



# RF Test Report

**Product Name: Distributed Remote Head**

**Product Model: DRH3919A**

**Report Number: SYBH(R)01170991EB-3**

**FCC ID: QISDRH3919A**

**IC ID: 6369A-DRH3919A**

**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.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1 and 6369A-3.
5. The laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers of test site No.1 are R-2364, G-415, C-2583, and T-256, and the accreditation numbers of test site No.2 are R-3760, G-485, C-4210 and T-1237.
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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:** Distributed Remote Head  
**Product Model:** DRH3919A

**Date of Receipt Sample:** 2013-09-12  
**Start Date of Test:** 2013-09-16  
**End Date of Test:** 2013-12-11

**Test Result:** Pass

<b>Approved by Senior Engineer:</b>	2013-12-16	Zhang Xinghai	<i>Zhang Xing hai</i>
	Date	Name	Signature

<b>Prepared by:</b>	2013-12-16	Li Guo	<i>Li Guo</i>
	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 (2013 Edition)  
47 CFR FCC Part 24 (2013 Edition)  
47 CFR FCC Part 20 (2013 Edition)  
IC RSS-Gen (Issue 3, December 2010)  
IC RSS-133 (Issue 6, January 2013)  
RSS-131 (Issue 2, July 2003)

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02  
FCC KDB 662911 D01 Multiple Transmitter Output v01  
GL-07 (Issue 1, January 2010)  
935210 D02 Signal Boosters Certification V01R01

### 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: 15 to 30 °C  
Ambient Relative Humidity: 20 to 80 %  
Atmospheric Pressure: Not applicable

## 2 Test Summary

### 2.1 PCS Band (1850-1910 MHz paired with 1930-1990 MHz)

#### 2.1.1 Non-measurement Technical Requirements

Description	FCC Rule No.	IC Rule No.	Requirements	Test Result	Verdict (NOTE)
Modulation Characteristics	§2.1047	RSS-133, §6.2	Digital modulation.	See technical specification description.	Comply
Frequency Plan		RSS-133, §6.1; SRSP-510, §4	Uplink: 1850-1910 MHz; Downlink: 1930-1990 MHz.	See technical specification description.	Comply

NOTE: For the verdict, the "N/A" denotes "not applicable".

#### 2.1.2 Technical Requirements

Test Item	FCC Rule No.	IC Rule No.	Requirements	Test Result	Verdict (NOTE 2)
RF Power Output	§2.1046, §24.232 §20.21	RSS-Gen, §4.8; RSS-133, §6.4 RSS-131, §6.2	FCC: EIRP ≤ 1640 W (for EBW ≤ 1MHz) or EIRP ≤ 1640 W/MHz (for EBW > 1MHz); PAR ≤ 13 dB. IC: Average EIRP ≤ 1640 W (for ChBW ≤ 1MHz) or Average EIRP ≤ 1640 W/MHz (for ChBW > 1MHz); Pcond ≤ 100 W; PAR ≤ 13 dB.	Appendix A	Pass
Bandwidth	§2.1049, §20.21	RSS-Gen, §4.6, RSS-131, §6.1	OBW: No limit. EBW: No limit.	Appendix B	Pass
Band Edges Compliance	§2.1051, §24.238 §20.21	RSS-Gen, §4.9; RSS-133, §6.5 RSS-131, §6.4	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Appendix C	Pass
Spurious Emission at Antenna Terminals(NOTE 3)	§2.1051, §24.238 §20.21	RSS-Gen, §4.9; RSS-133, §6.5 RSS-131, §6.4	≤ -13 dBm/1 MHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Appendix D	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238 §20.21	RSS-Gen, §4.9; RSS-133, §6.5 RSS-131, §6.4	≤ -13 dBm/1 MHz.	Appendix E	Pass
Frequency Stability	§2.1055, §24.235	RSS-Gen, §4.7; RSS-133, §6.3	FCC: within authorized frequency block.	Appendix F	Pass



Test Item	FCC Rule No.	IC Rule No.	Requirements	Test Result	Verdict (NOTE 2)
	§20.21	RSS-131, §6.5	IC: $\leq \pm 1.0$ ppm.		
Mean Output Power	--	RSS-131, §6.2	output power rating Prated MUST NOT be greater than Pmean	Appendix G	Pass
Non-Linearity	--	RSS-131, §6.3	$\leq -13$ dBm	Appendix H	Pass
Amplifier Gain and Bandwidth and Out of Band Rejection	§20.21	RSS-131, §6.1	FCC: Test for rejection of out of band signals, No limit. IC: G-Grated $\leq 1$ dB; 20 dB bandwidth $\leq$ nominal bandwidth; Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point;	Appendix I	
Photos of Test Setups	---	---	---	Appendix J	---
<p>NOTE 1: For the verdict, the "N/A" denotes "not applicable". According to the RSS- GEN, the receiver is not classified Category I Equipment Receivers.</p> <p>NOTE 3&amp;NOTE 4: For the EUT has two TRX ports, which supports MIMO, so the total limit is -13dBm and the limit for each port is <math>-13\text{dBm} - 10\lg 2 = -16\text{dBm}</math>;</p>					



