FCC&ISED
RF Test Report

Product Name: Smart Phone

Model Number: VOG-L04

Report No.: SYBH(Z-RF)20181218028001-2004

FCC ID：QISVOG-L04
IC: 6369A-VOGL04

Authorized	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	He Hao	Zhang shuangxia
DATE	2019-01-28	2019-01-28

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, an d 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)20181218028001-2004	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.

1 Table of contents

2 General Information

2.1 Test standard/s

Applied Rules :	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart C ISED RSS-Gen Issue 5 ISED RSS-247 Issue2
Test Method :	FCC KDB 558074 D01 DTS Meas Guidance v05 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices.

2.2 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	DC by Battery
	VN	3.82	V	
	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.

2.3 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

2.4 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

2.5 Application details

Date of Receipt Sample:	2019-01-02
Start of test:	2019-01-03
End of test:	2019-01-28

3 Test Summary

Test Item	FCC Rule No.	ISED Rule No.	Requirements	Test Result	Verdict
DTS (6 dB) Bandwidth	15.247(a)(2)	RSS-247, 5.2	≥ 500 kHz.	Appendix A	Pass
Occupied Bandwidth	---	RSS-247, 5.2 RSS-Gen, 6.7	No limit.	Appendix B	Pass
Duty Cycle	KDB 558074 D01（6.0）	KDB 558074 D01（6.0）	No limit.	Appendix C	Pass
Maximum Conducted Peak Output Power	15.247(b)(3)	RSS-247, 5.4	FCC: For directional gain: Conducted < 30 dBm – (G[dBi] – 6 [dB]); Otherwise: Conducted < 30 dBm, ISED: Conducted < 30 dBm. EIRP< 36 dBm,	Appendix D	Pass
Maximum Power Spectral Density Level	15.247(e)	RSS-247, 5.2	Conducted < 8 dBm/3 kHz.	Appendix E	Pass
Band Edges Compliance	15.247(d)	RSS-247, 5.5	< -20 dBr/100 kHz if total peak power ≤ power limit.	Appendix F	Pass
Unwanted Emissions into Non-Restricted Frequency Bands				Appendix G	Pass
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	RSS-247, 5.5 RSS-Gen, 6.13 RSS-Gen, 8.10	FCC Part 15.209 field strength limit; RSS-Gen 8.10 Field strength limit.	Appendix H	Pass
AC Power Line Conducted Emissions	15.207	RSS-Gen, 8.8	FCC Part 15.207 conducted limit; RSS-Gen, 8.8 conducted limit.	Appendix I	Pass

Note1: According to KDB 558074 D01, antenna-port conducted measurements are acceptable as an alternative to radiated measurements for demonstrating compliance to the limits in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions will also be required.

Note2: 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 Description of the Equipment under Test (EUT)

4.1 General Description

VOG-L04 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 B17and B18 and B19 and B20 and B26 and B28 and B34 and B38 and B39 and B40 and B41 and B66. 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-L04 provides one USIM 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 Bluetooth BLE 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	9.1.0.42(C792E10R1P4)	HL2VOGUEM

4.2.2 Sub- Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Adapter	HW-100400A00	Huawei Technologies Co., Ltd.	Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V ⎓ 2A OR 9V ⎓ 2A OR 10V ⎓ 4A
Adapter	HW-100400U00	Huawei Technologies Co., Ltd.	Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V ⎓ 2A OR 9V ⎓ 2A OR 10V ⎓ 4A
Adapter	HW-100400E00	Huawei	Input voltage: 100-240V ~50/60Hz 1.2A

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
		Technologies Co., Ltd.	Output voltage: 5V ⎓ 2A OR 9V ⎓ 2A OR 10V ⎓ 4A
Adapter	HW-100400B00	Huawei Technologies Co., Ltd.	Input voltage: 100-240V ~50/60Hz 1.2A Output voltage: 5V ⎓ 2A OR 9V ⎓ 2A OR 10V ⎓ 4A
Battery	HB486486ECW	Huawei Technologies Co., Ltd.	Rated capacity: 4100mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.4V

