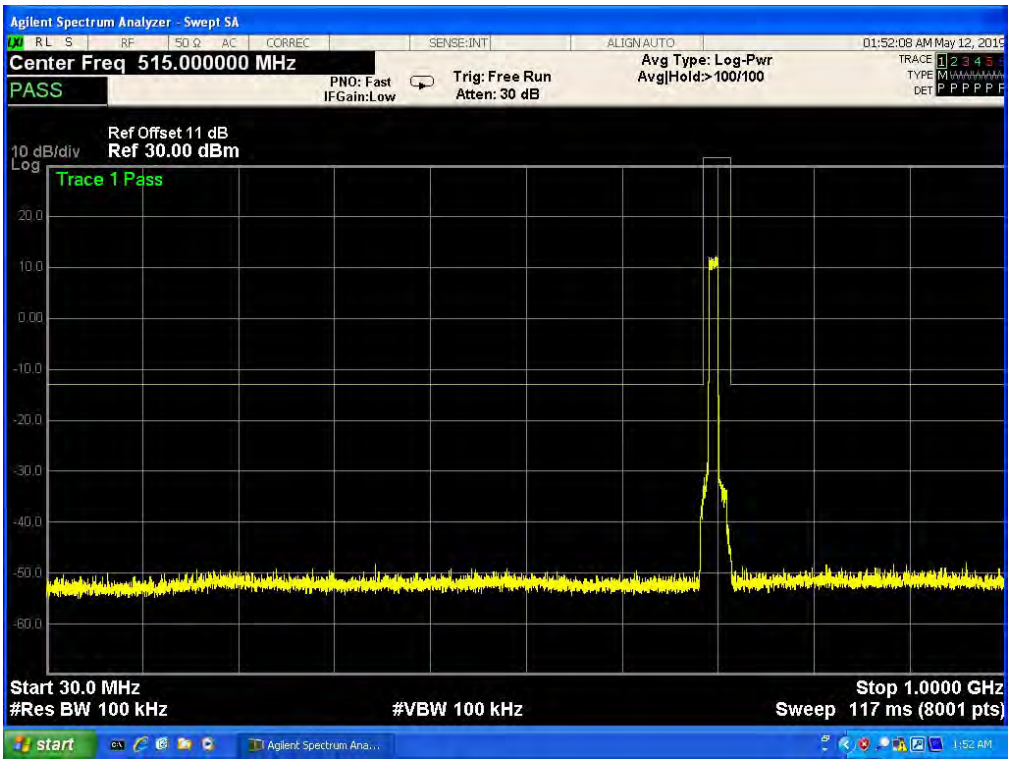
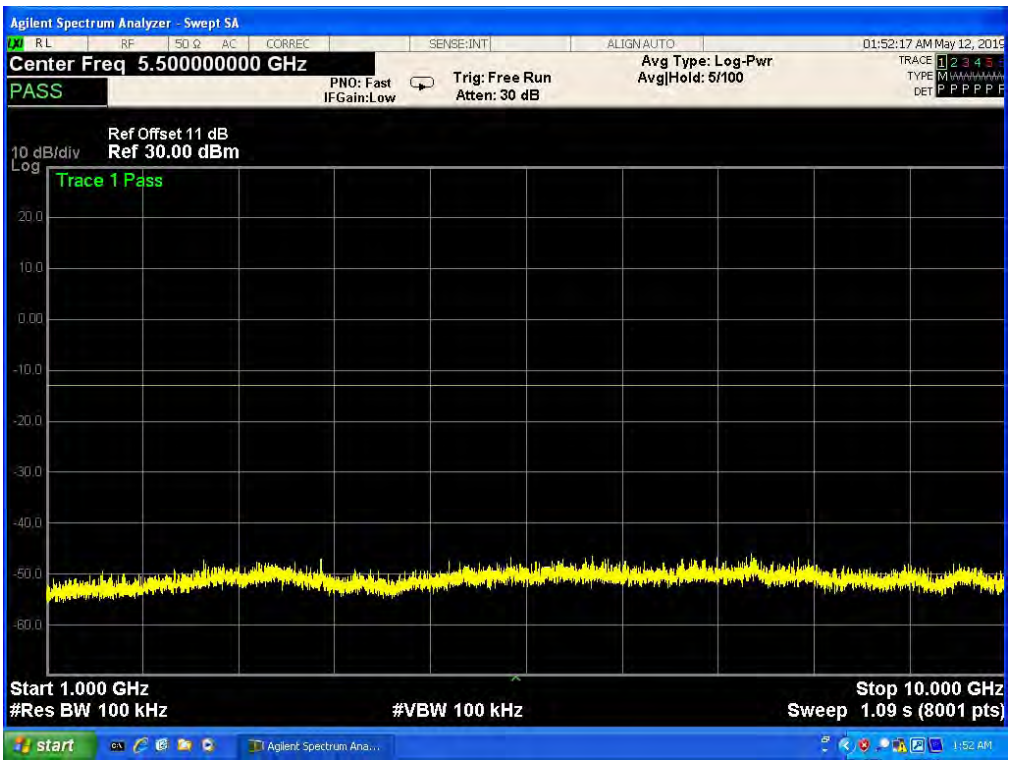
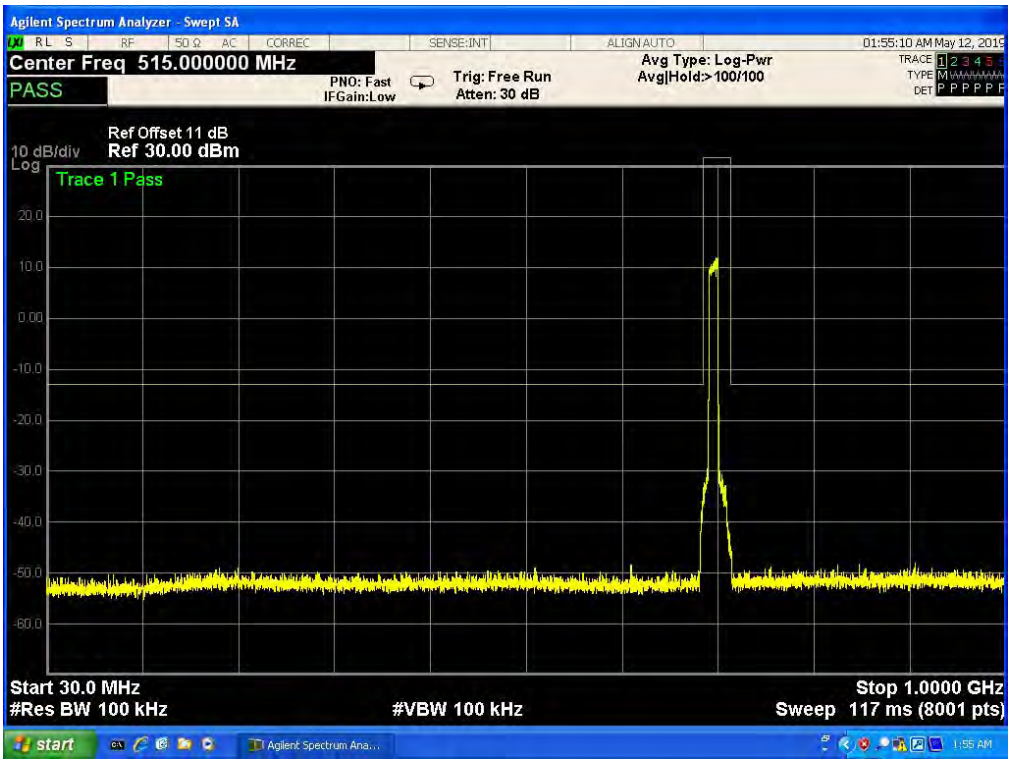
Band 12,UL Channel 23060,UL Frequency 704.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



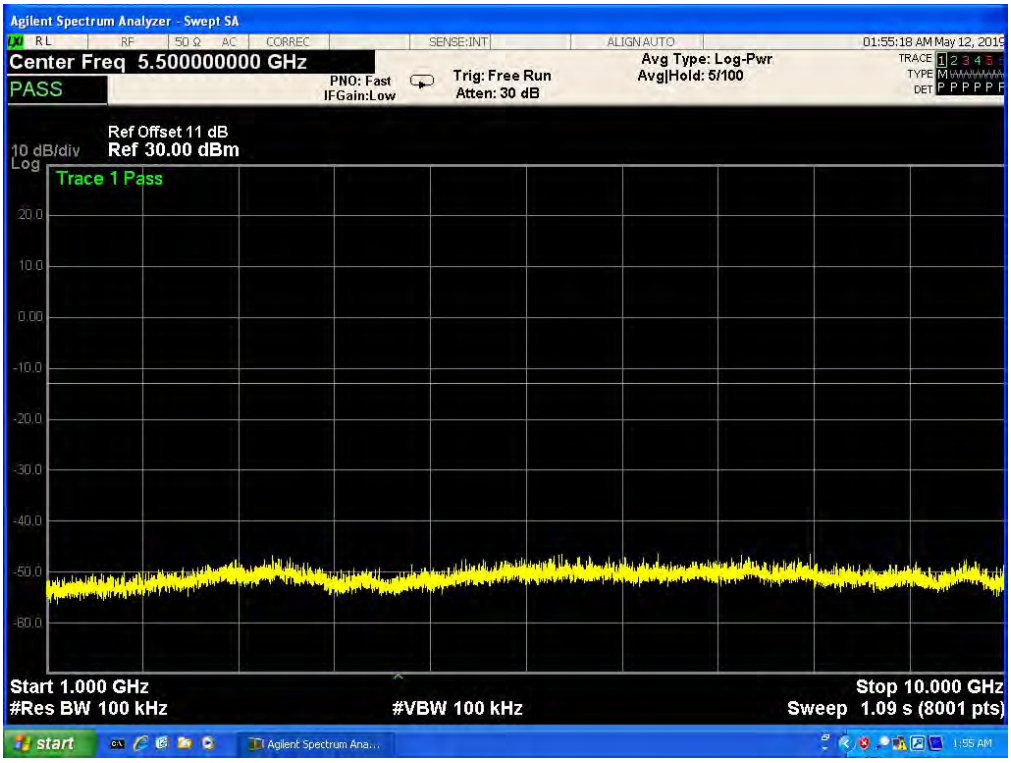
Band 12,UL Channel 23060,UL Frequency 704.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



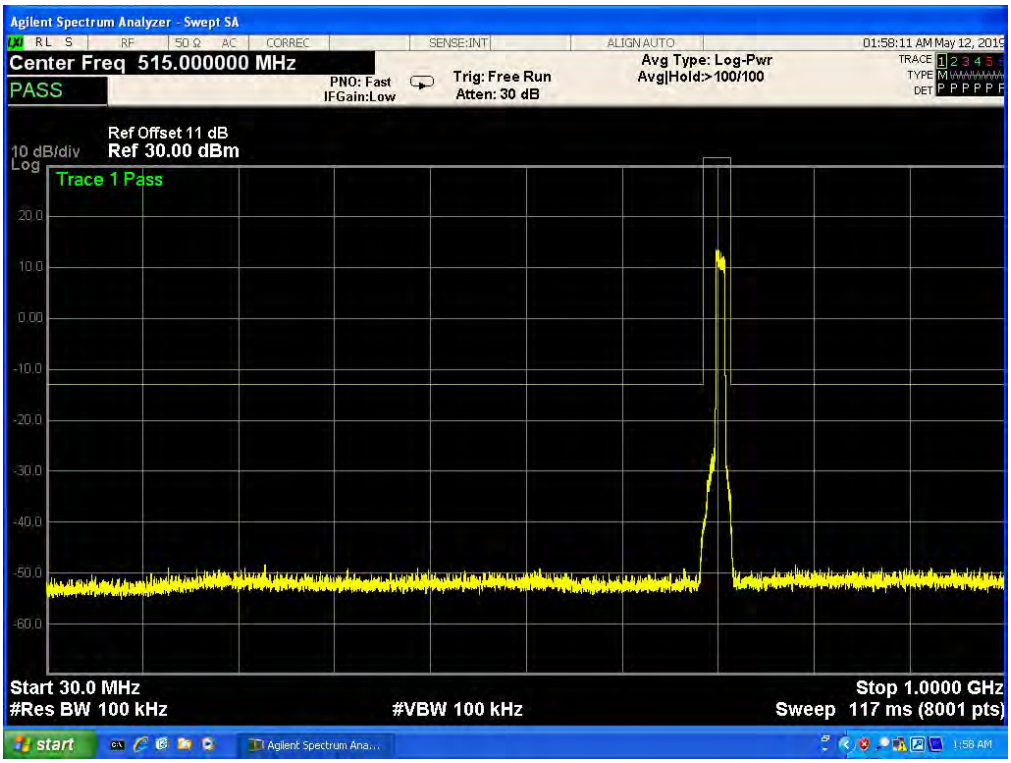
Band 12,UL Channel 23060,UL Frequency 704.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



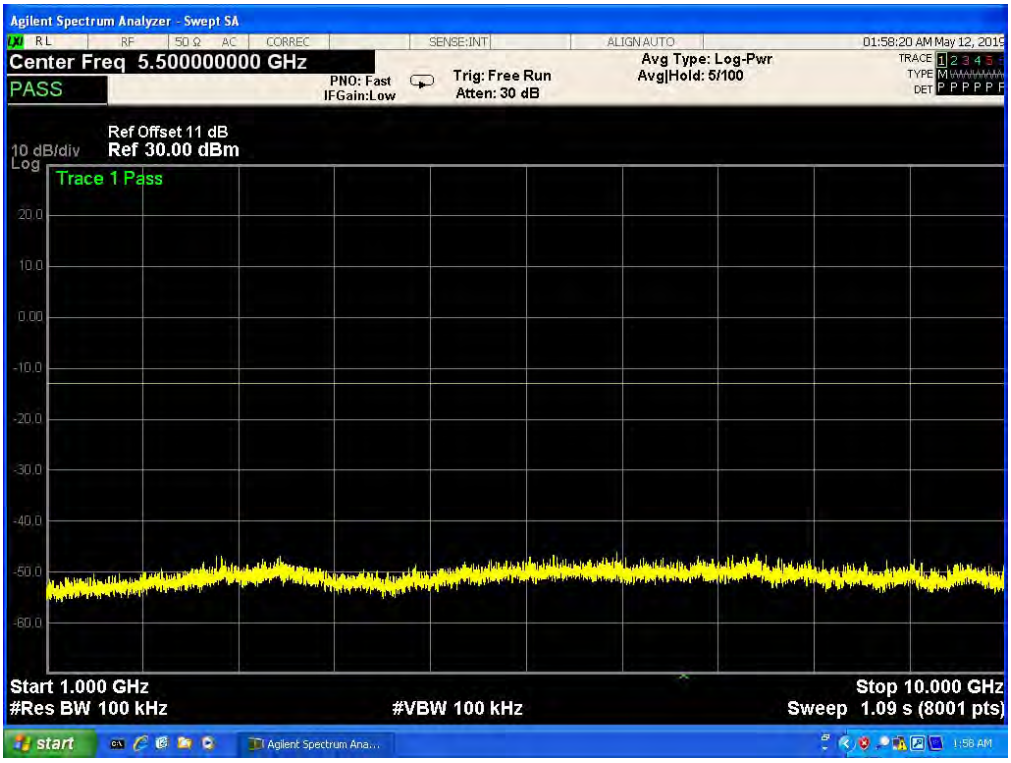
Band 12,UL Channel 23060,UL Frequency 704.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



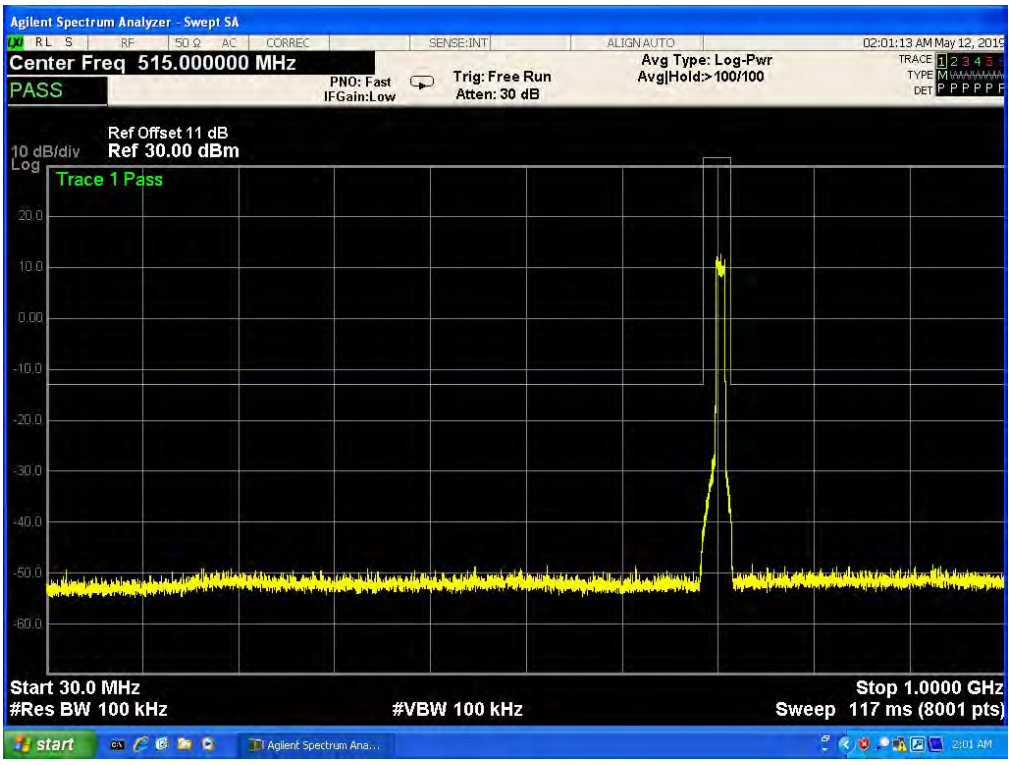
Band 12,UL Channel 23130,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



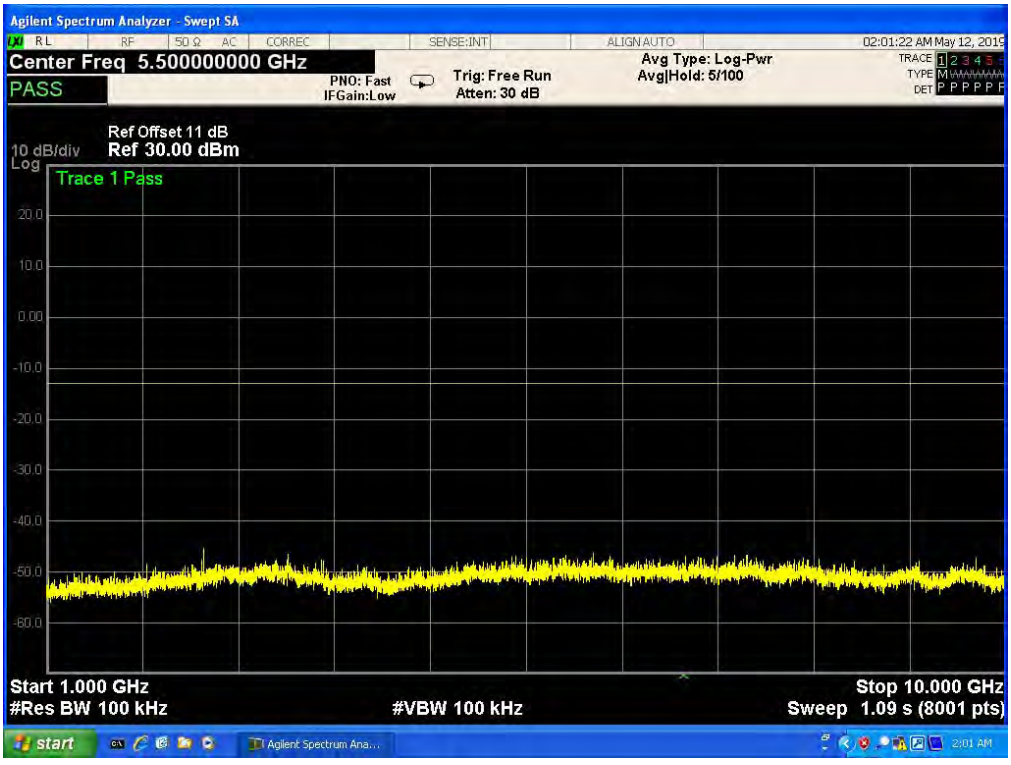
Band 12,UL Channel 23130,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



Band 12,UL Channel 23130,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM

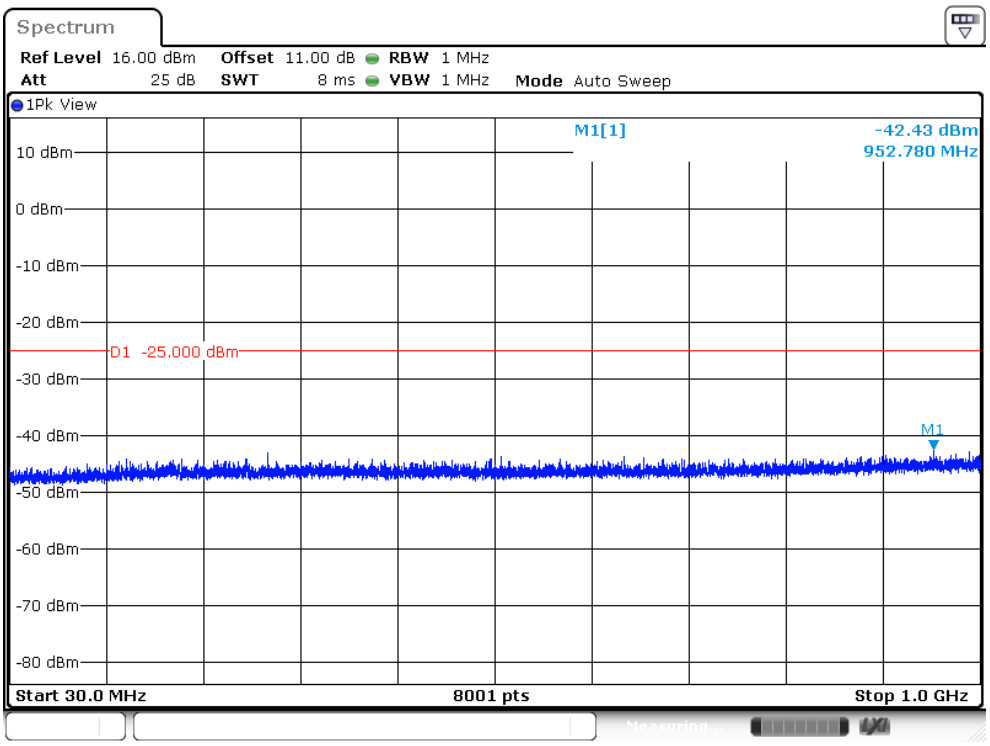


Band 12,UL Channel 23130,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM

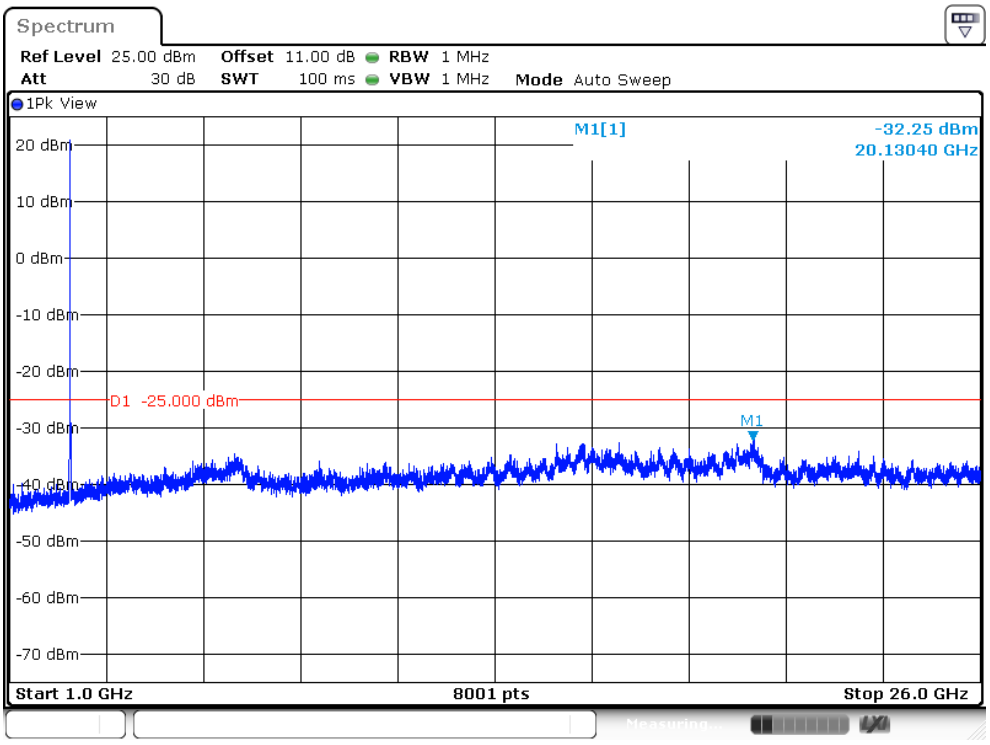


7.4 LTE BAND 41

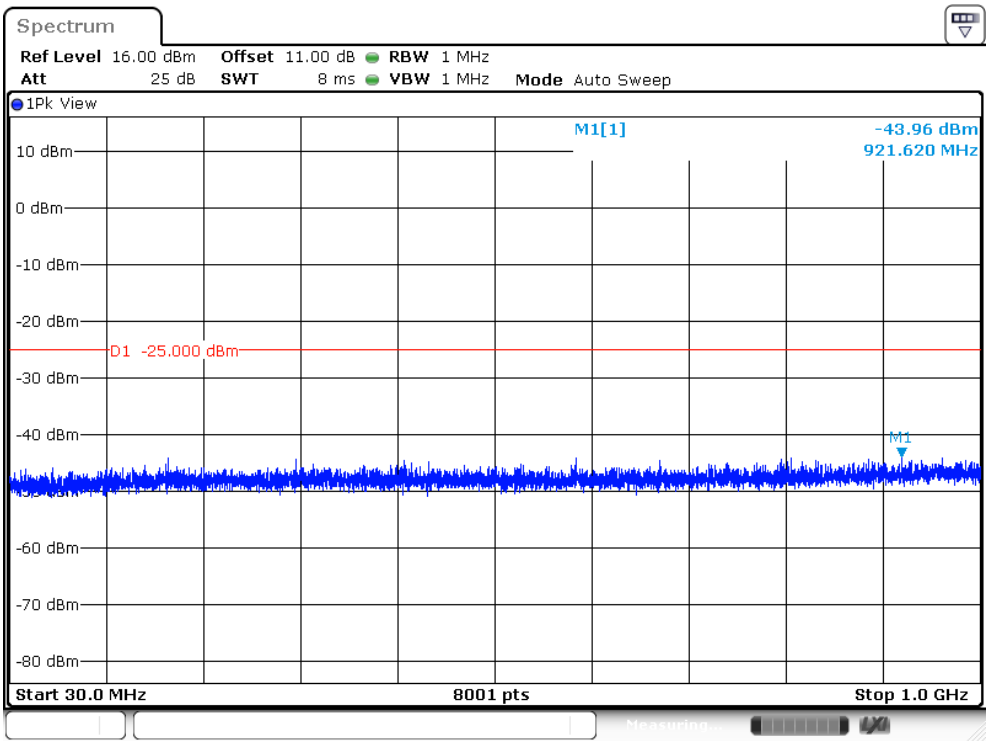
Band 41,UL Channel 40265,UL Frequency 2557.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



