

FCC

RF Test Report

Product Name: Mobile WiFi

Model Number: R226

Report No: SYBH(Z-RF)032052014-2003

FCC ID: QISR226

Reliability Laboratory of Huawei Technologies Co., Ltd.

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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 listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
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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: 2014-06-16
Start Date of Test: 2014-06-16
End Date of Test: 2014-06-23

Test Result: Pass

Approved by Senior Engineer:	2014-06-23	Liu Chunlin	
	Date	Name	Signature

Prepared by:	2014-06-23	Zhu Mingjing	
	Date	Name	Signature

CONTENT

1	General Information.....	5
1.1	Applied Standard.....	5
1.2	Test Location	5
1.3	Test Environment Condition.....	5
2	Test Summary	6
2.1	Measurement Technical Requirements.....	6
3	Description of the Equipment under Test (EUT).....	8
3.1	General Description	8
3.2	EUT Identity	8
3.3	Technical Description.....	9
4	General Test Conditions / Configurations.....	10
4.1	Test Modes	10
4.2	EUT Configurations.....	10
4.3	Test Environments	14
4.4	Test Setups.....	14
4.5	Test Conditions	17
5	Main Test Instruments	20

1 General Information

1.1 Applied Standard

Applied Rules:	47 CFR FCC Part 2, Subpart J 2013 47 CFR FCC Part 15, Subpart C 2013 47 CFR FCC Part 15, Subpart E 2013
Test Method:	FCC KDB 789033 D01 General UNII Test Procedures v01r03 FCC KDB 558074 D01 DTS Meas Guidance v03r01 FCC KDB 662911 D01 Multiple Transmitter Output v02 ANSI C63.10-2009, American National Standard for Testing Unlicensed Wireless Devices

1.2 Test Location

Test Location 1:	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, 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 (5150-5250MHz)

Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
Emission Bandwidth	5150-5250	15.403(i) 15.407(a)(1)	No limit.	Appendix A	Pass
Maximum Conducted Output Power	5150-5250	15.407(a)(1) 15.407(a)(4)	<MIN{17dBm, 4dBm+10*lg(EBW)} (avg during transmission)	Appendix B	Pass
Peak Power Spectral Density	5150-5250	15.407(a)(1) 15.407(a)(4)	<4dBm/MHz (avg during transmission)	Appendix C	
Band Edge Emissions	5150-5250	15.407(b)	<-27dBm/MHz PK e.i.r.p.	Appendix D	Pass
Peak Excursion Ratio	5150-5250	15.407(a)(6)	<13dB.	Appendix E	Pass
AC Power Line Conducted Emissions	5250-5350	15.407(b)(6) 15.207	§15.207/§7.2.4 limit.	Appendix F	Pass
Unwanted Emissions	5150-5250	15.407(b)(1) 15.407(b)(6) 15.407(b)(7) 15.209	- F<1GHz: §15.209/§7.2.5 limit (QP). - F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). - F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).	Appendix G	Pass (Note 1)
Note: This item is tested by Intertek.					

2.1.2 DTS (5725-5850 MHz)

Test Item	FCC Rule	Requirements	Test Result	Verdict
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz.	Appendix A	Pass
Maximum Peak Conducted Output Power	15.247(b)(3)	<30dBm-IF{G[dBi]>6dBi,G[dBi]-6dB,0dB}. (Peak)	Appendix B	Pass
Maximum Power Spectral Density Level	15.247(e)	<8dBm/3kHz-IF{G[dBi]>6dBi,G[dBi]-6dB,0dB}. (Peak)	Appendix C	Pass
Unwanted Emissions into Non-Restricted Frequency Bands	15.247(d)	<-20dBc/100kHz.	Appendix D	Pass
AC Power Line Conducted Emissions	15.207	§15.207/§7.2.4 limit.	Appendix E	Pass
Unwanted Emissions into Restricted Frequency Bands	15.247(d) 15.209 (NOTE 1)	§15.209/§7.2.5 limit.	Appendix F	Pass
NOTE 1: According to KDB 558074, 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. NOTE 2: This item is tested by Intertek.				

