



FCC RF Test Report

Product Name: Mobile WiFi

Model Number: HWD31

Report No: SYBH(Z-RF)035102014-2004

FCC ID: QISHWD31

Reliability Laboratory 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 listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number is 97456.
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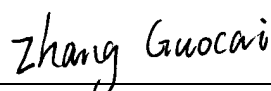


Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt Sample: 2014-11-28
Start Date of Test: 2014-11-28
End Date of Test: 2014-12-08

Test Result: Pass

Approved by Senior Engineer:	2014-12-11	Liu Chunlin	
	Date	Name	Signature

Prepared by:	2014-12-11	Zhang Guocai	
	Date	Name	Signature

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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 (5150-5250, 5250-5350, 5470-5725 MHz)

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
	5250-5350	15.403(i) 15.407(a)(2)			
	5470-5725	15.403(i) 15.407(a)(2)			
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
	5250-5350	15.407(a)(2) 15.407(a)(4)	<MIN{24dBm,11dBm+10*lg(EBW)} (avg during transmission)		
	5470-5725	15.407(a)(2) 15.407(a)(4)	<MIN{24dBm,11dBm+10*lg(EBW)} (avg during transmission)		
Peak Power Spectral Density	5150-5250	15.407(a)(1) 15.407(a)(4)	<4dBm/MHz (avg during transmission)	Appendix C	
	5250-5350	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)		
	5470-5725	15.407(a)(2) 15.407(a)(4)	<11dBm/MHz (avg during transmission)		
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 E (NOTE 1)	Pass
	5250-5350	15.407(b)(2) 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. 5.25-5.35 GHz). - F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		



Test Item	Band	FCC Rule	Requirements	Test Result	Verdict
	5470-5725	15.407(b)(3) 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. 5.47-5.725 GHz). - F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		
Peak Excursion Ratio	5150-5250 5250-5350 5470-5725	15.407(a)(6)	<13dB.	Appendix D	Pass
	5250-5350	15.407(b)(6) 15.207	§15.207/§7.2.4 limit.	Appendix F	Pass
					5470-5725

3 Description of the Equipment under Test (EUT)

3.1 General Description

HWD31 is a LTE/UMTS 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 3G WCDMA and 4G FDD/TDD LTE wireless internet accessing function. About 3G WCDMA wireless mode, it supports WCDMA and HSDPA/HSUPA/HSPA+/DC-HSPA+, operating in Band1 、Band2、Band5 ； and the 4G LTE, operating in Band11、Band3、Band18、Band17、Band41.The WiFi is 2X2 and the frequency are 2.4GHz/5GHz.

HWD31 supports 1Tx2Rx for 3G WCDMA and 4G LTE, WiFi only supports 2Tx2Rx.

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
Main Board	CL1KD02UM	11.411.03.05.824

3.2.2 Sub-Assembly

Name	Manufacture	Description
Adapter	Huawei Technologies Co., Ltd.	Model:HW-050200U3W Adapter,-10degC,45degC,100V,240V,5.0V/2.0 A,UL 2PIN,DC USB 2.0,DOE V,PSE,DOCO MO LOGO, white, Terminal Dedicated
Rechargeable Li	Huawei Technologies Co., Ltd.	Battery Model: HB414790EBW Rechargeable Battery, Li-polymer Battery,HB 414790EBW,3.8V,2.3Ah,Single Cell,MAX4.03* 46.54*90mm
USB Cable(Black)	Huawei Technologies Co., Ltd.	Terminal Accessory, Data Cable, Usb A Male to Micro Usb 120cm ,Black no Braid 360 Degree Rotate Test Standard ,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.		
	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 4 for the 40 MHz channel bandwidth. N = 58 for the 80 MHz channel bandwidth.		
	5470-5600 MHz (U-NII)	N = 100 to 116 with step of 4 for the 20 MHz channel bandwidth. N = 102 to 110 with step of 4 for the 40 MHz channel bandwidth. N = 106 for the 80 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.		
Modulation Type	BPSK/QPSK/16QAM/64QAM (OFDM).			
Emission Designator	U-NII(5150-5250 , 5250-5350, 5470-5725)	19M6G7D (for 802.11a mod), 21M4G7D (for 802.11n 20 MHz mode), 43M3G7D (for 802.11n 40 MHz mode), 21M2G7D (for 802.11ac 20 MHz mode) 43M4G7D (for 802.11ac 40 MHz mode) 83M8G7D (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), ☐ Diversity (for 802.11a) : Tx & Rx		
	Gain	2.58 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 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.