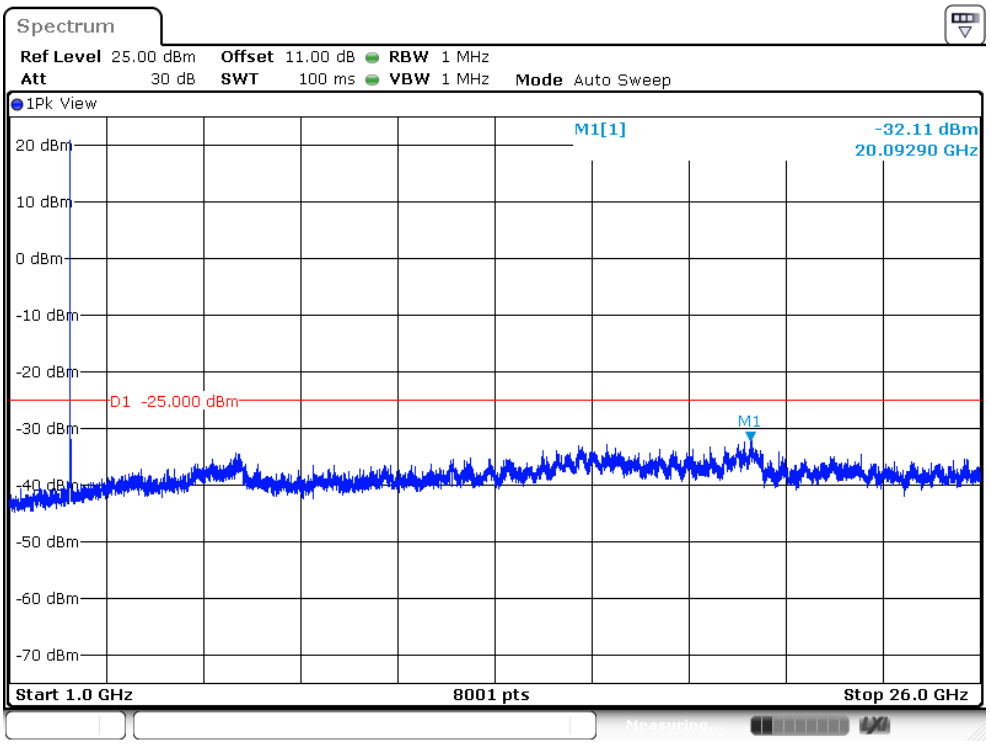
Band 41,UL Channel 40265,UL Frequency 2557.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



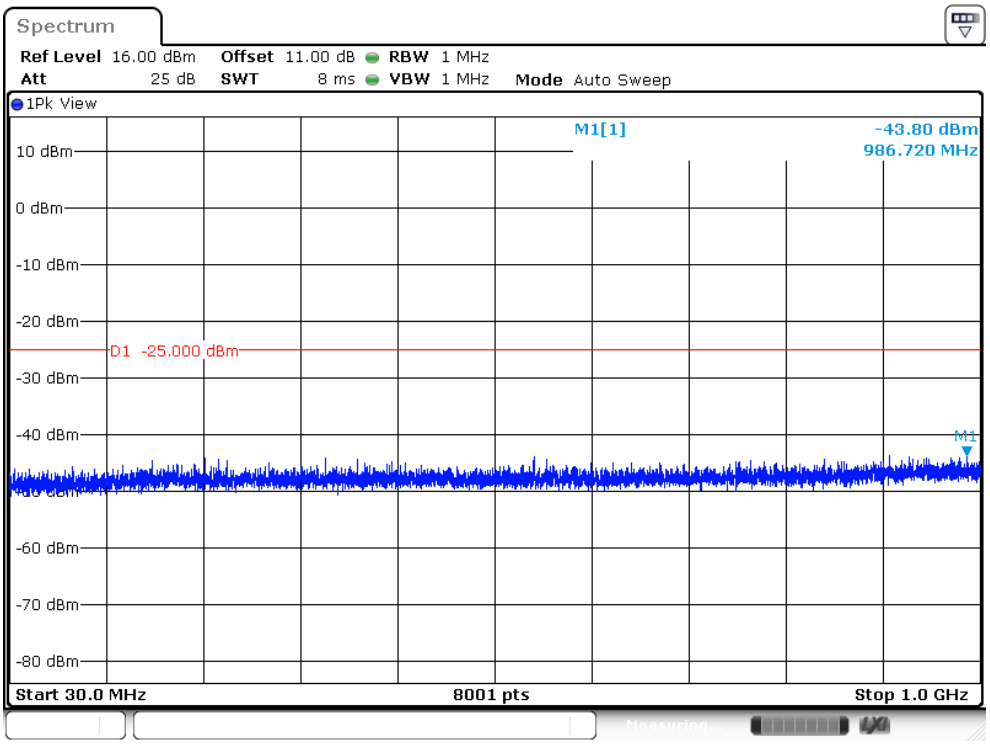
Band 41,UL Channel 40265,UL Frequency 2557.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



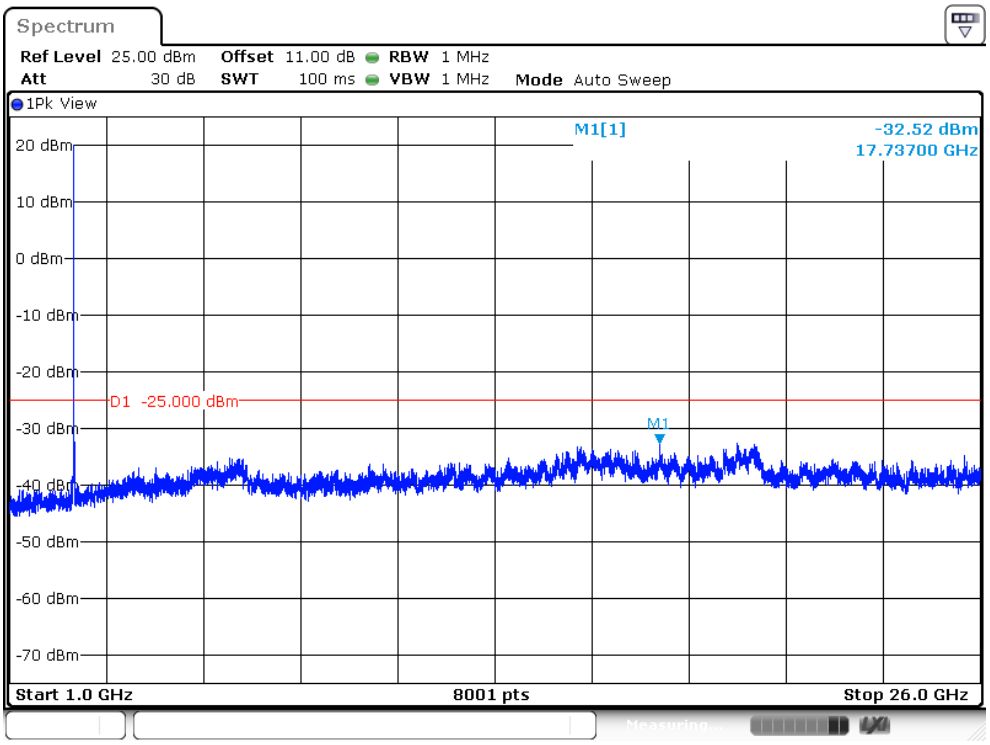
Band 41,UL Channel 40265,UL Frequency 2557.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



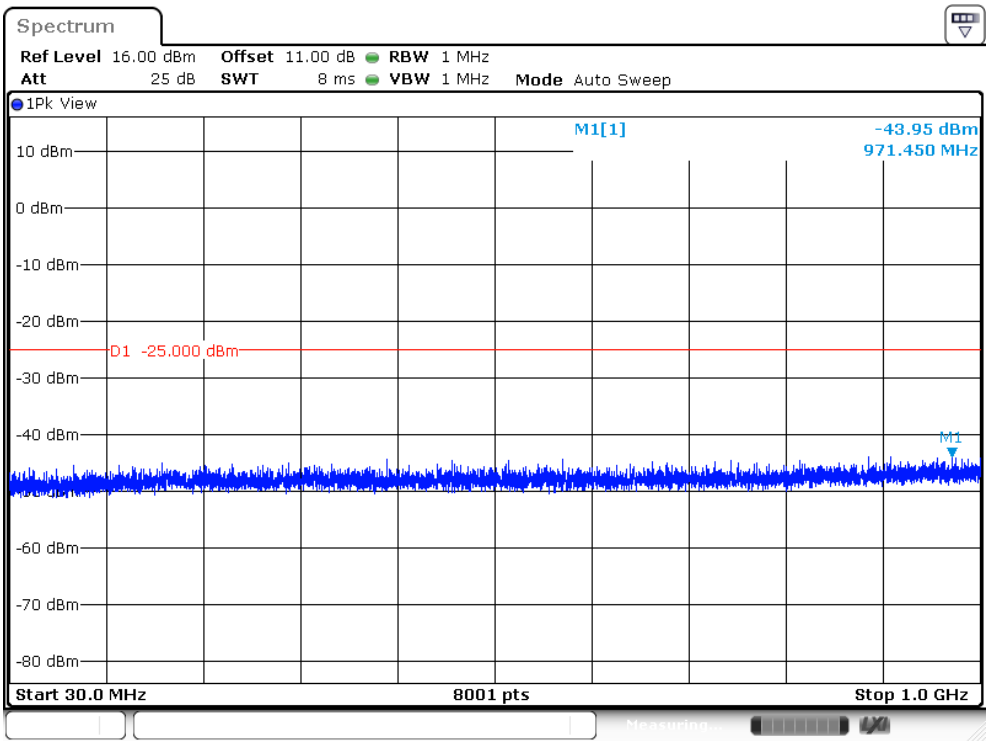
Band 41,UL Channel 41215,UL Frequency 2652.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



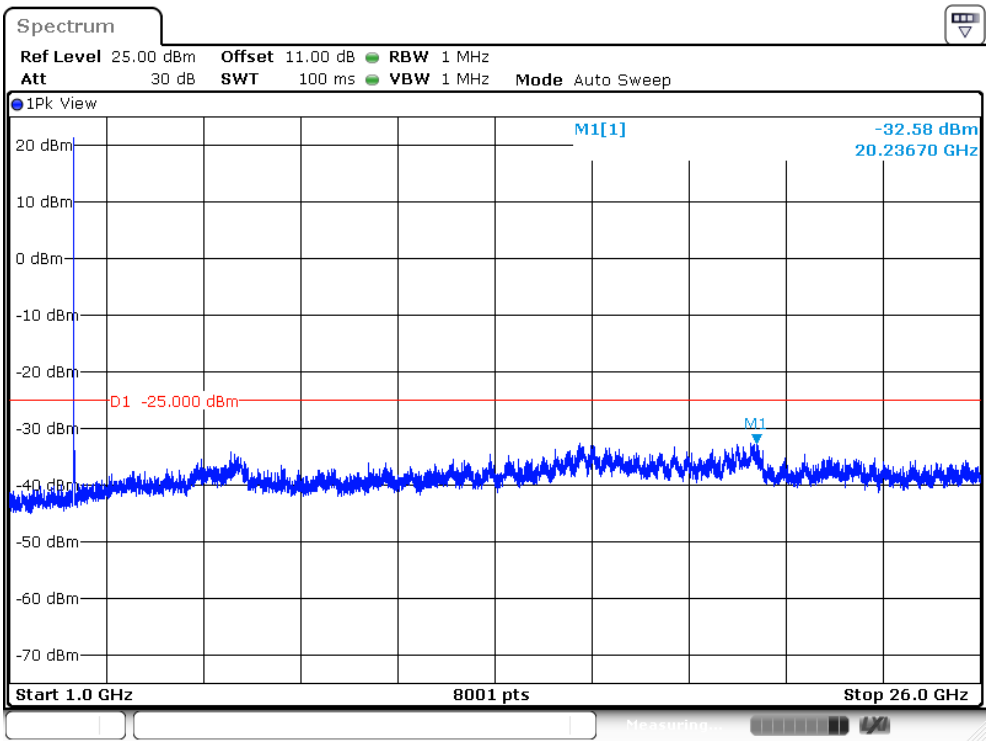
Band 41,UL Channel 41215,UL Frequency 2652.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



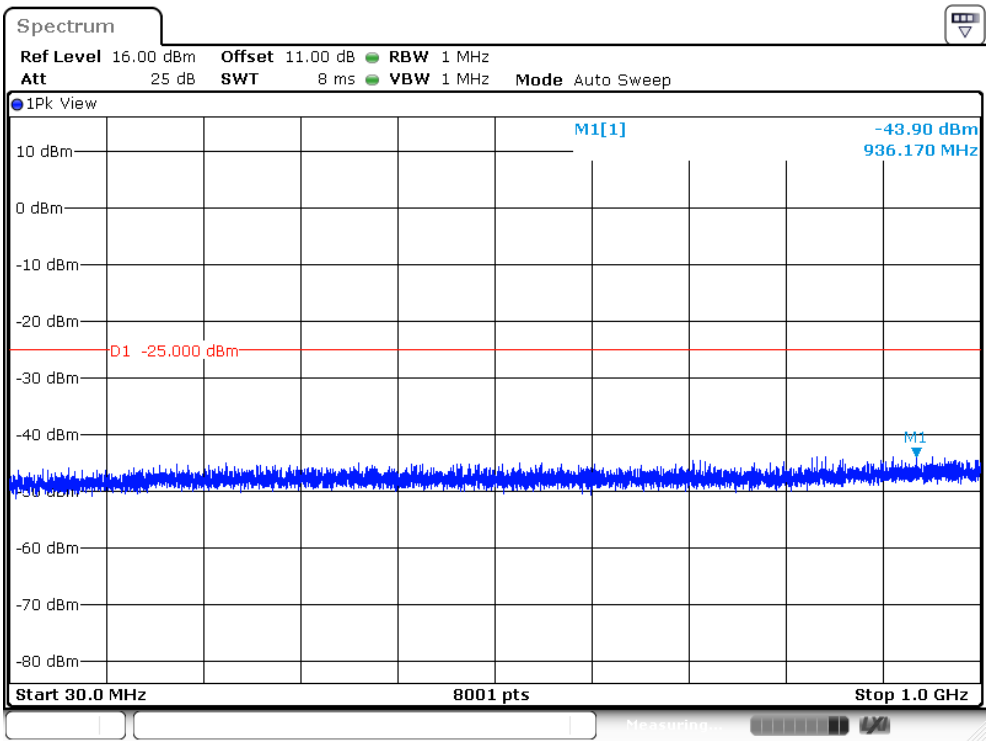
Band 41,UL Channel 41215,UL Frequency 2652.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



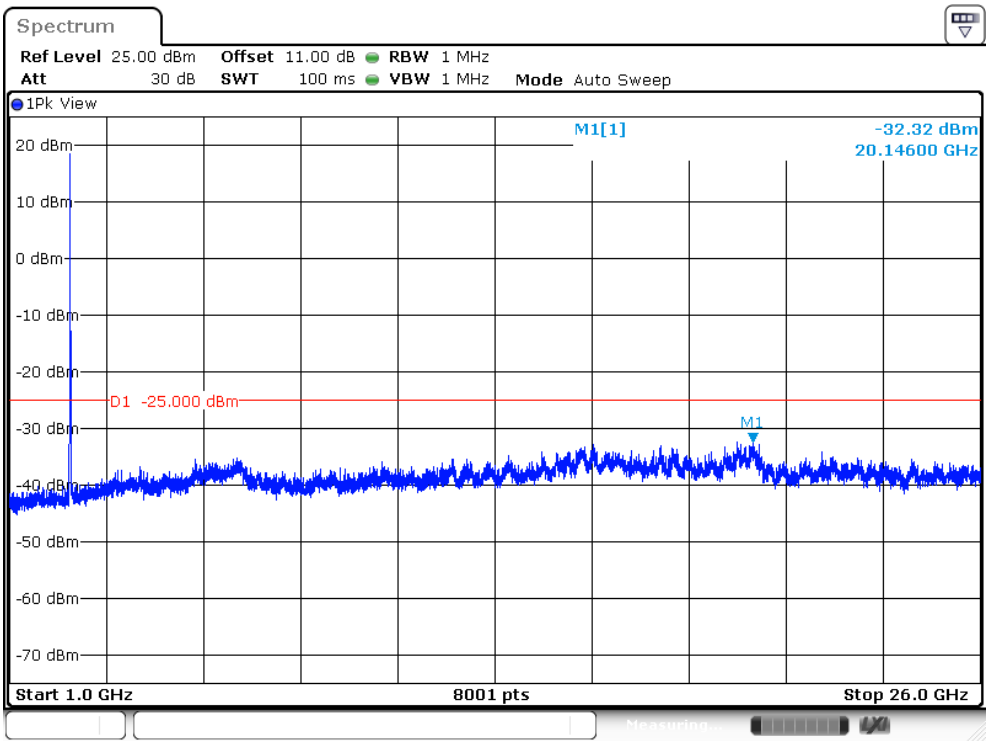
Band 41,UL Channel 41215,UL Frequency 2652.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



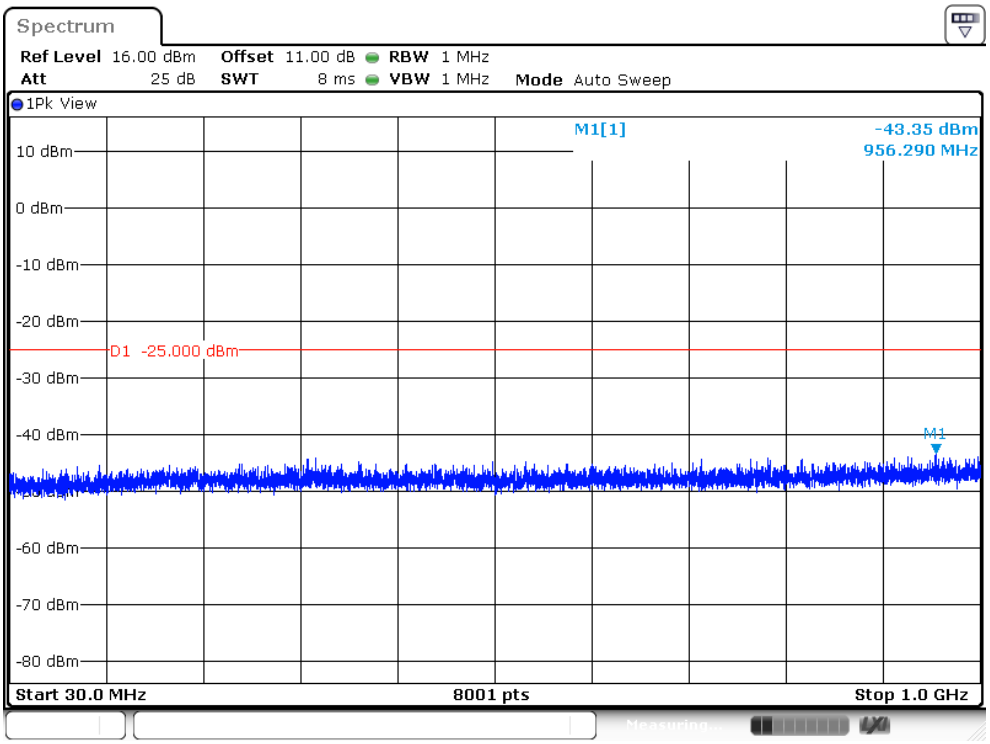
Band 41,UL Channel 40290,UL Frequency 2560.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



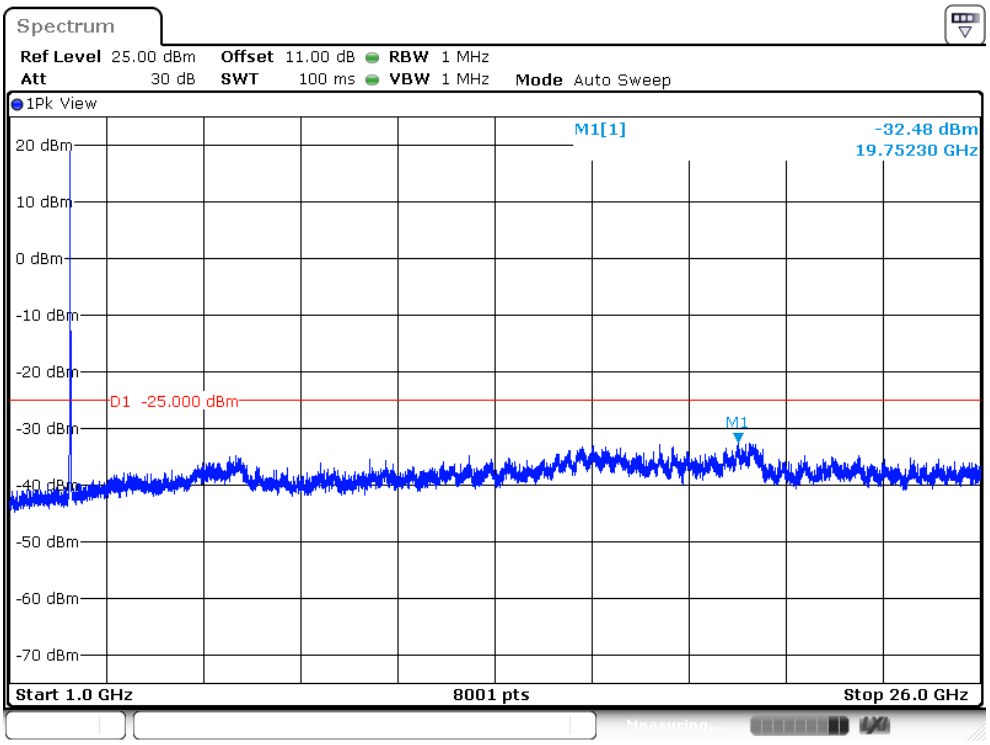
Band 41,UL Channel 40290,UL Frequency 2560.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



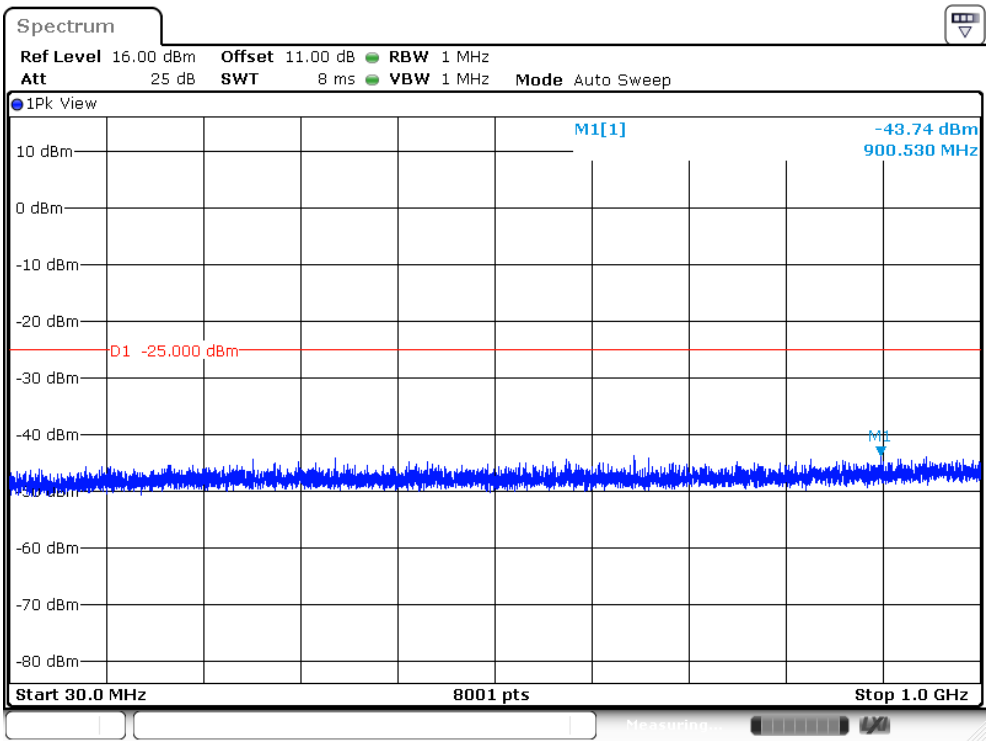
Band 41,UL Channel 40290,UL Frequency 2560.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



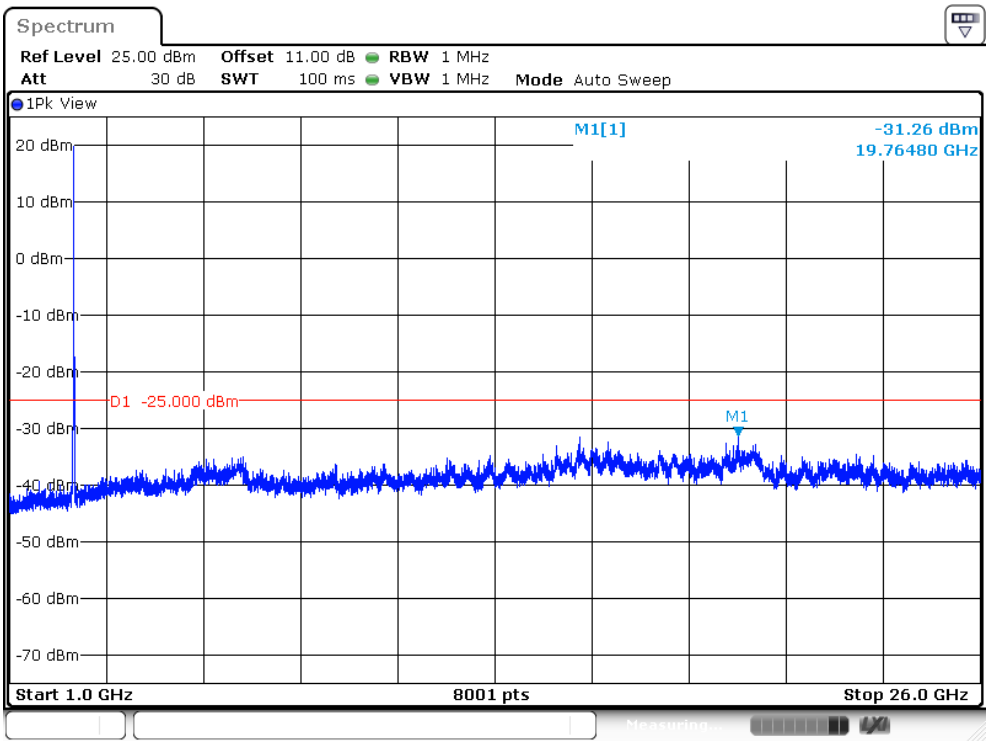
Band 41,UL Channel 40290,UL Frequency 2560.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



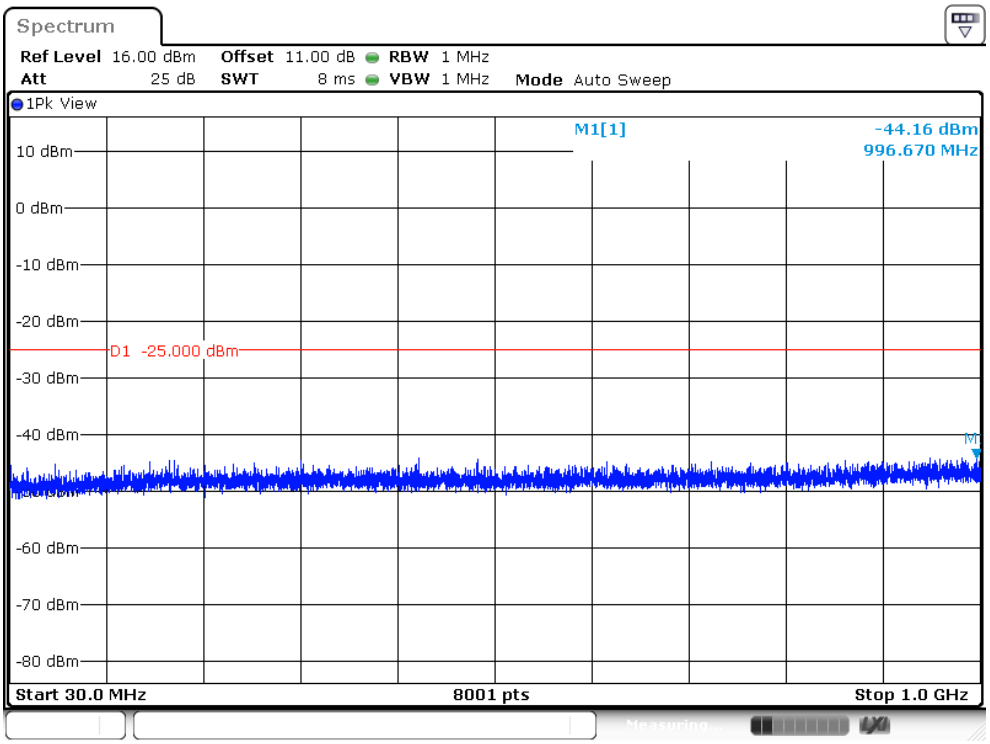
Band 41,UL Channel 41190,UL Frequency 2650.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