3 Description of the Equipment under Test (EUT)

3.1 General Description

R226 is a LTE/UMTS/GSM triple mode and 2*2 WiFi Wireless mobile WiFi; it can be used as a WiFi hotspot based on standard of IEEE802.11a/b/g/n/ac. It supports 2G GSM, 3G WCDMA and 4G LTE wireless internet accessing function. About 3G WCDMA wireless mode, it supports WCDMA and HSDPA/HSUPA/HSPA+/DC-HSPA+, operating in Band1 /2/5/8; and LTE, operating in Band3/5/7/20; and GSM mode supports EDGE/GPRS/GSM 1900MHz/1800MHz/850MHz/900MHz. The WiFi supports 2.4G 11b/g/n and 5G 11a/n/ac.

R226 supports 1Tx2Rx for WCDMA and LTE, WiFi supports 2Tx2Rx MIMO.

R226 supports carrier aggregation for LTE downlink from BS, the CA band is B3+B3, B3+B7, B3+B20, B7+B20 for VDF and B3+B3, B3+B5 for VHA by different software.

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		
Software Version	Hardware Version	Description
21.280.07.00.11	CL3E5786SM	Main Board

3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Adapter	HW-050200E3W	Huawei Technologies Co., Ltd.	NPUT:100-240V~50/60HZ 0.5A OUTPUT:5.0V  2.0A
Li-ion Battery	HB5P1H&24021135	Huawei Technologies Co., Ltd.	Rechargeable Battery,Li-polymer Battery, HB5P1H, 3.7V, 3Ah, Single Cell, Max 6*56*77.2mm, Embedded,Chinese-English-Spanish,Black Label, Terminal Dedicated
USB Cable	LSA00693 H09-000487	Huawei Technologies Co., Ltd.	Signal Cable,USB3.0 Data Cable,1m,USB3.0 AM-Customization Micro USB 5+6pin,Terminal Dedicated

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 4 for the 40 MHz channel bandwidth. N = 42 for the 80 MHz channel bandwidth.		
	5725-5850 MHz (DTS)	N = 149 to 165 with step of 4 for the 20 MHz channel bandwidth. N = 151 to 159 with step of 4 for the 40 MHz channel bandwidth. N = 155 for the 80 MHz channel bandwidth.		
Modulation Type	BPSK/QPSK/16QAM/64QAM (OFDM).			
Emission Designator	U-NII(5150-5250)	20M4G7D (for 802.11a mod), 21M2G7D (for 802.11n 20 MHz mode), 39M5G7D (for 802.11n 40 MHz mode), 21M2G7D (for 802.11ac 20 MHz mode) 39M6G7D (for 802.11ac 40 MHz mode) 81M3G7D (for 802.11ac 80 MHz mode)		
	DTS(5725-5850 MHz)	16M4G7D (for 802.11a mod), 17M8G7D (for 802.11n 20 MHz mode), 36M5G7D (for 802.11n 40 MHz mode), 17M8G7D (for 802.11ac 20 MHz mode) 36M5G7D (for 802.11ac 40 MHz mode) 76M4G7D (for 802.11ac 80 MHz mode)		
TPC	☒ Supported, ☐ Not Supported			
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): 2 Tx & 2 Rx, ☐ Diversity (for 802.11a) : Tx & Rx		
	Gain	Ant 1: 3.5 dBi, Ant 2: 2.5 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.
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 MIMO 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.

