



EMC Test Report

Product Name: LTE Wingle

Model Number: E8372h-510

Report No: SYBH(Z-EMC)061122014-2

FCC ID: QISE8372H-510

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.
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.
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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: Dec.23,2014

Start Date of Test: Jan.04,2015

End Date of Test: Jan.06,2015

Test Result: Pass

Approved By (Lab Manager)	<u>2014-01-07</u> Date	<u>Liu Chunlin</u> Name	 Signature
Prepared by (Test Engineer)	<u>2014-01-07</u> Date	<u>Peng Shao Hua</u> Name	 Signature



Modification Record

No.	Last Report No.	Modification Description
1	NA	First Report.

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1 General Information

EUT Description	
Product Name	LTE Wingle
Model Number	E8372h-510
Input voltage	DC 5V
TX Frequency	GSM850: 824MHz To 849MHz GSM1900: 1850MHz To 1910MHz WCDMA Band II: 1850MHz to 1910MHz WCDMA Band IV: 1710MHz to 1755MHz WCDMA Band V: 824 MHz to 849MHz LTE Band 2: 1850 MHz to 1910 MHz LTE Band 4: 1710MHz to 1755 MHz LTE Band 5: 824MHz to 849 MHz LTE Band 7: 2500 MHz to 2570MHz WIFI: 2400MHz to 2452MHz
RX Frequency	GSM850: 869MHz To 894MHz GSM1900: 1930MHz To 1990MHz WCDMA Band II: 1930MHz to 1990MHz WCDMA Band IV: 2110MHz to 2155MHz WCDMA Band V: 869MHz to 894MHz LTE Band 2: 1930MHz to 1990MHz LTE Band4: 2110MHz to 2155MHz LTE Band5: 869MHz to 894MHz LTE Band7: 2620MHz to 2690MHz WIFI: 2400MHz to 2452MHz
S/N	S6U0114C11000064
HW Version	CL1E8372HM
SW Version	21.180.01.02.00
EUT Accessory	
Data cable	Data Cable USB Male to USB Female , 17cm cable,Shielded. Data Cable USB Male to USB Female , 80cm cable,Shielded.
Car Charger	Brand: HUAWEI Model: HWCC02 Input voltage: 12-24V \equiv 1.0A MAX Output voltage: 5.0V \equiv 1.0A Rated Power: 5W S/N: HWBYA02E62500153 S/N: HWUEA02E5
Adapter	Brand: HUAWEI Model: HW-050100E4W Input voltage: 100-240V~50/60Hz, 0.2A Output voltage: 5.0V \equiv 1.0A Rated Power: 5W S/N: HWBYA07E12005028 S/N: HWUEA01E52900090
Adapter	Brand: HUAWEI Model: HW-050100A4W Input voltage: 100-240V~50/60Hz, 0.2A

	Output voltage: 5.0V — 1.0A Rated Power: 5W S/N: HWBYA32E80400018 S/N: HWUEA01E52900128
Adapter	Brand: HUAWEI Model: HW-050100B4W Input voltage: 100-240V~50/60Hz, 0.2A Output voltage: 5.0V — 1.0A Rated Power: 5W S/N: HWBYA07E52500424 S/N: HWUEA01E81100011
Adapter	Brand: HUAWEI Model: HW-050100U4W Input voltage: 100-240V~50/60Hz, 0.2A Output voltage: 5.0V — 1.0A Rated Power: 5W S/N: HWBYA07E22500436 S/N: HWUEA01E81100018

Remark: The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.



1.1 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

1.2 Applied Standards

APPLIED STANDARD

47 CFR FCC Part 15:2013, 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	Mode 1 ~Mode 4	CLASS B	Pass	Site1

Note:

1, Measurement taken is within the uncertainty of test system.
2, The item has been tested; 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:

- 1) If there is one kind of accessories with different models, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.
- 2) If EUT has more than one typical operation, only the worst test mode will be recorded in this report.

