



EMC Test Report

Product Name: LTE cube

Model Number: B310s-518

Report No: SYBH(Z-EMC)012122014-2

FCC ID: QISB310s-518

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 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: Nov.30, 2014
Start Date of Test: Nov.30, 2014
End Date of Test: Dec.04, 2014
Test Result: Pass

**Approved By
(Lab Manager)**

2014-11-30
Date

Liu Chunlin
Name

Liu Chunlin

Signature

**Prepared by
(Test Engineer)**

2014-12-04
Date

Li Zonghai
Name

Li Zonghai

Signature



TABLE OF CONTENT

1	General Information	5
1.1	EUT Description.....	5
1.2	Test Site Information.....	6
1.3	Applied Standards.....	6
2	Summary of Results.....	7
3	System Configuration during EMC Test.....	8
3.1	Test Mode.....	8
3.2	Test System Configuration.....	8
3.3	Cables Used during Test.....	9
3.4	Associated Equipment Used during Test	9
4	Electromagnetic Interference (EMI)	10
4.1	Radiated Disturbance 30MHz to 18GHz	10
4.2	Conducted Disturbance 0.15 MHz to 30MHz	12
5	Main Test Instruments.....	14
6	System Measurement Uncertainty	15
7	Test Data and Graph.....	16
7.1	Radiated Disturbance	16
7.2	Conducted Disturbance.....	18

1 General Information

1.1 EUT Description

EUT Description	
Product Name	LTE CPE
Model Number	B310s-518
Input voltage	DC 12.0V
TX Frequency	GSM 850: 824MHz To 849MHz GSM 1900: 1850MHz To 1910MHz WCDMA Band II: 1850MHz To 1910MHz WCDMA Band IV: 1710MHz To 1755MHz WCDMA Band V: 824MHz To 849MHz LTE Band II: 1850MHz To 1910MHz LTE Band IV: 1710MHz To 1755MHz LTE Band V: 824MHz To 849MHz LTE Band VII: 2500MHz To 2570MHz WIFI 2.4G: 2400MHz To 2483.5MHz
RX Frequency	GSM 850: 869MHz To 894MHz GSM 1900: 1930MHz To 1990MHz WCDMA Band II: 1930MHz To 1990MHz WCDMA Band IV: 2110MHz To 2155MHz WCDMA Band V: 869MHz To 894MHz LTE Band II: 1930MHz To 1990MHz LTE Band IV: 2110MHz To 2155MHz LTE Band V: 869MHz To 894MHz LTE Band VII: 2620MHz To 2690MHz WIFI 2.4G: 2400MHz To 2483.5MHz
S/N	B9K0114B06000140
HW Version	WL1B310I
SW Version	V100R001
EUT Accessory	
Data cable	Data Cable USB A Male to Micro Usb, shielded
Adapter	BRAND: HUAWEI Model: HW-120100U6W Input: 100-240V~50/60Hz, 0.5A Output: 12.0V  1.0A SN: H6361WE6E00013 SN: X636A1E9500401

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:	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 15:2013, 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	Mode1	CLASS B	Pass	Site1
<u>Conducted Emissions</u> ☒ DC Power Port ☒ AC Power Port ☒ Telecommunication Ports	Mode1 Mode2	CLASS B	Pass	Site1
Note: Measurement taken is within the uncertainty of test system.				

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 under normal operation, which were shown in this test report and defined as below:

Test Mode	
Mode 1:	Adapter + SIM Card + LAN + wireless service TRAFFIC mode
Mode 2:	Adapter + SIM Card + LAN + wireless service IDLE 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.