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	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Power Conf., per Port	Duty Cycle
11A	Ant 1	5180 (Ch.36)	---	10	71.43%
11A	Ant 2	5180 (Ch.36)	---	10	71.43%
11A	Ant 1	5200 (Ch.40)	---	10	71.43%
11A	Ant 2	5200 (Ch.40)	---	10	71.43%
11A	Ant 1	5240 (Ch.48)	---	10	71.43%

Test Mode	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Power Conf., per Port	Duty Cycle
11A	Ant 2	5240 (Ch.48)	---	10	71.43%
11N20	Ant 1	5180 (Ch.36)	---	10	69.84%
11N20	Ant 2	5180 (Ch.36)	---	10	69.84%
11N20m	Ant 1	5180 (Ch.36)	---	10	36.9%
11N20m	Ant 2	5180 (Ch.36)	---	10	36.9%
11N20	Ant 1	5200 (Ch.40)	---	10	69.84%
11N20	Ant 2	5200 (Ch.40)	---	10	69.84%
11N20m	Ant 1	5200 (Ch.40)	---	10	36.9%
11N20m	Ant 2	5200 (Ch.40)	---	10	36.9%
11N20	Ant 1	5240 (Ch.48)	---	10	69.84%
11N20	Ant 2	5240 (Ch.48)	---	10	69.84%
11N20m	Ant 1	5240 (Ch.48)	---	10	36.9%
11N20m	Ant 2	5240 (Ch.48)	---	10	36.9%
11N40	Ant 1	5190 (Ch.38)	---	10	56.39%
11N40	Ant 2	5190 (Ch.38)	---	10	56.39%
11N40m	Ant 1	5190 (Ch.38)	---	10	47.11%
11N40m	Ant 2	5190 (Ch.38)	---	10	47.11%
11N40	Ant 1	5230 (Ch.46)	---	10	56.39%
11N40	Ant 2	5230 (Ch.46)	---	10	56.39%
11N40m	Ant 1	5230 (Ch.46)	---	10	47.11%
11N40m	Ant 2	5230 (Ch.46)	---	10	47.11%
11AC20	Ant 1	5180 (Ch.36)	---	11	66.69%
11AC20	Ant 2	5180 (Ch.36)	---	11	66.69%
11N40m	Ant 1	5180 (Ch.36)	---	11	55.41%
11N40m	Ant 2	5180 (Ch.36)	---	11	55.41%
11AC20	Ant 1	5200 (Ch.40)	---	11	66.69%
11AC20	Ant 2	5200 (Ch.40)	---	11	66.69%
11AC20m	Ant 1	5200 (Ch.40)	---	11	55.41%
11AC20m	Ant 2	5200 (Ch.40)	---	11	55.41%
11AC20	Ant 1	5220 (Ch.48)	---	11	66.69%
11AC20	Ant 2	5220 (Ch.48)	---	11	66.69%
11AC20m	Ant 1	5220 (Ch.48)	---	11	55.41%
11AC20m	Ant 2	5220 (Ch.48)	---	11	55.41%
11AC40	Ant 1	5190 (Ch.38)	---	11	53.03%
11AC40	Ant 2	5190 (Ch.38)	---	11	53.03%

Test Mode	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Power Conf., per Port	Duty Cycle
11AC20m	Ant 1	5190 (Ch.38)	---	11	44.93%
11AC20m	Ant 2	5190 (Ch.38)	---	11	44.93%
11AC40	Ant 1	5230 (Ch.46)	---	11	53.03%
11AC40	Ant 2	5230 (Ch.46)	---	11	53.03%
11AC40m	Ant 1	5230 (Ch.46)	---	11	44.93%
11AC40m	Ant 2	5230 (Ch.46)	---	11	44.93%
11AC80	Ant 1	5210 (Ch.42)	---	11	41.59%
11AC80	Ant 2	5210 (Ch.42)	---	11	41.59%
11AC80m	Ant 1	5210 (Ch.42)	---	11	44.9%
11AC80m	Ant 2	5210 (Ch.42)	---	11	44.9%

