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Report No.: SZEM170300261304
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FCC&IC REPORT

Application No: SZEM1703002613RG
Applicant: GREAT TALENT TECHNOLOGY LIMITED
Manufacturer: GREAT TALENT TECHNOLOGY LIMITED
Factory: GREAT TALENT TECHNOLOGY LIMITED
Product Name: UL40
Model No.(EUT): UL40
Trade Mark: ANS
FCC ID: 2ALZM-UL40
IC ID: 22735-UL40
Standards: 47 CFR Part 2(2015);47 CFR Part 22 subpart H(2015)
47 CFR Part 24 subpart E(2015);47 CFR Part 27 subpart C(2015)
47 CFR Part 90 subpart S(2015);RSS-130 Issue 1, January 2013
RSS-132 Issue 3, January 2013;RSS-133 Issue 6, January 2013
RSS-139 issue 3, July 2015;RSS-199 Issue 3, December 2016
RSS-Gen Issue 4, Nov 2014
Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02
TIA-603-D 2010; RSS-Gen Issue 4, Nov 2014
Date of Receipt: 2017-04-12
Date of Test: 2017-04-13 to 2017-04-24
Date of Issue: 2017-06-05

Test Result:	PASS *
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* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Derek Yang
Wireless Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2017-06-05		Original

Authorized for issue by:				
Tested By		 (Mike Hu) /Project Engineer		2017-04-25 Date
Checked By		 (Jim Huang) /Reviewer		2017-06-05 Date



3 Test Summary

Test Item	FCC Rule No.	IC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913, §24.232 §27.50 §90.635	RSS-130 clause 4.4 RSS-132 clause 5.4 RSS-133 clause 6.4 RSS-139 clause 6.5 RSS-199 clause 4.4	ERP≤7W {CDMA B0 ,LTE BAND 5,BAND 26(824-849)} ERP≤3W (LTE BAND 12) ERP≤100W {CDMAB10, BAND26(814-824)} EIRP ≤ 1 W. (LTE BAND4,) EIRP ≤ 2 W. (CDMA B1,LTE BAND2,25,41,)	Section 1 of Appendix B	PASS
Peak-Average Ratio	§24.232 §27.50	RSS-130 clause 4.4 RSS-132 clause 5.4 RSS-133 clause 6.4 RSS-139 clause 6.5 RSS-199 clause 4.4	≤13dB	Section 2 of Appendix B	PASS
Modulation Characteristics	§2.1047	RSS-130 clause 4.1 RSS-132 clause 5.2 RSS-133 clause 6.2 RSS-139 clause 6.2 RSS-199 clause 4.1	Digital modulation	Section 3 of Appendix B	PASS
Bandwidth	§2.1049(h), §22.917, §24.238 §27.53	RSS-Gen 6.6	OBW:No limit EBW: No limit	Section 4 of Appendix B	PASS



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Band Edge Compliance	§2.1051, §22.917, §24.238 §27.53 §90.691	RSS-130 clause 4.6 RSS-132 clause 5.5 RSS-133 clause 6.5 RSS-139 clause 6.6 RSS-199 clause 4.5	1, ≤ -10,-13,-25dBm(LTE band 41) 2, ≤ -13dBm(other band)	Section 5 of Appendix B	PASS
Spurious emissions at antenna terminals	§2.1051, §22.917, §24.238 §27.53 §90.691	RSS-130 clause 4.6 RSS-132 clause 5.5 RSS-133 clause 6.5 RSS-139 clause 6.6 RSS-199 clause 4.5	1, ≤ -25dBm(LTE band 41) 2, ≤ -13dBm{other band}	Section 6 of Appendix B	PASS
Field strength of spurious radiation	§2.1051, §22.917, §24.238 §27.53 §90.691	RSS-130 clause 4.6 RSS-132 clause 5.5 RSS-133 clause 6.5 RSS-139 clause 6.6 RSS-199 clause 4.5	1, ≤ -25dBm(LTE band 41) 2, ≤ -13dBm{other band}	Section 7 of Appendix B	PASS
Frequency stability	§2.1055, §22.355, §24.235 §27.54 §90.213	RSS-130 clause 4.3 RSS-132 clause 5.3 RSS-133 clause 6.3 RSS-139 clause 6.4 RSS-199 clause 4.3	≤ ±2.5ppm.	Section 8 of Appendix B	PASS