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	Test Channel	Frequency[MHz]	Antenna Port	Duty Cycle
11A	36	5180	Ant 1	94.5%
11A	36	5180	Ant 2	94.5%
11A	40	5200	Ant 1	94.5%
11A	40	5200	Ant 2	94.5%



11A	48	5240	Ant 1	94.5%
11A	48	5240	Ant 2	94.5%
11A	52	5260	Ant 1	94.5%
11A	52	5260	Ant 2	94.5%
11A	56	5280	Ant 1	94.5%
11A	56	5280	Ant 2	94.5%
11A	64	5320	Ant 1	94.5%
11A	64	5320	Ant 2	94.5%
11A	100	5500	Ant 1	94.5%
11A	100	5500	Ant 2	94.5%
11A	116	5580	Ant 1	94.5%
11A	116	5580	Ant 2	94.5%
11A	140	5700	Ant 1	94.5%
11A	140	5700	Ant 2	94.5%
11N20	36	5180	Ant 1	95%
11N20	36	5180	Ant 2	95%
11N20M	36	5180	Ant 1	90%
11N20M	36	5180	Ant 2	90%
11N20	40	5200	Ant 1	95%
11N20	40	5200	Ant 2	95%
11N20M	40	5200	Ant 1	90%
11N20M	40	5200	Ant 2	90%
11N20	48	5240	Ant 1	95%
11N20	48	5240	Ant 2	95%
11N20M	48	5240	Ant 1	90%
11N20M	48	5240	Ant 2	90%
11N20	52	5260	Ant 1	95%
11N20	52	5260	Ant 2	95%
11N20M	52	5260	Ant 1	90%
11N20M	52	5260	Ant 2	90%
11N20	56	5280	Ant 1	95%
11N20	56	5280	Ant 2	95%
11N20M	56	5280	Ant 1	90%
11N20M	56	5280	Ant 2	90%
11N20	64	5320	Ant 1	95%
11N20	64	5320	Ant 2	95%
11N20M	64	5320	Ant 1	90%
11N20M	64	5320	Ant 2	90%
11N20	100	5500	Ant 1	95%



11N20	100	5500	Ant 2	95%
11N20M	100	5500	Ant 1	90%
11N20M	100	5500	Ant 2	90%
11N20	116	5580	Ant 1	95%
11N20	116	5580	Ant 2	95%
11N20M	116	5580	Ant 1	90%
11N20M	116	5580	Ant 2	90%
11N20	140	5700	Ant 1	95%
11N20	140	5700	Ant 2	95%
11N20M	140	5700	Ant 1	90%
11N20M	140	5700	Ant 2	90%
11N40	38	5190	Ant 1	87%
11N40	38	5190	Ant 2	87%
11N40M	38	5190	Ant 1	79%
11N40M	38	5190	Ant 2	79%
11N40	46	5230	Ant 1	87%
11N40	46	5230	Ant 2	87%
11N40M	46	5230	Ant 1	79%
11N40M	46	5230	Ant 2	79%
11N40	54	5270	Ant 1	87%
11N40	54	5270	Ant 2	87%
11N40M	54	5270	Ant 1	79%
11N40M	54	5270	Ant 2	79%
11N40	62	5310	Ant 1	87%
11N40	62	5310	Ant 2	87%
11N40M	62	5310	Ant 1	79%
11N40M	62	5310	Ant 2	79%
11N40	102	5510	Ant 1	87%
11N40	102	5510	Ant 2	87%
11N40M	102	5510	Ant 1	79%
11N40M	102	5510	Ant 2	79%
11N40	110	5550	Ant 1	87%
11N40	110	5550	Ant 2	87%
11N40M	110	5550	Ant 1	79%
11N40M	110	5550	Ant 2	79%
11N40	134	5670	Ant 1	87%
11N40	134	5670	Ant 2	87%
11N40M	134	5670	Ant 1	79%
11N40M	134	5670	Ant 2	79%
11AC20	36	5180	Ant 1	95%
11AC20	36	5180	Ant 2	95%



