



FCC RF Test Report

Product Name: Smart Phone

Model Number: VOG-L0J

Report No.: SYBH(Z-RF)20190115011001-2006

FCC ID : QISVOG-L0J

Authorized	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	He Hao	Zhang shuangxia
DATE	2019-03-01	2019-03-01

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 ※ ※

1. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.
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.
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 test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. 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.
9. If any question about this report, please contact the laboratory (PublicGCTC@huawei.com).

MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF)20190115011001-2006	First release.

DECLARATION

Type	Description
Multiple Models Applications	<input checked="" type="checkbox"/> The present report applies to single model.
	<input type="checkbox"/> 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
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1.2 Test Environment

Temperature :	TN	15 to 30	°C during room temperature tests
Ambient Relative Humidity:	20 to 85 %		
Atmospheric Pressure:	Not applicable		
Power supply :	VL	3.6	V
	VN	3.82	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:	2019-01-26
Start of test:	2019-01-27
End of test:	2019-02-28

3 Summary

FCC Rule No.	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE					
15.225 (a)	In-Band Emissions	15,848 μ V/m @ 30m 13.553 – 13.567 MHz	RADIATED	Pass	Section 4.2
2.1049 15.215	Bandwidth	N/A		Pass	Section 4.1
15.225(b)	In-Band Emissions	334 μ V/m @ 30m 13.410 – 13.553 MHz 13.567 – 13.710 MHz		Pass	Section 4.2
15.225(c)	In-Band Emissions	106 μ V/m @ 30m 13.110 – 13.410 MHz 13.710 – 14.010 MHz		Pass	Section 4.2
15.225(d) 15.209	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		Pass	Section 4.3
15.225(e)	Frequency Stability Tolerance	\pm 0.01% of Operating Frequency	Temperature Chamber	Pass	Section 4.4
15.207	AC Conducted Emissions 150kHz – 30MHz	FCC: < FCC 15.207 limits	LINE CONDUCTED	Pass	Section 4.5
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

VOG-L0J is a 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 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 B21 and B26 and B28 and B34 and B38 and B39 and B40 and B41 and B42. 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, Bluetooth, NFC, Wi-Fi and Wirelessly Charging etc. VOG-L0J provides one SIM card interface and one HUAWEI Nano memory card interface. Externally it provides type C USB charging port, and the port could be used as the earphone port or data-transfer port.

Note: Only NFC test data included in this report.



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	9.1.0.22(C341E22R1P1)	HL3VOGUEM

4.2.2 Sub-Assembly

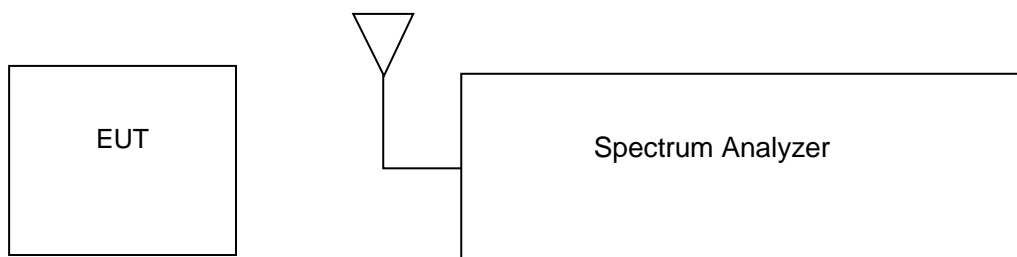
Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Battery	HB486486ECW	Huawei Technologies Co., Ltd.	Rated capacity: 4100mAh Nominal Voltage:  +3.82V Charging Voltage:  +4.4V