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5 General Information

5.1 Client Information

Applicant:	GREAT TALENT TECHNOLOGY LIMITED
Address of Applicant:	RM602,T3 Software Park,Hi-Tech Park South,Nanshan,Shenzhen,China
Manufacturer:	GREAT TALENT TECHNOLOGY LIMITED
Address of Manufacturer:	RM602,T3 Software Park,Hi-Tech Park South,Nanshan,Shenzhen,China
Factory:	GREAT TALENT TECHNOLOGY LIMITED
Address of Factory:	RM602,T3 Software Park,Hi-Tech Park South,Nanshan,Shenzhen,China

5.2 General Description of EUT

Product Name:	UL40
Model No.:	UL40
Trade Mark:	ANS
Sample Type:	Portable production
Antenna Type:	PIFA
Antenna Gain:	CDMA BC0: -1.02dBi; CDMA BC1: 1.15dBi; CDMA BC10: -1.02dBi; LTE B2:1.15dBi; LTE B4: 1.03dBi; LTE B5:-1.02dBi; LTE B12:- 2.29dBi; LTE B25:1.15dBi; LTE B26:-1.02dBi; LTE B41:0.23dBi.

5.3 Test Mode

Test Mode	Test Modes Description
CDMA/TM1	CDMA system, 1xRTT, 1xEV-DO Rev.0, 1xEV-DO Rev.A GMSK modulation
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation

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



5.4 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature	TN	25 °C
Voltage :	VL	3.4V
	VN	3.85V
	VH	4.4V

NOTE: VL= lower extreme test voltage
VN= nominal voltage
VH= upper extreme test voltage
TN= normal temperature



5.5 Test Frequency

Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
CDMA BC0	TX	Channel 1013	Channel 384	Channel 777
		824.7MHz	836.52 MHz	848.31 MHz
	RX	Channel 1013	Channel 384	Channel 777
		869.7 MHz	881.52 MHz	893.31 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
CDMA BC1	TX	Channel 25	Channel 600	Channel 1175
		1851.25MHz	1880.0 MHz	1908.75 MHz
	RX	Channel 25	Channel 600	Channel 1175
		1931.25 MHz	1960.0 MHz	1988.75 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
CDMA BC10	TX	Channel 476	Channel 580	Channel 684
		817.9MHz	820.5 MHz	823.1 MHz
	RX	Channel 476	Channel 580	Channel 684
		862.9MHz	865.5 MHz	868.1 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 1.4MHz	TX	Channel 18607	Channel 18900	Channel 19193
		1850.7 MHz	1880 MHz	1909.3 MHz
	RX	Channel 607	Channel 900	Channel 1193
		1930.7 MHz	1960 MHz	1989.3 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 3MHz	TX	Channel 18615	Channel 18900	Channel 19185
		1851.5 MHz	1880 MHz	1908.5 MHz
	RX	Channel 615	Channel 900	Channel 1185
		1931.5 MHz	1960 MHz	1988.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 5MHz	TX	Channel 18625	Channel 18900	Channel 19175
		1852.5 MHz	1880 MHz	1907.5 MHz
	RX	Channel 625	Channel 900	Channel 1175
		1932.5 MHz	1960 MHz	1987.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 10MHz	TX	Channel 18650	Channel 18900	Channel 19150
		1855 MHz	1880 MHz	1905 MHz



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	RX	Channel 650 1935 MHz	Channel 900 1960 MHz	Channel 1150 1985 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 15MHz	TX	Channel 18675 1857.5 MHz	Channel 18900 1880 MHz	Channel 19125 1902.5 MHz
		Channel 675 1937.5 MHz	Channel 900 1960 MHz	Channel 1125 1982.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 20MHz	TX	Channel 18700 1860 MHz	Channel 18900 1880 MHz	Channel 19100 1900 MHz
		Channel 700 1940 MHz	Channel 900 1960 MHz	Channel 1100 1980 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 1.4MHz	TX	Channel 19957 1710.7 MHz	Channel 20175 1732.5 MHz	Channel 20393 1754.3 MHz
		Channel 1957 2110.7 MHz	Channel 2175 2132.5 MHz	Channel 2393 2154.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 3MHz	TX	Channel 19965 1711.5 MHz	Channel 20175 1732.5 MHz	Channel 20385 1753.5 MHz
		Channel 1965 2111.5 MHz	Channel 2175 2132.5 MHz	Channel 2385 2153.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 5MHz	TX	Channel 19975 1712.5 MHz	Channel 20175 1732.5 MHz	Channel 20375 1752.5 MHz
		Channel 1975 2112.5 MHz	Channel 2175 2132.5 MHz	Channel 2375 2152.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 10MHz	TX	Channel 20000 1715 MHz	Channel 20175 1732.5 MHz	Channel 20350 1750 MHz
		Channel 2000 2115 MHz	Channel 2175 2132.5 MHz	Channel 2350 2150 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 15MHz	TX	Channel 20025 1717.5 MHz	Channel 20175 1732.5 MHz	Channel 20325 1747.5 MHz