### 3 **Description of the Equipment under Test (EUT)**

#### 3.1 **General Description**

The DRH3919A receive downlink baseband data from the DCU (Distributed Control Unit) and sends uplink baseband data to the DCU. The DRH3919A receive RF signals from the antenna system, down-converts the signals to intermediate frequency (IF) signals, amplifies the IF signals, and performs analog-to-digital conversion. The transmit (TX) channel filters downlink signals, performs digital-to-analog conversion, and up-converts RF signals to the TX band. Multiplexes receive (RX) and TX signals on the RF channel, which enables these signals to share the same antenna path. It also filters the RX and TX signals.

#### 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	
Board Name	Description
DRH3919A	Remote Radio Unit

##### 3.2.2 **Sub-Assembly**

Sub-Assembly Name	Description
DCU3900	Distributed Control Unit

### 3.3 Technical Specification

Characteristics	Description	
Radio System Type	<input checked="" type="checkbox"/> Industrial booster (Single Radio Access Technology, Single-RAT): <input checked="" type="checkbox"/> GSM, <input checked="" type="checkbox"/> UMTS, <input checked="" type="checkbox"/> LTE, <input type="checkbox"/> CDMA,	
Equipment Type	<input checked="" type="checkbox"/> industrial booster	
Supported Frequency Range	Downlink, F <sub>DL_low</sub> to F <sub>DL_high</sub> :	1930 to 1990 MHz
	Uplink, F <sub>UL_low</sub> to F <sub>UL_high</sub> :	1850 to 1910 MHz
Supported Channel Bandwidth (ChBW) / Channel Separation (ChS)	GSM:	<input checked="" type="checkbox"/> 200 kHz.
	UMTS:	<input checked="" type="checkbox"/> 5 MHz.
	LTE:	<input checked="" type="checkbox"/> 1.4 MHz, <input checked="" type="checkbox"/> 3 MHz, <input checked="" type="checkbox"/> 5 MHz, <input checked="" type="checkbox"/> 10 MHz, <input checked="" type="checkbox"/> 15 MHz, <input checked="" type="checkbox"/> 20 MHz.
		CDMA:
Type of Modulation / Spectral Efficiency Classes	GSM:	GMSK, 8PSK
	UMTS:	QPSK, 16QAM, 64QAM
	LTE:	QPSK, 16QAM, 64QAM
	CDMA:	--
Designation of Emissions	GSM:	300KGXW, 300KG7W
	UMTS:	5M00F9W
	LTE:	1M40D9W, 3M00D9W, 5M00D9W, 10M0D9W, 15M0D9W, 20M0D9W
	CDMA:	--
Transmission (TX) and Receiving (RX) Antenna Ports	TX & RX port:	2
	TX-only port:	0
	RX-only port:	0
Special for Industrial booster	Output Power:	Max. 20 W (43 dBm) (per antenna port)
	Output Gain:	Min. 17 dB    Max. 37 dB
Power Supply	Power Supply Type:	<input type="checkbox"/> External AC mains, <input checked="" type="checkbox"/> External DC mains, <input type="checkbox"/> AC/DC Adapter, <input type="checkbox"/> Powered over Ethernet (PoE).
	Nominal Voltage, Input to EUT:	-48 VDC
	Voltage Range, Input to EUT:	-36 to -57 VDC
Environment	Temperature:	-40 to +55 °C
	Relative Humidity:	5 to 100 %
Antenna Assembles	Antenna Type:	<input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated



Characteristics	Description	
	Smart Antenna:	<input checked="" type="checkbox"/> MIMO, <input type="checkbox"/> Non MIMO
	Max. Antenna Gain:	11 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.

## 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"> <li>- All TX tests are ONLY performed at the main TX antenna port (e.g. ANTA, TXA or similar) of the EUT, and</li> <li>- All RX tests are ONLY performed at the main RX antenna port (e.g. ANTA, RXB or similar) of the EUT.</li> </ul>
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

The DRH3919A supports dual single mode and MIMO mode. All modes have been included when several settings were tested to find the worst case setting, and Tx MIMO was used for the Tx measurements.

