

n77, Channel Bandwidth 90MHz

Channel 649668
(3745.02MHz)

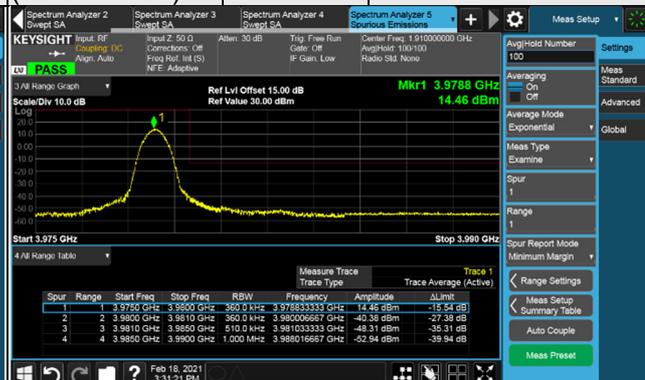
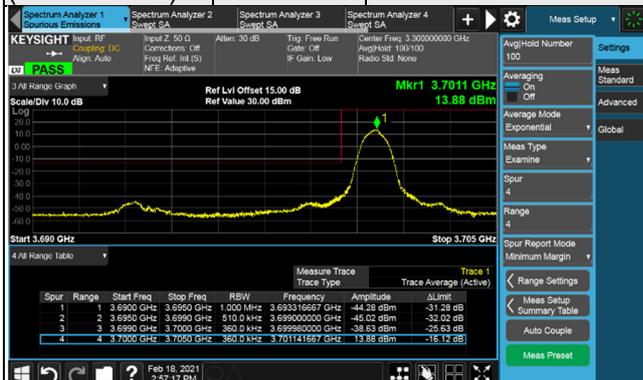
QPSK

1 RB / 0 RB Offset

Channel 662332
(3934.98MHz)

QPSK

1 RB / 244 RB Offset



Channel 649668
(3745.02MHz)

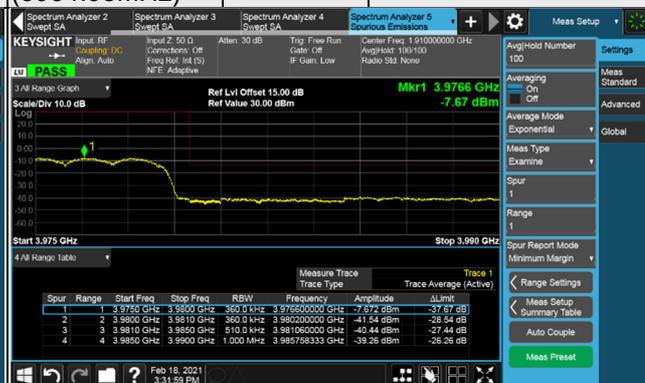
QPSK

245 RB / 0 RB Offset

Channel 662332
(3934.98MHz)

QPSK

245 RB / 0 RB Offset



n77, Channel Bandwidth 100MHz

Channel 650000
(3750.00MHz)

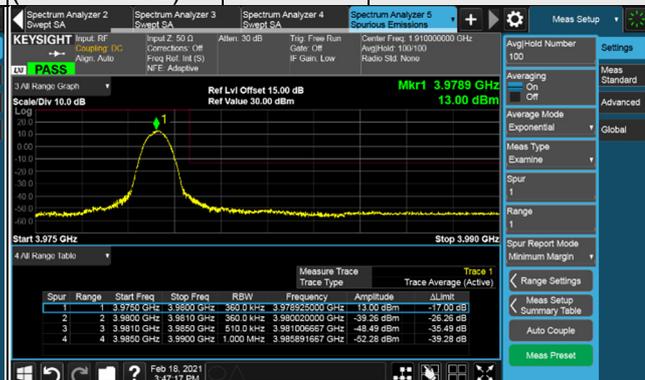
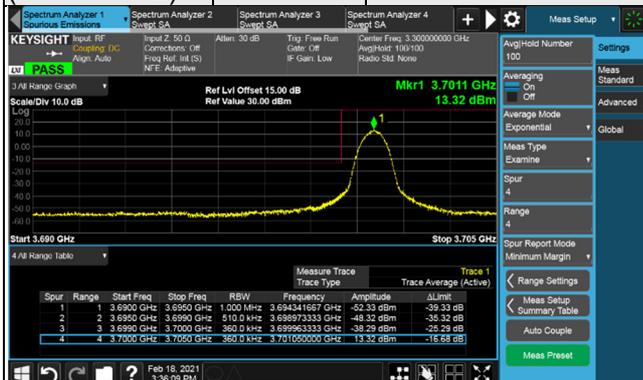
QPSK

1 RB / 0 RB Offset

Channel 662000
(3930.00MHz)

QPSK

1 RB / 272 RB Offset



Channel 650000
(3750.00MHz)

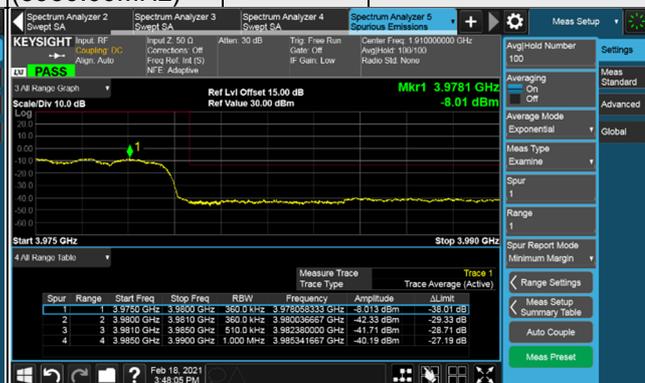
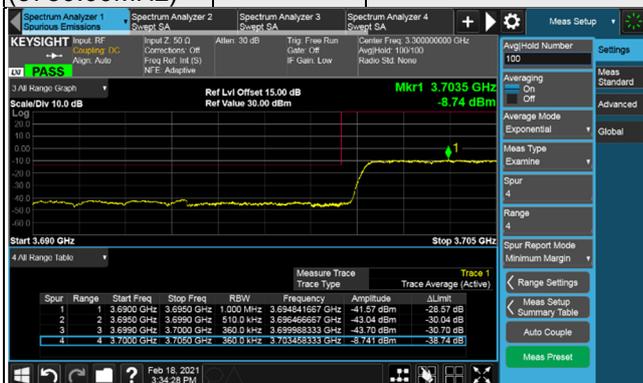
QPSK

273 RB / 0 RB Offset

Channel 662000
(3930.00MHz)

