

# RF Test Report

**Product Name: Pico BTS**

**Product Model: BTS3911B**

**Report Number: SYBH(R)02062087EB-1**

**FCC ID: QISBTS3911B**

**IC: 6369A-BTS3911B**

**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.
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3. The laboratory has been listed by the US Federal Communications Commission to perform electromagnetic emission measurements. The site recognition number for the test site located in Shenzhen is 97456, and the recognition numbers for the test site located in Shanghai is 684868.
4. The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers are 6369A-1 for the 3m chamber test site located at G2 building, 6369A-2 for the 3m chamber test site located at K3 building and 6369A-3 for the 10m chamber test site located at K3 building in Shenzhen; the recognition numbers are 6369D-1 for the 3m chamber test site and 6369D-2 for the 10m chamber test site located in Shanghai.
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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:** Pico BTS  
**Product Model:** BTS3911B

	For LTE	For UMTS and UL
<b>Date of Receipt Sample:</b>	2015-04-17	2015-10-19
<b>Start Date of Test:</b>	2015-04-17	2015-10-19
<b>End Date of Test:</b>	2015-05-04	2015-11-09

**Test Result:** Pass

<b>Approved by Senior</b>	2015-11-09	Zhang Xinghai	<i>Zhang Xing hai</i>
<b>Engineer:</b>	Date	Name	Signature

<b>Prepared by:</b>	2015-11-09	Hu Wei	<i>Hu Wei</i>
	Date	Name	Signature



### Modification Record

No.	Last Report No.	Modification Description
1	SYBH(R)01787709EB-1	Add UMTS and UL config, and the hardware is not changed. The test data for LTE is just quoted from last report SYBH(R)01787709EB-1, and the new test data for UMTS and UL is added.



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## 1 General Information

### 1.1 Applied Standard

Applied Rules:	47 CFR FCC Part 2 (10-1-14 Edition) 47 CFR FCC Part 24 (10-1-14 Edition) 47 CFR FCC Part 27 (10-1-14 Edition) IC RSS-Gen (Issue 4, November 2014) IC RSS-133 (Issue 6, January 2013) IC RSS-139 (Issue 3, July 2015)
Test Method:	FCC KDB 971168 D01 Power Meas License Digital Systems v02r02(if applicable) FCC KDB 662911 D01 Multiple Transmitter Output v02r01(if applicable)

### 1.2 Test Location

Test Location 1 (TL1):	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Test Location 2 (TL2):	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	No.2222, Xin Jinqiao Road, Pudong New Area, Shanghai, 201206, P.R.C
Test Location 3 (TL3):	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address:	No.1899 Xiyuan Avenue, Hi-tech Western District, Chengdu, 611731, P.R.C

### 1.3 Test Environment Condition

Temperature:	20.5 to 28 °C (Ambient)
Relative Humidity:	49 to 70 % (Ambient)
Atmospheric Pressure:	Not applicable



## 2 Test Summary

### 2.1 AWS Band (1710-1780 MHz paired with 2110-2180 MHz)

#### 2.1.1 Measurement Technical Requirements

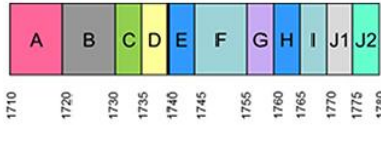
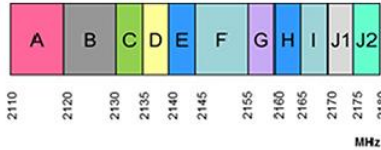
Test Item	FCC Rule	IC Rule	Requirements			Test Result	Verdict	Test Location
Transmitter Output Power	§2.1046, §27.50(d)	RSS-Gen,§6.12; RSS-139,§6.5; RSS-139,§4.1	FCC	Base Station / Fixed Station	<ul style="list-style-type: none"><li>● Average EIRP Power <math>\leq 1640</math> W (for EBW <math>\leq 1</math> MHz)( for 2110 - 2180 MHz).</li><li>● Average EIRP PD <math>\leq 1640</math> W/MHz (for EBW <math>&gt; 1</math> MHz)( for 2110 - 2180 MHz).</li><li>● Average EIRP Power <math>\leq 1</math> W (for 1710-1755 MHz)</li><li>● PAPR <math>\leq 13</math> dB@0.1%.</li></ul>	Appendix A1	Pass	TL1
				Mobile Station / Portable Station	<ul style="list-style-type: none"><li>● Average EIRP Power <math>\leq 1</math> W(For 1710-1780 MHz).</li><li>● PAPR <math>\leq 13</math>dB@0.1%.</li></ul>			
			IC	Base Station / Fixed Station	<ul style="list-style-type: none"><li>● Average EIRP Power <math>\leq 1640</math> W (for ChBW <math>\leq 1</math> MHz)( For 2110 - 2180 MHz).</li><li>● Average EIRP PD <math>\leq 1640</math> W/MHz (for ChBW <math>&gt; 1</math> MHz)( For 2110 - 2180 MHz).</li><li>● Average EIRP Power <math>\leq 1</math> W (for 1710-1780 MHz)</li><li>● PAPR <math>\leq 13</math> dB@0.1%.</li></ul>			
				Mobile and Portable Transmitter	<ul style="list-style-type: none"><li>● Average EIRP Power <math>\leq 1</math> W(For 1710-1780 MHz).</li><li>● PAPR <math>\leq 13</math>dB@0.1%.</li></ul>			
Bandwidth	§2.1049, §27.53(h)	RSS-Gen,§6.6; RSS-139,§2.3	FCC	<ul style="list-style-type: none"><li>● OBW: No limit.</li><li>● EBW (-26 dBc): No limit.</li></ul>		Appendix B1	Pass	TL1

