

FCC TEST REPORT

Product Name: Mobile Phone
Trade Mark: BLU
Model No.: TANK MEGA 4G
Report Number: 24111314624RFM-2
Test Standards: FCC 47 CFR Part 22
FCC 47 CFR Part 24
FCC 47 CFR Part 27
FCC ID: YHLBLUTKMG4G
Test Result: PASS
Date of Issue: December 12, 2024

Prepared for:

BLU Products, Inc.
8600 NW 36th Street, Suite #300 | Miami, FL 33166

Prepared by:

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UTTR-RF-FCC4G-V1.1

Version

Version No.	Date	Description
V1.0	December 12, 2024	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	BLU Products, Inc.
Address of Applicant:	8600 NW 36th Street, Suite #300 Miami, FL 33166
Manufacturer:	BLU Products, Inc.
Address of Manufacturer:	8600 NW 36th Street, Suite #300 Miami, FL 33166

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone	
Model No.:	TANK MEGA 4G	
Trade Mark:	BLU	
DUT Stage:	Identical Prototype	
EUT Supports Function: (Provided by the customer)	GSM Bands:	GSM850/PCS 1900
	UTRA Bands:	WCDMA Band II/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7
	2.4 GHz ISM Band:	Bluetooth 5.0
Software Version:	BLU_T0110LL_V03.01_GENERIC_ANATEL_22112024 (Provided by the customer)	
Hardware Version:	A599M10-A10 (Provided by the customer)	
Sample Received Date:	November 13, 2024	
Sample Tested Date:	November 15, 2024 to December 26, 2024	

Remark:

The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.

1.2.2 Description of Accessories

Adapter	
Model No.:	US-WS-1001
Input:	100-240 V~50/60 Hz 0.2 A
Output:	5.0 V $\pm$ 1000 mA
DC Cable:	1.0 Meter, Unshielded without ferrite

Battery	
Model No.:	C724211369L
Battery Type:	Lithium-ion Polymer Rechargeable Battery
Rated Voltage:	3.8 Vdc
Limited Charge Voltage:	4.35 Vdc
Rated Capacity:	3600 mAh

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	Single Carrier: LTE Band 2/4/5/7	
Type of Modulation:	QPSK, 16QAM	
Antenna Type: (Provided by the customer)	FPC Antenna	
Antenna Gain: (Provided by the customer)	LTE Band 2:	-1.86 dBi
	LTE Band 4:	-1.26 dBi
	LTE Band 5:	-1.46 dBi
	LTE Band 7:	2.59 dBi
Sample No.:	Radiated: S202411134635-ZJA04/8	
	Conducted: S202411134635-ZJA02/8	
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	3.5 to 4.35Vdc	
Extreme Test Temperature:	-10 °C to +55 °C	

Summary of Results:								
Bands	BW	Modulation	Frequency Range	Max RF Output Power (dBm)		ERP/EIRP	99% BW	Emission Designator
	(MHz)		(MHz)	Conducted (Average)	ERP/EIRP (Average)	(W)	(MHz)	
2	1.4	QPSK	1850.7-1909.3	22.86	21.00	0.1259	1.0962	1M10G7D
		16QAM		22.34	20.48	0.1117	1.1033	1M10W7D
	3	QPSK	1851.5-1908.5	22.84	20.98	0.1253	2.7149	2M71G7D
		16QAM		21.88	20.02	0.1005	2.7082	2M71W7D
	5	QPSK	1852.5-1907.5	23.01	21.15	0.1303	4.5129	4M51G7D
		16QAM		21.87	20.01	0.1002	4.5308	4M53W7D
	10	QPSK	1855.0-1905.0	22.86	21.00	0.1259	9.0130	9M01G7D
		16QAM		22.28	20.42	0.1102	9.0126	9M01W7D
	15	QPSK	1857.5-1902.5	22.93	21.07	0.1279	13.5410	13M5G7D
		16QAM		22.24	20.38	0.1091	13.5380	13M5W7D
	20	QPSK	1860.0-1900.0	23.04	21.18	0.1312	18.0480	18M0G7D
		16QAM		22.30	20.44	0.1107	18.0660	18M1W7D
4	1.4	QPSK	1710.7-1754.3	16.93	15.67	0.0369	1.1000	1M10G7D
		16QAM		16.14	14.88	0.0308	1.1062	1M11W7D
	3	QPSK	1711.5-1753.5	16.85	15.59	0.0362	2.7101	2M71G7D
		16QAM		16.20	14.94	0.0312	2.7103	2M71W7D
	5	QPSK	1712.5-1752.5	16.99	15.73	0.0374	4.5117	4M51G7D
		16QAM		16.33	15.07	0.0321	4.5336	4M53W7D
	10	QPSK	1715-1750	17.23	15.97	0.0395	8.9892	8M99G7D
		16QAM		16.65	15.39	0.0346	9.0087	9M01W7D
	15	QPSK	1717.5-1747.5	17.05	15.79	0.0379	13.5250	13M5G7D
		16QAM		16.53	15.27	0.0337	13.5240	13M5W7D
	20	QPSK	1720-1745	17.74	16.48	0.0445	18.0280	18M0G7D
		16QAM		17.03	15.77	0.0378	18.0720	18M1W7D

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Bands	BW	Modulation	Frequency Range	Max RF Output Power (dBm)		ERP/EIRP (W)	99% BW (MHz)	Emission Designator
	(MHz)			Conducted (Average)	ERP/EIRP (Average)			
5	1.4	QPSK	824.7-848.3	23.23	19.62	0.0916	1.1006	1M10G7D
		16QAM		22.47	18.86	0.0769	1.1017	1M10W7D
	3	QPSK	825.5-847.5	23.25	19.64	0.0920	2.7162	2M72G7D
		16QAM		22.29	18.68	0.0738	2.7096	2M71W7D
	5	QPSK	826.5-846.5	23.34	19.73	0.0940	4.5172	4M52G7D
		16QAM		22.69	19.08	0.0809	4.5256	4M53W7D
	10	QPSK	829-844	23.47	19.86	0.0968	9.0140	9M01G7D
		16QAM		22.83	19.22	0.0836	9.0200	9M02W7D
7	5	QPSK	2502.5-2567.5	17.46	20.05	0.1012	4.5149	4M51G7D
		16QAM		16.96	19.55	0.0902	4.5310	4M53W7D
	10	QPSK	2505-2565	17.49	20.08	0.1019	9.0091	9M01G7D
		16QAM		16.98	19.57	0.0906	9.0000	9M00W7D
	15	QPSK	2507.5-2562.5	17.34	19.93	0.0984	13.5290	13M5G7D
		16QAM		16.96	19.55	0.0902	13.5270	13M5W7D
	20	QPSK	2510-2560	17.52	20.11	0.1026	18.0400	18M0G7D
		16QAM		17.13	19.72	0.0938	18.0750	18M1W7D

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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
--	--	--	--	--

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.1 Meter	UnionTrust

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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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 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 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.