QPSK

273 RB / 0 RB Offset

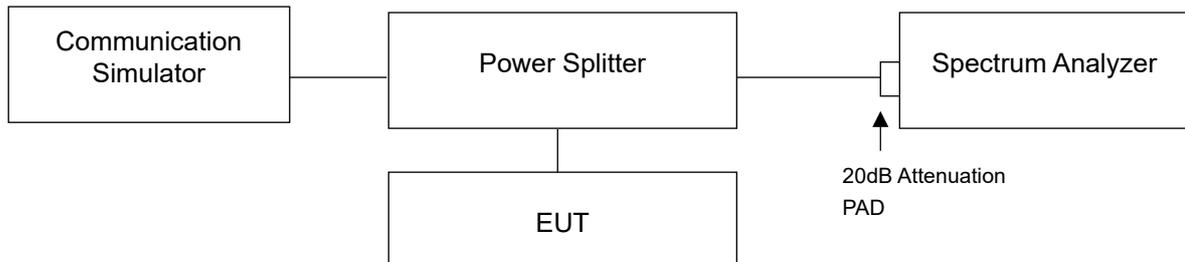


4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.6.2 Test Setup



4.6.3 Test Procedures

- Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

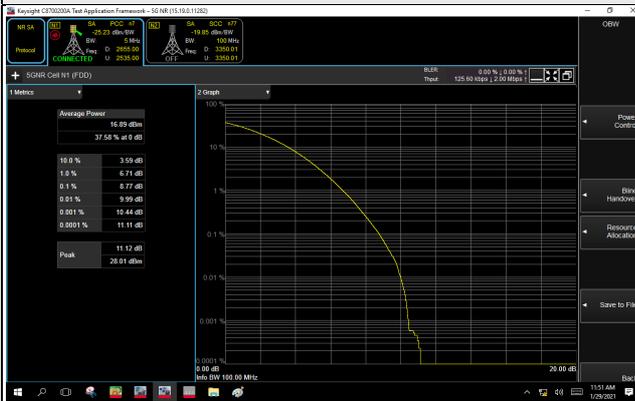
4.6.4 Test Results

n7, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
500500	2502.5	3.93	6.65	6.77	7.26	8.70
507000	2535.0	3.91	6.56	6.82	7.20	8.77
513500	2567.5	3.93	6.61	6.72	7.26	8.67
n7, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
501000	2505.0	4.03	6.79	6.80	7.28	8.75
507000	2535.0	4.00	6.75	6.75	7.19	8.73
513000	2565.0	4.01	6.73	6.77	7.17	8.72
n7, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
501500	2507.5	3.99	6.69	6.75	7.29	8.63
507000	2535.0	4.10	6.65	6.67	7.21	8.64
512500	2562.5	4.01	6.70	6.73	7.25	8.69
n7, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
502000	2510.0	3.69	6.63	6.67	7.09	8.66
507000	2535.0	4.02	6.64	6.61	7.05	8.73
512000	2560.0	3.89	6.67	6.66	7.09	8.69
n7, Channel Bandwidth 25MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
502500	2512.5	6.29	6.89	6.92	7.29	8.57
507000	2535.0	6.39	6.98	6.88	7.38	8.62
511500	2557.5	6.43	6.93	6.92	7.41	8.68

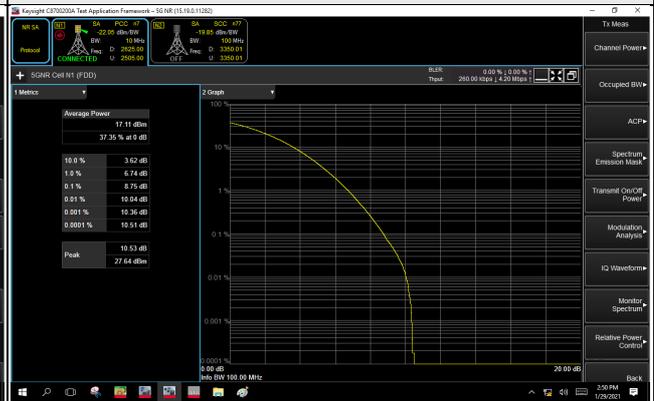
n7, Channel Bandwidth 30MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
503000	2515.0	4.71	7.21	7.21	7.65	8.73
507000	2535.0	4.47	7.18	7.35	7.80	8.56
511000	2555.0	5.08	7.11	7.31	7.74	8.60
n7, Channel Bandwidth 40MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
504000	2520.0	6.21	6.41	6.87	8.37	9.10
507000	2535.0	6.25	6.41	6.61	7.92	9.03
510000	2550.0	5.12	6.60	6.84	8.33	9.02
n7, Channel Bandwidth 50MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
505000	2525.0	4.77	6.11	6.84	7.88	9.34
507000	2535.0	4.95	6.51	6.73	7.34	8.96
509000	2545.0	5.11	6.26	6.76	7.53	9.03