Test Item	FCC Rule	IC Rule	Requirements		Test Result	Verdict	Test Location
			IC	<ul style="list-style-type: none"> <li>OBW: No limit.</li> <li>EBW (-20 dBc): No limit.</li> </ul>			
Band Edges Compliance / Emission Mask	§2.1051, §27.53(h)	RSS-Gen, §6.13; RSS-139, §6.6	FCC	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. (EBW is -26 dBc EBW)	Appendix C1	Pass	TL1
			IC	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. (EBW is -20 dBc EBW, or OBW)			
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	RSS-Gen, §6.13; RSS-139, §6.6	≤ -13 dBm/1 MHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.		Appendix D1	Pass	TL1
Field Strength of Spurious Radiation / Radiated Spurious Emissions	§2.1053, §27.53(h)	RSS-Gen, §6.13; RSS-139, §6.6	≤ -13 dBm/1 MHz.		Appendix E1	Pass	TL3
Frequency Stability	§2.1055, §27.54	RSS-Gen, §6.11; RSS-139, §6.4	FCC	<ul style="list-style-type: none"> <li>Test method: Fundamental emissions (Fc_meas) within the authorized bands of operation.</li> <li>Test conditions: (1) NV, -30°C/.../+50°C step=+10°C. (2) NT, ±15%*NV.</li> </ul>	Appendix F1	Pass	TL1
			IC	<ul style="list-style-type: none"> <li>Test method: OBW within frequency block.</li> <li>Test conditions: (1) NV, -30°C/+20°C/+50°C. (2) +20°C, ±15%*NV.</li> </ul>			
Receiver Spurious Emissions	---	RSS-Gen, §5; RSS-Gen, §7;	---		Appendix G1	---	---

## 2.1.2 Non-measurement Technical Requirements

Description	FCC Rule	IC Rule	Requirements	Test Result	Verdict
Frequency Plan	§27.5(h)	RSS-139, §6.1	1710-1780 MHz paired with 2110-2180 MHz:	See technical	Comply



Description	FCC Rule	IC Rule	Requirements	Test Result	Verdict
	§27.5(j)		 	specification description.	
Modulation Characteristics	§2.1047	RSS-139,§6.2	Any modulation.	See technical specification description.	Comply



## 2.2 PCS Band (1850-1915 MHz paired with 1930-1995 MHz)

### 2.2.1 Measurement Technical Requirements

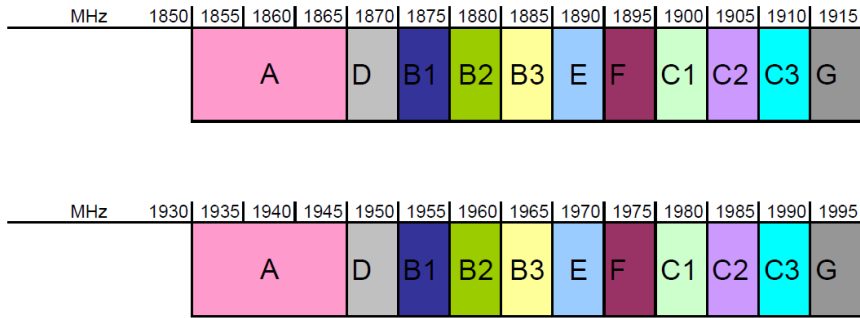
Test Item	FCC Rule	IC Rule	Requirements			Test Result	Verdict	Test Location
Transmitter Output Power	§2.1046, §24.232	RSS-Gen,§6.12; RSS-133,§6.4; RSS-133,§4.1	FCC	Base Station	<ul style="list-style-type: none"><li>Average EIRP Power ≤ 1640 W (for EBW ≤ 1 MHz).</li><li>Average EIRP PD ≤ 1640 W/MHz (for EBW &gt; 1 MHz).</li><li>PAPR ≤ 13 dB@0.1%.</li></ul>	Appendix A2	Pass	TL1
				Mobile Station / Portable Station	<ul style="list-style-type: none"><li>Average EIRP ≤ 2 W.</li><li>PAPR ≤ 13 dB@0.1%.</li></ul>			
			IC	Base Station	<ul style="list-style-type: none"><li>Average EIRP Power ≤ 1640 W (for ChBW ≤ 1 MHz).</li><li>Average EIRP PD ≤ 1640 W/MHz (for ChBW &gt; 1 MHz).</li><li>Average Conducted Power ≤ 100 W.</li><li>PAPR ≤ 13 dB@0.1%.</li></ul>			
				Mobile Station / Hand-held Portable Station	<ul style="list-style-type: none"><li>Average EIRP Power ≤ 2 W.</li><li>PAPR ≤ 13 dB@0.1%.</li></ul>			
Bandwidth	§2.1049, §24.238	RSS-Gen,§6.6; RSS-133,§2.3	FCC	<ul style="list-style-type: none"><li>OBW: No limit.</li><li>EBW (-26 dBc): No limit.</li></ul>		Appendix B2	Pass	TL1
			IC	<ul style="list-style-type: none"><li>OBW: No limit, may in lieu of EBW (-20 dBc).</li><li>EBW (-20 dBc): No limit.</li></ul>				
Band Edges	§2.1051,	RSS-Gen,§6.13;	FCC	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the		Appendix	Pass	TL1

