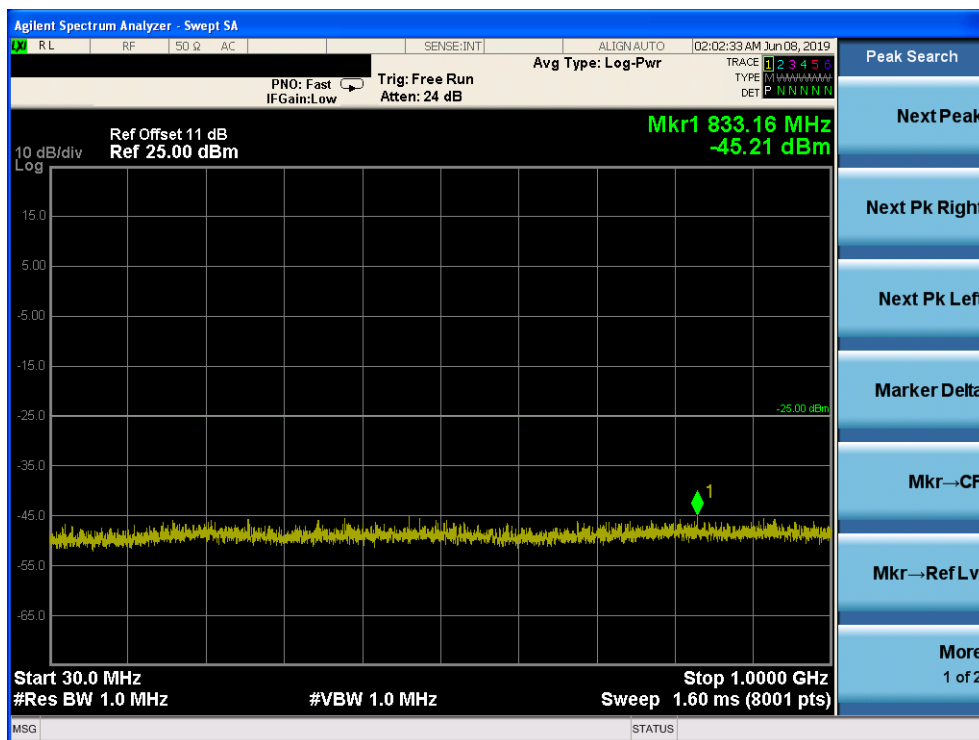
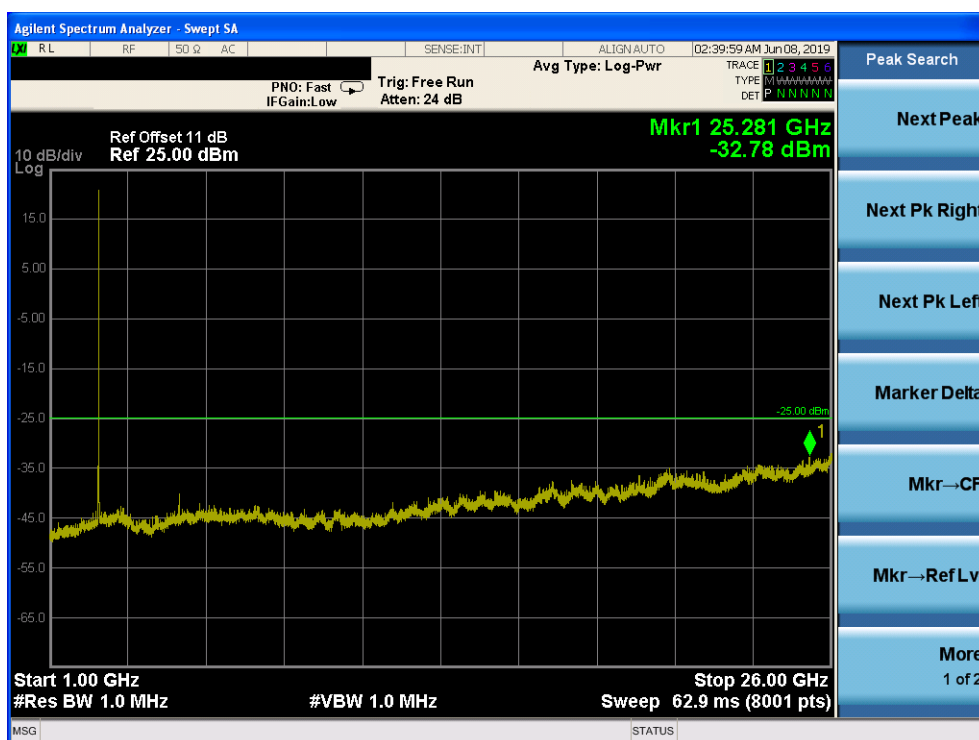


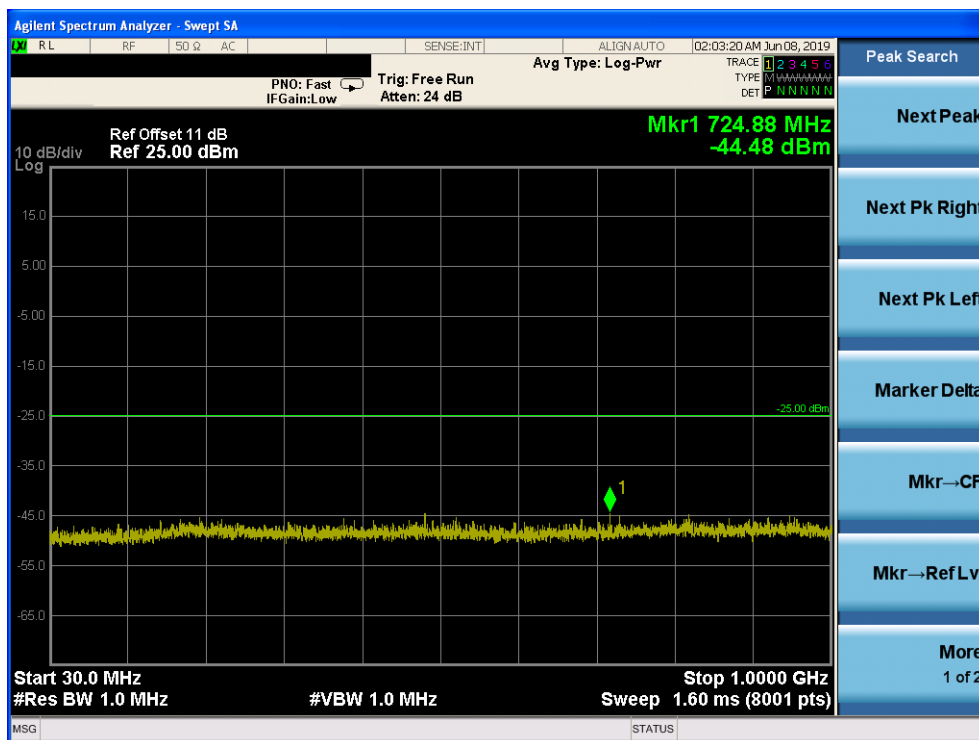
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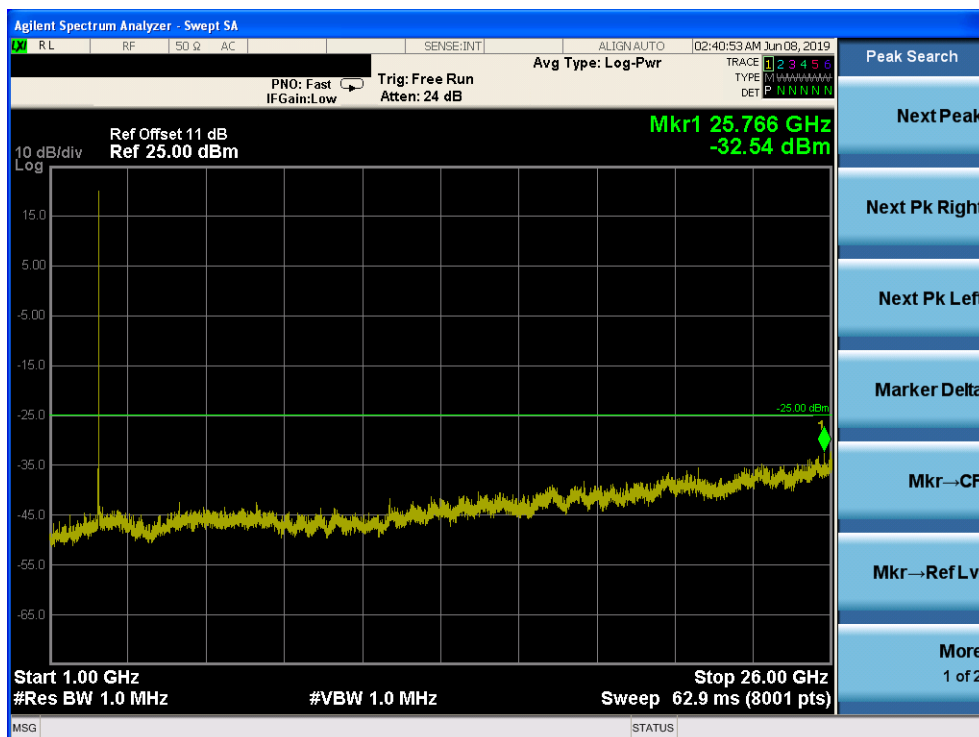
Band 7, UL Channel 21425, UL Frequency 2567.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



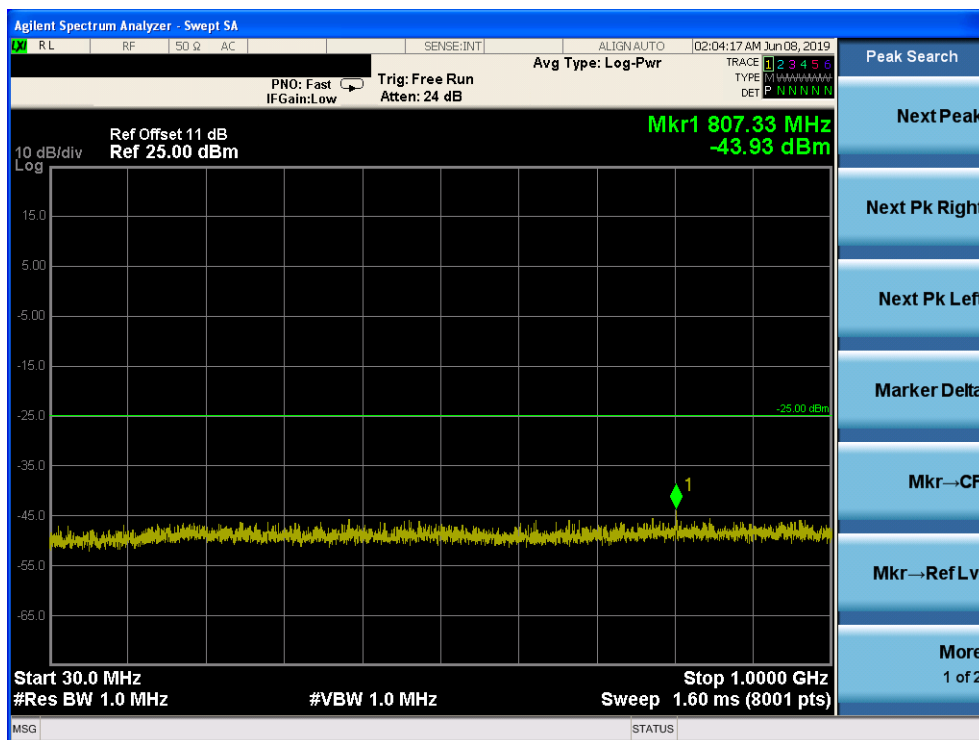
Band 7, UL Channel 21425, UL Frequency 2567.5, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



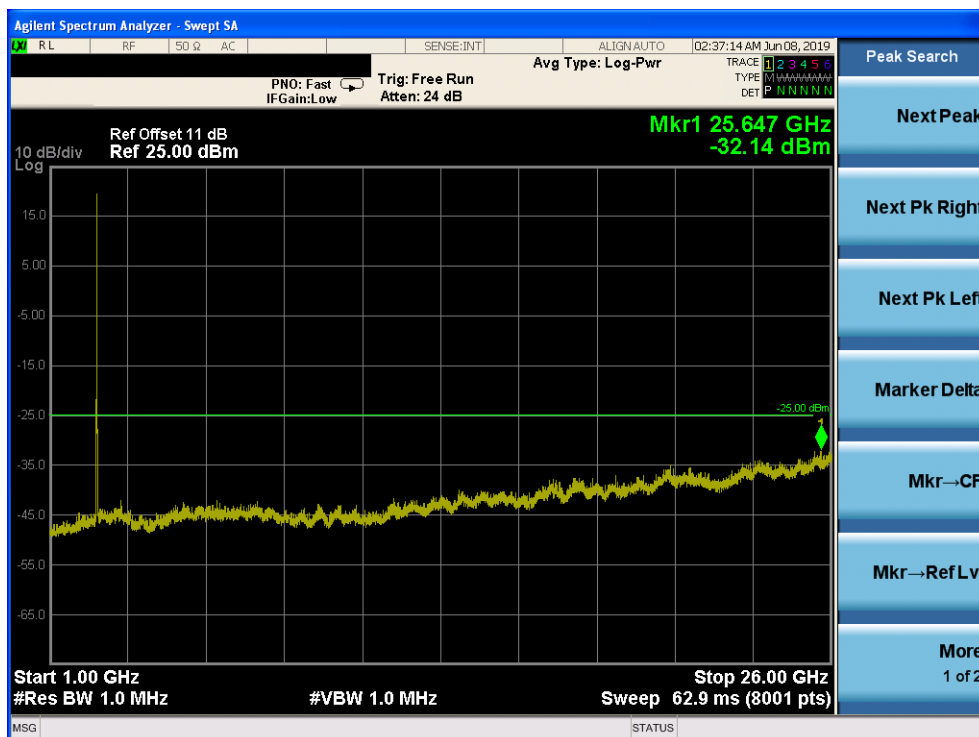
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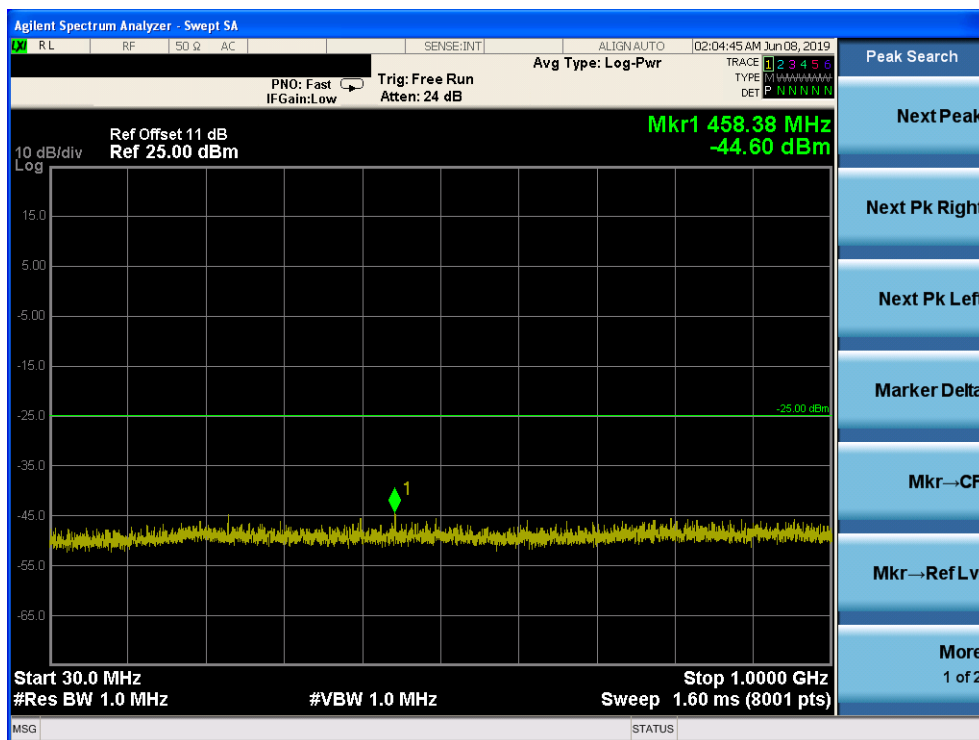
Band 7, UL Channel 20800, UL Frequency 2505.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



