FCC
RF Test Report

Product Name: Smart Phone

Model Number: ELE-L29/ELE-L09

Report No.: SYBH(Z-RF)20190117023001-2006
FCC ID：QISELE-LX9

Authorized	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	He Hao	Zhang shuangxia
DATE	2019-02-26	2019-02-26

Reliability Laboratory of Huawei Technologies Co., Ltd.

(Global Cmpliance 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 Reliability Laboratory of Huawei Technologies Co., Ltd has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01
2. The Laboratory of Sporton International (Shenzhen) Inc has passed the accreditation by National Voluntary Laboratory Accreditation Program (NVLAP). The NVLAP LAB CODE is 600156-0.
3. The Reliability Laboratory of Huawei Technologies Co., Ltd 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.
4. The Laboratory of Sporton International (Shenzhen) Inc 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 CN5019, and the Test Firm Registration Number is 577730.
5. The Reliability Laboratory of Huawei Technologies Co., Ltd 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.
6. The Reliability Laboratory 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.
7. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
8. The test report is invalid if there is any evidence of erasure and/or falsification.
9. The test report is only valid for the test samples.
10. 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.
11. If any question about this report, please contact the laboratory (PublicGCTC@huawei.com).

MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF)20181114019001-2006	First release.
2	SYBH(Z-RF)20190117023001-2006	(1) Updated the version of the board, and added some tests according to differences and modifications of the new version, please see General Description for details: _____ Note 1: ☐ The history report(s) should be withdrawn; ☒ The history report(s) are still valid.

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 ELE-L29. These models utilize the similar radio design, shielding, interface, physical layout and so on. The differences and modifications between these models are declared by the applicant and showed in General Description All others between these models are identical. The present report only presents the worst test case of all modes, see relevant test results for detailed.

1 Table of contents

2 General Information

1.1 Test standard/s

Applied Rules :	47 CFR FCC Part 02 47 CFR FCC Part 15 Subpart C (15.225)

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 VN VH	3.6 V 3.82 V 4.35 V	DC by Battery

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, Guangdong, P.R.C
Sub-contracted Test Location 1 :	Sporton International (Shenzhen) Inc.
Address of Sub-contracted Test Location 1 :	No.3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.China

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:	2019-01-30
Start of test:	2019-02-01
End of test:	2019-02-26

3 Summary

FCC Rule No.	Test Description	Test Limit	Test Condition	Test Result	Reference	Testing location
15.225 (a)	In-Band Emissions	15,848μV/m @ 30m 13.553 – 13.567 MHz	RADIATED	Pass	Section 5.2	Location 1
2.1049	Bandwidth	N/A		Refer to No. SYBH(Z-RF)20181114019001-2006	Section 5.1	Location 1
15.225(b)	In-Band Emissions	334μV/m @ 30m 13.410 – 13.553 MHz 13.567 – 13.710 MHz		Pass	Section 5.2	Location 1
15.225(c)	In-Band Emissions	106μV/m @ 30m 13.110 – 13.410 MHz 13.710 – 14.010 MHz		Pass	Section 5.2	Location 1
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 5.3	Location 1
15.225(e)	Frequency Stability Tolerance	± 0.01% of Operating Frequency	Temperature Chamber	Refer to No. SYBH(Z-RF)20181114019001-2006	Section 5.4	Location 1
15.207	AC Conducted Emissions 150kHz – 30MHz	FCC: < FCC 15.207 limits	LINE CONDUCTED	Pass	Section 5.5	Location 1
NOTE1: 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 NOTE2: For adding Wireless charging protective case we only tested the RSE (worst case) and AC Conducted Emissions and the data is not worsen, So all other data can refer to No. SYBH(Z-RF)20181114019001-2006 of before change of ELE-L29/ELE-L09.						

4 Product Description

4.1 Product Information

4.1.1 General Description

ELE-L29/ELE-L09 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-L29/ELE-L09 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 B32 and B34 and B38 and B39 and B41. The ELE-L29 LTE frequency band for intra-band carrier aggregation uplink operation band is CA_1C and CA_2C 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 (it can also used as SIM card interface), earphone port (to provide voice service) and one SIM card interface.ELE-L29 is dual SIM smart phone. ELE-L09 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.

