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CNAS L0310



# FCC

# RF Test Report

**Product Name: Mobile WiFi**

**Model Number: 801HW**

**Report No.: SYBH(Z-RF)20180926023001-2001**

**FCC ID: QIS801HW**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

**(Global Compliance and Testing Center of Huawei Technologies Co., Ltd)**

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### Notice

1. The Reliability Laboratory of Huawei Technologies Co., Ltd has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01
2. The Laboratory of Sporton International (Shenzhen) Inc has passed the accreditation by National Voluntary Laboratory Accreditation Program (NVLAP). The NVLAP LAB CODE is 600156-0.
3. The Reliability Laboratory of Huawei Technologies Co., Ltd has been recognized by the US Federal Communications Commission (FCC) to perform compliance testing subject to the Commission's Certification rules. The Designation Number is CN1173, and the Test Firm Registration Number is 294140.
4. The Laboratory of Sporton International (Shenzhen) Inc has been recognized by the US Federal Communications Commission (FCC) to perform compliance testing subject to the Commission's Certification rules. The Designation Number is CN5019, and the Test Firm Registration Number is 577730.
5. The Reliability Laboratory of Huawei Technologies Co., Ltd has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 6369A-1.
6. The Reliability Laboratory of Huawei Technologies Co., Ltd is also named "Global Compliance and Testing Center of Huawei Technologies Co., Ltd", the both names have coexisted since 2009.
7. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
8. The test report is invalid if there is any evidence of erasure and/or falsification.
9. The test report is only valid for the test samples.
10. 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

**Date of Receipt Sample:** 2018-10-25  
**Start Date of Test:** 2018-10-29  
**End Date of Test:** 2018-11-20

**Test Result:** Pass

<b>Approved by Senior Engineer:</b>	2018-11-20	He Hao	He Hao
	Date	Name	Signature

<b>Prepared by:</b>	2018-11-20	ZhouLingbo	ZhouLingbo
	Date	Name	Signature



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## 1 General Information

### 1.1 Applied Standard

Applied Rules:	47 CFR FCC Part 02 47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 27
Test Method:	FCC KDB 971168 D01 Power Meas License Digital Systems v03r01 ANSI C63.26

### 1.2 Test Location

Test Location :	Reliability Laboratory of Huawei Technologies Co., Ltd.
Address1:	No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park, Dongguan, Guangdong, P.R.C
Test Location 2:	Sporton International (Shenzhen) Inc.
Address1:	No.3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.China

### 1.3 Test Environment Condition

Ambient Temperature:	19.5 to 25 °C
Ambient Relative Humidity:	40 to 55 %
Atmospheric Pressure:	Not applicable



## 2 Test Summary

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

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232	$EIRP \leq 2\text{ W}$	Appendix A	Pass	Location 1
Peak-Average Ratio	§2.1046, §24.232	Limit $\leq 13\text{ dB}$	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §24.238	$\leq -13\text{ dBm}/1\% \cdot \text{EBW}$ , in 1 MHz bands immediately outside and adjacent to the frequency block.  Note 1): EBW is $-26\text{ dBc}$ EBW.	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §24.238	$\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz ) but outside authorized operating frequency blocks.	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1053, §24.238	$\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz ) but outside authorized operating frequency blocks.	Appendix G	Pass	Location 1 (above 30MHz); Location 2 (9K-30MHz)
Frequency Stability	§2.1055, §24.235	Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1

## 2.2 AWS Band (1710-1755 MHz paired with 2110-2155 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)	$EIRP \leq 1\text{ W}$	Appendix A	Pass	Location 1
Peak-Average Ratio	§2.1046, §27.50(d)	$Limit \leq 13\text{ dB}$	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §27.53(h)	FCC: $\leq -13\text{ dBm}/1\% \cdot \text{EBW}$ , in 1 MHz bands immediately outside and adjacent to the frequency block.  Note 1): EBW is $-26\text{ dBc}$ EBW.	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	FCC: $\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( $10 \cdot$ highest fundamental frequency, 40 GHz) but outside authorized operating frequency ranges.	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1053, §27.53(h)	FCC: $\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( $10 \cdot$ highest fundamental frequency, 40 GHz) but outside authorized operating frequency ranges.	Appendix G	Pass	Location 1 (above 30MHz); Location 2 (9K-30MHz)
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1
NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".					

### 2.3 Band12 (699-716MHz paired with 729-746 MHz)

Test Item	FCC Rule No	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§27.50(c)	FCC: ERP $\leq$ 3 W.	Appendix A	Pass	Location 1
Peak-Average Ratio	§2.1046, §27.50(c)	Limit $\leq$ 13 dB	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §27.53(g)	$\leq$ -13 dBm/30 kHz, in 100 kHz bands immediately outside and adjacent to the frequency blocks.	Appendix	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	$\leq$ -13 dBm/100 kHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1051, §27.53(g)	$\leq$ -13 dBm/100 kHz.	Appendix G	Pass	Location 1(above 30MHz); Location 2(9K-30MHz)
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1
NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".					



## 2.4 Band17 (704-716MHz paired with 734-746 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§27.50(c).	FCC: ERP $\leq$ 3 W.	Appendix A	Pass	Location 1
Peak-Average Ratio	§2.1046, §27.50(c)	Limits $\leq$ 13 dB	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §27.53(g)	$\leq$ -13 dBm/30 kHz, in 100 kHz bands immediately outside and adjacent to the frequency blocks.	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	$\leq$ -13 dBm/100 kHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1051, §27.53(g)	$\leq$ -13 dBm/100 kHz.	Appendix G	Pass	Location 1 (above 30MHz); Location 2 (9K-30MHz)
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1
NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".					

