

Channel Bandwidth: 20MHz

Channel 502000  
(2510.0MHz)

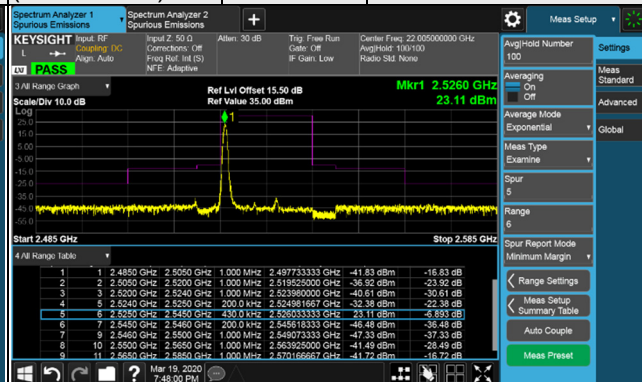
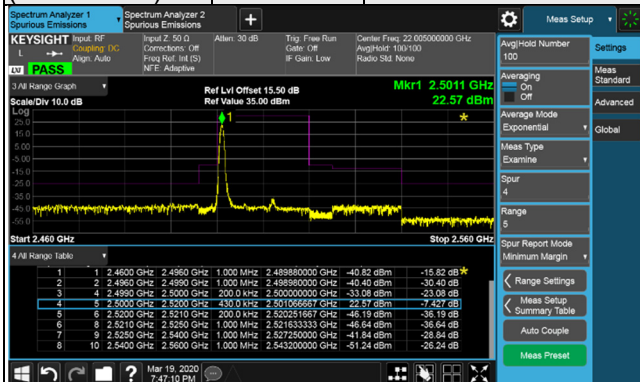
$\pi/2$  BPSK

1 RB / 0 RB Offset

Channel 507000  
(2535.0MHz)

$\pi/2$  BPSK

1 RB / 0 RB Offset



Channel 502000  
(2510.0MHz)

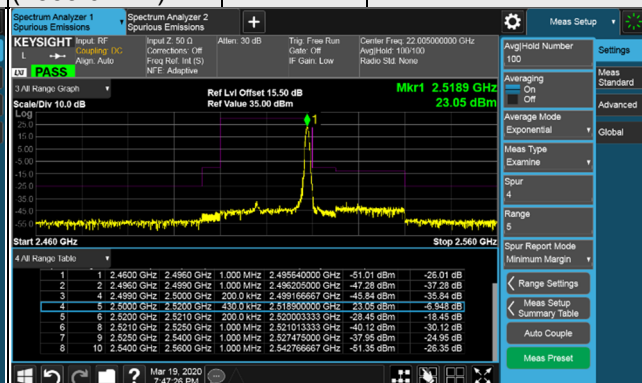
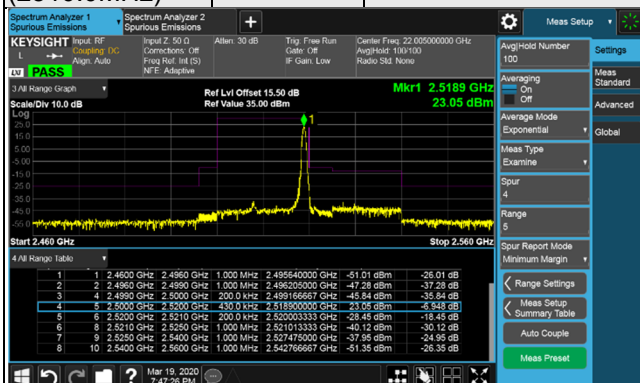
$\pi/2$  BPSK

1 RB / 99 RB Offset

Channel 507000  
(2535.0MHz)

$\pi/2$  BPSK

1 RB / 99 RB Offset



Channel 502000  
(2510.0MHz)

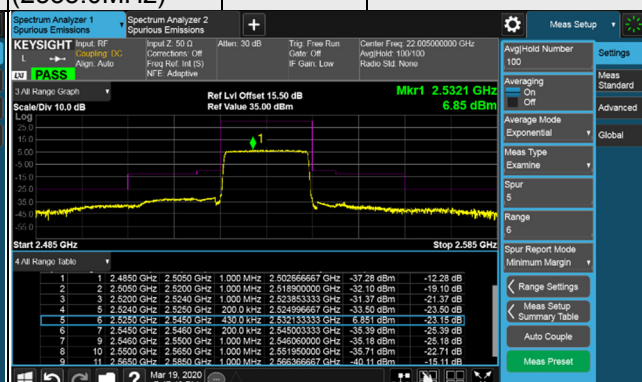
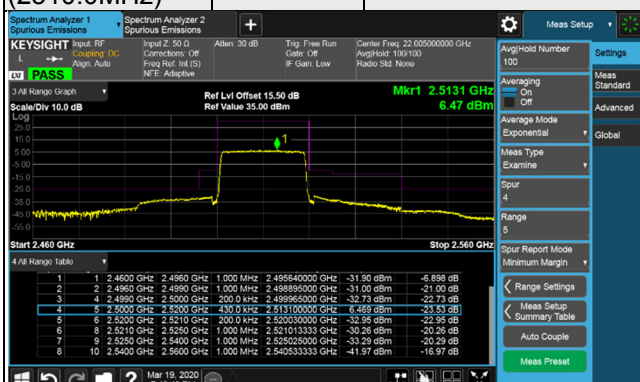
$\pi/2$  BPSK

100 RB / 0 RB Offset

Channel 507000  
(2535.0MHz)

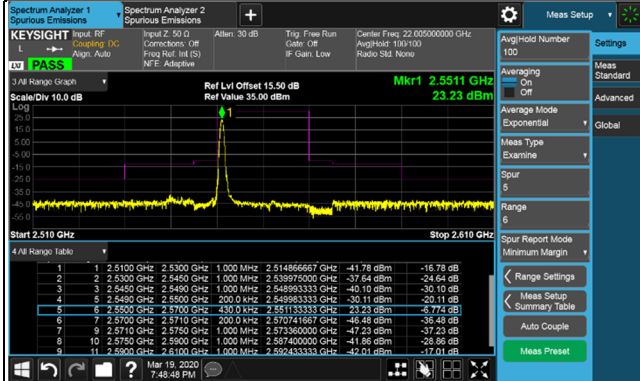
$\pi/2$  BPSK

100 RB / 0 RB Offset

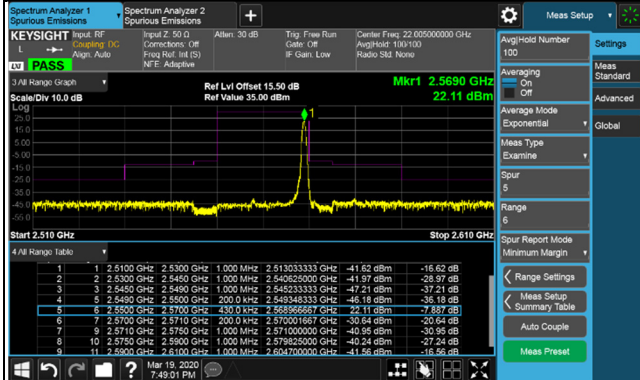


Channel Bandwidth: 20MHz

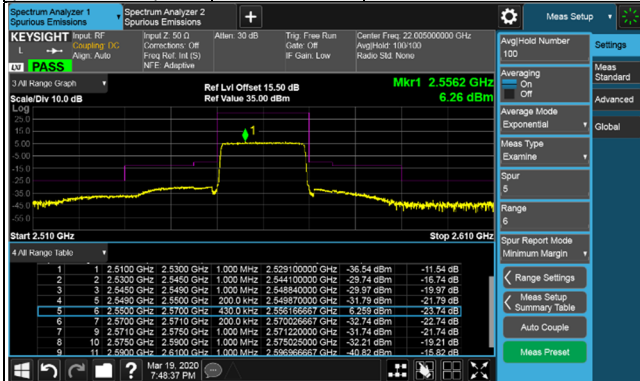
Channel 512000 (2560.0MHz)  $\pi/2$  BPSK 1 RB / 0 RB Offset



Channel 512000 (2560.0MHz)  $\pi/2$  BPSK 1 RB / 99 RB Offset



Channel 512000 (2560.0MHz)  $\pi/2$  BPSK 100 RB / 0 RB Offset



LTE Band 5

Channel Bandwidth 1.4MHz

Channel 20407  
(824.7MHz)

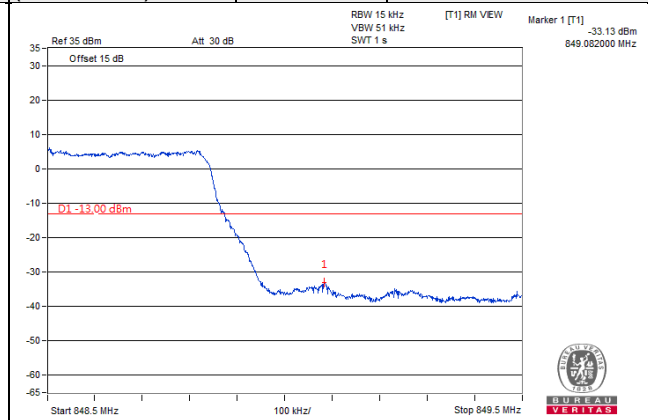
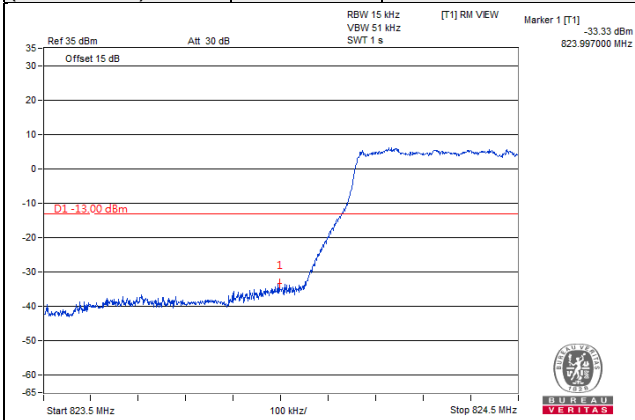
QPSK

1 RB / 0 RB Offset

Channel 20643  
(848.3MHz)

QPSK

1 RB / 5 RB Offset



Channel 20407  
(824.7MHz)

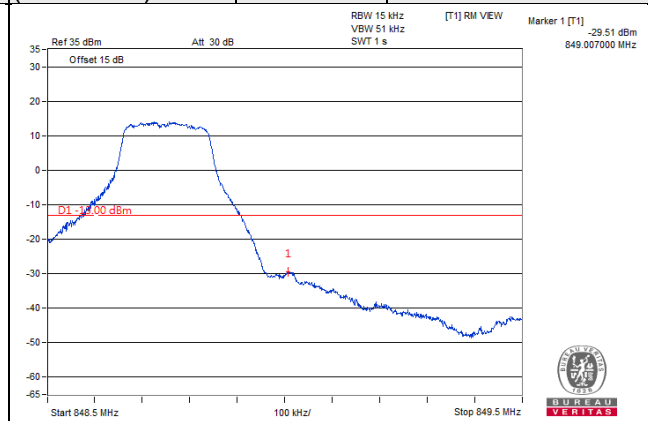
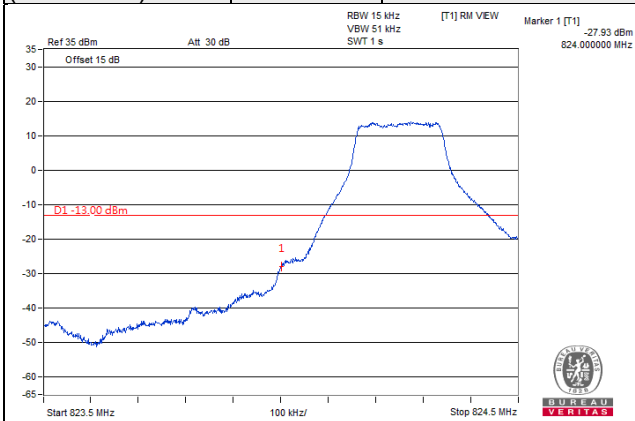
QPSK