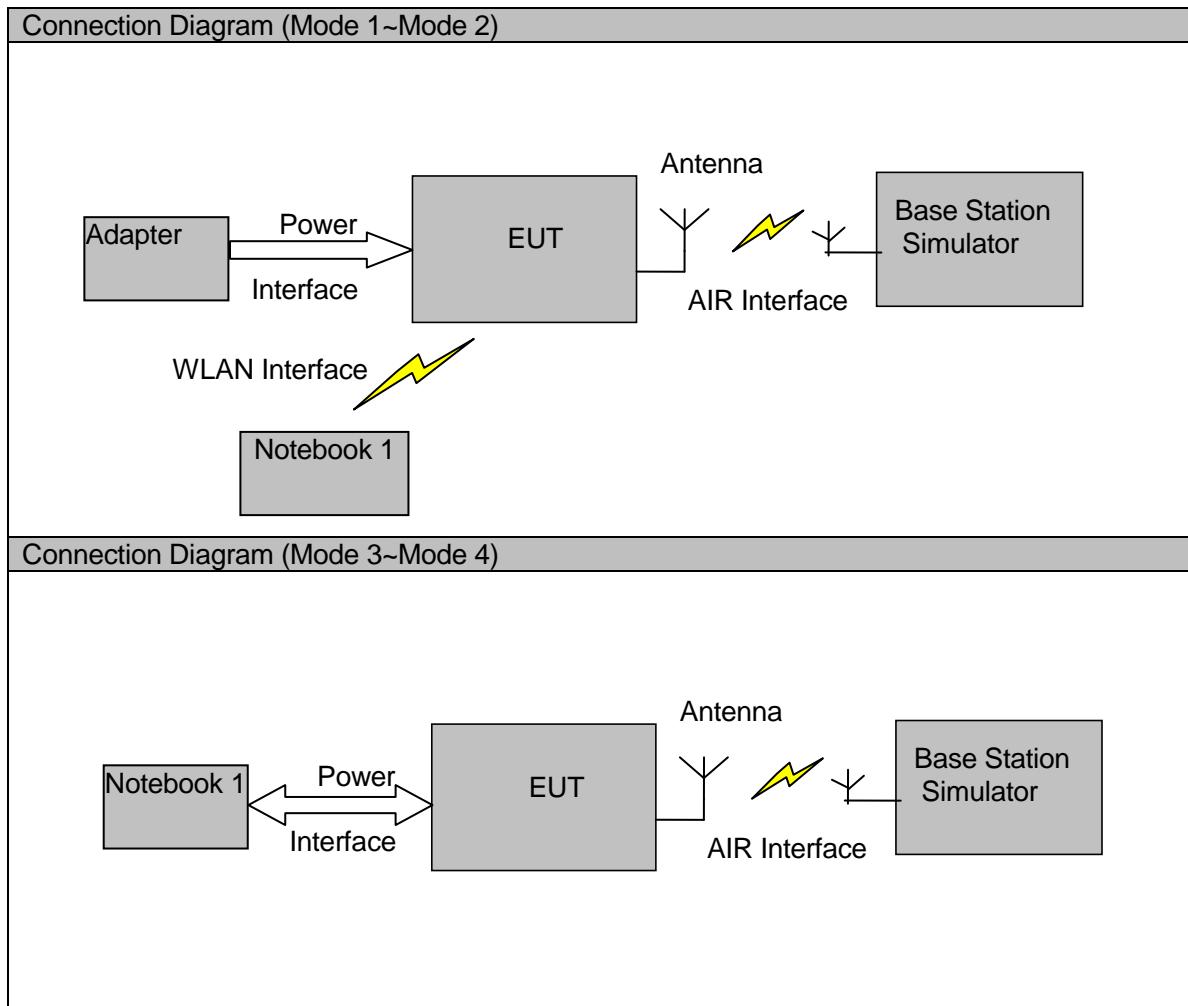
Traffic Mode:

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	1	0.8m	Shielded
USB	1	0.17m	Shielded

3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval (month)
Radio Communication Tester	CMU200	R&S	112347	2015-09-14	12
Radio Communication Tester	CMW500	R&S	115624	2015-09-17	12
Notebook	X200	ThinkPad	31090403588	/	/
Notebook	T61	Lenovo	3108052581	/	/

