



# EMC Test Report

**Product Name: Vodafone Mobile Wi-Fi**

**Model Number: R215**

**Report No: SYBH(Z-EMC)130052013-2**

**FCC ID: QISR215**

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

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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:** Jul.02, 2013  
**Start Date of Test:** Jul.02, 2013  
**End Date of Test:** Jul.08, 2013

**Test Result:** Pass

**Approved By  
(Lab Manager)**

2013-07-10  
Date

Liu Chunlin  
Name



Signature

**Operator  
(Test Engineer)**

2013-07-10  
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	Vodafone Mobile Wi-Fi
Model Number	R215
Serials Number	B2C01A9370100016
TX Frequency	GSM850: 824MHz To 849MHz GSM1900: 1850MHz To 1910MHz WCDMA Band V: 824MHz To 849MHz LTE Band 7: 2500MHz To 2570MHz WIFI 2.4G: 2412MHz To 2452MHz WIFI 5G: 5180MHz To 5240MHz, 5745MHz To 5825MHz
RX Frequency	GSM850: 869MHz To 894MHz GSM1900: 1930MHz To 1990MHz WCDMA Band V: 869MHz To 894MHz LTE Band 7: 2620MHz To 2690MHz WIFI 2.4G: 2412MHz To 2452MHz WIFI 5G: 5180MHz To 5240MHz, 5745MHz To 5825MHz
HW Version	CL1E5372SM
SW Version	21.221.15.00.11
EUT Accessory	
Data cable	Terminal Accessory, Black Cable, Terminal Dedicated
Adapter	BRAND: HUAWEI Model: HW-050100U1W Input:100-240V~ 50/60Hz, 0.2A MAX Output: 5.0V  1.0A SN: HWAB22169123 SN: TPAC61902097
Li-ion Battery	BRAND: HUAWEI Model: HB5F2H Rated capacity: 1780mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V SN: YRCD222920100160 SN: YAICC10X20100019
Li-ion Battery	BRAND: HUAWEI Model: HB554666RAW Rated capacity: 1500mAh Nominal Voltage:  +3.7V Charging Voltage:  +4.2V SN: 0000SCD412 SN: SID428

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 15:2012, 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.

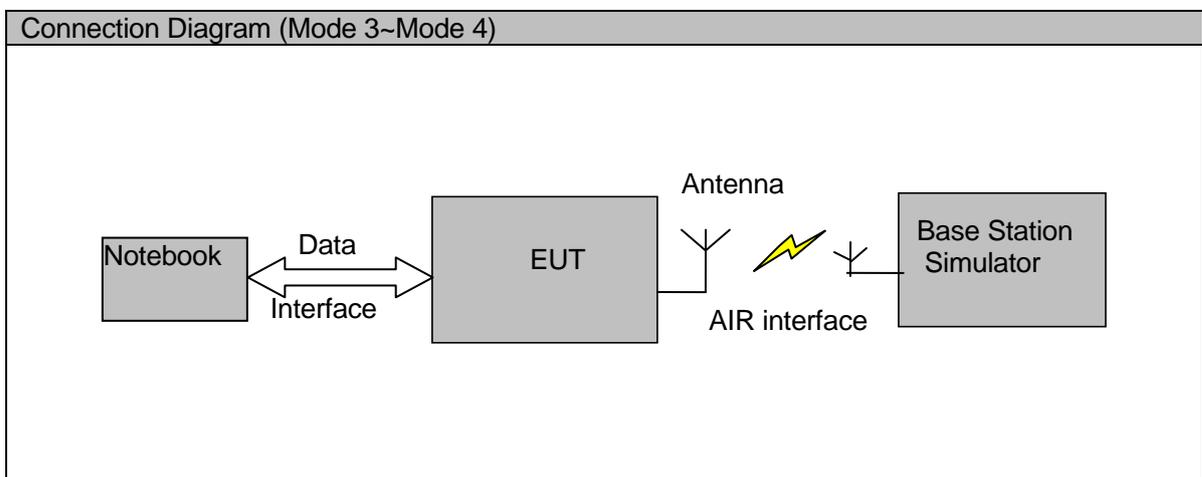
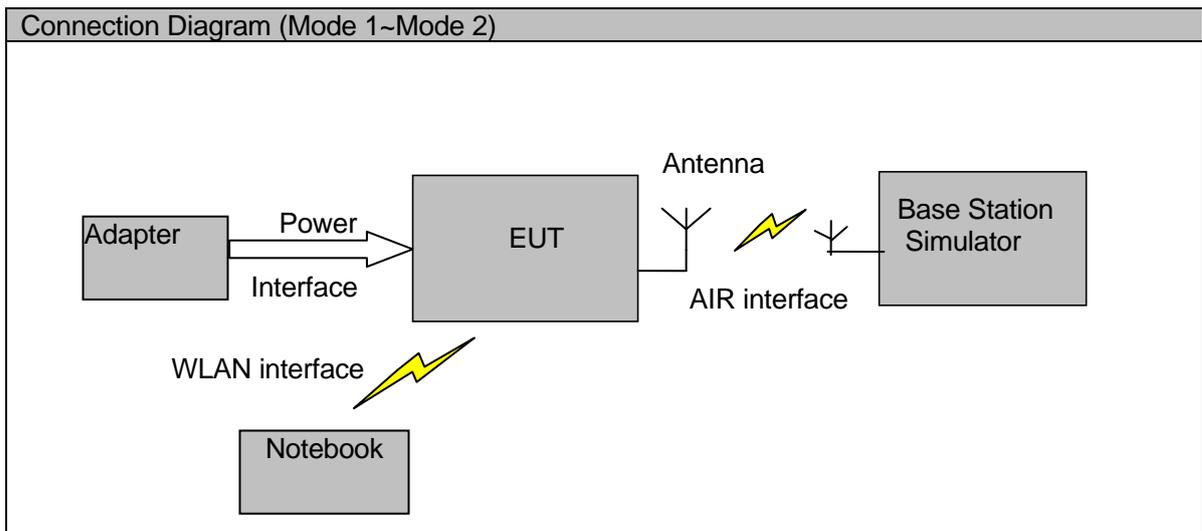
Traffic Mode:

