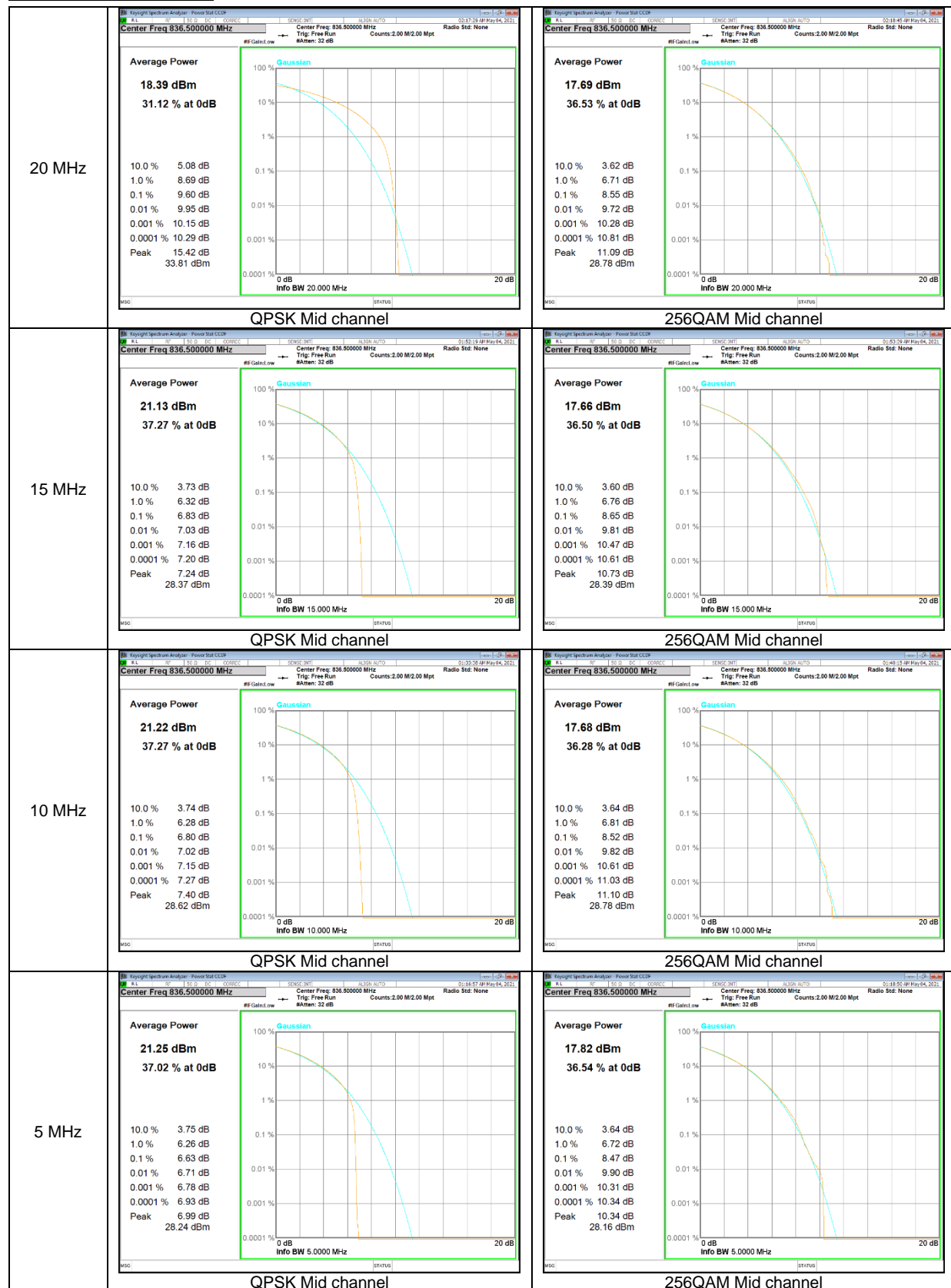
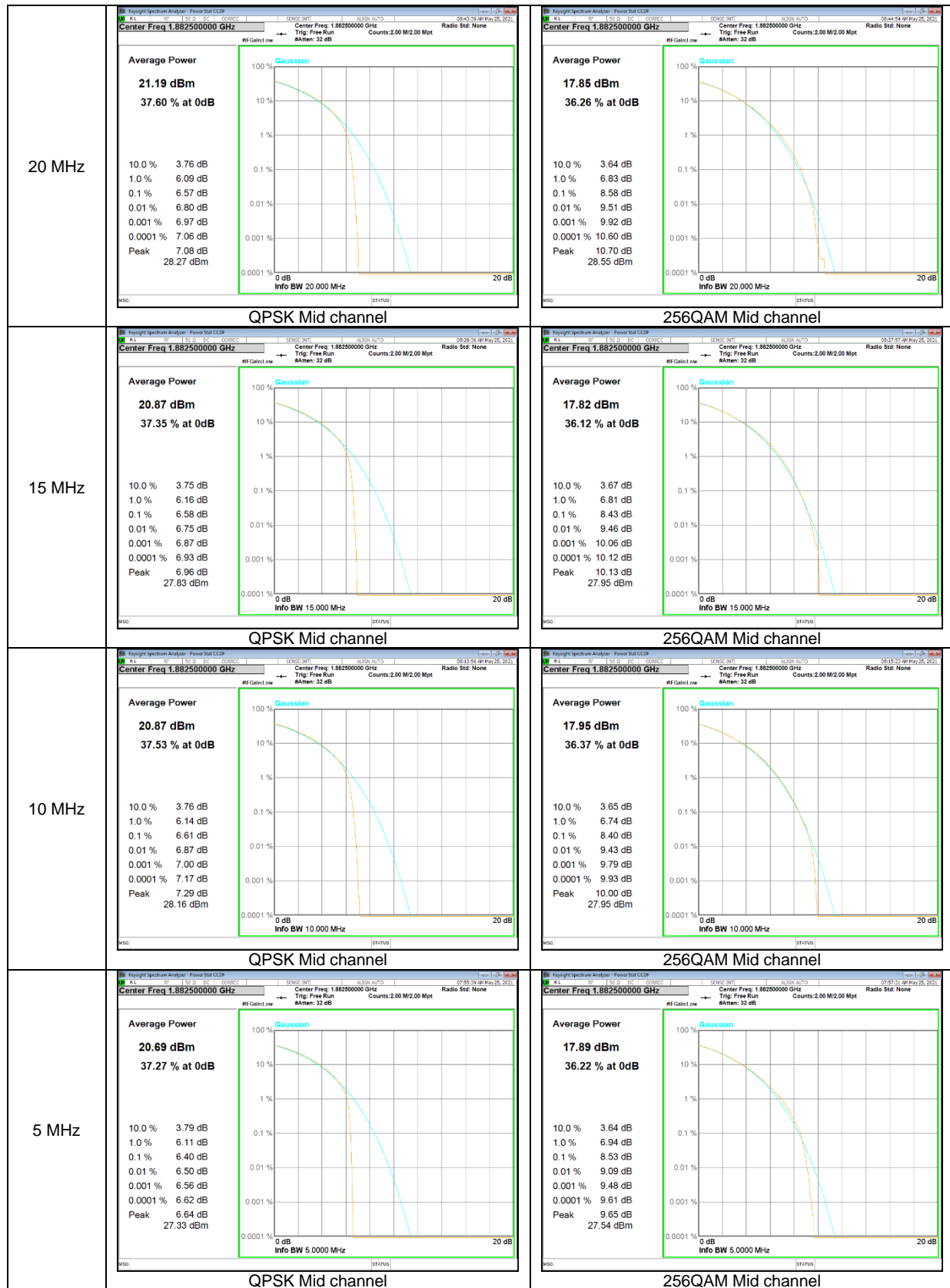


