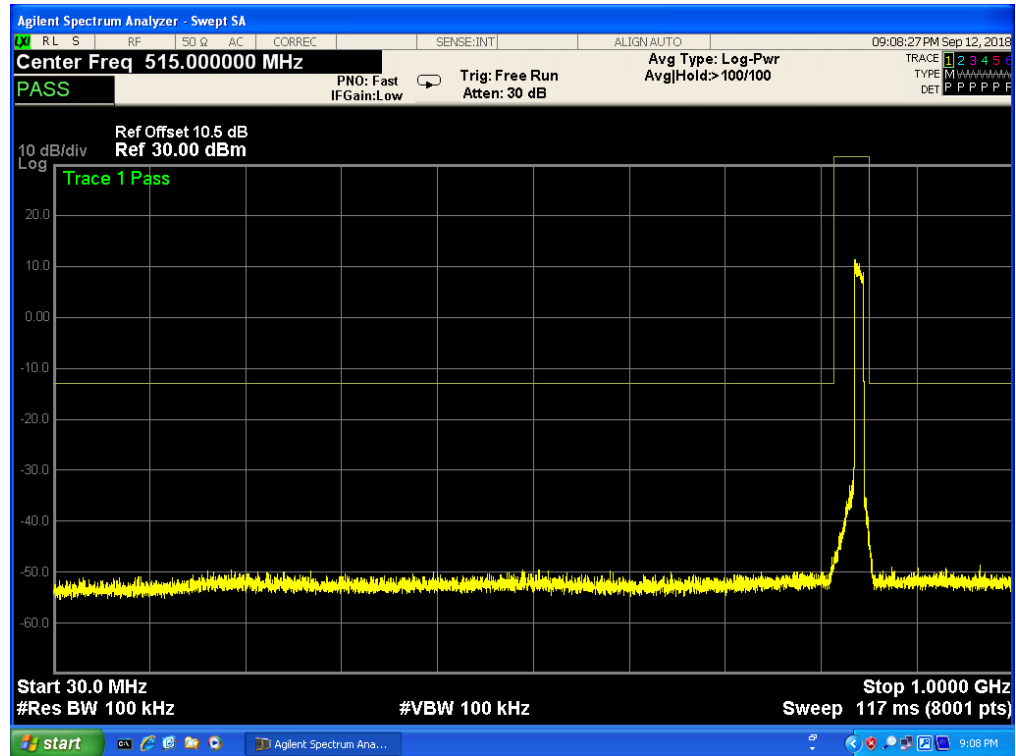


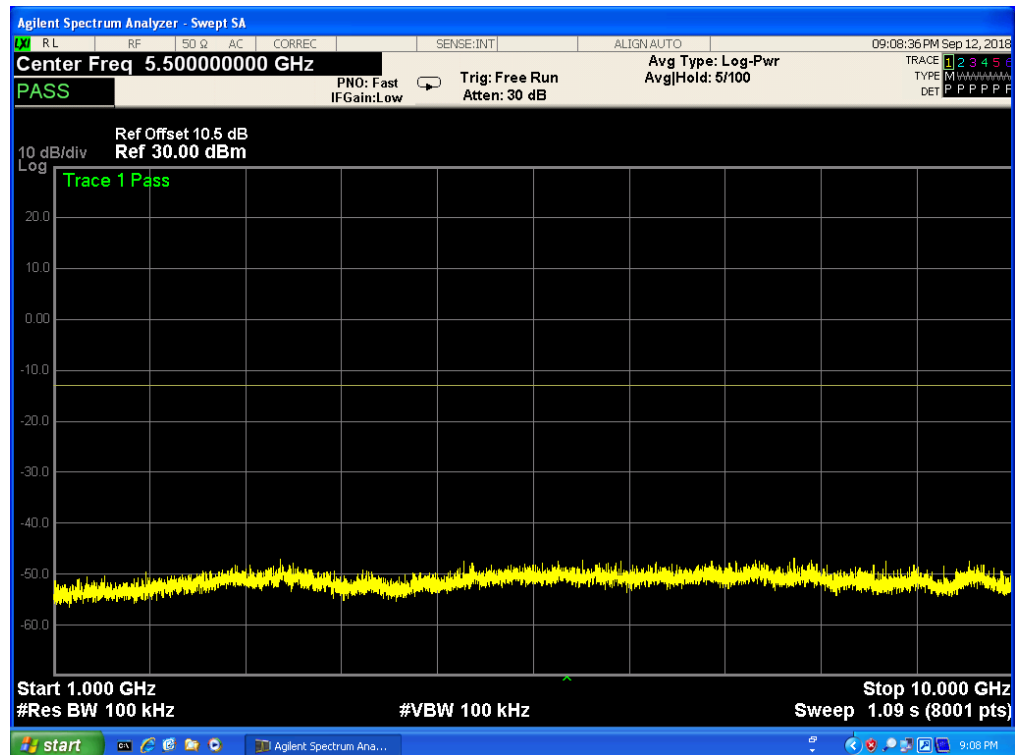


Report No.: SER180508709003E

Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM

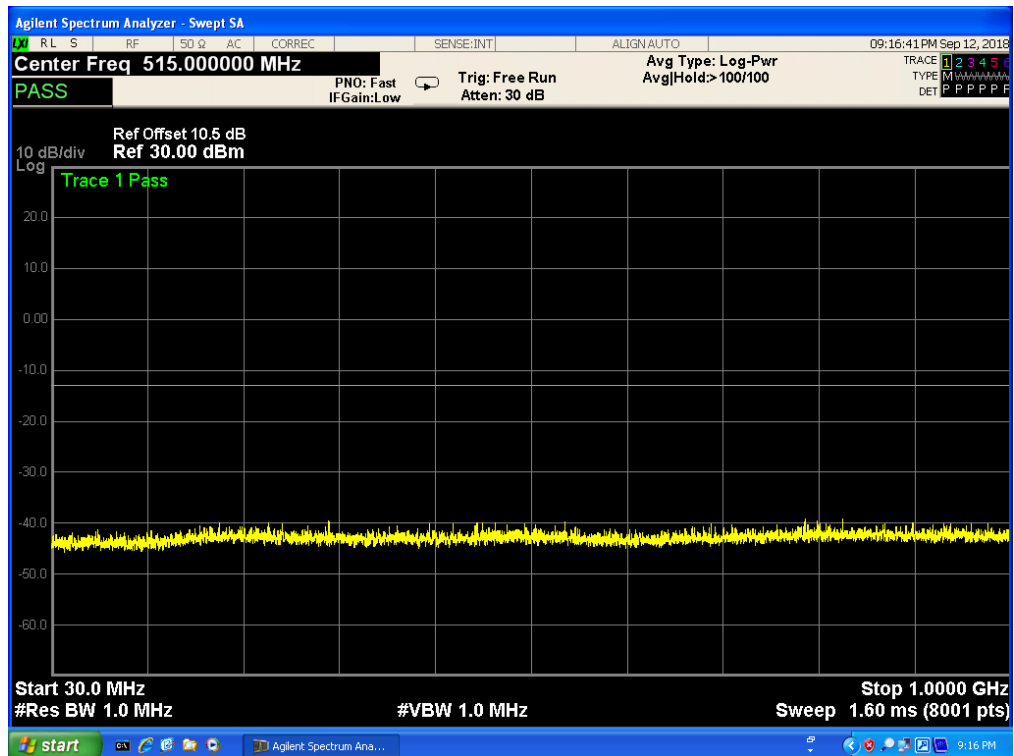


Band 5,UL Channel 20600,UL Frequency 844.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM

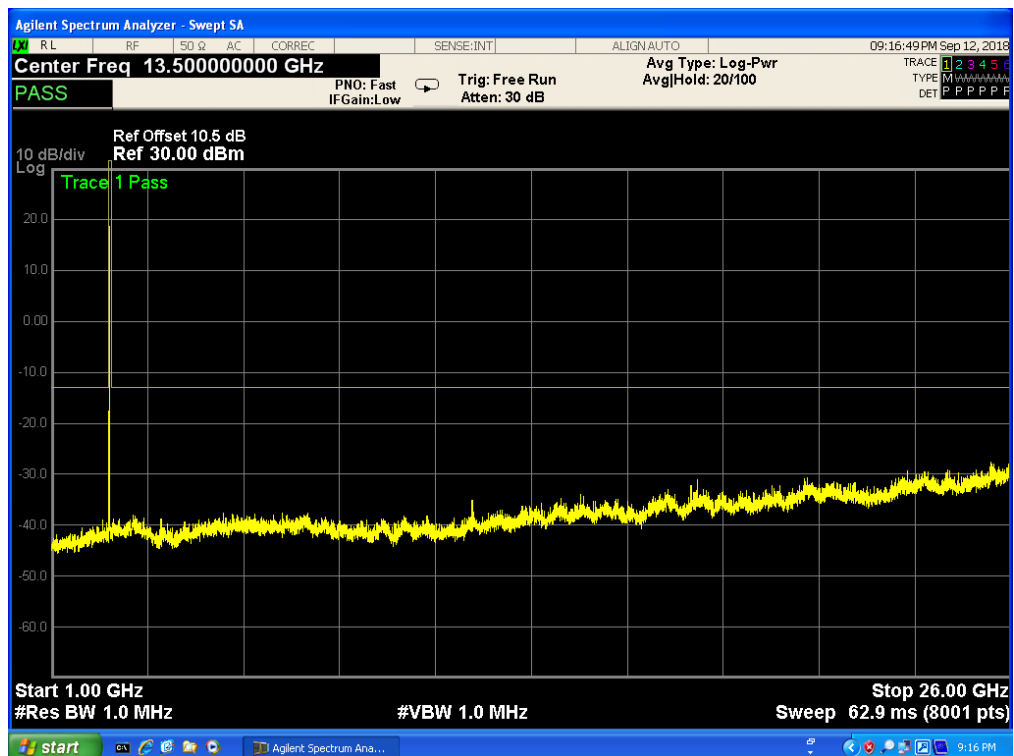


7.4 LTE BAND 7

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



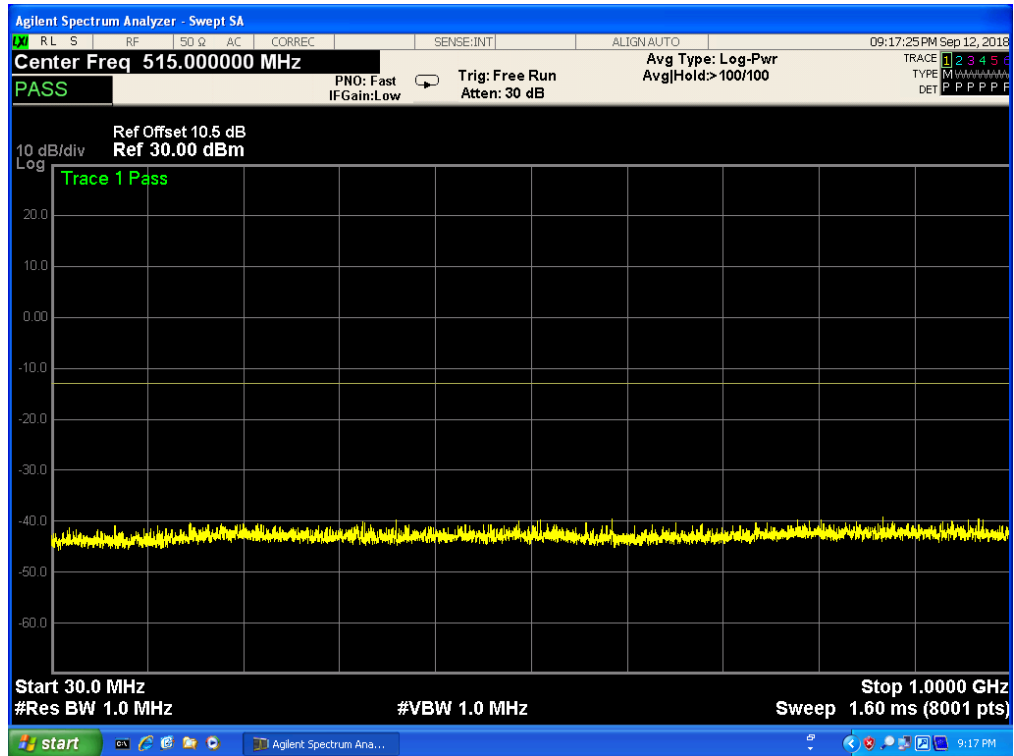
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



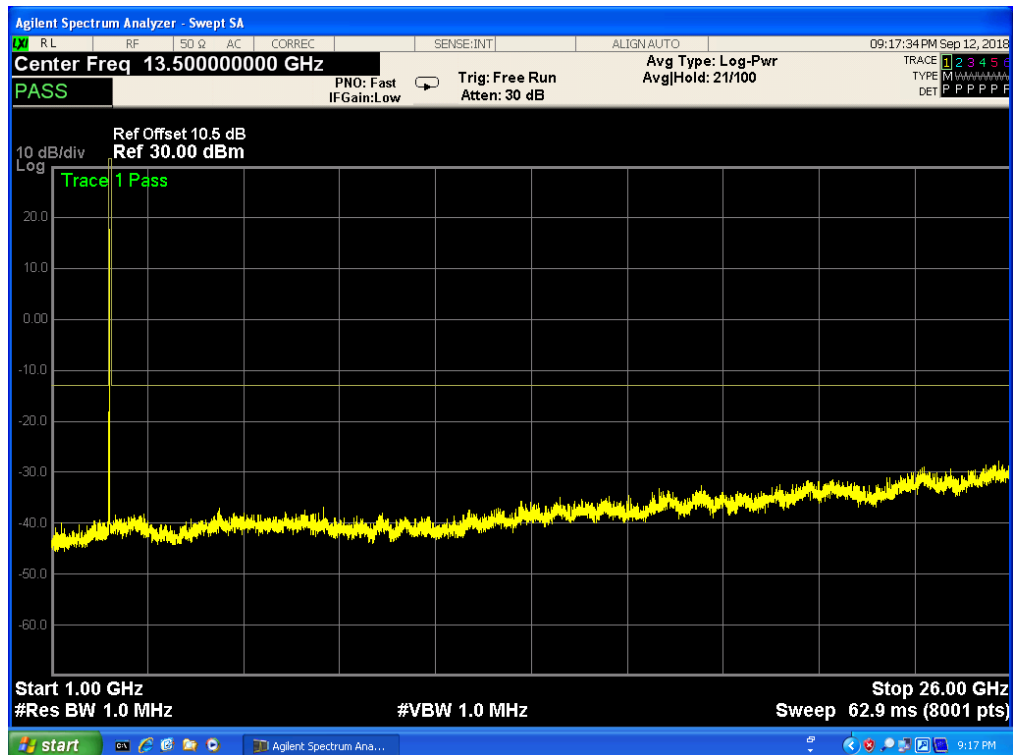


Report No.: SER180508709003E

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



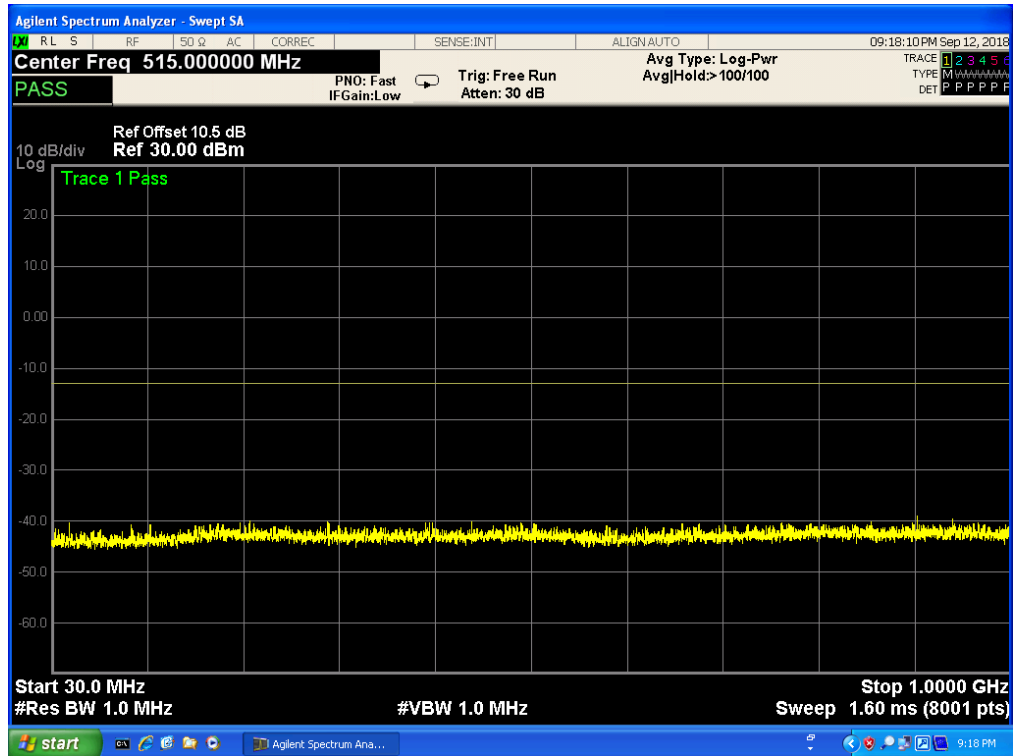
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



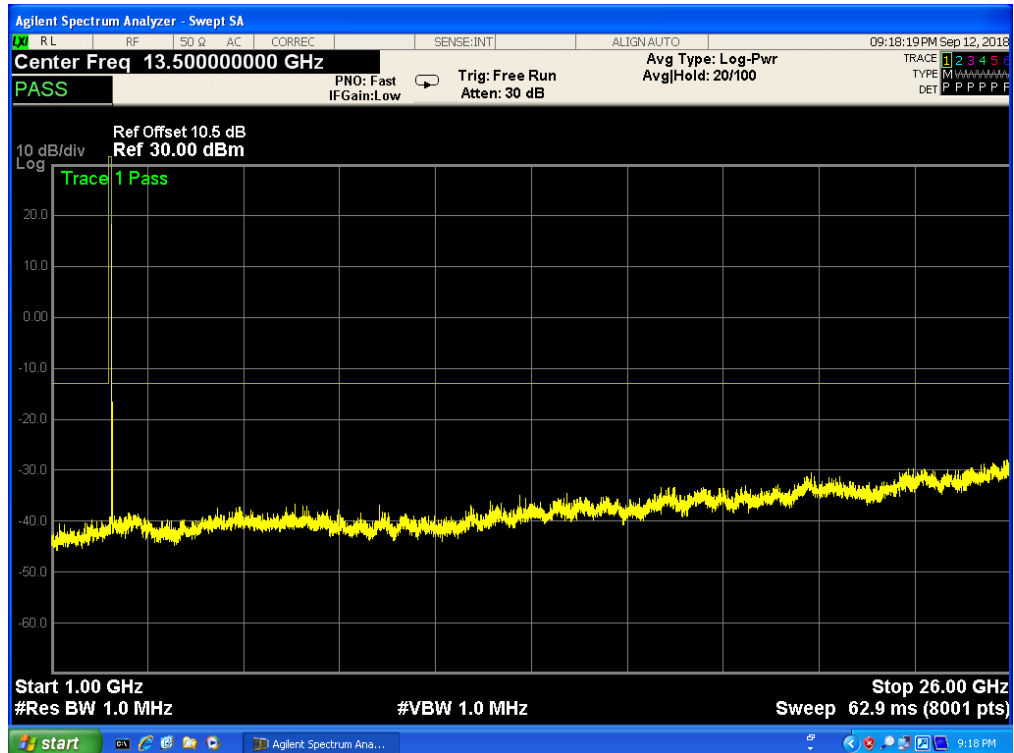


Report No.: SER180508709003E

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



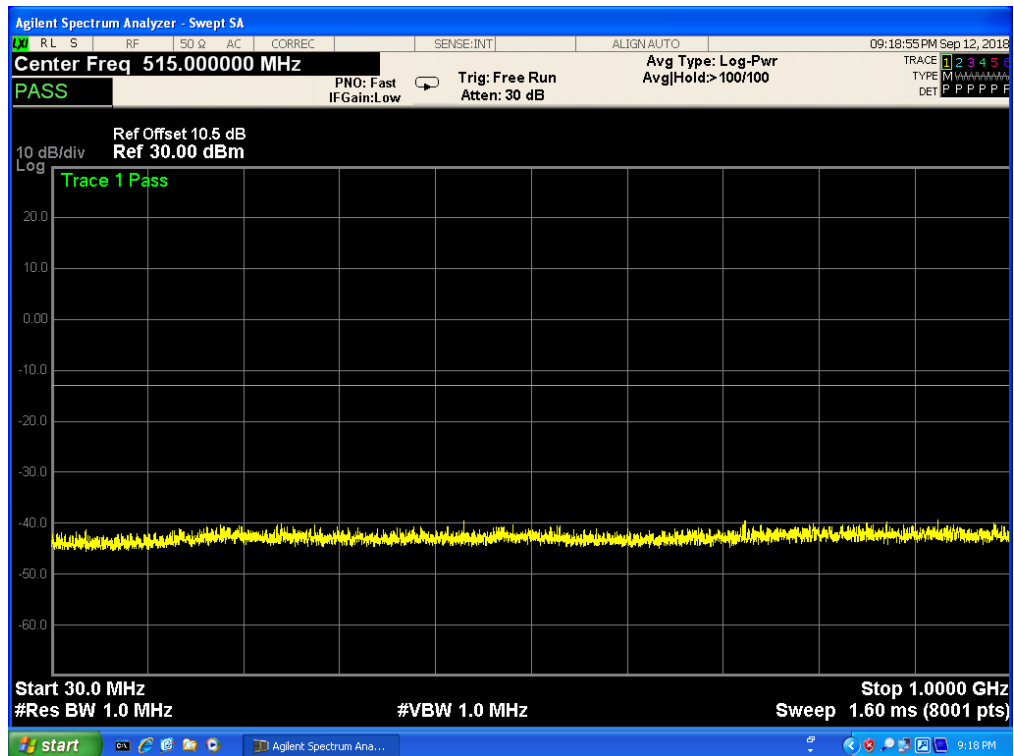
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



