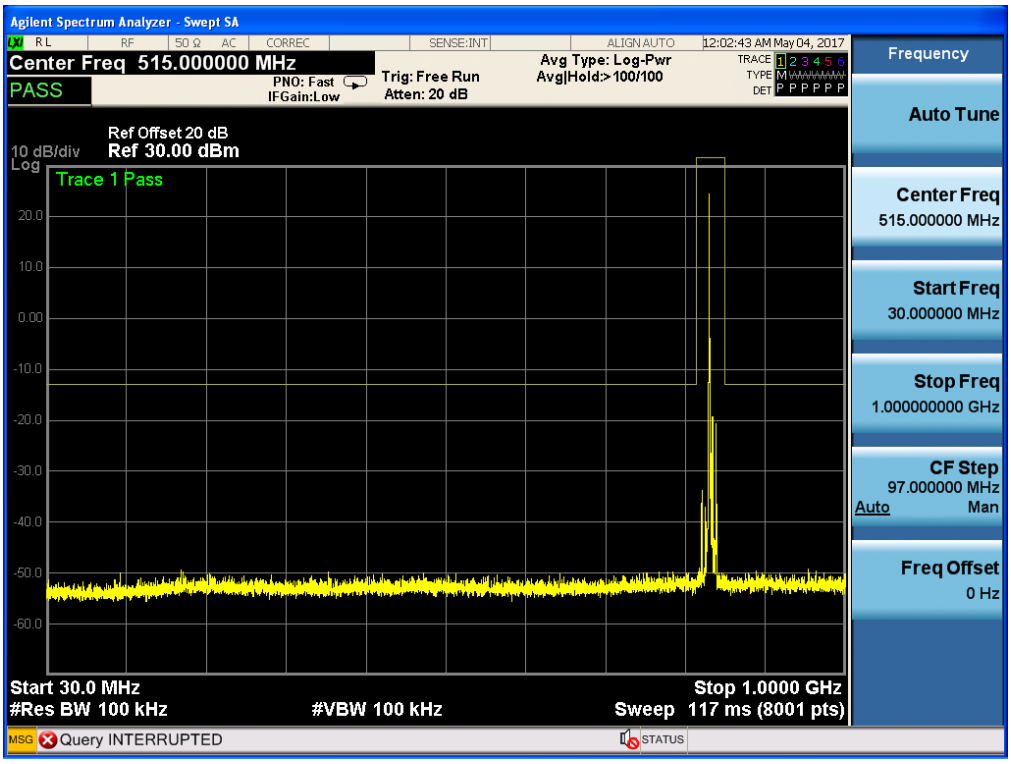
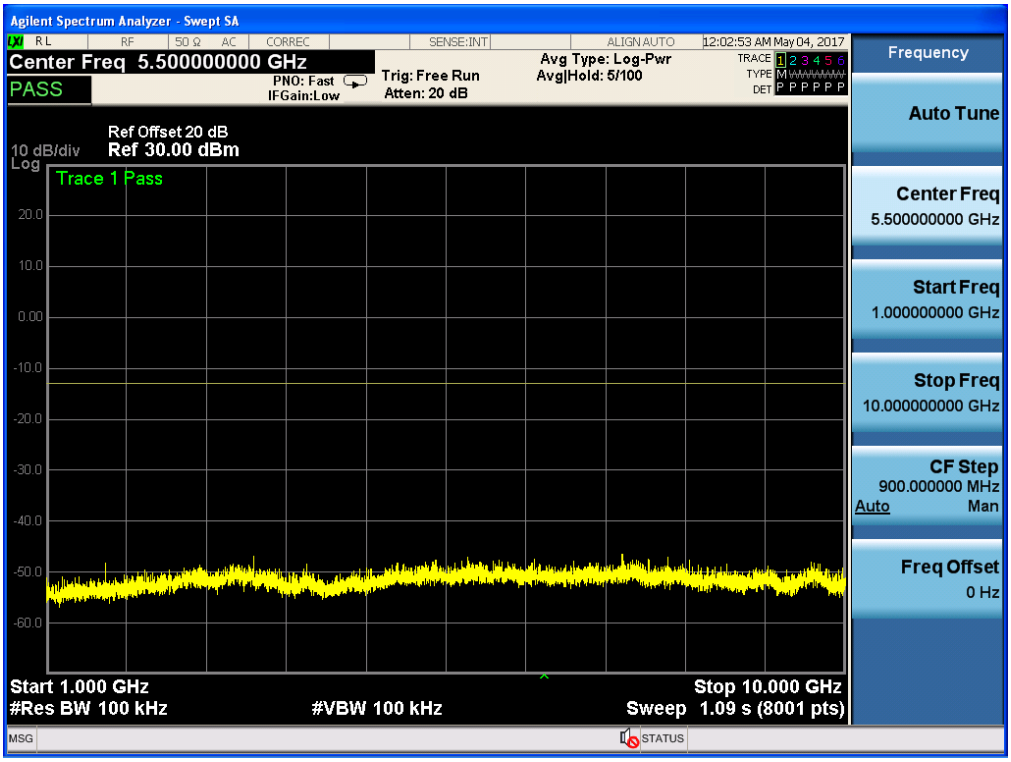
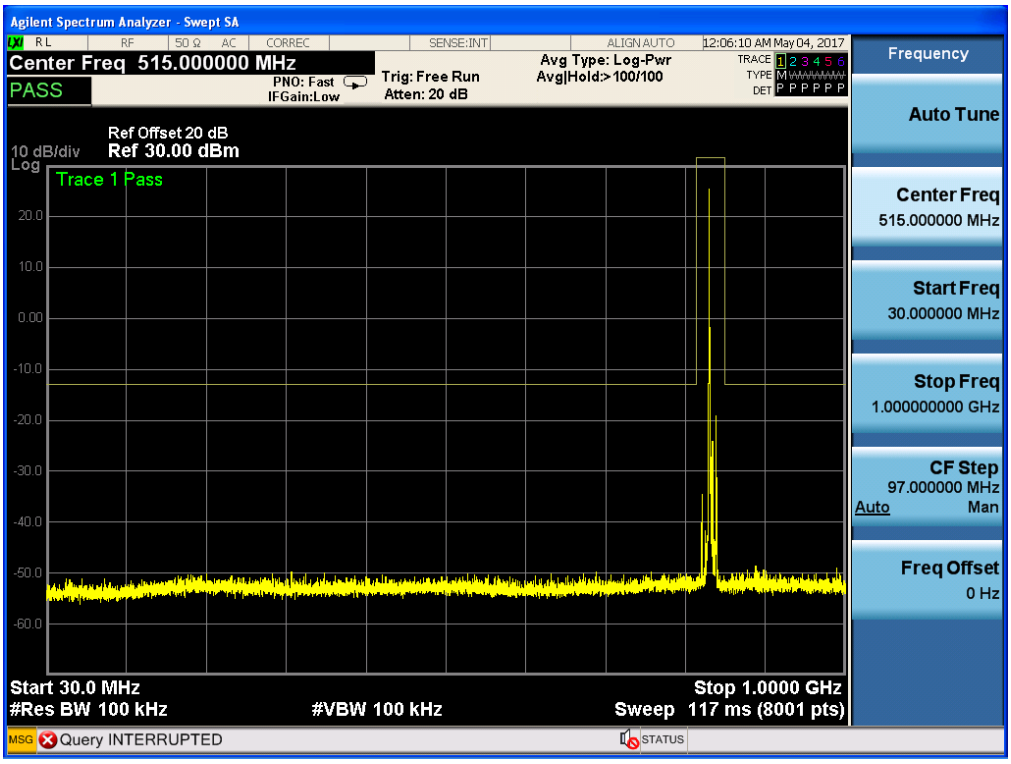
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



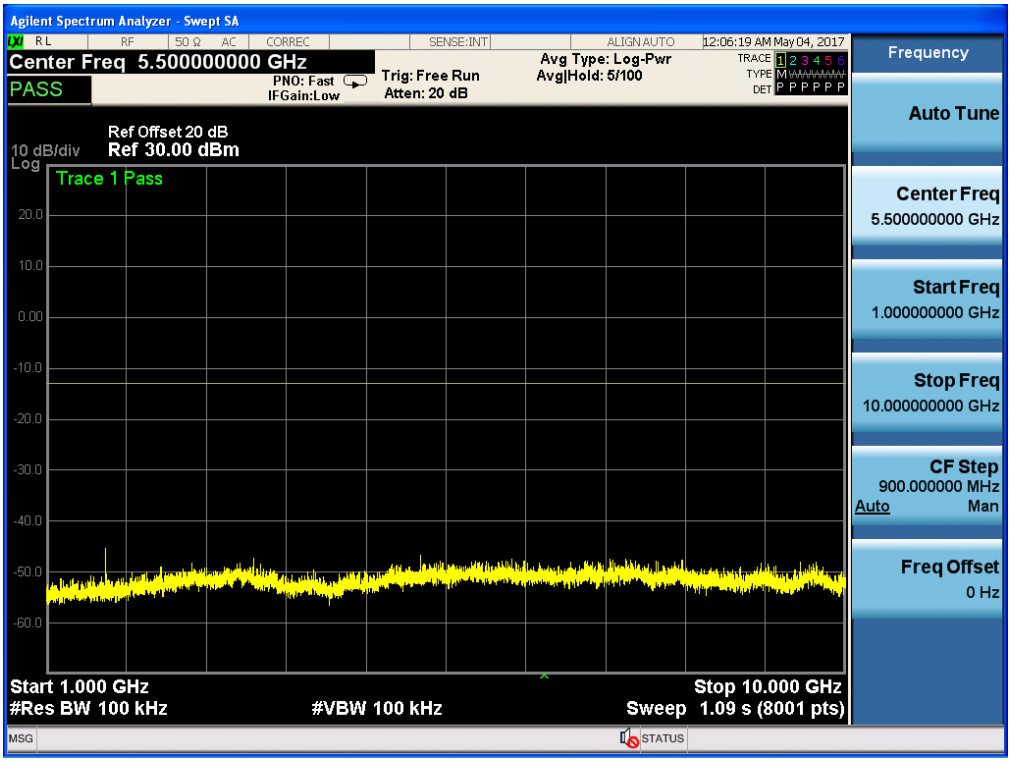
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



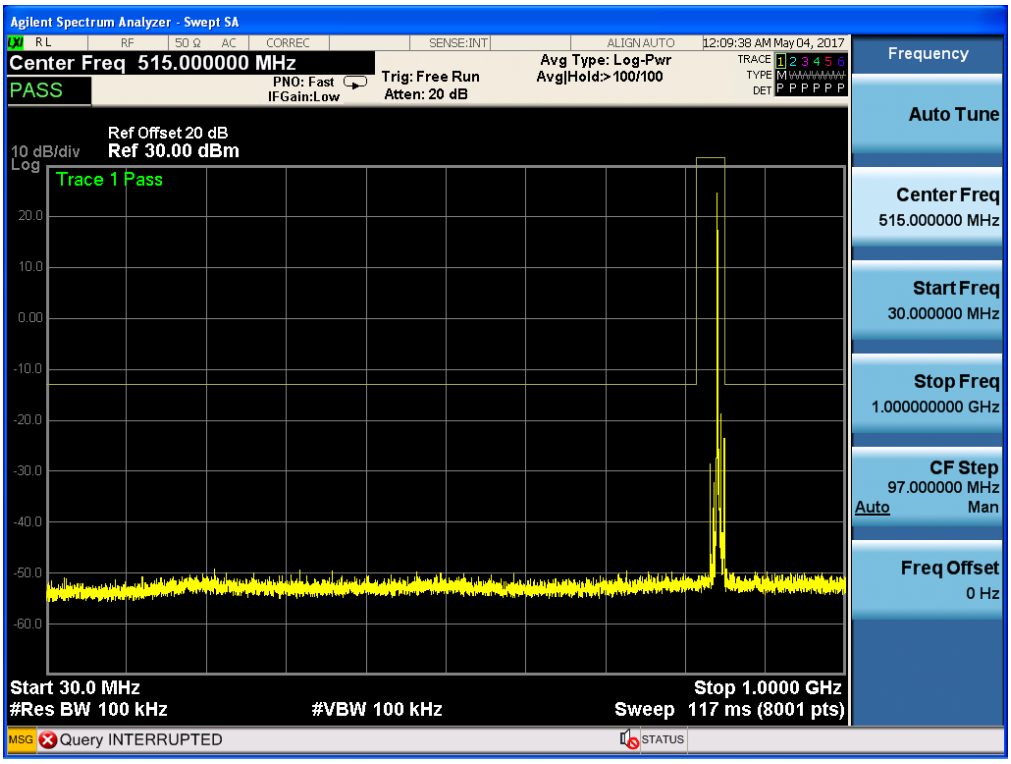
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



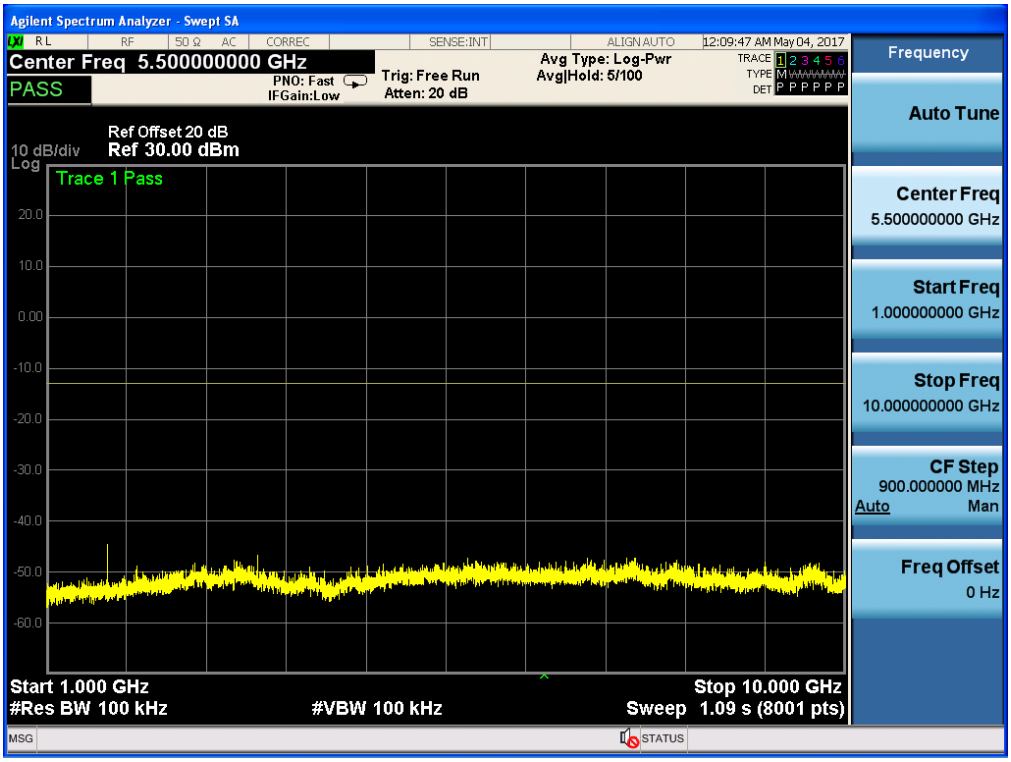
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



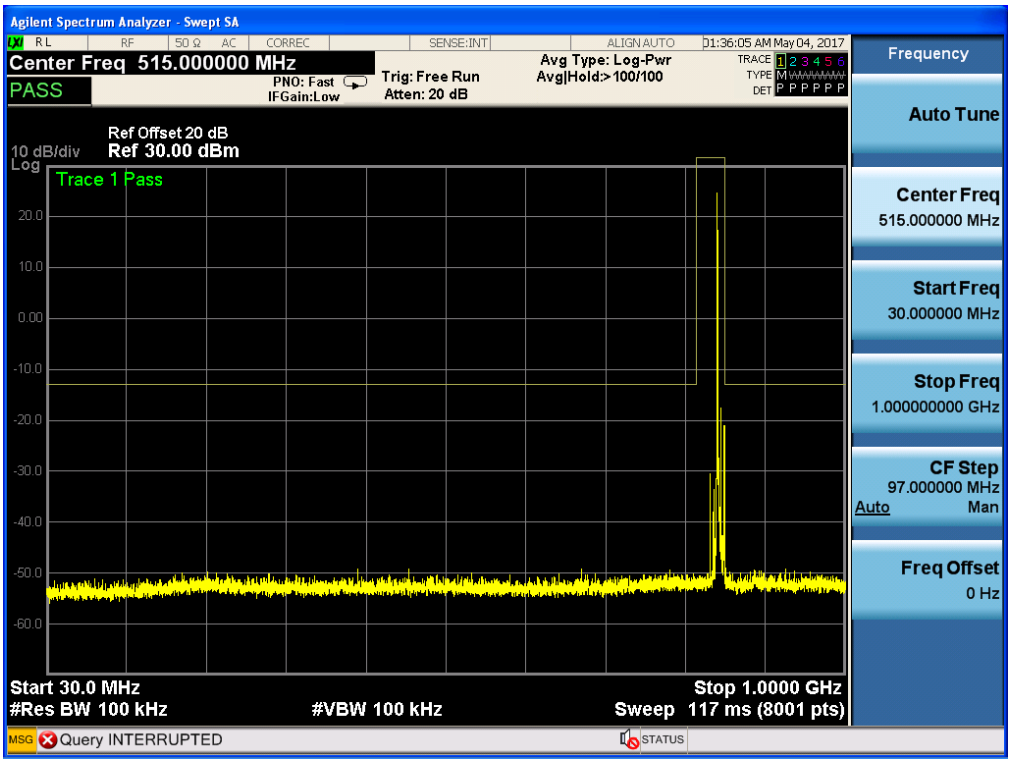
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



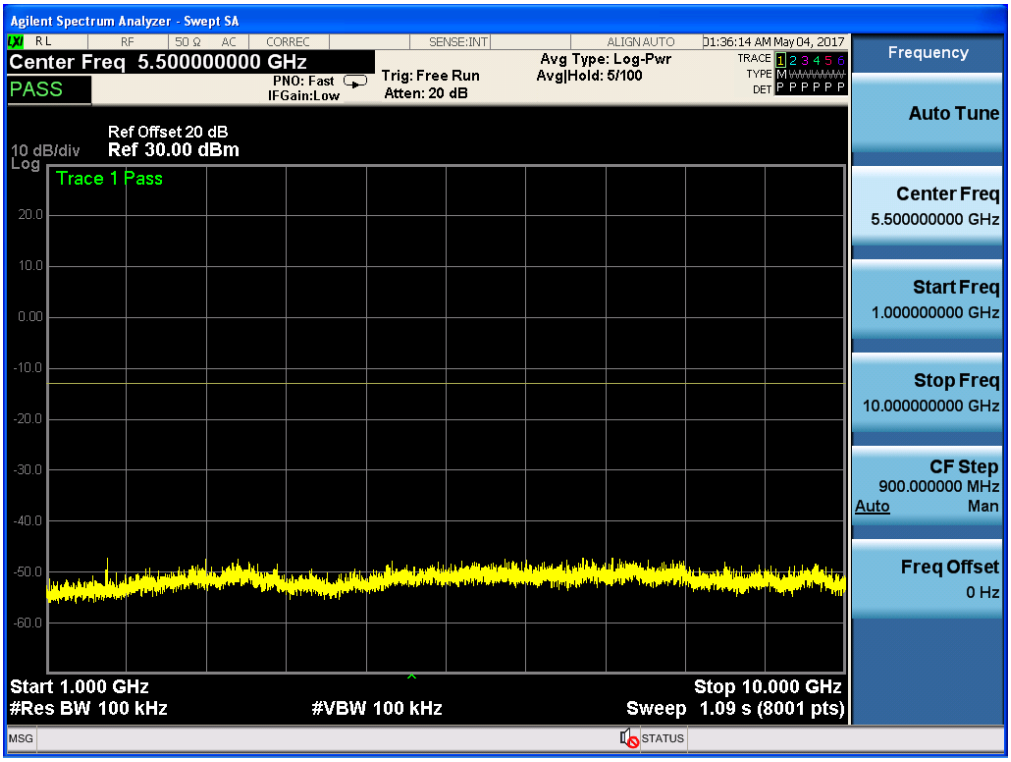
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



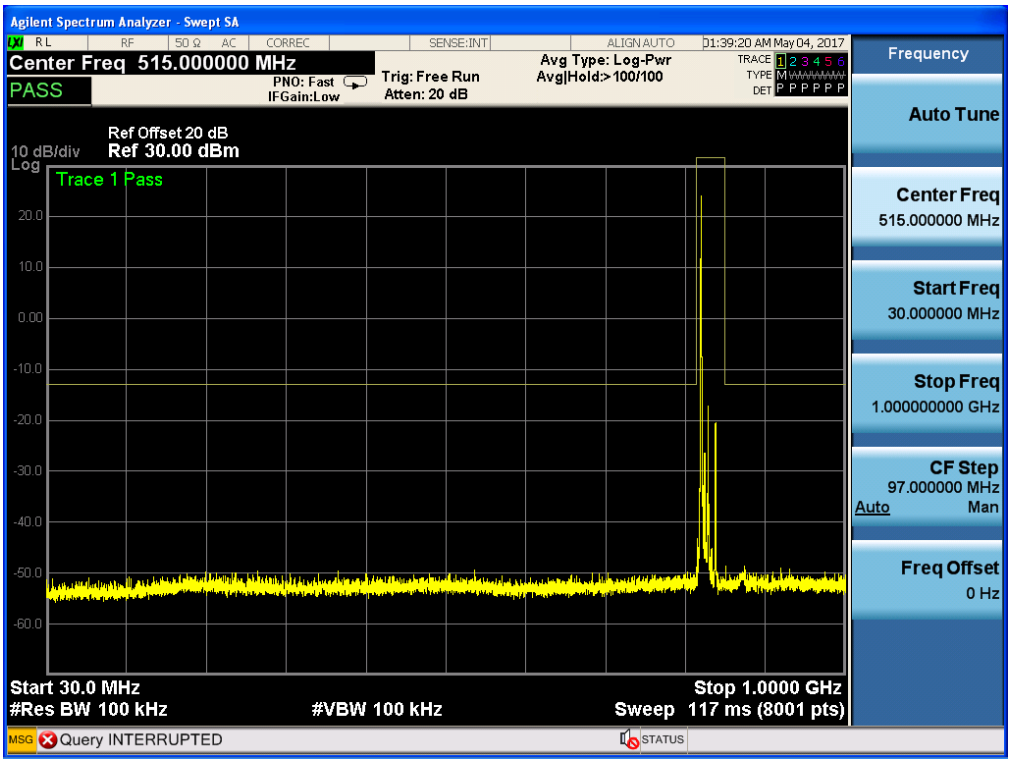
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



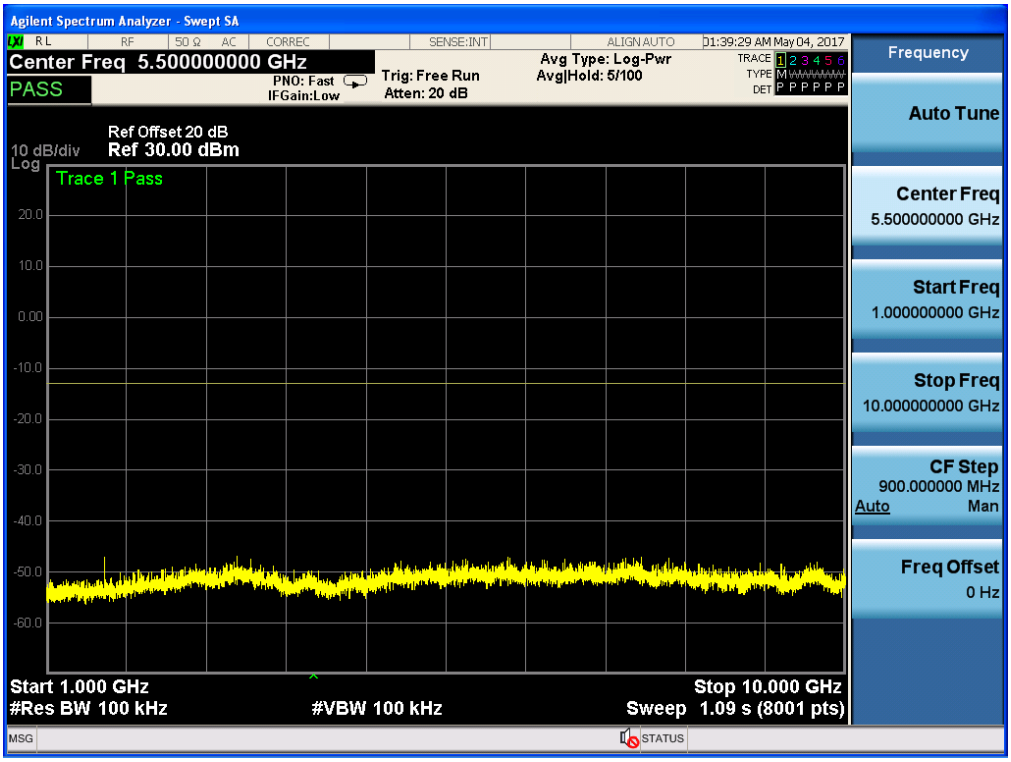
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



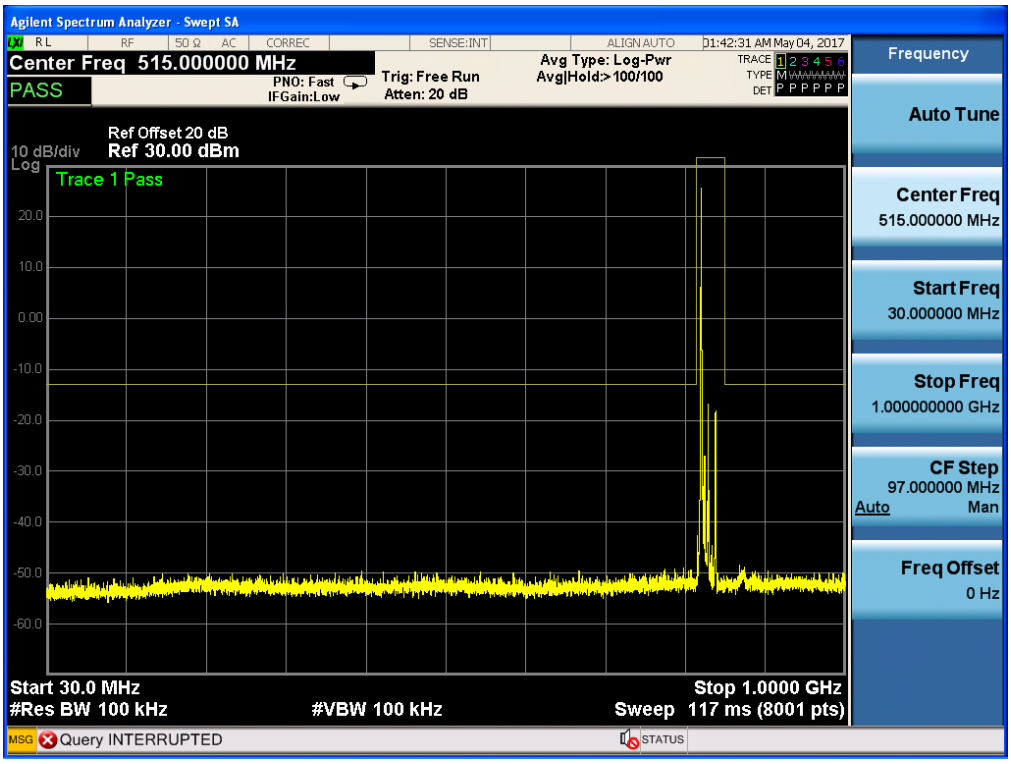
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



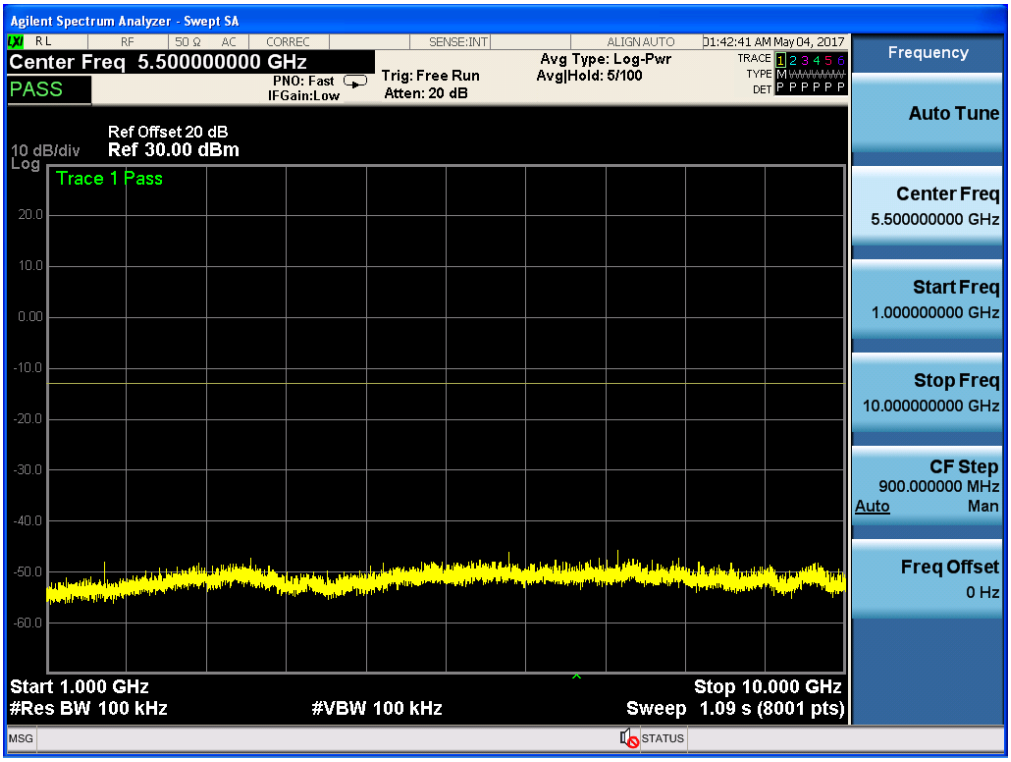
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



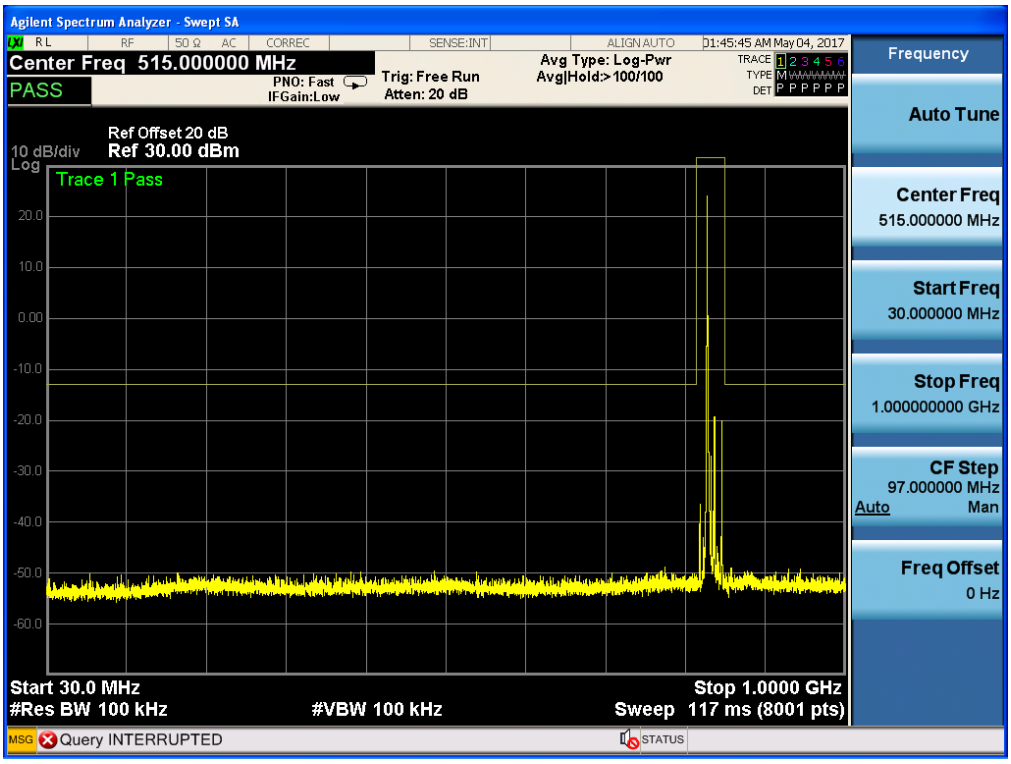
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



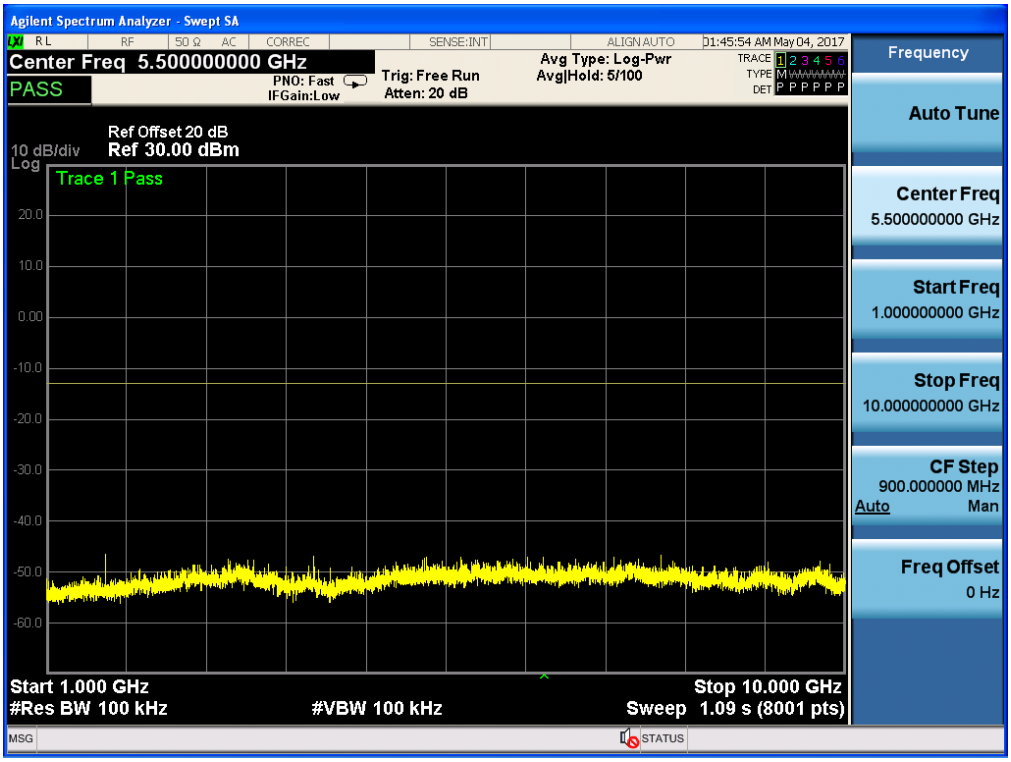
Band 5,UL Channel 20450,UL Frequency 829.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



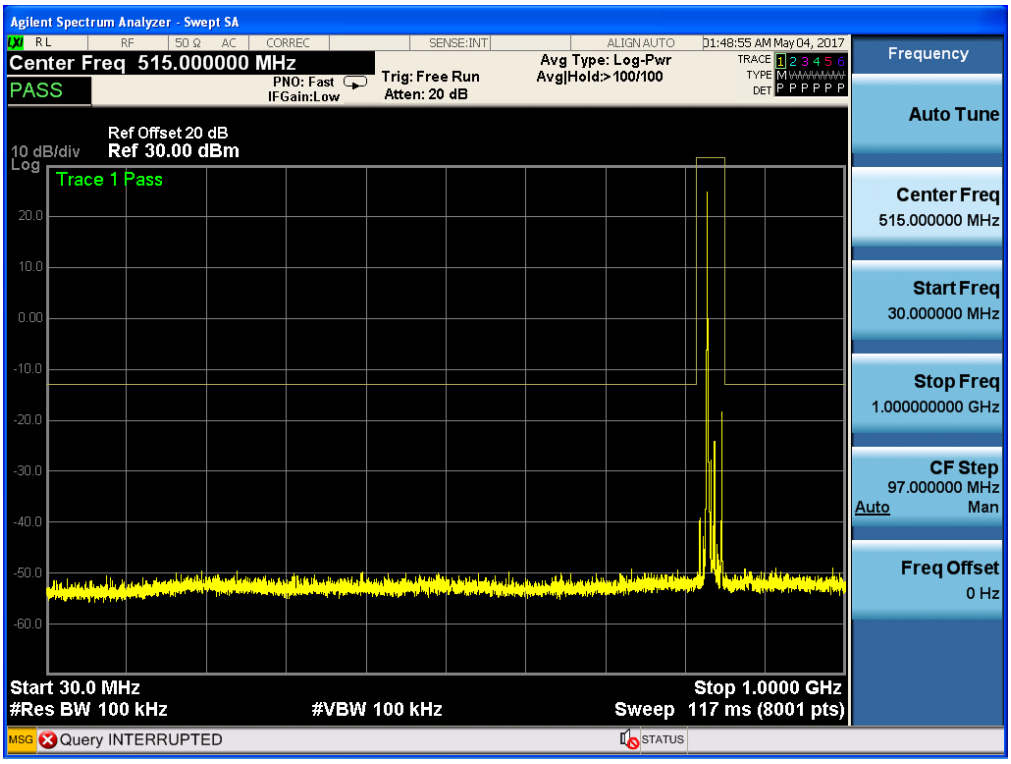
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



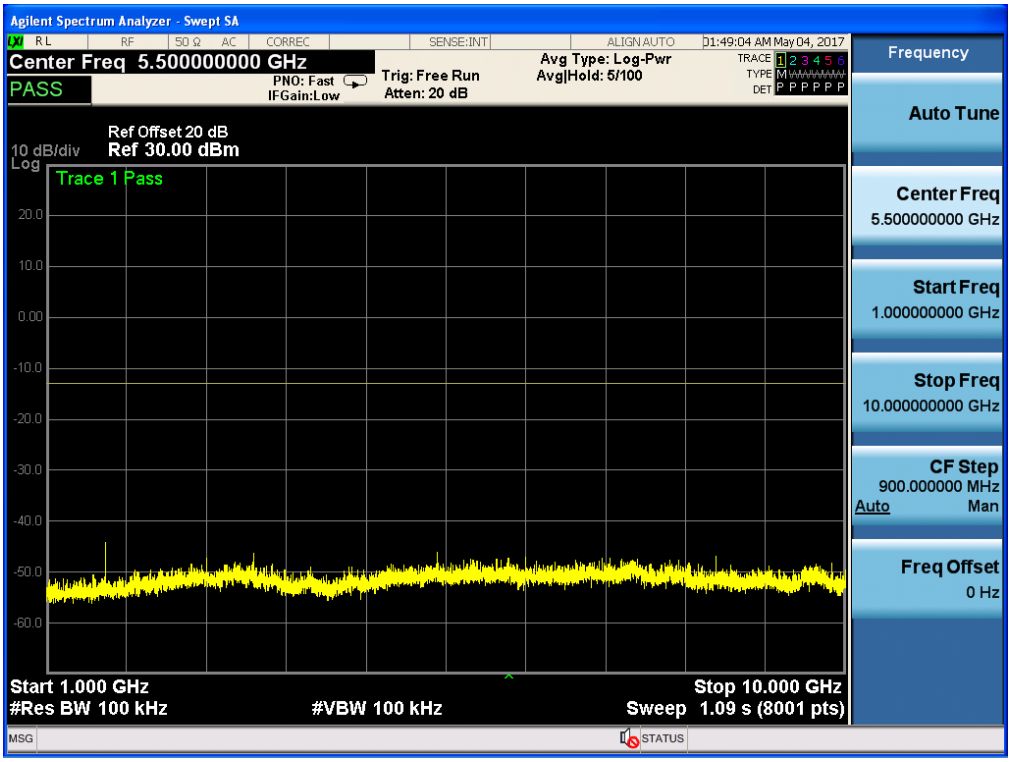
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



