



EMC Test Report

Product Name: LTE USB Stick

Model Number: MS2372h-517

FCC ID:QISMS2372H-517

Report No: SYBH(Z-EMC)081082017-2

Global Compliance and Testing Center 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 by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1.
4. The laboratory (Reliability Lab of Huawei Technologies Co., Ltd) is also named as “Global Compliance and Testing Center of Huawei Technologies Co., Ltd”, the both names have coexisted since 2009.
5. The laboratory has been recognized by the US Federal Communications Commission (FCC) to perform compliance testing subject to the Commission's Declaration Of Conformity (DOC) and Certification rules. The Designation Number is CN1173, and the Test Firm Registration Number is 294140.”
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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: Sep.18,2017
Start Date of Test: Sep.18,2017
End Date of Test: Sep.22,2017
Test Result: Pass

Approved By (Lab Manager)	<u>2017-09-30</u>	<u>Roger Zhang</u>	<u><i>Roger Zhang</i></u>
	Date	Name	Signature
Prepared by (Test Engineer)	<u>2017-09-30</u>	<u>Luo Wei</u>	<u><i>Luo Wei</i></u>
	Date	Name	Signature



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1 General Information

1.1 EUT Description

EUT Description	
Product Name	LTE USB Stick
Model Number	MS2372h-517
Serials Number	E6M0117815000122
Input Rated Voltage	--- 5V
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 2: 1850MHz to 1910MHz LTE BAND 4: 1710MHz to 1755MHz LTE BAND 5: 824MHz to 849MHz LTE BAND 7: 2500MHz to 2570MHz LTE BAND 12: 699MHz to 716MHz
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 2: 1930MHz to 1990MHz LTE BAND 4: 2110MHz to 2155MHz LTE BAND 5: 869MHz to 894MHz LTE BAND 7: 2620MHz to 2690MHz LTE BAND 12: 729MHz to 746MHz
HW Version	CL1MS2372HM VER.B
SW Version	21.328.01.03.00

Remark: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed information.



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 15:2016, 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	Mode 1	CLASS B	Pass	Site1
<u>Conducted Emissions</u> ☒ DC Power Port ☒ AC Power Port ☐ Telecommunication Ports	Mode 1~Mode 2	CLASS B	Pass	Site1
Note: 1, Measurement taken is within the measurement uncertainty of measurement 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

Huawei has verified the construction and function in typical operation. All the test modes are carried out with the EUT under normal operation, which are shown in this test report and defined as below:

Test Mode	
Mode 1:	EUT with PC+ USB Cable+ Idle Mode
Mode 2:	EUT with PC+ USB Cable + Traffic Mode

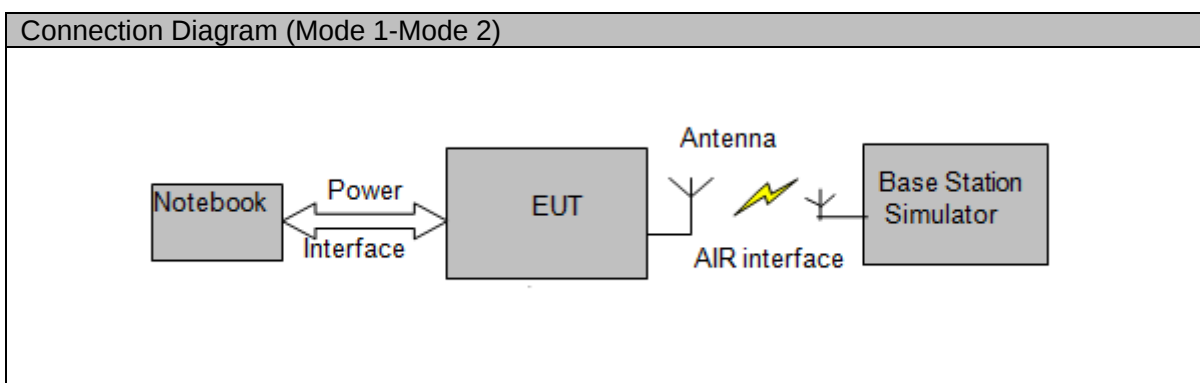
Traffic Mode:

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	1m	shielded

3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline
Radio Communication Tester	CMU200	R&S	3607033573	2018-02- 28
Radio Communication Tester	MT8820C	Anritsu	A110518805	2018-05- 15
Notebook	X230	ThinkPad	31090403579	/

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 C63.4-2014. The test distance is 3m. The set-up and test methods are according to ANSI C63.4-2014.

