EMC Test Report

Product Name: Smart Phone

Model Number: DRA-LX3

Report No: SYBH(Z-EMC)20180207022001-2

FCC ID：QISDRA-LX3

Reliability Laboratory of Huawei Technologies Co., Ltd.

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

Administration Building, Headquarters of Chang Lina Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, 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 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.**

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:	2018-03-06
Start Date of Test:	2018-03-07
End Date of Test:	2018-03-26
Test Result:	Pass

Approved By (Lab Manager)	**2018-03-30**	**Roger Zhang**	Roger Zhang
	Date	**Name**	**Signature**
Prepared by (Test Engineer)	**2018-03-27**	**Chang Lina**	Chang Lina
	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	DRA-LX3
Input voltage	3.82V
TX Frequency	GSM 850:824MHz to 849MHz PCS 1900:1850MHz to 1910MHz WCDMA 1900: 1850MHz to 1910MHz WCDMA 1700: 1710MHz to 1755MHz WCDMA 850: 824MHz to 849MHz LTE BAND 2: 1850MHz to1910MHz LTE BAND 4:1710MHz to 1755MHz LTE BAND 5: 824MHz to 849MHz LTE BAND 7:2500MHz to 2570MHz WIFI: 2400MHz to 2472MHz Bluetooth: 2400MHz to 2483.5MHz
RX Frequency	GSM 850:869MHz to 894MHz PCS 1900:1930MHz to 1990MHz WCDMA 1900: 1930MHz to 1990MHz WCDMA 1700: 2110MHz to 2155MHz WCDMA 850: 869MHz to 894MHz LTE BAND 2: 1930MHz to1990MHz LTE BAND 4:2110MHz to 2155MHz LTE BAND 5: 869MHz to 894MHz LTE BAND 7:2620MHz to 2690MHz WIFI: 2400MHz to 2472MHz Bluetooth: 2400MHz to 2483.5MHz FM: 87.5 MHz to 108MHz GPS: 1575.42MHz
S/N	QDB9K18212900002
HW Version	HL1DURAM
SW Version	DRA-LX3 1.0.0.51(C900)
EUT Accessory	
Data cable(04071002)	Data Cable USB A Male to Male to Micro Usb,Shielded Manufacturer: FOXCONN INTERCONNECT TECHNOLOGY LIMITED. LUXSHARE Precision Industry Co., Ltd HONGLIN TECHNOLOGY CO.,LTD. Dongguan Ming Ji Electronics Co., Ltd.
Adapter	Manufacturer:Huawei Technologies Co.,Ltd. Model: HW-050100U01 Input voltage: 100-240V 50/60Hz 0.2A Output Voltage: 5V ⎓ 1A Rated Power:5W SN: H780K8H8413423 P78001GBP01059 B78004GAC05122
Rechargeable Li-ion	Manufacturer:Huawei Technologies Co.,Ltd. Battery Model: HB405979ECW

	Rated capacity: 2920mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V SN: 2610SII125X107B6; 2610GCI205907199; 2610AYHC20X0A9ED;
Earphone(22040300)	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD GoerTek Inc. FOXCONN INTERCONNECT TECHNOLOGY LIMITED Boluo County Quancheng Electronic Co.,ltd
Earphone(22040150)	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co. ,LTD GoerTek Inc. Boluo County Quancheng Electronic 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 General product information

DRA-LX3 is subscriber equipment in the GSM/UMTS/LTE system， including single SIM and double SIM two different versions of card. The GSM frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. but only GSM850 and PCS1900 test data included in this report. The UMTS frequency band is band 1/2/4/5/8,but only band 2/4/5 test data included in this report. The LTE frequency band is band 2/4/5/7/8/28,but only band 2/4/5/7 test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) . It also provides bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other bluetooth devices.

