FCC
RF Test Report

Product Name: Mobile WiFi

Model Number: 801HW

Report No.: SYBH(Z-RF)20180926023001-2003

FCC ID：QIS801HW

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 China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.

2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01.

3. 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.

4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1.

5. 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.

6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

7. The test report is invalid if there is any evidence of erasure and/or falsification.

8. The test report is only valid for the test samples.

9. 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.

Applicant:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt Sample:	2018-10-25
Start Date of Test:	2018-10-29
End Date of Test:	2018-11-20

Test Result:	Pass

Approved by Senior Engineer:	2018-11-20	He Hao	He Hao
	Date	Name	Signature

Prepared by:	2018-11-20	ZhouLingbo	Zhou Ling bo
	Date	Name	Signature

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1 General Information

1.1 Applied Standard

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:	KDB 789033 D02 General UNII Test Procedures New Rules v02 FCC KDB 558074 D01 DTS Meas Guidance v04 ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices

1.2 Test Location

Test Location 1:	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address1:	No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park, Dongguan, Guangdong, P.R.C

1.3 Test Environment Condition

Temperature:	15 to 30 °C (Ambient)
Relative Humidity:	20 to 85 % (Ambient)
Atmospheric Pressure:	Not applicable

2 Test Summary

2.1 Measurement Technical Requirements

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

Test Item	Band	FCC Rule No.	Requirements	Test Result	Verdict
Emission Bandwidth	5150-5250	15.403(i) 15.407(a)(1)	No limit.	Appendix A	Pass
	5250-5350	15.403(i) 15.407(a)(2)			
	5470-5725	15.403(i) 15.407(a)(2)			
Occupied Bandwidth	5150-5250	KDB 789033 D02 § B	No limit.	Appendix B	Pass
	5250-5350				
	5470-5725				
Duty Cycle	5150-5725	--	No limit.	Appendix C	Pass
Maximum Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC: conducted < 250mW (avg during transmission)	Appendix D	
	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)		
maximum Power Spectral Density	5150-5250	15.407(a)(1) 15.407(a)(4)	FCC conducted <11dBm/MHz (avg during transmission)	Appendix E	
	5250-5350	15.407(a)(2) 15.407(a)(4)	conducted <11dBm/MHz (avg during transmission)		

Test Item	Band	FCC Rule No.	Requirements	Test Result	Verdict
	5470-5725	15.407(a)(2) 15.407(a)(4)	conducted <11dBm/MHz (avg during transmission)		
Frequency Stability	5150-5250 5250-5350 5470-5725	15.407(g)	an emission is maintained within the band of operation under all conditions	Appendix F	Pass

3 Description of the Equipment under Test (EUT)

3.1 General Description

801HW which supports LTE B2,B4,B12,B17,B25,B26,B41,And WCDMA HSDPA/HSUPA B2, B4, and CA. 801HW implement such functions as RF signal receiving/ transmitting, LTE/UMTS protocol processing, data service etc., and it can act as a Wi-Fi hotspot for user accessing to internet. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface. 801HW has 6 internal antennas as default Wi-Fi, diversity, and main antenna. The Wi-Fi is 2X2 and the frequency are 2.4GHz and 5GHz.

Note: Only 5G WIFI test data included in this report.

3.2 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.

3.2.1 Board

Board		
Description	Hardware Version	Software Version
Main Board	CL1SB08M	8.0.1.31(H60SP9C643)

3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Li-Polymer Battery	HB494590EBC-B	Huawei Technologies Co., Ltd.	Rated capacity: 3000mAh Nominal Voltage: ⎓ +3.8V

