

## EIRP Power Density

### LTE Band 30

#### QPSK / 5M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27685	2307.5	H	16.52	6.75	23.27	212.32
27710	2310	H	16.53	6.74	23.27	212.32
27735	2312.5	H	16.43	6.74	23.17	207.49

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

#### QPSK / 10M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27710	2310	H	16.23	6.74	22.97	198.15

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

#### 16QAM / 5M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27685	2307.5	H	16.47	6.75	23.22	209.89
27710	2310	H	16.49	6.74	23.23	210.38
27735	2312.5	H	16.39	6.74	23.13	205.59

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

#### 16QAM / 10M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27710	2310	H	16.15	6.74	22.89	194.54

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

### 64QAM / 5M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27685	2307.5	H	16.48	6.75	23.23	210.38
27710	2310	H	16.45	6.74	23.19	208.45
27735	2312.5	H	16.48	6.74	23.22	209.89

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

### 64QAM / 10M

Channel	Frequency (MHz)	Antenna Polarization	LVL (dBm/5MHz)	Correction Factor(dB)	EIRP Power Density (dBm/5MHz)	EIRP Power Density (mW /5MHz)
27710	2310	H	16.09	6.74	22.83	191.87

Note: The worst case vertical or horizontal polarization have been investigated and find the worst is horizontal.

## 4.2 Modulation characteristics Measurement

### 4.2.1 Limits of Modulation characteristics

N/A

### 4.2.2 Test Procedure

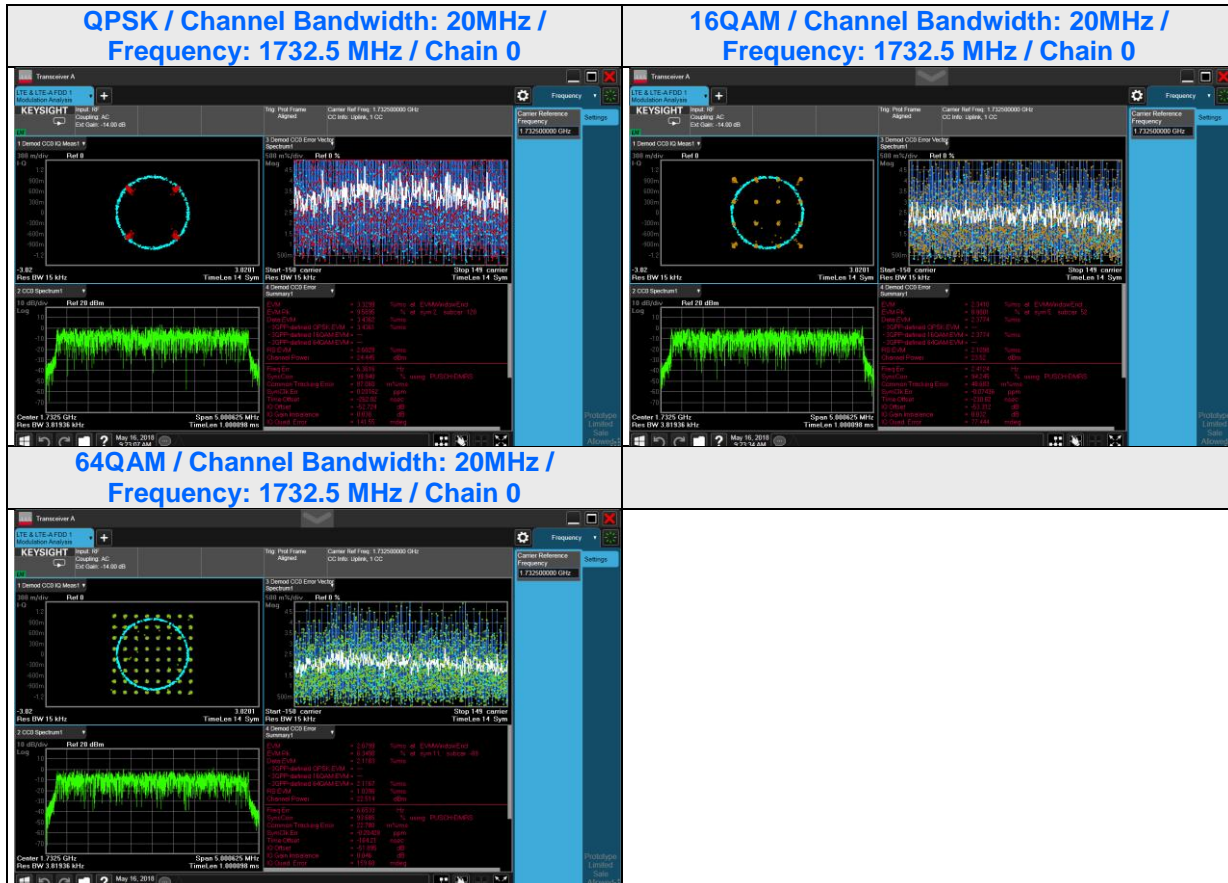
Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

### 4.2.3 Test Setup



## 4.2.4 Test Results

### LTE Band 4

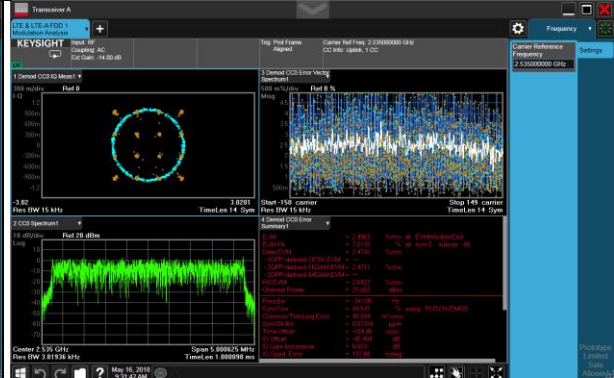


### LTE Band 7

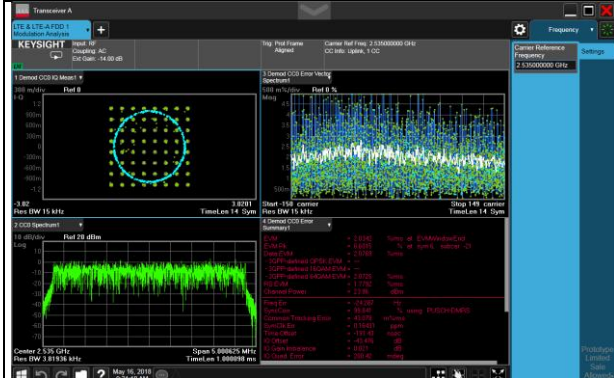
#### QPSK / Channel Bandwidth: 20MHz / Frequency: 2535 MHz / Chain 0



#### 16QAM / Channel Bandwidth: 20MHz / Frequency: 2535 MHz / Chain 0



#### 64QAM / Channel Bandwidth: 20MHz / Frequency: 2535 MHz / Chain 0





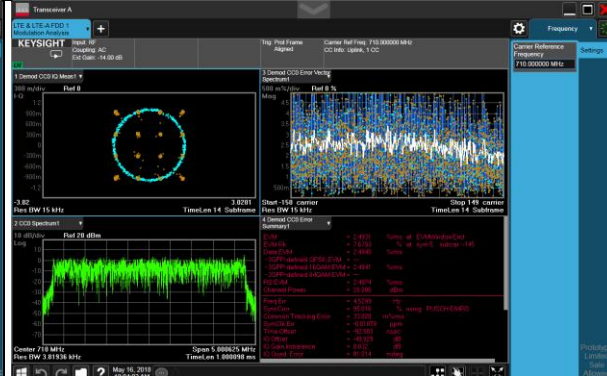


LTE Band 17

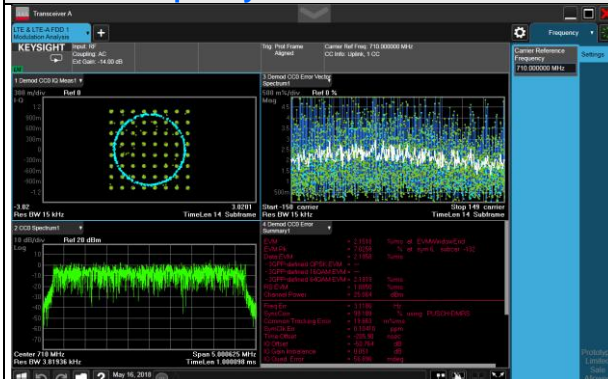
**QPSK / Channel Bandwidth: 10MHz /  
Frequency: 710 MHz / Chain 0**



**16QAM / Channel Bandwidth: 10MHz /  
Frequency: 710 MHz / Chain 0**



**64QAM / Channel Bandwidth: 10MHz /  
Frequency: 710 MHz / Chain 0**



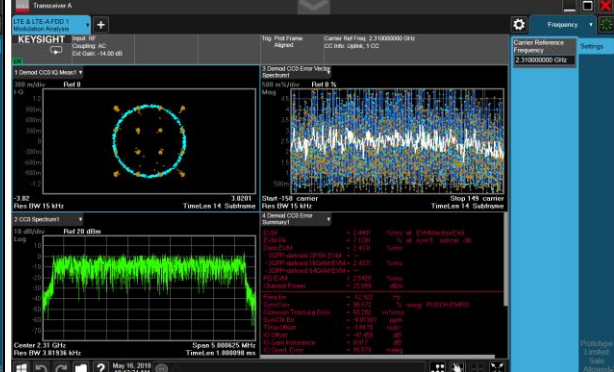


LTE Band 30

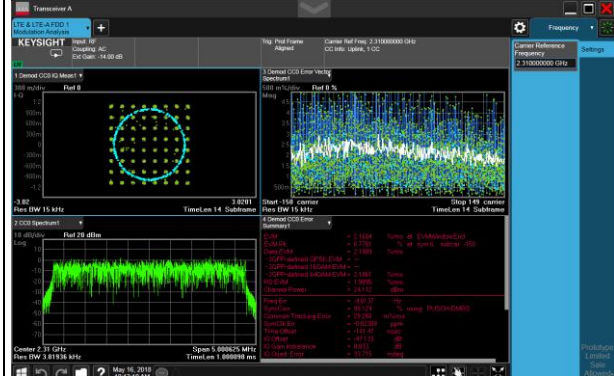
**QPSK / Channel Bandwidth: 10MHz /  
Frequency: 2310 MHz / Chain 0**



**16QAM / Channel Bandwidth: 10MHz /  
Frequency: 2310 MHz / Chain 0**



**64QAM / Channel Bandwidth: 10MHz /  
Frequency: 2310 MHz / Chain 0**

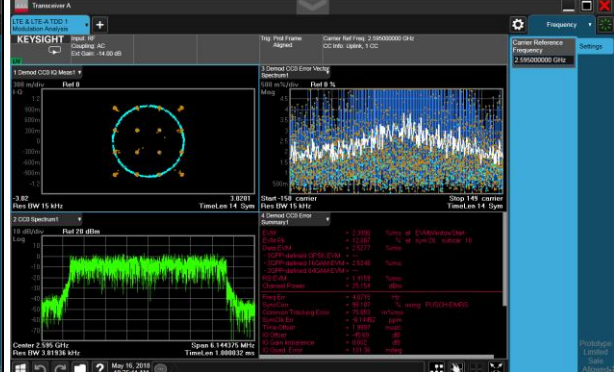


LTE Band 38

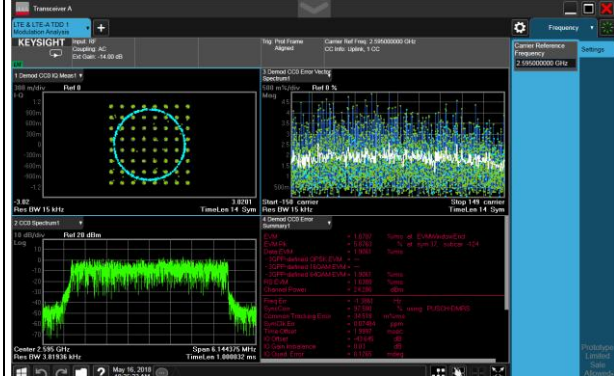
**QPSK / Channel Bandwidth: 20MHz / Frequency: 2595 MHz / Chain 0**



**16QAM / Channel Bandwidth: 20MHz / Frequency: 2595 MHz / Chain 0**



**64QAM / Channel Bandwidth: 20MHz / Frequency: 2595 MHz / Chain 0**

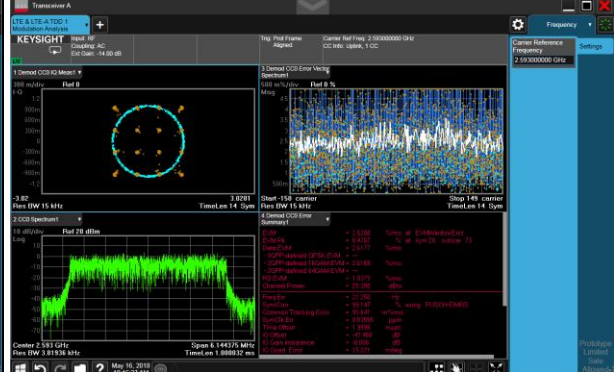


### LTE Band 41

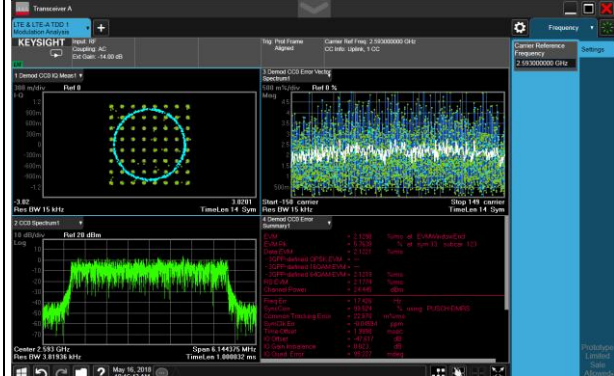
#### QPSK / Channel Bandwidth: 20MHz / Frequency: 2593 MHz / Chain 0



#### 16QAM / Channel Bandwidth: 20MHz / Frequency: 2593 MHz / Chain 0

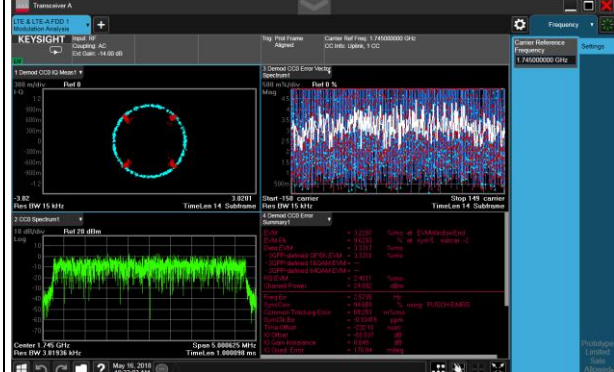


#### 64QAM / Channel Bandwidth: 20MHz / Frequency: 2593 MHz / Chain 0

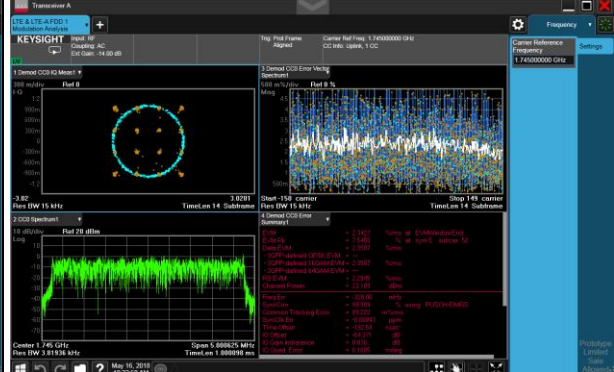


LTE Band 66

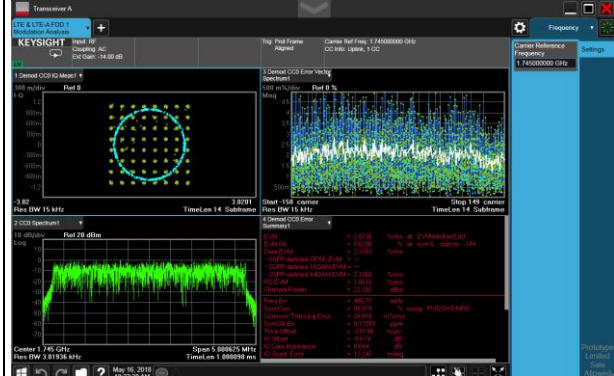
**QPSK / Channel Bandwidth: 20MHz / Frequency: 1745 MHz / Chain 0**



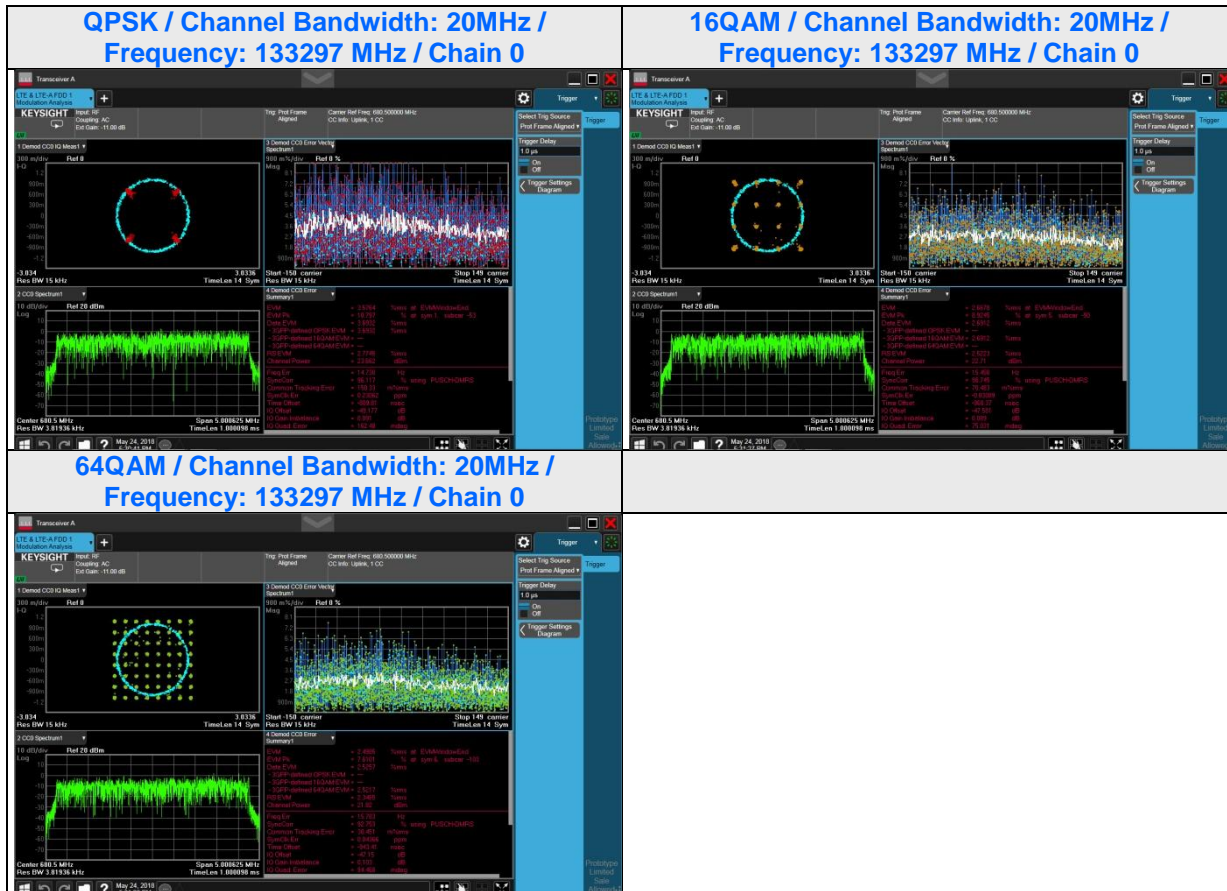
**16QAM / Channel Bandwidth: 20MHz / Frequency: 1745 MHz / Chain 0**



**64QAM / Channel Bandwidth: 20MHz / Frequency: 1745 MHz / Chain 0**



# LTE Band 71



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

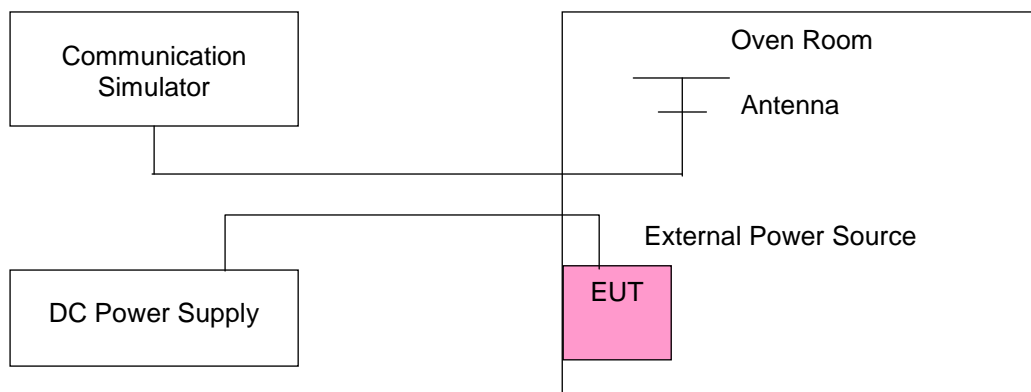
According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT  $-30^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .

#### 4.3.2 Test Procedure

- Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Setup



#### 4.3.4 Test Results

##### WCDMA Band 4

##### Frequency Error vs. Voltage

Voltage (Volts)	Frequency Error (MHz)		Limit (MHz)	
	WCDMA		Low Edge	High Edge
	Low	High		
2.805	1712.399977	1752.599982	1710	1755
3.795	1712.399964	1752.599967	1710	1755

##### Frequency Error vs. Temperature.

Temp. (°C)	Frequency Error (MHz)		Limit (MHz)	
	WCDMA		Low Edge	High Edge
	low	high		
50	1712.399975	1752.599974	1710	1755
40	1712.399966	1752.599968	1710	1755
30	1712.399975	1752.599976	1710	1755
20	1712.399971	1752.599978	1710	1755
10	1712.399973	1752.599969	1710	1755
0	1712.399974	1752.599976	1710	1755
-10	1712.399971	1752.599975	1710	1755
-20	1712.399968	1752.599972	1710	1755
-30	1712.399973	1752.599967	1710	1755

### LTE Band 4

Voltage (Volts)	Frequency Error (MHz)												Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
2.805	1710.151	1754.839	1710.160	1754.849	1710.251	1754.750	1710.521	1754.499	1710.780	1754.249	1711.040	1754.000	1710	1755
3.795	1710.151	1754.839	1710.161	1754.849	1710.250	1754.750	1710.520	1754.500	1710.780	1754.249	1711.041	1754.000	1710	1755

Temp. (°C)	Frequency Error (MHz)												Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
50	1710.151	1754.841	1710.160	1754.850	1710.249	1754.749	1710.520	1754.500	1710.780	1754.250	1711.041	1753.999	1710	1755
40	1710.151	1754.840	1710.161	1754.851	1710.250	1754.750	1710.520	1754.501	1710.780	1754.250	1711.040	1754.000	1710	1755
30	1710.149	1754.839	1710.160	1754.849	1710.249	1754.751	1710.520	1754.500	1710.780	1754.250	1711.040	1753.999	1710	1755
20	1710.150	1754.840	1710.160	1754.850	1710.250	1754.750	1710.520	1754.500	1710.780	1754.250	1711.040	1754.000	1710	1755
10	1710.149	1754.840	1710.160	1754.849	1710.250	1754.749	1710.520	1754.500	1710.781	1754.249	1711.039	1754.000	1710	1755
0	1710.150	1754.841	1710.160	1754.849	1710.249	1754.749	1710.519	1754.500	1710.781	1754.251	1711.041	1753.999	1710	1755
-10	1710.149	1754.840	1710.160	1754.850	1710.250	1754.751	1710.520	1754.500	1710.780	1754.251	1711.040	1754.001	1710	1755
-20	1710.150	1754.840	1710.159	1754.850	1710.251	1754.749	1710.520	1754.499	1710.781	1754.249	1711.039	1754.001	1710	1755
-30	1710.150	1754.841	1710.159	1754.850	1710.249	1754.749	1710.521	1754.500	1710.780	1754.249	1711.041	1753.999	1710	1755



### LTE Band 7

Voltage (Volts)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
2.805	2500.260	2569.760	2500.540	2569.480	2500.810	2569.220	2501.120	2568.920	2500	2570
3.795	2500.261	2569.760	2500.540	2569.480	2500.811	2569.220	2501.119	2568.920	2500	2570

Temp. (°C)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
50	2500.260	2569.760	2500.540	2569.480	2500.810	2569.221	2501.119	2568.920	2500	2570
40	2500.259	2569.760	2500.540	2569.480	2500.811	2569.221	2501.121	2568.920	2500	2570
30	2500.260	2569.760	2500.540	2569.480	2500.810	2569.221	2501.119	2568.919	2500	2570
20	2500.260	2569.760	2500.540	2569.480	2500.810	2569.220	2501.120	2568.920	2500	2570
10	2500.261	2569.761	2500.539	2569.479	2500.811	2569.219	2501.119	2568.920	2500	2570
0	2500.260	2569.759	2500.540	2569.481	2500.810	2569.220	2501.119	2568.920	2500	2570
-10	2500.260	2569.759	2500.539	2569.479	2500.809	2569.220	2501.120	2568.920	2500	2570
-20	2500.261	2569.760	2500.541	2569.480	2500.810	2569.220	2501.120	2568.919	2500	2570
-30	2500.261	2569.760	2500.539	2569.481	2500.810	2569.220	2501.120	2568.921	2500	2570

## LTE CA\_7C

Voltage (Volts)	Frequency Error (MHz)		Limit (MHz)	
	CA_10+20 MHz Low Channel	CA_10+20 MHz High Channel	Low Edge	High Edge
2.805	2545.540	2560.010	2500	2570
3.795	2545.630	2560.060	2500	2570

### Frequency Error vs. Temperature.

Temp. (°C)	Frequency Error (MHz)		Limit (MHz)	
	CA_10+20 MHz Low Channel	CA_10+20 MHz High Channel	Low Edge	High Edge
50	2545.580	2559.990	2500	2570
40	2545.600	2560.050	2500	2570
30	2545.560	2559.970	2500	2570
20	2545.600	2560.000	2500	2570
10	2545.530	2560.050	2500	2570
0	2545.510	2560.080	2500	2570
-10	2545.520	2560.010	2500	2570
-20	2545.610	2560.020	2500	2570
-30	2545.590	2560.040	2500	2570

### LTE Band 12

Voltage (Volts)	Frequency Error (MHz)								Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
2.805	699.150	715.840	699.151	715.860	699.250	715.749	699.519	715.500	699	716
3.795	699.150	715.839	699.149	715.861	699.249	715.750	699.520	715.500	699	716

Temp. (°C)	Frequency Error (MHz)								Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
50	699.151	715.839	699.150	715.860	699.249	715.750	699.520	715.500	699	716
40	699.149	715.841	699.150	715.860	699.250	715.750	699.520	715.500	699	716
30	699.149	715.840	699.151	715.860	699.250	715.750	699.520	715.500	699	716
20	699.150	715.840	699.150	715.860	699.250	715.750	699.520	715.500	699	716
10	699.151	715.840	699.149	715.859	699.250	715.749	699.521	715.500	699	716
0	699.151	715.840	699.150	715.860	699.250	715.749	699.521	715.499	699	716
-10	699.150	715.840	699.149	715.860	699.249	715.751	699.521	715.499	699	716
-20	699.150	715.841	699.150	715.860	699.251	715.751	699.520	715.499	699	716
-30	699.150	715.840	699.151	715.860	699.250	715.750	699.519	715.500	699	716

**LTE Band 13**

Voltage (Volts)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
2.805	777.261	786.760	777.519	786.501	777	787
3.795	777.261	786.761	777.519	786.500	777	787

Temp. (°C)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
50	777.261	786.760	777.520	786.500	777	787
40	777.260	786.759	777.519	786.499	777	787
30	777.259	786.760	777.520	786.500	777	787
20	777.260	786.760	777.520	786.500	777	787
10	777.259	786.759	777.520	786.499	777	787
0	777.260	786.760	777.519	786.499	777	787
-10	777.260	786.761	777.520	786.500	777	787
-20	777.259	786.760	777.519	786.499	777	787
-30	777.261	786.760	777.520	786.500	777	787

### LTE Band 17

Voltage (Volts)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
2.805	704.251	715.760	704.521	715.501	704	716
3.795	704.250	715.760	704.519	715.500	704	716

Temp. (°C)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
50	704.250	715.760	704.521	715.501	704	716
40	704.249	715.760	704.521	715.500	704	716
30	704.251	715.760	704.520	715.500	704	716
20	704.250	715.760	704.520	715.500	704	716
10	704.250	715.760	704.519	715.499	704	716
0	704.251	715.759	704.519	715.500	704	716
-10	704.250	715.760	704.520	715.499	704	716
-20	704.249	715.760	704.520	715.500	704	716
-30	704.250	715.760	704.520	715.499	704	716

### LTE Band 30

Voltage (Volts)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
2.805	2305.261	2314.759	2305.520	2314.500	2305	2315
3.795	2305.260	2314.760	2305.520	2314.501	2305	2315

Temp. (°C)	Frequency Error (MHz)				Limit (MHz)	
	5MHz		10MHz			
	Low	High	Low	High	Low Edge	High Edge
50	2305.259	2314.759	2305.519	2314.501	2305	2315
40	2305.259	2314.759	2305.520	2314.500	2305	2315
30	2305.260	2314.761	2305.520	2314.500	2305	2315
20	2305.260	2314.760	2305.520	2314.500	2305	2315
10	2305.260	2314.761	2305.520	2314.500	2305	2315
0	2305.259	2314.759	2305.519	2314.500	2305	2315
-10	2305.259	2314.759	2305.519	2314.501	2305	2315
-20	2305.260	2314.760	2305.520	2314.500	2305	2315
-30	2305.260	2314.760	2305.521	2314.499	2305	2315

### LTE Band 38

Voltage (Volts)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
2.805	2570.261	2619.741	2570.540	2619.480	2570.780	2619.219	2571.039	2619.000	2570	2620
3.795	2570.259	2619.739	2570.540	2619.479	2570.781	2619.219	2571.039	2619.001	2570	2620

