FCC&IC
RF Test Report

Product Name: Smart Watch

Model Number: HUAWEI WATCH

Report No: SYBH(Z-RF)021112015-2003

FCC ID: QISMERCURY

IC: 6369A-MERCURY

Reliability Laboratory of Huawei Technologies Co., Ltd.

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

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

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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:	2015-11-25
Start Date of Test:	2015-11-26
End Date of Test:	2015-11-30

Test Result:	Pass

Approved by Senior Engineer:	2015-11-30	Liu Chunlin	Liu Chunlin
	Date	Name	Signature

Prepared by:	2015-11-30	Hexiaolin	Hexiaolin
	Date	Name	Signature

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Modification Record

No.	Last Report No.	Modification Description
1		First report.

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1 General Information

1.1 Applied Standard

Applied Rules:	47 CFR FCC Part 2, Subpart J 2014 47 CFR FCC Part 15, Subpart C 2014 IC RSS-Gen (Issue 4, November 2014) IC RSS-247 (Issue 1, May 2015)
Test Method:	FCC KDB 558074 D01 DTS Meas Guidance v03r02 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.
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

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2 Test Summary

Test Item	FCC Part No.	IC Standard No.	Requirements	Test Result	Verdict
DTS (6 dB) Bandwidth	15.247(a)(2)	RSS-247, 5.2	≥ 500 kHz.	Appendix A	SYBH(Z-RF)006052015-2003
Occupied Bandwidth	---	RSS-247, 5.2 RSS-Gen, 6.6	---	Appendix B	SYBH(Z-RF)006052015-2003
Duty Cycle	KDB 558074（6.0）	--	No limit	Appendix C	SYBH(Z-RF)006052015-2003
Maximum Conducted Average Output Power	15.247(b)(3)	RSS-247, 5.5	For directional gain: < 30 dBm – (G[dBi] – 6 [dB]), Average; Otherwise: < 30 dBm, Average.	Appendix D	SYBH(Z-RF)006052015-2003
Maximum Power Spectral Density Level	15.247(e)	RSS-247, 5.2	For directional gain: < 8 dBm/3 kHz – (G[dBi] – 6 [dB]), Average. Otherwise: < 8 dBm/3 kHz, Average.	Appendix E	SYBH(Z-RF)006052015-2003
Band Edges Compliance	15.247(d)	RSS-247, 5.5	< -30 dBr/100 kHz if total peak power ≤ power limit.	Appendix F	SYBH(Z-RF)006052015-2003
Unwanted Emissions into Non-Restricted Frequency Bands				Appendix G	SYBH(Z-RF)006052015-2003
Unwanted Emissions into Restricted Frequency Bands (Radiated)	15.247(d) 15.209 (NOTE 1)	RSS-247, 5.5 RSS-Gen, 6.13	FCC Part 15.209 field strength limit; RSS-Gen 6.13 field strength limit.	Appendix H	Pass
AC Power Line Conducted Emissions	15.207	RSS-Gen, 6.13	FCC Part 15.207 conducted limit; RSS-Gen, 6.13 conducted limit.	Appendix I	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:We do not test MERCURY except of RSE,all the test data refer to SYBH(Z-RF)006052015-2003 of MERCURY

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3 Description of the Equipment under Test (EUT)

3.1 General Description

HUAWEI WATCH is a smart watch based on Android wear OS; it can be communicated with mobile phone via Bluetooth or WiFi . It supports Bluetooth4.1 and wifi IEEE802.11b/g/n 1Tx1Rx . Watch also support speaker playback function, MIC recording function, built-in accelerometer, gyro sensor, intelligent user can judge the state of motion, with the barometric height measurement, with PPG measurement of heart rate, PPG in contact with the skin surface using Corelle glass. With the vibration motor, support IP67 dustproof and waterproof level.

The Difference of HUAWEI WATCH(added) and HUAWEI WATCH(old) is as below:

HUAWEI WATCH (added) is added two appearance styles to the old one. HUAWEI WATCH (old) appearance is still available. The same points between HUAWEI WATCH (added) and HUAWEI WATCH (old) are as follows: PCB, cradle, the bottom shelf and software.

The differences between HUAWEI WATCH (added) and HUAWEI WATCH (old) are as follows:

The top shelf: HUAWEI WATCH added “pineapple” stripe on the top shelf, and also added zircon inlay on the top shelf. So its size had been a little change.

