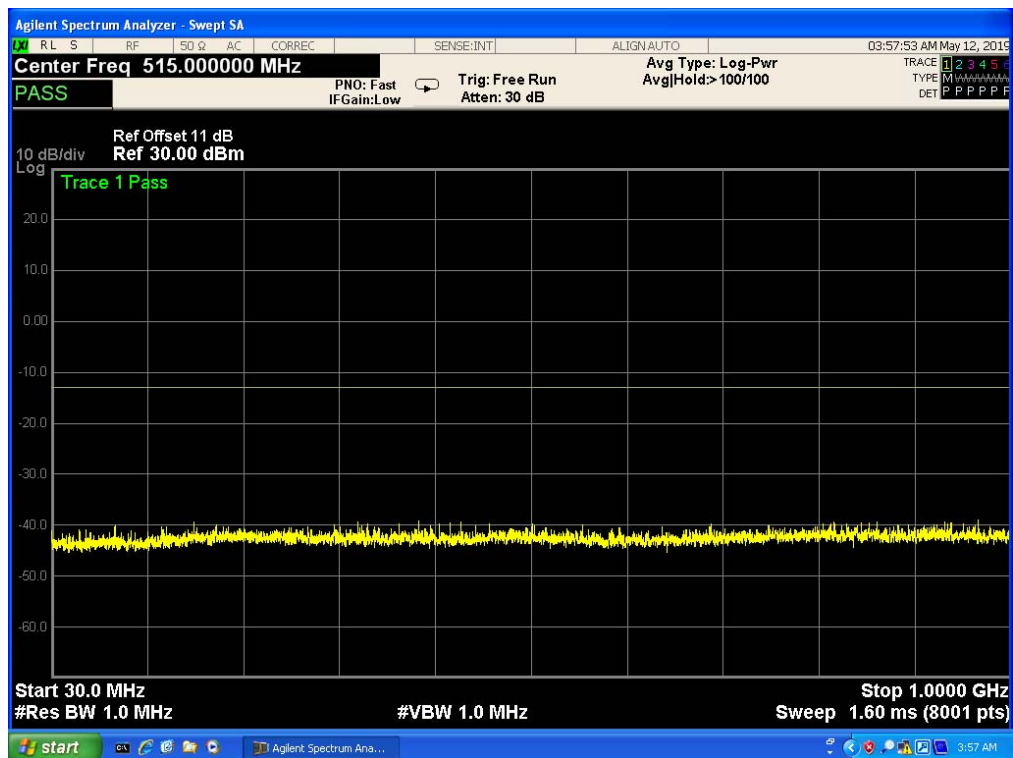


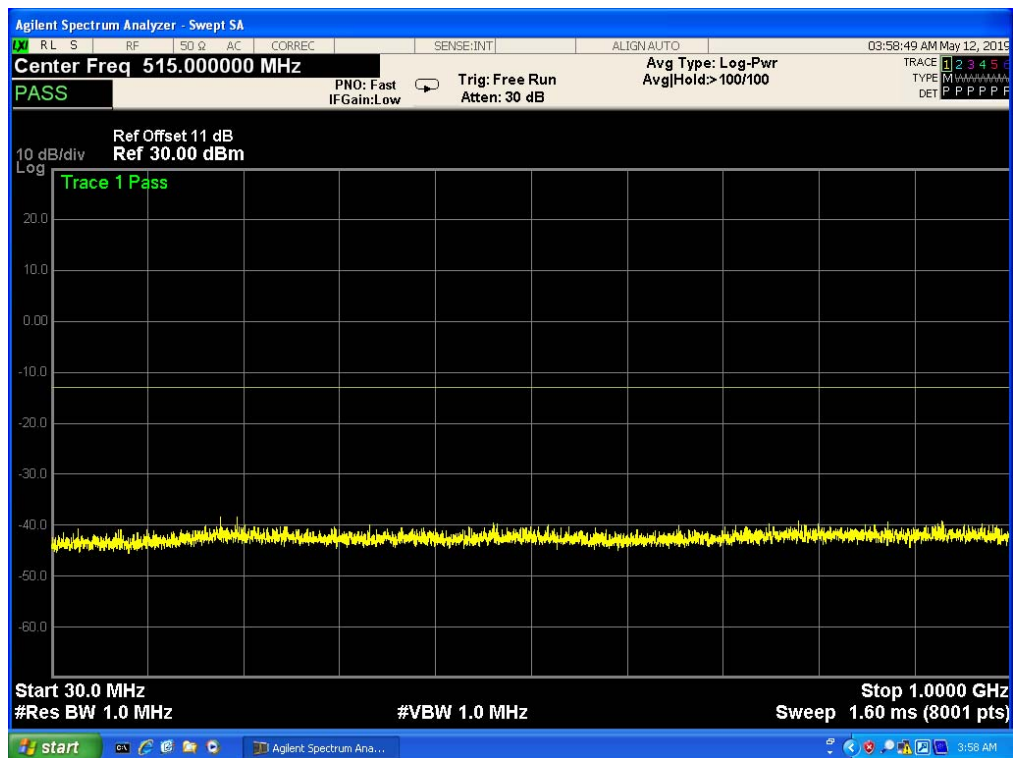
Band 25, UL Channel 26665, UL Frequency 1912.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



Band 25, UL Channel 26665, UL Frequency 1912.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



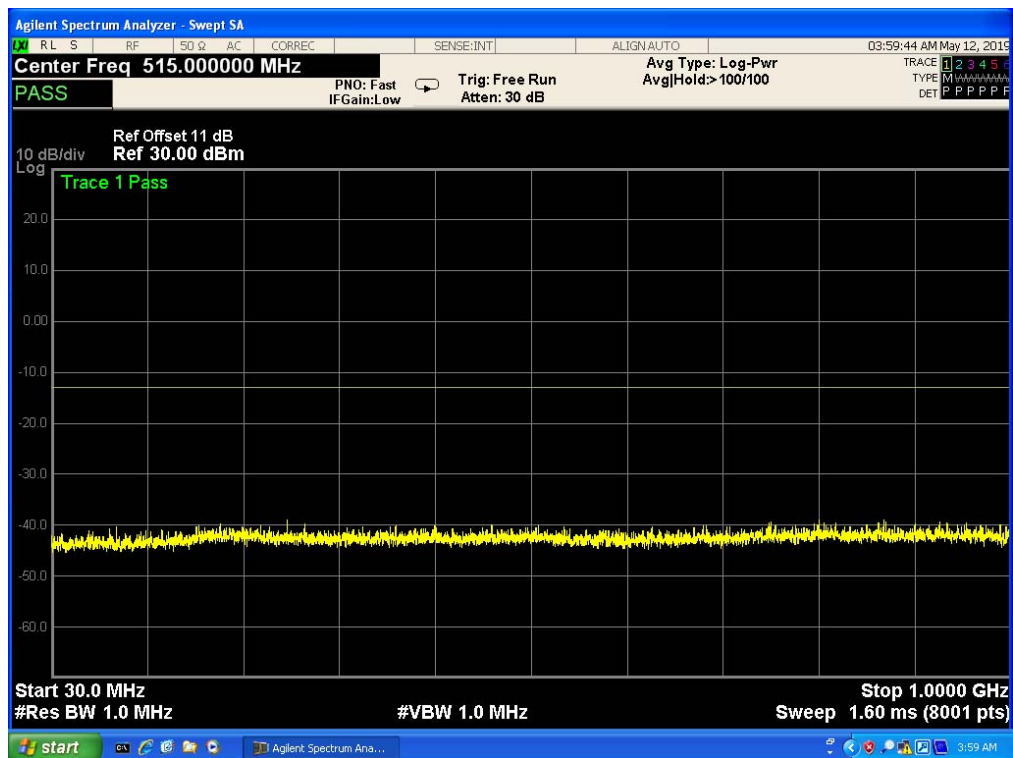
Band 25,UL Channel 26090,UL Frequency 1855.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



Band 25,UL Channel 26090,UL Frequency 1855.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



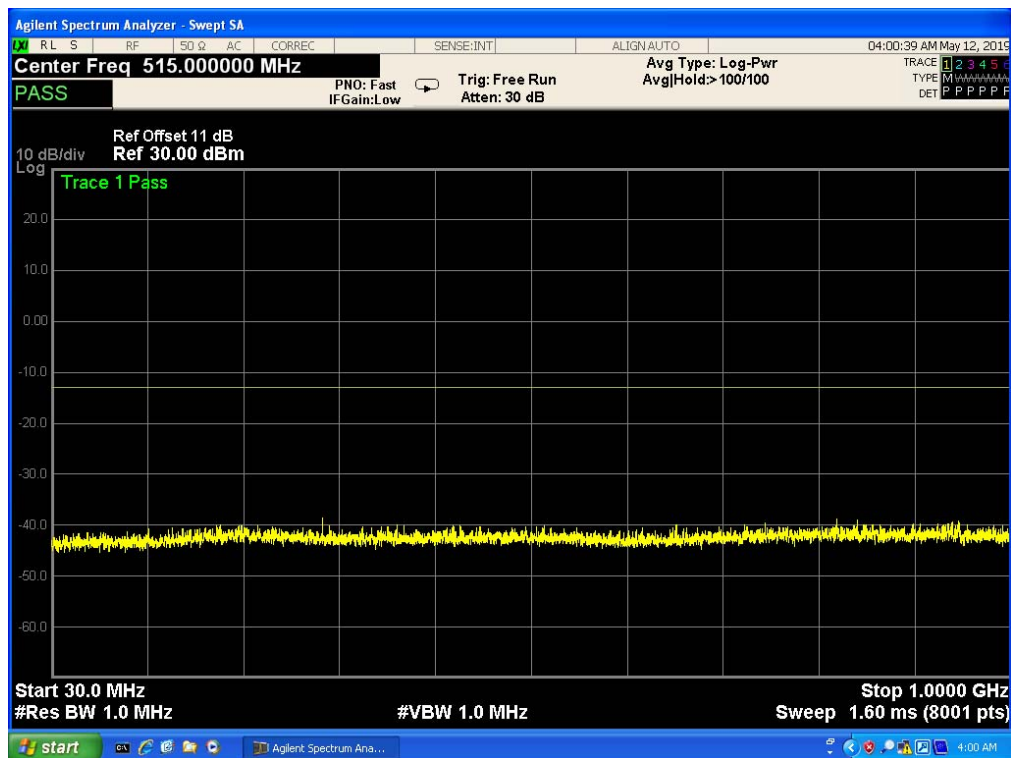
Band 25, UL Channel 26090, UL Frequency 1855.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



Band 25, UL Channel 26090, UL Frequency 1855.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



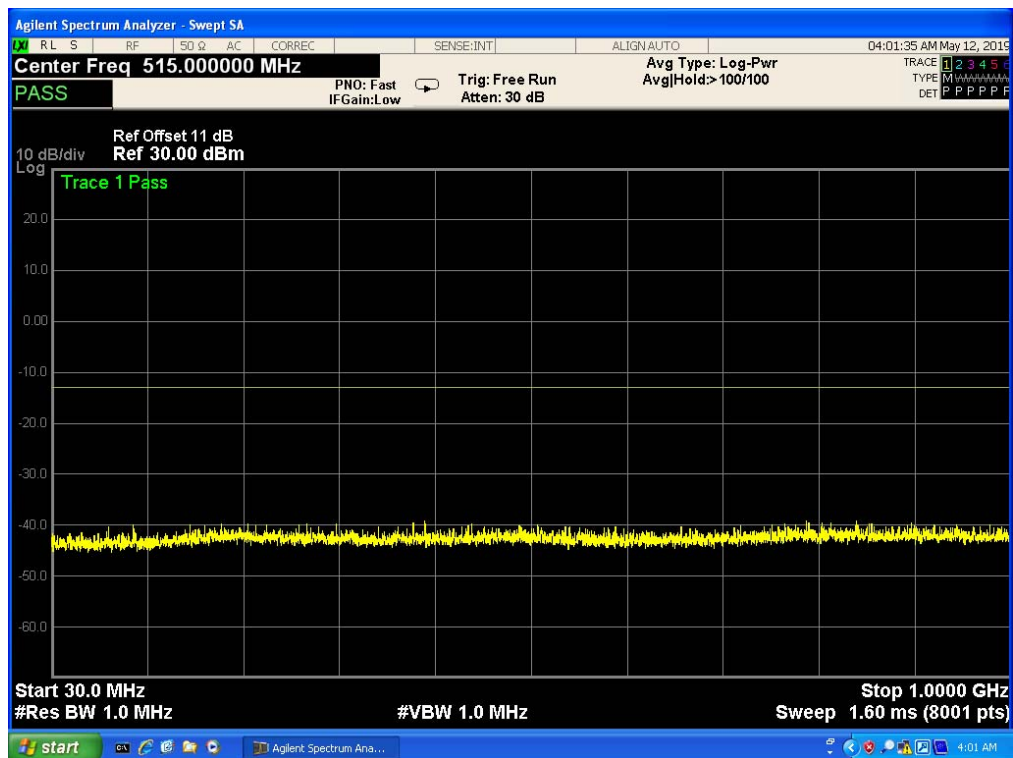
Band 25,UL Channel 26640,UL Frequency 1910.0,BW 10.0,N0. RB 50,RB POS. Low,QPSK