1.3 Test Site Information

Test Site 1:	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

1.4 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 5	CLASS B	Pass	Site1
Conducted Emissions ☐DC Power Port ☒AC Power Port ☐Telecommunication Ports	Mode 1~ Mode 5	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+GPS On +Earphone
Mode 2:	Charging +Camera On +Earphone +idle
Mode 3:	Charging +Video Playing +Earphone +idle
Mode 4:	Charging +FM +Earphone +idle
Mode 5:	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

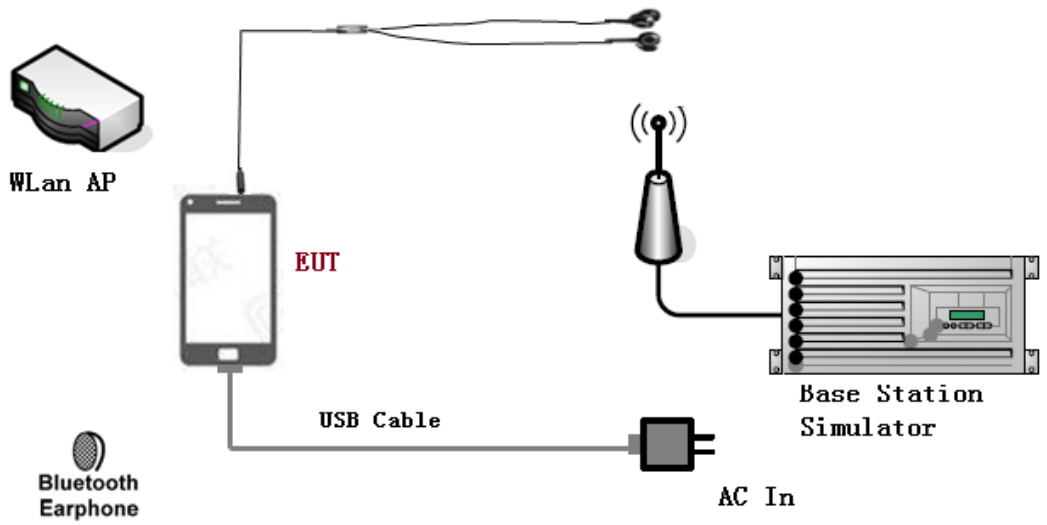
Adapter (Model : HW-050100U01, SN: B78004GAC05122) + Charging +Camera On +Earphone +idle the result is the worst (30MHz~1GHz).
Adapter (Model : HW-050100U01, SN: P78001GBP01059) + Charging +Video Playing +Earphone +idle the result is the worst (1GHz~18GHz).
Adapter (Model : HW-050100U01, SN: H780K8H8413423) + Charging + Camera On +Earphone +idle the result is the worst (18GHz~26.5GHz).

2) Conducted Emission

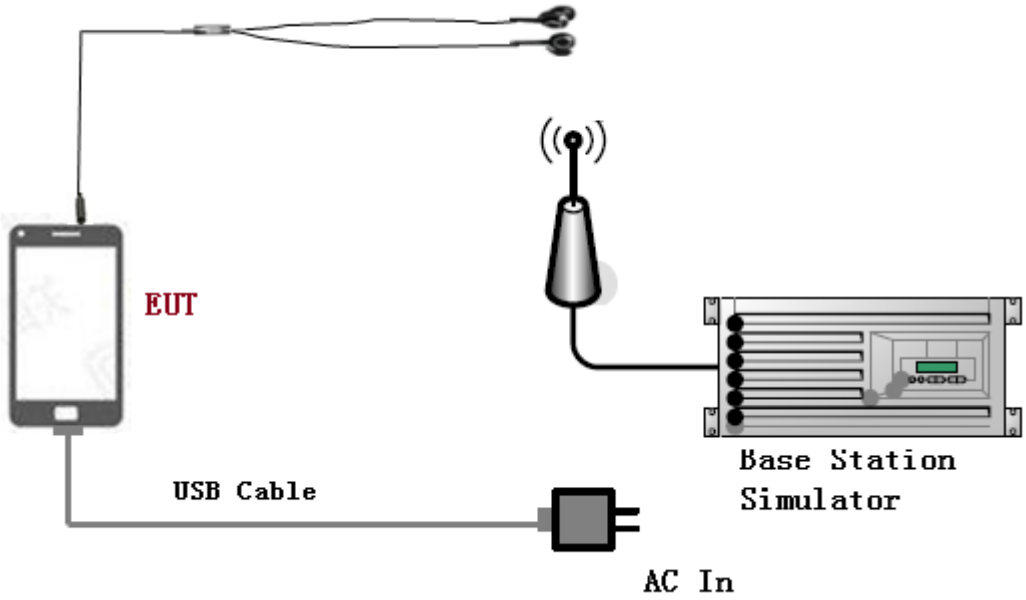
Adapter (Model : HW-050100U01, SN: P78001GBP01059) +Charging + Camera On +Earphone +idle the result is the worst.

