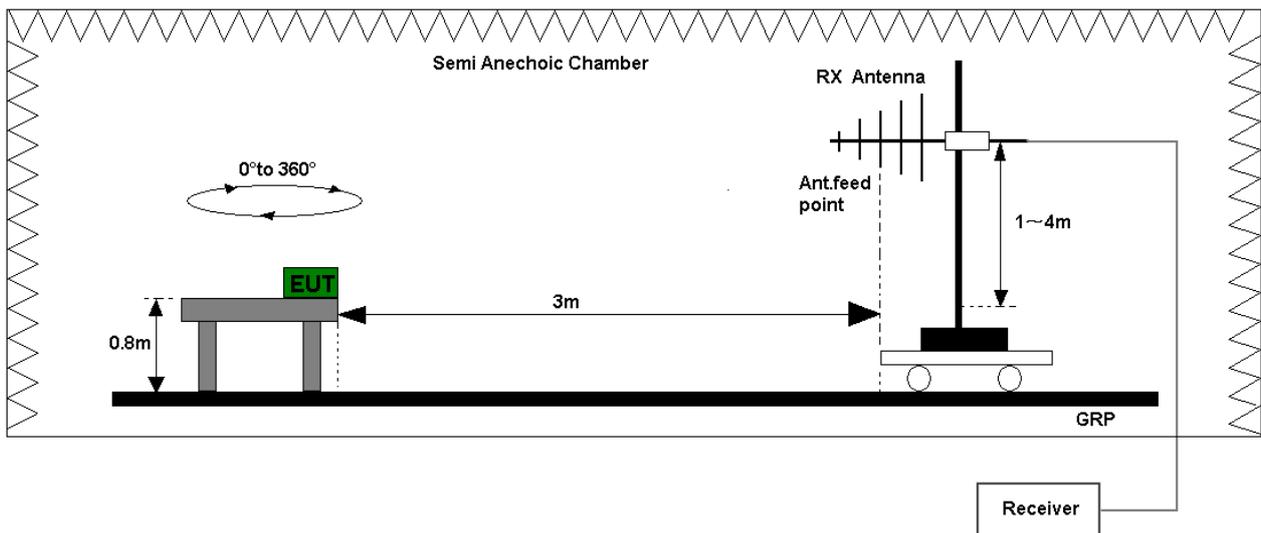


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz )

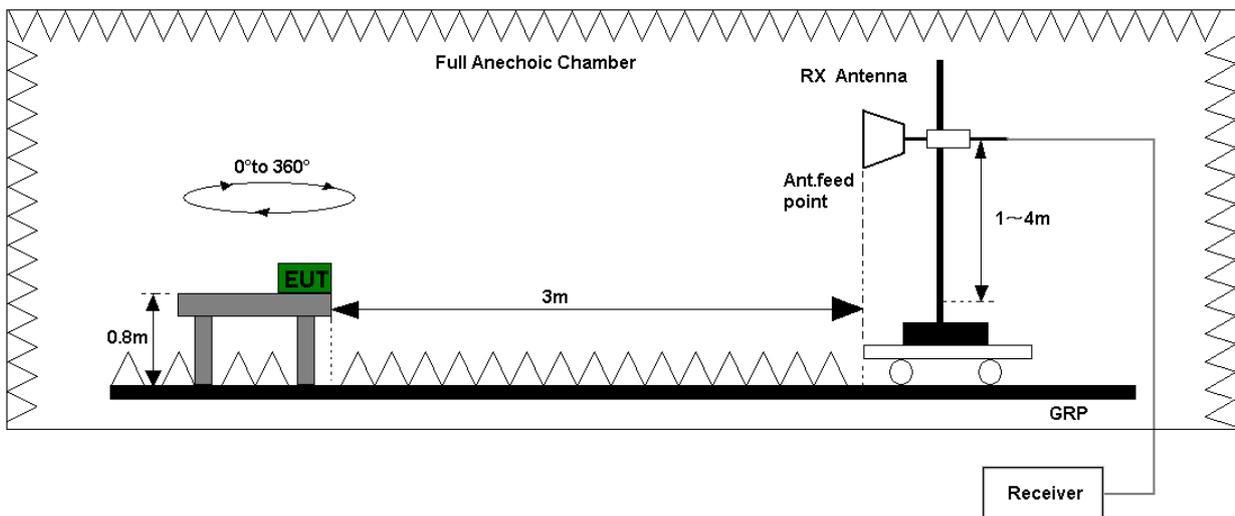


Figure 2. Test set-up of radiated disturbance(above 1GHz)

