15MHz+10MHz Channel Bandwidth Full RB

Lower ACP

Upper ACP

15MHz+15MHz Channel Bandwidth Full RB

Lower ACP

Upper ACP

15MHz+20MHz Channel Bandwidth Full RB

Lower ACP

Upper ACP

20MHz+5MHz Channel Bandwidth Full RB

Lower ACP

Upper ACP

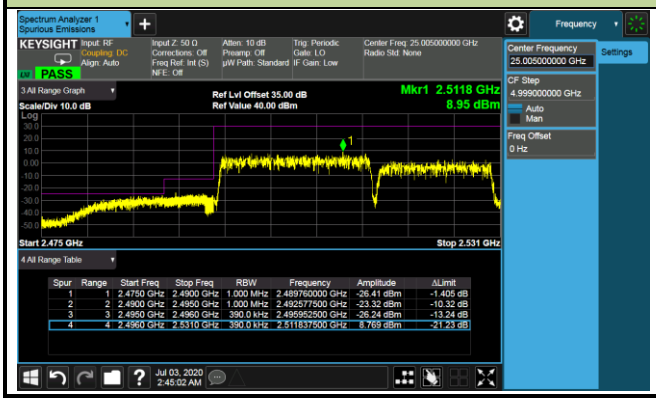
20MHz+10MHz Channel Bandwidth Full RB

Lower ACP

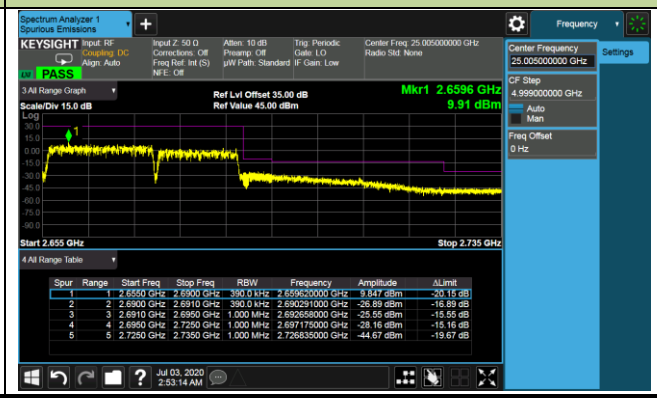
Upper ACP

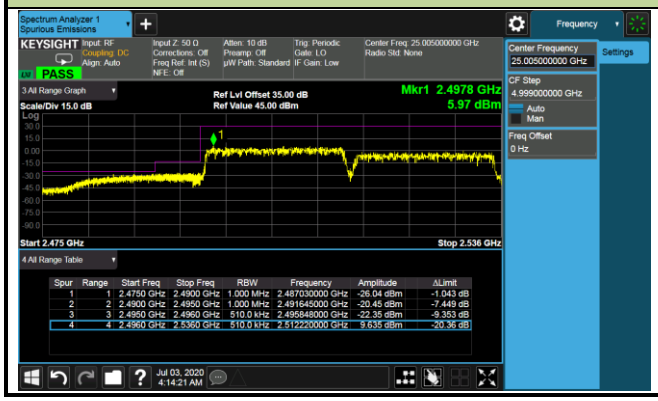
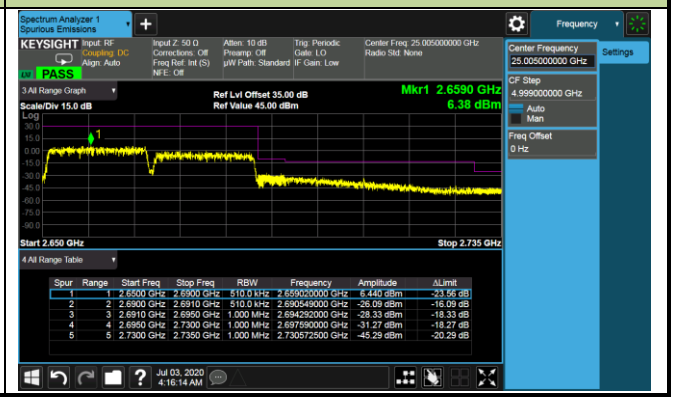
20MHz+15MHz Channel Bandwidth Full RB

Lower ACP

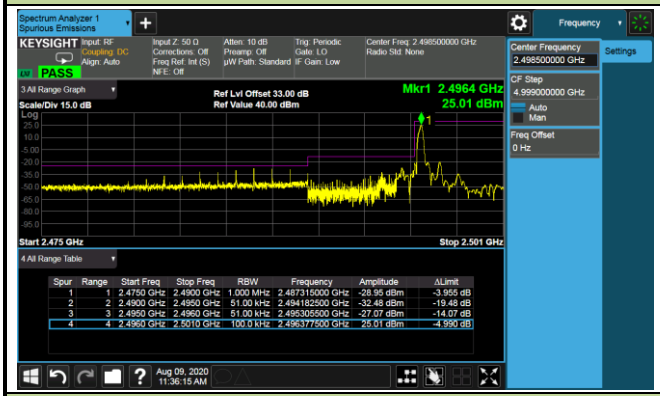
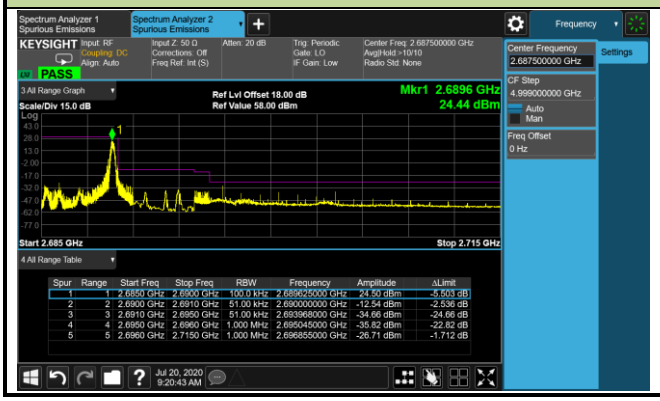


Upper ACP



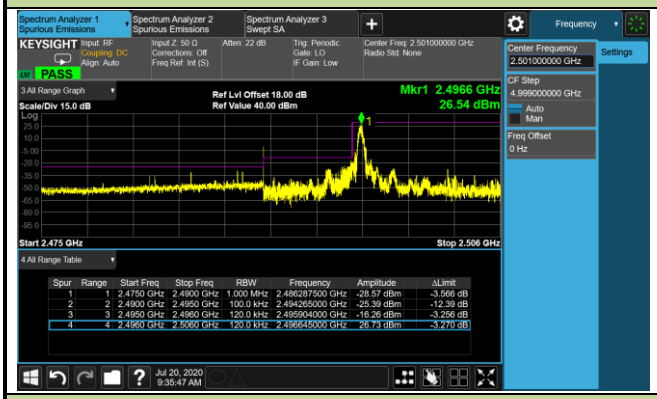
20MHz+20MHz Channel Bandwidth Full RB	
Lower ACP	Upper ACP
	

