



# RF Test Report

**Product Name: Multi-mode Multi-carriers Remote Radio Unit**

**Product Model: RRU3936**

**Report Number: SYBH(R)01156098EB-1**

**FCC ID: QISRRU3936-850M  
QISRRU3936-1900M**

**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.
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6. 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  
**Product Name:** Multi-mode Multi-carriers Remote Radio Unit  
**Product Model:** RRU3936

**Date of Receipt Sample:** 2013-11-19  
**Start Date of Test:** 2013-11-19  
**End Date of Test:** 2014-01-18

**Test Result:** Pass

<b>Approved by Senior</b>	2014-01-18	Zhang Xinghai	<i>Zhang Xing hai</i>
<b>Engineer:</b>	Date	Name	Signature

<b>Prepared by:</b>	2014-01-18	Hu Wei	<i>Hu Wei</i>
	Date	Name	Signature



### Modification Record

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



## CONTENT

1	General Information.....	6
1.1	Applied Standard.....	6
1.2	Test Location.....	6
1.3	Test Environment Condition.....	6
2	Test Summary.....	7
2.1	Cellular Band (824-849 MHz paired with 869-894 MHz).....	7
2.2	PCS Band (1850-1915 MHz paired with 1930-1995 MHz).....	9
3	Description of the Equipment under Test (EUT).....	11
3.1	General Description.....	11
3.2	EUT Identity.....	11
3.3	Technical Specification.....	12
4	General Test Conditions / Configurations.....	14
4.1	Test Modes.....	14
4.2	EUT Configurations.....	15
4.3	Test Environments.....	21
4.4	Test Setups.....	22
4.5	Test Conditions.....	24
5	Main Test Instruments.....	29
6	Measurement Uncertainty.....	30

## 1 General Information

### 1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2 (10-1-12 Edition)  
47 CFR FCC Part 22 (10-1-12 Edition)  
47 CFR FCC Part 24 (10-1-12 Edition)

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02r01  
FCC KDB 662911 D01 Multiple Transmitter Output v01r02 (if applicable)  
FCC KDB 662911 D02 MIMO with Cross-Polarized Antennas v01 (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: Tianfu Software Park, 801#, Tianfu Road, High-Tech Zone, Chengdu, 610041, P.R.C

### 1.3 Test Environment Condition

Temperature: 22 to 25 °C (Ambient)  
Relative Humidity: 26 to 58 % (Ambient)  
Atmospheric Pressure: Not applicable



## 2 Test Summary

### 2.1 Cellular Band (824-849 MHz paired with 869-894 MHz)

#### 2.1.1 Measurement Technical Requirements

Test Item	FCC Rule	IC Rule	Requirements		Test Result	Verdict	Test Location	
Transmitter Output Power	§2.1046, §22.913	RSS-Gen,§4.8; RSS-132,§5.4	FCC	Base Station	ERP ≤ 500 W.	Annex A1	Pass	TL1
				Subscriber Station	ERP ≤ 7 W.			
			IC	Base Station	<ul style="list-style-type: none"> <li>Avg EIRP ≤ 820 W.</li> <li>PAPR ≤ 13 dB.</li> </ul>			
				Subscriber Station	<ul style="list-style-type: none"> <li>Avg EIRP ≤ 11.5 W.</li> <li>PAPR ≤ 13 dB.</li> </ul>			
Bandwidth	§2.1049, §22.917	RSS-Gen,§4.6	FCC	<ul style="list-style-type: none"> <li>OBW: No limit.</li> <li>EBW (-26 dBc): No limit.</li> </ul>		Annex B1	Pass	TL1
			IC	OBW: No limit.				
Band Edges Compliance	§2.1051, §22.917	RSS-Gen,§4.9; RSS-132,§5.5	FCC	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. (EBW is -26 dBc EBW)		Annex C1	Pass	TL1
			IC	≤ -13 dBm/1%*OBW, in 1 MHz bands immediately outside and adjacent to the frequency block.				
Spurious Emission at Antenna Terminals	§2.1051, §22.917	RSS-Gen,§4.9; RSS-132,§5.5	≤ -13 dBm/100 kHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.		Annex D1	Pass	TL1	
Field Strength of Spurious Radiation	§2.1053, §22.917	RSS-Gen,§4.9; RSS-132,§5.5	≤ -13 dBm/100 kHz.		Annex E1	Pass	TL1	
Frequency Stability	§2.1055,	RSS-Gen,§4.7;	Base Station	≤ ±1.5 ppm.		Annex F1	Pass	TL1



Test Item	FCC Rule	IC Rule	Requirements	Test Result	Verdict	Test Location
	§22.355	RSS-132,§5.3	Subscriber Station   ≤ ±2.5 ppm.			
Receiver Spurious Emissions (Note 1, 2)	---	RSS-Gen,§4.10; RSS-Gen,§6; RSS-132,§5.6	<ul style="list-style-type: none"> <li>● Radiated limit: RSS-Gen, §6.1 field strength limit.</li> <li>● Conducted limit: ≤ -57 dBm/120 kHz (CISPR-QP), from 30 MHz to 1000 MHz, and ≤ -53 dBm/1 MHz (AV), from 1 GHz to 3rd harmonics.</li> </ul>	Annex G1	Pass	TL1
Photos of Test Setups	---	---	---	Annex H1	---	---
<p>Note 1: For Receiver Spurious Emissions, 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.</p> <p>Note 2: According to IC NOTICE 2012-DRS0126, only radio communication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to IC requirements. All other receivers are excluded from any IC certification, testing, labelling and reporting requirements.</p>						

