

TEST REPORT

Product Name: Global LTE Cat.M1/LTE Cat.NB2/2G Data-Only Module
Trade Mark: CINTERION
Model No. / HVIN: EXS82-W
Report Number: 191019004RFM-2
Test Standards: FCC 47 CFR Part 22
 FCC 47 CFR Part 24
 FCC 47 CFR Part 27
 FCC 47 CFR Part 90
 RSS-130 Issue 2, RSS-132 Issue 3
 RSS-133 Issue 6, RSS-139 Issue 3
 RSS-Gen Issue 5
FCC ID: QIPEXS82-W
IC: 7830A-EXS82W
Test Result: PASS
Date of Issue: December 21, 2019

Prepared for:

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Date: December 21, 2019

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Version

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CONTENTS

- 1. GENERAL INFORMATION 5**
 - 1.1 CLIENT INFORMATION 5**
 - 1.2 EUT INFORMATION 5**
 - 1.2.1 GENERAL DESCRIPTION OF EUT 5
 - 1.2.2 DESCRIPTION OF ACCESSORIES..... 5
 - 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD 5**
 - 1.4 DESCRIPTION OF SUPPORT UNITS 7**
 - 1.5 TEST LOCATION..... 7**
 - 1.6 TEST FACILITY..... 7**
 - 1.7 DEVIATION FROM STANDARDS 8**
 - 1.8 ABNORMALITIES FROM STANDARD CONDITIONS..... 8**
 - 1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER 8**
 - 1.10 MEASUREMENT UNCERTAINTY 8**
- 2. TEST SUMMARY 9**
- 3. EQUIPMENT LIST 13**
- 4. TEST CONFIGURATION 14**
 - 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING 14**
 - 4.2 TEST SETUP 15**
 - 4.2.1 FOR RADIATED EMISSIONS TEST SETUP 15
 - 4.2.2 FOR CONDUCTED RF TEST SETUP 16
 - 4.3 TEST CHANNELS 17**
 - 4.4 SYSTEM TEST CONFIGURATION 18**
 - 4.5 PRE-SCAN..... 19**
 - 4.5.1 LTE BAND 2 19
 - 4.5.2 LTE BAND 4 19
 - 4.5.3 LTE BAND 5 19
 - 4.5.4 LTE BAND 12 20
 - 4.5.5 LTE BAND 13 20
 - 4.5.6 LTE BAND 25 20
 - 4.5.7 LTE BAND 26 21
 - 4.5.8 LTE BAND 26 (PART 90S)..... 21
 - 4.5.9 LTE BAND 66 21
 - 4.5.10 LTE BAND 71 22
- 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 27**
 - 5.1 REFERENCE DOCUMENTS FOR TESTING 27**
 - 5.2 ERP OR EIRP 27**
 - 5.2.1 LTE BAND 2 30
 - 5.2.2 LTE BAND 4 30
 - 5.2.3 LTE BAND 5 31
 - 5.2.4 LTE BAND 12 31
 - 5.2.5 LTE BAND 13 32
 - 5.2.6 LTE BAND 25 32
 - 5.2.7 LTE BAND 26 33
 - 5.2.8 LTE BAND 26 (PART 90S)..... 33
 - 5.2.9 LTE BAND 66 34
 - 5.2.10 LTE BAND 71 34
 - 5.3 CONDUCTED OUTPUT POWER 35**
 - 5.4 PEAK-TO-AVERAGE RATIO 37**
 - 5.4.1 LTE BAND 2 37
 - 5.4.2 LTE BAND 4 37
 - 5.4.3 LTE BAND 5 38
 - 5.4.4 LTE BAND 12 38
 - 5.4.5 LTE BAND 13 38
 - 5.4.6 LTE BAND 25 38
 - 5.4.7 LTE BAND 26 39

5.4.8	LTE BAND 26 (PART 90S)	39
5.4.9	LTE BAND 66	39
5.4.10	LTE BAND 71	39
5.5	99%&26dB BANDWIDTH	40
5.5.1	LTE BAND 2	40
5.5.2	LTE BAND 4	44
5.5.3	LTE BAND 5	48
5.5.4	LTE BAND 12	52
5.5.5	LTE BAND 13	56
5.5.6	LTE BAND 25	60
5.5.7	LTE BAND 26	64
5.5.8	LTE BAND 26 (PART 90S)	68
5.5.9	LTE BAND 66	72
5.5.10	LTE BAND 71	76
5.6	BAND EDGE AT ANTENNA TERMINALS	80
5.6.1	LTE BAND 2	82
5.6.2	LTE BAND 4	84
5.6.3	LTE BAND 5	86
5.6.4	LTE BAND 12	88
5.6.5	LTE BAND 13	90
5.6.6	LTE BAND 25	92
5.6.7	LTE BAND 26	94
5.6.8	LTE BAND 26 (PART 90S)	96
5.6.9	LTE BAND 66	98
5.6.10	LTE BAND 71	100
5.7	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	102
5.7.1	LTE BAND 2	103
5.7.2	LTE BAND 4	105
5.7.3	LTE BAND 5	107
5.7.4	LTE BAND 12	109
5.7.5	LTE BAND 13	111
5.7.6	LTE BAND 25	113
5.7.7	LTE BAND 26	115
5.7.8	LTE BAND 26 (PART 90S)	117
5.7.9	LTE BAND 66	119
5.7.10	LTE BAND 71	121
5.8	FIELD STRENGTH OF SPURIOUS RADIATION	123
5.8.1	LTE BAND 2	124
5.8.2	LTE BAND 4	125
5.8.3	LTE BAND 5	126
5.8.4	LTE BAND 12	127
5.8.5	LTE BAND 13	128
5.8.6	LTE BAND 25	129
5.8.7	LTE BAND 26	130
5.8.8	LTE BAND 66	131
5.8.9	LTE BAND 71	132
5.9	FREQUENCY STABILITY	133
5.9.1	LTE BAND 2	134
5.9.2	LTE BAND 4	135
5.9.3	LTE BAND 5	135
5.9.4	LTE BAND 12	136
5.9.5	LTE BAND 13	136
5.9.6	LTE BAND 25	137
5.9.7	LTE BAND 26	137
5.9.8	LTE BAND 26 (PART 90S)	138
5.9.9	LTE BAND 66	138
5.9.10	LTE BAND 71	139

APPENDIX 1 PHOTOS OF TEST SETUP	140
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS	140

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Gemalto M2M GmbH
Address of Applicant:	Siemensdamm 50 Berlin, 13629 Germany
Manufacturer:	Gemalto M2M GmbH
Address of Manufacturer:	Siemensdamm 50 Berlin, 13629 Germany

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Global LTE Cat.M1/LTE Cat.NB2/2G Data-Only Module	
Model No.:	EXS82-W(See Note)	
Trade Mark:	CINTERION	
DUT Stage:	Identical Prototype	
EUT Supports Function:	GSM Bands:	GSM 850/ PCS 1900
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 12/ Band 13/ Band 25/ Band 26/ Band 66/ Band 71
Sample Received Date:	September 19, 2019	
Sample Tested Date:	September 19, 2019 to December 2, 2019	
Note:	This product EXS82-W has two forms of SIM and ESIM.	