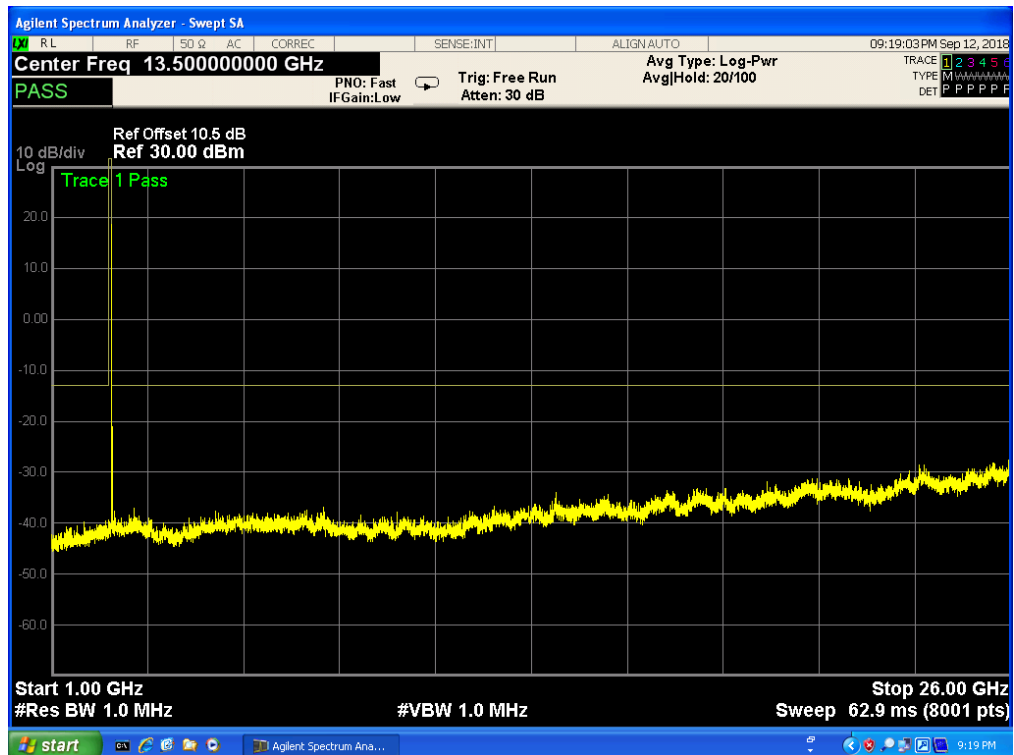


Report No.: SER180508709003E

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



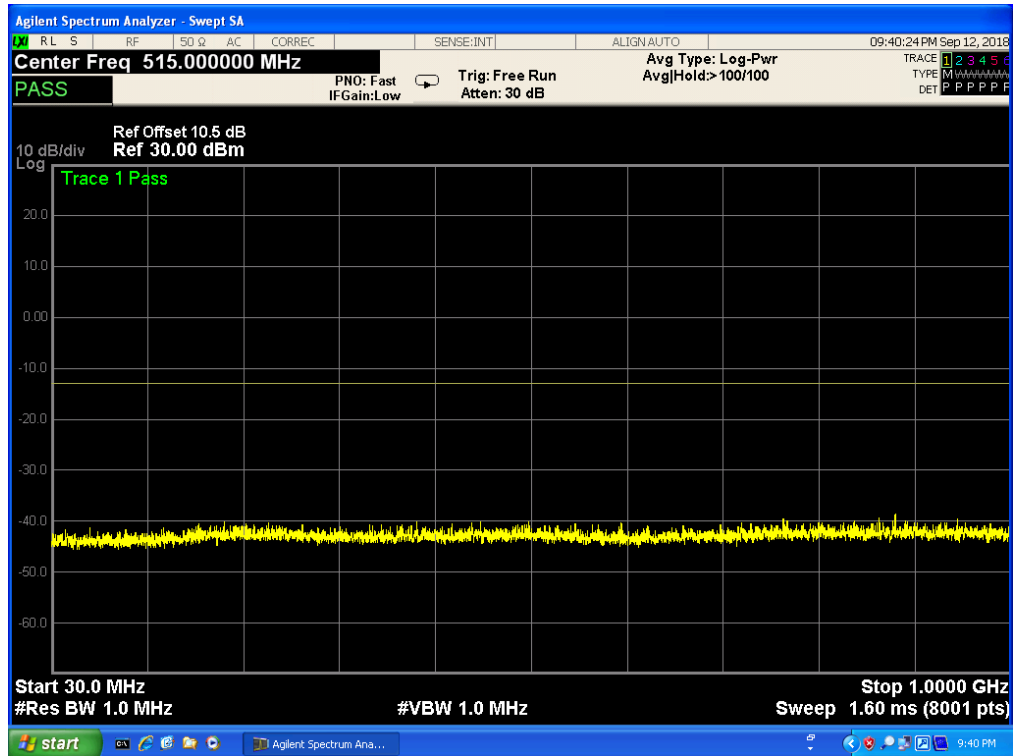
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



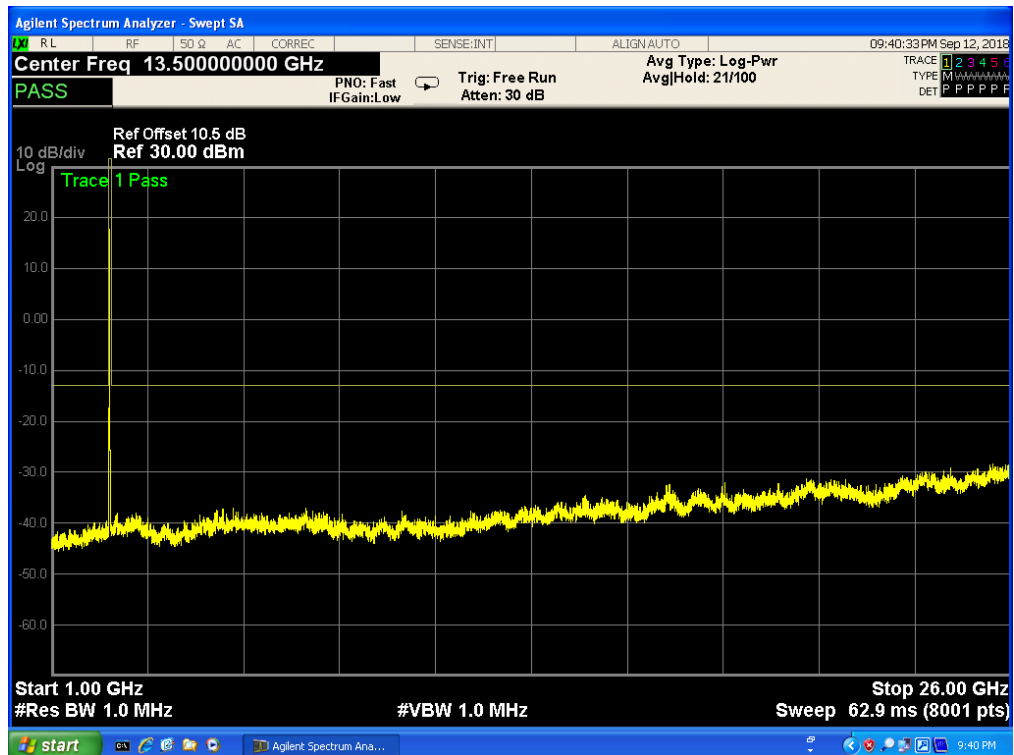


Report No.: SER180508709003E

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



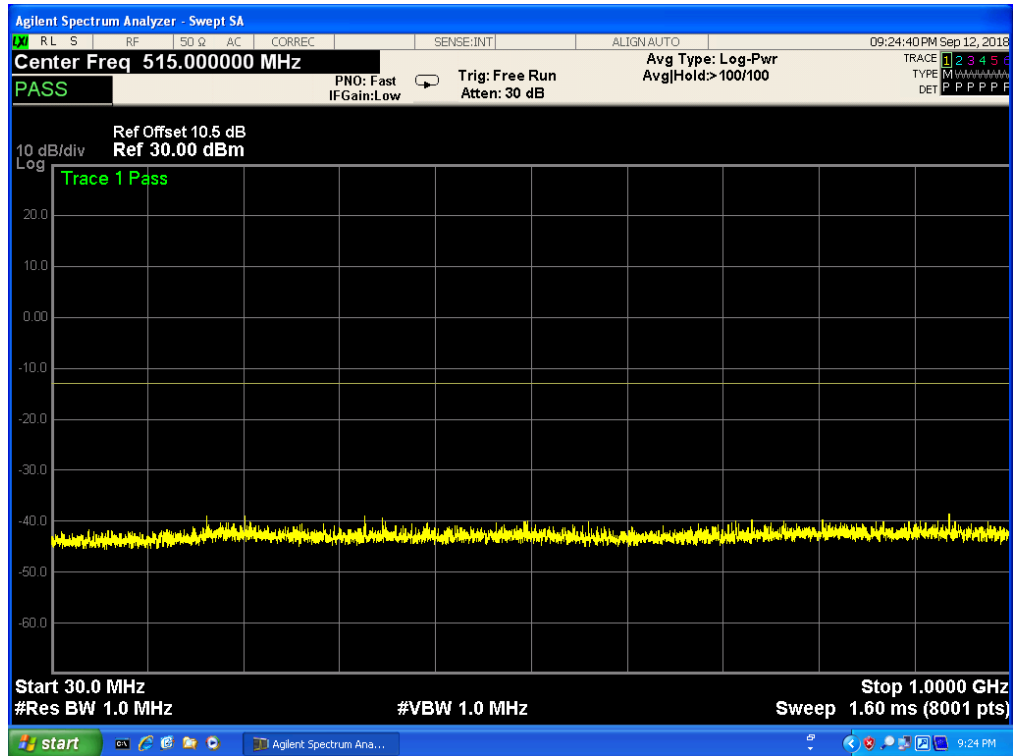
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



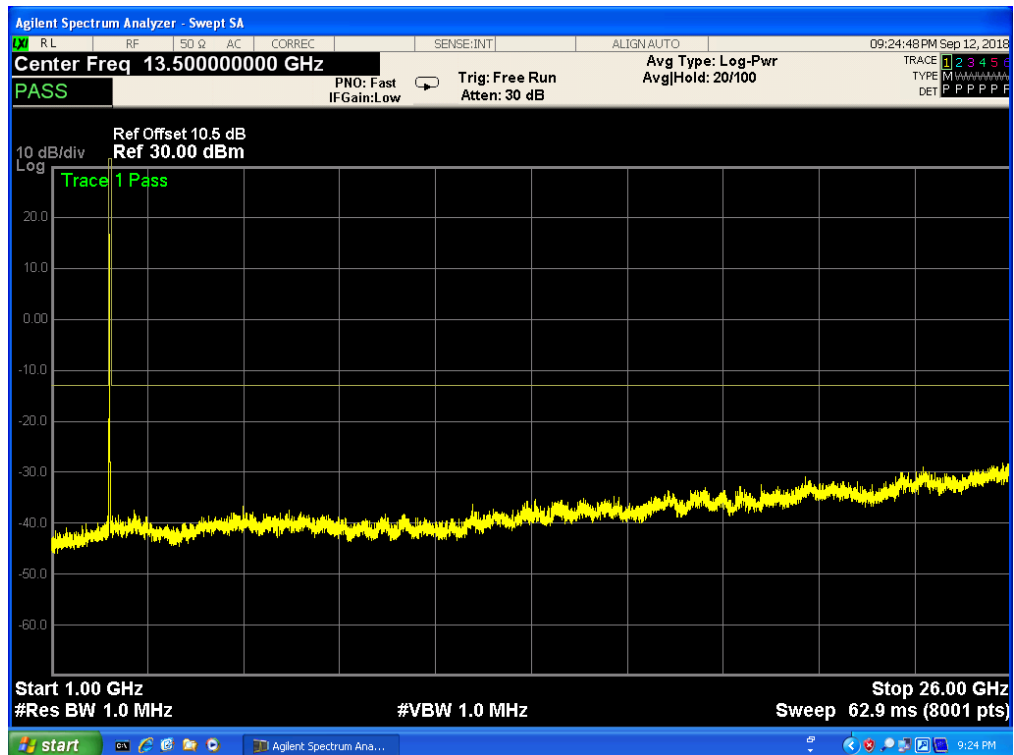


Report No.: SER180508709003E

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



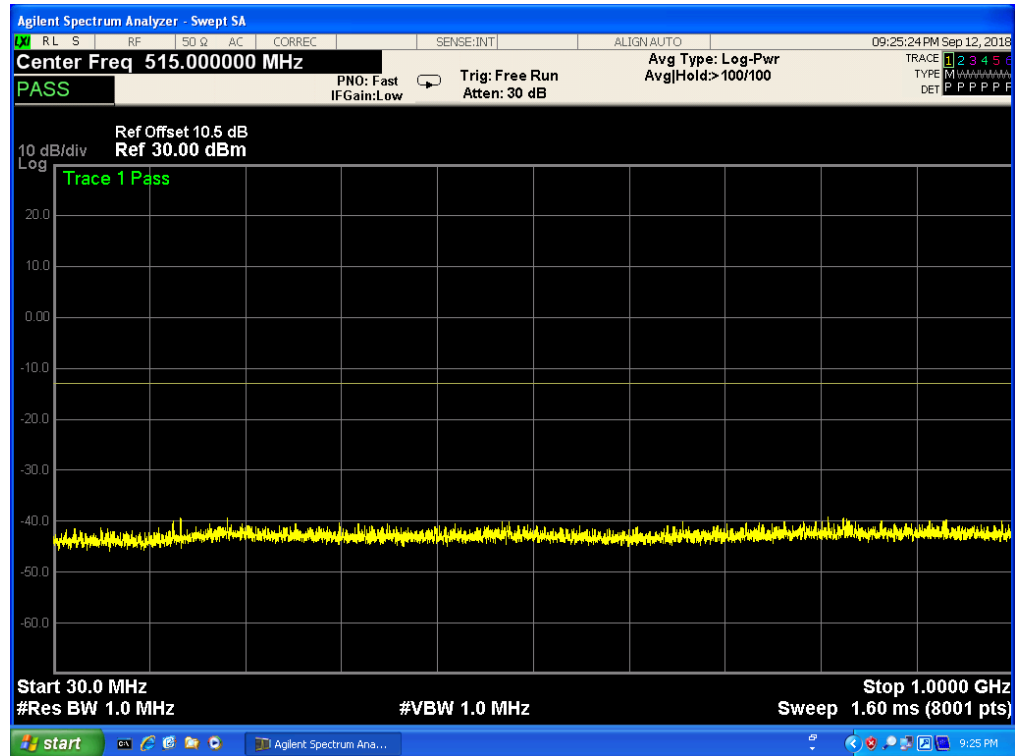
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



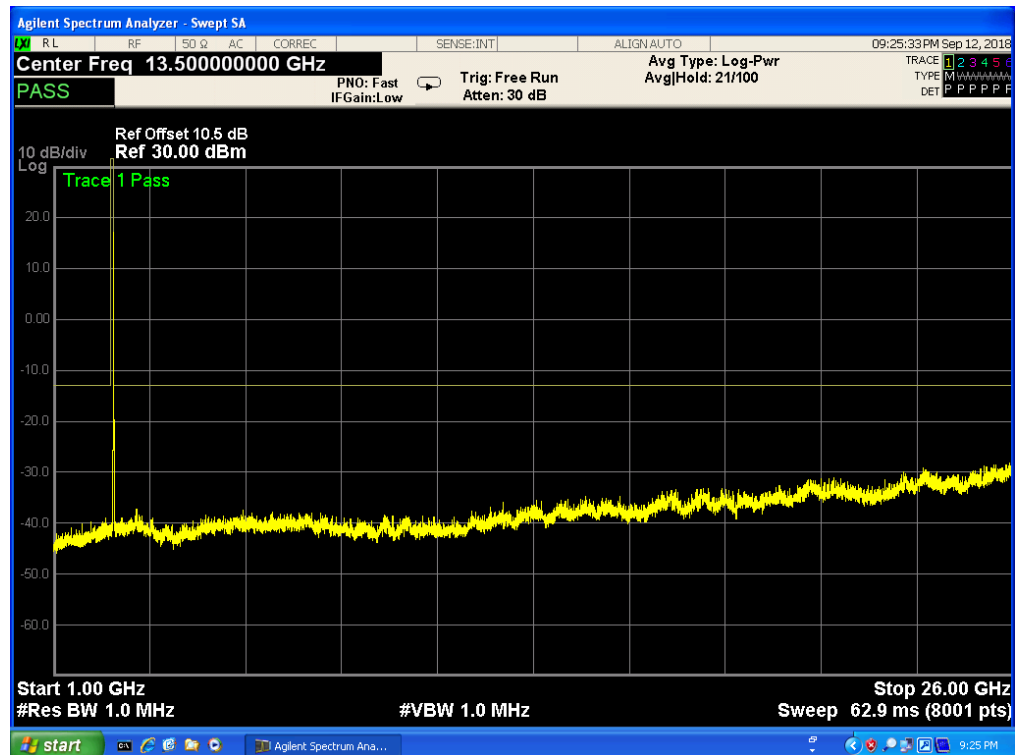


Report No.: SER180508709003E

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



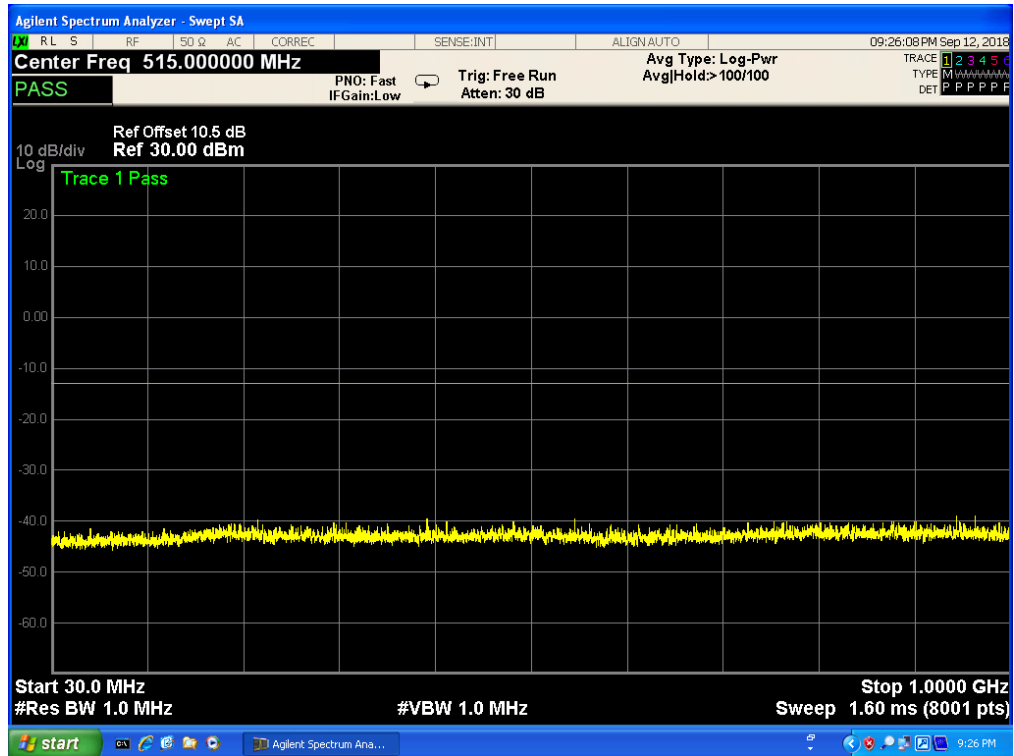
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