Temp. (°C)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
50	2570.260	2619.741	2570.540	2619.480	2570.780	2619.220	2571.041	2618.999	2570	2620
40	2570.259	2619.740	2570.539	2619.480	2570.780	2619.219	2571.041	2619.001	2570	2620
30	2570.259	2619.740	2570.540	2619.480	2570.779	2619.221	2571.041	2618.999	2570	2620
20	2570.260	2619.740	2570.540	2619.480	2570.780	2619.220	2571.040	2619.000	2570	2620
10	2570.261	2619.739	2570.541	2619.481	2570.781	2619.220	2571.040	2619.001	2570	2620
0	2570.260	2619.739	2570.541	2619.480	2570.780	2619.220	2571.040	2619.000	2570	2620
-10	2570.260	2619.740	2570.540	2619.479	2570.779	2619.219	2571.040	2619.000	2570	2620
-20	2570.261	2619.740	2570.540	2619.480	2570.781	2619.220	2571.041	2619.000	2570	2620
-30	2570.260	2619.739	2570.539	2619.480	2570.781	2619.220	2571.040	2618.999	2570	2620

## LTE CA\_38C

Voltage (Volts)	Frequency Error (MHz)		Limit (MHz)	
	CA_15+15 MHz Low Channel	CA_15+15 MHz High Channel	Low Edge	High Edge
2.805	2577.540	2592.580	2570	2620
3.795	2577.530	2592.530	2570	2620

### Frequency Error vs. Temperature.

Temp. (°C)	Frequency Error (MHz)		Limit (MHz)	
	CA_15+15 MHz Low Channel	CA_15+15 MHz High Channel	Low Edge	High Edge
50	2577.490	2592.530	2570	2620
40	2577.560	2592.410	2570	2620
30	2577.420	2592.420	2570	2620
20	2577.500	2592.500	2570	2620
10	2577.460	2592.570	2570	2620
0	2577.490	2592.490	2570	2620
-10	2577.490	2592.590	2570	2620
-20	2577.470	2592.430	2570	2620
-30	2577.540	2592.570	2570	2620



### LTE Band 41

Voltage (Volts)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz		Low Edge	High Edge
	Low	High	Low	High	Low	High	Low	High		
2.805	2496.260	2689.760	2496.540	2689.479	2496.811	2689.249	2497.080	2689.000	2496	2690
3.795	2496.259	2689.761	2496.540	2689.481	2496.810	2689.250	2497.080	2689.000	2496	2690

Temp. (°C)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz		Low Edge	High Edge
	Low	High	Low	High	Low	High	Low	High		
50	2496.261	2689.761	2496.540	2689.480	2496.810	2689.251	2497.081	2689.001	2496	2690
40	2496.261	2689.761	2496.541	2689.480	2496.810	2689.250	2497.081	2689.001	2496	2690
30	2496.259	2689.759	2496.540	2689.480	2496.809	2689.250	2497.081	2689.000	2496	2690
20	2496.260	2689.760	2496.540	2689.480	2496.810	2689.250	2497.080	2689.000	2496	2690
10	2496.259	2689.760	2496.540	2689.480	2496.810	2689.250	2497.080	2689.000	2496	2690
0	2496.260	2689.760	2496.541	2689.480	2496.810	2689.251	2497.080	2689.000	2496	2690
-10	2496.259	2689.759	2496.539	2689.479	2496.810	2689.249	2497.080	2689.001	2496	2690
-20	2496.261	2689.760	2496.541	2689.479	2496.809	2689.249	2497.081	2689.001	2496	2690
-30	2496.261	2689.761	2496.541	2689.480	2496.810	2689.249	2497.079	2689.000	2496	2690

## LTE CA\_41C

Voltage (Volts)	Frequency Error (MHz)		Limit (MHz)	
	CA_10+5 MHz Low Channel	CA_10+5 MHz High Channel	Low Edge	High Edge
2.805	2501.090	2508.220	2496	2690
3.795	2501.030	2508.210	2496	2690

### Frequency Error vs. Temperature.

Temp. (°C)	Frequency Error (MHz)		Limit (MHz)	
	CA_10+5 MHz Low Channel	CA_10+5 MHz High Channel	Low Edge	High Edge
50	2501.040	2508.240	2496	2690
40	2500.970	2508.250	2496	2690
30	2501.040	2508.170	2496	2690
20	2501.000	2508.200	2496	2690
10	2501.090	2508.180	2496	2690
0	2501.050	2508.120	2496	2690
-10	2501.010	2508.110	2496	2690
-20	2501.070	2508.150	2496	2690
-30	2500.930	2508.190	2496	2690

## LTE Band 66

Voltage (Volts)	Frequency Error (MHz)												Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
2.805	1710.150	1779.849	1710.139	1779.850	1710.260	1779.761	1710.500	1779.500	1710.750	1779.220	1710.999	1779.000	1710	1780
3.795	1710.151	1779.850	1710.140	1779.851	1710.261	1779.760	1710.501	1779.500	1710.749	1779.220	1711.001	1779.000	1710	1780

Temp. (°C)	Frequency Error (MHz)												Limit (MHz)	
	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz			
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low Edge	High Edge
50	1710.150	1779.850	1710.139	1779.850	1710.260	1779.761	1710.500	1779.501	1710.750	1779.221	1711.000	1779.000	1710	1780
40	1710.150	1779.851	1710.141	1779.849	1710.261	1779.760	1710.500	1779.500	1710.749	1779.221	1711.000	1779.000	1710	1780
30	1710.150	1779.851	1710.141	1779.849	1710.260	1779.761	1710.499	1779.501	1710.750	1779.219	1711.000	1779.000	1710	1780
20	1710.150	1779.850	1710.140	1779.850	1710.260	1779.760	1710.500	1779.500	1710.750	1779.220	1711.000	1779.000	1710	1780
10	1710.149	1779.849	1710.140	1779.850	1710.260	1779.759	1710.499	1779.500	1710.750	1779.219	1710.999	1779.000	1710	1780
0	1710.150	1779.849	1710.141	1779.850	1710.260	1779.760	1710.501	1779.500	1710.750	1779.219	1710.999	1779.001	1710	1780
-10	1710.150	1779.849	1710.141	1779.849	1710.261	1779.760	1710.500	1779.500	1710.750	1779.220	1711.000	1779.001	1710	1780
-20	1710.149	1779.849	1710.140	1779.849	1710.259	1779.760	1710.501	1779.500	1710.750	1779.219	1711.001	1779.000	1710	1780
-30	1710.149	1779.850	1710.140	1779.851	1710.260	1779.760	1710.501	1779.500	1710.751	1779.219	1711.001	1779.000	1710	1780

### LTE Band 71

Voltage (Volts)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz		Low Edge	High Edge
	Low	High	Low	High	Low	High	Low	High		
2.805	663.279	697.761	663.520	697.521	663.779	697.251	663.999	697.039	663	698
3.795	663.281	697.759	663.520	697.520	663.780	697.251	663.999	697.041	663	698

Temp. (°C)	Frequency Error (MHz)								Limit (MHz)	
	5MHz		10MHz		15MHz		20MHz		Low Edge	High Edge
	Low	High	Low	High	Low	High	Low	High		
50	663.281	697.760	663.521	697.520	663.780	697.251	664.001	697.039	663	698
40	663.280	697.761	663.519	697.520	663.779	697.249	664.001	697.040	663	698
30	663.279	697.760	663.520	697.520	663.780	697.249	664.000	697.040	663	698
20	663.280	697.760	663.520	697.520	663.780	697.250	664.000	697.040	663	698
10	663.279	697.761	663.521	697.519	663.781	697.250	664.000	697.039	663	698
0	663.280	697.760	663.520	697.521	663.779	697.249	664.000	697.040	663	698
-10	663.280	697.760	663.520	697.520	663.779	697.250	664.001	697.040	663	698
-20	663.279	697.760	663.520	697.521	663.779	697.249	664.001	697.040	663	698
-30	663.280	697.760	663.520	697.519	663.780	697.250	663.999	697.039	663	698

## 4.4 Emission Bandwidth Measurement

### 4.4.1 Limits of Emission Bandwidth Measurement

#### -26dB Bandwidth

According to FCC 27.53 specified that 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 26dB below the transmitter power.

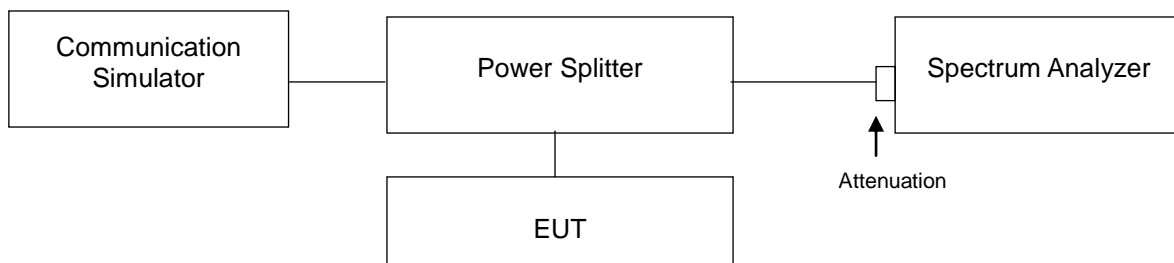
#### Occupied Bandwidth

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

### 4.4.2 Test Procedure

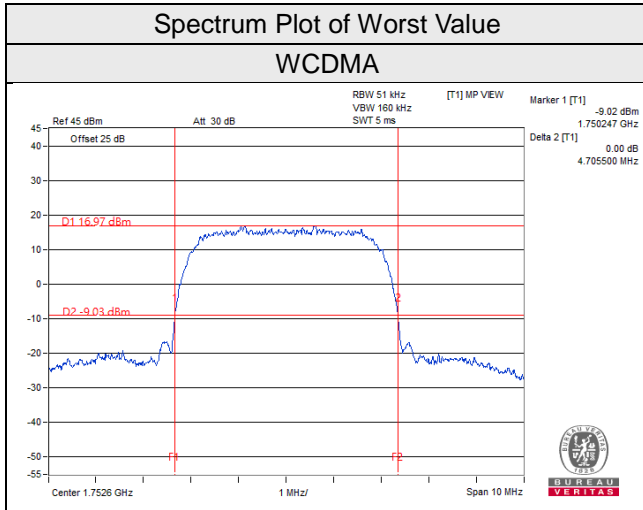
The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with  $RBW \geq 1\% \times OBW$  and  $VBW \geq 3 \times RBW$ .

### 4.4.3 Test Setup



#### 4.4.4 Test Results (-26dB Bandwidth)

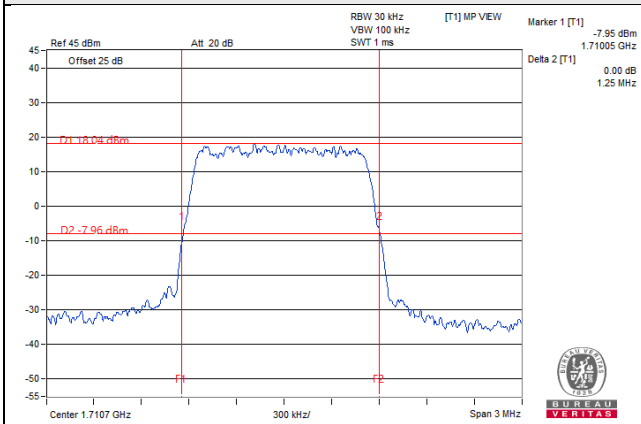
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		WCDMA
1312	1712.4	4.70
1413	1732.6	4.68
1513	1752.6	4.71



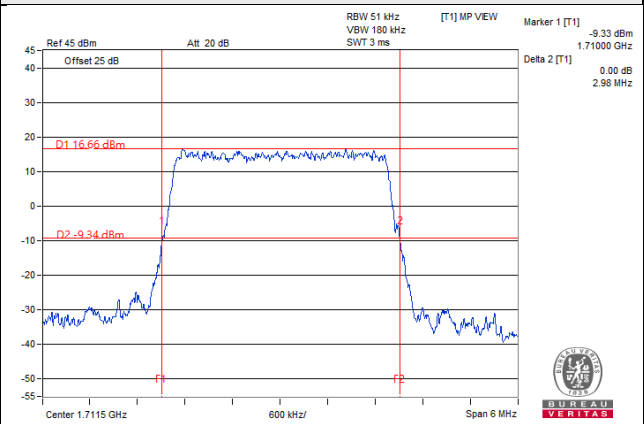
LTE Band 4									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	1.25	1.24	1.25	19965	1711.5	2.98	2.97	2.98
20175	1732.5	1.25	1.24	1.24	20175	1732.5	2.98	2.97	2.99
20393	1754.3	1.25	1.24	1.24	20385	1753.5	2.98	2.98	2.96
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	4.92	4.97	4.89	20000	1715	9.83	9.78	9.84
20175	1732.5	4.91	4.98	4.92	20175	1732.5	9.83	9.74	9.82
20375	1752.5	4.96	4.94	4.94	20350	1750	9.78	9.73	9.88
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	14.72	14.69	14.63	20050	1720	19.55	19.45	19.47
20175	1732.5	14.60	14.63	14.67	20175	1732.5	19.62	19.54	19.54
20325	1747.5	14.62	14.78	14.71	20300	1745	19.64	19.52	19.57

### Spectrum Plot of Worst Value

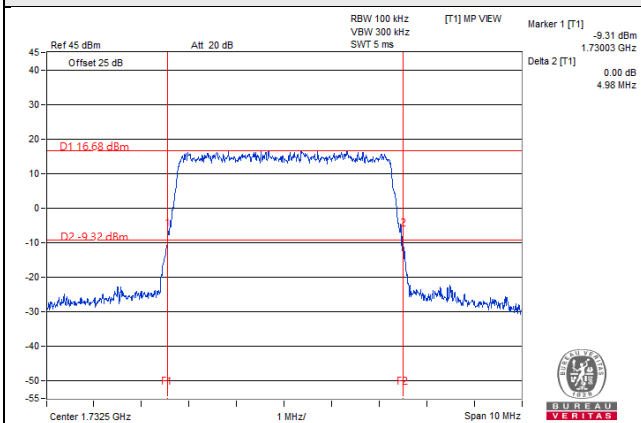
#### 1.4MHz / QPSK



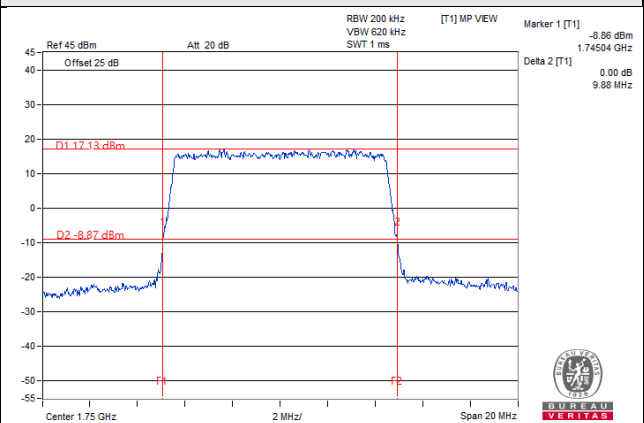
#### 3MHz / QPSK



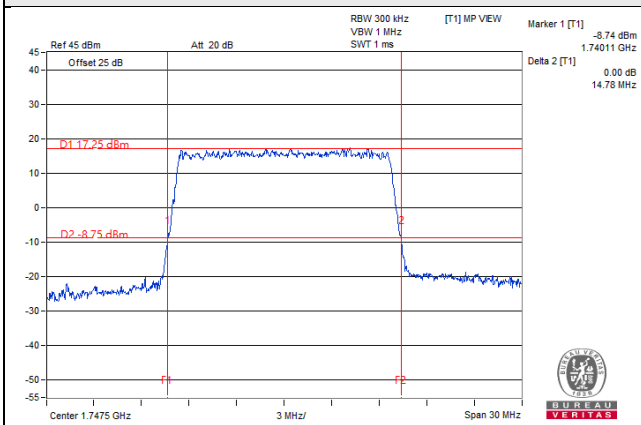
#### 5MHz / 16QAM



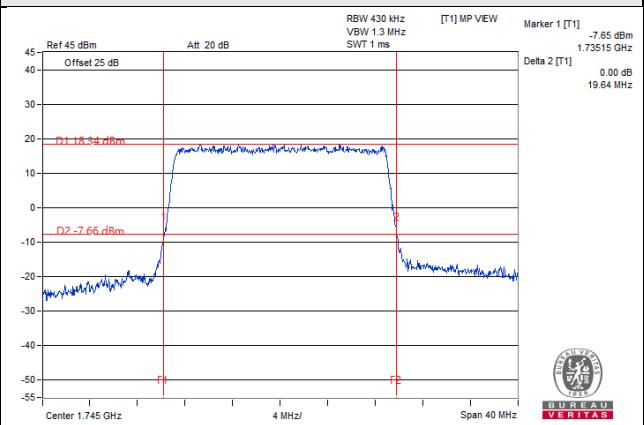
#### 10MHz / 64QAM



#### 15MHz / 16QAM

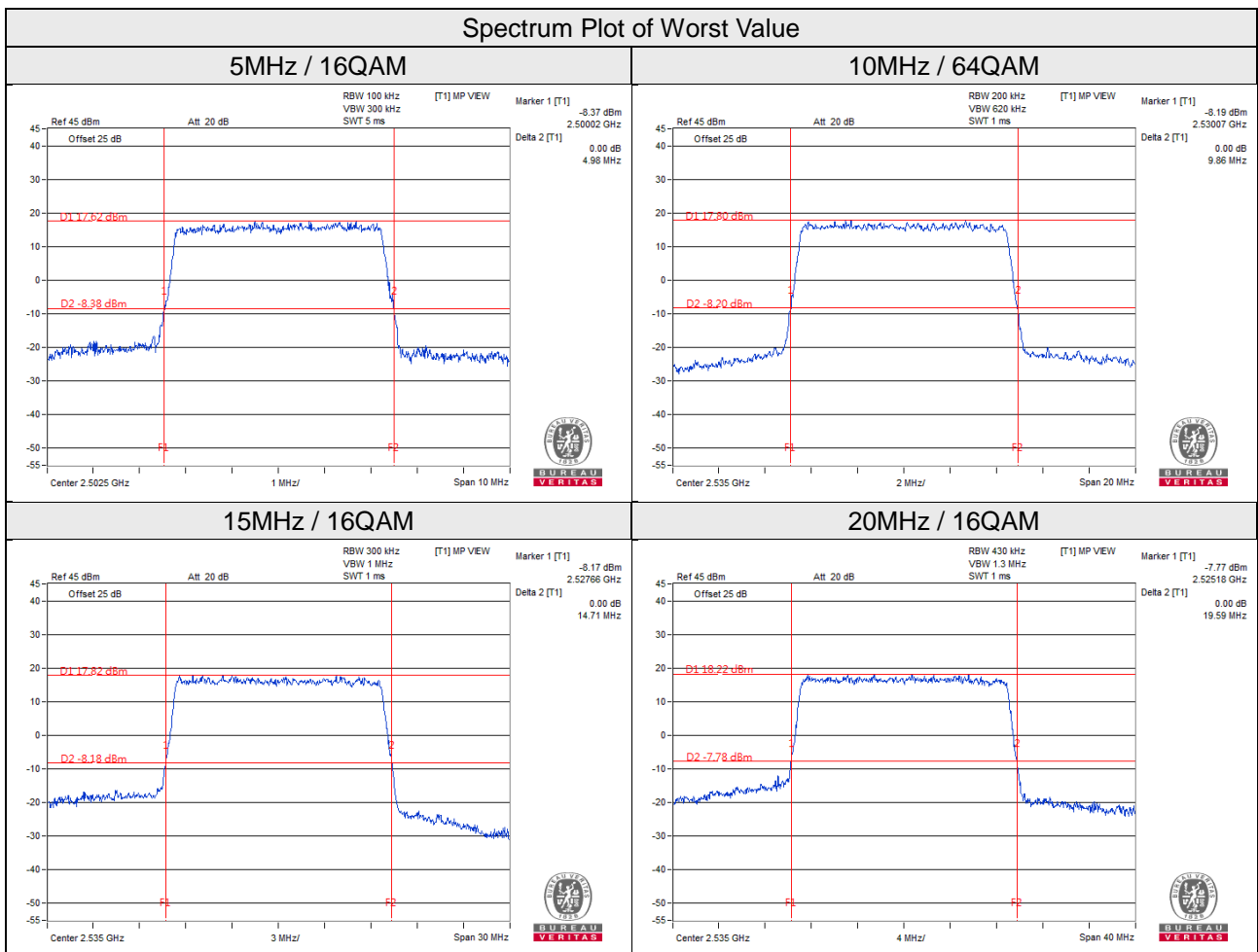


#### 20MHz / QPSK

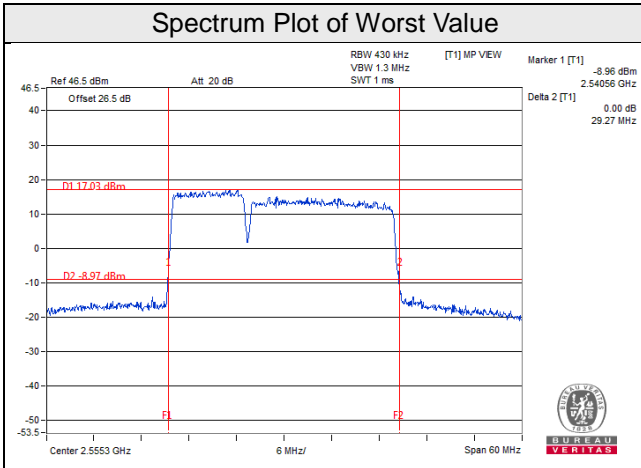




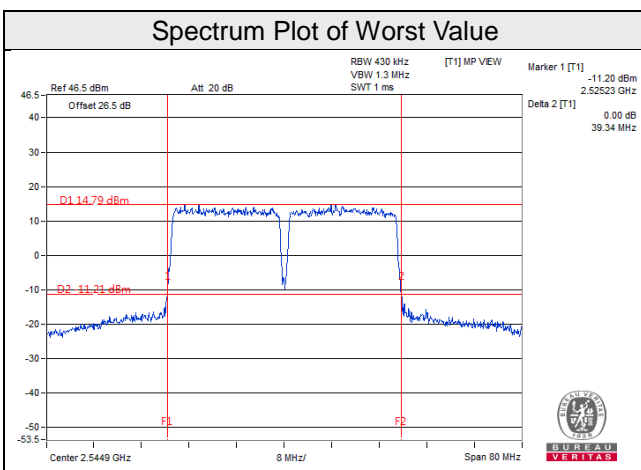
LTE Band 7									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20775	2502.5	4.94	4.98	4.91	20800	2505	9.82	9.79	9.79
21100	2535	4.95	4.97	4.94	21100	2535	9.81	9.71	9.86
21425	2567.5	4.91	4.95	4.94	21400	2565	9.85	9.80	9.80
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20825	2507.5	14.65	14.64	14.66	20850	2510	19.55	19.48	19.43
21100	2535	14.60	14.71	14.71	21100	2535	19.58	19.59	19.53
21375	2562.5	14.61	14.66	14.61	21350	2560	19.52	19.44	19.44



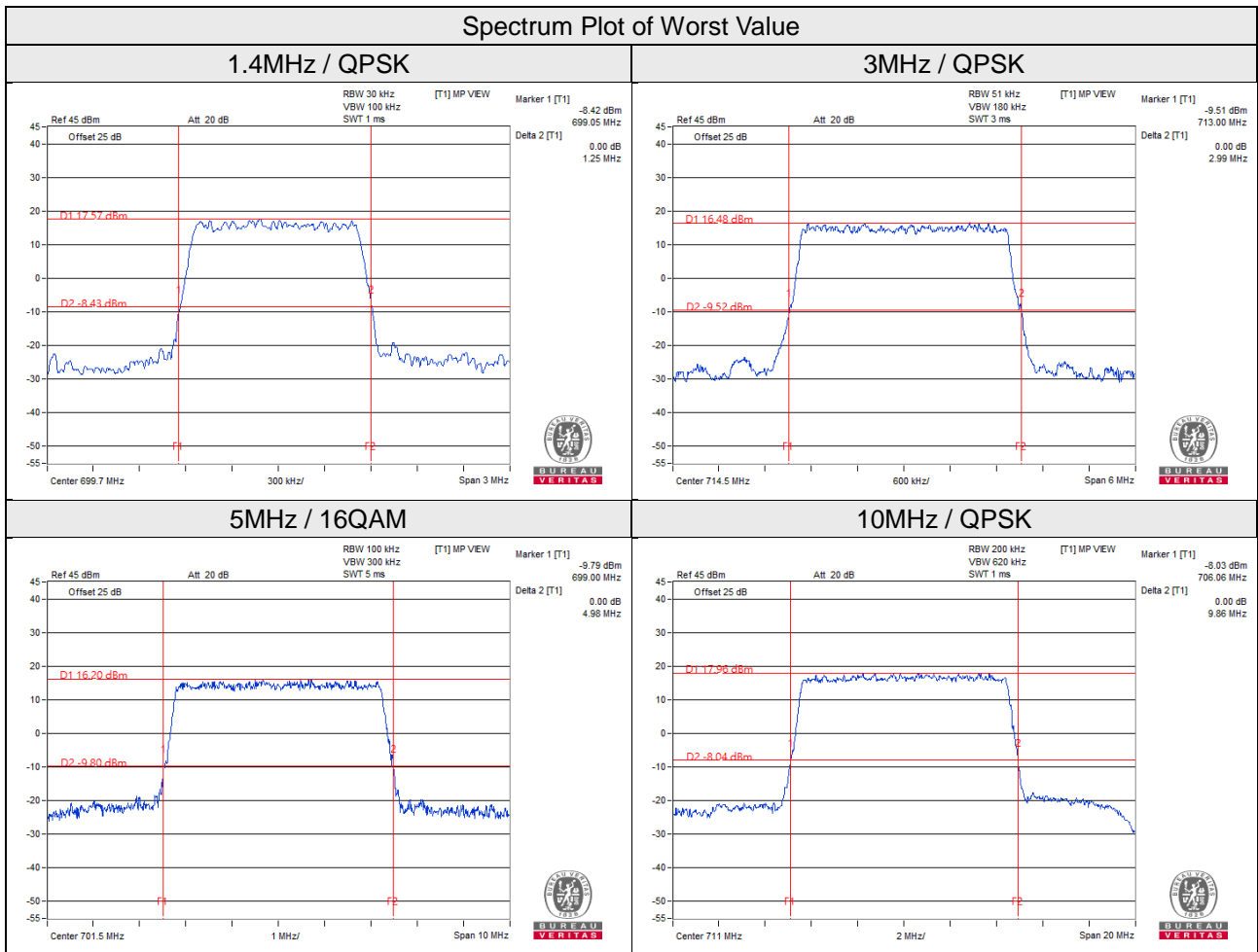
LTE CA_7C (10+20MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
21206+21350	2545.6+2560	29.27



LTE CA_7C (20+20MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
21100+21980	2535+2554.8	39.34



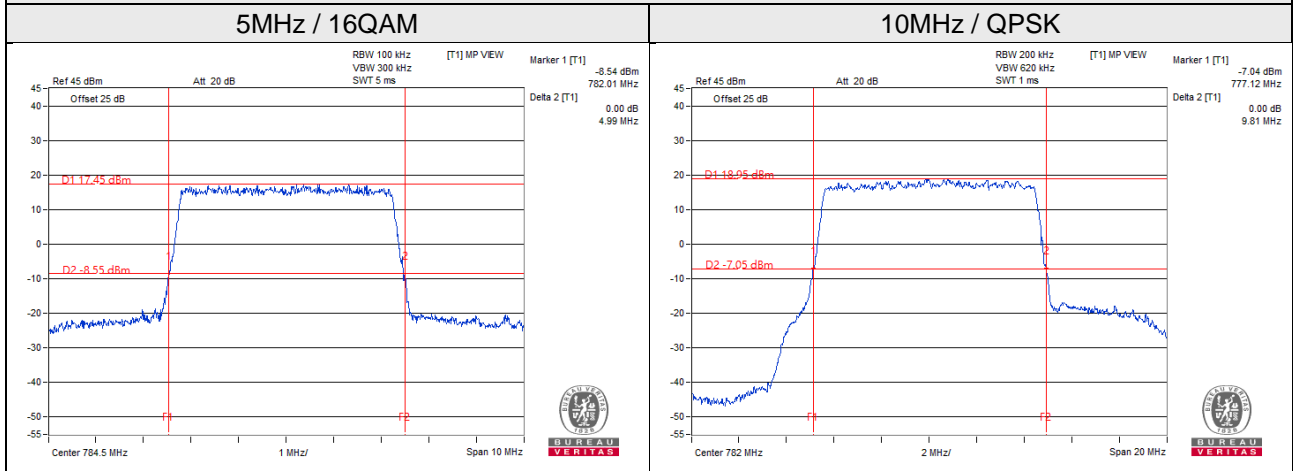
LTE Band 12									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23017	699.7	1.25	1.24	1.24	23025	700.5	2.99	2.98	2.99
23095	707.5	1.24	1.22	1.25	23095	707.5	2.98	2.96	2.98
23173	715.3	1.24	1.24	1.24	23165	714.5	2.99	2.99	2.96
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	4.94	4.98	4.92	23060	704	9.84	9.78	9.81
23095	707.5	4.95	4.96	4.94	23095	707.5	9.85	9.74	9.81
23155	713.5	4.97	4.97	4.96	23130	711	9.86	9.76	9.84



### LTE Band 13

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23205	779.5	4.94	4.91	4.95	23230	782	9.81	9.76	9.81
23230	782	4.92	4.93	4.92					
23255	784.5	4.93	4.99	4.96					

