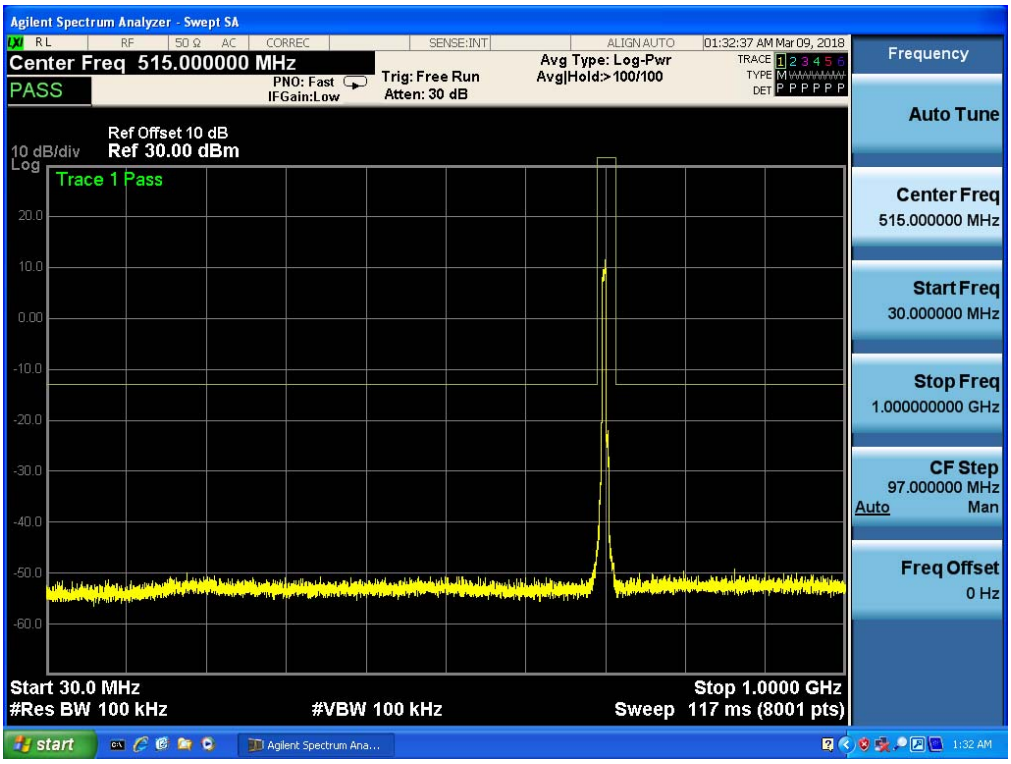
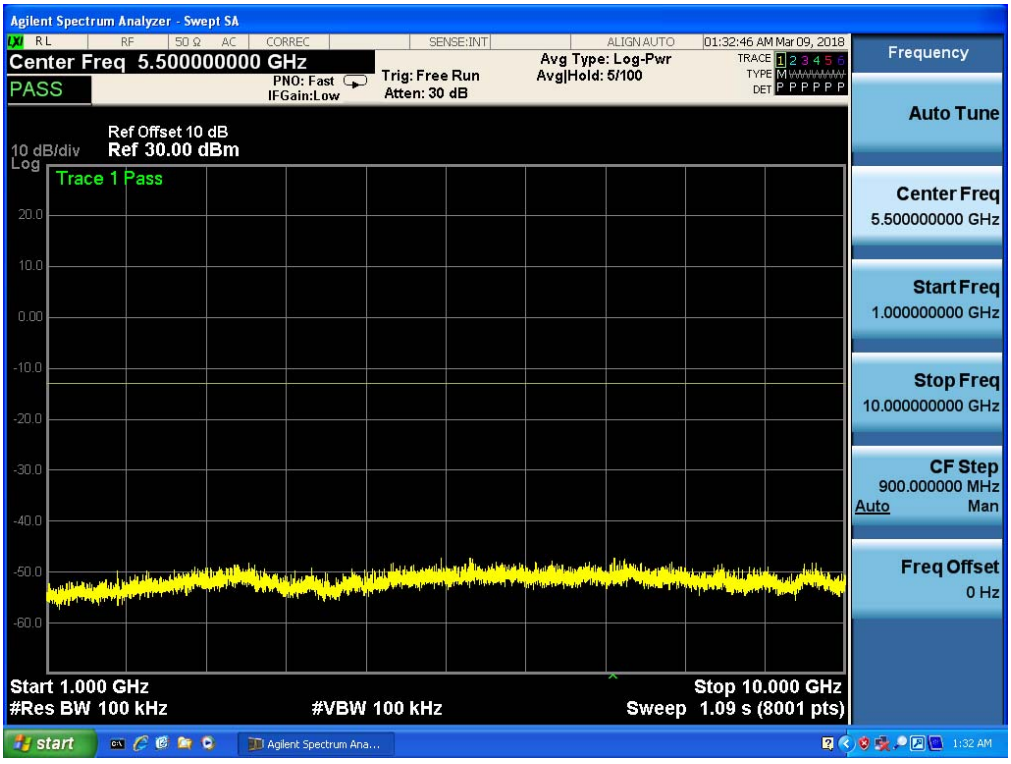
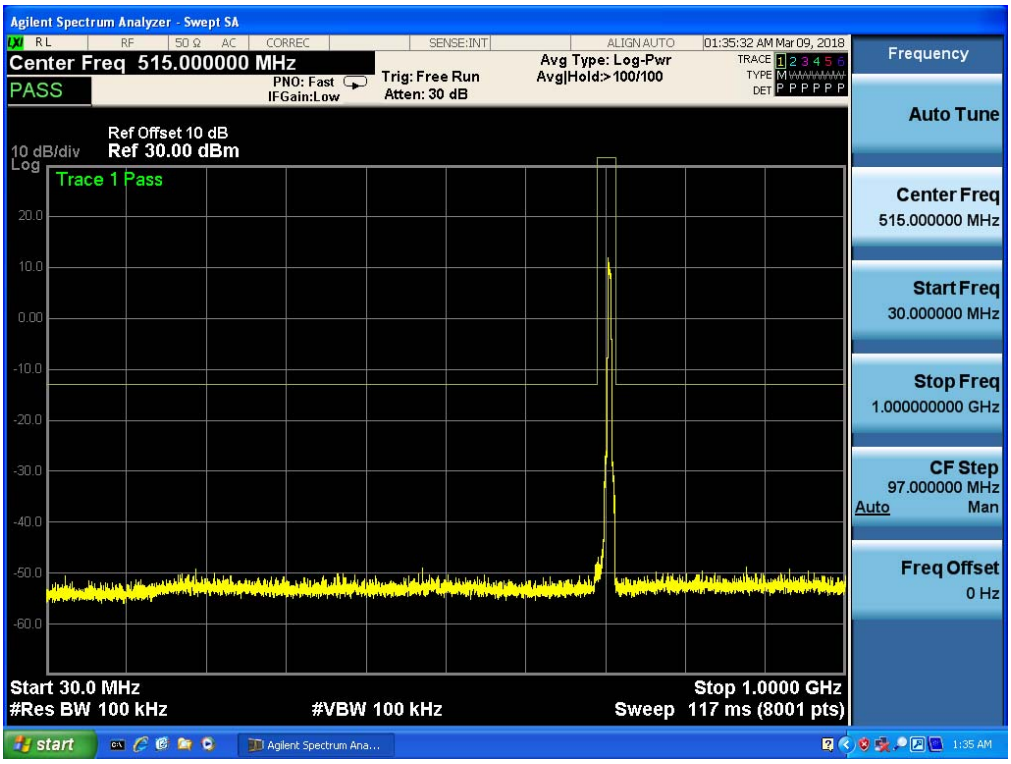
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



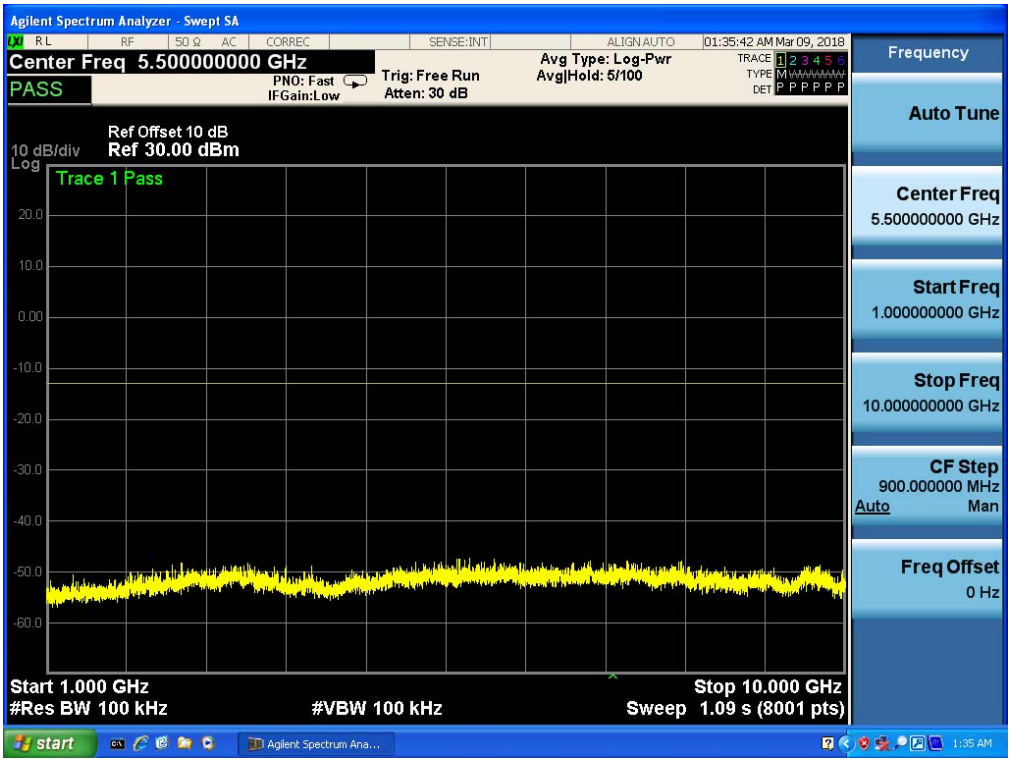
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



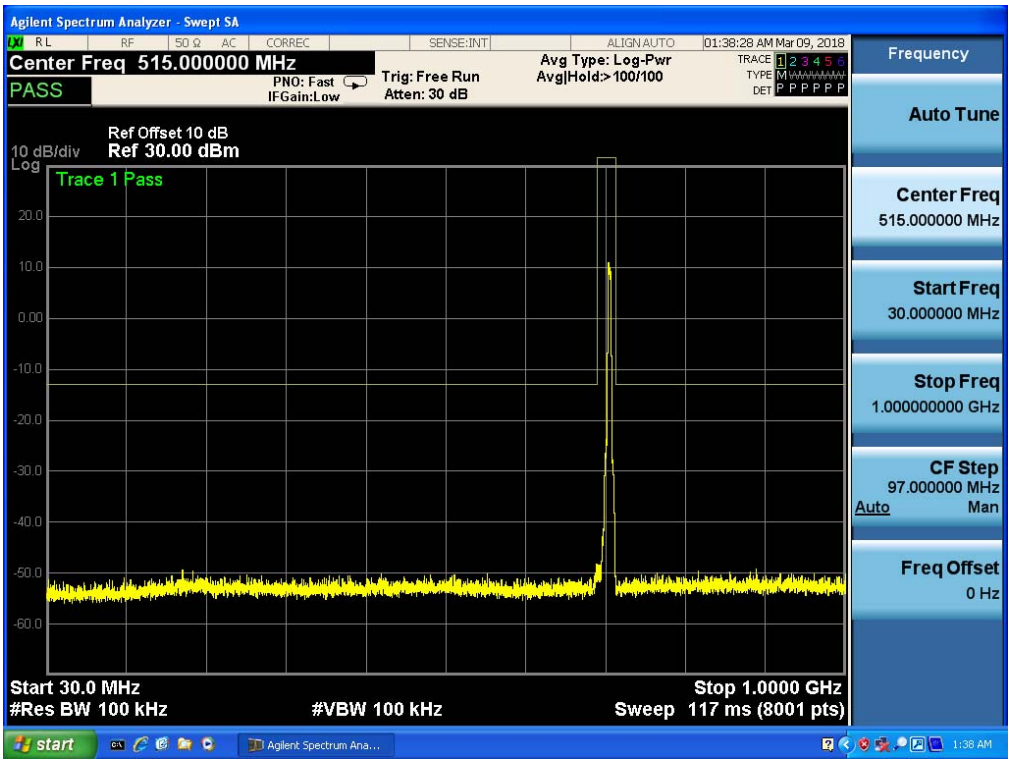
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



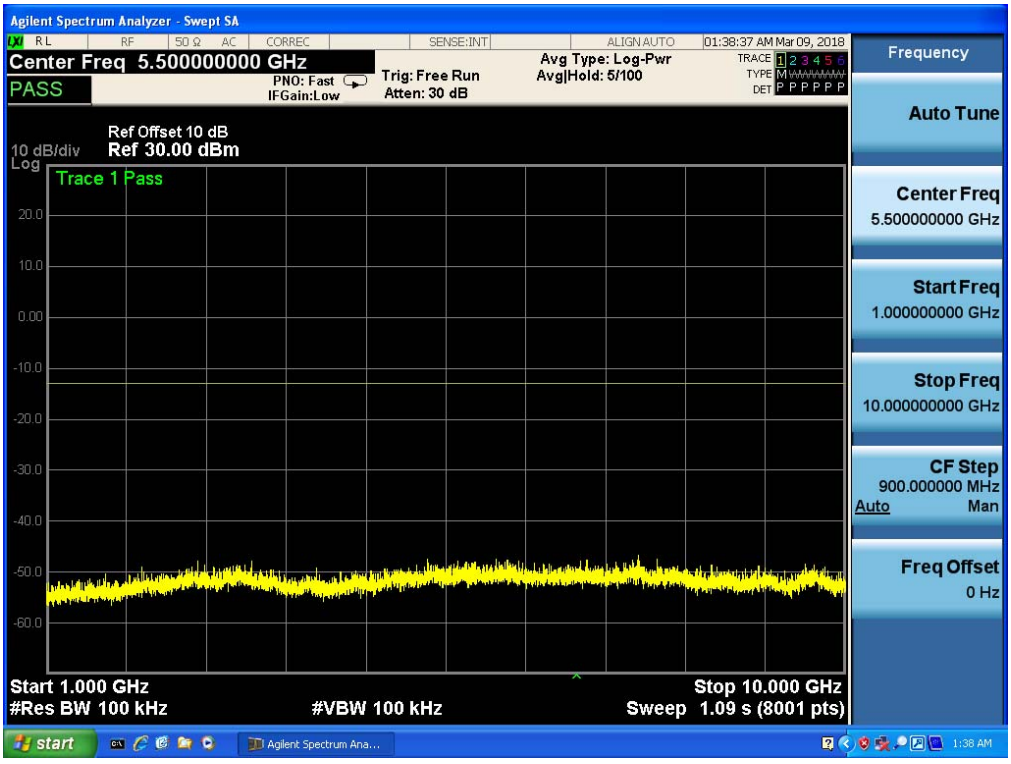
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



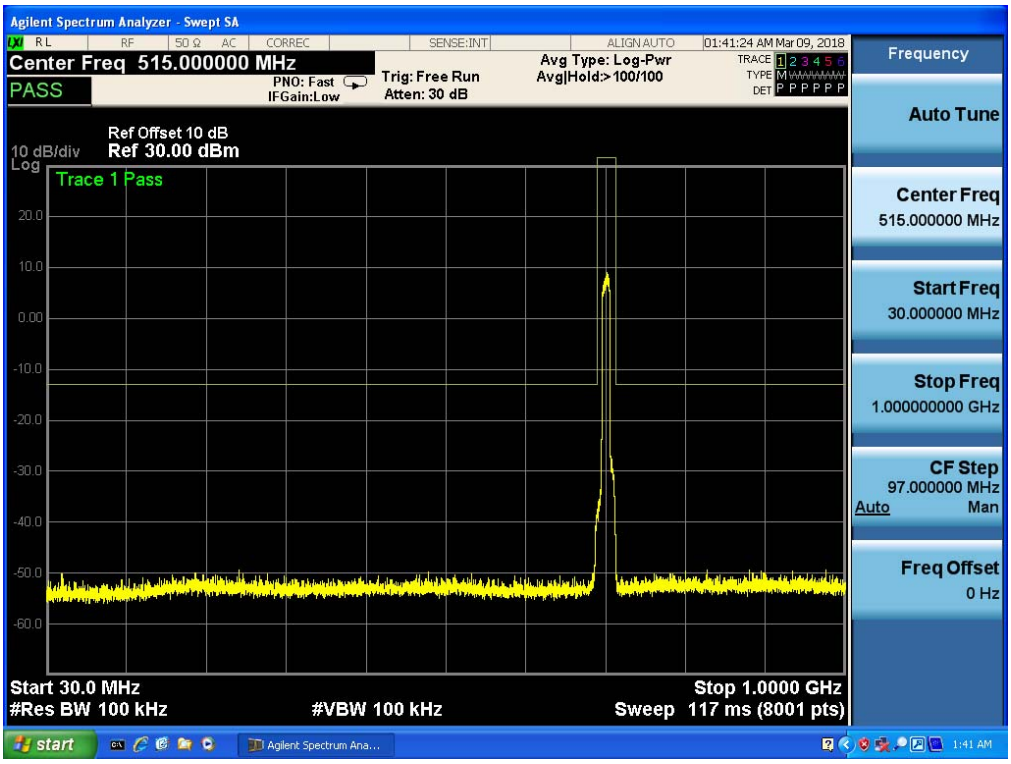
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



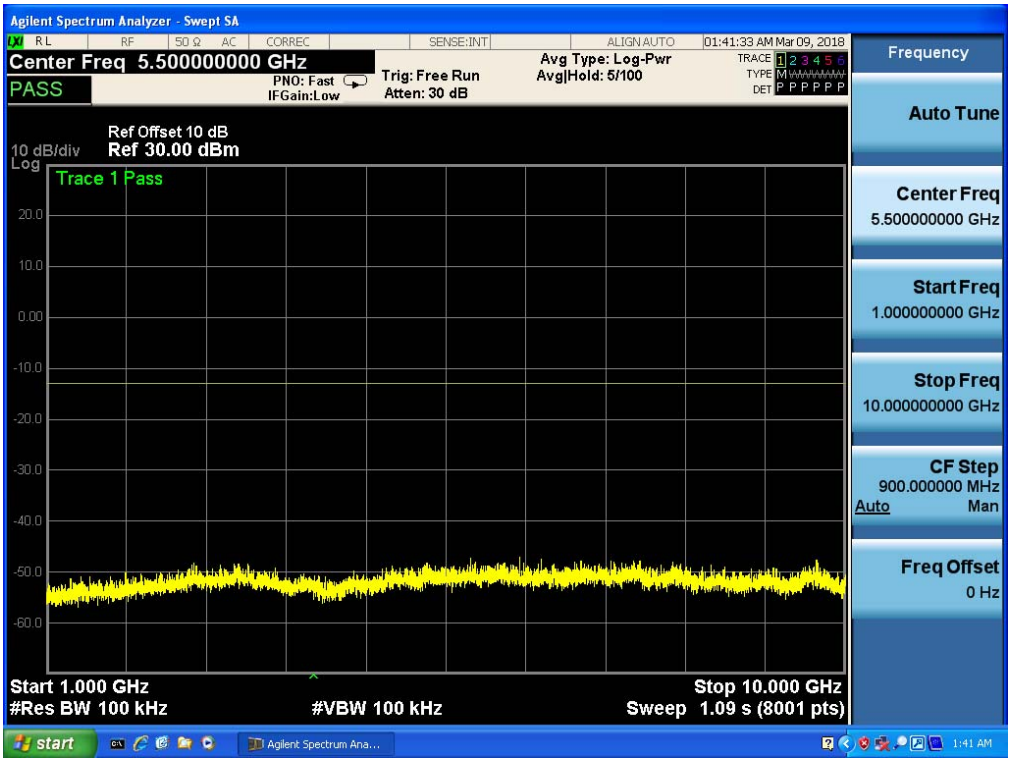
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



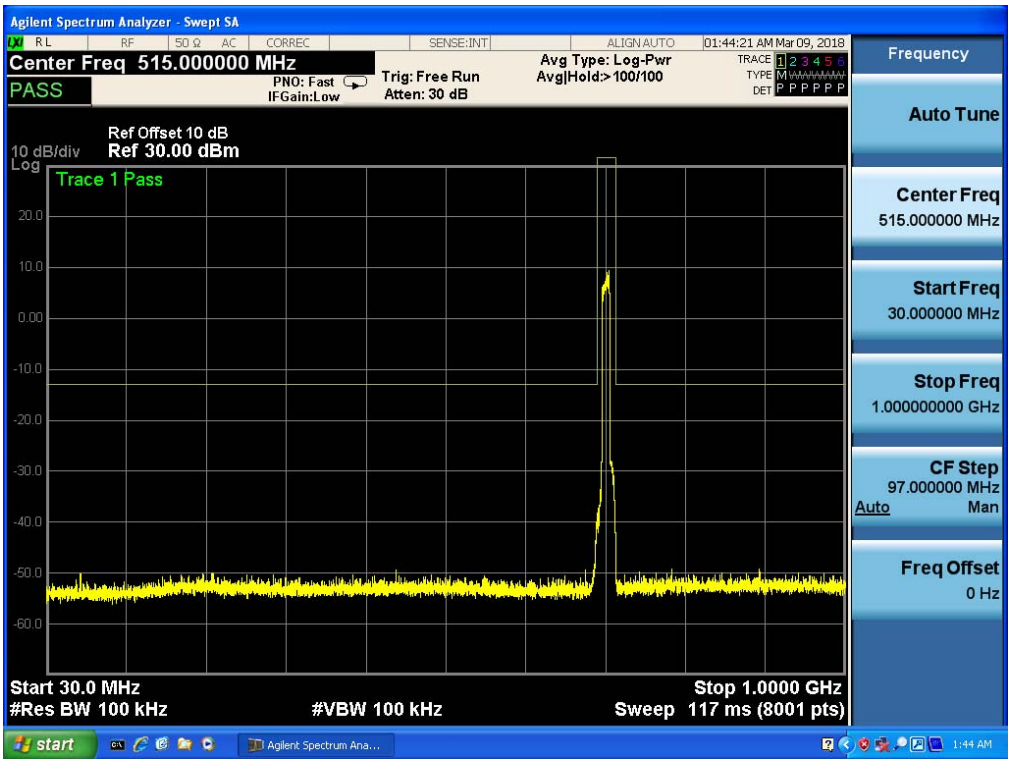
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



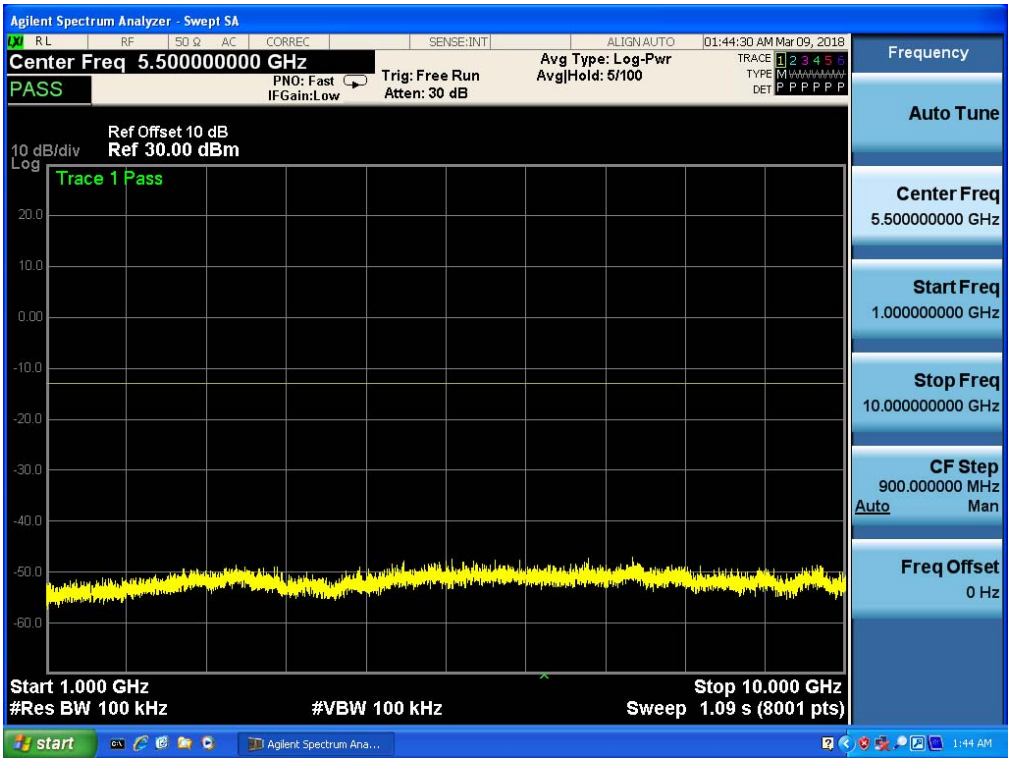
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



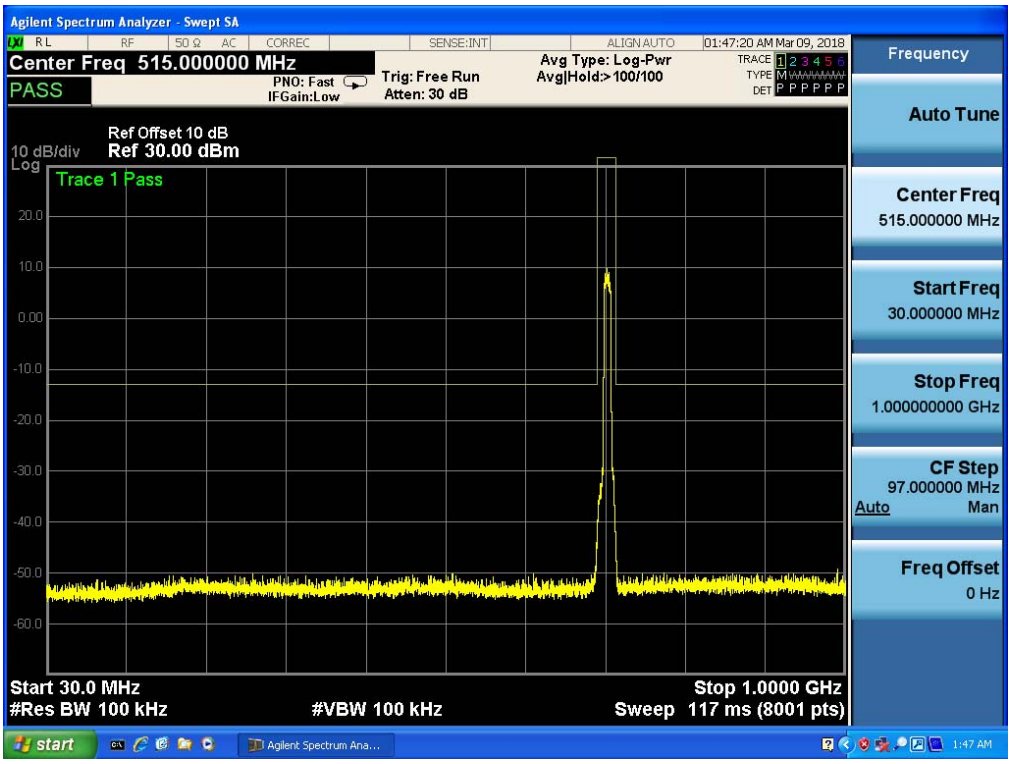
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



