

TESTING CERT #2174.01

RF Test Report

Product Name: Remote Radio Unit

Product Model: RRU3942-850

Report Number: SYBH(R)01271108EB-1

FCC ID: QISRRU3942-850

IC ID: 6369A-3942B5

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 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.
5. The laboratory has been listed by the VCCI to perform EMC measurements. The accreditation numbers for the test site No.1 located at G2 building in Shenzhen are R-3892, G-415, C-4361, and T-1348, and the accreditation numbers for the test site No.2 located at K3 building in Shenzhen are R-3760, G-485, C-4210 and T-1237.
6. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
7. The test report is invalid if there is any evidence of erasure and/or falsification.
8. The test report is only valid for the test samples.
9. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.



Applicant: Huawei Technologies Co., Ltd.
Address: Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129, P.R.C
Product Name: Remote Radio Unit
Product Model: RRU3942-850

Date of Receipt Sample: 2012-05-24 2013-12-24
Start Date of Test: 2012-05-24 2013-12-30
End Date of Test: 2012-08-08 2014-03-18

Test Result: Pass

Approved by Senior

2014-03-25

Zhang Xinghai

Zhang Xing hai

Engineer:

Date

Name

Signature

Prepared by:

2014-03-25

Huang Yuanqiu

Huang yuanqiu

Date

Name

Signature



Modification Record

No.	Last Report No.	Modification Description
1	SYBH(R)00666679EB-1	The modifications are declared by the applicant and showed as below: ● Add GSM+UMTS mode; ● Add GSM+LTE mode; ● Add UMTS+LTE mode; ● Add LTE mode; ● A new conducted rated power configure for the two antenna port is added, which is antenna port A is 40W and antenna port B is 80W; The test data of SYBH(R)00666679EB-1 were included in the report.



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1 General Information

1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 02 (10-1-12 Edition)
47 CFR FCC Part 22 (10-1-12 Edition)
IC RSS-Gen (Issue 3, December 2010)
IC RSS-132 (Issue 3, January 2013)

Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02
FCC KDB 662911 D01 Multiple Transmitter Output v02

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: 22 to 26 °C
Ambient Relative Humidity: 54 to 70 %
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 for Base Station

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 Power ≤ 500 W.	Annex A	Pass	TL1
				Mobile Station	ERP Power ≤ 7 W.			
			IC	Base Station	- Average EIRP Power ≤ 820 W. - PAPR ≤ 13 dB@0.1%.			
				Mobile Station	- Average EIRP Power ≤ 11.5 W. - PAPR ≤ 13 dB@0.1%.			
Bandwidth	\$2.1049, \$22.917	RSS-Gen,\$4.6	FCC	- OBW: No limit. - EBW (-26 dBc): No limit.		Annex B	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 C	Pass	TL1
			IC	≤ -13 dBm/1%*OBW, in 1 MHz bands immediately outside and adjacent to the sub-bands.				
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 th harmonics but outside authorized operating frequency ranges/sub-bands.			Annex D	Pass	TL1
Field Strength of Spurious Radiation	\$2.1053, \$22.917	RSS-Gen,\$4.9; RSS-132,\$5.5	≤ -13 dBm/100 kHz.			Annex E	Pass	TL1
Frequency Stability	\$2.1055, \$22.355	RSS-Gen,\$4.7; RSS-132,\$5.3	FCC	Base Station	- Test method: (Fc_meas - Fc_rated) / Fc_rated ≤ ±1.5 ppm. - Test conditions: (1) NV, -30°C/.../+50°C step=+10°C. (2) NT, ±15%*NV.	Annex F	Pass	TL1
				Mobile Station	Test method: (Fc_meas - Fc_rated) / Fc_rated ≤			



Test Item	FCC Rule	IC Rule	Requirements			Test Result	Verdict	Test Location
					±2.5 ppm. Test conditions: (1) NV, -30°C/.../+50°C step=+10°C. (2) NT, ±15%*NV.			
			IC	Base Station	- Test method option #1: (Fc_meas - Fc_meas@20°C&NV) / Fc_meas@20°C&NV ≤ ±1.5 ppm. - Test method option#2: OBW (OBW_lower to OBW_higher) within each sub-band. - Test conditions: (1) NV, -30°C/+20°C/+50°C. (2) +20°C, ±15%*NV.			
				Mobile Station	- Test method option #1: (Fc_meas - Fc_meas@20°C&NV) / Fc_meas@20°C&NV ≤ ±2.5 ppm. - Test method option #2: OBW (OBW_lower to OBW_higher) within each sub-band. - Test conditions: (1) NV, -30°C/+20°C/+50°C. (2) +20°C, ±15%*NV.			
Receiver Spurious Emissions (Note 1, 2)	---	RSS-Gen,§4.10 ; RSS-Gen,§6; RSS-132,§5.6	- Radiated limit: RSS-Gen, §6.1 field strength limit. - 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.			Annex G	Pass,	TL1
Photos of Test Setups	---	---	---			Annex H	---	---
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								



Test Item	FCC Rule	IC Rule	Requirements	Test Result	Verdict	Test Location
disconnected and the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna. 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.						

2.1.2 Non-measurement Technical Requirements

Description	FCC Rule	IC Rule	Requirements	Test Result	Verdict
Modulation Characteristics	§2.1047	RSS-132,§5.2	Digital modulation.	See technical specification description.	Comply

3 Description of the Equipment under Test (EUT)

3.1 General Description

The RRU 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 RRU can modulate, demodulate, combine, and divide baseband and RF signals. It also processes baseband and RF signal data.