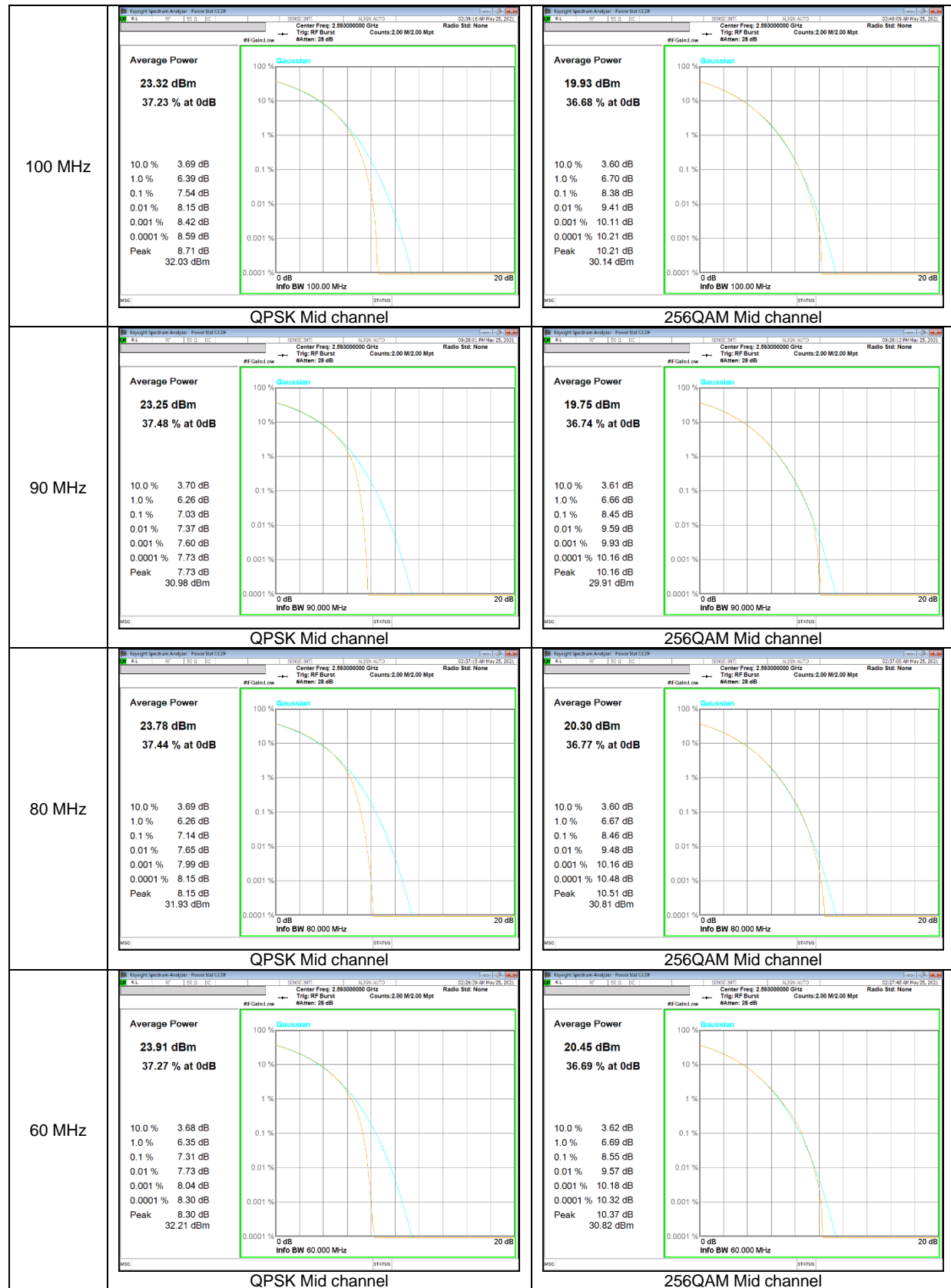
NR Band 5 CP-OFDM

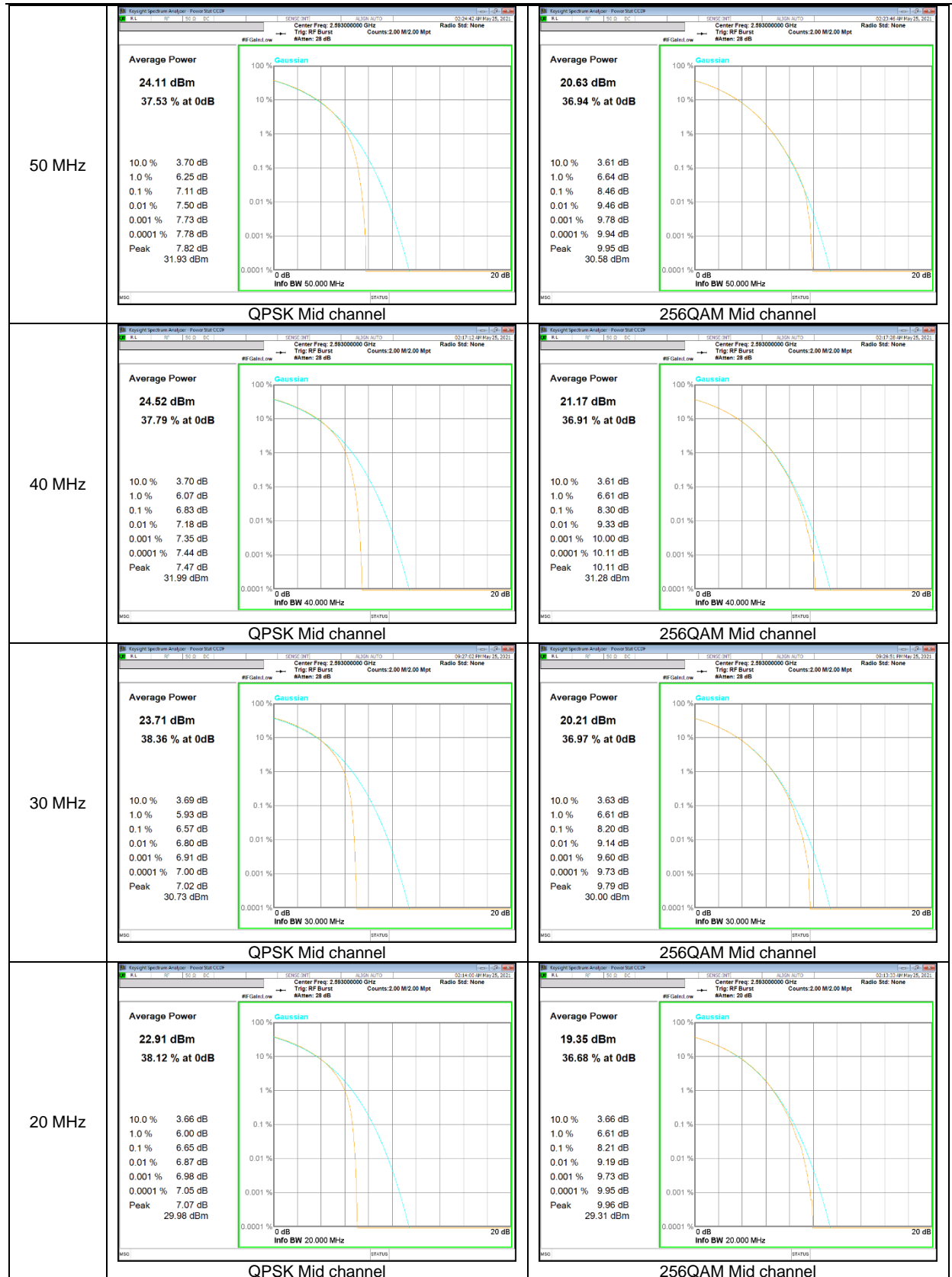


NR Band 25 CP-OFDM

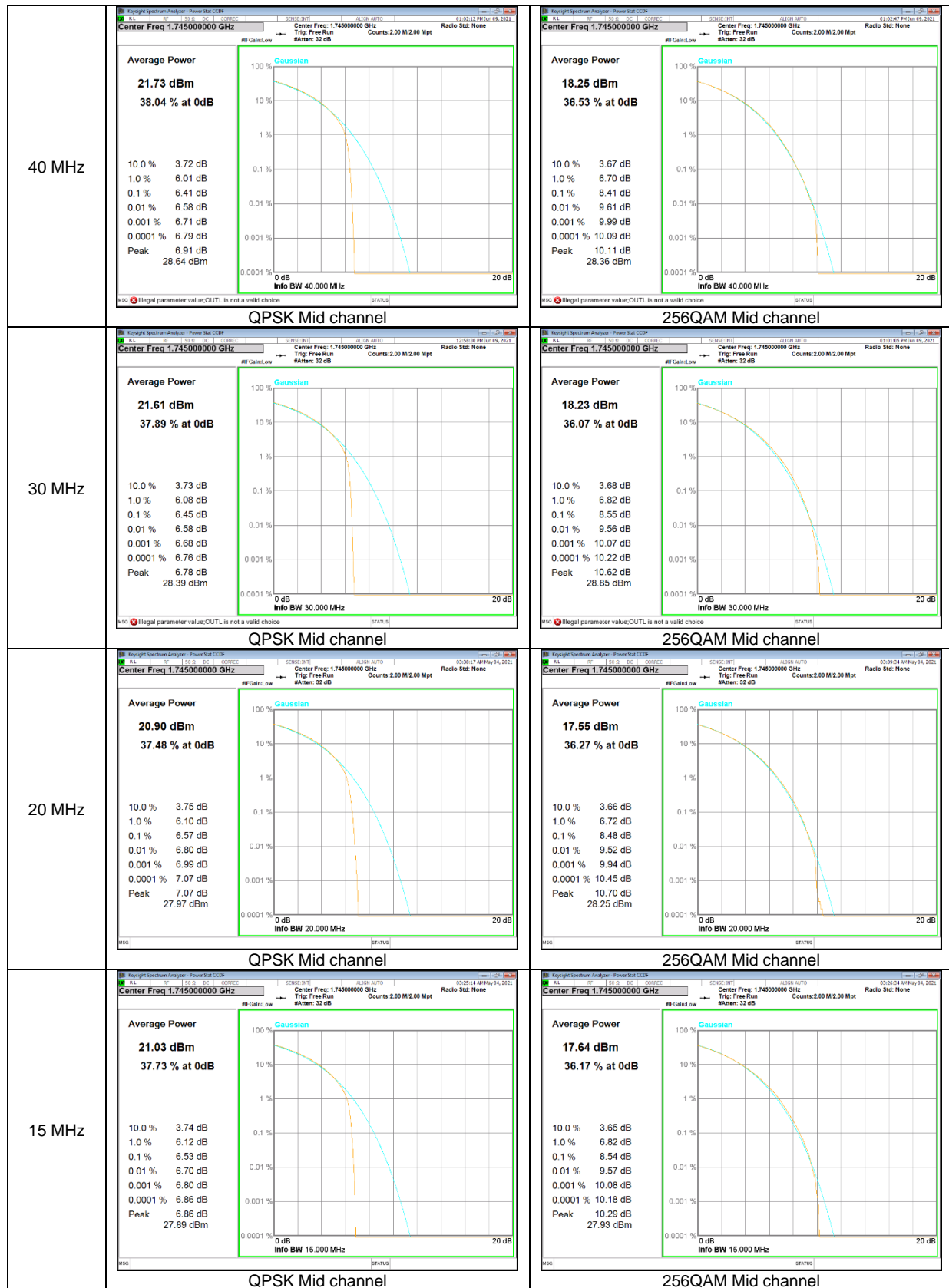


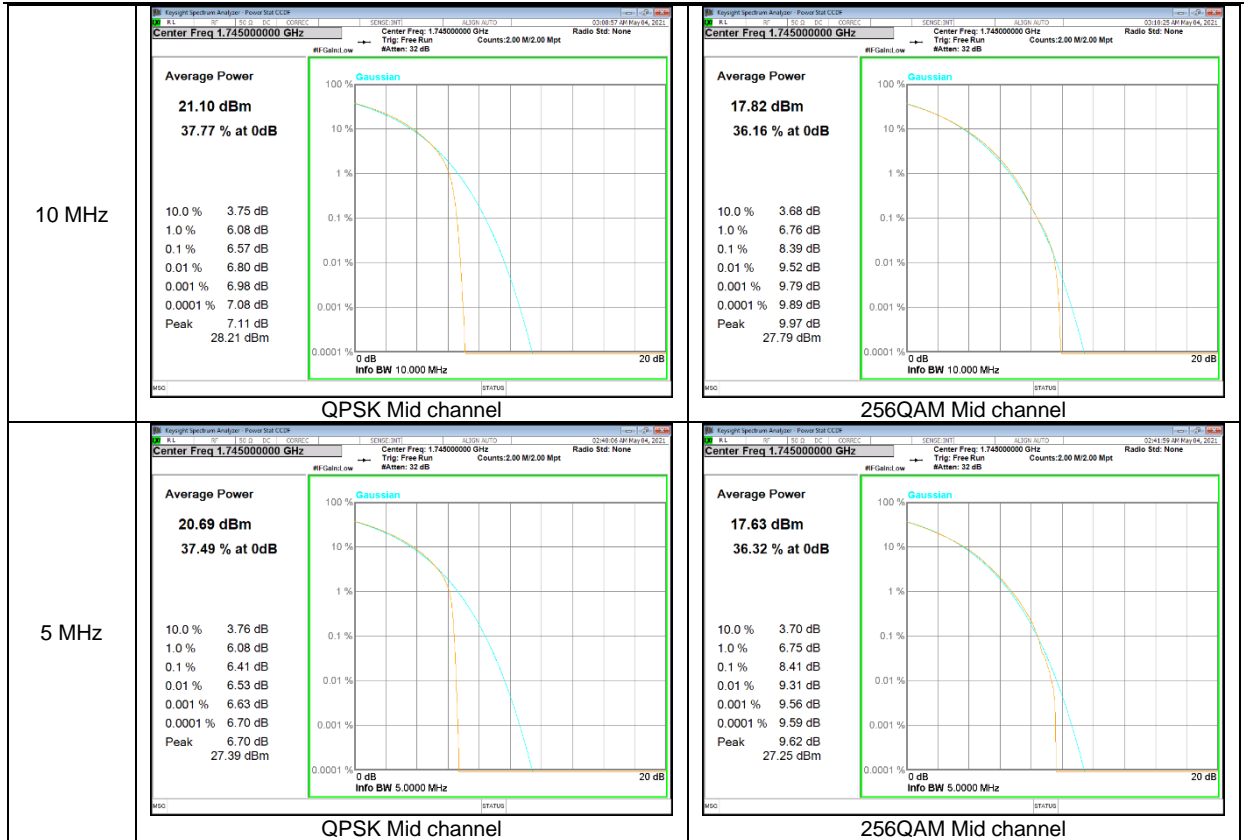
NR Band 41 CP-OFDM



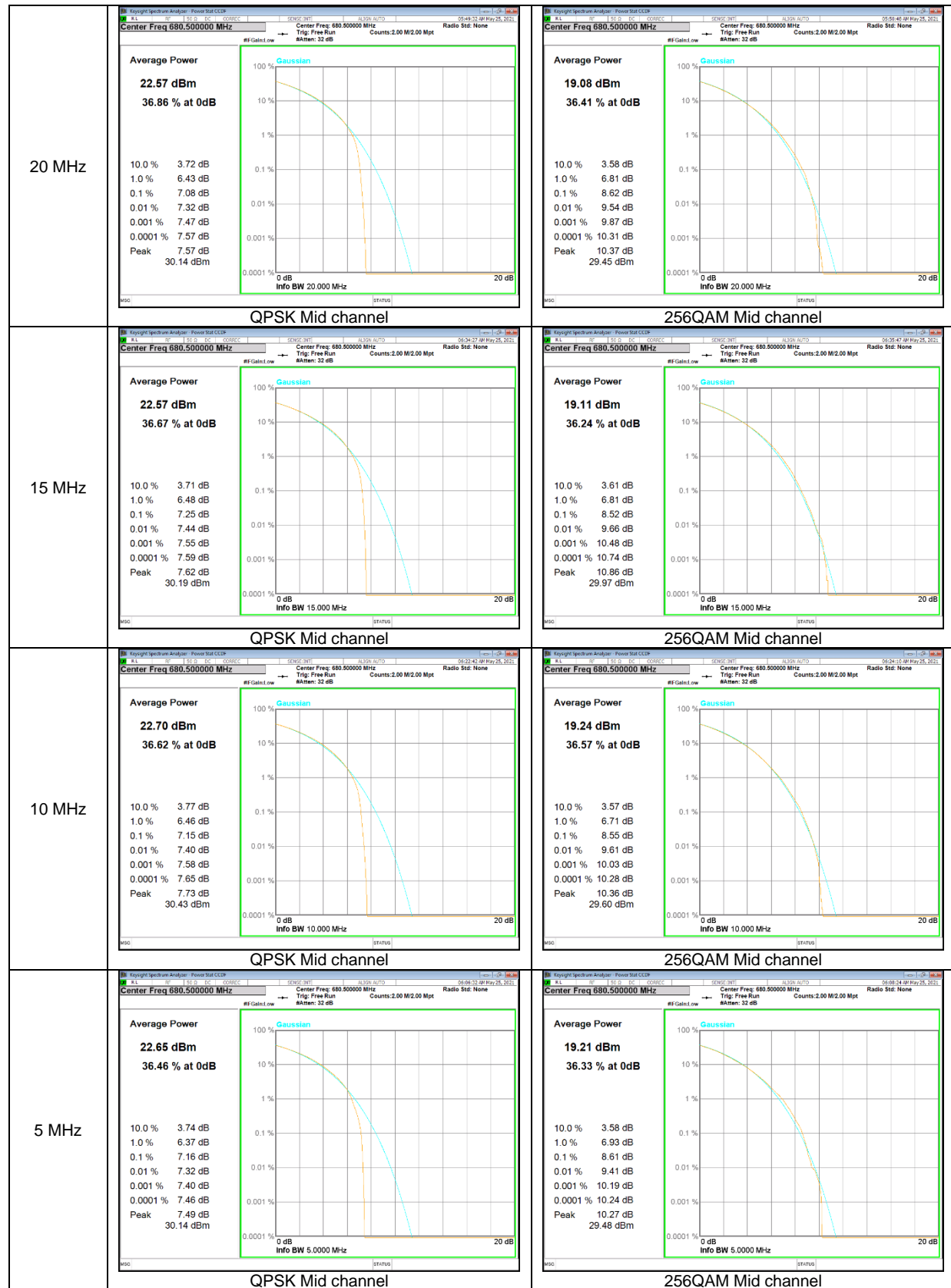


NR Band 66 CP-OFDM

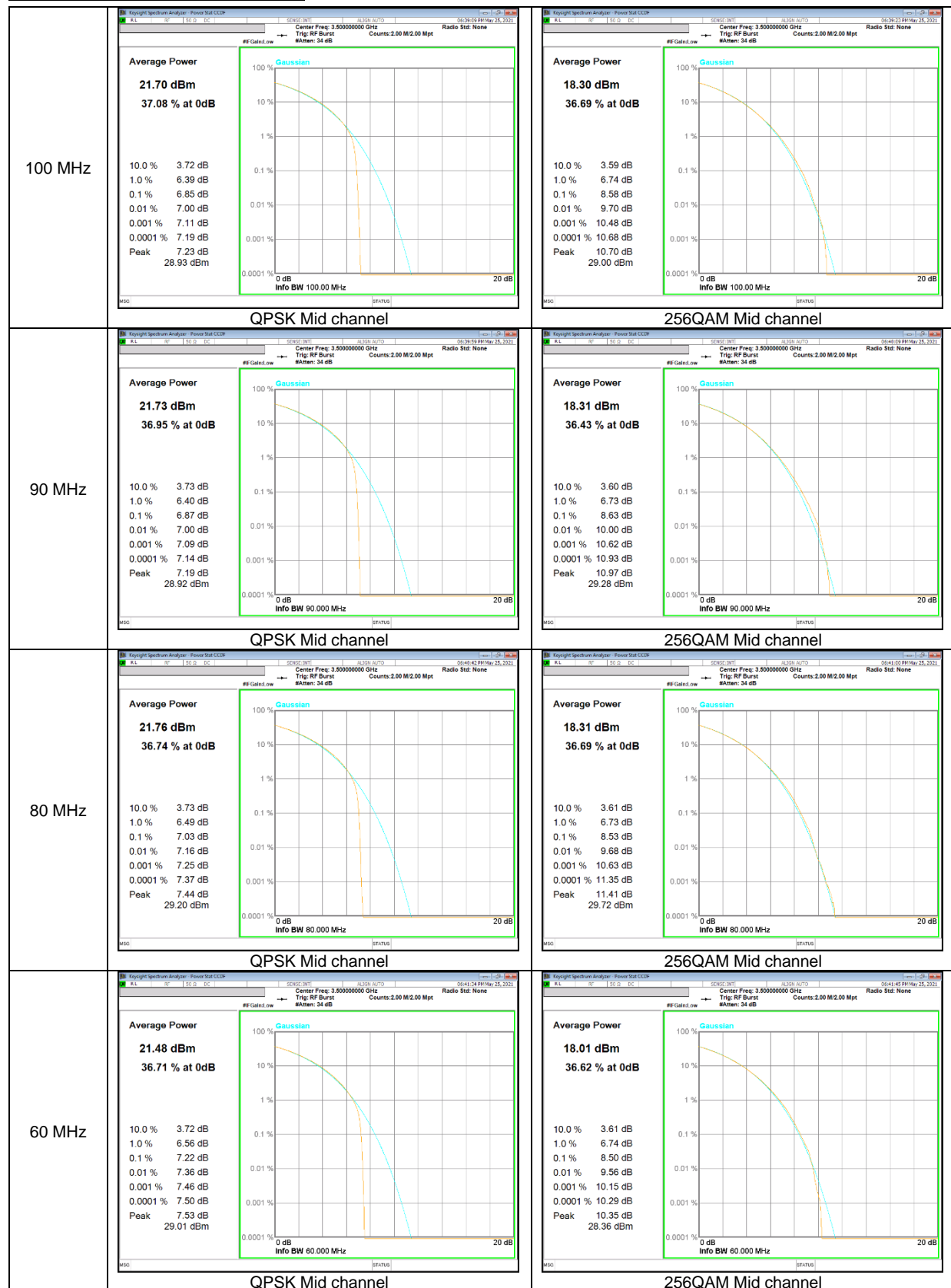


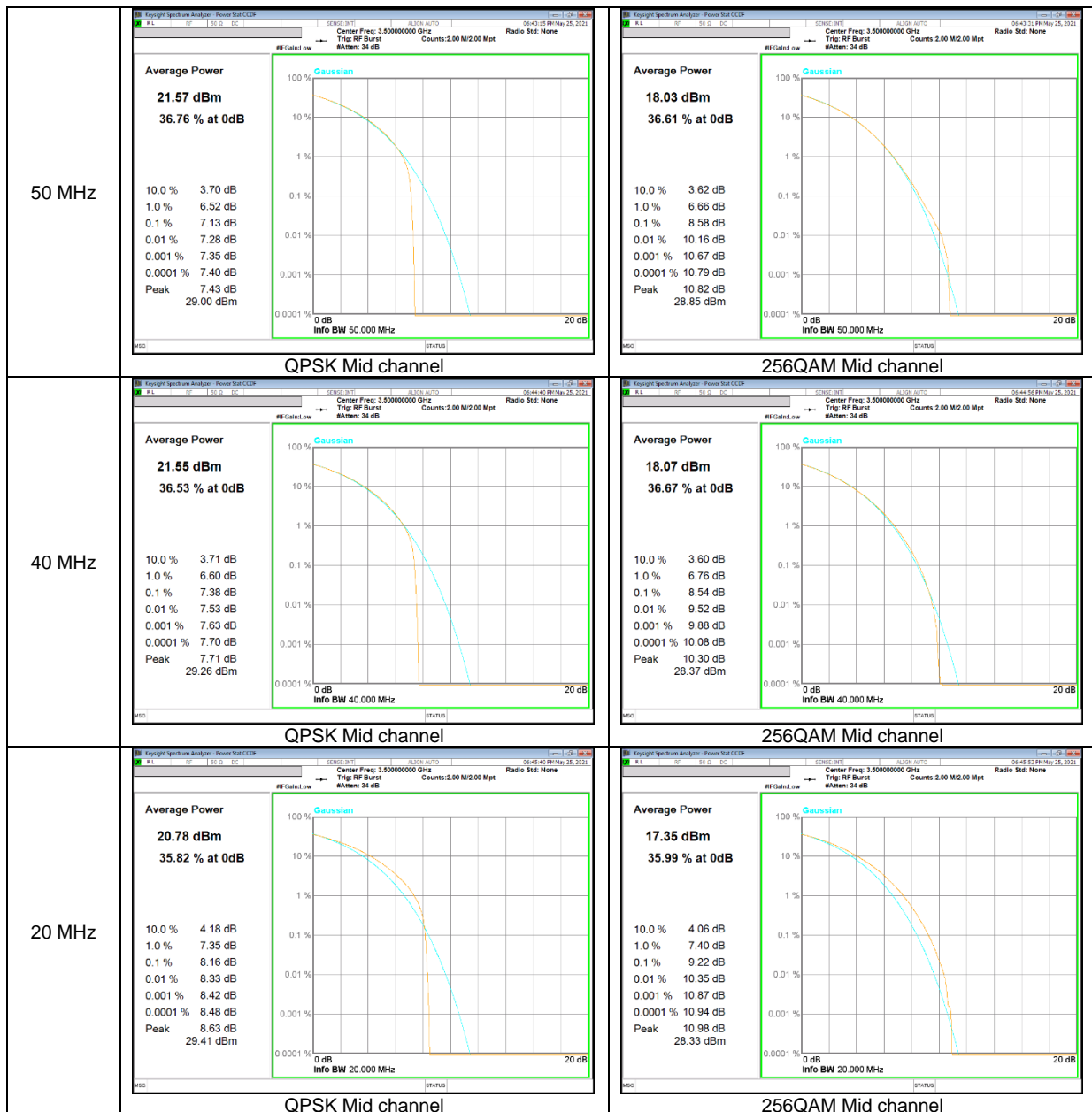


NR Band 71 CP-OFDM

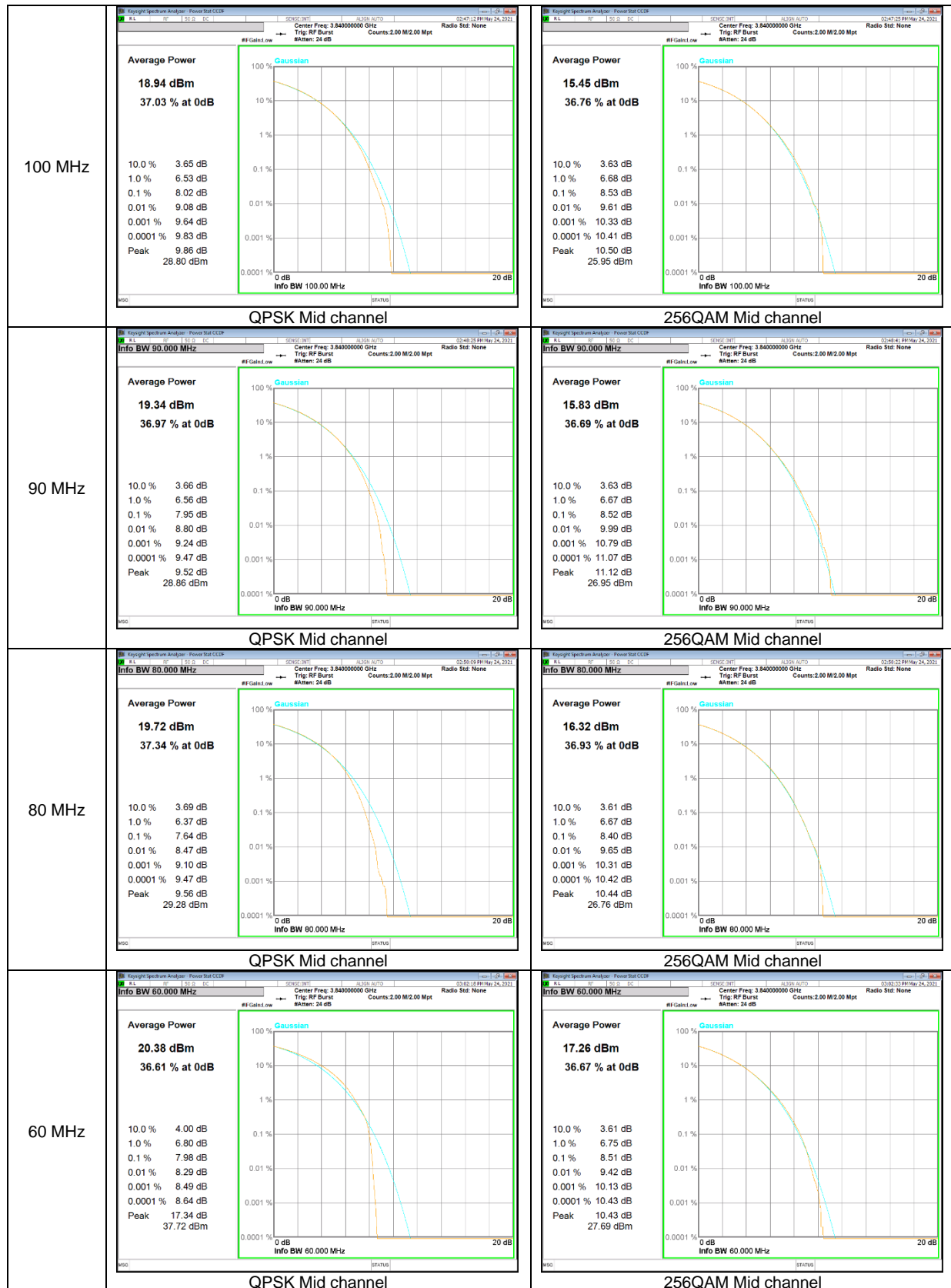


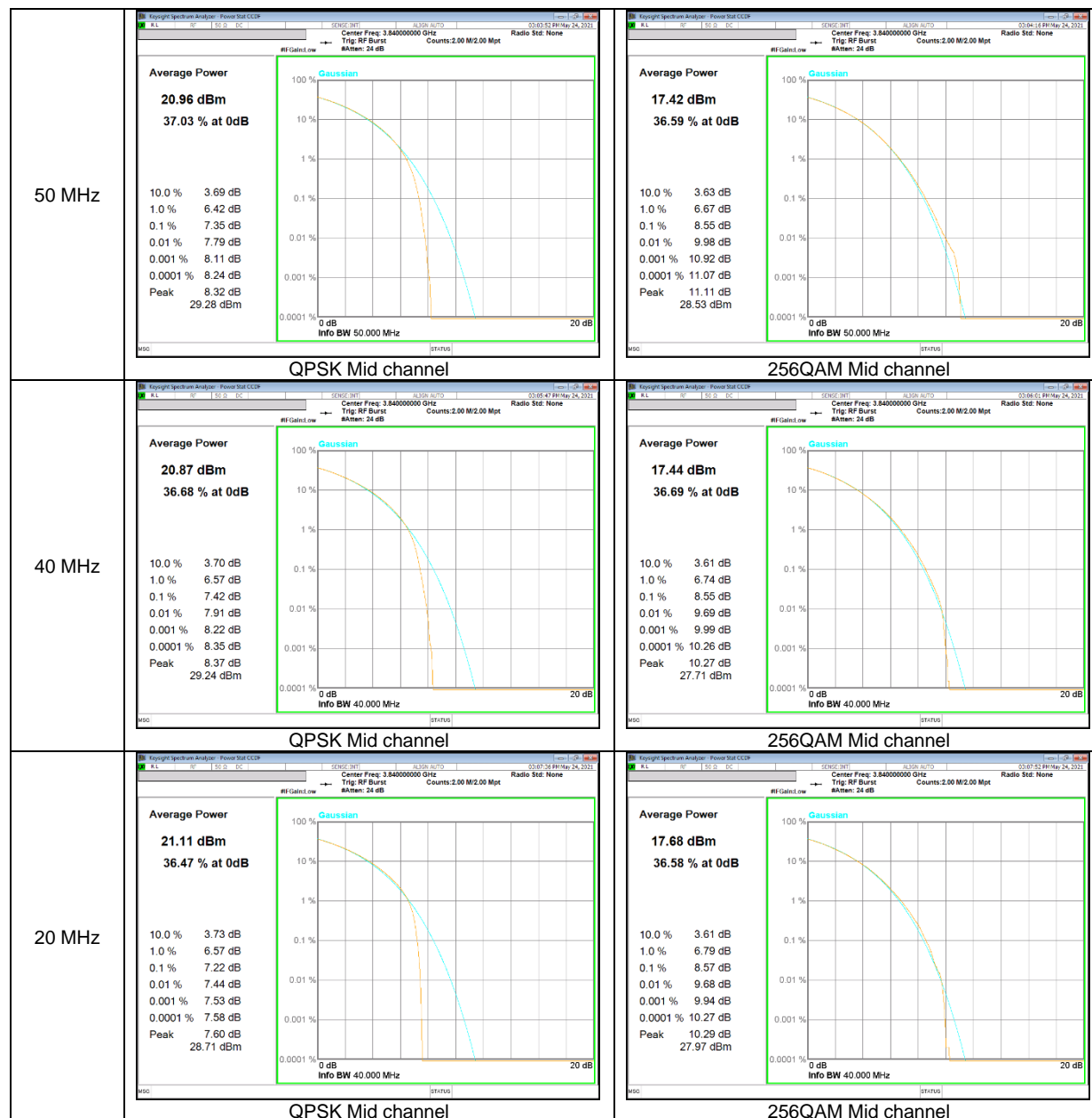
NR Band 77 (Lower) CP-OFDM





NR Band 77 (Upper) CP-OFDM





5G NR Band 2

5G NR Band 2(Frequency range: 1850-1910 MHz) is covered by 5G NR Band 25 (Frequency range: 1850-1915 MHz) due to overlapping frequency range, same maximum tune-up limit and same channel bandwidth.