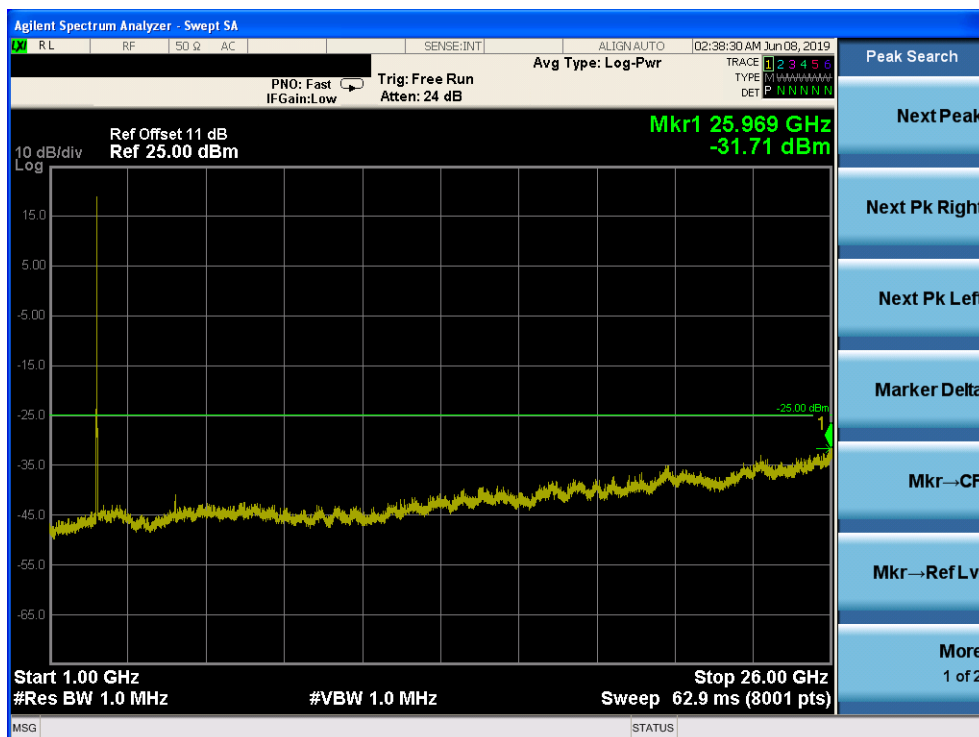
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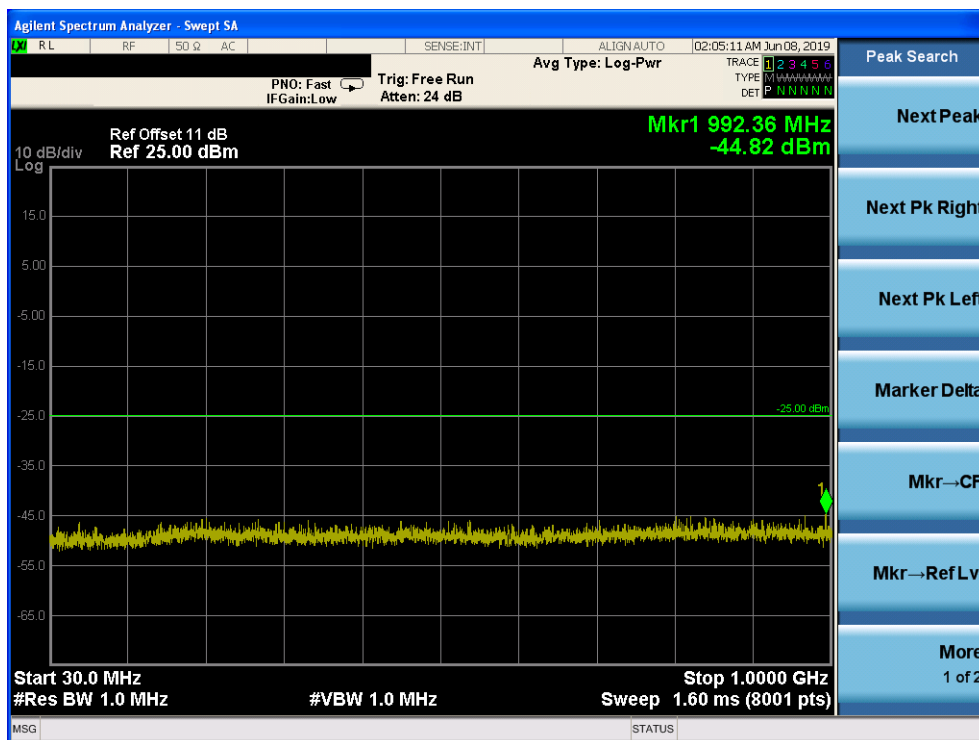
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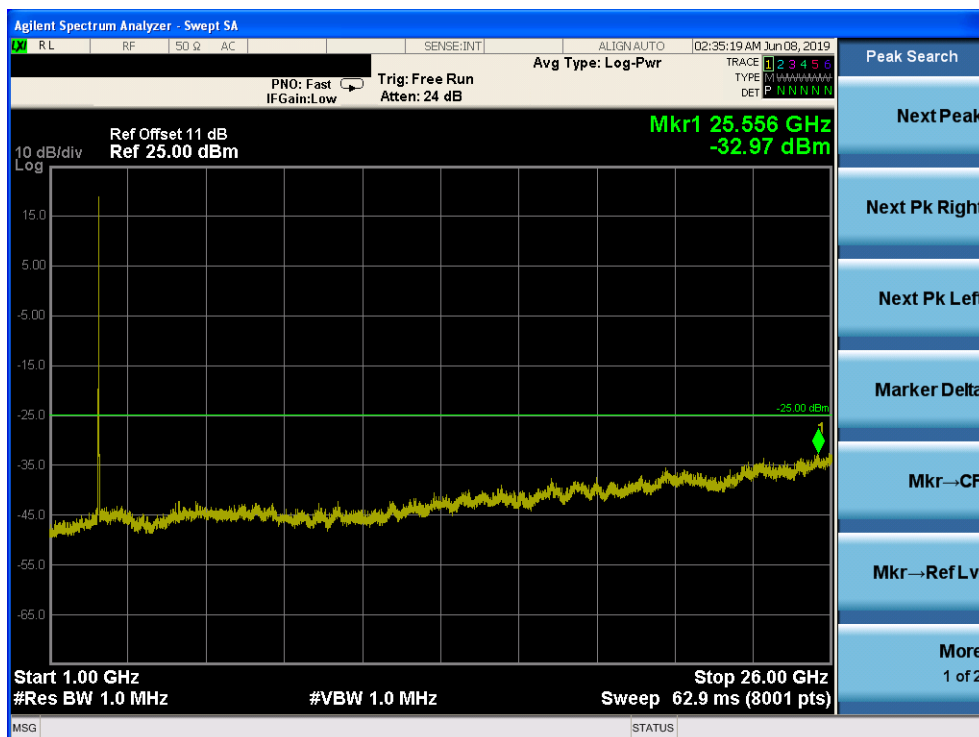
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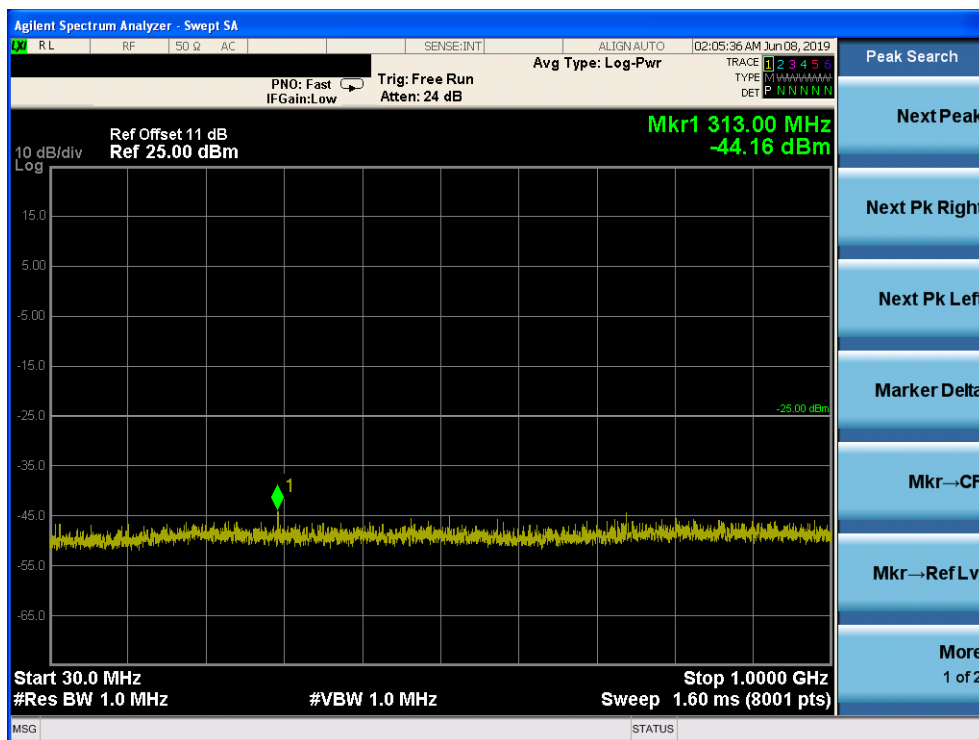
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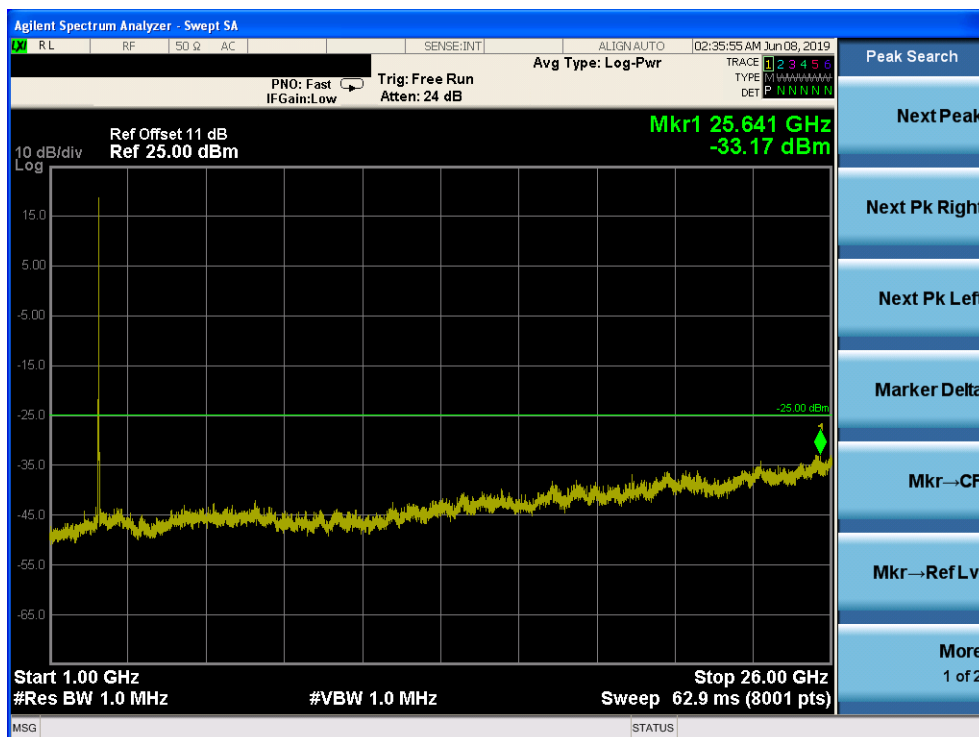
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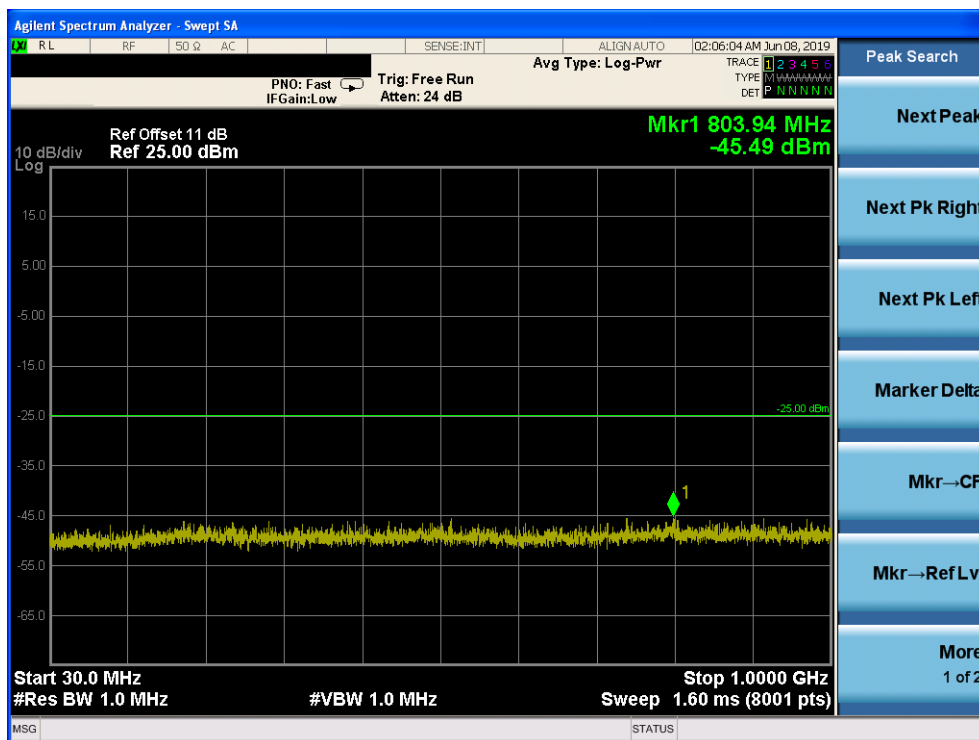
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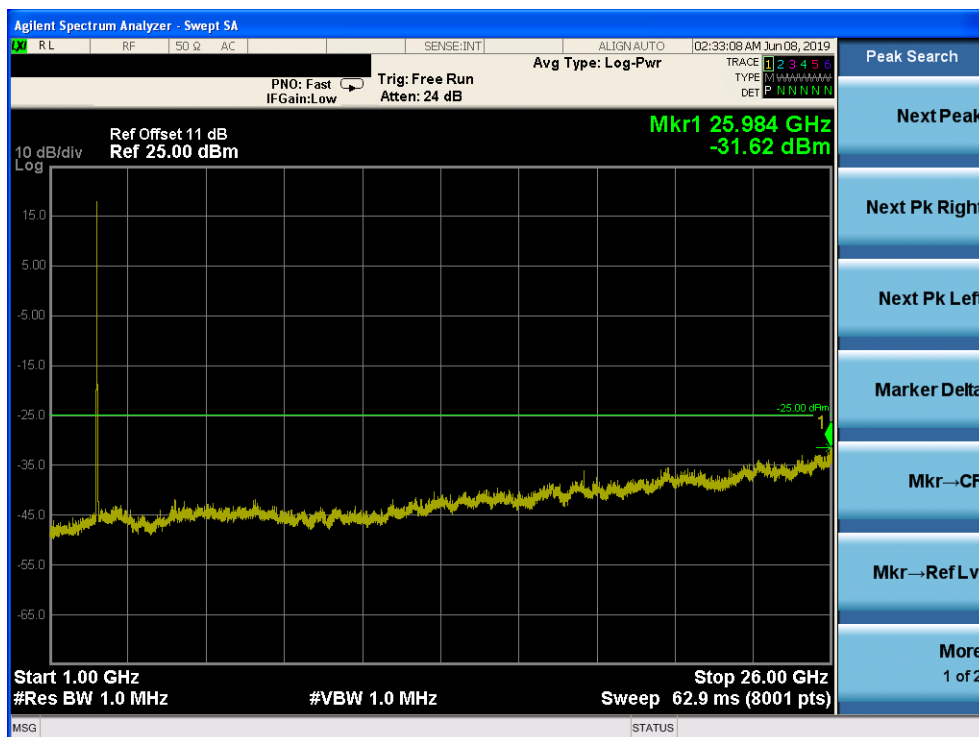
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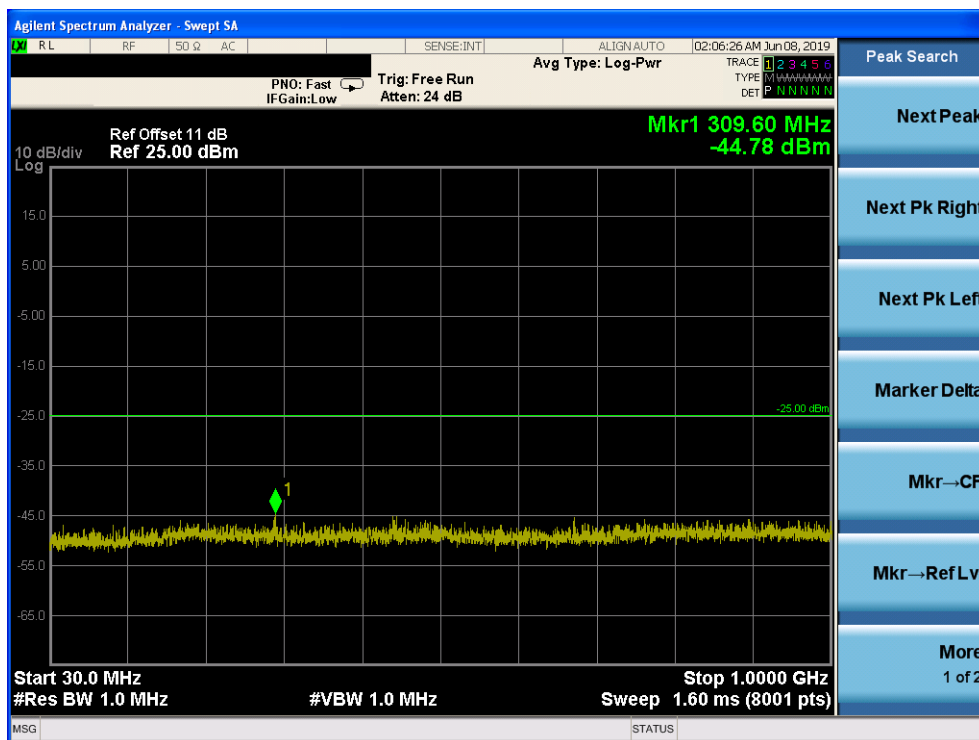
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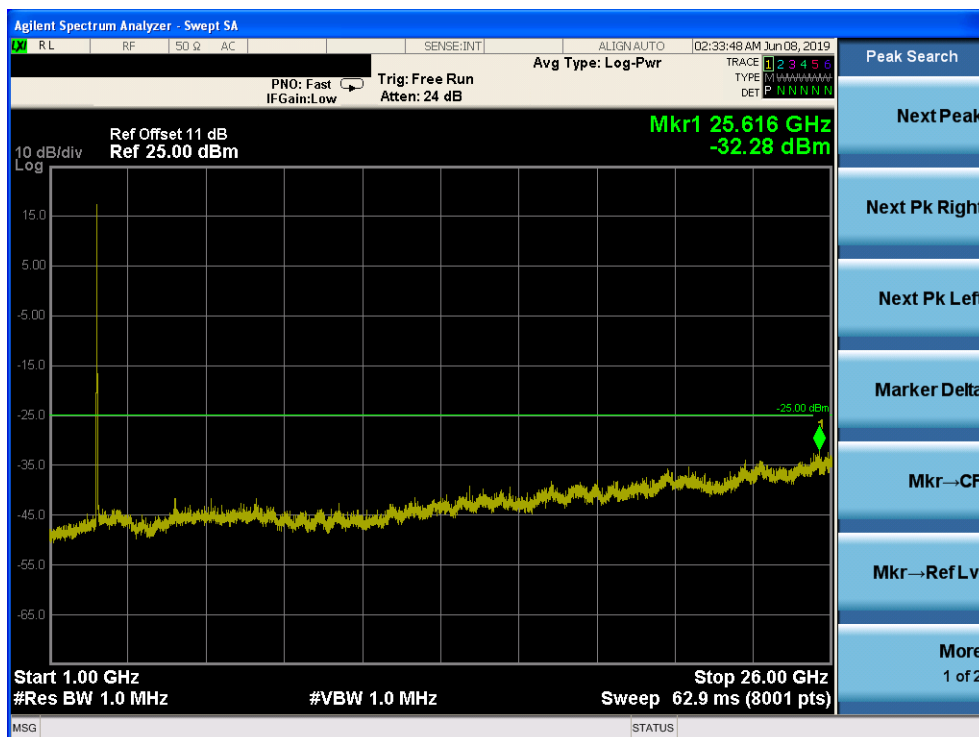
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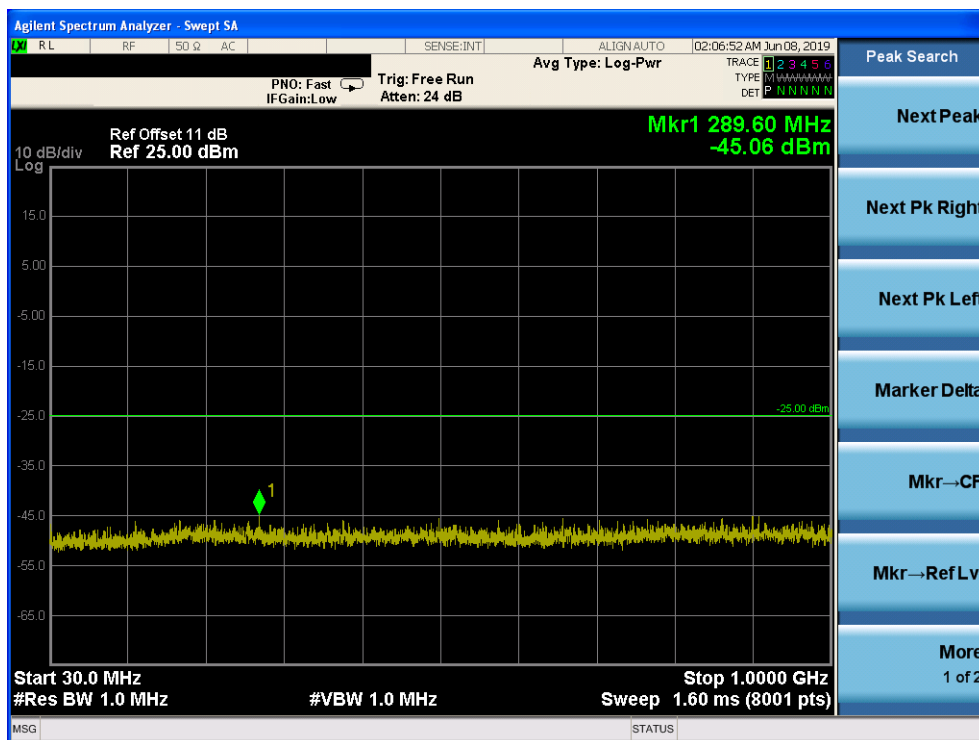
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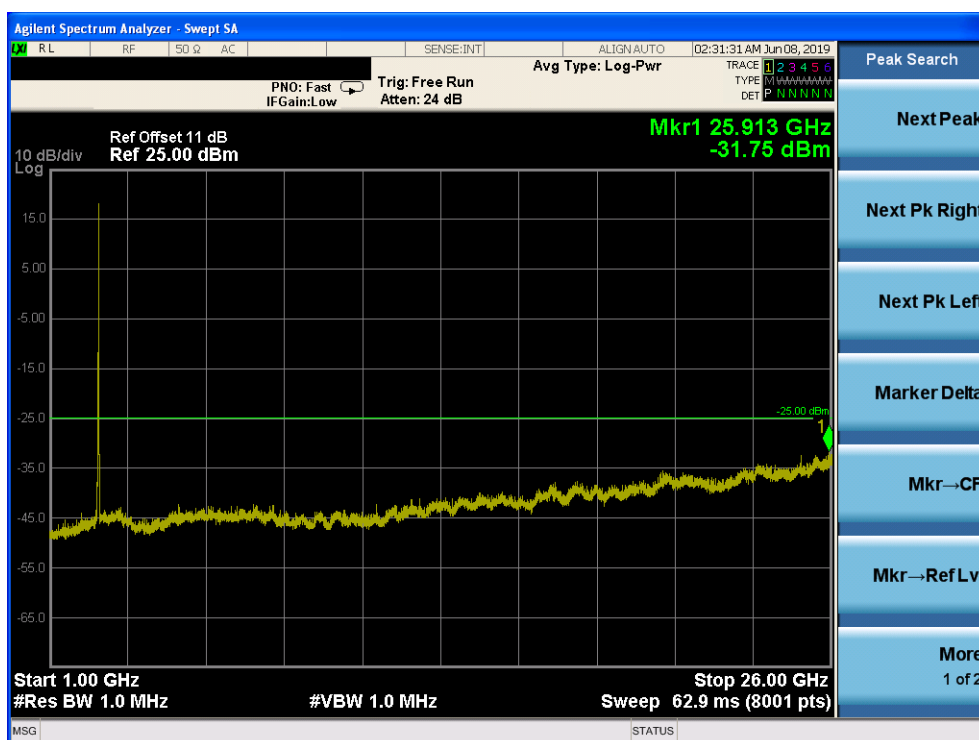
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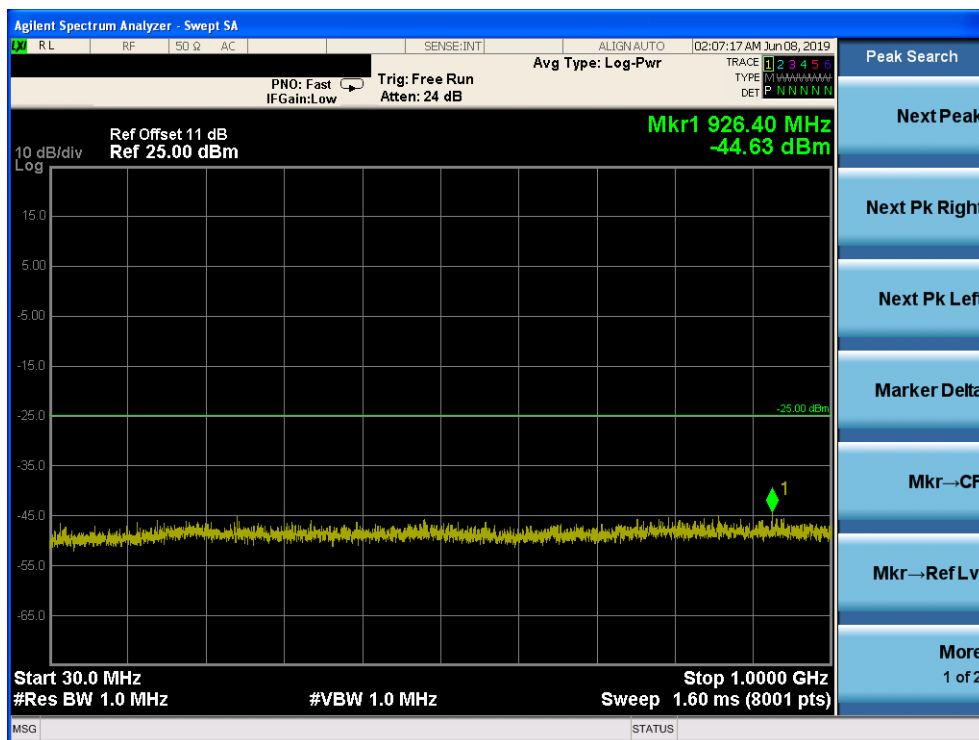
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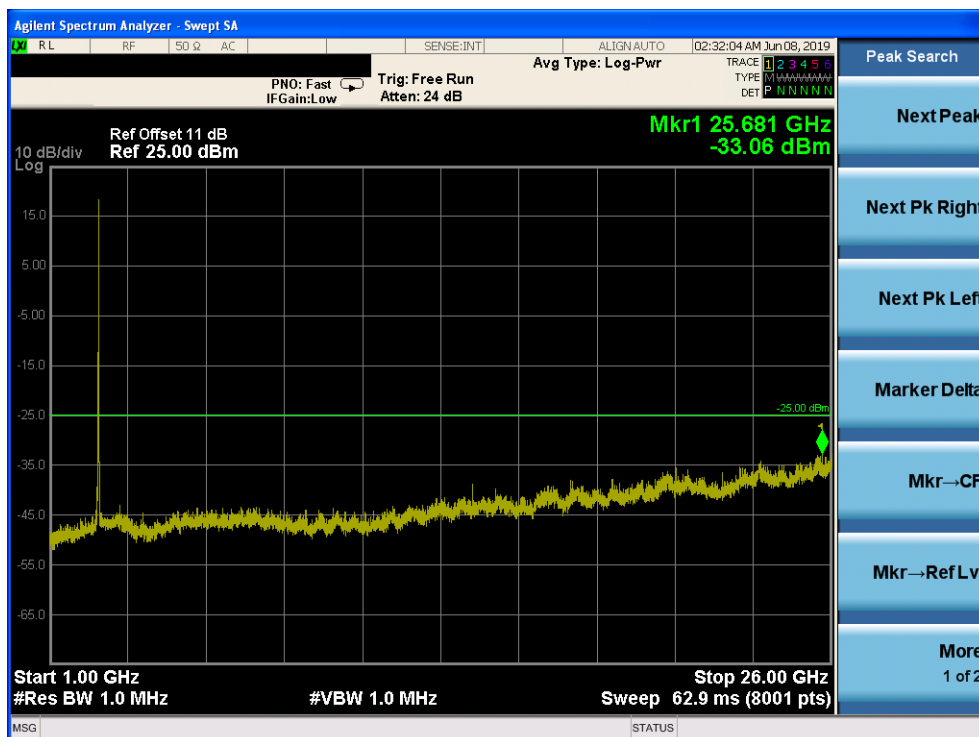
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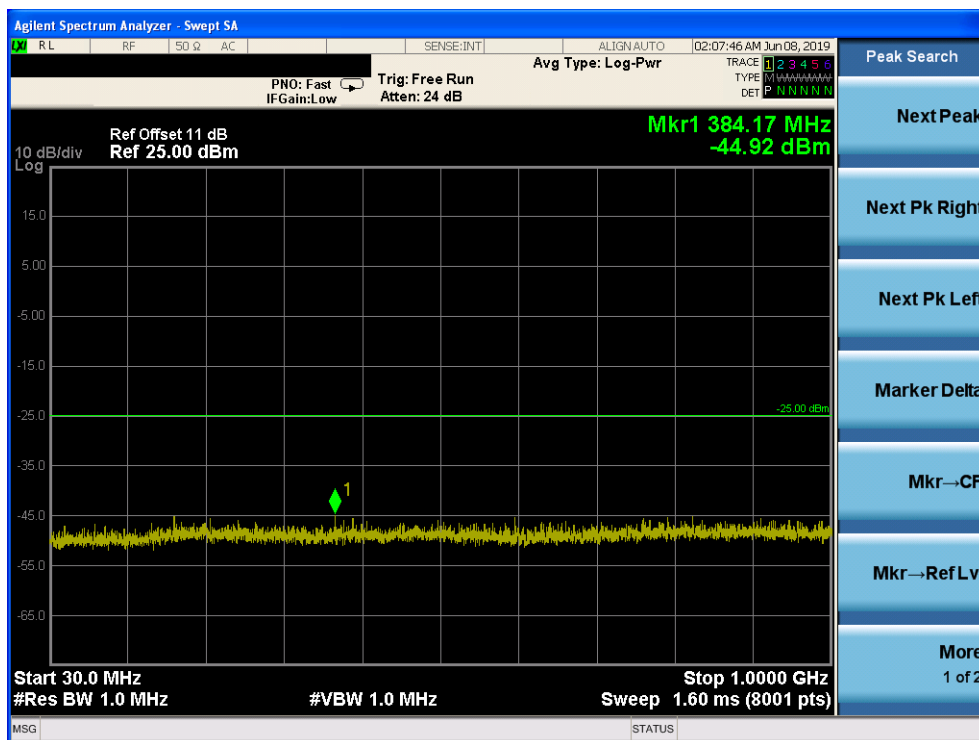
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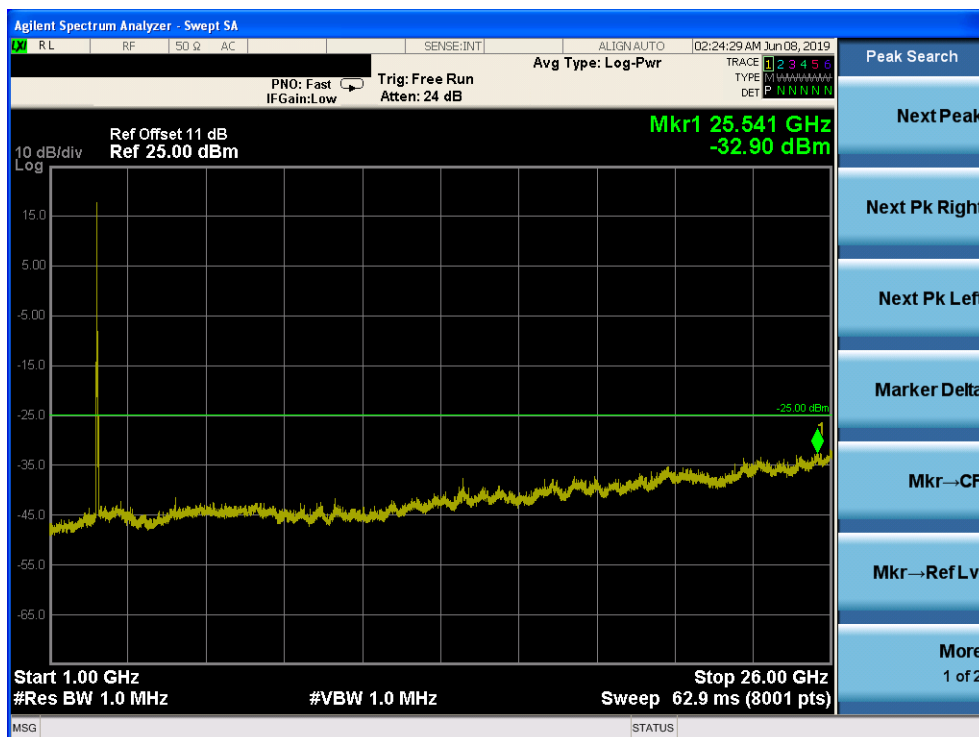
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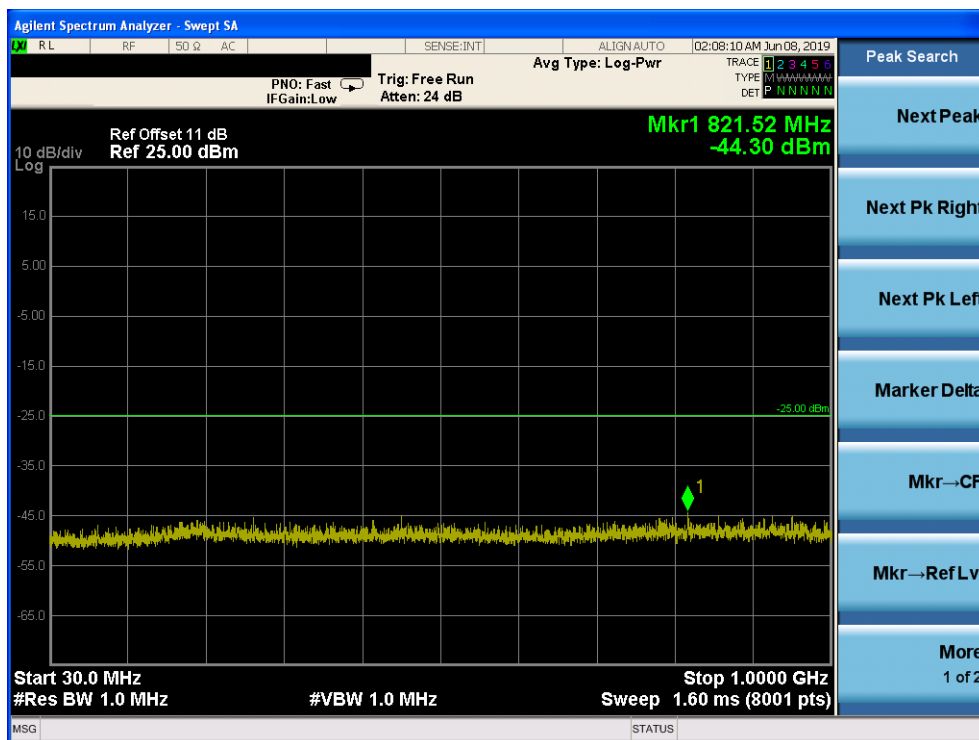
Band 7, UL Channel 20850, UL Frequency 2510.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



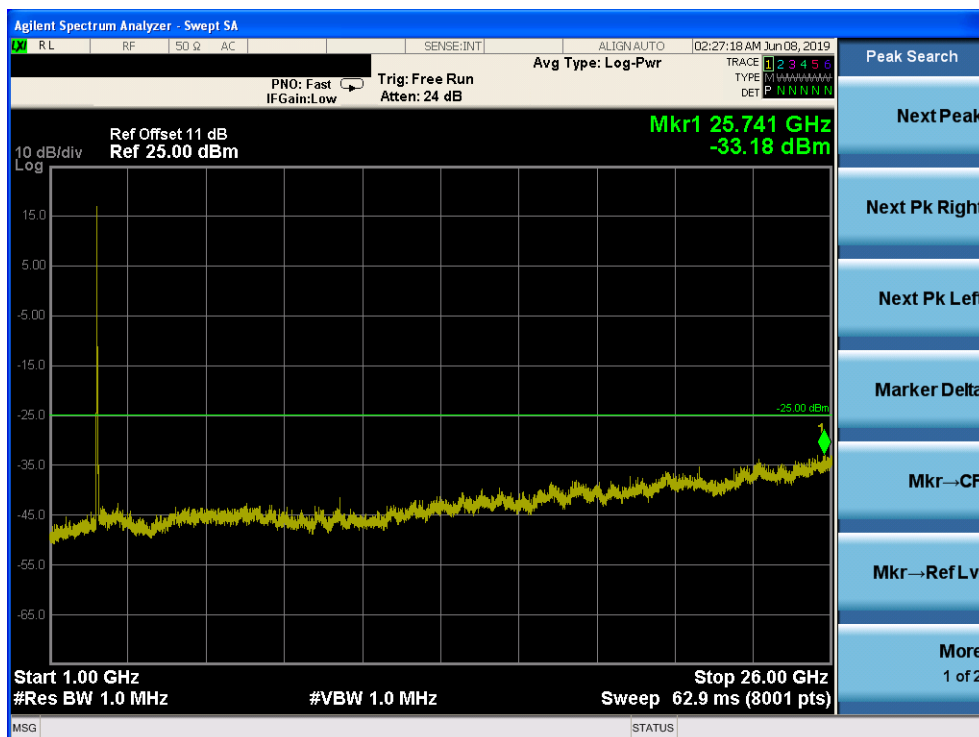
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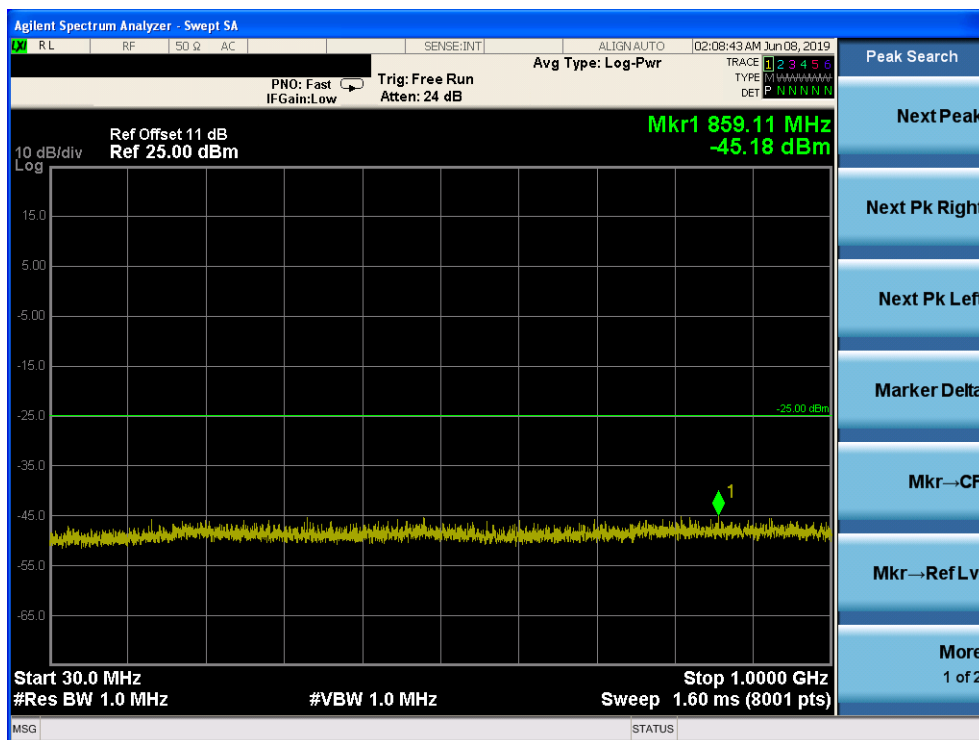
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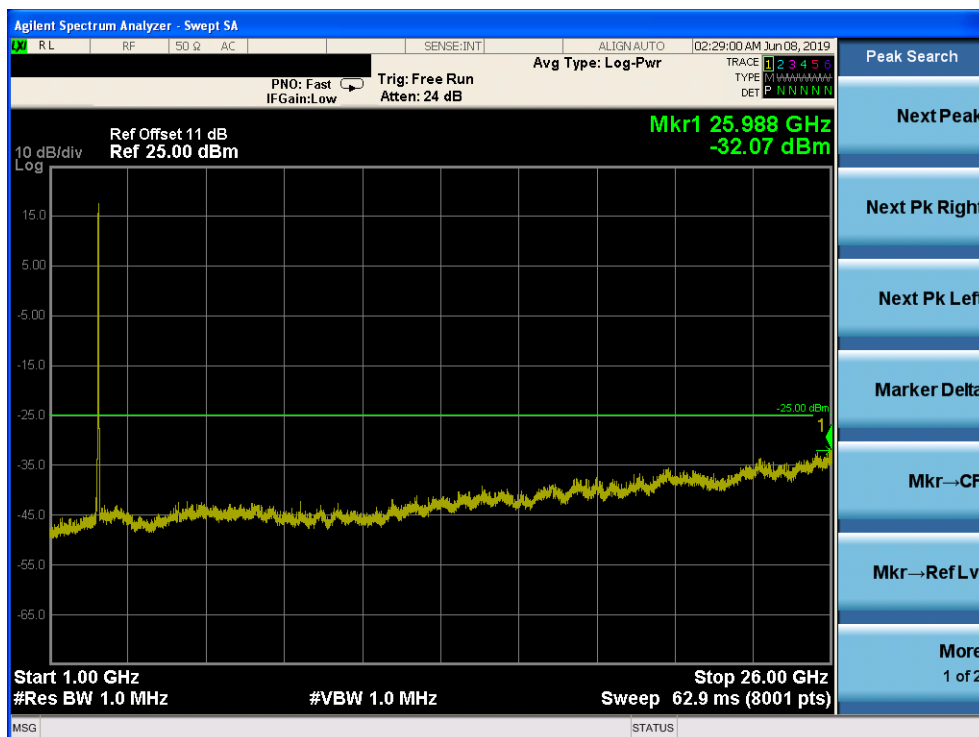
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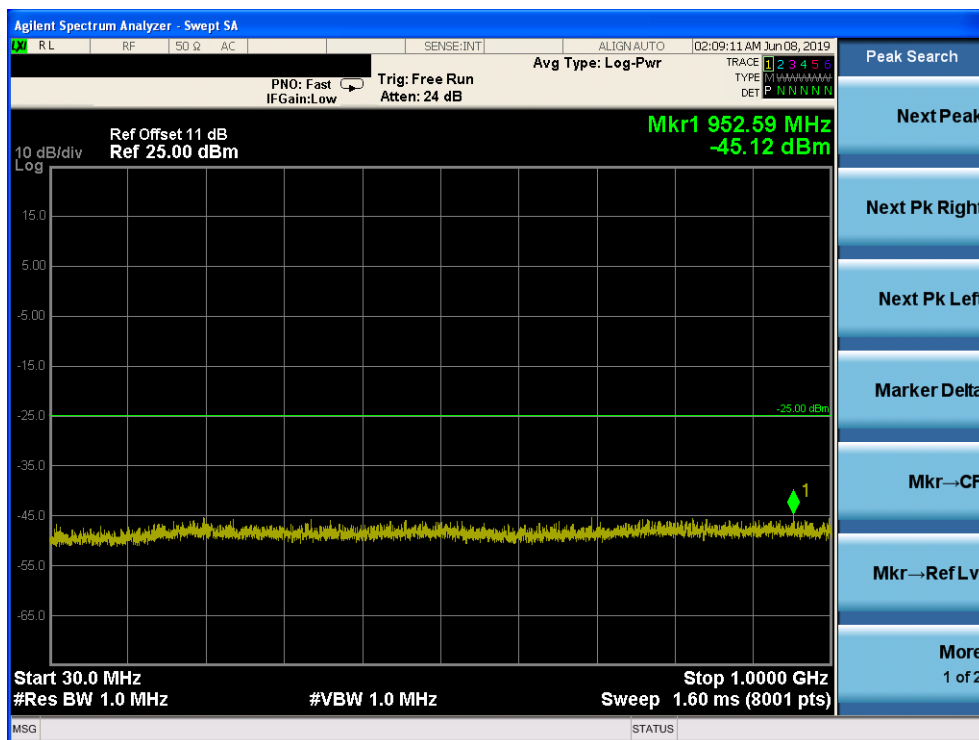
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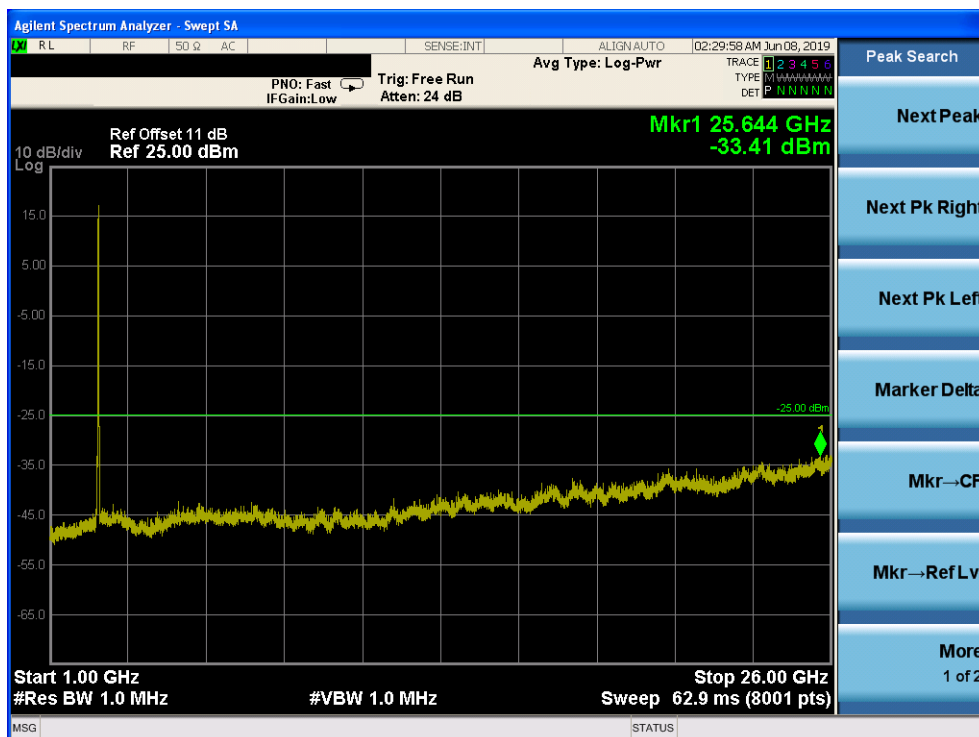
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Band 7, UL Channel 21350, UL Frequency 2560.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM

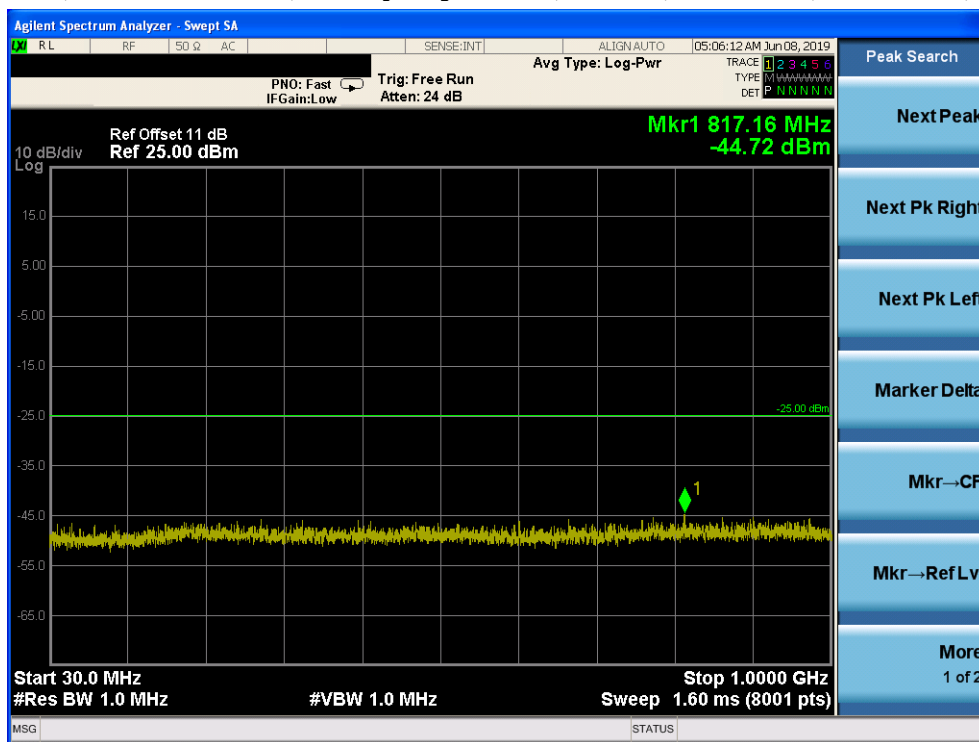


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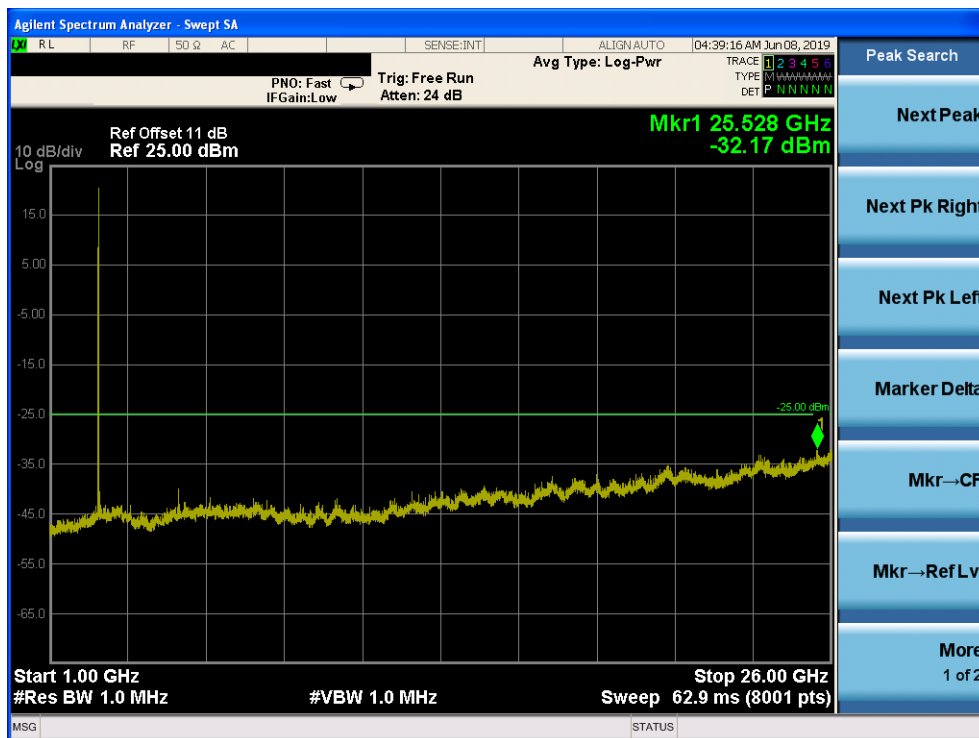


7.4 LTE BAND 41

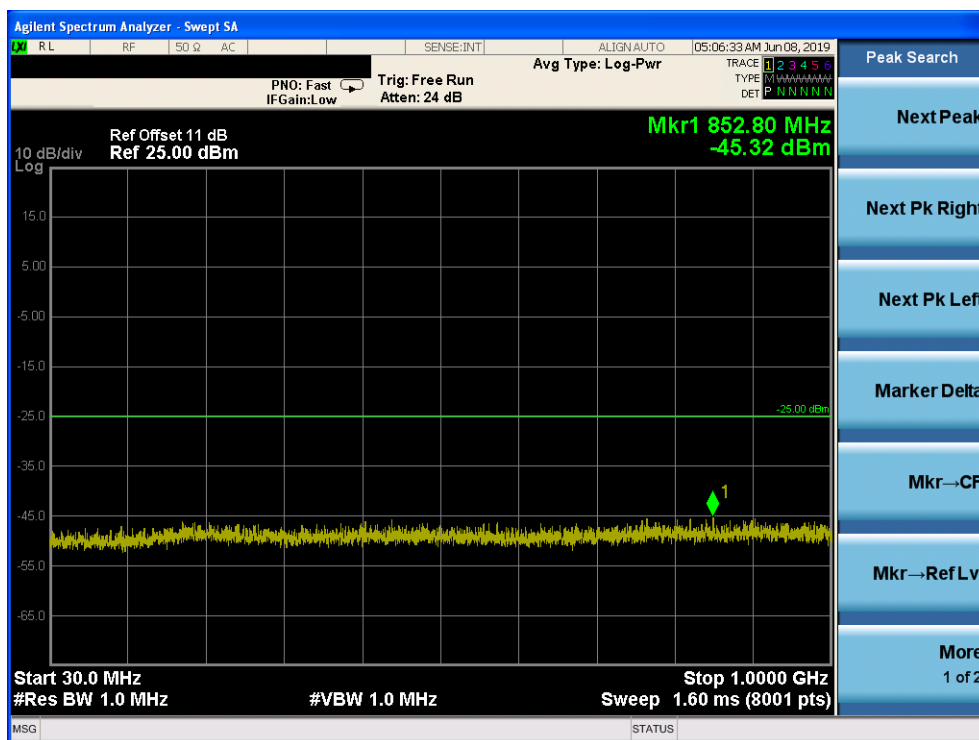
Band 41, UL Channel 40265, UL Frequency 2557.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



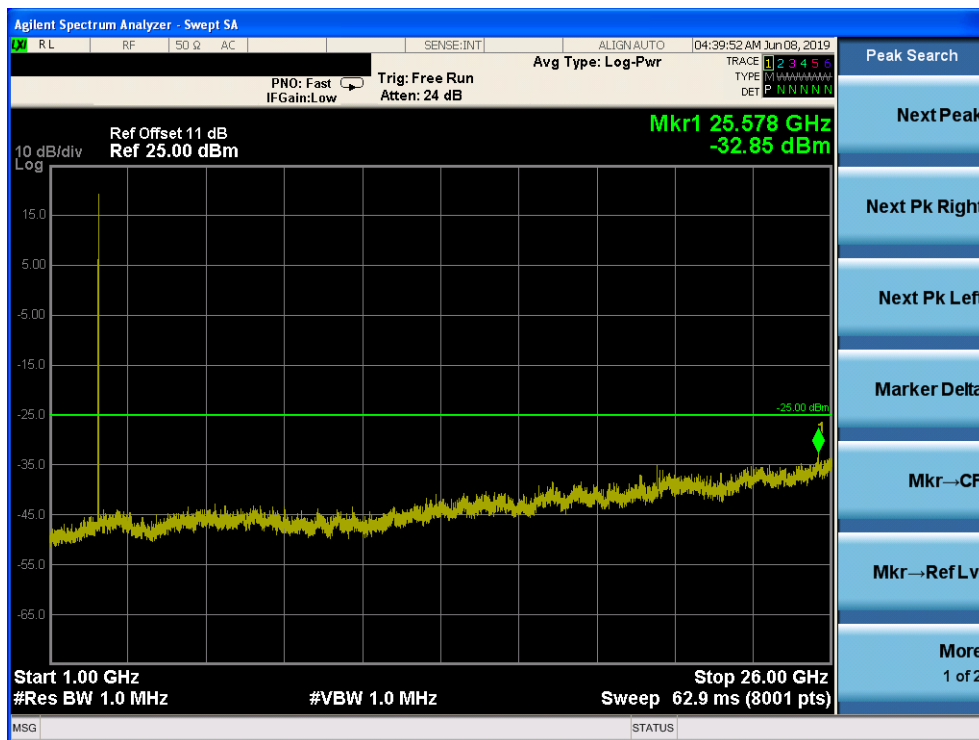
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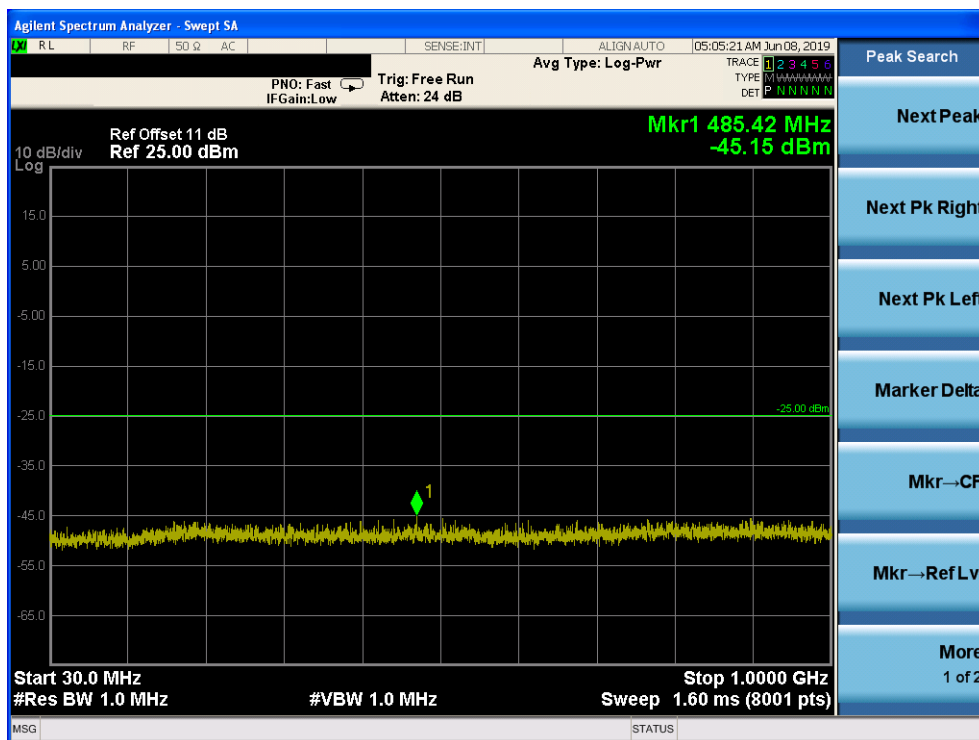
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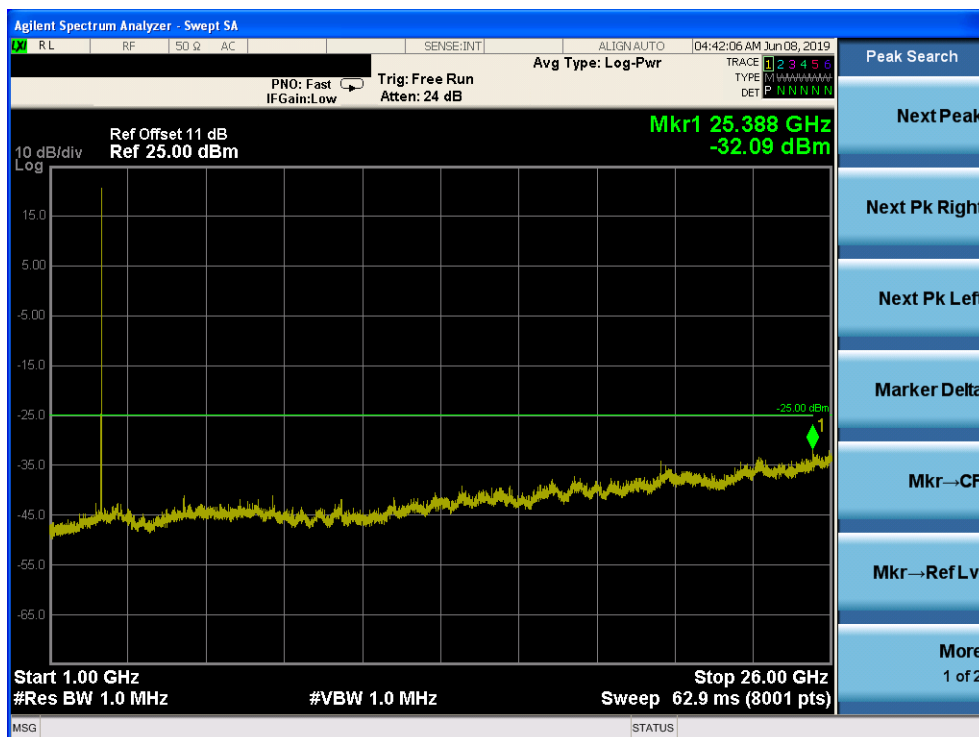
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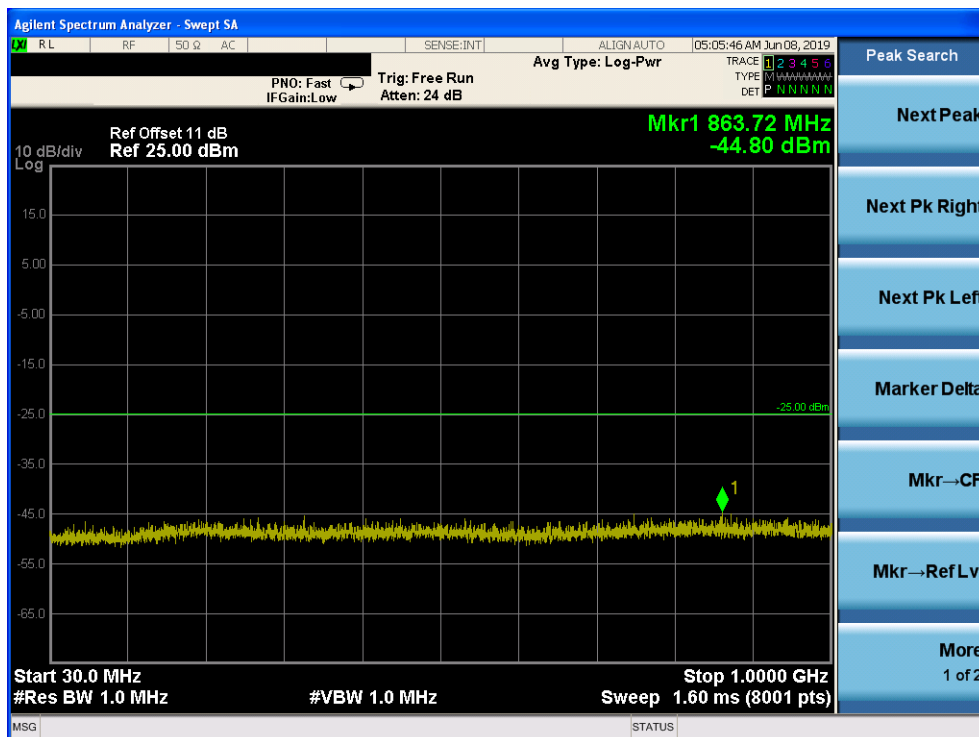
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



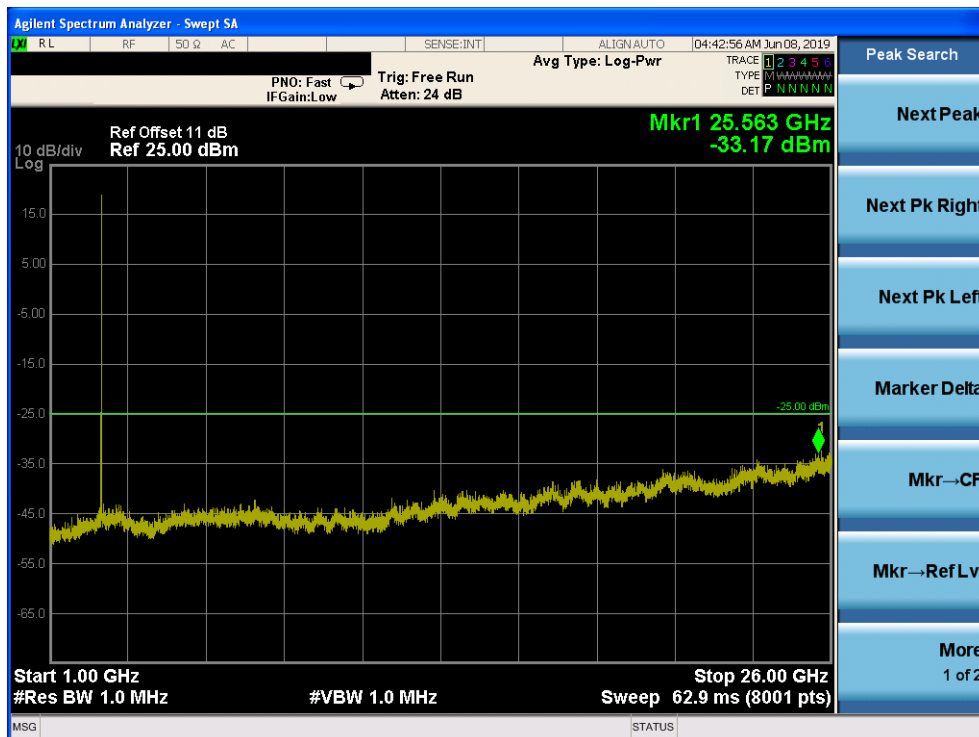
Band 41, UL Channel 41215, UL Frequency 2652.5, BW 5.0, NO. RB 25, RB POS. Low, QPSK



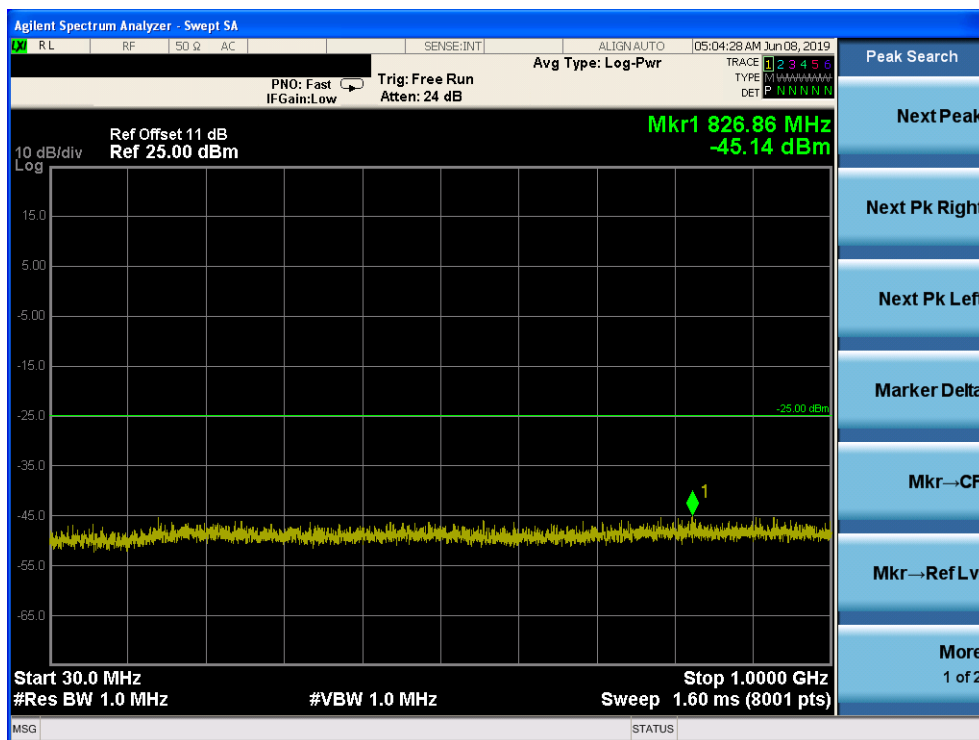
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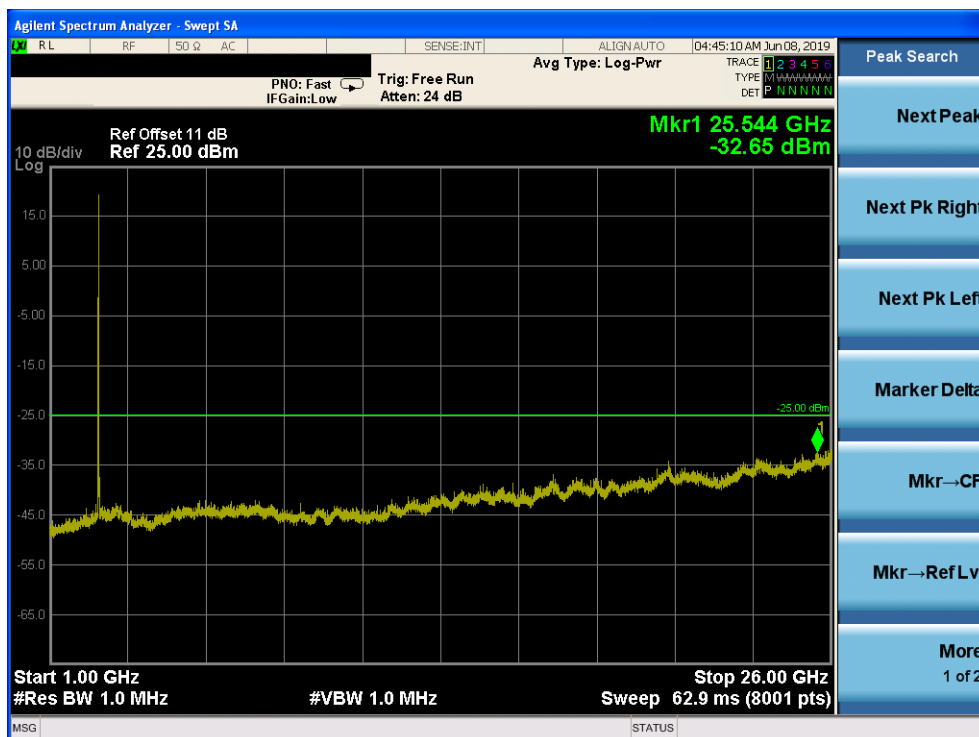
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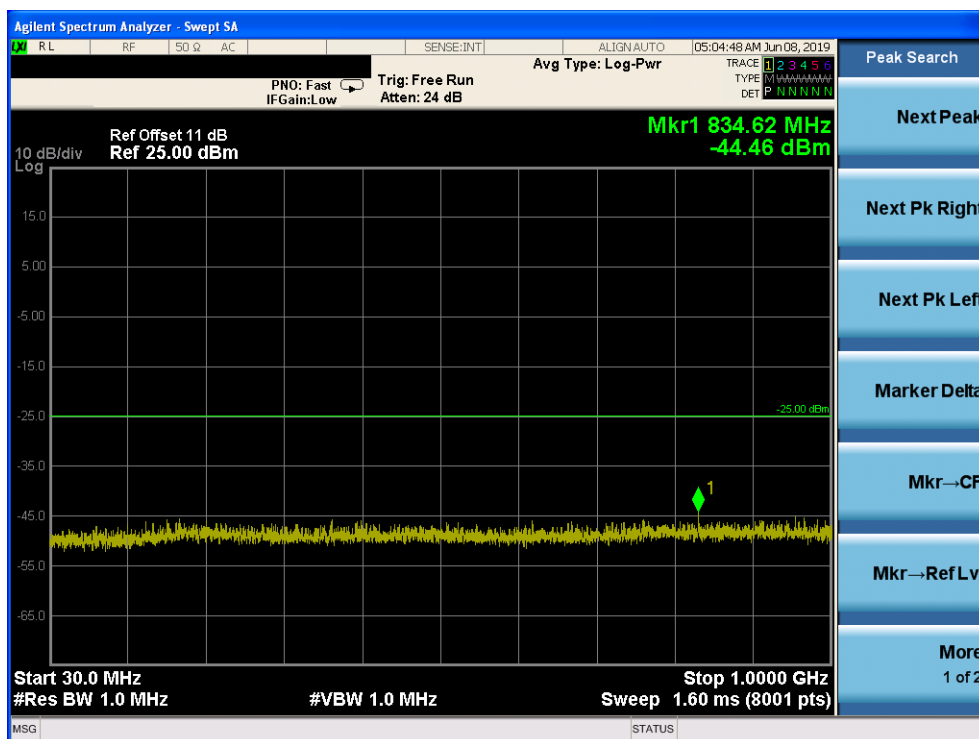
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



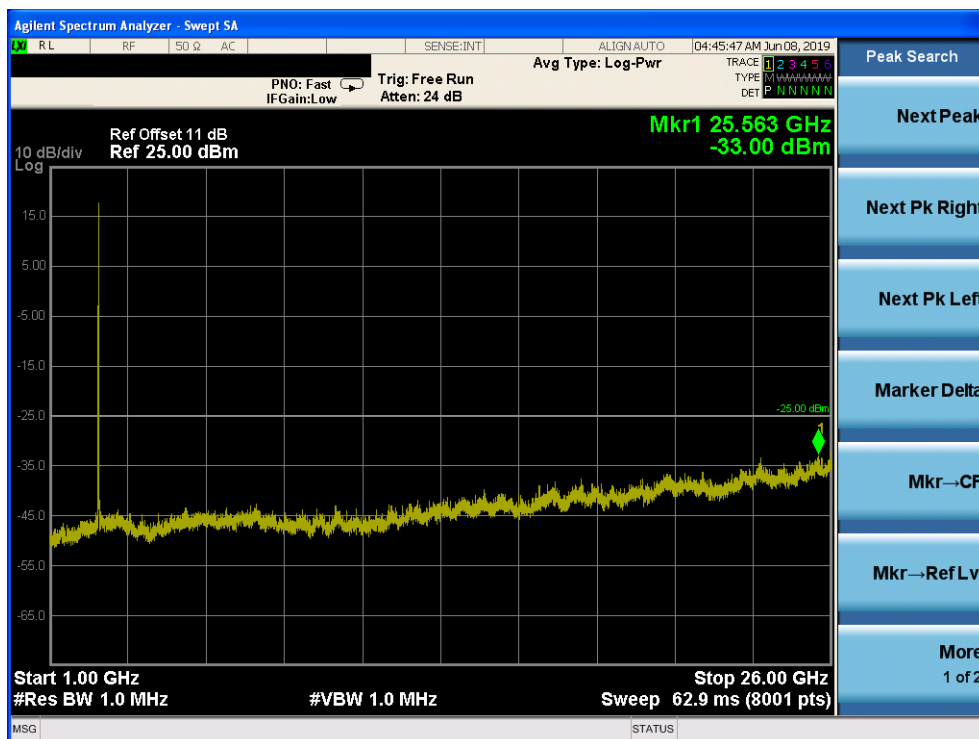
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



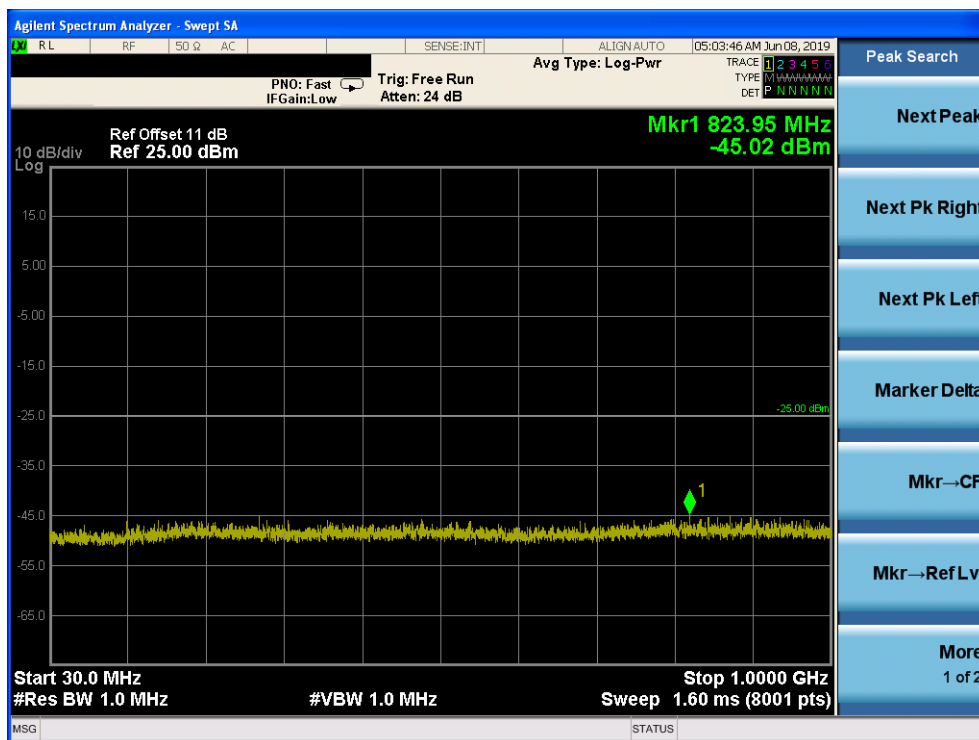
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



