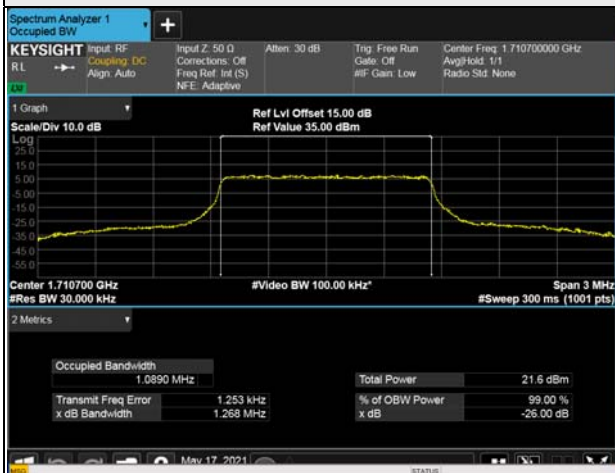


Spectrum Plot of Worst Value

1.4MHz / 16QAM



3MHz / QPSK



5MHz / 16QAM



10MHz / QPSK



15MHz / 256QAM



20MHz / 16QAM



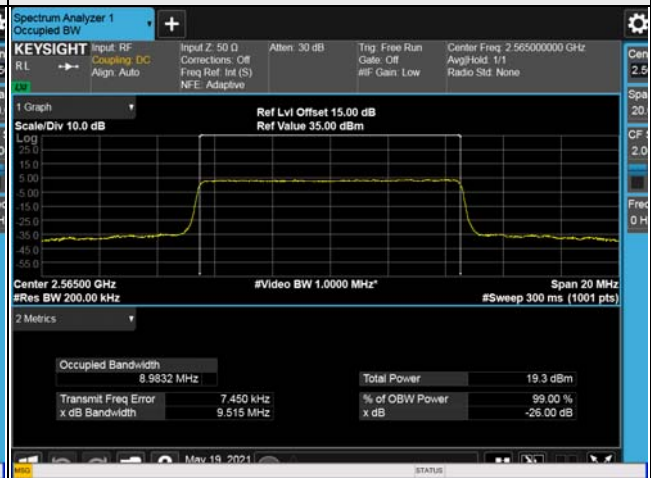
LTE Band 7, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20775	2502.5	4.79	4.79	4.79	4.79
21100	2535.0	4.79	4.79	4.79	4.79
21425	2567.5	4.80	4.79	4.79	4.81
LTE Band 7, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20800	2505.0	9.50	9.49	9.50	9.50
21100	2535.0	9.50	9.51	9.50	9.51
21400	2565.0	9.51	9.51	9.51	9.52
LTE Band 7, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20825	2507.5	14.22	14.23	14.24	14.22
21100	2535.0	14.23	14.23	14.24	14.23
21375	2562.5	14.24	14.25	14.26	14.23
LTE Band 7, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20850	2510.0	18.99	18.99	19.00	18.98
21100	2535.0	19.01	19.03	19.02	19.02
21350	2560.0	19.02	19.03	19.03	19.02

Spectrum Plot of Worst Value

5MHz / 256QAM



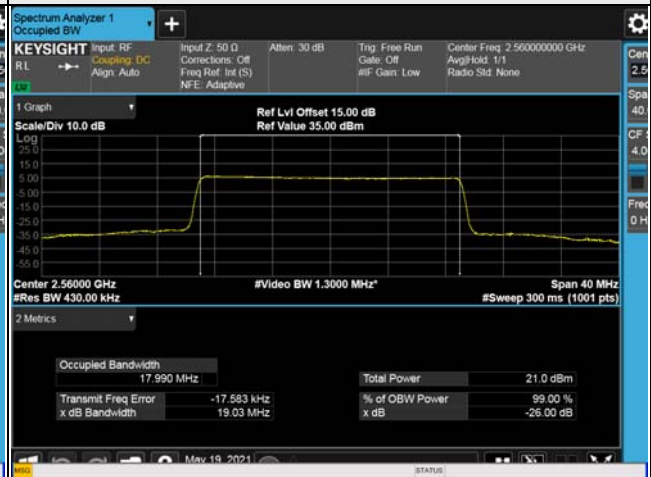
10MHz / 256QAM



15MHz / 64QAM



20MHz / 64QAM



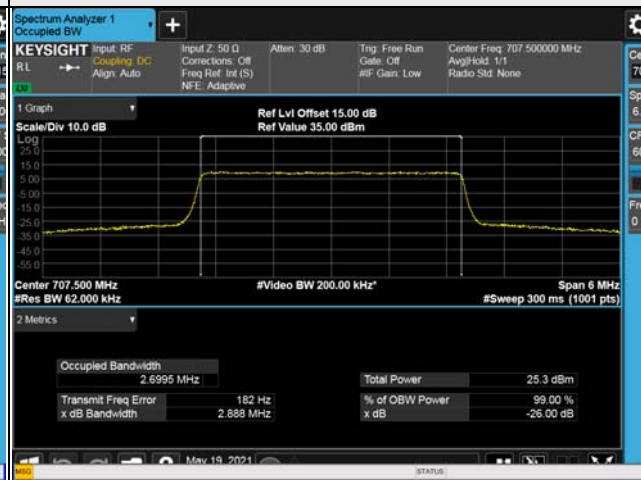
LTE Band 12, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23017	699.7	1.25	1.25	1.25	1.23
23095	707.5	1.23	1.26	1.24	1.25
23173	715.3	1.24	1.25	1.26	1.24
LTE Band 12, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23025	700.5	2.88	2.88	2.87	2.88
23095	707.5	2.89	2.88	2.88	2.88
23165	714.5	2.88	2.88	2.87	2.88
LTE Band 12, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23035	701.5	4.79	4.80	4.78	4.79
23095	707.5	4.79	4.80	4.78	4.79
23155	713.5	4.79	4.77	4.77	4.77
LTE Band 12, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23060	704.0	9.51	9.52	9.50	9.50
23095	707.5	9.53	9.51	9.52	9.51
23130	711.0	9.49	9.50	9.50	9.49

Spectrum Plot of Worst Value

1.4MHz / 64QAM



3MHz / QPSK



5MHz / 16QAM

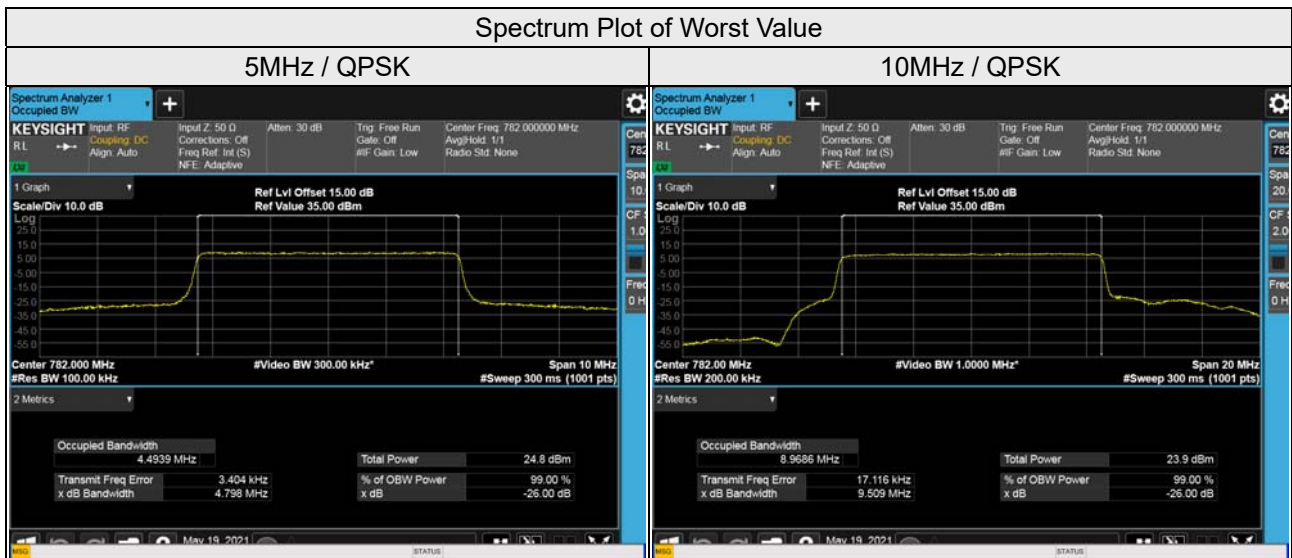


10MHz / QPSK



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

LTE Band 13, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
23230	782.0	9.51	9.49	9.50	9.49



LTE Band 38, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37775	2572.5	4.77	4.78	4.78	4.75
38000	2595.0	4.77	4.77	4.78	4.76
38225	2617.5	4.78	4.77	4.78	4.77
LTE Band 38, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37800	2575.0	9.50	9.49	9.49	9.49
38000	2595.0	9.47	9.49	9.48	9.50
38200	2615.0	9.49	9.50	9.49	9.49
LTE Band 38, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37825	2577.5	14.24	14.22	14.24	14.23
38000	2595.0	14.23	14.21	14.23	14.23
38175	2612.5	14.23	14.22	14.23	14.24
LTE Band 38, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37850	2580.0	19.01	19.01	19.00	19.00
38000	2595.0	19.00	19.01	19.01	19.00
38150	2610.0	19.00	19.00	19.00	18.99

Spectrum Plot of Worst Value

5MHz / 64QAM



10MHz / QPSK



15MHz / 256QAM



20MHz / 64QAM



LTE Band 41, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39675	2498.5	4.81	4.81	4.81	4.81
40620	2593.0	4.81	4.79	4.80	4.79
41565	2687.5	4.82	4.79	4.80	4.70
LTE Band 41, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39700	2501.0	9.50	9.52	9.52	9.53
40620	2593.0	9.49	9.50	9.49	9.50
41540	2685.0	9.49	9.51	9.49	9.51
LTE Band 41, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39725	2503.5	14.24	14.24	14.26	14.25
40620	2593.0	14.22	14.22	14.23	14.24
41515	2682.5	14.23	14.21	14.26	14.23
LTE Band 41, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39750	2506.0	18.99	19.03	19.08	19.02
40620	2593.0	19.02	19.02	19.01	19.00
41490	2680.0	19.01	19.01	19.01	19.01

Spectrum Plot of Worst Value



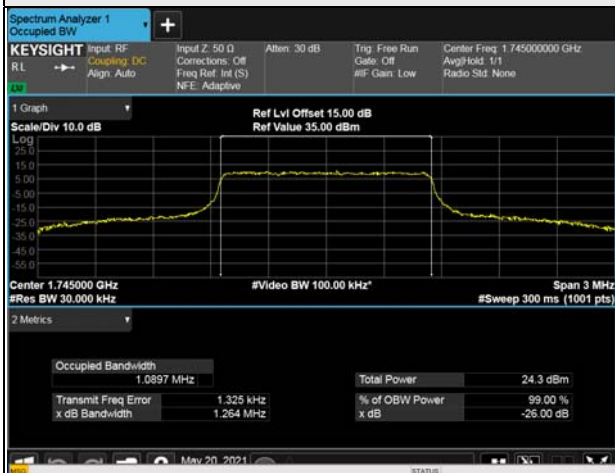
LTE Band 66, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131979	1710.7	1.25	1.26	1.26	1.23
132322	1745.0	1.26	1.26	1.26	1.24
132665	1779.3	1.24	1.26	1.26	1.25
LTE Band 66, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131987	1711.5	2.90	2.88	2.88	2.88
132322	1745.0	2.92	2.88	2.88	2.88
132657	1778.5	2.89	2.88	2.87	2.88
LTE Band 66, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
131997	1712.5	4.83	4.79	4.79	4.78
132322	1745.0	4.83	4.80	4.80	4.79
132647	1777.5	4.78	4.78	4.79	4.77
LTE Band 66, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132022	1715.0	9.52	9.52	9.49	9.51
132322	1745.0	9.56	9.53	9.52	9.51
132622	1775.0	9.49	9.51	9.50	9.49
LTE Band 66, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132047	1717.5	14.22	14.23	14.23	14.20
132322	1745.0	14.25	14.25	14.25	14.21
132597	1772.5	14.23	14.22	14.22	14.21

LTE Band 66, Channel Bandwidth 20MHz

Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132072	1720.0	18.99	19.00	19.01	18.96
132322	1745.0	19.01	19.01	19.00	19.01
132572	1770.0	19.00	19.01	19.01	19.01

Spectrum Plot of Worst Value

1.4MHz / 16QAM



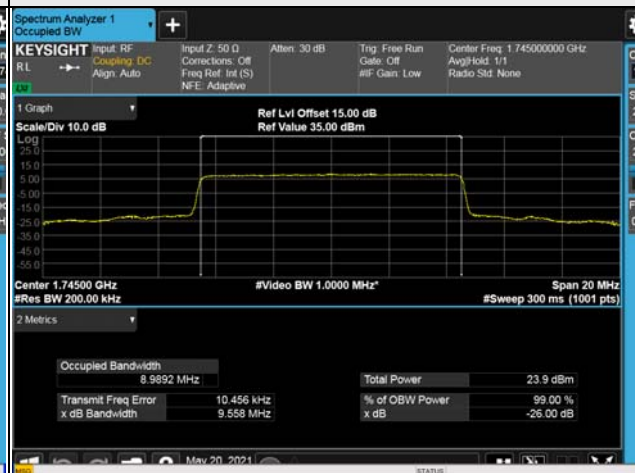
3MHz / QPSK



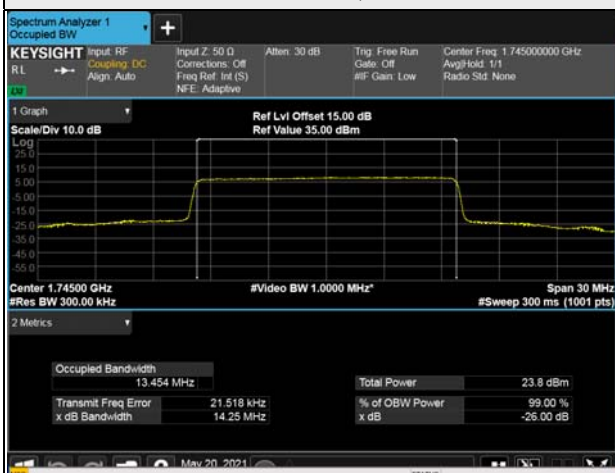
5MHz / QPSK



10MHz / QPSK



15MHz / QPSK

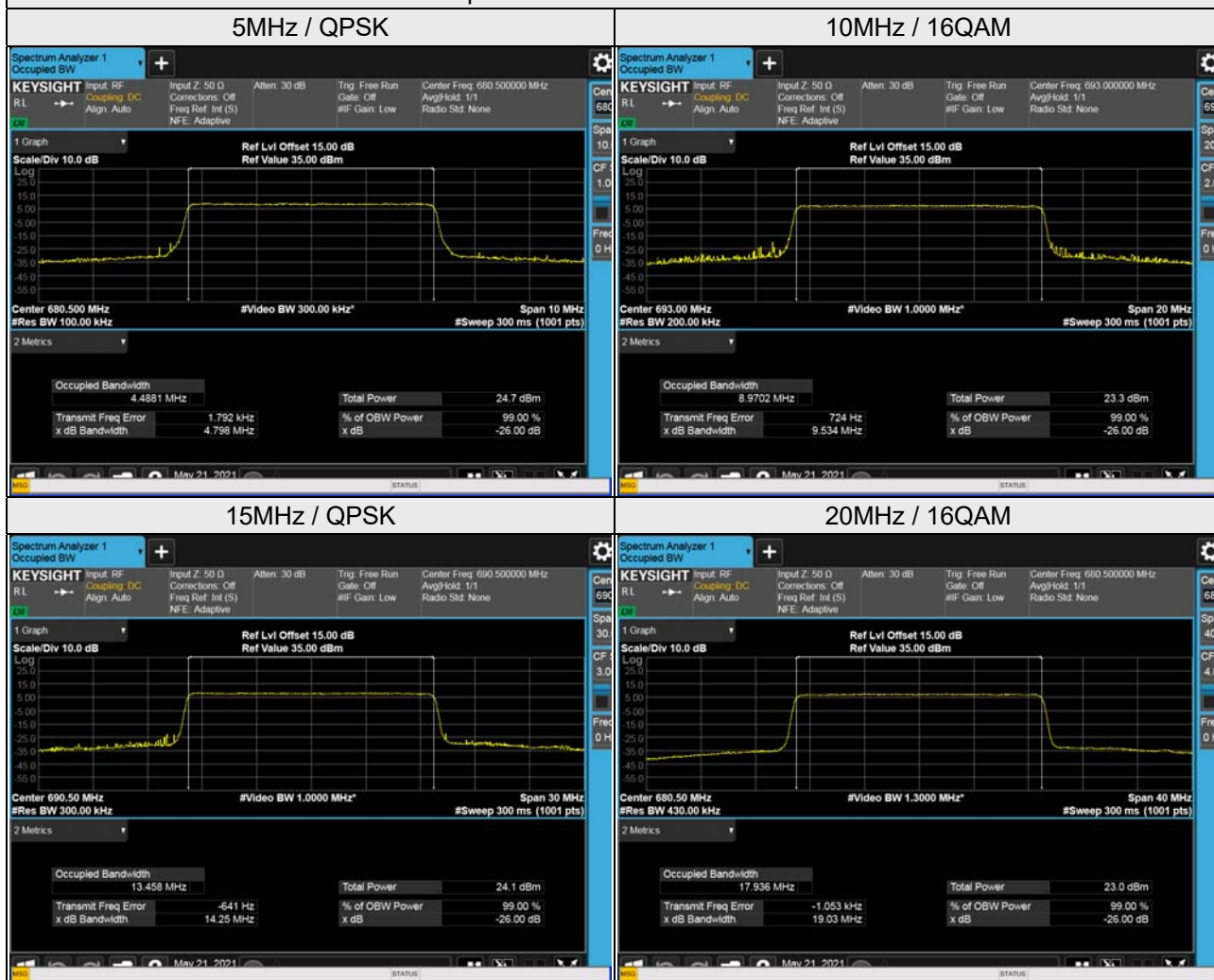


20MHz / QPSK



LTE Band 71, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
133147	665.5	4.78	4.77	4.77	4.77
133297	680.5	4.80	4.80	4.79	4.78
133447	695.5	4.79	4.79	4.78	4.78
LTE Band 71, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
133172	668.0	9.50	9.50	9.50	9.50
133297	680.5	9.52	9.50	9.51	9.50
133422	693.0	9.51	9.53	9.51	9.50
LTE Band 71, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
133197	670.5	14.23	14.21	14.24	14.24
133297	680.5	14.24	14.21	14.23	14.23
133397	690.5	14.25	14.23	14.25	14.24
LTE Band 71, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
133222	673.0	19.01	19.01	19.01	19.01
133297	680.5	19.02	19.03	19.02	19.02
133372	688.0	18.98	19.02	19.02	19.01

Spectrum Plot of Worst Value



4.5 Channel Edge / Out-of-Band Emissions Measurement

4.5.1 Limits of Band Edge / Out-of-Band Emissions Measurement

For WCDMA Band 4, LTE Band 4, 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.

For LTE Band 7, LTE Band 38, LTE Band 41:

According to FCC 27.53(m)(4) specified that 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, LTE Band 71:

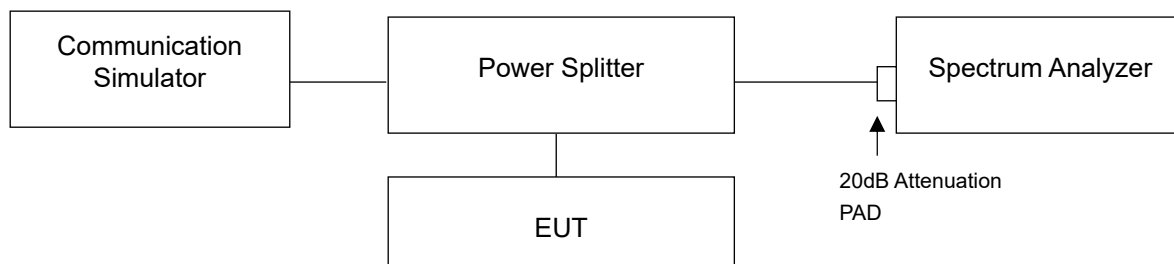
According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

For 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.

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

4.5.2 Test Setup



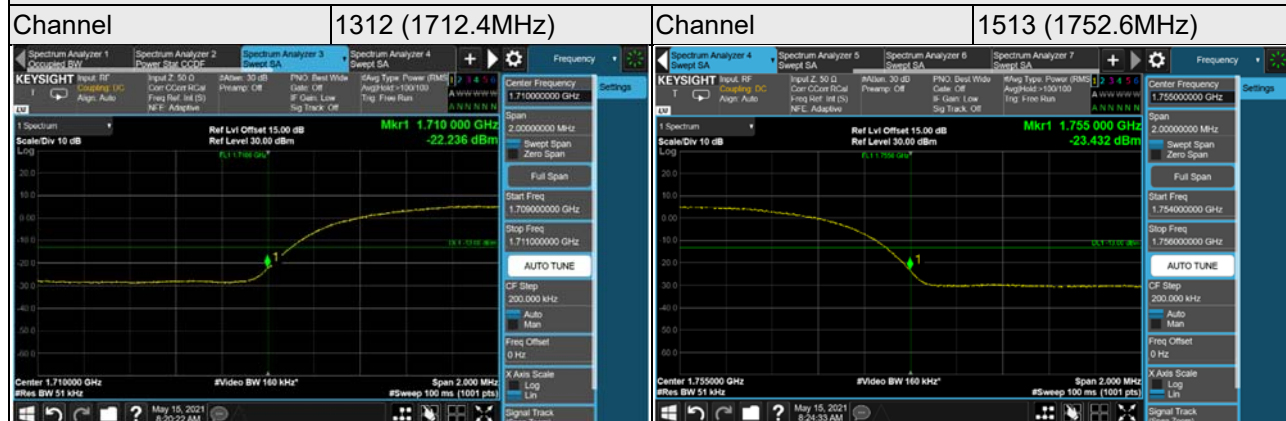
4.5.3 Test Procedures

- a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 2 channels: low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (WCDMA / HSDPA / HSUPA).
- c. 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).
- d. 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).
- e. 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).
- f. 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).
- g. 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).
- h. 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).
- i. Except LTE Band 12 measurement procedure refer 27.53(g).
- j. LTE Band 7, Band 38, Band 41 measurement, for 5 MHz and 10 MHz channel BW mode, extend the 1% range from 1M to 2M above and below the channel edge and then reduce the limit further by $10 \log(1000/100) = 10\text{dB}$ (i.e. total $-10 + -10 = -20\text{dB}$) to compensate for the integration from 100k to 1M.
- k. Record the max trace plot into the test report.