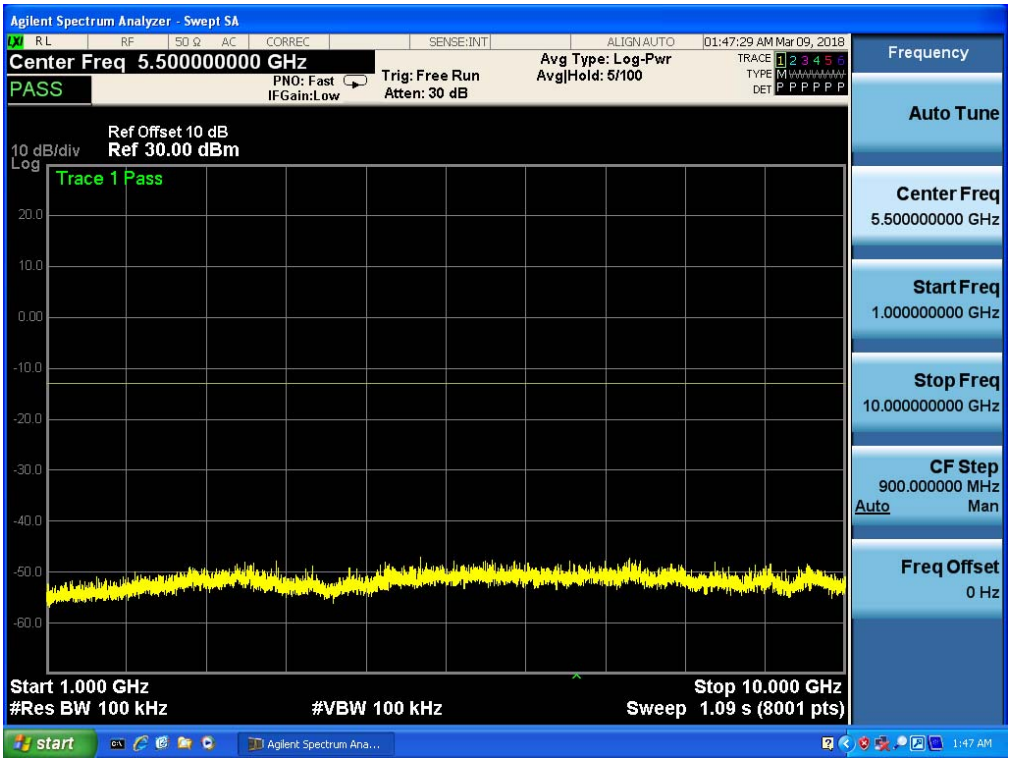
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



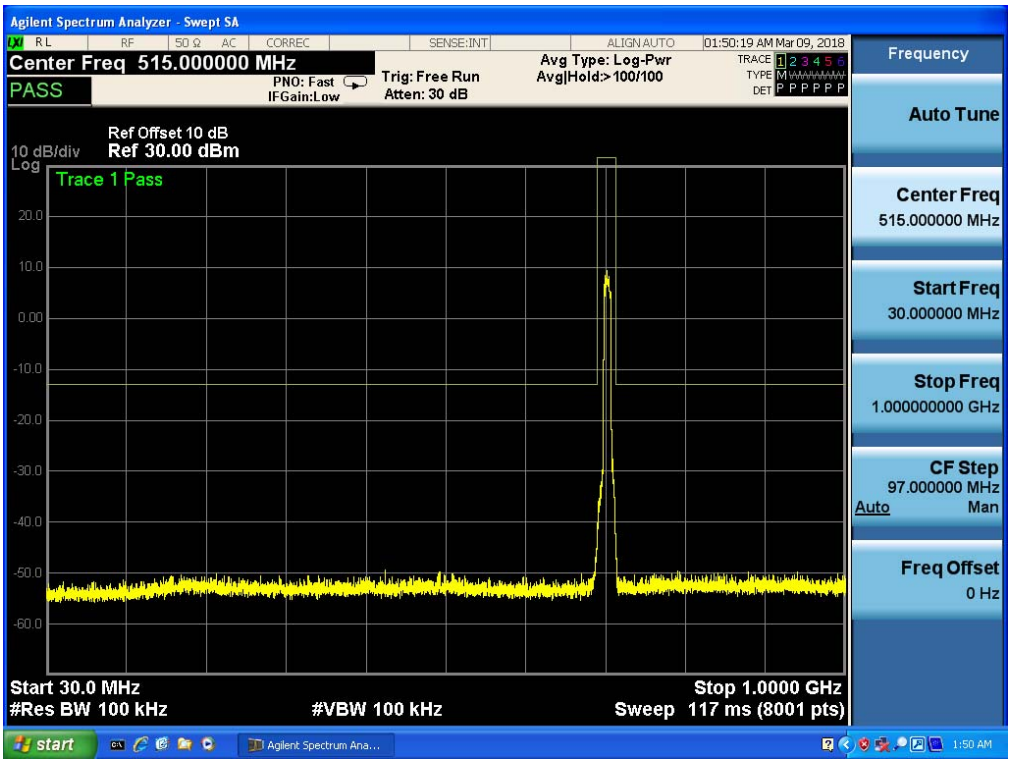
Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



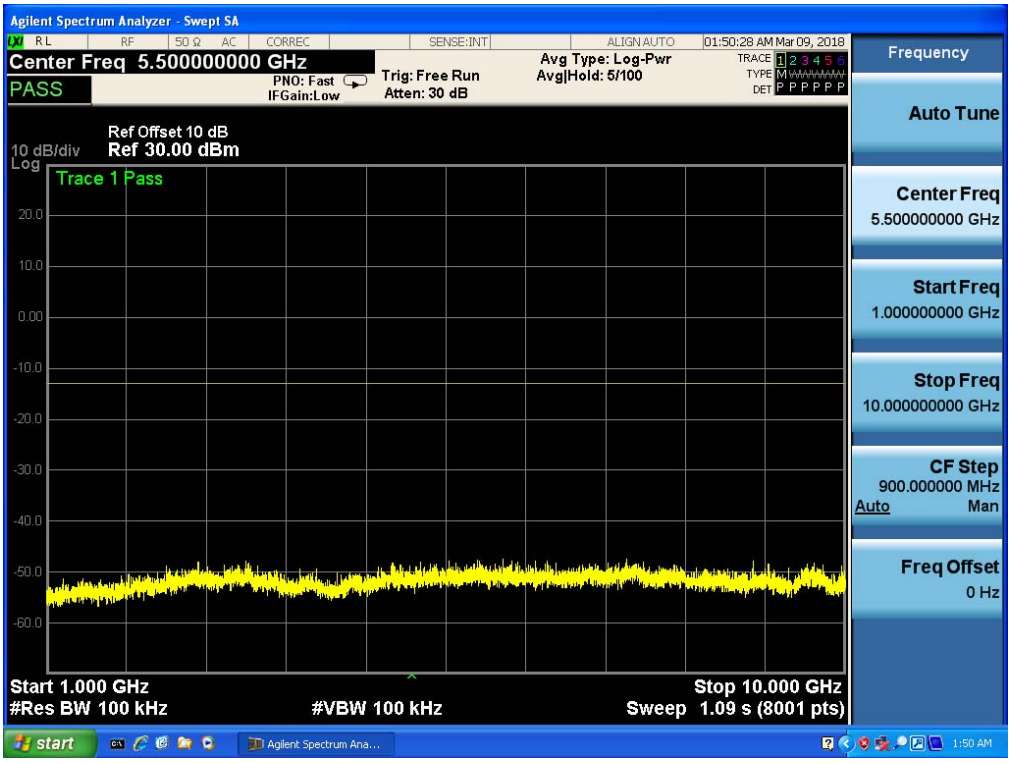
Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



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-603-E Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 5
LTE Band 7
LTE Band 12
LTE Band 17

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	-1.23	3.76	28.24	23.25	211.349	Horizontal	Pass
		1880	-0.25	3.91	28.22	24.06	254.683	Horizontal	Pass
		1909.3	-0.25	3.93	28.20	24.02	252.348	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-0.79	3.76	28.24	23.69	233.884	Horizontal	Pass
		1880	-0.76	3.91	28.22	23.55	226.464	Horizontal	Pass
		1909.3	-0.36	3.93	28.20	23.91	246.037	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-0.64	3.77	28.23	23.82	240.991	Horizontal	Pass
		1880	-0.94	3.91	28.24	23.39	218.273	Horizontal	Pass
		1908.5	-0.79	3.94	28.25	23.52	224.905	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-0.67	3.77	28.23	23.79	239.332	Horizontal	Pass
		1880	-0.29	3.91	28.24	24.04	253.513	Horizontal	Pass
		1908.5	-0.73	3.94	28.25	23.58	228.034	Horizontal	Pass
5.0MHz Band QPSK	25/0	1852.5	-1.31	3.77	28.31	23.23	210.378	Horizontal	Pass
		1880	-0.43	3.91	28.22	23.88	244.343	Horizontal	Pass
		1907.5	-0.94	3.94	28.20	23.32	214.783	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-1.41	3.77	28.31	23.13	205.589	Horizontal	Pass
		1880	-0.58	3.91	28.22	23.73	236.048	Horizontal	Pass
		1907.5	-0.79	3.94	28.20	23.47	222.331	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-0.64	3.79	28.33	23.90	245.471	Horizontal	Pass
		1880	-0.99	3.95	28.22	23.28	212.814	Horizontal	Pass
		1905	-3.97	3.97	28.19	20.25	105.925	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-0.64	3.79	28.33	23.90	245.471	Horizontal	Pass
		1880	-3.60	3.95	28.22	20.67	116.681	Horizontal	Pass
		1905	-0.44	3.97	28.19	23.78	238.781	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-0.87	3.79	28.34	23.68	233.346	Horizontal	Pass
		1880	-0.59	3.95	28.22	23.68	233.346	Horizontal	Pass
		1902.5	-0.93	3.97	28.18	23.28	212.814	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-0.52	3.79	28.34	24.03	252.930	Horizontal	Pass
		1880	-0.81	3.95	28.22	23.46	221.820	Horizontal	Pass
		1902.5	-0.61	3.97	28.18	23.60	229.087	Horizontal	Pass

20.0MHz Band QPSK	100/0	1860	-0.80	3.81	28.35	23.74	236.592	Horizontal	Pass
		1880	-1.07	3.96	28.22	23.19	208.449	Horizontal	Pass
		1900	-0.86	4	28.16	23.3	213.796	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-1.42	3.81	28.35	23.12	205.116	Horizontal	Pass
		1880	-1.01	3.96	28.22	23.25	211.349	Horizontal	Pass
		1900	-0.97	4	28.16	23.19	208.449	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	-0.69	3.76	28.24	23.79	239.332	Vertical	Pass
		1880	-0.94	3.91	28.22	23.37	217.270	Vertical	Pass
		1909.3	-0.75	3.93	28.2	23.52	224.905	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-0.79	3.76	28.24	23.69	233.884	Vertical	Pass
		1880	-0.52	3.91	28.22	23.79	239.332	Vertical	Pass
		1909.3	-0.51	3.93	28.2	23.76	237.684	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-0.60	3.77	28.23	23.86	243.220	Vertical	Pass
		1880	-0.69	3.91	28.24	23.64	231.206	Vertical	Pass
		1908.5	-1.18	3.94	28.25	23.13	205.589	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-0.38	3.77	28.23	24.08	255.859	Vertical	Pass
		1880	-1.07	3.91	28.24	23.26	211.836	Vertical	Pass
		1908.5	-1.01	3.94	28.25	23.3	213.796	Vertical	Pass
5.0MHz Band QPSK	25/0	1852.5	-0.67	3.77	28.31	23.87	243.781	Vertical	Pass
		1880	-0.71	3.91	28.22	23.6	229.087	Vertical	Pass
		1907.5	-0.97	3.94	28.2	23.29	213.304	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	-0.54	3.77	28.31	24	251.189	Vertical	Pass
		1880	-0.94	3.91	28.22	23.37	217.270	Vertical	Pass
		1907.5	-0.30	3.94	28.2	23.96	248.886	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	-1.37	3.79	28.33	23.17	207.491	Vertical	Pass
		1880	-0.70	3.95	28.22	23.57	227.510	Vertical	Pass
		1905	-1.01	3.97	28.19	23.21	209.411	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1855	-0.85	3.79	28.33	23.69	233.884	Vertical	Pass
		1880	-0.24	3.95	28.22	24.03	252.930	Vertical	Pass
		1905	-0.98	3.97	28.19	23.24	210.863	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-0.56	3.79	28.34	23.99	250.611	Vertical	Pass
		1880	-0.62	3.95	28.22	23.65	231.739	Vertical	Pass
		1902.5	-0.67	3.97	28.18	23.54	225.944	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-0.85	3.79	28.34	23.7	234.423	Vertical	Pass
		1880	-0.40	3.95	28.22	23.87	243.781	Vertical	Pass
		1902.5	-0.69	3.97	28.18	23.52	224.905	Vertical	Pass
20.0MHz Band	100/ 0	1860	-1.15	3.81	28.35	23.39	218.273	Vertical	Pass
		1880	-0.95	3.96	28.22	23.31	214.289	Vertical	Pass

QPSK		1900	-0.84	4	28.16	23.32	214.783	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-0.77	3.81	28.35	23.77	238.232	Vertical	Pass
		1880	-0.65	3.96	28.22	23.61	229.615	Vertical	Pass
		1900	-0.35	4	28.16	23.81	240.436	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	-0.97	3.12	27.58	23.49	223.357	Horizontal	Pass
		1732.5	-1.02	3.27	27.61	23.32	214.783	Horizontal	Pass
		1754.3	-1.31	3.29	27.63	23.03	200.909	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-1.52	3.12	27.58	22.94	196.789	Horizontal	Pass
		1732.5	-2.00	3.27	27.61	22.34	171.396	Horizontal	Pass
		1754.3	-1.76	3.29	27.63	22.58	181.134	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.70	3.13	27.61	22.78	189.671	Horizontal	Pass
		1732.5	-1.82	3.27	27.61	22.52	178.649	Horizontal	Pass
		1753.5	-1.84	3.3	27.62	22.48	177.011	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.17	3.13	27.61	22.31	170.216	Horizontal	Pass
		1732.5	-2.15	3.27	27.61	22.19	165.577	Horizontal	Pass
		1753.5	-1.97	3.3	27.62	22.35	171.791	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.65	3.13	27.63	22.85	192.752	Horizontal	Pass
		1732.5	-1.50	3.27	27.61	22.84	192.309	Horizontal	Pass
		1752.5	-2.03	3.3	27.6	22.27	168.655	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.35	3.13	27.63	22.15	164.059	Horizontal	Pass
		1732.5	-2.17	3.27	27.61	22.17	164.816	Horizontal	Pass
		1752.5	-2.12	3.3	27.6	22.18	165.196	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-1.81	3.15	27.64	22.68	185.353	Horizontal	Pass
		1732.5	-1.51	3.31	27.61	22.79	190.108	Horizontal	Pass
		1750	-1.89	3.33	27.59	22.37	172.584	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-1.92	3.15	27.64	22.57	180.717	Horizontal	Pass
		1732.5	-2.10	3.31	27.61	22.2	165.959	Horizontal	Pass
		1750	-1.80	3.33	27.59	22.46	176.198	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-2.08	3.15	27.65	22.42	174.582	Horizontal	Pass
		1732.5	-2.26	3.31	27.61	22.04	159.956	Horizontal	Pass
		1747.5	-2.00	3.33	27.57	22.24	167.494	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.15	3.15	27.65	22.35	171.791	Horizontal	Pass
		1732.5	-1.56	3.31	27.61	22.74	187.932	Horizontal	Pass
		1747.5	-1.67	3.33	27.57	22.57	180.717	Horizontal	Pass

20.0MHz Band QPSK	100/0	1720	-2.36	3.17	27.66	22.13	163.305	Horizontal	Pass
		1732.5	-1.72	3.32	27.61	22.57	180.717	Horizontal	Pass
		1745	-1.77	3.36	27.56	22.43	174.985	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-1.98	3.17	27.66	22.51	178.238	Horizontal	Pass
		1732.5	-1.80	3.32	27.61	22.49	177.419	Horizontal	Pass
		1745	-1.08	3.36	27.56	23.12	205.116	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	-1.77	3.12	27.58	22.69	185.780	Vertical	Pass
		1732.5	-2.04	3.27	27.61	22.3	169.824	Vertical	Pass
		1754.3	-1.39	3.29	27.63	22.95	197.242	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-1.44	3.12	27.58	23.02	200.447	Vertical	Pass
		1732.5	-1.48	3.27	27.61	22.86	193.197	Vertical	Pass
		1754.3	-1.48	3.29	27.63	22.86	193.197	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.35	3.13	27.61	23.13	205.589	Vertical	Pass
		1732.5	-1.12	3.27	27.61	23.22	209.894	Vertical	Pass
		1753.5	-2.06	3.3	27.62	22.26	168.267	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-1.74	3.13	27.61	22.74	187.932	Vertical	Pass
		1732.5	-1.30	3.27	27.61	23.04	201.372	Vertical	Pass
		1753.5	-1.55	3.3	27.62	22.77	189.234	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.58	3.13	27.63	22.92	195.884	Vertical	Pass
		1732.5	-1.59	3.27	27.61	22.75	188.365	Vertical	Pass
		1752.5	-1.47	3.3	27.6	22.83	191.867	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.09	3.13	27.63	22.41	174.181	Vertical	Pass
		1732.5	-1.29	3.27	27.61	23.05	201.837	Vertical	Pass
		1752.5	-1.31	3.3	27.6	22.99	199.067	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-2.08	3.15	27.64	22.41	174.181	Vertical	Pass
		1732.5	-1.47	3.31	27.61	22.83	191.867	Vertical	Pass
		1750	-1.67	3.33	27.59	22.59	181.552	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.10	3.15	27.64	22.39	173.380	Vertical	Pass
		1732.5	-2.12	3.31	27.61	22.18	165.196	Vertical	Pass
		1750	-1.74	3.33	27.59	22.52	178.649	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-1.93	3.15	27.65	22.57	180.717	Vertical	Pass
		1732.5	-2.02	3.31	27.61	22.28	169.044	Vertical	Pass
		1747.5	-1.74	3.33	27.57	22.5	177.828	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.26	3.15	27.65	22.24	167.494	Vertical	Pass
		1732.5	-1.59	3.31	27.61	22.71	186.638	Vertical	Pass
		1747.5	-1.97	3.33	27.57	22.27	168.655	Vertical	Pass
20.0MHz Band	100/0	1720	-1.57	3.17	27.66	22.92	195.884	Vertical	Pass
		1732.5	-1.81	3.32	27.61	22.48	177.011	Vertical	Pass

QPSK		1745	-1.28	3.36	27.56	22.92	195.884	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1720	-2.23	3.17	27.66	22.26	168.267	Vertical	Pass
		1732.5	-2.14	3.32	27.61	22.15	164.059	Vertical	Pass
		1745	-1.39	3.36	27.56	22.81	190.985	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 (EIRP) 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	7.50	2.01	19.68	2.15	23.02	200.447	Horizontal	Pass
		836.5	7.83	2.01	19.77	2.15	23.44	220.800	Horizontal	Pass
		848.3	7.24	2.02	19.82	2.15	22.89	194.536	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.67	2.01	19.68	2.15	23.19	208.449	Horizontal	Pass
		836.5	7.21	2.01	19.77	2.15	22.82	191.426	Horizontal	Pass
		848.3	6.77	2.02	19.82	2.15	22.42	174.582	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	7.19	2.01	19.7	2.15	22.73	187.499	Horizontal	Pass
		836.5	7.04	2.01	19.77	2.15	22.65	184.077	Horizontal	Pass
		847.5	6.64	2.02	19.81	2.15	22.28	169.044	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	6.89	2.01	19.7	2.15	22.43	174.985	Horizontal	Pass
		836.5	7.28	2.01	19.77	2.15	22.89	194.536	Horizontal	Pass
		847.5	6.59	2.02	19.81	2.15	22.23	167.109	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	6.95	2.01	19.71	2.15	22.5	177.828	Horizontal	Pass
		836.5	6.80	2.01	19.77	2.15	22.41	174.181	Horizontal	Pass
		846.5	6.55	2.02	19.79	2.15	22.17	164.816	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	6.99	2.01	19.71	2.15	22.54	179.473	Horizontal	Pass
		836.5	6.80	2.01	19.77	2.15	22.41	174.181	Horizontal	Pass
		846.5	7.11	2.02	19.79	2.15	22.73	187.499	Horizontal	Pass
10.0MHz Band QPSK	50/0	829	6.66	2.01	19.73	2.15	22.23	167.109	Horizontal	Pass
		836.5	6.91	2.01	19.77	2.15	22.52	178.649	Horizontal	Pass
		844	7.62	2.02	19.78	2.15	23.23	210.378	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	829	7.41	2.01	19.73	2.15	22.98	198.609	Horizontal	Pass
		836.5	7.11	2.01	19.77	2.15	22.72	187.068	Horizontal	Pass
		844	7.55	2.02	19.78	2.15	23.16	207.014	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 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	7.29	2.01	19.68	2.15	22.81	190.985	Vertical	Pass
		836.5	6.89	2.01	19.77	2.15	22.5	177.828	Vertical	Pass
		848.3	6.77	2.02	19.82	2.15	22.42	174.582	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	7.38	2.01	19.68	2.15	22.9	194.984	Vertical	Pass
		836.5	7.44	2.01	19.77	2.15	23.05	201.837	Vertical	Pass
		848.3	7.29	2.02	19.82	2.15	22.94	196.789	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	7.93	2.01	19.7	2.15	23.47	222.331	Vertical	Pass
		836.5	7.57	2.01	19.77	2.15	23.18	207.970	Vertical	Pass
		847.5	7.62	2.02	19.81	2.15	23.26	211.836	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	7.28	2.01	19.7	2.15	22.82	191.426	Vertical	Pass
		836.5	6.86	2.01	19.77	2.15	22.47	176.604	Vertical	Pass
		847.5	7.28	2.02	19.81	2.15	22.92	195.884	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	6.86	2.01	19.71	2.15	22.41	174.181	Vertical	Pass
		836.5	6.73	2.01	19.77	2.15	22.34	171.396	Vertical	Pass
		846.5	7.24	2.02	19.79	2.15	22.86	193.197	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	7.55	2.01	19.71	2.15	23.1	204.174	Vertical	Pass
		836.5	7.15	2.01	19.77	2.15	22.76	188.799	Vertical	Pass
		846.5	7.11	2.02	19.79	2.15	22.73	187.499	Vertical	Pass
10.0MHz Band QPSK	50/0	829	7.05	2.01	19.73	2.15	22.62	182.810	Vertical	Pass
		836.5	6.98	2.01	19.77	2.15	22.59	181.552	Vertical	Pass
		844	6.82	2.02	19.78	2.15	22.43	174.985	Vertical	Pass
10.0MHz Band 16 QAM	50/0	829	6.97	2.01	19.73	2.15	22.54	179.473	Vertical	Pass
		836.5	6.71	2.01	19.77	2.15	22.32	170.608	Vertical	Pass
		844	6.96	2.02	19.78	2.15	22.57	180.717	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	-1.18	4.54	27.75	22.03	159.588	Horizontal	Pass
		2535	-1.46	4.69	27.72	21.57	143.549	Horizontal	Pass
		2567.5	-1.25	4.71	27.71	21.75	149.624	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-2.02	4.54	27.75	21.19	131.522	Horizontal	Pass
		2535	-1.15	4.69	27.72	21.88	154.170	Horizontal	Pass
		2567.5	-1.02	4.71	27.71	21.98	157.761	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	-1.27	4.55	27.76	21.94	156.315	Horizontal	Pass
		2535	-1.46	4.69	27.72	21.57	143.549	Horizontal	Pass
		2565	-0.89	4.72	27.7	22.09	161.808	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-1.70	4.55	27.76	21.51	141.579	Horizontal	Pass
		2535	-1.88	4.69	27.72	21.15	130.317	Horizontal	Pass
		2565	-1.77	4.72	27.7	21.21	132.130	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	-1.60	4.55	27.77	21.62	145.211	Horizontal	Pass
		2535	-1.29	4.69	27.72	21.74	149.279	Horizontal	Pass
		2562.5	-1.67	4.72	27.69	21.3	134.896	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-1.41	4.55	27.77	21.81	151.705	Horizontal	Pass
		2535	-1.18	4.69	27.72	21.85	153.109	Horizontal	Pass
		2562.5	-1.32	4.72	27.69	21.65	146.218	Horizontal	Pass
20.0MHz Band QPSK	100/ 0	2510	-2.04	4.57	27.78	21.17	130.918	Horizontal	Pass
		2535	-1.41	4.73	27.72	21.58	143.880	Horizontal	Pass
		2560	-1.71	4.75	27.68	21.22	132.434	Horizontal	Pass
20.0MHz Band 16 QAM	100/ 0	2510	-1.71	4.57	27.78	21.5	141.254	Horizontal	Pass
		2535	-1.15	4.73	27.72	21.84	152.757	Horizontal	Pass
		2560	-0.87	4.75	27.68	22.06	160.694	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	-1.51	4.54	27.75	21.7	147.911	Vertical	Pass
		2535	-1.37	4.69	27.72	21.66	146.555	Vertical	Pass
		2567.5	-1.72	4.71	27.71	21.28	134.276	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-1.51	4.54	27.75	21.7	147.911	Vertical	Pass
		2535	-1.91	4.69	27.72	21.12	129.420	Vertical	Pass
		2567.5	-1.32	4.71	27.71	21.68	147.231	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	-1.98	4.55	27.76	21.23	132.739	Vertical	Pass
		2535	-1.68	4.69	27.72	21.35	136.458	Vertical	Pass
		2565	-1.67	4.72	27.7	21.31	135.207	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-1.59	4.55	27.76	21.62	145.211	Vertical	Pass
		2535	-1.12	4.69	27.72	21.91	155.239	Vertical	Pass
		2565	-1.30	4.72	27.7	21.68	147.231	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	-1.54	4.55	27.77	21.68	147.231	Vertical	Pass
		2535	-1.11	4.69	27.72	21.92	155.597	Vertical	Pass
		2562.5	-1.43	4.72	27.69	21.54	142.561	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-1.29	4.55	27.77	21.93	155.955	Vertical	Pass
		2535	-1.90	4.69	27.72	21.13	129.718	Vertical	Pass
		2562.5	-1.56	4.72	27.69	21.41	138.357	Vertical	Pass
20.0MHz Band QPSK	100/ 0	2510	-1.78	4.57	27.78	21.43	138.995	Vertical	Pass
		2535	-1.78	4.73	27.72	21.21	132.130	Vertical	Pass
		2560	-1.29	4.75	27.68	21.64	145.881	Vertical	Pass
20.0MHz Band 16 QAM	100/ 0	2510	-1.41	4.57	27.78	21.8	151.356	Vertical	Pass
		2535	-1.30	4.73	27.72	21.69	147.571	Vertical	Pass
		2560	-1.08	4.75	27.68	21.85	153.109	Vertical	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.6 LTE BAND 12