HUAWEI WATCH(old):

HUAWEI WATCH(added):

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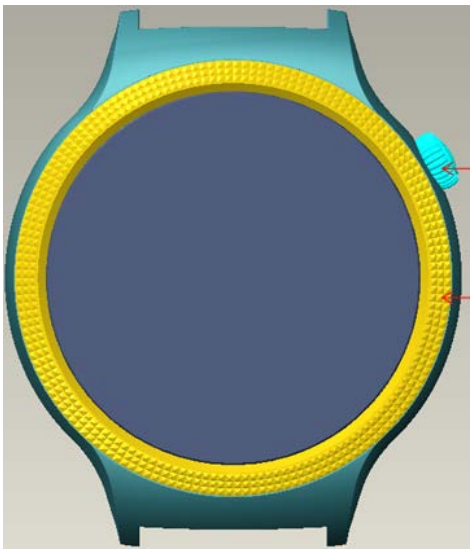

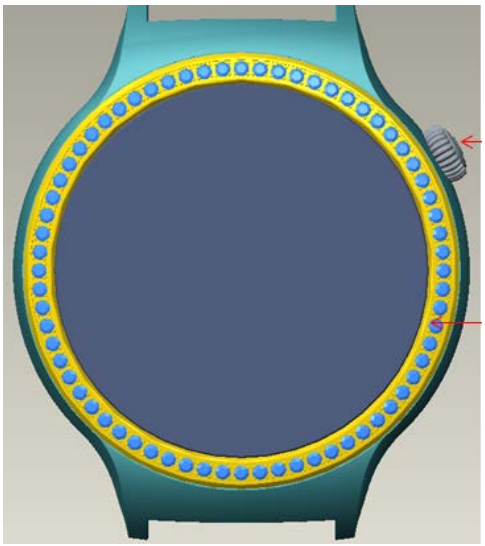

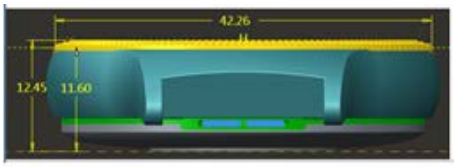

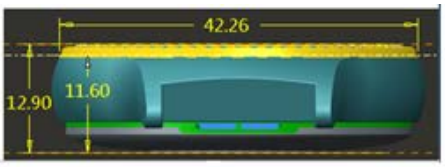

The middle shelf:

The middle shelf of added HUAWEI WATCH is expanded 1mm to be drum-like.

HUAWEI WATCH(old):

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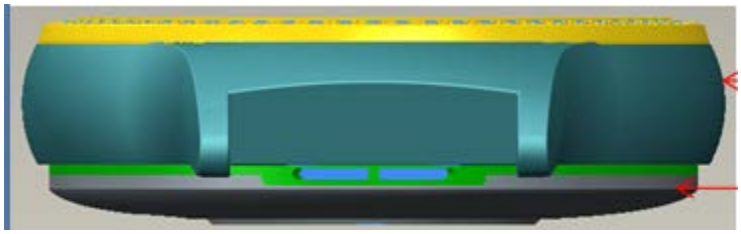
HUAWEI WATCH(added):



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	EB1MERCURYM VER.B	LCB43B

3.2.2 Sub-Assembly

Name	Manufacture	Description
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100C01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100U01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100E01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100B01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100A01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100Z01

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		Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100R01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A
Adapter	Huawei Technologies Co., Ltd.	Model: HW-050100J01 Input voltage: 100V~240V AC and 50/60 Hz,0.2A Output voltage: +5V ⎓ 1A

3.2.3 Battery

Name	Manufacture	Description
Li-polymer Battery	Huawei Technologies Co., Ltd.	Battery Model: HB442528EBC Rated capacity: 300mAH Nominal Voltage: ⎓ +3.8V Single Cell,MAX4.4*25*27.2mm

3.2.4 Cable

Name	Manufacture	Description
USB Cable	Huawei Technologies Co., Ltd.	Signal Cable,USB data cable,White intermediate high-end ,1m,USB AM,OD3.2,Micro B plug,5V2A,Terminal Dedicated

3.2.5 Dock

Name	Manufacture	Description
Dock	Huawei Technologies Co., Ltd.	Serials number: AF30-1 Smart Watch Charger Dock

3.3 Technical Description

Characteristics	Description	
TX/RX Operating Range	2400-2483.5 MHz band	fc = 2402 MHz + N * 2 MHz, where: - fc = “Operating Frequency” in MHz, - N = “Channel Number” with the range from 0 to 39.
Modulation Type	Digital	GFSK,

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Characteristics	Description
Emission Designator	GFSK for BT 4.0:710KGXD
Bluetooth Power Class	Class 1

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4 General Test Conditions / Configurations

4.1 EUT Configurations

4.1.1 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.

