EMC Test Report

Product Name: Smart Phone

Model Number: MAR-LX2J

Report No: SYBH(Z-EMC) 20190219010002-2

FCC ID: QISMAR-LX2J

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, 523808, P.R.C

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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 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 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 Certification rules. The Designation Number is CN1173, and the Test Firm Registration Number is 294140.**
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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.**
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:	2019-02-25
Start Date of Test:	2019-02-26
End Date of Test:	2019-03-18
Test Result:	Pass

Approved By (Lab Manager)	**2019-03-21**	**He Hao**	He Hao
	Date	**Name**	**Signature**
Prepared by (Test Engineer)	**2019-03-18**	**Liu Qian**	Liu Qian
	Date	**Name**	**Signature**

Modification Record

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

TABLE OF CONTENT

1 General Information

1.1 EUT Description

EUT Description	
Product Name	Smart Phone
Model Number	MAR-LX2J
Input voltage	3.8V
TX Frequency	GSM 850: 824MHz to 849MHz PCS 1900:1850MHz to 1910MHz WCDMA Band II: 1850MHz to 1910MHz WCDMA Band V: 824MHz to 849MHz LTE BAND 5: 824MHz to 849MHz LTE BAND 7: 2500MHz to 2570MHz LTE BAND 26: 814MHz to 849MHz LTE BAND 41: 2545MHz to 2655MHz Bluetooth: 2400MHz to 2483.5MHz 2.4G WIFI: 2412MHz to 2462MHz 5G WIFI: 5150MHz to 5250MHz 5250MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5850MHz
RX Frequency	GSM 850: 869MHz to 894MHz PCS 1900:1930MHz to 1990MHz WCDMA Band II: 1930MHz to 1990MHz WCDMA Band V: 869MHz to 894MHz LTE BAND 5: 869MHz to 894MHz LTE BAND 7: 2620MHz to 2690MHz LTE BAND 26: 859MHz to 894MHz LTE BAND 41: 2545MHz to 2655MHz Bluetooth: 2400MHz to 2483.5MHz 2.4G WIFI: 2412MHz to 2462MHz 5G WIFI: 5150MHz to 5250MHz 5250MHz to 5350MHz 5470MHz to 5725MHz 5725MHz to 5850MHz GPS: 1575.42MHz BDS: 1561.098MHz GLONASS:1602MHz
S/N	STPDU19103000150
HW Version	HL2MARLM
SW Version	9.0.1.120(SP1C900E120R1P16)
EUT Accessory	
Data cable	Data Cable USB A Male to Type C ,Shield Manufacturer: HUIZHOU DEHONG TECHNOLOGY CO.,LTD. FOXCONN INTERCONNECT TECHNOLOGY LIMITED NingBo Broad Telecommunication Co.,Ltd. LUXSHARE Precision Industry Co., Ltd. Freeport Resources Enterprises (Jiangxi) Co.,Ltd Dongguan Mingji Electronics Technology Group Co.,Ltd
Adapter	Manufacturer: Huawei Technologies Co.,Ltd.

	Model: HW-059200EHQ Input voltage: 100-240V 50/60Hz ,0.5A Output Voltage: 5V ⎓ 2A OR 9V ⎓ 2A Rated Power: 10W OR 18W SN: B68393GAK24347; K68304J5500063
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-090200BH0 Input voltage: 100-240V 50/60Hz ,0.5A Output Voltage: 5V ⎓ 2A OR 9V ⎓ 2A Rated Power: 10W OR 18W SN: H9891RJ2800162; K98901J3Y00034 B98932J6E00017
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-090200EH0 Input voltage: 100-240V 50/60Hz ,0.5A Output Voltage: 5V ⎓ 2A OR 9V ⎓ 2A Rated Power: 10W OR 18W SN: H988KEJ6B00066; K98801J5Y00259; B98832J8Z00250
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-090200JH0 Input voltage: 100-240V 50/60Hz ,0.5A Output Voltage: 5V ⎓ 2A OR 9V ⎓ 2A Rated Power: 10W OR 18W SN: H991K5J3X00721; K99101J3Y00524;
Adapter	Manufacturer: Huawei Technologies Co.,Ltd. Model: HW-090200UH0 Input voltage: 100-240V 50/60Hz ,0.5A Output Voltage: 5V ⎓ 2A OR 9V ⎓ 2A Rated Power: 10W OR 18W SN: H992K5J3X00029; K99201J3100017; B99232J6E00055
Rechargeable Li-ion	Manufacturer: Huawei Technologies Co.,Ltd. Battery Model: HB356687ECW Rated capacity: 3240mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V SN: 2872SYJ105X00797; 6HPNAIIA15A00090; 2872ACJ107900059
Earphone(22040322)	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD. Boluo County Quancheng Electronic Co.,ltd.
Earphone(22040336)	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD. Boluo County Quancheng Electronic Co.,ltd. Hong Fu Jin Precision Industry (Shenzhen) Co., LTD.