5 Test Results

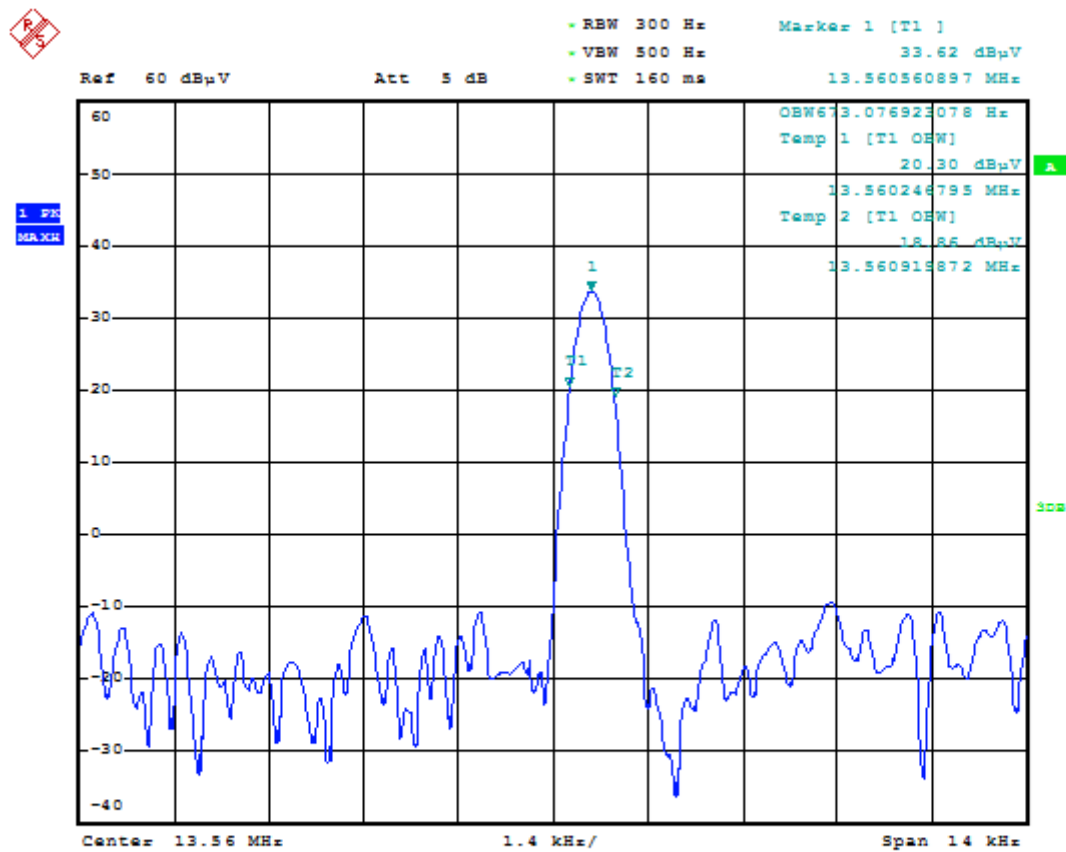
5.1 Bandwidth Measurement

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.