Test Item	FCC Rule	IC Rule	Requirements		Test Result	Verdict	Test Location
Compliance	§24.238	RSS-133,§6.5		frequency block. (EBW is -26 dBc EBW)	C2		
			IC	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. (EBW is -20 dBc EBW, or OBW)			
Spurious Emission at Antenna Terminals	§2.1051, §24.238	RSS-Gen,§6.13; RSS-133,§6.5	≤ -13 dBm/1 MHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency blocks.		Appendix D2	Pass	TL1
Field Strength of Spurious Radiation	§2.1053, §24.238	RSS-Gen,§6.13; RSS-133,§6.5	≤ -13 dBm/1 MHz.		Appendix E2	Pass	TL3
Frequency Stability	§2.1055, §24.235	RSS-Gen,§6.11; RSS-133,§6.3	FCC	<ul style="list-style-type: none"> <li>Test method: Fundamental emissions (Fc_meas) within the authorized frequency block.</li> <li>Test conditions: (1) NV, -30°C/.../+50°C step=+10°C. (2) NT, ±15%*NV.</li> </ul>	Appendix F2	Pass	TL1
			IC	<div>Base Station</div> <ul style="list-style-type: none"> <li>Test method option #1: (Fc_meas - Fc_meas@20°C&amp;NV) / Fc_meas@20°C&amp;NV ≤ ±1.0 ppm.</li> <li>Test method option#2: EBW (EBW_lower to EBW_higher) within frequency block.</li> <li>Test conditions: (1) NV, -30°C/+20°C/+50°C. (2) +20°C, ±15%*NV. (EBW is -20 dBc EBW, or OBW)</li> </ul>			
			IC	<div>Mobile Station</div> <ul style="list-style-type: none"> <li>Test method option #1: (Fc_meas - Fc_meas@20°C&amp;NV) / Fc_meas@20°C&amp;NV ≤ ±2.5 ppm.</li> <li>Test method option #2: EBW (EBW_lower to EBW_higher) within</li> </ul>			



Test Item	FCC Rule	IC Rule	Requirements			Test Result	Verdict	Test Location
					frequency block. ● Test conditions: (1) NV, -30°C/+20°C/+50°C. (2) +20°C, ±15%*NV. (EBW is -20 dBc EBW, or OBW)			
Receiver Spurious Emissions	---	IC NOTICE 2012-DRS0126	---			Appendix G2	---	---
Photos of Test Setups	---	---	---			---	---	---

## 2.2.2 Non-measurement Technical Requirements

Description	FCC Rule	IC Rule	Requirements	Test Result	Verdict
Frequency Plan	§24.229	RSS-133,§6.1	1850-1915 MHz paired with 1930-1995 MHz: 	See technical specification description.	Comply
Modulation Characteristics	§2.1047	RSS-133,§6.2	Digital modulation.	See technical specification description.	Comply

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

#### 3.1 General Description

The industry-leading BTS3911B is an LTE/UMTS/WLAN multi-band indoor micro base station, helping operators cope with the rapidly increasing traffic volume in the mobile broadband era. The BTS3911B is compact, lightweight, enables plug-and-play deployment, and offers self-configuration features, making it an excellent choice for operators. The BTS3911B does not require shelter or equipment room facilities, thereby simplifying site acquisition and network deployment.

#### 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	Hardware Version	Description
WD6BXRUIBA00	Ver.B	Manufactured Board,BTS3911B,WD6BXRUIBA00,Interface Board,5*1
WD6BIPX2W000	Ver.B	Manufactured Board,BTS3911B,WD6BIPX2W000,Transceiver Board,2T2R*2,AWS+PCS,1*1
WD6BIPX2W002	Ver.B	Manufactured Board,BTS3911B,WD6BIPX2W002,Transceiver Board,2T2R*2,AWS+PCS,1*1
WD6BXWF63W00	Ver.B	Manufactured Board,WA372DD-CE,WD6BXWF63W00,WiFi Card-11abgnac,3x3 Dual-Band-1*1

##### 3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Adapter	POE85-56A	FSP	Adapter,-25degC,60degC,90V,264V,56V/1.52A,C8/RI45,POE ADAPTER