Radiated Power (EIRP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	7.20	1.91	19.21	2.15	22.35	171.791	Horizontal	Pass
		707.5	7.57	1.91	19.26	2.15	22.77	189.234	Horizontal	Pass
		715.3	7.96	1.93	19.34	2.15	23.22	209.894	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	699.7	7.37	1.91	19.21	2.15	22.52	178.649	Horizontal	Pass
		707.5	6.95	1.91	19.26	2.15	22.15	164.059	Horizontal	Pass
		715.3	7.49	1.93	19.34	2.15	22.75	188.365	Horizontal	Pass
3.0MHz Band QPSK	15/0	700.5	7.91	1.91	19.21	2.15	23.06	202.302	Horizontal	Pass
		707.5	7.78	1.91	19.26	2.15	22.98	198.609	Horizontal	Pass
		714.5	7.35	1.93	19.34	2.15	22.61	182.390	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	700.5	7.61	1.91	19.21	2.15	22.76	188.799	Horizontal	Pass
		707.5	7.02	1.91	19.26	2.15	22.22	166.725	Horizontal	Pass
		714.5	7.30	1.93	19.34	2.15	22.56	180.302	Horizontal	Pass
5.0MHz Band QPSK	25/0	701.5	7.66	1.91	19.23	2.15	22.83	191.867	Horizontal	Pass
		707.5	7.54	1.91	19.26	2.15	22.74	187.932	Horizontal	Pass
		713.5	7.24	1.92	19.33	2.15	22.5	177.828	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	701.5	7.70	1.91	19.23	2.15	22.87	193.642	Horizontal	Pass
		707.5	7.54	1.91	19.26	2.15	22.74	187.932	Horizontal	Pass
		713.5	7.80	1.92	19.33	2.15	23.06	202.302	Horizontal	Pass
10.0MHz Band QPSK	50/0	704	7.37	1.91	19.25	2.15	22.56	180.302	Horizontal	Pass
		707.5	7.65	1.91	19.26	2.15	22.85	192.752	Horizontal	Pass
		711	7.31	1.92	19.32	2.15	22.56	180.302	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	704	7.12	1.91	19.25	2.15	22.31	170.216	Horizontal	Pass
		707.5	7.85	1.91	19.26	2.15	23.05	201.837	Horizontal	Pass
		711	7.24	1.92	19.32	2.15	22.49	177.419	Horizontal	Pass

Radiated Power (EIRP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	7.10	1.91	19.21	2.15	22.25	167.880	Vertical	Pass
		707.5	7.74	1.91	19.26	2.15	22.94	196.789	Vertical	Pass
		715.3	7.60	1.93	19.34	2.15	22.86	193.197	Vertical	Pass
1.4MHz Band 16 QAM	6/0	699.7	7.19	1.91	19.21	2.15	22.34	171.396	Vertical	Pass
		707.5	7.29	1.91	19.26	2.15	22.49	177.419	Vertical	Pass
		715.3	7.12	1.93	19.34	2.15	22.38	172.982	Vertical	Pass
3.0MHz Band QPSK	15/0	700.5	7.76	1.91	19.21	2.15	22.91	195.434	Vertical	Pass
		707.5	7.42	1.91	19.26	2.15	22.62	182.810	Vertical	Pass
		714.5	7.44	1.93	19.34	2.15	22.7	186.209	Vertical	Pass
3.0MHz Band 16 QAM	15/0	700.5	7.11	1.91	19.21	2.15	22.26	168.267	Vertical	Pass
		707.5	7.71	1.91	19.26	2.15	22.91	195.434	Vertical	Pass
		714.5	7.10	1.93	19.34	2.15	22.36	172.187	Vertical	Pass
5.0MHz Band QPSK	25/0	701.5	7.68	1.91	19.23	2.15	22.85	192.752	Vertical	Pass
		707.5	7.58	1.91	19.26	2.15	22.78	189.671	Vertical	Pass
		713.5	7.04	1.92	19.33	2.15	22.3	169.824	Vertical	Pass
5.0MHz Band 16 QAM	25/0	701.5	7.37	1.91	19.23	2.15	22.54	179.473	Vertical	Pass
		707.5	8.00	1.91	19.26	2.15	23.2	208.930	Vertical	Pass
		713.5	6.91	1.92	19.33	2.15	22.17	164.816	Vertical	Pass
10.0MHz Band QPSK	50/0	704	7.87	1.91	19.25	2.15	23.06	202.302	Vertical	Pass
		707.5	7.83	1.91	19.26	2.15	23.03	200.909	Vertical	Pass
		711	7.62	1.92	19.32	2.15	22.87	193.642	Vertical	Pass
10.0MHz Band 16 QAM	50/0	704	7.79	1.91	19.25	2.15	22.98	198.609	Vertical	Pass
		707.5	7.56	1.91	19.26	2.15	22.76	188.799	Vertical	Pass
		711	7.76	1.92	19.32	2.15	23.01	199.986	Vertical	Pass

Note:
SG Level= Signal generator output
Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.7 LTE BAND 17

Radiated Power (EIRP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	706.5	6.58	1.91	19.23	2.15	21.75	149.624	Horizontal	Pass
		710	6.46	1.91	19.26	2.15	21.66	146.555	Horizontal	Pass
		713.5	6.16	1.92	19.33	2.15	21.42	138.676	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	706.5	6.62	1.91	19.23	2.15	21.79	151.008	Horizontal	Pass
		710	6.46	1.91	19.26	2.15	21.66	146.555	Horizontal	Pass
		713.5	6.72	1.92	19.33	2.15	21.98	157.761	Horizontal	Pass
10.0MHz Band QPSK	50/0	709	6.89	1.91	19.25	2.15	22.08	161.436	Horizontal	Pass
		710	6.57	1.91	19.26	2.15	21.77	150.314	Horizontal	Pass
		711	6.23	1.92	19.32	2.15	21.48	140.605	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	709	7.04	1.91	19.25	2.15	22.23	167.109	Horizontal	Pass
		710	6.77	1.91	19.26	2.15	21.97	157.398	Horizontal	Pass
		711	6.16	1.92	19.32	2.15	21.41	138.357	Horizontal	Pass

Radiated Power (EIRP) for Band 17										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	706.5	6.46	1.91	19.23	2.15	21.63	145.546	Vertical	Pass
		710	6.36	1.91	19.26	2.15	21.56	143.219	Vertical	Pass
		713.5	6.82	1.92	19.33	2.15	22.08	161.436	Vertical	Pass
5.0MHz Band 16 QAM	25/0	706.5	6.15	1.91	19.23	2.15	21.32	135.519	Vertical	Pass
		710	6.78	1.91	19.26	2.15	21.98	157.761	Vertical	Pass
		713.5	6.69	1.92	19.33	2.15	21.95	156.675	Vertical	Pass
10.0MHz Band QPSK	50/0	709	6.65	1.91	19.25	2.15	21.84	152.757	Vertical	Pass
		710	6.61	1.91	19.26	2.15	21.81	151.705	Vertical	Pass
		711	6.40	1.92	19.32	2.15	21.65	146.218	Vertical	Pass
10.0MHz Band 16 QAM	50/0	709	6.57	1.91	19.25	2.15	21.76	149.968	Vertical	Pass
		710	6.34	1.91	19.26	2.15	21.54	142.561	Vertical	Pass
		711	6.54	1.92	19.32	2.15	21.79	151.008	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
LTE Band 12
LTE Band 17

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)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-53.15	4.04	33.51	-23.68	-13	-10.68	Horizontal
3701.4	-52.16	4.04	33.51	-22.69	-13	-9.69	Vertical
5552.1	-53.27	5.24	35.84	-22.67	-13	-9.67	Vertical
5552.1	-55.19	5.24	35.84	-24.59	-13	-11.59	Horizontal
Test Results for Mid Channel 1732.5MHz							
3760	-53.68	4.04	33.56	-24.16	-13	-11.16	Horizontal
3760	-52.14	4.04	33.56	-22.62	-13	-9.62	Vertical
5640	-52.69	5.24	35.91	-22.02	-13	-9.02	Vertical
5640	-53.11	5.24	35.91	-22.44	-13	-9.44	Horizontal
Test Results for High Channel 1754.3MHz							
3818.6	-52.68	4.04	34	-22.72	-13	-9.72	Horizontal
3818.6	-54.26	4.04	34	-24.30	-13	-11.30	Vertical
5727.9	-52.36	5.24	36.04	-21.56	-13	-8.56	Vertical
5727.9	-53.44	5.24	36.04	-22.64	-13	-9.64	Horizontal

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3720	-55.26	4.07	33.54	-25.79	-13	-12.79	Horizontal
3720	-51.36	4.07	33.54	-21.89	-13	-8.89	Vertical
5580	-55.17	5.28	35.86	-24.59	-13	-11.59	Vertical
5580	-53.64	5.28	35.86	-23.06	-13	-10.06	Horizontal
Test Results for Mid Channel 1732.5MHz							
3760	-52.69	4.04	33.56	-23.17	-13	-10.17	Horizontal
3760	-53.67	4.04	33.56	-24.15	-13	-11.15	Vertical
5640	-52.55	5.24	35.91	-21.88	-13	-8.88	Vertical
5640	-55.26	5.24	35.91	-24.59	-13	-11.59	Horizontal
Test Results for High Channel 1754.3MHz							
3800	-54.68	4.04	34	-24.72	-13	-11.72	Horizontal
3800	-53.27	4.04	34	-23.31	-13	-10.31	Vertical
5700	-56.59	5.24	36.04	-25.79	-13	-12.79	Vertical
5700	-57.78	5.24	36.04	-26.98	-13	-13.98	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)
. Over Limit= : PMea(dBm)-Limit(dBm)
. We test both H direction and V direction, recorded worst case direction.

9.2 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-54.22	4.02	29.8	-28.44	-13	-15.44	Horizontal
3421.4	-53.57	4.02	29.8	-27.79	-13	-14.79	Vertical
5132.1	-54.45	5.24	35.84	-23.85	-13	-10.85	Vertical
5132.1	-53.69	5.24	35.84	-23.09	-13	-10.09	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-55.27	4.03	30	-29.30	-13	-16.30	Horizontal
3465	-53.26	4.03	30	-27.29	-13	-14.29	Vertical
5197.5	-54.47	5.25	35.86	-23.86	-13	-10.86	Vertical
5197.5	-53.66	5.25	35.86	-23.05	-13	-10.05	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-54.48	4.05	30.01	-28.52	-13	-15.52	Horizontal
3508.6	-55.64	4.05	30.01	-29.68	-13	-16.68	Vertical
5262.9	-56.62	5.26	35.86	-26.02	-13	-13.02	Vertical
5262.9	-54.15	5.26	35.86	-23.55	-13	-10.55	Horizontal

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440	-54.25	4.02	29.8	-28.47	-13	-15.47	Horizontal
3440	-53.64	4.02	29.8	-27.86	-13	-14.86	Vertical
5160	-56.58	5.24	35.84	-25.98	-13	-12.98	Vertical
5160	-55.87	5.24	35.84	-25.27	-13	-12.27	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-53.54	4.03	30	-27.57	-13	-14.57	Horizontal
3465	-55.27	4.03	30	-29.30	-13	-16.30	Vertical
5197.5	-56.28	5.25	35.86	-25.67	-13	-12.67	Vertical
5197.5	-57.62	5.25	35.86	-27.01	-13	-14.01	Horizontal
Test Results for High Channel 1754.3MHz							
2490	-56.01	2.91	27.68	-31.24	-13	-18.24	Horizontal
3490	-55.27	2.91	27.68	-30.50	-13	-17.50	Vertical
5235	-57.94	5.26	35.86	-27.34	-13	-14.34	Vertical
5235	-56.62	5.26	35.86	-26.02	-13	-13.02	Horizontal

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

. Over Limit= : PMea(dBm)-Limit(dBm)

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

9.3 LTE BAND 5

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-53.27	2.78	27.5	-28.55	-13	-15.55	Horizontal
1649.4	-53.28	2.78	27.5	-28.56	-13	-15.56	Vertical
2474.1	-54.91	2.9	27.8	-30.01	-13	-17.01	Vertical
2474.1	-53.25	2.9	27.8	-28.35	-13	-15.35	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-53.22	2.8	27.48	-28.54	-13	-15.54	Horizontal
1673	-53.27	2.8	27.48	-28.59	-13	-15.59	Vertical
2509.5	-52.27	2.91	27.7	-27.48	-13	-14.48	Vertical
2509.5	-53.74	2.91	27.7	-28.95	-13	-15.95	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-53.68	2.82	27.43	-29.07	-13	-16.07	Horizontal
1696.6	-55.27	2.82	27.43	-30.66	-13	-17.66	Vertical
2544.9	-52.61	2.92	27.74	-27.79	-13	-14.79	Vertical
2544.9	-53.95	2.92	27.74	-29.13	-13	-16.13	Horizontal

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

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1658	-54.74	2.78	27.5	-30.02	-13	-17.02	Horizontal
1658	-55.27	2.78	27.5	-30.55	-13	-17.55	Vertical
2487	-54.18	2.9	27.8	-29.28	-13	-16.28	Vertical
2487	-55.62	2.9	27.8	-30.72	-13	-17.72	Horizontal
Test Results For Mid Channel 836.5MHz							
1673	-53.27	2.8	27.48	-28.59	-13	-15.59	Horizontal
1673	-53.58	2.8	27.48	-28.90	-13	-15.90	Vertical
2509.5	-54.02	2.91	27.7	-29.23	-13	-16.23	Vertical
2509.5	-52.67	2.91	27.7	-27.88	-13	-14.88	Horizontal
Test Results for High Channel 848.3MHz							
1688	-54.29	2.82	27.43	-29.68	-13	-16.68	Horizontal
1688	-53.24	2.82	27.43	-28.63	-13	-15.63	Vertical
2532	-52.65	2.92	27.74	-27.83	-13	-14.83	Vertical
2532	-53.67	2.92	27.74	-28.85	-13	-15.85	Horizontal

Note: PMea(dBm)= Power(dBm)+ ARpl (dBm)
. Over Limit= : PMea(dBm)-Limit(dBm)
. We test both H direction and V direction, recorded worst case direction.

9.4 LTE BAND 7

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5005	-54.28	5.23	35.81	-23.70	-13	-10.70	Horizontal
5005	-55.37	5.23	35.81	-24.79	-13	-11.79	Vertical
7507.5	-57.46	5.67	36.85	-26.28	-13	-13.28	Vertical
7507.5	-56.95	5.67	36.85	-25.77	-13	-12.77	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070	-54.41	5.23	35.82	-23.82	-13	-10.82	Horizontal
5070	-55.37	5.23	35.82	-24.78	-13	-11.78	Vertical
7605	-54.84	5.67	36.85	-23.66	-13	-10.66	Vertical
7605	-56.97	5.67	36.85	-25.79	-13	-12.79	Horizontal
Test Results for High Channel 1754.3MHz							
5135	-55.24	5.24	35.83	-24.65	-13	-11.65	Horizontal
5135	-53.95	5.24	35.83	-23.36	-13	-10.36	Vertical
7702.5	-52.31	5.68	36.87	-21.12	-13	-8.12	Vertical
7702.5	-56.69	5.68	36.87	-25.50	-13	-12.50	Horizontal

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5020	-54.68	5.23	35.82	-24.09	-13	-11.09	Horizontal
5020	-56.94	5.23	35.82	-26.35	-13	-13.35	Vertical
7530	-56.18	5.67	36.86	-24.99	-13	-11.99	Vertical
7530	-54.37	5.67	36.86	-23.18	-13	-10.18	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070	-55.06	5.23	35.82	-24.47	-13	-11.47	Horizontal
5070	-53.28	5.23	35.82	-22.69	-13	-9.69	Vertical
7605	-55.59	5.67	36.85	-24.41	-13	-11.41	Vertical
7605	-56.64	5.67	36.85	-25.46	-13	-12.46	Horizontal
Test Results for High Channel 1754.3MHz							
5120	-52.85	5.24	35.83	-22.26	-13	-9.26	Horizontal

5120	-53.27	5.24	35.83	-22.68	-13	-9.68	Vertical
7680	-56.95	5.7	36.88	-25.77	-13	-12.77	Vertical
7680	-53.68	5.7	36.88	-22.50	-13	-9.50	Horizontal

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

. Over Limit= : PMea(dBm)-Limit(dBm)

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

9.5 LTE BAND 12

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

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1399.4	-52.69	2.6	27.2	-28.09	-13	-15.09	Horizontal
1399.4	-53.29	2.6	27.2	-28.69	-13	-15.69	Vertical
2099.1	-54.44	2.85	27.54	-29.75	-13	-16.75	Vertical
2099.1	-52.87	2.85	27.54	-28.18	-13	-15.18	Horizontal
Test Results For Mid Channel 707.5MHz							
1415	-53.26	2.61	27.28	-28.59	-13	-15.59	Horizontal
1415	-52.37	2.61	27.28	-27.70	-13	-14.70	Vertical
2122.5	-52.91	2.87	27.59	-28.19	-13	-15.19	Vertical
2122.5	-54.25	2.87	27.59	-29.53	-13	-16.53	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-53.64	2.63	27.28	-28.99	-13	-15.99	Horizontal
1430.6	-53.26	2.63	27.28	-28.61	-13	-15.61	Vertical
2145.9	-52.98	2.88	27.6	-28.26	-13	-15.26	Vertical
2145.9	-52.33	2.88	27.6	-27.61	-13	-14.61	Horizontal

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

Test Results for Low Channel 704MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1408	-52.47	2.61	27.26	-27.82	-13	-14.82	Horizontal
1408	-52.22	2.61	27.26	-27.57	-13	-14.57	Vertical
2112	-53.56	2.87	27.58	-28.85	-13	-15.85	Vertical
2112	-53.58	2.87	27.58	-28.87	-13	-15.87	Horizontal
Test Results for Mid Channel 707.5MHz							
1415	-53.64	2.61	27.28	-28.97	-13	-15.97	Horizontal
1415	-53.29	2.61	27.28	-28.62	-13	-15.62	Vertical
2122.5	-54.27	2.87	27.59	-29.55	-13	-16.55	Vertical

2122.5	-53.26	2.87	27.59	-28.54	-13	-15.54	Horizontal
Test Results for High Channel 711MHz							
1422	-55.26	2.62	27.28	-30.60	-13	-17.60	Horizontal
1422	-52.32	2.62	27.28	-27.66	-13	-14.66	Vertical
2133	-54.14	2.87	27.60	-29.41	-13	-16.41	Vertical
2133	-53.62	2.87	27.60	-28.89	-13	-15.89	Horizontal

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

. Over Limit= : PMea(dBm)-Limit(dBm)

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

9.6 LTE BAND 17

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

Test Results for Low Channel 706.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1413	-50.26	2.61	27.28	-25.59	-13	-12.59	Horizontal
1413	-52.36	2.61	27.28	-27.69	-13	-14.69	Vertical
2119.5	-52.64	2.87	27.59	-27.92	-13	-14.92	Vertical
2119.5	-51.98	2.87	27.59	-27.26	-13	-14.26	Horizontal
Test Results For Mid Channel 710MHz							
1420	-51.22	2.62	27.3	-26.54	-13	-13.54	Horizontal
1420	-51.74	2.62	27.3	-27.06	-13	-14.06	Vertical
2130	-52.33	2.87	27.62	-27.58	-13	-14.58	Vertical
2130	-53.26	2.87	27.62	-28.51	-13	-15.51	Horizontal
Test Results for High Channel 713.5MHz							
1427	-53.27	2.66	27.28	-28.65	-13	-15.65	Horizontal
1427	-52.47	2.66	27.28	-27.85	-13	-14.85	Vertical
2140.5	-53.26	2.88	27.6	-28.54	-13	-15.54	Vertical
2140.5	-52.68	2.88	27.6	-27.96	-13	-14.96	Horizontal

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

Test Results for Low Channel 709MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1418	-53.24	2.62	27.3	-28.56	-13	-15.56	Horizontal
1418	-52.26	2.62	27.3	-27.58	-13	-14.58	Vertical
2127	-53.34	2.87	27.62	-28.59	-13	-15.59	Vertical
2127	-54.49	2.87	27.62	-29.74	-13	-16.74	Horizontal
Test Results for Mid Channel 710MHz							
1420	-52.55	2.62	27.3	-27.87	-13	-14.87	Horizontal
1420	-52.65	2.62	27.3	-27.97	-13	-14.97	Vertical
2130	-55.27	2.87	27.62	-30.52	-13	-17.52	Vertical
2130	-53.26	2.87	27.62	-28.51	-13	-15.51	Horizontal
Test Results for High Channel 711MHz							
1422	-51.33	2.62	27.3	-26.65	-13	-13.65	Horizontal
1422	-51.23	2.62	27.3	-26.55	-13	-13.55	Vertical
2133	-52.24	2.87	27.62	-27.49	-13	-14.49	Vertical
2133	-53.34	2.87	27.62	-28.59	-13	-15.59	Horizontal

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

. Over Limit= : PMea(dBm)-Limit(dBm)

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = −30° to +50°C

Voltage =low voltage, DC 3.66V, Normal, DC 3.85V and High voltage, DC 4.43V.

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

LTE Band 12

LTE Band 17

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	1880	7	0.003723	2.5
3.8	1880	-7.3	-0.003883	2.5
4.4	1880	8.5	0.004521	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	-6.3	-0.003351	2.5
Extreme (50C)	1880	-5	-0.002660	2.5
Extreme (40C)	1880	-9	-0.004787	2.5
Extreme (30C)	1880	5	0.002660	2.5
Extreme (10C)	1880	8	0.004255	2.5
Extreme (0C)	1880	11	0.005851	2.5
Extreme (-10C)	1880	14	0.007447	2.5
Extreme (-20C)	1880	6.3	0.003351	2.5
Extreme (-30C)	1880	6.7	0.003564	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	1880	8	0.004255	2.5
3.8	1880	-6.5	-0.003457	2.5
4.4	1880	7	0.003723	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	7.4	0.003936	2.5
Extreme (50C)	1880	6.6	0.003511	2.5
Extreme (40C)	1880	-8.5	-0.004521	2.5
Extreme (30C)	1880	-11	-0.005851	2.5
Extreme (10C)	1880	-10.2	-0.005426	2.5
Extreme (0C)	1880	5.3	0.002819	2.5
Extreme (-10C)	1880	4	0.002128	2.5
Extreme (-20C)	1880	8	0.004255	2.5
Extreme (-30C)	1880	7	0.003723	2.5

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

10.2 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	1732.5	-4.2	-0.002424	2.5
3.8	1732.5	-4.4	-0.002540	2.5
4.4	1732.5	-5.2	-0.003001	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	6	0.003463	2.5
Extreme (50C)	1732.5	-4.1	-0.002367	2.5
Extreme (40C)	1732.5	-3.9	-0.002251	2.5
Extreme (30C)	1732.5	-3	-0.001732	2.5
Extreme (10C)	1732.5	-2.8	-0.001616	2.5
Extreme (0C)	1732.5	5	0.002886	2.5
Extreme (-10C)	1732.5	5.1	0.002944	2.5
Extreme (-20C)	1732.5	3.3	0.001905	2.5
Extreme (-30C)	1732.5	3	0.001732	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	1732.5	-4.8	-0.002771	2.5
3.8	1732.5	-5.1	-0.002944	2.5
4.4	1732.5	-6	-0.003463	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	3	0.001732	2.5
Extreme (50C)	1732.5	4.5	0.002597	2.5
Extreme (40C)	1732.5	6.9	0.003983	2.5
Extreme (30C)	1732.5	-5.4	-0.003117	2.5
Extreme (10C)	1732.5	-7	-0.004040	2.5
Extreme (0C)	1732.5	6.8	0.003925	2.5
Extreme (-10C)	1732.5	6	0.003463	2.5
Extreme (-20C)	1732.5	-10	-0.005772	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 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	836.5	-2.1	-0.002510	2.5
3.8	836.5	-5.6	-0.006695	2.5
4.4	836.5	-3.6	-0.004304	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-2	-0.002391	2.5
Extreme (50C)	836.5	-2.4	-0.002869	2.5
Extreme (40C)	836.5	-3.1	-0.003706	2.5
Extreme (30C)	836.5	-5.9	-0.007053	2.5
Extreme (10C)	836.5	-6	-0.007173	2.5
Extreme (0C)	836.5	5.5	0.006575	2.5
Extreme (-10C)	836.5	4	0.004782	2.5
Extreme (-20C)	836.5	6.6	0.007890	2.5
Extreme (-30C)	836.5	4.8	0.005738	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	836.5	-3.6	-0.004304	2.5
3.8	836.5	-4.4	-0.005260	2.5
4.4	836.5	5.8	0.006934	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	836.5	-4.1	-0.004901	2.5
Extreme (50C)	836.5	-4.7	-0.005619	2.5
Extreme (40C)	836.5	-5.2	-0.006216	2.5
Extreme (30C)	836.5	6.9	0.008249	2.5
Extreme (10C)	836.5	7.5	0.008966	2.5
Extreme (0C)	836.5	4.3	0.005140	2.5
Extreme (-10C)	836.5	2.8	0.003347	2.5
Extreme (-20C)	836.5	3.3	0.003945	2.5
Extreme (-30C)	836.5	3.4	0.004065	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	2535	9.7	0.003826	2.5
3.8	2535	5.1	0.002012	2.5
4.4	2535	10	0.003945	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	-7.7	-0.003037	2.5
Extreme (50C)	2535	-10.2	-0.004024	2.5
Extreme (40C)	2535	11	0.004339	2.5
Extreme (30C)	2535	11.4	0.004497	2.5
Extreme (10C)	2535	5.8	0.002288	2.5

Extreme (0C)	2535	6.6	0.002604	2.5
Extreme (-10C)	2535	7.3	0.002880	2.5
Extreme (-20C)	2535	9	0.003550	2.5
Extreme (-30C)	2535	8.9	0.003511	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.6	2535	-8.6	-0.003393	2.5
3.8	2535	-7	-0.002761	2.5
4.4	2535	7.4	0.002919	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	8	0.003156	2.5
Extreme (50C)	2535	-4.5	-0.001775	2.5
Extreme (40C)	2535	-6.5	-0.002564	2.5
Extreme (30C)	2535	-8.7	-0.003432	2.5
Extreme (10C)	2535	-10.3	-0.004063	2.5
Extreme (0C)	2535	8.8	0.003471	2.5
Extreme (-10C)	2535	7.9	0.003116	2.5
Extreme (-20C)	2535	7.6	0.002998	2.5
Extreme (-30C)	2535	-9.1	-0.003590	2.5

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

10.5 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	707.5	3.6	0.005088	2.5
3.8	707.5	-7.2	-0.010177	2.5
4.4	707.5	4.4	0.006219	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-6.8	-0.009611	2.5
Extreme (50C)	707.5	-6	-0.008481	2.5
Extreme (40C)	707.5	-7	-0.009894	2.5
Extreme (30C)	707.5	-11	-0.015548	2.5
Extreme (10C)	707.5	-6.8	-0.009611	2.5
Extreme (0C)	707.5	-6.9	-0.009753	2.5
Extreme (-10C)	707.5	-7.1	-0.010035	2.5
Extreme (-20C)	707.5	-7.5	-0.010601	2.5
Extreme (-30C)	707.5	-5.3	-0.007491	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	707.5	4	0.005654	2.5
3.8	707.5	4.5	0.006360	2.5
4.4	707.5	-6.9	-0.009753	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	707.5	-7	-0.009894	2.5
Extreme (50C)	707.5	-6.2	-0.008763	2.5
Extreme (40C)	707.5	8	0.011307	2.5
Extreme (30C)	707.5	10	0.014134	2.5
Extreme (10C)	707.5	5.8	0.008198	2.5
Extreme (0C)	707.5	-7	-0.009894	2.5
Extreme (-10C)	707.5	-7.2	-0.010177	2.5
Extreme (-20C)	707.5	-3.9	-0.005512	2.5
Extreme (-30C)	707.5	-4.5	-0.006360	2.5

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

10.6 LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	710.0	-3.9	-0.005493	2.5
3.8	710.0	-3.5	-0.004930	2.5
4.4	710.0	-4.1	-0.005775	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	3.3	0.004648	2.5
Extreme (50C)	710.0	2.8	0.003944	2.5

Extreme (40C)	710.0	-5.5	-0.007746	2.5
Extreme (30C)	710.0	-5	-0.007042	2.5
Extreme (10C)	710.0	-6.8	-0.009577	2.5
Extreme (0C)	710.0	-7.2	-0.010141	2.5
Extreme (-10C)	710.0	-4.1	-0.005775	2.5
Extreme (-20C)	710.0	-6	-0.008451	2.5
Extreme (-30C)	710.0	8	0.011268	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.6	710.0	-4.1	-0.005775	2.5
3.8	710.0	-4.2	-0.005915	2.5
4.4	710.0	3	0.004225	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH 23790 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710.0	6.4	0.009014	2.5
Extreme (50C)	710.0	5.5	0.007746	2.5
Extreme (40C)	710.0	7.1	0.010000	2.5
Extreme (30C)	710.0	9	0.012676	2.5
Extreme (10C)	710.0	9.5	0.013380	2.5
Extreme (0C)	710.0	-4.2	-0.005915	2.5
Extreme (-10C)	710.0	-2.8	-0.003944	2.5
Extreme (-20C)	710.0	-6	-0.008451	2.5
Extreme (-30C)	710.0	5.6	0.007887	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.