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. 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

1.3 Applied Standards

APPLIED STANDARD

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**
Radiated Emissions Enclosure Port	Mode 2~ Mode 4	CLASS B	Pass	Site1
Conducted Emissions ☐DC Power Port ☒AC Power Port ☐Telecommunication Ports	Mode 1~ Mode 4	CLASS B	Pass	Site1
Note: 1, Measurement taken is within the uncertainty of test 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

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 +traffic +WIFI +BT+GNSS On +Earphone
Mode 2:	Charging +Camera On +Earphone +idle
Mode 3:	Charging +Video Playing +Earphone +idle
Mode 4:	USB Copy(EUT with PC) +Earphone

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

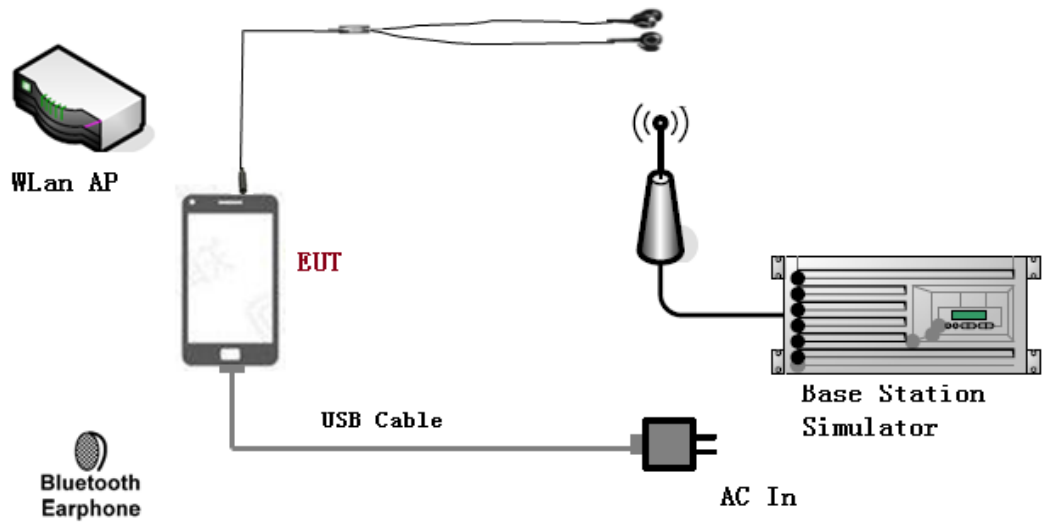
Adapter (Mode 3: HW-090200EH0, SN: K98801J5Y00259) +Charging +Video Playing +Earphone +idle the result is the worst (30MHz~1GHz).
Adapter (Mode 3: HW-090200EH0, SN: K98801J5Y00259) +Charging +Video Playing +Earphone +idle the result is the worst (1GHz~40GHz).

