



# EMC Test Report

**Product Name: Smart Phone**

**Model Number: VOG-L04**

**Report No: SYBH(Z-EMC) 20181218028001-2**

**FCC ID: QISVOG-L04**

**IC:6369A-VOGL04**

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

**(Global Compliance and Testing Center 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 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.”
6. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
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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.
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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:** 2019-01-03  
**Start Date of Test:** 2019-01-04  
**End Date of Test:** 2019-01-24

**Test Result:** Pass

**Approved By  
(Lab Manager)**

2019-01-26  
Date

He Hao  
Name

*He Hao*

Signature

**Prepared by  
(Test Engineer)**

2019-01-24  
Date

Peng Shaohua  
Name

*Peng Shaohua*

Signature



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**Modification Record**

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



## TABLE OF CONTENT

1	General Information .....	6
1.1	EUT Description .....	6
1.1	Test Laboratories sub-contracted .....	9
1.2	Applied Standards .....	9
2	Summary of Results.....	10
3	System Configuration during EMC Test.....	11
3.1	Test Mode .....	11
3.2	Test System Configuration.....	12
3.3	Cables Used during Test.....	15
3.4	Associated Equipment Used during Test.....	15
4	Electromagnetic Interference (EMI).....	16
4.1	Radiated Disturbance 30MHz to 40GHz .....	16
4.2	Conducted Disturbance 0.15 MHz to 30MHz.....	18
5	Main Test Instruments.....	19
6	System Measurement Uncertainty .....	19
7	Test Data and Graph.....	20
7.1	Radiated Disturbance.....	20
7.2	Conducted Disturbance.....	23

















# 1 General Information

## 1.1 EUT Description

EUT Description	
Product Name	Smart Phone
Model Number	VOG-L04
Serials Number	015WLB18C8001277
Input Rated Voltage	DC 3.8V
TX Frequency	GSM 850: 824MHz to 849MHz PCS 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 LTE BAND 17: 704MHz to 716MHz LTE BAND 26: 814MHz to 849MHz(only for FCC) LTE BAND 38: 2570MHz to 2620MHz LTE BAND 40: 2305 MHz ~2315 MHz(only for IC) 2350 MHz ~2360 MHz(only for IC) LTE BAND 41: 2535MHz to 2655MHz LTE BAND 66: 1710MHz to 1780MHz 2.4G WIFI: 2400MHz to 2472 MHz Bluetooth: 2400MHz to 2483.5MHz 5G WIFI:5150MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5825MHz NFC: 13.56MHz Wireless Charging: 110kHz-148kHz
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 LTE BAND 17: 704MHz to 716MHz LTE BAND 26: 859MHz to 894MHz(only for FCC) LTE BAND 38: 2570MHz to 2620MHz LTE BAND 40: 2305 MHz ~2315 MHz(only for IC) 2350 MHz ~2360 MHz(only for IC) LTE BAND 41: 2535MHz to 2655MHz LTE BAND 66: 2110MHz to 2200MHz 2.4G WIFI: 2400MHz to 2472 MHz Bluetooth: 2400MHz to 2483.5MHz



	5G WIFI:5150MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5825MHz GPS/ Galileo: 1575.42MHz/1176.45MHz A-GPS: 1575.42MHz. BDS: 1561.098MHz GLONASS: 1602.5625MHz NFC: 13.56MHz Wireless Charging: 110kHz-148kHz
HW Version	HL2VOGUEM
SW Version	9.1.0.42(C792E10R1P4)
EUT Accessory	
USB(04071722)	Data Cable USB A Male to Type C ,Shield Manufacturer: LUXSHARE Precision Industry Co., Ltd. HUIZHOU DEHONG TECHNOLOGY CO.,LTD. Ningbo Broad TVOGcommunication Co., Ltd.
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-100400A00 Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V  2A OR 9V  2A OR 10V  4A SN: CA41XX14A00472
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-100400U00 Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V  2A OR 9V  2A OR 10V  4A SN:CA45XX14A00034
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-100400E00 Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V  2A OR 9V  2A OR 10V  4A SN:CA45XX14A00134
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-100400B00 Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V  2A OR 9V  2A OR 10V  4A SN:CA47XX14A00426
Rechargeable Li-ion	Manufacturer:Huawei Technologies Co.,Ltd. Battery Model: HB486486ECW Rated capacity: 4100mAh Nominal Voltage:  +3.82V Charging Voltage:  +4.4V SN: 6DUNACI724G00064 5WNDAYI726X00085
Earphone(22040325)	Model: MEND1632B729003 Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD



Earphone(22040325)	Model: Windy-S Manufacturer: GoerTek Inc.
Earphone(22040325)	Model: 1331-3301-6001-TC-088 Manufacturer: Boluo County Quancheng Electronic Co.,Ltd
Earphone(22040325)	Model: 630276 Manufacturer: Foster Electric Co.,(GuangZhou)LTD.Sales Dep.

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





### 1.1 Test Laboratories sub-contracted

Site 1:	RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.
Test Site Location:	No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park, Dongguan, Guangdong, P.R.C

### 1.2 Applied Standards

#### APPLIED STANDARD

**47 CFR FCC Part 15, Subpart B  
ICES-003 Issue 6**

## 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~ Mode 4 Mode 7 ~Mode 9	CLASS B	Pass	Site1
<u>Conducted Emissions</u> <input type="checkbox"/> DC Power Port <input checked="" type="checkbox"/> AC Power Port <input type="checkbox"/> TVOGcommunication Ports	Mode 1 Mode 3 Mode 6 Mode 7 Mode 9	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:	Charging+ Camera On + Idle
Mode 2:	Earphone + Camera On + Idle
Mode 3:	Charging+ video Playing + Idle
Mode 4:	Earphone + video Playing + Idle
Mode 5:	Earphone +traffic
Mode 6:	Charging+traffic+WIFI+BT+GNSS+NFC On
Mode 7:	USB Copy(EUT with PC)
Mode 8:	USB&DP +Display
Mode 9:	Charging + Wireless Charging

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.

