



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

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FCC REPORT

Application No: SZEM1710011223RG
Applicant: Huawei Technologies Co., Ltd.
Manufacturer: Huawei Technologies Co., Ltd.
Factory: Huawei Technologies Co., Ltd.
Product Name: Smart Phone
Model No.(EUT): BLA-A09
Trade Mark: HUAWEI
FCC ID: QISBLA-A09
Standards: 47 CFR Part 2(2017)
47 CFR Part 22 subpart H(2017)
47 CFR Part 24 subpart E(2017)
47 CFR Part 27 subpart C(2017)
Test Method: FCC KDB 971168 D01 Power Meas License Digital Systems v03
TIA-603-E 2016
Date of Receipt: 2017-11-18
Date of Test: 2017-11-20 to 2017-12-07
Date of Issue: 2017-12-07

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
01		2017-12-07		Original

Authorized for issue by:				
Tested By		 (Mike Hu) /Project Engineer		2017-12-07
				Date
Checked By		 (Jim Huang) /Reviewer		2017-12-07
				Date



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Frequency stability	\$2.1055, \$22.355, \$24.235 \$27.54	$\leq \pm 2.5\text{ppm.}$	Section 8 of Appendix B	PASS
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Remark :

BLA-A09 is subscriber equipment in the LTE/ WCDMA/GSM system. The LTE frequency band is Band 1,Band 2,Band 3,Band 4,Band 5, Band 7,Band 8, Band 12,Band14, Band 18 , Band 20, Band 28, Band 29, Band 30,Band 66,Band 46,and Band39, But only Band 2,Band 4,Band 5,Band 7,Band 12, Band 30, Band 66 and Band 5_CA test data can be used in this report.



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4 General Information

4.1 Client Information

Applicant:	Huawei Technologies Co., Ltd.
Address of Applicant:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer:	Huawei Technologies Co., Ltd.
Address of Manufacturer:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Factory:	Huawei Technologies Co., Ltd.
Address of Factory:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

4.2 General Description of EUT

Product Name:	Smart Phone
Model No.:	BLA-A09
Trade Mark:	HUAWEI
Hardware version	HL2BLAM
Software version	BLA-A09 8.0.0.55(SP10C07)
Sample Type:	Portable production
Antenna Type:	Internal
Antenna Gain:	LTE B2:-0.57 dBi; LTE B4: 0.72dBi ;LTE B5:-2.4 dBi; LTE B7: -3.2dBi ;LTE B12:-3.6dBi; LTE B30:-2.61 dBi; LTE B66: -1.03dBi

4.3 Test Mode

Test Mode	Test Modes Description
LTE/TM1	LTE system, QPSK modulation
LTE/TM2	LTE system, 16QAM modulation
LTE/TM3	LTE system, 64QAM modulation

		E-UTRA CA configuration / Bandwidth combination set					
E-UTRA CA configuration	Uplink CA configurations (NOTE 3)	Component carriers in order of increasing carrier frequency					Maximum aggregated bandwidth [MHz]
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	
CA_5B	CA_5B	5, 10	10	/	/	/	20
		10	5	/	/	/	

NOTE1: E-UTRA CA configurations and bandwidth combination sets defined for intra-band contiguous CA)(Release 14)

NOTE2: The test mode(s) are selected according to relevant radio technology specifications.



4.4 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	52%	
Atmospheric Pressure:	1015Pa	
Temperature	TN	25 °C
Voltage :	VL	3.6V
	VN	3.82V
	VH	4.5V

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



4.5 Test Frequency

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
	RX	Channel 650	Channel 900	Channel 1150
		1935 MHz	1960 MHz	1985 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 15MHz	TX	Channel 18675	Channel 18900	Channel 19125
		1857.5 MHz	1880 MHz	1902.5 MHz
	RX	Channel 675	Channel 900	Channel 1125
		1937.5 MHz	1960 MHz	1982.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 2 20MHz	TX	Channel 18700	Channel 18900	Channel 19100
		1860 MHz	1880 MHz	1900 MHz
	RX	Channel 700	Channel 900	Channel 1100
		1940 MHz	1960 MHz	1980 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 4 1.4MHz	TX	Channel 19957	Channel 20175	Channel 20393
		1710.7 MHz	1732.5 MHz	1754.3 MHz