6 RB / 0 RB Offset

Channel 20643  
(848.3MHz)

QPSK

6 RB / 0 RB Offset



**Channel Bandwidth 3MHz**

**Channel 20415  
(825.5MHz)**

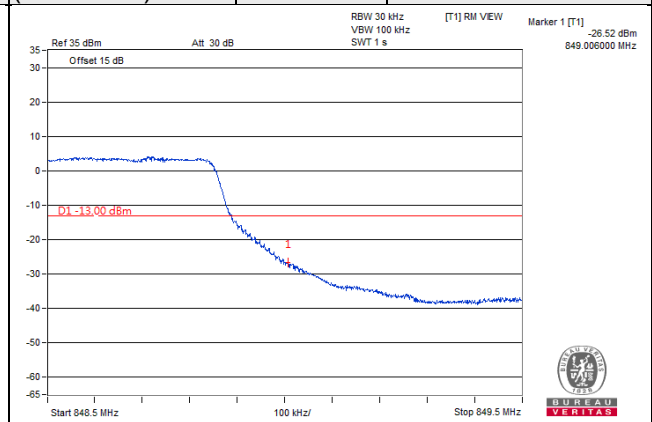
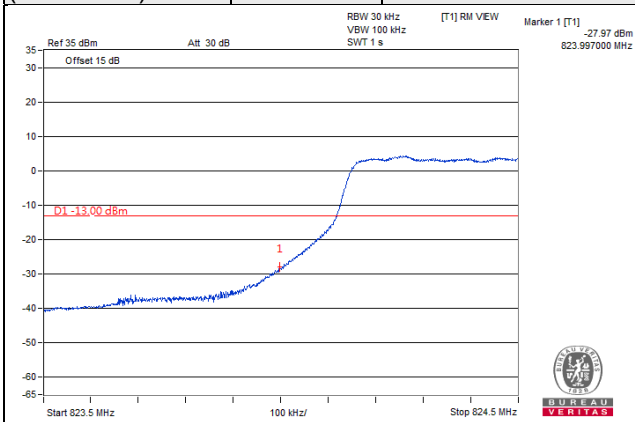
**QPSK**

**1 RB / 0 RB Offset**

**Channel 20635  
(847.5MHz)**

**QPSK**

**1 RB / 14 RB Offset**



**Channel 20415  
(825.5MHz)**

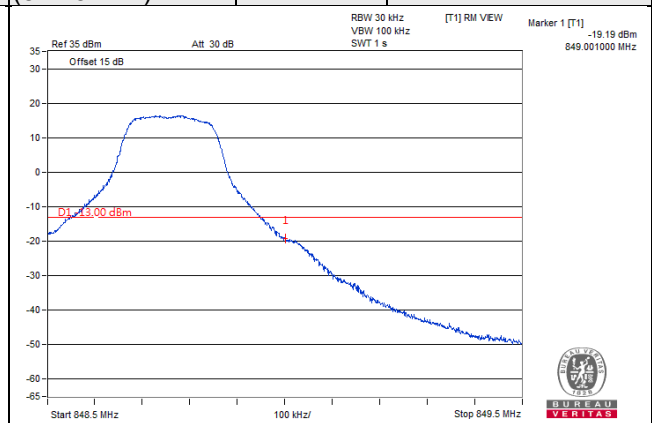
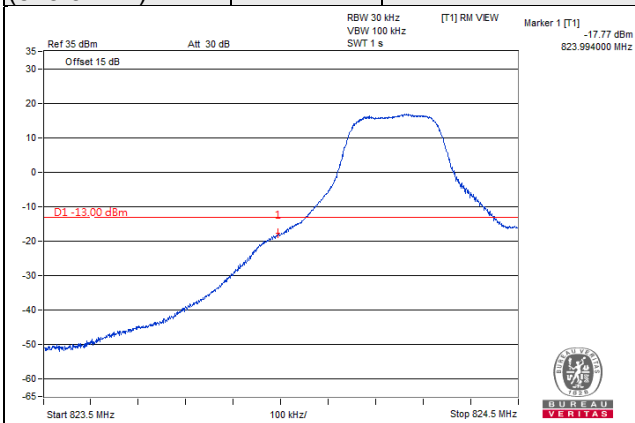
**QPSK**

**15 RB / 0 RB Offset**

**Channel 20635  
(847.5MHz)**

**QPSK**

**15 RB / 0 RB Offset**



**Channel Bandwidth 5MHz**

**Channel 20425  
(826.5MHz)**

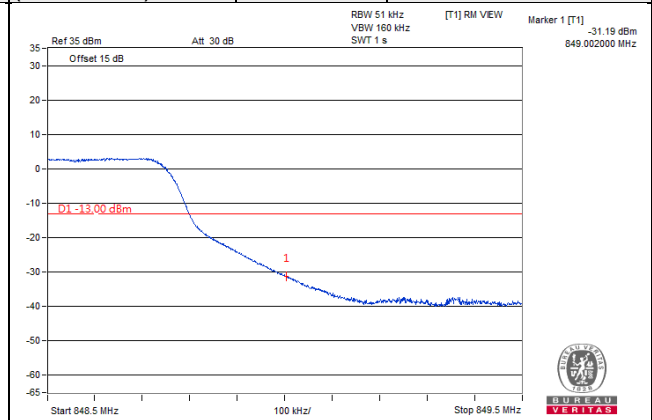
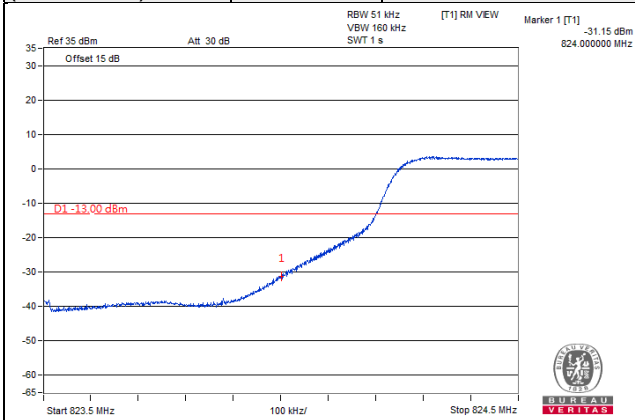
**QPSK**

**1 RB / 0 RB Offset**

**Channel 20625  
(846.5MHz)**

**QPSK**

**1 RB / 24 RB Offset**



**Channel 20425  
(826.5MHz)**

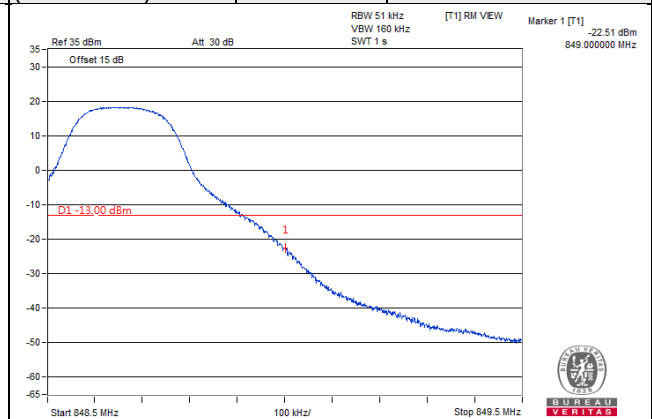
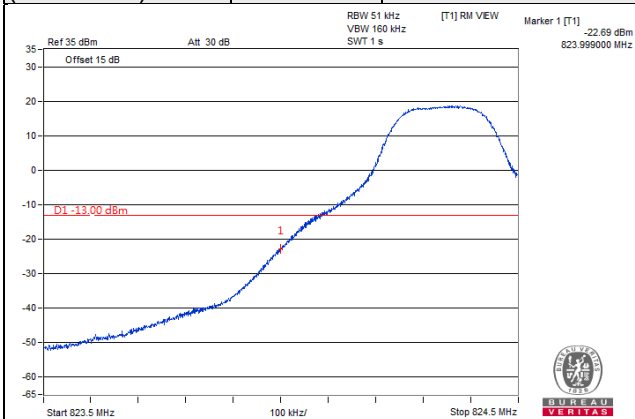
**QPSK**

**25 RB / 0 RB Offset**

**Channel 20625  
(846.5MHz)**

**QPSK**

**25 RB / 0 RB Offset**



Channel Bandwidth 10MHz

Channel 20450  
(829.0MHz)

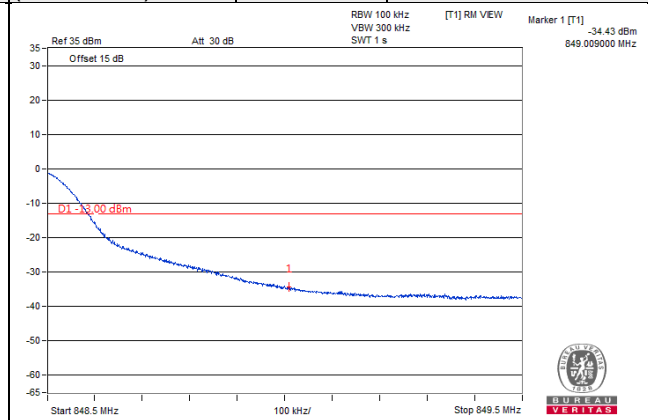
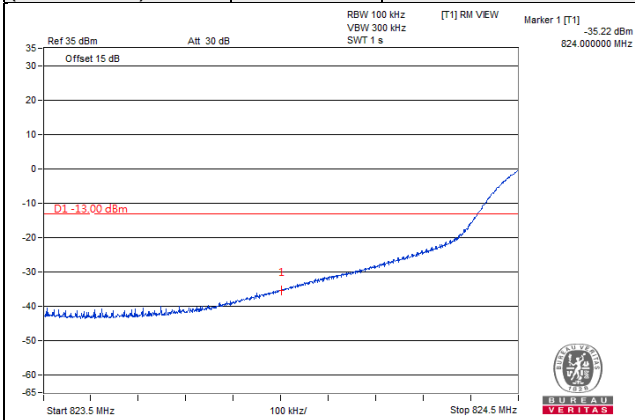
QPSK

1 RB / 0 RB Offset

Channel 20600  
(844.0MHz)

QPSK

1 RB / 49 RB Offset



Channel 20450  
(829.0MHz)

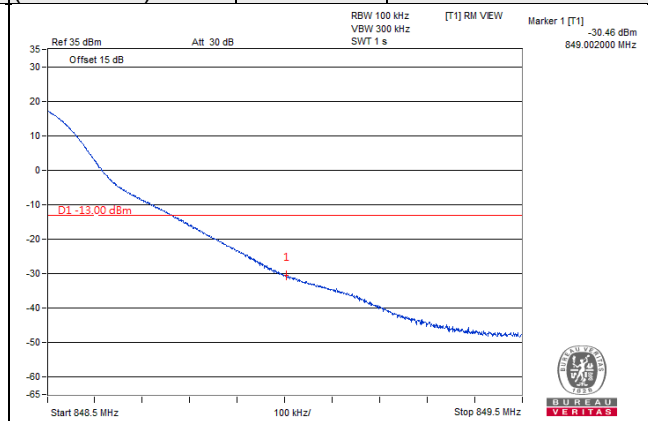
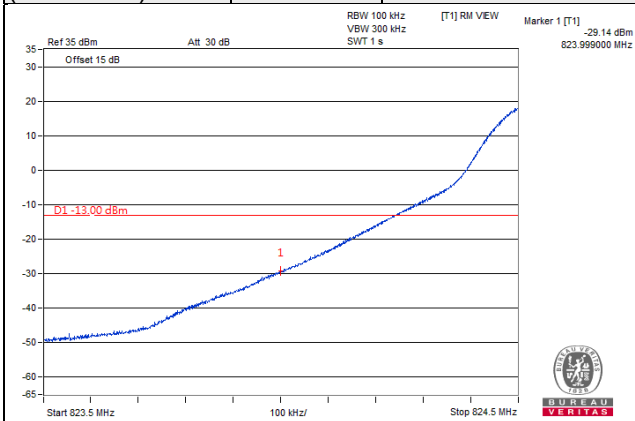
QPSK

