



# EMC Test Report

**Product Name: Smart Phone**

**Model Number: LYA-L0C**

**Report No: SYBH(Z-EMC) 20180808003001-2**

**FCC ID: QISLYA-L0C  
IC:6369A-LYAL0C**

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

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

No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park, Dongguan, Guangdong, 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 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.
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.





---

---















**Modification Record**

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

## TABLE OF CONTENT

1	General Information .....	6
1.1	EUT Description .....	6
1.2	Test Site Information .....	9
1.3	Differences Description .....	9
1.4	Applied Standards .....	11
2	Summary of Results.....	12
3	System Configuration during EMC Test.....	13
3.1	Test Mode .....	13
3.2	Test System Configuration.....	14
3.3	Cables Used during Test.....	17
3.4	Associated Equipment Used during Test.....	17
4	Electromagnetic Interference (EMI).....	18
4.1	Radiated Disturbance 30MHz to 40GHz .....	18
4.2	Conducted Disturbance 0.15 MHz to 30MHz.....	20
5	Main Test Instruments.....	21
6	System Measurement Uncertainty .....	21
7	Test Data and Graph.....	22
7.1	Radiated Disturbance .....	22
7.2	Conducted Disturbance.....	25



	NFC:13.56MHz GPS/A-GPS: 1575.42MHz BDS:1561.098MHz GLONASS: 1602MHz Galileo: 1575.42MHz\1176.45MHz Wireless Charging: 110kHz-148kHz
S/N	F3R0118621000036
HW Version	HL2LAYAM
SW Version	5.0.1.82(C792E4R1P9log)
EUT Accessory	
USB(04071722)	Data Cable USB A Male to USB Type C, Shielded Manufacturer: LUXSHARE Precision Industry Co., Ltd HUIZHOU DEHONG TECHNOLOGY CO.,LTD. Ningbo Broad Telecommunication 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: CA41XX14A00152
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:CA45XX14A00109
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:CA45XX14A00157
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:CA47XX14A00123
Rechargeable Li-ion	Manufacturer: Huawei Technologies Co.,Ltd. Battery Model: HB486486ECW Rated capacity: 4100mAh Nominal Voltage:  +3.82V Charging Voltage:  +4.4V SN: 5W NJSCI623G0027F 6DUNACI724G00064 5W NDAYI726X00085
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.





### 1.2 Test Site Information

Test 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

### 1.3 Differences Description

Model	LYA-L29	LYA-L0C																						
PCB	The same	The same																						
Frequency-GSM	The same	The same																						
Frequency-WCDMA	The same	The same																						
Frequency-LTE	Different B2/4/5/7/12/17/38/40/41(2545~2655MHz , support AXGP)	Different B2/4/5/7/12/17/38/40/41(2545~2655MHz , support AXGP)/B66																						
4*4 Mimo	Different Support B3、 B7、 B1	Different Support B2、 B7、 B66(B4) Replace TRI SAW filters of B1/B3/B7 with SAW filters of B2/B66/B7. Replace																						
SIM Card	Dual	Single																						
RF NV parameters	Different	<p>Different The power of LYA-L0C is different from LYA-L29 by change RF NV parameters.</p> <ul style="list-style-type: none"> <li>Down antenna (Primary)               <ul style="list-style-type: none"> <li>① 0mm body Scenario                   <table border="1"> <thead> <tr> <th></th> <th>WB2</th> <th>WB4</th> <th>LTEB2</th> <th>LTEB4</th> </tr> </thead> <tbody> <tr> <td>reduce</td> <td>0.5dB</td> <td>0.5dB</td> <td>0.5dB</td> <td>1.5dB</td> </tr> </tbody> </table> </li> <li>② 10mm hotspot Scenario                   <table border="1"> <thead> <tr> <th></th> <th>LTEB4</th> </tr> </thead> <tbody> <tr> <td>reduce</td> <td>0.5dB</td> </tr> </tbody> </table> </li> </ul> </li> <li>Up antenna (Secondary) Head Scenario               <table border="1"> <thead> <tr> <th></th> <th>WB2</th> <th>WB4</th> <th>LTEB2</th> </tr> </thead> <tbody> <tr> <td>rise</td> <td>1dB</td> <td>1dB</td> <td>1dB</td> </tr> </tbody> </table> </li> </ul>		WB2	WB4	LTEB2	LTEB4	reduce	0.5dB	0.5dB	0.5dB	1.5dB		LTEB4	reduce	0.5dB		WB2	WB4	LTEB2	rise	1dB	1dB	1dB
	WB2	WB4	LTEB2	LTEB4																				
reduce	0.5dB	0.5dB	0.5dB	1.5dB																				
	LTEB4																							
reduce	0.5dB																							
	WB2	WB4	LTEB2																					
rise	1dB	1dB	1dB																					