4.5.4 Test Results

Band Edge

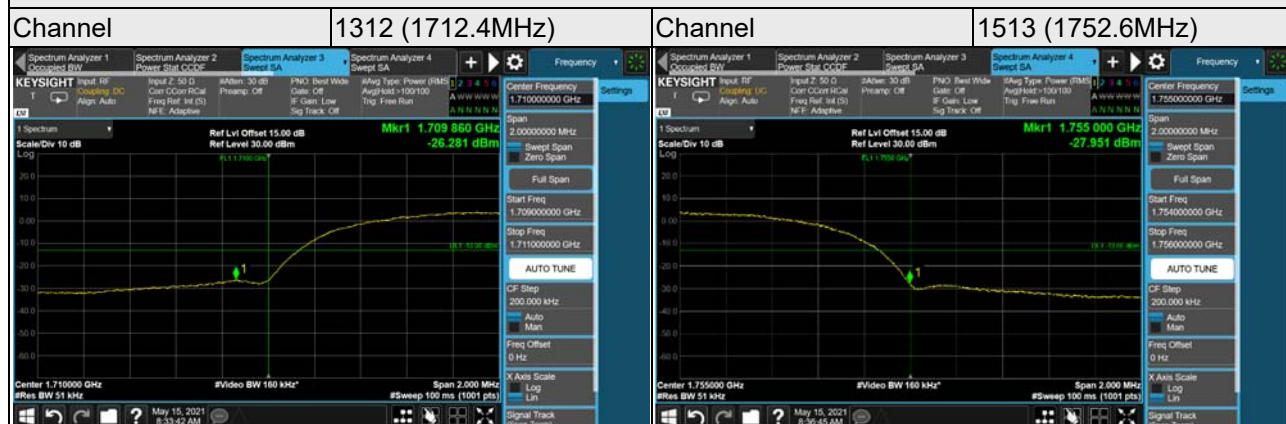
WCDMA Band 4



HSDPA

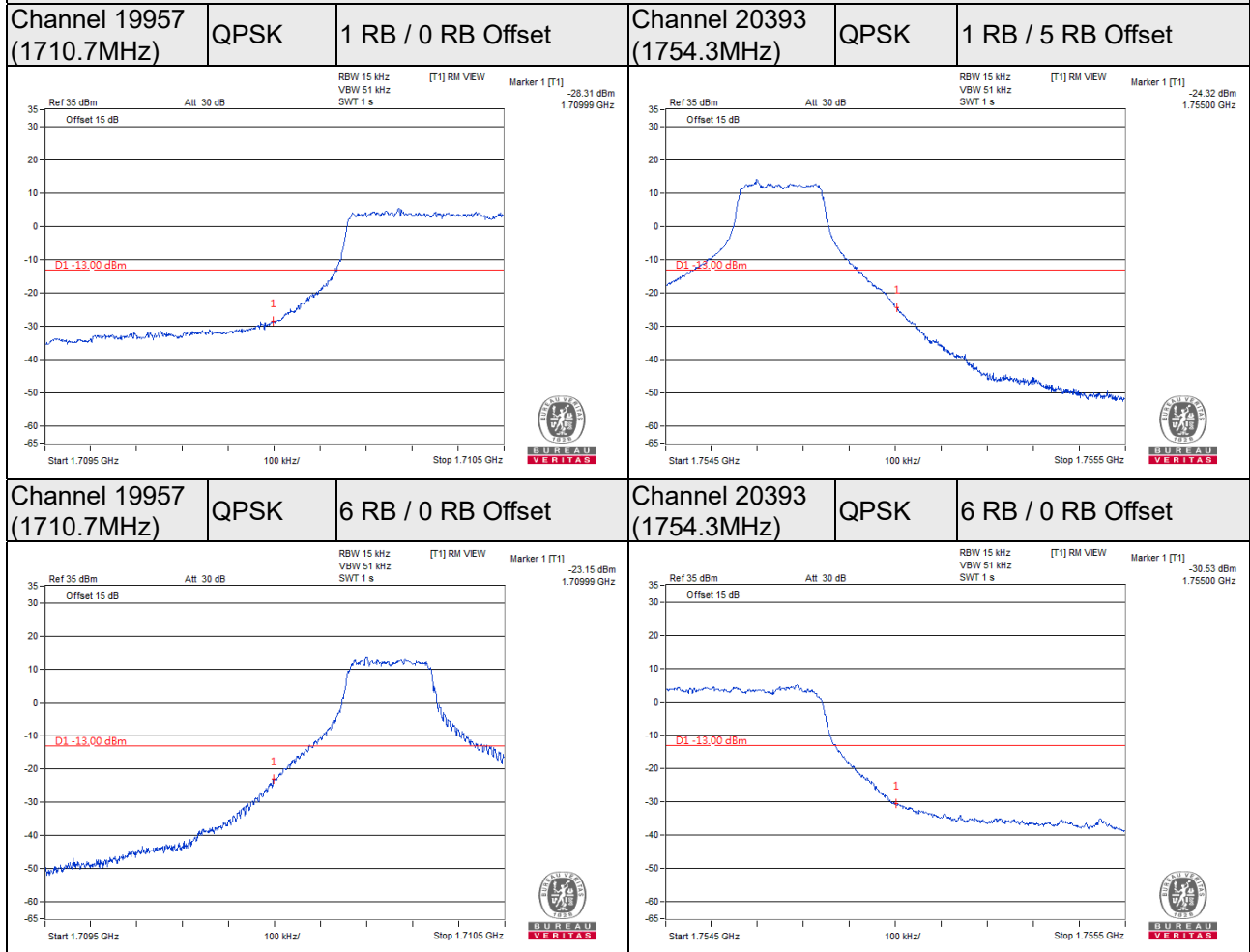


HSUPA



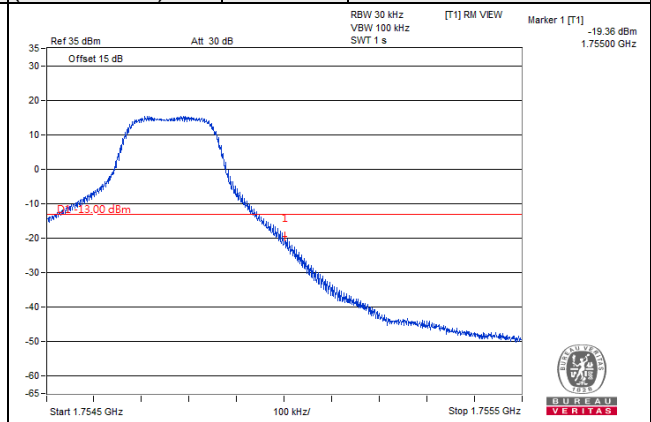
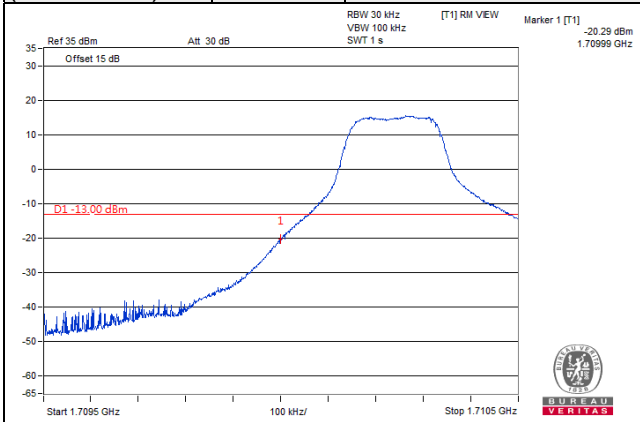
Band Edge

LTE Band 4, Channel Bandwidth 1.4MHz

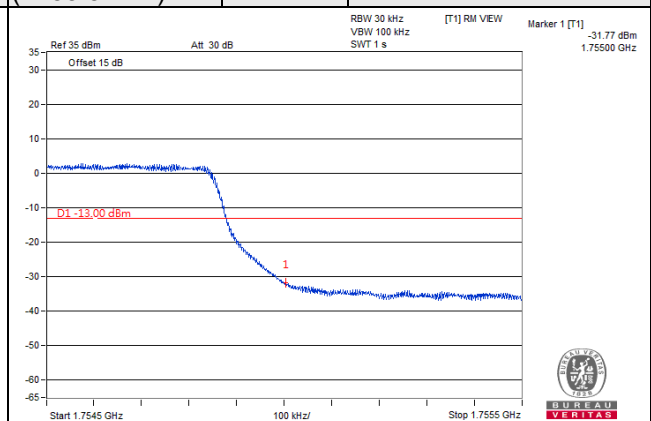
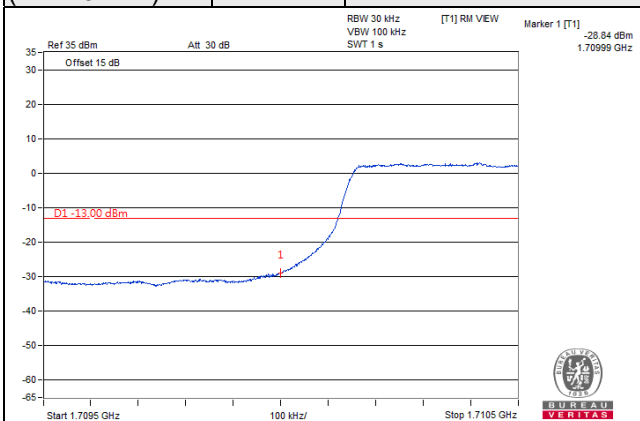


LTE Band 4, Channel Bandwidth 3MHz

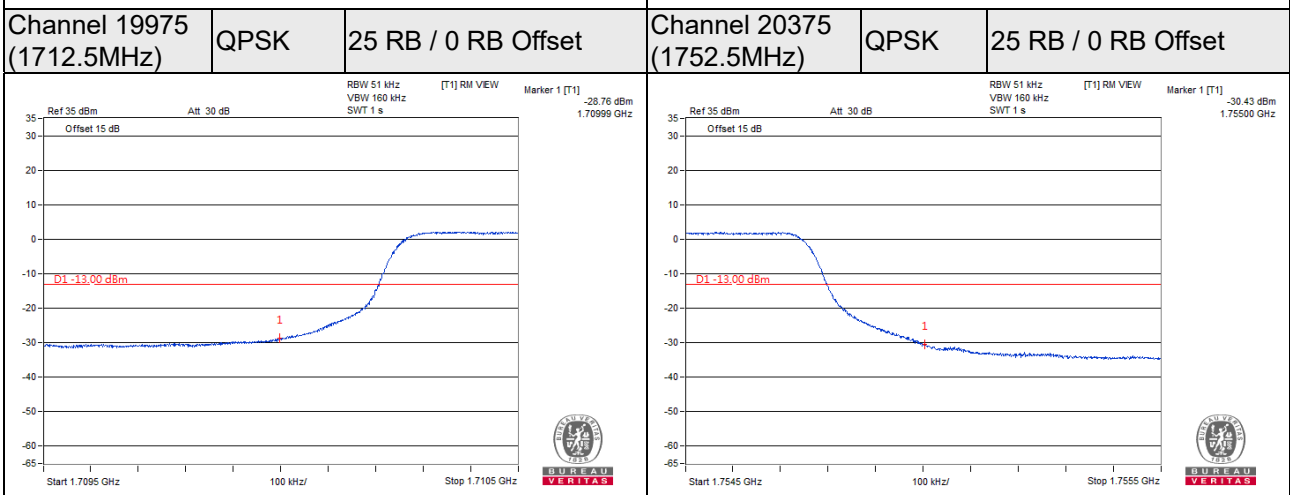
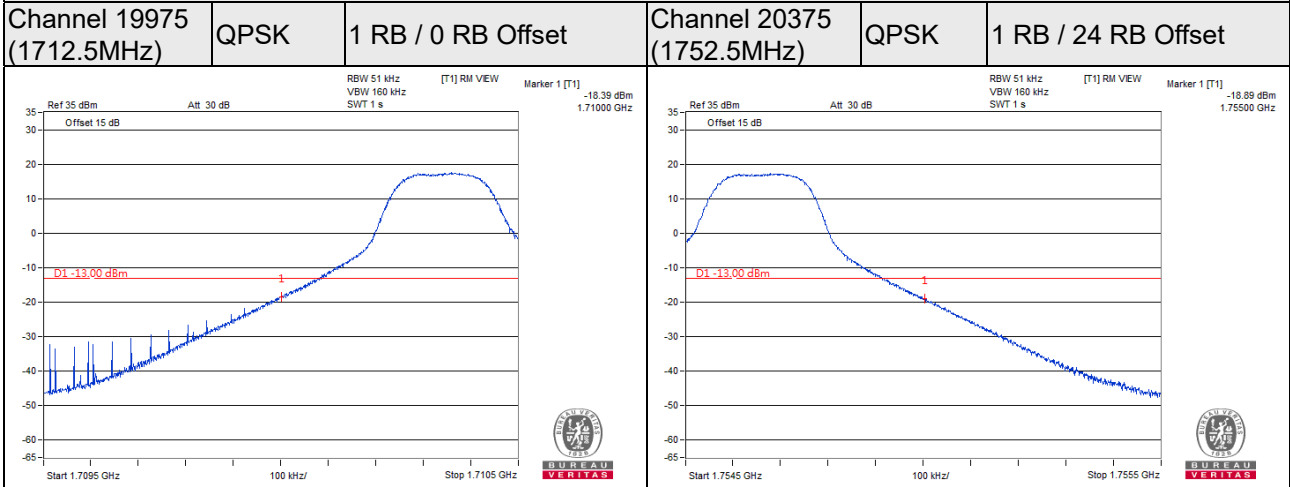
Channel 19965 (1711.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20385 (1753.5MHz)	QPSK	1 RB / 14 RB Offset
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Channel 19965 (1711.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 20385 (1753.5MHz)	QPSK	15 RB / 0 RB Offset
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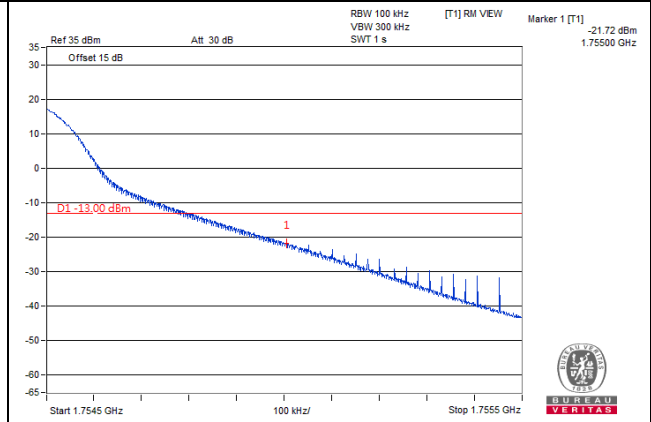
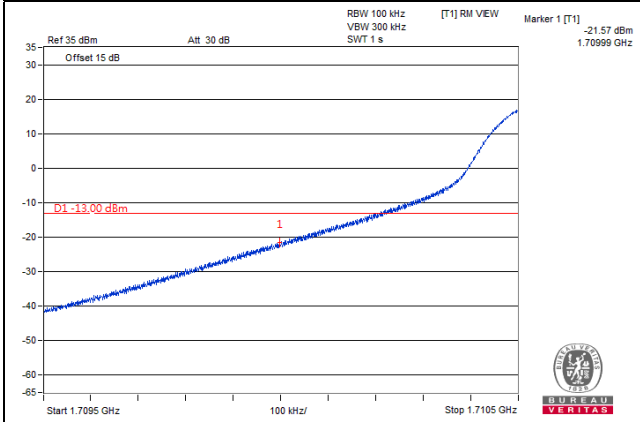


LTE Band 4, Channel Bandwidth 5MHz

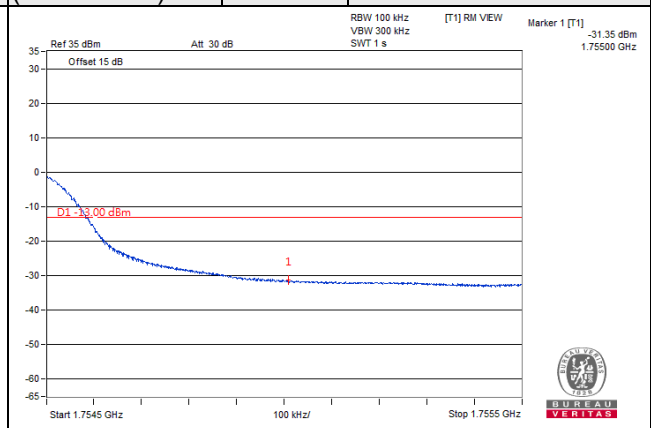
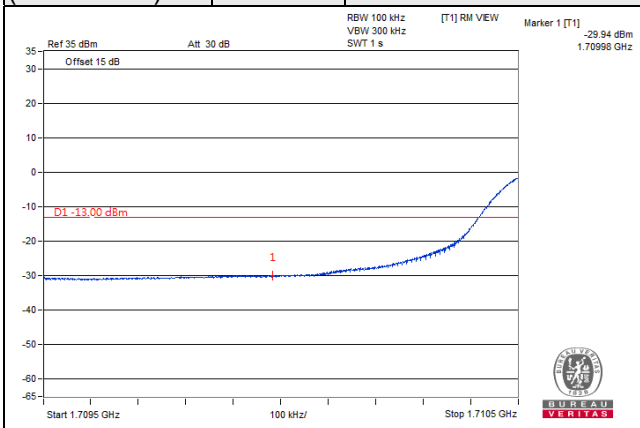


LTE Band 4, Channel Bandwidth 10MHz

Channel 20000 (1715.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 20350 (1750.0MHz)	QPSK	1 RB / 49 RB Offset
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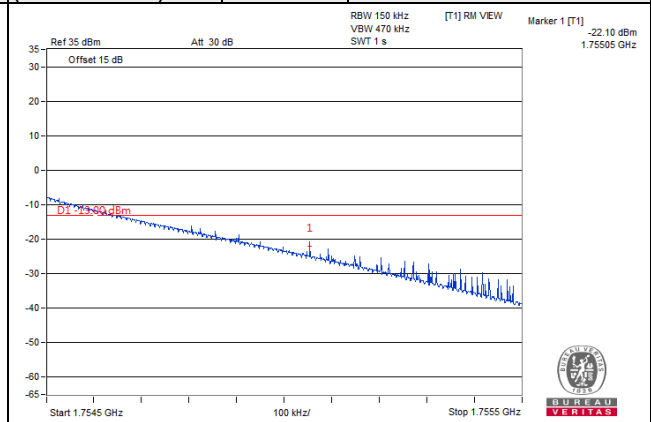
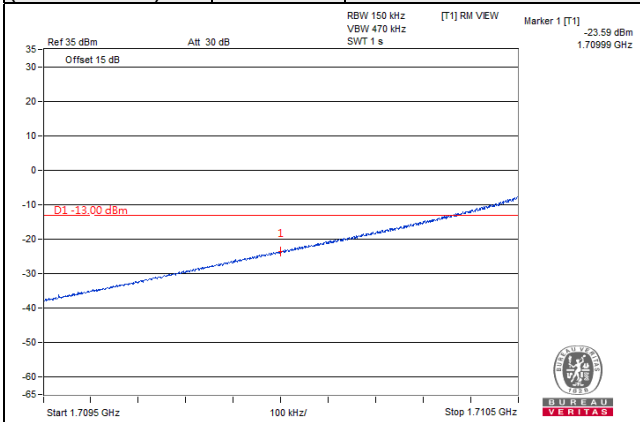


Channel 20000 (1715.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 20350 (1750.0MHz)	QPSK	50 RB / 0 RB Offset
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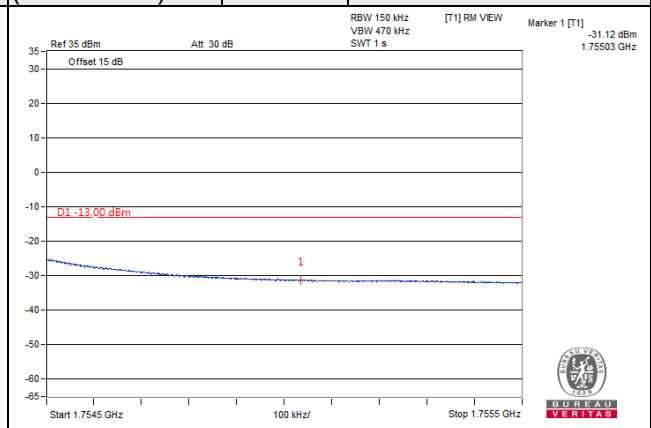
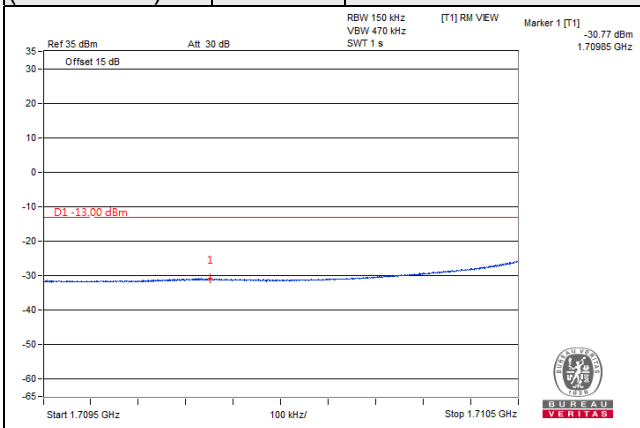


