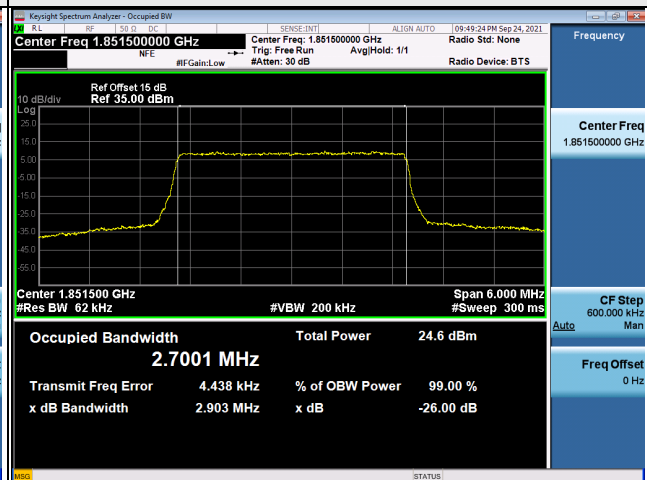


### Spectrum Plot of Worst Value

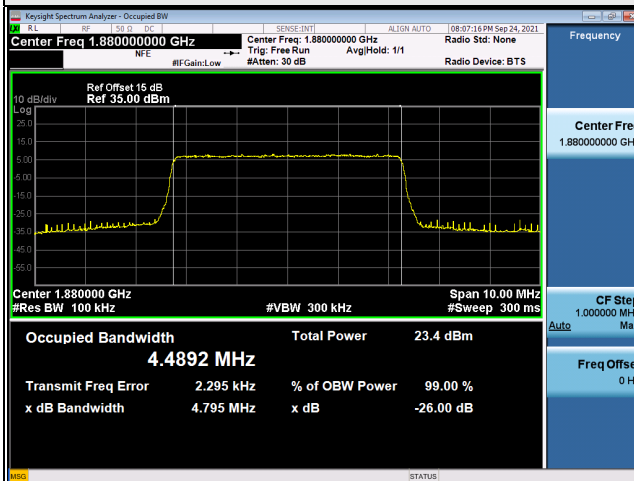
#### 1.4MHz / 64QAM



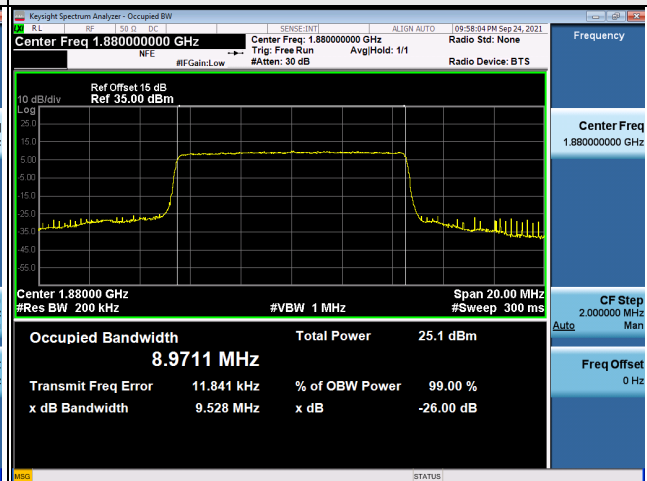
#### 3MHz / 64QAM



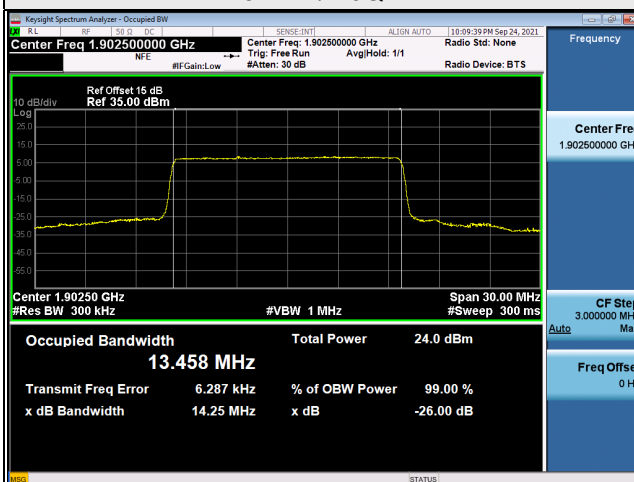
#### 5MHz / 64QAM



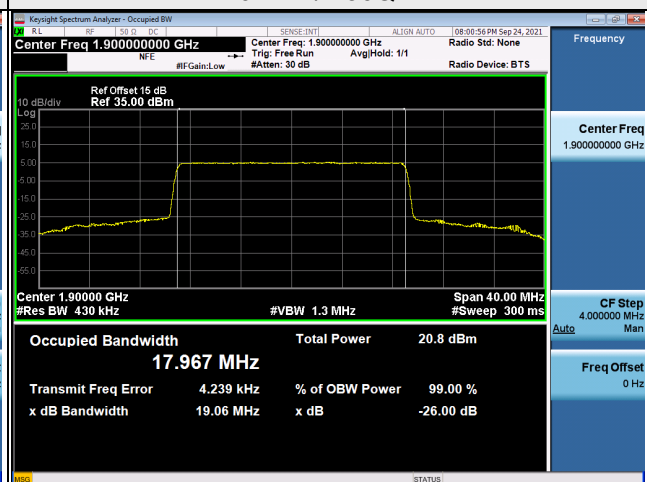
#### 10MHz / QPSK



#### 15MHz / 16QAM



#### 20MHz / 256QAM

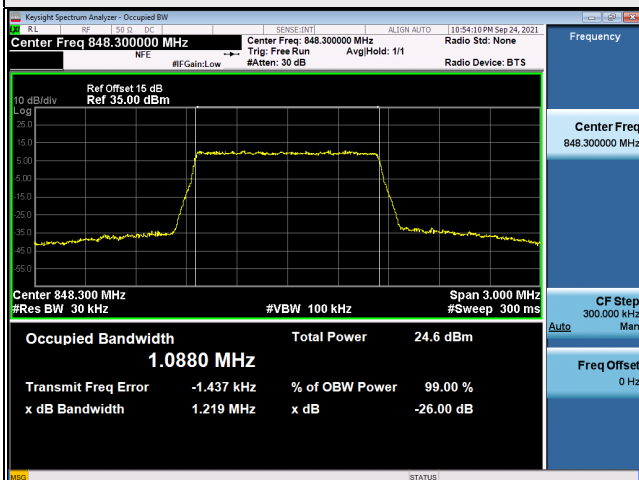


LTE Band 5

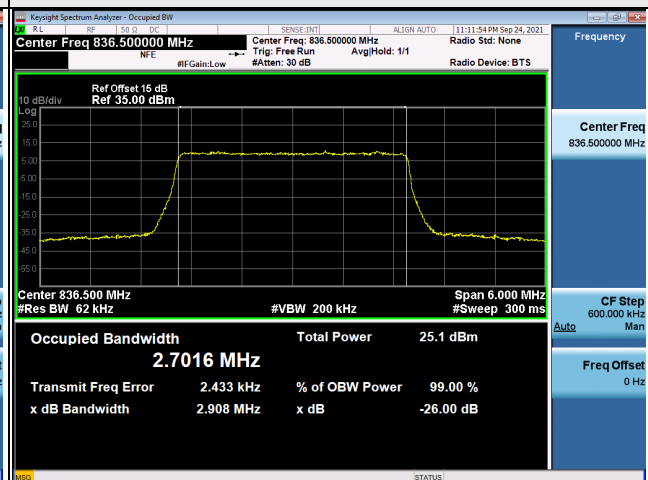
LTE Band 5, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20407	824.7	1.09	1.09	1.09	1.09
20525	836.5	1.09	1.09	1.09	1.09
20643	848.3	1.09	1.09	1.09	1.08
LTE Band 5, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20415	825.5	2.70	2.70	2.70	2.70
20525	836.5	2.70	2.70	2.70	2.70
20635	847.5	2.70	2.70	2.70	2.70
LTE Band 5, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20425	826.5	4.48	4.49	4.48	4.48
20525	836.5	4.49	4.49	4.49	4.49
20625	846.5	4.49	4.49	4.48	4.48
LTE Band 5, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20450	829.0	8.97	8.95	8.95	8.95
20525	836.5	8.97	8.95	8.95	8.95
20600	844.0	8.95	8.94	8.94	8.94

### Spectrum Plot of Worst Value

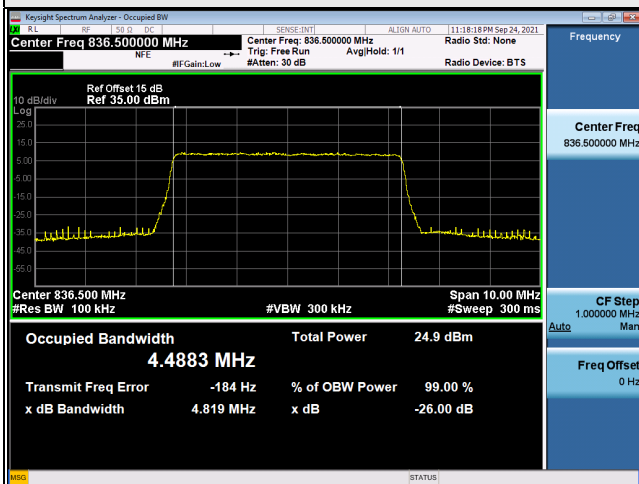
#### 1.4MHz / 64QAM



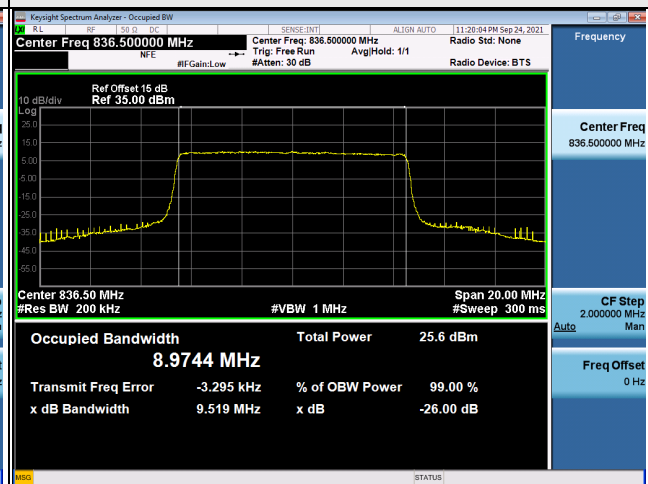
#### 3MHz / 16QAM



#### 5MHz / 16QAM



#### 10MHz / QPSK

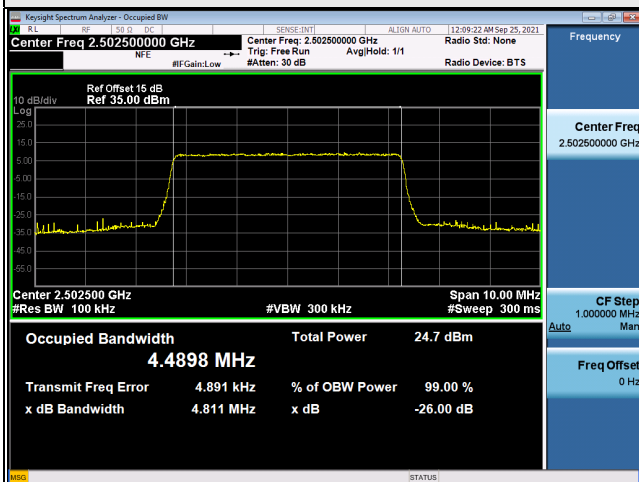


LTE Band 7

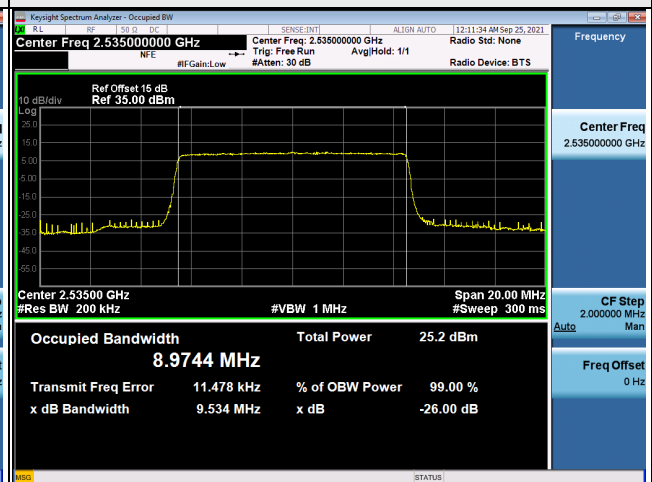
LTE Band 7, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20775	2502.5	4.49	4.49	4.49	4.49
21100	2535.0	4.49	4.49	4.49	4.49
21425	2567.5	4.49	4.49	4.49	4.49
LTE Band 7, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20800	2505.0	8.97	8.96	8.95	8.96
21100	2535.0	8.97	8.96	8.96	8.96
21400	2565.0	8.97	8.95	8.96	8.96
LTE Band 7, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20825	2507.5	13.44	13.44	13.44	13.44
21100	2535.0	13.46	13.45	13.46	13.45
21375	2562.5	13.45	13.45	13.44	13.44
LTE Band 7, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20850	2510.0	17.89	17.90	17.90	17.90
21100	2535.0	17.93	17.95	17.95	17.96
21350	2560.0	17.91	17.92	17.91	17.91