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	RX	Channel 2025 2117.5 MHz	Channel 2175 2132.5 MHz	Channel 2325 2147.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 20MHz	TX	Channel 20050 1720 MHz	Channel 20175 1732.5 MHz	Channel 20300 1745 MHz
		Channel 2050 2120 MHz	Channel 2175 2132.5 MHz	Channel 2300 2145 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 5 1.4MHz	TX	Channel 20407 824.7 MHz	Channel 20525 836.5 MHz	Channel 20643 848.3 MHz
		Channel 2407 869.7 MHz	Channel 2525 881.5 MHz	Channel 2643 893.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 5 3MHz	TX	Channel 20415 825.5 MHz	Channel 20525 836.5 MHz	Channel 20635 847.5 MHz
		Channel 2415 870.5 MHz	Channel 2525 881.5 MHz	Channel 2635 892.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 5 5MHz	TX	Channel 20425 826.5 MHz	Channel 20525 836.5 MHz	Channel 20625 846.5 MHz
		Channel 2425 871.5 MHz	Channel 2525 881.5 MHz	Channel 2625 891.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 5 10MHz	TX	Channel 20450 829 MHz	Channel 20525 836.5 MHz	Channel 20600 844 MHz
		Channel 2450 874 MHz	Channel 2525 881.5 MHz	Channel 2600 889 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND12 1.4MHz	TX	Channel 23017 699.7 MHz	Channel 23095 707.5 MHz	Channel 23173 715.3 MHz
		Channel 5017 729.7 MHz	Channel 5095 737.5 MHz	Channel 5173 745.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 12 3MHz	TX	Channel 23025 700.5 MHz	Channel 23095 707.5 MHz	Channel 23165 714.5 MHz

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	RX	Channel 5025 730.5 MHz	Channel 5095 737.5 MHz	Channel 5165 744.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 12 5MHz	TX	Channel 23035 701.5 MHz	Channel 23095 707.5 MHz	Channel 23155 713.5 MHz
		Channel 5035 731.5 MHz	Channel 5095 737.5 MHz	Channel 5155 743.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 12 10MHz	TX	Channel 23060 704 MHz	Channel 23095 707.5 MHz	Channel 23130 711 MHz
		Channel 5060 734 MHz	Channel 5095 737.5 MHz	Channel 5130 741 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 1.4MHz	TX	Channel 26047 1850.7 MHz	Channel 26365 1882.5 MHz	Channel 26683 1914.3 MHz
		Channel 8047 1930.7 MHz	Channel 8365 1962.5 MHz	Channel 8683 1994.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 3MHz	TX	Channel 26055 1851.5 MHz	Channel 26365 1882.5 MHz	Channel 26675 1913.5 MHz
		Channel 8055 1931.5 MHz	Channel 8365 1962.5 MHz	Channel 8675 1993.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 5MHz	TX	Channel 26065 1852.5 MHz	Channel 26365 1882.5 MHz	Channel 26665 1912.5 MHz
		Channel 8065 1932.5 MHz	Channel 8365 1962.5 MHz	Channel 8665 1992.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 10MHz	TX	Channel 26090 1855 MHz	Channel 26365 1882.5 MHz	Channel 26640 1910 MHz
		Channel 8090 1935 MHz	Channel 8365 1962.5 MHz	Channel 8640 1990 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 15MHz	TX	Channel 26115 1857.5 MHz	Channel 26365 1882.5 MHz	Channel 26615 1907.5 MHz