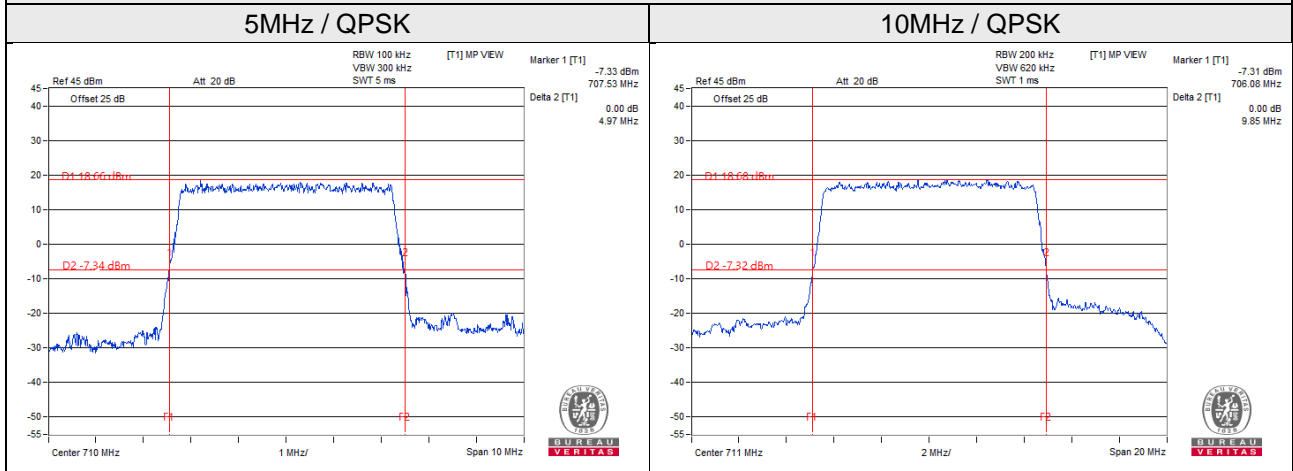
### Spectrum Plot of Worst Value



### LTE Band 17

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23755	706.5	4.90	4.97	4.93	23780	709	9.84	9.72	9.82
23790	710	4.97	4.96	4.92	23790	710	9.82	9.76	9.82
23825	713.5	4.93	4.94	4.92	23800	711	9.85	9.73	9.81

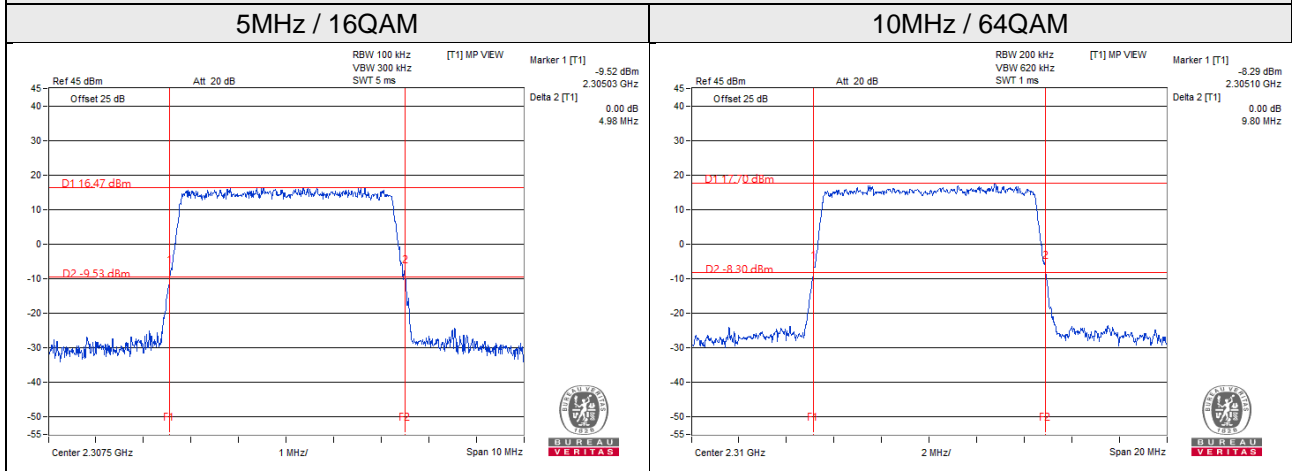
### Spectrum Plot of Worst Value



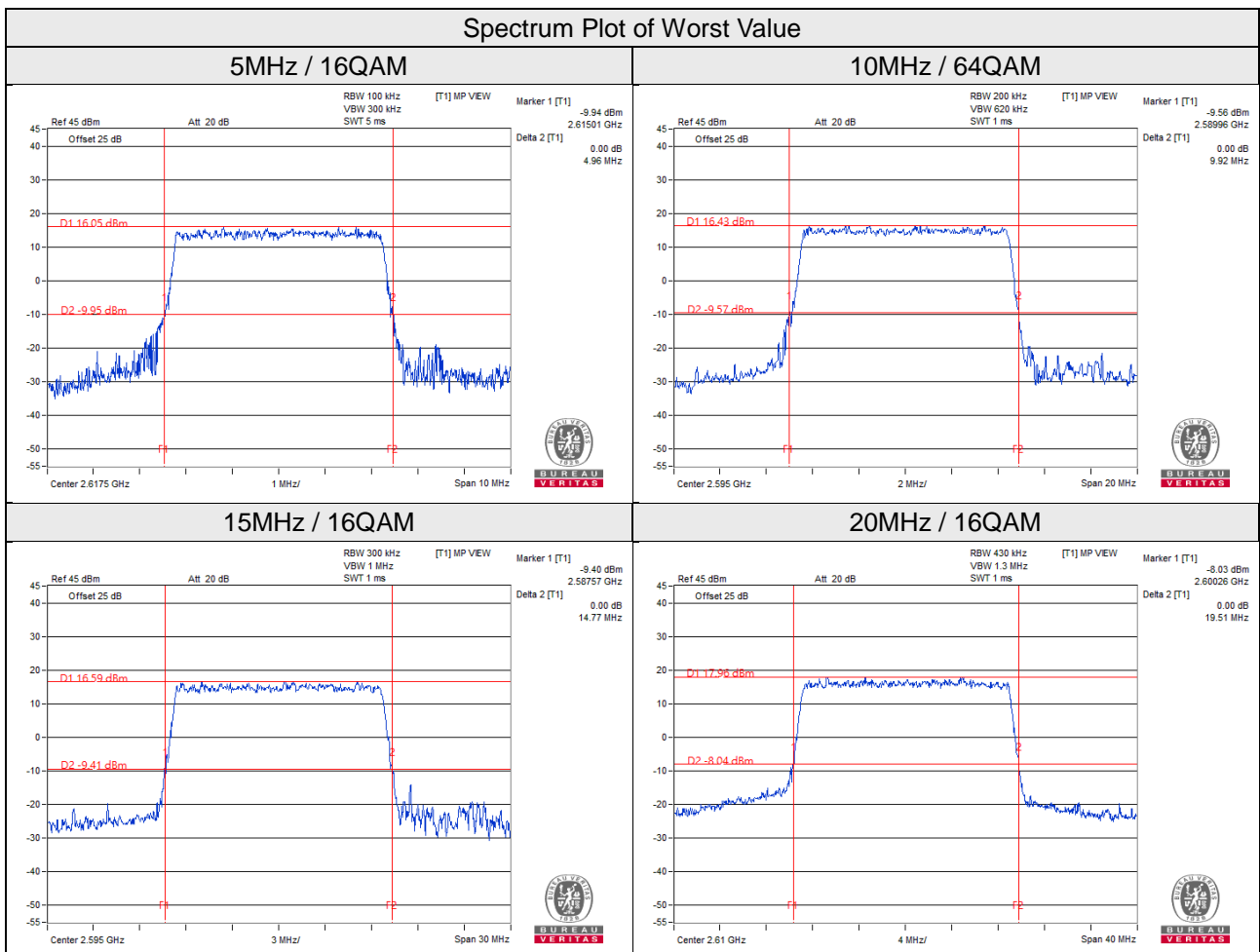
### LTE Band 30

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
27685	2307.5	4.94	4.98	4.94	27710	2310	9.78	9.78	9.80
27710	2310	4.90	4.94	4.96					
27735	2312.5	4.89	4.92	4.92					

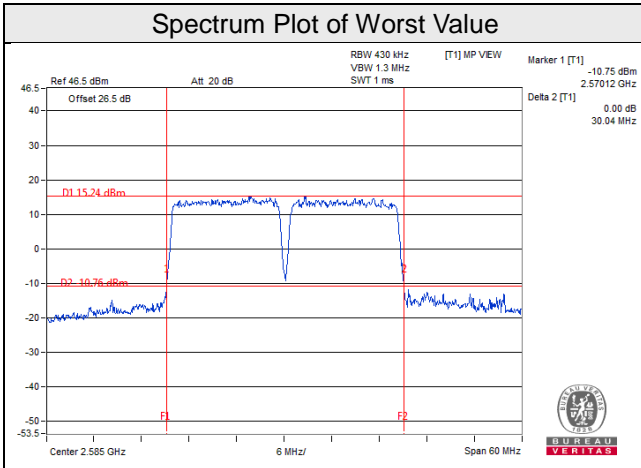
### Spectrum Plot of Worst Value



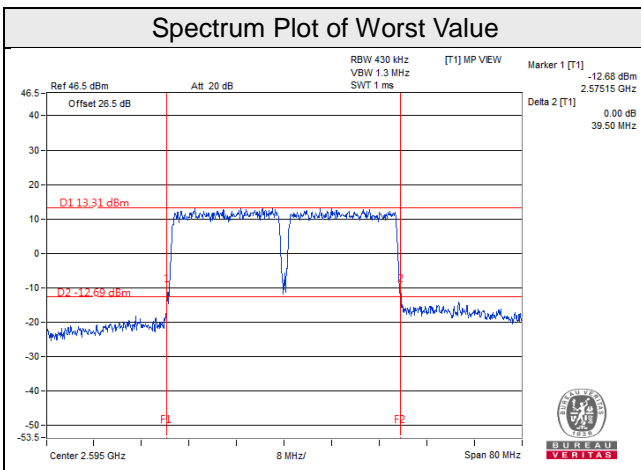
LTE Band 38									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37775	2572.5	4.95	4.92	4.89	37800	2575	9.78	9.75	9.79
38000	2595	4.90	4.92	4.88	38000	2595	9.78	9.72	9.92
38225	2617.5	4.89	4.96	4.91	38200	2615	9.77	9.81	9.75
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37825	2577.5	14.69	14.64	14.60	37850	2580	19.46	19.54	19.48
38000	2595	14.65	14.77	14.65	38000	2595	19.50	19.49	19.37
38175	2612.5	14.69	14.53	14.60	38150	2610	19.51	19.58	19.45



LTE CA_38C (15+15MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
37825+37975	2577.5+2592.5	30.04

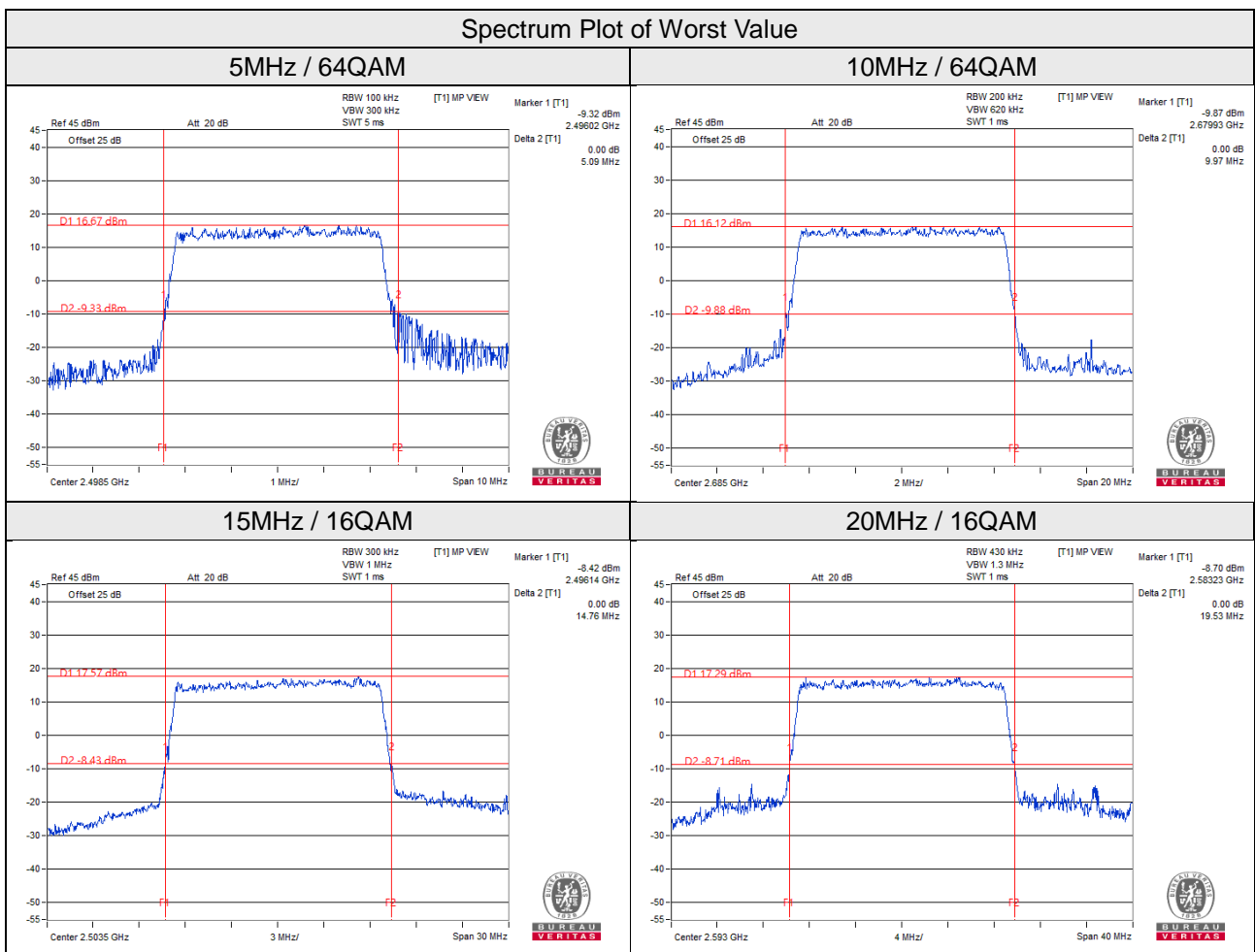


LTE CA_38C (20+20MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
37901+38099	2585.1+2604.9	39.50

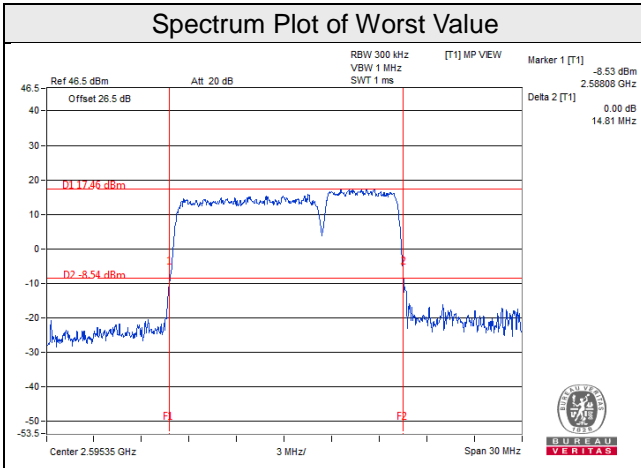




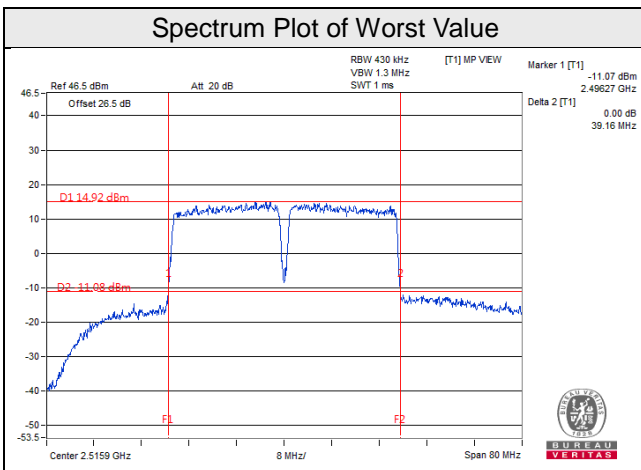
LTE Band 41									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39675	2498.5	5.02	5.06	5.09	39700	2501	9.74	9.75	9.87
40620	2593	4.91	4.91	4.94	50620	2593	9.77	9.78	9.87
41565	2687.5	5.04	5.06	5.01	41540	2685	9.74	9.75	9.97
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39725	2503.5	14.68	14.76	14.63	39750	2506	19.45	19.48	19.41
40620	2593	14.72	14.60	14.57	40620	2593	19.46	19.53	19.47
41515	2682.5	14.75	14.71	14.74	41490	2680	19.43	19.45	19.39



LTE CA_41C (10+5MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
39700+39772	2501+2508.2	14.81



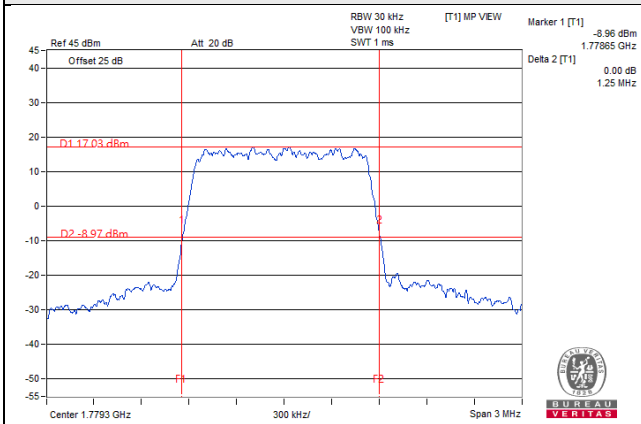
LTE CA_41C (20+20MHz)		
Channel	FREQ. (MHz)	-26dB Bandwidth (MHz)
		QPSK
39750+39948	2506+2525.8	39.16



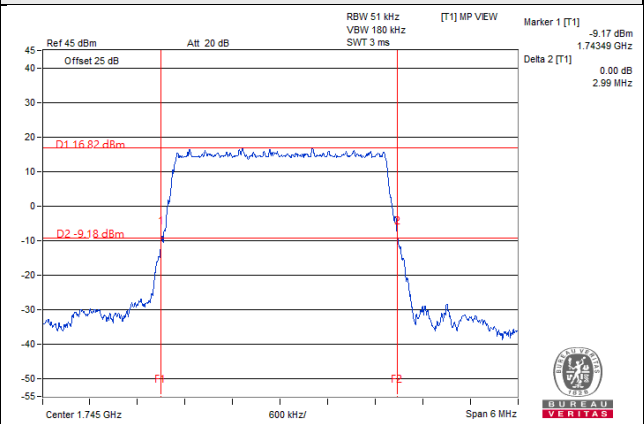
LTE Band 66									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131979	1710.7	1.23	1.23	1.24	131987	1711.5	2.97	2.94	2.93
132322	1745	1.24	1.25	1.24	132322	1745	2.99	2.96	2.97
132665	1779.3	1.25	1.24	1.25	132657	1778.5	2.99	2.96	2.97
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131997	1712.5	4.97	4.92	4.95	132022	1715	9.81	9.83	9.81
132322	1745	4.96	4.93	4.93	132322	1745	9.80	9.86	9.80
132647	1777.5	4.90	4.94	4.92	132622	1775	9.85	9.83	9.81
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
132047	1717.5	14.73	14.69	14.72	132072	1720	19.47	19.52	19.50
132322	1745	14.71	14.70	14.62	132322	1745	19.42	19.46	19.54
132597	1722.5	14.71	14.66	14.64	132572	1770	19.66	19.50	19.52

### Spectrum Plot of Worst Value

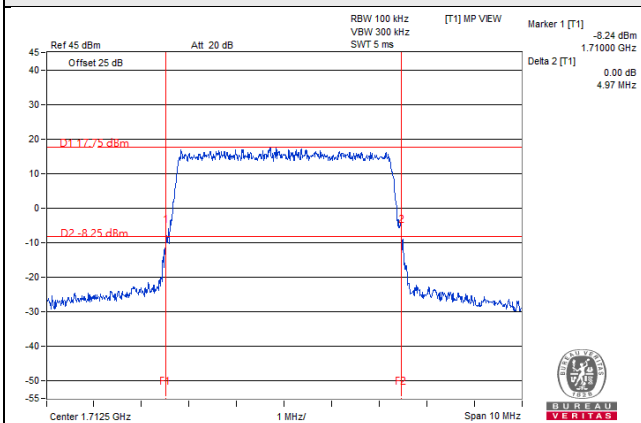
#### 1.4MHz / QPSK



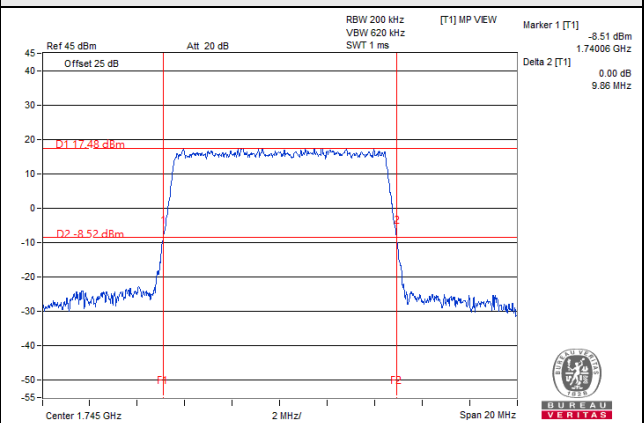
#### 3MHz / QPSK



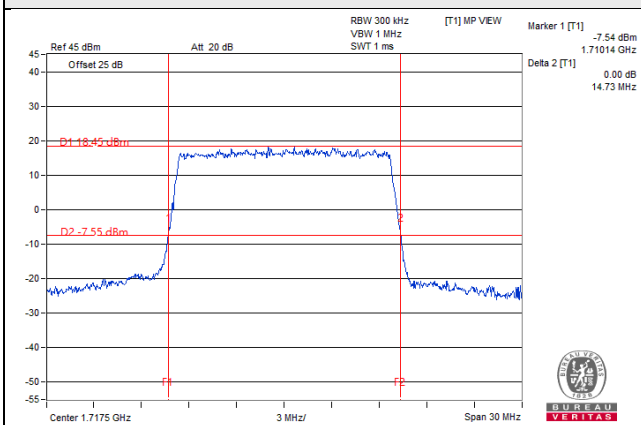
#### 5MHz / QPSK



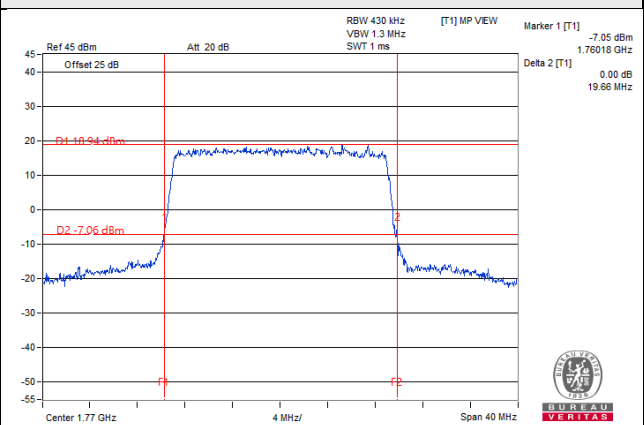
#### 10MHz / 16QAM



#### 15MHz / QPSK



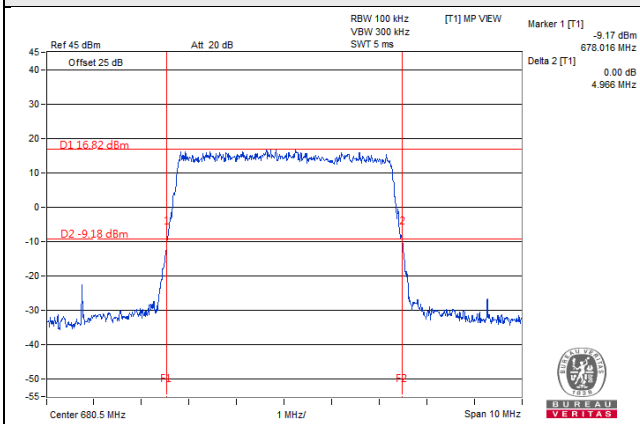
#### 20MHz / QPSK



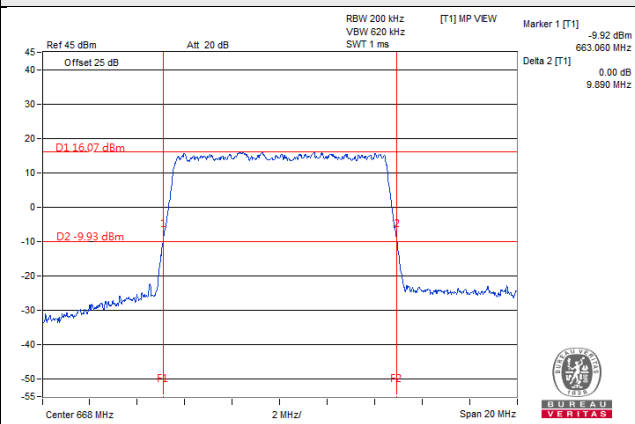
LTE Band 71									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
133147	665.5	4.94	4.95	4.92	133172	668	9.83	9.89	9.80
133297	680.5	4.97	4.95	4.96	133297	680.5	9.83	9.78	9.15
133447	695.5	4.95	4.93	4.92	133422	693	9.82	9.84	9.81
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	-26dB Bandwidth (MHz)			Channel	Frequency (MHz)	-26dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
133197	670.5	14.71	14.66	14.73	133222	673	19.44	19.43	19.47
133297	680.5	14.66	14.68	14.65	133297	680.5	19.59	19.51	19.46
133397	690.5	14.73	14.67	14.69	133372	688	19.55	19.50	19.50

### Spectrum Plot of Worst Value

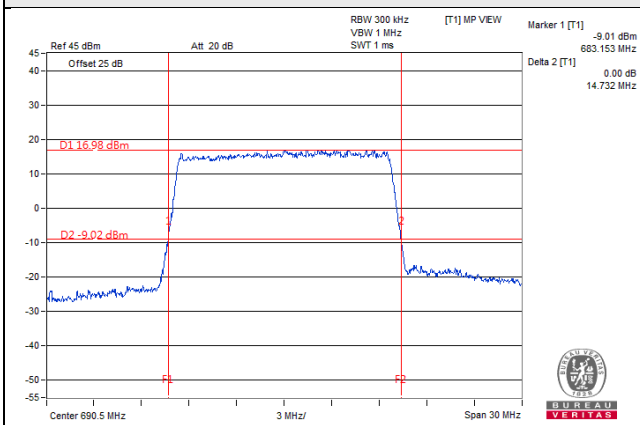
#### 5MHz / QPSK



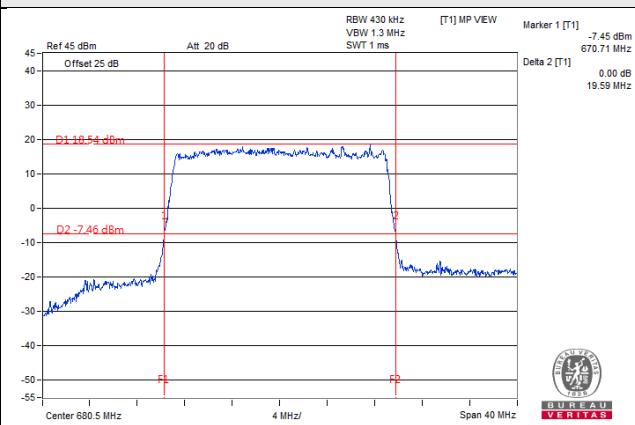
#### 10MHz / 16QAM



#### 15MHz / QPSK

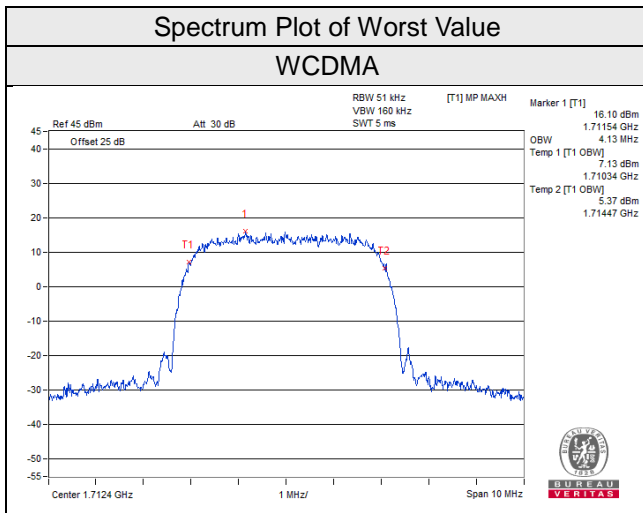


#### 20MHz / QPSK



#### 4.4.5 Test Results (Occupied Bandwidth)

Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		WCDMA
1312	1712.4	4.13
1413	1732.6	4.13
1513	1752.6	4.13

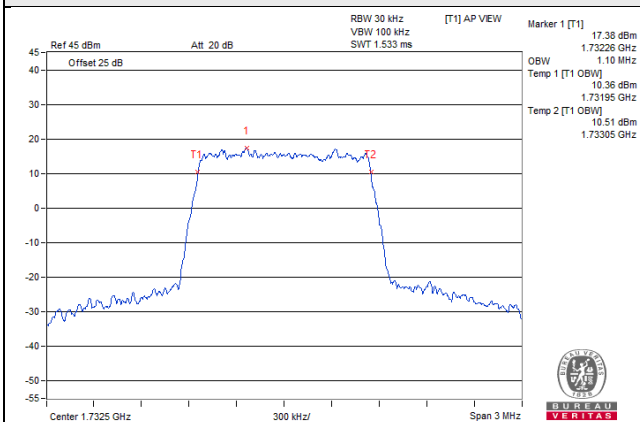


LTE Band 4									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19957	1710.7	1.09	1.09	1.08	19965	1711.5	2.69	2.68	2.69
20175	1732.5	1.09	1.09	1.10	20175	1732.5	2.70	2.69	2.69
20393	1754.3	1.09	1.09	1.10	20385	1753.5	2.69	2.69	2.70
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
19975	1712.5	4.50	4.48	4.49	20000	1715	9.00	8.96	8.98
20175	1732.5	4.49	4.50	4.50	20175	1732.5	8.98	8.96	8.98
20375	1752.5	4.49	4.50	4.50	20350	1750	8.98	8.94	9.00
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20025	1717.5	13.47	13.44	13.47	20050	1720	17.96	18.00	17.96
20175	1732.5	13.47	13.47	13.47	20175	1732.5	17.92	18.00	17.96
20325	1747.5	13.44	13.44	13.47	20300	1745	17.96	17.96	17.96