Worst Case:

Radiated Emission:

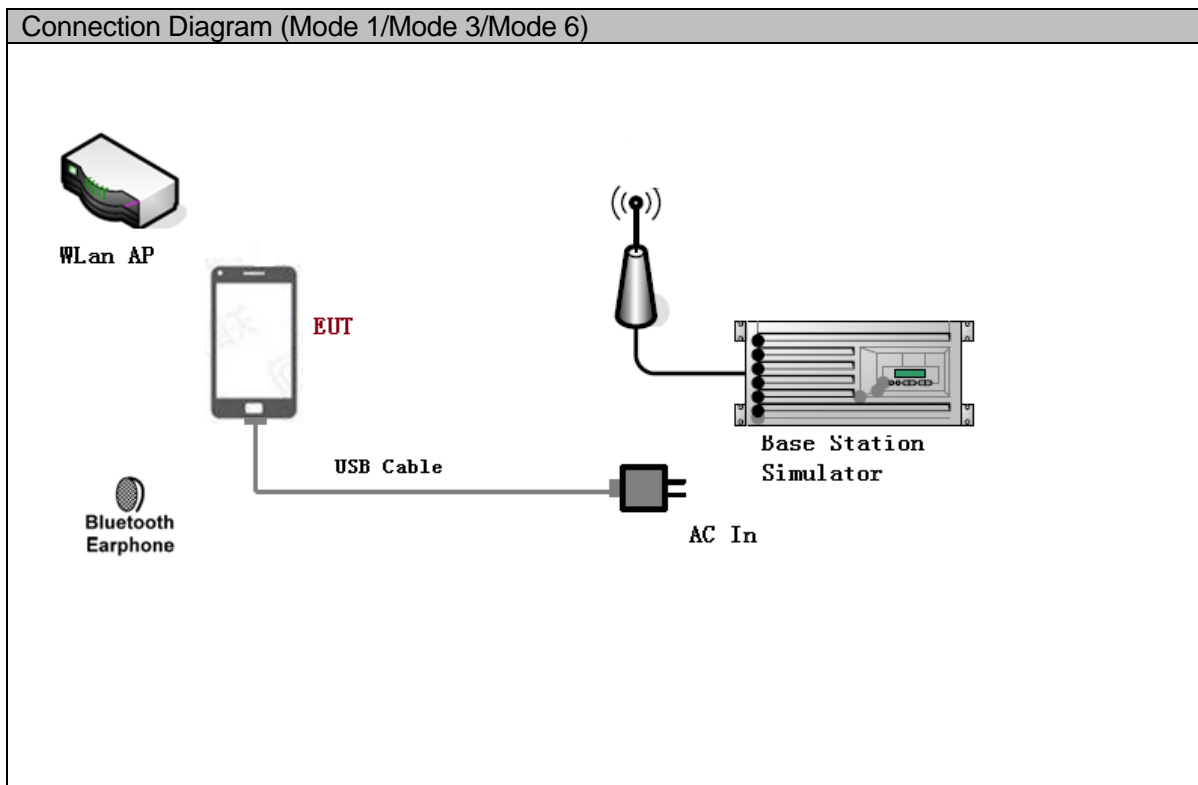
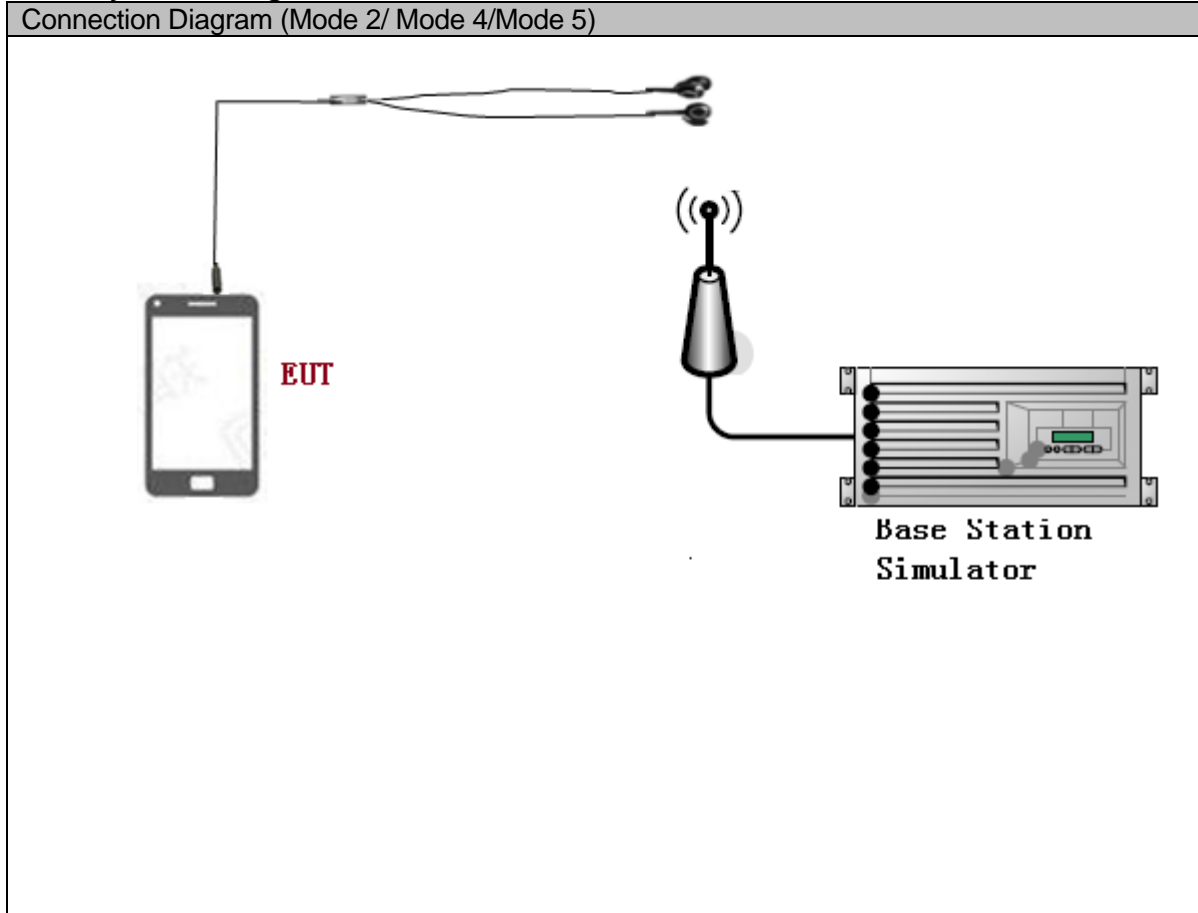
USB&DP +Display the result is the worst (30MHz~1GHz).

