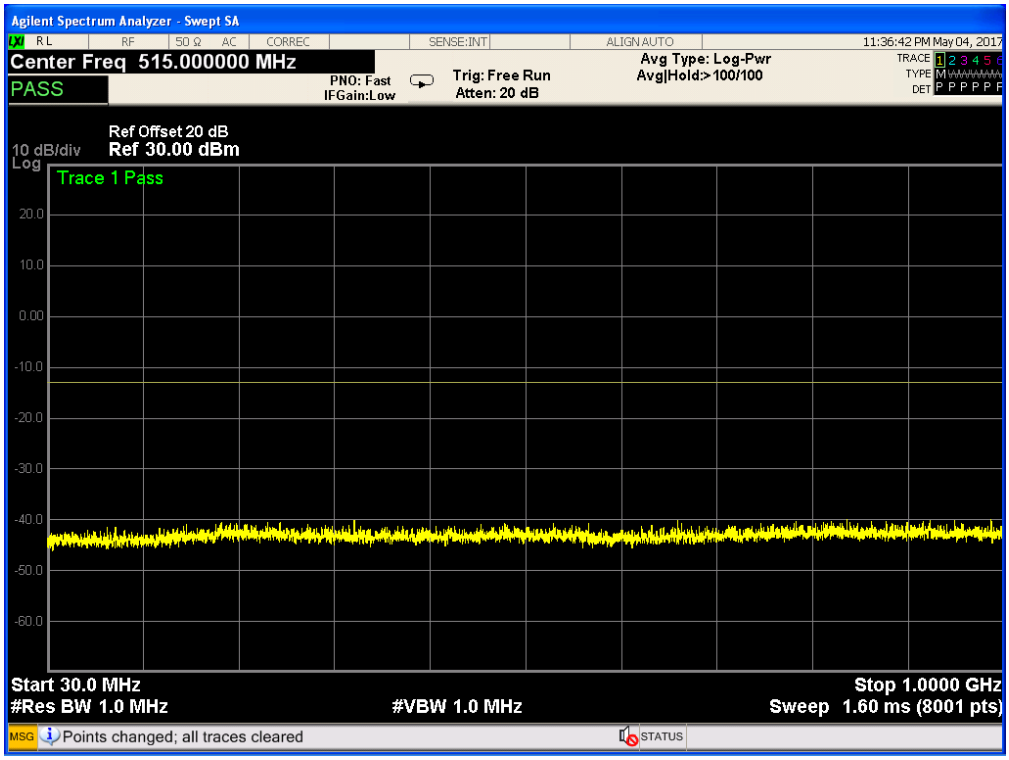
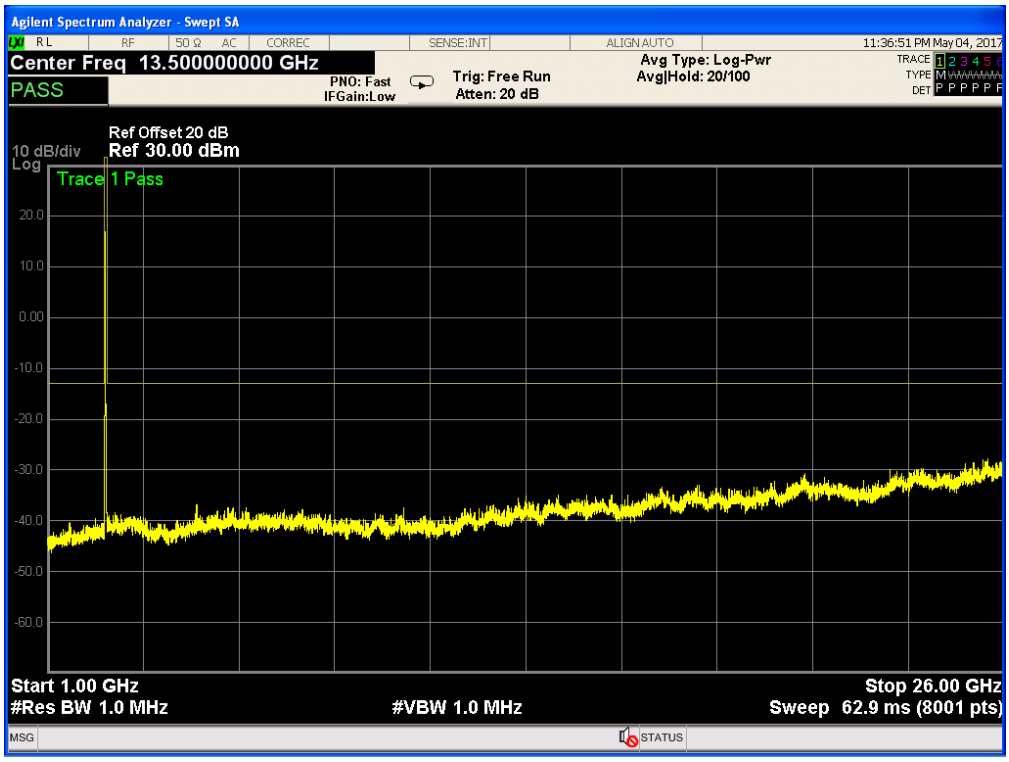
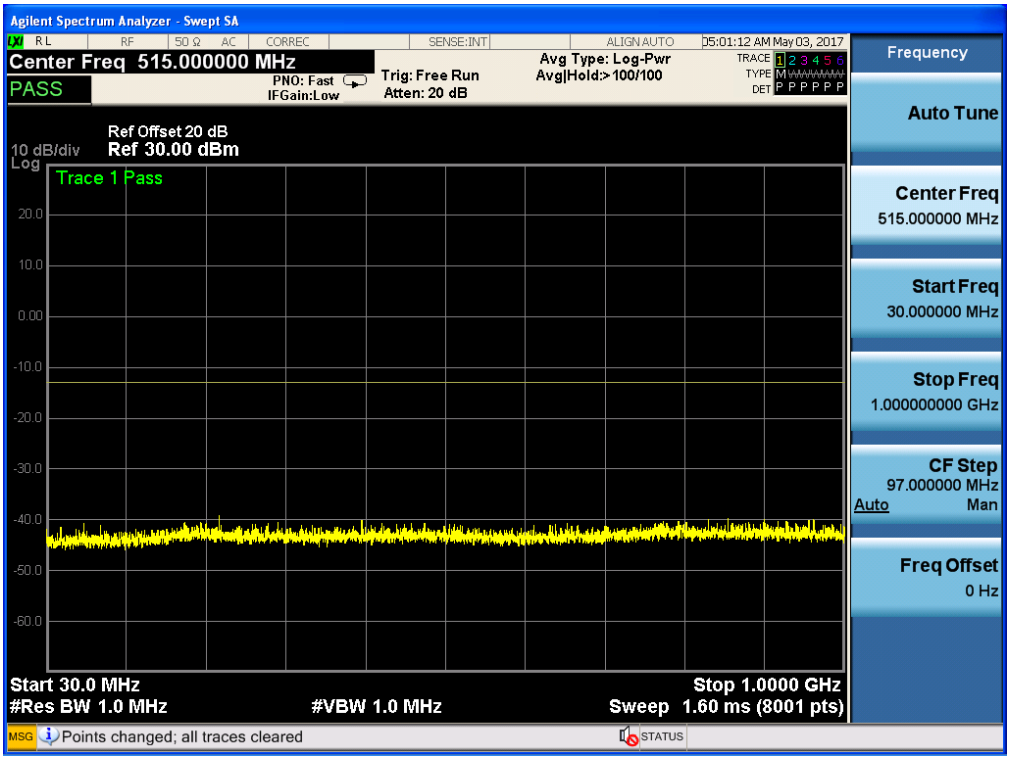
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



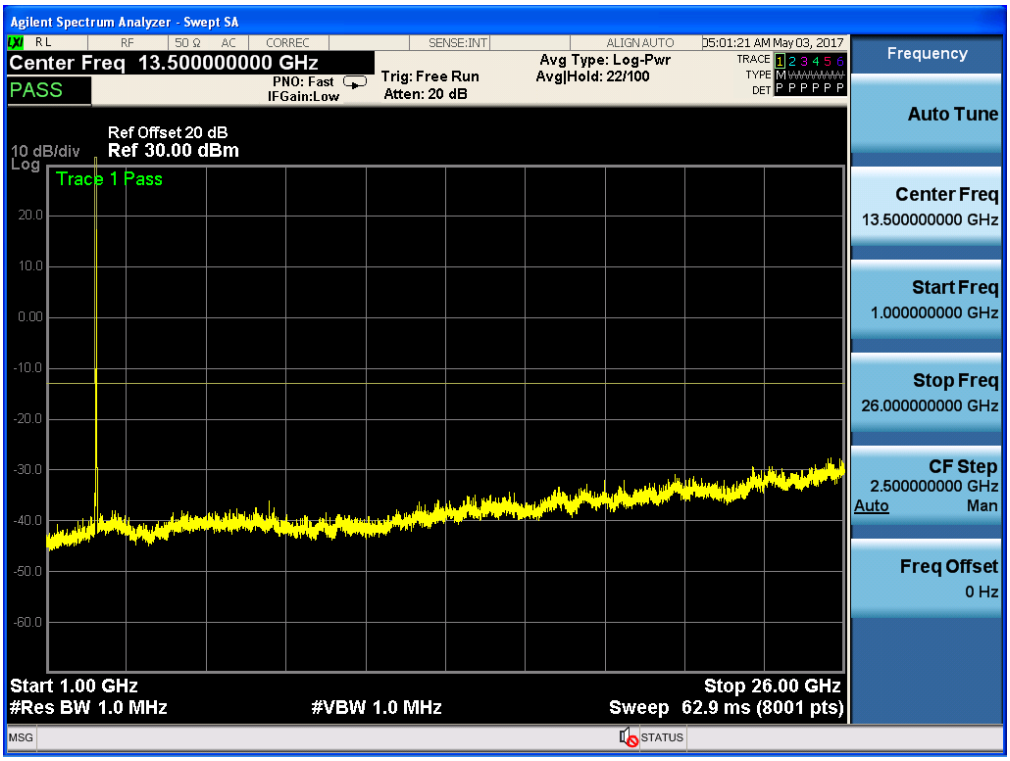
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



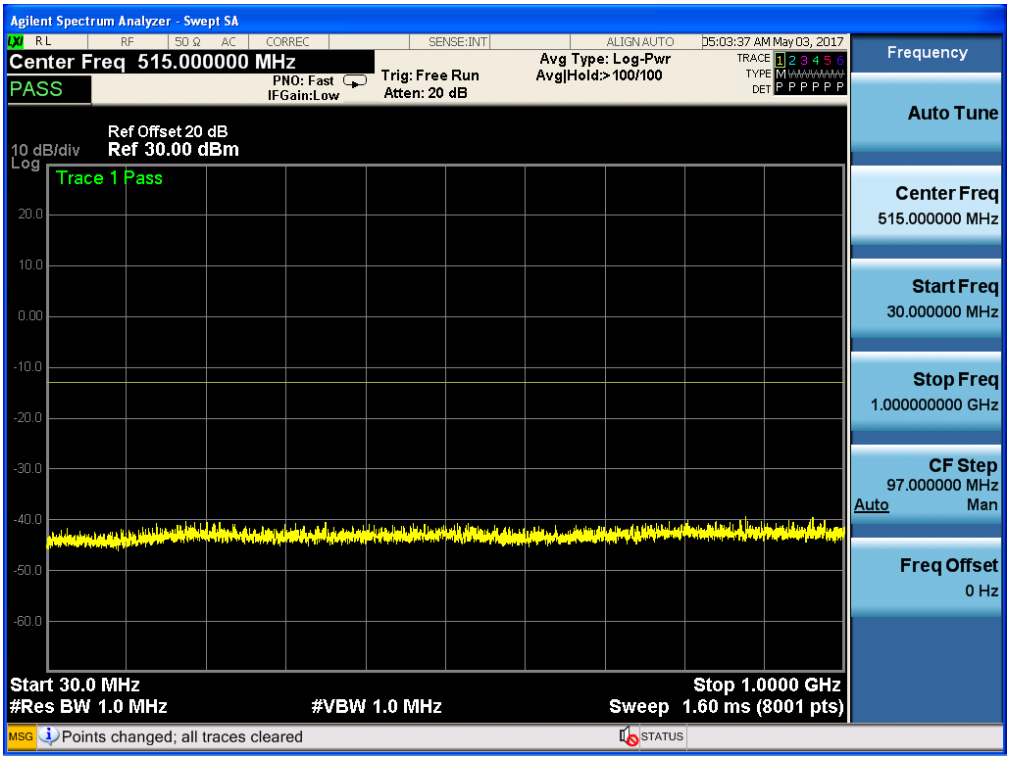
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



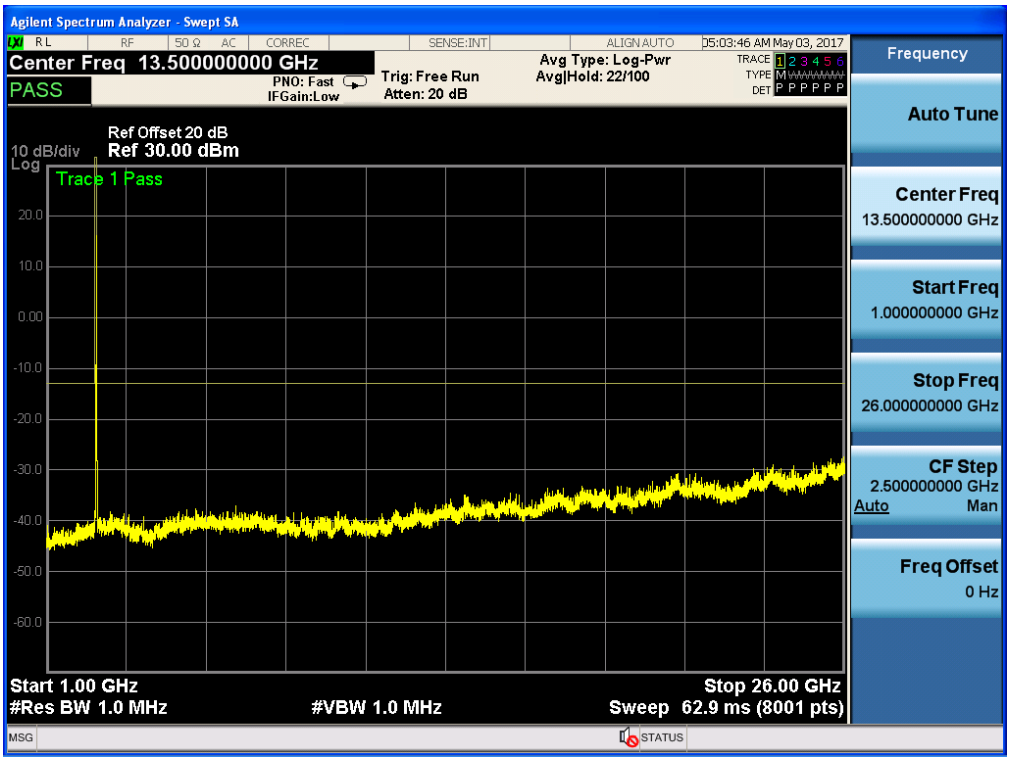
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



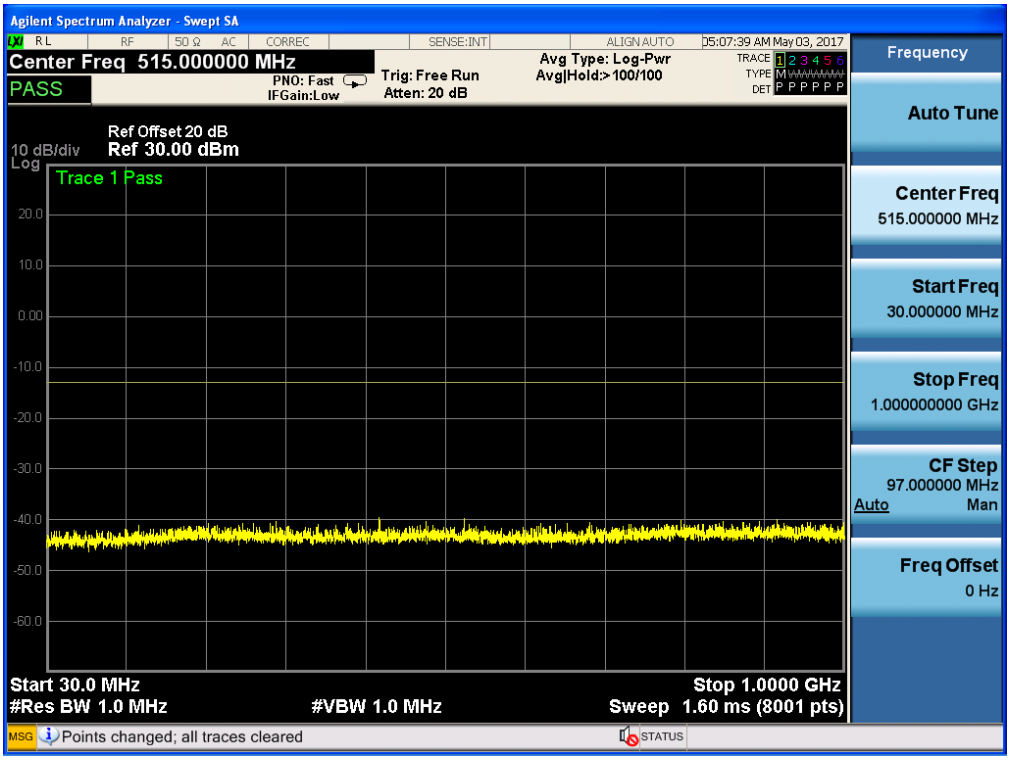
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



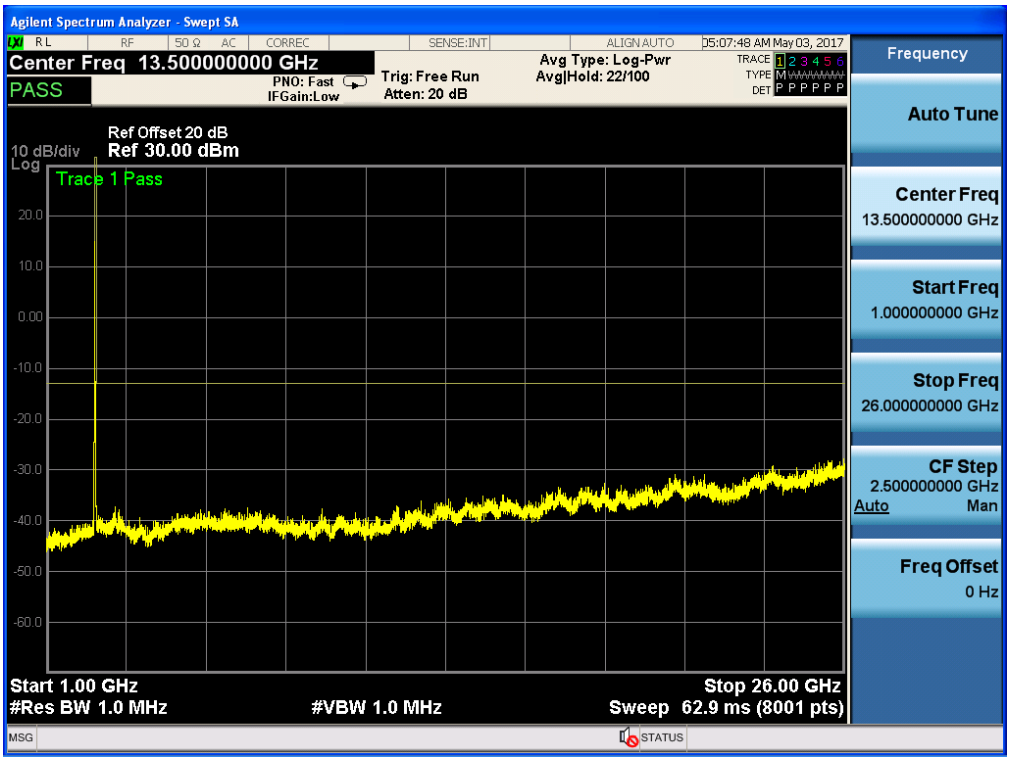
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



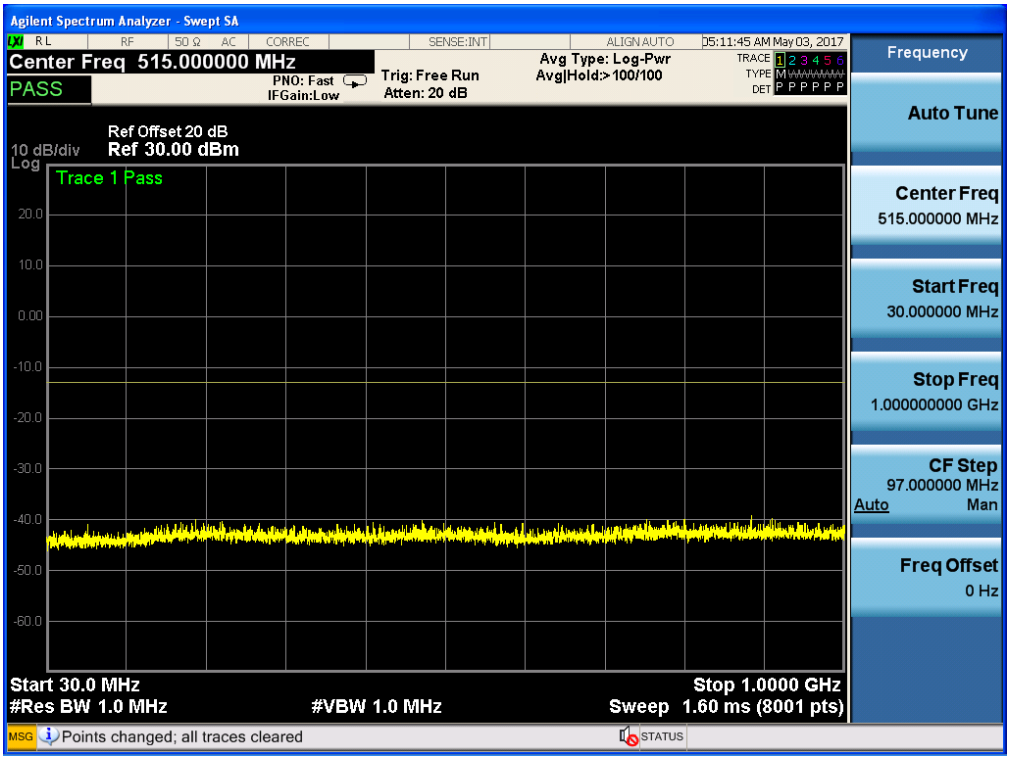
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



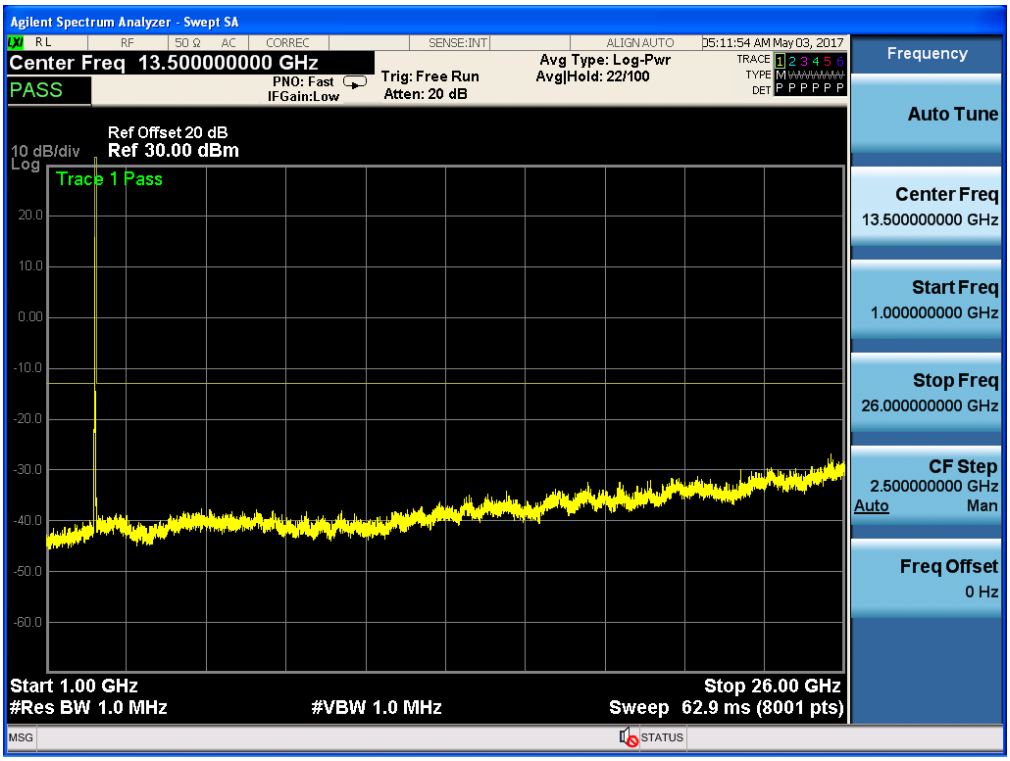
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



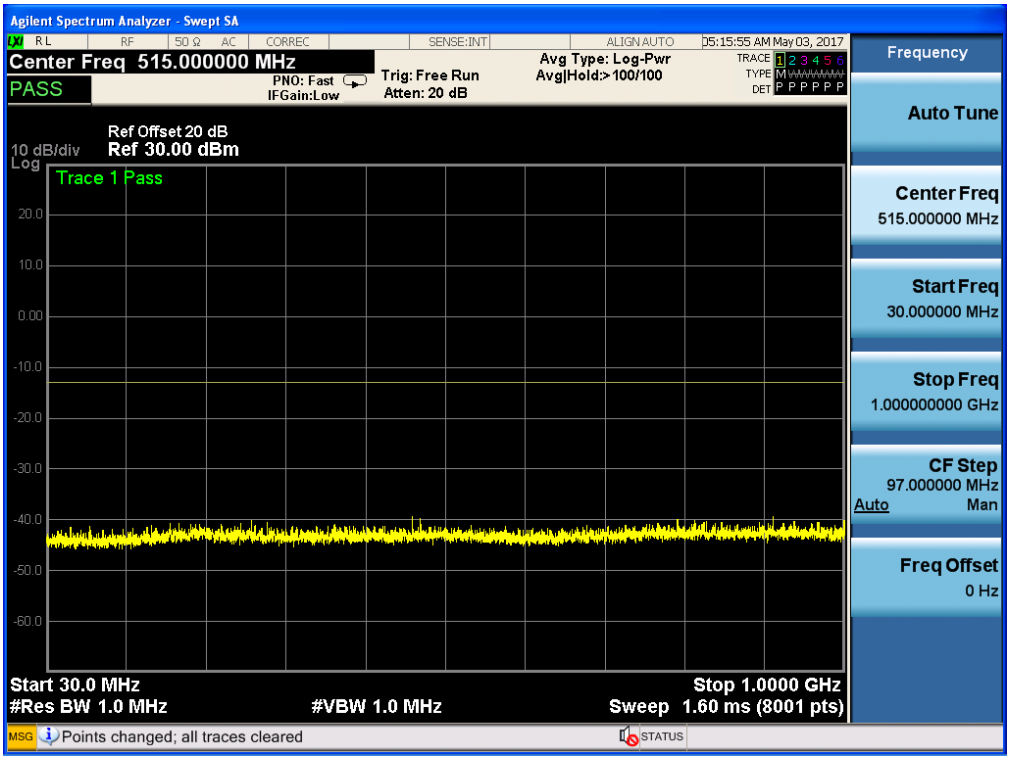
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