1.2.2 Description of Accessories

None.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	LTE	
Type of Modulation:	LTE Band 2/4/5/12/13/25/26/66/71:	BPSK,QPSK
Category	NB1	
Deployment	stand-alone	
Sub-carrier spacing	3.75KHz, 15KHz	
Ntones	single, multi-tone	
Antenna Type:	External Antenna	
Antenna Gain:	LTE Band 2:	2.17 dBi
	LTE Band 4:	2.17 dBi
	LTE Band 5:	5.17 dBi
	LTE Band 12:	3.17 dBi
	LTE Band 13:	3.17 dBi
	LTE Band 25:	2.17 dBi
	LTE Band 26:	5.17 dBi
	LTE Band 66:	2.17 dBi
LTE Band 71:	3.17 dBi	
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	2.8 to 4.6Vdc	
Extreme Test Temperature:	-40 °C to +70 °C	

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Summary of Results:								
Bands	Sub-carrier spacing	Modulation	Frequency Range	Max RF Output Power (dBm)		EIRP (W)	99% BW (kHz)	Emission Designator
	(KHz)		(MHz)	Conducted (Average)	ERP/EIRP (Average)			
2	3.75	BPSK	1850.7-1909.3	20.55	23.62	0.230	63.485	63K5G7D
		QPSK		20.61	22.78	0.190	73.704	73K7G7D
	15	BPSK	1851.5-1908.5	22.01	24.18	0.262	124.46	124KG7D
		QPSK		20.36	22.53	0.179	186.91	187KG7D
4	3.75	BPSK	1710.7-1754.3	20.54	22.28	0.169	61.406	61K4G7D
		QPSK		20.51	22.68	0.185	72.386	72K4G7D
	15	BPSK	1711.5-1753.5	20.01	22.18	0.165	122.33	122KG7D
		QPSK		20.20	22.31	0.170	188.170	188KG7D
5	3.75	BPSK	824.7-848.3	20.65	23.53	0.225	59.536	59K5G7D
		QPSK		20.54	23.56	0.227	64.252	64K3G7D
	15	BPSK	825.5-847.5	20.54	23.56	0.227	126.49	126KG7D
		QPSK		20.52	23.54	0.226	186.810	187KG7D
12	3.75	BPSK	699.7-715.3	20.78	21.79	0.151	58.873	58K9G7D
		QPSK		20.81	21.83	0.152	63.241	63K2G7D
	15	BPSK	700.5-714.5	20.71	21.73	0.149	120.82	121KG7D
		QPSK		20.69	21.71	0.148	188.77	189KG7D
13	3.75	BPSK	779.5-784.5	20.51	21.52	0.142	58.141	58K1G7D
		QPSK		20.71	21.72	0.149	69.951	70K0G7D
	15	BPSK	782-782	20.65	21.56	0.143	121.50	122KG7D
		QPSK		20.53	21.54	0.143	186.54	187KG7D
25	3.75	BPSK	1850.7-1914.3	20.43	22.48	0.177	62.440	62K4G7D
		QPSK		20.47	22.64	0.184	64.32	64K3G7D
	15	BPSK	1851.5-1913.5	20.35	22.52	0.179	127.17	127KG7D
		QPSK		20.48	22.48	0.177	187.39	187KG7D
26	3.75	BPSK	824.7-848.3	20.67	23.66	0.232	59.532	59K5G7D
		QPSK		20.78	23.79	0.239	69.794	69K8G7D
	15	BPSK	825.5-847.5	20.54	23.56	0.227	121.32	121KG7D
		QPSK		20.67	23.69	0.234	186.17	186KG7D
26 (Part 90S)	3.75	BPSK	814.7-823.3	20.74	23.76	0.238	60.147	60K1G7D
		QPSK		20.75	23.77	0.238	63.099	63K1G7D
	15	BPSK	815.5-822.5	20.68	23.70	0.234	121.08	121KG7D
		QPSK		20.67	23.69	0.234	187.48	187KG7D
66	3.75	BPSK	1710.7-1779.3	20.78	22.78	0.190	61.515	61K5G7D
		QPSK		20.66	22.83	0.192	69.527	69K5G7D
	15	BPSK	1711.5-1778.5	20.60	22.77	0.189	122.86	123KG7D
		QPSK		20.80	22.79	0.190	187.16	187KG7D
71	3.75	BPSK	665.5-695.5	20.89	21.88	0.154	59.614	59K6G7D
		QPSK		20.84	21.86	0.153	70.010	70K0G7D

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15	BPSK	668-693	20.83	21.72	0.149	122.48	122KG7D
	QPSK		20.80	21.82	0.152	191.230	191KG7D

1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Antenna	SMARTEQ	MiniMag	--	Applicant
Adapter	Lenovo	HKA02412020-3K	N/A	Applicant
PCB board	N/A	W30880-Q9812-X-2	N/A	Applicant

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.3 Meter	UnionTrust

1.5 TEST LOCATION

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1.6 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.7 DEVIATION FROM STANDARDS

None.

1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.10 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	± 3.8 dB
2	Conducted emission 150KHz-30MHz	± 3.4 dB
3	Radiated emission 9KHz-30MHz	± 4.9 dB
4	Radiated emission 30MHz-1GHz	± 4.7 dB
5	Radiated emission 1GHz-18GHz	± 5.1 dB
6	Radiated emission 18GHz-26GHz	± 5.2 dB
7	Radiated emission 26GHz-40GHz	± 5.2 dB

2. TEST SUMMARY

FCC 47 CFR Part 24 Test Cases (Band 2 & Band 25)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 24.232(d)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 4 & Band 66)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 22 Test Cases (Band 5 & Band 26)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 22.913(a)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 &	ANSI C63.26-2015 &	PASS

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FCC 47 CFR Part 27 Test Cases (LTE Band 12 & 71)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(c)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(c)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(g)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 13)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(b)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(b)(10)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5)	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	FCC 47 CFR Part 27.53	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 90 Test Cases (LTE Band 26)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046 & FCC 47 CFR Part 90.635	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 90.635	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	N/A	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h)	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Emission Mask	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 90.691	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 90.691	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 90.691	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS

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Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 90.213	ANSI/TIA-603-E-2016 & KDB 971168 D01v03r01	PASS
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RSS-130 Issue 2 Test Cases (LTE Band 12 & 13 & 71)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	RSS-130 Issue 2, Section 4.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	RSS-130 Issue 2, Section 4.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	RSS-130 Issue 2, Section 4.6	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	RSS-130 Issue 2, Section 4.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	RSS-130 Issue 2, Section 4.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	RSS-130 Issue 2, Section 4.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	RSS-130 Issue 2, Section 4.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

