



# EMC Test Report

**Product Name: Smart Phone**

**Model Number: VOG-L0J**

**Report No: SYBH(Z-EMC) 20190115011002 -2**

**FCC ID: QISVOG-L0J**

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

**(Global Compliance and Testing Center of Huawei Technologies Co., Ltd)**

No.2 No.2, New City Avenue, Songshan Lake Sci. & Tech. Industry Park, Dongguan, 523808, P.R.C

Tel: +86 769 23830808 Fax: +86 769 23837628

## Notice

1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is 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 recognized by the Innovation, Science and Economic Development Canada (ISED) to test to Canadian radio equipment requirements. The CAB identifier is CN0003, and the ISED# is 21741.
4. The laboratory (Reliability Lab of Huawei Technologies Co., Ltd.) is also named “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 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 signatures of the persons responsible for preparing 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. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
11. If any question about this report, please contact the laboratory(PublicGCTC@huawei.com).



**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** No.2 New City Avenue Songshan Lake Sci. &Tech.  
Industry Park, Dongguan, Guangdong, P.R.C

**Date of Receipt Test Item:** 2019-02-11  
**Start Date of Test:** 2019-02-11  
**End Date of Test:** 2019-02-26

**Test Result:** Pass

**Approved By (Lab Manager)**      2019-02-28      He Hao      He Hao  
Date      Name      Signature

**Prepared by (Test Engineer)**      2019-02-27      Peng Shaohua      Peng Shaohua  
Date      Name      Signature



---

---

**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 .....	7
1.2	Applied Standards .....	7
2	Summary of Results .....	8
3	System Configuration during EMC Test .....	9
3.1	Test Mode .....	9
3.2	Test System Configuration .....	10
3.3	Cables Used during Test .....	13
3.4	Associated Equipment Used during Test .....	13
4	Electromagnetic Interference (EMI) .....	14
4.1	Radiated Disturbance 30MHz to 40GHz .....	14
4.2	Conducted Disturbance 0.15 MHz to 30MHz .....	16
5	Main Test Instruments .....	17
6	System Measurement Uncertainty .....	17
7	Test Data and Graph .....	18
7.1	Radiated Disturbance .....	18
7.2	Conducted Disturbance .....	21

## 1 General Information

### 1.1 EUT Description

EUT Description	
Product Name	Smart Phone
Model Number	VOG-L0J
Serials Number	RKJ0118C24000522
Input Rated Voltage	DC 3.82V
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 LTE BAND 38: 2570MHz to 2620MHz LTE BAND 41: 2535MHz to 2655MHz 2.4G WIFI: 2400MHz to 2472 MHz Bluetooth: 2400MHz to 2483.5MHz 5G WIFI:5150MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5850MHz 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 LTE BAND 38: 2570MHz to 2620MHz LTE BAND 41: 2535MHz to 2655MHz 2.4G WIFI: 2400MHz to 2472 MHz Bluetooth: 2400MHz to 2483.5MHz 5G WIFI:5150MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5850MHz GPS/ Galileo: 1575.42MHz/1176.45MHz BDS: 1561.098MHz GLONASS: 1602.5625MHz

	NFC: 13.56MHz Wireless Charging: 110kHz-148kHz
HW Version	HL3VOGUEM
SW Version	9.1.0.22(C341E22R1P1)
<b>EUT Accessory</b>	
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.
Li-ion Polymer Battery	Manufacturer:Huawei Technologies Co.,Ltd. Battery Model: HB486486ECW Rated capacity: 4100mAh Nominal Voltage:  +3.82V Charging Voltage:  +4.4V SN: 6DUNACI724G00064 5WNDAYI726X00085
Earphone(22040296)	Model: MEND1632B729000 Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD
Earphone(22040296)	Model: Windy-C Manufacturer: GoerTek Inc.
Earphone(22040296)	Model: 1331-3301-6001-TC-296 Manufacturer: Boluo County Quancheng Electronic Co.,ltd
Earphone(22040296)	Model: 618017 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

Test Site 1:	Reliability Laboratory of Huawei Technologies Co., Ltd. Global Compliance and Testing Center of Huawei Technologies Co., Ltd.
Test Site Location:	No.2, New City Avenue, Songshan Lake Sci. & Tech. Industry Park, Dongguan, 523808, P.R.C

### 1.2 Applied Standards

#### 47 CFR FCC Part 15, 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~ 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	17°C ~ 35°C
Relative humidity	25% ~ 73%
Atmospheric pressure	87kPa ~ 103kPa



### 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:

- 1) Radiated Emission:

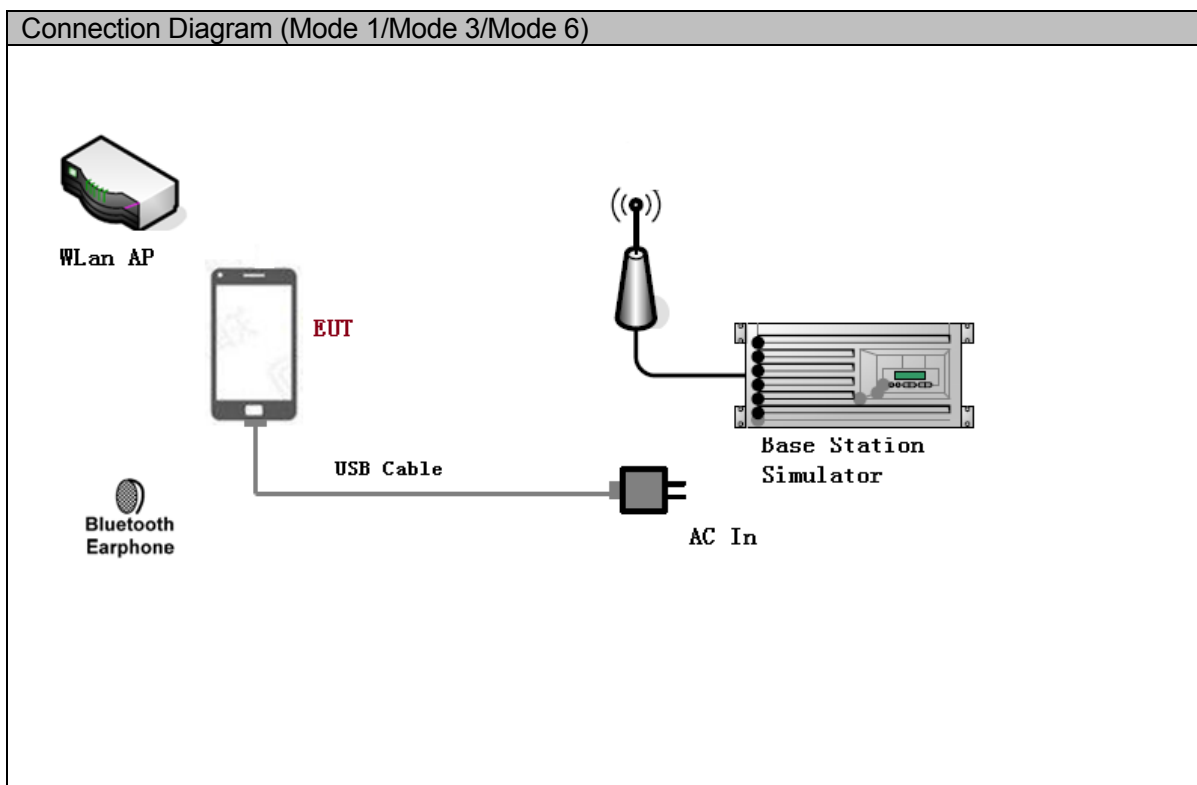
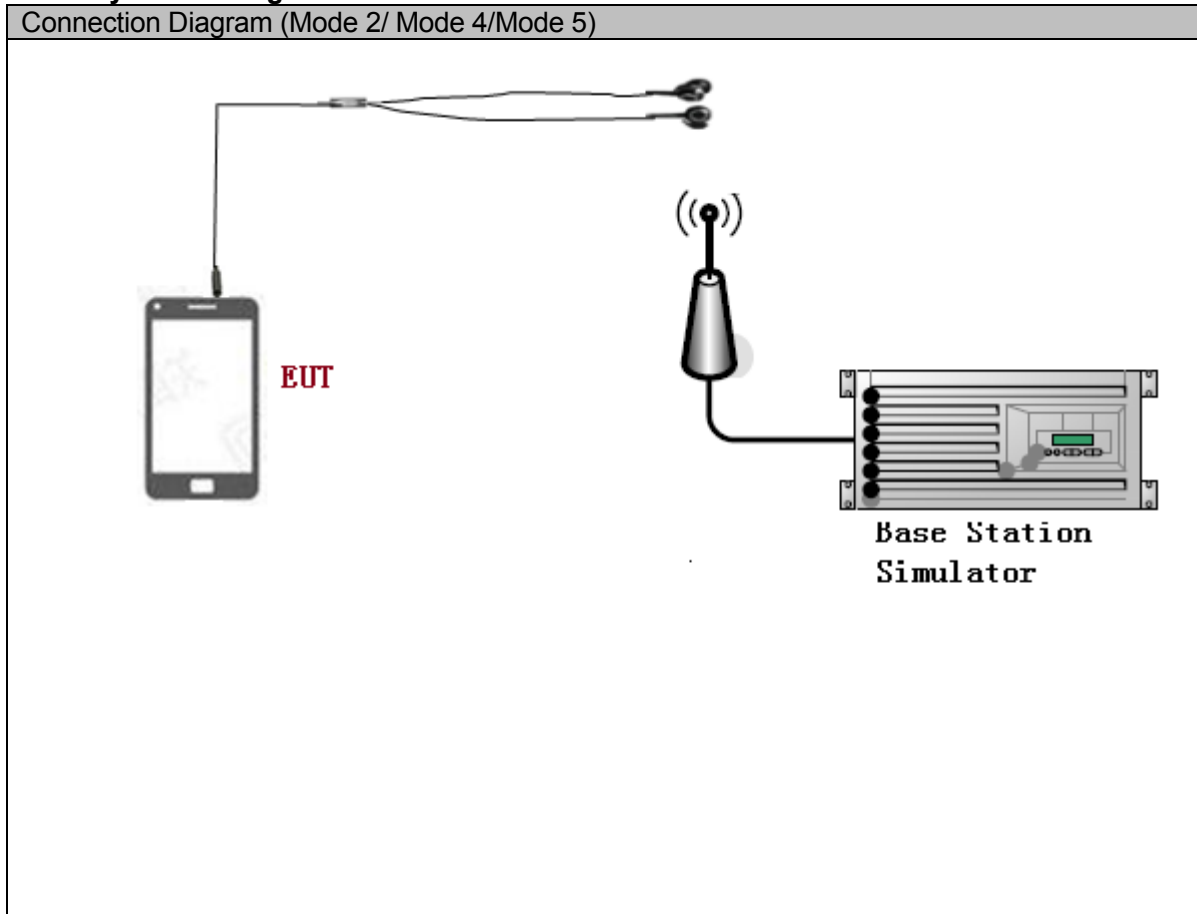
USB&DP +Display the result is the worst (30MHz~1GHz).