Adapter (Model: HW-100400U00, SN: CA45XX14A00034 + Charging+ Camera On + Idle the result is the worst (1GHz~40GHz).

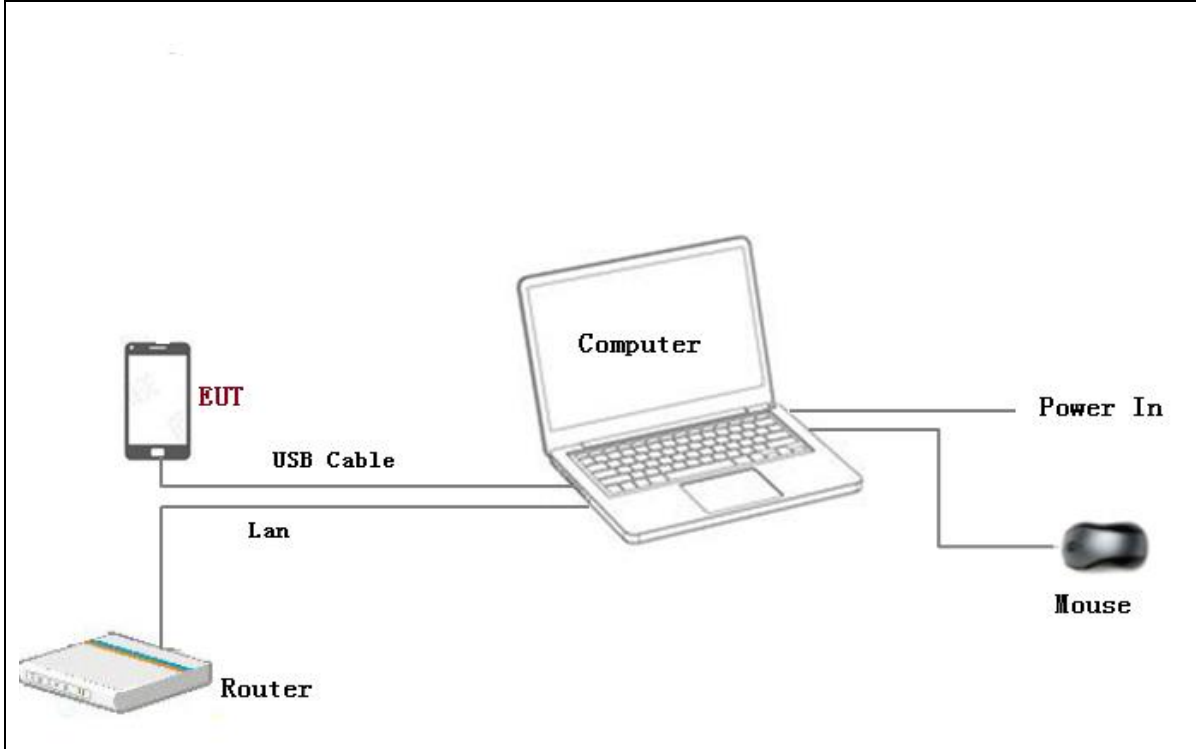
Conducted Emission:

Adapter (Model: HW-100400U00, SN: CA45XX14A00034 + Charging+ Camera On + Idle the result is the worst.