2) Conducted Emission

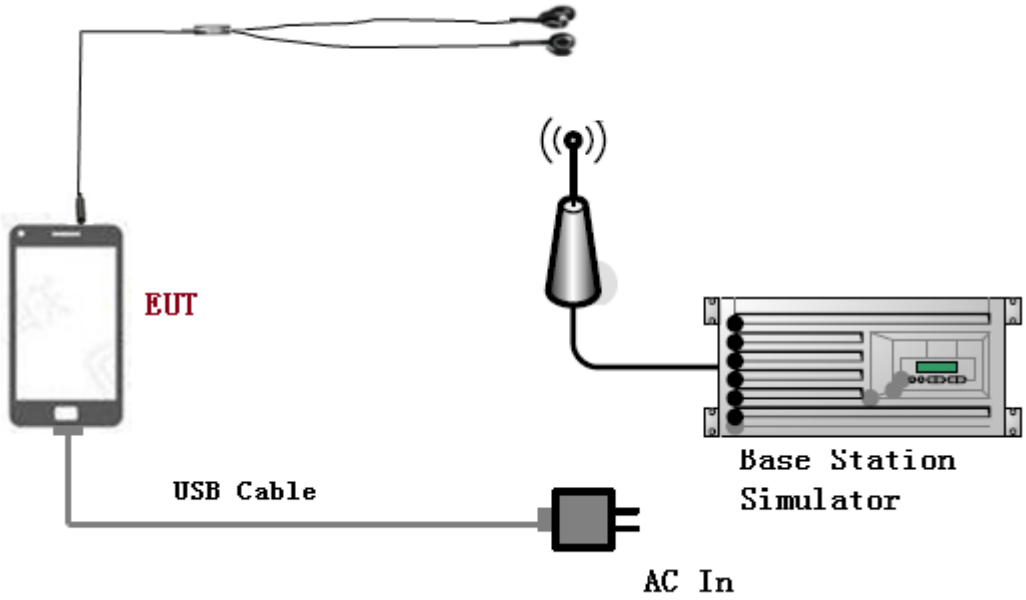
Adapter (Mode 3: HW-090200EH0, SN: K98801J5Y00259) +Charging +Video Playing +Earphone +idle the result is the worst.

3.2 Test System Configuration

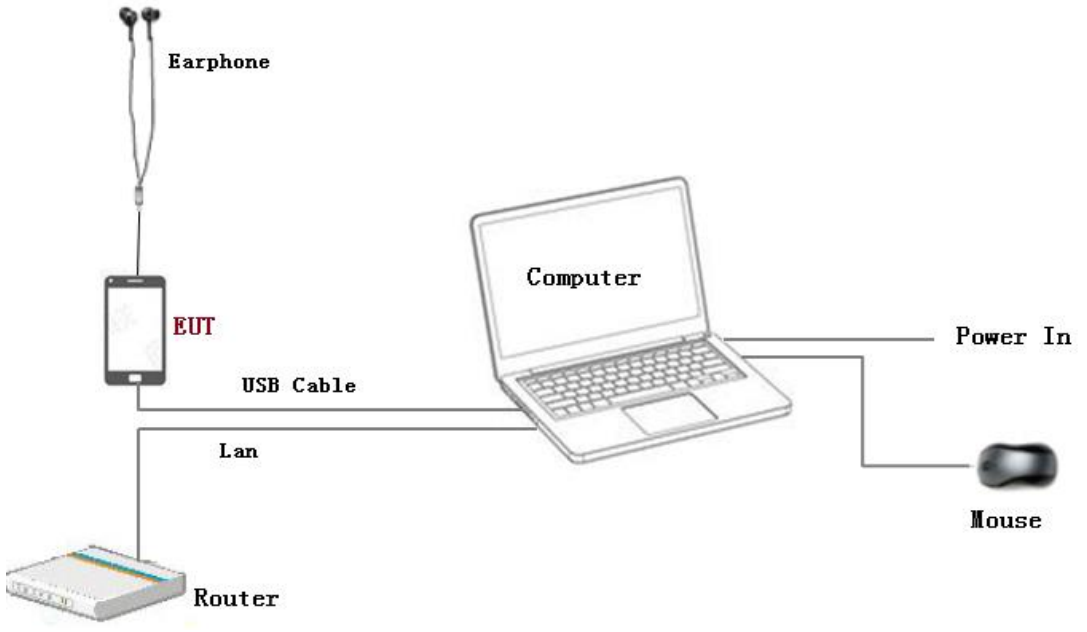
Connection Diagram (Mode 1)



Connection Diagram (Mode 2~3)



Connection Diagram (Mode 4)