Spectrum Plot of Worst Value

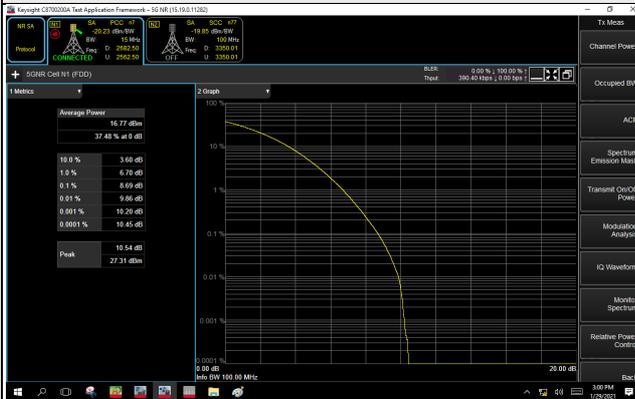
5MHz / 256QAM



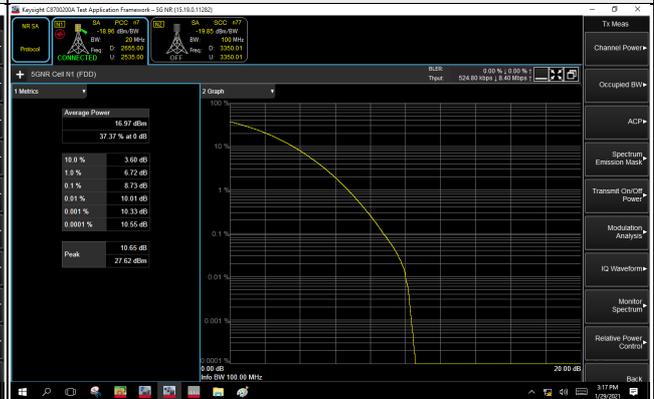
10MHz / 256QAM



15MHz / 256QAM



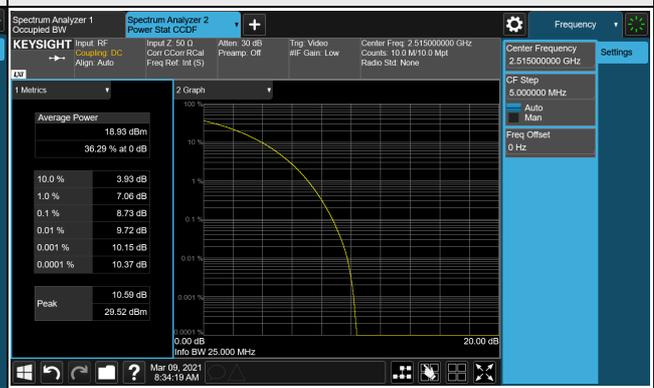
20MHz / 256QAM



25MHz / 256QAM



30MHz / 256QAM



40MHz / 256QAM



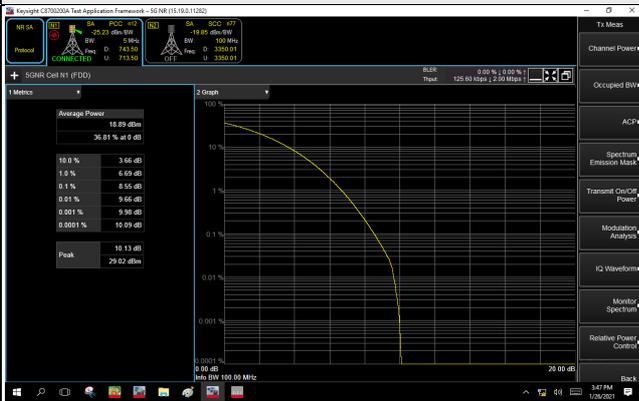
50MHz / 256QAM



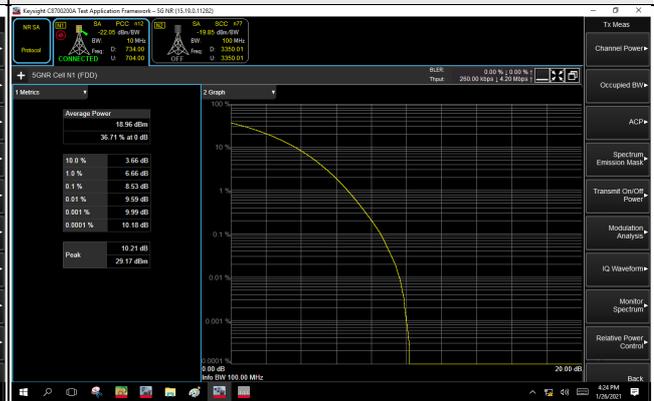
n12, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140300	701.5	3.84	6.47	6.68	7.10	8.37
141500	707.5	3.94	6.56	6.63	7.08	8.50
142700	713.5	3.84	6.54	6.85	7.12	8.55
n12, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140800	704.0	3.92	6.62	6.64	7.09	8.53
141500	707.5	3.93	6.65	6.65	7.11	8.52
142200	711.0	3.93	6.65	6.66	7.09	8.50
n12, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
141300	706.5	3.86	6.66	6.60	7.17	8.47
141500	707.5	3.98	6.60	6.60	7.17	8.40
141700	708.5	4.09	6.69	6.69	7.16	8.44

Spectrum Plot of Worst Value

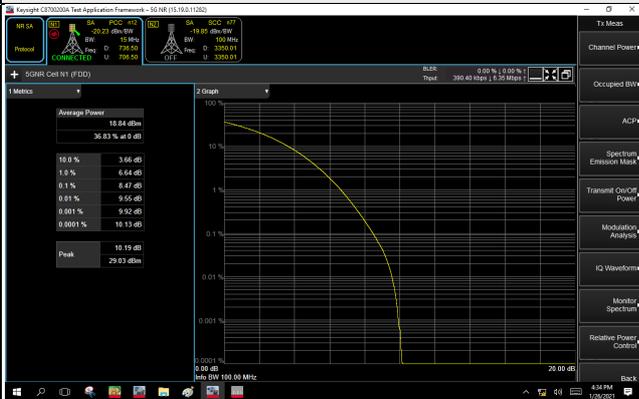
5MHz / 256QAM



10MHz / 256QAM

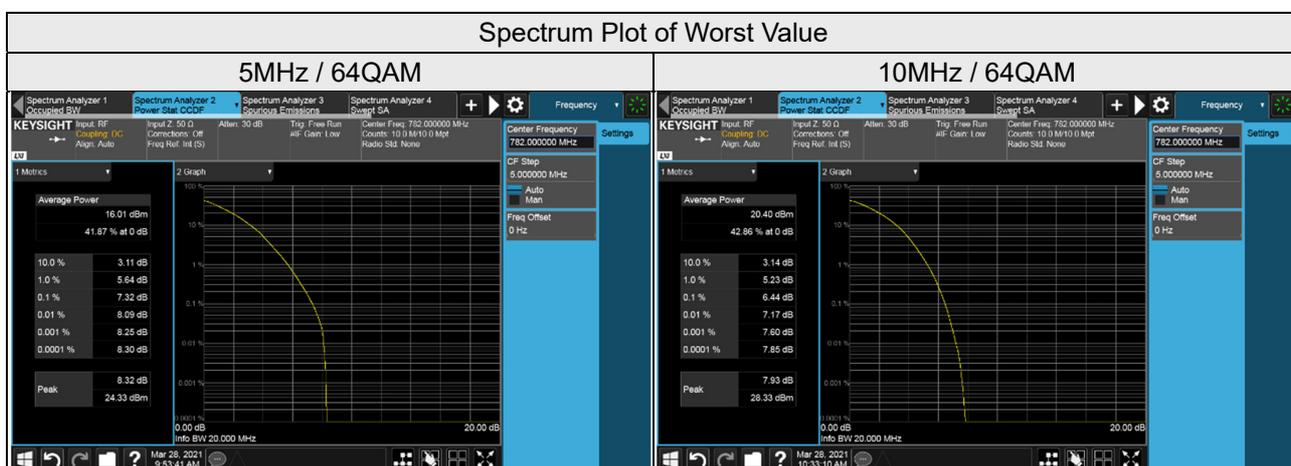


15MHz / 256QAM



n13, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
155900	779.5	5.14	5.14	6.07	7.23	7.21
156400	782.0	5.00	5.00	5.98	7.32	7.29
156900	784.5	4.86	4.85	5.64	6.26	6.32

n13, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
156400	782.0	5.03	5.06	5.92	6.44	6.42



n38, Channel Bandwidth 20MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
516000	2580.0	4.16	6.66	6.72	7.19	8.21
519000	2595.0	4.08	6.77	6.79	7.28	8.26
522000	2610.0	3.87	7.51	7.52	7.84	8.28

n38, Channel Bandwidth 30MHz

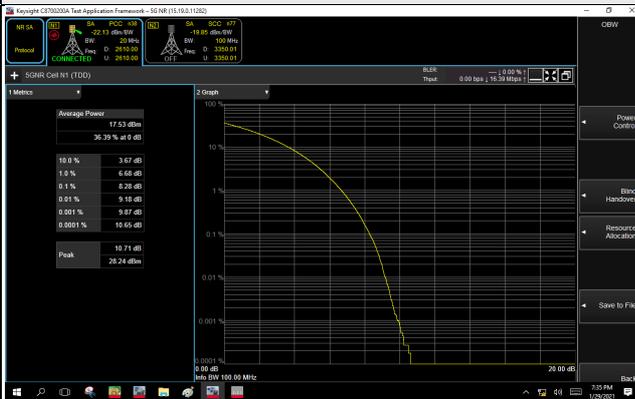
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
517000	2585.0	4.11	7.02	7.10	7.62	8.64
519000	2595.0	4.10	6.95	7.16	7.60	8.52
521000	2605.0	4.11	6.91	7.03	7.55	8.47