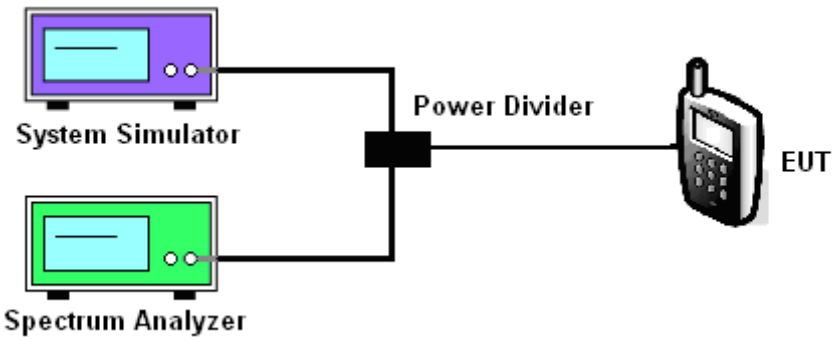
11.2 Measuring Instruments

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
LTE Band 12
LTE Band 17

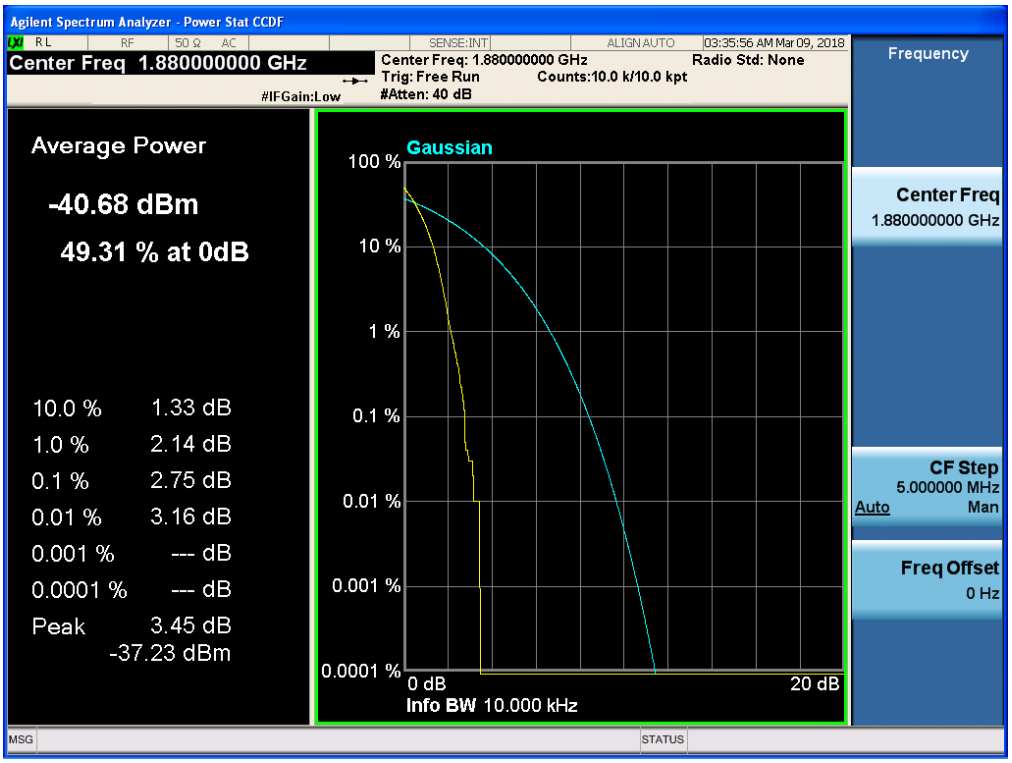
BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	2.75
2	18900	1880.0	1.4	1	Low	16-QAM	4.60
2	18900	1880.0	3.0	1	Low	QPSK	5.04
2	18900	1880.0	3.0	1	Low	16-QAM	5.61
2	18900	1880.0	5.0	1	Low	QPSK	5.42
2	18900	1880.0	5.0	1	Low	16-QAM	4.01
2	18900	1880.0	10.0	1	Low	QPSK	2.53
2	18900	1880.0	10.0	1	Low	16-QAM	2.40
2	18900	1880.0	15.0	1	Low	QPSK	2.08
2	18900	1880.0	15.0	1	Low	16-QAM	2.03
2	18900	1880.0	20.0	1	Low	QPSK	1.91
2	18900	1880.0	20.0	1	Low	16-QAM	1.96
4	20175	1732.5	1.4	1	Low	QPSK	5.27
4	20175	1732.5	1.4	1	Low	16-QAM	6.91
4	20175	1732.5	3.0	1	Low	QPSK	6.78
4	20175	1732.5	3.0	1	Low	16-QAM	5.98
4	20175	1732.5	5.0	1	Low	QPSK	4.48
4	20175	1732.5	5.0	1	Low	16-QAM	3.89
4	20175	1732.5	10.0	1	Low	QPSK	2.29
4	20175	1732.5	10.0	1	Low	16-QAM	2.16
4	20175	1732.5	15.0	1	Low	QPSK	1.99

4	20175	1732.5	15.0	1	Low	16-QAM	1.88
4	20175	1732.5	20.0	1	Low	QPSK	1.95
4	20175	1732.5	20.0	1	Low	16-QAM	2.02
5	20525	836.5	1.4	1	Low	QPSK	6.76
5	20525	836.5	1.4	1	Low	16-QAM	9.10
5	20525	836.5	3.0	1	Low	QPSK	8.34
5	20525	836.5	3.0	1	Low	16-QAM	7.79
5	20525	836.5	5.0	1	Low	QPSK	5.21
5	20525	836.5	5.0	1	Low	16-QAM	5.96
5	20525	836.5	10.0	1	Low	QPSK	2.40
5	20525	836.5	10.0	1	Low	16-QAM	2.75
7	21100	2535.0	5.0	1	Low	QPSK	2.04
7	21100	2535.0	5.0	1	Low	16-QAM	2.28
7	21100	2535.0	10.0	1	Low	QPSK	1.78
7	21100	2535.0	10.0	1	Low	16-QAM	2.11
7	21100	2535.0	15.0	1	Low	QPSK	1.75
7	21100	2535.0	15.0	1	Low	16-QAM	1.96
7	21100	2535.0	20.0	1	Low	QPSK	2.24
7	21100	2535.0	20.0	1	Low	16-QAM	2.17
12	23095	707.5	1.4	1	Low	QPSK	6.60
12	23095	707.5	1.4	1	Low	16-QAM	5.62
12	23095	707.5	3.0	1	Low	QPSK	3.56

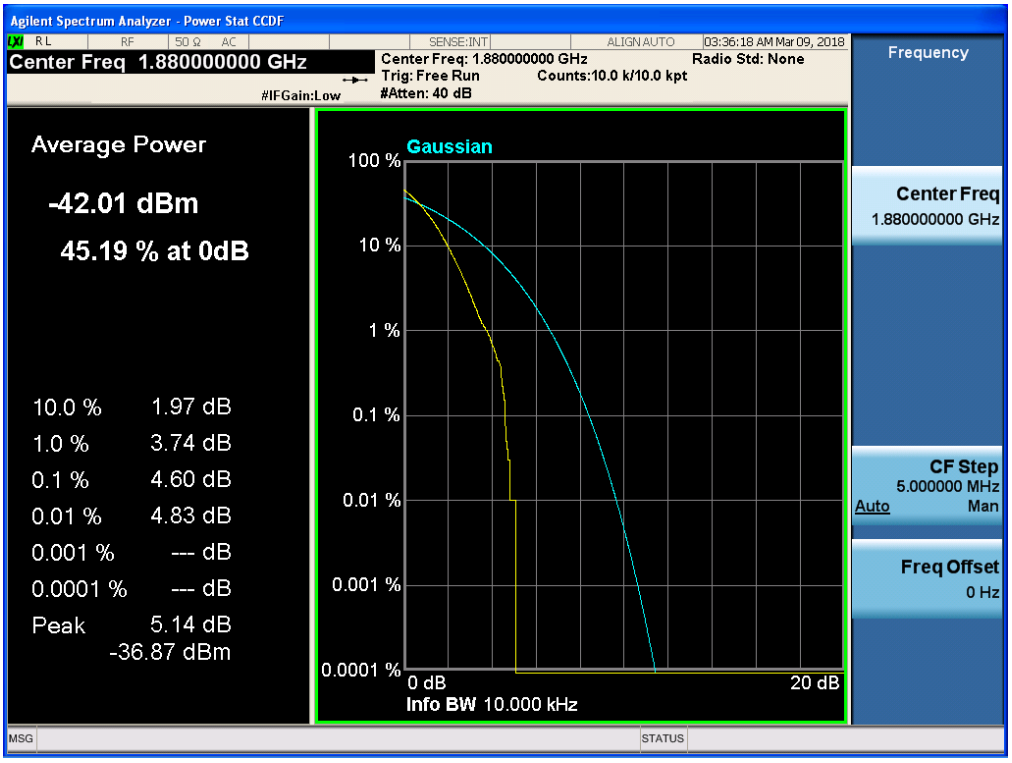
12	23095	707.5	3.0	1	Low	16-QAM	3.74
12	23095	707.5	5.0	1	Low	QPSK	3.04
12	23095	707.5	5.0	1	Low	16-QAM	3.02
12	23095	707.5	10.0	1	Low	QPSK	2.12
12	23095	707.5	10.0	1	Low	16-QAM	2.62
17	23790	710.0	5.0	1	Low	QPSK	3.42
17	23790	710.0	5.0	1	Low	16-QAM	3.43
17	23790	710.0	10.0	1	Low	QPSK	2.19
17	23790	710.0	10.0	1	Low	16-QAM	2.50

11.5 LTE BAND 2

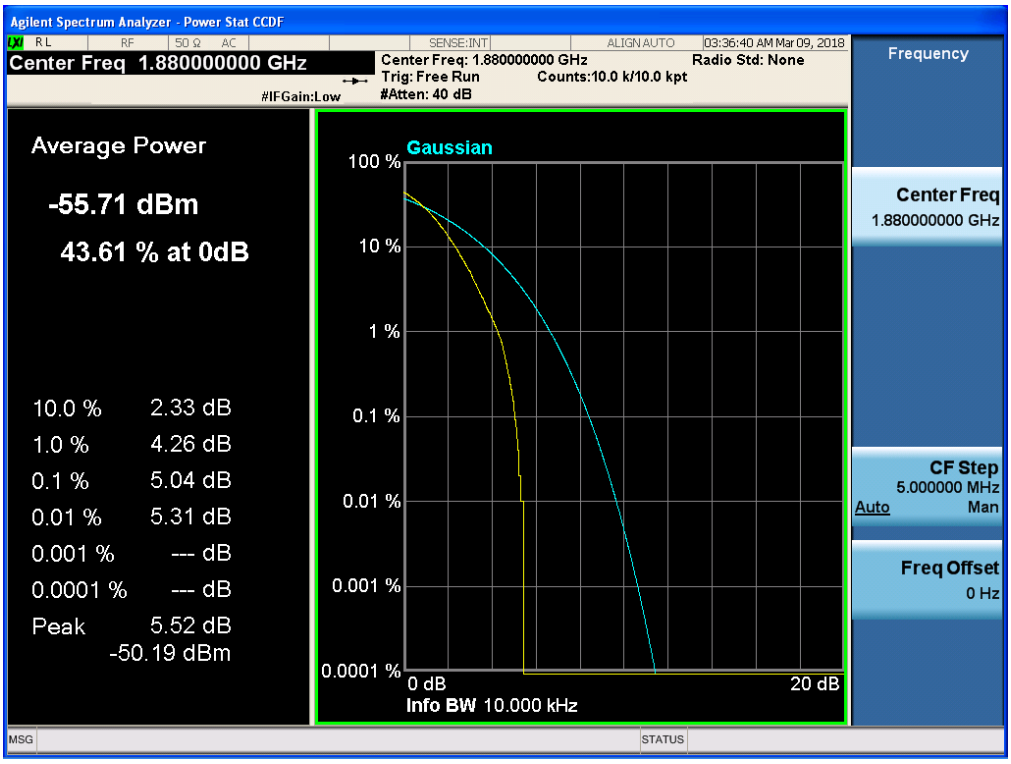
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,QPSK



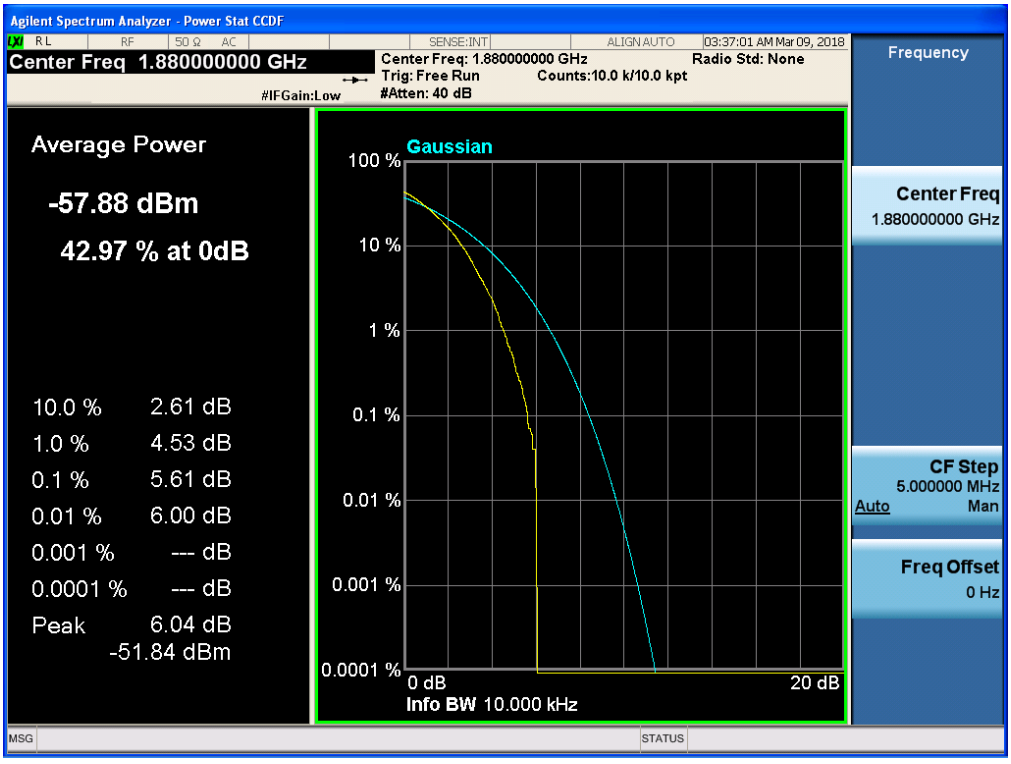
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



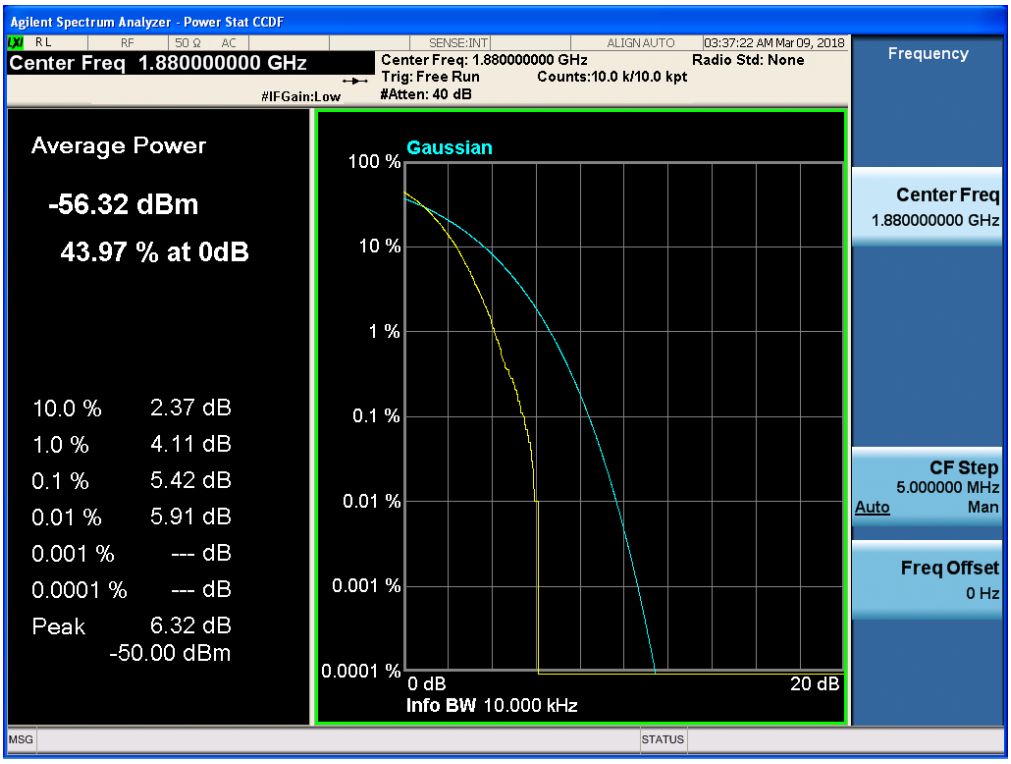
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,QPSK



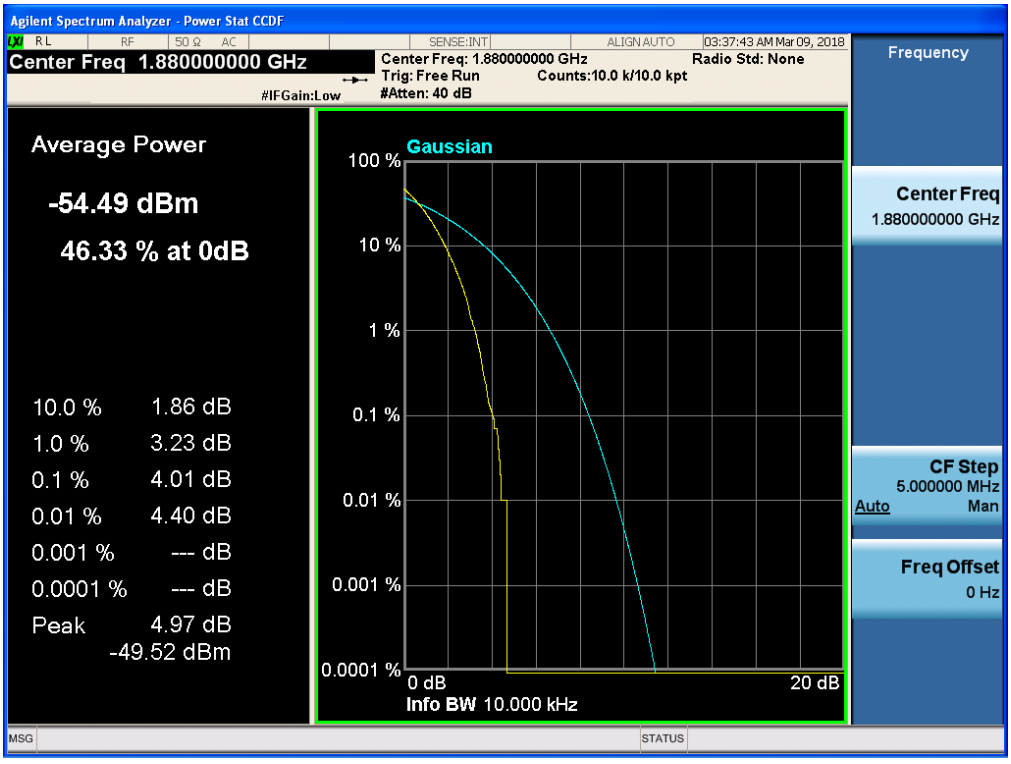
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



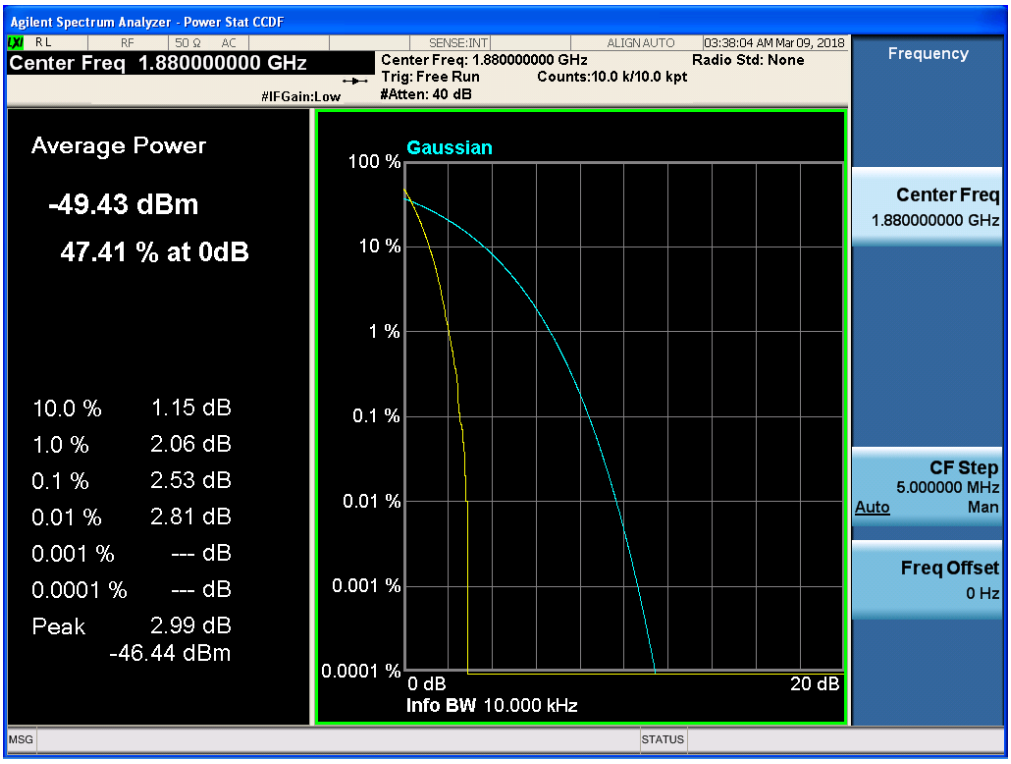
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



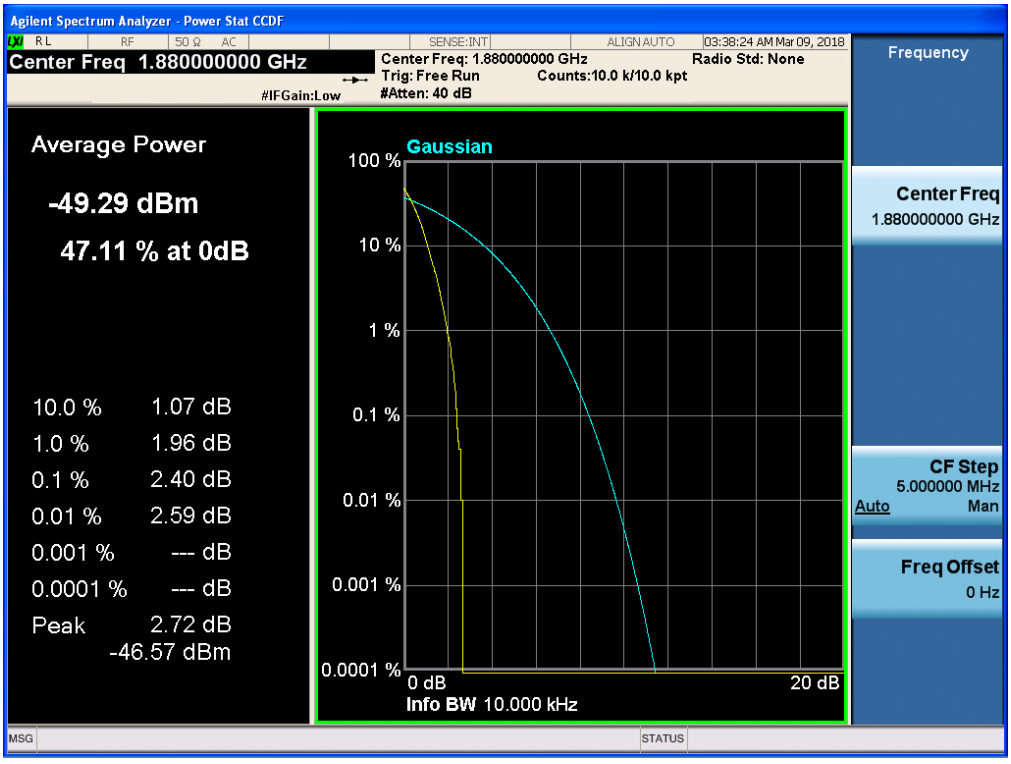
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



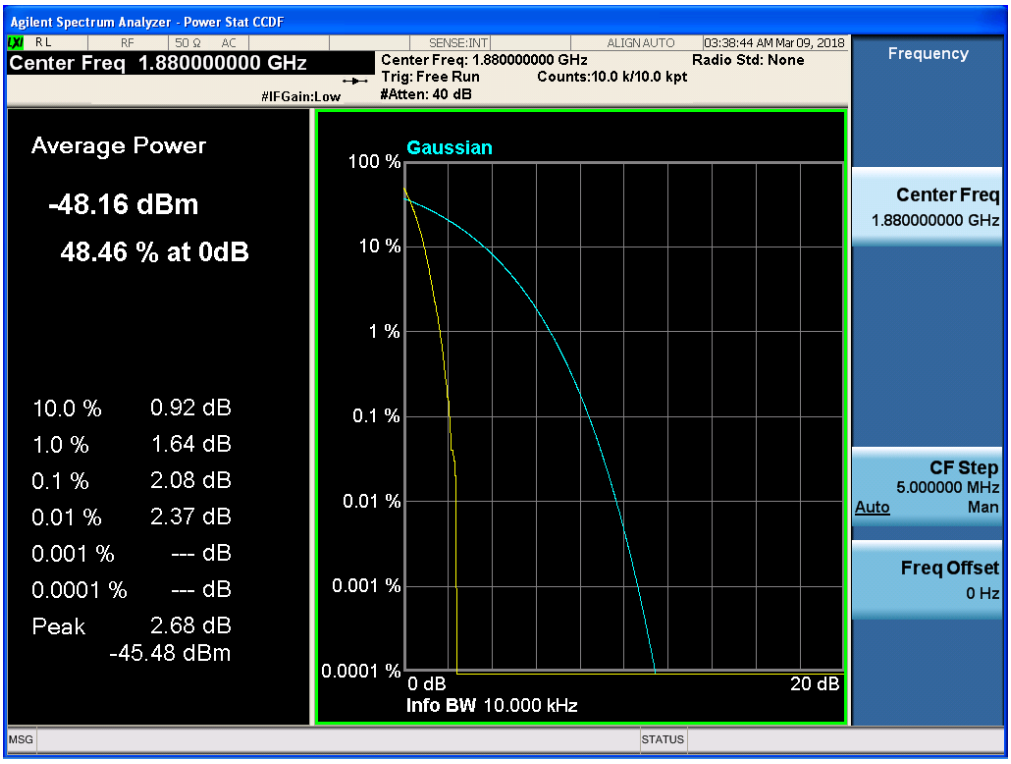
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