When the EUT state is switched on and with Radio Resource Control (RRC) connection established.

Idle Mode:

When the EUT state is switched on but without Radio Resource Control (RRC) connection.

#### 3.2 Test System Configuration



### 3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
USB Cable	1	100cm	shielded

### 3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval (month)
Radio Communication tester	CMU200	R&S	3608082535	2013-09-22	12
Radio Communication tester	CMW500	R&S	A111278719	2013-08-01	12
Notebook	X200	Lenovo	A100502902	/	/

## 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 is 3m. The set-up and test methods are according to ANSI C63.4-2009.

A preliminary scan and a final scan of the emissions are made from 30 MHz to 18 GHz by using test script of software; The emissions are measured using Quasi-Peak Detector (30MHz~1GHz) and AV/PK detector (above 1GHz). The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna is 1m to 4m. The azimuth range of turntable is 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 is configured in idle mode and the test performed at worst emission state.

#### 4.1.2 Test setup

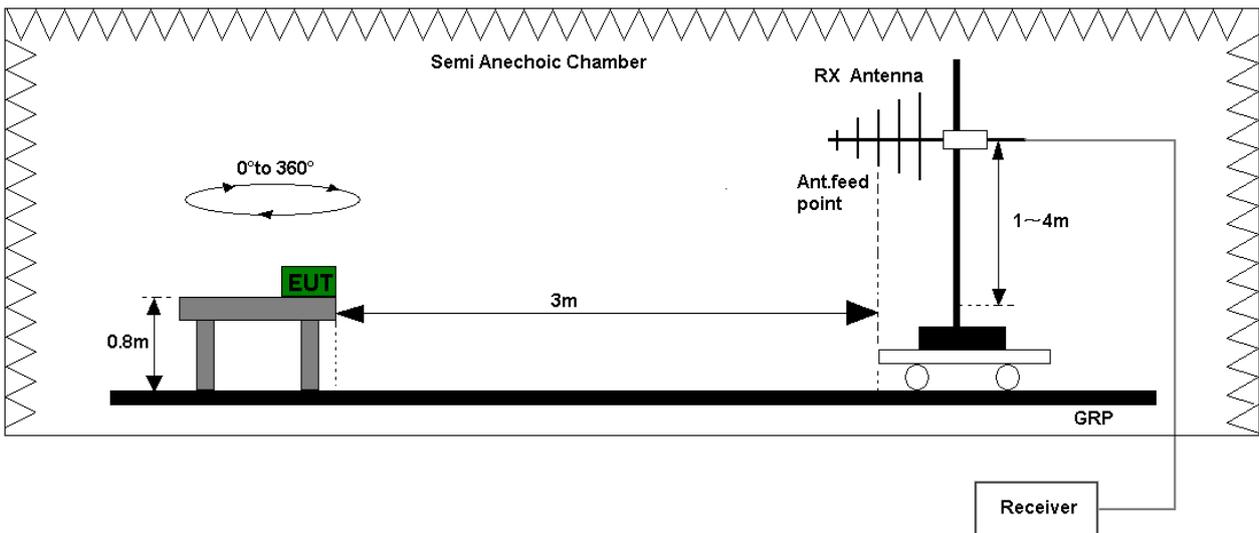


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

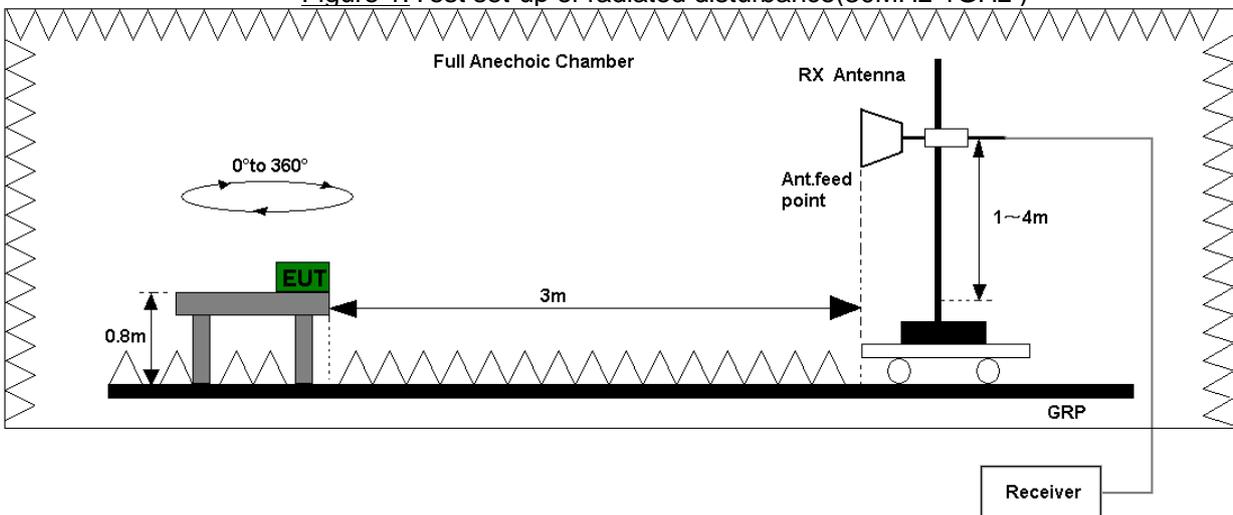


Figure 2. Test set-up of radiated disturbance(above 1GHz)

### 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 is placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT is connected to LISN and LISN is connected to reference Ground Plane. EUT is 80cm away from LISN. The set-up and test methods are according to ANSI C63.4-2009. Conducted Disturbance at AC Port measurements are undertaken on the L and N Lines. The emissions are measured using a Quasi-Peak Detector and Average Detector.

EUT is 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 is set in the shielded chamber and operated under nominal conditions.