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
WD5GMRAC50	Ver.A	Power Amplifier Board
WD5GMRXC50	Ver.A	Transceiver Board

3.2.2 Sub-Assembly

Sub-Assembly		
Sub-Assembly Name	Manufacturer	Description
WBBP	Huawei	NodeB baseband Unit
WMPT	Huawei	NodeB Main Processing Unit
LBBP	Huawei	LTE baseband Unit
LMPT	Huawei	LTE Main Processing Unit
GTMU	Huawei	GBTS baseband Unit



3.3 Technical Specification

Characteristics	Description
Radio System Type	Single Radio Access Technology (Single-RAT): ☒ GSM ☒ UMTS ☒ LTE ☐ CDMA ☐ WiMAX Multi-Standard Radio (MSR): ☒ GSM & UMTS ☒ GSM & LTE ☒ UMTS & LTE ☐ WiMAX & LTE ☐ CDMA & LTE
Equipment Type	☒ Base Station, ☐ Subscriber Station, ☐ Fixed Station, ☐ Mobile Station, ☐ Portable Station
Supported Frequency Range	Transmission (TX): 869 to 894 MHz Receiving (RX): 824 to 849 MHz
TX and RX Antenna Ports	TX & RX port: 2 TX-only port: 0 RX-only port: 2
Maximum RF Bandwidth	25 MHz
TX Output Power	60 W (antenna port A) and 60 W (antenna port B) or 40 W (antenna port A) and 80 W (antenna port B)
Supported Channel Bandwidth	GSM system: ☒ 200 kHz UMTS system: ☒ 5 MHz LTE system: ☒ 1.4 MHz, ☒ 3 MHz, ☒ 5 MHz, ☒ 10 MHz, ☒ 15 MHz, ☒ 20 MHz CDMA system: ☐ 1.23 MHz, ☐ 1.25 MHz WiMAX system: ☐ 5 MHz, ☐ 7 MHz, ☐ 10 MHz
Modulation Type	GSM system: Base-band: GMSK, 8PSK Carrier: TDMA UMTS system: Base-band: QPSK, 16QAM, 64QAM Carrier: CDMA LTE system: Base-band: QPSK, 16QAM, 64QAM Carrier: OFDM/OFDMA
Designation of Emissions	GSM system: 300KGXW, 300KG7W UMTS system: 5M00F9W LTE system: 1M40D9W, 3M00D9W, 5M00D9W, 10M0D9W, 15M0D9W, 20M0D9W
Power Supply	Power Supply Type: ☐ External AC mains, ☒ External DC mains, ☐ AC/DC Adapter,



Characteristics	Description
	☐ Powered over Ethernet (PoE) Nominal Voltage, -48 VDC Input to EUT: Voltage Range, -36 to -57 VDC Input to EUT:
Antenna Assemblies	Antenna Type: ☒ External ☐ Integrated Antenna Gain: See appendix A Remark: The antenna gain is the maximum gain when the EUT is the declared maximum power. When the EUT is put into service, the practical maximum antenna gain will be changed with the actual antenna conducted power, 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, - As the TRx A and TRx B are electrical identical, for 40 W (antenna port A) and 80 W (antenna port B) configuration, all TX tests are performed at the TRx B antenna port of the EUT, and additional tests on TRx A to verify the total test result, for 60 W (antenna port A) and 60 W (antenna port B) configuration, all TX tests are performed at the TRx A antenna port of the EUT. - All RX tests are ONLY performed at the main RX antenna port (e.g. TRXA, RXB or similar) 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.

4.2.2 Customized Configurations

NOTE1: 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.

NOTE2: the setting below were deemed representative for all traffic scenarios when setting with different modulations, channel bandwidths, number of carriers and RF configurations has been tested to find the worst case setting.

4.2.2.1 For test number SYBH(R)00666679

EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1U_B	B	1*U(80W) @TRXB	871.4	826.4	5	49	UMTS/TM1
1U_M	M	1*U(80W) @TRXB	881.4	836.4	5	49	UMTS/TM1
1U_T	T	1*U(80W) @TRXB	891.6	846.6	5	49	UMTS/TM1
2U_B	B	2*U(40W) @TRXB	871.4,876.4	826.4,831.4	5,5	46	UMTS/TM1
2U_M	M	2*U(40W) @TRXB	879,884	834,839	5,5	46	UMTS/TM1
2U_T	T	2*U(40W) @TRXB	886.6,891.6	841.6,846.6	5,5	46	UMTS/TM1



EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
3U_B	B	3*U(20W) @TRXB	871.4,876.4,881.4	826.4,831.4,836.4	5,5,5	43	UMTS/TM1
3U_T	T	3*U(20W) @TRXB	881.6,886.6,891.6	836.6,841.6,846.6	5,5,5	43	UMTS/TM1
1G_GMSK_B	B	1*G(80W) @TRXB	869.4	824.4	0.2	49	GSM/GMSK
1G_GMSK_M	M	1*G(80W) @TRXB	881.4	836.4	0.2	49	GSM/GMSK
1G_GMSK_T	T	1*G(80W) @TRXB	893.6	848.6	0.2	49	GSM/GMSK
1G_8PSK_B	B	1*G(80W) @TRXB	869.4	824.4	0.2	49	GSM/8PSK
1G_8PSK_M	M	1*G(80W) @TRXB	881.4	836.4	0.2	49	GSM/8PSK
1G_8PSK_T	T	1*G(80W) @TRXB	893.6	848.6	0.2	49	GSM/8PSK
2G_GMSK_B	B	2*G(40W) @TRXB	869.4,870	824.4,825	0.2,0.2	46,46	GSM/GMSK
2G_GMSK_M	M	2*G(40W) @TRXB	881.2,881.8	836.2,836.8	0.2,0.2	46,46	GSM/GMSK
2G_GMSK_T	T	2*G(40W) @TRXB	893,893.60	848,848.60	0.2,0.2	46,46	GSM/GMSK
3G_GMSK_B	B	3*G(27W) @TRXB	869.4,870,870.6	824.4,825,825.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
3G_GMSK_M	M	3*G(27W) @TRXB	880.8,881.4,882	835.8,836.4,837	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
3G_GMSK_T	T	3*G(27W) @TRXB	892.4,893,893.6	847.4,848,848.6	0.2,0.2,0.2	44.3,44.3,44.3	GSM/GMSK
4G_GMSK_B	B	4*G(20W) @TRXB	869.4,870,870.6,871.2	824.4,825,825.6,826.2	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
4G_GMSK_M	M	4*G(20W) @TRXB	880.6,881.2,881.8,882.4	835.6,836.2,836.8,837.4	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
4G_GMSK_T	T	4*G(20W) @TRXB	891.8,892.4,893,893.6	846.8,847.4,848,848.6	0.2,0.2,0.2,0.2	43,43,43,43	GSM/GMSK
5G_GMSK_B	B	5*G(16W) @TRXB	869.4,870,870.6,871.2,871.8	824.4,825,825.6,826.2,826.8	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK
5G_GMSK_M	M	5*G(16W) @TRXB	880.2,880.8,881.4,882,882.6	835.2,835.8,836.4,837,837.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK
5G_GMSK_T	T	5*G(16W) @TRXB	891.2,891.8,892.4,893,893.6	846.2,846.8,847.4,848,848.6	0.2,0.2,0.2,0.2,0.2	42,42,42,42,42	GSM/GMSK



EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
6G_GMSK_B	B	6*G(12W) @TRXB	869.4,870,870.6 ,871.2,871.8,87 2.4	824.4,825,825. 6,826.2,826.8,8 27.4	0.2,0.2,0.2, 0.2,0.2,0.2	40.8,40.8, 40.8,40.8, 40.8,40.8	GSM/G MSK
6G_GMSK_M	M	6*G(12W) @TRXB	880,880.6,881.2 ,881.8,882.4,88 3	835,835.6,836. 2,836.8,837.4,8 38	0.2,0.2,0.2, 0.2,0.2,0.2	40.8,40.8, 40.8,40.8, 40.8,40.8	GSM/G MSK
6G_GMSK_T	T	6*G(12W) @TRXB	890.6,891.2,891 ,892.4,893,89 3.6	845.6,846.2,84 6,847.4,848,8 48.6	0.2,0.2,0.2, 0.2,0.2,0.2	40.8,40.8, 40.8,40.8, 40.8,40.8	GSM/G MSK
7G_GMSK_B	B	7*G(6W) @TRXB	869.4,870,870.6 ,871.2,871.8,87 2.4,873	824.4,825,825. 6,826.2,826.8,8 27.4,828	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2	37.8,37.8, 37.8,37.8, 37.8,37.8, 37.8	GSM/G MSK
7G_GMSK_M	M	7*G(6W) @TRXB	879.6,880.2,880 ,881.4,882,88 2.6,883.2	834.6,835.2,83 5,836.4,837,8 37.6,838.2	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2	37.8,37.8, 37.8,37.8, 37.8,37.8, 37.8	GSM/G MSK
7G_GMSK_T	T	7*G(6W) @TRXB	890,890.6,891.2 ,891.8,892.4,89 3,893.6	845,845.6,846. 2,846.8,847.4,8 48,848.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2	37.8,37.8, 37.8,37.8, 37.8,37.8, 37.8	GSM/G MSK
8G_GMSK_B	B	8*G(5W) @TRXB	869.4,870,870.6 ,871.2,871.8,87 2.4,873,873.6	824.4,825,825. 6,826.2,826.8,8 27.4,828,828.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37,37,37, 37,37,37, 37,37	GSM/G MSK
8G_GMSK_M	M	8*G(5W) @TRXB	879.4,880,880.6 ,881.2,881.8,88 2.4,883,883.6	834.4,835,835. 6,836.2,836.8,8 37.4,838,838.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37,37,37, 37,37,37, 37,37	GSM/G MSK
8G_GMSK_T	T	8*G(5W) @TRXB	889.4,890,890.6 ,891.2,891.8,89 2.4,893,893.6	844.4,845,845. 6,846.2,846.8,8 47.4,848,848.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37,37,37, 37,37,37, 37,37	GSM/G MSK
1G1U_B	B	1*G(40W) @TRXB 1*U(40W) @TRXB	869.4,878.8	824.4,833.8	0.2,5	46,46	GU/TM 1
1G1U_T	T	1*G(40W) @TRXB 1*U(40W) @TRXB	884.2,893.6	839.2,848.6	5,0.2	46,46	GU/TM 1
1G2U_B	B	1*G(40W) @TRXB 2*U(20W) @TRXB	869.4,872.6,877 .6	824.4,827.6,83 2.6	0.2,5,5	46,43,43	GU/TM 1
1G2U_T	T	1*G(40W) @TRXB 2*U(20W) @TRXB	885.2,890.2,893 .6	840.2,845.2,84 8.6	5,5,0.2	43,43,46	GU/TM 1
2G1U_B	B	2*G(30W) @TRXB 1*U(20W) @TRXB	869.4,875.2,881	824.4,830.2,83 6	0.2,5,0.2	44.8,43,4 4.8	GU/TM 1



EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	RX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
2G1U_T	T	2*G(30W) @TRXB 1*U(20W) @TRXB	882,887.8,893.6	837,842.8,848.6	0.2,5,0.2	44.8,43,44.8	GU/TM1
3G1U_B	B	3*G(20W) @TRXB 1*U(20W) @TRXB	869.4,870,875.2,881	824.4,825,830.2,836	0.2,0.2,5,0.2	43,43,43,43	GU/TM1
3G1U_T	T	3*G(20W) @TRXB 1*U(20W) @TRXB	882,887.8,893,893.6	837,842.8,848,848.6	0.2,5,0.2,0.2	43,43,43,43	GU/TM1

4.2.2.2 For test number SYBH(R)01271108

EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1U_80W_B_TM1_TRXB	B	1*U(80W)@TRXB	871.4	5	49	UMTS/TM1
1U_80W_M_TM1_TRXB	M	1*U(80W)@TRXB	881.6	5	49	UMTS/TM1
1U_80W_T_TM1_TRXB	T	1*U(80W)@TRXB	891.6	5	49	UMTS/TM1
1U_40W_B_TM1_TRXA	B	1*U(40W)@TRXA	871.4	5	46	UMTS/TM1
1U_40W_M_TM1_TRXA	M	1*U(40W)@TRXA	881.6	5	46	UMTS/TM1
1U_40W_T_TM1_TRXA	T	1*U(40W)@TRXA	891.6	5	46	UMTS/TM1
4U_80W_B_TM1_TRXB	B	4*U(20W)@TRXB	871.4, 876.4, 881.4, 886.4	5,5,5,5	43	UMTS/TM1
4U_80W_T_TM1_TRXB	T	4*U(20W)@TRXB	876.6, 881.6, 886.6, 891.6	5,5,5,5	43	UMTS/TM1
1G_80W_B_TM1_TRXB	B	1*G(80W)@TRXB	869.4	0.2	49	GSM/GMSK
1G_80W_M_TM1_TRXB	M	1*G(80W)@TRXB	881.6	0.2	49	GSM/GMSK
1G_80W_T_TM1_TRXB	T	1*G(80W)@TRXB	893.6	0.2	49	GSM/GMSK
1G_40W_B_TM1_TRXA	B	1*G(80W)@TRXA	869.4	0.2	46	GSM/GMSK
1G_40W_M_TM1_TRXA	M	1*G(80W)@TRXA	881.6	0.2	46	GSM/GMSK
1G_40W_T_TM1_TRXA	T	1*G(80W)@TRXA	893.6	0.2	46	GSM/GMSK
8G_80W_B_TM1_TRXB	B	8*G(5W)@TRXB	869.4, 870, 870.6, 871.2, 871.8, 872.4, 873, 873.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37, 37, 37, 37, 37, 37, 37, 37	GSM/GMSK
8G_80W_M_TM1_TRXB	M	8*G(5W)@TRXB	879.4, 880, 880.6, 881.2, 881.8, 882.4, 883, 883.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37, 37, 37, 37, 37, 37, 37, 37	GSM/GMSK
8G_80W_T_TM1_TRXB	T	8*G(5W)@TRXB	889.4, 890, 890.6, 891.2, 891.8, 892.4, 893, 893.6	0.2,0.2,0.2, 0.2,0.2,0.2, 0.2,0.2	37, 37, 37, 37, 37, 37, 37, 37	GSM/GMSK
1G_60W_B_TM1_TRXA	B	1*G(80W)@TRXA	869.4	0.2	47.8	GSM/GMSK



EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1G_60W_M_TM1_TRXA	M	1*G(80W)@TRXA	881.6	0.2	47.8	GSM/GMSK
1G_60W_T_TM1_TRXA	T	1*G(80W)@TRXA	893.6	0.2	47.8	GSM/GMSK
1G_60W_B_TM2_TRXA	B	1*G(80W)@TRXA	869.4	0.2	47.8	GSM/8PSK
1G_60W_M_TM2_TRXA	M	1*G(80W)@TRXA	881.6	0.2	47.8	GSM/8PSK
1G_60W_T_TM2_TRXA	T	1*G(80W)@TRXA	893.6	0.2	47.8	GSM/8PSK
1U_60W_B_TM1_TRXA	B	1*U(80W)@TRXA	871.4	5	47.8	UMTS/TM1
1U_60W_M_TM1_TRXA	M	1*U(80W)@TRXA	881.6	5	47.8	UMTS/TM1
1U_60W_T_TM1_TRXA	T	1*U(80W)@TRXA	891.6	5	47.8	UMTS/TM1
1L_1.4M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	869.7	1.4	47.8	LTE/TM1.1
1L_1.4M_60W_M_TM1_TRXB	M	1*L(60W)@TRXB	881.5	1.4	47.8	LTE/TM1.1
1L_1.4M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	893.3	1.4	47.8	LTE/TM1.1
1L_3M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	870.5	3	47.8	LTE/TM1.1
1L_3M_60W_M_TM1_TRXB	M	1*L(60W)@TRXB	881.5	3	47.8	LTE/TM1.1
1L_3M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	892.5	3	47.8	LTE/TM1.1
1L_5M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	871.5	5	47.8	LTE/TM1.1
1L_5M_60W_M_TM1_TRXB	M	1*L(60W)@TRXB	881.5	5	47.8	LTE/TM1.1
1L_5M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	891.5	5	47.8	LTE/TM1.1
1L_10M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	874	10	47.8	LTE/TM1.1
1L_10M_60W_M_TM1_TRXB	M	1*L(60W)@TRXB	881.5	10	47.8	LTE/TM1.1
1L_10M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	889	10	47.8	LTE/TM1.1
1L_15M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	876.5	15	47.8	LTE/TM1.1
1L_15M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	886.5	15	47.8	LTE/TM1.1
1L_20M_60W_B_TM1_TRXB	B	1*L(60W)@TRXB	879	20	47.8	LTE/TM1.1
1L_20M_60W_T_TM1_TRXB	T	1*L(60W)@TRXB	884	20	47.8	LTE/TM1.1