### 3.3 Technical Specification

#### 3.3.1 AWS Band

Characteristics	Description
Radio System Type	Single Radio <input type="checkbox"/> GSM Access Technology (Single-RAT): <input checked="" type="checkbox"/> UMTS <input checked="" type="checkbox"/> LTE <input type="checkbox"/> CDMA <input type="checkbox"/> WiMAX Multi-Standard Radio (MSR): <input type="checkbox"/> GSM & UMTS <input type="checkbox"/> GSM & LTE <input type="checkbox"/> GSM & UMTS & LTE <input checked="" type="checkbox"/> UMTS & LTE <input type="checkbox"/> WiMAX & LTE <input type="checkbox"/> CDMA & LTE
Equipment Type	#1 <input checked="" type="checkbox"/> Base Station <input type="checkbox"/> CPE (Customer Premises Equipment) Station <input type="checkbox"/> Subscriber Station (User Equipment) #2 <input checked="" type="checkbox"/> Fixed Station <input type="checkbox"/> Mobile Station <input type="checkbox"/> Portable Station #3 <input checked="" type="checkbox"/> Indoor Station <input type="checkbox"/> Outdoor Station
Supported Frequency Range	Transmission (TX): 2110 to 2155 MHz Receiving (RX): 1710 to 1755 MHz
TX and RX Antenna Ports	TX & RX port: 2(for LTE),1(for UMTS) TX-only port: 0 RX-only port: 0(for LTE),1(for UMTS)
Multiple Carrier Supported	2
Maximum RF Bandwidth	20MHz
TX Output Power	Max. 250 mW
Supported Channel Bandwidth	GSM system: <input type="checkbox"/> 200 kHz UMTS system: <input checked="" type="checkbox"/> 5 MHz LTE system: <input type="checkbox"/> 1.4 MHz, <input 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 system: <input type="checkbox"/> 1.23 MHz, <input type="checkbox"/> 1.25 MHz WiMAX system: <input type="checkbox"/> 5 MHz, <input type="checkbox"/> 7 MHz, <input type="checkbox"/> 10 MHz
Modulation Type	GSM system: Not applicable UMTS system: Base-band: QPSK, 16QAM, 64QAM Carrier: CDMA LTE system: Base-band: QPSK, 16QAM, 64QAM Carrier: OFDM/OFDMA CDMA system: Not applicable

Characteristics	Description
	WiMAX system: Not applicable
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM system: Not applicable UMTS system: 4M17F9W LTE system: 4M50D9W, 8M97D9W, 13M5D9W, 17M9D9W CDMA system: Not applicable WiMAX system: Not applicable
Power Supply	Power Supply Type: <input type="checkbox"/> External AC mains, <input type="checkbox"/> External DC mains, <input type="checkbox"/> AC/DC Adapter, <input checked="" type="checkbox"/> Powered over Ethernet (PoE) Nominal Voltage, Input to EUT: PoE power supply: -48 VDC Voltage Range, Input to EUT: PoE power supply: -57VDC to -42.5VDC
Antenna Assemblies	Antenna Type: <input type="checkbox"/> External <input checked="" type="checkbox"/> Integrated Smart Antenna: <input checked="" type="checkbox"/> MIMO <input type="checkbox"/> Non MIMO Antenna Gain: 3 dBi (per antenna port, max.) Remark: When the EUT is put into service, the practical maximum antenna gain may exceed the value as described above, and if exceed, the combination of the practical output power and the practical antenna gain should NOT exceed the required ERP/EIRP limit.

### 3.3.2 PCS Band

Characteristics	Description
Radio System Type	Single Radio <input type="checkbox"/> GSM Access Technology <input checked="" type="checkbox"/> UMTS (Single-RAT): <input checked="" type="checkbox"/> LTE <input type="checkbox"/> CDMA <input type="checkbox"/> WiMAX Multi-Standard Radio (MSR): <input type="checkbox"/> GSM & UMTS <input type="checkbox"/> GSM & LTE <input type="checkbox"/> GSM & UMTS & LTE <input checked="" type="checkbox"/> UMTS & LTE <input type="checkbox"/> WiMAX & LTE <input type="checkbox"/> CDMA & LTE
Equipment Type	#1 <input checked="" type="checkbox"/> Base Station <input type="checkbox"/> CPE (Customer Premises Equipment) Station <input type="checkbox"/> Subscriber Station (User Equipment)