### 4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.  
Refer to the section 7.1 of this report for test data.

Test Limits (Class B)				
Frequency of Emission (MHz)	Radiated Limit			
	Unit( $\mu$ V/m)		Unit(dB $\mu$ 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 150kHz to 30 MHz: 9 kHz;

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

### 4.2.2 Test Setup

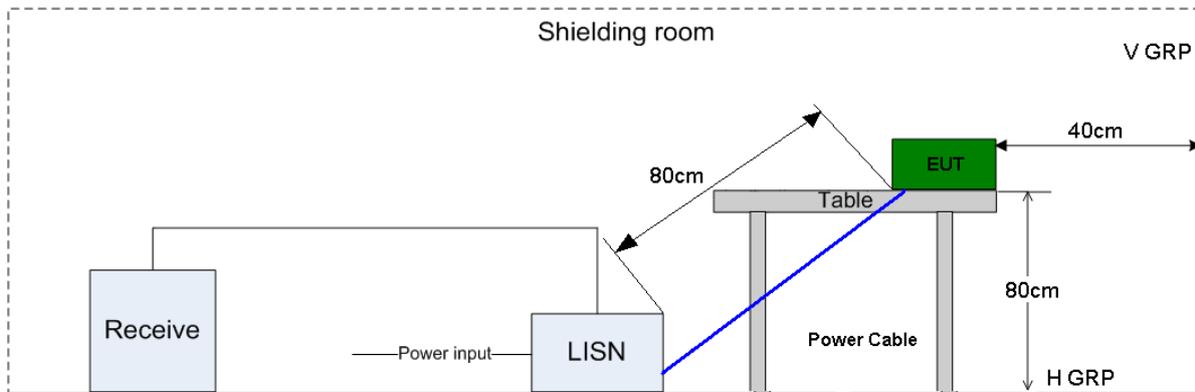


Figure 3. Test Set-up of conducted disturbance

### 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 $\mu$ V)	AV (dB $\mu$ 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
RE/CE	EMI Test receiver	ESU26	100150	R&S	May.27, 2013
	EMI Test receiver	ESCI	101163	R&S	Mar.05, 2013
	Broadband Antenna	VULB 9163	9163-941	SCHWARZBEC K	Jul.07, 2013
	Horn Antenna	HF906	10084	R&S	May.15, 2013
	Artificial Mains Network	ENV216	100382	R&S	Mar.21, 2013
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:

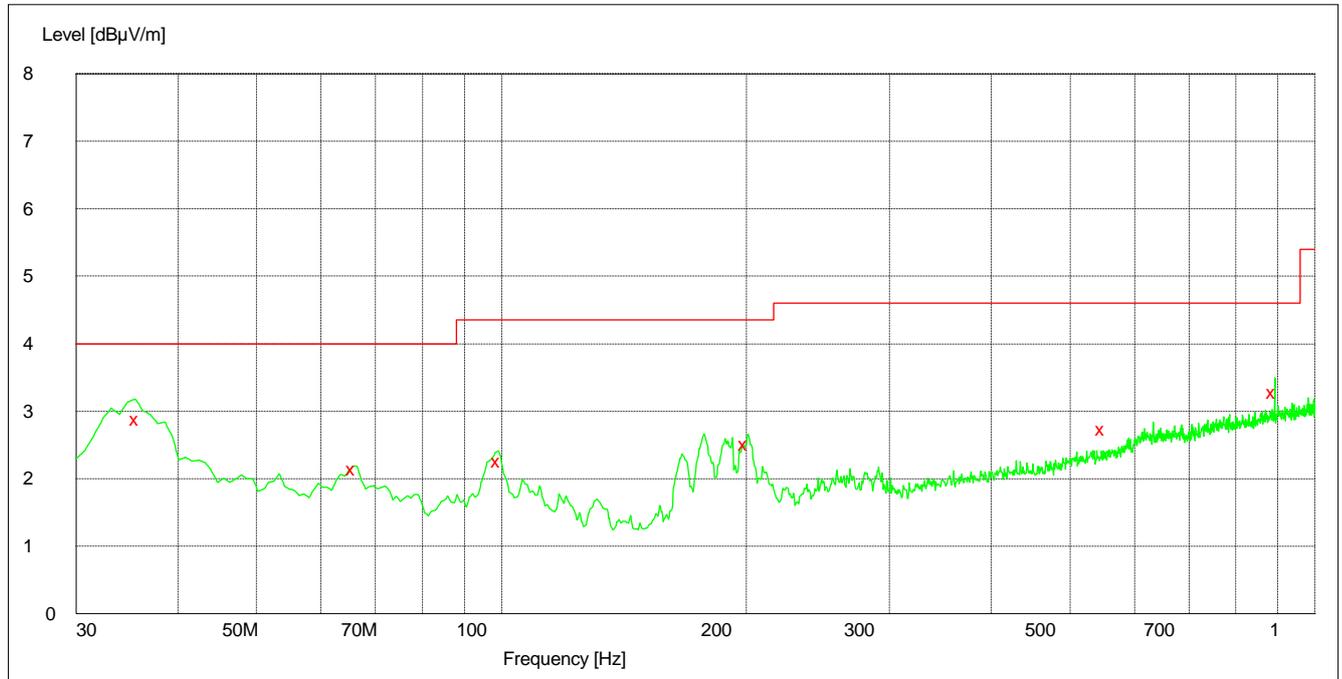
System Measurement Uncertainty		
Items	Extended Uncertainty	
RE(30MHz-1GHz)	Field strength (dB $\mu$ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB $\mu$ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB $\mu$ V)	U=2.6dB; k=2