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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 Output Power	±0.7 dB
2	99%&26dB Bandwidth	±1.86 %
3	Emission Mask	±2.7 dBm
4	Spurious emissions at antenna terminals	±2.7 dBm
5	Field strength of spurious radiation	30 MHz-1 GHz: ±4.9 dB 1 GHz-18 GHz: ±4.8 dB 18 GHz-40 GHz: ±5.1 dB
6	Frequency stability	±6.5 x 10 ⁻⁸
7	Humidity	±3.9 %
8	Temperature	±0.62 °C
9	DC Voltages	±0.68 %

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2. TEST SUMMARY

FCC 47 CFR Part 24 Test Cases (Band 2)			
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)			
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)			
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 & FCC 47 CFR Part 22.355	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS

FCC 47 CFR Part 27 Test Cases (LTE Band 7)			
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(h)(2)	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(h)(2)	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(m)(4)	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(m)(4)	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(m)(4)	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

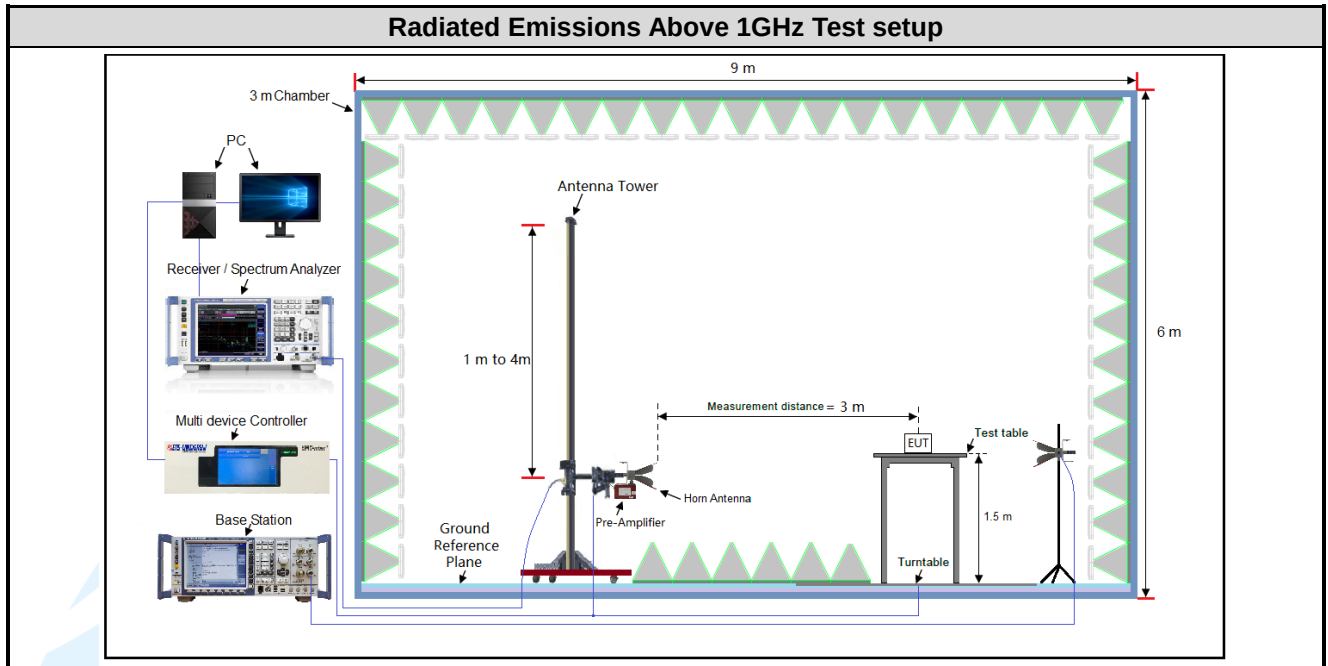
Disclaimer and Explanations:

The declared of product specification and data (e.g. antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.