n38, Channel Bandwidth 40MHz

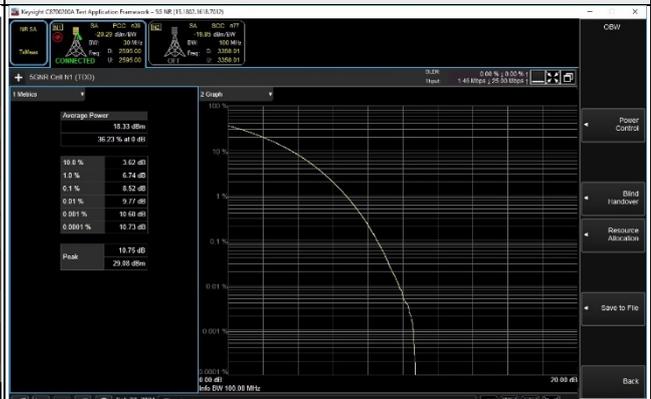
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
518000	2590.0	4.20	6.86	7.04	7.49	8.48
519000	2595.0	4.18	6.83	6.96	7.45	8.51
520000	2600.0	4.22	6.89	7.04	7.54	8.46

Spectrum Plot of Worst Value

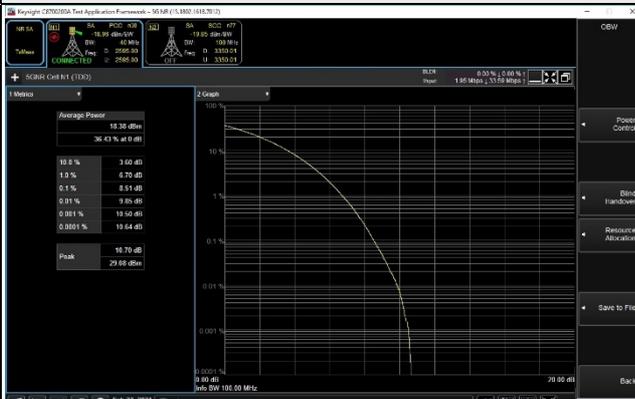
20MHz / 256QAM



30MHz / 256QAM



40MHz / 256QAM

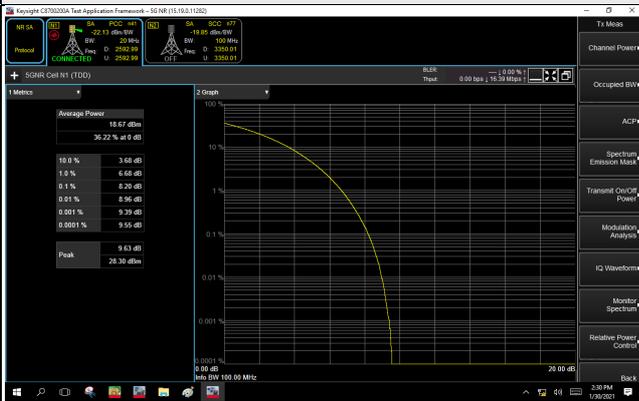


n41, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
501204	2506.02	3.80	6.42	6.44	6.81	8.14
518598	2592.99	3.69	6.45	6.50	6.86	8.20
535998	2679.99	3.66	6.42	6.48	6.85	8.18
n41, Channel Bandwidth 30MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
502200	2511.00	3.97	6.58	6.76	7.11	8.16
518598	2592.99	3.74	6.55	6.69	7.12	8.25
534996	2674.98	3.75	6.51	6.65	7.08	8.21
n41, Channel Bandwidth 40MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
503202	2516.01	4.13	6.63	6.75	7.15	8.24
518598	2592.99	3.66	6.56	6.72	7.07	8.23
534000	2670.00	3.87	6.47	6.61	7.05	8.18
n41, Channel Bandwidth 50MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
504204	2521.02	4.62	6.43	6.93	7.24	8.32
518598	2592.99	3.93	6.27	6.84	7.18	8.26
532998	2664.99	4.07	6.23	8.83	7.21	8.21
n41, Channel Bandwidth 60MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
505200	2526.00	4.70	6.89	6.88	7.30	8.32
518598	2592.99	3.84	6.69	6.74	7.16	8.25
531996	2659.98	4.04	6.64	6.63	7.18	8.17

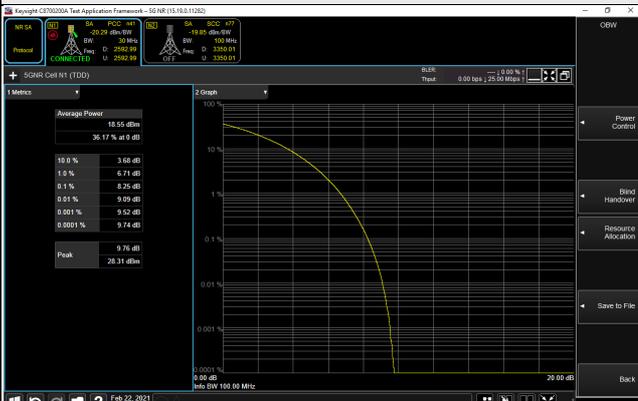
n41, Channel Bandwidth 80MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
507204	2536.02	4.31	6.89	6.84	7.33	8.39
518598	2592.99	3.95	6.71	6.74	7.22	8.20
529998	2649.99	3.99	6.67	6.66	7.18	8.19
n41, Channel Bandwidth 90MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
508200	2541.00	4.47	6.87	6.84	7.20	8.33
518598	2592.99	3.90	6.70	6.75	7.09	8.24
528996	2644.98	3.74	6.74	6.72	7.01	8.25
n41, Channel Bandwidth 100MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
509202	2546.01	3.90	6.88	6.89	7.36	8.40
518598	2592.99	3.85	6.81	6.82	7.26	7.28
528000	2640.00	4.25	7.92	7.97	8.12	8.42