RSS-132 Issue 3 Test Cases (Band 5)			
Test Item	Test Requirement	Test Method	Result
Effective Radiated Power (ERP)	RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	RSS-132 Issue 3, Section 5.4	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	RSS-132 Issue 3, Section 5.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

RSS-133 Issue 6 Test Cases (Band 2 & Band 25)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	RSS-133 Issue 6, Section 6.4	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of	RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 &	PASS

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UTTR-RF-RSS4G-V1.0

spurious radiation		KDB 971168 D01v03r01	
Frequency stability	RSS-133 Issue 6, Section 6.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

RSS-139 Issue 3 Test Cases (LTE Band 4 & Band 66)			
Test Item	Test Requirement	Test Method	Result
Equivalent Isotropic Radiated Power (EIRP)	RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Peak-to-average ratio	RSS-139 Issue 3, Section 6.5	KDB 971168 D01v03r01	PASS
99%&26dB Bandwidth	RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Band Edge at antenna terminals	RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Spurious emissions at antenna terminals	RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Field strength of spurious radiation	RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	RSS-139 Issue 3, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 24, 2019	Nov. 23, 2020
<input type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2019	Nov. 23, 2020
<input type="checkbox"/>	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 18, 2019	May 18, 2020
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 18, 2019	May 18, 2020
<input type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 23, 2019	Jun. 23, 2020
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Jan. 05, 2019	Jan. 05, 2020
<input checked="" type="checkbox"/>	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.160323		

RF Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2019	Nov. 23, 2020
<input checked="" type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	120932	Jul. 19, 2019	Jul. 19, 2020
<input type="checkbox"/>	Wideband Radio Communication Tester	R&S	CMW500	119583	Jul. 31, 2019	Jul. 31, 2020
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2019	Sep. 18, 2020
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 05, 2018	Jun. 05, 2020

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

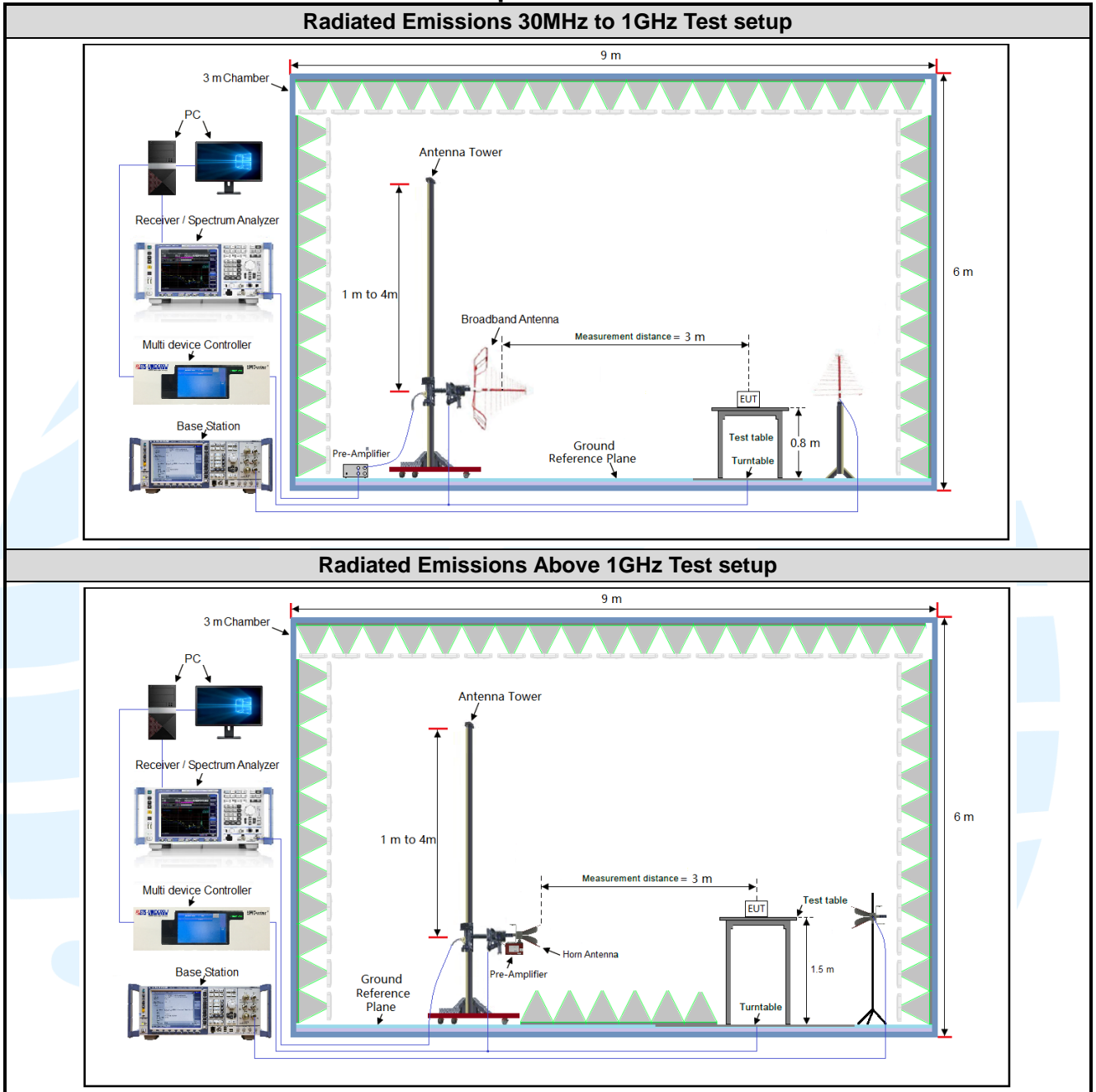
Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.8	20 to 75
TL/VL	-40	2.8	20 to 75
TH/VL	+70	2.8	20 to 75
TL/VH	-40	4.6	20 to 75
TH/VH	+70	4.6	20 to 75

Remark:

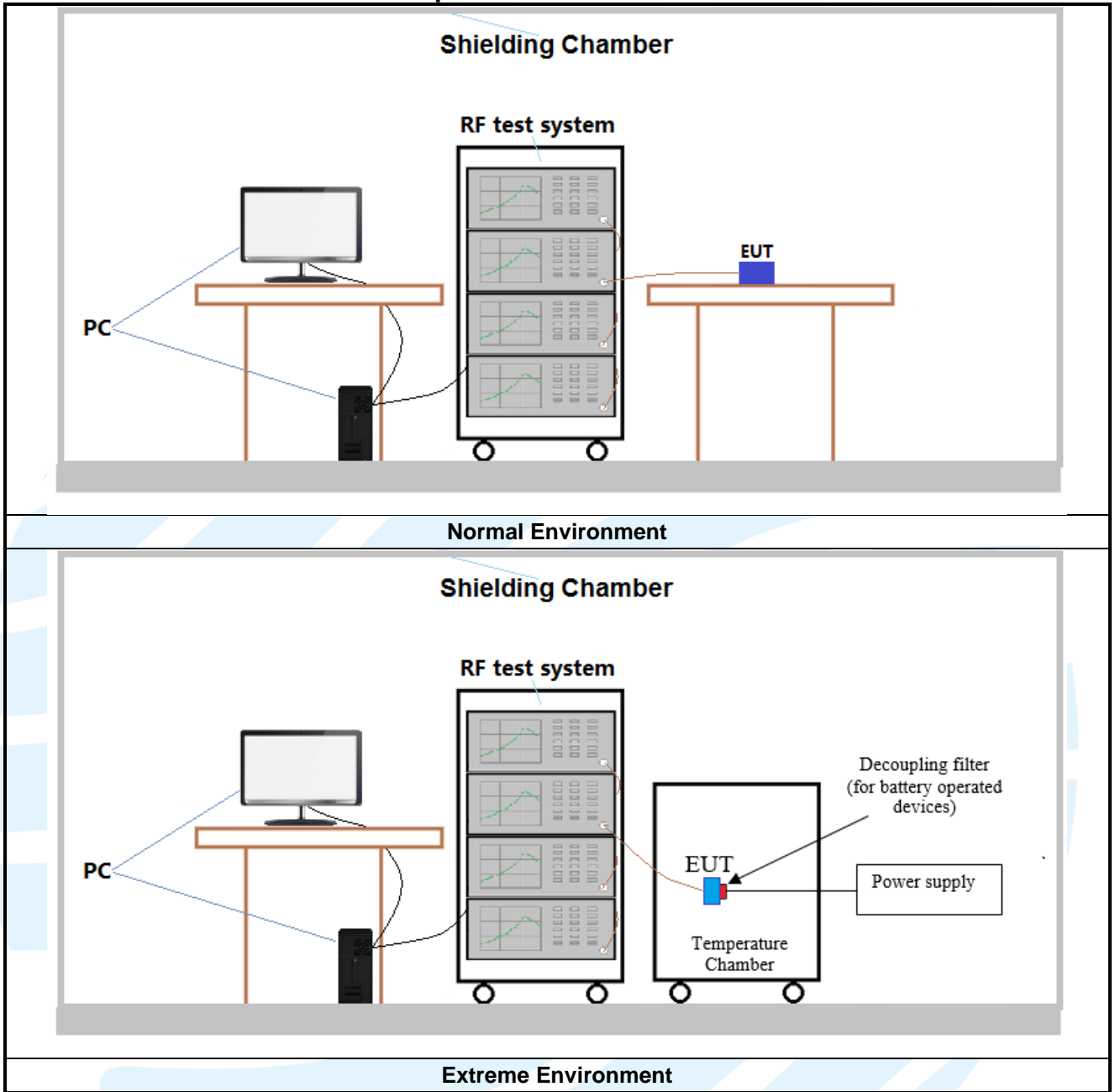
- 1) The EUT just work in such extreme temperature of -40 °C to +70 °C and the extreme voltage of 2.8 V to 4.6 V, so here the EUT is tested in the temperature of -40 °C to +70 °C and the voltage of 2.8 V to 4.6 V.
- 2) VN: Normal Voltage; TN: Normal Temperature;
 TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
 VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

4.2 TEST SETUP

4.2.1 For Radiated Emissions test setup



4.2.2 For Conducted RF test setup



4.3 TEST CHANNELS

Band	Test Frequency ID	Sub-carrier spacing (KHz)	Number [UL]	Frequency of Uplink (MHz)
LTE Band 2 TX: 1850-1910MHz	Low Range	3.75 or 15	18607	1850.1
	Middle Range	3.75 or 15	18900	1880
	High Range	3.75 or 15	19199	1909.9
LTE Band 4 TX: 1710-1755MHz	Low Range	3.75 or 15	19951	1710.1
	Middle Range	3.75 or 15	20175	1732.5
	High Range	3.75 or 15	20399	1754.9
LTE band 5 TX: 824–849MHz	Low Range	3.75 or 15	20401	824.1
	Middle Range	3.75 or 15	20525	836.5
	High Range	3.75 or 15	20649	848.9
LTE Band 12 TX: 699-716MHz	Low Range	3.75 or 15	23011	699.1
	Middle Range	3.75 or 15	23095	707.5
	High Range	3.75 or 15	23179	715.9
LTE Band 13 TX: 777-787MHz	Low Range	3.75 or 15	23181	777.1
	Middle Range	3.75 or 15	23230	782
	High Range	3.75 or 15	23279	786.9
LTE Band 25 TX: 1850-1915MHz	Low Range	3.75 or 15	26041	1850.1
	Middle Range	3.75 or 15	26365	1882.5
	High Range	3.75 or 15	26689	1914.9
LTE band 26 TX:824–849MHz	Low Range	3.75 or 15	26791	824.1
	Middle Range	3.75 or 15	26915	836.5
	High Range	3.75 or 15	27039	848.9
	Low Range	3.75 or 15	26691	814.1
	Middle Range	3.75 or 15	26740	819
	High Range	3.75 or 15	26789	823.9
LTE Band 66 TX: 1710-1780MHz	Low Range	3.75 or 15	131973	1710.1
	Middle Range	3.75 or 15	132322	1745
	High Range	3.75 or 15	132671	1779.9
LTE Band 71 TX: 663–698MHz	Low Range	3.75 or 15	133123	663.1
	Middle Range	3.75 or 15	133297	680.5
	High Range	3.75 or 15	133471	697.9

4.4 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.

The worst case was found when positioned as the table below.

Band	Mode	Antenna Port	Worst-case axis positioning
LTE Band 2	1TX	Chain 0	Y axis
LTE Band 4	1TX	Chain 0	Y axis
LTE Band 5	1TX	Chain 0	Y axis
LTE Band 12	1TX	Chain 0	Y axis
LTE Band 13	1TX	Chain 0	Y axis
LTE Band 25	1TX	Chain 0	Y axis
LTE Band 26	1TX	Chain 0	Y axis
LTE Band 66	1TX	Chain 0	Y axis
LTE Band 71	1TX	Chain 0	Y axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.5 PRE-SCAN

Pre-scan under all rate at lowest middle and highest channel, find the transmitter power as below.