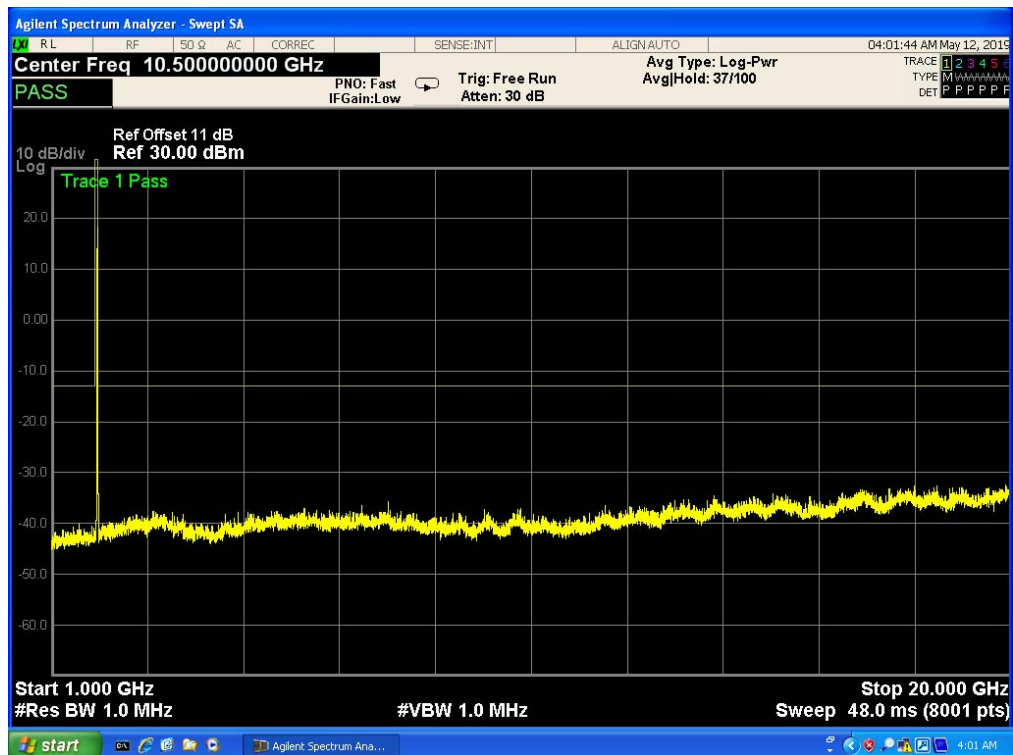
Band 25,UL Channel 26640,UL Frequency 1910.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



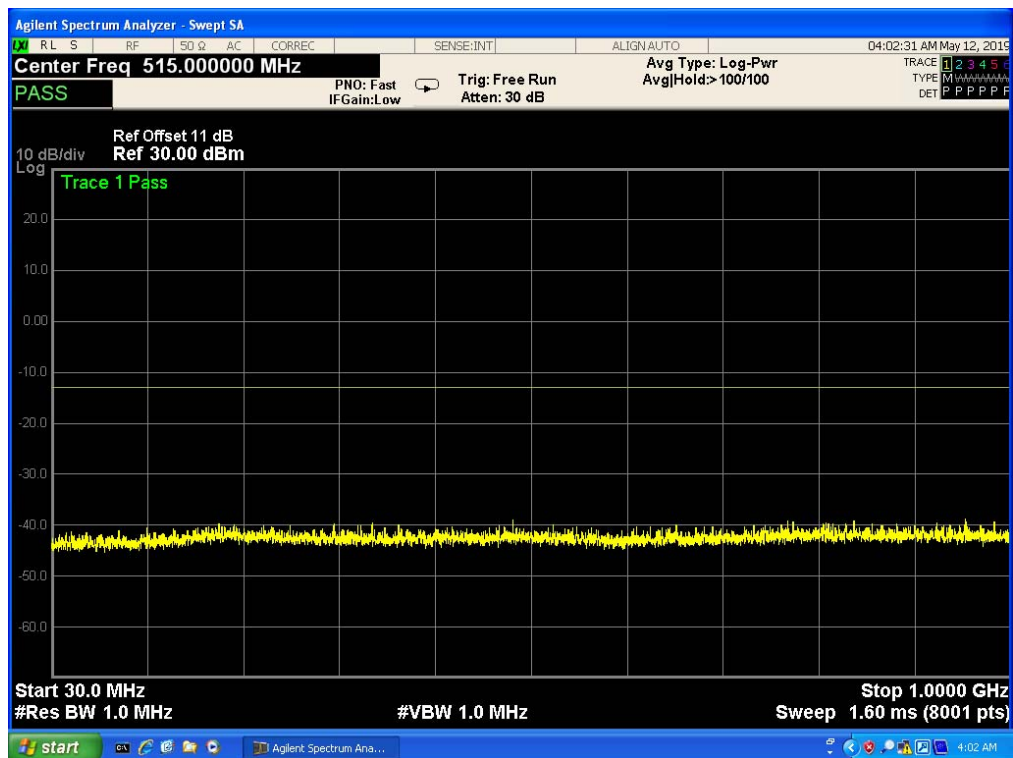
Band 25, UL Channel 26640, UL Frequency 1910.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



Band 25, UL Channel 26640, UL Frequency 1910.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



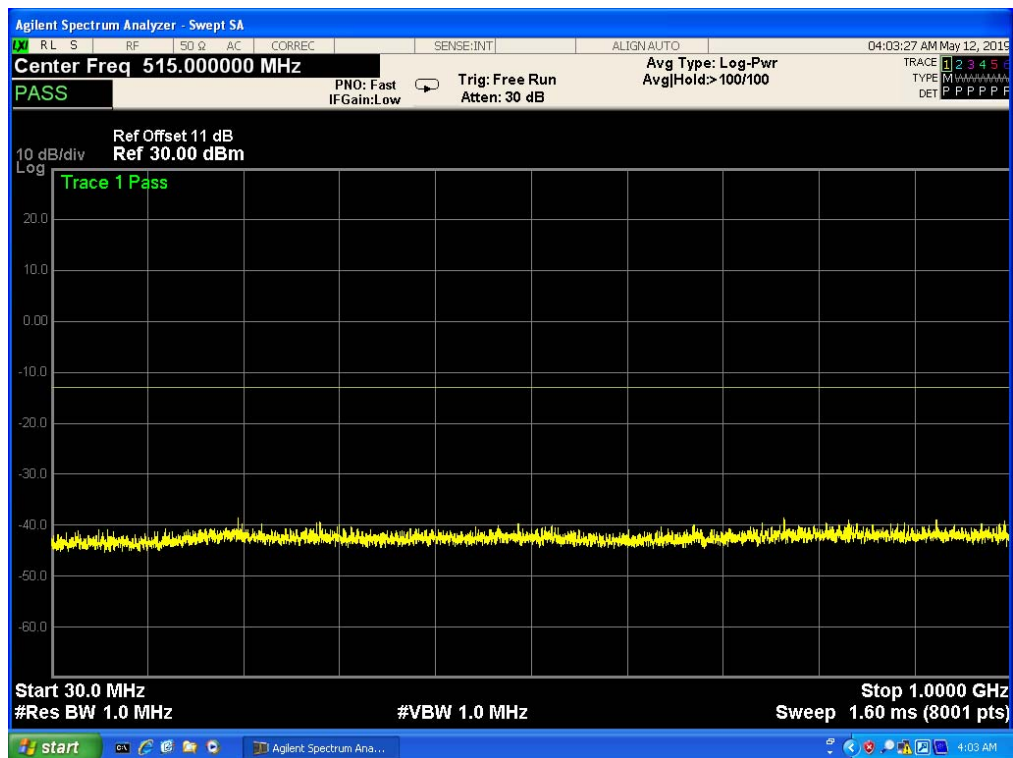
Band 25,UL Channel 26115,UL Frequency 1857.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



Band 25,UL Channel 26115,UL Frequency 1857.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



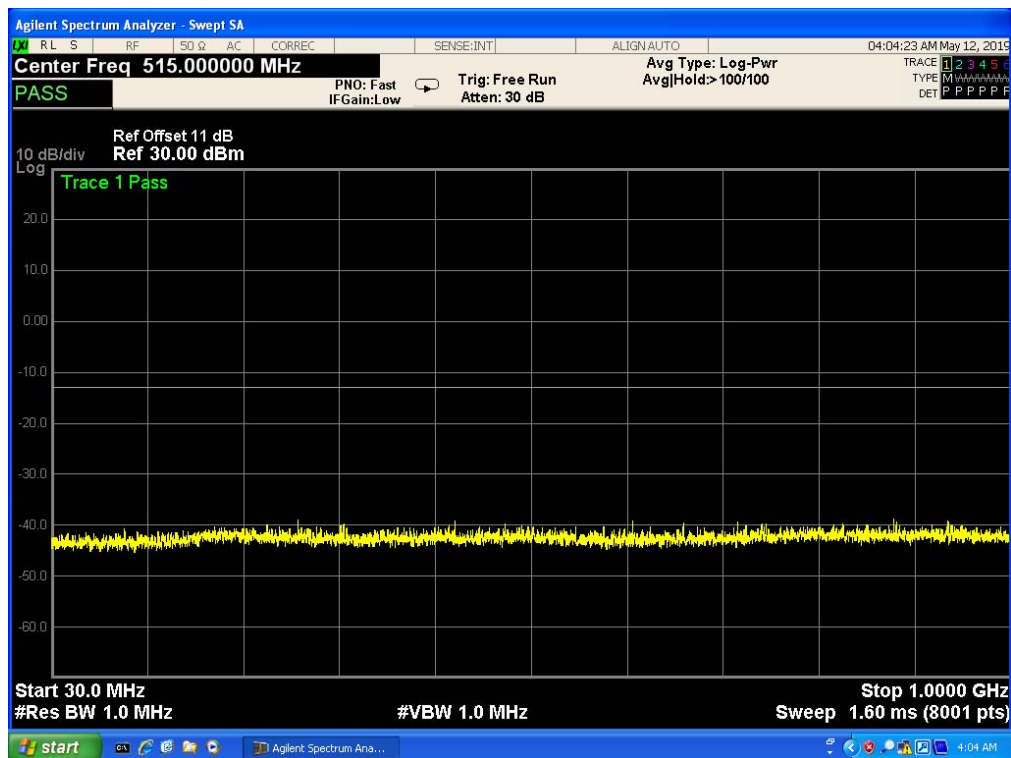
Band 25, UL Channel 26115, UL Frequency 1857.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



Band 25, UL Channel 26115, UL Frequency 1857.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