### Spectrum Plot of Worst Value

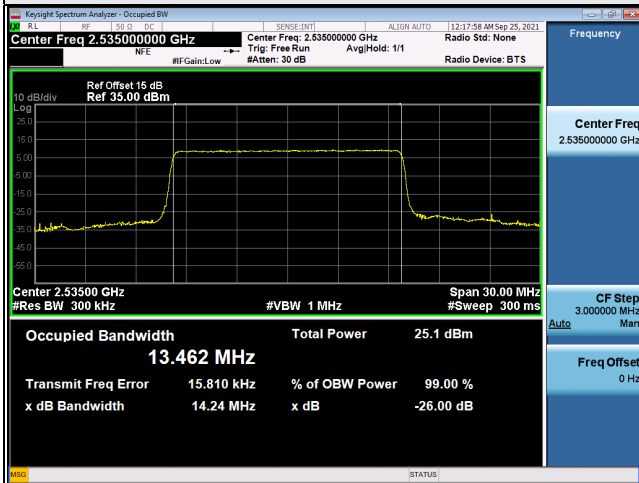
5MHz / 16QAM



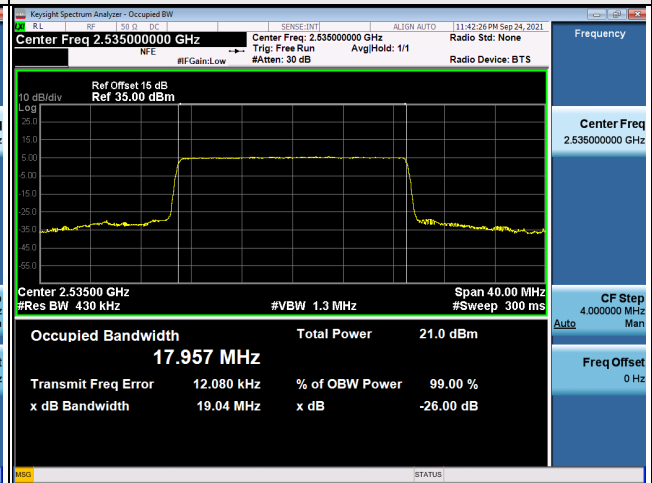
10MHz / QPSK



15MHz / QPSK



20MHz / 256QAM



LTE Band 12

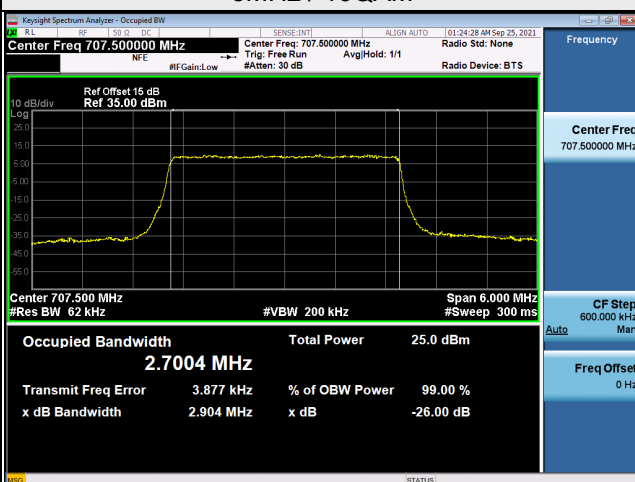
LTE Band 12, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23017	699.7	1.09	1.09	1.09	1.09
23095	707.5	1.09	1.09	1.09	1.08
23173	715.3	1.09	1.09	1.09	1.08
LTE Band 12, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23025	700.5	2.70	2.70	2.70	2.69
23095	707.5	2.70	2.70	2.70	2.69
23165	714.5	2.70	2.70	2.70	2.69
LTE Band 12, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23035	701.5	4.49	4.49	4.49	4.49
23095	707.5	4.49	4.48	4.48	4.48
23155	713.5	4.49	4.49	4.48	4.49
LTE Band 12, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23060	704.0	8.97	8.96	8.96	8.96
23095	707.5	8.97	8.96	8.96	8.95
23130	711.0	8.96	8.94	8.95	8.94

### Spectrum Plot of Worst Value

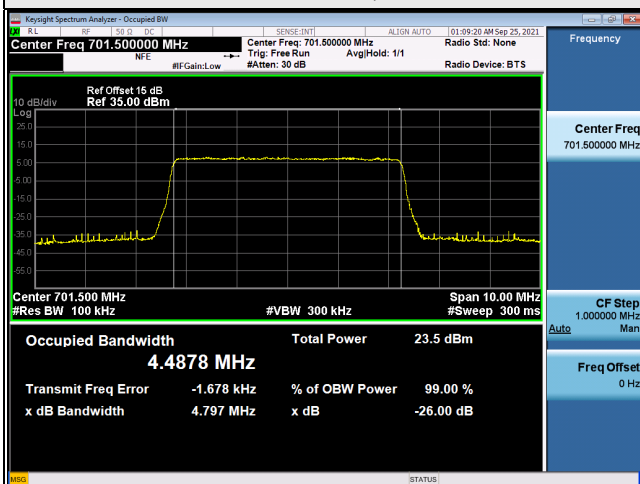
#### 1.4MHz / 64QAM



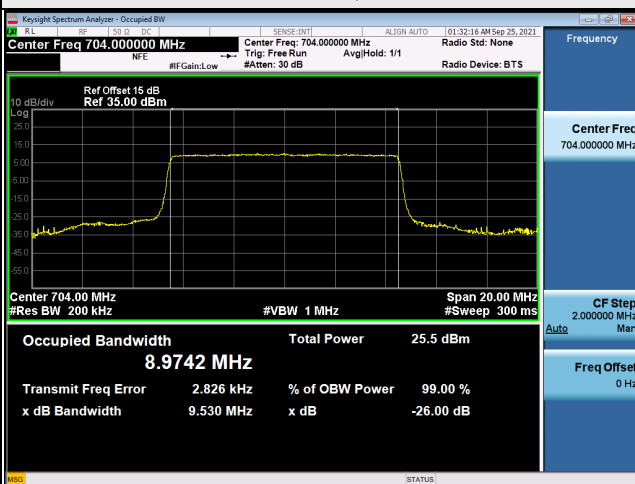
#### 3MHz / 16QAM



#### 5MHz / 16QAM



#### 10MHz / QPSK

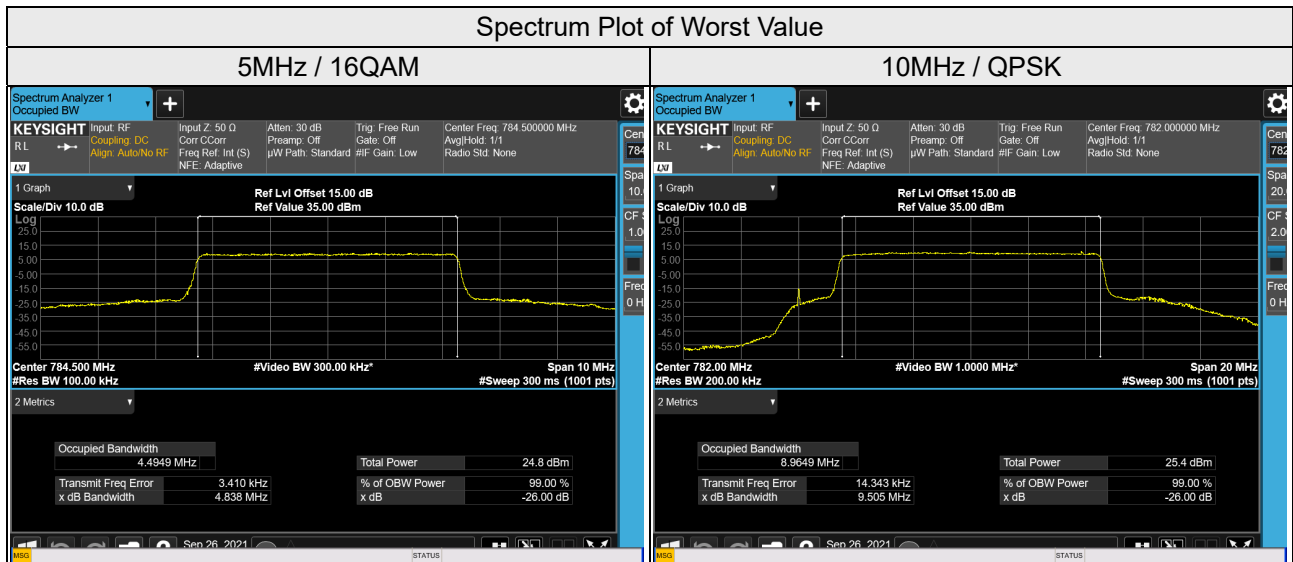


LTE Band 13

LTE Band 13, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23205	779.5	4.48	4.48	4.48	4.48
23230	782.0	4.49	4.49	4.49	4.49
23255	784.5	4.49	4.49	4.49	4.49

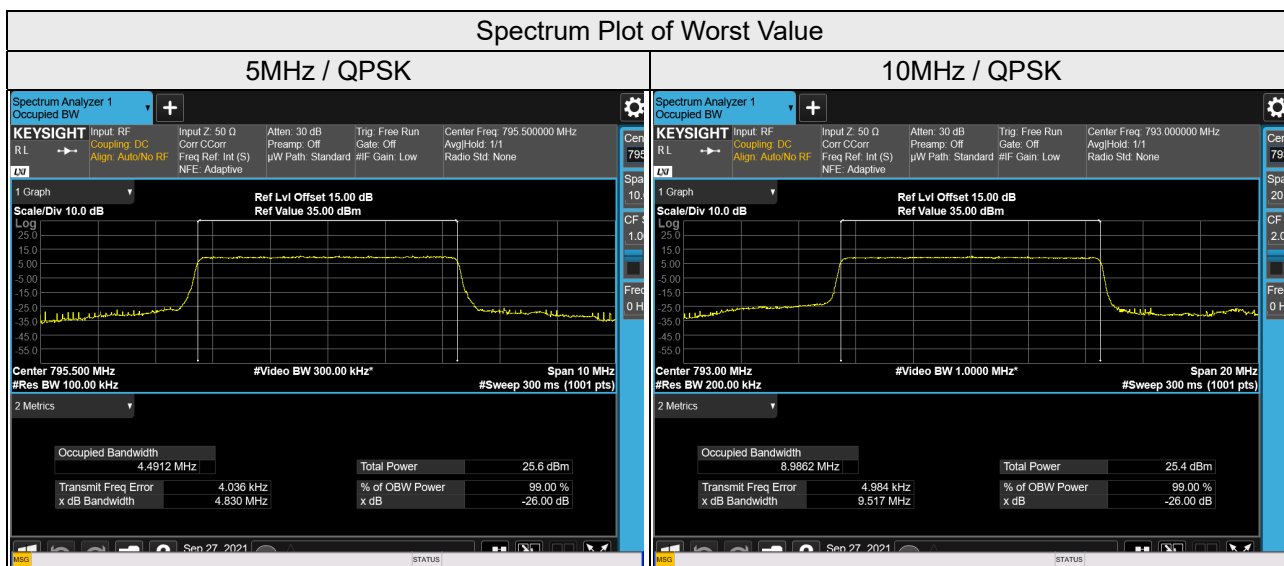
LTE Band 13, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23230	782.0	8.96	8.95	8.95	8.94