LTE Band 4, Channel Bandwidth 15MHz

Channel 20025 (1717.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20325 (1747.5MHz)	QPSK	1 RB / 74 RB Offset
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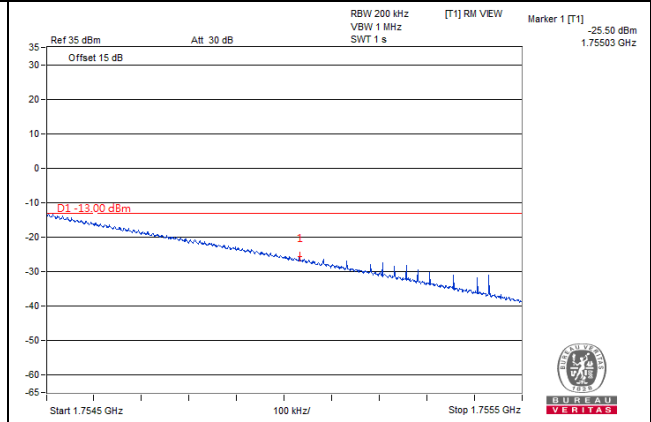
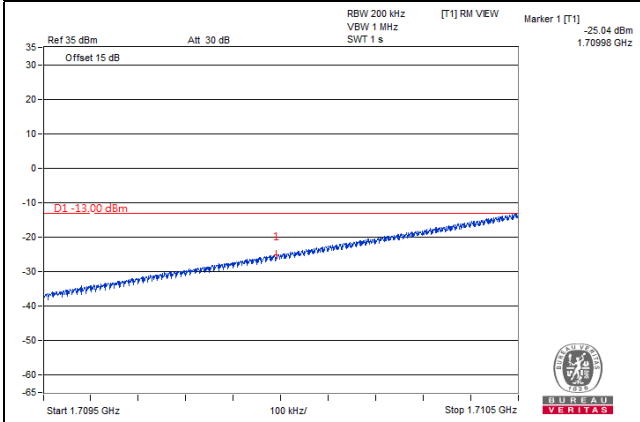


Channel 20025 (1717.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 20325 (1747.5MHz)	QPSK	75 RB / 0 RB Offset
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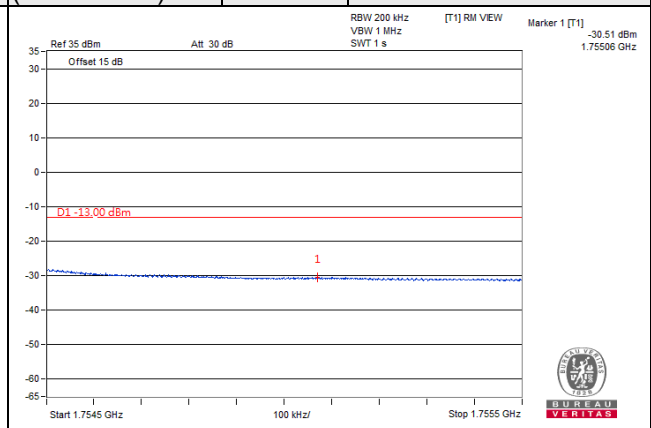
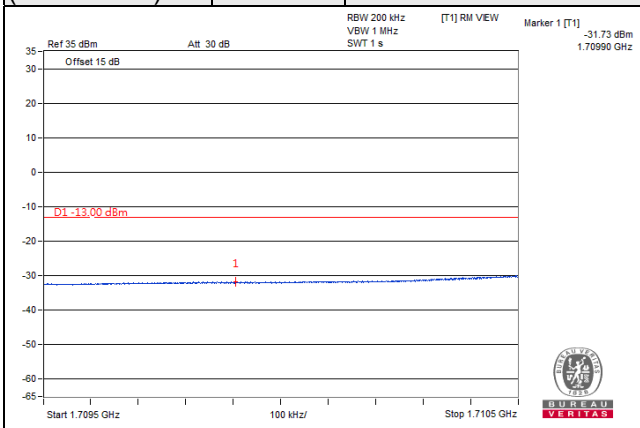


LTE Band 4, Channel Bandwidth 20MHz

Channel 20050 (1720.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 20300 (1745.0MHz)	QPSK	1 RB / 99 RB Offset
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Channel 20050 (1720.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 20300 (1745.0MHz)	QPSK	100 RB / 0 RB Offset
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Out-of-Band Emission

LTE Band 7, Channel Bandwidth 5MHz

Channel 20775 (2502.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 21425 (2567.5MHz)	QPSK	1 RB / 24 RB Offset
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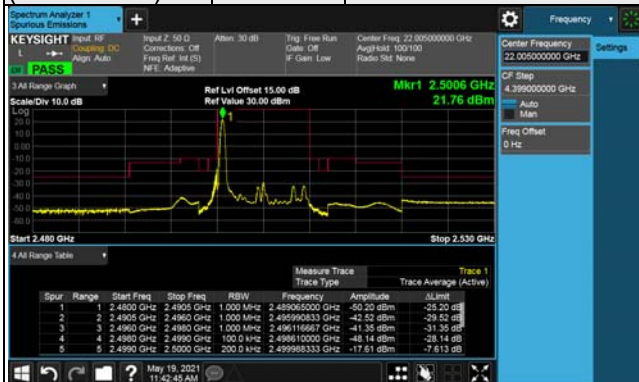
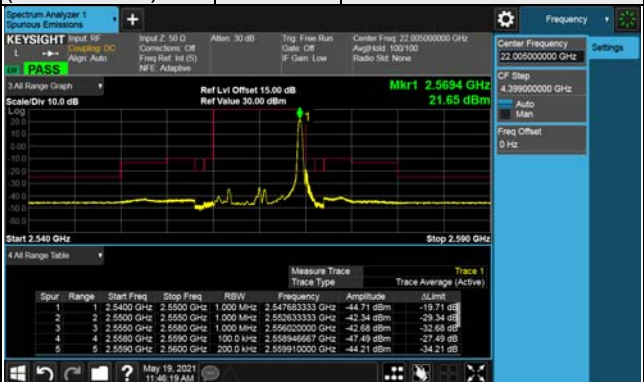


Channel 20775 (2502.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 21425 (2567.5MHz)	QPSK	25 RB / 0 RB Offset
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LTE Band 7, Channel Bandwidth 10MHz

Channel 20800 (2505.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 21400 (2565.0MHz)	QPSK	1 RB / 49 RB Offset
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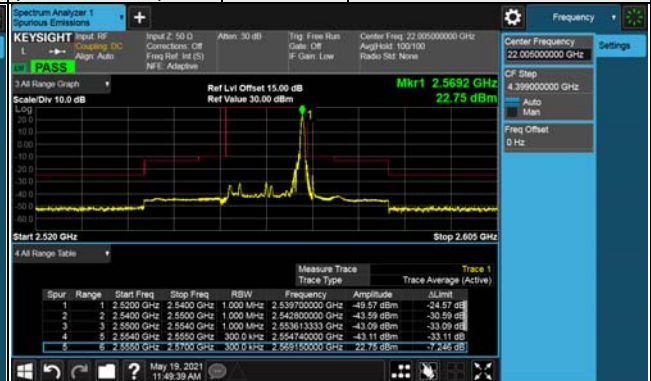
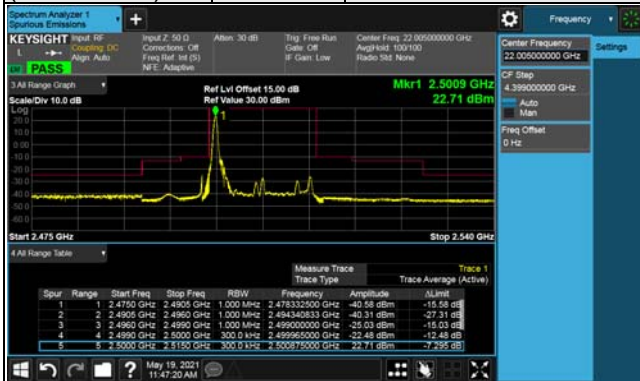



Channel 20800 (2505.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 21400 (2565.0MHz)	QPSK	50 RB / 0 RB Offset
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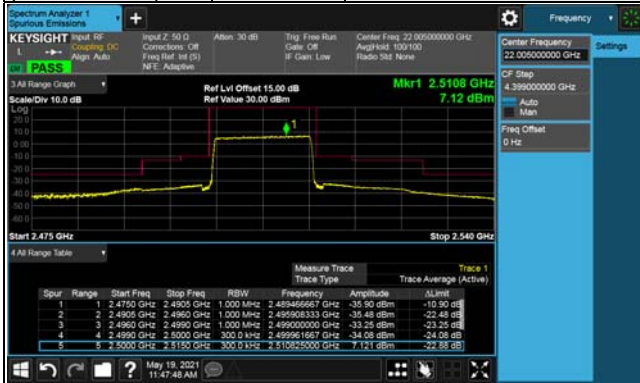



LTE Band 7, Channel Bandwidth 15MHz

Channel 20825 (2507.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 21375 (2562.5MHz)	QPSK	1 RB / 74 RB Offset
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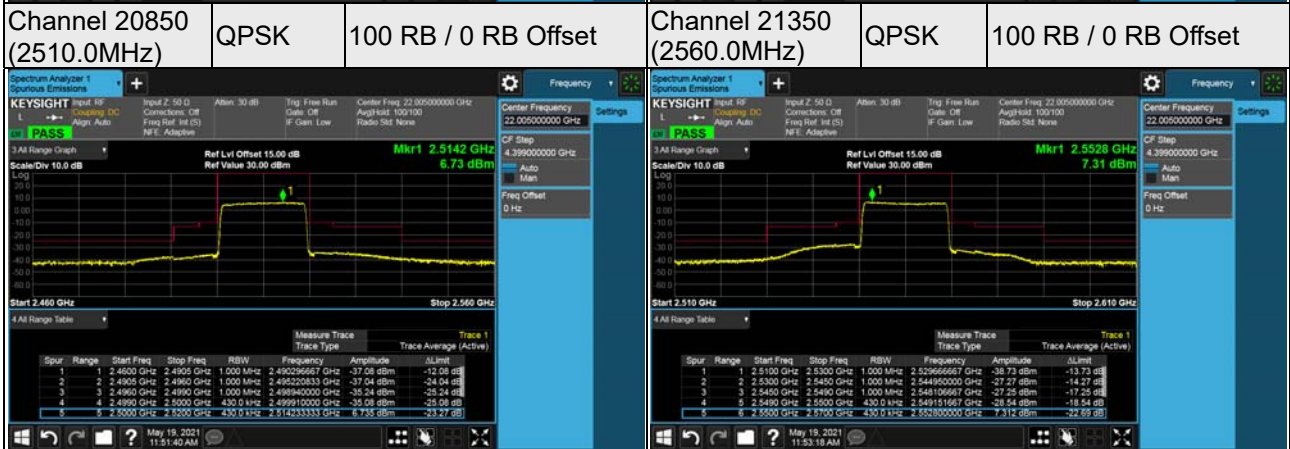
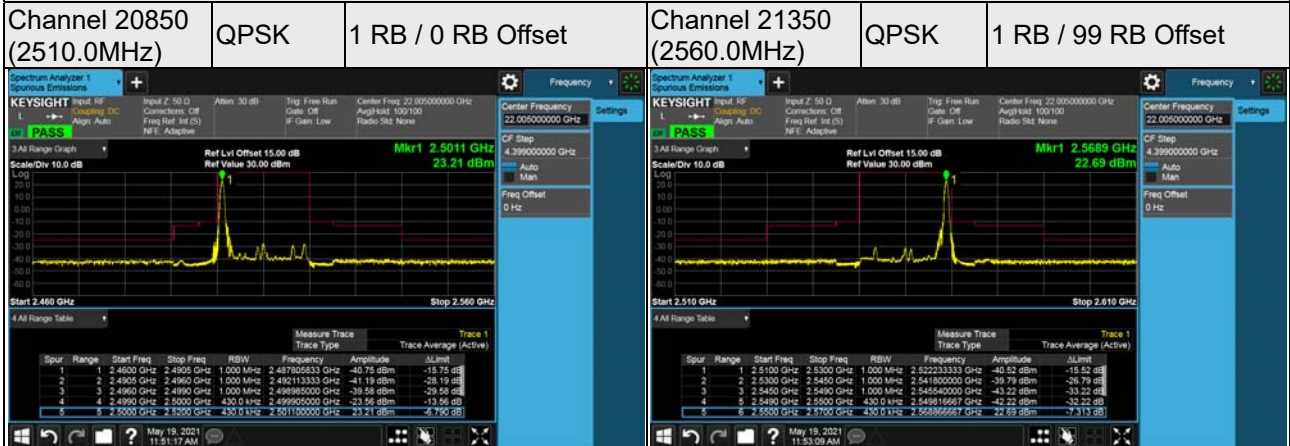
Channel 20825 (2507.5MHz)	QPSK	75 RB / 0 RB Offset
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Channel 21375 (2562.5MHz)	QPSK	75 RB / 0 RB Offset
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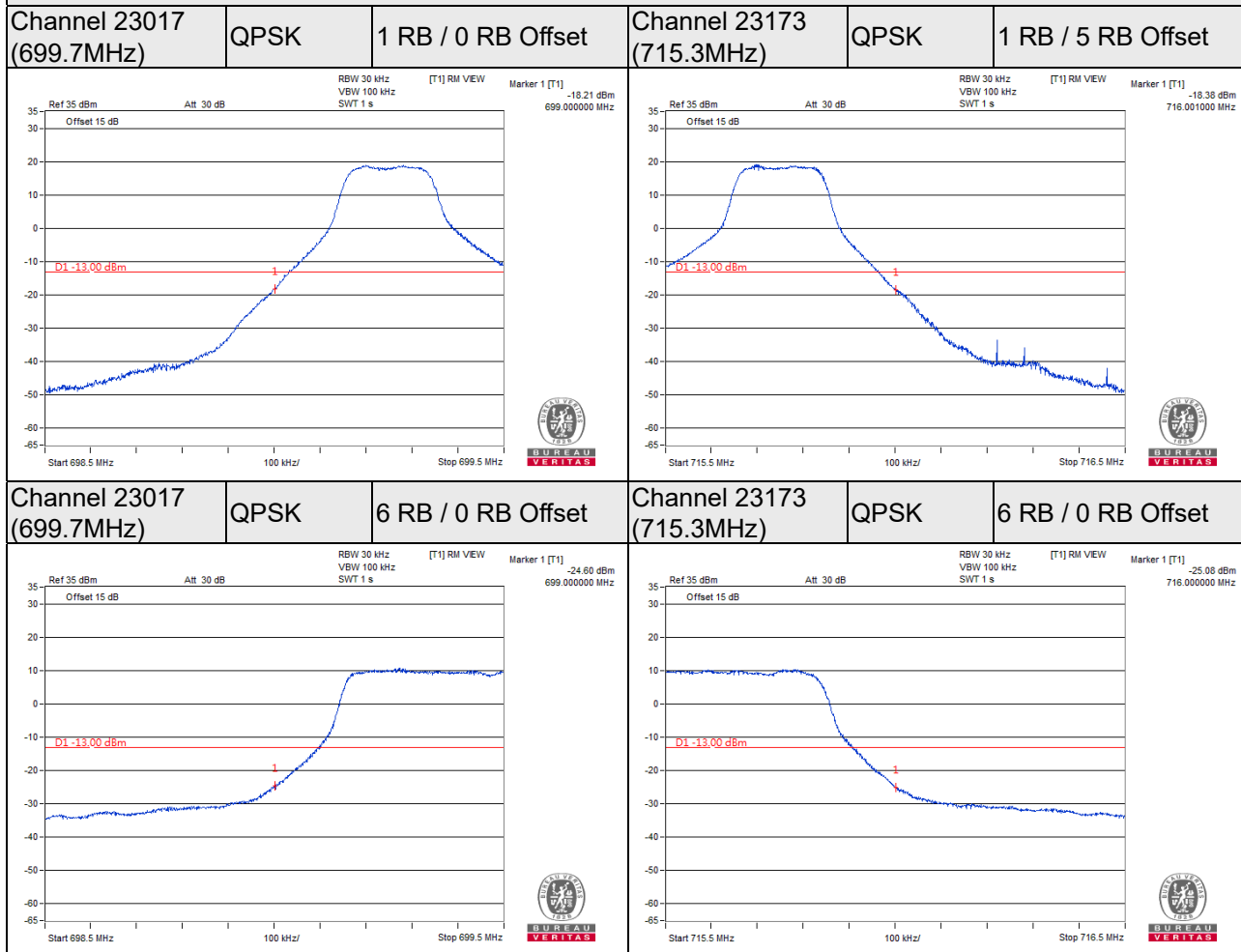


LTE Band 7, Channel Bandwidth 20MHz



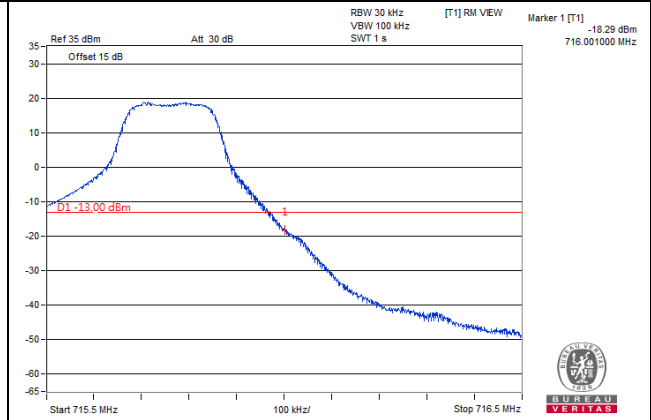
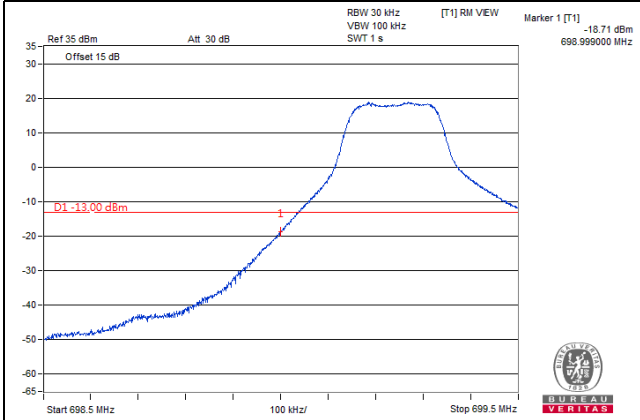
Band Edge

LTE Band 12, Channel Bandwidth 1.4MHz

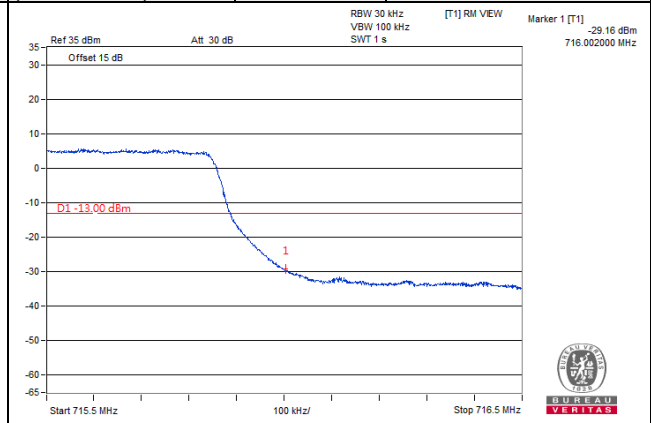
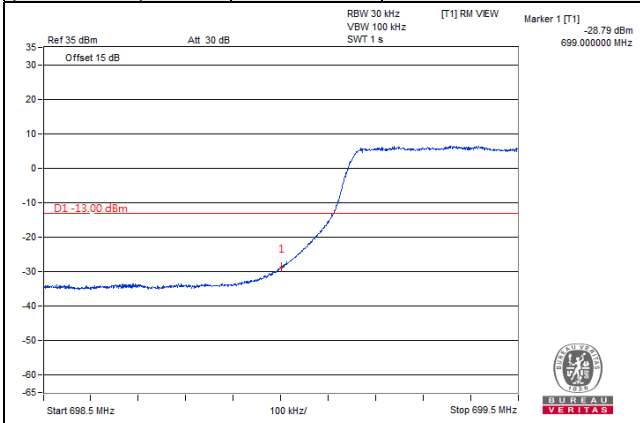


LTE Band 12, Channel Bandwidth 3MHz

Channel 23025 (700.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 23165 (714.5MHz)	QPSK	1 RB / 14RB Offset
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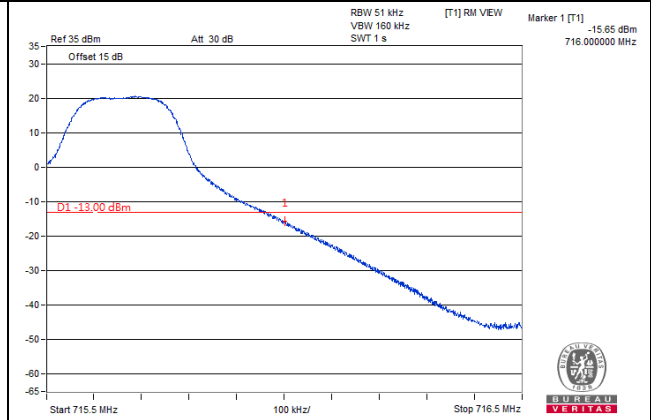
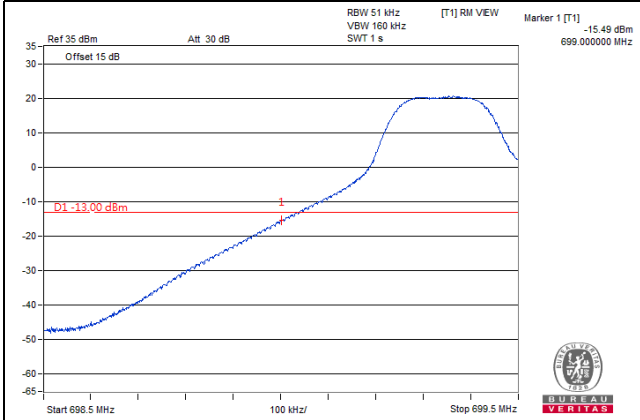