Hardware	<p>Different Location ID: Z4102, Z4302, Z4401 Description: B1/3/7 Tri saw filter, 2140MHz.</p> <p>Location ID: Z4103 Description: SAW filter -1960MHz</p>	<p>Different 1) Replace TRI SAW filters of B1/B3/B7 with SAW filters of B2/B66/B7. Replace Location ID: Z4102, Z4302, Z4401 Description: B2/B66/B7 Tri saw filter, 2655MHz. 2) Delete some chip inductors in Peripheral RF Matching circuits of the diversity circuit, MIMO main circuit, and MIMO diversity circuit. Delete Location ID: L4126 L4127 L4130 L3506 Description: Chip inductor 0.018uH/0.001uH/0.0022uH/0.0039uH 3) Delete The circuits related to the B32 frequency band. Delete: Location ID: Z3502, Z4104 Description: B32 saw filter 1474MHz Location ID: C3512, C5401, C5405 Description: Ceramic capacitor 0.033nF Location ID: Z5403 Description: Ceramic filter -1710MHz Location ID: U3503, U4101 Description: RF low noise amplifier - 1559~1610MHz 4) Replace B3 SAW filter with B2 SAW filter and slight change of Peripheral RF matching circuits. Replace: Location ID: Z4103 Description: SAW filter -1842.5MHz Delete: Location ID: L3502 L3516 L4129 Description: Chip inductor 0.0056uH/0.002uH/0.0075uH Location ID: C3514, C4110 Description: Ceramic capacitor 0.018nF</p>
Software	Different	Different
Dimensions	The same	The same
Appearance	The same	The same

The RE items were tested, and other EMC items refer to the previous report number: SYBH(Z-EMC) 20180706013002-2



## 1.4 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"/> Telecommunication 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+DOCK+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:

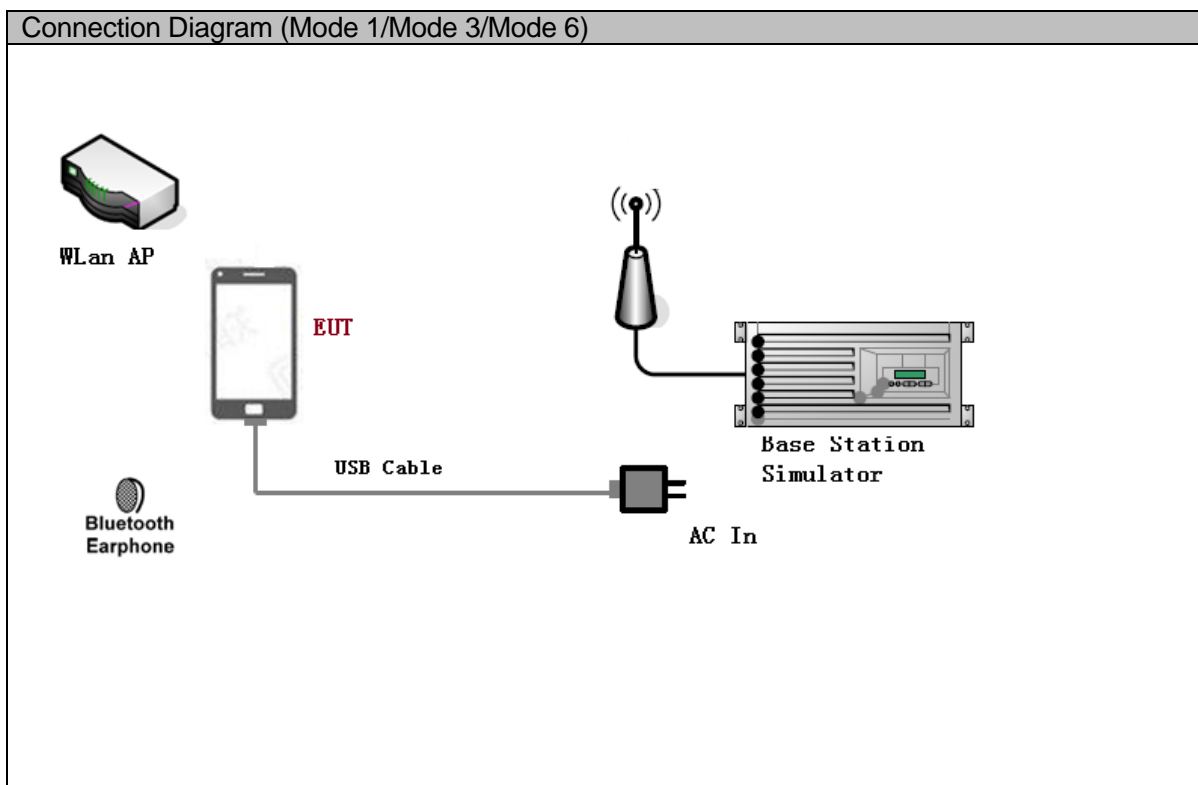
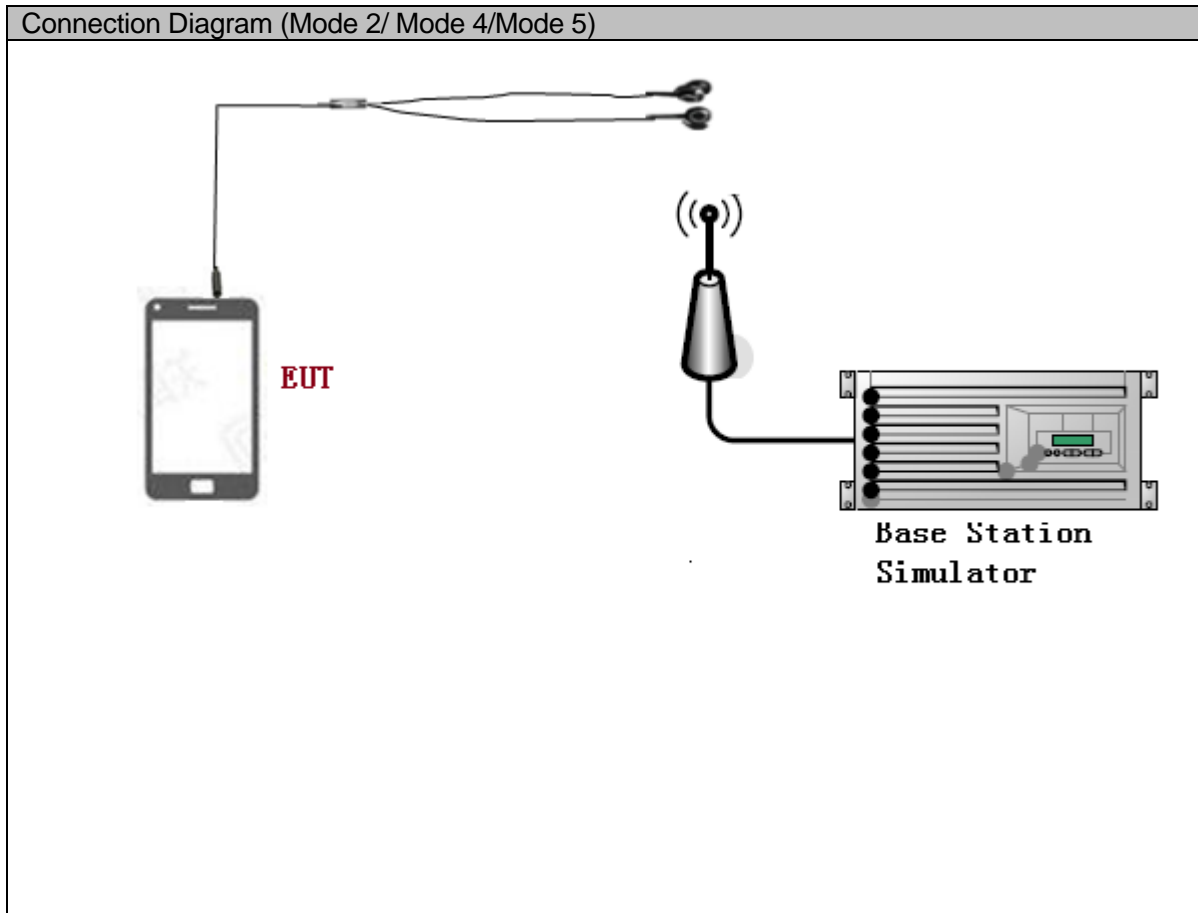
Adapter (Model: HW-100400U00, SN: CA45XX14A00109) + Charging+ Camera On + Idle the result is the worst (30MHz~1GHz).