The mobile phone ELE-L29/ELE-L09 is LTE/UMTS/GSM mobile phone with Bluetooth. The differences between before change of ELE-L29/ELE-L09 and after change of ELE-L29/ELE-L09 are showed in the following table.

	Before change of ELE-L29/ELE-L09	After change of ELE-L29/ELE-L09
GSM four bands	B2/B3/B5/B8	B2/B3/B5/B8
WCDMA bands	B1/2/4/5/6/8/19	B1/2/4/5/6/8/19
LTE bands	FDD LTE: B1/2/3/4/5/6/7/8/9/12/17/18/19/20/ B26/28/32 TDD LTE: B34/B38/39/40/41(120M,2535-2655)	FDD LTE: B1/2/3/4/5/6/7/8/9/12/17/18/19/20/ B26/28/32 TDD LTE: B34/B38/39/40/41(120M,2535-2655)
SIM card	the same	the same
NFC	the same	the same
External camera	the same	the same
internal camera	the same	the same
FLASH	the same	the same
Mainboard	the same	the same
PCB layout	the same	the same
Appearance	the same	the same
Bluetooth mode	the same	the same

WLAN mode	the same	the same
BT/ WLAN antenna	the same	the same
GSM/ WCDMA /LTE antenna	the same	The same
Adapter	the same	the same
Battery	the same	the same
Optional accessories	None	Wireless charging protective case
Chipset	the same	the same
Memory	the same	the same
RF Parameter	The same RF Parameter in the same band	The same RF Parameter in the same band
Dimension	the same	the same
Main Frequency NV	The same NV in the same band	The same NV in the same band

Note1: Only NFC test data included in this report.

Note2: For adding Wireless charging protective case we only tested the RSE (worst case) and AC Conducted Emissions and the data is not worsen, So all other data can refer to No. SYBH(Z-RF)20181114019001-2006 of before change of ELE-L29/ELE-L09.

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	5.0.1.78（C432E78R1P6log）	HL1ELLEM

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 OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Adapter	HW-050450E00	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.75A Output Voltage: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Adapter	HW-050450U00	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.75A Output Voltage: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Adapter	HW-050450A00	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.75A Output Voltage: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Adapter	HW-050450E01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.75A Output Voltage: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Adapter	HW-050450A01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.75A Output Voltage: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A
Li-ion Polymer Battery	HB436380ECW	Huawei Technologies Co.,Ltd.	Rated capacity: 3550mAh 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