### 4.2.2 Test Setup

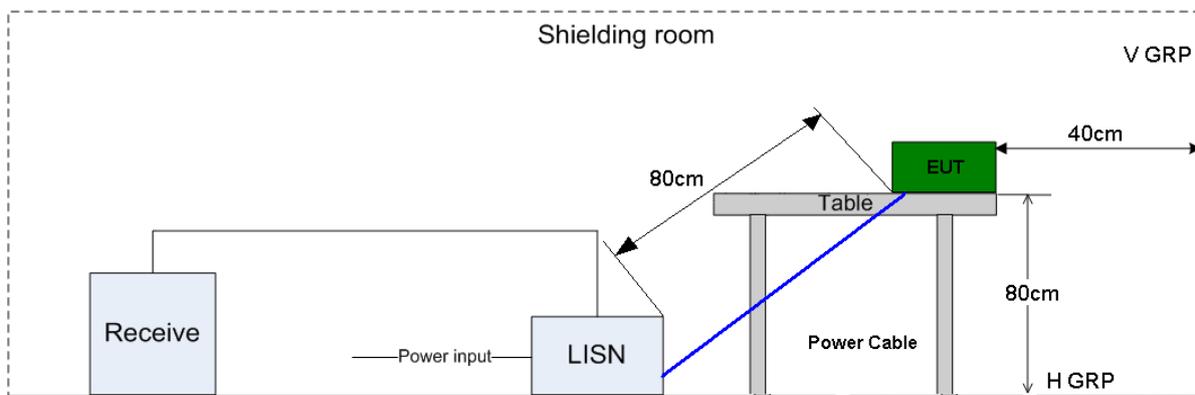


Figure 3. Test Set-up of conducted disturbance

### 4.2.3 Test Results

The EUT has met requirements for Conducted disturbance of power lines. 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	Cal interval (month)
RE	EMI Test receiver	ESU26	100150	R&S	May.14, 2014	12
	Broadband Antenna	VULB 9163	9163-356	SCHW ARZBECK	May.27, 2014	24
	Horn Antenna	HF906	100683	R&S	Feb.01, 2015	24
CE	Artificial Mains Network	ENV216	100382	R&S	Jan.28, 2014	12
	EMI Test receiver	ESCI	101163	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 are:

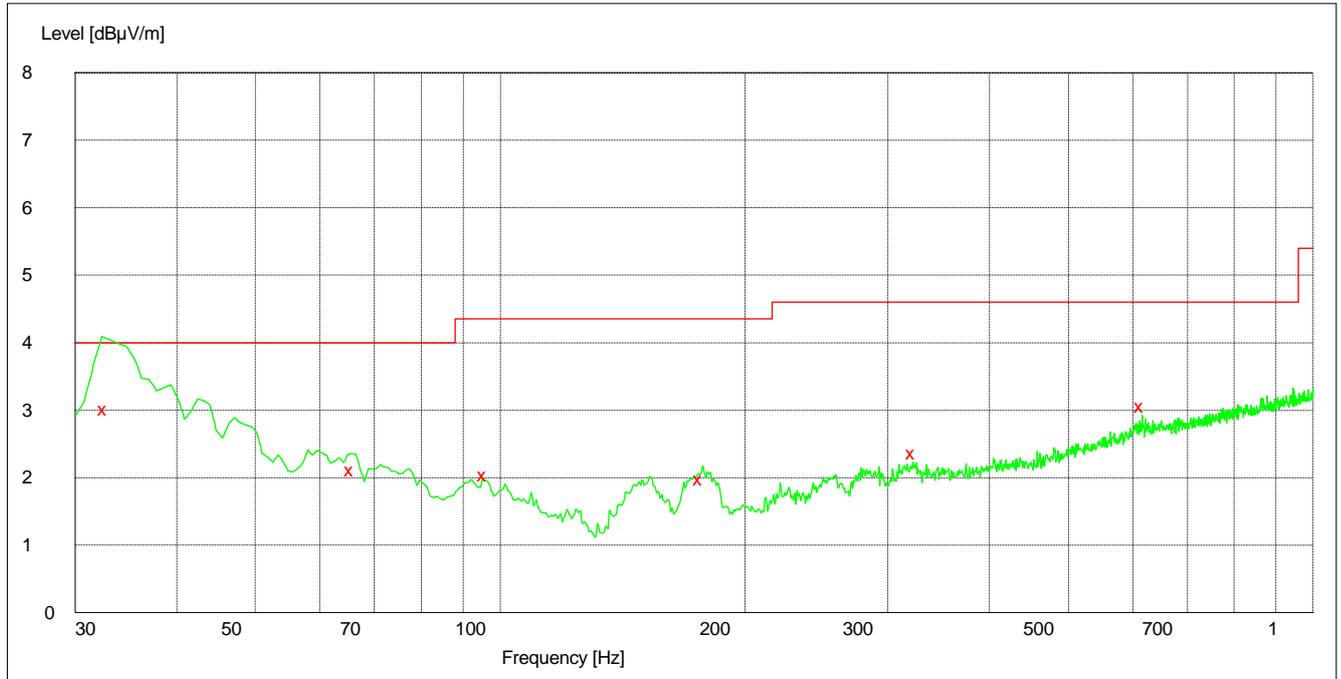
System Measurement Uncertainty		
Items	Extended Uncertainty	
RE(30MHz-1GHz)	Field strength (dB $\mu$ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB $\mu$ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB $\mu$ V)	U=2.6dB; k=2