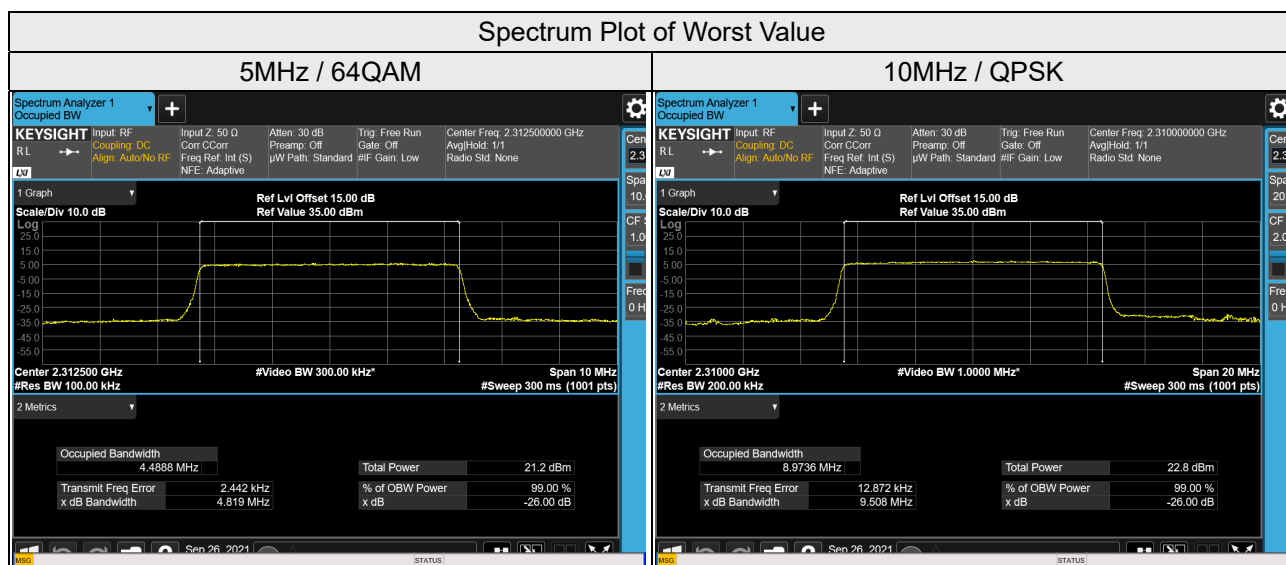
LTE Band 14

LTE Band 14, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23305	790.5	4.49	4.49	4.49	4.48
23330	793	4.49	4.49	4.49	4.49
23355	795.5	4.49	4.49	4.49	4.49
LTE Band 14, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23330	793	8.99	8.97	8.97	8.96



### LTE Band 30

LTE Band 30, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
27685	2307.5	4.49	4.49	4.49	4.49
27710	2310	4.49	4.49	4.49	4.49
27735	2312.5	4.49	4.49	4.49	4.49
LTE Band 30, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
27710	2310	8.97	8.95	8.96	8.96

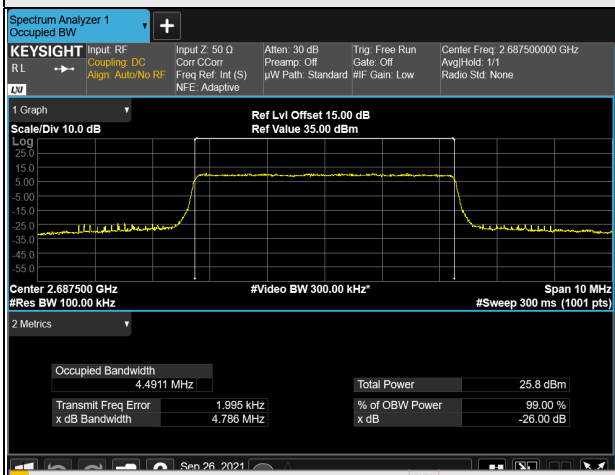


LTE Band 41

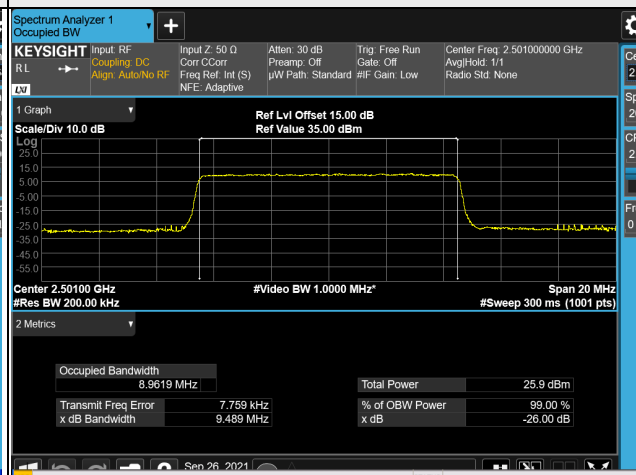
LTE Band 41, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39675	2498.5	4.49	4.49	4.48	4.48
40620	2593	4.48	4.49	4.48	4.48
41565	2687.5	4.49	4.49	4.48	4.48
LTE Band 41, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39700	2501	8.96	8.96	8.96	8.96
40620	2593	8.96	8.96	8.96	8.96
41540	2685	8.96	8.96	8.96	8.96
LTE Band 41, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39725	2503.5	13.44	13.44	13.44	13.44
40620	2593	13.44	13.44	13.45	13.43
41515	2682.5	13.44	13.44	13.44	13.43
LTE Band 41, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39750	2506	17.91	17.91	17.91	17.90
40620	2593	17.91	17.92	17.92	17.90
41490	2680	17.91	17.90	17.90	17.89

### Spectrum Plot of Worst Value

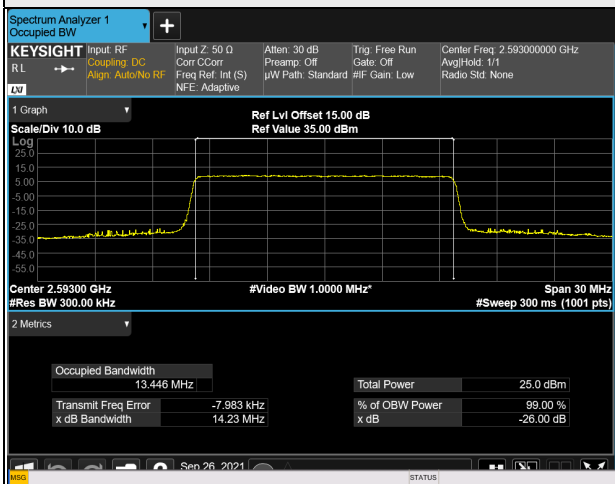
#### 5MHz / 16QAM



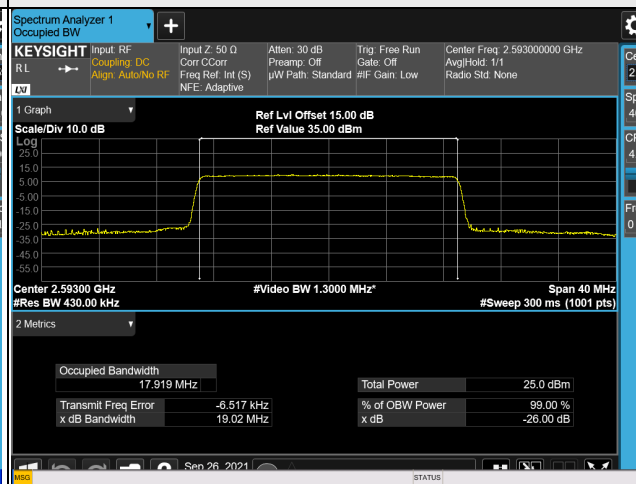
#### 10MHz / 64QAM



#### 15MHz / 64QAM



#### 20MHz / 64QAM



LTE Band 66

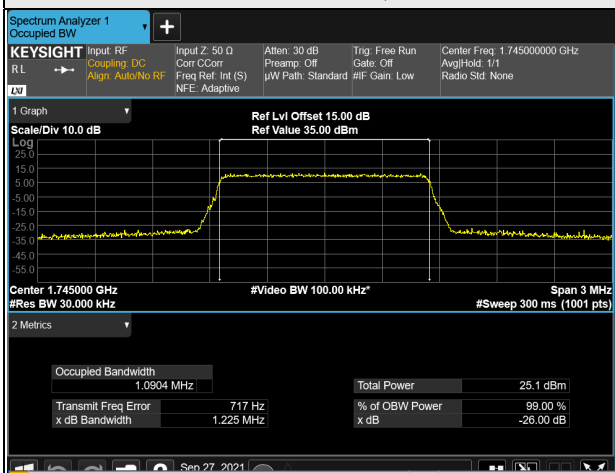
LTE Band 66, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131979	1710.7	1.09	1.09	1.09	1.09
132322	1745.0	1.09	1.09	1.09	1.09
132665	1779.3	1.09	1.09	1.09	1.08
LTE Band 66, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131987	1711.5	2.70	2.70	2.70	2.70
132322	1745.0	2.70	2.70	2.70	2.70
132657	1778.5	2.70	2.70	2.70	2.70
LTE Band 66, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131997	1712.5	4.49	4.49	4.49	4.49
132322	1745.0	4.49	4.49	4.49	4.49
132647	1777.5	4.49	4.49	4.48	4.49
LTE Band 66, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132022	1715.0	8.97	8.96	8.96	8.96
132322	1745.0	8.98	8.96	8.97	8.96
132622	1775.0	8.98	8.96	8.97	8.96
LTE Band 66, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132047	1717.5	13.44	13.44	13.44	13.45
132322	1745.0	13.47	13.47	13.46	13.47
132597	1772.5	13.49	13.49	13.49	13.50

LTE Band 66, Channel Bandwidth 20MHz

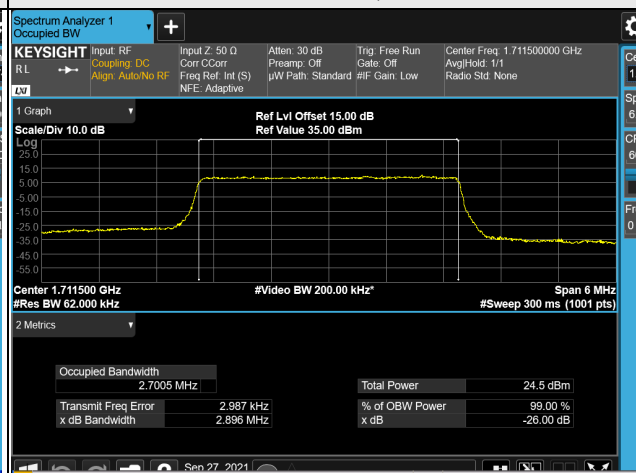
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132072	1720.0	17.90	17.90	17.89	17.90
132322	1745.0	17.97	17.98	17.98	17.99
132572	1770.0	18.03	18.01	18.03	18.02