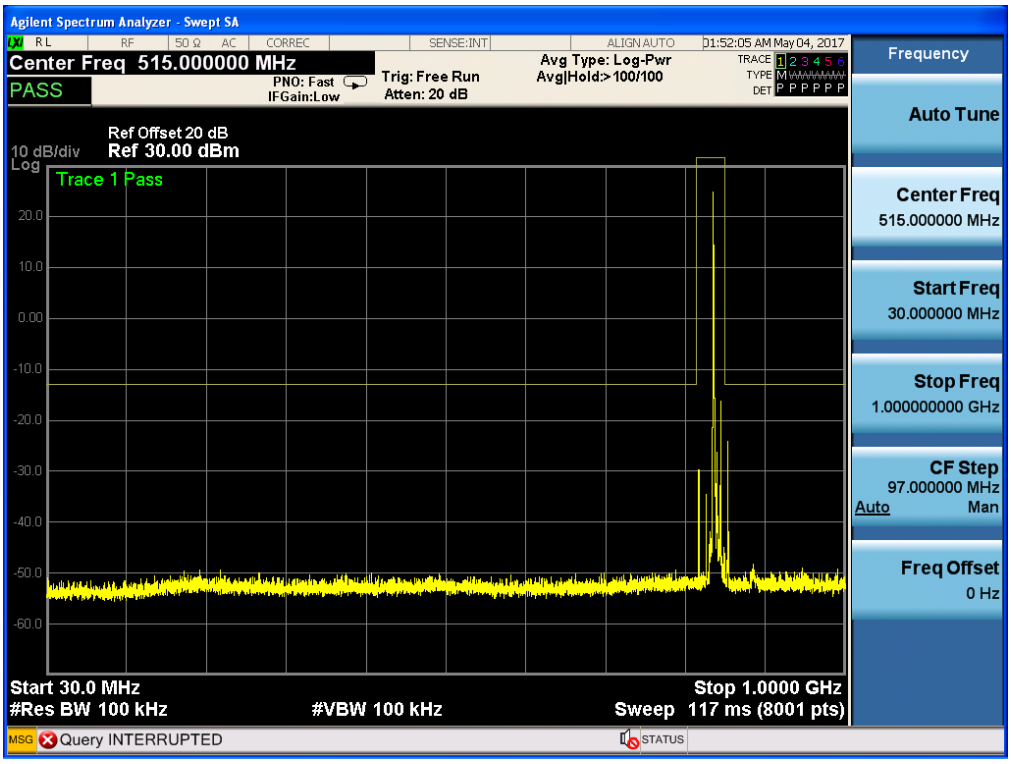
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



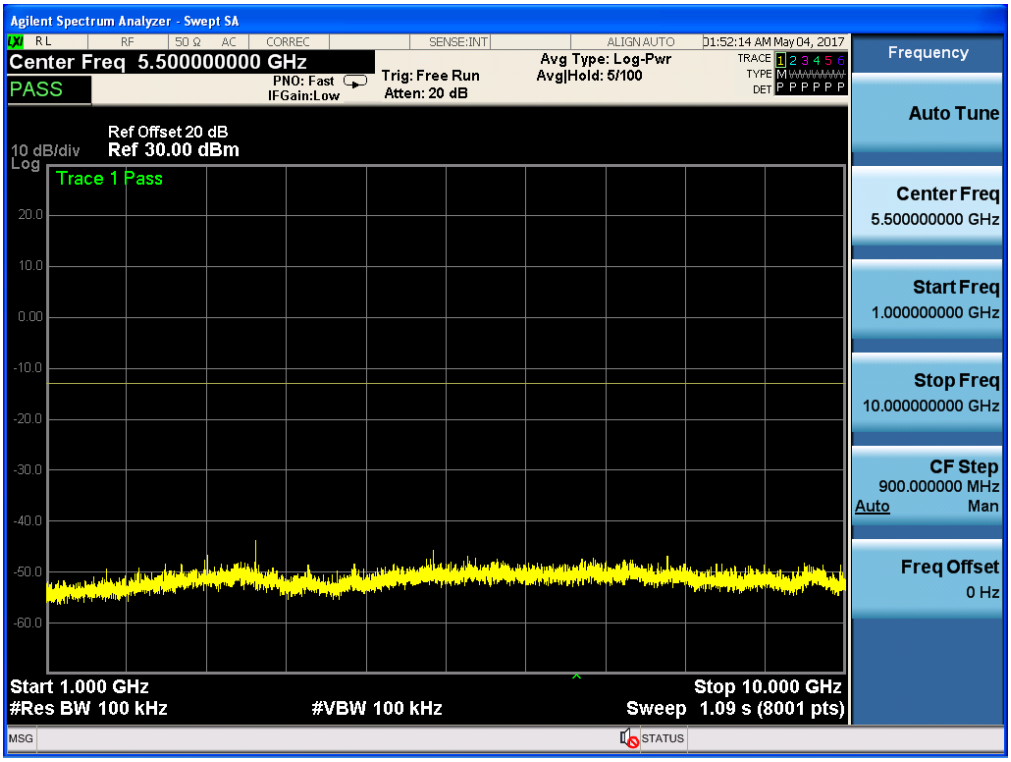
Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



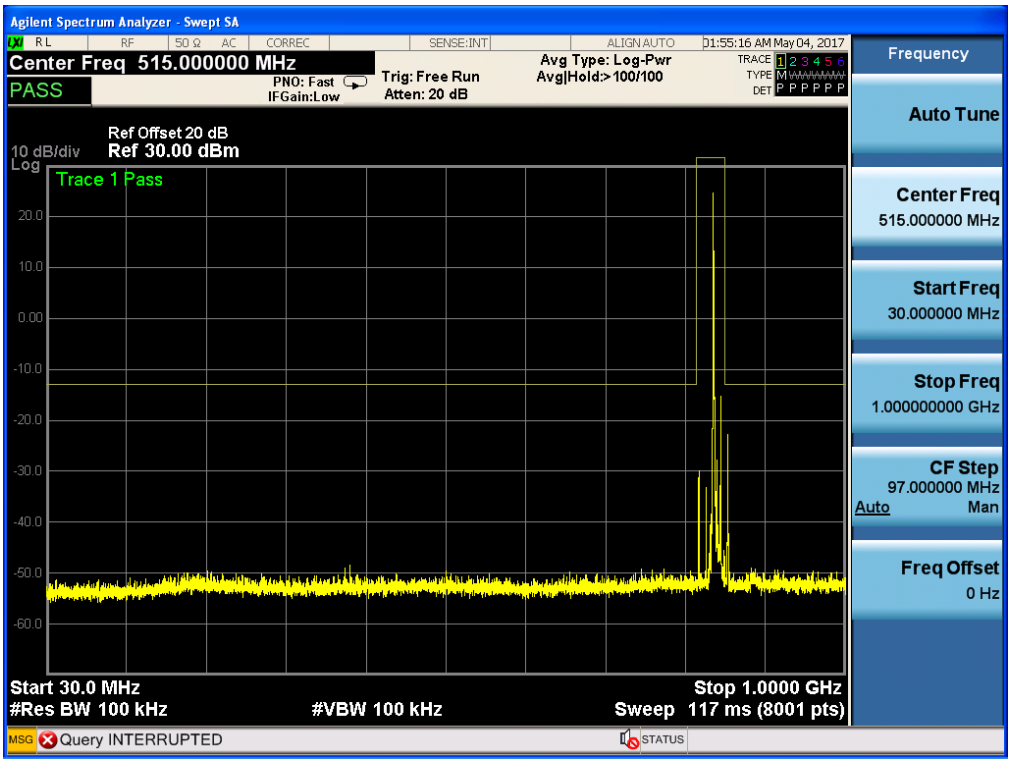
Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



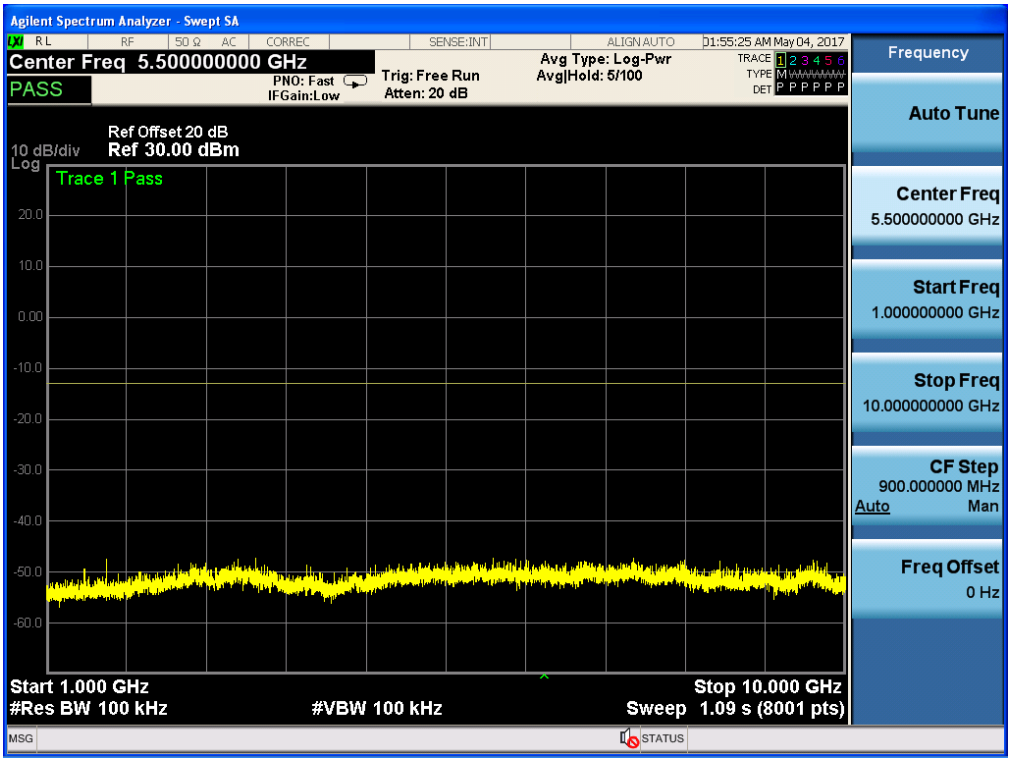
Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



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

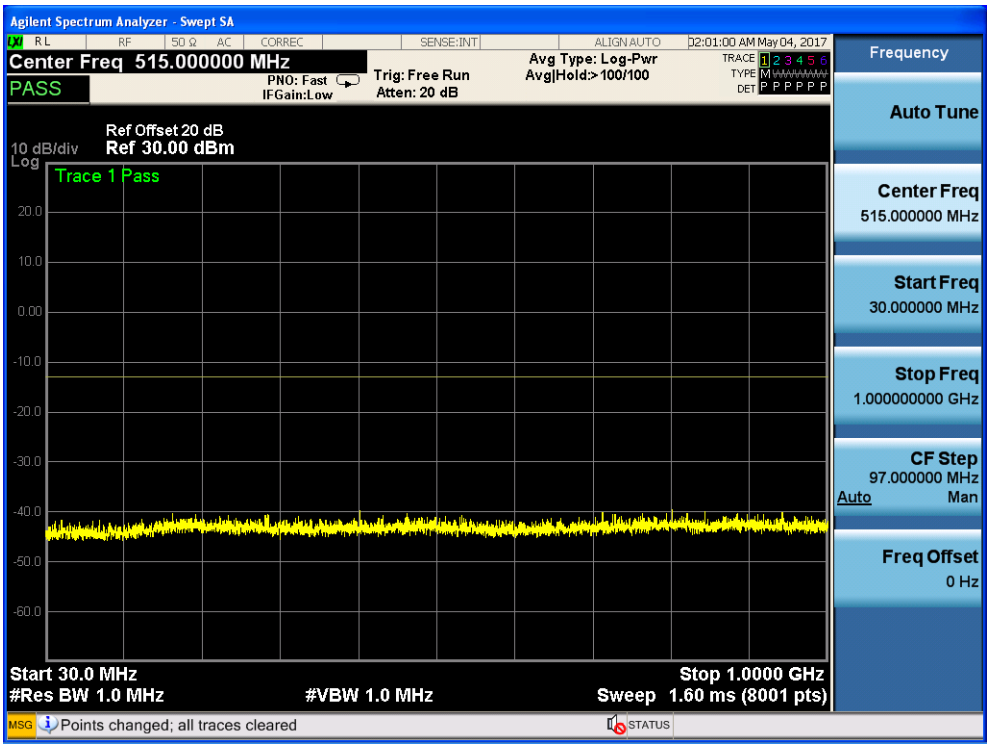


Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

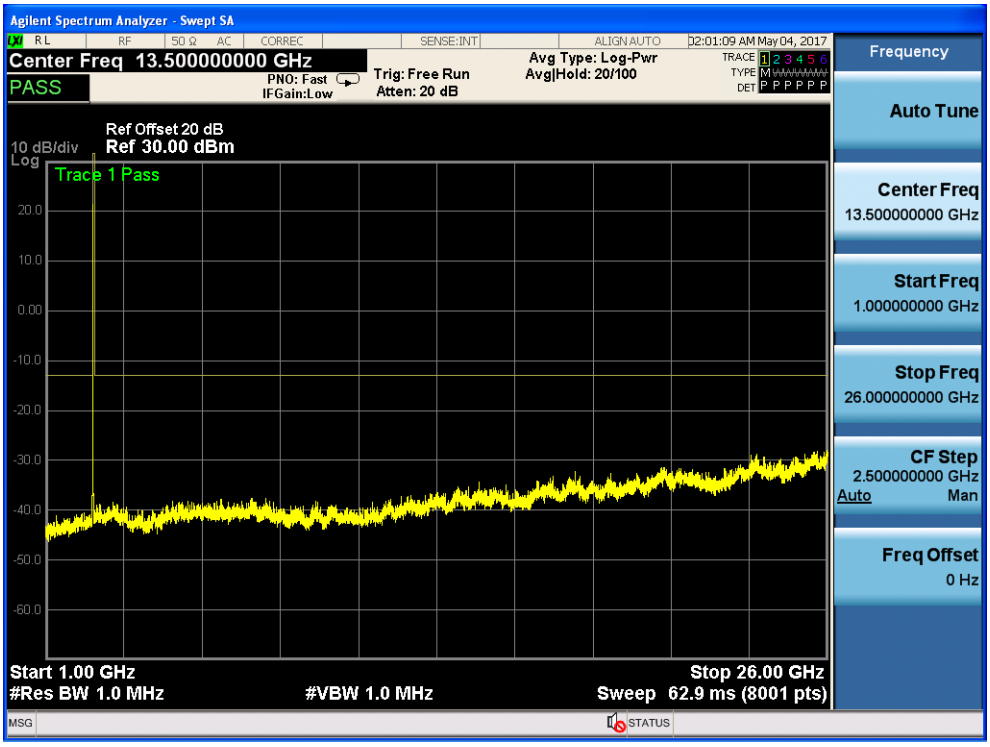


7.1.4 LTE BAND 7

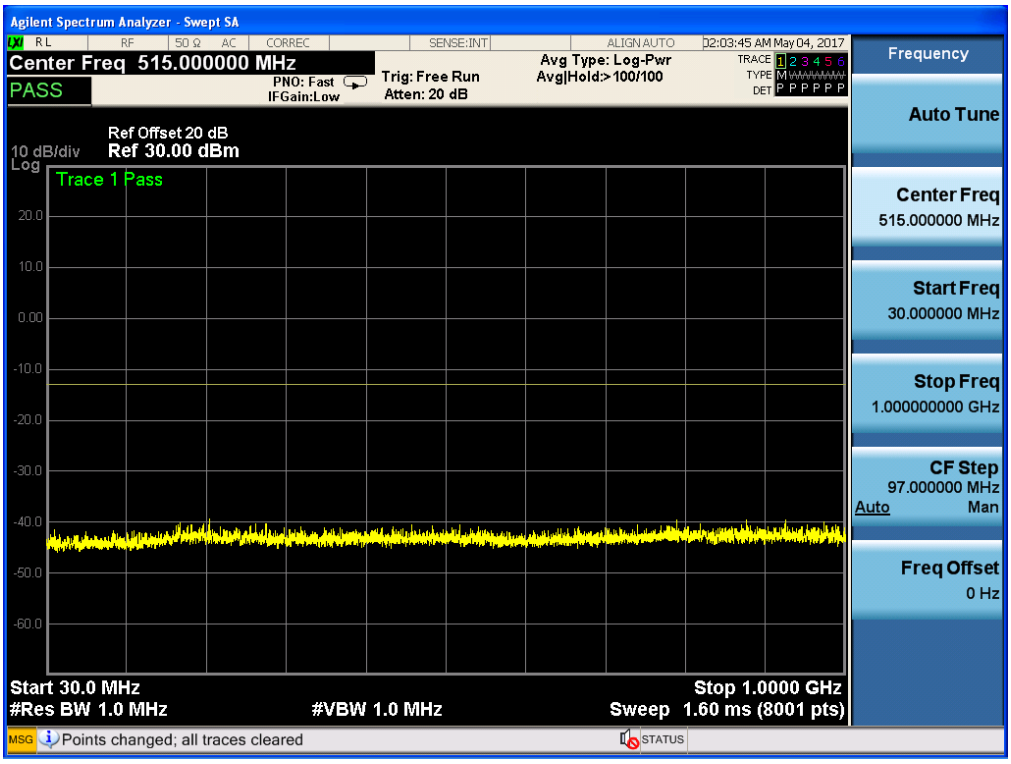
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



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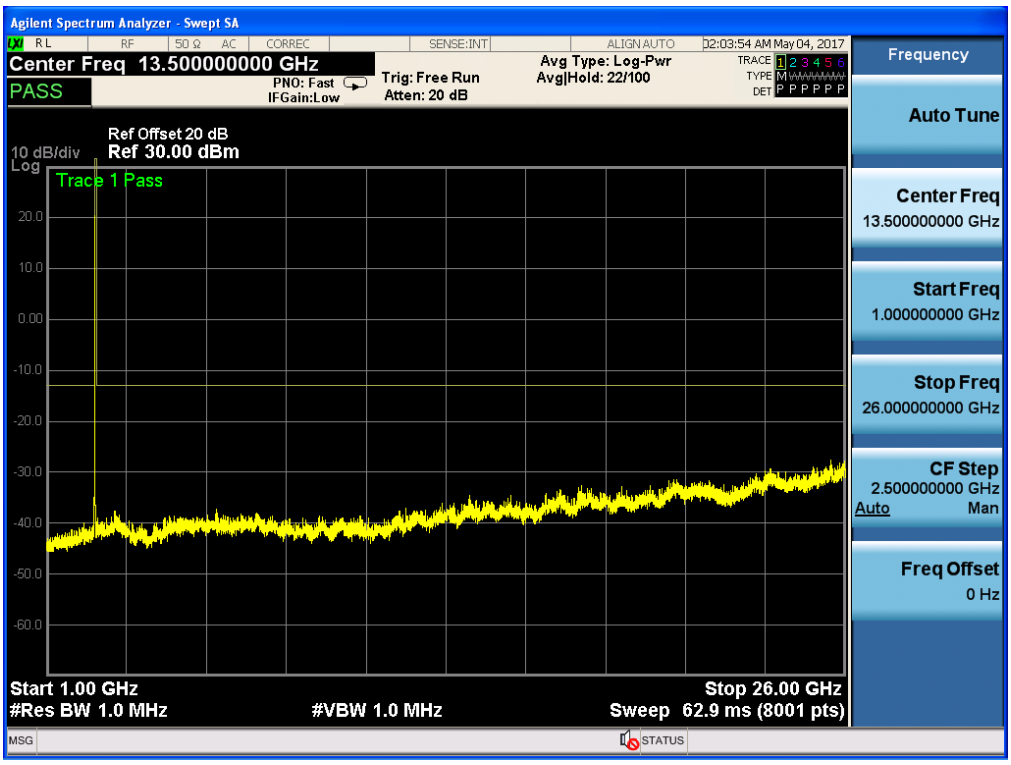
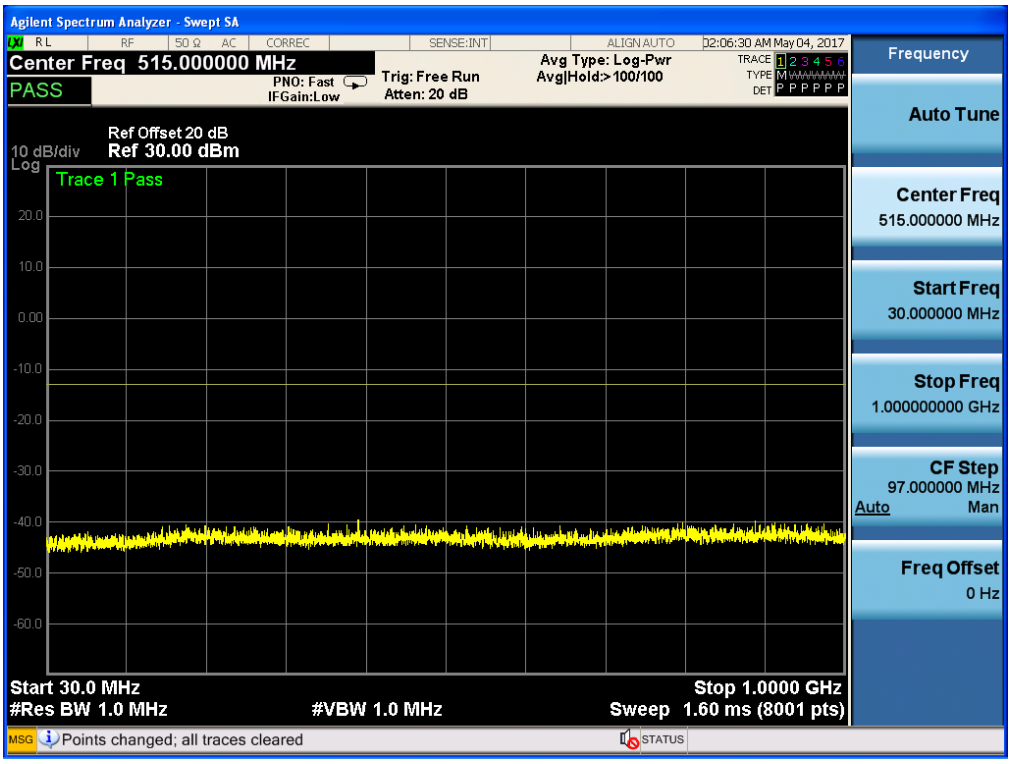
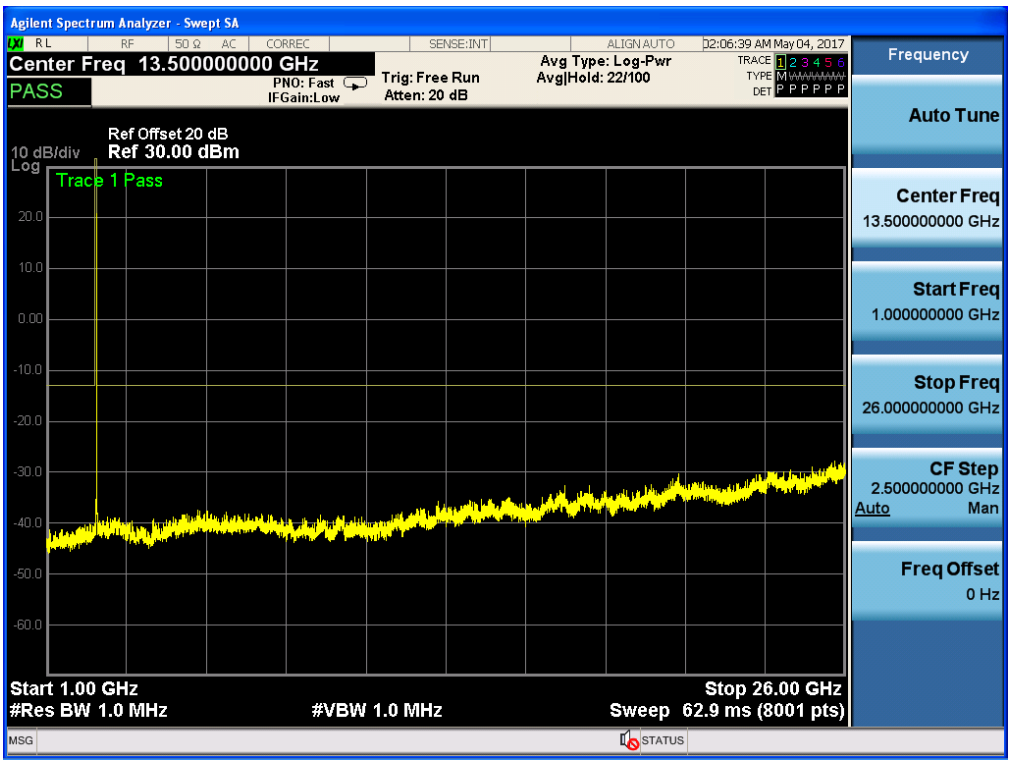


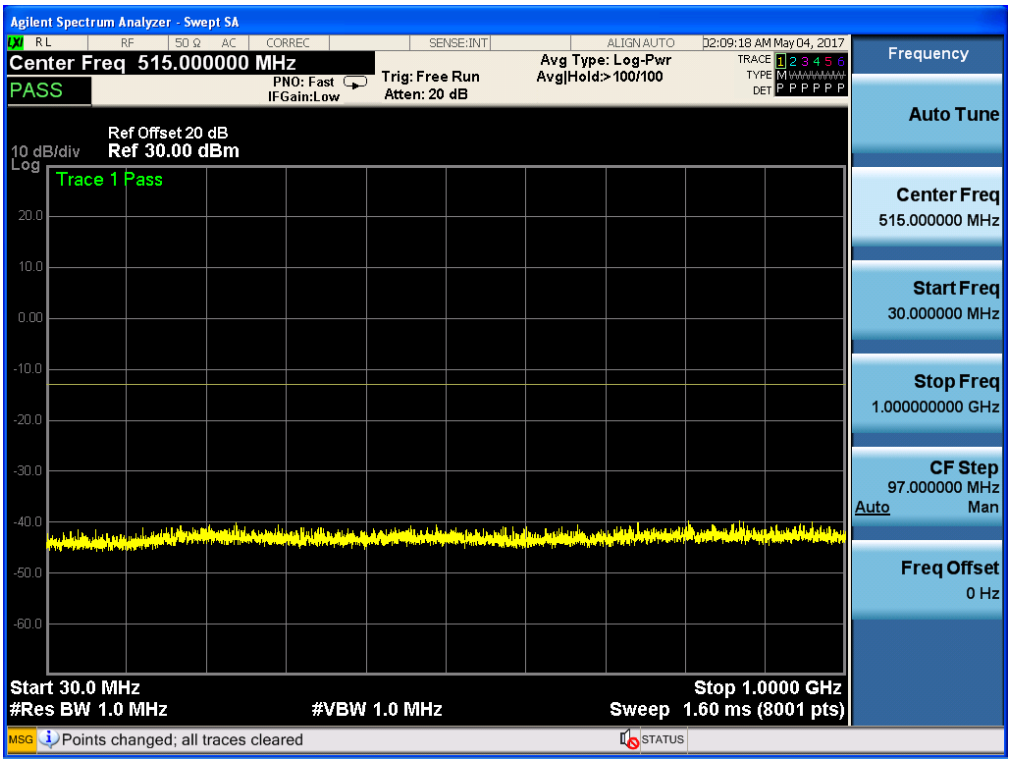
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



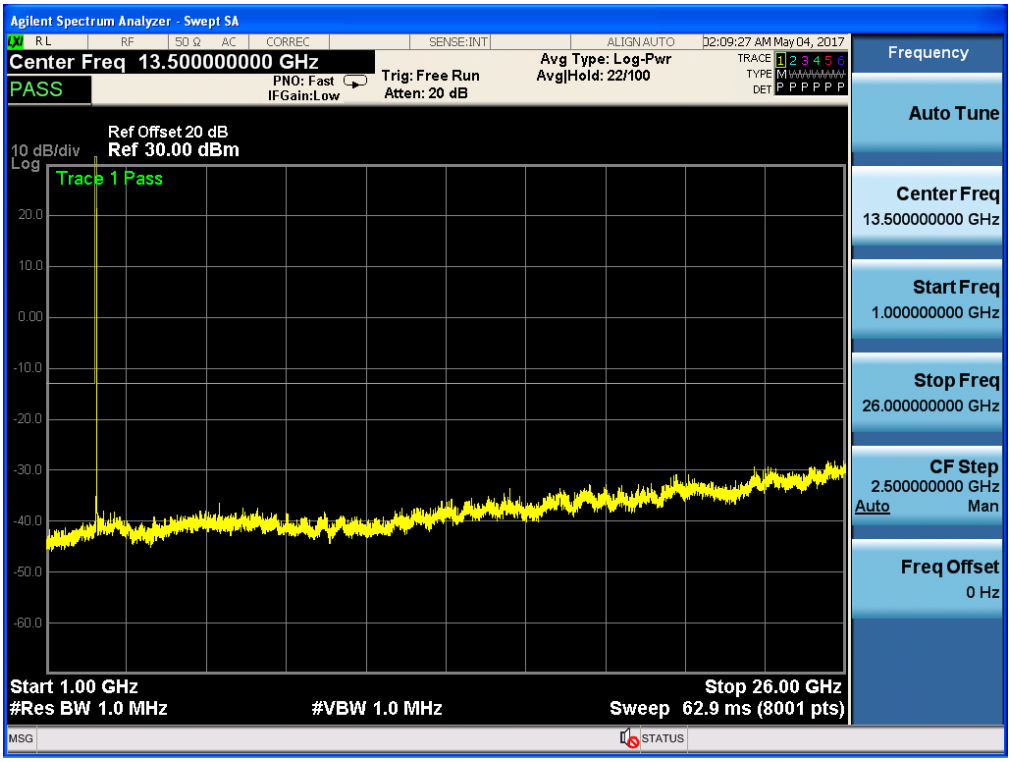
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



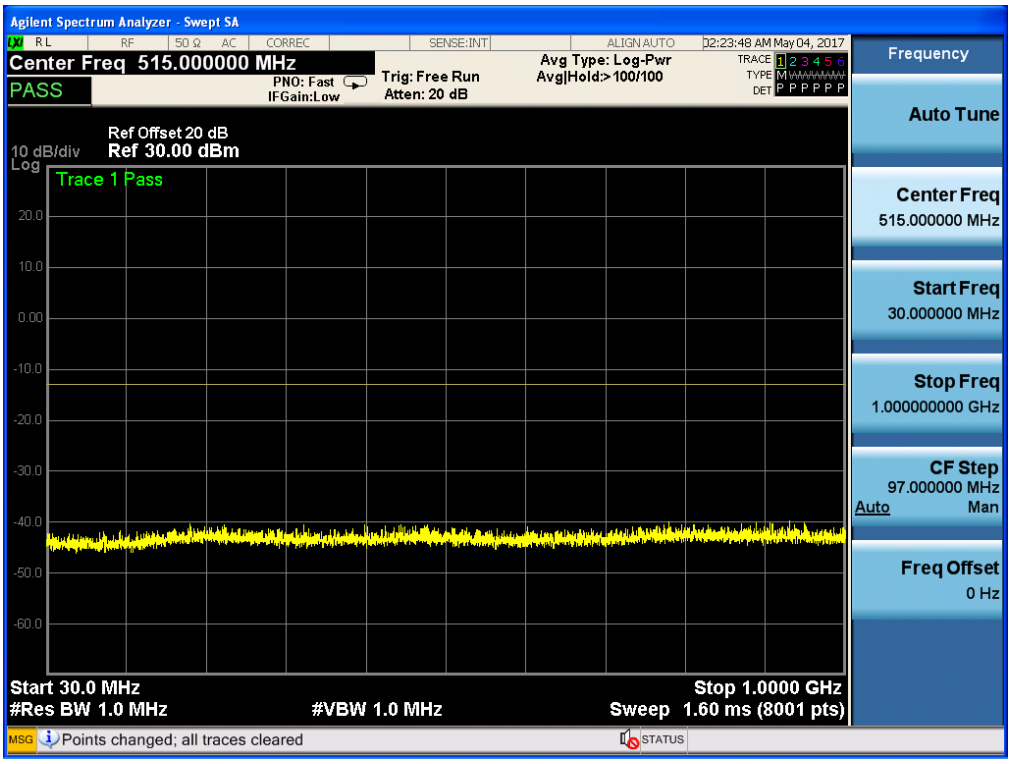
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



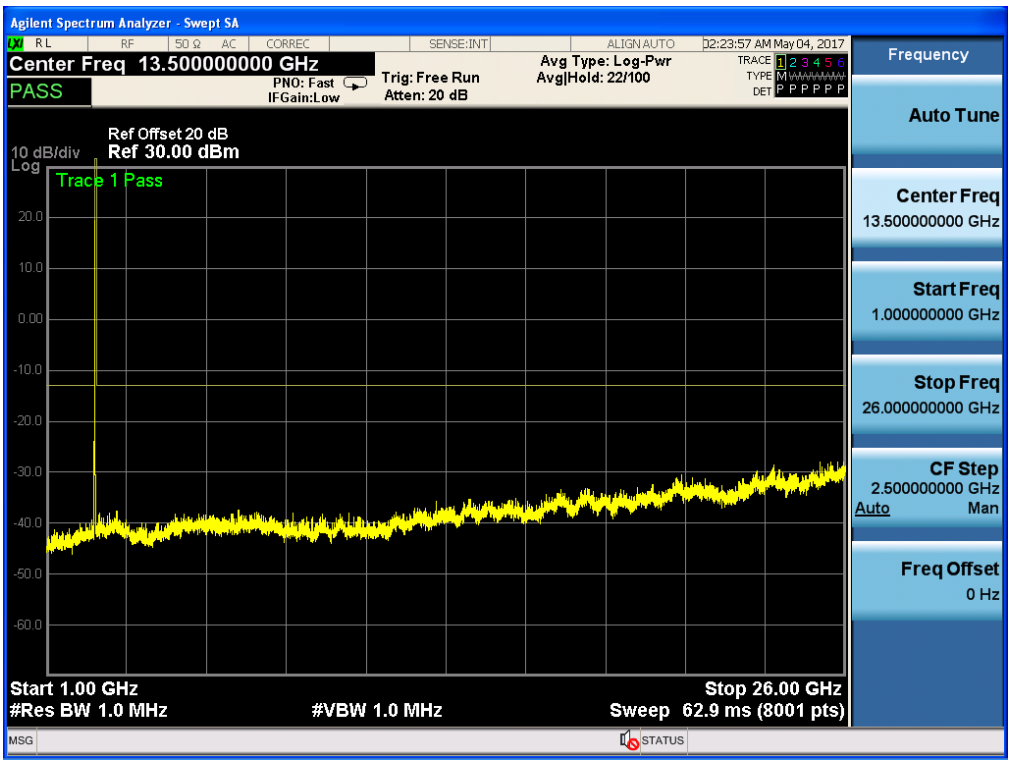
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



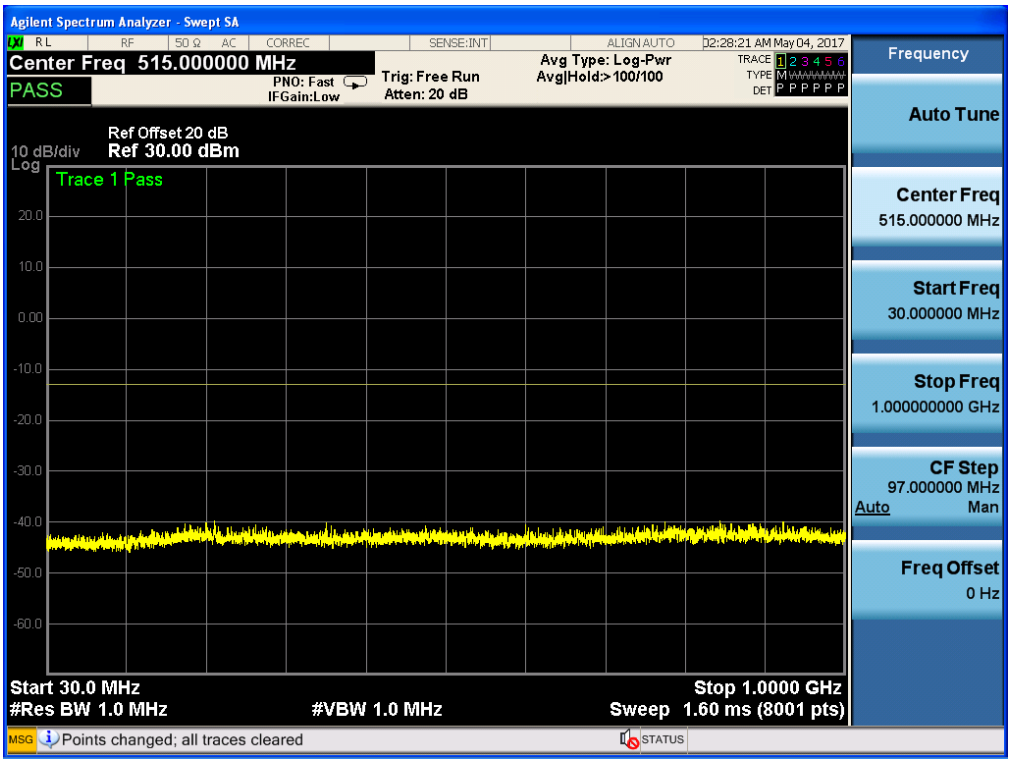
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