9. LIMITS AND CONDUCTED RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

Note

5G NR: All Waveforms (CP-OFDM vs DFT-s OFDM) and modulations (QPSK, 16QAM, 64QAM, 256QAM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

RESULTS

See the following pages.

- WCDMA

Band	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
B5	Rel.99	836.6	4.149	4.692
	HSDPA		4.147	4.694
B4	Rel.99	1732.6	4.147	4.679
	HSDPA		4.170	4.664
B2	Rel.99	1880.0	4.142	4.683
	HSDPA		4.155	4.671

- LTE Band 7

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B7	20M	QPSK	2535.0	17.887	19.200
		16QAM		17.894	19.340
	15M	QPSK	2535.0	13.453	14.490
		16QAM		13.421	14.580
	10M	QPSK	2535.0	8.956	9.756
		16QAM		8.949	9.788
5M	QPSK	2535.0	4.518	4.976	
	16QAM		4.490	4.961	

- LTE Band 12

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B12	10M	QPSK	707.5	8.952	9.691
		16QAM		8.913	9.609
	5M	QPSK	707.5	4.486	4.922
		16QAM		4.478	4.845
	3M	QPSK	707.5	2.694	2.942
		16QAM		2.693	2.958
	1.4M	QPSK	707.5	1.083	1.220
		16QAM		1.086	1.233

- LTE Band 13

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B13	10M	QPSK	782.0	8.937	9.684
		16QAM		8.924	9.657
	5M	QPSK	782.0	4.508	4.947
		16QAM		4.490	4.933

- LTE Band 14

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B14	10M	QPSK	793.0	8.932	9.644
		16QAM		8.914	9.672
	5M	QPSK	793.0	4.492	4.897
		16QAM		4.478	4.902

- LTE Band 25

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B25	20M	QPSK	1882.5	17.864	19.230
		16QAM		17.902	19.370
	15M	QPSK	1882.5	13.452	14.540
		16QAM		13.426	14.540