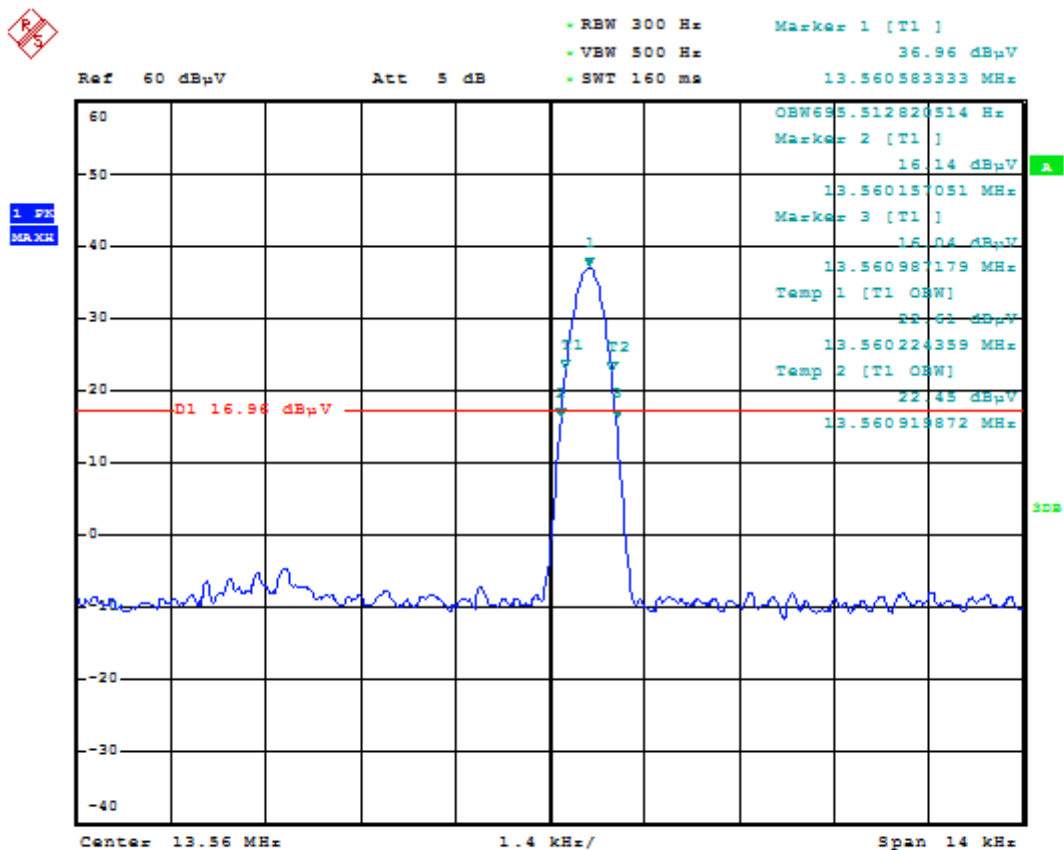
5.1.1 Test Setup



5.1.2 Test Result



Date: 31 . JAN . 2019 21:36:31



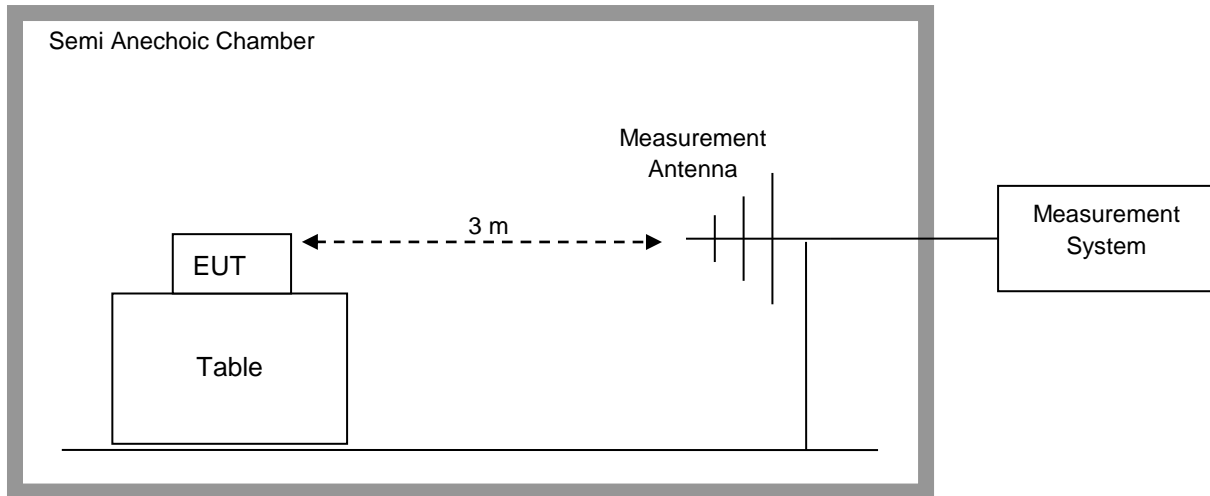
Date: 31.JAN.2019 21:31:19

Emission bandwidth	Result (KHz)	FL@OBW (MHz)	FH@OBW (MHz)	Verdict
99% emission bandwidth	695.131	13.560224625	13.560919756	PASS
20dB bandwidth	695.131	13.560232060	13.560927191	PASS

The result of the measurement is passed.

