

TESTING CERT #2174.01

FCC RF Test Report

Product Name: Smart Phone

Product Model: HUAWEI MT1-U06, MT1-U06

Report Number: SYBH(Z-RF)007032013-2003

FCC ID: QISMT1-U06

Reliability Laboratory of Huawei Technologies Co., Ltd.

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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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8. The test report is only valid for the test samples.
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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
Product Name: Smart Phone
Product Model: HUAWEI MT1-U06, MT1-U06

Date of Receipt Sample: 2013-02-03
Start Date of Test: 2013-02-05
End Date of Test: 2013-02-16

Test Result: Pass

Approved by Senior

Engineer:	2013-02-28	Dai Linjun	
	Date	Name	Signature

Prepared by:	2013-02-28	Zhong Yaning	
	Date	Name	Signature



Modification Record

No.	Last Report No.	Modification Description



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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J (2012 Edition)
47 CFR FCC Part 15, Subpart C (2012 Edition)

Test Method: FCC KDB 558074 D01 DTS Meas Guidance v02
FCC KDB 662911 D01 Multiple Transmitter Output v01r2

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

Ambient Temperature: 19.5to 25 °C
Ambient Relative Humidity: 40 to 55 %
Atmospheric Pressure: Not applicable

2 Test Summary

Test Item	FCC Part No.	Requirements	Test Result	Verdict (NOTE 2)
DTS (6 dB) Bandwidth	15.247(a)(2)	≥ 500 kHz.	Appendix A	Pass
Occupied Bandwidth (Only for IC requirement)	---	No limit.	--	--
Maximum Peak Conducted Output Power	15.247(b)(3)	For directional gain: < 30 dBm – (G[dBi] – 6 [dB]), peak; Otherwise: < 30 dBm, peak.	Appendix B	Pass
Maximum Power Spectral Density Level	15.247(e)	For directional gain: < 8 dBm/3 kHz – (G[dBi] – 6 [dB]), peak. Otherwise: < 8 dBm/3 kHz, peak.	Appendix C	Pass
Band Edges Compliance	15.247(d)	< -20 dBm/100 kHz if total peak power \leq power limit.	Appendix D	Pass
Unwanted Emissions into Non-Restricted Frequency Bands	15.247(d)	< -20 dBm/100 kHz if total peak power \leq power limit.	Appendix E	Pass
Unwanted Emissions into Restricted Frequency Bands (Conducted)	15.247(d) 15.209 (NOTE 1)	FCC Part 15.209 field strength limit;	Appendix F	Pass
Unwanted Emissions into Restricted Frequency Bands (Radiated)				
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	Appendix G	Pass

3 Description of the Equipment under Test (EUT)

3.1 General Description

HUAWEI MT1-U06, MT1-U06 is subscriber equipment in the UMTS/GSM system. The HSUPA/HSDPA/UMTS frequency band is Band I, Band II, Band IV, Band V and Band VIII. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, UMTS/GSM protocol processing, voice, video, MMS service, GPS, AGPS and WIFI etc. Externally it provides earphone port (to provide voice service) and USIM card interface. 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.

There are two different types of HUAWEI MT1-U06, MT1-U06. One is with NFC function, its FCC ID is QISMT1-U06N, the other is without NFC function, its FCC ID is QISMT1-U06. The others are the same, including circuit design, PCB board, structure. With the consideration of the identities and differences list above, all the RF tests were conducted to the EUT with NFC function.

NOTE: Only 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		
Hardware Version	Serial Number	Description
HD1U9900M	MT1-U06V100R001C00B104SP03	Main board of Mobile Phone


3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-050200 A3W	Huawei Technologies Co., Ltd.	Input voltage: ~100-240V 50/60Hz 0.5A Output voltage: 5V  2A Rated Power: 10W

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-050200 B3W	Huawei Technologies Co., Ltd.	Input voltage: ~100-240V 50/60Hz 0.5A Output voltage: 5V  2A Rated Power: 10W



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AC/DC Adapter	HW-050200 U3W	Huawei Technologies Co., Ltd.	Input voltage: ~100-240V 50/60Hz 0.5A Output voltage: 5V  2A Rated Power: 10W