## 2.5 Band25 (1850-1915 MHz paired with 1930-1995MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232	$EIRP \leq 2\text{ W}$	Appendix A	Pass	Location 1
Peak-Average Ratio	§2.1046, §24.232	Limit $\leq 13\text{ dB}$	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §24.238	FCC: $\leq -13\text{ dBm}/1\% \cdot \text{EBW}$ , in 1 MHz bands immediately outside and adjacent to the frequency block.  Note 1): EBW is $-26\text{ dBc}$ EBW.	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §24.238	FCC: $\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz) but outside authorized operating frequency blocks.	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1053, §24.238	FCC: $\leq -13\text{ dBm}/1\text{ MHz}$ , from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz) but outside authorized operating frequency blocks.	Appendix G	Pass	Location 1 (above 30MHz); Location 2 (9K-30MHz)
Frequency Stability	§2.1055, §24.235	FCC: Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1
NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".					

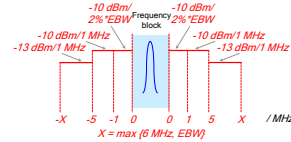
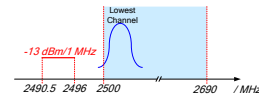
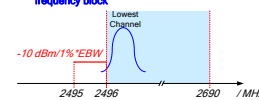
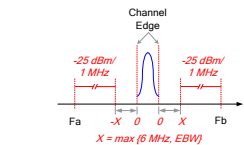
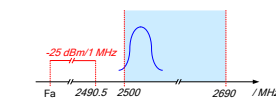
## 2.6 Band26 (814-824 MHz paired with 859-869MHz)

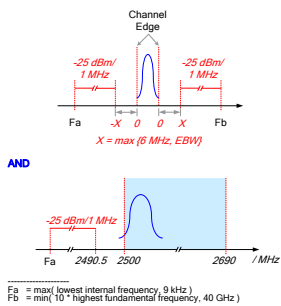
Test Item	FCC Rule No.	Requirements	Test Result	Verdict	Testing location
Transmitter Conducted Power Output	§2.1046, §90.635	< 100 W.	Appendix A	PASS	Location 1
Peak-Average Ratio	---	---	Appendix B	N/T	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	PASS	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	PASS	Location 1
Band Edges Compliance	§2.1051, §90.691	< 50 + 10Log10(P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge	Appendix E	PASS	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §90.691	< 43 + 10Log10(P[Watts]) for all out-of-band emissions	Appendix F	PASS	Location 1
Field Strength of Spurious Radiation	§2.1053, §90.691	< 43 + 10Log10(P[Watts]) for all out-of-band emissions	Appendix G	PASS	Location 1 (above 30MHz); Location 2(9K-30MHz)
Frequency Stability	§2.1055, §90.213	< ±2.5ppm.	Appendix H	PASS	Location 1
NOTE: For the verdict, the "N/A" denotes "not applicable", the "N/T" denotes "not tested".					

## 2.7 Band26 (824-849 MHz paired with 869-894 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913	ERP ≤ 7 W.	Appendix A	Pass	Location 1
Peak-Average Ratio	---	Limit≤13 dB	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §22.917	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.  Note 1): EBW is -26 dBc EBW.	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §22.917	≤ -13 dBm/RefBW, from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz), after 1 MHz bands immediately outside and adjacent to the frequency block. (RefBW: ≥100 kHz for frequency below 1 GHz, and =1 MHz above 1 GHz)	Appendix F	Pass	Location 1
Field Strength of Spurious Radiation	§2.1053, §22.917	≤ -13 dBm/RefBW, from max( lowest internal frequency, 9 kHz ) to min( 10 * highest fundamental frequency, 40 GHz), after 1 MHz bands immediately outside and adjacent to the frequency block. (RefBW: ≥100 kHz for frequency below 1 GHz, and =1 MHz above 1 GHz)	Appendix G	Pass	Location 1(above 30MHz); Location 2(9K-30MHz)
Frequency Stability	§2.1055, §22.355	≤ ±2.5ppm	Appendix H	Pass	Location 1

## 2.8 Band41 (2545-2655 MHz paired with 2545-2655 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)	$EIRP \leq 2W$	Appendix A	Pass	Location 1
Peak-Average Ratio	§27.50(a)	Limit $\leq 13$ dB	Appendix B	Pass	Location 1
Modulation Characteristics	§2.1047	Digital modulation	Appendix C	Pass	Location 1
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Appendix D	Pass	Location 1
Band Edges Compliance	§2.1051, §27.53(m4)	<p>FCC:</p>  <p>AND</p>  <p>AND, if 2495-2496 MHz is immediately outside and adjacent to the frequency block.</p>  <p>Note 1): EBW is -26 dBc EBW.</p>	Appendix E	Pass	Location 1
Spurious Emission at Antenna Terminals	§2.1051, §27.53(m)	<p>FCC:</p>  <p>AND</p>  <p>Fa = max( lowest internal frequency, 9 kHz ) Fb = min( 10 * highest fundamental frequency, 40 GHz )</p> <p>Note 1): EBW is -26 dBc EBW. Note 2): MeasFrom: max( lowest internal frequency, 9 kHz ). Note 3): MeasTo: min( 10 * highest</p>	Appendix F	Pass	Location 1

Test Item	FCC Rule No.	Requirements	Test Result	Verdict (Note1)	Testing location
		fundamental frequency, 40 GHz).			
Field Strength of Spurious Radiation	§2.1053, §27.53(m)	<p>FCC:</p>  <p>AND</p> <p>Note 1): EBW is -26 dBc EBW.</p> <p>Note 2): MeasFrom: max( lowest internal frequency, 9 kHz ).</p> <p>Note 3): MeasTo: min( 10 * highest fundamental frequency, 40 GHz ).</p>	Appendix G	Pass	Location 1 (above 30MHz); Location 2 (9K-30MHz)
Frequency Stability	§2.1055, §27.54	Within authorized bands of operation/frequency block.	Appendix H	Pass	Location 1



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

#### 3.1 General Description

801HW which supports LTE B2,B4,B12,B17,B25,B26,B41,And WCDMA HSDPA/HSUPA B2, B4, and CA. 801HW implement such functions as RF signal receiving/ transmitting, LTE/UMTS protocol processing, data service etc., and it can act as a Wi-Fi hotspot for user accessing to internet. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface. 801HW has 6 internal antennas as default Wi-Fi, diversity, and main antenna. The Wi-Fi is 2X2 and the frequency are 2.4GHz and 5GHz.

