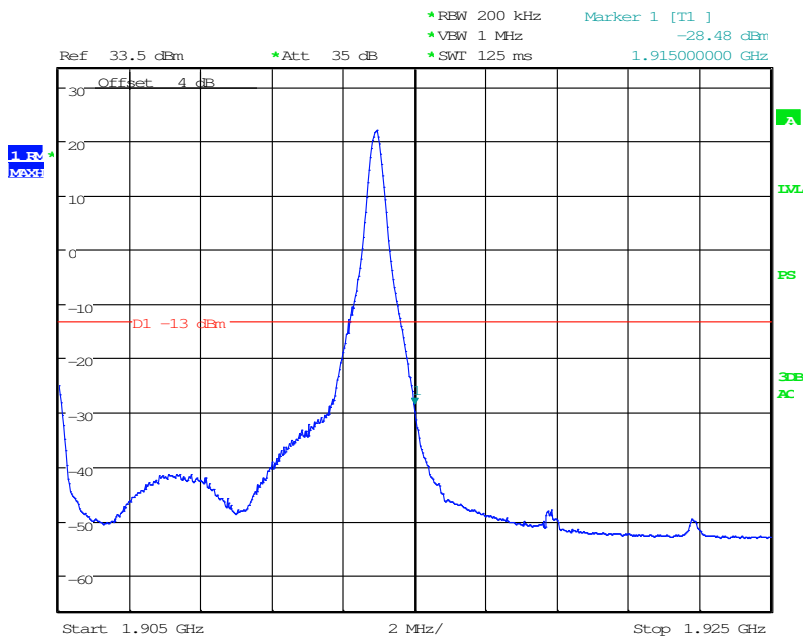
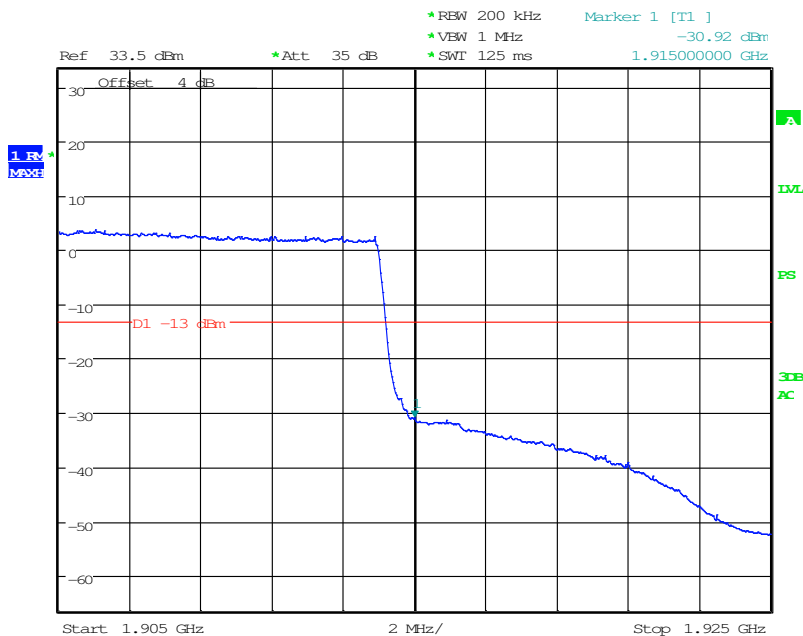


**20MHz bandwidth, 16QAM,(1,100) Mode, Above 1915MHz**

Date: 25.JUN.2015 11:11:04

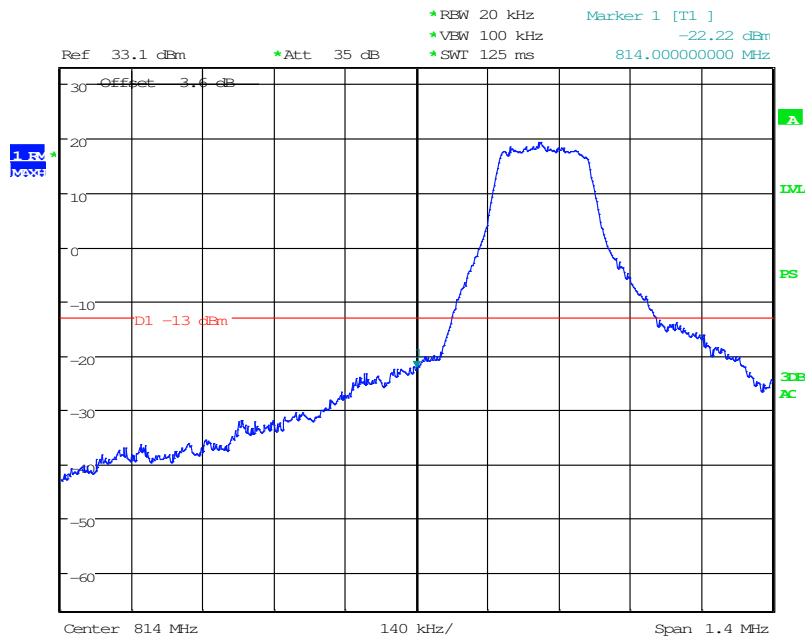
**20MHz bandwidth, 16QAM,100,0) Mode, Above 1915MHz**