## 7 Test Data and Graph

Only the worst test results are shown

### 7.1 Radiated Disturbance

#### 7.1.1 30MHz~1GHz



MEASUREMENT RESULT: QP Detector

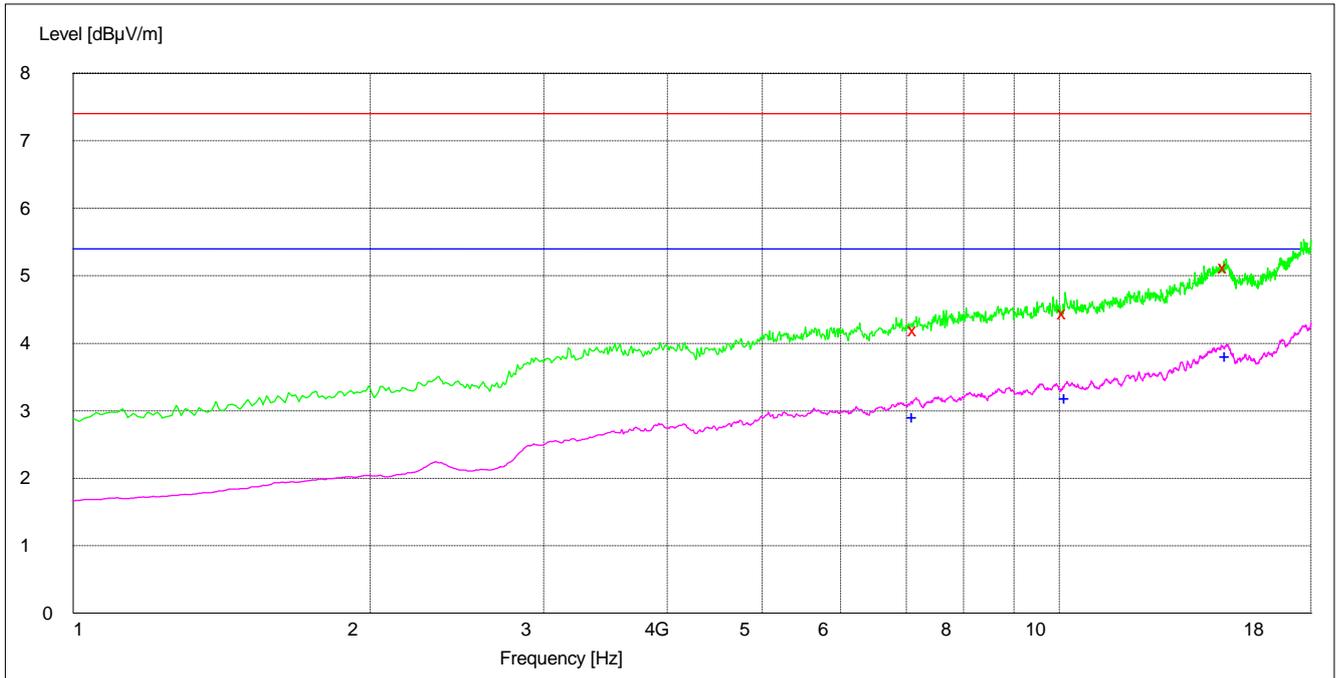
Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.700000	30.10	11.8	40.0	9.9	100.0	0.00	VERTICAL
65.760000	21.00	10.1	40.0	19.0	200.0	52.00	VERTICAL
95.820000	20.30	12.8	43.5	23.2	104.0	34.00	VERTICAL
176.700000	19.70	10.7	43.5	23.8	101.0	334.00	VERTICAL
322.500000	23.70	16.1	46.0	22.3	105.0	339.00	HORIZONTAL
616.380000	30.60	22.8	46.0	15.4	194.0	115.00	VERTICAL