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

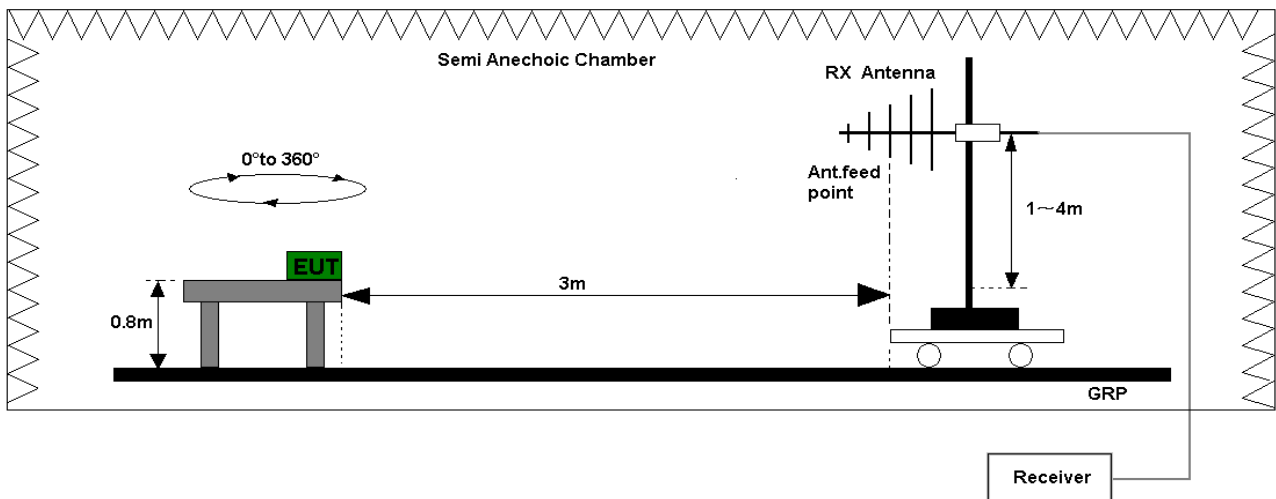


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

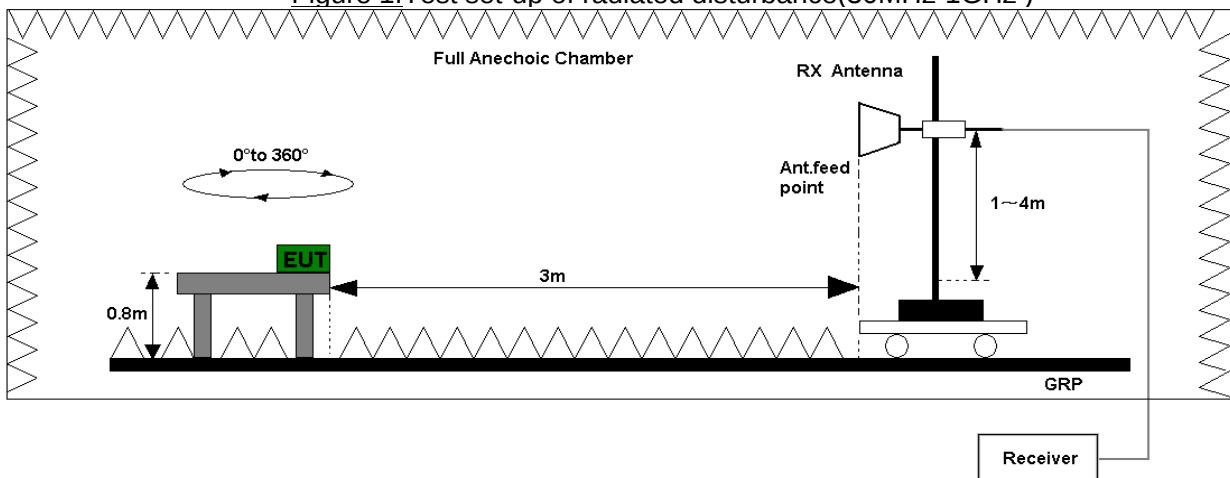


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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 C63.4-2014.