50 RB / 0 RB Offset

Channel 20600  
(844.0MHz)

QPSK

50 RB / 0 RB Offset



LTE Band 12

Channel Bandwidth: 1.4MHz

Channel 23017  
(699.7MHz)

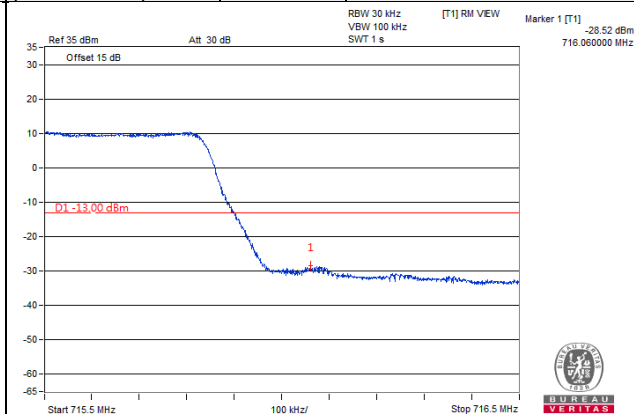
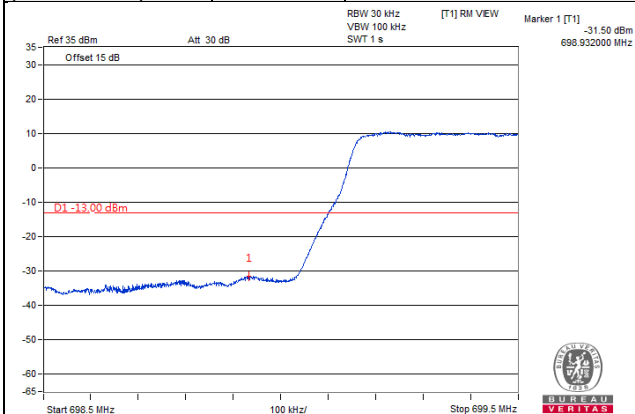
QPSK

1 RB / 0 RB Offset

Channel 23173  
(715.3MHz)

QPSK

1 RB / 5 RB Offset



Channel 23017  
(699.7MHz)

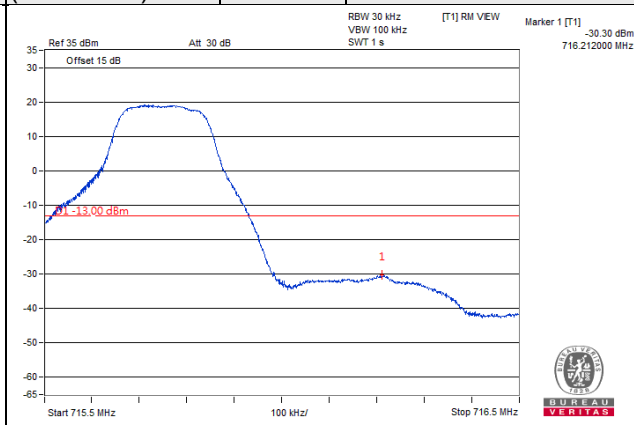
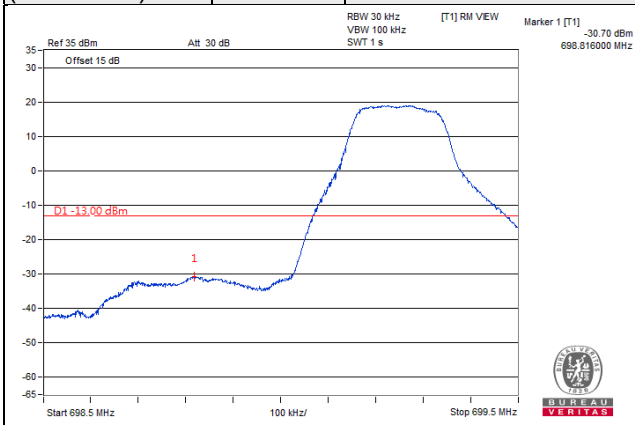
QPSK

6 RB / 0 RB Offset

Channel 23173  
(715.3MHz)

QPSK

6 RB / 0 RB Offset



Channel Bandwidth: 3MHz

Channel 23025  
(700.5MHz)

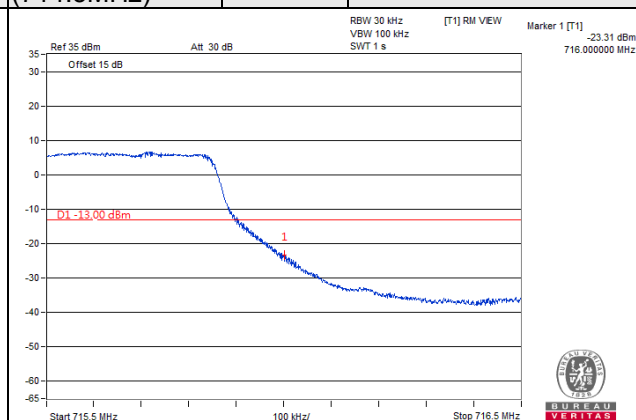
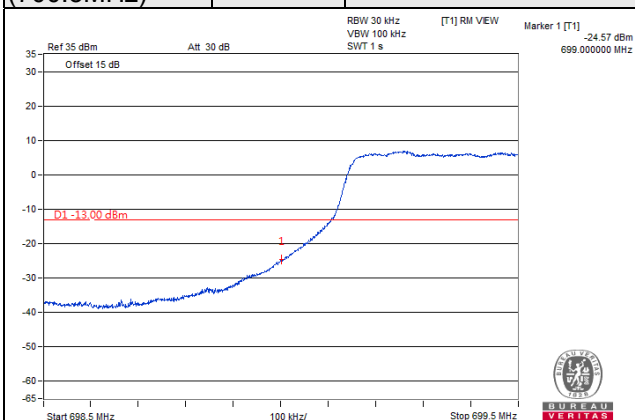
QPSK

1 RB / 0 RB Offset

Channel 23165  
(714.5MHz)

QPSK

1 RB / 14RB Offset



Channel 23025  
(700.5MHz)

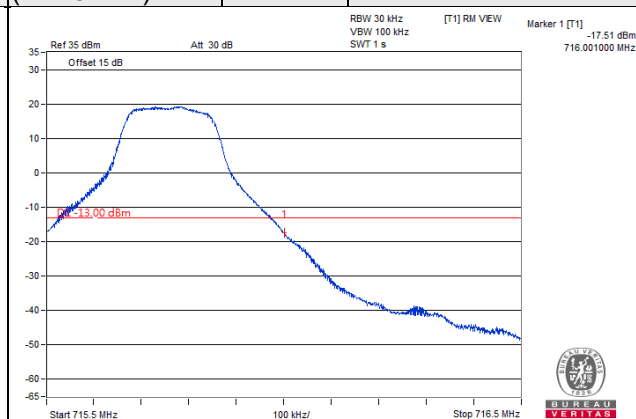
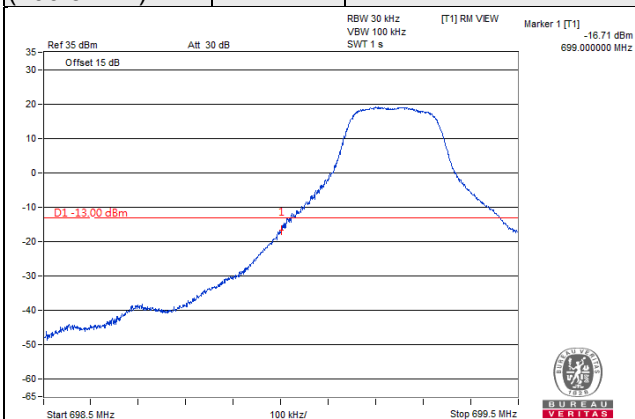
QPSK

15 RB / 0 RB Offset

Channel 23165  
(714.5MHz)

QPSK

15 RB / 0 RB Offset







BUREAU VERITAS

Channel Bandwidth: 5MHz

Channel 23035  
(701.5MHz)

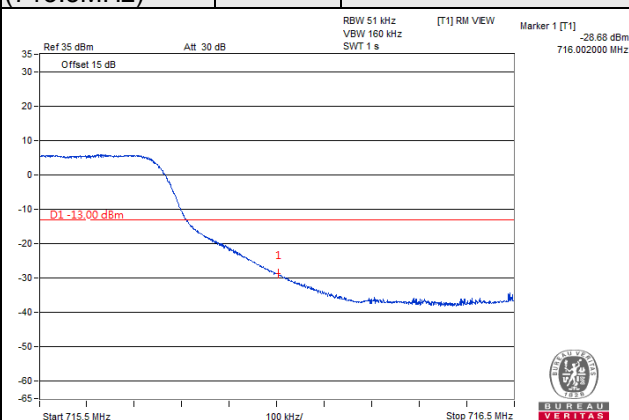
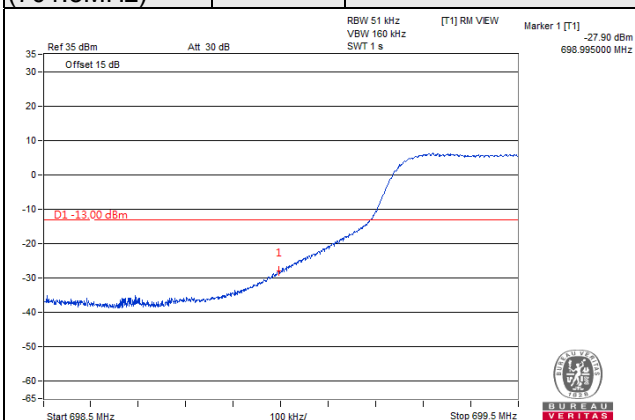
QPSK

1 RB / 0 RB Offset

Channel 23155  
(713.5MHz)

QPSK

1 RB / 24RB Offset



Channel 23035  
(701.5MHz)

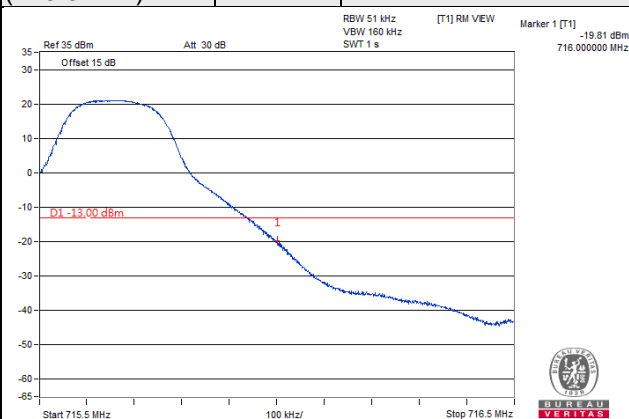
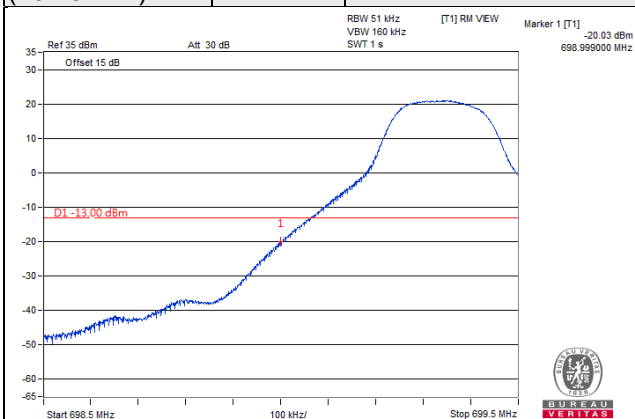
QPSK