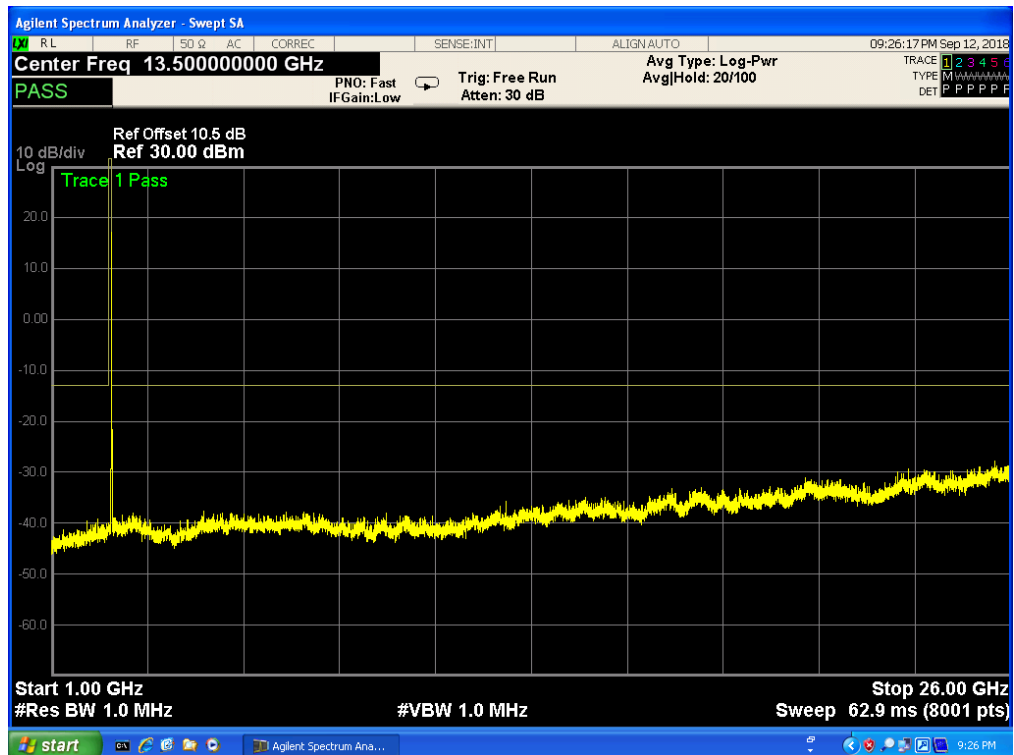


Report No.: SER180508709003E

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



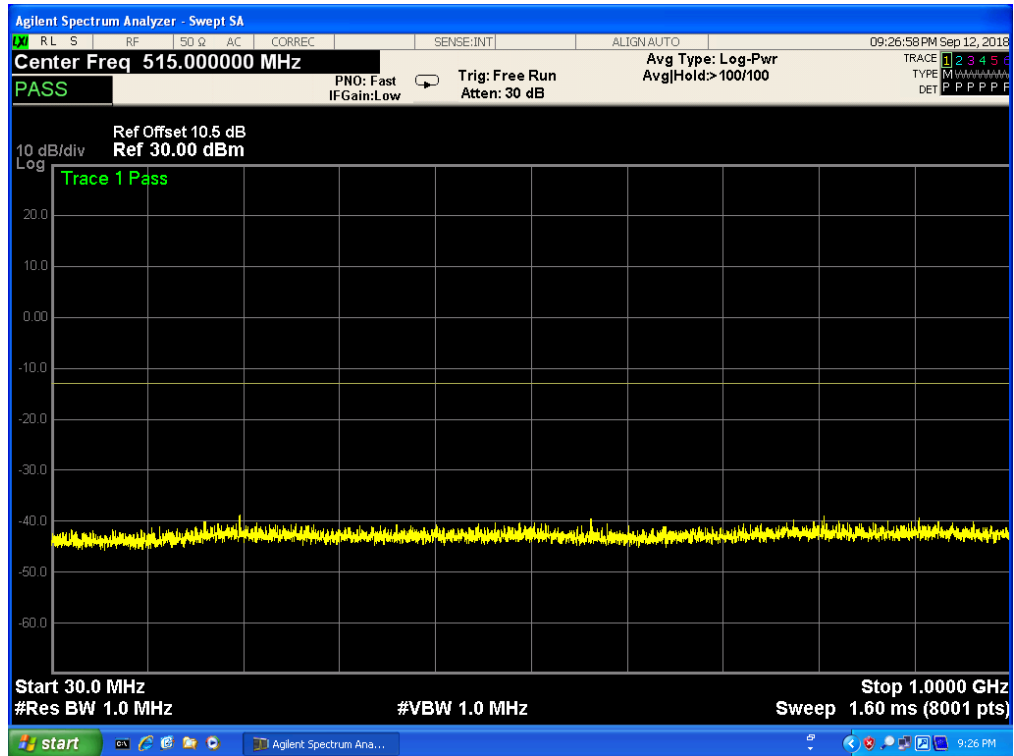
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,16-QAM



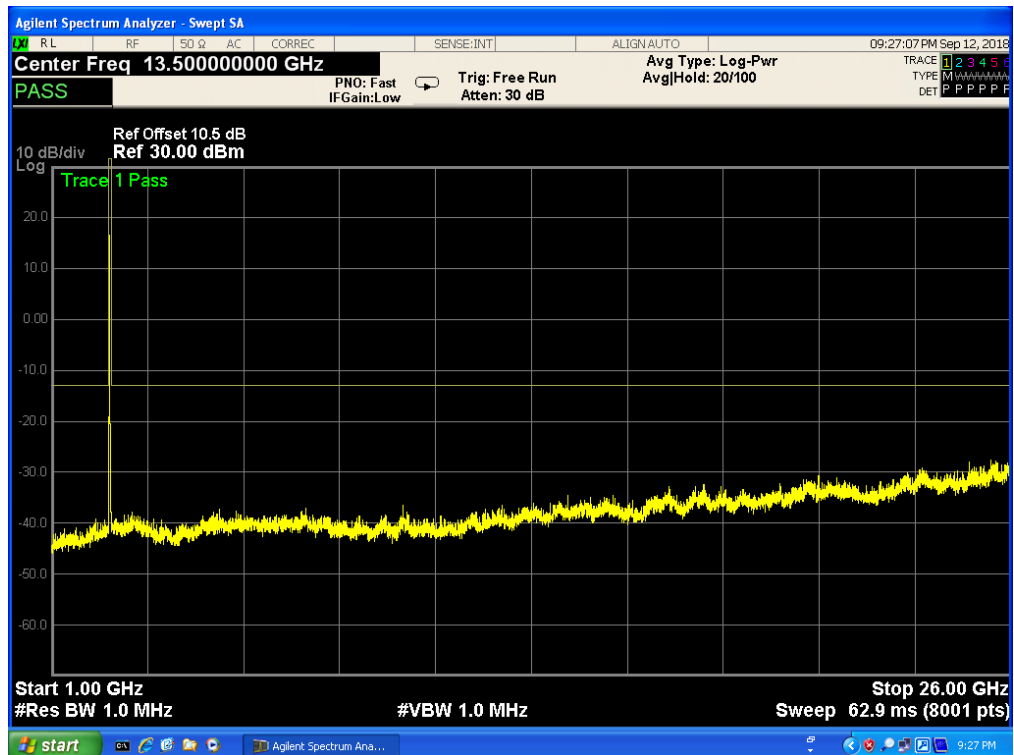


Report No.: SER180508709003E

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



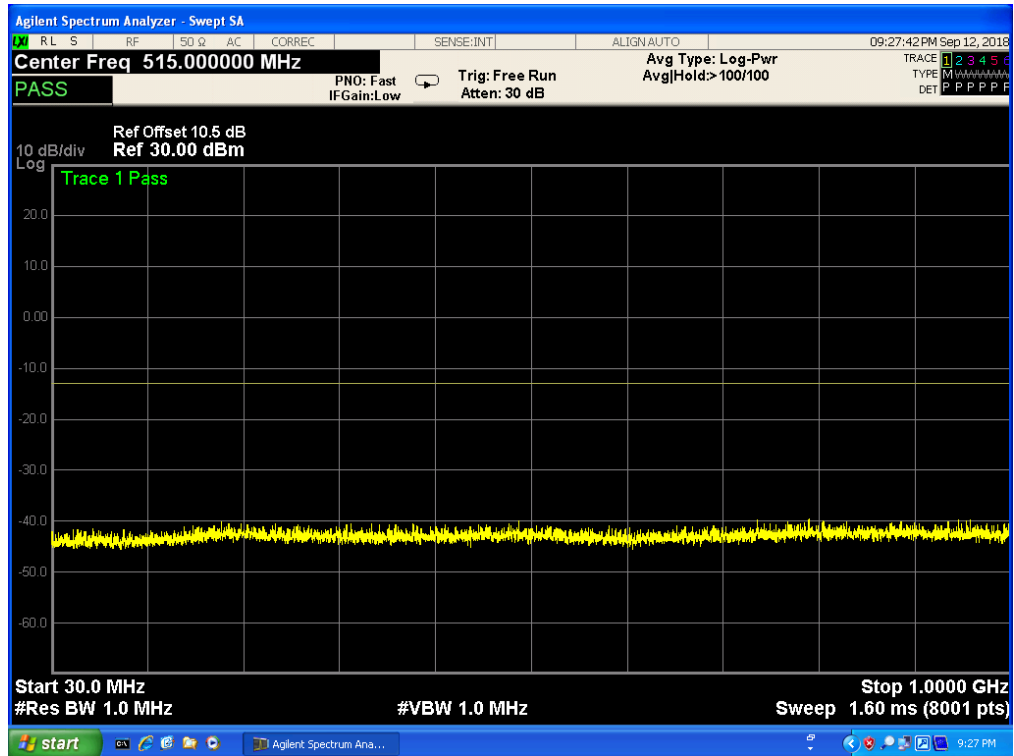
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



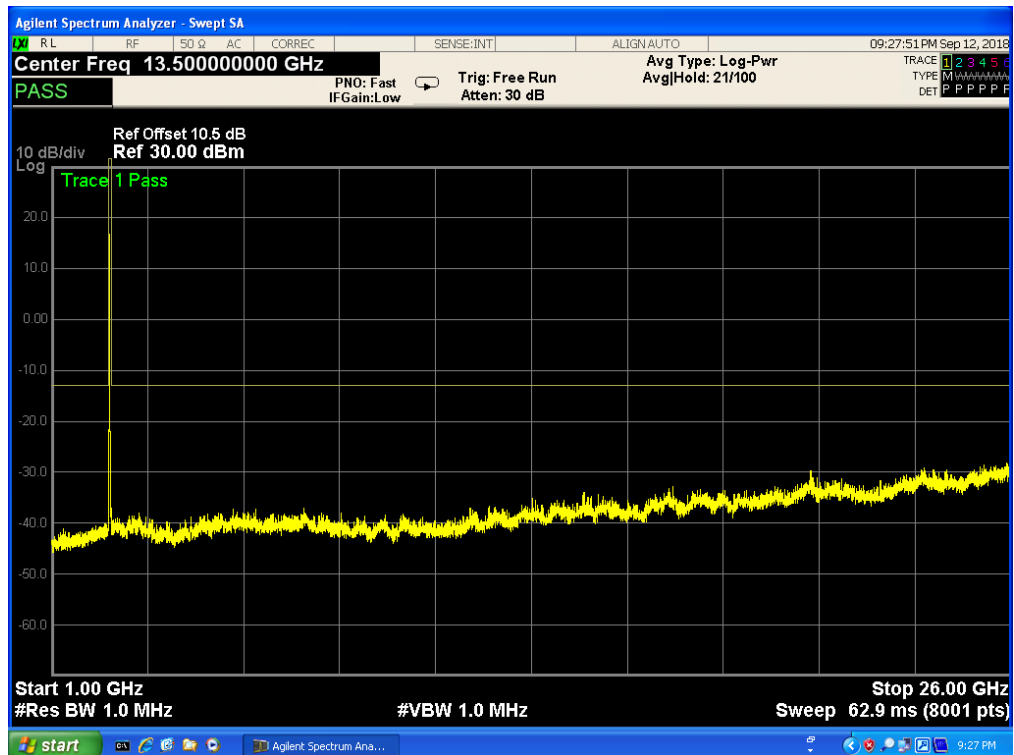


Report No.: SER180508709003E

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



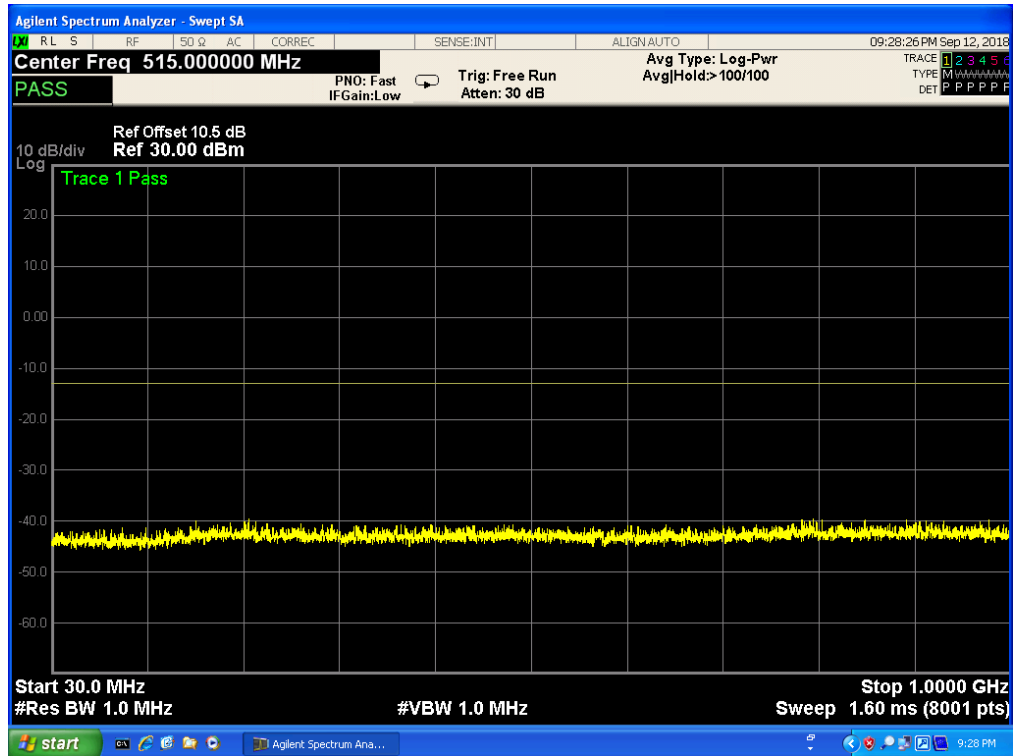
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



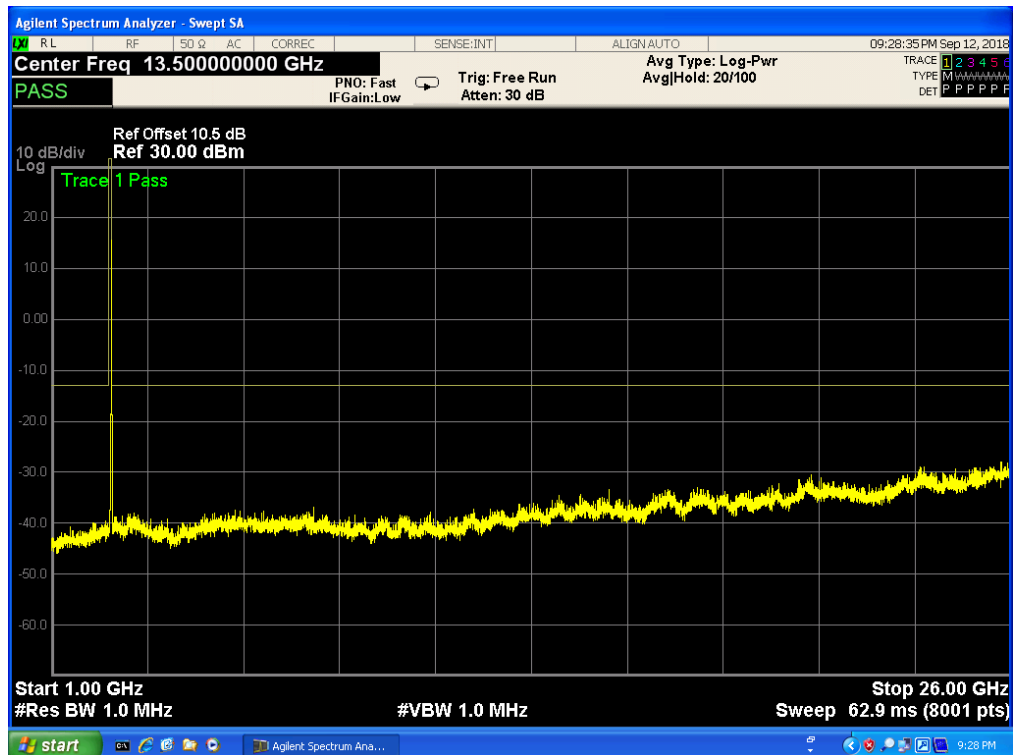


Report No.: SER180508709003E

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



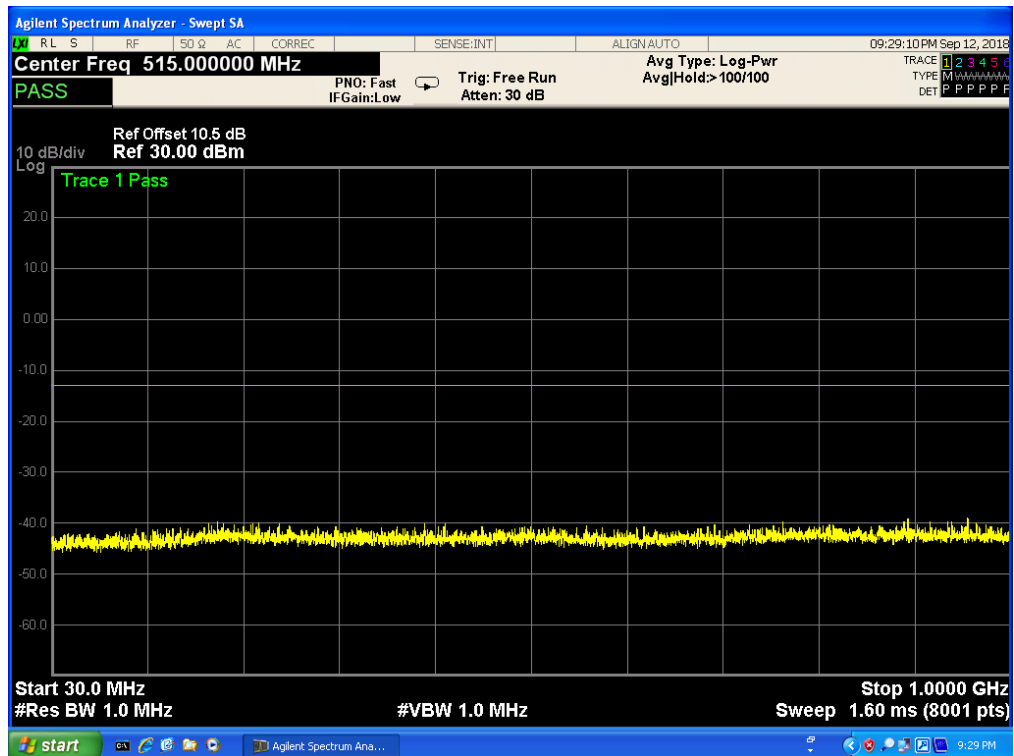
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