4.1.2 Customized Configurations

# EUT Conf.	Signal Description	Operating Frequency	Duty cycle
TM1_DH5_Ch0	GFSK for BT 4.0 modulation, package type DH5, hopping off.	Ch No. 0 / 2402 MHz	62.2
TM1_DH5_Ch19	GFSK for BT 4.0 modulation, package type DH5, hopping off.	Ch No. 19 / 2440 MHz	62.2
TM1_DH5_Ch39	GFSK for BT 4.0 modulation, package type DH5, hopping off.	Ch No. 39 / 2480 MHz	62.2

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

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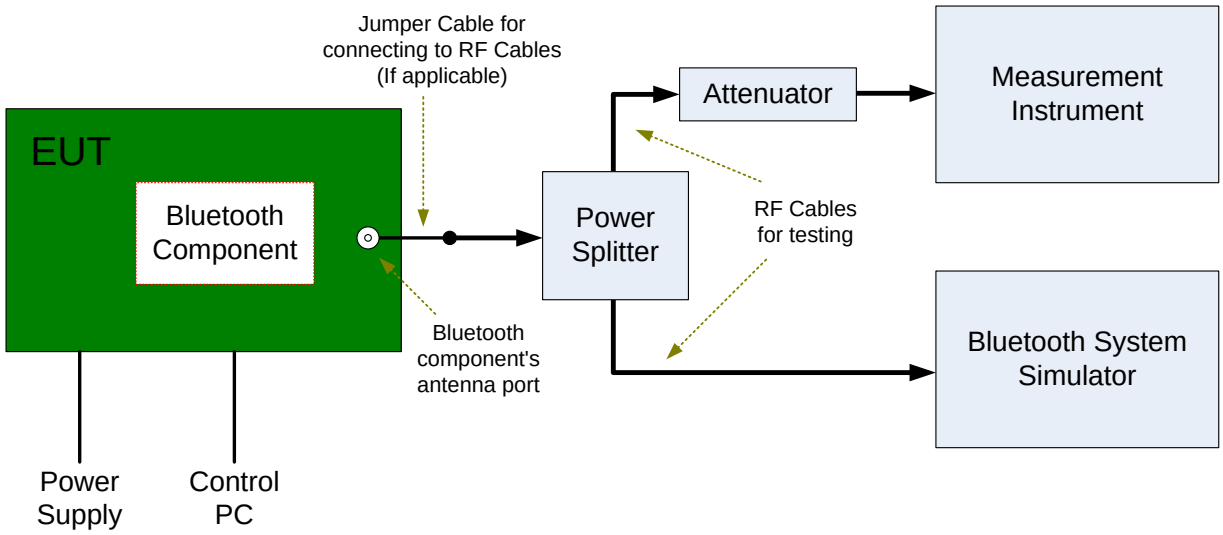
4.3 Test Setups

4.3.1 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.



4.3.2 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).