3.3 Technical Description

Characteristics	Description			
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11b (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11g (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11n (20 MHz channel bandwidth), <input checked="" type="checkbox"/> 802.11n (40 MHz channel bandwidth)			
TX/RX Operating Range	2412-2462 MHz band	fc = 2407 MHz + N * 5 MHz, where: - fc = “Operating Frequency” in MHz, - N = “Channel Number” with the range from 1 to 11 for the 20 MHz channel bandwidth, or 3 to 9 for the 40 MHz channel bandwidth.		
Data Rate	802.11b	1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps		
	802.11g	6 Mbps, 9 Mbps, 12 Mbps, 18 Mbps, 24 Mbps, 36 Mbps, 48 Mbps, 54 Mbps		
	802.11n (SISO)	MCS 0 to MCS 7		
	802.11n (MIMO)	MCS 8 to MCS 15		
Modulation Type	DBPSK/DQPSK/CCK (DSSS), BPSK/QPSK/16QAM/64QAM (OFDM).			
Emission Designator	10M3G1D (for 802.11b mode), 16M7G7D (for 802.11g mode), 16M4G7D (for 802.11n with 20MHz mode), 35M1G7D (for 802.11n with 40MHz mode)			
TX Power Control	<input checked="" type="checkbox"/> Supported, <input type="checkbox"/> Not Supported			
Standby Mode	<input type="checkbox"/> Supported, <input checked="" type="checkbox"/> Not Supported			
Equipment Type	<input type="checkbox"/> Stand-alone equipment, <input type="checkbox"/> Plug-in radio device, <input checked="" type="checkbox"/> Combined equipment			
Antenna	Description	Isotropic Antenna		
	Type	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated		
	Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3		
	Smart System	<input checked="" type="checkbox"/> SISO (for 802.11b/g/n), <input type="checkbox"/> MIMO (for 802.11n): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11b/g) : Tx & Rx		
	Gain	-2.2dBi (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	<input checked="" type="checkbox"/> AC/DC Adapter	<input type="checkbox"/> PoE:	<input type="checkbox"/> Other:



4 General Test Conditions / Configurations

4.1 Test Modes

NOTE: Typical working modes for each IEEE 802.11 mode are selected to perform tests.

Test Mode	Test Modes Description
11B	IEEE 802.11b with data rate of 11 Mbps using SISO mode.
11G	IEEE 802.11g with data rate of 54 Mbps using SISO mode.
11N20	IEEE 802.11n with data rate of MCS7 and bandwidth of 20 MHz using SISO mode.
11N40	IEEE 802.11n with data rate of MCS15 and bandwidth of 40 MHz using SISO mode.

4.2 EUT Configurations

4.2.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, <ul style="list-style-type: none"> - 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

Test Mode	RF Ch.	TX Freq. [MHz]	Port mode	RX Freq. [MHz]	Ch. BW [MHz]
11B	L	Ch No. 1 / 2412 MHz	BG 1	---	20
			BG 2	---	20
	M	Ch No. 6 / 2437 MHz	BG 1	---	20
			BG 2	---	20
	H	Ch No. 11 / 2462 MHz	BG 1	---	20
			BG 2	---	20
11G	L	Ch No. 1 / 2412 MHz	BG 1	---	20
			BG 2	---	20
	M	Ch No. 6 / 2437 MHz	BG 1	---	20
			BG 2	---	20
	H	Ch No. 11 / 2462 MHz	BG 1	---	20
			BG 2	---	20
11N20	L	Ch No. 1 / 2412 MHz	BG 1	---	20
			BG 2	---	20
	M	Ch No. 6 / 2437 MHz	BG 1	---	20
			BG 2	---	20
	H	Ch No. 11 / 2462 MHz	BG 1	---	20
			BG 2	---	20
11N40	L	Ch No. 3 / 2422 MHz	BG 1	---	40
			BG 2	---	40
	M	Ch No. 6 / 2437 MHz	BG 1	---	40
			BG 2	---	40
	H	Ch No. 9 / 2452 MHz	BG 1	---	40
			BG 2	---	40