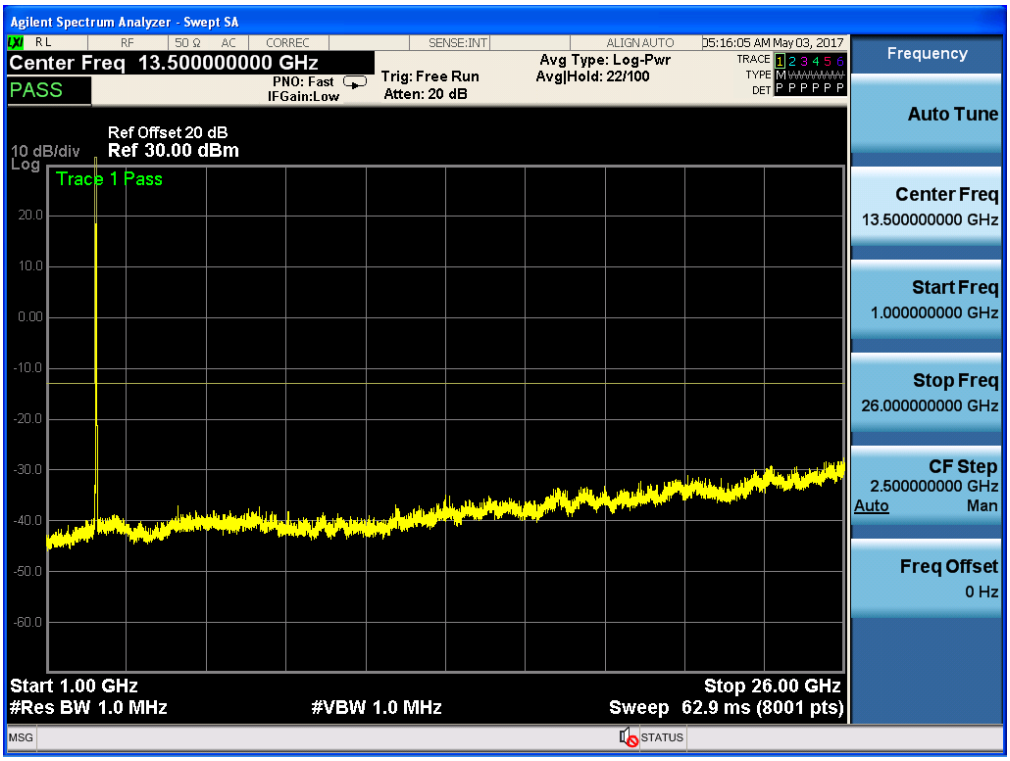
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



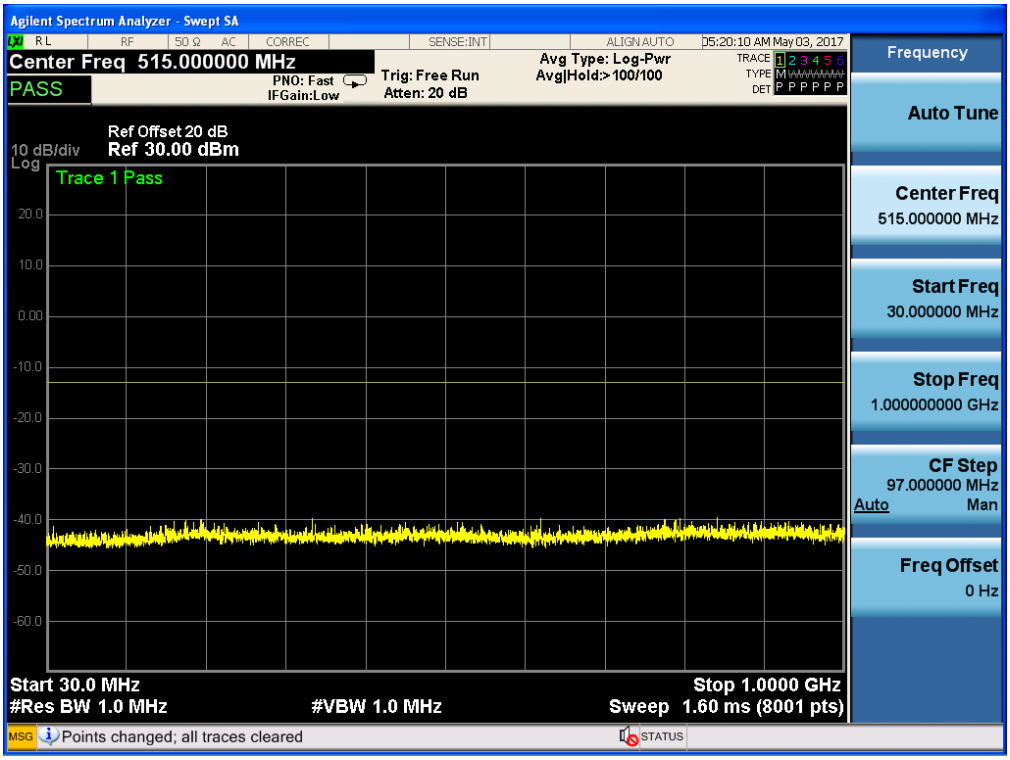
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



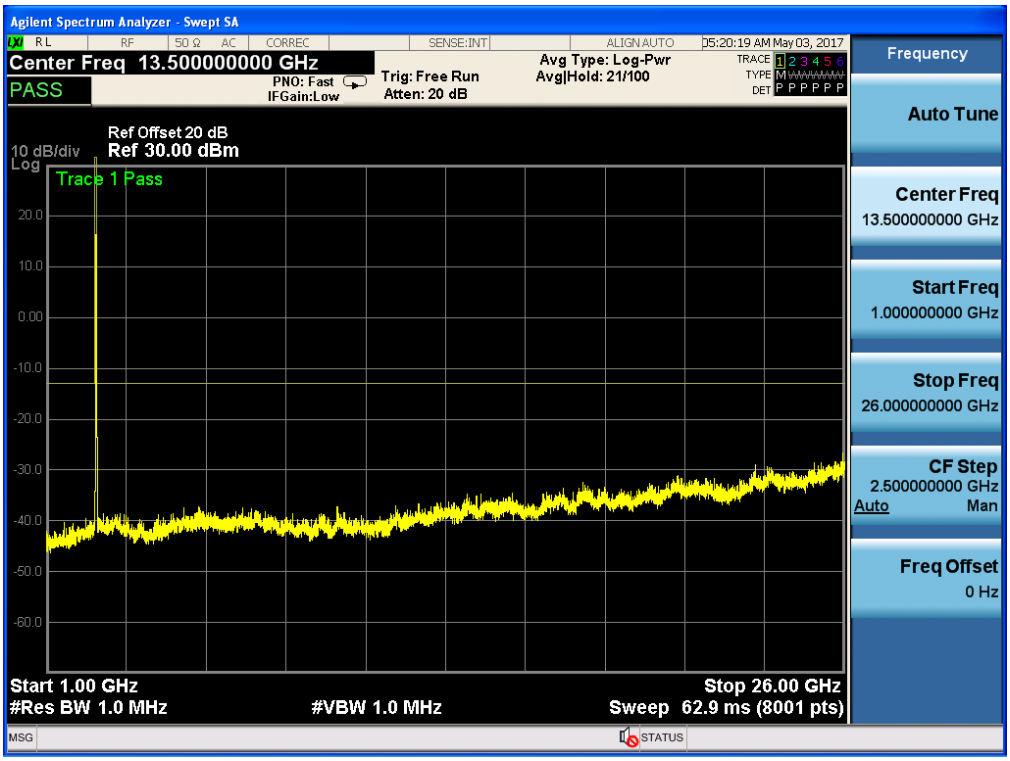
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



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



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



8. Radiated Spurious Emission

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 / EIA 603C 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 7

RESULTS

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	-2.75	3.76	28.24	21.73	148.799	Horizontal	Pass
		1880	-2.51	3.91	28.22	21.80	151.321	Horizontal	Pass
		1909.3	-2.20	3.93	28.2	22.07	161.146	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.59	3.76	28.24	21.89	154.589	Horizontal	Pass
		1880	-2.19	3.91	28.22	22.12	162.866	Horizontal	Pass
		1909.3	-2.81	3.93	28.2	21.46	139.884	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.27	3.77	28.23	22.19	165.614	Horizontal	Pass
		1880	-2.45	3.91	28.24	21.88	154.128	Horizontal	Pass
		1908.5	-2.24	3.94	28.25	22.07	160.986	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.59	3.77	28.23	21.87	153.895	Horizontal	Pass
		1880	-2.90	3.91	28.24	21.43	138.915	Horizontal	Pass
		1908.5	-2.03	3.94	28.25	22.28	168.954	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.69	3.77	28.31	21.85	153.128	Horizontal	Pass
		1880	-2.17	3.91	28.22	22.14	163.791	Horizontal	Pass
		1907.5	-2.26	3.94	28.2	22.00	158.367	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.87	3.77	28.31	21.67	146.953	Horizontal	Pass
		1880	-2.03	3.91	28.22	22.28	168.999	Horizontal	Pass
		1907.5	-2.24	3.94	28.2	22.02	159.039	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-2.41	3.79	28.33	22.13	163.387	Horizontal	Pass
		1880	-2.86	3.95	28.22	21.41	138.425	Horizontal	Pass
		1905	-2.43	3.97	28.19	21.79	150.939	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.97	3.79	28.33	21.57	143.555	Horizontal	Pass
		1880	-2.77	3.95	28.22	21.50	141.279	Horizontal	Pass
		1905	-2.07	3.97	28.19	22.15	163.992	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-2.73	3.79	28.34	21.82	152.167	Horizontal	Pass
		1880	-2.17	3.95	28.22	22.10	162.111	Horizontal	Pass
		1902.5	-2.56	3.97	28.18	21.65	146.138	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-2.61	3.79	28.34	21.94	156.432	Horizontal	Pass
		1880	-2.49	3.95	28.22	21.78	150.684	Horizontal	Pass
		1902.5	-2.53	3.97	28.18	21.68	147.312	Horizontal	Pass

20.0MHz Band QPSK	100/0	1860	-2.08	3.81	28.35	22.46	176.253	Horizontal	Pass
		1880	-2.00	3.96	28.22	22.26	168.080	Horizontal	Pass
		1900	-2.08	4	28.16	22.08	161.545	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-2.20	3.81	28.35	22.34	171.228	Horizontal	Pass
		1880	-2.46	3.96	28.22	21.80	151.394	Horizontal	Pass
		1900	-2.88	4	28.16	21.28	134.155	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 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	-2.57	3.76	28.24	21.91	155.288	Vertical	Pass
		1880	-2.15	3.91	28.22	22.16	164.481	Vertical	Pass
		1909.3	-2.11	3.93	28.2	22.16	164.452	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.56	3.76	28.24	21.92	155.728	Vertical	Pass
		1880	-2.40	3.91	28.22	21.91	155.255	Vertical	Pass
		1909.3	-2.32	3.93	28.2	21.95	156.565	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.70	3.77	28.23	21.76	149.846	Vertical	Pass
		1880	-2.97	3.91	28.24	21.36	136.646	Vertical	Pass
		1908.5	-2.17	3.94	28.25	22.14	163.718	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.11	3.77	28.23	22.35	171.980	Vertical	Pass
		1880	-2.93	3.91	28.24	21.40	138.181	Vertical	Pass
		1908.5	-2.16	3.94	28.25	22.15	164.017	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.45	3.77	28.31	22.09	161.957	Vertical	Pass
		1880	-2.38	3.91	28.22	21.93	155.926	Vertical	Pass
		1907.5	-2.65	3.94	28.2	21.61	144.901	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.00	3.77	28.31	22.54	179.497	Vertical	Pass
		1880	-2.13	3.91	28.22	22.18	165.224	Vertical	Pass
		1907.5	-2.19	3.94	28.2	22.07	160.947	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	-2.10	3.79	28.33	22.44	175.572	Vertical	Pass
		1880	-2.91	3.95	28.22	21.36	136.851	Vertical	Pass
		1905	-2.58	3.97	28.19	21.64	145.939	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.35	3.79	28.33	22.19	165.705	Vertical	Pass
		1880	-2.01	3.95	28.22	22.26	168.100	Vertical	Pass
		1905	-2.46	3.97	28.19	21.76	150.140	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-2.00	3.79	28.34	22.55	179.890	Vertical	Pass
		1880	-1.99	3.95	28.22	22.28	169.093	Vertical	Pass
		1902.5	-2.25	3.97	28.18	21.96	156.984	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-2.22	3.79	28.34	22.33	171.193	Vertical	Pass
		1880	-2.96	3.95	28.22	21.31	135.128	Vertical	Pass
		1902.5	-2.89	3.97	28.18	21.32	135.434	Vertical	Pass
20.0MH	100/	1860	-2.64	3.81	28.35	21.90	154.784	Vertical	Pass

z Band QPSK	0	1880	-2.90	3.96	28.22	21.36	136.696	Vertical	Pass
		1900	-2.24	4	28.16	21.92	155.617	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-2.40	3.81	28.35	22.14	163.556	Vertical	Pass
		1880	-2.09	3.96	28.22	22.17	165.002	Vertical	Pass
		1900	-2.19	4	28.16	21.97	157.502	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	-2.39	3.12	27.58	22.07	160.901	Horizontal	Pass
		1732.5	-2.97	3.27	27.61	21.37	137.031	Horizontal	Pass
		1754.3	-2.16	3.29	27.63	22.18	165.080	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.65	3.12	27.58	21.81	151.539	Horizontal	Pass
		1732.5	-2.93	3.27	27.61	21.41	138.499	Horizontal	Pass
		1754.3	-2.57	3.29	27.63	21.77	150.401	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-2.70	3.13	27.61	21.78	150.578	Horizontal	Pass
		1732.5	-2.66	3.27	27.61	21.68	147.085	Horizontal	Pass
		1753.5	-2.04	3.3	27.62	22.28	169.033	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.78	3.13	27.61	21.70	148.079	Horizontal	Pass
		1732.5	-2.45	3.27	27.61	21.89	154.349	Horizontal	Pass
		1753.5	-2.09	3.3	27.62	22.23	167.296	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-2.82	3.13	27.63	21.68	147.302	Horizontal	Pass
		1732.5	-2.54	3.27	27.61	21.80	151.375	Horizontal	Pass
		1752.5	-2.45	3.3	27.6	21.85	153.002	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-1.99	3.13	27.63	22.51	178.322	Horizontal	Pass
		1732.5	-2.66	3.27	27.61	21.68	147.175	Horizontal	Pass
		1752.5	-2.34	3.3	27.6	21.96	157.080	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-2.47	3.15	27.64	22.02	159.381	Horizontal	Pass
		1732.5	-2.19	3.31	27.61	22.11	162.550	Horizontal	Pass
		1750	-2.97	3.33	27.59	21.29	134.618	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.55	3.15	27.64	21.94	156.431	Horizontal	Pass
		1732.5	-2.80	3.31	27.61	21.50	141.197	Horizontal	Pass
		1750	-2.23	3.33	27.59	22.03	159.452	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-2.08	3.15	27.65	22.42	174.506	Horizontal	Pass
		1732.5	-2.62	3.31	27.61	21.68	147.270	Horizontal	Pass
		1747.5	-2.54	3.33	27.57	21.70	147.758	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.60	3.15	27.65	21.90	154.734	Horizontal	Pass
		1732.5	-2.23	3.31	27.61	22.07	160.923	Horizontal	Pass
		1747.5	-2.49	3.33	27.57	21.75	149.651	Horizontal	Pass

20.0MHz Band QPSK	100/0	1720	-2.15	3.17	27.66	22.34	171.232	Horizontal	Pass
		1732.5	-2.85	3.32	27.61	21.44	139.276	Horizontal	Pass
		1745	-2.34	3.36	27.56	21.86	153.434	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.11	3.17	27.66	22.38	173.115	Horizontal	Pass
		1732.5	-2.38	3.32	27.61	21.91	155.267	Horizontal	Pass
		1745	-2.91	3.36	27.56	21.29	134.509	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 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	-2.09	3.12	27.58	22.37	172.618	Vertical	Pass
		1732.5	-2.98	3.27	27.61	21.36	136.842	Vertical	Pass
		1754.3	-2.95	3.29	27.63	21.39	137.801	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.75	3.12	27.58	21.71	148.099	Vertical	Pass
		1732.5	-2.54	3.27	27.61	21.80	151.312	Vertical	Pass
		1754.3	-2.51	3.29	27.63	21.83	152.247	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-2.54	3.13	27.61	21.94	156.489	Vertical	Pass
		1732.5	-2.83	3.27	27.61	21.51	141.724	Vertical	Pass
		1753.5	-2.40	3.3	27.62	21.92	155.710	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.66	3.13	27.61	21.82	152.177	Vertical	Pass
		1732.5	-2.83	3.27	27.61	21.51	141.432	Vertical	Pass
		1753.5	-2.48	3.3	27.62	21.84	152.760	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-2.80	3.13	27.63	21.70	148.056	Vertical	Pass
		1732.5	-2.96	3.27	27.61	21.38	137.398	Vertical	Pass
		1752.5	-2.05	3.3	27.6	22.25	167.899	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.89	3.13	27.63	21.61	144.847	Vertical	Pass
		1732.5	-2.20	3.27	27.61	22.14	163.681	Vertical	Pass
		1752.5	-2.71	3.3	27.6	21.59	144.141	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-1.99	3.15	27.64	22.50	177.917	Vertical	Pass
		1732.5	-2.56	3.31	27.61	21.74	149.262	Vertical	Pass
		1750	-2.09	3.33	27.59	22.17	164.727	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.94	3.15	27.64	21.55	143.017	Vertical	Pass
		1732.5	-2.10	3.31	27.61	22.20	165.947	Vertical	Pass
		1750	-2.06	3.33	27.59	22.20	165.837	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-2.41	3.15	27.65	22.09	161.673	Vertical	Pass
		1732.5	-2.49	3.31	27.61	21.81	151.735	Vertical	Pass
		1747.5	-2.29	3.33	27.57	21.95	156.616	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.03	3.15	27.65	22.47	176.715	Vertical	Pass
		1732.5	-2.35	3.31	27.61	21.95	156.628	Vertical	Pass
		1747.5	-2.45	3.33	27.57	21.79	151.038	Vertical	Pass
20.0MH	100/0	1720	-2.93	3.17	27.66	21.56	143.297	Vertical	Pass

z Band		1732.5	-2.16	3.32	27.61	22.13	163.442	Vertical	Pass
QPSK		1745	-2.01	3.36	27.56	22.19	165.509	Vertical	Pass
20.0MH	100/0	1720	-2.43	3.17	27.66	22.06	160.511	Vertical	Pass
z Band		1732.5	-2.90	3.32	27.61	21.39	137.851	Vertical	Pass
16 QAM		1745	-2.62	3.36	27.56	21.58	143.879	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	7.32	2.01	19.68	2.15	22.84	192.422	Horizontal	Pass
		836.5	7.17	2.01	19.77	2.15	22.78	189.463	Horizontal	Pass
		848.3	7.84	2.02	19.82	2.15	23.49	223.223	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.91	2.01	19.68	2.15	23.43	220.213	Horizontal	Pass
		836.5	7.04	2.01	19.77	2.15	22.65	184.086	Horizontal	Pass
		848.3	7.51	2.02	19.82	2.15	23.16	207.089	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	7.81	2.01	19.7	2.15	23.35	216.242	Horizontal	Pass
		836.5	7.93	2.01	19.77	2.15	23.54	226.124	Horizontal	Pass
		847.5	7.20	2.02	19.81	2.15	22.84	192.264	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	7.28	2.01	19.7	2.15	22.82	191.262	Horizontal	Pass
		836.5	7.27	2.01	19.77	2.15	22.88	193.904	Horizontal	Pass
		847.5	7.27	2.02	19.81	2.15	22.91	195.280	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	7.79	2.01	19.71	2.15	23.34	215.910	Horizontal	Pass
		836.5	7.64	2.01	19.77	2.15	23.25	211.414	Horizontal	Pass
		846.5	7.06	2.02	19.79	2.15	22.68	185.268	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.69	2.01	19.71	2.15	23.24	210.692	Horizontal	Pass
		836.5	7.75	2.01	19.77	2.15	23.36	216.909	Horizontal	Pass
		846.5	7.90	2.02	19.79	2.15	23.52	224.986	Horizontal	Pass
10.0MHz Band QPSK	50/0	829	8.01	2.01	19.73	2.15	23.58	227.950	Horizontal	Pass
		836.5	7.37	2.01	19.77	2.15	22.98	198.701	Horizontal	Pass
		844	7.61	2.02	19.78	2.15	23.22	209.873	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	829	7.78	2.01	19.73	2.15	23.35	216.096	Horizontal	Pass
		836.5	7.78	2.01	19.77	2.15	23.39	218.187	Horizontal	Pass
		844	7.85	2.02	19.78	2.15	23.46	221.787	Horizontal	Pass

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	7.65	2.01	19.68	2.15	23.17	207.287	Vertical	Pass
		836.5	7.83	2.01	19.77	2.15	23.44	220.827	Vertical	Pass
		848.3	7.96	2.02	19.82	2.15	23.61	229.541	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.15	2.01	19.68	2.15	22.67	185.072	Vertical	Pass
		836.5	7.70	2.01	19.77	2.15	23.31	214.354	Vertical	Pass
		848.3	7.89	2.02	19.82	2.15	23.54	225.885	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	7.83	2.01	19.7	2.15	23.37	217.022	Vertical	Pass
		836.5	7.82	2.01	19.77	2.15	23.43	220.445	Vertical	Pass
		847.5	7.14	2.02	19.81	2.15	22.78	189.545	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	7.34	2.01	19.7	2.15	22.88	194.202	Vertical	Pass
		836.5	7.35	2.01	19.77	2.15	22.96	197.509	Vertical	Pass
		847.5	7.89	2.02	19.81	2.15	23.53	225.622	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	7.12	2.01	19.71	2.15	22.67	184.975	Vertical	Pass
		836.5	7.95	2.01	19.77	2.15	23.56	227.101	Vertical	Pass
		846.5	7.35	2.02	19.79	2.15	22.97	198.361	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.59	2.01	19.71	2.15	23.14	206.116	Vertical	Pass
		836.5	7.32	2.01	19.77	2.15	22.93	196.438	Vertical	Pass
		846.5	7.41	2.02	19.79	2.15	23.03	200.874	Vertical	Pass
10.0MHz Band QPSK	50/0	829	7.79	2.01	19.73	2.15	23.36	216.662	Vertical	Pass
		836.5	7.56	2.01	19.77	2.15	23.17	207.473	Vertical	Pass
		844	7.35	2.02	19.78	2.15	22.96	197.565	Vertical	Pass
10.0MHz Band 16 QAM	50/0	829	7.24	2.01	19.73	2.15	22.81	190.973	Vertical	Pass
		836.5	7.23	2.01	19.77	2.15	22.84	192.392	Vertical	Pass
		844	7.34	2.02	19.78	2.15	22.95	197.058	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 7

Radiated Power (EIRP) for Band 7									
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	
5.0MHz Band QPSK	25/0	2502.5	-0.95	4.54	27.75	22.26	168.219	Horizontal	Pass
		2535	-0.44	4.69	27.72	22.59	181.448	Horizontal	Pass
		2567.5	-0.67	4.71	27.71	22.33	170.852	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.74	4.54	27.75	22.47	176.778	Horizontal	Pass
		2535	-0.97	4.69	27.72	22.06	160.855	Horizontal	Pass
		2567.5	-0.21	4.71	27.71	22.79	190.092	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	-0.89	4.55	27.76	22.32	170.556	Horizontal	Pass
		2535	-0.81	4.69	27.72	22.22	166.535	Horizontal	Pass
		2565	-0.07	4.72	27.7	22.91	195.511	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.23	4.55	27.76	22.98	198.387	Horizontal	Pass
		2535	-0.03	4.69	27.72	23.00	199.599	Horizontal	Pass
		2565	-0.05	4.72	27.7	22.93	196.155	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	-0.41	4.55	27.77	22.81	191.089	Horizontal	Pass
		2535	-0.01	4.69	27.72	23.02	200.399	Horizontal	Pass
		2562.5	-0.36	4.72	27.69	22.61	182.549	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.19	4.55	27.77	23.03	200.955	Horizontal	Pass
		2535	-0.98	4.69	27.72	22.05	160.340	Horizontal	Pass
		2562.5	-0.52	4.72	27.69	22.45	175.790	Horizontal	Pass
20.0MHz Band QPSK	100/0	2510	-0.62	4.57	27.78	22.59	181.485	Horizontal	Pass
		2535	-0.31	4.73	27.72	22.68	185.369	Horizontal	Pass
		2560	-0.71	4.75	27.68	22.22	166.825	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.49	4.57	27.78	22.72	187.025	Horizontal	Pass
		2535	-0.13	4.73	27.72	22.86	193.190	Horizontal	Pass
		2560	-0.07	4.75	27.68	22.86	193.296	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 7									
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	
5.0MHz Band QPSK	25/0	2502.5	-0.50	4.54	27.75	22.71	186.617	Vertical	Pass
		2535	-0.14	4.69	27.72	22.89	194.734	Vertical	Pass
		2567.5	-0.06	4.71	27.71	22.94	196.694	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.11	4.54	27.75	23.10	203.963	Vertical	Pass
		2535	-0.74	4.69	27.72	22.29	169.305	Vertical	Pass
		2567.5	-0.54	4.71	27.71	22.46	176.263	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	-0.42	4.55	27.76	22.79	190.198	Vertical	Pass
		2535	-0.90	4.69	27.72	22.13	163.200	Vertical	Pass
		2565	-0.84	4.72	27.7	22.14	163.761	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.66	4.55	27.76	22.55	180.002	Vertical	Pass
		2535	-0.31	4.69	27.72	22.72	187.240	Vertical	Pass
		2565	0.02	4.72	27.7	23.00	199.348	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	-0.96	4.55	27.77	22.26	168.116	Vertical	Pass
		2535	-0.34	4.69	27.72	22.69	185.877	Vertical	Pass
		2562.5	-0.02	4.72	27.69	22.95	197.299	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.33	4.55	27.77	22.89	194.532	Vertical	Pass
		2535	-0.11	4.69	27.72	22.92	196.104	Vertical	Pass
		2562.5	-0.84	4.72	27.69	22.13	163.264	Vertical	Pass
20.0MHz Band QPSK	100/0	2510	-0.88	4.57	27.78	22.33	170.846	Vertical	Pass
		2535	-0.38	4.73	27.72	22.61	182.477	Vertical	Pass
		2560	-0.75	4.75	27.68	22.18	165.268	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.94	4.57	27.78	22.27	168.812	Vertical	Pass
		2535	-0.70	4.73	27.72	22.29	169.468	Vertical	Pass
		2560	-0.34	4.75	27.68	22.59	181.396	Vertical	Pass