25 RB / 0 RB Offset

Channel 23155  
(713.5MHz)

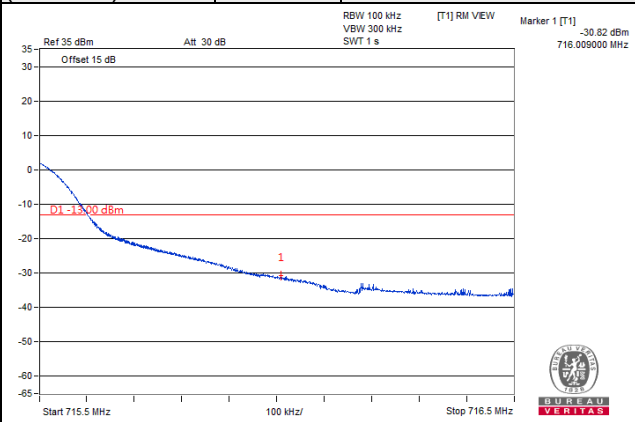
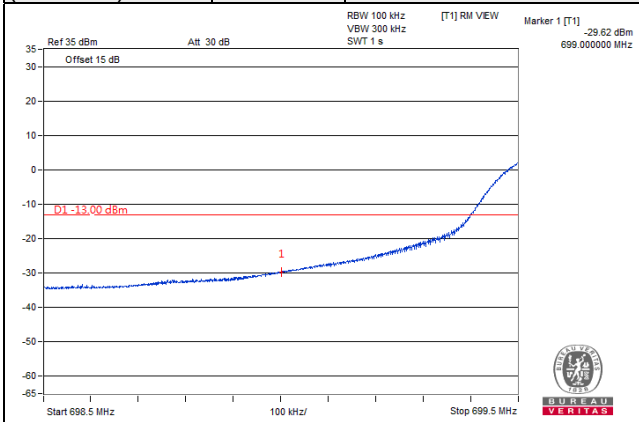
QPSK

25 RB / 0 RB Offset

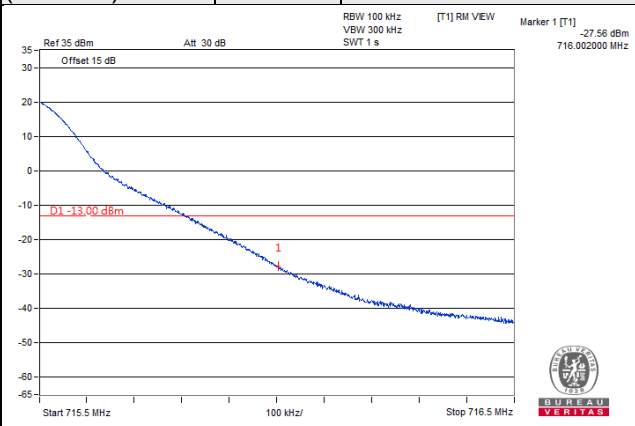
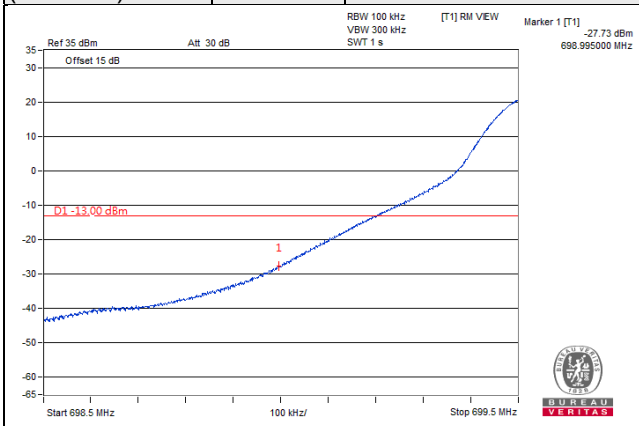


Channel Bandwidth: 10MHz

Channel 23060 (704MHz)	QPSK	1 RB / 0 RB Offset	Channel 23130 (711MHz)	QPSK	1 RB / 24RB Offset
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Channel 23060 (704MHz)	QPSK	50 RB / 0 RB Offset	Channel 23130 (711MHz)	QPSK	25 RB / 0 RB Offset
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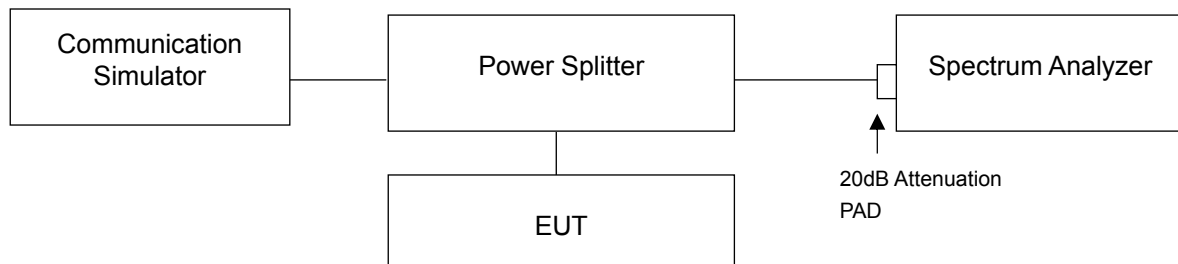


## 4.6 Peak to Average Ratio

### 4.6.1 Limits of Peak to Average Ratio Measurement

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

### 4.6.2 Test Setup



### 4.6.3 Test Procedures

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

#### 4.6.4 Test Results

n7

n7, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
500500	2502.5	4.18	3.60	5.34	5.43	8.54
507000	2535.0	4.23	3.61	5.34	5.49	8.37
513500	2567.5	4.22	3.36	4.13	4.18	8.20
n7, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
501000	2505.0	4.23	3.53	5.16	5.32	8.30
507000	2535.0	4.26	3.66	5.25	5.44	8.30
513000	2565.0	4.34	3.31	4.07	4.12	8.34
n7, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
501500	2507.5	4.33	3.62	4.95	5.01	8.73
507000	2535.0	4.41	3.47	5.22	5.26	8.49
512500	2562.5	4.43	3.30	3.94	4.10	8.53
n7, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
502000	2510.0	4.40	3.61	5.08	5.42	8.90
507000	2535.0	4.36	3.40	5.17	5.17	8.62
512000	2560.0	4.40	3.27	3.96	4.11	8.77

### Spectrum Plot of Worst Value

#### 5MHz / 256QAM



#### 10MHz / 256QAM



#### 15MHz / 256QAM



#### 20MHz / 256QAM

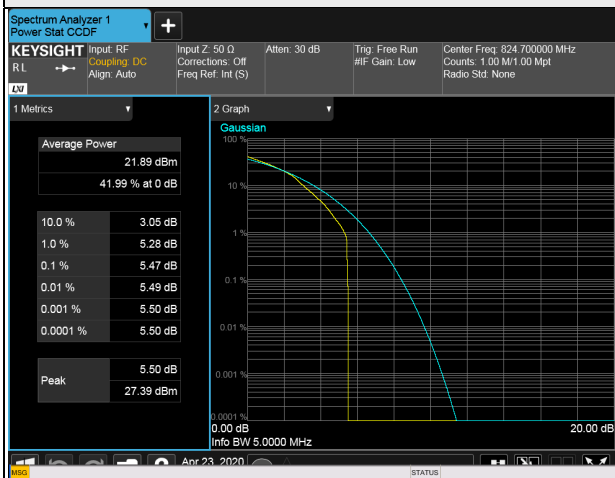


LTE Band 5

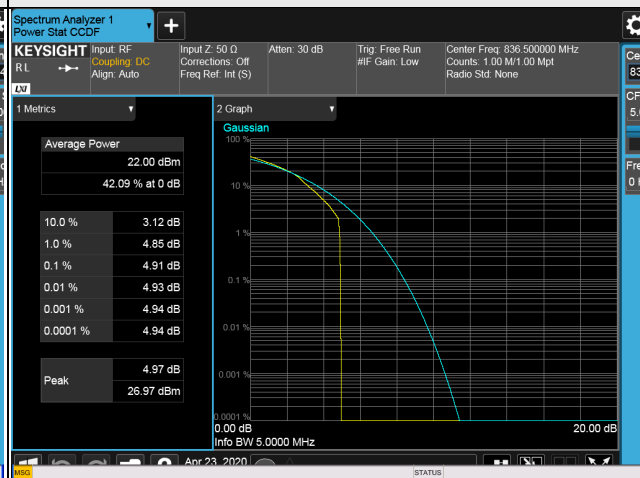
LTE Band 5, Channel Bandwidth 1.4MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
20407	824.7	4.12	5.40	5.47
20525	836.5	3.94	5.17	5.26
20643	848.3	3.50	4.22	4.30
LTE Band 5, Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
20415	825.5	3.92	4.76	4.87
20525	836.5	3.84	4.56	4.91
20635	847.5	3.51	4.23	4.32
LTE Band 5, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
20425	826.5	3.81	5.29	5.16
20525	836.5	3.79	4.97	5.26
20625	846.5	3.72	5.05	5.08
LTE Band 5, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
20450	829.0	3.78	5.56	5.58
20525	836.5	3.98	5.45	5.70
20600	844.0	3.72	5.32	5.43