4.2.2.2 DTS

Test Mode	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Power Conf., per Port	Duty Cycle
11A	Ant 1	5745 (Ch.149)	---	10	71.43%
11A	Ant 2	5745 (Ch.149)	---	10	71.43%
11A	Ant 1	5785 (Ch.157)	---	10	71.43%
11A	Ant 2	5785 (Ch.157)	---	10	71.43%
11A	Ant 1	5825 (Ch.165)	---	10	71.43%
11A	Ant 2	5825 (Ch.165)	---	10	71.43%
11N20	Ant 1	5745 (Ch.149)	---	10	69.31%
11N20	Ant 2	5745 (Ch.149)	---	10	69.31%
11N20m	Ant 1	5745 (Ch.149)	---	10	55.36%
11N20m	Ant 2	5745 (Ch.149)	---	10	55.36%
11N20	Ant 1	5785 (Ch.157)	---	10	69.31%
11N20	Ant 2	5785 (Ch.157)	---	10	69.31%
11N20m	Ant 1	5785 (Ch.157)	---	10	55.36%
11N20m	Ant 2	5785 (Ch.157)	---	10	55.36%
11N20	Ant 1	5825 (Ch.165)	---	10	69.31%
11N20	Ant 2	5825 (Ch.165)	---	10	69.31%
11N20m	Ant 1	5825 (Ch.165)	---	10	55.36%
11N20m	Ant 2	5825 (Ch.165)	---	10	55.36%
11N40	Ant 1	5755(Ch.151)	---	10	56.23%
11N40	Ant 2	5755(Ch.151)	---	10	56.23%

Test Mode	Antenna Port	TX Freq. [MHz]	RX Freq. [MHz]	Power Conf., per Port	Duty Cycle
11N40m	Ant 1	5755(Ch.151)	---	10	46.78%
11N40m	Ant 2	5755(Ch.151)	---	10	46.78%
11N40	Ant 1	5795(Ch.159)	---	10	56.23%
11N40	Ant 2	5795(Ch.159)	---	10	56.23%
11N40m	Ant 1	5795(Ch.159)	---	10	46.78%
11N40m	Ant 2	5795(Ch.159)	---	10	46.78%
11AC20	Ant 1	5745 (Ch.149)	---	11	66.67%
11AC20	Ant 2	5745 (Ch.149)	---	11	66.67%
11AC20m	Ant 1	5745 (Ch.149)	---	11	55.36%
11AC20m	Ant 2	5745 (Ch.149)	---	11	55.36%
11AC20	Ant 1	5785 (Ch.157)	---	11	66.67%
11AC20	Ant 2	5785 (Ch.157)	---	11	66.67%
11AC20m	Ant 1	5785 (Ch.157)	---	11	55.36%
11AC20m	Ant 2	5785 (Ch.157)	---	11	55.36%
11AC20	Ant 1	5825 (Ch.165)	---	11	66.67%
11AC20	Ant 2	5825 (Ch.165)	---	11	66.67%
11AC20m	Ant 1	5825 (Ch.165)	---	11	55.36%
11AC20m	Ant 2	5825 (Ch.165)	---	11	55.36%
11AC40	Ant 1	5755(Ch.151)	---	11	53.11%
11AC40	Ant 2	5755(Ch.151)	---	11	53.11%
11AC40m	Ant 1	5755(Ch.151)	---	11	44.51%
11AC40m	Ant 2	5755(Ch.151)	---	11	44.51%
11AC40	Ant 1	5795(Ch.159)	---	11	53.11%
11AC40	Ant 2	5795(Ch.159)	---	11	53.11%
11AC40m	Ant 1	5795(Ch.159)	---	11	44.51%
11AC40m	Ant 2	5795(Ch.159)	---	11	44.51%
11AC80	Ant 1	5775 (Ch.155)	---	11	41.81%
11AC80	Ant 2	5775 (Ch.155)	---	11	41.81%
11AC80m	Ant 1	5775 (Ch.155)	---	11	41.87%
11AC80m	Ant 2	5775 (Ch.155)	---	11	41.87%

