

5.8.2 LTE Band 4

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	3466.0	-46.76	6.4	4.7	-48.46	-13	Vertical
2	5180.0	-53.1	8.0	8.7	-52.40	-13	Horizontal
3	6795.6	-52.2	9.2	12.3	-49.10	-13	Horizontal
4	8561.6	-55.49	10.3	18.1	-47.69	-13	Horizontal
5	10214.0	-51.27	11.3	17.4	-45.17	-13	Vertical
6	11926.8	-46.43	12.5	17.1	-41.83	-13	Vertical
Middle Channel							
1	3466.0	-49.14	6.4	4.7	-50.84	-13	Vertical
2	5237.2	-52.5	8.0	8.7	-51.80	-13	Vertical
3	7291.2	-53.91	9.6	13.7	-49.81	-13	Vertical
4	9207.2	-53.85	10.5	18.5	-45.85	-13	Horizontal
5	10349.2	-51.12	11.5	17.4	-45.22	-13	Horizontal
6	11910.0	-46.97	12.5	17.1	-42.37	-13	Vertical
Highest Channel							
1	3466.0	-49.14	6.4	4.7	-50.84	-13	Vertical
2	5198.8	-52.77	8.0	8.7	-52.07	-13	Vertical
3	6949.6	-52.99	9.3	12.9	-49.39	-13	Vertical
4	8654.8	-56.44	10.3	18.5	-48.24	-13	Horizontal
5	10404.8	-50.76	11.6	17.1	-45.26	-13	Horizontal
6	12479.8	-46.28	12.7	18.7	-40.28	-13	Vertical

5.8.3 LTE Band 5

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	3199.6	-51.19	6.1	4.7	-52.59	-13	Vertical
2	4082.8	-54.49	7.0	7.7	-53.79	-13	Horizontal
3	4854.0	-52.99	7.6	7.9	-52.69	-13	Vertical
4	5675.2	-54.06	8.5	10.5	-52.06	-13	Horizontal
5	6566.8	-51.61	9.0	11.5	-49.11	-13	Horizontal
6	7280.2	-53.19	9.6	13.7	-49.09	-13	Vertical
Middle Channel							
1	3332.8	-51.96	6.2	4.7	-53.46	-13	Vertical
2	4111.2	-54.41	7.0	7.7	-53.71	-13	Horizontal
3	4965.2	-55.27	7.7	9.0	-53.97	-13	Vertical
4	5779.6	-54.01	8.4	10.5	-51.91	-13	Vertical
5	6404.4	-52.3	8.9	11.5	-49.70	-13	Horizontal
6	7237.6	-53.77	9.6	13.7	-49.67	-13	Vertical
Highest Channel							
1	3388.4	-52.55	6.3	4.7	-54.15	-13	Horizontal
2	4312.0	-52.87	7.1	7.7	-52.27	-13	Horizontal
3	5149.6	-53.93	7.9	8.7	-53.13	-13	Horizontal
4	6094.0	-52.59	8.7	10.4	-50.89	-13	Horizontal
5	7218.7	-52.97	9.5	13.7	-48.77	-13	Vertical
6	8137.0	-55.97	10.0	17.3	-48.67	-13	Vertical

5.8.4 LTE Band 12

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	3577.2	-50.77	6.5	4.7	-52.57	-13	Horizontal
2	4229.2	-52.9	7.1	7.7	-52.30	-13	Horizontal
3	4904.8	-55.04	7.7	9.0	-53.74	-13	Horizontal
4	5567.2	-52.52	8.2	9.5	-51.22	-13	Vertical
5	6282.0	-52.62	8.8	10.8	-50.62	-13	Vertical
6	7014.7	-53.43	9.3	12.9	-49.83	-13	Vertical
Middle Channel							
1	1415.7	-40.51	4.0	3.4	-41.11	-13	Horizontal
2	3574.4	-49.97	6.4	4.7	-51.67	-13	Horizontal
3	4241.2	-52.82	7.1	7.7	-52.22	-13	Horizontal
4	4910.8	-54.9	7.7	9.0	-53.60	-13	Vertical
5	5739.6	-53.17	8.5	10.5	-51.17	-13	Horizontal
6	7064.5	-52.37	9.4	12.9	-48.87	-13	Vertical
Highest Channel							
1	3193.2	-51	6.1	4.7	-52.40	-13	Vertical
2	3976.4	-53.39	6.9	7.7	-52.59	-13	Horizontal
3	4776.8	-52.78	7.6	7.9	-52.48	-13	Vertical
4	5539.2	-52.46	8.2	9.5	-51.16	-13	Horizontal
5	6373.2	-51.79	8.8	10.8	-49.79	-13	Horizontal
6	7151.8	-54.58	9.4	13.7	-50.28	-13	Horizontal