Note:

SG Level= Signal generator output

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

9. FIELD STRENGTH OF SPURIOUS RADIATION

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 log10(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 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (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 (1.4.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-34.63	12.42	-22.21	-13	-9.21	Horizontal
3701.4	-35.71	12.42	-23.29	-13	-10.29	Vertical
5552.1	-37.80	14.12	-23.68	-13	-10.68	Vertical
5552.1	-36.76	14.12	-22.64	-13	-9.64	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-35.23	11.76	-23.47	-13	-10.47	Horizontal
3760	-35.71	11.76	-23.95	-13	-10.95	Vertical
5640	-37.07	14.56	-22.51	-13	-9.51	Vertical
5640	-37.58	14.56	-23.02	-13	-10.02	Horizontal
Test Results for High Channel 1754.3MHz						
3818.6	-33.53	11.87	-21.66	-13	-8.66	Horizontal
3818.6	-36.78	11.87	-24.91	-13	-11.91	Vertical
5727.9	-40.10	14.66	-25.44	-13	-12.44	Vertical
5727.9	-35.63	14.66	-20.97	-13	-7.97	Horizontal

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

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3720	-33.63	12.42	-21.21	-13	-8.21	Horizontal
3720	-35.64	12.42	-23.22	-13	-10.22	Vertical
5580	-36.86	14.12	-22.74	-13	-9.74	Vertical
5580	-36.81	14.12	-22.69	-13	-9.69	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-35.66	11.76	-23.9	-13	-10.9	Horizontal
3760	-36.71	11.76	-24.95	-13	-11.95	Vertical
5640	-34.73	14.56	-20.17	-13	-7.17	Vertical
5640	-36.81	14.56	-22.25	-13	-9.25	Horizontal
Test Results for High Channel 1754.3MHz						
3800	-34.53	11.87	-22.66	-13	-9.66	Horizontal
3800	-33.48	11.87	-21.61	-13	-8.61	Vertical
5700	-35.64	14.66	-20.98	-13	-7.98	Vertical
5700	-34.53	14.66	-19.87	-13	-6.87	Horizontal

Note:
PMea(dBm)= Power(dBm)+ ARpl (dBm)

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-34.57	12.42	-22.15	-13	-9.15	Horizontal
3421.4	-34.38	12.42	-21.96	-13	-8.96	Vertical
5132.1	-37.07	14.12	-22.95	-13	-9.95	Vertical
5132.1	-34.79	14.12	-20.67	-13	-7.67	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-35.64	11.76	-23.88	-13	-10.88	Horizontal
3465	-34.53	11.76	-22.77	-13	-9.77	Vertical
5197.5	-35.71	14.56	-21.15	-13	-8.15	Vertical
5197.5	-37.78	14.56	-23.22	-13	-10.22	Horizontal
Test Results for High Channel 1754.3MHz						
3508.6	-34.37	11.87	-22.5	-13	-9.5	Horizontal
3508.6	-34.73	11.87	-22.86	-13	-9.86	Vertical
5262.9	-40.08	14.66	-25.42	-13	-12.42	Vertical
5262.9	-34.58	14.66	-19.92	-13	-6.92	Horizontal

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

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440	-36.81	12.42	-24.39	-13	-11.39	Horizontal
3440	-34.59	12.42	-22.17	-13	-9.17	Vertical
5160	-35.70	14.12	-21.58	-13	-8.58	Vertical
5160	-35.73	14.12	-21.61	-13	-8.61	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-39.00	11.76	-27.24	-13	-14.24	Horizontal
3465	-36.74	11.76	-24.98	-13	-11.98	Vertical
5197.5	-34.53	14.56	-19.97	-13	-6.97	Vertical
5197.5	-36.77	14.56	-22.21	-13	-9.21	Horizontal
Test Results for High Channel 1754.3MHz						
2490	-34.57	11.87	-22.7	-13	-9.7	Horizontal

3490	-35.68	11.87	-23.81	-13	-10.81	Vertical
5235	-40.08	14.66	-25.42	-13	-12.42	Vertical
5235	-37.90	14.66	-23.24	-13	-10.24	Horizontal

Note:
PMea(dBm)= Power(dBm)+ ARpl (dBm)

9.3 LTE BAND 5

QPSK EIRP POWER FOR LTE BAND 5 (1.4.0MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz						
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-36.64	12.42	-24.1	-13	-11.1	Horizontal
1649.4	-34.53	12.42	-21.99	-13	-8.99	Vertical
2474.1	-33.81	14.12	-19.57	-13	-6.57	Vertical
2474.1	-36.69	14.12	-22.45	-13	-9.45	Horizontal
Test Results for Mid Channel 836.5MHz						
1673	-35.56	11.76	-23.8	-13	-10.8	Horizontal
1673	-33.47	11.76	-21.71	-13	-8.71	Vertical
2509.5	-36.55	14.56	-21.99	-13	-8.99	Vertical
2509.5	-36.56	14.56	-22	-13	-9	Horizontal
Test Results for High Channel 848.3MHz						
1696.6	-33.22	11.87	-21.35	-13	-8.35	Horizontal
1696.6	-34.96	11.87	-23.09	-13	-10.09	Vertical
2544.9	-37.56	14.66	-22.9	-13	-9.9	Vertical
2544.9	-35.62	14.66	-20.96	-13	-7.96	Horizontal

QPSK EIRP POWER FOR LTE BAND 5 (10.0MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1658	-32.24	12.42	-19.82	-13	-6.82	Horizontal
1658	-33.36	12.42	-20.94	-13	-7.94	Vertical
2487	-36.69	14.12	-22.57	-13	-9.57	Vertical
2487	-34.47	14.12	-20.35	-13	-7.35	Horizontal
Test Results for Mid Channel 836.5MHz						
1673	-32.52	11.76	-20.76	-13	-7.76	Horizontal
1673	-35.56	11.76	-23.8	-13	-10.8	Vertical
2509.5	-34.41	14.56	-19.85	-13	-6.85	Vertical
2509.5	-36.69	14.56	-22.13	-13	-9.13	Horizontal

Test Results for High Channel 848.3MHz						
1688	-33.26	11.87	-21.39	-13	-8.39	Horizontal
1688	-34.41	11.87	-22.54	-13	-9.54	Vertical
2532	-39.68	14.66	-25.02	-13	-12.02	Vertical
2532	-36.67	14.66	-22.01	-13	-9.01	Horizontal

Note:
PMea(dBm)= Power(dBm)+ ARpl (dBm)

9.4 LTE BAND 7

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

Test Results for Low Channel 2502.5MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5005	-34.58	12.42	-22.16	-13	-9.16	Horizontal
5005	-35.64	12.42	-23.22	-13	-10.22	Vertical
7507.5	-37.71	14.12	-23.59	-13	-10.59	Vertical
7507.5	-35.76	14.12	-21.64	-13	-8.64	Horizontal
Test Results for Mid Channel 2535MHz						
5070	-37.06	11.76	-25.3	-13	-12.3	Horizontal
5070	-35.73	11.76	-23.97	-13	-10.97	Vertical
7605	-36.76	14.56	-22.2	-13	-9.2	Vertical
7605	-38.98	14.56	-24.42	-13	-11.42	Horizontal
Test Results for High Channel 2567.5MHz						
5135	-34.53	11.87	-22.66	-13	-9.66	Horizontal
5135	-33.38	11.87	-21.51	-13	-8.51	Vertical
7702.5	-36.79	14.66	-22.13	-13	-9.13	Vertical
7702.5	-37.23	14.66	-22.57	-13	-9.57	Horizontal

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

Test Results for Low Channel 2502.5MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5020	-36.81	12.42	-24.39	-13	-11.39	Horizontal
5020	-35.63	12.42	-23.21	-13	-10.21	Vertical
7530	-36.81	14.12	-22.69	-13	-9.69	Vertical
7530	-37.59	14.12	-23.47	-13	-10.47	Horizontal
Test Results for Mid Channel 2535MHz						
5070	-36.77	11.76	-25.01	-13	-12.01	Horizontal
5070	-37.63	11.76	-25.87	-13	-12.87	Vertical

7605	-34.53	14.56	-19.97	-13	-6.97	Vertical
7605	-37.90	14.56	-23.34	-13	-10.34	Horizontal
Test Results for High Channel 2567.5MHz						
5120	-34.58	11.87	-22.71	-13	-9.71	Horizontal
5120	-35.64	11.87	-23.77	-13	-10.77	Vertical
7680	-39.81	14.66	-25.15	-13	-12.15	Vertical
7680	-35.58	14.66	-20.92	-13	-7.92	Horizontal

Note:

PMea(dBm)= Power(dBm)+ ARpl (dBm)

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°C

Voltage =low voltage, 3.6VDC, Normal, 3.8VDC and High voltage, 4.4VDC.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC 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 +50ºC 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)				
3.8	1880	-9.8	-0.005213	2.5
3.6	1880	-8.0	-0.004255	2.5
4.4	1880	-14.2	-0.007553	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	-9.7	-0.005160	2.5
Extreme (50C)	1880	-5.9	-0.003138	2.5
Extreme (40C)	1880	-10.0	-0.005319	2.5
Extreme (30C)	1880	-7.1	-0.003777	2.5
Extreme (10C)	1880	-8.6	-0.004574	2.5
Extreme (0C)	1880	-8.3	-0.004415	2.5
Extreme (-10C)	1880	6.7	0.003564	2.5
Extreme (-20C)	1880	-5.4	-0.002872	2.5
Extreme (-30C)	1880	-10.6	-0.005638	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)				
3.8	1880	-5.6	-0.002979	2.5
3.6	1880	11.0	0.005851	2.5
4.4	1880	-13.3	-0.007074	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	-7.3	-0.003883	2.5
Extreme (50C)	1880	-5.1	-0.002713	2.5
Extreme (40C)	1880	-9.6	-0.005106	2.5
Extreme (30C)	1880	-5.7	-0.003032	2.5
Extreme (10C)	1880	-7.2	-0.003830	2.5
Extreme (0C)	1880	-4.6	-0.002447	2.5
Extreme (-10C)	1880	8.5	0.004521	2.5
Extreme (-20C)	1880	-6.1	-0.003245	2.5
Extreme (-30C)	1880	-9.3	-0.004947	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)				
3.8	1732.5	-5.3	-0.003059	2.5
3.6	1732.5	13.3	0.007677	2.5
4.4	1732.5	-13.6	-0.007850	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	-8.5	-0.004906	2.5
Extreme (50C)	1732.5	-8.3	-0.004791	2.5
Extreme (40C)	1732.5	-9.6	-0.005541	2.5
Extreme (30C)	1732.5	-5.0	-0.002886	2.5
Extreme (10C)	1732.5	-7.3	-0.004214	2.5
Extreme (0C)	1732.5	-4.5	-0.002597	2.5
Extreme (-10C)	1732.5	8.1	0.004675	2.5
Extreme (-20C)	1732.5	-7.7	-0.004444	2.5
Extreme (-30C)	1732.5	-8.4	-0.004848	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)				
3.8	1732.5	-7.3	-0.004214	2.5
3.6	1732.5	5.4	0.003117	2.5
4.4	1732.5	-10.3	-0.005945	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	-11.0	-0.006349	2.5
Extreme (50C)	1732.5	-8.7	-0.005022	2.5
Extreme (40C)	1732.5	-7.8	-0.004502	2.5
Extreme (30C)	1732.5	-6.9	-0.003983	2.5
Extreme (10C)	1732.5	-5.5	-0.003175	2.5
Extreme (0C)	1732.5	7.0	0.004040	2.5
Extreme (-10C)	1732.5	6.5	0.003752	2.5
Extreme (-20C)	1732.5	8.4	0.004848	2.5
Extreme (-30C)	1732.5	-9.8	-0.005657	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 4 QPSK, (CH 20175 RB size 100 RB Offset 0 10MHz BANDWIDTH)				
3.8	836.5	-4.8	-0.005738	2.5
3.6	836.5	12.1	0.014465	2.5
4.4	836.5	-11.3	-0.013509	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20175 RB size 100 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-9.6	-0.011476	2.5
Extreme (50C)	836.5	-5.9	-0.007053	2.5
Extreme (40C)	836.5	-9.7	-0.011596	2.5
Extreme (30C)	836.5	-7.1	-0.008488	2.5
Extreme (10C)	836.5	-9.0	-0.010759	2.5
Extreme (0C)	836.5	-10.8	-0.012911	2.5
Extreme (-10C)	836.5	-7.3	-0.008727	2.5
Extreme (-20C)	836.5	-8.2	-0.009803	2.5
Extreme (-30C)	836.5	-8.9	-0.010640	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 20175 RB size 100 RB Offset 0 10MHz BANDWIDTH)				
3.8	836.5	-15.6	-0.018649	2.5
3.6	836.5	-10.7	-0.012791	2.5
4.4	836.5	-10.1	-0.012074	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20175 RB size 100 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-8.0	-0.009564	2.5
Extreme (50C)	836.5	-7.3	-0.008727	2.5
Extreme (40C)	836.5	-10.8	-0.012911	2.5
Extreme (30C)	836.5	-10.6	-0.012672	2.5
Extreme (10C)	836.5	-6.0	-0.007173	2.5
Extreme (0C)	836.5	-6.5	-0.007770	2.5
Extreme (-10C)	836.5	-6.3	-0.007531	2.5
Extreme (-20C)	836.5	-10.5	-0.012552	2.5
Extreme (-30C)	836.5	-7.9	-0.009444	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)				
3.8	2535	-38.6	**-0.015056**	2.5
3.6	2535	-25.2	-0.009774	2.5
4.4	2535	-22.9	-0.008888	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	19.8	0.007979	2.5
Extreme (50C)	2535	-23.8	-0.009215	2.5
Extreme (40C)	2535	18.6	0.007505	2.5
Extreme (30C)	2535	-20.0	-0.007731	2.5
Extreme (10C)	2535	-22.4	-0.008679	2.5
Extreme (0C)	2535	31.6	0.012465	2.5
Extreme (-10C)	2535	-26.9	-0.010611	2.5
Extreme (-20C)	2535	-11.8	-0.004655	2.5
Extreme (-30C)	2535	-31.1	-0.012268	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)				
3.8	2535	15.0	0.005917	2.5
3.6	2535	-17.3	-0.006824	2.5
4.4	2535	-32.6	-0.012860	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	-16.1	-0.006351	2.5
Extreme (50C)	2535	-19.2	-0.007574	2.5
Extreme (40C)	2535	-24.8	-0.009783	2.5
Extreme (30C)	2535	-11.3	-0.004458	2.5
Extreme (10C)	2535	23.1	0.009112	2.5
Extreme (0C)	2535	21.0	0.008284	2.5
Extreme (-10C)	2535	19.1	0.007535	2.5
Extreme (-20C)	2535	17.2	0.006785	2.5
Extreme (-30C)	2535	22.1	0.008718	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.

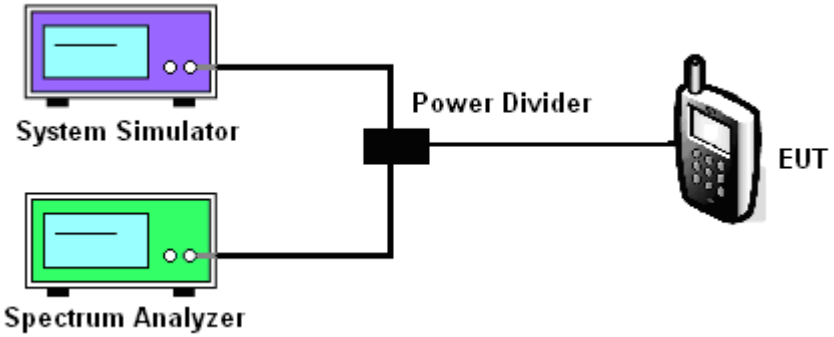
11.2 Measuring Instruments

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 7

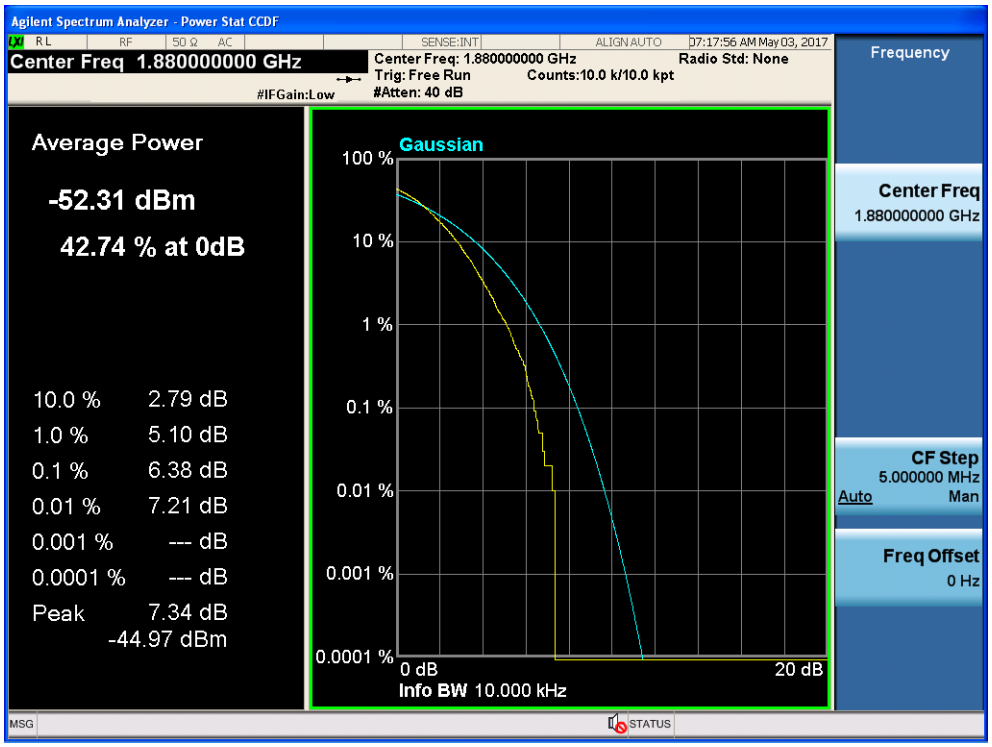
BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	6.38
2	18900	1880.0	1.4	1	Low	16QAM	6.47
2	18900	1880.0	3.0	1	Low	QPSK	3.50
2	18900	1880.0	3.0	1	Low	16QAM	3.31
2	18900	1880.0	5.0	1	Low	QPSK	2.79
2	18900	1880.0	5.0	1	Low	16QAM	2.53
2	18900	1880.0	10.0	1	Low	QPSK	3.43
2	18900	1880.0	10.0	1	Low	16QAM	3.49
2	18900	1880.0	15.0	1	Low	QPSK	3.40
2	18900	1880.0	15.0	1	Low	16QAM	3.20
2	18900	1880.0	20.0	1	Low	QPSK	2.47
2	18900	1880.0	20.0	1	Low	16QAM	2.56
4	20175	1732.5	1.4	1	Low	QPSK	6.82
4	20175	1732.5	1.4	1	Low	16QAM	6.68
4	20175	1732.5	3.0	1	Low	QPSK	2.96
4	20175	1732.5	3.0	1	Low	16QAM	3.02
4	20175	1732.5	5.0	1	Low	QPSK	3.12
4	20175	1732.5	5.0	1	Low	16QAM	3.24
4	20175	1732.5	10.0	1	Low	QPSK	2.67
4	20175	1732.5	10.0	1	Low	16QAM	3.00

4	20175	1732.5	15.0	1	Low	QPSK	2.94
4	20175	1732.5	15.0	1	Low	16QAM	2.87
4	20175	1732.5	20.0	1	Low	QPSK	3.58
4	20175	1732.5	20.0	1	Low	16QAM	3.52
5	20407	824.7	1.4	1	Low	QPSK	6.58
5	20407	824.7	1.4	1	Low	16-QAM	6.91
5	20525	836.5	1.4	1	Low	QPSK	6.25
5	20525	836.5	1.4	1	Low	16-QAM	6.49
5	20643	848.3	1.4	1	Low	QPSK	6.20
5	20643	848.3	1.4	1	Low	16-QAM	7.78
5	20415	825.5	3.0	1	Low	QPSK	4.75
5	20415	825.5	3.0	1	Low	16-QAM	4.88
5	20525	836.5	3.0	1	Low	QPSK	3.59
5	20525	836.5	3.0	1	Low	16-QAM	4.11
5	20635	847.5	3.0	1	Low	QPSK	4.47
5	20635	847.5	3.0	1	Low	16-QAM	4.52
5	20425	826.5	5.0	1	Low	QPSK	3.75
5	20425	826.5	5.0	1	Low	16-QAM	3.53
5	20525	836.5	5.0	1	Low	QPSK	3.19
5	20525	836.5	5.0	1	Low	16-QAM	3.62
5	20625	846.5	5.0	1	Low	QPSK	5.71
5	20625	846.5	5.0	1	Low	16-QAM	4.73

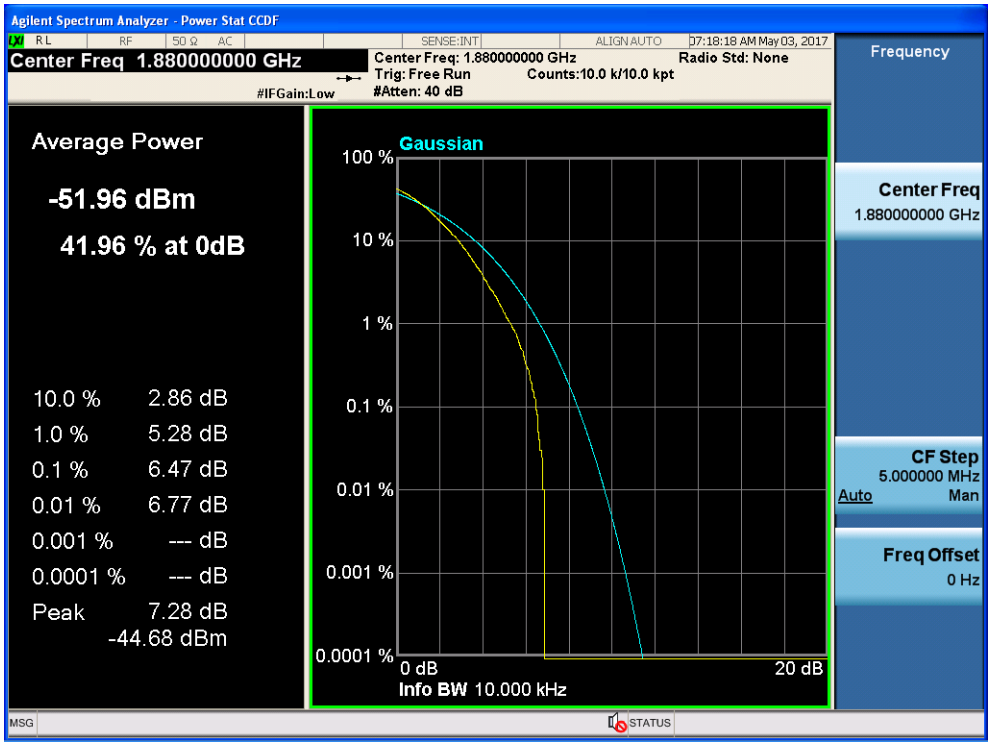
5	20407	824.7	1.4	1	Low	QPSK	5.76
5	20407	824.7	1.4	1	Low	16-QAM	5.24
5	20450	829.0	10.0	1	Low	QPSK	8.28
5	20450	829.0	10.0	1	Low	16-QAM	8.43
5	20525	836.5	10.0	1	Low	QPSK	4.92
5	20525	836.5	10.0	1	Low	16-QAM	5.41
7	21100	2535.0	5.0	1	Low	QPSK	3.79
7	21100	2535.0	5.0	1	Low	16QAM	3.94
7	21100	2535.0	10.0	1	Low	QPSK	3.42
7	21100	2535.0	10.0	1	Low	16QAM	3.39
7	21100	2535.0	15.0	1	Low	QPSK	3.06
7	21100	2535.0	15.0	1	Low	16QAM	3.09
7	21100	2535.0	20.0	1	Low	QPSK	4.17
7	21100	2535.0	20.0	1	Low	16QAM	4.13

11.5 LTE BAND 2

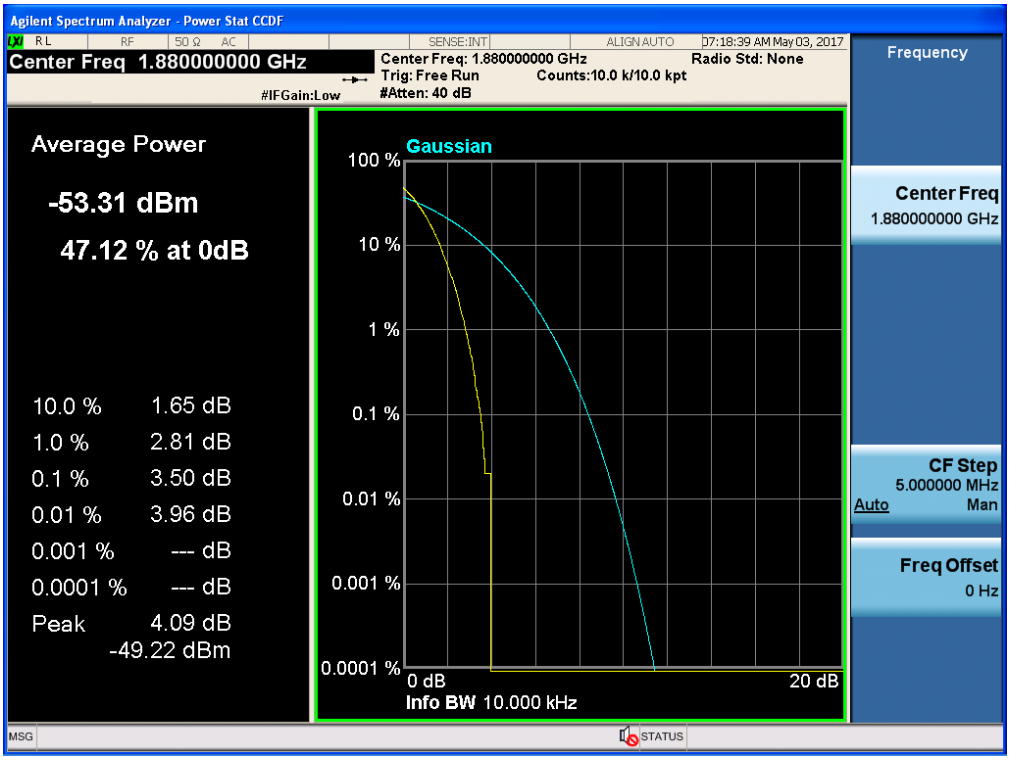
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,QPSK