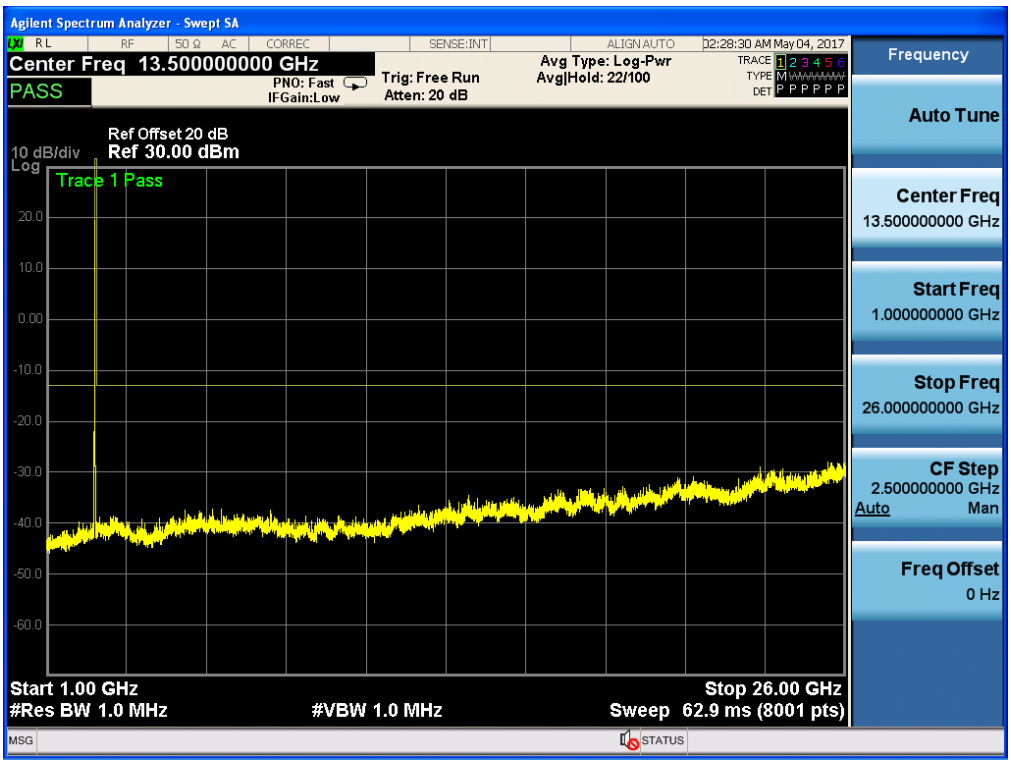
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



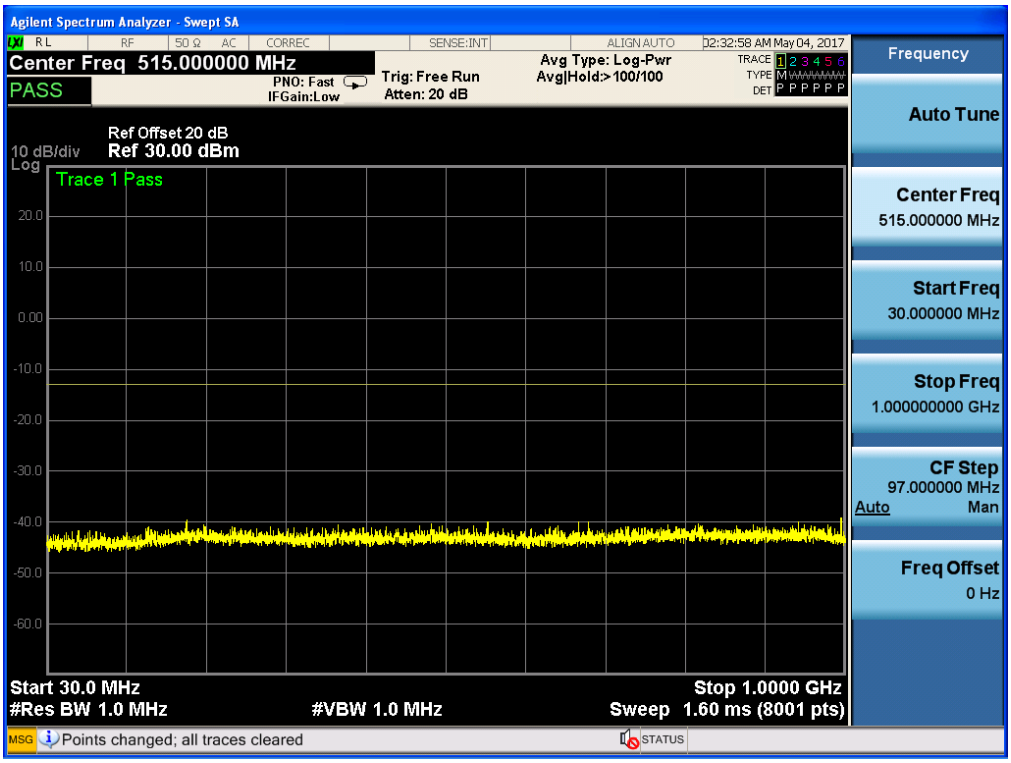
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



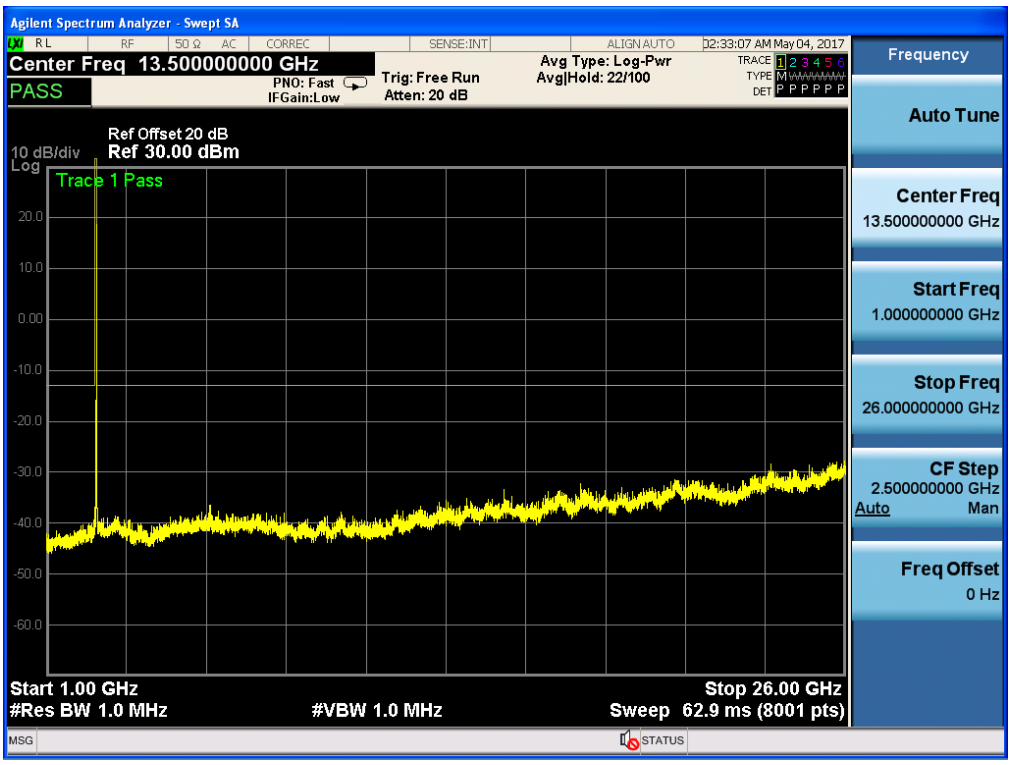
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



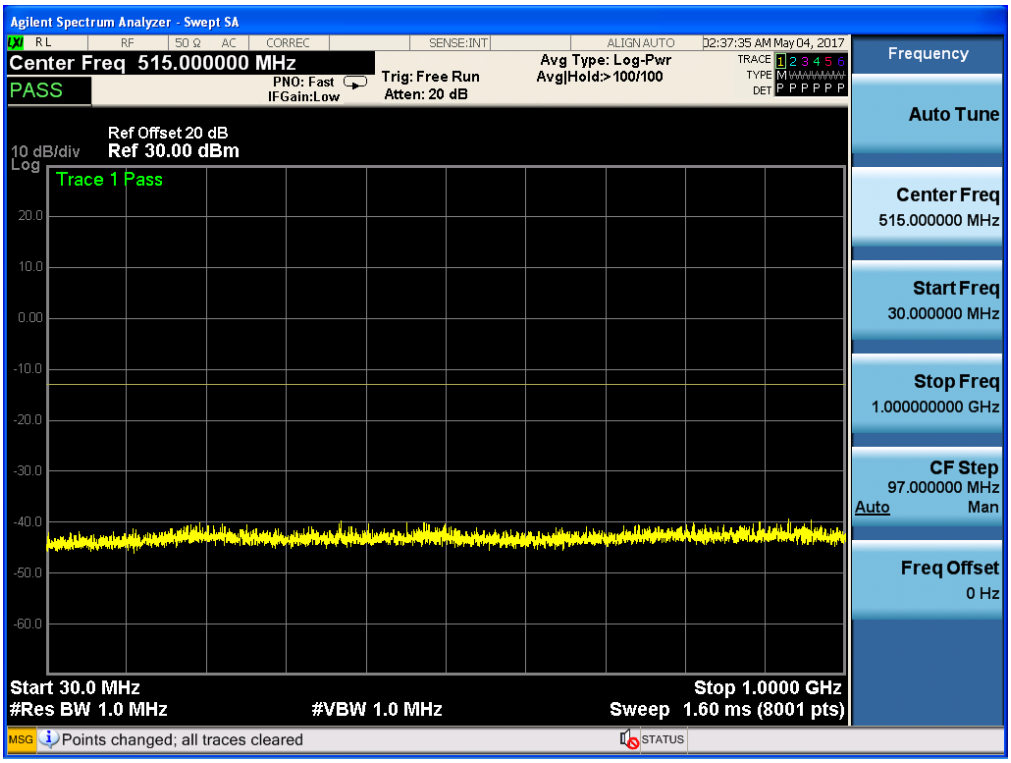
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



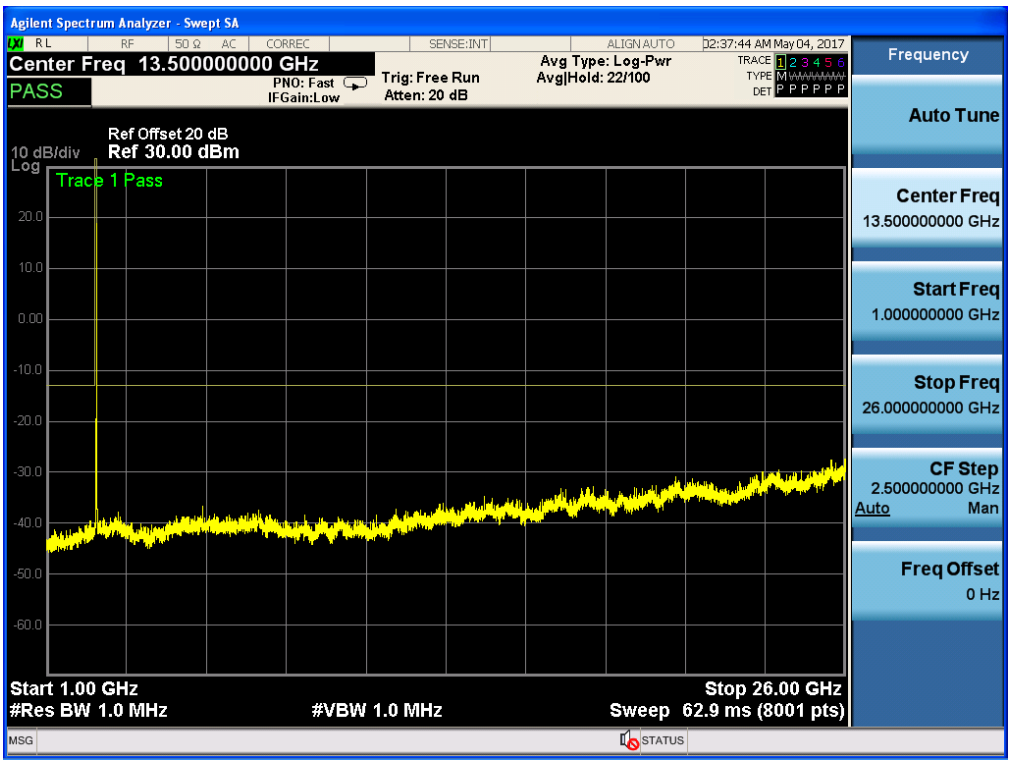
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



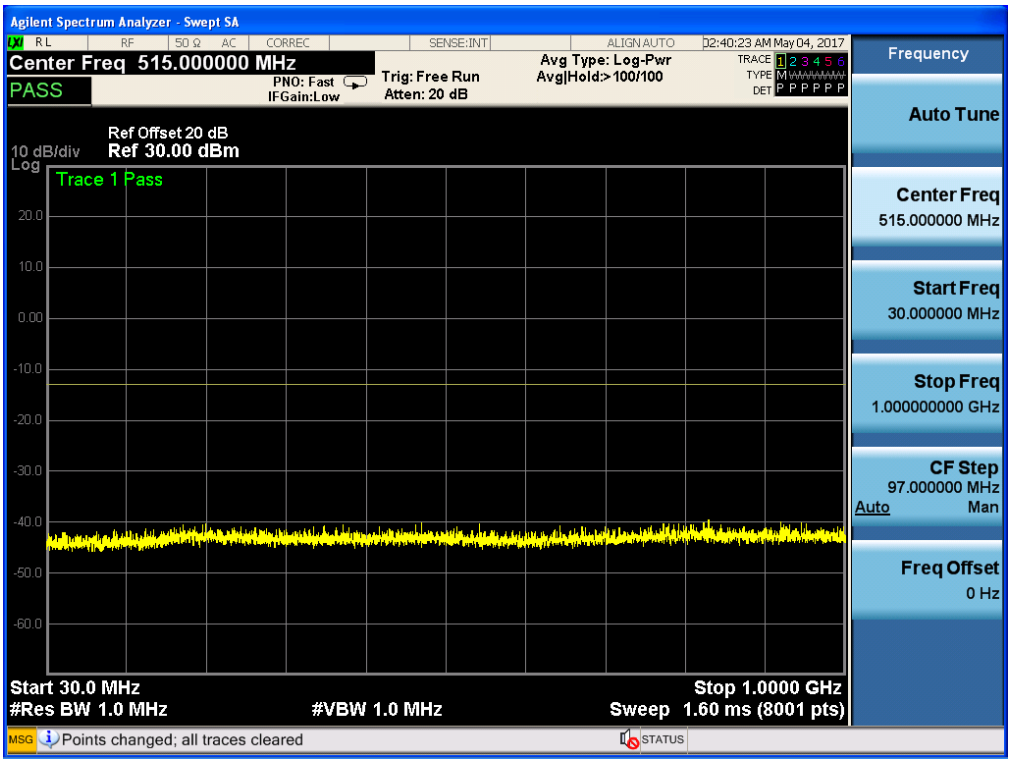
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



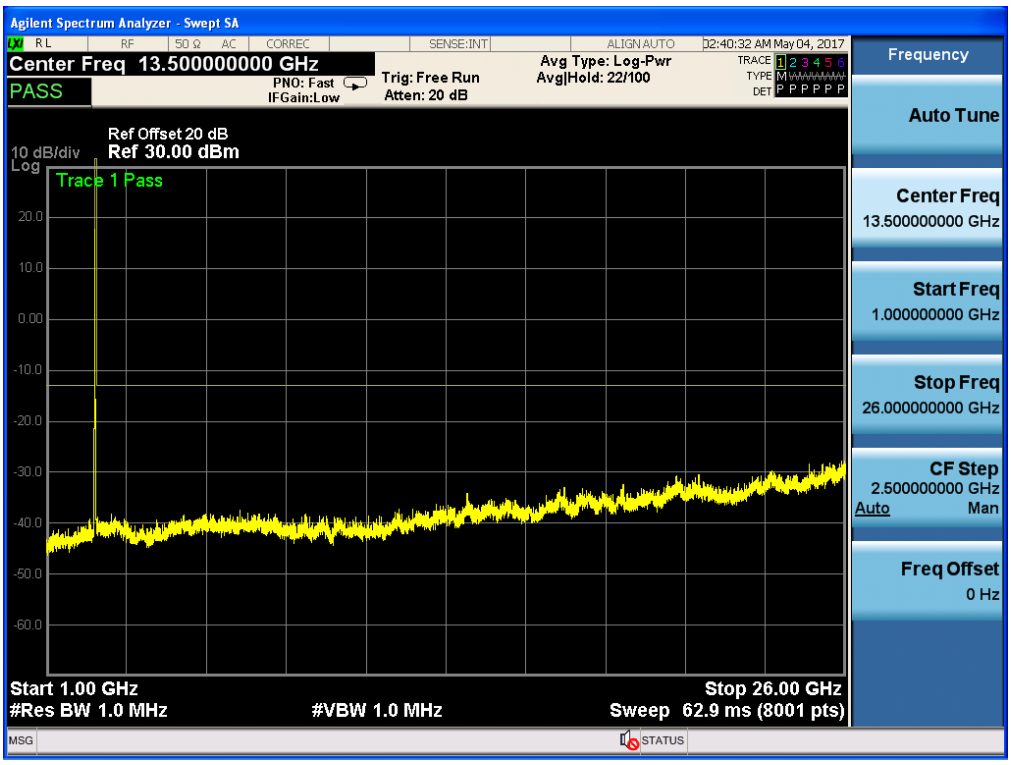
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



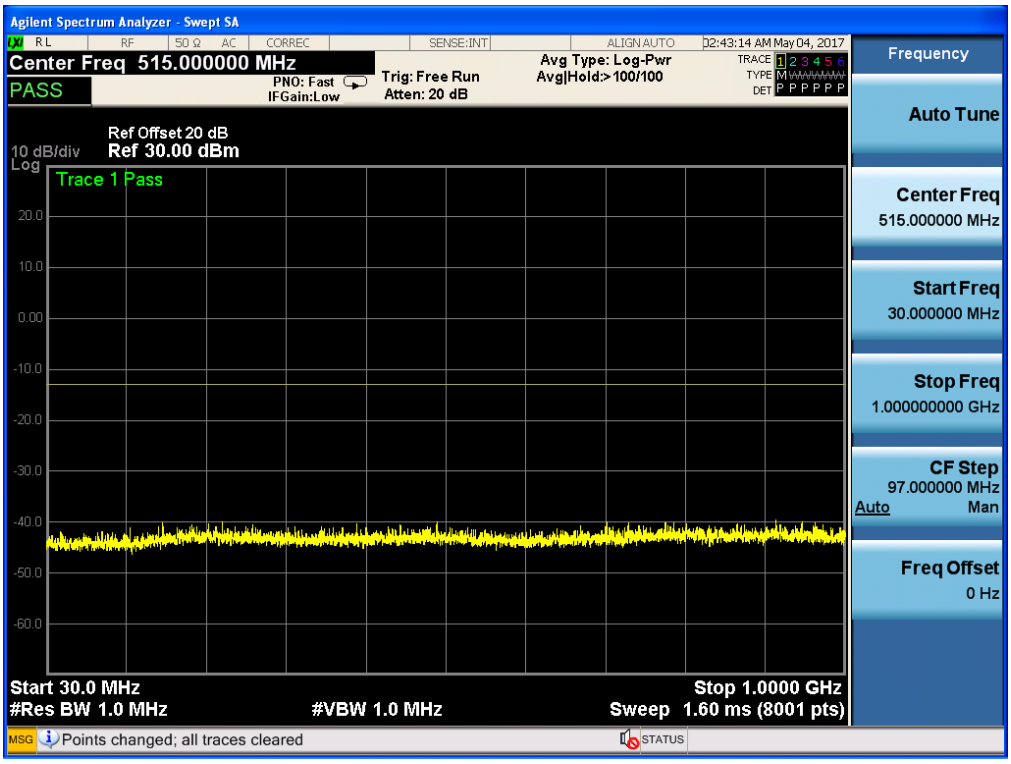
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



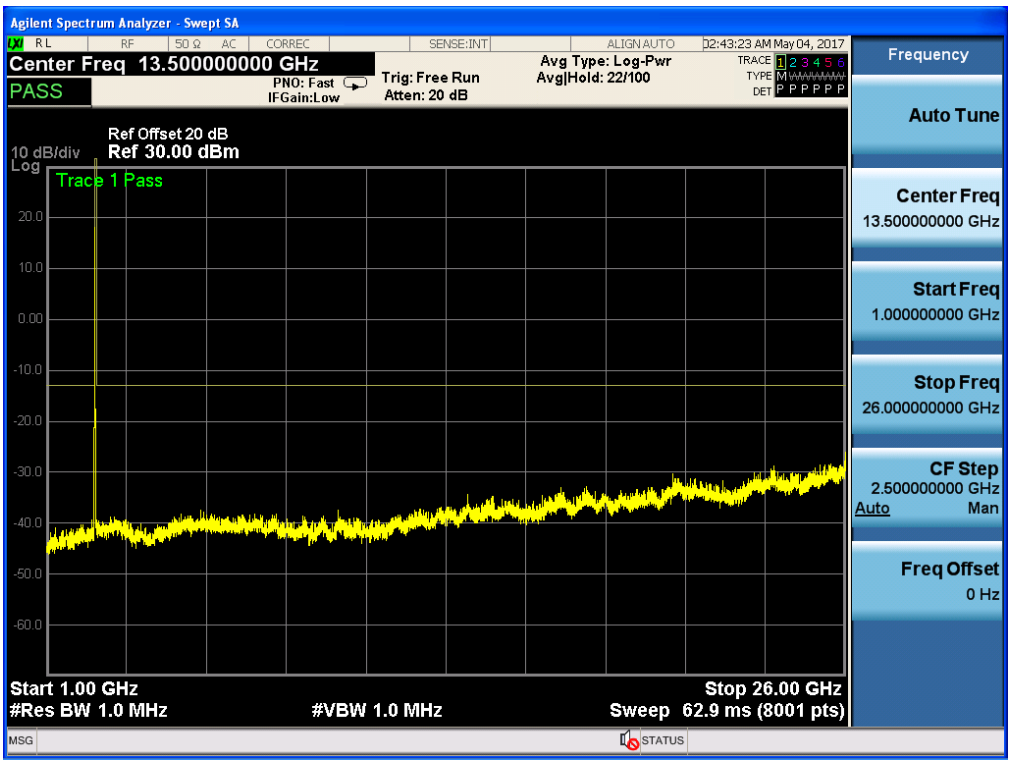
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



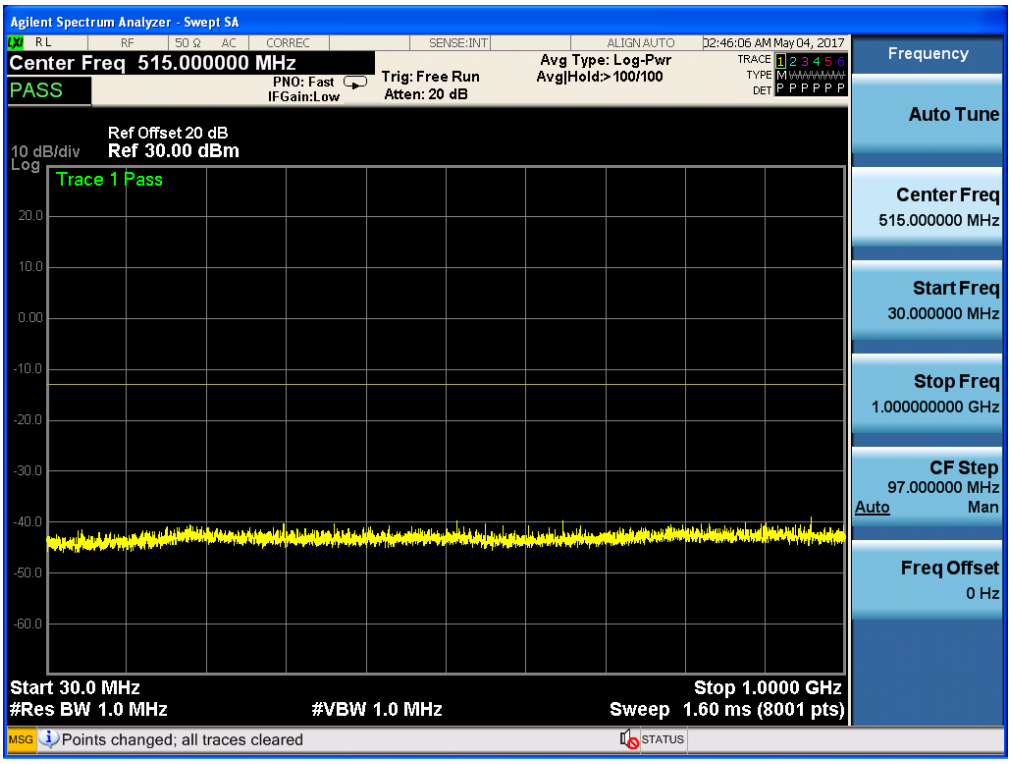
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



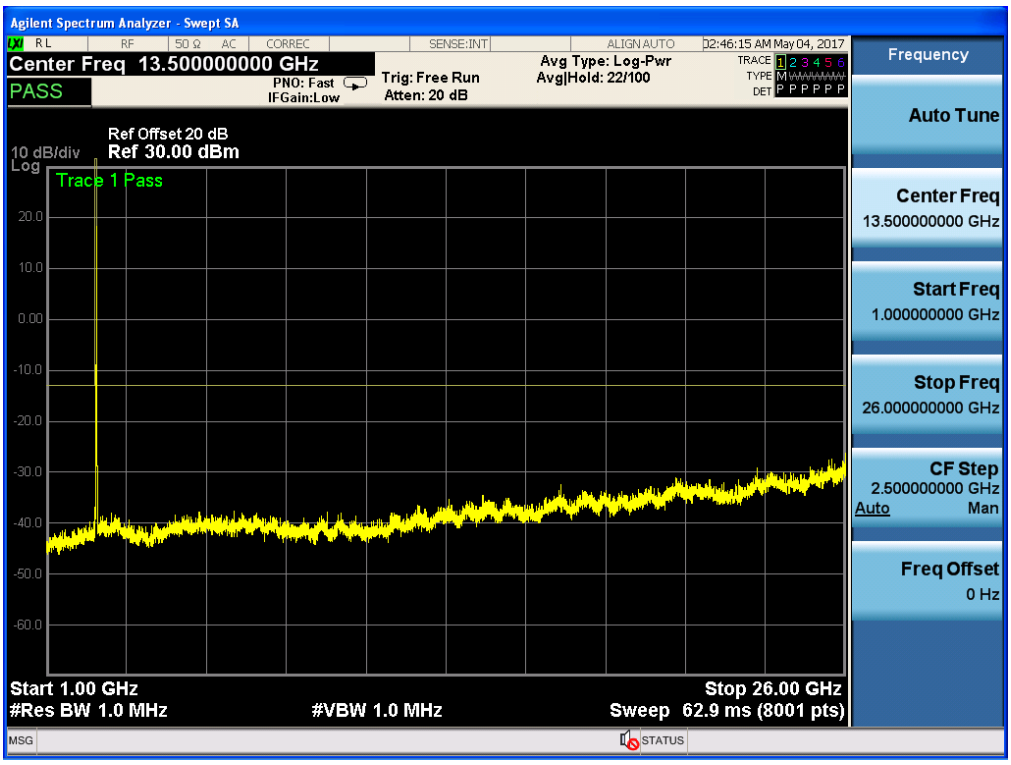
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



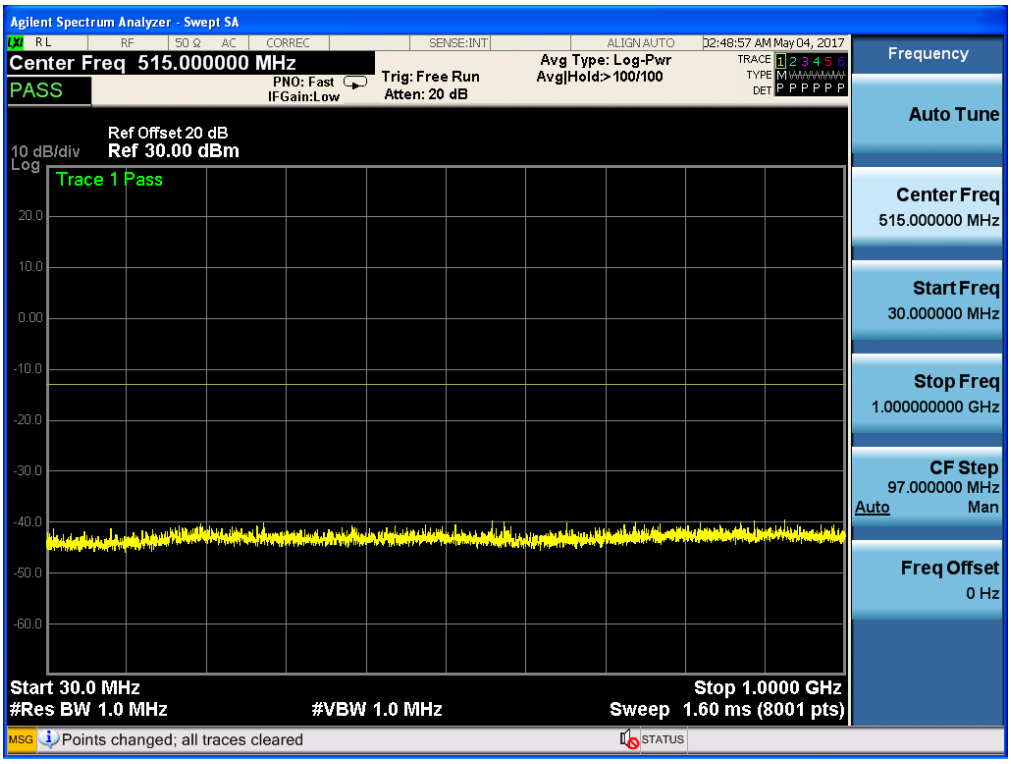
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



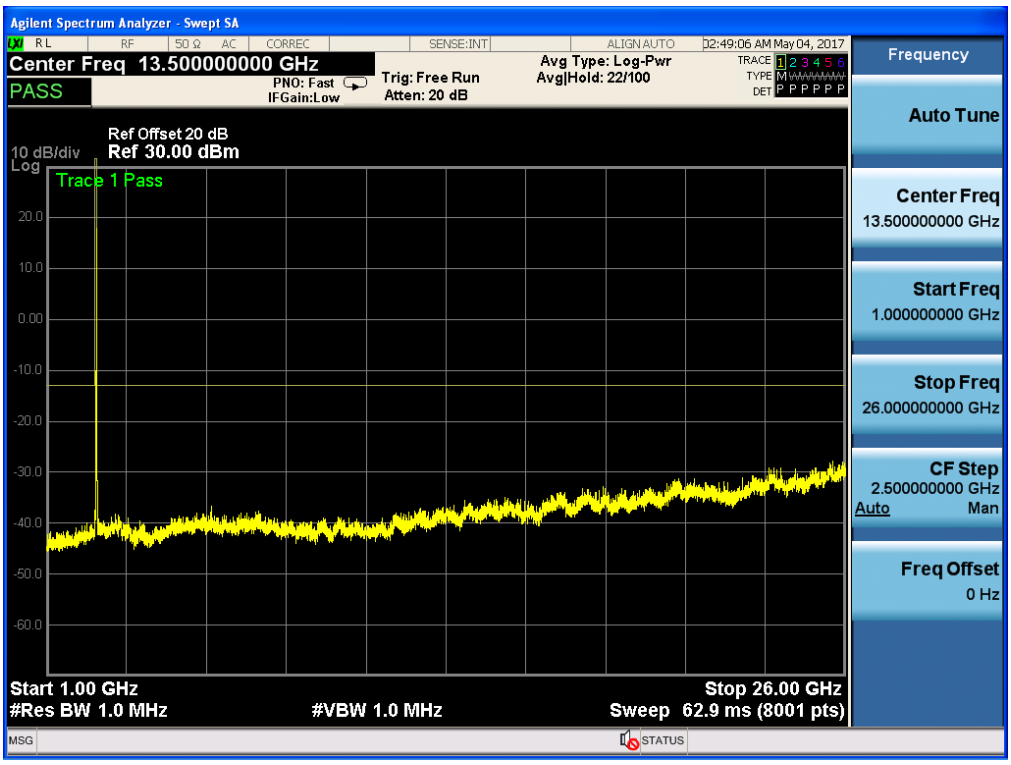
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



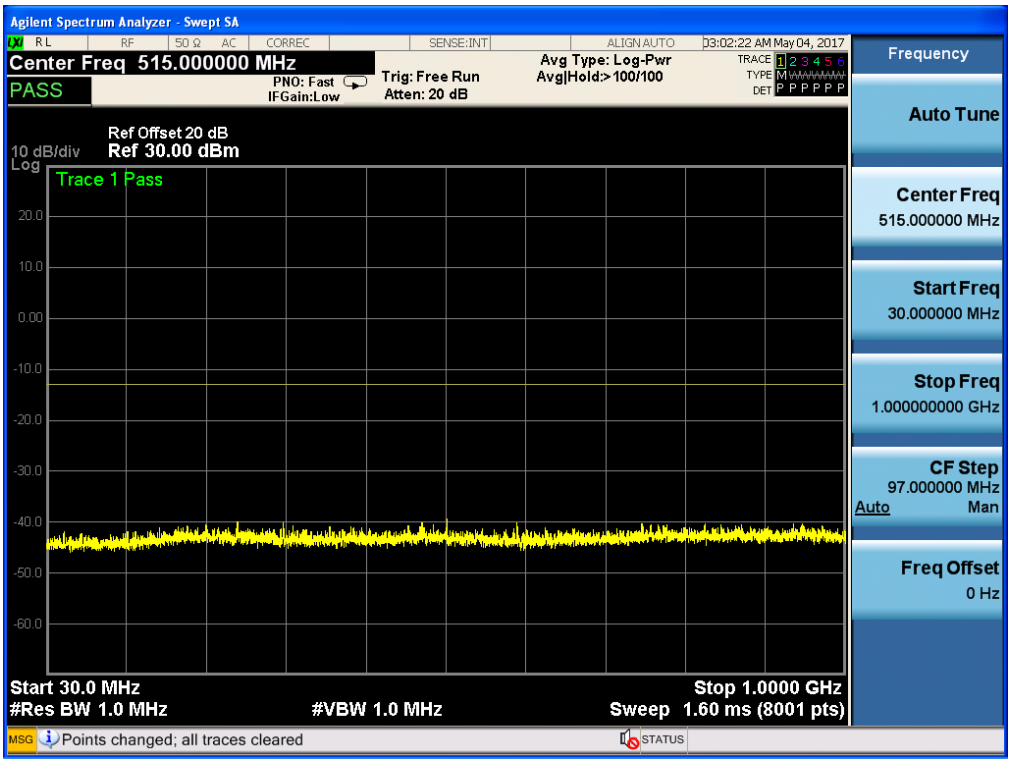
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



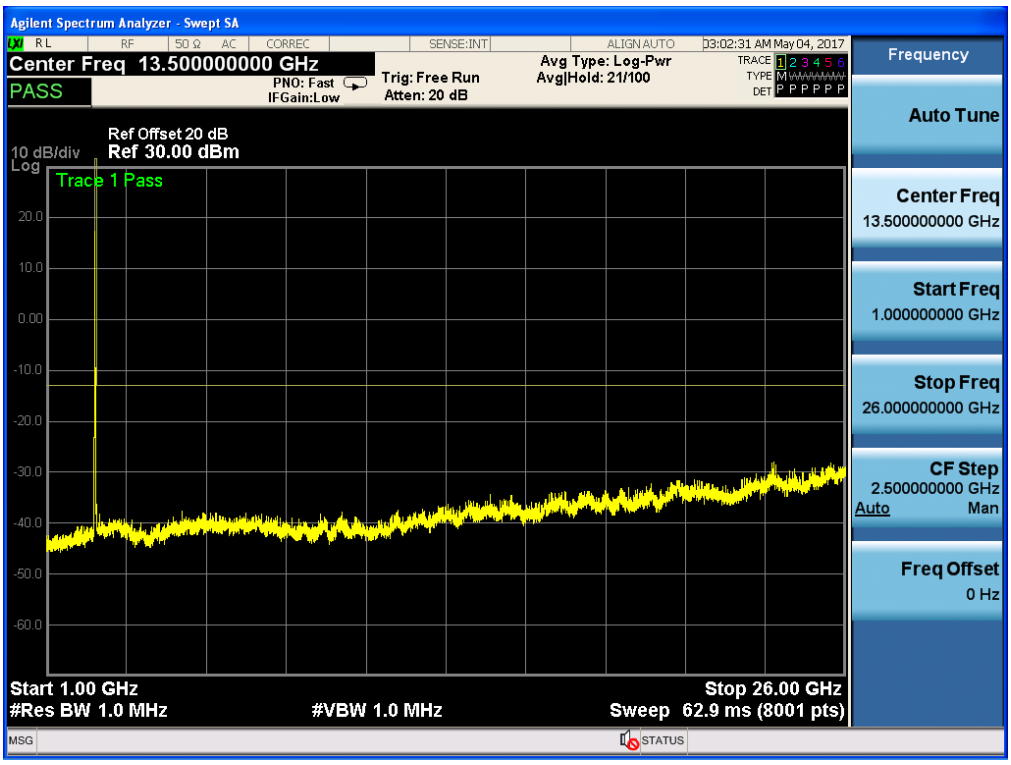
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



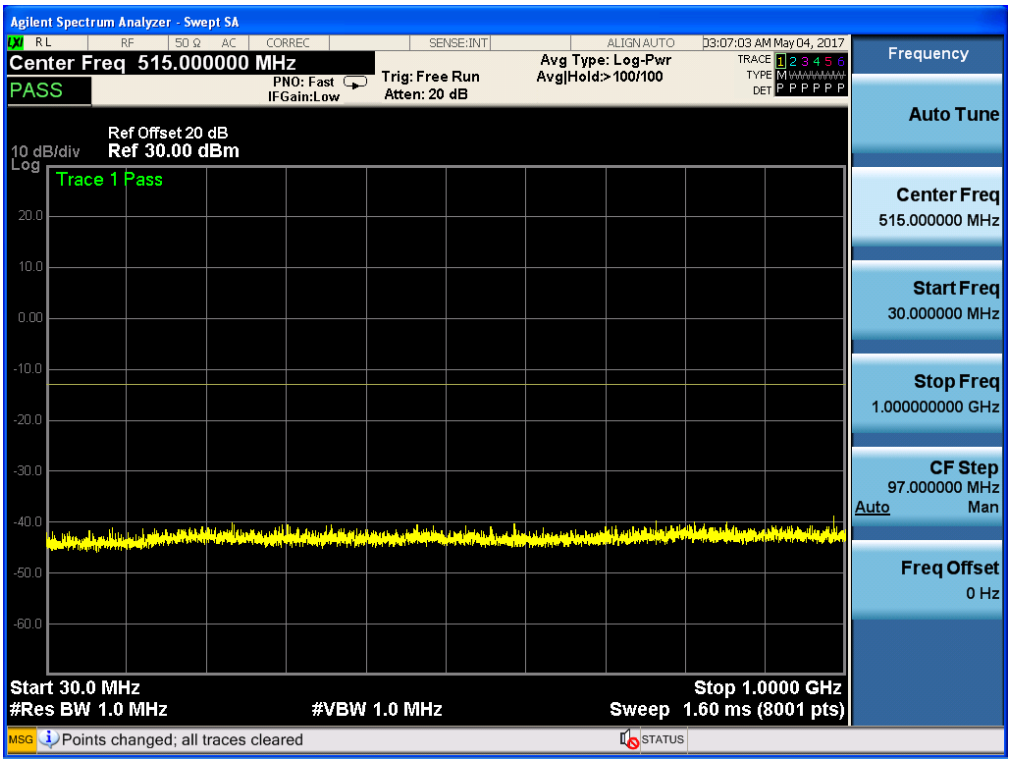
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



