



FCC&ISED RF Test Report

Product Name: Smart Phone

Model Number: ELE-L04m

Report No.: SYBH(Z-RF) 20190401017001-2007

FCC ID: QISELE-L04M

IC: 6369A-ELEL04M

Authorized	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	He Hao	Zhang shuangxia
DATE	2019-04-30	2019-04-30

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
Telephone: +86 769 23830808 Fax: +86 769 23837628

※ ※ Notice ※ ※

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2. 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.
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.
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MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF) 20190401017001-2007	First release.

DECLARATION

Type	Description
Multiple Models Applications	☒ The present report applies to single model.
	☐ The present report applies to several models. The practical measurements are performed with the model.
	The present report only presents the worst test case of all modes, see relevant test results for detailed.

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2 General Information

1.1 Test standard/s

Applied Rules :	47 CFR FCC Part 02 47 CFR FCC Part 15 Subpart C ISED RSS-Gen Issue 5 ISED RSS-210 Issue 9
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1.2 Test Environment

Temperature :	TN	15 to 30	°C during room temperature tests
Ambient Relative Humidity:	25 to 75 %		
Atmospheric Pressure:	Not applicable		
Power supply :	VL	3.6	V
	VN	3.8	V DC by Battery
	VH	4.35	V

NOTE 1: 1) VN= nominal voltage, VL= low extreme test voltage, VH= High extreme test voltage;

TN= normal temperature, TL= low extreme test temperature, TH= High extreme test temperature.

NOTE 2: The values used in the test report may be stringent than the declared.

1.3 Test Laboratories

Test Location 1 :	RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD.
Address of Test Location 1 :	No.2, New City Avenue, Songshan Lake Sci. & Tech. Industry Park, Dongguan, 523808, P.R.C

1.4 Applicant and Manufacturer

Company Name :	HUAWEI TECHNOLOGIES CO., LTD
Address :	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.5 Application details

Date of Receipt Sample:	2019-04-15
Start of test:	2019-04-16
End of test:	2019-04-30

3 Summary

FCC Rule No.	ISED Rule No.	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE						
15.225 (a)	RSS-210, B6(a)	In-Band Emissions	15,848 μ V/m @ 30m 13.553 – 13.567 MHz	RADIATED	Pass	Section 5.2
2.1049 15.215	RSS-Gen, 6.7	Bandwidth	N/A		Pass	Section 5.1
15.225(b)	RSS-210, B6(b)	In-Band Emissions	334 μ V/m @ 30m 13.410 – 13.553 MHz 13.567 – 13.710 MHz		Pass	Section 5.2
15.225(c)	RSS-210, B6(c)	In-Band Emissions	106 μ V/m @ 30m 13.110 – 13.410 MHz 13.710 – 14.010 MHz		Pass	Section 5.2
15.225(d) 15.209	RSS-210, B6(d)	Out-of-Band Emissions	FCC: Emissions outside of the specified band (13.110 – 14.010 MHz) must meet the radiated limits detailed in 15.209 ISED: Emissions outside of the specified band (13.110 – 14.010 MHz) must meet the radiated limits detailed in RSS-Gen 8.9		Pass	Section 5.3
15.225(e)	RSS-210, B6(d)	Frequency Stability Tolerance	$\pm$ 0.01% of Operating Frequency	Temperature Chamber	Pass	Section 5.4
15.207	RSS-Gen, 8.8	AC Conducted Emissions 150kHz – 30MHz	FCC: < FCC 15.207 limits ISED: < RSS-Gen, 8.8 limits.	LINE CONDUCTED	Pass	Section 5.5
NOTE: The transmitter has an integral PCB loop antenna that is enclosed within the housing of the EUT and meets the requirements of FCC 15.203						

4 Product Description

4.1 Product Information

4.1.1 General Description

ELE-L04m is subscriber equipment in the GSM/WCDMA/LTE system. The GSM frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The UMTS frequency band is B1 and B2 and B4 and B5 and B6 and B8 and B19. The ELE-L04m LTE frequency band is B1 and B2 and B3 and B4 and B5 and B6 and B7 and B8 and B9 and B12 and B17 and B18 and B19 and B20 and B26 and B28 and B34 and B38 and B39 and B41 and B66. The ELE-L04m LTE frequency band for intra-band carrier aggregation uplink operation band is CA_1C and CA_3C and CA_7C and CA_38C and CA_39C and CA_41C. The Mobile Phone implements such functions as RF signal receiving/transmitting LTE/HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS and WIFI etc. Externally it provides one micro SD card interface, earphone port (to provide voice service) and one SIM card interface. ELE-L04m is single SIM smart phone. 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.

Note1: Only NFC test data included in this report.

Note2: For Wireless charging protective case we tested the RSE of the worst case.