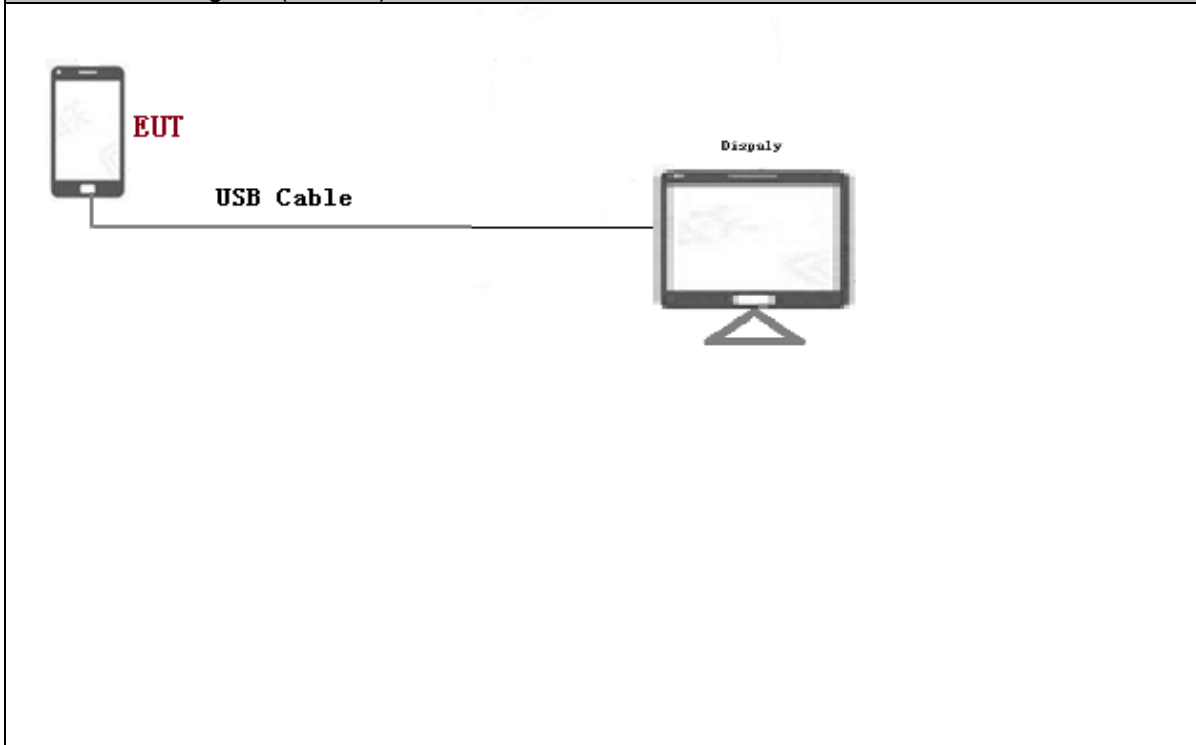
### 3.2 Test System Configuration



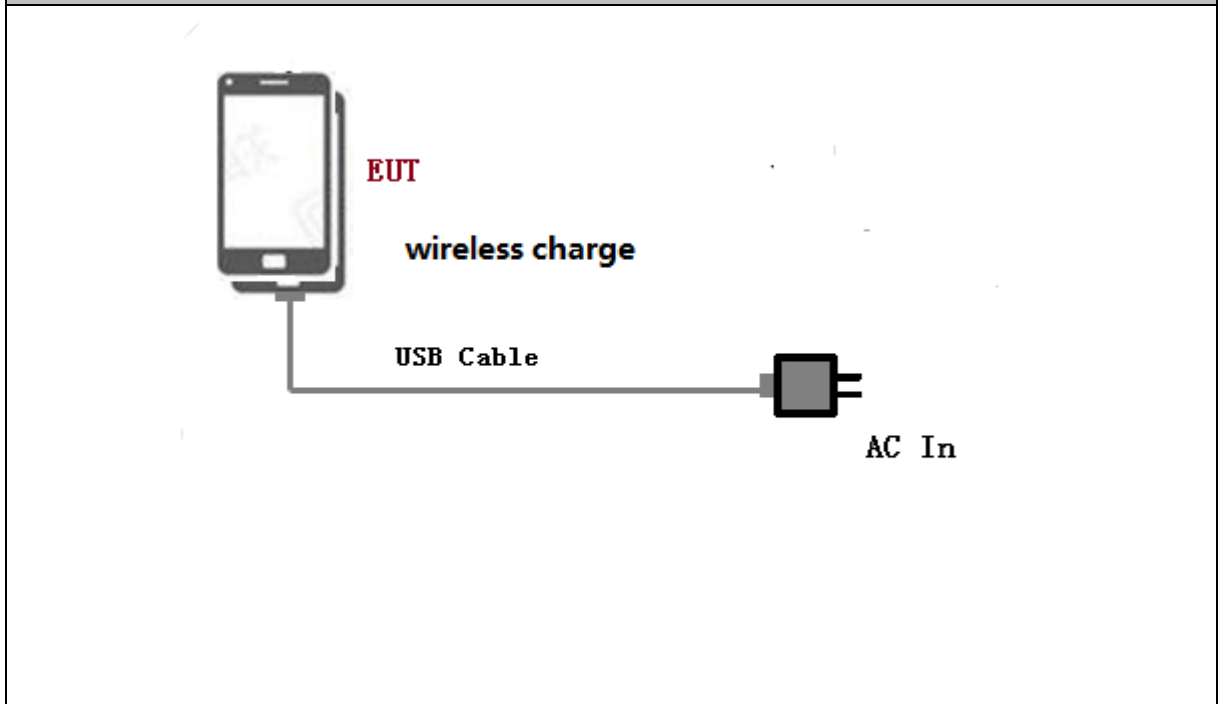
Connection Diagram (Mode 7)



Connection Diagram (Mode 8)



Connection Diagram (Mode 9)



### 3.3 Cables Used during Test

Cable	Quantity	Length	Type of Cable
USB	1	<3m	Shielded
Earphone	1	<3m	Unshielded
USB&DP cable	1	<3m	Shielded

### 3.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Calibrated Deadline	Cal interval
Radio Communication Tester	CMU200	R&S	3608082535	2019-05-07	12
Radio Communication Tester	MT8820C	Anritsu	A110518805	2019-05-08	12
Radio Communication Tester	CMW500	R&S	150791	2019-10-07	12
Notebook	S3	ThinkPad	A140714638	/	/
Mouse	M-U0025-O	Lenovo	HS423HB22TB	/	/
display	L197	Lenovo	8M03373A0956 983	/	/
WIRELESS CHARGER	CP60	HUAWEI	2155030353C8 B027778	/	/

## 4 VOGctromagnetic Interference (EMI)

### 4.1 Radiated Disturbance 30MHz to 40GHz

#### 4.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANCI C63.4: 2014. The test distance was 3m. The set-up and test methods were according to ANCI C63.4: 2014.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 40 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 40000 MHz: 1MHz;