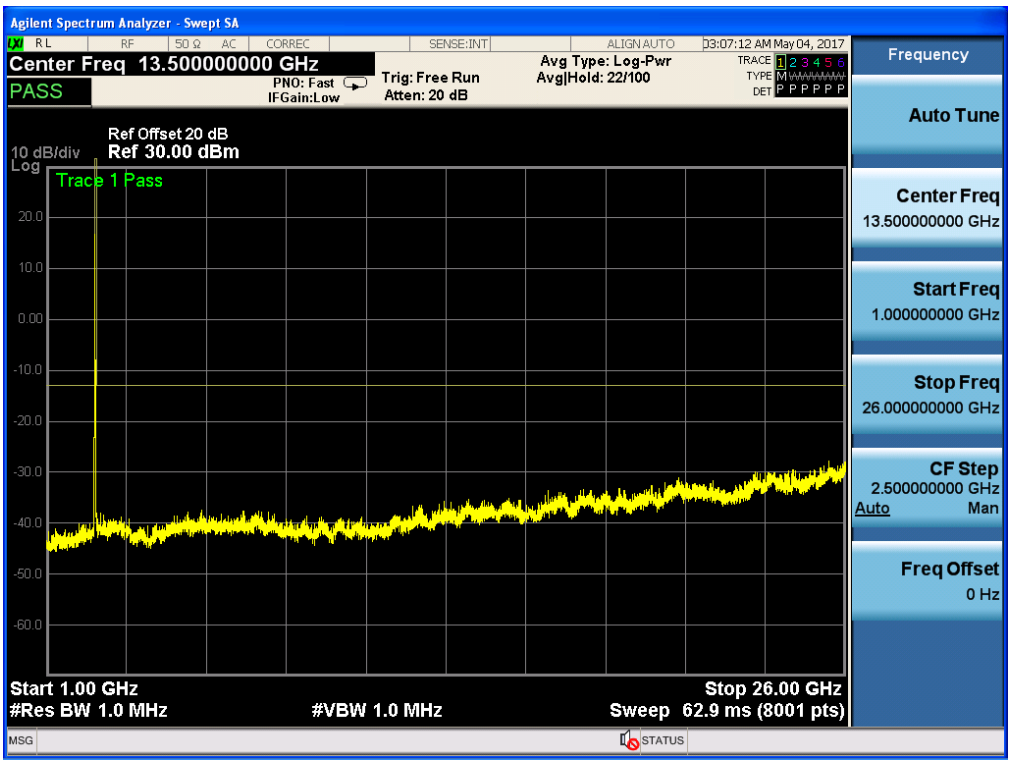
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



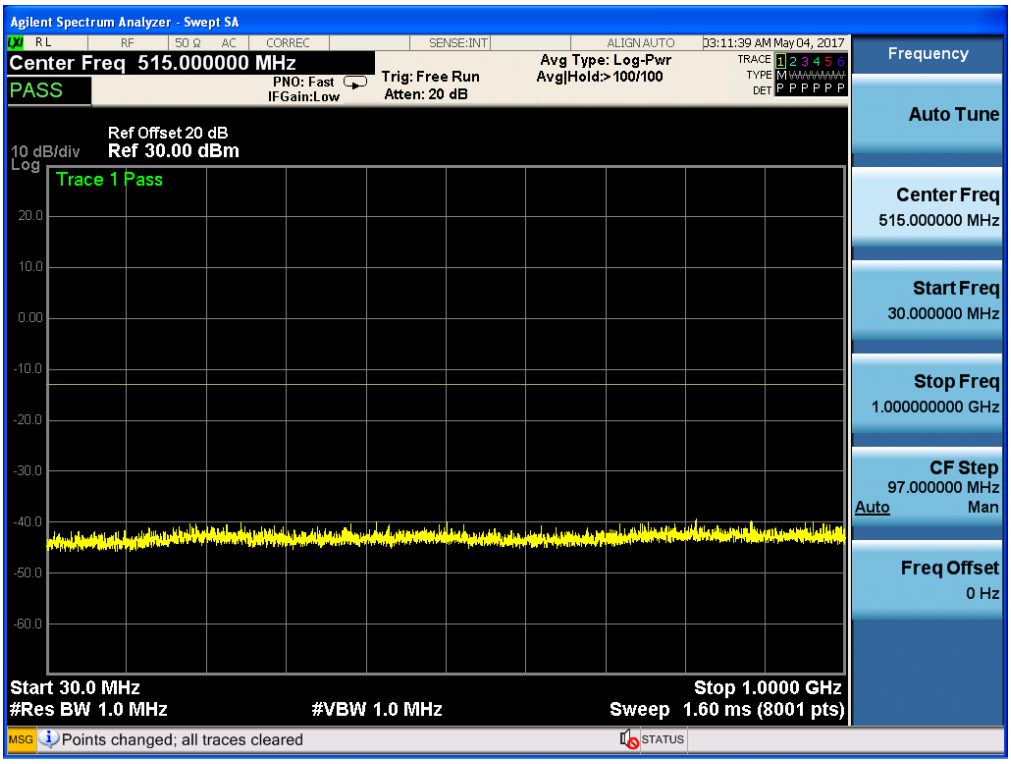
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



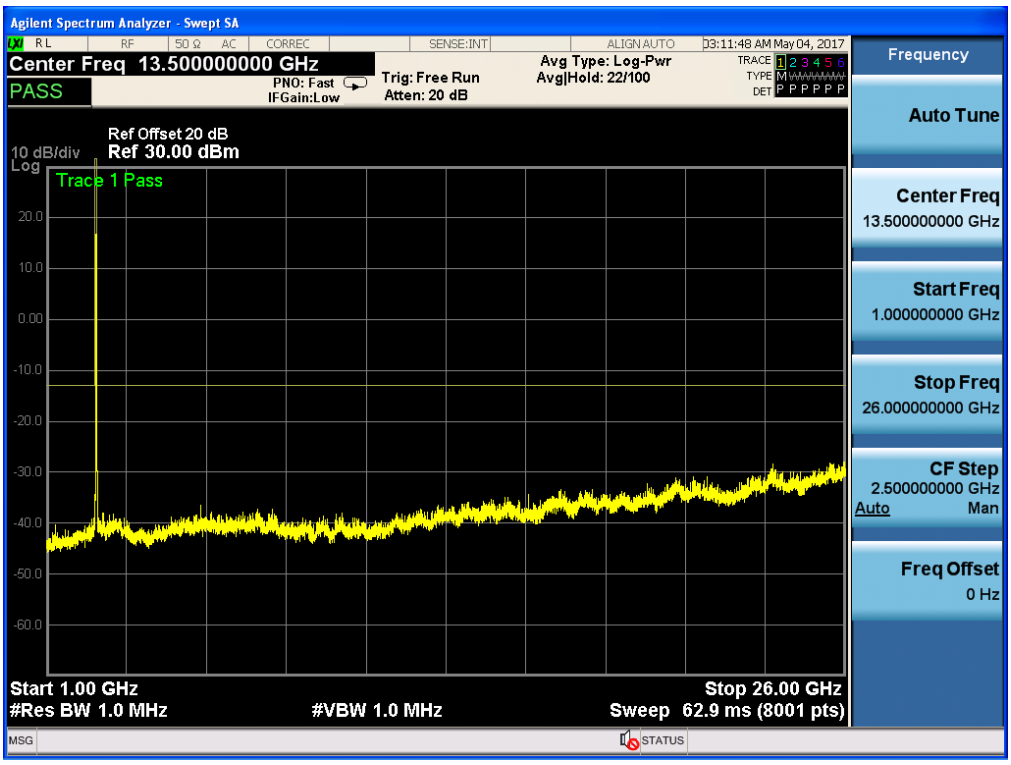
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



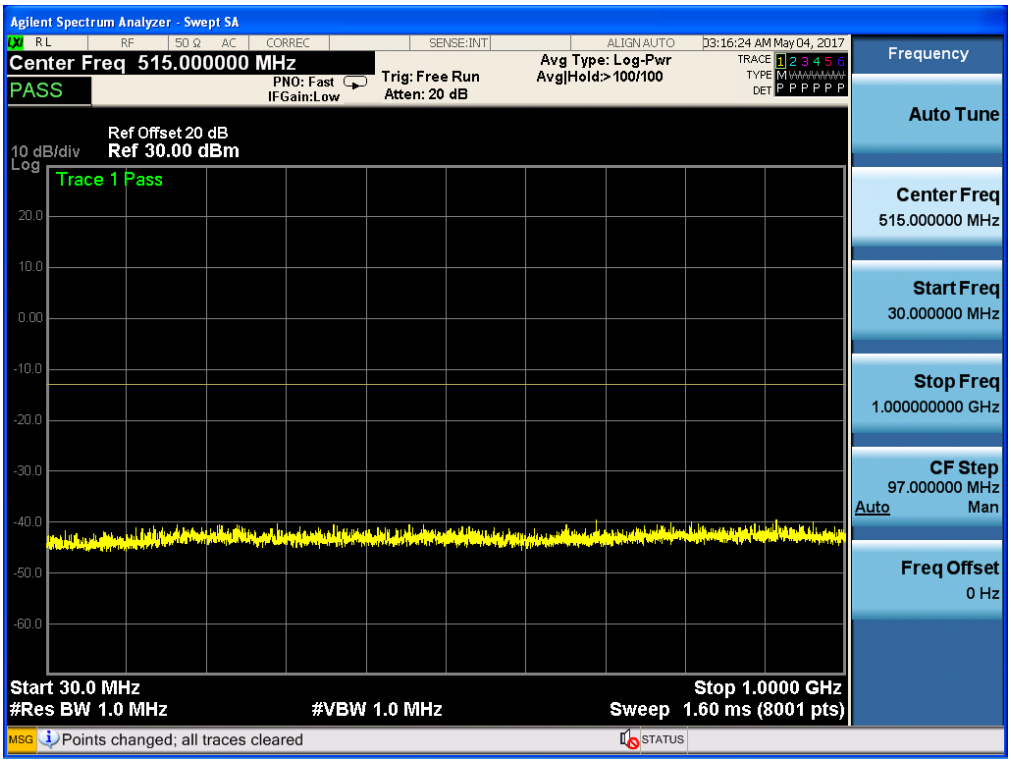
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



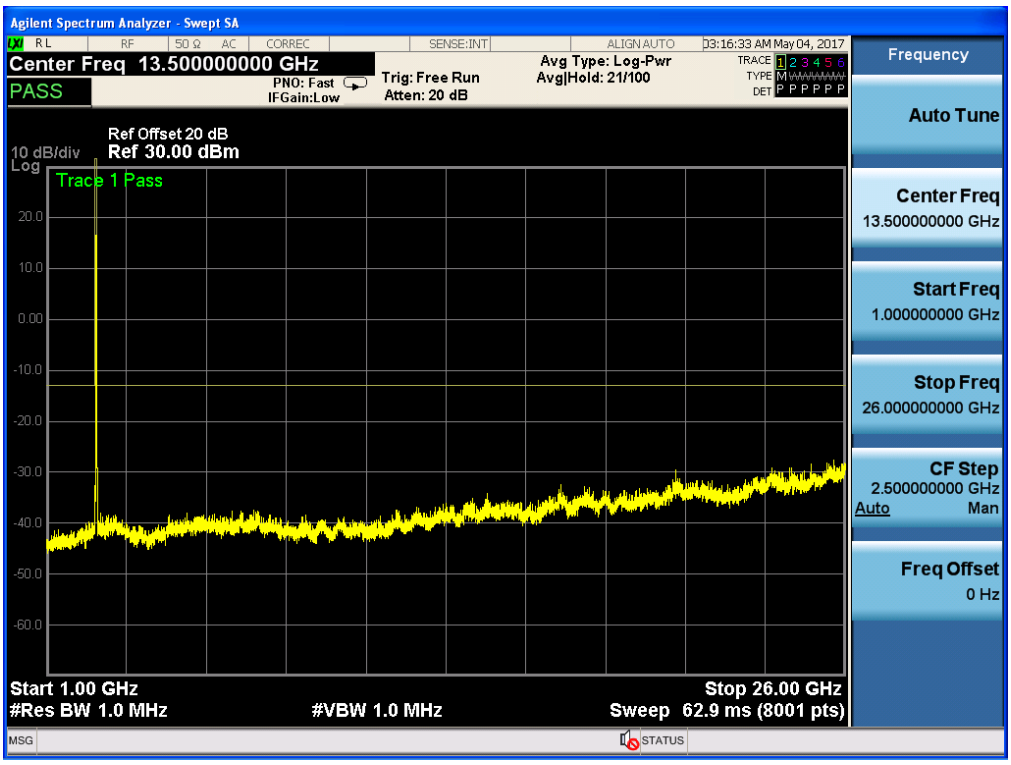
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



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

8.1.1 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 Band7

RESULTS

8.1.2 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	-2.09	3.76	28.24	22.39	173.454	Horizontal	Pass
		1880	-2.85	3.91	28.22	21.46	140.111	Horizontal	Pass
		1909.3	-2.10	3.93	28.2	22.17	164.671	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.31	3.76	28.24	22.17	164.798	Horizontal	Pass
		1880	-2.28	3.91	28.22	22.03	159.505	Horizontal	Pass
		1909.3	-2.11	3.93	28.2	22.16	164.528	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.92	3.77	28.23	21.54	142.677	Horizontal	Pass
		1880	-2.74	3.91	28.24	21.59	144.326	Horizontal	Pass
		1908.5	-2.59	3.94	28.25	21.72	148.460	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.20	3.77	28.23	22.26	168.365	Horizontal	Pass
		1880	-2.87	3.91	28.24	21.46	139.997	Horizontal	Pass
		1908.5	-2.15	3.94	28.25	22.16	164.360	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.03	3.77	28.31	22.51	178.416	Horizontal	Pass
		1880	-2.55	3.91	28.22	21.76	149.849	Horizontal	Pass
		1907.5	-2.69	3.94	28.2	21.57	143.559	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.59	3.77	28.31	21.95	156.753	Horizontal	Pass
		1880	-2.74	3.91	28.22	21.57	143.520	Horizontal	Pass
		1907.5	-2.32	3.94	28.2	21.94	156.473	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-2.52	3.79	28.33	22.02	159.335	Horizontal	Pass
		1880	-2.18	3.95	28.22	22.09	161.908	Horizontal	Pass
		1905	-2.46	3.97	28.19	21.76	149.878	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.81	3.79	28.33	21.73	148.923	Horizontal	Pass
		1880	-2.92	3.95	28.22	21.35	136.469	Horizontal	Pass
		1905	-2.02	3.97	28.19	22.20	165.967	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-2.87	3.79	28.34	21.68	147.207	Horizontal	Pass
		1880	-2.95	3.95	28.22	21.32	135.541	Horizontal	Pass
		1902.5	-2.06	3.97	28.18	22.15	164.140	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-2.35	3.79	28.34	22.20	166.128	Horizontal	Pass
		1880	-2.31	3.95	28.22	21.96	156.970	Horizontal	Pass
		1902.5	-2.93	3.97	28.18	21.28	134.176	Horizontal	Pass

20.0MHz Band QPSK	100/0	1860	-2.61	3.81	28.35	21.93	156.065	Horizontal	Pass
		1880	-2.39	3.96	28.22	21.87	153.798	Horizontal	Pass
		1900	-2.62	4	28.16	21.54	142.507	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-2.27	3.81	28.35	22.27	168.637	Horizontal	Pass
		1880	-2.82	3.96	28.22	21.44	139.265	Horizontal	Pass
		1900	-2.85	4	28.16	21.31	135.114	Horizontal	Pass

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	-2.84	3.76	28.24	21.64	145.878	Vertical	Pass
		1880	-2.14	3.91	28.22	22.17	164.707	Vertical	Pass
		1909.3	-2.72	3.93	28.2	21.55	142.833	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-2.23	3.76	28.24	22.25	167.887	Vertical	Pass
		1880	-2.25	3.91	28.22	22.06	160.670	Vertical	Pass
		1909.3	-2.89	3.93	28.2	21.38	137.504	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-2.10	3.77	28.23	22.36	172.129	Vertical	Pass
		1880	-2.49	3.91	28.24	21.84	152.818	Vertical	Pass
		1908.5	-2.58	3.94	28.25	21.73	148.823	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-2.15	3.77	28.23	22.31	170.167	Vertical	Pass
		1880	-2.45	3.91	28.24	21.88	154.125	Vertical	Pass
		1908.5	-2.21	3.94	28.25	22.10	162.023	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-2.68	3.77	28.31	21.86	153.573	Vertical	Pass
		1880	-2.43	3.91	28.22	21.88	154.161	Vertical	Pass
		1907.5	-2.30	3.94	28.2	21.96	157.131	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-2.29	3.77	28.31	22.25	167.907	Vertical	Pass
		1880	-2.52	3.91	28.22	21.79	151.129	Vertical	Pass
		1907.5	-2.59	3.94	28.2	21.67	146.848	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	-2.84	3.79	28.33	21.70	147.842	Vertical	Pass
		1880	-2.31	3.95	28.22	21.96	157.011	Vertical	Pass
		1905	-2.23	3.97	28.19	21.99	158.229	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-2.06	3.79	28.33	22.48	176.901	Vertical	Pass
		1880	-2.44	3.95	28.22	21.83	152.519	Vertical	Pass
		1905	-2.52	3.97	28.19	21.70	147.836	Vertical	Pass
15.0MH	75/0	1857.5	-2.95	3.79	28.34	21.60	144.655	Vertical	Pass

z Band QPSK		1880	-2.91	3.95	28.22	21.36	136.847	Vertical	Pass
		1902.5	-2.09	3.97	28.18	22.12	162.749	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-2.05	3.79	28.34	22.50	177.786	Vertical	Pass
		1880	-2.58	3.95	28.22	21.69	147.596	Vertical	Pass
		1902.5	-2.30	3.97	28.18	21.91	155.245	Vertical	Pass
20.0MHz Band QPSK	100/0	1860	-2.89	3.81	28.35	21.65	146.263	Vertical	Pass
		1880	-2.82	3.96	28.22	21.44	139.327	Vertical	Pass
		1900	-2.78	4	28.16	21.38	137.348	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-2.24	3.81	28.35	22.30	169.887	Vertical	Pass
		1880	-2.95	3.96	28.22	21.31	135.052	Vertical	Pass
		1900	-2.45	4	28.16	21.71	148.124	Vertical	Pass

8.1.3 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	-2.35	3.12	27.58	22.11	162.412	Horizontal	Pass
		1732.5	-2.22	3.27	27.61	22.12	162.913	Horizontal	Pass
		1754.3	-2.44	3.29	27.63	21.90	154.913	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.44	3.12	27.58	22.02	159.195	Horizontal	Pass
		1732.5	-2.63	3.27	27.61	21.71	148.344	Horizontal	Pass
		1754.3	-2.36	3.29	27.63	21.98	157.821	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-2.85	3.13	27.61	21.63	145.487	Horizontal	Pass
		1732.5	-2.12	3.27	27.61	22.22	166.858	Horizontal	Pass
		1753.5	-2.56	3.3	27.62	21.76	150.134	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.69	3.13	27.61	21.79	151.135	Horizontal	Pass
		1732.5	-2.02	3.27	27.61	22.32	170.744	Horizontal	Pass
		1753.5	-2.37	3.3	27.62	21.95	156.816	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-2.51	3.13	27.63	21.99	158.068	Horizontal	Pass
		1732.5	-2.09	3.27	27.61	22.25	168.013	Horizontal	Pass
		1752.5	-2.14	3.3	27.6	22.16	164.474	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.75	3.13	27.63	21.75	149.694	Horizontal	Pass
		1732.5	-2.38	3.27	27.61	21.96	157.199	Horizontal	Pass
		1752.5	-2.83	3.3	27.6	21.47	140.352	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-2.44	3.15	27.64	22.05	160.164	Horizontal	Pass
		1732.5	-2.24	3.31	27.61	22.06	160.524	Horizontal	Pass
		1750	-2.09	3.33	27.59	22.17	164.838	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.91	3.15	27.64	21.58	143.857	Horizontal	Pass
		1732.5	-2.37	3.31	27.61	21.93	155.956	Horizontal	Pass
		1750	-2.30	3.33	27.59	21.96	157.019	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-3.00	3.15	27.65	21.50	141.274	Horizontal	Pass
		1732.5	-2.71	3.31	27.61	21.59	144.116	Horizontal	Pass
		1747.5	-2.32	3.33	27.57	21.92	155.455	Horizontal	Pass
15.0MHz Band	75/0	1717.5	-2.10	3.15	27.65	22.40	173.643	Horizontal	Pass
		1732.5	-3.00	3.31	27.61	21.30	135.041	Horizontal	Pass

16 QAM		1747.5	-2.39	3.33	27.57	21.85	153.034	Horizontal	Pass
20.0MHz Band QPSK	100/0	1720	-2.81	3.17	27.66	21.68	147.191	Horizontal	Pass
		1732.5	-2.29	3.32	27.61	22.00	158.410	Horizontal	Pass
		1745	-2.23	3.36	27.56	21.97	157.389	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.49	3.17	27.66	22.00	158.453	Horizontal	Pass
		1732.5	-2.98	3.32	27.61	21.31	135.224	Horizontal	Pass
		1745	-2.10	3.36	27.56	22.10	162.192	Horizontal	Pass

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	-2.91	3.12	27.58	21.55	142.929	Vertical	Pass
		1732.5	-2.44	3.27	27.61	21.90	154.891	Vertical	Pass
		1754.3	-2.07	3.29	27.63	22.27	168.634	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.06	3.12	27.58	22.40	173.611	Vertical	Pass
		1732.5	-2.83	3.27	27.61	21.51	141.438	Vertical	Pass
		1754.3	-2.36	3.29	27.63	21.98	157.630	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-2.16	3.13	27.61	22.32	170.506	Vertical	Pass
		1732.5	-2.12	3.27	27.61	22.22	166.568	Vertical	Pass
		1753.5	-2.96	3.3	27.62	21.36	136.823	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.31	3.13	27.61	22.17	164.723	Vertical	Pass
		1732.5	-2.24	3.27	27.61	22.10	161.999	Vertical	Pass
		1753.5	-2.58	3.3	27.62	21.74	149.328	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-2.65	3.13	27.63	21.85	153.249	Vertical	Pass
		1732.5	-2.82	3.27	27.61	21.52	141.807	Vertical	Pass
		1752.5	-2.09	3.3	27.6	22.21	166.410	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.61	3.13	27.63	21.89	154.455	Vertical	Pass
		1732.5	-2.54	3.27	27.61	21.80	151.505	Vertical	Pass
		1752.5	-2.89	3.3	27.6	21.41	138.505	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-2.51	3.15	27.64	21.98	157.730	Vertical	Pass
		1732.5	-2.25	3.31	27.61	22.05	160.373	Vertical	Pass
		1750	-2.19	3.33	27.59	22.07	161.051	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.53	3.15	27.64	21.96	156.904	Vertical	Pass
		1732.5	-2.50	3.31	27.61	21.80	151.368	Vertical	Pass
		1750	-2.32	3.33	27.59	21.94	156.326	Vertical	Pass

15.0MHz Band QPSK	75/0	1717.5	-2.43	3.15	27.65	22.07	161.209	Vertical	Pass
		1732.5	-2.26	3.31	27.61	22.04	160.133	Vertical	Pass
		1747.5	-2.57	3.33	27.57	21.67	146.830	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.85	3.15	27.65	21.65	146.219	Vertical	Pass
		1732.5	-2.30	3.31	27.61	22.00	158.429	Vertical	Pass
		1747.5	-2.51	3.33	27.57	21.73	149.005	Vertical	Pass
20.0MHz Band QPSK	100/0	1720	-2.03	3.17	27.66	22.46	176.042	Vertical	Pass
		1732.5	-2.80	3.32	27.61	21.49	140.998	Vertical	Pass
		1745	-2.32	3.36	27.56	21.88	154.136	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.69	3.17	27.66	21.80	151.183	Vertical	Pass
		1732.5	-2.39	3.32	27.61	21.90	154.938	Vertical	Pass
		1745	-2.59	3.36	27.56	21.61	144.911	Vertical	Pass

8.1.4 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	7.42	2.01	19.68	2.15	22.94	196.888	Horizontal	Pass
		836.5	7.03	2.01	19.77	2.15	22.64	183.858	Horizontal	Pass
		848.3	7.89	2.02	19.82	2.15	23.54	225.966	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.92	2.01	19.68	2.15	23.44	220.725	Horizontal	Pass
		836.5	7.55	2.01	19.77	2.15	23.16	207.097	Horizontal	Pass
		848.3	7.86	2.02	19.82	2.15	23.51	224.496	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	7.99	2.01	19.7	2.15	23.53	225.414	Horizontal	Pass
		836.5	7.16	2.01	19.77	2.15	22.77	189.310	Horizontal	Pass
		847.5	7.69	2.02	19.81	2.15	23.33	215.181	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	7.18	2.01	19.7	2.15	22.72	186.982	Horizontal	Pass
		836.5	7.10	2.01	19.77	2.15	22.71	186.725	Horizontal	Pass
		847.5	7.58	2.02	19.81	2.15	23.22	209.687	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	7.75	2.01	19.71	2.15	23.30	213.809	Horizontal	Pass
		836.5	7.11	2.01	19.77	2.15	22.72	187.233	Horizontal	Pass
		846.5	7.73	2.02	19.79	2.15	23.35	216.462	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.65	2.01	19.71	2.15	23.20	209.099	Horizontal	Pass
		836.5	7.98	2.01	19.77	2.15	23.59	228.425	Horizontal	Pass
		846.5	7.65	2.02	19.79	2.15	23.27	212.147	Horizontal	Pass
10.0MHz Band QPSK	50/0	829	7.72	2.01	19.73	2.15	23.29	213.098	Horizontal	Pass
		836.5	7.96	2.01	19.77	2.15	23.57	227.546	Horizontal	Pass
		844	7.33	2.02	19.78	2.15	22.94	196.590	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	829	7.50	2.01	19.73	2.15	23.07	202.581	Horizontal	Pass
		836.5	7.76	2.01	19.77	2.15	23.37	217.337	Horizontal	Pass
		844	7.25	2.02	19.78	2.15	22.86	193.038	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	7.02	2.01	19.68	2.15	22.54	179.522	Vertical	Pass
		836.5	7.82	2.01	19.77	2.15	23.43	220.136	Vertical	Pass
		848.3	7.19	2.02	19.82	2.15	22.84	192.329	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.50	2.01	19.68	2.15	23.02	200.623	Vertical	Pass
		836.5	7.54	2.01	19.77	2.15	23.15	206.448	Vertical	Pass
		848.3	7.37	2.02	19.82	2.15	23.02	200.268	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	7.89	2.01	19.7	2.15	23.43	220.122	Vertical	Pass
		836.5	7.59	2.01	19.77	2.15	23.20	208.959	Vertical	Pass
		847.5	7.48	2.02	19.81	2.15	23.12	204.909	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	7.26	2.01	19.7	2.15	22.80	190.474	Vertical	Pass
		836.5	7.96	2.01	19.77	2.15	23.57	227.530	Vertical	Pass
		847.5	7.98	2.02	19.81	2.15	23.62	230.089	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	7.66	2.01	19.71	2.15	23.21	209.447	Vertical	Pass
		836.5	7.50	2.01	19.77	2.15	23.11	204.842	Vertical	Pass
		846.5	7.33	2.02	19.79	2.15	22.95	197.396	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.30	2.01	19.71	2.15	22.85	192.589	Vertical	Pass
		836.5	7.97	2.01	19.77	2.15	23.58	227.862	Vertical	Pass
		846.5	7.41	2.02	19.79	2.15	23.03	200.783	Vertical	Pass
10.0MHz Band QPSK	50/0	829	7.61	2.01	19.73	2.15	23.18	208.184	Vertical	Pass
		836.5	7.73	2.01	19.77	2.15	23.34	215.990	Vertical	Pass
		844	7.50	2.02	19.78	2.15	23.11	204.879	Vertical	Pass
10.0MHz Band 16 QAM	50/0	829	7.36	2.01	19.73	2.15	22.93	196.501	Vertical	Pass
		836.5	7.80	2.01	19.77	2.15	23.41	219.383	Vertical	Pass
		844	7.06	2.02	19.78	2.15	22.67	184.728	Vertical	Pass

8.1.5 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	-0.88	4.54	27.75	22.33	170.943	Horizontal	Pass
		2535	-0.17	4.69	27.72	22.86	193.030	Horizontal	Pass
		2567.5	-0.88	4.71	27.71	22.12	163.066	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.42	4.54	27.75	22.79	190.020	Horizontal	Pass
		2535	-0.71	4.69	27.72	22.32	170.617	Horizontal	Pass
		2567.5	-0.52	4.71	27.71	22.48	177.181	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	-0.29	4.55	27.76	22.92	195.934	Horizontal	Pass
		2535	-0.62	4.69	27.72	22.41	174.069	Horizontal	Pass
		2565	-0.95	4.72	27.7	22.03	159.612	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.31	4.55	27.76	22.90	194.791	Horizontal	Pass
		2535	-0.57	4.69	27.72	22.46	176.078	Horizontal	Pass
		2565	-0.17	4.72	27.7	22.81	190.804	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	-0.29	4.55	27.77	22.93	196.490	Horizontal	Pass
		2535	-0.30	4.69	27.72	22.73	187.401	Horizontal	Pass
		2562.5	-0.24	4.72	27.69	22.73	187.303	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.72	4.55	27.77	22.50	177.847	Horizontal	Pass
		2535	-0.10	4.69	27.72	22.93	196.212	Horizontal	Pass
		2562.5	-0.13	4.72	27.69	22.84	192.234	Horizontal	Pass
20.0MHz Band QPSK	100/0	2510	-0.48	4.57	27.78	22.73	187.486	Horizontal	Pass
		2535	-0.38	4.73	27.72	22.61	182.580	Horizontal	Pass
		2560	-0.05	4.75	27.68	22.88	193.928	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.51	4.57	27.78	22.70	186.040	Horizontal	Pass
		2535	-0.82	4.73	27.72	22.17	164.844	Horizontal	Pass
		2560	-0.52	4.75	27.68	22.41	174.365	Horizontal	Pass

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	-0.41	4.54	27.75	22.80	190.522	Vertical	Pass
		2535	-0.10	4.69	27.72	22.93	196.210	Vertical	Pass
		2567.5	-0.33	4.71	27.71	22.67	184.884	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.45	4.54	27.75	22.76	188.671	Vertical	Pass
		2535	-0.17	4.69	27.72	22.86	193.166	Vertical	Pass
		2567.5	-0.24	4.71	27.71	22.76	188.652	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	-0.32	4.55	27.76	22.89	194.360	Vertical	Pass
		2535	-0.50	4.69	27.72	22.53	179.009	Vertical	Pass
		2565	-0.90	4.72	27.7	22.08	161.326	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.40	4.55	27.76	22.81	190.814	Vertical	Pass
		2535	-0.33	4.69	27.72	22.70	186.115	Vertical	Pass
		2565	-0.93	4.72	27.7	22.05	160.158	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	-0.05	4.55	27.77	23.17	207.425	Vertical	Pass
		2535	-0.41	4.69	27.72	22.62	182.645	Vertical	Pass
		2562.5	-0.80	4.72	27.69	22.17	164.921	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.42	4.55	27.77	22.80	190.332	Vertical	Pass
		2535	-0.61	4.69	27.72	22.42	174.697	Vertical	Pass
		2562.5	-0.22	4.72	27.69	22.75	188.460	Vertical	Pass
20.0MHz Band QPSK	100/0	2510	-0.50	4.57	27.78	22.71	186.817	Vertical	Pass
		2535	-0.43	4.73	27.72	22.56	180.237	Vertical	Pass
		2560	-0.48	4.75	27.68	22.45	175.875	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.51	4.57	27.78	22.70	186.141	Vertical	Pass
		2535	-0.45	4.73	27.72	22.54	179.437	Vertical	Pass
		2560	-0.67	4.75	27.68	22.26	168.197	Vertical	Pass

9.0 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 Band7

RESULTS

PASS

9.1.2. 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	-34.51	12.42	-22.09	-13	-9.09	Horizontal
3701.4	-35.59	12.42	-23.17	-13	-10.17	Vertical
5552.1	-37.68	14.12	-23.56	-13	-10.56	Vertical
5552.1	-36.64	14.12	-22.52	-13	-9.52	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-35.11	11.76	-23.35	-13	-10.35	Horizontal
3760	-35.59	11.76	-23.83	-13	-10.83	Vertical
5640	-36.95	14.56	-22.39	-13	-9.39	Vertical
5640	-37.46	14.56	-22.9	-13	-9.9	Horizontal
Test Results for High Channel 1754.3MHz						
3818.6	-33.41	11.87	-21.54	-13	-8.54	Horizontal
3818.6	-36.66	11.87	-24.79	-13	-11.79	Vertical
5727.9	-39.98	14.66	-25.32	-13	-12.32	Vertical
5727.9	-35.51	14.66	-20.85	-13	-7.85	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	-33.51	12.42	-21.09	-13	-8.09	Horizontal
3720	-35.52	12.42	-23.1	-13	-10.1	Vertical
5580	-36.74	14.12	-22.62	-13	-9.62	Vertical
5580	-36.69	14.12	-22.57	-13	-9.57	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-35.54	11.76	-23.78	-13	-10.78	Horizontal
3760	-36.59	11.76	-24.83	-13	-11.83	Vertical
5640	-34.61	14.56	-20.05	-13	-7.05	Vertical
5640	-36.69	14.56	-22.13	-13	-9.13	Horizontal
Test Results for High Channel 1754.3MHz						
3800	-34.41	11.87	-22.54	-13	-9.54	Horizontal
3800	-33.36	11.87	-21.49	-13	-8.49	Vertical
5700	-35.52	14.66	-20.86	-13	-7.86	Vertical
5700	-34.41	14.66	-19.75	-13	-6.75	Horizontal

9.1.3. 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	-34.45	12.42	-22.03	-13	-9.03	Horizontal
3421.4	-34.26	12.42	-21.84	-13	-8.84	Vertical
5132.1	-36.95	14.12	-22.83	-13	-9.83	Vertical
5132.1	-34.67	14.12	-20.55	-13	-7.55	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-35.52	11.76	-23.76	-13	-10.76	Horizontal
3465	-34.41	11.76	-22.65	-13	-9.65	Vertical
5197.5	-35.59	14.56	-21.03	-13	-8.03	Vertical
5197.5	-37.66	14.56	-23.1	-13	-10.1	Horizontal
Test Results for High Channel 1754.3MHz						
3508.6	-34.25	11.87	-22.38	-13	-9.38	Horizontal
3508.6	-34.61	11.87	-22.74	-13	-9.74	Vertical
5262.9	-39.96	14.66	-25.3	-13	-12.3	Vertical
5262.9	-34.46	14.66	-19.8	-13	-6.8	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	-36.69	12.42	-24.27	-13	-11.27	Horizontal
3440	-34.47	12.42	-22.05	-13	-9.05	Vertical
5160	-35.58	14.12	-21.46	-13	-8.46	Vertical
5160	-35.61	14.12	-21.49	-13	-8.49	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-38.88	11.76	-27.12	-13	-14.12	Horizontal
3465	-36.62	11.76	-24.86	-13	-11.86	Vertical
5197.5	-34.41	14.56	-19.85	-13	-6.85	Vertical
5197.5	-36.65	14.56	-22.09	-13	-9.09	Horizontal
Test Results for High Channel 1754.3MHz						
2490	-34.45	11.87	-22.58	-13	-9.58	Horizontal
3490	-35.56	11.87	-23.69	-13	-10.69	Vertical
5235	-39.96	14.66	-25.3	-13	-12.3	Vertical
5235	-37.78	14.66	-23.12	-13	-10.12	Horizontal

9.1.4. 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	-36.52	12.42	-24.1	-13	-11.1	Horizontal
1649.4	-34.41	12.42	-21.99	-13	-8.99	Vertical
2474.1	-33.69	14.12	-19.57	-13	-6.57	Vertical
2474.1	-36.57	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

9.1.5. 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	-34.46	12.42	-22.04	-13	-9.04	Horizontal
5005	-35.52	12.42	-23.1	-13	-10.1	Vertical
7507.5	-37.59	14.12	-23.47	-13	-10.47	Vertical
7507.5	-35.64	14.12	-21.52	-13	-8.52	Horizontal
Test Results for Mid Channel 2535MHz						
5070	-36.94	11.76	-25.18	-13	-12.18	Horizontal
5070	-35.61	11.76	-23.85	-13	-10.85	Vertical
7605	-36.64	14.56	-22.08	-13	-9.08	Vertical
7605	-38.86	14.56	-24.3	-13	-11.3	Horizontal
Test Results for High Channel 2567.5MHz						
5135	-34.41	11.87	-22.54	-13	-9.54	Horizontal
5135	-33.26	11.87	-21.39	-13	-8.39	Vertical
7702.5	-36.67	14.66	-22.01	-13	-9.01	Vertical
7702.5	-37.11	14.66	-22.45	-13	-9.45	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	-36.69	12.42	-24.27	-13	-11.27	Horizontal
5020	-35.51	12.42	-23.09	-13	-10.09	Vertical
7530	-36.69	14.12	-22.57	-13	-9.57	Vertical
7530	-37.47	14.12	-23.35	-13	-10.35	Horizontal
Test Results for Mid Channel 2535MHz						
5070	-36.65	11.76	-24.89	-13	-11.89	Horizontal
5070	-37.51	11.76	-25.75	-13	-12.75	Vertical
7605	-34.41	14.56	-19.85	-13	-6.85	Vertical
7605	-37.78	14.56	-23.22	-13	-10.22	Horizontal
Test Results for High Channel 2567.5MHz						
5120	-34.46	11.87	-22.59	-13	-9.59	Horizontal
5120	-35.52	11.87	-23.65	-13	-10.65	Vertical
7680	-39.69	14.66	-25.03	-13	-12.03	Vertical
7680	-35.46	14.66	-20.8	-13	-7.8	Horizontal

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, 3.4VDC, Normal, 3.8VDC and High voltage, 4.3VDC.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC 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 Band7

RESULTS

See the following pages.