Channel 23025 (700.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 23165 (714.5MHz)	QPSK	15 RB / 0 RB Offset
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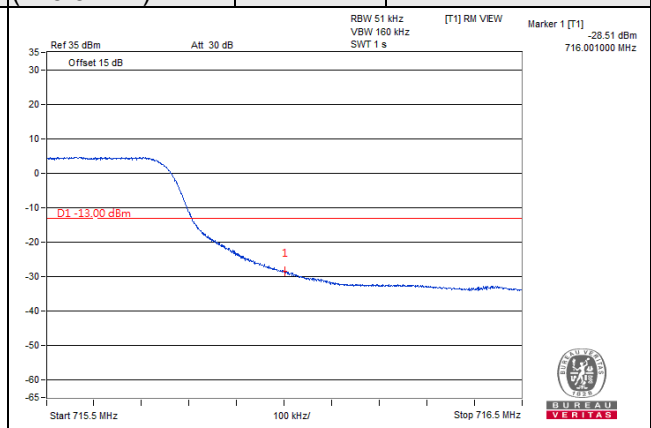
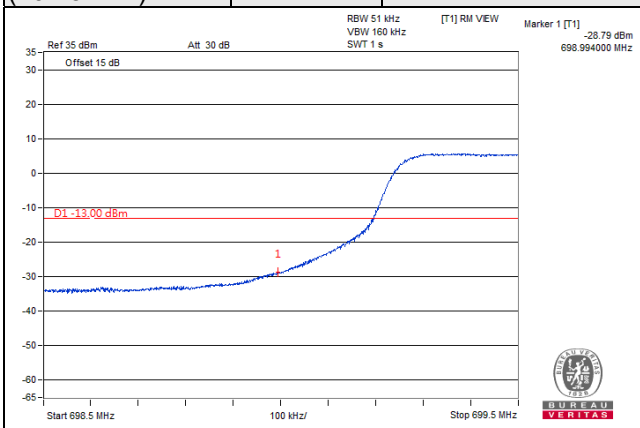


LTE Band 12, Channel Bandwidth 5MHz

Channel 23035 (701.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 23155 (713.5MHz)	QPSK	1 RB / 24RB Offset
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Channel 23035 (701.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 23155 (713.5MHz)	QPSK	25 RB / 0 RB Offset
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LTE Band 12, Channel Bandwidth 10MHz

Channel 23060
(704.0MHz)

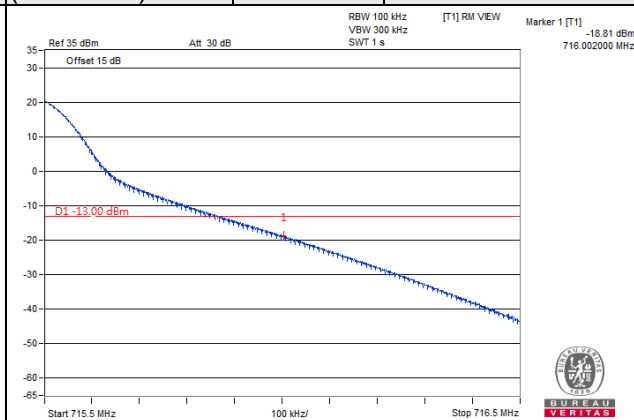
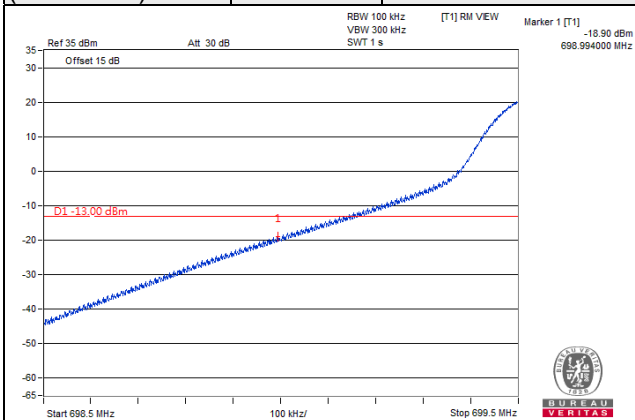
QPSK

1 RB / 0 RB Offset

Channel 23130
(711.0MHz)

QPSK

1 RB / 24RB Offset



Channel 23060
(704.0MHz)

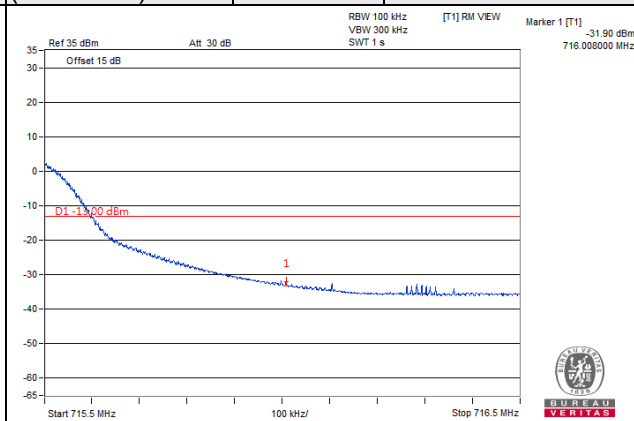
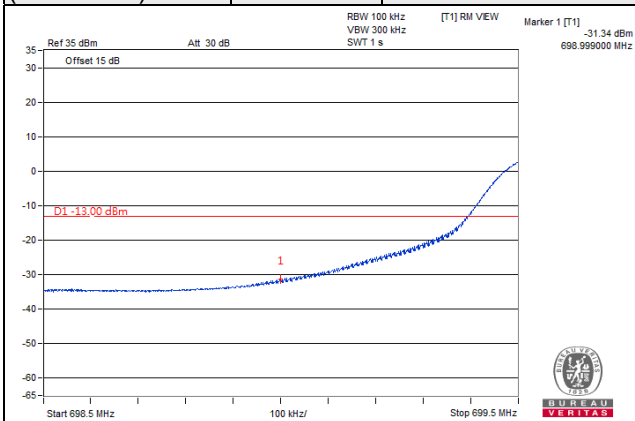
QPSK

50 RB / 0 RB Offset

Channel 23130
(711.0MHz)

QPSK

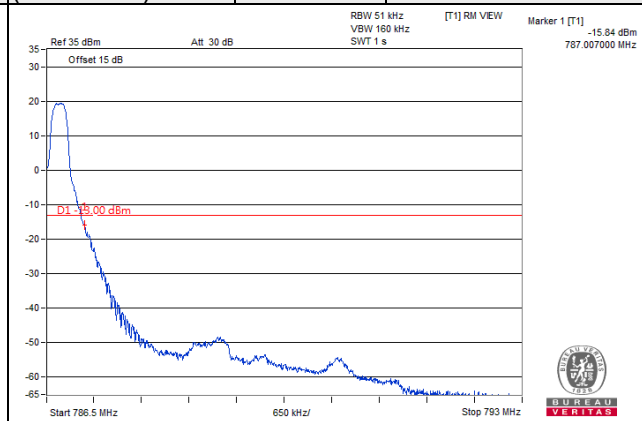
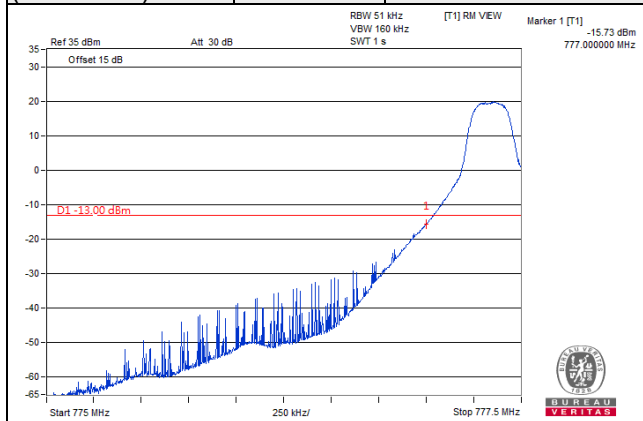
25 RB / 0 RB Offset



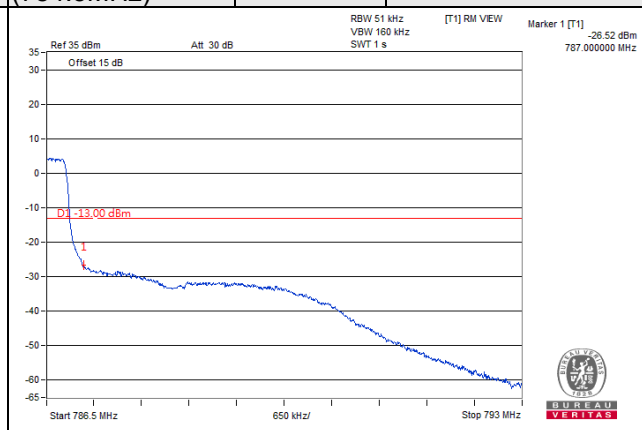
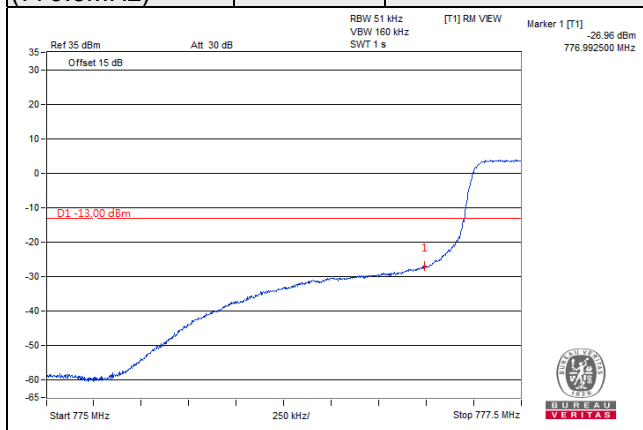
Band Edge

LTE Band 13, Channel Bandwidth 5MHz

Channel 23205 (779.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 23255 (784.5MHz)	QPSK	1 RB / 24 RB Offset
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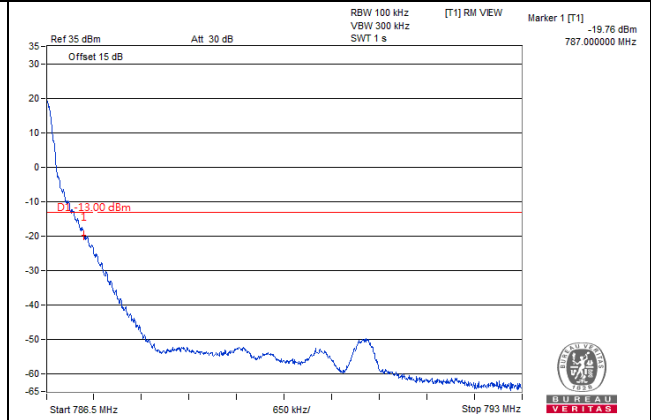
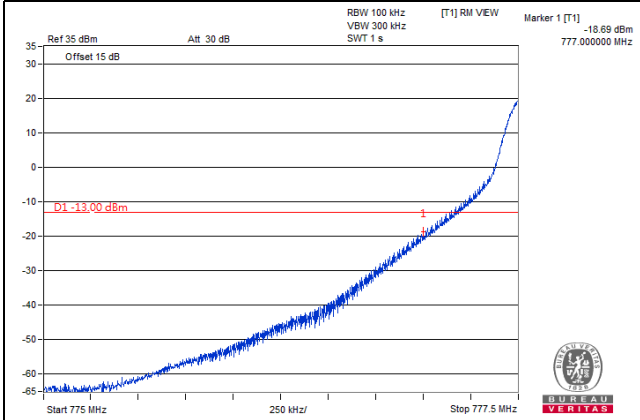


Channel 23205 (779.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 23255 (784.5MHz)	QPSK	25 RB / 0 RB Offset
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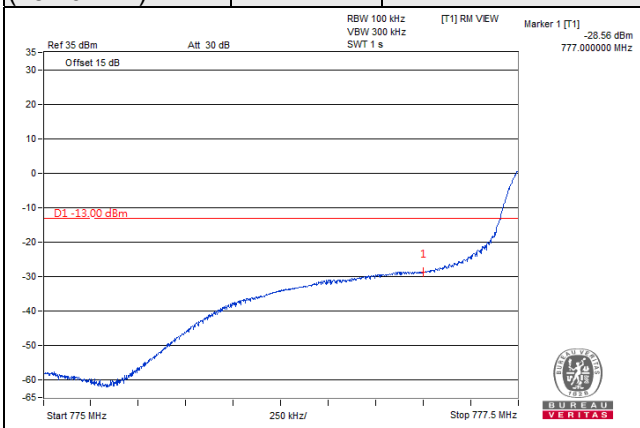


LTE Band 13, Channel Bandwidth 10MHz

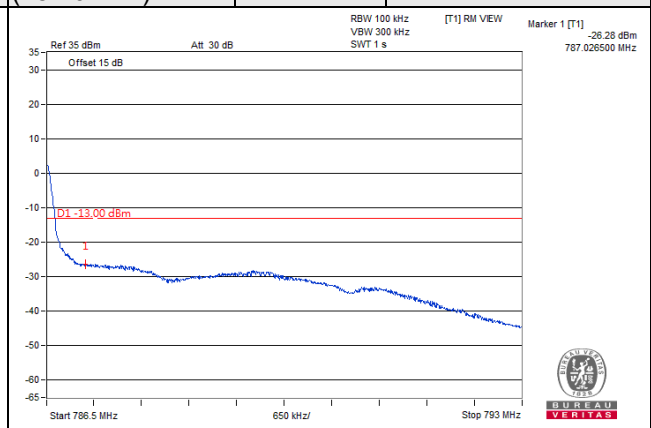
Channel 23230 (782.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 23230 (782.0MHz)	QPSK	1 RB / 49 RB Offset
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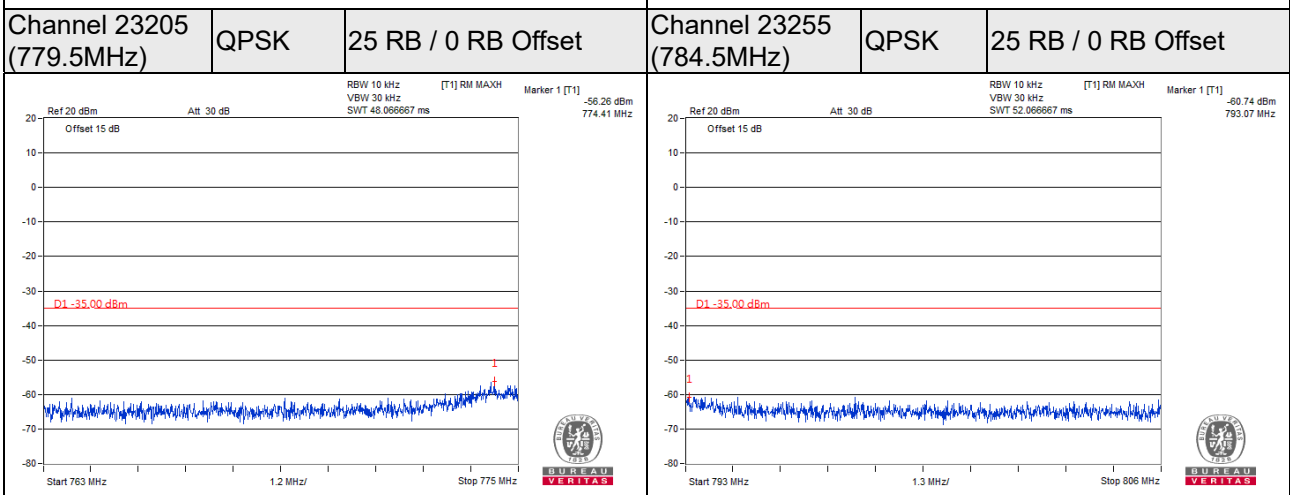
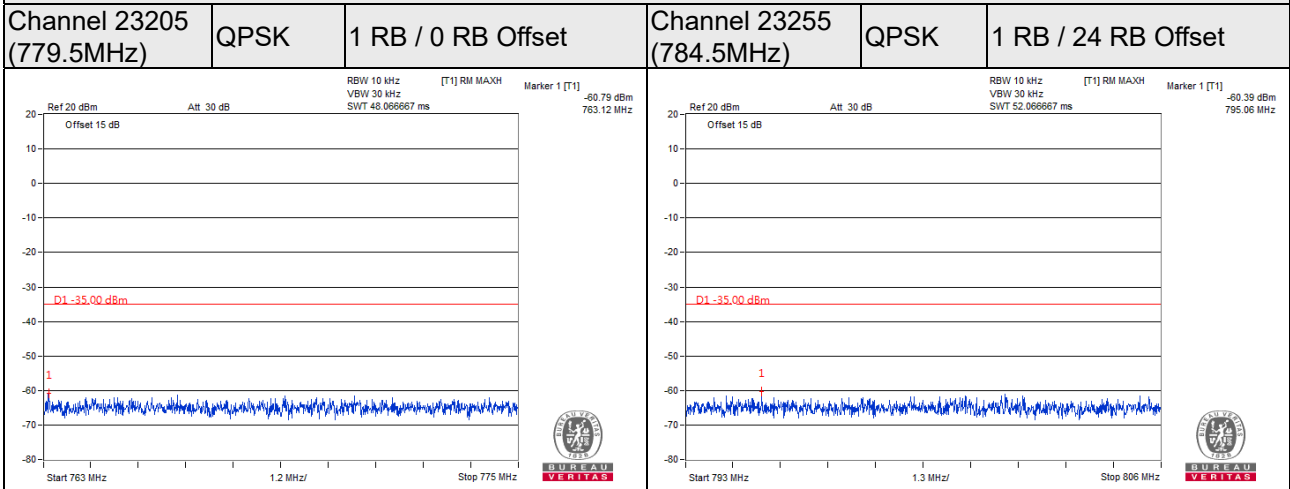
Channel 23230 (782.0MHz)	QPSK	50 RB / 0 RB Offset
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Channel 23230 (782.0MHz)	QPSK	50 RB / 0 RB Offset
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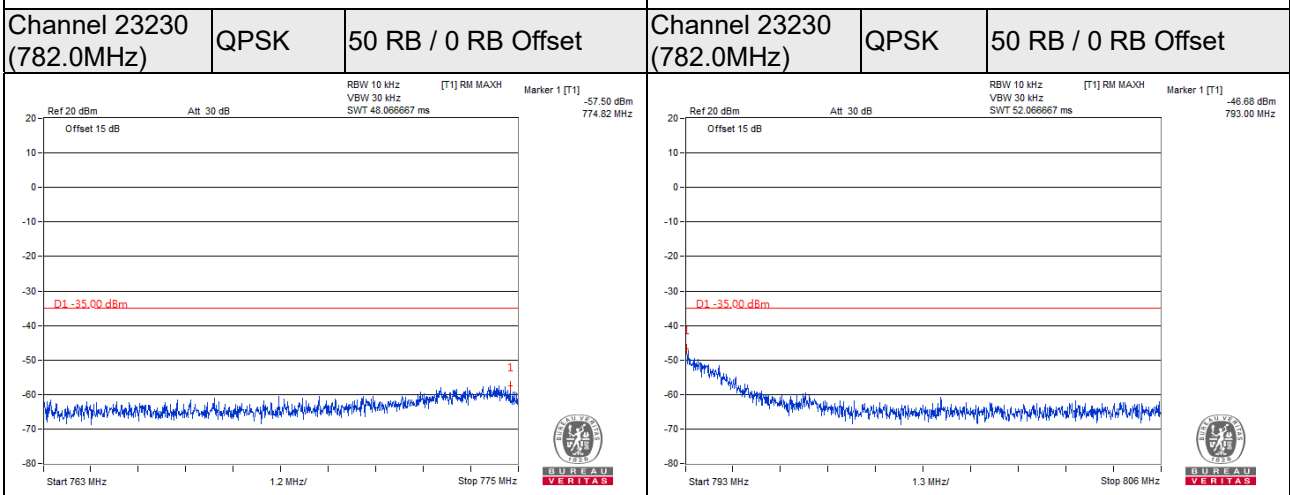
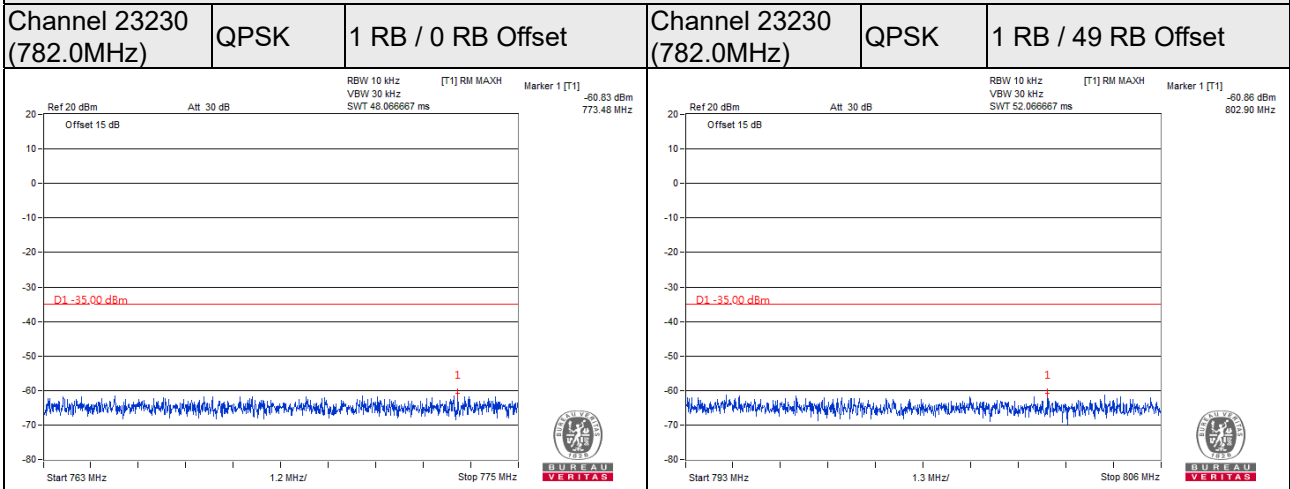


LTE Band 13, Channel Bandwidth 5MHz



For the 763-775MHz and 793-805MHz band, the FCC limit is $65+10\log(P[\text{watt}])$ in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.