3.3 Technical Description

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),			
TX/RX Operating Range	All	fc = 5000 MHz + N * 5 MHz, where: - fc = “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.		
	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.		
	5470-5725 MHz (U-NII)	N = 100 to 140 with step of 4 for the 20 MHz channel bandwidth. N = 102 to 134 with step of 8 for the 40 MHz channel bandwidth. N = 106 to 122 with step of 16 for the 80 MHz channel bandwidth.		
Modulation Type	BPSK/QPSK/16QAM/64QAM (OFDM).			
Emission Designator	U-NII(5150-5250 , 5250-5350, 5470-5725,)	20M8G7D (for 802.11a mod), 20M4G7D (for 802.11n 20 MHz mode), 39M8G7D (for 802.11n 40 MHz mode), 20M3G7D (for 802.11ac 20 MHz mode) 39M9G7D (for 802.11ac 40 MHz mode) 103MG7D (for 802.11ac 80 MHz mode)		
TPC	☒ Supported, ☐ Not Supported			
Antenna	Description	Isotropic Antenna		
	Type	☐ External, ☒ Integrated		
	Ports	☒ Ant 1, ☒ Ant 2, ☐ Ant 3, ☐ Ant 4		
	Smart System	☒ SISO (for 802.11a/n/ac), ☒ MIMO (for 802.11n/ac), ☐ Diversity (for 802.11a) : Tx & Rx		
	Gain	ANT1:4.3 dBi (per antenna port, max.) ANT2:4.8 dBi(per antenna port, max.) MIMO&CDD:3.2 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	☒ AC/DC Adapter	☐ PoE:	☐ Other:

4 General Test Conditions / Configurations

4.1 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 date of MCS0 and bandwidth of 20 MHz using SISO mode.
11N20m	IEEE 802.11n with data date of MCS8 and bandwidth of 20 MHz using MIMO mode.
11N40	IEEE 802.11n with data date of MCS0 and bandwidth of 40 MHz using SISO mode.
11N40m	IEEE 802.11n with data date of MCS8 and bandwidth of 40 MHz using MIMO mode.
11AC20	IEEE 802.11ac with data date of MCS0 and bandwidth of 20 MHz using SISO mode.
11AC20m	IEEE 802.11ac with data date of MCS8 and bandwidth of 20 MHz using SISO mode.
11AC40	IEEE 802.11ac with data date of MCS0 and bandwidth of 40 MHz using SISO mode.
11AC40m	IEEE 802.11ac with data date of MCS8 and bandwidth of 40 MHz using MIMO mode.
11AC80	IEEE 802.11ac with data date of MCS0 and bandwidth of 80 MHz using SISO mode.
11AC80m	IEEE 802.11ac with data date of MCS8 and bandwidth of 80 MHz using MIMO mode.

4.2 EUT Configurations

4.2.1 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.

4.2.2 Customized Configurations

4.2.2.1 U-NII

Test Mode	Power Conf., per Port		**Duty cycle [%]**	
	ANT1	ANT2	ANT1	ANT2
11A	CH36:13 CH100:11 CH140:12.5 Others:13.5	CH36:13 CH100:11 CH140:12.5 Others:13.5	98.94	98.94
11A _CDD	CH36:15		98.94	98.94

Test Mode	Power Conf., per Port		Duty cycle [%]	
	CH100:13 CH140:14.5 Others:15.5			
11N_20M_SISO	CH140:10 Others:11	CH140:10 Others:11	98.86	98.86
11N_40M_SISO	CH38:10 CH62:8.5 CH102:8.5 Others:11	CH38:10 CH62:8.5 CH102:8.5 Others:11	96.64	96.64
11N_20M_MIMO	CH140:12 Others:13		98.07	98.07
11N_40M_MIMO	CH38:12 CH62:10.5 CH102:10.5 Others:13		97.31	97.31
11AC_20M_SISO	CH140:10 Others:11	CH140:10 Others:11	98.87	98.87
11AC_20M_MIMO	CH140:12 Others:13		98.09	98.09
11AC_40M_SISO	CH38:10 CH62:8.5 CH102:8.5 Others:11	CH38:10 CH62:8.5 CH102:8.5 Others:11	96.66	96.64
11AC_40M_MIMO	CH38:12 CH62:10.5 CH102:10.5 Others:13		97.33	97.33
11AC_80M_SISO	CH42:8 CH58:6 CH106:4 CH122:11	CH42:8 CH58:6 CH106:4 CH122:11	96.91	97.12
11AC_80M_MIMO	CH42:10 CH58:8 CH106:6 CH122:13		94.78	94.78