Product	LTE-A Cat 12 M.2 Module	Test Engineer	Gordon Qi
Test Date	2020/08/09	Test Site	SR6
Test Band	Band 41 For HPUE	Test Result	Pass

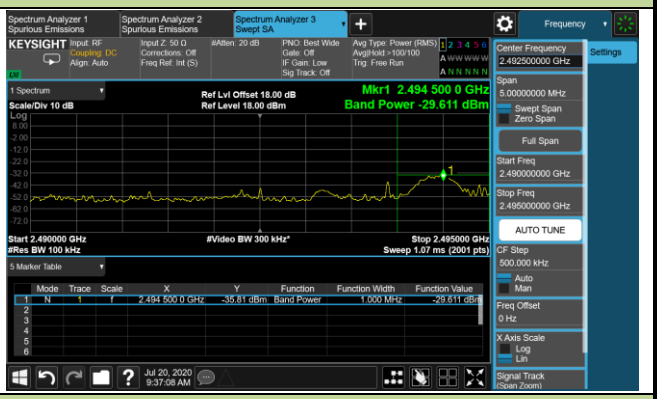
5MHz Channel Bandwidth - 1RB	
Lower ACP	Lower Extended Band Edge
	
Upper ACP	Upper Extended Band Edge
	

10MHz Channel Bandwidth - 1RB

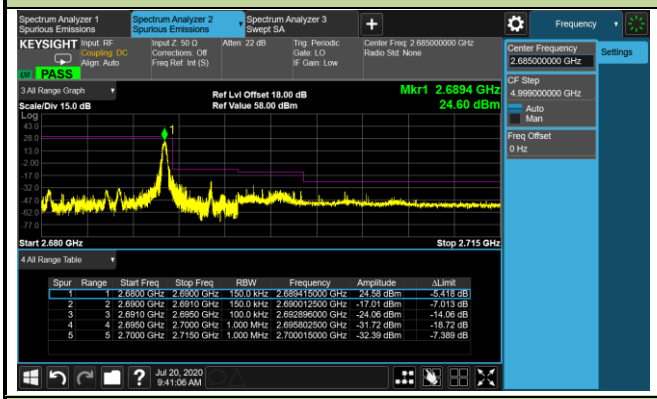
Lower ACP



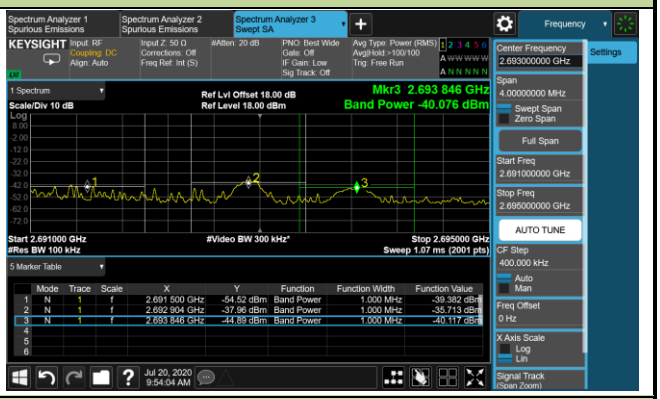
Lower Extended Band Edge



Upper ACP

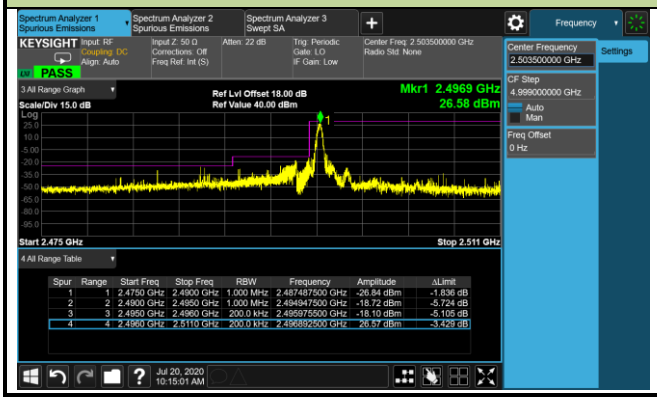


Upper Extended Band Edge

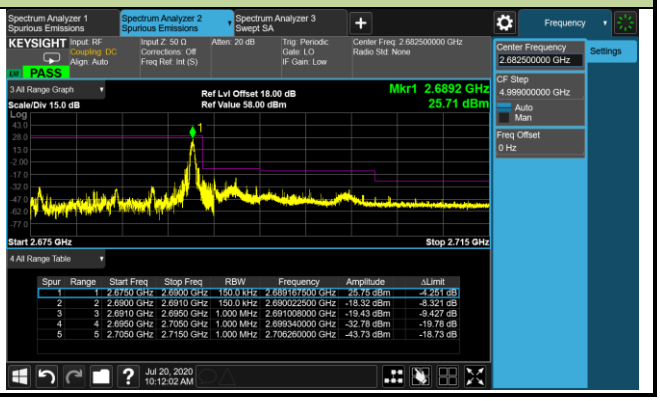


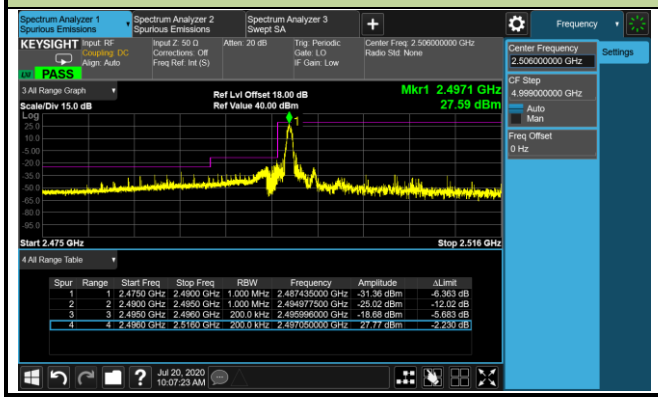
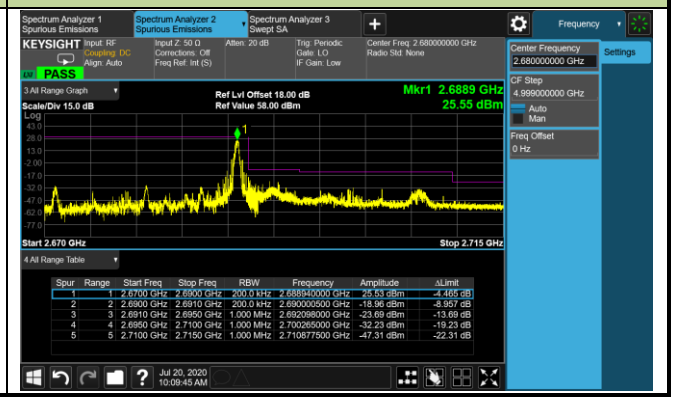
15MHz Channel Bandwidth - 1RB