### Spectrum Plot of Worst Value

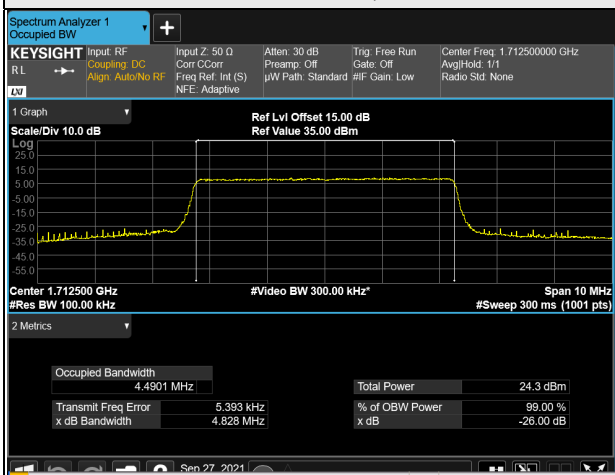
#### 1.4MHz / 16QAM



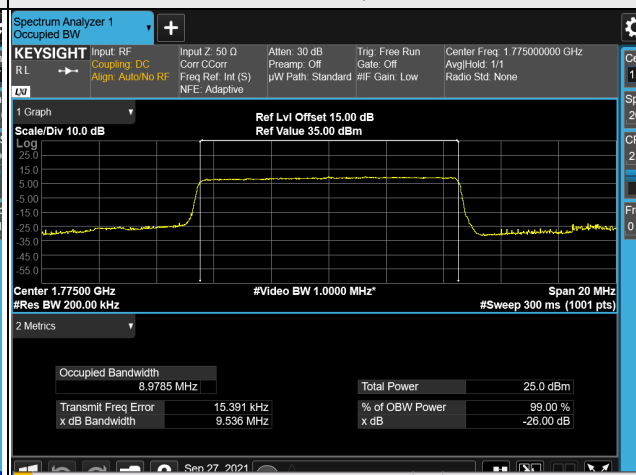
#### 3MHz / 16QAM



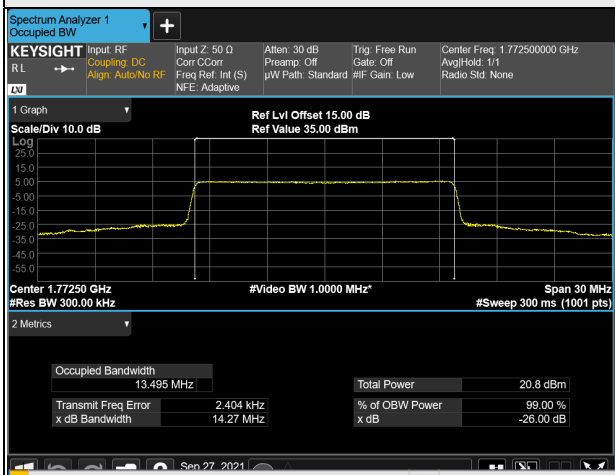
#### 5MHz / 16QAM



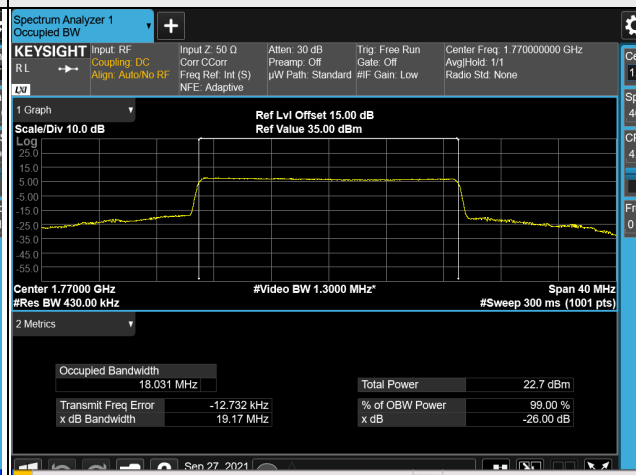
#### 10MHz / QPSK



#### 15MHz / 256QAM



#### 20MHz / 64QAM



26dB Bandwidth  
5GNR n77 (Part 270):

5GNR n77 (Part 270), Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
647334	3710.01	18.58	19.02	18.99	18.99	18.94
656000	3840	18.54	19.00	18.98	18.96	18.91
664666	3969.99	18.57	19.11	19.00	18.96	18.93
5GNR n77 (Part 270), Channel Bandwidth 40MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648000	3720	37.03	39.25	39.22	39.22	39.19
656000	3840	37.06	39.20	39.21	39.20	39.20
664000	3960	37.02	39.21	39.22	39.17	39.19
5GNR n77 (Part 270) Channel Bandwidth 50MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648334	3725.01	47.27	49.13	49.12	49.15	49.14
656000	3840	47.27	49.15	49.14	49.13	49.10
663666	3954.99	47.27	49.14	49.12	49.14	49.11
5GNR n77 (Part 270) Channel Bandwidth 60MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
648668	3730.02	59.78	59.82	59.78	59.81	59.74
656000	3840	59.74	59.81	59.79	59.76	59.74
663332	3949.98	59.78	59.78	59.76	59.79	59.75
5GNR n77 (Part 270), Channel Bandwidth 80MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
649334	3740.01	79.65	80.01	80.03	80.04	79.99
656000	3840	79.64	80.01	79.98	80.00	80.02
662666	3939.99	79.64	80.02	79.99	80.01	80.01



### 5GNR n77 (Part 270), Channel Bandwidth 90MHz

Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
649558	3745.02	89.55	89.63	89.64	89.62	89.58
656000	3840	89.58	90.34	90.33	90.32	90.32
662332	3934.98	89.56	90.33	90.33	90.32	90.29

### 5GNR n77 (Part 270), Channel Bandwidth 100MHz

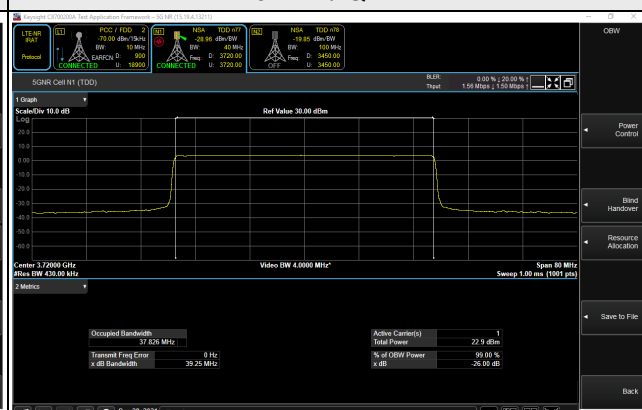
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
650000	3750	99.51	100.60	100.60	100.60	100.50
656000	3840	99.48	100.60	100.60	100.60	100.60
662000	3930	99.49	100.60	100.60	100.60	100.60

### Spectrum Plot of Worst Value

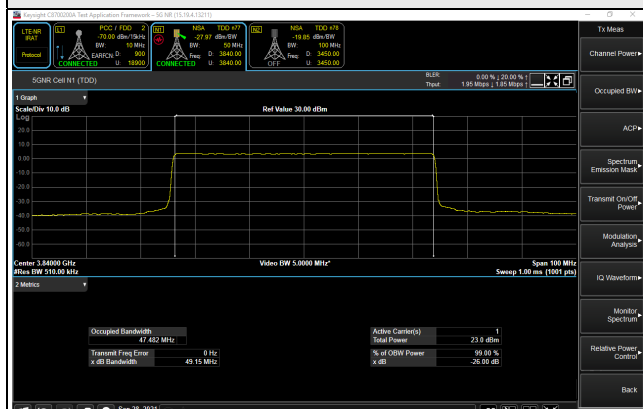
20MHz / QPSK



40MHz / QPSK



50MHz / QPSK

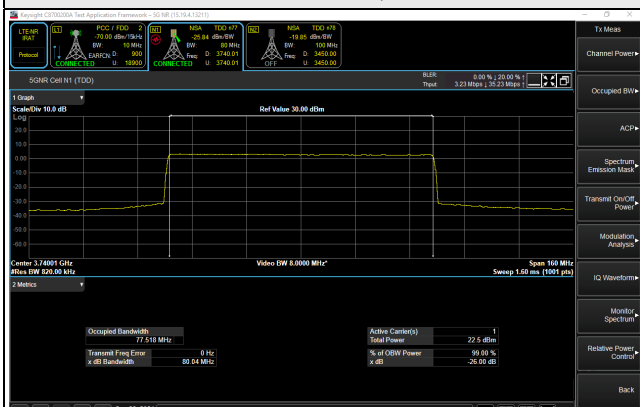


60MHz / QPSK

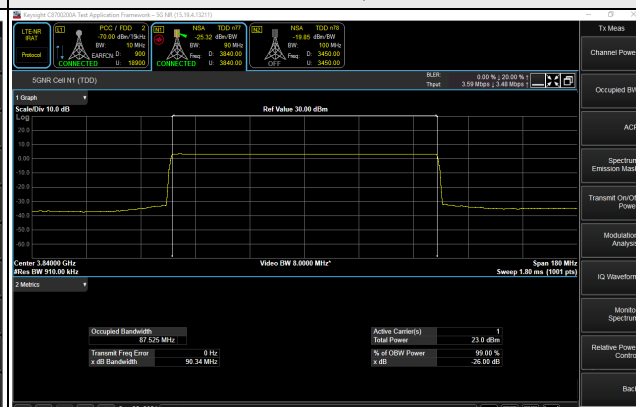


## Spectrum Plot of Worst Value

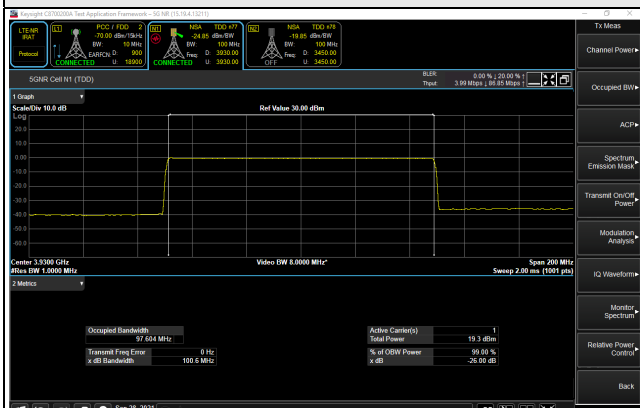
### 80MHz / 64QAM



### 90MHz / QPSK



### 100MHz / 256QAM



5GNR n77 (Part 27Q):

5GNR n77 (Part 27Q), Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
630668	3460.02	18.54	19.06	18.96	19.03	18.96
633334	3500.01	18.53	19.10	19.09	18.99	18.97
636000	3540	18.64	19.06	19.11	19.10	19.01
5GNR n77 (Part 27Q), Channel Bandwidth 40MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
631334	3470.01	37.00	39.25	39.21	39.21	39.18
633334	3500.01	37.01	39.22	39.21	39.23	39.23
635332	3529.98	37.02	39.21	39.20	39.19	39.21
5GNR n77 (Part 27Q) Channel Bandwidth 50MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
631668	3475.02	47.26	49.15	49.14	49.13	49.11
633334	3500.01	47.27	49.14	49.12	49.14	49.11
635000	3525	47.25	49.13	49.12	49.12	49.13
5GNR n77 (Part 27Q) Channel Bandwidth 60MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
632000	3480	59.74	59.83	59.87	59.80	59.74
633334	3500.01	59.76	59.77	59.78	59.78	59.76
634666	3519.99	59.74	59.81	59.85	59.79	59.75
5GNR n77 (Part 27Q), Channel Bandwidth 80MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
632668	3490.02	79.66	80.01	80.03	80.01	80.00
633334	3500.01	79.63	80.01	80.00	80.05	80.02
634000	3510	79.64	80.02	80.01	80.02	80.03

5GNR n77 (Part 27Q), Channel Bandwidth 90MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
633000	3495	89.56	90.36	90.33	90.32	90.32
633334	3500.01	89.55	90.32	90.32	90.32	90.29
633666	3504.99	89.56	90.38	90.40	90.32	90.33

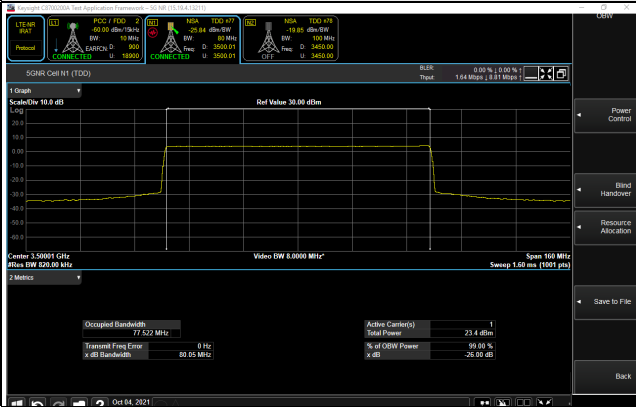
5GNR n77 (Part 27Q), Channel Bandwidth 100MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
633334	3500.01	99.44	100.60	100.60	100.60	100.60