3.3 Cables Used during Test

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

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	/	/

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

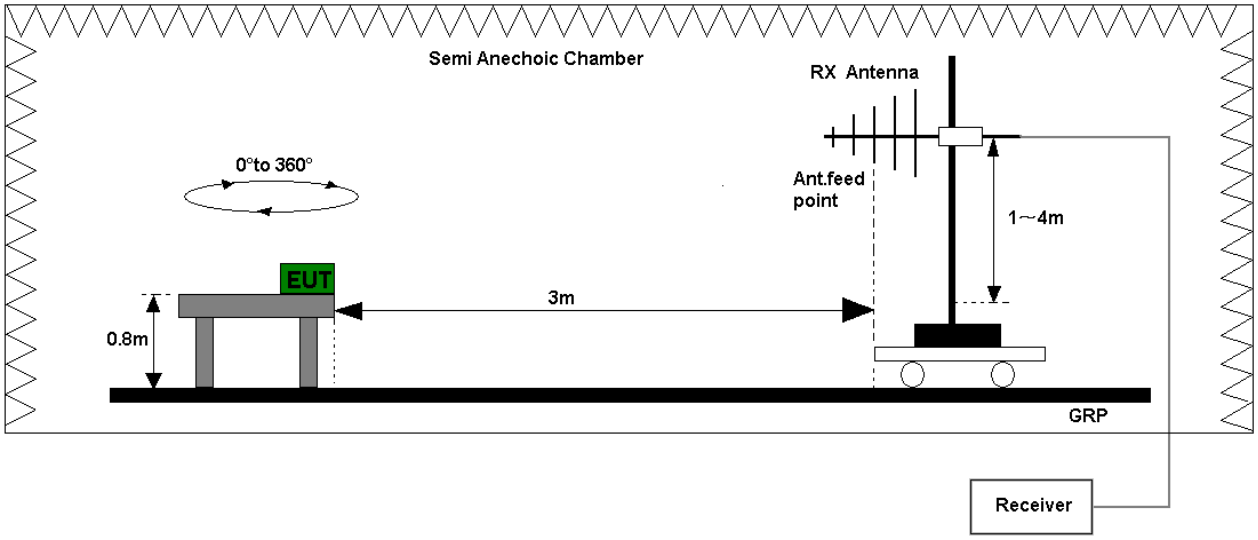


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

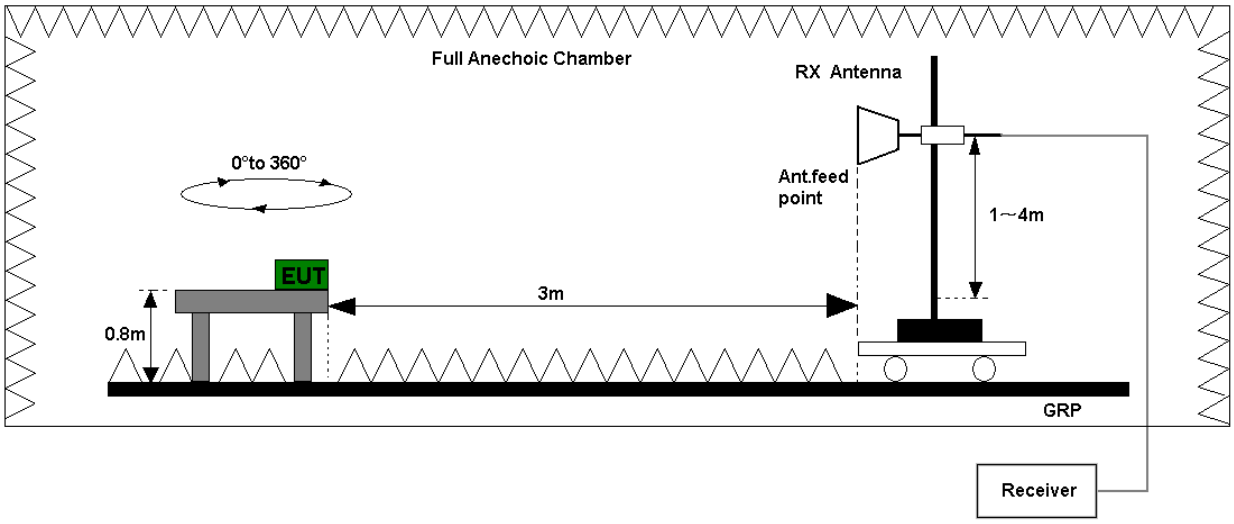


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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(μV/m)		Unit(dBμV/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

