

Report No.: SUAR/2021/C000301

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TEST REPORT

Application No.: AR/2021/C0003

Applicant: Xiaomi Communications Co., Ltd.

Address of Applicant: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing,

China, 100085

Manufacturer: Xiaomi Communications Co., Ltd.

Address of Manufacturer: #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing,

China, 100085

EUT Description: Mobile Phone **Model No.:** 22021211RG

Brand Name: POCO

FCC ID: 2AFZZ211RG Standards: 47 CFR Part 2

> 47 CFR Part 22 subpart H 47 CFR Part 24 subpart E 47 CFR Part 27 subpart H 47 CFR Part 27 subpart L 47 CFR Part 27 subpart M 47 CFR Part 90 subpart S

Date of Receipt: 2022/1/14

Date of Test: 2022/1/28 to 2022/2/24

Date of Issue: 2022/2/24

Test Result : PASS *

Authorized Signature:

Panta Sun Wireless Laboratory Manager



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or email: CN. Doccheck (@s.gs.com South of No. Flart, No. 1, Rursheng Road, Suzhou Industrial Park, Suzhou Area, China (liangsu) Pilot Free Trade Zone 中国・影制・中国(丁素)自由原居社会が某州氏で某州で使同区連幹部(号約6号厂房高額 邮鑑・215000

^{*} In the configuration tested, the EUT detailed in this report complied with the standards specified above.



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Version

Revision Record					
Version	Chapter	Date	Modifier	Remark	
01		2022/2/24		Original	

Prepared By	weller lin	
	(Weller Liu) / Engineer	
Checked By	well wei'	
	(Well Wei) / Reviewer	





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2 Test Summary

2.1 GSM850/UMTS Band 5/LTE Band 5/26(824~849 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913(a)(5)	ERP≤7W	Section 1 of Appendix B	Pass
Peak-Average Ratio	§22.913(d)	Limit≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §22.917(a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917(a)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §22.917(a)	FCC: ≤ -13 dBm/100 kHz.	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §22.355	≤ ±2.5ppm.	Section 8 of Appendix B	Pass



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2.2 GSM 1900/UMTS Band 2 /LTE Band 2

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232(c)	EIRP ≤ 2 W	Section 1 of Appendix B	Pass
Peak-Average Ratio	§24.232(d)	Limit≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §24.238(a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238(a)	≤ -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §24.238(a)	≤ -13 dBm/1 MHz.	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §24.235	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass



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2.3 UMTS Band 4 /LTE Band 4

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)(4)	EIRP ≤ 1 W	Section 1 of Appendix B	Pass
Peak-Average Ratio	§27.50(d)(5)	Limit≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	≤ -13 dBm/1 MHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(h)	≤ -13 dBm/1 MHz.	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass





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2.4 LTE Band 7/38/41/CA_7C/ CA_38C

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)(2)	EIRP ≤ 2W	Section 1 of Appendix B	Pass
Peak-Average Ratio		≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §27.53(m4)	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as de ned in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(m)	Channel Edge -25dBm/ 1 MHz 1 MHz 1 MHz 9 kHz 95 MHz XMHz 10th harmonics X=Max {6MHz, EBW}	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(m)	Channel Edge -25dBm/ 1 MHz 1 MHz 1 MHz 9 kHz 95 MHz × MHz 10 th harmonics X=Max {6MHz, EBW}	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass



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2.5 LTE Band 12/17

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046 §27.50(c)(10)	ERP≤3W.	Section 1 of Appendix B	Pass
Peak-Average Ratio		Limit≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Band Edges Compliance	§2.1051, §27.53(g)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10 th harmonics but outside authorized operating frequency ranges.	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass





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2.6 LTE Band 26(814~824 MHz)

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Transmitter Conducted Power Output	§2.1046, §90.635(b)	< 100 W.	Section 1 of Appendix B	Pass
Peak-Average Ratio		Limit≤13 dB	Section 2 of Appendix B	Pass
Modulation Characteristics	§2.1047	Digital modulation	Section 3 of Appendix B	Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.	Section 4 of Appendix B	Pass
Emission Mask	§2.1051 § 90.691(a)	For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50+10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.	Section 5 of Appendix B	Pass
Spurious Emission at Antenna Terminals	§2.1051, §90.691	< 43 + 10Log10(P[Watts]) for all out-of-band emissions	Section 6 of Appendix B	Pass
Field Strength of Spurious Radiation	§2.1053, §90.691	< 43 + 10Log10(P[Watts]) for all out-of-band emissions	Section 7 of Appendix B	Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §90.213	Within authorized bands of operation/frequency block.	Section 8 of Appendix B	Pass



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3 General Information

3.1 Details of Client

Applicant:	Xiaomi Communications Co., Ltd.
Address of Applicant:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd
Address: South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Area, China (Jiangsu) Pilot Free Trade Zone	
Post code:	215000
Test engineer:	Weller Liu, King-p Li, Nature Shen, Tizzy Song

3.3 Test Facility

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

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an

accredited testing laboratory. Designation Number: CN1312.