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

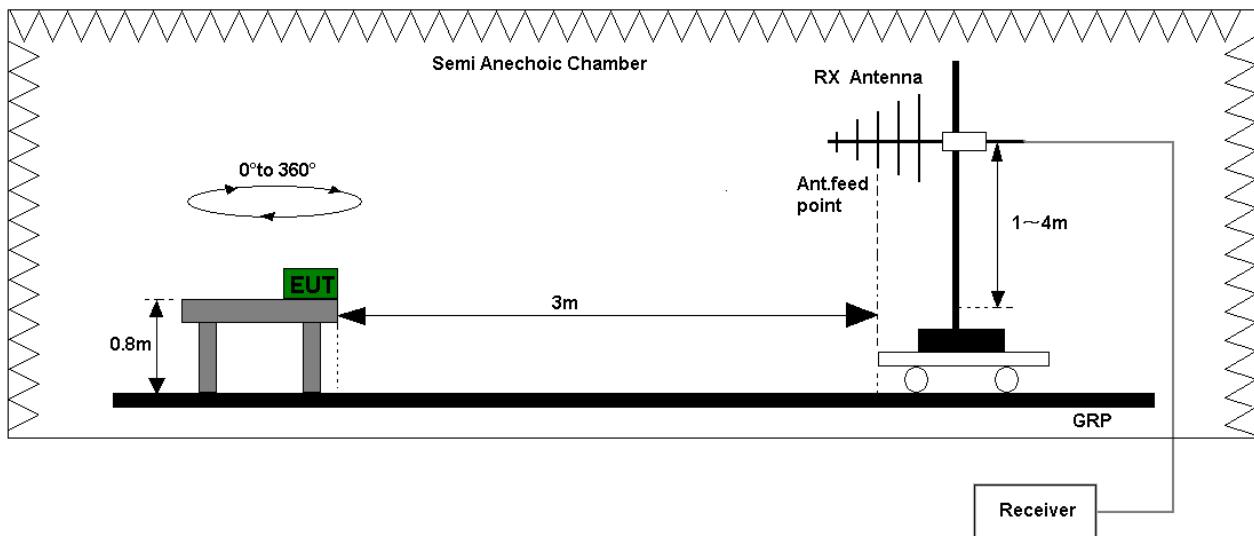


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

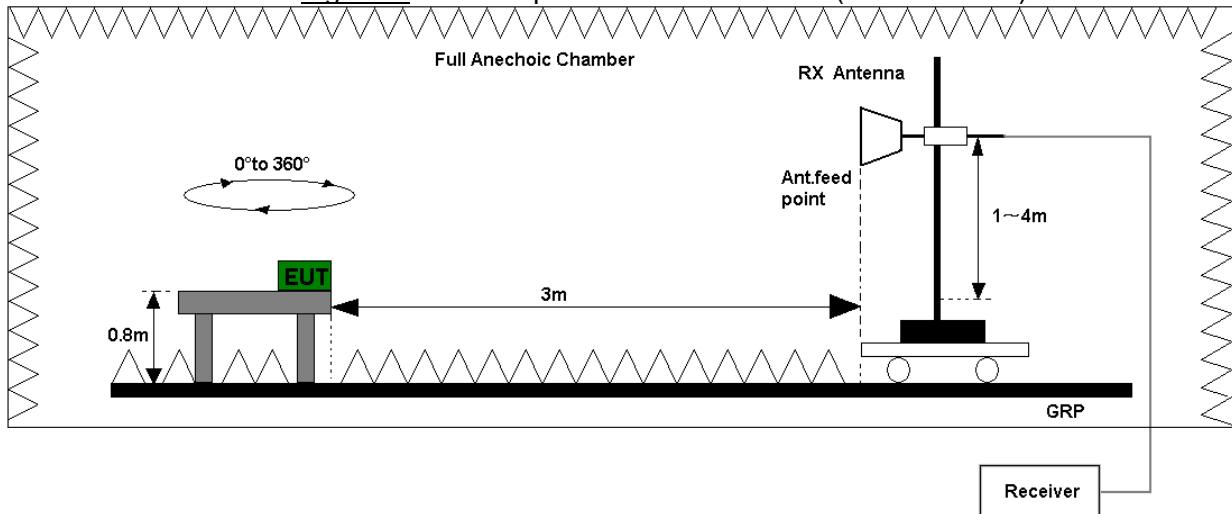


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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(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 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