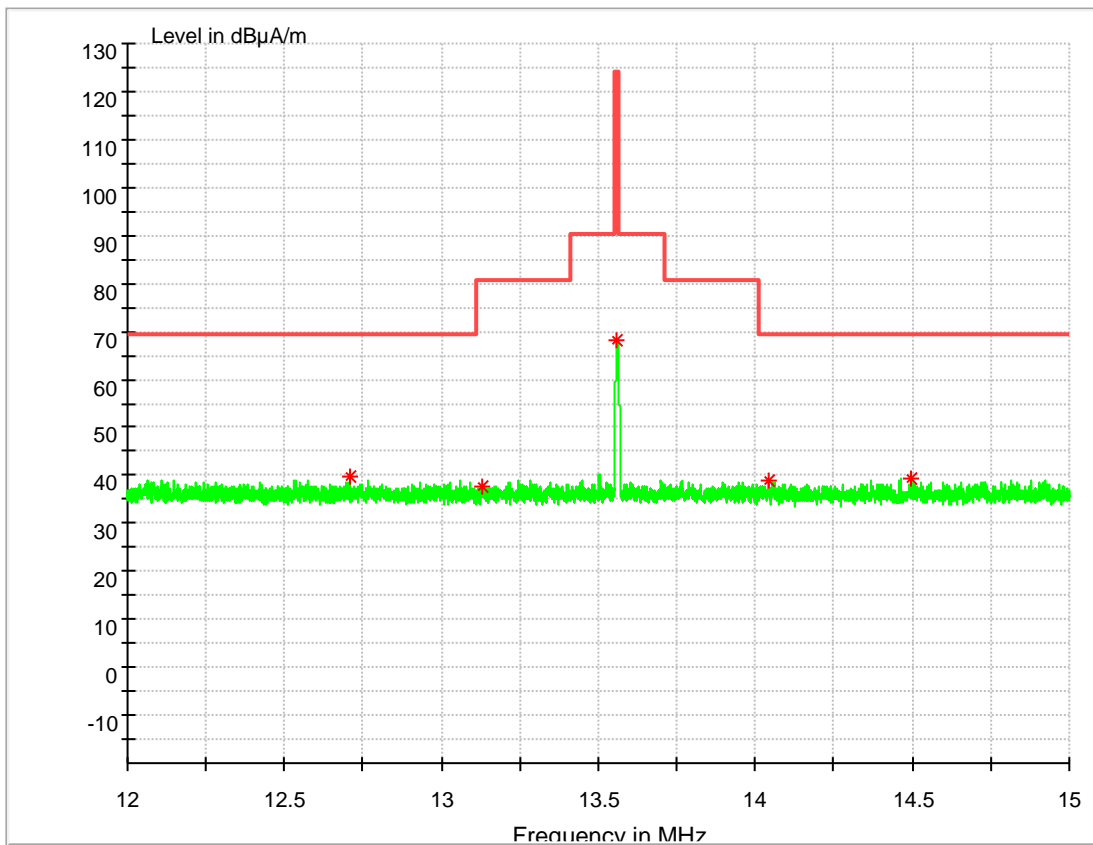
5.2 In-Band Radiated Spurious Emission Measurements

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)
12.708375	39.61	69.50	29.89	V	292.0	21.1
13.132500	37.80	80.50	42.70	V	63.0	21.1
13.559438	68.22	124.00	55.78	V	0.0	21.1
14.040563	38.87	69.50	30.63	V	212.0	21.1
14.494125	39.50	69.50	30.01	V	45.0	21.1

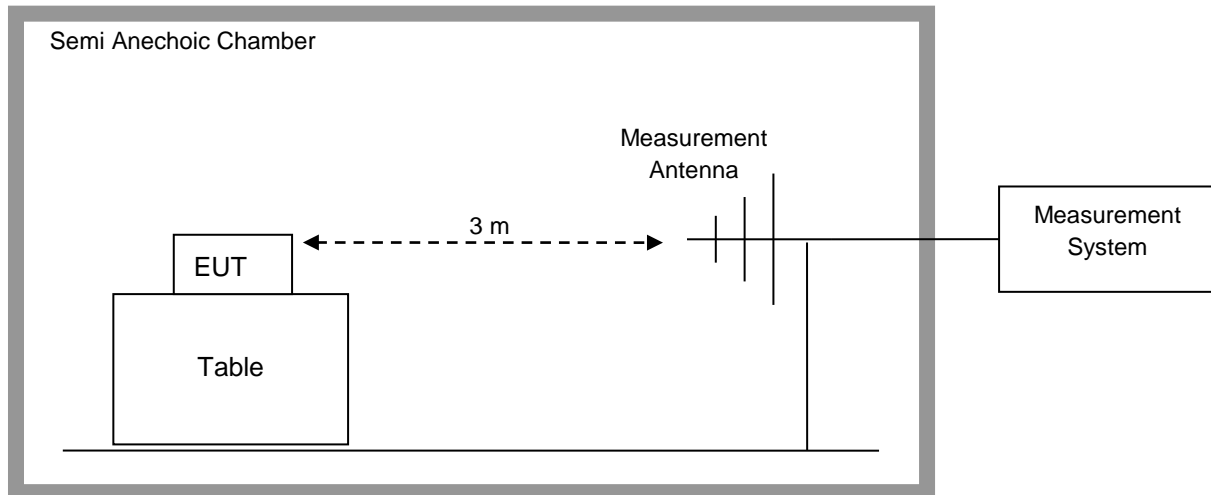
NOTES:

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

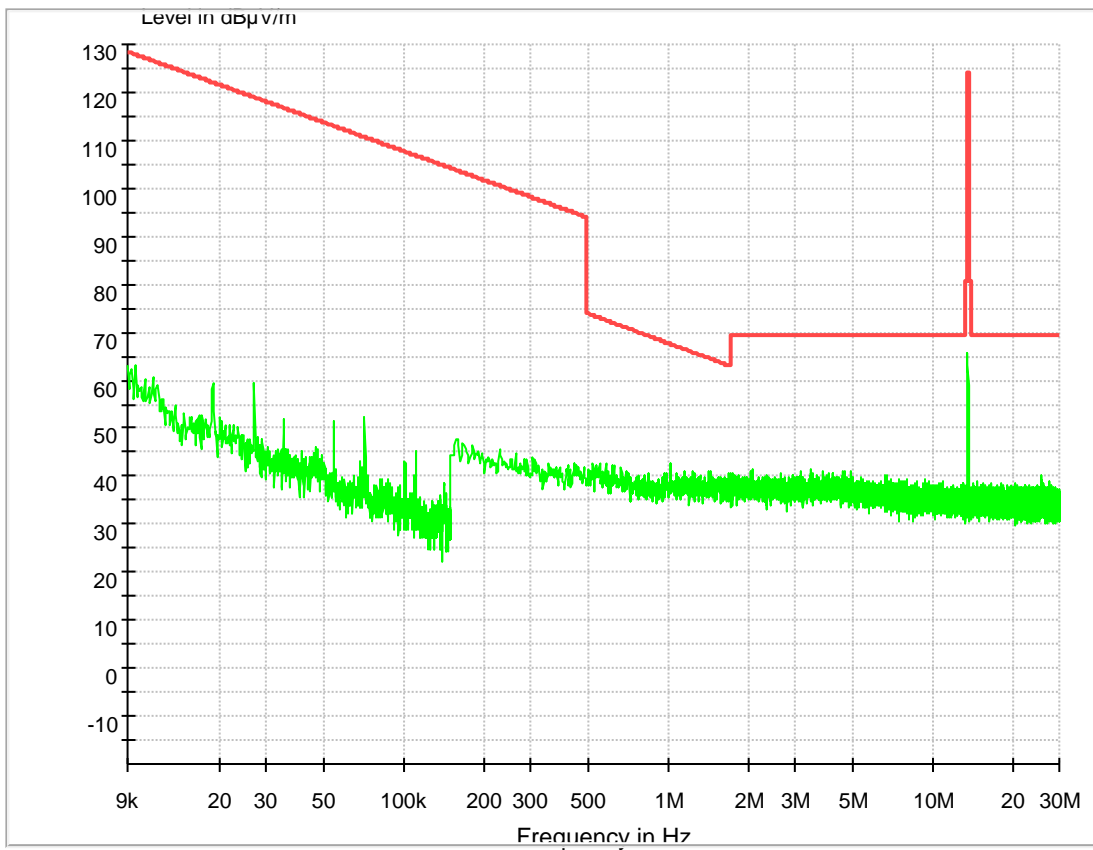
5.3.1 Test Setup



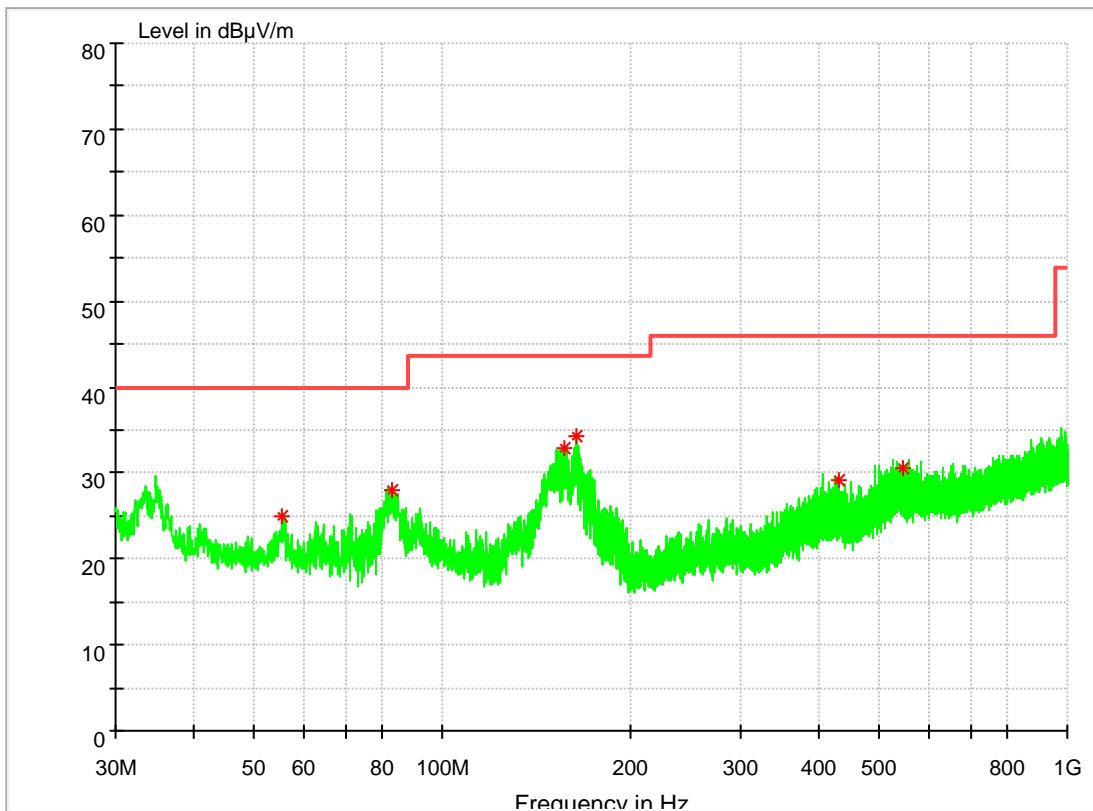
Measurement parameters	
Detector:	Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Video bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Span:	See Plots
Trace-Mode:	Max Hold

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)
55.559500	24.85	40.00	15.15	102.0	V	29.0	13.5
83.301500	28.07	40.00	11.93	121.0	V	246.0	10.3
156.779000	32.91	43.50	10.59	150.0	V	275.0	9.3
163.860000	34.23	43.50	9.27	11.0	H	152.0	9.7
429.979500	29.23	46.00	16.77	125.0	H	120.0	17.4
545.264000	30.45	46.00	15.55	103.0	V	135.0	19.4

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	13559984	-16	-0.00011799410
100%		0	13560019	19	0.00014011799
100%		10	13560012	12	0.00008849558
100%		20	13560003	3	0.00002212389
100%		30	13560018	18	0.00013274336
100%		40	13560008	8	0.00005899705
100%		50	13559988	-12	-0.00008849558
Battery End Point		3.6	20	13560006	6
115%	4.35	20	13559992	-8	-0.00005899705