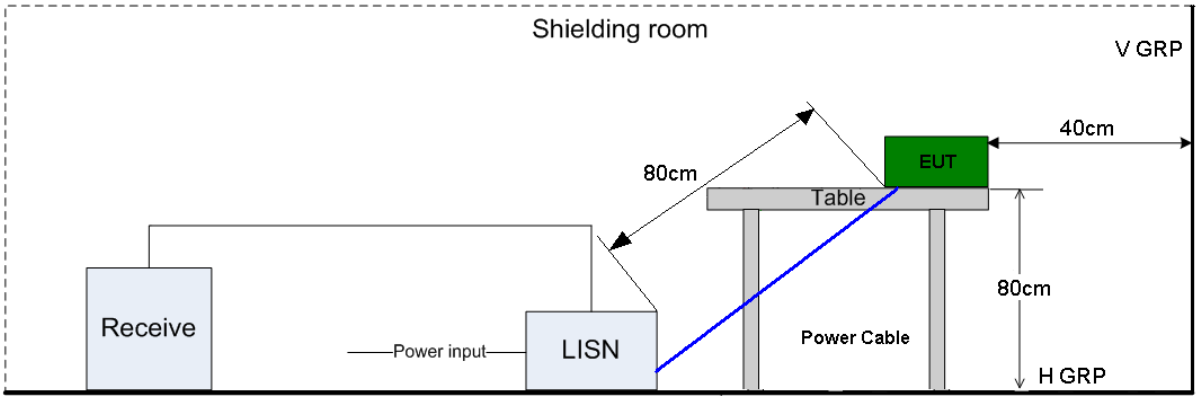


Figure 3. Test Set-up of conducted disturbance

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 (dBμV)	AV (dBμV)
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	Jan. 14, 2020	12
	Spectrum Analyzer	FSU43	100144	R&S	Jan. 14, 2020	12
	Broadband Antenna	VULB 9163	9163-491	SCHWARZBECK	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. 19, 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. 14, 2020	12
	Artificial Mains Network	ENV216	100382	R&S	May. 07, 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 (dBμV/m)	U=5.24dB; k=2
RE(1GHz-18GHz)	Field strength (dBμV/m)	U=4.98dB; k=2
RE(18 GHz-26.5GHz)	Field strength (dBμV/m)	U=4.40dB; k=2
RE (26.5 GHz- 40GHz)	Field strength (dBμV/m)	U=4.66dB; k=2
CE	Disturbance Voltage (dBμV)	U=2.3dB; k=2