The settings below were found to be representative for all traffic scenarios to find the worst case setting.

EUT Conf. (note1)	Input signal Freq. [MHz] (note1)	Input signal BW [MHz]	Type of input Signal	Pass band Configure [MHz]	MAX Output Power (dBm)	Gain [dB]	Direction
DL_1G_TM1_B_ANTA	1930.4	0.2	GSM@GMSK	1930.3-1930.5	43.0	37	Downlink
DL_1G_TM1_M_ANTA	1960	0.2	GSM@GMSK	1959.9-1960.1	43.0	37	Downlink
DL_1G_TM1_T_ANTA	1989.6	0.2	GSM@GMSK	1989.5-1989.7	43.0	37	Downlink
DL_1G_TM2_B_ANTA	1930.4	0.2	GSM@8PSK	1930.3-1930.5	43.0	37	Downlink
DL_1G_TM2_M_ANTA	1960	0.2	GSM@8PSK	1959.9-1960.1	43.0	37	Downlink
DL_1G_TM2_T_ANTA	1989.6	0.2	GSM@8PSK	1989.5-1989.7	43.0	37	Downlink
DL_2G_TM1_B_ANTA	1930.4,1931	0.2,0.2	GSM@GMSK	1930.3-1931.1	43.0	37	Downlink
DL_2G_TM1_M_ANTA	1959.6,1960.2	0.2,0.2	GSM@GMSK	1959.5-1960.3	43.0	37	Downlink
DL_2G_TM1_T_ANTA	1989,1989.6	0.2,0.2	GSM@GMSK	1988.9-1989.7	43.0	37	Downlink
DL_2G_TM2_B_ANTA	1930.4,1931	0.2,0.2	GSM@8PSK	1930.3-1931.1	43.0	37	Downlink
DL_2G_TM2_M_ANTA	1959.6,1960.2	0.2,0.2	GSM@8PSK	1959.5-1960.3	43.0	37	Downlink
DL_2G_TM2_T_ANTA	1989,1989.6	0.2,0.2	GSM@8PSK	1988.9-1989.7	43.0	37	Downlink
DL_1U_TM1_B_ANTA	1932.4	5	UMTS@TM1	1930.0-1935.0	43.0	37	Downlink
DL_1U_TM1_M_ANTA	1960	5	UMTS@TM1	1957.5-1962.5	43.0	37	Downlink
DL_1U_TM1_T_ANTA	1987.6	5	UMTS@TM1	1985.0-1990.0	43.0	37	Downlink
DL_2U_TM1_B_ANTA	1932.4,1937.4	5,5	UMTS@TM1	1930.0-1940.0	43.0	37	Downlink
DL_2U_TM1_M_ANTA	1957.6,1962.6	5,5	UMTS@TM1	1955.1-1965.1	43.0	37	Downlink