### 2.1.2 Non-measurement Technical Requirements

Description	FCC Rule	IC Rule	Requirements	Test Result	Verdict
Frequency Plan	§22.905	RSS-132,§5.1	824-849 MHz paired with 869-894 MHz.	See technical specification description.	Comply
Modulation Characteristics	§2.1047	RSS-132,§5.2	Digital 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,§4.8; RSS-133,§6.4; RSS-133,§4.1	FCC	Base Station	<ul style="list-style-type: none"> <li>Avg EIRP Power <math>\leq</math> 1640 W (for EBW <math>\leq</math> 1 MHz).</li> <li>Avg EIRP PD <math>\leq</math> 1640 W/MHz (for EBW <math>&gt;</math> 1 MHz).</li> <li>PAPR <math>\leq</math> 13 dB.</li> </ul>	Annex A2	Pass	TL1
				Subscriber Station	<ul style="list-style-type: none"> <li>Avg EIRP <math>\leq</math> 2 W.</li> <li>PAPR <math>\leq</math> 13 dB.</li> </ul>			
			IC	Base Station	<ul style="list-style-type: none"> <li>Avg EIRP Power <math>\leq</math> 1640 W (for ChBW <math>\leq</math> 1 MHz).</li> <li>Avg EIRP PD <math>\leq</math> 1640 W/MHz (for ChBW <math>&gt;</math> 1 MHz).</li> <li>Pcond <math>\leq</math> 100 W.</li> <li>PAPR <math>\leq</math> 13 dB.</li> </ul>			
				Subscriber Station	<ul style="list-style-type: none"> <li>Avg EIRP <math>\leq</math> 2 W.</li> <li>PAPR <math>\leq</math> 13 dB.</li> </ul>			
Bandwidth	§2.1049, §24.238	RSS-Gen,§4.6; RSS-133,§2.3	FCC	<ul style="list-style-type: none"> <li>OBW: No limit.</li> <li>EBW (-26 dBc): No limit.</li> </ul>	Annex 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 Compliance	§2.1051, §24.238	RSS-Gen,§4.9; RSS-133,§6.5	FCC	$\leq$ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block. (EBW is -26 dBc EBW)	Annex C2	Pass	TL1	
			IC	$\leq$ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.				



Test Item	FCC Rule	IC Rule	Requirements	Test Result	Verdict	Test Location		
			(EBW is -20 dBc EBW, or OBW)					
Spurious Emission at Antenna Terminals	§2.1051, §24.238	RSS-Gen, §4.9; RSS-133, §6.5	≤ -13 dBm/1 MHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.	Annex D2	Pass	TL1		
Field Strength of Spurious Radiation	§2.1053, §24.238	RSS-Gen, §4.9; RSS-133, §6.5	≤ -13 dBm/1 MHz.	Annex E2	Pass	TL1		
Frequency Stability	§2.1055, §24.235	RSS-Gen, §4.7; RSS-133, §6.3	FCC	Within authorized frequency block.		Annex F2	Pass	TL1
			IC	Base Station	≤ ±1.0 ppm.			
			IC	Subscriber Station	≤ ±2.5 ppm.			
Receiver Spurious Emissions	---	IC NOTICE 2012-DRS0126	---	Annex G2	---	---		
Photos of Test Setups	---	---	---	Annex H2	---	---		

### 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 RRU3936 is an outdoor remote radio unit. It is the radio frequency (RF) part of a distributed base station and can be located near antennas. The RRU3936 can modulate, demodulate, combine, and divide baseband and RF signals. It also processes baseband and RF signal data. Using the software-defined radio (SDR) technique, the RRU3936 supports the multi-mode application.

#### 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

###### 3.2.1.1 Cellular band

Board		
Board Name	Hardware Version	Description
WD5AJRX850A	VER.A	850M Transceiver Board
WD5AJRA850A	VER.A	Power Amplifier Board for 850M
WD5MJR12850	VER.A	850M Duplexer

###### 3.2.1.2 PCS band

Board		
Board Name	Hardware Version	Description
WD5AJRX820A	VER.A	1900M Transceiver Board
WD5AJRA820A	VER.B	Power Amplifier Board for 1900M
WD5MJR12820	VER.A	1900M Duplexer

##### 3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
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### 3.3 Technical Specification

Characteristics	Description
Radio System Type	Single Radio <input checked="" 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 <input checked="" type="checkbox"/> GSM & UMTS Radio <input checked="" type="checkbox"/> GSM & LTE (MSR): <input checked="" type="checkbox"/> UMTS & LTE <input type="checkbox"/> GSM & UMTS & LTE <input type="checkbox"/> WiMAX & LTE <input type="checkbox"/> CDMA & LTE
Equipment Type	#1 <input checked="" type="checkbox"/> Base Station <input type="checkbox"/> Subscriber Station #2 <input checked="" type="checkbox"/> Fixed Station <input type="checkbox"/> Mobile Station <input type="checkbox"/> Portable Station #3 <input type="checkbox"/> Indoor Station <input checked="" type="checkbox"/> Outdoor Station
Supported Frequency Range (Cellular band)	Transmission (TX): 869 to 894 MHz Receiving (RX): 824 to 849 MHz
Supported Frequency Range (PCS band)	Transmission (TX): 1930 to 1990 MHz Receiving (RX): 1850 to 1910 MHz
TX and RX Antenna Ports	TX & RX port: 1 TX-only port: 0 RX-only port: 1
Multiple Carrier Supported	6
Maximum RF Bandwidth	35 MHz (for multi-RAT) 35 MHz (for GSM only) 40 MHz (for UMST only) 40 MHz (for E-UTRA only)
TX Output Power	Max. 80 W
Supported Channel Bandwidth	GSM system: <input checked="" type="checkbox"/> 200 kHz UMTS system: <input checked="" type="checkbox"/> 5 MHz LTE system: <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 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: Base-band: GMSK, 8PSK Carrier: TDMA

Characteristics	Description
	UMTS system: Base-band: QPSK, 16QAM, 64QAM Carrier: CDMA LTE system: Base-band: QPSK, 16QAM,64QAM Carrier: OFDM/OFDMA CDMA system: --- WiMAX system: ---
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: 246KGXW, 251KG7W UMTS system: 4M20F9W LTE system: 18M0D9W CDMA system: --- WiMAX system: ---
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
Antenna Assembles	Antenna Type: <input checked="" type="checkbox"/> External <input type="checkbox"/> Integrated Smart Antenna: <input type="checkbox"/> MIMO <input checked="" type="checkbox"/> Non MIMO Antenna Gain: 10 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.