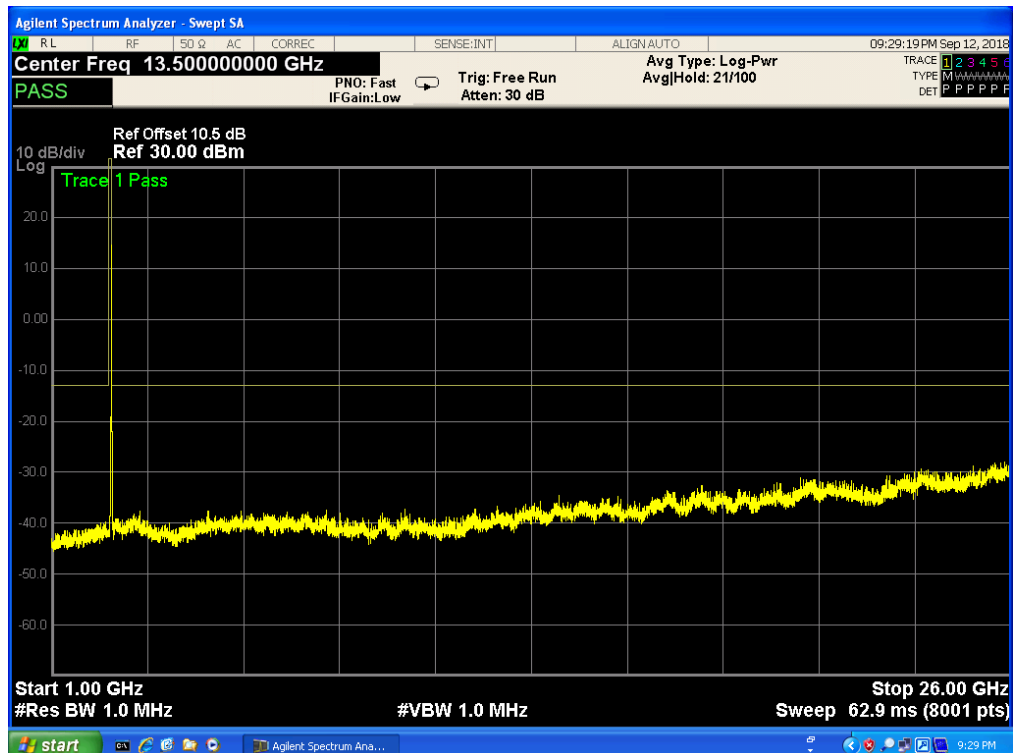


Report No.: SER180508709003E

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



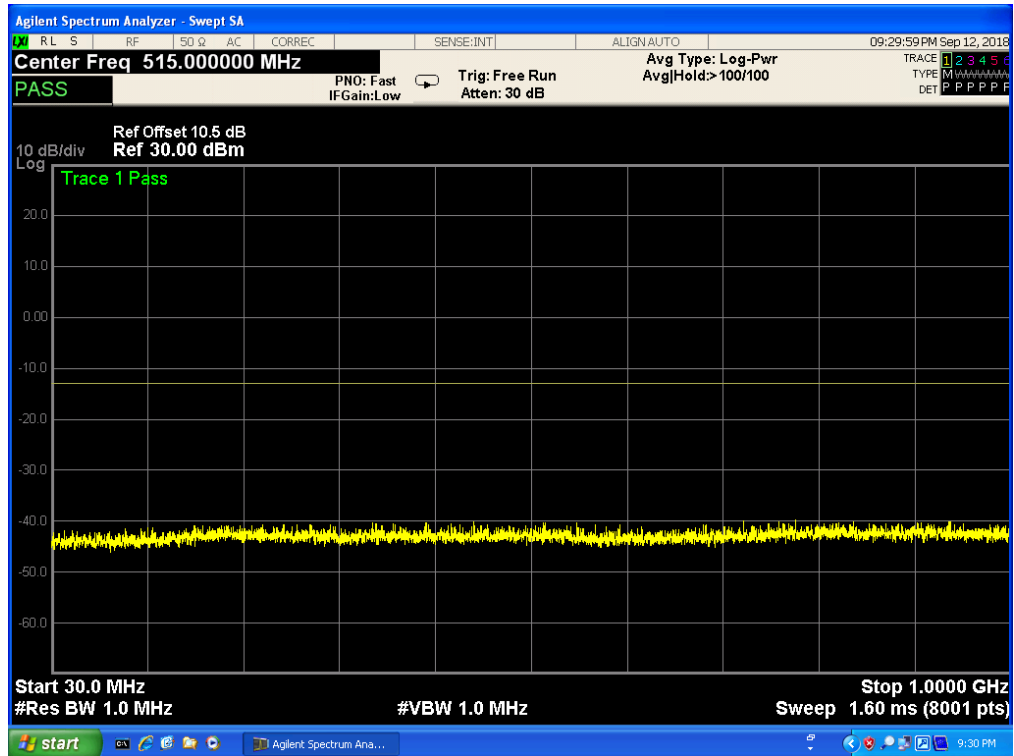
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16-QAM



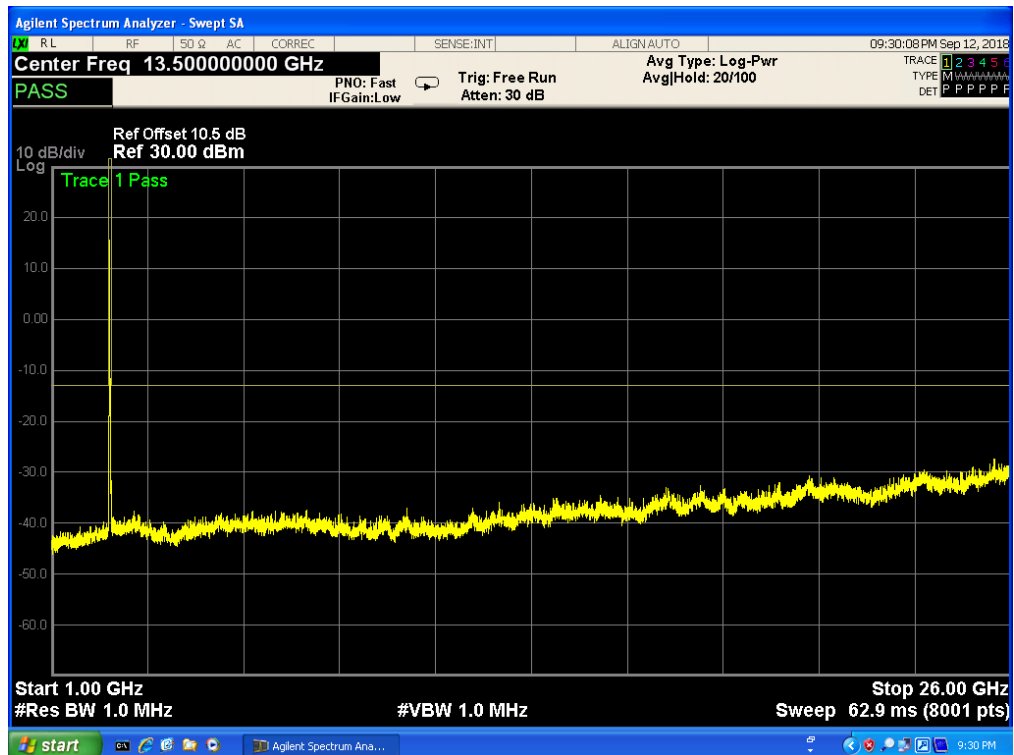


Report No.: SER180508709003E

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



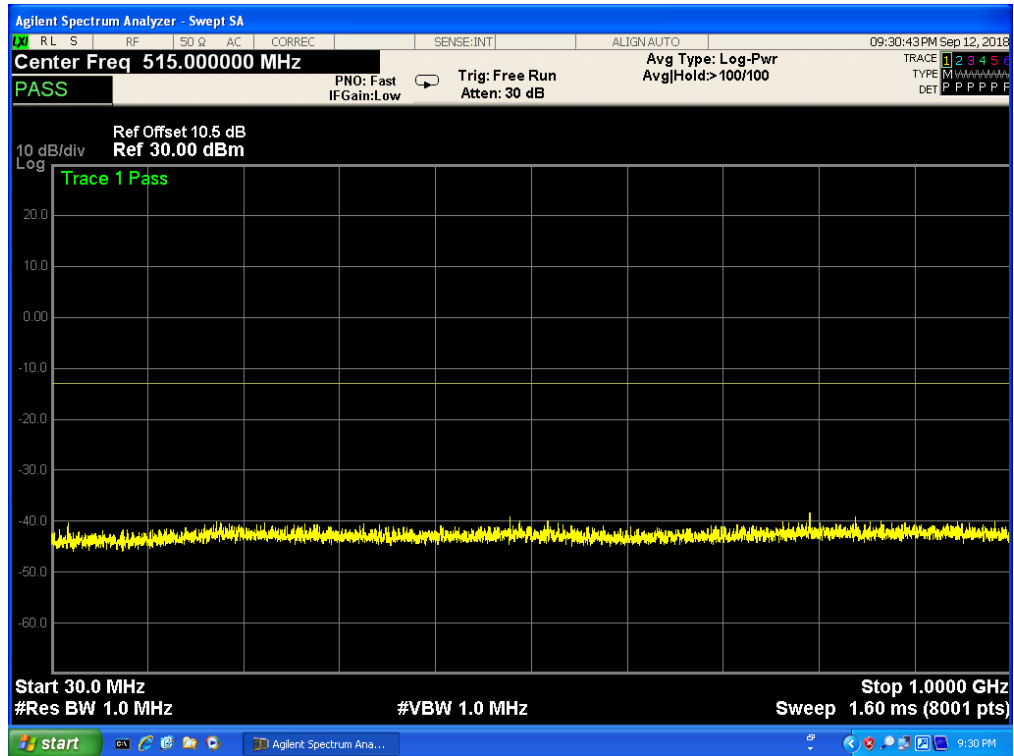
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



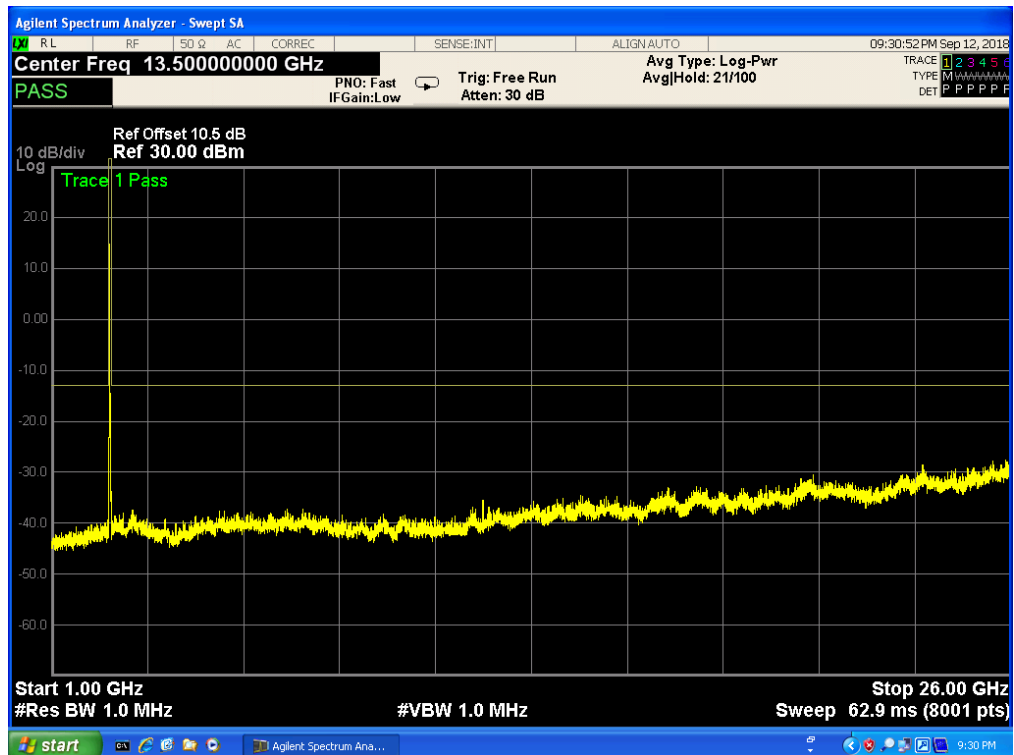


Report No.: SER180508709003E

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



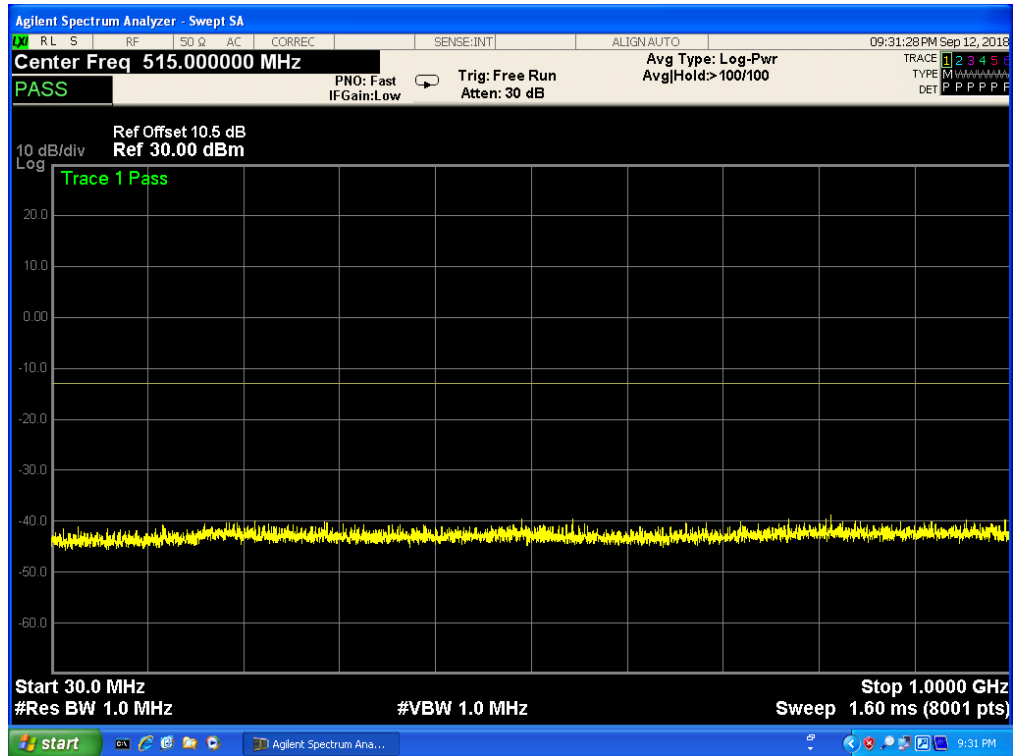
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16-QAM



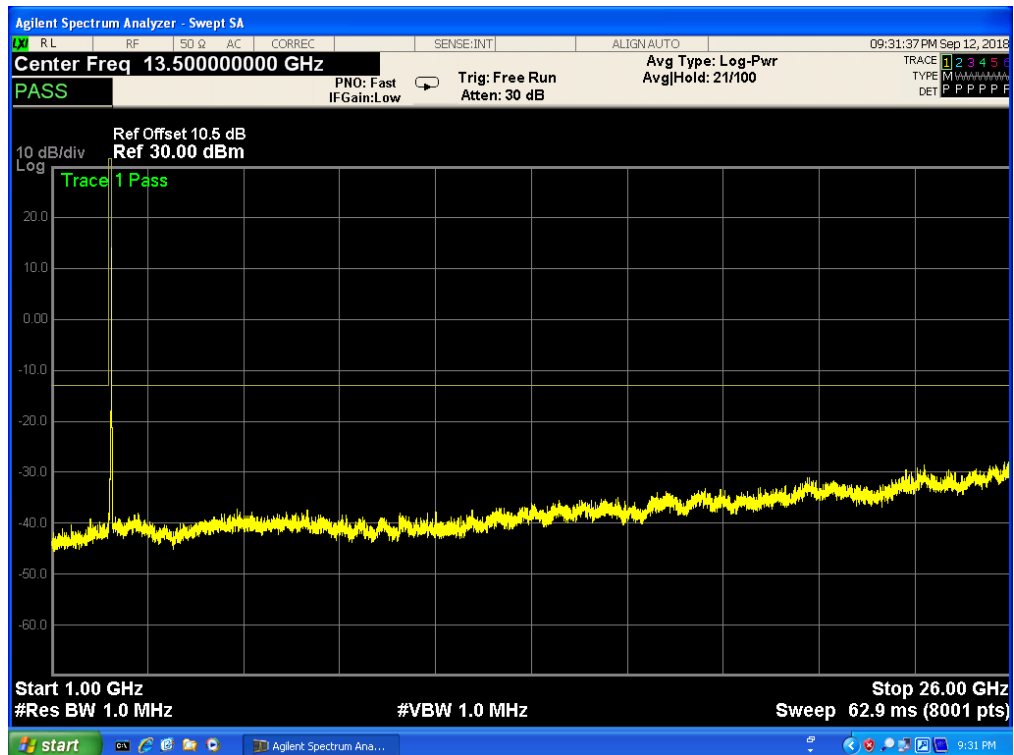


Report No.: SER180508709003E

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



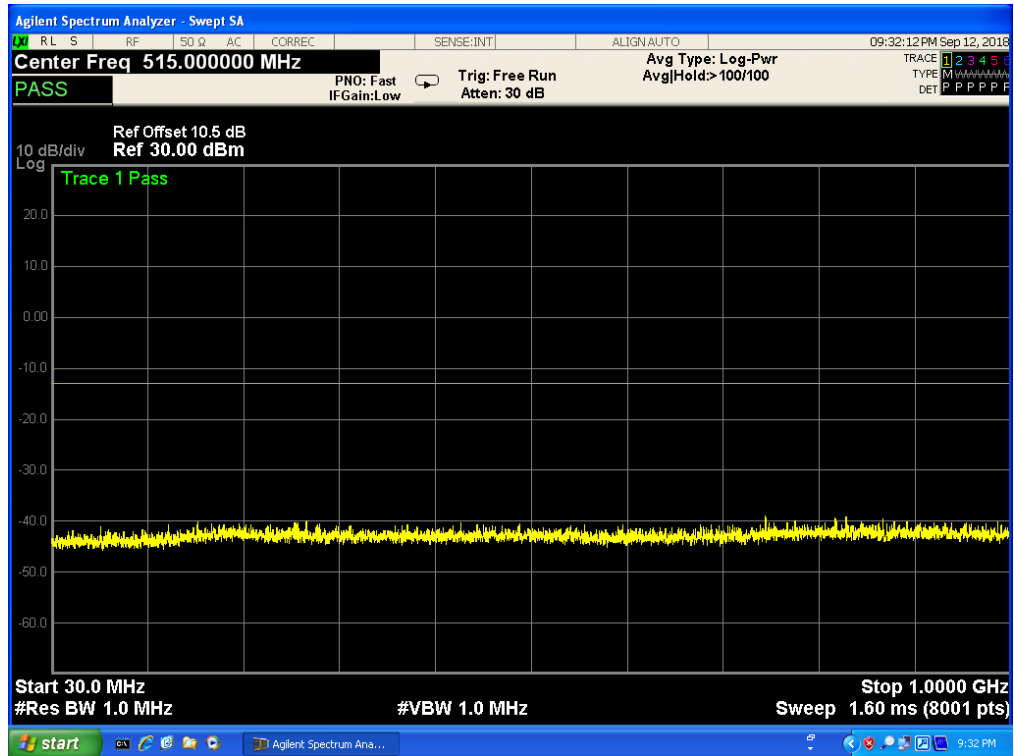
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



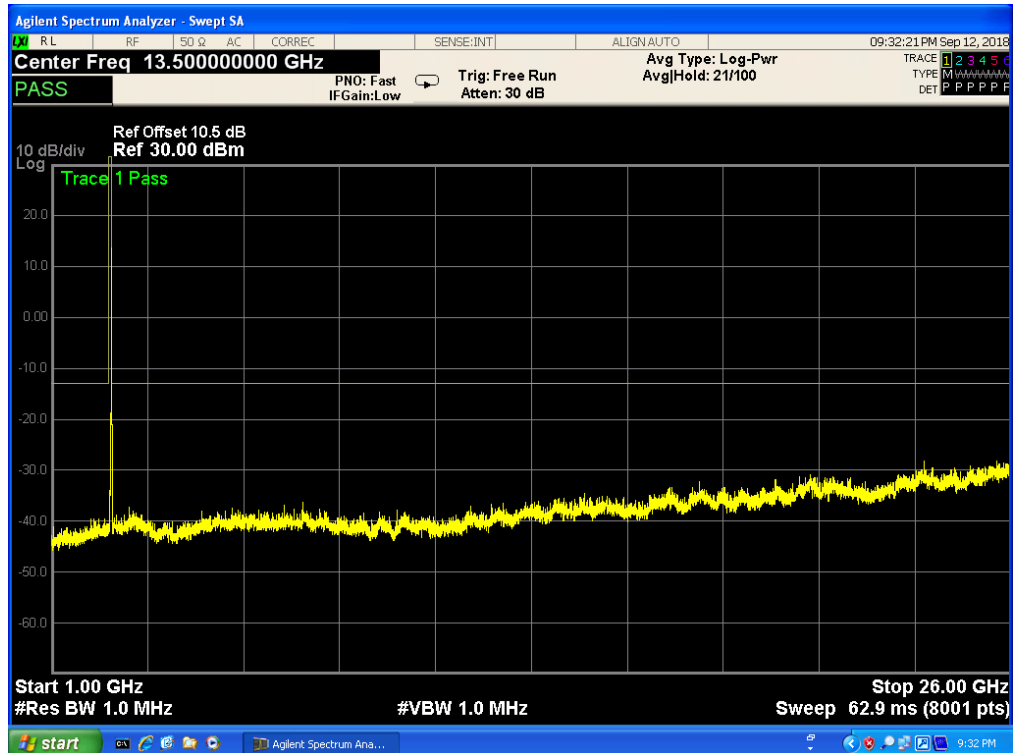


Report No.: SER180508709003E

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



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





8. Radiated Spurious Emission

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

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

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.

27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17

KDB 971168 v02r01 RF power output using broadband peak and average power meter method.

