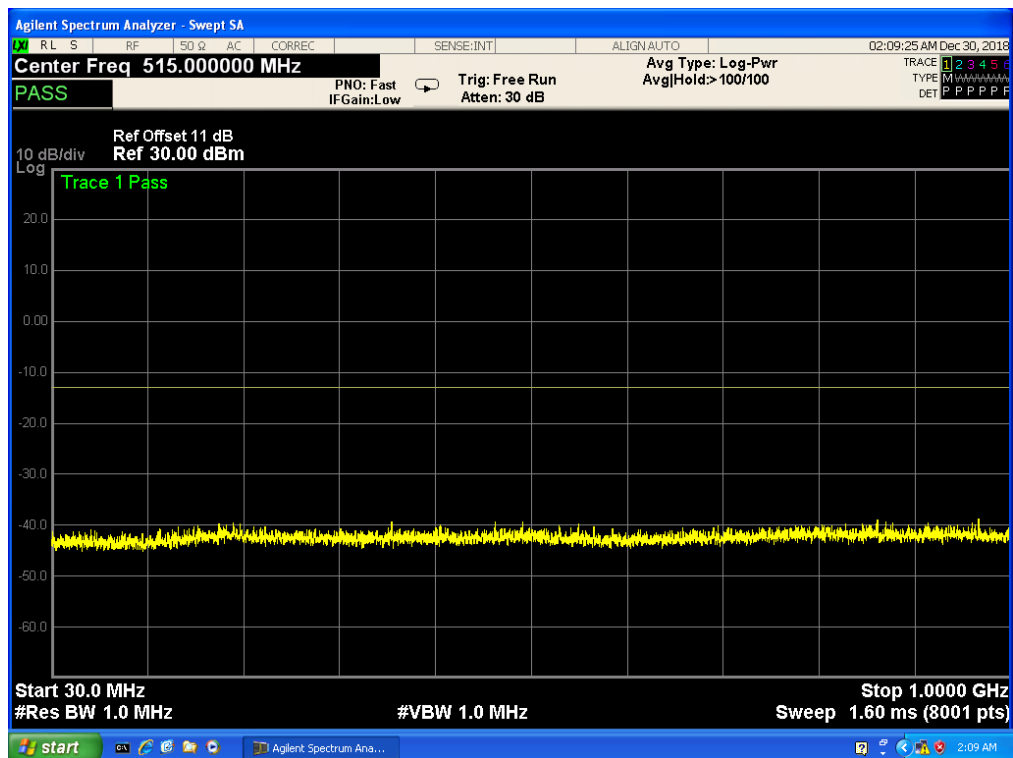
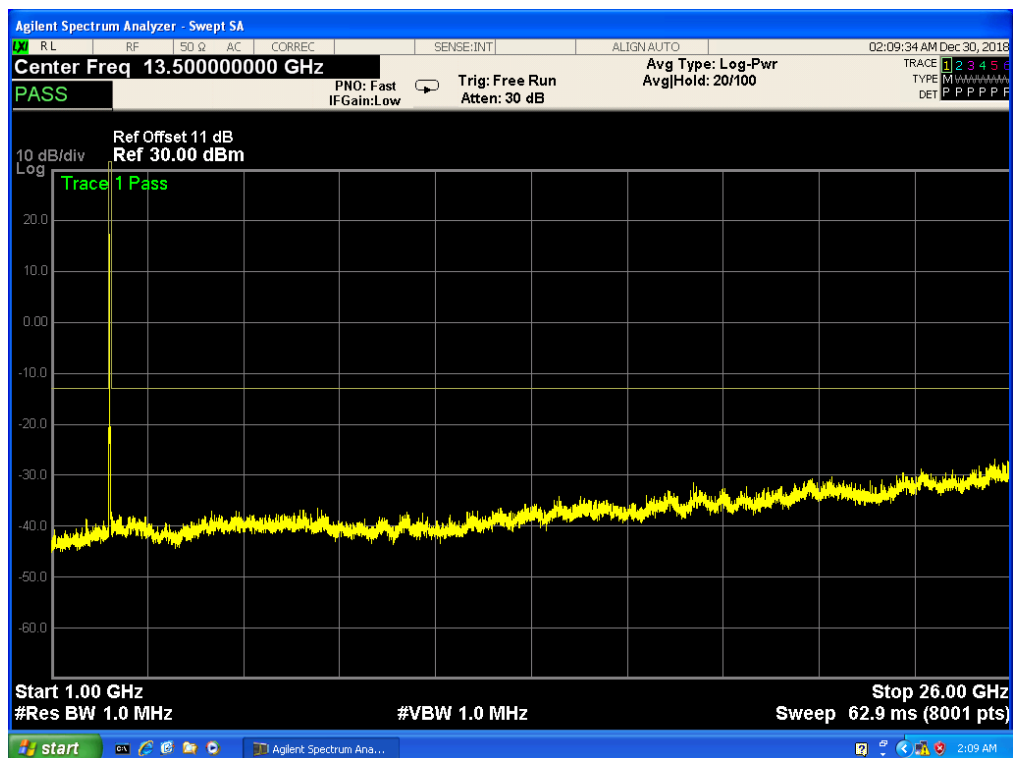


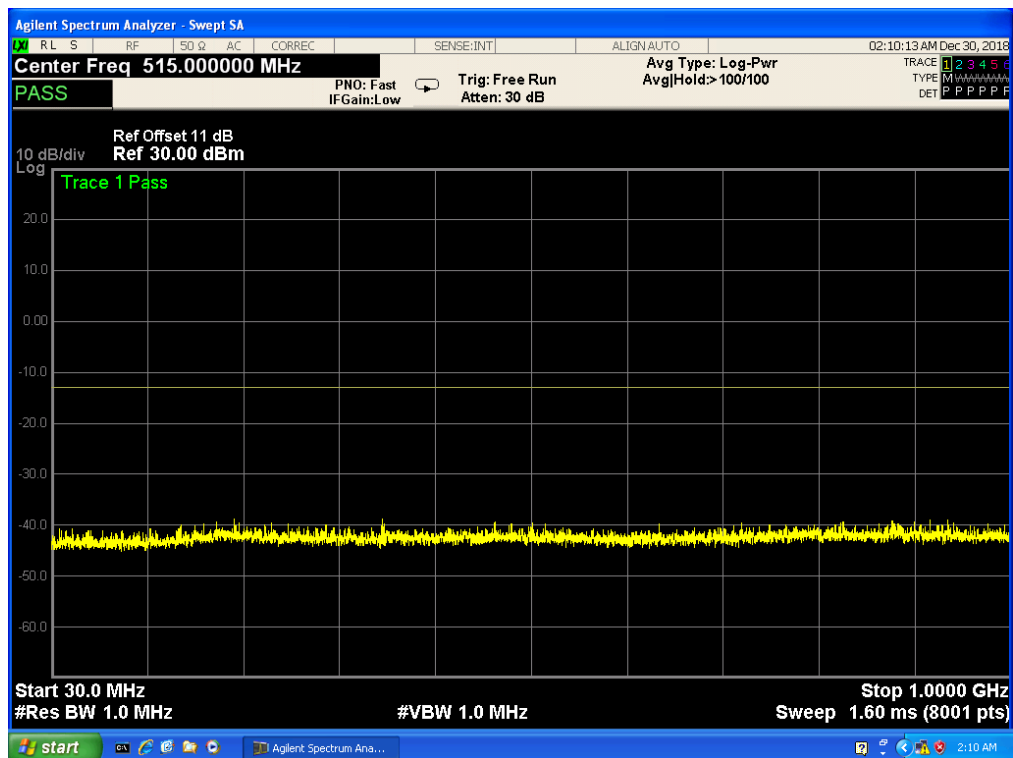
Band 7, UL Channel 20825, UL Frequency 2507.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



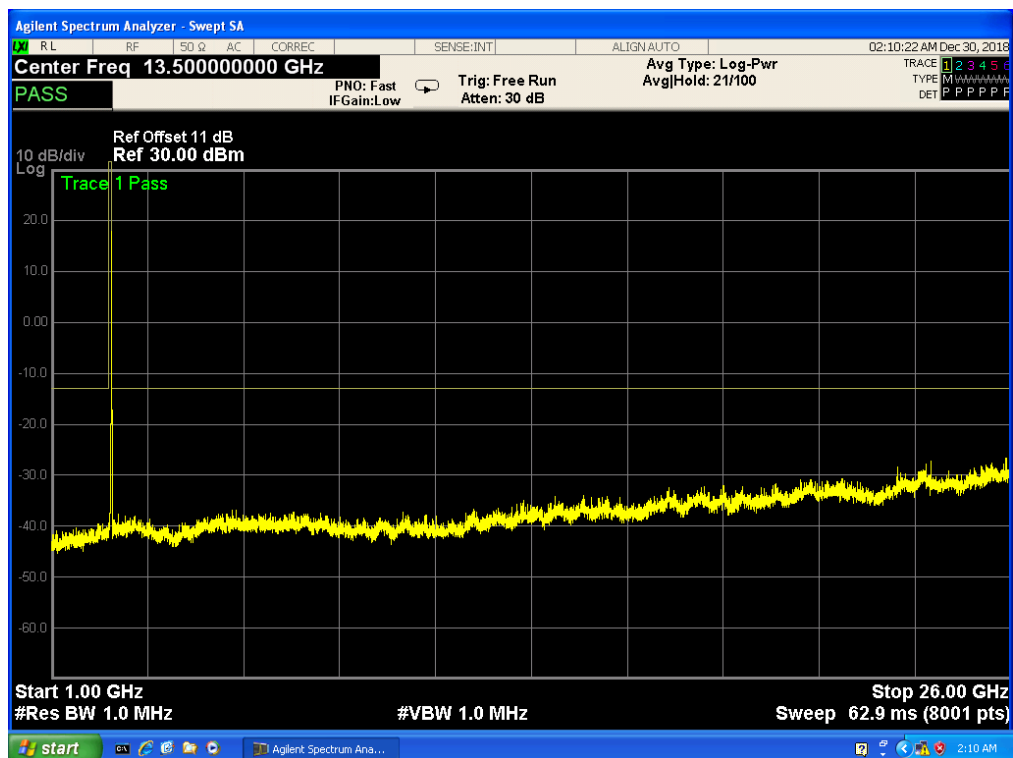
Band 7, UL Channel 20825, UL Frequency 2507.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



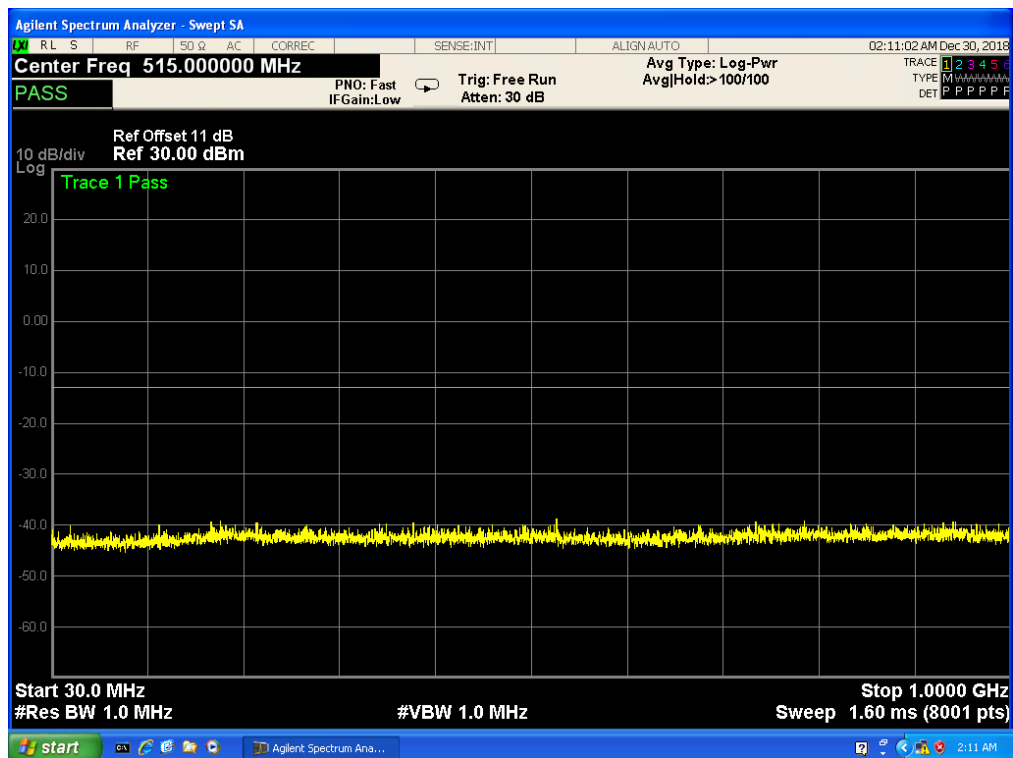
Band 7, UL Channel 21375, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



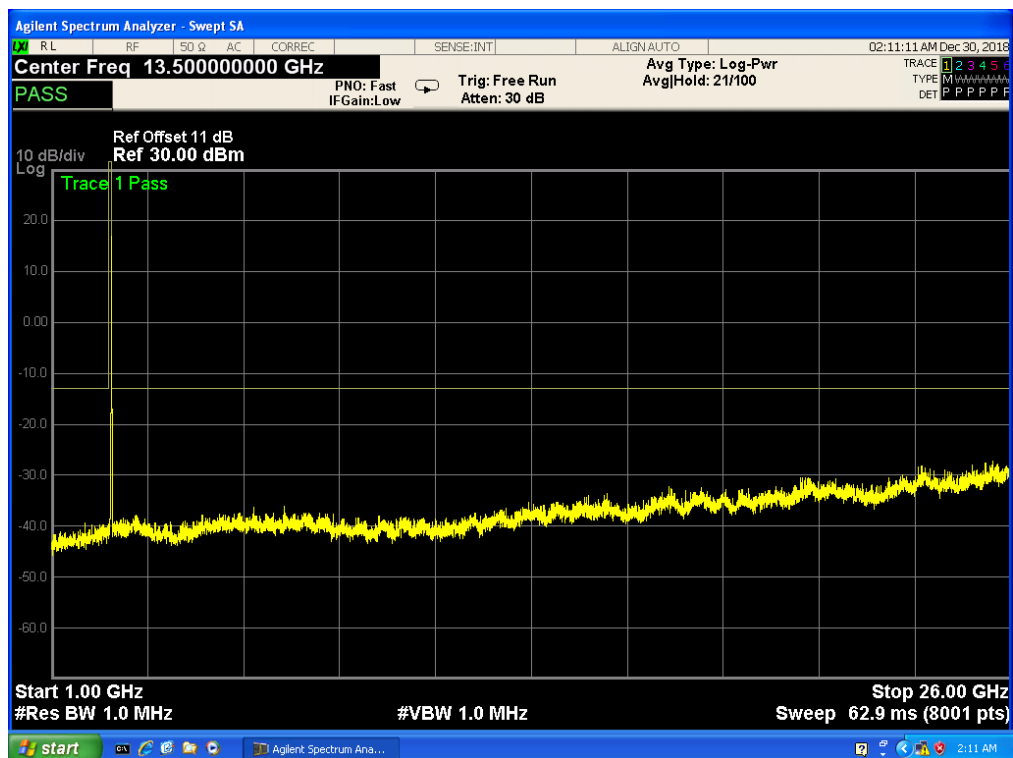
Band 7, UL Channel 21375, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



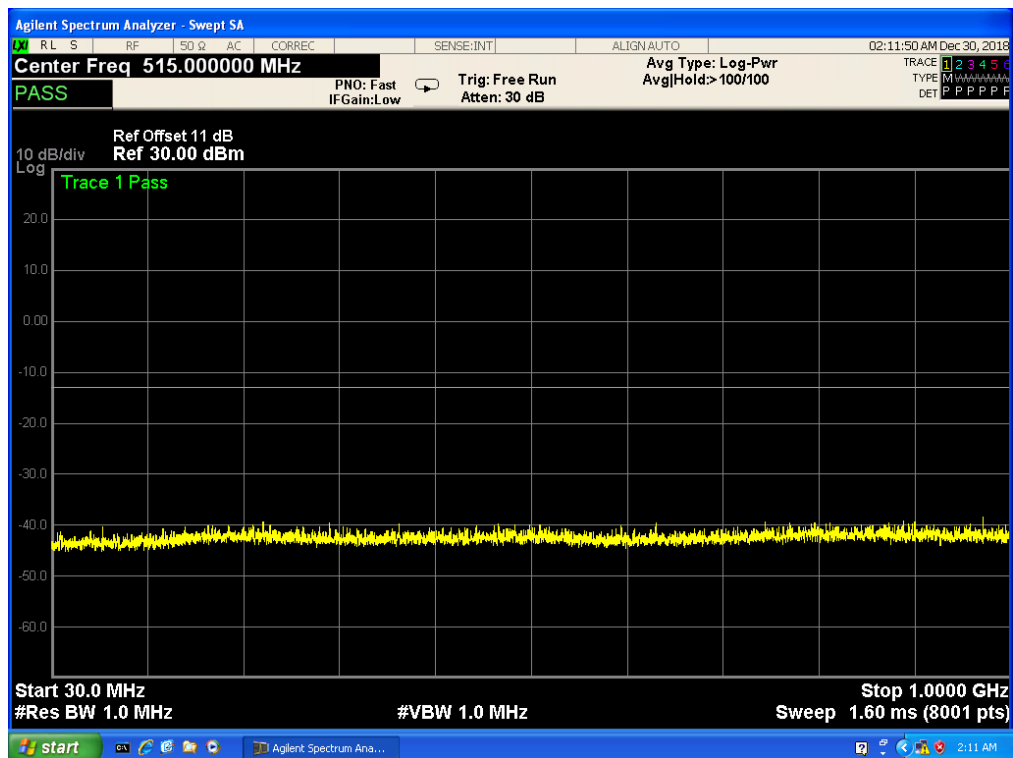
Band 7, UL Channel 21375, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



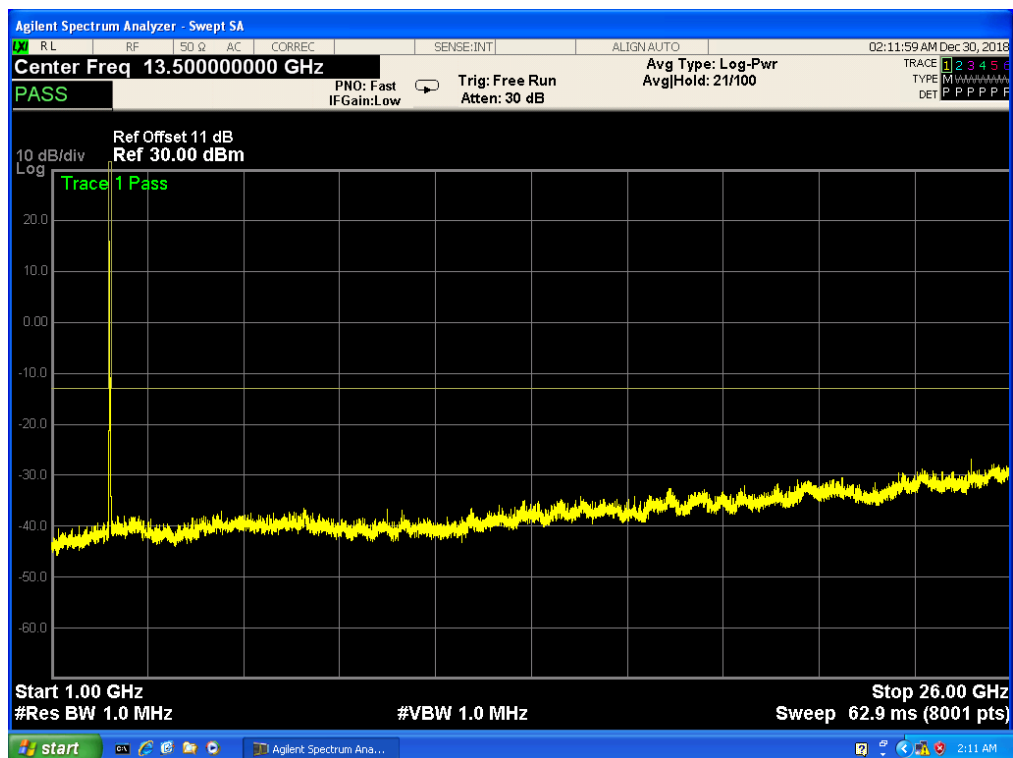
Band 7, UL Channel 21375, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