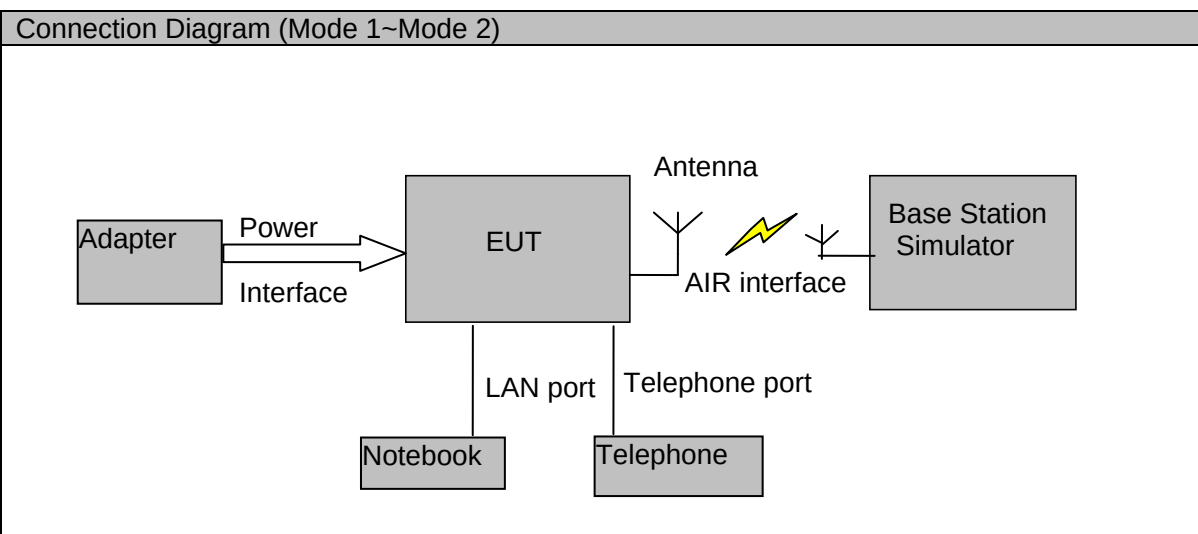
Traffic Mode:

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
LAN Cable	1	3m	unshielded
Telephone Cable	1	3m	unshielded

3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval (month)
Radio Communication tester	CMW500	R&S	A111278719	2015-9-17	12
Radio Communication Tester	CMU200	R&S	3608105673	2015-12-23	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 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