KDB 971168 D01 Power Meas License Digital Systems v02r01, "Measurement Guidance for Certification of Licensed Digital Transmitters"

MODES TESTED

- ☐ LTE Band 2
LTE Band 4
- ☐ LTE Band5
LTE Band 7

RESULTS

8.2 LTE BAND 2

Radiated Power (EIRP) for Band 2									
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	1852.5	2.41	3.77	28.31	26.95	495.450	Vertical	Pass
		1880	2.26	3.91	28.22	26.57	453.942	Vertical	Pass
		1907.5	2.62	3.94	28.2	26.88	487.528	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1852.5	1.30	3.77	28.31	25.84	383.707	Vertical	Pass
		1880	1.36	3.91	28.22	25.67	368.978	Vertical	Pass
		1907.5	1.17	3.94	28.2	25.43	349.140	Vertical	Pass
10.0MH z Band QPSK	50/0	1855	2.32	3.79	28.33	26.86	485.289	Vertical	Pass
		1880	2.47	3.95	28.22	26.74	472.063	Vertical	Pass
		1905	2.47	3.97	28.19	26.69	466.659	Vertical	Pass
10.0MH z Band 16 QAM	50/0	1855	1.24	3.79	28.33	25.78	378.443	Vertical	Pass
		1880	1.50	3.95	28.22	25.77	377.572	Vertical	Pass
		1905	1.13	3.97	28.19	25.35	342.768	Vertical	Pass
15.0MH z Band QPSK	75/0	1857.5	2.36	3.79	28.34	26.91	490.908	Vertical	Pass
		1880	2.59	3.95	28.22	26.86	485.289	Vertical	Pass
		1902.5	2.60	3.97	28.18	26.81	479.733	Vertical	Pass
15.0MH z Band 16 QAM	75/0	1857.5	1.26	3.79	28.34	25.81	381.066	Vertical	Pass
		1880	1.40	3.95	28.22	25.67	368.978	Vertical	Pass
		1902.5	1.52	3.97	28.18	25.73	374.111	Vertical	Pass
20.0MH z Band QPSK	100/ 0	1860	2.34	3.81	28.35	26.88	487.528	Vertical	Pass
		1880	2.43	3.96	28.22	26.69	466.659	Vertical	Pass
		1900	2.55	4	28.16	26.71	468.813	Vertical	Pass
20.0MH z Band 16 QAM	100/ 0	1860	1.19	3.81	28.35	25.73	374.111	Vertical	Pass
		1880	1.58	3.96	28.22	25.84	383.707	Vertical	Pass
		1900	1.49	4	28.16	25.65	367.282	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 2									
Mode	RB/ RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Max. EIRP	Max. EIRP	Polarizati on Of Max. ERP	
						Average	Averag e		
						(dBm)	(mW)		
5.0MHz Band QPSK	25/0	1852.5	1.22	3.77	28.31	25.76	376.704	Horizontal	Pass
		1880	1.17	3.91	28.22	25.48	353.183	Horizontal	Pass
		1907.5	1.45	3.94	28.2	25.71	372.392	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1852.5	0.32	3.77	28.31	24.86	306.196	Horizontal	Pass
		1880	0.42	3.91	28.22	24.73	297.167	Horizontal	Pass
		1907.5	0.43	3.94	28.2	24.69	294.442	Horizontal	Pass
10.0MH z Band QPSK	50/0	1855	1.25	3.79	28.33	25.79	379.315	Horizontal	Pass
		1880	1.54	3.95	28.22	25.81	381.066	Horizontal	Pass
		1905	1.44	3.97	28.19	25.66	368.129	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	1855	-0.07	3.79	28.33	24.47	279.898	Horizontal	Pass
		1880	0.48	3.95	28.22	24.75	298.538	Horizontal	Pass
		1905	0.36	3.97	28.19	24.58	287.078	Horizontal	Pass
15.0MH z Band QPSK	75/0	1857.5	1.24	3.79	28.34	25.79	379.315	Horizontal	Pass
		1880	1.37	3.95	28.22	25.64	366.438	Horizontal	Pass
		1902.5	1.37	3.97	28.18	25.58	361.410	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	1857.5	0.26	3.79	28.34	24.81	302.691	Horizontal	Pass
		1880	0.46	3.95	28.22	24.73	297.167	Horizontal	Pass
		1902.5	0.46	3.97	28.18	24.67	293.089	Horizontal	Pass
20.0MH z Band QPSK	100/ 0	1860	1.04	3.81	28.35	25.58	361.410	Horizontal	Pass
		1880	1.58	3.96	28.22	25.84	383.707	Horizontal	Pass
		1900	1.27	4	28.16	25.43	349.140	Horizontal	Pass
20.0MH z Band 16 QAM	100/ 0	1860	0.13	3.81	28.35	24.67	293.089	Horizontal	Pass
		1880	0.65	3.96	28.22	24.91	309.742	Horizontal	Pass
		1900	0.57	4	28.16	24.73	297.167	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 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level	Cable Loss	Antenna Gain	Max. EIRP	Max. EIRP	Polarization Of Max. ERP	
			(dBm)	(dBm)	(dB)	Average (dBm)	Average (mW)		
5.0MHz Band QPSK	25/0	1712.5	1.65	3.13	27.63	26.15	412.098	Vertical	Pass
		1732.5	1.90	3.27	27.61	26.24	420.727	Vertical	Pass
		1752.5	1.83	3.3	27.60	26.13	410.204	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	0.92	3.13	27.63	25.42	348.337	Vertical	Pass
		1732.5	1.01	3.27	27.61	25.35	342.768	Vertical	Pass
		1752.5	1.03	3.3	27.6	25.33	341.193	Vertical	Pass
10.0MHz z Band QPSK	50/0	1715	1.73	3.15	27.64	26.22	418.794	Vertical	Pass
		1732.5	1.83	3.31	27.61	26.13	410.204	Vertical	Pass
		1750	2.03	3.33	27.59	26.29	425.598	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	1715	0.89	3.15	27.64	25.38	345.144	Vertical	Pass
		1732.5	0.97	3.31	27.61	25.27	336.512	Vertical	Pass
		1750	1.00	3.33	27.59	25.26	335.738	Vertical	Pass
15.0MHz z Band QPSK	75/0	1717.5	1.65	3.15	27.65	26.15	412.098	Vertical	Pass
		1732.5	1.95	3.31	27.61	26.25	421.697	Vertical	Pass
		1747.5	1.87	3.33	27.57	26.11	408.319	Vertical	Pass
15.0MHz z Band 16 QAM	75/0	1717.5	0.91	3.15	27.65	25.41	347.536	Vertical	Pass
		1732.5	1.07	3.31	27.61	25.37	344.350	Vertical	Pass
		1747.5	1.08	3.33	27.57	25.32	340.408	Vertical	Pass
20.0MHz z Band QPSK	100/0	1720	1.79	3.17	27.66	26.28	424.620	Vertical	Pass
		1732.5	1.92	3.32	27.61	26.21	417.830	Vertical	Pass
		1745	1.97	3.36	27.56	26.17	414.000	Vertical	Pass
20.0MHz z Band 16 QAM	100/0	1720	0.90	3.17	27.66	25.39	345.939	Vertical	Pass
		1732.5	1.06	3.32	27.61	25.35	342.768	Vertical	Pass
		1745	1.22	3.36	27.56	25.42	348.337	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	
5.0MHz Band QPSK	25/0	1712.5	0.96	3.13	27.63	25.46	351.560	Horizontal	Pass
		1732.5	1.07	3.27	27.61	25.41	347.536	Horizontal	Pass
		1752.5	1.08	3.30	27.60	25.38	345.144	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	0.07	3.13	27.63	24.57	286.418	Horizontal	Pass
		1732.5	0.30	3.27	27.61	24.64	291.072	Horizontal	Pass
		1752.5	0.33	3.30	27.6	24.63	290.402	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	1.02	3.15	27.64	25.51	355.631	Horizontal	Pass
		1732.5	1.14	3.31	27.61	25.44	349.945	Horizontal	Pass
		1750	1.17	3.33	27.59	25.43	349.140	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	0.22	3.15	27.64	24.71	295.801	Horizontal	Pass
		1732.5	0.26	3.31	27.61	24.56	285.759	Horizontal	Pass
		1750	0.17	3.33	27.59	24.43	277.332	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	0.89	3.15	27.65	25.39	345.939	Horizontal	Pass
		1732.5	1.04	3.31	27.61	25.34	341.979	Horizontal	Pass
		1747.5	1.17	3.33	27.57	25.41	347.536	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	1717.5	0.07	3.15	27.65	24.57	286.418	Horizontal	Pass
		1732.5	0.51	3.31	27.61	24.81	302.691	Horizontal	Pass
		1747.5	0.43	3.33	27.57	24.67	293.089	Horizontal	Pass
20.0MHz Band QPSK	100/0	1720	0.95	3.17	27.66	25.44	349.945	Horizontal	Pass
		1732.5	1.10	3.32	27.61	25.39	345.939	Horizontal	Pass
		1745	1.01	3.36	27.56	25.21	331.894	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	0.12	3.17	27.66	24.61	289.068	Horizontal	Pass
		1732.5	0.24	3.32	27.61	24.53	283.792	Horizontal	Pass
		1745	0.49	3.36	27.56	24.69	294.442	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 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	
5.0MHz Band QPSK	25/0	826.5	10.31	2.01	19.71	2.15	25.86	385.478	Vertical	Pass
		836.5	10.13	2.01	19.77	2.15	25.74	374.973	Vertical	Pass
		846.5	10.17	2.02	19.79	2.15	25.79	379.315	Vertical	Pass
5.0MHz Band 16 QAM	25/0	826.5	9.36	2.01	19.71	2.15	24.91	309.742	Vertical	Pass
		836.5	9.27	2.01	19.77	2.15	24.88	307.610	Vertical	Pass
		846.5	9.14	2.02	19.79	2.15	24.76	299.226	Vertical	Pass
10.0MHz z Band QPSK	50/0	829	10.20	2.01	19.73	2.15	25.77	377.572	Vertical	Pass
		836.5	10.28	2.01	19.77	2.15	25.89	388.150	Vertical	Pass
		844	10.20	2.02	19.78	2.15	25.81	381.066	Vertical	Pass
10.0MHz z Band 16 QAM	50/0	829	9.26	2.01	19.73	2.15	24.83	304.089	Vertical	Pass
		836.5	9.30	2.01	19.77	2.15	24.91	309.742	Vertical	Pass
		844	9.23	2.02	19.78	2.15	24.84	304.789	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	Freque ncy	Result							Conclu sion
			SG Level (dBm)	Cable Loss (dBm)	Anten na Gain (dB)	Corre ction (dB)	Max. EIRP Averag e (dBm)	Max. EIRP Averag e (mW)	Polarizati on Of Max. ERP	
5.0MHz Band QPSK	25/0	826.5	9.61	2.01	19.71	2.15	25.16	328.095	Horizontal	Pass
		836.5	9.47	2.01	19.77	2.15	25.08	322.107	Horizontal	Pass
		846.5	9.52	2.02	19.79	2.15	25.14	326.588	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	826.5	8.82	2.01	19.71	2.15	24.37	273.527	Horizontal	Pass
		836.5	8.63	2.01	19.77	2.15	24.24	265.461	Horizontal	Pass
		846.5	8.64	2.02	19.79	2.15	24.26	266.686	Horizontal	Pass
10.0MH z Band QPSK	50/0	829	9.64	2.01	19.73	2.15	25.21	331.894	Horizontal	Pass
		836.5	9.62	2.01	19.77	2.15	25.23	333.426	Horizontal	Pass
		844	9.58	2.02	19.78	2.15	25.19	330.370	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	829	8.72	2.01	19.73	2.15	24.29	268.534	Horizontal	Pass
		836.5	8.70	2.01	19.77	2.15	24.31	269.774	Horizontal	Pass
		844	8.64	2.02	19.78	2.15	24.25	266.073	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 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	2.71	4.54	27.75	25.92	390.841	Vertical	Pass
		2535	2.75	4.69	27.72	25.78	378.443	Vertical	Pass
		2567.5	2.81	4.71	27.71	25.81	381.066	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	2.03	4.54	27.75	25.24	334.195	Vertical	Pass
		2535	2.10	4.69	27.72	25.13	325.837	Vertical	Pass
		2567.5	2.11	4.71	27.71	25.11	324.340	Vertical	Pass
10.0MH z Band QPSK	50/0	2505	2.83	4.55	27.76	26.04	401.791	Vertical	Pass
		2535	2.86	4.69	27.72	25.89	388.150	Vertical	Pass
		2565	2.95	4.72	27.7	25.93	391.742	Vertical	Pass
10.0MH z Band 16 QAM	50/0	2505	2.02	4.55	27.76	25.23	333.426	Vertical	Pass
		2535	2.18	4.69	27.72	25.21	331.894	Vertical	Pass
		2565	2.13	4.72	27.7	25.11	324.340	Vertical	Pass
15.0MH z Band QPSK	75/0	2507.5	2.69	4.55	27.77	25.91	389.942	Vertical	Pass
		2535	3.00	4.69	27.72	26.03	400.867	Vertical	Pass
		2562.5	2.91	4.72	27.69	25.88	387.258	Vertical	Pass
15.0MH z Band 16 QAM	75/0	2507.5	2.09	4.55	27.77	25.31	339.625	Vertical	Pass
		2535	2.21	4.69	27.72	25.24	334.195	Vertical	Pass
		2562.5	2.19	4.72	27.69	25.16	328.095	Vertical	Pass
20.0MH z Band QPSK	100/ 0	2510	2.80	4.57	27.78	26.01	399.025	Vertical	Pass
		2535	2.99	4.73	27.72	25.98	396.278	Vertical	Pass
		2560	2.93	4.75	27.68	25.86	385.478	Vertical	Pass
20.0MH z Band 16 QAM	100/ 0	2510	1.92	4.57	27.78	25.13	325.837	Vertical	Pass
		2535	2.07	4.73	27.72	25.06	320.627	Vertical	Pass
		2560	2.26	4.75	27.68	25.19	330.370	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	2.03	4.54	27.75	25.24	334.195	Horizontal	Pass
		2535	2.13	4.69	27.72	25.16	328.095	Horizontal	Pass
		2567.5	2.09	4.71	27.71	25.09	322.849	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	1.23	4.54	27.75	24.44	277.971	Horizontal	Pass
		2535	1.48	4.69	27.72	24.51	282.488	Horizontal	Pass
		2567.5	1.43	4.71	27.71	24.43	277.332	Horizontal	Pass
10.0MH z Band QPSK	50/0	2505	2.08	4.55	27.76	25.29	338.065	Horizontal	Pass
		2535	2.15	4.69	27.72	25.18	329.610	Horizontal	Pass
		2565	2.16	4.72	27.7	25.14	326.588	Horizontal	Pass
10.0MH z Band 16 QAM	50/0	2505	1.15	4.55	27.76	24.36	272.898	Horizontal	Pass
		2535	1.43	4.69	27.72	24.46	279.254	Horizontal	Pass
		2565	1.53	4.72	27.7	24.51	282.488	Horizontal	Pass
15.0MH z Band QPSK	75/0	2507.5	1.96	4.55	27.77	25.18	329.610	Horizontal	Pass
		2535	2.24	4.69	27.72	25.27	336.512	Horizontal	Pass
		2562.5	2.24	4.72	27.69	25.21	331.894	Horizontal	Pass
15.0MH z Band 16 QAM	75/0	2507.5	1.31	4.55	27.77	24.53	283.792	Horizontal	Pass
		2535	1.35	4.69	27.72	24.38	274.157	Horizontal	Pass
		2562.5	1.36	4.72	27.69	24.33	271.019	Horizontal	Pass
20.0MH z Band QPSK	100/ 0	2510	2.01	4.57	27.78	25.22	332.660	Horizontal	Pass
		2535	2.20	4.73	27.72	25.19	330.370	Horizontal	Pass
		2560	2.34	4.75	27.68	25.27	336.512	Horizontal	Pass
20.0MH z Band 16 QAM	100/ 0	2510	1.30	4.57	27.78	24.51	282.488	Horizontal	Pass
		2535	1.48	4.73	27.72	24.47	279.898	Horizontal	Pass
		2560	1.30	4.75	27.68	24.23	264.850	Horizontal	Pass

Note:

SG Level= Signal generator output

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



9. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

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

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

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



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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 2
LTE Band 4
- ☐ LTE Band5
LTE Band 7

RESULTS

PASS

9.1 LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 1852.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3705.0	-54.41	4.04	33.51	-24.94	-13	-11.94	Horizontal
3705.0	-50.26	4.04	33.51	-20.79	-13	-7.79	Vertical
5557.5	-49.98	5.24	35.84	-19.38	-13	-6.38	Vertical
5557.5	-51.23	5.24	35.84	-20.63	-13	-7.63	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-52.18	4.04	33.56	-22.66	-13	-9.66	Horizontal
3760.0	-52.42	4.04	33.56	-22.90	-13	-9.90	Vertical
5640.0	-53.67	5.24	35.91	-23.00	-13	-10.00	Vertical
5640.0	-54.49	5.24	35.91	-23.82	-13	-10.82	Horizontal
Test Results for High Channel 1907.5MHz							
3815.0	-50.28	4.04	34.00	-20.32	-13	-7.32	Horizontal
3815.0	-54.41	4.04	34.00	-24.45	-13	-11.45	Vertical
5722.5	-52.62	5.24	36.04	-21.82	-13	-8.82	Vertical
5722.5	-55.59	5.24	36.04	-24.79	-13	-11.79	Horizontal

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

Test Results for Low Channel 1860MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3720	-54.41	4.07	33.54	-24.94	-13	-11.94	Horizontal
3720	-50.28	4.07	33.54	-20.81	-13	-7.81	Vertical
5580	-53.39	5.28	35.86	-22.81	-13	-9.81	Vertical
5580	-52.68	5.28	35.86	-22.10	-13	-9.10	Horizontal
Test Results for Mid Channel 1880MHz							
3760	-52.61	4.04	33.56	-23.09	-13	-10.09	Horizontal
3760	-50.42	4.04	33.56	-20.90	-13	-7.90	Vertical
5640	-51.66	5.24	35.91	-20.99	-13	-7.99	Vertical
5640	-52.97	5.24	35.91	-22.30	-13	-9.30	Horizontal
Test Results for High Channel 1900MHz							
3800	-56.62	4.04	34.00	-26.66	-13	-13.66	Horizontal
3800	-52.58	4.04	34.00	-22.62	-13	-9.62	Vertical
5700	-50.34	5.24	36.04	-19.54	-13	-6.54	Vertical
5700	-53.62	5.24	36.04	-22.82	-13	-9.82	Horizontal

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

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

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

9.2 LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 1712.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
3425.0	-50.94	4.02	29.80	-25.16	-13	-12.16	Horizontal
3425.0	-49.96	4.02	29.80	-24.18	-13	-11.18	Vertical
5137.5	-48.97	5.24	35.84	-18.37	-13	-5.37	Vertical
5137.5	-51.41	5.24	35.84	-20.81	-13	-7.81	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-53.62	4.03	30.00	-27.65	-13	-14.65	Horizontal
3465.0	-52.68	4.03	30.00	-26.71	-13	-13.71	Vertical
5197.5	-50.94	5.25	35.86	-20.33	-13	-7.33	Vertical
5197.5	-51.34	5.25	35.86	-20.73	-13	-7.73	Horizontal
Test Results for High Channel 1752.5MHz							
3505.0	-52.66	4.05	30.01	-26.70	-13	-13.70	Horizontal
3505.0	-51.19	4.05	30.01	-25.23	-13	-12.23	Vertical
5257.5	-52.64	5.26	35.86	-22.04	-13	-9.04	Vertical
5257.5	-53.26	5.26	35.86	-22.66	-13	-9.66	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	-50.42	4.02	29.80	-24.64	-13	-11.64	Horizontal
3440.0	-49.97	4.02	29.80	-24.19	-13	-11.19	Vertical
5160.0	-48.68	5.24	35.84	-18.08	-13	-5.08	Vertical
5160.0	-50.27	5.24	35.84	-19.67	-13	-6.67	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-50.32	4.03	30.00	-24.35	-13	-11.35	Horizontal
3465.0	-52.67	4.03	30.00	-26.70	-13	-13.70	Vertical
5197.5	-51.12	5.25	35.86	-20.51	-13	-7.51	Vertical
5197.5	-50.43	5.25	35.86	-19.82	-13	-6.82	Horizontal
Test Results for High Channel 1745MHz							
2490.0	-49.37	2.91	27.68	-24.60	-13	-11.60	Horizontal
3490.0	-48.63	2.91	27.68	-23.86	-13	-10.86	Vertical
5235.0	-50.22	5.26	35.86	-19.62	-13	-6.62	Vertical
5235.0	-49.97	5.26	35.86	-19.37	-13	-6.37	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 5