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

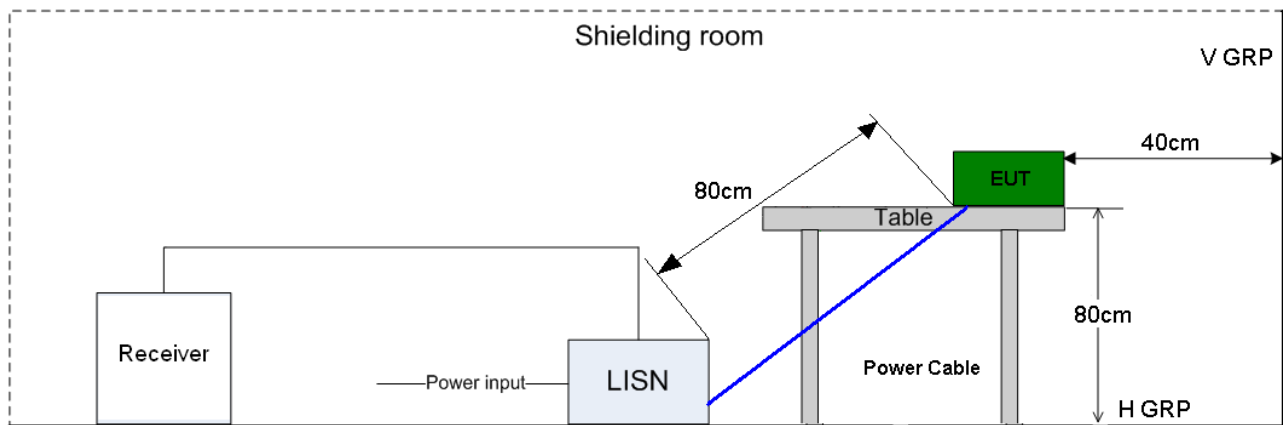


Figure 3. Test Set-up of conducted disturbance

4.2.3 Test Results

The EUT has met requirements for Conducted disturbance.

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	66-56 dB μ V	56-46 dB μ V
0.5MHz-5MHz	56 dB μ V	46 dB μ V
5MHz~30MHz	60 dB 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	Feb. 20, 2018	12
	Broadband Antenna	VULB 9163	9163-491	SCHWARZBECK	Mar. 28, 2019	24
	Horn Antenna	HF906	100683	R&S	Mar. 28, 2019	24
CE	EMI Test receiver	ESU26	101163	R&S	Feb. 20, 2018	12
	Artificial Mains Network	ENV216	100382	R&S	May. 15, 2018	12
Software Information						
Test Item	Software Name		Manufacturer		Version	
RE	EMC32		R&S		V9.25.0	
CE	EMC32		R&S		V9.25.0	

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=5.0dB; k=2
CE	Disturbance Voltage (dB μ V)	U=2.5dB; k=2