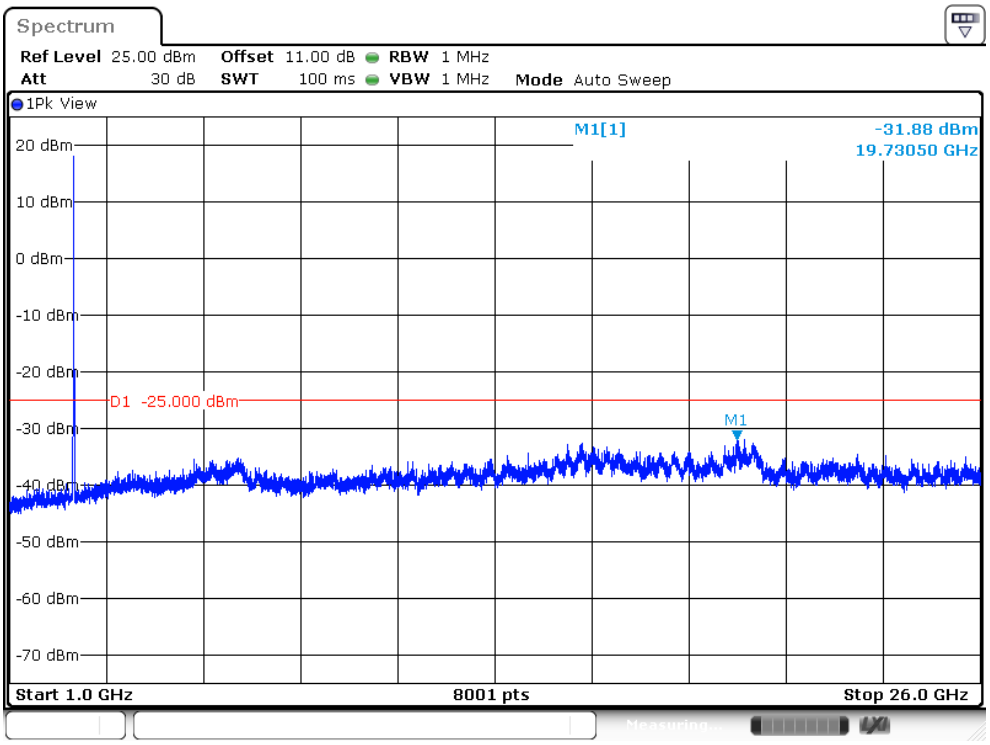
Band 41,UL Channel 41190,UL Frequency 2650.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



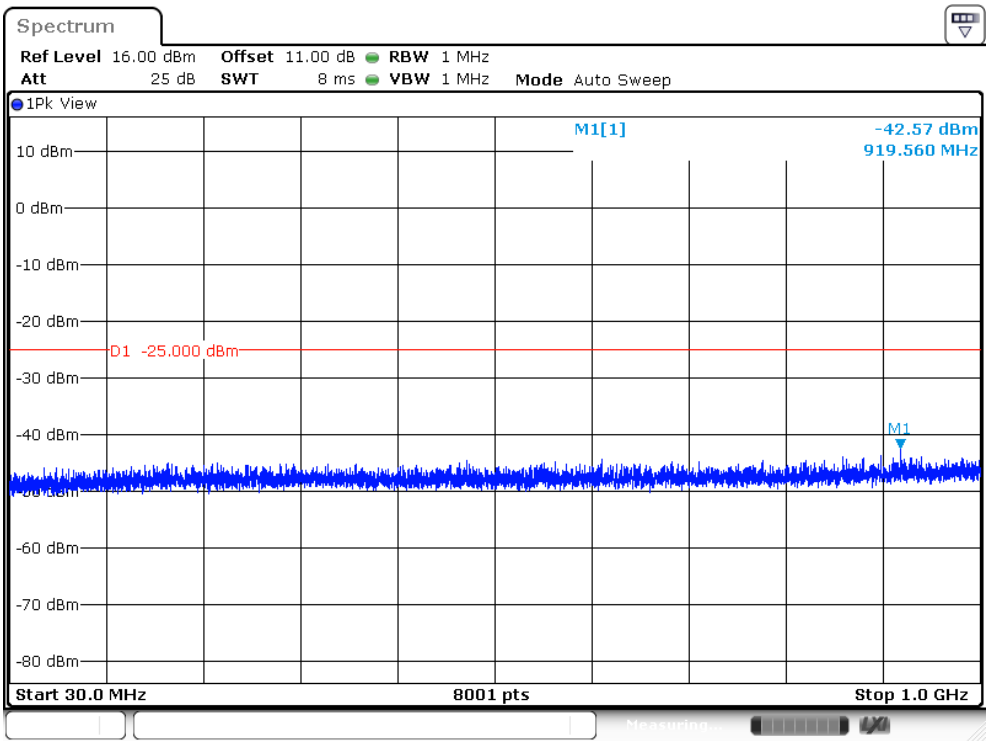
Band 41,UL Channel 41190,UL Frequency 2650.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



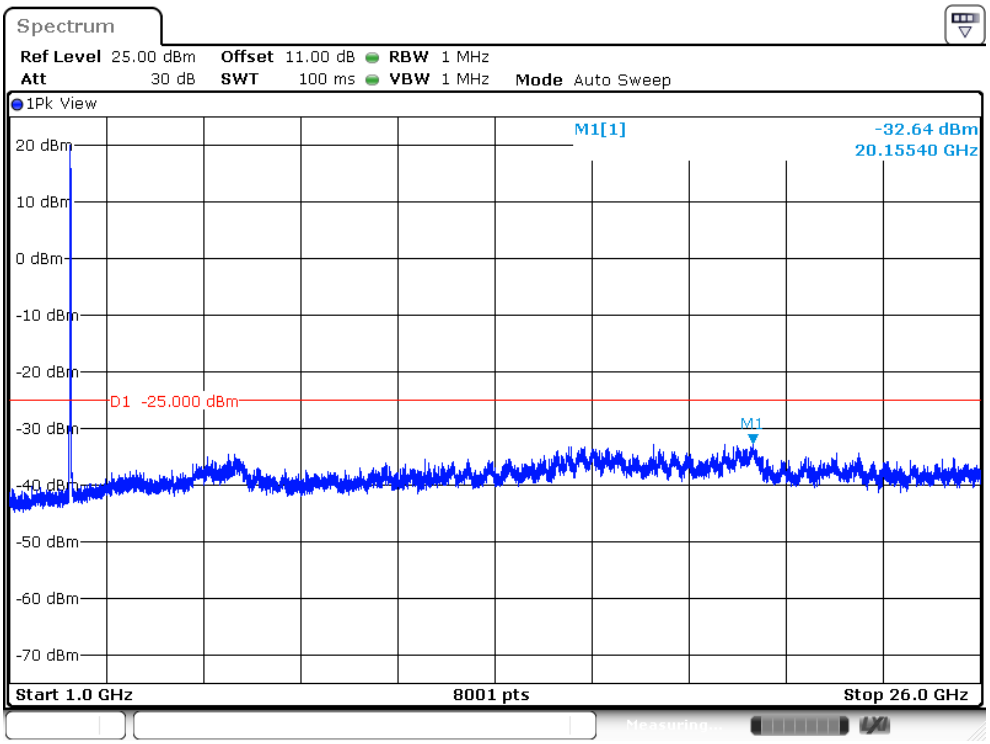
Band 41,UL Channel 41190,UL Frequency 2650.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



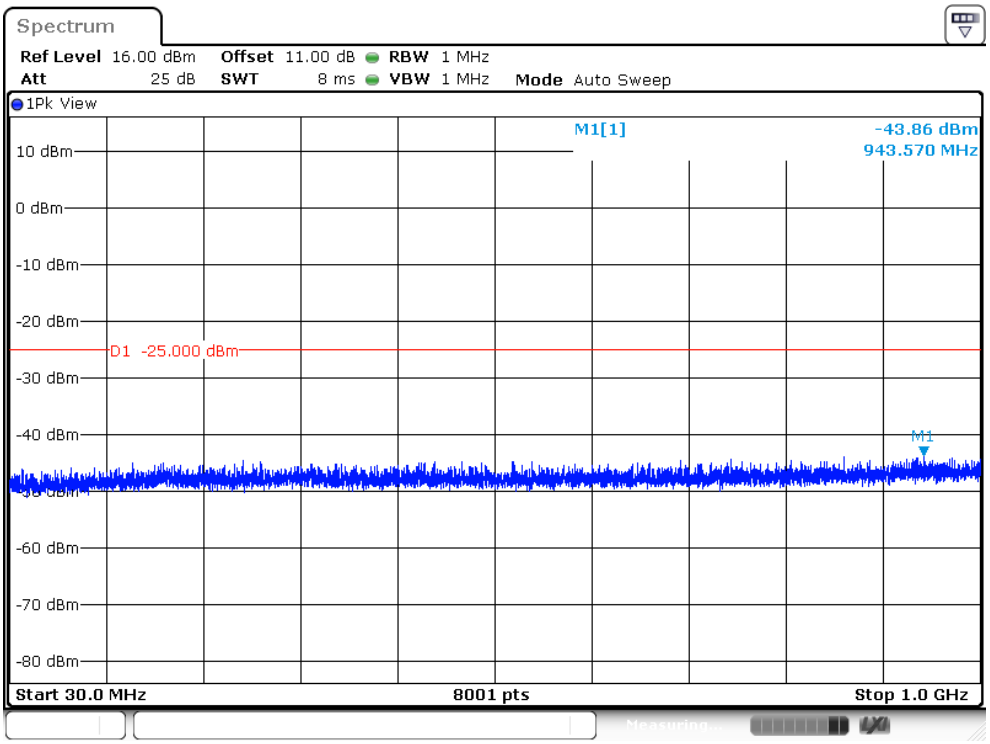
Band 41,UL Channel 40315,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



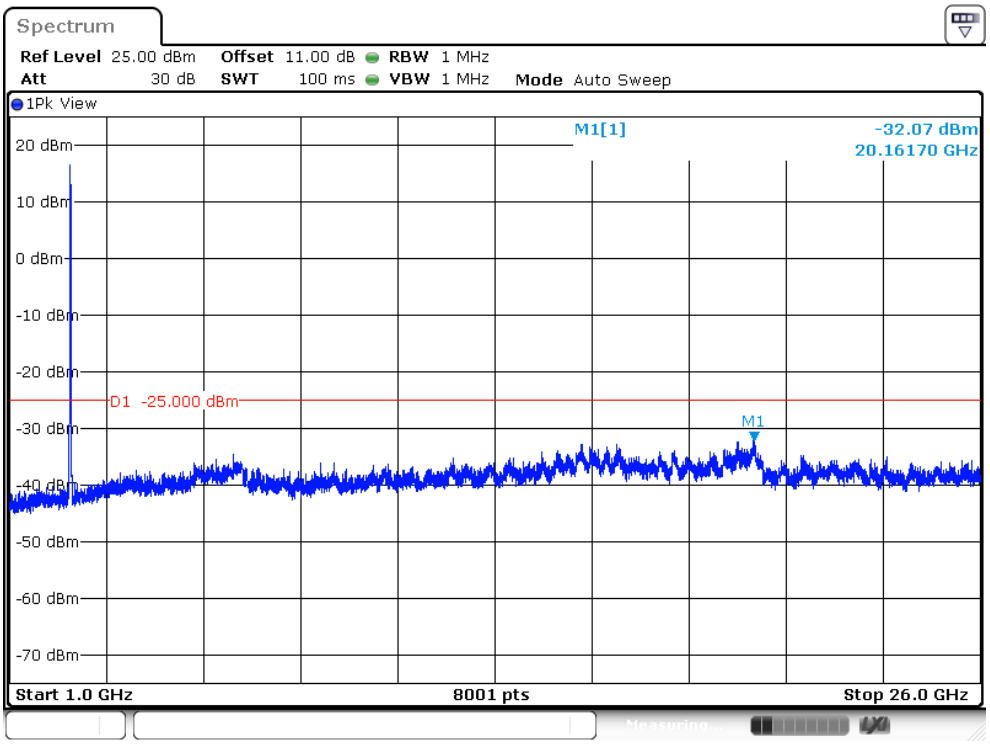
Band 41,UL Channel 40315,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



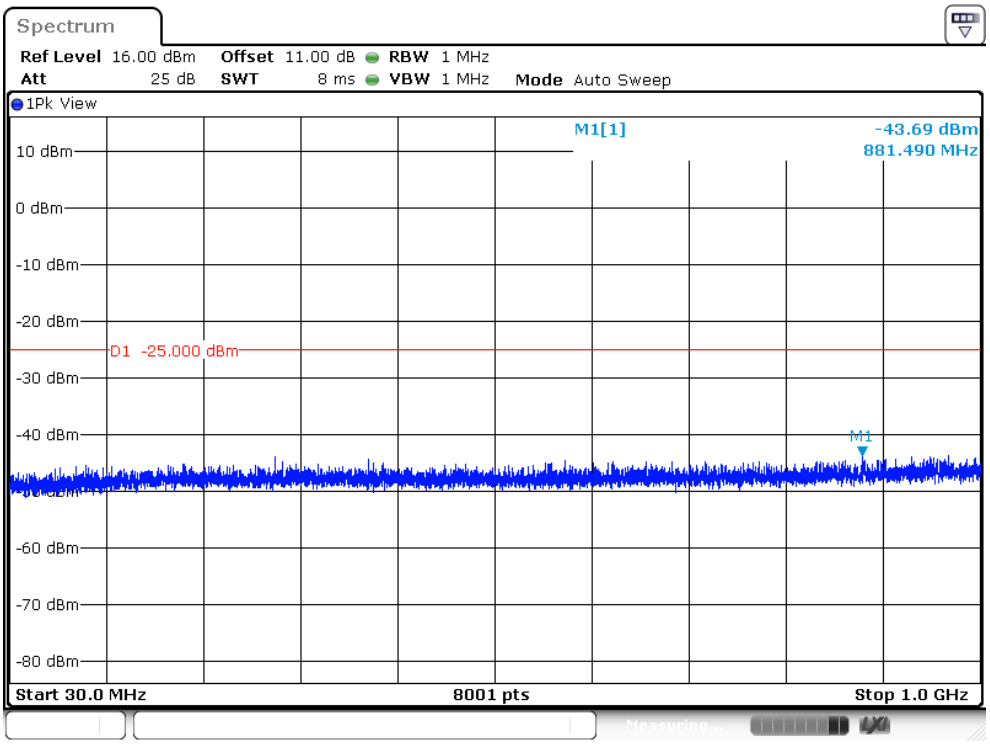
Band 41,UL Channel 40315,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



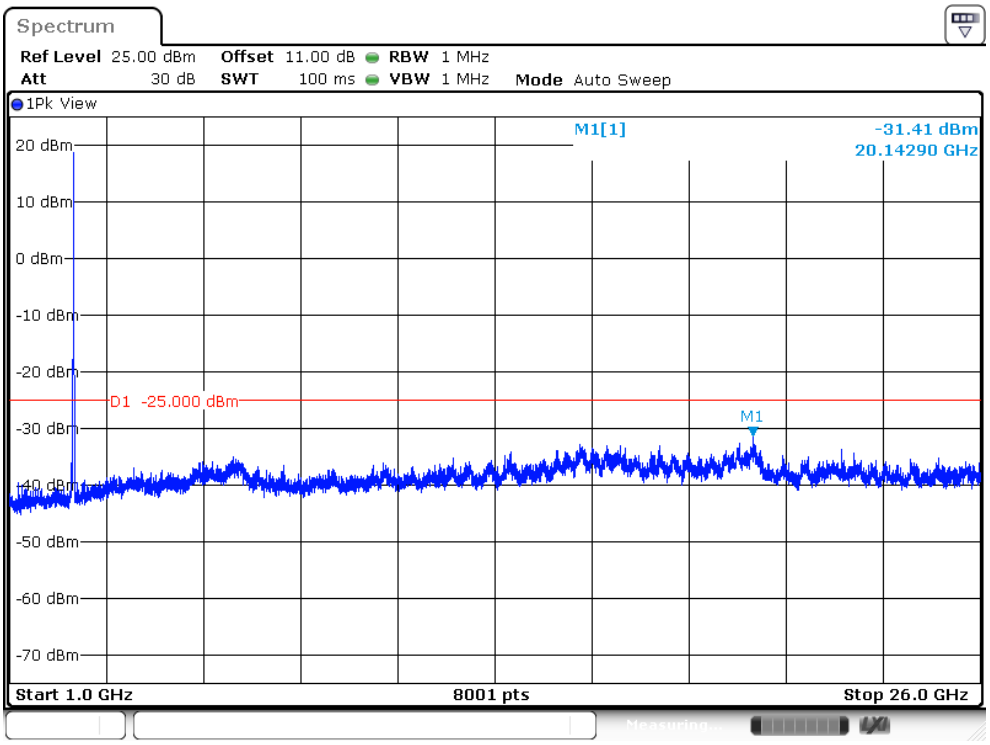
Band 41,UL Channel 40315,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



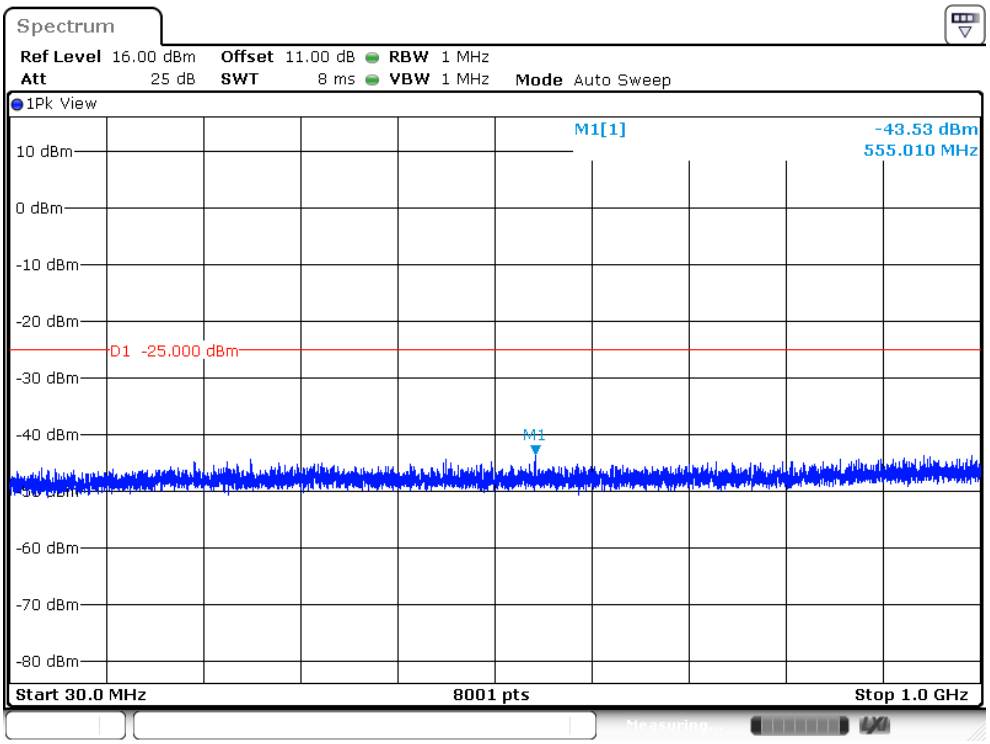
Band 41,UL Channel 41165,UL Frequency 2647.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



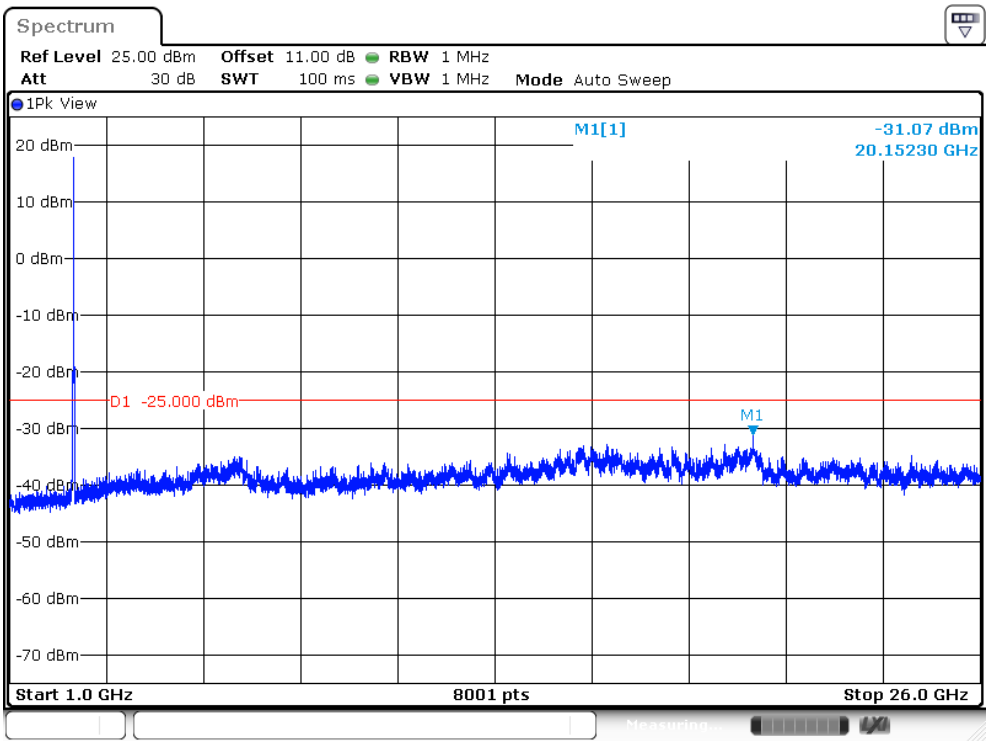
Band 41,UL Channel 41165,UL Frequency 2647.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



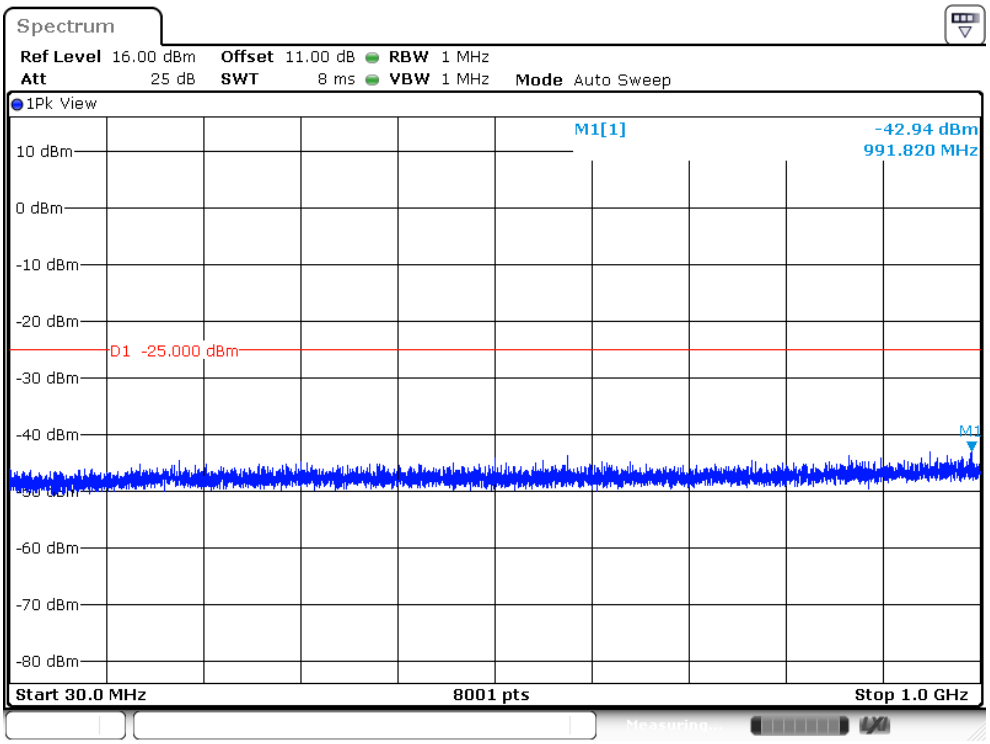
Band 41,UL Channel 41165,UL Frequency 2647.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



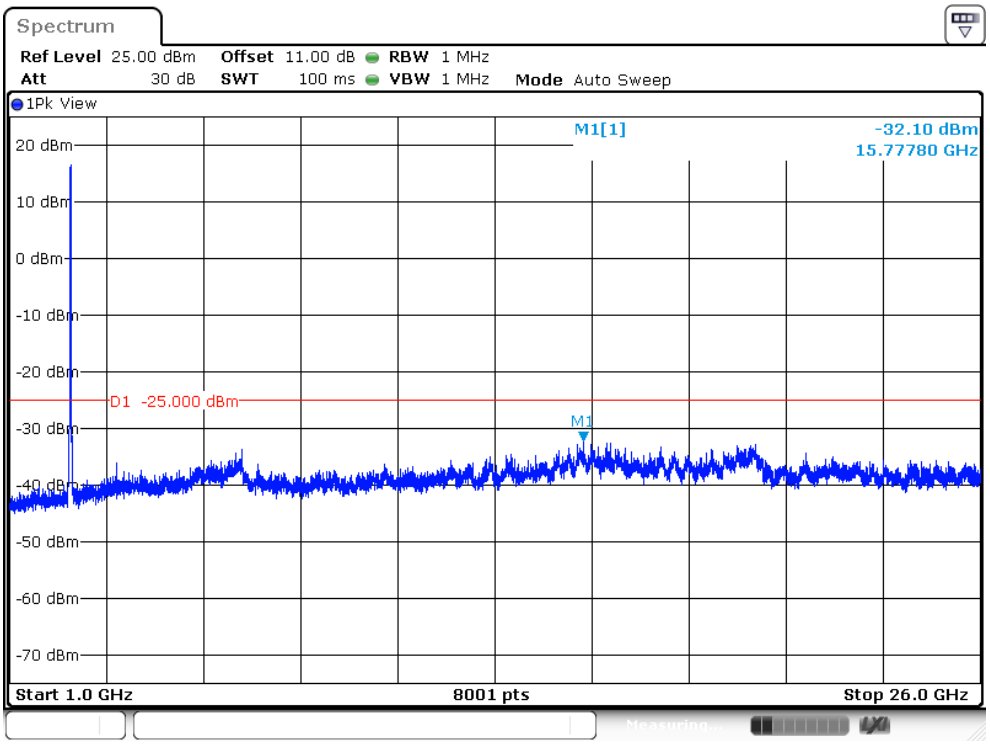
Band 41,UL Channel 41165,UL Frequency 2647.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



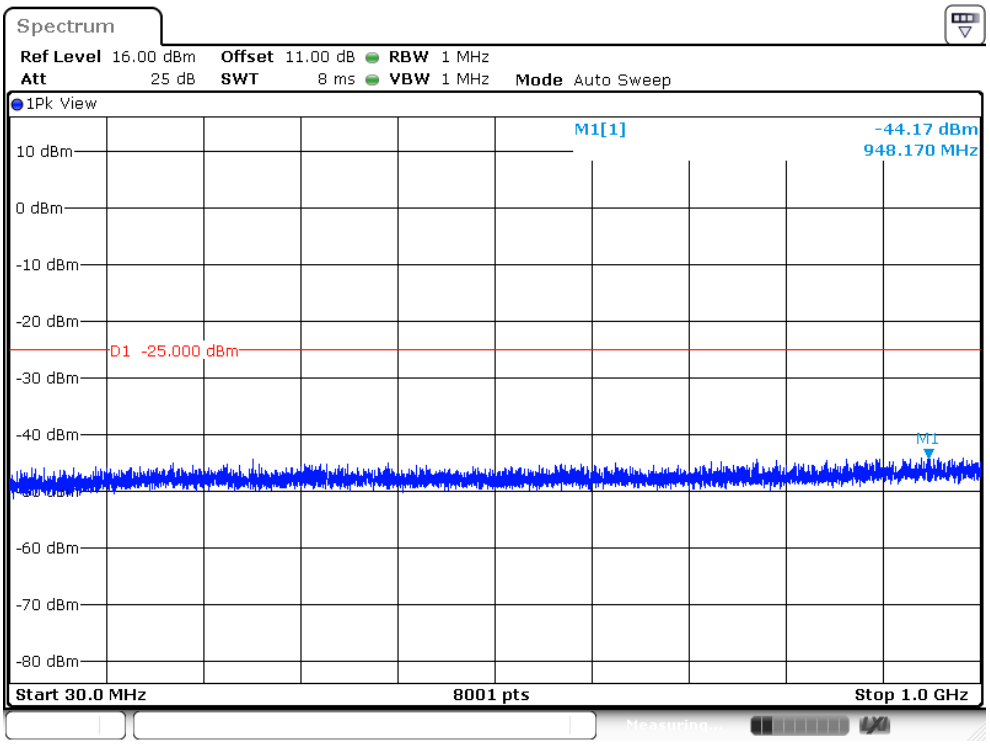
Band 41,UL Channel 40340,UL Frequency 2565.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