4.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

4.2.1 Board

Board		
Description	Software Version	Hardware Version
Main Board	5.0.1.130 (SP3C792E1R1P11)	HL3ELLEM

4.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Adapter	HW-050450B00	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Adapter	HW-050450E00	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Adapter	HW-050450U00	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Adapter	HW-050450A00	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Adapter	HW-050450E01	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Adapter	HW-050450A01	Huawei Technologies Co., Ltd.	Input voltage: 100V-240V~50/60Hz, 0.75A Output voltage: 5V  2A OR 4.5V  5A OR 5V  4.5A
Battery	HB436380ECW	Huawei Technologies Co., Ltd.	Rated capacity: 3550mAh mAh Nominal Voltage:  +3.85V Charging Voltage:  +4.43V

4.2.3 Wireless charging case

Wireless charging case	C-ELE Wireless charging case
Manufacturer	Huawei Technologies Co., Ltd.
Wireless charging power	10W max
Connector rating	5A max
Rated operating voltage	9V
Charging efficiency	>75%
Operating temperature	-10 °C~40 °C
Storage temperature	-40 °C~70°C

4.3 Technical Description

NOTE: For the detailed technical descriptions, see the applicant/manufacture's specifications or user manual.

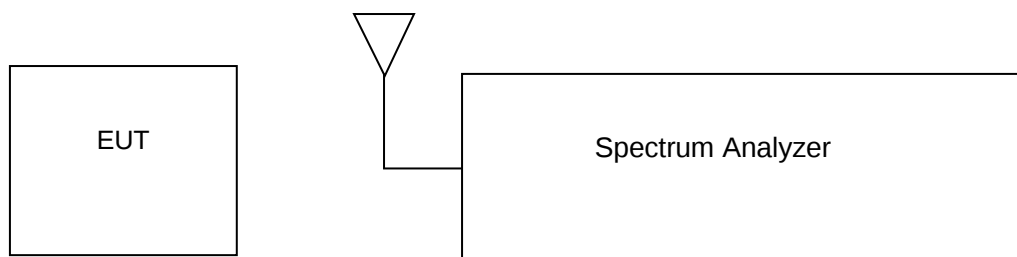
Characteristics	Description	
Operating Frequency	13.56MHz	
Modulation Type	ASK	
Antenna Type	Loop Antenna	
Description of product Class:	☒ product Class 1, ☐ product Class 2, ☐ product Class 3, ☐ product Class 4	
Power Supply	Power Supply Type:	☐ External DC mains, ☒ Battery, ☐ AC/DC Adapter, ☐ Powered over Ethernet (PoE). ☐ USB ☐ Other_____
	Input Rated Voltage	3.8V
	Operating Voltage Range	3.6V~4.35V

5 Test Results

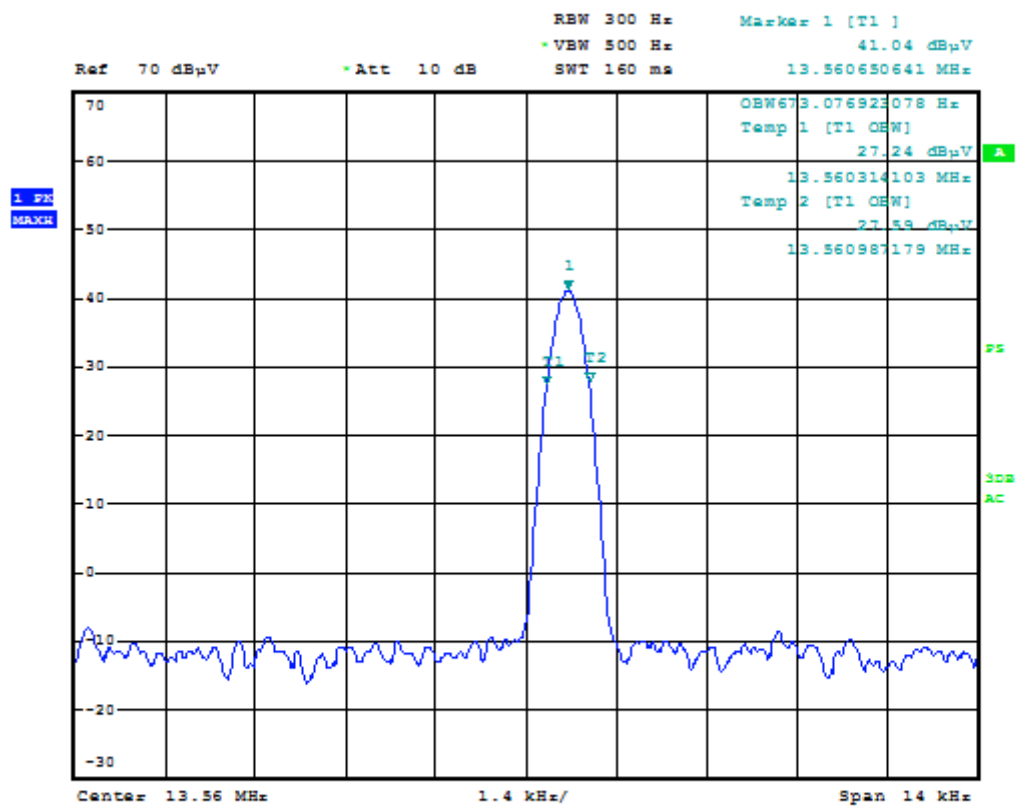
5.1 Bandwidth Measurement

The 99% emission bandwidth and 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