Test Firm Registration Number: 717327



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3.4 General Description of EUT

EUT Description:	Mobile Phone					
Model No.:	22021211RG					
Brand Name:	POCO					
Hardware Version:	P2					
Software Version:	MIUI 13					
Sample Type:	□ Portable Device, □ Mod	dule				
Antenna Type:	PIFA Antenna					
	⊠Provided by client					
	GSM850: -4.7dBi(ANT0); -: GSM1900:-2.0dBi(ANT2); -	, , ,				
	WCDMA: Band II: -2.0dBi(ANT2); -1. Band IV: -2.5dBi(ANT2); -1 Band V: -4.7dBi(ANT0); -3.	.7dBi(ANT5);				
Antenna Gain*:	LTE: Band 2: -2.0dBi(ANT2); -2.9dBi(ANT3); Band 4: -3.9dBi(ANT0); -2.5dBi(ANT2); -3.5dBi(ANT3);-1.7dBi(ANT5); Band 5: -4.7dBi(ANT0); -3.7dBi(ANT1); Band 7: -5.4dBi(ANT0); -1.6dBi(ANT2); -2.7dBi(ANT3);-1.1dBi(ANT5); Band 12: -7.2dBi(ANT0); -2.3dBi(ANT1); Band 17: -7.2dBi(ANT0); -2.3dBi(ANT1); Band 26: -4.6dBi(ANT0); -3.7dBi(ANT1); Band 38: -5.6dBi(ANT0); -1.6dBi(ANT2); -2.7dBi(ANT3); -1.1dBi(ANT5); Band 41: -5.4dBi(ANT0); -1.6dBi(ANT2); -2.7dBi(ANT3);-1.1dBi(ANT5); CA_7C: -5.4dBi(ANT0); -1.6dBi(ANT2); -2.7dBi(ANT3);-1.1dBi(ANT5); CA_38C: -5.6dBi(ANT0); -1.6dBi(ANT2); -2.7dBi(ANT3); -1.1dBi(ANT5);					
DE Cable*	⊠Provided by client	•	•			
RF Cable*:	4.5dB(Below 1GHz)	5dB(1~2GHz)	5.5dB(Above 2GHz)			

Remark:

- 1. Conduction Power & EIRP of all antennas are tested, and only the worst data is presented.
- 2.*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information , SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.



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3.5 Test Mode

Test Mode	Test Modes Description			
GSM/TM1	GSM system, GSM/GPRS, GMSK modulation			
GSM/TM2	GSM system, EGPRS, 8PSK modulation			
UMTS/TM1	UMTS system, WCDMA, QPSK modulation			
LTE/TM1	LTE system, QPSK modulation			
LTE/TM2	LTE system, 16QAM modulation			
LTE/TM3	LTE system, 64QAM modulation			
LTE/TM4	LTE system, 256QAM modulation			
Remark: The test mode	Remark: The test mode(s) are selected according to relevant radio technology specifications.			

3.6 Test Environment

Environment Parameter	101.0 KPa Selected Values During Tests				
Relative Humidity	44-46 % RH Ambient				
Value	Temperature(°C) Voltage(V)				
NTNV	22~23	3.87			
LTLV	-30	3.6			
LTHV	-30	4.45			
HTLV	50	3.6			
HTHV	50	4.45			

Remark:

NV: Normal Voltage NT: Normal Temperature

LT: Low Extreme Test Temperature
HT: High Extreme Test Temperature
LV: Low Extreme Test Voltage
HV: High Extreme Test Voltage



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3.7 Technical Specification

Characteristics	Description							
Radio System Type	⊠ GSM	□ UMTS		□ LTE				
	Band		T	(RX	
	GSM850		82	824 to 849 MHz			869 to	894 MHz
	GSM1900		18	50 to 19	10 MHz		1930 to	1990 MHz
	UMTS Band II		18	50 to 19	10 MHz		1930 to	1990 MHz
	UMTS Band I\	/	17	'10 to 17	55 MHz		2110 to	2155 MHz
	UMTS Band V		82	4 to 849	MHz		869 to	894 MHz
	LTE Band 2		18	50 to 19	10 MHz		1930 to	1990 MHz
	LTE Band 4		17	'10 to 17	55 MHz		2110 to	2155 MHz
	LTE Band 5		82	4 to 849	MHz		869 to	894 MHz
Supported Frequency Range	LTE Band 7		25	600 to 25	70 MHz		2620 to	2690 MHz
	LTE Band 12		69	9 to 716	MHz		729 to	746 MHz
	LTE Band 17		704 to 716 MHz			734 to	746 MHz	
	LTE Band 26 (814 to 824 MHz)		814 to 824MHz			859 to 869 MHz		
	LTE Band 26 (824 to 849 MHz)		824 to 849 MHz			869 to	894 MHz	
	LTE Band 38		25	70 to 26	20 MHz		2570 to	2620 MHz
	LTE Band 41		24	96 to 26	90MHz		2496 to	2690MHz
	LTE CA_7C		25	00 to 25	70 MHz		2620 to	2690 MHz
	LTE CA_38C		25	70 to 26	20 MHz		2570 to 2620 MHz	
	GSM system:		\boxtimes	0.2 MHz			•	
	UMTS system		\boxtimes	5 MHz				
	LTE Band 2			1.4 MHz 15 MHz	⊠3 MHz ⊠20 MHz		⊴5 MHz	⊠10 MHz
			×	1.4 MHz	⊠3 MHz		 ⊴5 MHz	⊠10 MHz
Supported Channel Bandwidth	LTE Band 4		M.	15 MHz	⊠20 MH	Z		
	LTE Band 5		M.	1.4 MHz	⊠3 MHz		⊴5 MHz	⊠10 MHz
	LTE Band 7		\boxtimes	5 MHz	⊠10 MH	z [⊴ 15 MH	z 🛛 20 MHz
	LTE Band 12		×	1.4 MHz	⊠3 MHz		⊴5 MHz	⊠10 MHz
	LTE Band 17		\boxtimes	5 MHz	⊠10 MH	Z		
	LTE Band 26(8	314-824)	M.	1.4 MHz	⊠3 MHz		⊴5 MHz	⊠10 MHz