10.1.1. 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	-9.4	-0.004999	2.5
3.6	1880	-7.6	-0.004056	2.5
4.4	1880	-13.8	-0.00732	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	-9.3	-0.004954	2.5
Extreme (50C)	1880	-5.5	-0.00293	2.5
Extreme (40C)	1880	-9.6	-0.005098	2.5
Extreme (30C)	1880	-6.7	-0.003569	2.5
Extreme (10C)	1880	-8.2	-0.00436	2.5
Extreme (0C)	1880	-7.9	-0.004215	2.5
Extreme (-10C)	1880	7.1	0.003797	2.5
Extreme (-20C)	1880	-5	-0.002648	2.5
Extreme (-30C)	1880	-10.2	-0.005433	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	-5.2	-0.002766	2.5
3.6	1880	11.4	0.006064	2.5
4.4	1880	-12.9	-0.006862	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	-6.9	-0.003670	2.5
Extreme (50C)	1880	-4.7	-0.002500	2.5
Extreme (40C)	1880	-9.2	-0.004894	2.5
Extreme (30C)	1880	-5.3	-0.002819	2.5
Extreme (10C)	1880	-6.8	-0.003617	2.5
Extreme (0C)	1880	-4.2	-0.002234	2.5
Extreme (-10C)	1880	8.9	0.004734	2.5
Extreme (-20C)	1880	-5.7	-0.003032	2.5
Extreme (-30C)	1880	-8.9	-0.004734	2.5

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

10.1.2. 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	-4.9	-0.002832	2.5
3.6	1732.5	13.7	0.007894	2.5
4.4	1732.5	-13.2	-0.007646	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	-8.1	-0.004665	2.5
Extreme (50C)	1732.5	-7.9	-0.004566	2.5
Extreme (40C)	1732.5	-9.2	-0.005284	2.5
Extreme (30C)	1732.5	-4.6	-0.002659	2.5
Extreme (10C)	1732.5	-6.9	-0.00398	2.5
Extreme (0C)	1732.5	-4.1	-0.002386	2.5
Extreme (-10C)	1732.5	8.5	0.004921	2.5
Extreme (-20C)	1732.5	-7.3	-0.004236	2.5
Extreme (-30C)	1732.5	-8	-0.004607	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	-6.9	-0.003983	2.5
3.6	1732.5	5.8	0.003348	2.5
4.4	1732.5	-9.9	-0.005714	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	-10.6	-0.006118	2.5
Extreme (50C)	1732.5	-8.3	-0.004791	2.5
Extreme (40C)	1732.5	-7.4	-0.004271	2.5
Extreme (30C)	1732.5	-6.5	-0.003752	2.5
Extreme (10C)	1732.5	-5.1	-0.002944	2.5
Extreme (0C)	1732.5	7.4	0.004271	2.5
Extreme (-10C)	1732.5	6.9	0.003983	2.5
Extreme (-20C)	1732.5	8.8	0.005079	2.5
Extreme (-30C)	1732.5	-9.4	-0.005426	2.5

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

10.1.3. 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	-4.4	-0.005216	2.5
3.6	836.5	12.5	0.014964	2.5
4.4	836.5	-10.9	-0.013014	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	836.5	-9.2	2.5
Extreme (50C)	836.5	836.5	-5.5	2.5
Extreme (40C)	836.5	836.5	-9.3	2.5
Extreme (30C)	836.5	836.5	-6.7	2.5
Extreme (10C)	836.5	836.5	-8.6	2.5
Extreme (0C)	836.5	836.5	-10.4	2.5
Extreme (-10C)	836.5	836.5	-6.9	2.5
Extreme (-20C)	836.5	836.5	-7.8	2.5
Extreme (-30C)	836.5	836.5	-8.5	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	-15.2	-0.018171	2.5
3.6	836.5	-10.3	-0.012313	2.5
4.4	836.5	-9.7	-0.011596	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	-7.6	-0.009085	2.5
Extreme (50C)	836.5	-6.9	-0.008249	2.5
Extreme (40C)	836.5	-10.4	-0.012433	2.5
Extreme (30C)	836.5	-10.2	-0.012194	2.5
Extreme (10C)	836.5	-5.6	-0.006695	2.5
Extreme (0C)	836.5	-6.1	-0.007292	2.5
Extreme (-10C)	836.5	-5.9	-0.007053	2.5
Extreme (-20C)	836.5	-10.1	-0.012074	2.5
Extreme (-30C)	836.5	-7.5	-0.008966	2.5

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

10.1.4. 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	-38.2	-0.015056	2.5
3.6	2535	-24.8	-0.009774	2.5
4.4	2535	-22.5	-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	20.2	0.007979	2.5
Extreme (50C)	2535	-23.4	-0.009215	2.5
Extreme (40C)	2535	19	0.007505	2.5
Extreme (30C)	2535	-19.6	-0.007731	2.5
Extreme (10C)	2535	-22	-0.008679	2.5
Extreme (0C)	2535	32	0.012623	2.5
Extreme (-10C)	2535	-26.5	-0.010454	2.5
Extreme (-20C)	2535	-11.4	-0.004497	2.5
Extreme (-30C)	2535	-30.7	-0.012110	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	15.4	0.006075	2.5
3.6	2535	-16.9	-0.006667	2.5
4.4	2535	-32.2	-0.012702	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	-15.7	-0.006193	2.5
Extreme (50C)	2535	-18.8	-0.007416	2.5
Extreme (40C)	2535	-24.4	-0.009625	2.5
Extreme (30C)	2535	-10.9	-0.004300	2.5
Extreme (10C)	2535	23.5	0.009270	2.5
Extreme (0C)	2535	21.4	0.008442	2.5
Extreme (-10C)	2535	19.5	0.007692	2.5
Extreme (-20C)	2535	17.6	0.006943	2.5
Extreme (-30C)	2535	22.5	0.008876	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

11.1.1 DESCRIPTION OF THE PAR MEASUREMENT

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

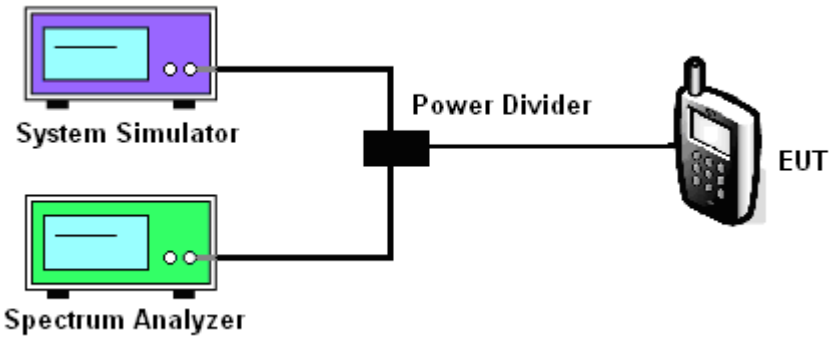
11.1.2 MEASURING INSTRUMENTS

See list of measuring instruments of this test report.

11.1.3 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 %.

11.1.4 TEST SETUP



MODES TESTED

- ☐ LTE Band2
  LTE Band 4
  LTE Band 5
- ☐ LTE Band7

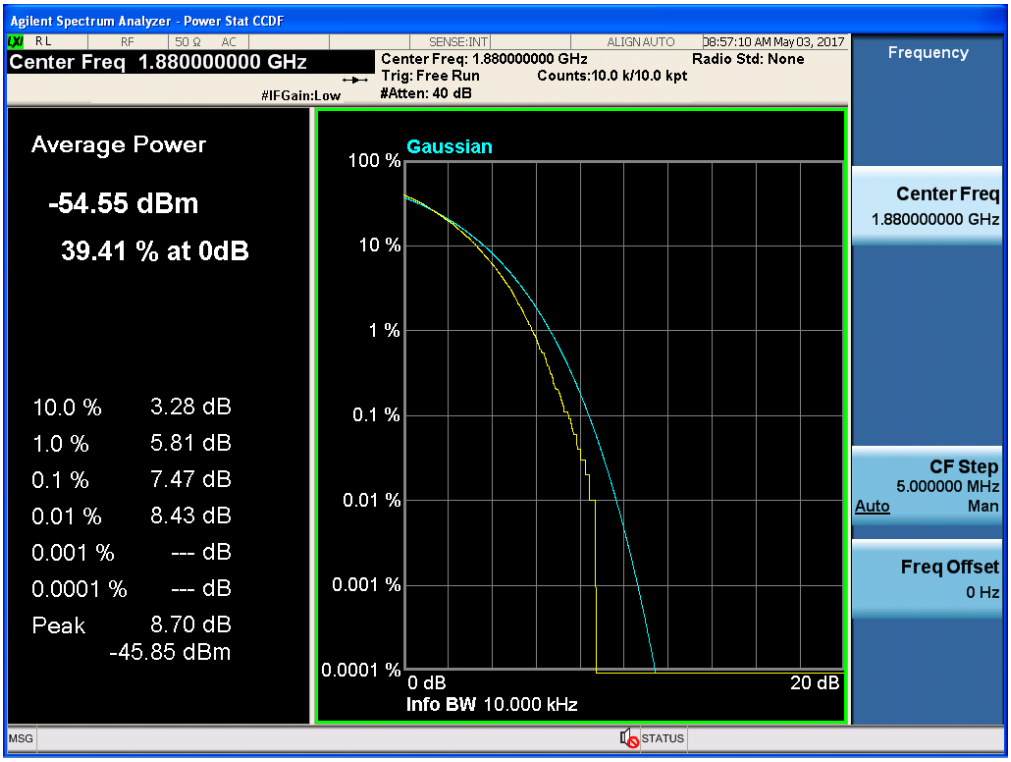
BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	7.47
2	18900	1880.0	1.4	1	Low	16QAM	7.16
2	18900	1880.0	3.0	1	Low	QPSK	4.24
2	18900	1880.0	3.0	1	Low	16QAM	4.74
2	18900	1880.0	5.0	1	Low	QPSK	3.68
2	18900	1880.0	5.0	1	Low	16QAM	3.25
2	18900	1880.0	10.0	1	Low	QPSK	3.15
2	18900	1880.0	10.0	1	Low	16QAM	4.03
2	18900	1880.0	15.0	1	Low	QPSK	2.94
2	18900	1880.0	15.0	1	Low	16QAM	2.94
2	18900	1880.0	20.0	1	Low	QPSK	2.83
2	18900	1880.0	20.0	1	Low	16QAM	3.61
4	20175	1732.5	1.4	1	Low	QPSK	8.45
4	20175	1732.5	1.4	1	Low	16QAM	8.91
4	20175	1732.5	3.0	1	Low	QPSK	5.91
4	20175	1732.5	3.0	1	Low	16QAM	5.62
4	20175	1732.5	5.0	1	Low	QPSK	3.79
4	20175	1732.5	5.0	1	Low	16QAM	3.92
4	20175	1732.5	10.0	1	Low	QPSK	3.57

4	20175	1732.5	10.0	1	Low	16QAM	3.67
4	20175	1732.5	15.0	1	Low	QPSK	3.20
4	20175	1732.5	15.0	1	Low	16QAM	3.18
4	20175	1732.5	20.0	1	Low	QPSK	3.59
4	20175	1732.5	20.0	1	Low	16QAM	3.89
5	20407	824.7	1.4	1	Low	QPSK	7.74
5	20407	824.7	1.4	1	Low	16-QAM	8.10
5	20525	836.5	1.4	1	Low	QPSK	7.94
5	20525	836.5	1.4	1	Low	16-QAM	7.84
5	20643	848.3	1.4	1	Low	QPSK	8.91
5	20643	848.3	1.4	1	Low	16-QAM	7.58
5	20415	825.5	3.0	1	Low	QPSK	8.32
5	20415	825.5	3.0	1	Low	16-QAM	7.68
5	20525	836.5	3.0	1	Low	QPSK	5.15
5	20525	836.5	3.0	1	Low	16-QAM	5.51
5	20635	847.5	3.0	1	Low	QPSK	8.28
5	20635	847.5	3.0	1	Low	16-QAM	7.40
5	20425	826.5	5.0	1	Low	QPSK	2.67
5	20425	826.5	5.0	1	Low	16-QAM	2.88
5	20525	836.5	5.0	1	Low	QPSK	2.90
5	20525	836.5	5.0	1	Low	16-QAM	2.92
5	20625	846.5	5.0	1	Low	QPSK	3.02

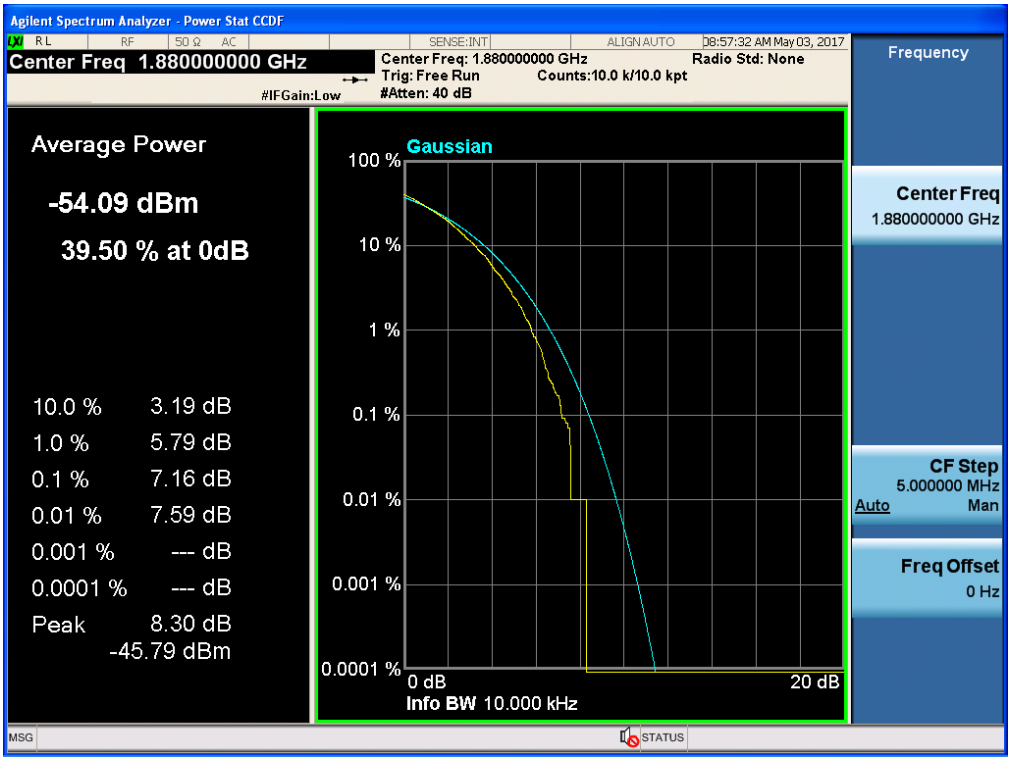
5	20625	846.5	5.0	1	Low	16-QAM	2.53
5	20407	824.7	1.4	1	Low	QPSK	2.57
5	20407	824.7	1.4	1	Low	16-QAM	2.33
5	20450	829.0	10.0	1	Low	QPSK	2.52
5	20450	829.0	10.0	1	Low	16-QAM	2.39
5	20525	836.5	10.0	1	Low	QPSK	2.06
5	20525	836.5	10.0	1	Low	16-QAM	2.22
7	21100	2535.0	5.0	1	Low	QPSK	3.68
7	21100	2535.0	5.0	1	Low	16QAM	3.92
7	21100	2535.0	10.0	1	Low	QPSK	3.29
7	21100	2535.0	10.0	1	Low	16QAM	3.57
7	21100	2535.0	15.0	1	Low	QPSK	2.82
7	21100	2535.0	15.0	1	Low	16QAM	2.82
7	21100	2535.0	20.0	1	Low	QPSK	3.31
7	21100	2535.0	20.0	1	Low	16QAM	3.25

11.1.5 LTE BAND 2

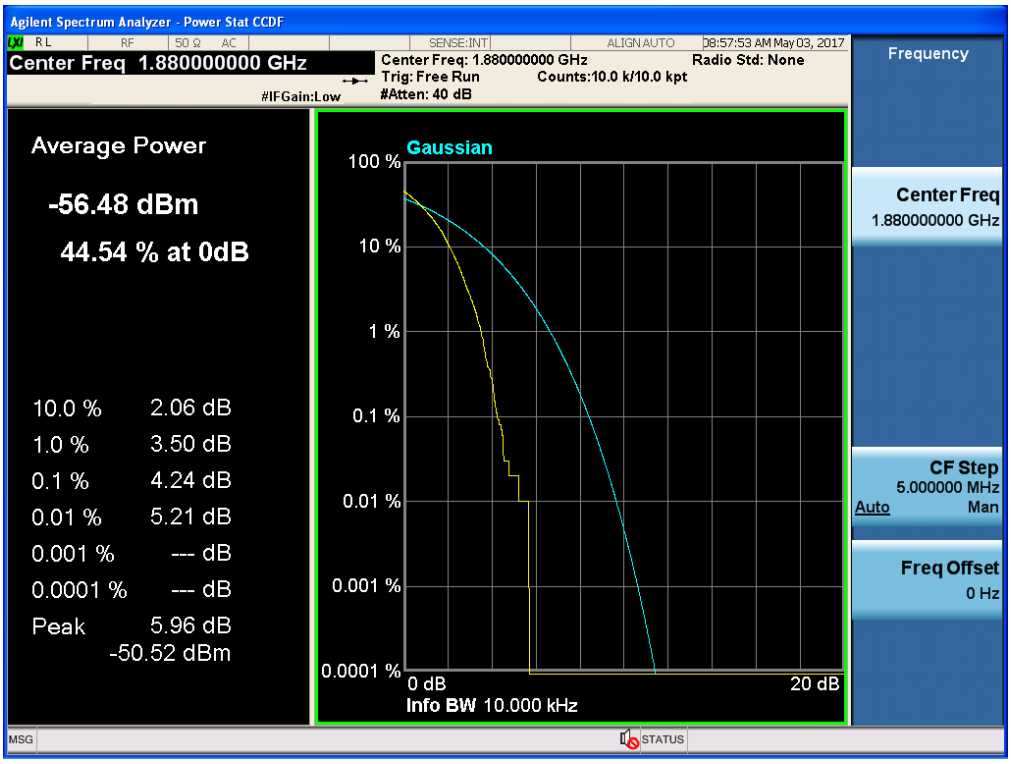
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,QPSK



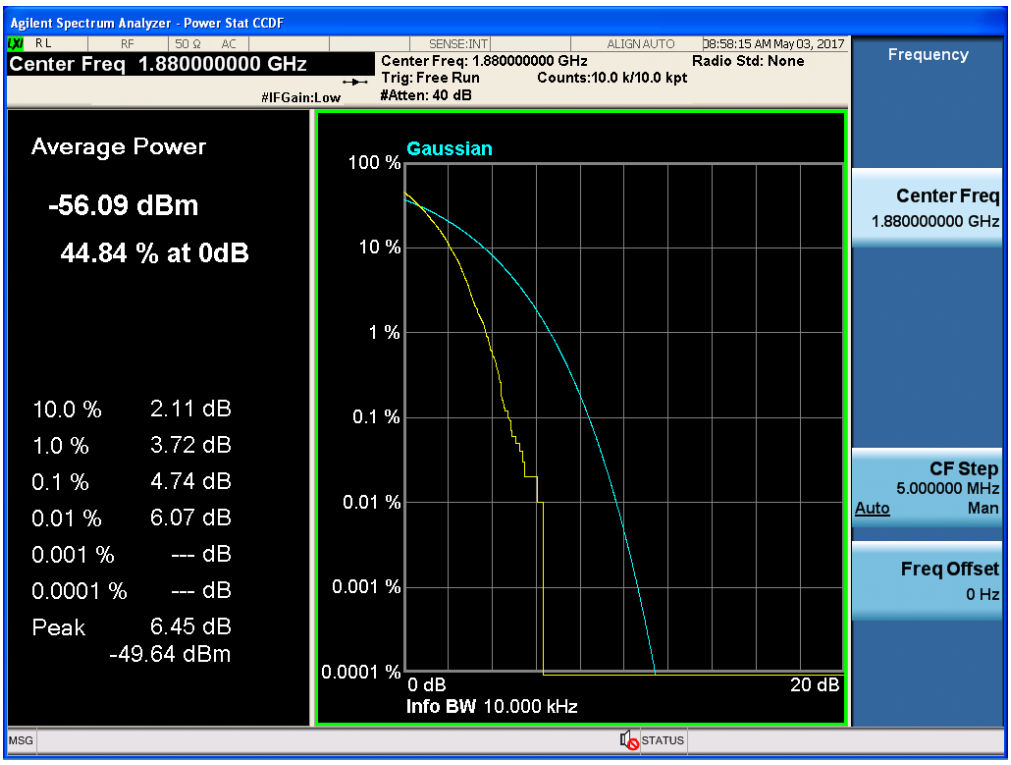
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,16QAM



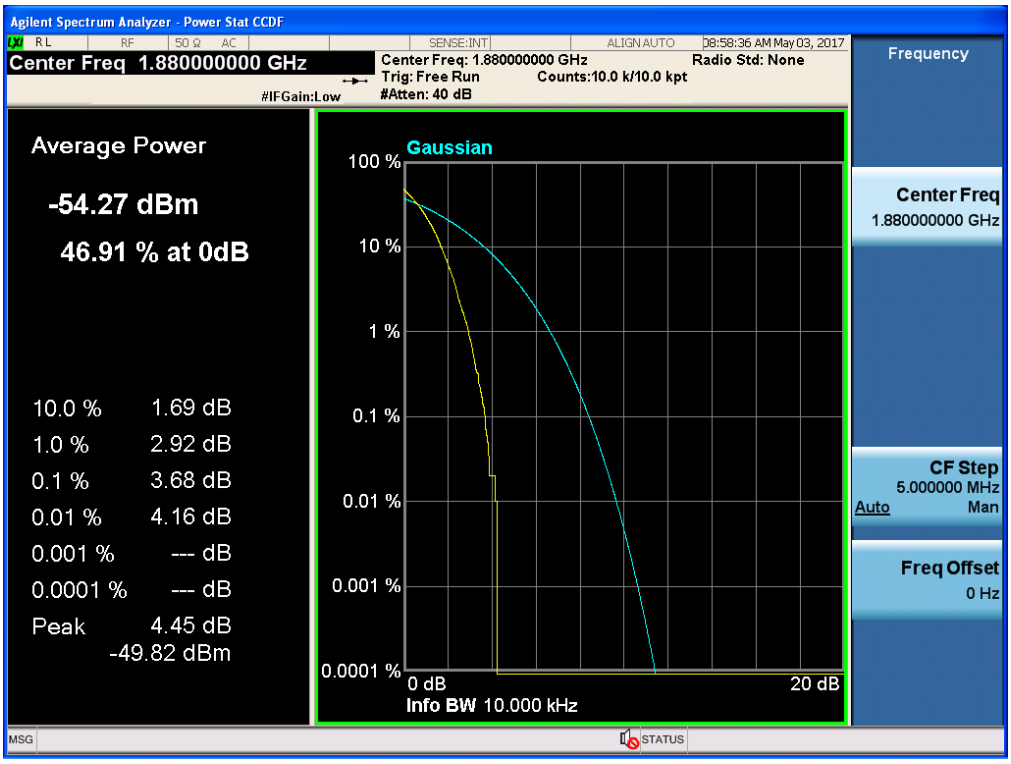
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,QPSK



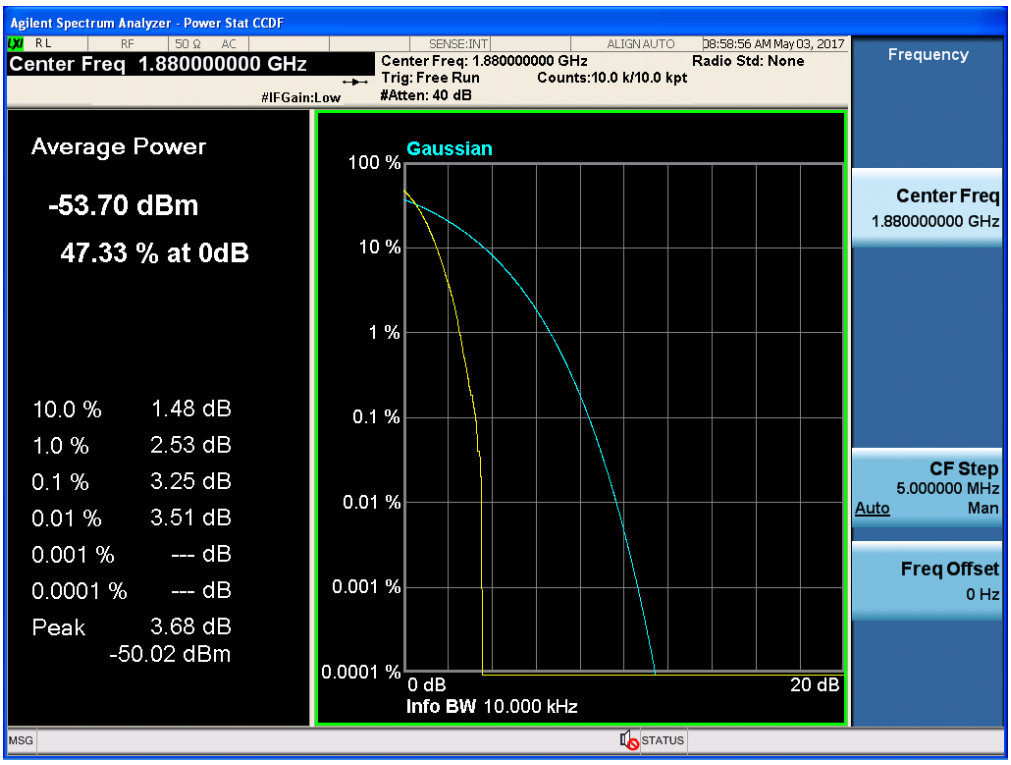
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,16QAM



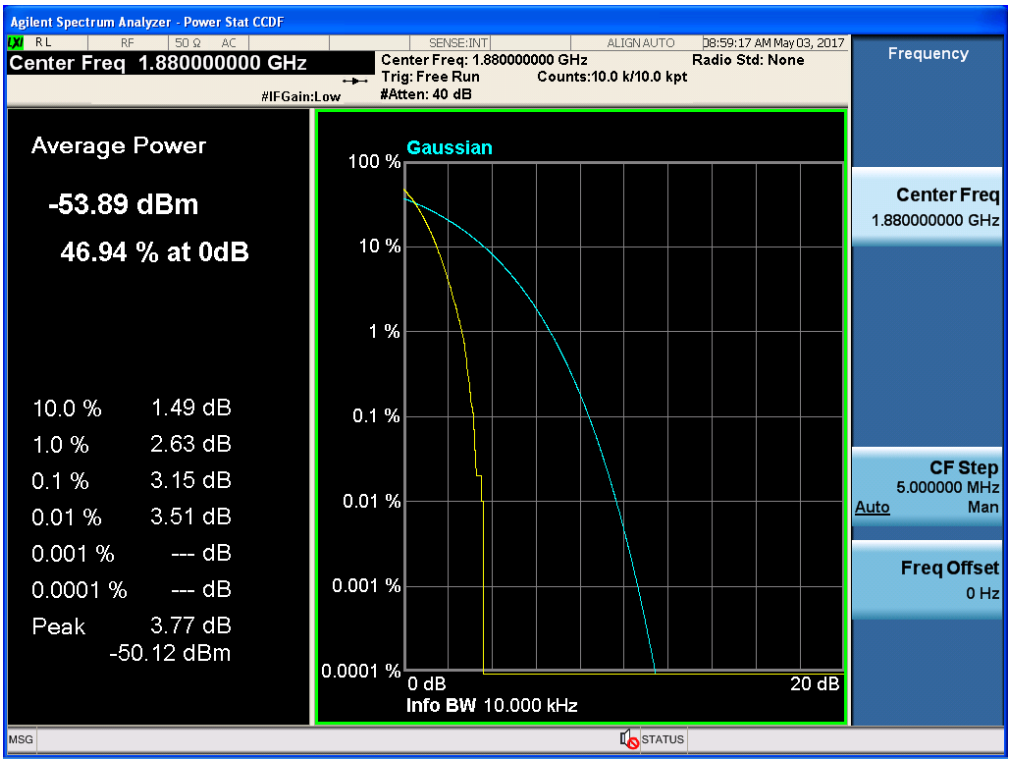
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



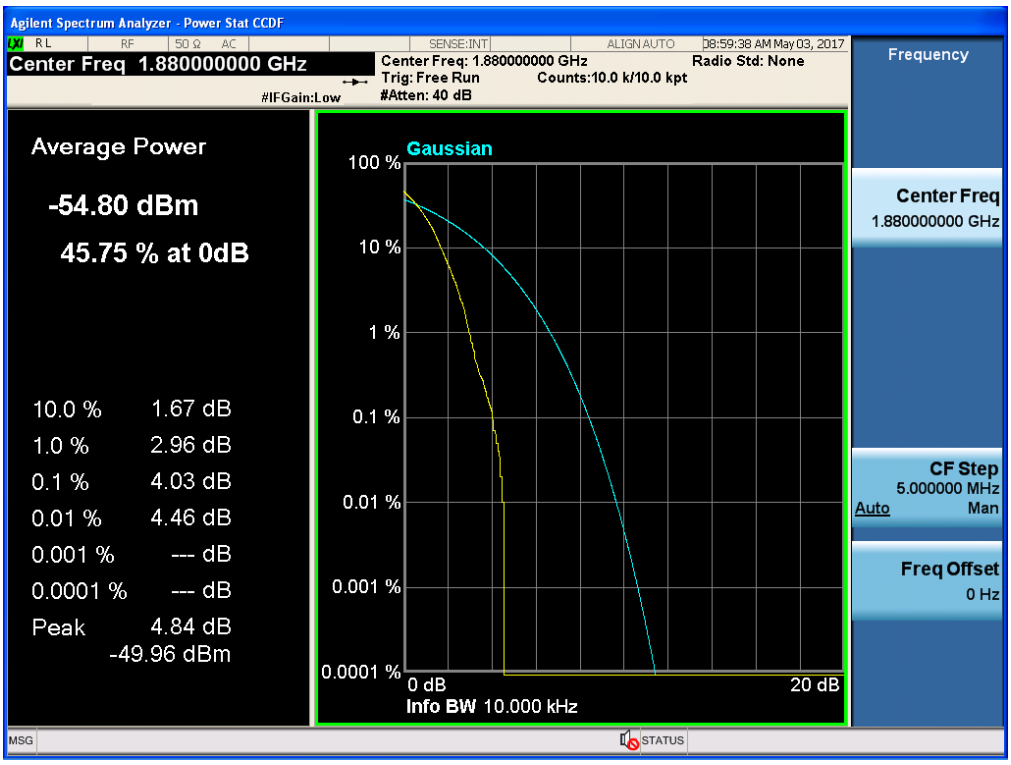
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



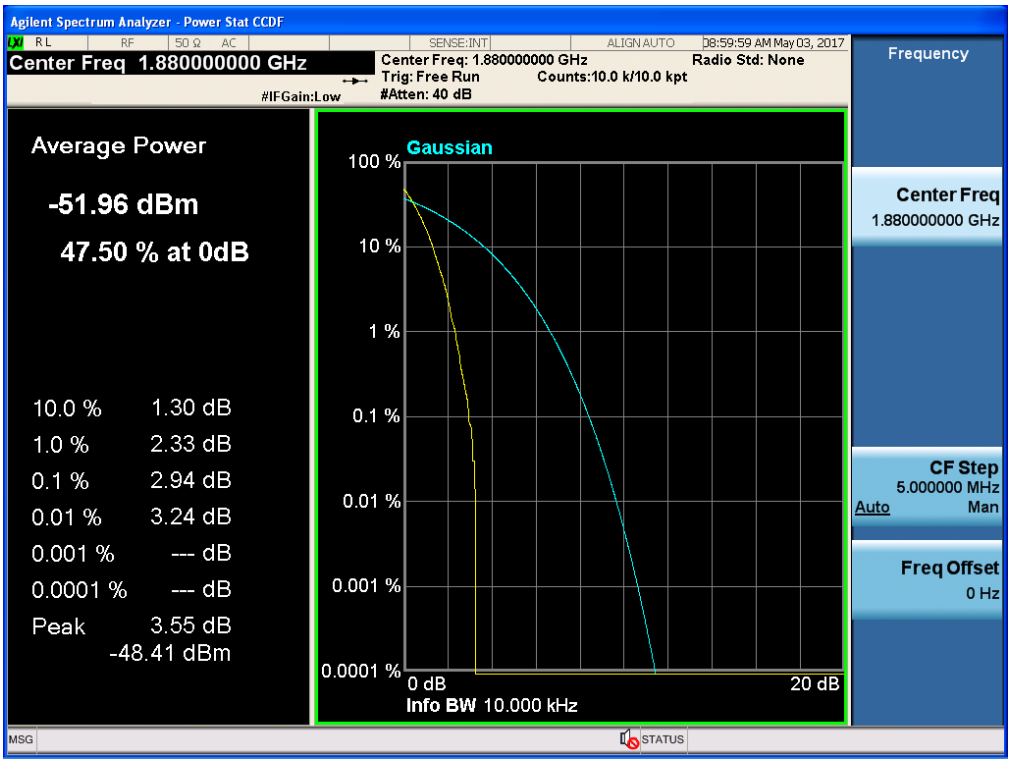
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



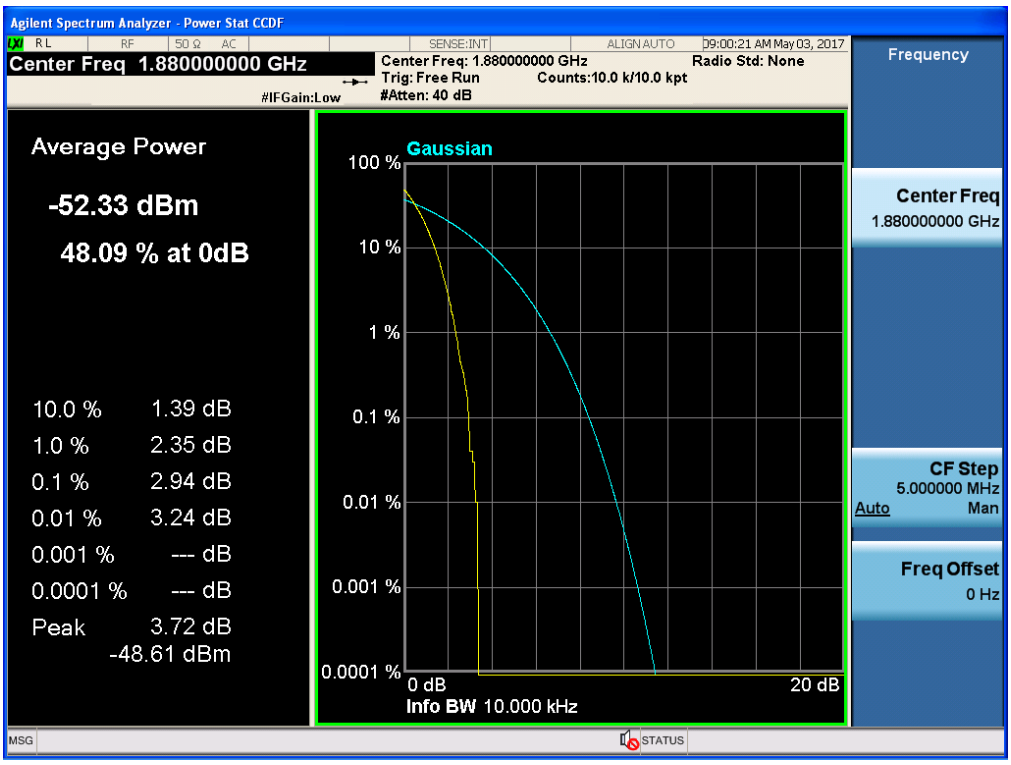
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



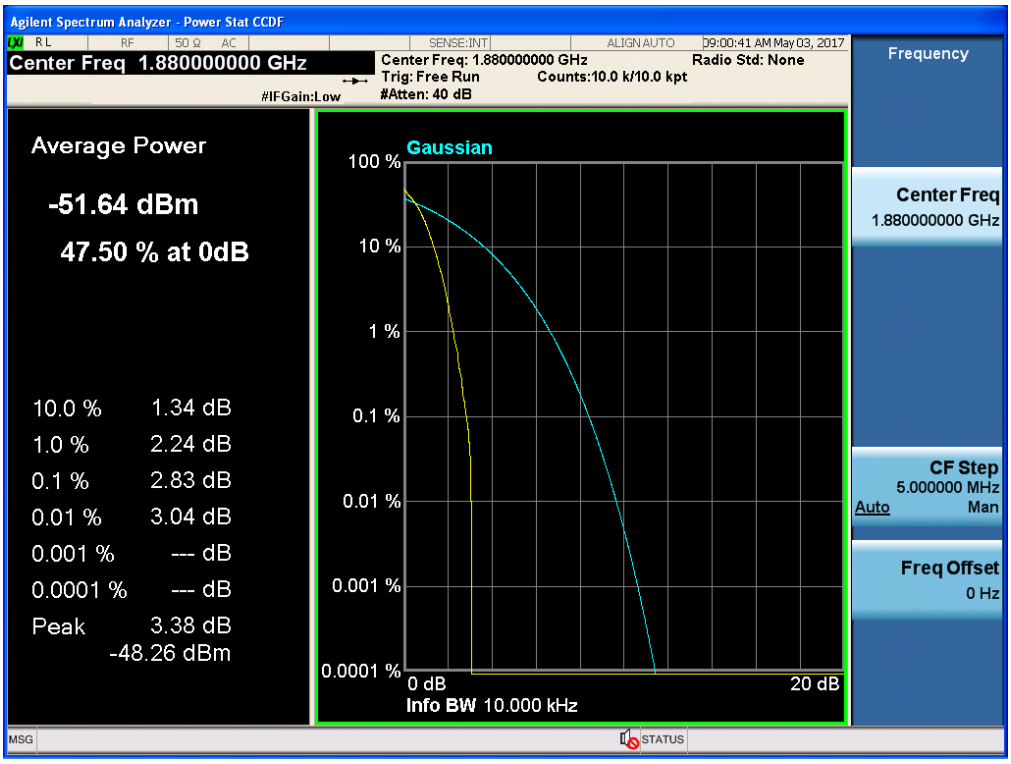
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