5.8.5 LTE Band 13

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	1386.6	-48.76	4.0	3.4	-49.36	-13	Horizontal
2	2107.7	-41.4	4.9	2.8	-43.50	-13	Horizontal
3	3121.2	-50.82	6.0	4.7	-52.12	-13	Horizontal
4	3898.8	-53.96	6.8	7.7	-53.06	-13	Vertical
5	4683.6	-52.67	7.5	7.9	-52.27	-13	Horizontal
6	5422.0	-52.61	8.1	9.5	-51.21	-13	Vertical
Middle Channel							
1	3158.4	-50.77	6.0	4.7	-52.07	-13	Horizontal
2	3948.8	-53.54	6.8	7.7	-52.64	-13	Horizontal
3	4750.0	-51.83	7.5	7.9	-51.43	-13	Vertical
4	5626.8	-53.28	8.3	10.5	-51.08	-13	Horizontal
5	6400.0	-52.3	8.9	11.5	-49.70	-13	Horizontal
6	7213.6	-53.59	9.5	13.7	-49.39	-13	Vertical
Highest Channel							
1	1857.7	-40.51	4.6	2.9	-42.21	-13	Horizontal
2	2600.0	-38.36	5.5	3.7	-40.16	-13	Vertical
3	3180.4	-48.68	6.1	4.7	-50.08	-13	Horizontal
4	4541.6	-51.36	7.4	7.3	-51.46	-13	Horizontal
5	6340.4	-51.67	8.8	10.8	-49.67	-13	Horizontal
6	8501.2	-55.9	10.3	18.1	-48.10	-13	Vertical

5.8.6 LTE Band 25

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	3573.6	-50.67	6.4	4.7	-52.37	-13	Horizontal
2	4556.0	-50.55	7.4	7.3	-50.65	-13	Vertical
3	6405.2	-52.07	8.9	11.5	-49.47	-13	Horizontal
4	8433.6	-55.96	10.2	18.1	-48.06	-13	Horizontal
5	10810.4	-48.55	11.7	17.3	-42.95	-13	Horizontal
6	13835.0	-50	13.8	24.8	-39.00	-13	Horizontal
Middle Channel							
1	3769.6	-51.26	6.6	7.7	-50.16	-13	Vertical
2	5384.0	-52.64	8.1	9.5	-51.24	-13	Vertical
3	6965.6	-52.98	9.3	12.9	-49.38	-13	Horizontal
4	9190.4	-53.82	10.5	18.5	-45.82	-13	Horizontal
5	12141.0	-45.99	12.6	17.5	-41.09	-13	Vertical
6	16027.4	-41.27	15.0	20.4	-35.87	-13	Vertical
Highest Channel							
1	3577.2	-50.13	6.5	4.7	-51.93	-13	Horizontal
2	4520.8	-51.29	7.3	7.3	-51.29	-13	Horizontal
3	6011.2	-52.7	8.6	10.4	-50.90	-13	Horizontal
4	8241.6	-54.63	10.1	17.3	-47.43	-13	Horizontal
5	10788.4	-48.39	11.7	17.3	-42.79	-13	Horizontal
6	12806.0	-46.77	12.5	19.2	-40.07	-13	Vertical

5.8.7 LTE Band 26

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	1846.7	-40.85	4.6	2.9	-42.55	-13	Horizontal
2	2489.2	-38.56	5.4	3.7	-40.26	-13	Vertical
3	3184.4	-50.01	6.1	4.7	-51.41	-13	Vertical
4	4546.8	-50.85	7.4	7.3	-50.95	-13	Vertical
5	6404.0	-52.03	8.9	11.5	-49.43	-13	Horizontal
6	7880.5	-53.77	9.9	16.6	-47.07	-13	Vertical
Middle Channel							
1	1667.0	-45.27	4.3	2.9	-46.67	-13	Horizontal
2	2450.4	-39.64	5.3	3.7	-41.24	-13	Horizontal
3	3590.0	-50.28	6.5	4.7	-52.08	-13	Horizontal
4	4558.8	-50.88	7.4	7.3	-50.98	-13	Vertical
5	5656.8	-53.67	8.3	10.5	-51.47	-13	Horizontal
6	6807.6	-53.39	9.2	12.3	-50.29	-13	Horizontal
Highest Channel							
1	1852.5	-41.2	4.6	2.9	-42.90	-13	Horizontal
2	2608.5	-38.21	5.5	3.7	-40.01	-13	Horizontal
3	3584.8	-49.9	6.5	4.7	-51.70	-13	Horizontal
4	4442.0	-50.67	7.3	7.3	-50.67	-13	Horizontal
5	5498.0	-52.31	8.2	9.5	-51.01	-13	Horizontal
6	6344.8	-51.68	8.8	10.8	-49.68	-13	Horizontal