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	RX	Channel 8115 1937.5 MHz	Channel 8365 1962.5 MHz	Channel 8615 1987.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 25 20MHz	TX	Channel 26140 1860 MHz	Channel 26365 1882.5 MHz	Channel 26590 1905 MHz
		Channel 8140 1940 MHz	Channel 8365 1962.5 MHz	Channel 8590 1985 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (814-824) 1.4MHz	TX	Channel 26697 814.7 MHz	Channel 26740 819 MHz	Channel 26783 823.3 MHz
		Channel 8697 859.7 MHz	Channel 8740 864MHz	Channel 8783 868.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (814-824) 3MHz	TX	Channel 26705 815.5 MHz	Channel 26740 819 MHz	Channel 26775 822.5 MHz
		Channel 8705 860.5 MHz	Channel 8740 864MHz	Channel 8775 867.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (814-824) 5MHz	TX	Channel 26715 816.5 MHz	Channel 26740 819 MHz	Channel 26765 821.5 MHz
		Channel 8715 861.5 MHz	Channel 8740 864MHz	Channel 8755 866.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (814-824) 10MHz	TX	Channel 26740 819 MHz	Channel 26740 819 MHz	Channel 26740 819 MHz
		Channel 8740 864MHz	Channel 8740 864MHz	Channel 8740 864MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (824-849) 1.4MHz	TX	Channel 26797 824.7 MHz	Channel 26915 836.5 MHz	Channel 27033 848.3 MHz
		Channel 8697 859.7 MHz	Channel 8915 881.5 MHz	Channel 9033 893.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (824-849) 3MHz	TX	Channel 26805 825.5 MHz	Channel 26915 836.5 MHz	Channel 27025 847.5 MHz

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	RX	Channel 8805 860.5 MHz	Channel 8915 881.5 MHz	Channel 9025 892.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (824-849) 5MHz	TX	Channel 26815 826.5 MHz	Channel 26915 836.5 MHz	Channel 27015 846.5 MHz
		Channel 8815 871.5 MHz	Channel 8915 881.5 MHz	Channel 9015 891.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (824-849) 10MHz	TX	Channel 26840 829 MHz	Channel 26915 836.5 MHz	Channel 26990 844 MHz
		Channel 8840 874 MHz	Channel 8915 881.5 MHz	Channel 8990 889 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND26 (824-849) 15MHz	TX	Channel 26865 831.5 MHz	Channel 26915 836.5 MHz	Channel 26965 841.5 MHz
		Channel 8865 876.5 MHz	Channel 8915 881.5 MHz	Channel 8965 886.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 5MHz	TX/RX	Channel 39675 2498.5 MHz	Channel40620 2593 MHz	Channel 41565 2687.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 10MHz	TX/RX	Channel 39700 2501 MHz	Channel40620 2593 MHz	Channel 41540 2685 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 15MHz	TX/RX	Channel 39725 2503.5 MHz	Channel40620 2593 MHz	Channel 41515 2682.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 41 20MHz	TX/RX	Channel 39750 2506 MHz	Channel40620 2593 MHz	Channel 41490 2680 MHz



5.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

5.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

5.8 Deviation from Standards

None.

5.9 Abnormalities from Standard Conditions

None.

5.10 Other Information Requested by the Customer

None.

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5.11 Technical Specification

Characteristics	Description	
Radio System Type	☒ CDMA	
	☒ LTE	
Supported Frequency Range	CDMA BC0	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	CDMA BC1	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	CDMA BC10	Transmission (TX): 817 to 824 MHz
		Receiving (RX): 862 to 869 MHz
	LTE band 2	Transmission (TX): 1850 to 1910 MHz
		Receiving (RX): 1930 to 1990 MHz
	LTE band 4	Transmission (TX): 1710 to 1755 MHz
		Receiving (RX): 2110 to 2155 MHz
	LTE band 5	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	LTE band 12	Transmission (TX): 699 to 716 MHz
		Receiving (RX): 729 to 746 MHz
	LTE band 25	Transmission (TX): 1850 to 1915 MHz
		Receiving (RX): 1930 to 1995 MHz
	LTE band 26(814-824)	Transmission (TX): 814 to 824 MHz
		Receiving (RX): 859 to 869 MHz
Target TX Output Power	LTE band 26(824-849)	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	LTE band 41	Transmission (TX): 2496 to 2690MHz
		Receiving (RX): 2496 to 2690MHz
Supported Channel Bandwidth	CDMA system:	☒ 1.23 MHz
	LTE band2	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz; ☒ 20 MHz
	LTE band4	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz;