EUT Conf.	RF Ch	Carrier Conf. Description	TX Freq. [MHz]	Ch. BW [MHz]	Power Level [dBm]	Test Mode
1G1U_80W_B_TM1_TRXB	B	1*G(40W)&1*U(40W)@TRXB	869.4, 886.6	0.2,5	46, 46	GU/TM1
1G1U_80W_T_TM1_TRXB	T	1*G(40W)&1*U(40W)@TRXB	874.2, 893.6	5,0.2	46, 46	GU/TM1
1G1U_40W_B_TM1_TRXA	B	1*G(20W)&1*U(20W)@TRXA	869.4, 886.6	0.2,5	43, 43	GU/TM1
1G1U_40W_T_TM1_TRXA	T	1*G(20W)&1*U(20W)@TRXA	874.2, 893.6	5,0.2	43, 43	GU/TM1
3G1U_80W_B_TM1_TRXB	B	3*G(20W)&1*U(20W)@TRXB	869.4, 870, 879, 886.6	0.2,0.2,5,0.2	43, 43, 43, 43	GU/TM1
3G1U_80W_T_TM1_TRXB	T	3*G(20W)&1*U(20W)@TRXB	874.2, 874.8, 884, 893.6	0.2,0.2,5,0.2	43, 43, 43, 43	GU/TM1
1U1L_20M_80W_B_TM1_TRXB	B	1*U(40W)&1*L(40W)@TRXB	871.4, 884	5,20	46, 46	GU/TM1
1U1L_20M_40W_B_TM1_TRXA	B	1*U(20W)&1*L(20W)@TRXA	871.4, 884	5,20	43, 43	GU/TM1
1U1L_1.4M_80W_B_TM1_TRXB	B	1*U(40W)&1*L(40W)@TRXB	871.4, 883.3	5,20	46, 46	GU/TM1
1U1L_1.4M_80W_T_TM1_TRXB	T	1*U(40W)&1*L(40W)@TRXB	876.4,893.3	5,20	46, 46	GU/TM1
3U1L_1.4M_80W_B_TM1_TRXB	B	3*U(20W)&1*L(20W)@TRXB	871.4, 876.4, 881.4, 888.3	5,5,5,20	43, 43, 43, 43	GU/TM1
3U1L_1.4M_80W_T_TM1_TRXB	T	3*U(20W)&1*L(20W)@TRXB	876.4, 881.4, 886.4, 893.3	5,5,5,20	43, 43, 43, 43	GU/TM1
1G1L_1.4M_60W_B_TM1_TRXA	B	1*G(30W)&1*L(30W)@TRXA	869.4, 888.3	0.2,1.4	44.8, 44.8	GL/TM1
1G1L_1.4M_60W_T_TM1_TRXA	T	1*G(30W)&1*L(30W)@TRXA	874.2, 893.3	0.2,1.4	44.8, 44.8	GL/TM1
1G1L_20M_60W_B_TM1_TRXA	B	1*G(30W)&1*L(30W)@TRXA	869.4, 884	0.2,20	44.8, 44.8	GL/TM1
3G1L_1.4M_60W_B_TM1_TRXA	B	3*G(12W)&1*L(20W)@TRXA	869.4, 870, 879, 888.6	0.2,0.2,1.4, 0.2	40.8, 40.8, 43, 40.8	GL/TM1
3G1L_1.4M_60W_T_TM1_TRXA	T	3*G(12W)&1*L(20W)@TRXA	874.2, 874.8, 884, 893.6	0.2,0.2,1.4, 0.2	40.8, 40.8, 43, 40.8	GL/TM1
3G1L_20M_60W_B_TM1_TRXA	B	3*G(12W)&1*L(20W)@TRXA	869.4, 870, 881.5, 893.6	0.2,0.2,20, 0.2	40.8, 40.8, 43, 40.8	GL/TM1