Note: Only UMTS frequency B2 and B4, LTE frequency B2 and B4 and B12 and B17 and B25 and B26 and B41 bands test data included in this report.


#### 3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

##### 3.2.1 Board

Board		
Description	Hardware Version	Software Version
Main Board	CL1SB08M	8.0.1.31(H60SP9C643)

##### 3.2.2 Sub-Assembly

Sub-Assembly			
Sub-Assembly Name	Model	Manufacturer	Description
Li-Polymer Battery	HB494590EBC-B	Huawei Technologies Co., Ltd.	Rated capacity: 3000mAh Nominal Voltage:  +3.8V

### 3.3 Technical Specification

Characteristics	Description	
Radio System Type	<input checked="" type="checkbox"/> UMTS <input checked="" type="checkbox"/> LTE	
	WCDMA1900	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	WCDMA1700	Transmission (TX): 1710 to 1755 MHz
		Receiving (RX): 2110 to 2155 MHz
	LTE BAND2	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	LTE BAND4	Transmission (TX): 1710 to 1755 MHz
		Receiving (RX): 2110 to 2155 MHz
	LTE BAND12	Transmission (TX): 699 to 716 MHz
		Receiving (RX): 729 to 746 MHz
	LTE BAND17	Transmission (TX): 704 to 716 MHz
		Receiving (RX): 734 to 746 MHz
	LTE BAND25	Transmission (TX): 1850 to 1915MHz
		Receiving (RX): 1930 to 1995 MHz
	LTE band 26(814 to 824 MHz )	Transmission (TX): 814 to 824MHz
		Receiving (RX): 859 to 869 MHz
	LTE band 26 (824 to 849 MHz )	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	LTE BAND41	Transmission (TX): 2496 to 2690MHz
		Receiving (RX): 2496 to 2690MHz
TX and RX Antenna Ports	TX & RX port:	1
	TX-only port:	0
	RX-only port:	1
Target TX Output Power	UMTS1900: 22.5dBm UMTS1700 21.5dBm LTE BAND2: 22dBm LTE BAND4: 21.5dBm LTE BAND12: 22.5dBm LTE BAND17: 22.5dBm LTE BAND25: 22dBm LTE BAND26(814 to 824 MHz ): 22.5dBm LTE BAND26 (824 to 849 MHz ): 22.5dBm LTE BAND41: 22dBm	
	UMTS system:	<input checked="" type="checkbox"/> 5 MHz
	LTE band 2	<input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz , <input checked="" type="checkbox"/> 15MHz , <input checked="" type="checkbox"/> 20MHz
	LTE band 4	<input checked="" type="checkbox"/> 1.4MHz, <input checked="" type="checkbox"/> 3MHz, <input checked="" type="checkbox"/> 5MHz, <input checked="" type="checkbox"/> 10MHz ,





Characteristics	Description	
		☑15MHz ,☑20MHz
	LTE band 12	☑1.4MHz, ☑3MHz, ☑5MHz, ☑10MHz
	LTE band 17	☑5MHz, ☑10MHz
	LTE band 25	☑1.4MHz, ☑3MHz, ☑5MHz, ☑10MHz , ☑15MHz ,☑20MHz
	LTE band 26(814 to 824 MHz )	☑1.4MHz, ☑3MHz, ☑5MHz, ☑10MHz
	LTE band 26 (824 to 849 MHz )	☑1.4MHz, ☑3MHz, ☑5MHz, ☑10MHz , ☑15MHz
	LTE band 41	☑5MHz, ☑10MHz ,☑15MHz ,☑20MHz
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.)	UMTS1900:	4M17F9W
	UMTS1700:	4M17F9W
	LTE BAND2:	1M09G7D (1.4 MHz QPSK modulation), 1M10W7D (1.4 MHz 16QAM modulation) 2M71G7D (3 MHz QPSK modulation), 2M72W7D (3 MHz 16QAM modulation) 4M53G7D (5 MHz QPSK modulation), 4M53W7D (5 MHz 16QAM modulation) 9M02G7D (10 MHz QPSK modulation), 9M02W7D (10 MHz 16QAM modulation) 13M6G7D (15 MHz QPSK modulation), 13M5W7D (15 MHz 16QAM modulation) 18M0G7D (20 MHz QPSK modulation), 18M0W7D (20 MHz 16QAM modulation)
	LTE BAND4:	1M10G7D (1.4 MHz QPSK modulation), 1M10W7D (1.4 MHz 16QAM modulation) 2M71G7D (3 MHz QPSK modulation), 2M71W7D (3 MHz 16QAM modulation) 4M51G7D (5 MHz QPSK modulation), 4M52W7D (5 MHz 16QAM modulation) 9M00G7D (10 MHz QPSK modulation), 9M01W7D (10 MHz 16QAM modulation) 13M5G7D (15 MHz QPSK modulation), 13M5W7D (15 MHz 16QAM modulation) 18M0G7D (20 MHz QPSK modulation), 18M0W7D (20 MHz 16QAM modulation)
	LTE BAND12:	1M10G7D (1.4 MHz QPSK modulation), 1M10W7D (1.4 MHz 16QAM modulation) 2M71G7D (3 MHz QPSK modulation), 2M72W7D (3 MHz 16QAM modulation) 4M52G7D (5 MHz QPSK modulation), 4M52W7D (5 MHz 16QAM modulation) 9M00G7D (10 MHz QPSK modulation),