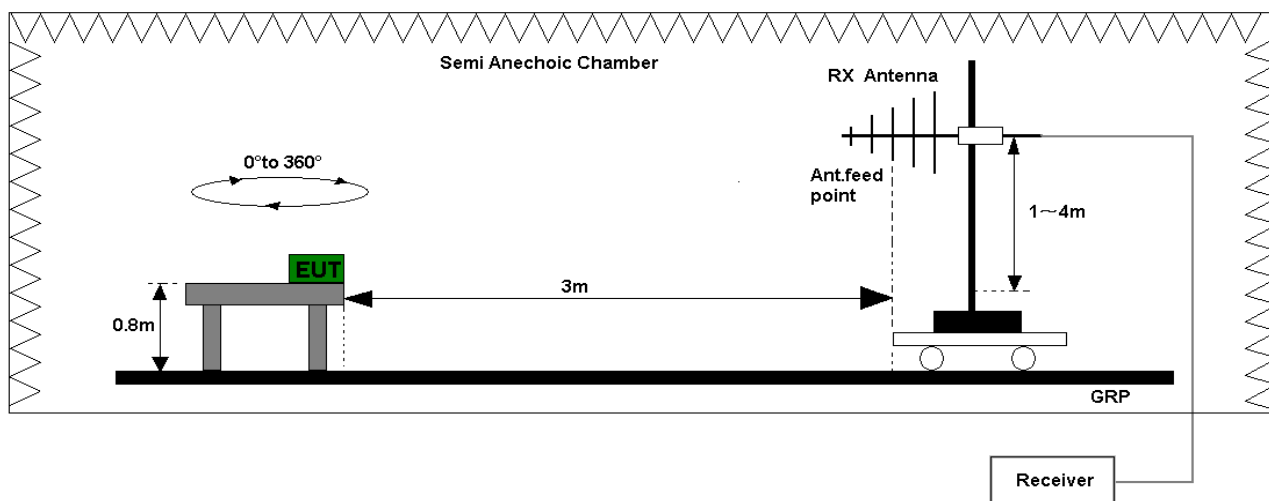


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

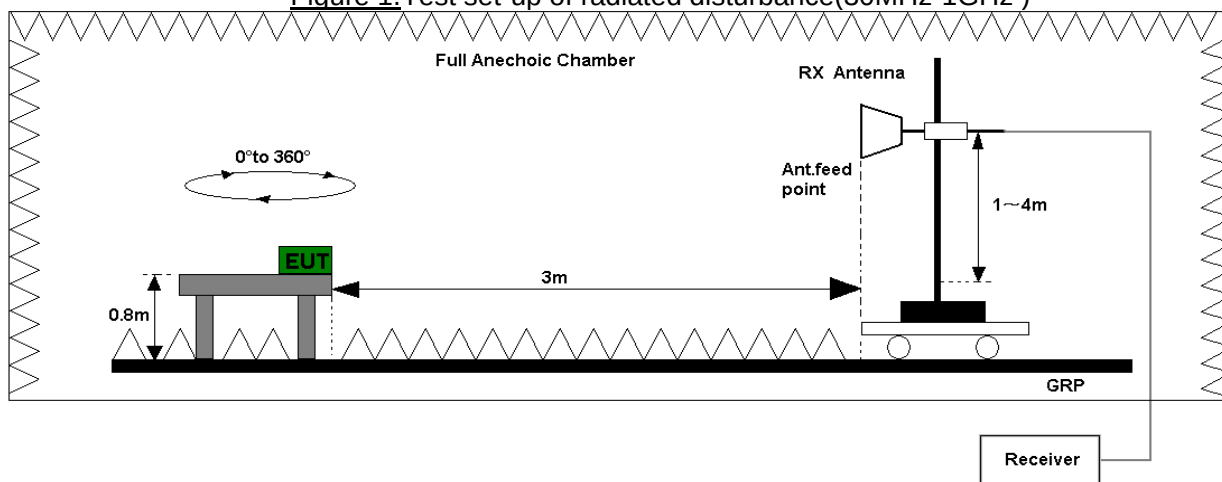


Figure 2. Test set-up of radiated disturbance(above 1GHz)



4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.
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 main cable of the EUT being measured shall be connected to LISN. The LISN shall be placed 0.8m away from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All the other units of the EUT and associated equipment shall be at least 0.8m away from the LISN. All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of the same length as the main cable and run parallel to the mains connection at a separation distance of not more than 0.1m.

The setup of Conducted Disturbance for telecommunication port is according to Annex C of EN 55022/CISPR 22.

Measurement bandwidth (RBW) for 150KHz to 30MHz: 9KHz;

