



FCC

RF Test Report

Product Name: WCDMA Digital Mobile Phone

Model Number: HUAWEI G610-U15

Report No: SYBH(Z-RF)013062013-2002

FCC ID: QISG610-U15

Reliability Laboratory of Huawei Technologies Co., Ltd.

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

Tel: +86 755 28780808 Fax: +86 755 89652518



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.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-2.
5. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. The test report is only valid for the test samples.
8. 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: 2013-06-29
Start Date of Test: 2013-06-30
End Date of Test: 2013-07-07

Test Result: Pass

Approved by Senior Engineer:	2013-07-23	Dai Linjun	
	Date	Name	Signature

Prepared by:	2013-07-23	Guo Xingxing	
	Date	Name	Signature



Modification Record

No.	Last Report No.	Modification Description



CONTENT

1 General Information6
1.1 Applied Standard.....6
1.2 Test Location6
1.3 Test Environment Condition.....6
2 Test Summary7
3 Description of the Equipment under Test (EUT)8
3.1 General Description8
3.2 EUT Identity8
3.3 Technical Description.....9
4 General Test Conditions / Configurations 10
4.1 EUT Configurations..... 10
4.2 Test Environments 11
4.3 Antenna requirements..... 11
4.4 Test Setups..... 12
4.5 Test Conditions 15
5 Main Test Instruments 18
6 Main Test Instruments 18



1 General Information

1.1 Applied Standard

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

Test Method: FCC PUBLIC NOTICE DA 00-705 Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems (Released March 30, 2000)

ANSI C63.4-2003/-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

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

Ambient Temperature: 19.5 to 25 °C
Ambient Relative Humidity: 45 to 55 %
Atmospheric Pressure: Not applicable



2 Test Summary

Test Item	FCC Part No.	Requirements	Test Result	Verdict (NOTE)
20dB Emission Bandwidth (EBW)	15.247(a)(1)	No limit.	Appendix A	Pass
Carrier Frequency Separation	15.247(a)(1)	$\geq \text{MAX} \{25\text{kHz}, \text{IIF}\{\text{output power} \leq 125\text{mW}, 2/3 * 20\text{dB EBW}, 20\text{dB EBW}\}\}$.	Appendix B	Pass
Number of Hopping Channel	15.247(a)(1)(iii)	≥ 15 channels.	Appendix C	Pass
Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	$< 0.4\text{s}$ within a period of $(0.4\text{s} * \text{hopping number})$.	Appendix D	Pass
Maximum Peak Conducted Output Power	15.247(b)(1)	$< 1\text{ W}$ if using ≥ 75 non-overlapping channels.	Appendix E	Pass
Band edge spurious emission	15.247(d)	$< -20\text{ dB}/100\text{ kHz}$ if total peak power \leq power limit.	Appendix F	Pass
Conducted RF Spurious Emission			Appendix G	Pass
Radiated Emissions in the Restricted Bands	15.247(d) 15.209	FCC Part 15.209 field strength limit;	Appendix H	Pass
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	Appendix I	Pass



3 Description of the Equipment under Test (EUT)

3.1 General Description

WCDMA Digital Mobile Phone HUAWEI G610-U15 is subscriber equipment in the WCDMA/GSM system. HUAWEI G610-U15 supports GSM/GPRS/EDGE 850/1800/1900 and WCDMA850/1900. The Mobile Phone implements such functions as RF signal receiving/transmitting, UMTS and GSM protocol processing, voice, video, MMS service, GPS etc. Externally it provides micro SD card interface, earphone port (to provide voice service). 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.

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		
Serial Number	Hardware Version	Software Version
157NAC1982900112	HD1G610M Ver.C	V100R001C00B101

3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
AC/DC Adapter	HW-050100U2W(02220432)	Huawei Technologies Co., Ltd.	Input voltage: ~100-240V Output voltage: 5V/1A
Rechargeable Li-ion	HB505076RBC	Huawei Technologies Co., Ltd.	Rated capacity: 2150mAh Nominal Voltage: +3.8V



3.3 Technical Description

Characteristics	Description	
TX/RX Operating Range	2400-2483.5 MHz band	$f_c = 2402 \text{ MHz} + N * 1 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 78.
	Carrier	Frequency Hopping Spread Spectrum (FHSS)
Modulation Type	Digital	GFSK, $\pi/4$ -DQPSK, 8DPSK
	Emission Designator	GFSK: 947KGXD $\pi/4$ -DQPSK: 1M27GXD 8DPSK: 1M26GXD
Bluetooth Power Class	Class 1,	



4 General Test Conditions / Configurations

4.1 EUT Configurations

4.1.1 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.

4.1.2 Customized Configurations

# EUT Conf.	Signal Description	Operating Frequency
TM1_DH5_Hop	GFSK modulation, package type DH5, hopping on.	---
TM1_DH5_Ch0	GFSK modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz
TM1_DH5_Ch39	GFSK modulation, package type DH5, hopping off.	Ch No. 39 / 2441 MHz
TM1_DH5_Ch78	GFSK modulation, package type DH5, hopping off.	Ch No. 78 / 2480 MHz
TM2_2DH5_Hop	$\pi/4$ -DQPSK modulation, package type 2DH5, hopping on.	---
TM2_2DH5_Ch0	$\pi/4$ -DQPSK modulation, package type 2DH5, hopping off.	Ch No. 0 / 2402 MHz
TM2_2DH5_Ch39	$\pi/4$ -DQPSK modulation, package type 2DH5, hopping off.	Ch No. 39 / 2441 MHz
TM2_2DH5_Ch78	$\pi/4$ -DQPSK modulation, package type 2DH5, hopping off.	Ch No. 78 / 2480 MHz
TM3_3DH5_Hop	8DPSK modulation, package type 3DH5, hopping on.	---
TM3_3DH5_Ch0	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 0 / 2402 MHz
TM3_3DH5_Ch39	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 39 / 2441 MHz
TM3_3DH5_Ch78	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 78 / 2480 MHz



4.2 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

4.3 Antenna requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

The antennas of the Huawei Mobile Phone are **permanently attached**.

There are no provisions for connection to an external antenna.

Conclusion:

The **Huawei Mobile Phone FCC ID: QISG610-U15** unit complies with the requirement of §15.203.

Ch. Frequency (MHz)

For BT 2.0&3.0

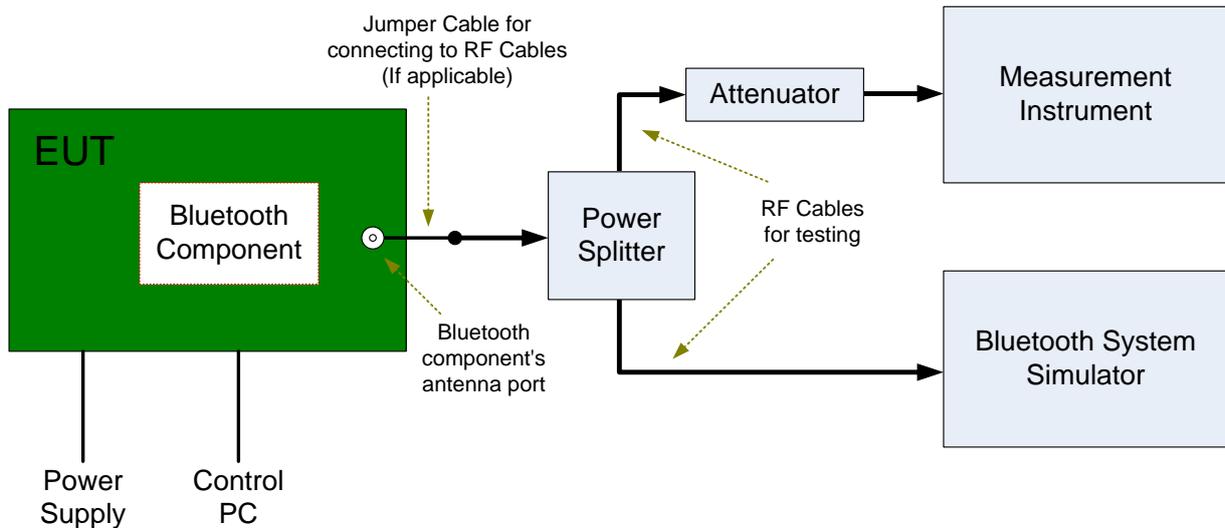
Ch.	Frequency (MHz)
00	2402
.	.
.	.
39	2441
.	.
.	.
78	2480