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

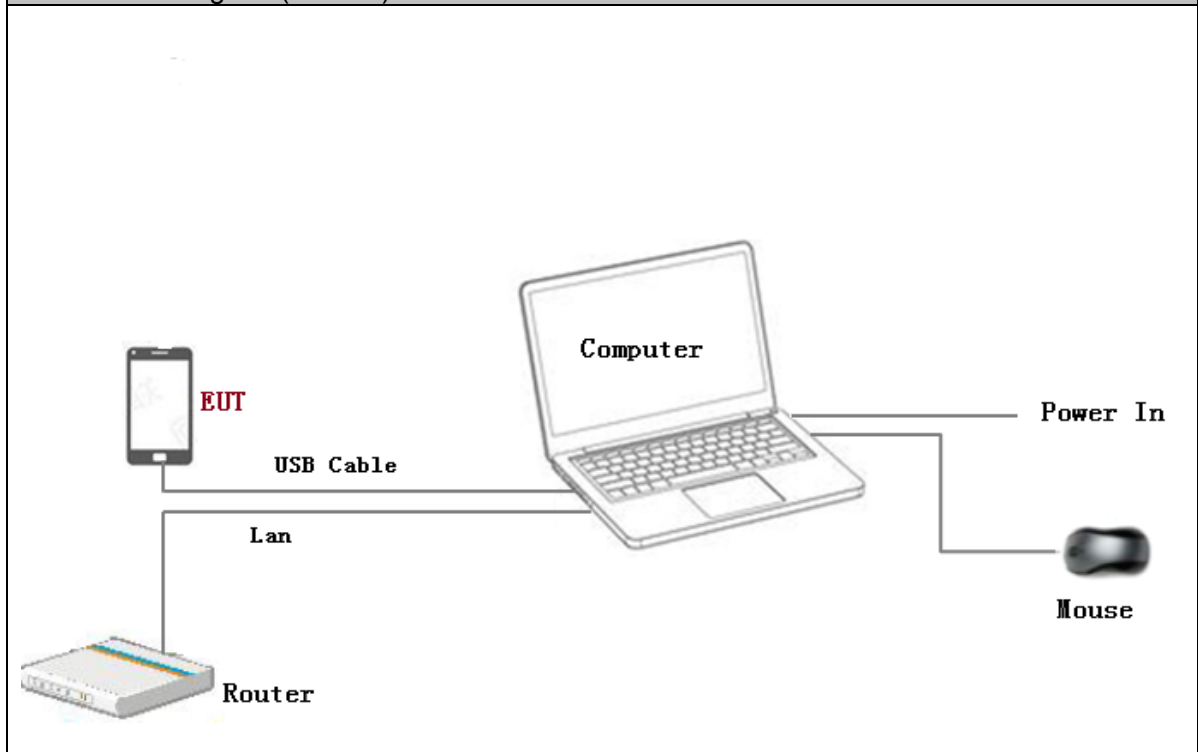
- 2) Conducted Emission:

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

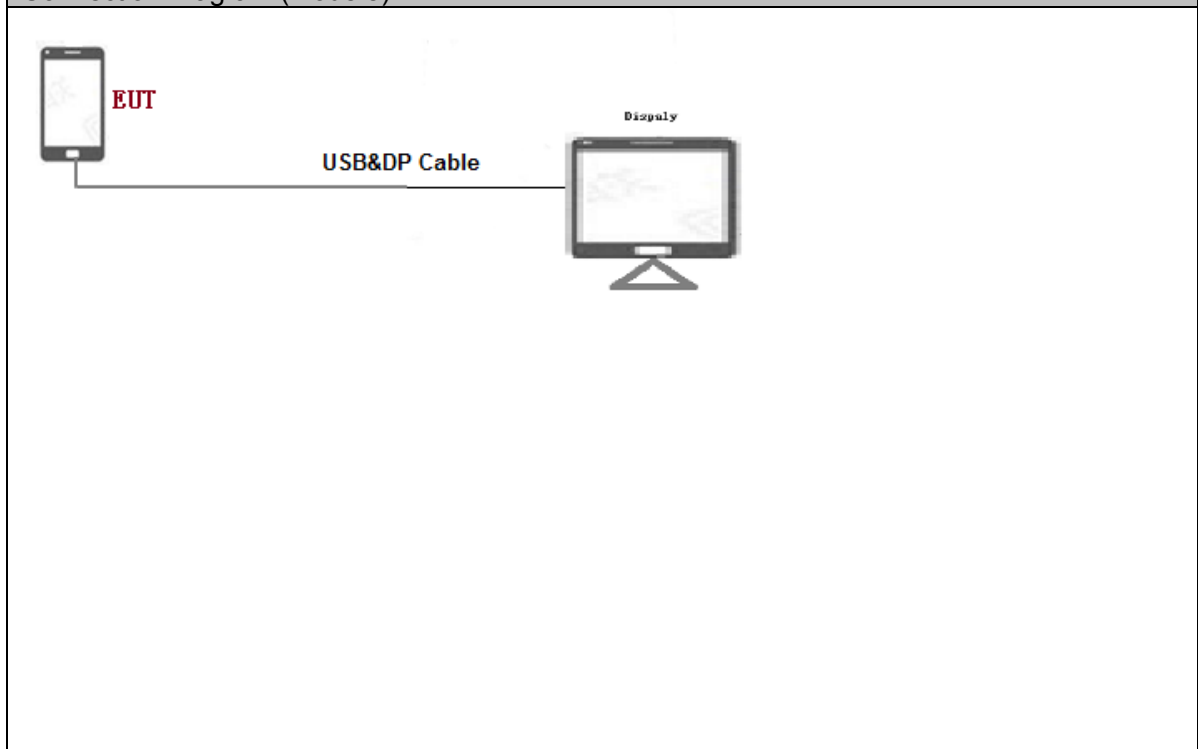
### 3.2 Test System Configuration



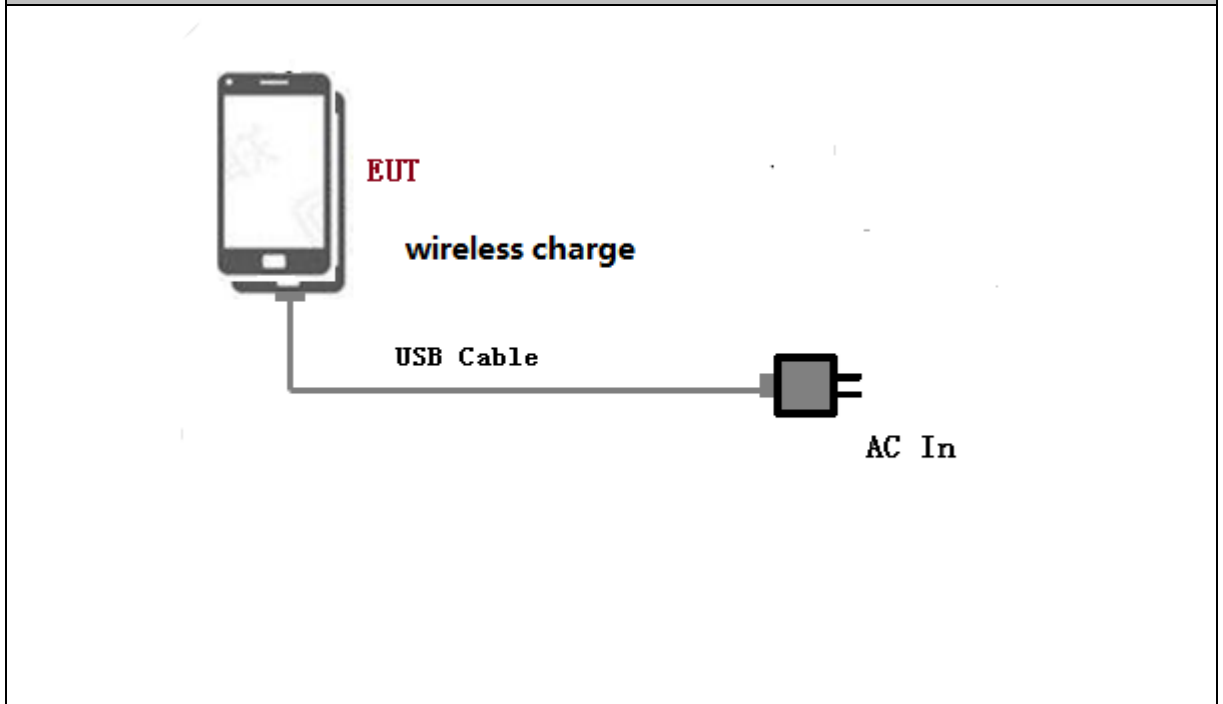
Connection Diagram (Mode 7)



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	/	/
Adapter	HW-100400A00	HUAWEI	CA41XX14A00 472	/	/
Adapter	HW-100400U00	HUAWEI	CA45XX14A00 034	/	/
Adapter	HW-100400E00	HUAWEI	CA45XX14A00 134	/	/
Adapter	HW-100400B00	HUAWEI	CA47XX14A00 426	/	/