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

4.2.2 Test Setup

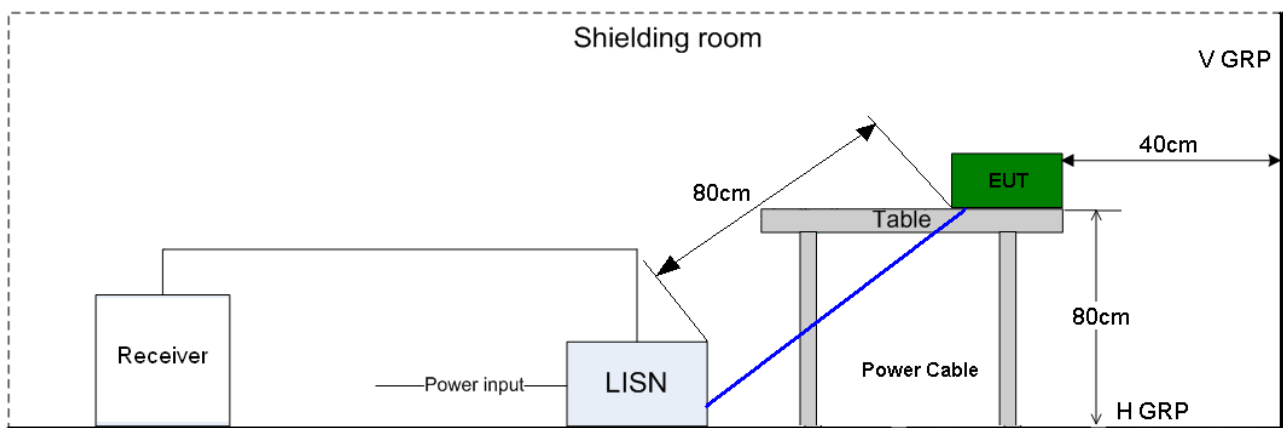


Figure 1. Test set-up of conducted disturbance for power port

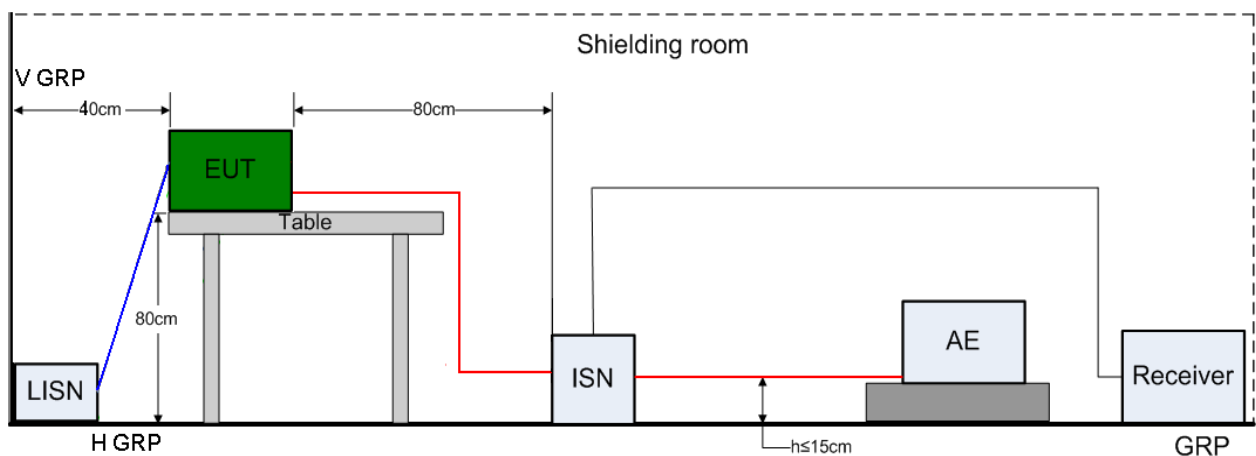


Figure 2. Test set-up of conducted disturbance for telecommunication ports



4.2.3 Test Results

The EUT has met requirements for Conducted disturbance.
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	AV
0.15MHz~0.5MHz	66-56dBμV	56-46 dBμV
0.5MHz-5MHz	56dBμV	46 dBμV
5MHz~30MHz	60dBμV	50 dBμV

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	SCHWARZBECK	Feb.25, 2015	24
	Horn Antenna	HF906	100684	R&S	Feb.25, 2015	24
CE	Artificial Mains Network	ENV216	100382	R&S	Feb.25, 2015	12
	Impedance Stabilization Network	ISN T400A	24867	TESEQ	Feb.25, 2015	12
Software Information						
Test Item	Software Name		Manufacturer		Version	
RE	EMC 32		R&S		V8.40.0	
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 were:

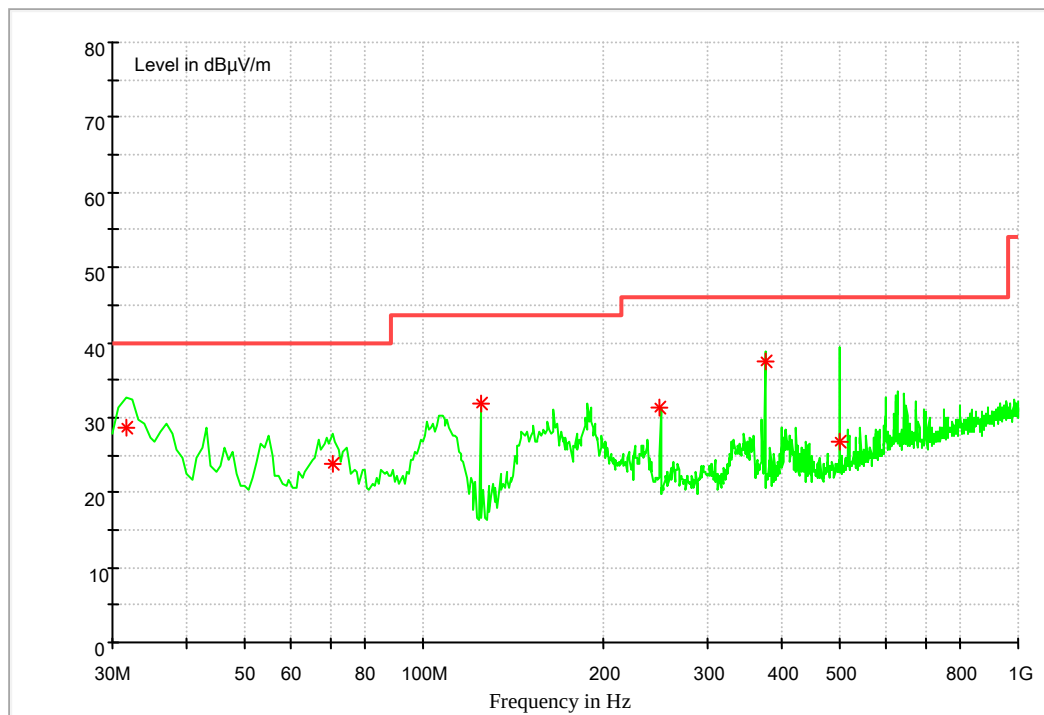
System Measurement Uncertainty		
Items		Extended Uncertainty
RE(30MHz-1GHz)	Field strength (dB μ V/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dB μ V/m)	U=5.1dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.6dB; k=2