## 4 General Test Conditions / Configurations

### 4.1 Test Modes

NOTE: The test mode(s) are selected according to relevant radio technology specifications.

Test Mode	Test Modes Description
GSM/GMSK	GSM system, GSM/GPRS, GMSK modulation
GSM/8PSK	GSM system, EDGE, 8PSK modulation
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
GU/TM1	MSR system, 3GPP TS 37.141 clause 4.9.2 (GSM/GMSK; UMTS/TM1)
GL/TM1	MSR system, 3GPP TS 37.141 clause 4.9.2 (GSM/GMSK; LTE/TM1.1)
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 Cellular band

EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1G_GMSK_B	B	869.4	824.4	0.2	49	GSM/GMSK
1G_GMSK_M	M	881.6	836.4	0.2	49	GSM/GMSK
1G_GMSK_T	T	893.6	848.6	0.2	49	GSM/GMSK
1G_8PSK_B	B	869.4	824.4	0.2	49	GSM/8PSK
1G_8PSK_M	M	881.6	836.4	0.2	49	GSM/8PSK
1G_8PSK_T	T	893.6	848.6	0.2	49	GSM/8PSK
2G_GMSK_M	M	869.4,893.6	824.4,848.6	0.2,0.2	46,46	GSM/GMSK
3G_GMSK_M	M	869.4,881.6,893.6	824.4,836.6,848.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
4G_GMSK_M	M	869.4,877.4,885.6,893.6	824.4,832.4,840.6,848.6	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
5G_GMSK_M	M	869.4,875.2,881.2,887.2,893.6	824.4,830.2,836.2,842.2,848.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK
6G_GMSK_M	M	869.4,874.8,878.8,883.2	824.4,829.8,833.8,838.2	0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7	GSM/GMSK



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
		6,888.4,893.6	8.6,843.4,848.6	2,0.2,0.2,0.2	7,40.7,40.7,40.7	K
2G_8PSK_M	M	869.4,893.6	824.4,848.6	0.2,0.2	46,46	GSM/8PSK
3G_8PSK_M	M	869.4,881.6,893.6	824.4,836.6,848.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/8PSK
4G_8PSK_M	M	869.4,877.4,885.6,893.6	824.4,832.4,840.6,848.6	0.2,0.2,0.2,0.2	43,43,43,43	GSM/8PSK
5G_8PSK_M	M	869.4,875.2,881.2,887.2,893.6	824.4,830.2,836.2,842.2,848.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/8PSK
6G_8PSK_M	M	869.4,874,878.8,883.6,888.4,893.6	824.4,829,833.8,838.6,843.4,848.6	0.2,0.2,0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7,40.7,40.7	GSM/8PSK
1U_B	B	871.4	826.4	5	49	UMTS/TM1
1U_M	M	881.6	836.6	5	49	UMTS/TM1
1U_T	T	891.6	846.6	5	49	UMTS/TM1
2U_M	M	871.4,891.6	826.4,846.6	5,5	46,46	UMTS/TM1
3U_M	M	871.4,881.6,891.6	826.4,836.6,846.6	5,5,5	44,44,44	UMTS/TM1
4U_M	M	871.4,878,884.6,891.6	826.4,833,839.6,846.6	5,5,5,5	43,43,43,43	UMTS/TM1
1G1U_M	M	869.4,891.6	824.4,846.6	0.2,5	46,46	GU/TM1
1G2U_M	M	869.4,881.6,891.6	824.4,836.6,846.6	0.2,5,5	46,43,43	GU/TM1
2G1U_M	M	869.4,881.6,893.6	824.4,836.6,848.6	0.2,5,0.2	43,46,43	GU/TM1
2G2U_M	M	869.4,879,884,893.6	824.4,834,839,848.6	0.2,5,5,0.2	43,43,43,43	GU/TM1
3G1U_M	M	869.4,870,881.6,893.6	824.4,825,836.6,848.6	0.2,0.2,5,0.2	43,43,43,43	GU/TM1
3G2U_M	M	869.4,870,879,884,893.6	824.4,825,834,839,848.6	0.2,0.2,5,5,0.2	41,41,43,43,43	GU/TM1
4G1U_M	M	869.4,870,881.6,893,893.6	824.4,825,836.6,848.6	0.2,0.2,5,0.2,0.2	40.7,40.7,43,40.7,40.7	GU/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
1G_GMSK_B	B	1930.4	1850.4	0.2	49	GSM/GMSK
1G_GMSK_M	M	1960	1880	0.2	49	GSM/GMSK
1G_GMSK_T	T	1989.6	1909.6	0.2	49	GSM/GMSK
1G_8PSK_B	B	1930.4	1850.4	0.2	49	GSM/8PSK