Characteristics	Description
	<div>#2<div><input checked="" type="checkbox"/> Fixed Station</div><div><input type="checkbox"/> Mobile Station</div><div><input type="checkbox"/> Portable Station</div></div> <div>#3<div><input checked="" type="checkbox"/> Indoor Station</div><div><input type="checkbox"/> Outdoor Station</div></div>
Supported Frequency Range	Transmission (TX): 1930 to 1990 MHz Receiving (RX): 1850 to 1910 MHz
TX and RX Antenna Ports	TX & RX port: 2(for LTE),1(for UMTS) TX-only port: 0 RX-only port: 0(for LTE),1(for UMTS)
Multiple Carrier Supported	2
Maximum RF Bandwidth	20 MHz
TX Output Power	Max. 250 mW
Supported Channel Bandwidth	GSM system: <input type="checkbox"/> 200 kHz UMTS system: <input checked="" type="checkbox"/> 5 MHz LTE system: <input type="checkbox"/> 1.4 MHz, <input 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 system: <input type="checkbox"/> 1.23 MHz, <input type="checkbox"/> 1.25 MHz WiMAX system: <input type="checkbox"/> 5 MHz, <input type="checkbox"/> 7 MHz, <input type="checkbox"/> 10 MHz
Modulation Type	GSM system: Not applicable UMTS system: Base-band: QPSK, 16QAM, 64QAM Carrier: CDMA LTE system: Base-band: QPSK, 16QAM, 64QAM Carrier: OFDM/OFDMA CDMA system: Not applicable WiMAX system: Not applicable
Designation of Emissions (Note: the necessary bandwidth of which is the worst value from the measured occupied bandwidths for each type of channel bandwidth configuration.)	GSM system: Not applicable UMTS system: 4M17F9W LTE system: 4M49D9W, 8M97D9W, 13M5D9W, 17M9D9W CDMA system: Not applicable WiMAX system: Not applicable
Power Supply	Power Supply Type: <input type="checkbox"/> External AC mains, <input type="checkbox"/> External DC mains, <input type="checkbox"/> AC/DC Adapter, <input checked="" type="checkbox"/> Powered over Ethernet (PoE) Nominal Voltage, PoE power supply: -48 VDC Input to EUT: Voltage Range, PoE power supply: -57VDC to -42.5VDC Input to EUT:
Antenna Assemblies	Antenna Type: <input type="checkbox"/> External <input checked="" type="checkbox"/> Integrated



Characteristics	Description
	<p>Smart Antenna: <input checked="" type="checkbox"/> MIMO <input type="checkbox"/> Non MIMO</p> <p>Antenna Gain: 3 dBi (per antenna port, max.)</p> <p>Remark: When the EUT is put into service, the practical maximum antenna gain may exceed the value as described above, and if exceed, the combination of the practical output power and the practical antenna gain should NOT exceed the required ERP/EIRP limit.</p>



## 4 General Test Conditions / Configurations

### 4.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications, and these test mode(s) reflect the worst case scenario.

Test Mode	Test Modes Description
UMTS/TM1	UMTS system, 3GPP TS 25.141 clause 6.1.1, Test Model 1, QPSK modulation
LTE/TM1.1	LTE system, 3GPP TS 36.141 clause 6.1.1, E-TM 1.1
UL/TM1	MSR system, 3GPP TS 37.141 clause 4.9.2 (UMTS/TM1; LTE/TM1.1)

## 4.2 EUT Configurations

### 4.2.1 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. TRXA, TXA or similar) of the EUT, and</li> <li>All RX tests are ONLY performed at the main RX antenna port (e.g. TRXA, 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.

### 4.2.2 Customized Configurations

NOTE: For the carrier configurations, the description of “n\*TxxxM(yyyW)@zzz” denotes the n \* multiple carriers of the radio system type T (G - GSM system, U - UMTS system, L - LTE system, C - CDMA system, W - WiMAX system), for which the channel bandwidth of each carrier is xxx MHz (applicable for T supporting various channel bandwidths) and the power level of each carrier is yyy Watts, at the antenna port zzz (if specified). While the combinations of several “n\*TxxxM(yyyW)@zzz”s denotes the carrier configurations of the MSR system.

#### 4.2.2.1 AWS Band

EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
5M_B	B	2112.5	---	5	21@Ant1,2	LTE/TM1.1
5M_M	M	2132.5	---	5	21@Ant1,2	LTE/TM1.1
5M_T	T	2152.5	---	5	21@Ant1,2	LTE/TM1.1
10M_B	B	2115	---	10	21@Ant1,2	LTE/TM1.1
10M_M	M	2132.5	---	10	21@Ant1,2	LTE/TM1.1
10M_T	T	2150	---	10	21@Ant1,2	LTE/TM1.1
15M_B	B	2117.5	---	15	21@Ant1,2	LTE/TM1.1
15M_M	M	2132.5	---	15	21@Ant1,2	LTE/TM1.1
15M_T	T	2147.5	---	15	21@Ant1,2	LTE/TM1.1
20M_B	B	2120	---	20	21@Ant1,2	LTE/TM1.1
20M_M	M	2132.5	---	20	21@Ant1,2	LTE/TM1.1
20M_T	T	2145	---	20	21@Ant1,2	LTE/TM1.1
1U_B	B	2112.4	---	5	21@Ant1	UMTS/TM1
1U_M	M	2132.4	---	5	21@Ant1	UMTS/TM1
1U_T	T	2152.6	---	5	21@Ant1	UMTS/TM1
1U1L5M_B	B	2112.4, 2117.4	---	5,5	17@Ant1; 17@Ant1,2	UL/TM1

EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1U1L5M_M	M	2132.4, 2137.4	---	5,5	17@Ant1; 17@Ant1,2	UL/TM1
1U1L5M_T	T	2147.4, 2152.4	---	5,5	17@Ant1; 17@Ant1,2	UL/TM1
1U1L10M_B	B	2112.4, 2119.9	---	5,10	17@Ant1; 17@Ant1,2	UL/TM1
1U1L10M_M	M	2132.4, 2139.9	---	5,10	17@Ant1; 17@Ant1,2	UL/TM1
1U1L10M_T	T	2142.4, 2149.9	---	5,10	17@Ant1; 17@Ant1,2	UL/TM1
1U1L15M_B	B	2112.4, 2122.4	---	5,15	17@Ant1; 17@Ant1,2	UL/TM1
1U1L15M_M	M	2132.4, 2142.4	---	5,15	17@Ant1; 17@Ant1,2	UL/TM1
1U1L15M_T	T	2137.4, 2147.4	---	5,15	17@Ant1; 17@Ant1,2	UL/TM1