Adapter (Model: HW-100400U00, SN: CA45XX14A00109) + Charging+ Camera On + Idle the result is the worst (1GHz~40GHz).

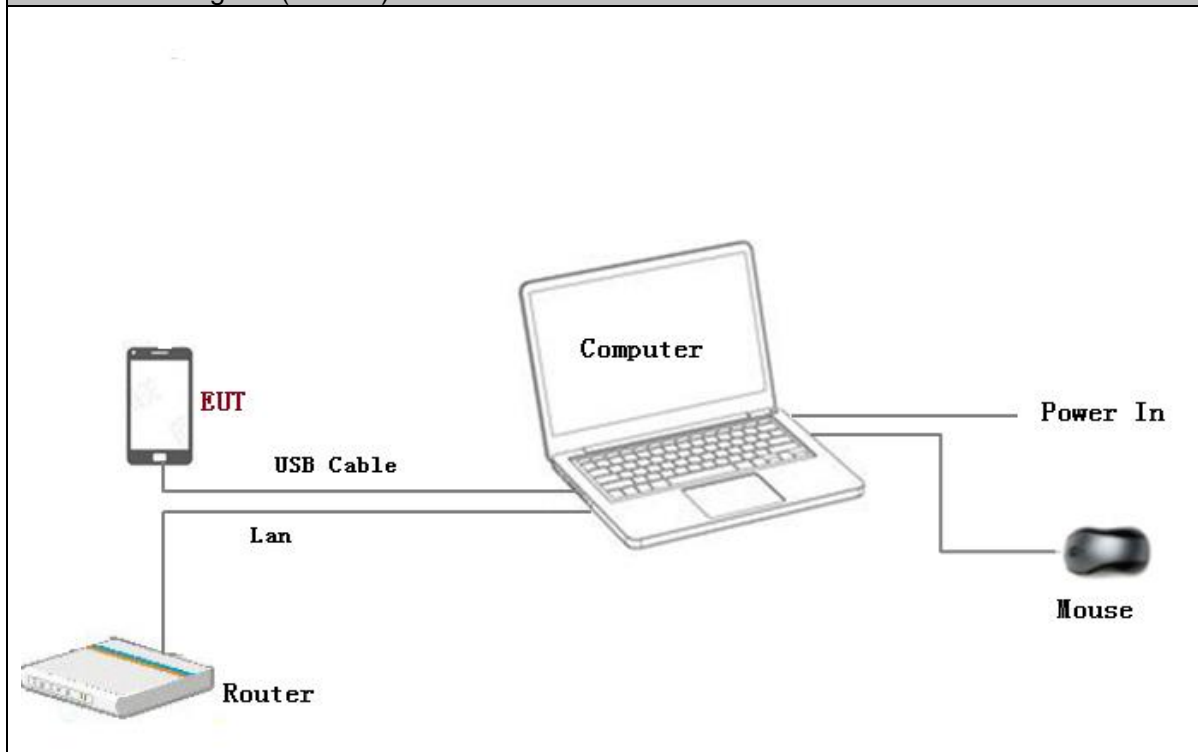
##### Conducted Emission:

Adapter (Model: HW-100400U00, SN: CA45XX14A00109) + Charging+ Camera On + Idle the result is the worst.