4.3 Test Environments

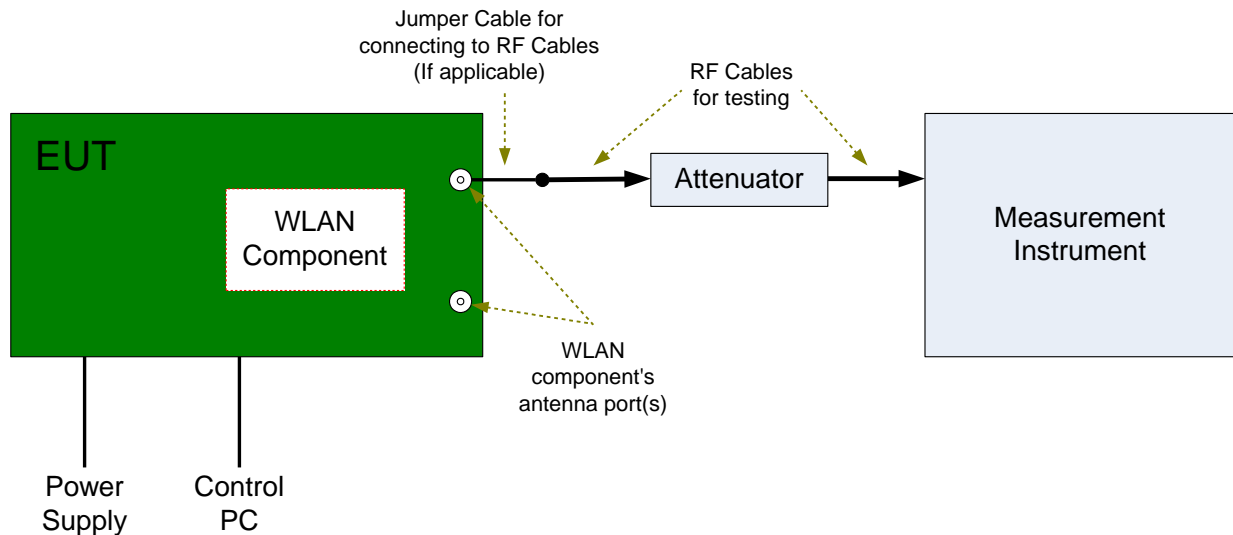
NOTE: The values used in the test report may be stringent than the declared.

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

4.4 Test Setups

4.4.1 Test Setup 1

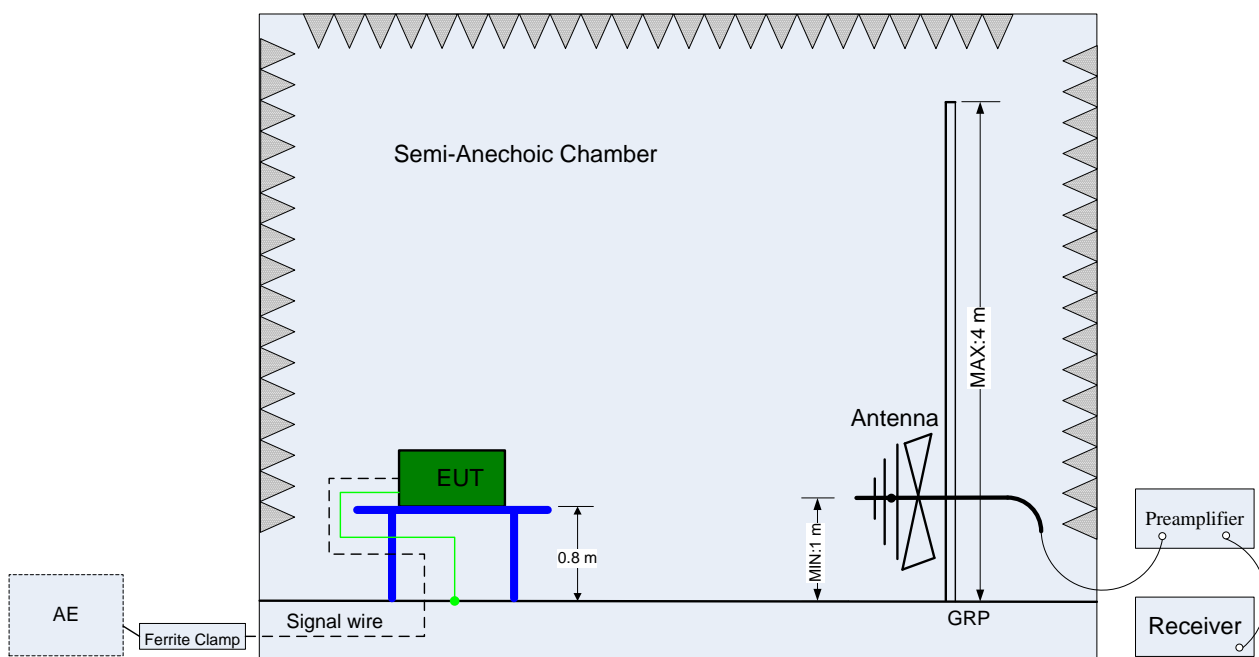
The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