4.3 Test Environments

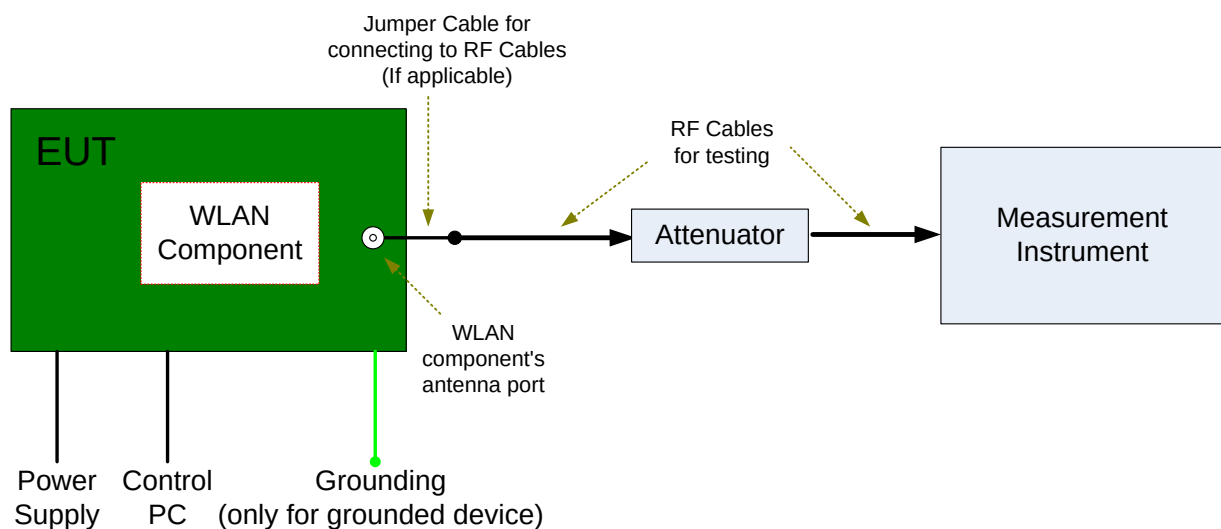
NOTE: The values used in the test report may be stringent than the declared.

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
NTNV	Ambient	3.7 VDC	Ambient

4.4 Test Setups

4.4.1 Test Setup 1

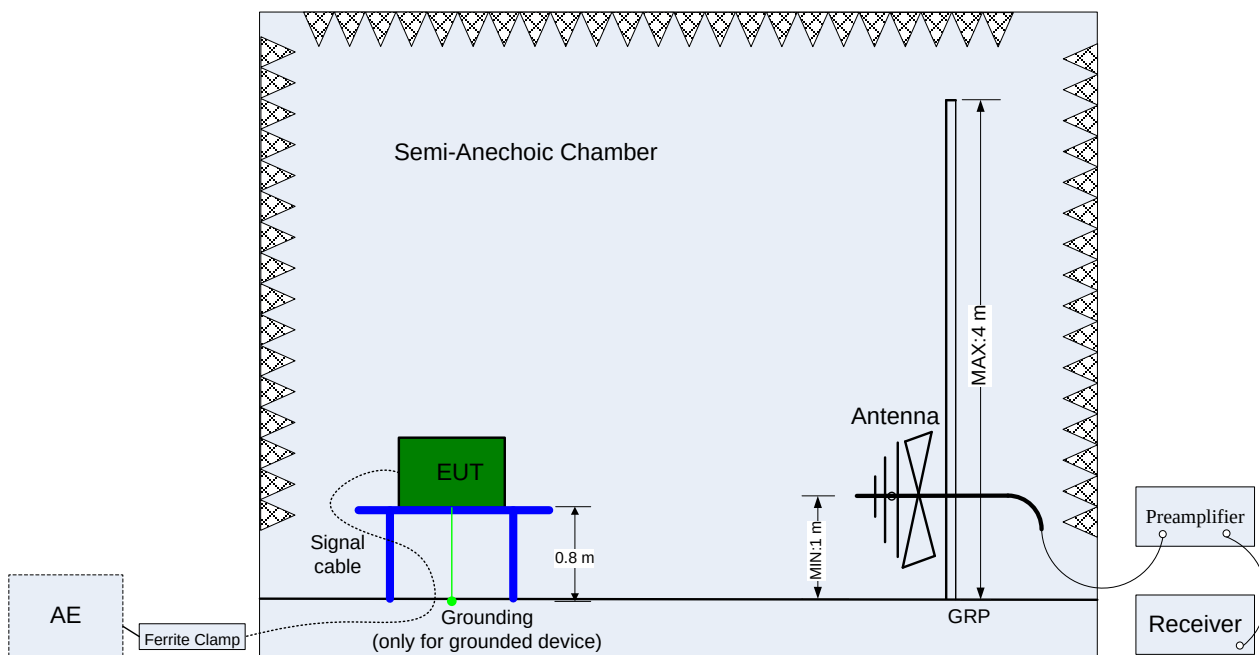
The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