4.3 Technical Description

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

Characteristics	Description	
TX/RX Operating Range	2400-2483.5 MHz band	fc = 2402 MHz + N * 2 MHz, where: - fc = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 39.
Modulation Type	Digital	GFSK,
Emission Designator	GFSK for BT 4.2: 1M04FXD GFSK for BT 5.0: 2M07KFXD	
Bluetooth Power Class	Class 1	
Antenna	Description	Isotropic Antenna
	Type	☒ Integral ☐ External ☐ Dedicated
	Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
	Gain	-1.4 dBi (per antenna port, max.)
	Remark	When the EUT is put into service, the practical maximum antenna gain should NOT exceed the value as described above.
Power Supply	Type	☐ External DC mains, ☒ Battery, ☐ AC/DC Adapter, ☐ Powered over Ethernet (PoE). ☐ Other

5 General Test Conditions / Configurations

5.1 EUT Configurations

5.1.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, - All TX tests are performed at all TX antenna ports of the EUT, and - All RX tests are performed at all RX antenna ports of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

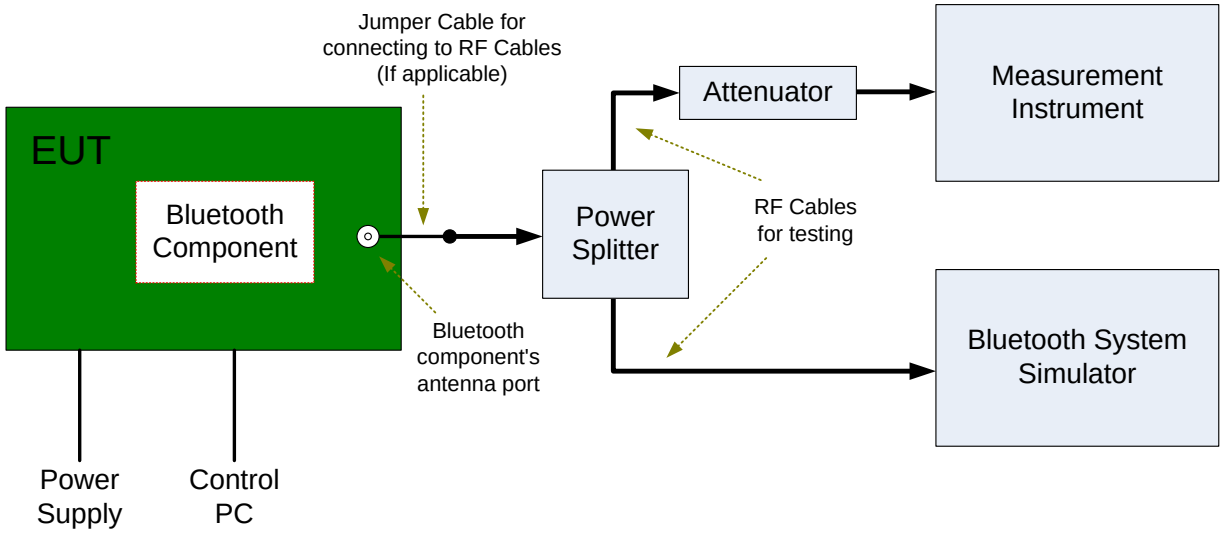
5.1.2 Customized Configurations

# EUT Conf.	Signal Description	Operating Frequency	Duty cycle
TM1_Ch0	GFSK for BT 4.2modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz	60.80%
TM1_Ch19	GFSK for BT 4.2 modulation, package type DH5, hopping off.	Ch No. 19 / 2440 MHz	60.70%
TM1_Ch39	GFSK for BT 4.2 modulation, package type DH5, hopping off.	Ch No. 39 / 2480 MHz	60.80%
TM2_Ch0	GFSK for BT 5.0 modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz	56.92%
TM2_Ch19	GFSK for BT 5.0 modulation, package type DH5, hopping off.	Ch No. 19 / 2440 MHz	56.90%
TM2_Ch39	GFSK for BT 5.0 modulation, package type DH5, hopping off.	Ch No. 39 / 2480 MHz	56.90%