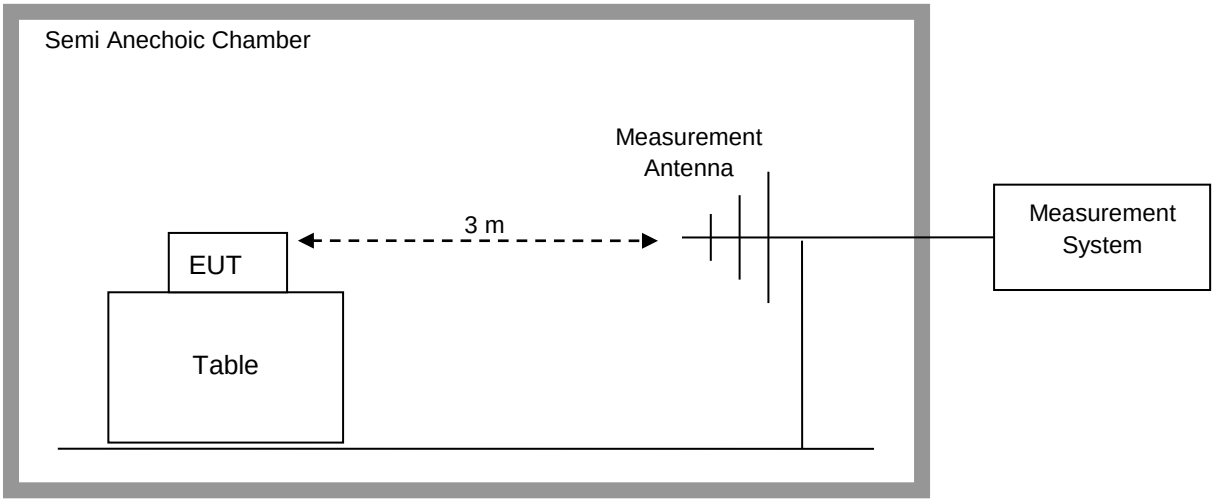
5 Test Results

5.1 Bandwidth Measurement

Refer to No. SYBH(Z-RF)20181114019001-2006

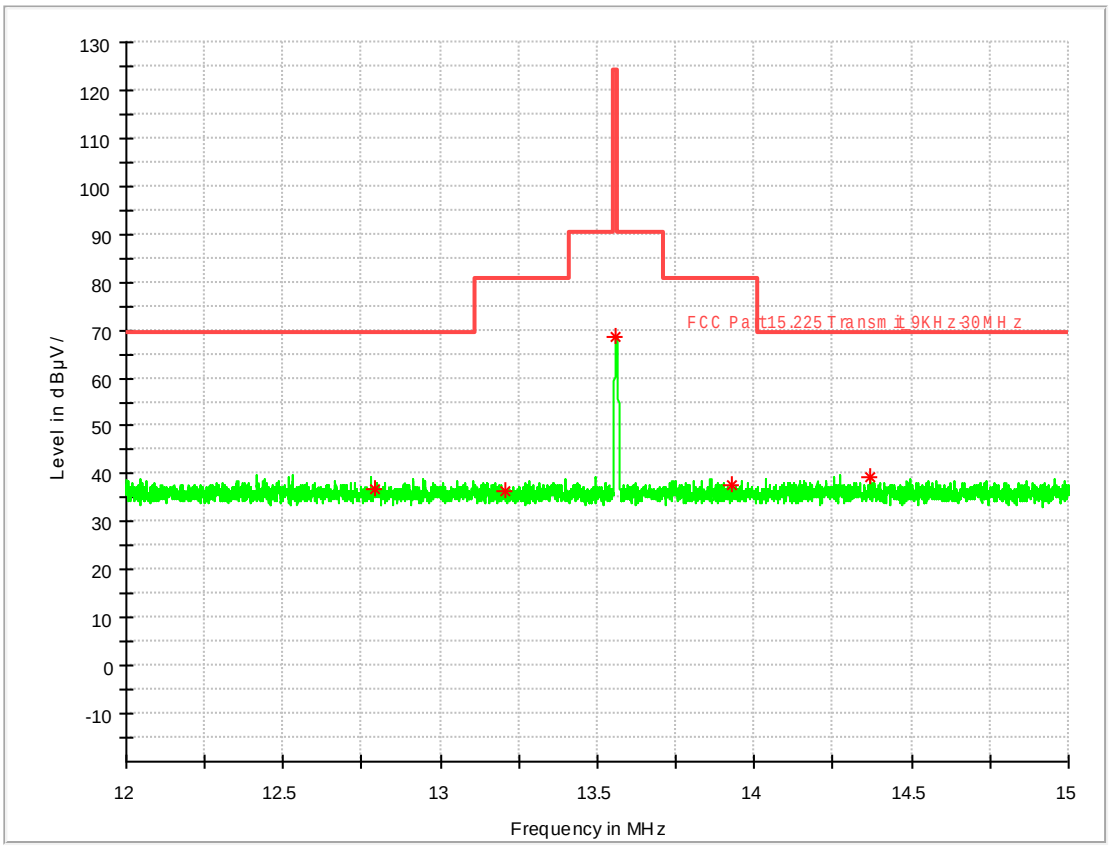
5.2 In-Band Radiated Spurious Emission Measurements

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)	Quasi Peak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Azimuth (deg)
12.790875	36.83	69.50	32.67	292.0
13.208250	36.26	80.50	44.24	63.0
13.559438	68.67	124.00	55.33	0.0
13.930500	37.56	80.50	42.94	212.0
14.366625	39.12	69.50	30.38	45.0