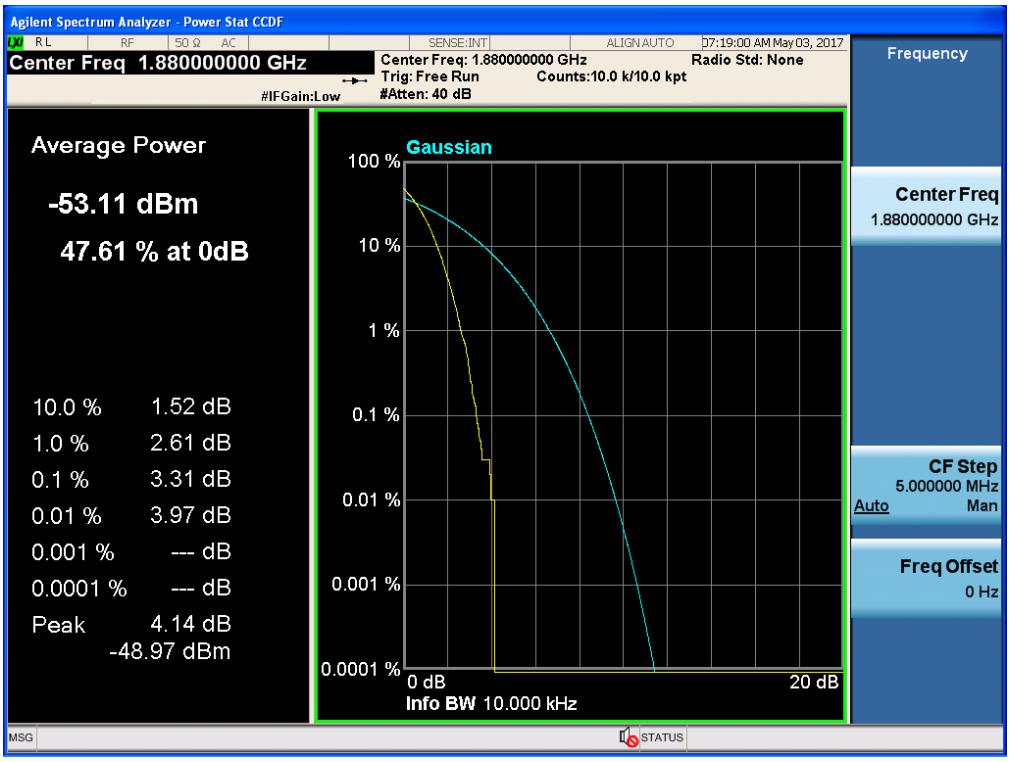
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,16QAM



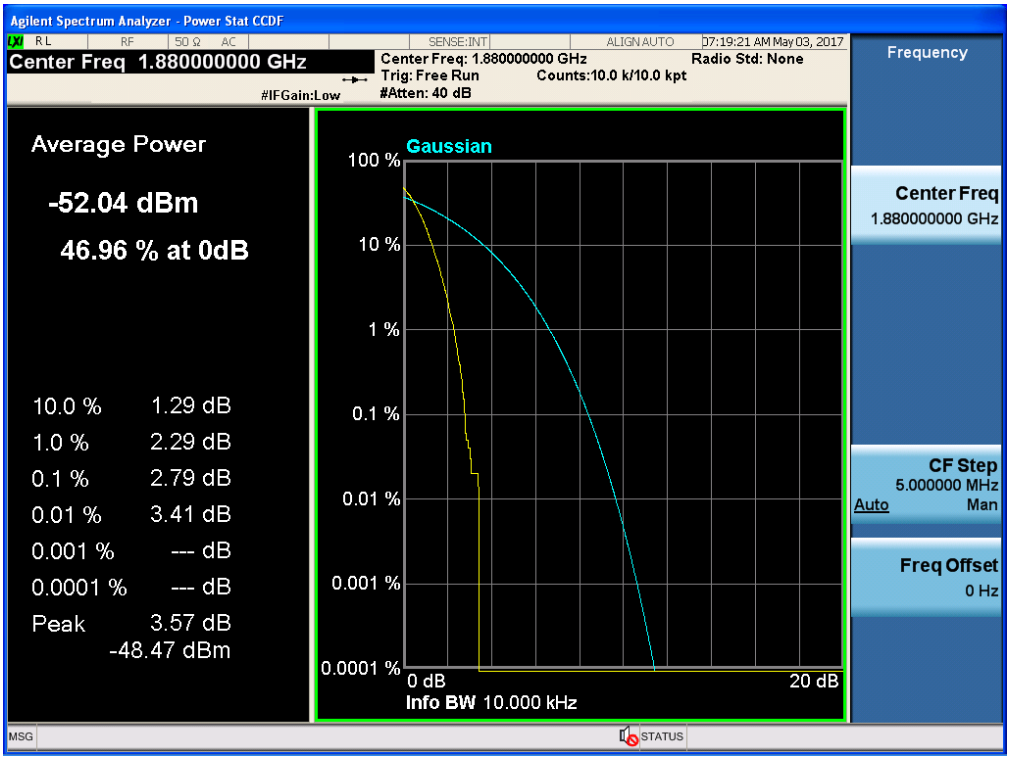
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,QPSK



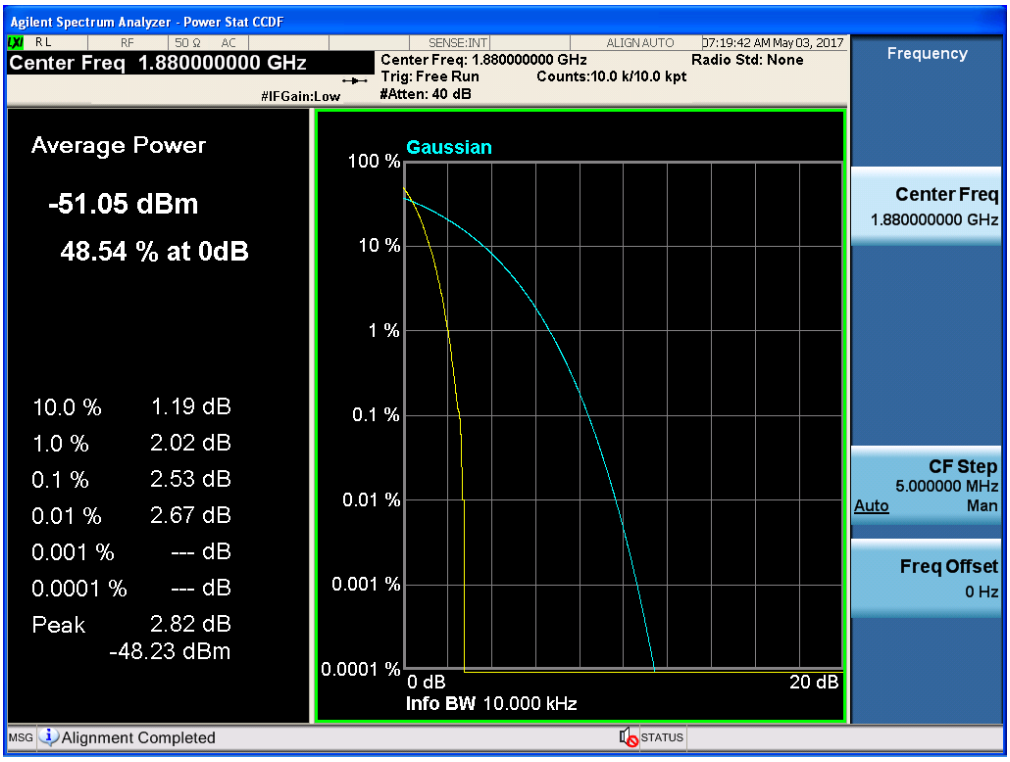
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,16QAM



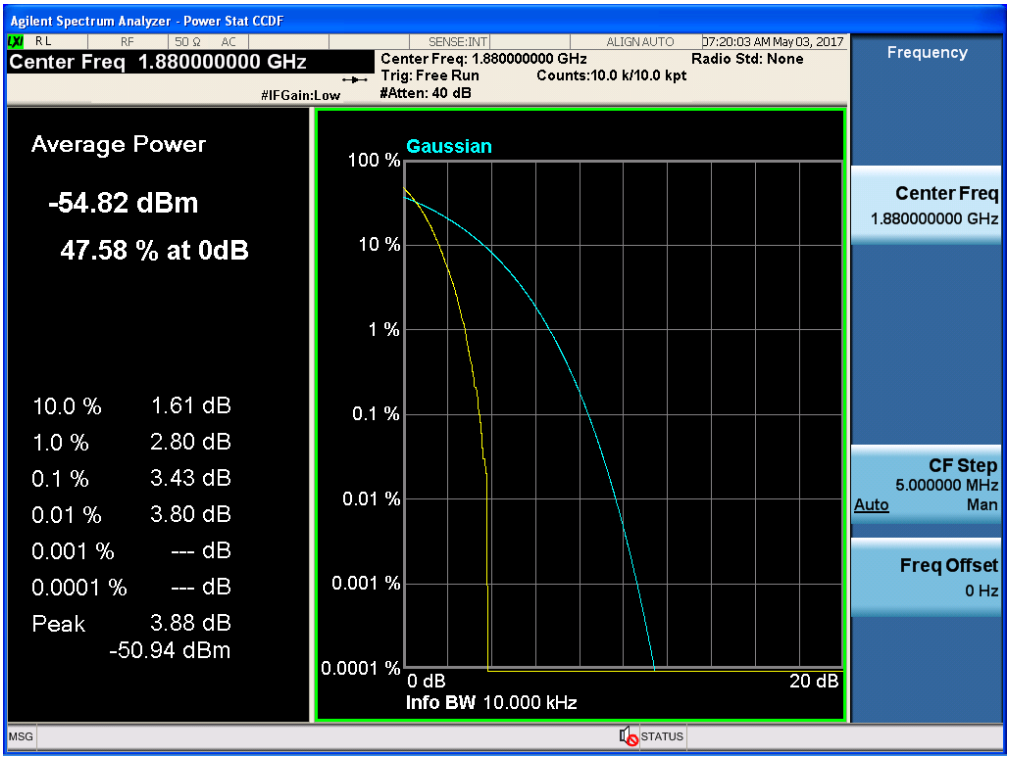
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



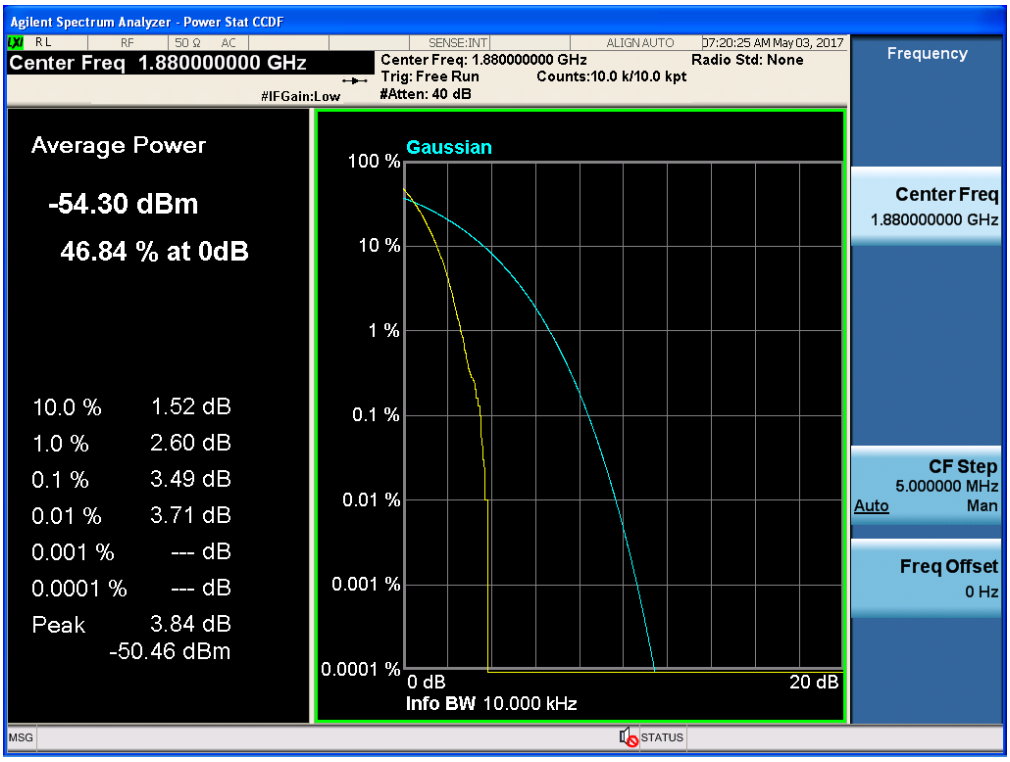
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



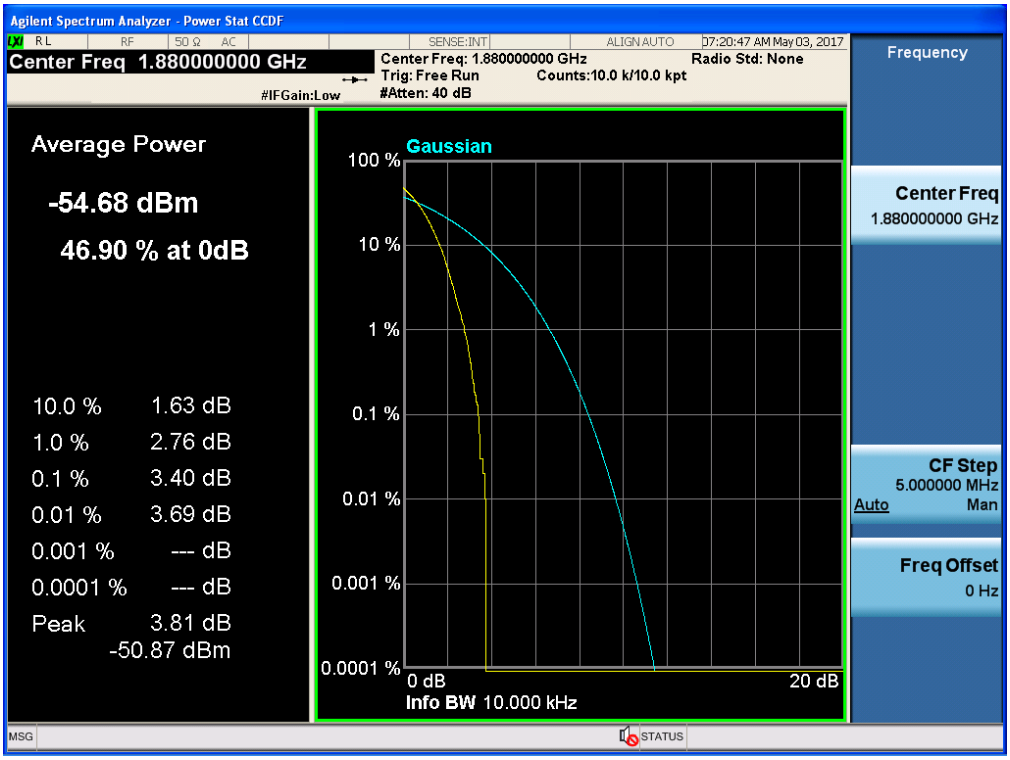
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



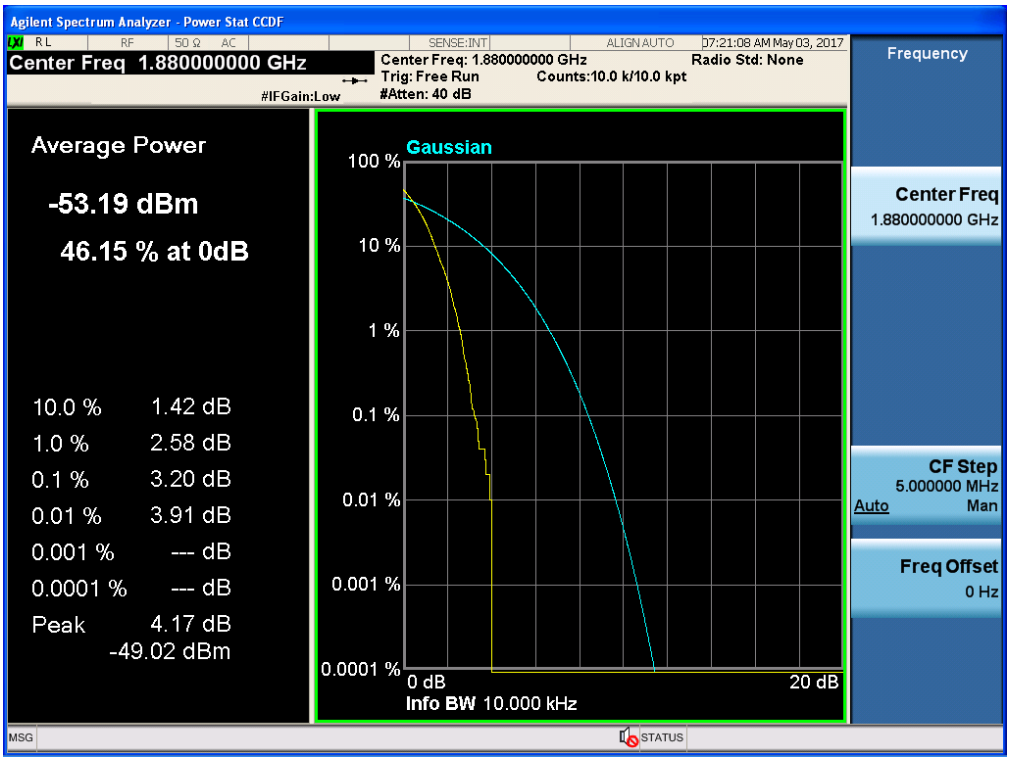
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



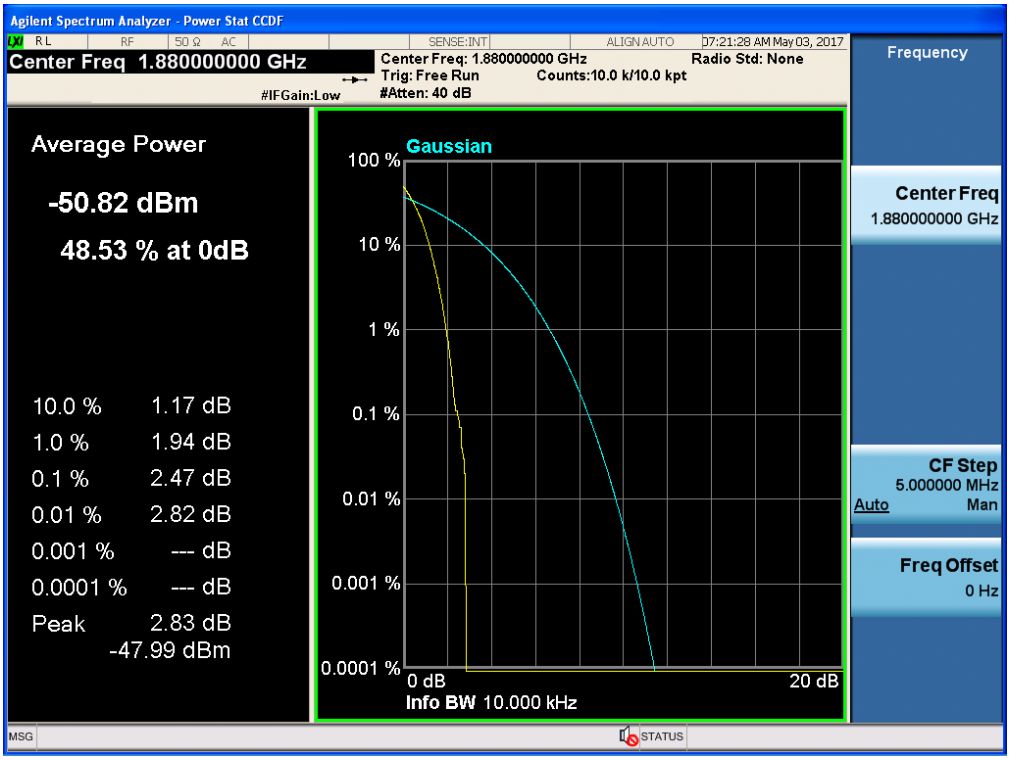
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



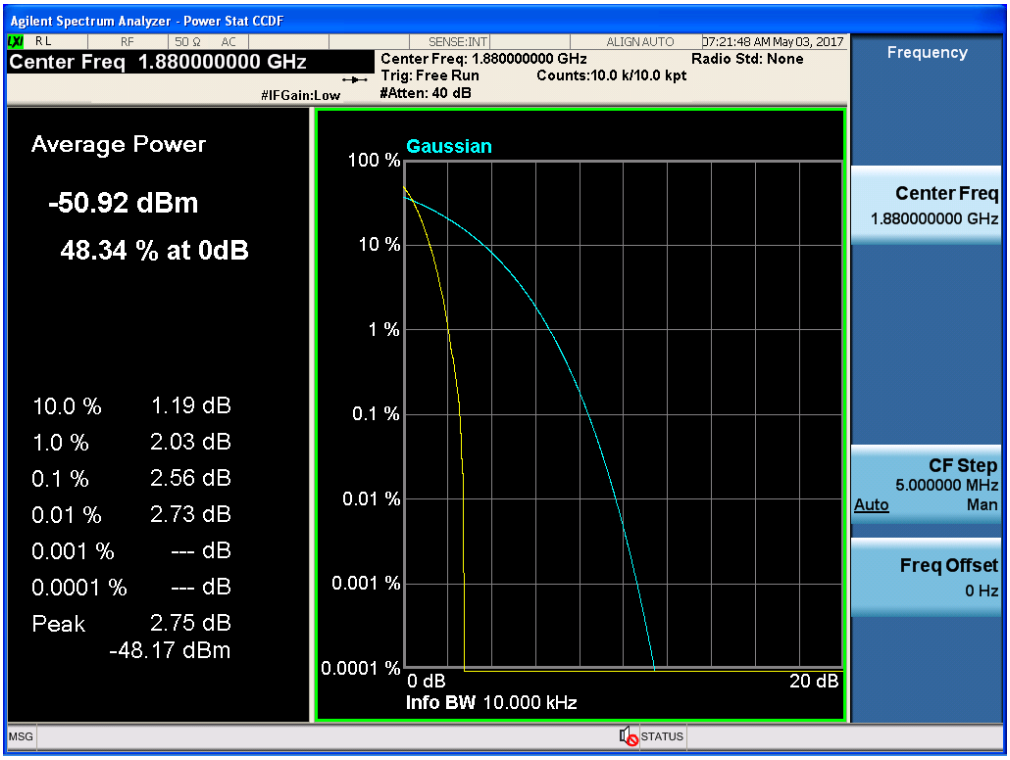
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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