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_				Page:		15 of 43	
	LTE Band 26(824-849	١	⊠1.4 MI	Hz ⊠3 N	1Hz	⊠5 MHz	⊠10 MHz
	LTE Band 20(024-043	,	⊠15 MH	łz			
	LTE Band38		⊠5 MHz	<u>z</u> ⊠10	MHz	⊠15 MHz	⊠20 MHz
	LTE Band41		⊠5 MHz	<u>z</u> ⊠10	MHz	⊠15 MHz	⊠20 MHz
			⊠10MF	tz+15MH	<u>z</u>	⊠10MHz-	⊦20MHz
	LTE Band CA_7C		⊠15MH	dz+15MH	<u>z</u>	⊠15MHz-	-20MHz
			⊠20MF	tz+20MH	<u>z</u>		
	LTE Band CA_38C		⊠15MF	tz+15MH	7	⊠20MHz-	⊦20MHz
	LTE Band CA_4A-7A		⊠20MF	tz+20MH	<u> </u>		
	Note1: WCDMA support case was tested and the						the worst
Characteristics	Description						
	GSM:	GS	М	EGPRS			
	GSM850	245	KGXW	251KG7	W		
	GSM1900	247KGXW		250KG7	W		
	UMTS:	QPSK					
	Band II	4M15F9W					
	Band IV	4M14F9					
	Band V	4M15F9W					
	E-UTRA:	QP	QPSK 16QAM			64QAM	256QAM
Designation of Emissions		1M	09G7D	1M09W7	7D	1M09W7D	1M09W7D
(Remark: the necessary		2M	70G7D	2M70W7	7D	2M70W7D	2M70W7D
bandwidth of which is the worst value from the	LTE Band 2	4M	47G7D	4M47W7	7D	4M48W7D	4M47W7D
measured occupied	LIL Ballu Z	8M9	94G7D	8M93W7	7D	8M94W7D	8M94W7D
bandwidths for each type of channel bandwidth		13N	/I5G7D	13M5W7	7D	13M5W7D	13M4W7D
configuration.)			/19G7D	17M9W7	7D	17M9W7D	17M9W7D
		1M	09G7D	1M10W7	D	1M09W7D	1M09W7D
		2M	70G7D	2M69W7	D	2M70W7D	2M69W7D
	LTE Band 4	4M	47G7D	4M47W7	D	4M48W7D	4M48W7D
	LIE Dallu 4	8M9	94G7D	8M94W7	D	8M95W7D	8M94W7D
		13N	/I5G7D	13M5W7	7D	13M5W7D	13M5W7D
		17N	/19G7D	17M9W7	D	17M9W7D	17M9W7D
	LTE Bond 5	1M	09G7D	1M09W7	7D	1M09W7D	1M09W7D
	LTE Band 5	2M	70G7D	2M69W7	D	2M70W7D	2M69W7D
		-					



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		4M47G7D	4M47W7D	4M48W7D	4M47W7D
		8M94G7D	8M93W7D	8M95W7D	8M94W7D
		4M47G7D	4M47W7D	4M47W7D	4M48W7D
	LTE Band 7	8M94G7D	8M93W7D	8M95W7D	8M95W7D
	LIE Ballu /	13M5G7D	13M5W7D	13M5W7D	13M5W7D
		18M1G7D	17M9W7D	17M9W7D	17M9W7D
		1M09G7D	1M09W7D	1M09W7D	1M09W7D
	LTE Dand 12	2M70G7D	2M70W7D	2M70W7D	2M69W7D
	LTE Band 12	4M47G7D	4M47W7D	4M48W7D	4M47W7D
		8M94G7D	8M93W7D	8M95W7D	8M94W7D
	LTC Dond 47	4M47G7D	4M47W7D	4M48W7D	4M47W7D
	LTE Band 17	8M93G7D	8M93W7D	8M96W7D	8M93W7D
		1M10G7D	1M09W7D	1M09W7D	1M09W7D
	LTE Band 26	2M70G7D	2M69W7D	2M69W7D	2M69W7D
	(814-824) LTE Band 26 (824-849)	4M48G7D	4M47W7D	4M48W7D	4M47W7D
		8M95G7D	8M92W7D	8M95W7D	8M95W7D
		1M10G7D	1M09W7D	1M10W7D	1M09W7D
		2M70G7D	2M70W7D	2M70W7D	2M70W7D
		4M46G7D	4M47W7D	4M48W7D	4M47W7D
		8M94G7D	8M94W7D	8M96W7D	8M95W7D
		13M5G7D	13M5W7D	13M5W7D	13M5W7D
		4M47G7D	4M48W7D	4M48W7D	4M47W7D
	LTE Band 38	8M92G7D	8M93W7D	8M95W7D	8M93W7D
	LTE Band 30	13M5G7D	13M4W7D	13M5W7D	13M5W7D
		17M9G7D	17M9W7D	17M9W7D	17M9W7D
		4M49G7D	4M48W7D	4M48W7D	4M47W7D
	LTE Band 41	8M97G7D	8M93W7D	8M94W7D	8M93W7D
	LIE Band 41	13M7G7D	13M5W7D	13M5W7D	13M5W7D
		17M9G7D	17M9W7D	17M9W7D	17M9W7D
		50RB+100R	B:		
		27M7G7D	27M8W7D	27M7W7D	27M7W7D
	LTE Band CA_7C	75RB+50RE	3:		
		23M3G7D	23M2W7D	23M2W7D	23M2W7D
		75RB+75RE	3:		



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			i ago.	17 01 10		
		28M4G7D	28M3W7D	28M4W7D	28M3W7D	
		75RB+100R	B:			
		32M6G7D	32M6W7D	32M6W7D	32M6W7D	
		100RB+50R	B:			
		27M8G7D	27M8W7D	27M8W7D	27M8W7D	
	100RB+75RB:					
		32M7G7D	32M7W7D	32M6W7D	32M6W7D	
		100RB+100RB:				
		38M0G7D	37M8W7D	37M7W7D	37M8W7D	
		75RB+75RB	3:			
LTE Bond CA 29C	TE Band CA_38C	28M2G7D	28M1W7D	28M1W7D	28M2W7D	
L	TIL Dalid CA_30C	100RB+100	RB:			
		37M4G7D	37M5W7D	37M4W7D	37M5W7D	