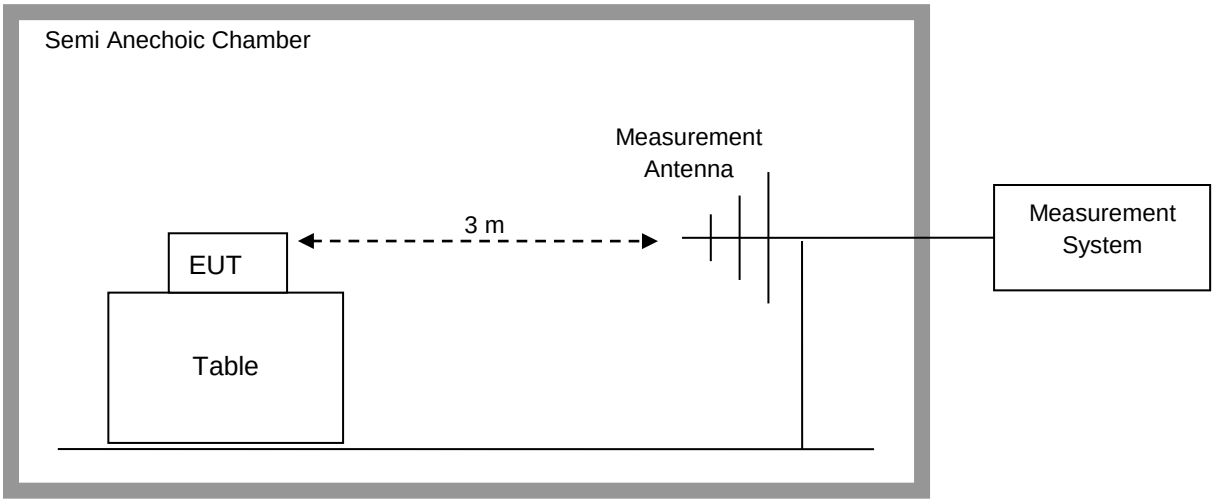
NOTES:

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 log10(30/3)2 = 40dB
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