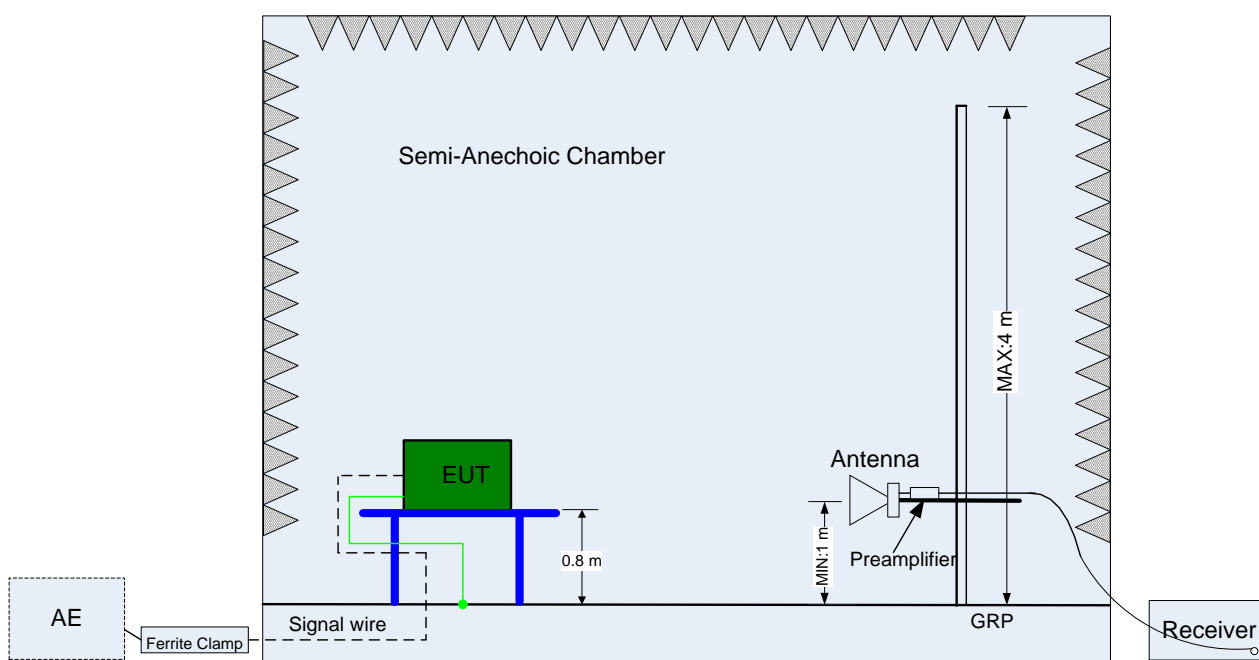
4.4.2 Test Setup 2

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 3m. The setup is according to 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)