**Spectrum Plot of Worst Value**

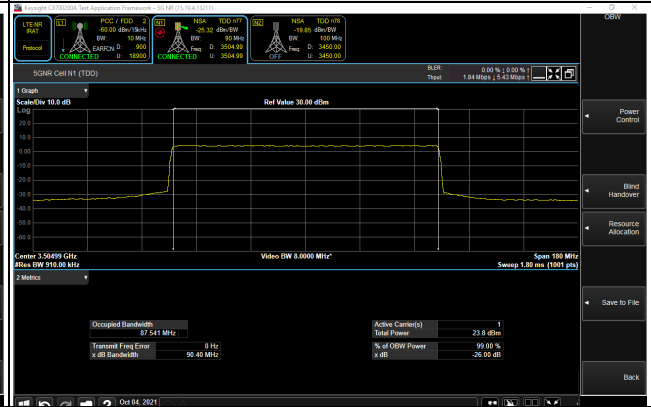


## Spectrum Plot of Worst Value

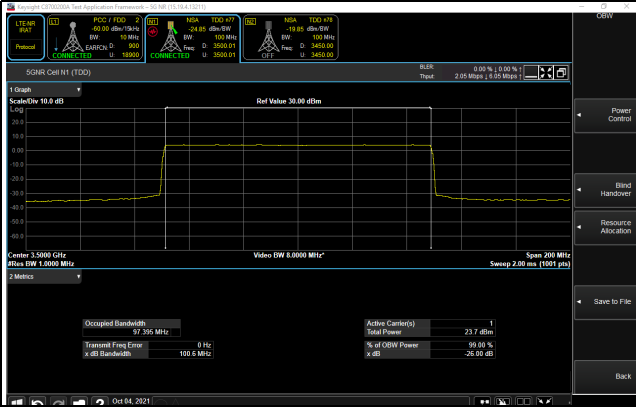
### 80MHz / 64QAM



### 90MHz / 16QAM



### 100MHz / 16QAM

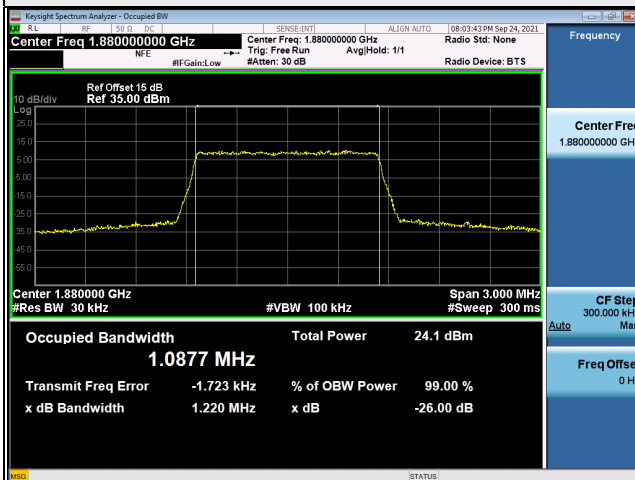


LTE Band 2

LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	1.21	1.22	1.22	1.21
18900	1880.0	1.21	1.22	1.22	1.21
19193	1909.3	1.21	1.21	1.21	1.21
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	2.93	2.90	2.89	2.93
18900	1880.0	2.94	2.91	2.90	2.92
19185	1908.5	2.91	2.91	2.92	2.93
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	4.82	4.81	4.79	4.80
18900	1880.0	4.81	4.83	4.80	4.80
19175	1907.5	4.81	4.83	4.79	4.79
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	9.54	9.52	9.51	9.50
18900	1880.0	9.53	9.53	9.50	9.51
19150	1905.0	9.51	9.50	9.50	9.50
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	14.25	14.23	14.26	14.23
18900	1880.0	14.25	14.24	14.25	14.24
19125	1902.5	14.25	14.25	14.25	14.25
LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	19.03	19.03	19.01	19.02
18900	1880.0	19.03	19.03	19.03	19.02
19100	1900.0	19.08	19.06	19.07	19.06

### Spectrum Plot of Worst Value

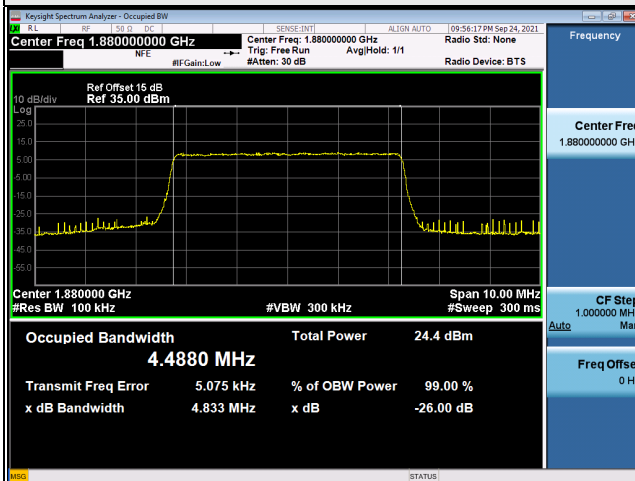
#### 1.4MHz / 64QAM



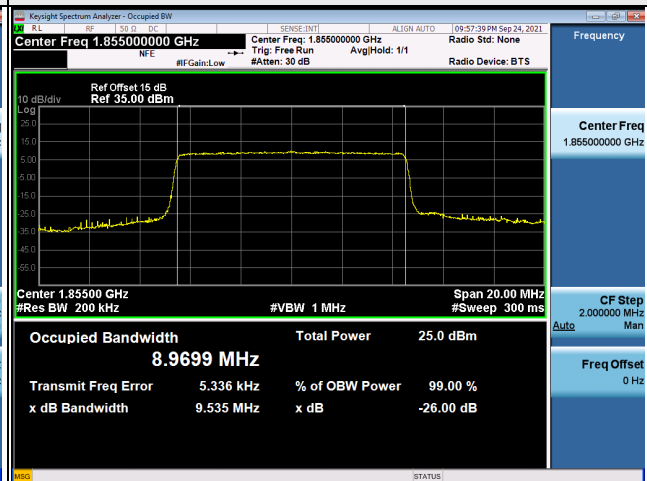
#### 3MHz / QPSK



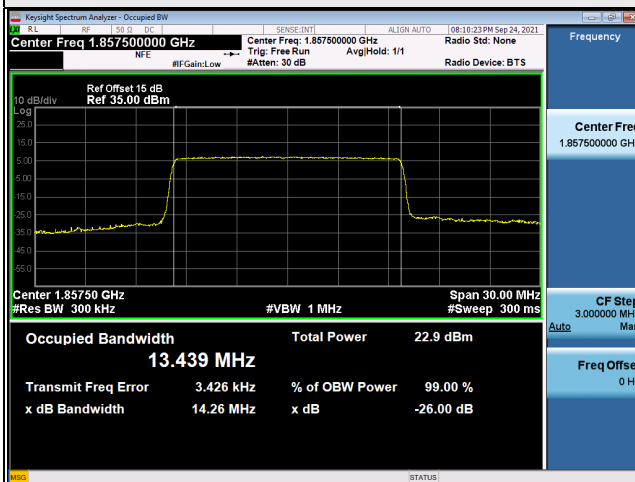
#### 5MHz / 16QAM



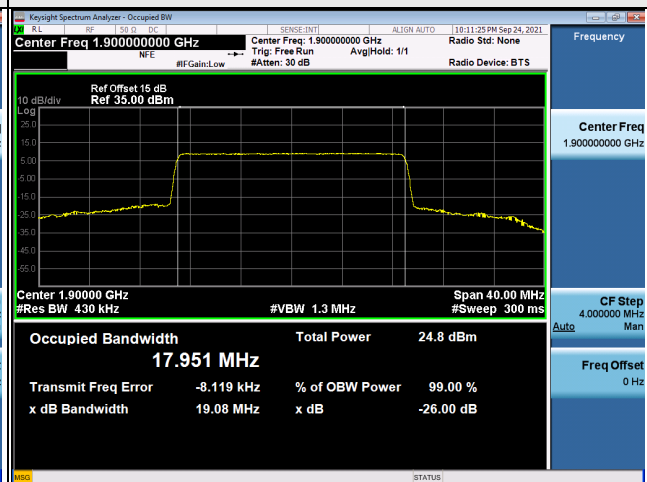
#### 10MHz / QPSK



#### 15MHz / 64QAM



#### 20MHz / QPSK



LTE Band 5

LTE Band 5, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20407	824.7	1.22	1.21	1.22	1.21
20525	836.5	1.21	1.22	1.21	1.20
20643	848.3	1.22	1.21	1.22	1.21
LTE Band 5, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20415	825.5	2.94	2.90	2.90	2.91
20525	836.5	2.93	2.91	2.90	2.91
20635	847.5	2.94	2.90	2.90	2.92
LTE Band 5, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20425	826.5	4.81	4.81	4.80	4.80
20525	836.5	4.82	4.82	4.80	4.80
20625	846.5	4.81	4.81	4.79	4.81
LTE Band 5, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20450	829.0	9.53	9.51	9.51	9.50
20525	836.5	9.52	9.50	9.51	9.51
20600	844.0	9.52	9.50	9.50	9.50

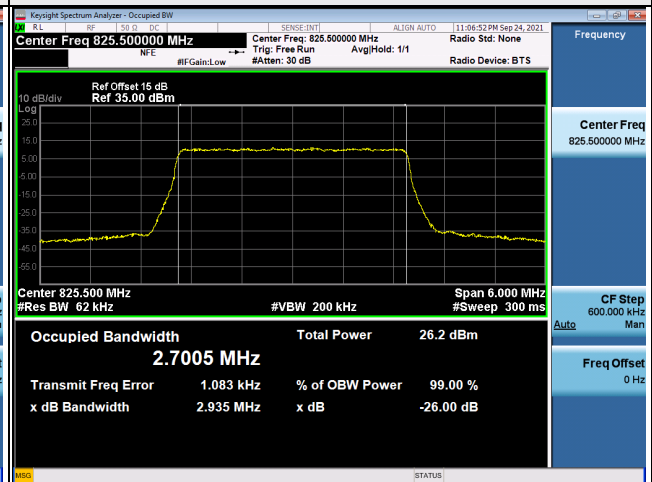


### Spectrum Plot of Worst Value

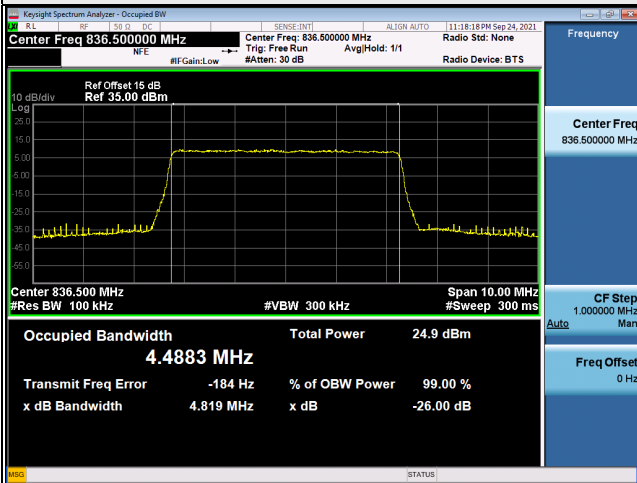
#### 1.4MHz / 64QAM



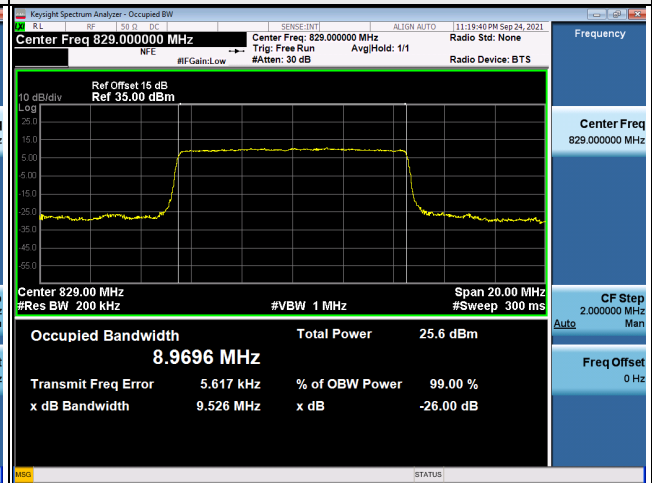
#### 3MHz / QPSK



#### 5MHz / 16QAM



#### 10MHz / QPSK

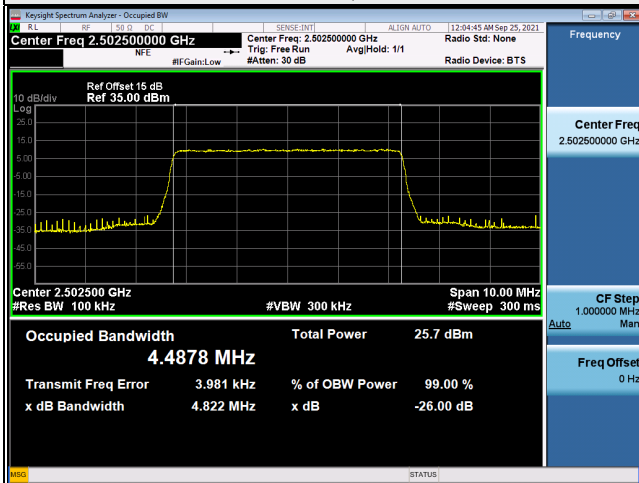


LTE Band 7

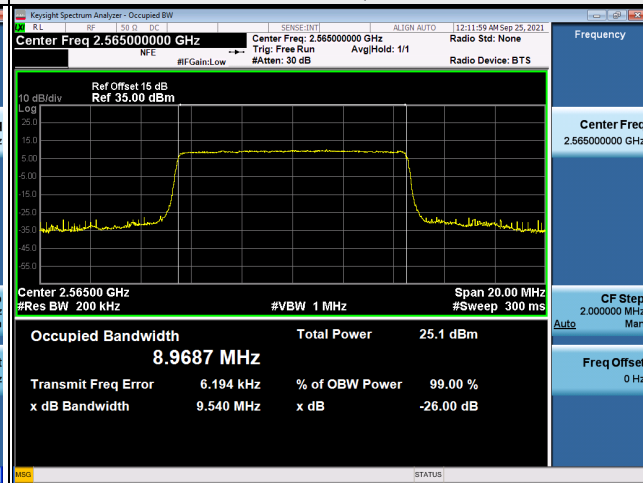
LTE Band 7, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20775	2502.5	4.82	4.81	4.79	4.81
21100	2535.0	4.82	4.82	4.79	4.81
21425	2567.5	4.81	4.80	4.79	4.80
LTE Band 7, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20800	2505.0	9.52	9.51	9.49	9.50
21100	2535.0	9.53	9.52	9.51	9.50
21400	2565.0	9.54	9.52	9.50	9.51
LTE Band 7, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20825	2507.5	14.24	14.23	14.25	14.22
21100	2535.0	14.24	14.24	14.25	14.27
21375	2562.5	14.25	14.23	14.26	14.24
LTE Band 7, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20850	2510.0	19.02	19.04	19.01	19.00
21100	2535.0	19.04	19.04	19.05	19.05
21350	2560.0	19.02	19.03	19.02	19.02