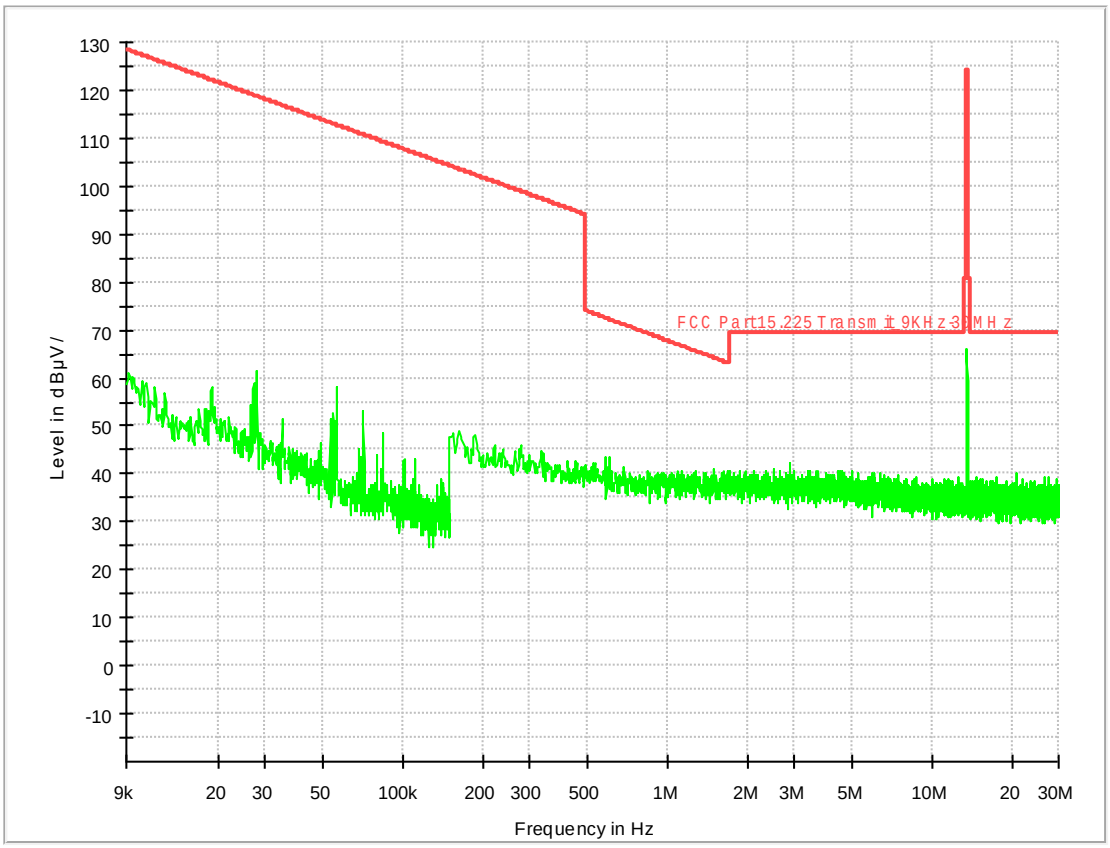
5.3.1 Test Setup



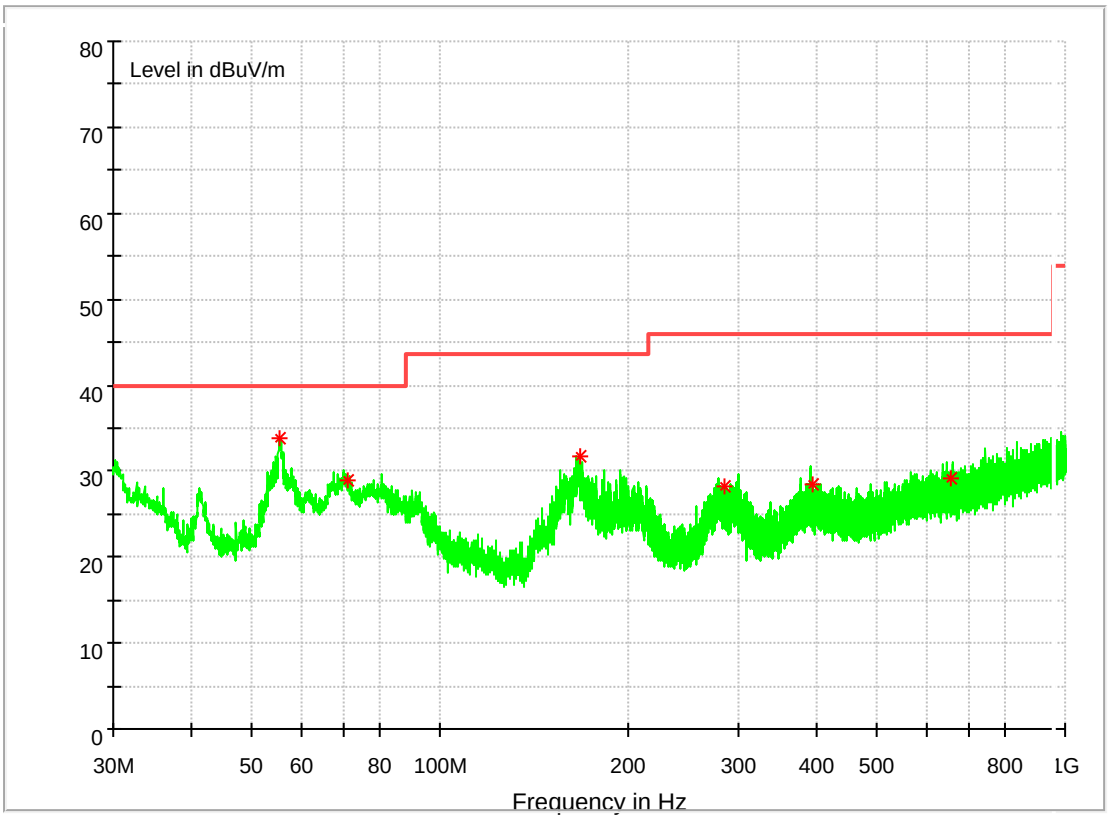
Measurement parameters	
Detector:	Quasi Peak
Sweep time:	Auto
Resolution bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Video bandwidth:	9 kHz – 150 kHz: 200 Hz 150 kHz – 30 MHz: 9 kHz 30 MHz – 1000 MHz: 100 kHz
Span:	See Plots
Trace-Mode:	Max Hold