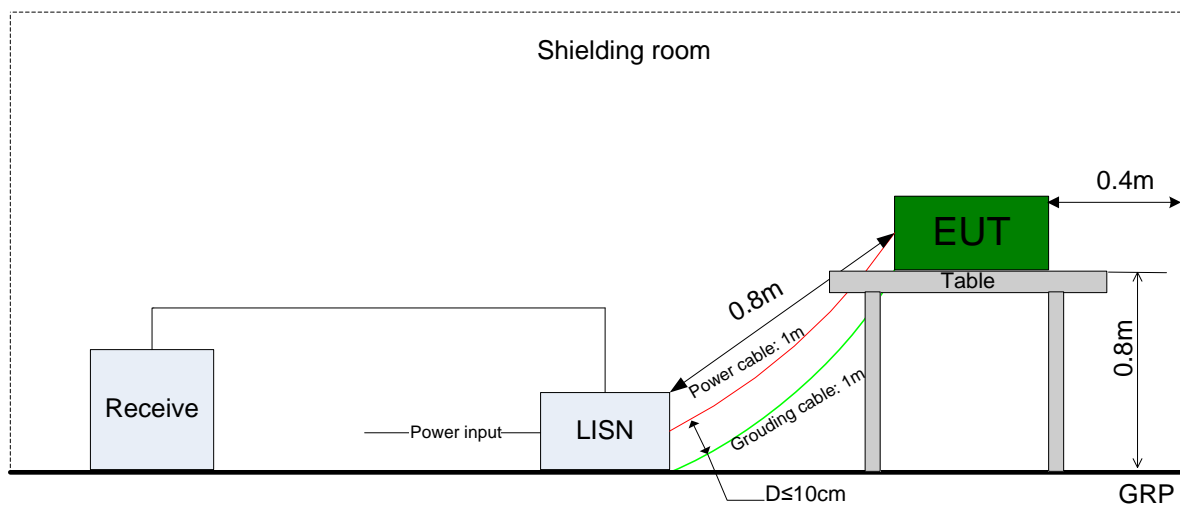


(Above 1 GHz)

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

Test Case	Test Conditions	
	Configuration	Description
DTS (6 dB) Bandwidth	Measurement Method	FCC KDB 558074 §7.1.1 Option 2.
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
Maximum Peak Conducted Output Power	Measurement Method	FCC KDB 558074 §7.2.1.2 Option 2 (integrated band power method).
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
Maximum Power Spectral Density Level	Measurement Method	FCC KDB 558074 §7.3.1 Option 1 (peak PSD).
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
Unwanted Emissions into Non-Restricted Frequency Bands	Measurement Method	FCC KDB 558074 §7.4.1, use Peak PSD.
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
Unwanted Emissions into Restricted Frequency Bands (Conducted)	Measurement Method	FCC KDB 558074 §7.4.2, Conducted (antenna-port).
	Test Environment	NTNV
	Test Setup	Test Setup 1
	EUT Configuration	11B_L, 11B_M, 11B_H 11G_L, 11G_M, 11G_H 11N20_L, 11 N20_M, 11 N20_H 11N40_L, 11 N40_M, 11 N40_H
Unwanted Emissions into Restricted	Measurement Method	FCC KDB 558074 §7.4.2, Radiated (cabinet/case emissions with impedance matching for antenna-port).
	Test Environment	NTNV

Test Case	Test Conditions	
	Configuration	Description
Frequency Bands (Radiated)	Test Setup	Test Setup 2
	EUT Placement	<input checked="" type="checkbox"/> Flatwise, <input type="checkbox"/> Upright, <input type="checkbox"/> Hung
	EUT Configuration	(1) 30 MHz to 1 GHz: 11B_B (Worst Conf.). (2) 1 GHz to 3 GHz: 11B_L, 11B_H 11G_L, 11G_H 11N20_L, 11 N20_H 11N40_L, 11 N40_H (3) 3 GHz to 18 GHz: 11B_L (Worse Conf.), 11B_H (Worse Conf.). (4) 18 GHz to 26.5 GHz: 11B_L (Worse Conf.), 11B_H (Worse Conf.).
AC Power Line Conducted Emissions	Measurement Method	AC mains conducted.
	Test Environment	NTNV
	Test Setup	Test Setup 3
	EUT Configuration	11B_L (Worst Conf.).

5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal. Due
Power supply	KEITHLEY	2303	1288003	2012-11-09	2013-11-08
Spectrum Analyzer	Agilent	E4440A	MY48250119	2012-07-18	2013-07-17
Signal Analyzer	R&S	FSQ31	200021	2012-11-09	2013-11-08
Spectrum Analyzer	Agilent	N9030A	MY49431698	2012-11-09	2013-11-08
Temperature Chamber	WEISS	WKL64	24600294	2013-01-29	2014-01-28
Signal generator	Agilent	E8257D	MY49281095	2012-07-10	2013-07-09
Spectrum analyzer	R&S	FSU3	200474	2012-03-06	2013-03-05
Spectrum analyzer	R&S	FSU43	100144	2012-03-06	2013-03-05
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2012-04-06	2013-04-05
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100391	2012-10-12	2013-10-11
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBE CK	VULB 9163	9163-521	2012-12-09	2013-12-08
Pyramidal Horn Antenna(26GHz-40GH z)	ETS-Lindgren	3160-10	00123940	2012-02-28	2013-02-27
Pyramidal Horn Antenna(18GHz-26.5G Hz)	ETS-Lindgren	3160-09	00125912	2012-02-28	2013-02-27

END