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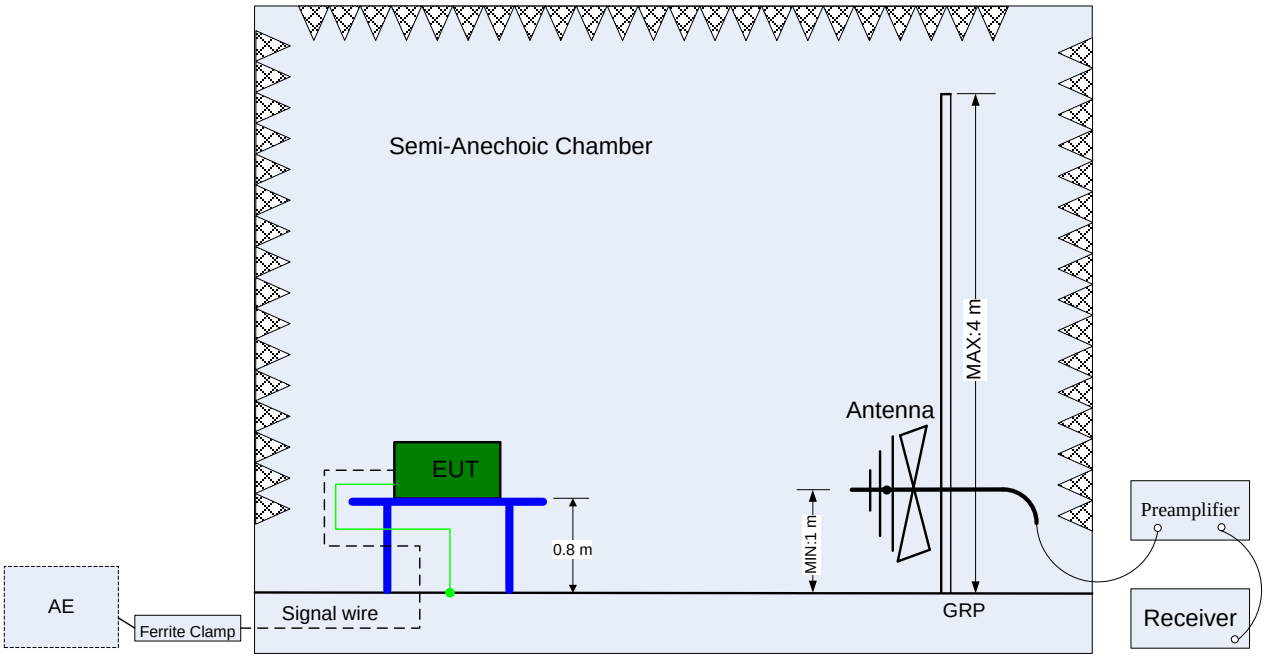
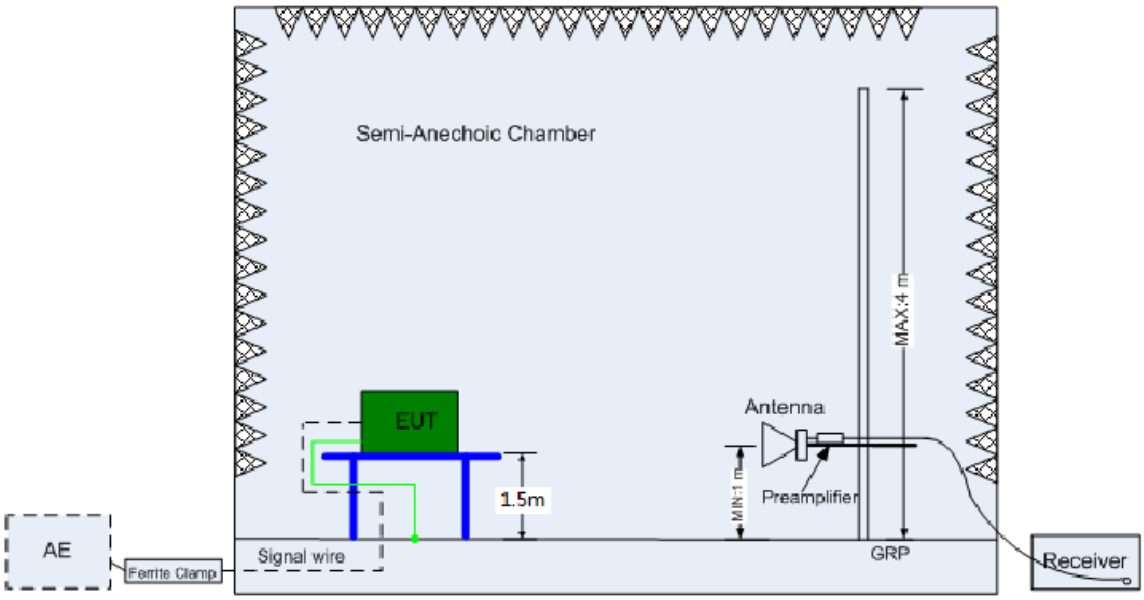


(Below 1 GHz)



(Above 1 GHz)

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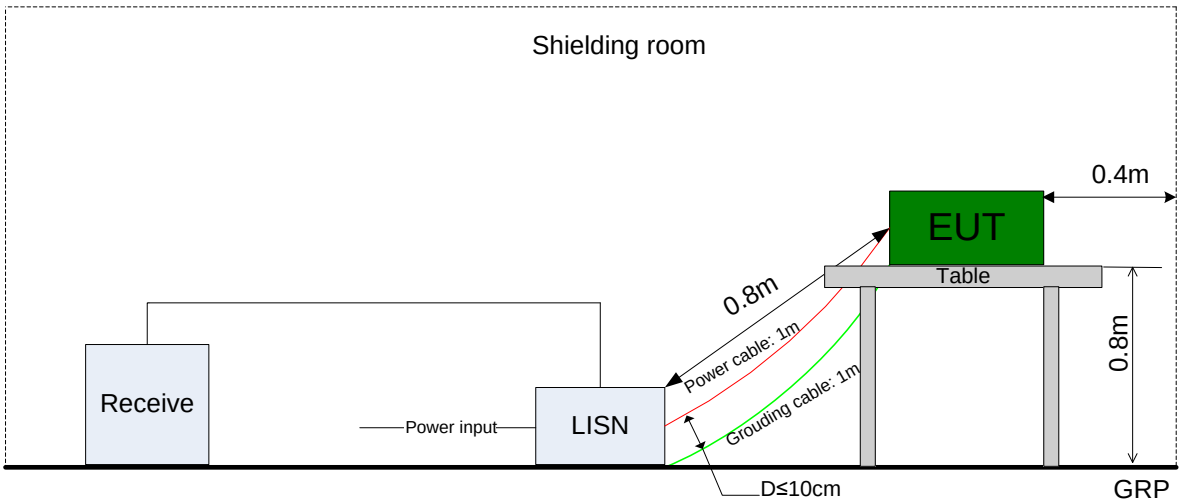
4.3.3 Test Setup 3