Frequency/ Channel Operations

4.4 Test Setups

4.4.1 Test Setup 1

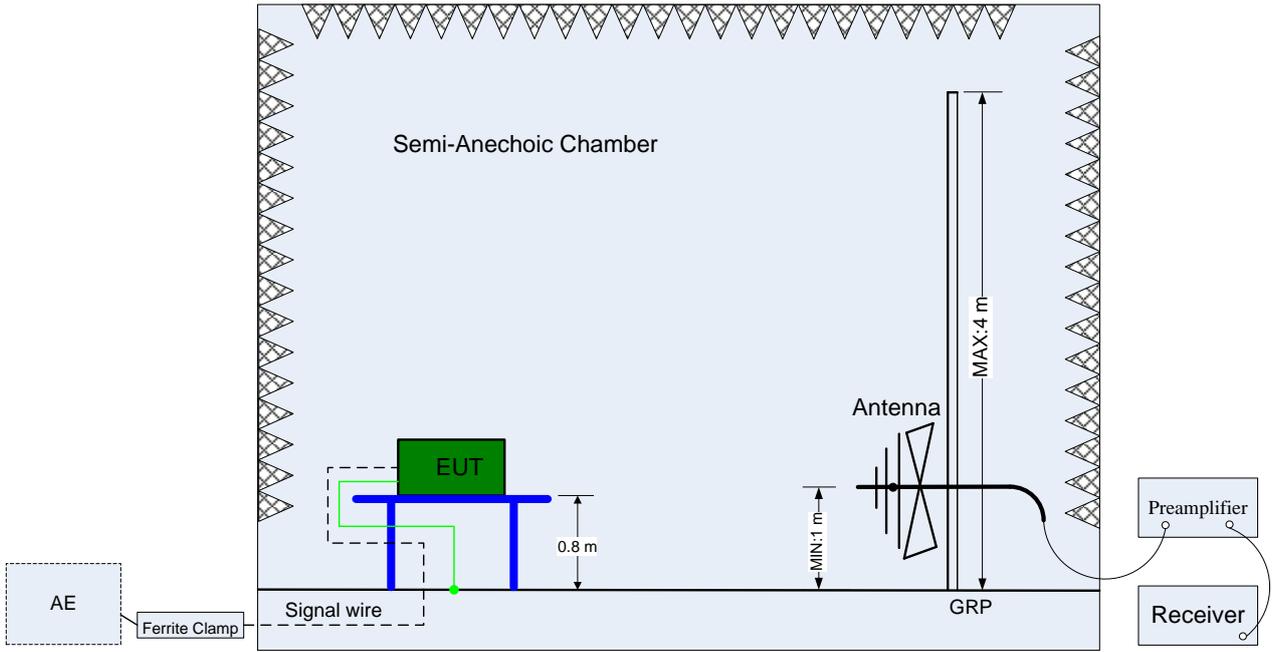
The Bluetooth component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by Bluetooth System Simulator and/or PC/software to emit the specified signals for the purpose of measurements.