5.8.8 LTE Band 66

No.	Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBi)	Peak EIRP (dBm)	Limit (dBm)	Polarization
Lowest Channel							
1	3428.8	-46.8	6.4	4.7	-48.50	-13	Vertical
2	5149.2	-53.55	7.9	8.7	-52.75	-13	Vertical
3	6849.6	-52.78	9.2	12.3	-49.68	-13	Vertical
4	8576.0	-55.89	10.3	18.1	-48.09	-13	Vertical
5	10244.8	-50.26	11.4	17.4	-44.26	-13	Vertical
6	11964.6	-46.46	12.6	17.1	-41.96	-13	Horizontal
Middle Channel							
1	3493.6	-46.06	6.4	4.7	-47.76	-13	Horizontal
2	5127.2	-53.79	7.9	8.7	-52.99	-13	Vertical
3	6841.2	-53.48	9.2	12.3	-50.38	-13	Horizontal
4	8510.4	-56.79	10.3	18.1	-48.99	-13	Horizontal
5	10241.6	-51.26	11.4	17.4	-45.26	-13	Horizontal
6	11988.4	-47.18	12.6	17.1	-42.68	-13	Horizontal
Highest Channel							
1	3559.6	-46.05	6.4	4.7	-47.75	-13	Horizontal
2	5333.6	-52.35	8.1	8.7	-51.75	-13	Vertical
3	7140.8	-54.67	9.4	13.7	-50.37	-13	Horizontal
4	8908.8	-55.35	10.4	18.3	-47.45	-13	Vertical
5	10699.6	-50.01	11.7	17.3	-44.41	-13	Horizontal
6	12625.4	-47.15	12.8	19.2	-40.75	-13	Vertical

5.9 FREQUENCY STABILITY

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 Requirement:

LTE Band 2 & LTE Band 25: RSS-133 Issue 6, Section 6.3
LTE Band 4 & LTE Band 66: RSS-139 Issue 3, Section 6.4
LTE Band 5: RSS-132 Issue 3, Section 5.3
LTE Band 12 & LTE Band 13: RSS-130 Issue 2, Section 4.5

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.

RSS-132 Issue 3, Section 5.3:

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.5 ppm for base stations

RSS-133 Issue 6, Section 6.3:

The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

RSS-139 Issue 3, Section 6.4, RSS-130 Issue 2, Section 4.5:

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

- 1) Use CMW 500 or CMU 200 with Frequency Error measurement capability.
 - a) Temp. = -30° to $+50^{\circ}\text{C}$
 - b) Voltage = low voltage, 2.8 Vdc, Normal, 3.8 Vdc and High voltage, 4.6Vdc.
- 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 Result: Pass

5.9.1 LTE Band 2

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 2 / 20MHz / Full RB							
QPSK	18900 / 1880.0	VL	TN	2.35	0.0013	N/A	Pass
		VN		5.12	0.0027		Pass
		VH		4.32	0.0023		Pass
		VN	50	4.31	0.0023		Pass
			40	4.23	0.0023		Pass
			30	2.45	0.0013		Pass
			20	6.47	0.0034		Pass
			10	7.32	0.0039		Pass
			0	4.39	0.0023		Pass
			-10	3.98	0.0021		Pass
			-20	4.09	0.0022		Pass
			-30	4.60	0.0024		Pass

5.9.2 LTE Band 4

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 4 / 20MHz / Full RB							
QPSK	20175 / 1732.5	VL	TN	3.21	0.0019	N/A	Pass
		VN		2.50	0.0014		Pass
		VH		2.76	0.0016		Pass
		VN	50	2.76	0.0016		Pass
			40	3.72	0.0021		Pass
			30	3.67	0.0021		Pass
			20	4.31	0.0025		Pass
			10	2.17	0.0013		Pass
			0	2.76	0.0016		Pass
			-10	3.51	0.0020		Pass
			-20	2.31	0.0013		Pass
			-30	1.12	0.0006		Pass

5.9.3 LTE Band 5

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 5 / 10MHz / Full RB							
QPSK	20525 / 836.5	VL	TN	0.09	0.0001	± 2.5	Pass
		VN		1.02	0.0012	± 2.5	Pass
		VH		-1.23	-0.0015	± 2.5	Pass
		VN	50	4.66	0.0056	± 2.5	Pass
			40	0.92	0.0011	± 2.5	Pass
			30	4.92	0.0059	± 2.5	Pass
			20	0.31	0.0004	± 2.5	Pass
			10	5.19	0.0062	± 2.5	Pass
			0	1.59	0.0019	± 2.5	Pass
			-10	-0.94	-0.0011	± 2.5	Pass
			-20	1.10	0.0013	± 2.5	Pass
			-30	1.60	0.0019	± 2.5	Pass