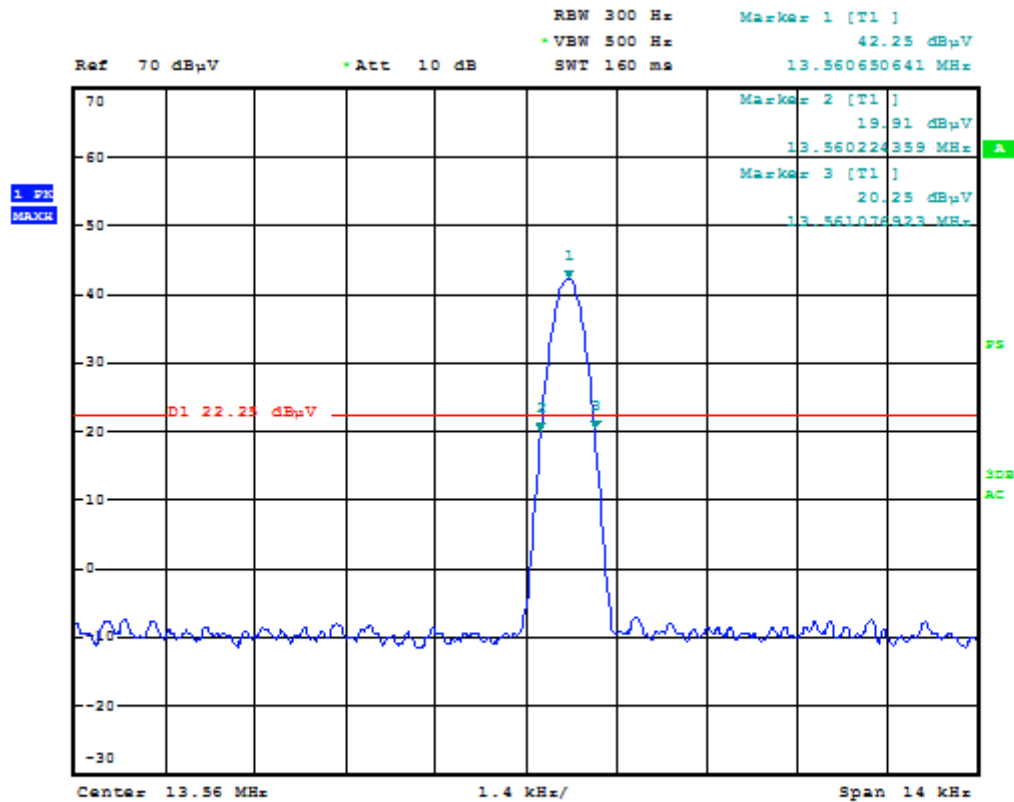
5.1.1 Test Setup



5.1.2 Test Result



Date: 25.APR.2019 16:09:23



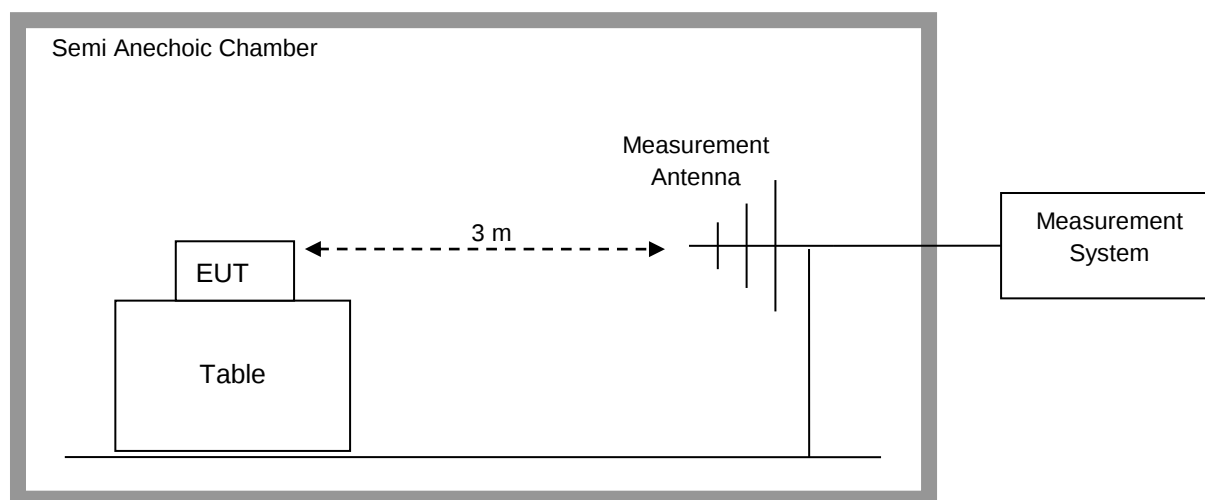
Date: 25.APR.2019 16:10:52

Emission bandwidth	Result (Hz)	FL@OBW (MHz)	FH@OBW (MHz)	Verdict
99% emission bandwidth	673.077	13.560314103	13.560987179	PASS
20dB bandwidth	854.87	13.560224359	13.561079923	PASS

The result of the measurement is passed.