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3.8 Test Frequencies

Test Mode	TX / RX		RF Channel	
i est ivioue	Test Mode TA/RA		Middle (M)	High (H)
	TX	Channel 128	Channel 190	Channel 251
GSM850	IA	824.2MHz	836.6 MHz	848.8 MHz
	DV	Channel 128	Channel 190	Channel 251
	RX	869.2 MHz	881.6 MHz	893.8 MHz

Test Mode	TX / RX		RF Channel	
rest wode	IA/NA	Low (L)	Middle (M)	High (H)
	TX	Channel 512	Channel 661	Channel 810
GSM1900		1850.2MHz	1880.0 MHz	1909.8 MHz
G3W1900	RX	Channel 512	Channel 661	Channel 810
	KA	1930.2 MHz	1960.0 MHz	1989.8 MHz

Test Mode	TX / RX		RF Channel	
rest wode	IA/ NA	Low (L)	Middle (M)	High (H)
	TX	Channel 9262	Channel 9400	Channel 9538
WCDMA Band II	1.7	1852.4 MHz	1880.0 MHz	1907.6 MHz
WCDINIA Band II	DV	Channel 9662	Channel 9800	Channel 9938
	RX	1932.4 MHz	1960.0 MHz	1987.6 MHz

Test Mode	TX / RX RF Chann			
1 63t Mode		Low (L)	Middle (M)	High (H)
		Channel 1312	Channel 1413	Channel 1513
MCDMA Bond IV	TX	1712.4MHz	1732.6 MHz	1752.6 MHz
WCDMA Band IV	DV	Channel 1537	Channel 1638	Channel 1738
	RX	2112.4 MHz	2132.6 MHz	2152.6 MHz

Test Mode	TX / RX	RF Channel				
rest ivioue	IA/IX	Low (L) Channel 4132 826.4MHz Channel 4357 871.4 MHz	Middle (M)	High (H)		
	TX	Channel 4132	Channel 4182	Channel 4233		
MCDMA Bond V		826.4MHz	836.4 MHz	846.6 MHz		
WCDMA Band V	DV	Channel 4357	Channel 4407	Channel 4458		
	RX	871.4 MHz	881.4 MHz	891.6 MHz		



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			ray	e. 190143	,
Test Mode	Bandwidth	TX / RX		RF Channel	
rest Mode	Dariuwiuiii	IA/NA	Low (L)	Middle (M)	High (H)
			Channel 18607	Channel 18900	Channel 19193
		TX	1850.7 MHz	1880 MHz	1909.3 MHz
	1.4MHz	RX	Channel 607	Channel 900	Channel 1193
		KA	1930.7 MHz	1960 MHz	1989.3 MHz
			Channel 18615	Channel 18900	Channel 19185
		TX	1851.5 MHz	1880 MHz	1908.5 MHz
	3MHz	RX	Channel 615	Channel 900	Channel 1185
		KA	1931.5 MHz	1960 MHz	1988.5 MHz
			Channel 18625	Channel 18900	Channel 19175
		TX	1852.5 MHz	1880 MHz	1907.5 MHz
	5MHz	RX	Channel 625	Channel 900	Channel1175
LTE Band 2			1932.5 MHz	1960 MHz	1987.5 MHz
LTE Band 2			Channel 18650	Channel 18900	Channel 19150
		TX	1855 MHz	1880 MHz	1905 MHz
	10MHz	RX	Channel 650	Channel 900	Channel 1150
		KX	1935 MHz	1960 MHz	1985 MHz
			Channel 18675	Channel 18900	Channel 19125
		TX	1857.5 MHz	1880 MHz	1902.5 MHz
	15MHz	RX	Channel 675	Channel 900	Channel 1125
		KA	1937.5 MHz	1960 MHz	1982.5 MHz
			Channel 18700	Channel 18900	Channel 19100
		TX	1860 MHz	1880 MHz	1900 MHz
	20MHz	RX	Channel 700	Channel 900	Channel 1100
		KΛ	1940 MHz	1960 MHz	1980 MHz



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			ı ag	C. 20 01 +0	
Test Mode	Bandwidth	dth TX / RX		RF Channel	
1 GSt WIOGE	Danawiani	TA/TA	Low (L)	Middle (M)	High (H)
			Channel 19957	Channel 20175	Channel 20393
		TX	1710.7 MHz	1732.5 MHz	1754.3 MHz
	1.4MHz	RX	Channel 1975	Channel 2175	Channel 2375
		KA	2112.5 MHz	2132.5MHz	2152.5 MHz
			Channel 19965	Channel 20175	Channel 20385
		TX	1711.5 MHz	1732.5 MHz	1753.5 MHz
	3MHz	RX	Channel 2000	Channel 2175	Channel 2350
		KA.	2115 MHz	2132.5MHz	2150 MHz
			Channel 19975	Channel 20175	Channel 20375
		TX	1712.5 MHz	1732.5 MHz	1752.5 MHz
	5MHz	RX	Channel 1975	Channel 2175	Channel 2375
			2112.5 MHz	2132.5MHz	2152.5 MHz
LTE Band 4			Channel 20000	Channel 20175	Channel 20350
		TX	1715 MHz	1732.5 MHz	1750 MHz
	10MHz	RX	Channel 2000	Channel 2175	Channel 2350
			2115 MHz	2132.5MHz	2150 MHz
			Channel 20025	Channel 20175	Channel 20325
		TX	1717.5 MHz	1732.5 MHz	1747.5 MHz
	15MHz	RX	Channel 2025	Channel 2175	Channel 2325
		100	2117.5 MHz	2132.5MHz	2147.5 MHz
			Channel 20050	Channel 20175	Channel 20300
		TX	1720 MHz	1732.5 MHz	1745 MHz
	20MHz	DV	Channel 2050	Channel 2175	Channel 2300
		RX	2120 MHz	2132.5MHz	2145 MHz