5.2 Test Setups

5.2.1 Test Setup 1

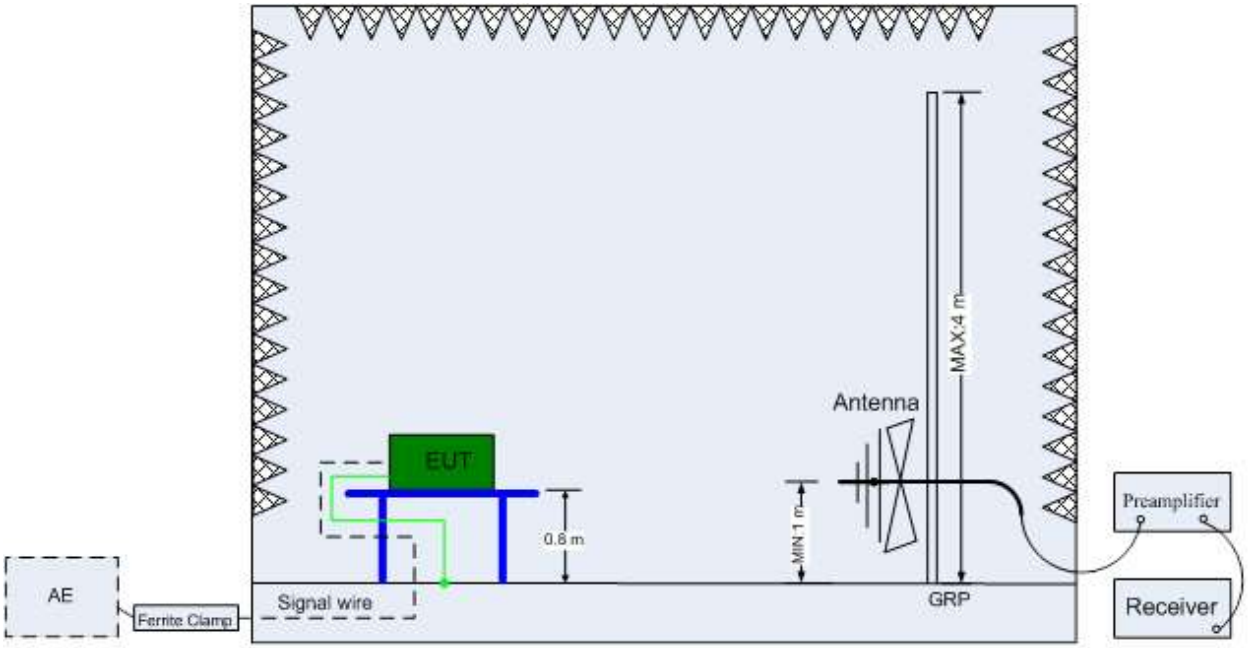
The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by Bluetooth System Simulator and/or PC/software to emit the specified signals for the purpose of measurements.