3.2 Test System Configuration

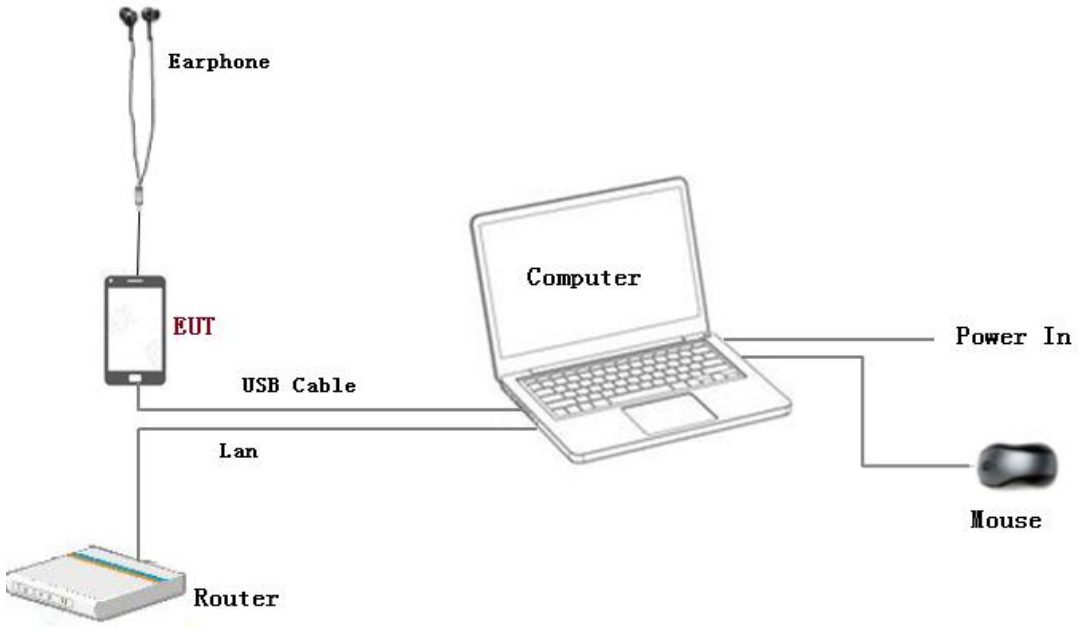
Connection Diagram (Mode 1)



Connection Diagram (Mode 2~4)



Connection Diagram (Mode 5)



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	2018-05-15	12
Radio Communication Tester	MT8820C	Anritsu	A110518805	2018-05-15	12
ThinkPad	S3-S431	Lenovo	A140714638	/	/
mouse	M-U0025-O	Lenovo	HS423HB22TB	/	/

4 Electromagnetic Interference (EMI)

4.1 Radiated Disturbance 30MHz to 26.5GHz

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 26.5 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 26500 MHz: 1MHz;