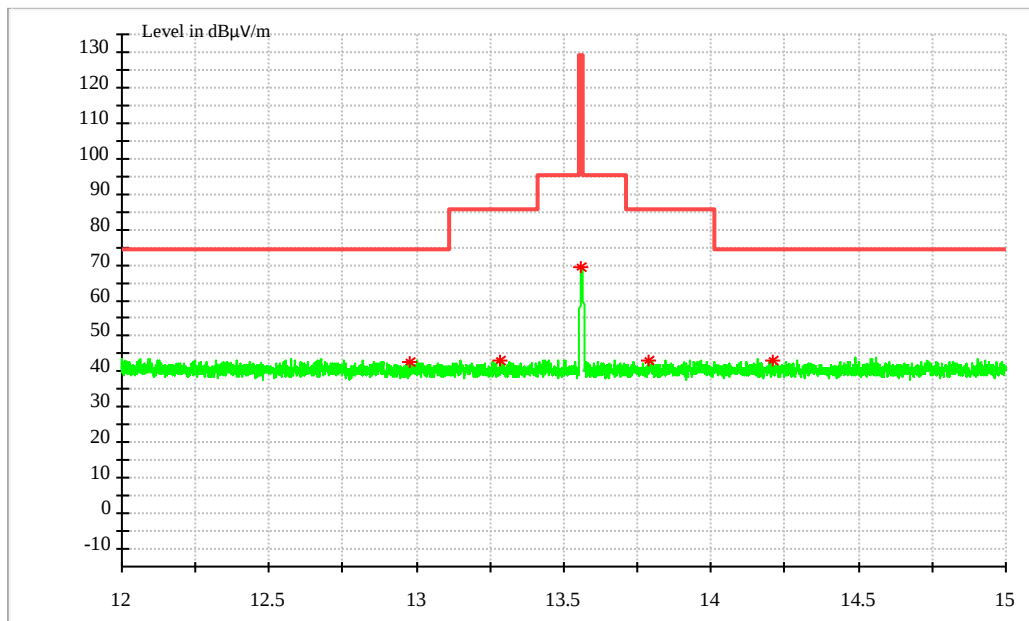
5.2 In-Band Radiated Spurious Emission Measurements

5.2.1 Test Setup



Measurement parameters	
Detector:	Quasi Peak
Sweep time:	-/-
Resolution bandwidth:	10 kHz
Video bandwidth:	10 kHz
Span:	-/-
Trace-Mode:	Max Hold