Spectrum Plot of Worst Value

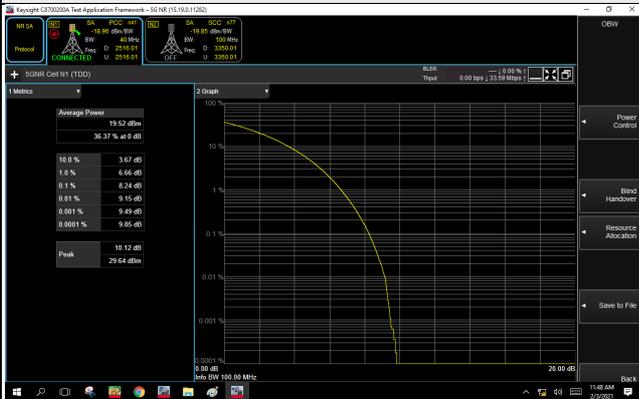
20MHz / 256QAM



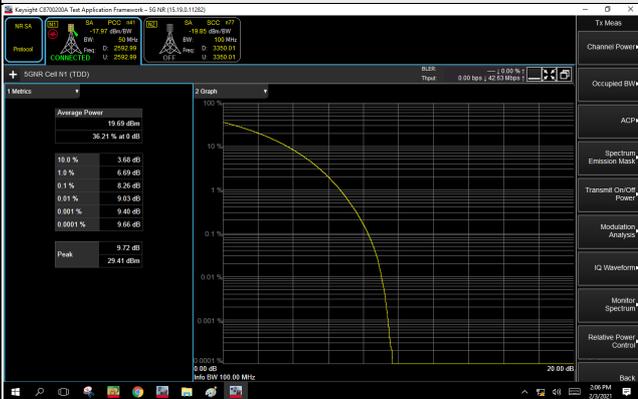
30MHz / 256QAM



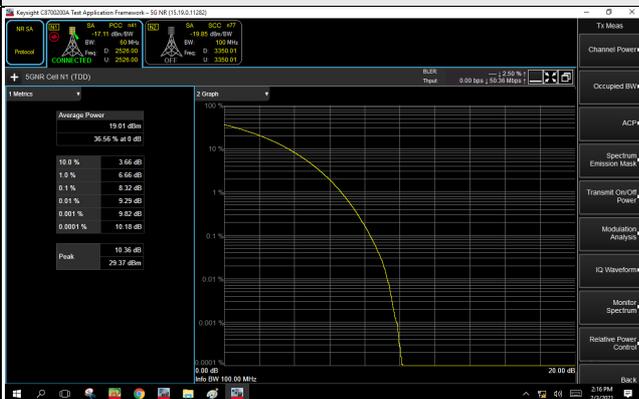
40MHz / 256QAM



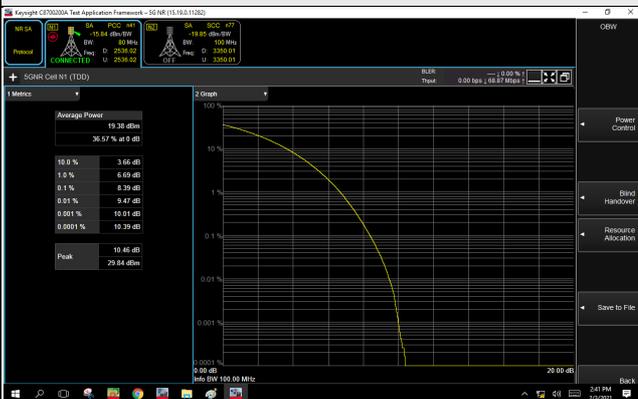
50MHz / 256QAM



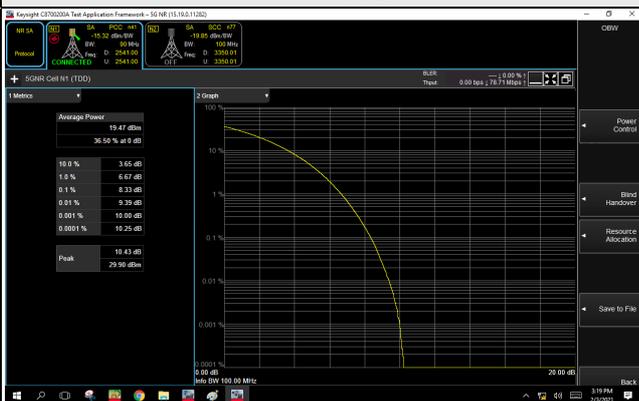
60MHz / 256QAM



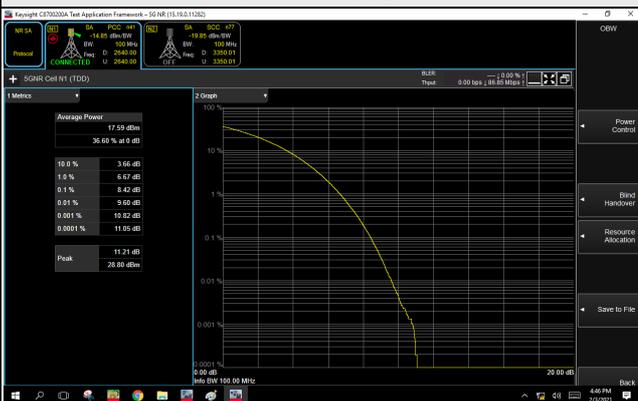
80MHz / 256QAM



90MHz / 256QAM



100MHz / 256QAM



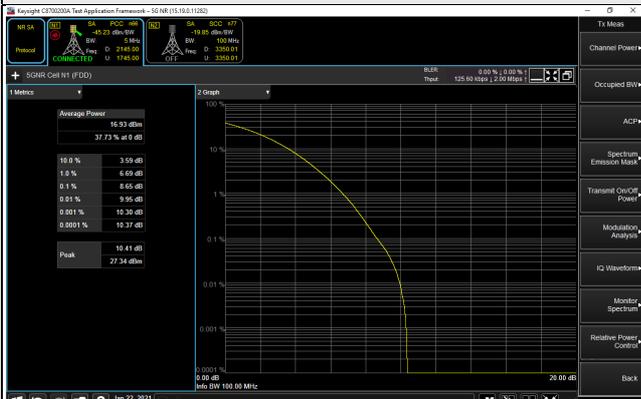
n66, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
342500	1712.5	3.80	6.52	6.62	7.08	8.64
349000	1745.0	3.82	6.57	6.70	7.13	8.65
355500	1777.5	3.81	6.53	6.64	7.11	8.59
n66, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343000	1715.0	3.88	6.71	6.64	7.10	8.57
349000	1745.0	3.91	6.63	6.65	7.10	8.60
355000	1775.0	3.90	6.66	6.66	7.08	8.60
n66, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343500	1717.5	3.92	6.56	6.58	7.18	8.47
349000	1745.0	3.88	6.55	6.72	7.14	8.55
354500	1772.5	3.98	6.61	6.65	7.16	8.53
n66, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
344000	1720.0	3.87	6.55	6.55	6.97	8.52
349000	1745.0	3.76	6.48	6.51	6.95	8.61
354000	1770.0	3.86	6.58	6.60	7.01	8.49
n66, Channel Bandwidth 30MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
345000	1725.0	3.88	6.61	6.77	7.17	8.52
349000	1745.0	3.80	6.56	6.72	7.17	8.49
353000	1765.0	3.94	6.73	6.84	7.22	8.44

n66, Channel Bandwidth 40MHz

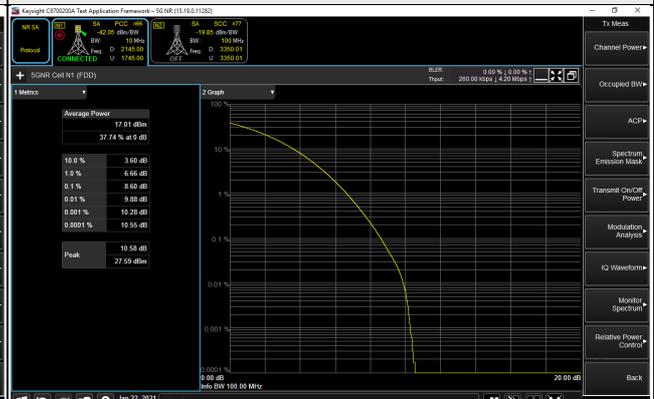
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
346000	1730.0	3.92	6.59	6.67	7.12	8.46
349000	1745.0	3.91	6.53	6.69	7.13	8.49
352000	1760.0	4.21	6.75	6.89	7.27	8.48