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

#### 4.1.2 Test setup

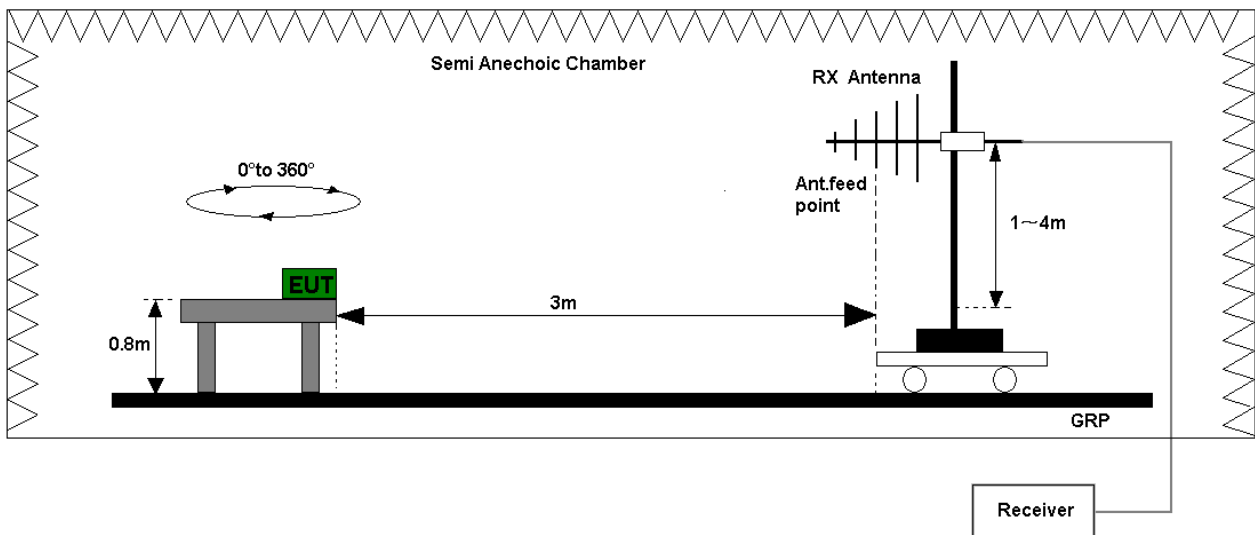


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

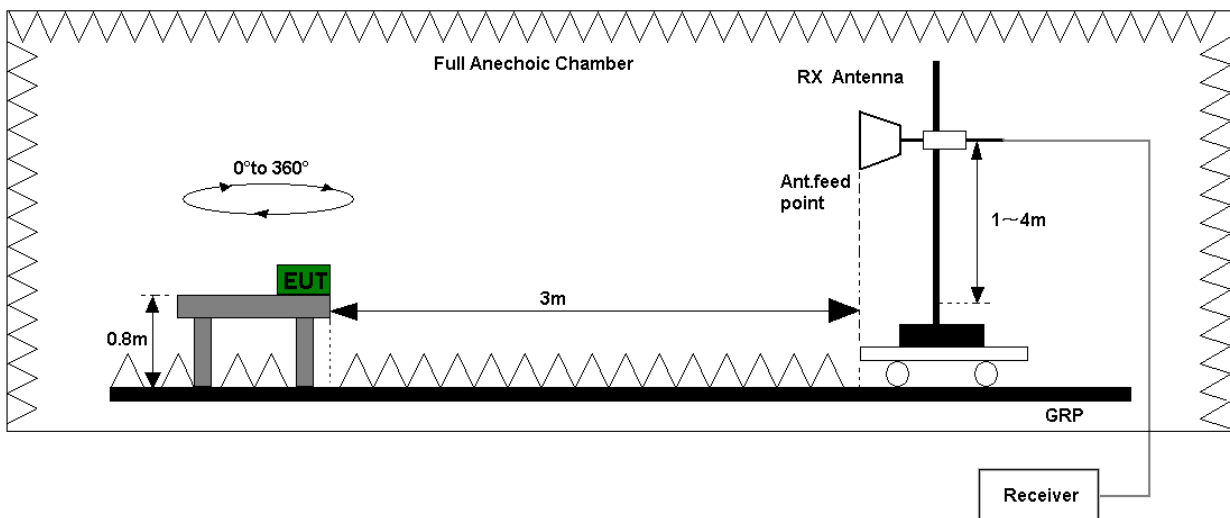


Figure 2. Test set-up of radiated disturbance(above 1GHz)





### 4.1.3 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.  
Refer to the section 7.1.1 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 ANCI C63.4: 2014 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 150 kHz to 30 MHz: 9 kHz;

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

### 4.2.2 Test Setup

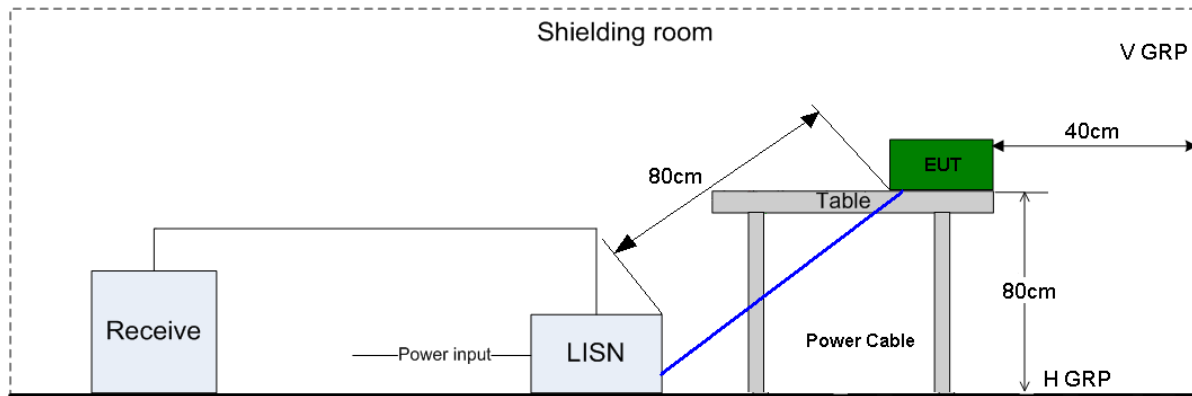


Figure 3. Test Set-up of conducted disturbance

### 4.2.3 Test Results

The EUT has met requirements for Conducted disturbance of power lines.