5.3.2 Test Result

9k~30MHz



30M-1GHZ



MEASUREMENT RESULT: QP Detector

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Transd. (dB)
55.559500	33.93	40.00	6.07	100.0	V	219.0	13.5
71.176500	28.86	40.00	11.14	100.0	V	236.0	9.4
166.964000	31.74	43.50	11.76	100.0	V	278.0	10.1
285.643500	28.12	46.00	17.88	100.0	H	105.0	14.1
394.235000	28.43	46.00	17.57	100.0	H	1.0	16.6
658.172000	29.23	46.00	16.77	100.0	V	13.0	20.9

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

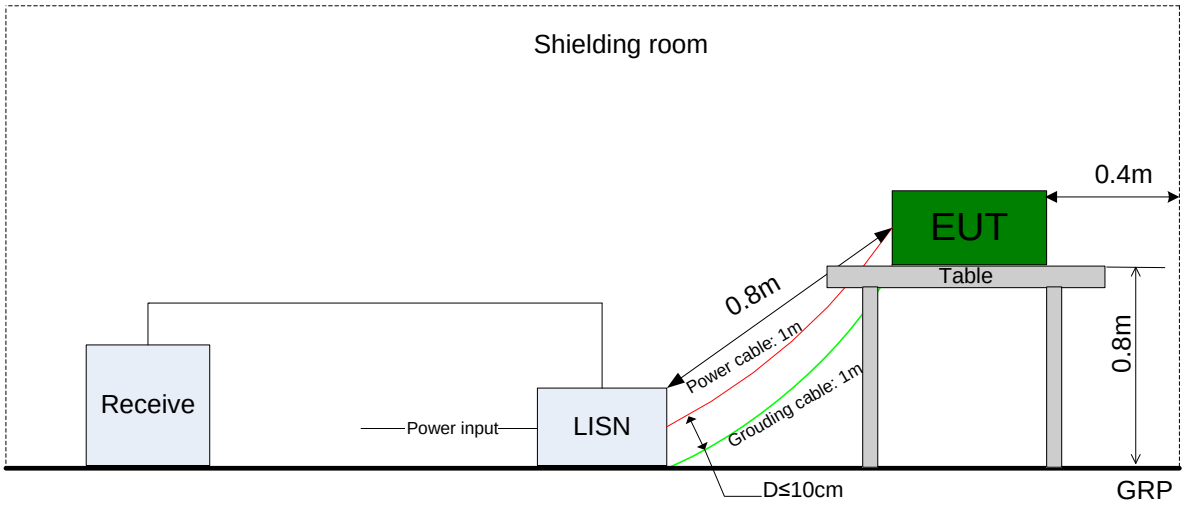
Refer to No. SYBH(Z-RF)20181114019001-2006