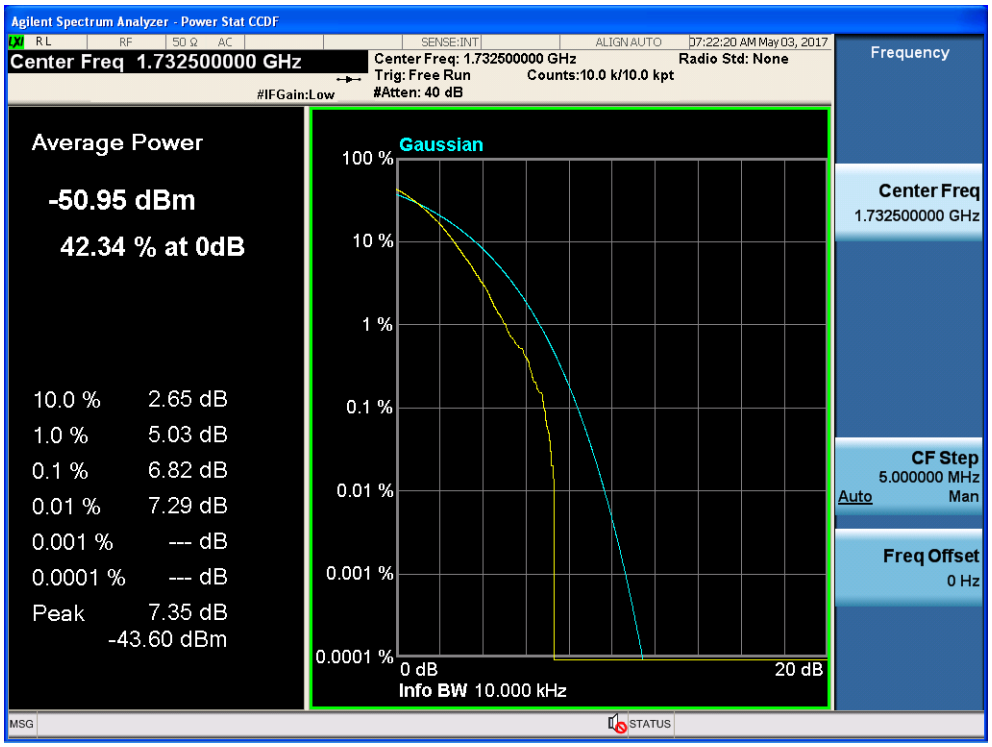


Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

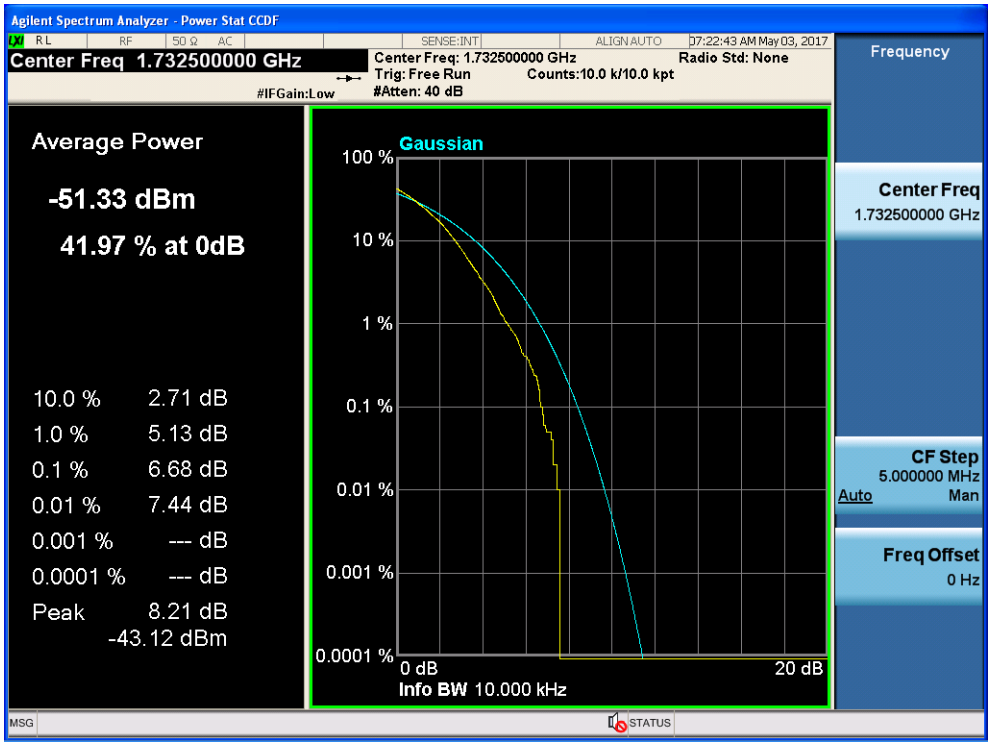


11.6 LTE BAND 4

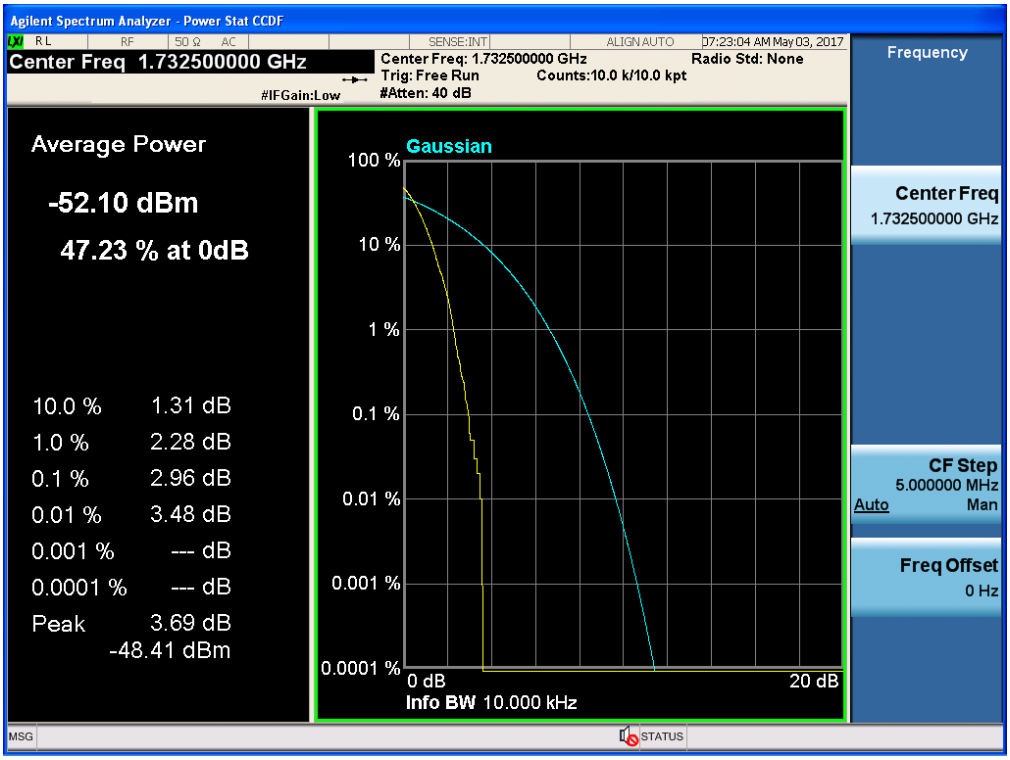
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



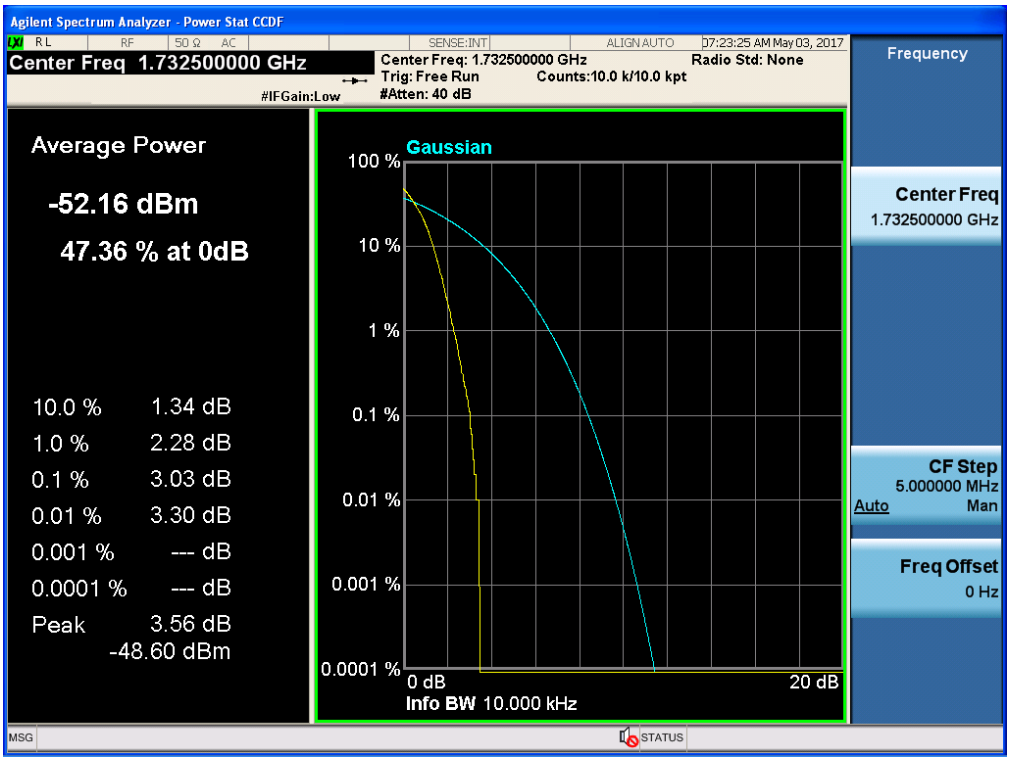
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,16QAM



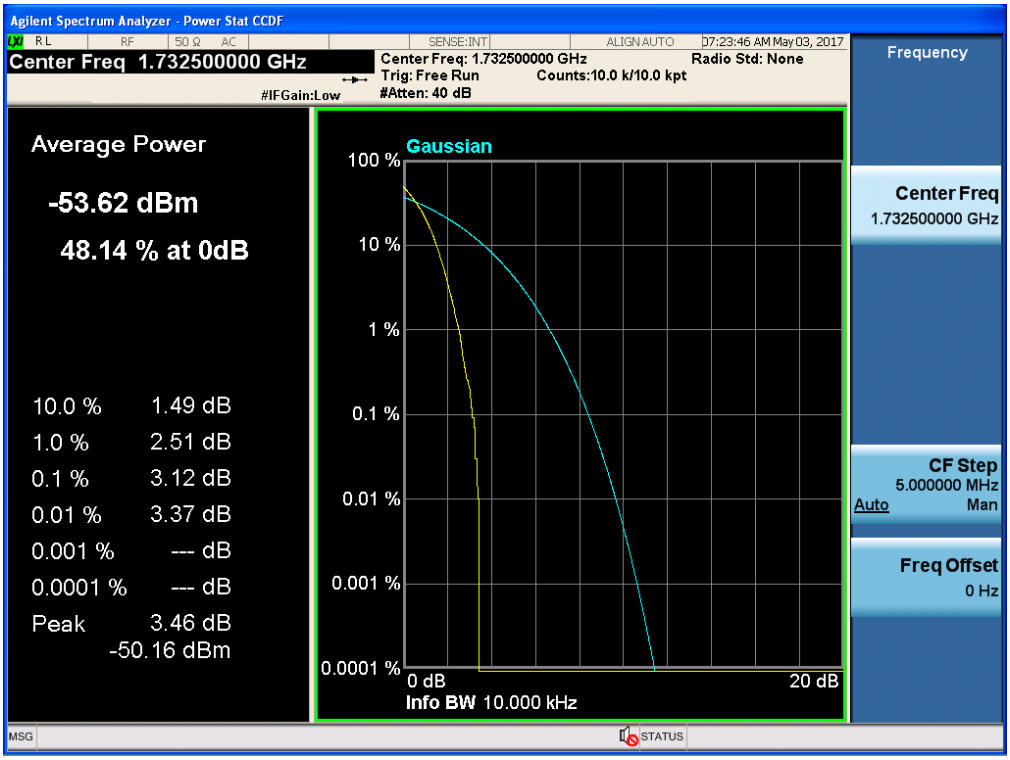
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



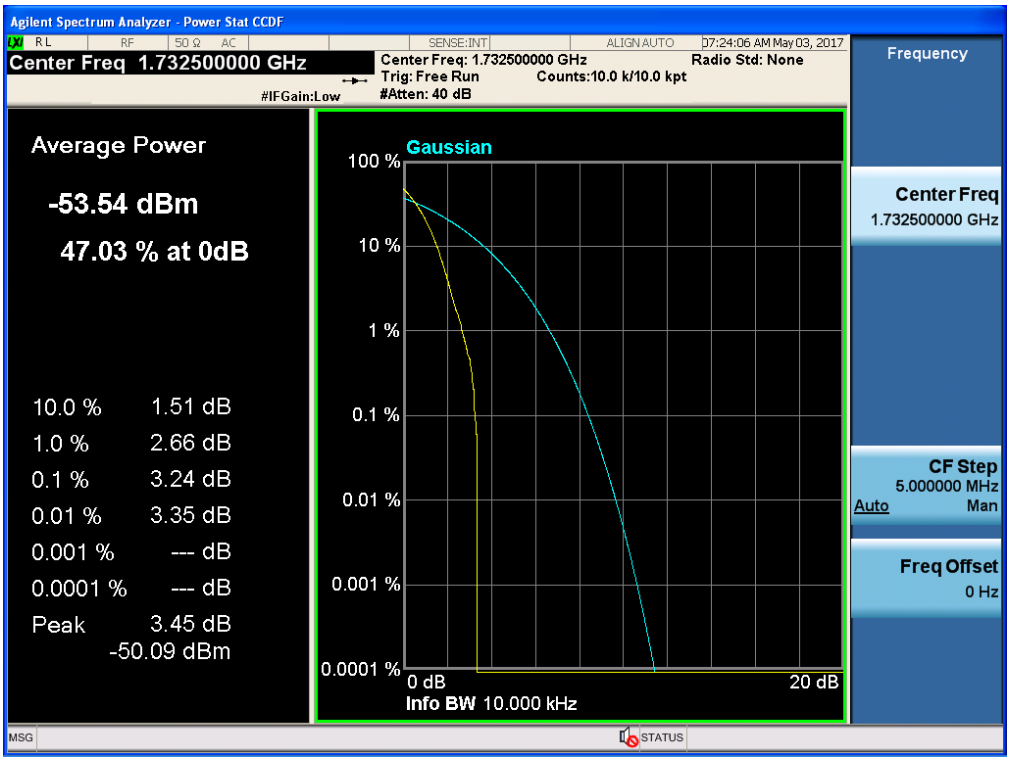
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



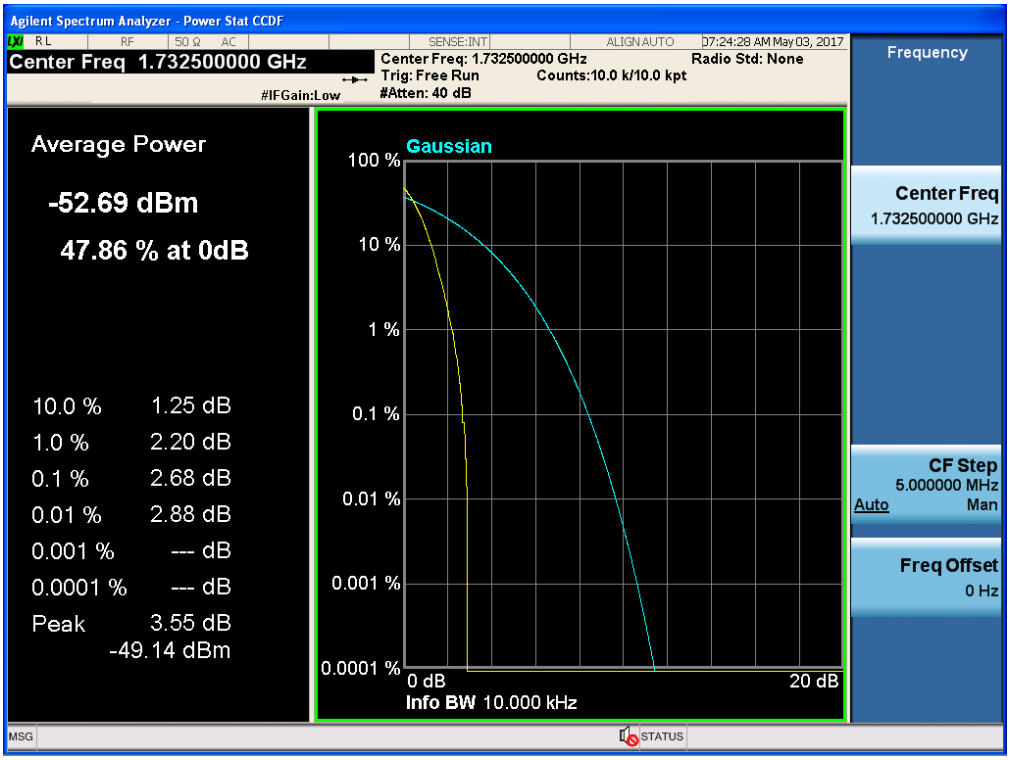
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



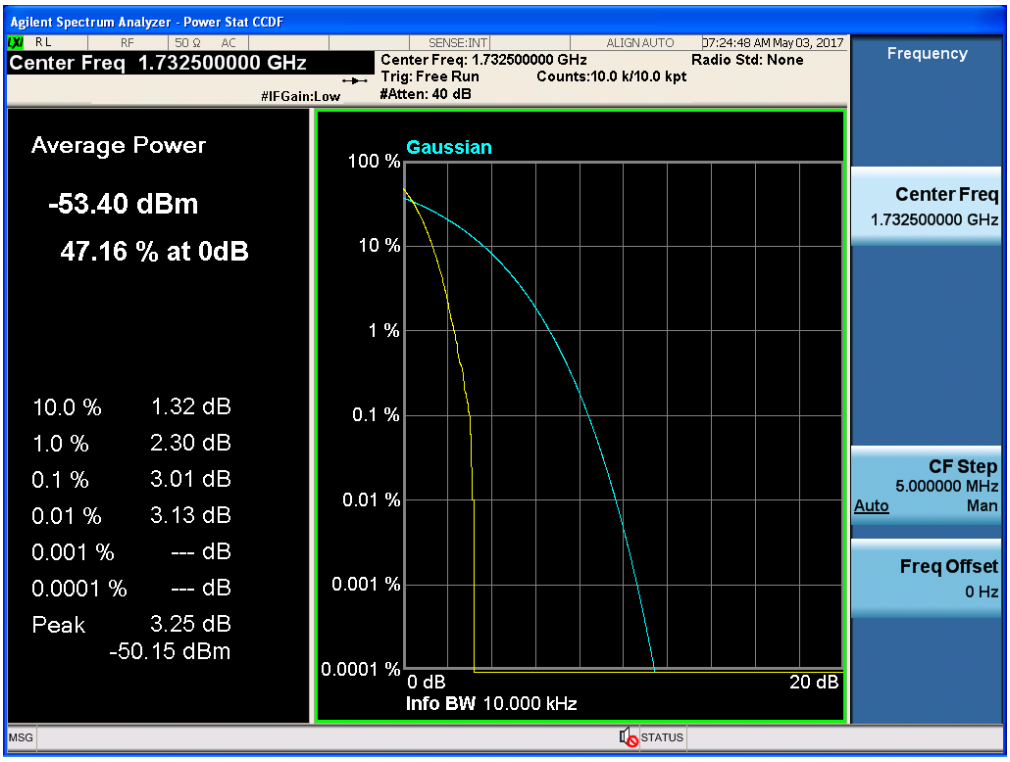
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



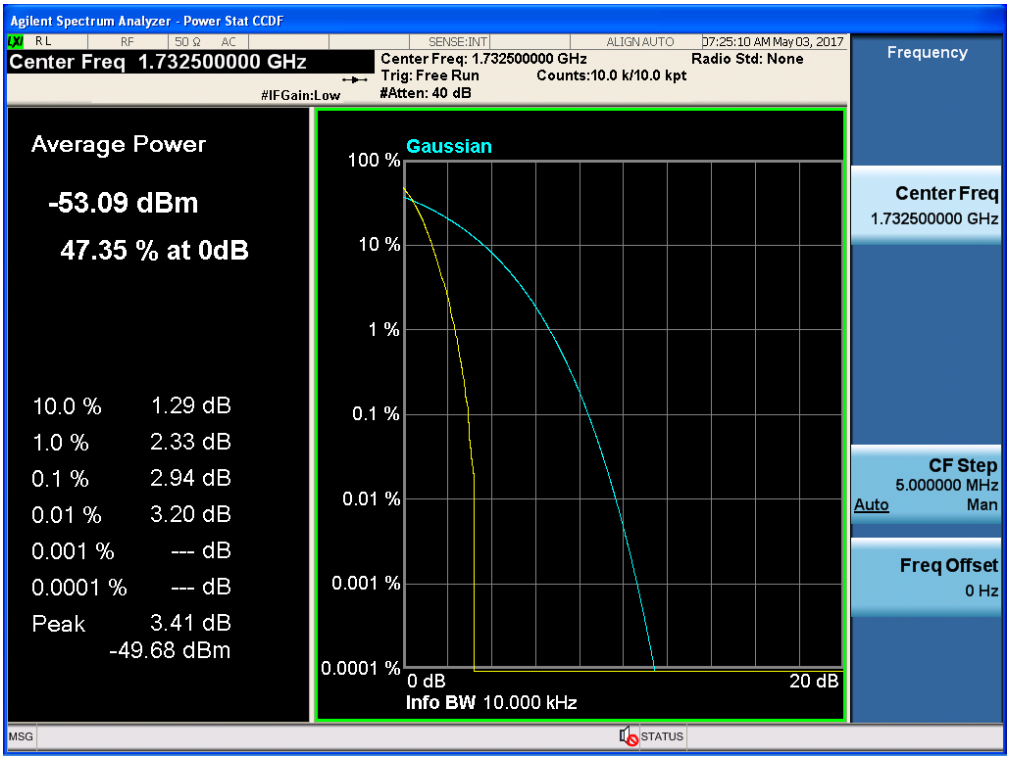
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



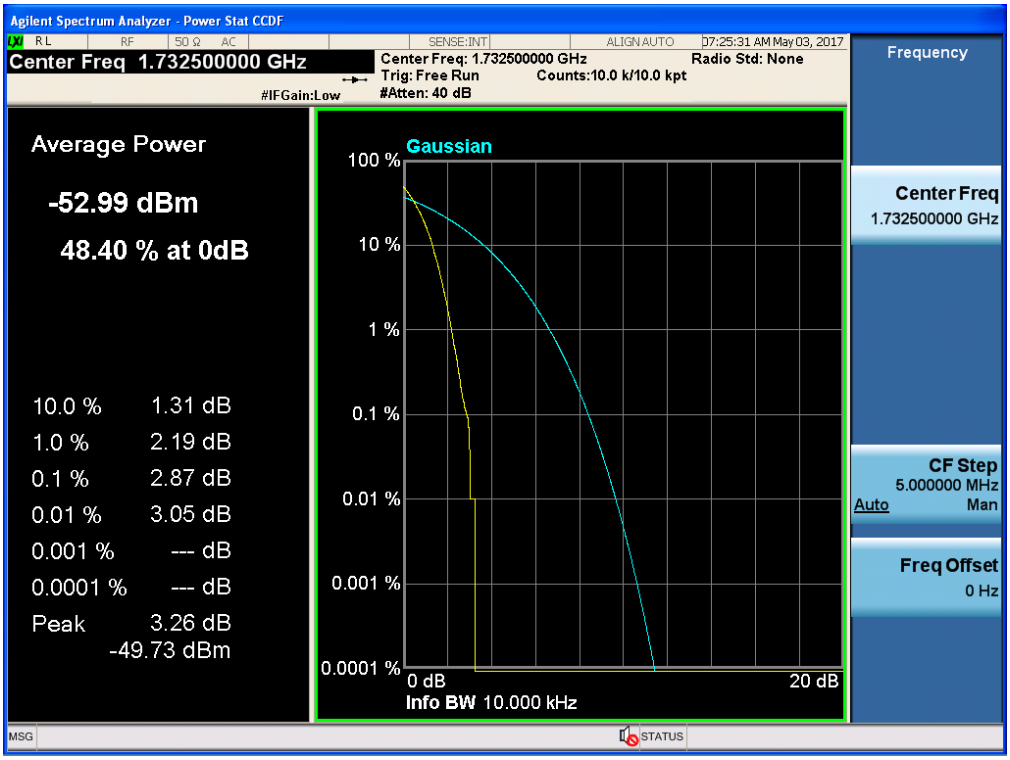
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,16QAM



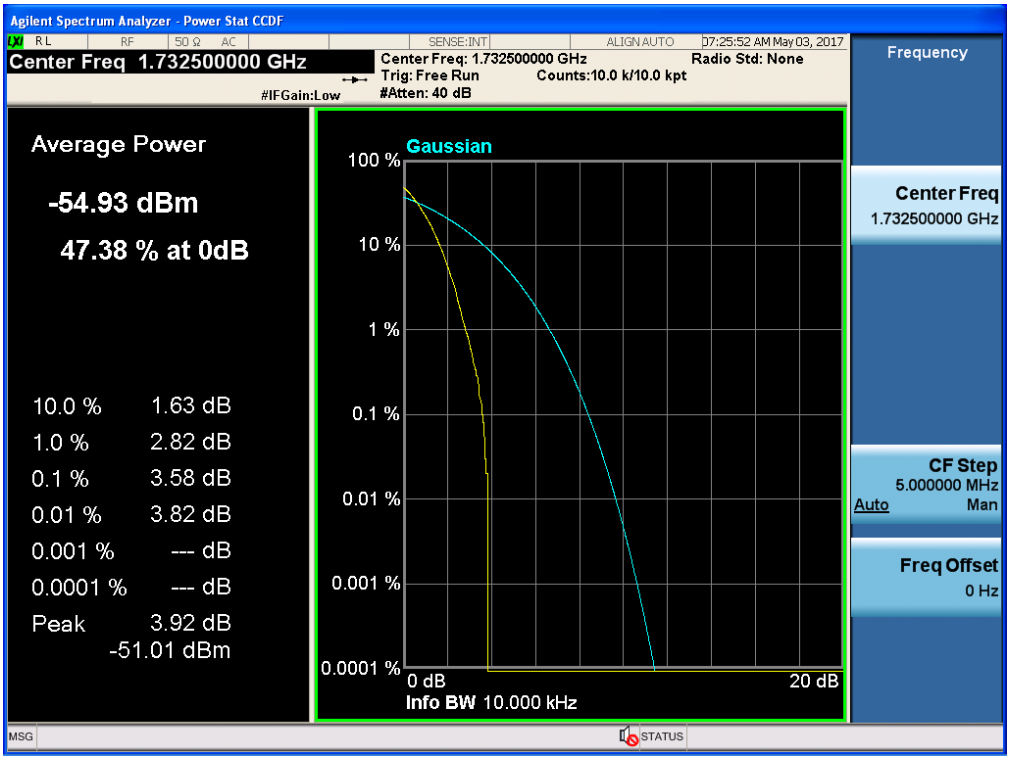
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



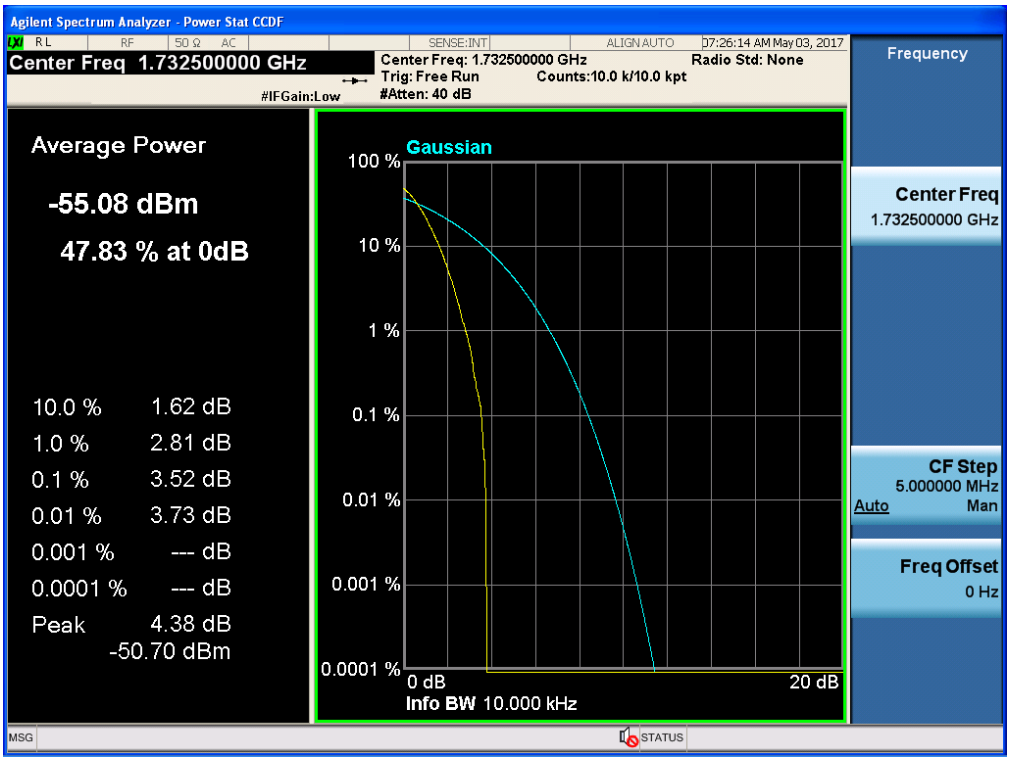
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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