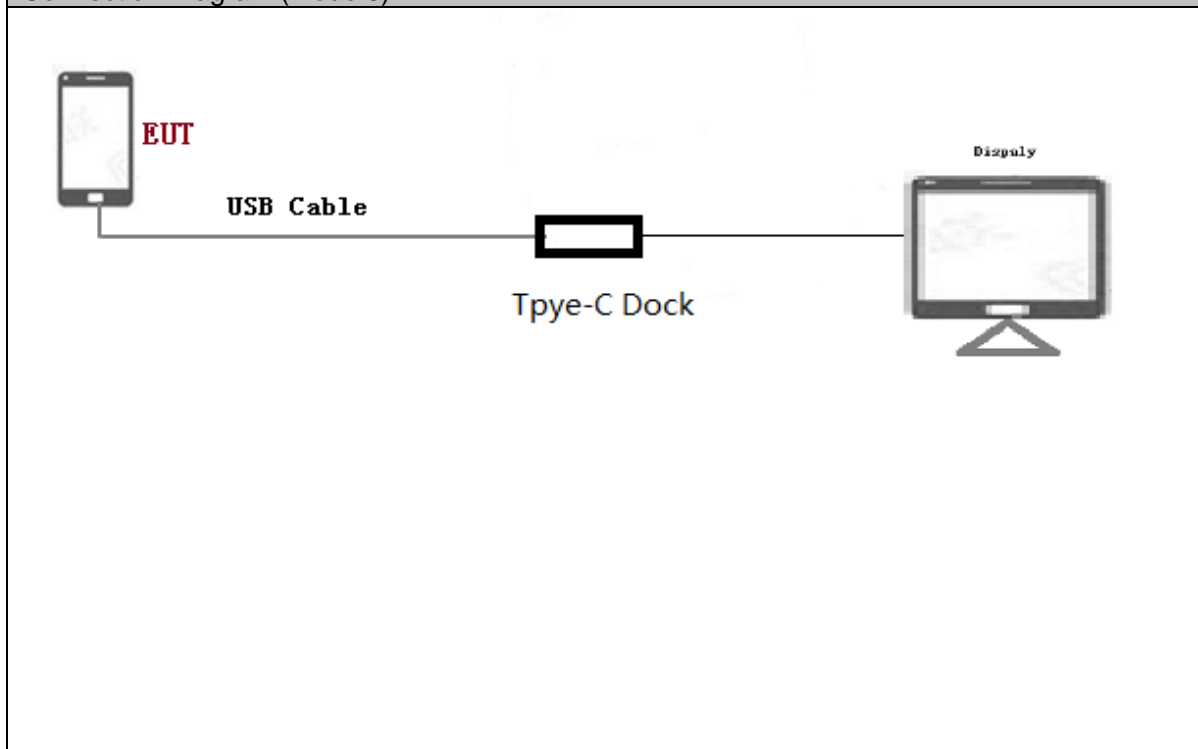
### 3.2 Test System Configuration



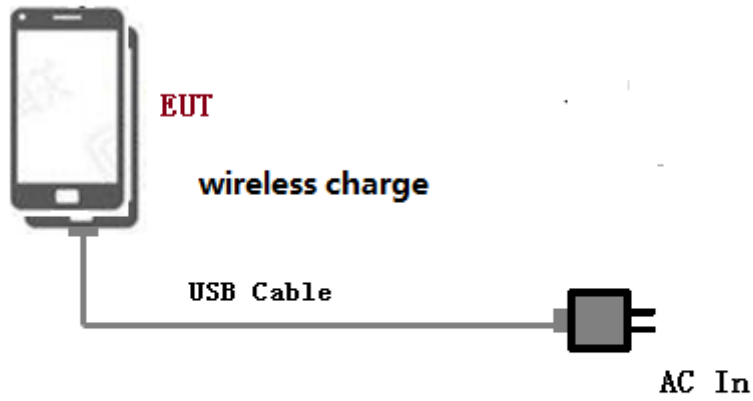
Connection Diagram (Mode 7)



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
VGA 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
Notebook	S3	ThinkPad	A140714638	/	/
Mouse	M-U0025-O	Lenovo	HS423HB22TB	/	/
Dock	AD10	HUAWEI	S2201615	/	/
display	L197	Lenovo	8M03373A0956 983	/	/
Smart Phone	LYA-L29	HUAWEI	LHS011872100 0004	/	/