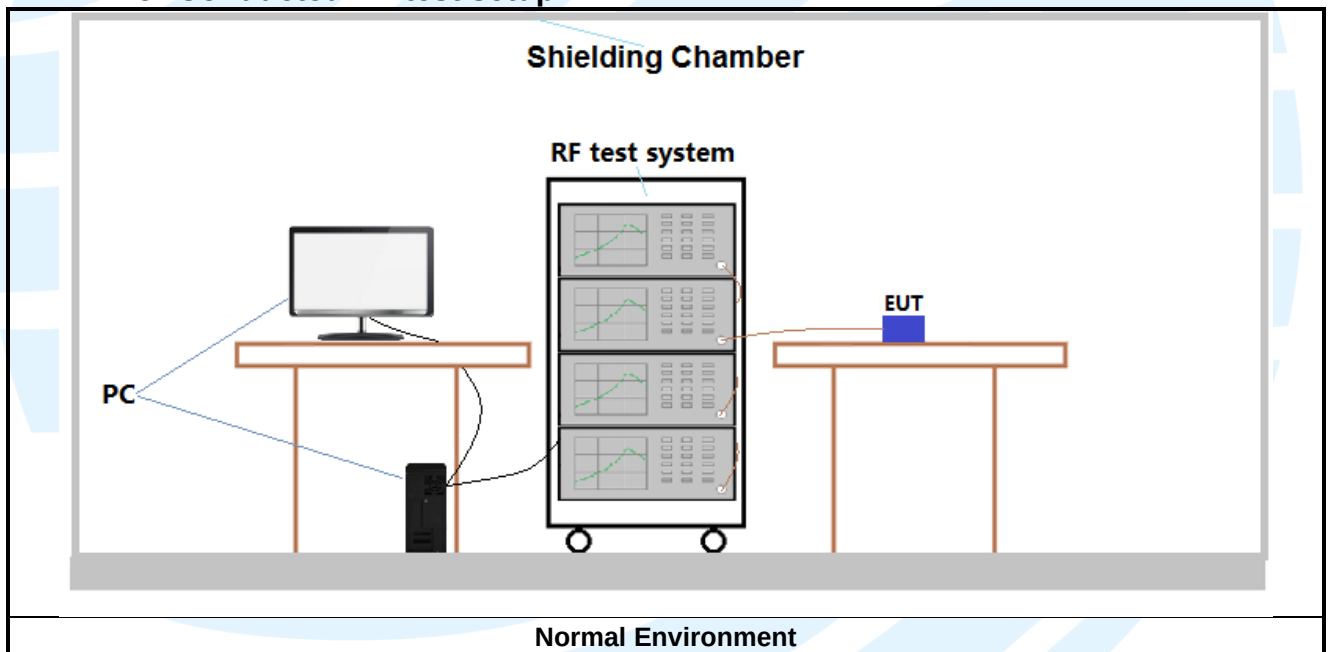
3. EQUIPMENT LIST

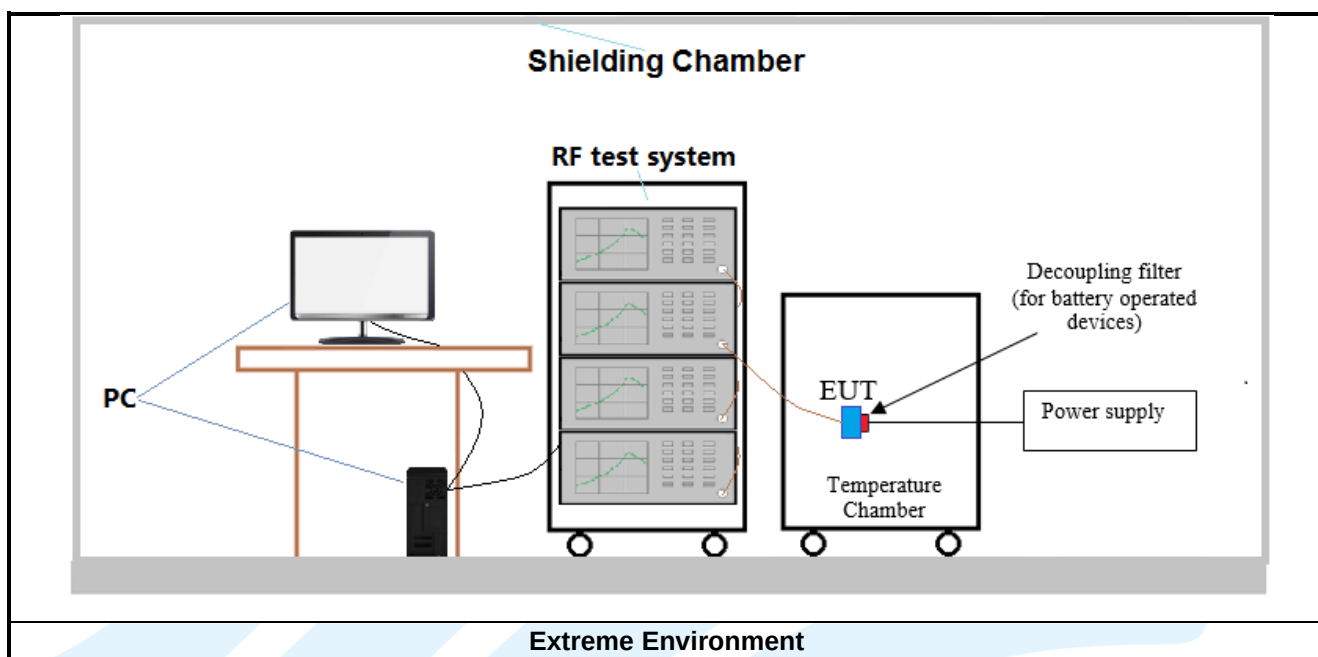
Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	3m SAC	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	11-Nov-2023	10-Nov-2026
☒	Receiver	R&S	ESIB26	100114	25-Oct-2024	24-Oct-2025
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	29-Oct-2024	28-Oct-2025
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	29-Oct-2024	28-Oct-2025
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	29-Oct-2024	28-Oct-2025
☒	Preamplifier	HP	8447F	2805A02960	25-Oct-2024	24-Oct-2025
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	01-Apr-2024	31-Mar-2025
☒	Pre-amplifier	ETS-Lindgren	00118385	00201874	01-Apr-2024	31-Mar-2025
☒	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	28-Mar-2024	27-Mar-2025
☒	Pre-amplifier	ETS-Lindgren	00118384	00202652	28-Mar-2024	27-Mar-2025
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

RF Conducted Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	EXA Signal Analyzer	KEYSIGHT	N9010B	MY62060155	29-Mar-2024	28-Mar-2025
☒	DC Source	KIKUSUI	PWR400L	LK003024	N/A	N/A
☒	Digital multimeter	FLUKE	15B+	30701460WS15	29-Oct-2024	28-Oct-2025
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290020	29-Mar-2024	28-Mar-2025
☒	Wideband Radio Communication Tester	R&S	CMW500	119583	29-Mar-2024	28-Mar-2025
☒	Wideband Radio Communication Tester	R&S	CMW500	120932	29-Mar-2024	28-Mar-2025



4.2.2 For Conducted RF test setup





4.3 TEST CHANNELS

Band	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink (MHz)
LTE Band 2 TX: 1850-1910MHz	Low Range	1.4	18607	1850.7
		3	18615	1851.5
		5	18625	1852.5
		10	18650	1855
		15	18675	1857.5
		20	18700	1860
	Middle Range	1.4/3/5/10/15/20	18900	1880
	High Range	1.4	19193	1909.3
		3	19185	1908.5
		5	19175	1907.5
		10	19150	1905
		15	19125	1902.5
		20	19100	1900
LTE Band 4 TX: 1710-1755MHz	Low Range	1.4	19957	1710.7
		3	19965	1711.5
		5	19975	1712.5
		10	20000	1715
		15	20025	1717.5
		20	20050	1720
	Middle Range	1.4/3/5/10/ 15/20	20175	1732.5
	High Range	1.4	20393	1754.3
		3	20385	1753.5
		5	20375	1752.5
		10	20350	1750
		15	20325	1747.5
		20	20300	1745
LTE band 5 TX: 824-849MHz	Low Range	1.4	20407	824.7
		3	20415	825.5
		5	20425	826.5
		10	20450	829
	Middle Range	1.4/3/5/10	20525	836.5
	High Range	1.4	20643	848.3
		3	20635	847.5
		5	20625	846.5
		10	20600	844
LTE Band 7 TX: 2500-2570MHz	Low Range	5	20775	2502.5
		10	20800	2505
		15	20825	2507.5
		20	20850	2510
	Middle Range	5/10/15/20	21100	2535
	High Range	5	21425	2567.5
		10	21400	2565
		15	21375	2562.5
		20	21350	2560

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.

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 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	Bandwidth(MHz)						Modulation			RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Conducted output power	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☒	☒	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☒	☒	☒	☒	☒	☒
99%&26dB Bandwidth	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☐	☐	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☐	☐	☒	☒	☒	☒
peak-to-average ratio	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☒	☐	☒	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☒	☒
Band Edge at antenna terminals	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☐	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☐	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☒	☐	☒	☒	☐	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☒	☐	☒	☒	☐	☒

Item	Band	Bandwidth(MHz)						Modulation			RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Spurious emissions at antenna terminals	2	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	4	☒	☒	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
	5	☒	☒	☒	☒	--	--	☒	☒	☐	☒	☐	☐	☒	☒	☒
	7	-	-	☒	☒	☒	☒	☒	☒	☐	☒	☐	☐	☒	☒	☒
Field strength of spurious radiation	2	☐	☐	☐	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒	☒
	4	☐	☐	☐	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒	☒
	5	☐	☐	☐	☒	--	--	☒	☐	☐	☒	☐	☐	☒	☒	☒
	7	-	-	☐	☐	☐	☒	☒	☐	☐	☒	☐	☐	☒	☒	☒
Frequency stability	2	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐
	4	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐
	5	☐	☐	☐	☒	--	--	☒	☐	☐	☐	☐	☒	☐	☒	☐
	7	-	-	☐	☐	☐	☒	☒	☐	☐	☐	☐	☒	☐	☒	☐

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	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
6	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 2.1046(a)
LTE Band 2: FCC 47 CFR Part 24.232(c)
LTE Band 4: FCC 47 CFR Part 27.50(d)(4)
LTE Band 5: FCC 47 CFR Part 22.913(a)
LTE Band 7: FCC 47 CFR Part 27.50(h)(2)
Test Method: KDB 971168 D01v03r01 & 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(h)(2):