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

Test Results for Low Channel 826.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
1653.0	-50.41	2.78	27.50	-25.69	-13	-12.69	Horizontal
1653.0	-50.68	2.78	27.50	-25.96	-13	-12.96	Vertical
2479.5	-52.29	2.90	27.80	-27.39	-13	-14.39	Vertical
2479.5	-50.13	2.90	27.80	-25.23	-13	-12.23	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.38	2.78	27.48	-24.68	-13	-11.68	Horizontal
1673.0	-48.88	2.78	27.48	-24.18	-13	-11.18	Vertical
2509.5	-47.61	2.91	27.70	-22.82	-13	-9.82	Vertical
2509.5	-47.96	2.91	27.70	-23.17	-13	-10.17	Horizontal
Test Results for High Channel 846.5MHz							
1693.0	-47.16	2.78	27.43	-22.51	-13	-9.51	Horizontal
1693.0	-48.85	2.78	27.43	-24.20	-13	-11.20	Vertical
2539.5	-49.11	2.92	27.74	-24.29	-13	-11.29	Vertical
2539.5	-49.98	2.92	27.74	-25.16	-13	-12.16	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	-50.11	2.78	27.50	-25.39	-13	-12.39	Horizontal
1658.0	-49.36	2.78	27.50	-24.64	-13	-11.64	Vertical
2487.0	-48.87	2.90	27.80	-23.97	-13	-10.97	Vertical
2487.0	-48.12	2.90	27.80	-23.22	-13	-10.22	Horizontal
Test Results for Mid Channel 836.5MHz							
1673.0	-51.42	2.78	27.48	-26.72	-13	-13.72	Horizontal
1673.0	-48.67	2.78	27.48	-23.97	-13	-10.97	Vertical
2509.5	-53.62	2.91	27.70	-28.83	-13	-15.83	Vertical
2509.5	-51.12	2.91	27.70	-26.33	-13	-13.33	Horizontal
Test Results for High Channel 844MHz							
1688.0	-53.24	2.78	27.43	-28.59	-13	-15.59	Horizontal
1688.0	-50.58	2.78	27.43	-25.93	-13	-12.93	Vertical
2532.0	-48.63	2.92	27.74	-23.81	-13	-10.81	Vertical
2532.0	-47.67	2.92	27.74	-22.85	-13	-9.85	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 7

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

Test Results for Low Channel 2502.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5005.0	-52.98	5.23	35.81	-22.40	-13	-9.40	Horizontal
5005.0	-52.34	5.23	35.81	-21.76	-13	-8.76	Vertical
7507.5	-53.67	5.67	36.85	-22.49	-13	-9.49	Vertical
7507.5	-50.88	5.67	36.85	-19.70	-13	-6.70	Horizontal
Test Results for Mid Channel 2535MHz							
5070.0	-52.67	5.23	35.82	-22.08	-13	-9.08	Horizontal
5070.0	-53.69	5.23	35.82	-23.10	-13	-10.10	Vertical
7605.0	-53.64	5.67	36.85	-22.46	-13	-9.46	Vertical
7605.0	-52.27	5.67	36.85	-21.09	-13	-8.09	Horizontal
Test Results for High Channel 2567.5MHz							
5135.0	-55.56	5.24	35.83	-24.97	-13	-11.97	Horizontal
5135.0	-53.96	5.24	35.83	-23.37	-13	-10.37	Vertical
7702.5	-53.41	5.68	36.87	-22.22	-13	-9.22	Vertical
7702.5	-50.57	5.68	36.87	-19.38	-13	-6.38	Horizontal

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

Test Results for Low Channel 2510MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Gain(dB)	Absolute Level(dBm)	Limit (dBm)	Margin(dBm)	Polarity
5020	-56.96	5.23	35.82	-26.37	-13	-13.37	Horizontal
5020	-57.41	5.23	35.82	-26.82	-13	-13.82	Vertical
7530	-51.01	5.67	36.86	-19.82	-13	-6.82	Vertical
7530	-50.23	5.67	36.86	-19.04	-13	-6.04	Horizontal
Test Results for Mid Channel 2535MHz							
5070	-50.29	5.23	35.82	-19.70	-13	-6.70	Horizontal
5070	-49.96	5.23	35.82	-19.37	-13	-6.37	Vertical
7605	-51.64	5.67	36.85	-20.46	-13	-7.46	Vertical
7605	-52.97	5.67	36.85	-21.79	-13	-8.79	Horizontal
Test Results for High Channel 2560MHz							
5120	-57.48	5.24	35.83	-26.89	-13	-13.89	Horizontal
5120	-53.62	5.24	35.83	-23.03	-13	-10.03	Vertical
7680	-52.68	5.7	36.88	-21.50	-13	-8.50	Vertical
7680	-54.41	5.7	36.88	-23.23	-13	-10.23	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, AC 108V, Normal, AC 120V and High voltage, AC 132V.

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 2
LTE Band 4
- ☐ LTE Band 5
LTE Band 7

RESULTS

See the following pages.

10.1 LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	1880	-4.8	-0.002553	2.5
AC 120	1880	15.6	0.008298	2.5
AC 132	1880	11.7	0.006223	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	-5.6	-0.002979	2.5
Extreme (50C)	1880	-4.2	-0.002234	2.5
Extreme (40C)	1880	13.5	0.007181	2.5
Extreme (30C)	1880	8.5	0.004521	2.5
Extreme (10C)	1880	9	0.004787	2.5
Extreme (0C)	1880	11	0.005851	2.5
Extreme (-10C)	1880	11.4	0.006064	2.5
Extreme (-20C)	1880	12.7	0.006755	2.5
Extreme (-30C)	1880	13.6	0.007234	2.5

**16QAM, (20MHz BANDWIDTH)****Frequency error vs. Voltage**

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	1880	-5.4	-0.002872	2.5
AC 120	1880	15.9	0.008457	2.5
AC 132	1880	11.7	0.006223	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH 18900 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	5.2	0.002766	2.5
Extreme (50C)	1880	6.7	0.003564	2.5
Extreme (40C)	1880	-10.3	-0.005479	2.5
Extreme (30C)	1880	8.7	0.004628	2.5
Extreme (10C)	1880	9.6	0.005106	2.5
Extreme (0C)	1880	-11.2	-0.005957	2.5
Extreme (-10C)	1880	-8.6	-0.004574	2.5
Extreme (-20C)	1880	5.8	0.003085	2.5
Extreme (-30C)	1880	10.3	0.005479	2.5

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

10.2 LTE BAND 4

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	1732.5	2.8	0.001616	2.5
AC 120	1732.5	4.7	0.002713	2.5
AC 132	1732.5	5.1	0.002944	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	13.6	0.007850	2.5
Extreme (50C)	1732.5	12.8	0.007388	2.5
Extreme (40C)	1732.5	14.7	0.008485	2.5
Extreme (30C)	1732.5	11.9	0.006869	2.5
Extreme (10C)	1732.5	-4.7	-0.002713	2.5
Extreme (0C)	1732.5	-5.8	-0.003348	2.5
Extreme (-10C)	1732.5	-2.6	-0.001501	2.5
Extreme (-20C)	1732.5	5.8	0.003348	2.5
Extreme (-30C)	1732.5	6.3	0.003636	2.5

**16QAM, (20MHz BANDWIDTH)****Frequency error vs. Voltage**

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	1732.5	-7.7	-0.004444	2.5
AC 120	1732.5	11.9	0.006869	2.5
AC 132	1732.5	7.6	0.004387	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	-6.4	-0.003694	2.5
Extreme (50C)	1732.5	9.4	0.005426	2.5
Extreme (40C)	1732.5	13.2	0.007619	2.5
Extreme (30C)	1732.5	11.5	0.006638	2.5
Extreme (10C)	1732.5	10.7	0.006176	2.5
Extreme (0C)	1732.5	9.9	0.005714	2.5
Extreme (-10C)	1732.5	9	0.005195	2.5
Extreme (-20C)	1732.5	10	0.005772	2.5
Extreme (-30C)	1732.5	11.5	0.006638	2.5

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

10.3 LTE BAND 5

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 QPSK, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
AC 108	836.5	-3.1	-0.003706	2.5
AC 120	836.5	11.1	0.013270	2.5
AC 132	836.5	8.6	0.010281	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	10.4	0.012433	2.5
Extreme (50C)	836.5	6.7	0.008010	2.5
Extreme (40C)	836.5	-3.2	-0.003825	2.5
Extreme (30C)	836.5	11	0.013150	2.5
Extreme (10C)	836.5	10	0.011955	2.5
Extreme (0C)	836.5	8.5	0.010161	2.5
Extreme (-10C)	836.5	9.5	0.011357	2.5
Extreme (-20C)	836.5	9.9	0.011835	2.5
Extreme (-30C)	836.5	10.2	0.012194	2.5



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16QAM, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 5 16QAM, (CH 20525 RB size 50 RB Offset 0 10MHz BANDWIDTH)				
AC 108	836.5	-2.9	-0.003467	2.5
AC 120	836.5	10.8	0.012911	2.5
AC 132	836.5	9.6	0.011476	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	11.1	0.013270	2.5
Extreme (50C)	836.5	10.3	0.012313	2.5
Extreme (40C)	836.5	4.6	0.005499	2.5
Extreme (30C)	836.5	5.7	0.006814	2.5
Extreme (10C)	836.5	6.9	0.008249	2.5
Extreme (0C)	836.5	10.4	0.012433	2.5
Extreme (-10C)	836.5	14.8	0.017693	2.5
Extreme (-20C)	836.5	12.1	0.014465	2.5
Extreme (-30C)	836.5	10.5	0.012552	2.5

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

10.4 LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	2535	-8.5	-0.003353	2.5
AC 120	2535	14.7	0.005799	2.5
AC 132	2535	-6.9	-0.002722	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	-5.8	-0.002288	2.5
Extreme (50C)	2535	12.5	0.004931	2.5
Extreme (40C)	2535	11.6	0.004576	2.5
Extreme (30C)	2535	-6.9	-0.002722	2.5
Extreme (10C)	2535	-4.4	-0.001736	2.5
Extreme (0C)	2535	13.2	0.005207	2.5
Extreme (-10C)	2535	10.2	0.004024	2.5
Extreme (-20C)	2535	8.9	0.003511	2.5
Extreme (-30C)	2535	9.1	0.003590	2.5

**16QAM, (20MHz BANDWIDTH)****Frequency error vs. Voltage**

Voltage [V]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH 21100 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
AC 108	2535	-8.9	-0.003511	2.5
AC 120	2535	-14.6	-0.005759	2.5
AC 132	2535	-11.6	-0.004576	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	-12	-0.004734	2.5
Extreme (50C)	2535	-14.5	-0.005720	2.5
Extreme (40C)	2535	-10.9	-0.004300	2.5
Extreme (30C)	2535	-9.6	-0.003787	2.5
Extreme (10C)	2535	5.2	0.002051	2.5
Extreme (0C)	2535	6.3	0.002485	2.5
Extreme (-10C)	2535	-7.4	-0.002919	2.5
Extreme (-20C)	2535	-7	-0.002761	2.5
Extreme (-30C)	2535	-8.1	-0.003195	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.

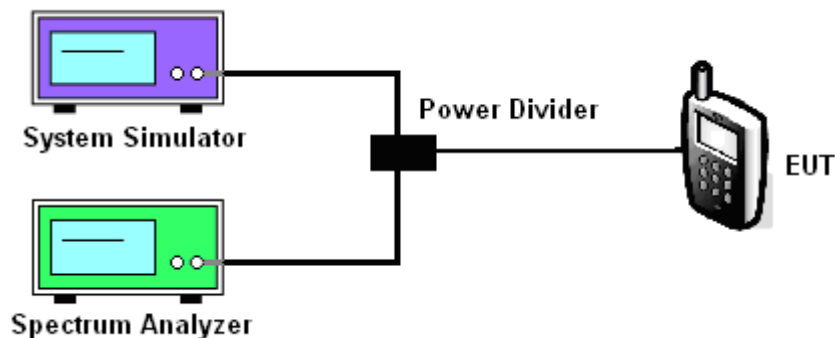
11.2 Measuring Instruments

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 Band2
- ☐ LTE Band 4
- ☐ LTE Band5
- ☐ LTE Band 7

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	5.0	1	Low	QPSK	4.60
2	18900	1880.0	5.0	1	Low	16-QAM	5.34
2	18900	1880.0	10.0	1	Low	QPSK	4.38
2	18900	1880.0	10.0	1	Low	16-QAM	5.16
2	18900	1880.0	15.0	1	Low	QPSK	4.55
2	18900	1880.0	15.0	1	Low	16-QAM	5.39
2	18900	1880.0	20.0	1	Low	QPSK	4.85
2	18900	1880.0	20.0	1	Low	16-QAM	5.51
4	20175	1732.5	5.0	1	Low	QPSK	4.68
4	20175	1732.5	5.0	1	Low	16-QAM	5.30
4	20175	1732.5	10.0	1	Low	QPSK	4.45
4	20175	1732.5	10.0	1	Low	16-QAM	4.94
4	20175	1732.5	15.0	1	Low	QPSK	4.45
4	20175	1732.5	15.0	1	Low	16-QAM	5.26
4	20175	1732.5	20.0	1	Low	QPSK	4.58
4	20175	1732.5	20.0	1	Low	16-QAM	5.44
5	20525	836.5	5.0	1	Low	QPSK	4.85
5	20525	836.5	5.0	1	Low	16-QAM	5.76
5	20525	836.5	10.0	1	Low	QPSK	5.11
5	20525	836.5	10.0	1	Low	16-QAM	5.89

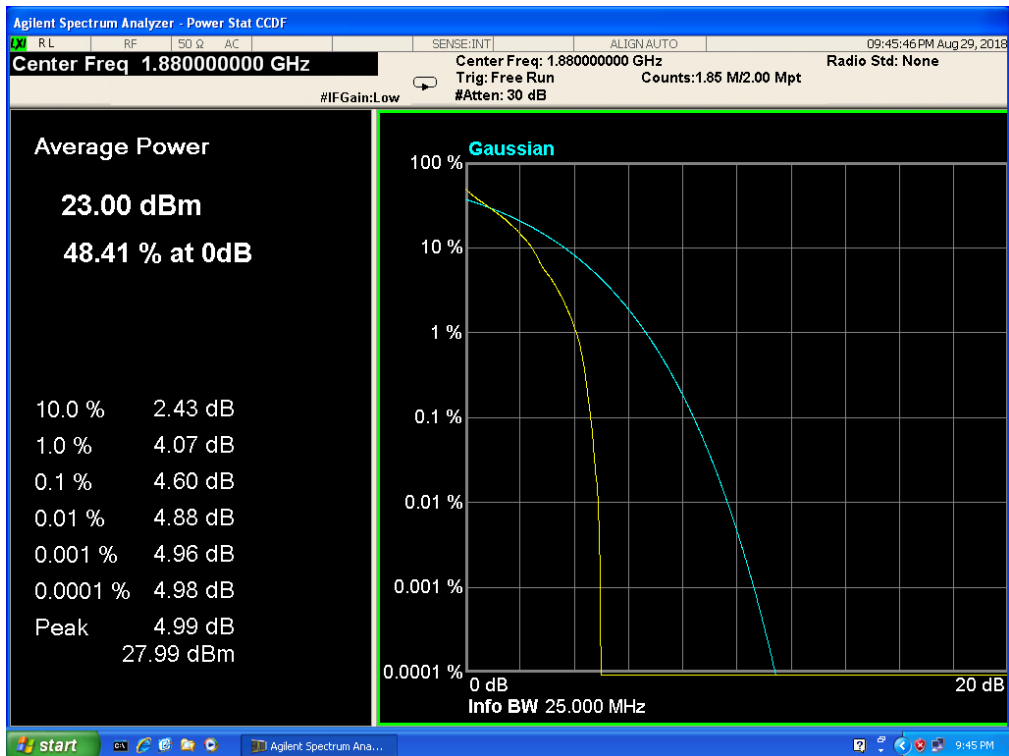


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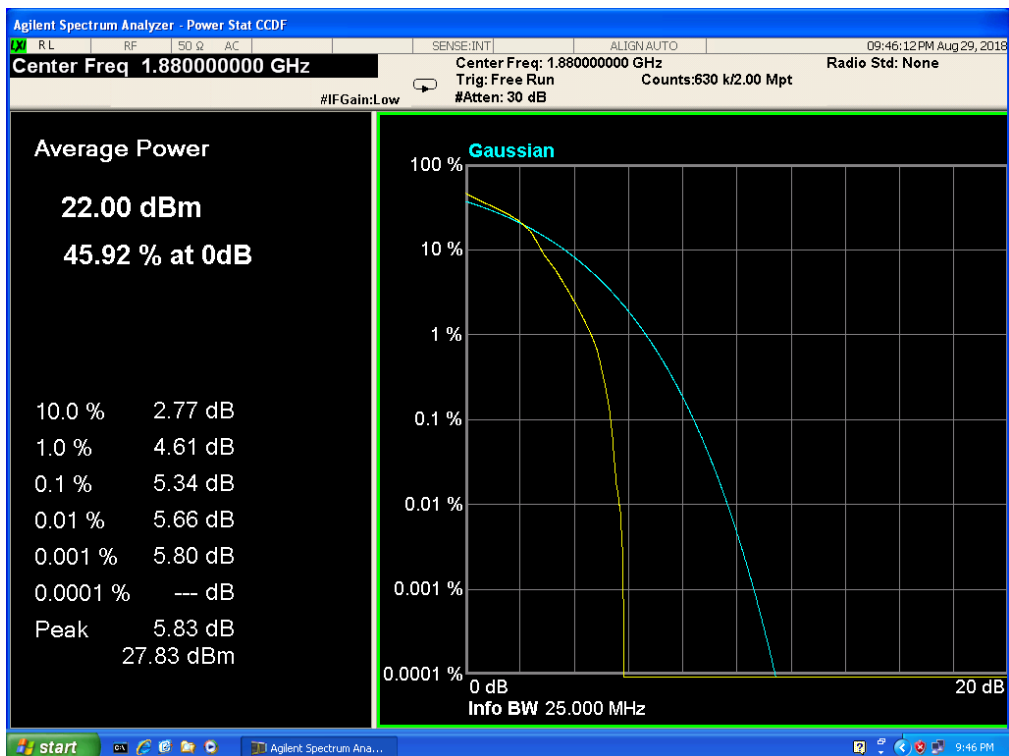
7	21100	2535.0	5.0	1	Low	QPSK	4.77
7	21100	2535.0	5.0	1	Low	16-QAM	5.53
7	21100	2535.0	10.0	1	Low	QPSK	4.59
7	21100	2535.0	10.0	1	Low	16-QAM	5.38
7	21100	2535.0	15.0	1	Low	QPSK	4.89
7	21100	2535.0	15.0	1	Low	16-QAM	5.87
7	21100	2535.0	20.0	1	Low	QPSK	4.89
7	21100	2535.0	20.0	1	Low	16-QAM	5.56

11.5 LTE BAND 2

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



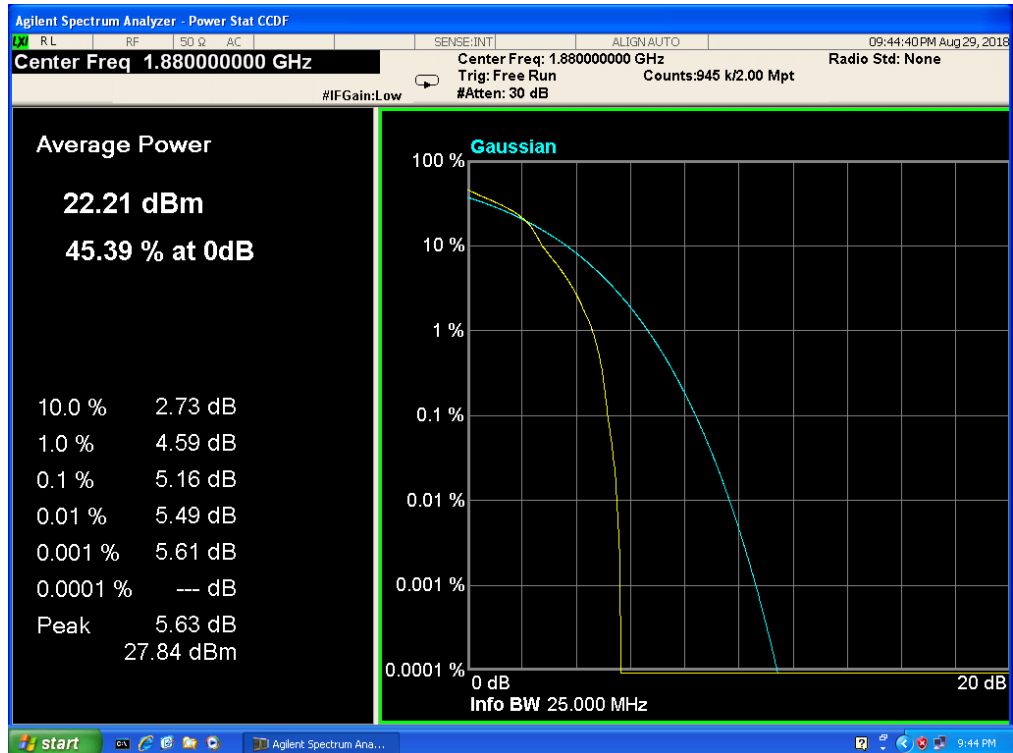
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Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