4.3 Test Environments

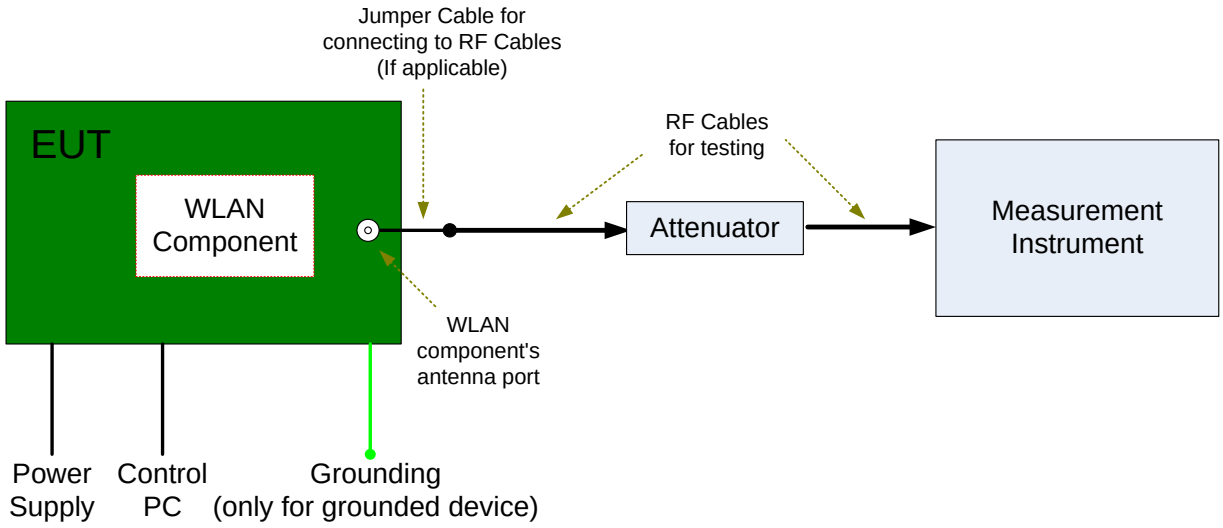
Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.45V
	VN	3.8V
	VH	4.25V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature

4.4 Test Setups

4.4.1 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.



4.5 Test Conditions

4.5.1 U-NII

Test Case	Test Conditions	
	Configuration	Description
Emission Bandwidth (EBW)	Meas. Method	FCC KDB 789033 D02 §C).
	Test Env.	NTNV
	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.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Maximum Conducted Output Power	Meas. Method	FCC KDB 789033 D02 §E)3) b)
	Test Env.	NTNV
	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.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	All EUT conf. with Tx modes.
Frequency Stability	Meas. Method	15.407(g) Frequence 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.140

5 Main Test Instruments

NOTE: Unless otherwise specified, the calibration intervals for test instruments were Annual (per year). The other intervals, if applicable, are marked with (##y), which denotes ## years calibration interval.

Test Address 1:

Main Test Equipments					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	1342889	2018/10/23	2019/10/22
Spectrum Analyzer	Agilent	N9030A	MY49431698	2018/7/23	2019/7/23
Signal generator	Agilent	E8257D	MY49281095	2018/7/23	2019/7/22
BT/WIFI test system	Tonscend	JS0806-2	188060102	2018/05/30	2019/05/29
Temperature Chamber	WEISS	WKL64	56246002940010	2017/12/13	2018/12/12

6 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
Frequency Stability	Frequency Accuracy [Hz]	U=82.24Hz
Duty Cycle	Duty Cycle [%]	U=±2.06 %

7 Appendixes

Appendix No.	Description
SYBH(Z-RF)20180926023001-2003-A	Appendix for 5 WLAN

END