## 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

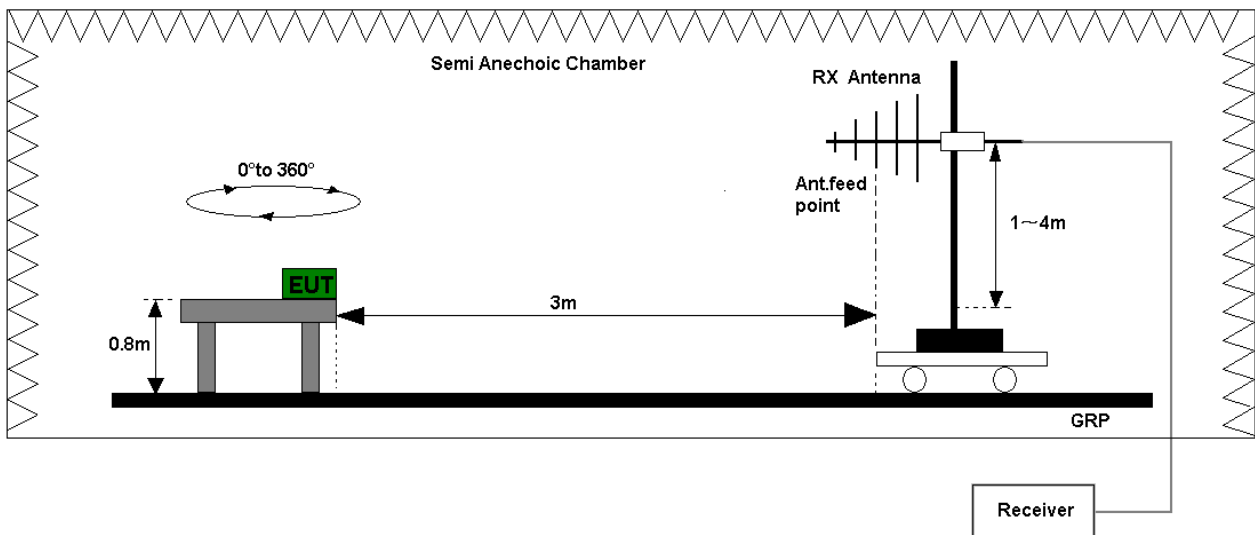


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

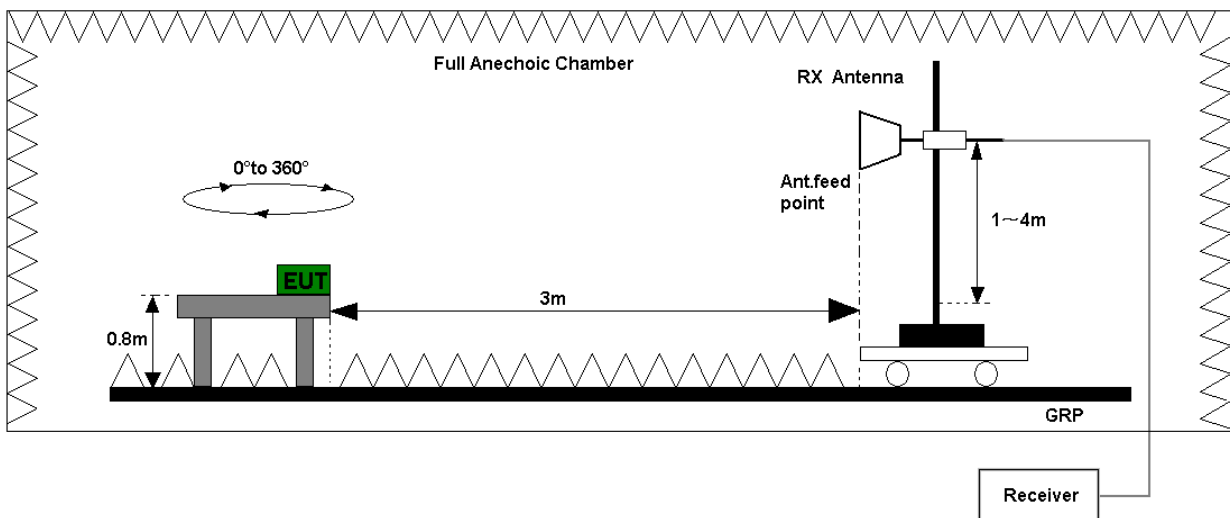


Figure 2. Test set-up of radiated disturbance(above 1GHz)