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

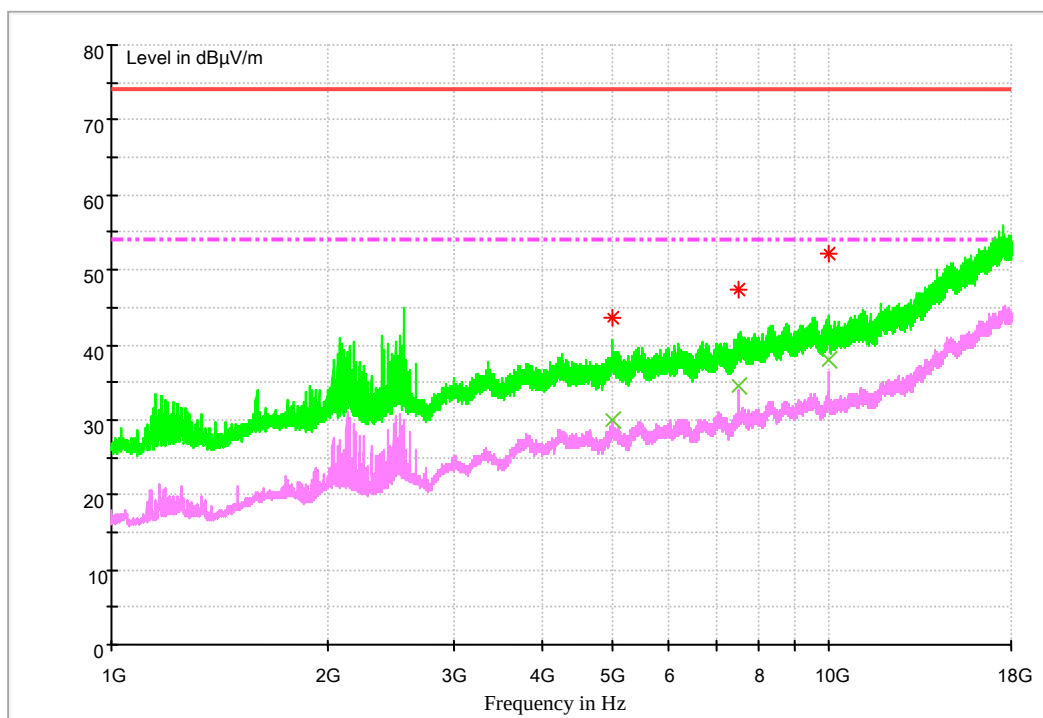
Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarisation
MHz	dBμV/m	dB	dBμV/m	dB	cm	deg	
31.719040	28.7	14.1	40.0	11.3	100.0	107.0	VERTICAL
70.567040	23.9	10.9	40.0	16.1	100.0	295.0	HORIZONTAL
125.000320	31.9	11.4	43.5	11.6	100.0	131.0	VERTICAL
249.988480	31.2	14.4	46.0	14.8	100.0	225.0	HORIZONTAL
374.964800	37.4	17.4	46.0	8.6	100.0	237.0	HORIZONTAL
500.088960	26.6	19.8	46.0	19.4	100.0	192.0	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.