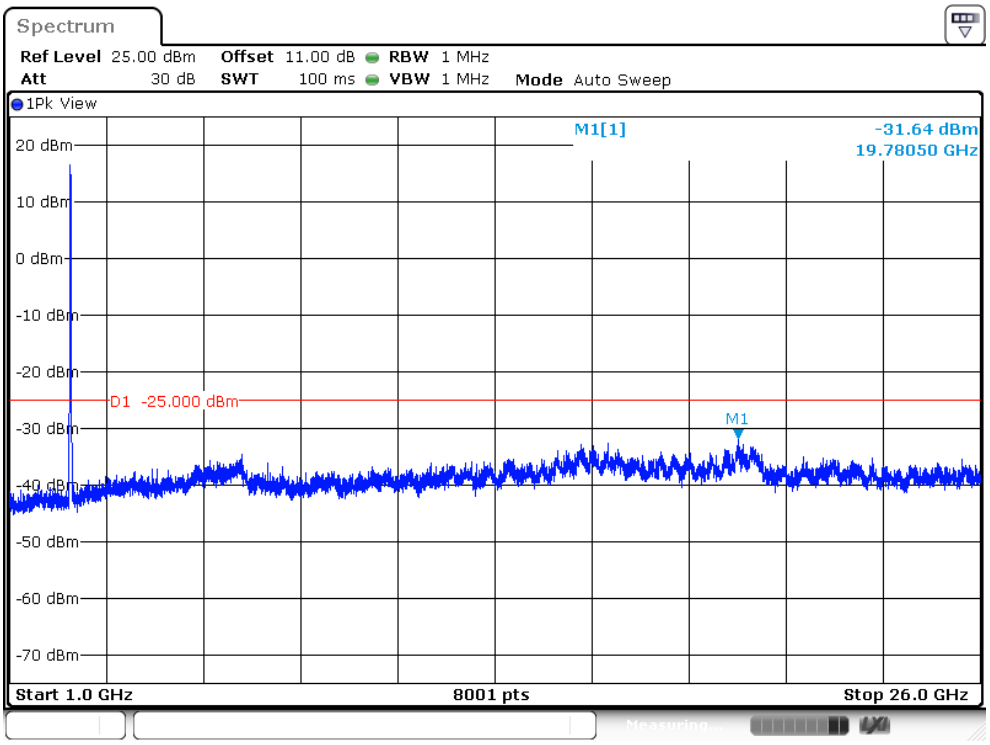
Band 41,UL Channel 40340,UL Frequency 2565.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



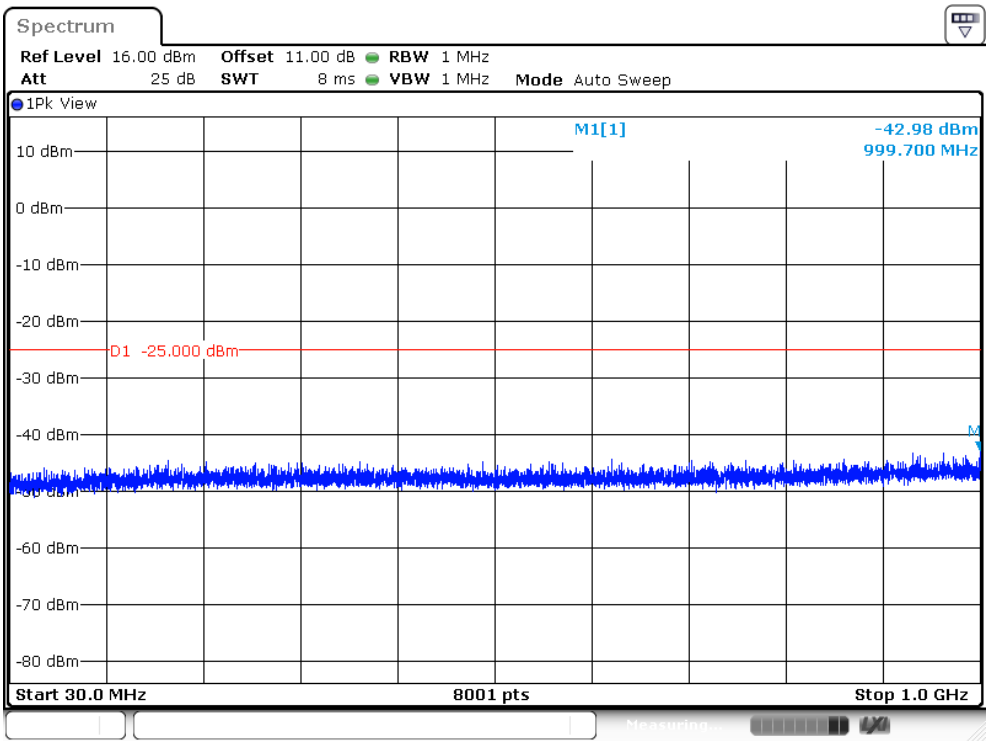
Band 41,UL Channel 40340,UL Frequency 2565.0,BW 20.0,NO. RB 100,RB POS. Low,16-QAM



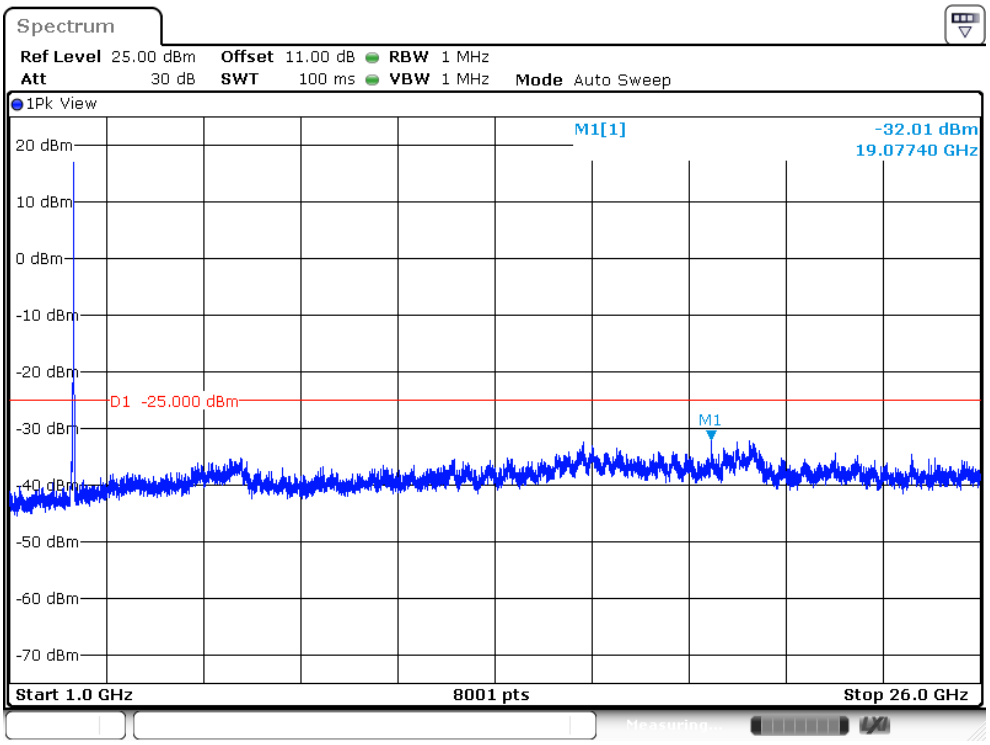
Band 41,UL Channel 40340,UL Frequency 2565.0,BW 20.0,NO. RB 100,RB POS. Low,16-QAM



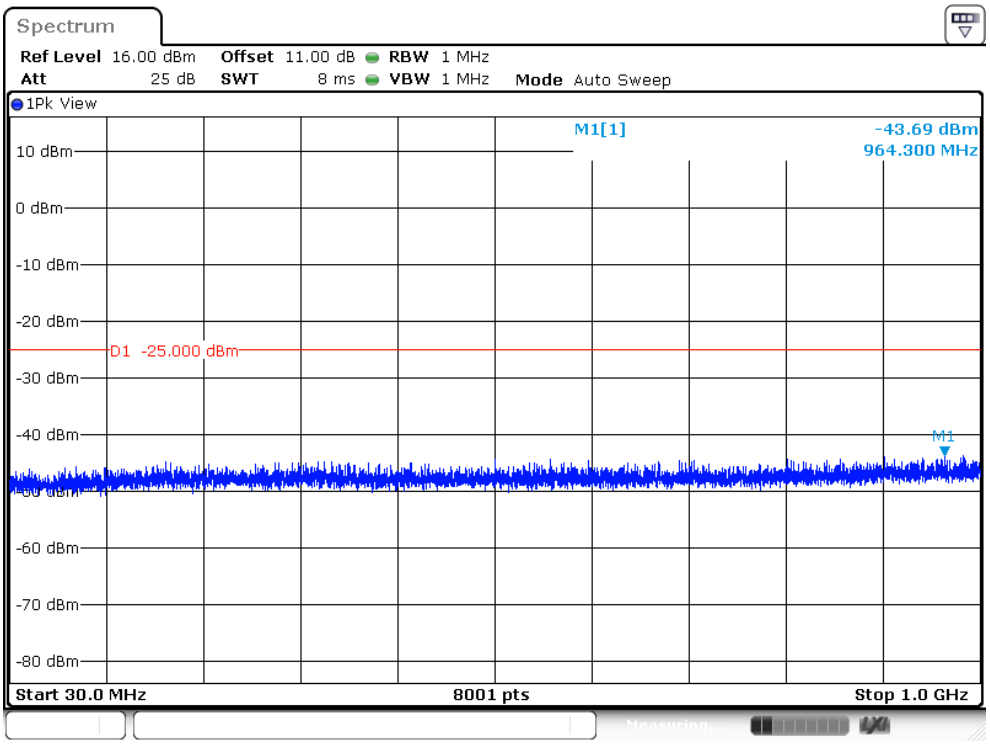
Band 41,UL Channel 41140,UL Frequency 2645.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



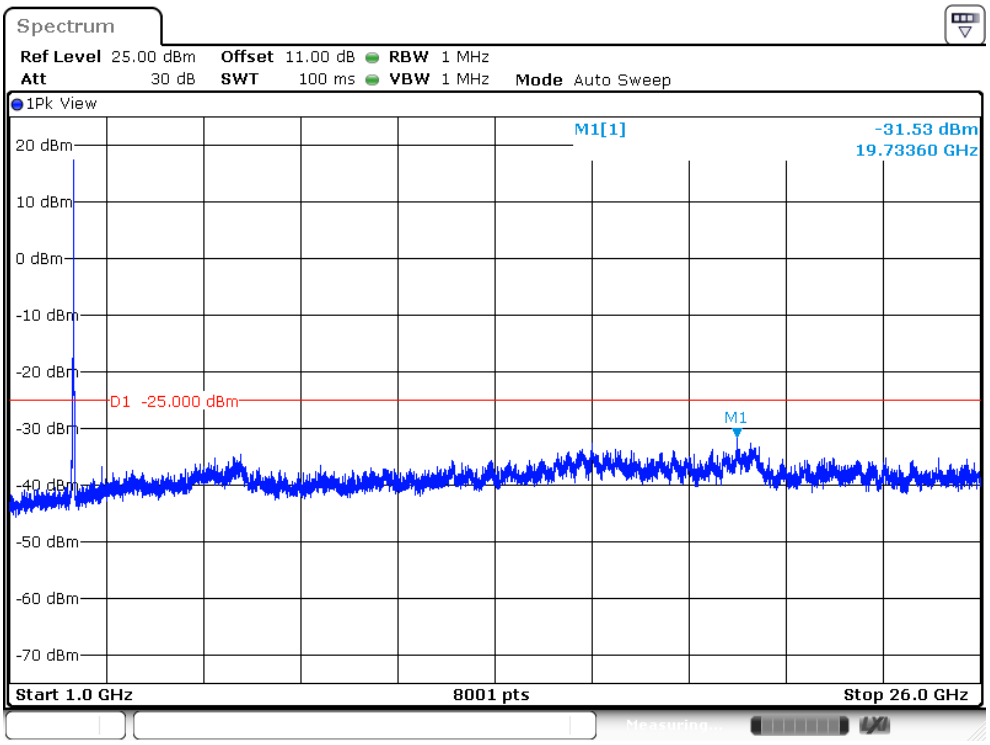
Band 41,UL Channel 41140,UL Frequency 2645.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



Band 41,UL Channel 41140,UL Frequency 2645.0,BW 20.0,NO. RB 100,RB POS. Low,16-QAM



Band 41,UL Channel 41140,UL Frequency 2645.0,BW 20.0,NO. RB 100,RB POS. Low,16-QAM



8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

TEST PROCEDURE

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

MODES TESTED

LTE Band 4
LTE Band 7
LTE Band 12
LTE Band 41

RESULTS

Pass

8.2 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	-0.71	3.12	27.58	23.75	237.365	Horizontal	Pass
		1732.5	-0.97	3.27	27.61	23.37	217.509	Horizontal	Pass
		1754.3	-0.43	3.29	27.63	23.91	246.189	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.05	3.13	27.61	23.43	220.266	Horizontal	Pass
		1732.5	-0.82	3.27	27.61	23.52	224.964	Horizontal	Pass
		1753.5	-0.74	3.3	27.62	23.58	227.894	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-0.53	3.13	27.63	23.97	249.603	Horizontal	Pass
		1732.5	-0.23	3.27	27.61	24.11	257.647	Horizontal	Pass
		1752.5	-0.28	3.3	27.6	24.02	252.245	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-0.63	3.15	27.64	23.86	243.007	Horizontal	Pass
		1732.5	-0.67	3.31	27.61	23.63	230.614	Horizontal	Pass
		1750	-0.49	3.33	27.59	23.77	238.427	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-0.84	3.15	27.65	23.66	232.015	Horizontal	Pass
		1732.5	-0.63	3.31	27.61	23.67	232.687	Horizontal	Pass
		1747.5	-0.47	3.33	27.57	23.77	238.019	Horizontal	Pass
20.0MHz Band QPSK	100/0	1720	-0.82	3.17	27.66	23.67	232.782	Horizontal	Pass
		1732.5	-0.57	3.32	27.61	23.72	235.736	Horizontal	Pass
		1745	-0.57	3.36	27.56	23.63	230.750	Horizontal	Pass
1.4MHz Band QPSK	6/0	1710.7	-0.67	3.12	27.58	23.79	239.155	Vertical	Pass
		1732.5	-0.62	3.27	27.61	23.72	235.677	Vertical	Pass
		1754.3	-0.77	3.29	27.63	23.57	227.425	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-0.71	3.13	27.61	23.77	238.037	Vertical	Pass
		1732.5	-0.55	3.27	27.61	23.79	239.492	Vertical	Pass
		1753.5	-0.66	3.3	27.62	23.66	232.060	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-0.51	3.13	27.63	23.99	250.691	Vertical	Pass
		1732.5	-0.52	3.27	27.61	23.82	241.131	Vertical	Pass
		1752.5	-0.26	3.3	27.6	24.04	253.346	Vertical	Pass
10.0MHz Band	50/0	1715	-0.70	3.15	27.64	23.79	239.270	Vertical	Pass
		1732.5	-0.48	3.31	27.61	23.82	240.964	Vertical	Pass

QPSK		1750	-0.58	3.33	27.59	23.68	233.506	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-0.93	3.15	27.65	23.57	227.439	Vertical	Pass
		1732.5	-0.45	3.31	27.61	23.85	242.796	Vertical	Pass
		1747.5	-0.45	3.33	27.57	23.79	239.357	Vertical	Pass
20.0MHz Band QPSK	100/0	1720	-0.31	3.17	27.66	24.18	261.947	Vertical	Pass
		1732.5	-0.62	3.32	27.61	23.67	232.928	Vertical	Pass
		1745	-0.47	3.36	27.56	23.73	235.881	Vertical	Pass

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	1710.7	-1.60	3.12	27.58	22.86	193.187	Horizontal	Pass
		1732.5	-1.62	3.27	27.61	22.72	186.923	Horizontal	Pass
		1754.3	-1.67	3.29	27.63	22.67	185.074	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.38	3.13	27.61	22.10	162.054	Horizontal	Pass
		1732.5	-2.34	3.27	27.61	22.00	158.313	Horizontal	Pass
		1753.5	-2.19	3.3	27.62	22.13	163.255	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.64	3.13	27.63	21.86	153.337	Horizontal	Pass
		1732.5	-2.36	3.27	27.61	21.98	157.871	Horizontal	Pass
		1752.5	-1.58	3.3	27.6	22.72	187.138	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-1.73	3.15	27.64	22.76	188.821	Horizontal	Pass
		1732.5	-1.59	3.31	27.61	22.71	186.548	Horizontal	Pass
		1750	-1.82	3.33	27.59	22.44	175.444	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-1.62	3.15	27.65	22.88	194.068	Horizontal	Pass
		1732.5	-1.48	3.31	27.61	22.82	191.541	Horizontal	Pass
		1747.5	-1.46	3.33	27.57	22.78	189.592	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-1.83	3.17	27.66	22.66	184.474	Horizontal	Pass
		1732.5	-1.64	3.32	27.61	22.65	184.123	Horizontal	Pass
		1745	-1.44	3.36	27.56	22.76	188.859	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-1.62	3.12	27.58	22.84	192.158	Vertical	Pass
		1732.5	-1.53	3.27	27.61	22.81	190.791	Vertical	Pass
		1754.3	-1.57	3.29	27.63	22.77	189.399	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.33	3.13	27.61	22.15	164.150	Vertical	Pass
		1732.5	-2.18	3.27	27.61	22.16	164.539	Vertical	Pass
		1753.5	-2.30	3.3	27.62	22.02	159.368	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.51	3.13	27.63	21.99	158.098	Vertical	Pass
		1732.5	-2.30	3.27	27.61	22.04	159.838	Vertical	Pass
		1752.5	-2.52	3.3	27.6	21.78	150.695	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-1.76	3.15	27.64	22.73	187.554	Vertical	Pass
		1732.5	-1.56	3.31	27.61	22.74	187.834	Vertical	Pass
		1750	-1.79	3.33	27.59	22.47	176.666	Vertical	Pass
15.0MH	75/0	1717.5	-1.85	3.15	27.65	22.65	183.940	Vertical	Pass

z Band		1732.5	-1.69	3.31	27.61	22.61	182.348	Vertical	Pass
16 QAM		1747.5	-1.67	3.33	27.57	22.57	180.907	Vertical	Pass
20.0MH		1720	-1.75	3.17	27.66	22.74	187.966	Vertical	Pass
z Band	100/0	1732.5	-1.68	3.32	27.61	22.61	182.501	Vertical	Pass
16 QAM		1745	-1.28	3.36	27.56	22.92	196.000	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 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	-0.59	4.54	27.75	22.62	182.94	Horizontal	Pass
		2535	-0.56	4.69	27.72	22.47	176.52	Horizontal	Pass
		2567.5	-0.56	4.71	27.71	22.44	175.57	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	-0.59	4.55	27.76	22.62	183.00	Horizontal	Pass
		2535	-0.38	4.69	27.72	22.65	183.90	Horizontal	Pass
		2565	-0.41	4.72	27.7	22.57	180.62	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	-0.43	4.55	27.77	22.79	190.00	Horizontal	Pass
		2535	-0.38	4.69	27.72	22.65	183.98	Horizontal	Pass
		2562.5	-0.55	4.72	27.69	22.42	174.71	Horizontal	Pass
20.0MHz Band QPSK	100/0	2510	-0.92	4.57	27.78	22.29	169.56	Horizontal	Pass
		2535	-0.74	4.73	27.72	22.25	167.96	Horizontal	Pass
		2560	-0.56	4.75	27.68	22.37	172.60	Horizontal	Pass
5.0MHz Band QPSK	25/0	2502.5	-1.12	4.54	27.75	22.09	161.69	Vertical	Pass
		2535	-0.80	4.69	27.72	22.23	167.15	Vertical	Pass
		2567.5	-0.80	4.71	27.71	22.20	165.81	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	-1.06	4.55	27.76	22.15	163.95	Vertical	Pass
		2535	-0.87	4.69	27.72	22.16	164.59	Vertical	Pass
		2565	-0.96	4.72	27.70	22.02	159.17	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	-1.30	4.55	27.77	21.92	155.61	Vertical	Pass
		2535	-0.81	4.69	27.72	22.22	166.73	Vertical	Pass
		2562.5	-1.36	4.72	27.69	21.61	144.82	Vertical	Pass
20.0MHz Band QPSK	100/0	2510	-0.32	4.57	27.78	22.89	194.41	Vertical	Pass
		2535	-0.96	4.73	27.72	22.03	159.75	Vertical	Pass
		2560	-0.73	4.75	27.68	22.20	165.78	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 7									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band 16 QAM	25/0	2502.5	-0.79	4.54	27.75	22.42	174.52	Horizontal	Pass
		2535	-0.54	4.69	27.72	22.49	177.34	Horizontal	Pass
		2567.5	-0.60	4.71	27.71	22.40	173.91	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-0.62	4.55	27.76	22.59	181.41	Horizontal	Pass
		2535	-0.30	4.69	27.72	22.73	187.59	Horizontal	Pass
		2565	-0.47	4.72	27.7	22.51	178.17	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.74	4.55	27.77	22.48	177.04	Horizontal	Pass
		2535	-0.46	4.69	27.72	22.57	180.66	Horizontal	Pass
		2562.5	-0.52	4.72	27.69	22.45	175.87	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.82	4.57	27.78	22.39	173.48	Horizontal	Pass
		2535	-0.59	4.73	27.72	22.40	173.94	Horizontal	Pass
		2560	-0.69	4.75	27.68	22.24	167.48	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-1.04	4.54	27.75	22.17	164.73	Vertical	Pass
		2535	-1.36	4.69	27.72	21.67	147.00	Vertical	Pass
		2567.5	-0.93	4.71	27.71	22.07	160.88	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-1.17	4.55	27.76	22.04	159.94	Vertical	Pass
		2535	-0.72	4.69	27.72	22.31	170.10	Vertical	Pass
		2565	-0.96	4.72	27.70	22.02	159.08	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-0.96	4.55	27.77	22.26	168.10	Vertical	Pass
		2535	-1.43	4.69	27.72	21.60	144.53	Vertical	Pass
		2562.5	-0.56	4.72	27.69	22.41	174.06	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2510	-0.60	4.57	27.78	22.61	182.45	Vertical	Pass
		2535	-0.01	4.73	27.72	22.98	198.46	Vertical	Pass
		2560	-0.92	4.75	27.68	22.01	158.87	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 12

Radiated Power (ERP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	699.7	7.40	1.91	19.21	2.15	22.55	180.019	Vertical	Pass
		707.5	7.32	1.91	19.26	2.15	22.52	178.662	Vertical	Pass
		715.3	7.11	1.93	19.34	2.15	22.37	172.761	Vertical	Pass
3.0MHz Band QPSK	15/0	700.5	7.17	1.91	19.21	2.15	22.32	170.477	Vertical	Pass
		707.5	7.13	1.91	19.26	2.15	22.33	171.113	Vertical	Pass
		714.5	7.05	1.93	19.34	2.15	22.31	170.396	Vertical	Pass
5.0MHz Band QPSK	25/0	701.5	7.40	1.91	19.23	2.15	22.57	180.863	Vertical	Pass
		707.5	7.36	1.91	19.26	2.15	22.56	180.332	Vertical	Pass
		713.5	6.89	1.92	19.33	2.15	22.15	164.132	Vertical	Pass
10.0MHz Band QPSK	50/0	704	7.20	1.91	19.25	2.15	22.39	173.239	Vertical	Pass
		707.5	7.03	1.91	19.26	2.15	22.23	167.290	Vertical	Pass
		711	7.32	1.92	19.32	2.15	22.57	180.781	Vertical	Pass
1.4MHz Band QPSK	6/0	699.7	7.44	1.91	19.21	2.15	22.59	181.501	Horizontal	Pass
		707.5	7.28	1.91	19.26	2.15	22.48	177.059	Horizontal	Pass
		715.3	7.17	1.93	19.34	2.15	22.43	175.144	Horizontal	Pass
3.0MHz Band QPSK	15/0	700.5	7.22	1.91	19.21	2.15	22.37	172.457	Horizontal	Pass
		707.5	7.09	1.91	19.26	2.15	22.29	169.617	Horizontal	Pass
		714.5	7.36	1.93	19.34	2.15	22.62	182.833	Horizontal	Pass
5.0MHz Band QPSK	25/0	701.5	7.51	1.91	19.23	2.15	22.68	185.291	Horizontal	Pass
		707.5	7.43	1.91	19.26	2.15	22.63	183.056	Horizontal	Pass
		713.5	6.94	1.92	19.33	2.15	22.20	165.828	Horizontal	Pass
10.0MHz Band QPSK	50/0	704	7.12	1.91	19.25	2.15	22.31	170.231	Horizontal	Pass
		707.5	7.11	1.91	19.26	2.15	22.31	170.241	Horizontal	Pass
		711	7.44	1.92	19.32	2.15	22.69	185.950	Horizontal	Pass

Radiated Power (EIRP) for Band 12										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	699.7	5.96	1.91	19.21	2.15	21.11	129.033	Vertical	Pass
		707.5	5.90	1.91	19.26	2.15	21.10	128.726	Vertical	Pass
		715.3	5.67	1.93	19.34	2.15	20.93	123.902	Vertical	Pass
3.0MHz Band 16 QAM	15/0	700.5	6.31	1.91	19.21	2.15	21.46	139.950	Vertical	Pass
		707.5	6.18	1.91	19.26	2.15	21.38	137.414	Vertical	Pass
		714.5	6.27	1.93	19.34	2.15	21.53	142.257	Vertical	Pass
5.0MHz Band 16 QAM	25/0	701.5	6.13	1.91	19.23	2.15	21.30	134.776	Vertical	Pass
		707.5	6.29	1.91	19.26	2.15	21.49	140.865	Vertical	Pass
		713.5	6.18	1.92	19.33	2.15	21.44	139.432	Vertical	Pass
10.0MHz Band 16 QAM	50/0	704	6.47	1.91	19.25	2.15	21.66	146.579	Vertical	Pass
		707.5	6.32	1.91	19.26	2.15	21.52	141.944	Vertical	Pass
		711	6.46	1.92	19.32	2.15	21.71	148.094	Vertical	Pass
1.4MHz Band 16 QAM	6/0	699.7	6.19	1.91	19.21	2.15	21.34	136.065	Horizontal	Pass
		707.5	5.96	1.91	19.26	2.15	21.16	130.731	Horizontal	Pass
		715.3	5.80	1.93	19.34	2.15	21.06	127.726	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	700.5	6.34	1.91	19.21	2.15	21.49	140.825	Horizontal	Pass
		707.5	6.21	1.91	19.26	2.15	21.41	138.426	Horizontal	Pass
		714.5	6.29	1.93	19.34	2.15	21.55	143.025	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	701.5	6.31	1.91	19.23	2.15	21.48	140.557	Horizontal	Pass
		707.5	6.55	1.91	19.26	2.15	21.75	149.796	Horizontal	Pass
		713.5	6.38	1.92	19.33	2.15	21.64	146.006	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	704	6.61	1.91	19.25	2.15	21.80	151.430	Horizontal	Pass
		707.5	6.33	1.91	19.26	2.15	21.53	142.330	Horizontal	Pass
		711	6.35	1.92	19.32	2.15	21.60	144.615	Horizontal	Pass