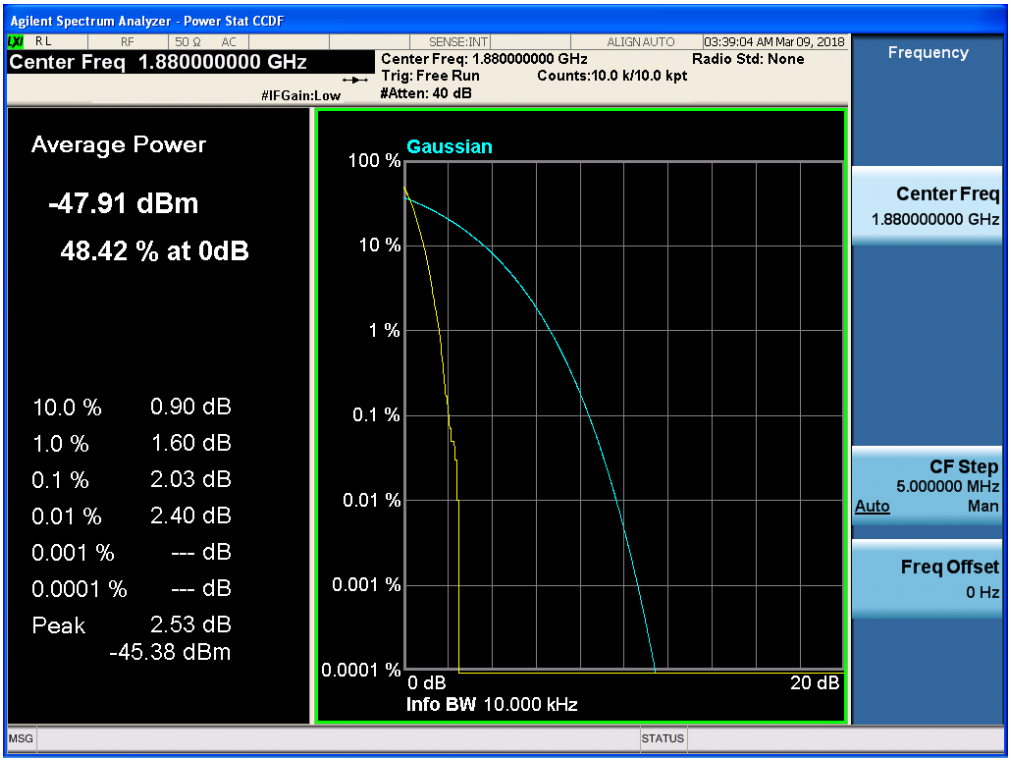
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



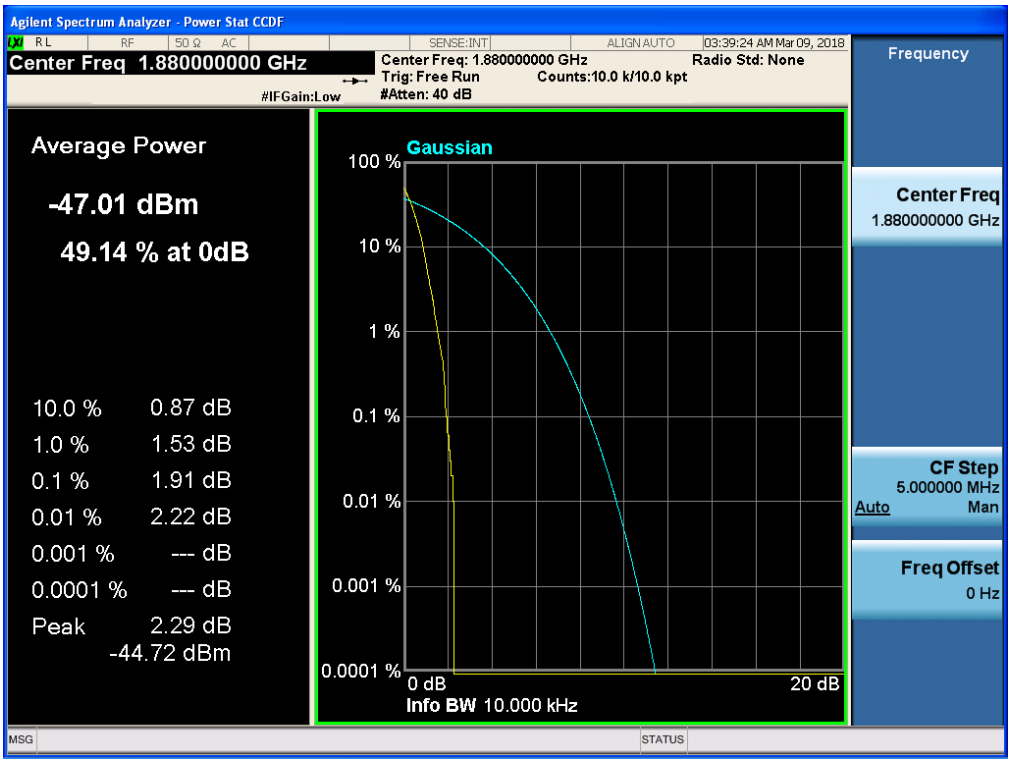
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



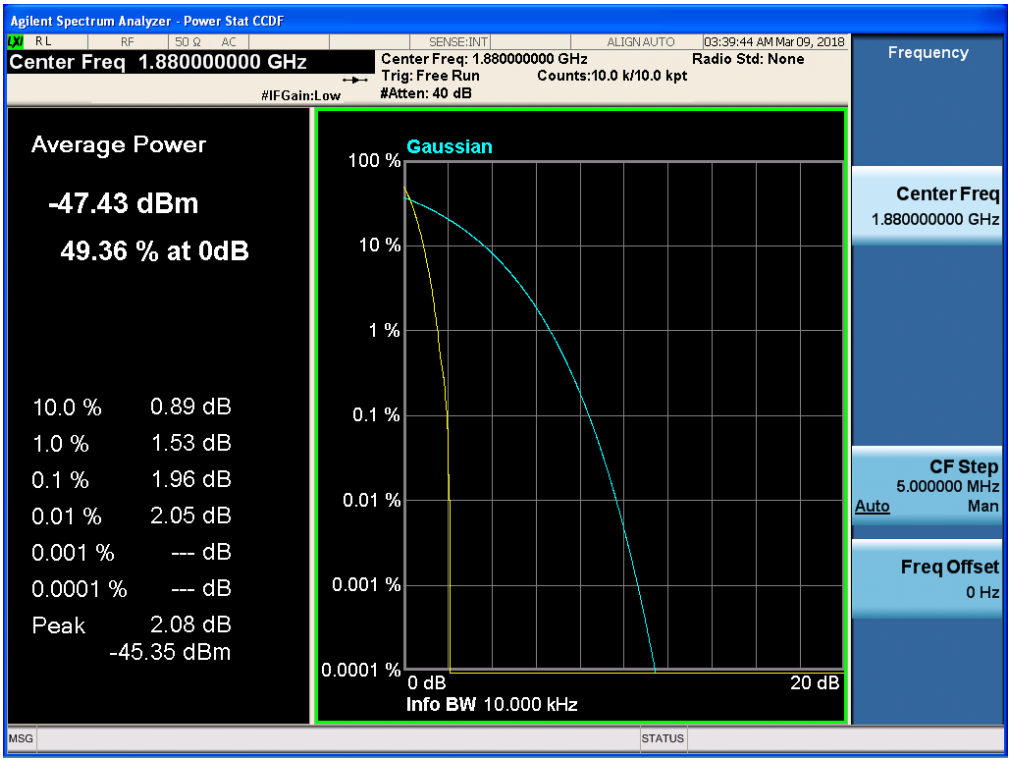
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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

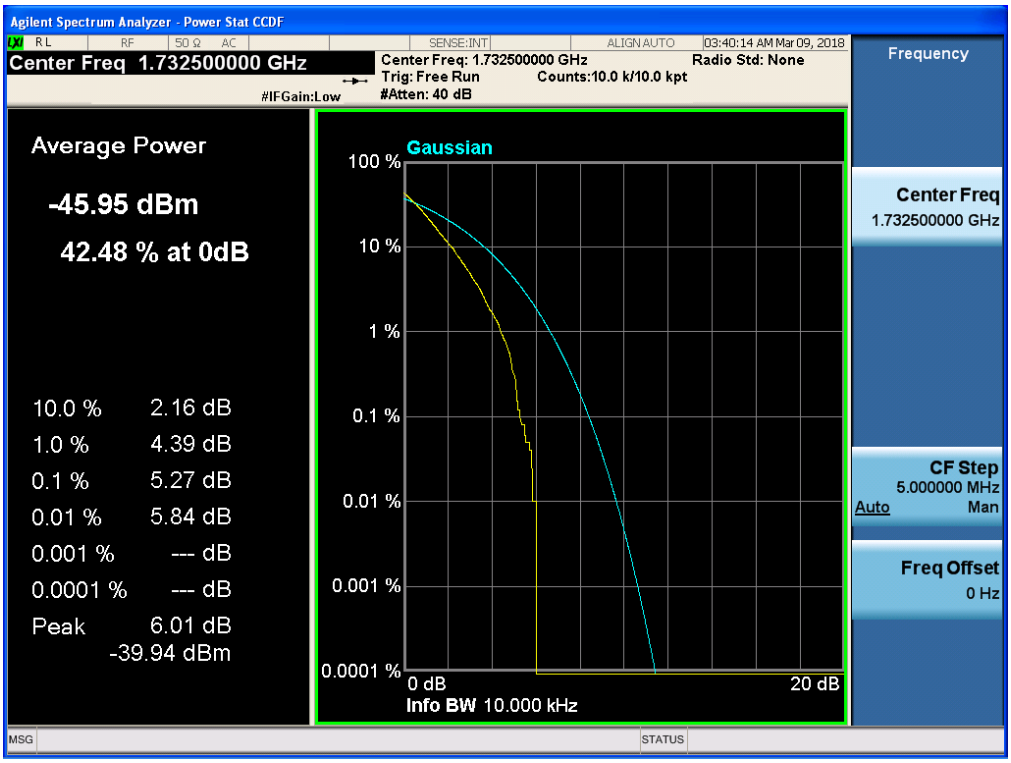


Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

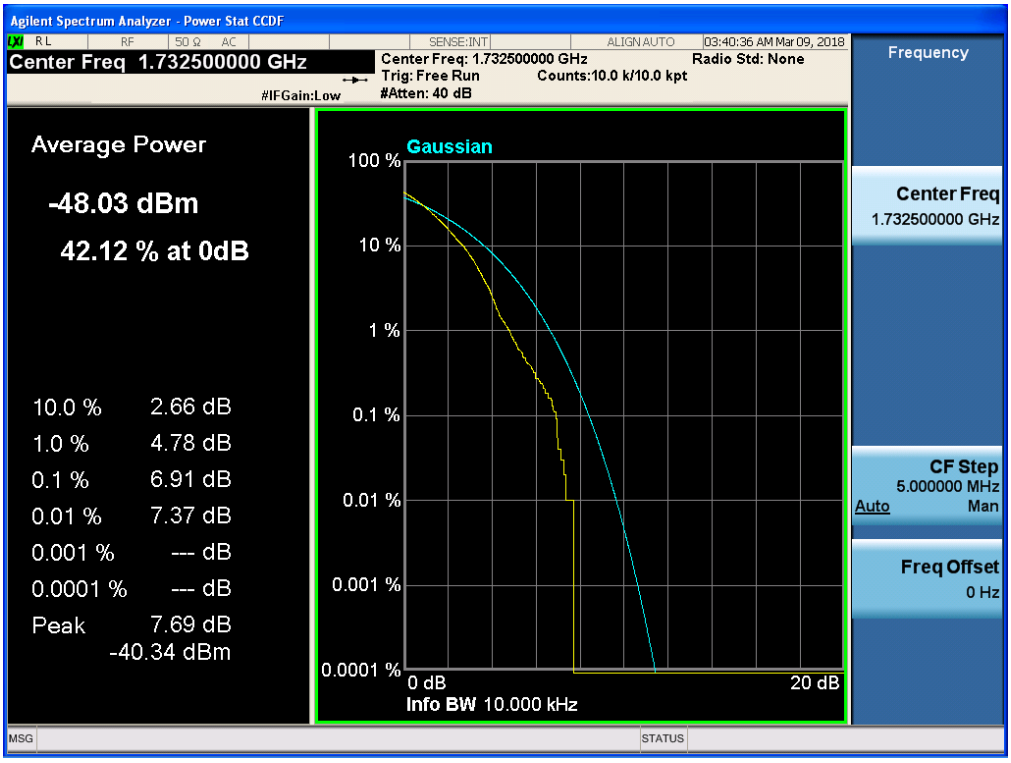


11.6 LTE BAND 4

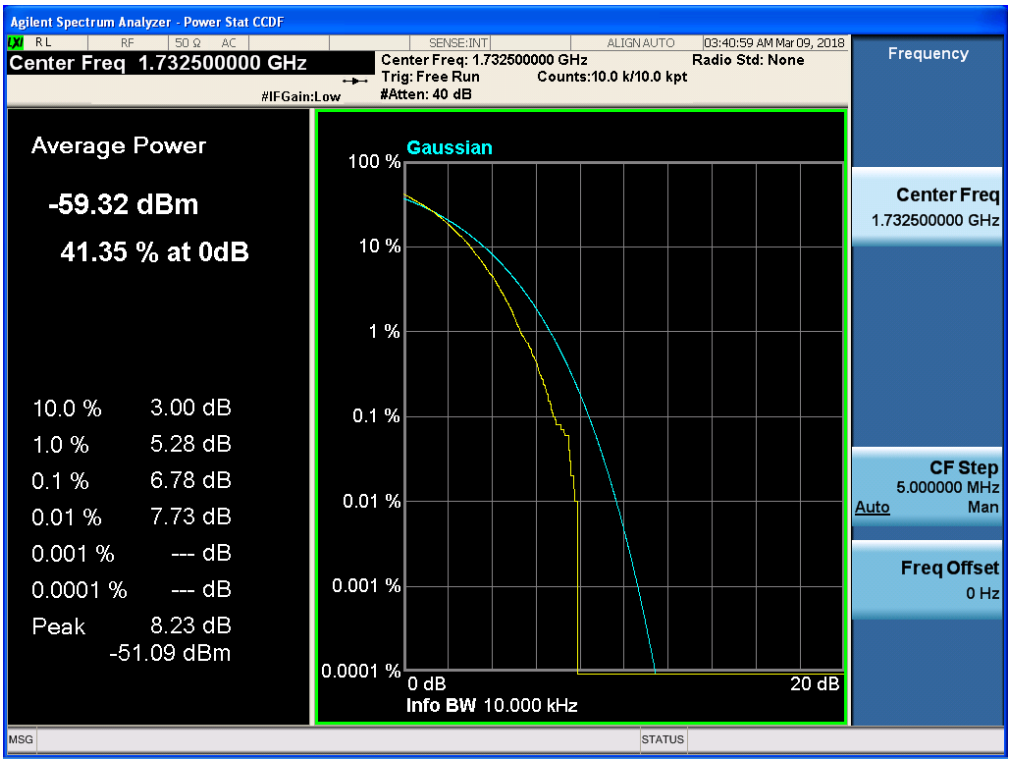
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



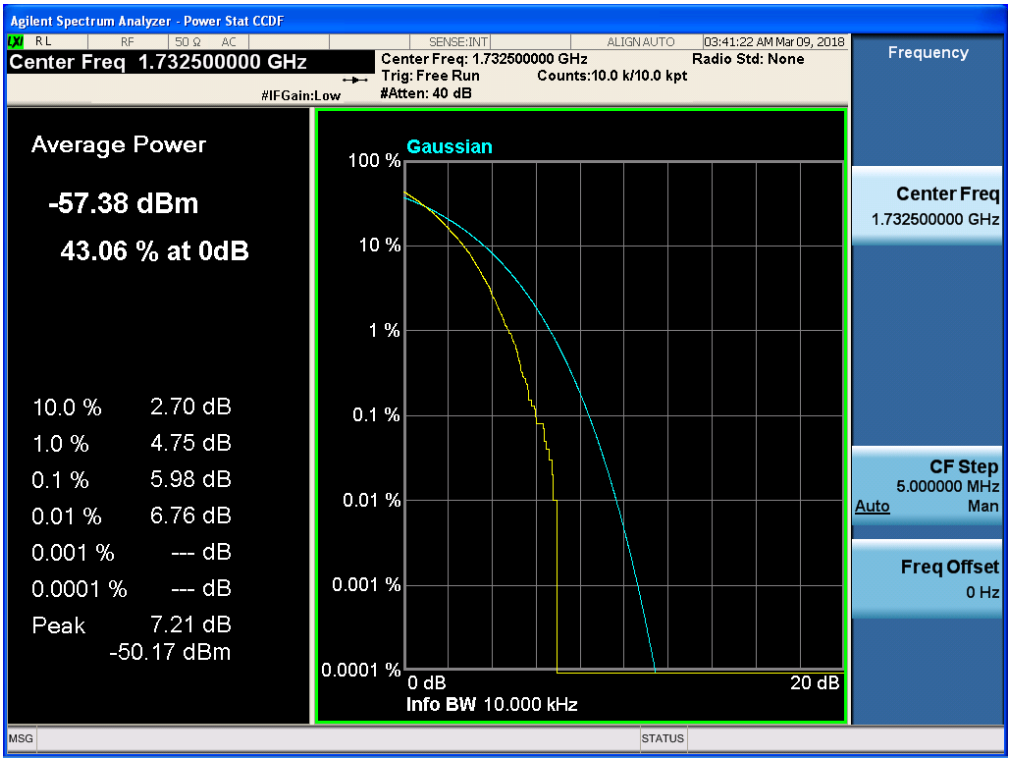
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



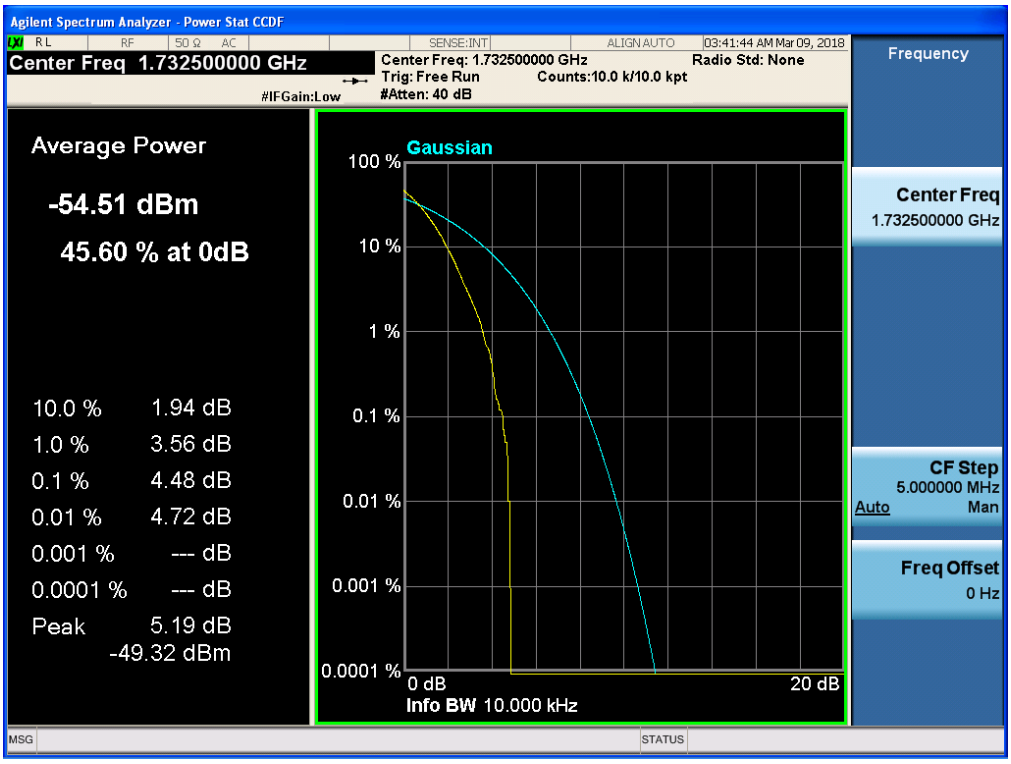
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



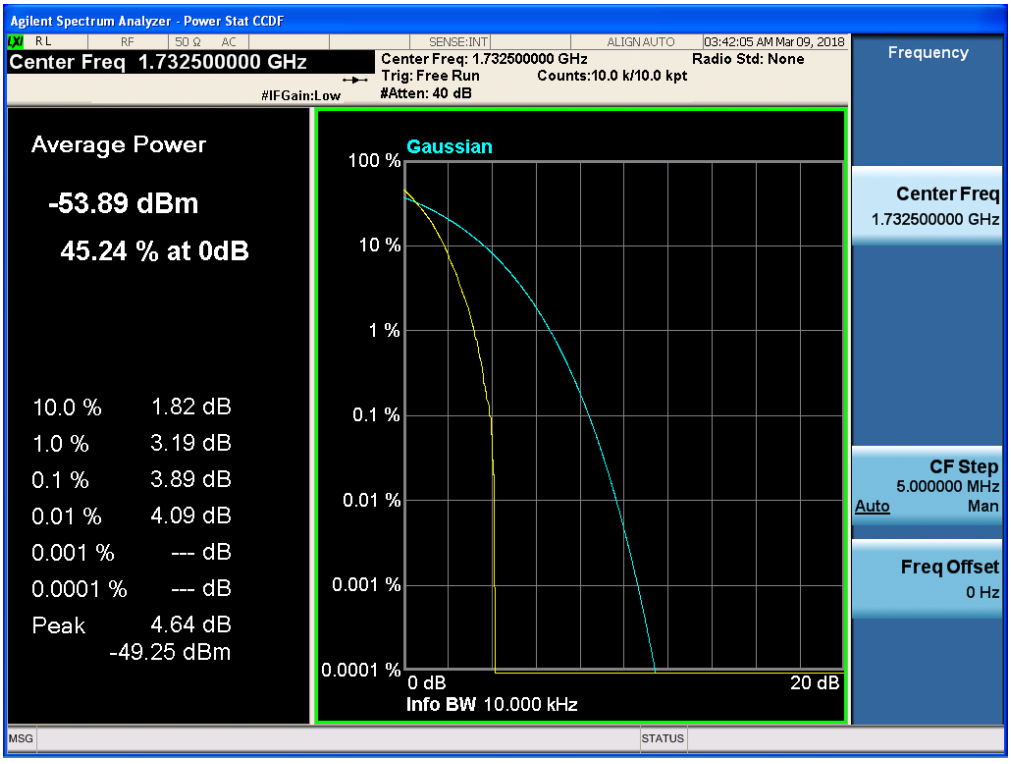
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



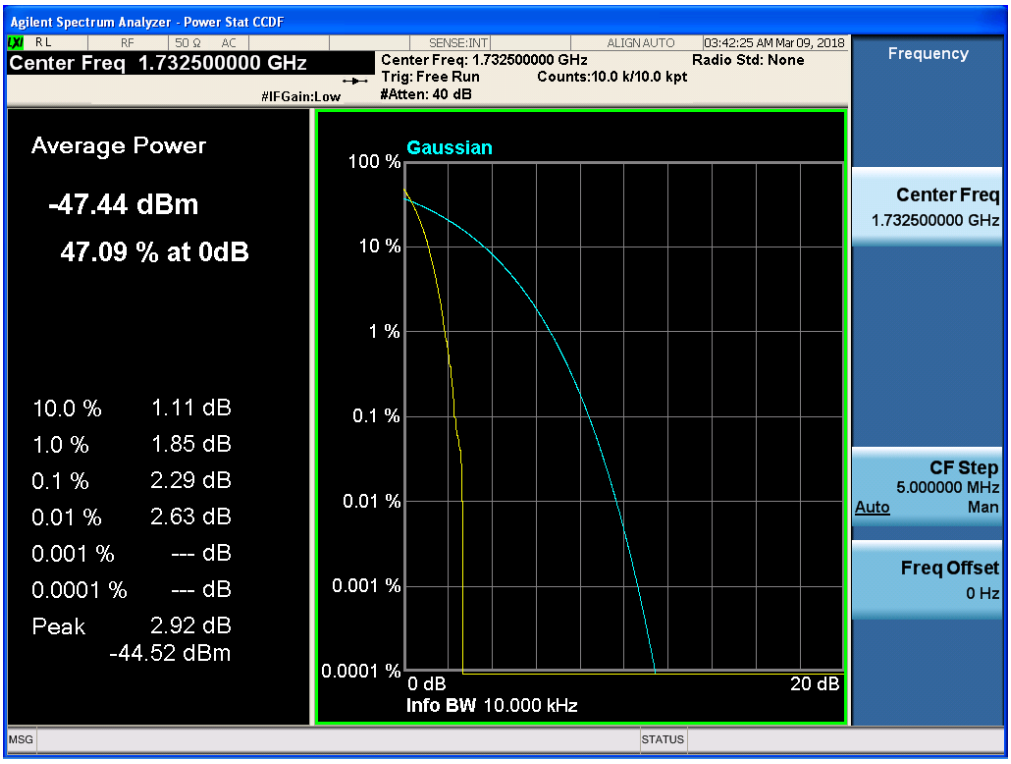
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



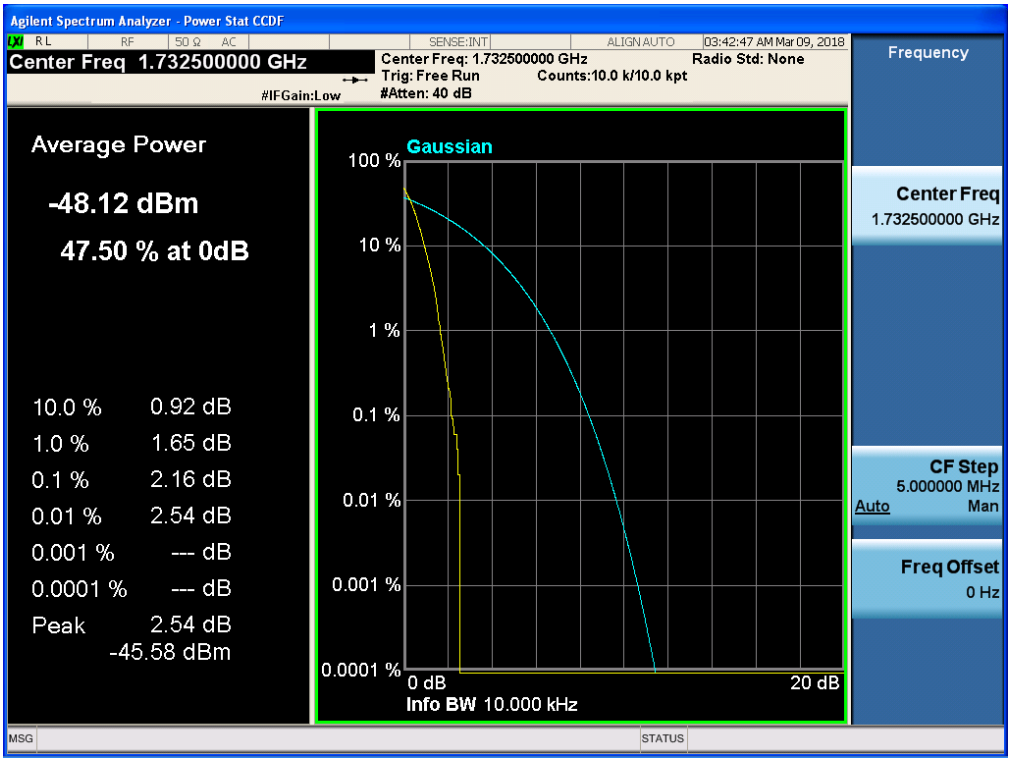
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