Toot Mode	Dondwidth	TV / DV		RF Channel	
Test Mode	Bandwidth	TX / RX	Low (L)	Middle (M)	High (H)
			Channel 20407	Channel 20525	Channel 20643
		TX	824.7 MHz	836.5 MHz	848.3 MHz
	1.4MHz	RX	Channel 2407	Channel 2525	Channel 2643
		KA	869.7 MHz	881.5 MHz	893.3 MHz
			Channel 20415	Channel 20525	Channel 20635
		TX	825.5 MHz	836.5 MHz	847.5 MHz
	3MHz	RX	Channel 2415	Channel 2525	Channel 2635
LTE Day LE			870.5 MHz	881.5 MHz	892.5 MHz
LTE Band 5		TX	Channel 20425	Channel 20525	Channel 20625
	CMI I		826.5 MHz	836.5 MHz	846.5 MHz
	5MHz	RX	Channel 2425	Channel 2525	Channel 2625
		KA	871.5 MHz	881.5 MHz	891.5 MHz
	10MHz		Channel 20450	Channel 20525	Channel 20600
		TX	829 MHz	836.5 MHz	844 MHz
		RX	Channel 2450	Channel 2525	Channel 2600
		INΛ	874 MHz	881.5 MHz	889 MHz



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Test Mode	Bandwidth	TX / RX	RF Channel		
rest Mode	Danuwium	IA/KA	Low (L)	Middle (M)	High (H)
			Channel 20775	Channel 21100	Channel 21425
		TX	2502.5 MHz	2535 MHz	2567.5 MHz
	5MHz	RX	Channel 2775	Channel 3100	Channel 5825
		ľΛΛ	2622.5 MHz	2655 MHz	2687.5 MHz
			Channel 20800	Channel 21100	Channel 21400
		TX	2505 MHz	2535 MHz	2565 MHz
	10MHz	RX	Channel 2800	Channel 3100	Channel 3400
1.TE D 1.7			2625 MHz	2655 MHz	2685 MHz
LTE Band 7		TX	Channel 20825	Channel 21100	Channel 21375
	4 CM I -		2507.5 MHz	2535 MHz	2562.5 MHz
	15MHz	RX	Channel 2825	Channel 3100	Channel 3375
		ľΛΛ	2627.5 MHz	2655 MHz	2682.5 MHz
	20MHz		Channel 20850	Channel 21100	Channel 21350
		TX	2510 MHz	2535 MHz	2560 MHz
		RX	Channel 2850	Channel 3100	Channel 3350
		ľΛ	2630 MHz	2655 MHz	2680 MHz

Took Mode	Donalis i déla	TV / DV		RF Channel	
Test Mode	Bandwidth	TX / RX	Low (L)	Middle (M)	High (H)
			Channel 23017	Channel 23095	Channel 23173
		TX	699.7 MHz	707.5 MHz	715.3 MHz
	1.4MHz	RX	Channel 5017	Channel 5095	Channel 5173
		KΛ	729.7 MHz	737.5 MHz	745.3 MHz
			Channel 23025	Channel 23095	Channel 23165
		TX	700.5 MHz	707.5 MHz	714.5 MHz
	3MHz	RX	Channel 5025	Channel 5095	Channel 5165
1.TE D 140			730.5 MHz	737.5 MHz	744.5 MHz
LTE Band 12		TX	Channel 23035	Channel 23095	Channel 23155
	CANA		701.5 MHz	707.5 MHz	713.5 MHz
	5MHz	RX	Channel 5035	Channel 5095	Channel 5155
		KΛ	731.5 MHz	737.5 MHz	743.5 MHz
			Channel 23060	Channel 23095	Channel 23130
	10MHz	TX	704 MHz	707.5 MHz	711 MHz
		RX	Channel 5060	Channel 5095	Channel 5130
		KΛ	734 MHz	737.5 MHz	741 MHz



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Test Mode	Bandwidth	TV / DV	RF Channel		
rest Mode	Dariuwiutii	TX / RX	Low (L)	Middle (M)	High (H)
			Channel 23755	Channel 23790	Channel 23825
		TX	706.5 MHz	710 MHz	713.5 MHz
	5MHz	RX	Channel 5755	Channel 5790	Channel 5825
LTE Band 17		KΛ	736.5 MHz	740 MHz	743.5 MHz
LIE Dallu II			Channel 23780	Channel 23790	Channel 23800
		TX	709 MHz	710 MHz	711 MHz
	10MHz	RX	Channel 5780	Channel 5790	Channel 5800
		KΛ	739 MHz	740 MHz	741 MHz

Toot Mode	Dondwidth	TV / DV		RF Channel	
Test Mode	Bandwidth	TX / RX	Low (L)	Middle (M)	High (H)
			Channel 26697	Channel 26740	Channel 26783
		TX	814.7 MHz	819 MHz	823.3 MHz
	1.4MHz	RX	Channel 8697	Channel 8740	Channel 8783
		KΛ	859.7 MHz	864MHz	868.3 MHz
			Channel 26705	Channel 26740	Channel 26775
		TX	815.5 MHz	819 MHz	822.5 MHz
	3MHz	RX	Channel 8705	Channel 8740	Channel 8775
LTE Band 26			860.5 MHz	864MHz	867.5 MHz
(814-824)		TX	Channel 26715	Channel 26740	Channel 26765
(5 : 1 5 = 1)	514 11		816.5 MHz	819 MHz	821.5 MHz
	5MHz	DV	Channel 8715	Channel 8740	Channel 8755
		RX	861.5 MHz	864MHz	866.5 MHz
			Channel 26740	Channel 26740	Channel 26740
		TX	819 MHz	819 MHz	819 MHz
	10MHz	RX	Channel 8740	Channel 8740	Channel 8740
		IXA	864MHz	864MHz	864MHz