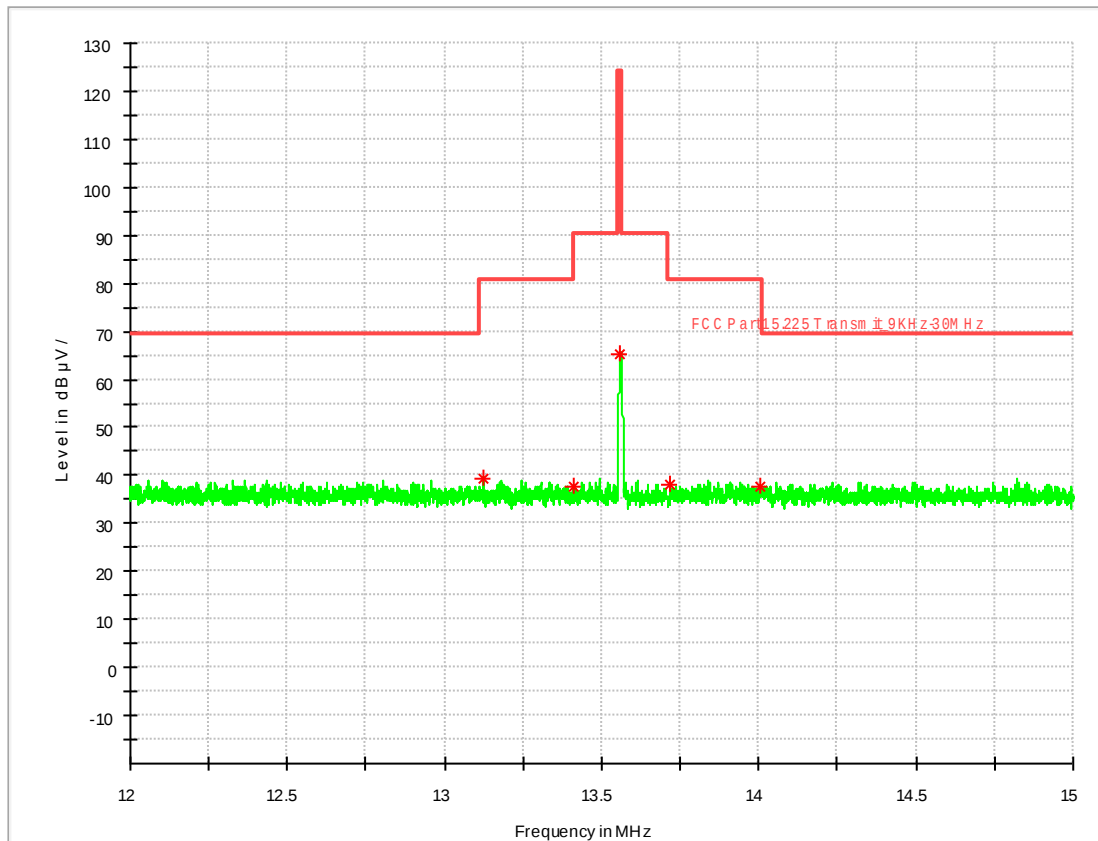
5.2.2 Test Result



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Transd (dB)
12.976313	37.81	69.50	31.69	V	159.0	31.6
13.283063	38.28	80.50	42.22	V	78.0	31.6
13.559625	64.24	124.00	59.76	V	297.0	31.6
13.789313	38.16	80.50	42.34	V	283.0	31.6
14.209500	38.24	69.50	31.26	V	200.0	31.6

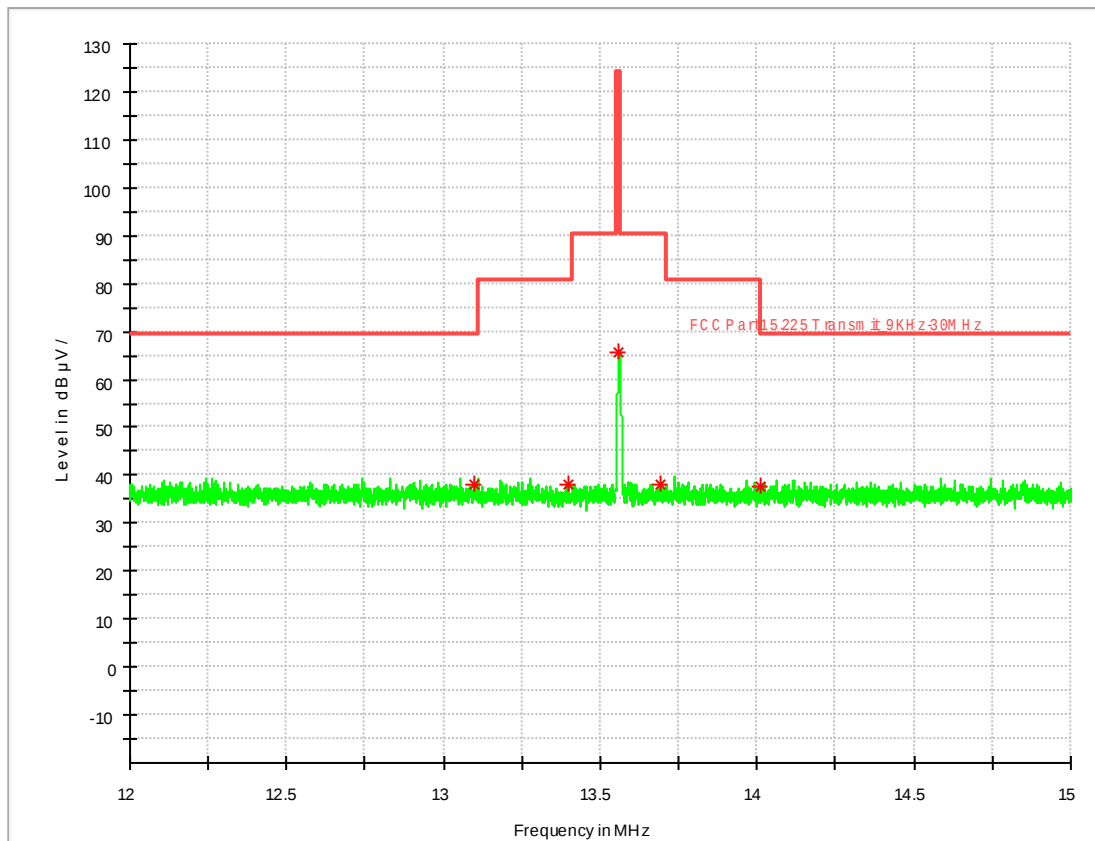
(adaptor + Wireless Charging Case) worst case



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Transd (dB)
13.122938	39.54	80.50	40.96	V	58.0	31.6
13.412063	37.67	90.50	52.83	V	152.0	31.6
13.558688	65.44	124.00	58.56	V	147.0	31.6
13.716375	38.22	80.50	42.28	V	326.0	31.6
14.001563	37.78	80.50	42.72	V	201.0	31.6

(adaptor + Wireless charging charger+ Wireless Charging Case) worst case



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)	Transd (dB)
13.099500	38.17	69.50	31.33	V	121.0	31.6
13.397063	38.23	80.50	42.27	V	58.0	31.6
13.559438	65.69	124.00	58.31	V	76.0	31.6
13.692188	38.25	90.50	52.25	V	125.0	31.6
14.010375	37.64	69.50	31.86	V	136.0	31.6