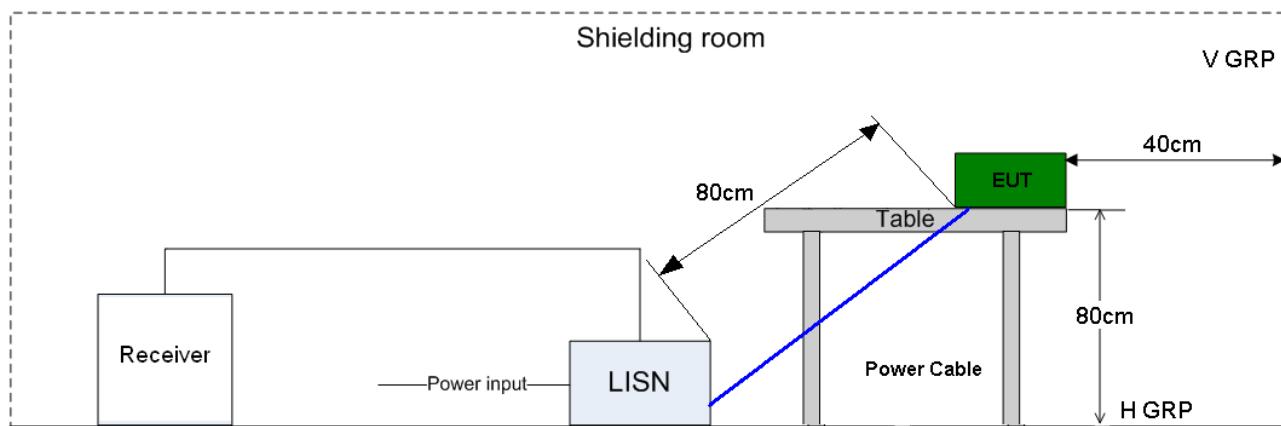


Figure 3. Test Set-up of conducted disturbance

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 μ V)	AV (dB μ 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. 08, 2015	12
	Broadband Antenna	VULB 9163	9163-356	SCHWAR ZBECK	Mar. 21 2016	24
	Horn Antenna	HF906	100683	R&S	Feb. 01, 2015	24
CE	Artificial Mains Network	ENV216	100382	R&S	Nov.03, 2015	12
	Artificial Mains Network	ENV4200	100134	R&S	Nov.03, 2015	12
	EMI Test receiver	ESCI	101163	R&S	Nov.03, 2015	12
Software Information						
Test Item	Software Name		Manufacturer		Version	
RE	ES-K1		R&S		1.7.1	
CE	EMC32		R&S		V8.40.0	

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:

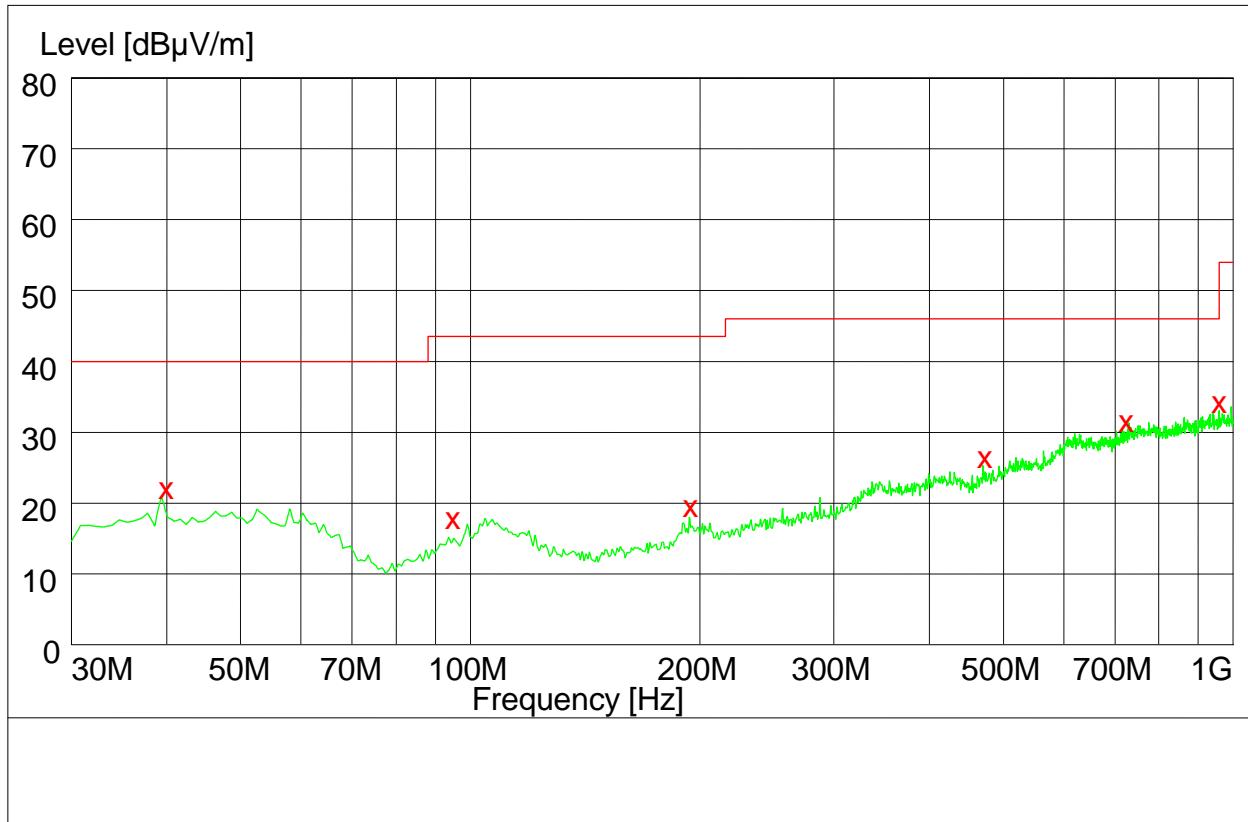
System Measurement Uncertainty		
Items		Extended Uncertainty
RE(30MHz-1GHz)	Field strength (dB μ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB μ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.6dB; k=2