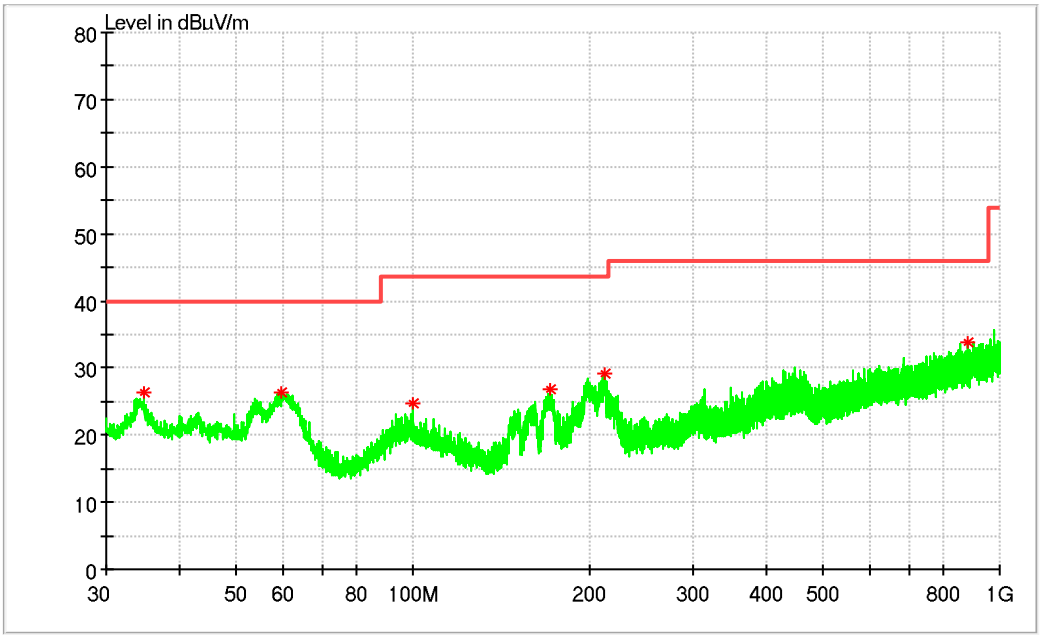
7 Test Data and Graph

Only the worst test results were shown

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz

Test Mode 3: Charging + Video Playing +Earphone +idle



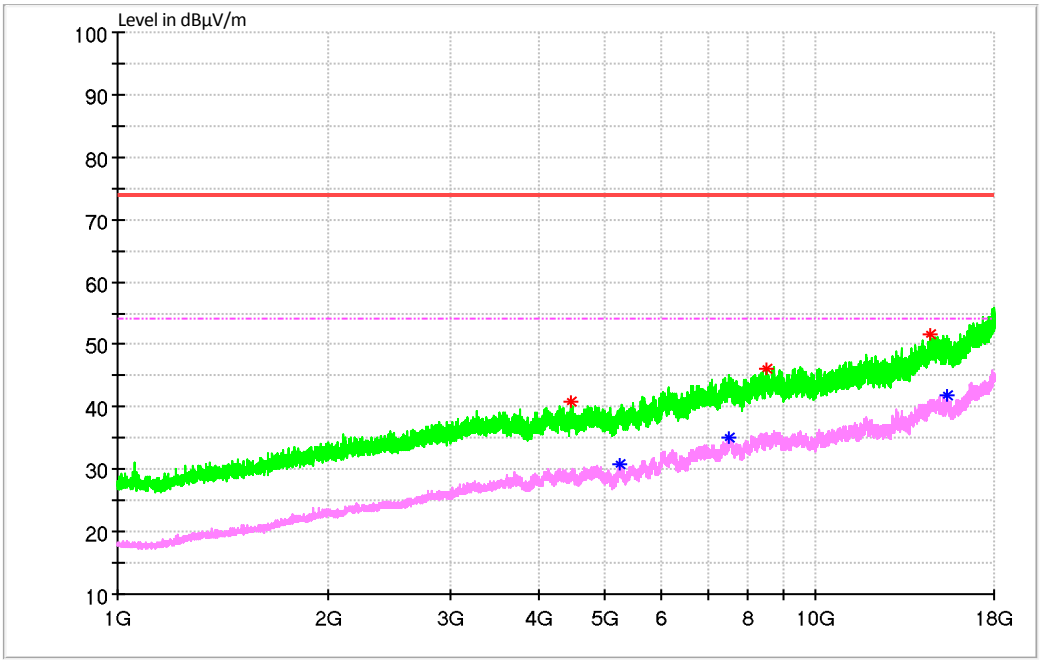
MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
34.801500	26.34	13.0	40.00	13.66	100.0	0.0	V
59.488000	26.35	13.1	40.00	13.65	100.0	312.0	V
99.985500	24.77	14.0	43.50	18.73	100.0	21.0	V
171.474500	26.90	10.2	43.50	16.60	100.0	184.0	V
212.214500	29.06	12.3	43.50	14.44	100.0	262.0	V
883.939500	33.87	23.4	46.00	12.13	100.0	312.0	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 3: Charging + Video Playing +Earphone +idle



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
4468.5667	40.91	-4.7	74.00	33.09	120.0	287.0	V
8514.0000	46.10	3.7	74.00	27.90	105.0	287.0	V
14601.7000	51.61	10.2	74.00	22.39	145.0	217.0	H