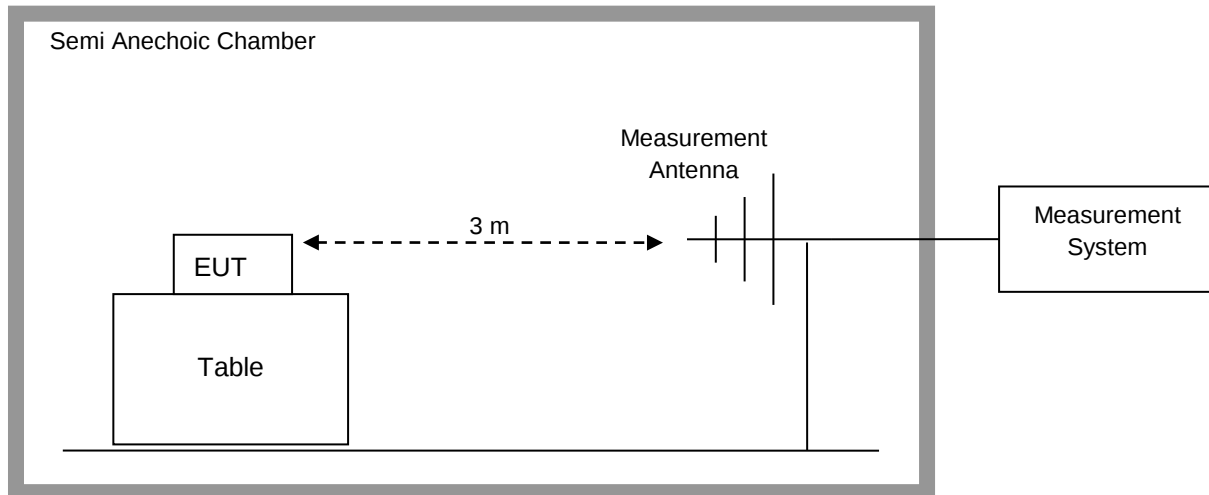
NOTES:

1. All measurements were performed using a loop antenna. The antenna was positioned in three orthogonal positions (X front, Y side, Z top) and the position with the highest emission level was recorded.
2. Measurements were performed at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2). Extrapolation Factor = $20 \log_{10}(30/3)^2 = 40\text{dB}$
3. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector.
4. 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.

The result of the measurement is passed.