Lower ACP



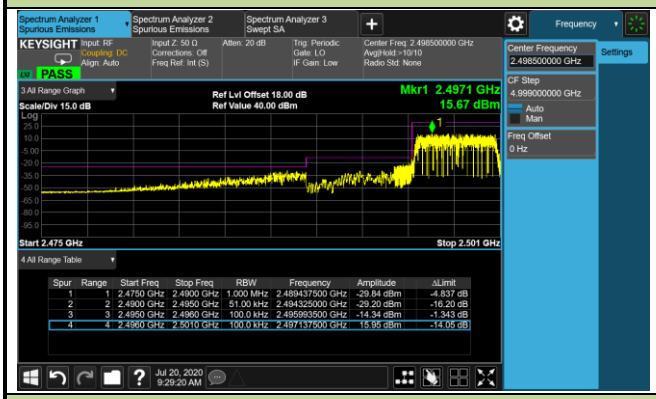
Upper ACP



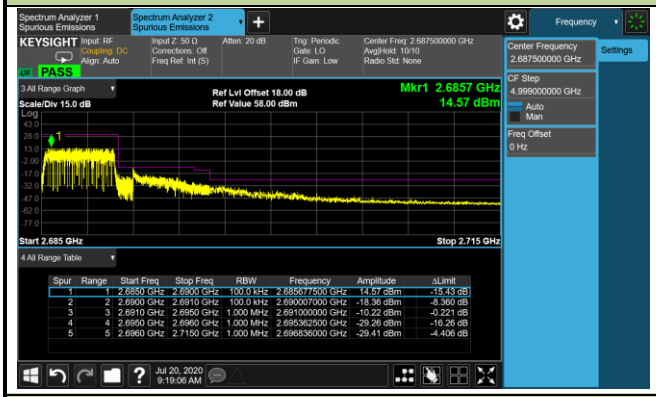
20MHz Channel Bandwidth - 1RB	
Lower ACP	Upper ACP
	