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	RX	Channel 1957 2110.7 MHz	Channel 2175 2132.5 MHz	Channel 2393 2154.3 MHz
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
		Channel 2025 2117.5 MHz	Channel 2175 2132.5 MHz	Channel 2325 2147.5 MHz
	RX			
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

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	RX	Channel 2415 870.5 MHz	Channel 2525 881.5 MHz	Channel 2635 892.5 MHz
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	Channel 2425 871.5 MHz	Channel 2525 881.5 MHz	Channel 2625 891.5 MHz
		Channel 2425 871.5 MHz	Channel 2525 881.5 MHz	Channel 2625 891.5 MHz
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	Channel 2450 874 MHz	Channel 2525 881.5 MHz	Channel 2600 889 MHz
		Channel 2450 874 MHz	Channel 2525 881.5 MHz	Channel 2600 889 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 5MHz	TX	Channel 20775 2502.5 MHz	Channel 21100 2535 MHz	Channel 21425 2567.5 MHz
		Channel 2775 2622.5 MHz	Channel 3100 2655 MHz	Channel 5825 2687.5 MHz
	RX	Channel 2775 2622.5 MHz	Channel 3100 2655 MHz	Channel 5825 2687.5 MHz
		Channel 2775 2622.5 MHz	Channel 3100 2655 MHz	Channel 5825 2687.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 10MHz	TX	Channel 20800 2505 MHz	Channel 21100 2535 MHz	Channel 21400 2565 MHz
		Channel 2800 2625 MHz	Channel 3100 2655 MHz	Channel 3400 2685 MHz
	RX	Channel 2800 2625 MHz	Channel 3100 2655 MHz	Channel 3400 2685 MHz
		Channel 2800 2625 MHz	Channel 3100 2655 MHz	Channel 3400 2685 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 15MHz	TX	Channel 20825 2507.5 MHz	Channel 21100 2535 MHz	Channel 21375 2562.5 MHz
		Channel 2825 2627.5 MHz	Channel 3100 2655 MHz	Channel 3375 2682.5 MHz
	RX	Channel 2825 2627.5 MHz	Channel 3100 2655 MHz	Channel 3375 2682.5 MHz
		Channel 2825 2627.5 MHz	Channel 3100 2655 MHz	Channel 3375 2682.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 7 20MHz	TX	Channel 20850 2510 MHz	Channel 21100 2535 MHz	Channel 21350 2560 MHz
		Channel 2850 2630 MHz	Channel 3100 2655 MHz	Channel 3350 2680 MHz
	RX	Channel 2850 2630 MHz	Channel 3100 2655 MHz	Channel 3350 2680 MHz
		Channel 2850 2630 MHz	Channel 3100 2655 MHz	Channel 3350 2680 MHz
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 23017 699.7 MHz	Channel 23095 707.5 MHz	Channel 23173 715.3 MHz

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	RX	Channel 5017 729.7 MHz	Channel 5095 737.5 MHz	Channel 5173 745.3 MHz
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
		Channel 5025 730.5 MHz	Channel 5095 737.5 MHz	Channel 5165 744.5 MHz
	RX			
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 30 5MHz	TX	Channel 27685 2307.5 MHz	Channel 27710 2310 MHz	Channel 27735 2312.5 MHz
		Channel 9795 2352.5 MHz	Channel 9820 2355 MHz	Channel 9845 2357.5 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 30 10MHz	TX	Channel 27710 2310 MHz	Channel 27710 2310 MHz	Channel 27710 2310 MHz
		Channel 9820 2355 MHz	Channel 9820 2355 MHz	Channel 9820 2355 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 1.4MHz	TX	Channel 131979 1710.7 MHz	Channel 132322 1745 MHz	Channel 132665 1779.3 MHz
		Channel 66443 2110.7 MHz	Channel 66786 2145 MHz	Channel 67129 2179.3 MHz
	RX			
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 3MHz	TX	Channel 131987 1711.5 MHz	Channel 132322 1745 MHz	Channel 132657 1778.5 MHz