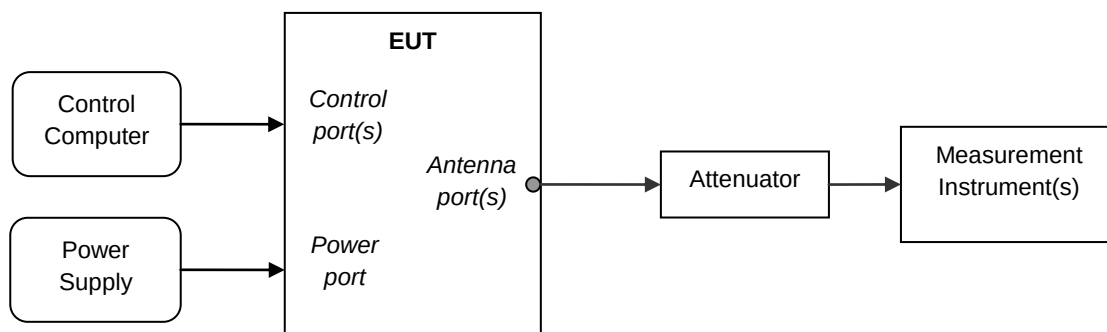


4.3 Test Environments

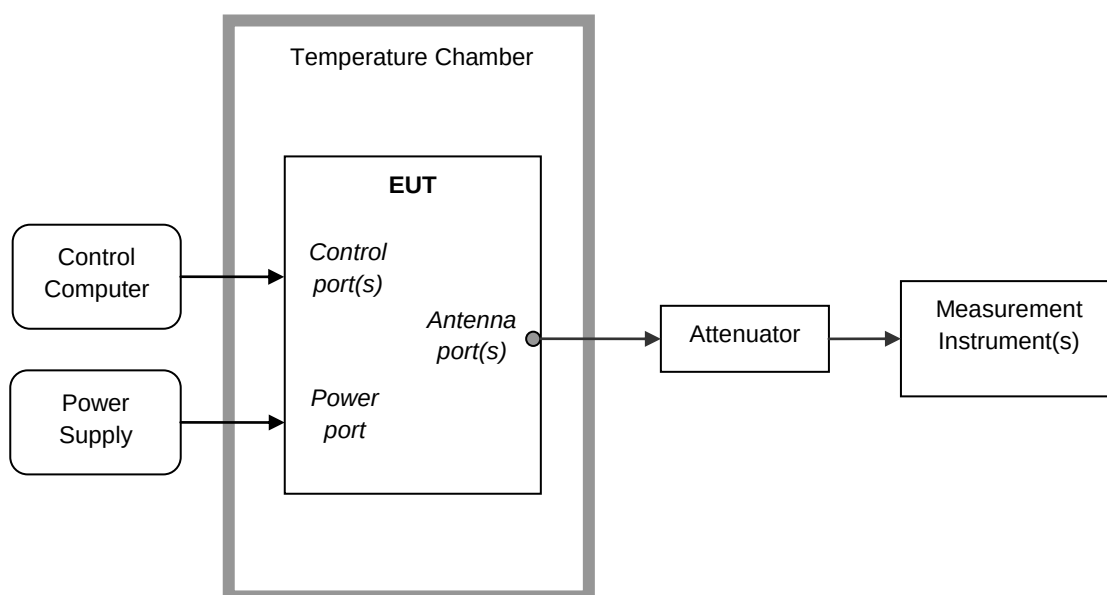
Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Ambient Climate	Ambient	---	Ambient
Rated Voltage	---	-48 VDC	---