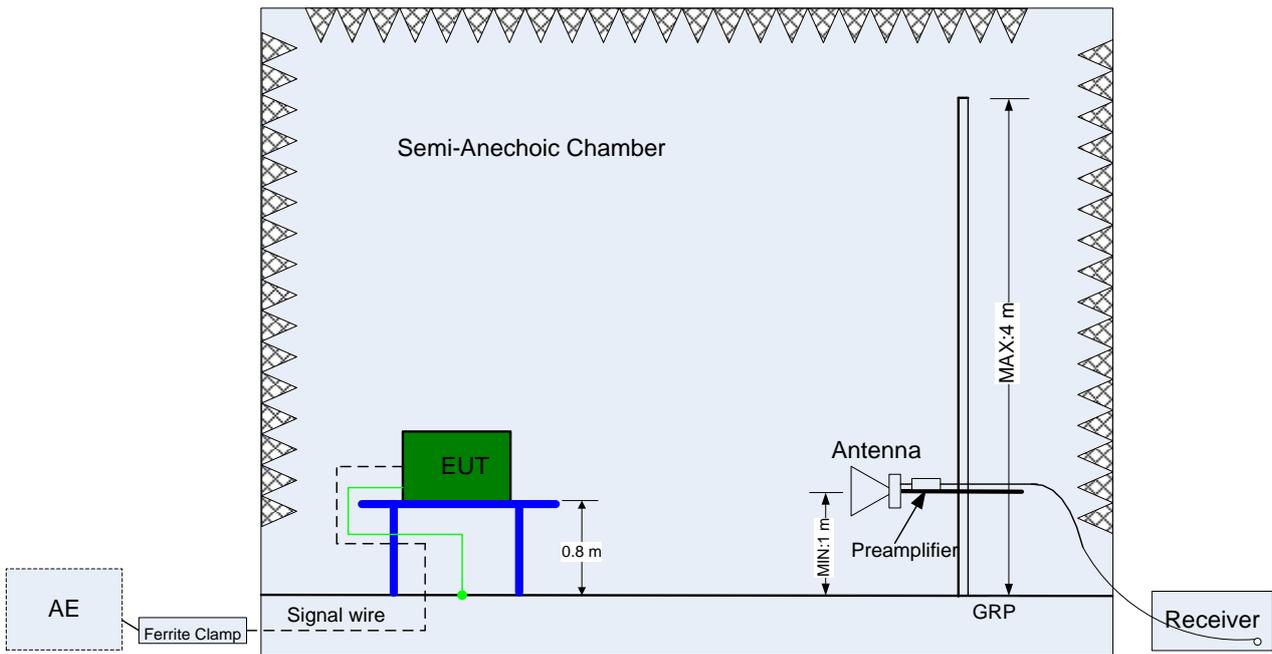
4.4.2 Test Setup 2

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)

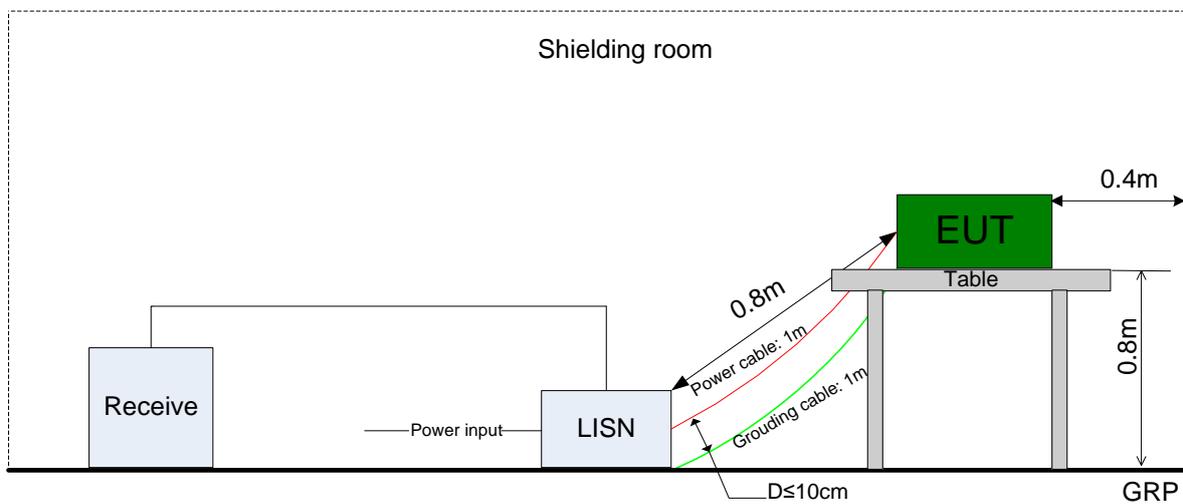


(Above 1 GHz)