Characteristics	Description	
		9M00W7D (10 MHz 16QAM modulation)
	LTE BAND17:	4M52G7D (5 MHz QPSK modulation), 4M52W7D (5 MHz 16QAM modulation) 9M01G7D (10 MHz QPSK modulation), 9M00W7D (10 MHz 16QAM modulation)
	LTE BAND25	1M10G7D (1.4 MHz QPSK modulation), 1M10W7D (1.4 MHz 16QAM modulation) 2M72G7D (3 MHz QPSK modulation), 2M72W7D (3 MHz 16QAM modulation) 4M52G7D (5 MHz QPSK modulation), 4M53W7D (5 MHz 16QAM modulation) 9M02G7D (10 MHz QPSK modulation), 9M03W7D (10 MHz 16QAM modulation) 13M6G7D (15 MHz QPSK modulation), 13M6W7D (15 MHz 16QAM modulation) 18M1G7D (20 MHz QPSK modulation), 18M1W7D (20 MHz 16QAM modulation)
	LTE BAND26(814 to 824 MHz )	1M09G7D (1.4 MHz QPSK modulation), 1M09W7D (1.4 MHz 16QAM modulation) 2M72G7D (3 MHz QPSK modulation), 2M72W7D (3 MHz 16QAM modulation) 4M52G7D (5 MHz QPSK modulation), 4M52W7D (5 MHz 16QAM modulation) 8M99G7D (10 MHz QPSK modulation), 8M99W7D (10 MHz 16QAM modulation)
	LTE BAND26(824 to 849 MHz )	1M10G7D (1.4 MHz QPSK modulation), 1M09W7D (1.4 MHz 16QAM modulation) 2M72G7D (3 MHz QPSK modulation), 2M71W7D (3 MHz 16QAM modulation) 4M52G7D (5 MHz QPSK modulation), 4M52W7D (5 MHz 16QAM modulation) 9M01G7D (10 MHz QPSK modulation), 9M00W7D (10 MHz 16QAM modulation) 13M5G7D (15 MHz QPSK modulation), 13M5W7D (15 MHz 16QAM modulation)
	LTE BAND41	4M52G7D (5 MHz QPSK modulation), 4M51W7D (5 MHz 16QAM modulation) 8M99G7D (10 MHz QPSK modulation), 9M03W7D (10 MHz 16QAM modulation) 13M5G7D (15 MHz QPSK modulation), 13M5W7D (15 MHz 16QAM modulation) 18M0G7D (20 MHz QPSK modulation), 18M0W7D (20 MHz 16QAM modulation)



## 4 General Test Conditions / Configurations

### 4.1 Test Modes

NOTE1: The test mode(s) are selected according to relevant radio technology specifications.

NOTE2: The power of LTE system 64QAM modulation is lower than that of 16QAM, so we did not test 64QAM modulation.

Test Mode	Test Modes Description
UMTS/TM1	WCDMA system, QPSK modulation
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

### 4.2 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.45V
	VN	3.8V
	VH	4.25V

NOTE: VL= lower extreme test voltage

VN= nominal voltage

VH= upper extreme test voltage

TN= normal temperature

### 4.3 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA1900	TX	Channel 9262	Channel9400	Channel9538
		1852.4MHz	1880.0MHz	1907.6MHz
	RX	Channel 9662	Channel 9800	Channel 9938
		1932.4 MHz	1960.0 MHz	1987.6 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
WCDMA1700	TX	Channel1312	Channel1413	Channel1513
		1712.4MHz	1732.6MHz	1752.6MHz
	RX	Channel 1537	Channel 1638	Channel 1738
		2112.4 MHz	2132.6 MHz	2152.6 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 2	TX(1.4M)	Channel 18607	Channel 18900	Channel 19193
		1850.7 MHz	1880 MHz	1909.3 MHz
	TX(3M)	Channel 18615	Channel 18900	Channel 19185
		1851.5 MHz	1880 MHz	1908.5 MHz
	TX(5M)	Channel 18625	Channel 18900	Channel 19175
		1852.5 MHz	1880 MHz	1907.5 MHz
	TX(10M)	Channel 18650	Channel 18900	Channel 19150
		1855 MHz	1880 MHz	1905 MHz
	TX(15M)	Channel 18675	Channel 18900	Channel 19125



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
	TX(20M)	1857.5 MHz	1880 MHz	1902.5 MHz
		Channel 18700	Channel 18900	Channel 19100
	RX(1.4M)	1860 MHz	1880 MHz	1900 MHz
		Channel 607	Channel 900	Channel 1193
	RX(3M)	1930.7 MHz	1960 MHz	1989.3 MHz
		Channel 615	Channel 900	Channel 1185
	RX(5M)	1931.5 MHz	1960 MHz	1988.5 MHz
		Channel 625	Channel 900	Channel 1175
	RX(10M)	1932.5 MHz	1960 MHz	1987.5 MHz
		Channel 650	Channel 900	Channel 1150
	RX(15M)	1935 MHz	1960 MHz	1985 MHz
		Channel 675	Channel 900	Channel 1125
	RX(20M)	1937.5 MHz	1960 MHz	1982.5 MHz
		Channel 700	Channel 900	Channel 1100

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 4	TX(1.4M)	Channel 19957	Channel 20175	Channel 20393
		1710.7 MHz	1732.5 MHz	1754.3 MHz
	TX(3M)	Channel 19965	Channel 20175	Channel 20385
		1711.5 MHz	1732.5 MHz	1753.5 MHz
	TX(5M)	Channel 19975	Channel 20175	Channel 20375
		1712.5 MHz	1732.5 MHz	1752.5 MHz



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
	TX(10M)	Channel 20000	Channel 20175	Channel 20350
		1715 MHz	1732.5 MHz	1750 MHz
	TX(15M)	Channel 20025	Channel 20175	Channel 20325
		1717.5 MHz	1732.5 MHz	1747.5 MHz
	TX(20M)	Channel 20050	Channel 20175	Channel 20300
		1720 MHz	1732.5 MHz	1745 MHz
	RX(1.4M)	Channel 1975	Channel 2175	Channel 2375
		2112.5 MHz	2132.5MHz	2152.5 MHz
	RX(3M)	Channel 2000	Channel 2175	Channel 2350
		2115 MHz	2132.5MHz	2150 MHz
	RX(5M)	Channel 1975	Channel 2175	Channel 2375
		2112.5 MHz	2132.5MHz	2152.5 MHz
	RX(10M)	Channel 2000	Channel 2175	Channel 2350
		2115 MHz	2132.5MHz	2150 MHz
	RX(15M)	Channel 2025	Channel 2175	Channel 2325
		2117.5 MHz	2132.5MHz	2147.5 MHz
	RX(20M)	Channel 2050	Channel 2175	Channel 2300
		2120 MHz	2132.5MHz	2145 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 12	TX(1.4M)	Channel 23017	Channel 23095	Channel 23173
		699.7 MHz	707.5 MHz	715.3 MHz
	TX(3M)	Channel 23025	Channel 23095	Channel 23165