5.3 Radiated Spurious Emission Measurements, Out-of-Band

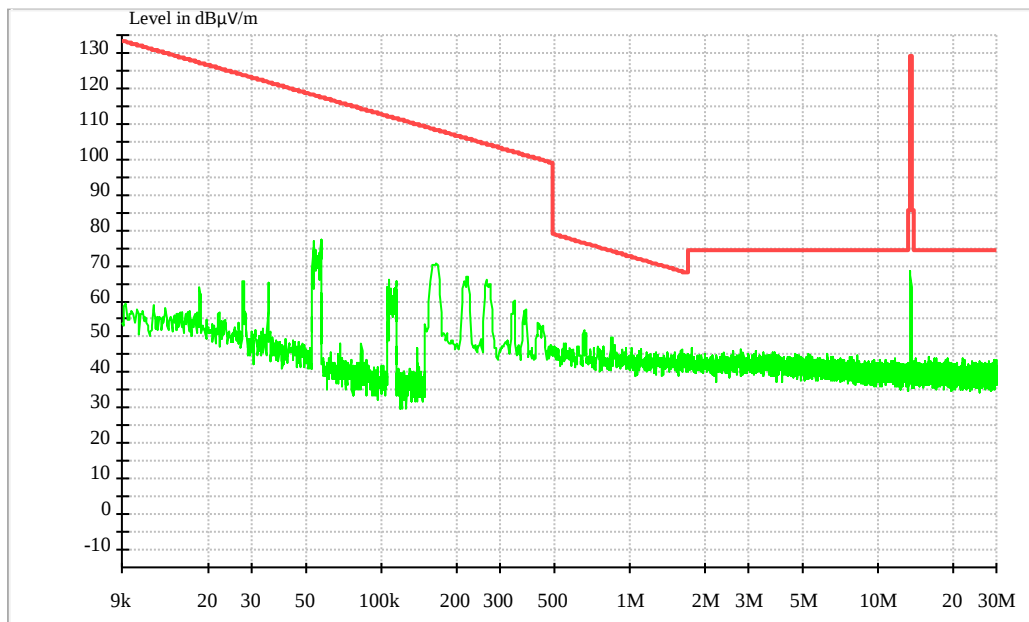
5.3.1 Test Setup



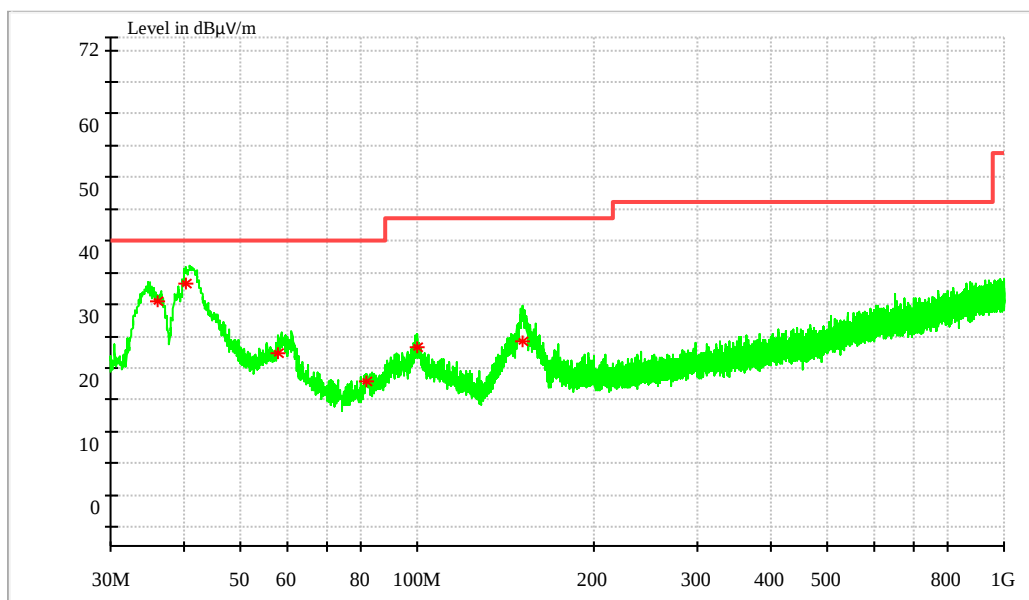
Measurement parameters	
Detector:	Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Video bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Span:	See Plots
Trace-Mode:	Max Hold

5.3.2 Test Result

9k~30MHz



30M~1GHz



Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarisation	Azimuth (deg)	Transd (dB)
36.028440	30.55	40.00	9.45	100.0	V	45.0	13.2
40.352460	33.34	40.00	6.66	100.0	V	249.0	14.4
57.676080	22.33	40.00	17.67	100.0	V	311.0	13.3
81.646120	17.93	43.50	22.07	172.0	V	242.0	9.7
100.008460	23.33	43.50	20.17	100.0	V	108.0	14.0
151.019980	24.15	43.50	19.35	100.0	V	271.0	9.2

NOTES:

1. All measurements were recorded using a spectrum analyzer employing a quasi-peak detector for emissions below 960MHz.
2. Both Vertical and Horizontal polarities of the receive antenna were evaluated with the worst case emissions being reported. Below 30MHz the Loop antenna was positioned in 3 separate radials.
3. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
4. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
5. 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.

The result of the measurement is passed.

5.4 Frequency Stability

5.4.1 Test Setup

The EUT was placed in a Climatic Chamber. A small whip antenna was placed close to the EUT, and connected to the measuring Spectrum Analyzer. Measurement performed without modulation on TX.

5.4.2 Test Result

VOLTAGE (%)	POWER Battery	TEMP (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%		-20	13559987	-13	-0.00009587021
100%		-10	13559981	-19	-0.00014011799
100%		0	13560014	14	0.00010324484
100%		10	13560013	13	0.00009587021
100%		20	13560005	5	0.00003687316
100%		30	13560017	17	0.00012536873
100%		40	13560008	8	0.00005899705
100%		50	13559984	-16	-0.00011799410
Battery End Point	VL	20	13560007	7	0.00005162242
115%	VH	20	13559992	-8	-0.00005899705

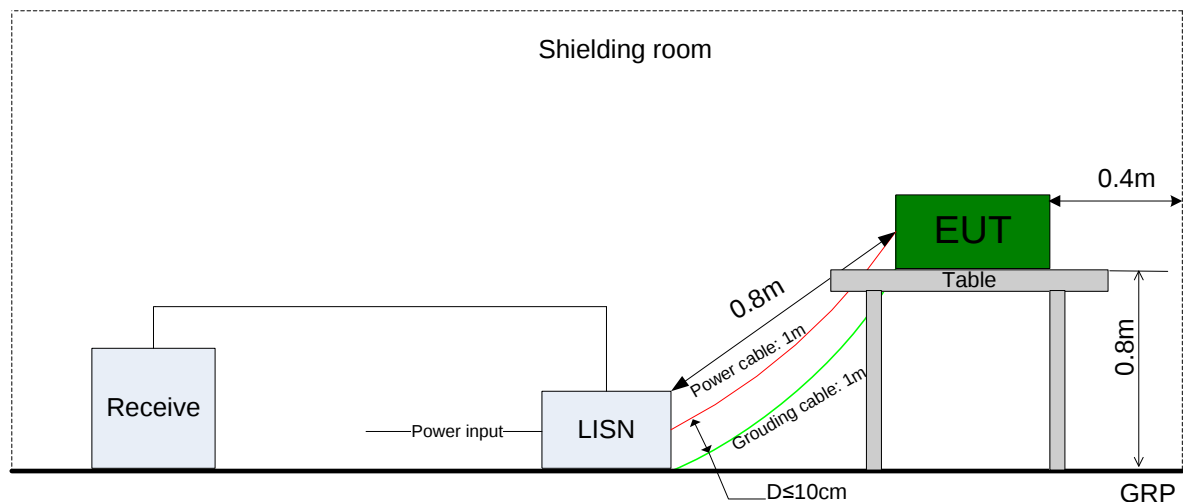
The result of the measurement is passed.