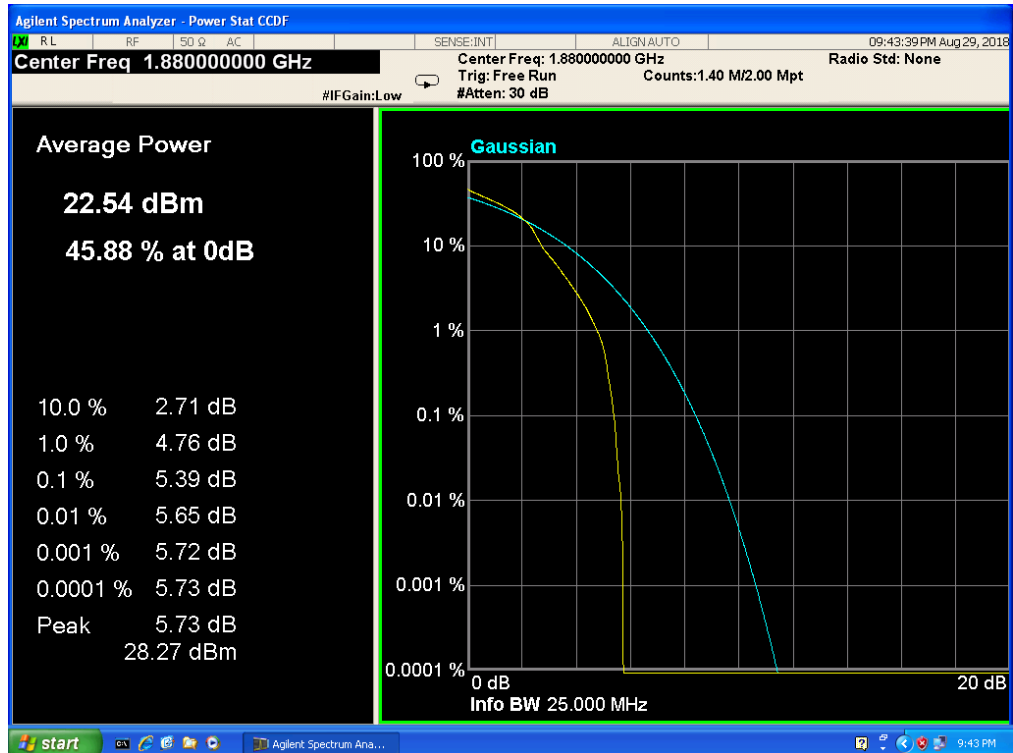
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



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



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



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

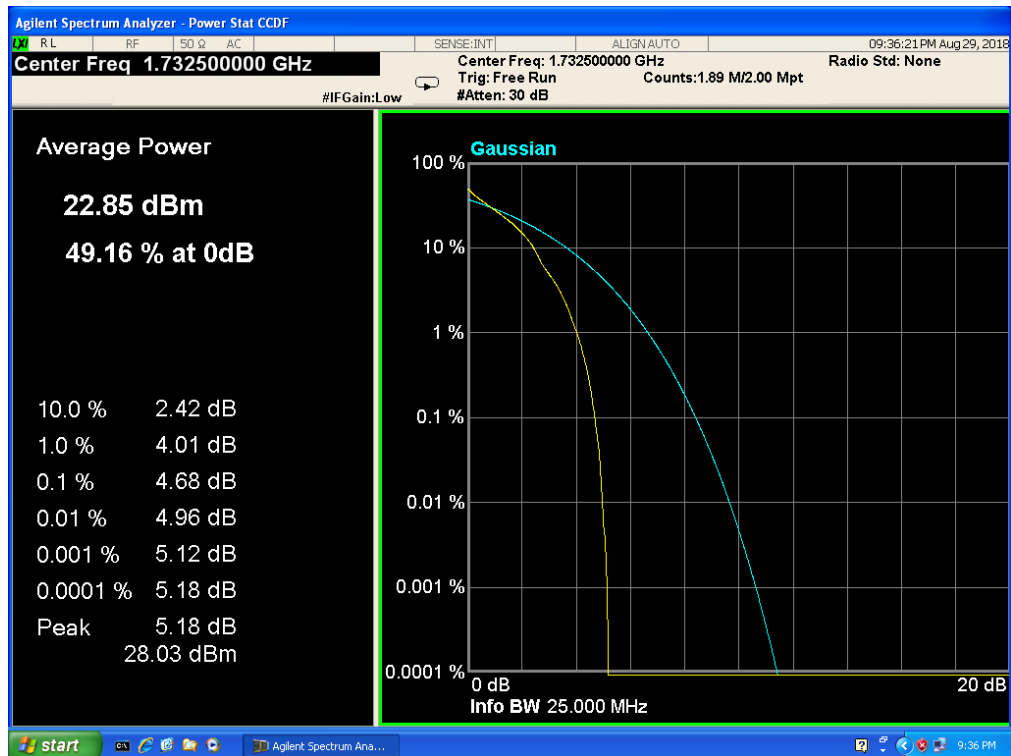


Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,16-QAM

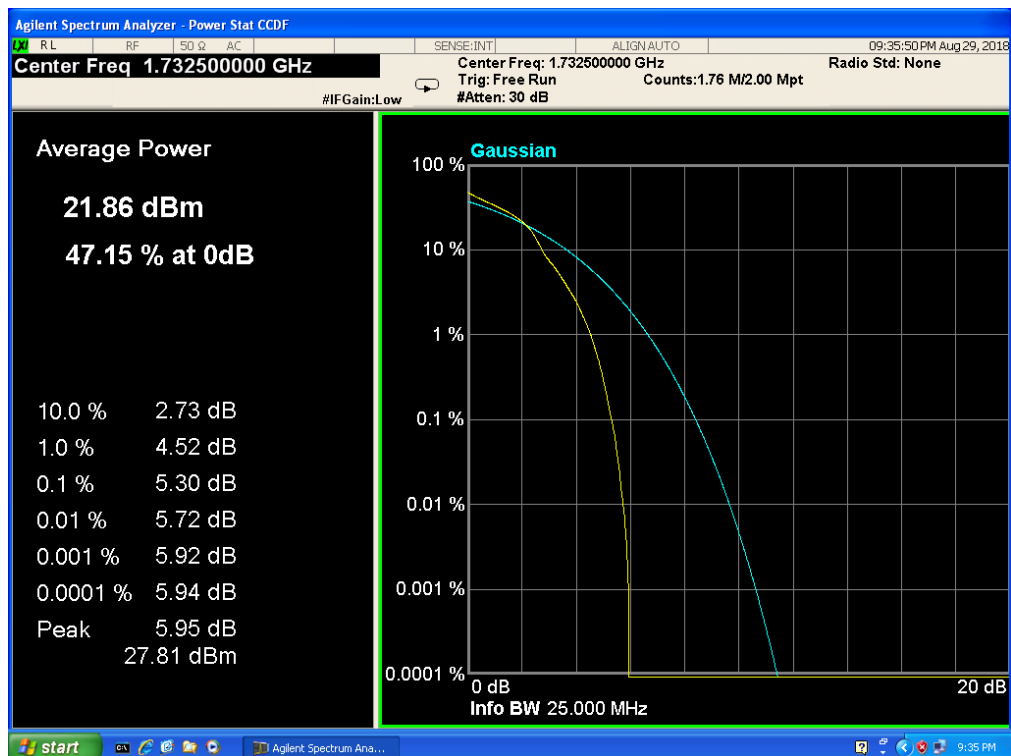


11.6 LTE BAND 4

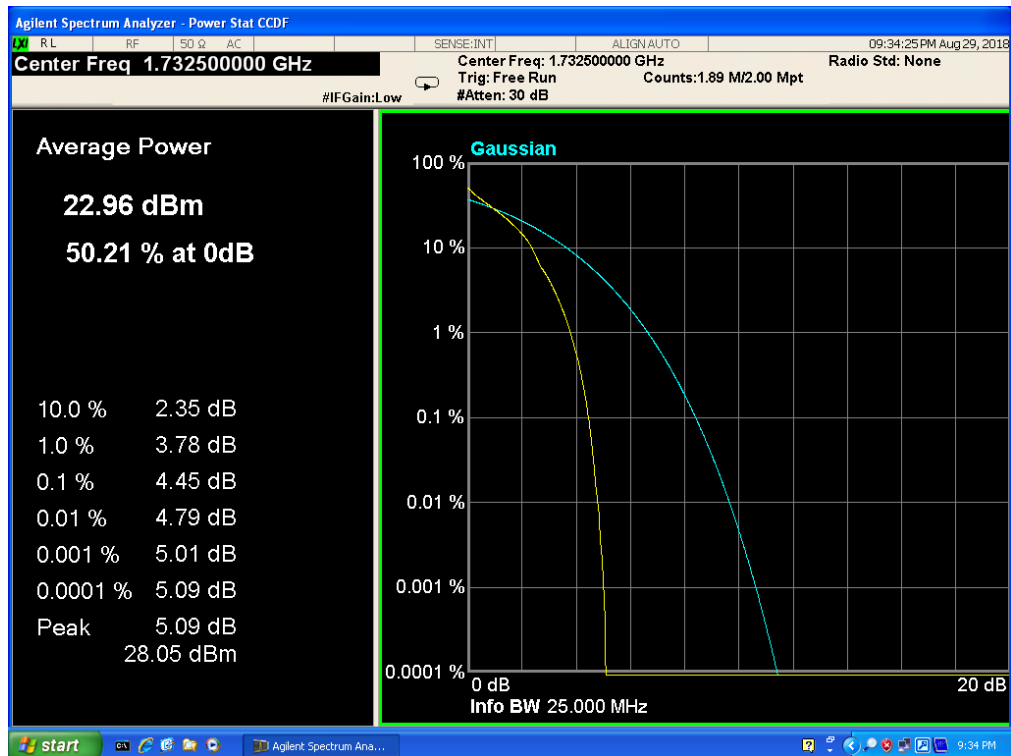
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



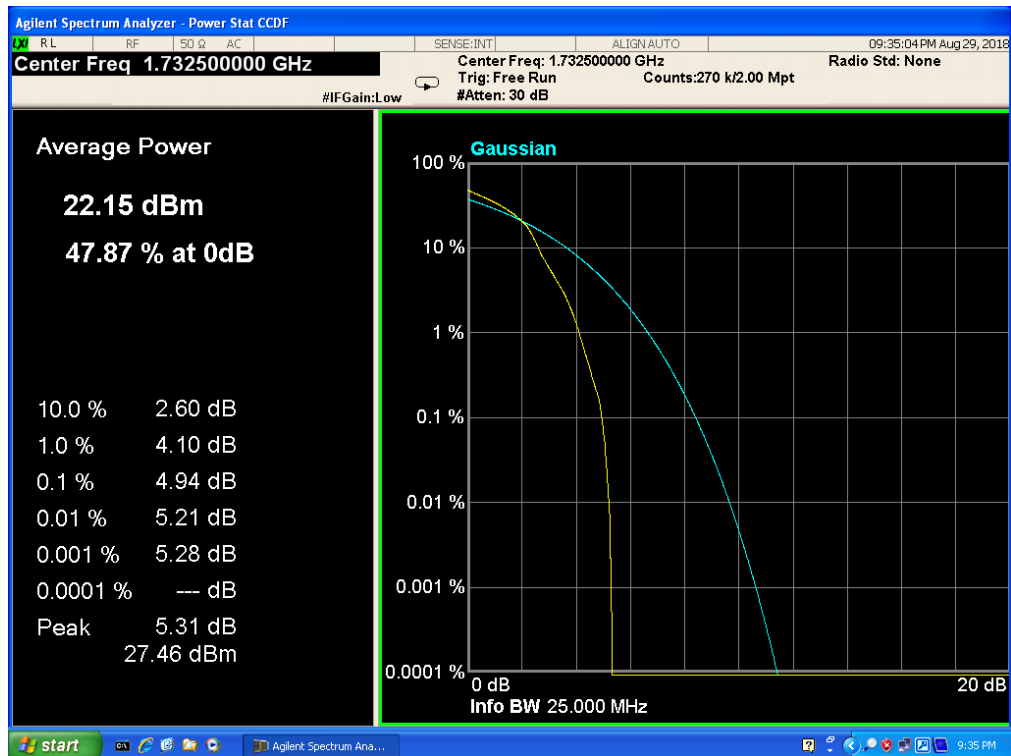
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16-QAM



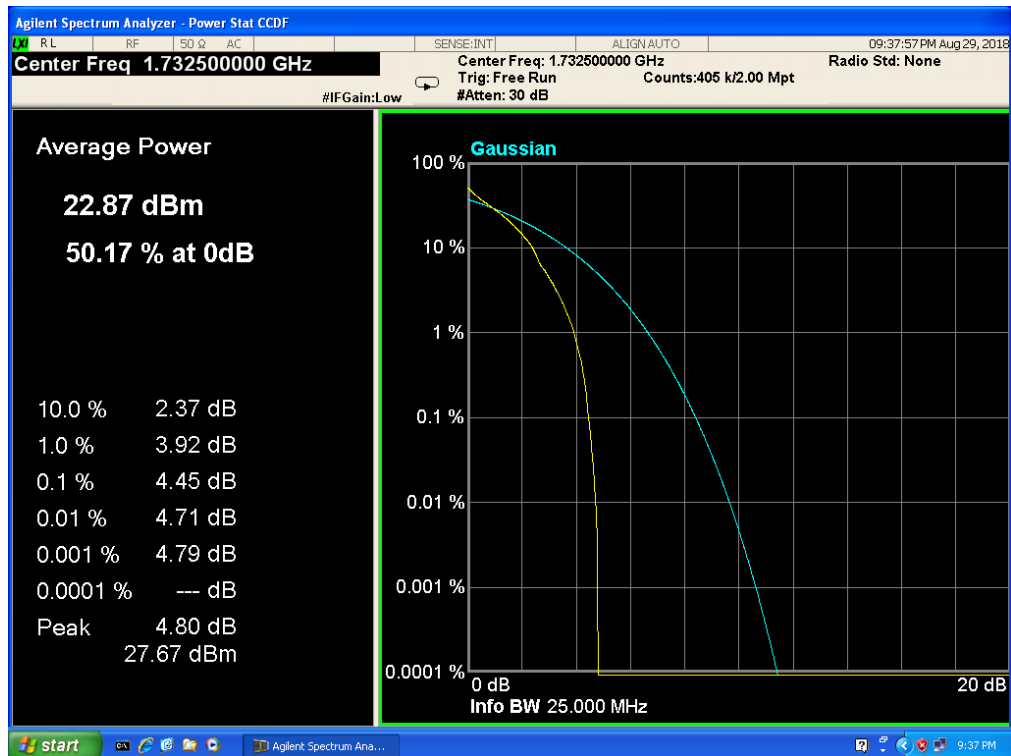
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



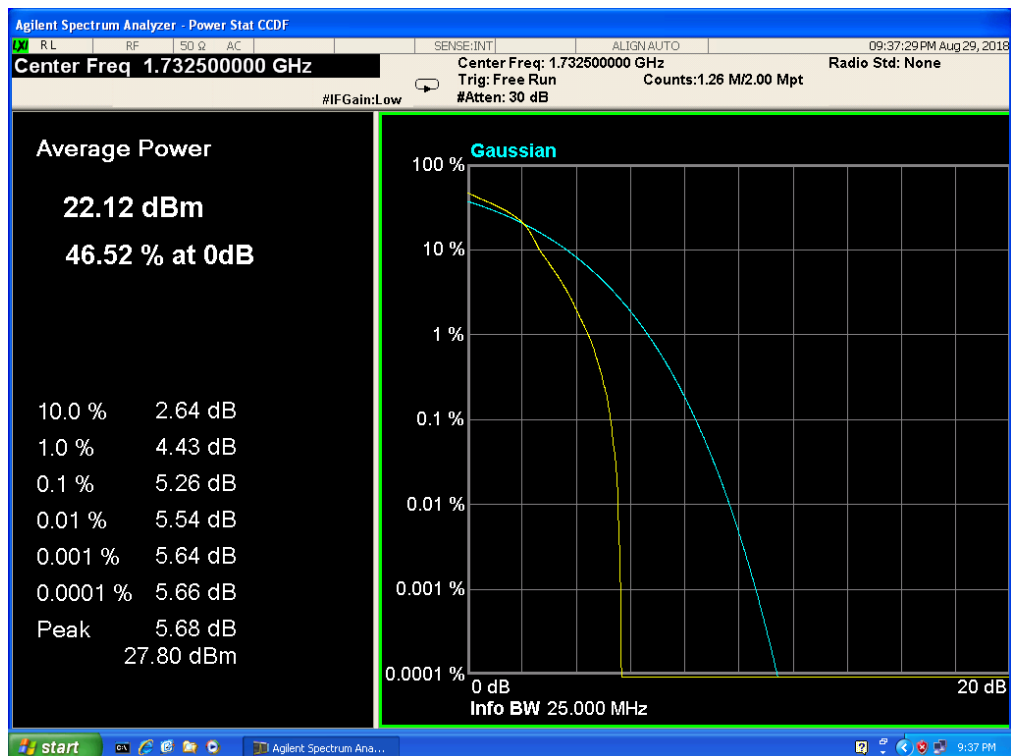
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



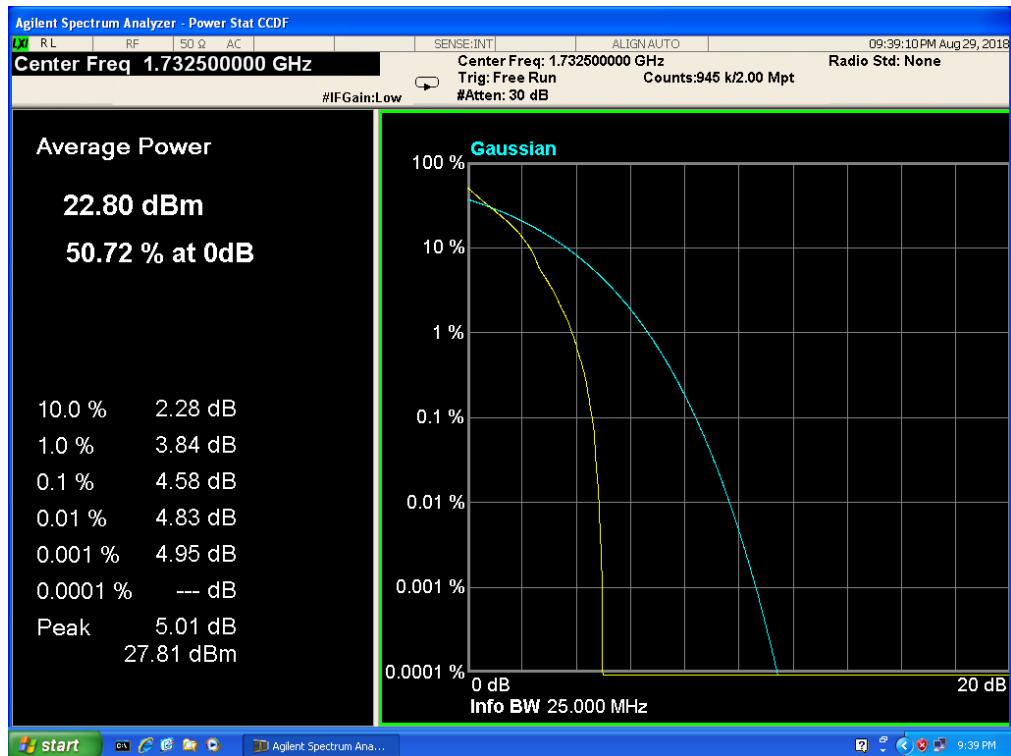
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



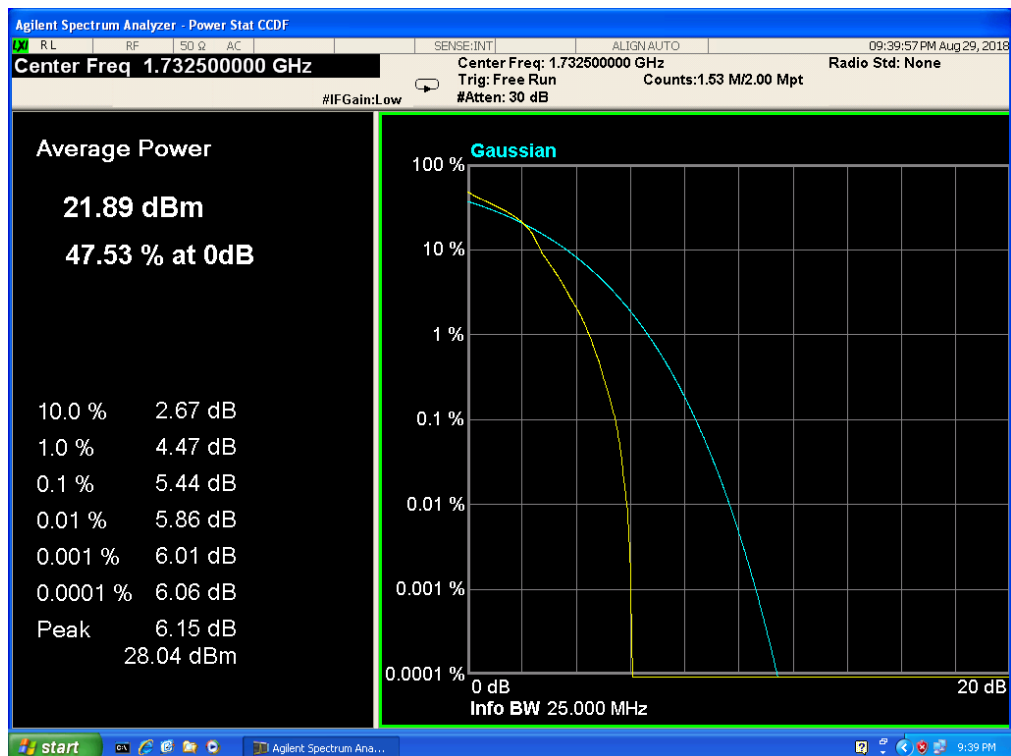
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16-QAM