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
	TX(5M)	700.5 MHz	707.5 MHz	714.5 MHz
		Channel 23035	Channel 23095	Channel 23155
	TX(10M)	701.5 MHz	707.5 MHz	713.5 MHz
		Channel 23060	Channel 23095	Channel 23130
	RX(1.4M)	704 MHz	707.5 MHz	711 MHz
		Channel 5017	Channel 5095	Channel 5173
	RX (3M)	729.7 MHz	737.5 MHz	745.3 MHz
		Channel 5025	Channel 5095	Channel 5165
	RX(5M)	730.5 MHz	737.5 MHz	744.5 MHz
		Channel 5035	Channel 5095	Channel 5155
	RX (10M)	731.5 MHz	737.5 MHz	743.5 MHz
		Channel 5060	Channel 5095	Channel 5130
		734 MHz	737.5 MHz	741 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 17	TX (5M)	Channel 23755	Channel 23790	Channel 23825
		706.5 MHz	710 MHz	713.5 MHz
	TX (10M)	Channel 23780	Channel 23790	Channel 23800
		709 MHz	710 MHz	711 MHz
	RX (5M)	Channel 5755	Channel 5790	Channel 5825
		736.5 MHz	740 MHz	743.5 MHz
	RX (10M)	Channel 5780	Channel 5790	Channel 5800



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 25	TX (1.4M)	Channel 26047	Channel 26365	Channel 26683
		1850.7	1882.5	1914.3
	TX (3M)	Channel 26055	Channel 26365	Channel 26675
		1851.5	1882.5	1913.5
	TX (5M)	Channel 26065	Channel 26365	Channel 26665
		1852.5	1882.5	1912.5
	TX (10M)	Channel 26090	Channel 26365	Channel 26640
		1855	1882.5	1910
	TX (15M)	Channel 26115	Channel 26365	Channel 26615
		1857.5	1882.5	1907.5
	TX (20M)	Channel 26140	Channel 26365	Channel 26590
		1860	1882.5	1905
	RX (1.4M)	Channel 8047	Channel 8365	Channel 8683
		1930.7	1962.5	1994.3
	RX (3M)	Channel 8055	Channel 8365	Channel 8675
		1931.5	1962.5	1993.5
	RX (5M)	Channel 8065	Channel 8365	Channel 8665
		1932.5	1962.5	1992.5
	RX (10M)	Channel 8090	Channel 8365	Channel 8640
		1935	1962.5	1990
	RX (15M)	Channel 8115	Channel 8365	Channel 8615
		1937.5	1962.5	1987.5
	RX (20M)	Channel 8140	Channel 8365	Channel 8590
		1940	1962.5	1985



Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE Band 26 (814 to 824 MHz )	TX (1.4M)	Channel 26697	Channel 26740	Channel 26783
		814.7 MHz	819 MHz	823.3 MHz
	TX (3M)	Channel 26705	Channel 26740	Channel 26775
		815.5 MHz	819 MHz	822.5 MHz
	TX (5M)	Channel 26715	Channel 26740	Channel 26765
		816.5 MHz	819 MHz	821.5 MHz
	TX (10M)	Channel 26740	Channel 26740	Channel 26740
		819 MHz	819 MHz	819 MHz
	RX (1.4M)	Channel 8697	Channel 8740	Channel 8783
		859.7 MHz	864 MHz	868.3 MHz
	RX (3M)	Channel 8705	Channel 8740	Channel 8765
		860.5 MHz	864 MHz	867.5 MHz
	RX (5M)	Channel 8715	Channel 8740	Channel 8765
		861.5 MHz	864 MHz	866.5 MHz
	RX (10M)	Channel 8740	Channel 8740	Channel 8740
		864 MHz	864 MHz	864 MHz

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE Band 26 (824 to 849 MHz )	TX (1.4M)	Channel 26797	Channel 26915	Channel 27033
		824.7 MHz	836.5 MHz	848.3 MHz
	TX (3M)	Channel 26805	Channel 26915	Channel 27025
		825.5 MHz	836.5 MHz	847.5 MHz

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
	TX (5M)	Channel 26815	Channel 26915	Channel 27015
		826.5 MHz	836.5 MHz	846.5 MHz
	TX (10M)	Channel 26840	Channel 26915	Channel 26990
		829 MHz	836.5 MHz	844 MHz
	TX (15M)	Channel 26865	Channel 26915	Channel 26965
		831.5 MHz	836.5 MHz	841.5 MHz
	RX (1.4M)	Channel 8697	Channel 8915	Channel 9033
		859.7 MHz	881.5 MHz	893.3 MHz
	RX (3M)	Channel 8805	Channel 8915	Channel 9025
		860.5 MHz	881.5 MHz	892.5 MHz
	RX (5M)	Channel 8815	Channel 8915	Channel 9015
		871.5 MHz	881.5 MHz	891.5 MHz
	RX (10M)	Channel 8840	Channel 8915	Channel 8990
		874 MHz	881.5 MHz	889 MHz
	RX (15M)	Channel 8865	Channel 8915	Channel 8965
		876.5 MHz	881.5 MHz	886.5 MHz

Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
LTE Band 41(2496-2690)	TX(5M)	Channel 39675	Channel 40620	Channel 41565
		2498.5 MHz	2593 MHz	2687.5 MHz
	TX(10M)	Channel 39700	Channel 40620	Channel 41540
		2501 MHz	2593 MHz	2685 MHz
	TX(15M)	Channel 39725	Channel 40620	Channel 41515



Test Mode	TX / RX	RF Channel		
		Low (B)	Middle (M)	High (T)
		2503.5 MHz	2593 MHz	2682.5 MHz
	TX(20M)	Channel 39750	Channel 40620	Channel 41490
		2506 MHz	2593 MHz	2680 MHz
	RX(5M)	Channel 39675	Channel 40620	Channel 41565
		2498.5 MHz	2593 MHz	2687.5 MHz
	RX(10M)	Channel 39700	Channel 40620	Channel 41540
		2501 MHz	2593 MHz	2685 MHz
	RX(15M)	Channel 39725	Channel 40620	Channel 41515
		2503.5 MHz	2593 MHz	2682.5 MHz
	RX(20M)	Channel 39750	Channel 40620	Channel 41490
		2506 MHz	2593 MHz	2680 MHz

## 4.4 DESCRIPTION OF TESTS

### 4.4.1 Radiated Power and Radiated Spurious Emissions

Radiated spurious emissions are investigated indoors in a full-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-E-2016. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 150cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized.