5MHz Channel Bandwidth - Full RB

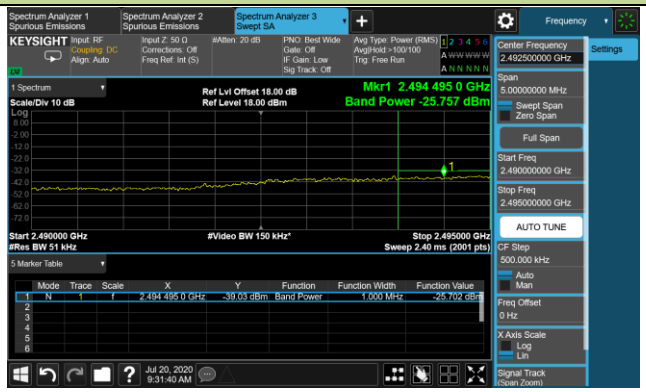
Lower ACP



Upper ACP



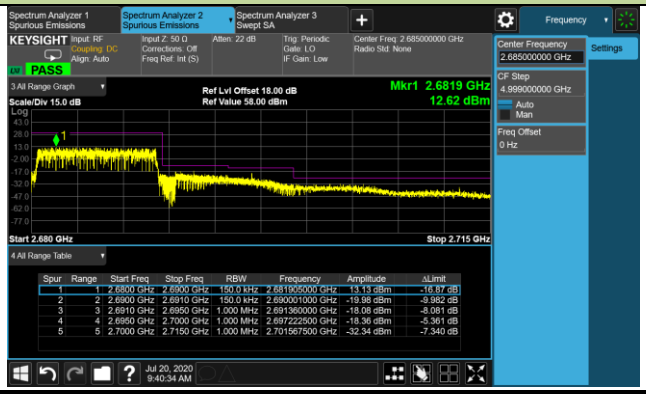
Upper Extended Band Edge



10MHz Channel Bandwidth - Full RB

Lower ACP

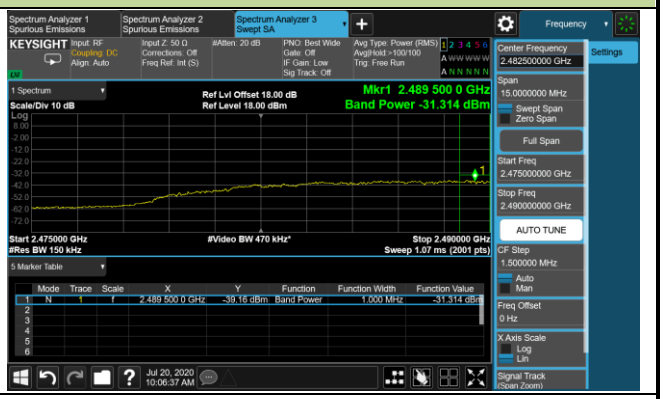
Upper ACP



15MHz Channel Bandwidth - Full RB

Lower ACP

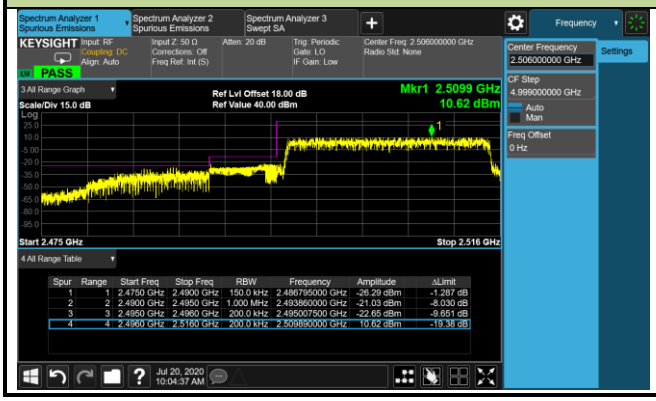
Lower Extended Band Edge



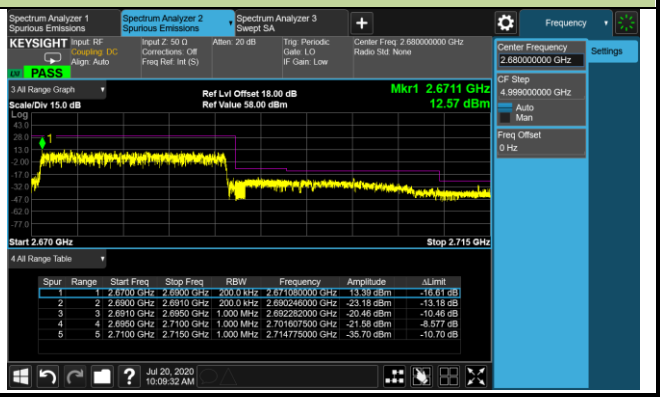
Upper ACP

20MHz Channel Bandwidth - Full RB

Lower ACP



Upper ACP



5.6. Peak to Average Ratio

5.6.1. Test Limit

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

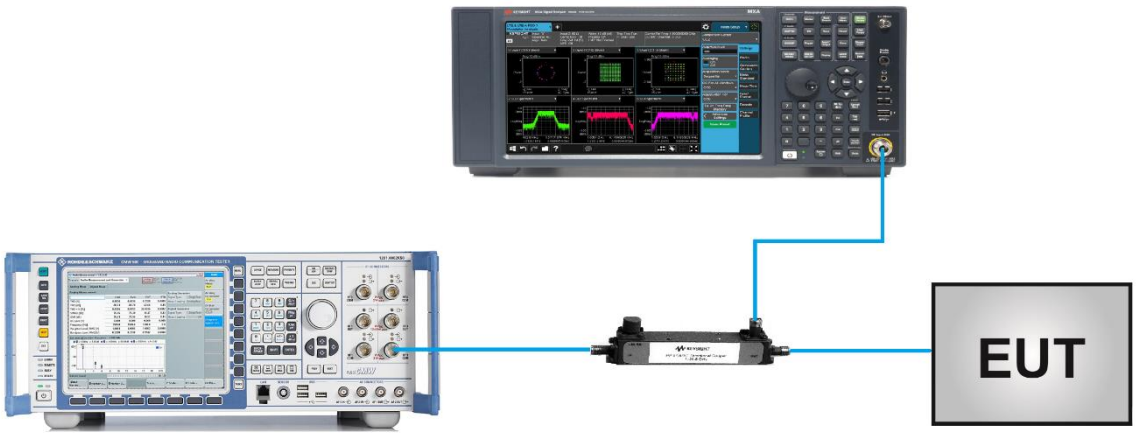
5.6.2. Test Procedure Used

ANSI C63.26-2015 - Section 5.2.3.4 (CCDF).

5.6.3. Test Setting

1. Set the resolution / measurement bandwidth ≥ signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PARR level associated with a probability of 0.1%

5.6.4. Test Setup

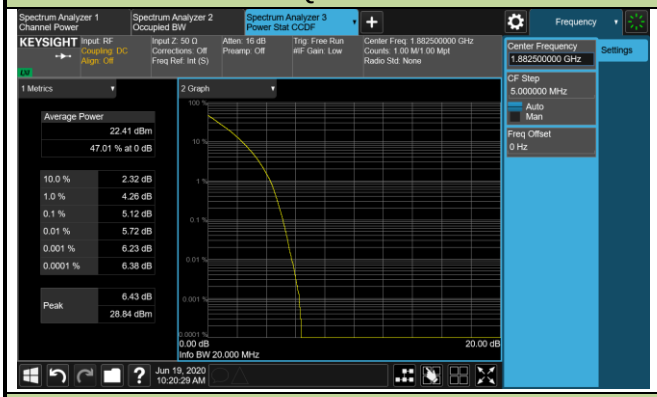


5.6.5. Test Result

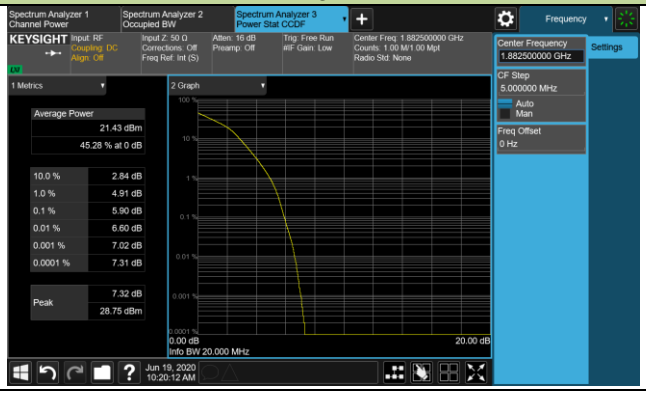
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/19	Test Site	SR6
Test Band	Band 2/25	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
26365	1882.5	20	5.12	≤ 13.00	Pass
16QAM					
26365	1882.5	20	5.90	≤ 13.00	Pass
64QAM					
26365	1882.5	20	6.54	≤ 13.00	Pass

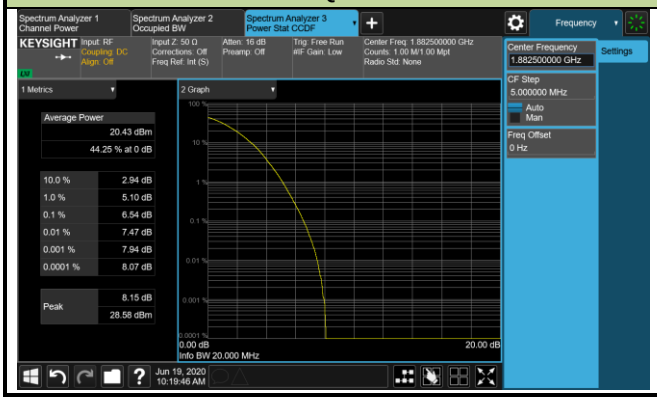
QPSK



16QAM



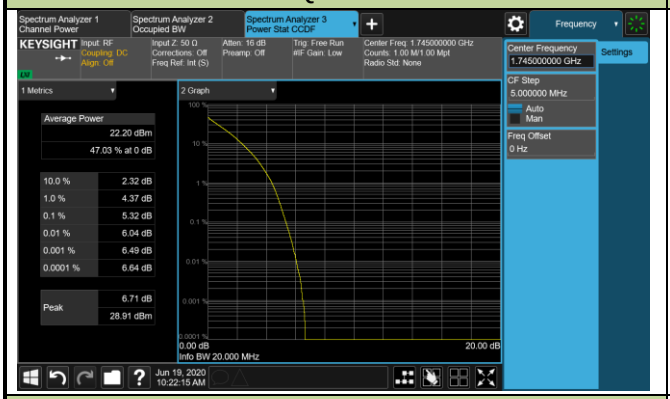
64QAM



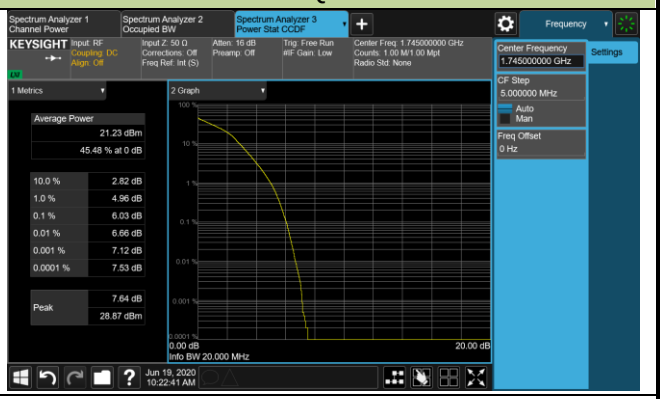
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/19	Test Site	SR6
Test Band	Band 4/66	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
132322	1745.0	20	5.32	≤ 13.00	Pass
16QAM					
132322	1745.0	20	6.57	≤ 13.00	Pass
64QAM					
132322	1745.0	20	6.03	≤ 13.00	Pass