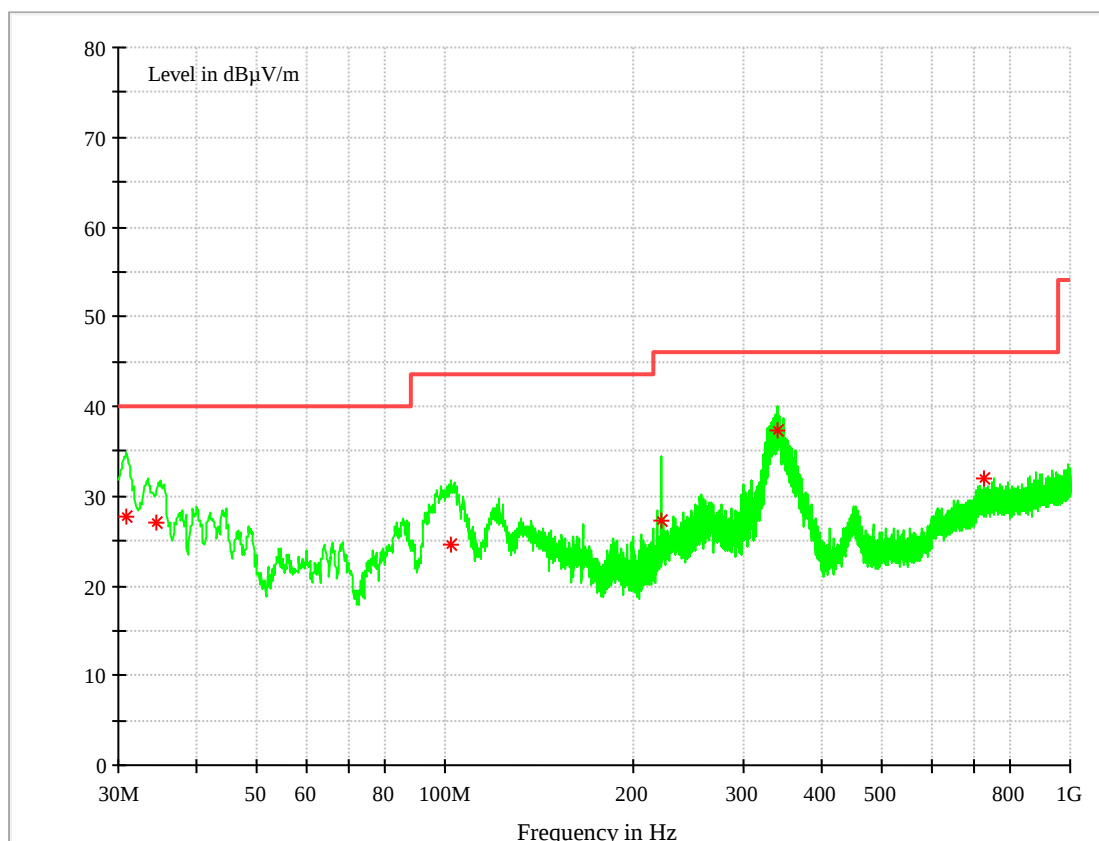
7 Test Data and Graph

Only the worst test result is shown in this report.

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz

Mode 1:



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
30.926950	27.75	14.7	40.00	12.25	106.0	219.0	VERTICAL
34.503600	27.05	15.1	40.00	12.95	117.0	114.0	VERTICAL
102.415050	24.49	13.8	43.50	19.01	154.0	131.0	VERTICAL
222.027750	27.29	13.6	46.00	18.71	156.0	164.0	HORIZONTAL
340.045500	37.38	17.1	46.00	8.62	100.0	280.0	HORIZONTAL
726.192250	32.06	23.9	46.00	13.94	106.0	13.0	VERTICAL

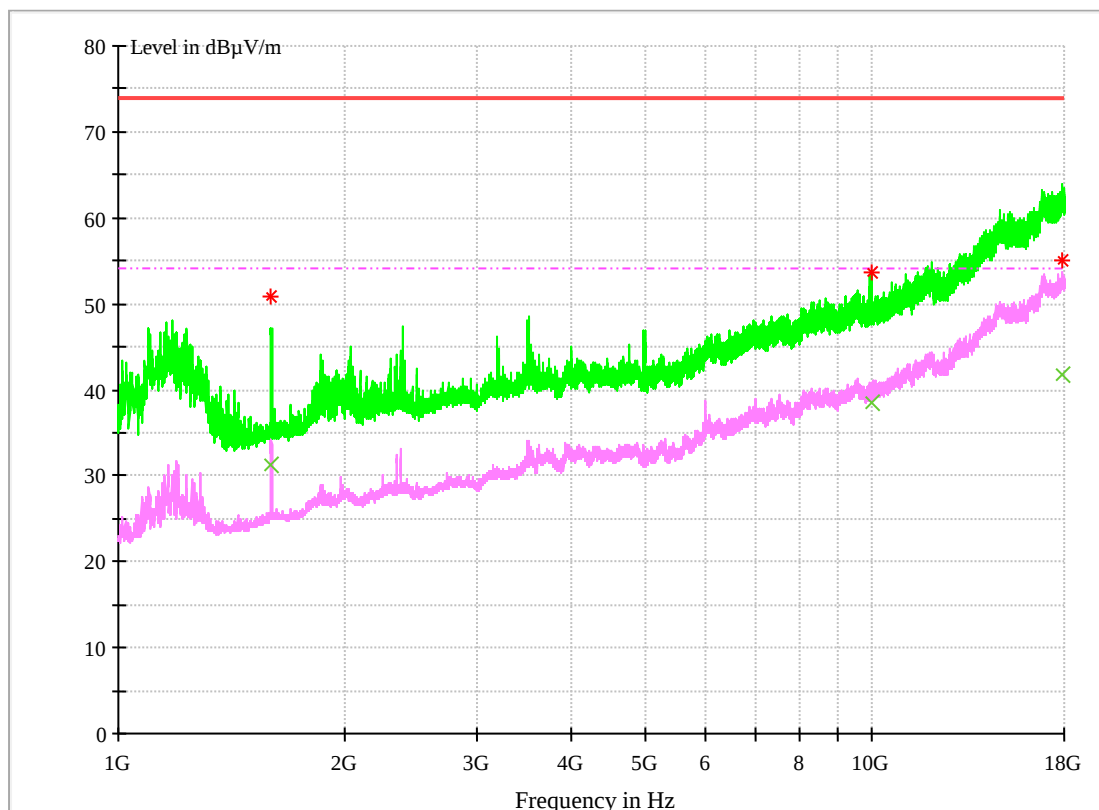
Note:

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.

7.1.2 1GHz~18GHz

Mode 1:



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1594.377333	50.79	-12	74	23.21	100	317	VERTICAL
9983.900666	53.63	7.3	74	20.37	118	109	VERTICAL
17840.59	55.09	21.5	74	18.91	135	173	HORIZONTAL

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1593.410667	31.17	-12	54	22.83	100	326	VERTICAL
9996.795333	38.47	7.3	54	15.53	161	12	VERTICAL
17899.38467	41.66	21.6	54	12.34	125	332	HORIZONTAL

Note:

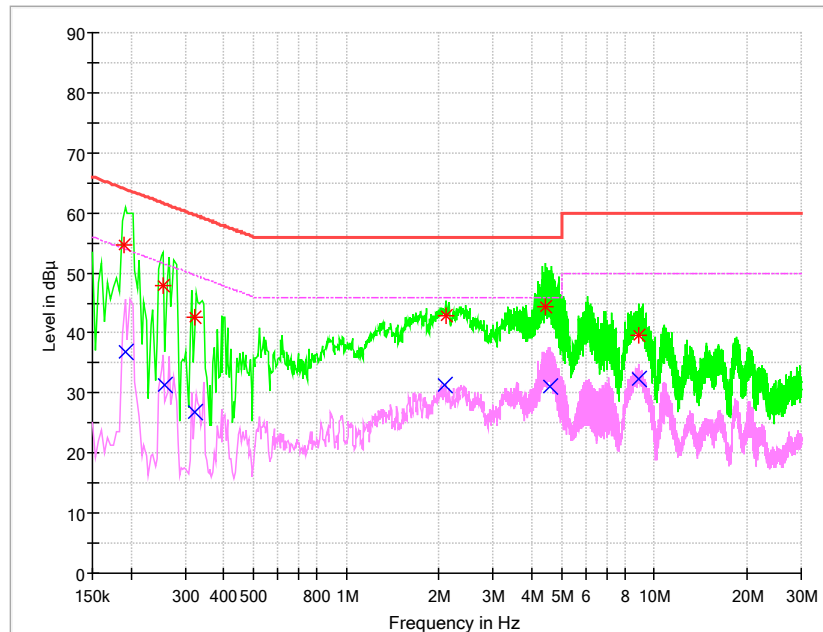
Level = Reading level by receiver + Transd (Antenna factor + cable loss – preamplifier gain)

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

7.2 Conducted Disturbance

7.2.1 AC Port Test Data

Mode 2:



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV	Line	Transd dB	Margin dB	Limit dBμV	PE
0.190189	54.59	N	9.7	9.44	64.03	FLO
0.254565	47.84	N	9.7	13.77	61.61	FLO
0.320644	42.52	L1	9.7	17.17	59.69	FLO
2.099197	42.96	N	9.7	13.04	56	FLO
4.443638	44.45	L1	9.8	11.55	56	FLO
8.888051	39.69	L1	9.9	20.31	60	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Line	Transd dB	Margin dB	Limit dBμV	PE
0.192251	36.89	L1	9.7	17.05	53.94	FLO
0.256545	31.22	L1	9.7	20.32	51.54	FLO
0.321615	26.75	L1	9.7	22.92	49.67	FLO
2.095957	31.46	N	9.7	14.54	46	FLO
4.590945	31.13	L1	9.8	14.87	46	FLO
8.892645	32.28	L1	9.9	17.72	50	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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