## 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

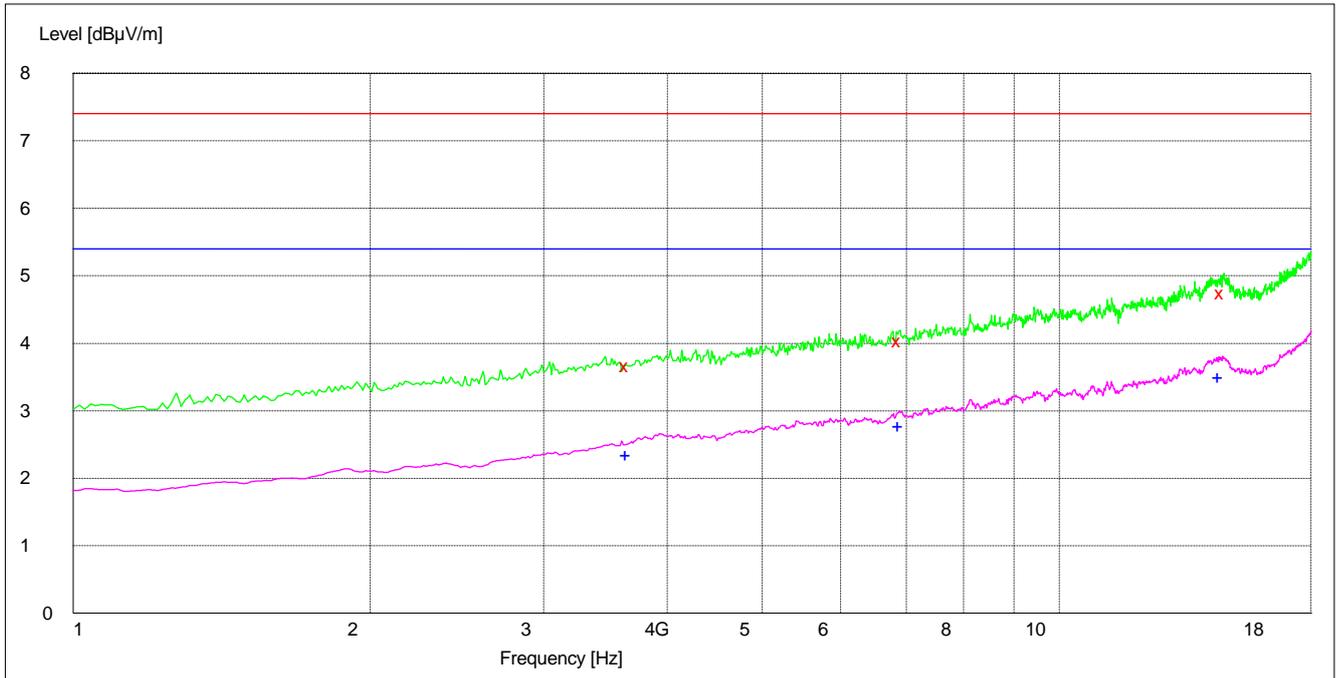
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
35.700000	28.70	15.0	40.0	11.3	100.0	359.00	VERTICAL
65.880000	21.30	11.6	40.0	18.7	101.0	139.00	VERTICAL
99.300000	22.60	13.4	43.5	20.9	102.0	125.00	VERTICAL
200.160000	25.10	12.3	43.5	18.4	100.0	337.00	VERTICAL
549.360000	27.30	19.8	46.0	18.7	100.0	205.00	HORIZONTAL
892.320000	32.70	24.8	46.0	13.3	149.0	343.00	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.