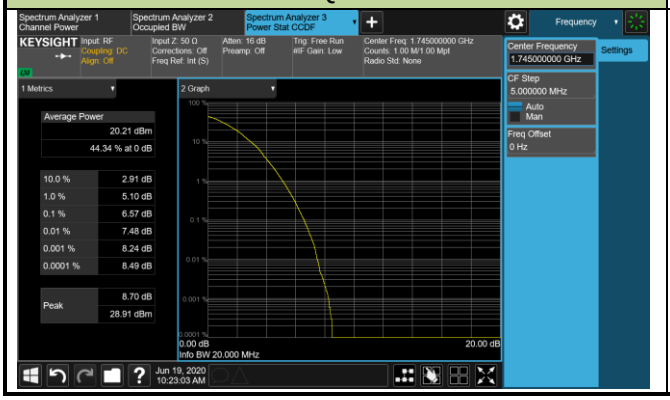
QPSK



16QAM



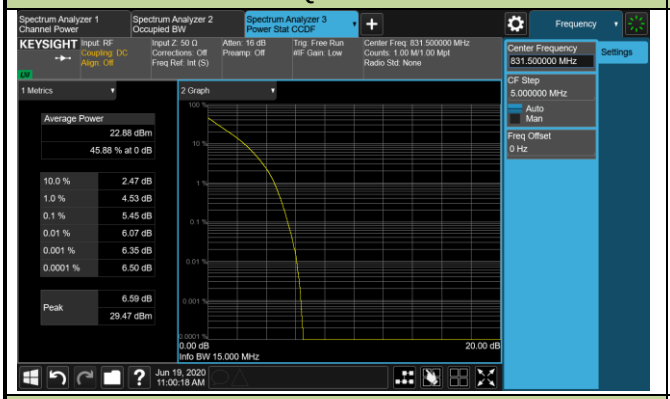
64QAM



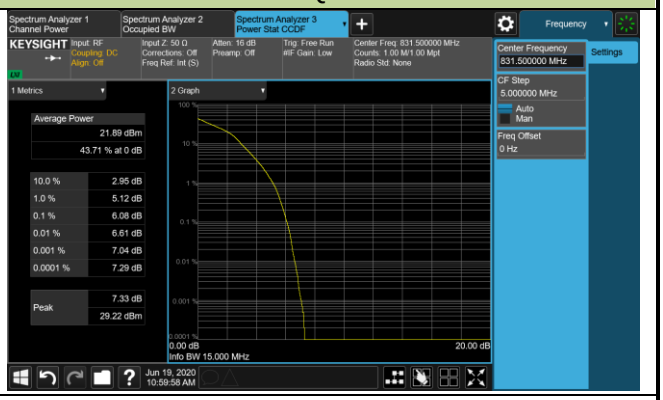
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/19	Test Site	SR6
Test Band	Band 5/26	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
20525	836.5	10	5.45	≤ 13.00	Pass
16QAM					
20525	836.5	10	6.08	≤ 13.00	Pass
64QAM					
20525	836.5	10	6.53	≤ 13.00	Pass

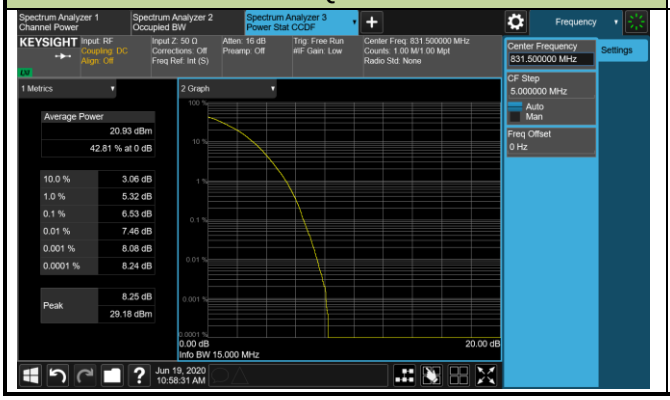
QPSK



16QAM



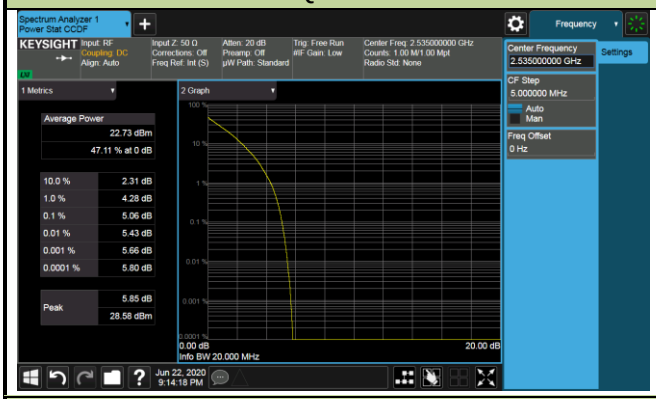
64QAM



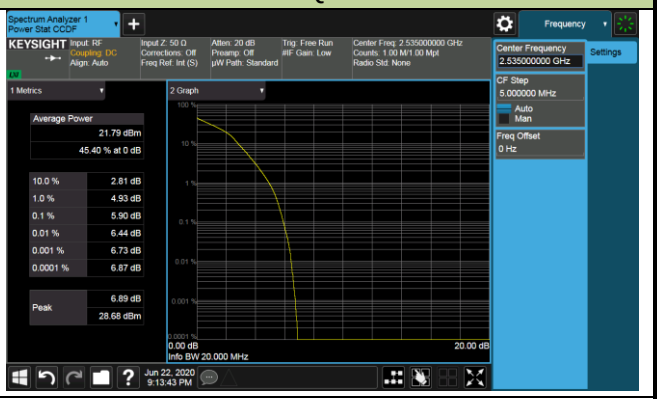
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/22	Test Site	SR6
Test Band	Band 7	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
21100	2535.0	20	5.06	≤ 13.00	Pass
16QAM					
21100	2535.0	20	5.90	≤ 13.00	Pass
64QAM					
21100	2535.0	20	6.57	≤ 13.00	Pass