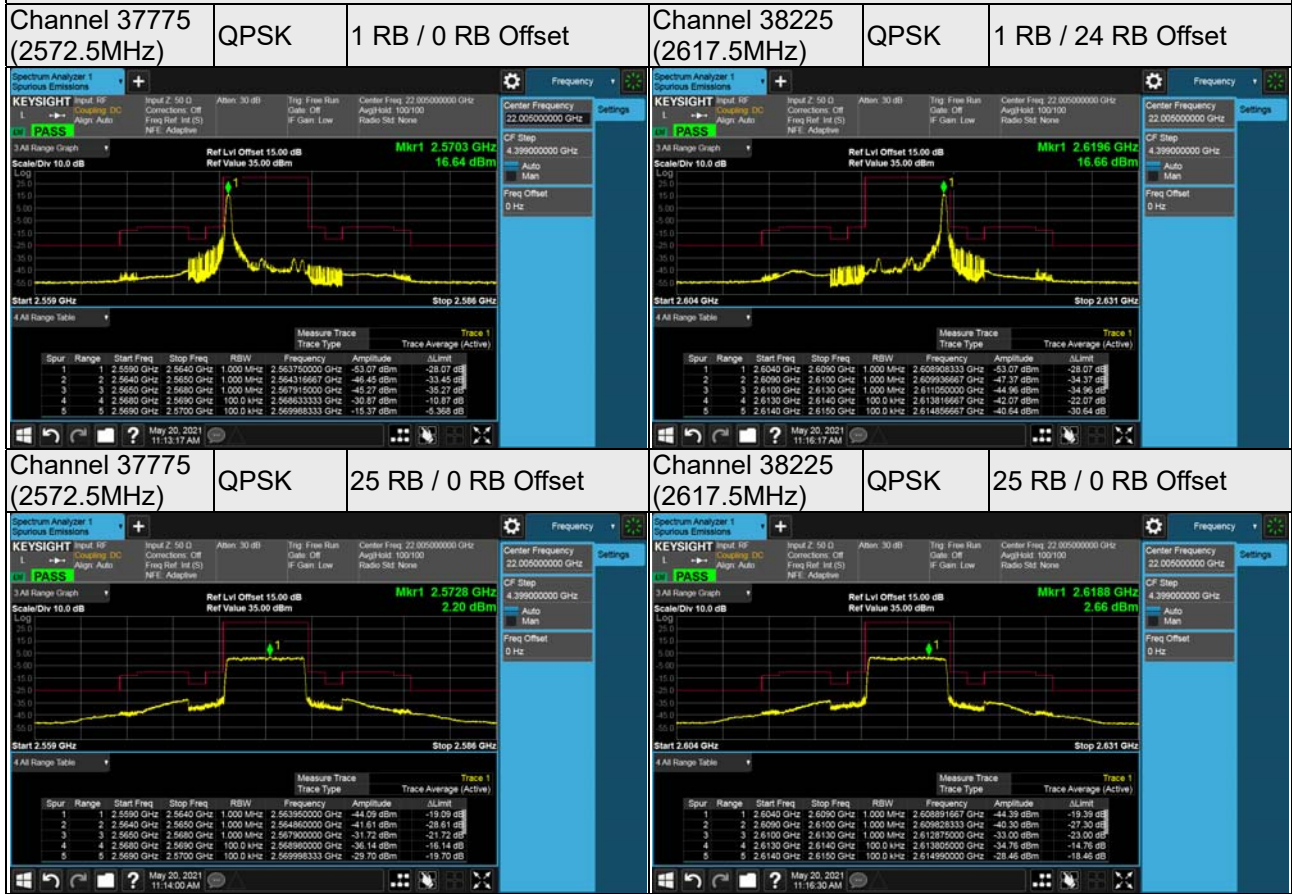
LTE Band 13, Channel Bandwidth 10MHz



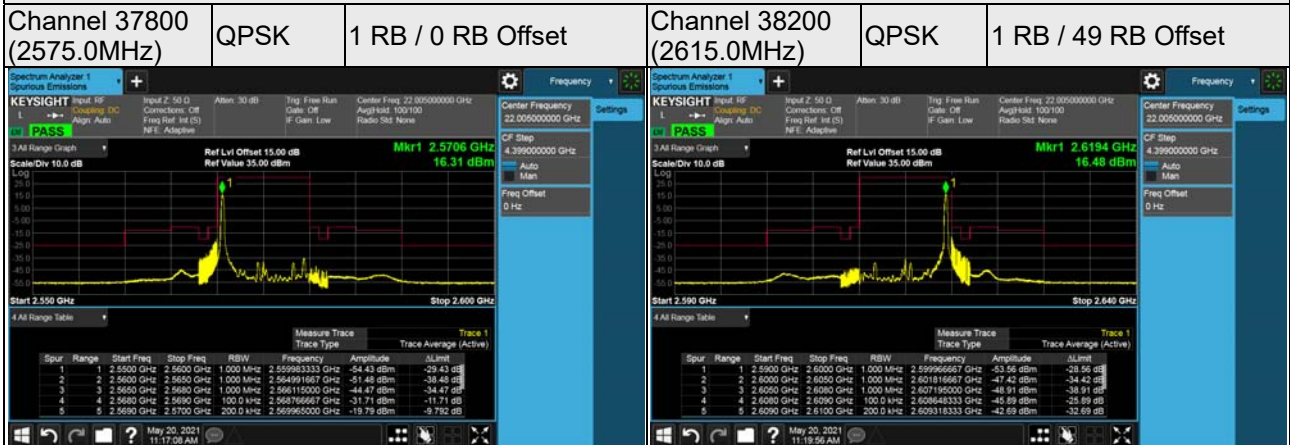
For the 763-775MHz and 793-805MHz band, the FCC limit is $65+10\log(P[\text{watt}])$ in a 6.25 kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25 kHz with the available equipment, a bandwidth of 10 kHz was used instead to show compliance, and the correction factor is compensated at the spectrum. By using a 10 kHz bandwidth on the spectrum analyzer.

Out-of-Band Emission

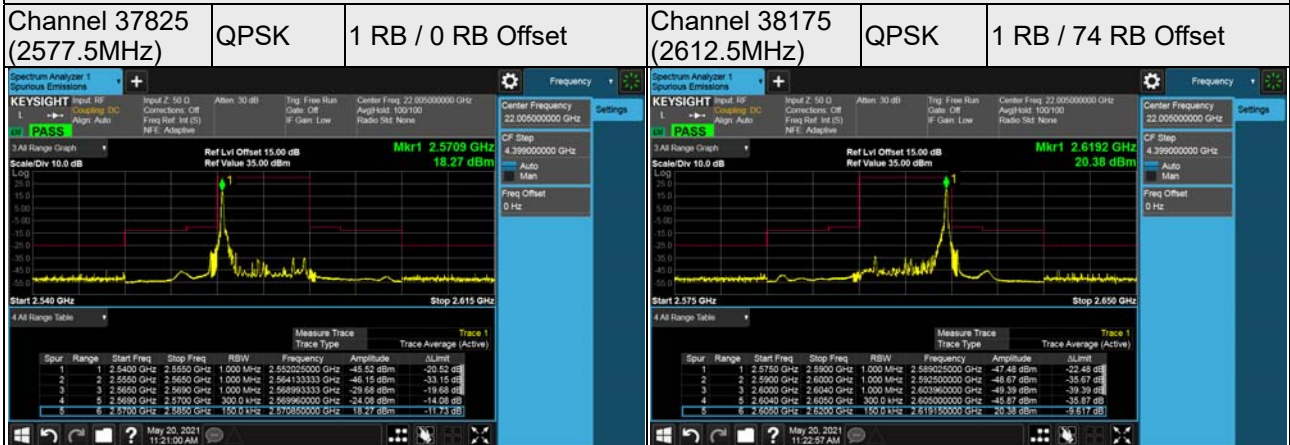
LTE Band 38, Channel Bandwidth 5MHz



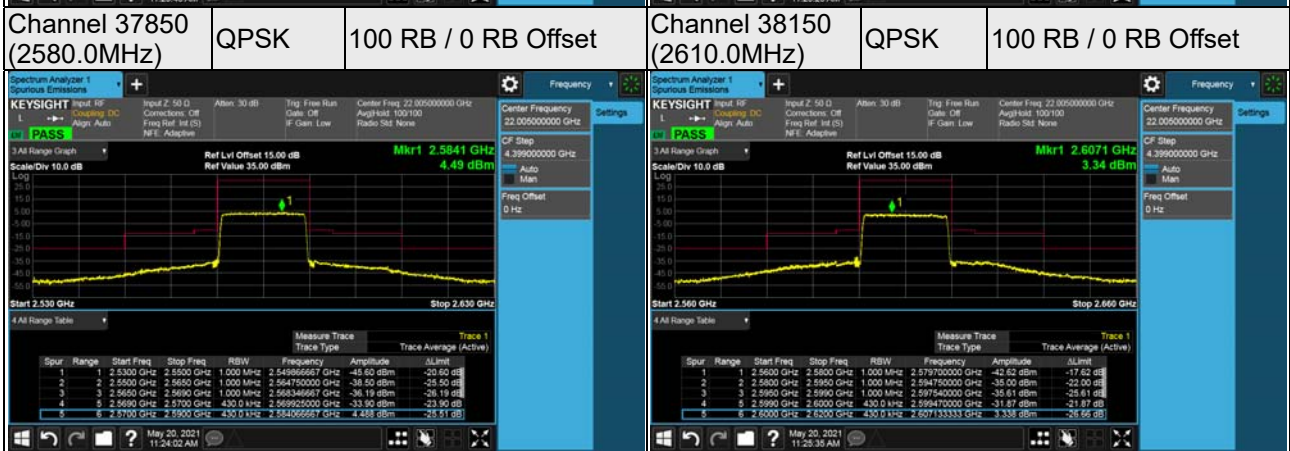
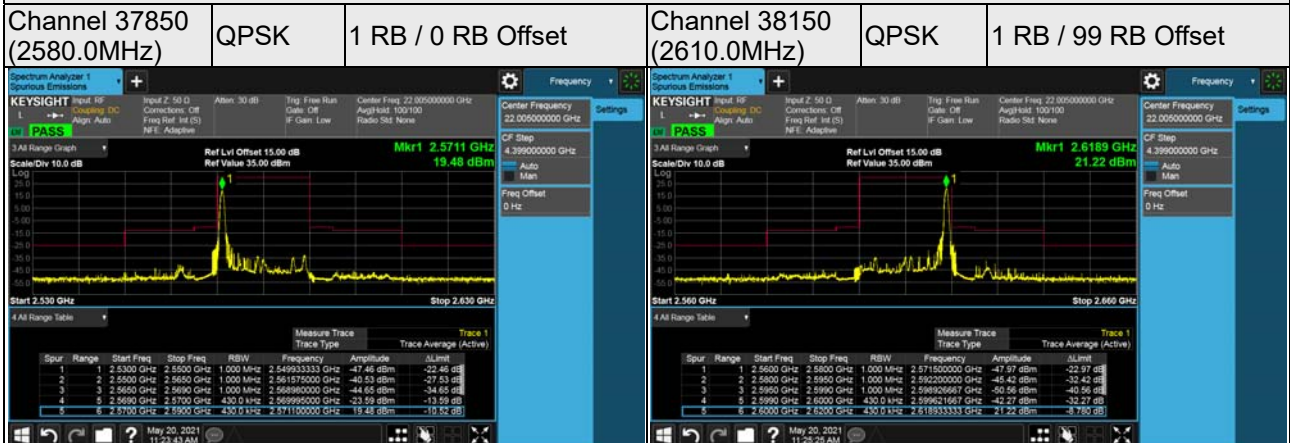
LTE Band 38, Channel Bandwidth 10MHz



LTE Band 38, Channel Bandwidth 15MHz

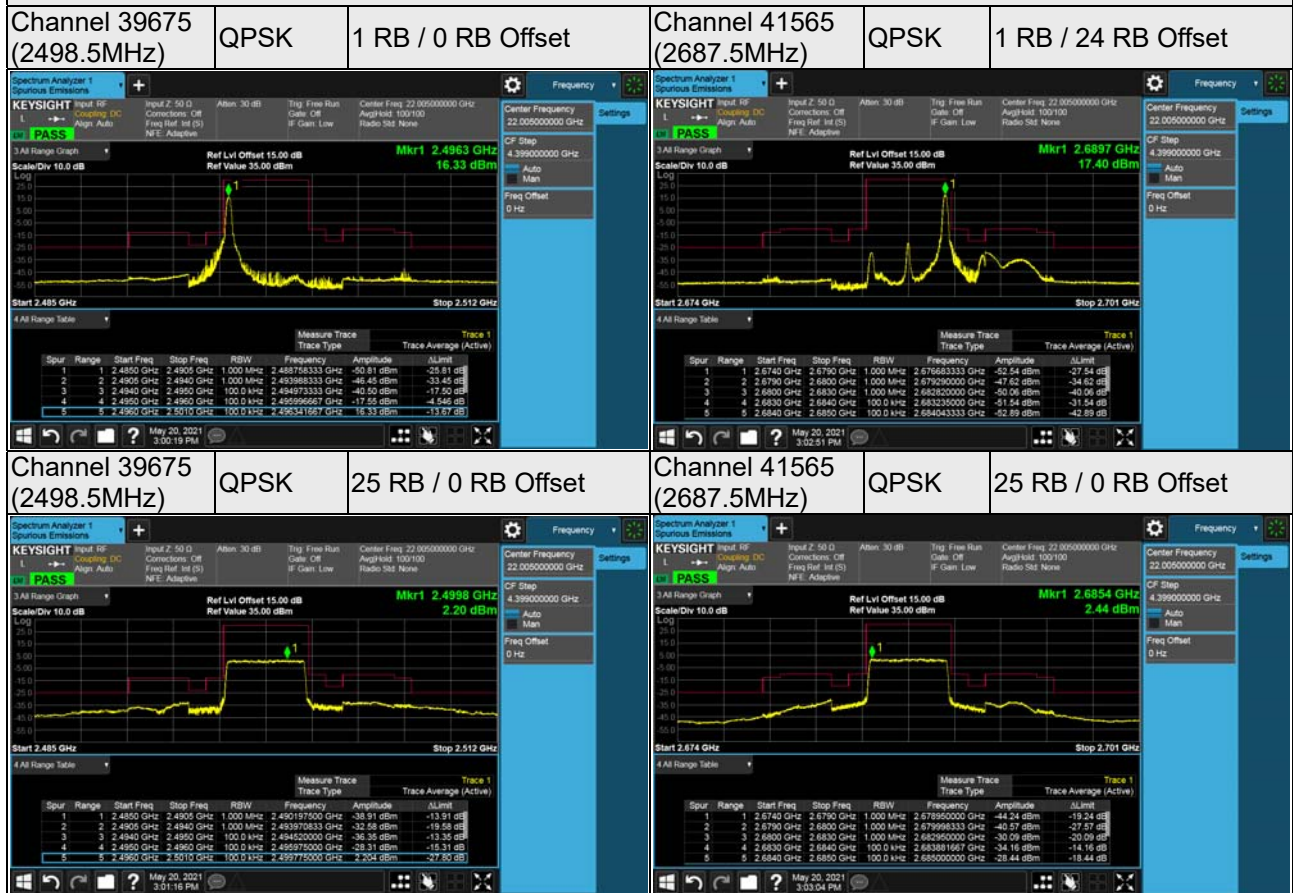


LTE Band 38, Channel Bandwidth 20MHz



Out-of-Band Emission

LTE Band 41, Channel Bandwidth 5MHz



LTE Band 41, Channel Bandwidth 10MHz

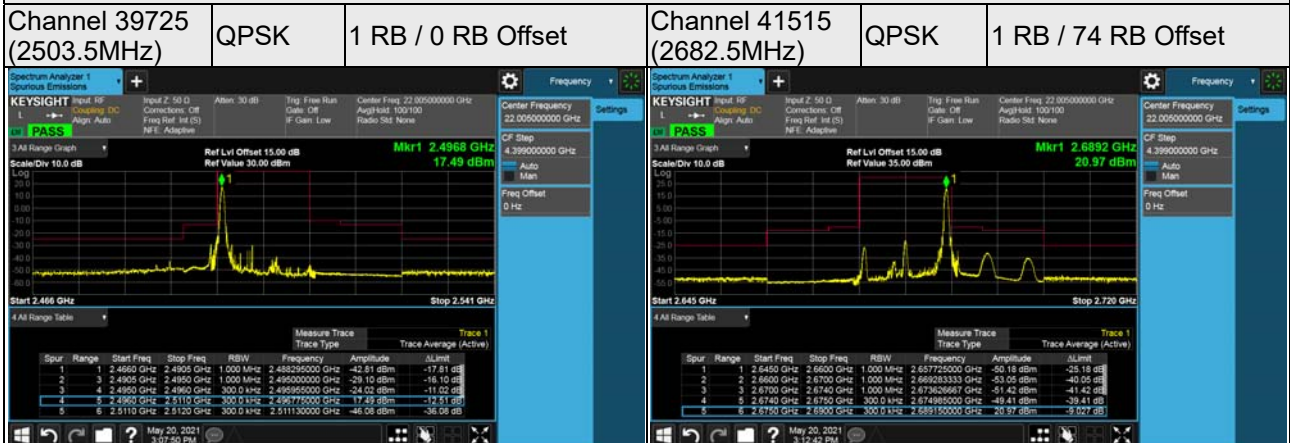
Channel 39700 (2501.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 41540 (2685.0MHz)	QPSK	1 RB / 49 RB Offset
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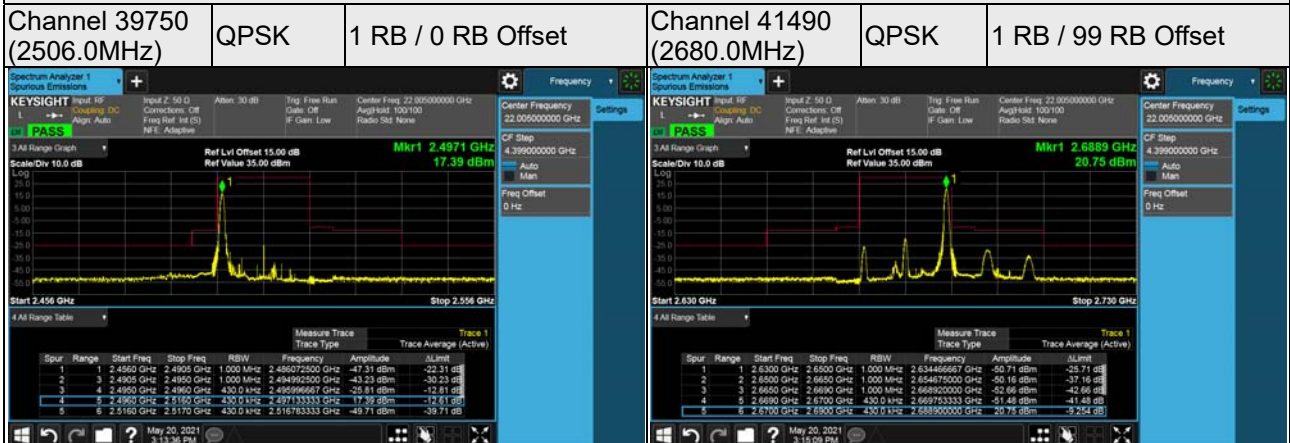
Channel 39700 (2501.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 41540 (2685.0MHz)	QPSK	50 RB / 0 RB Offset
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LTE Band 41, Channel Bandwidth 15MHz