## 4 Electromagnetic 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

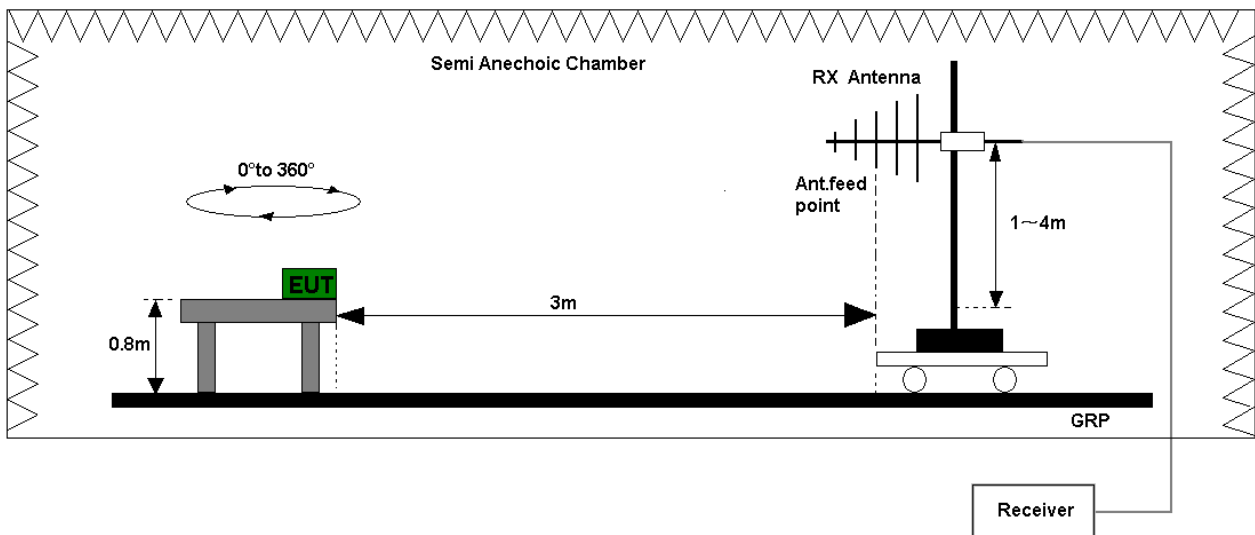


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz )

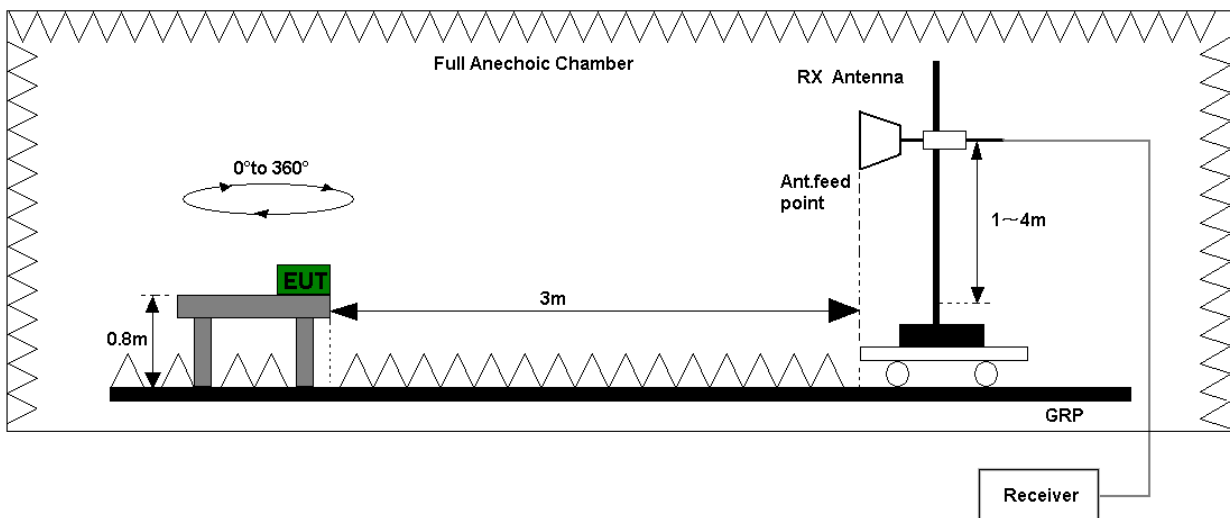


Figure 2. Test set-up of radiated disturbance(above 1GHz)



### 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

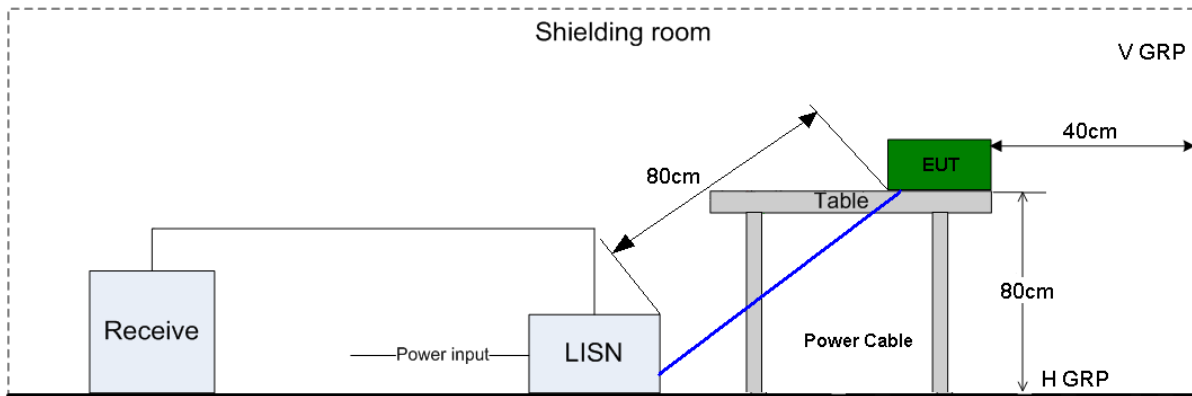


Figure 3. Test Set-up of conducted disturbance

### 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=5.62dB; k=2
RE(1GHz-18GHz)	Field strength (dB $\mu$ V/m)	U=5.18dB; 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