Spectrum Plot of Worst Value

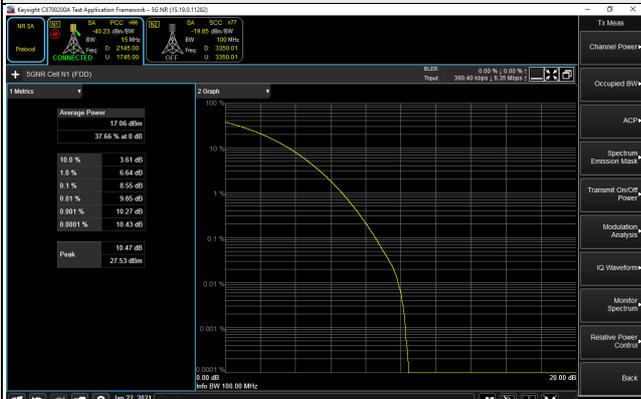
5MHz / 256QAM



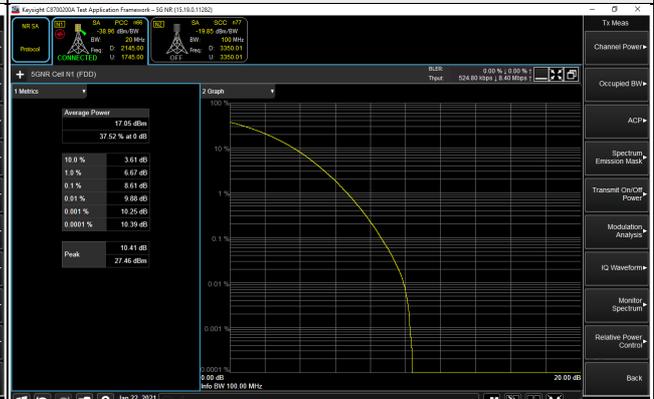
10MHz / 256QAM



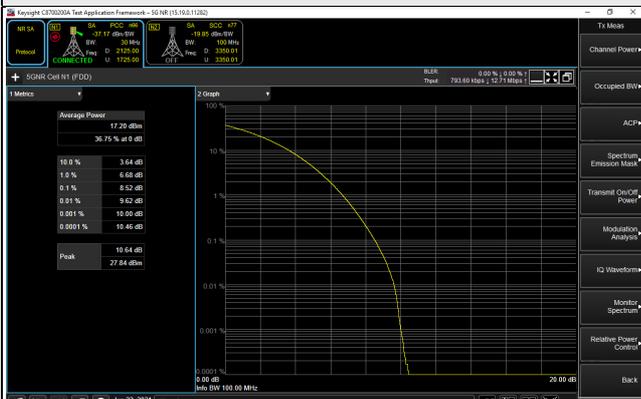
15MHz / 256QAM



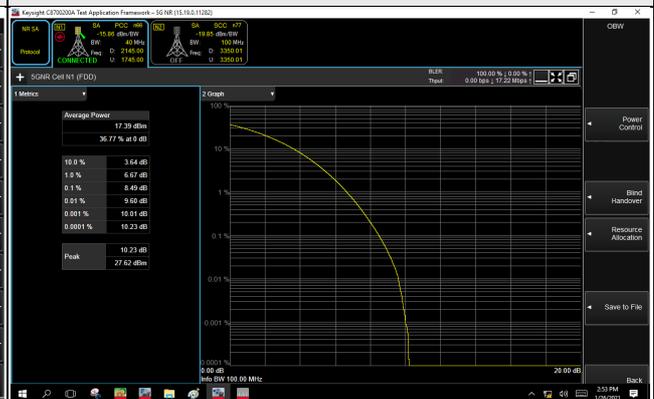
20MHz / 256QAM



30MHz / 256QAM



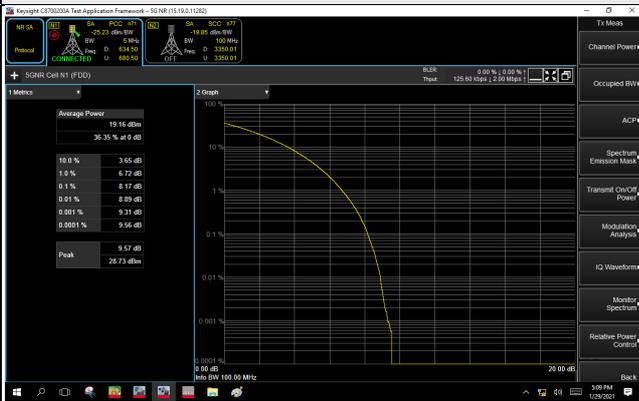
40MHz / 256QAM



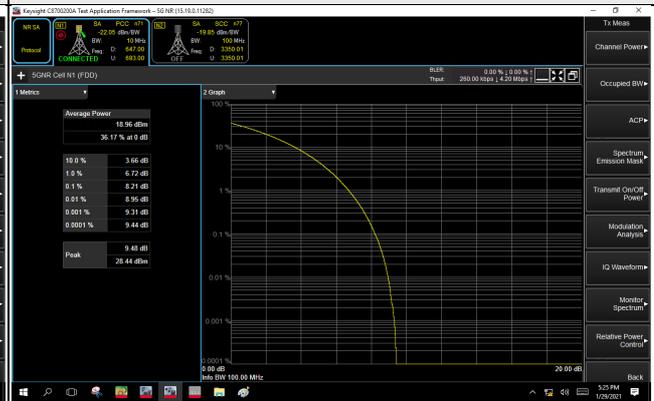
n71, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
133100	665.5	3.77	6.17	6.25	6.68	8.13
136100	680.5	3.76	6.49	6.53	6.88	8.17
139100	695.5	3.76	6.40	6.51	6.91	8.12
n71, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
133600	668.0	3.87	6.59	6.56	6.96	8.12
136100	680.5	3.84	6.43	6.44	6.83	8.15
138600	693.0	3.90	6.50	6.51	6.92	8.21
n71 Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
134100	670.5	4.09	6.67	6.65	7.13	8.18
136100	680.5	3.83	6.44	6.46	6.98	8.21
138100	690.5	3.84	6.51	6.55	7.05	8.34
n71, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
134600	673.0	4.01	6.64	6.67	6.98	8.24
136100	680.5	3.54	6.54	6.63	6.91	8.31
137600	688.0	3.84	6.44	6.47	6.83	8.25