A portable or small unlicensed wireless device shall be placed on a non-metallic test fixture or other non-metallic support during testing. The supporting fixture shall permit orientation of the EUT in each of three orthogonal (x, y, z) axis positions such that emissions from the EUT are maximized. Measure the EUT maximum RF power and record the result.

A half-wave dipole is then substituted in place of the EUT. For emissions above 3GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT.

The power of the emission is calculated using the following formula:

$$P_d [\text{dBm}] = P_g [\text{dBm}] - \text{cable loss} [\text{dB}] + \text{antenna gain} [\text{dBd/dBi}]$$

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_g [\text{dBm}] - \text{cable loss} [\text{dB}]$ .

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power} [\text{Watts}])$ .

### Test Procedures Used

KDB 971168 D01 v03-Section 5.2.2 / KDB 971168 D01 v03-Section 5.8

ANSI/TIA-603-E-2016-Section 2.2.17 / ANSI/TIA-603-E-2016-Section 2.2.12

Note: Reference test setup 3

#### 4.4.2 Peak-Average Ratio

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth.

##### Test Procedures Used

KDB 971168 D01 v03-Section 5.7.2

##### Test Settings

- 1、 The signal analyzer's CCDF measurement profile enabled
- 2、 Frequency= carrier center frequency
- 3、 Measurement BW > EBW of signal
- 4、 for continuous transmissions, set to 1ms
- 5、 Record the maximum PAPR level associated with a probability of 0.1%.

Note: Reference test setup 1

#### 4.4.3 Occupied Bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

#### Test Procedures Used

KDB 971168 D01 v03-Section 4.3

#### Test Settings

- 1、 SET RBW=1-5% of OBW
- 2、 SET VBW  $\geq 3 \times$  RBW
- 3、 Detector: Peak
- 4、 Trace mode= max hold.
- 5、 Sweep= auto couple
- 6、 Steps 1-5 were repeated after it is stable

Note: Reference test setup 1.



#### **4.4.4 Band Edge Compliance**

The test complies with the requirements in clause 2 of the present report according to test procedures in KDB 971168 D01 v03-Section 6 with corresponding test settings.

Note: Reference test setup 1.



#### **4.4.5 Spurious and Harmonic Emissions at Antenna Terminal**

The test complies with the requirements in clause 2 of the present report according to test procedures in KDB 971168 D01 v03-Section 6 with corresponding test settings.

Note: Reference test setup 1.



#### 4.4.6 Frequency Stability / Temperature Variation

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.

**Time Period and Procedure:**

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

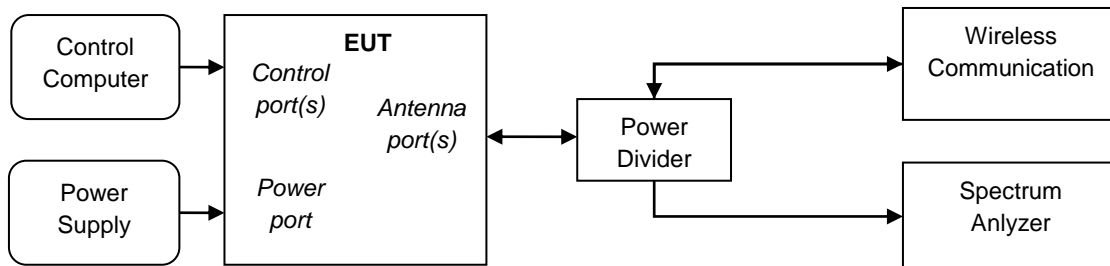
**Test Procedures Used**

ANSI/TIA-603-E-2016

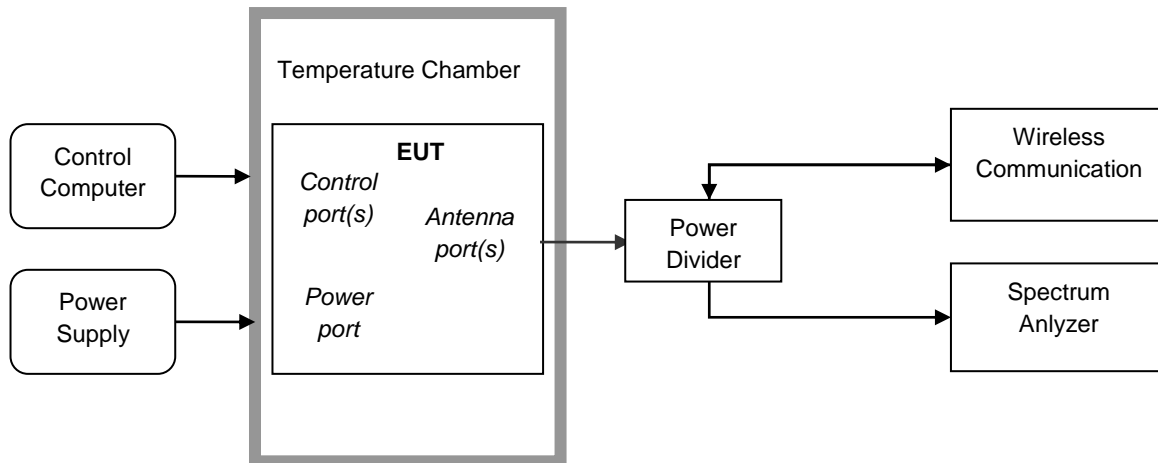
Note: Reference test setup 2.