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		☒ 15 MHz; ☒ 20 MHz
	LTE band5	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz
	LTE band12	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz
	LTE band25	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz; ☒ 20 MHz
	LTE band26(814-824)	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz;
	LTE band26(824-849)	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz
	LTE band41	☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz; ☒ 20 MHz

Characteristics	Description	
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.)	CDMA BC0	1M28G7D
	CDMA BC1	1M29G7D
	CDMA BC10	1M28G7D
	LTE band2	1M11G7D;1M10W7D 2M69G7D;2M69W7D 4M50G7D;4M50W7D 8M97G7D;8M95W7D 13M6G7D;13M5W7D 17M9G7D;17M9W7D
	LTE band4	1M11G7D;1M10W7D 2M69G7D;2M69W7D 4M50G7D;4M49W7D 8M95G7D;8M95W7D 13M5G7D;13M5W7D 17M9G7D;17M9W7D
	LTE band5	1M11G7D;1M10W7D 2M69G7D;2M69W7D 4M50G7D;4M49W7D 8M97G7D;8M95W7D
	LTE band12	1M11G7D;1M10W7D 2M69G7D;2M69W7D 4M50G7D;4M49W7D 8M97G7D;8M95W7D
	LTE band25	1M11G7D;1M10W7D 2M70G7D;2M69W7D 4M50G7D;4M50W7D 8M95G7D;8M95W7D 13M5G7D;13M5W7D 17M9G7D;17M9W7D
	LTE band26 (814-824)	1M11G7D;1M10W7D 2M69G7D;2M69W7D 4M50G7D;4M50W7D



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		8M99G7D;8M97W7D
	LTE band26 (824-849)	1M10G7D;1M10W7D 2M70G7D;2M69W7D 4M50G7D;4M50W7D 8M97G7D;8M97W7D 13M6G7D;13M6W7D
	LTE band41	4M50G7D;4M50W7D 8M95G7D;8M95W7D 13M6G7D;13M6W7D 17M9G7D;17M9W7D



6 Description of Tests

6.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

Note: Reference test setup 1

6.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 0.8m high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6). The output power into the substitution antenna was then measured.
- 7). Steps 5) and 6) were repeated with both antennas polarized.
- 8). Calculate power in dBm by the following formula:

$$\text{ERP (dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

Where:

Pg is the generator output power into the substitution antenna.



Above 1GHz test procedure as below:

- 1). Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber
- 2). Calculate power in dBm by the following formula:
$$\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$
$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:

Pg is the generator output power into the substitution antenna.
- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete.

Note: Reference test setup 2

6.3 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

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 transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel). 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.

Note: Reference test setup 1

6.4 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02



The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to peak or peak hold power.

Note: Reference test setup 1

6.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note: Reference test setup 1



6.6 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, 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. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

Note: Reference test setup 1

6.7 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 80cm high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3). Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4). The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5). A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6). The output power into the substitution antenna was then measured.
- 7). Steps 5) and 6) were repeated with both antennas polarized.
- 8) Calculate power in dBm by the following formula:

$$\text{ERP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$

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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 [dBm] – cable loss [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 $43 + 10\log_{10}(\text{Power [Watts]})$.

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber
- 2) Calculate power in dBm by the following formula:

$$\text{EIRP(dBm)} = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBi)}$$

$$\text{EIRP} = \text{ERP} + 2.15\text{dB}$$

Where:

P_g is the generator output power into the substitution antenna.