### Spectrum Plot of Worst Value

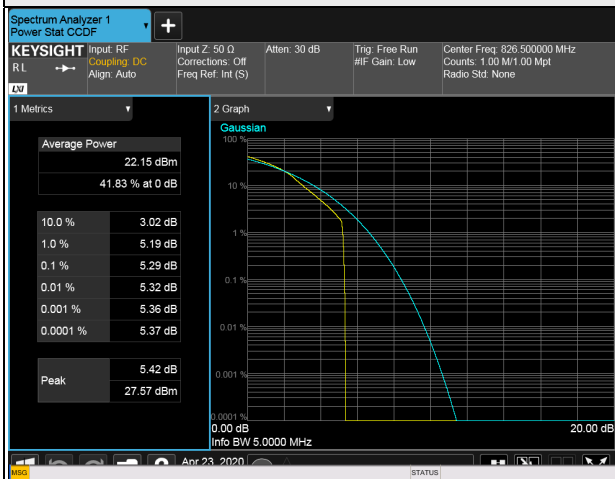
#### 1.4MHz / 64QAM



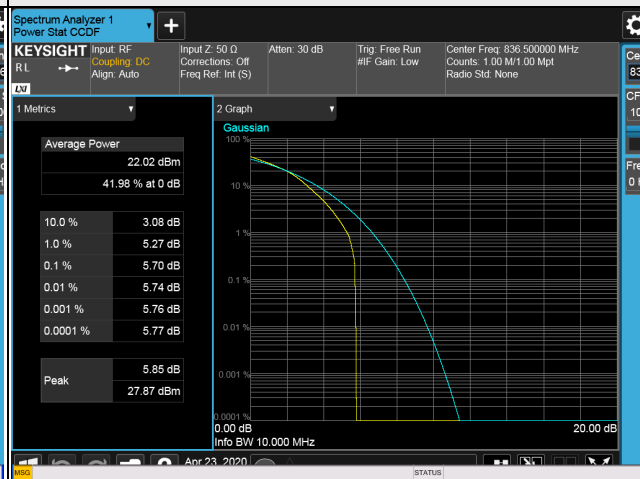
#### 3MHz / 64QAM



#### 5MHz / 16QAM



#### 10MHz / 64QAM



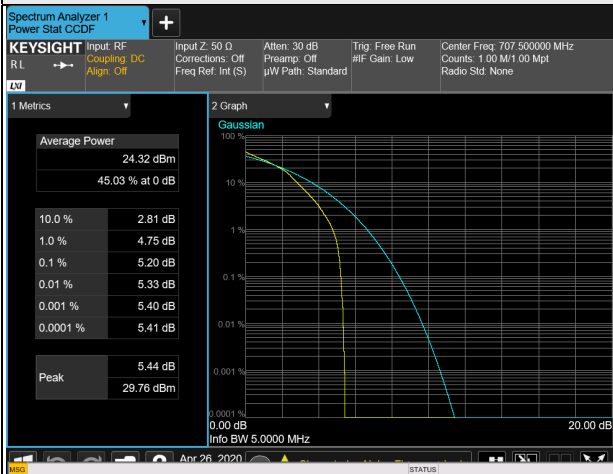
LTE Band 12

LTE Band 12, Channel Bandwidth 1.4MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
23017	699.7	3.73	4.53	4.74
23095	707.5	3.59	5.10	5.20
23173	715.3	3.63	4.45	4.49
LTE Band 12, Channel Bandwidth 3MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
23025	700.5	3.49	4.36	4.54
23095	707.5	3.42	5.09	5.13
23165	714.5	3.46	4.60	4.64
LTE Band 12, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
23035	701.5	3.50	4.38	4.48
23095	707.5	3.44	4.99	5.08
23155	713.5	3.53	4.99	5.05
LTE Band 12, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		QPSK	16QAM	64QAM
23060	704.0	3.26	4.74	4.71
23095	707.5	3.27	4.77	4.86
23130	711.0	3.57	5.17	5.19

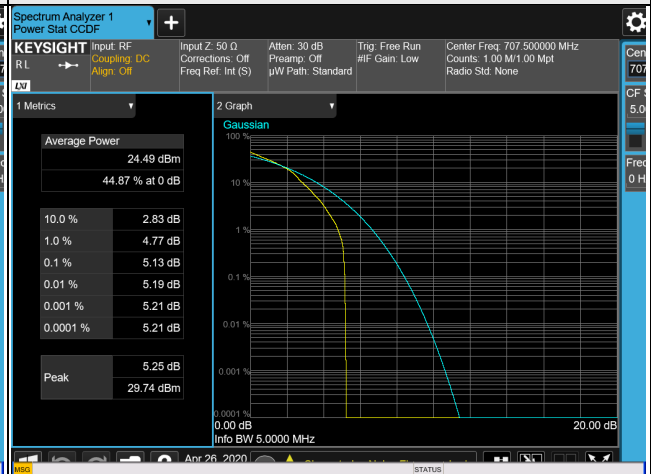


### Spectrum Plot of Worst Value

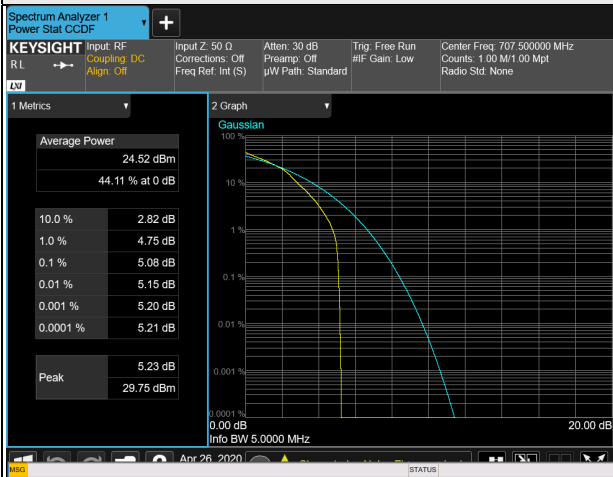
#### 1.4MHz / 64QAM



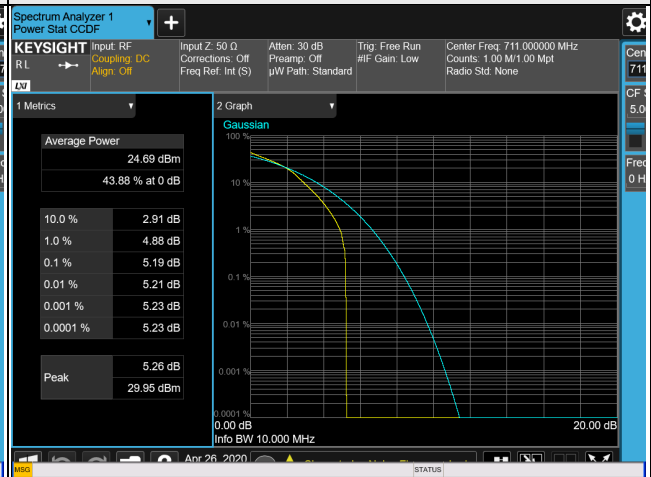
#### 3MHz / 16QAM



#### 5MHz / 64QAM



#### 10MHz / 64QAM



## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

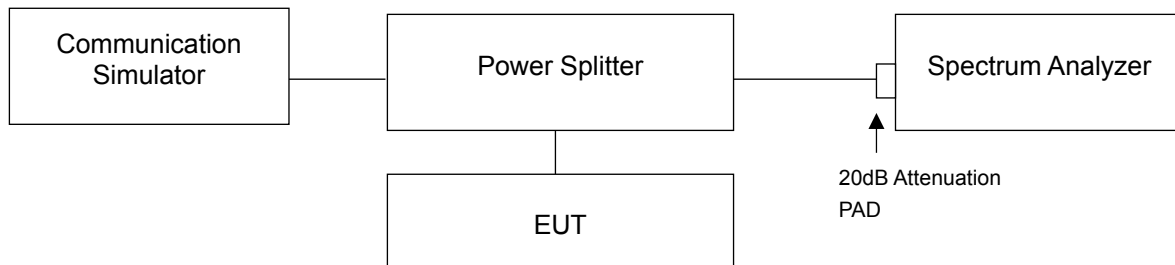
For LTE Band 5

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. The emission limit equal to  $-13\text{dBm}$ .

For LTE Band 12

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

### 4.7.2 Test Setup



### 4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9kHz to 8GHz / 9GHz / 26GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

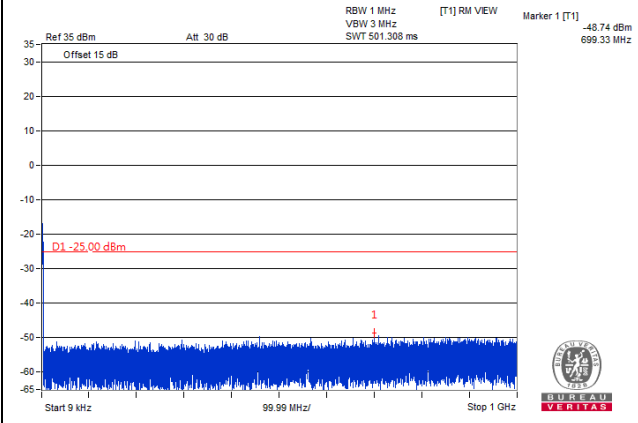
### 4.7.4 Test Results

n7

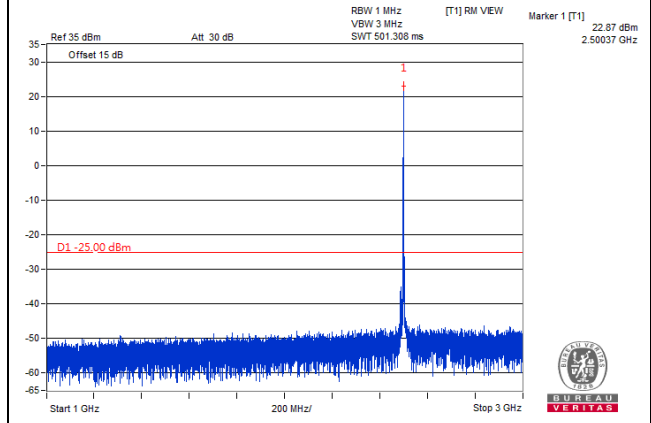
Channel Band width: 5MHz

Channel 500500(2502.5MHz)

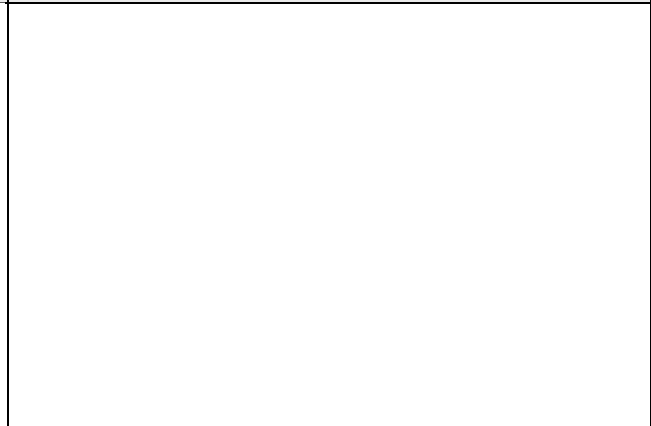
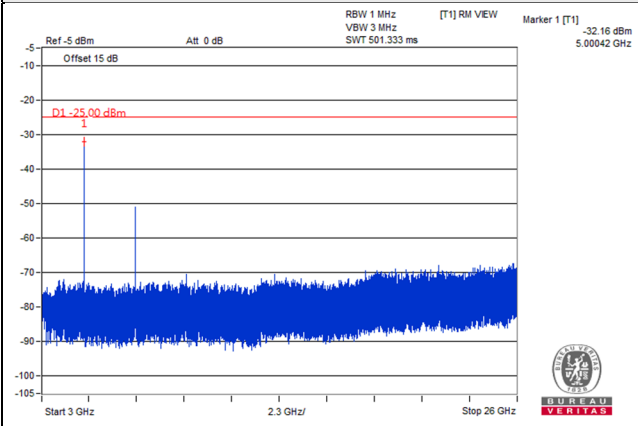
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

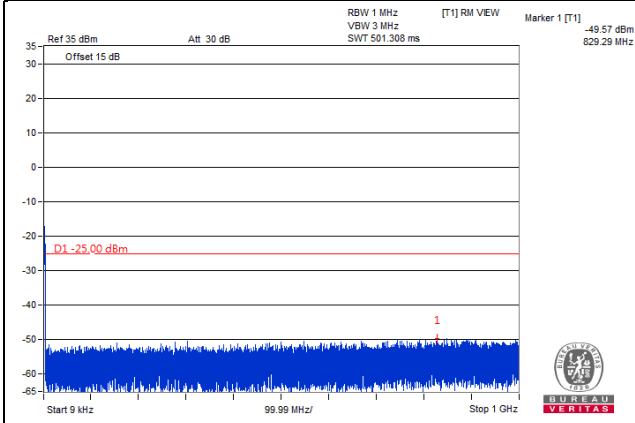


\*The 9kHz signal over the limit is from Spectrum.