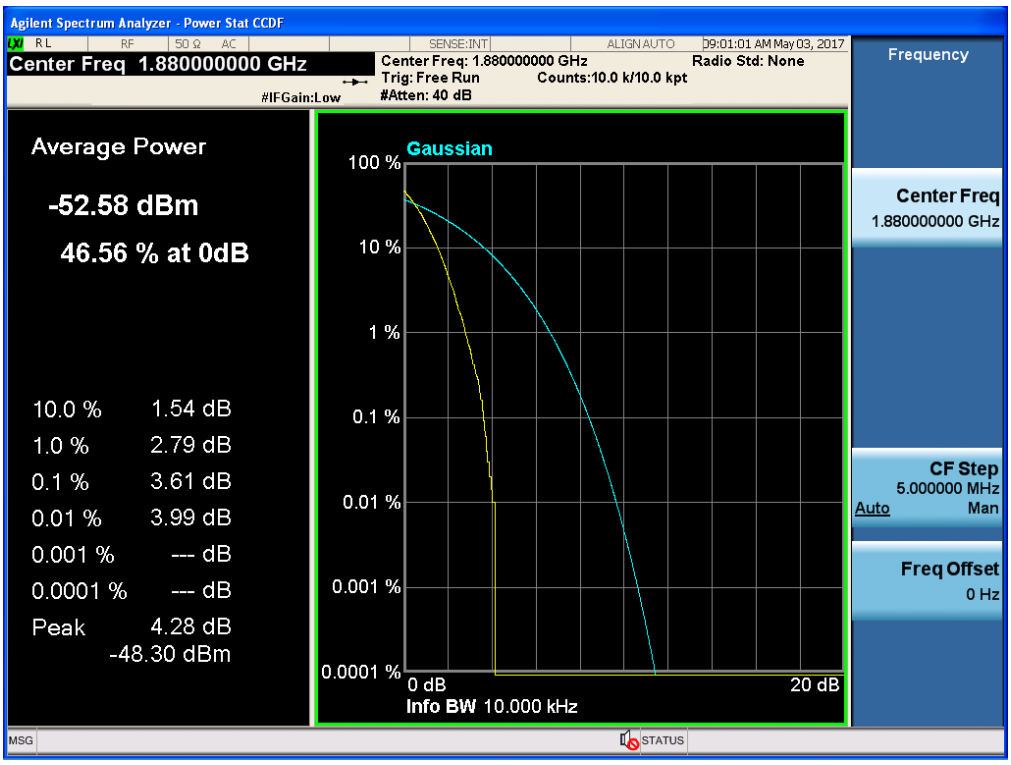
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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

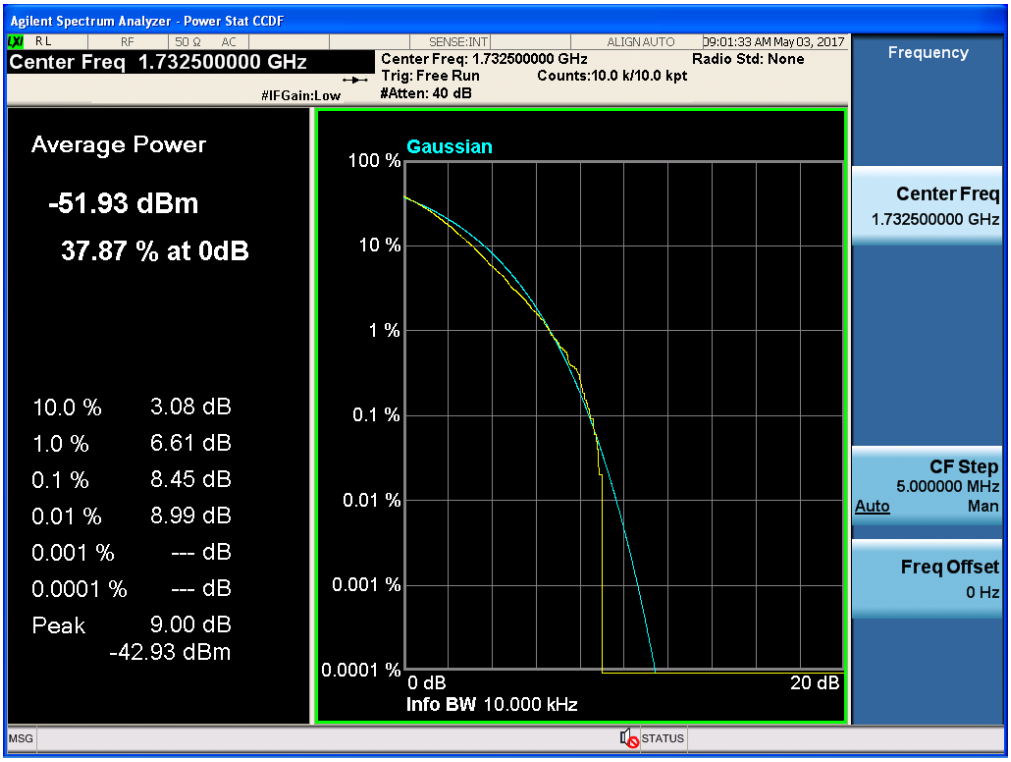


Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

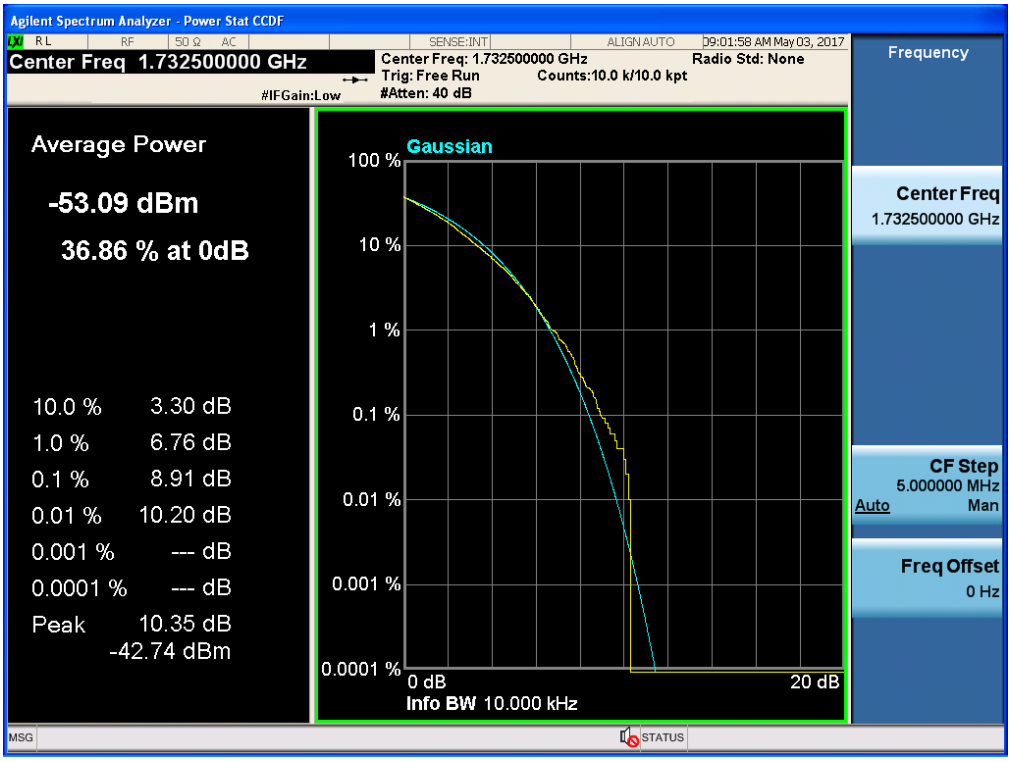


11.1.6 LTE BAND 4

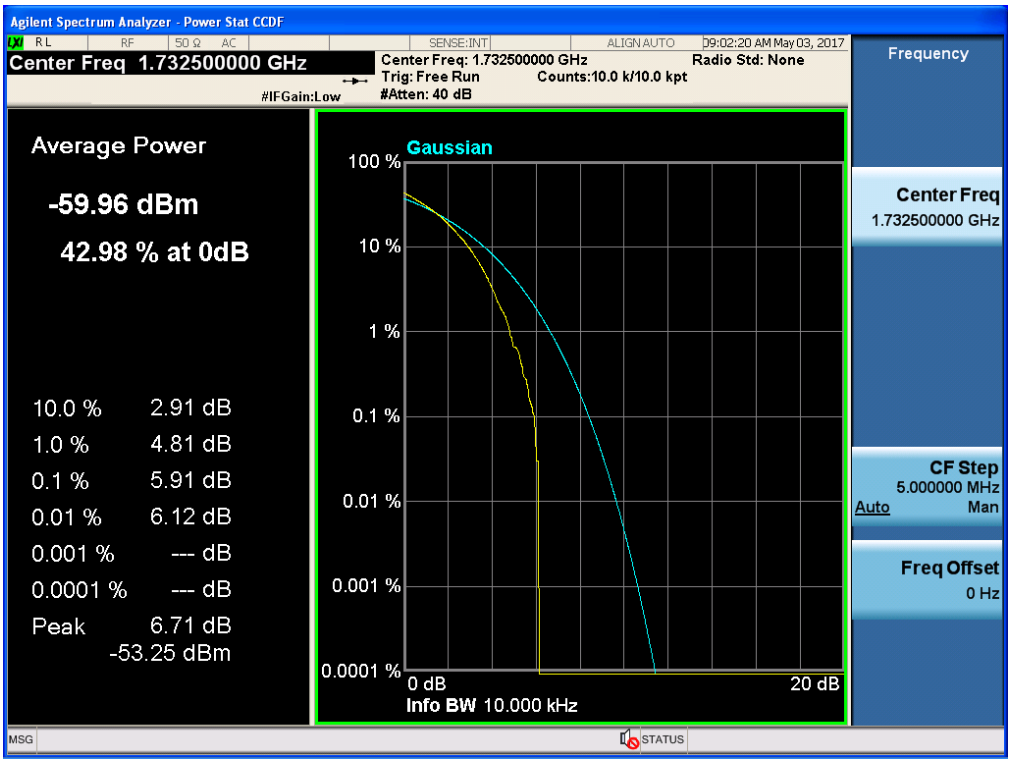
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



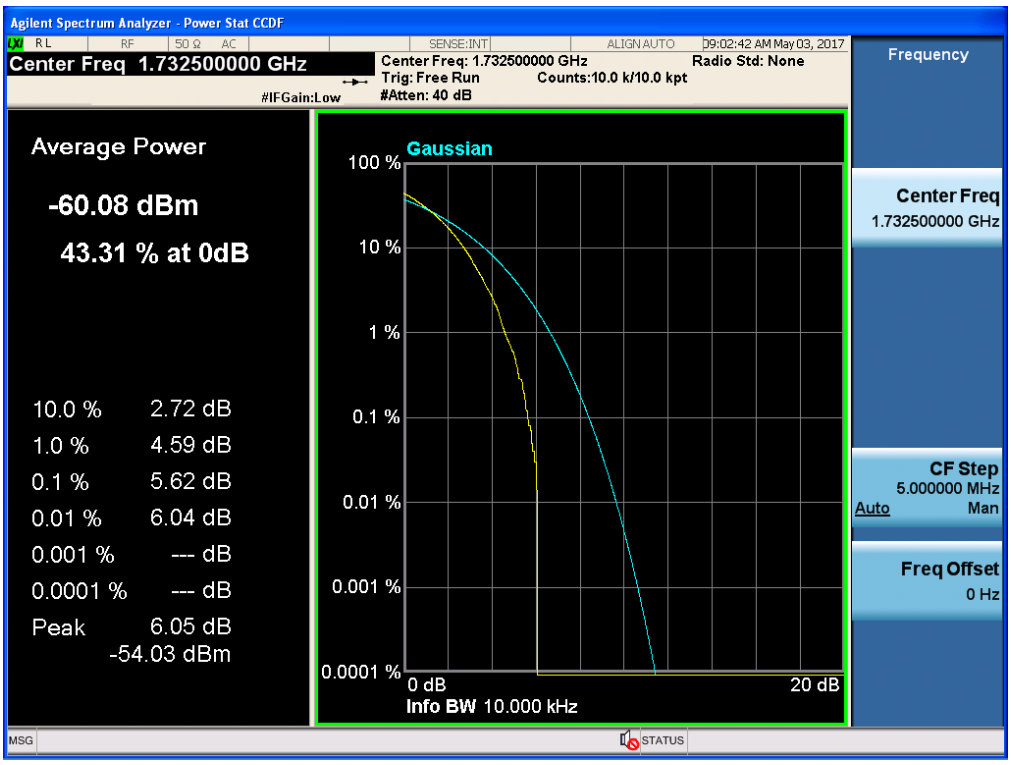
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,16QAM



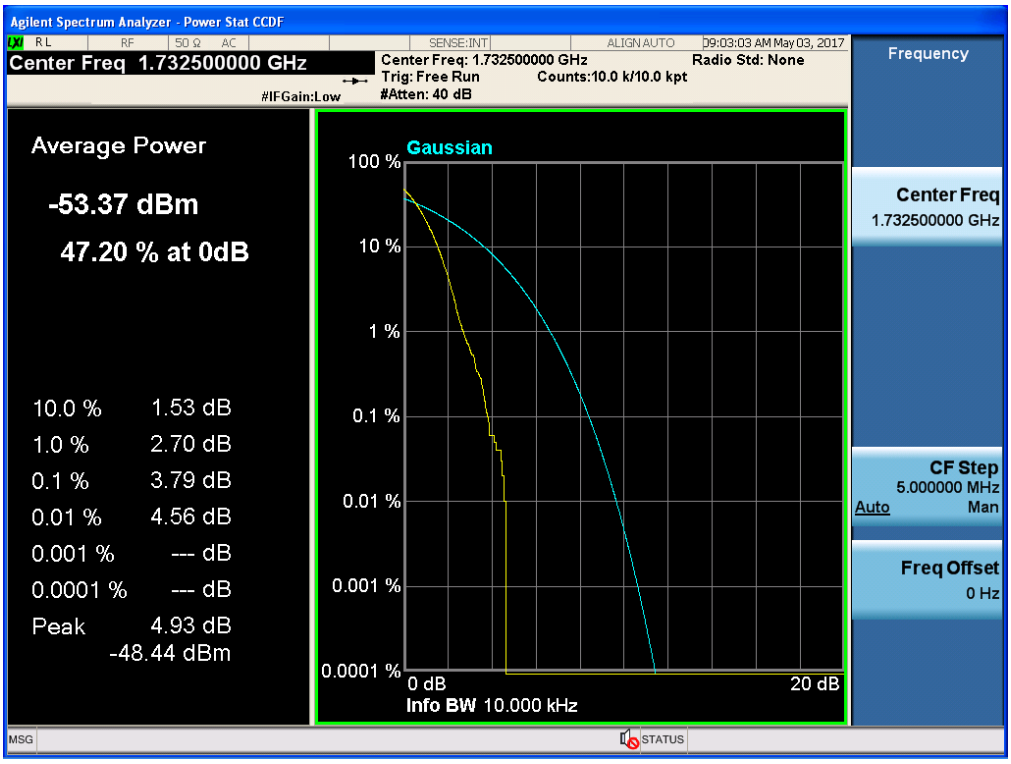
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



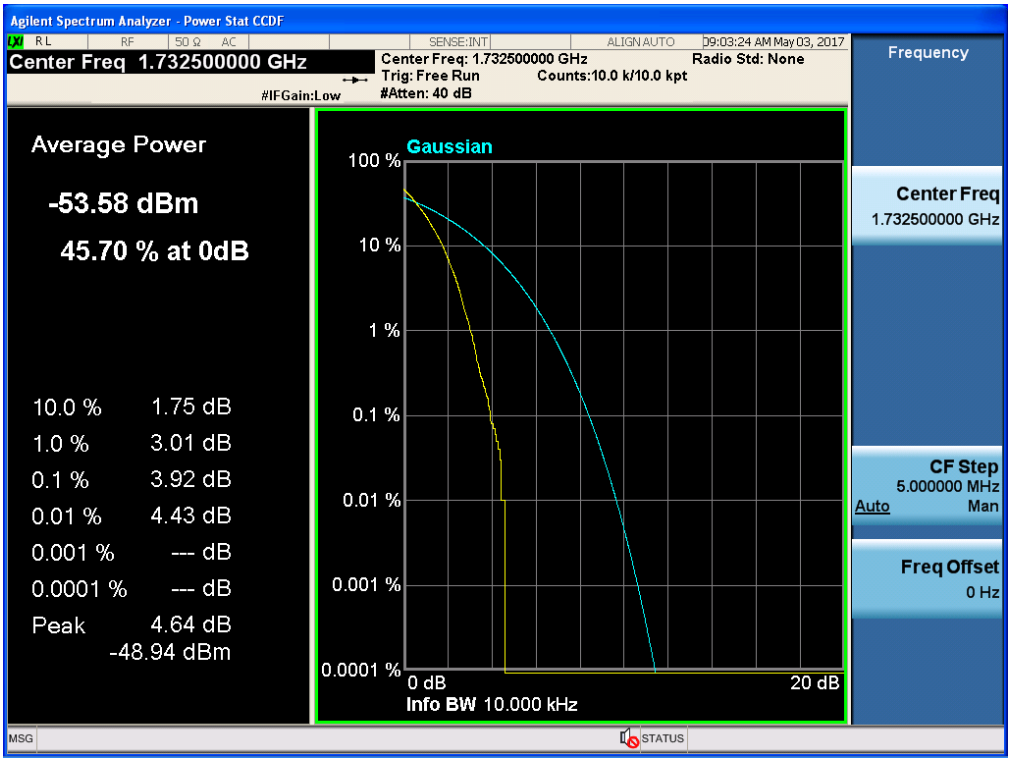
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



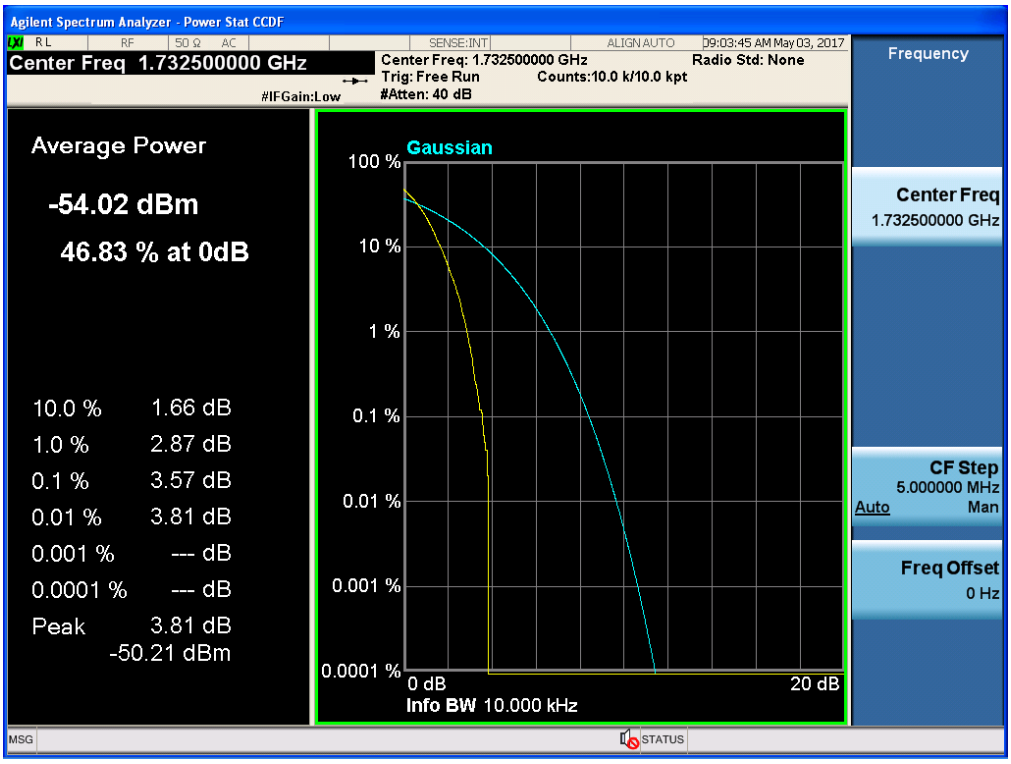
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



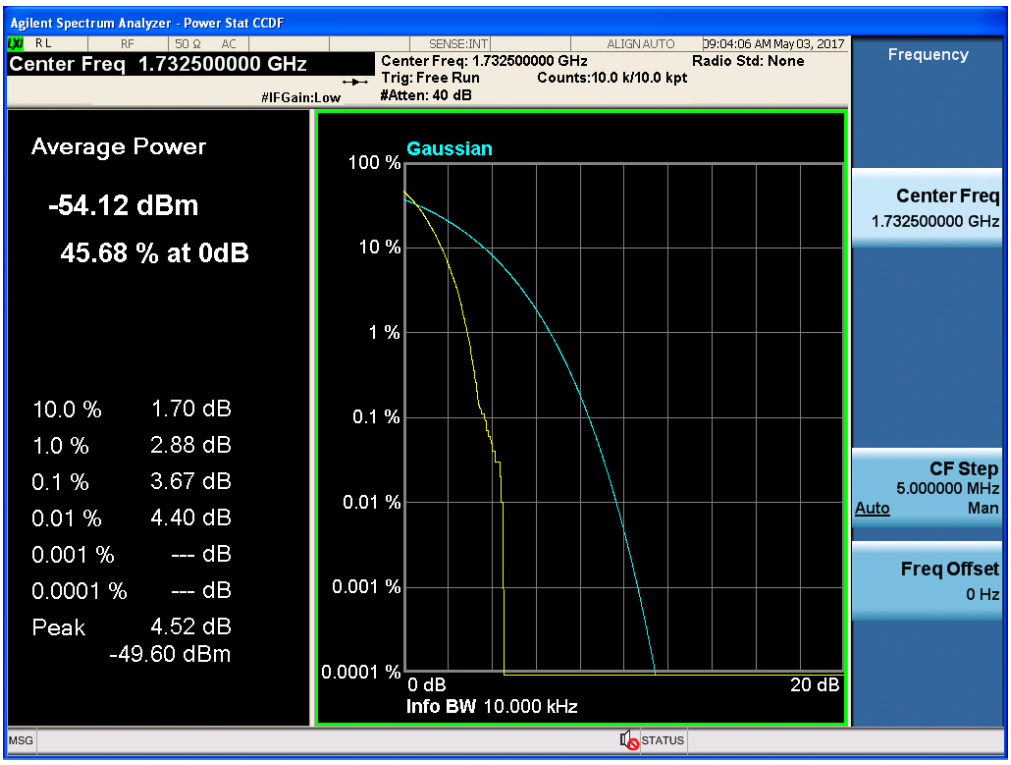
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



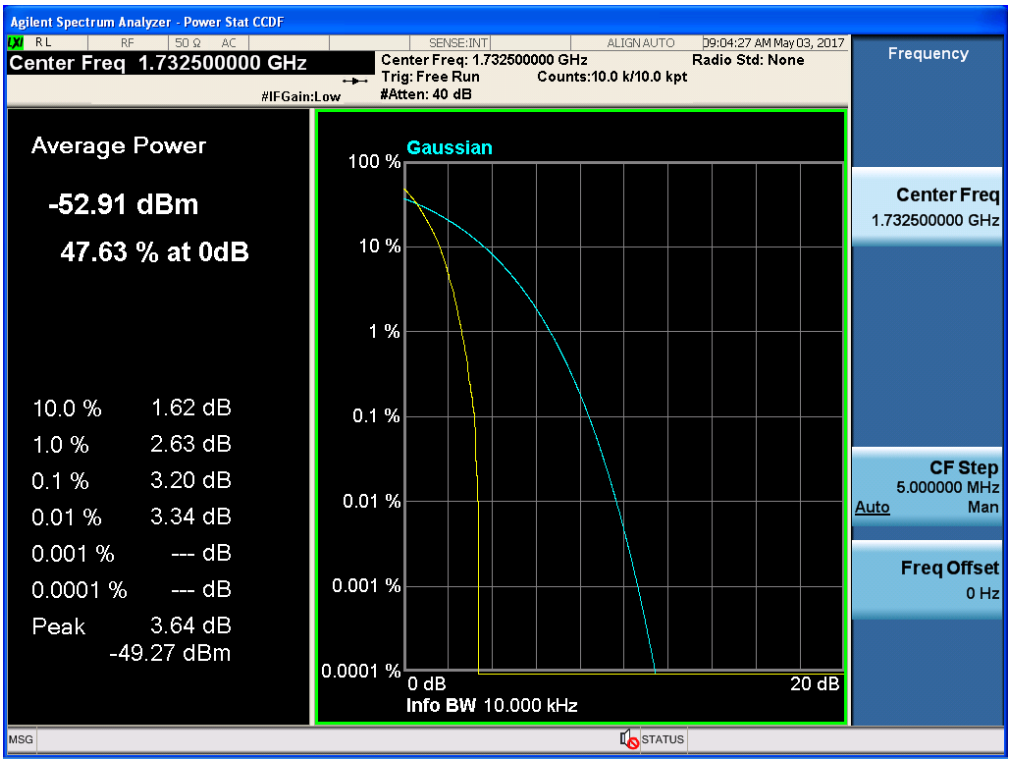
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



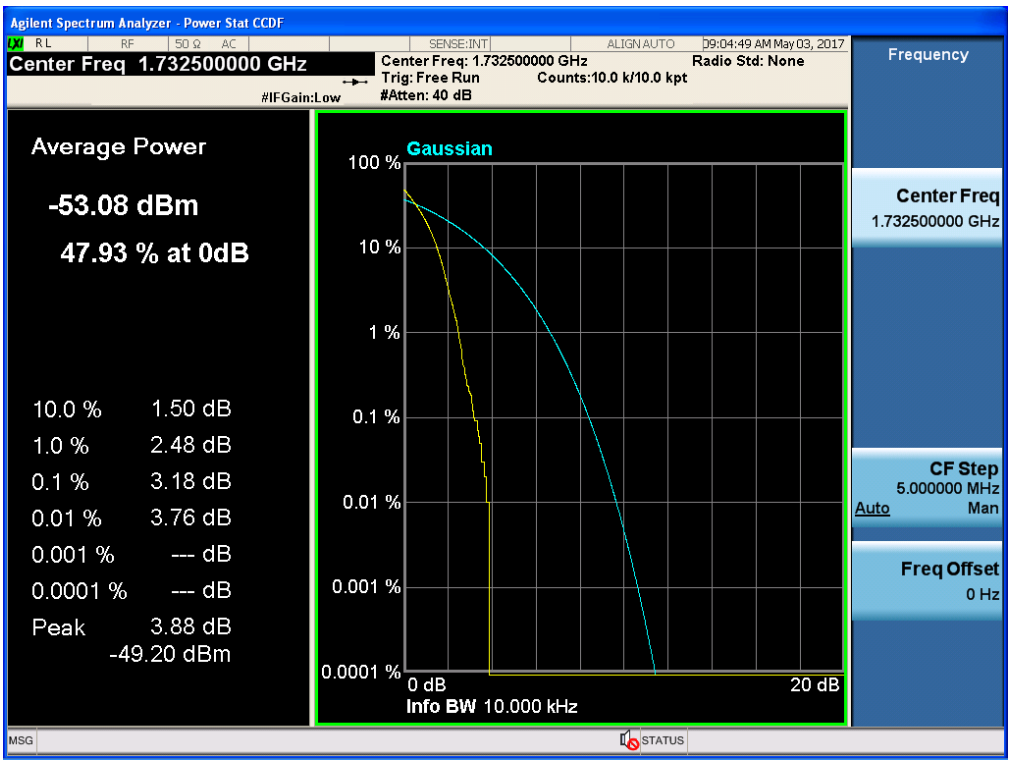
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,16QAM



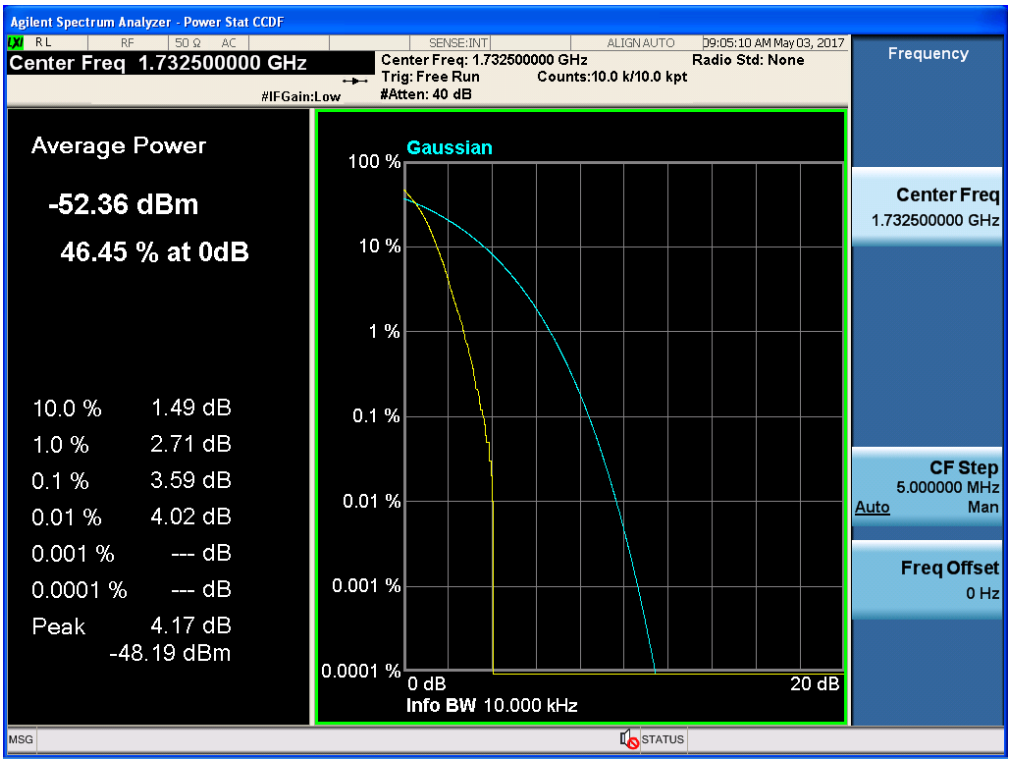
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



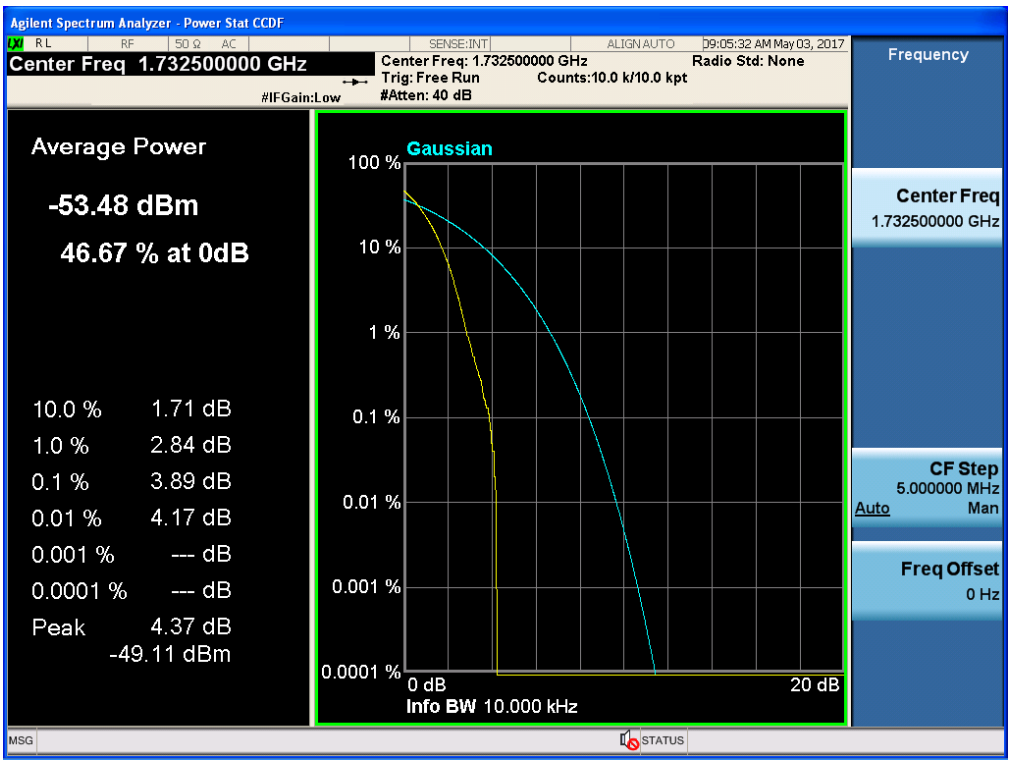
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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

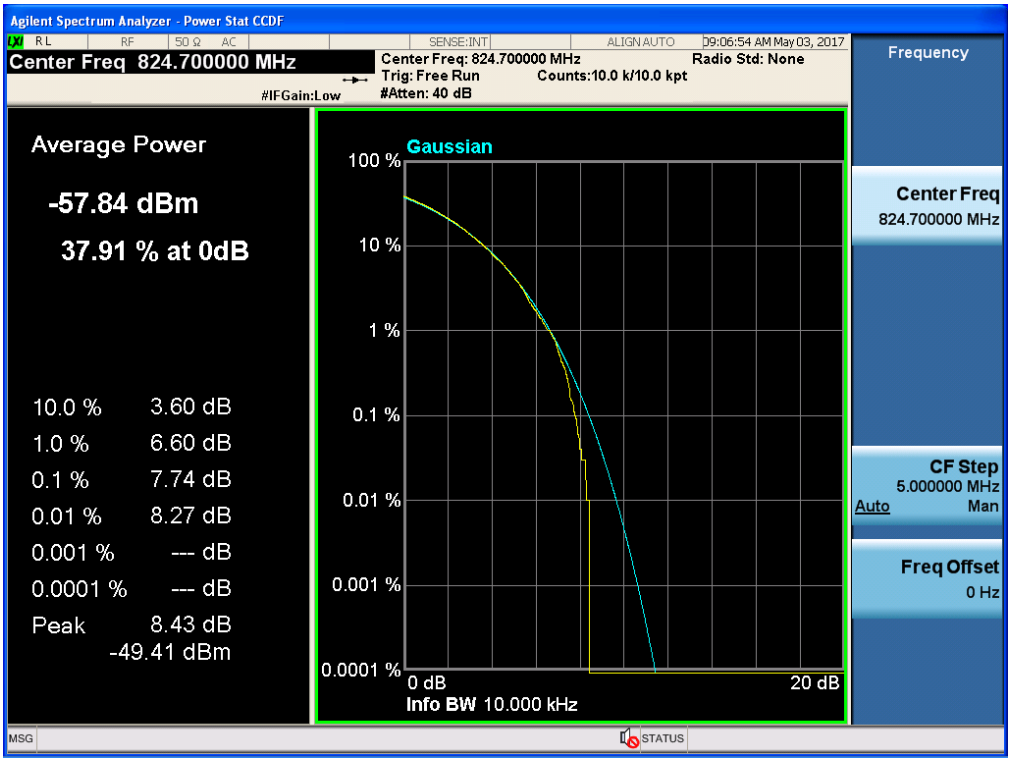


Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,16QAM

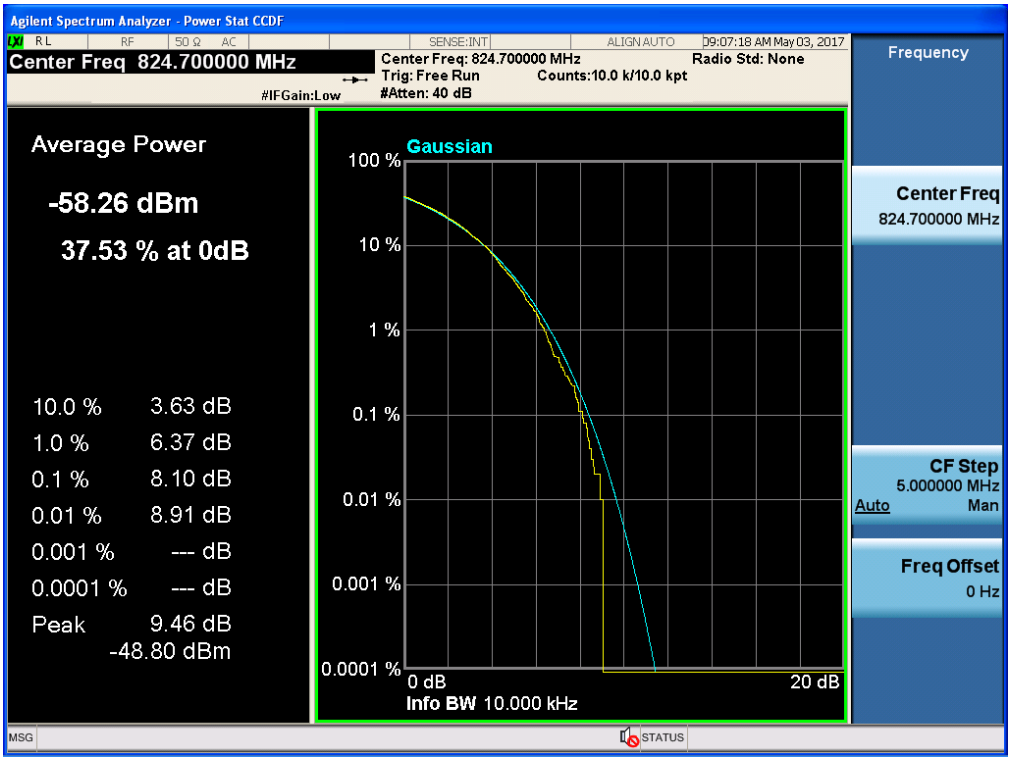


11.1.7 LTE BAND 5

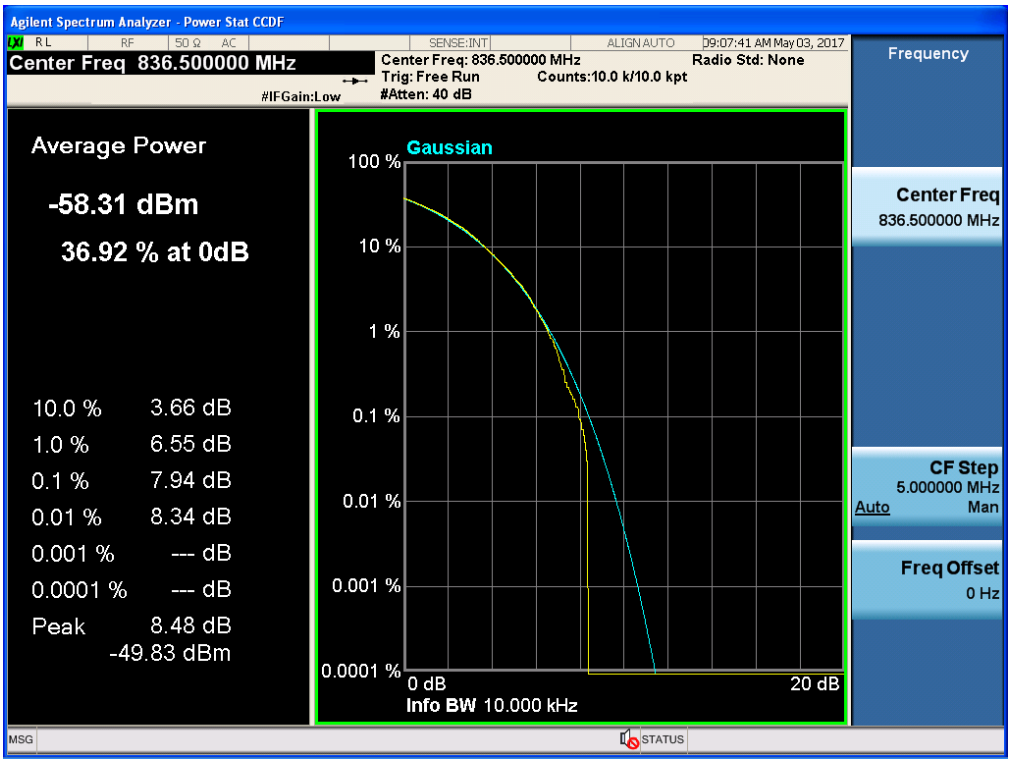
Band 5,UL Channel 20407,UL Frequency 824.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