Spectrum Plot of Worst Value

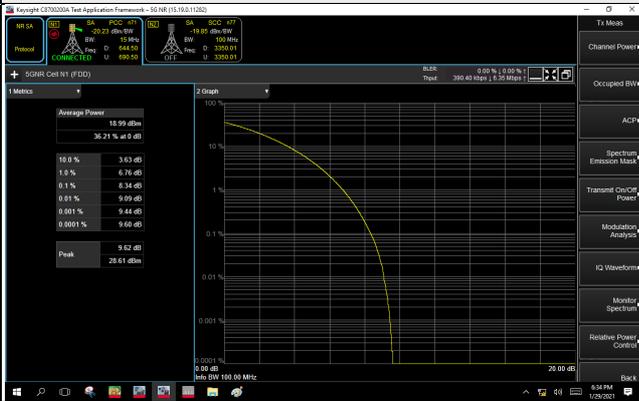
5MHz / 256QAM



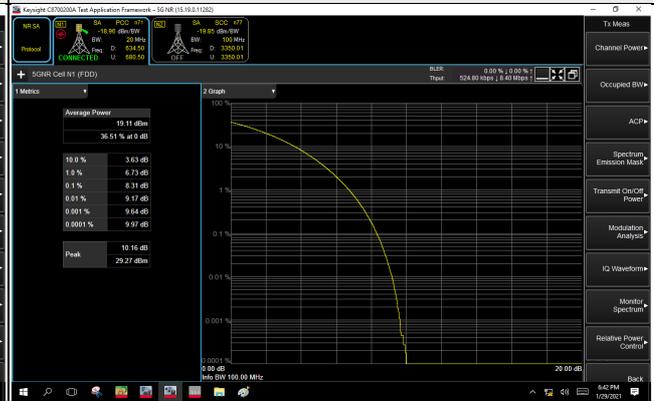
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



n77, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
647334	3710.01	4.01	6.51	6.45	6.89	8.50
656000	3840.00	4.05	6.59	6.67	7.11	8.49
664666	3969.99	4.04	6.54	6.55	6.98	8.42
n77, Channel Bandwidth 30MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
647668	3715.02	3.86	6.49	6.53	6.99	8.47
656000	3840.00	3.89	6.67	6.70	7.13	8.51
664332	3964.98	3.87	6.59	6.57	7.03	8.42
n77, Channel Bandwidth 40MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648000	3720.00	3.87	6.51	6.59	6.98	8.48
656000	3840.00	3.86	6.61	6.74	7.12	8.56
664000	3960.00	3.84	6.53	6.62	7.06	8.48
n77, Channel Bandwidth 50MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648334	3725.01	4.07	6.57	6.57	7.05	8.56
656000	3840.00	4.07	6.53	6.61	7.05	8.50
663666	3954.99	4.03	6.56	6.57	7.10	8.46
n77, Channel Bandwidth 60MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648668	3730.02	4.05	6.64	6.64	7.11	8.58
656000	3840.00	4.09	6.65	6.62	6.99	8.48
663332	3949.98	4.03	6.51	6.41	6.78	8.48

n77, Channel Bandwidth 70MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
649000	3735.00	4.10	6.70	6.67	7.11	8.58
656000	3840.00	4.11	6.63	6.71	7.03	8.49
663000	3945.00	4.02	6.42	6.53	6.93	8.43

n77, Channel Bandwidth 80MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
649334	3740.01	4.08	6.69	6.59	7.10	8.52
656000	3840.00	4.07	6.61	6.61	7.11	8.54
662666	3939.99	4.15	6.49	6.52	6.91	8.48

n77, Channel Bandwidth 90MHz

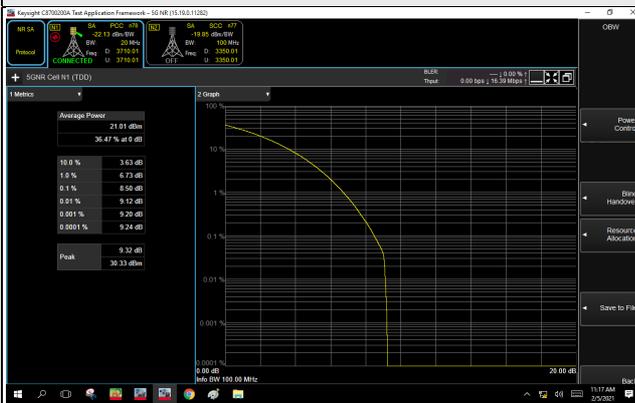
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
649558	3745.02	4.08	6.63	6.68	7.07	8.52
656000	3840.00	4.09	6.62	6.66	7.02	8.51
662332	3934.98	4.15	6.58	6.58	6.98	8.47

n77, Channel Bandwidth 100MHz

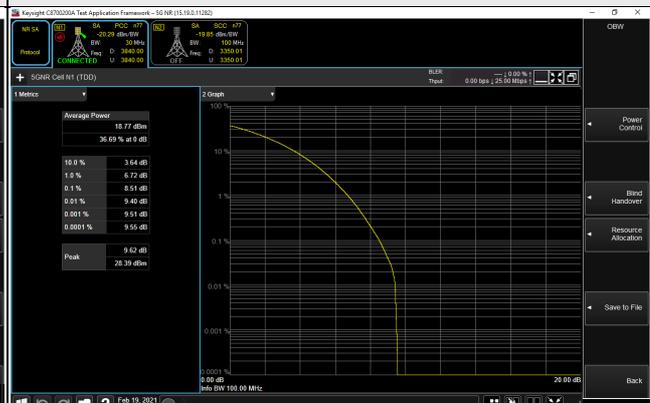
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
650000	3750.00	4.09	6.73	6.71	7.21	8.53
656000	3840.00	4.16	6.68	6.67	7.13	8.52
662000	3930.00	4.23	6.65	6.68	7.16	8.49