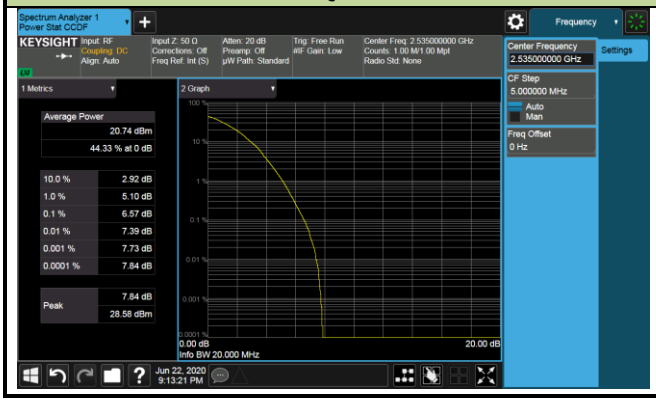
QPSK



16QAM



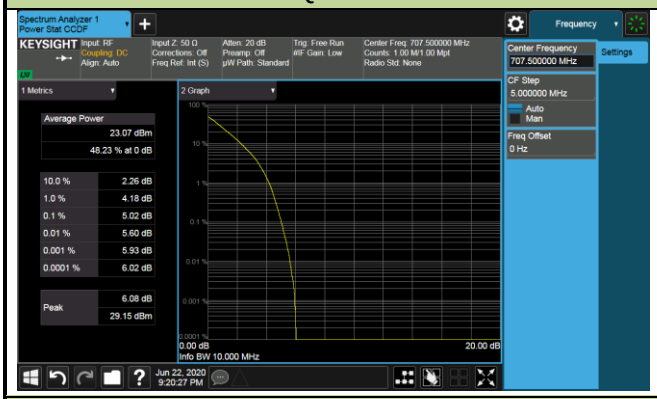
64QAM



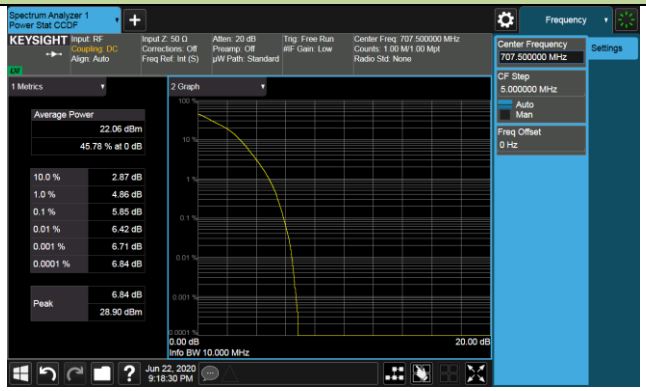
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/22	Test Site	SR6
Test Band	Band 12	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
26365	707.5	10	5.02	≤ 13.00	Pass
16QAM					
26365	707.5	10	5.85	≤ 13.00	Pass
64QAM					
26365	707.5	10	6.48	≤ 13.00	Pass

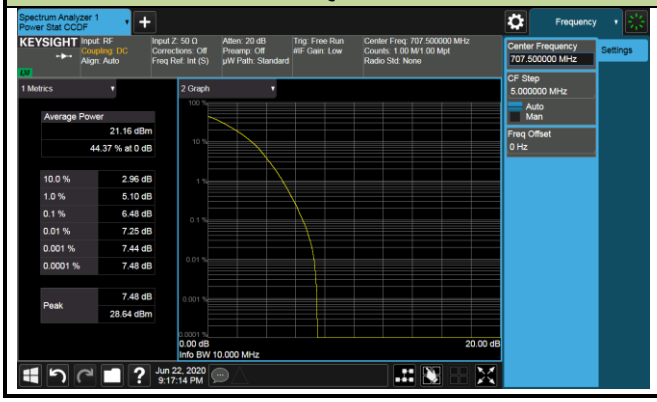
QPSK



16QAM



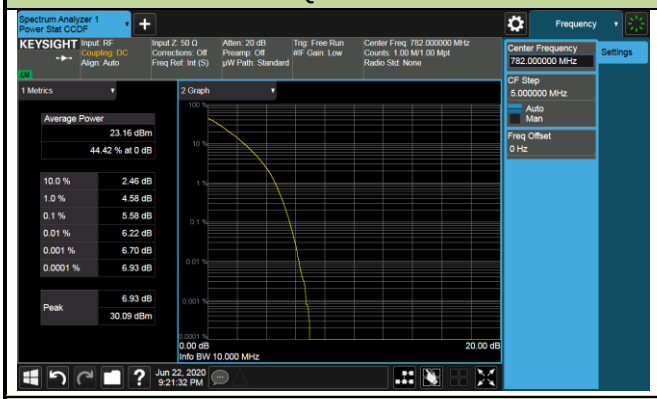
64QAM



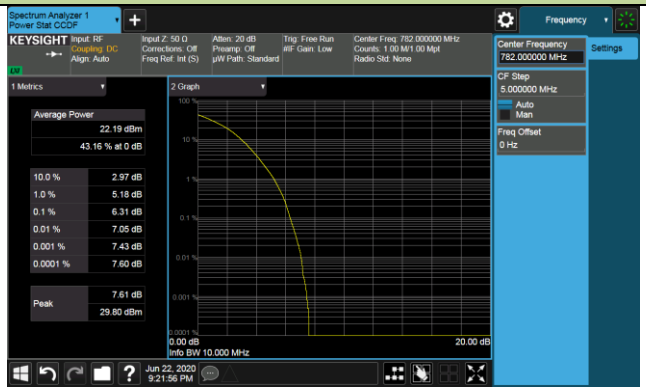
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/22	Test Site	SR6
Test Band	Band 13	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
132322	782	10	5.58	≤ 13.00	Pass
16QAM					
132322	782	10	6.31	≤ 13.00	Pass
64QAM					
132322	782	10	6.85	≤ 13.00	Pass