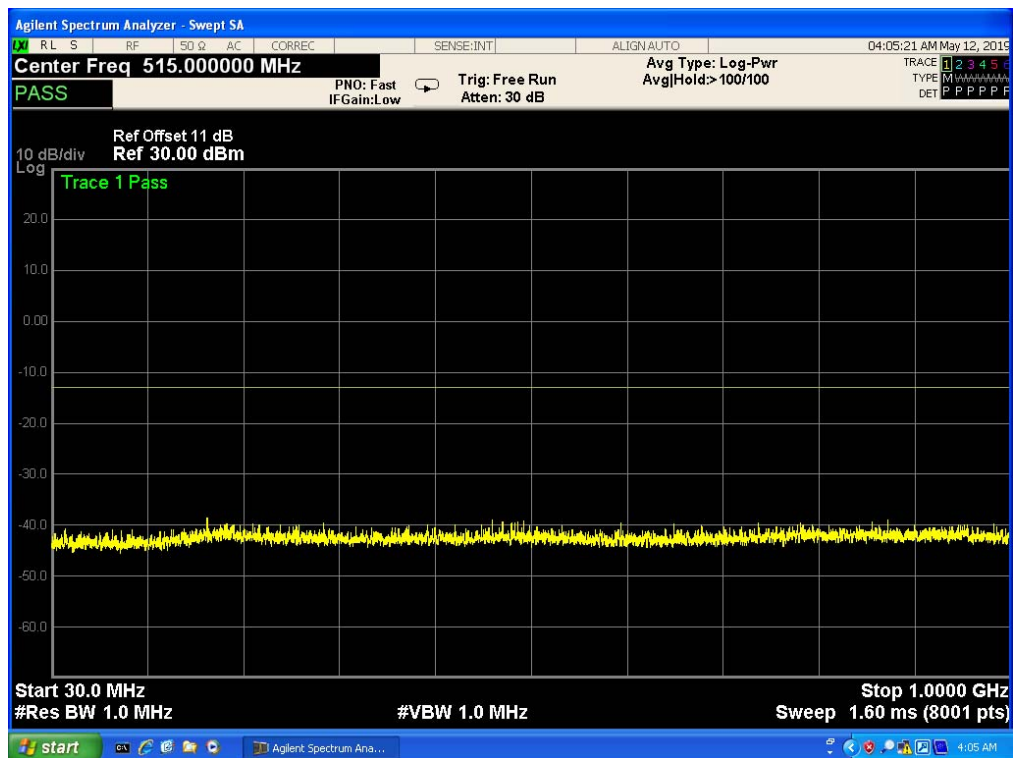
Band 25, UL Channel 26615, UL Frequency 1907.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



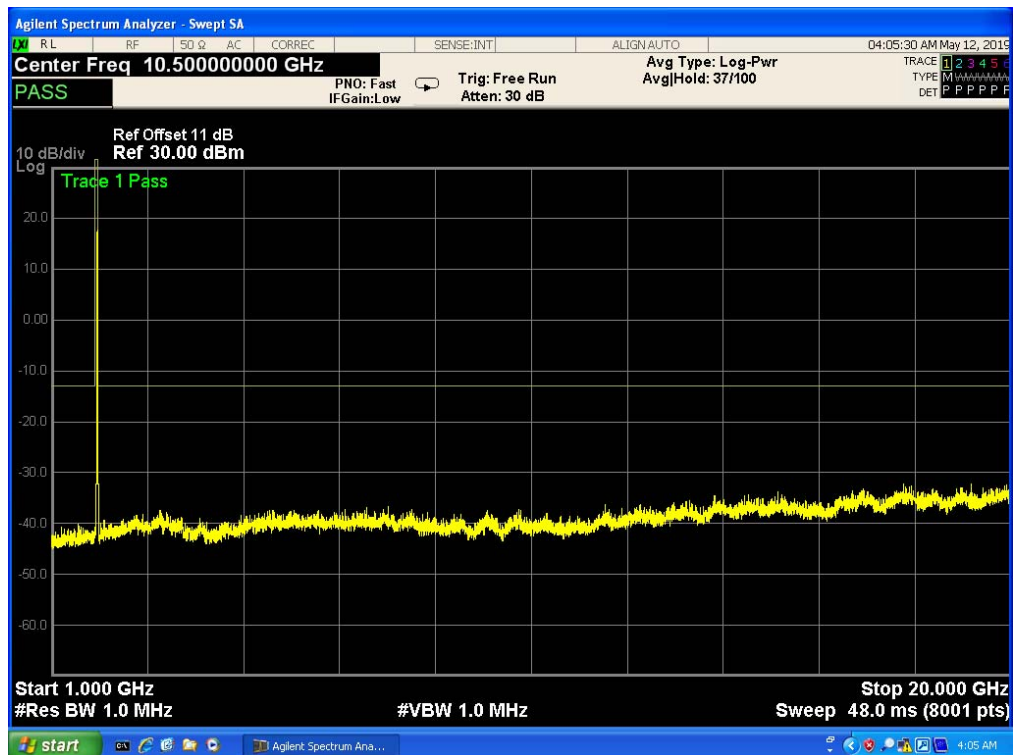
Band 25, UL Channel 26615, UL Frequency 1907.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



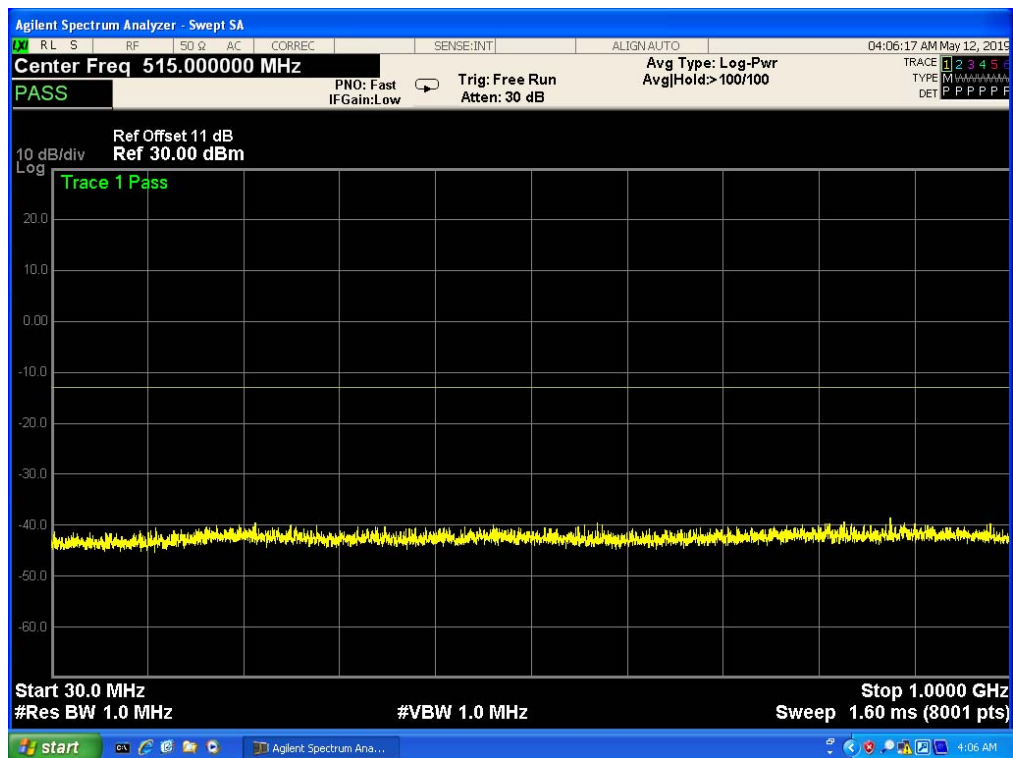
Band 25, UL Channel 26615, UL Frequency 1907.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



Band 25, UL Channel 26615, UL Frequency 1907.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



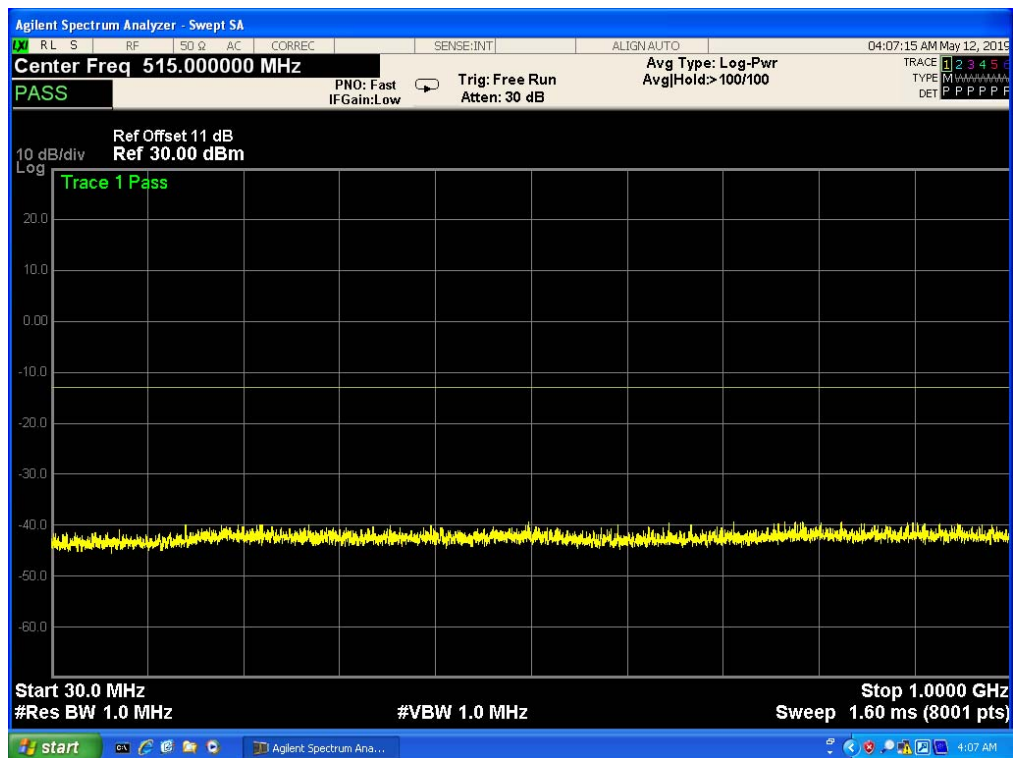
Band 25, UL Channel 26140, UL Frequency 1860.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 25, UL Channel 26140, UL Frequency 1860.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



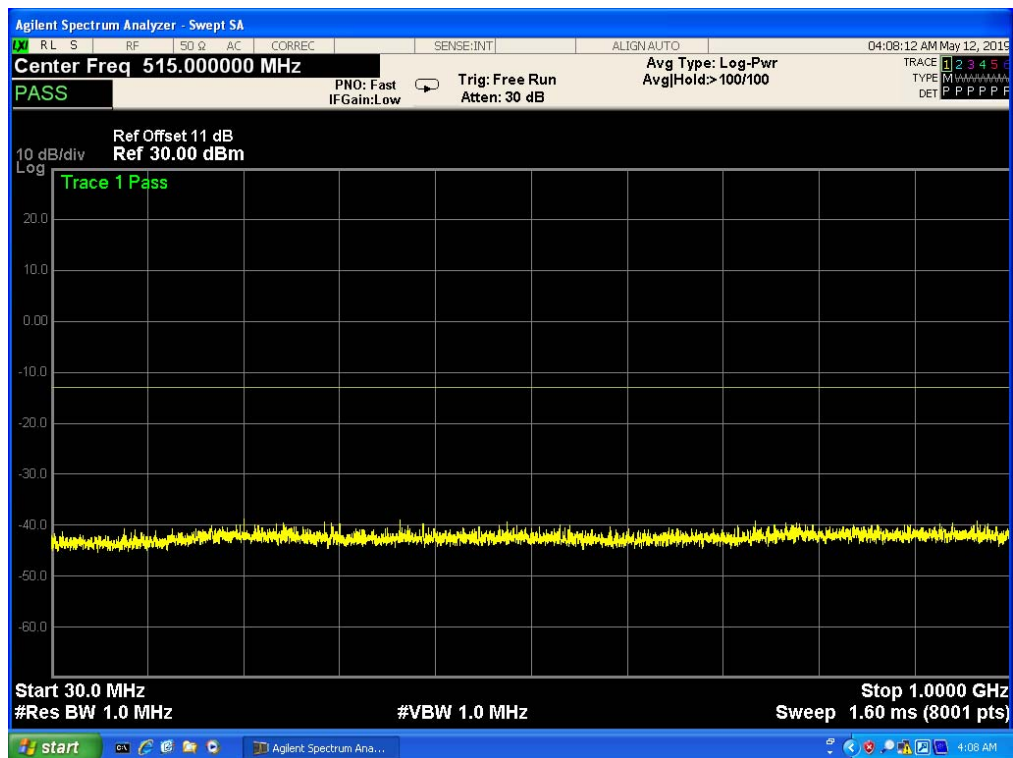
Band 25, UL Channel 26140, UL Frequency 1860.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