#### 4.2.2.2 PCS Band

EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
5M_B	B	1932.5	---	5	21@Ant3,4	LTE/TM1.1
5M_M	M	1960	---	5	21@Ant3,4	LTE/TM1.1
5M_T	T	1987.5	---	5	21@Ant3,4	LTE/TM1.1
10M_B	B	1935	---	10	21@Ant3,4	LTE/TM1.1
10M_M	M	1960	---	10	21@Ant3,4	LTE/TM1.1
10M_T	T	1985	---	10	21@Ant3,4	LTE/TM1.1
15M_B	B	1937.5	---	15	21@Ant3,4	LTE/TM1.1
15M_M	M	1960	---	15	21@Ant3,4	LTE/TM1.1
15M_T	T	1982.5	---	15	21@Ant3,4	LTE/TM1.1
20M_B	B	1940	---	20	21@Ant3,4	LTE/TM1.1
20M_M	M	1960	---	20	21@Ant3,4	LTE/TM1.1
20M_T	T	1980	---	20	21@Ant3,4	LTE/TM1.1
1U_B	B	1932.4	---	5	21@Ant3	UMTS/TM1
1U_M	M	1960	---	5	21@Ant3	UMTS/TM1
1U_T	T	1987.6	---	5	21@Ant3	UMTS/TM1
1U1L5M_B	B	1932.4, 1937.4	---	5,5	17@Ant3; 17@Ant3,4	UL/TM1
1U1L5M_M	M	1960,1965	---	5,5	17@Ant3; 17@Ant3,4	UL/TM1
1U1L5M_T	T	1982.4, 1987.4	---	5,5	17@Ant3; 17@Ant3,4	UL/TM1



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1U1L10M_B	B	1932.4, 1939.9	---	5,10	17@Ant3; 17@Ant3,4	UL/TM1
1U1L10M_M	M	1960,1967.5	---	5,10	17@Ant3; 17@Ant3,4	UL/TM1
1U1L10M_T	T	1977.4, 1984.9	---	5,10	17@Ant3; 17@Ant3,4	UL/TM1
1U1L15M_B	B	1932.4, 1942.4	---	5,15	17@Ant3; 17@Ant3,4	UL/TM1
1U1L15M_M	M	1960,1970	---	5,15	17@Ant3; 17@Ant3,4	UL/TM1
1U1L15M_T	T	1972.4, 1982.4	---	5,15	17@Ant3; 17@Ant3,4	UL/TM1