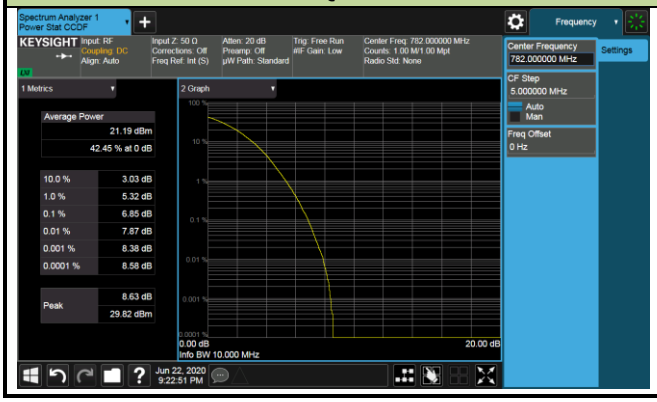
QPSK



16QAM



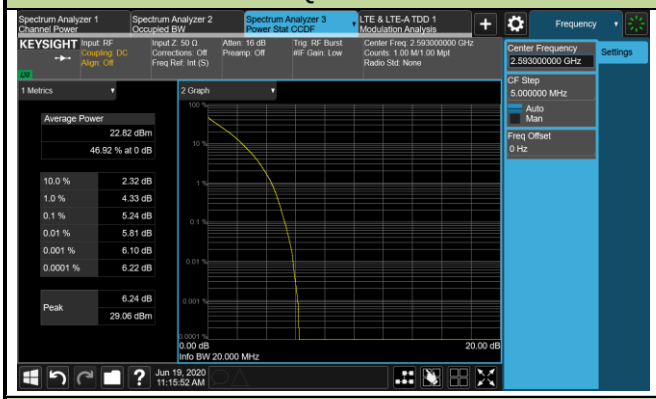
64QAM



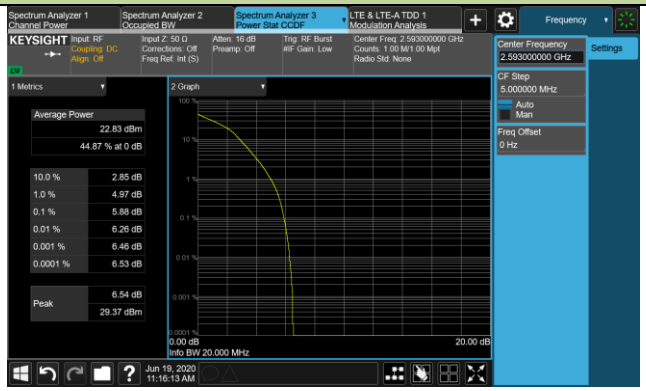
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/19	Test Site	SR6
Test Band	Band 38/41	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
38000	2595.0	20	5.24	≤ 13.00	Pass
16QAM					
38000	2595.0	20	5.88	≤ 13.00	Pass
64QAM					
38000	2595.0	20	5.88	≤ 13.00	Pass

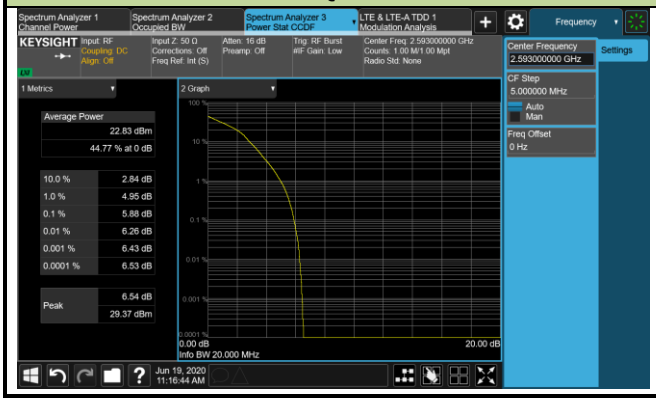
QPSK



16QAM



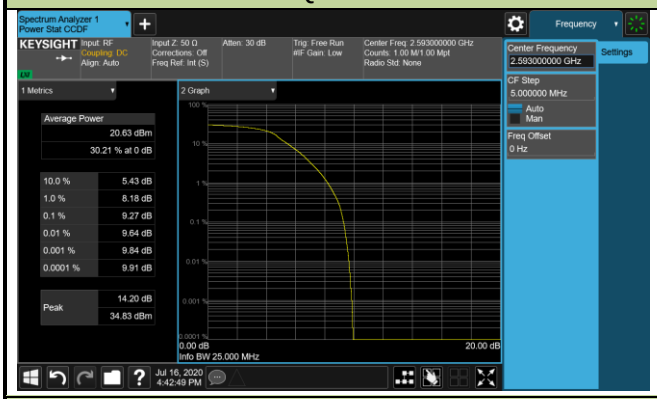
64QAM



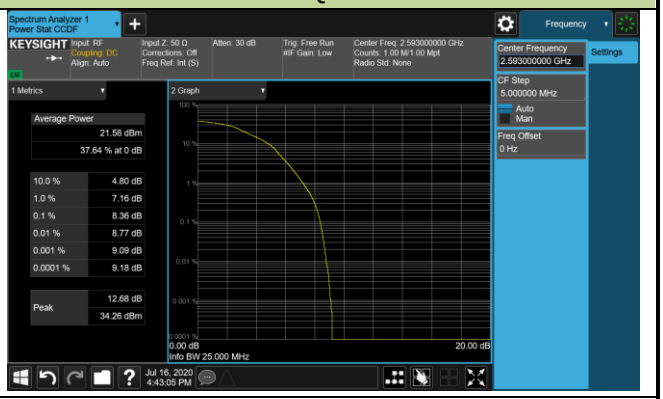
Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/07/16	Test Site	SR6
Test Band	Band 41 For HPUE	Test Result	Pass

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	Peak to Average Ratio (dB)	Limit (dB)	Result
QPSK					
40620	2593.0	20	9.27	≤ 13.00	Pass
16QAM					
40620	2593.0	20	8.36	≤ 13.00	Pass
64QAM					
40620	2593.0	20	8.99	≤ 13.00	Pass

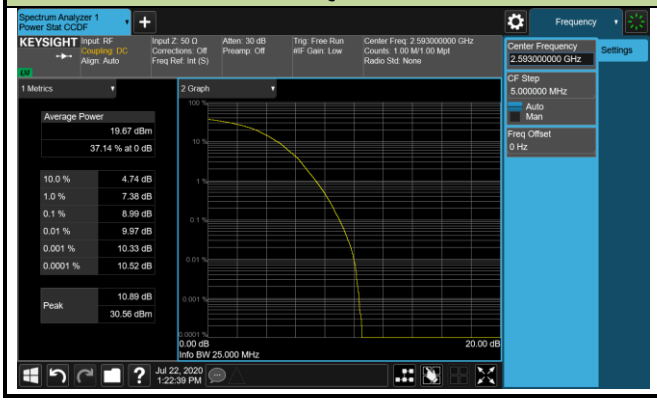
QPSK



16QAM



64QAM



5.7. Conducted Spurious Emissions

5.7.1. Test Limit

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

For Band 7, 38/41 the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 55 + 10 log(P) dB.