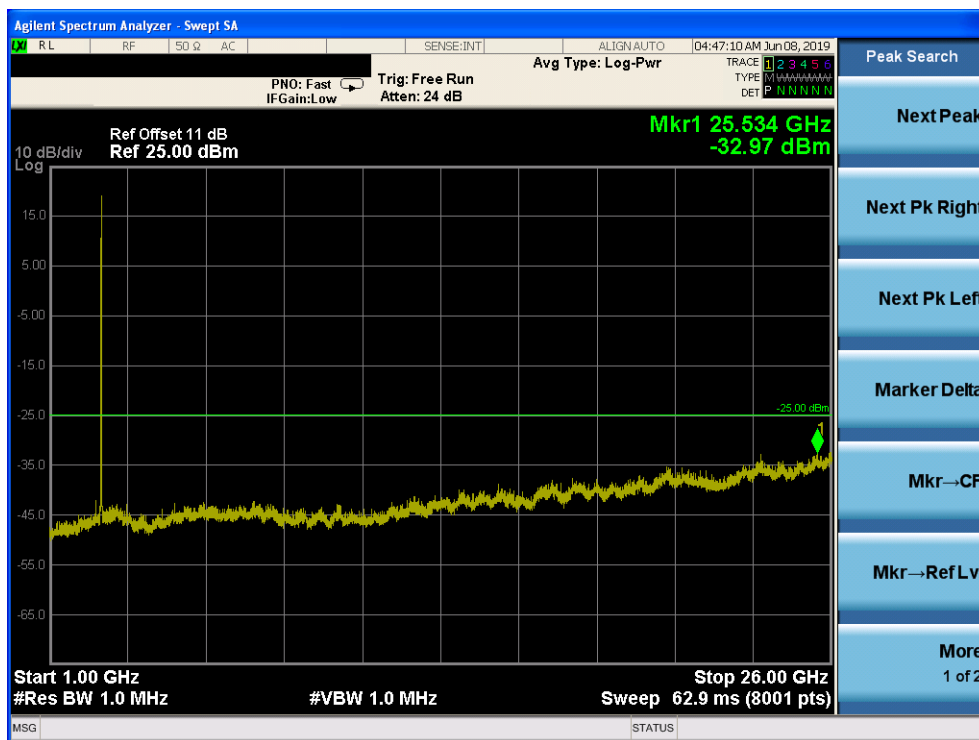
Band 41, UL Channel 40290, UL Frequency 2560.0, BW 10.0, NO. RB 50, RB POS. Low, 16-QAM



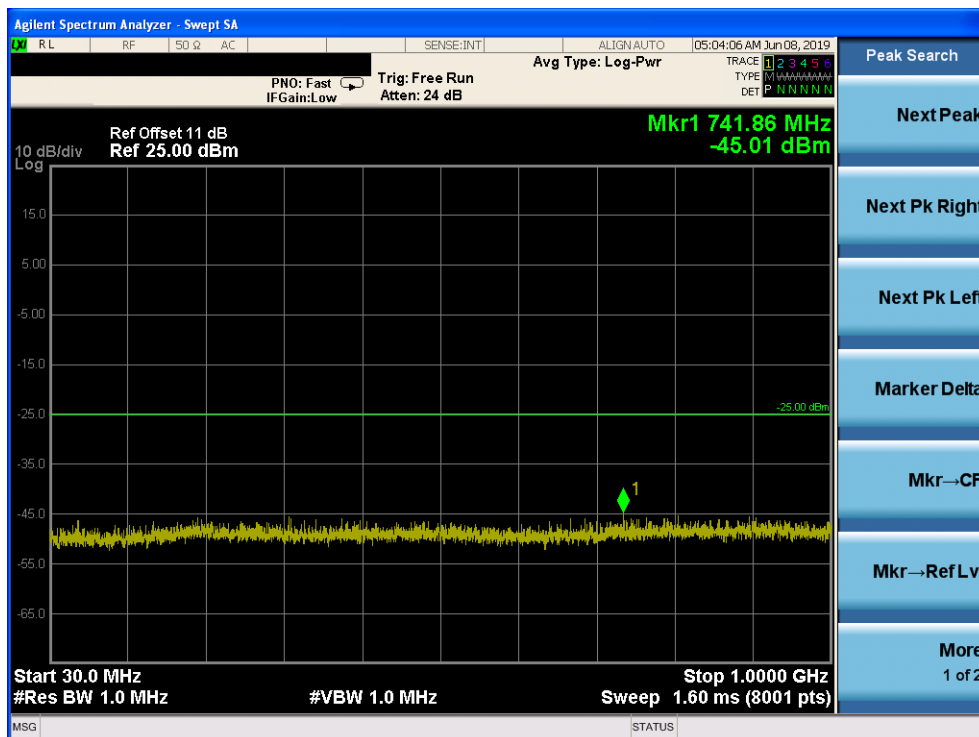
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



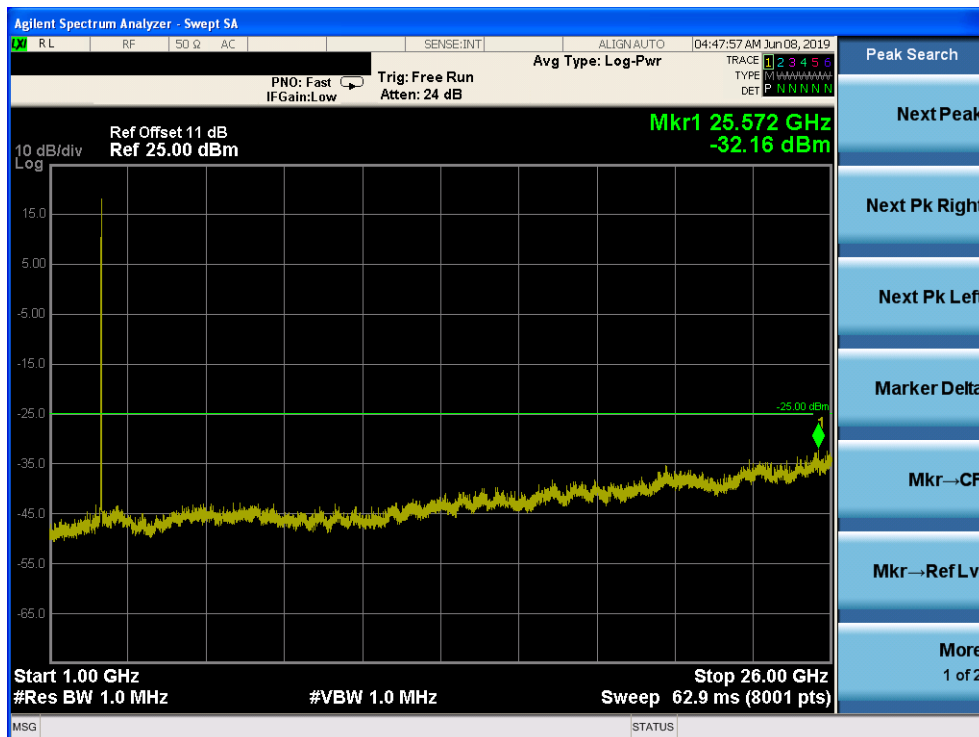
Band 41, UL Channel 41190, UL Frequency 2650.0, BW 10.0, NO. RB 50, RB POS. Low, QPSK



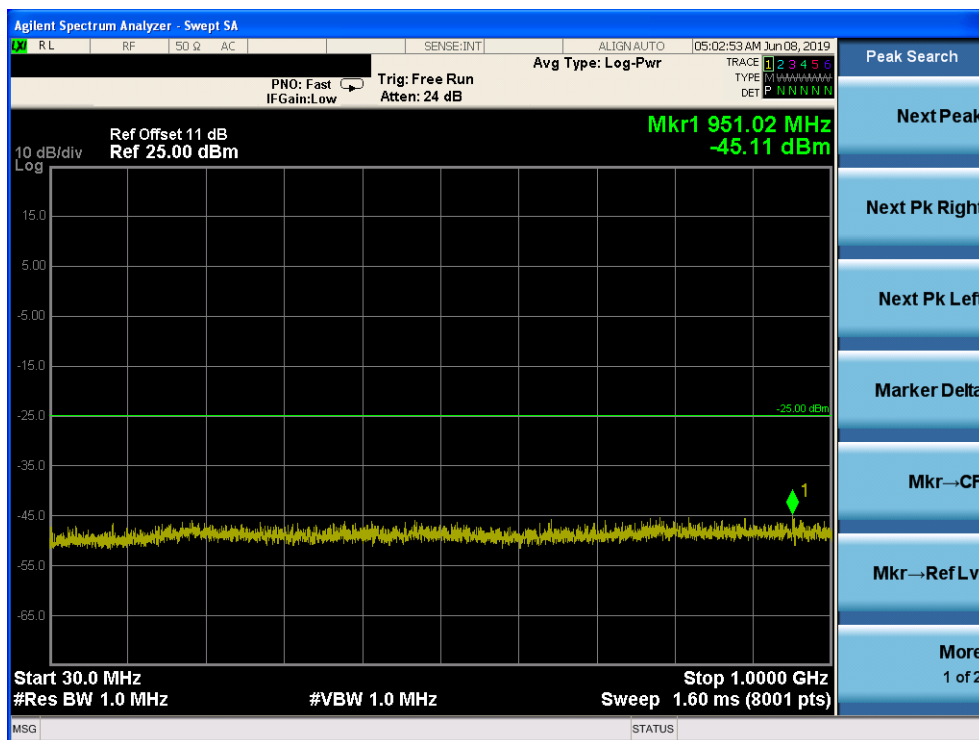
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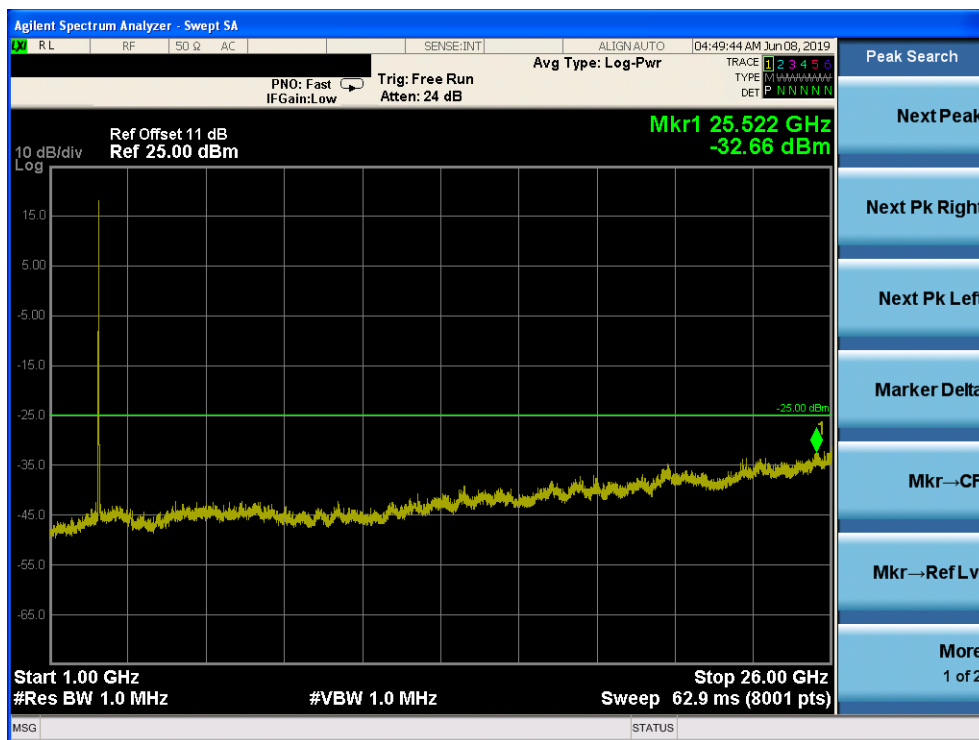
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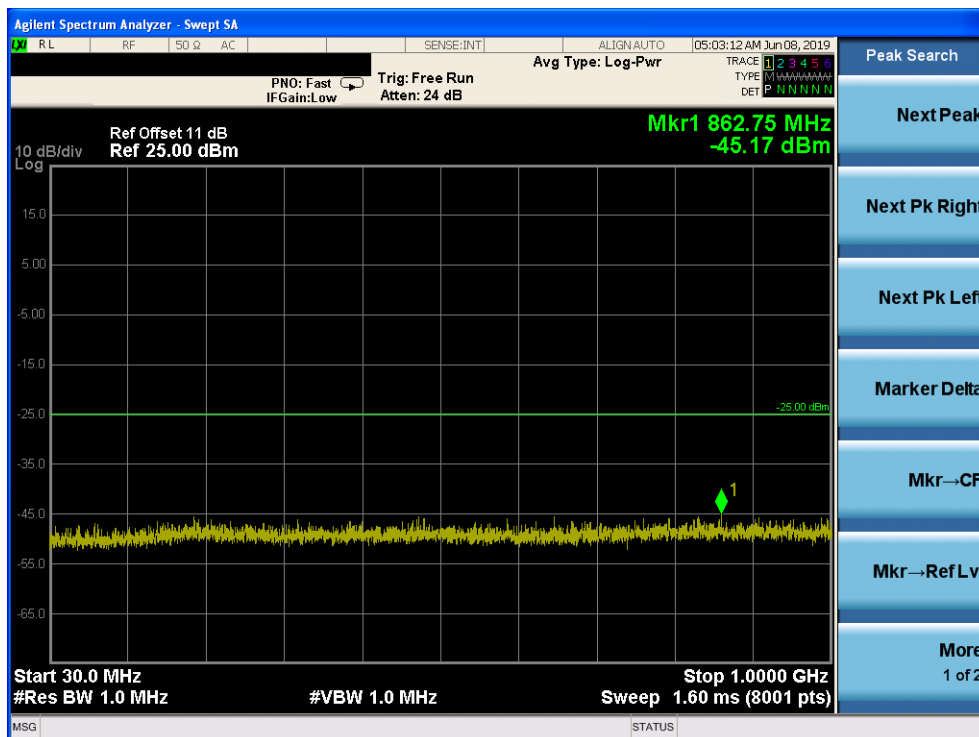
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



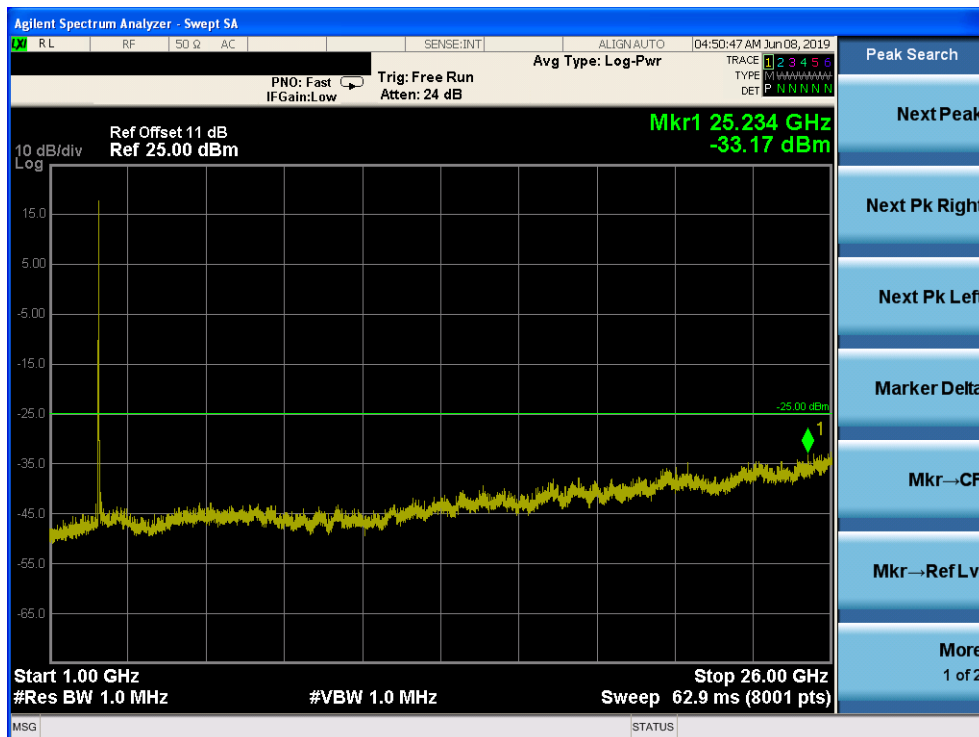
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



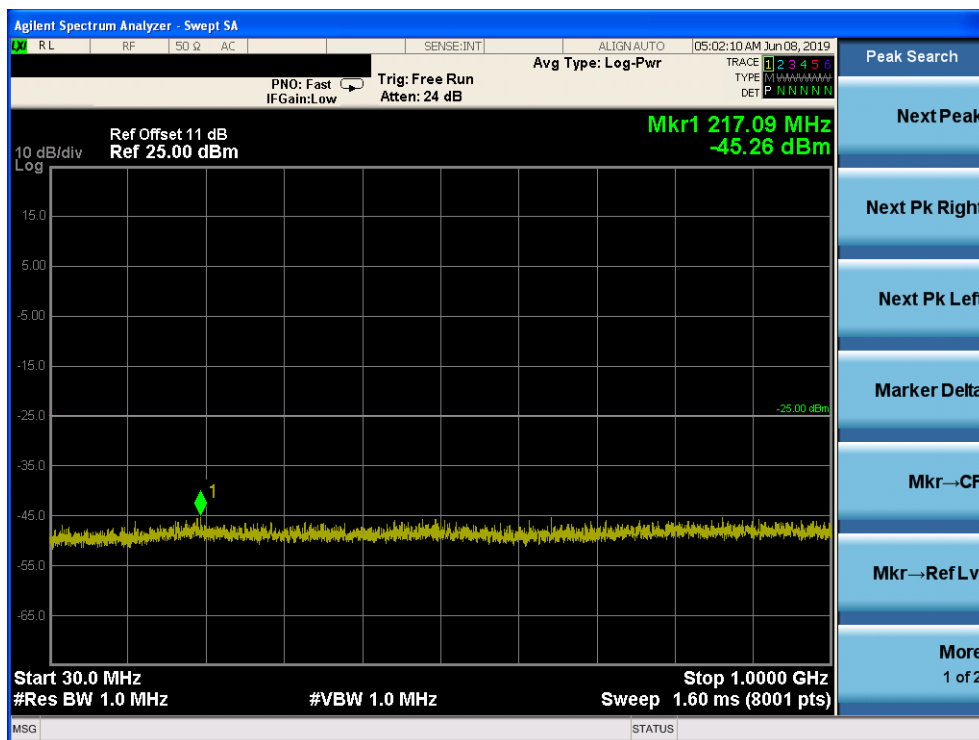
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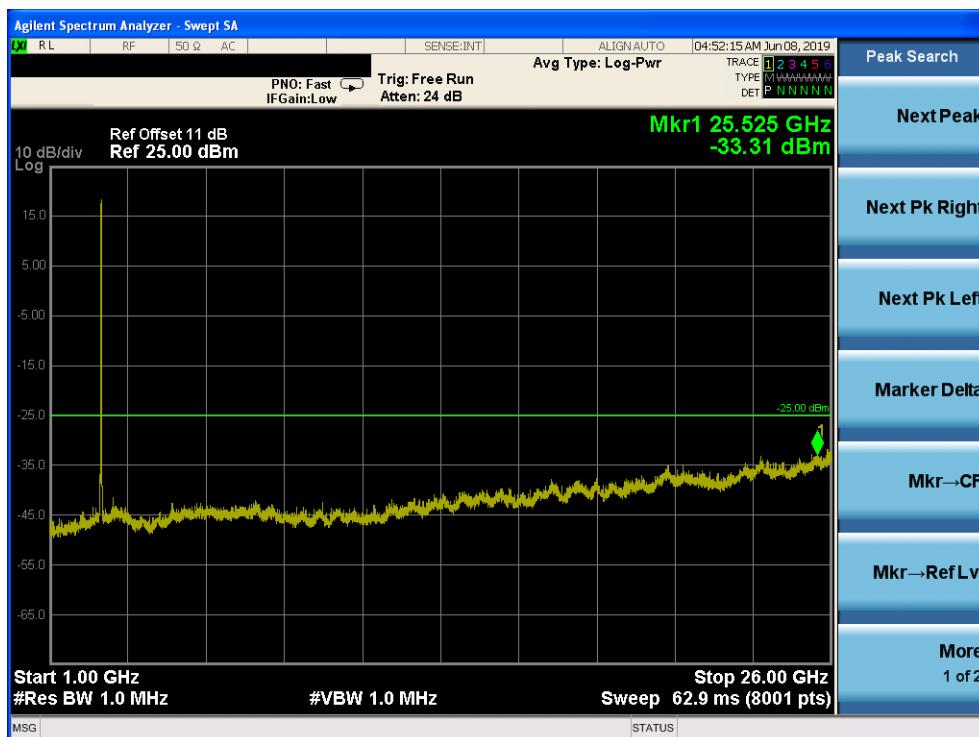
Band 41, UL Channel 40315, UL Frequency 2562.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



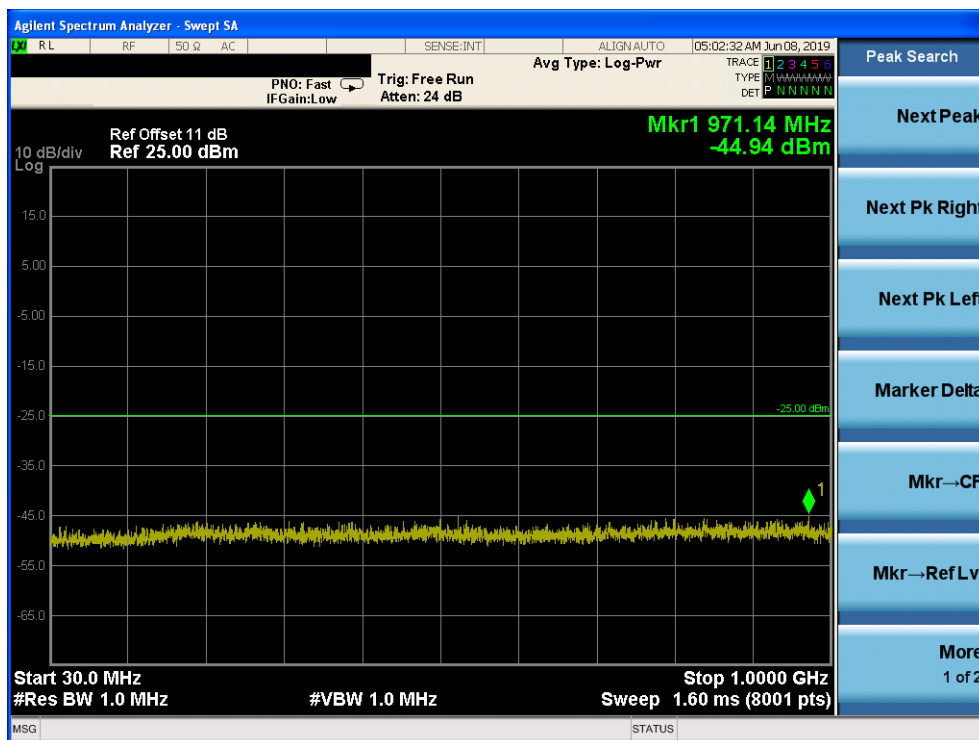
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, QPSK



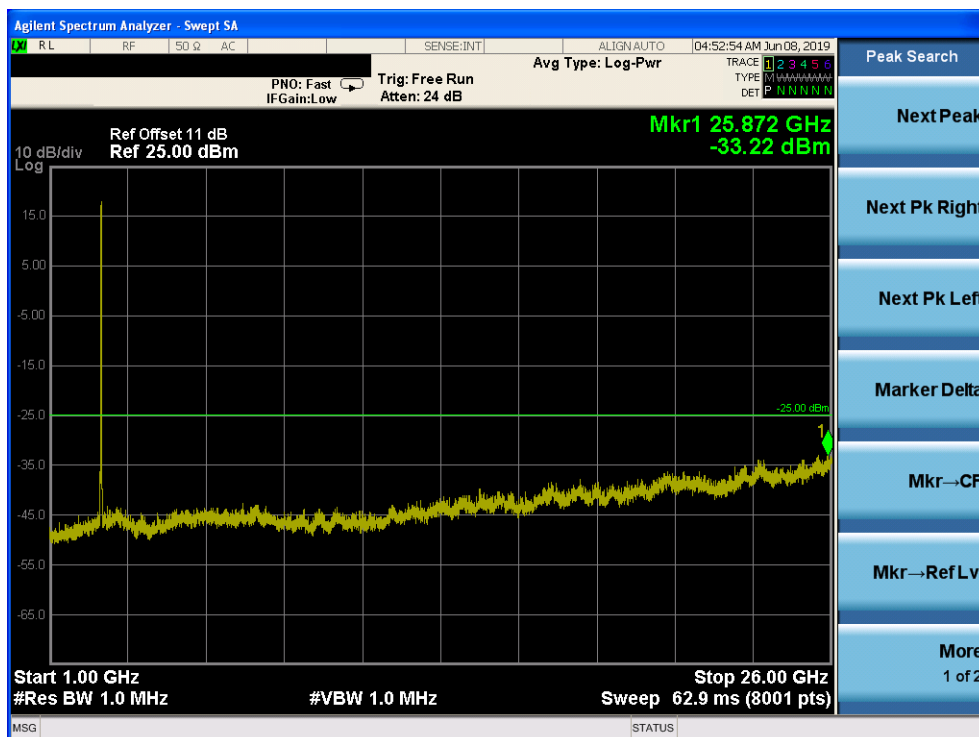
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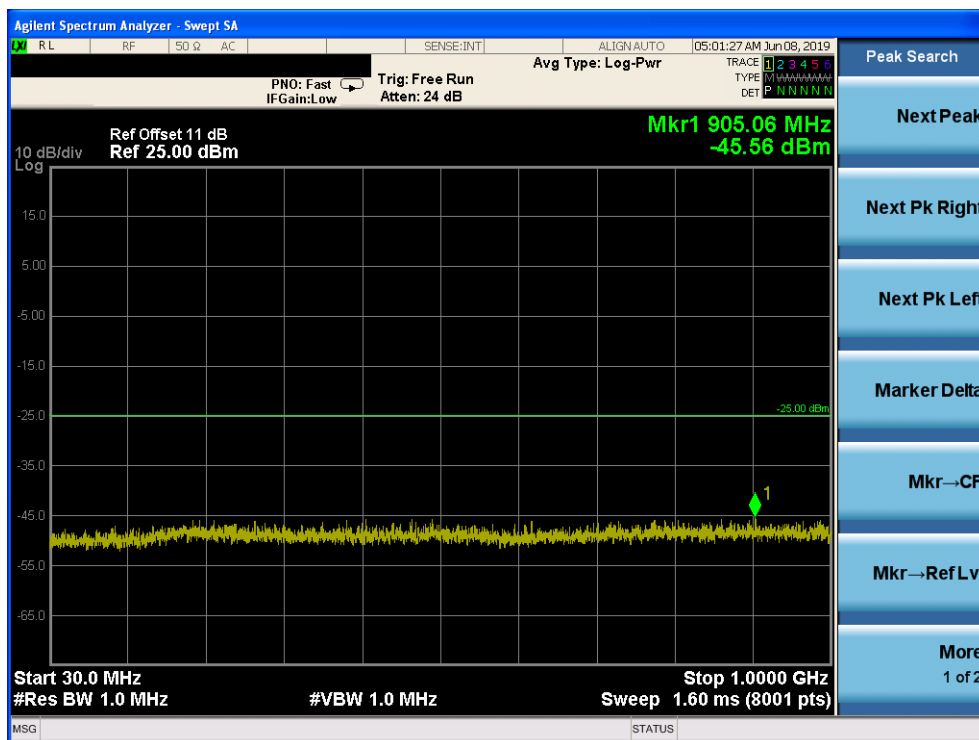
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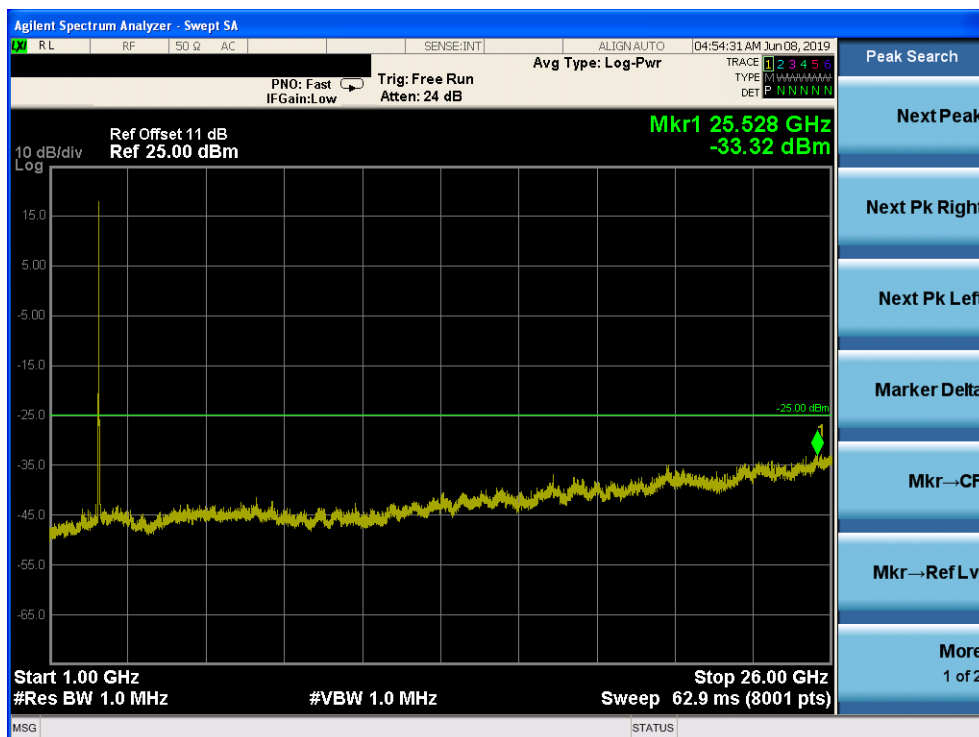
Band 41, UL Channel 41165, UL Frequency 2647.5, BW 15.0, NO. RB 75, RB POS. Low, 16-QAM



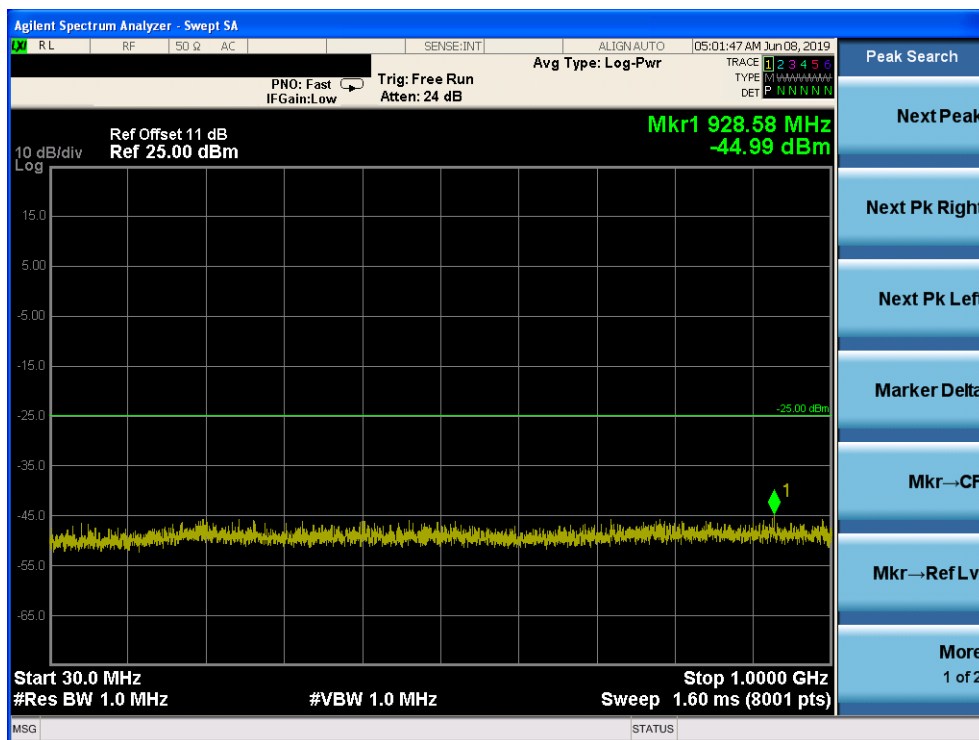
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