7 Test Data and Graph

Only the worst test results are shown.

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz(Travel Charger)



MEASUREMENT RESULT: QP Detector

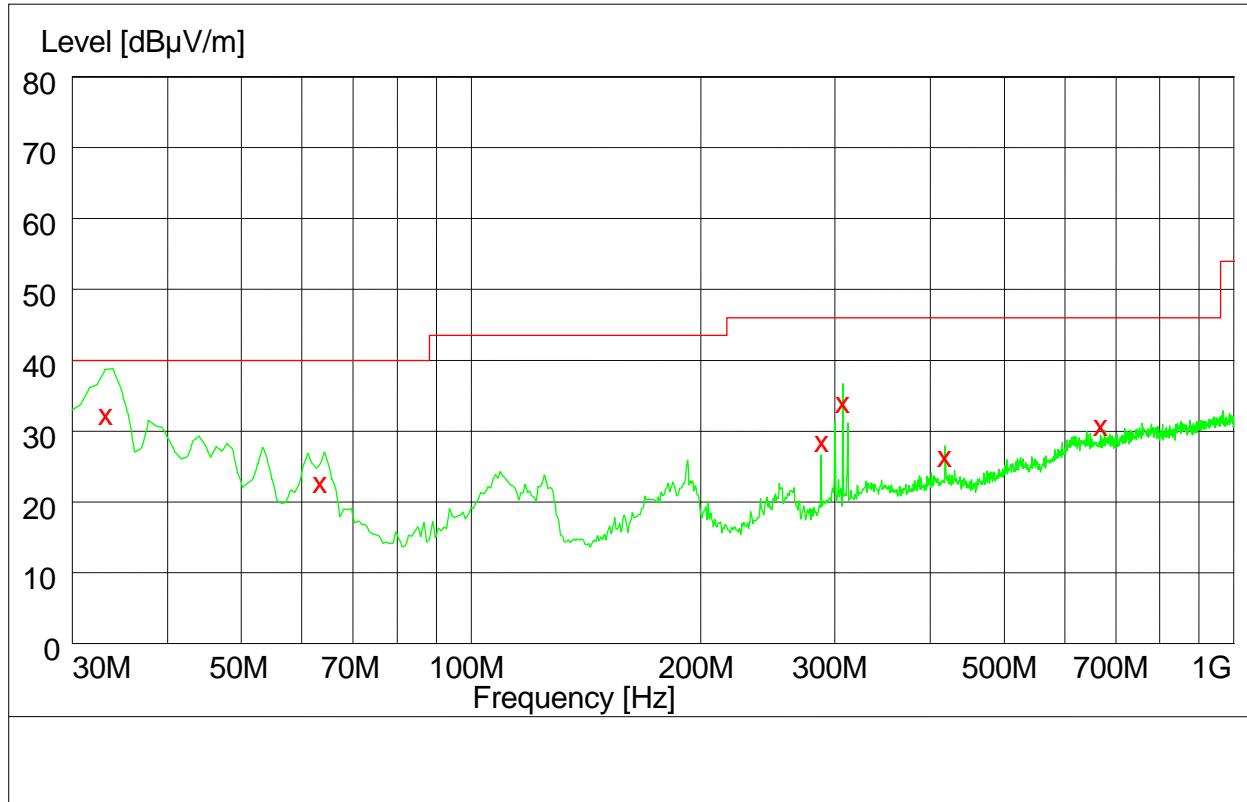
Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
39.972000	23.10	14.7	40.0	16.9	174.0	90.00	VERTICAL
95.008000	18.80	12.6	43.5	24.7	100.0	359.00	VERTICAL
194.456000	20.60	13.8	43.5	22.9	200.0	164.00	HORIZONTAL
472.972000	27.40	20.3	46.0	18.6	100.0	306.00	HORIZONTAL
724.396000	32.50	24.8	46.0	13.5	189.0	0.00	VERTICAL
959.112000	35.30	27.0	46.0	10.7	128.0	119.00	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.