3. Test the EUT in the lowest channel, the middle channel the Highest channel
4. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
5. Repeat above procedures until all frequencies measured was complete

Note: Reference test setup 3

6.8 Frequency Stability / Temperature Variation

Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 Power Meas License Digital Systems v02r02

. 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 $\pm 0.00025\%$ (± 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



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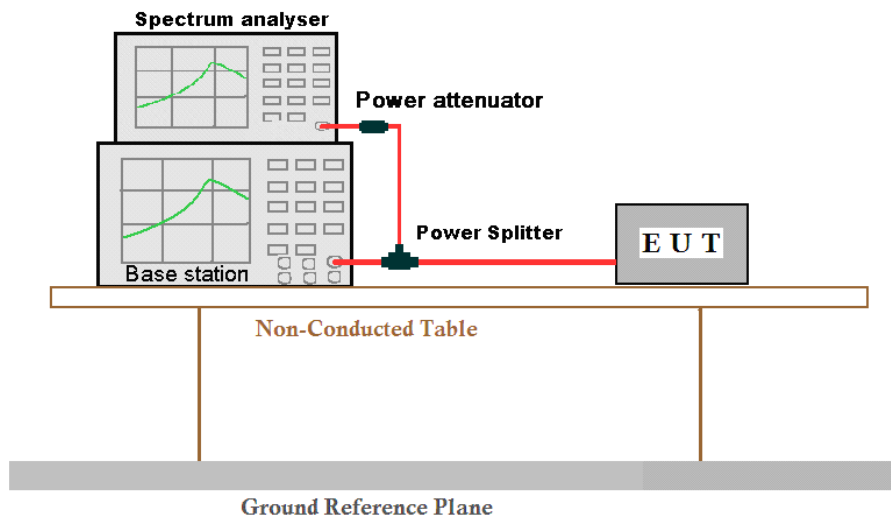
transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

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.