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			ı ag		
Test Mode	Bandwidth	Bandwidth TX / RX		RF Channel	
rest Mode	Dandwidth	IA/IX	Low (L)	Middle (M)	High (H)
			Channel 26797	Channel 26915	Channel 27033
		TX	824.7 MHz	836.5 MHz	848.3 MHz
	1.4MHz	RX	Channel 8697	Channel 8915	Channel 9033
		KA	859.7 MHz	881.5 MHz	893.3 MHz
			Channel 26805	Channel 26915	Channel 27025
		TX	825.5 MHz	836.5 MHz	847.5 MHz
	3MHz	DV	Channel 8805	Channel 8915	Channel 9025
		RX	860.5 MHz	881.5 MHz	892.5 MHz
			Channel 26815	Channel 26915	Channel 27015
LTE Band26		TX	826.5 MHz	836.5 MHz	846.5 MHz
(824-849)	5MHz	RX	Channel 8815	Channel 8915	Channel 9015
(02 : 0 :0)			871.5 MHz	881.5 MHz	891.5 MHz
			Channel 26840	Channel 26915	Channel 26990
		TX	829 MHz	836.5 MHz	844 MHz
	10MHz	DV	Channel 8840	Channel 8915	Channel 8990
		RX	874 MHz	881.5 MHz	889 MHz
			Channel 26865	Channel 26915	Channel 26965
		TX	831.5 MHz	836.5 MHz	841.5 MHz
	15MHz	RX	Channel 8865	Channel 8915	Channel 8965
		100	876.5 MHz	881.5 MHz	886.5 MHz



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				0		
Test Mode	Donadii i dalah	Donadouidable TV / DV	RF Channel			
rest Mode	Bandwidth	TX / RX	Low (L)	Middle (M)	High (H)	
	5MHz	TX/RX	Channel 37775	Channel38000	Channel 38225	
	SIVIHZ	IAINA	2572.5 MHz	2595 MHz	2617.5 MHz	
	10MHz	TX/RX	Channel 37800	Channel38000	Channel 38200	
LTC Bond 20	TOIVIE	INN	2575 MHz	2595 MHz	2615 MHz	
LTE Band 38	15MHz	TX/RX	Channel 37825	Channel38000	Channel 38175	
	IOIVITZ	INN	2577.5 MHz	2595 MHz	2612.5 MHz	
2	201411-	TX/RX	Channel 37850	Channel38000	Channel 38150	
	20MHz TX/RX	2580 MHz	2595 MHz	2610 MHz		

Test Mode	Bandwidth	Bandwidth TX / RX	RF Channel		
i est Mode	Dariuwiutii	IA/KA	Low (L)	Middle (M)	High (H)
			Channel 39675	Channel40620	Channel 41565
	5MHz	TX / RX	2498.5 MHz	2593 MHz	2687.5 MHz
			Channel 39700	Channel40620	Channel 41540
LTE Band 41	10MHz	TX / RX	2501 MHz	2593 MHz	2685 MHz
(2496-2690)			Channel 39725	Channel40620	Channel 41515
,	15MHz	TX / RX	2503.5 MHz	2593 MHz	2682.5 MHz
			Channel 39750	Channel40620	Channel 41490
	20MHz	TX / RX	2506 MHz	2593 MHz	2680 MHz



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Table 4.3.1.1.7A-1: Test frequencies for CA_7C

Range	CC-Combo / N _{RB_agg} [RB]			CC1 Note1					CC2 Note1		
		BW [RB]	NuL	fuL [MHz]	N _{DL}	f _{DL} [MHz]	BW [RB]	NuL	fuL [MHz]	N _{DL}	f _{DL} [MHz]
Low	50+100	50	20805	2505.5	2805	2625.5	100	20949	2519.9	2949	2639.9
		100	20850	2510	2850	2630	50	20994	2524.4	2994	2644.4
	75+50	75	20825	2507.5	2825	2627.5	50	20945	2519.5	2945	2639.5
	75+75	75	20825	2507.5	2825	2627.5	75	20975	2522.5	2975	2642.5
	75+100	75	20828	2507.8	2828	2627.8	100	20999	2524.9	2999	2644.9
		100	20850	2510	2850	2630	75	21021	2527.1	3021	2647.1
	100+100	100	20850	2510	2850	2630	100	21048	2529.8	3048	2649.8
Mid	50+100	50	21006	2525.6	3006	2645.6	100	21150	2540	3150	2660
		100	21051	2530.1	3051	2650.1	50	21195	2544.5	3195	2664.5
	75+50	75	21051	2530.1	3051	2650.1	50	21171	2542.1	3171	2662.1
	75+75	75	21025	2527.5	3025	2647.5	75	21175	2542.5	3175	2662.5
	75+100	75	21003	2525.3	3003	2645.3	100	21174	2542.4	3174	2662.4
		100	21026	2527.6	3026	2647.6	75	21197	2544.7	3197	2664.7
	100+100	100	21001	2525.1	3001	2645.1	100	21199	2544.9	3199	2664.9
High	50+100	50	21206	2545.6	3206	2665.6	100	21350	2560	3350	2680
		100	21251	2550.1	3251	2670.1	50	21395	2564.5	3395	2684.5
	75+50	75	21277	2552.7	3277	2672.7	50	21397	2564.7	3397	2684.7
	75+75	75	21225	2547.5	3225	2667.5	75	21375	2562.5	3375	2682.5
	75+100	75	21179	2542.9	3179	2662.9	100	21350	2560	3350	2680
		100	21201	2545.1	3201	2665.1	75	21372	2562.2	3372	2682.2
	100+100	100	21152	2540.2	3152	2660.2	100	21350	2560	3350	2680
Note 1:	Carriers in inc	creasing f	requency	order.							



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Table 4.3.1.2.6A-1: Test frequencies for CA_38C

Range	CC- Combo / NRB_agg [RB]		CC1 Note1			CC2 Note1	
		BW [RB]	N _{UL/DL}	ful/bl [MHz]	BW [RB]	N _{UL/DL}	f _{UL/DL} [MHz]
Low	75+75	75	37825	2577.5	75	37975	2592.5
	100+100	100	37850	2580	100	38048	2599.8
Mid	75+75	75	37925	2587.5	75	38075	2602.5
	100+100	100	37901	2585.1	100	38099	2604.9
High	75+75	75	38025	2597.5	75	38175	2612.5
	100+100	100	37952	2590.2	100	38150	2610
Note 1:	Carriers in increasing frequency order.						

CA_4A-7A,	45+70	50+50	f1	CC 50	20175	1732.5	2175	2132.5
DC_4A-7A			f2	CC 50	20350	1750	2350	2150
			f5	CC 50	21100	2535	3100	2655
			f6	CC 50	21400	2565	3400	2685



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4 Description of Tests

4.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 V03r01

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.

Remark: Reference test setup 1



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4.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 V03r01; ANSI/C63.26 (2015)

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB

Measurement Procedure: FCC KDB 971168 D01 V03r01; ANSI/C63.26 (2015)

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). Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- 5). 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.
- 6). Repeat above procedures until all frequencies measured was complete.

E (dB μ V/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m) EIRP (dBm) = E (dB μ V/m) + 20 log D - 104.8; where D is the measurement distance in meters ERP = EIRP - 2.15 (dB); where ERP and EIRP are expressed in consistent units.

Above 1GHz test procedure as below:

- 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:

E (dB μ V/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m) EIRP (dBm) = E (dB μ V/m) + 20 log D - 104.8; where D is the measurement distance in meters

- 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

Remark: Reference test setup 2



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4.3 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 4.2

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.

Remark: Reference test setup 1

Test Settings

- The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW ≥ 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
 - 1 5% of the 99% occupied bandwidth observed in Step 7





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4.4 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

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 two 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 rms.

Remark: Reference test setup 1

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- VBW > 3 x RBW
- Detector = RMS
- Number of sweep points ≥ 2 x Span/RBW
- Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize





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4.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 V03r01

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.

Remark: Reference test setup 1

Test Settings

- Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
- Detector = RMS
- Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings





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4.6 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.7.1

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.

Remark: Reference test setup 1

Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power





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4.7 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 V03r01

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

E (dB μ V/m) = Measured amplitude level (dB μ V) + (Cable Loss (dB) + Antenna Factor (dB/m) – AMP(dB)) EIRP (dBm) = E (dB μ V/m) + 20 log D – 104.8; where D is the measurement distance in meters

Above 1GHz test procedure as below:

- 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:

 $E (dB\mu V/m) = Measured \ amplitude \ level \ (dB\mu V) + (Cable \ Loss \ (dB) + Antenna \ Factor \ (dB/m) - AMP(dB)) \\ EIRP \ (dBm) = E \ (dB\mu V/m) + 20 \ log \ D - 104.8; \ where \ D \ is the measurement \ distance \ in meters$

- 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 Y 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

Remark1: Reference test setup 2

Remark2: The emission below 18G were measured at a 3m test distance, while emissions above 18GHz were measured at a 1m test distance.

Remark: Reference test setup 2

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Factor(Antenna Factor + Cable Factor - Preamplifier Factor)

- 2) Scan from 9kHz to 40GHz, The disturbance between 9KHz to 30MHz and 18GHz to 40GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) All modes have been tested, but only the worst case data displayed in this report.



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4.8 Frequency Stability / Temperature Variation

Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 V03r01; ANSI/C63.26 (2015)

- . 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 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.

Remark: Reference test setup 3



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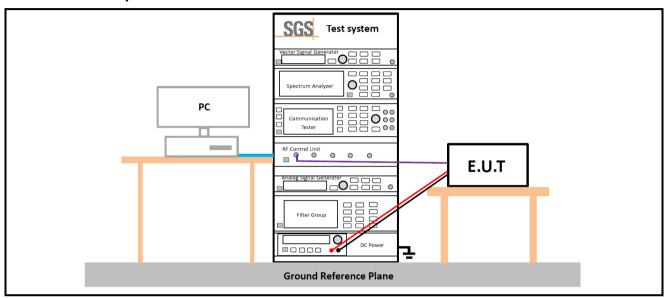


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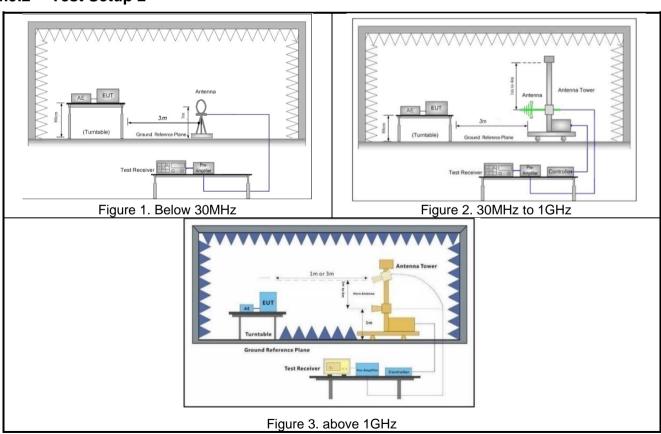
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4.9 Test Setups

4.9.1 Test Setup 1



4.9.2 Test Setup 2





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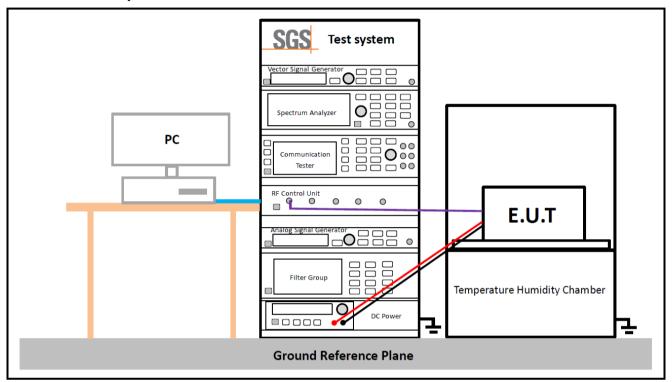
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4.9.3 Test Setup 3





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4.10Test Conditions

Test Case	•	Test Condi	tions			
		Test Environm ent	Ambient Climate & Rated Voltage			
	Average Power,	Test Setup	Test Setup 1			
	Total	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)			
Transmit Output		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;			
Power Data	Average	Test Environm ent	Ambient Climate & Rated Voltage			
	Power, Spectral Density	Test Setup	Test Setup 1			
	(if required	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)			
		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;			
	·		Ambient Climate & Rated Voltage			
Peak-to-A Ratio	verage	Test Setup	Test Setup 1			
(if required	RF Channels (TX)		L, M, H (L= low channel, M= middle channel, H= high channel)			
		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;			
		Test Environm ent	Ambient Climate & Rated Voltage			
	Modulation Characteristics		Test Setup 1			
	aracteristics Setup RF Channels (TX)		M (M= middle channel)			



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		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;				
		Test Environm ent	Ambient Climate & Rated Voltage				
	Occupie d	Test Setup	Test Setup 1				
	Bandwid th	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)				
Bandwid		Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;				
th	Emissio	Test Environm ent	Ambient Climate & Rated Voltage				
	n Bandwid th	Test Setup	Test Setup 1				
	(if required)	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)				
	,		GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;				
			Ambient Climate & Rated Voltage				
Band Edg		Test Setup	Test Setup 1				
Compliand	ce	RF Channels (TX)	L, H (L= low channel, H= high channel)				
			GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4;				
		Test Environm ent	Ambient Climate & Rated Voltage				
	Spurious Emission at Antenna		Test Setup 1				
Terminals		RF Channels (TX)	L,M, H (L= low channel, M= middle channel, H= high channel)				
		Test Mode	GSM/TM1;UMTS/TM1; LTE/TM1;				



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ī—————————————————————————————————————		1 agc. 33 01 +3
	Test Environm ent	Ambient Climate & Rated Voltage
	Test Setup	Test Setup 2
Field Strength of Spurious Radiation	Test Mode	GSM/TM1;GSM/TM2;UMTS/TM1; LTE/TM1;LTE/TM2; LTE/TM3; LTE/TM4; Remark: 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)
	Test Environm ent	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage; (2) VL, VN and VH of Rated Voltage at Ambient Climate.
Frequency Stability	Test Setup	Test Setup 3
	RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
	Test Mode	GSM/TM1; UMTS/TM1; LTE/TM1;





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5 Main Test Instruments

RF Test Equipment							
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date		
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/5/8	2024/5/7		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2021/2/20 2022/2/19	2022/2/19 2023/2/18		
Signal Analyzer	ROHDE&SCHWARZ	FSV3030	SUWI-01-02-02	2021/2/20	2022/2/19		
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2021/2/20	2023/2/18		
		104400.07		2022/2/19	2023/2/18		
Measurement Software	Tonscend	JS1120-3 Test System V 2.6.88.0336	SUWI-02-09-09	NCR	NCR		
Radio Communication Analyzer	Anritsu	MT8821C	SUWI-01-26-03	2021/9/29	2022/9/28		
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-27-01	2021/9/28	2022/9/27		
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2021/2/20 2022/2/19	2022/2/19 2023/2/18		



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RSE Test Equipment 996-01							
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date		
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/5/8	2024/5/7		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2021/2/20 2022/2/19	2022/2/19 2023/2/18		
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/2/19	2023/2/16		
				2021/2/20	2022/2/19		
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/2/19	2023/2/18		
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2021/2/20	2022/2/19		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2022/2/19	2023/2/18		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2021/5/16	2022/5/15		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/5/14	2022/5/13		
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2021/2/20 2022/2/19	2022/2/19 2023/2/18		
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2021/2/20	2022/2/19		
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2021/2/20	2022/2/19 2023/2/18		
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/6/10	2022/6/9		
Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	2021/12/4	2022/12/3		
Radio Communication Analyzer	ROHDE&SCHWARZ	CMW500	SUWI-01-27-01	2021/9/28	2022/9/27		
Measurement Software	Tonscend	JS32-RE V3.0.0.3	SUWI-02-09-04	NCR	NCR		



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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:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	±7.25 x 10 ⁻⁸
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	±7.25 x 10 ⁻⁸
		± 4.8dB (Below 1GHz)
7	Radiated Emission	± 4.8dB (1GHz to 6GHz)
'	Radiated Effilssion	± 4.8dB (6GHz to 18GHz)
		± 4.8dB (Above 18GHz)



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7 Appendixes

Appendix A.3	WWAN Setup Photos
Appendix B.1	GSM 850 & 1900
Appendix B.2	WCDMA Band II & IV & V
Appendix B.3	LTE Band 2
Appendix B.4	LTE Band 4
Appendix B.5	LTE Band 5
Appendix B.6	LTE Band 7
Appendix B.7	LTE Band 12
Appendix B.8	LTE Band 17
Appendix B.9	LTE Band 26(814-824)
Appendix B.10	LTE Band 26(824-849)
Appendix B.11	LTE Band 38
Appendix B.12	LTE Band 41
Appendix B.13	LTE CA_7C
Appendix B.14	LTE CA_38C
Appendix B.15	LTE CA_4A-7A

The End