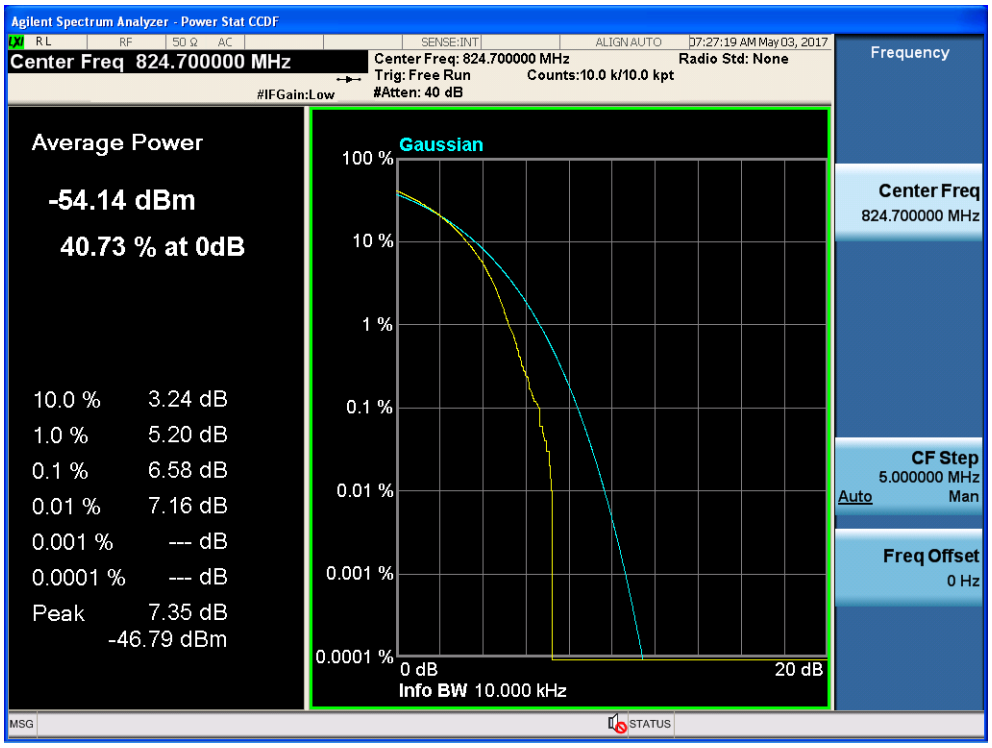


Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,16QAM

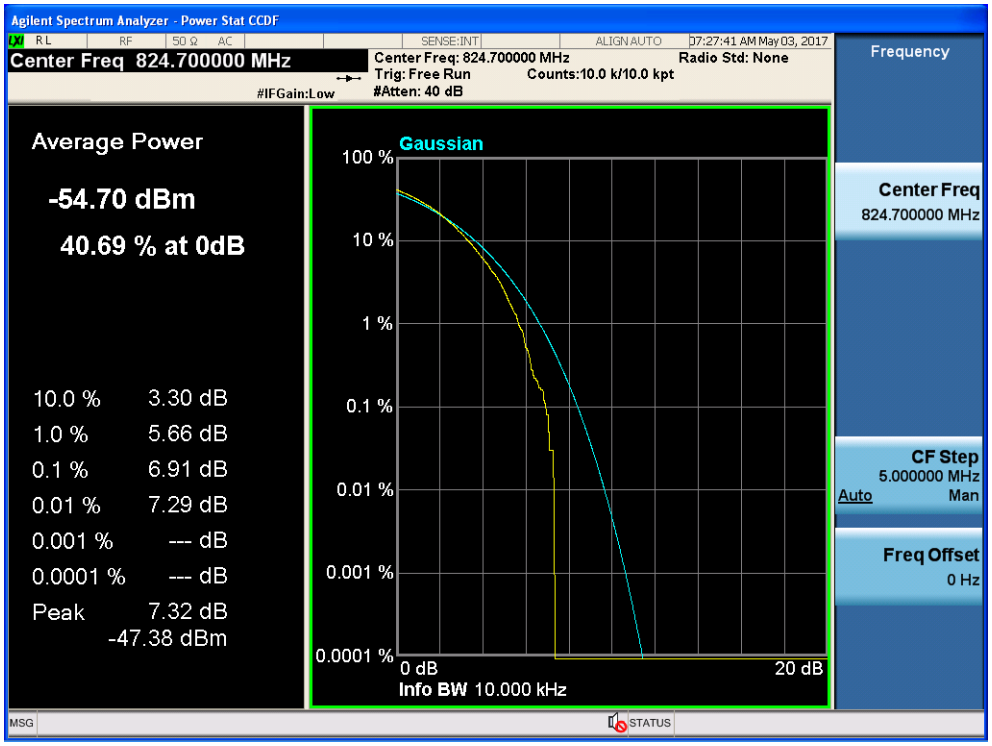


11.7 LTE BAND 5

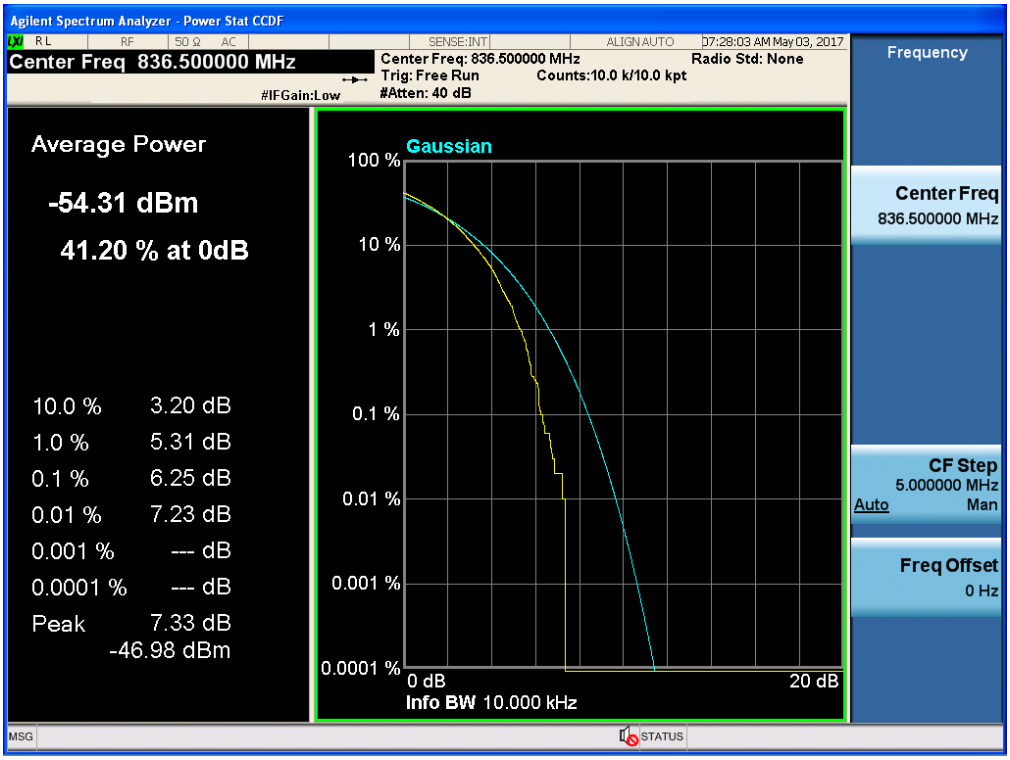
Band 5,UL Channel 20407,UL Frequency 824.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



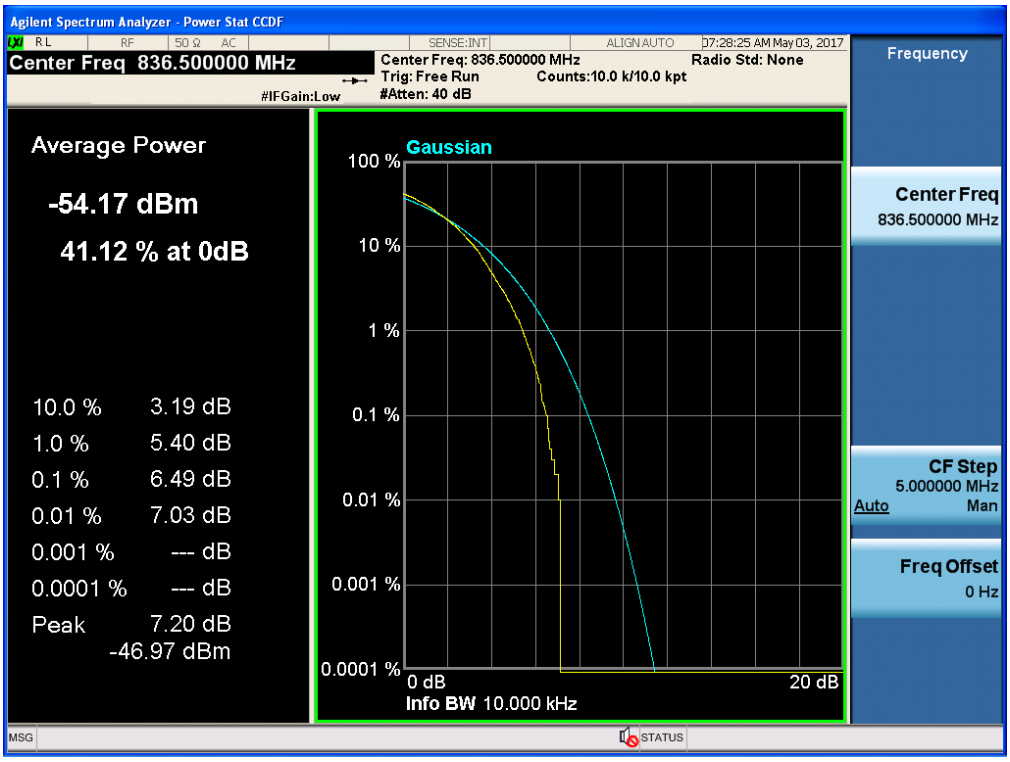
Band 5,UL Channel 20407,UL Frequency 824.7,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



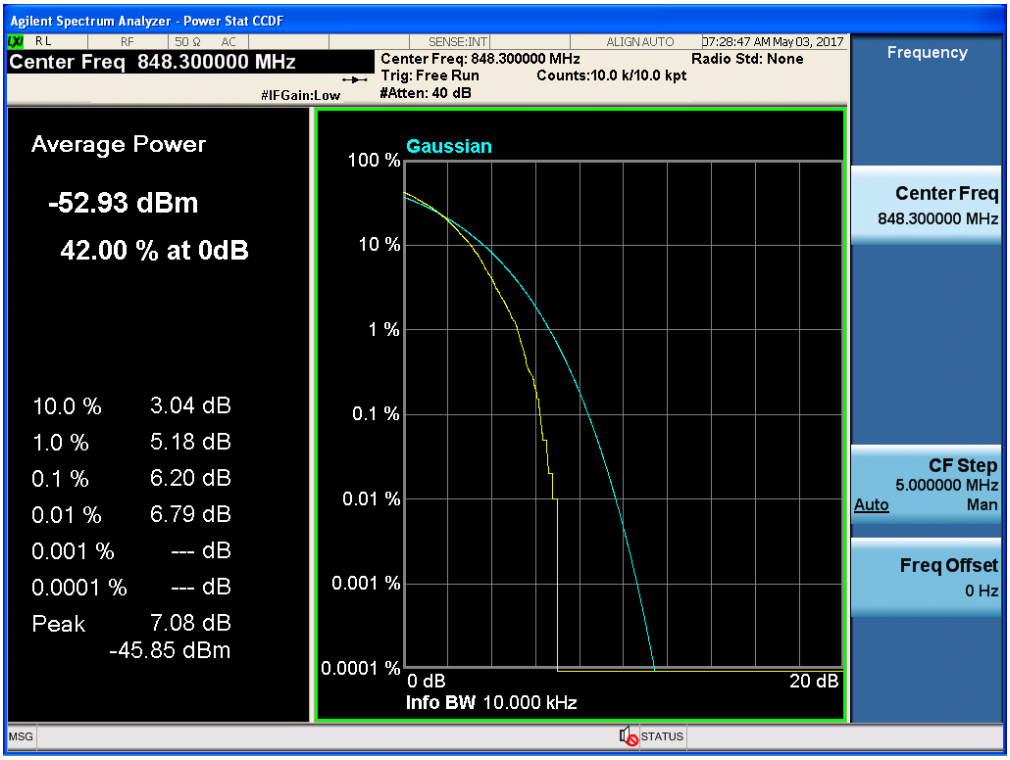
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



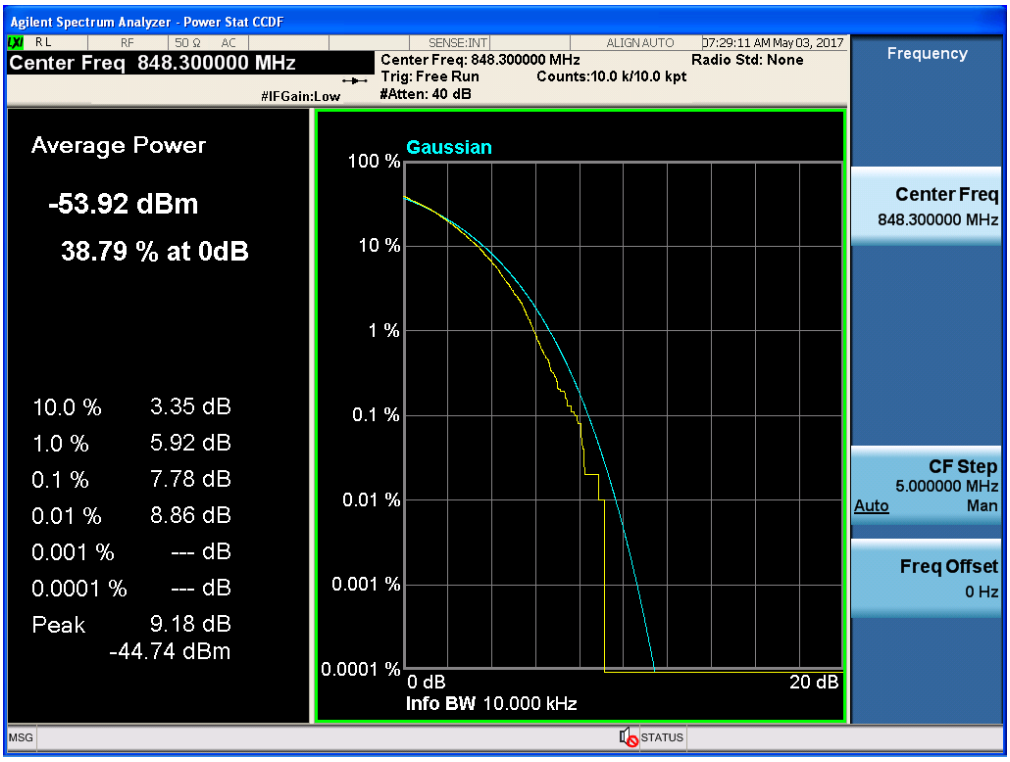
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



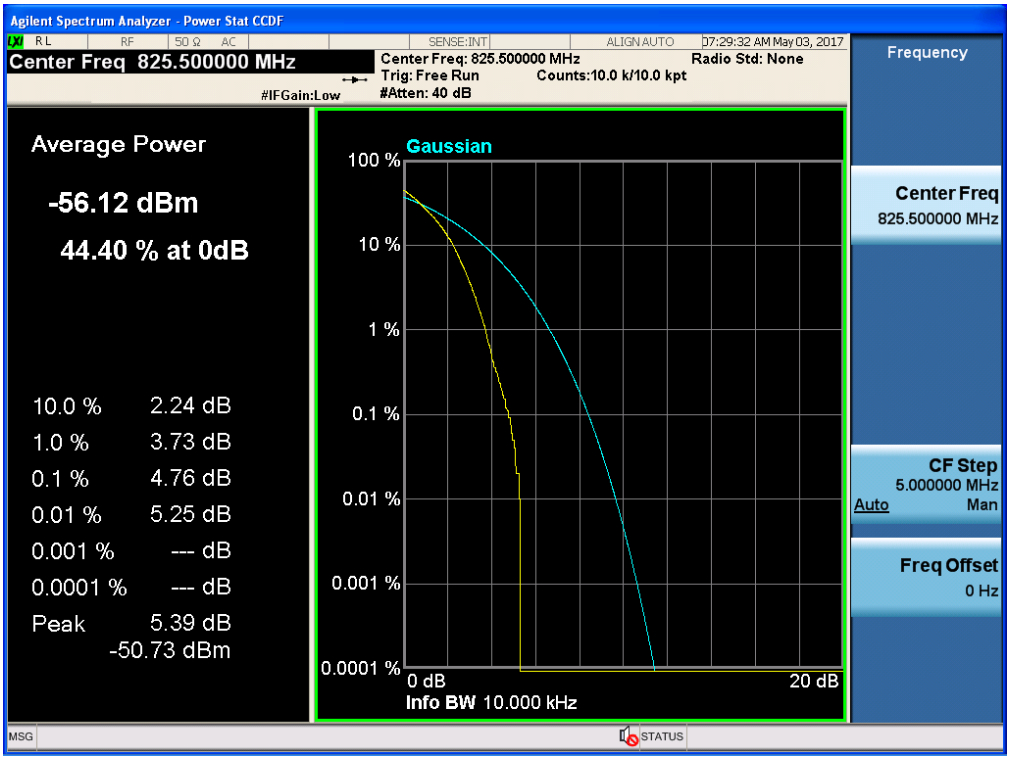
Band 5,UL Channel 20643,UL Frequency 848.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



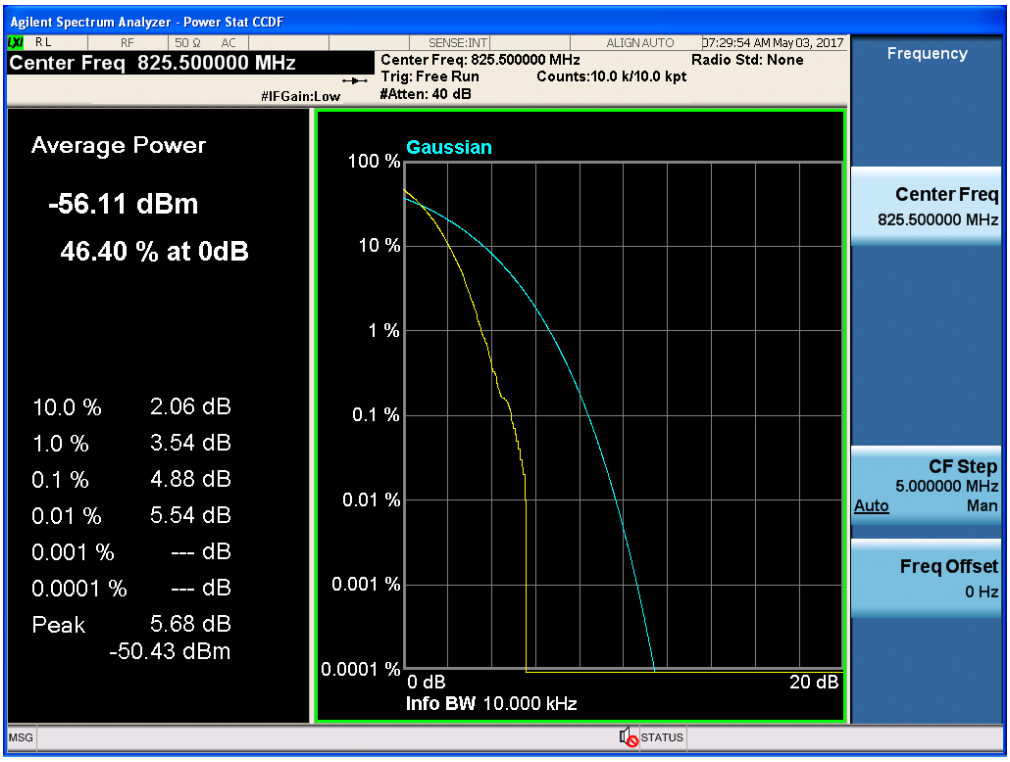
Band 5,UL Channel 20643,UL Frequency 848.3,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



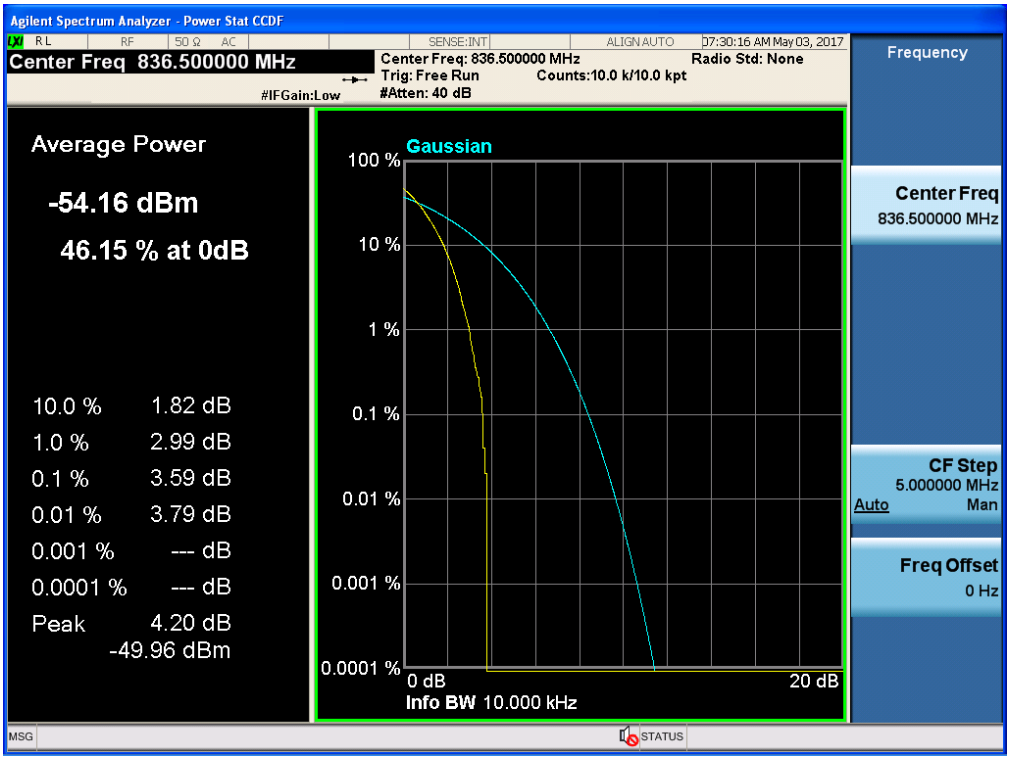
Band 5,UL Channel 20415,UL Frequency 825.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



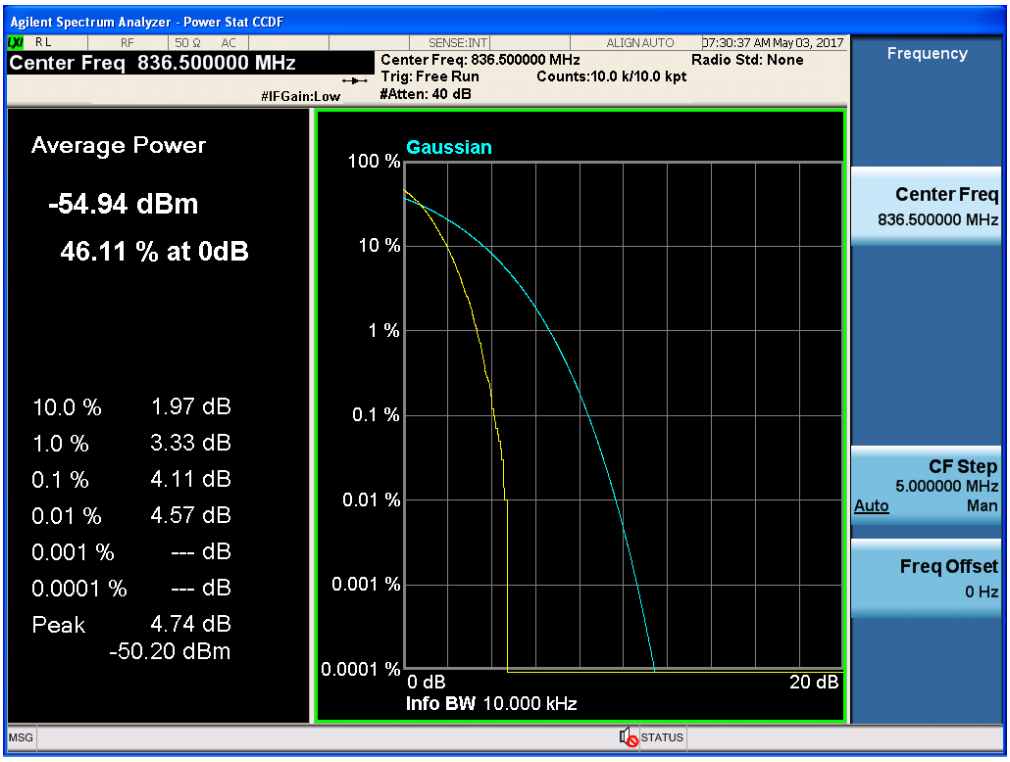
Band 5,UL Channel 20415,UL Frequency 825.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



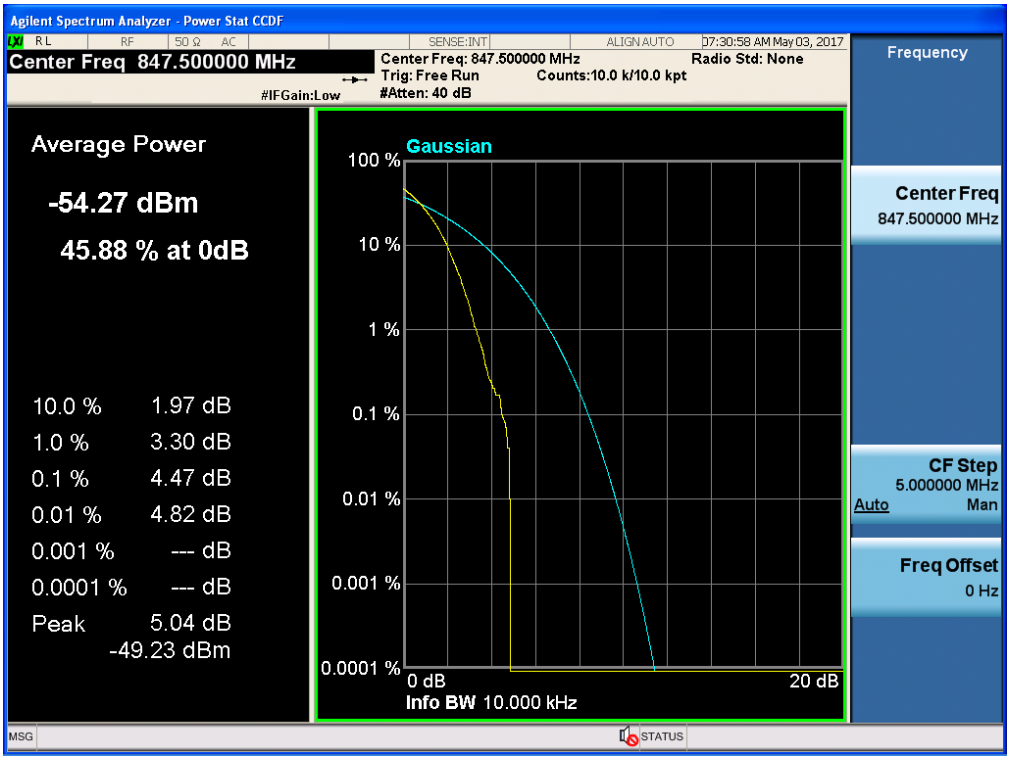
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