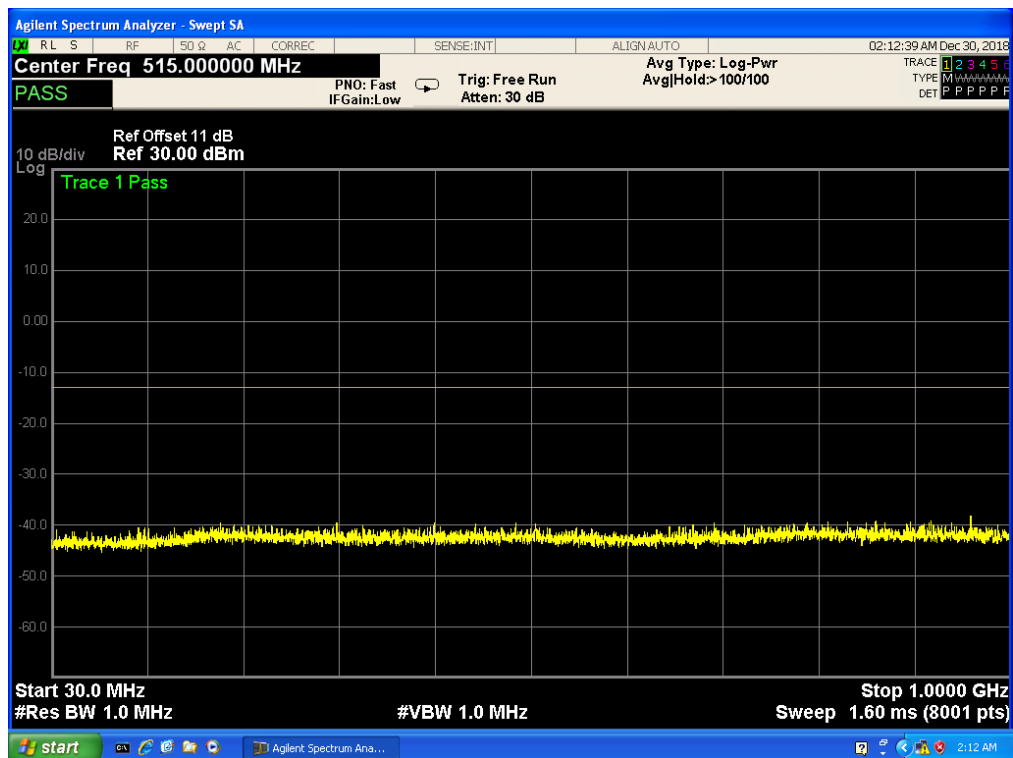
Band 7, UL Channel 20850, UL Frequency 2510.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



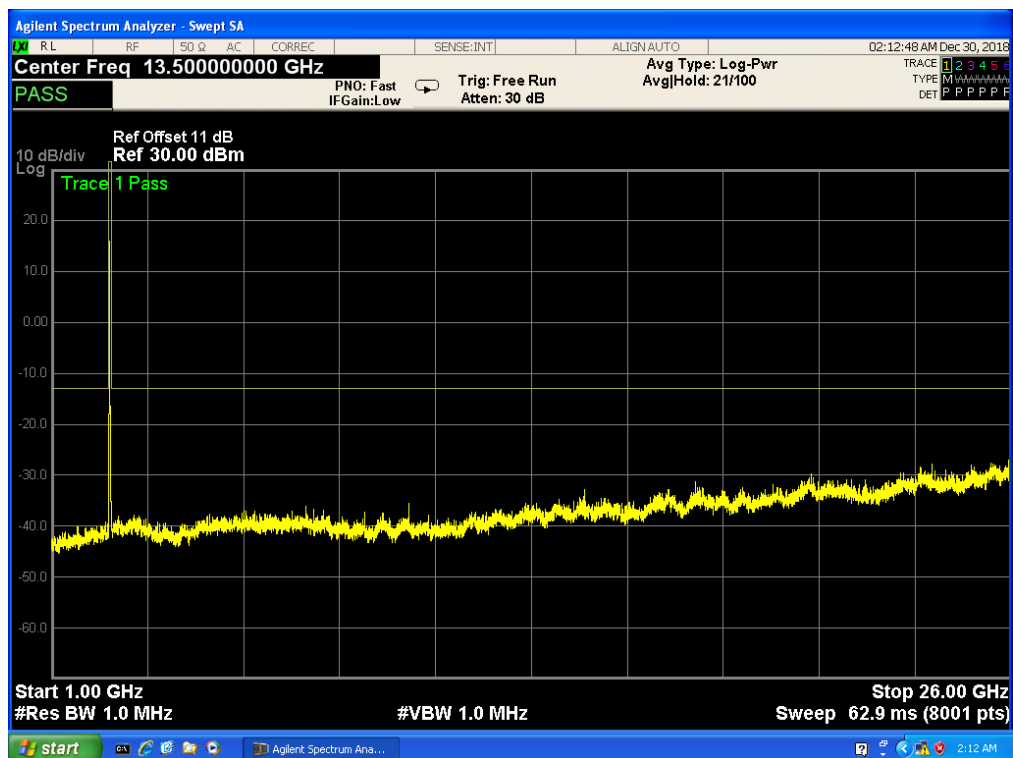
Band 7, UL Channel 20850, UL Frequency 2510.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



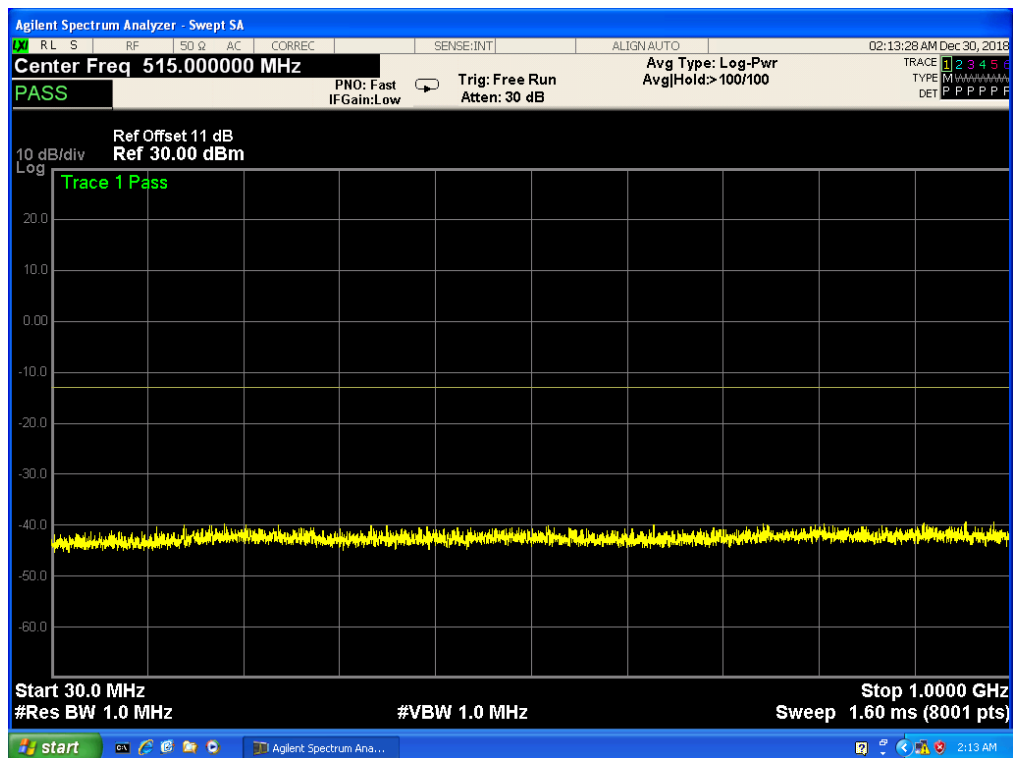
Band 7, UL Channel 20850, UL Frequency 2510.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



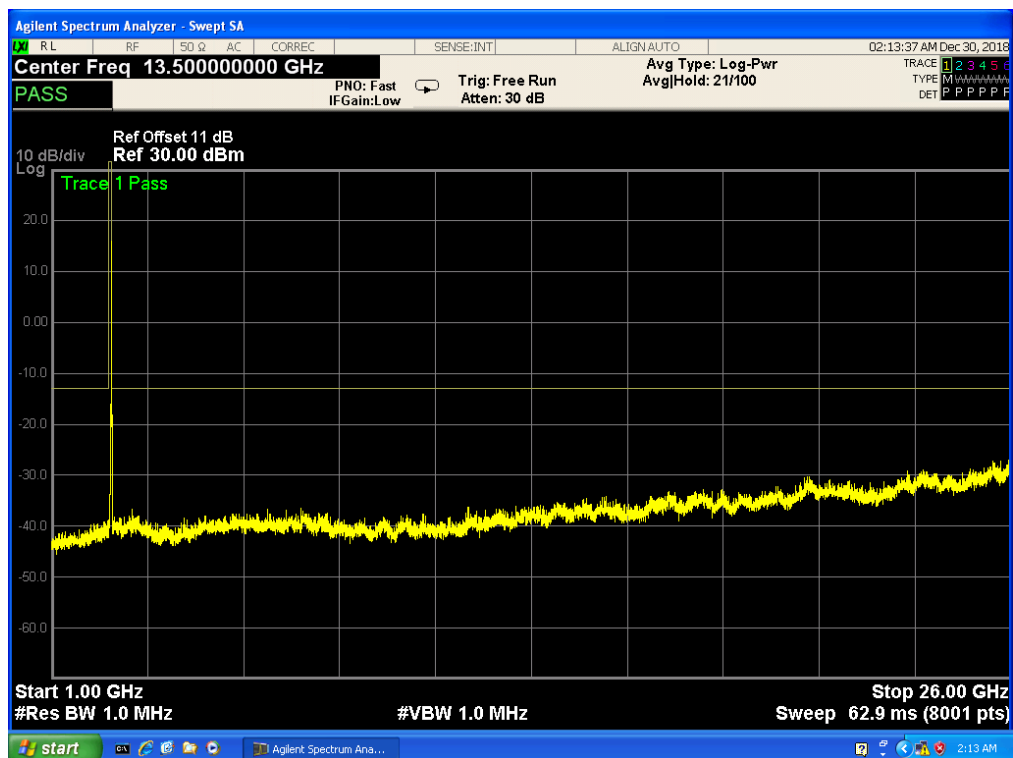
Band 7, UL Channel 20850, UL Frequency 2510.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



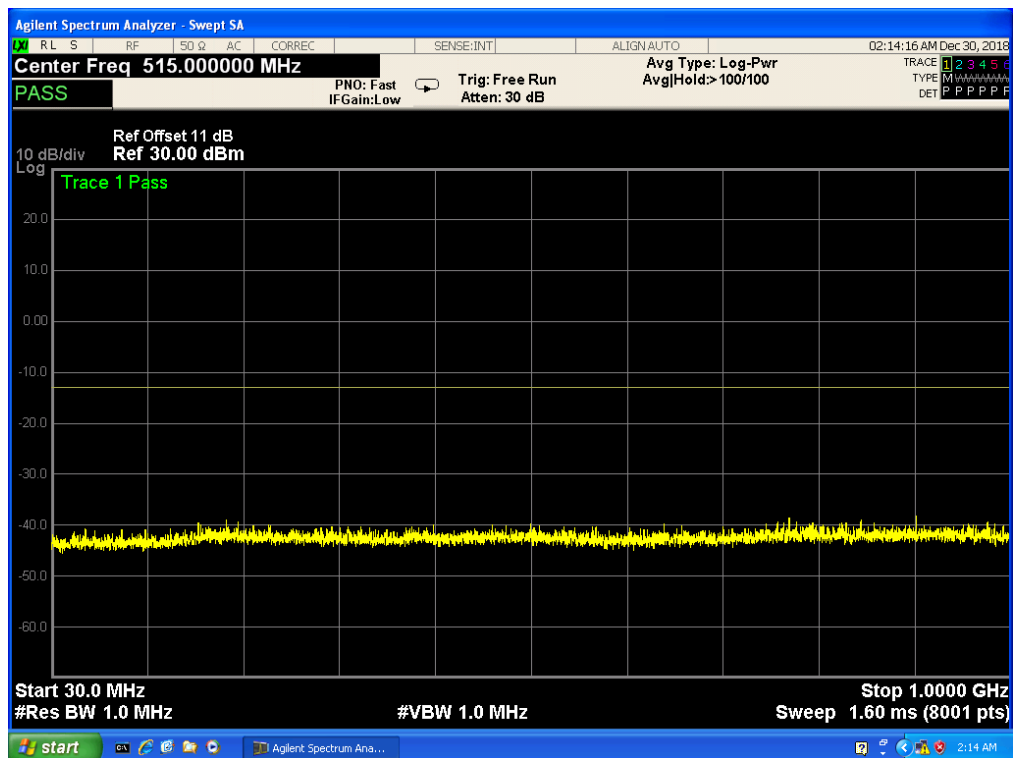
Band 7, UL Channel 21350, UL Frequency 2560.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



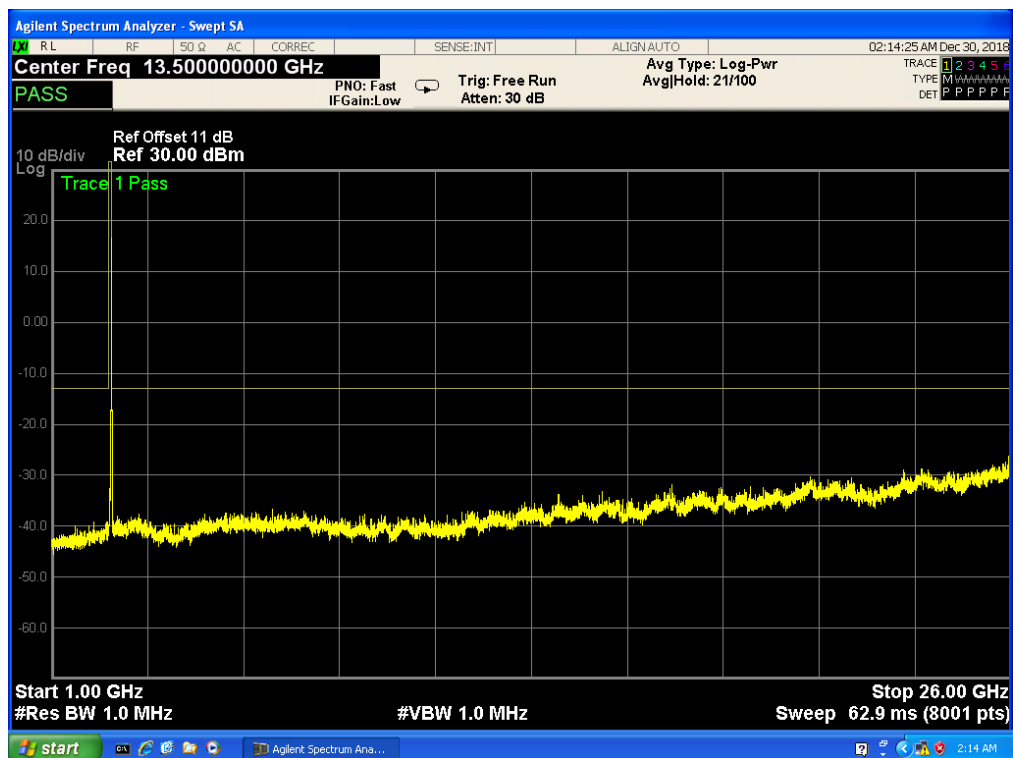
Band 7, UL Channel 21350, UL Frequency 2560.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



Band 7, UL Channel 21350, UL Frequency 2560.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



Band 7, UL Channel 21350, UL Frequency 2560.0, 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 Band5
- LTE Band 7

RESULTS

Pass

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/ RB SIZE	Frequency	Result						Conclusio n
			SG Level (dBm)	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Avera ge (dBm)	Max. EIRP	Polarizati on Of Max. ERP	
							Average		
							(mW)		
1.4MHz Band QPSK	6/0	1850.7	-1.63	3.76	28.24	22.85	192.752	Vertical	Pass
		1880	-1.30	3.91	28.22	23.01	199.986	Vertical	Pass
		1909.3	-1.36	3.93	28.20	22.91	195.434	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.24	3.76	28.24	22.24	167.494	Vertical	Pass
		1880	-1.97	3.91	28.22	22.34	171.396	Vertical	Pass
		1909.3	-2.08	3.93	28.20	22.19	165.577	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-1.57	3.77	28.23	22.89	194.536	Vertical	Pass
		1880	-1.46	3.91	28.24	22.87	193.642	Vertical	Pass
		1908.5	-1.36	3.94	28.25	22.95	197.242	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.13	3.77	28.23	22.33	171.002	Vertical	Pass
		1880	-2.08	3.91	28.24	22.25	167.880	Vertical	Pass
		1908.5	-2.05	3.94	28.25	22.26	168.267	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-1.52	3.77	28.31	23.02	200.447	Vertical	Pass
		1880	-1.44	3.91	28.22	22.87	193.642	Vertical	Pass
		1907.5	-1.47	3.94	28.20	22.79	190.108	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.42	3.77	28.31	22.12	162.930	Vertical	Pass
		1880	-2.22	3.91	28.22	22.09	161.808	Vertical	Pass
		1907.5	-2.09	3.94	28.20	22.17	164.816	Vertical	Pass
10.0MH z Band QPSK	50/0	1855	-1.61	3.79	28.33	22.93	196.336	Vertical	Pass
		1880	-1.39	3.95	28.22	22.88	194.089	Vertical	Pass
		1905	-1.35	3.97	28.19	22.87	193.642	Vertical	Pass
10.0MH z Band 16 QAM	50/0	1855	-2.29	3.79	28.33	22.25	167.880	Vertical	Pass
		1880	-2.18	3.95	28.22	22.09	161.808	Vertical	Pass
		1905	-2.05	3.97	28.19	22.17	164.816	Vertical	Pass
15.0MH z Band QPSK	75/0	1857.5	-1.69	3.79	28.34	22.86	193.197	Vertical	Pass
		1880	-1.32	3.95	28.22	22.95	197.242	Vertical	Pass
		1902.5	-1.27	3.97	28.18	22.94	196.789	Vertical	Pass
15.0MH z Band 16 QAM	75/0	1857.5	-2.32	3.79	28.34	22.23	167.109	Vertical	Pass
		1880	-1.93	3.95	28.22	22.34	171.396	Vertical	Pass
		1902.5	-1.94	3.97	28.18	22.27	168.655	Vertical	Pass