EUT Conf. (note1)	Input signal Freq. [MHz] (note1)	Input signal BW [MHz]	Type of input Signal	Pass band Configure [MHz]	MAX Output Power (dBm)	Gain [dB]	Direction
DL_2U_TM1_T_ANTA	1982.6,1987.6	5,5	UMTS@TM1	1980.0-1990.0	43.0	37	Downlink
DL_1L_1.4M_B_ANTA	1930.7	1.4	LTE@E-TM1.1	1930-1931.4	43.0	37	Downlink
DL_1L_1.4M_M_ANTA	1960	1.4	LTE@E-TM1.1	1959.3-1960.7	43.0	37	Downlink
DL_1L_1.4M_T_ANTA	1989.3	1.4	LTE@E-TM1.1	1988.6-1990	43.0	37	Downlink
DL_2L_1.4M_B_ANTA	1930.7,1932.1	1.4,1.4	LTE@E-TM1.1	1930-1932.8	43.0	37	Downlink
DL_2L_1.4M_M_ANTA	1959.3,1960.7	1.4,1.4	LTE@E-TM1.1	1958.6-1961.4	43.0	37	Downlink
DL_2L_1.4M_T_ANTA	1987.9,1989.3	1.4,1.4	LTE@E-TM1.1	1987.2-1990	43.0	37	Downlink
DL_1L_20M_B_ANTA	1940	20	LTE@E-TM1.1	1930-1950	43.0	37	Downlink
DL_1L_20M_M_ANTA	1960	20	LTE@E-TM1.1	1950-1970	43.0	37	Downlink
DL_1L_20M_T_ANTA	1980	20	LTE@E-TM1.1	1970-1990	43.0	37	Downlink
DL_20M_B_ANTA	Sweep	0	CW	1930-1950	43.0	37	Downlink
DL_20M_M_ANTA	Sweep	0	CW	1950-1970	43.0	37	Downlink
DL_20M_T_ANTA	Sweep	0	CW	1970-1990	43.0	37	Downlink
DL_1CW_M_ANTA	1960	0	CW	1959.9-1960.1	43.0	37	Downlink
DL_2CW_B_ANTA	1931.8,1932.4	0,0	CW	1930.0-1935.0	43.0	37	Downlink
DL_2CW_M_ANTA	1960.0,1960.6	0,0	CW	1958.0-1963.0	43.0	37	Downlink
DL_2CW_T_ANTA	1987.0, 1987.6	0,0	CW	1985.0-1990.0	43.0	37	Downlink
DL_1G_TM1_B_ANTB	1930.4	0.2	GSM@GMSK	1930.3-1930.5	43.0	37	Downlink
DL_1G_TM1_M_ANTB	1960	0.2	GSM@GMSK	1959.9-1960.1	43.0	37	Downlink
DL_1G_TM1_T_ANTB	1989.6	0.2	GSM@GMSK	1989.5-1989.7	43.0	37	Downlink
DL_1G_TM2_B_ANTB	1930.4	0.2	GSM@8PSK	1930.3-1930.5	43.0	37	Downlink
DL_1G_TM2_M_ANTB	1960	0.2	GSM@8PSK	1959.9-1960.1	43.0	37	Downlink
DL_1G_TM2_T_ANTB	1989.6	0.2	GSM@8PSK	1989.5-1989.7	43.0	37	Downlink
DL_2G_TM1_B_ANTB	1930.4,1931	0.2,0.2	GSM@GMSK	1930.3-1931.1	43.0	37	Downlink
DL_2G_TM1_M_ANTB	1959.6,1960.2	0.2,0.2	GSM@GMSK	1959.5-1960.3	43.0	37	Downlink
DL_2G_TM1_T_ANTB	1989,1989.6	0.2,0.2	GSM@GMSK	1988.9-1989.7	43.0	37	Downlink
DL_2G_TM2_B_ANTB	1930.4,1931	0.2,0.2	GSM@8PSK	1930.3-1931.1	43.0	37	Downlink
DL_2G_TM2_M_ANTB	1959.6,1960.2	0.2,0.2	GSM@8PSK	1959.5-1960.3	43.0	37	Downlink
DL_2G_TM2_T_ANTB	1989,1989.6	0.2,0.2	GSM@8PSK	1988.9-1989.7	43.0	37	Downlink
DL_1U_TM1_B_ANTB	1932.4	5	UMTS@TM1	1930.0-1935.0	43.0	37	Downlink
DL_1U_TM1_M_ANTB	1960	5	UMTS@TM1	1957.5-1962.5	43.0	37	Downlink
DL_1U_TM1_T_ANTB	1987.6	5	UMTS@TM1	1985.0-1990.0	43.0	37	Downlink
DL_2U_TM1_B_ANTB	1932.4,1937.4	5,5	UMTS@TM1	1930.0-1940.0	43.0	37	Downlink
DL_2U_TM1_M_ANTB	1957.6,1962.6	5,5	UMTS@TM1	1955.1-1965.1	43.0	37	Downlink
DL_2U_TM1_T_ANTB	1982.6,1987.6	5,5	UMTS@TM1	1980.0-1990.0	43.0	37	Downlink
DL_1L_1.4M_B_ANTB	1930.7	1.4	LTE@E-TM1.1	1930-1931.4	43.0	37	Downlink
DL_1L_1.4M_M_ANTB	1960	1.4	LTE@E-TM1.1	1959.3-1960.7	43.0	37	Downlink
DL_1L_1.4M_T_ANTB	1989.3	1.4	LTE@E-TM1.1	1988.6-1990	43.0	37	Downlink
DL_2L_1.4M_B_ANTB	1930.7,1932.1	1.4,1.4	LTE@E-TM1.1	1930-1932.8	43.0	37	Downlink