Band 25, UL Channel 26140, UL Frequency 1860.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



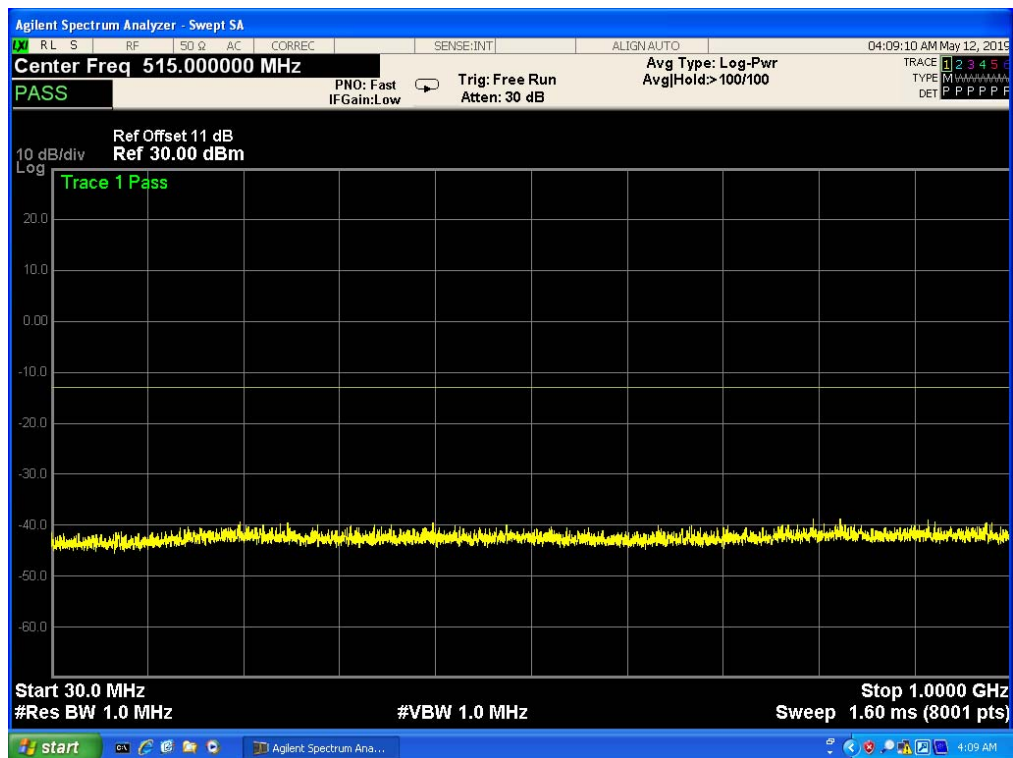
Band 25, UL Channel 26590, UL Frequency 1905.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 25, UL Channel 26590, UL Frequency 1905.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 25, UL Channel 26590, UL Frequency 1905.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



Band 25, UL Channel 26590, UL Frequency 1905.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 25

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-1.75	3.76	28.24	22.73	187.592	Horizontal	Pass
		1880	-1.49	3.91	28.22	22.82	191.398	Horizontal	Pass
		1909.3	-1.50	3.93	28.2	22.77	189.196	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-1.75	3.77	28.23	22.71	186.624	Horizontal	Pass
		1880	-1.62	3.91	28.24	22.71	186.841	Horizontal	Pass
		1908.5	-1.54	3.94	28.25	22.77	189.256	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-1.89	3.77	28.31	22.65	184.233	Horizontal	Pass
		1880	-1.60	3.91	28.22	22.71	186.839	Horizontal	Pass
		1907.5	-1.70	3.94	28.2	22.56	180.213	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-1.86	3.79	28.33	22.68	185.287	Horizontal	Pass
		1880	-1.49	3.95	28.22	22.78	189.493	Horizontal	Pass
		1905	-1.39	3.97	28.19	22.83	191.798	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-1.61	3.79	28.34	22.94	196.977	Horizontal	Pass
		1880	-1.33	3.95	28.22	22.94	196.739	Horizontal	Pass
		1902.5	-1.24	3.97	28.18	22.97	197.993	Horizontal	Pass
20.0MHz Band QPSK	100/0	1860	-1.81	3.81	28.35	22.73	187.457	Horizontal	Pass
		1880	-1.58	3.96	28.22	22.68	185.142	Horizontal	Pass
		1900	-1.28	4	28.16	22.88	194.233	Horizontal	Pass
1.4MHz Band QPSK	6/0	1850.7	-1.79	3.76	28.24	22.69	185.940	Vertical	Pass
		1880	-1.59	3.91	28.22	22.72	187.051	Vertical	Pass
		1909.3	-1.60	3.93	28.2	22.67	185.119	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-1.61	3.77	28.23	22.85	192.772	Vertical	Pass
		1880	-1.46	3.91	28.24	22.87	193.542	Vertical	Pass
		1908.5	-1.39	3.94	28.25	22.92	196.042	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-1.81	3.77	28.31	22.73	187.471	Vertical	Pass
		1880	-1.51	3.91	28.22	22.80	190.741	Vertical	Pass
		1907.5	-1.68	3.94	28.2	22.58	181.212	Vertical	Pass
10.0MHz Band	50/0	1855	-1.75	3.79	28.33	22.79	190.297	Vertical	Pass
		1880	-1.54	3.95	28.22	22.73	187.527	Vertical	Pass

QPSK		1905	-1.57	3.97	28.19	22.65	183.991	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-1.72	3.79	28.34	22.83	192.085	Vertical	Pass
		1880	-1.47	3.95	28.22	22.80	190.348	Vertical	Pass
		1902.5	-1.19	3.97	28.18	23.02	200.372	Vertical	Pass
20.0MHz Band QPSK	100/0	1860	-1.73	3.81	28.35	22.81	191.083	Vertical	Pass
		1880	-1.63	3.96	28.22	22.63	183.047	Vertical	Pass
		1900	-1.11	4	28.16	23.05	202.058	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	1850.7	-2.67	3.76	28.24	21.81	151.535	Horizontal	Pass
		1880	-2.44	3.91	28.22	21.87	153.901	Horizontal	Pass
		1909.3	-2.38	3.93	28.2	21.89	154.583	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.67	3.77	28.23	21.79	151.103	Horizontal	Pass
		1880	-2.63	3.91	28.24	21.70	148.074	Horizontal	Pass
		1908.5	-2.48	3.94	28.25	21.83	152.334	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.76	3.77	28.31	21.78	150.498	Horizontal	Pass
		1880	-2.36	3.91	28.22	21.95	156.511	Horizontal	Pass
		1907.5	-2.48	3.94	28.2	21.78	150.802	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.70	3.79	28.33	21.84	152.710	Horizontal	Pass
		1880	-2.38	3.95	28.22	21.89	154.675	Horizontal	Pass
		1905	-2.43	3.97	28.19	21.79	150.897	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-2.76	3.79	28.34	21.79	151.132	Horizontal	Pass
		1880	-2.49	3.95	28.22	21.78	150.706	Horizontal	Pass
		1902.5	-2.40	3.97	28.18	21.81	151.818	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-2.72	3.81	28.35	21.82	152.155	Horizontal	Pass
		1880	-2.35	3.96	28.22	21.91	155.209	Horizontal	Pass
		1900	-2.46	4	28.16	21.70	147.928	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.61	3.76	28.24	21.87	153.667	Vertical	Pass
		1880	-2.54	3.91	28.22	21.77	150.366	Vertical	Pass
		1909.3	-2.33	3.93	28.2	21.94	156.244	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.69	3.77	28.23	21.77	150.429	Vertical	Pass
		1880	-2.62	3.91	28.24	21.71	148.413	Vertical	Pass
		1908.5	-2.46	3.94	28.25	21.85	153.238	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.71	3.77	28.31	21.83	152.525	Vertical	Pass
		1880	-2.56	3.91	28.22	21.75	149.738	Vertical	Pass
		1907.5	-2.35	3.94	28.2	21.91	155.390	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.87	3.79	28.33	21.67	146.789	Vertical	Pass
		1880	-2.56	3.95	28.22	21.71	148.286	Vertical	Pass
		1905	-2.65	3.97	28.19	21.57	143.396	Vertical	Pass
15.0MHz Band	75/0	1857.5	-2.88	3.79	28.34	21.67	146.804	Vertical	Pass
		1880	-2.53	3.95	28.22	21.74	149.398	Vertical	Pass

16 QAM		1902.5	-2.48	3.97	28.18	21.73	149.072	Vertical	Pass
20.0MH	100/0	1860	-2.67	3.81	28.35	21.87	153.730	Vertical	Pass
z Band		1880	-2.30	3.96	28.22	21.96	157.187	Vertical	Pass
16 QAM		1900	-2.34	4	28.16	21.82	152.213	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.3 LTE BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-1.69	3.12	27.58	22.77	189.319	Horizontal	Pass
		1732.5	-1.78	3.27	27.61	22.56	180.439	Horizontal	Pass
		1754.3	-1.42	3.29	27.63	22.92	196.101	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.81	3.13	27.61	22.67	184.972	Horizontal	Pass
		1732.5	-1.58	3.27	27.61	22.76	188.969	Horizontal	Pass
		1753.5	-1.50	3.3	27.62	22.82	191.311	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.48	3.13	27.63	23.02	200.464	Horizontal	Pass
		1732.5	-1.18	3.27	27.61	23.16	206.812	Horizontal	Pass
		1752.5	-1.24	3.3	27.6	23.06	202.109	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-1.52	3.15	27.64	22.97	198.203	Horizontal	Pass
		1732.5	-1.51	3.31	27.61	22.79	190.055	Horizontal	Pass
		1750	-1.41	3.33	27.59	22.85	192.966	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-1.83	3.15	27.65	22.67	184.890	Horizontal	Pass
		1732.5	-1.41	3.31	27.61	22.89	194.537	Horizontal	Pass
		1747.5	-1.43	3.33	27.57	22.81	190.980	Horizontal	Pass
20.0MHz Band QPSK	100/0	1720	-1.65	3.17	27.66	22.84	192.112	Horizontal	Pass
		1732.5	-1.42	3.32	27.61	22.87	193.564	Horizontal	Pass
		1745	-1.53	3.36	27.56	22.67	184.769	Horizontal	Pass
1.4MHz Band QPSK	6/0	1710.7	-1.64	3.12	27.58	22.82	191.350	Vertical	Pass
		1732.5	-1.58	3.27	27.61	22.76	188.681	Vertical	Pass
		1754.3	-1.56	3.29	27.63	22.78	189.627	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.62	3.13	27.61	22.86	193.144	Vertical	Pass
		1732.5	-1.44	3.27	27.61	22.90	195.018	Vertical	Pass
		1753.5	-1.60	3.3	27.62	22.72	187.214	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.36	3.13	27.63	23.14	206.141	Vertical	Pass
		1732.5	-1.27	3.27	27.61	23.07	202.577	Vertical	Pass
		1752.5	-1.19	3.3	27.6	23.11	204.471	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-1.63	3.15	27.64	22.86	193.016	Vertical	Pass
		1732.5	-1.48	3.31	27.61	22.82	191.537	Vertical	Pass
		1750	-1.41	3.33	27.59	22.85	192.852	Vertical	Pass