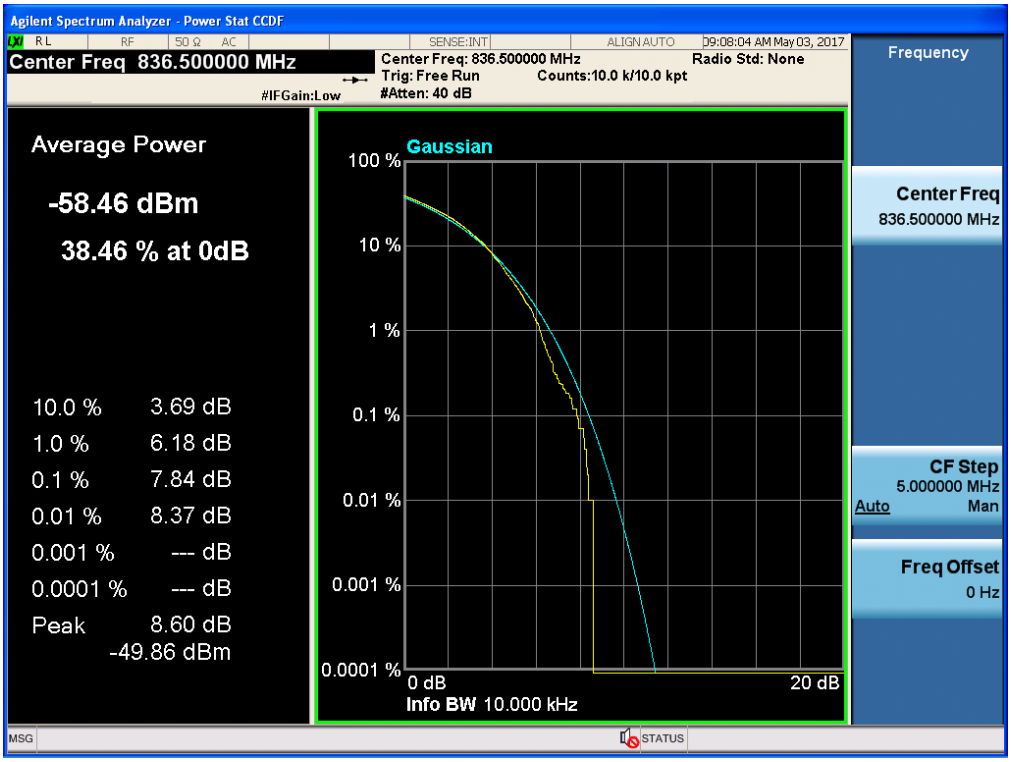
Band 5,UL Channel 20407,UL Frequency 824.7,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



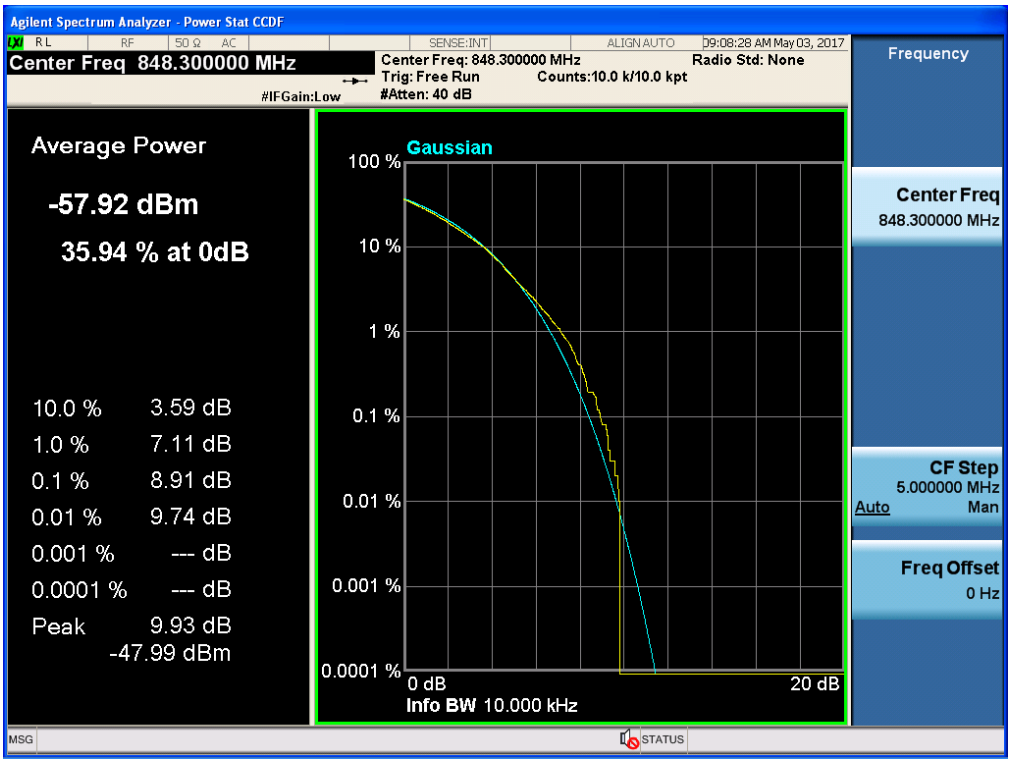
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



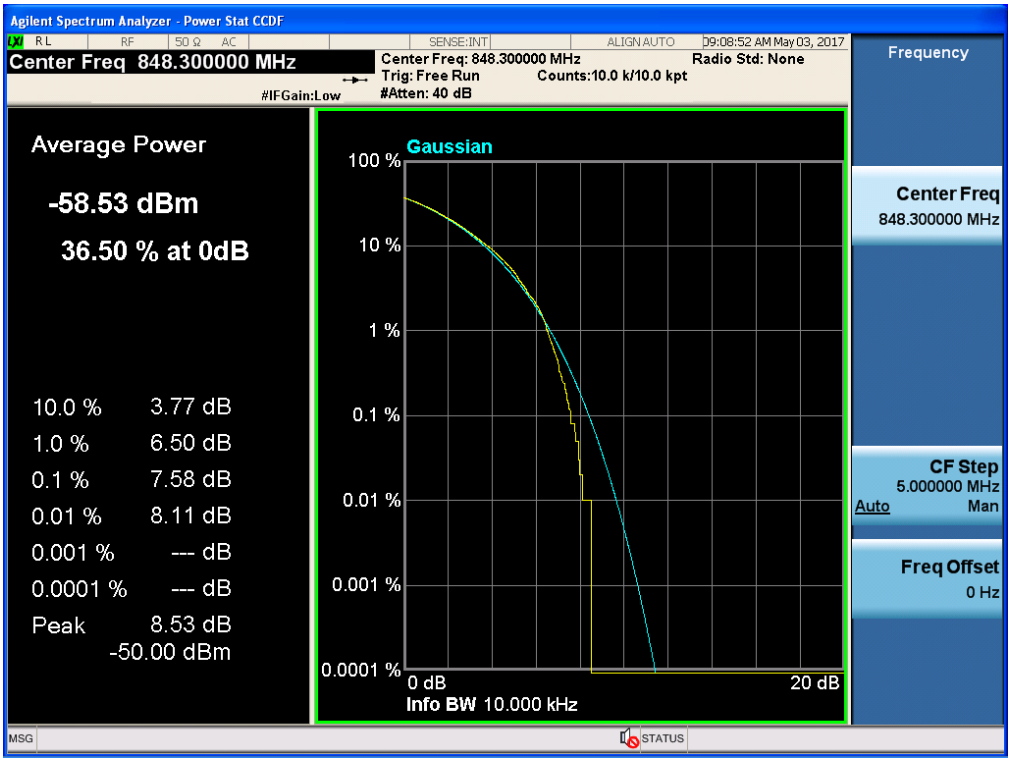
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



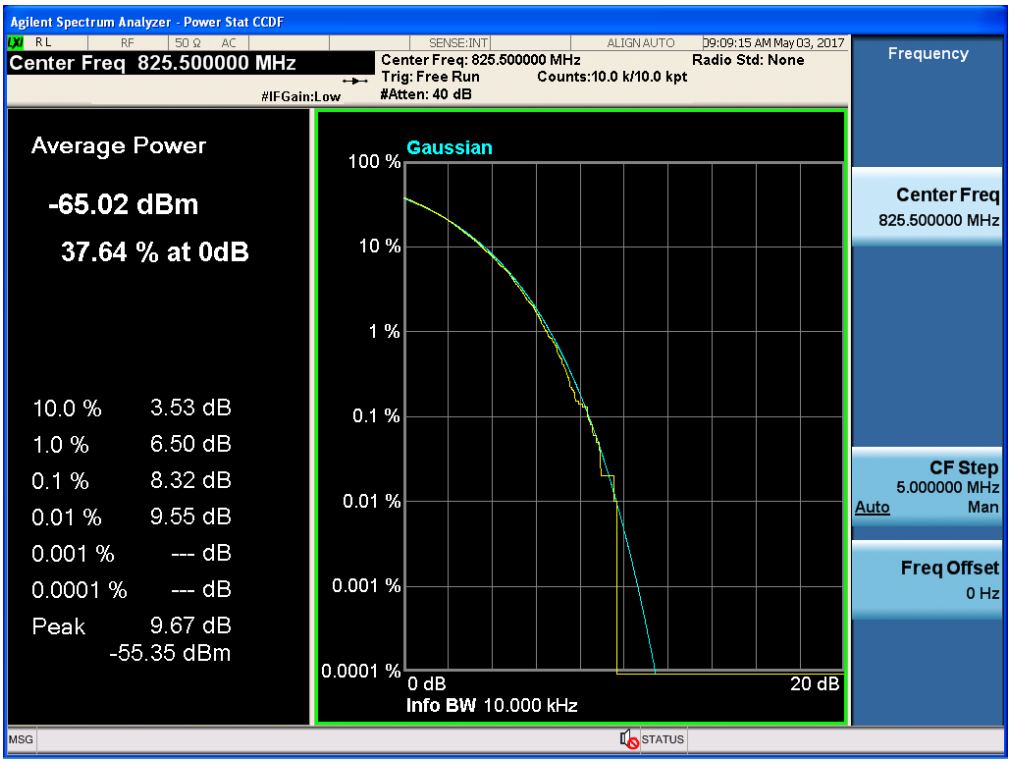
Band 5,UL Channel 20643,UL Frequency 848.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



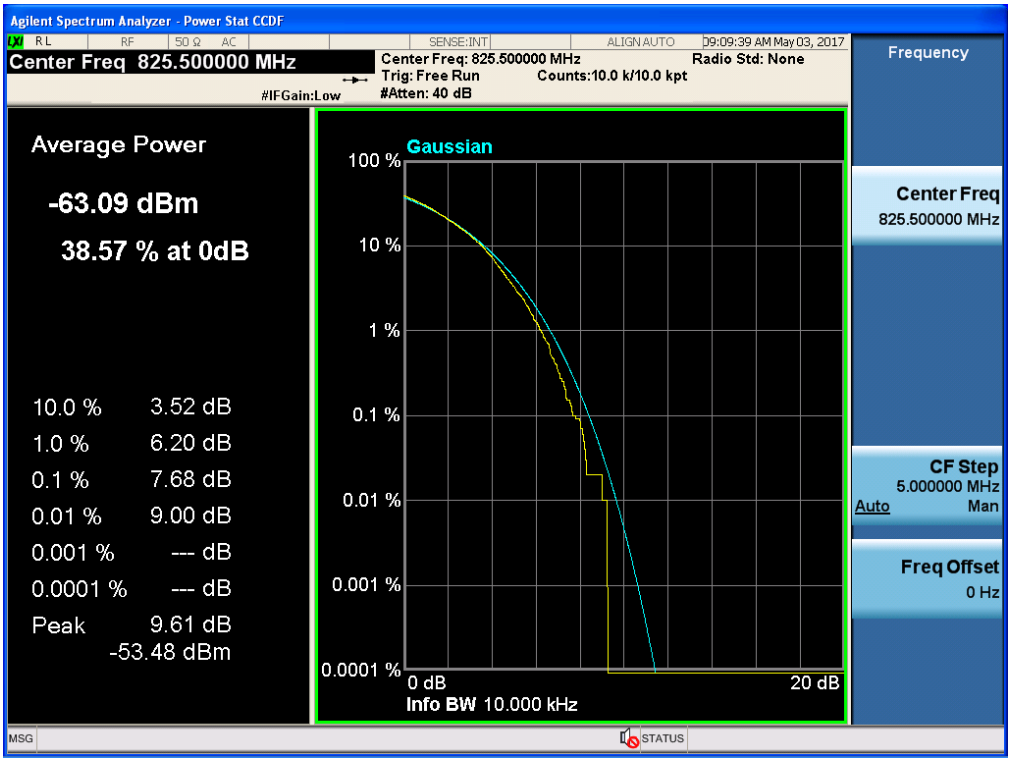
Band 5,UL Channel 20643,UL Frequency 848.3,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



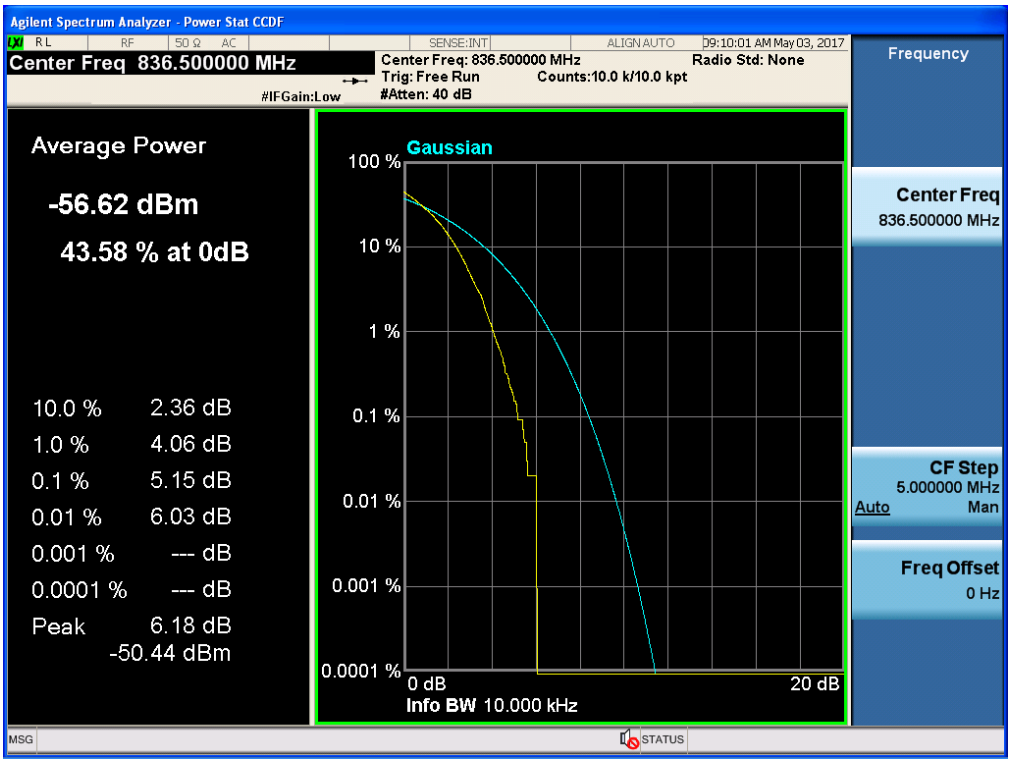
Band 5,UL Channel 20415,UL Frequency 825.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



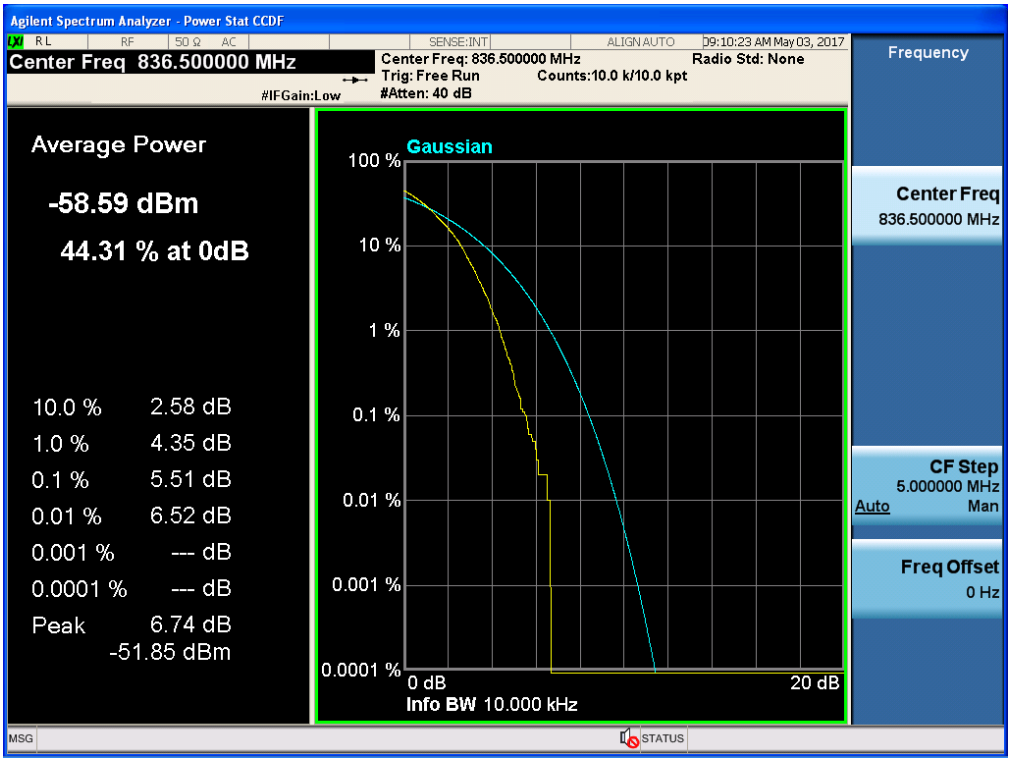
Band 5,UL Channel 20415,UL Frequency 825.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



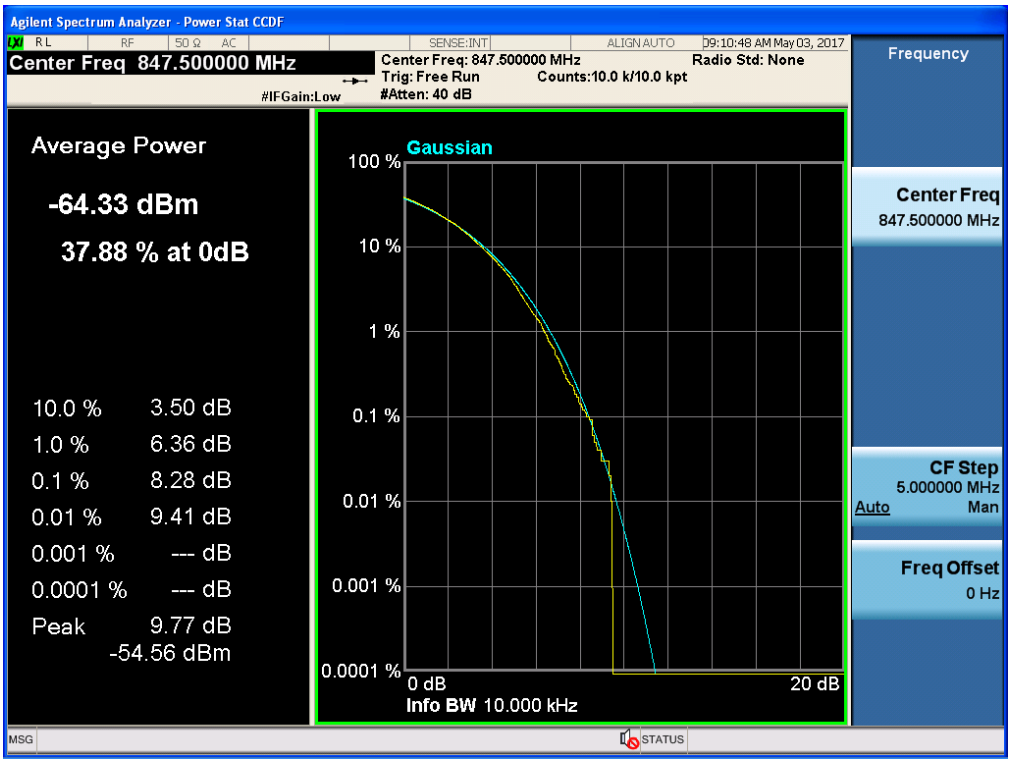
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



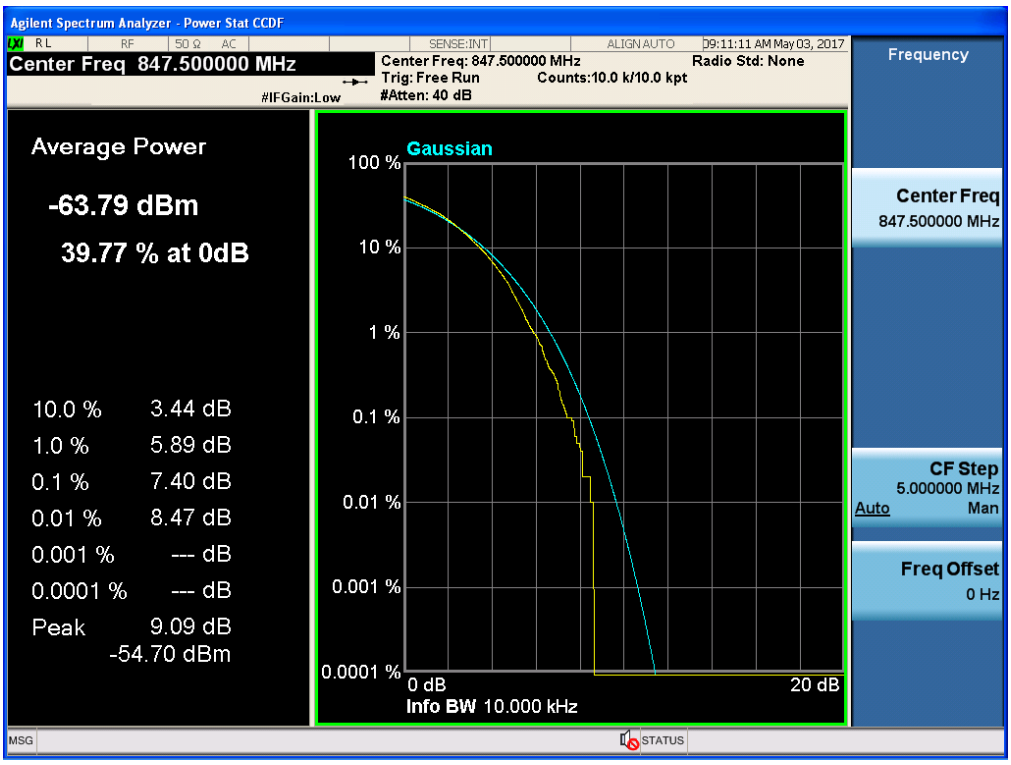
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



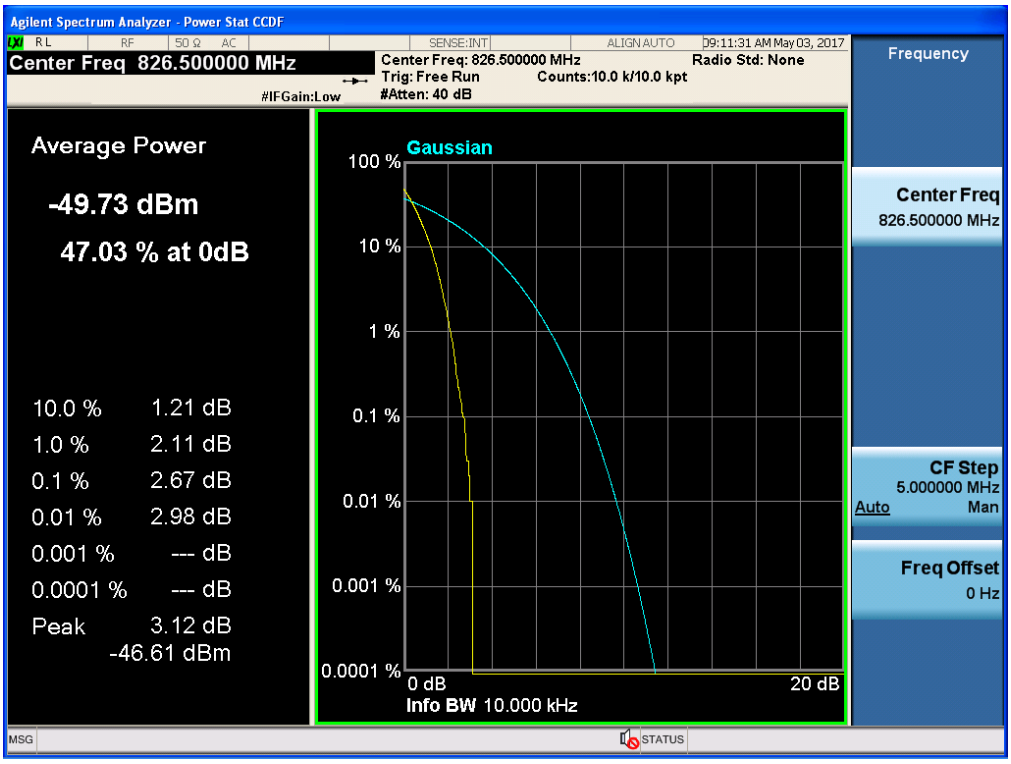
Band 5,UL Channel 20635,UL Frequency 847.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



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



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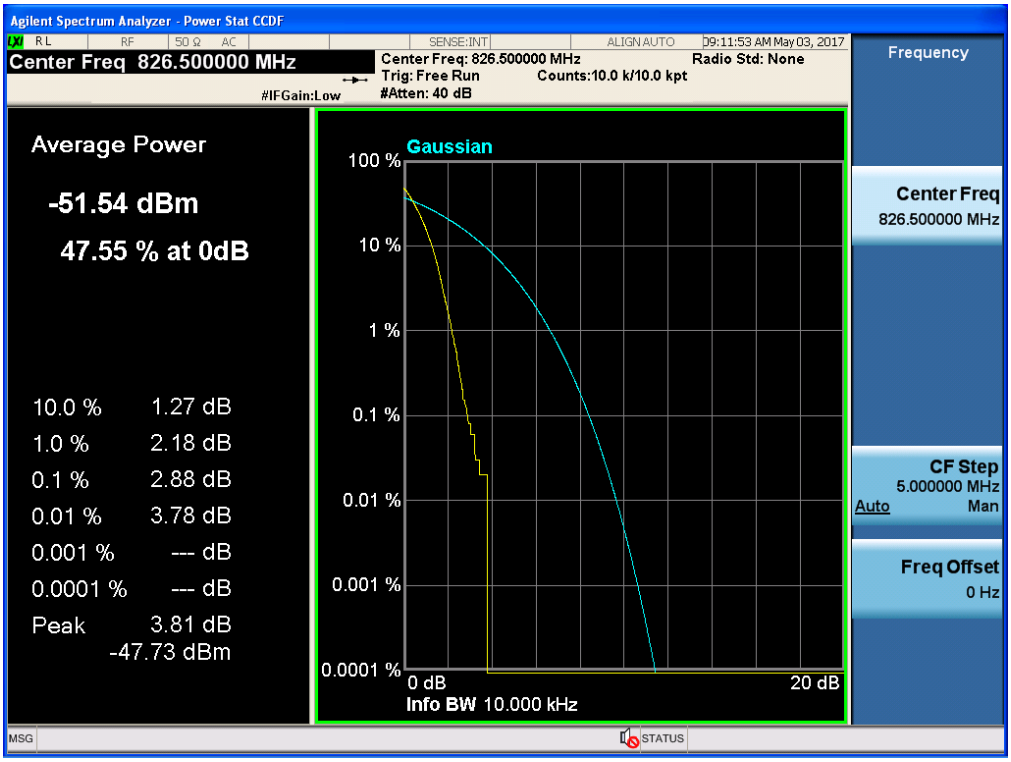

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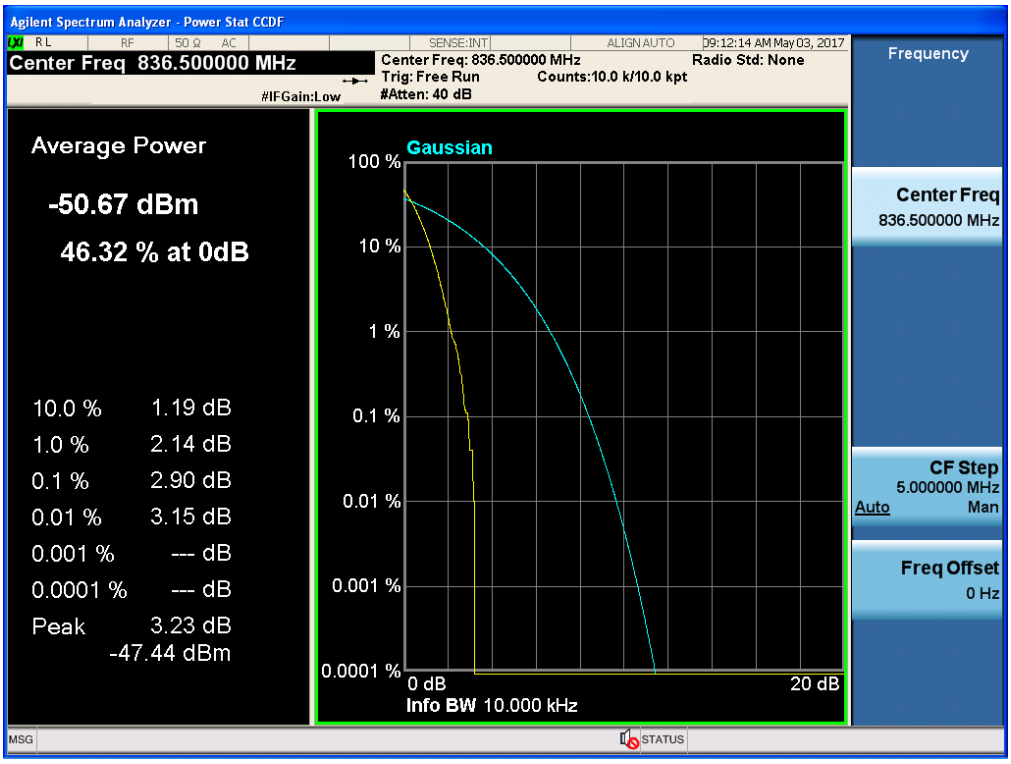
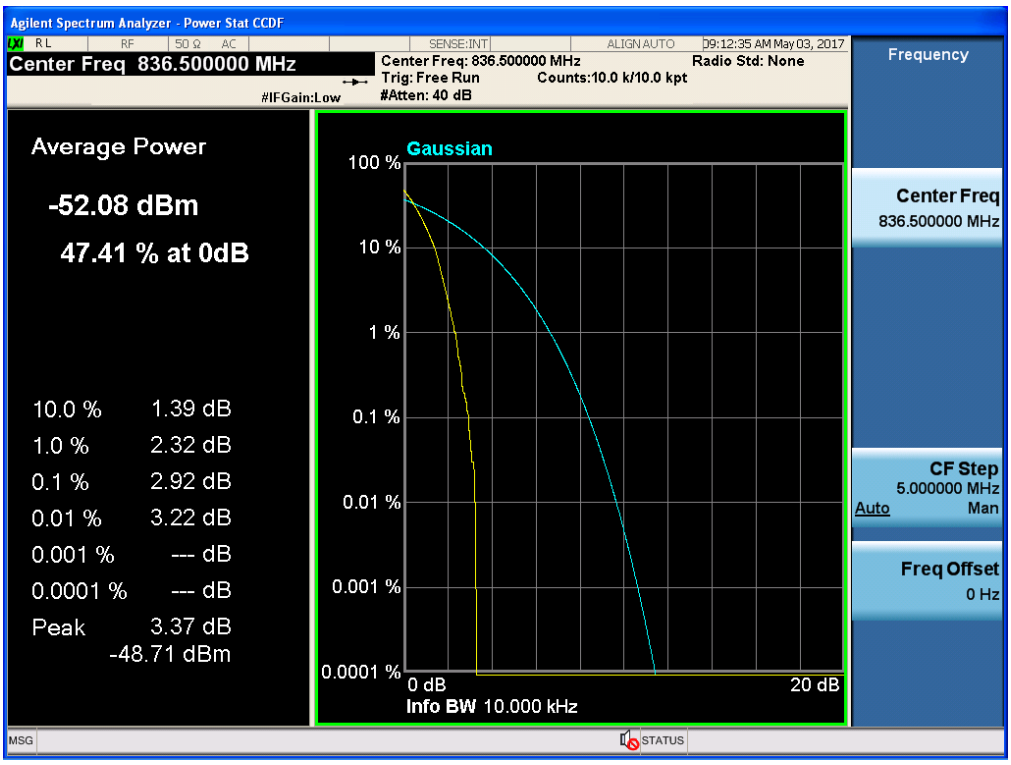
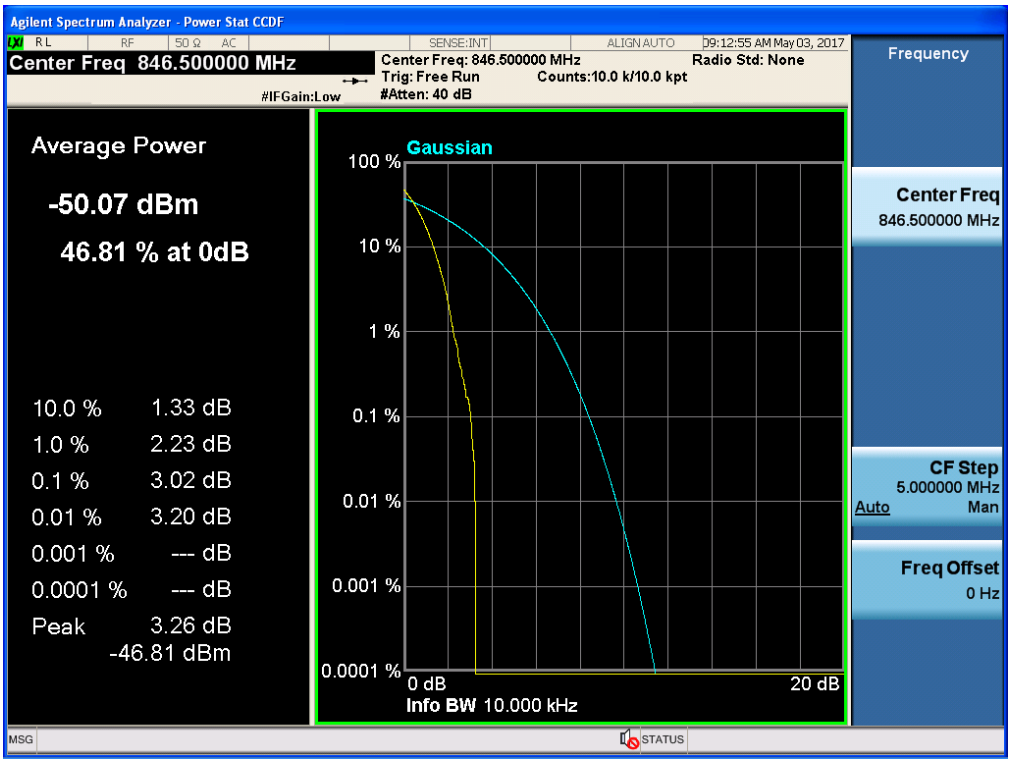


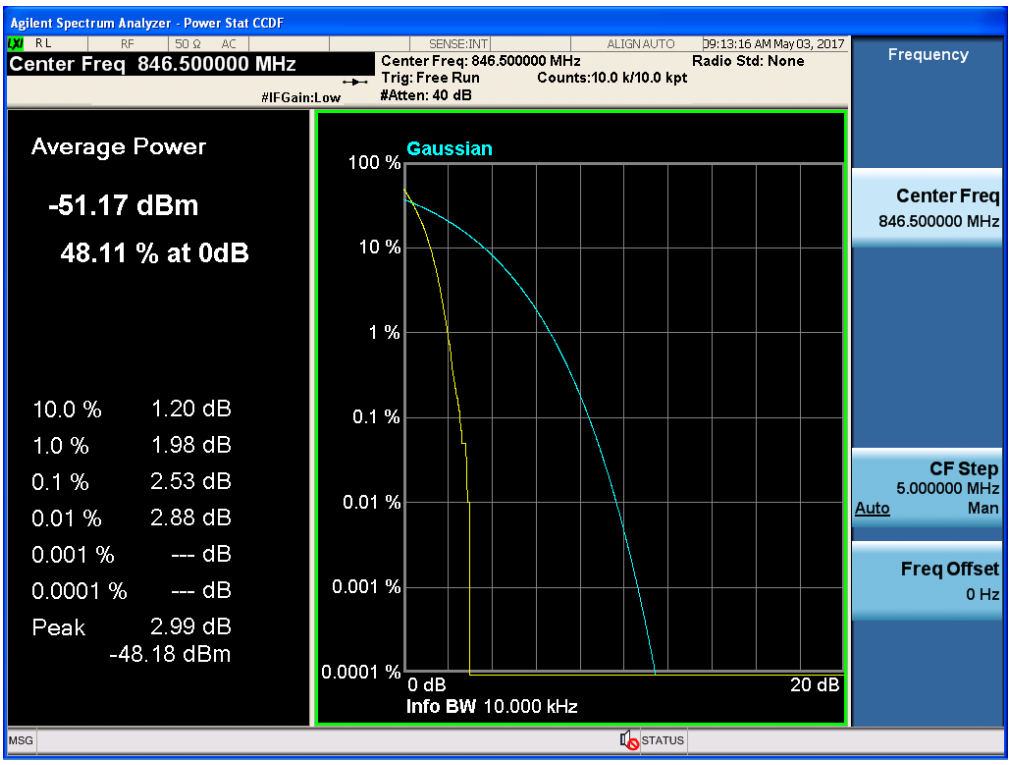
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