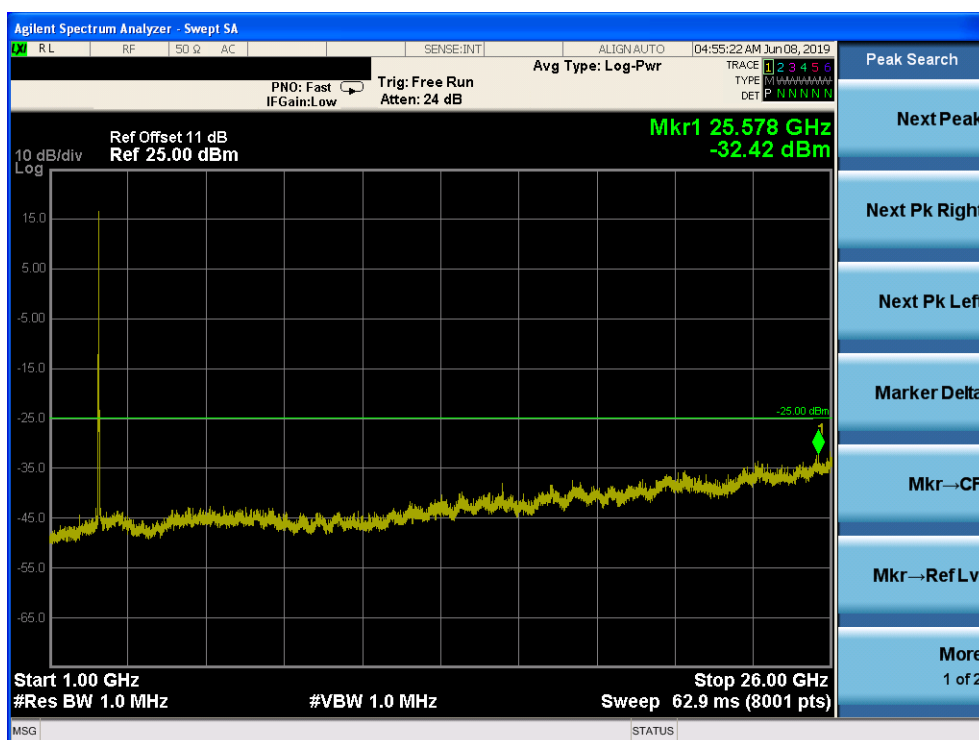
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



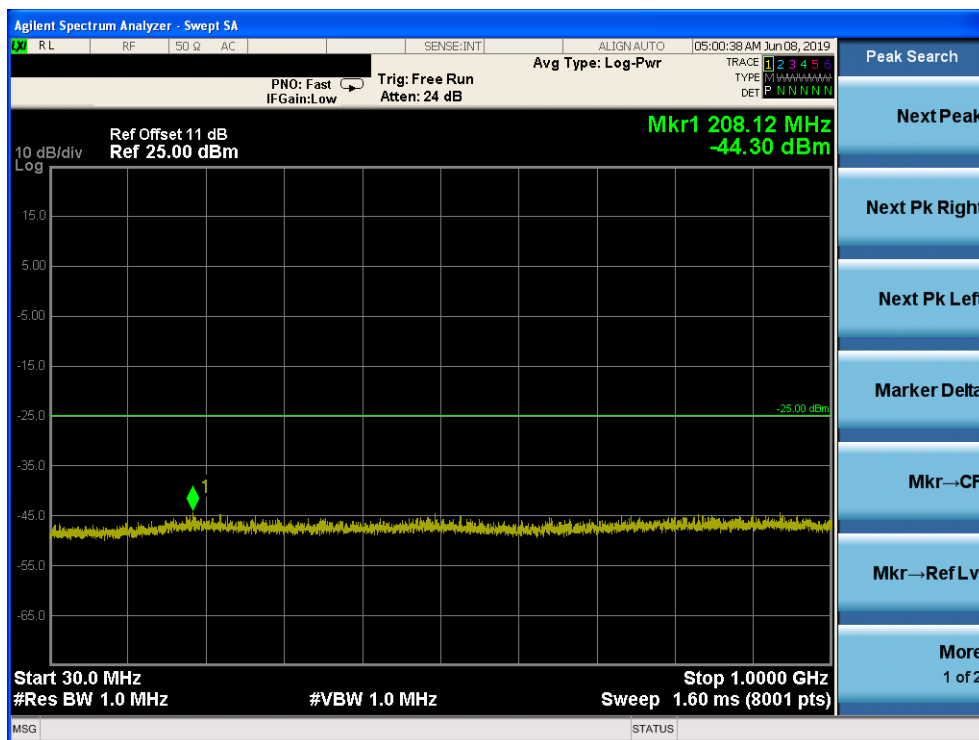
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



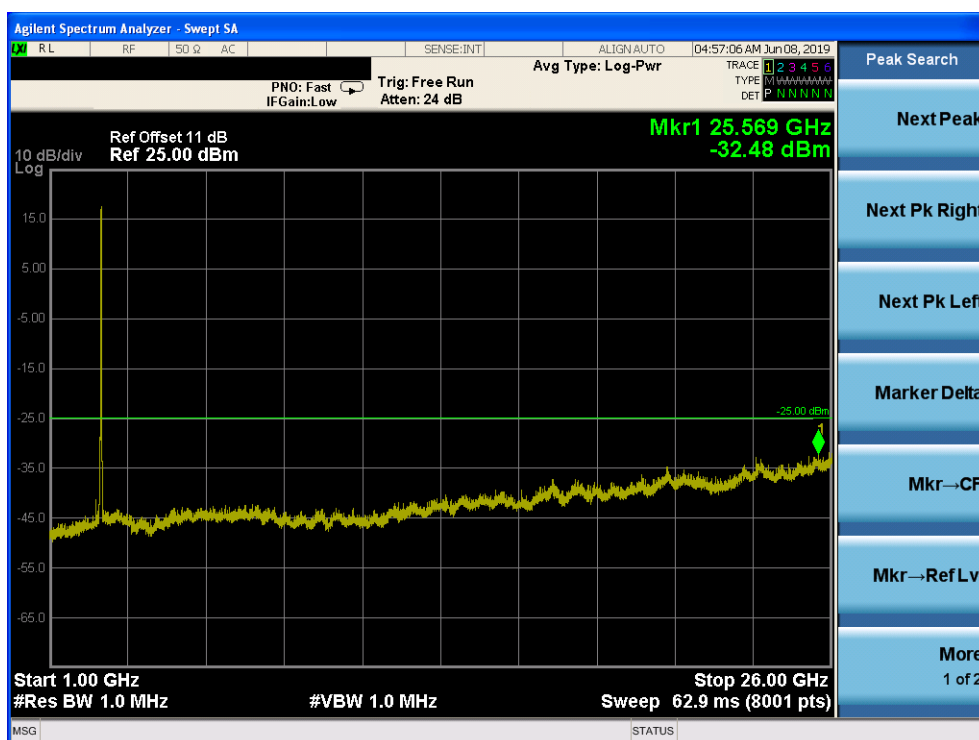
Band 41, UL Channel 40340, UL Frequency 2565.0, BW 20.0, NO. RB 100, RB POS. Low, 16-QAM



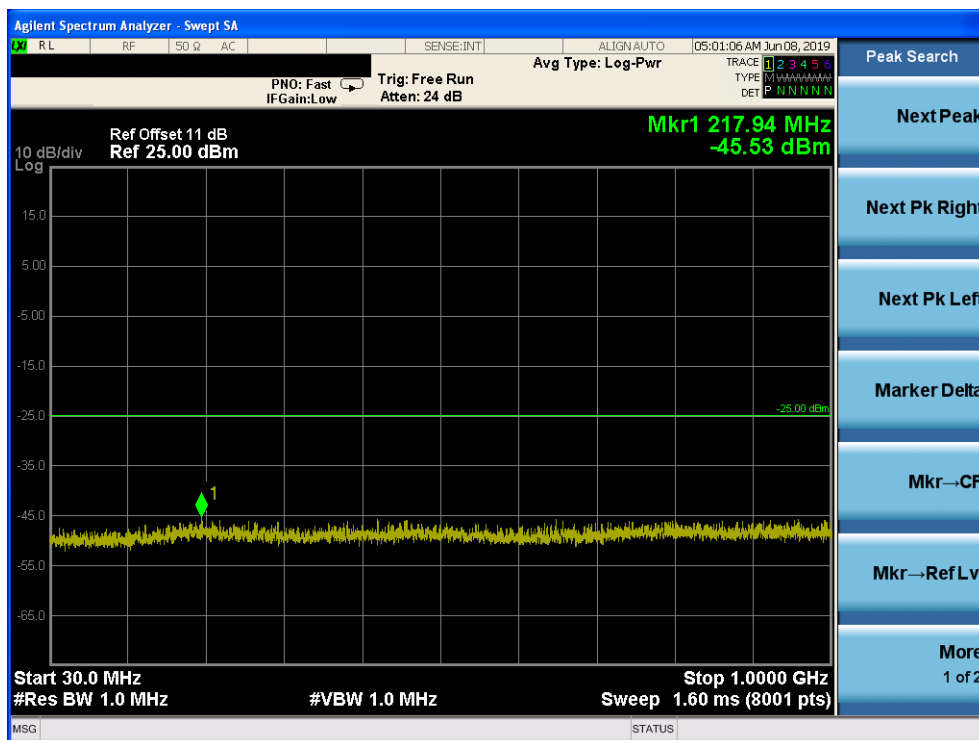
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



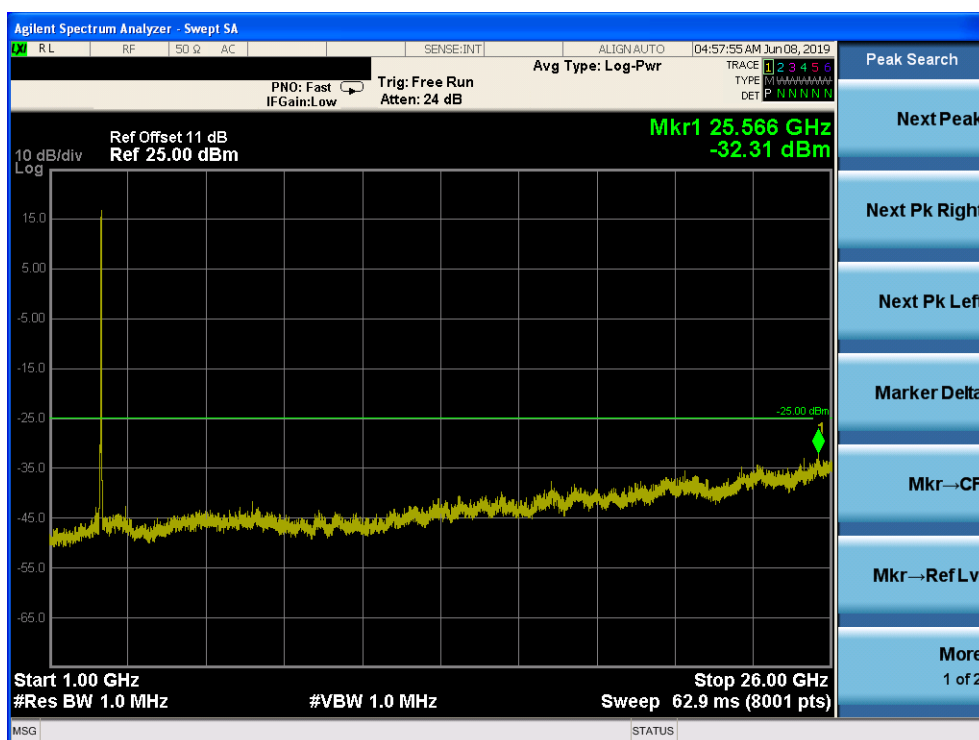
Band 41, UL Channel 41140, UL Frequency 2645.0, BW 20.0, NO. RB 100, RB POS. Low, QPSK



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 5
LTE Band 7
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	-0.93	3.12	27.58	23.53	225.424	Vertical	Pass
		1732.5	-0.91	3.27	27.61	23.43	220.293	Vertical	Pass
		1754.3	-0.83	3.29	27.63	23.51	224.388	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-1.82	3.12	27.58	22.64	183.654	Vertical	Pass
		1732.5	-1.83	3.27	27.61	22.51	178.238	Vertical	Pass
		1754.3	-1.75	3.29	27.63	22.59	181.552	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-0.77	3.13	27.61	23.71	234.963	Vertical	Pass
		1732.5	-0.66	3.27	27.61	23.68	233.346	Vertical	Pass
		1753.5	-0.60	3.30	27.62	23.72	235.505	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.01	3.13	27.61	22.47	176.604	Vertical	Pass
		1732.5	-2.08	3.27	27.61	22.26	168.267	Vertical	Pass
		1753.5	-1.94	3.30	27.62	22.38	172.982	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.10	3.13	27.63	23.40	218.776	Vertical	Pass
		1732.5	-0.73	3.27	27.61	23.61	229.615	Vertical	Pass
		1752.5	-0.81	3.30	27.60	23.49	223.357	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.16	3.13	27.63	22.34	171.396	Vertical	Pass
		1732.5	-1.87	3.27	27.61	22.47	176.604	Vertical	Pass
		1752.5	-1.81	3.30	27.60	22.49	177.419	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-1.07	3.15	27.64	23.42	219.786	Vertical	Pass
		1732.5	-0.94	3.31	27.61	23.36	216.770	Vertical	Pass
		1750	-0.71	3.33	27.59	23.55	226.464	Vertical	Pass
10.0MHz Band 16 QAM	50/0	1715	-1.95	3.15	27.64	22.54	179.473	Vertical	Pass
		1732.5	-1.89	3.31	27.61	22.41	174.181	Vertical	Pass
		1750	-1.87	3.33	27.59	22.39	173.380	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-0.76	3.15	27.65	23.65	231.739	Vertical	Pass
		1732.5	-1.32	3.31	27.61	22.98	198.609	Vertical	Pass
		1747.5	-1.15	3.33	27.57	23.09	203.704	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-1.99	3.15	27.65	22.51	178.238	Vertical	Pass
		1732.5	-2.04	3.31	27.61	22.26	168.267	Vertical	Pass
		1747.5	-1.85	3.33	27.57	22.39	173.380	Vertical	Pass

20.0MH z Band QPSK	100/0	1720	-0.75	3.17	27.66	23.74	236.592	Vertical	Pass
		1732.5	-0.54	3.32	27.61	23.75	237.137	Vertical	Pass
		1745	-0.53	3.36	27.56	23.67	232.809	Vertical	Pass
20.0MH z Band 16 QAM	100/0	1720	-0.66	3.17	27.66	23.83	241.546	Vertical	Pass
		1732.5	-0.45	3.32	27.61	23.84	242.103	Vertical	Pass
		1745	-0.40	3.36	27.56	23.80	239.883	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-1.15	3.12	27.58	23.31	214.289	Horizontal	Pass
		1732.5	-1.07	3.27	27.61	23.27	212.324	Horizontal	Pass
		1754.3	-1.26	3.29	27.63	23.08	203.236	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-2.22	3.12	27.58	22.24	167.494	Horizontal	Pass
		1732.5	-2.20	3.27	27.61	22.14	163.682	Horizontal	Pass
		1754.3	-2.38	3.29	27.63	21.96	157.036	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-1.07	3.13	27.61	23.41	219.280	Horizontal	Pass
		1732.5	-0.95	3.27	27.61	23.39	218.273	Horizontal	Pass
		1753.5	-1.15	3.30	27.62	23.17	207.491	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-2.50	3.13	27.61	21.98	157.761	Horizontal	Pass
		1732.5	-2.48	3.27	27.61	21.86	153.462	Horizontal	Pass
		1753.5	-2.20	3.30	27.62	22.12	162.930	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-1.06	3.13	27.63	23.44	220.800	Horizontal	Pass
		1732.5	-1.07	3.27	27.61	23.27	212.324	Horizontal	Pass
		1752.5	-1.11	3.30	27.60	23.19	208.449	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-2.57	3.13	27.63	21.93	155.955	Horizontal	Pass
		1732.5	-2.30	3.27	27.61	22.04	159.956	Horizontal	Pass
		1752.5	-2.23	3.30	27.60	22.07	161.065	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-1.13	3.15	27.64	23.36	216.770	Horizontal	Pass
		1732.5	-1.08	3.31	27.61	23.22	209.894	Horizontal	Pass
		1750	-0.99	3.33	27.59	23.27	212.324	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-2.35	3.15	27.64	22.14	163.682	Horizontal	Pass
		1732.5	-2.14	3.31	27.61	22.16	164.437	Horizontal	Pass
		1750	-2.21	3.33	27.59	22.05	160.325	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-1.29	3.15	27.65	23.21	209.411	Horizontal	Pass
		1732.5	-1.12	3.31	27.61	23.18	207.970	Horizontal	Pass
		1747.5	-1.00	3.33	27.57	23.24	210.863	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-2.17	3.15	27.65	22.33	171.002	Horizontal	Pass
		1732.5	-2.34	3.31	27.61	21.96	157.036	Horizontal	Pass
		1747.5	-2.07	3.33	27.57	22.17	164.816	Horizontal	Pass
20.0MHz Band	100/0	1720	-0.69	3.17	27.66	23.80	239.883	Horizontal	Pass
		1732.5	-0.65	3.32	27.61	23.64	231.206	Horizontal	Pass

QPSK		1745	-0.51	3.36	27.56	23.69	233.884	Horizontal	Pass
20.0MH	100/0	1720	-0.63	3.17	27.66	23.86	243.220	Horizontal	Pass
z Band		1732.5	-0.39	3.32	27.61	23.90	245.471	Horizontal	Pass
16 QAM		1745	-0.43	3.36	27.56	23.77	238.232	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.3 LTE BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	824.7	7.51	2.01	19.68	2.15	23.03	200.909	Vertical	Pass
		836.5	7.52	2.01	19.77	2.15	23.13	205.589	Vertical	Pass
		848.3	7.52	2.02	19.82	2.15	23.17	207.491	Vertical	Pass
1.4MHz Band 16 QAM	6/0	824.7	6.84	2.01	19.68	2.15	22.36	172.187	Vertical	Pass
		836.5	6.86	2.01	19.77	2.15	22.47	176.604	Vertical	Pass
		848.3	6.77	2.02	19.82	2.15	22.42	174.582	Vertical	Pass
3.0MHz Band QPSK	15/0	825.5	7.66	2.01	19.70	2.15	23.20	208.930	Vertical	Pass
		836.5	7.63	2.01	19.77	2.15	23.24	210.863	Vertical	Pass
		847.5	7.76	2.02	19.81	2.15	23.40	218.776	Vertical	Pass
3.0MHz Band 16 QAM	15/0	825.5	6.93	2.01	19.70	2.15	22.47	176.604	Vertical	Pass
		836.5	6.80	2.01	19.77	2.15	22.41	174.181	Vertical	Pass
		847.5	6.68	2.02	19.81	2.15	22.32	170.608	Vertical	Pass
5.0MHz Band QPSK	25/0	826.5	7.65	2.01	19.71	2.15	23.20	208.930	Vertical	Pass
		836.5	7.63	2.01	19.77	2.15	23.24	210.863	Vertical	Pass
		846.5	7.57	2.02	19.79	2.15	23.19	208.449	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	6.73	2.01	19.71	2.15	22.28	169.044	Vertical	Pass
		836.5	6.70	2.01	19.77	2.15	22.31	170.216	Vertical	Pass
		846.5	6.72	2.02	19.79	2.15	22.34	171.396	Vertical	Pass
10.0MHz z Band QPSK	50/0	829	7.91	2.01	19.73	2.15	23.48	222.844	Vertical	Pass
		836.5	7.80	2.01	19.77	2.15	23.41	219.280	Vertical	Pass
		844	7.76	2.02	19.78	2.15	23.37	217.270	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	829	7.63	2.01	19.73	2.15	23.20	208.930	Vertical	Pass
		836.5	7.62	2.01	19.77	2.15	23.23	210.378	Vertical	Pass
		844	7.82	2.02	19.78	2.15	23.43	220.293	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (ERP) for Band 5										
Mode	RB/ RB SIZE	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	7.59	2.01	19.68	2.15	23.11	204.644	Horizontal	Pass
		836.5	7.56	2.01	19.77	2.15	23.17	207.491	Horizontal	Pass
		848.3	7.49	2.02	19.82	2.15	23.14	206.063	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	6.58	2.01	19.68	2.15	22.10	162.181	Horizontal	Pass
		836.5	6.26	2.01	19.77	2.15	21.87	153.815	Horizontal	Pass
		848.3	6.37	2.02	19.82	2.15	22.02	159.221	Horizontal	Pass
3.0MHz Band QPSK	15/0	825.5	7.46	2.01	19.70	2.15	23.00	199.526	Horizontal	Pass
		836.5	7.51	2.01	19.77	2.15	23.12	205.116	Horizontal	Pass
		847.5	7.42	2.02	19.81	2.15	23.06	202.302	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	825.5	6.38	2.01	19.70	2.15	21.92	155.597	Horizontal	Pass
		836.5	6.36	2.01	19.77	2.15	21.97	157.398	Horizontal	Pass
		847.5	6.32	2.02	19.81	2.15	21.96	157.036	Horizontal	Pass
5.0MHz Band QPSK	25/0	826.5	7.26	2.01	19.71	2.15	22.81	190.985	Horizontal	Pass
		836.5	7.28	2.01	19.77	2.15	22.89	194.536	Horizontal	Pass
		846.5	7.32	2.02	19.79	2.15	22.94	196.789	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	6.42	2.01	19.71	2.15	21.97	157.398	Horizontal	Pass
		836.5	6.21	2.01	19.77	2.15	21.82	152.055	Horizontal	Pass
		846.5	6.28	2.02	19.79	2.15	21.90	154.882	Horizontal	Pass
10.0MHz z Band QPSK	50/0	829	7.76	2.01	19.73	2.15	23.33	215.278	Horizontal	Pass
		836.5	7.52	2.01	19.77	2.15	23.13	205.589	Horizontal	Pass
		844	7.73	2.02	19.78	2.15	23.34	215.774	Horizontal	Pass
10.0MHz z Band 16 QAM	50/0	829	7.82	2.01	19.73	2.15	23.39	218.273	Horizontal	Pass
		836.5	8.02	2.01	19.77	2.15	23.63	230.675	Horizontal	Pass
		844	7.86	2.02	19.78	2.15	23.47	222.331	Horizontal	Pass

Note:

SG Level= Signal generator output

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

8.4 LTE BAND 7

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	0.24	4.54	27.75	23.45	221.309	Vertical	Pass
		2535	0.48	4.69	27.72	23.51	224.388	Vertical	Pass
		2567.5	0.49	4.71	27.71	23.49	223.357	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-0.90	4.54	27.75	22.31	170.216	Vertical	Pass
		2535	-0.60	4.69	27.72	22.43	174.985	Vertical	Pass
		2567.5	-0.52	4.71	27.71	22.48	177.011	Vertical	Pass
10.0MH z Band QPSK	50/0	2505	0.20	4.55	27.76	23.41	219.280	Vertical	Pass
		2535	0.35	4.69	27.72	23.38	217.771	Vertical	Pass
		2565	0.29	4.72	27.70	23.27	212.324	Vertical	Pass
10.0MH z Band 16 QAM	50/0	2505	-0.97	4.55	27.76	22.24	167.494	Vertical	Pass
		2535	-0.77	4.69	27.72	22.26	168.267	Vertical	Pass
		2565	-0.65	4.72	27.70	22.33	171.002	Vertical	Pass
15.0MH z Band QPSK	75/0	2507.5	0.19	4.55	27.77	23.41	219.280	Vertical	Pass
		2535	0.36	4.69	27.72	23.39	218.273	Vertical	Pass
		2562.5	0.54	4.72	27.69	23.51	224.388	Vertical	Pass
15.0MH z Band 16 QAM	75/0	2507.5	-0.85	4.55	27.77	22.37	172.584	Vertical	Pass
		2535	-0.85	4.69	27.72	22.18	165.196	Vertical	Pass
		2562.5	-0.78	4.72	27.69	22.19	165.577	Vertical	Pass
20.0MH z Band QPSK	100/0	2510	0.53	4.57	27.78	23.74	236.592	Vertical	Pass
		2535	0.81	4.73	27.72	23.80	239.883	Vertical	Pass
		2560	0.80	4.75	27.68	23.73	236.048	Vertical	Pass
20.0MH z Band 16 QAM	100/0	2510	0.65	4.57	27.78	23.86	243.220	Vertical	Pass
		2535	0.77	4.73	27.72	23.76	237.684	Vertical	Pass
		2560	0.79	4.75	27.68	23.72	235.505	Vertical	Pass

Note:

SG Level= Signal generator output

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

Radiated Power (EIRP) for Band 7									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cabl e Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	-0.14	4.54	27.75	23.07	202.768	Horizontal	Pass
		2535	0.12	4.69	27.72	23.15	206.538	Horizontal	Pass
		2567.5	0.17	4.71	27.71	23.17	207.491	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-1.14	4.54	27.75	22.07	161.065	Horizontal	Pass
		2535	-1.07	4.69	27.72	21.96	157.036	Horizontal	Pass
		2567.5	-1.09	4.71	27.71	21.91	155.239	Horizontal	Pass
10.0MH z Band QPSK	50/0	2505	-0.23	4.55	27.76	22.98	198.609	Horizontal	Pass
		2535	-0.12	4.69	27.72	22.91	195.434	Horizontal	Pass
		2565	-0.09	4.72	27.70	22.89	194.536	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	2505	-1.29	4.55	27.76	21.92	155.597	Horizontal	Pass
		2535	-1.28	4.69	27.72	21.75	149.624	Horizontal	Pass
		2565	-1.11	4.72	27.70	21.87	153.815	Horizontal	Pass
15.0MH z Band QPSK	75/0	2507.5	-0.29	4.55	27.77	22.93	196.336	Horizontal	Pass
		2535	0.03	4.69	27.72	23.06	202.302	Horizontal	Pass
		2562.5	0.07	4.72	27.69	23.04	201.372	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	2507.5	-1.41	4.55	27.77	21.81	151.705	Horizontal	Pass
		2535	-1.26	4.69	27.72	21.77	150.314	Horizontal	Pass
		2562.5	-1.18	4.72	27.69	21.79	151.008	Horizontal	Pass
20.0MH z Band QPSK	100/ 0	2510	0.39	4.57	27.78	23.60	229.087	Horizontal	Pass
		2535	0.54	4.73	27.72	23.53	225.424	Horizontal	Pass
		2560	0.79	4.75	27.68	23.72	235.505	Horizontal	Pass
20.0MH z Band 16 QAM	100/ 0	2510	0.32	4.57	27.78	23.53	225.424	Horizontal	Pass
		2535	0.45	4.73	27.72	23.44	220.800	Horizontal	Pass
		2560	0.35	4.75	27.68	23.28	212.814	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)	Anten na Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	2557.5	-2.53	4.54	27.75	20.68	117.053	Vertical	Pass
		2605	-2.76	4.69	27.72	20.27	106.345	Vertical	Pass
		2652.5	-2.90	4.71	27.71	20.10	102.345	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2557.5	-3.76	4.54	27.75	19.45	88.009	Vertical	Pass
		2605	-3.60	4.69	27.72	19.43	87.791	Vertical	Pass
		2652.5	-3.99	4.71	27.71	19.01	79.540	Vertical	Pass
10.0MH z Band QPSK	50/0	2560	-2.86	4.55	27.76	20.35	108.448	Vertical	Pass
		2605	-2.81	4.69	27.72	20.22	105.109	Vertical	Pass
		2650	-2.30	4.72	27.7	20.68	116.974	Vertical	Pass
10.0MH z Band 16 QAM	50/0	2560	-3.94	4.55	27.76	19.27	84.561	Vertical	Pass
		2605	-3.83	4.69	27.72	19.20	83.090	Vertical	Pass
		2650	-3.65	4.72	27.7	19.33	85.619	Vertical	Pass
15.0MH z Band QPSK	75/0	2562.5	-2.44	4.55	27.77	20.78	119.541	Vertical	Pass
		2605	-2.73	4.69	27.72	20.30	107.173	Vertical	Pass
		2648.5	-2.66	4.72	27.69	20.31	107.312	Vertical	Pass
15.0MH z Band 16 QAM	75/0	2562.5	-3.53	4.55	27.77	19.69	93.144	Vertical	Pass
		2605	-3.32	4.69	27.72	19.71	93.534	Vertical	Pass
		2648.5	-3.50	4.72	27.69	19.47	88.463	Vertical	Pass
20.0MH z Band QPSK	100/0	2565	-2.84	4.57	27.78	20.37	108.979	Vertical	Pass
		2605	-2.49	4.73	27.72	20.50	112.258	Vertical	Pass
		2645	-2.10	4.75	27.68	20.83	120.962	Vertical	Pass
20.0MH z Band 16 QAM	100/0	2565	-2.42	4.57	27.78	20.79	119.950	Vertical	Pass
		2605	-2.96	4.73	27.72	20.03	100.693	Vertical	Pass
		2645	-2.76	4.75	27.68	20.17	103.992	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 41									
Mode	RB/ RB SIZE	Frequency	Result						Conclusio n
			SG Level (dBm)	Cable Loss (dBm)	Antenn a Gain (dB)	Max. EIRP Avera ge (dBm)	Max. EIRP	Polarizati on Of Max. ERP	
							Average (mW)		
5.0MHz Band QPSK	25/0	2557.5	-2.99	4.54	27.75	20.22	105.250	Horizontal	Pass
		2605	-3.36	4.69	27.72	19.67	92.615	Horizontal	Pass
		2652.5	-2.74	4.71	27.71	20.26	106.236	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2557.5	-4.18	4.54	27.75	19.03	79.963	Horizontal	Pass
		2605	-4.00	4.69	27.72	19.03	79.966	Horizontal	Pass
		2652.5	-3.81	4.71	27.71	19.19	82.916	Horizontal	Pass
10.0MH z Band QPSK	50/0	2560	-3.25	4.55	27.76	19.96	99.158	Horizontal	Pass
		2605	-2.64	4.69	27.72	20.39	109.474	Horizontal	Pass
		2650	-2.87	4.72	27.7	20.11	102.583	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	2560	-4.33	4.55	27.76	18.88	77.238	Horizontal	Pass
		2605	-3.11	4.69	27.72	19.92	98.100	Horizontal	Pass
		2650	-3.45	4.72	27.7	19.53	89.766	Horizontal	Pass
15.0MH z Band QPSK	75/0	2562.5	-2.51	4.55	27.77	20.71	117.831	Horizontal	Pass
		2605	-2.91	4.69	27.72	20.12	102.803	Horizontal	Pass
		2648.5	-3.12	4.72	27.69	19.85	96.503	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	2562.5	-4.08	4.55	27.77	19.14	82.129	Horizontal	Pass
		2605	-3.89	4.69	27.72	19.14	82.010	Horizontal	Pass
		2648.5	-3.26	4.72	27.69	19.71	93.564	Horizontal	Pass
20.0MH z Band QPSK	100/ 0	2565	-2.34	4.57	27.78	20.87	122.180	Horizontal	Pass
		2605	-2.74	4.73	27.72	20.25	105.920	Horizontal	Pass
		2645	-2.61	4.75	27.68	20.32	107.756	Horizontal	Pass
20.0MH z Band 16 QAM	100/ 0	2565	-2.32	4.57	27.78	20.89	122.744	Horizontal	Pass
		2605	-2.49	4.73	27.72	20.50	112.202	Horizontal	Pass
		2645	-2.71	4.75	27.68	20.22	105.196	Horizontal	Pass

Note:

SG Level= Signal generator output

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

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

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

LIMIT

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

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

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:

- a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB; and
- b. for mobile subscriber equipment, the attenuation shall not be less than $43 + 10 \log_{10}(p)$, dB at the channel edges and $55 + 10 \log_{10}(p)$ at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