11AC20M	36	5180	Ant 1	94%
11AC20M	36	5180	Ant 2	94%
11AC20	40	5200	Ant 1	95%
11AC20	40	5200	Ant 2	95%
11AC20M	40	5200	Ant 1	94%
11AC20M	40	5200	Ant 2	94%
11AC20	48	5240	Ant 1	95%
11AC20	48	5240	Ant 2	95%
11AC20M	48	5240	Ant 1	94%
11AC20M	48	5240	Ant 2	94%
11AC20	52	5260	Ant 1	95%
11AC20	52	5260	Ant 2	95%
11AC20M	52	5260	Ant 1	94%
11AC20M	52	5260	Ant 2	94%
11AC20	56	5280	Ant 1	95%
11AC20	56	5280	Ant 2	95%
11AC20M	56	5280	Ant 1	94%
11AC20M	56	5280	Ant 2	94%
11AC20	64	5320	Ant 1	95%
11AC20	64	5320	Ant 2	95%
11AC20M	64	5320	Ant 1	94%
11AC20M	64	5320	Ant 2	94%
11AC20	100	5500	Ant 1	95%
11AC20	100	5500	Ant 2	95%
11AC20M	100	5500	Ant 1	94%
11AC20M	100	5500	Ant 2	94%
11AC20	116	5580	Ant 1	95%
11AC20	116	5580	Ant 2	95%
11AC20M	116	5580	Ant 1	94%
11AC20M	116	5580	Ant 2	94%
11AC20	140	5700	Ant 1	95%
11AC20	140	5700	Ant 2	95%
11AC20M	140	5700	Ant 1	94%
11AC20M	140	5700	Ant 2	94%
11AC40	38	5190	Ant 1	87%
11AC40	38	5190	Ant 2	87%
11AC40M	38	5190	Ant 1	79%
11AC40M	38	5190	Ant 2	79%
11AC40	46	5230	Ant 1	87%
11AC40	46	5230	Ant 2	87%
11AC40M	46	5230	Ant 1	79%



11AC40M	46	5230	Ant 2	79%
11AC40	54	5270	Ant 1	87%
11AC40	54	5270	Ant 2	87%
11AC40M	54	5270	Ant 1	79%
11AC40M	54	5270	Ant 2	79%
11AC40	62	5310	Ant 1	87%
11AC40	62	5310	Ant 2	87%
11AC40M	62	5310	Ant 1	79%
11AC40M	62	5310	Ant 2	79%
11AC40	102	5510	Ant 1	87%
11AC40	102	5510	Ant 2	87%
11AC40M	102	5510	Ant 1	79%
11AC40M	102	5510	Ant 2	79%
11AC40	110	5550	Ant 1	87%
11AC40	110	5550	Ant 2	87%
11AC40M	110	5550	Ant 1	79%
11AC40M	110	5550	Ant 2	79%
11AC40	134	5670	Ant 1	87%
11AC40	134	5670	Ant 2	87%
11AC40M	134	5670	Ant 1	79%
11AC40M	134	5670	Ant 2	79%
11AC80	42	5210	Ant 1	67%
11AC80	42	5210	Ant 2	67%
11AC80	58	5290	Ant 1	65%
11AC80	58	5290	Ant 2	65%
11AC80	106	5530	Ant 1	67%
11AC80	106	5530	Ant 2	67%
11AC80M	42	5210	Ant 1	65%
11AC80M	42	5210	Ant 2	65%
11AC80M	58	5290	Ant 1	67%
11AC80M	58	5290	Ant 2	67%
11AC80M	106	5530	Ant 1	65%
11AC80M	106	5530	Ant 2	65%