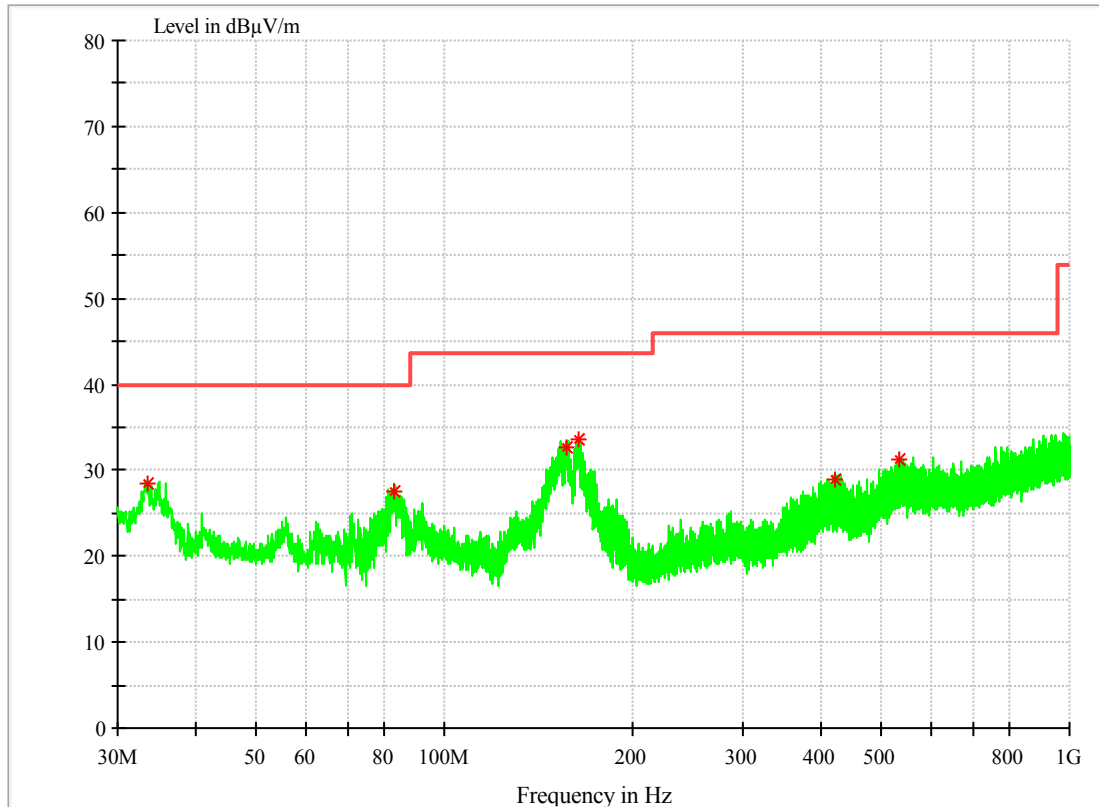
## 7 Test Data and Graph

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

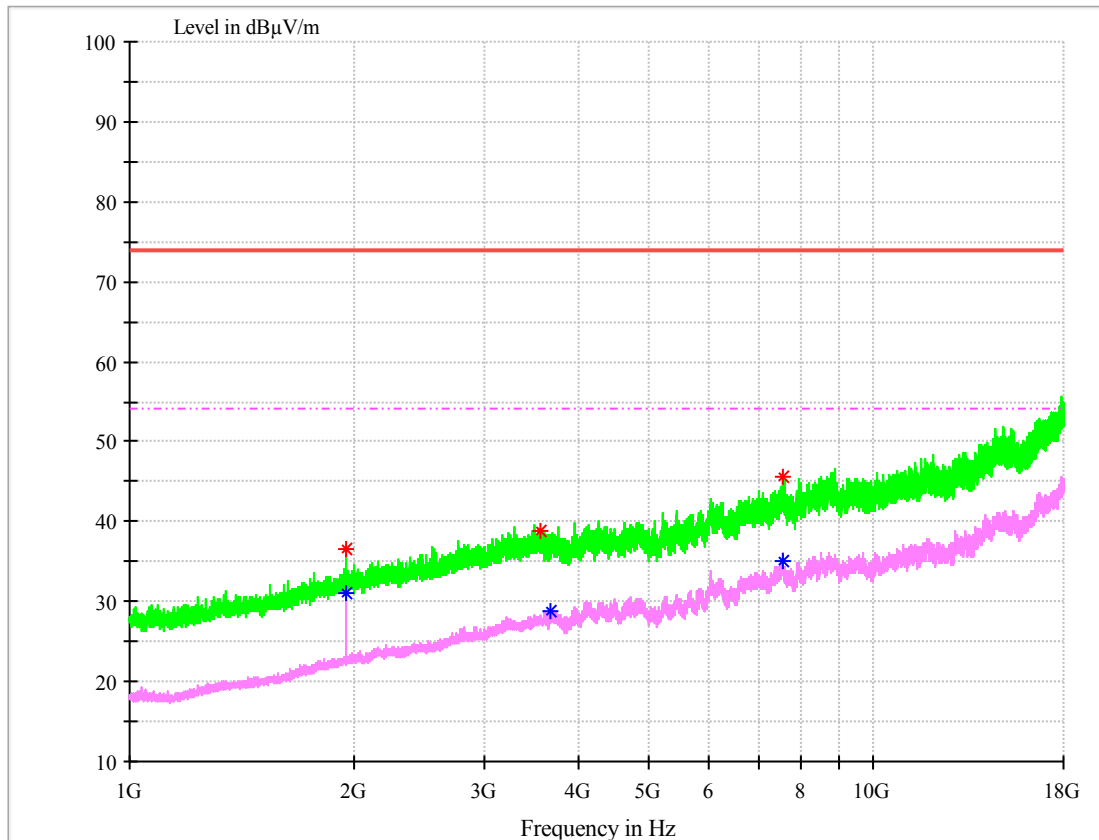
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.540500	28.49	13.0	40.00	11.51	100.0	166.0	V
82.816500	27.54	10.1	40.00	12.46	100.0	42.0	V
156.536500	32.55	9.3	43.50	10.95	100.0	84.0	V
163.278000	33.63	9.7	43.50	9.87	100.0	115.0	V
421.152500	28.98	17.1	46.00	17.02	100.0	60.0	H
534.594000	31.18	19.3	46.00	14.82	100.0	209.0	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 1GHz~18GHz