LTE Band 4
LTE Band 5
LTE Band 7
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	-56.08	4.02	29.80	-30.30	-13	-17.30	Horizontal
3421.4	-59.15	4.02	29.80	-33.37	-13	-20.37	Vertical
5132.1	-60.30	5.24	35.84	-29.70	-13	-16.70	Vertical
5132.1	-59.08	5.24	35.84	-28.48	-13	-15.48	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-54.59	4.03	30.00	-28.62	-13	-15.62	Horizontal
3465.0	-56.08	4.03	30.00	-30.11	-13	-17.11	Vertical
5197.5	-59.92	5.25	35.86	-29.31	-13	-16.31	Vertical
5197.5	-57.74	5.25	35.86	-27.13	-13	-14.13	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-56.57	4.05	30.01	-30.61	-13	-17.61	Horizontal
3508.6	-59.08	4.05	30.01	-33.12	-13	-20.12	Vertical
5262.9	-58.47	5.26	35.86	-27.87	-13	-14.87	Vertical
5262.9	-59.66	5.26	35.86	-29.06	-13	-16.06	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
3440.0	-56.15	4.02	29.80	-30.37	-13	-17.37	Horizontal
3440.0	-56.20	4.02	29.80	-30.42	-13	-17.42	Vertical
5160.0	-62.44	5.24	35.84	-31.84	-13	-18.84	Vertical
5160.0	-60.30	5.24	35.84	-29.70	-13	-16.70	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-54.38	4.03	30.00	-28.41	-13	-15.41	Horizontal
3465.0	-57.25	4.03	30.00	-31.28	-13	-18.28	Vertical
5197.5	-58.76	5.25	35.86	-28.15	-13	-15.15	Vertical
5197.5	-60.02	5.25	35.86	-29.41	-13	-16.41	Horizontal
Test Results for High Channel 1745MHz							
2490.0	-53.66	2.91	27.68	-28.89	-13	-15.89	Horizontal
3490.0	-54.98	2.91	27.68	-30.21	-13	-17.21	Vertical
5235.0	-58.47	5.26	35.86	-27.87	-13	-14.87	Vertical
5235.0	-56.92	5.26	35.86	-26.32	-13	-13.32	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

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

9.2 LTE BAND 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	-56.87	2.78	27.50	-32.15	-13	-19.15	Horizontal
1649.4	-57.74	2.78	27.50	-33.02	-13	-20.02	Vertical
2474.1	-56.42	2.90	27.80	-31.52	-13	-18.52	Vertical
2474.1	-53.93	2.90	27.80	-29.03	-13	-16.03	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-55.44	2.78	27.48	-30.74	-13	-17.74	Horizontal
1673.0	-53.57	2.78	27.48	-28.87	-13	-15.87	Vertical
2509.5	-56.08	2.91	27.70	-31.29	-13	-18.29	Vertical
2509.5	-56.14	2.91	27.70	-31.35	-13	-18.35	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-55.98	2.78	27.43	-31.33	-13	-18.33	Horizontal
1696.6	-59.04	2.78	27.43	-34.39	-13	-21.39	Vertical
2544.9	-54.88	2.92	27.74	-30.06	-13	-17.06	Vertical
2544.9	-56.13	2.92	27.74	-31.31	-13	-18.31	Horizontal

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

Test Results for Low Channel 829MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1658.0	-56.95	2.78	27.50	-32.23	-13	-19.23	Horizontal
1658.0	-56.08	2.78	27.50	-31.36	-13	-18.36	Vertical
2487.0	-57.98	2.90	27.80	-33.08	-13	-20.08	Vertical
2487.0	-55.60	2.90	27.80	-30.70	-13	-17.70	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-55.10	2.78	27.48	-30.40	-13	-17.40	Horizontal
1673.0	-55.93	2.78	27.48	-31.23	-13	-18.23	Vertical
2509.5	-56.72	2.91	27.70	-31.93	-13	-18.93	Vertical
2509.5	-56.44	2.91	27.70	-31.65	-13	-18.65	Horizontal
Test Results for High Channel 844MHz							
1688.0	-54.75	2.78	27.43	-30.10	-13	-17.10	Horizontal
1688.0	-54.09	2.78	27.43	-29.44	-13	-16.44	Vertical
2532.0	-57.72	2.92	27.74	-32.90	-13	-19.90	Vertical
2532.0	-56.20	2.92	27.74	-31.38	-13	-18.38	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

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

9.3 LTE BAND 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	-85.82	5.23	35.81	-55.24	-25	-30.24	Horizontal
5005.0	-89.12	5.23	35.81	-58.54	-25	-33.54	Vertical
7507.5	-89.25	5.67	36.85	-58.07	-25	-33.07	Vertical
7507.5	-85.92	5.67	36.85	-54.74	-25	-29.74	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070.0	-82.82	5.23	35.82	-52.23	-25	-27.23	Horizontal
5070.0	-84.16	5.23	35.82	-53.57	-25	-28.57	Vertical
7605.0	-84.97	5.67	36.85	-53.79	-25	-28.79	Vertical
7605.0	-89.03	5.67	36.85	-57.85	-25	-32.85	Horizontal
Test Results for High Channel 1754.3MHz							
5135.0	-85.85	5.24	35.83	-55.26	-25	-30.26	Horizontal
5135.0	-82.35	5.24	35.83	-51.76	-25	-26.76	Vertical
7702.5	-86.24	5.68	36.87	-55.05	-25	-30.05	Vertical
7702.5	-86.97	5.68	36.87	-55.78	-25	-30.78	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	-84.16	5.23	35.82	-53.57	-25	-28.57	Horizontal
5020	-90.82	5.23	35.82	-60.23	-25	-35.23	Vertical
7530	-86.27	5.67	36.86	-55.08	-25	-30.08	Vertical
7530	-89.49	5.67	36.86	-58.30	-25	-33.30	Horizontal
Test Results for Mid Channel 1732.5MHz							
5070	-85.54	5.23	35.82	-54.95	-25	-29.95	Horizontal
5070	-90.13	5.23	35.82	-59.54	-25	-34.54	Vertical
7605	-87.95	5.67	36.85	-56.77	-25	-31.77	Vertical
7605	-86.46	5.67	36.85	-55.28	-25	-30.28	Horizontal
Test Results for High Channel 1754.3MHz							
5120	-85.54	5.24	35.83	-54.95	-25	-29.95	Horizontal
5120	-90.46	5.24	35.83	-59.87	-25	-34.87	Vertical
7680	-88.25	5.70	36.88	-57.07	-25	-32.07	Vertical
7680	-89.85	5.70	36.88	-58.67	-25	-33.67	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

Over Limit= : P_{Mea}(dBm)-Limit(dBm)

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

9.4 LTE BAND 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	-54.17	2.63	27.26	-29.54	-25	-4.54	Horizontal
5115	-52.11	2.63	27.26	-27.48	-25	-2.48	Vertical
7672.5	-55.31	2.67	27.58	-30.40	-25	-5.40	Vertical
7672.5	-57.20	2.67	27.58	-32.29	-25	-7.29	Horizontal
Test Results for Mid Channel 2605MHz							
5210	-56.37	2.62	27.28	-31.71	-25	-6.71	Horizontal
5210	-55.02	2.62	27.28	-30.36	-25	-5.36	Vertical
7815	-54.00	2.85	27.62	-29.23	-25	-4.23	Vertical
7815	-51.56	2.85	27.62	-26.79	-25	-1.79	Horizontal
Test Results for High Channel 2652.5MHz							
5305	-55.89	2.64	27.28	-31.25	-25	-6.25	Horizontal
5305	-52.70	2.64	27.28	-28.06	-25	-3.06	Vertical
7957.5	-52.48	2.85	27.70	-27.63	-25	-2.63	Vertical
7957.5	-53.32	2.85	27.70	-28.47	-25	-3.47	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	-53.79	2.63	27.30	-29.12	-25	-4.12	Horizontal
5130	-58.02	2.63	27.30	-33.35	-25	-8.35	Vertical
7695	-54.30	2.67	27.62	-29.35	-25	-4.35	Vertical
7695	-57.10	2.67	27.62	-32.15	-25	-7.15	Horizontal
Test Results for Mid Channel 2605MHz							
5210	-53.27	2.62	27.33	-28.56	-25	-3.56	Horizontal
5210	-54.74	2.62	27.33	-30.03	-25	-5.03	Vertical
7815	-55.07	2.85	27.67	-30.25	-25	-5.25	Vertical
7815	-55.38	2.85	27.67	-30.56	-25	-5.56	Horizontal
Test Results for High Channel 2645MHz							
5290	-51.86	2.64	27.33	-27.17	-25	-2.17	Horizontal
5290	-53.81	2.64	27.33	-29.12	-25	-4.12	Vertical
7935	-54.77	2.85	27.67	-29.95	-25	-4.95	Vertical
7935	-55.47	2.85	27.67	-30.65	-25	-5.65	Horizontal

Note: P_{Mea}(dBm)= Power(dBm)+ AR_{pl} (dBm)

. Over Limit= : P_{Mea}(dBm)-Limit(dBm)

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

10. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = -30° to $+50^{\circ}\text{C}$

Voltage = low voltage, DC 3.2V, Normal, DC 3.85V and High voltage, DC 4.4V.

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to -30°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

LTE Band 4
LTE Band 5
LTE Band 7
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)				
3.2	1732.5	11	0.006349	2.5
3.85	1732.5	5.1	0.002944	2.5
4.4	1732.5	6.8	0.003925	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	-11.3	-0.006522	2.5
Extreme (50C)	1732.5	5.9	0.003405	2.5
Extreme (40C)	1732.5	7	0.004040	2.5
Extreme (30C)	1732.5	-8.6	-0.004964	2.5
Extreme (10C)	1732.5	-10.4	-0.006003	2.5
Extreme (0C)	1732.5	11.1	0.006407	2.5
Extreme (-10C)	1732.5	8.8	0.005079	2.5
Extreme (-20C)	1732.5	10	0.005772	2.5
Extreme (-30C)	1732.5	4.5	0.002597	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)				
3.2	1732.5	4.9	0.002828	2.5
3.85	1732.5	-8.8	-0.005079	2.5
4.4	1732.5	-6.5	-0.003752	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	9.7	0.005599	2.5
Extreme (50C)	1732.5	8.1	0.004675	2.5
Extreme (40C)	1732.5	6.5	0.003752	2.5
Extreme (30C)	1732.5	-11.5	-0.006638	2.5
Extreme (10C)	1732.5	-8.2	-0.004733	2.5
Extreme (0C)	1732.5	-12.7	-0.007330	2.5
Extreme (-10C)	1732.5	7.2	0.004156	2.5
Extreme (-20C)	1732.5	6.6	0.003810	2.5
Extreme (-30C)	1732.5	6.7	0.003867	2.5

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

10.2 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)				
3.2	836.5	8.9	0.010640	2.5
3.85	836.5	8.4	0.010042	2.5
4.4	836.5	7.6	0.009085	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	-9.4	-0.011237	2.5
Extreme (50C)	836.5	-12.6	-0.015063	2.5
Extreme (40C)	836.5	-13.9	-0.016617	2.5
Extreme (30C)	836.5	2.7	0.003228	2.5
Extreme (10C)	836.5	3.9	0.004662	2.5
Extreme (0C)	836.5	6.3	0.007531	2.5
Extreme (-10C)	836.5	-8.8	-0.010520	2.5
Extreme (-20C)	836.5	4.9	0.005858	2.5
Extreme (-30C)	836.5	-7.8	-0.009325	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)				
3.2	836.5	6.5	0.007770	2.5
3.85	836.5	7.3	0.008727	2.5
4.4	836.5	-11.4	-0.013628	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	9.9	0.011835	2.5
Extreme (50C)	836.5	4.2	0.005021	2.5
Extreme (40C)	836.5	7	0.008368	2.5
Extreme (30C)	836.5	-11	-0.013150	2.5
Extreme (10C)	836.5	-8.9	-0.010640	2.5
Extreme (0C)	836.5	2.1	0.002510	2.5
Extreme (-10C)	836.5	3.5	0.004184	2.5
Extreme (-20C)	836.5	5.4	0.006455	2.5
Extreme (-30C)	836.5	6.7	0.008010	2.5

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

10.3 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)				
3.2	2535	-9.5	-0.003748	2.5
3.85	2535	5.4	0.002130	2.5
4.4	2535	8	0.003156	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	4	0.001578	2.5
Extreme (50C)	2535	5.6	0.002209	2.5
Extreme (40C)	2535	-12.5	-0.004931	2.5
Extreme (30C)	2535	-13.7	-0.005404	2.5
Extreme (10C)	2535	-11.4	-0.004497	2.5
Extreme (0C)	2535	-8.1	-0.003195	2.5
Extreme (-10C)	2535	8	0.003156	2.5
Extreme (-20C)	2535	9.9	0.003905	2.5
Extreme (-30C)	2535	6.2	0.002446	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	-11.5	-0.004536	2.5
3.85	2535	-8.6	-0.003393	2.5
4.4	2535	6.8	0.002682	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	3.9	0.001538	2.5
Extreme (50C)	2535	4.5	0.001775	2.5
Extreme (40C)	2535	5.3	0.002091	2.5
Extreme (30C)	2535	5.6	0.002209	2.5
Extreme (10C)	2535	-13.7	-0.005404	2.5
Extreme (0C)	2535	-11.4	-0.004497	2.5
Extreme (-10C)	2535	-11.8	-0.004655	2.5
Extreme (-20C)	2535	1.6	0.000631	2.5
Extreme (-30C)	2535	4	0.001578	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)				
3.2	2605	2.5	0.003434	2.5
3.85	2605	3.6	0.004945	2.5
4.4	2605	4.1	0.005632	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	1.5	0.000576	2.5
Extreme (50C)	2605	1.3	0.000499	2.5
Extreme (40C)	2605	2.2	0.000845	2.5
Extreme (30C)	2605	3.2	0.001228	2.5
Extreme (10C)	2605	2.3	0.000898	2.5
Extreme (0C)	2605	2.6	0.000998	2.5
Extreme (-10C)	2605	4.1	0.001574	2.5
Extreme (-20C)	2605	3.5	0.001344	2.5
Extreme (-30C)	2605	3.3	0.001267	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)				
3.2	2605	3.5	0.001344	2.5
3.85	2605	2.6	0.000998	2.5
4.4	2605	3.4	0.001305	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	5.1	0.001958	2.5
Extreme (50C)	2605	4.5	0.001727	2.5
Extreme (40C)	2605	3.2	0.001228	2.5
Extreme (30C)	2605	3.4	0.001305	2.5
Extreme (10C)	2605	0.6	0.000230	2.5
Extreme (0C)	2605	2.5	0.000960	2.5
Extreme (-10C)	2605	2.7	0.001036	2.5
Extreme (-20C)	2605	2.9	0.001113	2.5
Extreme (-30C)	2605	4.1	0.001574	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.

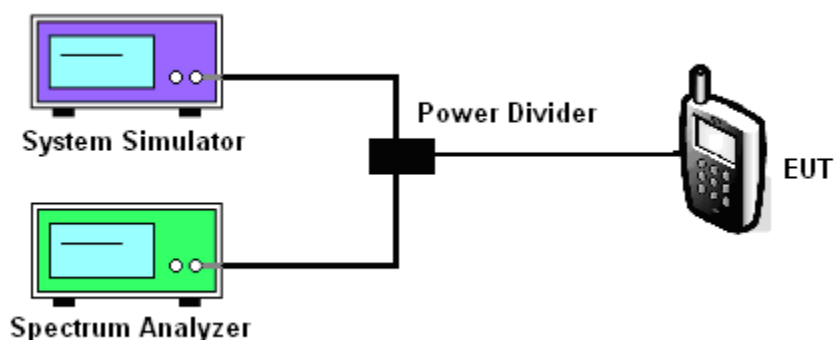
11.2 Measuring Instruments

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

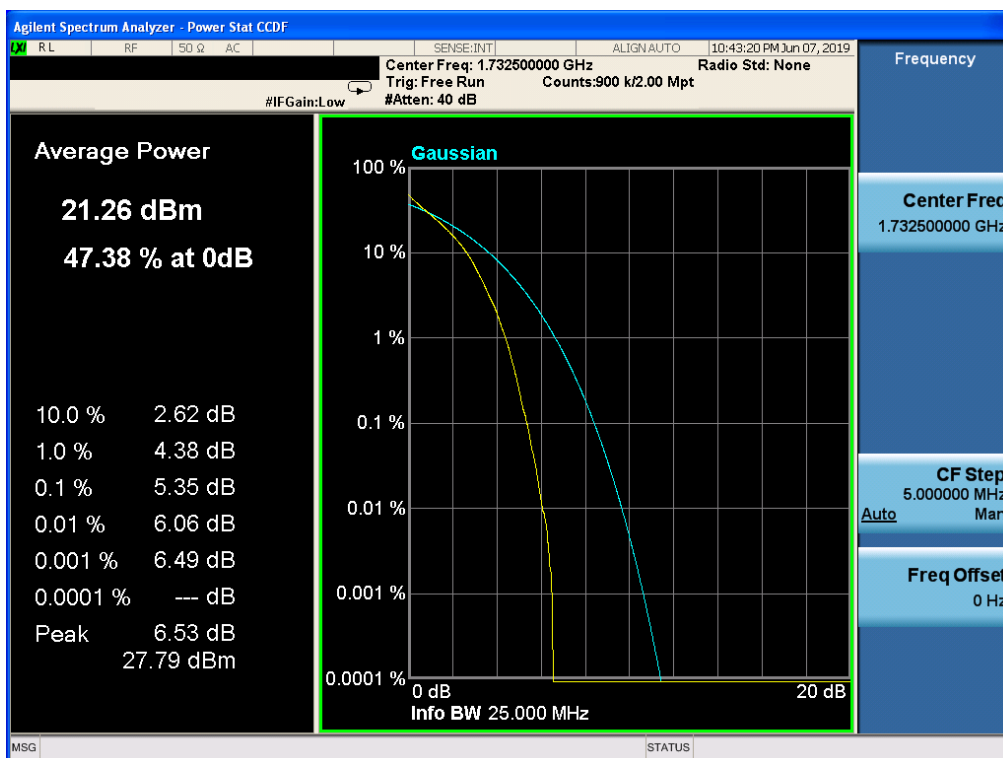
- LTE Band 4
- LTE Band 5
- LTE Band 7
- LTE Band 41

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
4	20175	1732.5	1.4	1	Low	QPSK	5.35
4	20175	1732.5	1.4	1	Low	16-QAM	6.13
4	20175	1732.5	3.0	1	Low	QPSK	5.40
4	20175	1732.5	3.0	1	Low	16-QAM	6.20
4	20175	1732.5	5.0	1	Low	QPSK	5.14
4	20175	1732.5	5.0	1	Low	16-QAM	5.59
4	20175	1732.5	10.0	1	Low	QPSK	4.79
4	20175	1732.5	10.0	1	Low	16-QAM	5.69
4	20175	1732.5	15.0	1	Low	QPSK	4.59
4	20175	1732.5	15.0	1	Low	16-QAM	5.40
4	20175	1732.5	20.0	1	Low	QPSK	4.67
4	20175	1732.5	20.0	1	Low	16-QAM	5.73
5	20525	836.5	1.4	1	Low	QPSK	5.42
5	20525	836.5	1.4	1	Low	16-QAM	6.14
5	20525	836.5	3.0	1	Low	QPSK	5.69
5	20525	836.5	3.0	1	Low	16-QAM	6.50
5	20525	836.5	5.0	1	Low	QPSK	6.02
5	20525	836.5	5.0	1	Low	16-QAM	6.03
5	20525	836.5	10.0	1	Low	QPSK	5.53
5	20525	836.5	10.0	1	Low	16-QAM	6.56
7	21100	2535.0	5.0	1	Low	QPSK	4.70

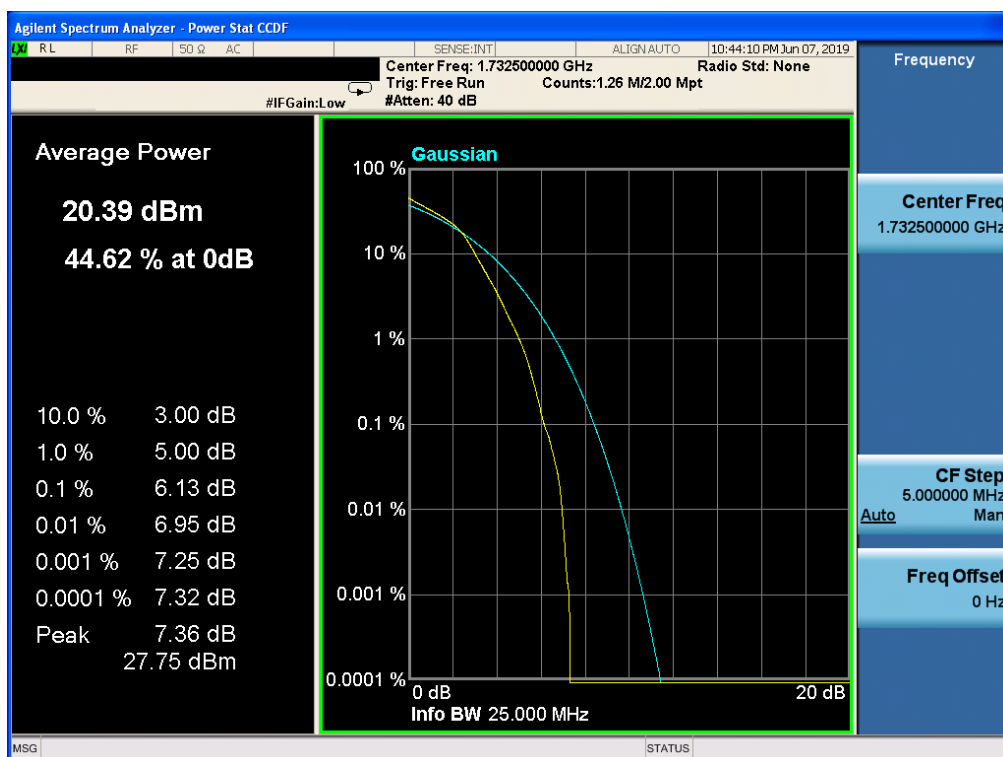
7	21100	2535.0	5.0	1	Low	16-QAM	5.25
7	21100	2535.0	10.0	1	Low	QPSK	4.58
7	21100	2535.0	10.0	1	Low	16-QAM	5.41
7	21100	2535.0	15.0	1	Low	QPSK	4.77
7	21100	2535.0	15.0	1	Low	16-QAM	5.46
7	21100	2535.0	20.0	1	Low	QPSK	4.88
7	21100	2535.0	20.0	1	Low	16-QAM	5.33
41	40740	2605.0	5.0	1	Low	QPSK	5.02
41	40740	2605.0	5.0	1	Low	16-QAM	5.89
41	40740	2605.0	10.0	1	Low	QPSK	5.27
41	40740	2605.0	10.0	1	Low	16-QAM	6.50
41	40740	2605.0	15.0	1	Low	QPSK	5.22
41	40740	2605.0	15.0	1	Low	16-QAM	6.31
41	40740	2605.0	20.0	1	Low	QPSK	4.71
41	40740	2605.0	20.0	1	Low	16-QAM	5.41

11.5 LTE BAND 4

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



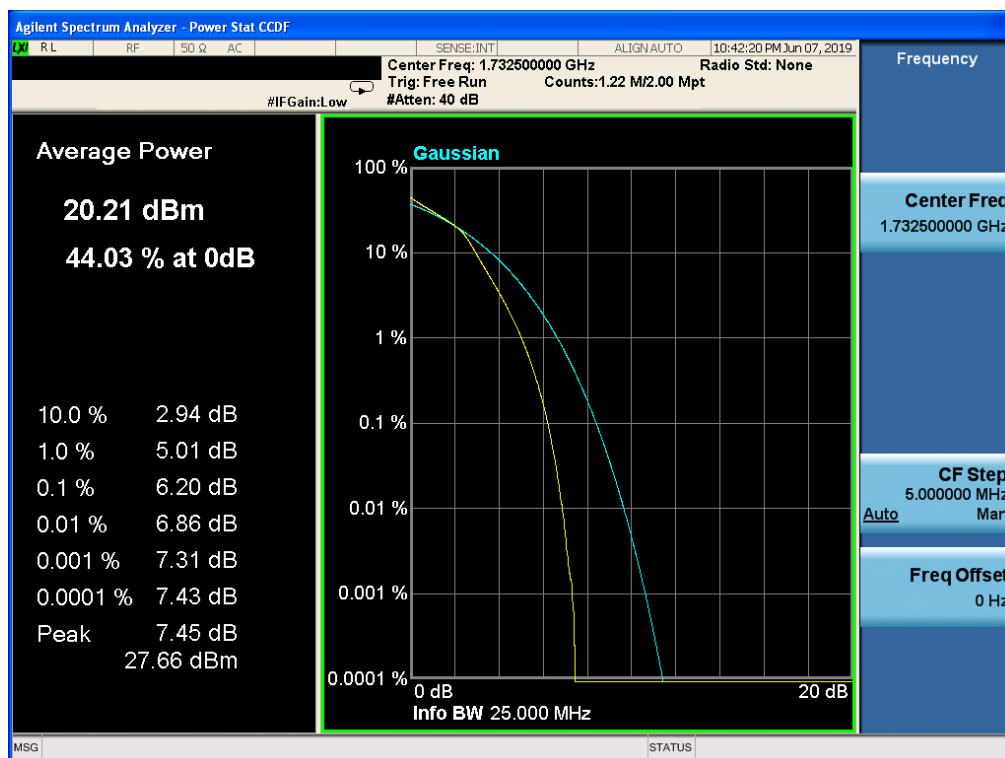
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 1.4, NO. RB 1, RB POS. Low, 16-QAM



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



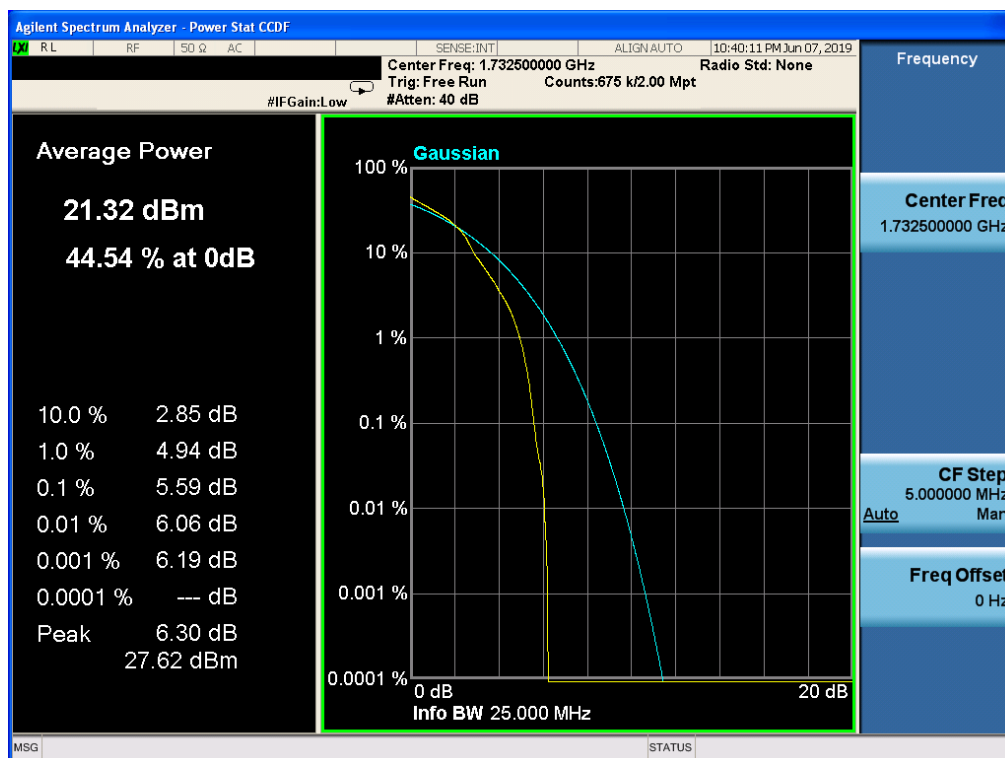
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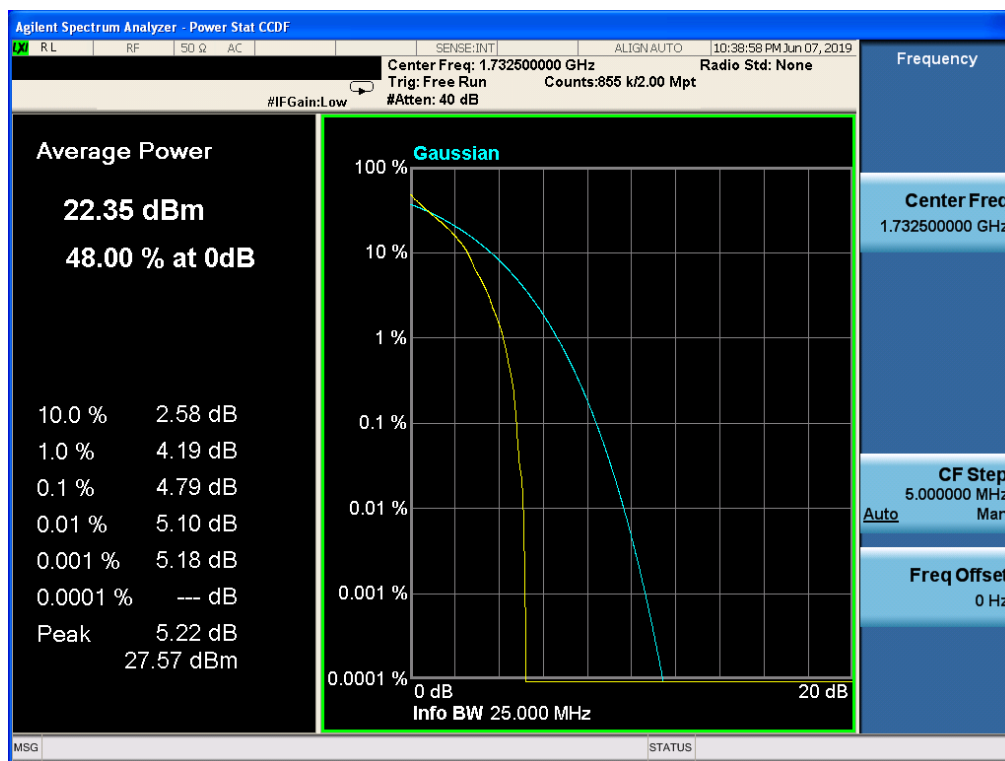
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 5.0, NO. RB 1, RB POS. Low, QPSK



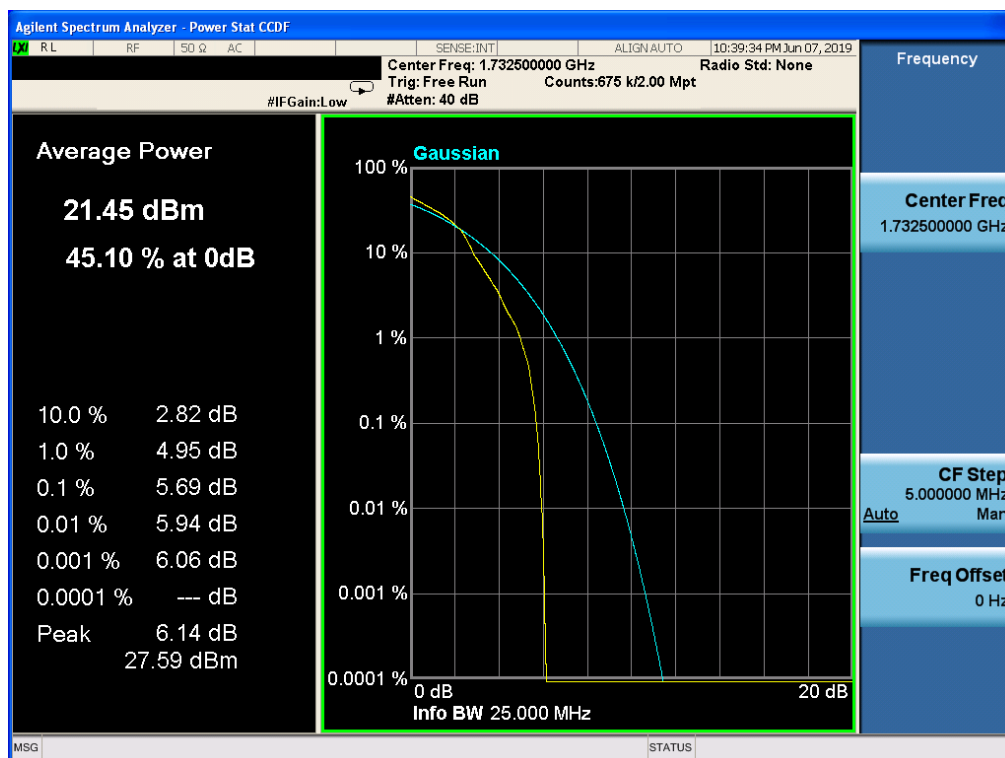
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