4.3 Test Environments

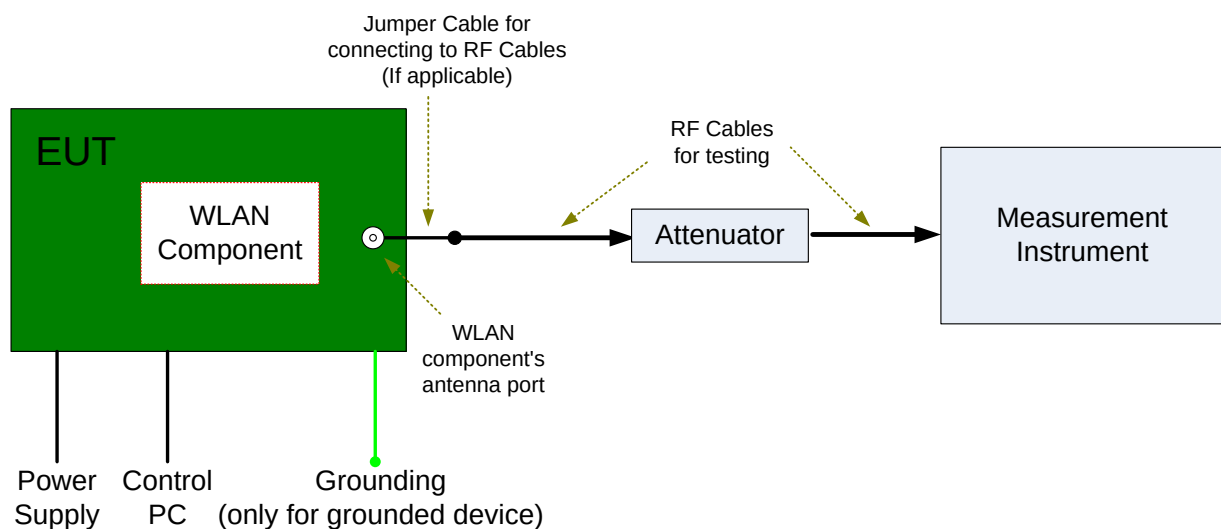
NOTE: The values used in the test report may be stringent than the declared.

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
NTNV	Ambient	3.8 VDC	Ambient