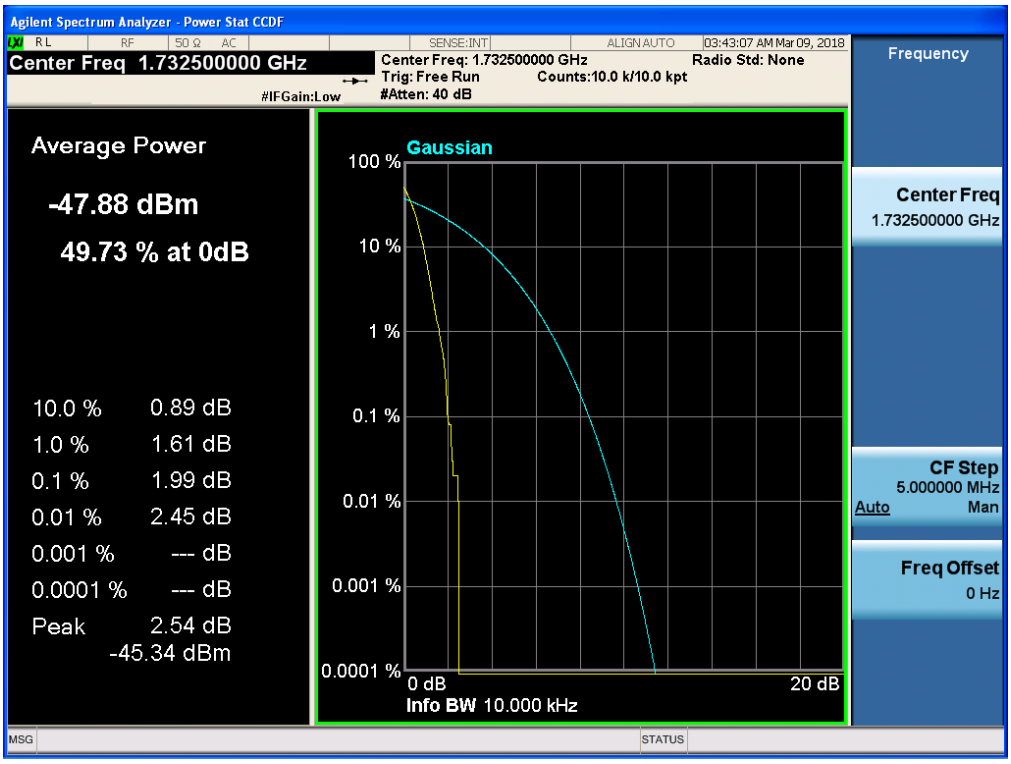
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



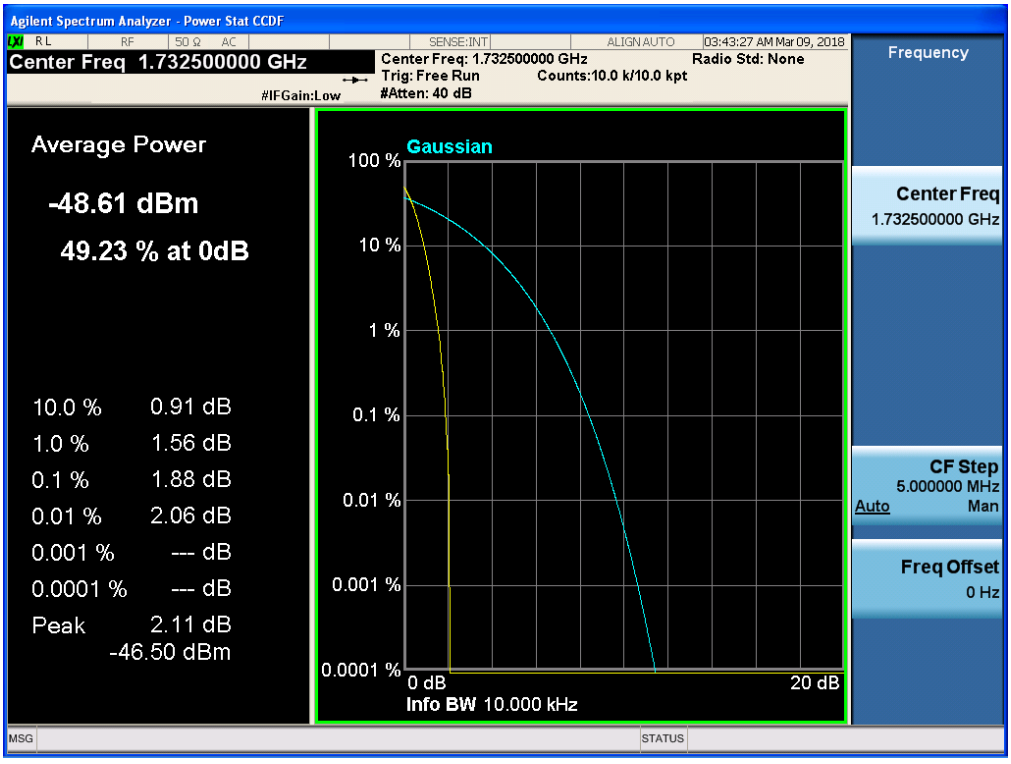
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



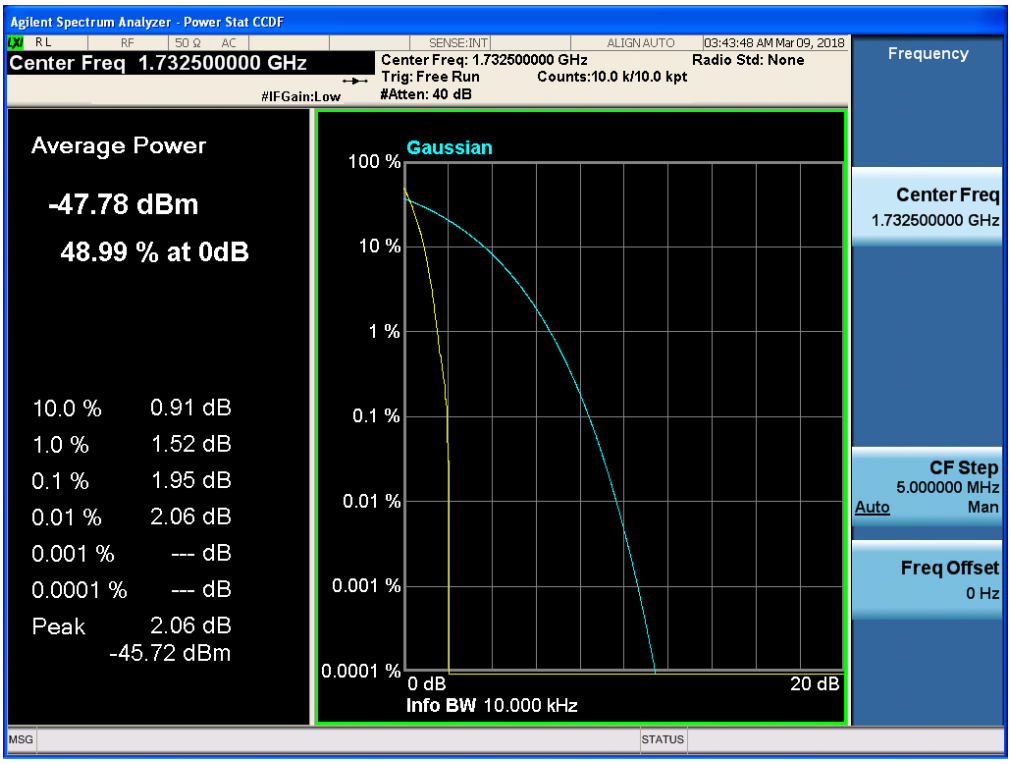
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



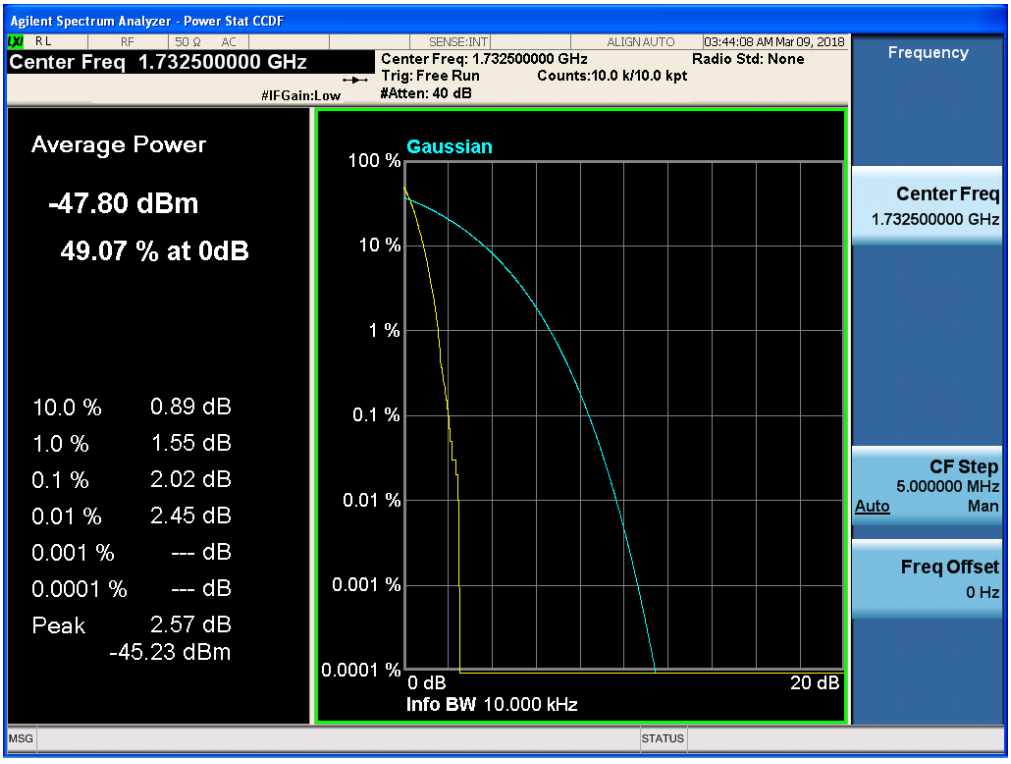
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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

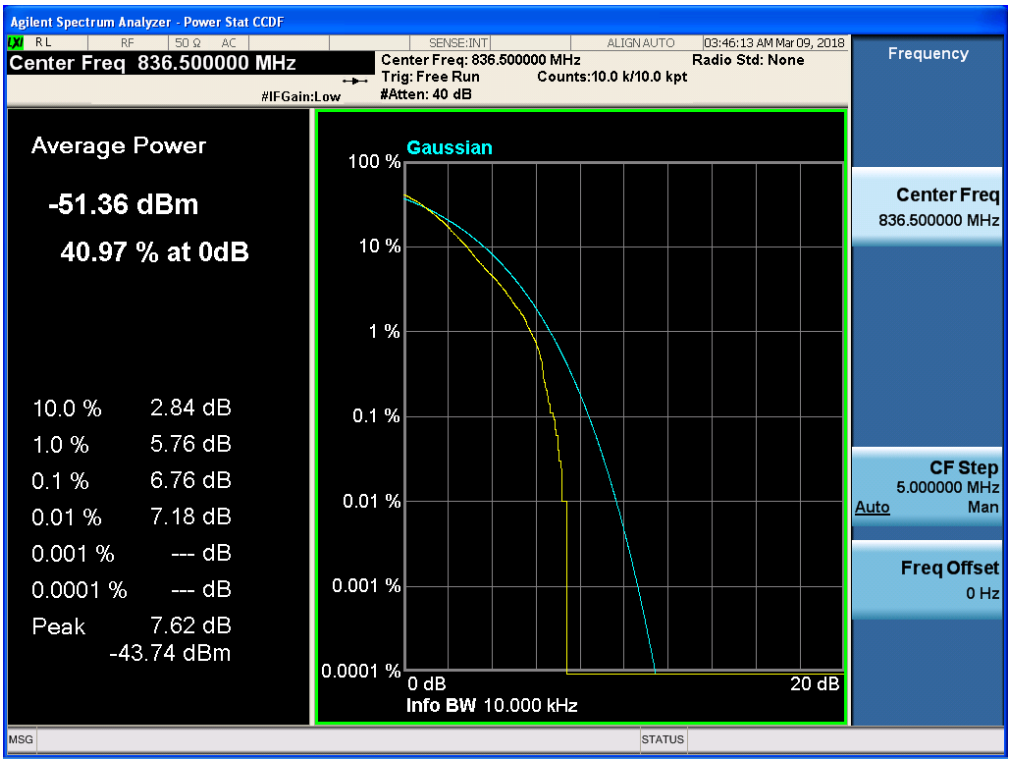


Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

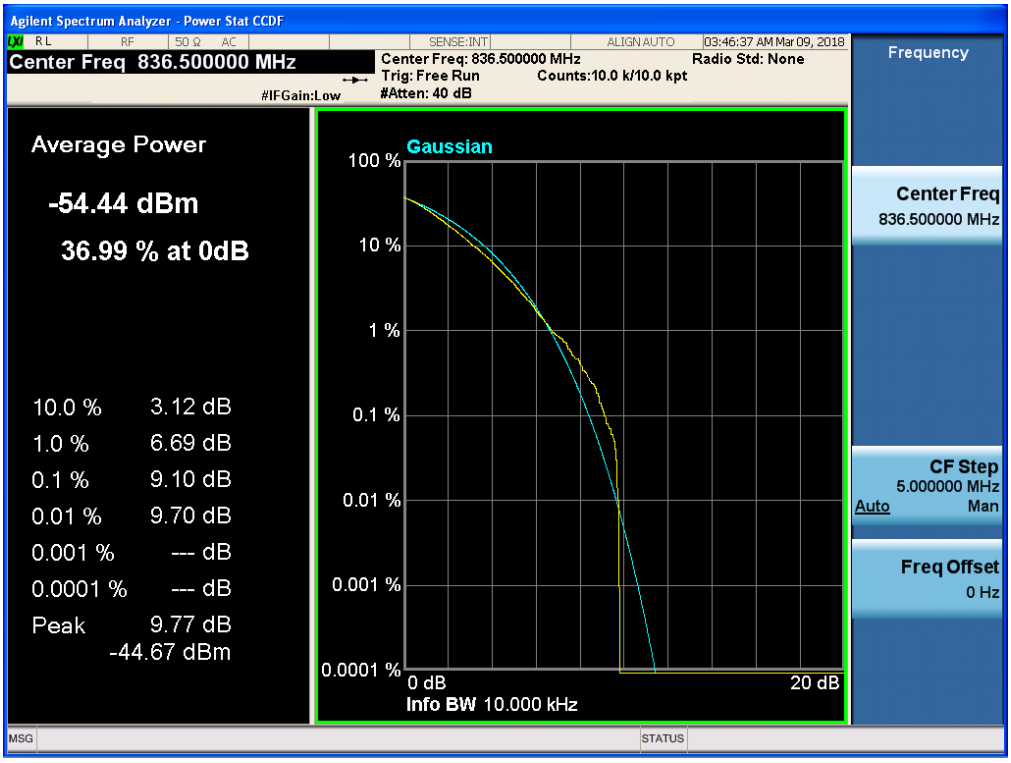


11.7 LTE BAND 5

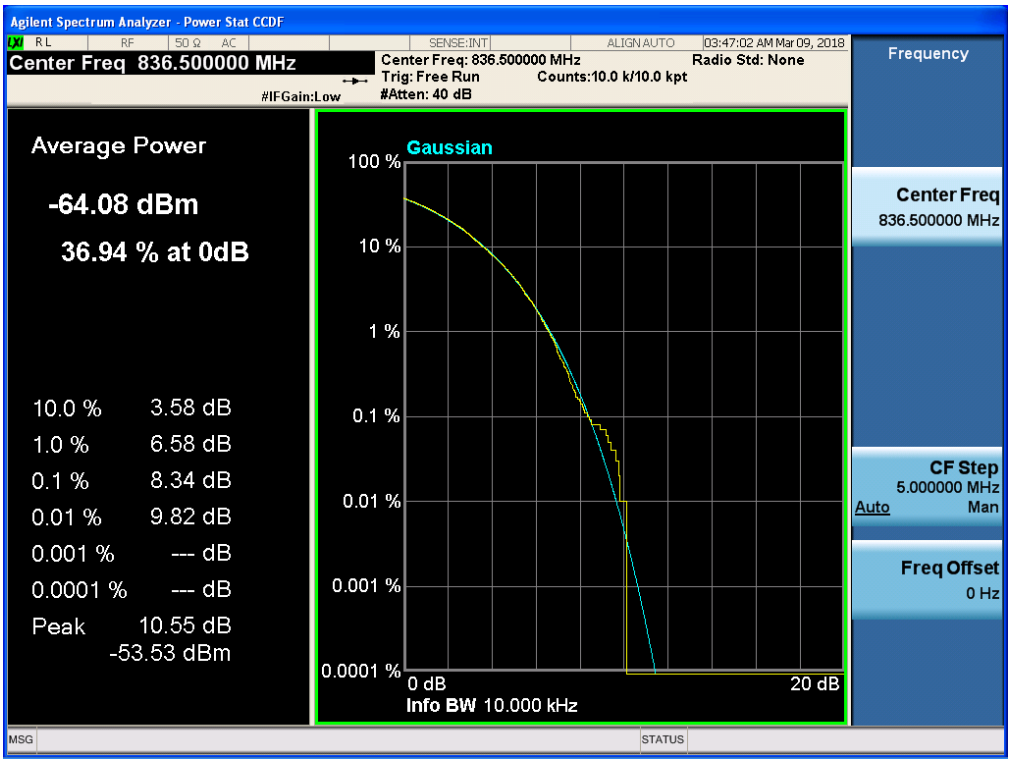
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



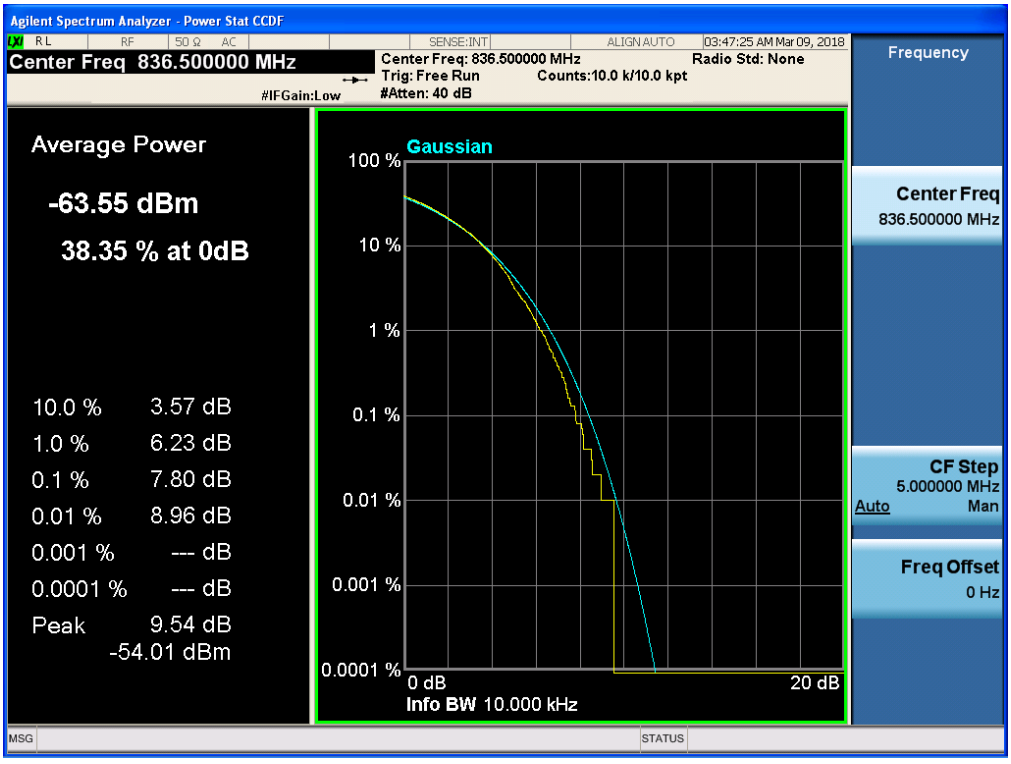
Band 5,UL Channel 20525,UL Frequency 836.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



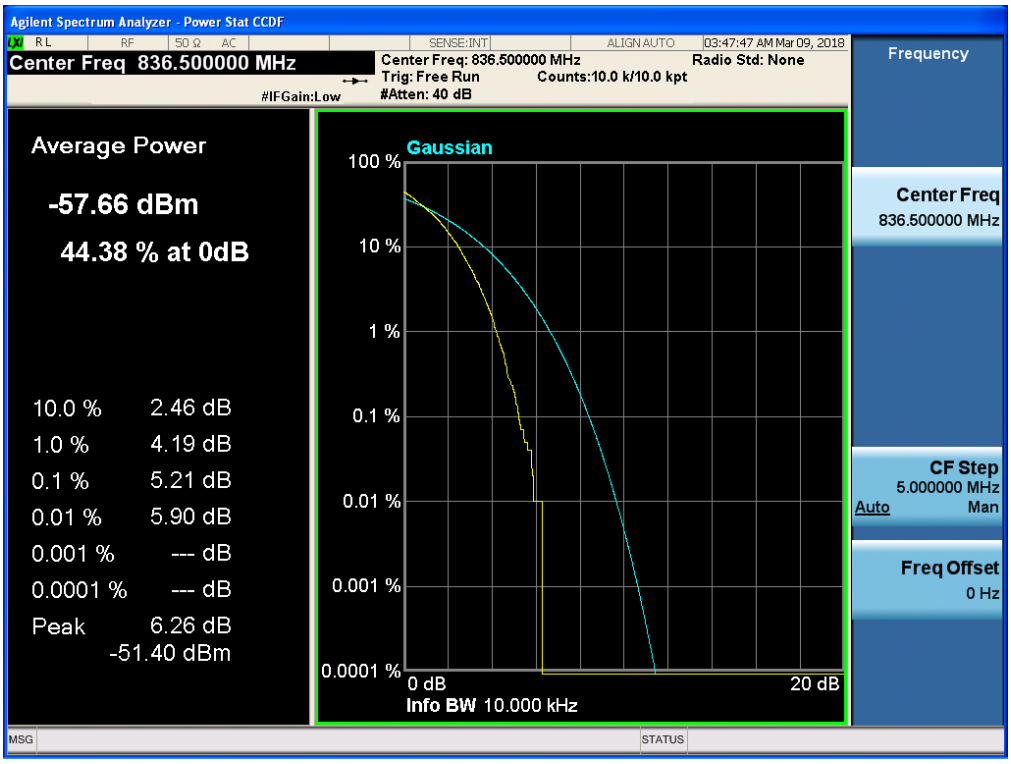
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



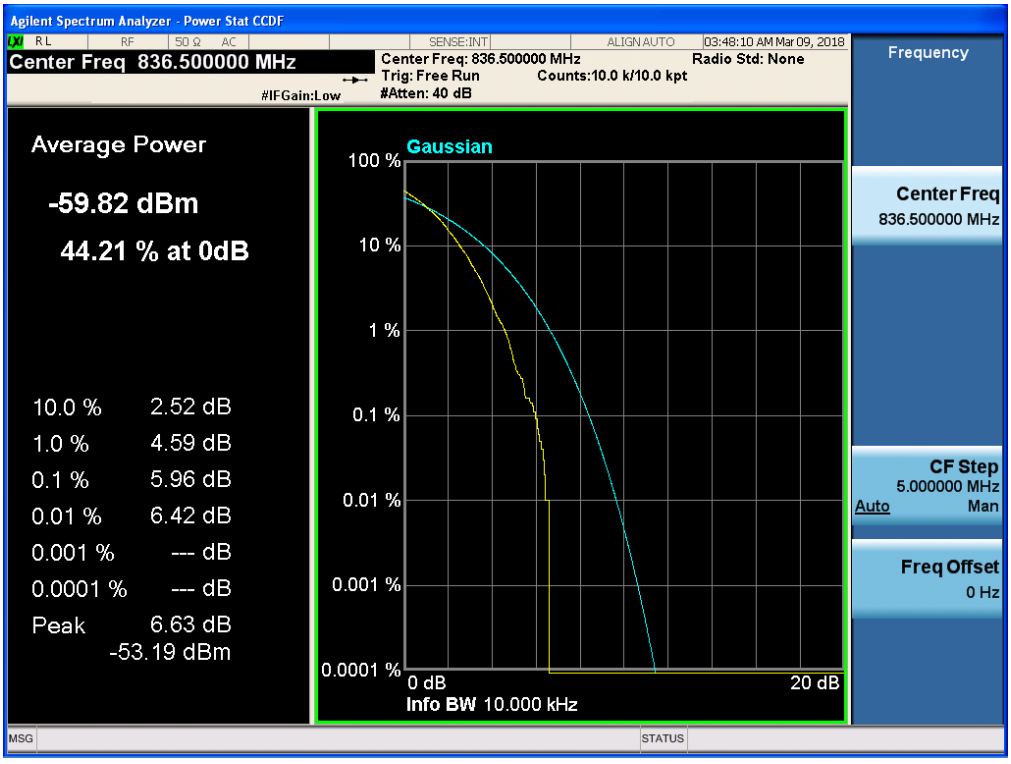
Band 5,UL Channel 20525,UL Frequency 836.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



