FCC
RF Test Report

Product Name: Smart Phone

Model Number: STK-LX1

Report No.: SYBH(Z-RF)20190214006001-2003

FCC ID：QISSTK-LX1

Authorized	APPROVED (Lab Manager)	PREPARED (Test Engineer)
BY	He Hao	Zhou Bing bo
DATE	2019-03-19	2019-03-19

Reliability Laboratory of Huawei Technologies Co., Ltd.

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

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※ ※ 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)2019021 4006001-2003	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. Note: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
Test Method :	FCC KDB 558074 D01 DTS Meas Guidance v05r01 ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. 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 :	VN	3.82	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.

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:	2019-02-27
Start of test:	2019-02-28
End of test:	2019-03-19

3 Test Summary

Test Item	FCC Rule No.	Requirements	Test Result	Verdict	Testing location
20dB Emission Bandwidth (EBW)	15.247(a)(1)	No limit.	Appendix A	Pass	Test Location 1
Carrier Frequency Separation	15.247(a)(1)	≥ MAX {25kHz, IIF{output power ≤125mW, 2/3*20dB EBW, 20dB EBW }}.	Appendix B	Pass	Test Location 1
Number of Hopping Channel	15.247(a)(1)(iii)	≥15 channels.	Appendix C	Pass	Test Location 1
Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	< 0.4s within a period of (0.4s*hopping number).	Appendix D	Pass	Test Location 1
Maximum Peak Output Power	15.247(b)(1)	FCC: Conducted < 1 W if using ≥75 non-overlapping channels.	Appendix E	Pass	Test Location 1
Band edge spurious emission	15.247(d)	< -20 dBr/100 kHz if total peak power ≤ power limit.	Appendix F	Pass	Test Location 1
Conducted RF Spurious Emission			Appendix G	Pass	Test Location 1
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 Description of the Equipment under Test (EUT)

4.1 General Description

STK-LX1 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 B5 and B8. The LTE frequency band is B1 and B3 and B7 and B8 and B2 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 and different versions of the software, the phone may support single SIM card or double SIM card. 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 Bluetooth 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	STK-LX1 9.0.1.18	HL1STKM

4.2.2 Sub- Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Adapter	HW-050200U01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200E01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200B01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200A01	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200U02	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200E02	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200A02	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Adapter	HW-050200B02	Huawei Technologies Co.,Ltd.	Input Voltage:100V-240V~50/60Hz, 0.5A Output Voltage: 5V ⎓ 2A
Li-ion Polymer Battery	HB446486ECW	Huawei Technologies Co.,Ltd.	Rated capacity: 3900mAh 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 * 1 MHz, where: - fc = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 78.
Modulation Type	Carrier	Frequency Hopping Spread Spectrum (FHSS)
	Digital	GFSK, π/4-DQPSK, 8DPSK
Emission Designator	GFSK: 960KFXD π/4-DQPSK: 1M27GXD 8DPSK: 1M27GXD	
Bluetooth Power Class	Class 1	
Antenna	Description	Isotropic Antenna
	Type	☒ Integral ☐ External ☐ Dedicated
	Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
	Gain	-2.5dBi (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.
Sensors and Antenna	Sensors and Antenna optimization function should be disabled during testing by software method to get the stable maximum power and avoid the influence of uncertain conditions

5.1.2 Customized Configurations

# EUT Conf.	Signal Description	Operating Frequency
TM1_DH5_Hop	GFSK modulation, package type DH5, hopping on.	---
TM1_DH5_Ch0	GFSK modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz
TM1_DH5_Ch39	GFSK modulation, package type DH5, hopping off.	Ch No. 39 / 2441 MHz
TM1_DH5_Ch78	GFSK modulation, package type DH5, hopping off.	Ch No. 78 / 2480 MHz
TM2_2DH5_Hop	π/4-DQPSK modulation, package type 2DH5, hopping on.	---
TM2_2DH5_Ch0	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 0 / 2402 MHz
TM2_2DH5_Ch39	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 39 / 2441 MHz
TM2_2DH5_Ch78	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 78 / 2480 MHz
TM3_3DH5_Hop	8DPSK modulation, package type 3DH5, hopping on.	---
TM3_3DH5_Ch0	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 0 / 2402 MHz
TM3_3DH5_Ch39	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 39 / 2441 MHz
TM3_3DH5_Ch78	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 78 / 2480 MHz

5.2 Antenna requirements

Excerpt from §15.203 of the FCC Rules/Regulations:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

The antennas of the **STK-LX1** are **permanently attached.**
There are no provisions for connection to an external antenna.

Conclusion:
The **Smart Phone FCC ID: QISSTK-LX1** unit complies with the requirement of §15.203.
Ch. Frequency (MHz)

Ch.	Frequency (MHz)
00	2402
. .	. .
39	2441
. .	. .
78	2480

Frequency/ Channel Operations

5.3 Description of tests

5.3.1 Bandwidth measurement

(a) Connect EUT test port to universal communication tester.
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measuring frequency number, finally test the bandwidth with universal communication tester.

5.3.2 Carrier frequency separation measurement

(a) Connect EUT test port to spectrum analyzer and universal communication tester.
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number to two adjacent channels separately and test the carrier frequency separation with spectrum analyzer.

5.3.3 Number of hopping channel

(a) Connect EUT test port to spectrum analyzer and universal communication tester.
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function, then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.
(c) Count the quantity of peaks to get the number of hopping channels.

5.3.4 Time of occupancy

(a) Connect test port of EUT to spectrum analyzer and universal communication tester.
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
(c) Set the span of spectrum analyzer to 0 Hz, and set the resolution bandwidth to1 MHz and the vedio bandwidth to 1 MHz, then get the time domain measured diagram. and set sweep time to 2 times of one burst occupancy time, and measure the time of occupancy of one burst.
(d) Set the resolution bandwidth to1 MHz and the vedio bandwidth to 3 MHz ,and set the sweep time to a period (0.4 seconds multiplied by the number of hopping channels employed), and count the number of the bursts.
(e) Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts

5.3.5 Peak output power

(a) Connect EUT test port to spectrum analyzer and universal communication tester.
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
(c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

5.3.6 Band edge spurious emission

(a) Connect EUT test port to spectrum analyzer and universal communication tester
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
(c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.
(d) Switch on the frequency hopping function, and repeat above measurement.

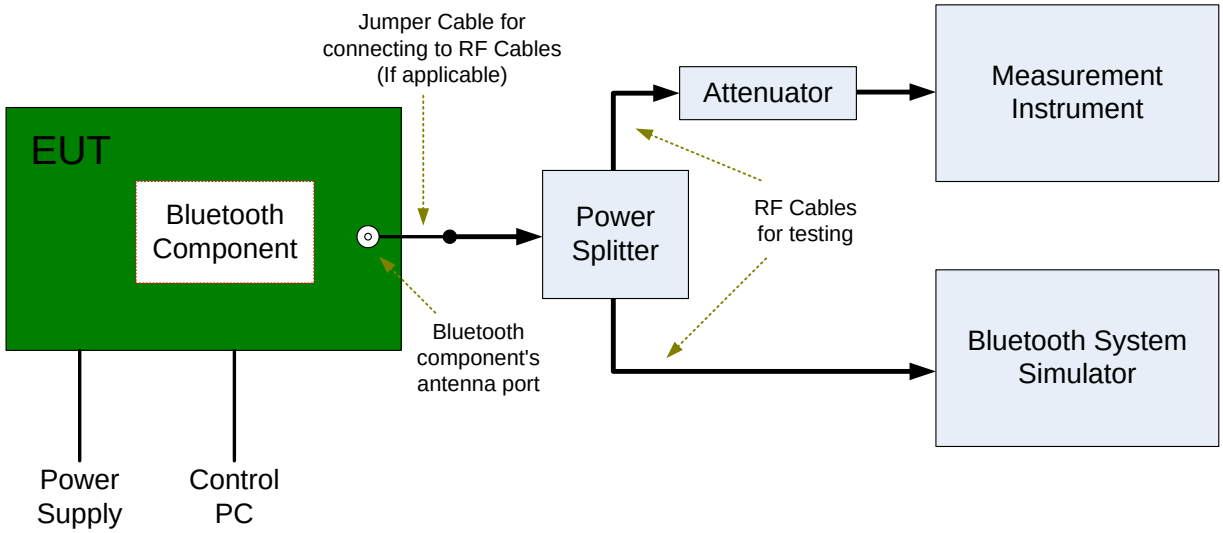
5.3.7 Conducted RF Spurious

(a) Connect EUT test port to spectrum analyzer and universal communication tester
(b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
(c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted spurious separately.
(d) Switch on the frequency hopping function, and repeat the above measurement.

5.4 Test Setups

5.4.1 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.



5.5 Test Conditions

Test Case	Test Conditions	
	Configuration	Description
20dB Emission Bandwidth (EBW)	Meas. Method	C63.10 §7.8.7
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.
Carrier Frequency Separation	Meas. Method	C63.10 §7.8.2
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Hop, TM2_2DH5_Hop, TM3_3DH5_Hop.
Number of Hopping Channel	Meas. Method	C63.10 §7.8.3
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Hop, TM2_2DH5_Hop, TM3_3DH5_Hop.
Time of Occupancy (Dwell Time)	Meas. Method	C63.10 §7.8.4
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch39, TM2_2DH5_Ch39, TM3_3DH5_Ch39.
Maximum Peak Conducted Output Power	Meas. Method	C63.10 §7.8.5
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.
Band edge spurious emission	Meas. Method	C63.10 §7.8.6
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch78.
Conducted RF Spurious Emission	Meas. Method	C63.10 §7.8.8
	Test Env.	TN/VN

Test Case	Test Conditions	
	Configuration	Description
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.

6 Main Test Instruments

6.1 Current Test Project/Report

☒ 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	2018/05/17
☒	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	2018/12/21	2019/12/21
☐	DC Power Supply	KEITHLEY	2303	000381E	2018/05/21	2019/05/21
☐	DC Power Supply	KEITHLEY	2303	000510E	2018/05/21	2019/05/21
☐	DC Power Supply	KEITHLEY	2303	1342896	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	2019/03/01	2020/03/01
☐	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

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
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
Frequency Stability	Frequency Accuracy [Hz]	U=41.58Hz
Duty Cycle	Duty Cycle [%]	U=±2.06 %

8 Appendixes

Appendix No.	Description
SYBH(Z-RF)20190214006001-2003-A	Appendix for Bluetooth

END