4.4 Test Setups

4.4.1 Test Setup 1



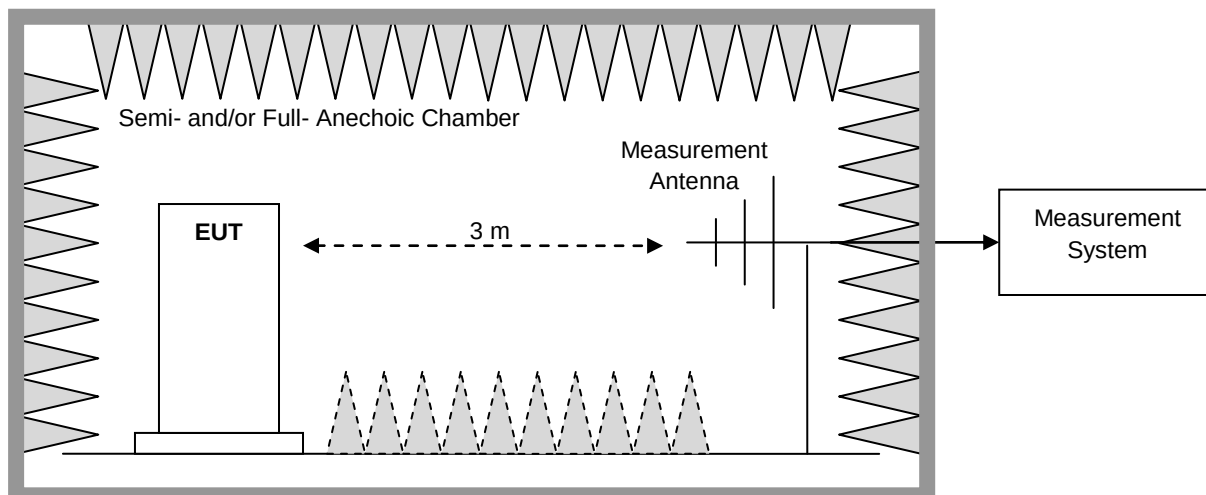
4.4.2 Test Setup 2



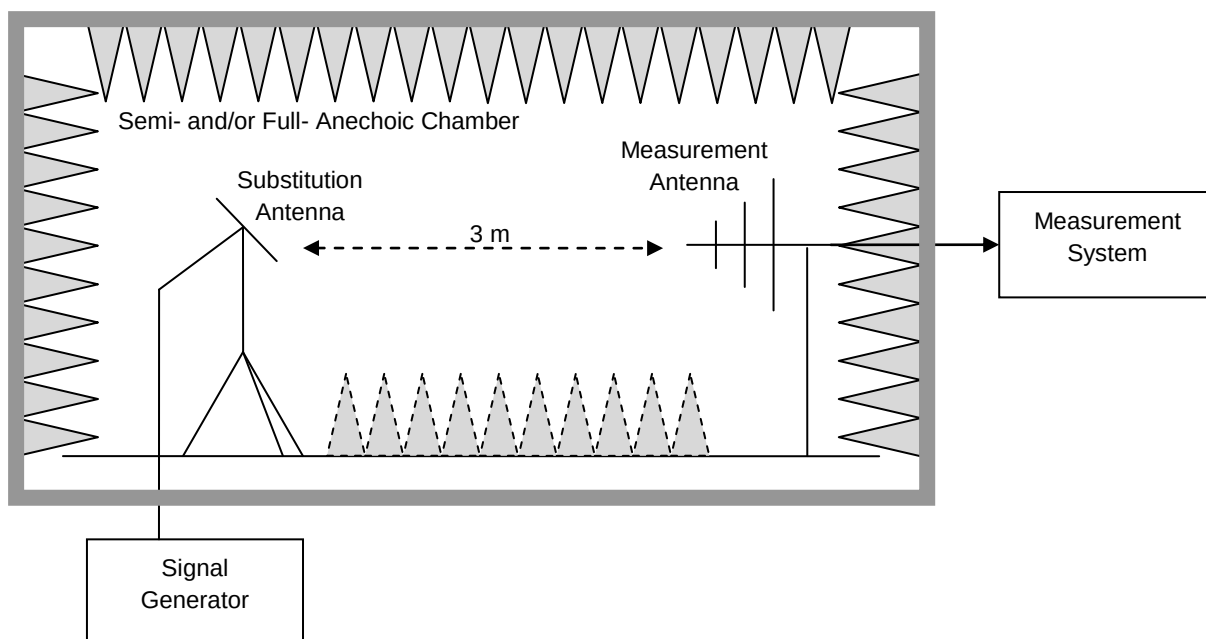
4.4.3 Test Setup 3

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 For test number SYBH(R)00666679

Test Case		Test Conditions		
Transmitter Output Power	Average Power, Total	Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	1U_B, 1U_M, 1U_T 2U_B, 2U_M, 2U_T 3U_B, 3U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 2G_GMSK_B, 2G_GMSK_M, 2G_GMSK_T 3G_GMSK_B, 3G_GMSK_M, 3G_GMSK_T 4G_GMSK_B, 4G_GMSK_M, 4G_GMSK_T 5G_GMSK_B, 5G_GMSK_M, 5G_GMSK_T 6G_GMSK_B, 6G_GMSK_M, 6G_GMSK_T 7G_GMSK_B, 7G_GMSK_M, 7G_GMSK_T 8G_GMSK_B, 8G_GMSK_M, 8G_GMSK_T 1G1U_B, 1G1U_T 1G2U_B, 1G2U_T 2G1U_B, 2G1U_T 3G1U_B, 3G1U_T	
	Average 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.	Not applicable	
	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.	Not applicable	
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage	
		Test Setup	Test Seup 1	
		EUT Conf.	1U_B, 1U_T 2U_B, 2U_T 3U_B, 3U_T 1G_GMSK_B, 1G_GMSK_T 8G_GMSK_B, 8G_GMSK_T 1G1U_B, 1G1U_T	

Test Case		Test Conditions	
			3G1U_B, 3G1U_T
Spurious Emission at Antenna Terminals	Test Env.	Ambient Climate & Rated Voltage	
	Test Setup	Test Seup 1	
	EUT Conf.	1U_B, 1U_M, 1U_T 2U_B, 2U_M, 2U_T 3U_B, 3U_T 1G_GMSK_B, 1G_GMSK_M, 1G_GMSK_T 8G_GMSK_B, 8G_GMSK_T 1G1U_B, 1G1U_T 3G1U_B, 3G1U_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 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 For test number SYBH(R)01271108

Test Case		Test Conditions	
Transmitter Output Power	Average Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1U_80W_B_TM1_TRXB, 1U_80W_M_TM1_TRXB, 1U_80W_T_TM1_TRXB, 1U_40W_B_TM1_TRXA, 1U_40W_M_TM1_TRXA, 1U_40W_T_TM1_TRXA, 4U_80W_B_TM1_TRXB, 4U_80W_T_TM1_TRXB, 1G_80W_B_TM1_TRXB, 1G_80W_M_TM1_TRXB, 1G_80W_T_TM1_TRXB, 1G_40W_B_TM1_TRXA, 1G_40W_M_TM1_TRXA, 1G_40W_T_TM1_TRXA,



Test Case		Test Conditions	
			8G_80W_B_TM1_TRXB, 8G_80W_T_TM1_TRXB, 1L_20M_60W_B_TM1_TRXB, 1L_20M_60W_T_TM1_TRXB, 1G1U_80W_B_TM1_TRXB, 1G1U_80W_T_TM1_TRXB, 1G1U_40W_B_TM1_TRXA, 1G1U_40W_T_TM1_TRXA, 3G1U_80W_B_TM1_TRXB, 3G1U_80W_T_TM1_TRXB, 1U1L_20M_80W_B_TM1_TRXB, 1U1L_20M_40W_B_TM1_TRXA, 1U1L_1.4M_80W_B_TM1_TRXB, 1U1L_1.4M_80W_T_TM1_TRXB, 3U1L_1.4M_80W_B_TM1_TRXB, 3U1L_1.4M_80W_T_TM1_TRXB, 1G1L_1.4M_60W_B_TM1_TRXA, 1G1L_1.4M_60W_T_TM1_TRXA, 1G1L_20M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_T_TM1_TRXA, 3G1L_20M_60W_B_TM1_TRXA
	Peak-to-Average Ratio (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1G_60W_B_TM1_TRXA, 1G_60W_M_TM1_TRXA, 1G_60W_T_TM1_TRXA, 1G_60W_B_TM2_TRXA, 1G_60W_M_TM2_TRXA, 1G_60W_T_TM2_TRXA, 1U_60W_B_TM1_TRXA, 1U_60W_M_TM1_TRXA, 1U_60W_T_TM1_TRXA, 1L_1.4M_60W_B_TM1_TRXB, 1L_1.4M_60W_M_TM1_TRXB, 1L_1.4M_60W_T_TM1_TRXB, 1L_3M_60W_B_TM1_TRXB, 1L_3M_60W_M_TM1_TRXB, 1L_3M_60W_T_TM1_TRXB, 1L_5M_60W_B_TM1_TRXB, 1L_5M_60W_M_TM1_TRXB, 1L_5M_60W_T_TM1_TRXB, 1L_10M_60W_B_TM1_TRXB, 1L_10M_60W_M_TM1_TRXB, 1L_10M_60W_T_TM1_TRXB, 1L_15M_60W_B_TM1_TRXB, 1L_15M_60W_T_TM1_TRXB, 1L_20M_60W_B_TM1_TRXB, 1L_20M_60W_T_TM1_TRXB
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Seup 1
		EUT Conf.	1L_1.4M_60W_B_TM1_TRXB, 1L_1.4M_60W_M_TM1_TRXB, 1L_1.4M_60W_T_TM1_TRXB, 1L_3M_60W_B_TM1_TRXB, 1L_3M_60W_M_TM1_TRXB, 1L_3M_60W_T_TM1_TRXB, 1L_5M_60W_B_TM1_TRXB, 1L_5M_60W_M_TM1_TRXB, 1L_5M_60W_T_TM1_TRXB, 1L_10M_60W_B_TM1_TRXB, 1L_10M_60W_M_TM1_TRXB, 1L_10M_60W_T_TM1_TRXB, 1L_15M_60W_B_TM1_TRXB, 1L_15M_60W_T_TM1_TRXB, 1L_20M_60W_B_TM1_TRXB, 1L_20M_60W_T_TM1_TRXB
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage

Test Case	Test Conditions	
	Test Setup	Test Seup 1
	EUT Conf.	1U_80W_B_TM1_TRXB, 1U_80W_T_TM1_TRXB, 1U_40W_B_TM1_TRXA, 1U_40W_T_TM1_TRXA, 4U_80W_B_TM1_TRXB, 4U_80W_T_TM1_TRXB, 4U_80W_B_TM1_TRXA, 4U_80W_T_TM1_TRXA, 1L_20M_60W_B_TM1_TRXB, 1L_20M_60W_T_TM1_TRXB, 1G_80W_B_TM1_TRXB, 1G_80W_T_TM1_TRXB, 8G_80W_B_TM1_TRXB, 8G_80W_T_TM1_TRXB, 1G1U_80W_B_TM1_TRXB, 1G1U_80W_T_TM1_TRXB, 3G1U_80W_B_TM1_TRXB, 3G1U_80W_T_TM1_TRXB, 1G1L_1.4M_60W_B_TM1_TRXA, 1G1L_1.4M_60W_T_TM1_TRXA, 1G1L_20M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_T_TM1_TRXA, 3G1L_20M_60W_B_TM1_TRXA, 1U1L_1.4M_80W_B_TM1_TRXB, 1U1L_1.4M_80W_T_TM1_TRXB, 1U1L_20M_80W_B_TM1_TRXB, 3U1L_1.4M_80W_B_TM1_TRXB, 3U1L_1.4M_80W_T_TM1_TRXB,
	Test Env.	Ambient Climate & Rated Voltage
Spurious Emission at Antenna Terminals	Test Setup	Test Seup 1
	EUT Conf.	1U_80W_B_TM1_TRXB, 1U_80W_M_TM1_TRXB, 1U_80W_T_TM1_TRXB, 4U_80W_B_TM1_TRXB, 4U_80W_M_TM1_TRXB, 4U_80W_T_TM1_TRXB, 1L_20M_60W_B_TM1_TRXB, 1L_20M_60W_T_TM1_TRXB, 1G_80W_B_TM1_TRXB, 1G_80W_T_TM1_TRXB, 8G_80W_B_TM1_TRXB, 8G_80W_T_TM1_TRXB, 1G1U_80W_B_TM1_TRXB, 1G1U_80W_T_TM1_TRXB, 3G1U_80W_B_TM1_TRXB, 3G1U_80W_T_TM1_TRXB, 1G1L_1.4M_60W_B_TM1_TRXA, 1G1L_1.4M_60W_T_TM1_TRXA, 1G1L_20M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_B_TM1_TRXA, 3G1L_1.4M_60W_T_TM1_TRXA, 3G1L_20M_60W_B_TM1_TRXA, 1U1L_1.4M_80W_B_TM1_TRXB, 1U1L_1.4M_80W_T_TM1_TRXB, 1U1L_20M_80W_B_TM1_TRXB, 3U1L_1.4M_80W_B_TM1_TRXB, 3U1L_1.4M_80W_T_TM1_TRXB,
	Test Env.	Ambient Climate & Rated Voltage
Field Strength of Spurious	Test Env.	Ambient Climate & Rated Voltage



Test Case	Test Conditions	
Radiation	Test Setup	Test Seup 3
	EUT Conf.	--
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.	--
Receiver Spurious Emissions	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Seup 1
	EUT Conf.	--



5 Main Test Instruments

Equipment Name	Manufacturer	Model	Serial Number	Cal. Due
Test Setup 1 & 2				
Spectrum Analyzer	Agilent	N9020A	MY50110169	2014-12-15
Spectrum Analyzer	R&S	FSQ40	100025	2014-11-26
Spectrum Analyzer	Agilent	E4440A	MY49420179	2014-08-30
Temperature Chamber	Chongqingyinhe	ESS-SDJ62	2006001	2014-05-30
Temperature Chamber	ESPEC	EW0470S	12113066	2014-12-25
Test Setup 3				
3m Semi Anechoic Chamber	S+M	---	---	---
EMI Test Receiver	R&S	ESU40	100144	2014-12-23
Bilog Antenna	Schaffner	CBL 6112B	2536	2015-03-22
Horn Antenna	R&S	HF906	359287/005	2016-03-21

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

END