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

4.1.2 Test setup

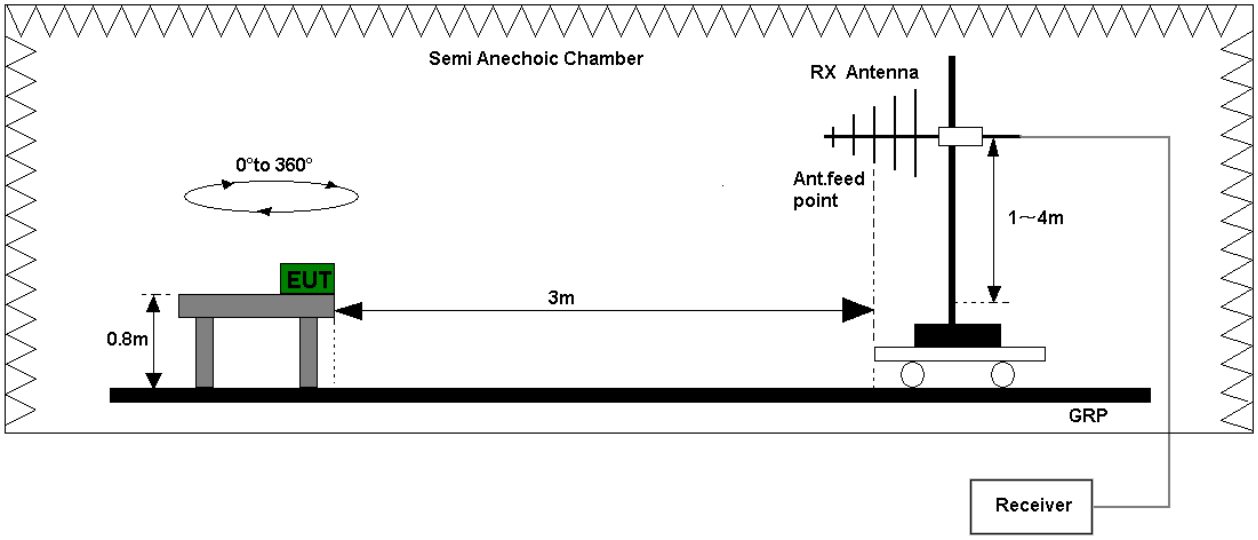


Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

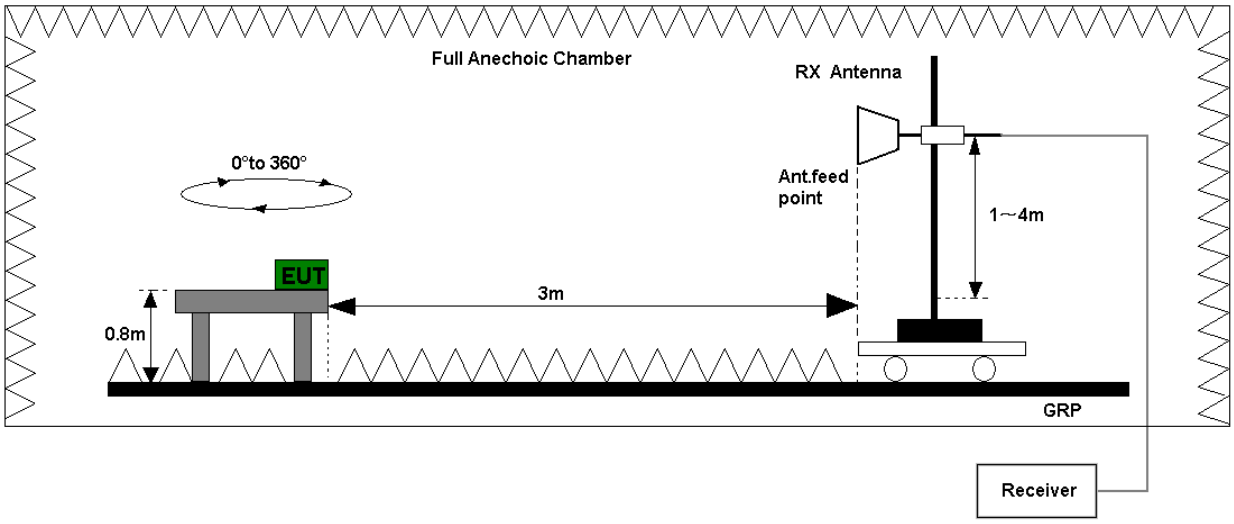


Figure 2. Test set-up of radiated disturbance(above 1GHz)