7.1.2 30MHz~1GHz(Car Charger)



MEASUREMENT RESULT: QP Detector

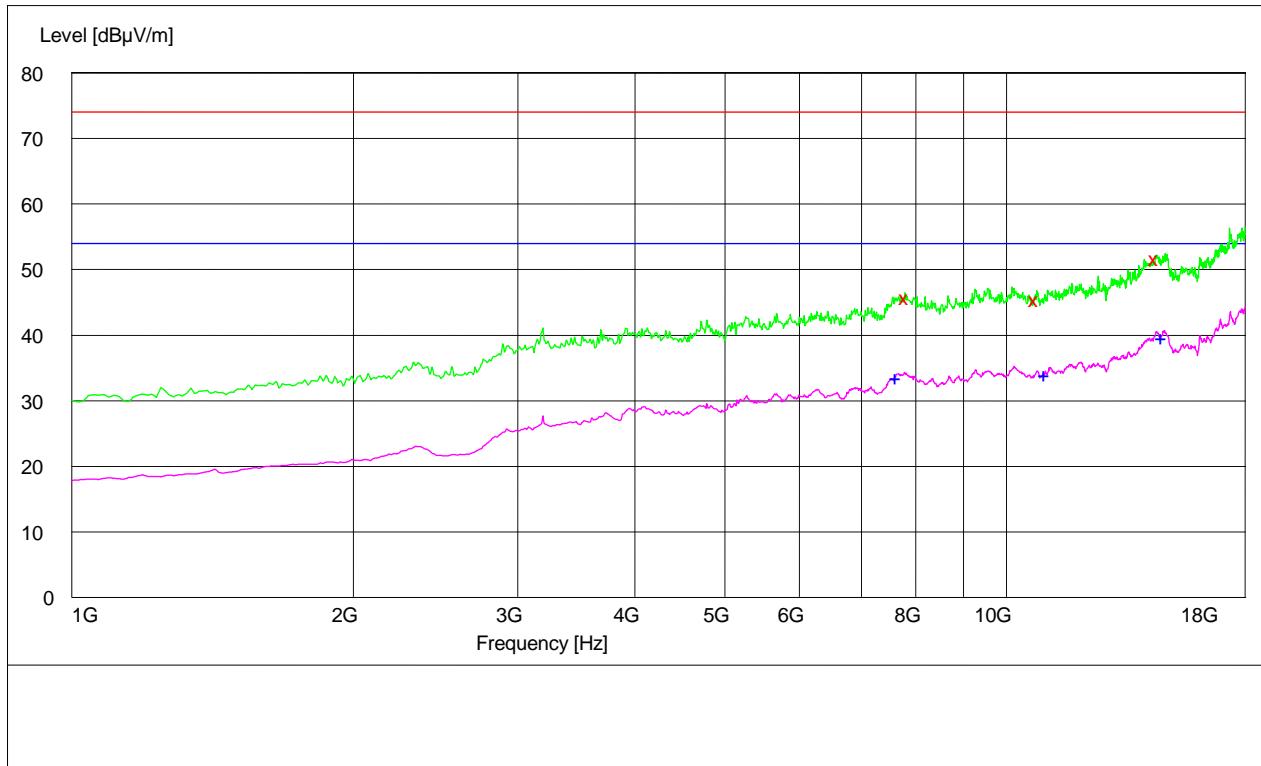
Frequency MHz	Level dB μ V/m	Transd dB	Limit dB μ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.220000	33.20	13.0	40.0	6.8	100.0	276.00	VERTICAL
63.484000	23.60	13.6	40.0	16.4	100.0	284.00	VERTICAL
287.992000	29.40	15.8	46.0	16.6	123.0	156.00	HORIZONTAL
307.212000	34.90	16.3	46.0	11.1	100.0	341.00	VERTICAL
418.180000	27.30	20.2	46.0	18.7	100.0	175.00	VERTICAL
669.300000	31.60	24.0	46.0	14.4	166.0	41.00	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.