EUT Conf. (note1)	Input signal Freq. [MHz] (note1)	Input signal BW [MHz]	Type of input Signal	Pass band Configure [MHz]	MAX Output Power (dBm)	Gain [dB]	Direction
DL_2L_1.4M_M_ANTB	1959.3,1960.7	1.4,1.4	LTE@E-TM1.1	1958.6-1961.4	43.0	37	Downlink
DL_2L_1.4M_T_ANTB	1987.9,1989.3	1.4,1.4	LTE@E-TM1.1	1987.2-1990	43.0	37	Downlink
DL_1L_20M_B_ANTB	1940	20	LTE@E-TM1.1	1930-1950	43.0	37	Downlink
DL_1L_20M_M_ANTB	1960	20	LTE@E-TM1.1	1950-1970	43.0	37	Downlink
DL_1L_20M_T_ANTB	1980	20	LTE@E-TM1.1	1970-1990	43.0	37	Downlink
DL_20M_B_ANTB	Sweep	0	CW	1930-1950	43.0	37	Downlink
DL_20M_M_ANTB	Sweep	0	CW	1950-1970	43.0	37	Downlink
DL_20M_T_ANTB	Sweep	0	CW	1970-1990	43.0	37	Downlink
DL_1CW_M_ANTB	1960	0	CW	1959.9-1960.1	43.0	37	Downlink
DL_2CW_B_ANTB	1931.8,1932.4	0,0	CW	1930.0-1935.0	43.0	37	Downlink
DL_2CW_M_ANTB	1960.0,1960.6	0,0	CW	1958.0-1963.0	43.0	37	Downlink
DL_2CW_T_ANTB	1987.0, 1987.6	0,0	CW	1985.0-1990.0	43.0	37	Downlink

Note1: "ANTA" and "ANTB" means Antenna connector port.  
Note2: "sweep" means sweep appointed frequency band with a continuous sinusoid signal to get a frequency response plot

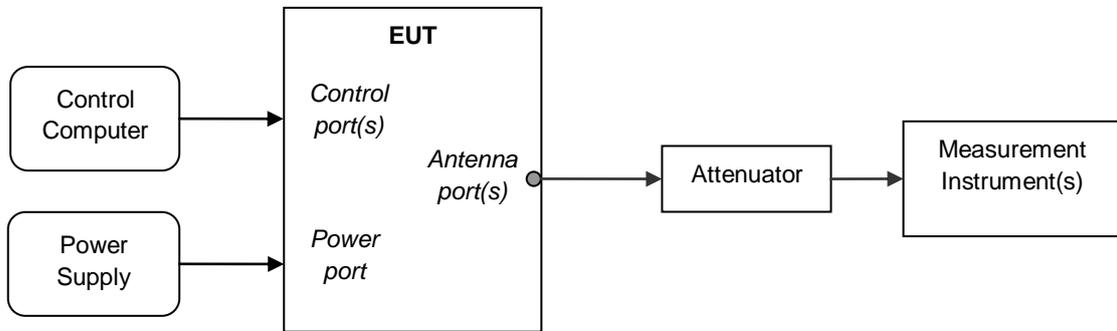


## 4.2 Test Environments

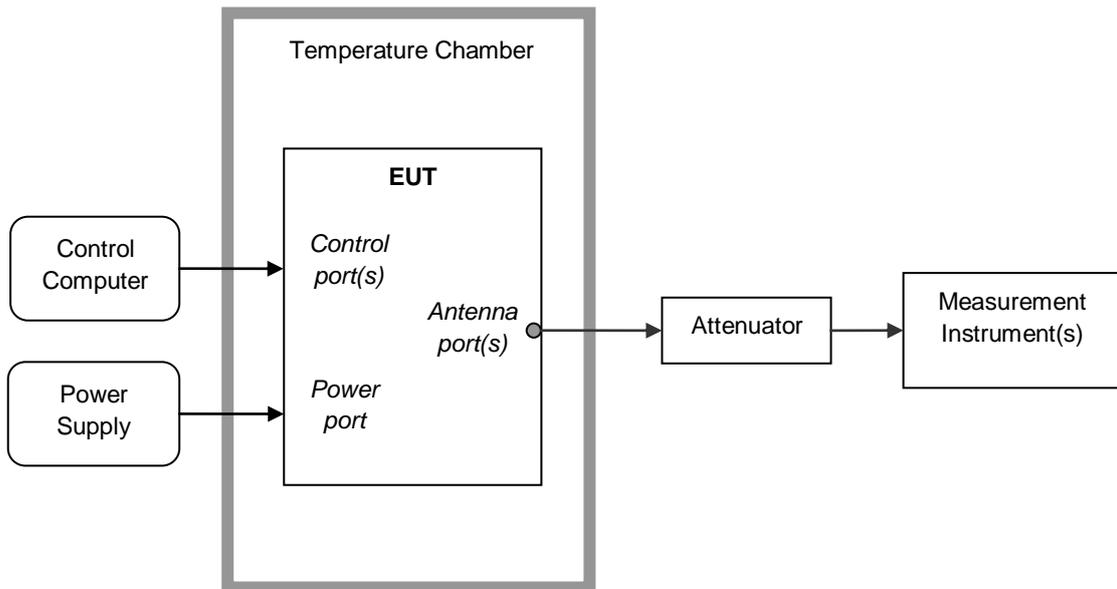
Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Ambient Climate	Ambient	---	Ambient
Rated Voltage	---	-48 VDC	---