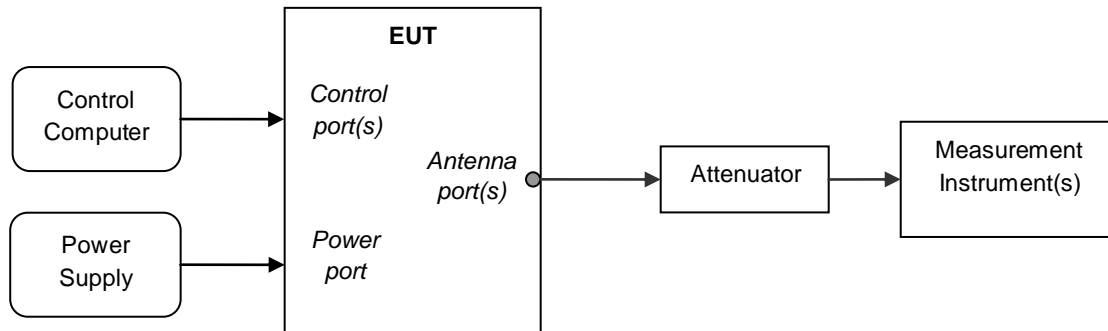


### 4.3 Test Environments

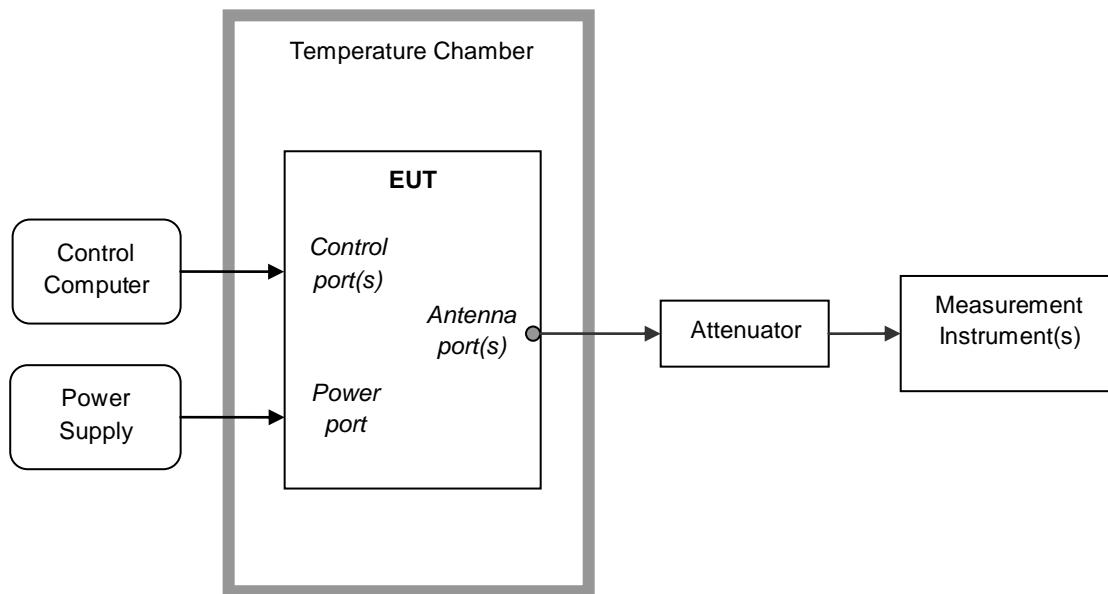
Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Ambient Climate	Ambient	---	Ambient
Rated Voltage	---	-48 VDC	---