### 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

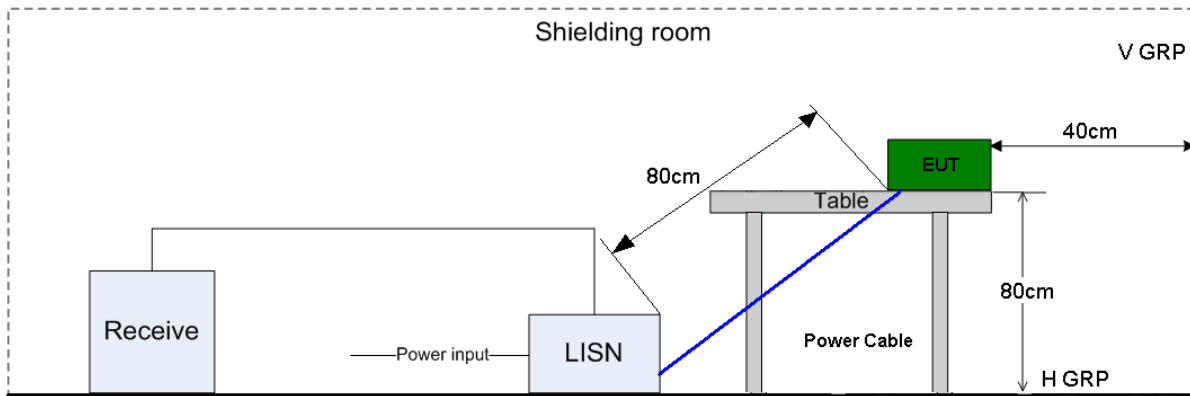


Figure 3. Test Set-up of conducted disturbance

### 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	Jan. 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

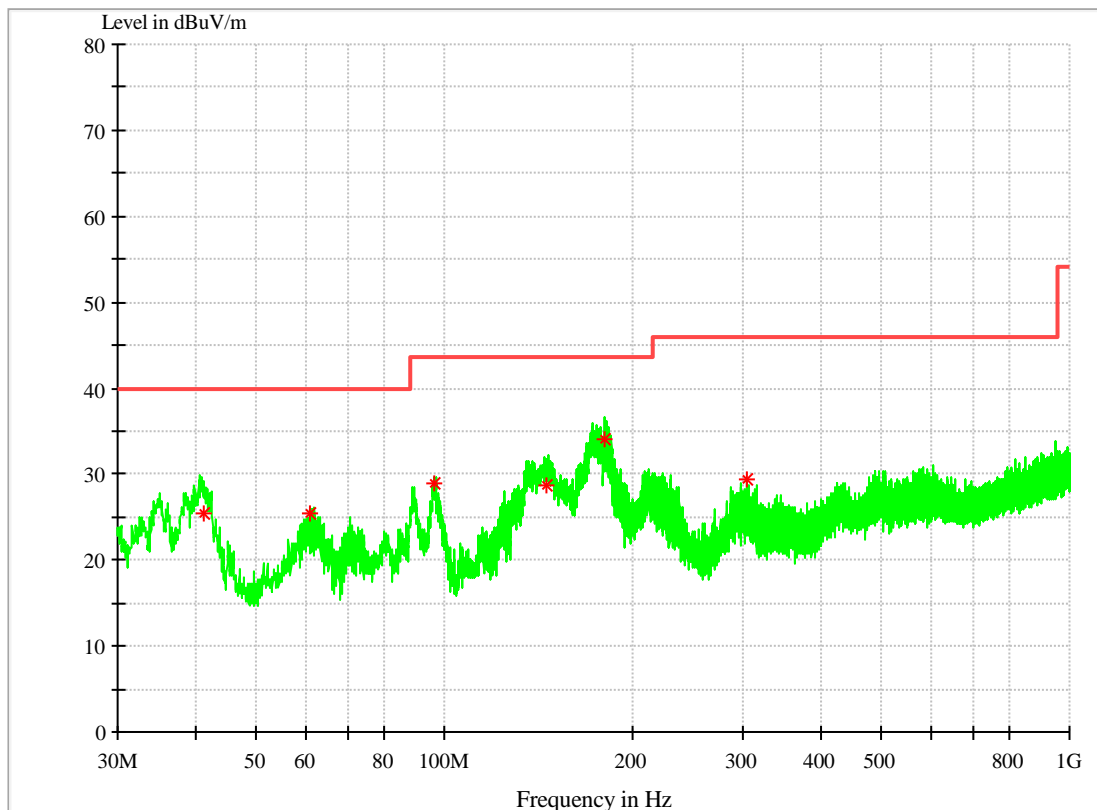
## 7 Test Data and Graph

Only the worst test results were shown

### 7.1 Radiated Disturbance

#### 7.1.1 30MHz~1GHz

Test Mode 1: Charging+ Camera On + Idle



#### MEASUREMENT RESULT: QP Detector

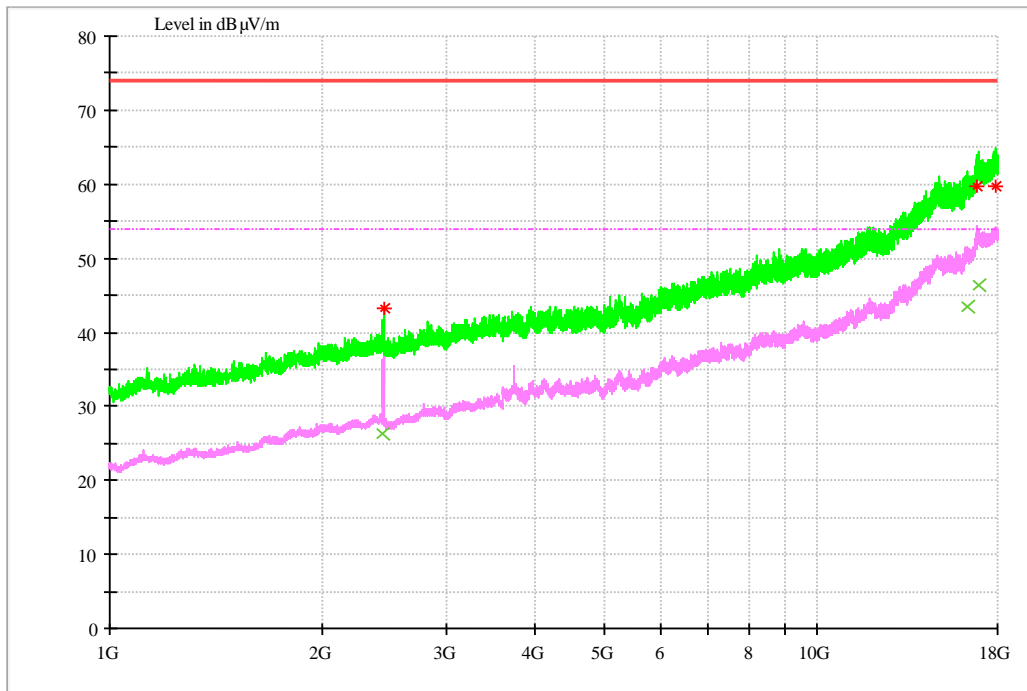
Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Height cm	Azimuth deg	Polarisation
41.227740	25.46	14.4	40.00	14.54	100.0	236.0	V