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.



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4.4 Test Conditions

Test Case	Test Conditions		
	Configuration	Description	
6dB Emission Bandwidth (EBW)	Meas. Method	FCC KDB 558074 §8.1 Option 2.	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch19, TM1_DH5_Ch39.	
Occupied Bandwidth	Meas. Method	FCC KDB 558074 §8.2 Option 2.	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_Ch0, TM1_Ch19, TM1_Ch39.	
Maximum Conducted Average Output Power	Meas. Method	FCC KDB 558074 §9.2 .2. 4	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch19, TM1_DH5_Ch39.	
Maximum Power Spectral Density Level	Meas. Method	FCC KDB 558074 §10.1	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch19, TM1_DH5_Ch39.	
Band edge spurious emission	Meas. Method	FCC KDB 558074 §13.0.	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch39.	
Unwanted Emissions into Non-Restricted Frequency Bands	Meas. Method	FCC KDB 558074 §11.0	
	Test Env.	NTNV	
	Test Setup	Test Setup 1	
	EUT Conf.	TM1_DH5_Ch0, TM1_DH5_Ch19, TM1_DH5_Ch39.	
Unwanted Emissions into Restricted Frequency Bands (Radiated)	Meas. Method	ANSI C63.10; FCC KDB 558074 §12.1, Radiated	
	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_Ch19, TM1_DH5_Ch39.
		3-18 GHz	TM1_DH5_Ch19 (Worse Conf.),
		18-26.5 GHz	TM1_DH5_Ch0 (Worst Conf.).
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.	

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5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	1342889	2015-09-16	2017-09-15
Wireless Communication Test set	Agilent	N4010A	MY49081592	2015-10-30	2016-10-29
Universal Radio Communication Tester	R&S	CMU200	123299	2015-10-30	2016-10-29
Spectrum Analyzer	Agilent	N9020A	MY52090652	2015-07-08	2016-07-07
Universal Radio Communication Tester	R & S	CMW500	126854	2015-02-13	2016-02-12
Spectrum Analyzer	Agilent	E4440A	MY48250119	2015-07-08	2016-07-07
Signal Analyzer	R&S	FSQ31	200021	2015-10-30	2016-10-29
Spectrum Analyzer	Agilent	N9030A	MY49431698	2015-10-30	2016-10-29
Temperature Chamber	WEISS	WKL64	56246002940010	2015-02-13	2016-02-12
Signal generator	Agilent	E8257D	MY49281095	2015-10-30	2016-10-29
Vector Signal Generator	R&S	SMU200A	104162	2015-10-30	2016-10-29
Test receiver	R&S	ESU26	100387	2015-6-24	2016-06-23
Test receiver	R&S	ESCI	101163	2015-6-24	2016-06-23
Spectrum analyzer	R&S	FSU3	200474	2015-06-15	2016-06-14
Spectrum analyzer	R&S	FSU43	100144	2015-06-15	2016-06-14
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100262	2015-4-30	2017-4-29
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2015-4-30	2017-4-29
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-490	2015-4-30	2017-4-29
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-520	2015-4-30	2017-4-29
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2015-4-30	2017-4-29
double ridged horn antenna（0.8G-18GHz)	R&S	HF907	100305	2015-4-30	2017-4-29
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	5140299	2015-7-15	2017-7-14
Artificial Main Network	R&S	ENV4200	100134	2015-6-24	2016-6-23
Line Impedance Stabilization Network	R&S	ENV216	100382	2015-6-24	2016-6-23
Signal Generator	Agilent	E4438C	MY49071538	2015-03-10	2016-03-09

END

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