### Spectrum Plot of Worst Value

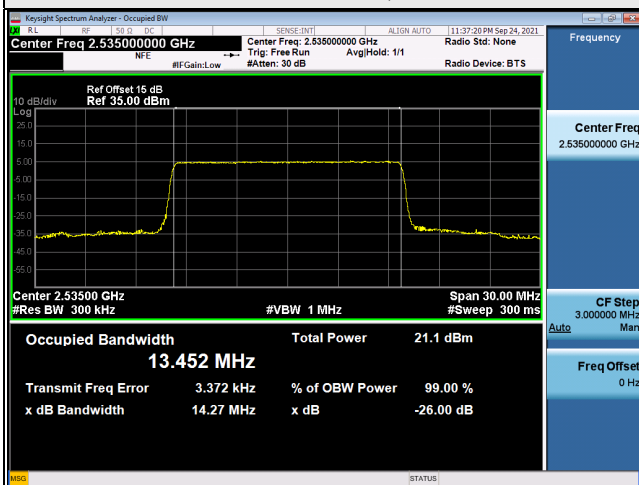
#### 5MHz / QPSK



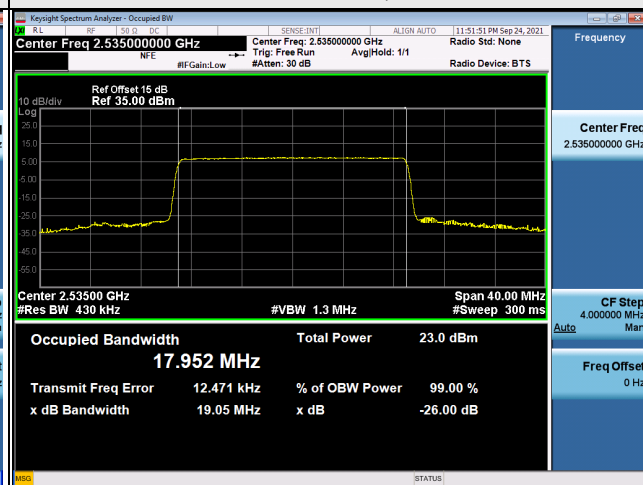
#### 10MHz / QPSK



#### 15MHz / 256QAM



#### 20MHz / 64QAM

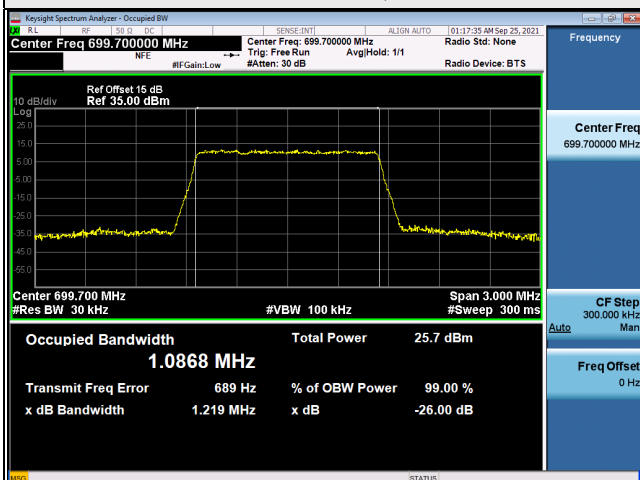


LTE Band 12

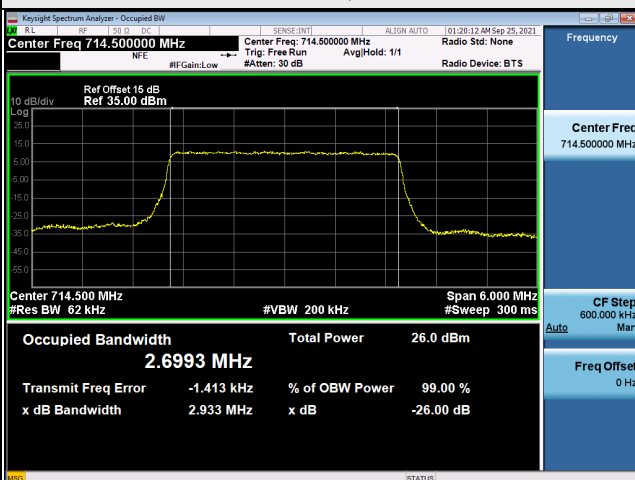
LTE Band 12, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23017	699.7	1.22	1.22	1.22	1.21
23095	707.5	1.22	1.22	1.21	1.22
23173	715.3	1.22	1.21	1.22	1.21
LTE Band 12, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23025	700.5	2.93	2.90	2.91	2.91
23095	707.5	2.93	2.90	2.90	2.91
23165	714.5	2.93	2.92	2.90	2.90
LTE Band 12, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23035	701.5	4.82	4.80	4.80	4.80
23095	707.5	4.82	4.80	4.80	4.80
23155	713.5	4.81	4.81	4.78	4.80
LTE Band 12, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23060	704.0	9.53	9.52	9.51	9.51
23095	707.5	9.52	9.51	9.51	9.51
23130	711.0	9.51	9.51	9.49	9.48

### Spectrum Plot of Worst Value

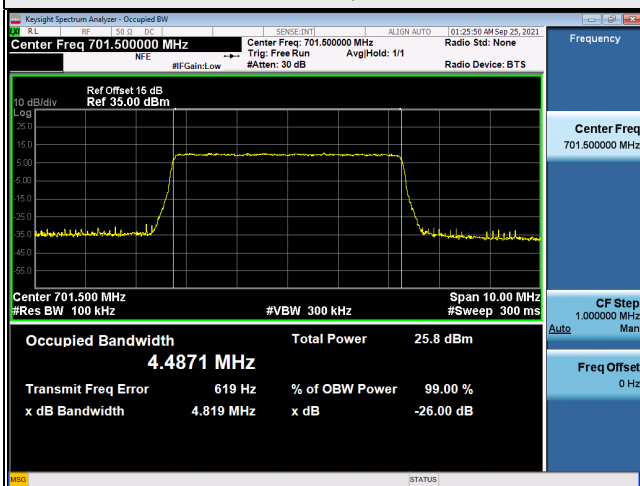
#### 1.4MHz / 16QAM



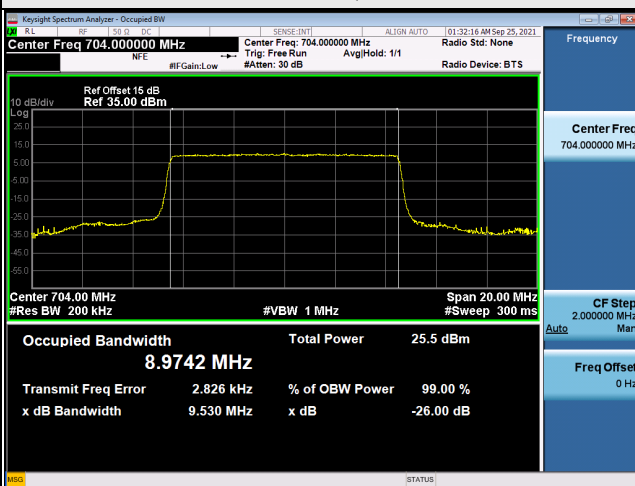
#### 3MHz / QPSK



#### 5MHz / QPSK



#### 10MHz / QPSK

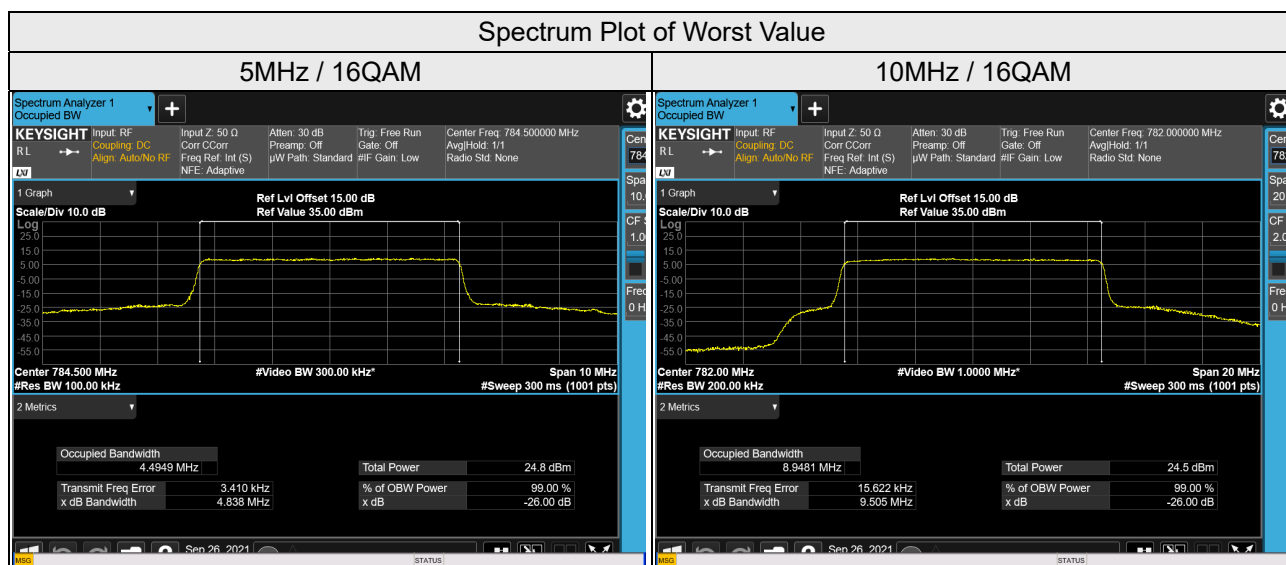


### LTE Band 13

LTE Band 13, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23205	779.5	4.80	4.77	4.80	4.78
23230	782.0	4.82	4.82	4.79	4.83
23255	784.5	4.79	4.84	4.79	4.82

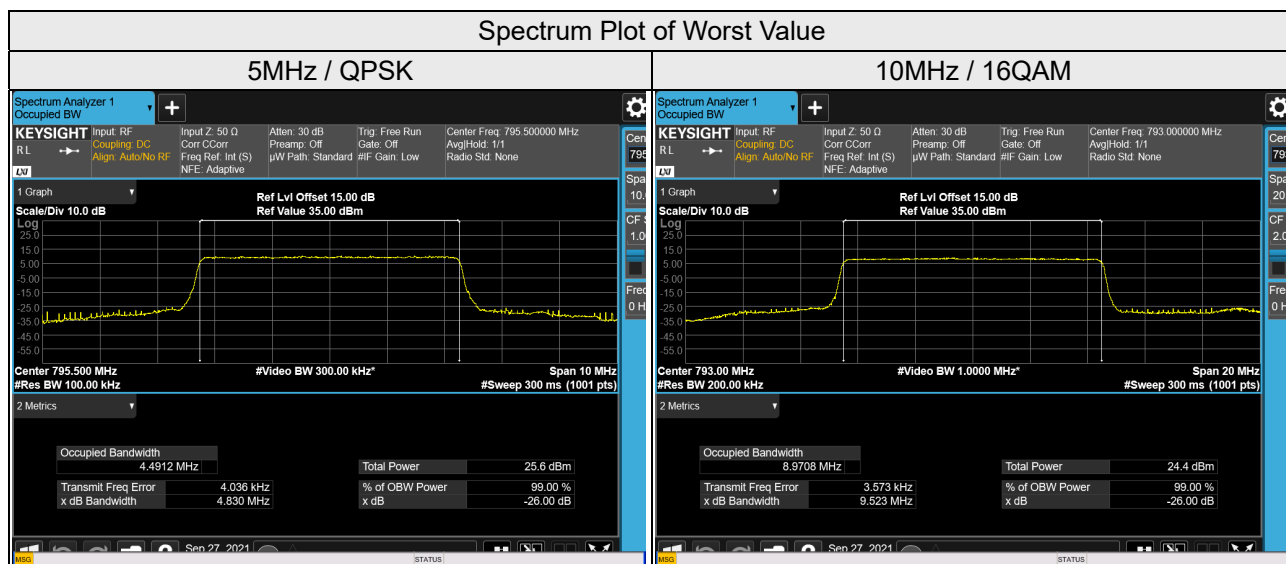
  

LTE Band 13, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23230	782.0	9.51	9.51	9.50	9.50