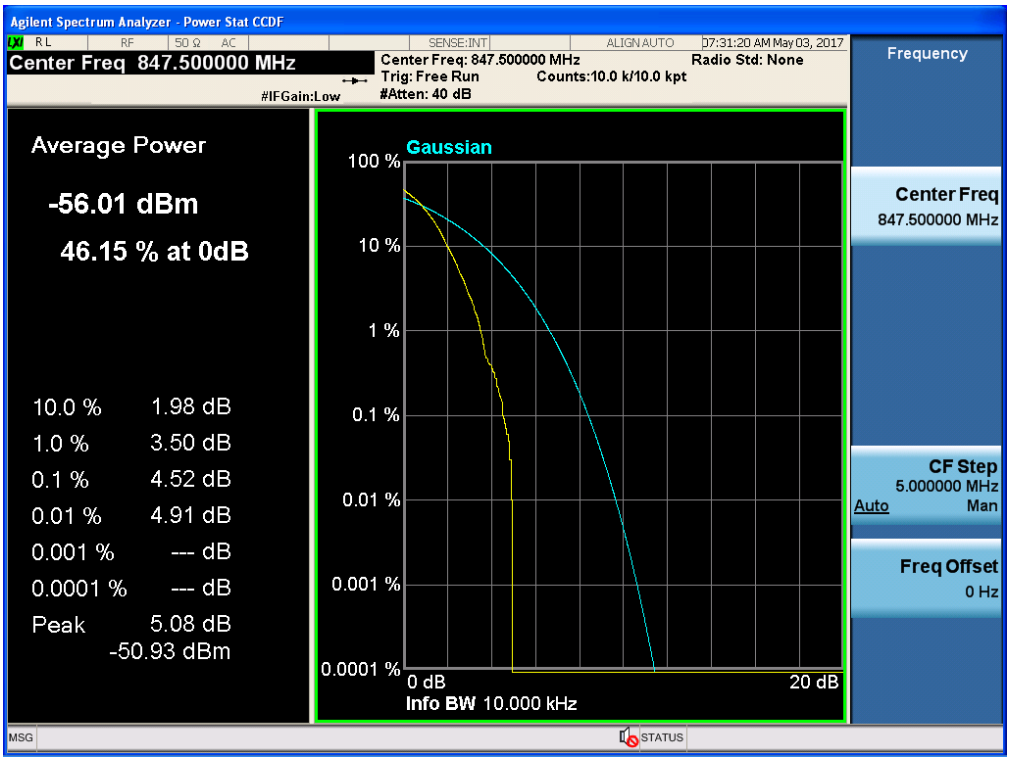
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



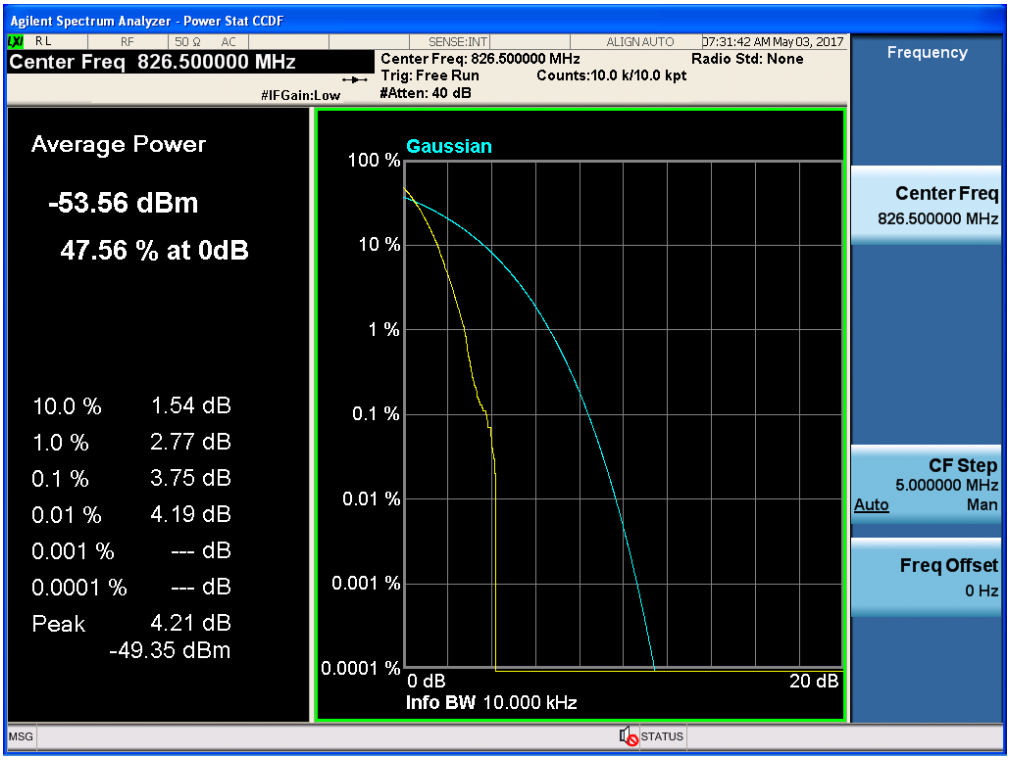
Band 5,UL Channel 20635,UL Frequency 847.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



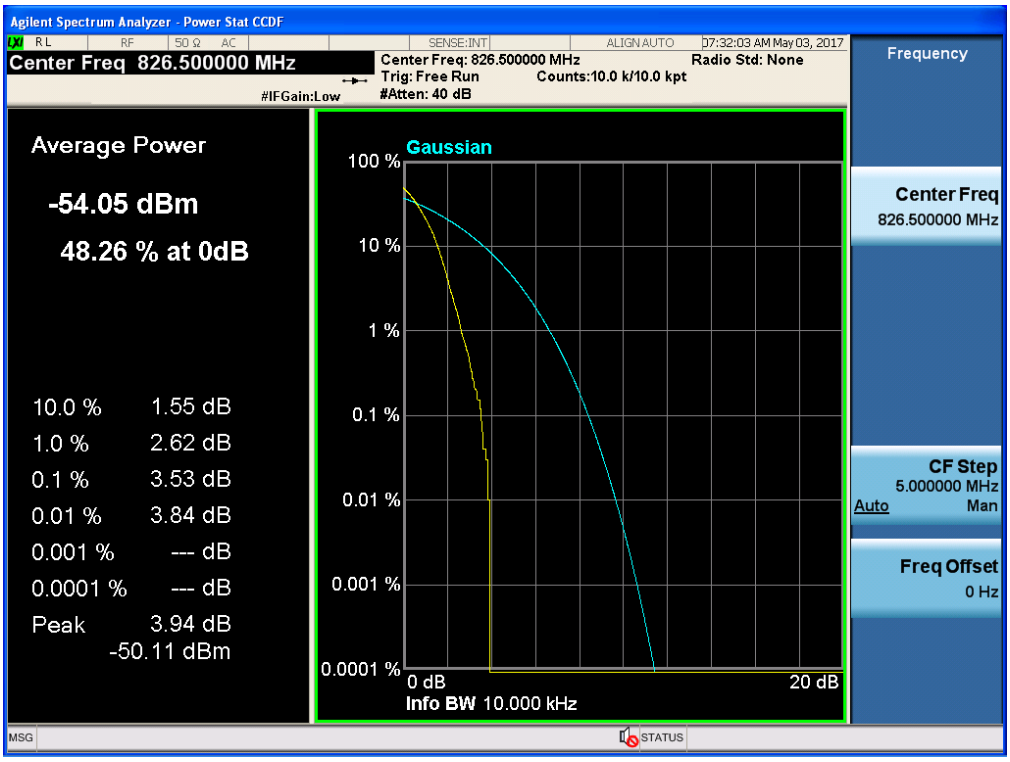
Band 5,UL Channel 20635,UL Frequency 847.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



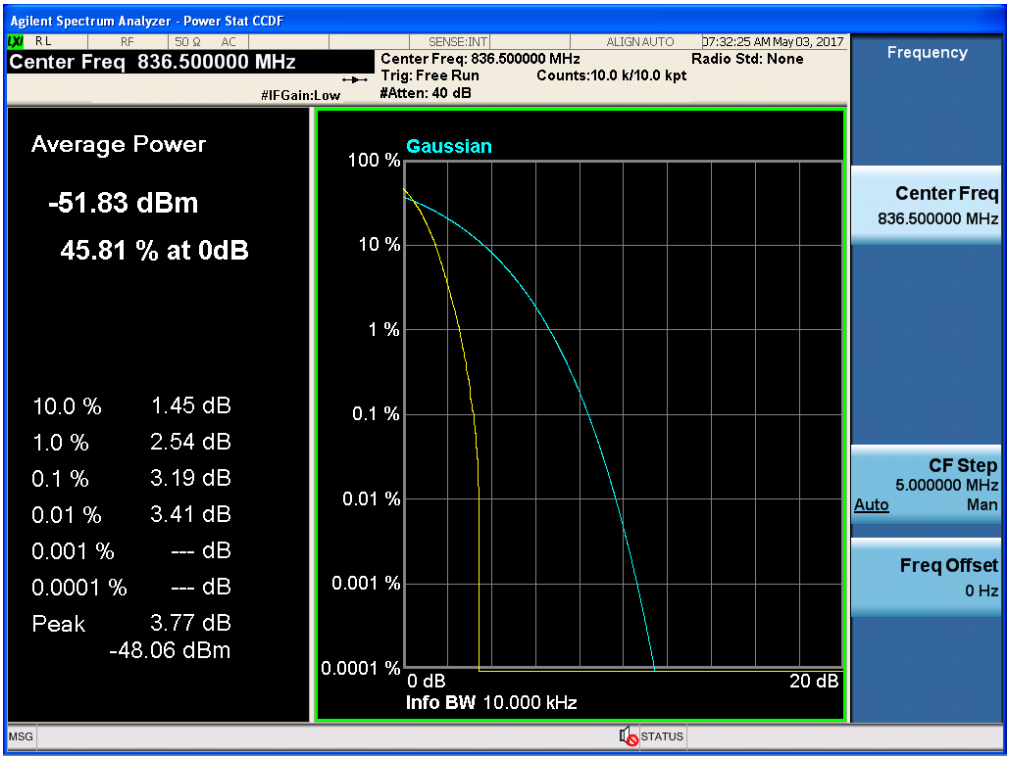
Band 5,UL Channel 20425,UL Frequency 826.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



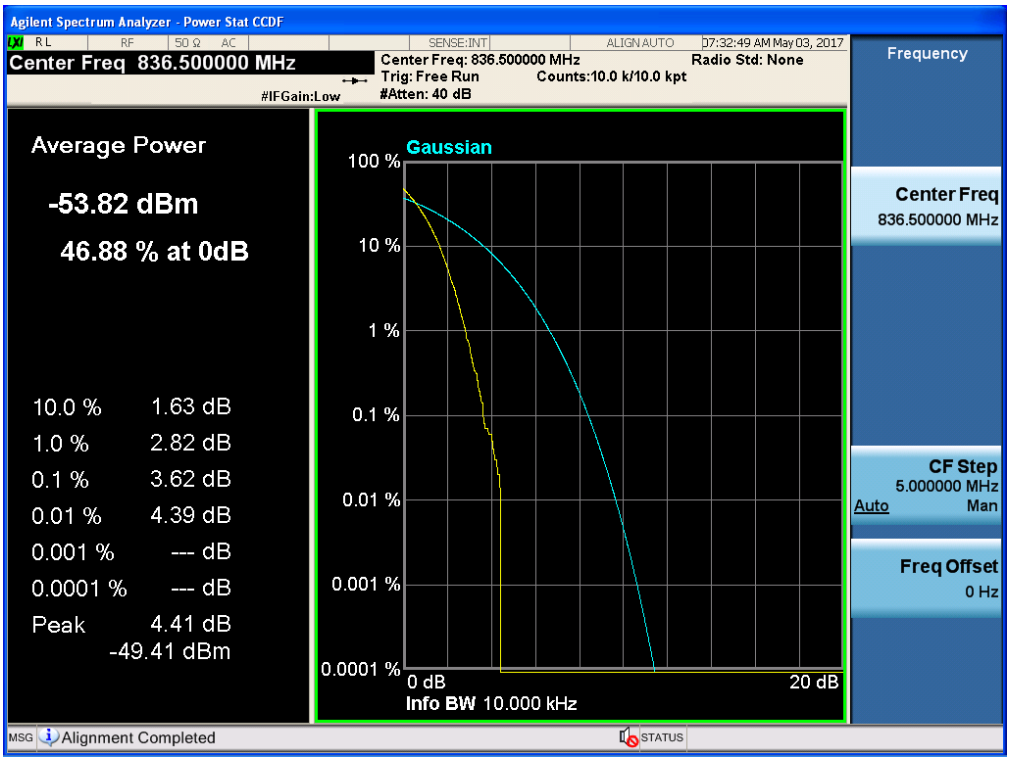
Band 5,UL Channel 20425,UL Frequency 826.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



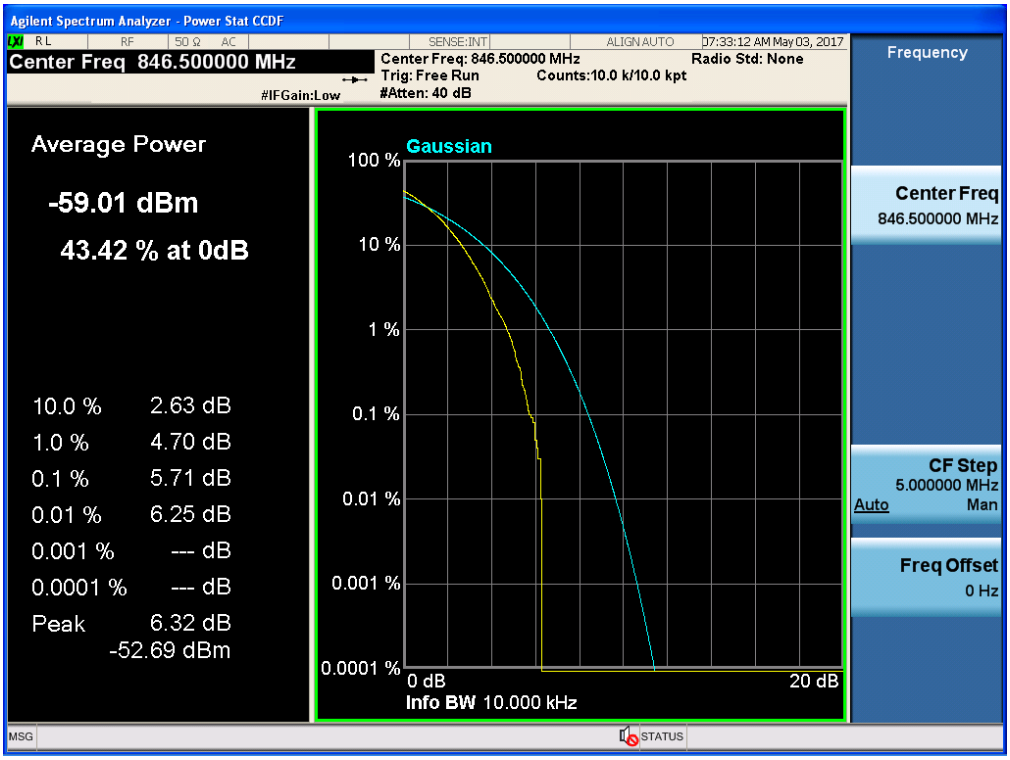
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



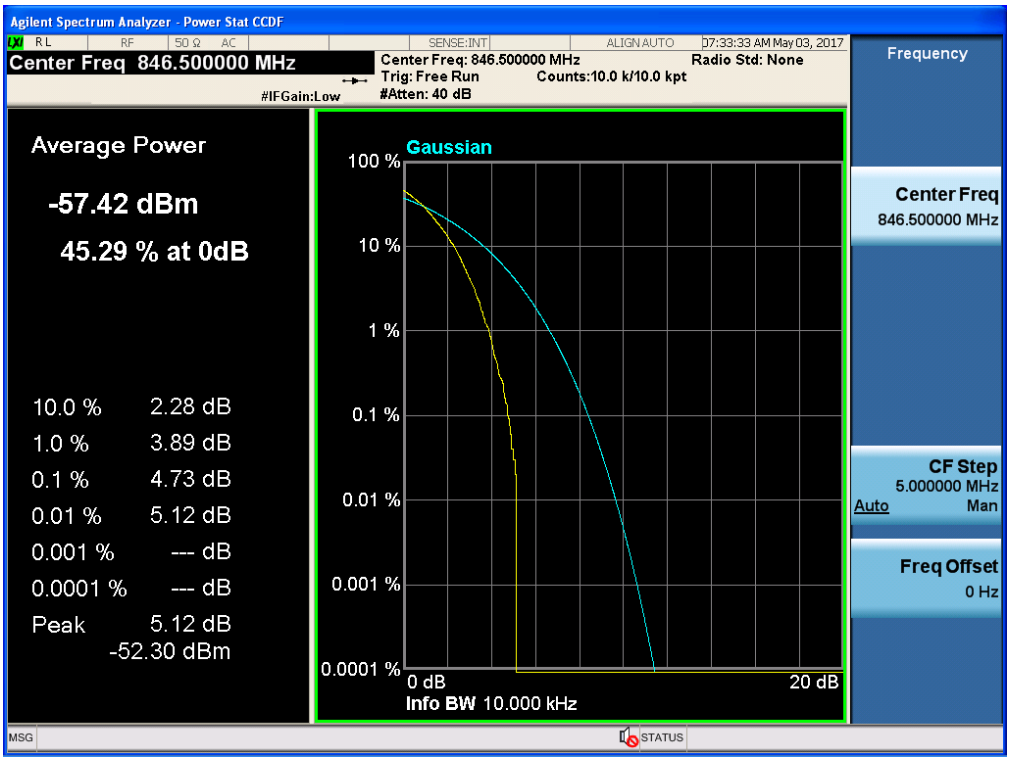
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



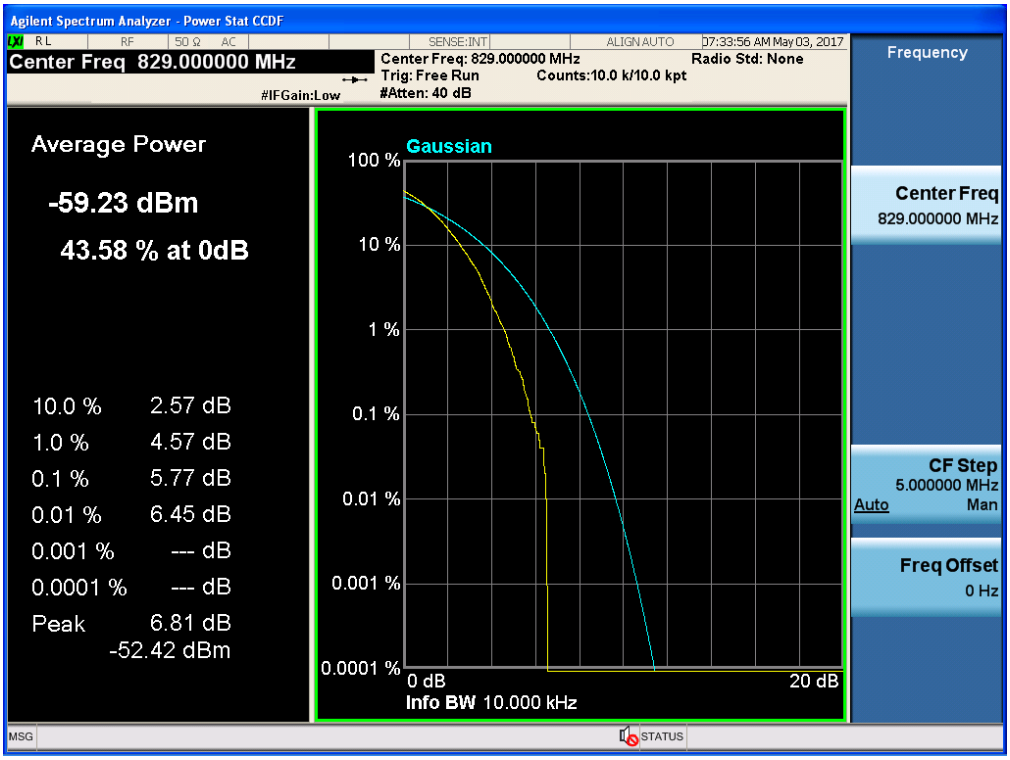
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



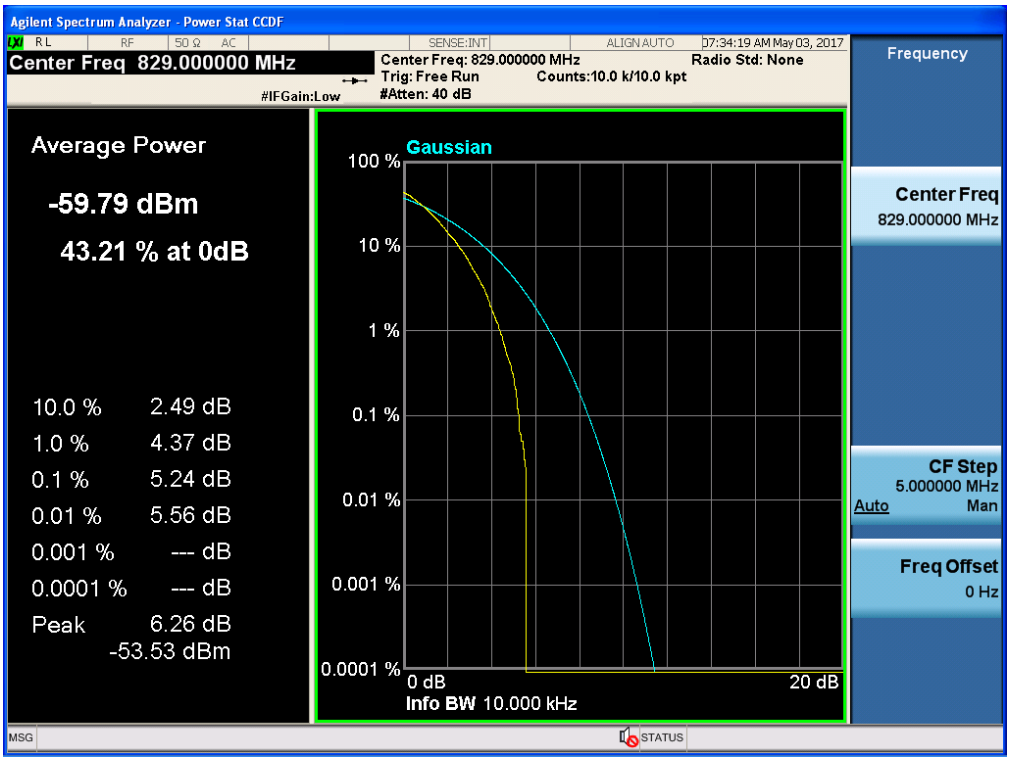
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



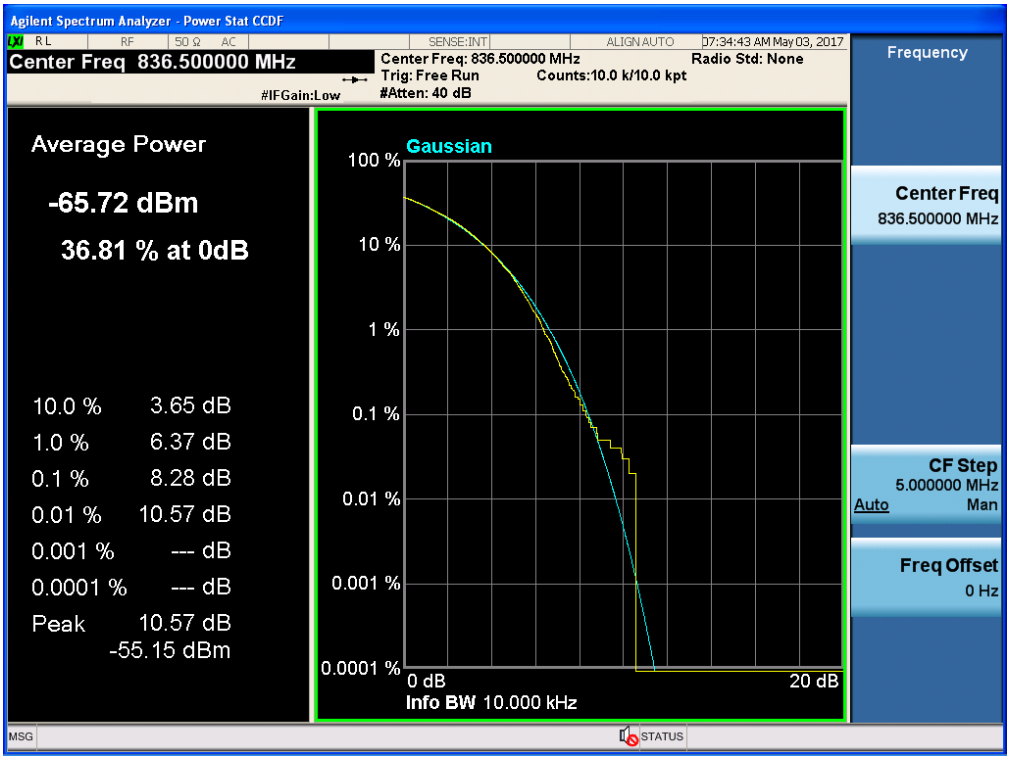
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