1GHz~18GHz



MEASUREMENT RESULT: PK Detector

Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarization
MHz	dBμV/m	dB	dBμV/m	dB	cm	deg	
5001.244000	43.7	30.3	74.0	30.3	114.0	44.0	HORIZONTAL
7499.974000	47.5	26.5	74.0	26.5	203.0	244.0	VERTICAL
10000.054667	52.3	21.7	74.0	21.7	113.0	154.0	HORIZONTAL

MEASUREMENT RESULT: AV Detector

Frequency	Level	Transducer	Limit	Margin	Height	Azimuth	Polarization
MHz	dBμV/m	dB	dBμV/m	dB	cm	deg	
4999.778000	29.9	0.3	54.0	24.1	100.0	0.0	HORIZONTAL
7499.854000	34.5	5.6	54.0	19.5	100.0	207.0	VERTICAL L
9999.866000	38.0	9.3	54.0	16.0	100.0	154.0	HORIZONTAL

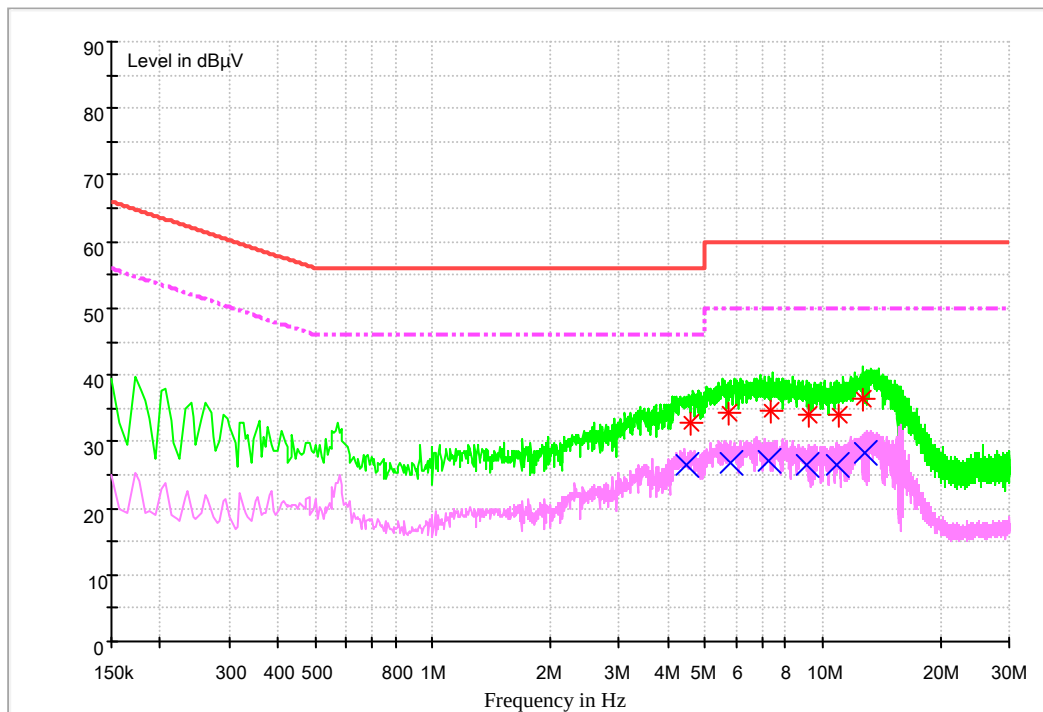
Note:

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.