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

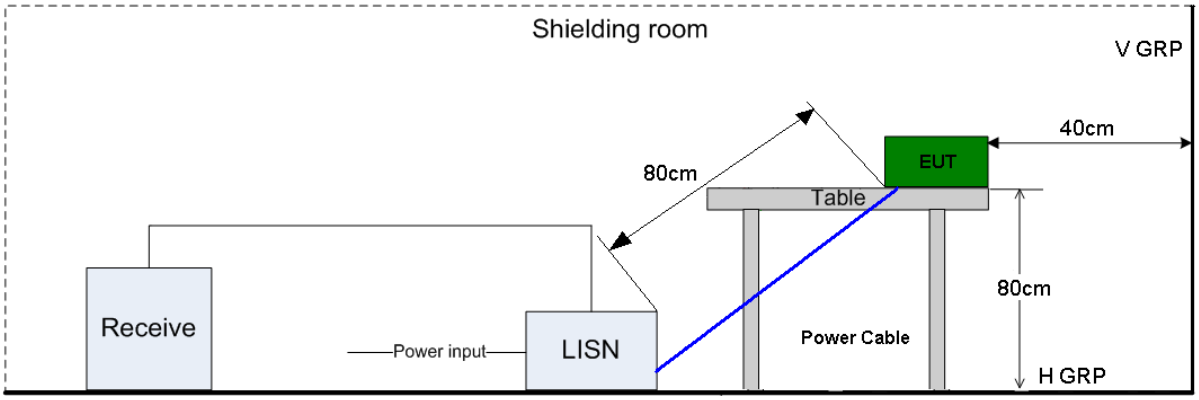


Figure 3. Test Set-up of conducted disturbance

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. 19, 2019	12
	Broadband Antenna	VULB 9163	9163-491	SCHWARZBECK	Mar. 28, 2019	24
	Horn Antenna (1-18G)	HF906	100683	R&S	Mar. 28, 2019	24
	Horn Antenna (18-26.5G)	ETS 3160-9	5140299	ETS-LINDGREN	Jul. 19, 2019	24
	Amplifier	R&S	SCU-40	10016	May. 15, 2018	12
CE	EMI Test receiver	ESU26	100150	R&S	May. 15, 2018	12
	Artificial Mains Network	ENV4200	100134	R&S	May. 15, 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 were:

System Measurement Uncertainty		
Items		**Extended Uncertainty**
RE(30MHz-1GHz)	Field strength (dBμV/m)	U=4.1dB; k=2
RE(1GHz-18GHz)	Field strength (dBμV/m)	U=5.1dB; k=2
RE(18GHz-26.5GHz)	Field strength (dBμV/m)	U=4.82dB; k=2
CE	Disturbance Voltage (dBμV)	U=2.5dB; k=2