Note:

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

The reading level is calculated 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
7153.300000	41.90	2.4	74.0	32.1	149.0	55.00	VERTICAL
10131.700000	44.50	6.6	74.0	29.5	139.0	112.00	VERTICAL
14759.200000	51.30	16.8	74.0	22.7	100.0	171.00	HORIZONTAL

#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transducer dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
7128.600000	29.10	2.3	54.0	24.9	100.0	358.00	VERTICAL
10174.000000	31.90	6.6	54.0	22.1	144.0	182.00	HORIZONTAL
14796.500000	38.10	16.7	54.0	15.9	109.0	44.00	VERTICAL

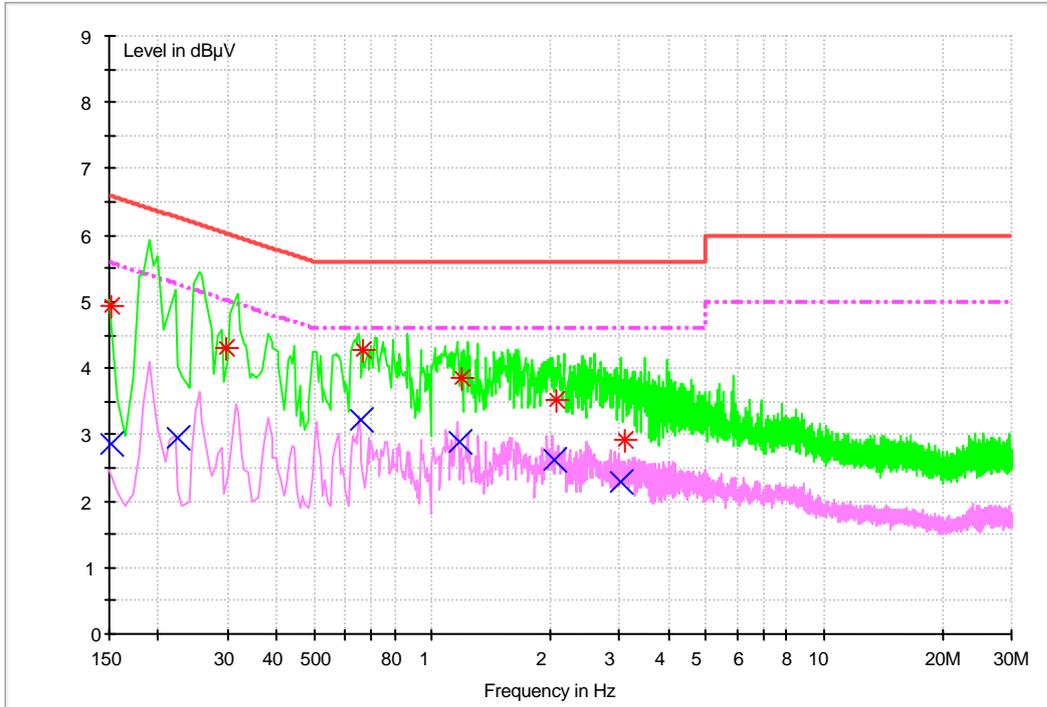
Note:

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

The reading level is calculated 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
0.150934	49.3	9.7	65.9	16.6	L1	FLO
0.296846	43.0	9.7	60.3	17.3	L1	FLO
0.663926	42.9	9.7	56.0	13.1	N	FLO
1.182214	38.5	9.7	56.0	17.5	N	FLO
2.069306	35.4	9.7	56.0	20.6	N	FLO
3.108314	29.2	9.7	56.0	26.8	L1	FLO

#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.151491	28.7	9.7	55.9	27.2	L1	FLO
0.224918	29.5	9.7	52.6	23.1	L1	FLO
0.661216	32.1	9.7	46.0	13.9	N	FLO
1.178951	29.0	9.7	46.0	17.0	N	FLO
2.059496	26.3	9.7	46.0	19.7	N	FLO
3.014760	22.8	9.7	46.0	23.2	L1	FLO

Note:

Level= Reading level+ Transducer (cable loss + correction factor)  
The reading level is calculated by software which is not shown in the sheet.



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