## 4.5 Test Setups

### 4.5.1 Test Setup 1



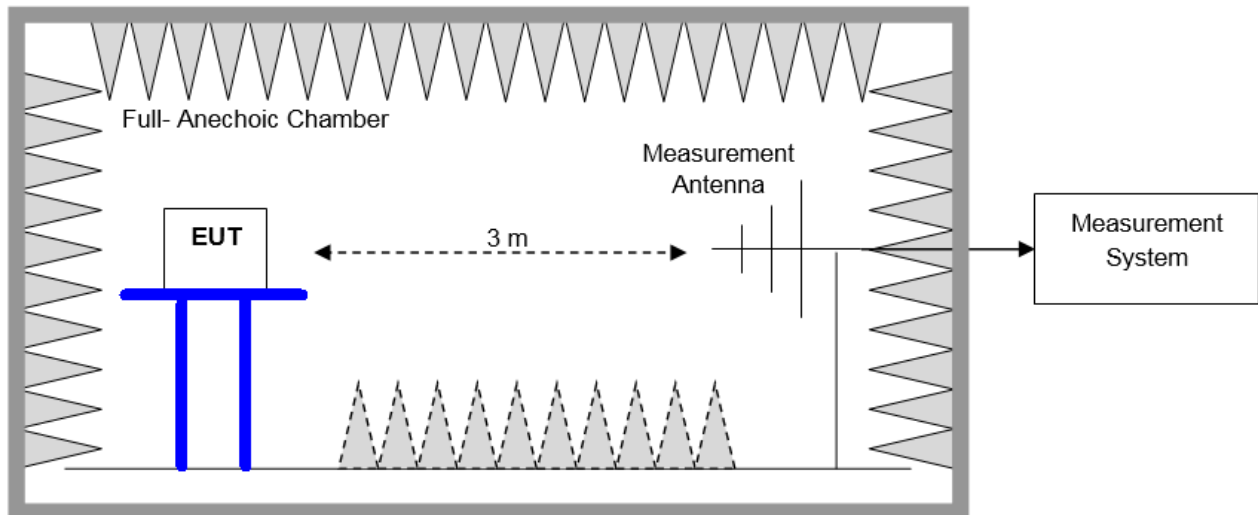
#### 4.5.2 Test Setup 2



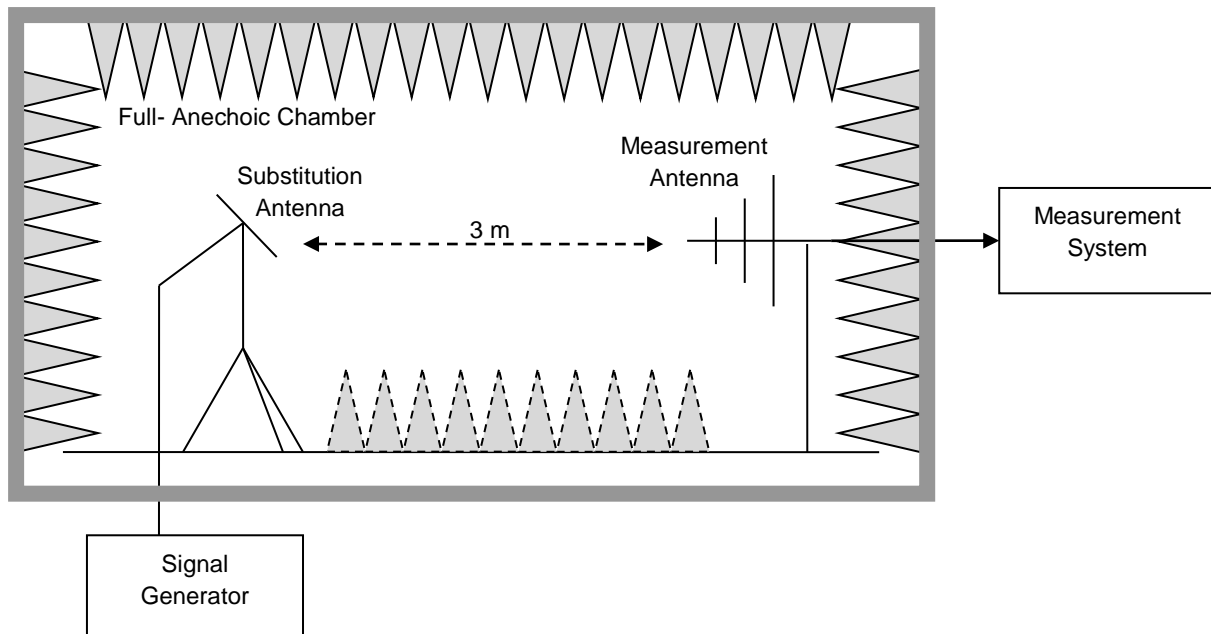
### 4.5.3 Test Setup 3

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

#### 4.5.3.1 Step 1: Pre-test



#### 4.5.3.2 Step 2: Substitution method to verify the maximum ERP/EIRP



## 4.6 Test Conditions

Test Case		Test Conditions	
Transmit Output Power Data	Average Power, Total	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
	Average Power, Spectral Density (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Peak-to-Average Ratio (if required)		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Modulation Characteristics		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	M (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Bandwidth	Occupied Bandwidth	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
	Emission Bandwidth (if required)	Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Band Edges Compliance		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, H (L= low channel, M= middle channel, H= high channel )
		Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Spurious Emission at Antenna Terminals		Test Env.	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )



Test Case	Test Conditions	
	Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2
Field Strength of Spurious Radiation	Test Env.	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 3
	Test Mode	GSM/TM1,GSM/TM2,UMTS/TM1/TM2/TM3,LTE/TM1,LTE/TM2 NOTE: If applicable, the EUT conf. that has maximum power density (based on the equivalent power level) is selected.
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
Frequency Stability	Test Env.	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH of Rated Voltage at Ambient Climate.
	Test Setup	Test Setup 2
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel )
	Test Mode	UMTS/TM1,LTE/TM1,LTE/TM2