4.5.1 LTE Band 2

LTE Band 2 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			18601/1850.1	18900/1880.0	19199/1909.9
BPSK	3.75	1@0	20.47	20.23	20.42
		1@47	20.43	20.27	20.55
	15	1@0	22.01	21.17	21.45
		1@11	20.12	20.33	20.34
QPSK	3.75	1@0	20.35	20.30	20.61
		1@47	20.29	20.35	20.58
	15	1@0	20.11	20.36	20.09
		1@11	20.14	20.27	20.02
	15	12@0	19.33	19.24	19.54

4.5.2 LTE Band 4

LTE Band 4 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			19951/1710.1	20175/1732.5	20399/1754.9
BPSK	3.75	1@0	20.01	19.95	20.11
		1@47	20.33	20.46	20.54
	15	1@0	19.98	20.01	20.01
		1@11	19.98	19.97	19.77
QPSK	3.75	1@0	20.23	20.49	20.51
		1@47	20.51	20.47	20.45
	15	1@0	20.11	20.03	20.14
		1@11	20.01	19.94	20.20
	15	12@0	18.92	18.82	19.03

4.5.3 LTE Band 5

LTE Band 5 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			20401/824.1	20525/836.5	20649/848.9
BPSK	3.75	1@0	20.47	20.50	20.51
		1@47	20.44	20.43	20.65
	15	1@0	20.54	20.46	20.32
		1@11	20.54	20.41	20.37
QPSK	3.75	1@0	20.47	20.54	20.51
		1@47	20.47	20.50	20.37
	15	1@0	20.44	20.52	20.48
		1@11	20.16	20.41	20.41

	15	12@0	19.43	19.55	19.61
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4.5.4 LTE Band 12

LTE Band 12 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			23011/699.1	23095/707.5	23179/715.9
BPSK	3.75	1@0	20.77	20.75	20.65
		1@47	20.63	20.78	20.56
	15	1@0	20.61	20.62	20.71
		1@11	20.34	20.56	20.43
QPSK	3.75	1@0	20.56	20.80	20.81
		1@47	20.55	20.77	20.67
	15	1@0	20.60	20.69	20.54
		1@11	20.45	20.58	20.63
	15	12@0	19.78	19.65	19.54

4.5.5 LTE Band 13

LTE Band 13 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			23181/777.1	23230/782	23279/786.9
BPSK	3.75	1@0	20.33	20.47	20.51
		1@47	20.47	20.43	20.24
	15	1@0	20.45	20.55	20.23
		1@11	20.12	20.51	20.65
QPSK	3.75	1@0	20.47	20.44	20.71
		1@47	20.42	20.39	20.50
	15	1@0	20.45	20.53	20.50
		1@11	20.37	20.45	20.45
	15	12@0	19.13	19.35	19.45

4.5.6 LTE Band 25

LTE Band 25 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			26041/1850.1	26365/1882.5	26689/1914
BPSK	3.75	1@0	20.12	20.28	20.31
		1@47	20.43	20.33	20.10
	15	1@0	20.27	20.25	20.35
		1@11	20.13	20.28	20.11
QPSK	3.75	1@0	20.44	20.39	20.47
		1@47	20.24	20.42	20.32
	15	1@0	20.31	20.29	20.30
		1@11	20.11	20.36	20.48

	15	12@0	19.24	19.26	19.17
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4.5.7 LTE Band 26

LTE Band 26 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			26791/824.1	26915/836.5	27039/848.9
BPSK	3.75	1@0	20.31	20.64	20.47
		1@47	20.67	20.57	20.60
	15	1@0	20.48	20.54	20.43
		1@11	20.47	20.41	20.39
QPSK	3.75	1@0	20.60	20.71	20.77
		1@47	20.67	20.68	20.78
	15	1@0	20.67	20.56	20.51
		1@11	20.43	20.57	20.21
	15	12@0	19.57	19.49	19.39

4.5.8 LTE Band 26 (Part 90S)

LTE Band 26 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			26691/814.1	26740/819	26789/823.9
BPSK	3.75	1@0	20.65	20.74	20.71
		1@47	20.54	20.69	20.68
	15	1@0	20.57	20.60	20.68
		1@11	20.44	20.56	20.61
QPSK	3.75	1@0	20.54	20.75	20.70
		1@47	20.67	20.66	20.65
	15	1@0	20.67	20.64	20.67
		1@11	20.46	20.55	20.19
	15	12@0	19.32	19.62	19.57

4.5.9 LTE Band 66

LTE Band 66 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			131973/1710.1	132322/1745.0	132671/1779.9
BPSK	3.75	1@0	20.41	20.61	20.54
		1@47	20.78	20.56	20.60
	15	1@0	20.54	20.60	20.57
		1@11	20.47	20.56	20.57
QPSK	3.75	1@0	20.31	20.61	20.66
		1@47	20.45	20.57	20.51
	15	1@0	20.34	20.62	20.53
		1@11	20.54	20.71	20.80

	15	12@0	19.37	19.40	19.37
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4.5.10 LTE Band 71

LTE Band 71 Maximum Average Power (dBm)					
Modulation	Sub-carrier spacing (KHz)	Ntones	Conducted Power (dBm) for low/mid/high channel		
			133123/663.1	133297/680.5	133471/697.9
BPSK	3.75	1@0	20.76	20.83	20.86
		1@47	20.79	20.89	20.87
	15	1@0	20.70	20.67	20.57
		1@11	20.67	20.76	20.83
QPSK	3.75	1@0	20.61	20.84	20.71
		1@47	20.67	20.79	20.73
	15	1@0	20.80	20.79	20.79
		1@11	20.72	20.73	20.69
	15	12@0	19.21	19.51	19.66

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the LTE worse case mode applicability and tested channel detail as below:

Item	Band	Sub-carrier spacing (KHz)		Modulation		Channel		
		3.75	15	BPSK	QPSK	L	M	H
ERP/EIRP	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Conducted output power	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Item	Band	Sub-carrier spacing (KHz)		Modulation		Channel		
		3.75	15	BPSK	QPSK	L	M	H
99%&26dB Bandwidth	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
peak-to-average ratio	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Item	Band	Sub-carrier spacing (KHz)		Modulation		Channel		
		3.75	15	BPSK	QPSK	L	M	H
Band Edge at antenna terminals	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Spurious emissions at antenna terminals	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Item	Band	Sub-carrier spacing (KHz)		Modulation		L	M	H
		3.75	15	BPSK	QPSK			
Field strength of spurious radiation	2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	12	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	17	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	26	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	66	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	71	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Frequency stability	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	17	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	25	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	26	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	66	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	71	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Remark: The mark "☒" means is chosen for testing; The mark "☐" means is not chosen for testing; The mark "-" means is not supported bandwidth								

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 22	Public Mobile Services
3	FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
4	FCC 47 CFR Part 24	Personal Communications Services
5	FCC 47 CFR Part 90	Private Land Mobile Radio Services
6	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
7	RSS-130 Issue 2	Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz
8	RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
9	RSS-133 Issue 6	2 GHz Personal Communications Services Aussi disponible
10	RSS-139 Issue 3	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
11	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
12	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 ERP OR EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a)
LTE Band 2 & LTE Band 25: FCC 47 CFR Part 24.232(c)
LTE Band 4 & LTE Band 66: FCC 47 CFR Part 27.50(d)(4)
LTE Band 5 & LTE Band 26: FCC 47 CFR Part 22.913(a)
LTE Band 12 & Band 71: FCC 47 CFR Part 27.50(c)(10)
LTE Band 13: FCC 47 CFR Part 27.50(b)(10)
LTE Band 26: FCC 47 CFR Part 90.635
LTE Band 2 & LTE Band 25: RSS-133 Issue 6, Section 6.4
LTE Band 4 & LTE Band 66: RSS-139 Issue 3, Section 6.5
LTE Band 5: RSS-132 Issue 3, Section 5.4
LTE Band 12 & LTE Band 13 & Band 71: RSS-130 Issue 2, Section 4.6

Test Method: KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

Limit:

FCC 47 CFR Part 22.913(a):

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c):

Mobile and portable stations are limited to 2 watts EIRP.