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 0.8 m 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
20dB Emission Bandwidth (EBW)	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.
Carrier Frequency Separation	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Hop, TM2_2DH5_Hop, TM3_3DH5_Hop.
Number of Hopping Channel	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Hop, TM2_2DH5_Hop, TM3_3DH5_Hop.
Time of Occupancy (Dwell Time)	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch39, TM2_2DH5_Ch39, TM3_3DH5_Ch39.
Maximum Peak Conducted Output Power	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.
Band edge spurious emission	Meas. Method	DA 00-705
	Test Env.	NTNV
	Test Setup	Test Setup 1
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch78.
Conducted RF Spurious Emission	Meas. Method	DA 00-705
	Test Env.	NTNV

Test Case	Test Conditions		
	Configuration	Description	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.	
Radiated Emissions in the Restricted Bands	Meas. Method	DA 00-705, C63.4, C63.10. (1) 30 MHz to 1 GHz: Pre: RBW = 100 kHz; VBW = 300 kHz; Det. = Peak. Final: RBW = 120 kHz; Det. = CISPR Quasi-Peak. (2) 1 GHz to 26.5 GHz: Average: RBW = 1 MHz; VBW = 10 Hz; Det. = Peak; Sweep-time = Auto; Trace = Single. Peak: RBW = 1 MHz; VBW = 3 MHz; Det. = Peak; Sweep-time = Auto; Trace ≥ Max Hold * 100.	
	Test Env.	NTNV	
	Test Setup	Test Setup 2	
	EUT Conf.	30 MHz -1 GHz	TM1_DH5_Ch0 (Worst Conf.).
		1-3 GHz	TM1_DH5_Ch0, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch0, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch0, TM3_3DH5_Ch39, TM3_3DH5_Ch78.
		3-18 GHz	TM1_DH5_Ch0 (Worse Conf.), TM1_DH5_Ch39 (Worse Conf.), TM1_DH5_Ch78 (Worse Conf.).
18-26.5 GHz		TM1_DH5_Ch0 (Worst Conf.).	
Receiver Spurious Emissions	Meas. Method	<input type="checkbox"/> Antenna-conducted, <input type="checkbox"/> Radiated. NOTE: If the receiver has a detachable antenna of known impedance, antenna conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method is recommended. The antenna conducted test shall be performed with the antenna disconnected and the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna. (1) 30 MHz to 1 GHz: Pre: RBW = 100 kHz; VBW = 300 kHz; Det. = Peak. Final: RBW = 120 kHz; Det. = CISPR Quasi-Peak. (2) 1 GHz to 8 GHz: Pre: RBW = 1 MHz; VBW = 3 MHz; Det. = Peak. Final: RBW = 1 MHz; Det. = Average.	
	Test Env.	NTNV	
	Test Setup	Test Setup 2	
	EUT Conf.	RX.	



Test Case	Test Conditions	
	Configuration	Description
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.	TM1_DH5_Ch39.

**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.

6 Main Test Instruments

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	2012-11-09	2013-11-08
Spectrum Analyzer	Agilent	E4440A	MY48250119	2012-08-20	2013-08-19
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	562460029400 10	2013-01-29	2014-01-28
Signal generator	Agilent	E8257D	MY49281095	2012-09-14	2013-09-13
Test receiver	R&S	ESU26	100150	2013-05-15	2014-05-14
Spectrum analyzer	R&S	FSU3	200474	2013-01-29	2014-01-28
Spectrum analyzer	R&S	FSU43	100144	2013-01-29	2014-01-28
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2013-02-02	2014-02-01
Trilog Broadband Antenna (30M~3GHz)	SCHWARZ BECK	VULB 9163	9163-521	2011-12-09	2013-12-08
Pyramidal Horn Antenna(18GHz-26-5GHz)	ETS-Lindgren	3160-09	00091989	2011-10-20	2013-10-19

END