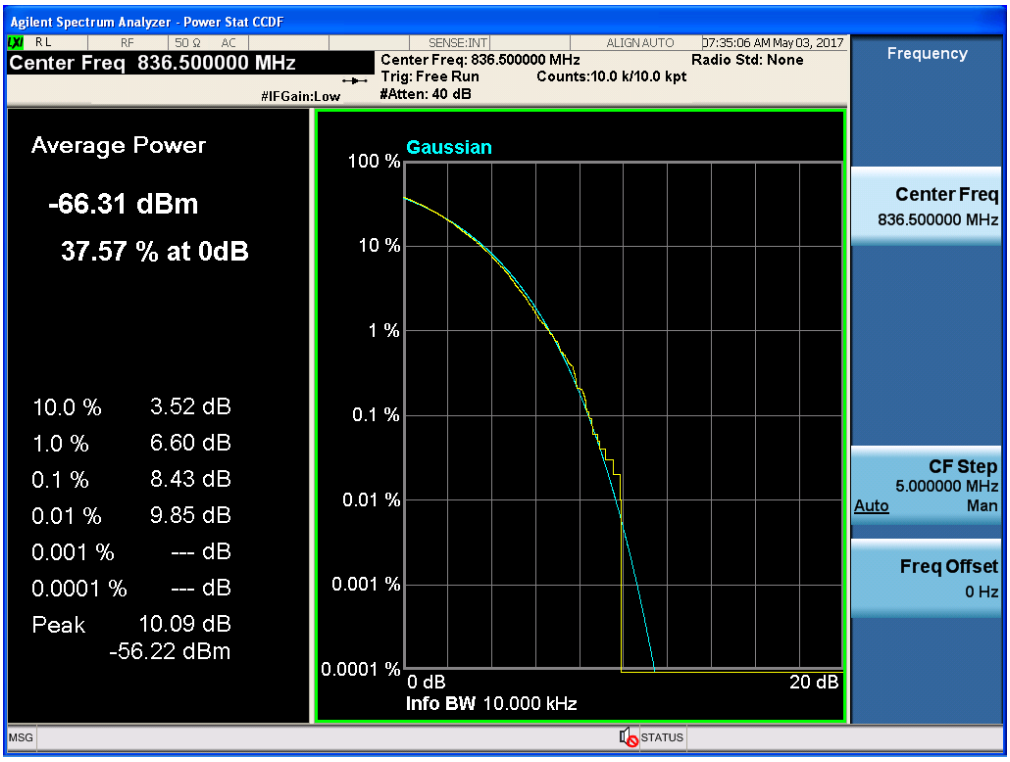
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



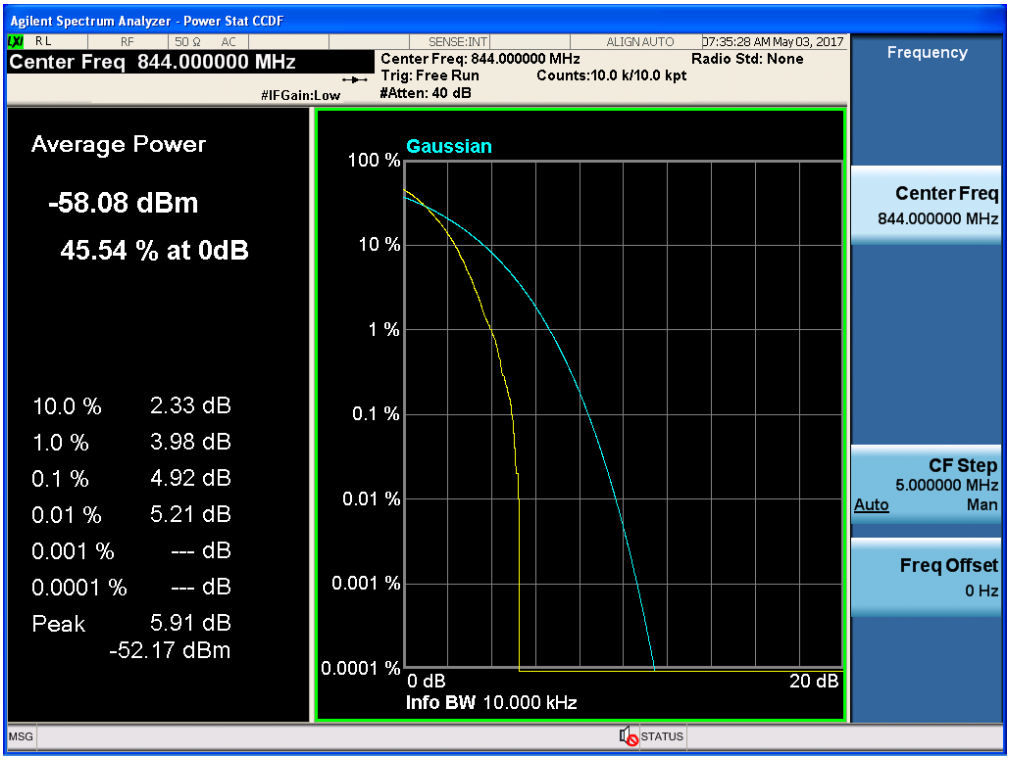
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



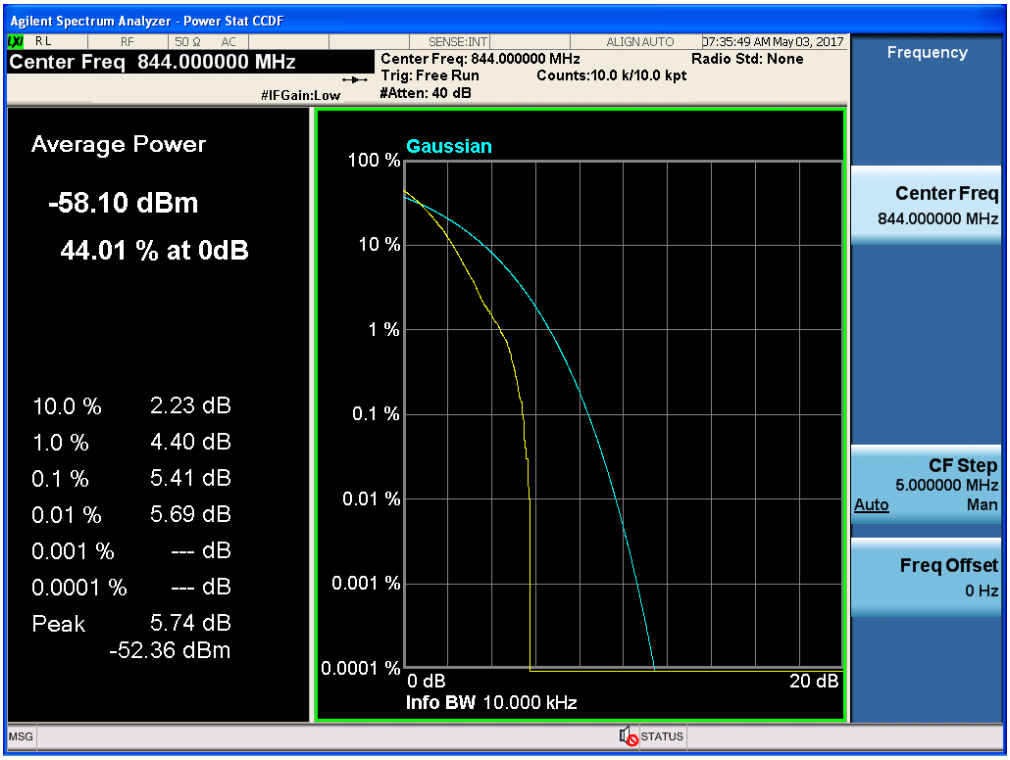
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK

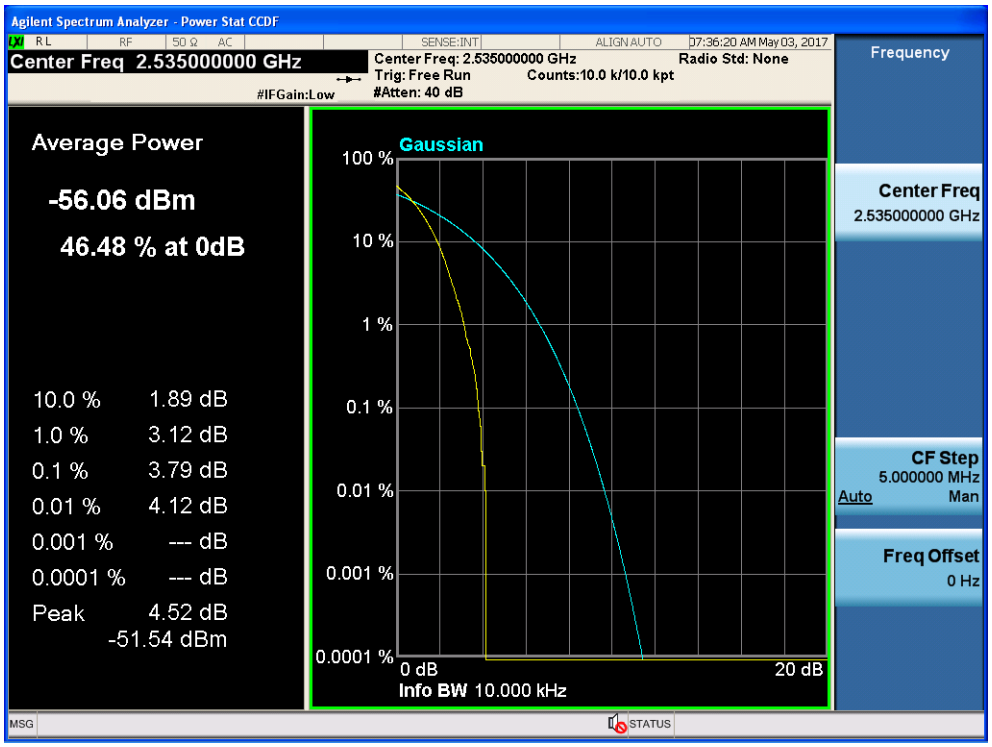


Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

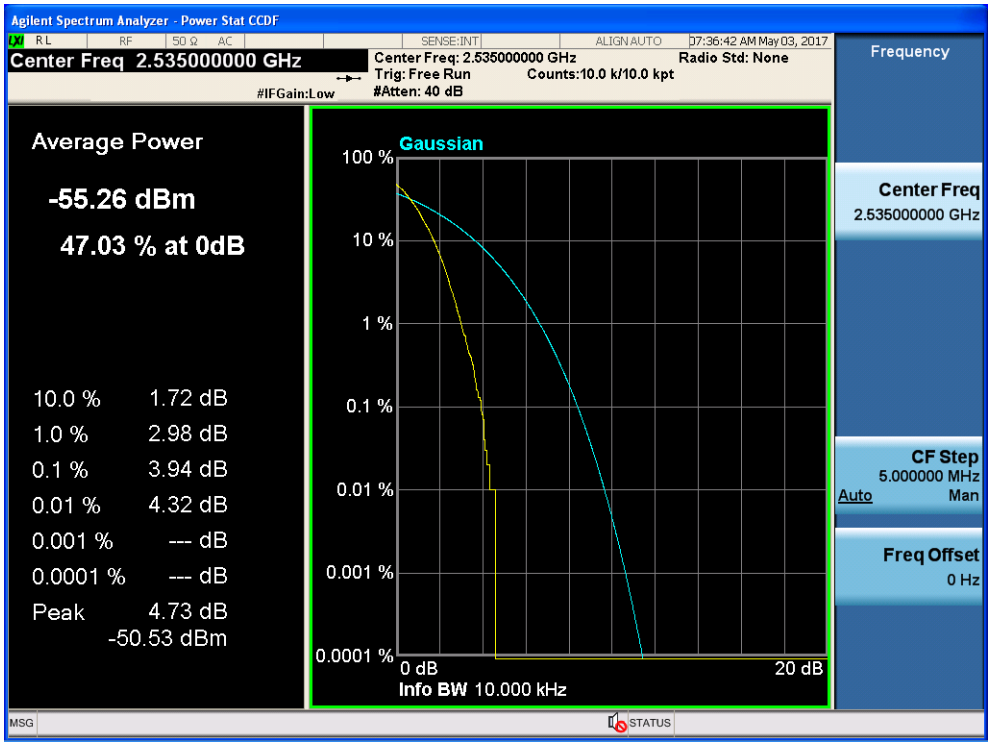


11.8 LTE BAND 7

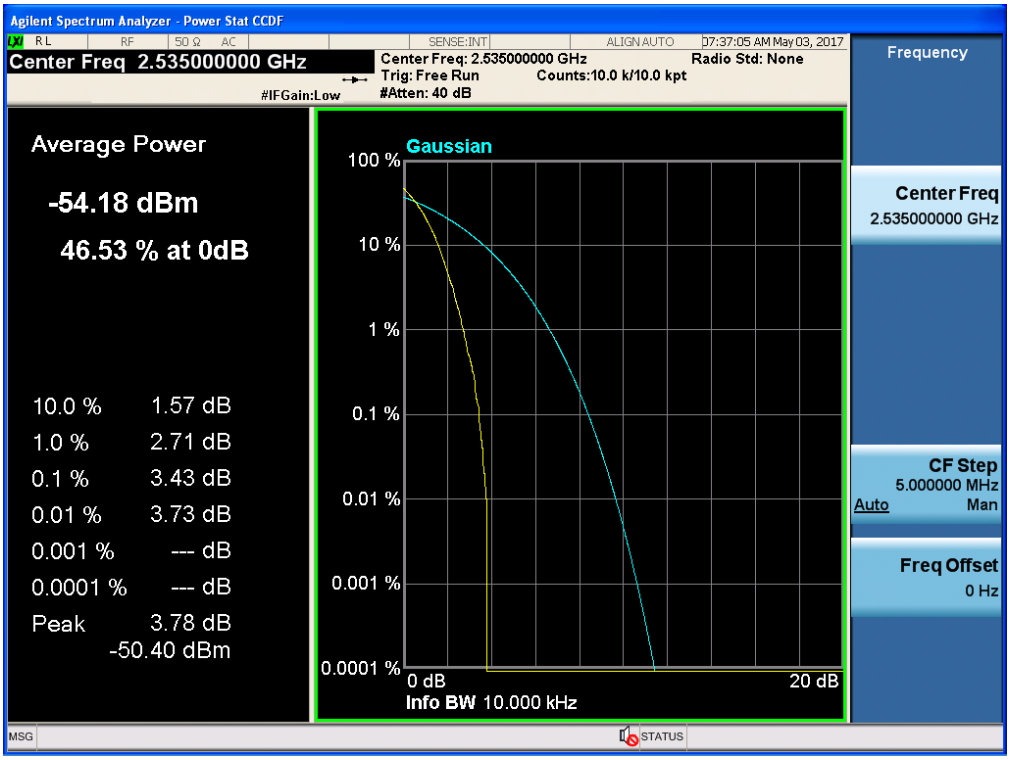
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



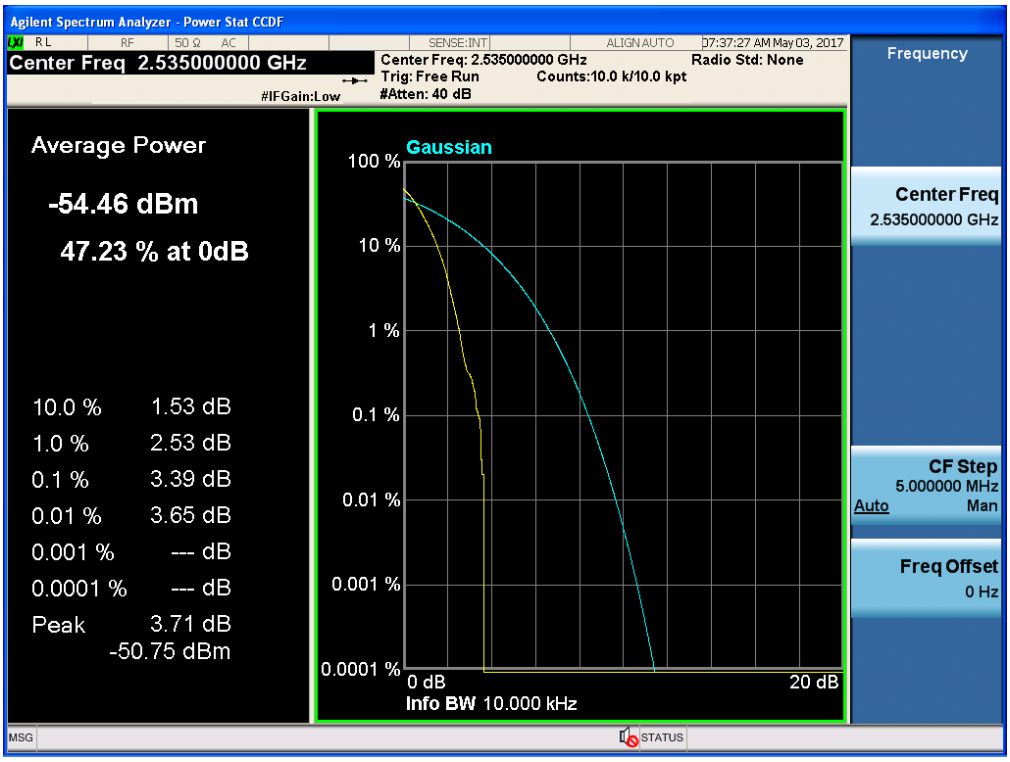
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



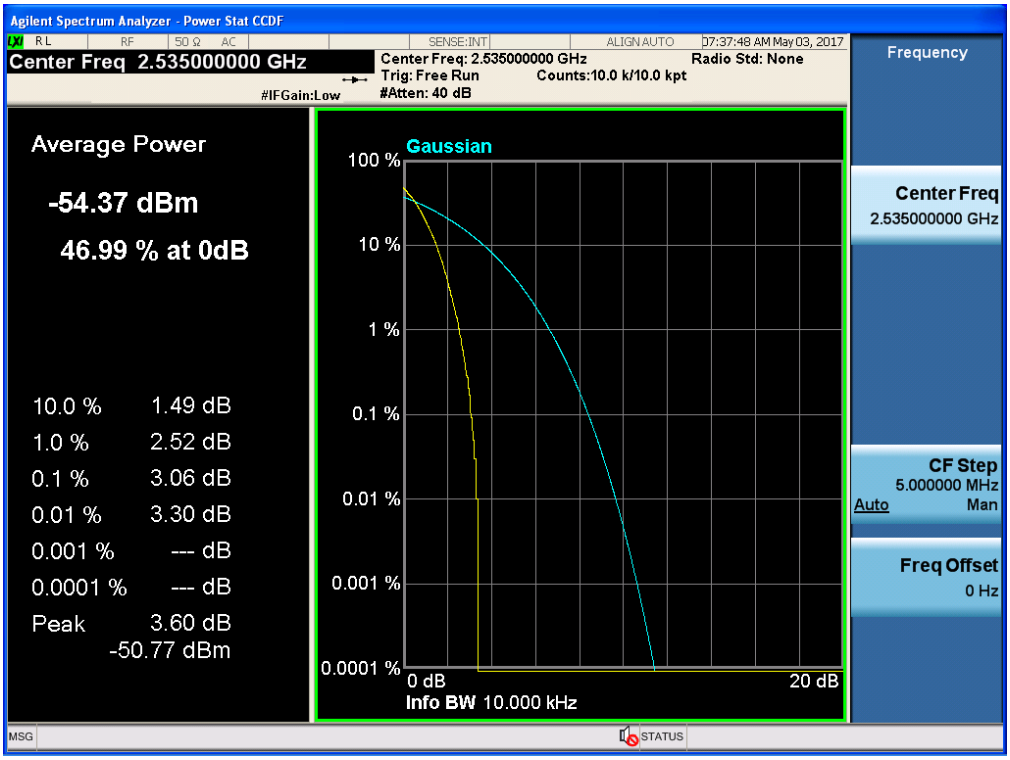
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



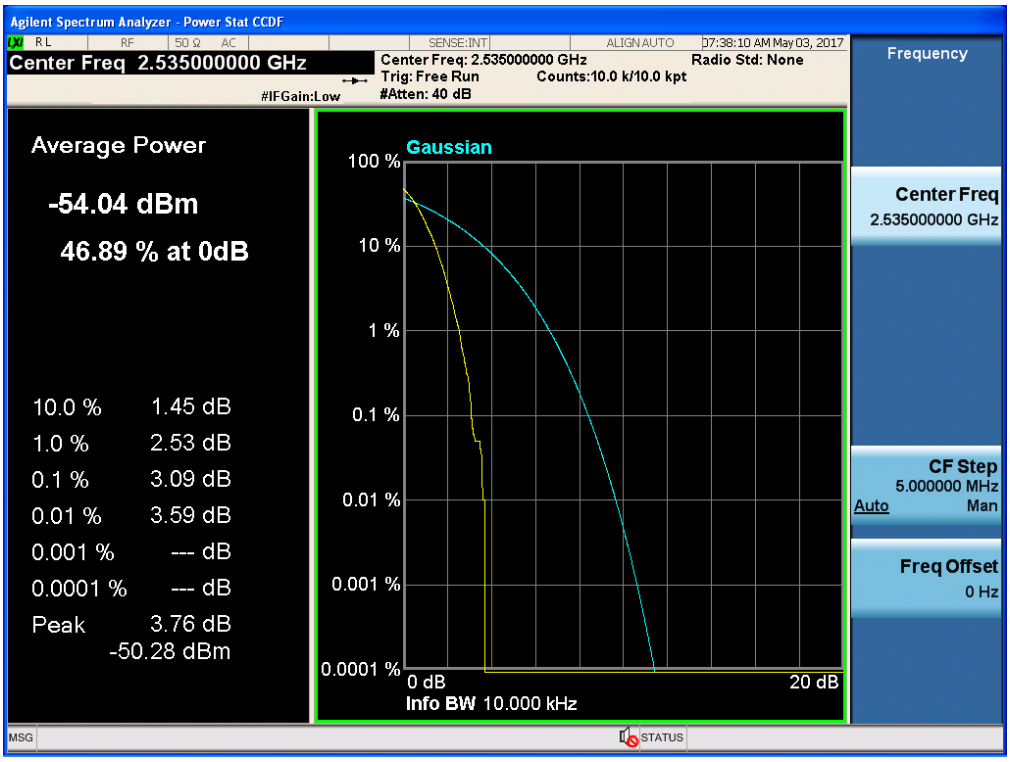
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



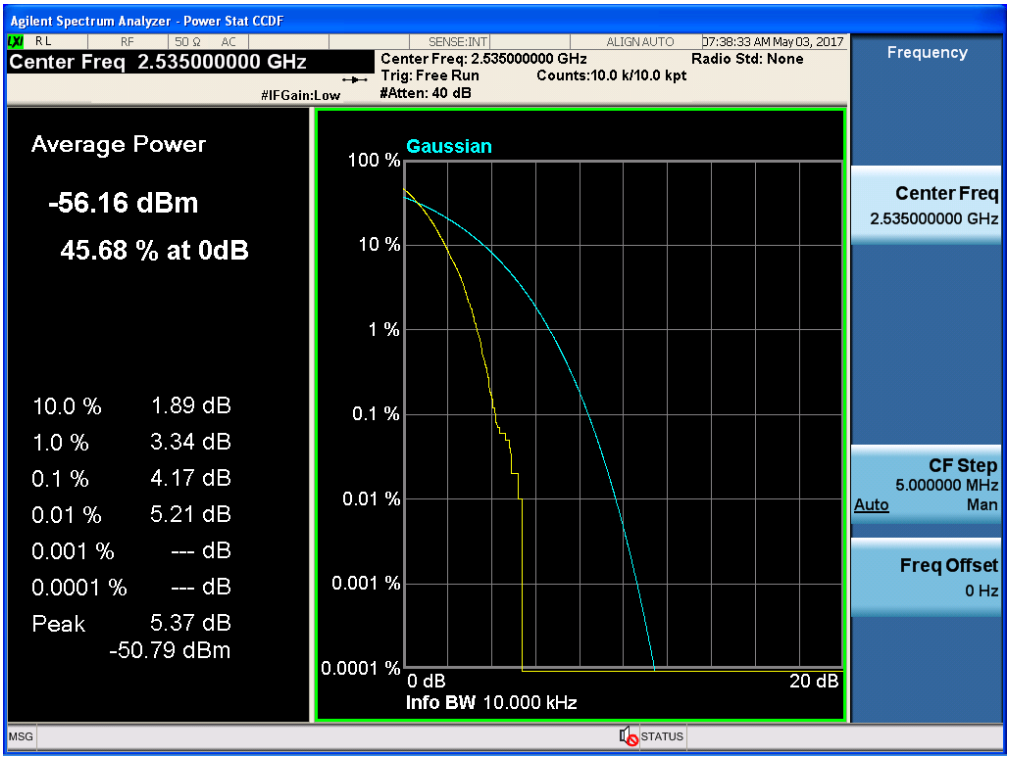
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



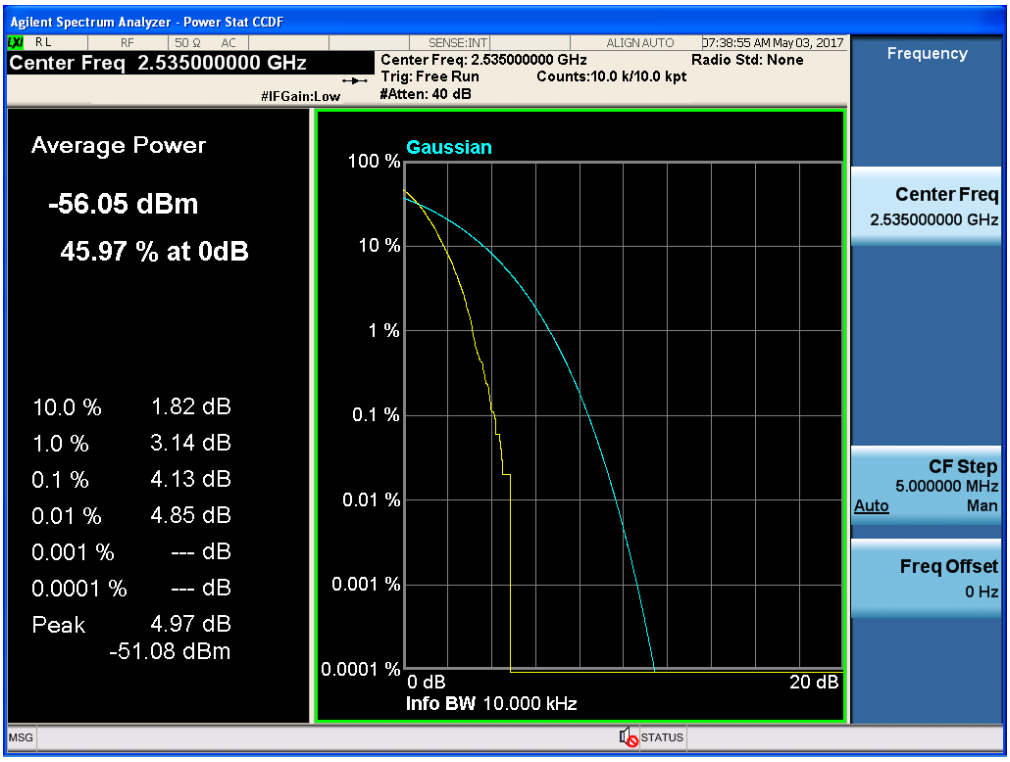
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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,16QAM



----END OF REPORT----