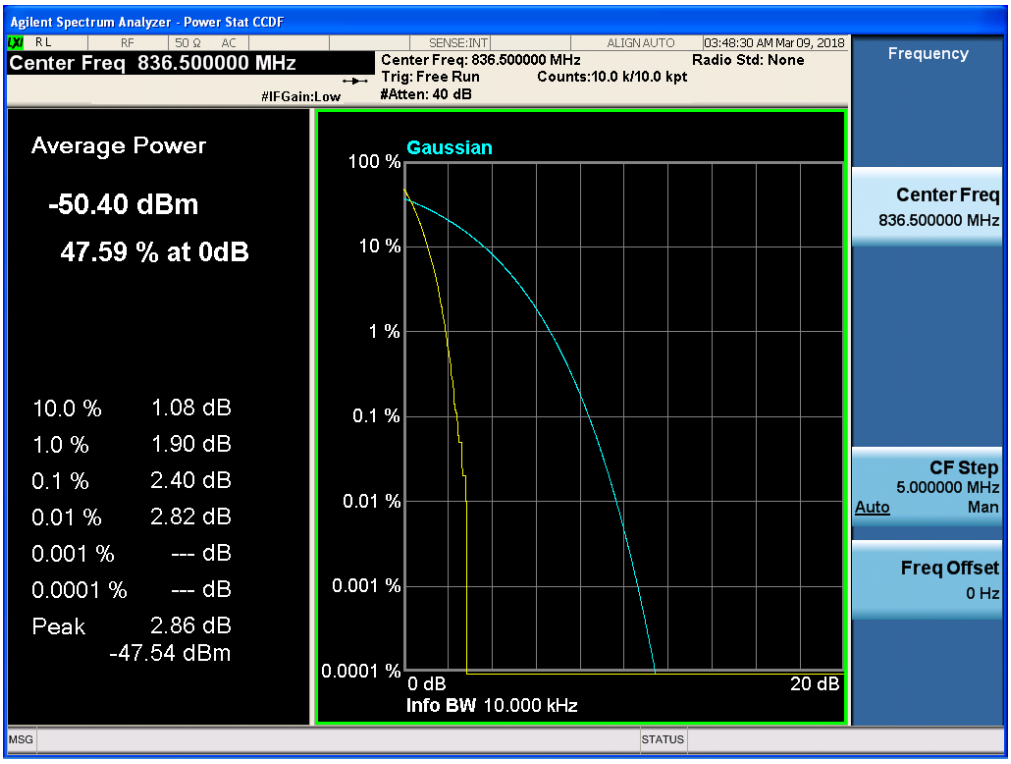
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



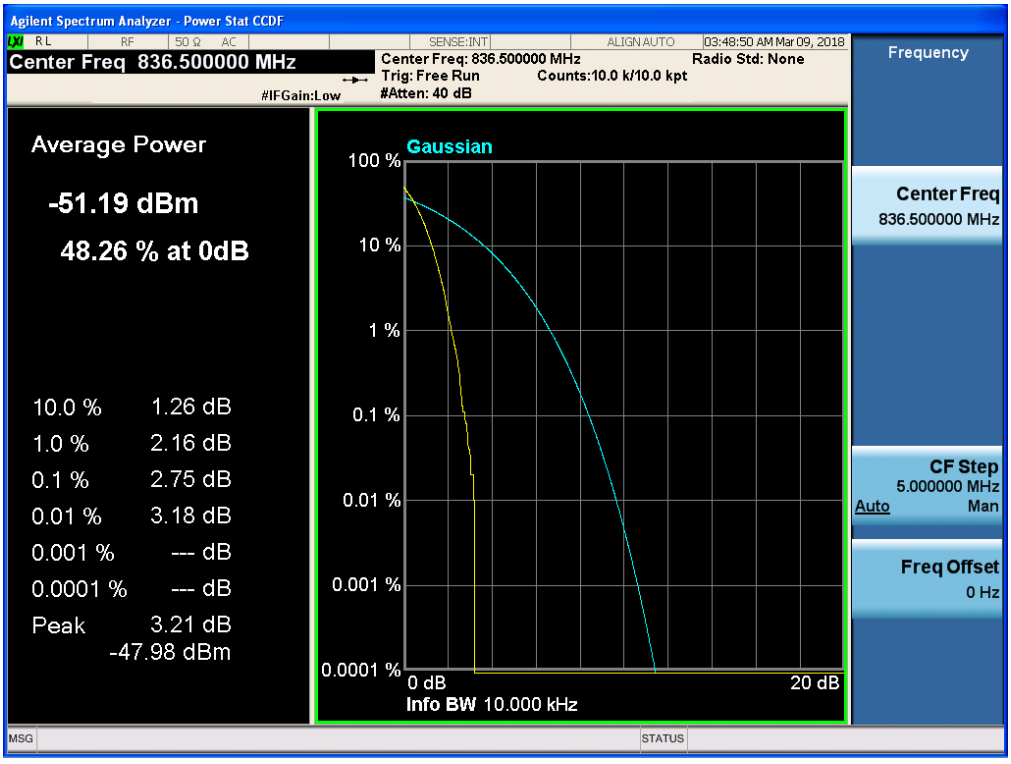
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



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

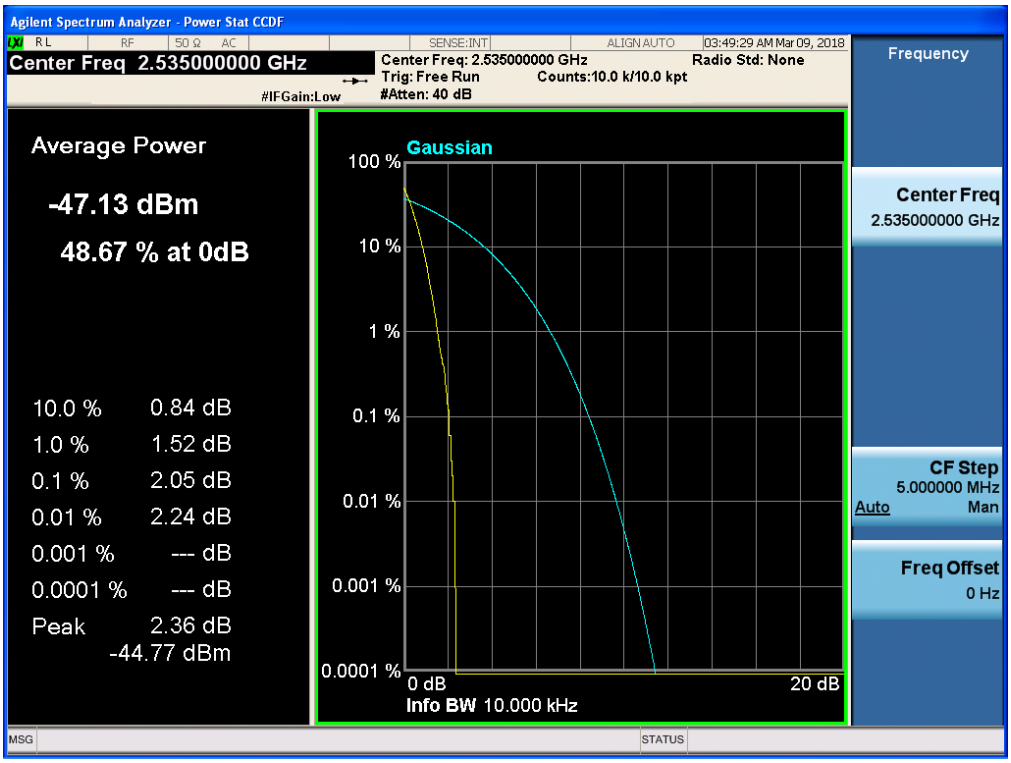


Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

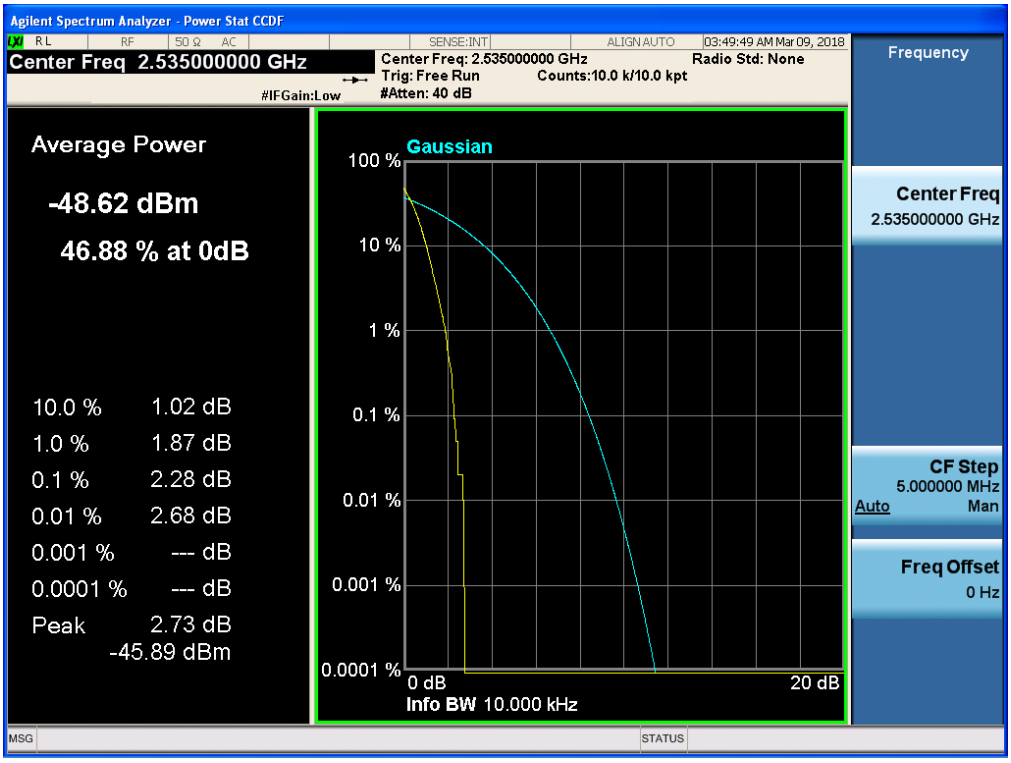


11.8 LTE BAND 7

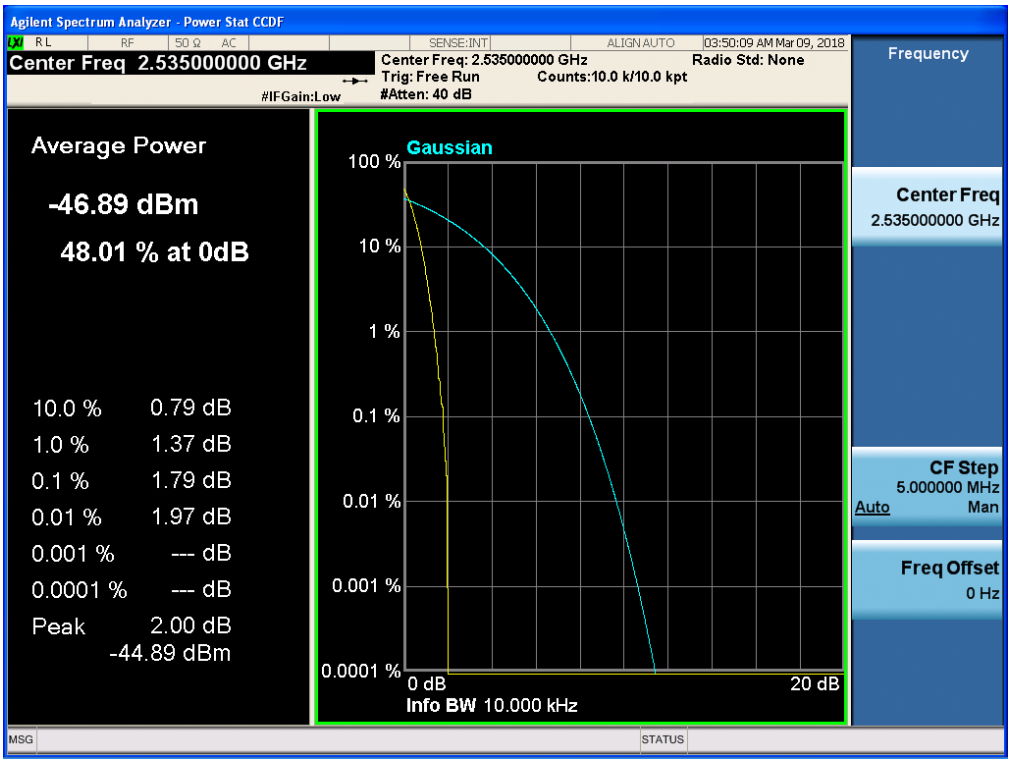
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



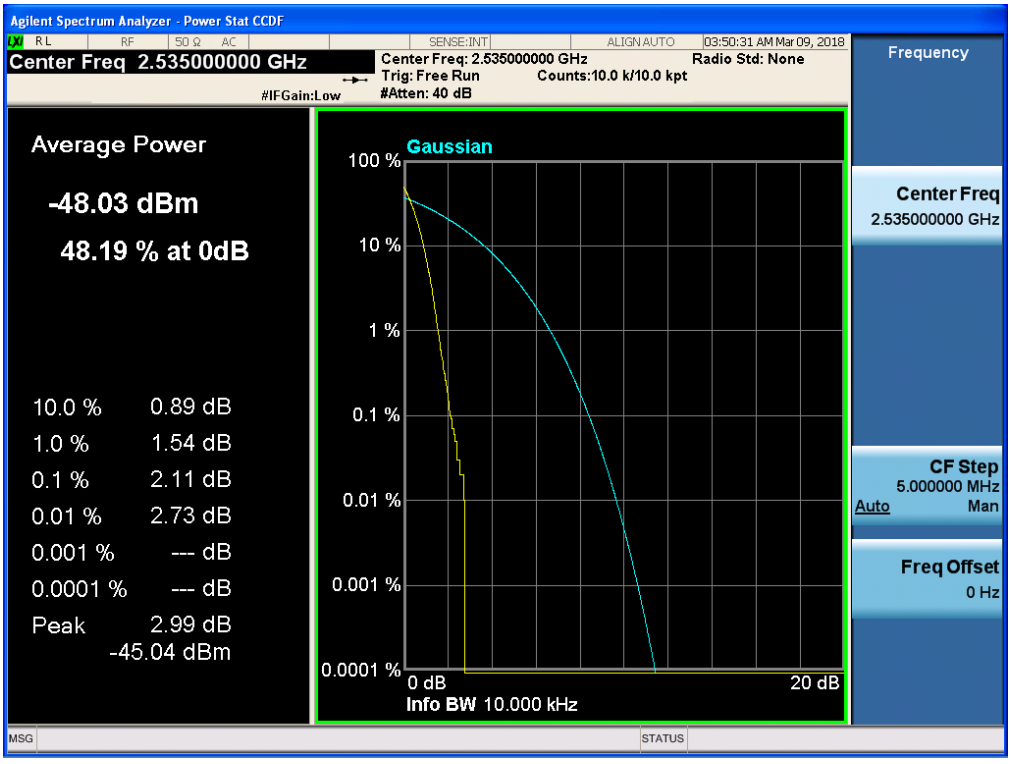
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



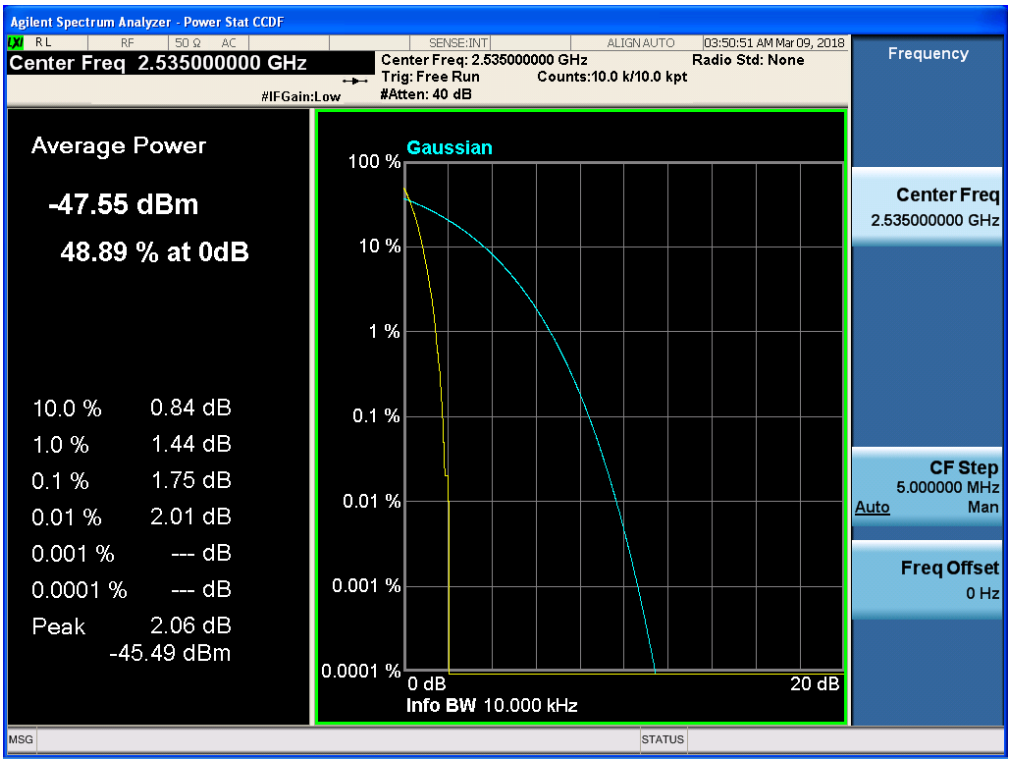
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



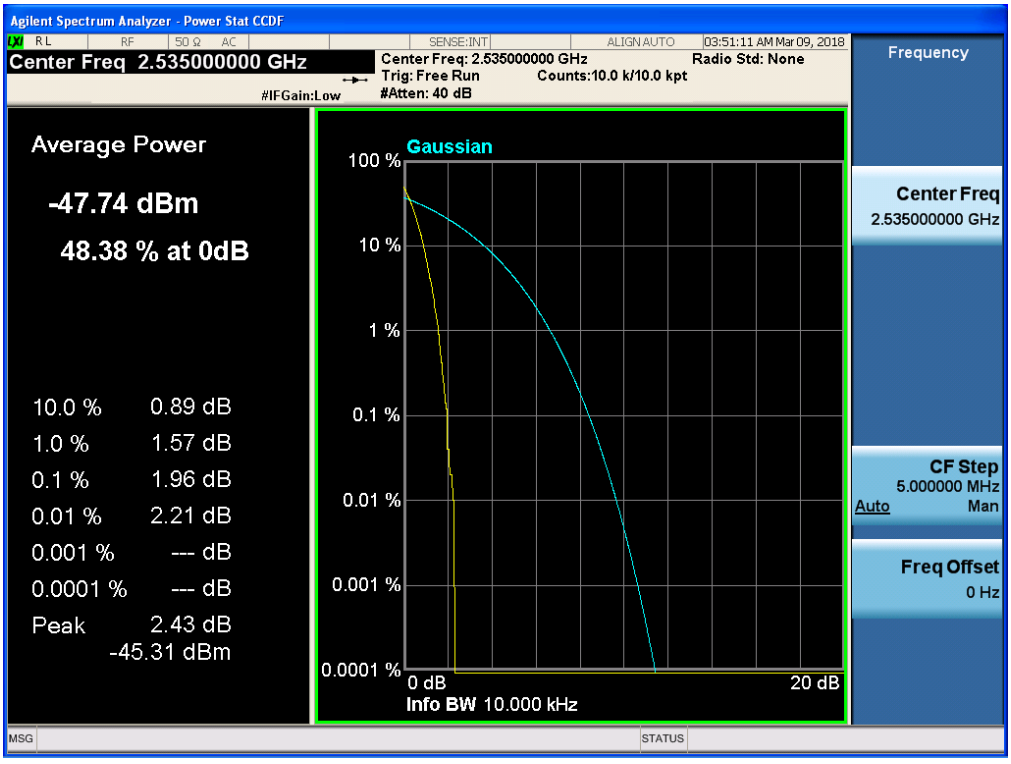
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



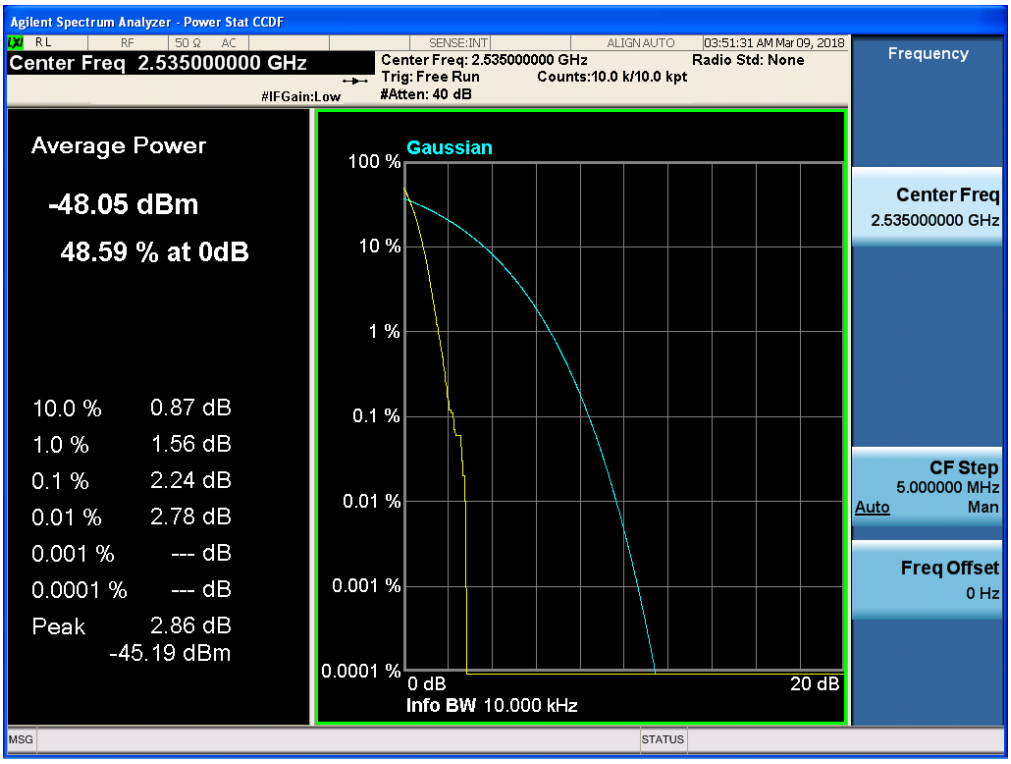
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



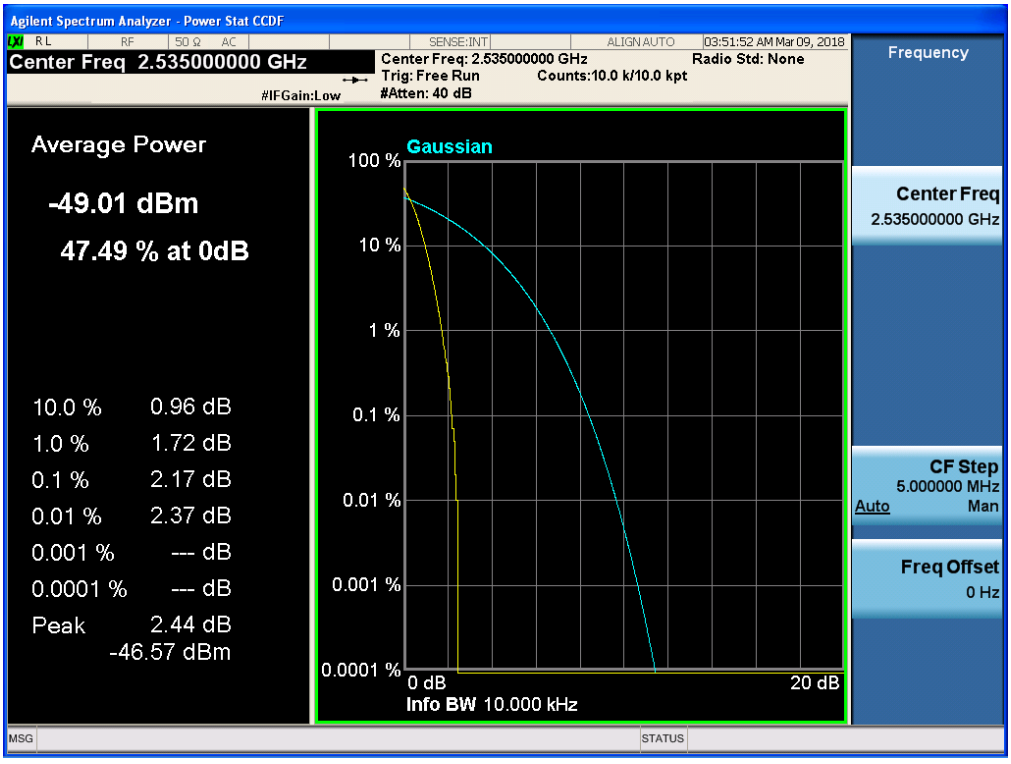
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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

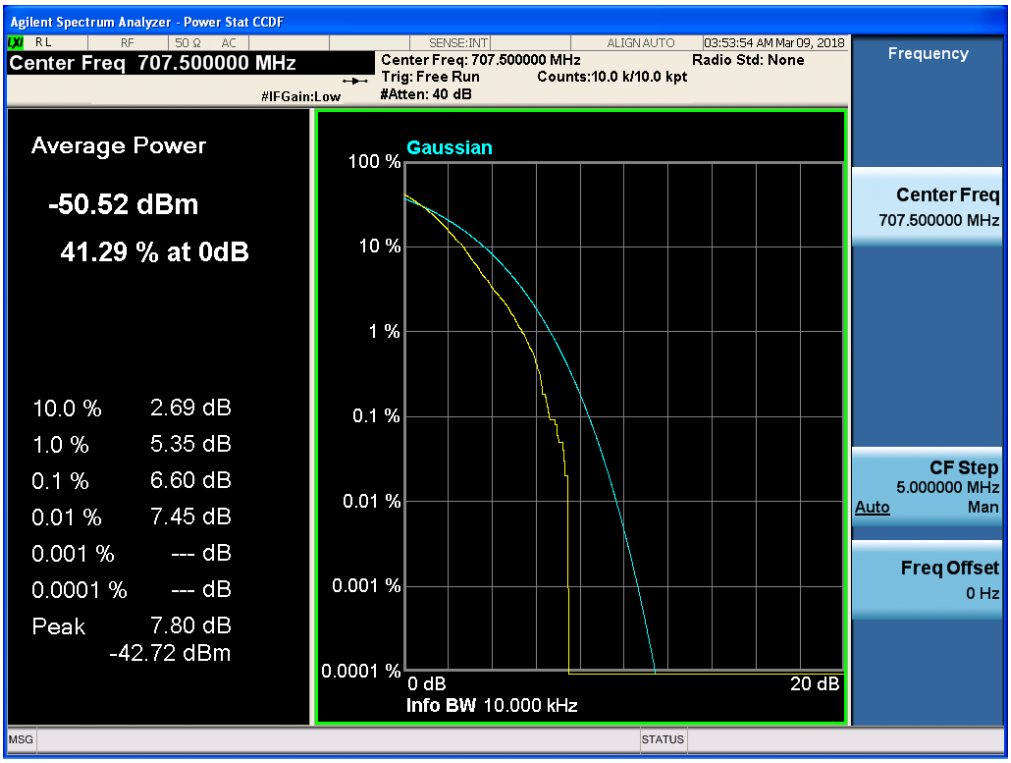


Band 7,UL Channel 21100,UL Frequency 2535.0,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