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1G_8PSK_M	M	1960	1880	0.2	49	GSM/8PSK
1G_8PSK_T	T	1989.6	1909.6	0.2	49	GSM/8PSK
2G_GMSK_B	B	1930.4,1965	1850.4,1885	0.2,0.2	46,46	GSM/GMSK
2G_GMSK_T	T	1955,1989.60	1875,1909.60	0.2,0.2	46,46	GSM/GMSK
2G_8PSK_B	B	1930.4,1965	1850.4,1885	0.2,0.2	46,46	GSM/8PSK
2G_8PSK_T	T	1955,1989.60	1875,1909.60	0.2,0.2	46,46	GSM/8PSK
3G_GMSK_B	B	1930.4,1947.6,1965	1850.4,1867.6,1885	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
3G_GMSK_T	T	1955,1972.4,1989.6	1875,1892.4,1909.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
3G_8PSK_B	B	1930.4,1947.6,1965	1850.4,1867.6,1885	0.2,0.2,0.2	44.3,44.3,44.3	GSM/8PSK
3G_8PSK_T	T	1955,1972.4,1989.6	1875,1892.4,1909.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/8PSK
4G_GMSK_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
4G_GMSK_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
4G_8PSK_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,0.2,0.2,0.2	43,43,43,43	GSM/8PSK
4G_8PSK_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,0.2,0.2,0.2	43,43,43,43	GSM/8PSK
5G_GMSK_B	B	1930.4,1939,1947.6,1956.2,1965	1850.4,1859,1867.6,1876.2,1885	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK
5G_GMSK_T	T	1955,1963.8,1972.4,1981,1989.6	1875,1883.8,1892.4,1901,1909.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK
5G_8PSK_B	B	1930.4,1939,1947.6,1956.2,1965	1850.4,1859,1867.6,1876.2,1885	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/8PSK
5G_8PSK_T	T	1955,1963.8,1972.4,1981,1989.6	1875,1883.8,1892.4,1901,1909.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/8PSK
6G_GMSK_B	B	1930.4,1937.4,1944.4,1951.4,1958.4,1965	1850.4,1857.4,1864.4,1871.4,1878.4,1885	0.2,0.2,0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7,40.7,40.7	GSM/GMSK
6G_GMSK_T	T	1955,1961.6,1968.6,1975.6,1982.6,1989.6	1875,1881.6,1888.6,1895.6,1902.6,1909.6	0.2,0.2,0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7,40.7,40.7	GSM/GMSK
6G_8PSK_B	B	1930.4,1937.4,1944.4,1951.4,1958.4,1965	1850.4,1857.4,1864.4,1871.4,1878.4,1885	0.2,0.2,0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7,40.7,40.7	GSM/8PSK



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
6G_8PSK_T	T	1955,1961.6,1968.6,1975.6,1982.6,1989.6	1875,1881.6,1888.6,1895.6,1902.6,1909.6	0.2,0.2,0.2,0.2,0.2,0.2	40.7,40.7,40.7,40.7,40.7,40.7	GSM/8PSK
1U_B	B	1932.4	1852.4	5	49	UMTS/TM1
1U_M	M	1960	1880	5	49	UMTS/TM1
1U_T	T	1987.6	1907.6	5	49	UMTS/TM1
2U_B	B	1932.4,1967.4	1852.4,1887.4	5,5	46,46	UMTS/TM1
2U_T	T	1952.6,1987.6	1872.6,1907.6	5,5	46,46	UMTS/TM1
3U_B	B	1932.4,1949.8,1967.4	1852.4,1869.8,1887.4	5,5,5	43.9,43.9,43.9	UMTS/TM1
3U_T	T	1952.6,1970.2,1987.6	1872.6,1890.2,1907.6	5,5,5	43.9,43.9,43.9	UMTS/TM1
4U_B	B	1932.4,1944,1955.6,1967.4	1852.4,1864,1875.6,1887.4	5,5,5,5	43,43,43,43	UMTS/TM1
4U_T	T	1952.6,1964.4,1976,1987.6	1872.6,1884.4,1896,1907.6	5,5,5,5	43,43,43,43	UMTS/TM1
1G1U_B	B	1930.4,1962.8	1850.4,1882.8	0.2,5	46,46	GU/TM1
1G1U_T	T	1957.2,1989.6	1877.2,1909.6	5,0.2	46,46	GU/TM1
1G2U_B	B	1930.4,1946.4,1962.8	1850.4,1866.4,1882.8	0.2,5,5	46,43,43	GU/TM1
1G2U_T	T	1957.2,1973.6,1989.6	1877.2,1893.6,1909.6	5,5,0.2	43,43,46	GU/TM1
2G1U_B	B	1930.4,1947.4,1965	1850.4,1867.4,1885	0.2,5,0.2	43,46,43	GU/TM1
2G1U_T	T	1955,1972.6,1989.6	1875,1892.6,1909.6	0.2,5,0.2	43,46,43	GU/TM1
2G2U_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,5,5,0.2	43,43,43,43	GU/TM1
2G2U_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,5,5,0.2	43,43,43,43	GU/TM1
3G1U_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,0.2,5,0.2	43,43,43,43	GU/TM1
3G1U_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,0.2,5,0.2	43,43,43,43	GU/TM1
3G2U_B	B	1930.4,1938.8,1947.2,1955.6,1965	1850.4,1858.8,1867.2,1875.6,1885	0.2,0.2,5,5,0.2	41,41,43,43,41	GU/TM1
3G2U_T	T	1955,1964.4,1972.8,1981.2,1989.6	1875,1884.4,1892.8,1901.2,1909.6	0.2,0.2,5,5,0.2	41,41,43,43,41	GU/TM1
4G1U_B	B	1930.4,1938.8,1947.2,1955.6,1965	1850.4,1858.8,1867.2,1875.6,1885	0.2,0.2,5,0.2,0.2	40.7,40.7,43,40.7,40.7	GU/TM1
4G1U_T	T	1955,1964.4,1972.8,1981.2,1989.6	1875,1884.4,1892.8,1901.2,1909.6	0.2,0.2,5,0.2,0.2	40.7,40.7,43,40.7,40.7	GU/TM1
1L_1M4_B	B	1930.7	1850.7	1.4	47.7	LTE/TM1.1