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	RX	Channel 66451 2111.5 MHz	Channel 66786 2145 MHz	Channel 67121 2178.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 5MHz	TX	Channel 131997 1712.5 MHz	Channel 132322 1745 MHz	Channel 132647 1777.5 MHz
		Channel 66461 2112.5 MHz	Channel 66786 2145 MHz	Channel 67111 2177.5 MHz
	RX	Channel 66461 2112.5 MHz	Channel 66786 2145 MHz	Channel 67111 2177.5 MHz
		Channel 66461 2112.5 MHz	Channel 66786 2145 MHz	Channel 67111 2177.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 10MHz	TX	Channel 132022 1715 MHz	Channel 132322 1745 MHz	Channel 132622 1775 MHz
		Channel 66486 2115 MHz	Channel 66786 2145 MHz	Channel 67086 2175 MHz
	RX	Channel 66486 2115 MHz	Channel 66786 2145 MHz	Channel 67086 2175 MHz
		Channel 66486 2115 MHz	Channel 66786 2145 MHz	Channel 67086 2175 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 15MHz	TX	Channel 132047 1717.5 MHz	Channel 132322 1745 MHz	Channel 132597 1772.5 MHz
		Channel 66511 2117.5 MHz	Channel 66786 2145 MHz	Channel 67086 2172.5 MHz
	RX	Channel 66511 2117.5 MHz	Channel 66786 2145 MHz	Channel 67086 2172.5 MHz
		Channel 66511 2117.5 MHz	Channel 66786 2145 MHz	Channel 67086 2172.5 MHz
Test Mode	TX / RX	RF Channel		
		Low (L)	Middle (M)	High (H)
LTE BAND 66 20MHz	TX	Channel 132072 1720 MHz	Channel 132322 1745 MHz	Channel 132572 1770 MHz
		Channel 66536 2120 MHz	Channel 66786 2145 MHz	Channel 67036 2170 MHz
	RX	Channel 66536 2120 MHz	Channel 66786 2145 MHz	Channel 67036 2170 MHz
		Channel 66536 2120 MHz	Channel 66786 2145 MHz	Channel 67036 2170 MHz



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LTE Band 5_CA

Test Mode	Channel	PCC frequency	SCC frequency
5MHz/10MHZ	LCH	826.8	834
	MCH	831.8	839
	HCH	836.8	844
Test Mode	Channel	PCC frequency	SCC frequency
10MHz/5MHZ	LCH	829	836.2
	MCH	834	841.2
	HCH	839	846.2
Test Mode	Channel	PCC frequency	SCC frequency
10MHz/10MHZ	LCH	829	838.9
	MCH	831.6	841.5
	HCH	834.1	844



4.6 Test Location

All tests were performed at:

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

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.

4.7 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 –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **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.

4.8 Deviation from Standards

None.

4.9 Abnormalities from Standard Conditions

None.



4.10 Other Information Requested by the Customer

None.

4.11 Technical Specification

Characteristics	Description	
Radio System Type	☒ LTE	
Supported Frequency Range	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 5_CA	Transmission (TX): 824 to 849 MHz
		Receiving (RX): 869 to 894 MHz
	LTE band 7	Transmission (TX): 2500 to 2570 MHz
		Receiving (RX): 2620 to 2690 MHz
	LTE band 12	Transmission (TX): 699to 716 MHz
		Receiving (RX): 729to 746 MHz
Target TX Output Power	LTE band 30	Transmission (TX): 2305 to 2315 MHz
		Receiving (RX): 2350 to 2360 MHz
	LTE band 66	Transmission (TX): 1710to 1780 MHz
		Receiving (RX): 2110 to 2180 MHz
	LTE band 2: 25dBm	
	LTE band4: 25dBm	
Supported Channel Bandwidth	LTE band 5: 24.5dBm	
	LTE band 7: 23.5dBm	
	LTE band12: 24.5dBm	
	LTE band30: 25dBm	
	LTE band 66: 25dBm	
	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; ☒ 15 MHz, ☒ 20 MHz
	LTE band5	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz
	LTE band5_CA	☒ 5 MHz+ 10MHz; ☒ 10 MHz +10MHz
	LTE band7	☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz, ☒ 20 MHz
	LTE band12	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz
	LTE band30	☒ 5 MHz; ☒ 10 MHz
	LTE band66	☒ 1.4 MHz; ☒ 3 MHz; ☒ 5 MHz; ☒ 10 MHz; ☒ 15 MHz