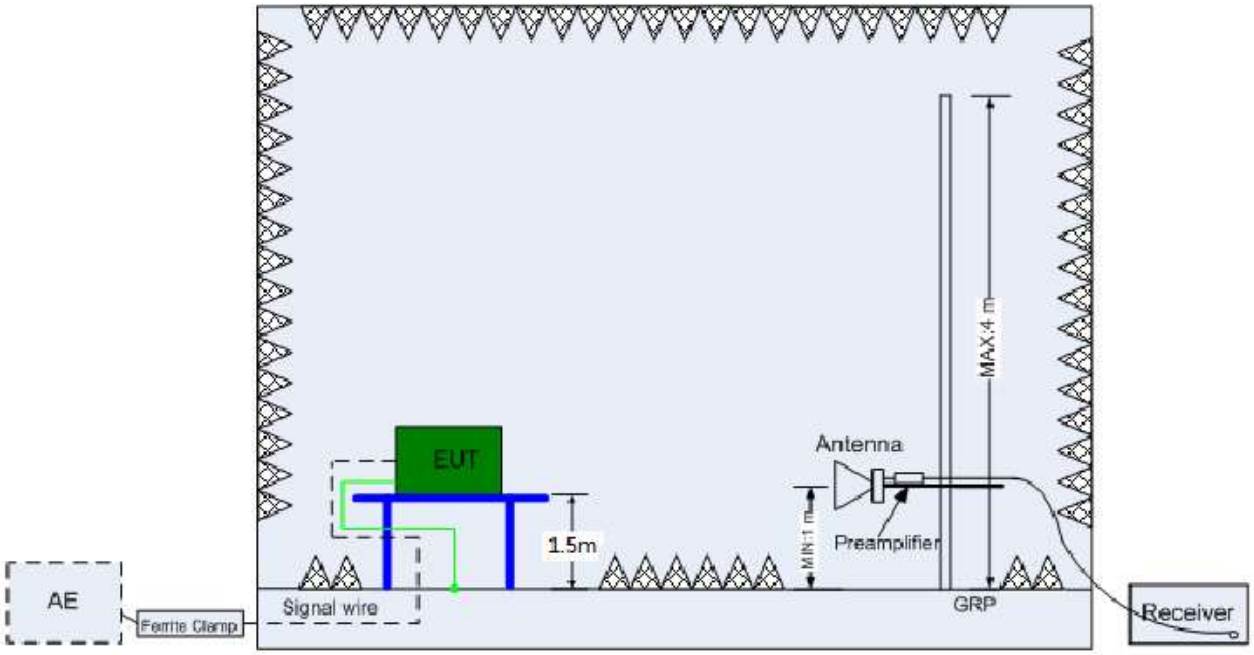
5.2.2 Test Setup 2

The semi-anechoic chamber and full-anechoic chamber has met the requirement of ANSI C63.4. The test distance is 3m.The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



(Below 1 GHz)

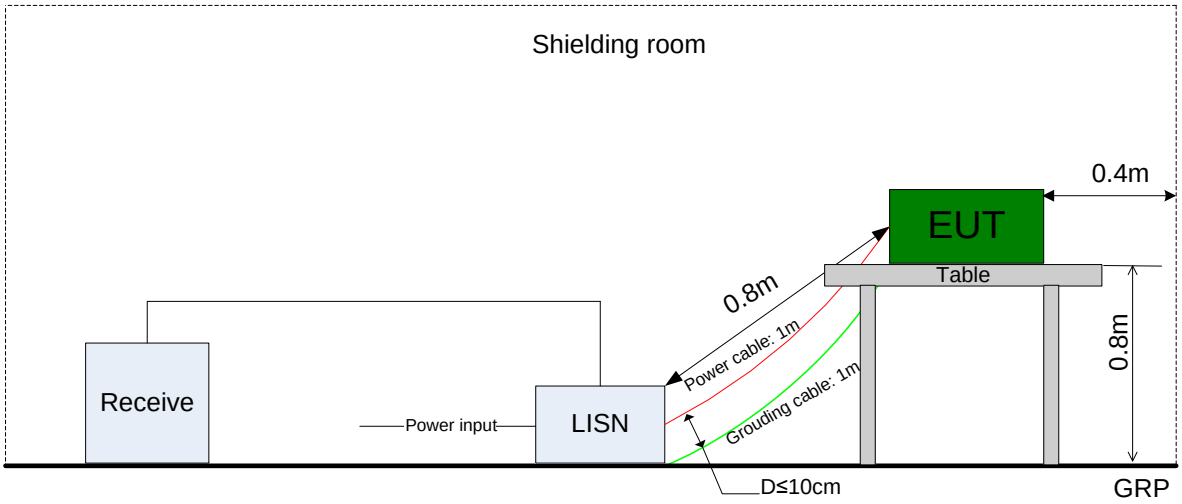


(Above 1 GHz)

5.2.3 Test Setup 3

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.



5.3 Test Conditions

Test Case	Test Conditions		
	Configuration	Description	
6dB Emission Bandwidth (EBW)	Meas. Method	FCC KDB 558074 D01 §8.2 Option 2.	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Occupied Bandwidth	Meas. Method	FCC KDB 558074 D01 §8.2 Option 2.	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Maximum peak Conducted Output Power	Meas. Method	FCC KDB 558074 D01 §8.3.1.1	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Maximum Power Spectral Density Level	Meas. Method	FCC KDB 558074 D01 §8.4	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Band edge spurious emission	Meas. Method	FCC KDB 558074 D01§8.7	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch39. TM2_Ch0, TM2_Ch39.	
Unwanted Emissions into Non-Restricted Frequency Bands	Meas. Method	FCC KDB 558074 D01§8.5	
	Test Env.	TN/VN	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39. TM2_Ch0, TM2_Ch19, TM2_Ch39.	
Unwanted Emissions into Restricted Frequency Bands (Radiated)	Meas. Method	ANSI C63.10; FCC KDB 558074 D01§8.6, Radiated	
	Test Env.	TN/VN	
	Test Setup	Test Setup 2	
	EUT Conf.	30 MHz -1 GHz	TM1_Ch0 (Worst Conf.). TM2_Ch0 (Worst Conf.).
		1-3 GHz	TM1_Ch0, TM2_Ch39. TM2_Ch0, TM2_Ch39.
		3-18 GHz	TM1_Ch19 (Worst Conf.), TM2_Ch19 (Worst Conf.),
		18-26.5 GHz	TM1_Ch0 (Worst Conf.). TM2_Ch0 (Worst Conf.).