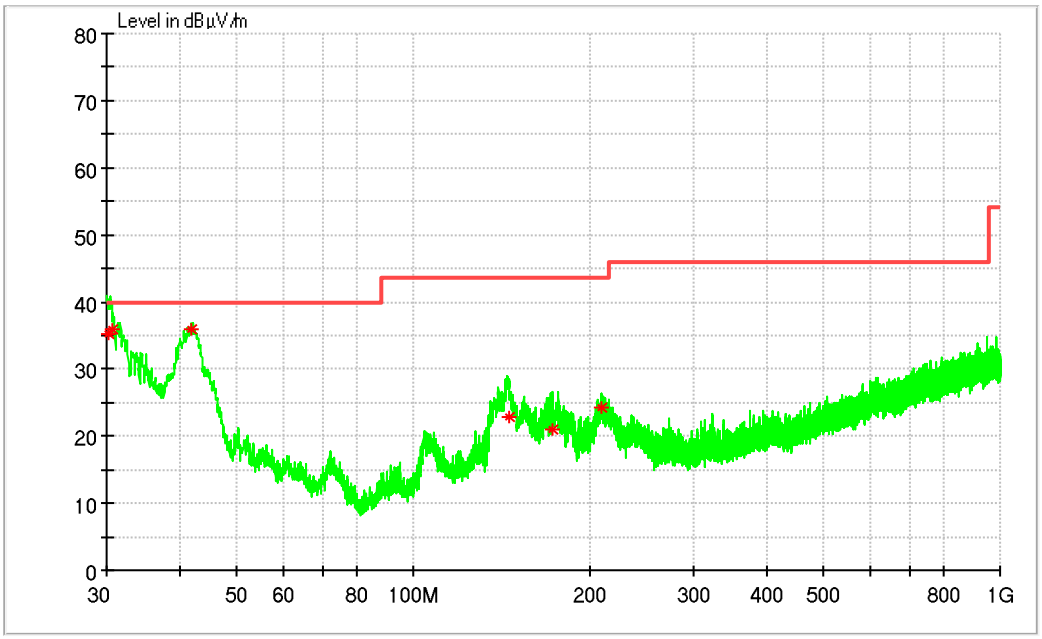
7 Test Data and Graph

Only the worst test results were shown

7.1 Radiated Disturbance

7.1.1 30MHz~1GHz

Test Mode 2:Charging+Camera On+Earphone+idle



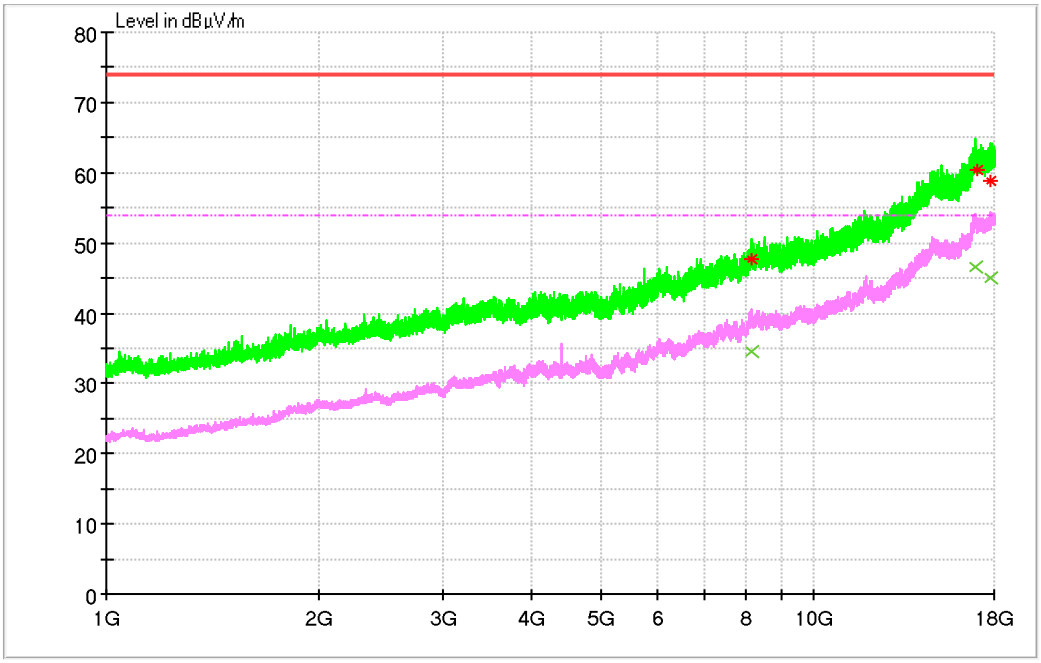
MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
30.162960	35.24	13.5	40	4.76	101	163	H
30.630340	35.81	13.8	40	4.19	100	74	H
41.947680	35.88	17.9	40	4.12	100	98	H
145.491820	22.90	12.9	43.5	20.60	102	237	H
172.246320	21.10	11.4	43.5	22.40	101	110	H
208.909960	24.19	12.8	43.5	19.31	220	284	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
8176.1053	47.62	5.5	74	26.38	125	308	V
16986.299	60.31	20.5	74	13.69	118	41	V
17824.467	58.78	21.4	74	15.22	200	122	V

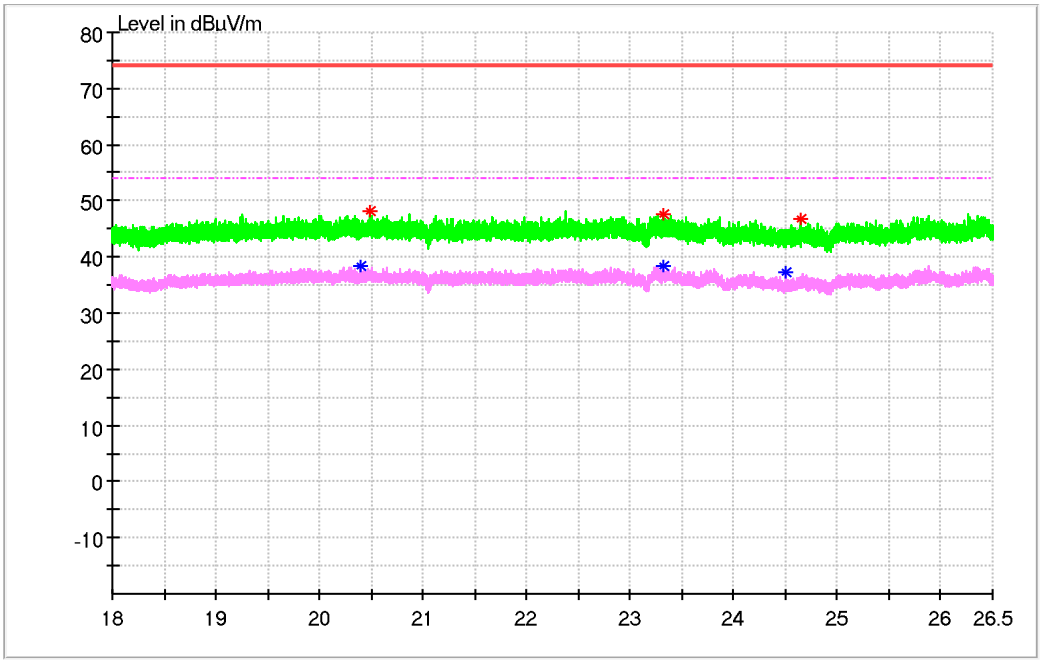
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
8145.2387	34.6	5.4	54	19.4	200	134	V
16888.054	46.55	21	54	7.45	100	109	V
17827.398	44.98	21.4	54	9.02	158	38	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 2:Charging+Camera On+Earphone+idle



MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
20487.95	48.09	-4.7	74	25.91	131	227	V
23322.275	47.47	-3.1	74	26.53	106	0	V
24651.675	46.67	-2.6	74	27.33	159	64	V

MEASUREMENT RESULT: AV Detector

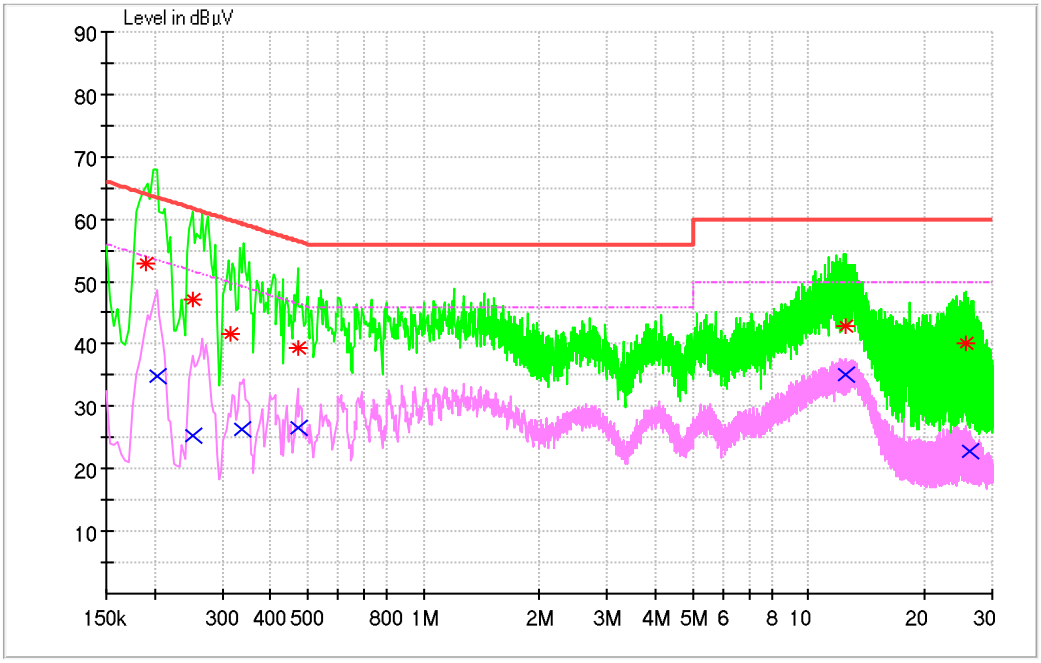
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
20399.55	38.3	-4.7	54	15.7	100	14	V
23312.925	38.42	-3.1	54	15.58	200	238	V
24496.125	37.18	-2.7	54	16.82	121	318	V

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.

7.2 Conducted Disturbance

7.2.1 AC Port Test Data

Test Mode 2: Charging + Camera On +Earphone +idle



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.189089	52.96	N	9.7	11.11	64.07	FLO
0.250974	47.12	N	9.7	14.6	61.72	FLO
0.315292	41.67	N	9.7	18.16	59.83	FLO
0.473203	39.47	N	9.7	16.99	56.46	FLO
12.512404	42.82	L1	10	17.18	60	FLO
25.719775	40.03	L1	10.2	19.97	60	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Line	Transd dB	Margin dB	Limit dBµV	PE
0.202589	34.78	N	9.7	18.72	53.5	FLO
0.250286	25.2	N	9.7	26.55	51.75	FLO
0.335832	26.27	N	9.7	23.04	49.31	FLO
0.474695	26.54	N	9.7	19.89	46.43	FLO
12.412749	35.15	L1	10	14.85	50	FLO
26.335721	22.73	L1	10.3	27.27	50	FLO

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