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



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

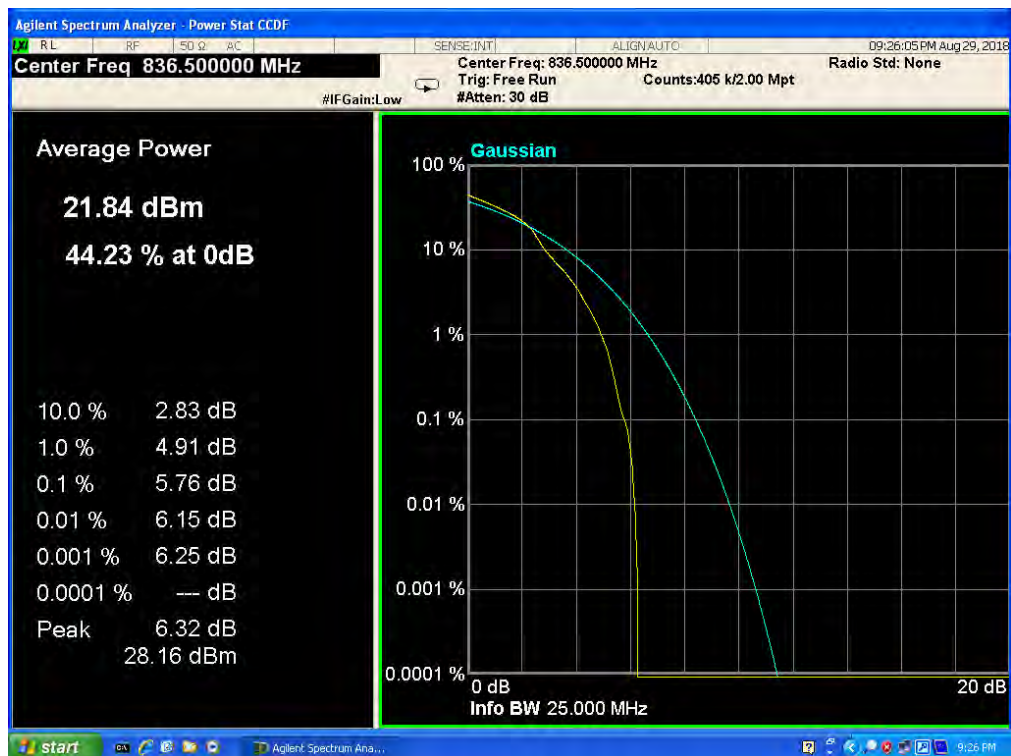


11.7 LTE BAND 5

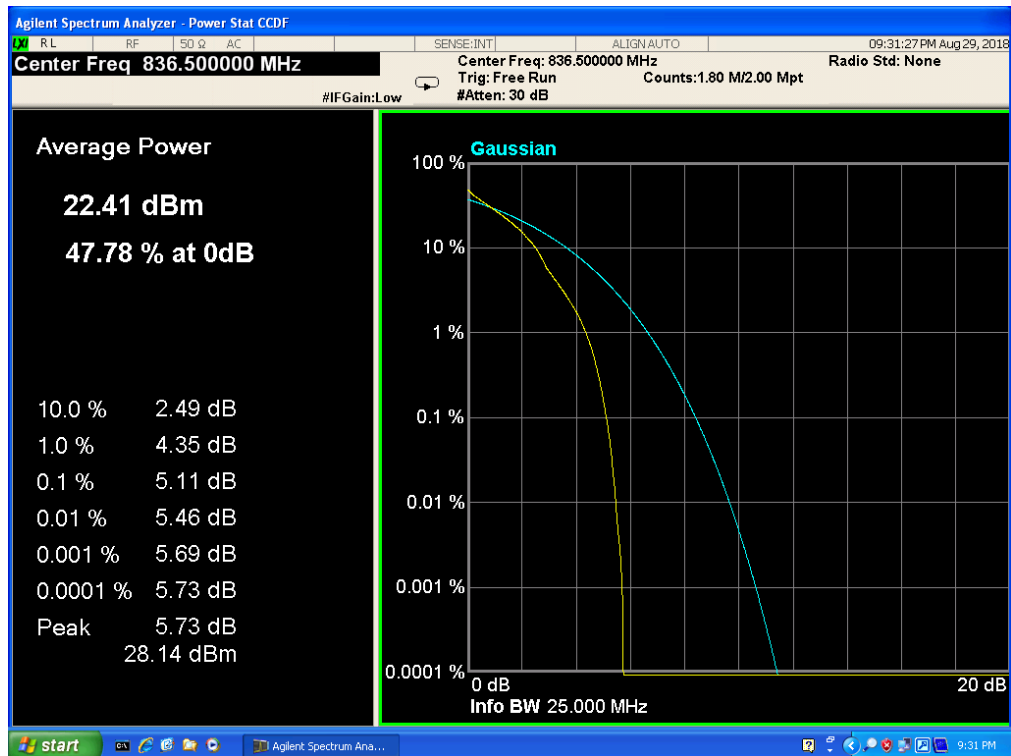
Band 5,UL Channel 20525,UL Frequency 836.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



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



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

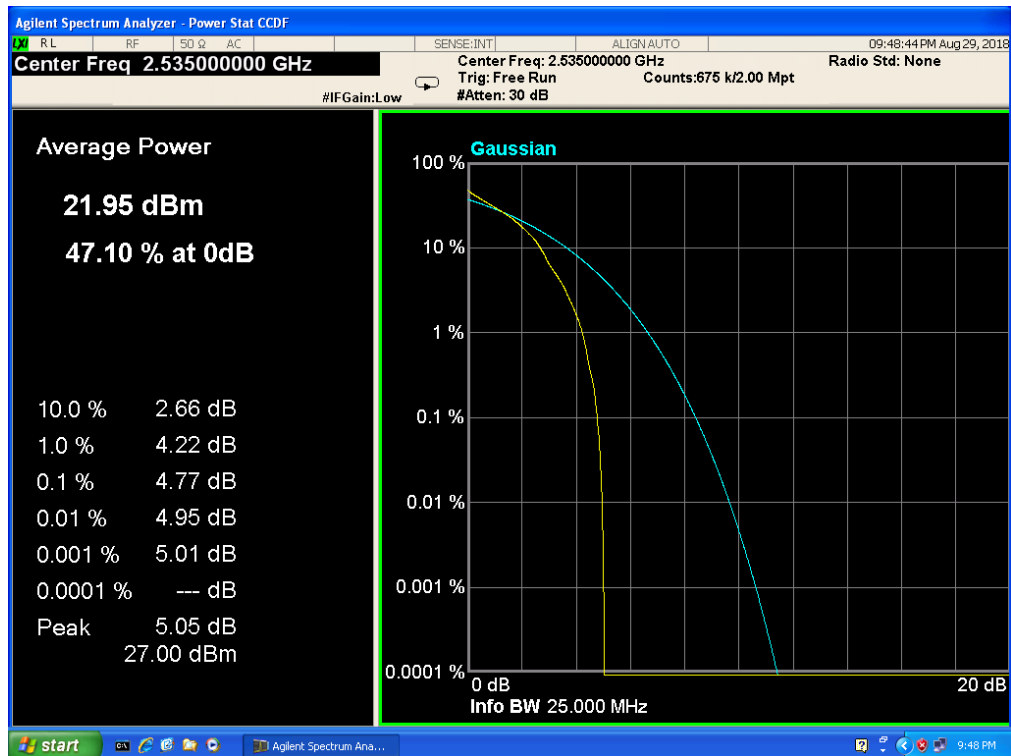


Band 5,UL Channel 20525,UL Frequency 836.5,BW 10.0,NO. RB 1,RB POS. Low,16-QAM

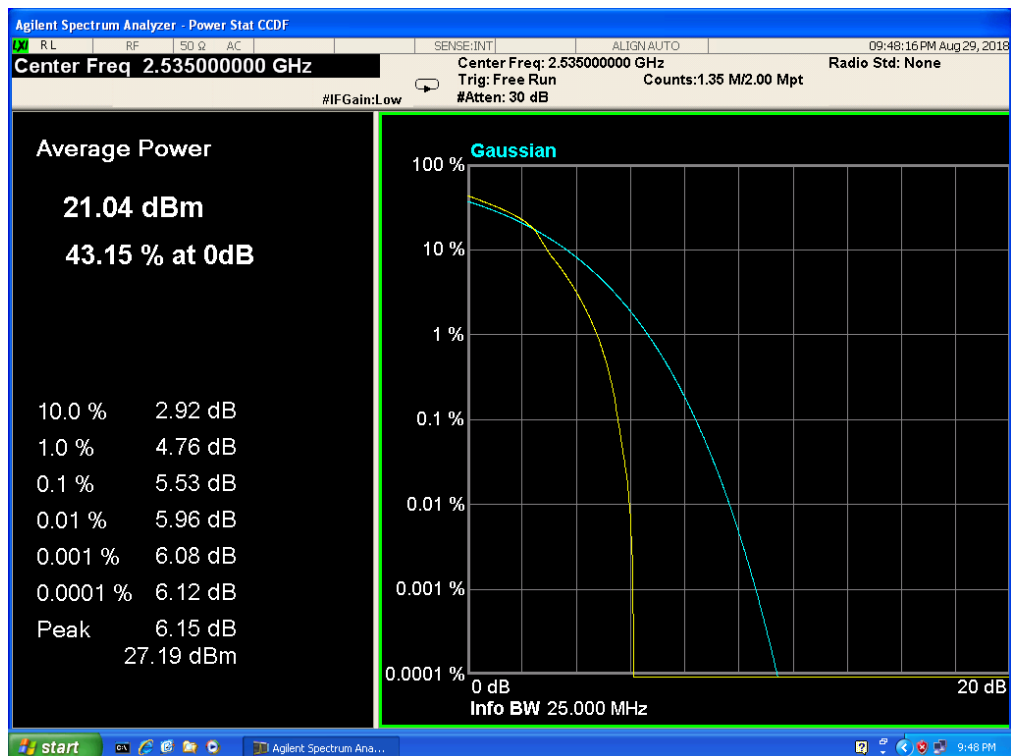


11.8 LTE BAND 7

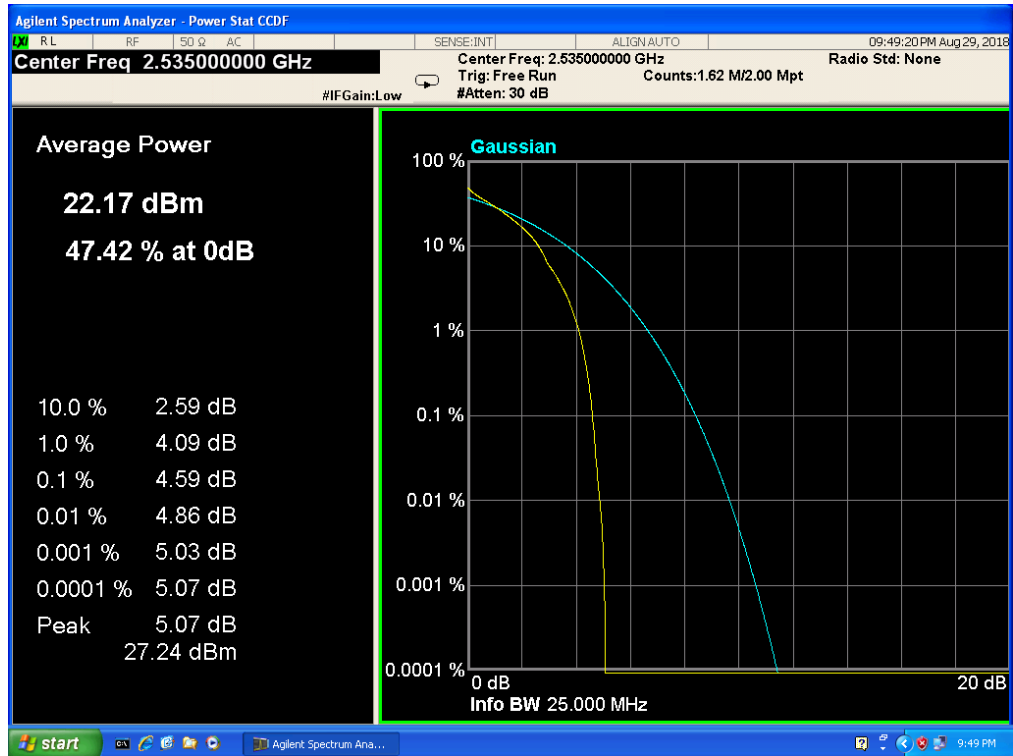
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 25,RB POS. Low,QPSK



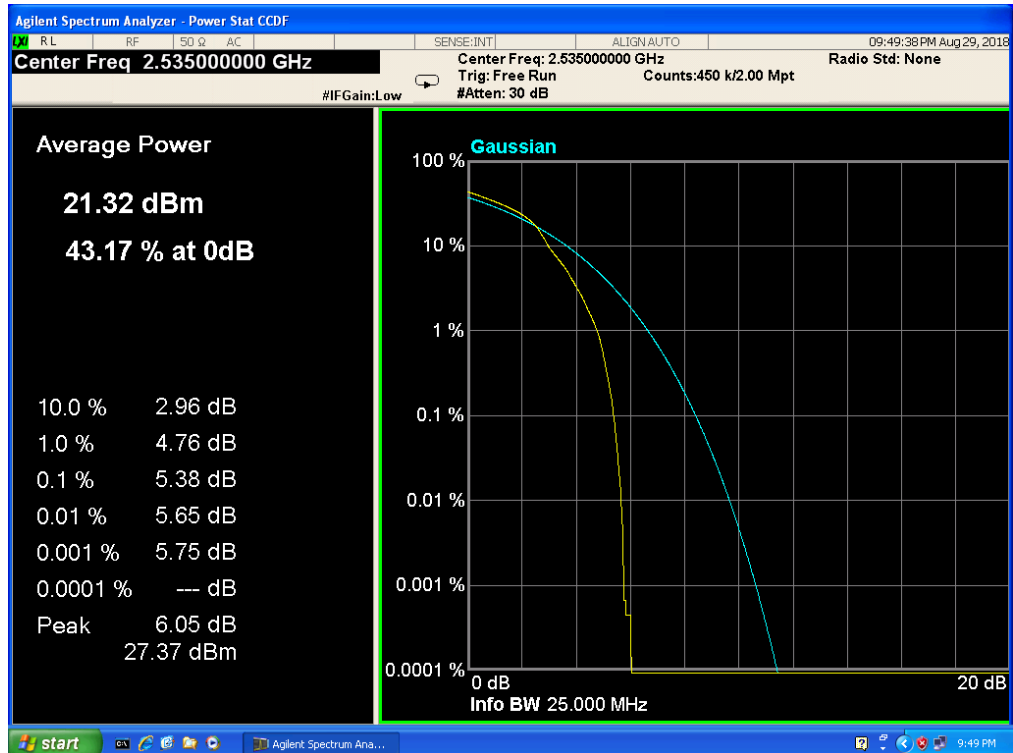
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 5.0,NO. RB 25,RB POS. Low,16-QAM



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



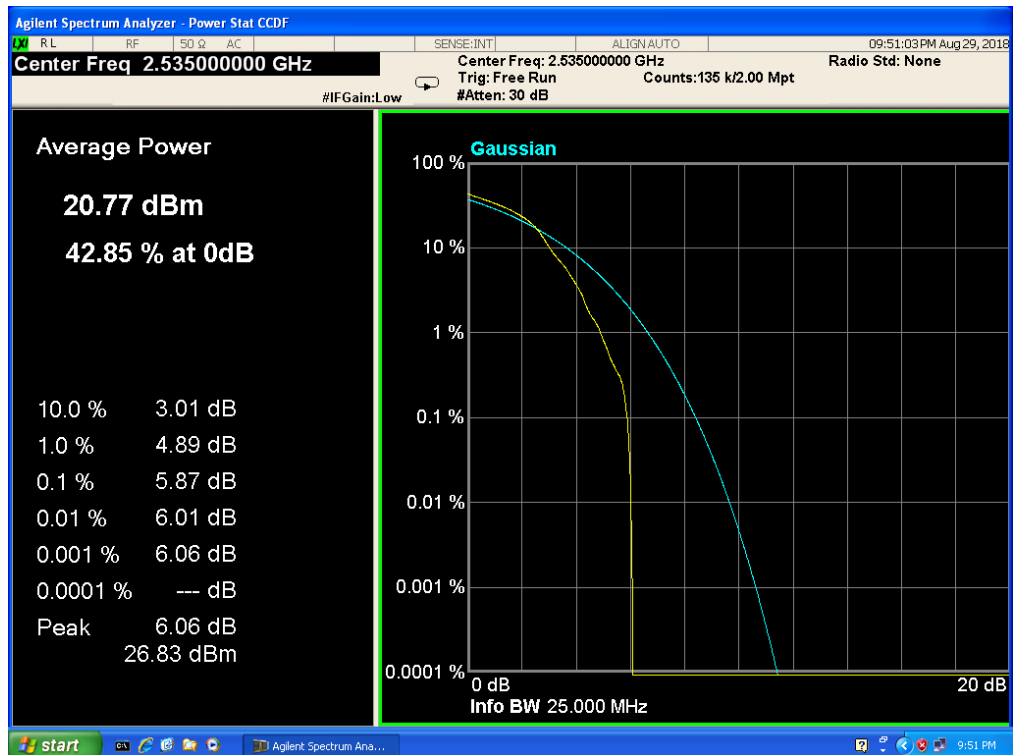
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 10.0,NO. RB 1,RB POS. Low,16-QAM



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



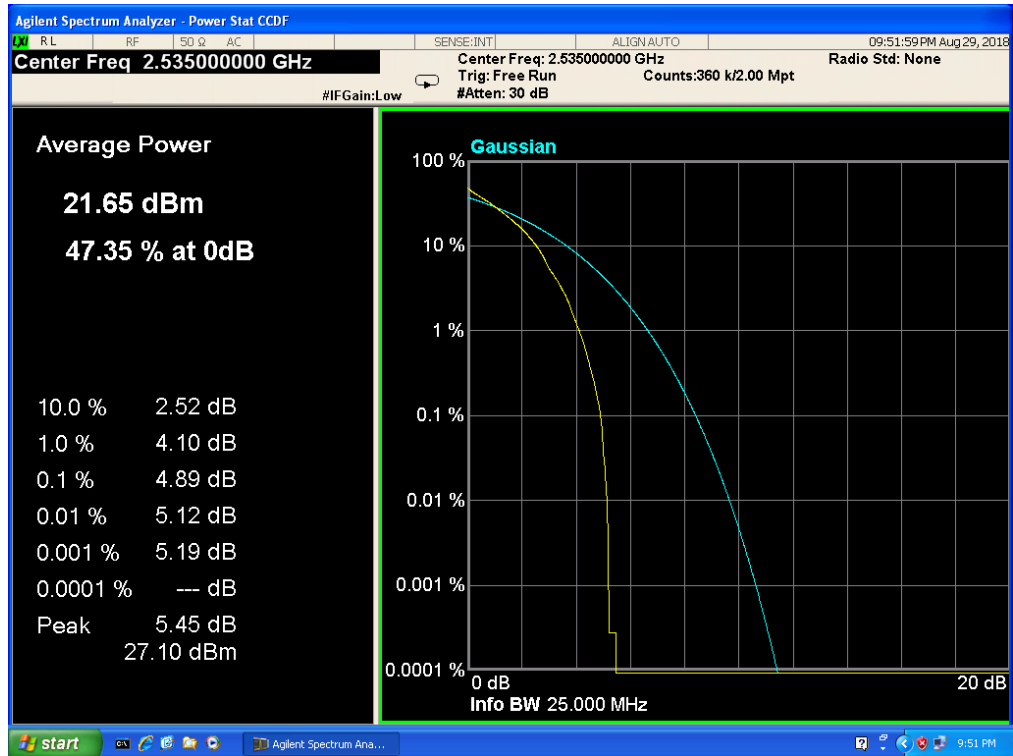
Band 7,UL Channel 21100,UL Frequency 2535.0,BW 15.0,NO. RB 1,RB POS. Low,16-QAM





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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



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