4.4 Test Setups

4.4.1 Test Setup 1

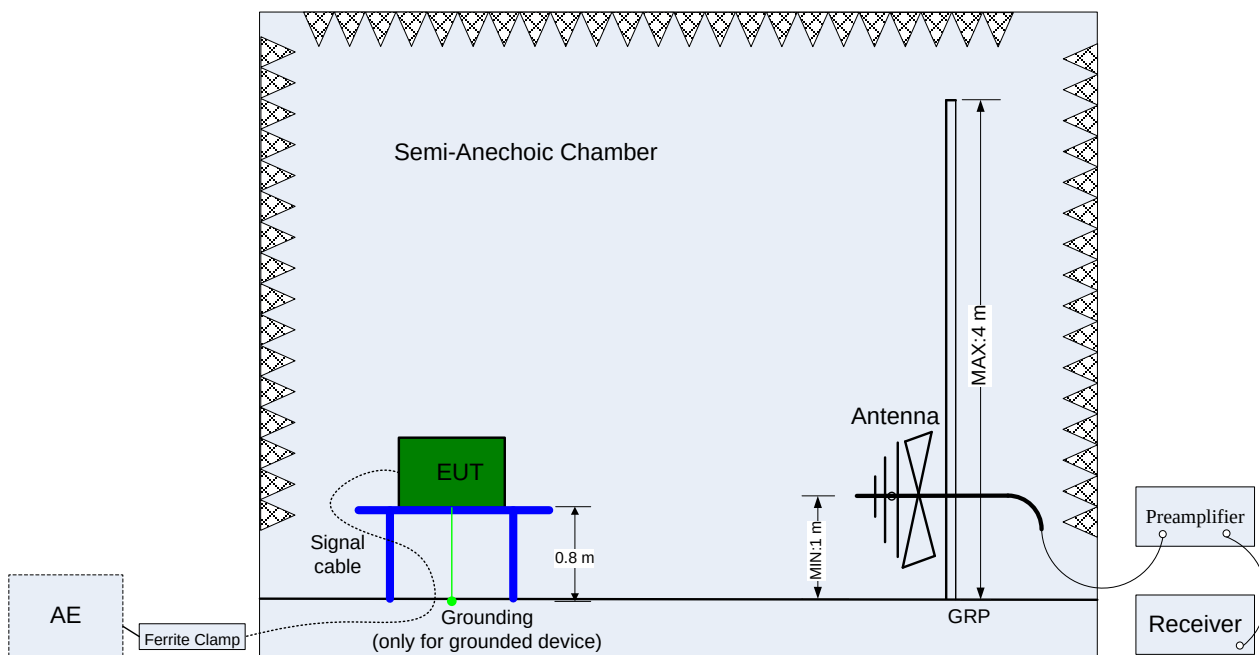
The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



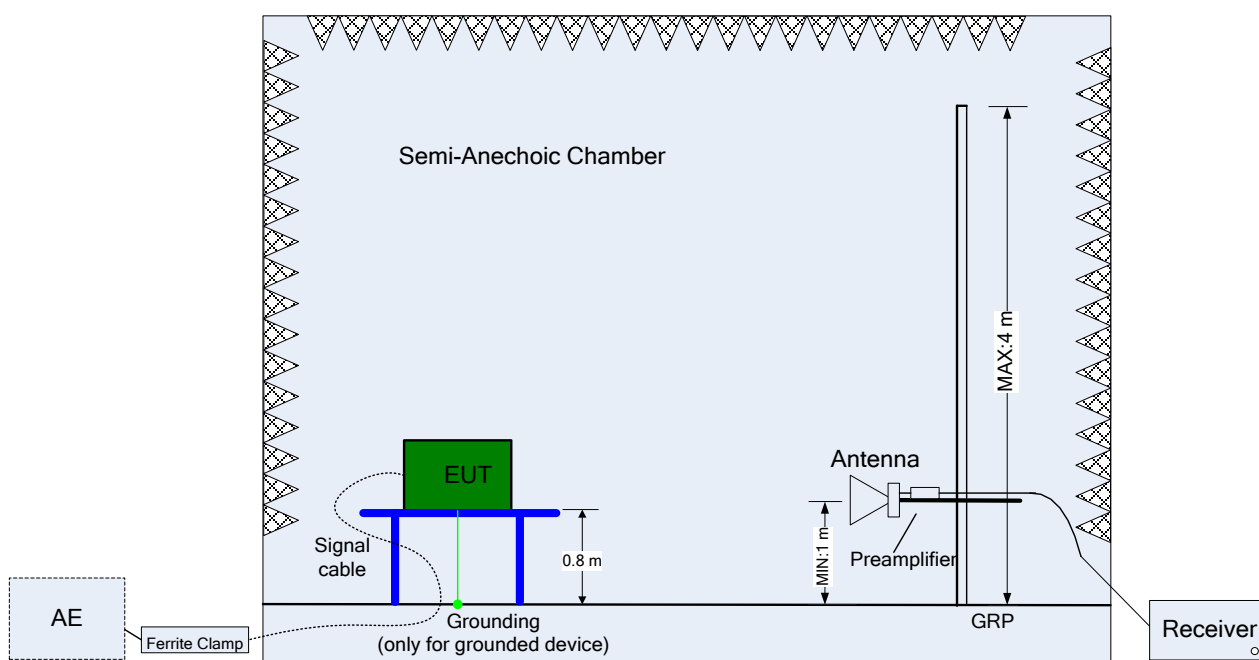
4.4.2 Test Setup 2

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)