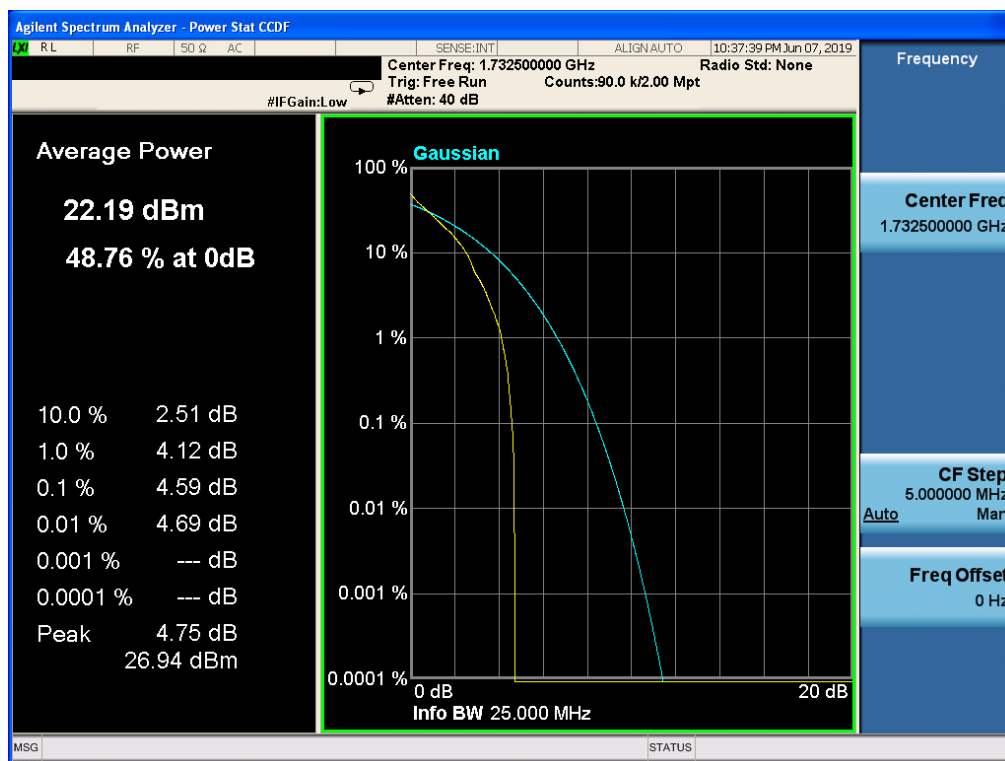
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 10.0, NO. RB 1, RB POS. Low, QPSK



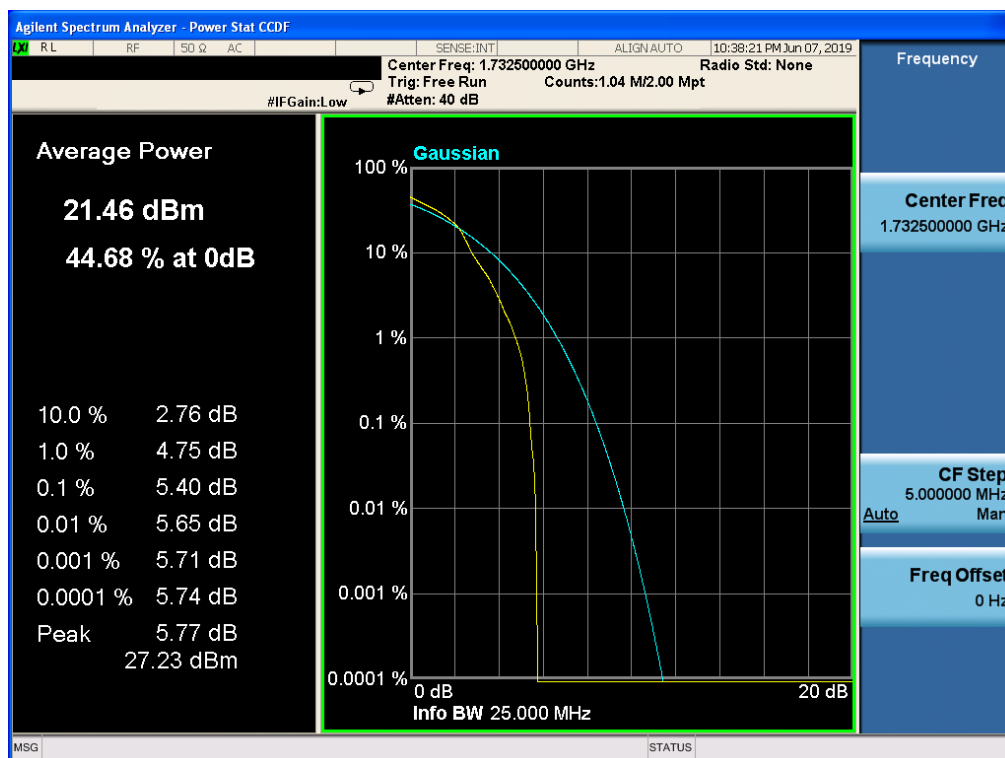
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



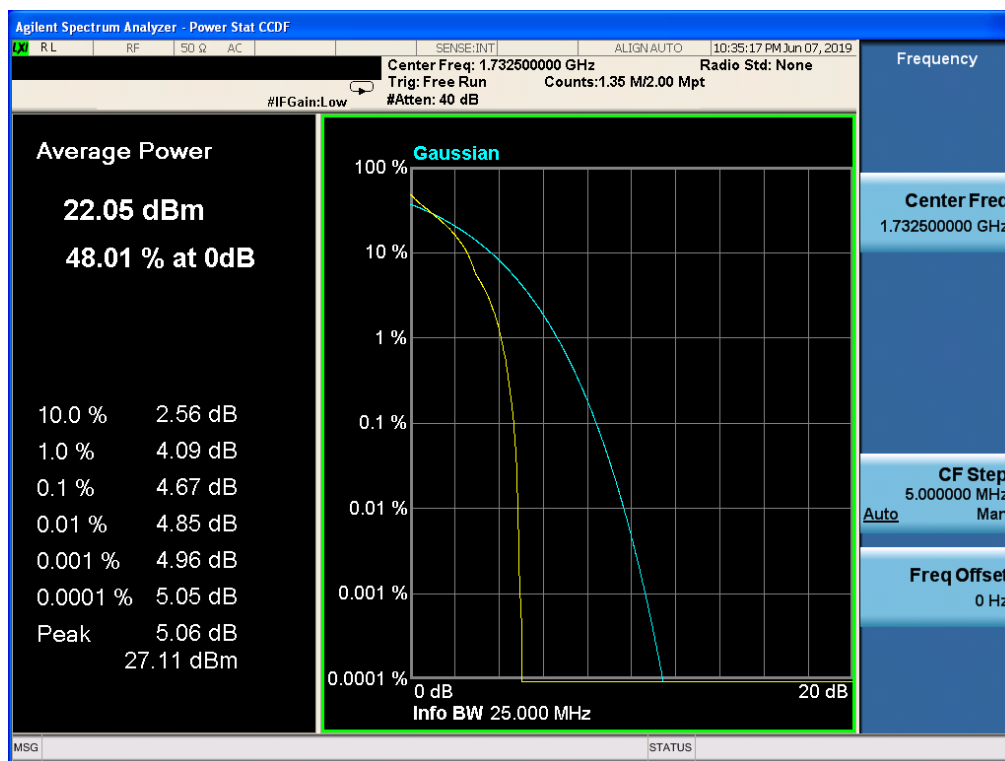
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 15.0, NO. RB 1, RB POS. Low, QPSK



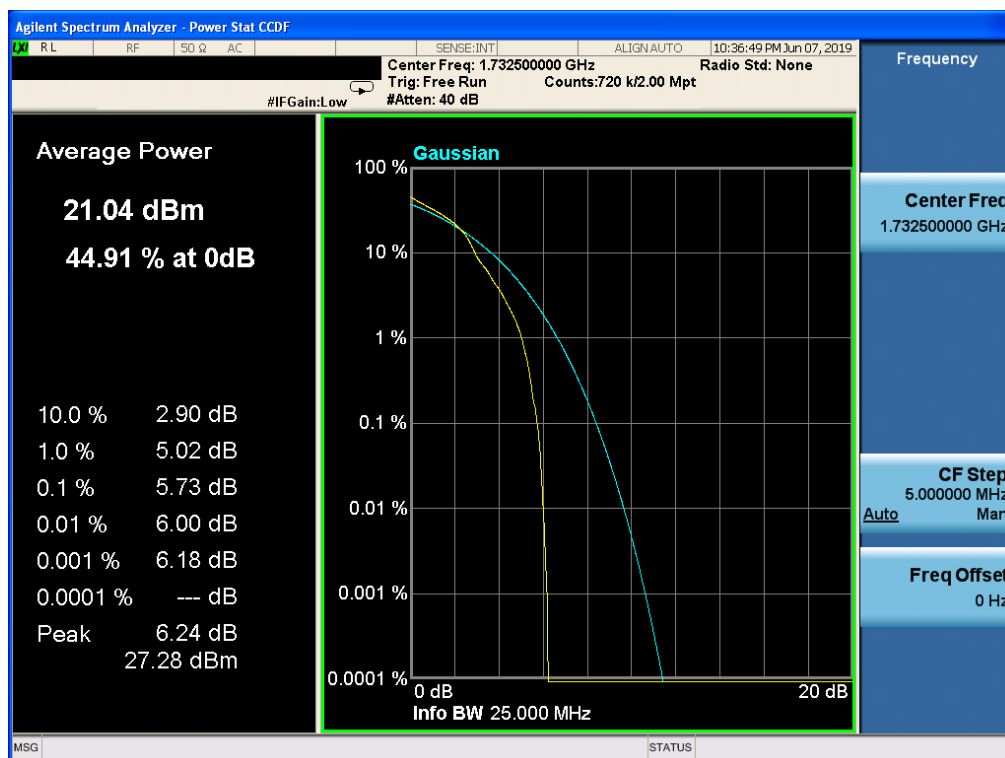
Band 4, UL Channel 20175, UL Frequency 1732.5, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



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

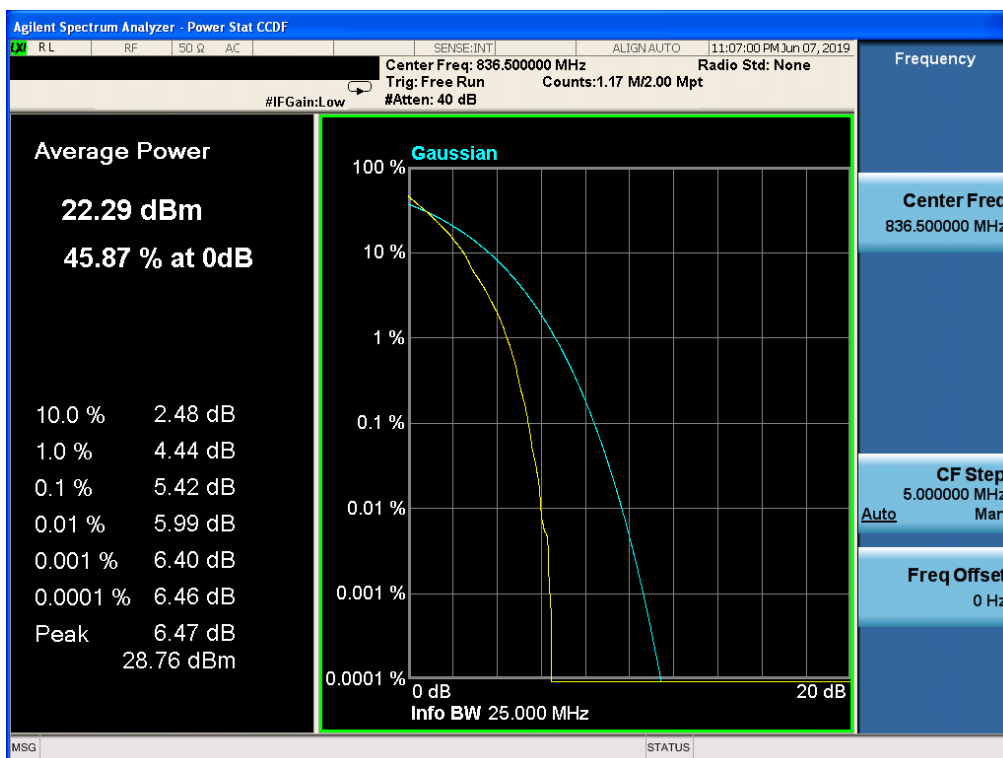


Band 4, UL Channel 20175, UL Frequency 1732.5, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM



11.6 LTE BAND 5

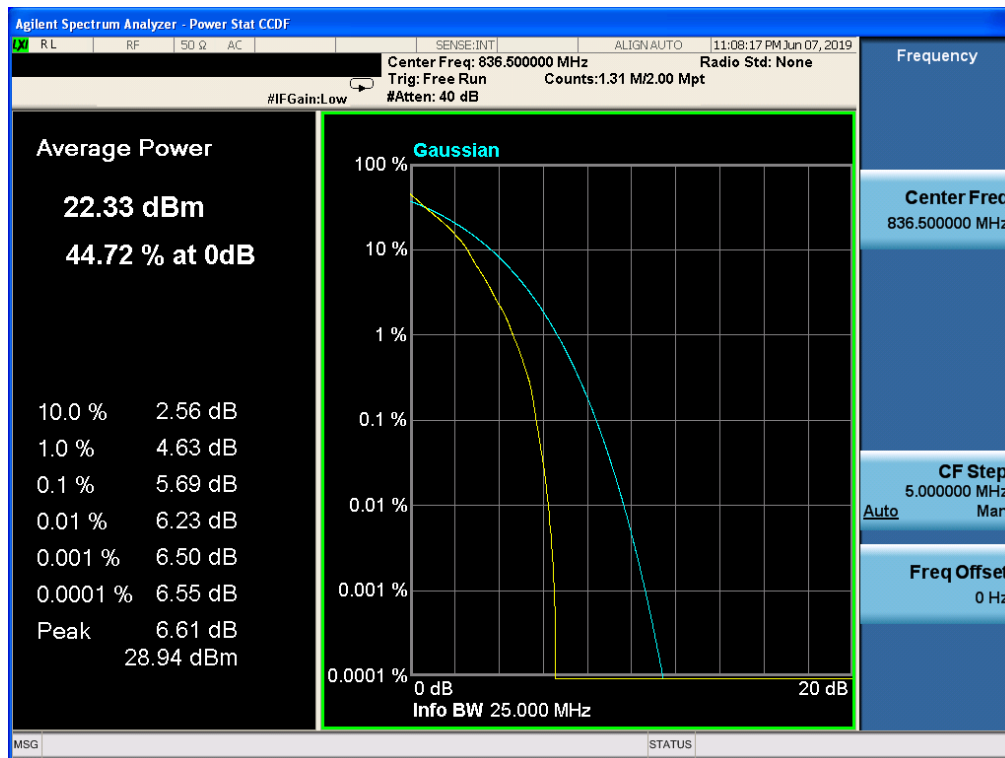
Band 5, UL Channel 20525, UL Frequency 836.5, BW 1.4, NO. RB 1, RB POS. Low, QPSK



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



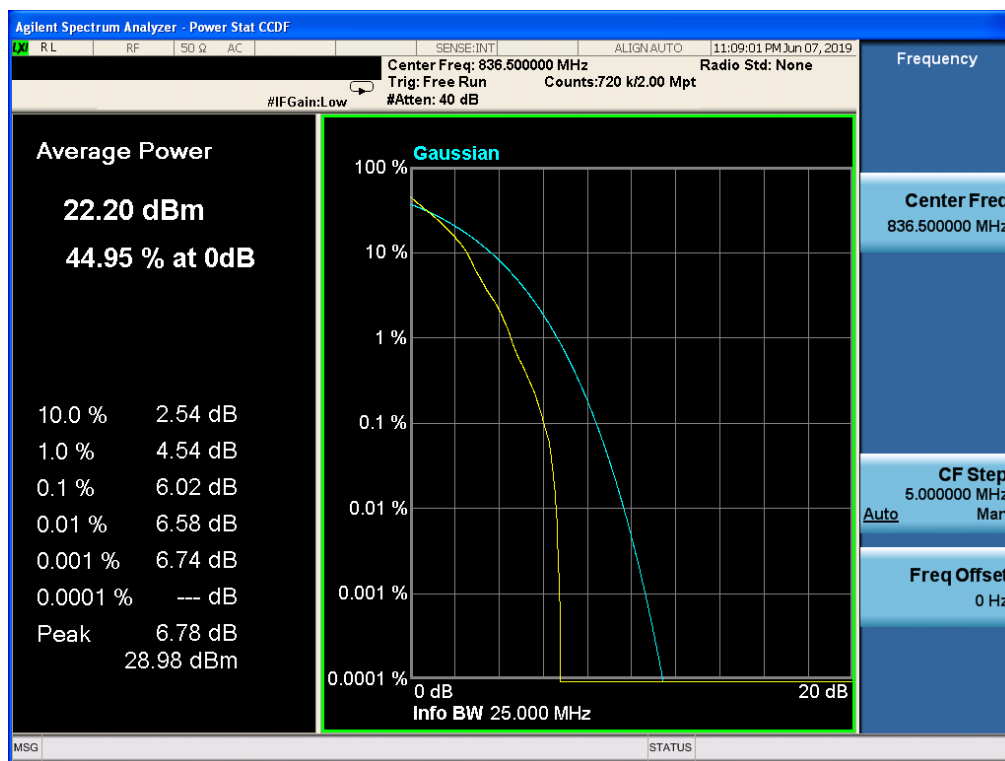
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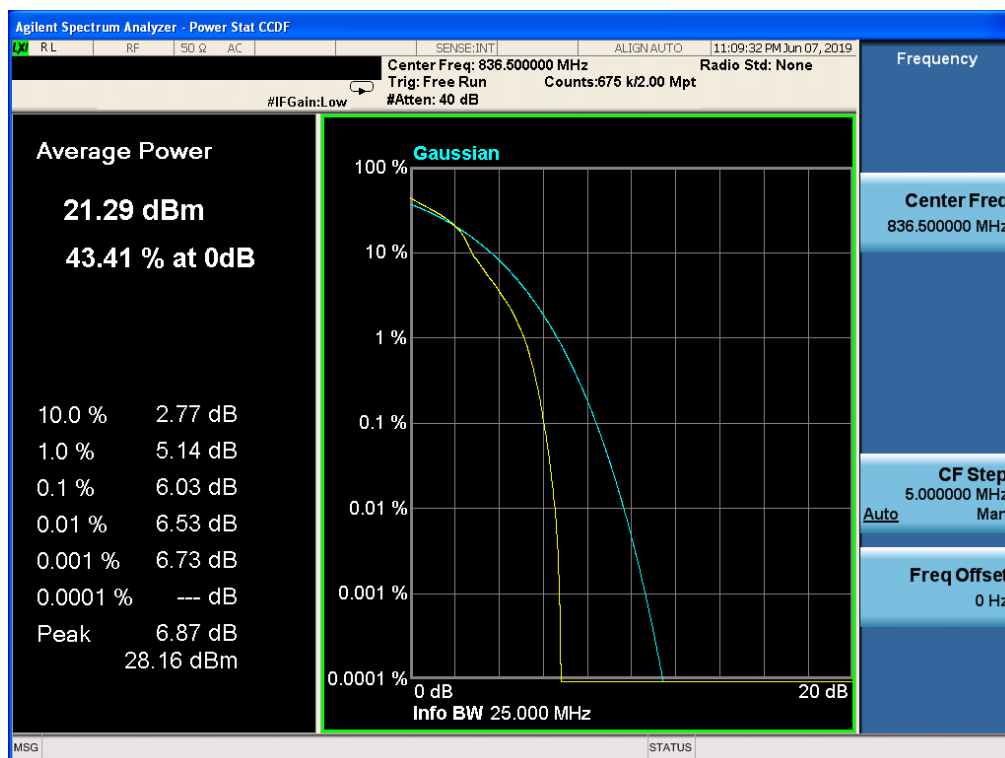
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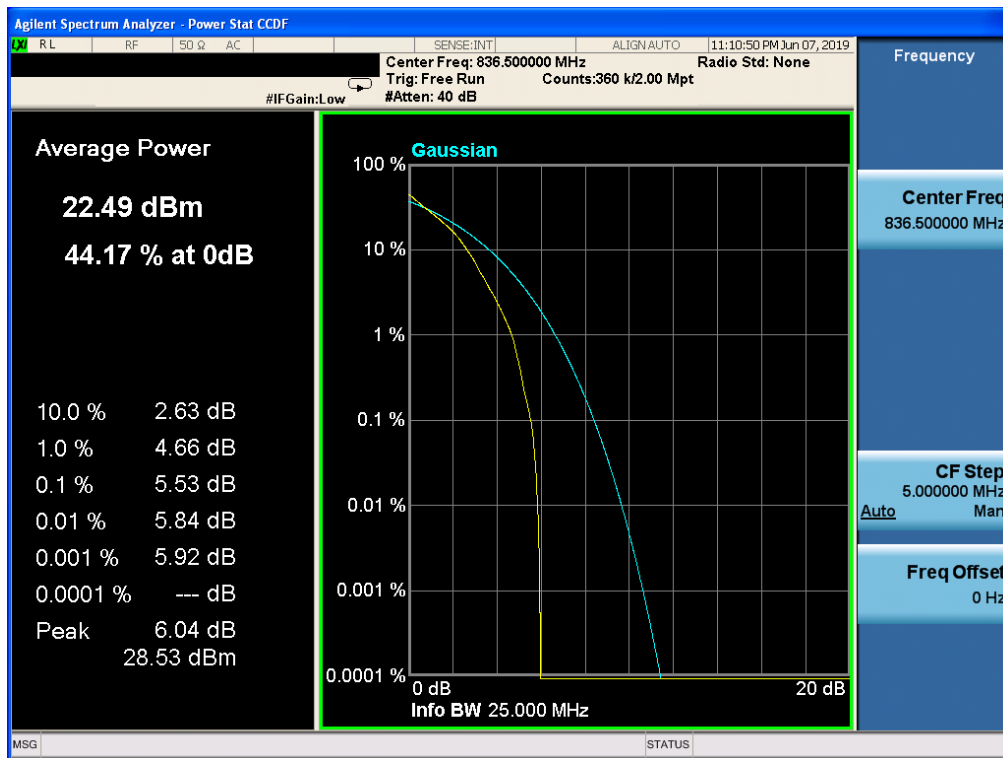
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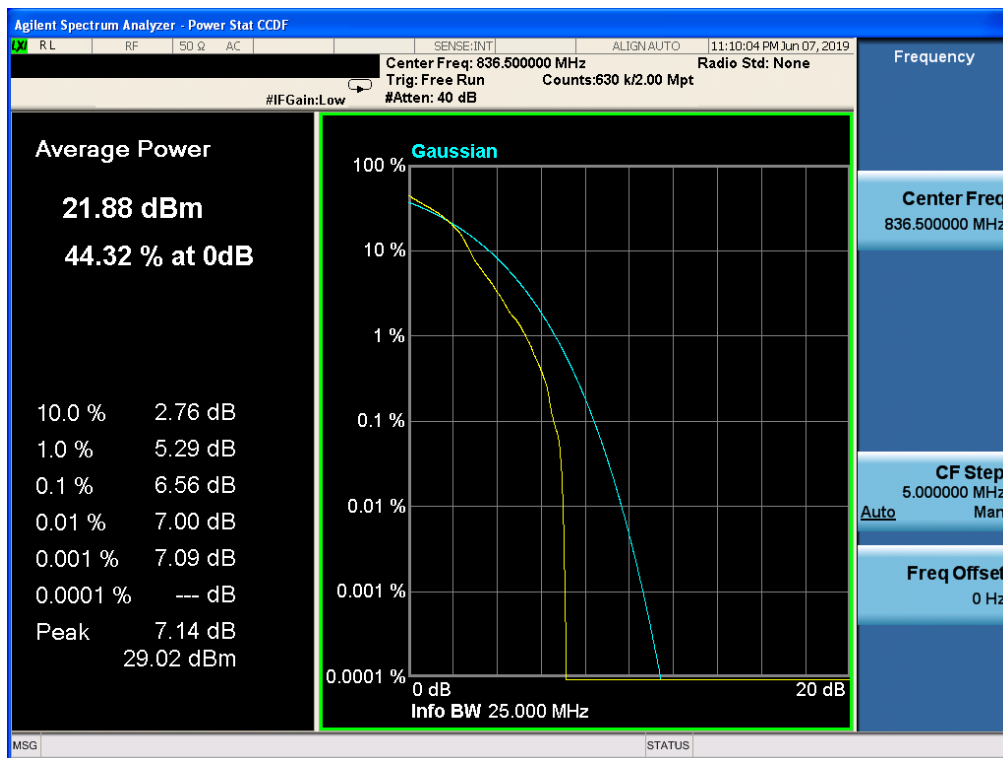
Band 5, UL Channel 20525, UL Frequency 836.5, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



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

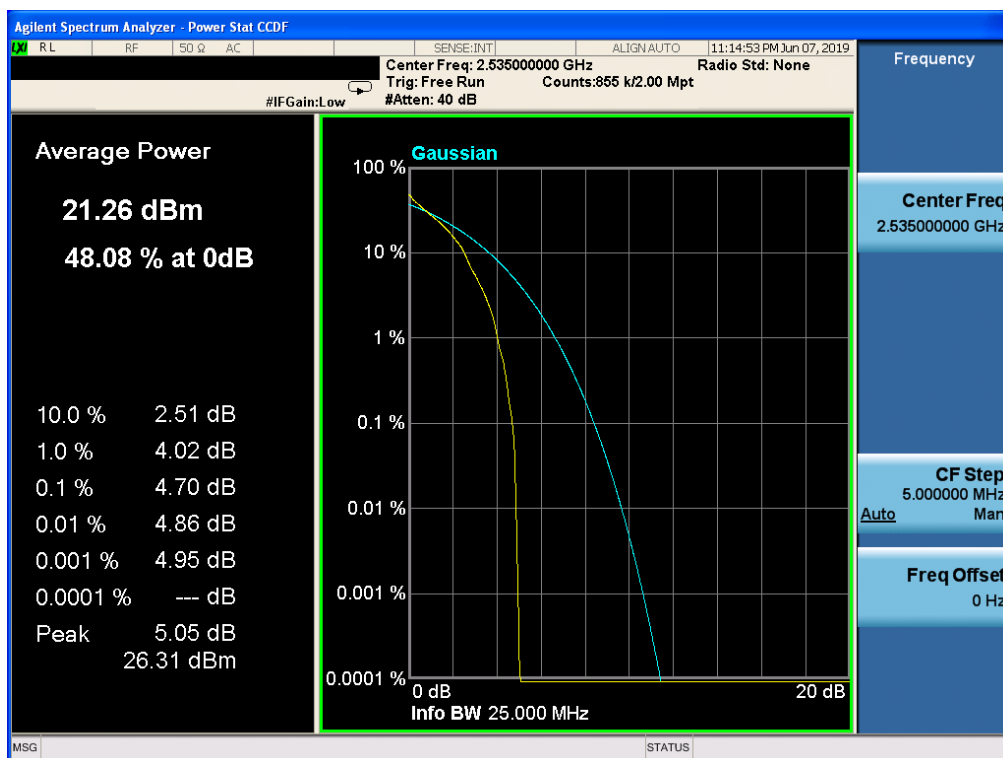


Band 5, UL Channel 20525, UL Frequency 836.5, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM

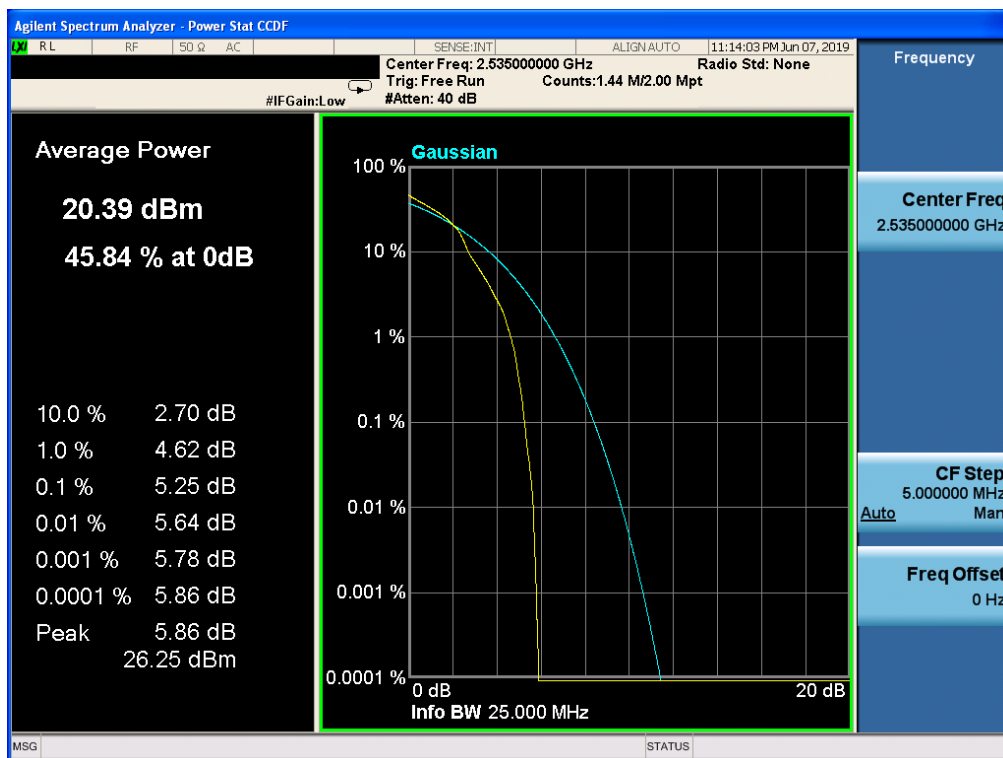


11.7 LTE BAND 7

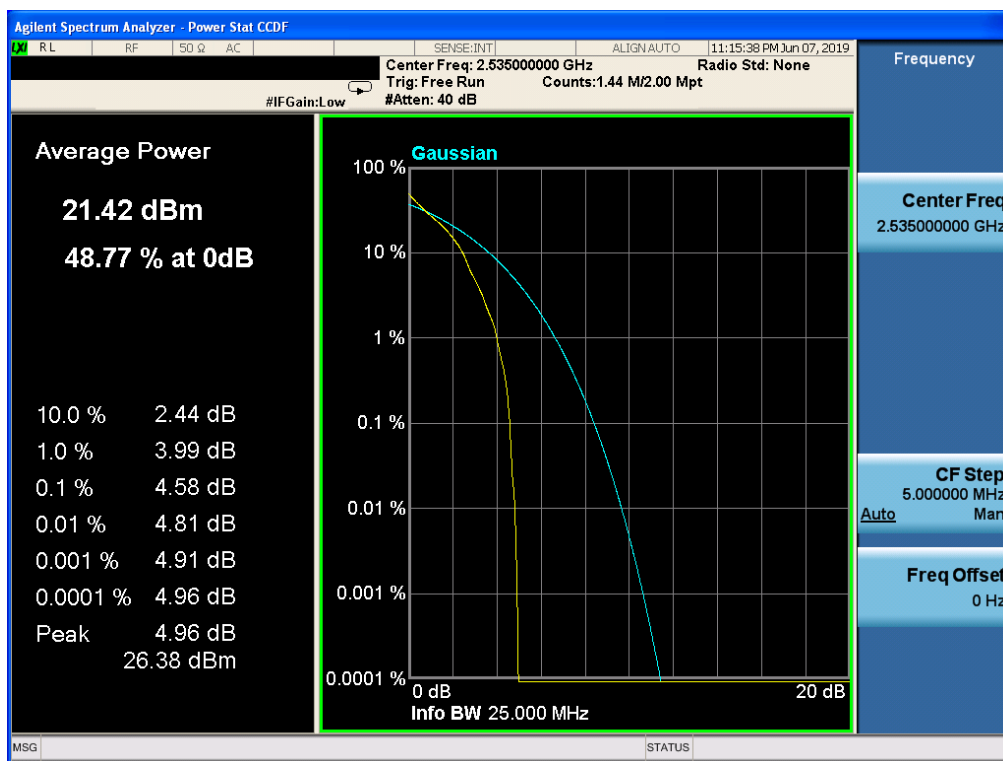
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 5.0, NO. RB 25, RB POS. Low, QPSK