Test Mode 1: Charging+ Camera On + Idle



#### MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1955.966667	36.52	-12.4	74.00	37.48	100.0	0.0	H
3559.633333	38.95	-6.0	74.00	36.05	100.0	202.0	H
7550.666667	45.66	1.4	74.00	28.34	139.0	329.0	V

#### MEASUREMENT RESULT: AV Detector

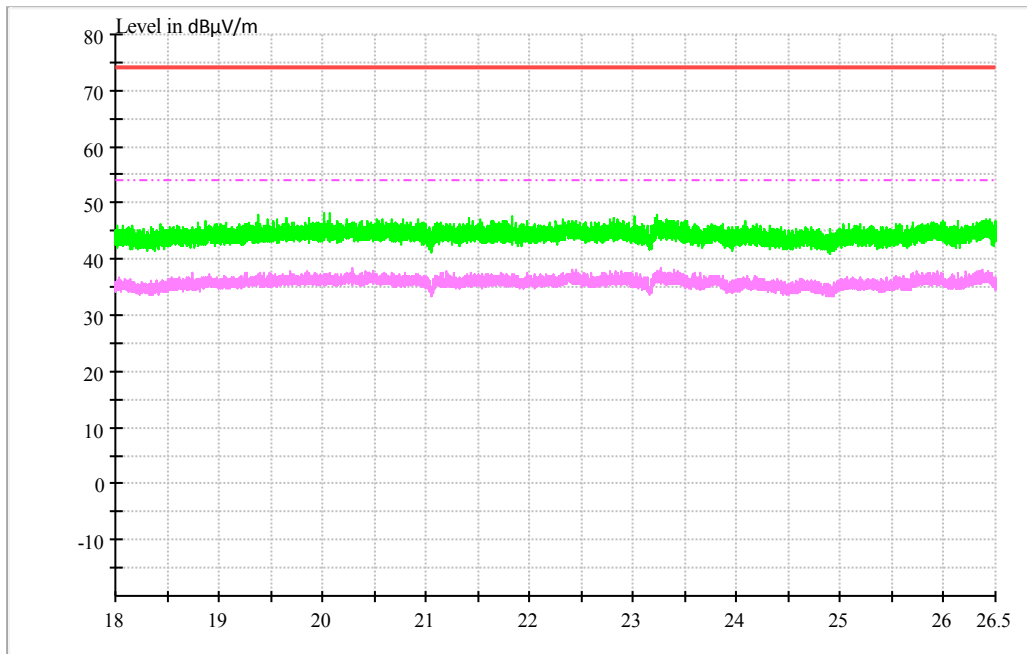
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
1955.96667	31.05	-12.4	54.00	22.95	100.0	2.0	H
3671.833333	28.90	-6.3	54.00	25.10	100.0	19.0	H
7559.166667	35.02	1.4	54.00	18.98	194.0	273.0	V