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

8.5 LTE BAND 41

Radiated Power (EIRP) for Band 41									
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	2557.5	0.45	4.54	27.75	23.66	232.026	Vertical	Pass
		2605	0.15	4.69	27.72	23.18	208.030	Vertical	Pass
		2652.5	-0.08	4.71	27.71	22.92	195.672	Vertical	Pass
10.0MHz Band QPSK	50/0	2560	0.02	4.55	27.76	23.23	210.457	Vertical	Pass
		2605	0.06	4.69	27.72	23.09	203.619	Vertical	Pass
		2650	0.69	4.72	27.7	23.67	232.896	Vertical	Pass
15.0MHz Band QPSK	75/0	2562.5	0.35	4.55	27.77	23.57	227.620	Vertical	Pass
		2605	0.24	4.69	27.72	23.27	212.380	Vertical	Pass
		2648.5	0.16	4.72	27.69	23.13	205.440	Vertical	Pass
20.0MHz Band QPSK	100/0	2565	0.13	4.57	27.78	23.34	215.539	Vertical	Pass
		2605	0.33	4.73	27.72	23.32	214.837	Vertical	Pass
		2645	0.65	4.75	27.68	23.58	228.025	Vertical	Pass
5.0MHz Band QPSK	25/0	2557.5	-0.08	4.54	27.75	23.13	205.744	Horizontal	Pass
		2605	-0.49	4.69	27.72	22.54	179.615	Horizontal	Pass
		2652.5	0.19	4.71	27.71	23.19	208.505	Horizontal	Pass
10.0MHz Band QPSK	50/0	2560	-0.47	4.55	27.76	22.74	187.979	Horizontal	Pass
		2605	0.35	4.69	27.72	23.38	217.978	Horizontal	Pass
		2650	0.04	4.72	27.7	23.02	200.455	Horizontal	Pass
15.0MHz Band QPSK	75/0	2562.5	0.40	4.55	27.77	23.62	229.918	Horizontal	Pass
		2605	0.11	4.69	27.72	23.14	205.978	Horizontal	Pass
		2648.5	-0.27	4.72	27.69	22.70	186.021	Horizontal	Pass
20.0MHz Band QPSK	100/0	2565	0.54	4.57	27.78	23.75	237.132	Horizontal	Pass
		2605	0.15	4.73	27.72	23.14	206.270	Horizontal	Pass
		2645	0.23	4.75	27.68	23.16	206.974	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 41									
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 16 QAM	25/0	2557.5	0.22	4.54	27.75	23.43	220.068	Vertical	Pass
		2605	0.41	4.69	27.72	23.44	221.008	Vertical	Pass
		2652.5	-0.06	4.71	27.71	22.94	196.646	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2560	-0.13	4.55	27.76	23.08	203.461	Vertical	Pass
		2605	0.12	4.69	27.72	23.15	206.347	Vertical	Pass
		2650	0.13	4.72	27.7	23.11	204.872	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2562.5	0.25	4.55	27.77	23.47	222.481	Vertical	Pass
		2605	0.61	4.69	27.72	23.64	231.199	Vertical	Pass
		2648.5	0.27	4.72	27.69	23.24	210.902	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2565	0.40	4.57	27.78	23.61	229.548	Vertical	Pass
		2605	0.51	4.73	27.72	23.50	224.110	Vertical	Pass
		2645	0.24	4.75	27.68	23.17	207.276	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2557.5	-0.24	4.54	27.75	22.97	197.984	Horizontal	Pass
		2605	-0.11	4.69	27.72	22.92	195.947	Horizontal	Pass
		2652.5	0.14	4.71	27.71	23.14	205.859	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2560	-0.41	4.55	27.76	22.80	190.443	Horizontal	Pass
		2605	0.79	4.69	27.72	23.82	240.732	Horizontal	Pass
		2650	0.37	4.72	27.7	23.35	216.304	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2562.5	-0.27	4.55	27.77	22.95	197.451	Horizontal	Pass
		2605	-0.09	4.69	27.72	22.94	196.885	Horizontal	Pass
		2648.5	0.56	4.72	27.69	23.53	225.394	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2565	0.68	4.57	27.78	23.89	245.042	Horizontal	Pass
		2605	0.33	4.73	27.72	23.32	214.816	Horizontal	Pass
		2645	0.27	4.75	27.68	23.20	208.843	Horizontal	Pass

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 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 4
LTE Band 7
LTE Band 12
LTE Band 41

RESULTS

PASS

9.1 LTE BAND 4

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

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-53.32	4.02	29.80	-27.54	-13	-14.54	Horizontal
3421.4	-47.83	4.02	29.80	-22.05	-13	-9.05	Vertical
5132.1	-46.82	5.24	35.84	-16.22	-13	-3.22	Vertical
5132.1	-53.31	5.24	35.84	-22.71	-13	-9.71	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-48.35	4.03	30.00	-22.38	-13	-9.38	Horizontal
3465	-44.77	4.03	30.00	-18.80	-13	-5.80	Vertical
5197.5	-48.11	5.25	35.86	-17.50	-13	-4.50	Vertical
5197.5	-51.03	5.25	35.86	-20.42	-13	-7.42	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-47.68	4.05	30.01	-21.72	-13	-8.72	Horizontal
3508.6	-46.33	4.05	30.01	-20.37	-13	-7.37	Vertical
5262.9	-51.56	5.26	35.86	-20.96	-13	-7.96	Vertical
5262.9	-46.60	5.26	35.86	-16.00	-13	-3.00	Horizontal

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

Test Results for Low Channel 1720MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440	-53.26	4.02	29.80	-27.48	-13	-14.48	Horizontal
3440	-49.39	4.02	29.80	-23.61	-13	-10.61	Vertical
5160	-50.40	5.24	35.84	-19.80	-13	-6.80	Vertical
5160	-48.91	5.24	35.84	-18.31	-13	-5.31	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465	-45.21	4.03	30.00	-19.24	-13	-6.24	Horizontal
3465	-48.56	4.03	30.00	-22.59	-13	-9.59	Vertical
5197.5	-48.93	5.25	35.86	-18.32	-13	-5.32	Vertical
5197.5	-50.78	5.25	35.86	-20.17	-13	-7.17	Horizontal
Test Results for High Channel 1745MHz							
3490	-52.24	2.91	27.68	-27.47	-13	-14.47	Horizontal
3490	-53.89	2.91	27.68	-29.12	-13	-16.12	Vertical
5235	-53.06	5.26	35.86	-22.46	-13	-9.46	Vertical
5235	-50.92	5.26	35.86	-20.32	-13	-7.32	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 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
5005.0	-61.55	5.23	35.81	-30.97	-25	-5.97	Horizontal
5005.0	-67.79	5.23	35.81	-37.21	-25	-12.21	Vertical
7507.5	-62.59	5.67	36.85	-31.41	-25	-6.41	Vertical
7507.5	-66.01	5.67	36.85	-34.83	-25	-9.83	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070.0	-62.28	5.23	35.82	-31.69	-25	-6.69	Horizontal
5070.0	-59.25	5.23	35.82	-28.66	-25	-3.66	Vertical
7605.0	-61.06	5.67	36.85	-29.88	-25	-4.88	Vertical
7605.0	-64.67	5.67	36.85	-33.49	-25	-8.49	Horizontal
Test Results for High Channel 1754.3MHz							
5135.0	-59.82	5.24	35.83	-29.23	-25	-4.23	Horizontal
5135.0	-65.26	5.24	35.83	-34.67	-25	-9.67	Vertical
7702.5	-61.83	5.68	36.87	-30.64	-25	-5.64	Vertical
7702.5	-64.46	5.68	36.87	-33.27	-25	-8.27	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	-69.20	5.23	35.82	-38.61	-25	-13.61	Horizontal
5020	-68.21	5.23	35.82	-37.62	-25	-12.62	Vertical
7530	-60.88	5.67	36.86	-29.69	-25	-4.69	Vertical
7530	-67.91	5.67	36.86	-36.72	-25	-11.72	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070	-65.31	5.23	35.82	-34.72	-25	-9.72	Horizontal
5070	-66.24	5.23	35.82	-35.65	-25	-10.65	Vertical
7605	-63.18	5.67	36.85	-32.00	-25	-7.00	Vertical
7605	-68.19	5.67	36.85	-37.01	-25	-12.01	Horizontal
Test Results for High Channel 1754.3MHz							
5120	-62.99	5.24	35.83	-32.40	-25	-7.40	Horizontal
5120	-65.57	5.24	35.83	-34.98	-25	-9.98	Vertical
7680	-63.26	5.70	36.88	-32.08	-25	-7.08	Vertical
7680	-67.78	5.70	36.88	-36.60	-25	-11.60	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 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	-52.23	2.60	27.20	-27.63	-13	-14.63	Horizontal
1399.4	-47.28	2.60	27.20	-22.68	-13	-9.68	Vertical
2099.1	-54.83	2.85	27.54	-30.14	-13	-17.14	Vertical
2099.1	-43.67	2.85	27.54	-18.98	-13	-5.98	Horizontal
Test Results For Mid Channel 707.5MHz							
1415	-55.56	2.61	27.28	-30.89	-13	-17.89	Horizontal
1415	-49.42	2.61	27.28	-24.75	-13	-11.75	Vertical
2122.5	-50.12	2.87	27.59	-25.40	-13	-12.40	Vertical
2122.5	-51.14	2.87	27.59	-26.42	-13	-13.42	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-54.68	2.63	27.28	-30.03	-13	-17.03	Horizontal
1430.6	-48.16	2.63	27.28	-23.51	-13	-10.51	Vertical
2145.9	-55.20	2.88	27.60	-30.48	-13	-17.48	Vertical
2145.9	-43.97	2.88	27.60	-19.25	-13	-6.25	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	-48.33	2.61	27.26	-23.68	-13	-10.68	Horizontal
1408	-50.73	2.61	27.26	-26.08	-13	-13.08	Vertical
2112	-50.37	2.87	27.58	-25.66	-13	-12.66	Vertical
2112	-45.76	2.87	27.58	-21.05	-13	-8.05	Horizontal
Test Results for Mid Channel 707.5MHz							
1415	-54.93	2.61	27.28	-30.26	-13	-17.26	Horizontal
1415	-46.67	2.61	27.28	-22.00	-13	-9.00	Vertical
2122.5	-50.94	2.87	27.59	-26.22	-13	-13.22	Vertical
2122.5	-51.27	2.87	27.59	-26.55	-13	-13.55	Horizontal
Test Results for High Channel 711MHz							
1422	-49.84	2.62	27.28	-25.18	-13	-12.18	Horizontal
1422	-45.61	2.62	27.28	-20.95	-13	-7.95	Vertical
2133	-49.85	2.87	27.60	-25.12	-13	-12.12	Vertical
2133	-52.16	2.87	27.60	-27.43	-13	-14.43	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 41

QPSK EIRP POWER FOR LTE BAND 41 (5MHZ BANDWIDTH)

Test Results for Low Channel 2557.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5115	-64.99	2.63	27.26	-40.36	-25	-15.36	Horizontal
5115	-56.67	2.63	27.26	-32.04	-25	-7.04	Vertical
7672.5	-59.36	2.67	27.58	-34.45	-25	-9.45	Vertical
7672.5	-60.35	2.67	27.58	-35.44	-25	-10.44	Horizontal
Test Results for Mid Channel 2605MHz							
5210	-66.18	2.62	27.28	-41.52	-25	-16.52	Horizontal
5210	-60.50	2.62	27.28	-35.84	-25	-10.84	Vertical
7815	-64.57	2.85	27.62	-39.80	-25	-14.80	Vertical
7815	-58.87	2.85	27.62	-34.10	-25	-9.10	Horizontal
Test Results for High Channel 2652.5MHz							
5305	-62.51	2.64	27.28	-37.87	-25	-12.87	Horizontal
5305	-62.27	2.64	27.28	-37.63	-25	-12.63	Vertical
7957.5	-60.79	2.85	27.70	-35.94	-25	-10.94	Vertical
7957.5	-56.85	2.85	27.70	-32.00	-25	-7.00	Horizontal

QPSK EIRP POWER FOR LTE BAND 41 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 2565MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5130	-60.02	2.63	27.30	-35.35	-25	-10.35	Horizontal
5130	-59.53	2.63	27.30	-34.86	-25	-9.86	Vertical
7695	-66.08	2.67	27.62	-41.13	-25	-16.13	Vertical
7695	-55.88	2.67	27.62	-30.93	-25	-5.93	Horizontal
Test Results for Mid Channel 2605MHz							
5210	-58.78	2.62	27.33	-34.07	-25	-9.07	Horizontal
5210	-59.79	2.62	27.33	-35.08	-25	-10.08	Vertical
7815	-66.96	2.85	27.67	-42.14	-25	-17.14	Vertical
7815	-63.20	2.85	27.67	-38.38	-25	-13.38	Horizontal
Test Results for High Channel 2645MHz							
5290	-66.16	2.64	27.33	-41.47	-25	-16.47	Horizontal
5290	-62.40	2.64	27.33	-37.71	-25	-12.71	Vertical
7935	-67.04	2.85	27.67	-42.22	-25	-17.22	Vertical
7935	-59.22	2.85	27.67	-34.40	-25	-9.40	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 3.2V, Normal, DC 3.8V and High voltage, DC 4.2V.

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 4

LTE Band 7

LTE Band 12

LTE Band 41

RESULTS

See the following pages.

10.1 LTE BAND 4

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-10.5	-0.006044	2.5
3.8	1732.5	-14.1	-0.008153	2.5
4.2	1732.5	-14.6	-0.008437	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	-17.4	-0.010031	2.5
Extreme (50C)	1732.5	-16.6	-0.009555	2.5
Extreme (40C)	1732.5	-13.9	-0.008040	2.5
Extreme (30C)	1732.5	-13.2	-0.007633	2.5
Extreme (10C)	1732.5	-15.0	-0.008676	2.5
Extreme (0C)	1732.5	-12.1	-0.006994	2.5
Extreme (-10C)	1732.5	-13.6	-0.007869	2.5
Extreme (-20C)	1732.5	-16.0	-0.009254	2.5
Extreme (-30C)	1732.5	-12.9	-0.007435	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-16.5	-0.009544	2.5
3.8	1732.5	-17.9	-0.010341	2.5
4.2	1732.5	-15.7	-0.009090	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	-14.5	-0.008351	2.5
Extreme (50C)	1732.5	-10.7	-0.006148	2.5
Extreme (40C)	1732.5	-15.0	-0.008675	2.5
Extreme (30C)	1732.5	-16.7	-0.009651	2.5
Extreme (10C)	1732.5	-16.8	-0.009670	2.5
Extreme (0C)	1732.5	-17.4	-0.010041	2.5
Extreme (-10C)	1732.5	-13.7	-0.007929	2.5
Extreme (-20C)	1732.5	-11.3	-0.006544	2.5
Extreme (-30C)	1732.5	-12.1	-0.006969	2.5

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

10.2 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)				
3.4	2535	-11.4	-0.004478	2.5
3.8	2535	-12.0	-0.004727	2.5
4.2	2535	-12.4	-0.004911	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	-17.7	-0.006974	2.5
Extreme (50C)	2535	-15.1	-0.005975	2.5
Extreme (40C)	2535	-16.6	-0.006535	2.5
Extreme (30C)	2535	-15.4	-0.006059	2.5
Extreme (10C)	2535	-17.0	-0.006705	2.5
Extreme (0C)	2535	-11.5	-0.004545	2.5
Extreme (-10C)	2535	-12.5	-0.004928	2.5
Extreme (-20C)	2535	-11.6	-0.004561	2.5
Extreme (-30C)	2535	-17.8	-0.007002	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)				
3.2	2535	-12.1	-0.004787	2.5
3.8	2535	-10.7	-0.004211	2.5
4.4	2535	-13.2	-0.005202	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	-11.2	-0.004431	2.5
Extreme (50C)	2535	-12.1	-0.004792	2.5
Extreme (40C)	2535	-13.8	-0.005429	2.5
Extreme (30C)	2535	-12.6	-0.004959	2.5
Extreme (10C)	2535	-17.6	-0.006926	2.5
Extreme (0C)	2535	-15.7	-0.006205	2.5
Extreme (-10C)	2535	-10.3	-0.004079	2.5
Extreme (-20C)	2535	-12.8	-0.005053	2.5
Extreme (-30C)	2535	-10.1	-0.003983	2.5

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

10.3 LTE BAND 12

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 QPSK, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	-14.0	-0.019833	2.5
3.8	707.5	-10.6	-0.014954	2.5
4.2	707.5	-14.7	-0.020814	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	-12.9	-0.018203	2.5
Extreme (50C)	707.5	-15.1	-0.021322	2.5
Extreme (40C)	707.5	-12.9	-0.018253	2.5
Extreme (30C)	707.5	-10.3	-0.014495	2.5
Extreme (10C)	707.5	-15.9	-0.022540	2.5
Extreme (0C)	707.5	-11.8	-0.016612	2.5
Extreme (-10C)	707.5	-13.0	-0.018374	2.5
Extreme (-20C)	707.5	-14.1	-0.019972	2.5
Extreme (-30C)	707.5	-11.8	-0.016700	2.5

16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 12 16QAM, (CH 23095 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	707.5	-15.8	-0.022343	2.5
3.8	707.5	-14.4	-0.020335	2.5
4.2	707.5	-17.3	-0.024443	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	-10.4	-0.014714	2.5
Extreme (50C)	707.5	-11.6	-0.016329	2.5
Extreme (40C)	707.5	-11.7	-0.016497	2.5
Extreme (30C)	707.5	-10.4	-0.014688	2.5
Extreme (10C)	707.5	-11.5	-0.016300	2.5
Extreme (0C)	707.5	-10.3	-0.014578	2.5
Extreme (-10C)	707.5	-17.0	-0.023988	2.5
Extreme (-20C)	707.5	-11.3	-0.015964	2.5
Extreme (-30C)	707.5	-17.9	-0.025300	2.5

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

10.4 LTE BAND 41

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2605	-11.1	-0.004277	2.5
3.8	2605	-13.0	-0.004987	2.5
4.2	2605	-13.4	-0.005131	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
QPSK, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2605	-17.0	-0.006529	2.5
Extreme (50C)	2605	-16.8	-0.006437	2.5
Extreme (40C)	2605	-14.3	-0.005495	2.5
Extreme (30C)	2605	-17.5	-0.006715	2.5
Extreme (10C)	2605	-16.4	-0.006301	2.5
Extreme (0C)	2605	-13.7	-0.005258	2.5
Extreme (-10C)	2605	-11.6	-0.004449	2.5
Extreme (-20C)	2605	-12.8	-0.004912	2.5
Extreme (-30C)	2605	-11.8	-0.004513	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2605	-16.4	-0.006303	2.5
3.8	2605	-14.6	-0.005609	2.5
4.2	2605	-17.9	-0.006856	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
16QAM, (CH 40740 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2605	-10.4	-0.003994	2.5
Extreme (50C)	2605	-16.7	-0.006427	2.5
Extreme (40C)	2605	-16.8	-0.006460	2.5
Extreme (30C)	2605	-11.5	-0.004427	2.5
Extreme (10C)	2605	-16.3	-0.006245	2.5
Extreme (0C)	2605	-14.5	-0.005556	2.5
Extreme (-10C)	2605	-15.4	-0.005915	2.5
Extreme (-20C)	2605	-15.8	-0.006076	2.5
Extreme (-30C)	2605	-17.8	-0.006823	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.

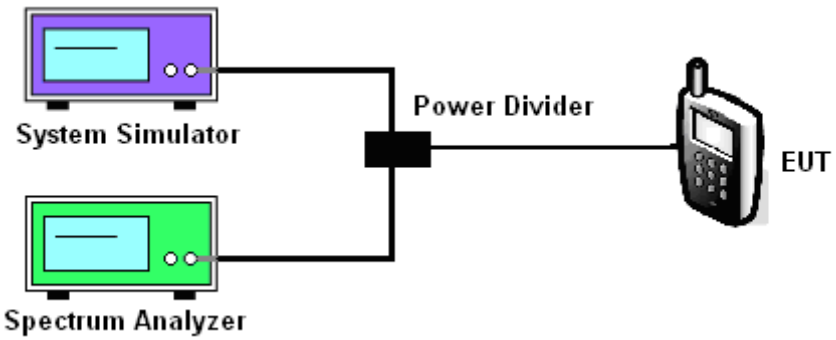
11.2 Measuring Instruments

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

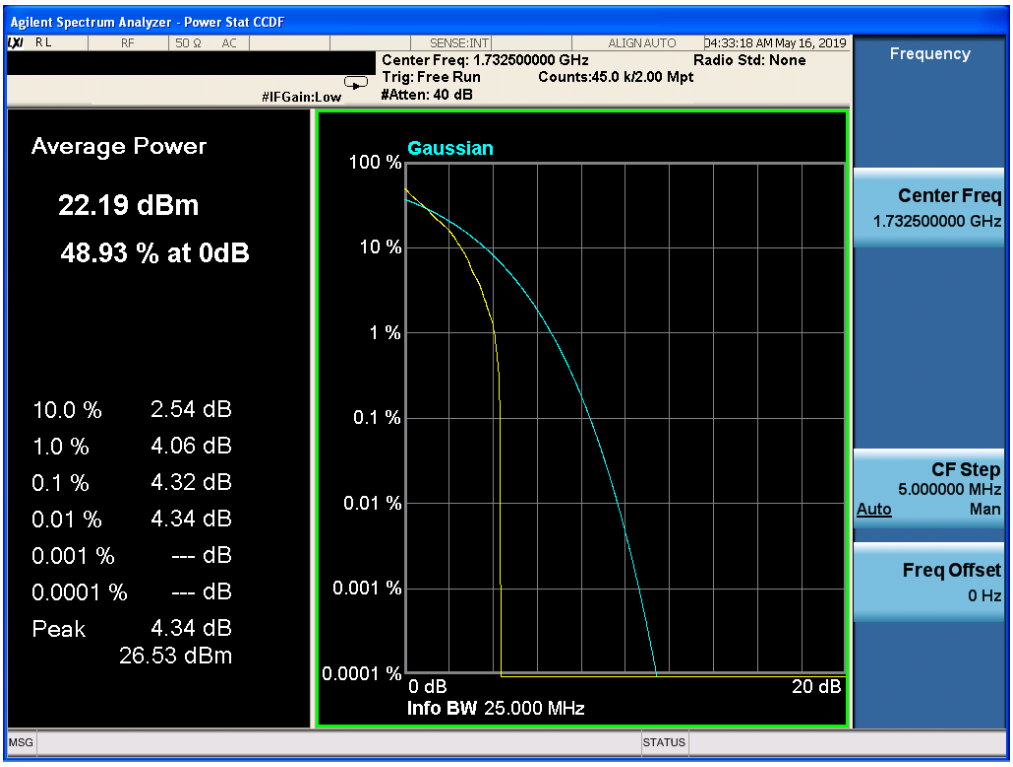
LTE Band 4
LTE Band 7
LTE Band 12
LTE Band 41

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
4	20175	1732.5	1.4	1	Low	QPSK	4.32
4	20175	1732.5	1.4	1	Low	16-QAM	4.84
4	20175	1732.5	3.0	1	Low	QPSK	4.18
4	20175	1732.5	3.0	1	Low	16-QAM	4.97
4	20175	1732.5	5.0	1	Low	QPSK	4.30
4	20175	1732.5	5.0	1	Low	16-QAM	5.08
4	20175	1732.5	10.0	1	Low	QPSK	4.05
4	20175	1732.5	10.0	1	Low	16-QAM	4.89
4	20175	1732.5	15.0	1	Low	QPSK	4.13
4	20175	1732.5	15.0	1	Low	16-QAM	4.93
4	20175	1732.5	20.0	1	Low	QPSK	4.23
4	20175	1732.5	20.0	1	Low	16-QAM	5.20
7	21100	2535.0	5.0	1	Low	QPSK	4.98
7	21100	2535.0	5.0	1	Low	16-QAM	5.78
7	21100	2535.0	10.0	1	Low	QPSK	5.01
7	21100	2535.0	10.0	1	Low	16-QAM	6.01
7	21100	2535.0	15.0	1	Low	QPSK	5.02
7	21100	2535.0	15.0	1	Low	16-QAM	5.70
7	21100	2535.0	20.0	1	Low	QPSK	4.91
7	21100	2535.0	20.0	1	Low	16-QAM	5.71
12	23095	707.5	1.4	1	Low	QPSK	4.45

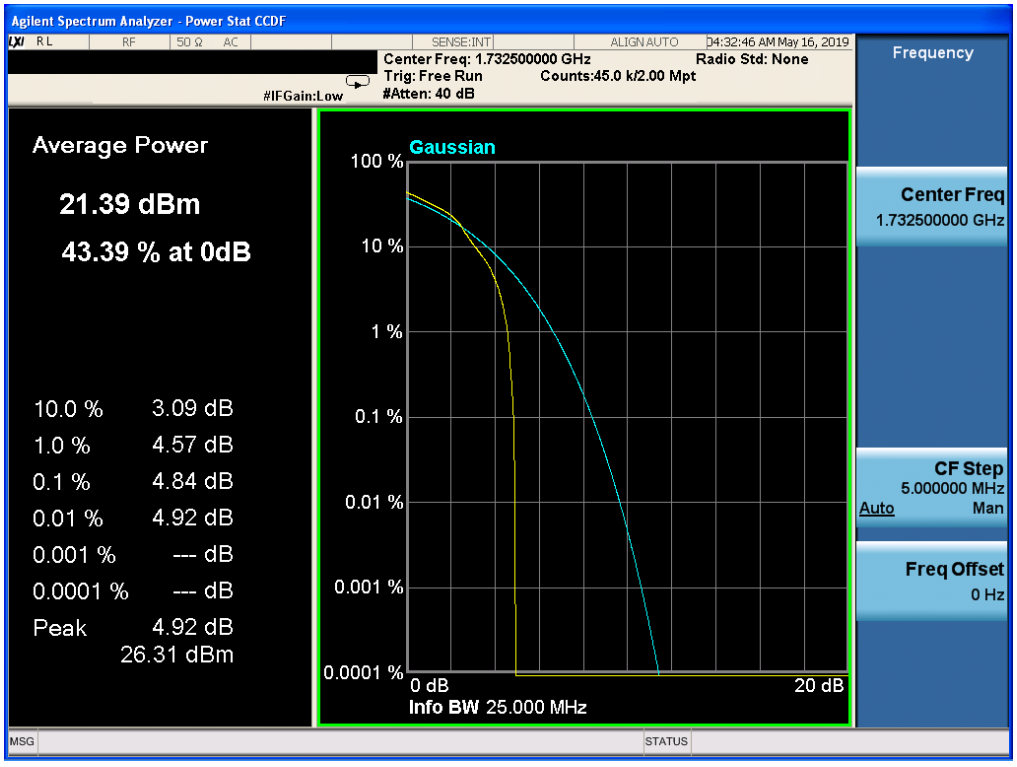
12	23095	707.5	1.4	1	Low	16-QAM	5.28
12	23095	707.5	3.0	1	Low	QPSK	4.74
12	23095	707.5	3.0	1	Low	16-QAM	5.28
12	23095	707.5	5.0	1	Low	QPSK	4.93
12	23095	707.5	5.0	1	Low	16-QAM	5.50
12	23095	707.5	10.0	1	Low	QPSK	4.79
12	23095	707.5	10.0	1	Low	16-QAM	5.73
41	40740	2605.0	5.0	1	Low	QPSK	3.30
41	40740	2605.0	5.0	1	Low	16-QAM	3.51
41	40740	2605.0	10.0	1	Low	QPSK	3.06
41	40740	2605.0	10.0	1	Low	16-QAM	3.97
41	40740	2605.0	15.0	1	Low	QPSK	4.32
41	40740	2605.0	15.0	1	Low	16-QAM	3.66
41	40740	2605.0	20.0	1	Low	QPSK	4.20
41	40740	2605.0	20.0	1	Low	16-QAM	4.00

11.5 LTE BAND 4

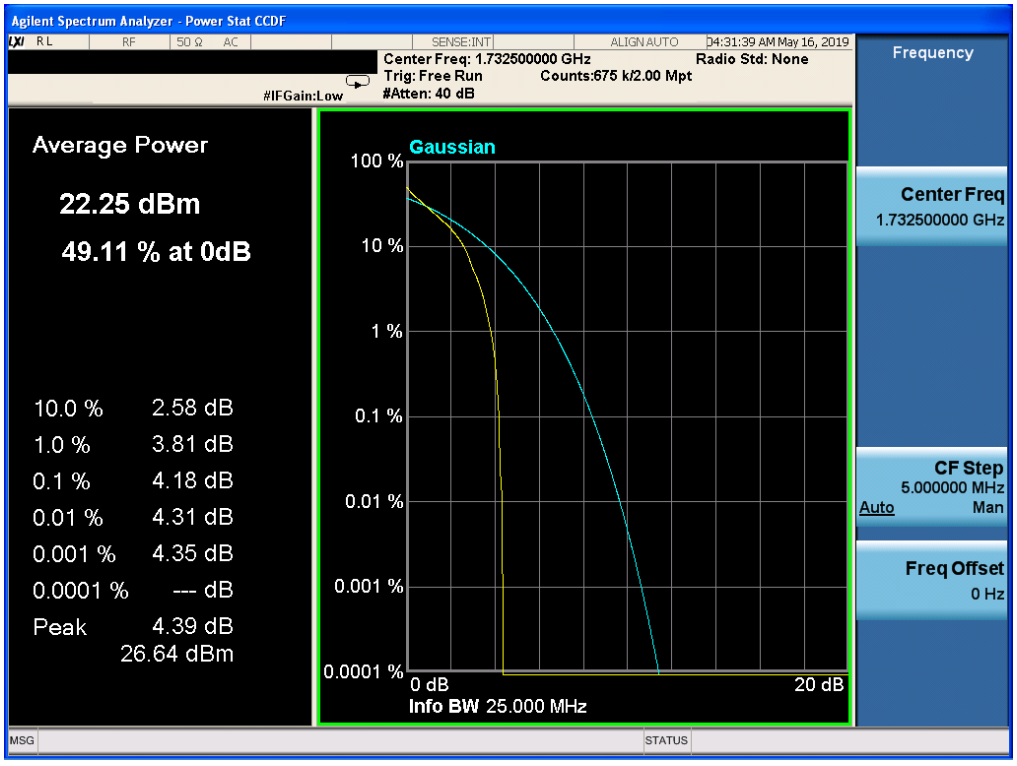
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