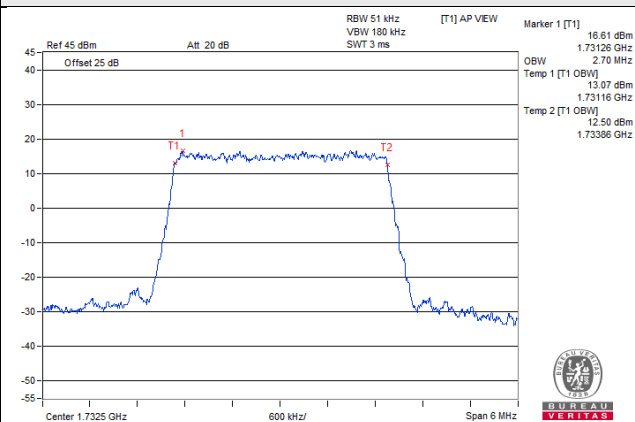


### Spectrum Plot of Worst Value

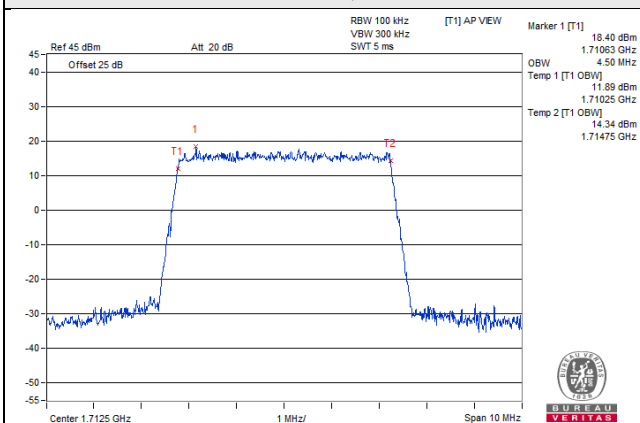
#### 1.4MHz / 64QAM



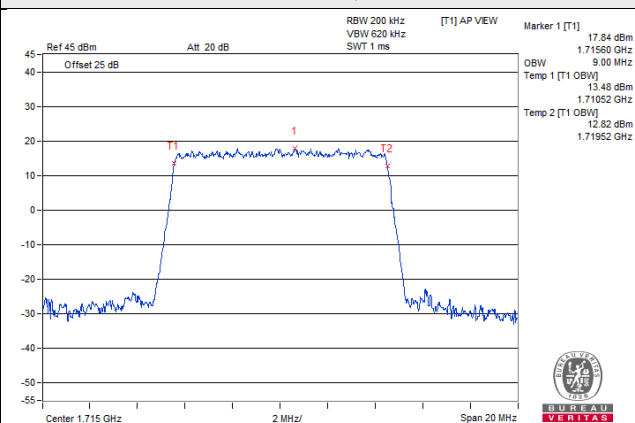
#### 3MHz / QPSK



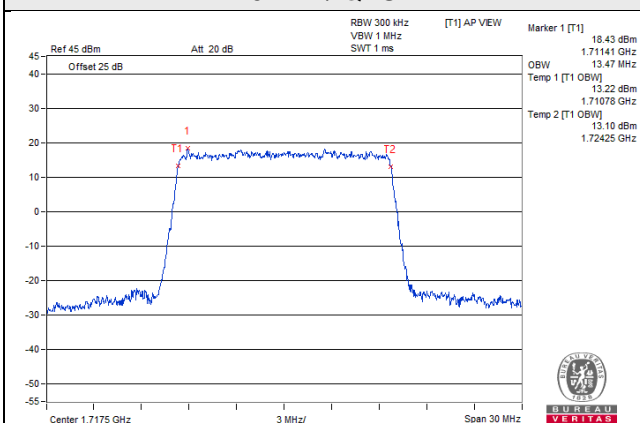
#### 5MHz / QPSK



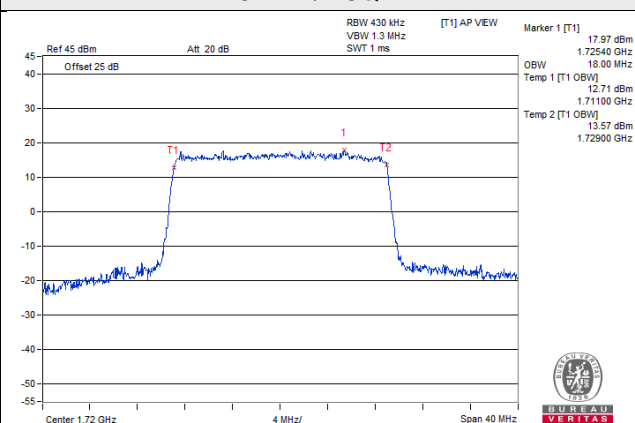
#### 10MHz / QPSK



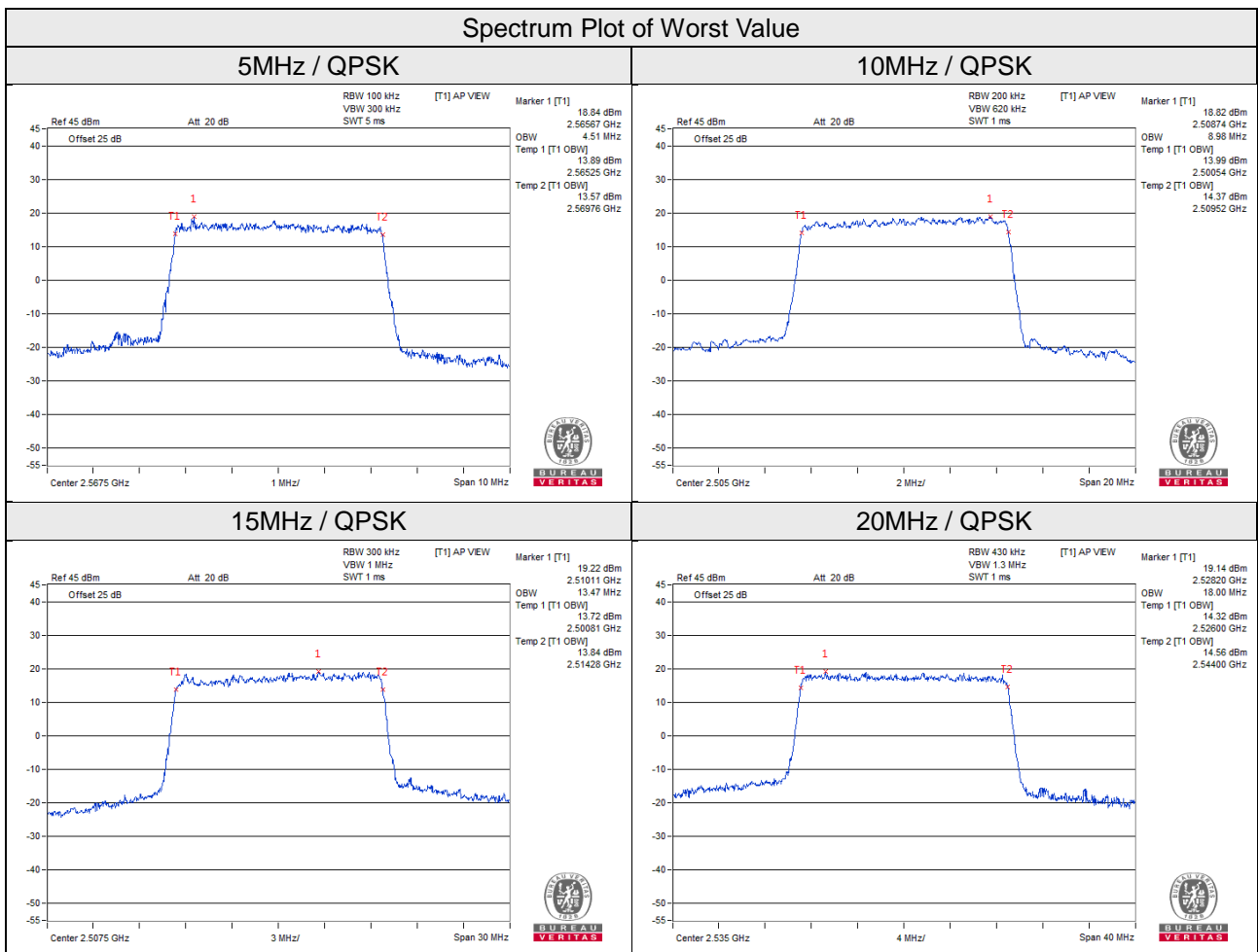
#### 15MHz / QPSK



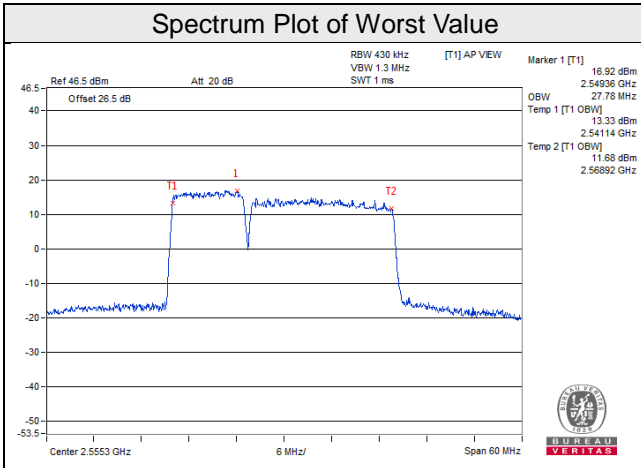
#### 20MHz / 16QAM



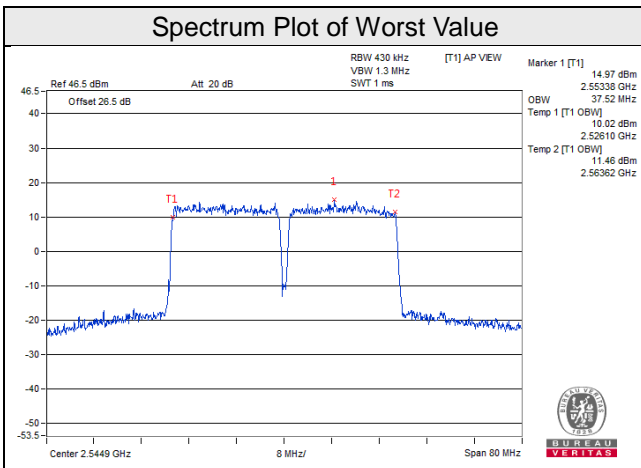
LTE Band 7									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20775	2502.5	4.50	4.49	4.49	20800	2505	8.98	8.96	8.98
21100	2535	4.50	4.49	4.49	21100	2535	8.98	8.96	8.98
21425	2567.5	4.51	4.49	4.49	21400	2565	8.98	8.94	8.98
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20825	2507.5	13.47	13.44	13.47	20850	2510	17.92	17.96	17.96
21100	2535	13.44	13.47	13.47	21100	2535	18.00	17.96	17.96
21375	2562.5	13.44	13.44	13.47	21350	2560	17.88	17.92	17.92



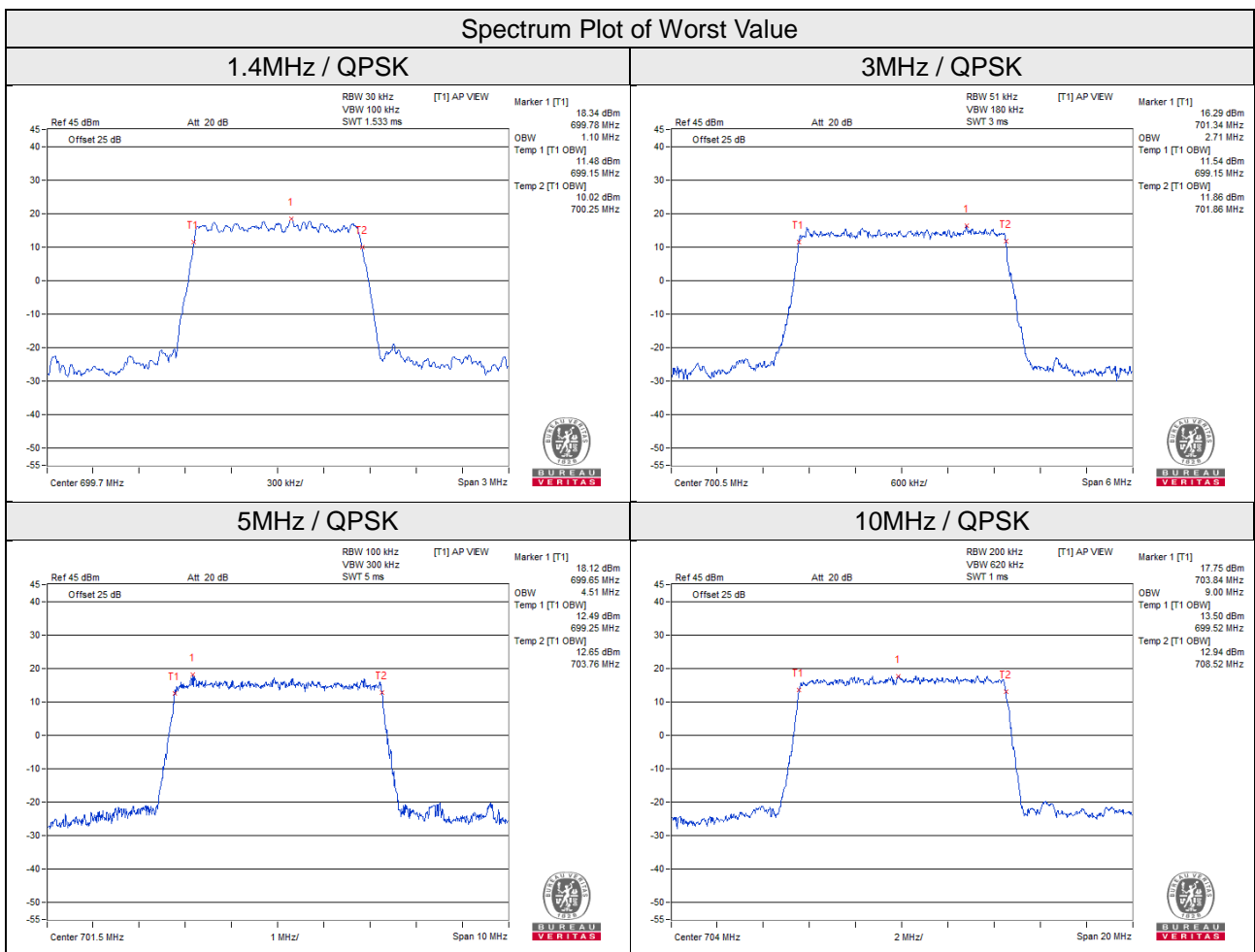
LTE CA_7C (10+20MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
21206+21350	2545.6+2560	27.78



LTE CA_7C (20+20MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
21100+21980	2535+2554.8	37.52



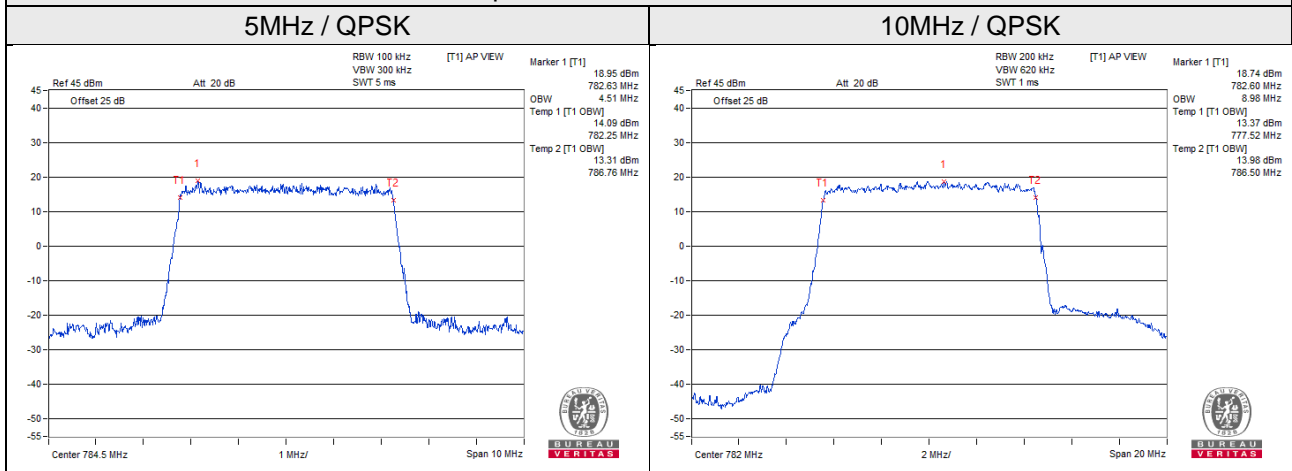
LTE Band 12									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23017	699.7	1.10	1.09	1.09	23025	700.5	2.71	2.69	2.69
23095	707.5	1.09	1.09	1.10	23095	707.5	2.69	2.69	2.70
23173	715.3	1.09	1.09	1.09	23165	714.5	2.71	2.69	2.70
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23035	701.5	4.51	4.50	4.49	23060	704	9.00	8.96	8.98
23095	707.5	4.50	4.50	4.49	23095	707.5	8.98	8.98	8.98
23155	713.5	4.49	4.49	4.49	23130	711	8.98	8.96	8.96



### LTE Band 13

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23205	779.5	4.50	4.49	4.48	23230	782	8.98	8.94	8.98
23230	782	4.49	4.49	4.49					
23255	784.5	4.51	4.49	4.49					

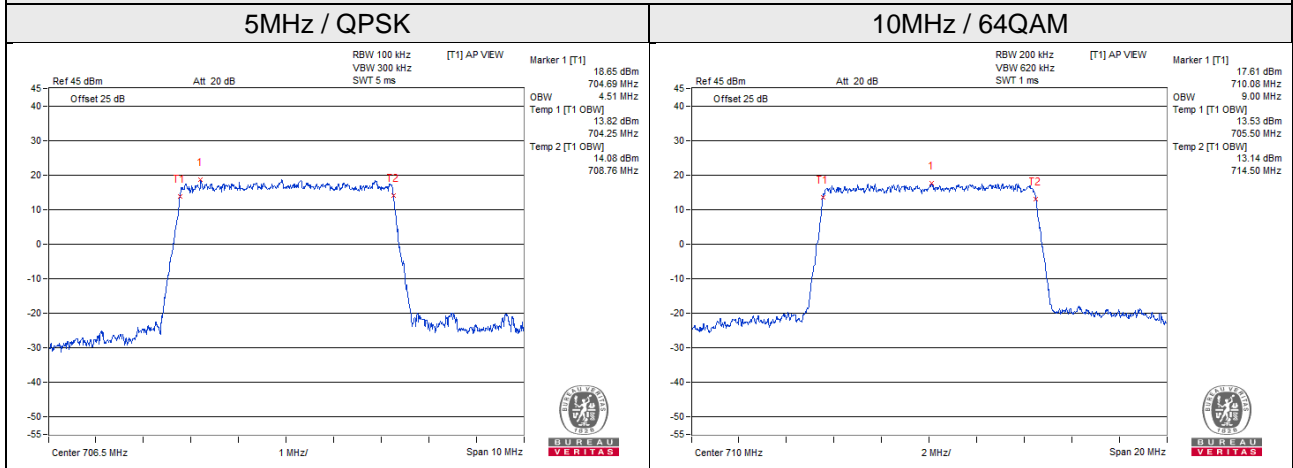
### Spectrum Plot of Worst Value



### LTE Band 17

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
23755	706.5	4.51	4.49	4.49	23780	709	8.98	8.94	8.96
23790	710	4.50	4.50	4.49	23790	710	8.98	8.94	9.00
23825	713.5	4.50	4.48	4.49	23800	711	8.98	8.98	8.96

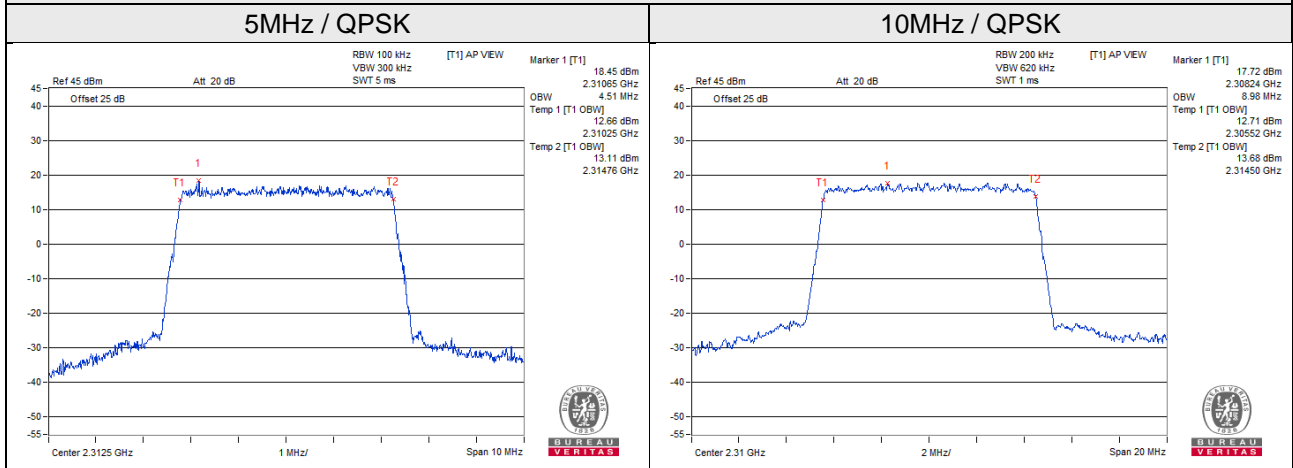
### Spectrum Plot of Worst Value



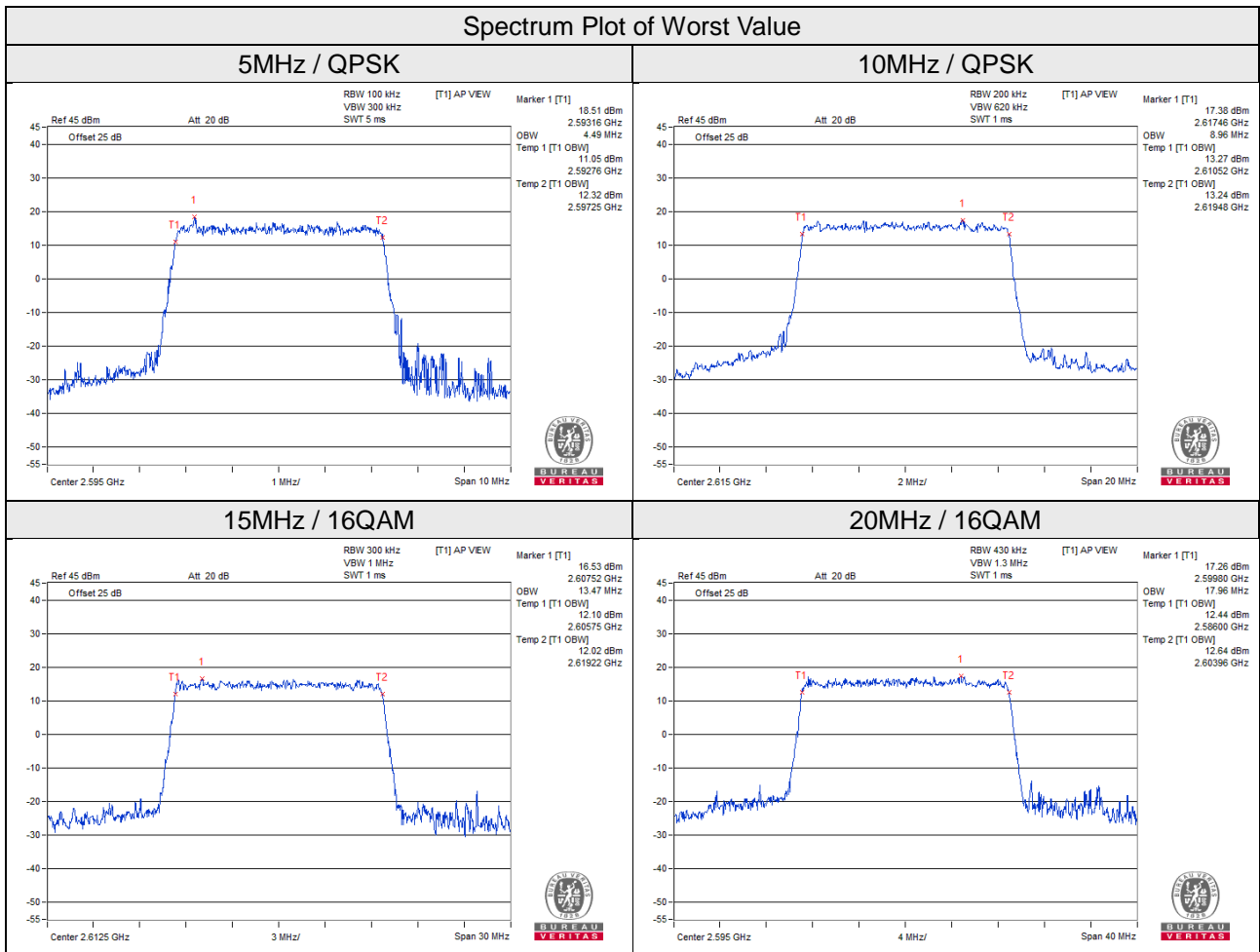
### LTE Band 30

Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
27685	2307.5	4.50	4.49	4.49	27710	2310	8.98	8.94	8.96
27710	2310	4.50	4.49	4.49					
27735	2312.5	4.51	4.49	4.49					

### Spectrum Plot of Worst Value

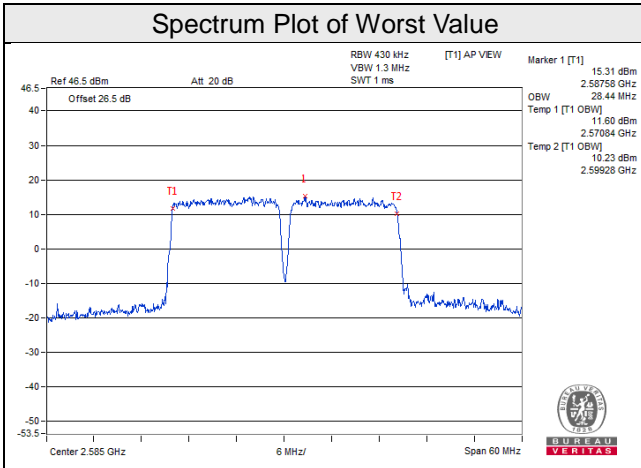


LTE Band 38									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37775	2572.5	4.48	4.48	4.47	37800	2575	8.94	8.96	8.96
38000	2595	4.49	4.49	4.48	38000	2595	8.94	8.96	8.96
38225	2617.5	4.48	4.49	4.49	38200	2615	8.96	8.96	8.96
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37825	2577.5	13.44	13.44	13.44	37850	2580	17.96	17.92	17.92
38000	2595	13.44	13.44	13.44	38000	2595	17.96	17.96	17.88
38175	2612.5	13.44	13.47	13.44	38150	2610	17.96	17.92	17.88

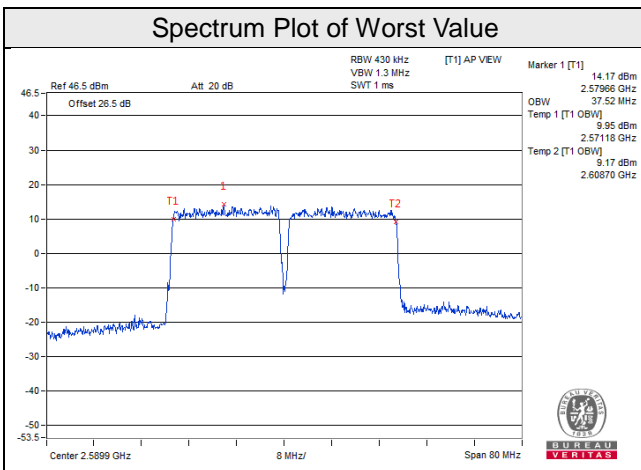




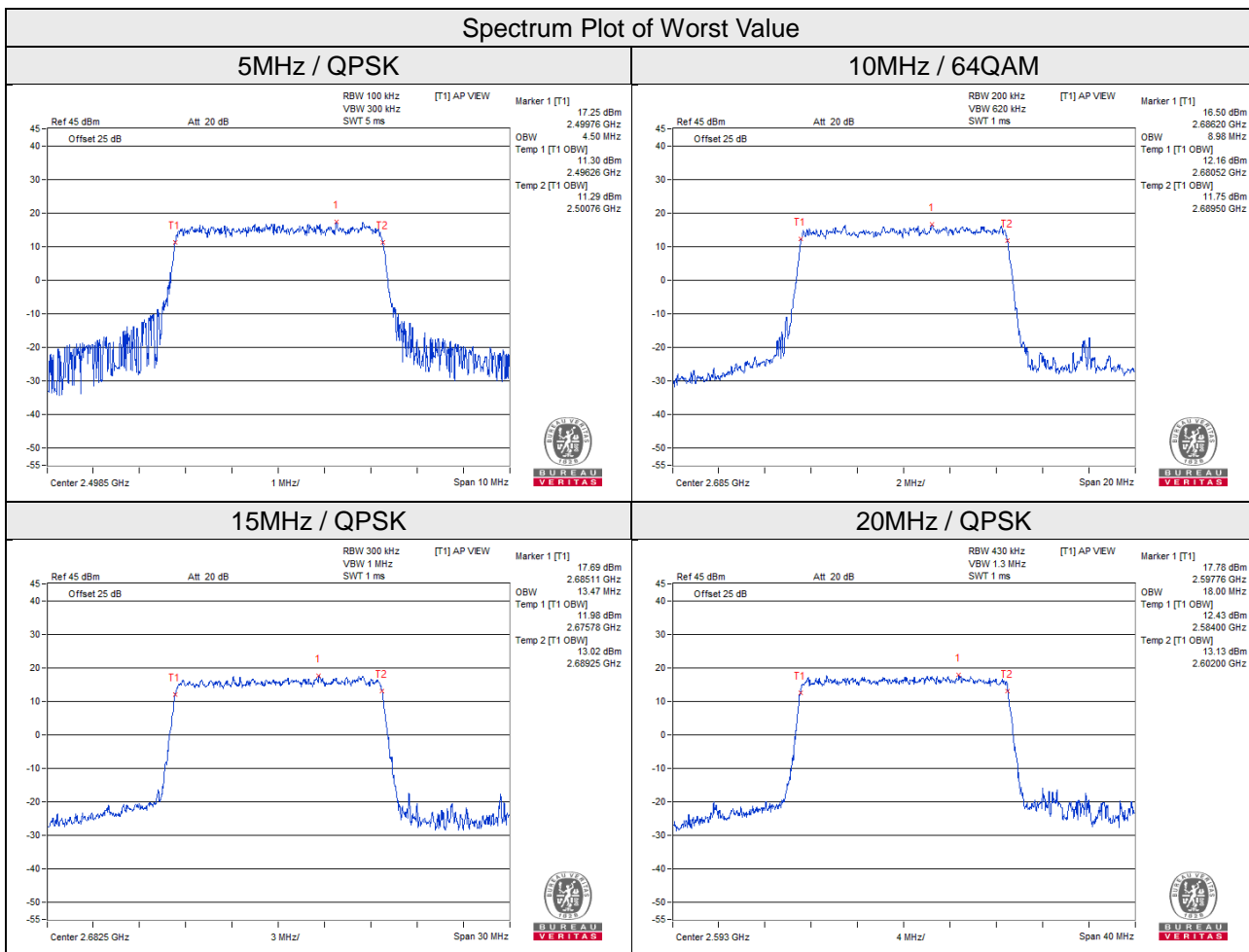
LTE CA_38C (15+15MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
37825+37975	2577.5+2592.5	28.38