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1L_1M4_M	M	1960	1880	1.4	47.7	LTE/TM1.1
1L_1M4_T	T	1989.3	1909.3	1.4	47.7	LTE/TM1.1
1L_3M_B	B	1931.5	1851.5	3	47.7	LTE/TM1.1
1L_3M_M	M	1960	1880	3	47.7	LTE/TM1.1
1L_3M_T	T	1988.5	1908.5	3	47.7	LTE/TM1.1
1L_5M_B	B	1932.5	1852.5	5	47.7	LTE/TM1.1
1L_5M_M	M	1960	1880	5	47.7	LTE/TM1.1
1L_5M_T	T	1987.5	1907.5	5	47.7	LTE/TM1.1
1L_10M_B	B	1935	1855	10	47.7	LTE/TM1.1
1L_10M_M	M	1960	1880	10	47.7	LTE/TM1.1
1L_10M_T	T	1985	1905	10	47.7	LTE/TM1.1
1L_15M_B	B	1937.5	1857.5	15	47.7	LTE/TM1.1
1L_15M_M	M	1960	1880	15	47.7	LTE/TM1.1
1L_15M_T	T	1982.5	1902.5	15	47.7	LTE/TM1.1
1L_20M_B	B	1940	1860	20	47.7	LTE/TM1.1
1L_20M_M	M	1960	1880	20	47.7	LTE/TM1.1
1L_20M_T	T	1980	1900	20	47.7	LTE/TM1.1
2L_1M4_B	B	1930.7,1969.3	1850.7,1889.3	1.4,1.4	46,46	LTE/TM1.1
2L_1M4_T	T	1950.7,1989.3	1870.7,1909.3	1.4,1.4	46,46	LTE/TM1.1
2L_20M_B	B	1940,1960	1860,1880	20,20	46,46	LTE/TM1.1
2L_20M_T	T	1960,1980	1880,1900	20,20	46,46	LTE/TM1.1
2L_5M_20M_B	B	1932.5,1960	1852.5,1880	5,20	46,46	LTE/TM1.1
2L_5M_20M_T	T	1960,1987.50	1880,1907.50	20,5	46,46	LTE/TM1.1
1G1L_1M4_B	B	1930.4,1964.5	1850.4,1884.5	0.2,1.4	46,46	GL/TM1
1G1L_1M4_T	T	1955.5,1989.6	1875.5,1909.6	1.4,0.2	46,46	GL/TM1
1G1L_20M_B	B	1930.4,1955.2	1850.4,1875.2	0.2,20	46,46	GL/TM1
1G1L_20M_T	T	1964.8,1989.6	1884.8,1909.6	20,0.2	46,46	GL/TM1
2G1L_1M4_B	B	1930.4,1947.7,1965	1850.4,1867.7,1885	0.2,1.4,0.2	43,46,43	GL/TM1
2G1L_1M4_T	T	1955,1972.3,1989.6	1875,1892.3,1909.6	0.2,1.4,0.2	43,46,43	GL/TM1
2G1L_20M_B	B	1930.4,1947.7,1965	1850.4,1867.7,1885	0.2,20,0.2	43,46,43	GL/TM1
2G1L_20M_T	T	1955,1972.3,1989.6	1875,1892.3,1909.6	0.2,20,0.2	43,46,43	GL/TM1
3G1L_1M4_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,0.2,1.4,0.2	43,43,43,43	GL/TM1
3G1L_1M4_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,0.2,1.4,0.2	43,43,43,43	GL/TM1
3G1L_20M_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,0.2,20,0.2	43,43,43,43	GL/TM1
3G1L_20M_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,0.2,20,0.2	43,43,43,43	GL/TM1



EUT Conf.	RF Ch.	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
4G1L_1M4_B	B	1930.4,1936,1947.6,1959.2,1965	1850.4,1856,1867.6,1879.2,1885	0.2,0.2,1.4,0.2,0.2	40.7,40.7,43,40.7,40.7	GL/TM1
4G1L_1M4_T	T	1955,1960.8,1972.4,1984,1989.6	1875,1880.8,1892.4,1904,1909.6	0.2,0.2,1.4,0.2,0.2	40.7,40.7,43,40.7,40.7	GL/TM1
4G1L_20M_B	B	1930.4,1936,1947.6,1959.2,1965	1850.4,1856,1867.6,1879.2,1885	0.2,0.2,20,0.2,0.2	40.7,40.7,43,40.7,40.7	GL/TM1
4G1L_20M_T	T	1955,1960.8,1972.4,1984,1989.6	1875,1880.8,1892.4,1904,1909.6	0.2,0.2,20,0.2,0.2	40.7,40.7,43,40.7,40.7	GL/TM1
2G2L_5M_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,5,5,0.2	43,40,40,43	GL/TM1
2G2L_5M_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,5,5,0.2	43,40,40,43	GL/TM1
2G2L_10M_B	B	1930.4,1941.8,1953.2,1965	1850.4,1861.8,1873.2,1885	0.2,10,10,0.2	43,40,40,43	GL/TM1
2G2L_10M_T	T	1955,1966.8,1978.2,1989.6	1875,1886.8,1898.2,1909.6	0.2,10,10,0.2	43,40,40,43	GL/TM1
1U1L_1M4_B	B	1932.4,1964.2	1852.4,1884.2	5,1.4	46,46	UL/TM1
1U1L_1M4_T	T	1955.8,1987.6	1875.8,1907.6	1.4,5	46,46	UL/TM1
1U1L_20M_B	B	1932.4,1954.9	1852.4,1874.9	5,20	46,46	UL/TM1
1U1L_20M_T	T	1965.1,1987.6	1885.1,1907.6	20,5	46,46	UL/TM1
2U1L_1M4_B	B	1932.4,1947.4,1962.4	1852.4,1867.4,1882.4	5,1.4,5	43,46,43	UL/TM1
2U1L_1M4_T	T	1957.6,1972.6,1987.6	1877.6,1892.6,1907.6	5,1.4,5	43,46,43	UL/TM1
2U1L_20M_B	B	1932.4,1947.4,1962.4	1852.4,1867.4,1882.4	5,20,5	43,46,43	UL/TM1
2U1L_20M_T	T	1957.6,1972.6,1987.6	1877.6,1892.6,1907.6	5,20,5	43,46,43	UL/TM1
3U1L_1M4_B	B	1932.4,1937.4,1949.9,1962.4	1852.4,1857.4,1869.9,1882.4	5,5,1.4,5	43,43,43,43	UL/TM1
3U1L_1M4_T	T	1957.6,1962.6,1975.1,1987.6	1877.6,1882.6,1895.1,1907.6	5,5,1.4,5	43,43,43,43	UL/TM1
3U1L_20M_B	B	1932.4,1937.4,1949.9,1962.4	1852.4,1857.4,1869.9,1882.4	5,5,20,5	43,43,43,43	UL/TM1
3U1L_20M_T	T	1957.6,1962.6,1975.1,1987.6	1877.6,1882.6,1895.1,1907.6	5,5,20,5	43,43,43,43	UL/TM1