Refer to the section 7.2.1 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
RE	EMI Test receiver	ESU26	100150	R&S	Jun. 28, 2019	12
	Spectrum Analyzer	FSU43	100048	R&S	Jun. 29, 2019	12
	Broadband Antenna	VULB 9163	9163-491	SCHWARZ BECK	Mar. 28, 2019	24
	Horn Antenna	HF906	100683	R&S	Mar. 28, 2019	24
	Horn antenna (18 to 26.5G)	3160-09	5140299	ETS	Jul. 20, 2019	24
	Horn antenna (26.5 to 40G)	3160-10	LM5947	ETS	Jul. 19, 2019	24
	Amplifier	SCU26	10021	R&S	May. 08, 2019	12
	Amplifier	SCU40	10016	R&S	May. 08, 2019	12
CE	EMI Test receiver	ESCI	101163	R&S	May. 19, 2019	12
	Artificial Mains Network	ENV216	100382	R&S	May. 08, 2019	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 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
RE(18 GHz-26.5GHz)	Field strength (dB $\mu$ V/m)	U=4.82dB; k=2
RE (26.5 GHz- 40GHz)	Field strength (dB $\mu$ V/m)	U=5.22dB; k=2
CE	Disturbance Voltage (dB $\mu$ V)	U=2.5dB; k=2