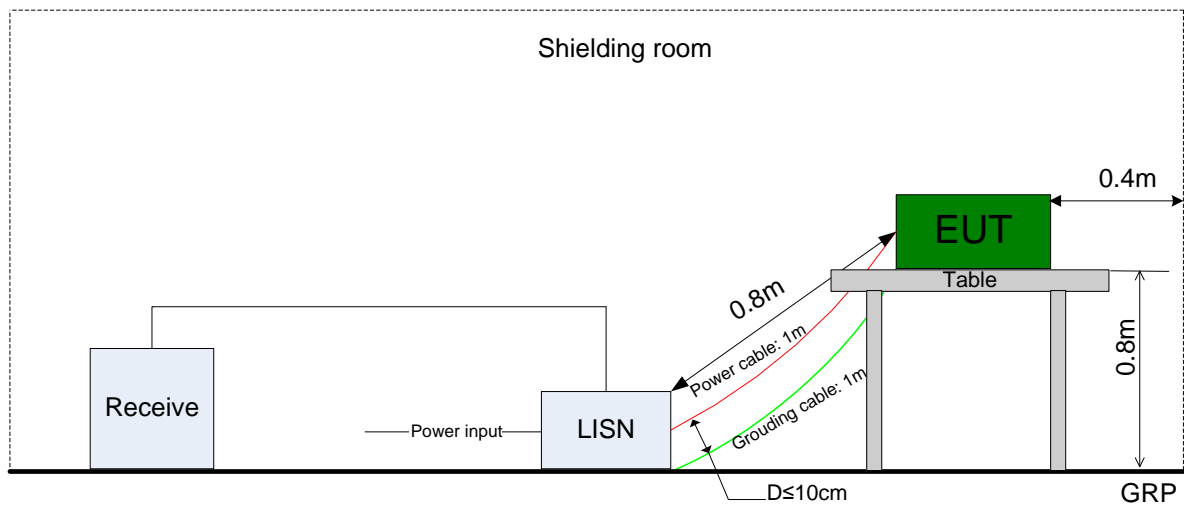
The result of the measurement is passed.