7.1.3 1GHz~18GHz(Travel Charger)



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/ m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
7809.900000	45.70	5.3	74.0	28.3	100.0	276.00	VERTICAL
10755.900000	45.50	6.6	74.0	28.5	100.0	179.00	HORIZONTAL
14435.700000	51.80	17.2	74.0	22.2	100.0	95.00	HORIZONTAL

MEASUREMENT RESULT: AV Detector

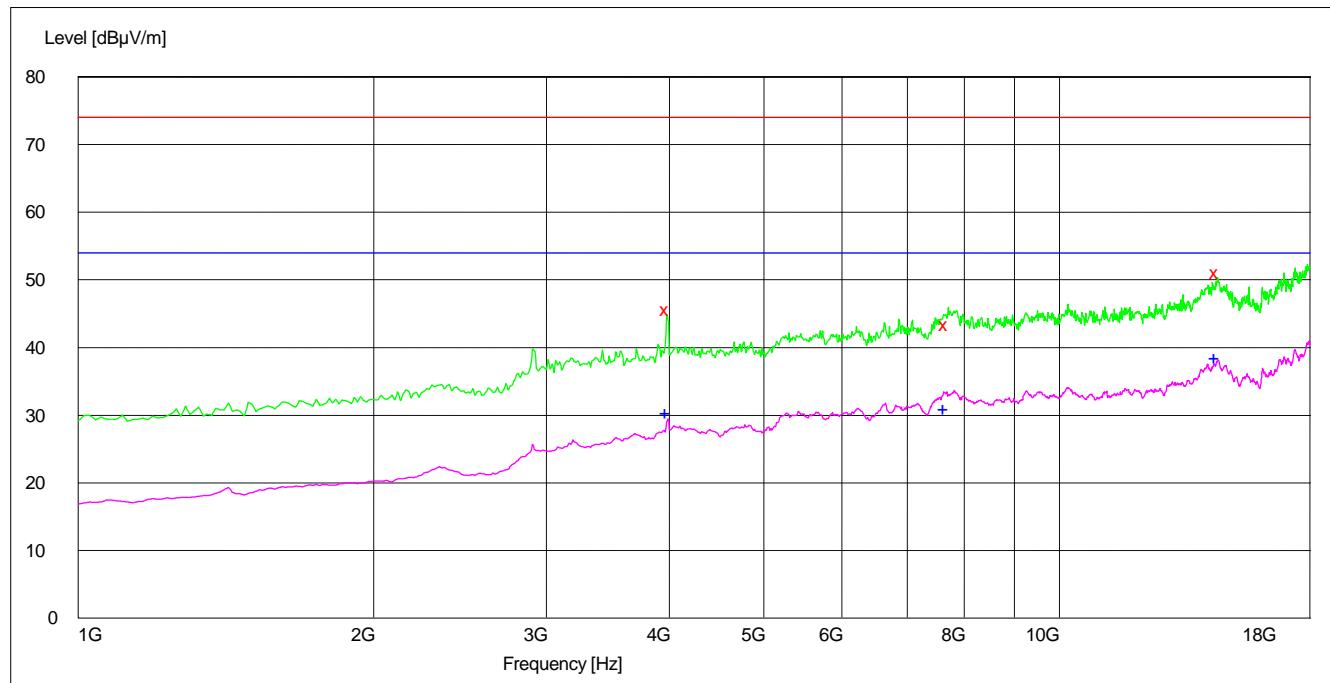
Frequency MHz	Level dBµV/ m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
7632.600000	33.60	5.2	54.0	20.4	100.0	45.00	HORIZONTAL
11011.800000	34.10	7.1	54.0	19.9	100.0	333.00	HORIZONTAL
14689.200000	39.70	16.5	54.0	14.3	100.0	35.00	VERTICAL

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.