Spectrum Plot of Worst Value

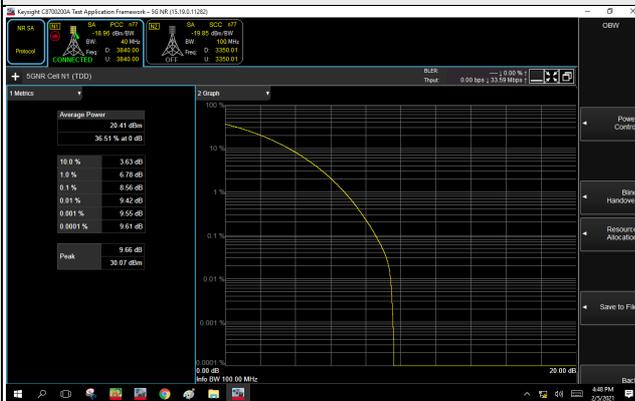
20MHz / 256QAM



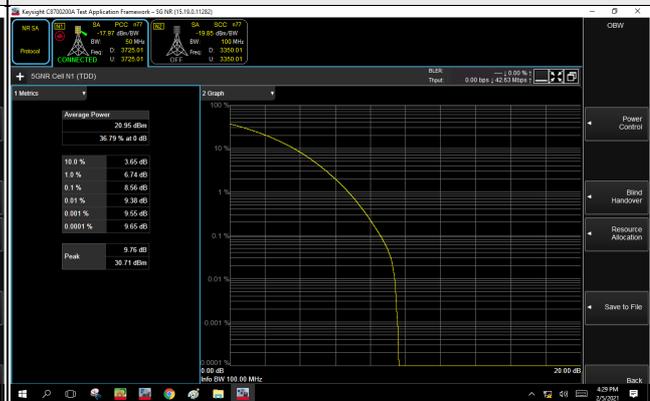
30MHz / 256QAM



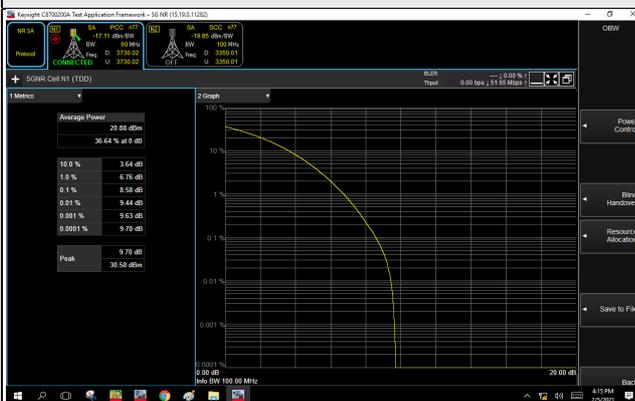
40MHz / 256QAM



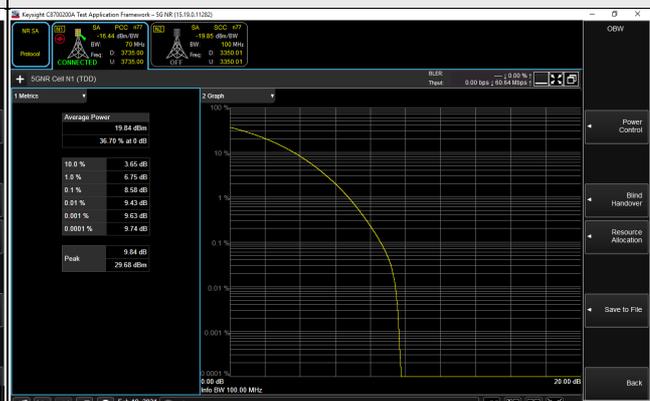
50MHz / 256QAM



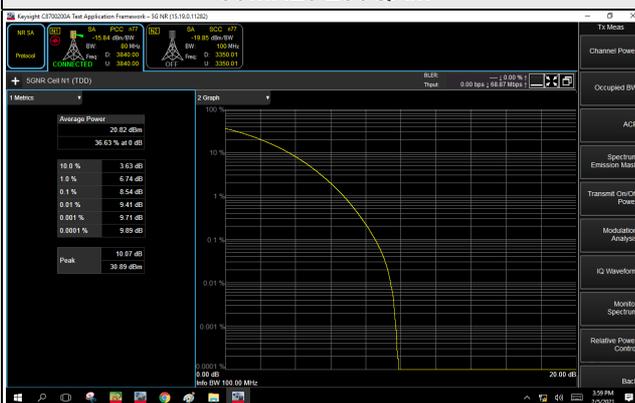
60MHz / 256QAM



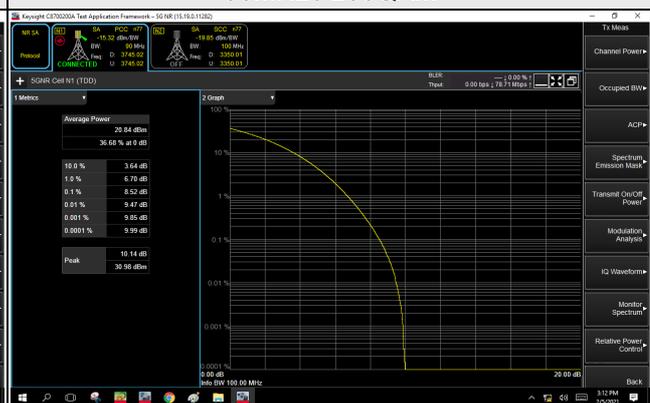
70MHz / 256QAM



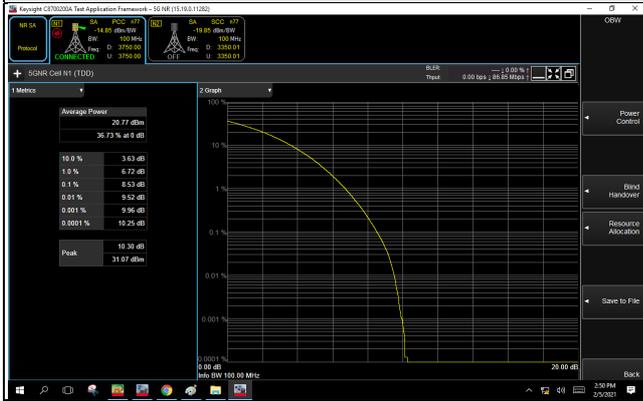
80MHz / 256QAM



90MHz / 256QAM



100MHz / 256QAM



4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

For n7, n38, n41:

In the FCC 27.53(m)(4), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The emission limit equal to -25dBm .

For n12, n71:

According to FCC 27.53(g) for operations in the 600 MHz band and 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

For n13:

According to FCC 27.53(c)(2) for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

According to FCC 27.53(f) for operations in the 775-788 MHz, emissions in the band 1559-1610MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm

For n30:

In the FCC 27.53(a)(4)(iii), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $70 + 10 \log (P)$ dB. The limit of emission is equal to -40 dBm.

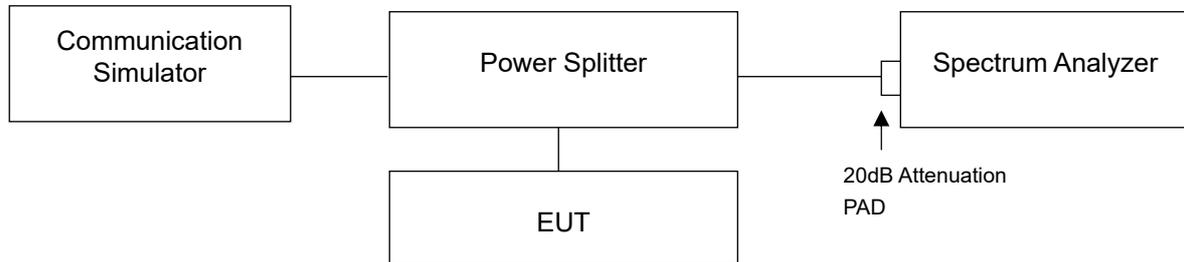
For n66:

In the FCC 27.53(h), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm .

For n77:

According to FCC 27.53(l) for mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. 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.

4.7.2 Test Setup



4.7.3 Test Procedure

- a. All measurements were done at low and high channels operational frequency range.
- b. Measuring frequency range is from 9kHz to 10GHz / 26.5GHz / 30GHz / 40GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement