



FCC

RF Test Report

Product Name: Smart Phone

Model Number: ELE-L29m/ELE-L09m

Report No.: SYBH(Z-RF)20190401022001-2005

FCC ID: QISELE-LX9M

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DATE	2019-05-05	2019-05-05

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MODIFICATION RECORD

No.	Report No	Modification Description
1	SYBH(Z-RF)20190401022001 -2005	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 <u>ELE-L29m</u>. 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.

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2 General Information

2.1 Test standard/s

Applied Rules :	47 CFR FCC Part 2, Subpart J 47 CFR FCC Part 15, Subpart C 47 CFR FCC Part 15, Subpart E
Test Method :	FCC KDB 789033 D02 General UNII Test Procedures New Rules v02 FCC KDB 662911 D01 Multiple Transmitter Output v02r01 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:	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.

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:	2019-04-15
Start of test:	2019-04-16
End of test:	2019-05-05

3 Test Summary

3.1 Measurement Technical Requirements

3.1.1 U-NII (5150-5250, 5250-5350, 5470-5725 MHz, 5725-5850)

Test Item	Band	FCC Rule No.	Requirements	Test Result	Verdict	Testing location
Emission Bandwidth	5150-5250	15.403(i) 15.407(a)(1)	No limit.	Refer to No. SYBH(Z-RF) 20190401017001-2005	Pass	Test Location 1
	5250-5350	15.403(i) 15.407(a)(2)				
	5470-5725	15.403(i) 15.407(a)(2)				
	5725-5850	15.403(i) 15.407(e)	≥ 500 kHz.			
Occupied Bandwidth	5150-5250	KDB 789033 D02 § D	No limit.	Refer to No. SYBH(Z-RF) 20190401017001-2005	Pass	Test Location 1
	5250-5350					
	5470-5725					
	5725-5850					
Duty Cycle	5150-5850	KDB 789033 D02 § B	No limit.	Refer to No. SYBH(Z-RF) 20190401017001-2005	Pass	Test Location 1
Maximum Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC: conducted < 250mW (avg during transmission)	Refer to No. SYBH(Z-RF) 20190401017001-2005		
	5250-5350	15.407(a)(2) 15.407(a)(4)	FCC:conducted <MIN{250mW,11dBm+10*lg(EBW)} (avg during transmission)			
	5470-5725	15.407(a)(2) 15.407(a)(4)	FCC: conducted <MIN{250mW,11dBm+10*lg(EBW)} (avg during transmission)			
	5725-5850	15.407(a)(3)	conducted < 1W (avg during transmission)			
maximum	5150-5250	15.407(a)(1)	FCC	Refer to No.		Test

Test Item	Band	FCC Rule No.	Requirements	Test Result	Verdict	Testing location
Power Spectral Density		15.407(a)(4)	conducted <11dBm/MHz (avg during transmission)	SYBH(Z-RF) 20190401017001-2005		Location 1
	5250-5350	15.407(a)(2) 15.407(a)(4)	conducted <11dBm/MHz (avg during transmission)			
	5470-5725	15.407(a)(2) 15.407(a)(4)	conducted <11dBm/MHz (avg during transmission)			
	5725-5850	15.407(a)(3) 15.407(a)(4)	conducted <30dBm/500KHz (avg during transmission)			
Frequency Stability	5150-5250 5250-5350 5470-5725 5725-5850	15.407(g)	FCC Part 15.407(g)	Refer to No. SYBH(Z-RF) 20190401017001-2005	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

ELE-L29m/ELE-L09m 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-L29m/ELE-L09m 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-L29m 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-L29m is dual SIM smart phone. ELE-L09m 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 difference between model **ELE-L04m** and model **ELE -L29m** is show in the below table:

	Model	ELE-L04m	ELE-L29m
Licensed Frequency	LTE BAND	FCC Band: B2/B4/ B5/B7/B12/B17/B26/B38/ B41(2535~2655MHz)/B66	FCC Band: B2/B4/ B5/B7/B12/B17/B26/B38/ B41(2535~2655MHz)
	UMTS BAND	the same	the same
	GSM	the same	the same
	IC	the same	the same
	Antenna	the same	the same
	NFC	the same	the same
Unlicensed Frequency	Bluetooth	the same	the same
	2.4G Wi-Fi	the same	the same
	5.8G Wi-Fi	the same	the same
	IC	the same	the same
	Antenna	the same	the same
Hardware	Ram / Rom	the same	the same
	Camera	the same	the same
	PCB	the same	the same
	USB Port	the same	the same
	SIM	one	two
	Hardware version	the same	the same
RF	RF circuit	The hardware channel of WCDMA B4 and LTE B2/4/7(include CA band) is different, Irrelevant to other frequency bands	The hardware channel of WCDMA B4 and LTE B2/4/7(include CA band) is different, Irrelevant to other frequency bands

Appearance	Dimension	the same	the same
	Color	different	different
Accessory	Battery	the same	the same
	External Charger	the same	the same
	USB label	the same	the same
	Earphone	the same	the same

Note1: Based on HW knowledge of the device design, we do not test 5G WLAN of ELE-L29m/ELE-L09m, all test data can refer to No. SYBH(Z-RF)20190401017001-2005 of ELE-L04m(FCC ID: QISELE-L04M).

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 (SP2C432E131R1P11)	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

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
			=== 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	
IEEE 802.11 WLAN Mode Supported	☒ 802.11a (20 MHz channel bandwidth), ☒ 802.11n (20 MHz channel bandwidth), ☒ 802.11n (40 MHz channel bandwidth), ☒ 802.11ac (20 MHz channel bandwidth), ☒ 802.11ac (40 MHz channel bandwidth), ☒ 802.11ac (80 MHz channel bandwidth), ☒ 802.11ac (160 MHz channel bandwidth),	
TX/RX Operating Range	All	$f_c = 5000 \text{ MHz} + N * 5 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, - N = "Channel Number".
	5150-5250 MHz (U-NII)	$N = 36$ to 48 with step of 4 for the 20 MHz channel bandwidth. $N = 38$ to 46 with step of 8 for the 40 MHz channel bandwidth. $N = 42$ for the 80 MHz channel bandwidth. $N = 50$ for the 160 MHz channel bandwidth
	5250-5350 MHz (U-NII)	$N = 52$ to 64 with step of 4 for the 20 MHz channel bandwidth. $N = 54$ to 62 with step of 8 for the 40 MHz channel bandwidth. $N = 58$ for the 80 MHz channel bandwidth.
	5470-5650 MHz (U-NII) (for FCC)	$N = 100$ to 128 with step of 4 for the 20 MHz channel bandwidth. $N = 102$ to 126 with step of 8 for the 40 MHz channel bandwidth. $N = 106$ to 122 with step of 16 for the 80 MHz channel bandwidth. $N = 114$ for the 160 MHz channel bandwidth.
	5650-5725 MHz (U-NII)	$N = 132$ to 140 with step of 4 for the 20 MHz channel bandwidth. $N = 134$ for the 40 MHz channel bandwidth.
	5725-5850MHz (U-NII)	$N = 149$ to 165 with step of 4 for the 20 MHz channel bandwidth. $N = 151$ to 159 with step of 8 for the 40 MHz channel bandwidth. $N = 155$ for the 80 MHz channel bandwidth.
Modulation Type	802.11a: BPSK/QPSK/16QAM/64QAM (OFDM).	
	802.11n: BPSK/QPSK/16QAM/64QAM (OFDM).	
	802.11ac: BPSK/QPSK/16QAM/64QAM/256QAM (OFDM).	
Emission Designator	U-NII(5150-5250, 5250-5350, 5470-5725, 5725-5850)	17M3G7D (for 802.11a mod), 18M1G7D (for 802.11n 20 MHz mode), 36M7G7D (for 802.11n 40 MHz mode), 18M1G7D (for 802.11ac 20 MHz mode) 36M7G7D (for 802.11ac 40 MHz mode) 75M6G7D (for 802.11ac 80 MHz mode) 155MG7D (for 802.11ac 160 MHz mode)
TX Power Control (TPC)	☐ Supported, ☒ Not Supported	
Equipment Type	☒ Stand-alone equipment, ☐ Plug-in radio device, ☐ Combined equipment	
Antenna	Description	Isotropic Antenna

Characteristics	Description	
	Type	☒ Integral (permanent fixed antenna, which may be built-in, designed as an indispensable part of EUT) ☐ Dedicated (removable antenna supplied with EUT, designed as an indispensable part of EUT)
	Ports	☒ Ant 1, ☒ Ant 2, ☐ Ant 3, ☐ Ant 4
	Smart System	☒ SISO (for 802.11a/n/ac), ☒ CDD (for 802.11a), 2 Tx & 2 Rx, ☒ MIMO (for 802.11a/ac), 2 Tx & 2 Rx, ☐ Diversity (for 802.11a/n/ac) : Tx & Rx
	Gain	Ant 1: -2.12 dBi (per antenna port, max.) Ant 2: -2.01 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). ☐ USB ☐ Other_____

5 General Test Conditions / Configurations

5.1 Test Modes

NOTE: Worst cases for each IEEE 802.11 mode are selected to perform tests.

Test Mode	Test Modes Description
11A	IEEE 802.11a with data rate of 6 Mbps using SISO mode.
11A CDD	IEEE 802.11a with data rate of 6 Mbps using CDD mode.
11N20	IEEE 802.11n with data rate of MCS0 and bandwidth of 20 MHz using SISO mode.
11N20m	IEEE 802.11n with data rate of MCS8 and bandwidth of 20 MHz using MIMO mode.
11N40	IEEE 802.11n with data rate of MCS0 and bandwidth of 40 MHz using SISO mode.
11N40m	IEEE 802.11n with data rate of MCS8 and bandwidth of 40 MHz using MIMO mode.
11AC20	IEEE 802.11ac with data rate of MCS0 and bandwidth of 20 MHz using SISO mode.
11AC20m	IEEE 802.11ac with data rate of MCS8 and bandwidth of 20 MHz using SISO mode.
11AC40	IEEE 802.11ac with data rate of MCS0 and bandwidth of 40 MHz using SISO mode.
11AC40m	IEEE 802.11ac with data rate of MCS8 and bandwidth of 40 MHz using MIMO mode.
11AC80	IEEE 802.11ac with data rate of MCS0 and bandwidth of 80 MHz using SISO mode.
11AC80m	IEEE 802.11ac with data rate of MCS8 and bandwidth of 80 MHz using MIMO mode.
11AC160	IEEE 802.11ac with data rate of MCS0 and bandwidth of 80 MHz using SISO mode.
11AC160m	IEEE 802.11ac with data rate of MCS8 and bandwidth of 80 MHz using MIMO mode.

5.2 EUT Configurations

5.2.1 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

5.2.2 Customized Configurations

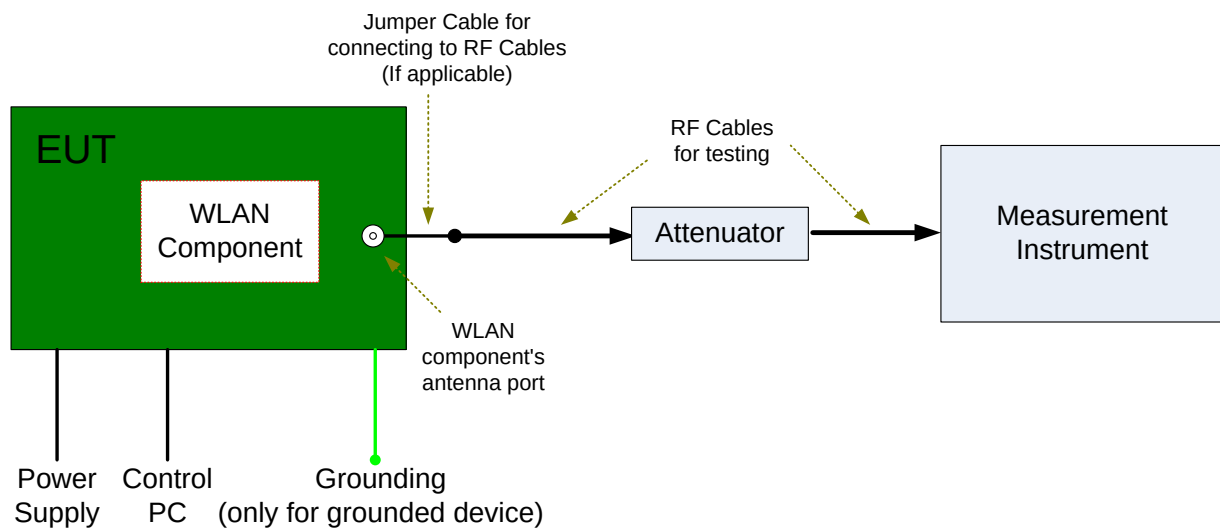
Test Mode	Antenna Port	Power Conf.,	Duty cycle [%]
11A	Ant 1	CH36/64/100149/453/157/161/165: 10 CH140: 9 Others:15.5	99.19
11A	Ant 2	CH36/64/100149/453/157/161/165: 10 CH140: 9 Others:15	99.19
11A	Ant 1+ Ant 2	CH36/64/100/149/153/157/161/165: 13 CH140: 12 Others:18.3	99.19
11N20	Ant 1	CH36/64/100149/153/157/161/165: 10 CH140: 9 Others:15.5	99.12
11N20	Ant 2	CH36/64/100/149/153/157/161/165: 10 CH140: 9 Others:15	99.12
11N20M	Ant 1+ Ant 2	CH36/64/100/149/153/157/161/165: 13 CH140: 12 Others:18.3	98.38
11N40	Ant 1	CH38/62/102/134: 8 CH151/159: 10 Others: 15	97.98
11N40	Ant 2	CH38/62/102/134: 8 CH151/159: 10 Others: 14.5	97.98
11N40M	Ant 1+ Ant 2	CH38/62/102/134: 11 CH151/159: 13 Others: 17.8	96.49
11AC20	Ant 1	CH36/64/100/149/153/157/161/165: 10 CH140: 9 Others:15.5	99.19
11AC20	Ant 2	CH36/64/100/149/153/157/161/165: 10 CH140: 9 Others:15	99.13
11AC20M	Ant 1+ Ant 2	CH36/64/100/149/153/157/161/165: 13 CH140: 12 Others:18.3	99.13
11AC40	Ant 1	CH38/62/102/134: 8 CH151/159: 10 Others: 15	97.99

11AC40	Ant 2	CH38/62/102/134: 8 CH151/159: 10 Others: 14.5	97.99
11AC40M	Ant 1+ Ant 2	CH38/62/102/134: 11 CH151/159: 13 Others: 17.8	98.16
11AC80	Ant 1	CH155: 10 Others: 8	96.24
11AC80	Ant 2	CH155: 10 Others: 8	96.24
11AC80M	Ant 1+ Ant 2	CH155: 13 Others: 11	96.24
11AC160	Ant 1	7.5	93.19
11AC160	Ant 2	7.5	93.19
11AC160M	Ant 1+ Ant 2	10.3	92.9

5.3 Test Setups

5.3.1 Test Setup 1

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



5.4 Test Conditions

Test Case	Test Conditions	
	Configuration	Description
Emission Bandwidth (EBW)	Meas. Method	FCC KDB 789033 D02 §C).
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Occupied Bandwidth (OBW)	Meas. Method	FCC KDB 789033 D02 §D).
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Maximum Conducted Output Power	Meas. Method	FCC KDB 789033 D02 §E)2)b) Method SA-1 and d) Method SA-2.
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Maximum Power Spectral Density	Meas. Method	FCC KDB 789033 D02 §F).
	Test Env.	TN/VN
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Frequency Stability	Meas. Method	15.407(g) Frequency Stability
	Test Env.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH of Rated Voltage at Ambient Climate.
	Test Setup	Test Setup 1
	EUT Conf.	Ch.36,Ch.165

6 Main Test Instruments

6.1 Current Test Project/Report

Main Test Equipments(BT/WIFI test system)					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal-Due
Spectrum Analyzer	Agilent	N9030A	MY49431698	2018/07/23	2019/07/23
DC Power Supply	KEITHLEY	2303	1342896	2018/10/24	2019/10/24

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 = 0.58 dB
RF Power Density, Conducted	Power [dBm]	U = 0.64 dB
Bandwidth	Magnitude [kHz]	20MHz: U=41.78kHz 40MHz: U=82.12kHz 80MHz: U=163.5kHz
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=82.24Hz
Duty Cycle	Duty Cycle [%]	U=±2.06 %

END