20.0MHz z Band QPSK	100/ 0	1860	-1.63	3.81	28.35	22.91	195.434	Vertical	Pass
		1880	-1.26	3.96	28.22	23.00	199.526	Vertical	Pass
		1900	-1.20	4.00	28.16	22.96	197.697	Vertical	Pass
20.0MHz z Band 16 QAM	100/ 0	1860	-2.28	3.81	28.35	22.26	168.267	Vertical	Pass
		1880	-1.98	3.96	28.22	22.28	169.044	Vertical	Pass
		1900	-1.98	4.00	28.16	22.18	165.196	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)	Anten na Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-2.07	3.76	28.24	22.41	174.181	Horizontal	Pass
		1880	-1.79	3.91	28.22	22.52	178.649	Horizontal	Pass
		1909.3	-1.80	3.93	28.20	22.47	176.604	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.53	3.76	28.24	21.95	156.675	Horizontal	Pass
		1880	-2.46	3.91	28.22	21.85	153.109	Horizontal	Pass
		1909.3	-2.48	3.93	28.20	21.79	151.008	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.10	3.77	28.23	22.36	172.187	Horizontal	Pass
		1880	-1.89	3.91	28.24	22.44	175.388	Horizontal	Pass
		1908.5	-1.82	3.94	28.25	22.49	177.419	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.78	3.77	28.23	21.68	147.231	Horizontal	Pass
		1880	-2.59	3.91	28.24	21.74	149.279	Horizontal	Pass
		1908.5	-2.48	3.94	28.25	21.83	152.405	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.11	3.77	28.31	22.43	174.985	Horizontal	Pass
		1880	-1.90	3.91	28.22	22.41	174.181	Horizontal	Pass
		1907.5	-1.75	3.94	28.20	22.51	178.238	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.77	3.77	28.31	21.77	150.314	Horizontal	Pass
		1880	-2.58	3.91	28.22	21.73	148.936	Horizontal	Pass
		1907.5	-2.41	3.94	28.20	21.85	153.109	Horizontal	Pass
10.0MH z Band QPSK	50/0	1855	-2.19	3.79	28.33	22.35	171.791	Horizontal	Pass
		1880	-1.88	3.95	28.22	22.39	173.380	Horizontal	Pass
		1905	-1.89	3.97	28.19	22.33	171.002	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	1855	-2.89	3.79	28.33	21.65	146.218	Horizontal	Pass
		1880	-2.53	3.95	28.22	21.74	149.279	Horizontal	Pass
		1905	-2.43	3.97	28.19	21.79	151.008	Horizontal	Pass
15.0MH z Band QPSK	75/0	1857.5	-2.14	3.79	28.34	22.41	174.181	Horizontal	Pass
		1880	-1.90	3.95	28.22	22.37	172.584	Horizontal	Pass
		1902.5	-1.72	3.97	28.18	22.49	177.419	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	1857.5	-2.67	3.79	28.34	21.88	154.170	Horizontal	Pass
		1880	-2.48	3.95	28.22	21.79	151.008	Horizontal	Pass
		1902.5	-2.45	3.97	28.18	21.76	149.968	Horizontal	Pass
20.0MH z Band	100/ 0	1860	-2.08	3.81	28.35	22.46	176.198	Horizontal	Pass
		1880	-1.79	3.96	28.22	22.47	176.604	Horizontal	Pass

QPSK		1900	-1.71	4.00	28.16	22.45	175.792	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-3.21	3.81	28.35	21.33	135.831	Horizontal	Pass
		1880	-2.90	3.96	28.22	21.36	136.773	Horizontal	Pass
		1900	-2.77	4.00	28.16	21.39	137.721	Horizontal	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	-3.22	3.12	27.58	21.24	133.045	Vertical	Pass
		1732.5	-3.15	3.27	27.61	21.19	131.522	Vertical	Pass
		1754.3	-3.07	3.29	27.63	21.27	133.968	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-4.01	3.12	27.58	20.45	110.917	Vertical	Pass
		1732.5	-3.83	3.27	27.61	20.51	112.460	Vertical	Pass
		1754.3	-3.67	3.29	27.63	20.67	116.681	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-3.22	3.13	27.61	21.26	133.660	Vertical	Pass
		1732.5	-3.10	3.27	27.61	21.24	133.045	Vertical	Pass
		1753.5	-3.01	3.30	27.62	21.31	135.207	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-3.91	3.13	27.61	20.57	114.025	Vertical	Pass
		1732.5	-3.75	3.27	27.61	20.59	114.551	Vertical	Pass
		1753.5	-3.74	3.30	27.62	20.58	114.288	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-3.28	3.13	27.63	21.22	132.434	Vertical	Pass
		1732.5	-3.15	3.27	27.61	21.19	131.522	Vertical	Pass
		1752.5	-2.96	3.30	27.60	21.34	136.144	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-3.86	3.13	27.63	20.64	115.878	Vertical	Pass
		1732.5	-3.79	3.27	27.61	20.55	113.501	Vertical	Pass
		1752.5	-3.78	3.30	27.60	20.52	112.720	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-3.21	3.15	27.64	21.28	134.276	Vertical	Pass
		1732.5	-3.04	3.31	27.61	21.26	133.660	Vertical	Pass
		1750	-2.99	3.33	27.59	21.27	133.968	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-3.94	3.15	27.64	20.55	113.501	Vertical	Pass
		1732.5	-3.81	3.31	27.61	20.49	111.944	Vertical	Pass
		1750	-3.82	3.33	27.59	20.44	110.662	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-3.14	3.15	27.65	21.36	136.773	Vertical	Pass
		1732.5	-2.91	3.31	27.61	21.39	137.721	Vertical	Pass
		1747.5	-2.97	3.33	27.57	21.27	133.968	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-4.22	3.15	27.65	20.28	106.660	Vertical	Pass
		1732.5	-3.93	3.31	27.61	20.37	108.893	Vertical	Pass
		1747.5	-4.02	3.33	27.57	20.22	105.196	Vertical	Pass

20.0MH z Band QPSK	100/0	1720	-3.30	3.17	27.66	21.19	131.522	Vertical	Pass
		1732.5	-3.01	3.32	27.61	21.28	134.276	Vertical	Pass
		1745	-2.87	3.36	27.56	21.33	135.831	Vertical	Pass
20.0MH z Band 16 QAM	100/0	1720	-4.26	3.17	27.66	20.23	105.439	Vertical	Pass
		1732.5	-3.98	3.32	27.61	20.31	107.399	Vertical	Pass
		1745	-3.91	3.36	27.56	20.29	106.905	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 QPSK	6/0	1710.7	-3.41	3.12	27.58	21.05	127.350	Horizontal	Pass
		1732.5	-3.23	3.27	27.61	21.11	129.122	Horizontal	Pass
		1754.3	-3.39	3.29	27.63	20.95	124.451	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-4.25	3.12	27.58	20.21	104.954	Horizontal	Pass
		1732.5	-4.21	3.27	27.61	20.13	103.039	Horizontal	Pass
		1754.3	-4.19	3.29	27.63	20.15	103.514	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-3.54	3.13	27.61	20.94	124.165	Horizontal	Pass
		1732.5	-3.47	3.27	27.61	20.87	122.180	Horizontal	Pass
		1753.5	-3.33	3.30	27.62	20.99	125.603	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-4.40	3.13	27.61	20.08	101.859	Horizontal	Pass
		1732.5	-4.21	3.27	27.61	20.13	103.039	Horizontal	Pass
		1753.5	-4.18	3.30	27.62	20.14	103.276	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-3.46	3.13	27.63	21.04	127.057	Horizontal	Pass
		1732.5	-3.39	3.27	27.61	20.95	124.451	Horizontal	Pass
		1752.5	-3.40	3.30	27.60	20.90	123.027	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-4.37	3.13	27.63	20.13	103.039	Horizontal	Pass
		1732.5	-4.09	3.27	27.61	20.25	105.925	Horizontal	Pass
		1752.5	-4.24	3.30	27.60	20.06	101.391	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-3.60	3.15	27.64	20.89	122.744	Horizontal	Pass
		1732.5	-3.39	3.31	27.61	20.91	123.310	Horizontal	Pass
		1750	-3.29	3.33	27.59	20.97	125.026	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-4.46	3.15	27.64	20.03	100.693	Horizontal	Pass
		1732.5	-4.29	3.31	27.61	20.01	100.231	Horizontal	Pass
		1750	-4.21	3.33	27.59	20.05	101.158	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-3.65	3.15	27.65	20.85	121.619	Horizontal	Pass
		1732.5	-3.41	3.31	27.61	20.89	122.744	Horizontal	Pass
		1747.5	-3.28	3.33	27.57	20.96	124.738	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-4.43	3.15	27.65	20.07	101.625	Horizontal	Pass
		1732.5	-4.19	3.31	27.61	20.11	102.565	Horizontal	Pass
		1747.5	-4.10	3.33	27.57	20.14	103.276	Horizontal	Pass
20.0MHz Band	100/0	1720	-3.57	3.17	27.66	20.92	123.595	Horizontal	Pass
		1732.5	-3.28	3.32	27.61	21.01	126.183	Horizontal	Pass

QPSK		1745	-3.25	3.36	27.56	20.95	124.451	Horizontal	Pass
20.0MHz	100/0	1720	-4.44	3.17	27.66	20.05	101.158	Horizontal	Pass
z Band		1732.5	-4.18	3.32	27.61	20.11	102.565	Horizontal	Pass
16 QAM		1745	-4.14	3.36	27.56	20.06	101.391	Horizontal	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	5.12	2.01	19.68	2.15	20.64	115.878	Vertical	Pass
		836.5	4.94	2.01	19.77	2.15	20.55	113.501	Vertical	Pass
		848.3	5.09	2.02	19.82	2.15	20.74	118.577	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	3.52	2.01	19.68	2.15	19.04	80.168	Vertical	Pass
		836.5	3.50	2.01	19.77	2.15	19.11	81.470	Vertical	Pass
		848.3	3.54	2.02	19.82	2.15	19.19	82.985	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	5.07	2.01	19.70	2.15	20.61	115.080	Vertical	Pass
		836.5	5.02	2.01	19.77	2.15	20.63	115.611	Vertical	Pass
		847.5	4.95	2.02	19.81	2.15	20.59	114.551	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	3.57	2.01	19.70	2.15	19.11	81.470	Vertical	Pass
		836.5	3.53	2.01	19.77	2.15	19.14	82.035	Vertical	Pass
		847.5	3.44	2.02	19.81	2.15	19.08	80.910	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	5.03	2.01	19.71	2.15	20.58	114.288	Vertical	Pass
		836.5	4.99	2.01	19.77	2.15	20.60	114.815	Vertical	Pass
		846.5	4.95	2.02	19.79	2.15	20.57	114.025	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	3.56	2.01	19.71	2.15	19.11	81.470	Vertical	Pass
		836.5	3.53	2.01	19.77	2.15	19.14	82.035	Vertical	Pass
		846.5	3.51	2.02	19.79	2.15	19.13	81.846	Vertical	Pass
10.0MHz z Band QPSK	50/0	829	5.06	2.01	19.73	2.15	20.63	115.611	Vertical	Pass
		836.5	4.97	2.01	19.77	2.15	20.58	114.288	Vertical	Pass
		844	4.99	2.02	19.78	2.15	20.60	114.815	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	829	3.40	2.01	19.73	2.15	18.97	78.886	Vertical	Pass
		836.5	3.38	2.01	19.77	2.15	18.99	79.250	Vertical	Pass
		844	3.43	2.02	19.78	2.15	19.04	80.168	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 QPSK	6/0	824.7	4.63	2.01	19.68	2.15	20.15	103.514	Horizontal	Pass
		836.5	4.56	2.01	19.77	2.15	20.17	103.992	Horizontal	Pass
		848.3	4.55	2.02	19.82	2.15	20.20	104.713	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	3.34	2.01	19.68	2.15	18.86	76.913	Horizontal	Pass
		836.5	3.16	2.01	19.77	2.15	18.77	75.336	Horizontal	Pass
		848.3	3.02	2.02	19.82	2.15	18.67	73.621	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	4.57	2.01	19.70	2.15	20.11	102.565	Horizontal	Pass
		836.5	4.48	2.01	19.77	2.15	20.09	102.094	Horizontal	Pass
		847.5	4.52	2.02	19.81	2.15	20.16	103.753	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	3.37	2.01	19.70	2.15	18.91	77.804	Horizontal	Pass
		836.5	3.22	2.01	19.77	2.15	18.83	76.384	Horizontal	Pass
		847.5	3.24	2.02	19.81	2.15	18.88	77.268	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	4.61	2.01	19.71	2.15	20.16	103.753	Horizontal	Pass
		836.5	4.48	2.01	19.77	2.15	20.09	102.094	Horizontal	Pass
		846.5	4.51	2.02	19.79	2.15	20.13	103.039	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	3.36	2.01	19.71	2.15	18.91	77.804	Horizontal	Pass
		836.5	3.31	2.01	19.77	2.15	18.92	77.983	Horizontal	Pass
		846.5	3.19	2.02	19.79	2.15	18.81	76.033	Horizontal	Pass
10.0MH z Band QPSK	50/0	829	4.49	2.01	19.73	2.15	20.06	101.391	Horizontal	Pass
		836.5	4.52	2.01	19.77	2.15	20.13	103.039	Horizontal	Pass
		844	4.58	2.02	19.78	2.15	20.19	104.472	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	829	3.40	2.01	19.73	2.15	18.97	78.886	Horizontal	Pass
		836.5	3.29	2.01	19.77	2.15	18.90	77.625	Horizontal	Pass
		844	3.28	2.02	19.78	2.15	18.89	77.446	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.5 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	0.13	4.54	27.75	23.34	215.774	Vertical	Pass
		2535	0.12	4.69	27.72	23.15	206.538	Vertical	Pass
		2567.5	0.28	4.71	27.71	23.28	212.814	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-1.13	4.54	27.75	22.08	161.436	Vertical	Pass
		2535	-0.90	4.69	27.72	22.13	163.305	Vertical	Pass
		2567.5	-0.93	4.71	27.71	22.07	161.065	Vertical	Pass
10.0MH z Band QPSK	50/0	2505	-0.02	4.55	27.76	23.19	208.449	Vertical	Pass
		2535	0.18	4.69	27.72	23.21	209.411	Vertical	Pass
		2565	0.20	4.72	27.70	23.18	207.970	Vertical	Pass
10.0MH z Band 16 QAM	50/0	2505	-1.16	4.55	27.76	22.05	160.325	Vertical	Pass
		2535	-0.92	4.69	27.72	22.11	162.555	Vertical	Pass
		2565	-0.95	4.72	27.70	22.03	159.588	Vertical	Pass
15.0MH z Band QPSK	75/0	2507.5	0.06	4.55	27.77	23.28	212.814	Vertical	Pass
		2535	0.21	4.69	27.72	23.24	210.863	Vertical	Pass
		2562.5	0.29	4.72	27.69	23.26	211.836	Vertical	Pass
15.0MH z Band 16 QAM	75/0	2507.5	-1.20	4.55	27.77	22.02	159.221	Vertical	Pass
		2535	-0.97	4.69	27.72	22.06	160.694	Vertical	Pass
		2562.5	-0.84	4.72	27.69	22.13	163.305	Vertical	Pass
20.0MH z Band QPSK	100/0	2510	-0.02	4.57	27.78	23.19	208.449	Vertical	Pass
		2535	0.27	4.73	27.72	23.26	211.836	Vertical	Pass
		2560	0.38	4.75	27.68	23.31	214.289	Vertical	Pass
20.0MH z Band 16 QAM	100/0	2510	-1.06	4.57	27.78	22.15	164.059	Vertical	Pass
		2535	-0.89	4.73	27.72	22.10	162.181	Vertical	Pass
		2560	-0.90	4.75	27.68	22.03	159.588	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 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	-0.32	4.54	27.75	22.89	194.536	Horizontal	Pass
		2535	-0.12	4.69	27.72	22.91	195.434	Horizontal	Pass
		2567.5	-0.03	4.71	27.71	22.97	198.153	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-1.18	4.54	27.75	22.03	159.588	Horizontal	Pass
		2535	-1.15	4.69	27.72	21.88	154.170	Horizontal	Pass
		2567.5	-1.21	4.71	27.71	21.79	151.008	Horizontal	Pass
10.0MH z Band QPSK	50/0	2505	-0.36	4.55	27.76	22.85	192.752	Horizontal	Pass
		2535	-0.14	4.69	27.72	22.89	194.536	Horizontal	Pass
		2565	-0.07	4.72	27.70	22.91	195.434	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	2505	-1.25	4.55	27.76	21.96	157.036	Horizontal	Pass
		2535	-1.00	4.69	27.72	22.03	159.588	Horizontal	Pass
		2565	-1.03	4.72	27.70	21.95	156.675	Horizontal	Pass
15.0MH z Band QPSK	75/0	2507.5	-0.36	4.55	27.77	22.86	193.197	Horizontal	Pass
		2535	-0.14	4.69	27.72	22.89	194.536	Horizontal	Pass
		2562.5	-0.10	4.72	27.69	22.87	193.642	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	2507.5	-1.32	4.55	27.77	21.90	154.882	Horizontal	Pass
		2535	-1.12	4.69	27.72	21.91	155.239	Horizontal	Pass
		2562.5	-1.08	4.72	27.69	21.89	154.525	Horizontal	Pass
20.0MH z Band QPSK	100/ 0	2510	-0.42	4.57	27.78	22.79	190.108	Horizontal	Pass
		2535	-0.18	4.73	27.72	22.81	190.985	Horizontal	Pass
		2560	-0.08	4.75	27.68	22.85	192.752	Horizontal	Pass
20.0MH z Band 16 QAM	100/ 0	2510	-1.35	4.57	27.78	21.86	153.462	Horizontal	Pass
		2535	-1.07	4.73	27.72	21.92	155.597	Horizontal	Pass
		2560	-1.00	4.75	27.68	21.93	155.955	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 7

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	-56.94	4.04	33.51	-27.47	-13	-14.47	Horizontal
3701.4	-56.41	4.04	33.51	-26.94	-13	-13.94	Vertical
5552.1	-58.74	5.24	35.84	-28.14	-13	-15.14	Vertical
5552.1	-58.32	5.24	35.84	-27.72	-13	-14.72	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-55.94	4.04	33.56	-26.42	-13	-13.42	Horizontal
3760	-56.94	4.04	33.56	-27.42	-13	-14.42	Vertical
5640	-54.41	5.24	35.91	-23.74	-13	-10.74	Vertical
5640	-57.32	5.24	35.91	-26.65	-13	-13.65	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-55.15	4.04	34.00	-25.19	-13	-12.19	Horizontal
3818.6	-56.82	4.04	34.00	-26.86	-13	-13.86	Vertical
5727.9	-54.17	5.24	36.04	-23.37	-13	-10.37	Vertical
5727.9	-54.53	5.24	36.04	-23.73	-13	-10.73	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	-58.74	4.07	33.54	-29.27	-13	-16.27	Horizontal
3720	-55.64	4.07	33.54	-26.17	-13	-13.17	Vertical
5580	-58.13	5.28	35.86	-27.55	-13	-14.55	Vertical
5580	-57.63	5.28	35.86	-27.05	-13	-14.05	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-54.61	4.04	33.56	-25.09	-13	-12.09	Horizontal
3760	-55.66	4.04	33.56	-26.14	-13	-13.14	Vertical
5640	-57.47	5.24	35.91	-26.80	-13	-13.80	Vertical
5640	-58.61	5.24	35.91	-27.94	-13	-14.94	Horizontal
Test Results for High Channel 1900MHz							
3800	-55.35	4.04	34.00	-25.39	-13	-12.39	Horizontal
3800	-57.18	4.04	34.00	-27.22	-13	-14.22	Vertical
5700	-57.35	5.24	36.04	-26.55	-13	-13.55	Vertical
5700	-56.92	5.24	36.04	-26.12	-13	-13.12	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	-55.24	4.02	29.80	-29.46	-13	-16.46	Horizontal
3421.4	-56.39	4.02	29.80	-30.61	-13	-17.61	Vertical
5132.1	-57.81	5.24	35.84	-27.21	-13	-14.21	Vertical
5132.1	-58.52	5.24	35.84	-27.92	-13	-14.92	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-57.41	4.03	30.00	-31.44	-13	-18.44	Horizontal
3465	-56.62	4.03	30.00	-30.65	-13	-17.65	Vertical
5197.5	-58.93	5.25	35.86	-28.32	-13	-15.32	Vertical
5197.5	-57.31	5.25	35.86	-26.70	-13	-13.70	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-54.42	4.05	30.01	-28.46	-13	-15.46	Horizontal
3508.6	-58.65	4.05	30.01	-32.69	-13	-19.69	Vertical
5262.9	-59.57	5.26	35.86	-28.97	-13	-15.97	Vertical
5262.9	-57.62	5.26	35.86	-27.02	-13	-14.02	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	-55.64	4.02	29.80	-29.86	-13	-16.86	Horizontal
3440	-55.62	4.02	29.80	-29.84	-13	-16.84	Vertical
5160	-54.19	5.24	35.84	-23.59	-13	-10.59	Vertical
5160	-58.37	5.24	35.84	-27.77	-13	-14.77	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-54.41	4.03	30.00	-28.44	-13	-15.44	Horizontal
3465	-52.85	4.03	30.00	-26.88	-13	-13.88	Vertical
5197.5	-60.19	5.25	35.86	-29.58	-13	-16.58	Vertical
5197.5	-60.34	5.25	35.86	-29.73	-13	-16.73	Horizontal
Test Results for High Channel 1745MHz							
2490	-55.67	2.91	27.68	-30.90	-13	-17.90	Horizontal
3490	-54.41	2.91	27.68	-29.64	-13	-16.64	Vertical
5235	-58.92	5.26	35.86	-28.32	-13	-15.32	Vertical
5235	-60.23	5.26	35.86	-29.63	-13	-16.63	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	-55.61	2.78	27.50	-30.89	-13	-17.89	Horizontal
1649.4	-59.95	2.78	27.50	-35.23	-13	-22.23	Vertical
2474.1	-52.82	2.90	27.80	-27.92	-13	-14.92	Vertical
2474.1	-56.63	2.90	27.80	-31.73	-13	-18.73	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-54.17	2.78	27.48	-29.47	-13	-16.47	Horizontal
1673	-55.28	2.78	27.48	-30.58	-13	-17.58	Vertical
2509.5	-54.13	2.91	27.70	-29.34	-13	-16.34	Vertical
2509.5	-56.22	2.91	27.70	-31.43	-13	-18.43	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-53.98	2.78	27.43	-29.33	-13	-16.33	Horizontal
1696.6	-57.64	2.78	27.43	-32.99	-13	-19.99	Vertical
2544.9	-53.31	2.92	27.74	-28.49	-13	-15.49	Vertical
2544.9	-54.45	2.92	27.74	-29.63	-13	-16.63	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	-55.73	2.78	27.50	-31.01	-13	-18.01	Horizontal
1658	-54.41	2.78	27.50	-29.69	-13	-16.69	Vertical
2487	-56.85	2.90	27.80	-31.95	-13	-18.95	Vertical
2487	-54.72	2.90	27.80	-29.82	-13	-16.82	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-56.92	2.78	27.48	-32.22	-13	-19.22	Horizontal
1673	-57.41	2.78	27.48	-32.71	-13	-19.71	Vertical
2509.5	-56.32	2.91	27.70	-31.53	-13	-18.53	Vertical
2509.5	-54.11	2.91	27.70	-29.32	-13	-16.32	Horizontal
Test Results for High Channel 844MHz							
1688	-57.82	2.78	27.43	-33.17	-13	-20.17	Horizontal
1688	-55.92	2.78	27.43	-31.27	-13	-18.27	Vertical
2532	-56.36	2.92	27.74	-31.54	-13	-18.54	Vertical
2532	-54.41	2.92	27.74	-29.59	-13	-16.59	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 7