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure:

The EUT was set up for the maximum power with CMW500, and 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

5.2.1 LTE Band 2

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	18607	18900	19193	18607	18900	19193
			1850.7	1880	1909.3	1850.7	1880	1909.3
2	1.4	1RB#0	22.61	22.55	22.77	22.24	21.57	21.33
		1RB#2	22.62	22.48	22.76	22.34	21.56	21.45
		1RB#5	22.64	22.58	22.76	22.21	21.60	21.34
		3RB#0	22.80	22.63	22.75	21.67	21.47	21.62
		3RB#1	22.86	22.62	22.72	21.71	21.48	21.61
		3RB#3	22.80	22.69	22.76	21.69	21.48	21.65
		6RB#0	22.10	21.66	21.64	21.27	20.75	20.92
Band	Bandwidth (MHz)	RB	18615	18900	19185	18615	18900	19185
			1851.5	1880	1908.5	1851.5	1880	1908.5
2	3	1RB#0	22.75	22.51	22.83	21.88	21.60	21.36
		1RB#8	22.76	22.59	22.83	21.87	21.56	21.35
		1RB#14	22.84	22.56	22.84	21.63	21.49	21.41
		8RB#0	22.14	21.72	21.59	21.33	21.08	20.94
		8RB#4	22.15	21.59	21.60	21.33	21.05	20.97
		8RB#7	22.08	21.72	21.60	21.21	20.92	20.76
		15RB#0	22.17	21.69	21.60	21.26	20.82	20.72
Band	Bandwidth (MHz)	RB	18625	18900	19175	18625	18900	19175
			1852.5	1880	1907.5	1852.5	1880	1907.5
2	5	1RB#0	22.98	22.68	22.54	21.63	21.82	21.31
		1RB#12	22.99	22.77	22.65	21.38	21.71	21.12
		1RB#24	23.01	22.73	22.66	21.29	21.87	21.27
		12RB#0	22.20	21.59	21.63	21.26	20.99	20.89
		12RB#6	22.17	21.63	21.62	21.27	21.01	20.88
		12RB#13	22.05	21.75	21.64	20.97	20.87	20.69
		25RB#0	22.14	21.62	21.48	21.08	20.94	20.89
Band	Bandwidth (MHz)	RB	18650	18900	19150	18650	18900	19150
			1855	1880	1905	1855	1880	1905
2	10	1RB#0	22.76	22.62	22.75	22.20	21.54	22.15
		1RB#24	22.86	22.61	22.63	21.89	21.49	22.28
		1RB#49	22.77	22.74	22.65	21.82	21.52	22.18
		25RB#0	22.07	21.78	21.43	21.00	21.03	20.76
		25RB#12	22.12	21.72	21.46	21.03	21.03	20.76
		25RB#25	21.76	21.86	21.63	20.86	20.99	20.91
		50RB#0	21.88	21.62	21.68	21.04	20.97	20.97
Band	Bandwidth (MHz)	RB	18675	18900	19125	18675	18900	19125
			1857.5	1880	1902.5	1857.5	1880	1902.5
2	15	1RB#0	22.77	22.44	22.70	22.21	21.62	22.24
		1RB#38	22.82	22.38	22.78	21.85	21.53	22.19
		1RB#74	22.93	22.49	22.70	21.95	21.74	22.18
		38RB#0	21.80	21.67	21.65	21.80	21.68	21.64
		38RB#18	21.80	21.69	21.63	21.80	21.69	21.63
		38RB#37	21.80	21.69	21.63	21.80	21.69	21.63
		75RB#0	21.80	21.69	21.62	20.83	20.94	20.73
Band	Bandwidth (MHz)	RB	18700	18900	19100	18700	18900	19100
			1860	1880	1900	1860	1880	1900
2	20	1RB#0	22.82	22.81	22.72	21.83	22.30	21.50
		1RB#49	22.88	22.80	22.75	21.37	22.12	21.46
		1RB#99	23.04	22.88	22.80	21.42	22.20	21.36
		50RB#0	21.77	21.63	21.60	21.13	20.83	20.98
		50RB#25	21.88	21.74	21.74	21.13	20.77	20.98
		50RB#50	21.93	21.78	21.69	21.03	20.68	21.06
		100RB#0	21.75	21.58	21.67	20.87	20.95	20.63

5.2.2 LTE Band 4

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	19957	20175	20393	19957	20175	20393
			1710.7	1732.5	1754.3	1710.7	1732.5	1754.3
4	1.4	1RB#0	16.31	16.55	16.72	15.71	15.86	15.96
		1RB#2	16.55	16.74	16.93	16.02	16.06	16.14
		1RB#5	16.49	16.52	16.73	15.89	15.83	15.93
		3RB#0	16.53	16.63	16.82	15.80	15.92	16.05
		3RB#1	16.52	16.63	16.82	15.79	15.92	16.05
		3RB#3	16.56	16.62	16.83	15.83	15.90	16.02
		6RB#0	16.00	16.06	16.26	15.24	15.09	15.52
Band	Bandwidth (MHz)	RB	19965	20175	20385	19965	20175	20385
			1711.5	1732.5	1753.5	1711.5	1732.5	1753.5
4	3	1RB#0	16.45	16.62	16.73	15.89	15.93	15.93
		1RB#8	16.73	16.68	16.85	16.20	15.97	16.06
		1RB#14	16.73	16.49	16.71	16.20	15.78	15.95
		8RB#0	16.03	16.08	16.25	15.28	15.26	15.53
		8RB#4	16.04	16.08	16.24	15.28	15.25	15.52
		8RB#7	16.21	16.04	16.25	15.43	15.20	15.53
		15RB#0	16.10	16.07	16.23	15.34	15.16	15.43
Band	Bandwidth (MHz)	RB	19975	20175	20375	19975	20175	20375
			1712.5	1732.5	1752.5	1712.5	1732.5	1752.5
4	5	1RB#0	16.10	16.20	16.23	15.40	15.73	15.58
		1RB#12	16.99	16.63	16.81	16.33	16.16	16.17
		1RB#24	16.66	15.93	16.25	16.01	15.48	15.62
		12RB#0	15.95	15.92	15.96	15.14	15.16	15.25
		12RB#6	15.94	15.93	15.96	15.12	15.16	15.27
		12RB#13	16.22	15.82	16.02	15.42	15.04	15.32
		25RB#0	16.07	15.86	16.01	15.32	15.02	15.31
Band	Bandwidth (MHz)	RB	20000	20175	20350	20000	20175	20350
			1715	1732.5	1750	1715	1732.5	1750
4	10	1RB#0	15.75	16.39	16.18	15.22	15.71	15.37
		1RB#24	16.62	16.52	16.61	16.09	15.83	15.82
		1RB#49	17.23	16.44	17.00	16.65	15.80	16.21
		25RB#0	15.74	15.99	15.91	14.89	15.22	15.19
		25RB#12	15.82	16.00	15.92	14.89	15.22	15.20
		25RB#25	16.46	16.03	16.36	15.63	15.24	15.63
		50RB#0	16.09	16.01	16.14	15.29	15.23	15.41
Band	Bandwidth (MHz)	RB	20025	20175	20325	20025	20175	20325
			1717.5	1732.5	1747.5	1717.5	1732.5	1747.5
4	15	1RB#0	16.06	16.73	16.46	15.64	16.37	15.66
		1RB#38	16.94	16.48	16.75	16.40	16.12	15.96
		1RB#74	17.05	16.15	16.90	16.53	15.79	16.12
		38RB#0	16.34	16.08	16.23	16.34	16.08	16.22
		38RB#18	16.33	16.09	16.22	16.33	16.09	16.22
		38RB#37	16.32	16.08	16.22	16.32	16.08	16.22
		75RB#0	16.32	16.08	16.22	15.49	15.30	15.45
Band	Bandwidth (MHz)	RB	20050	20175	20300	20050	20175	20300
			1720	1732.5	1745	1720	1732.5	1745
4	20	1RB#0	16.03	16.92	16.83	15.38	16.49	16.06
		1RB#49	16.87	16.55	16.49	16.25	16.15	15.75
		1RB#99	17.43	16.88	17.74	16.79	16.47	17.03
		50RB#0	15.85	16.12	15.93	15.06	15.38	15.22
		50RB#25	15.86	16.15	15.93	15.05	15.38	15.22
		50RB#50	16.62	16.13	16.62	15.83	15.34	15.91
		100RB#0	16.26	16.12	16.28	15.46	15.33	15.51