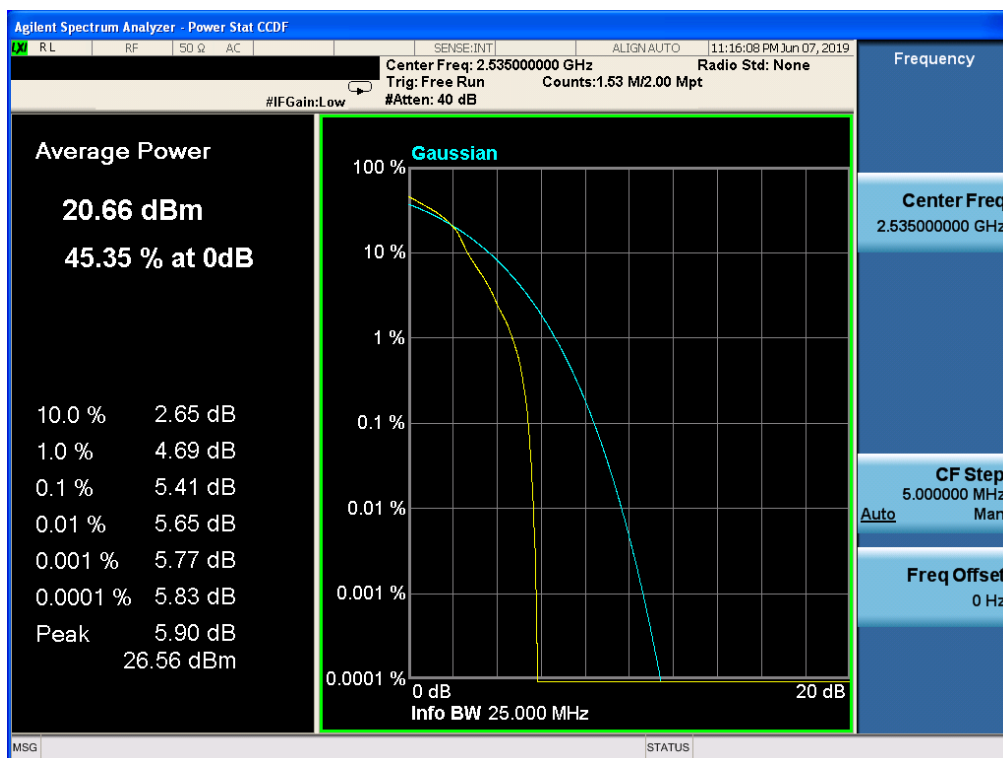
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 5.0, NO. RB 25, RB POS. Low, 16-QAM



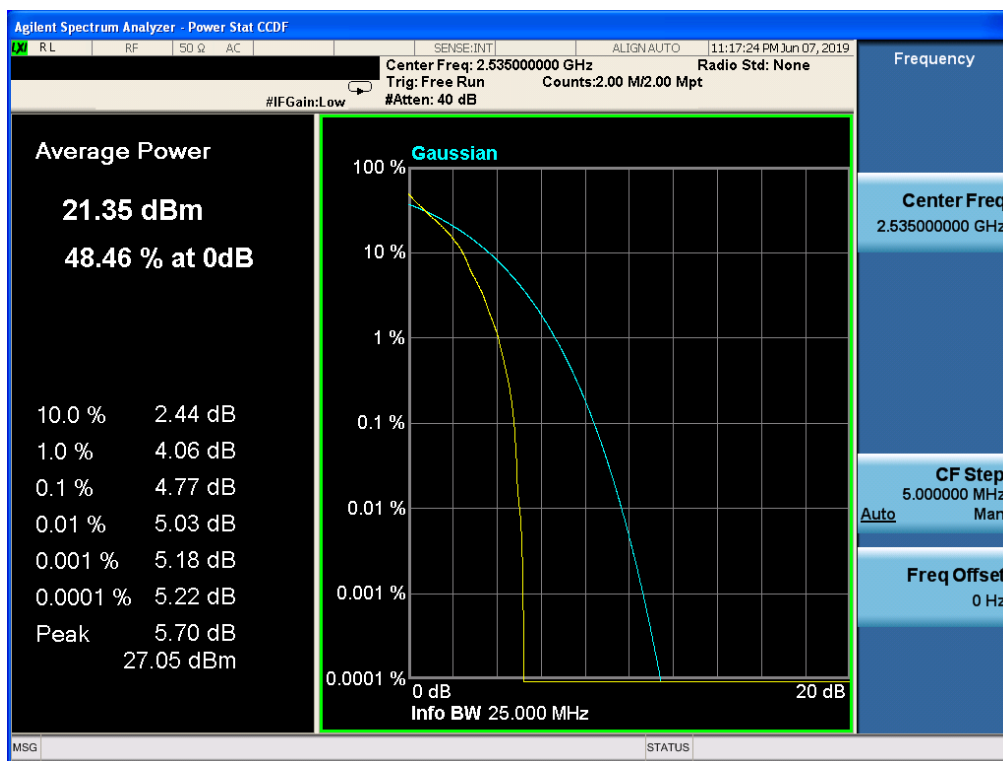
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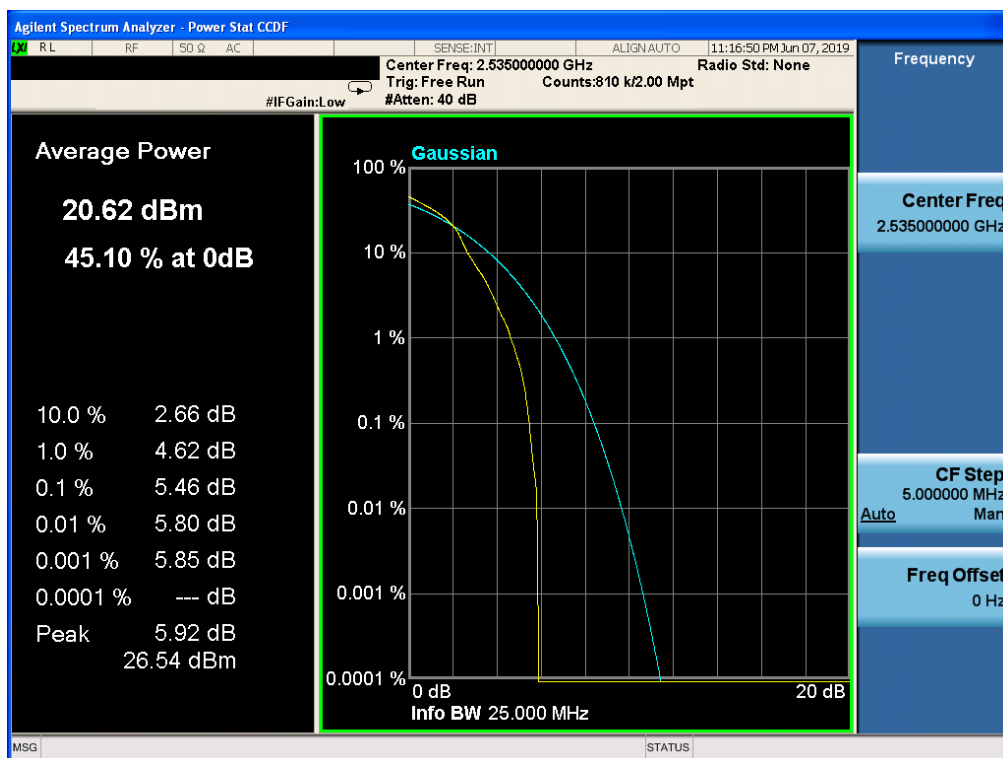
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 10.0, NO. RB 1, RB POS. Low, 16-QAM



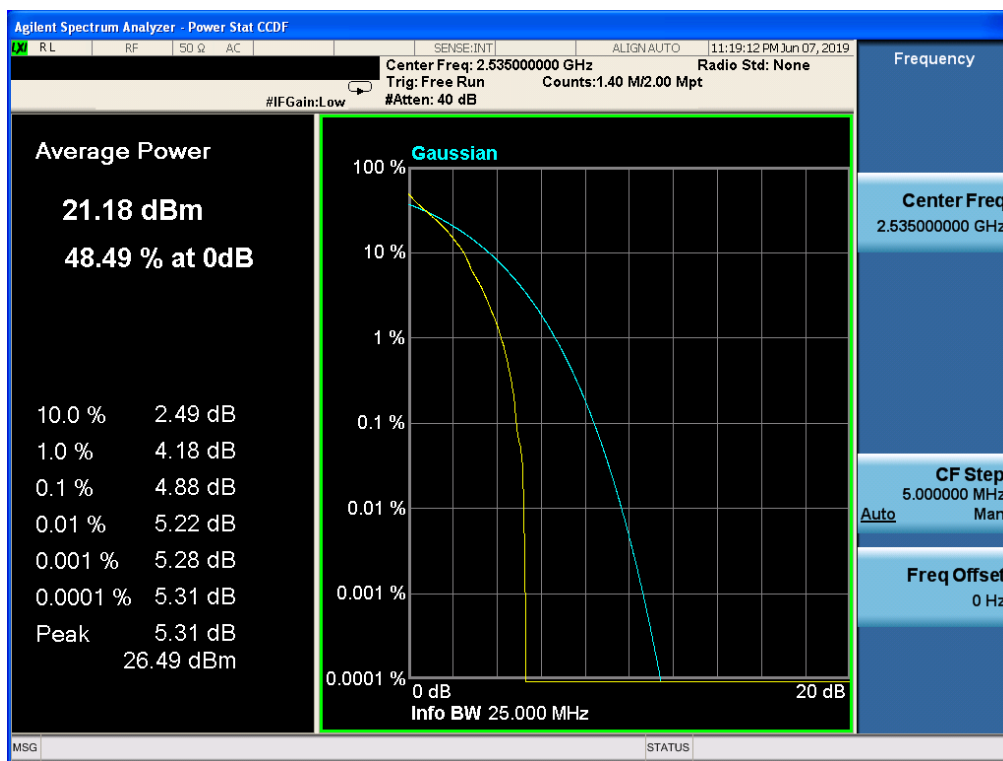
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 15.0, NO. RB 1, RB POS. Low, QPSK



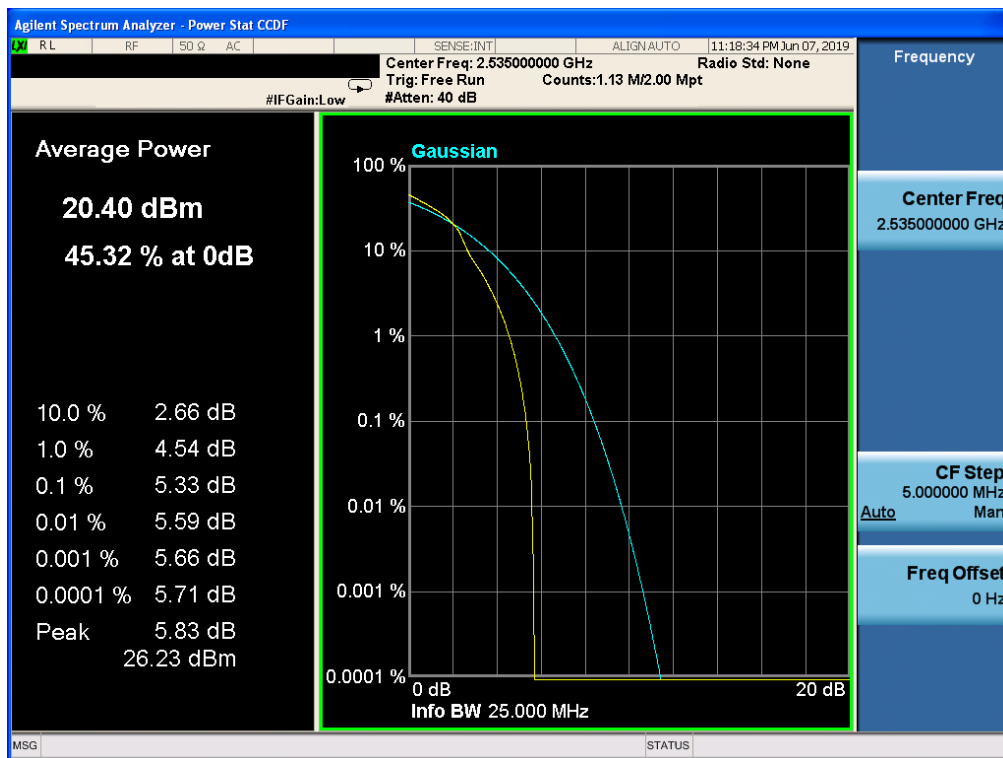
Band 7, UL Channel 21100, UL Frequency 2535.0, BW 15.0, NO. RB 1, RB POS. Low, 16-QAM



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

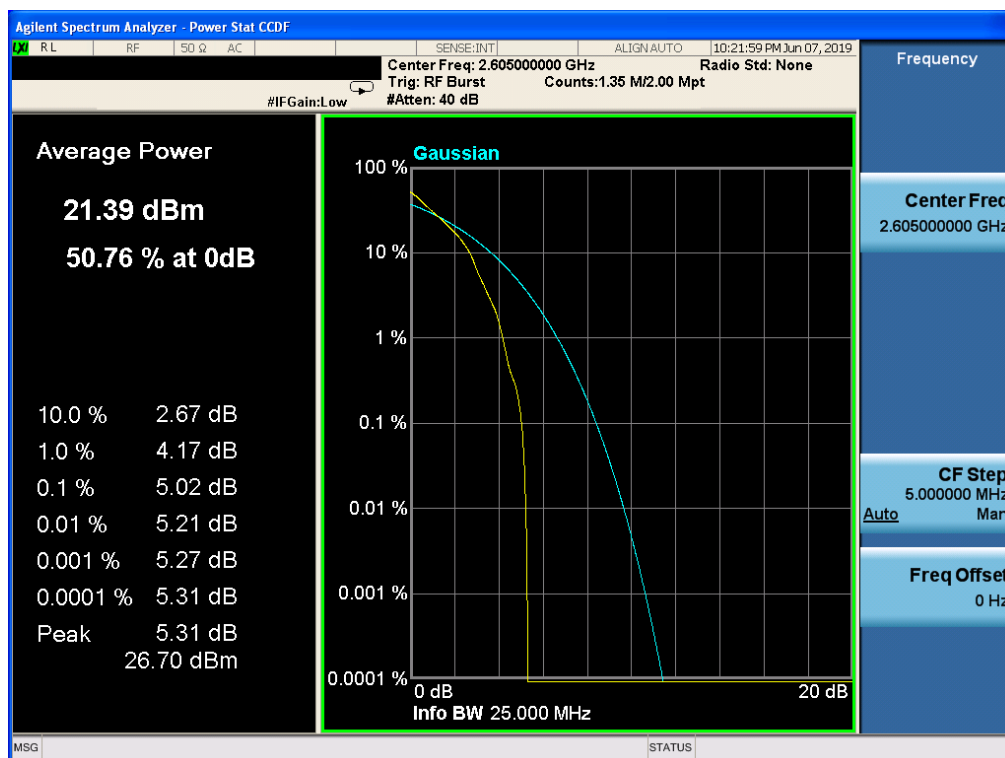


Band 7, UL Channel 21100, UL Frequency 2535.0, BW 20.0, NO. RB 1, RB POS. Low, 16-QAM

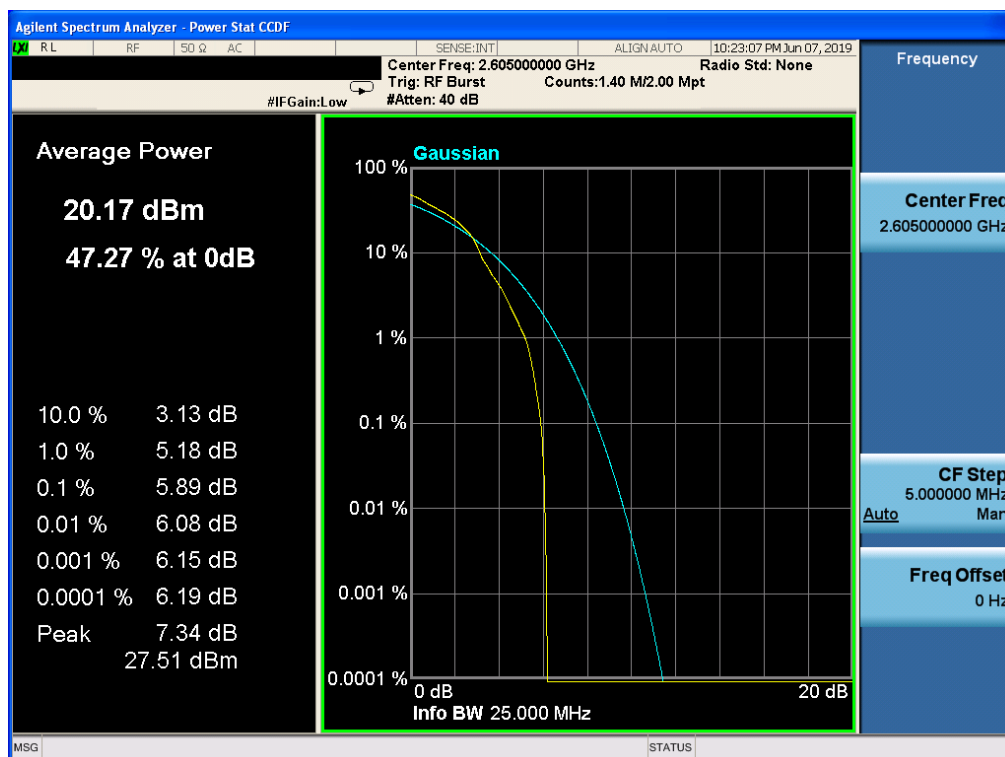


11.8 LTE BAND 41

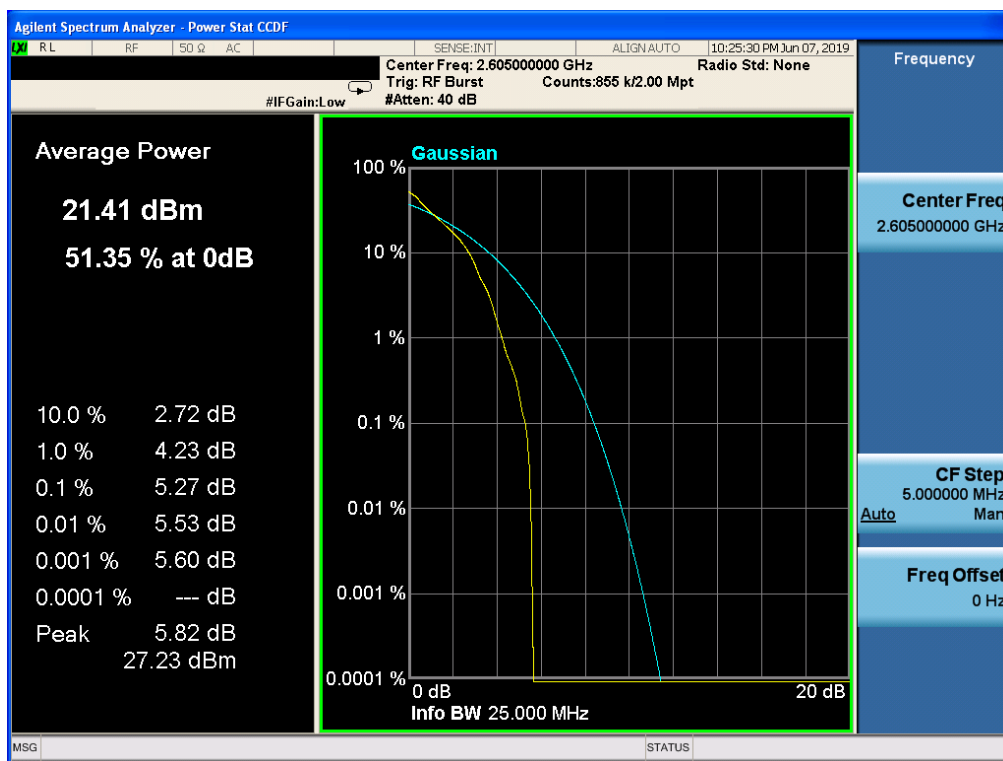
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 1, RB POS. Low, QPSK



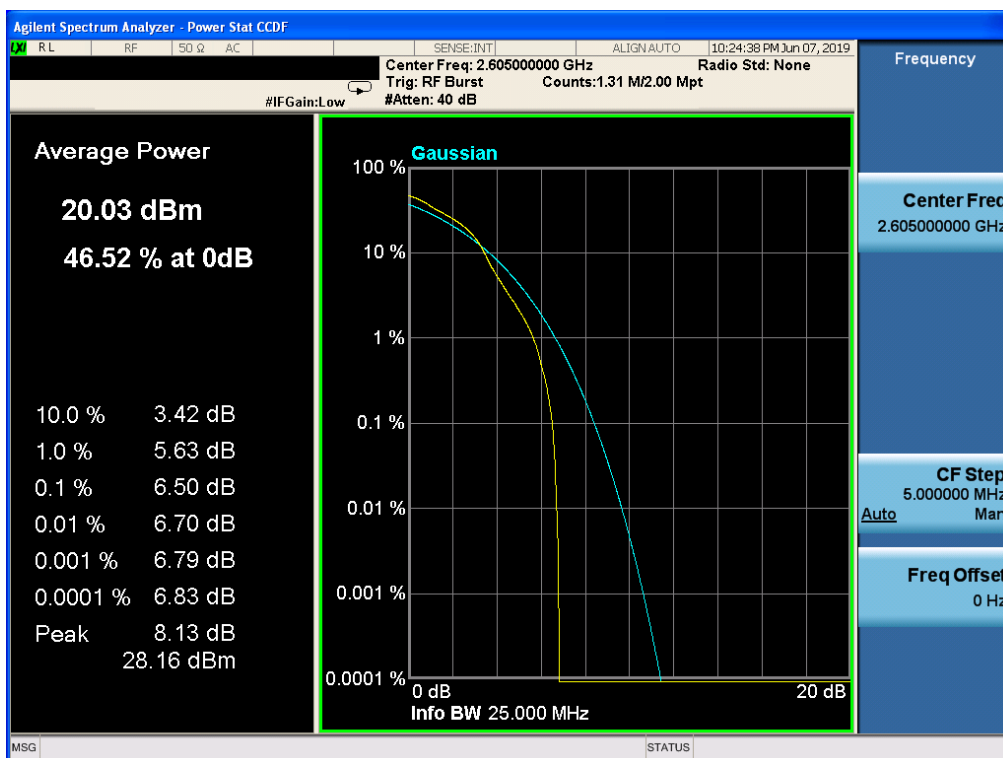
Band 41, UL Channel 40740, UL Frequency 2605.0, BW 5.0, NO. RB 1, RB POS. Low, 16-QAM



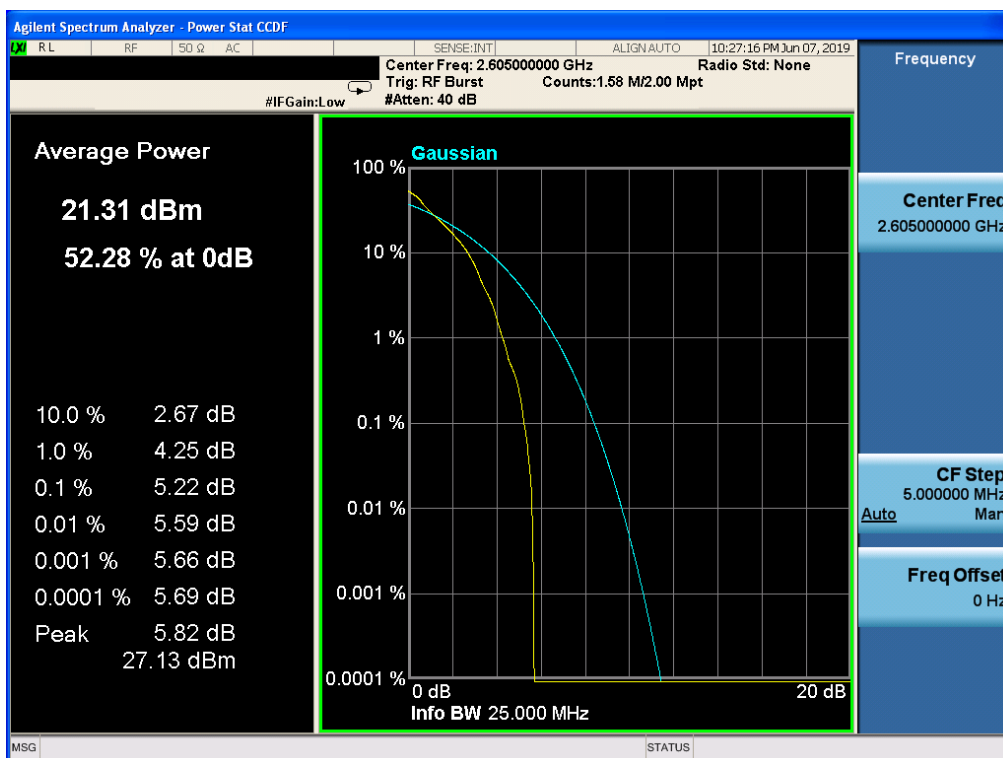
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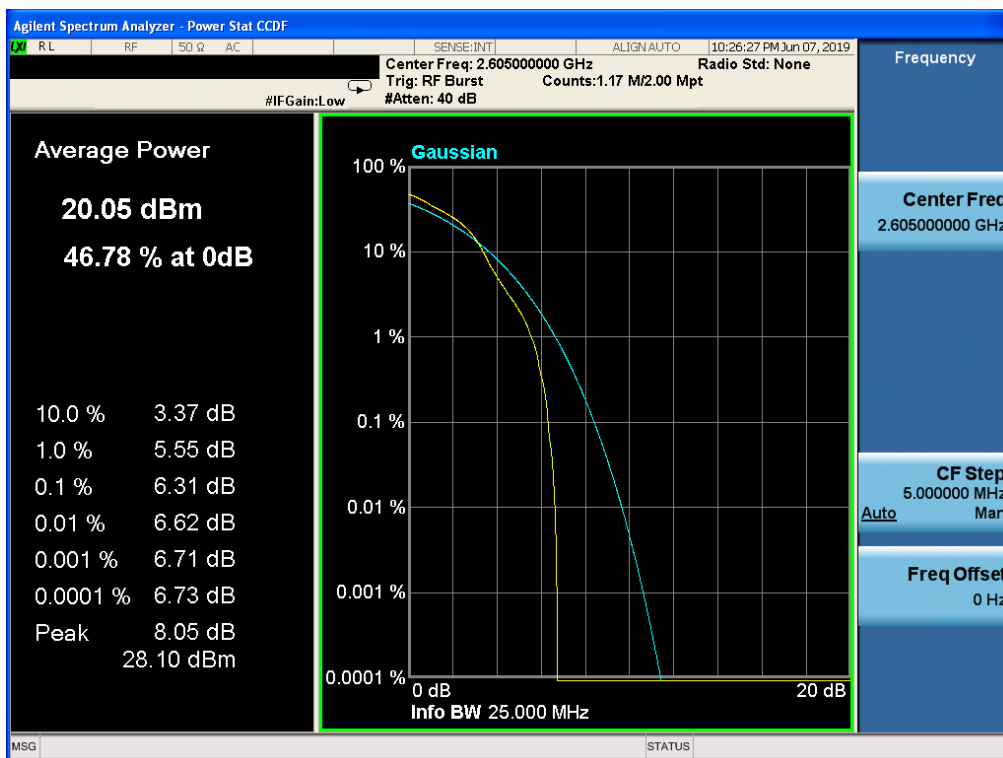
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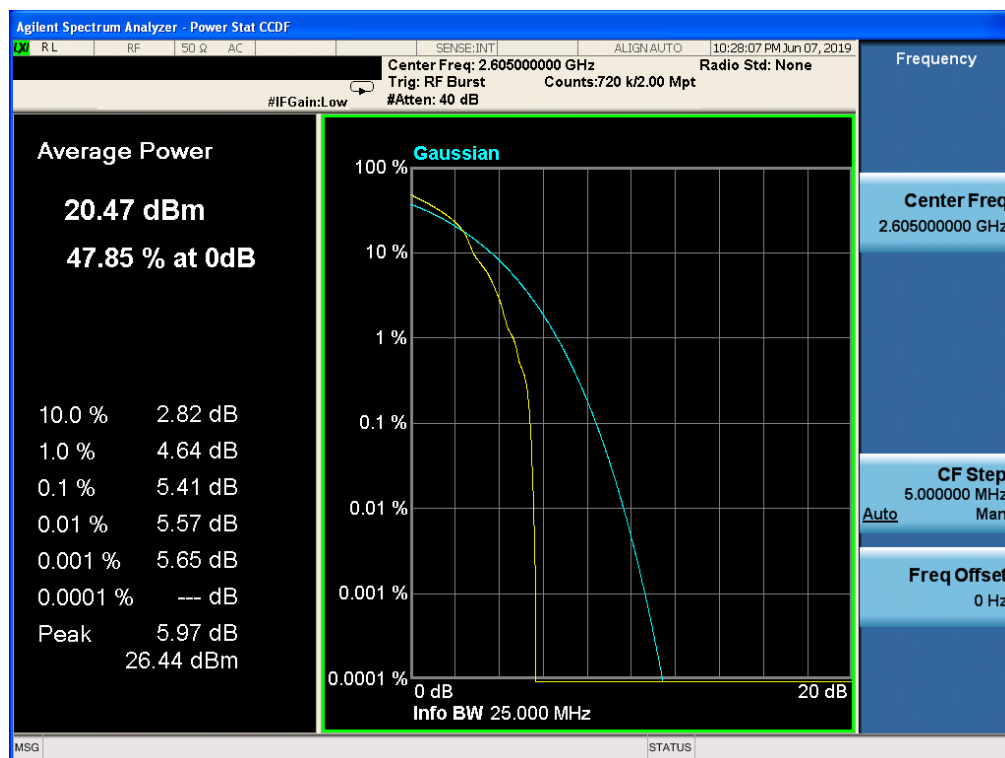
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Band 41, UL Channel 40740, UL Frequency 2605.0, BW 20.0, NO. RB 1, RB POS. Low, QPSK



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



----END OF REPORT----