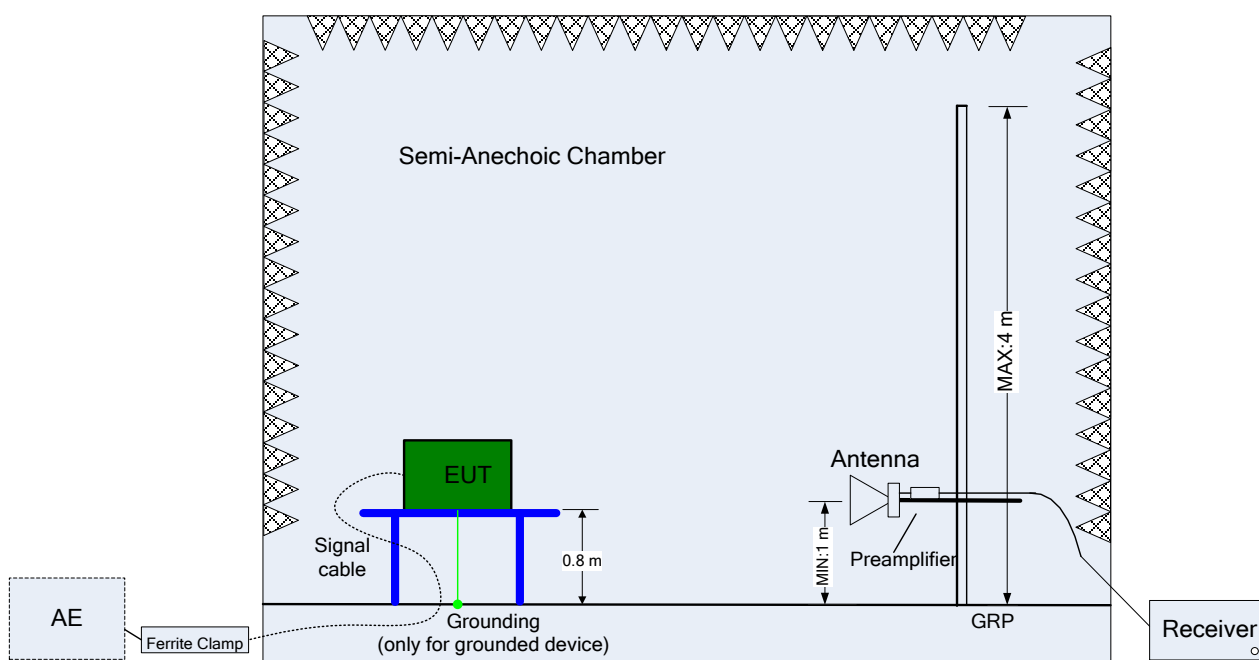
4.4.2 Test Setup 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3 m (for 30 MHz to 26.5 GHz) or 1 m (for 26.5 GHz to 40 GHz). The setup is according to ANSI C63.10, 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)