Note: Reference test setup 4

6.9 Test Setups

6.9.1 Test Setup 1



6.9.2 Test Setup 2

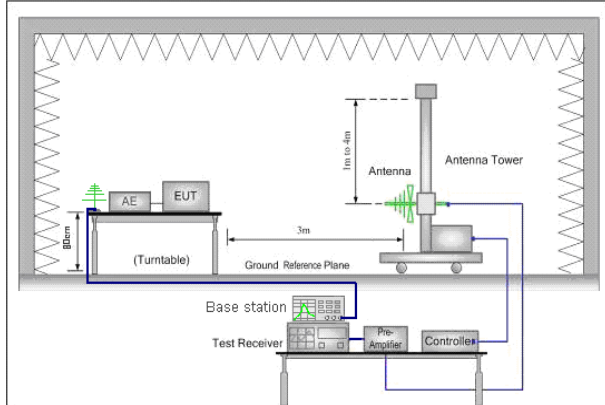


Figure 1. 30MHz to 1GHz

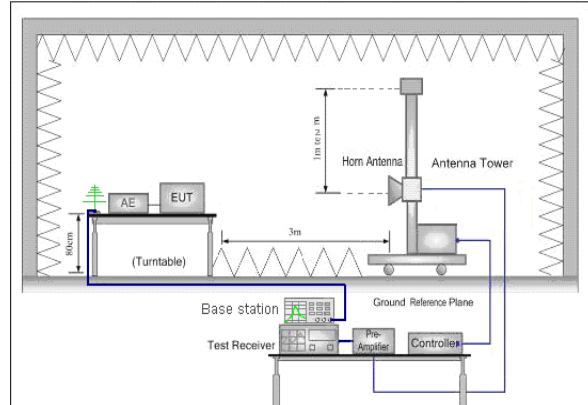


Figure 2. above 1GHz

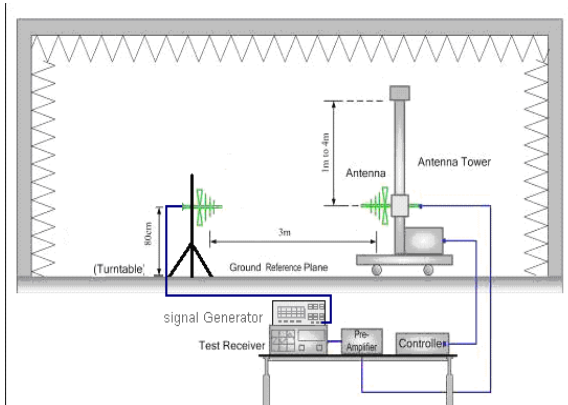


Figure 1. 30MHz to 1GHz

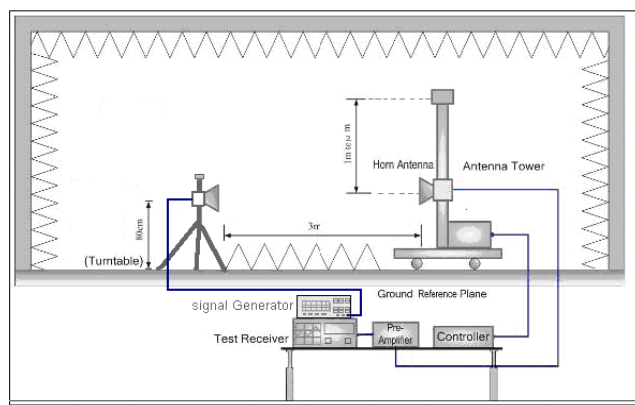


Figure 2. above 1GHz

6.9.3 Test Setup 3

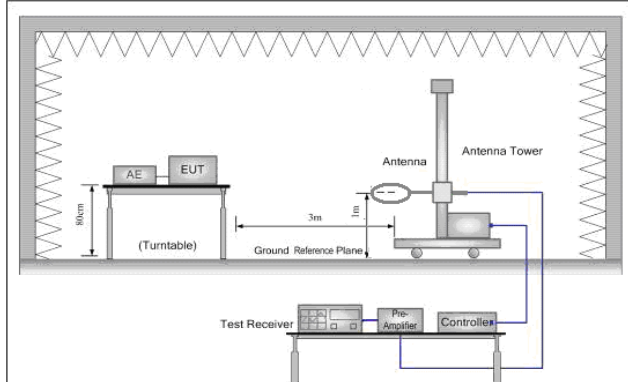


Figure 1. Below 30MHz

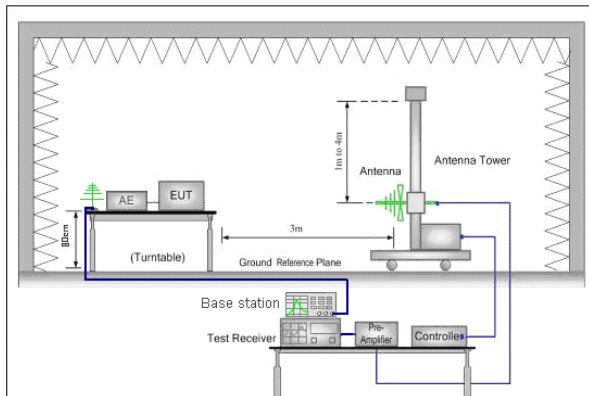


Figure 2. 30MHz to 1GHz

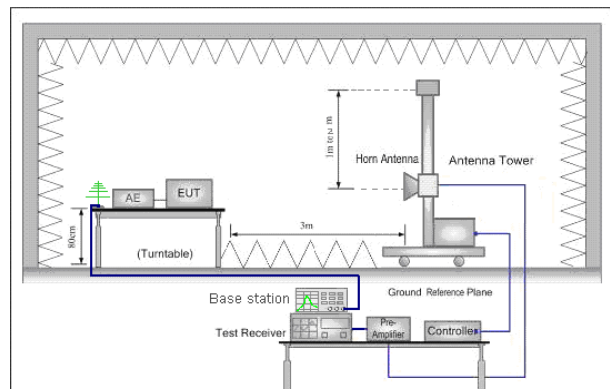


Figure 3. above 1GHz

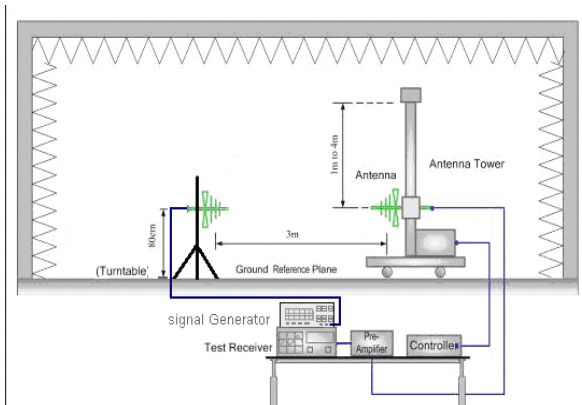


Figure 2. 30MHz to 1GHz

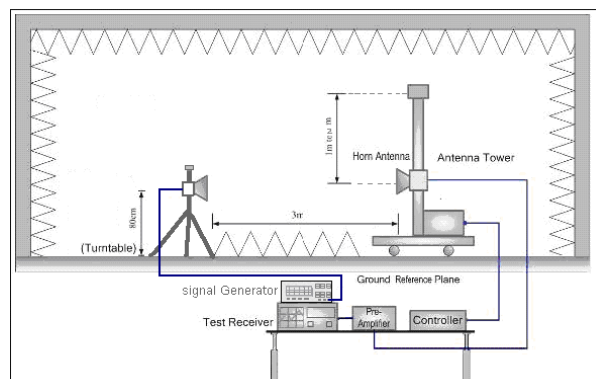
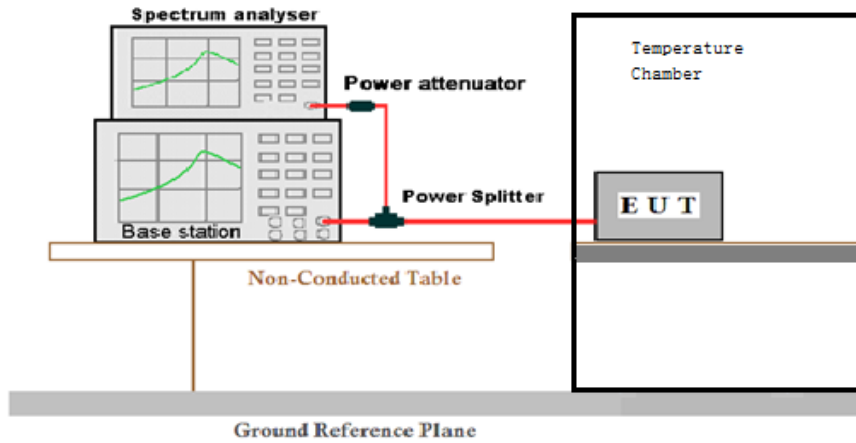


Figure 3. above 1GHz

6.9.4 Test Setup 4





6.10 Test Conditions

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

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Terminals	Test Setup	Test Setup 1
	RF Channels (TX)	L,M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	CDMA/TM1;LTE/TM1;LTE/TM2
Field Strength of Spurious Radiation	Test Environment	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 2
	Test Mode	CDMA/TM1;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 4
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	CDMA/TM1;LTE/TM1;LTE/TM2



7 Main Test Instruments

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2016-05-13	2017-05-13
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-09-16	2017-09-16
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2014-11-15	2017-11-15
4	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015-10-17	2018-10-17
5	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2016-04-25	2017-04-25
7	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17
8	Band filter	Amindeon	82346	SEM023-01	N/A	N/A