5.2.3 LTE Band 5

Conducted Power(dBm)								
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	20407	20525	20643	20407	20525	20643
			824.7	836.5	848.3	824.7	836.5	848.3
5	1.4	1RB#0	23.07	22.99	23.23	22.14	21.54	22.47
		1RB#2	22.92	23.11	23.19	22.16	21.98	22.27
		1RB#5	23.00	23.14	23.21	22.23	21.97	22.30
		3RB#0	23.10	23.17	23.07	21.50	22.28	21.85
		3RB#1	23.08	23.18	23.07	21.61	22.38	21.84
		3RB#3	23.06	23.15	22.99	21.57	22.24	21.77
		6RB#0	22.07	22.68	22.04	21.58	21.64	21.15
Band	Bandwidth (MHz)	RB	20415	20525	20635	20415	20525	20635
			825.5	836.5	847.5	825.5	836.5	847.5
5	3	1RB#0	23.07	23.16	23.25	21.62	21.58	22.29
		1RB#8	23.07	23.20	23.22	21.61	21.96	22.20
		1RB#14	23.03	23.14	23.18	21.63	21.97	22.18
		8RB#0	22.13	22.17	22.12	21.72	21.17	21.54
		8RB#4	22.14	22.13	22.13	21.72	21.18	21.55
		8RB#7	22.17	22.68	22.08	21.20	21.77	21.01
		15RB#0	22.04	22.60	21.96	21.60	21.49	21.55
Band	Bandwidth (MHz)	RB	20425	20525	20625	20425	20525	20625
			826.5	836.5	846.5	826.5	836.5	846.5
5	5	1RB#0	23.28	23.23	23.10	21.47	22.29	21.59
		1RB#12	23.22	23.22	23.07	21.47	22.69	21.75
		1RB#24	23.13	23.34	23.01	21.53	22.36	21.58
		12RB#0	22.01	22.12	21.99	21.50	21.22	21.42
		12RB#6	22.02	22.17	22.00	21.48	21.11	21.42
		12RB#13	22.07	22.62	22.01	20.94	21.75	21.45
		25RB#0	22.06	22.55	22.05	21.11	21.61	21.66
Band	Bandwidth (MHz)	RB	20450	20525	20600	20450	20525	20600
			829	836.5	844	829	836.5	844
5	10	1RB#0	23.13	23.31	23.47	22.10	21.91	22.83
		1RB#24	23.11	23.06	23.25	22.20	22.48	22.70
		1RB#49	23.13	23.05	23.20	22.18	22.41	22.68
		25RB#0	22.09	22.22	22.51	20.94	21.17	21.61
		25RB#12	22.13	22.10	22.59	20.97	21.20	21.65
		25RB#25	22.16	22.09	22.12	21.13	21.52	21.73
		50RB#0	22.08	22.59	22.14	21.08	21.70	21.57

5.2.4 LTE Band 7

			Conducted Power(dBm)					
Modulation			QPSK			16QAM		
Band	Bandwidth (MHz)	RB	20775	21100	21425	20775	21100	21425
			2502.5	2535	2567.5	2502.5	2535	2567.5
7	5	1RB#0	16.98	16.98	16.52	16.53	16.36	16.04
		1RB#12	17.20	17.46	17.02	16.96	16.86	16.56
		1RB#24	17.12	16.84	16.36	16.50	16.25	15.93
		12RB#0	16.82	16.72	16.33	16.03	15.76	15.40
		12RB#6	16.81	16.72	16.33	16.02	15.76	15.42
		12RB#13	16.83	16.66	16.29	16.03	15.72	15.35
		25RB#0	16.80	16.70	16.31	16.04	15.78	15.45
Band	Bandwidth (MHz)	RB	20800	21100	21400	20800	21100	21400
			2505	2535	2565	2505	2535	2565
7	10	1RB#0	16.94	17.04	16.41	16.42	16.52	15.72
		1RB#24	17.27	17.34	16.88	16.80	16.85	16.20
		1RB#49	17.49	17.34	17.01	16.98	16.85	16.33
		25RB#0	16.72	16.81	16.20	15.92	15.93	15.39
		25RB#12	16.72	16.82	16.21	15.92	15.93	15.39
		25RB#25	16.99	16.99	16.60	16.19	16.10	15.80
		50RB#0	16.84	16.90	16.41	16.07	16.03	15.61
Band	Bandwidth (MHz)	RB	20825	21100	21375	20825	21100	21375
			2507.5	2535	2562.5	2507.5	2535	2562.5
7	15	1RB#0	17.17	17.20	16.52	16.66	16.74	15.75
		1RB#38	17.24	17.34	16.64	16.74	16.96	15.93
		1RB#74	17.04	16.88	16.81	16.55	16.51	16.10
		38RB#0	16.78	16.78	16.37	16.78	16.78	16.36
		38RB#18	16.78	16.77	16.35	16.78	16.77	16.34
		38RB#37	16.78	16.77	16.35	16.78	16.76	16.35
		75RB#0	16.79	16.76	16.35	16.01	15.83	15.40
Band	Bandwidth (MHz)	RB	20850	21100	21350	20850	21100	21350
			2510	2535	2560	2510	2535	2560
7	20	1RB#0	17.07	17.44	16.95	16.42	16.72	16.49
		1RB#49	16.94	17.32	16.54	16.32	16.71	16.15
		1RB#99	17.47	17.52	17.51	16.83	16.88	17.13
		50RB#0	16.45	16.71	16.17	15.43	15.73	15.22
		50RB#25	16.42	16.73	16.17	15.44	15.74	15.23
		50RB#50	16.65	16.92	16.66	15.66	15.93	15.73
		100RB#0	16.53	16.81	16.41	15.54	15.82	15.44

5.3 ERP OR EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a)
LTE Band 2: FCC 47 CFR Part 24.232(c)
LTE Band 4: FCC 47 CFR Part 27.50(d)(4)
LTE Band 5: FCC 47 CFR Part 22.913(a)
LTE Band 7: FCC 47 CFR Part 27.50(h)(2)
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(h)(2):

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure:

According to KDB 412172 D01 Power Approach,

- **ERP or EIRP = $P_T + G_T - L_C$**
- **ERP = EIRP - 2.15**

where

- **P_T** = transmitter output power, expressed in dBW, dBm, or PSD;
- **G_T** = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
- **L_C** = **signal attenuation in the connecting cable between the transmitter and antenna, in dB.**

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

Note: The maximum ERP/EIRP is calculated from max output power and antenna gain, the antenna gain provided by the customer, and the customer takes all the responsibilities for the accuracy of antenna gain.