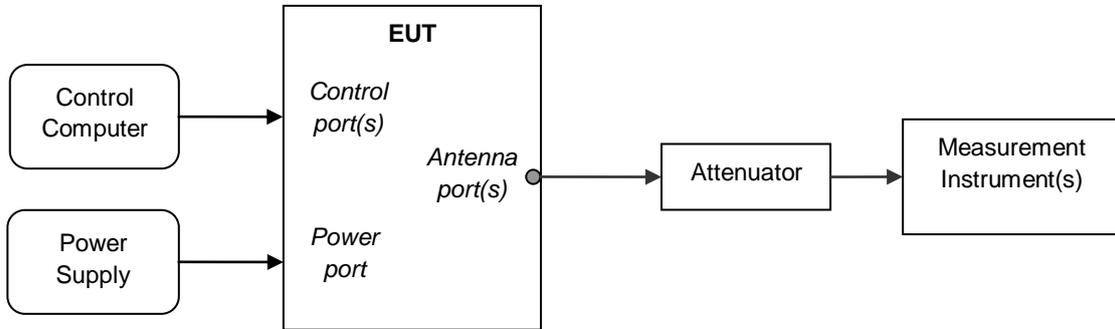


### 4.3 Test Environments

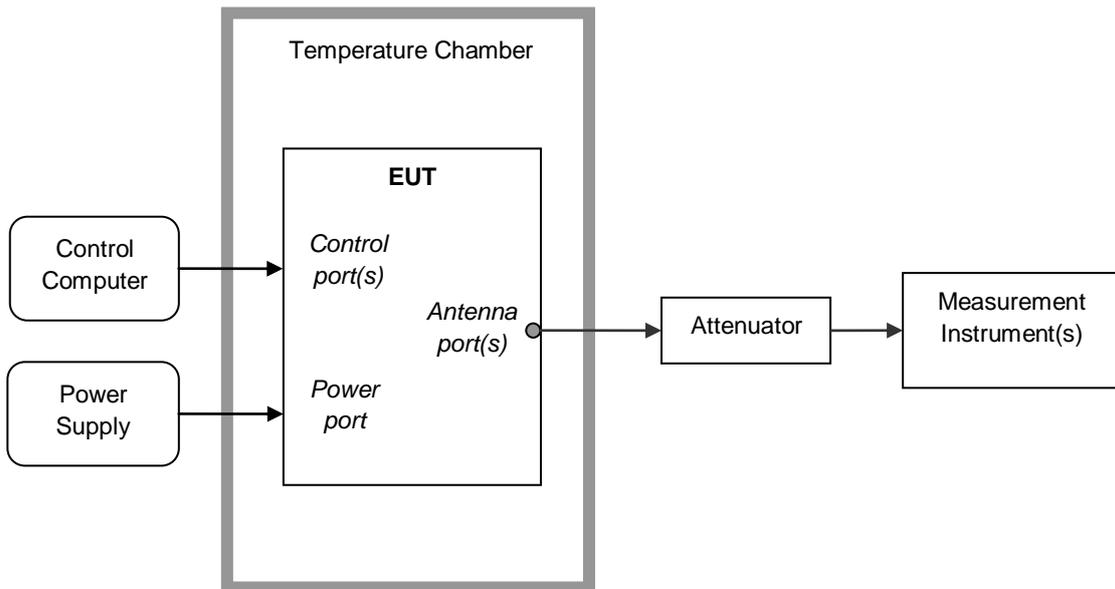
Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Ambient Climate	Ambient	---	Ambient
Rated Voltage	---	-48 VDC	---