## 4.4 Test Setups

### 4.4.1 Test Setup 1



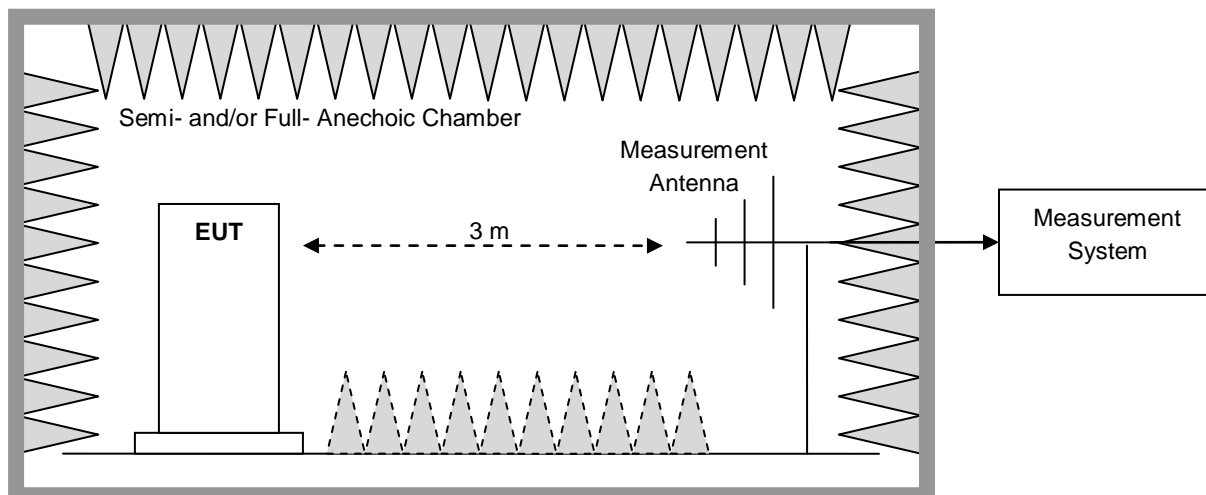
### 4.4.2 Test Setup 2



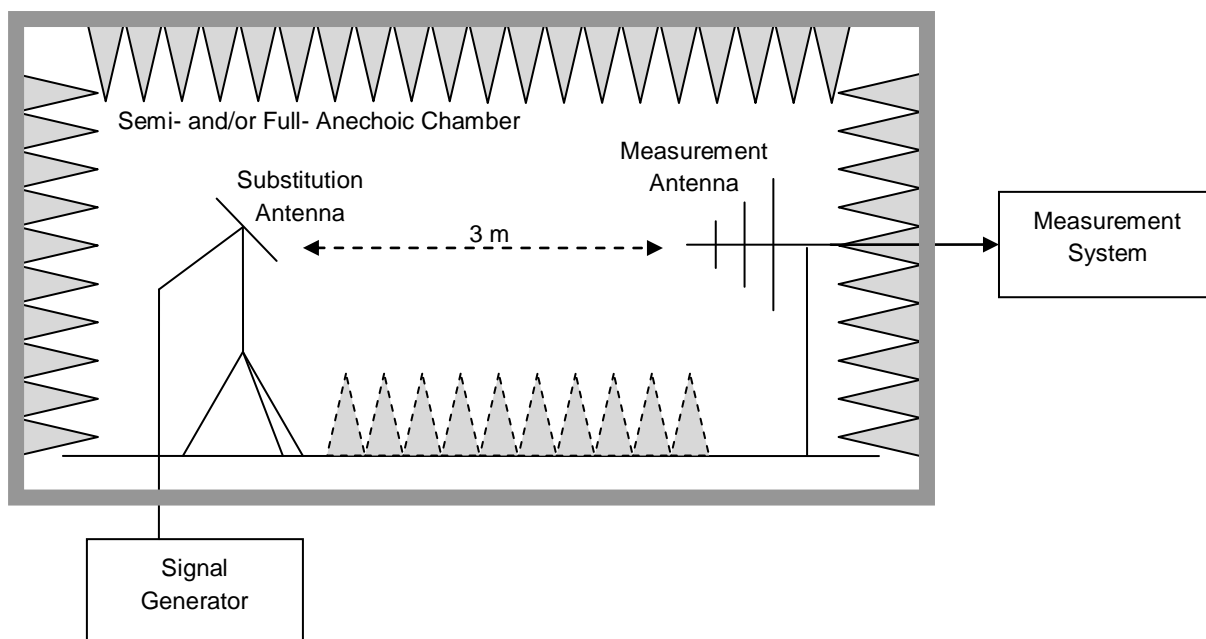
### 4.4.3 Test Setup 3

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

#### 4.4.3.1 Step 1: Pre-test



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



## 4.5 Test Conditions

### 4.5.1 AWS Band

Test Case		Test Conditions		
Transmitter Output Power	Channel Power, Total	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T 1U1L5M_B, 1U1L5M_M, 1U1L5M_T 1U1L10M_B, 1U1L10M_M, 1U1L10M_T 1U1L15M_B, 1U1L15M_M, 1U1L15M_T	
		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
	Peak-to-Average Ratio	EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
	Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
			Test Setup	Test Setup 1
EUT Conf.			5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
Test Env.			Ambient Climate & Rated Voltage	
Test Setup			Test Setup 1	
EUT Conf.			5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
Emission Bandwidth		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_T 20M_B,20M_T 1U_B, 1U_T	

Test Case		Test Conditions	
			1U1L5M_B, 1U1L5M_T
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T 1U1L5M_B, 1U1L5M_M, 1U1L5M_T
Field Strength of Spurious Radiation		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 3
		EUT Conf.	5M_M (Worst case)  NOTE: If applicable, the EUT Conf. that has maximum power density (based on the equivalent power level) is selected.
Frequency Stability	Frequency Error	Test Env.	(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 Setup 2
		EUT Conf.	5M_M  NOTE: A representative EUT Conf. was selected since the un-modulation carrier configuration was required by the standards/rules.
	Frequency Range (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 2
		EUT Conf.	Not applicable
Receiver Spurious Emissions		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		EUT Conf.	Not applicable

#### 4.5.2 PCS Band

Test Case		Test Conditions	
Transmitter Output Power	Channel Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		EUT Conf.	5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T 1U1L5M_B, 1U1L5M_M, 1U1L5M_T 1U1L10M_B, 1U1L10M_M, 1U1L10M_T 1U1L15M_B, 1U1L15M_M, 1U1L15M_T
	Power Spectral	Test Env.	Ambient Climate & Rated Voltage

Test Case		Test Conditions		
	Density	Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
	Peak-to-Average Ratio	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
	Emission Bandwidth	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 10M_B,10M_M,10M_T 15M_B,15M_M,15M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T	
	Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
			Test Setup	Test Setup 1
			EUT Conf.	5M_B,5M_T 20M_B,20M_T 1U_B, 1U_T 1U1L5M_B, 1U1L5M_T
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 1	
		EUT Conf.	5M_B,5M_M,5M_T 20M_B,20M_M,20M_T 1U_B, 1U_M, 1U_T 1U1L5M_B, 1U1L5M_M, 1U1L5M_T	
Field Strength of Spurious Radiation		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Setup 3	
		EUT Conf.	5M_M (Worst case)  NOTE: If applicable, the EUT Conf. that has maximum power density (based on the equivalent power level) is selected.	



Test Case		Test Conditions	
Frequency Stability	Frequency Error	Test Env.	(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 Setup 2
		EUT Conf.	5M_M  NOTE: A representative EUT Conf. was selected since the un-modulation carrier configuration was required by the standards/rules.
	Frequency Range (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 2
		EUT Conf.	Not applicable
Receiver Spurious Emissions		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		EUT Conf.	Not applicable

## 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	Agilent	N9020A	MY51240619	2016-03-25
Spectrum Analyzer	R&S	FSQ26	200791	2016-01-26
Vector Signal Generator	Agilent	E4438C	MY49071538	2016-03-09
Vector Signal Generator	Agilent	E4438C	MY47271904	2015-10-27
Vector Signal Generator	Agilent	E8257D	MY49281095	2015-11-03
Power Supply	Chroma	6530	653000008611	2016-10-20
Climate Chamber	ESPEC	EW0470S	12113066	2015-10-20
Test Setup 3				
EMI Test receiver	Agilent	N9038A	MY52260169	2015-11-23
Spectrum analyser	Agilent	N9010A	MY52220816	2016-03-15
Bilog Antenna	TESQ	CBL 6112D	35238	2015-12-01
Bilog Antenna	TESQ	CBL 6112D	35239	2015-12-01
Horn Antenna	SWARZBECK	BBHA 9120D	1077	2015-12-01
Horn Antenna	SWARZBECK	BBHA 9120D	1078	2015-12-01
Horn Antenna	ETS	3160-09	00117544	2015-12-26

Note: The test instrument used in the new test is added to the above table.

## 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
Transmitter Output Power	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

END