15.0MH z Band QPSK	75/0	1717.5	-1.76	3.15	27.65	22.74	187.852	Vertical	Pass
		1732.5	-1.36	3.31	27.61	22.94	196.924	Vertical	Pass
		1747.5	-1.30	3.33	27.57	22.94	196.613	Vertical	Pass
20.0MH z Band QPSK	100/0	1720	-1.27	3.17	27.66	23.22	209.725	Vertical	Pass
		1732.5	-1.45	3.32	27.61	22.84	192.179	Vertical	Pass
		1745	-1.42	3.36	27.56	22.78	189.847	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	1710.7	-2.54	3.12	27.58	21.92	155.589	Horizontal	Pass
		1732.5	-2.41	3.27	27.61	21.93	155.826	Horizontal	Pass
		1754.3	-2.53	3.29	27.63	21.81	151.863	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-3.33	3.13	27.61	21.15	130.439	Horizontal	Pass
		1732.5	-3.19	3.27	27.61	21.15	130.386	Horizontal	Pass
		1753.5	-3.10	3.3	27.62	21.22	132.292	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-3.47	3.13	27.63	21.03	126.828	Horizontal	Pass
		1732.5	-3.34	3.27	27.61	21.00	125.797	Horizontal	Pass
		1752.5	-2.35	3.3	27.6	21.95	156.625	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.70	3.15	27.64	21.79	151.029	Horizontal	Pass
		1732.5	-2.40	3.31	27.61	21.90	154.801	Horizontal	Pass
		1750	-2.61	3.33	27.59	21.65	146.148	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.54	3.15	27.65	21.96	156.886	Horizontal	Pass
		1732.5	-2.37	3.31	27.61	21.93	155.900	Horizontal	Pass
		1747.5	-2.27	3.33	27.57	21.97	157.244	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.79	3.17	27.66	21.70	148.060	Horizontal	Pass
		1732.5	-2.57	3.32	27.61	21.72	148.548	Horizontal	Pass
		1745	-2.40	3.36	27.56	21.80	151.453	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.59	3.12	27.58	21.87	153.981	Vertical	Pass
		1732.5	-2.46	3.27	27.61	21.88	154.046	Vertical	Pass
		1754.3	-2.47	3.29	27.63	21.87	153.767	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-3.18	3.13	27.61	21.30	134.774	Vertical	Pass
		1732.5	-3.13	3.27	27.61	21.21	132.181	Vertical	Pass
		1753.5	-3.06	3.3	27.62	21.26	133.715	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-3.39	3.13	27.63	21.11	129.159	Vertical	Pass
		1732.5	-3.17	3.27	27.61	21.17	131.036	Vertical	Pass
		1752.5	-3.29	3.3	27.6	21.01	126.302	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.58	3.15	27.64	21.91	155.160	Vertical	Pass
		1732.5	-2.37	3.31	27.61	21.93	155.871	Vertical	Pass
		1750	-2.56	3.33	27.59	21.70	147.815	Vertical	Pass
15.0MHz Band	75/0	1717.5	-2.73	3.15	27.65	21.77	150.309	Vertical	Pass
		1732.5	-2.58	3.31	27.61	21.72	148.653	Vertical	Pass

16 QAM		1747.5	-2.59	3.33	27.57	21.65	146.264	Vertical	Pass
20.0MH	100/0	1720	-2.65	3.17	27.66	21.84	152.922	Vertical	Pass
z Band		1732.5	-2.49	3.32	27.61	21.80	151.415	Vertical	Pass
16 QAM		1745	-2.19	3.36	27.56	22.01	158.973	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.4 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	824.7	6.09	2.01	19.68	2.15	21.61	145.023	Horizontal	Pass
		836.5	6.14	2.01	19.77	2.15	21.75	149.791	Horizontal	Pass
		848.3	6.07	2.02	19.82	2.15	21.72	148.442	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	6.21	2.01	19.7	2.15	21.75	149.715	Horizontal	Pass
		836.5	6.13	2.01	19.77	2.15	21.74	149.193	Horizontal	Pass
		847.5	6.06	2.02	19.81	2.15	21.70	147.969	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	5.96	2.01	19.71	2.15	21.51	141.681	Horizontal	Pass
		836.5	5.93	2.01	19.77	2.15	21.54	142.683	Horizontal	Pass
		846.5	5.90	2.02	19.79	2.15	21.52	141.895	Horizontal	Pass
10.0MHz z Band QPSK	50/0	829	5.96	2.01	19.73	2.15	21.53	142.312	Horizontal	Pass
		836.5	5.93	2.01	19.77	2.15	21.54	142.435	Horizontal	Pass
		844	5.95	2.02	19.78	2.15	21.56	143.204	Horizontal	Pass
1.4MHz Band QPSK	6/0	824.7	6.23	2.01	19.68	2.15	21.75	149.728	Vertical	Pass
		836.5	6.13	2.01	19.77	2.15	21.74	149.343	Vertical	Pass
		848.3	6.05	2.02	19.82	2.15	21.70	148.031	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	6.19	2.01	19.7	2.15	21.73	148.881	Vertical	Pass
		836.5	6.00	2.01	19.77	2.15	21.61	144.969	Vertical	Pass
		847.5	6.03	2.02	19.81	2.15	21.67	146.763	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	5.94	2.01	19.71	2.15	21.49	140.796	Vertical	Pass
		836.5	5.83	2.01	19.77	2.15	21.44	139.378	Vertical	Pass
		846.5	6.02	2.02	19.79	2.15	21.64	145.769	Vertical	Pass
10.0MHz z Band QPSK	50/0	829	6.11	2.01	19.73	2.15	21.68	147.176	Vertical	Pass
		836.5	6.00	2.01	19.77	2.15	21.61	144.790	Vertical	Pass
		844	6.29	2.02	19.78	2.15	21.90	154.963	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	Freque ncy	Result							Conclu sion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
1.4MHz Band 16 QAM	6/0	824.7	4.97	2.01	19.68	2.15	20.49	111.990	Horizontal	Pass
		836.5	5.05	2.01	19.77	2.15	20.66	116.335	Horizontal	Pass
		848.3	5.03	2.02	19.82	2.15	20.68	116.894	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	5.29	2.01	19.7	2.15	20.83	120.939	Horizontal	Pass
		836.5	5.11	2.01	19.77	2.15	20.72	118.073	Horizontal	Pass
		847.5	5.01	2.02	19.81	2.15	20.65	116.105	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	5.10	2.01	19.71	2.15	20.65	116.130	Horizontal	Pass
		836.5	5.14	2.01	19.77	2.15	20.75	118.775	Horizontal	Pass
		846.5	5.04	2.02	19.79	2.15	20.66	116.298	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	829	5.27	2.01	19.73	2.15	20.84	121.361	Horizontal	Pass
		836.5	5.15	2.01	19.77	2.15	20.76	119.220	Horizontal	Pass
		844	5.18	2.02	19.78	2.15	20.79	119.863	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	5.11	2.01	19.68	2.15	20.63	115.670	Vertical	Pass
		836.5	5.00	2.01	19.77	2.15	20.61	115.210	Vertical	Pass
		848.3	5.05	2.02	19.82	2.15	20.70	117.489	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	5.13	2.01	19.7	2.15	20.67	116.815	Vertical	Pass
		836.5	5.12	2.01	19.77	2.15	20.73	118.206	Vertical	Pass
		847.5	4.92	2.02	19.81	2.15	20.56	113.808	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	5.19	2.01	19.71	2.15	20.74	118.508	Vertical	Pass
		836.5	5.14	2.01	19.77	2.15	20.75	118.891	Vertical	Pass
		846.5	5.07	2.02	19.79	2.15	20.69	117.307	Vertical	Pass
10.0MH z Band 16 QAM	50/0	829	5.31	2.01	19.73	2.15	20.88	122.332	Vertical	Pass
		836.5	5.26	2.01	19.77	2.15	20.87	122.082	Vertical	Pass
		844	5.19	2.02	19.78	2.15	20.80	120.168	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.5 LTE BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	6.42	1.91	19.21	2.15	21.57	143.501	Vertical	Pass
		707.5	6.38	1.91	19.26	2.15	21.58	144.034	Vertical	Pass
		715.3	6.27	1.93	19.34	2.15	21.53	142.183	Vertical	Pass
3.0MHz Band QPSK	15/0	700.5	6.17	1.91	19.21	2.15	21.32	135.632	Vertical	Pass
		707.5	6.25	1.91	19.26	2.15	21.45	139.759	Vertical	Pass
		714.5	6.28	1.93	19.34	2.15	21.54	142.680	Vertical	Pass
5.0MHz Band QPSK	25/0	701.5	6.48	1.91	19.23	2.15	21.65	146.162	Vertical	Pass
		707.5	6.44	1.91	19.26	2.15	21.64	145.723	Vertical	Pass
		713.5	6.12	1.92	19.33	2.15	21.38	137.438	Vertical	Pass
10.0MHz Band QPSK	50/0	704	6.28	1.91	19.25	2.15	21.47	140.301	Vertical	Pass
		707.5	6.13	1.91	19.26	2.15	21.33	135.704	Vertical	Pass
		711	6.33	1.92	19.32	2.15	21.58	143.988	Vertical	Pass
1.4MHz Band QPSK	6/0	699.7	6.45	1.91	19.21	2.15	21.60	144.582	Horizontal	Pass
		707.5	6.42	1.91	19.26	2.15	21.62	145.352	Horizontal	Pass
		715.3	6.40	1.93	19.34	2.15	21.66	146.511	Horizontal	Pass
3.0MHz Band QPSK	15/0	700.5	6.39	1.91	19.21	2.15	21.54	142.558	Horizontal	Pass
		707.5	6.24	1.91	19.26	2.15	21.44	139.361	Horizontal	Pass
		714.5	6.44	1.93	19.34	2.15	21.70	147.755	Horizontal	Pass
5.0MHz Band QPSK	25/0	701.5	6.58	1.91	19.23	2.15	21.75	149.669	Horizontal	Pass
		707.5	6.59	1.91	19.26	2.15	21.79	151.048	Horizontal	Pass
		713.5	6.14	1.92	19.33	2.15	21.40	137.906	Horizontal	Pass
10.0MHz Band QPSK	50/0	704	6.35	1.91	19.25	2.15	21.54	142.575	Horizontal	Pass
		707.5	6.31	1.91	19.26	2.15	21.51	141.448	Horizontal	Pass
		711	6.63	1.92	19.32	2.15	21.88	154.305	Horizontal	Pass

Radiated Power (EIRP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	699.7	5.12	1.91	19.21	2.15	20.27	106.525	Vertical	Pass
		707.5	4.93	1.91	19.26	2.15	20.13	103.074	Vertical	Pass
		715.3	4.89	1.93	19.34	2.15	20.15	103.593	Vertical	Pass
3.0MHz Band 16 QAM	15/0	700.5	5.40	1.91	19.21	2.15	20.55	113.551	Vertical	Pass
		707.5	5.37	1.91	19.26	2.15	20.57	114.013	Vertical	Pass
		714.5	5.38	1.93	19.34	2.15	20.64	115.919	Vertical	Pass
5.0MHz Band 16 QAM	25/0	701.5	5.29	1.91	19.23	2.15	20.46	111.259	Vertical	Pass
		707.5	5.48	1.91	19.26	2.15	20.68	116.966	Vertical	Pass
		713.5	5.40	1.92	19.33	2.15	20.66	116.539	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	704	5.61	1.91	19.25	2.15	20.80	120.133	Vertical	Pass
		707.5	5.47	1.91	19.26	2.15	20.67	116.794	Vertical	Pass
		711	5.52	1.92	19.32	2.15	20.77	119.417	Vertical	Pass
1.4MHz Band 16 QAM	6/0	699.7	5.20	1.91	19.21	2.15	20.35	108.270	Horizontal	Pass
		707.5	5.21	1.91	19.26	2.15	20.41	109.800	Horizontal	Pass
		715.3	5.03	1.93	19.34	2.15	20.29	106.898	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	700.5	5.45	1.91	19.21	2.15	20.60	114.919	Horizontal	Pass
		707.5	5.32	1.91	19.26	2.15	20.52	112.806	Horizontal	Pass
		714.5	5.49	1.93	19.34	2.15	20.75	118.922	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	701.5	5.40	1.91	19.23	2.15	20.57	114.131	Horizontal	Pass
		707.5	5.58	1.91	19.26	2.15	20.78	119.665	Horizontal	Pass
		713.5	5.45	1.92	19.33	2.15	20.71	117.636	Horizontal	Pass
10.0MHz z Band 16 QAM	50/0	704	5.68	1.91	19.25	2.15	20.87	122.320	Horizontal	Pass
		707.5	5.45	1.91	19.26	2.15	20.65	116.111	Horizontal	Pass
		711	5.58	1.92	19.32	2.15	20.83	121.108	Horizontal	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.6 LTE BAND 17