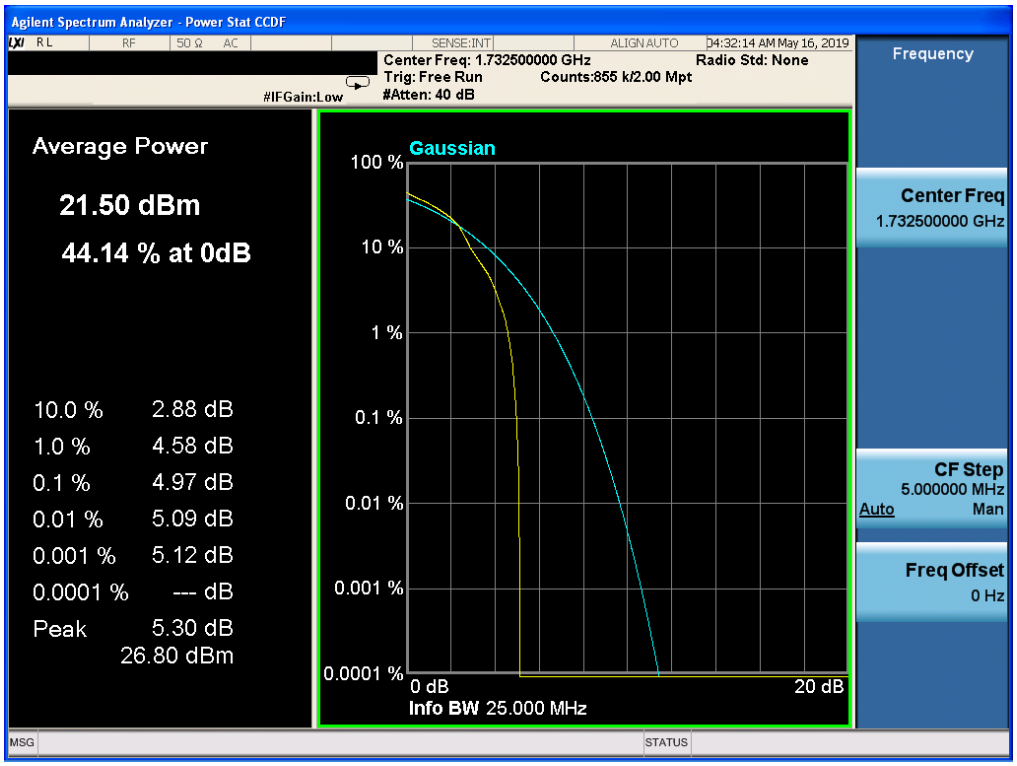
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



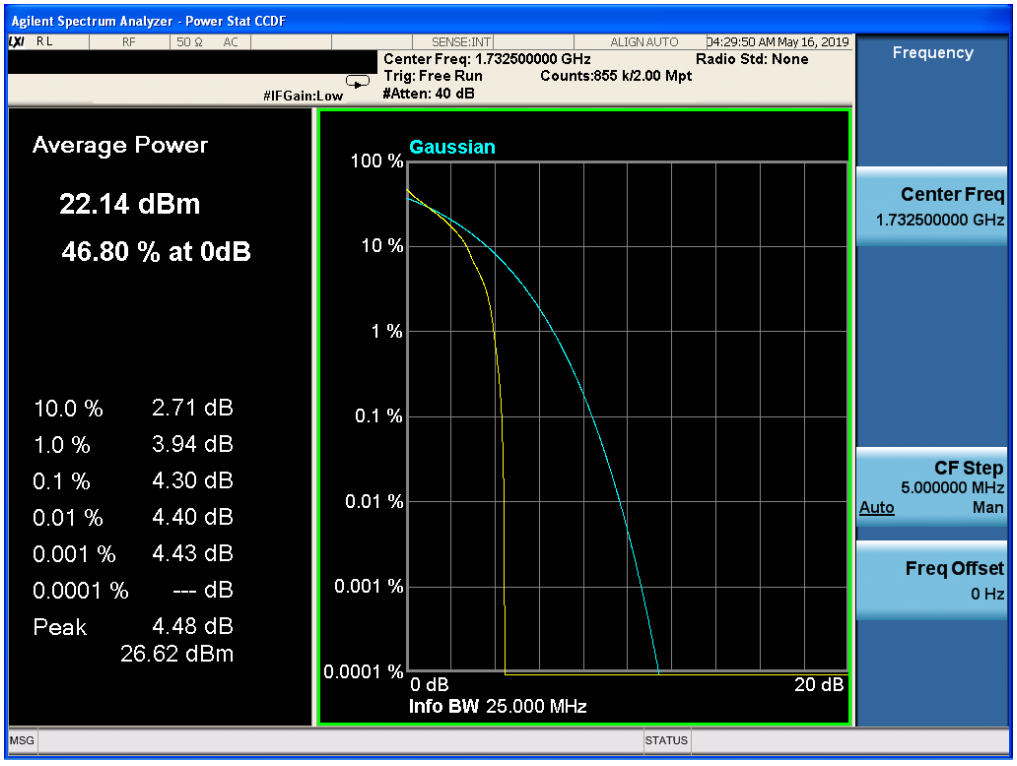
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



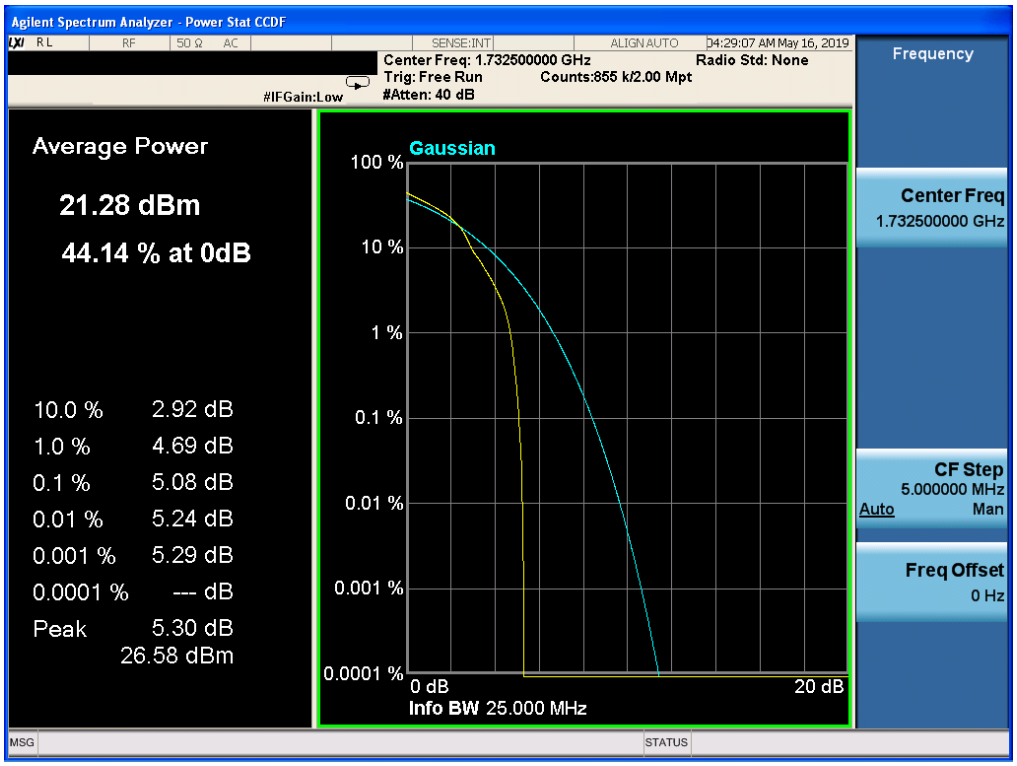
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



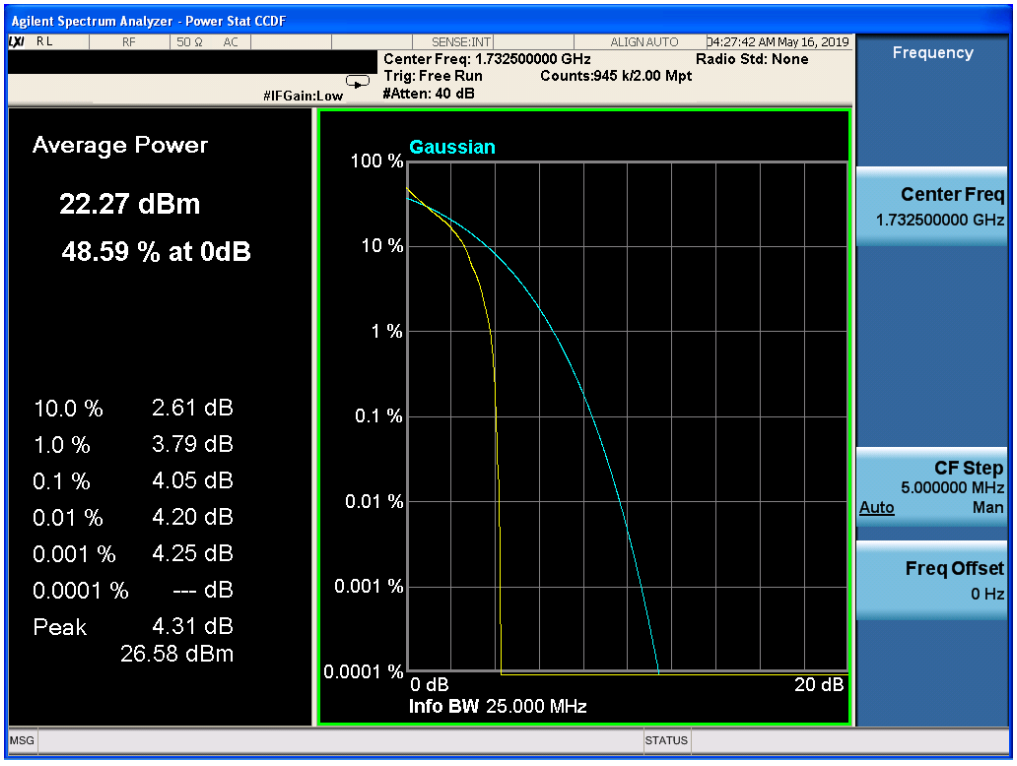
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



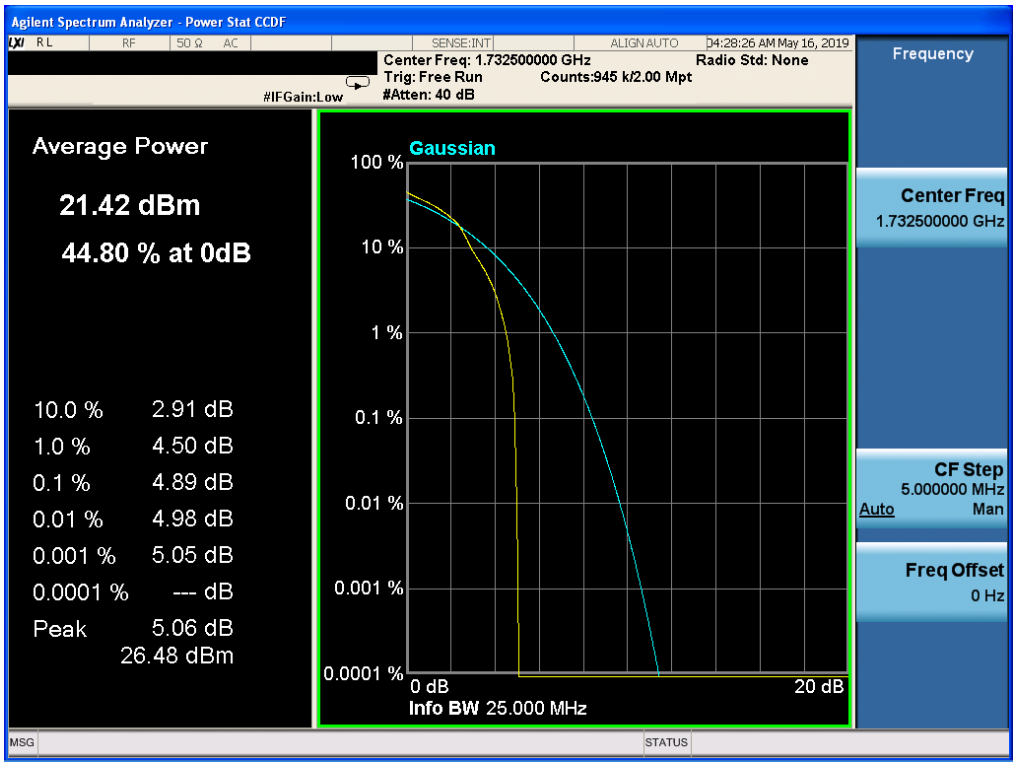
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



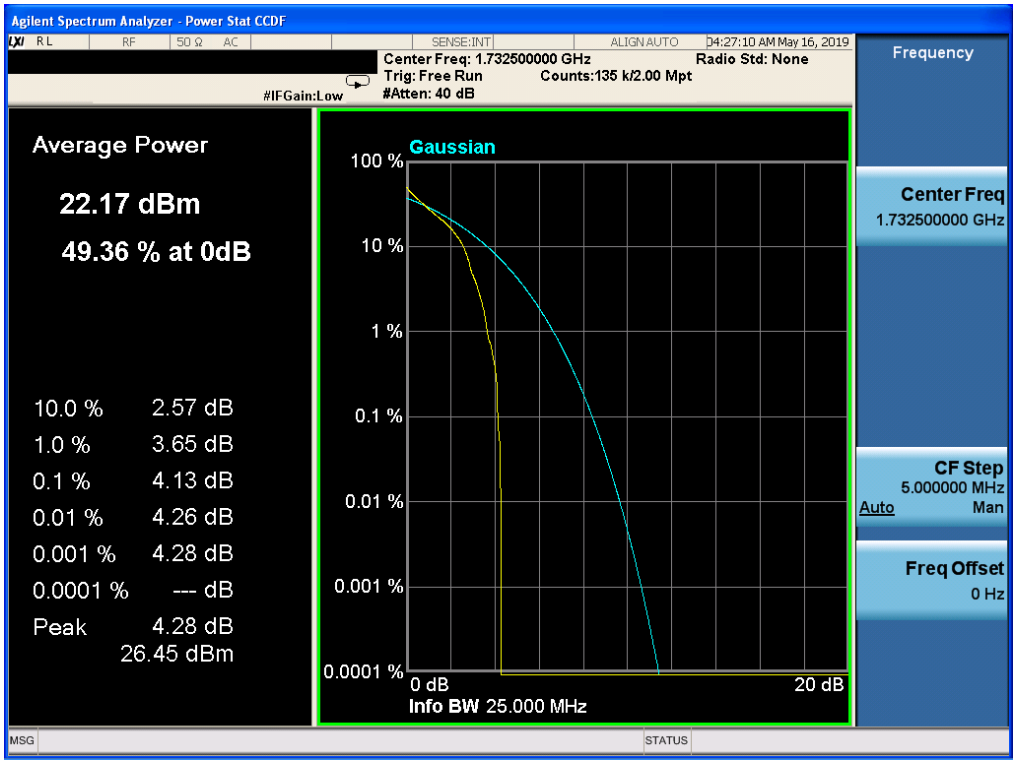
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



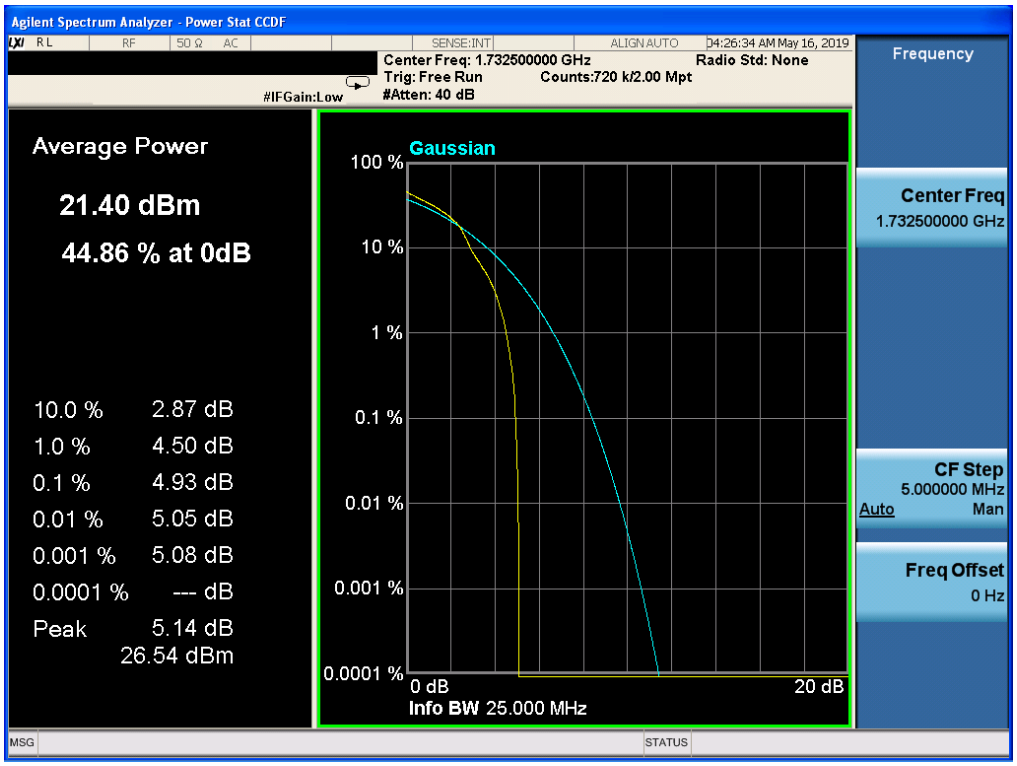
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



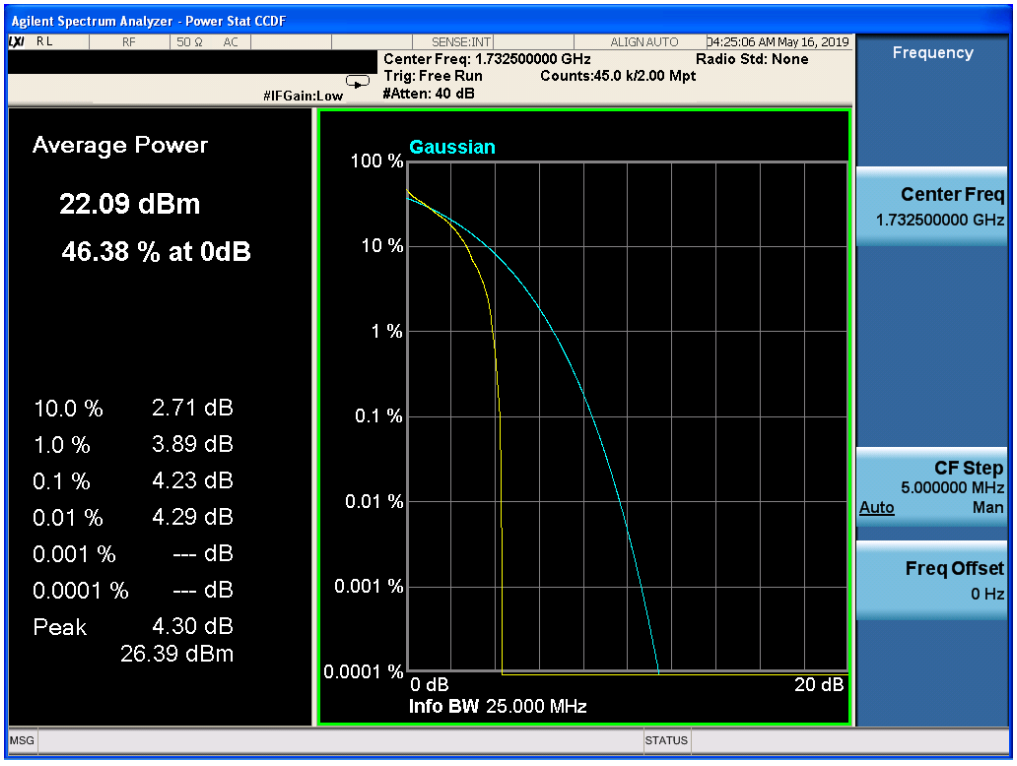
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



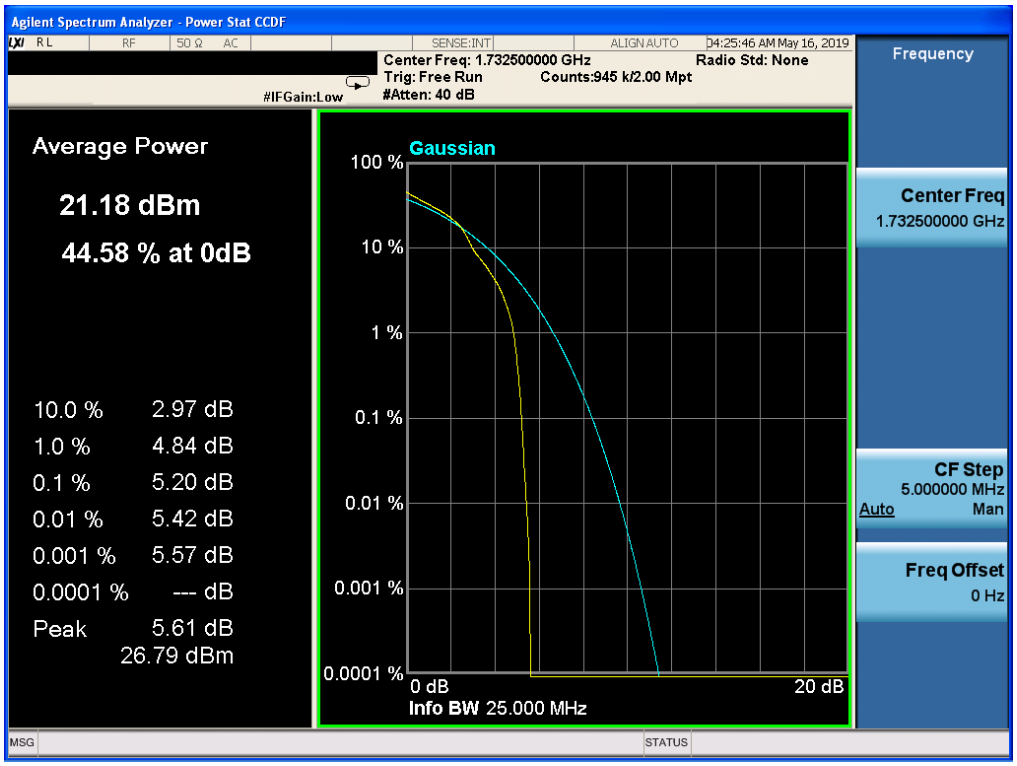
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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

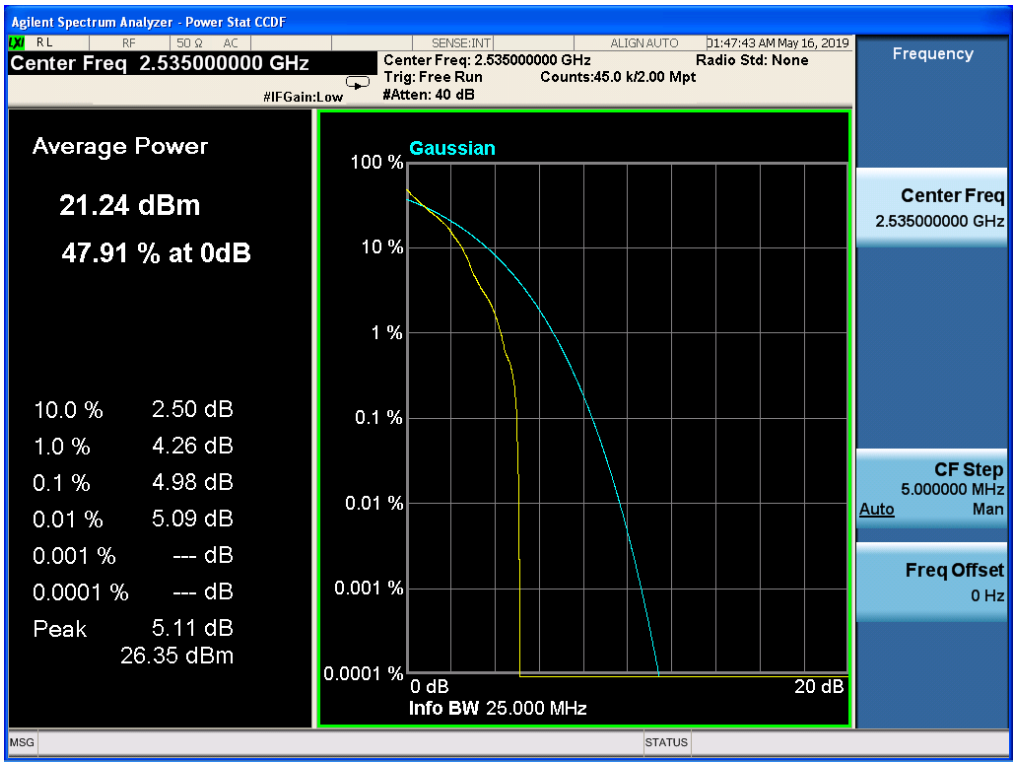


Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

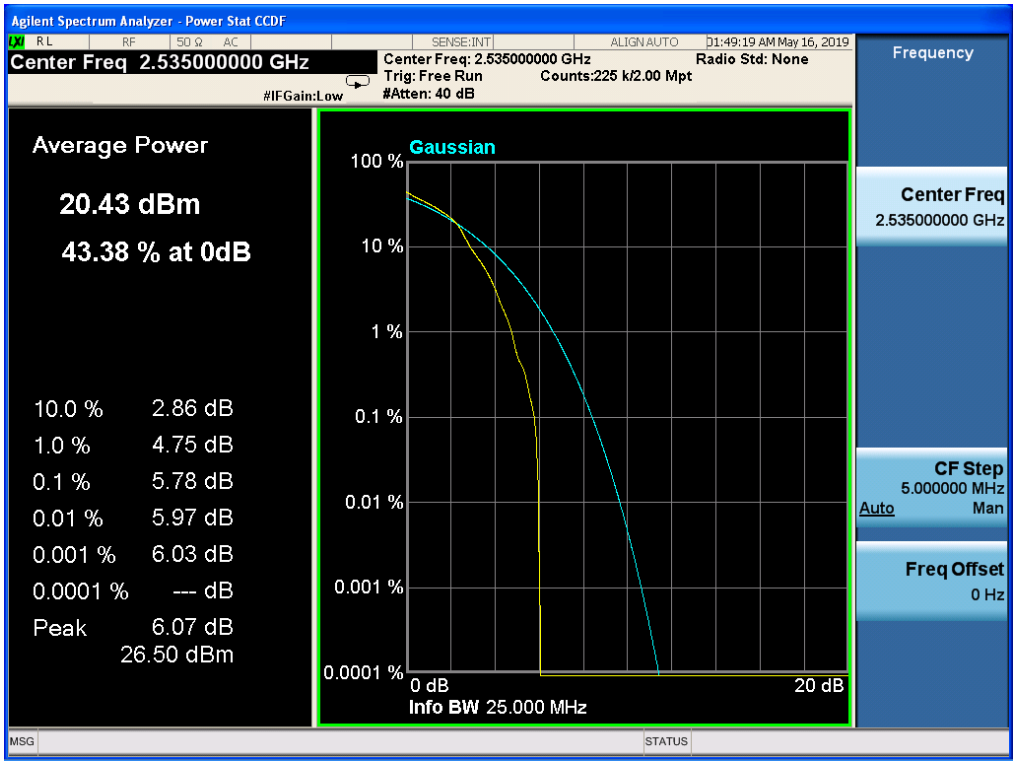


11.6 LTE BAND 7

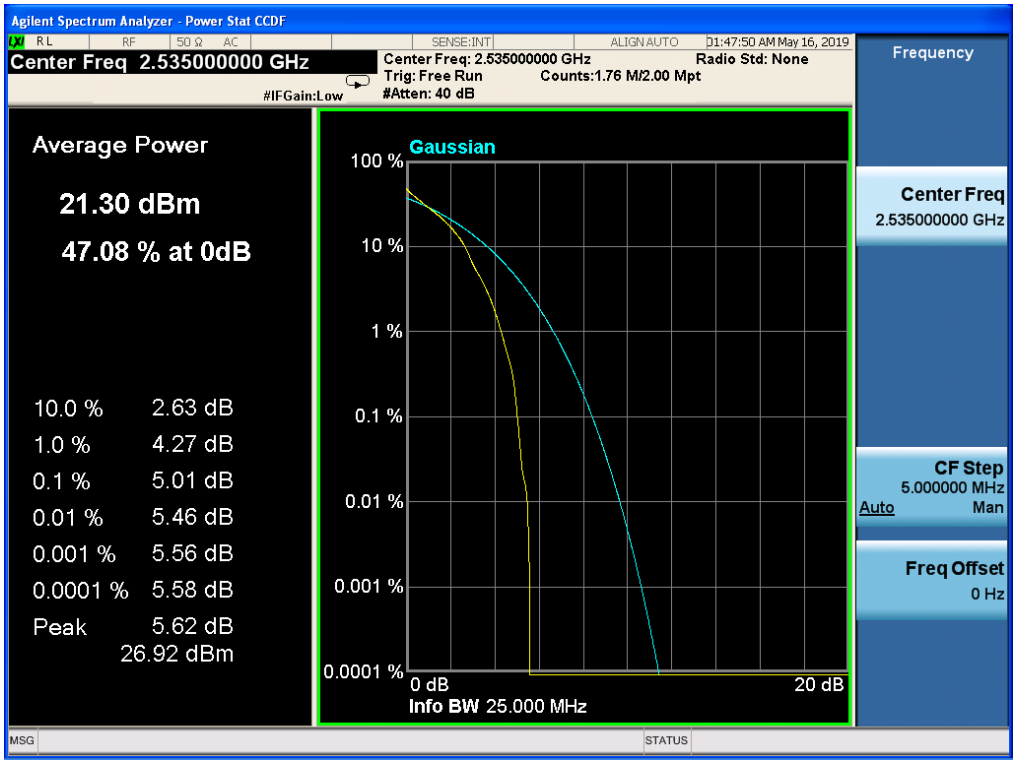
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 25,RB POS. Low,QPSK