5.3.1 LTE Band 2

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
Channel Bandwidth: 1.4MHz							
Lowest	21.00	20.48	33.01	0.1259	0.1117	2	Pass
Middle	20.83	19.74	33.01	0.1211	0.0942	2	Pass
Highest	20.91	19.79	33.01	0.1233	0.0953	2	Pass
Channel Bandwidth: 3MHz							
Lowest	20.98	20.02	33.01	0.1253	0.1005	2	Pass
Middle	20.73	19.74	33.01	0.1183	0.0942	2	Pass
Highest	20.98	19.55	33.01	0.1253	0.0902	2	Pass
Channel Bandwidth: 5MHz							
Lowest	21.15	19.77	33.01	0.1303	0.0948	2	Pass
Middle	20.91	20.01	33.01	0.1233	0.1002	2	Pass
Highest	20.80	19.45	33.01	0.1202	0.0881	2	Pass
Channel Bandwidth: 10MHz							
Lowest	21.00	20.34	33.01	0.1259	0.1081	2	Pass
Middle	20.88	19.68	33.01	0.1225	0.0929	2	Pass
Highest	20.89	20.42	33.01	0.1227	0.1102	2	Pass
Channel Bandwidth: 15MHz							
Lowest	21.07	20.35	33.01	0.1279	0.1084	2	Pass
Middle	20.63	19.88	33.01	0.1156	0.0973	2	Pass
Highest	20.92	20.38	33.01	0.1236	0.1091	2	Pass
Channel Bandwidth: 20MHz							
Lowest	21.18	19.97	33.01	0.1312	0.0993	2	Pass
Middle	21.02	20.44	33.01	0.1265	0.1107	2	Pass
Highest	20.94	19.64	33.01	0.1242	0.0920	2	Pass

5.3.2 LTE Band 4

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
Channel Bandwidth: 1.4MHz							
Lowest	15.30	14.76	30.00	0.0339	0.0299	1	Pass
Middle	15.48	14.80	30.00	0.0353	0.0302	1	Pass
Highest	15.67	14.88	30.00	0.0369	0.0308	1	Pass
Channel Bandwidth: 3MHz							
Lowest	15.47	14.94	30.00	0.0352	0.0312	1	Pass
Middle	15.42	14.71	30.00	0.0348	0.0296	1	Pass
Highest	15.59	14.80	30.00	0.0362	0.0302	1	Pass
Channel Bandwidth: 5MHz							
Lowest	15.73	15.07	30.00	0.0374	0.0321	1	Pass
Middle	15.37	14.90	30.00	0.0344	0.0309	1	Pass
Highest	15.55	14.91	30.00	0.0359	0.0310	1	Pass
Channel Bandwidth: 10MHz							
Lowest	15.97	15.39	30.00	0.0395	0.0346	1	Pass
Middle	15.26	14.57	30.00	0.0336	0.0286	1	Pass
Highest	15.74	14.95	30.00	0.0375	0.0313	1	Pass
Channel Bandwidth: 15MHz							
Lowest	15.79	15.27	30.00	0.0379	0.0337	1	Pass
Middle	15.47	15.11	30.00	0.0352	0.0324	1	Pass
Highest	15.64	14.96	30.00	0.0366	0.0313	1	Pass
Channel Bandwidth: 20MHz							
Lowest	16.17	15.53	30.00	0.0414	0.0357	1	Pass
Middle	15.66	15.23	30.00	0.0368	0.0333	1	Pass
Highest	16.48	15.77	30.00	0.0445	0.0378	1	Pass

5.3.3 LTE Band 5

Channel	Maximum ERP (dBm)			Maximum ERP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
Channel Bandwidth: 1.4MHz							
Lowest	19.49	18.62	38.45	0.0889	0.0728	7	Pass
Middle	19.57	18.77	38.45	0.0906	0.0753	7	Pass
Highest	19.62	18.86	38.45	0.0916	0.0769	7	Pass
Channel Bandwidth: 3MHz							
Lowest	19.46	18.11	38.45	0.0883	0.0647	7	Pass
Middle	19.59	18.36	38.45	0.0910	0.0685	7	Pass
Highest	19.64	18.68	38.45	0.0920	0.0738	7	Pass
Channel Bandwidth: 5MHz							
Lowest	19.67	17.92	38.45	0.0927	0.0619	7	Pass
Middle	19.73	19.08	38.45	0.0940	0.0809	7	Pass
Highest	19.49	18.14	38.45	0.0889	0.0652	7	Pass
Channel Bandwidth: 10MHz							
Lowest	19.52	18.59	38.45	0.0895	0.0723	7	Pass
Middle	19.70	18.87	38.45	0.0933	0.0771	7	Pass
Highest	19.86	19.22	38.45	0.0968	0.0836	7	Pass

5.3.4 LTE Band 7

Channel	Maximum EIRP (dBm)			Maximum EIRP (W)			Result
	QPSK	16QAM	Limit (dBm)	QPSK	16QAM	Limit (W)	
Channel Bandwidth: 5MHz							
Lowest	19.79	19.55	33.01	0.0953	0.0902	2	Pass
Middle	20.05	19.45	33.01	0.1012	0.0881	2	Pass
Highest	19.61	19.15	33.01	0.0914	0.0822	2	Pass
Channel Bandwidth: 10MHz							
Lowest	20.08	19.57	33.01	0.1019	0.0906	2	Pass
Middle	19.93	19.44	33.01	0.0984	0.0879	2	Pass
Highest	19.60	18.92	33.01	0.0912	0.0780	2	Pass
Channel Bandwidth: 15MHz							
Lowest	19.83	19.37	33.01	0.0962	0.0865	2	Pass
Middle	19.93	19.55	33.01	0.0984	0.0902	2	Pass
Highest	19.40	18.95	33.01	0.0871	0.0785	2	Pass
Channel Bandwidth: 20MHz							
Lowest	20.06	19.42	33.01	0.1014	0.0875	2	Pass
Middle	20.11	19.47	33.01	0.1026	0.0885	2	Pass
Highest	20.10	19.72	33.01	0.1023	0.0938	2	Pass

5.4 PEAK-TO-AVERAGE RATIO

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.232(d)
LTE Band 4: FCC 47 CFR Part 27.50(d)(5)
LTE Band 5: FCC 47 CFR Part 22.913(a)
LTE Band 7: FCC 47 CFR Part 27.50(d)(5)

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.

- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth
- Set the number of counts to a value that stabilizes the measured CCDF curve
- 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: Please refer to Appendix A1

5.5 99%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h)

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: Please refer to Appendix A2

5.6 BAND EDGE AT ANTENNA TERMINALS

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.238(a)
LTE Band 4: FCC 47 CFR Part 27.53(h)(1)
LTE Band 5: FCC 47 CFR Part 22.917(a)
LTE Band 7: FCC 47 CFR Part 27.53(m)(4)
Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

FCC 47 CFR Part 27.53(m)(4):

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 defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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.

For each band edge measurement:

- 1) Set the spectrum analyzer span to include the block edge frequency.
- 2) Set a marker to point the corresponding band edge frequency in each test case.
- 3) Set display line at -13 dBm
- 4) Set resolution bandwidth to at least 1% of emission bandwidth.
- 5) Set spectrum analyzer with RMS detector.
- 6) Record the max trace plot into the test report

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: Please refer to Appendix A3

5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.238(a)
LTE Band 4: FCC 47 CFR Part 27.53(h)
LTE Band 5: FCC 47 CFR Part 22.917(a)
LTE Band 7: FCC 47 CFR Part 27.53(m)(4)
Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a), 27.53(c)(2):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

FCC 47 CFR Part 27.53(m)(4):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $55 + 10 \log(P)$ dB. The emission limit equal to -25 dBm.

Test Procedure:

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

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: Please refer to Appendix A4

5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.238(a)
LTE Band 4: FCC 47 CFR Part 27.53(h)
LTE Band 5: FCC 47 CFR Part 22.917(a)
LTE Band 7: FCC 47 CFR Part 27.53(m)(4)
Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009 MHz-30 MHz	Peak	10 kHz	30 KHz	Peak
30 MHz-1 GHz	Quasi-peak	100 kHz	300 KHz	Peak
Above 1 GHz	Peak	1 MHz	3 MHz	Peak

Limits:

FCC 47 CFR Part 24.238(a), 27.53(h)(1), 22.917(a):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

FCC 47 CFR Part 27.53(m)(4):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $55 + 10 \log(P)$ dB. The emission limit equal to -25 dBm.

Test Setup: Refer to section 4.2.1 for details.

Test Procedures: KDB 971168 D01v03r01 Section 7

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The worst measurement data as follows:

5.8.1 LTE Band 2

LTE Band 2_ 20 MHz_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
Lowest Channel							
1	821.387	-81.57	13.20	-68.37	-13.00	-55.37	Horizontal
2	899.958	-81.34	14.32	-67.02	-13.00	-54.02	Horizontal
3	979.139	-80.44	15.25	-65.19	-13.00	-52.19	Horizontal
4	3720.000	-52.16	7.54	-44.62	-13.00	-31.62	Horizontal
5	5580.000	-60.10	11.04	-49.06	-13.00	-36.06	Horizontal
6	862.802	-81.34	13.74	-67.60	-13.00	-54.60	Vertical
7	919.132	-81.32	14.53	-66.79	-13.00	-53.79	Vertical
8	958.714	-81.03	14.93	-66.10	-13.00	-53.10	Vertical
9	3720.000	-54.74	7.54	-47.20	-13.00	-34.20	Vertical
10	5580.000	-60.51	11.04	-49.47	-13.00	-36.47	Vertical
Middle Channel							
1	815.635	-81.70	13.04	-68.66	-13.00	-55.66	Horizontal
2	868.886	-82.38	13.80	-68.58	-13.00	-55.58	Horizontal
3	986.044	-82.18	15.44	-66.74	-13.00	-53.74	Horizontal
4	3760.000	-55.63	7.73	-47.90	-13.00	-34.90	Horizontal
5	5640.000	-59.89	11.18	-48.71	-13.00	-35.71	Horizontal
6	776.485	-80.88	11.90	-68.98	-13.00	-55.98	Vertical
7	815.635	-81.25	13.04	-68.21	-13.00	-55.21	Vertical
8	906.304	-81.48	14.53	-66.95	-13.00	-53.95	Vertical
9	3760.000	-57.12	7.73	-49.39	-13.00	-36.39	Vertical
10	5640.000	-59.85	11.18	-48.67	-13.00	-35.67	Vertical
Highest Channel							
1	703.731	-79.70	11.46	-68.24	-13.00	-55.24	Horizontal
2	887.398	-81.37	14.17	-67.20	-13.00	-54.20	Horizontal
3	952.000	-80.75	14.82	-65.93	-13.00	-52.93	Horizontal
4	3800.000	-54.59	7.92	-46.67	-13.00	-33.67	Horizontal
5	5700.000	-60.13	11.33	-48.80	-13.00	-35.80	Horizontal
6	821.387	-81.34	13.20	-68.14	-13.00	-55.14	Vertical
7	906.304	-81.26	14.53	-66.73	-13.00	-53.73	Vertical
8	986.044	-81.61	15.44	-66.17	-13.00	-53.17	Vertical
9	3800.000	-56.48	7.92	-48.56	-13.00	-35.56	Vertical
10	5700.000	-59.81	11.33	-48.48	-13.00	-35.48	Vertical

5.8.2 LTE Band 4

LTE Band 4_ 20 MHz_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
Lowest Channel							
1	844.803	-80.35	13.42	-66.93	-13.00	-53.93	Horizontal
2	893.656	-80.54	14.20	-66.34	-13.00	-53.34	Horizontal
3	986.044	-81.42	15.44	-65.98	-13.00	-52.98	Horizontal
4	3440.000	-51.41	6.41	-45.00	-13.00	-32.00	Horizontal
5	5160.000	-59.98	10.10	-49.88	-13.00	-36.88	Horizontal
6	815.635	-80.26	13.04	-67.22	-13.00	-54.22	Vertical
7	906.304	-81.41	14.53	-66.88	-13.00	-53.88	Vertical
8	972.283	-81.10	15.04	-66.06	-13.00	-53.06	Vertical
9	3440.000	-53.77	6.41	-47.36	-13.00	-34.36	Vertical
10	5160.000	-58.98	10.10	-48.88	-13.00	-35.88	Vertical
Middle Channel							
1	821.387	-81.09	13.20	-67.89	-13.00	-54.89	Horizontal
2	925.613	-81.06	14.46	-66.60	-13.00	-53.60	Horizontal
3	972.283	-81.35	15.04	-66.31	-13.00	-53.31	Horizontal
4	3465.000	-43.05	6.46	-36.59	-13.00	-23.59	Horizontal
5	5197.500	-52.51	10.18	-42.33	-13.00	-29.33	Horizontal
6	809.924	-81.09	12.89	-68.20	-13.00	-55.20	Vertical
7	932.141	-81.62	14.41	-67.21	-13.00	-54.21	Vertical
8	979.139	-82.01	15.25	-66.76	-13.00	-53.76	Vertical
9	3465.000	-45.05	6.46	-38.59	-13.00	-25.59	Vertical
10	5197.500	-56.53	10.18	-46.35	-13.00	-33.35	Vertical
Highest Channel							
1	815.635	-80.86	13.04	-67.82	-13.00	-54.82	Horizontal
2	862.802	-81.06	13.74	-67.32	-13.00	-54.32	Horizontal
3	952.000	-80.60	14.82	-65.78	-13.00	-52.78	Horizontal
4	3490.000	-60.39	6.50	-53.89	-13.00	-40.89	Horizontal
5	5235.000	-60.41	10.26	-50.15	-13.00	-37.15	Horizontal
6	771.047	-81.33	11.94	-69.39	-13.00	-56.39	Vertical
7	850.760	-81.68	13.57	-68.11	-13.00	-55.11	Vertical
8	945.334	-81.25	14.69	-66.56	-13.00	-53.56	Vertical
9	3490.000	-59.86	6.50	-53.36	-13.00	-40.36	Vertical
10	5235.000	-60.43	10.26	-50.17	-13.00	-37.17	Vertical