### 4.3 Test Setups

#### 4.3.1 Test Setup 1



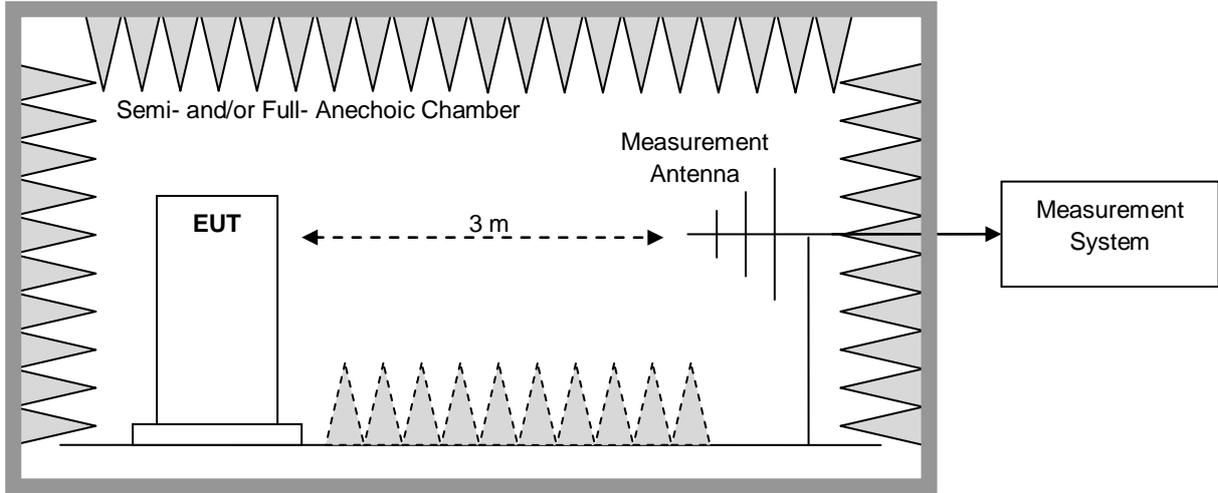
#### 4.3.2 Test Setup 2



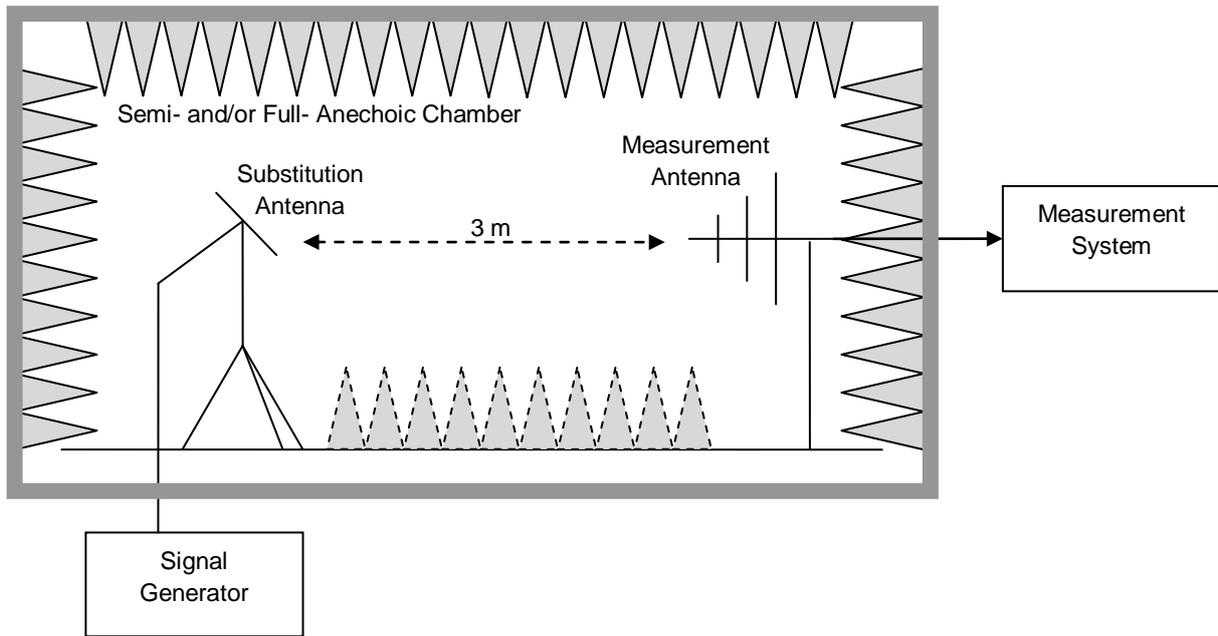
#### 4.3.3 Test Setup 3

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

##### 4.3.3.1 Step 1: Pre-test



#### 4.3.3.2 Step 2: Substitution method to verify the maximum ERP



#### 4.4 Test Conditions

Test Case		Test Conditions	
Transmitter Output Power- Conduct	Average Power, Total	Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_B_ANTA, DL_1G_TM1_M_ANTA, DL_1G_TM1_T_ANTA, DL_1G_TM2_B_ANTA, DL_1G_TM2_M_ANTA, DL_1G_TM2_T_ANTA, DL_1U_TM1_B_ANTA, DL_1U_TM1_M_ANTA, DL_1U_TM1_T_ANTA, DL_1L_1.4M_B_ANTA, DL_1L_1.4M_M_ANTA, DL_1L_1.4M_T_ANTA, DL_1L_20M_B_ANTA, DL_1L_20M_M_ANTA, DL_1L_20M_T_ANTA, DL_1G_TM1_B_ANTB, DL_1G_TM1_M_ANTB, DL_1G_TM1_T_ANTB, DL_1G_TM2_B_ANTB, DL_1G_TM2_M_ANTB, DL_1G_TM2_T_ANTB, DL_1U_TM1_B_ANTB, DL_1U_TM1_M_ANTB, DL_1U_TM1_T_ANTB, DL_1L_1.4M_B_ANTB, DL_1L_1.4M_M_ANTB, DL_1L_1.4M_T_ANTB, DL_1L_20M_B_ANTB, DL_1L_20M_M_ANTB, DL_1L_20M_T_ANTB,
	Peak-to-Average Ratio (if required)	Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB, DL_1G_TM2_M_ANTA, DL_1G_TM2_M_ANTB, DL_1U_TM1_M_ANTA, DL_1U_TM1_M_ANTB, DL_1L_1.4M_M_ANTA, DL_1L_1.4M_M_ANTB, DL_1L_20M_M_ANTA, DL_1L_20M_M_ANTB,
Bandwidth	Occupied Bandwidth	Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB, DL_1G_TM2_M_ANTA, DL_1G_TM2_M_ANTB, DL_1U_TM1_M_ANTA, DL_1U_TM1_M_ANTB, DL_1L_1.4M_M_ANTA, DL_1L_1.4M_M_ANTB, DL_1L_20M_M_ANTA, DL_1L_20M_M_ANTB,