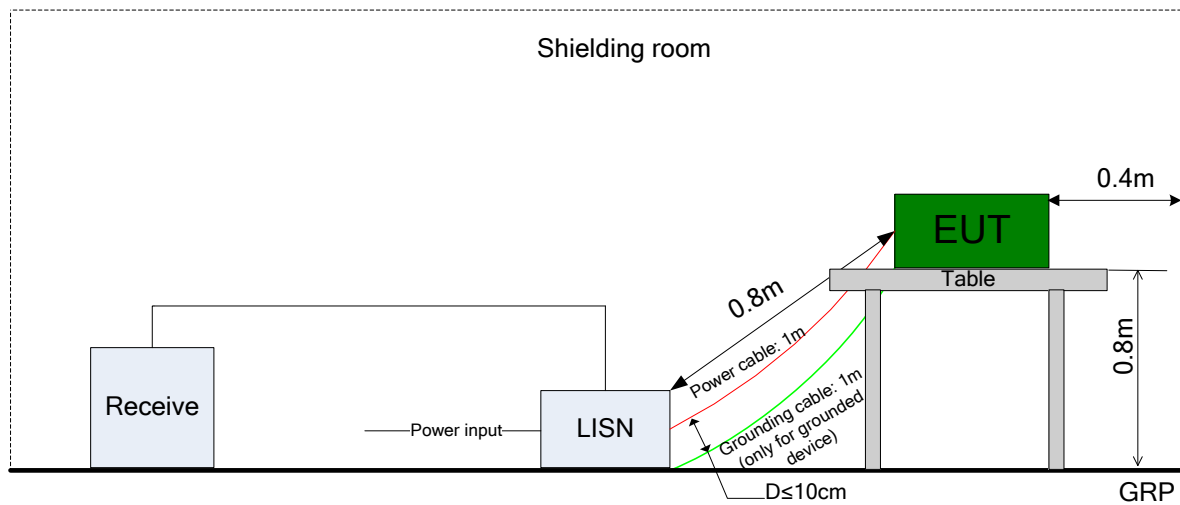


(Above 1 GHz)

4.4.3 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.



4.5 Test Conditions

4.5.1 U-NII

Test Case	Test Conditions		
	Configuration	Description	
26 dB Emission Bandwidth (EBW)	Meas. Method	FCC KDB 789033 §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 §C)3)b) Method SA-1 and d) Method SA-2.	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	All EUT conf. with Tx modes.	
Peak Power Spectral Density	Meas. Method	FCC KDB 789033 §E).	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	All EUT conf. with Tx modes.	
Peak Excursion Ratio	Meas. Method	FCC KDB 789033 §F).	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	All EUT conf. with Tx modes.	
Unwanted Emissions (Cond.)	Meas. Method	FCC KDB 789033 §G), Conducted (antenna-port). NOTE: Antenna-port conducted measurements (Cond.) are acceptable as an alternative to radiated measurements (Rad.) 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 (Rad-a) for cabinet/case emissions will also be required.	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	5150-5250	All EUT Test Mode 20 MHz bandwidth: Ch.36, Ch.48 40 MHz bandwidth: Ch.38, Ch.46 80 MHz bandwidth: Ch.42
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.	NTNV	
	Test Setup	Test Setup 3	
	EUT Conf.	11A_Ch.100 (Worst Conf.)	