LTE Band 14

LTE Band 14, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23305	790.5	4.82	4.82	4.80	4.81
23330	793	4.80	4.83	4.80	4.81
23355	795.5	4.83	4.81	4.81	4.81
LTE Band 14, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23330	793	9.52	9.52	9.52	9.51

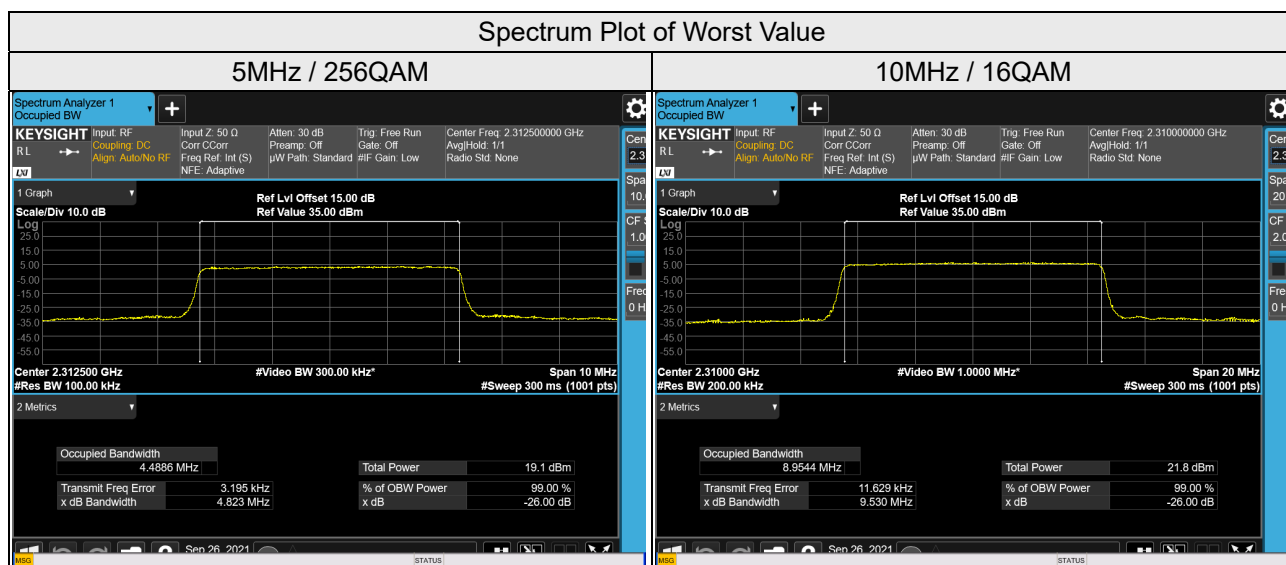


### LTE Band 30

LTE Band 30, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
27685	2307.5	4.82	4.81	4.80	4.81
27710	2310	4.82	4.81	4.80	4.81
27735	2312.5	4.82	4.81	4.82	4.82

LTE Band 30, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
27710	2310	9.51	9.53	9.51	9.51



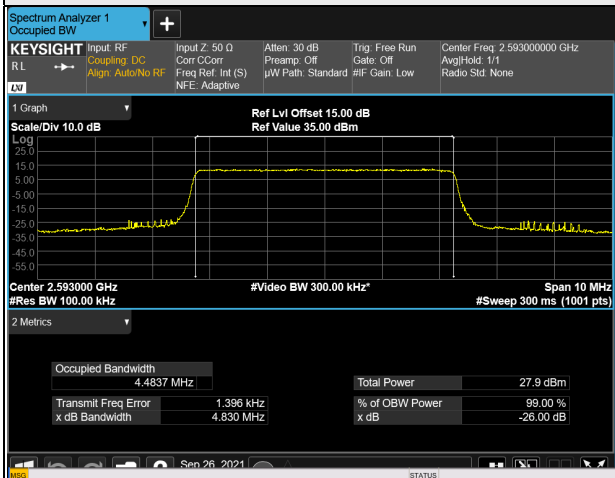


LTE Band 41

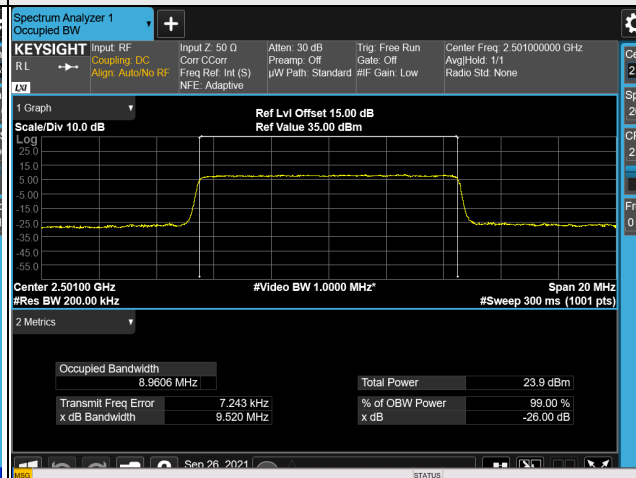
LTE Band 41, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39675	2498.5	4.81	4.79	4.79	4.82
40620	2593	4.83	4.80	4.79	4.78
41565	2687.5	4.80	4.79	4.81	4.79
LTE Band 41, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39700	2501	9.50	9.50	9.49	9.52
40620	2593	9.49	9.50	9.50	9.52
41540	2685	9.50	9.51	9.50	9.51
LTE Band 41, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39725	2503.5	14.24	14.21	14.24	14.26
40620	2593	14.25	14.22	14.24	14.21
41515	2682.5	14.23	14.21	14.24	14.23
LTE Band 41, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39750	2506	19.02	19.01	19.02	19.01
40620	2593	19.02	19.01	19.02	19.01
41490	2680	19.02	19.00	19.02	19.01

### Spectrum Plot of Worst Value

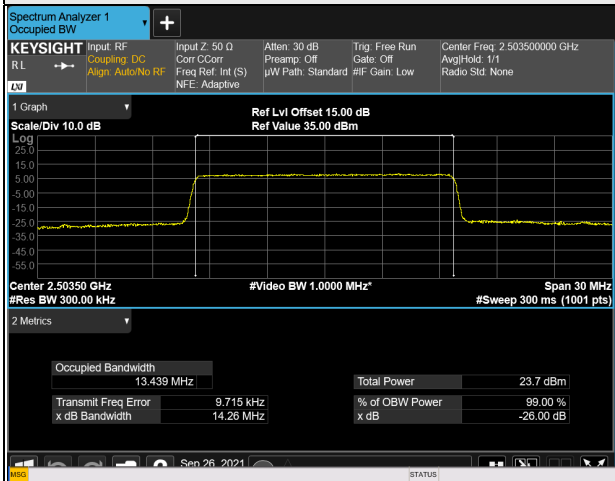
#### 5MHz / QPSK



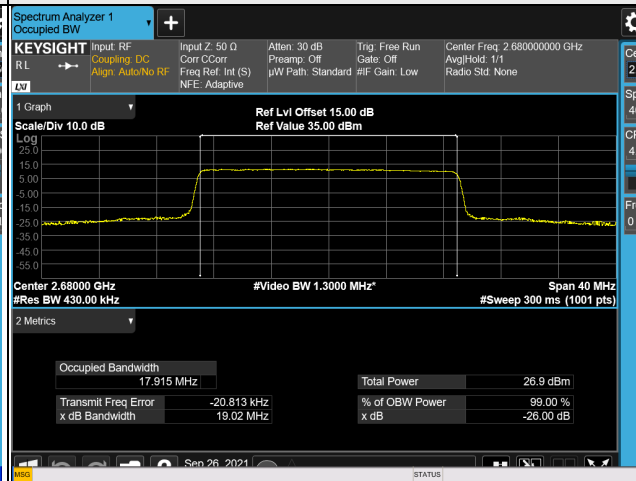
#### 10MHz / 256QAM



#### 15MHz / 256QAM



#### 20MHz / QPSK



LTE Band 66

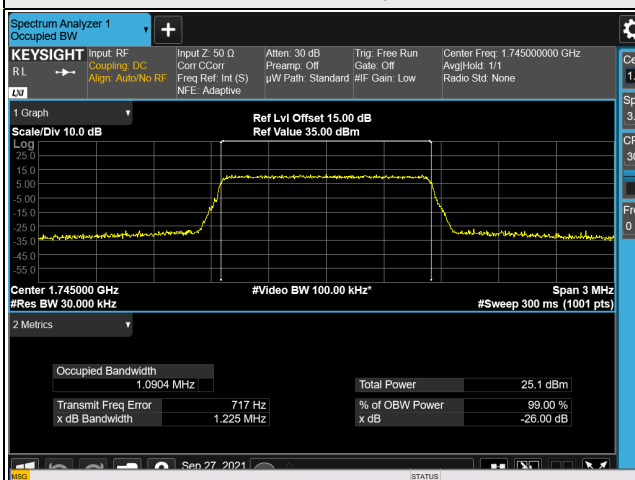
LTE Band 66, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131979	1710.7	1.22	1.21	1.21	1.21
132322	1745.0	1.22	1.23	1.22	1.21
132665	1779.3	1.22	1.22	1.22	1.21
LTE Band 66, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131987	1711.5	2.94	2.90	2.91	2.91
132322	1745.0	2.94	2.90	2.92	2.92
132657	1778.5	2.94	2.90	2.92	2.92
LTE Band 66, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131997	1712.5	4.82	4.83	4.79	4.81
132322	1745.0	4.81	4.82	4.79	4.82
132647	1777.5	4.80	4.80	4.80	4.80
LTE Band 66, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132022	1715.0	9.53	9.51	9.50	9.51
132322	1745.0	9.52	9.51	9.52	9.51
132622	1775.0	9.54	9.52	9.51	9.51
LTE Band 66, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132047	1717.5	14.23	14.24	14.24	14.24
132322	1745.0	14.25	14.24	14.25	14.26
132597	1772.5	14.27	14.27	14.27	14.27

LTE Band 66, Channel Bandwidth 20MHz

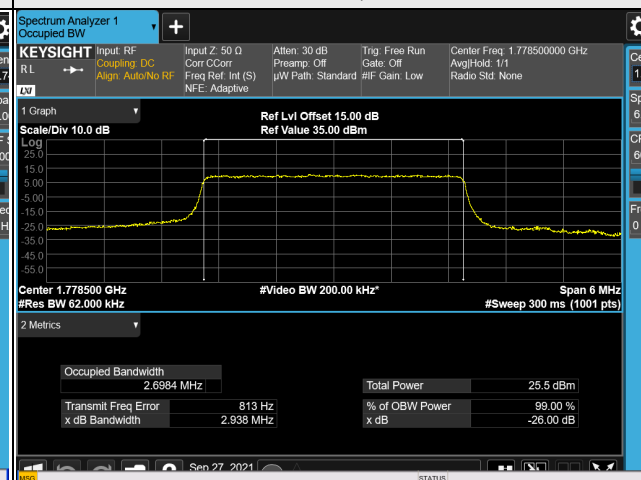
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132072	1720.0	19.03	19.03	19.02	19.00
132322	1745.0	19.05	19.04	19.03	19.05
132572	1770.0	21.12	19.29	19.17	19.09