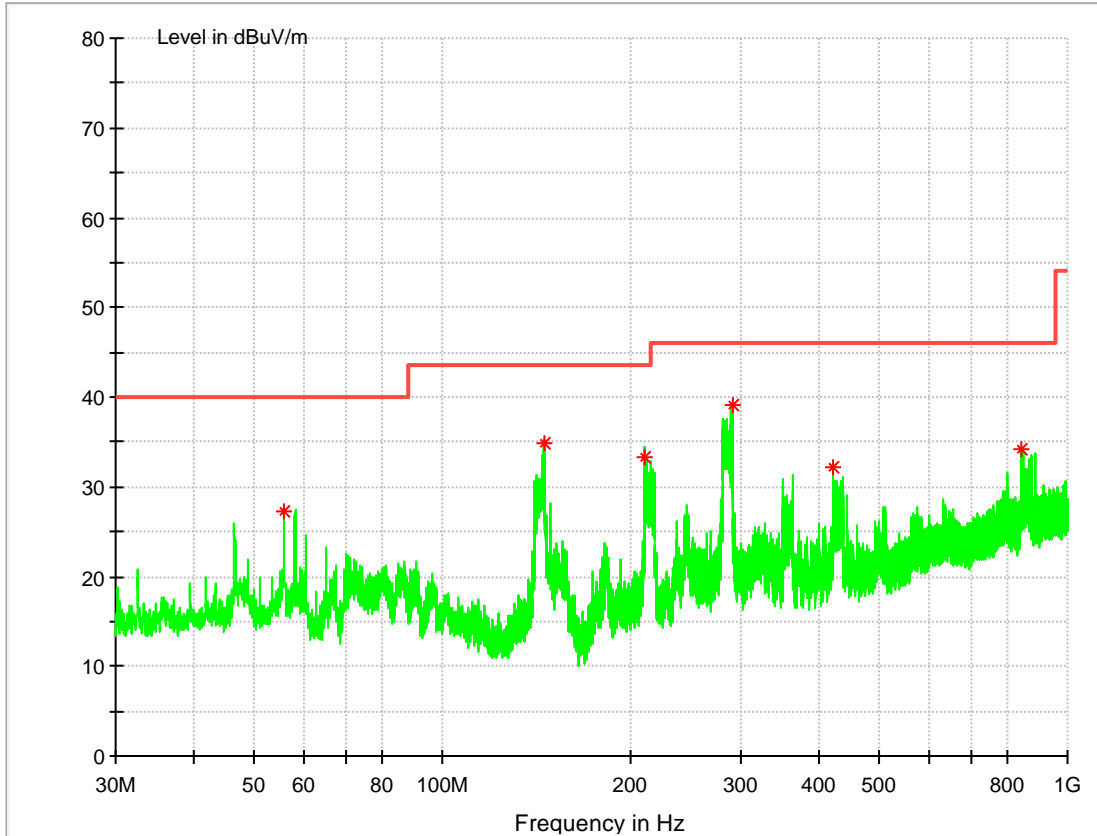
## 7 Test Data and Graph

Only the worst test results were shown

### 7.1 Radiated Disturbance

#### 7.1.1 30MHz~1GHz

Test Mode 8: USB&DP +Display



#### MEASUREMENT RESULT: QP Detector

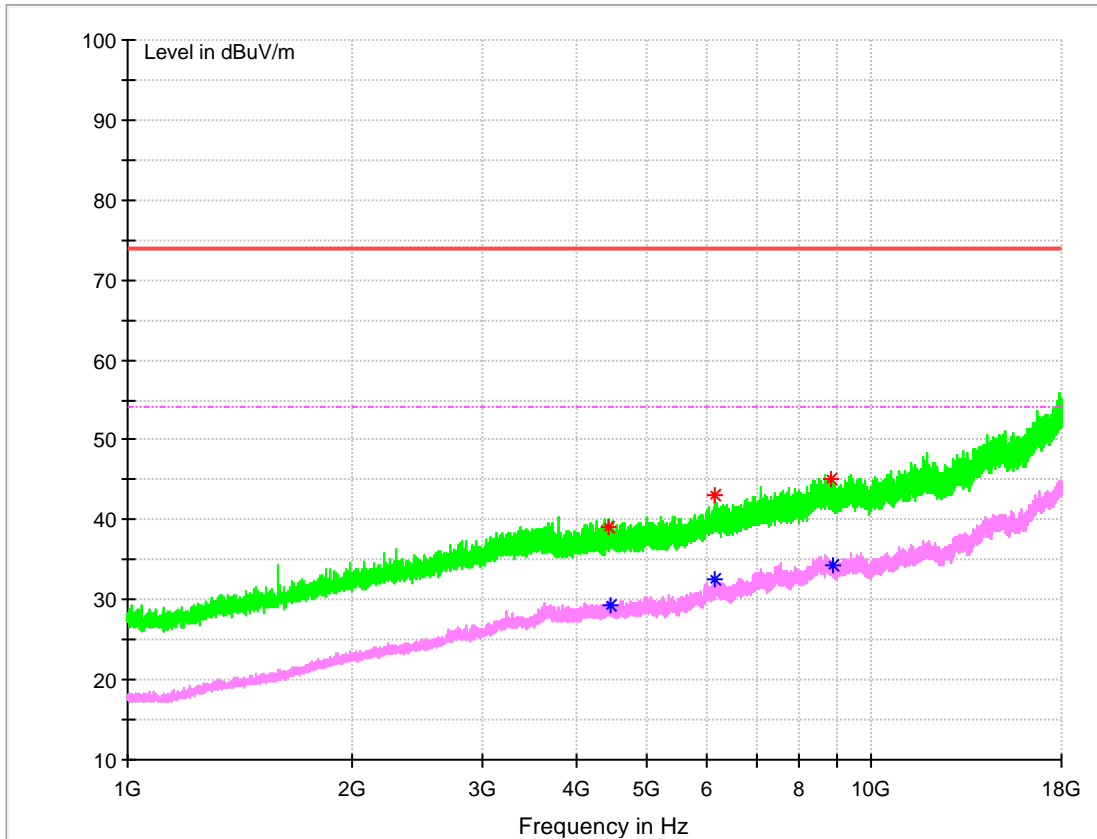
Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
55.640333	27.31	13.9	40.00	12.69	100.0	0.0	V
145.688667	34.88	9.6	43.50	8.62	100.0	88.0	V
211.196000	33.35	12.6	43.50	10.15	100.0	359.0	V
291.350333	39.20	14.8	46.00	6.80	100.0	332.0	V
421.459667	32.11	17.6	46.00	13.89	100.0	276.0	H
845.285000	34.10	23.3	46.00	11.90	100.0	359.0	V

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 1GMHz~18GHz

Test Mode 1: Charging+ Camera On + Idle



#### MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
4423.800000	39.13	-5.0	74	34.87	242.0	50.0	H
6170.266667	43.06	-1.1	74	30.94	186.0	0.0	V
8837.566667	45.16	3.4	74	28.84	109.0	273.0	V

#### MEASUREMENT RESULT: AV Detector

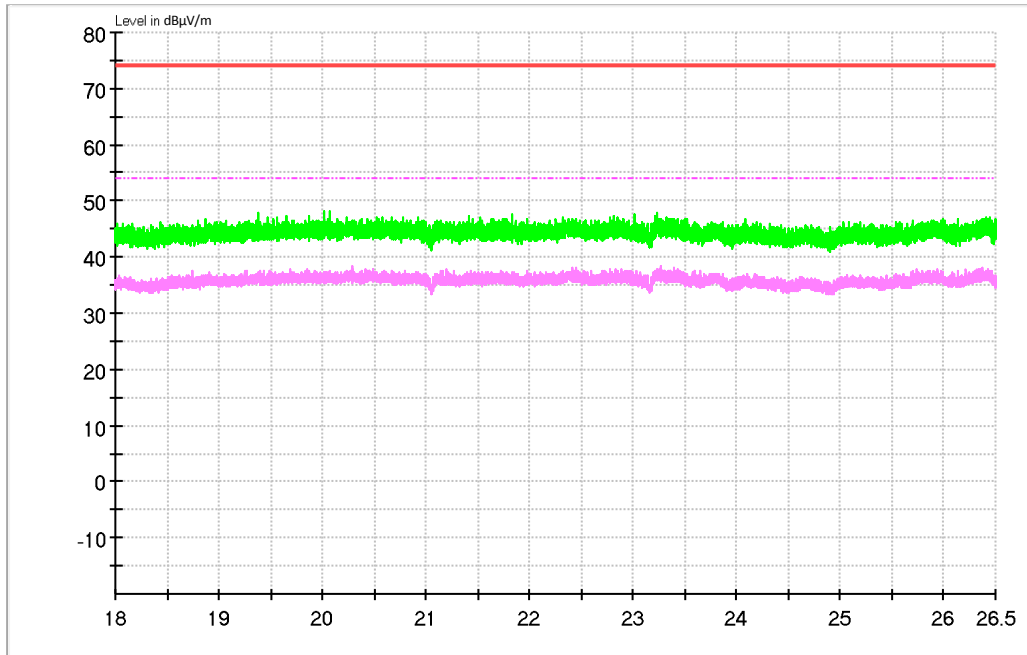
Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
4462.333333	29.39	-4.7	54	24.61	100.0	0.0	H
6171.400000	32.49	-1.1	54	21.51	100.0	238.0	H
8878.933333	34.41	3.3	54	19.59	194.0	358.0	V

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.