## 4.4 Test Setups

### 4.4.1 Test Setup 1



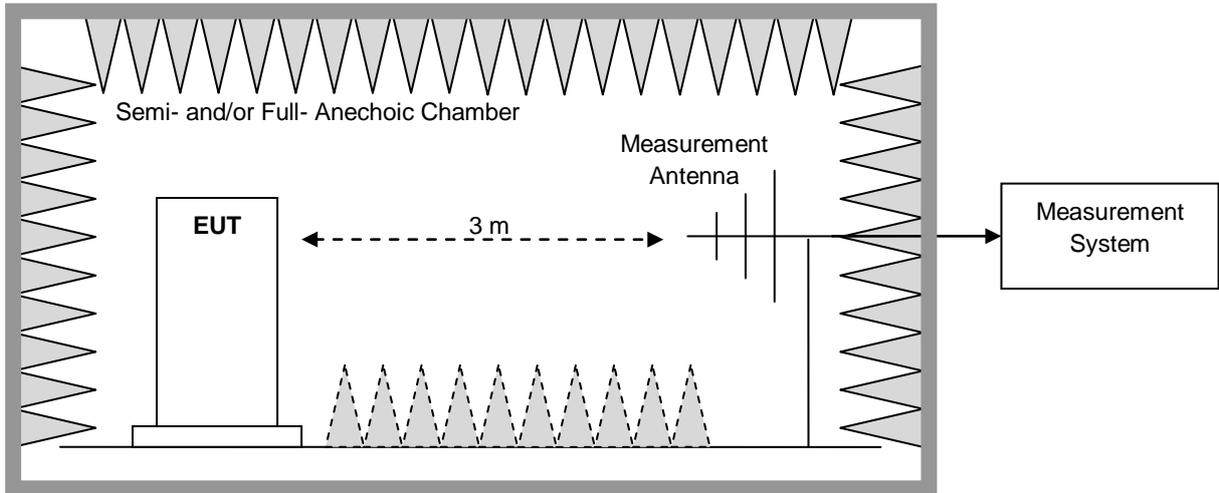
### 4.4.2 Test Setup 2



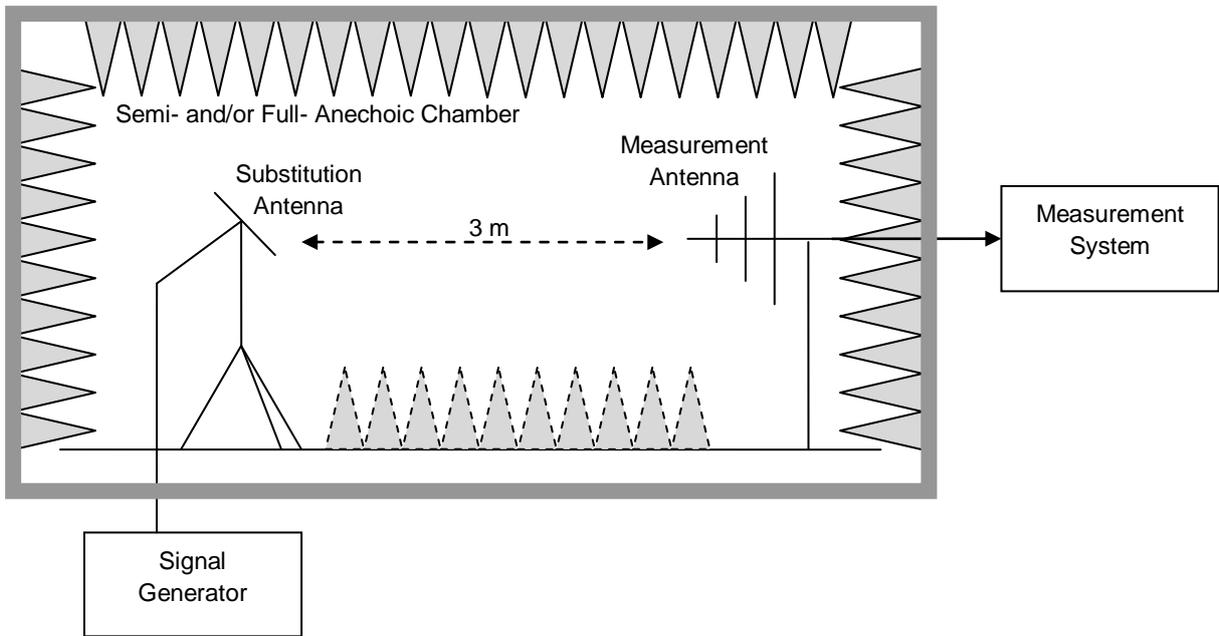
### 4.4.3 Test Setup 3

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 Cellular band

Test Case		Test Conditions		
Transmitter Output Power	Channel Power, Total	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	1U_B, 1U_M, 1U_T 2U_M, 3U_M, 4U_M 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 2G_GMSK_M, 3G_GMSK_M, 4G_GMSK_M 5G_GMSK_M, 6G_GMSK_M 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T 2G_8PSK_M, 3G_8PSK_M, 4G_8PSK_M 5G_8PSK_M, 6G_8PSK_M 1G1U_M, 1G2U_M, 2G1U_M, 2G2U_M 3G1U_M, 3G2U_M, 4G1U_M	
	Power Spectral Density (if required)	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	Not applicable	
	Peak-to-Average Ratio (if required)	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T	
	Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
			Test Setup	Test Seup 1
			EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T
Emission Bandwidth (if required)		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T	
Band Edges Compliance	Test Env.	Ambient Climate & Rated Voltage		
	Test Setup	Test Seup 1		
	EUT Conf.	1U_B, 1U_T 1G_GMSK_B, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_T 1G1U_M, 3G1U_M		
Spurious Emission at Antenna Terminals	Test Env.	Ambient Climate & Rated Voltage		
	Test Setup	Test Seup 1		
	EUT Conf.	1U_B, 1U_M, 1U_T		

Test Case	Test Conditions	
		1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G1U_M, 3G1U_M
Field Strength of Spurious Radiation	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	EUT Conf.	1G_GMSK_M  NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
Frequency Stability	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 Seup 2
	EUT Conf.	1U_M 1G_GMSK_M  NOTE: A representative EUT configuration was selected since the un-modulation carrier configuration was required by the standards/rules.
Receiver Spurious Emissions	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	EUT Conf.	1U_M 1G_GMSK_M