Radiated Power (ERP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	706.5	6.82	1.91	19.23	2.15	21.99	157.974	Vertical	Pass
		710	6.71	1.91	19.26	2.15	21.91	155.328	Vertical	Pass
		713.5	6.73	1.92	19.33	2.15	21.99	158.015	Vertical	Pass
10.0MHz Band QPSK	50/0	709	6.95	1.91	19.25	2.15	22.14	163.650	Vertical	Pass
		710	6.99	1.91	19.26	2.15	22.19	165.432	Vertical	Pass
		711	6.71	1.92	19.32	2.15	21.96	157.119	Vertical	Pass
5.0MHz Band QPSK	25/0	706.5	6.93	1.91	19.23	2.15	22.10	162.159	Vertical	Pass
		710	6.77	1.91	19.26	2.15	21.97	157.302	Vertical	Pass
		713.5	6.78	1.92	19.33	2.15	22.04	159.783	Vertical	Pass
10.0MHz Band QPSK	50/0	709	6.91	1.91	19.25	2.15	22.10	162.157	Vertical	Pass
		710	7.02	1.91	19.26	2.15	22.22	166.617	Vertical	Pass
		711	6.66	1.92	19.32	2.15	21.91	155.133	Vertical	Pass

Radiated Power (ERP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	25/0	706.5	5.42	1.91	19.23	2.15	20.59	114.484	Vertical	Pass
		710	5.39	1.91	19.26	2.15	20.59	114.620	Vertical	Pass
		713.5	5.33	1.92	19.33	2.15	20.59	114.430	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	709	5.31	1.91	19.25	2.15	20.50	112.295	Vertical	Pass
		710	5.21	1.91	19.26	2.15	20.41	109.870	Vertical	Pass
		711	5.24	1.92	19.32	2.15	20.49	111.929	Vertical	Pass
5.0MHz Band 16 QAM	25/0	706.5	5.32	1.91	19.23	2.15	20.49	111.874	Horizontal	Pass
		710	5.39	1.91	19.26	2.15	20.59	114.597	Horizontal	Pass
		713.5	5.34	1.92	19.33	2.15	20.60	114.768	Horizontal	Pass
10.0MHz z Band 16 QAM	50/0	709	5.29	1.91	19.25	2.15	20.48	111.727	Horizontal	Pass
		710	5.50	1.91	19.26	2.15	20.70	117.563	Horizontal	Pass
		711	5.17	1.92	19.32	2.15	20.42	110.205	Horizontal	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.7 LTE BAND 25

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-2.53	3.86	28.24	21.84	152.897	Vertical	Pass
		1882.5	-3.07	3.76	28.22	21.39	137.645	Vertical	Pass
		1914.3	-2.67	3.91	28.20	21.61	144.936	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.62	3.75	28.23	21.86	153.454	Vertical	Pass
		1882.5	-2.60	3.98	28.24	21.66	146.510	Vertical	Pass
		1913.5	-2.40	3.87	28.25	21.98	157.801	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.92	3.66	28.31	21.73	148.941	Vertical	Pass
		1882.5	-2.65	3.76	28.22	21.81	151.668	Vertical	Pass
		1912.5	-2.85	3.91	28.20	21.44	139.164	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	-3.23	3.90	28.33	21.20	131.871	Vertical	Pass
		1882.5	-3.23	3.78	28.22	21.22	132.328	Vertical	Pass
		1910	-3.00	3.87	28.19	21.32	135.550	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-2.89	3.89	28.34	21.56	143.221	Vertical	Pass
		1882.5	-2.33	4.00	28.22	21.90	154.775	Vertical	Pass
		1907.5	-2.82	3.94	28.18	21.42	138.542	Vertical	Pass
20.0MHz Band QPSK	100/0	1860	-3.79	3.94	28.35	20.62	115.267	Vertical	Pass
		1882.5	-2.43	3.84	28.22	21.96	157.003	Vertical	Pass
		1905	-2.03	4.17	28.16	21.95	156.773	Vertical	Pass
1.4MHz Band QPSK	6/0	1850.7	-2.40	3.90	28.24	21.94	156.166	Horizontal	Pass
		1882.5	-3.09	3.74	28.22	21.39	137.707	Horizontal	Pass
		1914.3	-2.51	4.06	28.20	21.63	145.702	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-3.57	3.63	28.23	21.02	126.530	Horizontal	Pass
		1882.5	-2.72	3.91	28.24	21.61	145.026	Horizontal	Pass
		1913.5	-3.34	3.87	28.25	21.05	127.227	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-3.39	3.71	28.31	21.21	132.091	Horizontal	Pass
		1882.5	-2.86	3.93	28.22	21.43	138.902	Horizontal	Pass
		1912.5	-2.96	4.03	28.20	21.21	132.082	Horizontal	Pass
10.0MHz Band	50/0	1855	-3.10	3.96	28.33	21.27	133.888	Horizontal	Pass
		1882.5	-2.41	4.15	28.22	21.66	146.673	Horizontal	Pass

QPSK		1910	-2.89	3.92	28.19	21.38	137.415	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-2.47	3.98	28.34	21.89	154.406	Horizontal	Pass
		1882.5	-3.26	3.81	28.22	21.14	130.163	Horizontal	Pass
		1907.5	-2.52	4.15	28.18	21.51	141.628	Horizontal	Pass
20.0MHz Band QPSK	100/0	1860	-3.28	3.70	28.35	21.37	137.026	Horizontal	Pass
		1882.5	-2.70	4.05	28.22	21.47	140.361	Horizontal	Pass
		1905	-1.95	4.18	28.16	22.04	159.898	Horizontal	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	1850.7	-4.19	3.75	28.24	20.30	107.111	Vertical	Pass
		1882.5	-3.78	3.98	28.22	20.47	111.332	Vertical	Pass
		1914.3	-3.21	4.08	28.2	20.91	123.169	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-3.85	3.64	28.23	20.74	118.672	Vertical	Pass
		1882.5	-3.65	4.00	28.24	20.59	114.600	Vertical	Pass
		1913.5	-4.18	3.99	28.25	20.07	101.722	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-4.14	3.80	28.31	20.37	108.980	Vertical	Pass
		1882.5	-3.68	3.85	28.22	20.68	117.003	Vertical	Pass
		1912.5	-4.28	3.83	28.2	20.09	102.061	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-3.69	3.93	28.33	20.71	117.638	Vertical	Pass
		1882.5	-3.16	4.07	28.22	20.99	125.556	Vertical	Pass
		1910	-3.27	3.99	28.19	20.93	123.762	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-3.83	3.84	28.34	20.67	116.735	Vertical	Pass
		1882.5	-4.07	4.10	28.22	20.05	101.068	Vertical	Pass
		1907.5	-4.17	3.94	28.18	20.07	101.557	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-3.87	3.90	28.35	20.58	114.190	Vertical	Pass
		1882.5	-3.92	3.80	28.22	20.50	112.127	Vertical	Pass
		1905	-3.45	3.86	28.16	20.85	121.696	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-3.64	3.61	28.24	20.99	125.462	Horizontal	Pass
		1882.5	-3.23	4.04	28.22	20.95	124.392	Horizontal	Pass
		1914.3	-3.32	4.05	28.2	20.83	121.136	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-3.80	3.64	28.23	20.79	120.000	Horizontal	Pass
		1882.5	-3.51	4.00	28.24	20.73	118.206	Horizontal	Pass
		1913.5	-3.35	4.03	28.25	20.86	121.959	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-4.48	3.69	28.31	20.15	103.425	Horizontal	Pass
		1882.5	-3.46	3.79	28.22	20.97	125.007	Horizontal	Pass
		1912.5	-4.10	4.09	28.2	20.02	100.406	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-4.35	3.86	28.33	20.12	102.825	Horizontal	Pass
		1882.5	-3.61	3.82	28.22	20.79	119.839	Horizontal	Pass
		1910	-3.63	3.96	28.19	20.59	114.653	Horizontal	Pass
15.0MHz Band	75/0	1857.5	-4.29	3.83	28.34	20.22	105.098	Horizontal	Pass
		1882.5	-3.52	4.02	28.22	20.69	117.108	Horizontal	Pass

16 QAM		1907.5	-3.24	4.06	28.18	20.88	122.339	Horizontal	Pass
20.0MH	100/0	1860	-3.43	3.88	28.35	21.04	126.980	Horizontal	Pass
z Band		1882.5	-3.54	3.86	28.22	20.81	120.642	Horizontal	Pass
16 QAM		1905	-3.93	3.95	28.16	20.28	106.743	Horizontal	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27.53

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 25

RESULTS

PASS

9.1 LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-50.30	4.04	33.51	-20.83	-13	-7.83	Horizontal
3701.4	-52.62	4.04	33.51	-23.15	-13	-10.15	Vertical
5552.1	-55.38	5.24	35.84	-24.78	-13	-11.78	Vertical
5552.1	-65.76	5.24	35.84	-35.16	-13	-22.16	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-51.83	4.04	33.56	-22.31	-13	-9.31	Horizontal
3760	-52.39	4.04	33.56	-22.87	-13	-9.87	Vertical
5640	-52.49	5.24	35.91	-21.82	-13	-8.82	Vertical
5640	-54.99	5.24	35.91	-24.32	-13	-11.32	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-51.34	4.04	34.00	-21.38	-13	-8.38	Horizontal
3818.6	-53.79	4.04	34.00	-23.83	-13	-10.83	Vertical
5727.9	-55.36	5.24	36.04	-24.56	-13	-11.56	Vertical
5727.9	-55.14	5.24	36.04	-24.34	-13	-11.34	Horizontal

QPSK EIRP POWER FOR LTE BAND 2 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720	-55.77	4.07	33.54	-26.30	-13	-13.30	Horizontal
3720	-49.58	4.07	33.54	-20.11	-13	-7.11	Vertical
5580	-56.70	5.28	35.86	-26.12	-13	-13.12	Vertical
5580	-57.49	5.28	35.86	-26.91	-13	-13.91	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-54.97	4.04	33.56	-25.45	-13	-12.45	Horizontal
3760	-51.91	4.04	33.56	-22.39	-13	-9.39	Vertical
5640	-55.82	5.24	35.91	-25.15	-13	-12.15	Vertical
5640	-57.00	5.24	35.91	-26.33	-13	-13.33	Horizontal
Test Results for High Channel 1900MHz							
3800	-53.33	4.04	34.00	-23.37	-13	-10.37	Horizontal
3800	-54.33	4.04	34.00	-24.37	-13	-11.37	Vertical
5700	-56.26	5.24	36.04	-25.46	-13	-12.46	Vertical
5700	-54.30	5.24	36.04	-23.50	-13	-10.50	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3421.4	-58.05	4.02	29.80	-32.27	-13	-19.27	Horizontal
3421.4	-55.37	4.02	29.80	-29.59	-13	-16.59	Vertical
5132.1	-59.86	5.24	35.84	-29.26	-13	-16.26	Vertical
5132.1	-60.30	5.24	35.84	-29.70	-13	-16.70	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-49.67	4.03	30.00	-23.70	-13	-10.70	Horizontal
3465	-53.44	4.03	30.00	-27.47	-13	-14.47	Vertical
5197.5	-56.69	5.25	35.86	-26.08	-13	-13.08	Vertical
5197.5	-54.81	5.25	35.86	-24.20	-13	-11.20	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-49.34	4.05	30.01	-23.38	-13	-10.38	Horizontal
3508.6	-55.27	4.05	30.01	-29.31	-13	-16.31	Vertical
5262.9	-55.22	5.26	35.86	-24.62	-13	-11.62	Vertical
5262.9	-52.79	5.26	35.86	-22.19	-13	-9.19	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3440	-55.44	4.02	29.80	-29.66	-13	-16.66	Horizontal
3440	-55.37	4.02	29.80	-29.59	-13	-16.59	Vertical
5160	-58.04	5.24	35.84	-27.44	-13	-14.44	Vertical
5160	-61.13	5.24	35.84	-30.53	-13	-17.53	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-48.84	4.03	30.00	-22.87	-13	-9.87	Horizontal
3465	-52.58	4.03	30.00	-26.61	-13	-13.61	Vertical
5197.5	-58.76	5.25	35.86	-28.15	-13	-15.15	Vertical
5197.5	-57.75	5.25	35.86	-27.14	-13	-14.14	Horizontal
Test Results for High Channel 1745MHz							
3490	-51.90	2.91	27.68	-27.13	-13	-14.13	Horizontal
3490	-53.22	2.91	27.68	-28.45	-13	-15.45	Vertical
5235	-57.24	5.26	35.86	-26.64	-13	-13.64	Vertical
5235	-56.04	5.26	35.86	-25.44	-13	-12.44	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.3 LTE BAND 5

QPSK EIRP POWER FOR LTE BAND 5 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1649.4	-54.41	2.78	27.50	-29.69	-13	-16.69	Horizontal
1649.4	-48.95	2.78	27.50	-24.23	-13	-11.23	Vertical
2474.1	-51.91	2.90	27.80	-27.01	-13	-14.01	Vertical
2474.1	-53.07	2.90	27.80	-28.17	-13	-15.17	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-54.59	2.80	27.48	-29.91	-13	-16.91	Horizontal
1673	-52.69	2.80	27.48	-28.01	-13	-15.01	Vertical
2509.5	-55.25	2.91	27.70	-30.46	-13	-17.46	Vertical
2509.5	-51.73	2.91	27.70	-26.94	-13	-13.94	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-53.22	2.82	27.43	-28.61	-13	-15.61	Horizontal
1696.6	-52.63	2.82	27.43	-28.02	-13	-15.02	Vertical
2544.9	-48.82	2.92	27.74	-24.00	-13	-11.00	Vertical
2544.9	-54.91	2.92	27.74	-30.09	-13	-17.09	Horizontal

QPSK EIRP POWER FOR LTE BAND 5 (10MHZ BANDWIDTH)

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658	-52.56	2.78	27.50	-27.84	-13	-14.84	Horizontal
1658	-55.11	2.78	27.50	-30.39	-13	-17.39	Vertical
2487	-55.61	2.90	27.80	-30.71	-13	-17.71	Vertical
2487	-48.59	2.90	27.80	-23.69	-13	-10.69	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-52.22	2.80	27.48	-27.54	-13	-14.54	Horizontal
1673	-55.02	2.80	27.48	-30.34	-13	-17.34	Vertical
2509.5	-55.84	2.91	27.70	-31.05	-13	-18.05	Vertical
2509.5	-55.23	2.91	27.70	-30.44	-13	-17.44	Horizontal
Test Results for High Channel 844MHz							
1688	-54.26	2.82	27.43	-29.65	-13	-16.65	Horizontal
1688	-55.06	2.82	27.43	-30.45	-13	-17.45	Vertical
2532	-53.87	2.92	27.74	-29.05	-13	-16.05	Vertical
2532	-55.58	2.92	27.74	-30.76	-13	-17.76	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.4 LTE BAND 12

QPSK EIRP POWER FOR LTE BAND 12 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1399.4	-47.65	2.60	27.20	-23.05	-13	-10.05	Horizontal
1399.4	-49.02	2.60	27.20	-24.42	-13	-11.42	Vertical
2099.1	-48.36	2.85	27.54	-23.67	-13	-10.67	Vertical
2099.1	-48.40	2.85	27.54	-23.71	-13	-10.71	Horizontal
Test Results For Mid Channel 707.5MHz							
1415	-50.54	2.61	27.28	-25.87	-13	-12.87	Horizontal
1415	-48.14	2.61	27.28	-23.47	-13	-10.47	Vertical
2122.5	-46.72	2.87	27.59	-22.00	-13	-9.00	Vertical
2122.5	-50.76	2.87	27.59	-26.04	-13	-13.04	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-50.83	2.63	27.28	-26.18	-13	-13.18	Horizontal
1430.6	-55.25	2.63	27.28	-30.60	-13	-17.60	Vertical
2145.9	-52.04	2.88	27.60	-27.32	-13	-14.32	Vertical
2145.9	-49.44	2.88	27.60	-24.72	-13	-11.72	Horizontal

QPSK EIRP POWER FOR LTE BAND 12 (10MHZ BANDWIDTH)

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1408	-47.90	2.61	27.26	-23.25	-13	-10.25	Horizontal
1408	-51.06	2.61	27.26	-26.41	-13	-13.41	Vertical
2112	-49.96	2.87	27.58	-25.25	-13	-12.25	Vertical
2112	-50.77	2.87	27.58	-26.06	-13	-13.06	Horizontal
Test Results for Mid Channel 707.5MHz							
1415	-49.22	2.61	27.28	-24.55	-13	-11.55	Horizontal
1415	-53.16	2.61	27.28	-28.49	-13	-15.49	Vertical
2122.5	-51.72	2.87	27.59	-27.00	-13	-14.00	Vertical
2122.5	-51.22	2.87	27.59	-26.50	-13	-13.50	Horizontal
Test Results for High Channel 711MHz							
1422	-53.08	2.62	27.28	-28.42	-13	-15.42	Horizontal
1422	-48.26	2.62	27.28	-23.60	-13	-10.60	Vertical
2133	-51.36	2.87	27.60	-26.63	-13	-13.63	Vertical
2133	-50.97	2.87	27.60	-26.24	-13	-13.24	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

9.5 LTE BAND 17

QPSK EIRP POWER FOR LTE BAND 17 (5MHZ BANDWIDTH)

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1413	-49.11	2.61	27.28	-24.44	-13	-11.44	Horizontal
1413	-46.95	2.61	27.28	-22.28	-13	-9.28	Vertical
2119.5	-49.47	2.87	27.59	-24.75	-13	-11.75	Vertical
2119.5	-49.13	2.87	27.59	-24.41	-13	-11.41	Horizontal
Test Results For Mid Channel 710MHz							
1420	-47.68	2.62	27.30	-23.00	-13	-10.00	Horizontal
1420	-50.44	2.62	27.30	-25.76	-13	-12.76	Vertical
2130	-51.16	2.87	27.62	-26.41	-13	-13.41	Vertical
2130	-53.81	2.87	27.62	-29.06	-13	-16.06	Horizontal
Test Results for High Channel 713.5MHz							
1427	-50.74	2.66	27.28	-26.12	-13	-13.12	Horizontal
1427	-52.19	2.66	27.28	-27.57	-13	-14.57	Vertical
2140.5	-49.31	2.88	27.60	-24.59	-13	-11.59	Vertical
2140.5	-48.01	2.88	27.60	-23.29	-13	-10.29	Horizontal

QPSK EIRP POWER FOR LTE BAND 17 (10MHZ BANDWIDTH)

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1418	-51.64	2.62	27.30	-26.96	-13	-13.96	Horizontal
1418	-49.50	2.62	27.30	-24.82	-13	-11.82	Vertical
2127	-50.67	2.87	27.62	-25.92	-13	-12.92	Vertical
2127	-53.76	2.87	27.62	-29.01	-13	-16.01	Horizontal
Test Results for Mid Channel 710MHz							
1420	-51.20	2.62	27.30	-26.52	-13	-13.52	Horizontal
1420	-48.71	2.62	27.30	-24.03	-13	-11.03	Vertical
2130	-53.07	2.87	27.62	-28.32	-13	-15.32	Vertical
2130	-48.65	2.87	27.62	-23.90	-13	-10.90	Horizontal
Test Results for High Channel 711MHz							
1422	-57.97	2.62	27.30	-33.29	-13	-20.29	Horizontal
1422	-50.30	2.62	27.30	-25.62	-13	-12.62	Vertical
2133	-49.25	2.87	27.62	-24.50	-13	-11.50	Vertical
2133	-52.20	2.87	27.62	-27.45	-13	-14.45	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

. Over Limit= : P_{Mea}(dBm)-Limit(dBm)

. We test both H direction and V direction, recorded worst case direction.

9.6 LTE BAND 25

QPSK EIRP POWER FOR LTE BAND 25 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3701.4	-50.78	2.61	27.26	-26.13	-13	-13.13	Horizontal
3701.4	-50.40	2.61	27.26	-25.75	-13	-12.75	Vertical
5552.1	-53.70	2.87	27.58	-28.99	-13	-15.99	Vertical
5552.1	-51.57	2.87	27.58	-26.86	-13	-13.86	Horizontal
Test Results For Mid Channel 1882.5MHz							
3765	-50.03	2.63	27.28	-25.38	-13	-12.38	Horizontal
3765	-51.98	2.63	27.28	-27.33	-13	-14.33	Vertical
5647.5	-49.56	2.88	27.62	-24.82	-13	-11.82	Vertical
5647.5	-51.08	2.88	27.62	-26.34	-13	-13.34	Horizontal
Test Results for High Channel 1914.3MHz							
3828.6	-53.30	2.65	27.28	-28.67	-13	-15.67	Horizontal
3828.6	-52.66	2.65	27.28	-28.03	-13	-15.03	Vertical
5742.9	-51.45	2.88	27.70	-26.63	-13	-13.63	Vertical
5742.9	-50.96	2.88	27.70	-26.14	-13	-13.14	Horizontal

QPSK EIRP POWER FOR LTE BAND 25 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720	-52.47	2.62	27.30	-27.79	-13	-14.79	Horizontal
3720	-51.97	2.62	27.30	-27.29	-13	-14.29	Vertical
5580	-52.53	2.87	27.62	-27.78	-13	-14.78	Vertical
5580	-51.32	2.87	27.62	-26.57	-13	-13.57	Horizontal
Test Results for Mid Channel 1882.5MHz							
3765	-53.18	2.64	27.33	-28.49	-13	-15.49	Horizontal
3765	-52.95	2.64	27.33	-28.26	-13	-15.26	Vertical
5647.5	-53.08	2.88	27.67	-28.29	-13	-15.29	Vertical
5647.5	-51.50	2.88	27.67	-26.71	-13	-13.71	Horizontal
Test Results for High Channel 1905MHz							
3810	-49.21	2.64	27.33	-24.52	-13	-11.52	Horizontal
3810	-52.79	2.64	27.33	-28.10	-13	-15.10	Vertical
5715	-50.92	2.88	27.67	-26.13	-13	-13.13	Vertical
5715	-50.33	2.88	27.67	-25.54	-13	-12.54	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

We test both H direction and V direction, recorded worst case direction.

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = -30° to $+50^{\circ}\text{C}$

Voltage = low voltage, DC 3.2V, Normal, DC 3.85V and High voltage, DC DC 4.2V.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to -30°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.

Frequency Stability vs Voltage:

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

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 25

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	-17.5	-0.009309	2.5
3.85	1880	-17.8	-0.009468	2.5
4.2	1880	-17.3	-0.009202	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	-17.7	-0.009415	2.5
Extreme (50C)	1880	-17.6	-0.009362	2.5
Extreme (40C)	1880	-17.7	-0.009415	2.5
Extreme (30C)	1880	-17.8	-0.009468	2.5
Extreme (10C)	1880	-17.3	-0.009202	2.5
Extreme (0C)	1880	-17.2	-0.009149	2.5
Extreme (-10C)	1880	-16.9	-0.008989	2.5
Extreme (-20C)	1880	-17.1	-0.009096	2.5
Extreme (-30C)	1880	-16.8	-0.008936	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	-19.2	-0.010213	2.5
3.85	1880	-19.0	-0.010106	2.5
4.2	1880	-19.2	-0.010213	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	-18.9	-0.010053	2.5
Extreme (50C)	1880	-19.1	-0.010160	2.5
Extreme (40C)	1880	-19.7	-0.010479	2.5
Extreme (30C)	1880	-19.2	-0.010213	2.5
Extreme (10C)	1880	-18.8	-0.010000	2.5
Extreme (0C)	1880	-19.7	-0.010479	2.5
Extreme (-10C)	1880	-19.1	-0.010160	2.5
Extreme (-20C)	1880	-18.9	-0.010053	2.5
Extreme (-30C)	1880	-19.2	-0.010213	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.2 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-14.4	-0.008312	2.5
3.85	1732.5	-14.3	-0.008254	2.5
4.2	1732.5	-14.4	-0.008312	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	-14.4	-0.008312	2.5
Extreme (50C)	1732.5	-14.1	-0.008139	2.5
Extreme (40C)	1732.5	-14.8	-0.008543	2.5
Extreme (30C)	1732.5	-14.8	-0.008543	2.5
Extreme (10C)	1732.5	-14.1	-0.008139	2.5
Extreme (0C)	1732.5	-14.3	-0.008254	2.5
Extreme (-10C)	1732.5	-14.6	-0.008427	2.5
Extreme (-20C)	1732.5	-14.8	-0.008543	2.5
Extreme (-30C)	1732.5	-14.2	-0.008196	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-16.7	-0.009639	2.5
3.85	1732.5	-16.9	-0.009755	2.5
4.2	1732.5	-16.7	-0.009639	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	-16.8	-0.009697	2.5
Extreme (50C)	1732.5	-16.8	-0.009697	2.5
Extreme (40C)	1732.5	-16.3	-0.009408	2.5
Extreme (30C)	1732.5	-16.6	-0.009582	2.5
Extreme (10C)	1732.5	-16.2	-0.009351	2.5
Extreme (0C)	1732.5	-15.9	-0.009177	2.5
Extreme (-10C)	1732.5	-16.1	-0.009293	2.5
Extreme (-20C)	1732.5	-16.7	-0.009639	2.5
Extreme (-30C)	1732.5	-16.6	-0.009582	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	-10.5	-0.012552	2.5
3.85	836.5	-10.2	-0.012194	2.5
4.2	836.5	-11.1	-0.013270	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-10.6	-0.012672	2.5
Extreme (50C)	836.5	-11.6	-0.013867	2.5
Extreme (40C)	836.5	-11.1	-0.013270	2.5
Extreme (30C)	836.5	-10.9	-0.013030	2.5
Extreme (10C)	836.5	-10.8	-0.012911	2.5
Extreme (0C)	836.5	-10.7	-0.012791	2.5
Extreme (-10C)	836.5	-11.3	-0.013509	2.5
Extreme (-20C)	836.5	-12.1	-0.014465	2.5
Extreme (-30C)	836.5	-11.3	-0.013509	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	836.5	-13.2	-0.015780	2.5
3.85	836.5	-13.5	-0.016139	2.5
4.2	836.5	-13.9	-0.016617	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-13.8	-0.016497	2.5
Extreme (50C)	836.5	-12.9	-0.015421	2.5
Extreme (40C)	836.5	-12.9	-0.015421	2.5
Extreme (30C)	836.5	-13.1	-0.015660	2.5
Extreme (10C)	836.5	-13.3	-0.015900	2.5
Extreme (0C)	836.5	-13.3	-0.015900	2.5
Extreme (-10C)	836.5	-13.1	-0.015660	2.5
Extreme (-20C)	836.5	-13.9	-0.016617	2.5
Extreme (-30C)	836.5	-13.8	-0.016497	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.4 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	-16.6	-0.006548	2.5
3.85	707.5	-16.8	-0.006627	2.5
4.2	707.5	-16.4	-0.006469	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-16.3	-0.006430	2.5
Extreme (50C)	707.5	-16.1	-0.006351	2.5
Extreme (40C)	707.5	-16.2	-0.006391	2.5
Extreme (30C)	707.5	-16.2	-0.006391	2.5
Extreme (10C)	707.5	-15.8	-0.006233	2.5
Extreme (0C)	707.5	-16.9	-0.006667	2.5
Extreme (-10C)	707.5	-17.1	-0.006746	2.5
Extreme (-20C)	707.5	-16.6	-0.006548	2.5
Extreme (-30C)	707.5	-16.7	-0.006588	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	-14.5	-0.005720	2.5
3.85	707.5	-14.8	-0.005838	2.5
4.2	707.5	-14.9	-0.005878	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-14.2	-0.005602	2.5
Extreme (50C)	707.5	-14.7	-0.005799	2.5
Extreme (40C)	707.5	-14.2	-0.005602	2.5
Extreme (30C)	707.5	-15.3	-0.006036	2.5
Extreme (10C)	707.5	-14.4	-0.005680	2.5
Extreme (0C)	707.5	-15.1	-0.005957	2.5
Extreme (-10C)	707.5	-13.9	-0.005483	2.5
Extreme (-20C)	707.5	-13.5	-0.005325	2.5
Extreme (-30C)	707.5	-14.2	-0.005602	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.5 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	-5.2	-0.007350	2.5
3.85	710.0	-5.8	-0.008198	2.5
4.2	710.0	-5.4	-0.007633	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	-5.6	-0.007915	2.5
Extreme (50C)	710.0	-6.4	-0.009046	2.5
Extreme (40C)	710.0	-5.9	-0.008339	2.5
Extreme (30C)	710.0	-6.7	-0.009470	2.5
Extreme (10C)	710.0	-6.1	-0.008622	2.5
Extreme (0C)	710.0	-3.5	-0.004947	2.5
Extreme (-10C)	710.0	-5.9	-0.008339	2.5
Extreme (-20C)	710.0	-5.5	-0.007774	2.5
Extreme (-30C)	710.0	-6.2	-0.008763	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710.0	-11.6	-0.016396	2.5
3.85	710.0	-11	-0.015548	2.5
4.2	710.0	-11.2	-0.015830	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	-10.9	-0.015406	2.5
Extreme (50C)	710.0	-11.7	-0.016537	2.5
Extreme (40C)	710.0	-11.1	-0.015689	2.5
Extreme (30C)	710.0	-11.2	-0.015830	2.5
Extreme (10C)	710.0	-11.3	-0.015972	2.5
Extreme (0C)	710.0	-10.8	-0.015265	2.5
Extreme (-10C)	710.0	-11.8	-0.016678	2.5
Extreme (-20C)	710.0	-11.4	-0.016113	2.5
Extreme (-30C)	710.0	-10.9	-0.015406	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.6 LTE BAND 25

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 25 QPSK, (CH 26365 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1882.5	-13.4	-0.018873	2.5
3.85	1882.5	-12.8	-0.018028	2.5
4.2	1882.5	-12.6	-0.017746	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 25 QPSK, (CH 26365 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1882.5	-12.9	-0.018169	2.5
Extreme (50C)	1882.5	-13.4	-0.018873	2.5
Extreme (40C)	1882.5	-12.9	-0.018169	2.5
Extreme (30C)	1882.5	-13.7	-0.019296	2.5
Extreme (10C)	1882.5	-13.6	-0.019155	2.5
Extreme (0C)	1882.5	-13.7	-0.019296	2.5
Extreme (-10C)	1882.5	-12.8	-0.018028	2.5
Extreme (-20C)	1882.5	-13.3	-0.018732	2.5
Extreme (-30C)	1882.5	-13.2	-0.018592	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 25 16QAM, (CH 26365 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1882.5	-14.7	-0.020704	2.5
3.85	1882.5	-15	-0.021127	2.5
4.2	1882.5	-14.5	-0.020423	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 25 16QAM, (CH 26365 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1882.5	-14.5	-0.020423	2.5
Extreme (50C)	1882.5	-15.6	-0.021972	2.5
Extreme (40C)	1882.5	-15.1	-0.021268	2.5
Extreme (30C)	1882.5	-14.6	-0.020563	2.5
Extreme (10C)	1882.5	-14.7	-0.020704	2.5
Extreme (0C)	1882.5	-15.1	-0.021268	2.5
Extreme (-10C)	1882.5	-15.4	-0.021690	2.5
Extreme (-20C)	1882.5	-14.9	-0.020986	2.5
Extreme (-30C)	1882.5	-15.3	-0.021549	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

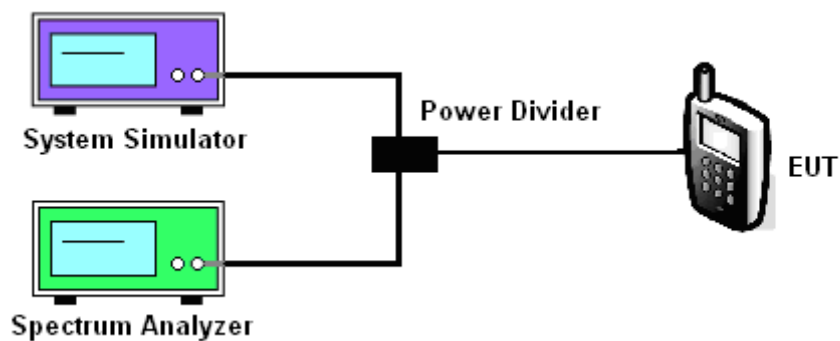
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
 - a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
 - b. Set EUT in maximum power output, and triggered the burst signal.
 - c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 5
LTE Band 12
LTE Band 17
LTE Band 25

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	5.29
2	18900	1880.0	1.4	1	Low	16-QAM	6.14
2	18900	1880.0	3.0	1	Low	QPSK	5.22
2	18900	1880.0	3.0	1	Low	16-QAM	5.88
2	18900	1880.0	5.0	1	Low	QPSK	5.27
2	18900	1880.0	5.0	1	Low	16-QAM	5.77
2	18900	1880.0	10.0	1	Low	QPSK	4.96
2	18900	1880.0	10.0	1	Low	16-QAM	5.87
2	18900	1880.0	15.0	1	Low	QPSK	4.86
2	18900	1880.0	15.0	1	Low	16-QAM	5.56
2	18900	1880.0	20.0	1	Low	QPSK	4.69
2	18900	1880.0	20.0	1	Low	16-QAM	5.39
4	20175	1732.5	1.4	1	Low	QPSK	4.32
4	20175	1732.5	1.4	1	Low	16-QAM	4.84
4	20175	1732.5	3.0	1	Low	QPSK	4.18
4	20175	1732.5	3.0	1	Low	16-QAM	4.97
4	20175	1732.5	5.0	1	Low	QPSK	4.30
4	20175	1732.5	5.0	1	Low	16-QAM	5.08
4	20175	1732.5	10.0	1	Low	QPSK	4.05
4	20175	1732.5	10.0	1	Low	16-QAM	4.89

4	20175	1732.5	15.0	1	Low	QPSK	4.13
4	20175	1732.5	15.0	1	Low	16-QAM	4.93
4	20175	1732.5	20.0	1	Low	QPSK	4.23
4	20175	1732.5	20.0	1	Low	16-QAM	5.20
5	20525	836.5	1.4	1	Low	QPSK	5.10
5	20525	836.5	1.4	1	Low	16-QAM	5.93
5	20525	836.5	3.0	1	Low	QPSK	5.29
5	20525	836.5	3.0	1	Low	16-QAM	5.87
5	20525	836.5	5.0	1	Low	QPSK	5.71
5	20525	836.5	5.0	1	Low	16-QAM	5.99
5	20525	836.5	10.0	1	Low	QPSK	5.12
5	20525	836.5	10.0	1	Low	16-QAM	6.15
12	23095	707.5	1.4	1	Low	QPSK	4.45
12	23095	707.5	1.4	1	Low	16-QAM	5.28
12	23095	707.5	3.0	1	Low	QPSK	4.74
12	23095	707.5	3.0	1	Low	16-QAM	5.28
12	23095	707.5	5.0	1	Low	QPSK	4.93
12	23095	707.5	5.0	1	Low	16-QAM	5.50
12	23095	707.5	10.0	1	Low	QPSK	4.79
12	23095	707.5	10.0	1	Low	16-QAM	5.73
17	23790	710.0	5.0	1	Low	QPSK	4.94
17	23790	710.0	5.0	1	Low	16-QAM	5.38

17	23790	710.0	10.0	1	Low	QPSK	4.42
17	23790	710.0	10.0	1	Low	16-QAM	5.31
25	26365	1882.5	1.4	1	Low	QPSK	4.96
25	26365	1882.5	1.4	1	Low	16-QAM	6.14
25	26365	1882.5	3.0	1	Low	QPSK	4.98
25	26365	1882.5	3.0	1	Low	16-QAM	6.08
25	26365	1882.5	5.0	1	Low	QPSK	5.28
25	26365	1882.5	5.0	1	Low	16-QAM	6.05
25	26365	1882.5	10.0	1	Low	QPSK	5.39
25	26365	1882.5	10.0	1	Low	16-QAM	6.20
25	26365	1882.5	15.0	1	Low	QPSK	4.96
25	26365	1882.5	15.0	1	Low	16-QAM	5.77
25	26365	1882.5	20.0	1	Low	QPSK	4.89
25	26365	1882.5	20.0	1	Low	16-QAM	5.42