QPSK EIRP POWER FOR LTE BAND 7 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005	-58.69	5.23	35.81	-28.11	-13	-15.11	Horizontal
5005	-54.61	5.23	35.81	-24.03	-13	-11.03	Vertical
7507.5	-59.37	5.67	36.85	-28.19	-13	-15.19	Vertical
7507.5	-56.82	5.67	36.85	-25.64	-13	-12.64	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-55.52	5.23	35.82	-24.93	-13	-11.93	Horizontal
5070	-57.41	5.23	35.82	-26.82	-13	-13.82	Vertical
7605	-58.16	5.67	36.85	-26.98	-13	-13.98	Vertical
7605	-59.28	5.67	36.85	-28.10	-13	-15.10	Horizontal
Test Results for High Channel 2567.5MHz							
5135	-57.13	5.24	35.83	-26.54	-13	-13.54	Horizontal
5135	-56.63	5.24	35.83	-26.04	-13	-13.04	Vertical
7702.5	-58.96	5.68	36.87	-27.77	-13	-14.77	Vertical
7702.5	-58.65	5.68	36.87	-27.46	-13	-14.46	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020	-58.91	5.23	35.82	-28.32	-13	-15.32	Horizontal
5020	-58.74	5.23	35.82	-28.15	-13	-15.15	Vertical
7530	-59.63	5.67	36.86	-28.44	-13	-15.44	Vertical
7530	-55.52	5.67	36.86	-24.33	-13	-11.33	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-56.12	5.23	35.82	-25.53	-13	-12.53	Horizontal
5070	-54.42	5.23	35.82	-23.83	-13	-10.83	Vertical
7605	-58.97	5.67	36.85	-27.79	-13	-14.79	Vertical
7605	-59.74	5.67	36.85	-28.56	-13	-15.56	Horizontal
Test Results for High Channel 2560MHz							
5120	-55.63	5.24	35.83	-25.04	-13	-12.04	Horizontal
5120	-56.92	5.24	35.83	-26.33	-13	-13.33	Vertical
7680	-59.41	5.7	36.88	-28.23	-13	-15.23	Vertical
7680	-59.85	5.7	36.88	-28.67	-13	-15.67	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ ARpl (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 3.6V, Normal, DC 3.8V and High voltage, DC 4.4V.

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 7

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)				
3.6	1880	7.4	0.003936	2.5
3.8	1880	-11.8	-0.006277	2.5
4.4	1880	10.2	0.005426	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	7	0.003723	2.5
Extreme (50C)	1880	-7.8	-0.004149	2.5
Extreme (40C)	1880	-11	-0.005851	2.5
Extreme (30C)	1880	-8.5	-0.004521	2.5
Extreme (10C)	1880	6.9	0.003670	2.5
Extreme (0C)	1880	12.4	0.006596	2.5
Extreme (-10C)	1880	15.2	0.008085	2.5
Extreme (-20C)	1880	7.5	0.003989	2.5
Extreme (-30C)	1880	-6.2	-0.003298	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)				
3.6	1880	11.7	0.006223	2.5
3.8	1880	6.9	0.003670	2.5
4.4	1880	7.8	0.004149	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	-7	-0.003723	2.5
Extreme (50C)	1880	5	0.002660	2.5
Extreme (40C)	1880	-6.9	-0.003670	2.5
Extreme (30C)	1880	10.4	0.005532	2.5
Extreme (10C)	1880	-12.3	-0.006543	2.5
Extreme (0C)	1880	-10.5	-0.005585	2.5
Extreme (-10C)	1880	8.6	0.004574	2.5
Extreme (-20C)	1880	-9.9	-0.005266	2.5
Extreme (-30C)	1880	7.2	0.003830	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)				
3.6	1732.5	12.1	0.006984	2.5
3.8	1732.5	5.8	0.003348	2.5
4.4	1732.5	7.4	0.004271	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	-13.4	-0.007734	2.5
Extreme (50C)	1732.5	9	0.005195	2.5
Extreme (40C)	1732.5	7.4	0.004271	2.5
Extreme (30C)	1732.5	-9.6	-0.005541	2.5
Extreme (10C)	1732.5	-10.5	-0.006061	2.5
Extreme (0C)	1732.5	-11.6	-0.006696	2.5
Extreme (-10C)	1732.5	9.3	0.005368	2.5
Extreme (-20C)	1732.5	10	0.005772	2.5
Extreme (-30C)	1732.5	8.5	0.004906	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)				
3.6	1732.5	7.1	0.004098	2.5
3.8	1732.5	-6.5	-0.003752	2.5
4.4	1732.5	-8	-0.004618	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	-9.6	-0.005541	2.5
Extreme (50C)	1732.5	11.5	0.006638	2.5
Extreme (40C)	1732.5	8.4	0.004848	2.5
Extreme (30C)	1732.5	-11.6	-0.006696	2.5
Extreme (10C)	1732.5	-7.3	-0.004214	2.5
Extreme (0C)	1732.5	-12.4	-0.007157	2.5
Extreme (-10C)	1732.5	-8.5	-0.004906	2.5
Extreme (-20C)	1732.5	9.6	0.005541	2.5
Extreme (-30C)	1732.5	9	0.005195	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)				
3.6	836.5	11	0.013150	2.5
3.8	836.5	8.7	0.010400	2.5
4.4	836.5	7.3	0.008727	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	-7.4	-0.008846	2.5
Extreme (50C)	836.5	-11.6	-0.013867	2.5
Extreme (40C)	836.5	12.3	0.014704	2.5
Extreme (30C)	836.5	5.6	0.006695	2.5
Extreme (10C)	836.5	9.6	0.011476	2.5
Extreme (0C)	836.5	8.4	0.010042	2.5
Extreme (-10C)	836.5	-7	-0.008368	2.5
Extreme (-20C)	836.5	8.6	0.010281	2.5
Extreme (-30C)	836.5	-7.3	-0.008727	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)				
3.6	836.5	6.9	0.008249	2.5
3.8	836.5	7.7	0.009205	2.5
4.4	836.5	-13.4	-0.016019	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	12.5	0.014943	2.5
Extreme (50C)	836.5	8.4	0.010042	2.5
Extreme (40C)	836.5	9.3	0.011118	2.5
Extreme (30C)	836.5	-8.1	-0.009683	2.5
Extreme (10C)	836.5	-7.2	-0.008607	2.5
Extreme (0C)	836.5	5.5	0.006575	2.5
Extreme (-10C)	836.5	7	0.008368	2.5
Extreme (-20C)	836.5	6	0.007173	2.5
Extreme (-30C)	836.5	8.9	0.010640	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	2535	-9.3	-0.003669	2.5
3.8	2535	-8.5	-0.003353	2.5
4.4	2535	10.2	0.004024	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	7.7	0.003037	2.5
Extreme (50C)	2535	8.5	0.003353	2.5
Extreme (40C)	2535	-11	-0.004339	2.5
Extreme (30C)	2535	-13.4	-0.005286	2.5
Extreme (10C)	2535	-9	-0.003550	2.5
Extreme (0C)	2535	-6.7	-0.002643	2.5
Extreme (-10C)	2535	11.2	0.004418	2.5
Extreme (-20C)	2535	13.5	0.005325	2.5
Extreme (-30C)	2535	9.6	0.003787	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	2535	-12.1	-0.004773	2.5
3.8	2535	-9	-0.003550	2.5
4.4	2535	-7.4	-0.002919	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.6	0.002604	2.5
Extreme (50C)	2535	8.5	0.003353	2.5
Extreme (40C)	2535	13.2	0.005207	2.5
Extreme (30C)	2535	9.9	0.003905	2.5
Extreme (10C)	2535	-12.1	-0.004773	2.5
Extreme (0C)	2535	-9.3	-0.003669	2.5
Extreme (-10C)	2535	-10	-0.003945	2.5
Extreme (-20C)	2535	5.8	0.002288	2.5
Extreme (-30C)	2535	6.8	0.002682	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.

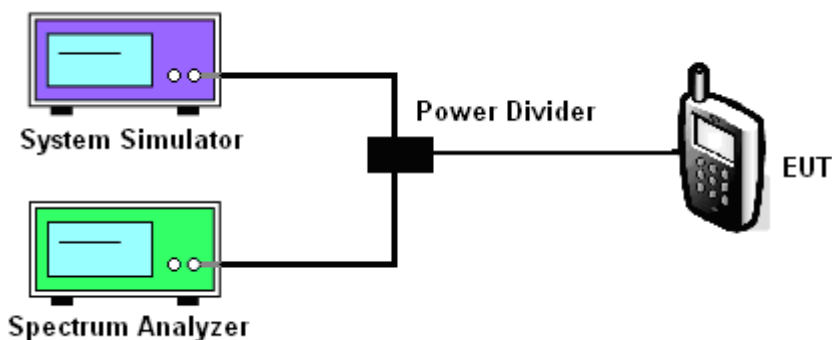
11.2 Measuring Instruments

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

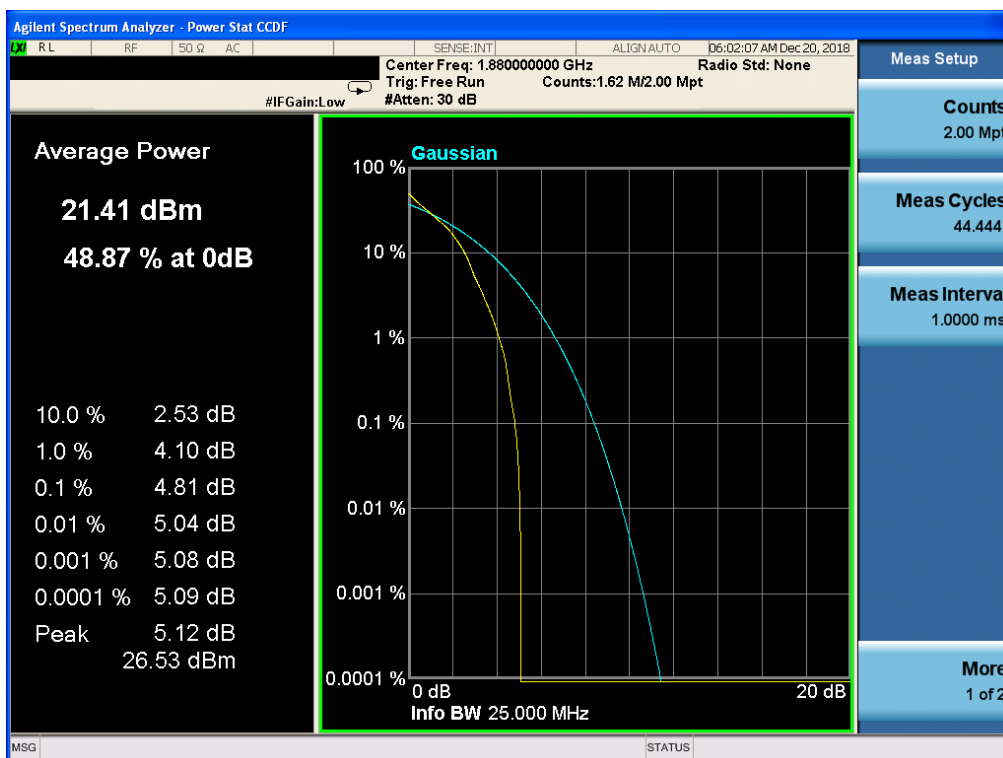
- ☐ LTE Band2
- ☐ LTE Band 4
- ☐ LTE Band5
- ☐ LTE Band 7

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	4.81
2	18900	1880.0	1.4	1	Low	16-QAM	5.10
2	18900	1880.0	3.0	1	Low	QPSK	4.63
2	18900	1880.0	3.0	1	Low	16-QAM	5.16
2	18900	1880.0	5.0	1	Low	QPSK	5.18
2	18900	1880.0	5.0	1	Low	16-QAM	5.14
2	18900	1880.0	10.0	1	Low	QPSK	5.13
2	18900	1880.0	10.0	1	Low	16-QAM	4.90
2	18900	1880.0	15.0	1	Low	QPSK	5.46
2	18900	1880.0	15.0	1	Low	16-QAM	5.31
2	18900	1880.0	20.0	1	Low	QPSK	5.31
2	18900	1880.0	20.0	1	Low	16-QAM	5.24
4	20175	1732.5	1.4	1	Low	QPSK	5.78
4	20175	1732.5	1.4	1	Low	16-QAM	4.72
4	20175	1732.5	3.0	1	Low	QPSK	6.05
4	20175	1732.5	3.0	1	Low	16-QAM	4.66
4	20175	1732.5	5.0	1	Low	QPSK	5.96
4	20175	1732.5	5.0	1	Low	16-QAM	5.10
4	20175	1732.5	10.0	1	Low	QPSK	5.97
4	20175	1732.5	10.0	1	Low	16-QAM	5.04

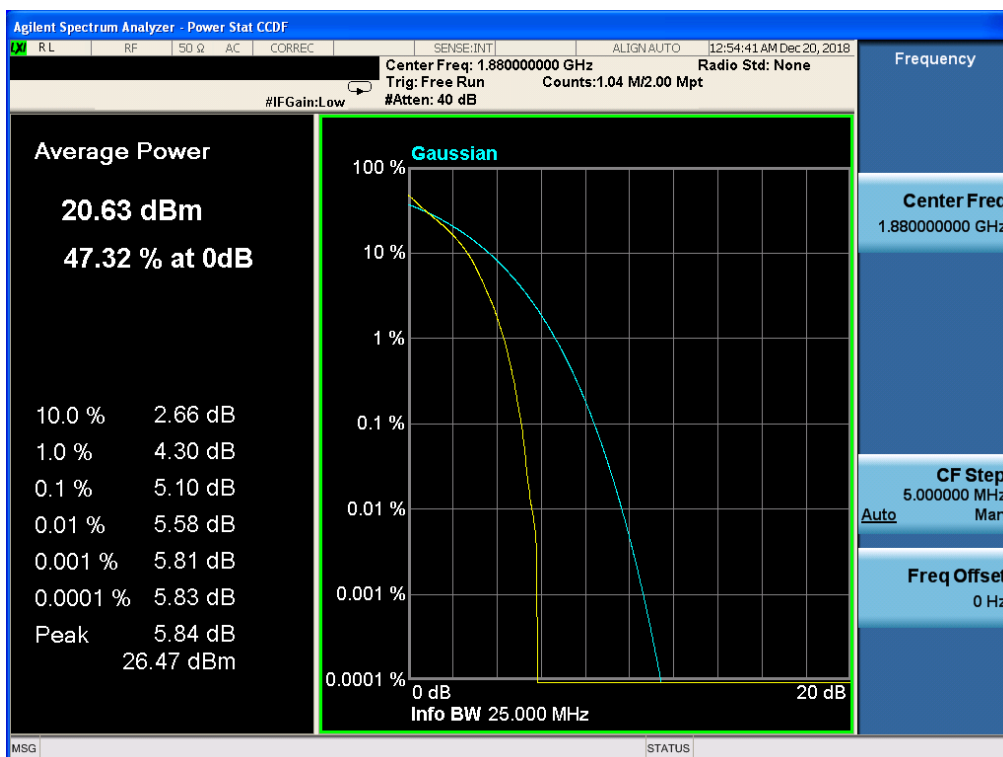
4	20175	1732.5	15.0	1	Low	QPSK	6.11
4	20175	1732.5	15.0	1	Low	16-QAM	5.40
4	20175	1732.5	20.0	1	Low	QPSK	6.22
4	20175	1732.5	20.0	1	Low	16-QAM	5.29
5	20525	836.5	1.4	1	Low	QPSK	4.36
5	20525	836.5	1.4	1	Low	16-QAM	4.91
5	20525	836.5	3.0	1	Low	QPSK	4.68
5	20525	836.5	3.0	1	Low	16-QAM	4.97
5	20525	836.5	5.0	1	Low	QPSK	4.97
5	20525	836.5	5.0	1	Low	16-QAM	5.06
5	20525	836.5	10.0	1	Low	QPSK	5.14
5	20525	836.5	10.0	1	Low	16-QAM	5.23
7	21100	2535.0	5.0	1	Low	QPSK	5.65
7	21100	2535.0	5.0	1	Low	16-QAM	4.92
7	21100	2535.0	10.0	1	Low	QPSK	5.66
7	21100	2535.0	10.0	1	Low	16-QAM	4.89
7	21100	2535.0	15.0	1	Low	QPSK	5.84
7	21100	2535.0	15.0	1	Low	16-QAM	5.22
7	21100	2535.0	20.0	1	Low	QPSK	5.90
7	21100	2535.0	20.0	1	Low	16-QAM	5.19