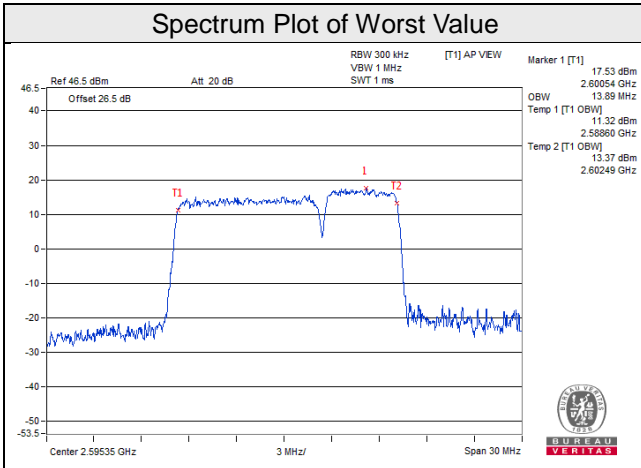
LTE CA_38C (20+20MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
37901+38099	2585.1+2604.9	37.52



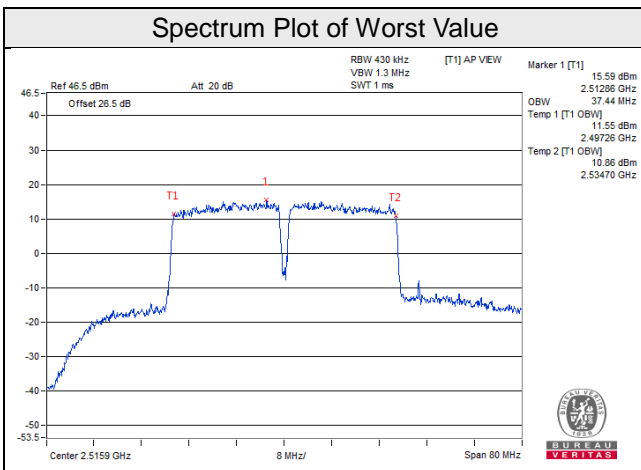
LTE Band 41									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39675	2498.5	4.50	4.49	4.49	39700	2501	8.96	8.96	8.96
40620	2593	4.48	4.50	4.48	50620	2593	8.94	8.96	8.96
41565	2687.5	4.50	4.50	4.49	41540	2685	8.94	8.94	8.98
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39725	2503.5	13.44	13.47	13.44	39750	2506	17.92	17.92	17.92
40620	2593	13.44	13.47	13.44	40620	2593	18.00	17.92	17.92
41515	2682.5	13.47	13.47	13.47	41490	2680	17.92	17.88	17.92



LTE CA_41C (10+5MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
39700+39772	2501+2508.2	13.89



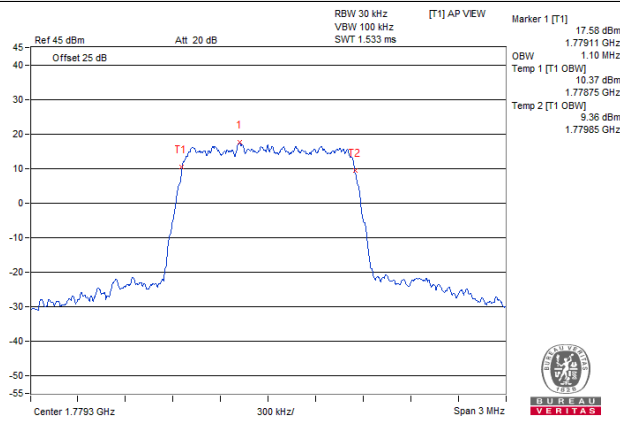
LTE CA_41C (20+20MHz)		
Channel	FREQ. (MHz)	Occupied Bandwidth (MHz)
		QPSK
39750+39948	2506+2525.8	37.44



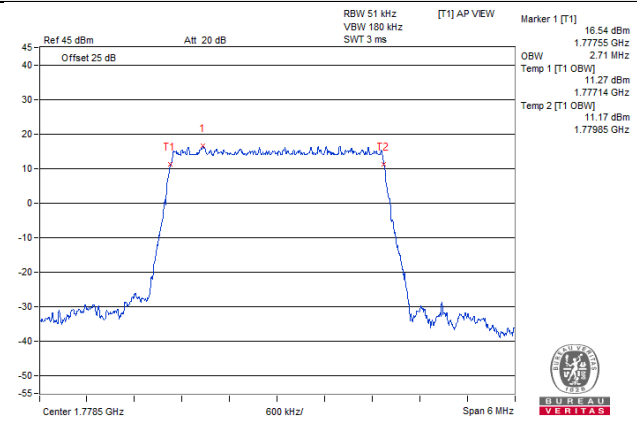
LTE Band 66									
Channel Bandwidth 1.4MHz					Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131979	1710.7	1.09	1.08	1.09	131987	1711.5	2.70	2.69	2.68
132322	1745	1.10	1.09	1.10	132322	1745	2.70	2.68	2.69
132665	1779.3	1.10	1.10	1.10	132657	1778.5	2.71	2.69	2.70
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
131997	1712.5	4.50	4.50	4.50	132022	1715	9.00	8.98	8.98
132322	1745	4.51	4.50	4.50	132322	1745	8.98	8.98	8.98
132647	1777.5	4.51	4.50	4.50	132622	1775	9.00	8.98	9.00
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
132047	1717.5	13.50	13.44	13.47	132072	1720	18.00	17.92	17.96
132322	1745	13.47	13.44	13.47	132322	1745	17.96	17.92	17.92
132597	1722.5	13.47	13.44	13.47	132572	1770	18.00	17.92	18.00

### Spectrum Plot of Worst Value

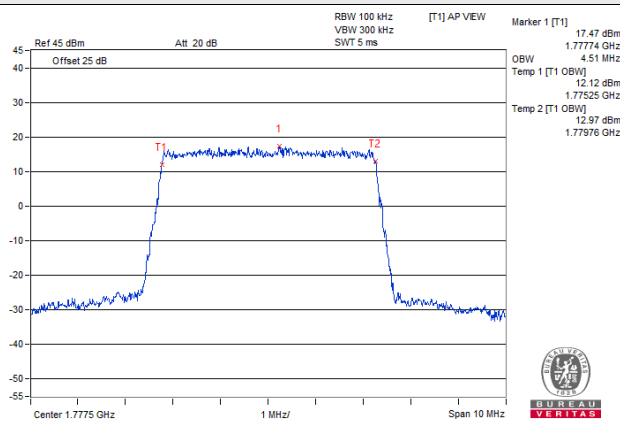
#### 1.4MHz / QPSK



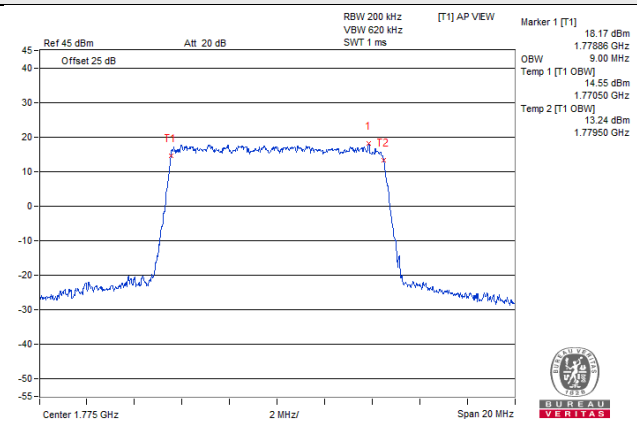
#### 3MHz / QPSK



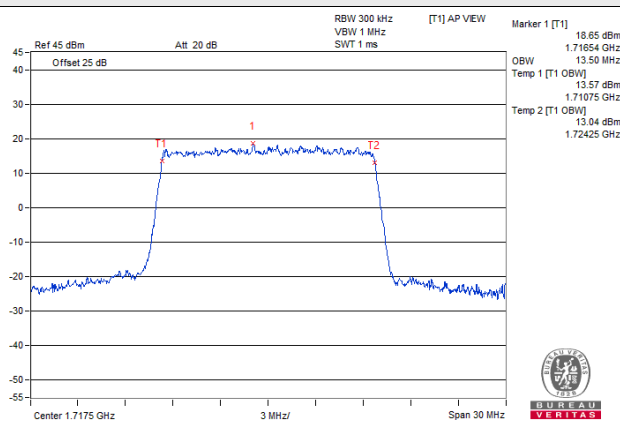
#### 5MHz / QPSK



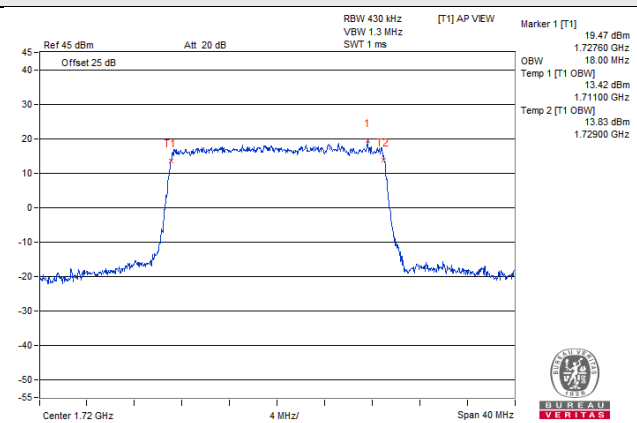
#### 10MHz / QPSK



#### 15MHz / QPSK



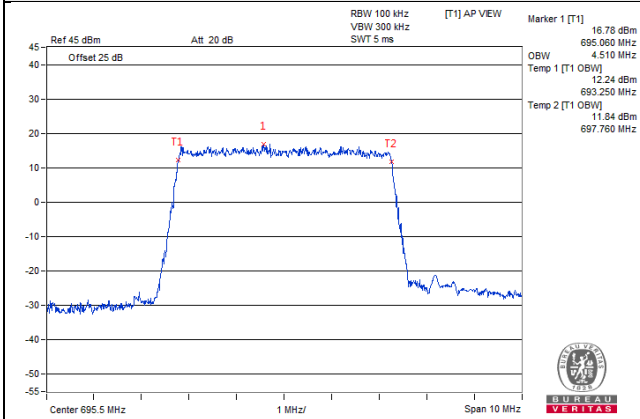
#### 20MHz / QPSK



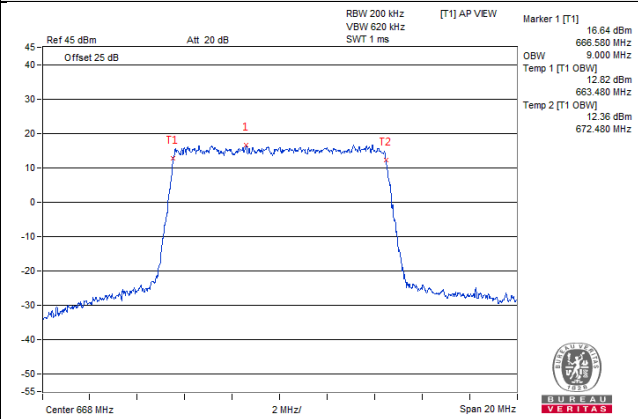
LTE Band 71									
Channel Bandwidth 5MHz					Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
133147	665.5	4.50	4.50	4.50	133172	668	9.00	9.00	8.98
133297	680.5	4.50	4.51	4.51	133297	680.5	8.98	9.00	8.98
133447	695.5	4.51	4.51	4.50	133422	693	9.00	8.98	8.98
Channel Bandwidth 15MHz					Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
133197	670.5	13.50	13.50	13.50	133222	673	18.00	17.88	18.00
133297	680.5	13.47	13.47	13.47	133297	680.5	18.00	17.88	17.92
133397	690.5	13.50	13.50	13.50	133372	688	18.04	17.92	18.04

### Spectrum Plot of Worst Value

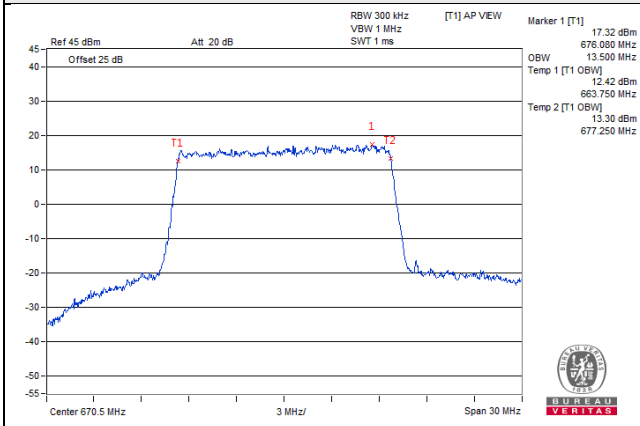
#### 5MHz / QPSK



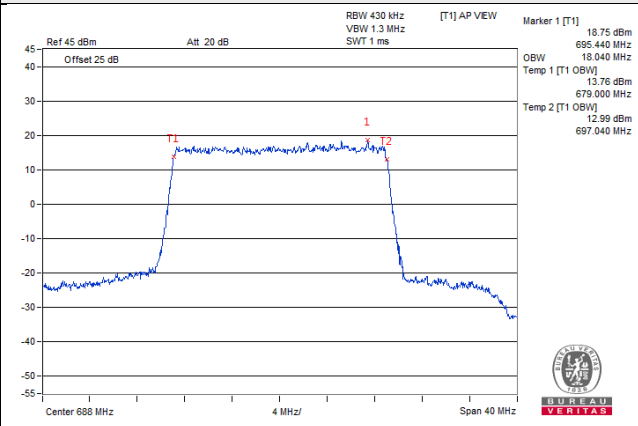
#### 10MHz / QPSK



#### 15MHz / QPSK



#### 20MHz / QPSK



## 4.5 Channel Edge Measurement

### 4.5.1 Limits of Channel Edge Measurement

According to FCC 27.53(a)(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands: (i) By a factor of not less than:  $43 + 10 \log (P)$  dB on all frequencies between 2305 and 2320 MHz 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 2345 MHz, 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 2305 MHz,  $55 + 10 \log (P)$  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 2365 MHz, and not less than  $70 + 10 \log (P)$  dB above 2365 MHz.

According to FCC 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, 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 any frequency outside the 746-758 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;
- (2) 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;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

According to FCC 27.53(f) For operations in the 746–758 MHz, 775–788 MHz, and 805–806 MHz bands, emissions in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

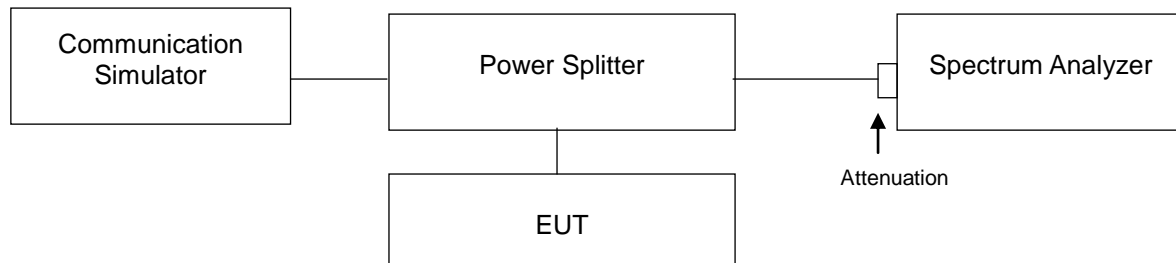
According to FCC 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  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.

According to FCC 27.53(h) AWS emission limits— General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 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  $43 + 10 \log_{10} (P)$  dB.

According to FCC 27.53(v)(4) For mobile digital stations, the attenuation 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.



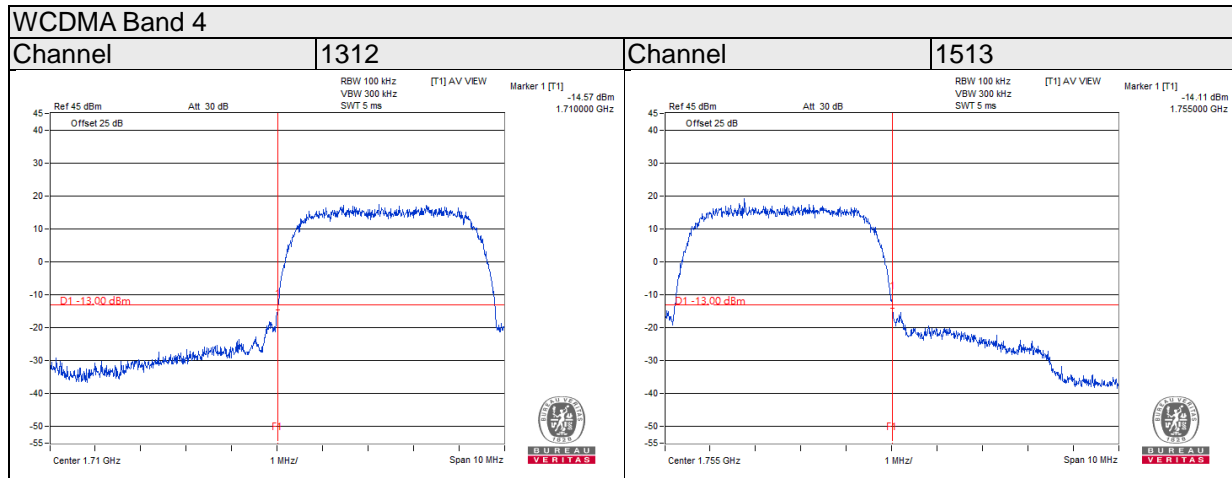
#### 4.5.2 Test Setup



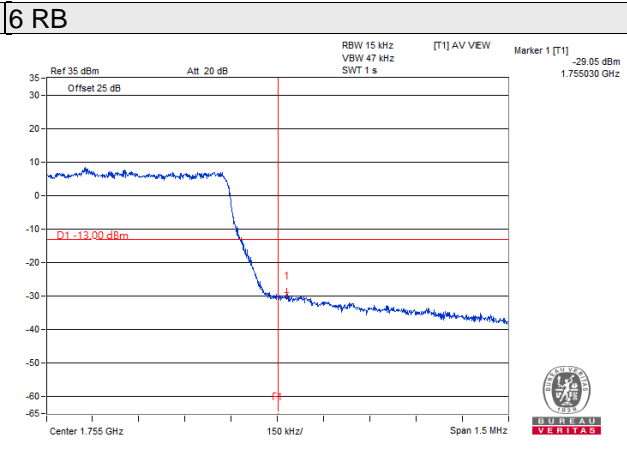
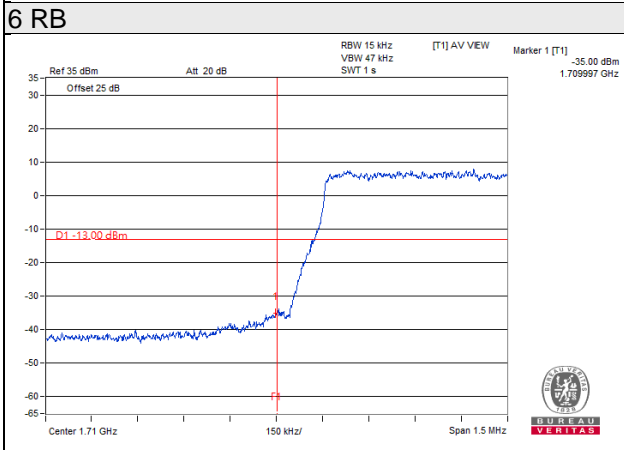
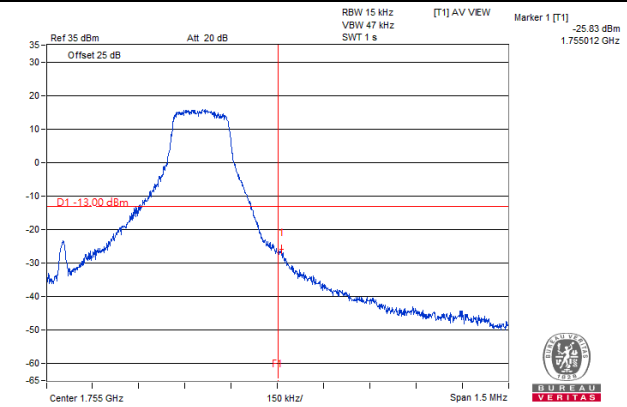
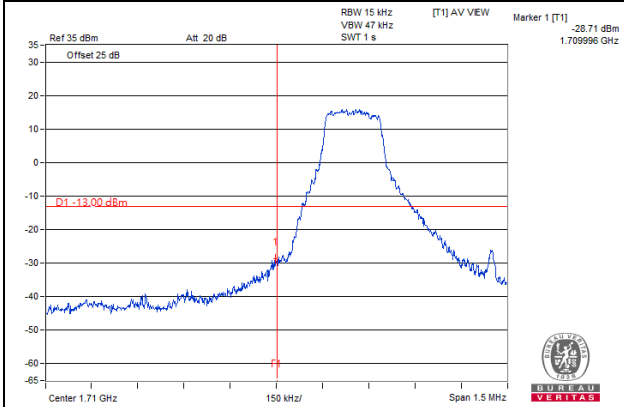
#### 4.5.3 Test Procedures

- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and s RB of the spectrum is >1% emission bandwidth and VB of the spectrum is  $\geq 3*RB$ .
- c. Record the max trace plot into the test report.

#### 4.5.4 Test Results



LTE Band 4 Channel Band width: 1.4MHz	
Channel 19957	Channel 20393
1 RB	1 RB



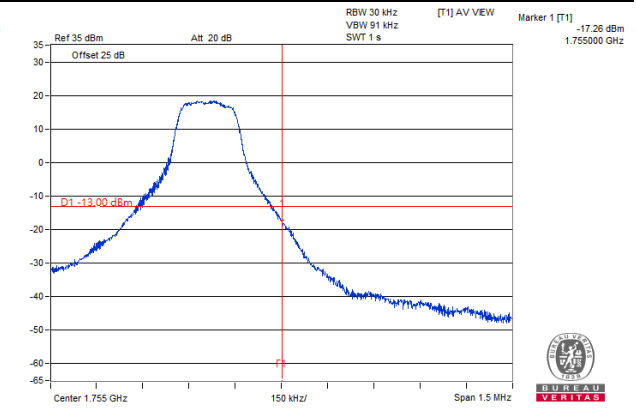
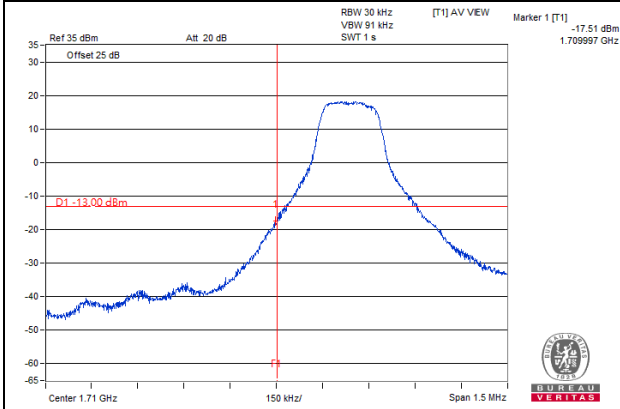
LTE Band 4 Channel Band width: 3MHz

Channel 19965

Channel 20385

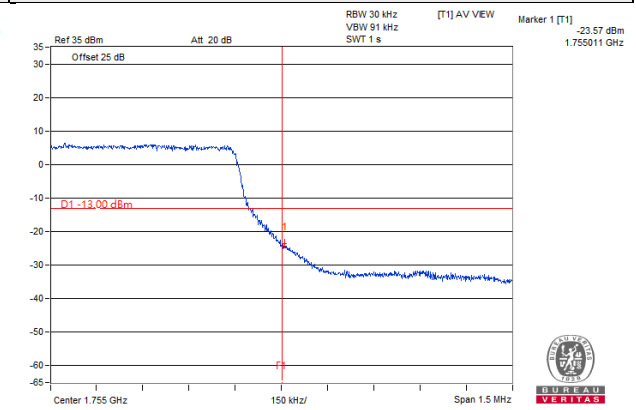
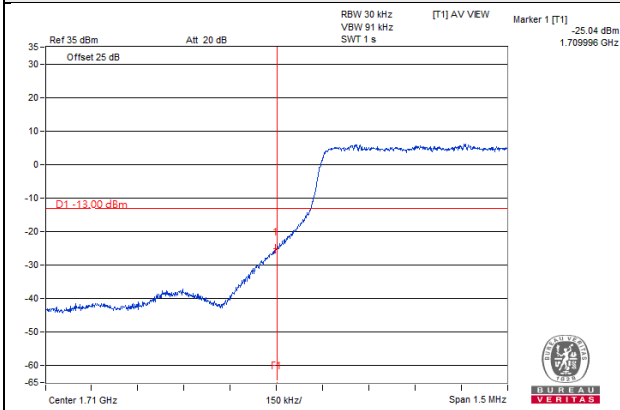
1 RB

1 RB

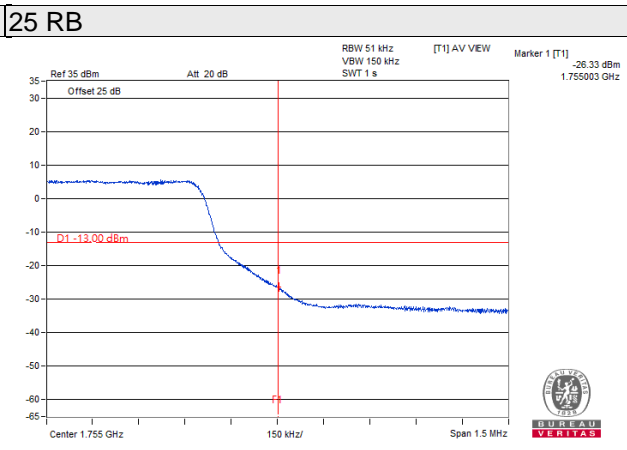
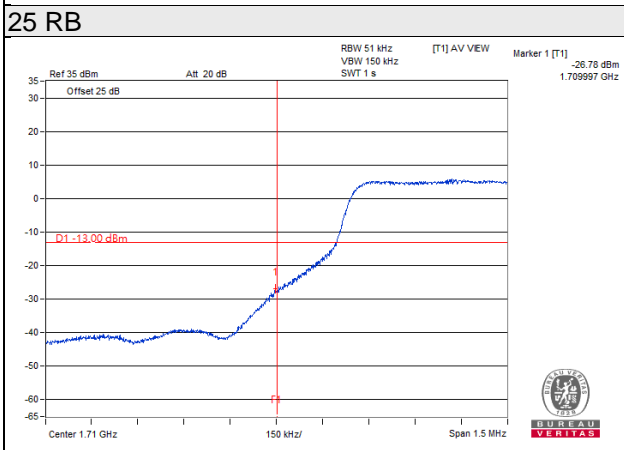
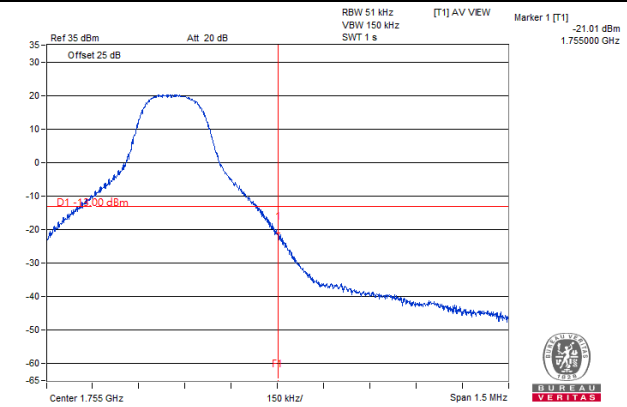
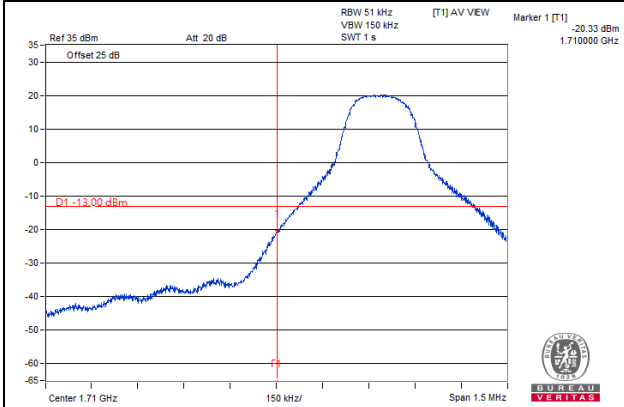