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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.)	LTE band2	1M10G7D;1M10D7W; 1M10D7W 2M69G7D;2M69D7W; 2M69D7W 4M48G7D;4M49D7W; 4M49D7W 8M95G7D;8M95D7W; 8M93D7W 13M6G7D;13M5D7W; 13M5D7W 18M0G7D;18M0D7W; 18M0D7W
	LTE band4	1M10G7D;1M10D7W; 1M10D7W 2M69G7D;2M70D7W; 2M69D7W 4M48G7D;4M49D7W; 4M48D7W 8M95G7D;8M95D7W; 8M95D7W 13M6G7D;13M5D7W; 13M5D7W 18M0G7D;18M0D7W; 18M0D7W
	LTE band5	1M10G7D;1M11D7W; 1M10D7W 2M70G7D;2M69D7W; 2M69D7W 4M49G7D;4M49D7W; 4M50D7W 8M97G7D;8M97D7W; 8M97D7W
	LTE band5_CA	13M9G7D;13M9D7W; 13M9D7W 13M9G7D;13M9D7W; 13M9D7W 18M7G7D;18M7D7W; 18M7D7W
	LTE band7	4M49G7D;4M49D7W; 4M48D7W 8M95G7D;8M95D7W; 8M95D7W 13M6G7D;13M6D7W; 13M5D7W 18M0G7D;18M0D7W; 18M0D7W
	LTE band12	1M10G7D;1M10D7W; 1M10D7W 2M69G7D;2M69D7W; 2M69D7W 4M49G7D;4M49D7W; 4M49D7W 8M97G7D;8M95D7W; 8M97D7W
	LTE band30	4M49G7D;4M50D7W; 4M48D7W 8M93G7D;8M95D7W; 8M93D7W
	LTE band66	1M10G7D;1M10D7W; 1M10D7W 2M69G7D;2M69D7W; 2M69D7W 4M48G7D;4M48D7W; 4M48D7W 8M95G7D;8M95D7W; 8M93D7W 13M5G7D;13M5D7W; 13M5D7W 18M0G7D;18M0D7W; 18M0D7W



5 Description of Tests

5.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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

5.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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

5.3 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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

5.4 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03



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

5.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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



5.6 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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

5.7 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 Power Meas License Digital Systems v03

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:

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



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

5.8 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 v03

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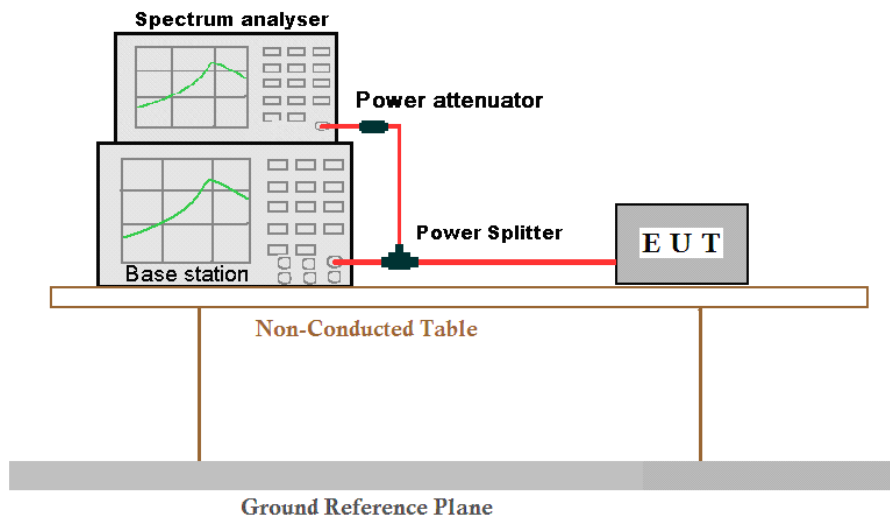
transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