11.5 LTE BAND 2

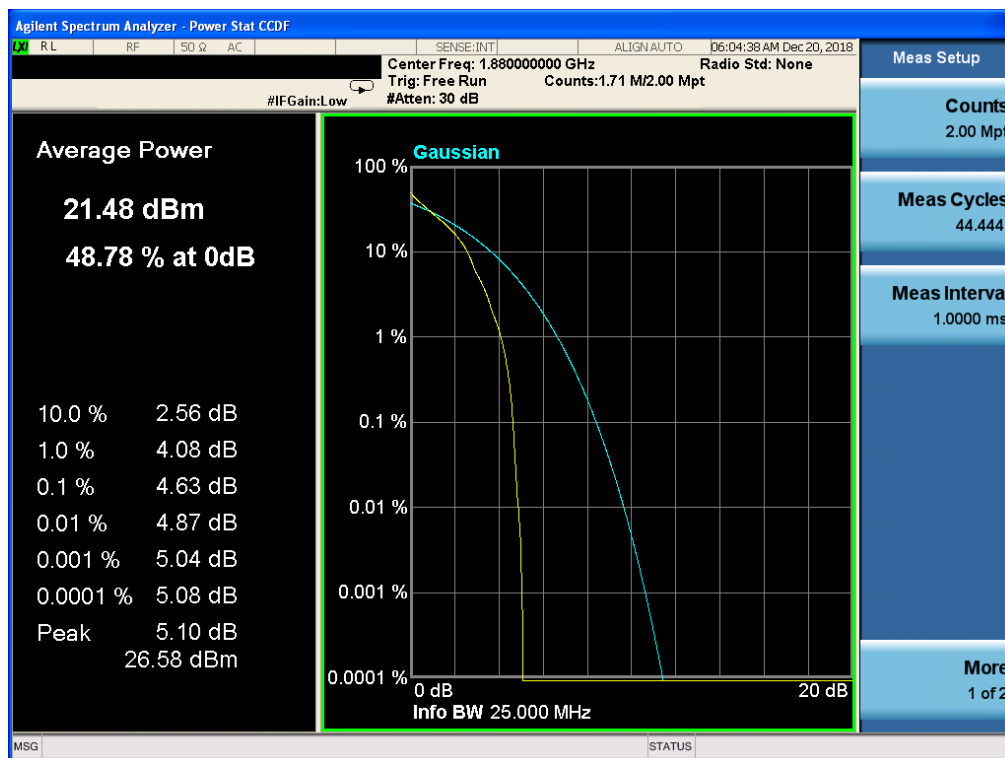
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 1.4, NO. RB 1, RB POS. Low, QPSK



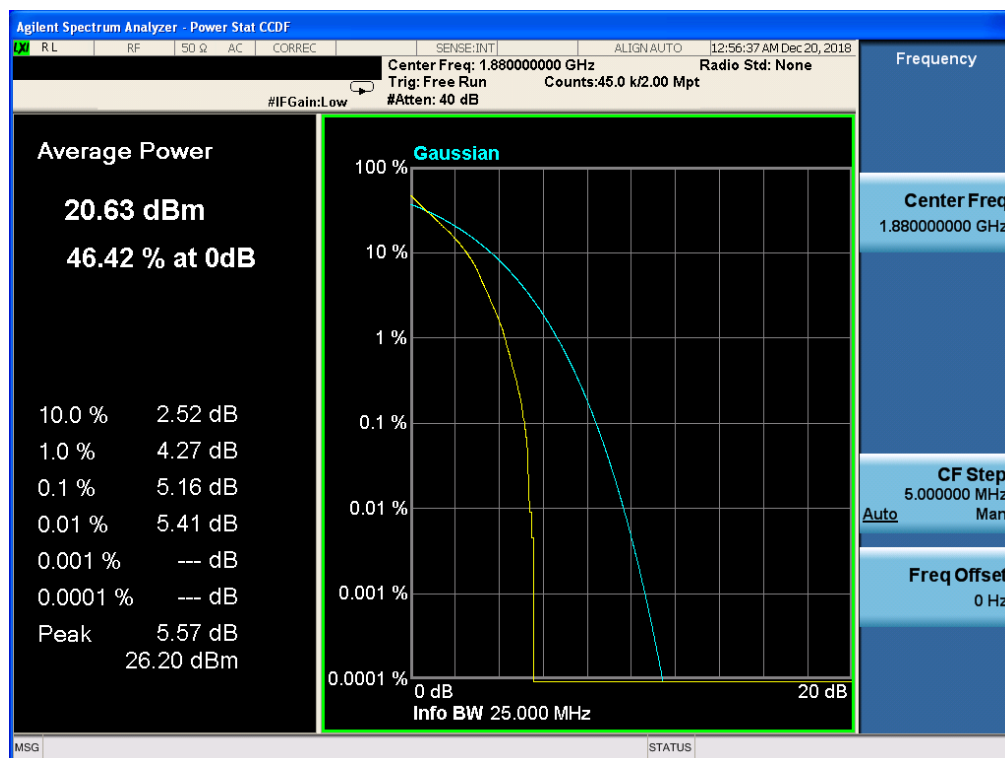
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 1.4, NO. RB 1, RB POS. Low, 16-QAM



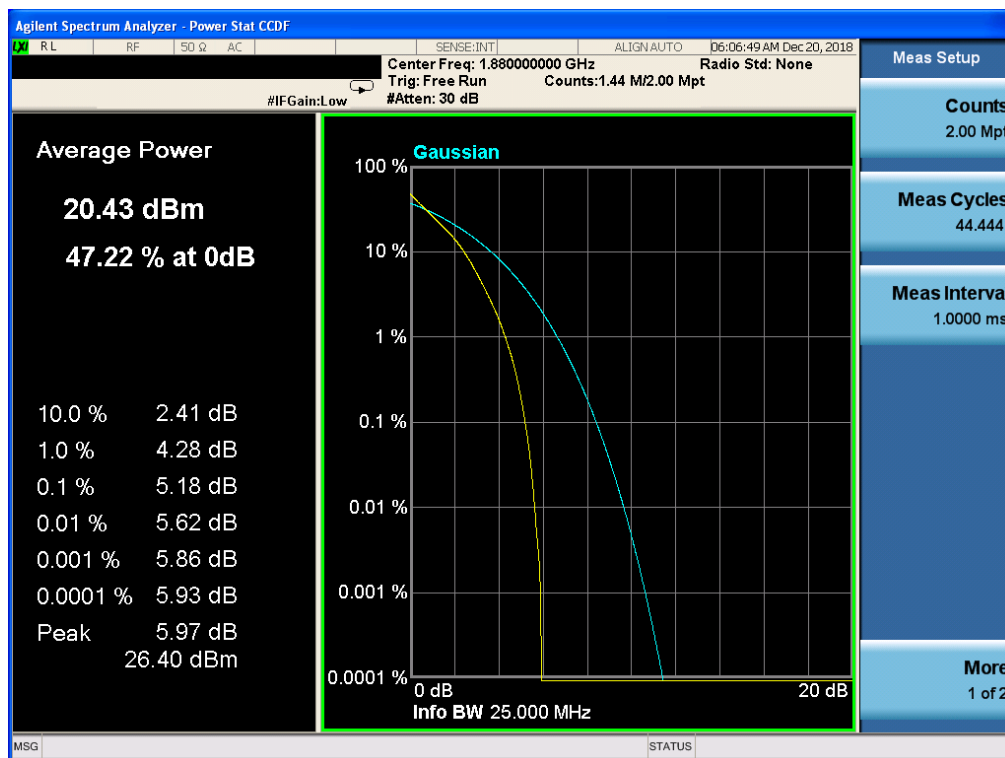
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 3.0, NO. RB 1, RB POS. Low, QPSK



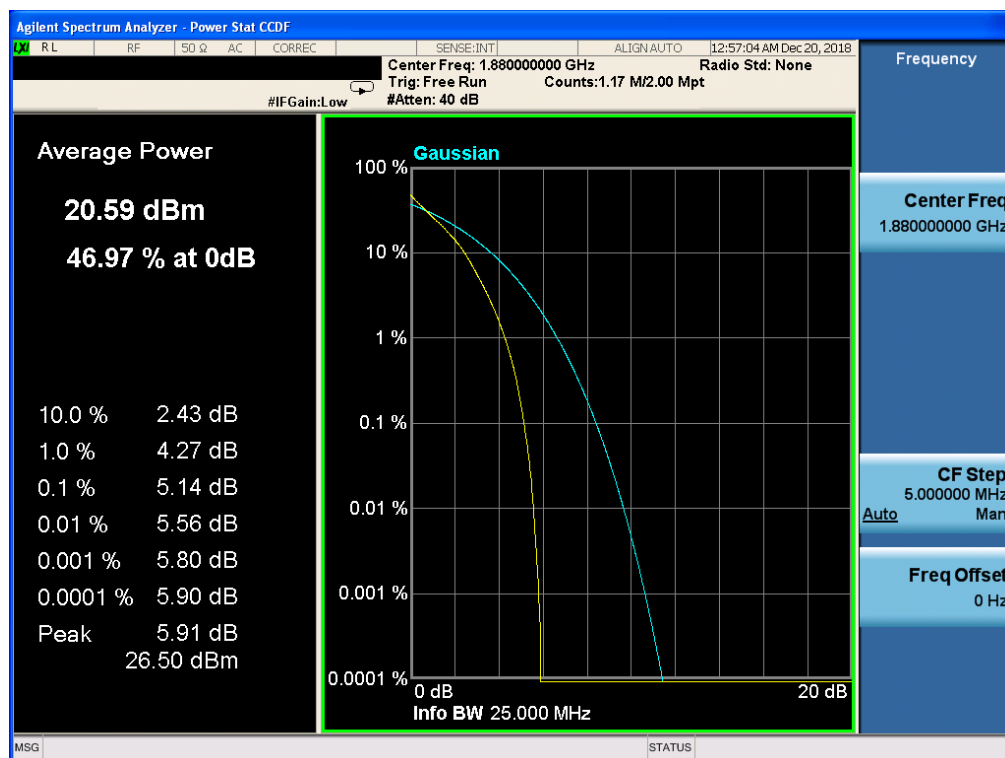
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 3.0, NO. RB 1, RB POS. Low, 16-QAM



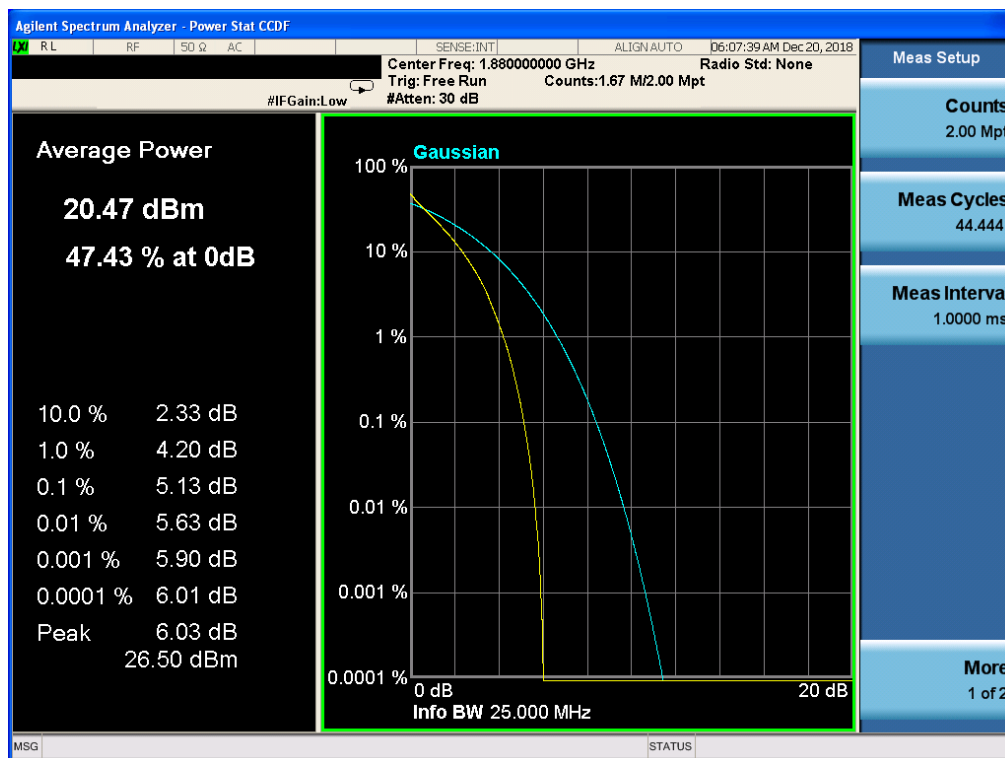
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 5.0, NO. RB 1, RB POS. Low, QPSK



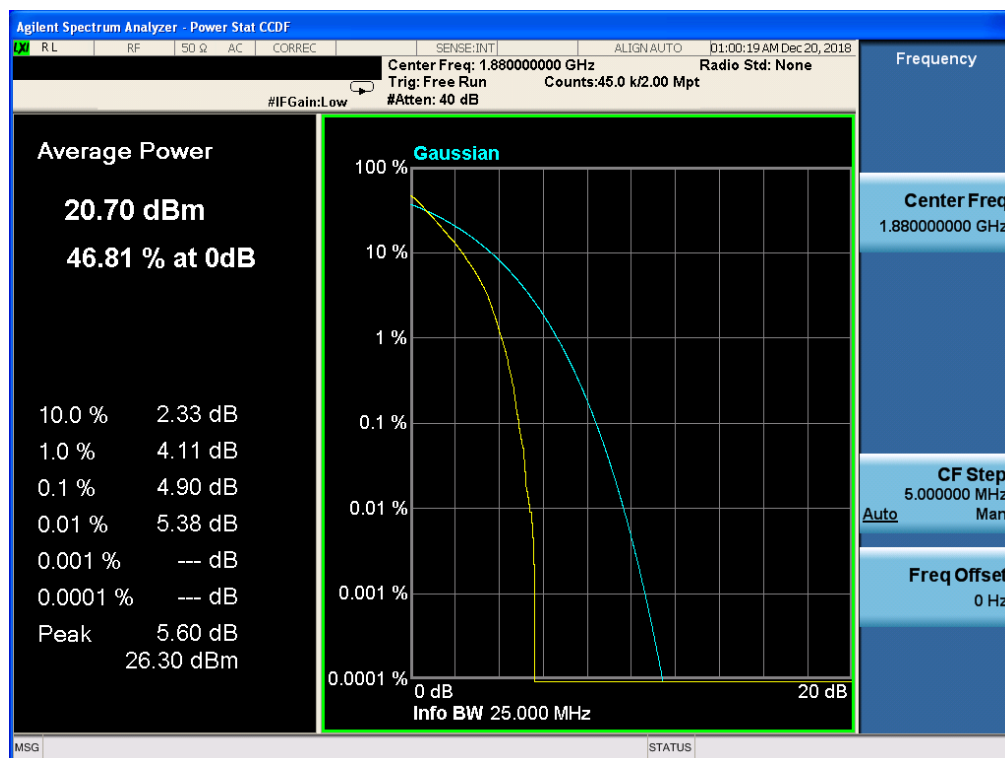
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



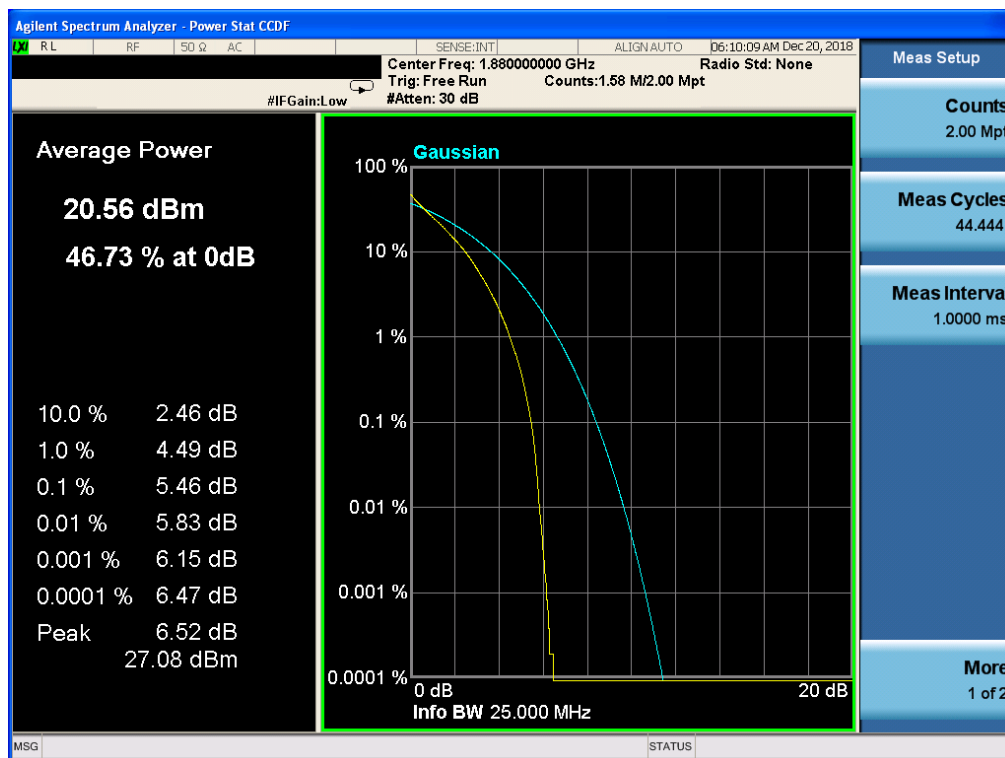
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 10.0, NO. RB 1, RB POS. Low, QPSK



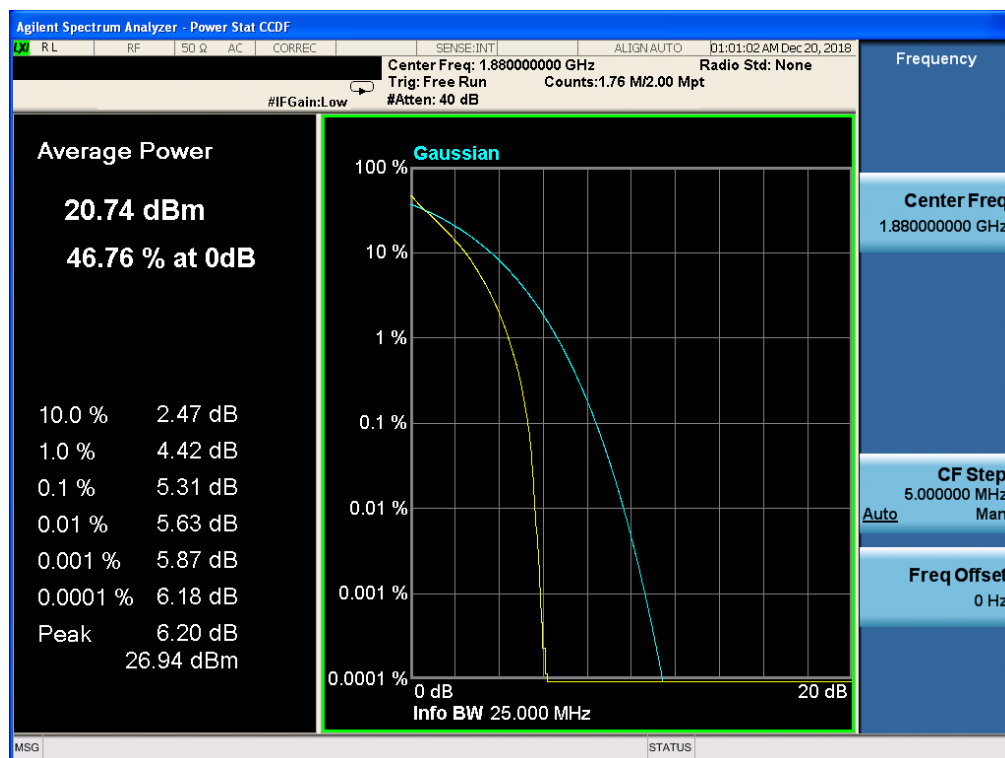
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



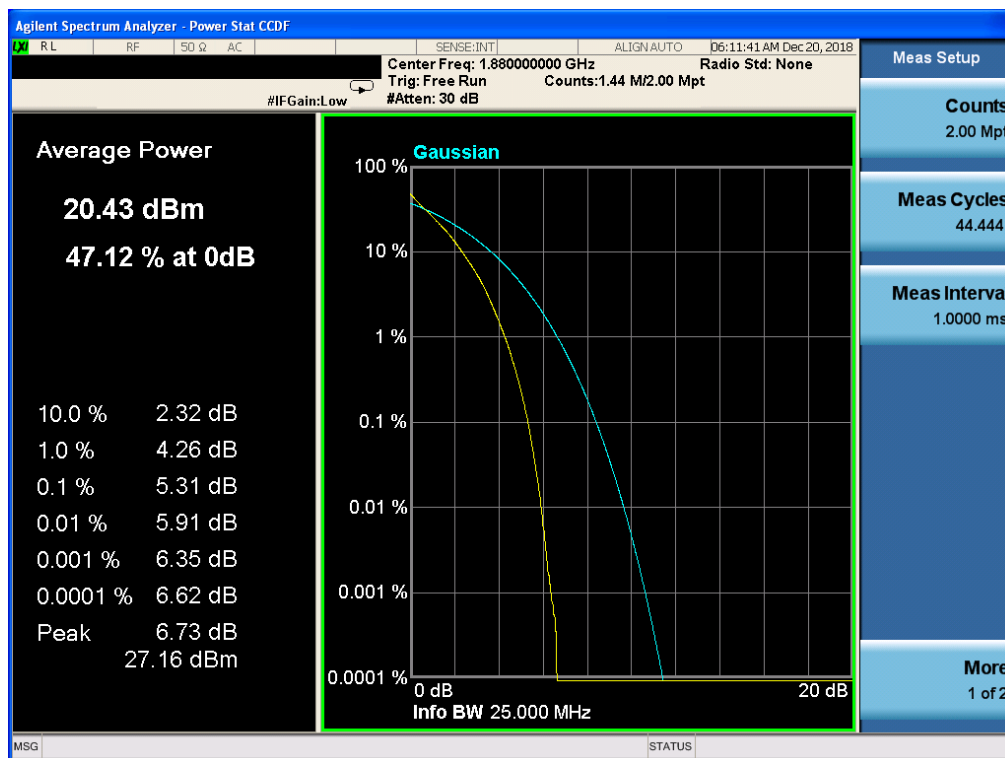
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 15.0, NO. RB 1, RB POS. Low, QPSK



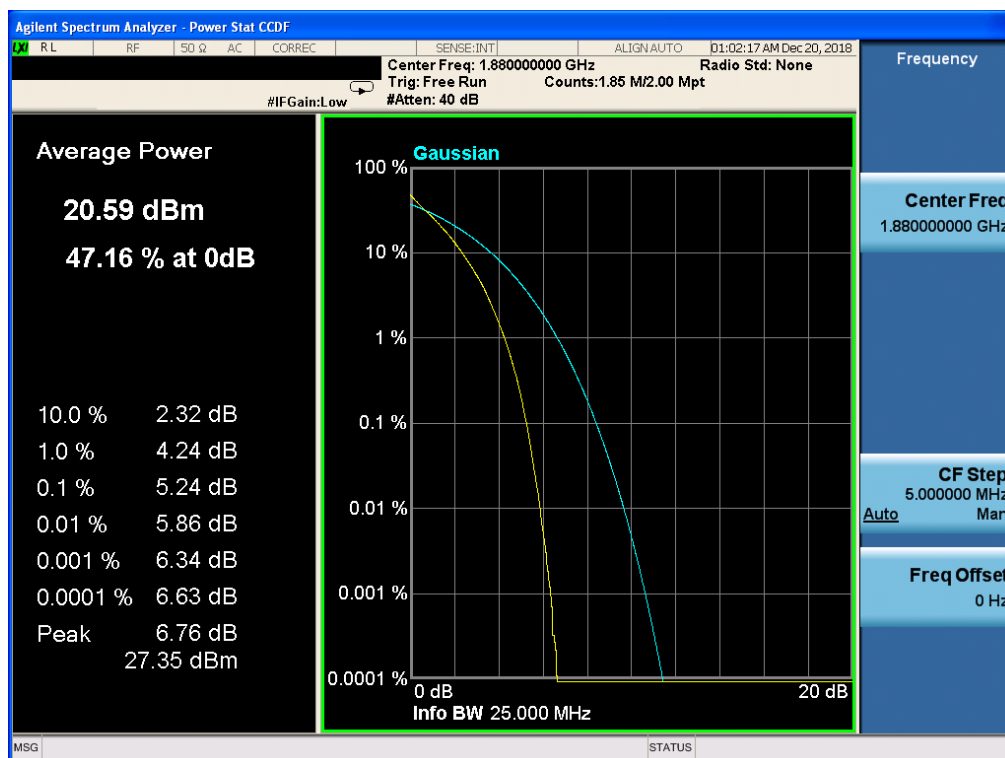
Band 2, UL Channel 18900, UL Frequency 1880.0, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



Band 2, UL Channel 18900, UL Frequency 1880.0, BW 20.0, NO. RB 1, RB POS. Low, QPSK

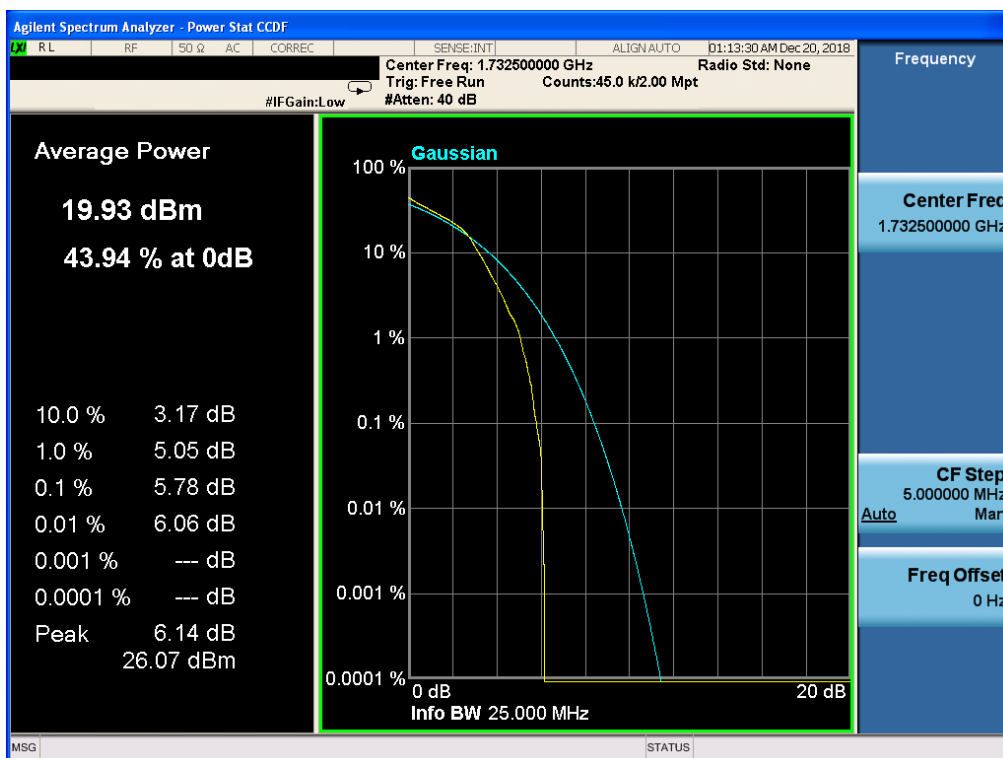


Band 2, UL Channel 18900, UL Frequency 1880.0, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM

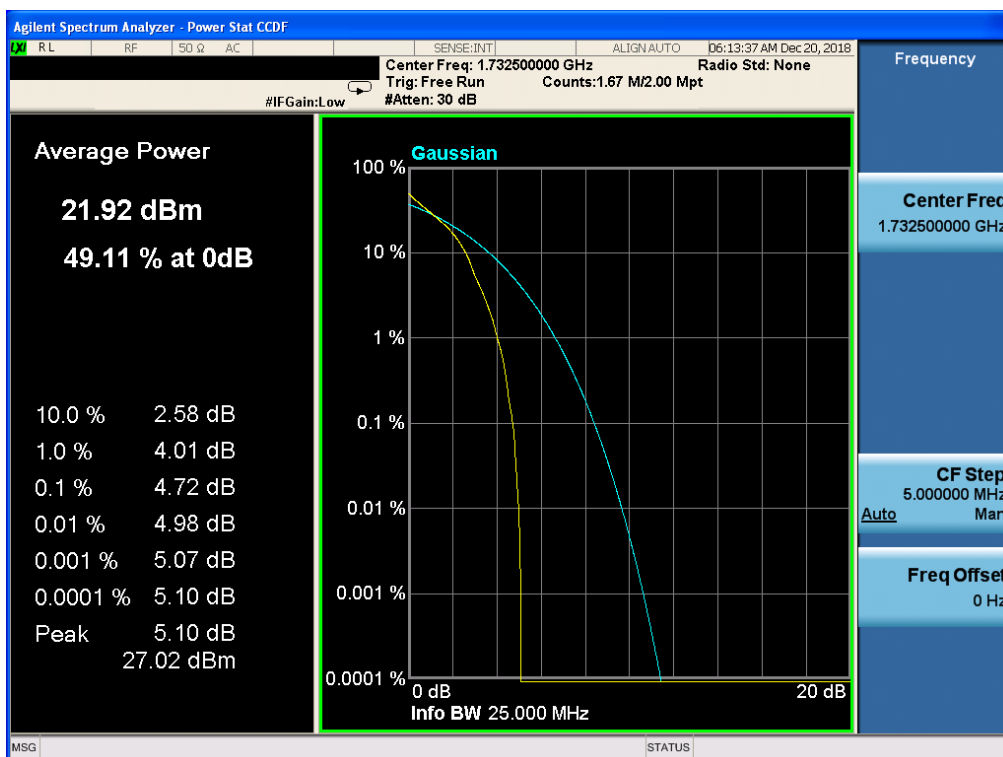


11.6 LTE BAND 4

Band 4, UL Channel 20175, UL Frequency 1732.5, BW 1.4, NO. RB 1, RB POS. Low, QPSK



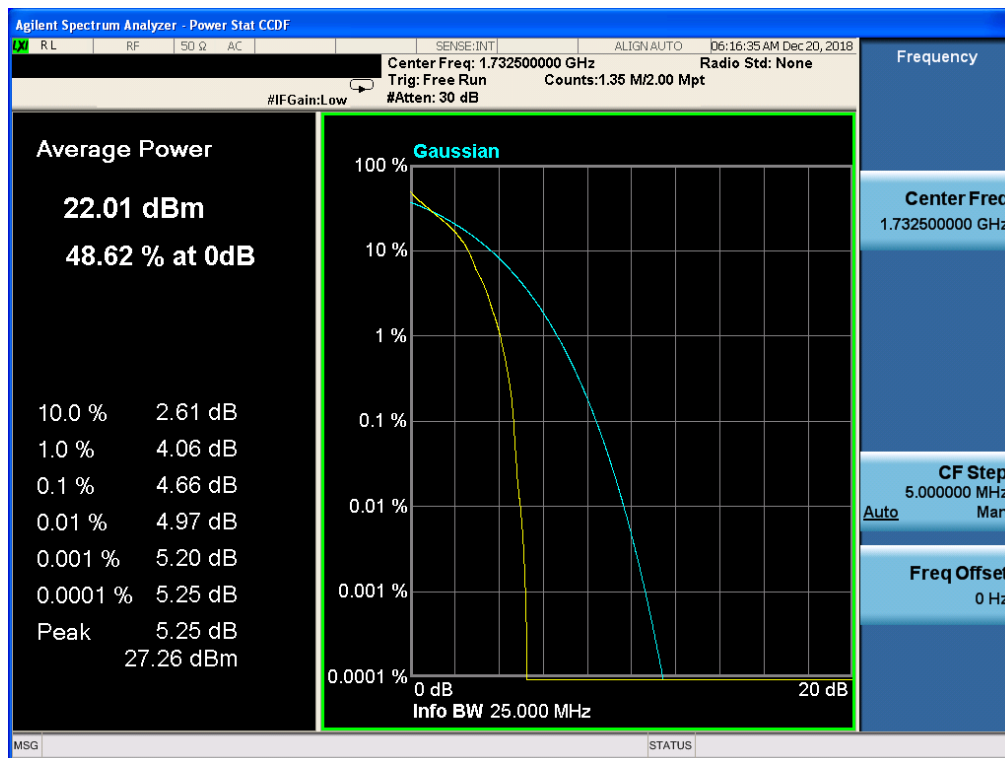
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 1.4, NO. RB 1, RB POS. Low, 16-QAM



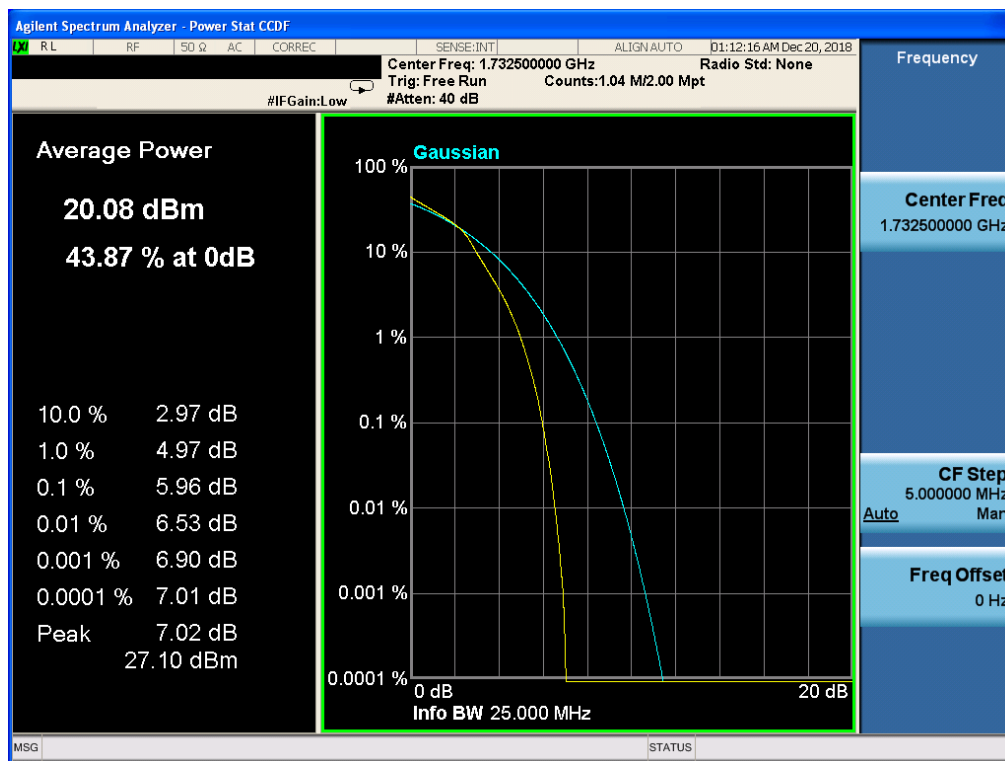
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 3.0, NO. RB 1, RB POS. Low, QPSK



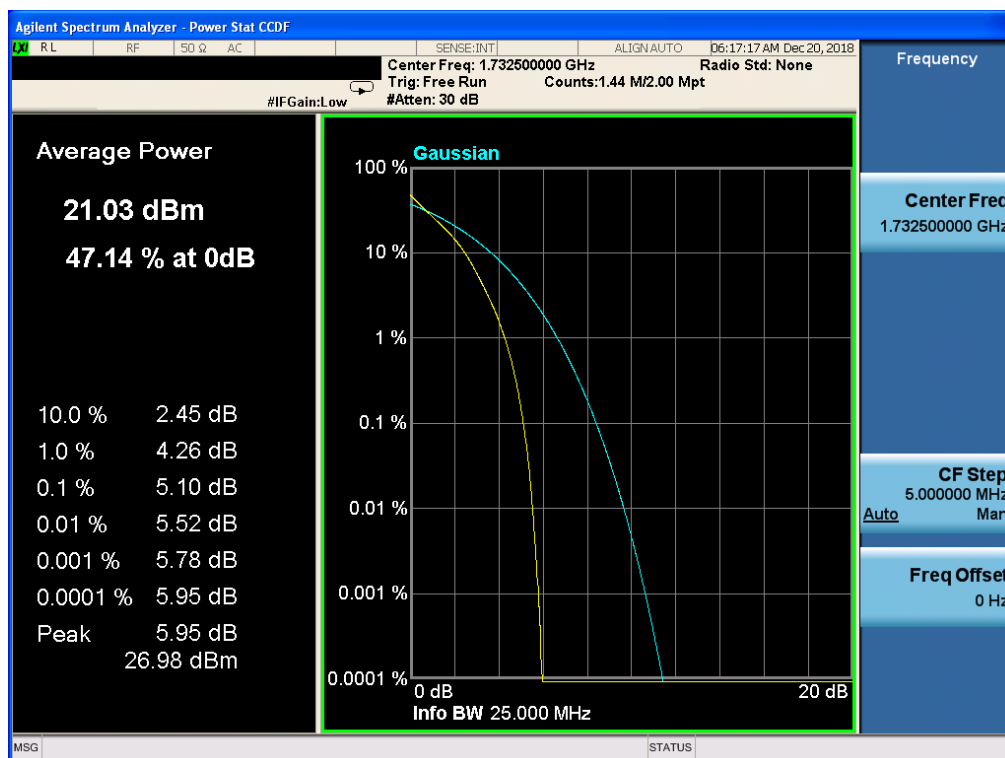
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 3.0, NO. RB 1, RB POS. Low, 16-QAM



Band 4, UL Channel 20175, UL Frequency 1732.5, BW 5.0, NO. RB 1, RB POS. Low, QPSK



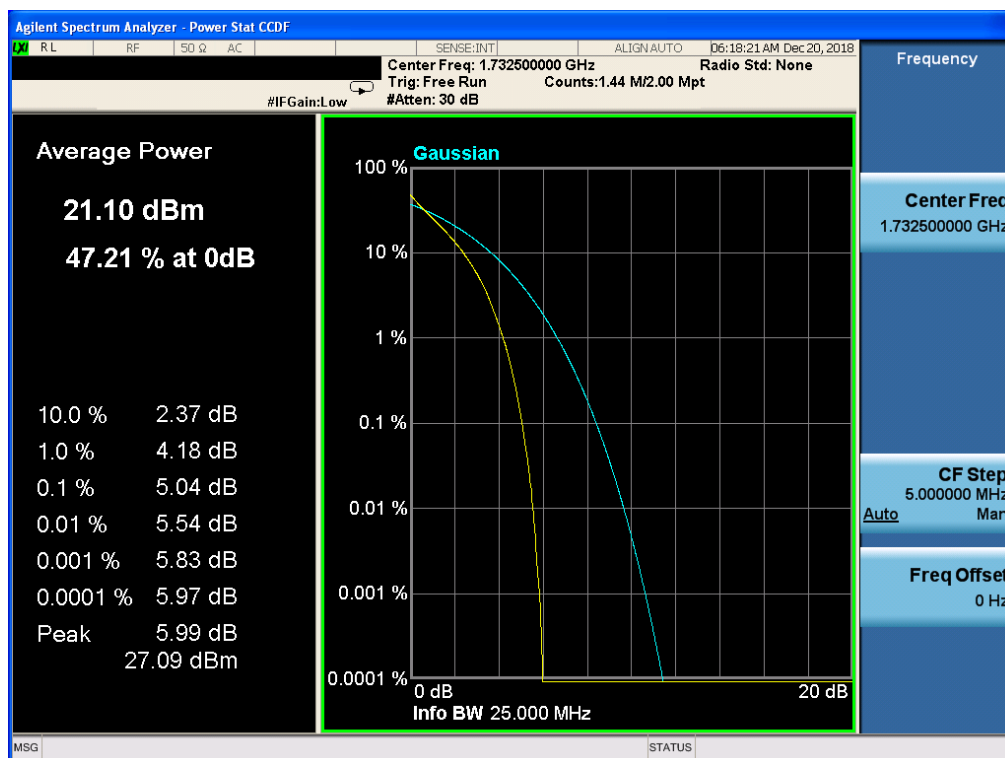
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



Band 4, UL Channel 20175, UL Frequency 1732.5, BW 10.0, NO. RB 1, RB POS. Low, QPSK



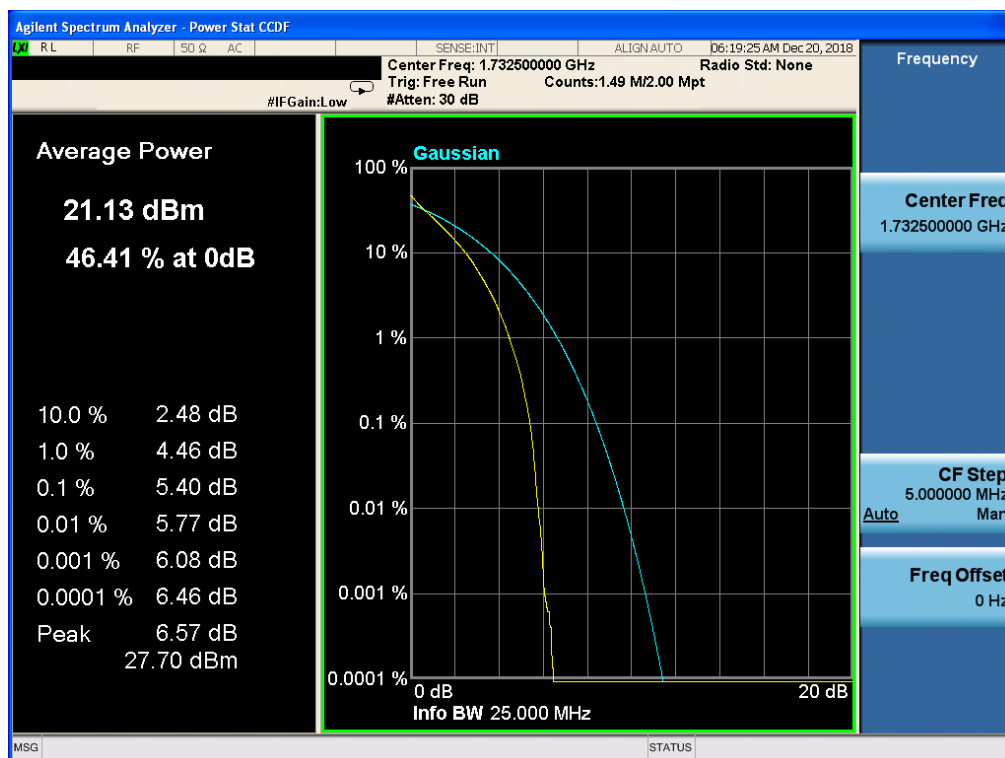
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



Band 4, UL Channel 20175, UL Frequency 1732.5, BW 15.0, NO. RB 1, RB POS. Low, QPSK



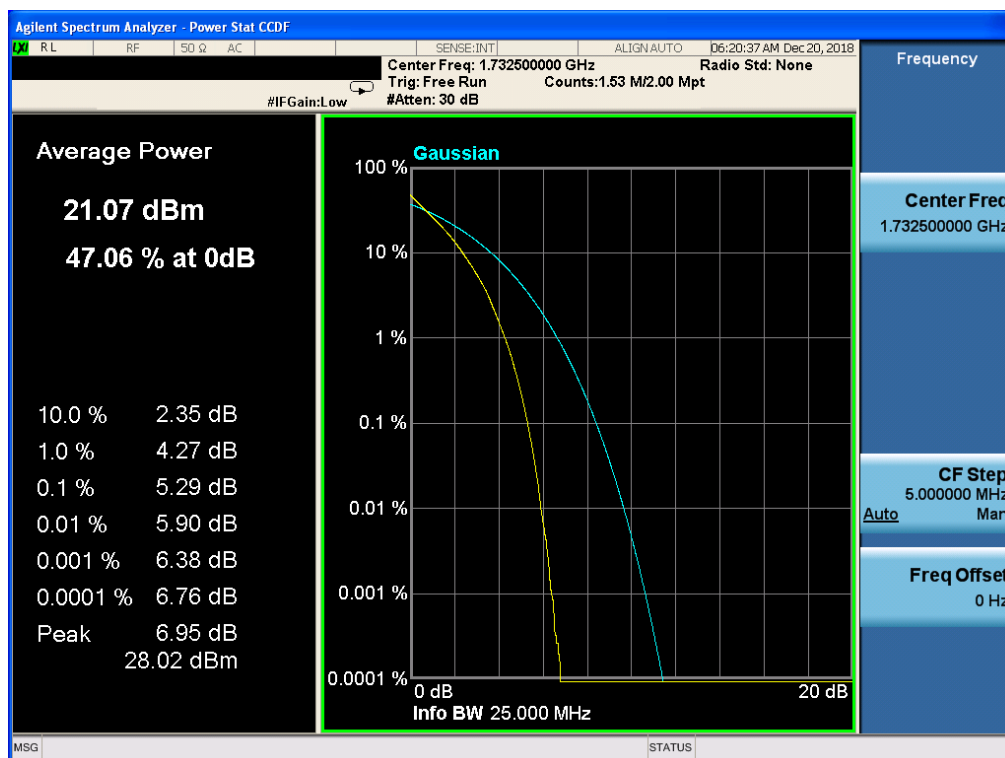
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



Band 4, UL Channel 20175, UL Frequency 1732.5, BW 20.0, NO. RB 1, RB POS. Low, QPSK

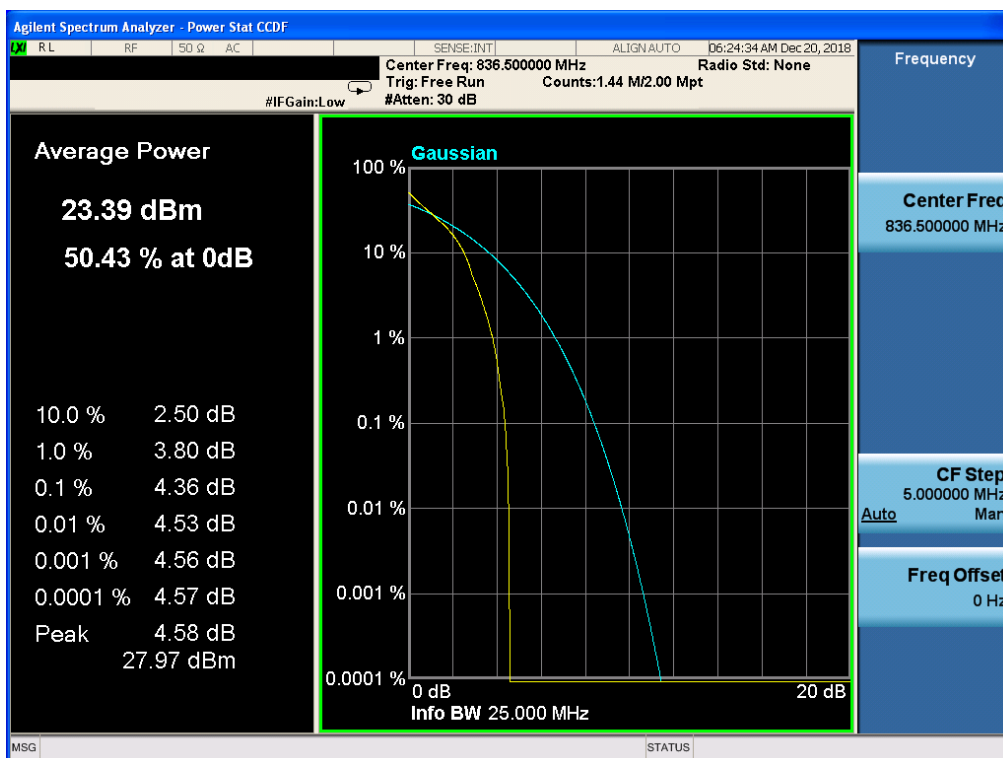


Band 4, UL Channel 20175, UL Frequency 1732.5, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM

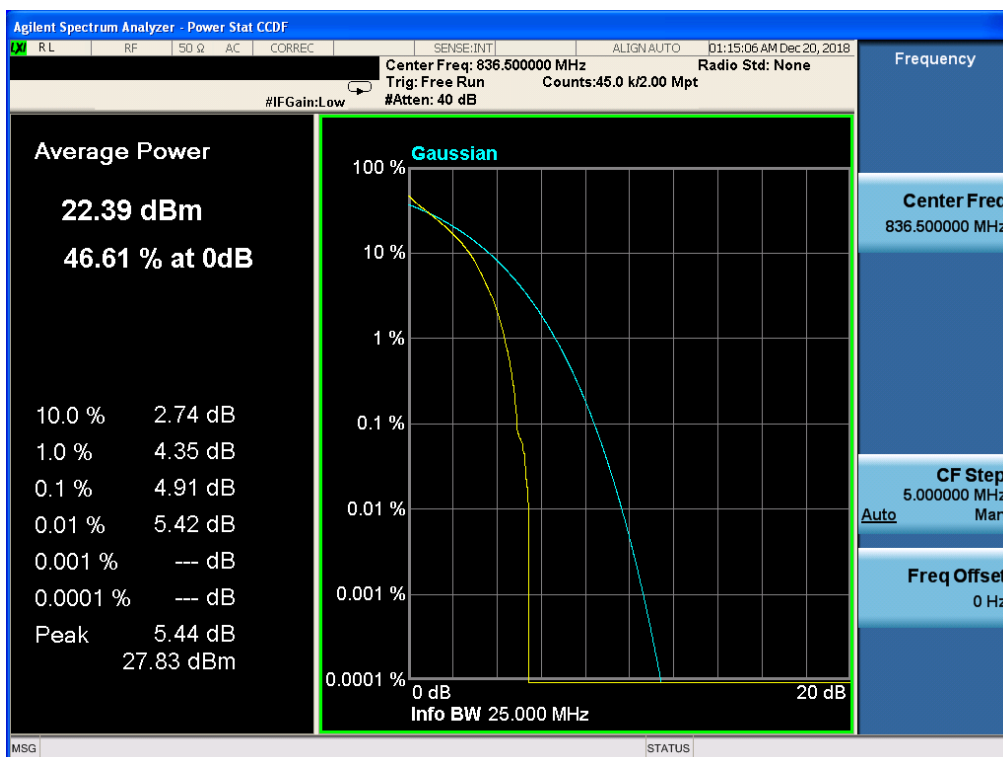


11.7 LTE BAND 5

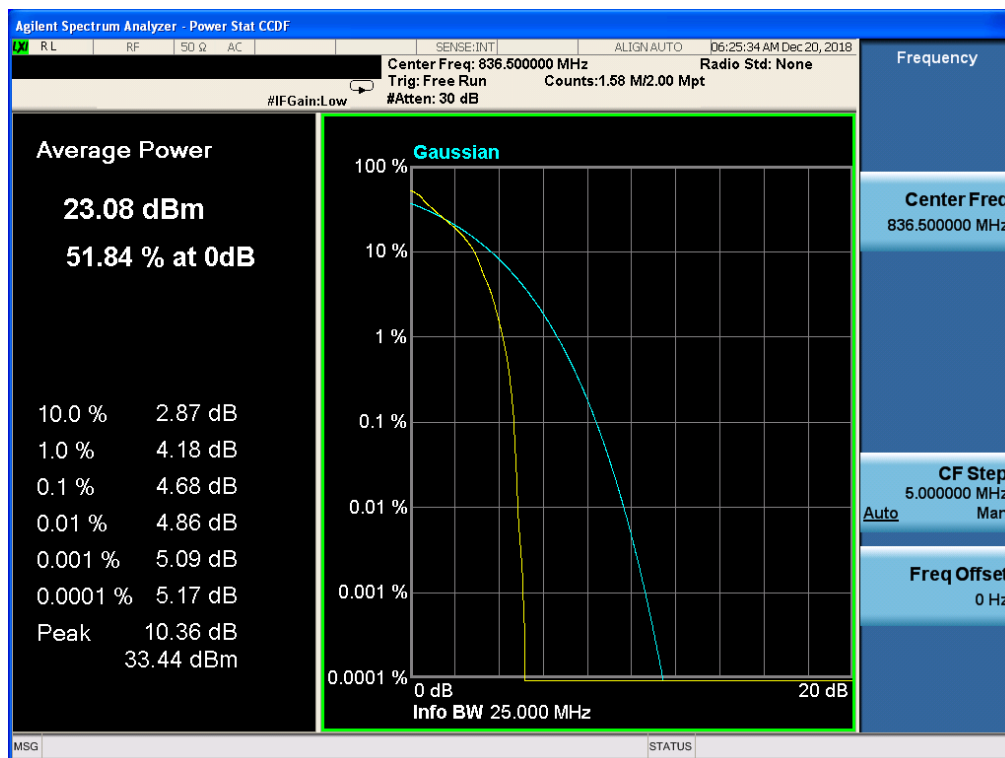
Band 5, UL Channel 20525, UL Frequency 836.5, BW 1.4, NO. RB 1, RB POS. Low, QPSK



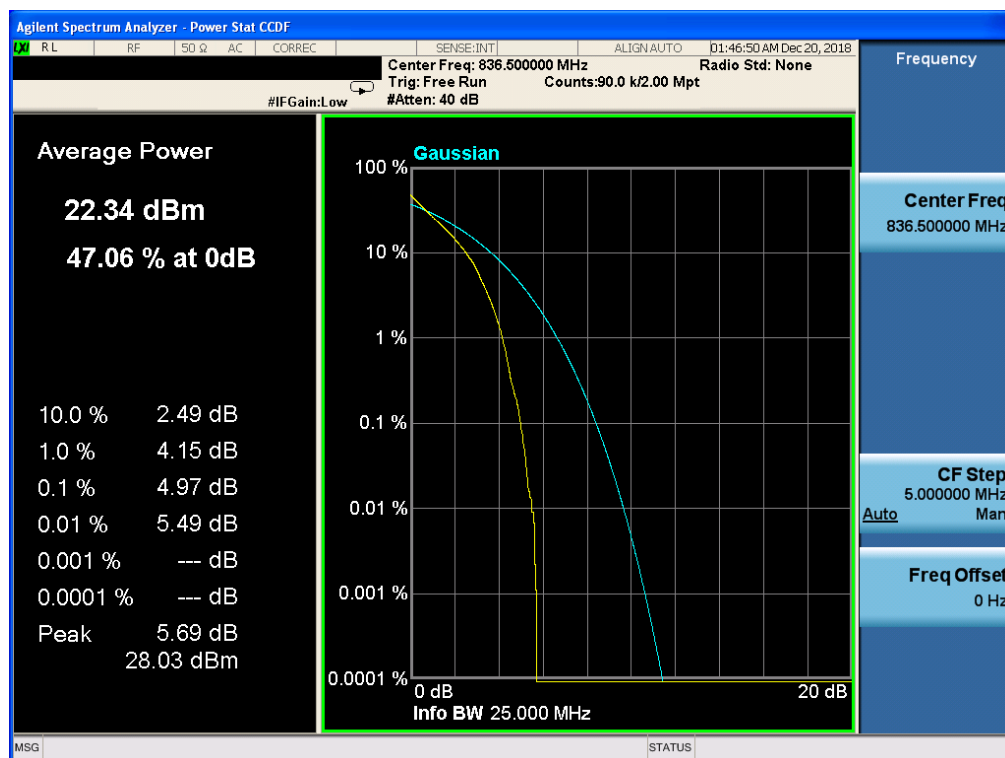
Band 5, UL Channel 20525, UL Frequency 836.5, BW 1.4, NO. RB 1, RB POS. Low, 16-QAM



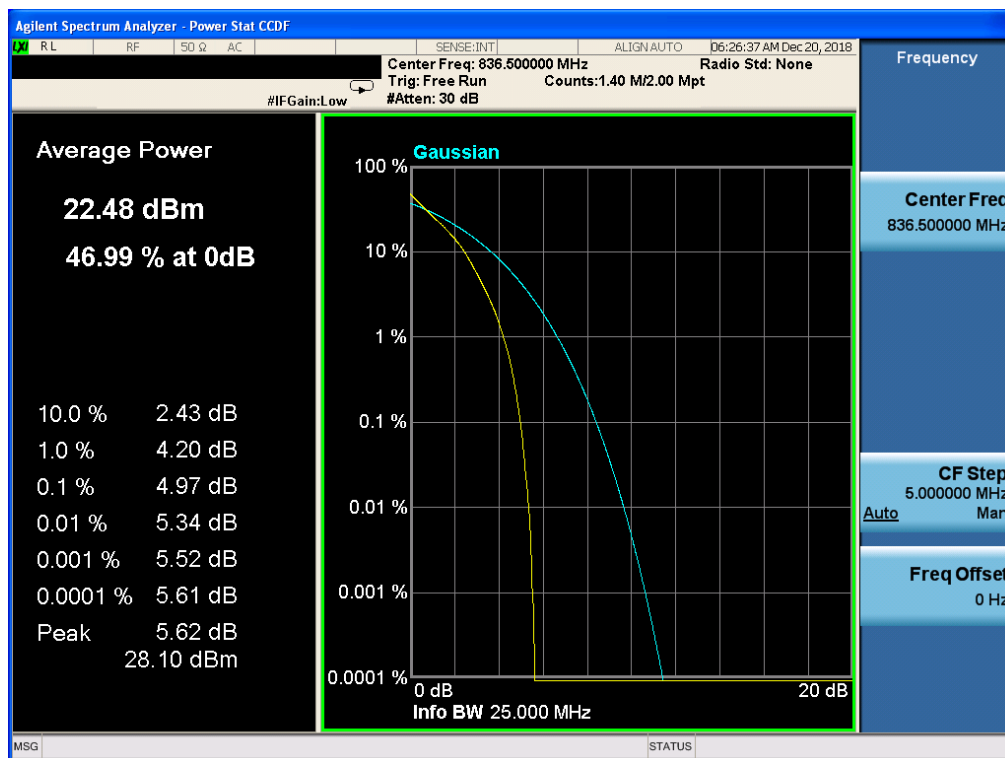
Band 5, UL Channel 20525, UL Frequency 836.5, BW 3.0, NO. RB 1, RB POS. Low, QPSK



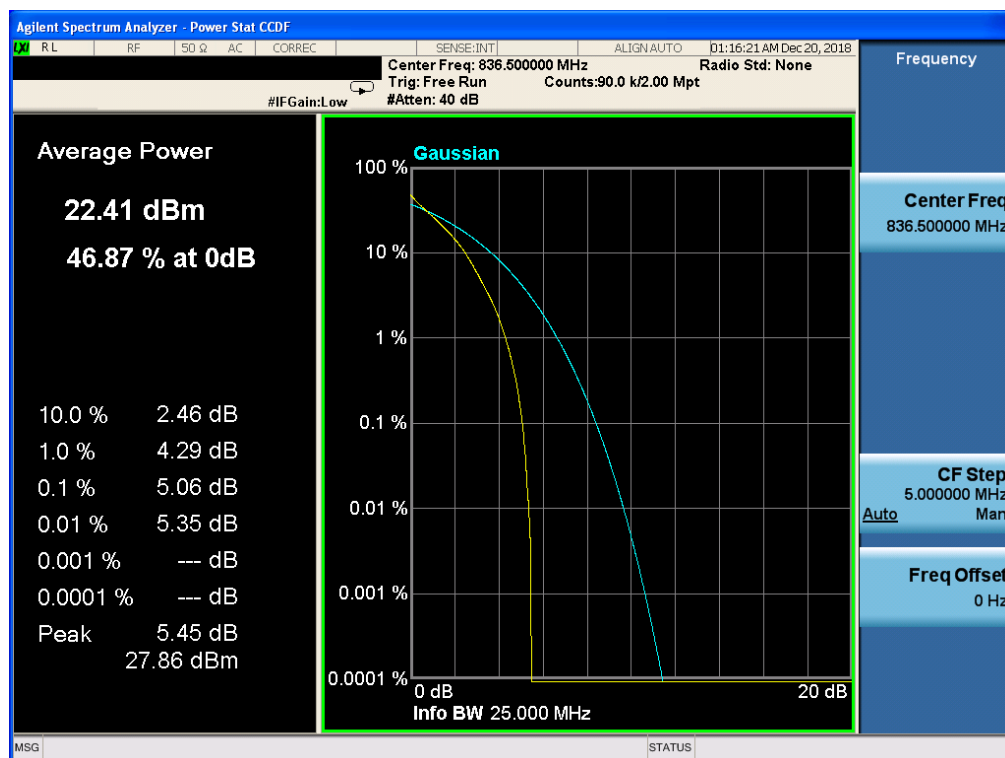
Band 5, UL Channel 20525, UL Frequency 836.5, BW 3.0, NO. RB 1, RB POS. Low, 16-QAM