15 RB

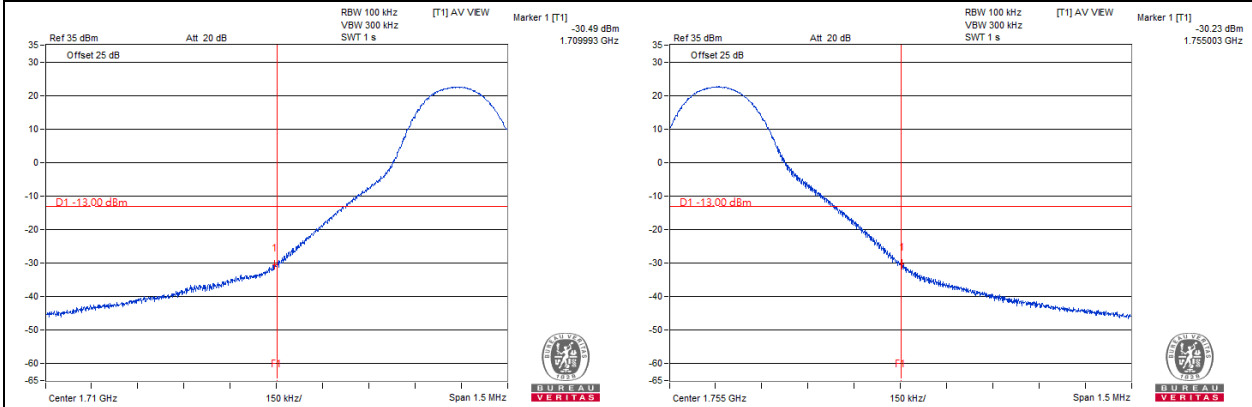
15 RB



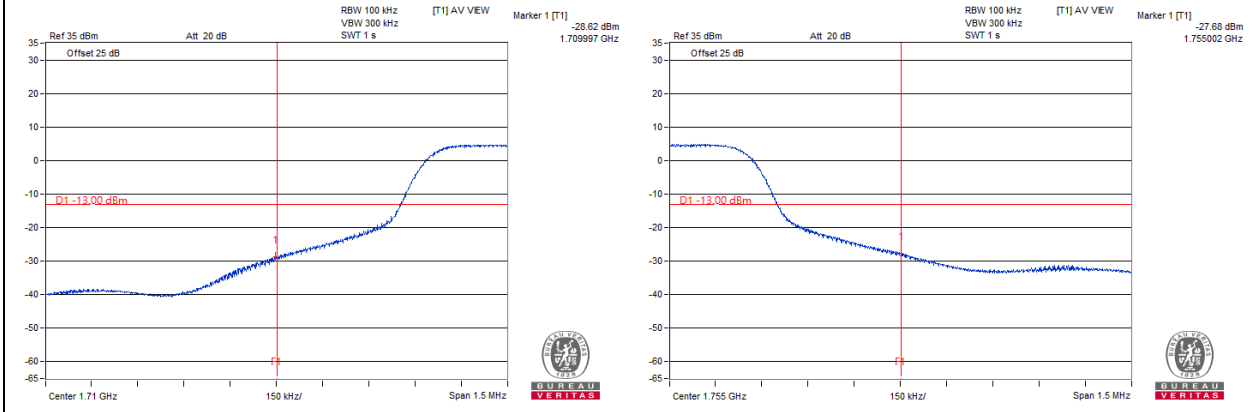
LTE Band 4 Channel Band width: 5MHz	
Channel 19975	Channel 20375
1 RB	1 RB



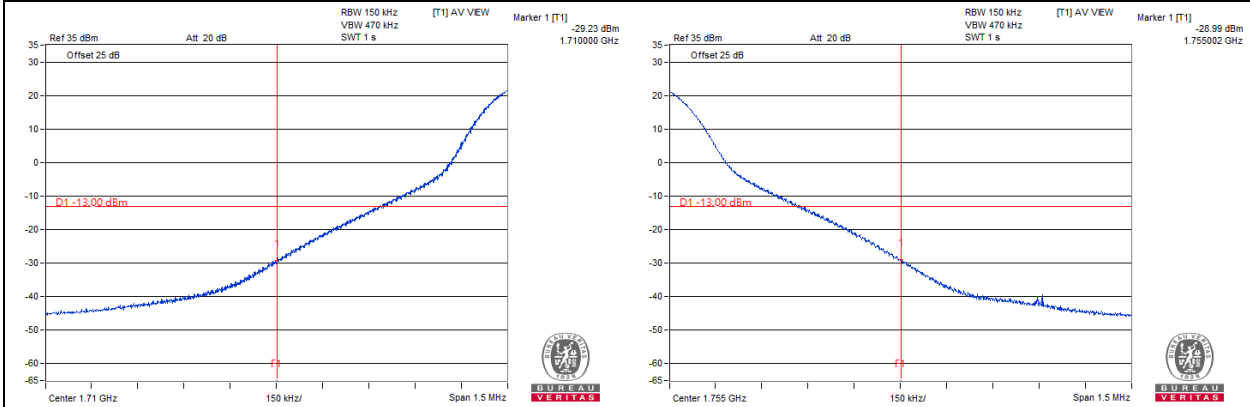
LTE Band 4 Channel Band width: 10MHz	
Channel 20000	Channel 20350
1 RB	1 RB



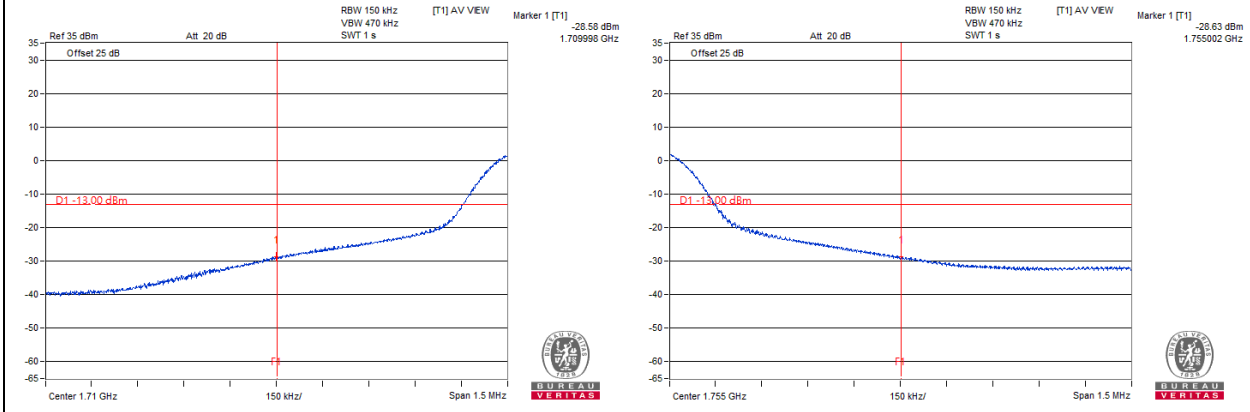
50 RB	50 RB
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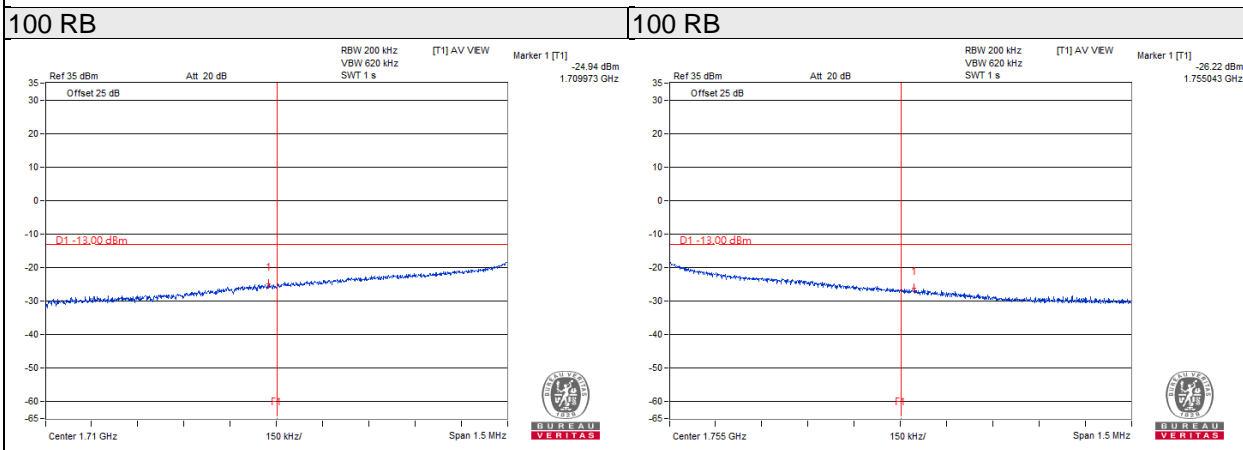
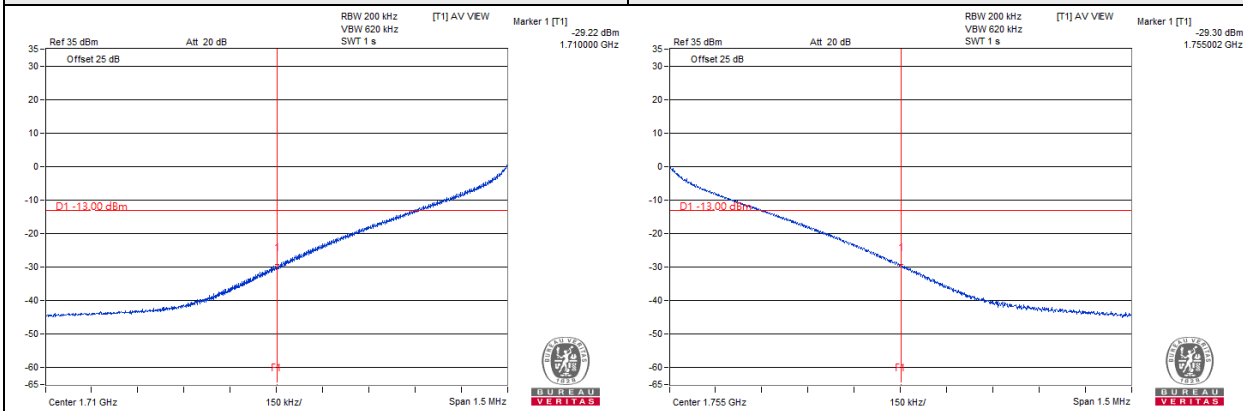
LTE Band 4 Channel Band width: 15MHz	
Channel 20025	Channel 20325
1 RB	1 RB



75 RB	75 RB
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LTE Band 4 Channel Band width: 20MHz	
Channel 20050	Channel 20300
1 RB	1 RB





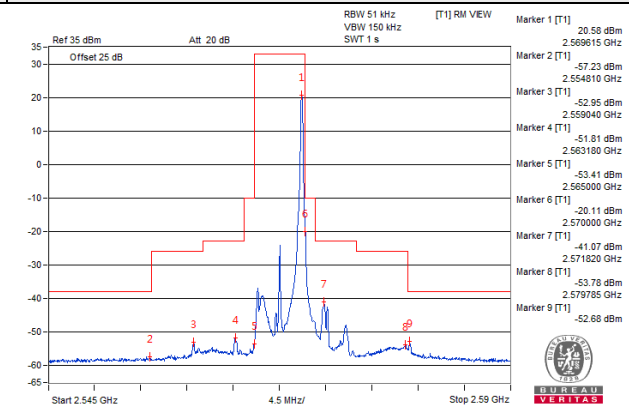
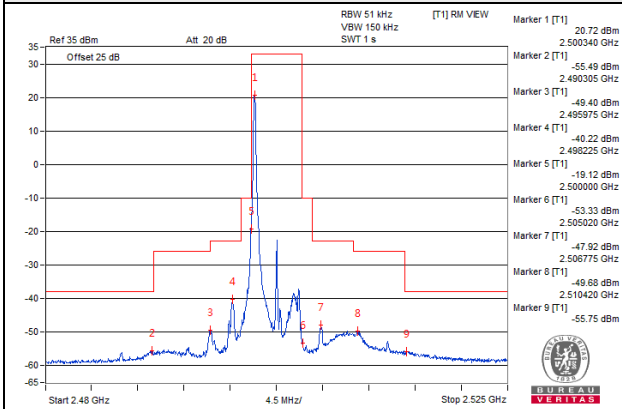
**LTE Band 7 Channel Band width: 5MHz**

**Channel 20775**

**1 RB**

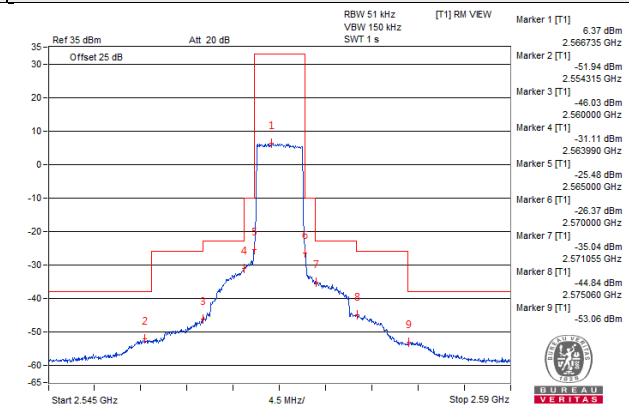
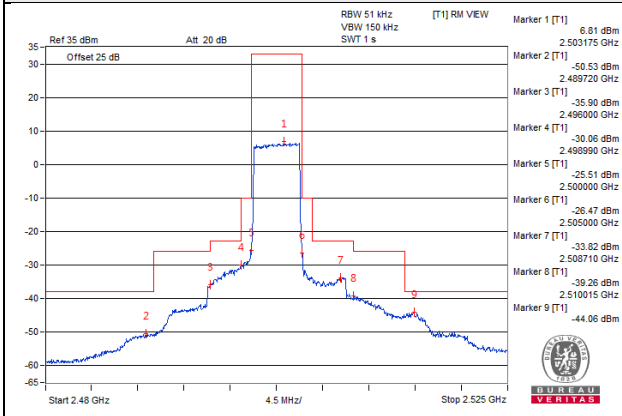
**Channel 21425**

**1 RB**



**25 RB**

**25 RB**



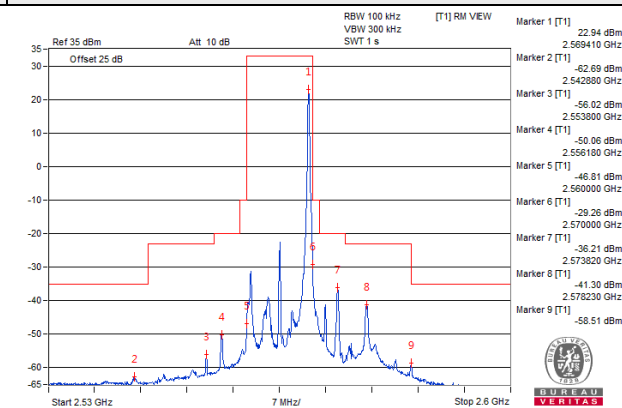
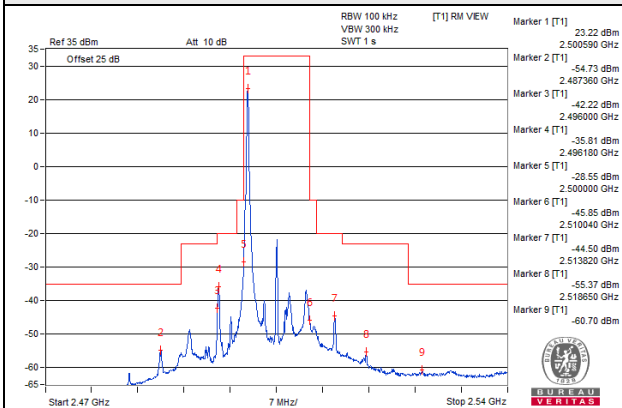
**LTE Band 7 Channel Band width: 10MHz**

**Channel 20800**

**1 RB**

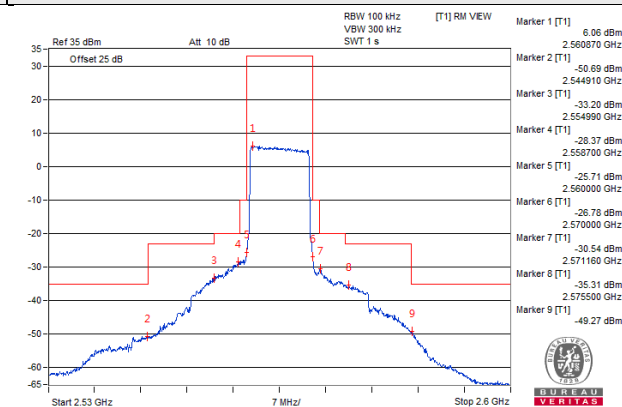
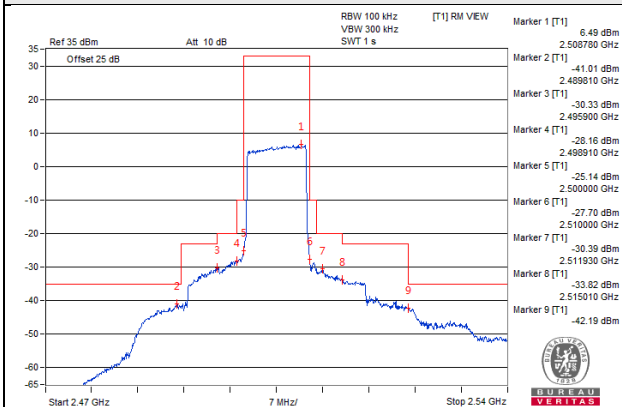
**Channel 21400**

**1 RB**



**50 RB**

**50 RB**



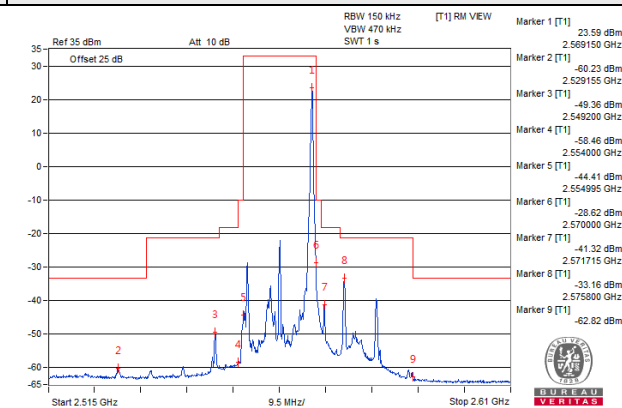
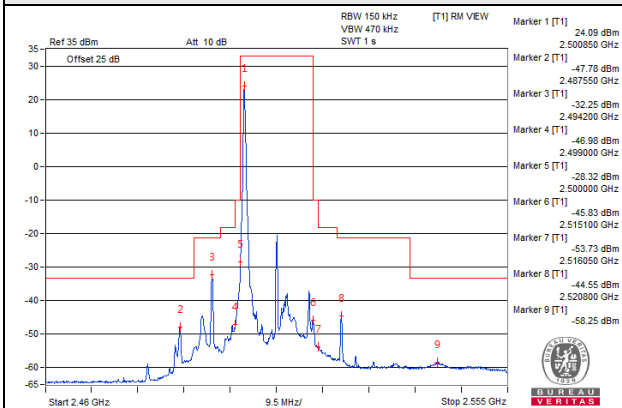
**LTE Band 7 Channel Band width: 15MHz**

**Channel 20825**

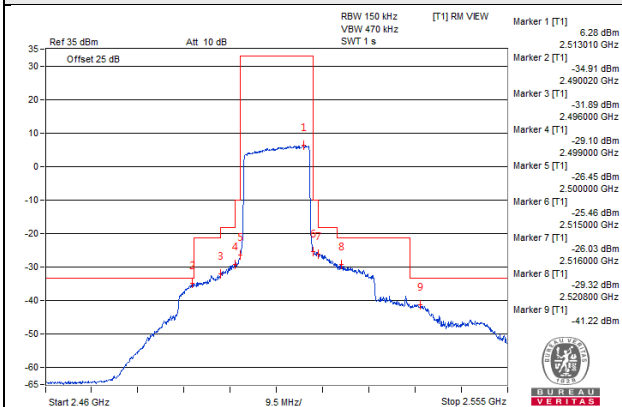
**1 RB**

**Channel 21375**

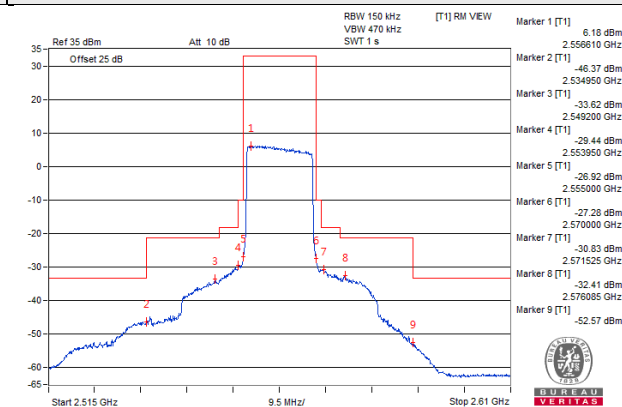
**1 RB**



**75 RB**



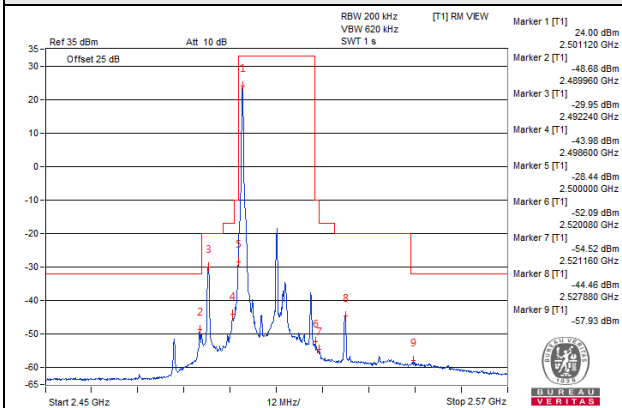
**75 RB**



**LTE Band 7 Channel Band width: 20MHz**

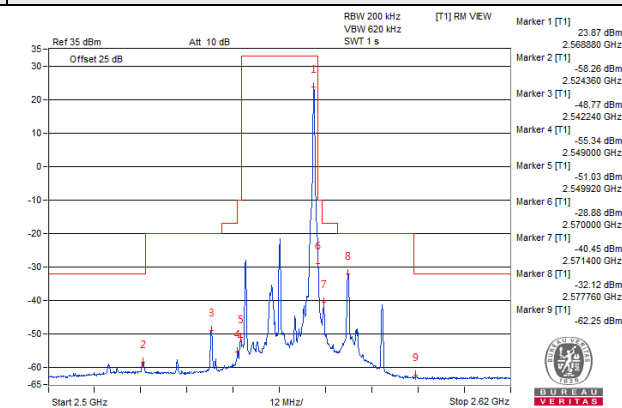
**Channel 20850**

**1 RB**

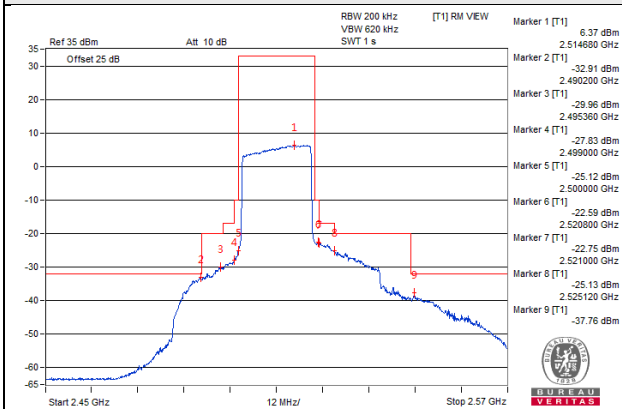


**Channel 21350**

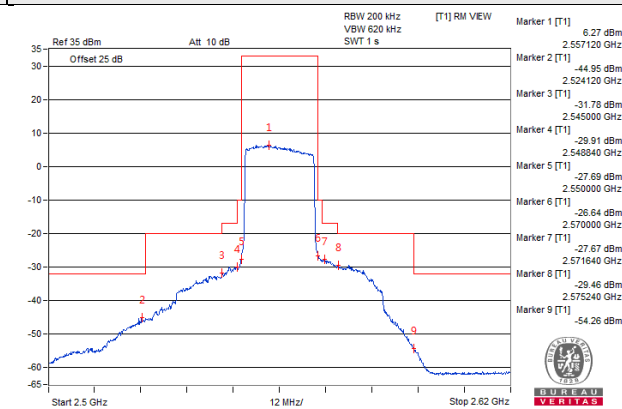
**1 RB**



**100 RB**

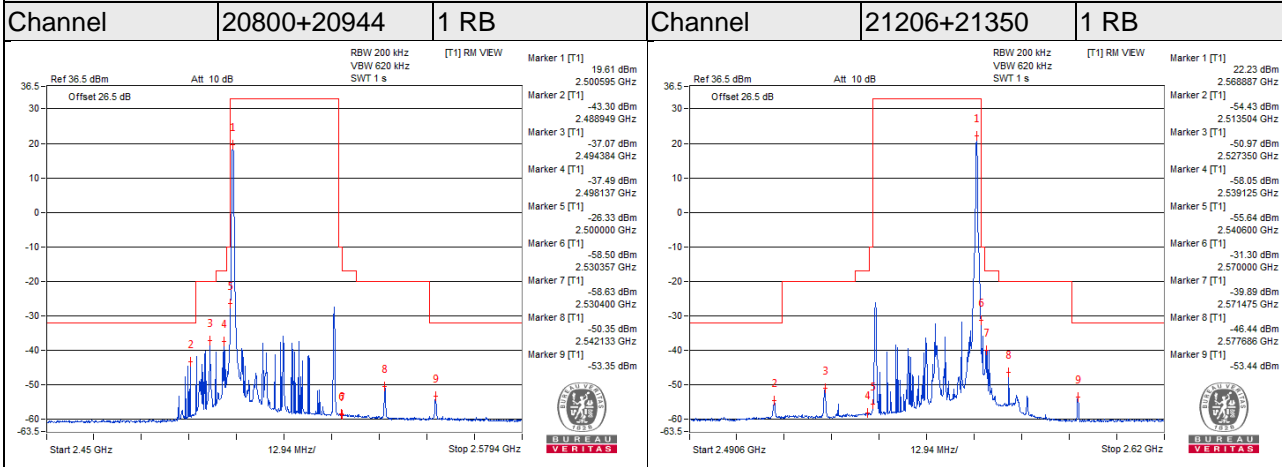


**100 RB**

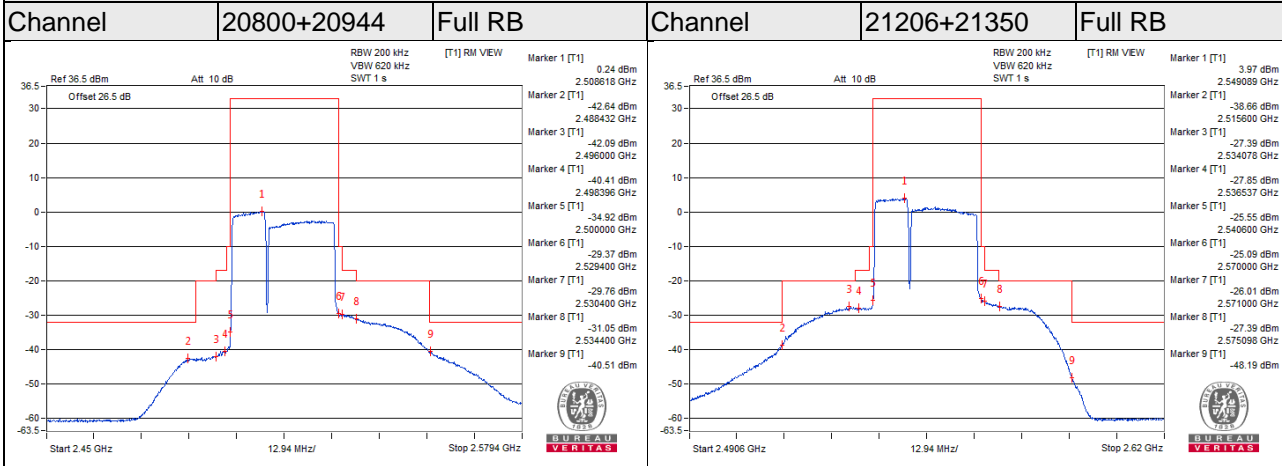


### LTE CA\_7C

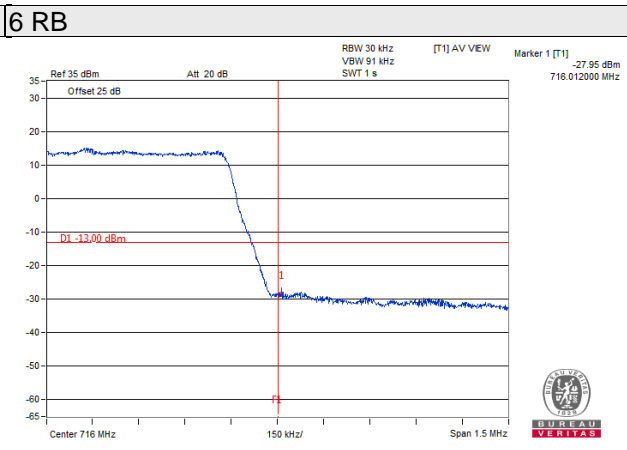
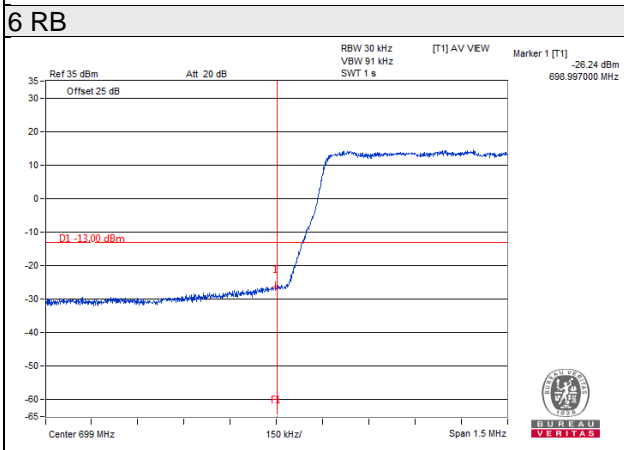
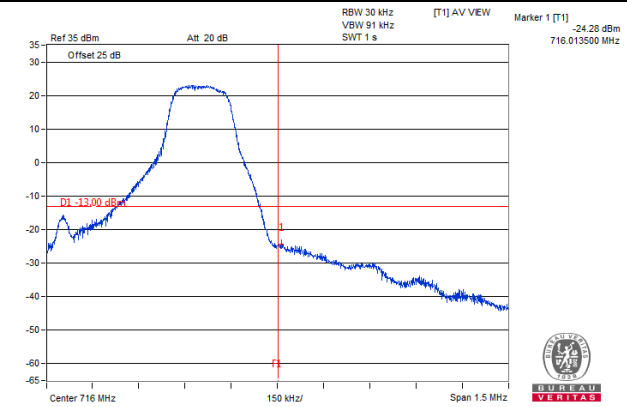
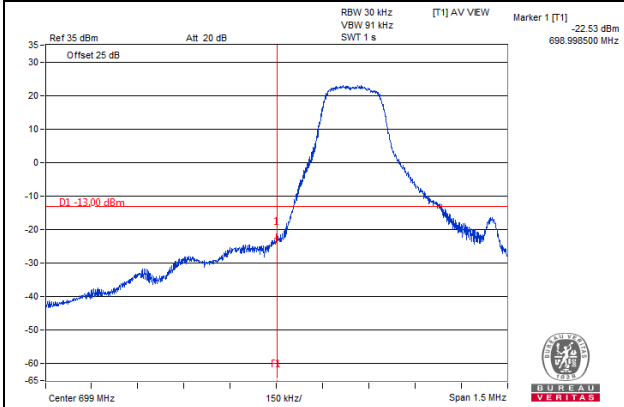
#### Channel Bandwidth 10+20MHz