FCC 47 CFR Part 27.50(d)(4):

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

FCC 47 CFR Part 27.50(c)(10):

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

FCC 47 CFR Part 27.50(b)(10):

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

FCC 47 CFR Part 90.635:

Shenzhen UnionTrust Quality and Technology Co., Ltd.

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Table—Equivalent Power and Antenna Heights for Base Stations in the 851–869 MHz and 935–940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

Antenna height (ATT) meters (feet)	Effective radiated power (watts) ^{1 2 4}
Above 1,372 (4,500)	65
Above 1,220 (4,000) to 1,372 (4,500)	70
Above 1,067 (3,500) to 1,220 (4,000)	75
Above 915 (3,000) to 1,067 (3,500)	100
Above 763 (2,500) to 915 (3,000)	140
Above 610 (2,000) to 763 (2,500)	200
Above 458 (1,500) to 610 (2,000)	350
Above 305 (1,000) to 458 (1,500)	600
Up to 305 (1,000)	³ 1,000

1. Power is given in terms of effective radiated power (ERP).
2. Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.
3. Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).
4. Licensees in San Diego, CA, will be permitted to utilize an ERP of 500 watts at the following mountaintop sites: Palomar, Otay, Woodson and Miguel.

RSS-130 Issue 2, Section 4.6,

4.6.2 Frequency bands 617-652 MHz and 663-698 MHz

The e.r.p. shall not exceed 3 watts for mobile equipment, fixed subscriber equipment and portable equipment.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

RSS-132 Issue 3, Section 5.4,

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Procedure:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4. A amplifier should be connected to the Signal Source output port. And the cable should be connected between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}), the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{\text{Mea}} + P_{\text{Ag}} - P_{\text{cl}} + G_{\text{a}}$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (0dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

Test Setup: Refer to section 4.2.1 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: See table below

5.2.1 LTE Band 2

LTE Band 2 Maximum EIRP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
18601	1850.1	BPSK	H	3.75	1@0	22.64	33.01	Pass
		QPSK	H	3.75	1@0	22.52	33.01	Pass
		BPSK	H	15	1@0	24.18	33.01	Pass
		QPSK	H	15	1@0	22.28	33.01	Pass
18900	1880	BPSK	H	3.75	1@0	22.40	33.01	Pass
		QPSK	H	3.75	1@0	22.47	33.01	Pass
		BPSK	H	15	1@0	23.34	33.01	Pass
		QPSK	H	15	1@0	22.53	33.01	Pass
19199	1909.9	BPSK	H	3.75	1@0	22.59	33.01	Pass
		QPSK	H	3.75	1@0	22.78	33.01	Pass
		BPSK	H	15	1@0	23.62	33.01	Pass
		QPSK	H	15	1@0	22.26	33.01	Pass

5.2.2 LTE Band 4

LTE Band 4 Maximum EIRP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
19951	1710.1	BPSK	H	3.75	1@0	22.18	30.01	Pass
		QPSK	H	3.75	1@0	22.40	33.01	Pass
		BPSK	H	15	1@0	22.15	33.01	Pass
		QPSK	H	15	1@0	22.28	33.01	Pass
20175	1732.5	BPSK	H	3.75	1@0	22.12	33.01	Pass
		QPSK	H	3.75	1@0	22.66	33.01	Pass
		BPSK	H	15	1@0	22.18	33.01	Pass
		QPSK	H	15	1@0	22.20	33.01	Pass
20399	1754.9	BPSK	H	3.75	1@0	22.28	33.01	Pass
		QPSK	H	3.75	1@0	22.68	33.01	Pass
		BPSK	H	15	1@0	22.18	33.01	Pass
		QPSK	H	15	1@0	22.31	33.01	Pass

5.2.3 LTE Band 5

LTE Band 5 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
20401	824.1	BPSK	H	3.75	1@0	23.49	38.45	Pass
		QPSK	H	3.75	1@0	23.49	38.45	Pass
		BPSK	H	15	1@0	23.56	38.45	Pass
		QPSK	H	15	1@0	23.46	38.45	Pass
20525	836.5	BPSK	H	3.75	1@0	23.52	38.45	Pass
		QPSK	H	3.75	1@0	23.56	38.45	Pass
		BPSK	H	15	1@0	23.48	38.45	Pass
		QPSK	H	15	1@0	23.54	38.45	Pass
20649	848.9	BPSK	H	3.75	1@0	23.53	38.45	Pass
		QPSK	H	3.75	1@0	23.53	38.45	Pass
		BPSK	H	15	1@0	23.34	38.45	Pass
		QPSK	H	15	1@0	23.50	38.45	Pass

5.2.4 LTE Band 12

LTE Band 12 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
23011	699.1	BPSK	H	3.75	1@0	21.79	38.45	Pass
		QPSK	H	3.75	1@0	21.58	38.45	Pass
		BPSK	H	15	1@0	21.63	38.45	Pass
		QPSK	H	15	1@0	21.62	38.45	Pass
23095	707.5	BPSK	H	3.75	1@0	21.77	38.45	Pass
		QPSK	H	3.75	1@0	21.82	38.45	Pass
		BPSK	H	15	1@0	21.64	38.45	Pass
		QPSK	H	15	1@0	21.71	38.45	Pass
23179	715.9	BPSK	H	3.75	1@0	21.67	38.45	Pass
		QPSK	H	3.75	1@0	21.83	38.45	Pass
		BPSK	H	15	1@0	21.73	38.45	Pass
		QPSK	H	15	1@0	21.56	38.45	Pass

5.2.5 LTE Band 13

LTE Band 13 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
23181	777.1	BPSK	H	3.75	1@0	21.34	38.45	Pass
		QPSK	H	3.75	1@0	21.48	38.45	Pass
		BPSK	H	15	1@0	21.46	38.45	Pass
		QPSK	H	15	1@0	21.46	38.45	Pass
23230	782	BPSK	H	3.75	1@0	21.48	38.45	Pass
		QPSK	H	3.75	1@0	21.45	38.45	Pass
		BPSK	H	15	1@0	21.56	38.45	Pass
		QPSK	H	15	1@0	21.54	38.45	Pass
23279	786.9	BPSK	H	3.75	1@0	21.52	38.45	Pass
		QPSK	H	3.75	1@0	21.72	38.45	Pass
		BPSK	H	15	1@0	21.24	38.45	Pass
		QPSK	H	15	1@0	21.51	38.45	Pass

5.2.6 LTE Band 25

LTE Band 25 Maximum EIRP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
26041	1850.1	BPSK	H	3.75	1@0	22.29	30.01	Pass
		QPSK	H	3.75	1@0	22.61	30.01	Pass
		BPSK	H	15	1@0	22.44	30.01	Pass
		QPSK	H	15	1@0	22.48	30.01	Pass
26365	1882.5	BPSK	H	3.75	1@0	22.45	30.01	Pass
		QPSK	H	3.75	1@0	22.56	30.01	Pass
		BPSK	H	15	1@0	22.42	30.01	Pass
		QPSK	H	15	1@0	22.46	30.01	Pass
26689	1914.9	BPSK	H	3.75	1@0	22.48	30.01	Pass
		QPSK	H	3.75	1@0	22.64	30.01	Pass
		BPSK	H	15	1@0	22.52	30.01	Pass
		QPSK	H	15	1@0	22.47	30.01	Pass

5.2.7 LTE Band 26

LTE Band 26 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
26791	824.1	BPSK	H	3.75	1@0	23.33	30.01	Pass
		QPSK	H	3.75	1@0	23.62	30.01	Pass
		BPSK	H	15	1@0	23.50	30.01	Pass
		QPSK	H	15	1@0	23.69	30.01	Pass
26915	836.5	BPSK	H	3.75	1@0	23.66	30.01	Pass
		QPSK	H	3.75	1@0	23.73	30.01	Pass
		BPSK	H	15	1@0	23.56	30.01	Pass
		QPSK	H	15	1@0	23.58	30.01	Pass
27039	848.9	BPSK	H	3.75	1@0	23.49	30.01	Pass
		QPSK	H	3.75	1@0	23.79	30.01	Pass
		BPSK	H	15	1@0	23.45	30.01	Pass
		QPSK	H	15	1@0	23.53	30.01	Pass

5.2.8 LTE Band 26 (Part 90S)

LTE Band 26 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
26691	814.1	BPSK	H	3.75	1@0	23.67	30.01	Pass
		QPSK	H	3.75	1@0	23.56	30.01	Pass
		BPSK	H	15	1@0	23.59	30.01	Pass
		QPSK	H	15	1@0	23.69	30.01	Pass
26740	819	BPSK	H	3.75	1@0	23.76	30.01	Pass
		QPSK	H	3.75	1@0	23.77	30.01	Pass
		BPSK	H	15	1@0	23.62	30.01	Pass
		QPSK	H	15	1@0	23.66	30.01	Pass
26789	823.9	BPSK	H	3.75	1@0	23.73	30.01	Pass
		QPSK	H	3.75	1@0	23.72	30.01	Pass
		BPSK	H	15	1@0	23.70	30.01	Pass
		QPSK	H	15	1@0	23.69	30.01	Pass

5.2.9 LTE Band 66

LTE Band 66 Maximum EIRP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
131973	1710.1	BPSK	H	3.75	1@0	22.58	30.01	Pass
		QPSK	H	3.75	1@0	22.48	30.01	Pass
		BPSK	H	15	1@0	22.71	30.01	Pass
		QPSK	H	15	1@0	22.51	30.01	Pass
132322	1745	BPSK	H	3.75	1@0	22.78	30.01	Pass
		QPSK	H	3.75	1@0	22.78	30.01	Pass
		BPSK	H	15	1@0	22.77	30.01	Pass
		QPSK	H	15	1@0	22.79	30.01	Pass
132671	1779.9	BPSK	H	3.75	1@0	22.71	30.01	Pass
		QPSK	H	3.75	1@0	22.83	30.01	Pass
		BPSK	H	15	1@0	22.74	30.01	Pass
		QPSK	H	15	1@0	22.70	30.01	Pass

5.2.10 LTE Band 71

LTE Band 71 Maximum ERP (dBm) Standalone								
Channel	Frequency(MHz)	Modulation	Polarization	Sub-carrier spacing (KHz)	Ntones	EIRP(dBm)	Limit(dBm)	Result
133123	663.1	BPSK	H	3.75	1@0	21.78	38.45	Pass
		QPSK	H	3.75	1@0	21.63	38.45	Pass
		BPSK	H	15	1@0	21.72	38.45	Pass
		QPSK	H	15	1@0	21.82	38.45	Pass
133297	680.5	BPSK	H	3.75	1@0	21.85	38.45	Pass
		QPSK	H	3.75	1@0	21.86	38.45	Pass
		BPSK	H	15	1@0	21.69	38.45	Pass
		QPSK	H	15	1@0	21.81	38.45	Pass
133471	697.9	BPSK	H	3.75	1@0	21.88	38.45	Pass
		QPSK	H	3.75	1@0	21.73	38.45	Pass
		BPSK	H	15	1@0	21.59	38.45	Pass
		QPSK	H	15	1@0	21.81	38.45	Pass

5.3 CONDUCTED OUTPUT POWER

FCC 47 CFR Part 2.1046(a)
LTE Band 2 & LTE Band 25: FCC 47 CFR Part 24.232(c)
LTE Band 4 & LTE Band 66: FCC 47 CFR Part 27.50(d)(4)
LTE Band 5 & LTE Band 26: FCC 47 CFR Part 22.913(a)
LTE Band 12 & Band 71: FCC 47 CFR Part 27.50(c)(10)
LTE Band 13: FCC 47 CFR Part 27.50(b)(10)
LTE Band 26: FCC 47 CFR Part 90.635

Test Requirement:

LTE Band 2 & LTE Band 25: RSS-133 Issue 6, Section 6.4
LTE Band 4 & LTE Band 66: RSS-139 Issue 3, Section 6.5
LTE Band 5: RSS-132 Issue 3, Section 5.4
LTE Band 12 & LTE Band 13 & Band 71: RSS-130 Issue 2, Section 4.6
KDB 971168 D01v03r01 & ANSI C63.26-2015

Test Method:

Limit:

FCC 47 CFR Part 22.913(a):

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c):

Mobile and portable stations are limited to 2 watts EIRP.

FCC 47 CFR Part 27.50(d)(4):

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

FCC 47 CFR Part 27.50(c)(10):

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

FCC 47 CFR Part 27.50(b)(10):

Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

FCC 47 CFR Part 90.635:

(a) The effective radiated power and antenna height for base stations may not exceed 1 kilowatt (30 dBw) and 304 m. (1,000 ft.) above average terrain (AAT), respectively, or the equivalent thereof as determined from the Table. These are maximum values, and applicants will be required to justify power levels and antenna heights requested.