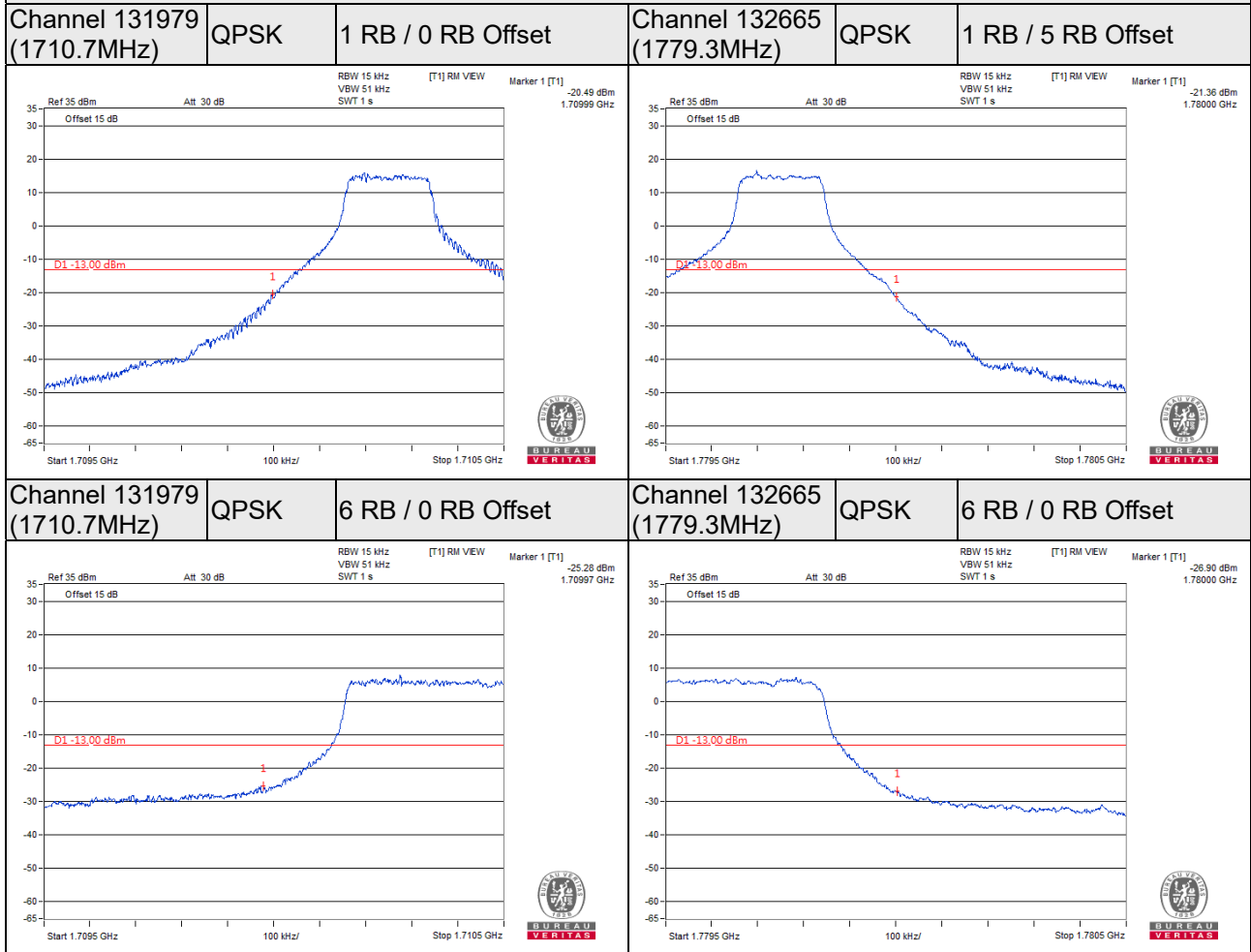


LTE Band 41, Channel Bandwidth 20MHz



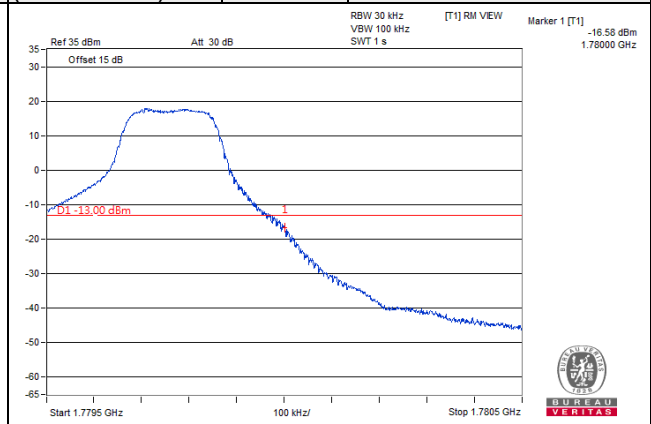
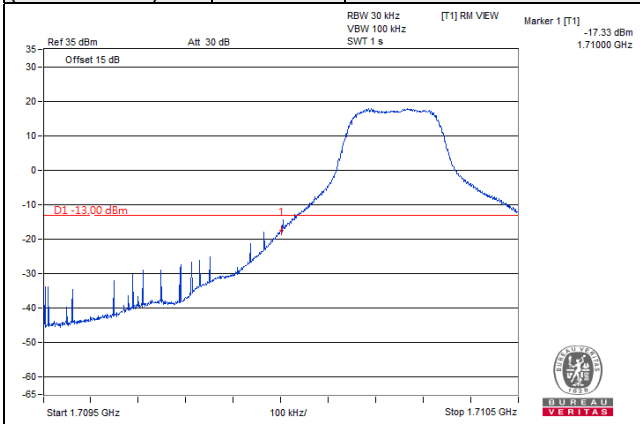
Band Edge

LTE Band 66, Channel Bandwidth 1.4MHz

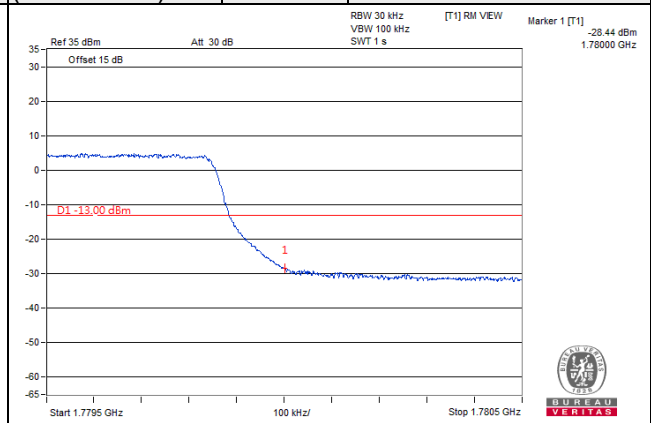
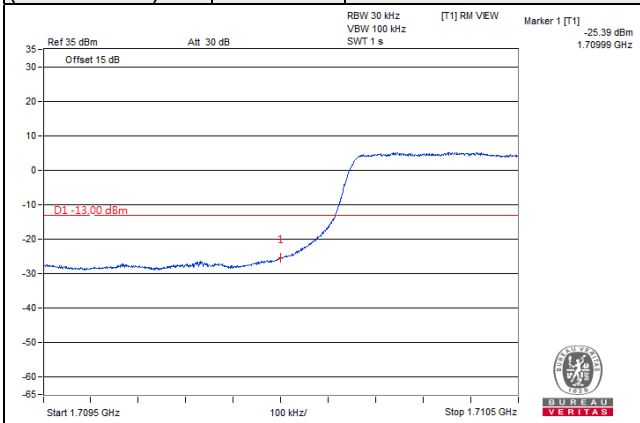


LTE Band 66, Channel Bandwidth 3MHz

Channel 131987 (1711.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 132657 (1778.5MHz)	QPSK	1 RB / 14 RB Offset
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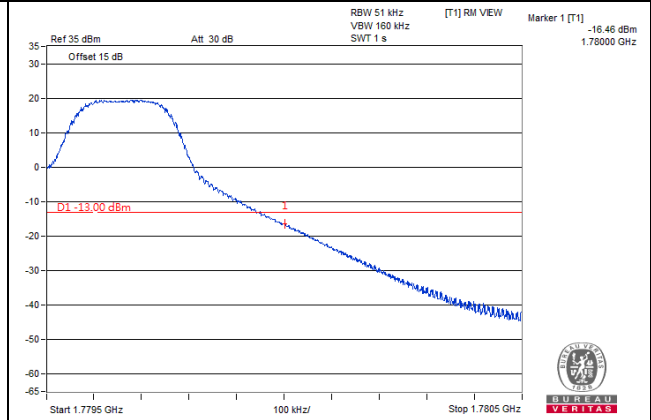
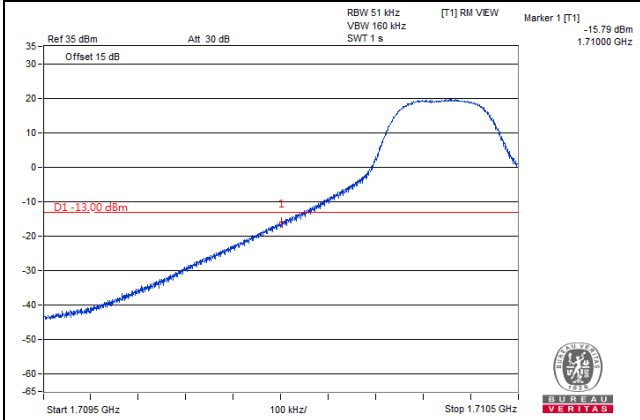


Channel 131987 (1711.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 132657 (1778.5MHz)	QPSK	15 RB / 0 RB Offset
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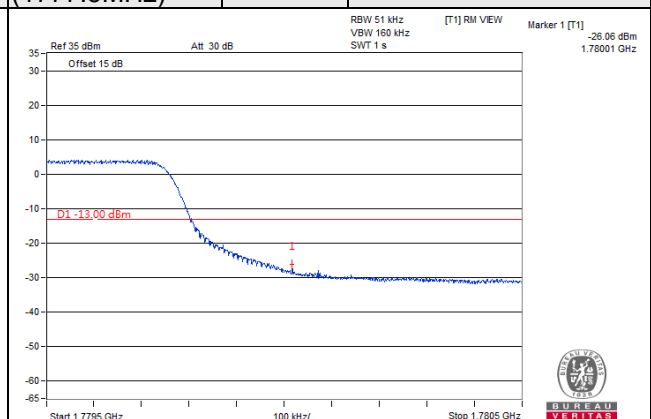
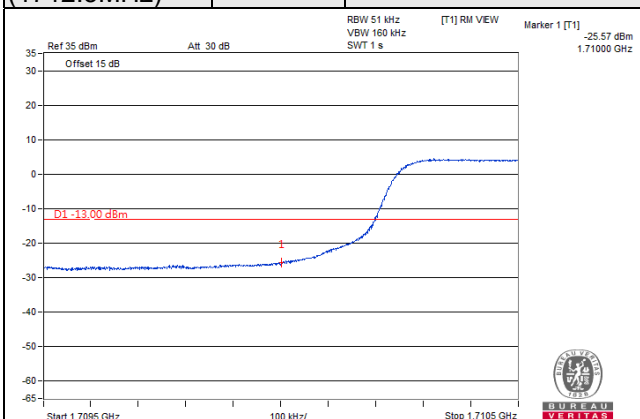


LTE Band 66, Channel Bandwidth 5MHz

Channel 131997 (1712.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 132647 (1777.5MHz)	QPSK	1 RB / 24 RB Offset
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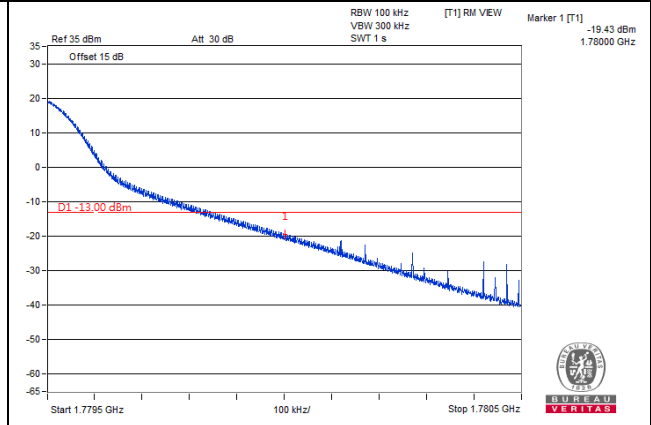
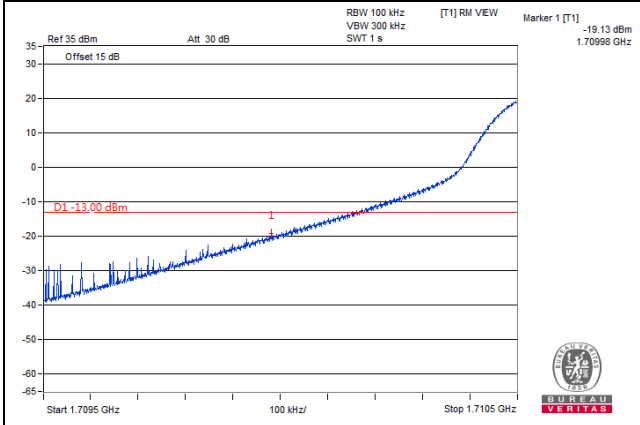


Channel 131997 (1712.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 132647 (1777.5MHz)	QPSK	25 RB / 0 RB Offset
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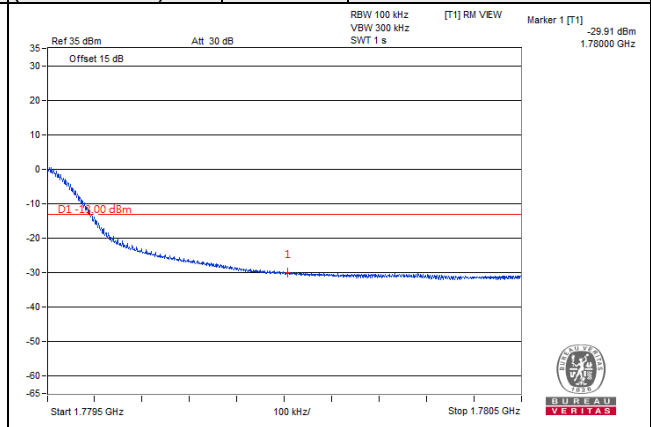
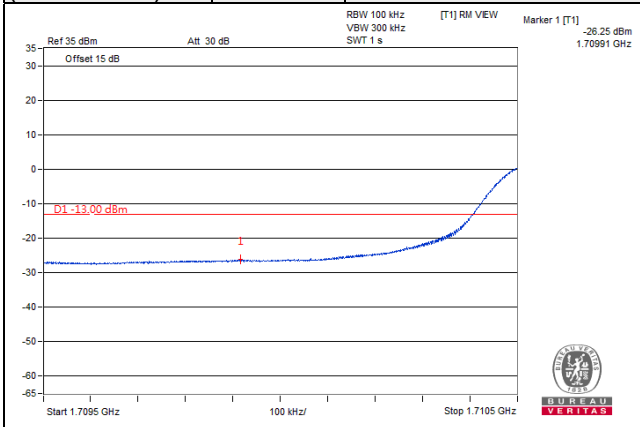


LTE Band 66, Channel Bandwidth 10MHz

Channel 132022 (1715.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 132622 (1775.0MHz)	QPSK	1 RB / 49 RB Offset
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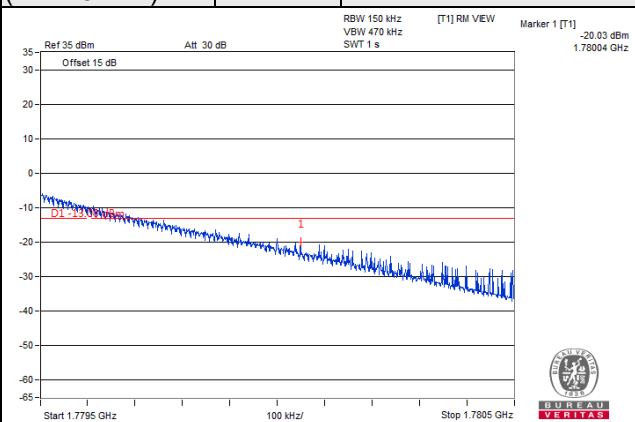
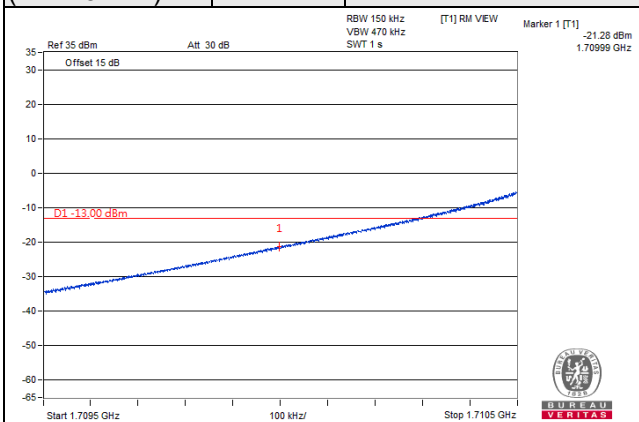


Channel 132022 (1715.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 132622 (1775.0MHz)	QPSK	50 RB / 0 RB Offset
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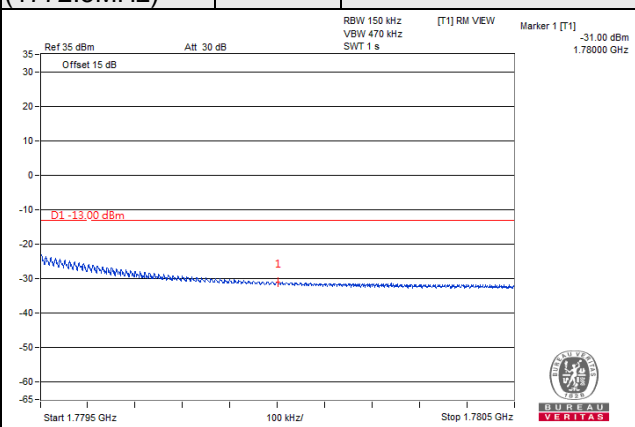
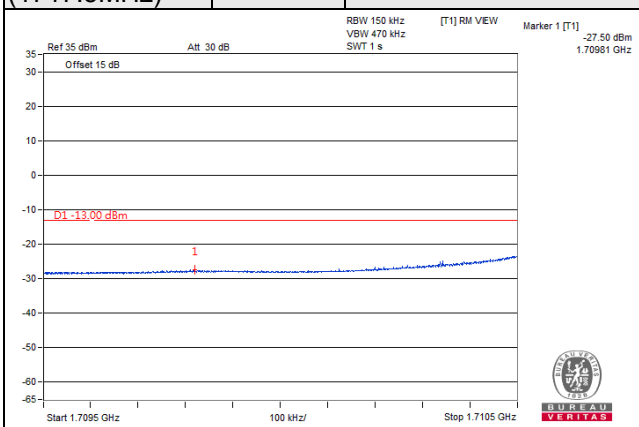


LTE Band 66, Channel Bandwidth 15MHz

Channel 132047 (1717.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 132597 (1772.5MHz)	QPSK	1 RB / 74 RB Offset
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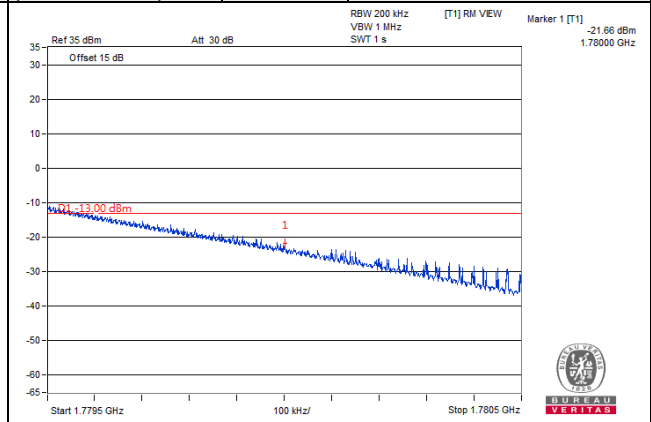
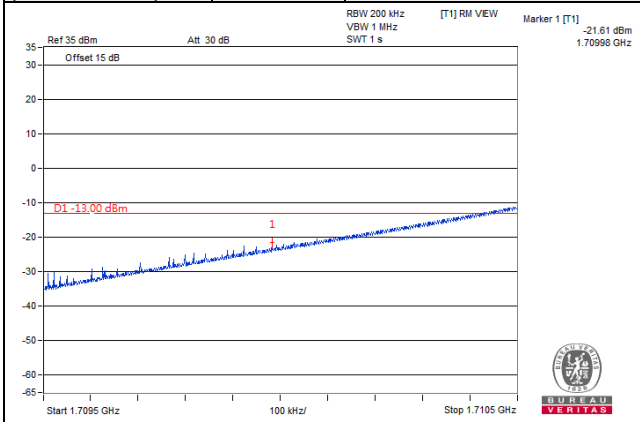


Channel 132047 (1717.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 132597 (1772.5MHz)	QPSK	75 RB / 0 RB Offset
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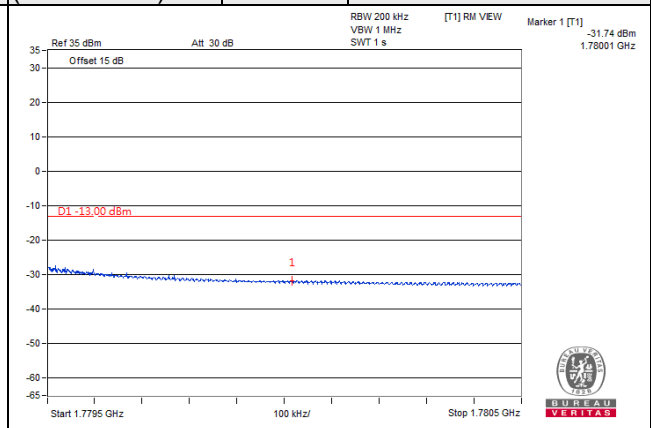
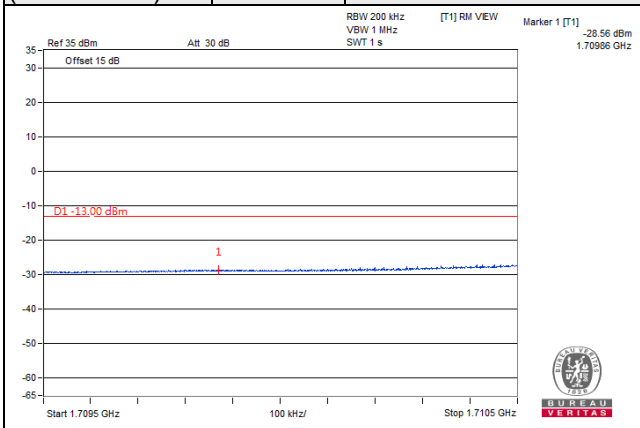