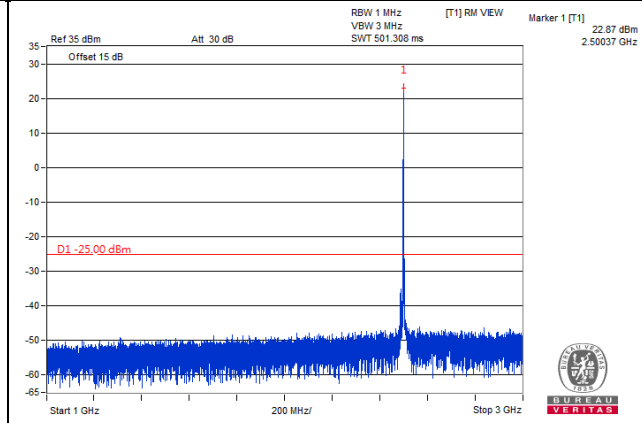
Channel Band width: 5MHz

Channel 507000(2535MHz)

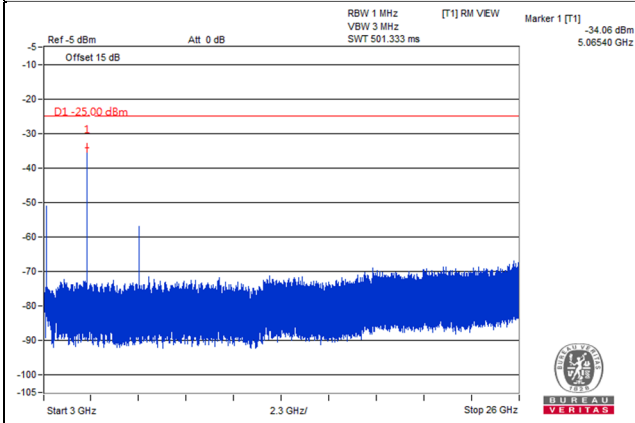
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

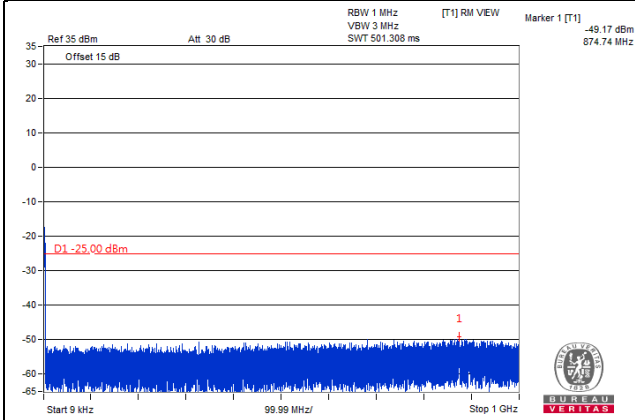


\*The 9kHz signal over the limit is from Spectrum.

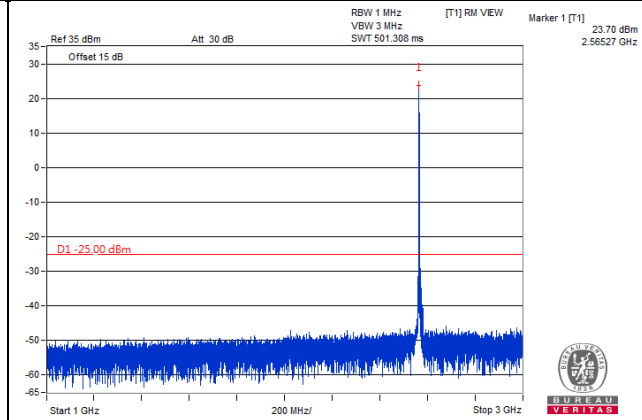
Channel Band width: 5MHz

Channel 513500(2567.5MHz)

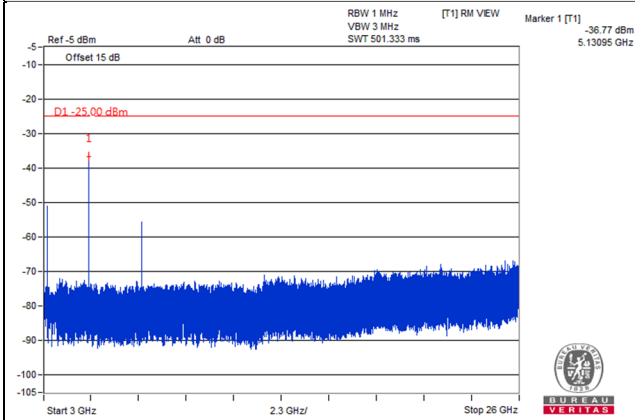
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

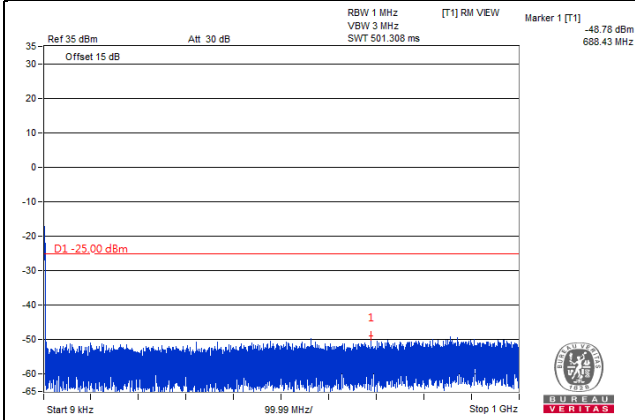


\*The 9kHz signal over the limit is from Spectrum.

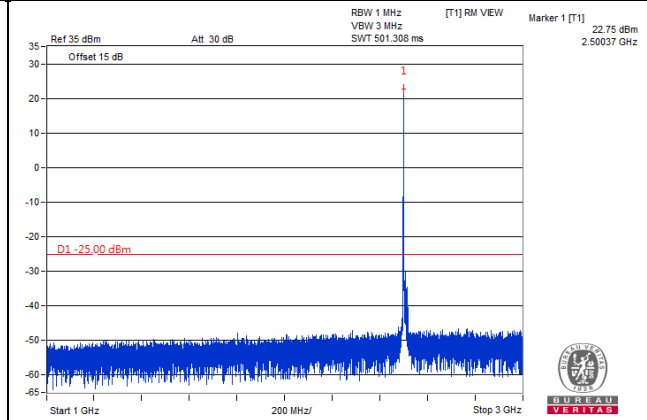
Channel Band width: 10MHz

Channel 501000(2505MHz)

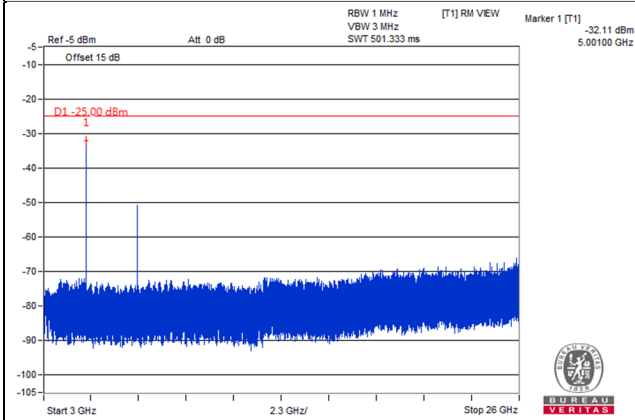
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

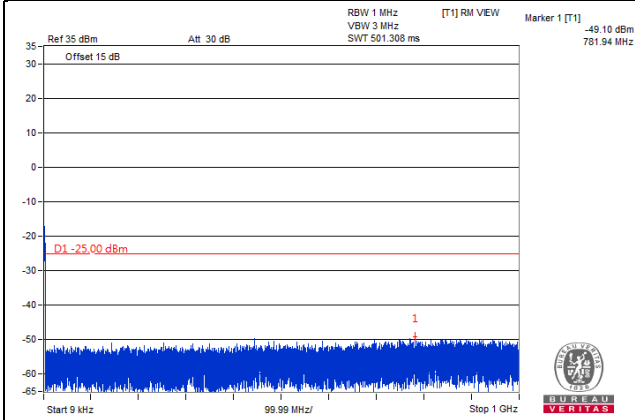


\*The 9kHz signal over the limit is from Spectrum.

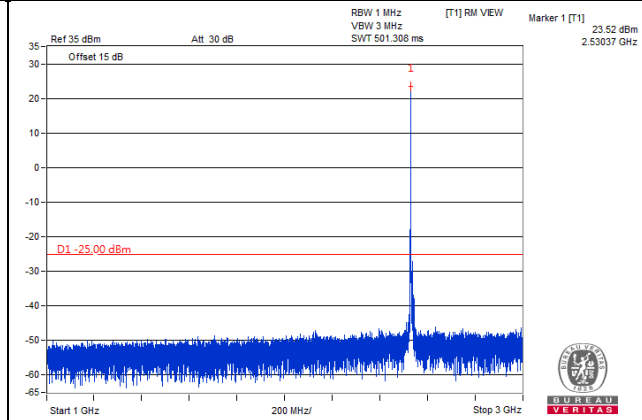
Channel Band width: 10MHz

Channel 507000(2535MHz)

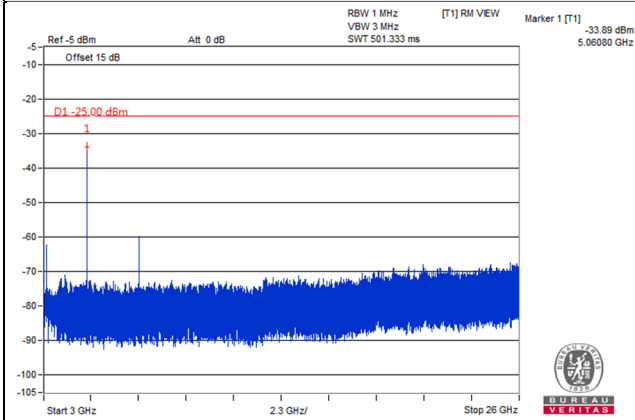
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

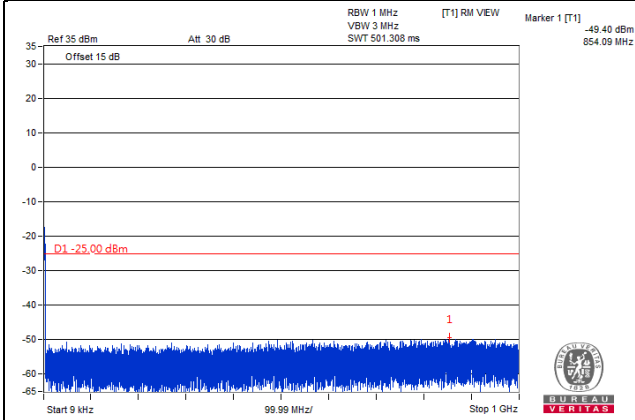


\*The 9kHz signal over the limit is from Spectrum.