(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Table—Equivalent Power and Antenna Heights for Base Stations in the 851–869 MHz and 935–940 MHz Bands Which Have a Requirement for a 32 km (20 mi) Service Area Radius

Antenna height (ATT) meters (feet)	Effective radiated power (watts) ^{1 2 4}
Above 1,372 (4,500)	65
Above 1,220 (4,000) to 1,372 (4,500)	70
Above 1,067 (3,500) to 1,220 (4,000)	75
Above 915 (3,000) to 1,067 (3,500)	100
Above 763 (2,500) to 915 (3,000)	140
Above 610 (2,000) to 763 (2,500)	200
Above 458 (1,500) to 610 (2,000)	350
Above 305 (1,000) to 458 (1,500)	600
Up to 305 (1,000)	³ 1,000

- Power is given in terms of effective radiated power (ERP).
- Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe

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areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.

3. Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).
4. Licensees in San Diego, CA, will be permitted to utilize an ERP of 500 watts at the following mountaintop sites: Palomar, Otay, Woodson and Miguel.

RSS-130 Issue 2, Section 4.6,

4.6.2 Frequency bands 617-652 MHz and 663-698 MHz

The e.r.p. shall not exceed 3 watts for mobile equipment, fixed subscriber equipment and portable equipment.

4.6.3 Frequency bands 698-756 MHz and 777-787 MHz

The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.

RSS-132 Issue 3, Section 5.4,

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

错误!未找到引用源。 , Section 4.4,

For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 W. For fixed subscriber equipment, the transmitter output power shall not exceed 2 W and the e.i.r.p. shall be limited to 40 W.

Test Procedure:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: [The full result refer to section 4.5 for details.](#)

5.4 PEAK-TO-AVERAGE RATIO

LTE Band 2 & LTE Band 25: FCC 47 CFR Part 24.232(d)
 LTE Band 4 & LTE Band 66: FCC 47 CFR Part 27.50(d)(5)
 LTE Band 5 & LTE Band 26: FCC 47 CFR Part 22.913(a)
 LTE Band 12 & Band 17: FCC 47 CFR Part 27.50(d)(5)
 LTE Band 13: FCC 47 CFR Part 27.50(d)(5)

Test Requirement:

LTE Band 2 & LTE Band 25: RSS-133 Issue 6, Section 6.4
 LTE Band 4 & LTE Band 66: RSS-139 Issue 3, Section 6.5
 LTE Band 5: RSS-132 Issue 3, Section 5.4
 LTE Band 12 & LTE Band 13 & Band 71: RSS-130 Issue 2, Section 4.6

Test Method:

KDB 971168 D01v03r01 Section 5.7

Limit:

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

- a) Set resolution/measurement bandwidth \geq signal's occupied bandwidth
- b) Set the number of counts to a value that stabilizes the measured CCDF curve
- c) Record the maximum PAPR level associated with a probability of 0.1 %

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: See table below

5.4.1 LTE Band 2

LTE Band 2 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/ Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	18900/1880.0	2.87	13	Pass
QPSK	3.75	18900/1880.0	3.31	13	Pass
BPSK	15	18900/1880.0	4.62	13	Pass
QPSK	15	18900/1880.0	6.43	13	Pass

5.4.2 LTE Band 4

LTE Band 4 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/ Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	20175/1732.5	3.01	13	Pass
QPSK	3.75	20175/1732.5	3.42	13	Pass
BPSK	15	20175/1732.5	4.67	13	Pass
QPSK	15	20175/1732.5	5.99	13	Pass

5.4.3 LTE Band 5

LTE Band 5 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency(MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	20525/836.5	4.23	13	Pass
QPSK	3.75	20525/836.5	5.10	13	Pass
BPSK	15	20525/836.5	5.56	13	Pass
QPSK	15	20525/836.5	5.67	13	Pass

5.4.4 LTE Band 12

LTE Band 12 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency(MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	23095/707.5	3.98	13	Pass
QPSK	3.75	23095/707.5	4.26	13	Pass
BPSK	15	23095/707.5	5.35	13	Pass
QPSK	15	23095/707.5	5.87	13	Pass

5.4.5 LTE Band 13

LTE Band 13 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency(MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	23230/782	4.05	13	Pass
QPSK	3.75	23230/782	4.32	13	Pass
BPSK	15	23230/782	5.59	13	Pass
QPSK	15	23230/782	6.56	13	Pass

5.4.6 LTE Band 25

LTE Band 25 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency(MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	26365/1882.5	4.02	13	Pass
QPSK	3.75	26365/1882.5	4.30	13	Pass
BPSK	15	26365/1882.5	5.65	13	Pass
QPSK	15	26365/1882.5	6.24	13	Pass

5.4.7 LTE Band 26

LTE Band 26 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	26915/836.5	4.04	13	Pass
QPSK	3.75	26915/836.5	4.15	13	Pass
BPSK	15	26915/836.5	5.60	13	Pass
QPSK	15	26915/836.5	6.32	13	Pass

5.4.8 LTE Band 26 (Part 90S)

LTE Band 26 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	26740/819	4.03	13	Pass
QPSK	3.75	26740/819	4.17	13	Pass
BPSK	15	26740/819	5.63	13	Pass
QPSK	15	26740/819	6.67	13	Pass

5.4.9 LTE Band 66

LTE Band 66 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	132322/1745.0	4.04	13	Pass
QPSK	3.75	132322/1745.0	4.28	13	Pass
BPSK	15	132322/1745.0	5.66	13	Pass
QPSK	15	132322/1745.0	6.17	13	Pass

5.4.10 LTE Band 71

LTE Band 71 Peak-to-average ratio (dB)					
Modulation	Sub-carrier spacing (KHz)	Channel/Frequency (MHz)	PAPR(dB)	Limit (dB)	Result
BPSK	3.75	133297/680.5	3.97	13	Pass
QPSK	3.75	133297/680.5	4.13	13	Pass
BPSK	15	133297/680.5	5.63	13	Pass
QPSK	15	133297/680.5	6.72	13	Pass

5.5 99%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h)
 RSS-Gen Issue 5, Section 6.7
Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4
Limit: No Limit, for reporting purposes only.

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Link mode
Test Results: Pass
Test Data: See table below

5.5.1 LTE Band 2

LTE Band 2								
Modulation	Sub-carrier spacing (KHz)	Ntones	Bandwidth(KHz) for low/mid/high channel					
			18601/1850.1		18900/1880.0		19199/1909.9	
			99% (KHz)	-26dBc (KHz)	99% (KHz)	-26dBc (KHz)	99% (KHz)	-26dBc (KHz)
QPSK	3.75	1@0	71.459	42.68	73.704	42.34	68.887	40.03
QPSK	15	1@0	124.72	117.8	123.39	115.6	120.22	103.9
QPSK	15	12@0	186.91	250.8	186.1	249.7	185.1	248.9
BPSK	3.75	1@0	62.234	41.32	60.718	41.25	63.485	41.44
BPSK	15	1@0	124.46	104.6	122.33	116.1	120.58	114.9