LTE Band 66, Channel Bandwidth 20MHz

Channel 132072 (1720.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 132572 (1770.0MHz)	QPSK	1 RB / 99 RB Offset
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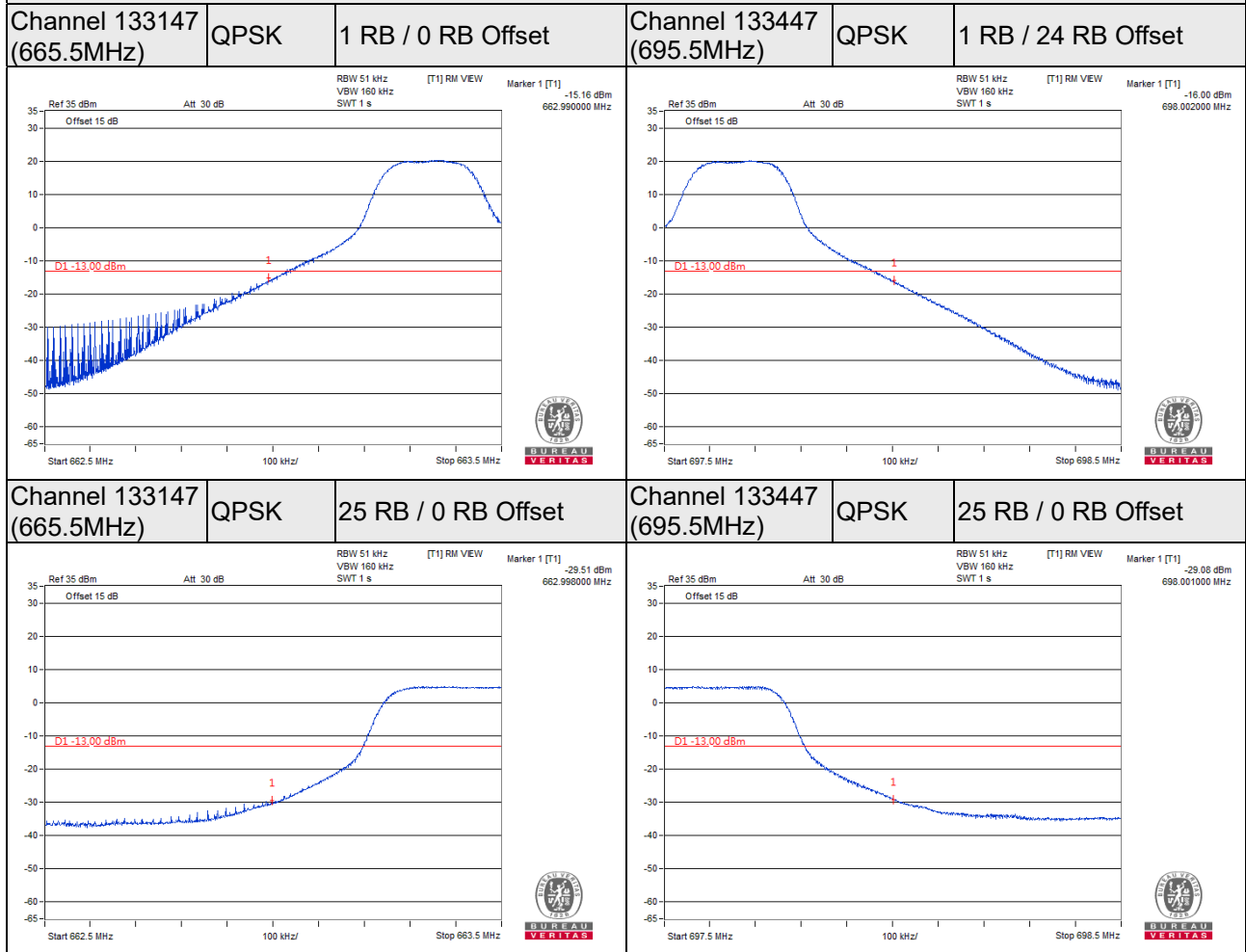


Channel 132072 (1720.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 132572 (1770.0MHz)	QPSK	100 RB / 0 RB Offset
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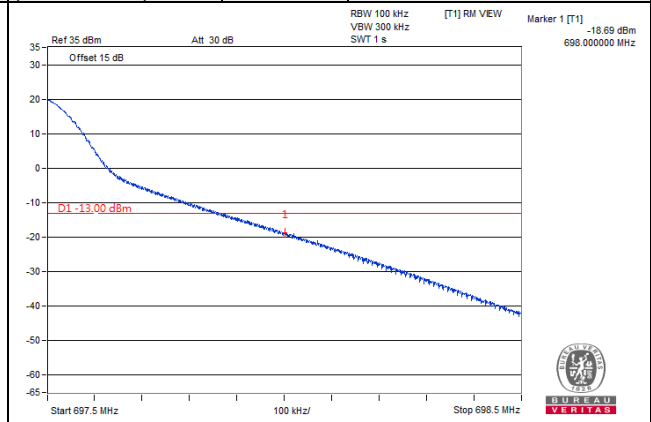
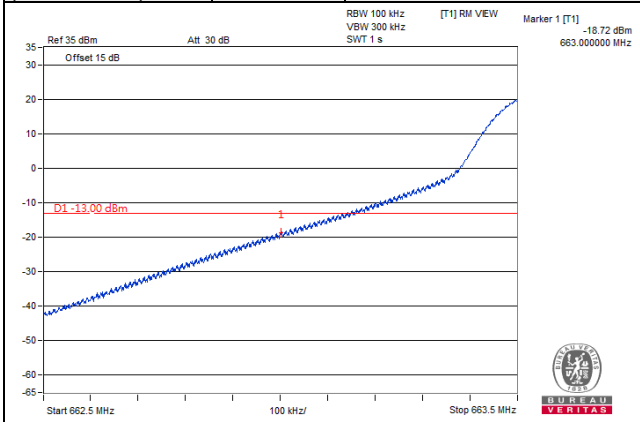
Band Edge

LTE Band 71, Channel Bandwidth 5MHz

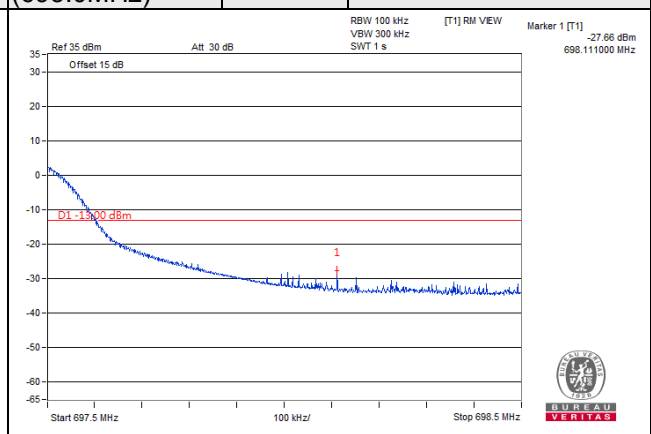
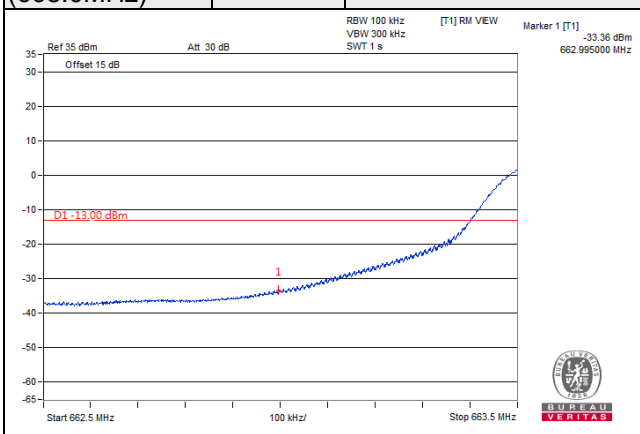


LTE Band 71, Channel Bandwidth 10MHz

Channel 133172 (668.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 133422 (693.0MHz)	QPSK	1 RB / 49 RB Offset
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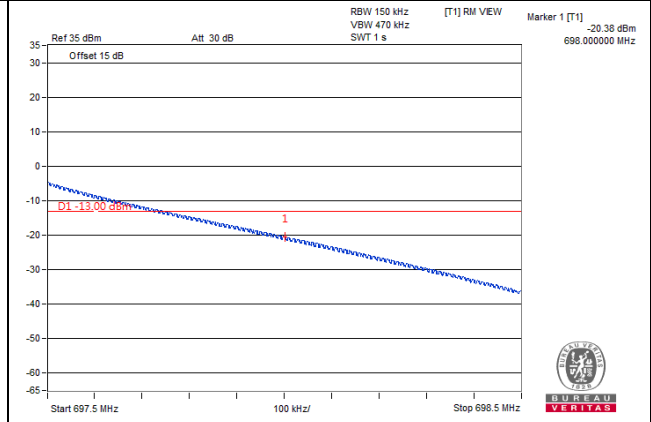
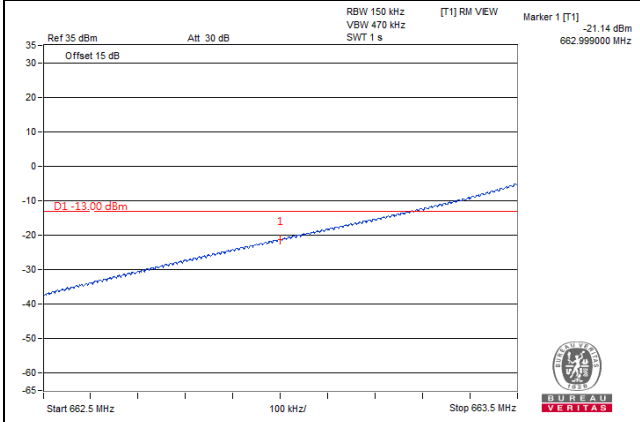


Channel 133172 (668.0MHz)	QPSK	50 RB / 0 RB Offse	Channel 133422 (693.0MHz)	QPSK	50 RB / 0 RB Offset
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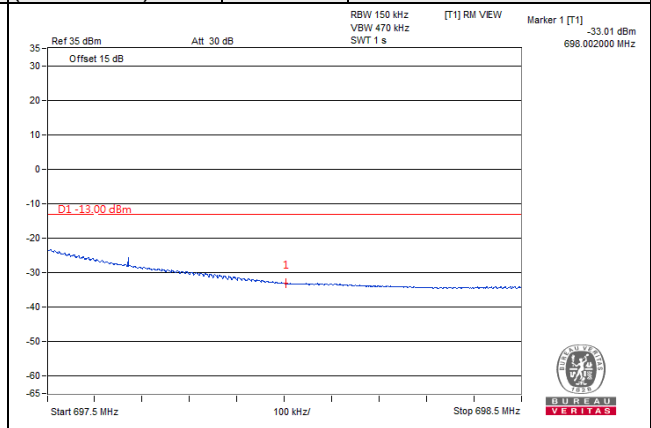
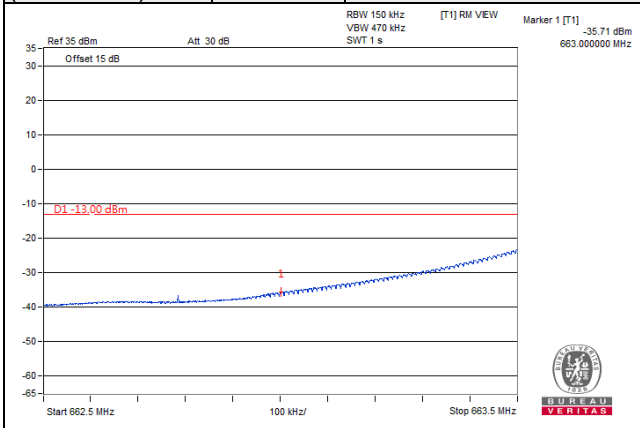


LTE Band 71, Channel Bandwidth 15MHz

Channel 133197 (670.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 133397 (690.5MHz)	QPSK	1 RB / 74 RB Offset
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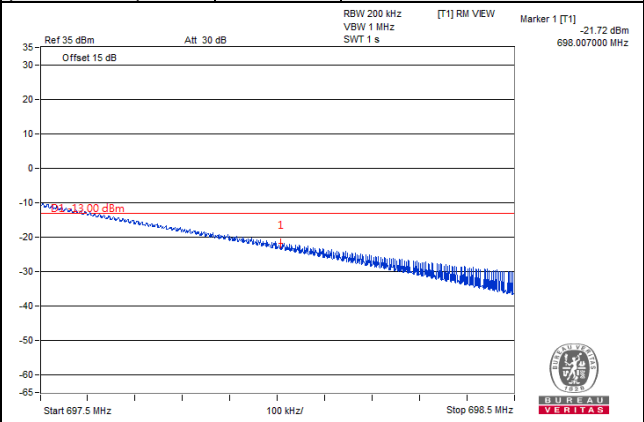
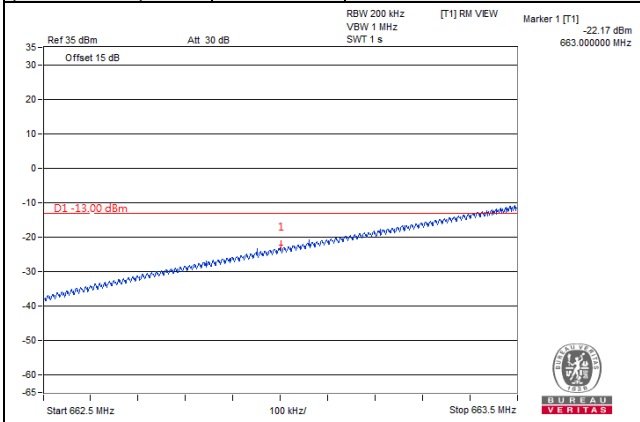


Channel 133197 (670.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 133397 (690.5MHz)	QPSK	75 RB / 0 RB Offset
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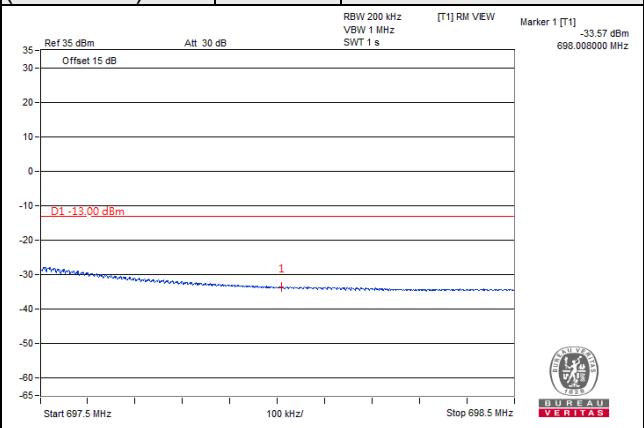
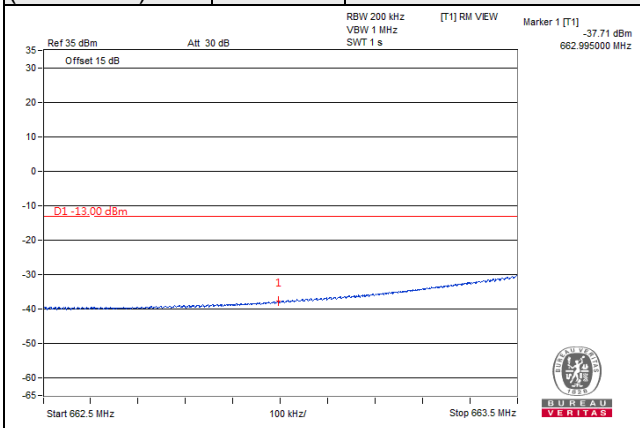


LTE Band 71, Channel Bandwidth 20MHz

Channel 133222 (673.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 133372 (688.0MHz)	QPSK	1 RB / 99 RB Offset
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Channel 133222 (673.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 133372 (688.0MHz)	QPSK	100 RB / 0 RB Offset
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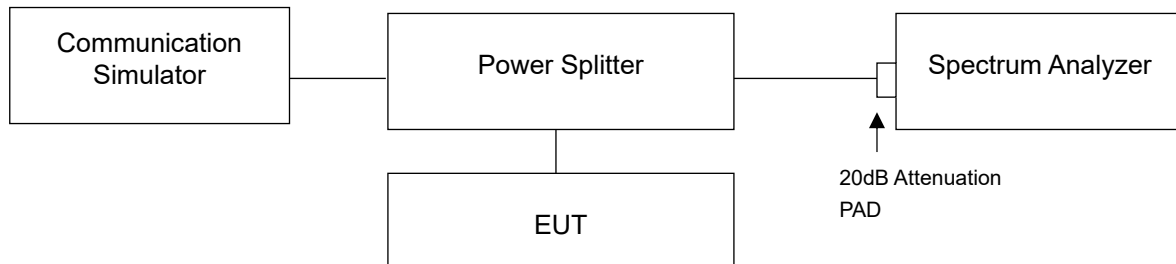


4.6 Peak to Average Ratio

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



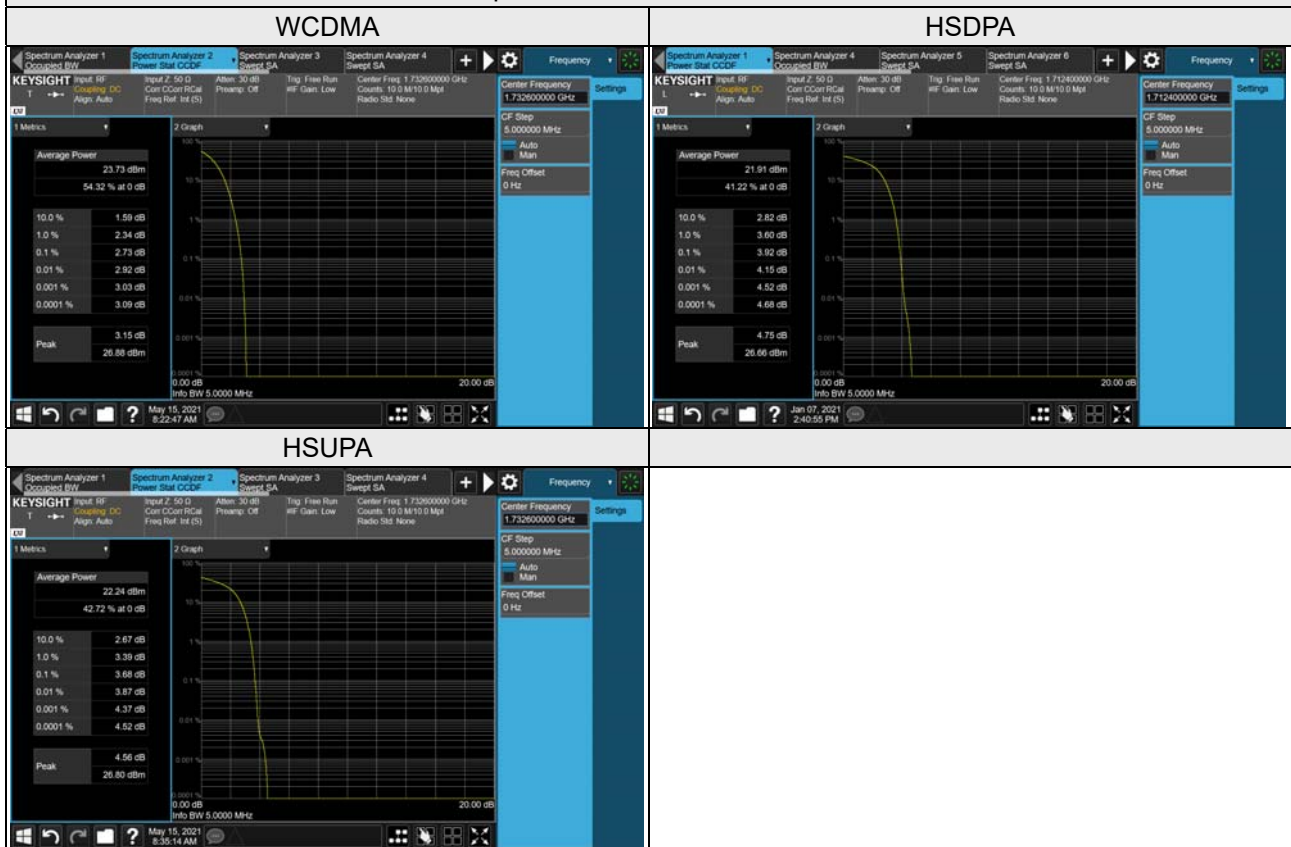
4.6.3 Test Procedures

- 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

Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
1312	1712.4	2.27	3.92	3.43
1413	1732.6	2.73	3.67	3.68
1513	1752.6	2.35	3.40	3.35

Spectrum Plot of Worst Value



LTE Band 4, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
19957	1710.7	4.67	5.49	6.20	6.93
20175	1732.5	5.10	5.92	6.42	6.81
20393	1754.3	4.63	5.45	6.09	6.79
LTE Band 4, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
19965	1711.5	4.71	5.54	6.21	6.79
20175	1732.5	5.14	5.96	6.45	6.77
20385	1753.5	4.34	5.14	5.76	6.69
LTE Band 4, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
19975	1712.5	4.65	5.53	6.18	6.76
20175	1732.5	5.14	6.00	6.55	6.92
20375	1752.5	3.94	4.80	5.57	6.77
LTE Band 4, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20000	1715.0	4.66	5.44	6.21	6.97
20175	1732.5	5.22	5.98	6.46	7.04
20350	1750.0	3.55	4.45	5.35	6.58
LTE Band 4, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20025	1717.5	4.79	5.51	6.06	6.96
20175	1732.5	5.21	5.87	6.56	6.68
20325	1747.5	4.18	4.67	5.58	6.78

LTE Band 4, Channel Bandwidth 20MHz

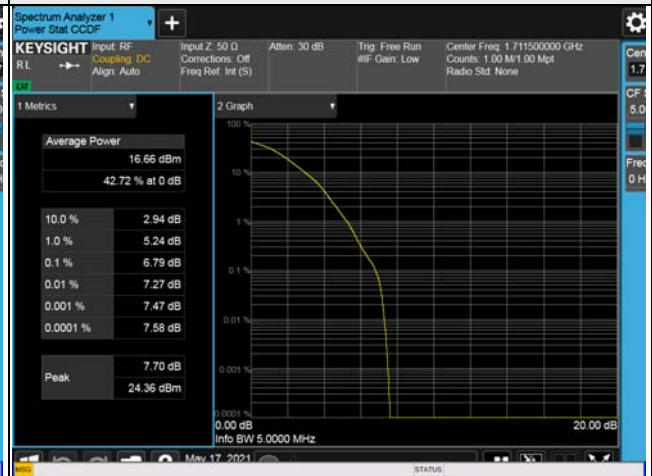
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20050	1720.0	4.48	5.36	6.27	7.17
20175	1732.5	4.83	5.60	6.41	6.86
20300	1745.0	4.56	5.23	6.17	7.18