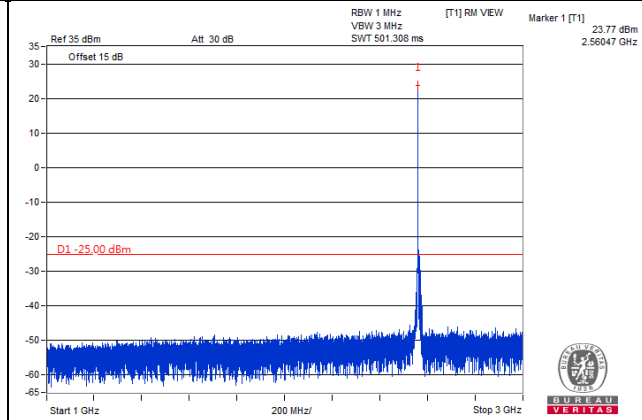
Channel Band width: 10MHz

Channel 513000(2565MHz)

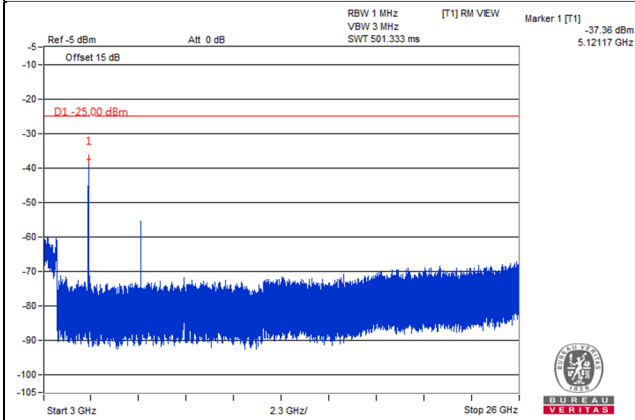
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz



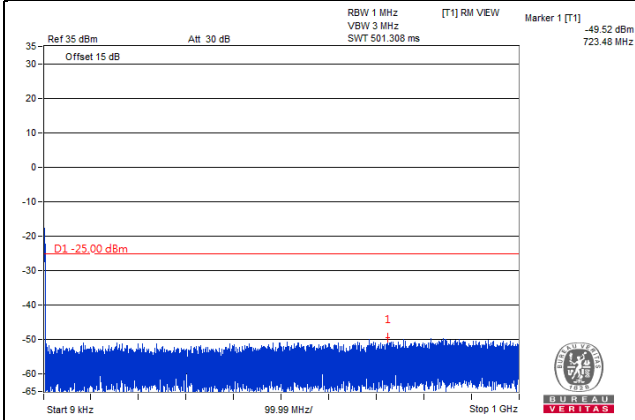
\*The 9kHz signal over the limit is from Spectrum.



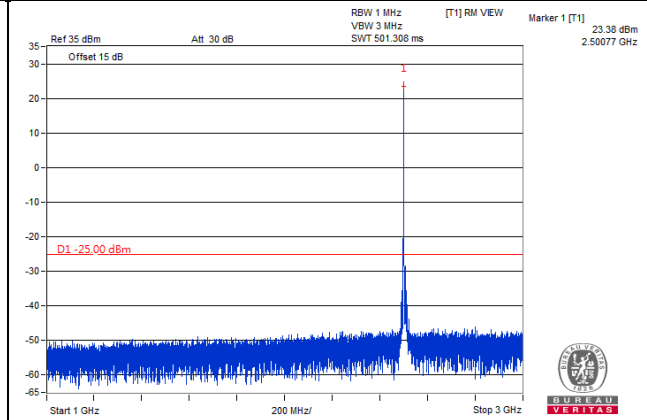
Channel Band width: 15MHz

Channel 501500(2507.5MHz)

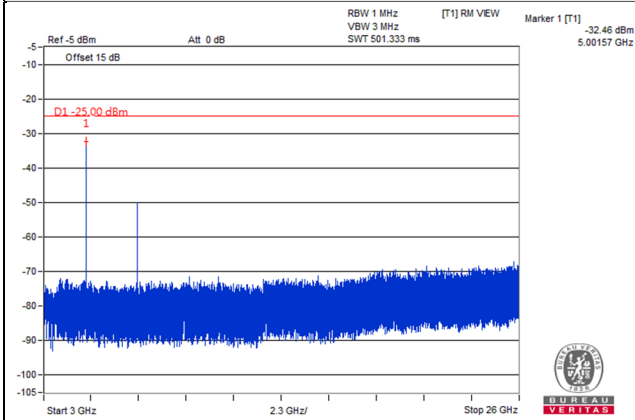
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

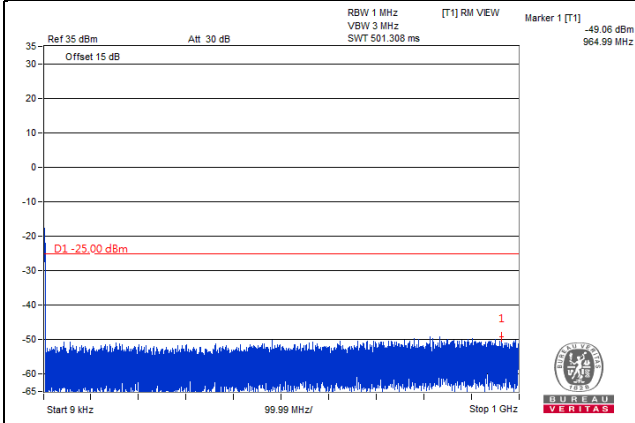


\*The 9kHz signal over the limit is from Spectrum.

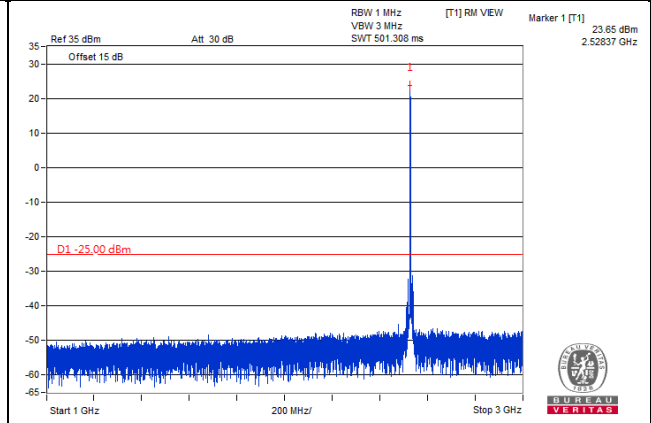
Channel Band width: 15MHz

Channel 507000(2535MHz)

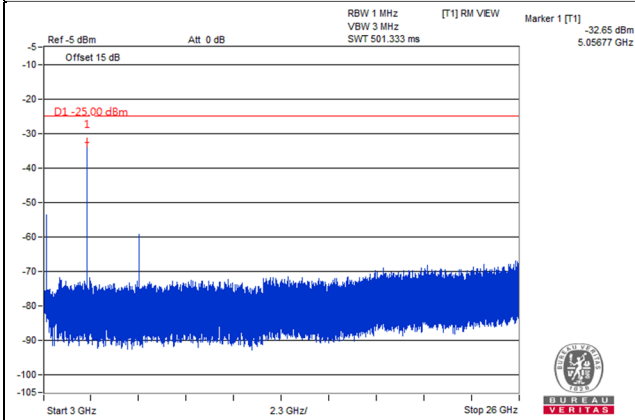
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

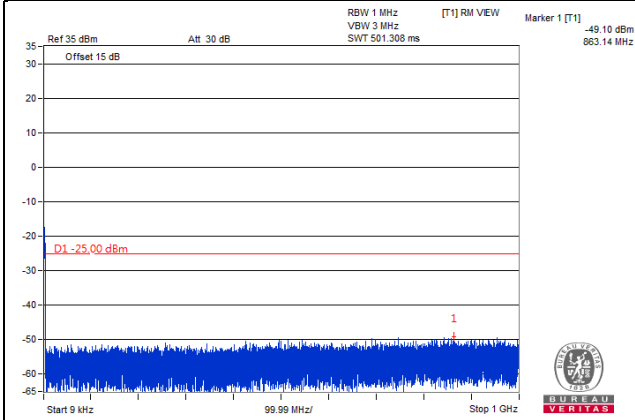


\*The 9kHz signal over the limit is from Spectrum.

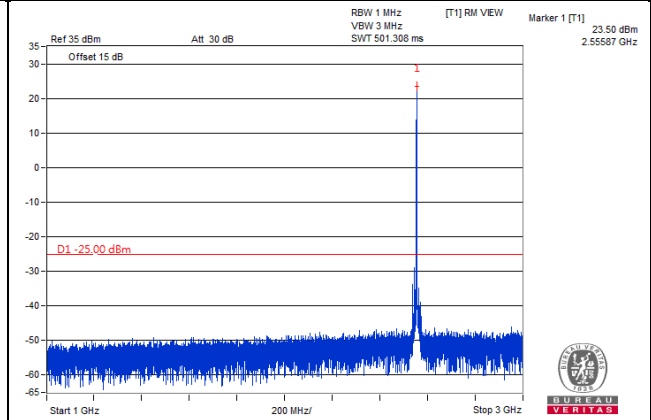
Channel Band width: 15MHz

Channel 512500(2562.5MHz)

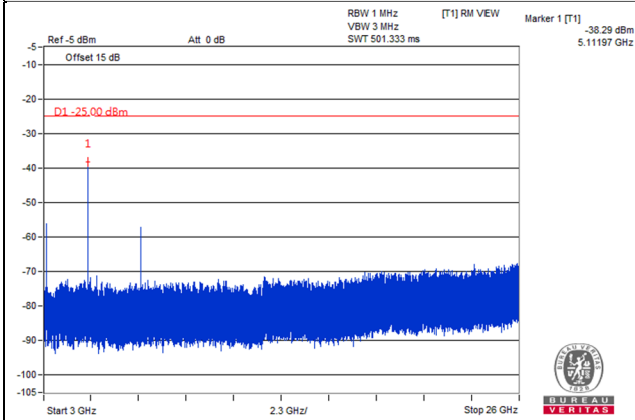
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

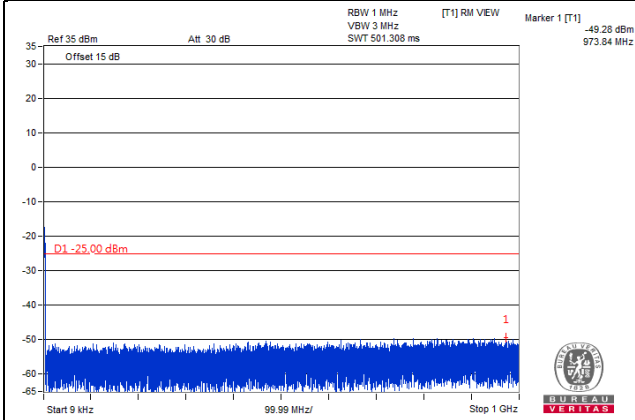


\*The 9kHz signal over the limit is from Spectrum.

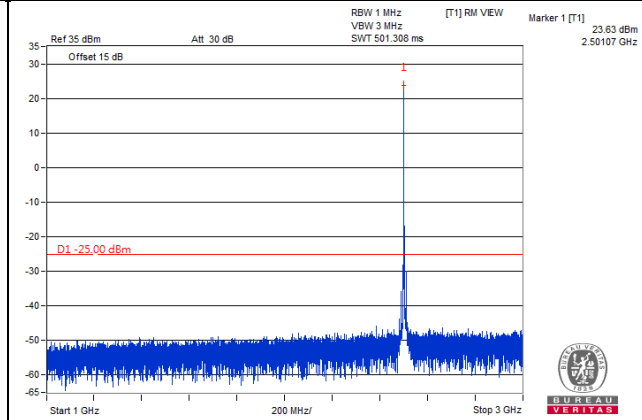
Channel Band width: 20MHz

Channel 502000(2510MHz)

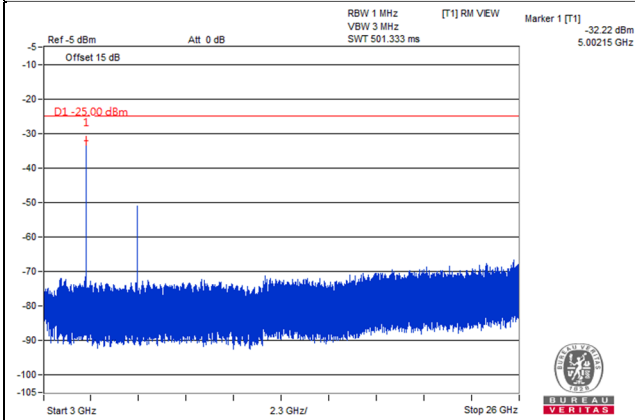
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

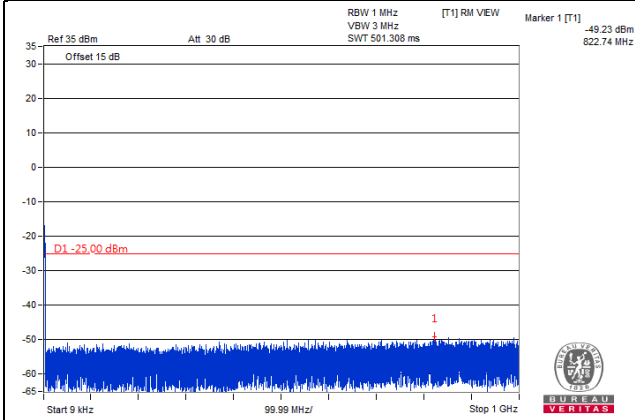


\*The 9kHz signal over the limit is from Spectrum.