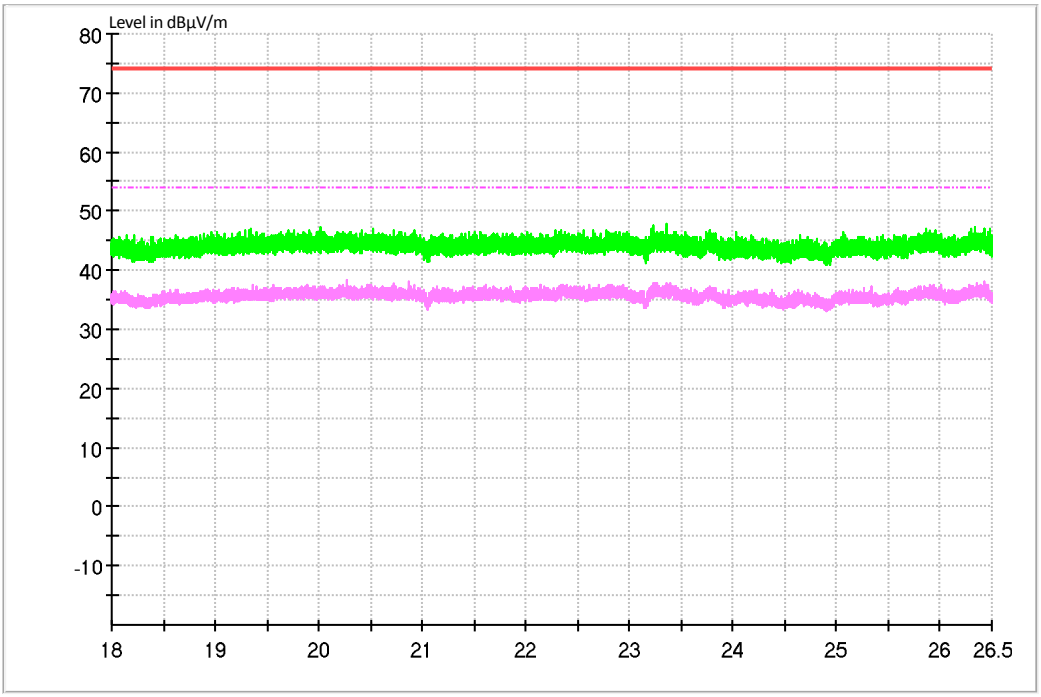
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
5251.1333	30.72	-4.0	54.00	23.28	102.0	145.0	H
7486.6333	35.13	1.5	54.00	18.87	129.0	236.0	V
15412.033	41.85	10.6	54.00	12.15	134.0	336.0	H

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

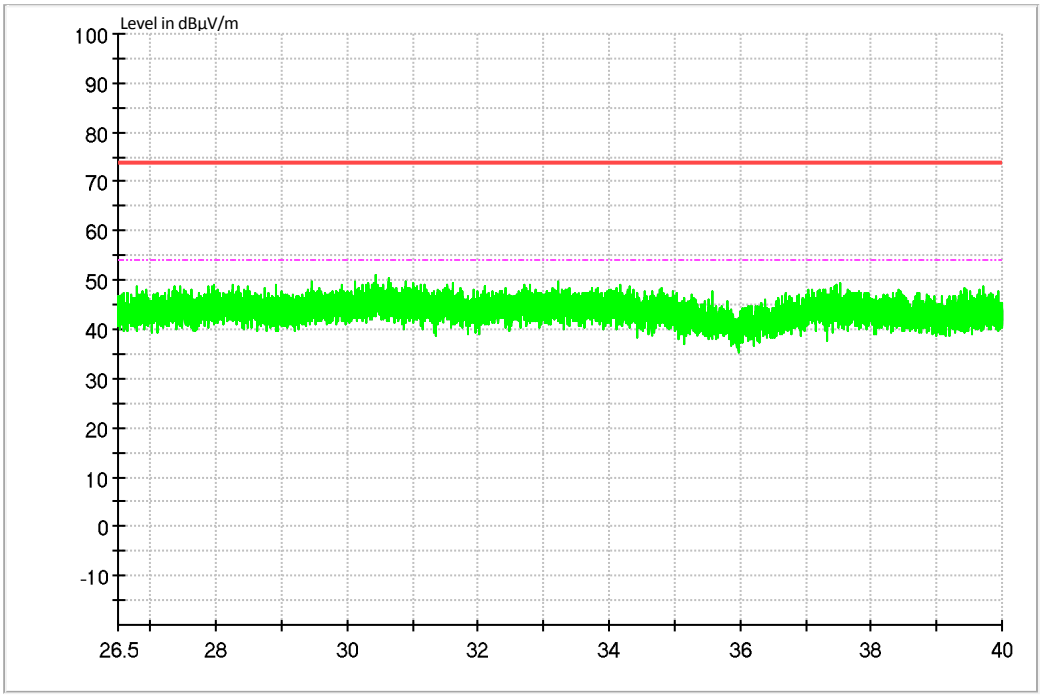
Test Mode 3: Charging + Video Playing +Earphone +idle