#### 4.5.2 PCS band

Test Case		Test Conditions	
Transmitter Output Power	Channel Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1U_B, 1U_M, 1U_T 2U_B, 2U_T 3U_B, 3U_T 4U_B, 4U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 2G_GMSK_B, 2G_GMSK_T 3G_GMSK_B, 3G_GMSK_T 4G_GMSK_B, 4G_GMSK_T 5G_GMSK_B, 5G_GMSK_T 6G_GMSK_B, 6G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T 2G_8PSK_B, 2G_8PSK_T 3G_8PSK_B, 3G_8PSK_T 4G_8PSK_B, 4G_8PSK_T 5G_8PSK_B, 5G_8PSK_T



Test Case		Test Conditions	
			6G_8PSK_B, 6G_8PSK_T 1G1U_B, 1G1U_T 1G2U_B, 1G2U_T, 2G1U_B, 2G1U_T, 2G2U_B, 2G2U_T, 3G1U_B, 3G1U_T, 3G2U_B, 3G2U_T, 4G1U_B, 4G1U_T, 1L_1M4_B, 1L_1M4_M, 1L_1M4_T 1L_3M_B, 1L_3M_M, 1L_3M_T 1L_5M_B, 1L_5M_M, 1L_5M_T 1L_10M_B, 1L_10M_M, 1L_10M_T 1L_15M_B, 1L_15M_M, 1L_15M_T 1L_20M_B, 1L_20M_M, 1L_20M_T 2L_1M4_B, 2L_1M4_T 2L_20M_B, 2L_20M_T 2L_5M_20M_B, 2L_5M_20M_T 1G1L_1M4_B, 1G1L_1M4_T 1G1L_20M_B, 1G1L_20M_T 2G1L_1M4_B, 2G1L_1M4_T 2G1L_20M_B, 2G1L_20M_T 3G1L_1M4_B, 3G1L_1M4_T 3G1L_20M_B, 3G1L_20M_T 4G1L_1M4_B, 4G1L_1M4_T 4G1L_20M_B, 4G1L_20M_T 2G2L_5M_B, 2G2L_5M_T 2G2L_10M_B, 2G2L_10M_T 1U1L_1M4_B, 1U1L_1M4_T 1U1L_20M_B, 1U1L_20M_T 2U1L_1M4_B, 2U1L_1M4_T 2U1L_20M_B, 2U1L_20M_T 3U1L_1M4_B, 3U1L_1M4_T 3U1L_20M_B, 3U1L_20M_T
Power Spectral Density (if required)	Test Env.	Ambient Climate & Rated Voltage	
	Test Setup	Test Seup 1	
	EUT Conf.	1U_B, 1U_M, 1U_T 1L_1M4_B, 1L_1M4_M, 1L_1M4_T	
Peak-to-Average Ratio (if required)	Test Env.	Ambient Climate & Rated Voltage	
	Test Setup	Test Seup 1	
	EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T 1L_1M4_B, 1L_1M4_M, 1L_1M4_T	

Test Case		Test Conditions	
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T 1L_1M4_B, 1L_1M4_M, 1L_1M4_T 1L_3M_B, 1L_3M_M, 1L_3M_T 1L_5M_B, 1L_5M_M, 1L_5M_T 1L_10M_B, 1L_10M_M, 1L_10M_T 1L_15M_B, 1L_15M_M, 1L_15M_T 1L_20M_B, 1L_20M_M, 1L_20M_T
	Emission Bandwidth (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1U_B, 1U_M, 1U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_M, 1G_8PSK_T 1L_1M4_B, 1L_1M4_M, 1L_1M4_T 1L_3M_B, 1L_3M_M, 1L_3M_T 1L_5M_B, 1L_5M_M, 1L_5M_T 1L_10M_B, 1L_10M_M, 1L_10M_T 1L_15M_B, 1L_15M_M, 1L_15M_T 1L_20M_B, 1L_20M_M, 1L_20M_T
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1U_B, 1U_T 4U_B, 4U_T 1G_GMSK_B, 1G_GMSK_T 1G_8PSK_B, 1G_8PSK_T 6G_GMSK_B, 6G_GMSK_T 6G_8PSK_B, 6G_8PSK_T 1G1U_B, 1G1U_T 3G1U_B, 3G1U_T 1L_1M4_B, 1L_1M4_T 1L_20M_B, 1L_20M_T 1G1L_1M4_B, 1G1L_1M4_T 1U1L_1M4_B, 1U1L_1M4_T
Spurious Emission at Antenna Terminals	Test Env.	Ambient Climate & Rated Voltage	
	Test Setup	Test Seup 1	
	EUT Conf.	1U_B, 1U_T 4U_B, 4U_T 1G_GMSK_B, 1G_GMSK_T 6G_GMSK_B, 6G_GMSK_T 1G1U_B, 1G1U_T	

Test Case	Test Conditions	
		3G1U_B, 3G1U_T 1L_1M4_B, 1L_1M4_T 1G1L_1M4_B, 1G1L_1M4_T 1U1L_1M4_B, 1U1L_1M4_T
Field Strength of Spurious Radiation	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 3
	EUT Conf.	1G_GMSK_M NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
Frequency Stability	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 Seup 2
	EUT Conf.	1G_GMSK_M 1U1L_1M4_B NOTE: A representative EUT configuration was selected since the un-modulation carrier configuration was required by the standards/rules.
Receiver Spurious Emissions	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 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	E4440A	MY49420179	2014-08-30
Spectrum Analyzer	Agilent	N9020A	MY51240619	2014-02-03
Vector Signal Generator	Agilent	E4438C	MY47271904	2014-11-26
Temperature Chamber	ESPEC	EW0470S	12113066	2014-07-17
Power Supply	Chroma	62012P-80-60	62012PD01403	2014-10-15
Test Setup 3				
EMI Test Receiver	R&S	ESU40	100144	2014-12-23
Bilog Antenna (30M-1GHz)	Schaffner	CBL6112B	2536	2015-03-22 (2y)
Horn Antenna (1G-18GHz)	R&S	HF906	359287/005	2014-03-23 (2y)



## 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