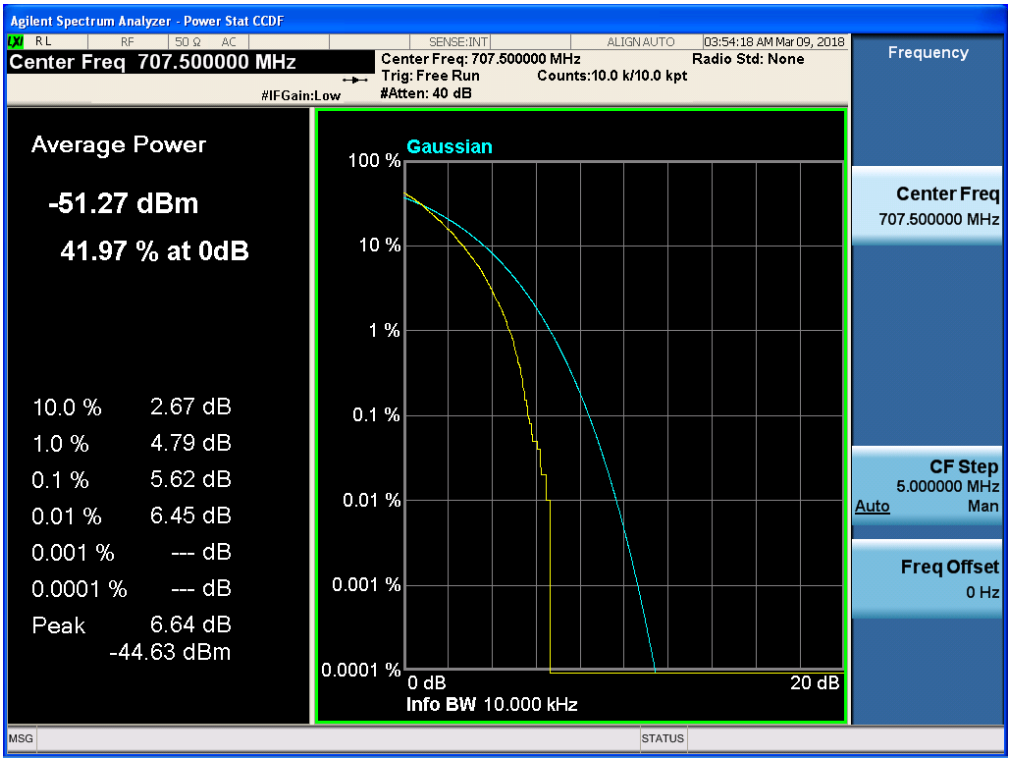


11.9 LTE BAND 12

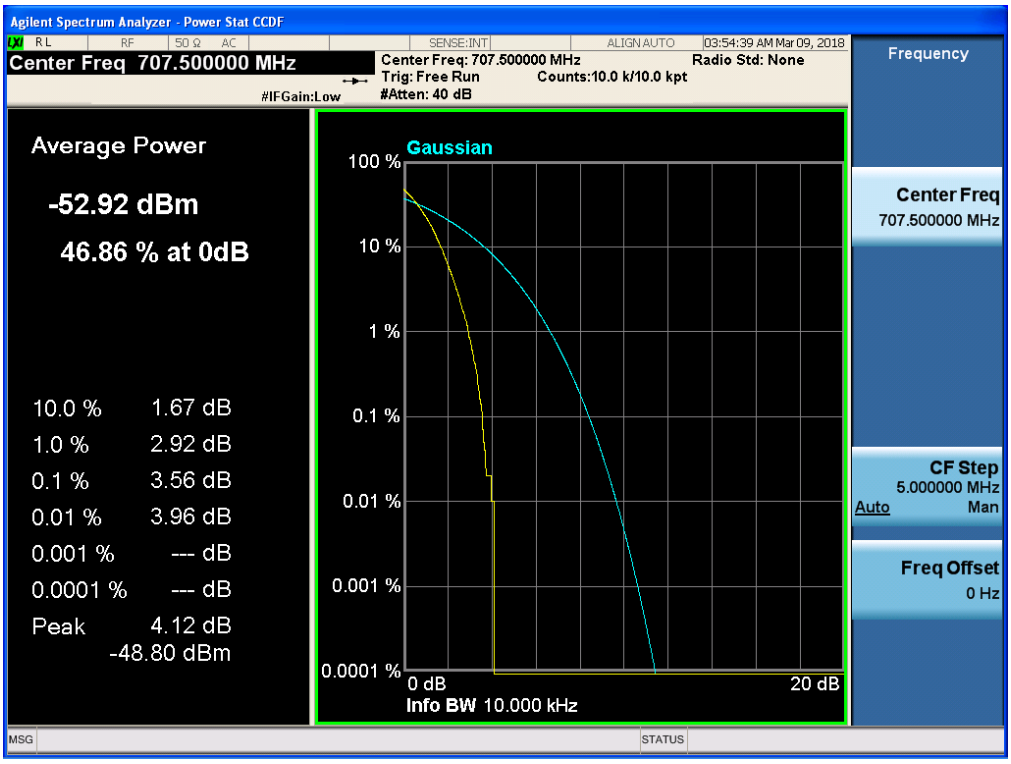
Band 12,UL Channel 23095,UL Frequency 707.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



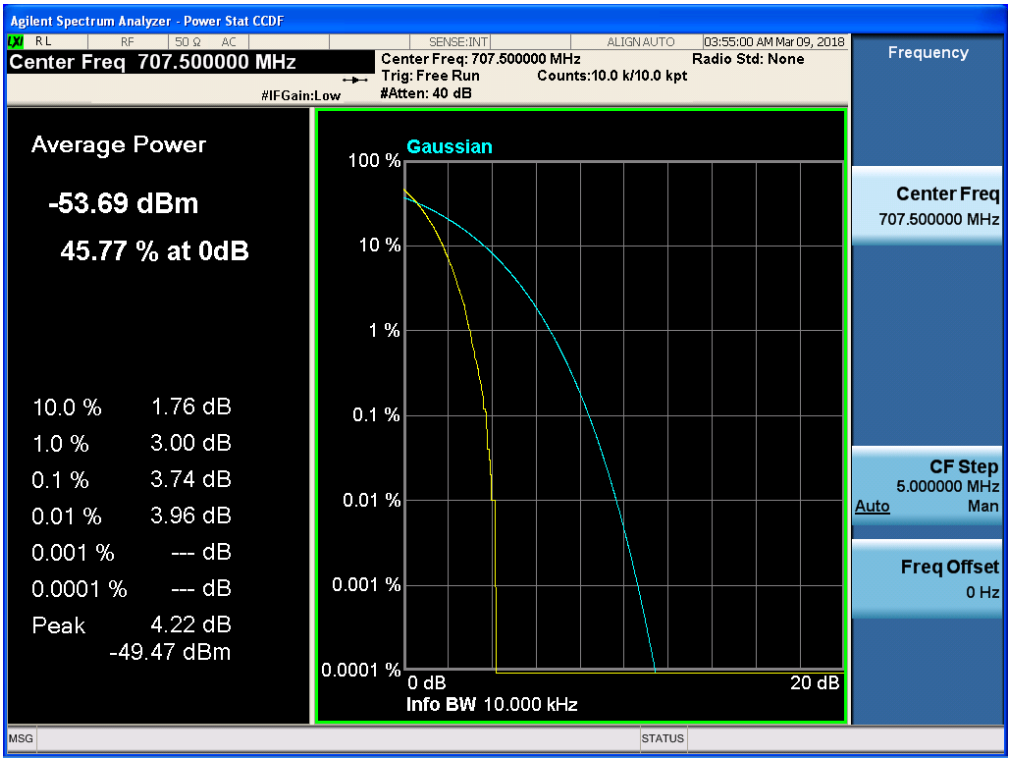
Band 12,UL Channel 23095,UL Frequency 707.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



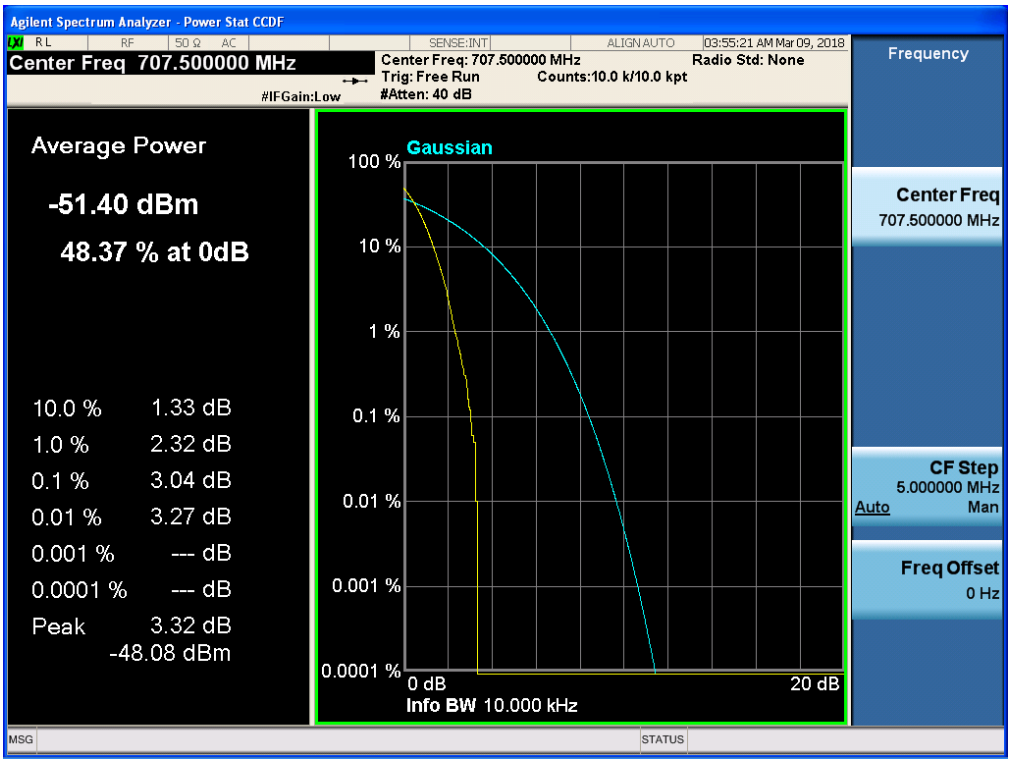
Band 12,UL Channel 23095,UL Frequency 707.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



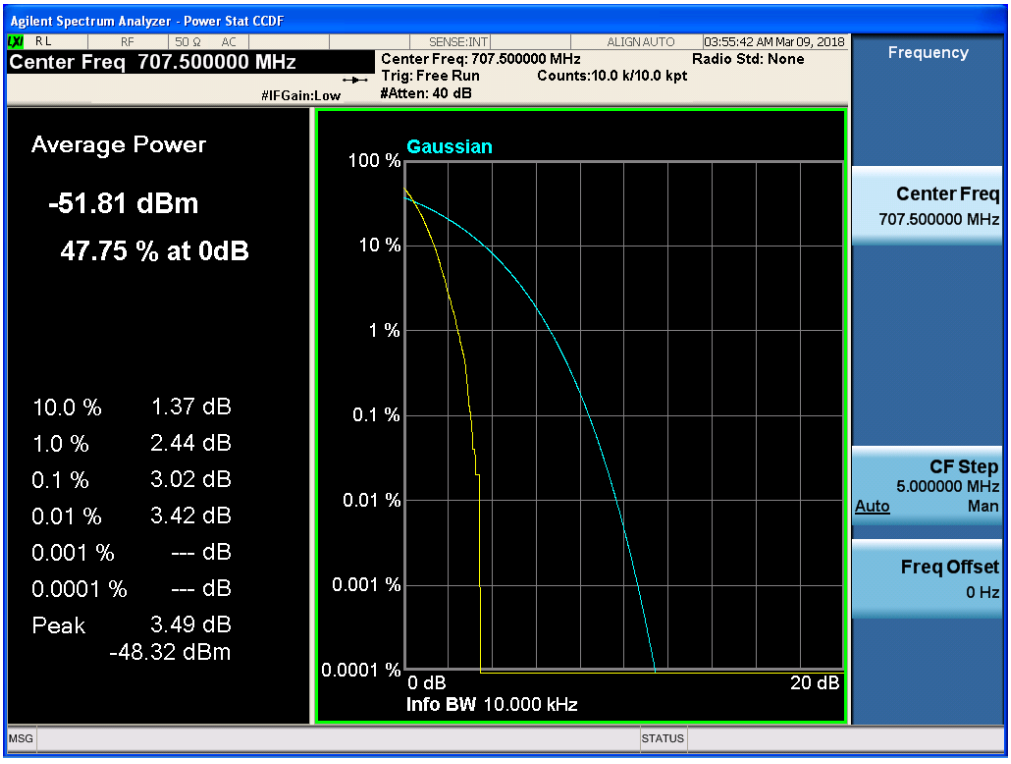
Band 12,UL Channel 23095,UL Frequency 707.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



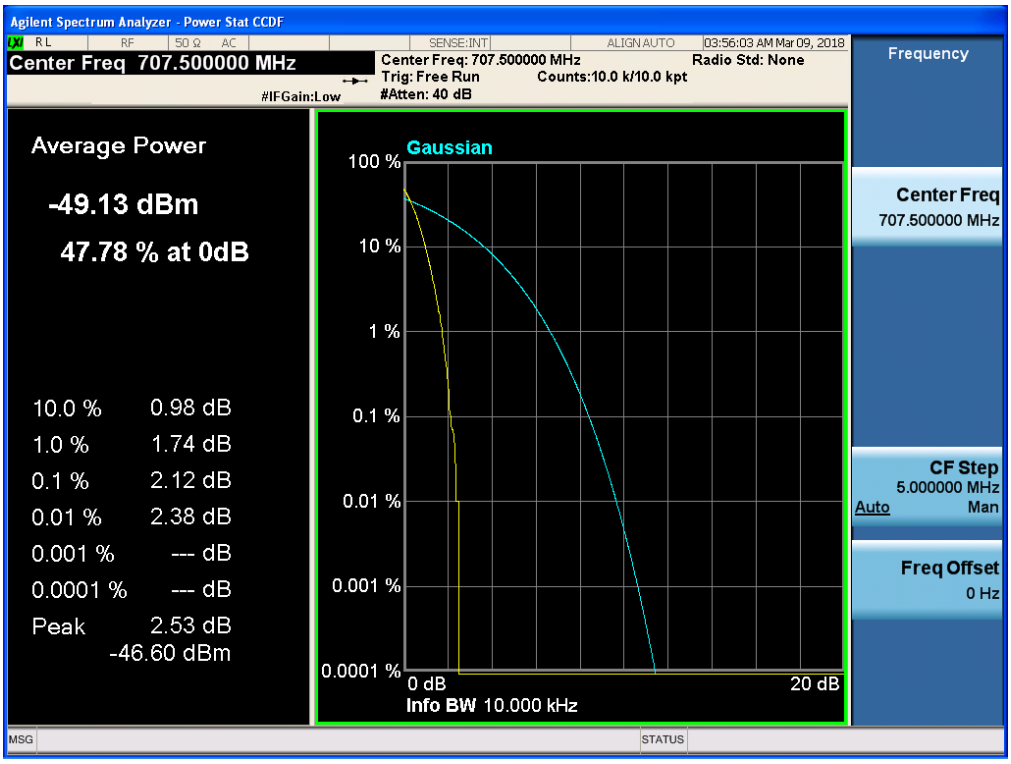
Band 12,UL Channel 23095,UL Frequency 707.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



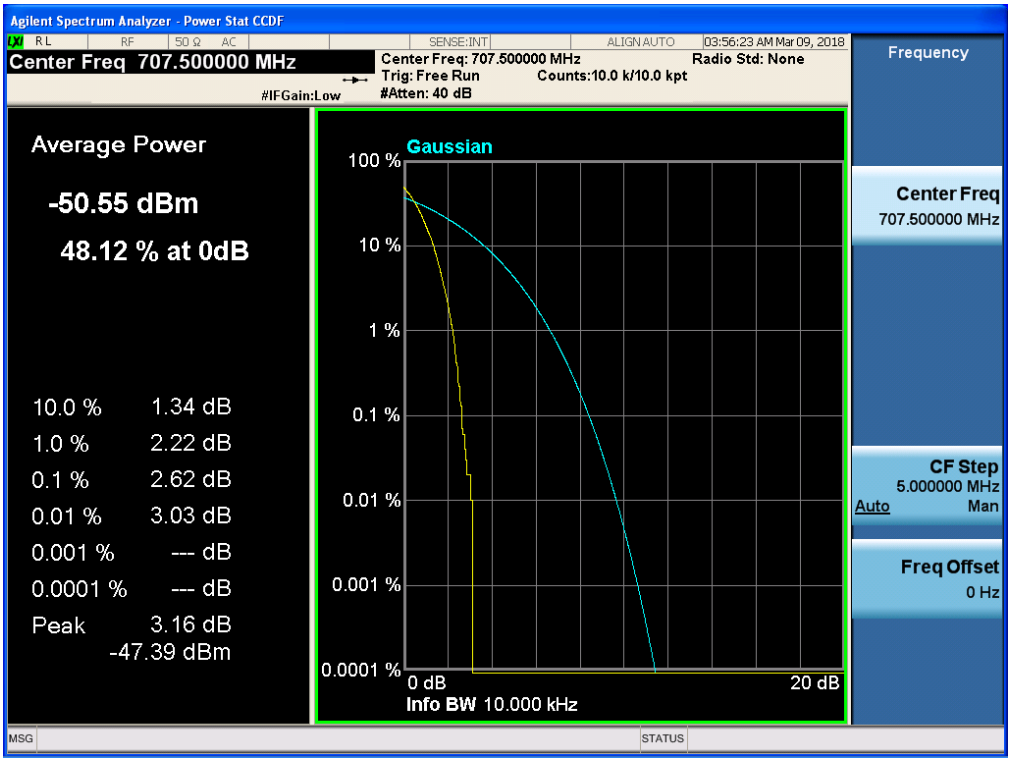
Band 12,UL Channel 23095,UL Frequency 707.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



Band 12,UL Channel 23095,UL Frequency 707.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK

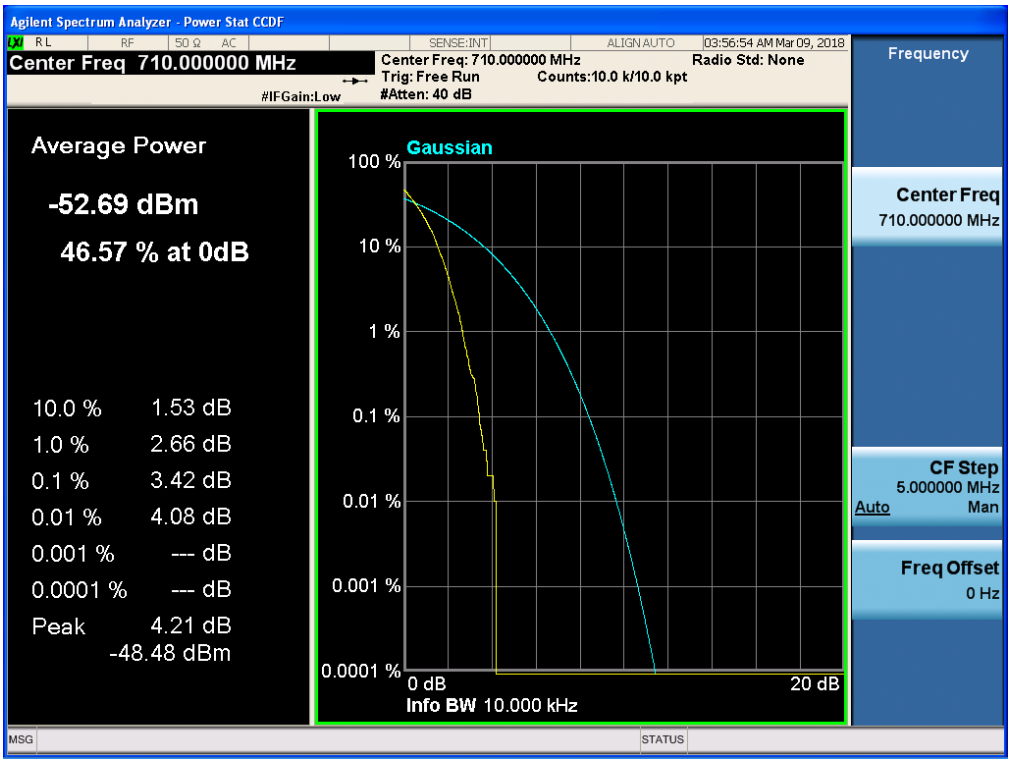


Band 12,UL Channel 23095,UL Frequency 707.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

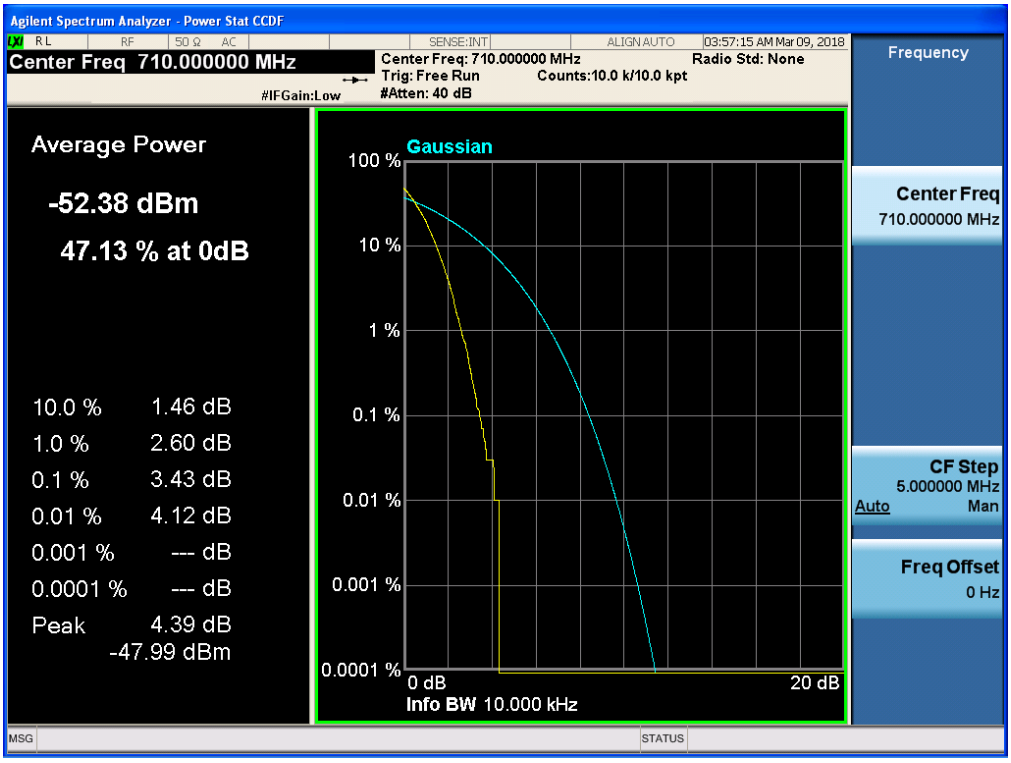


11.10 LTE BAND 17

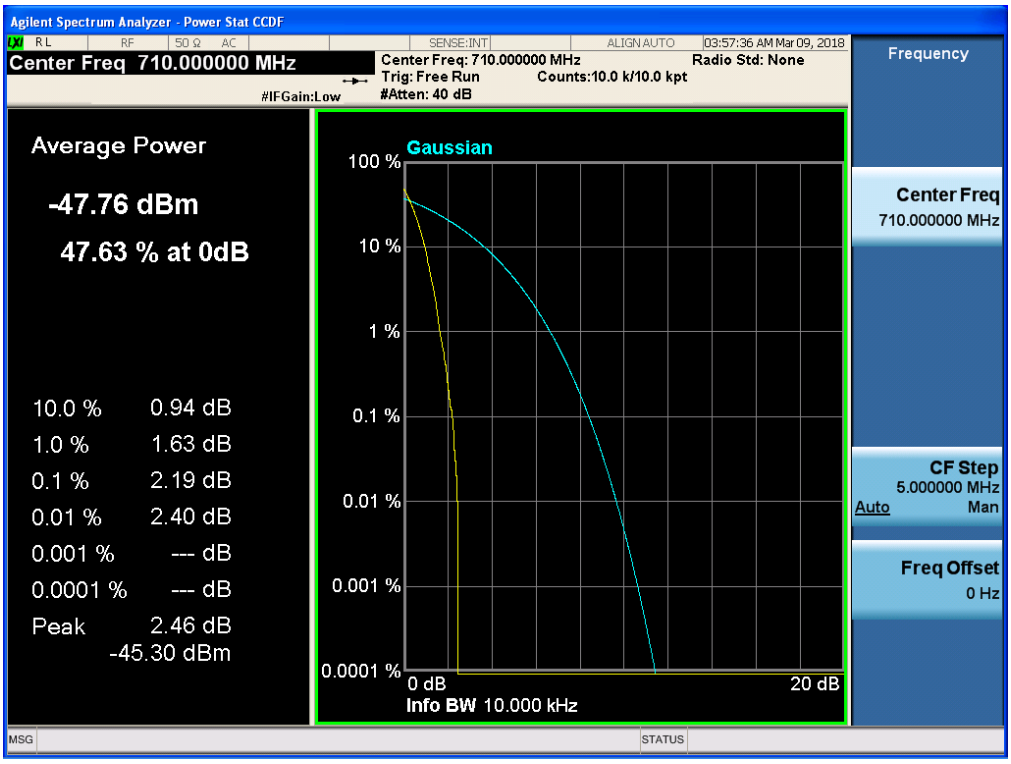
Band 17,UL Channel 23790,UL Frequency 710.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



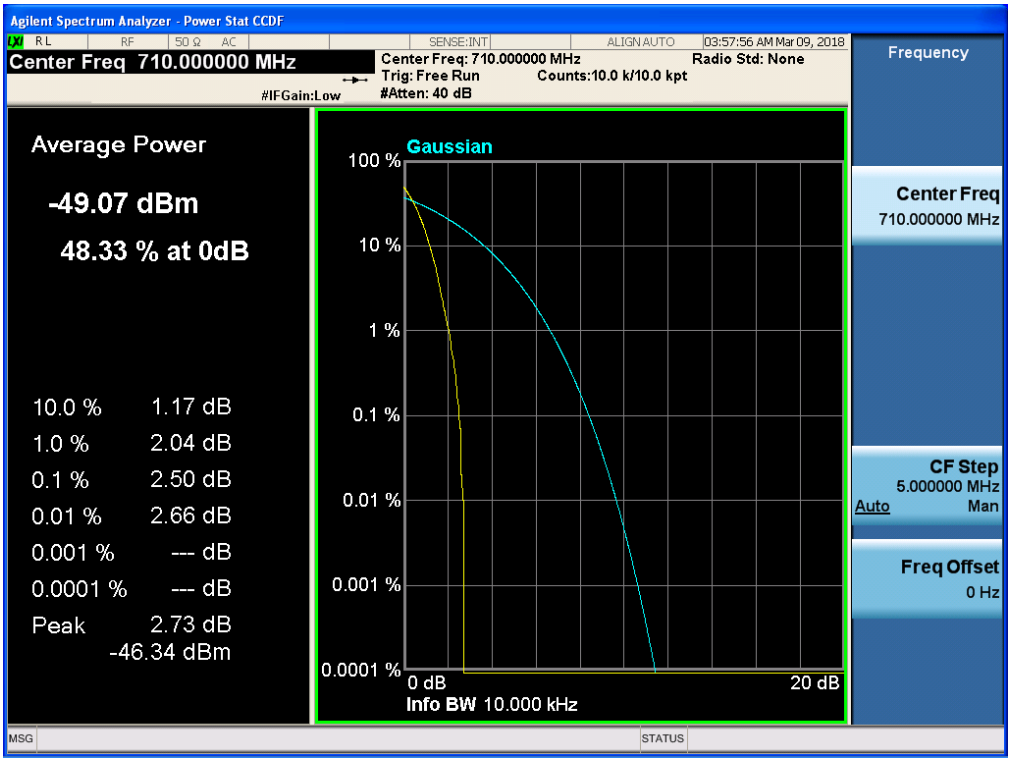
Band 17,UL Channel 23790,UL Frequency 710.0,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



Band 17,UL Channel 23790,UL Frequency 710.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



Band 17,UL Channel 23790,UL Frequency 710.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



----END OF REPORT----