### 7.1.2 1GHz~18GHz



#### MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3648.500000	36.60	-5.7	74.0	37.4	200.0	23.00	HORIZONTAL
6894.900000	40.40	2.4	74.0	33.6	200.0	197.00	VERTICAL
14647.900000	47.40	14.3	74.0	26.6	175.0	253.00	VERTICAL

#### MEASUREMENT RESULT: AV Detector

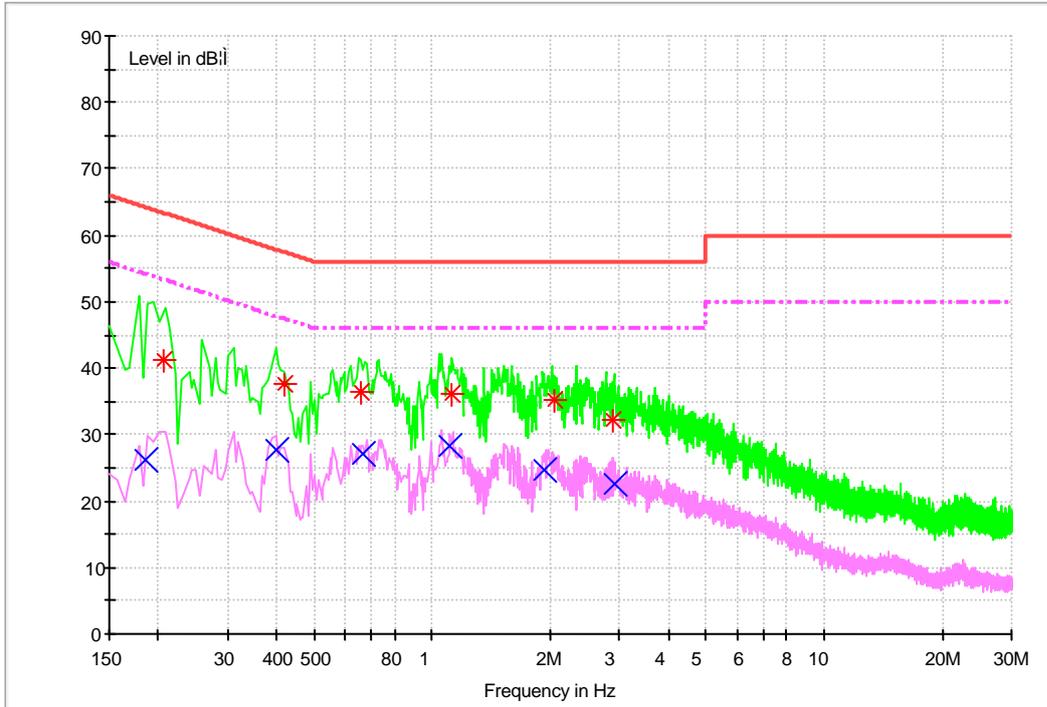
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3653.000000	23.50	-5.7	54.0	30.5	197.0	214.00	VERTICAL
6897.400000	27.70	2.4	54.0	26.3	200.0	1.00	VERTICAL
14544.600000	35.00	14.5	54.0	19.0	100.0	274.00	VERTICAL

**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 MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.206779	41.4	9.7	63.3	21.9	N	FLO
0.417432	37.7	9.7	57.5	19.8	N	FLO
0.658680	36.3	9.7	56.0	19.7	N	FLO
1.121602	36.3	9.7	56.0	19.7	N	FLO
2.056354	35.1	9.7	56.0	20.9	N	FLO
2.876726	32.3	9.7	56.0	23.7	N	FLO

#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.185666	26.3	9.7	54.2	27.9	N	FLO
0.399184	27.6	9.7	47.9	20.3	N	FLO
0.662168	26.9	9.7	46.0	19.1	N	FLO
1.108125	28.2	9.7	46.0	17.8	N	FLO
1.934089	24.6	9.7	46.0	21.4	N	FLO
2.926058	22.6	9.7	46.0	23.4	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**-----