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

5.9 Test Setups

5.9.1 Test Setup 1



5.9.2 Test Setup 2

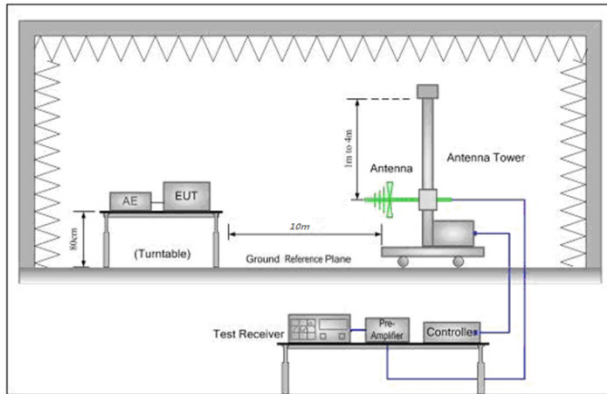


Figure 1. 30MHz to 1GHz

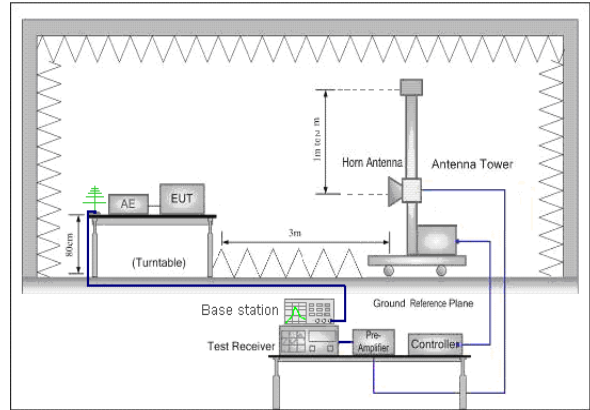


Figure 2. above 1GHz

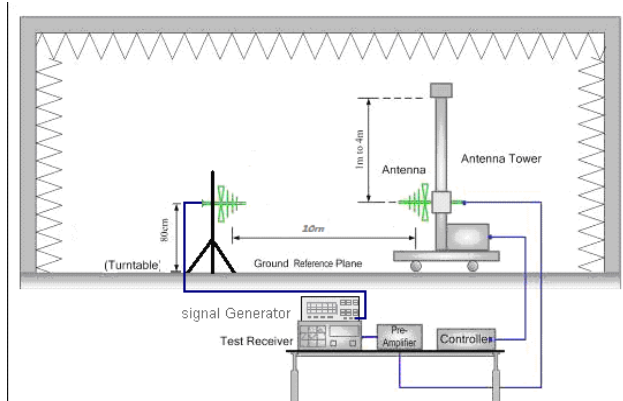


Figure 1. 30MHz to 1GHz

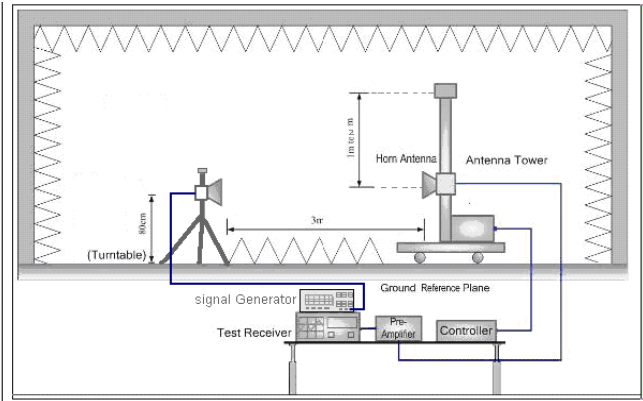


Figure 2. above 1GHz

5.9.3 Test Setup 3

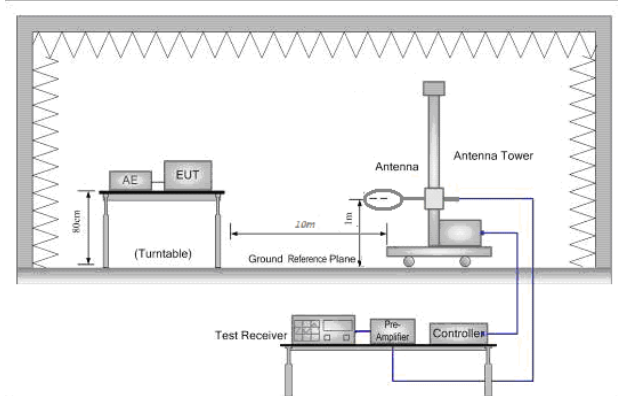


Figure 1. Below 30MHz

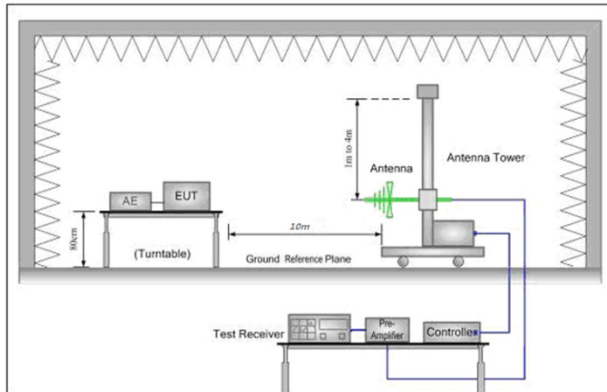


Figure 2. 30MHz to 1GHz

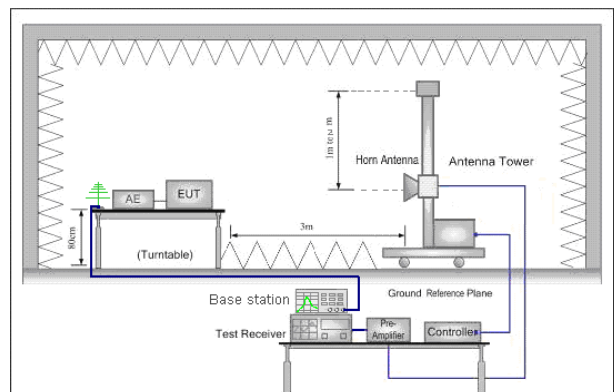


Figure 3. above 1GHz

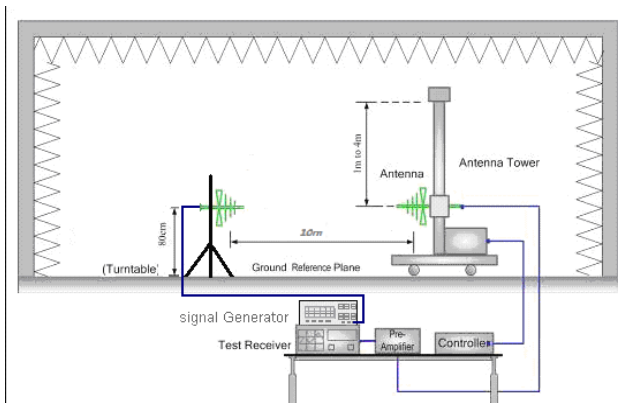


Figure 2. 30MHz to 1GHz

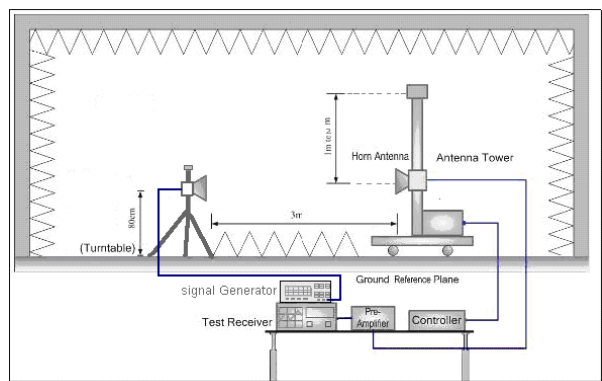
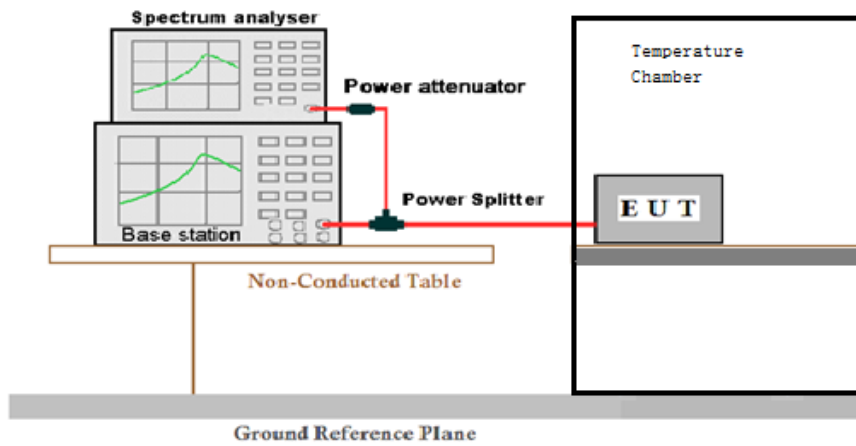


Figure 3. above 1GHz

5.9.4 Test Setup 4





5.10 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	LTE/TM1; LTE/TM2;LTE/TM3
	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	LTE/TM1; LTE/TM2;LTE/TM3
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	LTE/TM1; LTE/TM2;LTE/TM3
Modulation Characteristics		Test Environment	Ambient Climate & Rated Voltage
		Test Setup	Test Setup 1
		RF Channels (TX)	M (M= middle channe)
		Test Mode	LTE/TM1;LTE/TM2;LTE/TM3