## 5 Main Test Instruments

### Test Location 1:

Main Test Equipments					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
Power supply	KEITHLEY	2303	000381E	2018/05/21	2019/05/21
Universal Radio Communication Tester	R&S	CMU200	110932	2018/4/27	2019/4/26
Universal Radio Communication Tester	R & S	CMW500	126854	2018/7/23	2019/7/22
Spectrum Analyzer	Agilent	N9030A	MY49431698	2018/7/23	2019/7/22
Temperature Chamber	WEISS	WKL64	56246002940010	2017/12/13	2018/12/12
Signal generator	Agilent	E8257D	MY49281095	2018/7/23	2019/7/22
Spectrum Analyzer	Keysight	N9040B	MY57212529	2018/6/28	2019/6/28
Universal Radio Communication Tester	R&S	CMU200	117385	2018/05/08	2019/05/07
Universal Radio Communication Tester	R&S	MT8821C	6261760791	2018/4/2	2019/4/1
Test receiver	R&S	ESU26	100387	2018/1/20	2019/1/19
Test receiver	R&S	ESCI	101163	2018/1/20	2019/1/19
Test receiver	R&S	ESU26	100150	2018/1/20	2019/1/19
Spectrum analyzer	R&S	FSU3	200474	2018/1/20	2019/1/19
Spectrum analyzer	R&S	FSU43	100144	2018/1/20	2019/1/19
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100262	2017/6/15	2019/6/14
LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	2017/8/21	2019/8/20
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-490	2017/3/29	2019/3/28
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-521	2018/4/9	2020/4/8
Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-357	2017/4/21	2019/4/20
Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	2017/5/27	2019/5/26
double ridged horn antenna (0.8G-18GHz)	R&S	HF907	100305	2017/4/21	2019/4/20
Pyramidal Horn Antenna(18GHz-26.5GHz)	ETS-Lindgren	3160-09	5140299	2017/7/20	2019/7/19
Pyramidal Horn Antenna(26.5GHz-40GHz)	ETS-Lindgren	3160-10	00205695	2018/4/20	2020/4/19
Pyramidal Horn	ETS-Lindgren	3160-10	LM5947	2017/7/20	2019/7/19



Antenna(26.5GHz-40GHz)					
Artificial Main Network	R&S	ENV4200	100134	2018/5/8	2019/5/7
Line Impedance Stabilization Network	R&S	ENV216	100382	2018/5/8	2019/5/7
<b>Software Information</b>					
Test Item	Software Name		Manufacturer		Version
RSE	EMC32		R&S		V8.40.0

**Test Location 2:**

<b>Test Location 1:Main Test Equipments</b>					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal- Due
EMI Test Receiver&SA	Agilent	N9038A	N9038A	2018/8/30	2019/8/29
Loop Antenna	R&S	HFH2-Z2	HFH2-Z2	2018/5/30	2020/5/29
Bilog Antenna	TeseQ	CBL6112D	CBL6112D	2018/6/5	2019/6/4
LF Amplifier	Burgeon	BPA-530	BPA-530	2018/4/20	2019/4/19
<b>Software Information</b>					
Test Item	Software Name		Manufacturer		Version
RE	E3		AUDIX		6.2009-8-24(sporton)



## 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
Transmit Output Power Conducted	Power [dBm]	U = 0.64 dB
RF Power Density, Conducted	Power [dBm]	U = 0.64 dB
Bandwidth	Magnitude [kHz]	200kHz: U=9.06kHz 1.4MHz: U=9.48kHz 3MHz: U= 10.86kHz 5MHz: U=13.84kHz 10MHz: U=22.32kHz 15MHz: U=31.9kHz 20MHz: U=41.78kHz
Band Edge Compliance	Disturbance Power [dBm]	U = 0.9 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	20MHz~3.6GHz: U=0.88dB 3.6GHz~8.4GHz: U=1.08dB 8.4GHz~13.6GHz: U=1.24dB 13.6GHz~22GHz: U=1.34dB 22GHz~26.5GHz: U=1.36dB
Field Strength of Spurious Radiation	ERP/EIRP [dBm]	For 3 m Chamber: U = 5.94 dB (30 MHz to 3GHz) U = 5.54 dB (3GHz to 18GHz) U = 4.94 dB (18GHz to 26.5GHz)
Frequency Stability	Frequency Accuracy [Hz]	800MHz: U=24.08Hz 900MHz: U=24.54Hz 1900MHz: U=34.7Hz 2100MHz: U=36.96Hz 2300MHz: U=39.24Hz 2500MHz: U=41.58Hz 2600MHz: U=42.74Hz



## 7 Appendixes

Appendix No.	Description
SYBH(Z-RF)20180926023001-2001-A	Appendix_for_WCDMA
SYBH(Z-RF)20180926023001-2001-B	Appendix_for_LTE Band2
SYBH(Z-RF)20180926023001-2001-C	Appendix_for_LTE Band4
SYBH(Z-RF)20180926023001-2001-D	Appendix_for_LTE Band12
SYBH(Z-RF)20180926023001-2001-E	Appendix_for_LTE Band17
SYBH(Z-RF)20180926023001-2001-F	Appendix_for_LTE Band25
SYBH(Z-RF)20180926023001-2001-G	Appendix_for_LTE Band26 (814-824)
SYBH(Z-RF)20180926023001-2001-H	Appendix_for_LTE Band26 (824-849)
SYBH(Z-RF)20180926023001-2001-I	Appendix_for_LTE Band41

Appendix	Description
Appendix A	Effective (Isotropic) Radiated Power Output Data
Appendix B	Peak-Average Ratio
Appendix C	Modulation Characteristics
Appendix D	Bandwidth
Appendix E	Band Edges Compliance
Appendix F	Spurious Emission at Antenna Terminals
Appendix G	Field Strength of Spurious Radiation
Appendix H	Frequency Stability

END