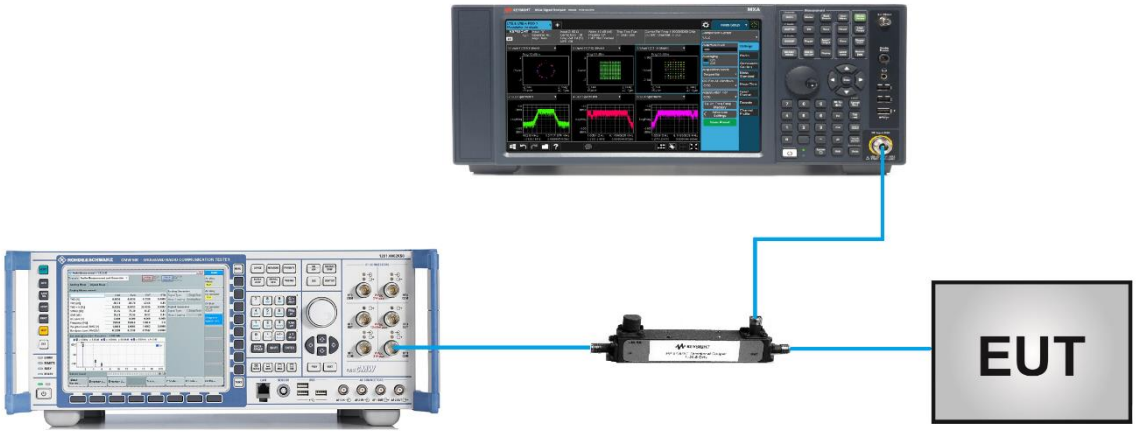
5.7.2. Test Procedure Used

ANSI C63.26-2015 - Section 5.7

5.7.3. Test Setting

1. Set the analyzer frequency to low, mid, high channel.
2. RBW = 1MHz
3. VBW ≥ 3*RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to “free run.”
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power.
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

5.7.4. Test Setup



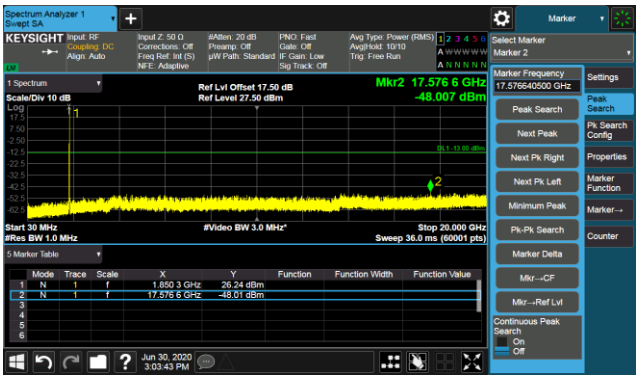
5.7.5. Test Result

Product	LTE-A Cat 12 M.2 Module	Test Engineer	Candy Luo
Test Date	2020/06/30	Test Site	SR6
Test Band	Band 2/25	Test Result	Pass

Channel	Frequency (MHz)	Channel Bandwidth (MHz)	Frequency Range (MHz)	Max Spurious Emissions (dBm)	Limit (dBm)	Result
26047	1850.7	1.4	30 ~ 20000	-48.01	≤ -13.00	Pass
26365	1882.5	1.4	30 ~ 20000	-48.20	≤ -13.00	Pass
26683	1914.3	1.4	30 ~ 20000	-46.97	≤ -13.00	Pass
26055	1851.5	3	30 ~ 20000	-47.43	≤ -13.00	Pass
26365	1882.5	3	30 ~ 20000	-46.66	≤ -13.00	Pass
26675	1913.5	3	30 ~ 20000	-47.23	≤ -13.00	Pass
26065	1852.5	5	30 ~ 20000	-47.38	≤ -13.00	Pass
26365	1882.5	5	30 ~ 20000	-46.78	≤ -13.00	Pass
26665	1912.5	5	30 ~ 20000	-48.20	≤ -13.00	Pass
16390	1855.0	10	30 ~ 20000	-46.79	≤ -13.00	Pass
26365	1882.5	10	30 ~ 20000	-48.14	≤ -13.00	Pass
26640	1910.0	10	30 ~ 20000	-46.83	≤ -13.00	Pass
26115	1857.5	15	30 ~ 20000	-47.88	≤ -13.00	Pass
26365	1882.5	15	30 ~ 20000	-47.39	≤ -13.00	Pass
26615	1907.5	15	30 ~ 20000	-47.16	≤ -13.00	Pass
26140	1860.0	20	30 ~ 20000	-46.45	≤ -13.00	Pass
26365	1882.5	20	30 ~ 20000	-48.13	≤ -13.00	Pass
26590	1905.0	20	30 ~ 20000	-48.07	≤ -13.00	Pass

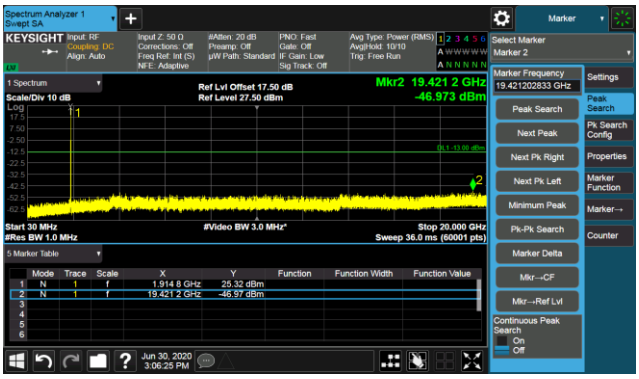
1.4MHz Channel Bandwidth

Channel 26047 (1850.7MHz)



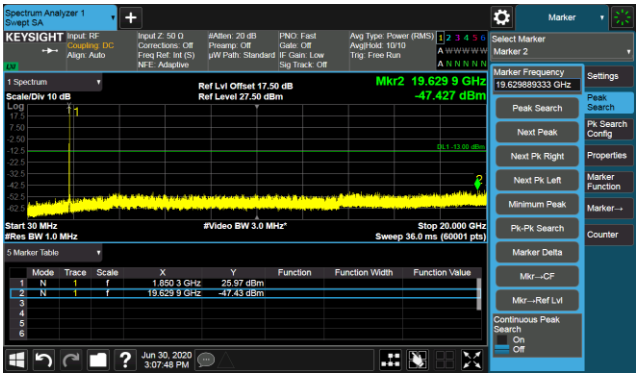
Channel 26365 (1882.5MHz)

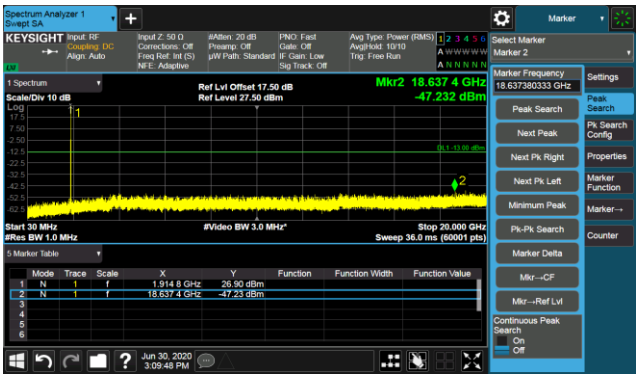
Channel 26683 (1914.3MHz)



3MHz Channel Bandwidth

Channel 26055 (1851.5MHz)



Channel 26365 (1882.5MHz)

Channel 26675 (1913.5MHz)