	20dB Bandwidth	Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB, DL_1G_TM2_M_ANTA, DL_1G_TM2_M_ANTB, DL_1U_TM1_M_ANTA, DL_1U_TM1_M_ANTB,



Test Case		Test Conditions	
	26dB Bandwidth		DL_1L_1.4M_M_ANTA, DL_1L_1.4M_M_ANTB, DL_1L_20M_M_ANTA, DL_1L_20M_M_ANTB,
		Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB, DL_1G_TM2_M_ANTA, DL_1G_TM2_M_ANTB, DL_1U_TM1_M_ANTA, DL_1U_TM1_M_ANTB, DL_1L_1.4M_M_ANTA, DL_1L_1.4M_M_ANTB, DL_1L_20M_M_ANTA, DL_1L_20M_M_ANTB,
Band Edges Compliance		Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_B_ANTA, DL_1G_TM1_B_ANTB, DL_1G_TM1_T_ANTA, DL_1G_TM1_T_ANTB, DL_2G_TM1_B_ANTA, DL_2G_TM1_B_ANTB, DL_2G_TM1_T_ANTA, DL_2G_TM1_T_ANTB, DL_1U_TM1_B_ANTA, DL_1U_TM1_B_ANTB, DL_1U_TM1_T_ANTA, DL_1U_TM1_T_ANTB, DL_2U_TM1_B_ANTA, DL_2U_TM1_B_ANTB, DL_2U_TM1_T_ANTA, DL_2U_TM1_T_ANTB, DL_1L_1.4M_B_ANTA, DL_1L_1.4M_B_ANTB, DL_1L_1.4M_T_ANTA, DL_1L_1.4M_T_ANTB, DL_2L_1.4M_B_ANTA, DL_2L_1.4M_B_ANTB, DL_2L_1.4M_T_ANTA, DL_2L_1.4M_T_ANTB,
Spurious Emission at Antenna Terminals		Test Environment.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	DL_1G_TM1_B_ANTA, DL_1G_TM1_B_ANTB, DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB, DL_1G_TM1_T_ANTA, DL_1G_TM1_T_ANTB, DL_2G_TM1_B_ANTA, DL_2G_TM1_B_ANTB, DL_2G_TM1_M_ANTA, DL_2G_TM1_M_ANTB, DL_2G_TM1_T_ANTA, DL_2G_TM1_T_ANTB, DL_1U_TM1_B_ANTA, DL_1U_TM1_B_ANTB, DL_1U_TM1_M_ANTA, DL_1U_TM1_M_ANTB, DL_1U_TM1_T_ANTA, DL_1U_TM1_T_ANTB, DL_2U_TM1_B_ANTA, DL_2U_TM1_B_ANTB, DL_2U_TM1_M_ANTA, DL_2U_TM1_M_ANTB, DL_2U_TM1_T_ANTA, DL_2U_TM1_T_ANTB, DL_1L_1.4M_B_ANTA, DL_1L_1.4M_B_ANTB, DL_1L_1.4M_M_ANTA, DL_1L_1.4M_M_ANTB, DL_1L_1.4M_T_ANTA, DL_1L_1.4M_T_ANTB,