5.5 AC Power Line Conducted Emissions

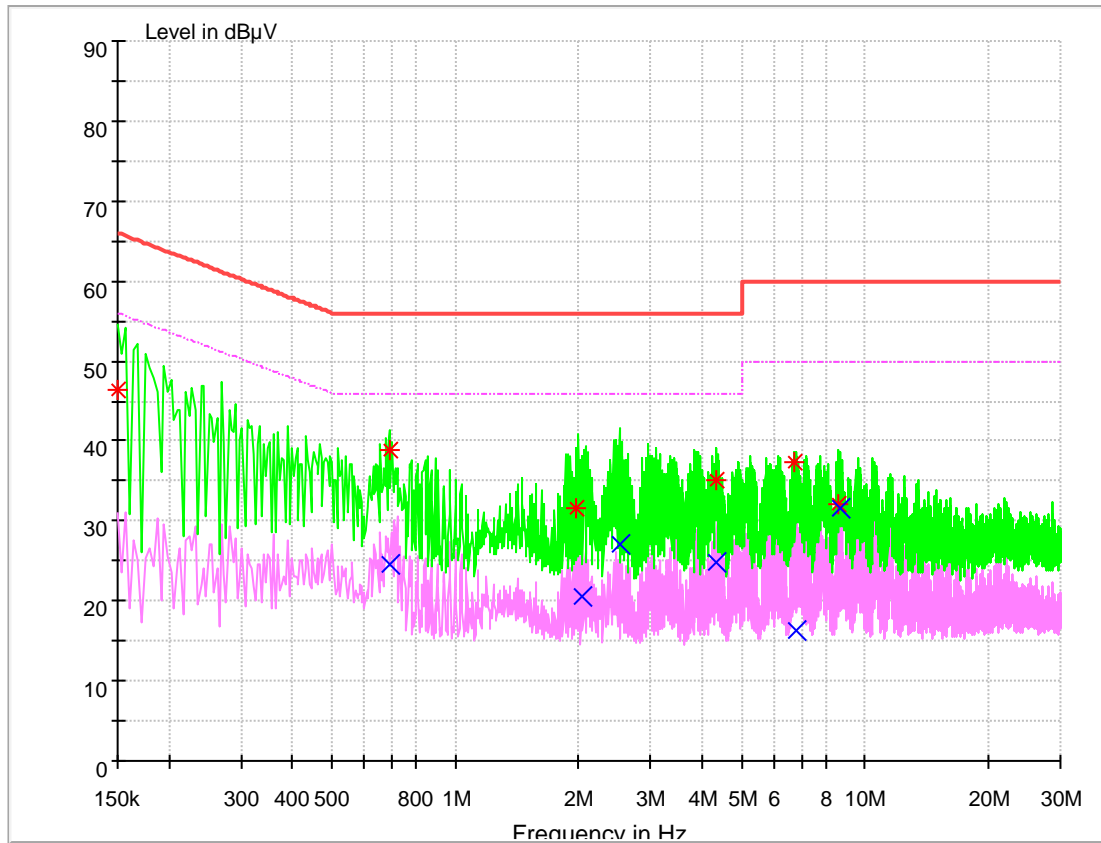
5.5.1 Test Setup

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
0.150276	46.34	N	9.7	19.65	65.99	FLO
0.690977	38.82	L1	9.7	17.18	56.00	FLO
1.978822	31.52	L1	9.7	24.48	56.00	FLO
4.356771	35.02	L1	9.8	20.98	56.00	FLO
6.714413	37.32	L1	9.8	22.68	60.00	FLO
8.652630	32.19	L1	9.8	27.81	60.00	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Limit dBµV	Transd dB	Margin dB	Line dBµV	PE
0.696190	24.52	L1	9.7	21.48	46.00	FLO
2.036438	20.52	L1	9.7	25.48	46.00	FLO
2.539225	26.99	L1	9.7	19.01	46.00	FLO
4.325289	24.90	L1	9.7	21.10	46.00	FLO
6.767324	16.39	L1	9.7	33.61	50.00	FLO
8.680272	31.70	L1	9.7	18.30	50.00	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

This table gives a complete overview of the RF measurement equipment.

Devices used during the test described are marked

<input checked="" type="checkbox"/> Main Test Equipment(RE test system)						
Marked	Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
<input checked="" type="checkbox"/>	Test receiver	R&S	ESU26	100387	2019/01/15	2020/01/14
<input checked="" type="checkbox"/>	LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100262	2017/04/25	2019/04/25
<input type="checkbox"/>	LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2017/04/25	2019/04/25
<input checked="" type="checkbox"/>	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-357	2017/04/21	2019/04/20
<input type="checkbox"/>	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-520	2017/3/29	2019/3/28
<input type="checkbox"/>	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-491	2017/3/29	2019/3/28
<input type="checkbox"/>	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-356	2018/4/9	2020/4/8
<input checked="" type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100305	2017/4/21	2019/4/20
<input type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF906	100684	2017/5/27	2019/5/26
<input type="checkbox"/>	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF906	100683	2017/3/29	2019/3/28
<input checked="" type="checkbox"/>	Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	5140299	2017/07/20	2019/07/19
<input type="checkbox"/>	Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	00206665	2018/4/21	2020/4/20
<input checked="" type="checkbox"/>	Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	00205695	2018/04/20	2020/04/19
<input type="checkbox"/>	Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	LM5947	2017/07/20	2019/07/19
<input checked="" type="checkbox"/>	Measurement Software	R&S	EMC32 V9.25.0	/	/	/

<input checked="" type="checkbox"/> Main Test Equipment(CE test system)						
Marked	Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due

<input type="checkbox"/>	Test receiver	R&S	ESU26	100387	2019/01/15	2020/01/14
<input checked="" type="checkbox"/>	Test receiver	R&S	ESCI	101163	2019/01/15	2020/01/14
<input type="checkbox"/>	Artificial Main Network	R&S	ENV4200	100134	2018/05/08	2019/05/07
<input checked="" type="checkbox"/>	Line Impedance Stabilization Network	R&S	ENV216	100382	2018/05/08	2019/05/07
<input checked="" type="checkbox"/>	Measurement Software	R&S	EMC32 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 [dBμV/m]	For 3 m Chamber: U = 5.90 dB (30 MHz-1 GHz) U = 4.94 dB (1 GHz-18 GHz) U = 4.24 dB (18 GHz-26.5 GHz)
AC Power Line Conducted Emissions	Disturbance Voltage[dBμV]	U=2.3 dB

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