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

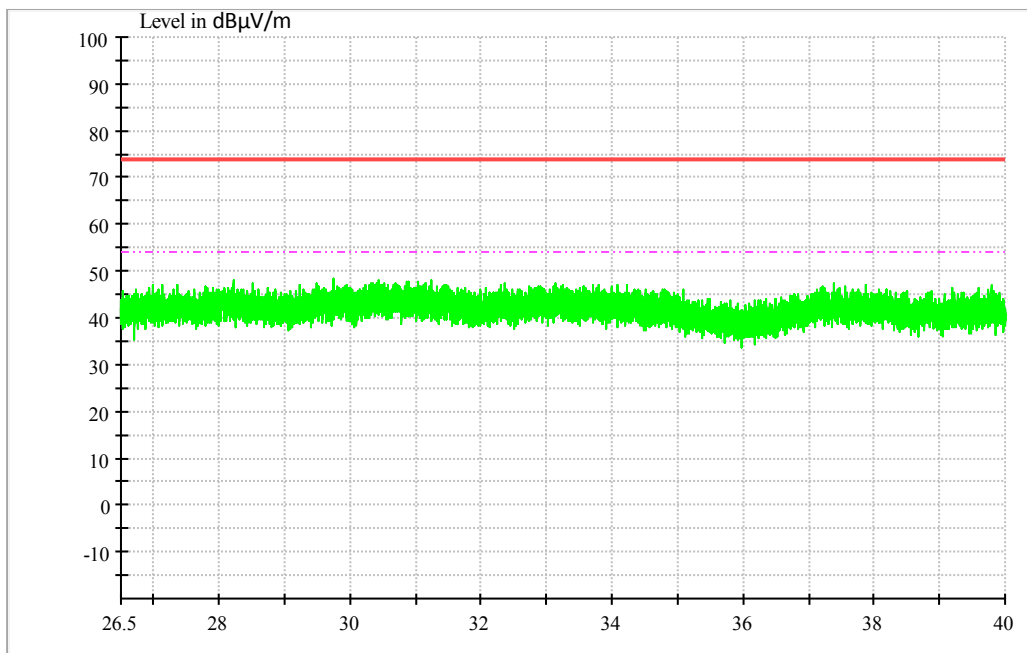
Test Mode 1: Charging+ Camera On + Idle



NOTE 1: The data was measured by Peak detector.  
NOTE 2: No peak found in the Test Range of "18 GHz to 26.5GHz"

### 7.1.4 26.5GHz~40GHz

Test Mode 1: Charging+ Camera On + Idle

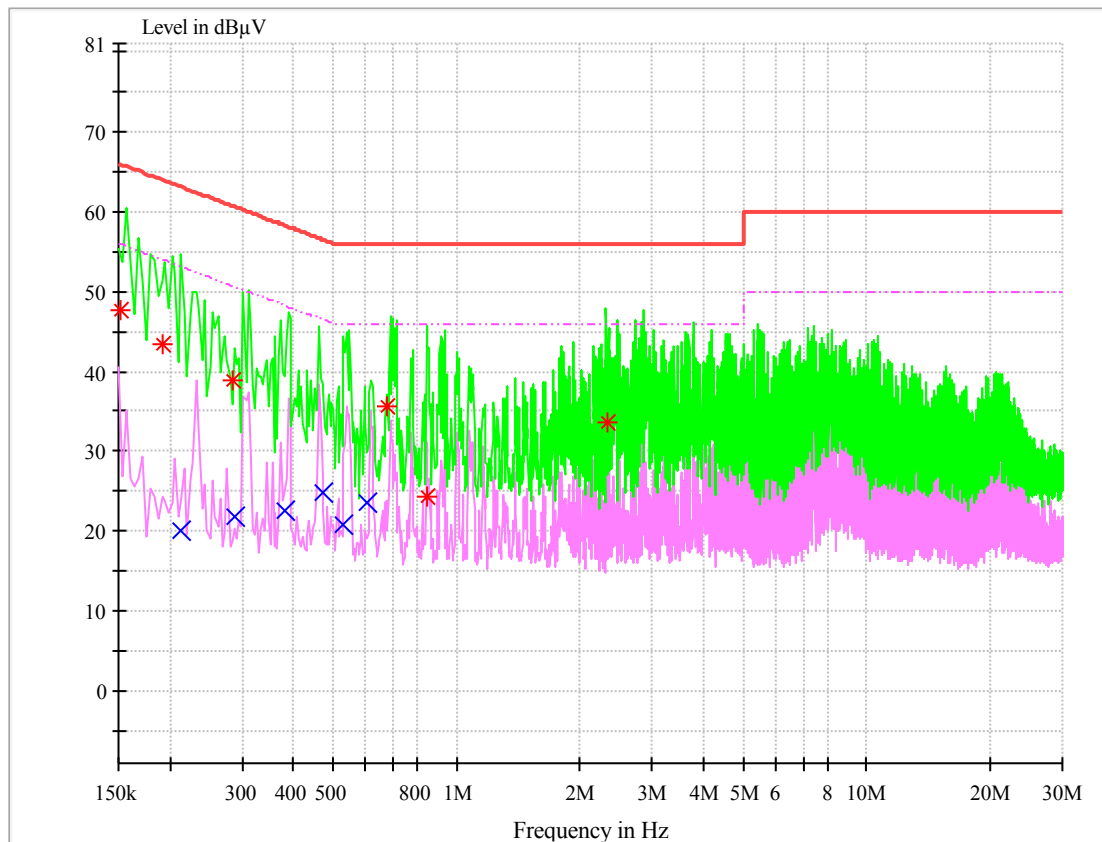


NOTE 1: The data was measured by Peak detector.  
NOTE 2: No peak found in the Test Range of "26.5 GHz to 40GHz"

## 7.2 Conducted Disturbance

### 7.2.1 AC Port Test Data

Test Mode 1: Charging+ Camera On + Idle



#### MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.151284	47.64	N	9.7	18.29	65.93	FLO
0.191088	43.51	N	9.7	20.48	63.99	FLO
0.285462	38.81	N	9.7	21.85	60.66	FLO
0.676370	35.62	N	9.7	20.38	56.00	FLO
0.852489	24.37	N	9.7	31.63	56.00	FLO
2.399712	33.66	N	9.8	22.34	50.00	FLO

#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.213640	20.08	N	9.7	32.98	53.06	FLO
0.287002	21.93	N	9.7	28.68	50.61	FLO
0.382995	22.71	N	9.7	25.50	48.21	FLO
0.473118	24.84	N	9.7	21.62	46.46	FLO
0.526679	20.94	N	9.7	25.06	46.00	FLO
0.606370	23.66	N	9.8	22.34	46.00	FLO

-----END-----