7.2 Conducted Disturbance

AC Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV	Transducer dB	Limit dBμV	Margin dB	Line	PE
4.597342	32.7	9.8	56.0	23.3	L1	FLO
5.762066	34.3	9.8	60.0	25.7	N	FLO
7.329218	34.6	9.9	60.0	25.4	L1	FLO
9.175512	33.9	9.9	60.0	26.1	L1	FLO
10.961898	34.0	9.9	60.0	26.0	L1	FLO
12.638190	36.4	10.0	60.0	23.6	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Transducer dB	Limit dBμV	Margin dB	Line	PE
4.469026	26.4	9.8	46.0	19.6	N	FLO
5.815751	26.8	9.8	50.0	23.2	L1	FLO
7.256054	27.2	9.9	50.0	22.8	L1	FLO
9.089820	26.5	9.9	50.0	23.5	N	FLO
10.810856	26.5	9.9	50.0	23.5	N	FLO
12.822015	28.4	10.0	50.0	21.6	N	FLO

Note:

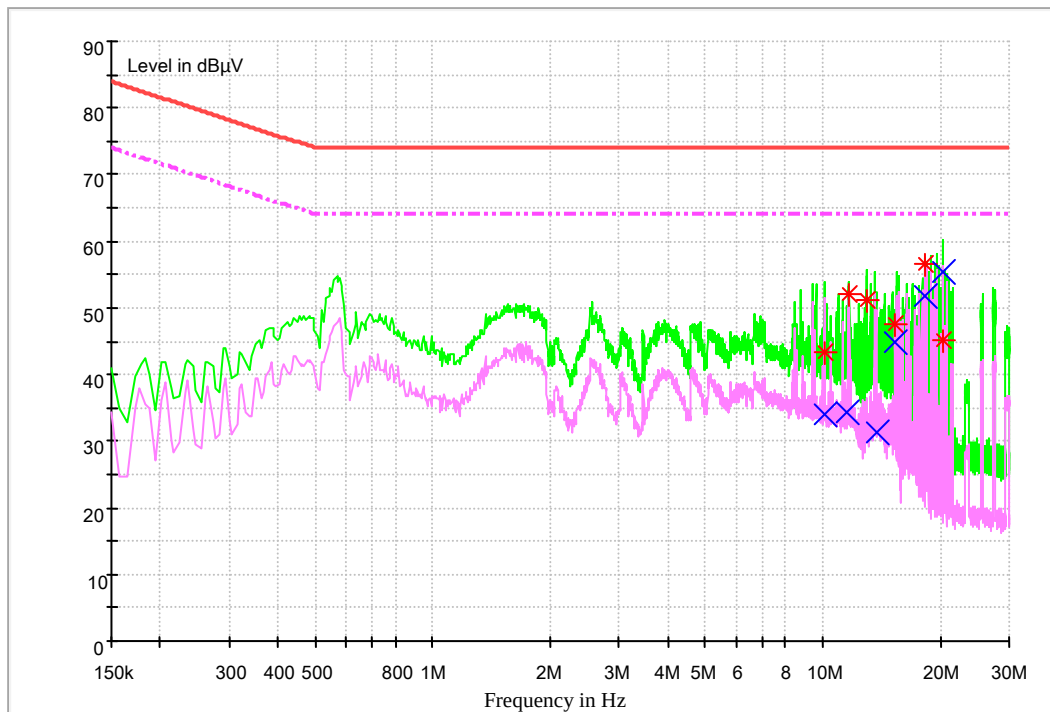
Level= Reading level+ Transd (cable loss + correction factor)

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



1.3.1 Conducted Disturbance

1.3.2 LAN Port Test Data



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV	Transducer dB	Limit dBμV	Margin dB	Line	PE
10.136588	43.4	0.0	74.0	30.6	L1	FLO
11.585786	52.0	0.0	74.0	22.0	N	FLO
13.008533	51.3	0.0	74.0	22.7	L1	FLO
15.372090	47.6	0.0	74.0	26.4	L1	FLO
18.243352	56.5	0.0	74.0	17.5	L1	FLO
20.243393	45.0	0.0	74.0	29.0	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Transducer dB	Limit dBμV	Margin dB	Line	PE
10.078650	33.9	0.0	64.0	30.1	N	FLO
11.543058	34.3	0.0	64.0	29.7	L1	FLO
13.687354	31.4	0.0	64.0	32.6	L1	FLO
15.373508	44.9	0.0	64.0	19.1	N	FLO
18.248212	51.8	0.0	64.0	12.2	N	FLO
20.320590	55.3	0.0	64.0	8.7	N	FLO

Note:

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

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

-----END-----