5.9.4 LTE Band 12

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 12 / 10MHz / Full RB							
QPSK	23095 / 707.5	VL	TN	-0.37	-0.0005	N/A	Pass
		VN		-4.06	-0.0057		Pass
		VH		-3.06	-0.0043		Pass
		VN	50	-5.45	-0.0077		Pass
			40	-2.96	-0.0042		Pass
			30	-6.02	-0.0085		Pass
			20	-1.44	-0.0020		Pass
			10	-5.12	-0.0072		Pass
			0	-1.62	-0.0023		Pass
			-10	-4.22	-0.0060		Pass
			-20	-3.36	-0.0047		Pass
			-30	-1.83	-0.0026		Pass

5.9.5 LTE Band 13

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 13 / 10MHz / Full RB							
QPSK	23230 / 782	VL	TN	-2.43	-0.0031	N/A	Pass
		VN		-4.12	-0.0053		Pass
		VH		-7.20	-0.0092		Pass
		VN	50	-2.56	-0.0033		Pass
			40	-1.87	-0.0024		Pass
			30	-2.59	-0.0033		Pass
			20	-0.89	-0.0011		Pass
			10	-4.75	-0.0061		Pass
			0	-2.55	-0.0033		Pass
			-10	-3.24	-0.0041		Pass
			-20	-2.46	-0.0031		Pass
			-30	-5.02	-0.0064		Pass

5.9.6 LTE Band 25

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 25 / 20MHz / Full RB							
QPSK	26340 / 1880.0	VL	TN	3.45	0.0018	N/A	Pass
		VN		5.82	0.0031		Pass
		VH		3.87	0.0021		Pass
		VN	50	0.79	0.0004		Pass
			40	0.14	0.0001		Pass
			30	-3.23	-0.0017		Pass
			20	-3.18	-0.0017		Pass
			10	1.81	0.0010		Pass
			0	2.8	0.0015		Pass
			-10	-3.72	-0.0020		Pass
			-20	-4.33	-0.0023		Pass
			-30	3.76	0.0020		Pass

5.9.7 LTE Band 26

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 26 / 15MHz / Full RB							
QPSK	26915 / 836.5	VL	TN	-4.59	-0.0055	± 2.5	Pass
		VN		0.28	0.0003	± 2.5	Pass
		VH		2.19	0.0026	± 2.5	Pass
		VN	50	-2.45	-0.0029	± 2.5	Pass
			40	-2.77	-0.0033	± 2.5	Pass
			30	-1.66	-0.0020	± 2.5	Pass
			20	0.98	0.0012	± 2.5	Pass
			10	2.78	0.0033	± 2.5	Pass
			0	-1.55	-0.0019	± 2.5	Pass
			-10	-1.54	-0.0018	± 2.5	Pass
			-20	0.34	0.0004	± 2.5	Pass
			-30	-2.23	-0.0027	± 2.5	Pass

5.9.8 LTE Band 26 (Part 90S)

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 26 / 10MHz / Full RB							
QPSK	26740 / 819	VL	TN	4.98	0.0061	± 2.5	Pass
		VN		-0.79	-0.0010	± 2.5	Pass
		VH		-3.70	-0.0045	± 2.5	Pass
		VN	50	-3.40	-0.0042	± 2.5	Pass
			40	-3.14	-0.0038	± 2.5	Pass
			30	-5.82	-0.0071	± 2.5	Pass
			20	0.66	0.0008	± 2.5	Pass
			10	-0.29	-0.0004	± 2.5	Pass
			0	4.45	0.0054	± 2.5	Pass
			-10	-5.37	-0.0066	± 2.5	Pass
			-20	-9.11	-0.0111	± 2.5	Pass
			-30	-11.34	-0.0138	± 2.5	Pass

5.9.9 LTE Band 66

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 66 / 20MHz / Full RB							
QPSK	132322 / 1745	VL	TN	-4.59	-0.0026	N/A	Pass
		VN		-4.26	-0.0024		Pass
		VH		-7.40	-0.0042		Pass
		VN	50	-6.84	-0.0039		Pass
			40	-7.79	-0.0045		Pass
			30	-5.79	-0.0033		Pass
			20	-4.35	-0.0025		Pass
			10	-5.55	-0.0032		Pass
			0	-3.22	-0.0018		Pass
			-10	-2.53	-0.0014		Pass
			-20	-6.59	-0.0038		Pass
			-30	-7.00	-0.0040		Pass

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.