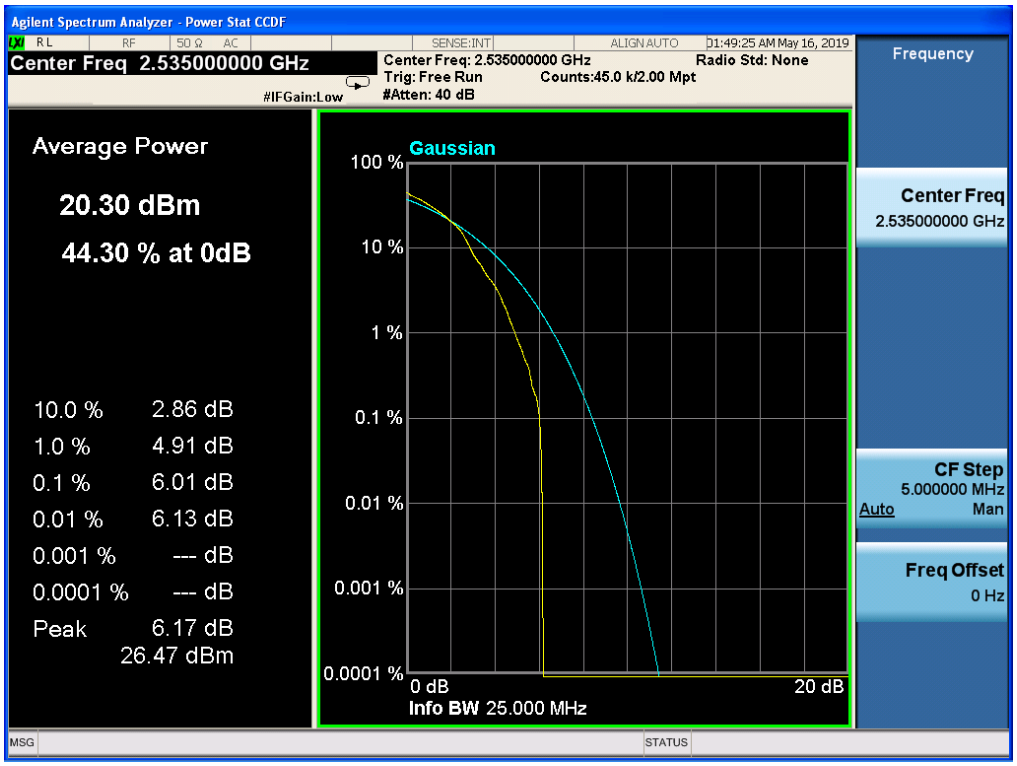
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



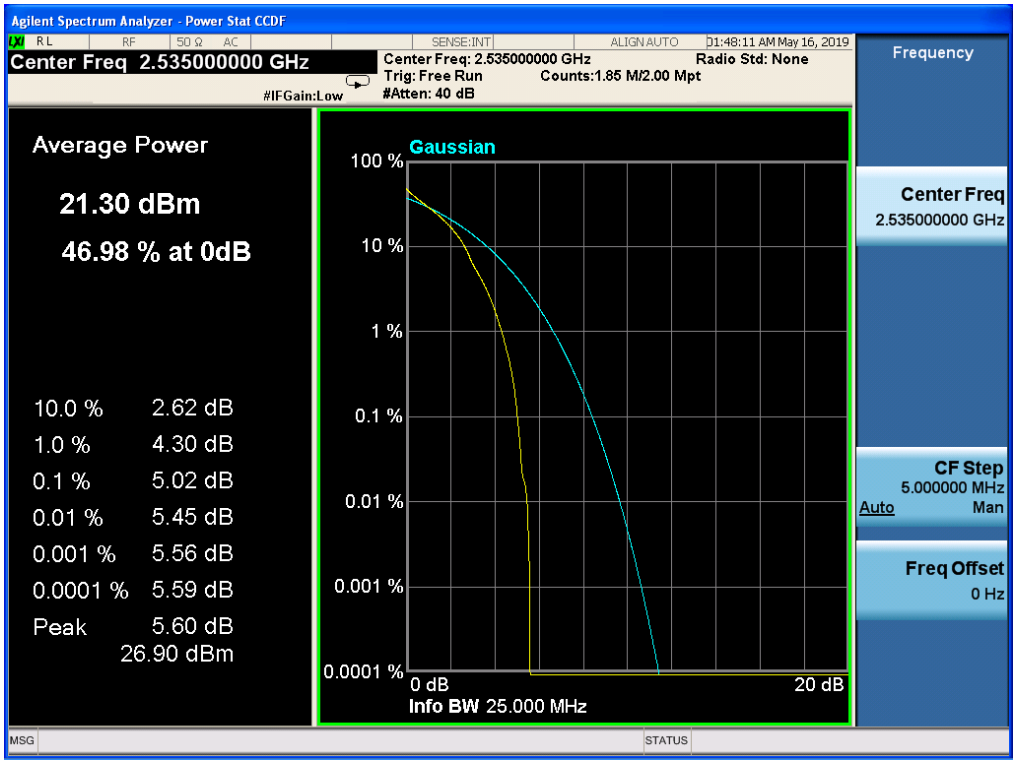
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



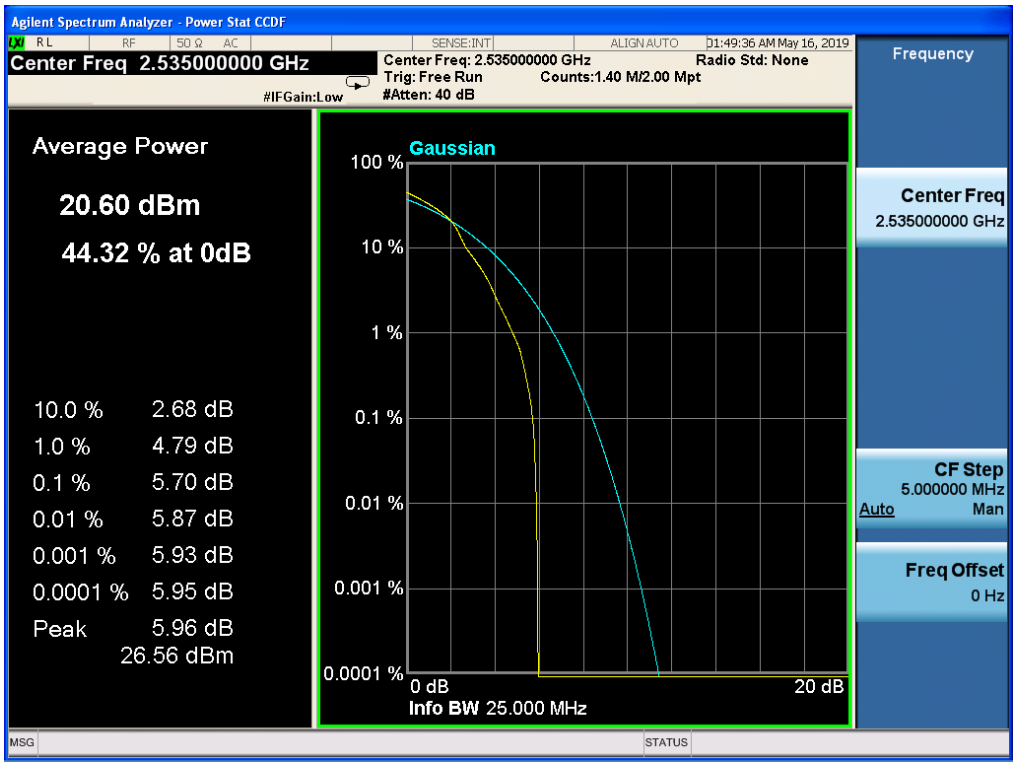
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



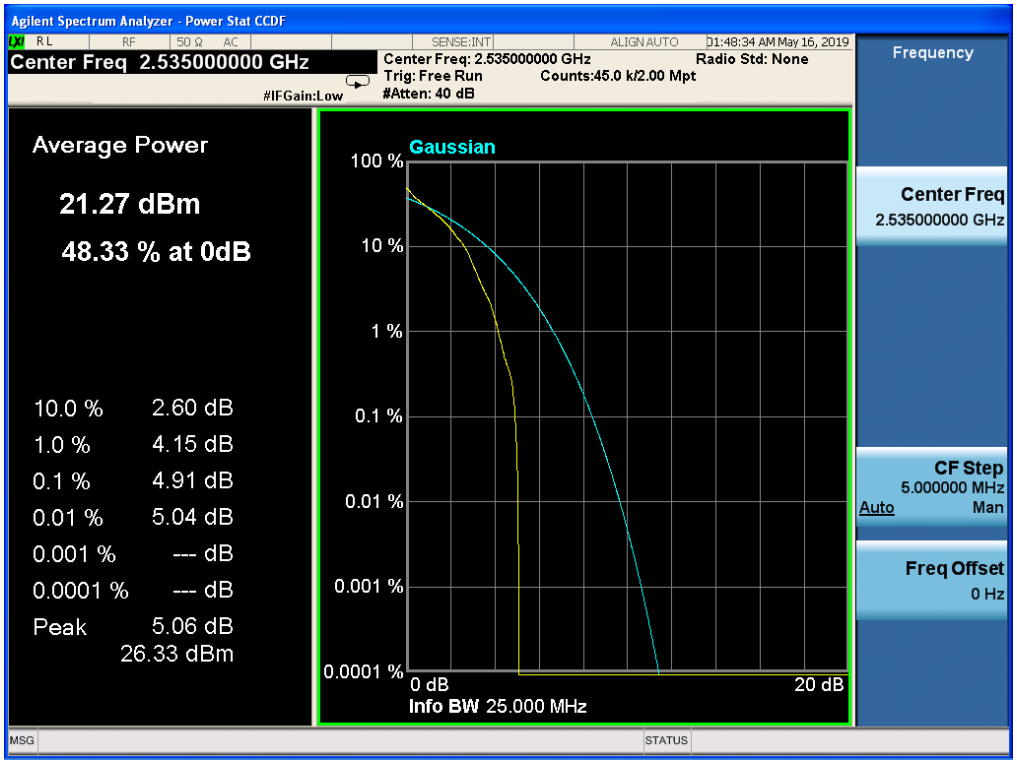
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



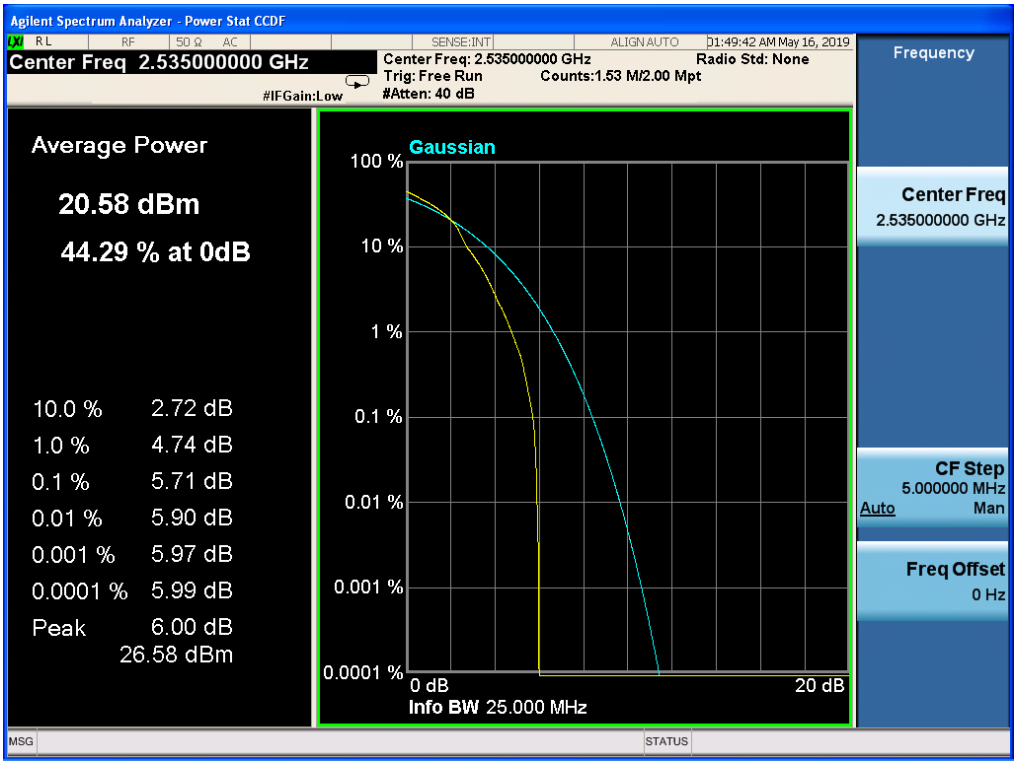
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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

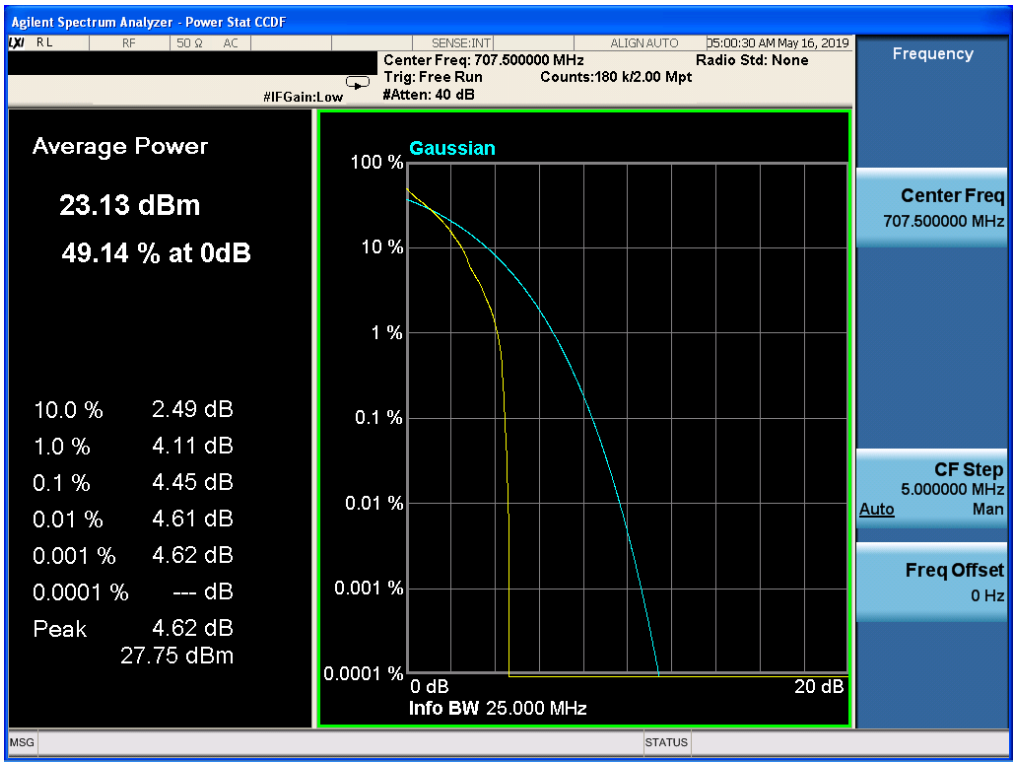


Band 7,UL Channel 21100,UL Frequency 2535.0,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

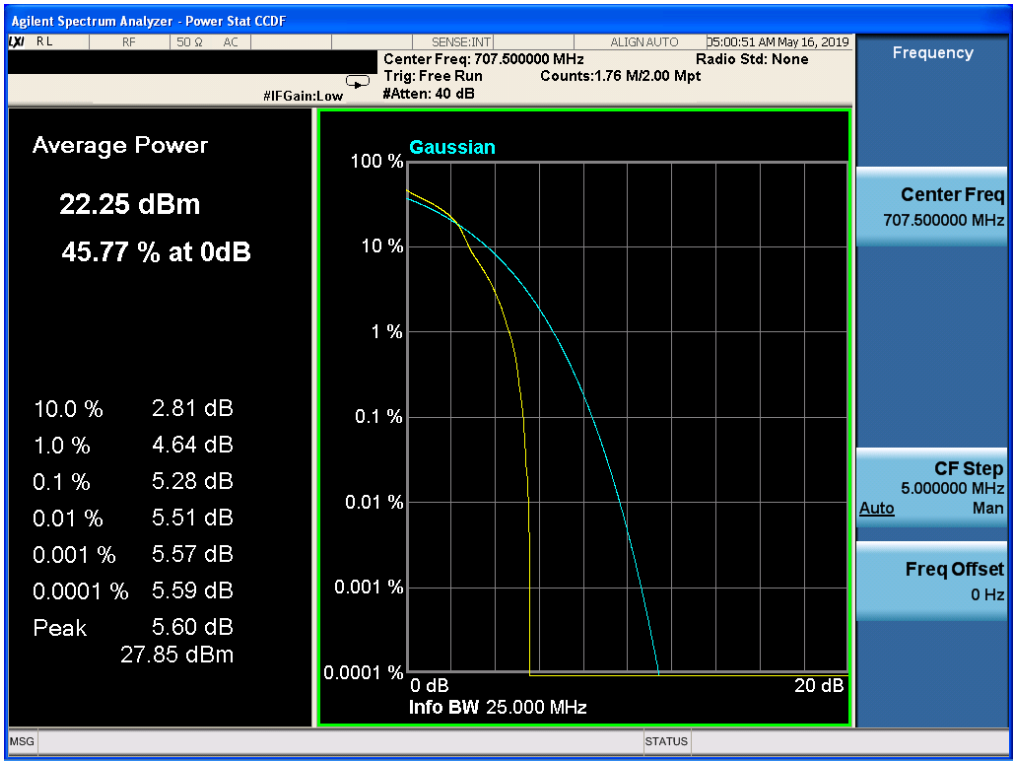


11.7 LTE BAND 12

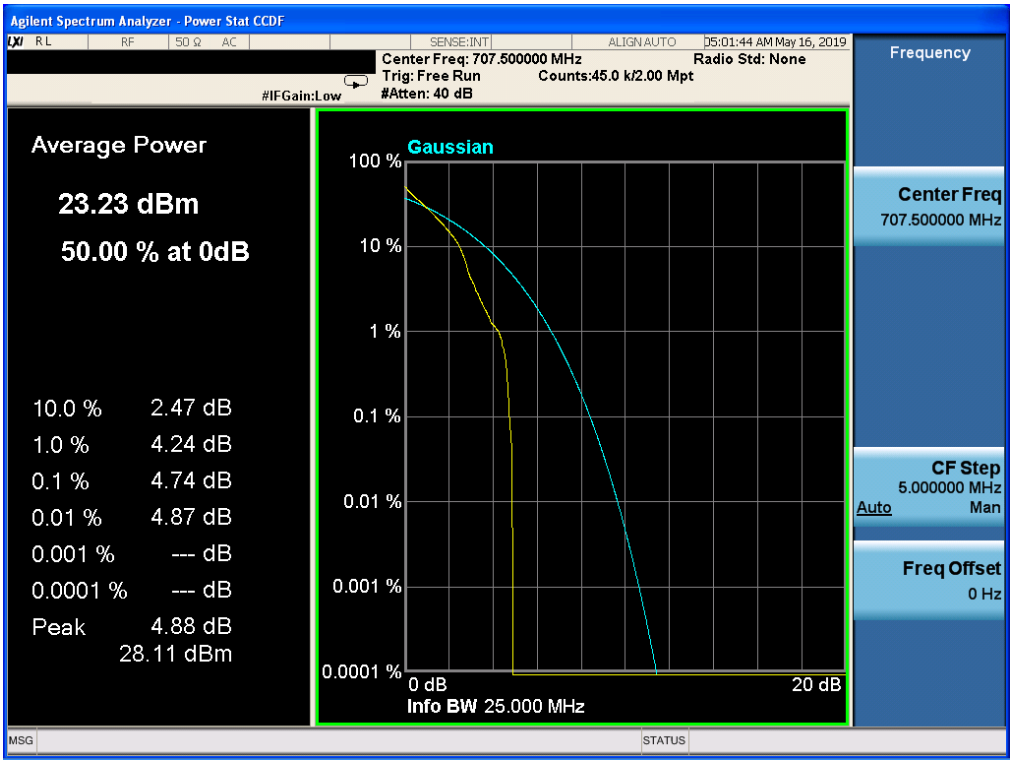
Band 12,UL Channel 23095,UL Frequency 707.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



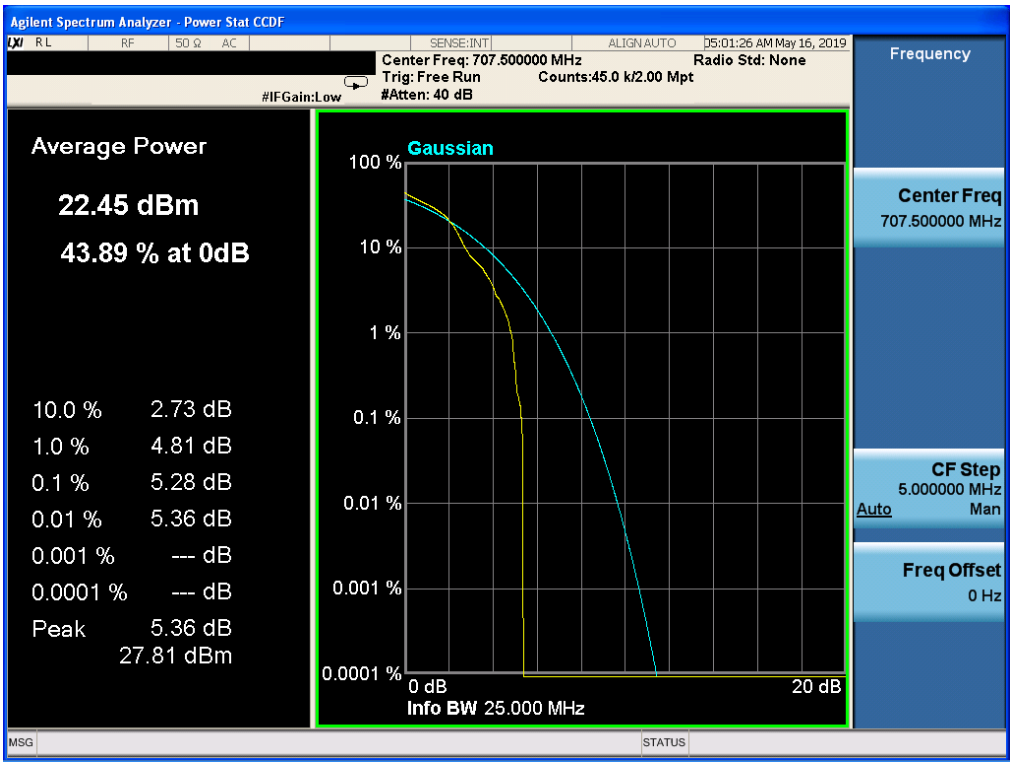
Band 12,UL Channel 23095,UL Frequency 707.5,BW 1.4,NO. RB 1,RB POS. Low,16-QAM



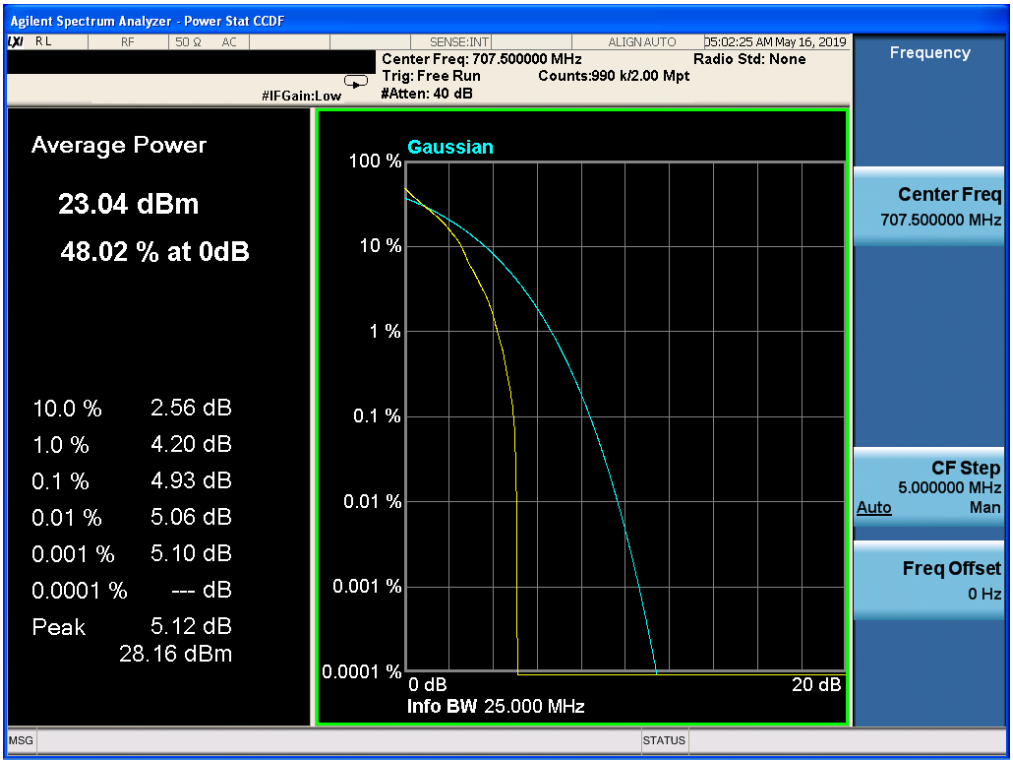
Band 12,UL Channel 23095,UL Frequency 707.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