7.1.4 1GHZ~18GHZ(Car Charger)



MEASUREMENT RESULT: PK Detector

Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB	dB μ V/m	dB	cm	deg	
3987.900000	45.50	-3.1	74.0	28.5	100.0	202.00	VERTICAL
7681.800000	43.30	4.7	74.0	30.7	150.0	131.00	VERTICAL
14475.700000	51.00	17.5	74.0	23.0	100.0	216.00	HORIZONTAL

MEASUREMENT RESULT: AV Detector

Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarisation
MHz	dB μ V/m	dB	dB μ V/m	dB	cm	deg	
3989.500000	30.40	-3.1	54.0	23.6	150.0	202.00	VERTICAL
7660.100000	30.90	5.0	54.0	23.1	105.0	258.00	VERTICAL
14466.200000	38.50	17.5	54.0	15.5	150.0	317.00	HORIZONTAL

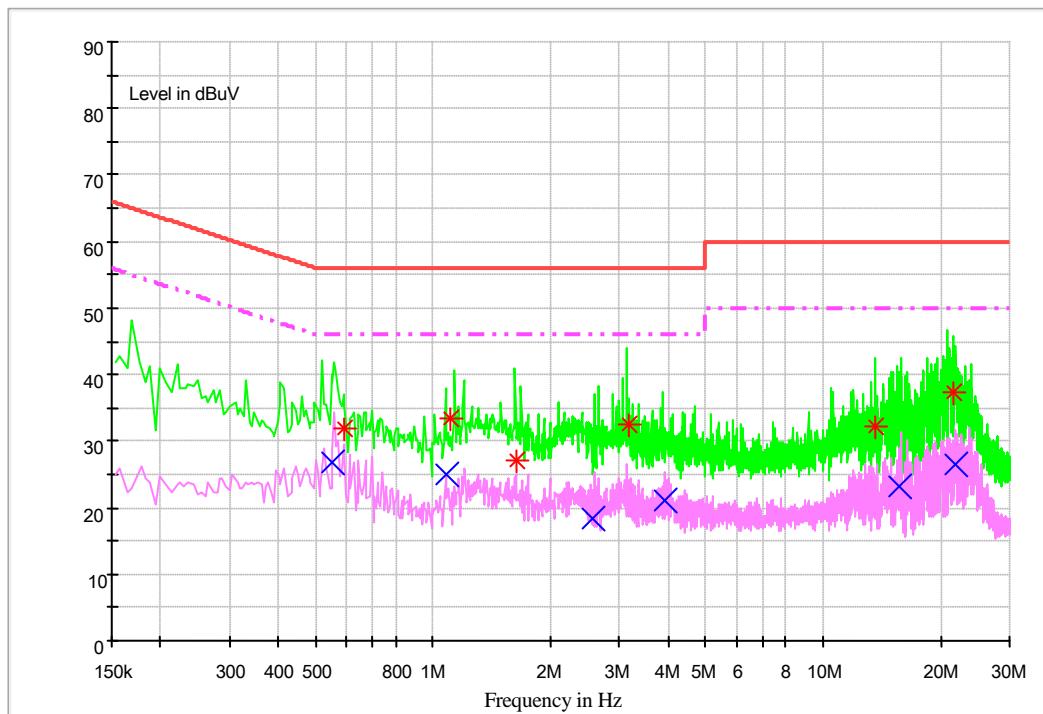
Note:

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 dB μ V	Transducer dB	Limit dB μ V	Margin dB	Line dB μ V	PE
0.589796	32.1	9.7	56.0	23.9	N	FLO
1.103838	33.3	9.7	56.0	22.7	L1	FLO
1.641262	27.0	9.7	56.0	29.0	N	FLO
3.179490	32.4	9.7	56.0	23.6	L1	FLO
13.523756	32.1	10.0	60.0	27.9	N	FLO
21.544452	37.2	10.2	60.0	22.8	N	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB μ V	Transducer dB	Limit dB μ V	Margin dB	Line dB μ V	PE
0.551418	26.7	9.7	46.0	19.3	N	FLO
1.079216	24.9	9.7	46.0	21.1	N	FLO
2.561524	18.2	9.7	46.0	27.8	L1	FLO
3.913748	20.9	9.8	46.0	25.1	L1	FLO
15.721954	23.2	10.1	50.0	26.8	N	FLO
21.840855	26.5	10.2	50.0	23.5	N	FLO

Note:

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

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

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