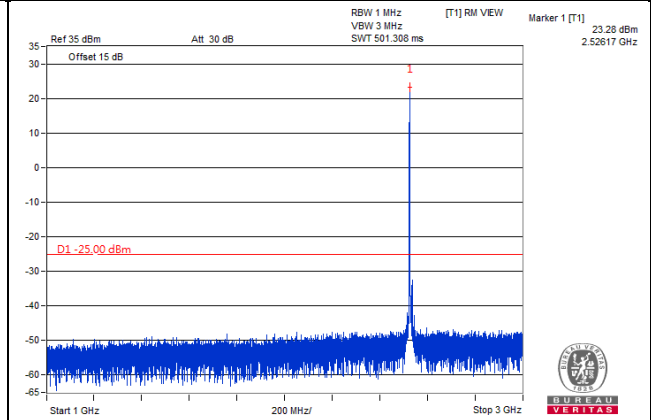
Channel Band width: 20MHz

Channel 507000(2535MHz)

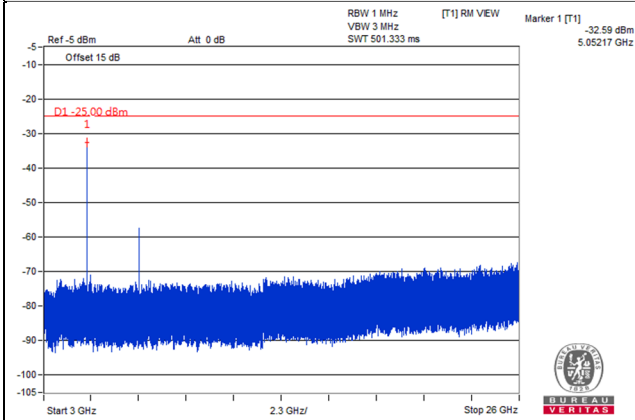
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz

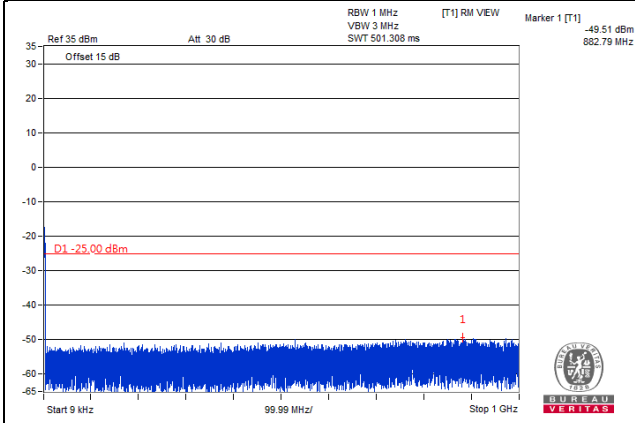


\*The 9kHz signal over the limit is from Spectrum.

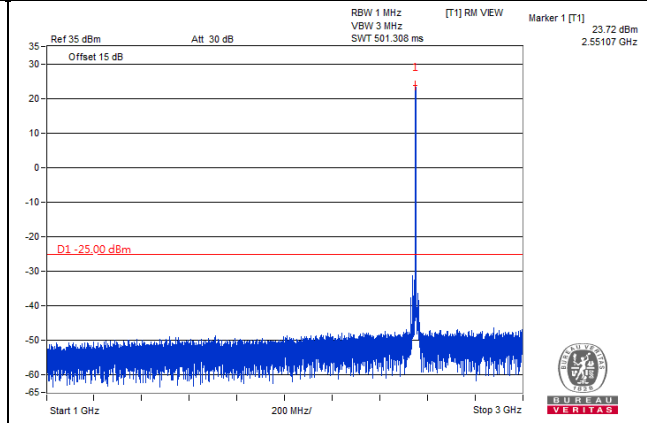
Channel Band width: 20MHz

Channel 512000(2560MHz)

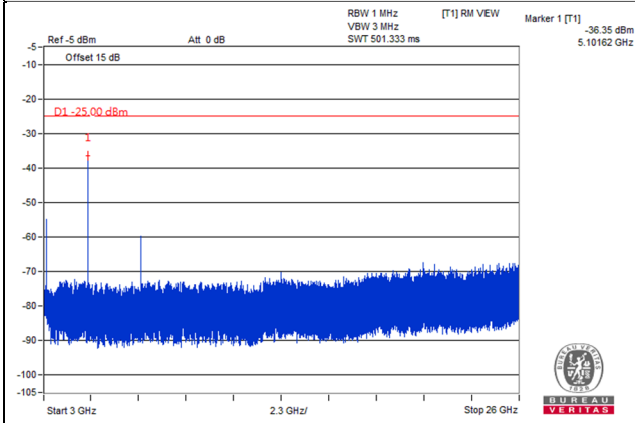
Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~3GHz



Frequency Range : 3GHz~26GHz



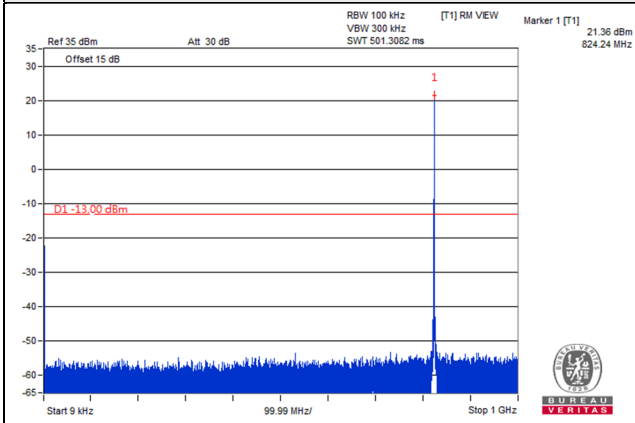
\*The 9kHz signal over the limit is from Spectrum.

LTE Band 5

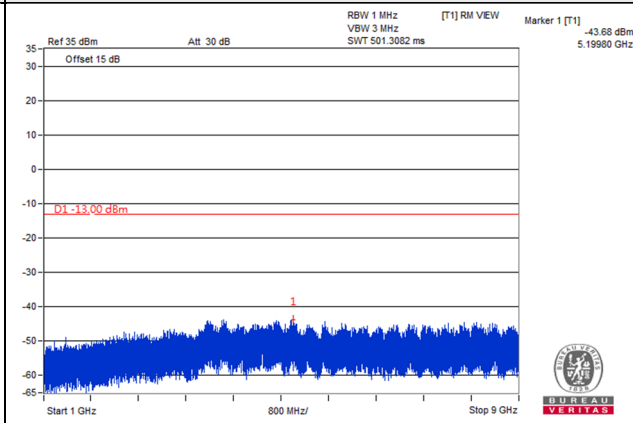
Channel Bandwidth 1.4MHz

Channel 20407 (824.7MHz)

Frequency Range : 9kHz~1GHz

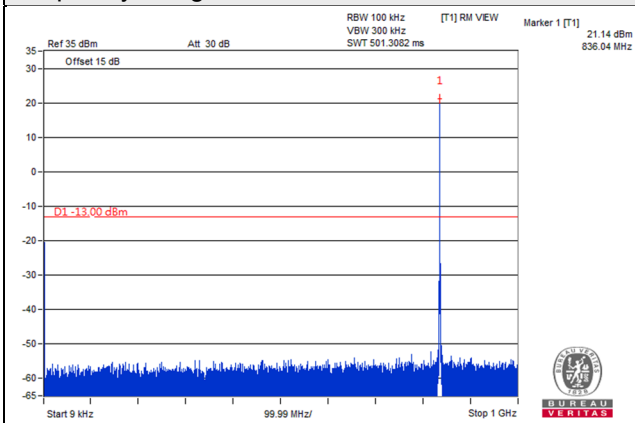


Frequency Range : 1GHz~9GHz

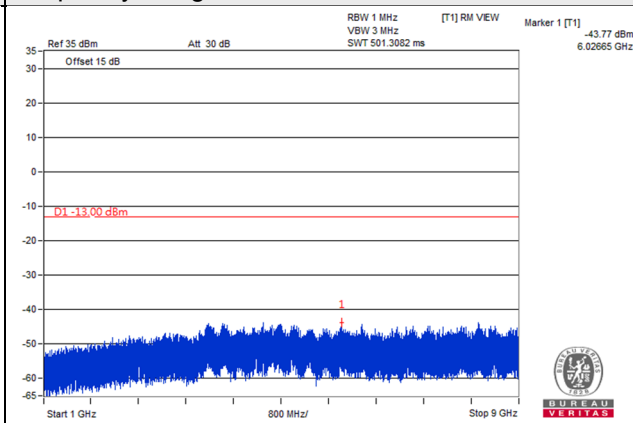


Channel 20525 (836.5MHz)

Frequency Range : 9kHz~1GHz

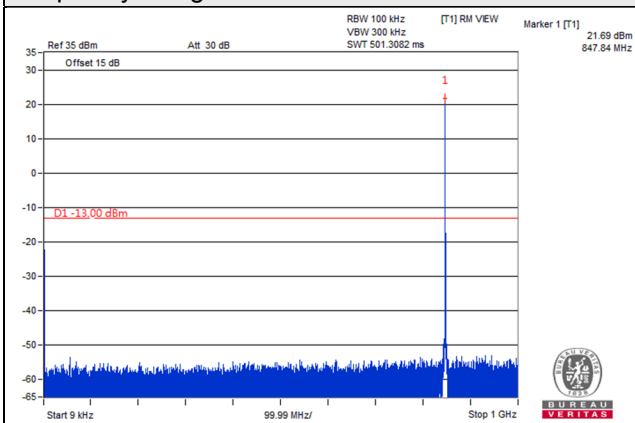


Frequency Range : 1GHz~9GHz

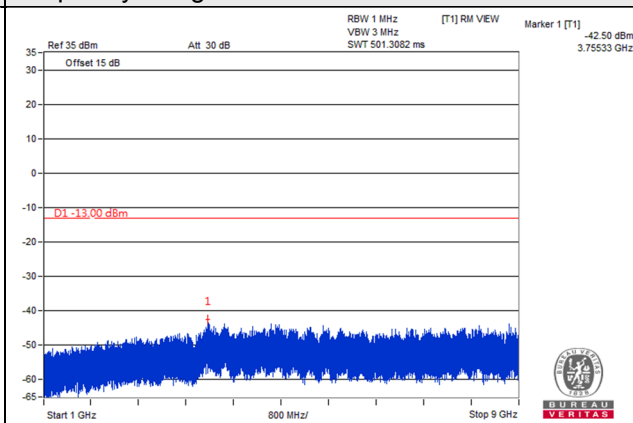


Channel 20643 (848.3MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~9GHz



\*The 9kHz signal over the limit is from Spectrum.