Test Case	Test Conditions	
	Configuration	Description
AC Power Line Conducted Emissions	Meas. Method	AC mains conducted. Pre: RBW = 10 kHz; Det. = Peak. Final: RBW = 9 kHz; Det. = CISPR Quasi-Peak & Average.
	Test Env.	TN/VN
	Test Setup	Test Setup 3
	EUT Conf.	TM1_Ch39, TM2_Ch39

6 Main Test Instruments

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

☒ Main Test Equipment (BT/WIFI test system)						
Marked	Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
☒	JS1120-3 BT/WIFI test system	JS Tonscend	JS0806-2	/	2018/05/30	2019/05/30
☐	Power Detecting & Samplig Unit	R&S	OSP-B157	101429	2018/07/23	2019/07/23
☐	Power Sensor	R&S	NRP2	103085/106211	2018/05/17	2019/05/17
☐	DC Power Supply	KEITHLEY	2303	1342889	2018/10/24	2019/10/24
☐	DC Power Supply	KEITHLEY	2303	000500E	2018/05/21	2019/05/21
☐	DC Power Supply	KEITHLEY	2303	1288003	2018/05/21	2019/05/21
☐	DC Power Supply	KEITHLEY	2303	000381E	2018/05/21	2019/05/21
☐	DC Power Supply	KEITHLEY	2303	000510E	2018/10/24	2019/10/24
☐	Temperature Chamber	WEISS	WKL64	5624600294001 0	2018/12/13	2019/12/13
☒	Spectrum Analyzer	Agilent	N9030A	MY51380032	2018/07/23	2019/07/23
☐	Spectrum Analyzer	Agilent	N9030A	MY49431698	2018/07/23	2019/07/23
☐	Spectrum Analyzer	Keysight	N9040B	MY57212529	2018/06/28	2019/06/28
☐	Signal Analyzer	R&S	FSQ31	200021	2018/07/23	2019/07/23
☐	Signal Analyzer	R&S	FSU26	201069	2018/11/2	2019/11/2
☐	Universal Radio Communication Tester	R&S	CMW500	164699	2018/03/15	2019/03/15
☐	Universal Radio Communication Tester	R&S	CMW500	159302	2018/07/23	2019/07/23
☐	Wireless Communication Test set	Agilent	N4010A	MY49081592	2018/07/23	2019/07/23
☒	Signal generator	Agilent	E8257D	MY51500314	2018/04/27	2019/04/27
☐	Signal generator	Agilent	E8257D	MY49281095	2018/07/23	2019/07/23
☐	Vector Signal Generator	R&S	SMW200A	103447	2018/05/31	2019/05/31
☐	Vector Signal Generator	R&S	SMU200A	104162	2018/07/23	2019/07/23

☒ 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	/	/	/

☒ 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-40	ETS-Lindgren	3160-10	LM5947	2017/07/20	2019/07/19

	GHz)					
☒	Measurement Software	R&S	EMC32 V9.25.0	/	/	/

7 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
Transmit Output Power Data	Power [dBm]	U = 0.39 dB
RF Power Density, Conducted	Power [dBm]	U = 0.64 dB
Bandwidth	Magnitude [%]	U=7%
Band Edge Compliance	Disturbance Power [dBm]	U = 0.9 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	20MHz~3.6GHz：U＝0.88dB 3.6GHz~8.4GHz：U＝1.08dB 8.4GHz~13.6GHz：U＝1.24dB 13.6GHz~22GHz：U＝1.34dB 22GHz~26.5GHz：U＝1.36dB
Field Strength of Spurious Radiation	ERP/EIRP [dBm]	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)
Frequency Stability	Frequency Accuracy [Hz]	U=41.58Hz
AC Power Line Conducted Emissions	Disturbance Voltage[dBμV]	U=2.3 dB
Duty Cycle	Duty Cycle [%]	U=±2.06 %

8 Appendixes

Appendix No.	Description
SYBH(Z-RF)20181218028001-2004-A	Appendix for Bluetooth BLE

END