	10M	QPSK	1882.5	8.985	9.777
		16QAM		8.945	9.719
	5M	QPSK	1882.5	4.491	4.938
		16QAM		4.490	4.882
	3M	QPSK	1882.5	2.696	2.982
		16QAM		2.682	3.012
	1.4M	QPSK	1882.5	1.086	1.225
		16QAM		1.080	1.212

- LTE Band 26 (Part 90)

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26 Part(90)	15M	QPSK	821.5	13.405	14.320
		16QAM		13.409	14.660
	10M	QPSK	819.0	8.939	9.751
		16QAM		8.948	9.732
	5M	QPSK	819.0	4.487	4.930
		16QAM		4.482	4.929
	3M	QPSK	819.0	2.688	2.934
		16QAM		2.688	2.992
	1.4M	QPSK	819.0	1.089	1.227
		16QAM		1.083	1.229

- LTE Band 26 (Straddle)

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26 (Straddle)	15M	QPSK	824.0	13.408	14.430
		16QAM		13.413	14.610
	10M	QPSK	824.0	8.954	9.671
		16QAM		8.925	9.717
	5M	QPSK	824.0	4.506	4.912
		16QAM		4.491	4.945
	3M	QPSK	824.0	2.693	2.985
		16QAM		2.693	2.966
	1.4M	QPSK	824.0	1.088	1.237
		16QAM		1.088	1.235

- LTE Band 26 (Part 22)

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B26 (Part 22)	15M	QPSK	831.5	13.390	14.540
		16QAM		13.432	14.550
	10M	QPSK	831.5	8.943	9.811
		16QAM		8.950	9.711
	5M	QPSK	831.5	4.496	4.908
		16QAM		4.481	4.901
	3M	QPSK	831.5	2.695	2.972
		16QAM		2.695	3.025
	1.4M	QPSK	831.5	1.080	1.228
		16QAM		1.086	1.230

- LTE Band 30

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B30	10M	QPSK	2310	8.964	9.715
		16QAM		8.972	9.699
	5M	QPSK	2310	4.492	4.921
		16QAM		4.480	4.921

- LTE Band 41

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B41	20M	QPSK	2593.0	17.901	20.060
		16QAM		17.892	19.120
	15M	QPSK	2593.0	13.435	14.690
		16QAM		13.436	14.580
	10M	QPSK	2593.0	8.956	9.664
		16QAM		8.987	9.602
	5M	QPSK	2593.0	4.477	4.862
		16QAM		4.483	4.915

- LTE Band 66

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B66	20M	QPSK	1745.0	17.875	19.200
		16QAM		17.885	19.420
	15M	QPSK	1745.0	13.434	14.500
		16QAM		13.419	14.510
	10M	QPSK	1745.0	8.980	9.669
		16QAM		8.976	9.736
	5M	QPSK	1745.0	4.487	4.958
		16QAM		4.482	4.894
	3M	QPSK	1745.0	2.690	2.989
		16QAM		2.691	3.018
	1.4M	QPSK	1745.0	1.087	1.224
		16QAM		1.087	1.230

- LTE Band 71

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
LTE B71	20M	QPSK	680.5	17.811	19.120
		16QAM		17.844	19.240
	15M	QPSK	680.5	13.407	14.570
		16QAM		13.390	14.400
	10M	QPSK	680.5	8.937	9.754
		16QAM		8.934	9.740
	5M	QPSK	680.5	4.491	4.877
		16QAM		4.486	4.914