NOTE: No peak found in the Test Range of “18 GHz to 26.5GHz”

7.1.4 26.5GHz~40GHz

Test Mode 3: Charging + Video Playing +Earphone +idle

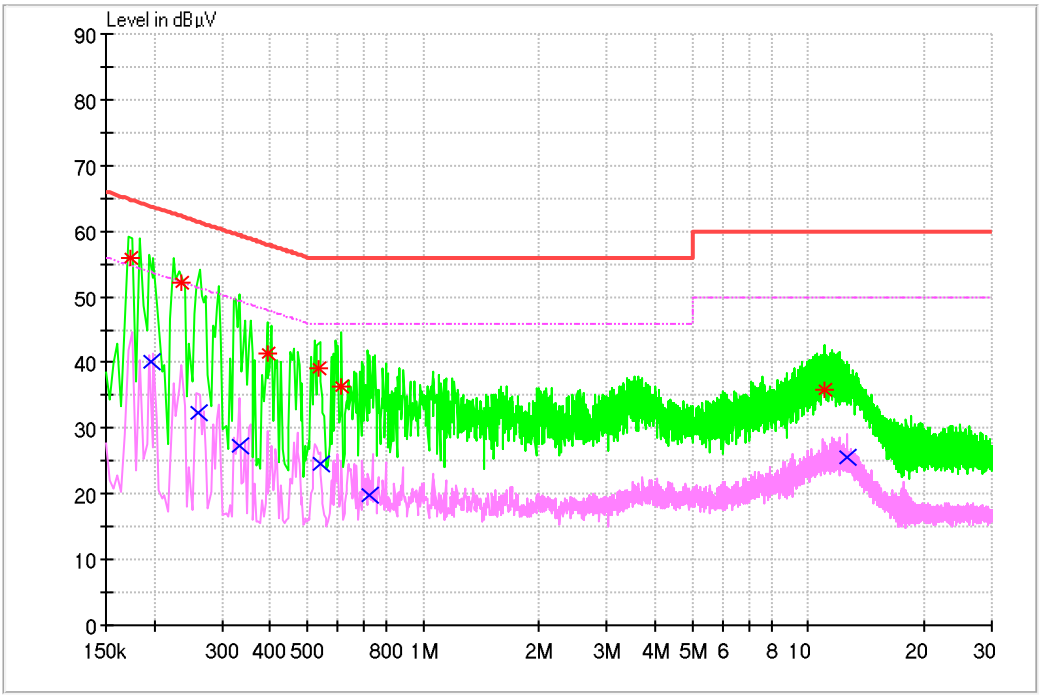


NOTE: No peak found in the Test Range of “26.5 GHz to 40GHz”

7.2 Conducted Disturbance

7.2.1 AC Port Test Data

Test Mode 3: Charging +Video Playing +Earphone +idle



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.173868	55.88	L1	9.7	8.89	64.77	FLO
0.235100	52.06	N	9.7	10.21	62.27	FLO
0.395112	41.37	N	9.7	16.59	57.96	FLO
0.537293	39.10	L1	9.7	16.90	56.00	FLO
0.609286	36.46	N	9.7	19.54	56.00	FLO
11.021164	35.93	L1	10.0	24.07	60.00	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.195596	40.18	L1	9.7	13.62	53.80	FLO
0.261692	32.39	L1	9.7	18.99	51.38	FLO
0.331785	27.35	N	9.7	22.06	49.41	FLO
0.538157	24.56	L1	9.7	21.44	46.00	FLO
0.721434	19.85	N	9.7	26.15	46.00	FLO
12.644516	25.67	L1	10.0	24.33	50.00	FLO

----------END----------