60.918240	25.34	13.4	40.00	14.66	122.0	236.0	V
96.353060	28.83	14.2	43.50	14.67	101.0	262.0	H
145.867420	28.67	9.8	43.50	14.83	100.0	172.0	V
180.121800	34.13	11.5	43.50	9.37	100.0	132.0	V
305.235140	29.38	15.6	46.00	16.62	100.0	246.0	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
2440.968667	43.19	-7.6	74	30.81	100	234	V
16862.51533	59.73	20.9	74	14.27	191	248	H
17882.29733	59.63	21.6	74	14.37	125	218	V

#### MEASUREMENT RESULT: AV Detector

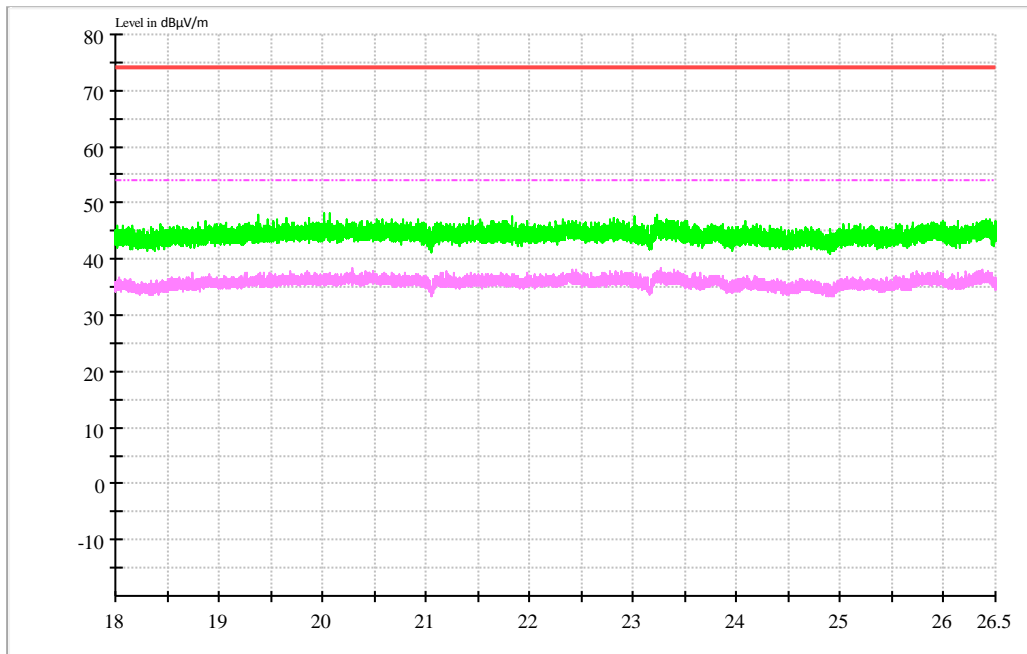
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2437.428	26.30	-7.6	54	27.70	178	290	V
16331.94667	43.40	18.5	54	10.60	100	210	V
16885.30733	46.39	21	54	7.61	100	328	V