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5.8.3 LTE Band 5

LTE Band 5_ 10 MHz_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
Lowest Channel							
1	718.725	-79.73	11.51	-68.22	-13.00	-55.22	Horizontal
2	881.184	-81.07	14.07	-67.00	-13.00	-54.00	Horizontal
3	965.474	-81.32	14.91	-66.41	-13.00	-53.41	Horizontal
4	1658.000	-58.97	-0.23	-59.20	-13.00	-46.20	Horizontal
5	2487.000	-59.48	3.50	-55.98	-13.00	-42.98	Horizontal
6	809.924	-81.50	12.89	-68.61	-13.00	-55.61	Vertical
7	868.886	-81.67	13.80	-67.87	-13.00	-54.87	Vertical
8	958.714	-81.20	14.93	-66.27	-13.00	-53.27	Vertical
9	1674.504	-53.75	-0.11	-53.86	-13.00	-40.86	Vertical
10	2487.000	-59.62	3.50	-56.12	-13.00	-43.12	Vertical
Middle Channel							
1	787.475	-80.42	12.31	-68.11	-13.00	-55.11	Horizontal
2	912.695	-81.59	14.49	-67.10	-13.00	-54.10	Horizontal
3	992.997	-81.29	15.56	-65.73	-13.00	-52.73	Horizontal
4	1684.232	-56.23	-0.04	-56.27	-13.00	-43.27	Horizontal
5	2509.500	-60.33	3.58	-56.75	-13.00	-43.75	Horizontal
6	821.387	-80.96	13.20	-67.76	-13.00	-54.76	Vertical
7	881.184	-81.08	14.07	-67.01	-13.00	-54.01	Vertical
8	986.044	-81.53	15.44	-66.09	-13.00	-53.09	Vertical
9	1684.232	-51.51	-0.04	-51.55	-13.00	-38.55	Vertical
10	2509.500	-59.40	3.58	-55.82	-13.00	-42.82	Vertical
Highest Channel							
1	815.635	-80.18	13.04	-67.14	-13.00	-54.14	Horizontal
2	906.304	-81.10	14.53	-66.57	-13.00	-53.57	Horizontal
3	992.997	-81.60	15.56	-66.04	-13.00	-53.04	Horizontal
4	1703.856	-53.06	0.10	-52.96	-13.00	-39.96	Horizontal
5	2532.000	-59.95	3.68	-56.27	-13.00	-43.27	Horizontal
6	881.184	-81.51	14.07	-67.44	-13.00	-54.44	Vertical
7	938.714	-80.83	14.52	-66.31	-13.00	-53.31	Vertical
8	992.997	-81.40	15.56	-65.84	-13.00	-52.84	Vertical
9	1703.856	-49.03	0.10	-48.93	-13.00	-35.93	Vertical
10	2532.000	-59.10	3.68	-55.42	-13.00	-42.42	Vertical

5.8.4 LTE Band 7

LTE Band 7_ 20 MHz_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
Lowest Channel							
1	723.793	-80.63	11.58	-69.05	-25.00	-44.05	Horizontal
2	787.475	-80.75	12.31	-68.44	-25.00	-43.44	Horizontal
3	887.398	-80.55	14.17	-66.38	-25.00	-41.38	Horizontal
4	5020.000	-59.32	9.79	-49.53	-25.00	-24.53	Horizontal
5	7506.207	-44.04	13.07	-30.97	-25.00	-5.97	Horizontal
6	815.635	-81.64	13.04	-68.60	-25.00	-43.60	Vertical
7	862.802	-81.40	13.74	-67.66	-25.00	-42.66	Vertical
8	952.000	-81.57	14.82	-66.75	-25.00	-41.75	Vertical
9	5020.000	-59.22	9.79	-49.43	-25.00	-24.43	Vertical
10	7530.000	-60.35	13.06	-47.29	-25.00	-22.29	Vertical
Middle Channel							
1	765.648	-80.88	11.85	-69.03	-25.00	-44.03	Horizontal
2	838.887	-80.82	13.30	-67.52	-25.00	-42.52	Horizontal
3	906.304	-80.65	14.53	-66.12	-25.00	-41.12	Horizontal
4	5070.000	-58.54	9.90	-48.64	-25.00	-23.64	Horizontal
5	7605.000	-60.34	13.04	-47.30	-25.00	-22.30	Horizontal
6	728.897	-80.25	11.61	-68.64	-25.00	-43.64	Vertical
7	821.387	-80.06	13.20	-66.86	-25.00	-41.86	Vertical
8	986.044	-81.62	15.44	-66.18	-25.00	-41.18	Vertical
9	5070.000	-58.98	9.90	-49.08	-25.00	-24.08	Vertical
10	7605.000	-59.95	13.04	-46.91	-25.00	-21.91	Vertical
Highest Channel							
1	698.804	-80.48	11.44	-69.04	-25.00	-44.04	Horizontal
2	821.387	-80.35	13.20	-67.15	-25.00	-42.15	Horizontal
3	986.044	-82.12	15.44	-66.68	-25.00	-41.68	Horizontal
4	5120.000	-59.58	10.01	-49.57	-25.00	-24.57	Horizontal
5	7680.000	-59.43	13.02	-46.41	-25.00	-21.41	Horizontal
6	703.731	-80.35	11.46	-68.89	-25.00	-43.89	Vertical
7	776.485	-80.64	11.90	-68.74	-25.00	-43.74	Vertical
8	875.013	-80.88	13.93	-66.95	-25.00	-41.95	Vertical
9	5120.000	-59.87	10.01	-49.86	-25.00	-24.86	Vertical
10	7680.000	-59.49	13.02	-46.47	-25.00	-21.47	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

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UTTR-RF-FCC4G-V1.1

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
FCC 47 CFR Part 22.355 &
FCC 47 CFR Part 24.235 &
FCC 47 CFR Part 27.54

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

Limits:

FCC 47 CFR Part 22.355, FCC 47 CFR Part 90.213

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

FCC 47 CFR Part 24.235, FCC 47 CFR Part 27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

- 1) Use CMW 500 with Frequency Error measurement capability.
 - a) Temp. = -30° to $+50^{\circ}\text{C}$
 - b) Voltage = low voltage, 3.5 Vdc, Normal, 3.8 Vdc and High voltage, 4.35 Vdc.

- 2) Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

- 3) Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

Equipment Used: Refer to section 3 for details.

Test Results: Pass

Test Data: Please refer to Appendix A5

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