9	Universal radio communication tester	Rohde & Schwarz	CMU200	SEM010-01	2016-10-23	2017-10-23
10	Universal radio communication tester	Rohde & Schwarz	CMW500	SEM010-03	2016-10-23	2017-10-23
11	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
12	BiConiLog Antenna (30MHz-3GHz)	Schwarzbeck	VULB9163	SEM003-05	2015-10-17	2018-10-17
13	Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-06	2015-06-14	2018-06-14



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RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2016-05-13	2017-05-13
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-29
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-07-06	2017-07-06
5	.Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14

RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	Humi/ Temp Indicator	MingGao	TH101B	W006-09	2017-03-09	2018-03-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2016-09-17	2017-10-17
3	MXA Signal Analyzer	Agilent	N9020A	W025-01	2016-07-18	2017-07-18
4	Barometer	ChangChun	DYM3	SEL0088	2016-05-24	2017-05-24
5	Dual Output Mobile Communication DC Source	Agilent Technologies Inc	66319D	W009-02	2016-07-23	2017-07-23
6	Digital Multimeter	Fluke	15B+	W055-01	2017-03-09	2018-03-09
7	Wireless Communications Test Set	Rohde & Schwarz	CMW500	W005-03	2017-03-08	2018-03-08
8	Universal Radio Communication Tester	R&S	CMU200	W005-01	2016-10-23	2017-10-23



8 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	Data
Transmit Output Power Data	Power [dBm]	U = 0.37 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 = 4.5 dB (30 MHz to 1GHz) U = 3.3 dB (above 1 GHz) For 10 m Chamber: U = 4.5 dB (30 MHz to 1GHz) U = 3.2 dB (above 1 GHz)
Frequency Stability	Frequency Accuracy [ppm]	U = 0.24 ppm



9 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1RG1703002613RG

The End