- NR Band 5 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n5	20M	QPSK	836.5	18.919	19.700
		16QAM		18.844	19.730
		64QAM		18.874	19.790
		256QAM		18.930	19.800
	15M	QPSK	836.5	14.077	14.740
		16QAM		14.125	14.870
		64QAM		14.115	14.870
		256QAM		14.088	14.780
	10M	QPSK	836.5	9.276	9.894
		16QAM		9.269	9.990
		64QAM		9.256	9.933
		256QAM		9.288	9.905
	5M	QPSK	836.5	4.474	4.910
		16QAM		4.496	4.987
		64QAM		4.481	4.905
		256QAM		4.476	4.861

- NR Band 25 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n25	20M	QPSK	1883.0	18.935	19.780
		16QAM		18.953	19.790
		64QAM		19.026	19.850
		256QAM		18.955	19.990
	15M	QPSK	1883.0	14.116	14.780
		16QAM		14.123	14.890
		64QAM		14.082	14.980
		256QAM		14.111	14.830
	10M	QPSK	1883.0	9.291	9.942
		16QAM		9.303	9.915
		64QAM		9.331	9.941
		256QAM		9.289	9.938
	5M	QPSK	1883.0	4.464	4.890
		16QAM		4.469	5.081
		64QAM		4.478	5.460
		256QAM		4.475	4.910

- NR Band 41 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n41	100M	QPSK	2593.0	97.120	101.400
		16QAM		97.040	101.400
		64QAM		97.138	101.400
		256QAM		97.225	101.400
	90M	QPSK	2593.0	87.029	90.930
		16QAM		87.242	91.010
		64QAM		87.055	90.840
		256QAM		87.098	90.760
	80M	QPSK	2593.0	77.184	80.650
		16QAM		77.496	80.720
		64QAM		77.218	80.650
		256QAM		77.253	80.720
	60M	QPSK	2593.0	57.742	60.320
		16QAM		57.847	60.230
		64QAM		57.811	60.400
		256QAM		57.715	60.210
	50M	QPSK	2593.0	47.315	49.680
		16QAM		47.408	49.500
		64QAM		47.444	49.770
		256QAM		47.623	49.540
	40M	QPSK	2593.0	37.911	39.630
		16QAM		37.857	39.750
		64QAM		37.880	39.600
		256QAM		37.783	39.410
	30M	QPSK	2593.0	27.887	29.640
		16QAM		37.846	29.180
		64QAM		27.864	29.210
		256QAM		27.933	29.370
20M	QPSK	2593.0	17.917	19.980	
	16QAM		17.894	18.740	
	64QAM		17.857	19.050	
	256QAM		17.818	18.780	

- NR Band 66 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n66	40M	QPSK	1745.0	38.720	40.480
		16QAM		38.640	40.480
		64QAM		38.703	40.540
		256QAM		38.659	40.490
	30M	QPSK	1745.0	28.692	30.210
		16QAM		28.717	29.980
		64QAM		28.697	30.030
		256QAM		28.620	29.970
	20M	QPSK	1745.0	19.028	19.840
		16QAM		18.947	19.790
		64QAM		18.942	19.800
		256QAM		18.937	19.770
	15M	QPSK	1745.0	14.140	14.950
		16QAM		14.122	14.860
		64QAM		14.118	14.900
		256QAM		14.118	14.850
	10M	QPSK	1745.0	9.263	9.889
		16QAM		9.296	9.944
		64QAM		4.496	4.995
		256QAM		9.308	9.956
5M	QPSK	1745.0	4.469	4.944	
	16QAM		4.496	4.995	
	64QAM		4.480	4.878	
	256QAM		4.467	4.860	

- NR Band 71 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n71	20M	QPSK	680.5	18.898	19.820
		16QAM		18.844	19.770
		64QAM		18.919	19.740
		256QAM		18.845	19.750
	15M	QPSK	680.5	14.114	14.840
		16QAM		14.128	14.720
		64QAM		14.153	14.870
		256QAM		14.099	14.800
	10M	QPSK	680.5	9.291	9.925
		16QAM		9.280	9.866
		64QAM		9.291	9.842
		256QAM		9.264	9.771
	5M	QPSK	680.5	4.475	4.916
		16QAM		4.481	4.942
		64QAM		4.485	4.914
		256QAM		4.472	4.905

- NR Band 77 CP-OFDM

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n77 (Lower)	100M	QPSK	3500	97.303	101.300
		16QAM		97.123	101.500
		64QAM		97.396	101.400
		256QAM		97.523	101.400
	90M	QPSK	3500	87.355	90.990
		16QAM		87.262	90.990
		64QAM		87.116	90.890
		256QAM		87.273	91.140
	80M	QPSK	3500	77.391	80.680
		16QAM		77.407	80.560
		64QAM		77.372	80.630
		256QAM		77.417	80.780
	60M	QPSK	3500	57.706	60.280
		16QAM		57.730	60.290
		64QAM		57.661	60.240
		256QAM		57.836	60.180
	50M	QPSK	3500	47.471	49.510
		16QAM		47.467	49.680
		64QAM		47.470	49.510
		256QAM		47.467	49.680
	40M	QPSK	3500	37.799	39.540
		16QAM		37.978	39.550
		64QAM		37.898	39.760
		256QAM		37.787	39.630
	20M	QPSK	3500	18.260	19.600
		16QAM		18.225	19.070
		64QAM		18.192	19.550
		256QAM		18.185	19.550

Band	BW	Modulation	f [MHz]	99% BW (MHz)	-26dB BW (MHz)
NR n77 (Upper)	100M	QPSK	3500	97.257	101.400
		16QAM		97.257	101.400
		64QAM		97.725	101.500
		256QAM		97.638	101.200
	90M	QPSK	3500	87.323	91.100
		16QAM		87.237	90.880
		64QAM		87.363	90.940
		256QAM		87.077	91.140
	80M	QPSK	3500	77.491	80.650
		16QAM		77.558	80.520
		64QAM		77.426	80.680
		256QAM		77.722	80.780
	60M	QPSK	3500	57.877	60.300
		16QAM		57.887	60.480
		64QAM		57.920	60.330
		256QAM		57.841	60.260
	50M	QPSK	3500	47.460	49.560
		16QAM		47.272	49.560
		64QAM		47.518	49.570
		256QAM		47.536	49.490
	40M	QPSK	3500	37.904	39.540
		16QAM		37.992	39.630
		64QAM		37.979	39.510
		256QAM		37.872	39.610
	20M	QPSK	3500	18.222	19.250
		16QAM		18.266	19.110
		64QAM		18.165	19.060
		256QAM		18.175	19.210

9.1.1. OCCUPIED BANDWIDTH RESULTS

WCDMA



LTE Band 7



LTE Band 12



LTE Band 13



LTE Band 14