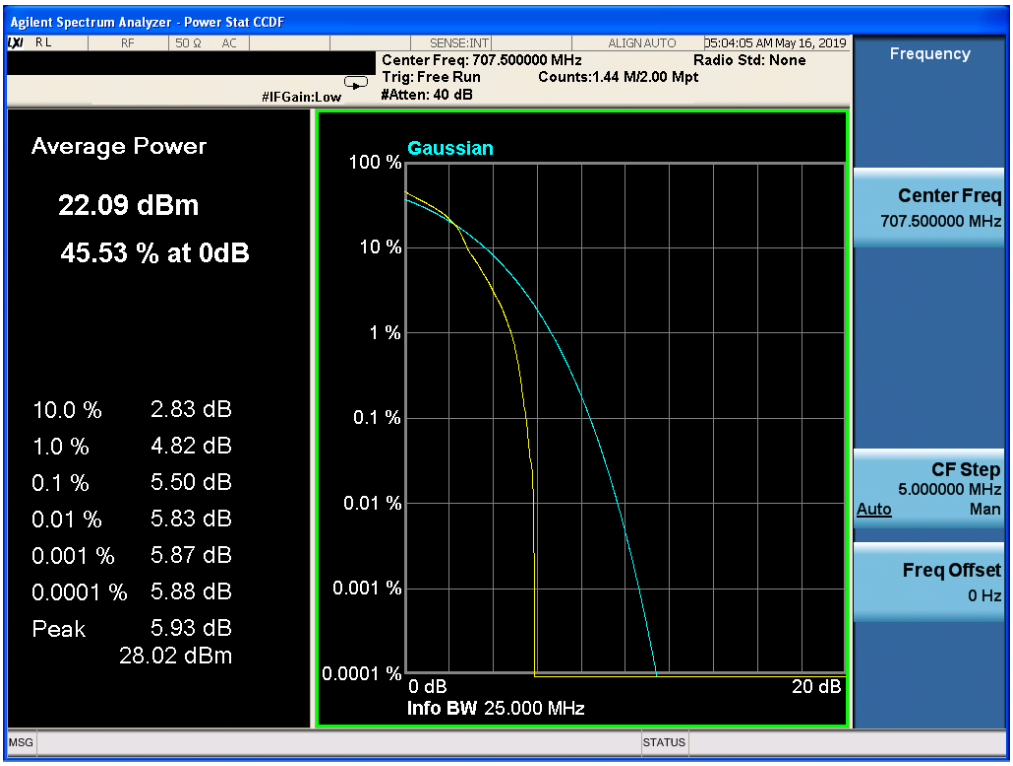
Band 12,UL Channel 23095,UL Frequency 707.5,BW 3.0,NO. RB 1,RB POS. Low,16-QAM



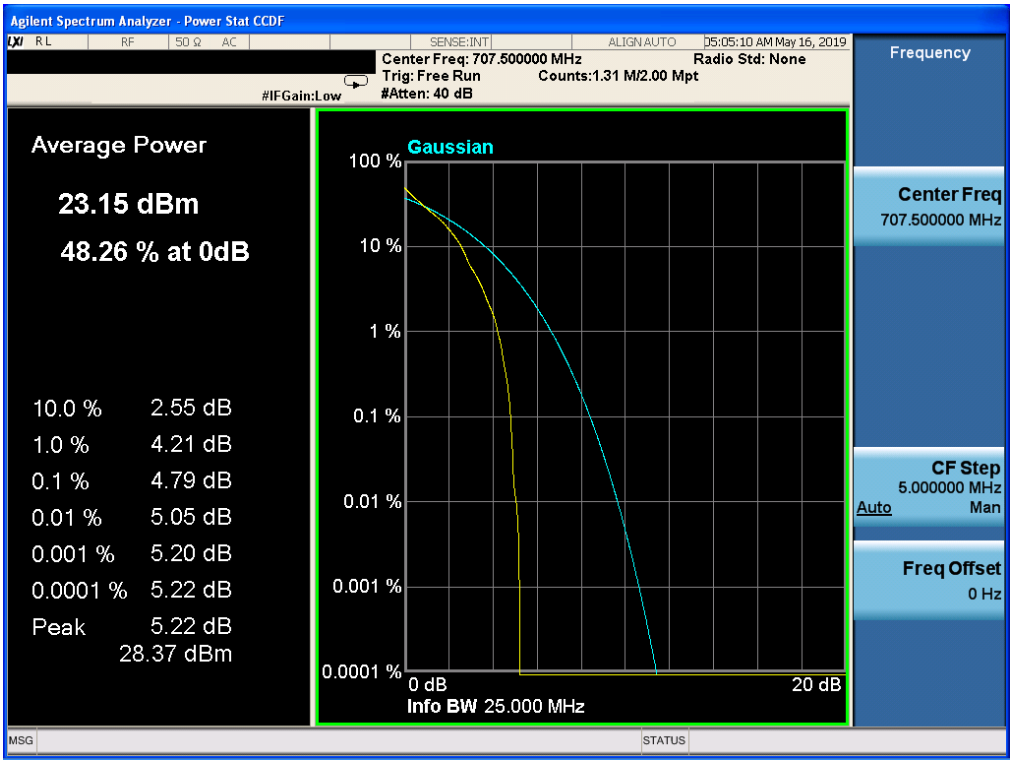
Band 12,UL Channel 23095,UL Frequency 707.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



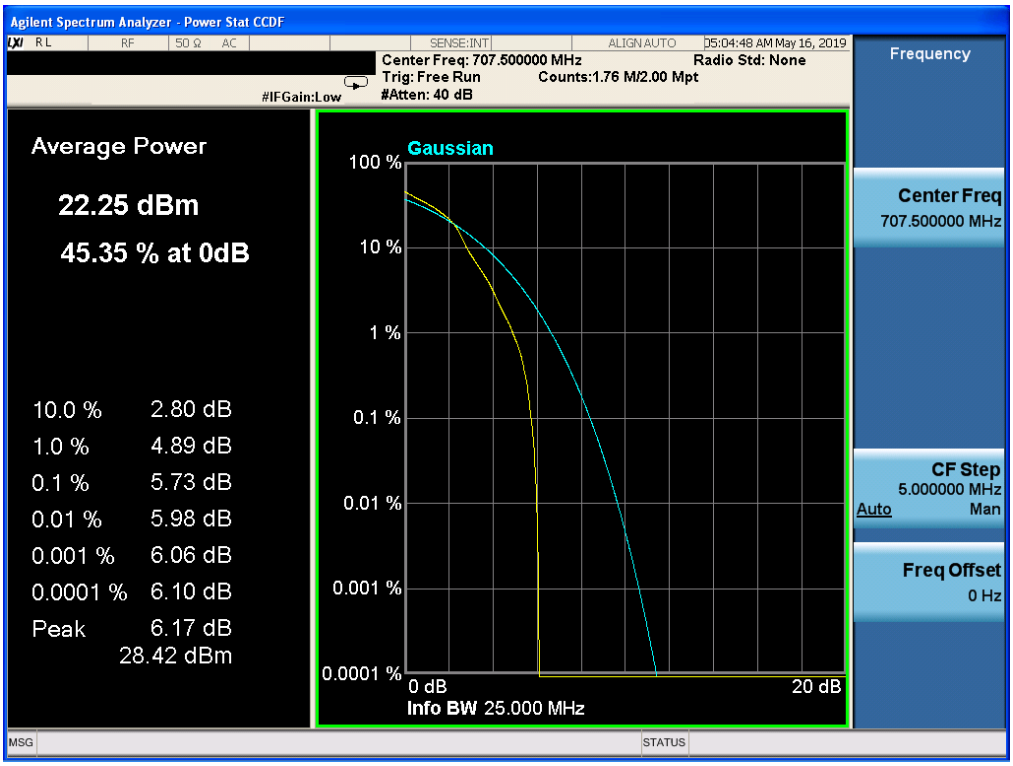
Band 12,UL Channel 23095,UL Frequency 707.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



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

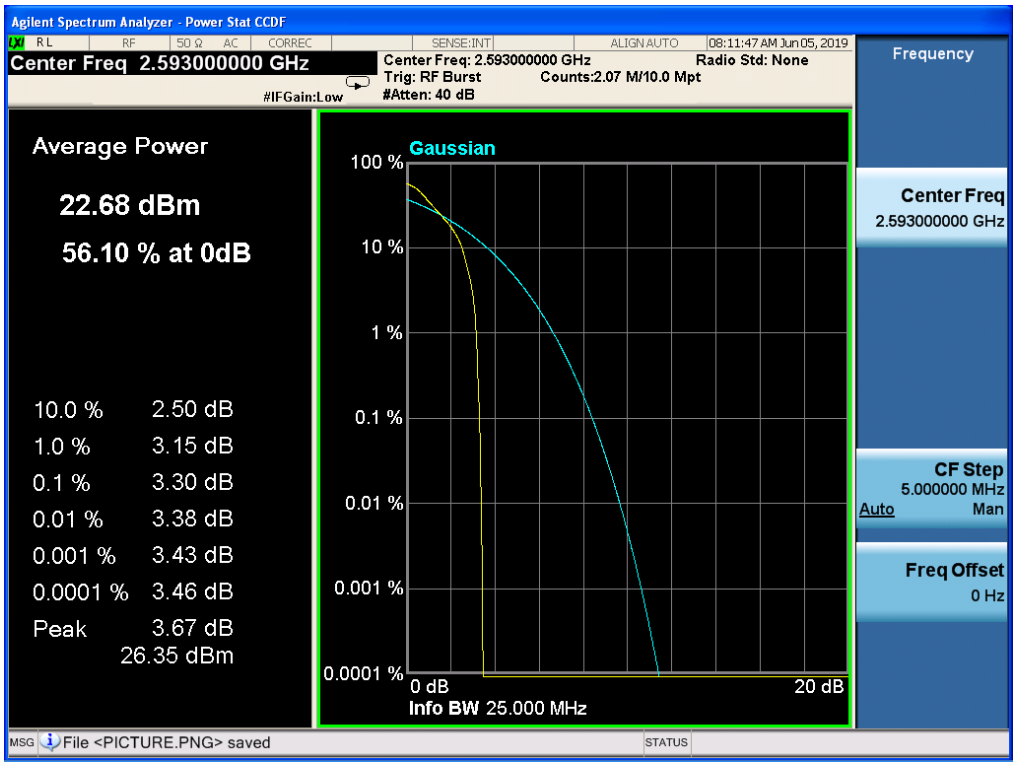


Band 12,UL Channel 23095,UL Frequency 707.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

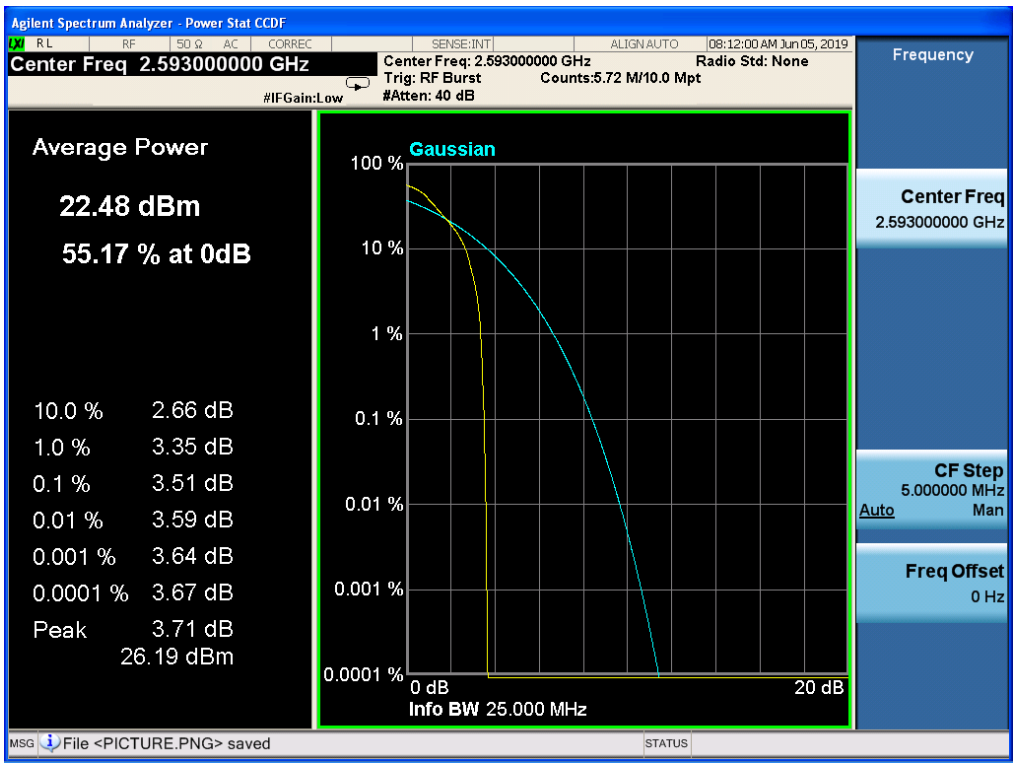


11.8 LTE BAND 41

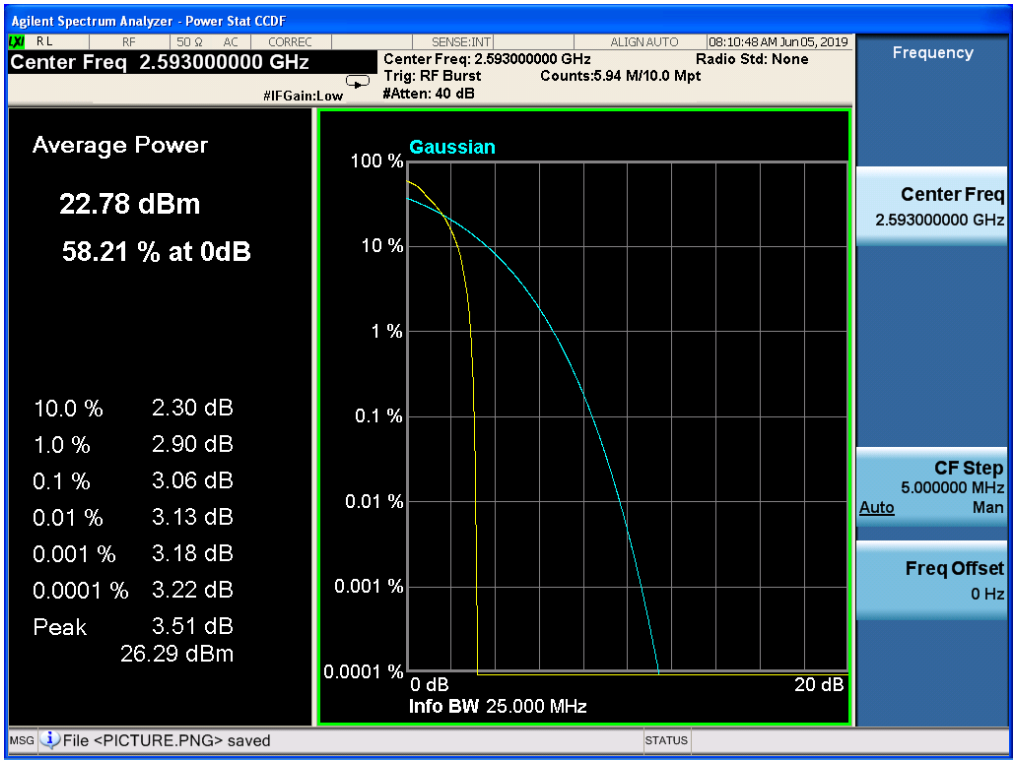
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



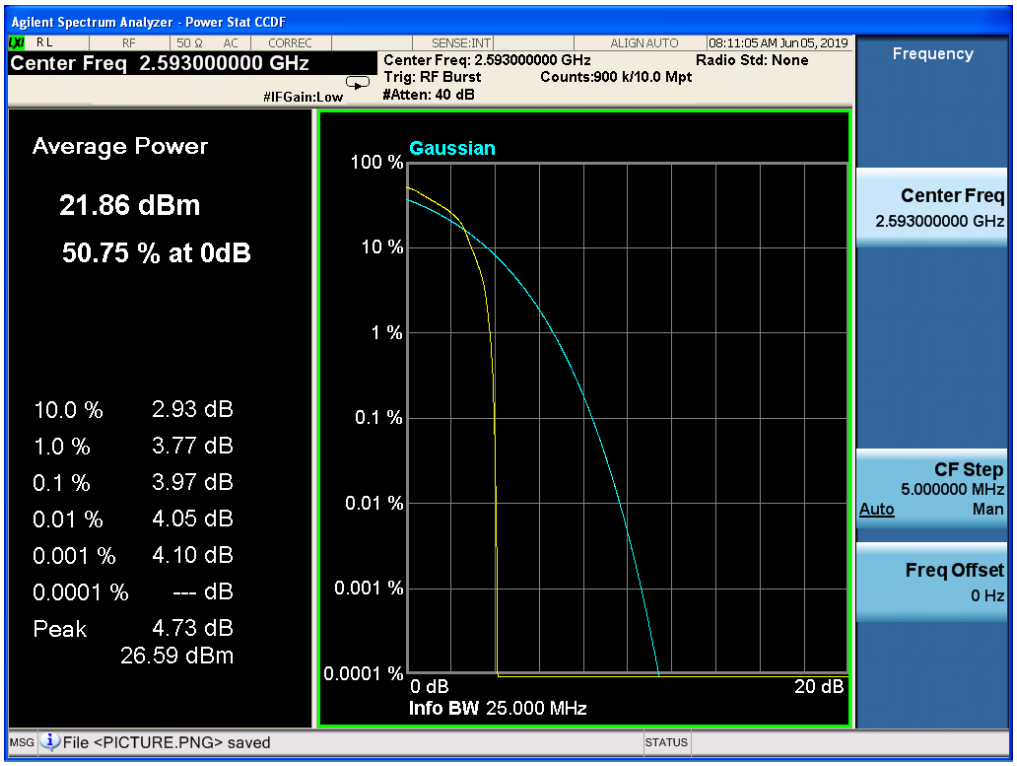
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



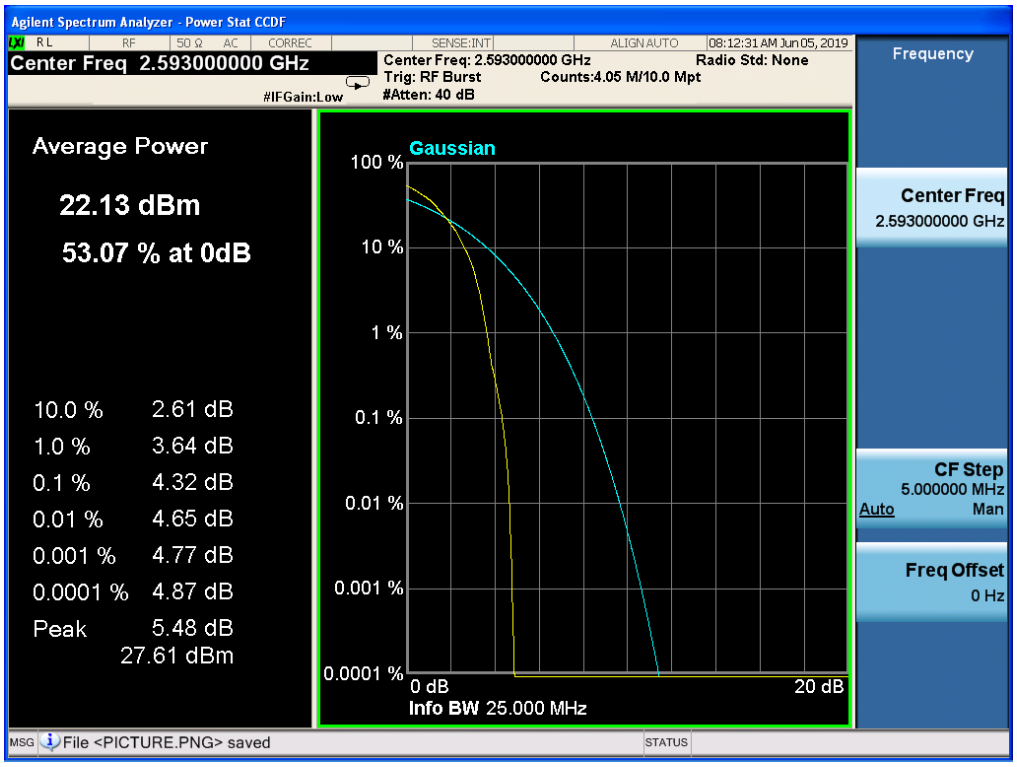
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



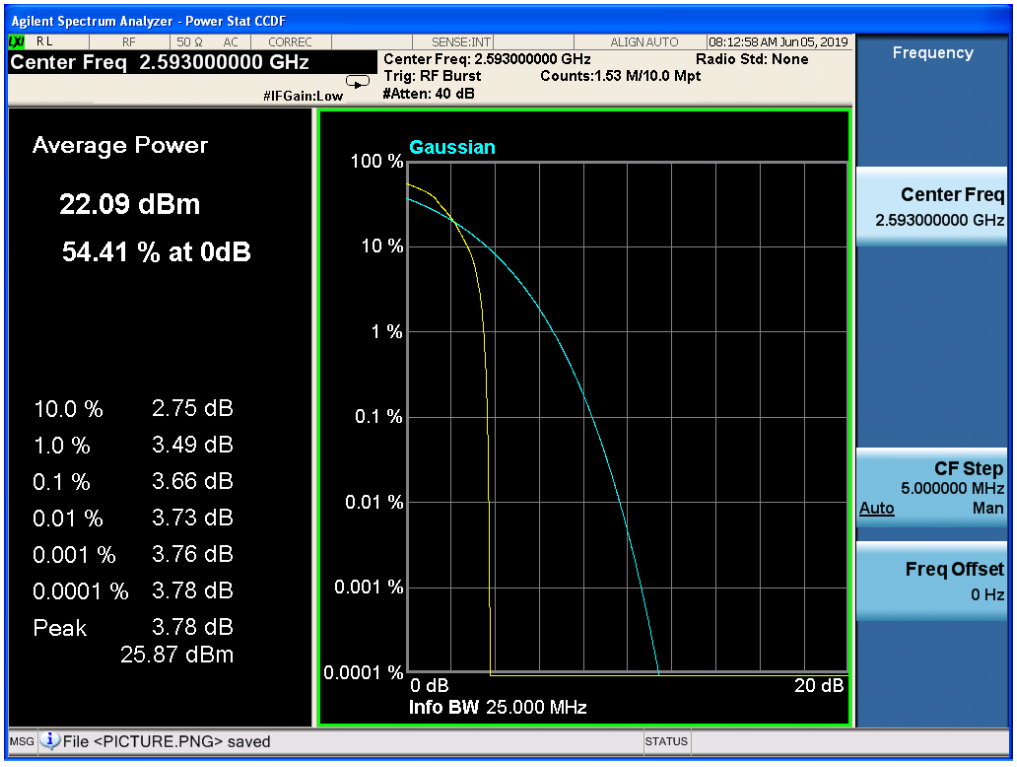
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



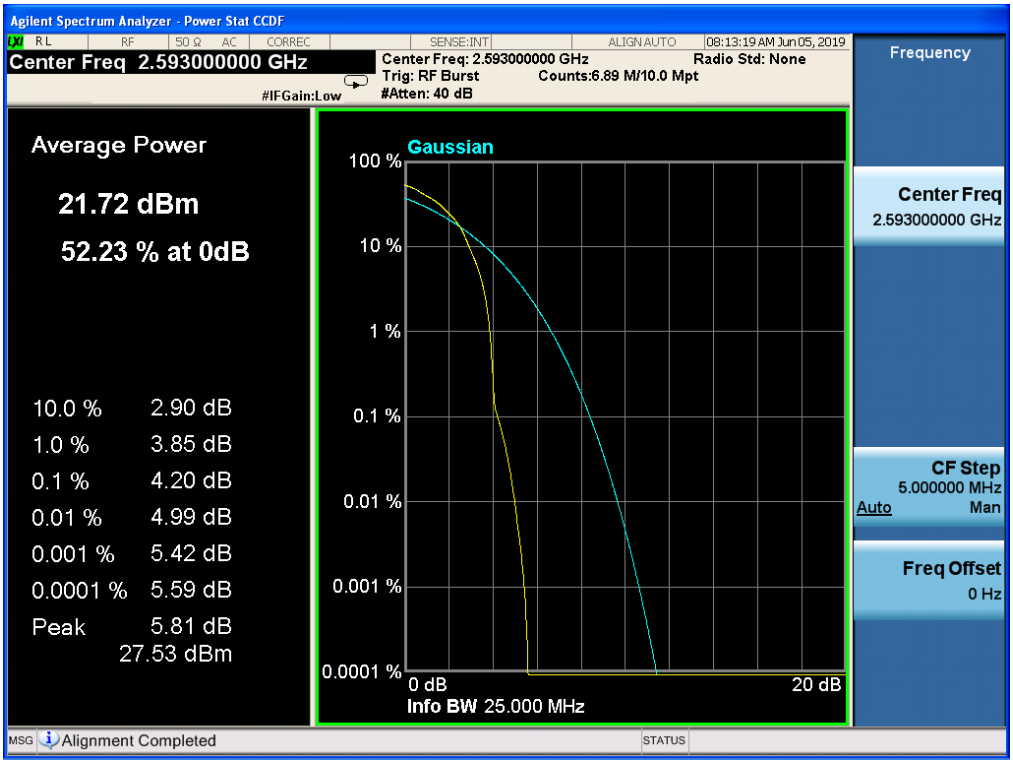
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



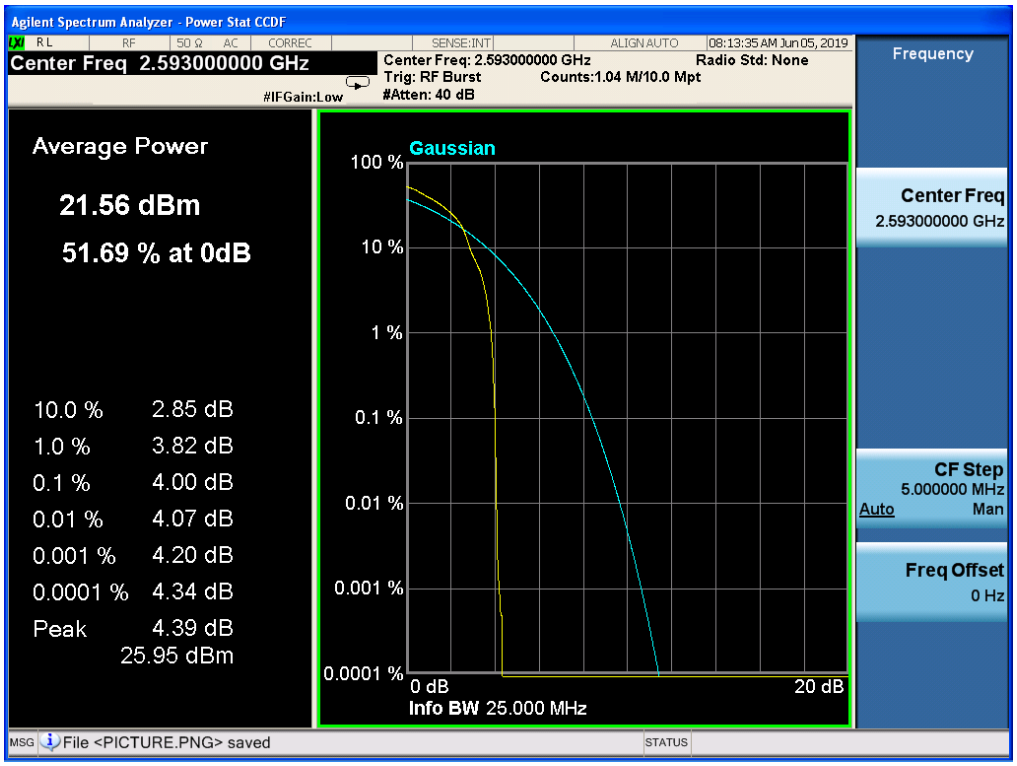
Band 41,UL Channel 40740,UL Frequency 2605.0,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



Band 41,UL Channel 40740,UL Frequency 2605.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



Band 41,UL Channel 40740,UL Frequency 2605.0,BW 20.0,NO. RB 1,RB POS. Low,16-QAM



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