5.5 AC Power Line Conducted Emissions

5.5.1 Test Setup

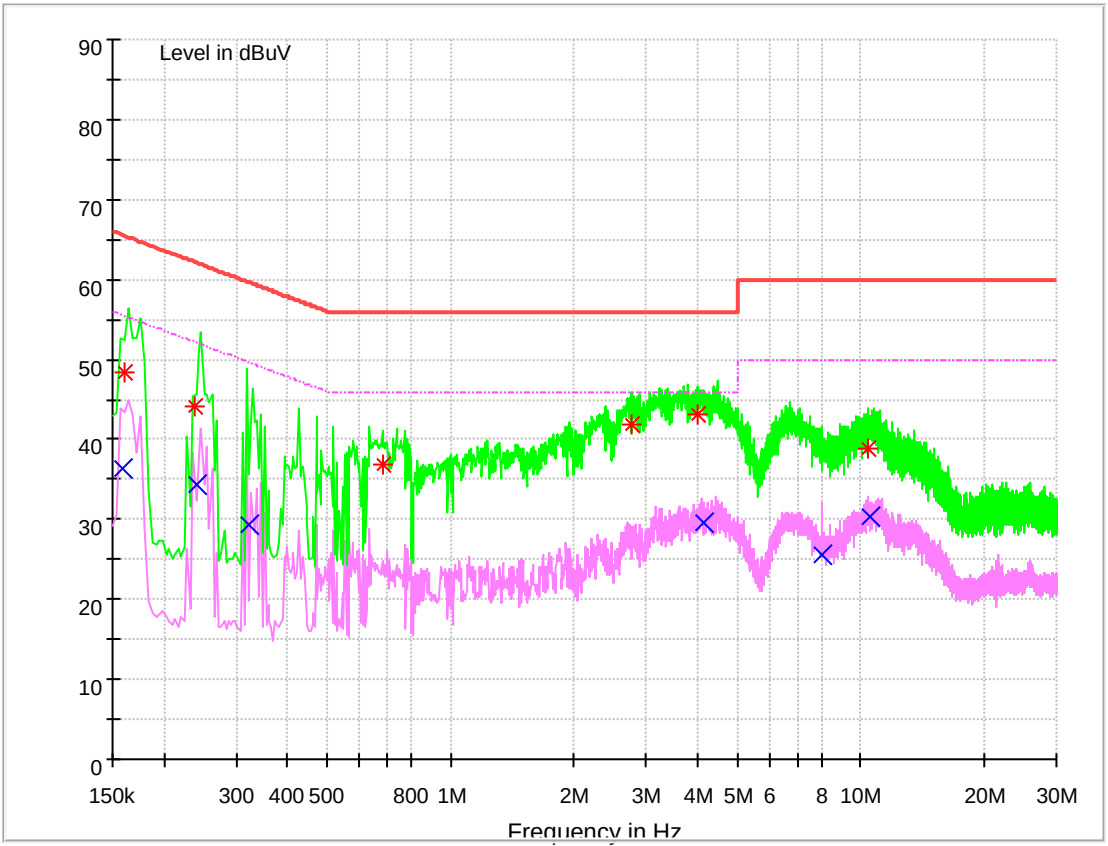
The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All 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
0.159748	48.48	65.48	9.7	17.00	N	FLO
0.238224	44.22	62.16	9.7	17.94	N	FLO
0.681208	36.84	56.00	9.7	19.16	N	FLO
2.767009	41.78	56.00	9.7	14.22	L1	FLO
4.000568	43.13	56.00	9.7	12.87	N	FLO
10.412411	38.80	60.00	10.4	21.20	L1	FLO

MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Limit dBµV	Transd dB	Margin dB	Line dBµV	PE
0.158244	36.32	55.56	9.7	19.24	N	FLO
0.241598	34.28	52.04	9.7	17.76	N	FLO
0.322597	29.29	49.64	9.7	20.35	L1	FLO
4.158017	29.54	46.00	9.7	16.46	N	FLO
8.080733	25.67	50.00	9.7	24.33	N	FLO
10.584148	30.39	50.00	10.5	19.61	N	FLO

Note:

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

6 MAIN TEST INSTRUMENTS

1.6 History Test Project/Report

Refer to No. SYBH(Z-RF)20181114019001-2006

1.7 Current Test Project/Report

This table gives a complete overview of the RF measurement equipment.
Devices used during the test described are marked ☒

1.7.1 Test Location 1:

☒ Main Test Equipment(RE test system)						
Marked	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	100262	2017/04/25	2019/04/25
☐	LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2017/04/25	2019/04/25
☒	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-357	2017/04/21	2019/04/20
☐	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-520	2017/3/29	2019/3/28
☐	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-491	2017/3/29	2019/3/28
☐	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-356	2018/4/9	2020/4/8
☒	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100305	2017/4/21	2019/4/20
☐	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF906	100684	2017/5/27	2019/5/26
☐	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF906	100683	2017/3/29	2019/3/28
☒	Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	5140299	2017/07/20	2019/07/19
☐	Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	00206665	2018/4/21	2020/4/20
☒	Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	00205695	2018/04/20	2020/04/19

☐	Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	LM5947	2017/07/20	2019/07/19
☒	Measurement Software	R&S	EMC32 V9.25.0	/	/	/

☒ Main Test Equipment(CE test system)						
Marked	Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
☐	Test receiver	R&S	ESU26	100387	2019/01/15	2020/01/14
☒	Test receiver	R&S	ESCI	101163	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
☒	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----------