5.5 AC Power Line Conducted Emissions

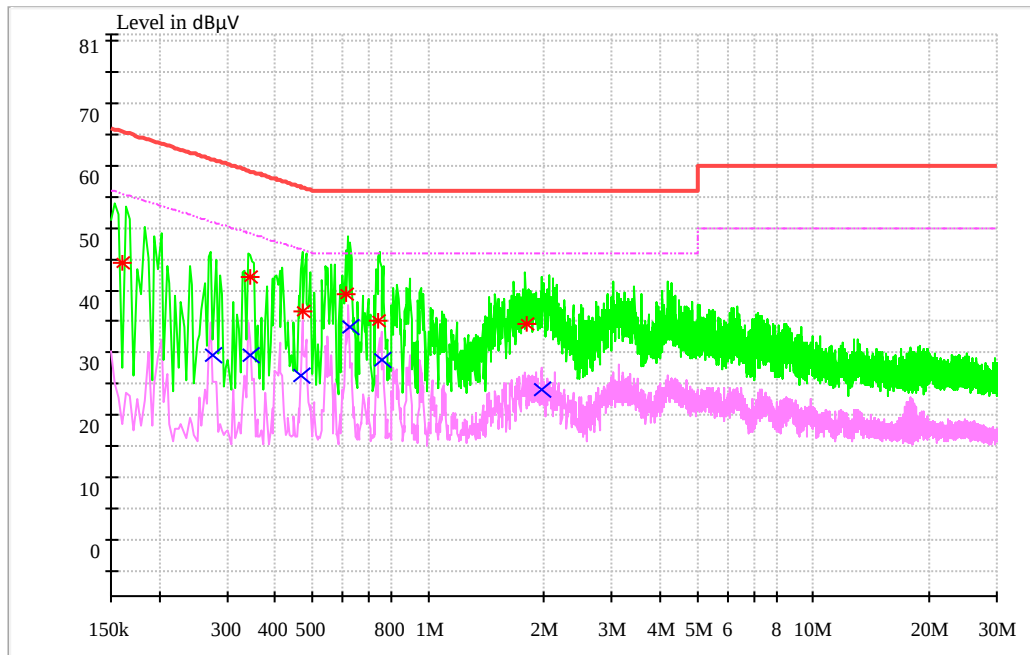
5.5.1 Test Setup

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.



5.5.2 Test Result



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV	Limit dBμV	Transd dB	Margin dB	Line	PE
0.160557	44.43	65.44	9.7	21.00	N	FLO
0.344674	42.20	59.09	9.7	21.00	L1	FLO
0.471363	36.70	56.49	9.7	21.00	L1	FLO
0.613123	39.41	56.00	9.7	21.00	L1	FLO
0.742866	35.21	56.00	9.7	21.00	L1	FLO
1.792036	34.74	56.00	9.7	21.00	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV	Limit dBμV	Transd dB	Margin dB	Line dBμV	PE
0.275730	29.52	50.94	9.7	21.42	L1	FLO
0.343806	29.72	49.11	9.7	19.39	L1	FLO
0.467130	26.47	46.57	9.7	20.09	L1	FLO
0.624187	34.17	46.00	9.7	11.83	L1	FLO
0.756493	28.79	46.00	9.7	17.21	L1	FLO
1.963315	24.04	46.00	9.7	21.96	L1	FLO

Note1:

1, 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.

2, Margin=Limit - Level

The result of the measurement is passed.

6 MAIN TEST INSTRUMENTS

6.1 Current Test Project/Report

Main Test Equipments(RE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100387	2019/01/15	2020/01/14
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2019/03/15	2021/03/15
Trilog Broadband Antenna (30M~3GHz)	SCHWARZ BECK	VULB 9163	9163-356	2018/4/9	2020/4/8
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF906	100684	2017/5/27	2019/5/26
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	5140299	2017/07/20	2019/07/19
Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	00205695	2018/04/20	2020/04/19
Software Information					
Test Item	Software Name		Manufacturer		Version
RE	EMC32		R&S		V9.25.0

Main Test Equipment(CE test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Test receiver	R&S	ESU26	100387	2019/01/15	2020/01/14
Artificial Main Network	R&S	ENV4200	100134	2018/05/08	2019/05/07
Line Impedance Stabilization Network	R&S	ENV216	100382	2018/05/08	2019/05/07
Software Information					
Test Item	Software Name		Manufacturer		Version
CE	EMC32		R&S		V9.25.0

7 System Measurement Uncertainty

For a 95% confidence level ($k = 2$), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
All Emissions, Radiated	Field Strength [dB μ V/m]	For 3 m Chamber: U = 3.868 dB (9 kHz to 150 kHz) U = 3.782 dB (150 kHz to 30 MHz) U = 5.24 dB (30 MHz-1 GHz)
AC Power Line Conducted Emissions	Disturbance Voltage[dB μ V]	U=2.3 dB

-----The END-----