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

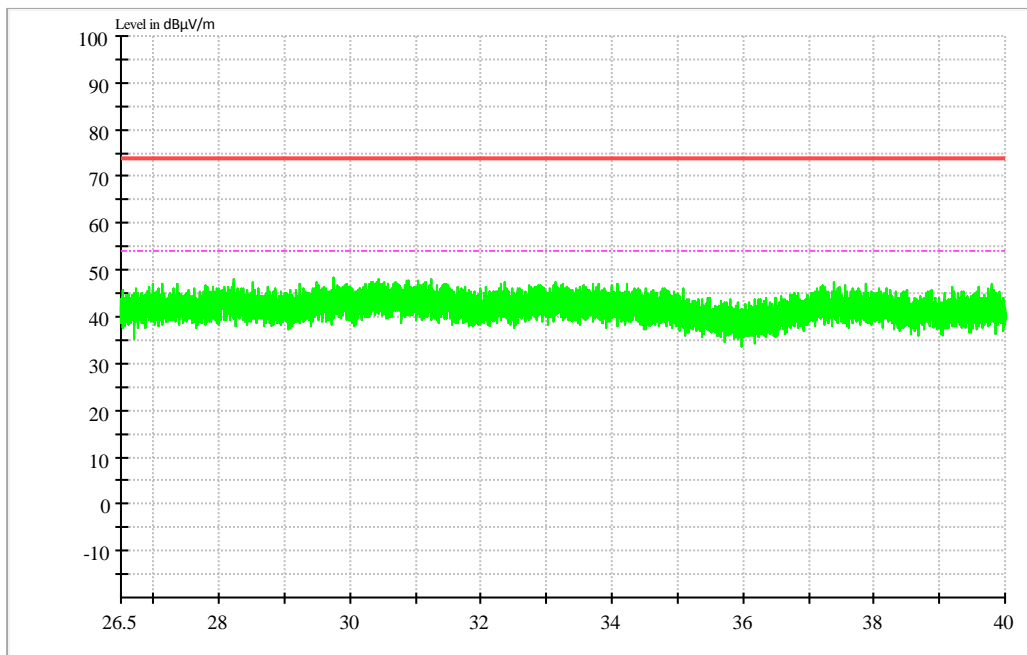
Test Mode 1: Charging+ Camera On + Idle



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



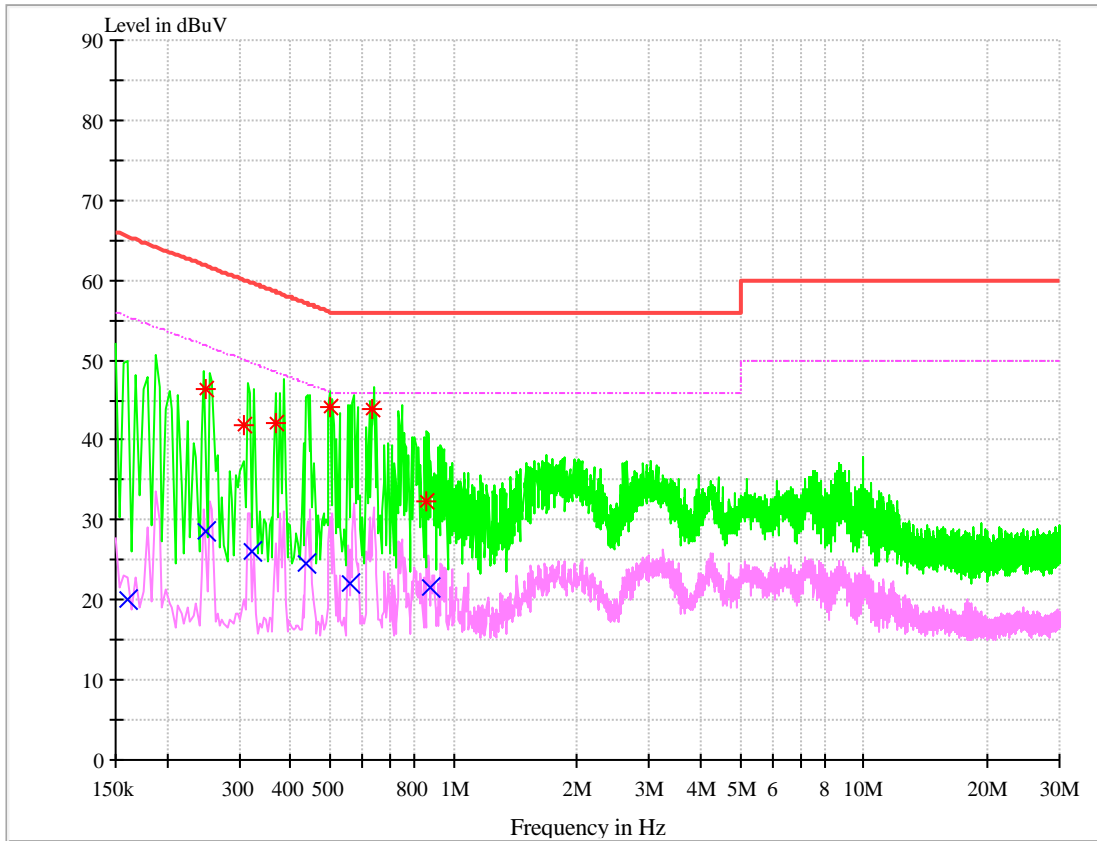
NOTE 1: The data was measured by Peak detector.  
NOTE 2: No peak found in the Test Range of "26.5 GHz to 40GHz"



## 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 dB $\mu$ V	Line	Transd dB	Margin dB	Limit dB $\mu$ V	PE
0.249789	46.30	N	9.7	15.46	61.76	FLO
0.307241	41.82	N	9.7	18.23	60.05	FLO
0.368012	42.10	N	9.7	16.45	58.55	FLO
0.498210	44.05	N	9.7	11.98	56.03	FLO
0.633818	43.88	N	9.7	12.12	56.00	FLO
0.861954	32.32	N	10.0	23.68	56.00	FLO

#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dB $\mu$ V	Line	Transd dB	Margin dB	Limit dB $\mu$ V	PE
0.161176	20.15	L1	9.7	35.25	55.40	FLO
0.249926	28.68	N	9.7	23.08	51.76	FLO
0.320648	26.18	L1	9.7	23.51	49.69	FLO
0.435118	24.69	N	9.7	22.46	47.15	FLO
0.556619	22.02	N	9.7	23.98	46.00	FLO
0.873857	21.55	N	9.7	24.45	46.00	FLO

-----END-----