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	LTE/TM1; LTE/TM2;LTE/TM3
	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	LTE/TM1; LTE/TM2;LTE/TM3
Band	Edges	Test	Ambient Climate & Rated Voltage



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Compliance	Environment	
	Test Setup	Test Setup 1
	RF Channels (TX)	L, H (L= low channel, H= high channel)
	Test Mode	LTE/TM1; LTE/TM2;LTE/TM3
Spurious Emission at Antenna Terminals	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	LTE/TM1
Field Strength of Spurious Radiation	Test Environment	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 2
	Test Mode	;LTE/TM1;LTE/TM2; LTE/TM3;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	LTE/TM1;LTE/TM2; LTE/TM3



6 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	2017-05-10	2018-05-10
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2017-10-09	2018-10-09
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-02	2017-11-15	2020-11-15
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	2017-11-24	2020-11-24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2017-04-14	2018-04-14
7	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2017-10-17	2018-10-17
8	Band filter	Amindeon	82346	SEM023-01	N/A	N/A
9	Universal radio communication tester	Rohde & Schwarz	CMU200	SEM010-01	2017-10-09	2018-10-09
10	Universal radio communication tester	Rohde & Schwarz	CMW500	SEM010-03	2017-10-23	2018-10-23
11	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017-10-09	2018-10-09
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	2017-05-10	2018-05-10
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2017-04-14	2018-04-14
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	2017-07-06	2018-07-06
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	Signal Analyzer	Rohde Schwarz	FSV	W005-02	2017-03-06	2018-03-06
3	Barometer	ChangChun	DYM3	SEL0088	2017-05-24	2018-05-24
4	Dual Output Mobile Communication DC Source	Agilent Technologies Inc	66319D	W009-02	2017-07-23	2018-07-23
5	Digital Multimeter	Fluke	15B+	W055-01	2017-03-09	2018-03-09
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	W005-02	2017-03-06	2018-03-06
7	Wideband Radio CommunicationTester	Rohde & Schwarz	CMW500	W005-02	2017-03-06	2018-03-06



7 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

8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM17010011223RG.

Refer to Appendix B - LTE Band 2/4/5/7/12/30/66/5_CA data of Report Details for SZEM1701001122301.

The End