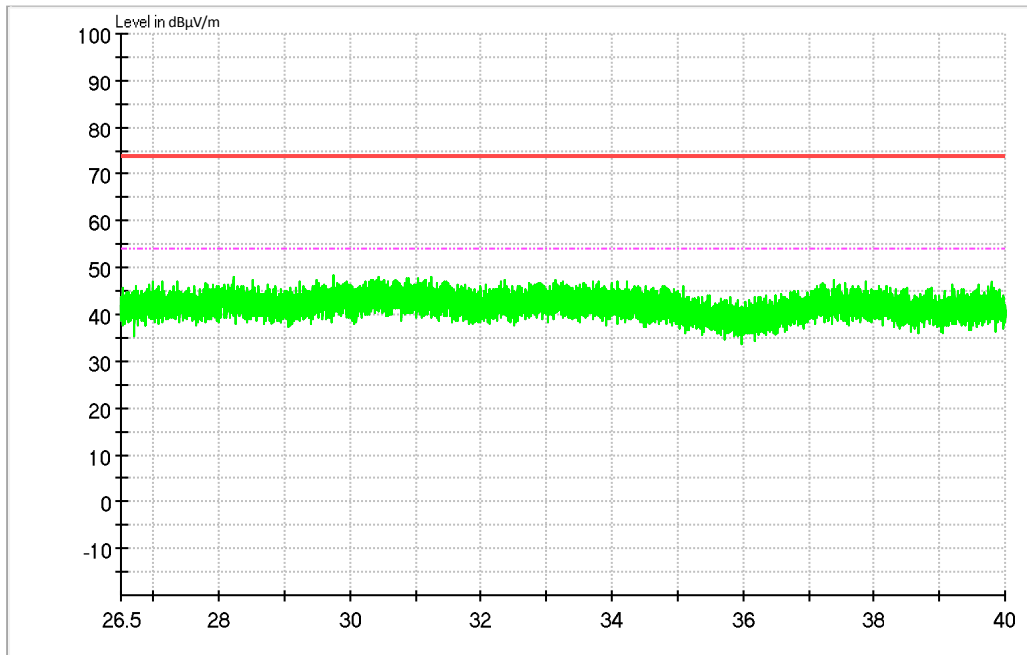
### 7.1.3 18GHz~26.5GHz

Test Mode 1: Charging+ Camera On + Idle



### 7.1.4 26.5GHz~40GHz

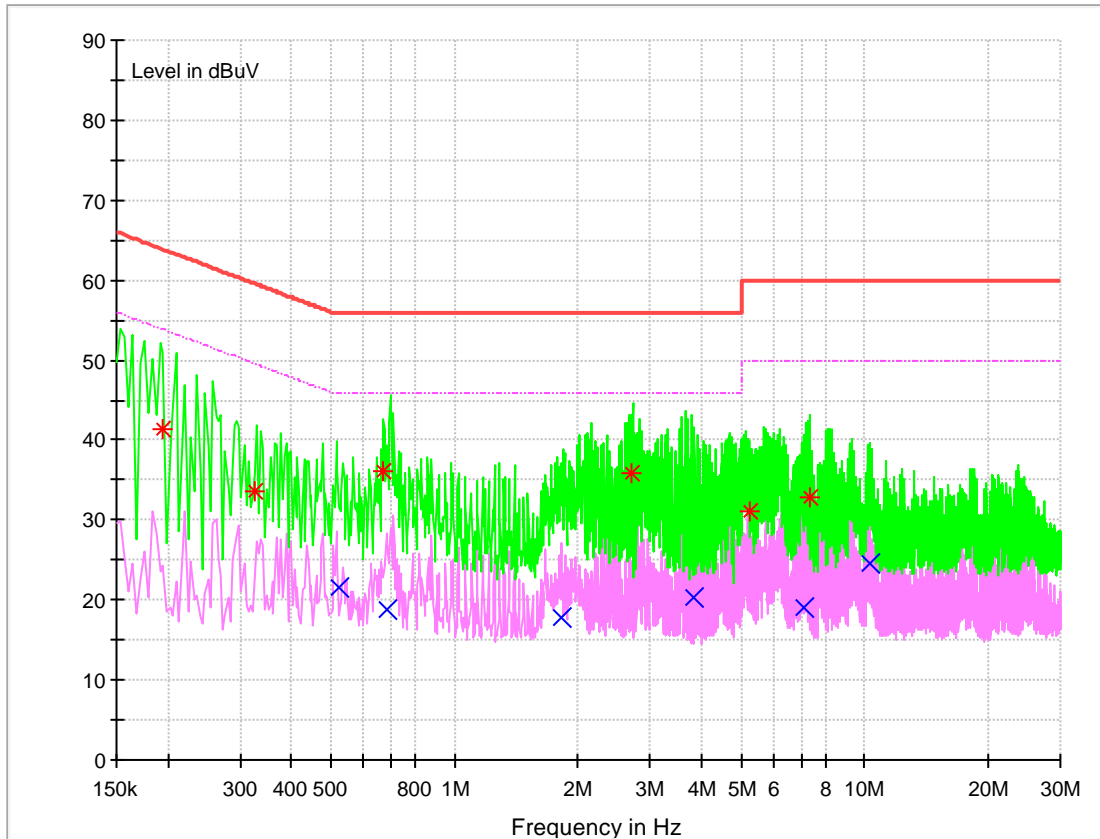
Test Mode 1: Charging+ Camera On + Idle



## 7.2 Conducted Disturbance

### 7.2.1 AC Port Test Data

Test Mode 1: Charging+ Camera On + Idle



#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB $\mu$ V	Line	Transd dB	Margin dB	Limit dB $\mu$ V	PE
0.521241	21.55	N	9.7	24.45	46.00	FLO
0.682542	18.74	N	9.7	27.26	46.00	FLO
1.825179	17.92	N	9.7	28.08	46.00	FLO
3.826555	20.41	N	9.7	25.59	46.00	FLO
7.116606	19.13	N	9.7	30.87	50.00	FLO
10.253380	24.55	N	10.0	25.45	50.00	FLO

#### MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dB $\mu$ V	Line	Transd dB	Margin dB	Limit dB $\mu$ V	PE
0.194216	41.37	L1	9.7	22.48	63.85	FLO
0.327075	33.64	N	9.7	25.89	59.53	FLO
0.672284	36.08	L1	9.7	19.92	56.00	FLO
2.710526	35.73	N	9.7	20.27	56.00	FLO
5.227791	31.10	N	9.7	28.90	60.00	FLO
7.378218	32.85	N	10.0	27.15	60.00	FLO

-----END-----