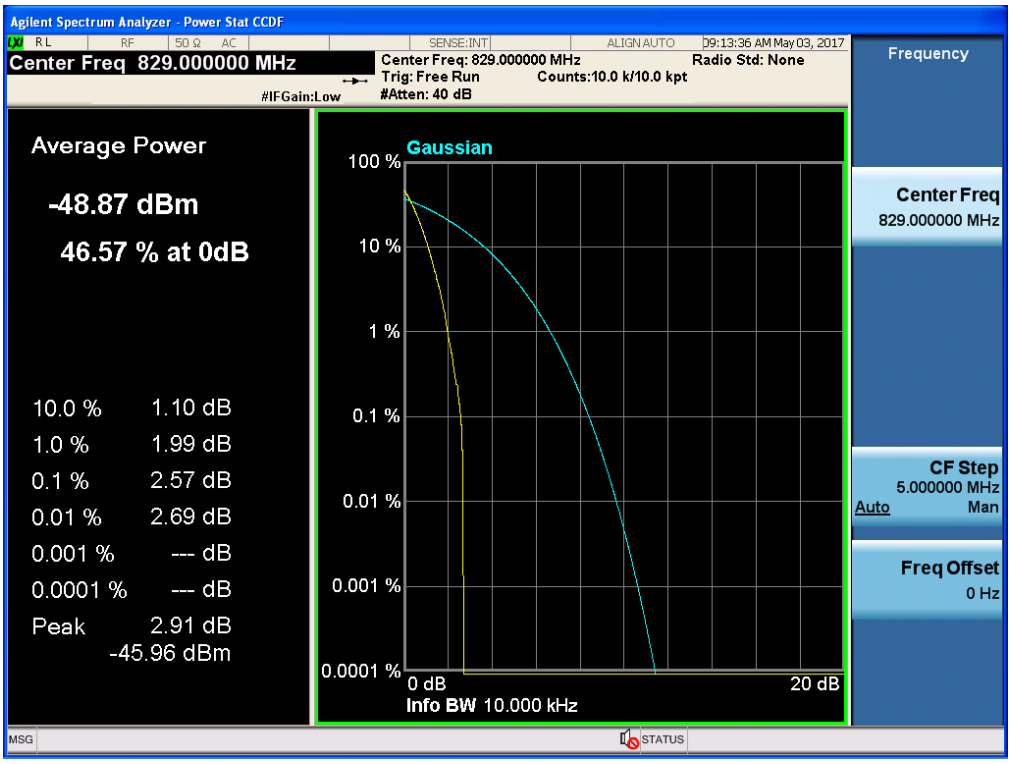
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



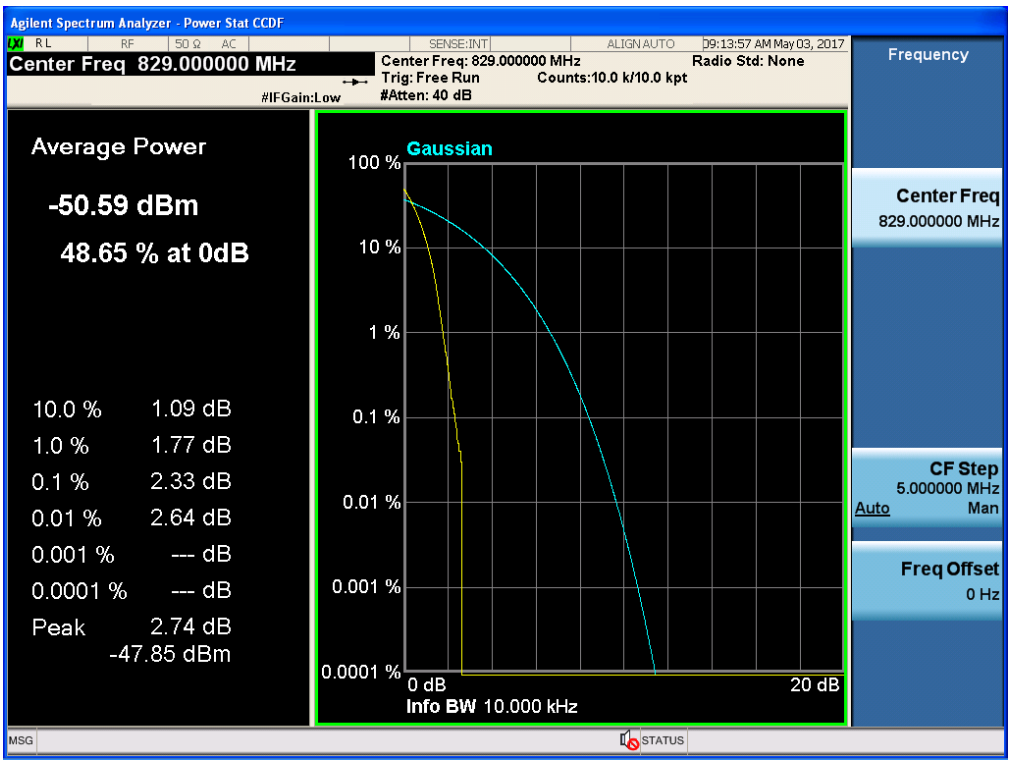
Band 5,UL Channel 20625,UL Frequency 846.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



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



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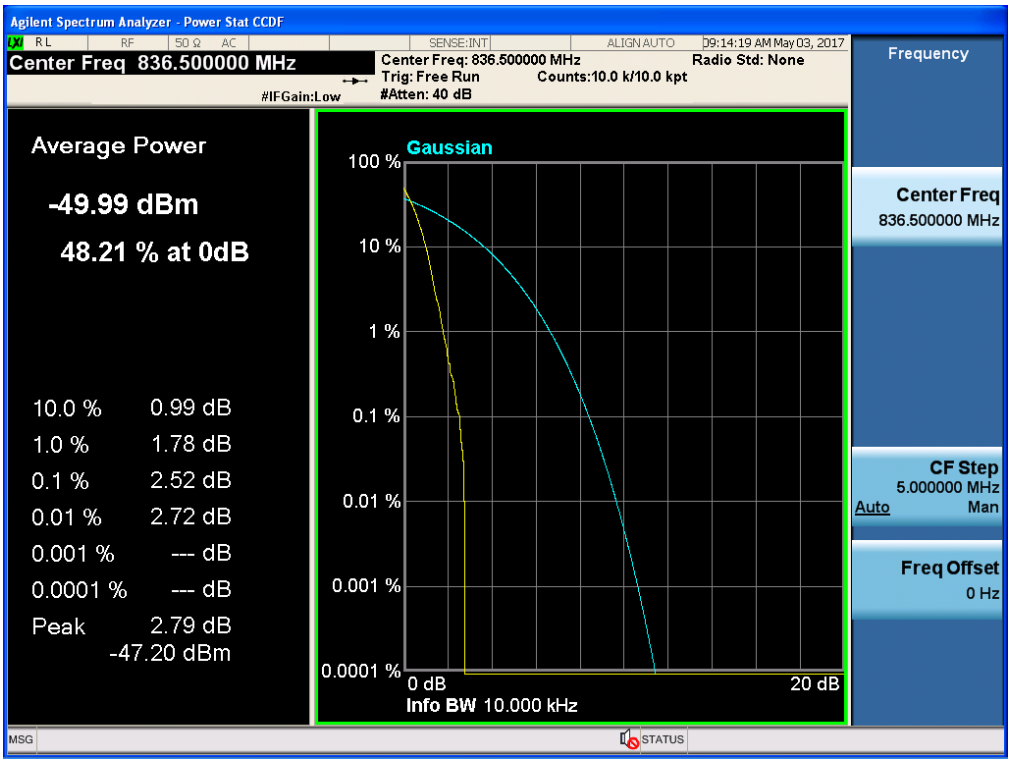

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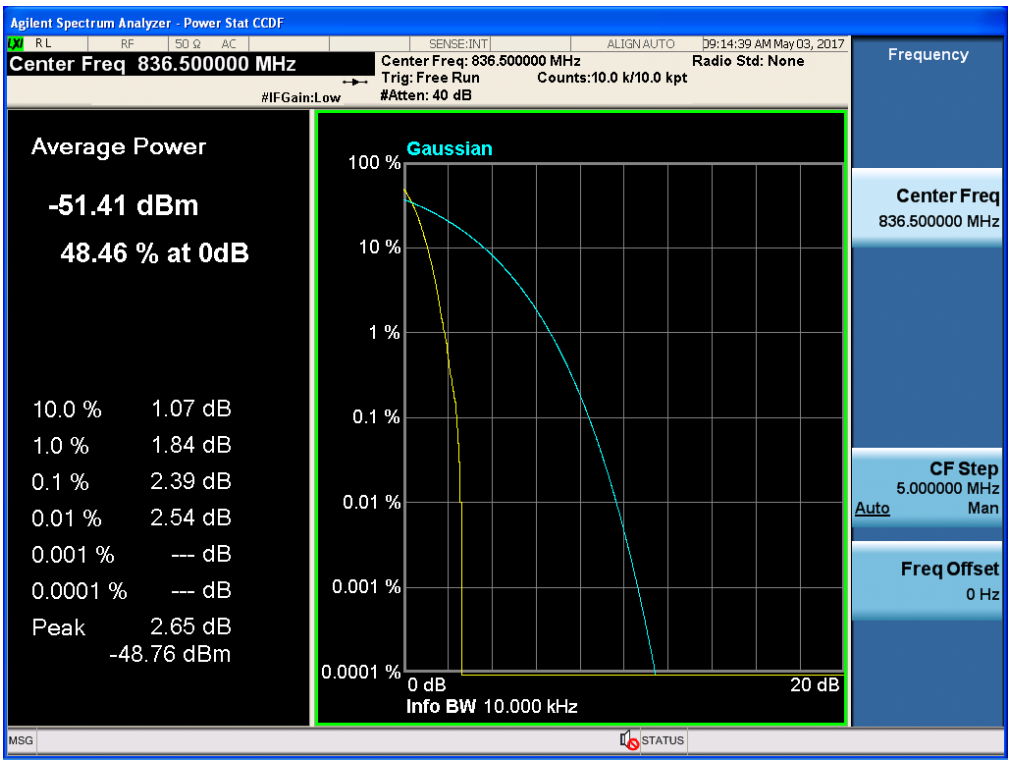
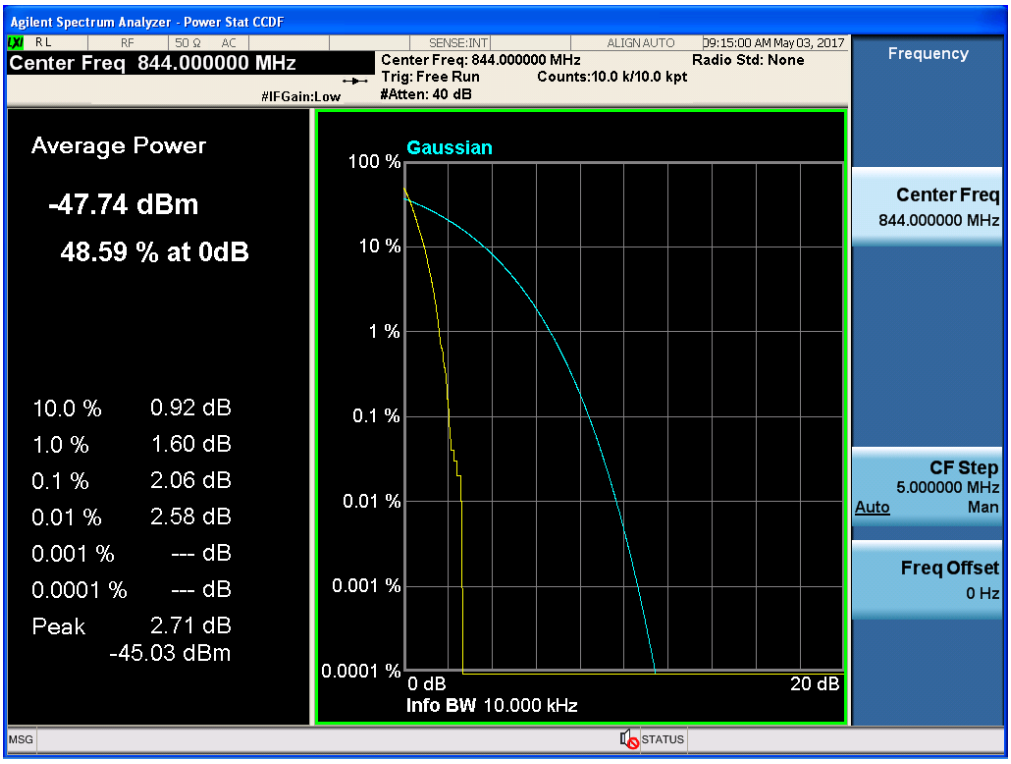


Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



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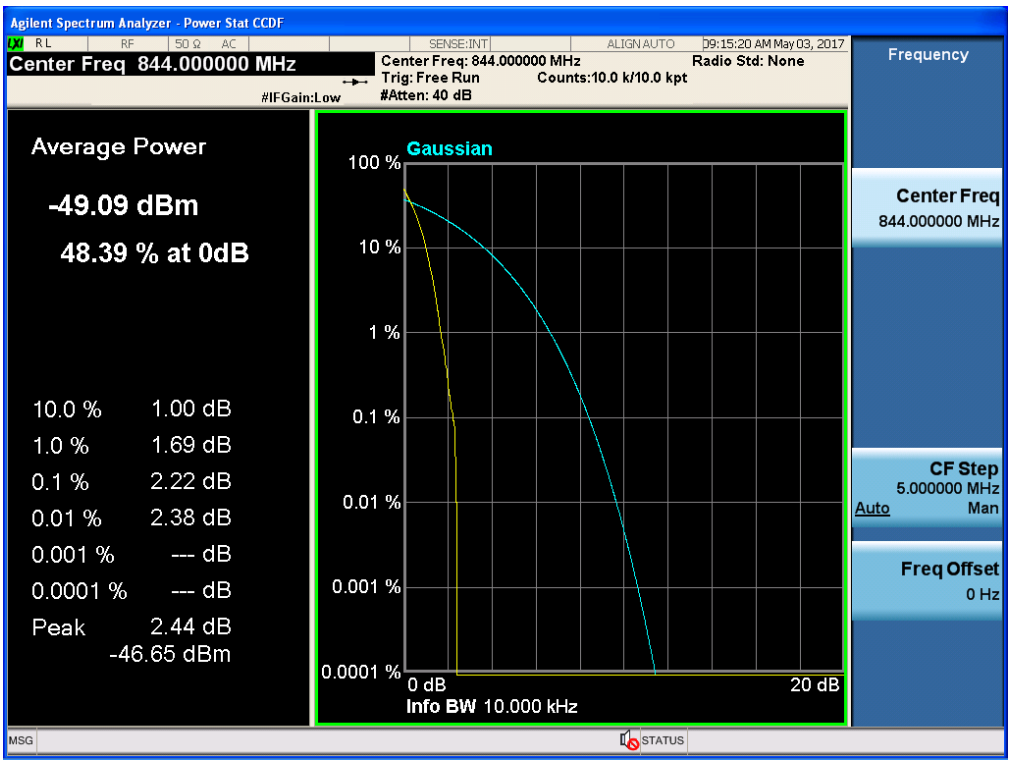
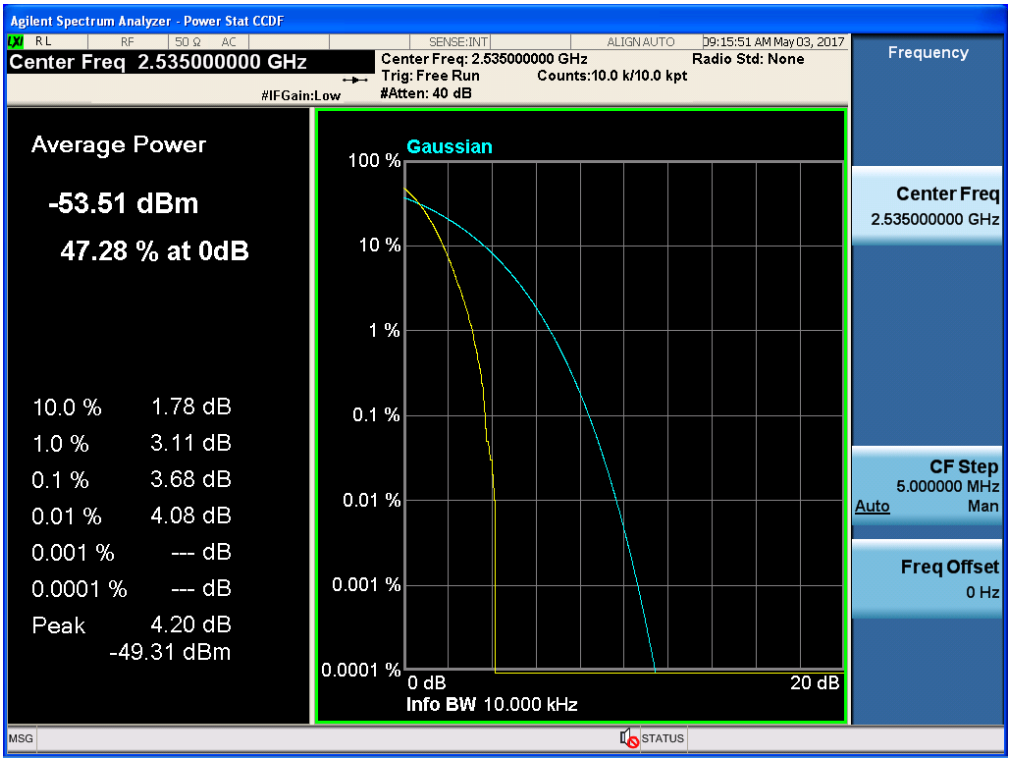


11.1.8 LTE BAND 7

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



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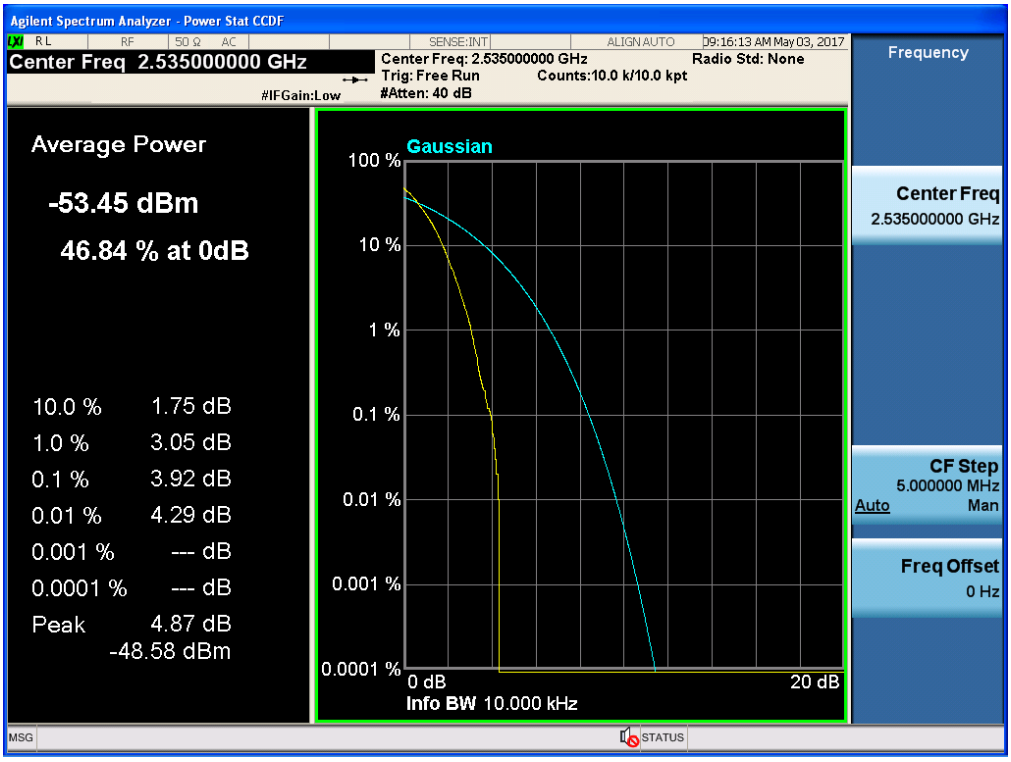

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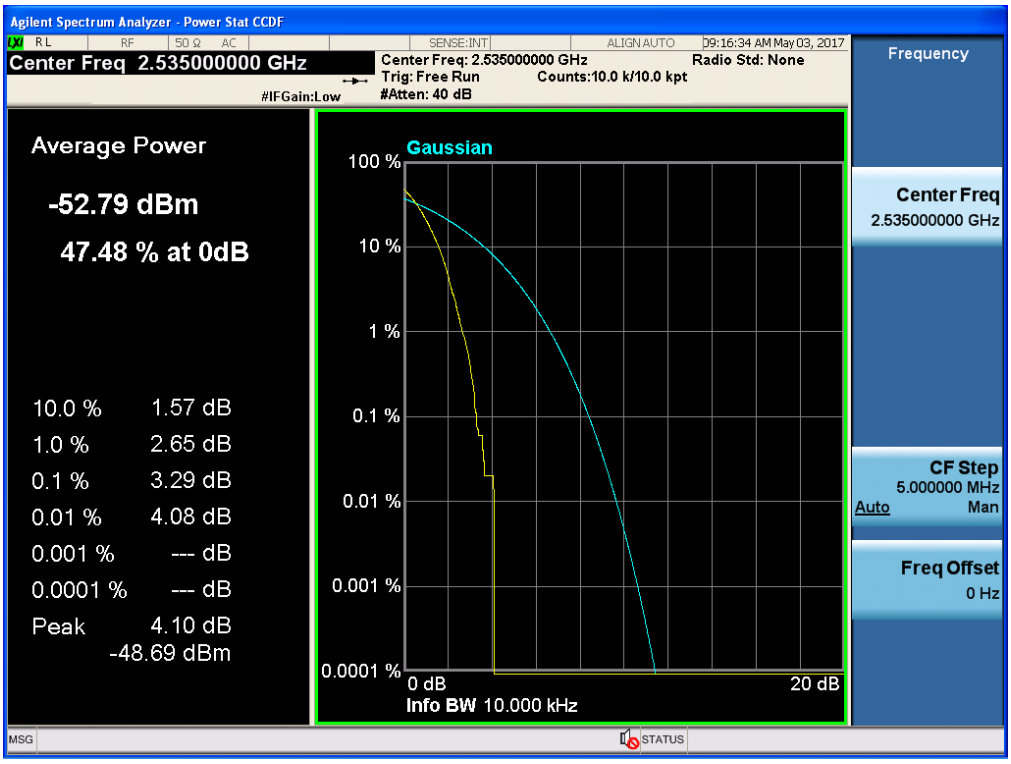
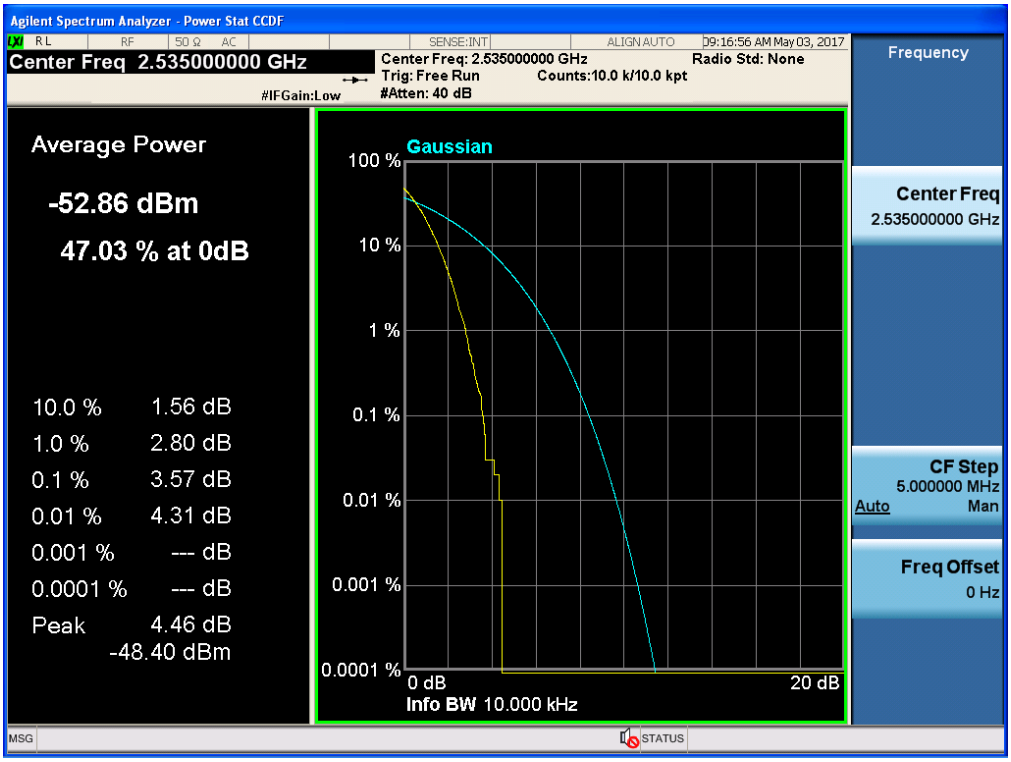
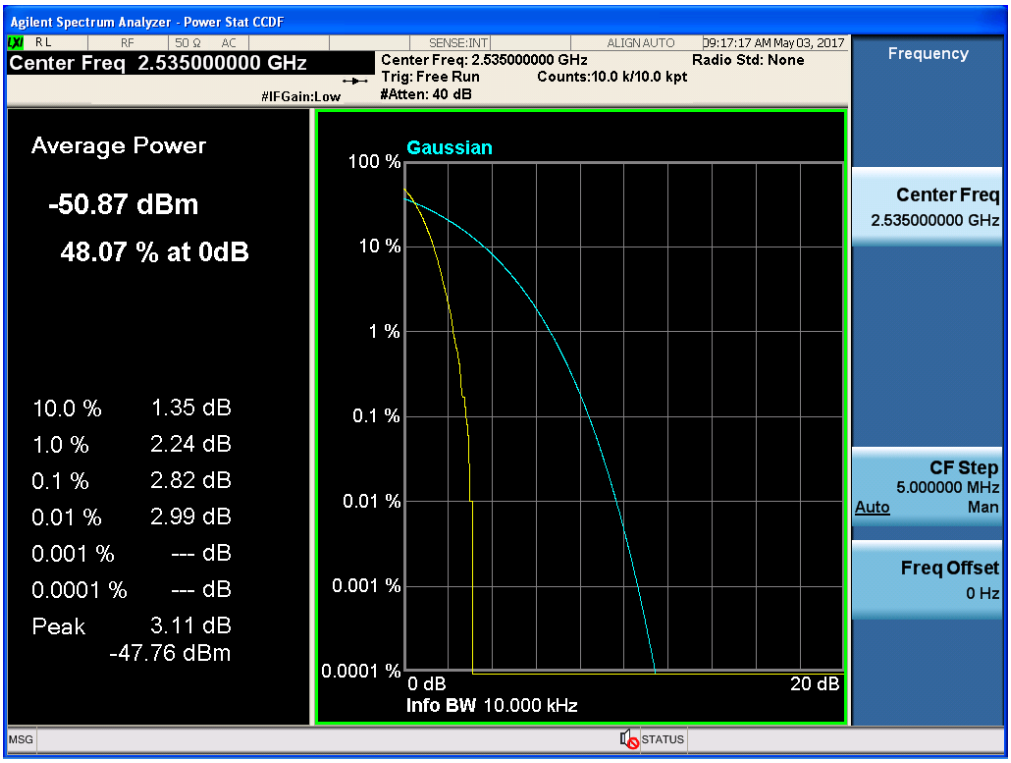


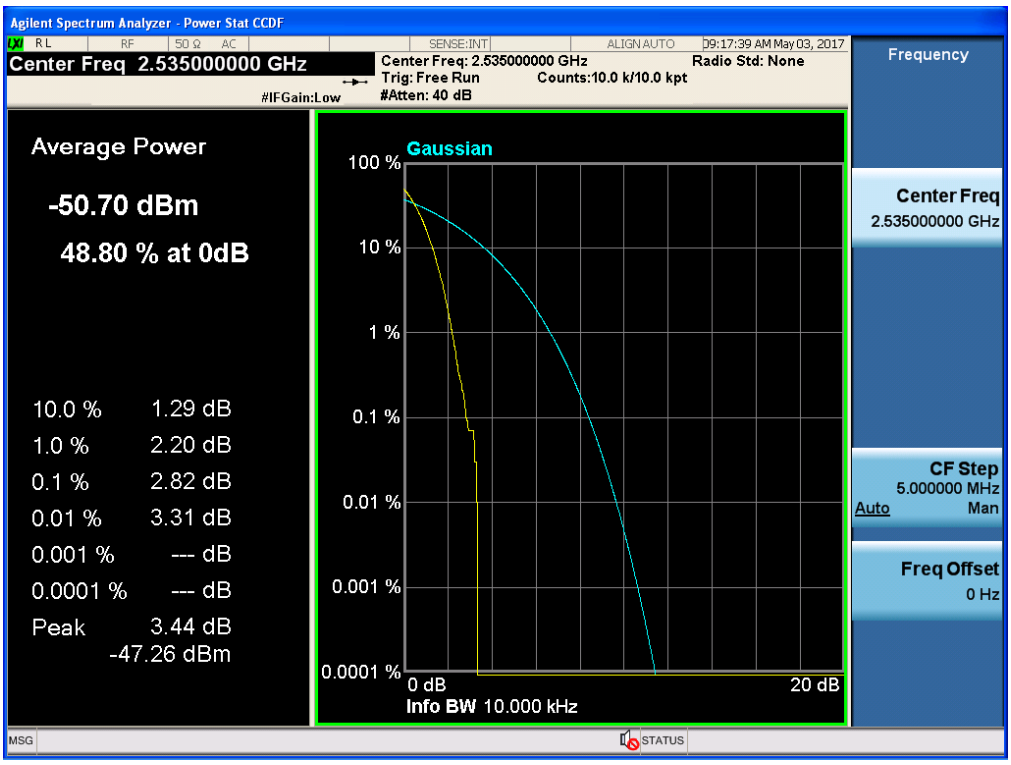
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



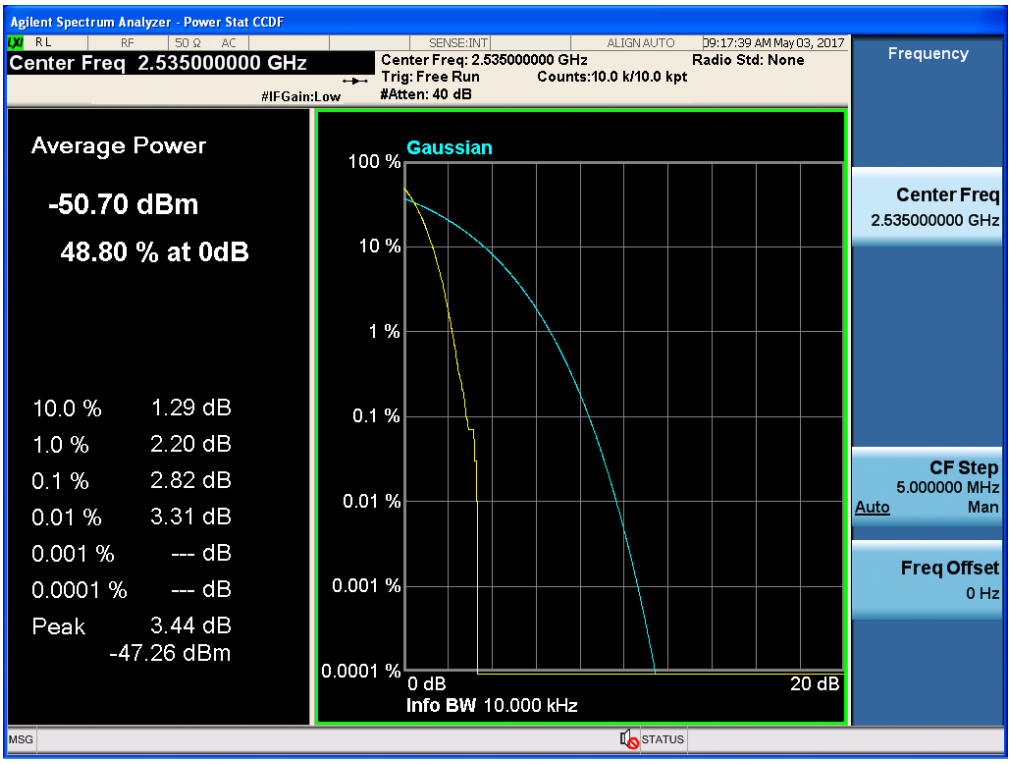
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



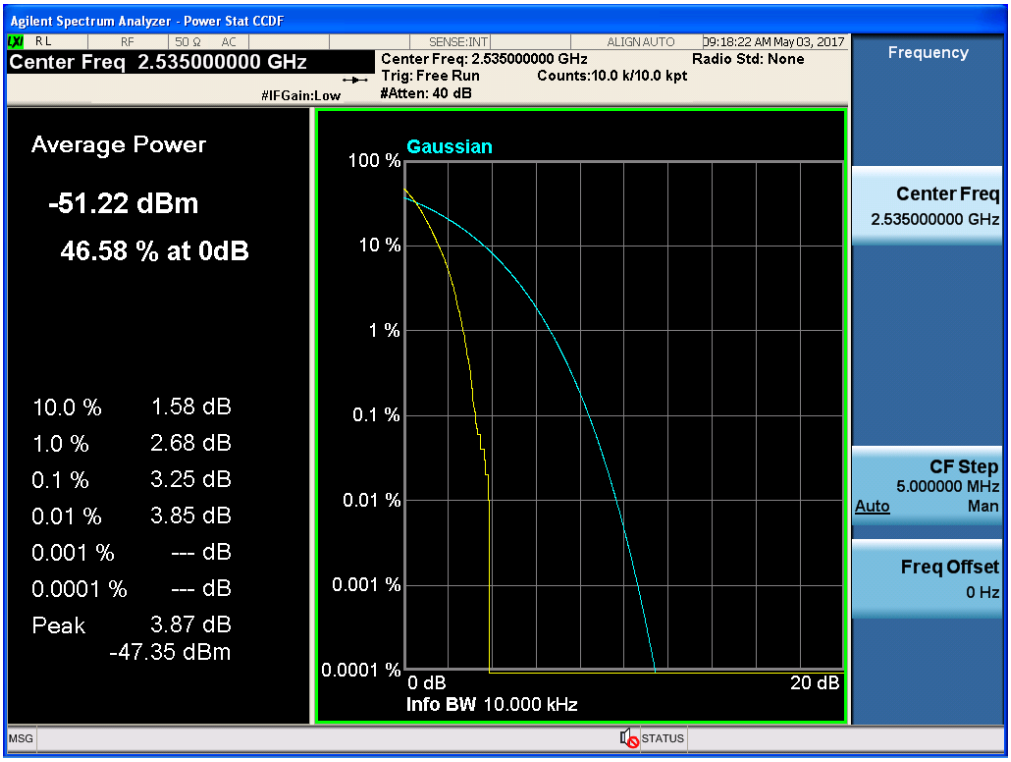
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



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



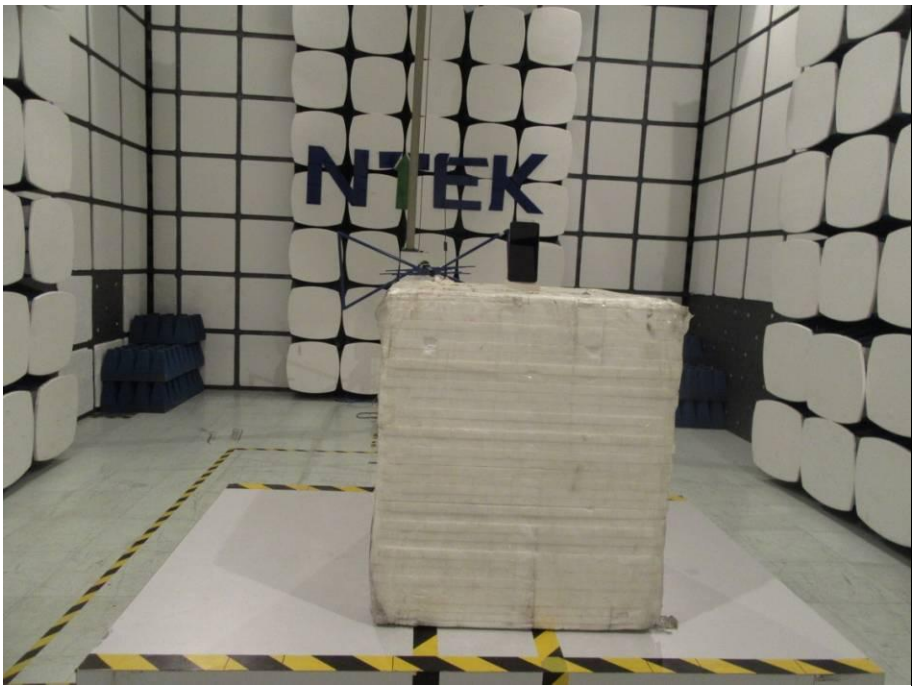
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

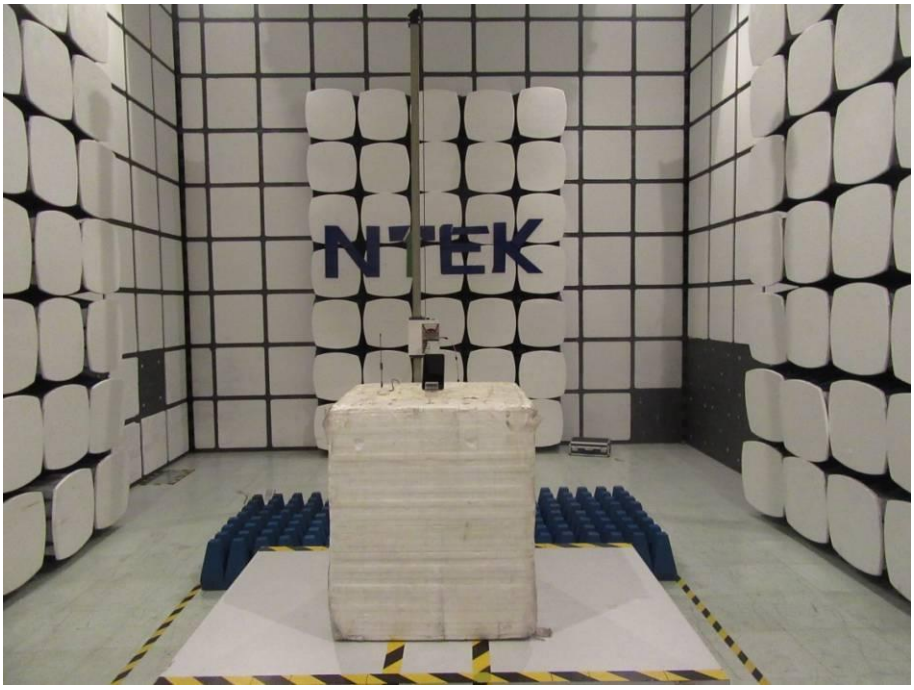


APPENDIX IV

PHOTOGRAPHS OF TEST SETUP

RADIATED SPURIOUS EMISSION





----END OF REPORT----