### Spectrum Plot of Worst Value

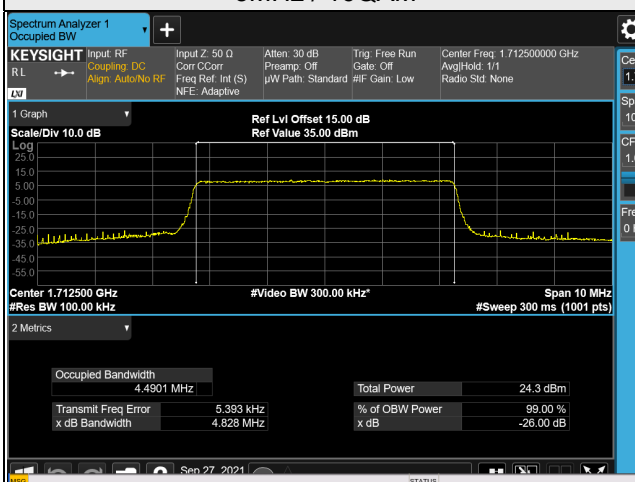
#### 1.4MHz / 16QAM



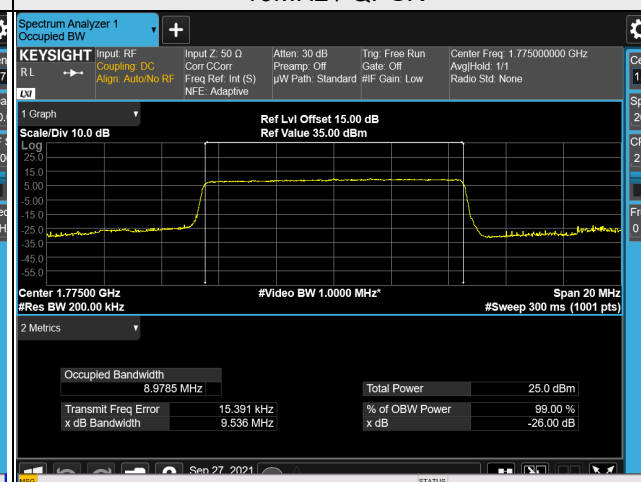
#### 3MHz / QPSK



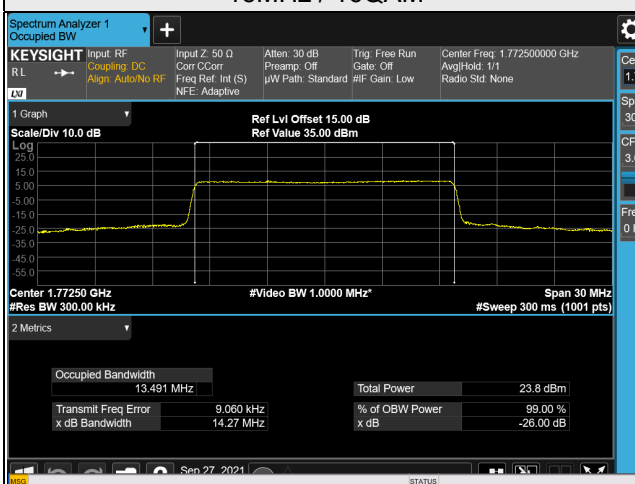
#### 5MHz / 16QAM



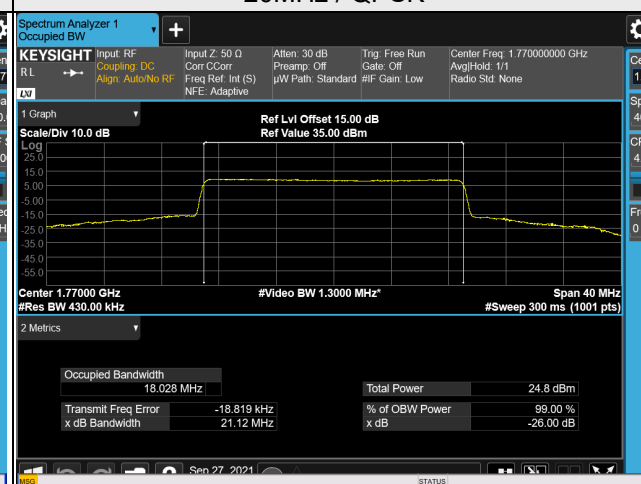
#### 10MHz / QPSK



#### 15MHz / 16QAM



#### 20MHz / QPSK



## 4.5 Channel Edge / Out-of-Band Emission Measurement

### 4.5.1 Limits of Channel Edge / Out-of-Band Emission Measurement

For 5G NR n77 (Part 27O):

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.

For 5G NR n77 (Part 27Q):

According to FCC 27.53(n), for operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed  $-13$  dBm/MHz. Compliance with this paragraph (n)(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, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, but limited to a maximum of 200 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.

For LTE Band 2, 5:

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. 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.

For LTE Band 7, 41:

According to FCC 27.53(m)(4) regulations, any transmit power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that  $43 + 10 \log(P)$  dB on all frequencies between 2490.5MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

For LTE Band 12:

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. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For LTE Band 13:

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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

According to 27.53(c)(4), on all frequencies between 763-775MHz and 793-805MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations

For LTE Band 14:

According to FCC part 90.543 (e), For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the 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, in accordance with the following:

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.
- (2) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least  $43 + 10 \log (P)$  dB.

For LTE Band 30:

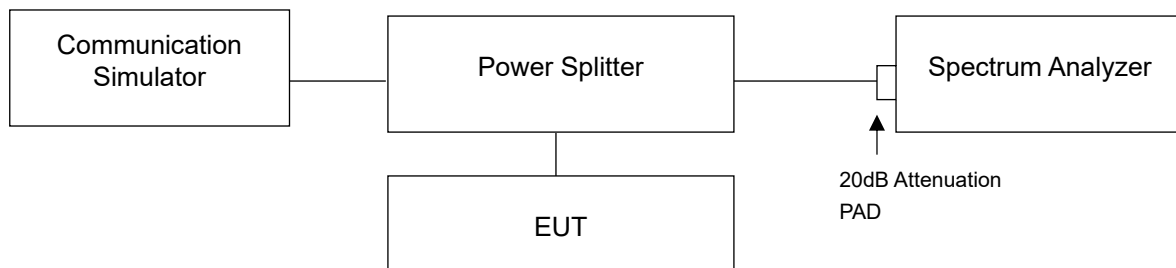
According to FCC 27.53(a) (4), for mobile and portable stations operating in the 2305-2315MHz and 2350-2360 MHz bands:

- (i) By a factor of not less than:  $43 + 10 \log (P)$  dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than  $55 + 10 \log (P)$  dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345MHz, not less than  $61 + 10 \log (P)$  dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than  $67 + 10 \log (P)$  dB on all frequencies between 2328 and 2337 MHz;
- (ii) By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2300 and 2305MHz,  $55 + 10 \log (P)$  dB on all frequencies between 2296 and 2300 MHz,  $61 + 10 \log (P)$  dB on all frequencies between 2292 and 2296 MHz,  $67 + 10 \log (P)$  dB on all frequencies between 2288 and 2292 MHz, and  $70 + 10 \log (P)$  dB below 2288 MHz;
- (iii) By a factor of not less than  $43 + 10 \log (P)$  dB on all frequencies between 2360 and 2365MHz, and not less than  $70 + 10 \log (P)$  dB above 2365MHz.
- (iv) 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 channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed

For LTE Band 66:

According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log (P)$  dB. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 4.5.2 Test Setup



#### 4.5.3 Test Procedures

For LTE Band 2, 5:

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
- c. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz).
- d. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (LTE Channel Bandwidth 5MHz).
- e. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
- f. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
- g. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
- h. Record the max trace plot into the test report.

For 5GNR n77, LTE Band 7, 12, 13, 14, 30, 41, 66:

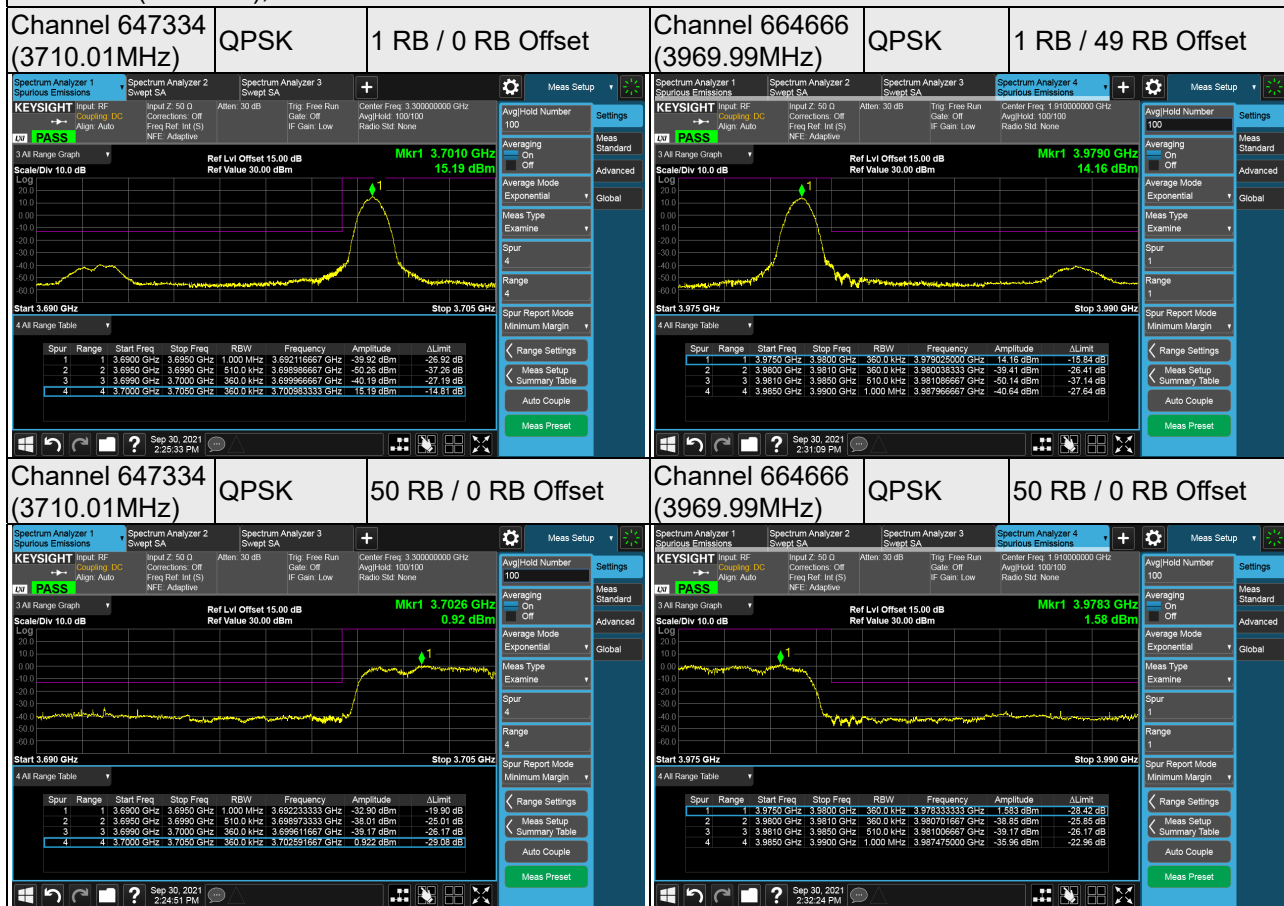
- a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels: low and high operational frequency range.
- b. Measurement refer to ANSI C63.26 section 5.7.2 and FCC Part 27 section 27.53.
- c. Record the max trace plot into the test report.



### 4.5.4 Test Results

#### Out-of-Band Emission 5G NR n77(Part 270):

5G NR n77(Part 270), Channel Bandwidth 20MHz



5G NR n77(Part 270), Channel Bandwidth 40MHz

Channel 648000 (3720.00MHz)	QPSK	1 RB / 0 RB Offset	Channel 664000 (3960.00MHz)	QPSK	1 RB / 104 RB Offset
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Channel 648000 (3720.00MHz)	QPSK	100 RB / 0 RB Offset	Channel 664000 (3960.00MHz)	QPSK	100 RB / 0 RB Offset
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### 5G NR n77(Part 270), Channel Bandwidth 50MHz

Channel 648334 (3725.01MHz) QPSK 1 RB / 0 RB Offset Channel 663666 (3954.99MHz) QPSK 1 RB / 131 RB Offset



Channel 648334 (3725.01MHz) QPSK 128 RB / 0 RB Offset Channel 663666 (3954.99MHz) QPSK 128 RB / 0 RB Offset



### 5G NR n77(Part 270), Channel Bandwidth 60MHz

Channel 648668 (3730.02MHz)	QPSK	1 RB / 0 RB Offset	Channel 663332 (3949.98MHz)	QPSK	1 RB / 160 RB Offset
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Channel 648668 (3730.02MHz)	QPSK	162 RB / 0 RB Offset	Channel 663332 (3949.98MHz)	QPSK	162 RB / 0 RB Offset
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