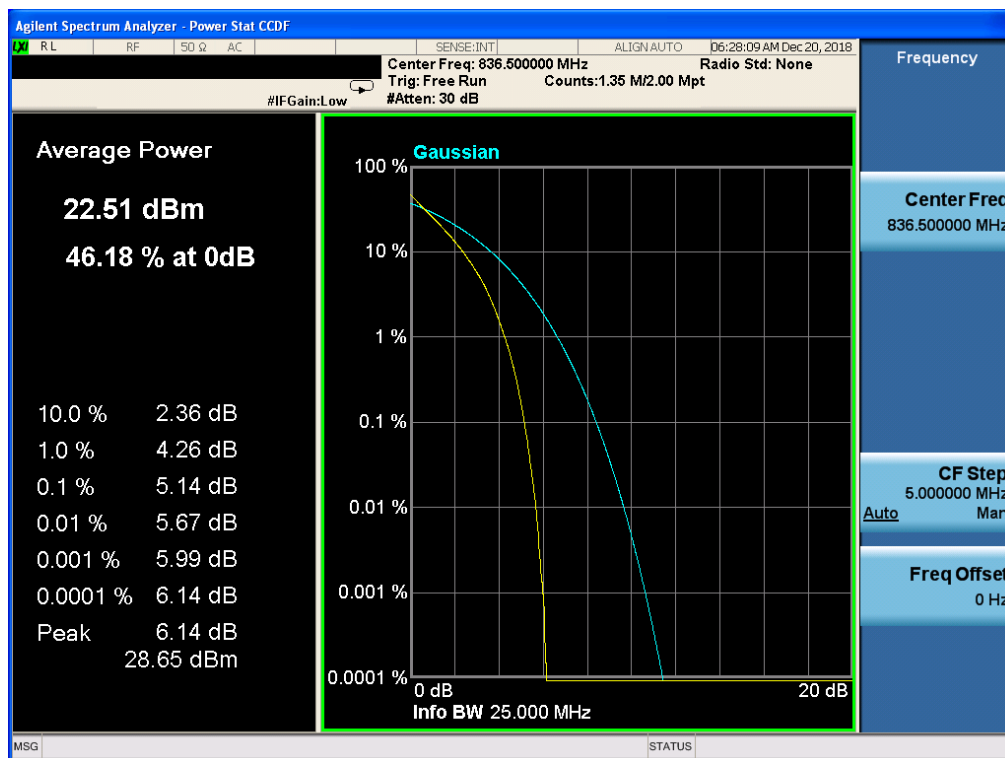
Band 5, UL Channel 20525, UL Frequency 836.5, BW 5.0, NO. RB 1, RB POS. Low, QPSK



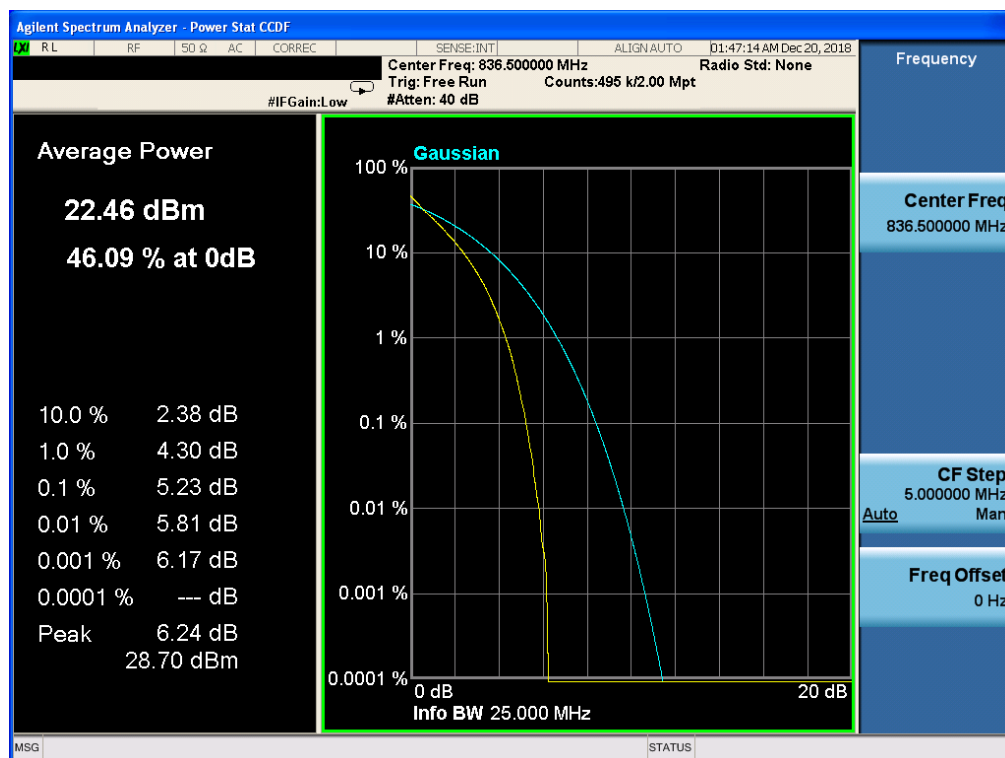
Band 5, UL Channel 20525, UL Frequency 836.5, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



Band 5, UL Channel 20525, UL Frequency 836.5, BW 10.0, NO. RB 1, RB POS. Low, QPSK

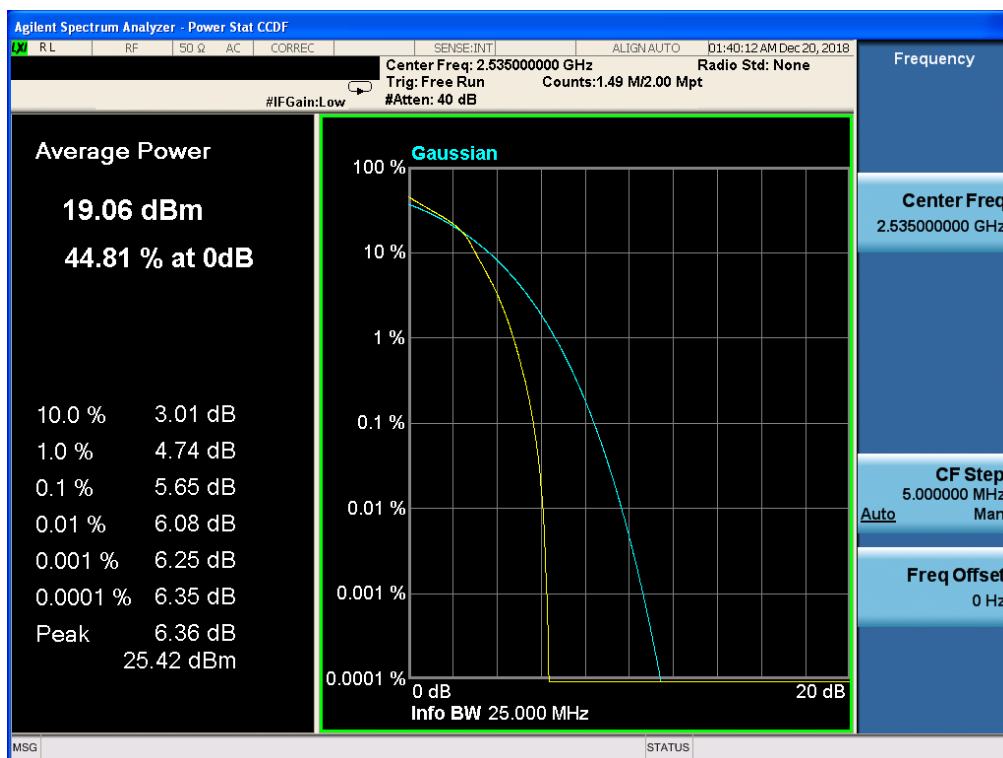


Band 5, UL Channel 20525, UL Frequency 836.5, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM

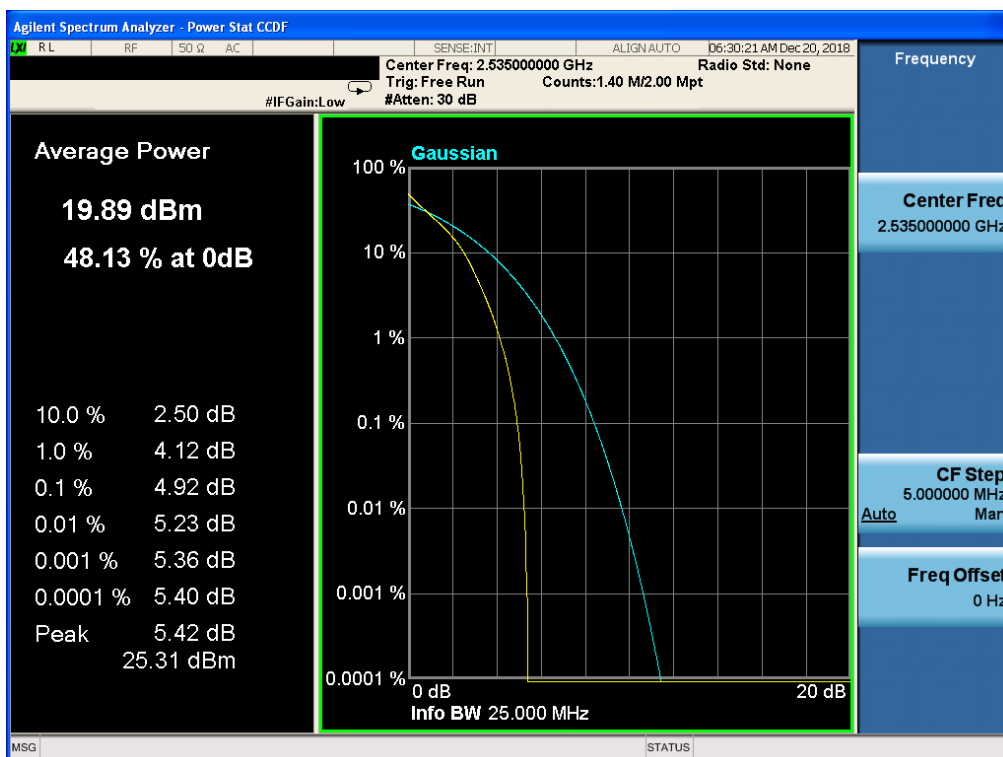


11.8 LTE BAND 7

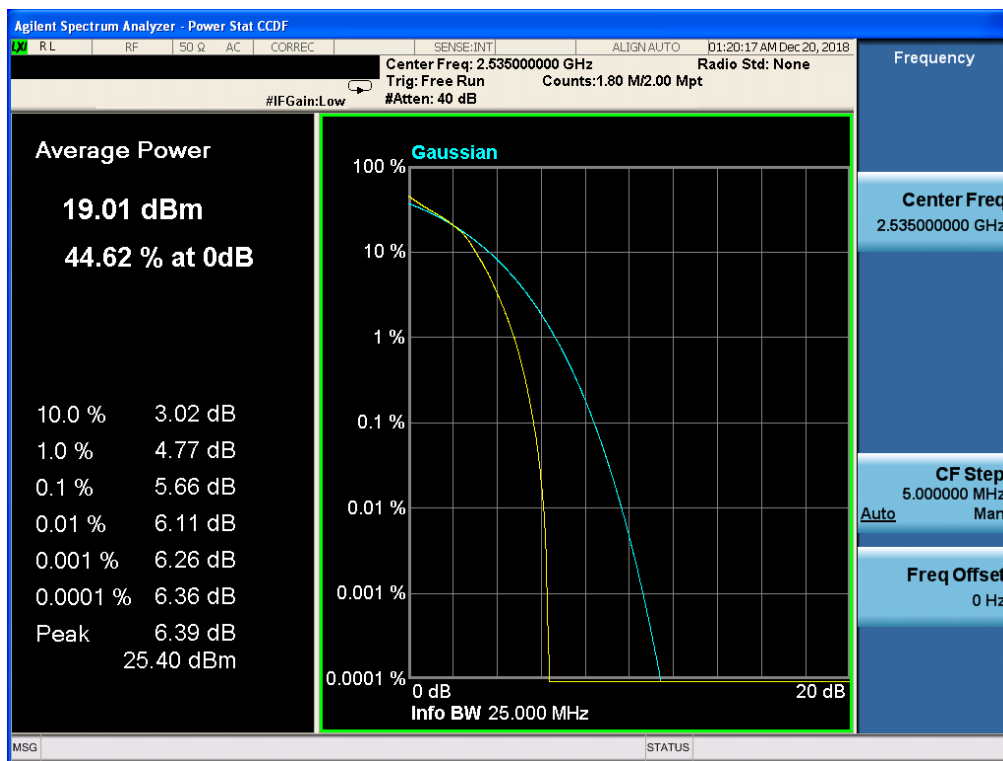
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 5.0, NO. RB 25, RB POS. Low, QPSK



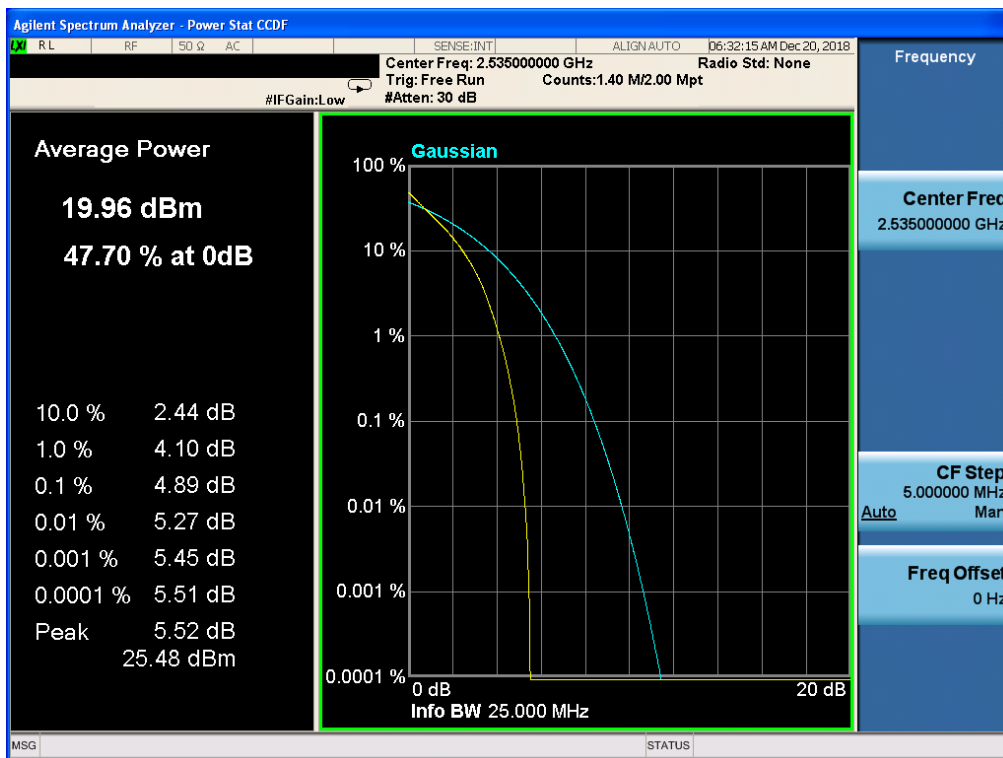
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



Band 7, UL Channel 21100, UL Frequency 2535.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



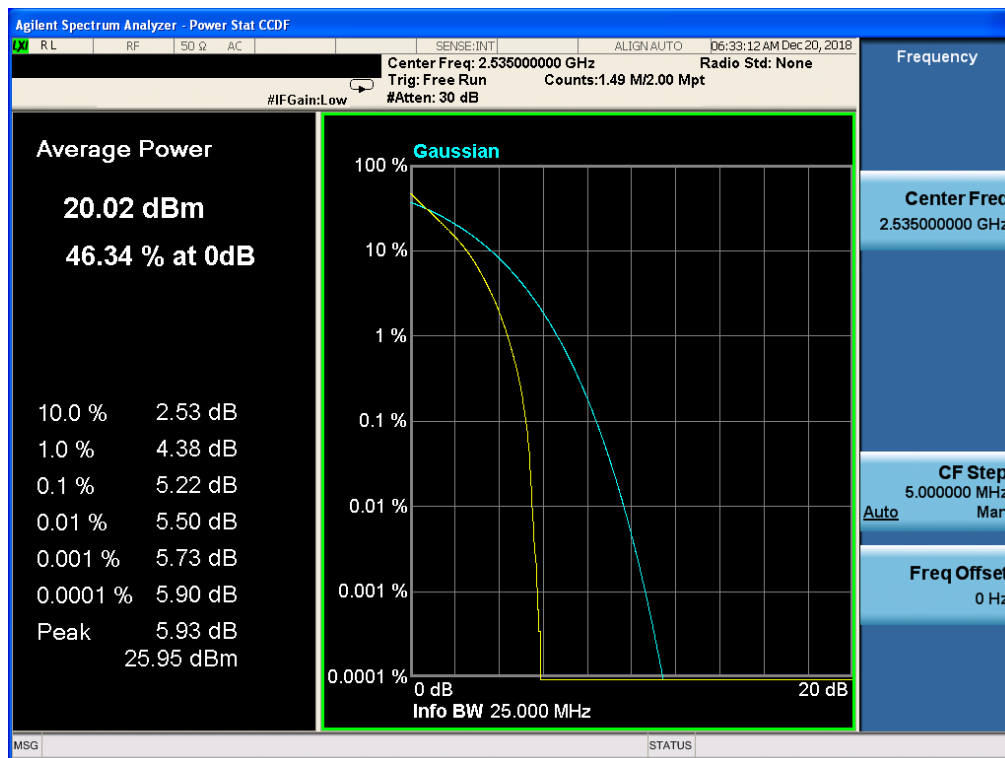
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



Band 7, UL Channel 21100, UL Frequency 2535.0, BW 15.0, NO. RB 1, RB POS. Low, QPSK



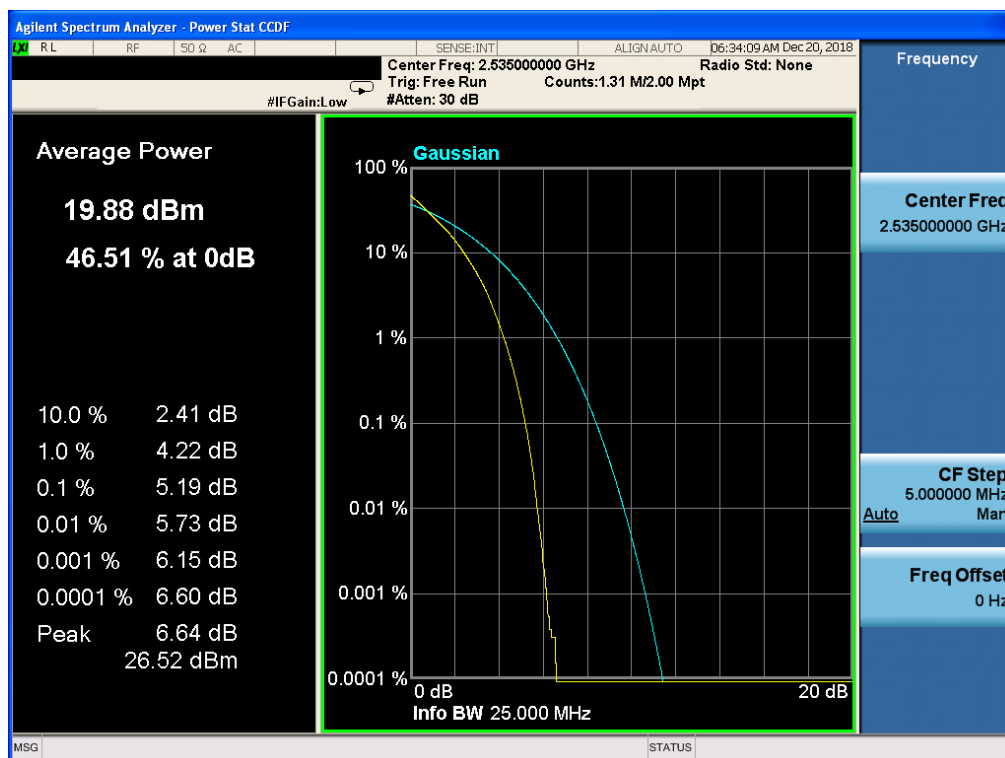
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



Band 7, UL Channel 21100, UL Frequency 2535.0, BW 20.0, NO. RB 1, RB POS. Low, QPSK



Band 7, UL Channel 21100, UL Frequency 2535.0, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM



----END OF REPORT----