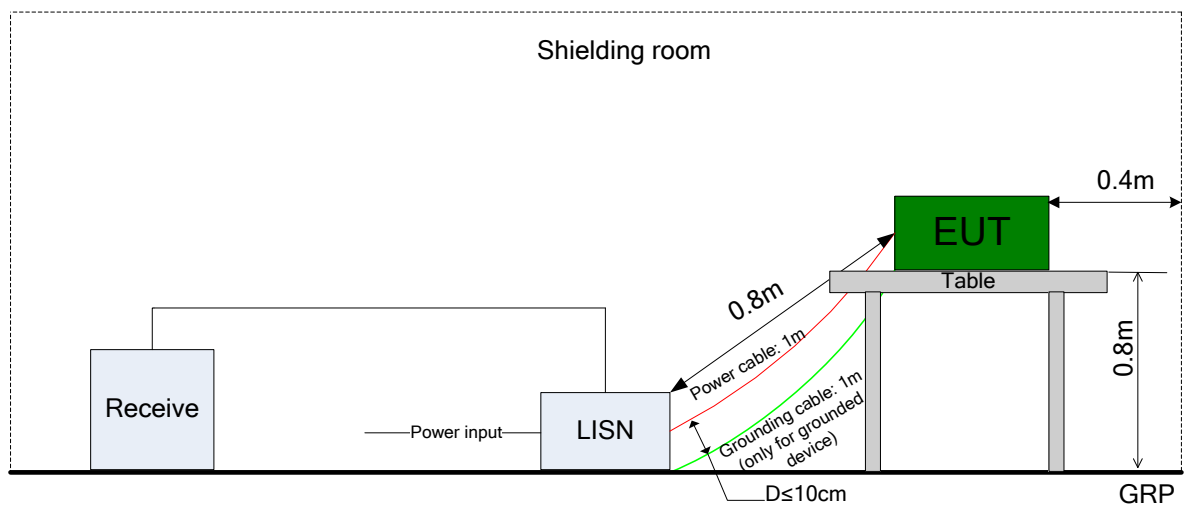


(Above 1 GHz)

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
		5250-5350	All EUT Test Mode 20 MHz bandwidth: Ch.52, Ch.64 40 MHz bandwidth: Ch.54, Ch.62 80 MHz bandwidth: Ch.58
		5470-5725	All EUT Test Mode 20 MHz bandwidth: Ch.100, Ch.140 40 MHz bandwidth: Ch.102, Ch.134



Test Case	Test Conditions	
	Configuration	Description
		80 MHz bandwidth: Ch.106
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.)



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	A120714713	2014-05-26	2015-05-25
Wireless Communication Test set	Agilent	N4010A	MY49081592	2014-11-04	2015-11-03
Universal Radio Communication Tester	R&S	CMU200	117341	2014-02-25	2015-02-24
Spectrum Analyzer	Agilent	N9020A	MY52090652	2014-07-11	2015-07-10
Universal Radio Communication Tester	R & S	CMW500	126855	2013-08-08	2015-08-09
Spectrum Analyzer	Agilent	E4440A	MY48250119	2014-07-11	2015-07-10
Signal Analyzer	R&S	FSQ31	200021	2014-11-04	2015-11-03
Spectrum Analyzer	Agilent	N9030A	MY49431698	2014-11-04	2015-11-03
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	2014-11-04	2015-11-03
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)	SCHWARZ BECK	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-LIND GREN	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

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