Test Case	Test Conditions	
		DL_2L_1.4M_B_ANTA, DL_2L_1.4M_B_ANTB, DL_2L_1.4M_M_ANTA, DL_2L_1.4M_M_ANTB, DL_2L_1.4M_T_ANTA, DL_2L_1.4M_T_ANTB,  NOTE: A representative EUT configuration was selected since the un-modulation carrier configuration was required by the standards/rules while all the actual operating signals for EUT are modulation signals.
Field Strength of Spurious Radiation	Test Environment.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	EUT Conf.	DL_1CW_M_ANTA, DL_1CW_M_ANTB
Frequency Stability	Test Environment.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) 85%, 100% and 115% of Rated Voltage at Ambient Climate.
	Test Setup	Test Seup 2
	EUT Conf.	DL_1G_TM1_M_ANTA, DL_1G_TM1_M_ANTB  NOTE: A representative EUT configuration was selected since the un-modulation carrier configuration was required by the standards/rules while all the actual operating signals for EUT are modulation signals.
Mean Output Power	Test Environment.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	EUT Conf.	DL_2CW_M_ANTA, DL_2CW_M_ANTB
Non-Linearity	Test Environment.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	EUT Conf.	DL_2CW_B_ANTA, DL_2CW_B_ANTB, DL_2CW_M_ANTA, DL_2CW_M_ANTB, DL_2CW_T_ANTA, DL_2CW_T_ANTB,
Amplifier Gain and Bandwidth and Out of Band Rejection	Test Environment.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	EUT Conf.	DL_20M_B_ANTA, DL_20M_T_ANTA, DL_20M_B_ANTB, DL_20M_T_ANTB,  NOTE: EUT will not configure the whole operating band, so lower 20MHz sub-band and upper 20MHz sub-band are selected to test.



## 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. Due
Test Setup 1 & 2				
Spectrum Analyzer	R&S	FSQ26	101153	2013-12-24
Power Meter	Agilent	E4417A	GB41292113	2014-05-13
Vector Signal Generator	R&S	SMU200A	105242	2014-07-25
Vector Signal Generator	Agilent	E4438C	MY49072562	2014-08-18
Signal Generator	Agilent	E8257D	MY49281095	2014-09-21
Climate Chamber	ESPEC	ESS-KWGDS61	200900666	2014-08-19
Test Setup 3				
3m Semi Anechoic Chamber	S+M	---	---	---
EMI Test Receiver	R&S	ESU40	100144	2014-01-09
Bilog Antenna	Schaffner	CBL 6112B	2536	2015-03-22
Horn Antenna	R&S	HF906	359287/005	2014-03-23

## 6 Measurement Uncertainty

For a 95% confidence level ( $k = 2$ ), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item		Extended Uncertainty
RF Power Output	Power [dBm]	U = 0.39 dB
Bandwidth	Magnitude [%]	U = 0.2%
Band Edge Compliance	Disturbance Power [dBm]	U = 2.0 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	U = 2.0 dB
Field Strength of Spurious Radiation	ERP [dBm]	For 3 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz) For 10 m Chamber: U = 4.6 dB (30 MHz to 1GHz) U = 3.0 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy [ppm]	U = 0.21 ppm
Mean Output Power	Disturbance Power [dBm]	U = 1.2 dB
Non-Linearity		U = 1.2 dB
Amplifier Gain and Bandwidth and Out of Band Rejection		U = 0.39 dB

END