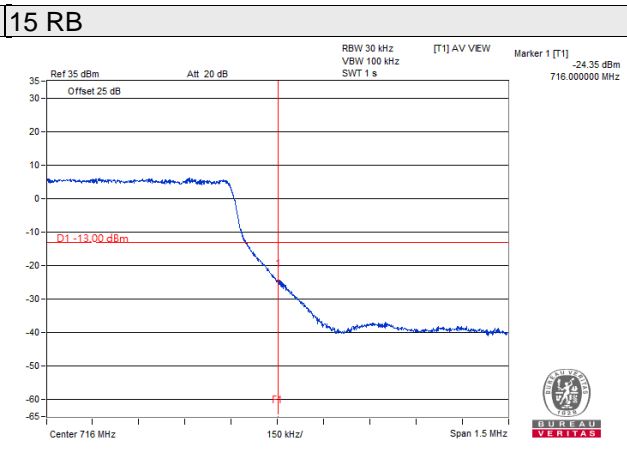
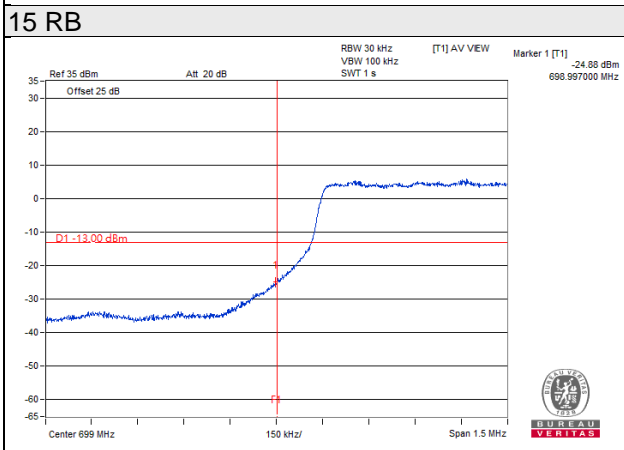
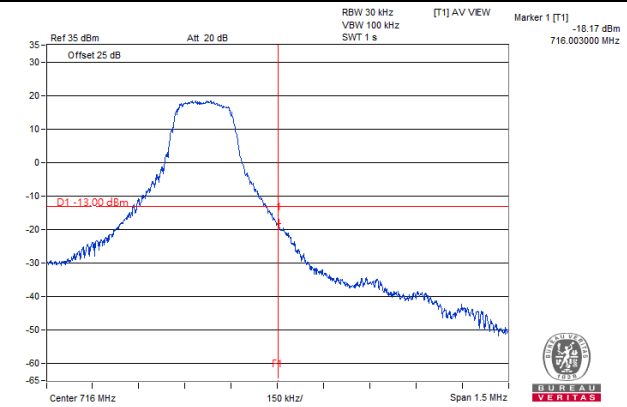
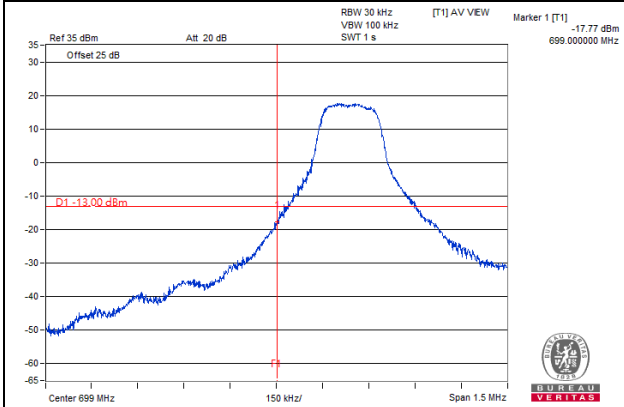
#### Channel Bandwidth 10+20MHz



LTE Band 12 Channel Band width: 1.4MHz	
Channel 23017	Channel 23173
1 RB	1 RB



LTE Band 12 Channel Band width: 3MHz	
Channel 23025	Channel 23165
1 RB	1 RB



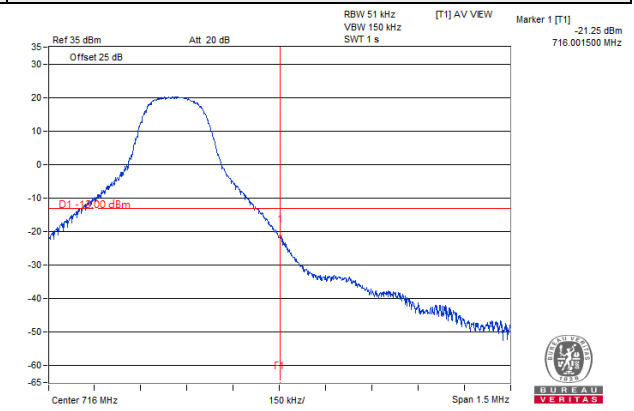
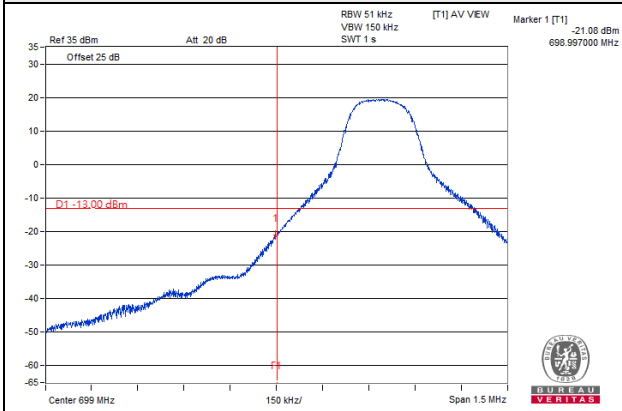
LTE Band 12 Channel Band width: 5MHz

Channel 23035

Channel 23155

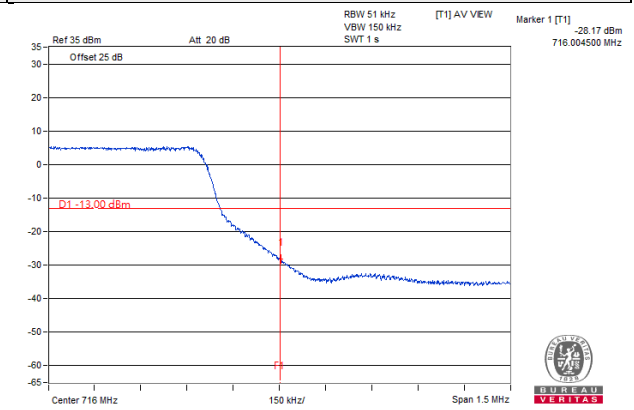
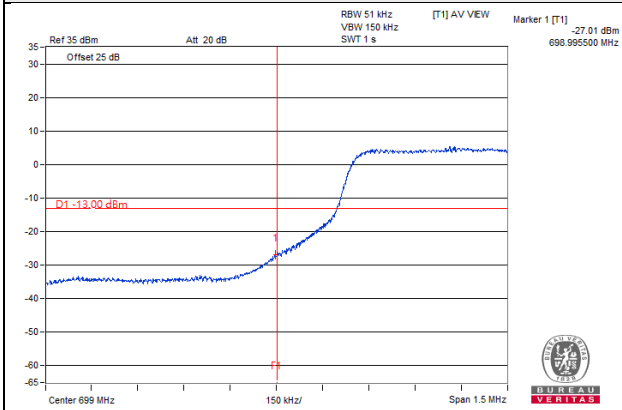
1 RB

1 RB



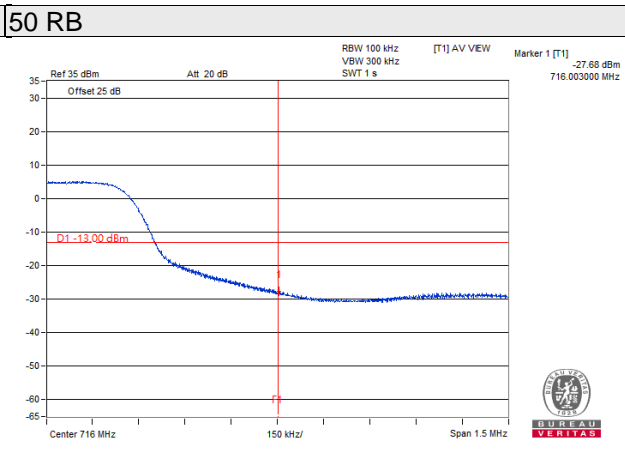
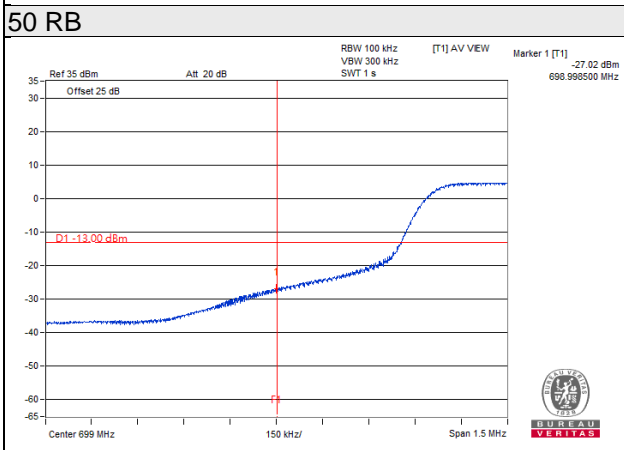
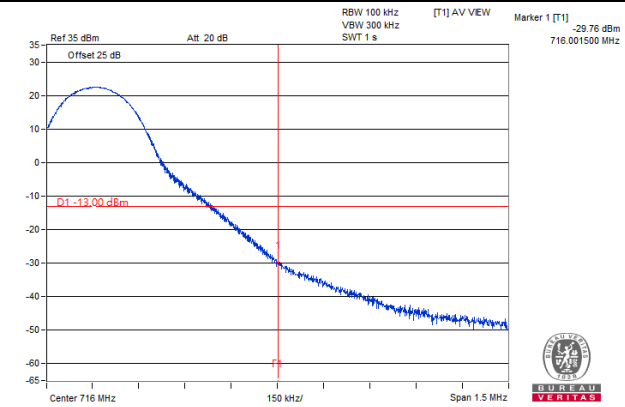
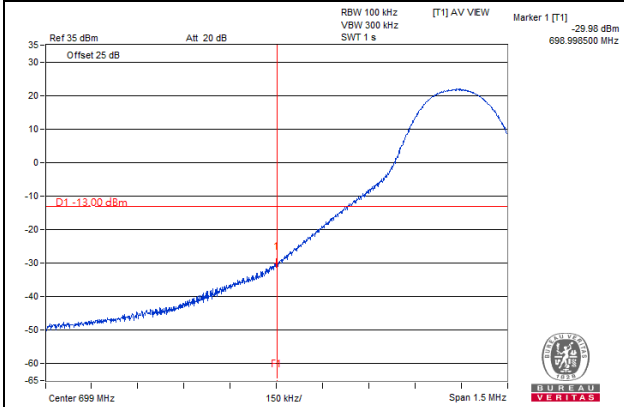
25 RB

25 RB

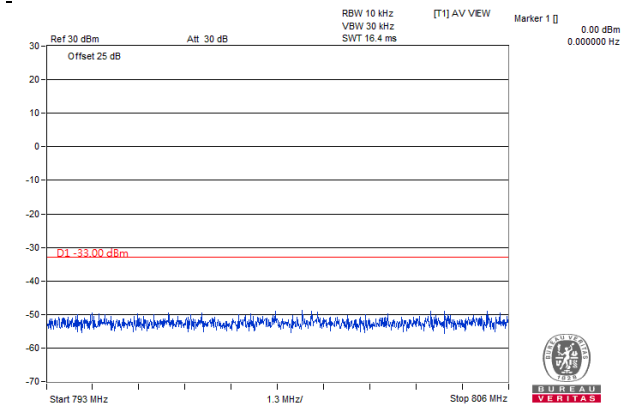
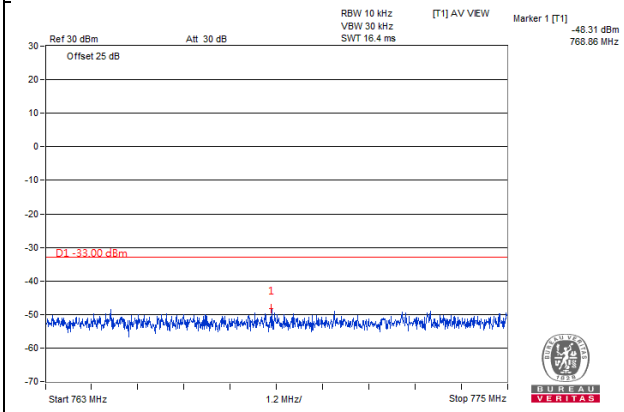
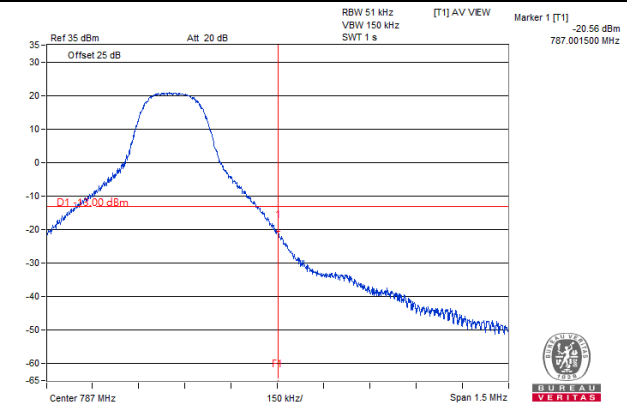
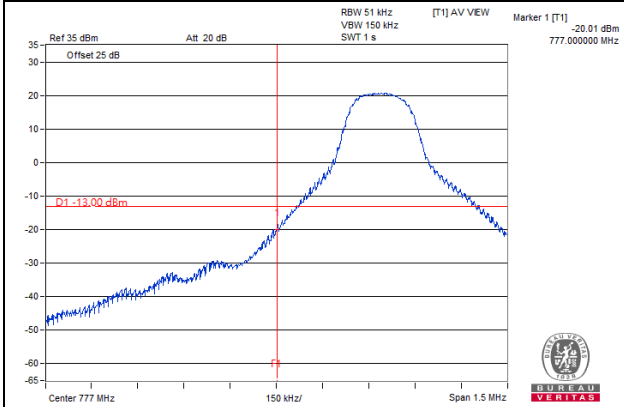




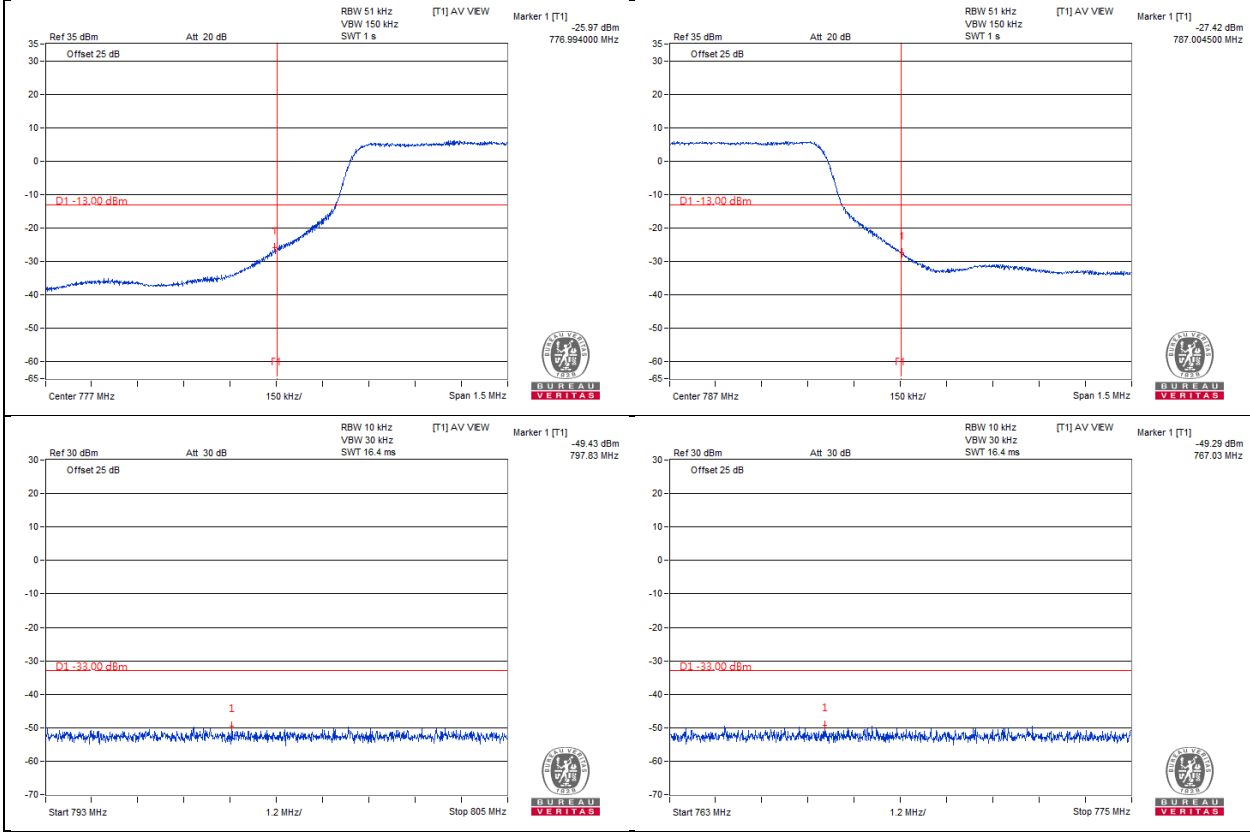
LTE Band 12 Channel Band width: 10MHz	
Channel 23060	Channel 23130
1 RB	1 RB



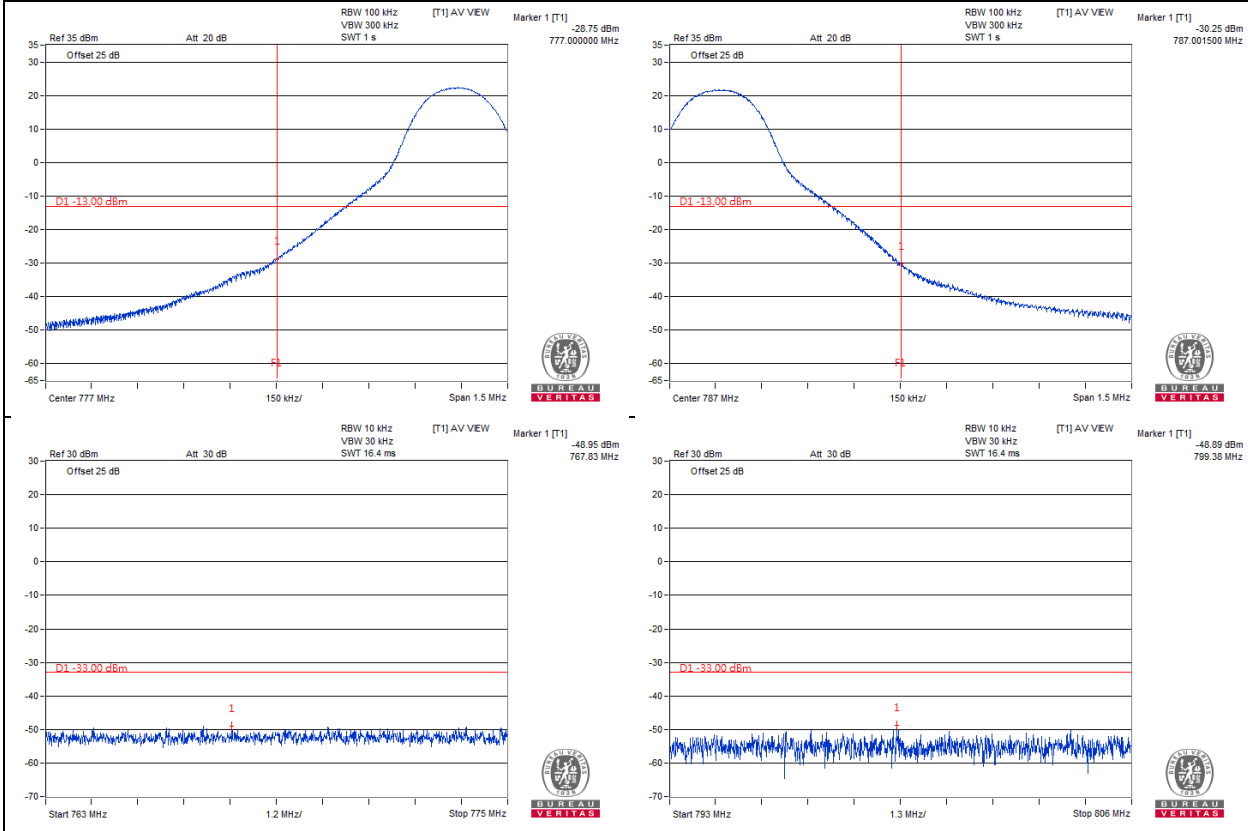
LTE Band 13 Channel Band width: 5MHz	
Channel 23205	Channel 23255
1 RB	1 RB



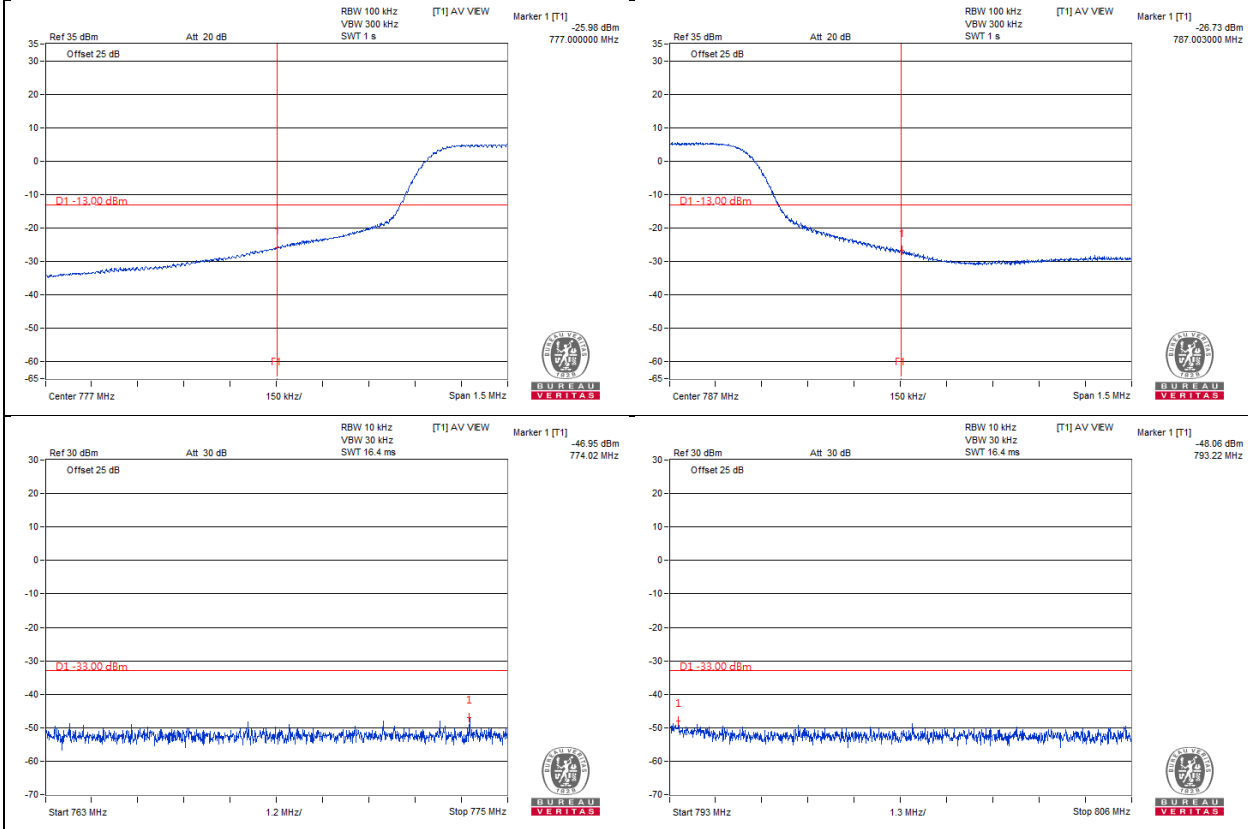
LTE Band 13 Channel Band width: 5MHz	
Channel 23205	Channel 23255
25 RB	25 RB



LTE Band 13 Channel Band width: 10MHz	
Channel 23230	Channel 23230
1 RB	1 RB



LTE Band 13 Channel Band width: 10MHz	
Channel 23230	Channel 23230
50 RB	50 RB



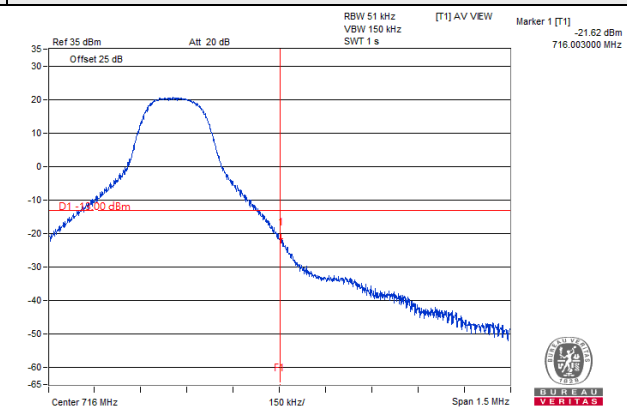
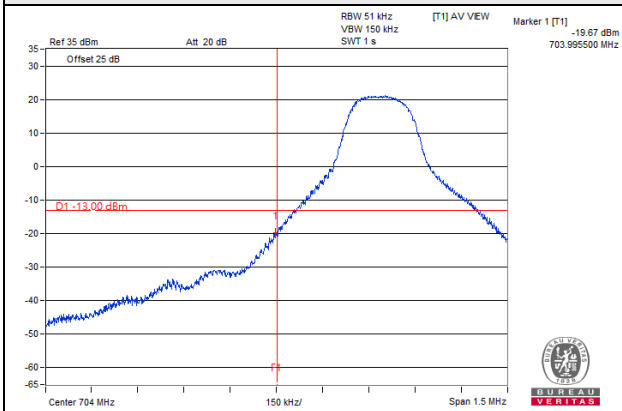
LTE Band 17 Channel Band width: 5MHz

Channel 23755

Channel 23825

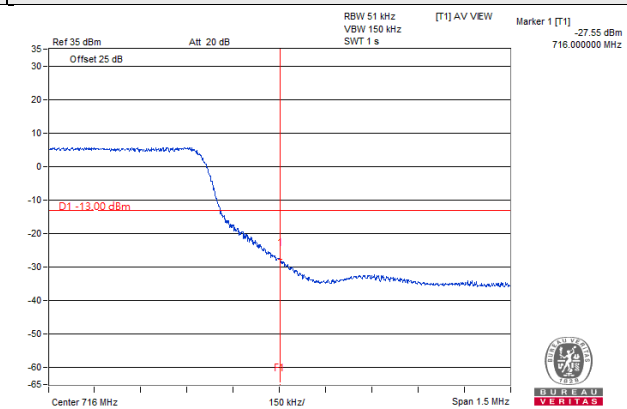
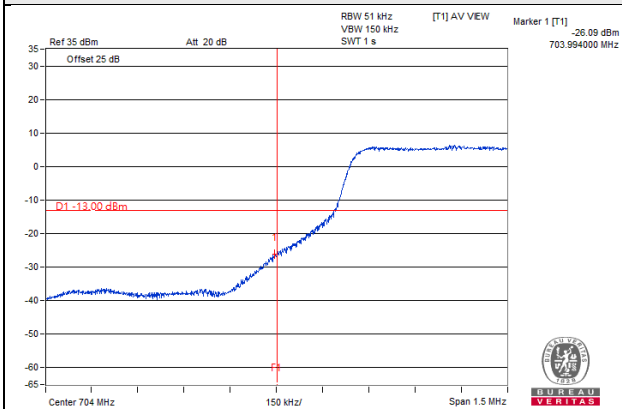
1 RB

1 RB



25 RB

25 RB



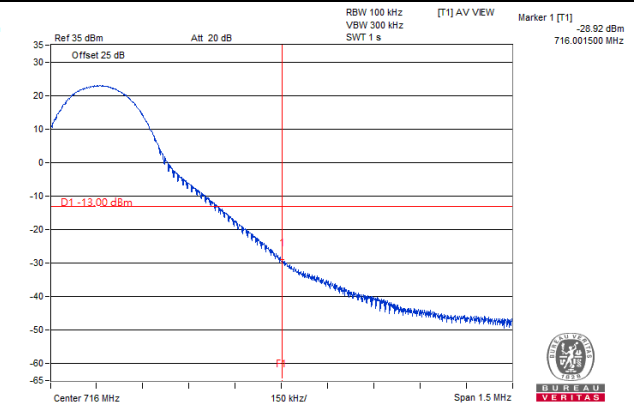
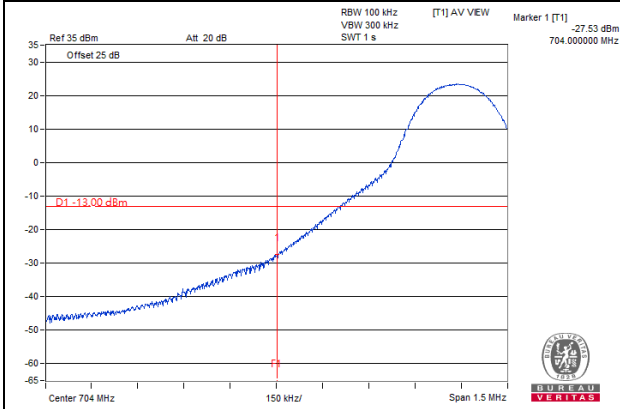
LTE Band 17 Channel Band width: 10MHz