Spectrum Plot of Worst Value

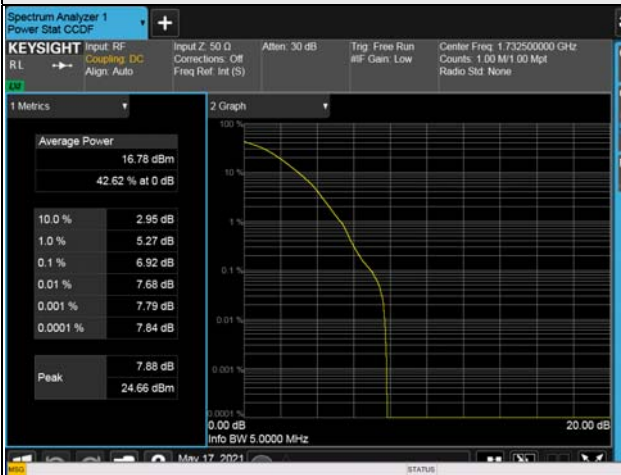
1.4MHz / 256QAM



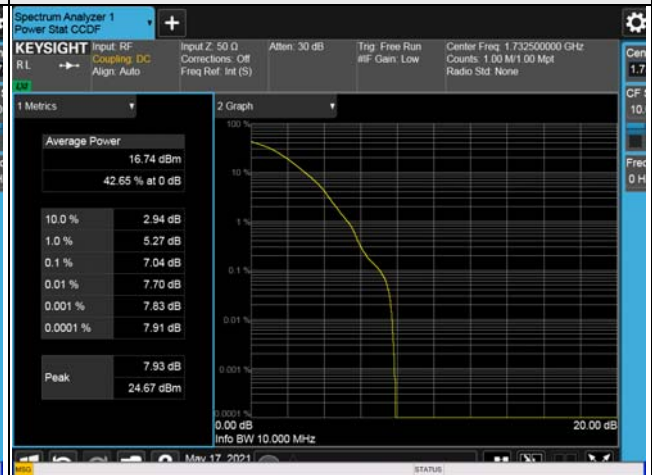
3MHz / 256QAM



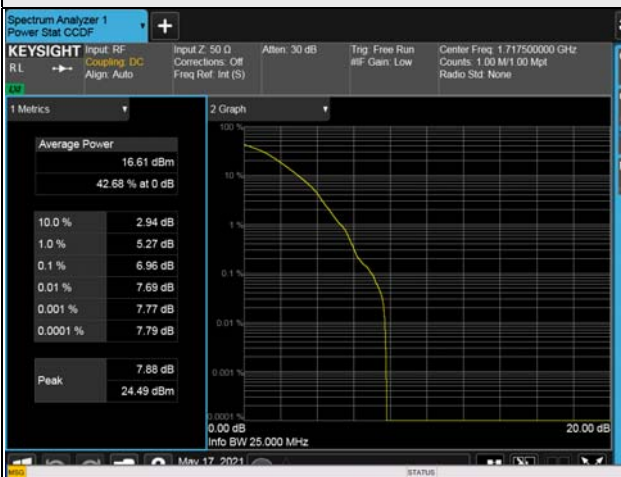
5MHz / 256QAM



10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



LTE Band 7, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20775	2502.5	4.64	5.53	6.30	7.18
21100	2535.0	4.86	5.77	6.41	7.20
21425	2567.5	4.04	4.93	5.90	6.97
LTE Band 7, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20800	2505.0	4.62	5.53	6.20	7.23
21100	2535.0	4.88	5.75	6.33	7.39
21400	2565.0	4.53	5.46	6.25	7.18
LTE Band 7, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20825	2507.5	4.63	5.55	6.16	7.42
21100	2535.0	4.93	5.77	6.24	7.38
21375	2562.5	4.60	5.42	6.20	7.34
LTE Band 7, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20850	2510.0	4.66	5.58	6.37	7.39
21100	2535.0	4.88	5.79	6.38	7.21
21350	2560.0	4.46	5.24	6.03	7.43

Spectrum Plot of Worst Value

5MHz / 256QAM



10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



LTE Band 12, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23017	699.7	5.60	6.52	6.90	7.28
23095	707.5	5.56	6.46	6.86	7.34
23173	715.3	5.42	6.32	6.68	7.15
LTE Band 12, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23025	700.5	5.60	6.52	6.88	7.25
23095	707.5	5.53	6.44	6.78	7.03
23165	714.5	5.42	6.34	6.77	7.05
LTE Band 12, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23035	701.5	5.55	6.51	6.87	7.21
23095	707.5	5.55	6.42	6.87	7.26
23155	713.5	5.43	6.39	6.83	6.96
LTE Band 12, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23060	704.0	5.60	6.46	7.01	7.25
23095	707.5	5.54	6.44	6.89	7.31
23130	711.0	5.55	6.44	6.79	7.15

Spectrum Plot of Worst Value

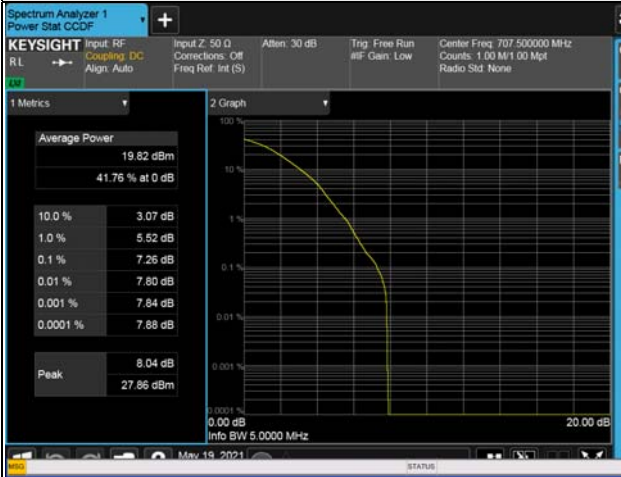
1.4MHz / 256QAM



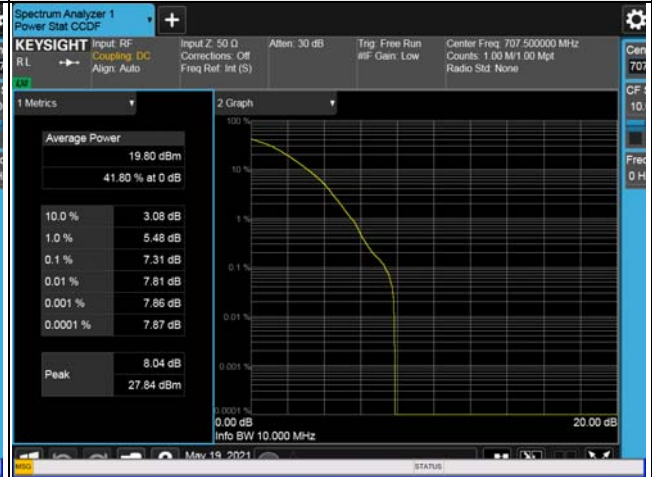
3MHz / 256QAM



5MHz / 256QAM

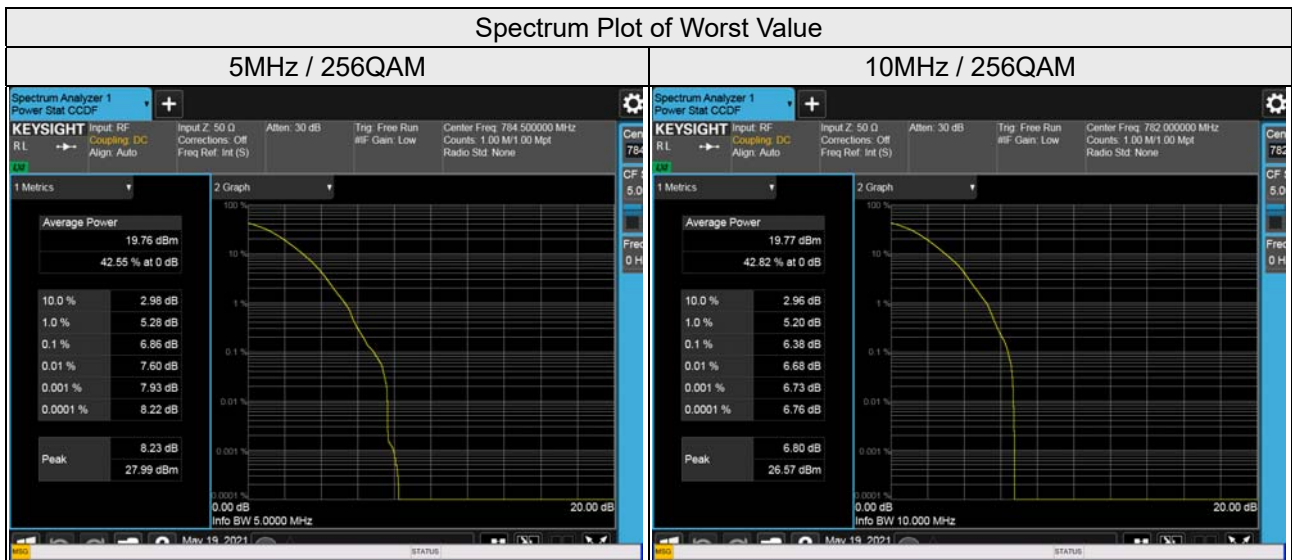


10MHz / 256QAM



LTE Band 13, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23205	779.5	3.16	3.99	4.70	6.21
23230	782.0	3.44	4.23	4.95	6.26
23255	784.5	4.53	5.31	5.89	6.86

LTE Band 13, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
23230	782.0	3.17	3.99	4.77	6.38



LTE Band 38, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
37775	2572.5	5.26	6.06	7.95	7.82
38000	2595.0	4.31	5.15	6.83	7.79
38225	2617.5	4.68	5.24	7.50	7.67
LTE Band 38, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
37800	2575.0	5.35	6.64	7.93	7.89
38000	2595.0	4.58	5.78	7.34	7.60
38200	2615.0	4.80	6.44	7.17	7.68
LTE Band 38, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
37825	2577.5	5.08	6.67	7.30	8.06
38000	2595.0	5.02	5.75	7.03	7.43
38175	2612.5	4.95	5.15	6.46	7.22
LTE Band 38, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
37850	2580.0	5.45	6.54	7.18	7.87
38000	2595.0	4.89	5.36	7.12	7.50
38150	2610.0	4.64	5.36	6.96	7.81

Spectrum Plot of Worst Value

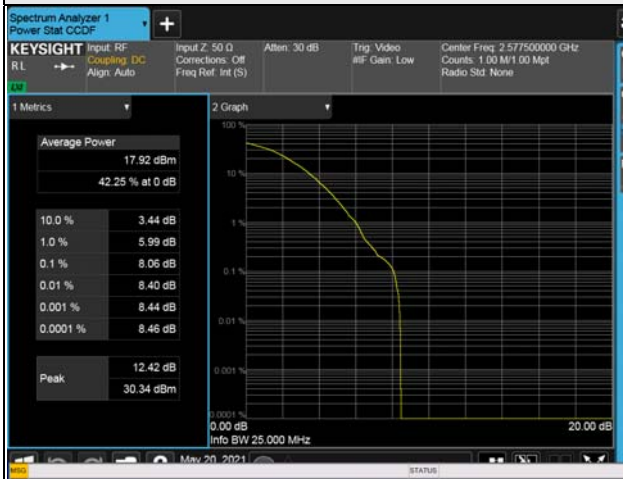
5MHz / 256QAM



10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



LTE Band 41, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
39675	2498.5	3.81	6.34	7.91	8.24
40620	2593.0	3.99	6.57	8.31	8.87
41565	2687.5	3.85	6.98	8.44	7.94
LTE Band 41, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
39700	2501.0	3.93	6.27	7.96	7.93
40620	2593.0	4.11	6.66	8.07	8.42
41540	2685.0	4.04	6.45	8.31	8.38
LTE Band 41, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
39725	2503.5	4.48	6.75	7.93	8.19
40620	2593.0	4.68	6.30	8.08	4.81
41515	2682.5	5.22	5.61	7.40	8.00
LTE Band 41, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
39750	2506.0	4.85	6.33	7.48	8.56
40620	2593.0	5.07	6.55	8.14	8.58
41490	2680.0	4.86	6.22	8.06	8.32

Spectrum Plot of Worst Value

5MHz / 256QAM



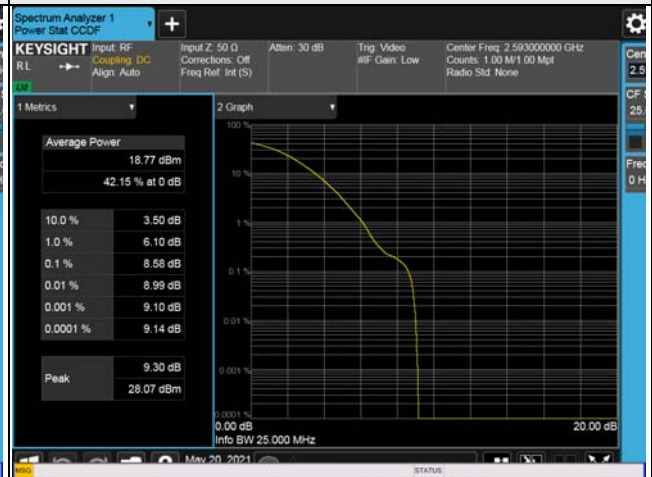
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



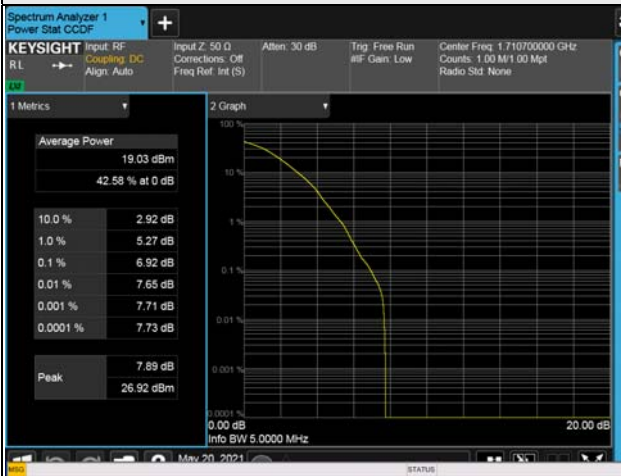
LTE Band 66, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
131979	1710.7	4.45	5.25	6.01	6.92
132322	1745.0	3.39	4.18	4.91	6.46
132665	1779.3	4.76	5.57	6.16	6.88
LTE Band 66, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
131987	1711.5	4.37	5.25	5.97	7.00
132322	1745.0	3.35	4.19	4.94	6.52
132657	1778.5	4.56	5.41	5.74	6.82
LTE Band 66, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
131997	1712.5	4.33	5.26	5.98	7.03
132322	1745.0	3.36	4.23	4.98	6.58
132647	1777.5	4.20	5.01	5.68	6.85
LTE Band 66, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
132022	1715.0	4.31	5.22	5.92	7.05
132322	1745.0	3.58	4.45	5.21	6.66
132622	1775.0	3.88	4.69	5.39	6.74
LTE Band 66, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
132047	1717.5	4.31	5.21	5.98	6.84
132322	1745.0	3.94	4.80	5.50	6.30
132597	1772.5	4.61	5.45	6.09	6.58

LTE Band 66, Channel Bandwidth 20MHz

Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
132072	1720.0	4.29	5.19	5.95	7.15
132322	1745.0	4.32	5.24	5.91	6.27
132572	1770.0	5.01	5.87	6.50	6.41

Spectrum Plot of Worst Value

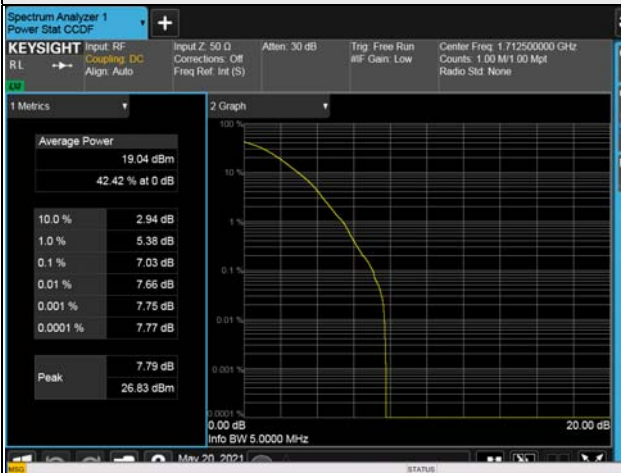
1.4MHz / 256QAM



3MHz / 256QAM



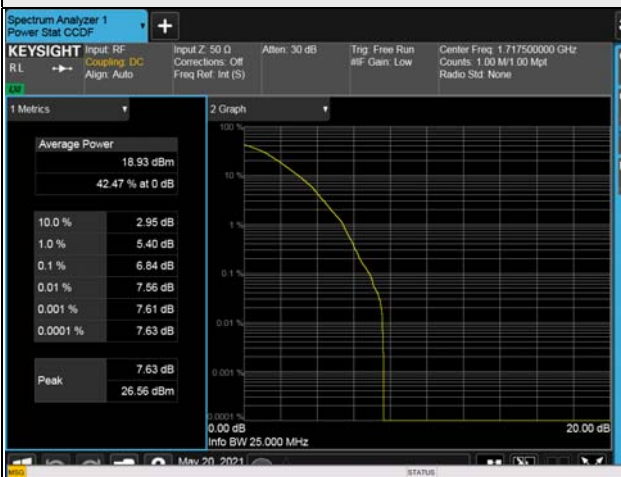
5MHz / 256QAM



10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



LTE Band 71, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
133147	665.5	4.22	5.05	5.80	7.00
133297	680.5	4.65	5.50	6.07	6.93
133447	695.5	4.41	5.26	5.91	6.84
LTE Band 71, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
133172	668.0	4.25	5.07	5.87	6.91
133297	680.5	4.75	5.63	6.14	6.80
133422	693.0	4.78	5.67	6.17	6.54
LTE Band 71, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
133197	670.5	4.32	5.23	5.82	6.75
133297	680.5	4.73	5.55	6.07	6.95
133397	690.5	4.66	5.52	6.06	7.05
LTE Band 71, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
133222	673.0	4.34	5.17	5.92	6.29
133297	680.5	4.56	5.41	6.17	6.65
133372	688.0	4.66	5.46	5.99	6.82

Spectrum Plot of Worst Value

5MHz / 256QAM



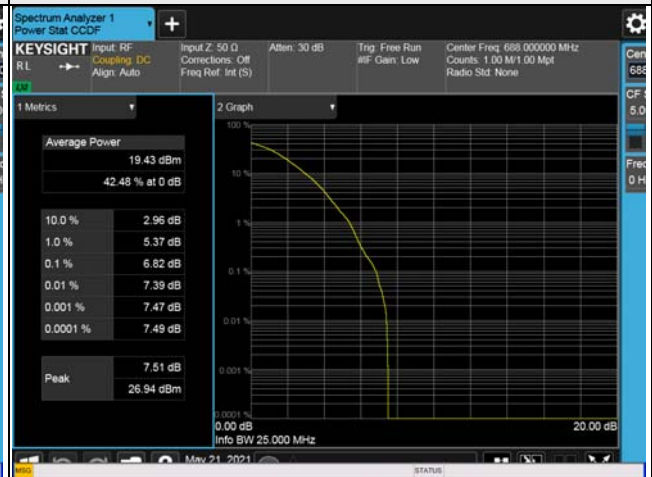
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM



4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

For WCDMA Band 4, LTE Band 4, LTE Band 66:

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 LTE Band 7, LTE Band 38, LTE Band 41:

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 LTE Band 13:

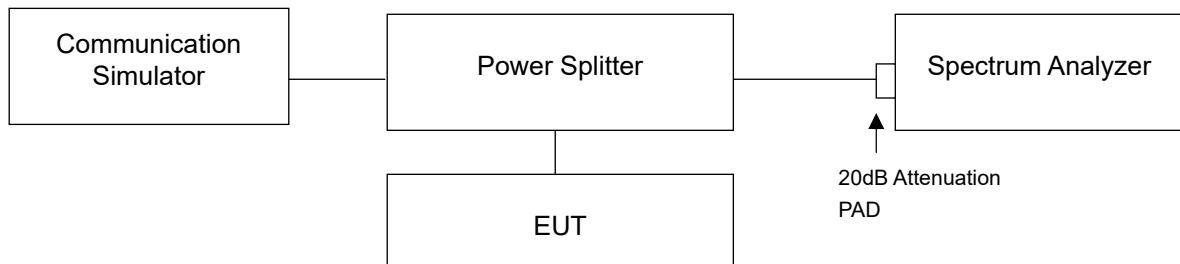
According to FCC 27.53(c)(2) for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB.

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 LTE Band 12, LTE Band 17, LTE Band 71:

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.

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 1GHz. 20dB attenuation pad is connected with spectrum. RBW=100kHz and VBW=300kHz are used for LTE Band 12, LTE Band 13 and LTE Band 71 conducted emission measurement.
- c. Measuring frequency range is from 9kHz to 1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for WCDMA / HSDPA / HSUPA Band 4, LTE Band 4, LTE Band 7, LTE Band 38, LTE Band 41 and LTE Band 66 conducted emission measurement.
- d. Measuring frequency range is from 1GHz to 7GHz / 8GHz / 18GHz / 20GHz / 24GHz / 26GHz / 27GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.