4.5.2 DTS

Configuration	Description
DTS (6 dB) Bandwidth	
Test Method	FCC KDB 558074, §8.1 Option 1.
Test Env.	NTNV
Test Setup	Test Setup 1
EUT Conf.	All EUT conf. with Tx modes.
Remark	For measurements on EUT with multiple transmit chains, the test is performed at each chain, and is used as respective result for each chain.
Maximum Peak Conducted Output Power	
Test Method	FCC KDB 558074, §9.1.2 Integrated Band Power Method.
Test Env.	NTNV
Test Setup	Test Setup 1
EUT Conf.	All EUT conf. with Tx modes.
Remark	For measurements on EUT with multiple transmit chains, the test is performed at each chain (respectively as Ant 1, Ant 2, ..., Ant N) and then combined into the final result (as Ant Sum) to compare with the limit. The result for Ant Sum equals the linear power sum of results for Ant 1 to Ant N (the N denotes the antenna chains used by EUT antenna systems).
Maximum Power Spectral Density Level	
Test Method	FCC KDB 558074, §10.2 Method PKPSD (Peak PSD).
Test Env.	NTNV
Test Setup	Test Setup 1
EUT Conf.	All EUT conf. with Tx modes.
Remark	For measurements on EUT with multiple transmit chains, the test is performed at each chain (respectively as Ant 1, Ant 2, ..., Ant N) and then combined into the final result (as Ant Sum) to compare with the limit. The result for Ant Sum equals the linear power sum of results for Ant 1 to Ant N (the N denotes the antenna chains used by smart antenna systems). However, it is should be noted that the method is a stringent but convenient consideration, because the measured maximum value for each chain may be located at different frequency occurrence. For the ultimate judgment, the combination of the final result (Trace Sum) should be performed frequency-by-frequency on the measured spectrum trace for each chain (Trace 1, Trace 2, ..., Trace N). Unless otherwise specified, the method for ultimate judgment will not be used.
Unwanted Emissions into Non-Restricted Frequency Bands	
Test Method	FCC KDB 558074, §11 (Peak-based).
Test Env.	NTNV
Test Setup	Test Setup 1
EUT Conf.	All EUT conf. with Tx modes.
Remark	- For measurements on EUT with multiple transmit chains, the test is performed at each chain and used as respective results for each chain, due to the relative-limit requirement. - In the result table, the "Pref", which is used as the reference level, refers to the peak power level in any 100 kHz bandwidth within the fundamental emission, and the "Puw" refers to the

Configuration	Description
	maximum emission power in 100 kHz band segments outside of the authorized frequency band. ● In the result table, the "< Limit" denotes that "The P_{uw} [dBm] is less than P_{ref} [dBm] – 20 [dB], see test plots for detailed".
AC Power Line Conducted Emissions	
Test Method	AC mains conducted. Pre.: RBW=10 kHz; Det.=Peak. Final: RBW=9 kHz; Det.=CISPR Quasi-Peak & Average.
Test Env.	NTNV
Test Setup	Test Setup 3
EUT Conf.	11N20_ Ch.149 (Worse conf.),
Remark	(void)

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.

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	1288003	2012-11-19	2014-11-18
Wireless Communication Test set	Agilent	N4010A	MY49081592	2013-10-29	2014-10-28
Universal Radio Communication Tester	R&S	CMU200	113164	2013-07-18	2014-07-17
Universal Radio Communication Tester	R & S	CMW500	126855	2013-08-08	2015-08-09
Spectrum Analyzer	Agilent	E4440A	MY48250119	2013-08-09	2014-08-08
Signal Analyzer	R&S	FSQ31	200021	2013-10-29	2014-10-28
Spectrum Analyzer	Agilent	N9030A	MY49431698	2013-10-29	2014-10-28
Temperature Chamber	WEISS	WKL64	56246002940010	2014-02-25	2015-02-24
Temperature Chamber	ESPEC	MW3030	06114003	2014-05-09	2015-05-08
Signal generator	Agilent	E8257D	MY51500314	2014-05-09	2015-05-08
Vector Signal Generator	R&S	SMU200A	104162	2013-10-29	2014-10-28
Test receiver	R&S	ESU26	100150	2014-05-09	2015-05-08
Spectrum analyzer	R&S	FSU3	200474	2013-12-24	2014-12-23
Spectrum analyzer	R&S	FSU43	100144	2013-12-24	2014-12-23
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2013-02-02	2015-02-01
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-490	2013-02-02	2015-02-01
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100262	2013-03-23	2015-03-22
Pyramidal Horn Antenna(18GHz-26-5GHz)	ETS-LINDGREN	3160-09	5140299	2013-03-05	2015-03-04
Artificial Mains Network	R&S	ENV4200	100134	2013-12-24	2014-12-23
Artificial Mains Network	R&S	ENV216	100382	2013-12-24	2014-12-23

END