Channel 23780

Channel 23800

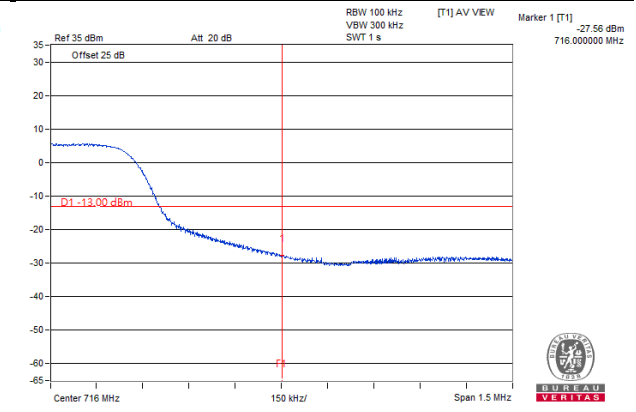
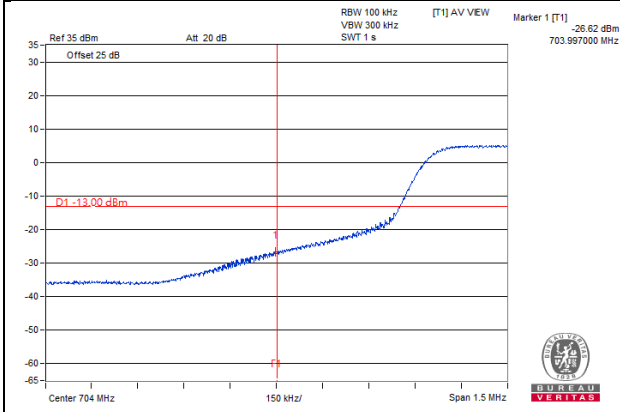
1 RB

1 RB



50 RB

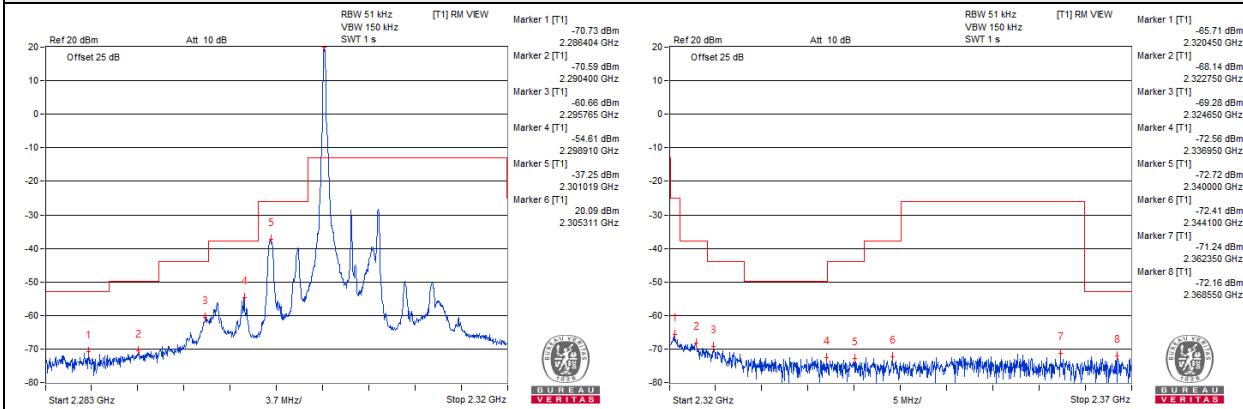
50 RB



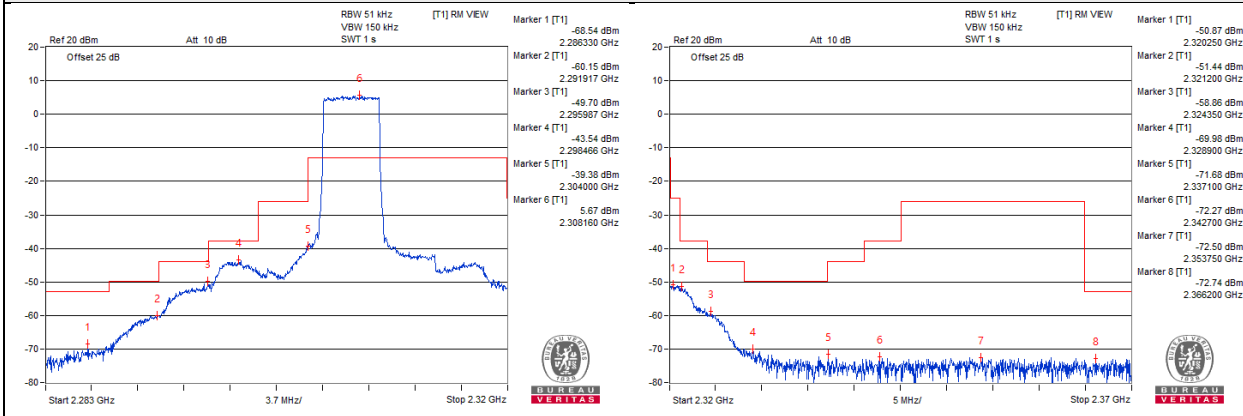
LTE Band 30 Channel Band width: 5MHz

Channel 27685

1 RB



25 RB

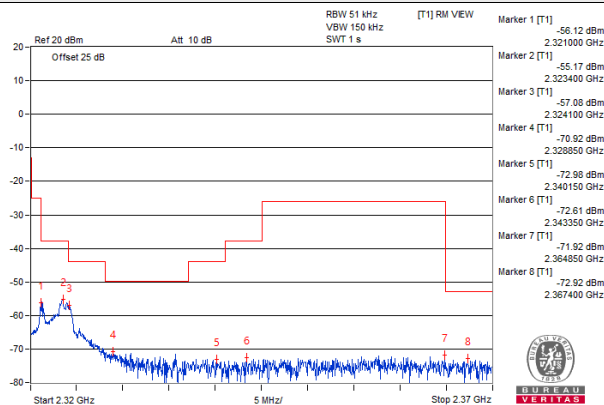
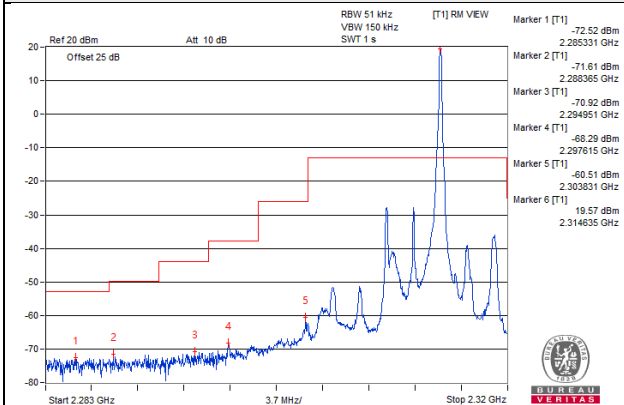




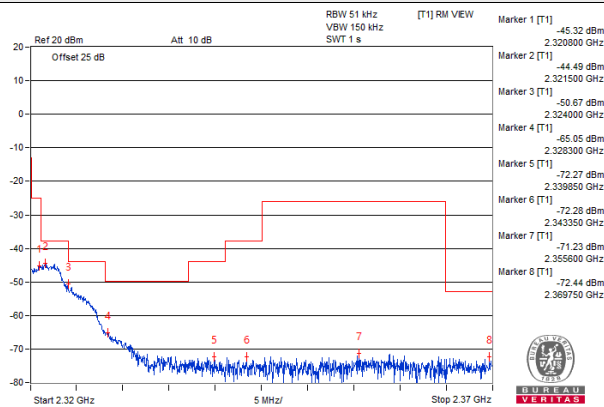
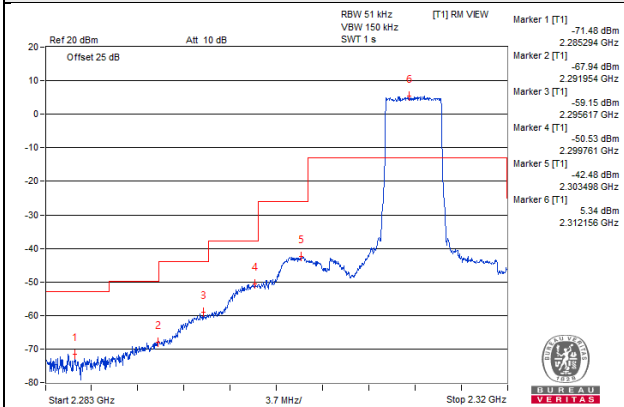
LTE Band 30 Channel Band width: 5MHz

Channel 27735

1 RB



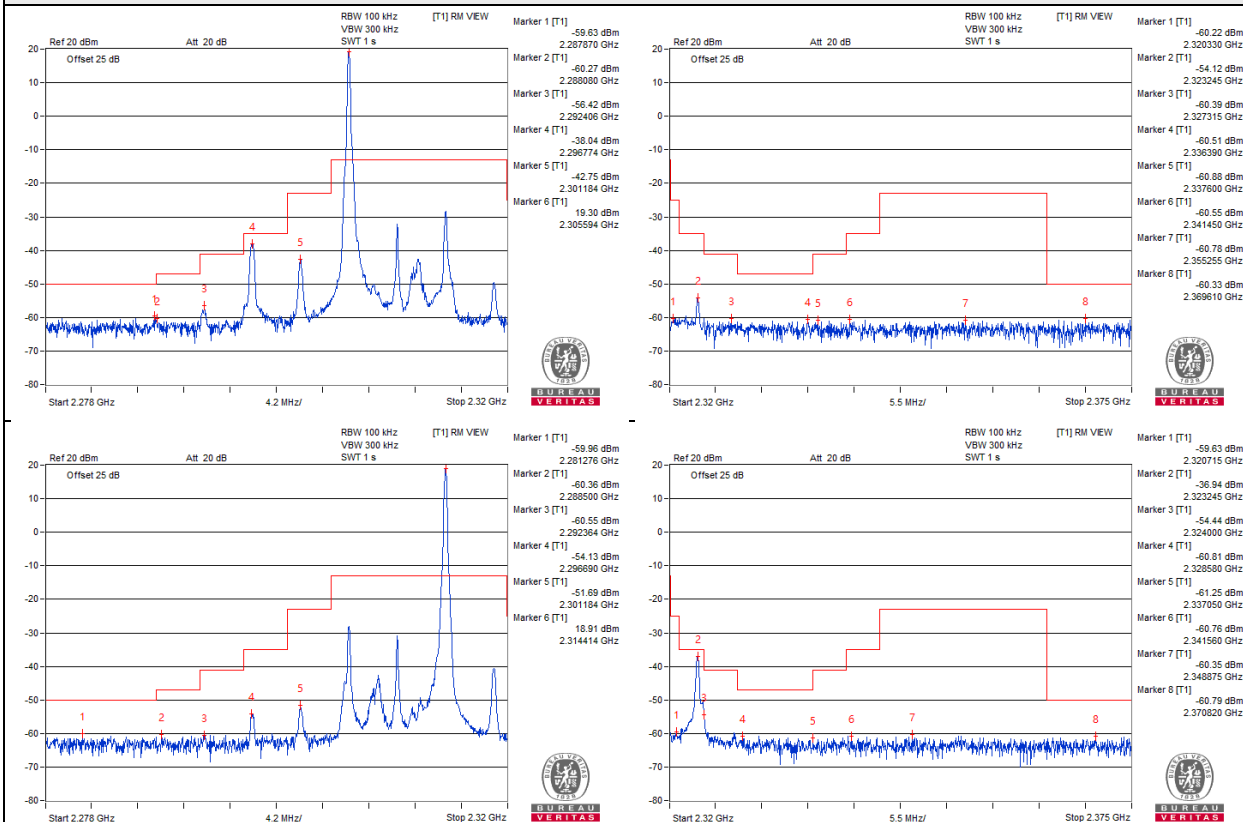
25 RB



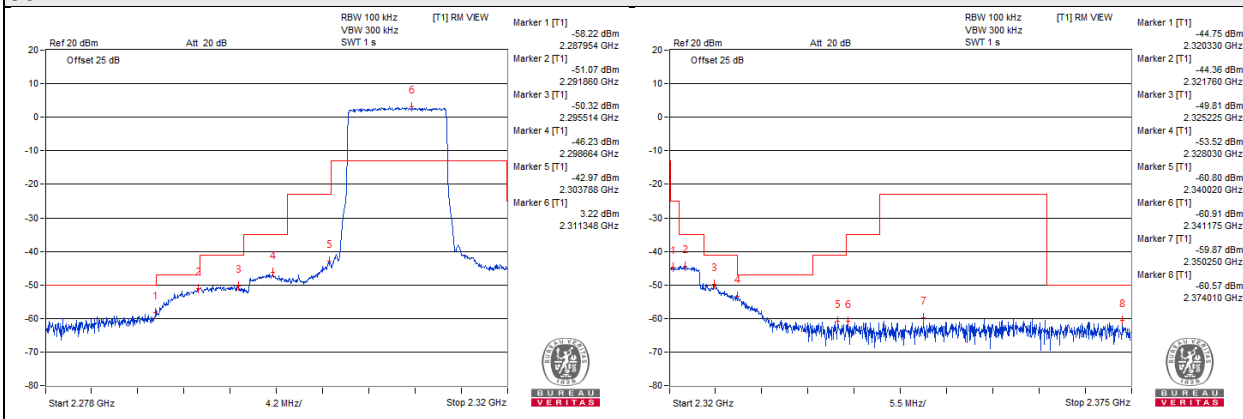
**LTE Band 30 Channel Band width: 10MHz**

**Channel 27710**

**1 RB**



**50 RB**



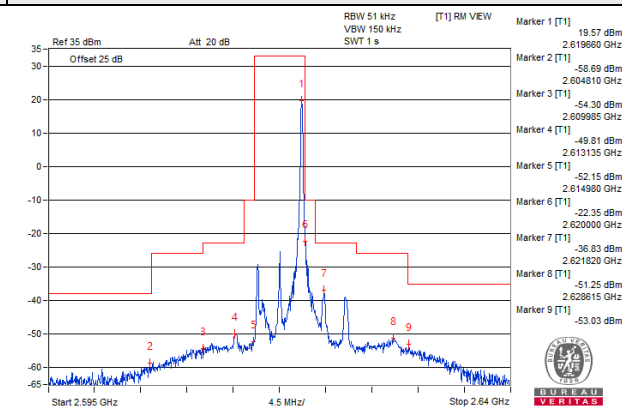
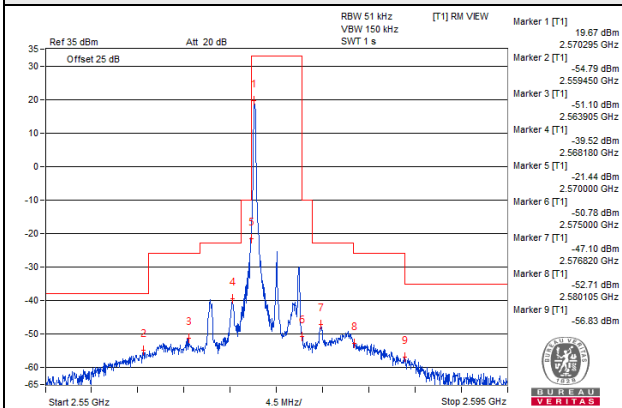
LTE Band 38 Channel Band width: 5MHz

Channel 37775

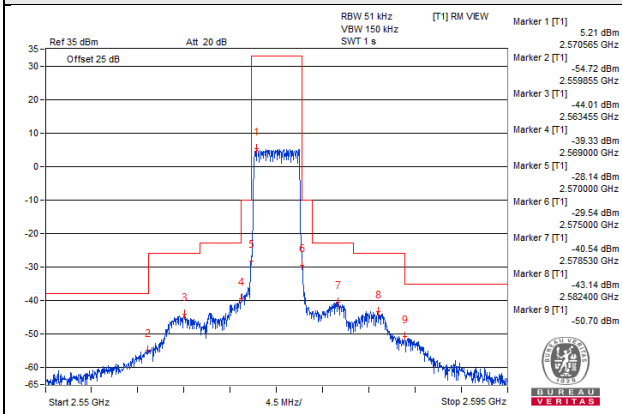
1 RB

Channel 38225

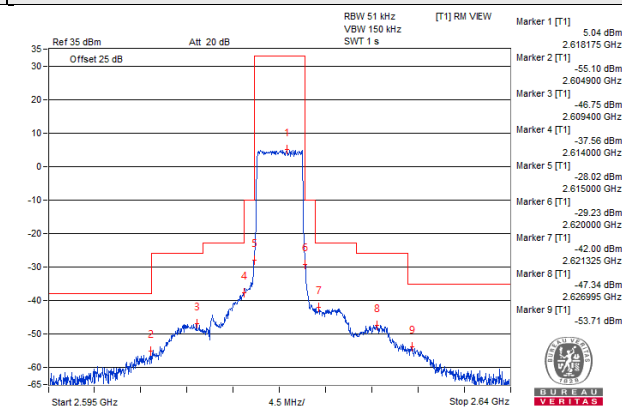
1 RB



25 RB



25 RB



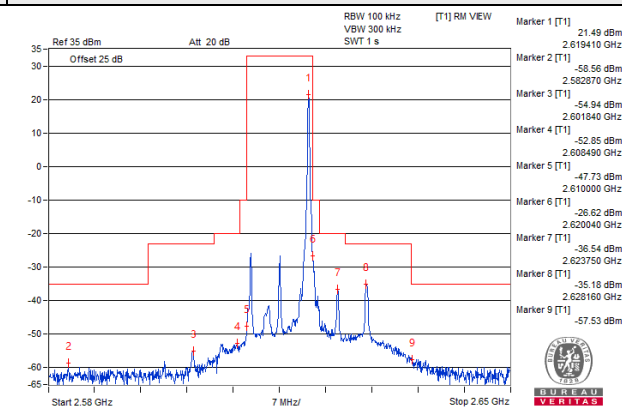
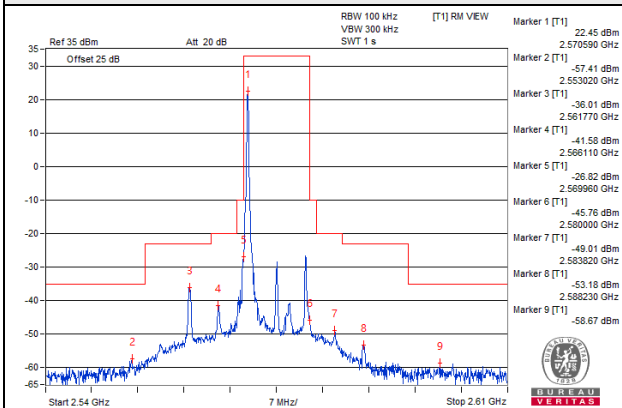
LTE Band 38 Channel Band width: 10MHz

Channel 37800

1 RB

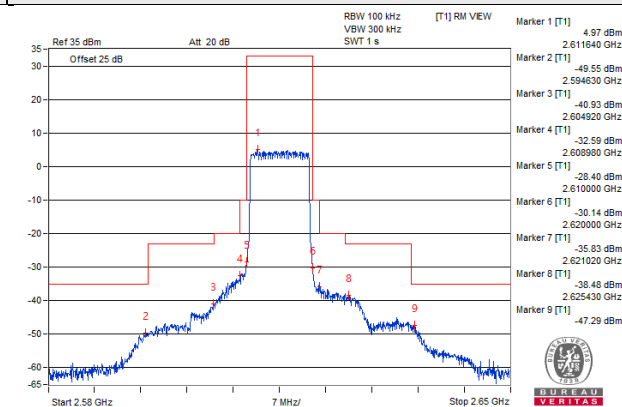
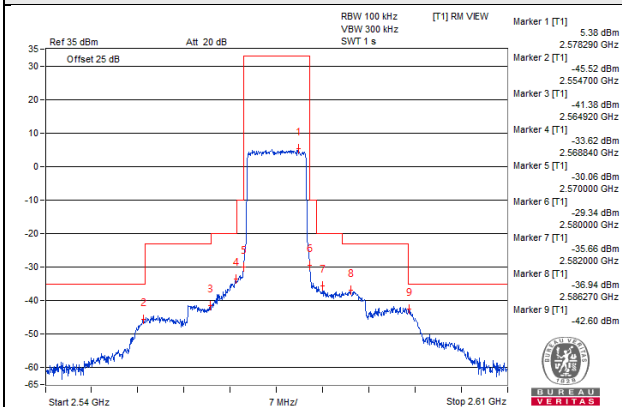
Channel 38200

1 RB



50 RB

50 RB



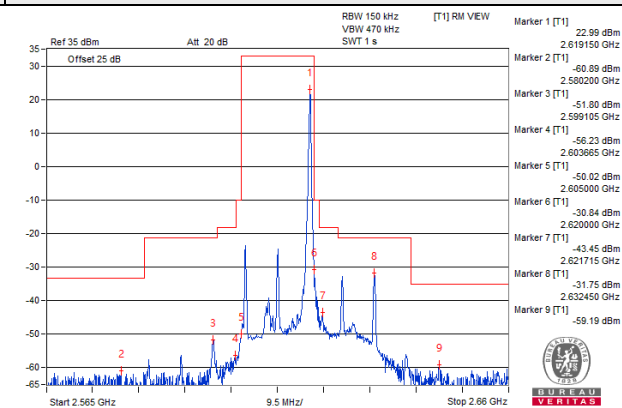
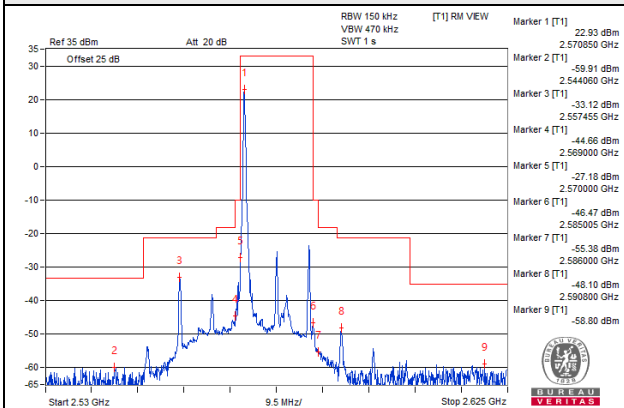
LTE Band 38 Channel Band width: 15MHz

Channel 37825

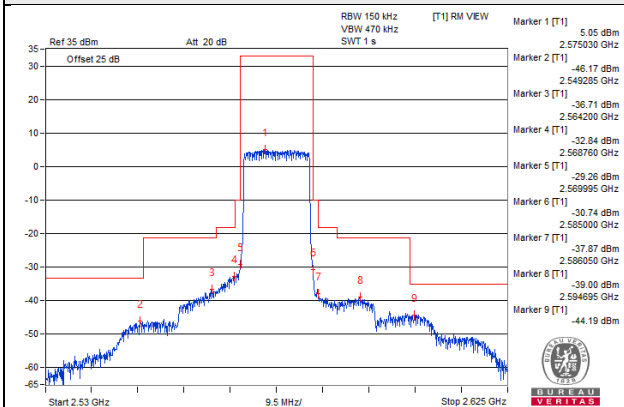
1 RB

Channel 38175

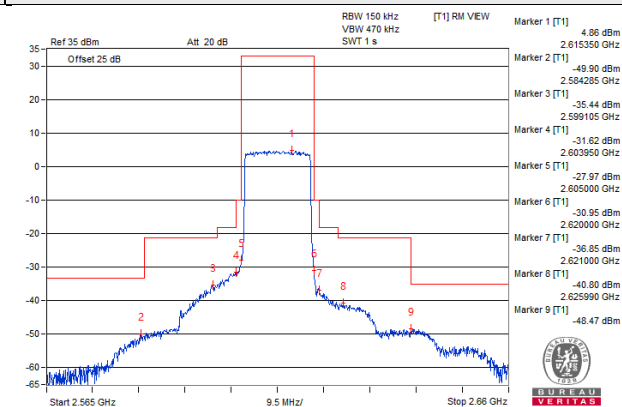
1 RB



75 RB



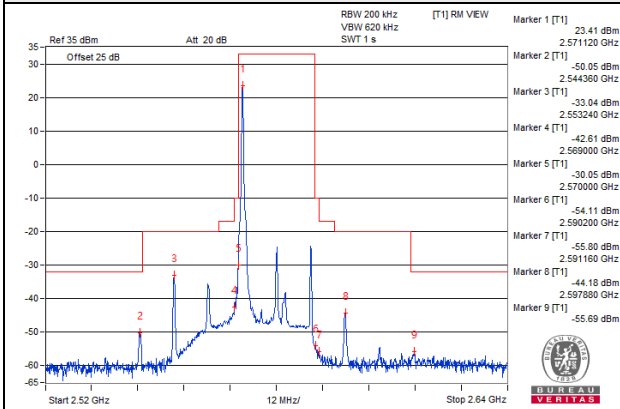
75 RB



**LTE Band 38 Channel Band width: 20MHz**

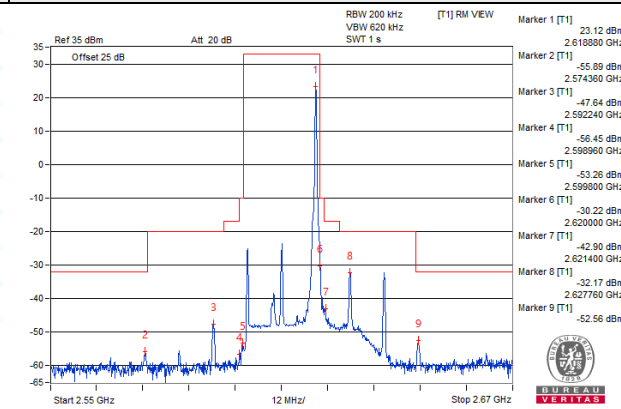
**Channel 37850**

**1 RB**

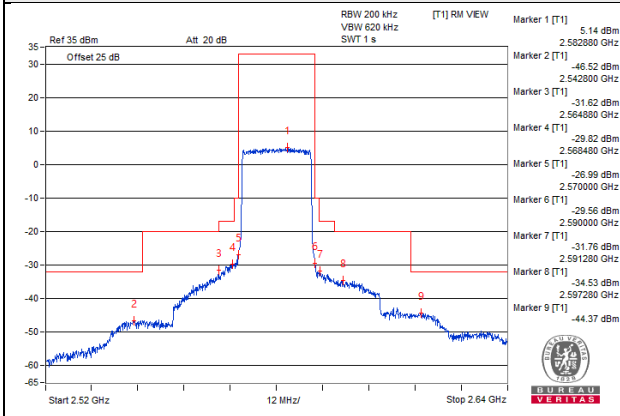


**Channel 38150**

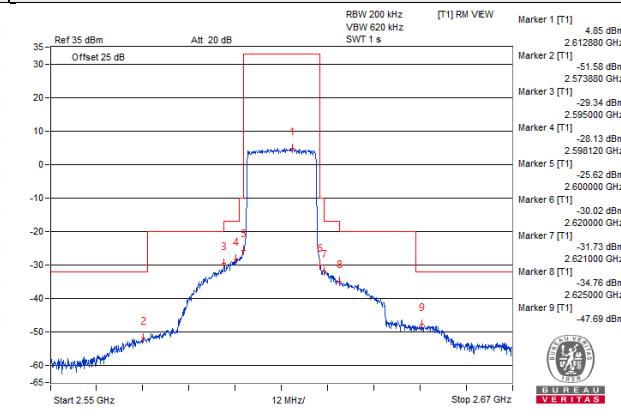
**1 RB**



**100 RB**

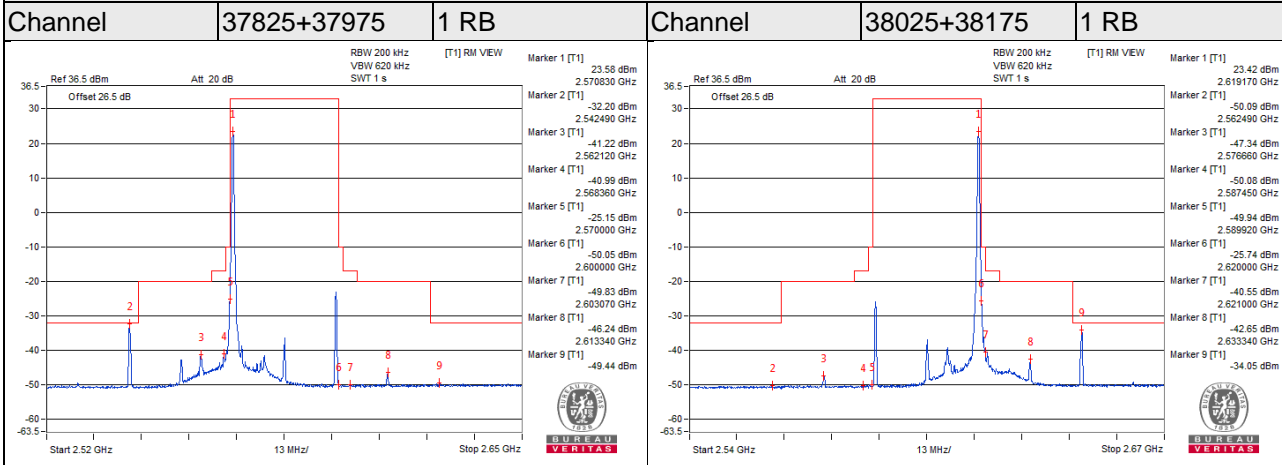


**100 RB**



### LTE CA\_38C

#### Channel Bandwidth 15+15MHz



#### Channel Bandwidth 15+15MHz