Date: 25.JUN.2015 11:10:35

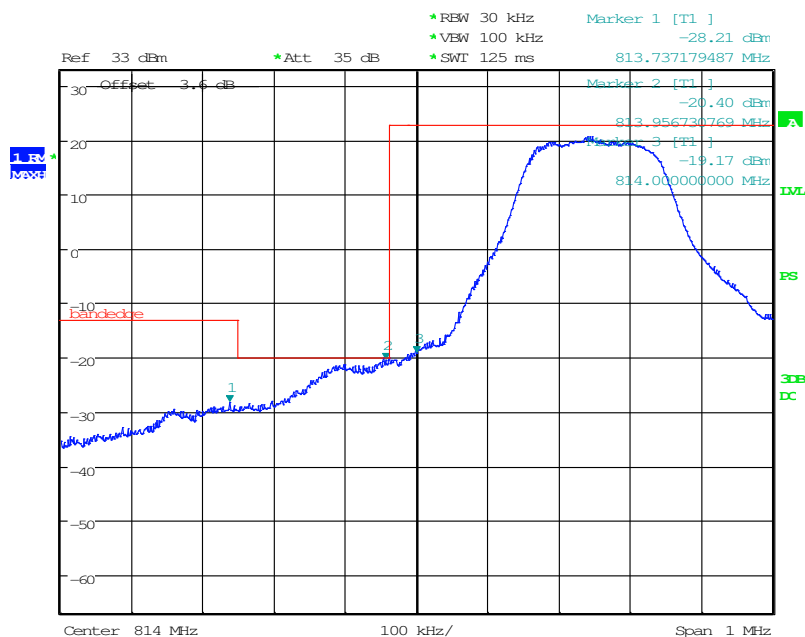
## 4.5.6 LTE B26 Band Edge Results

## Graphical results:

1.4MHz bandwidth, QPSK, (1,0) Mode, below 814 MHz

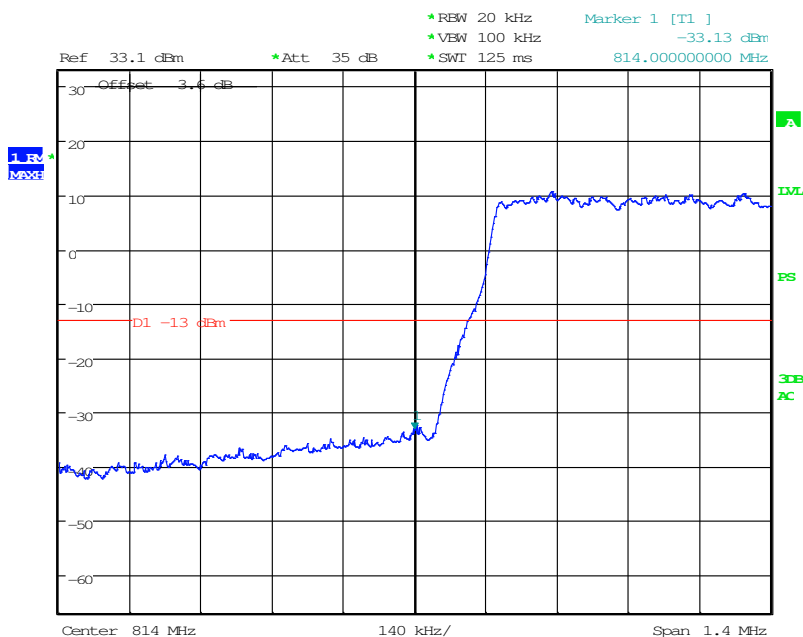


Date: 25.JUN.2015 11:53:20

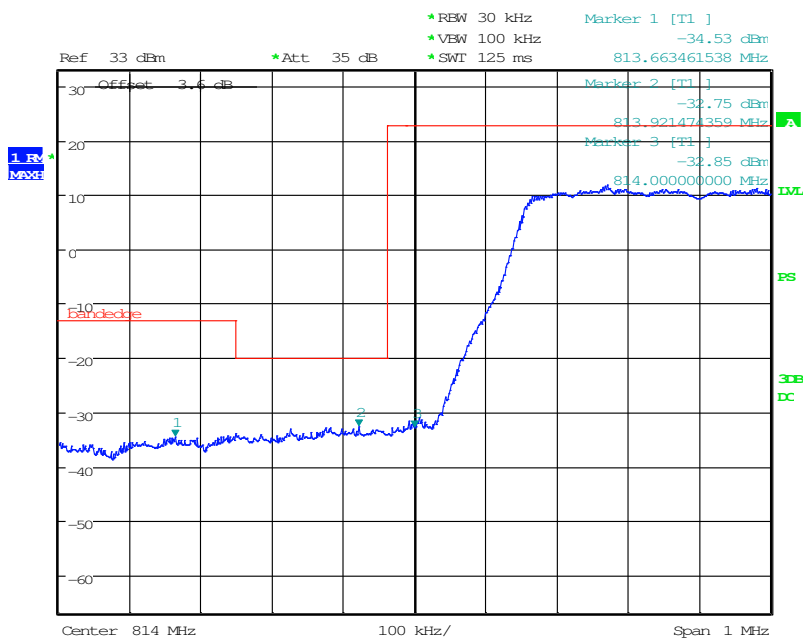


Date: 9.JUL.2015 15:57:21

## 1.4 MHz bandwidth, QPSK, (6,0) Mode, below 814 MHz

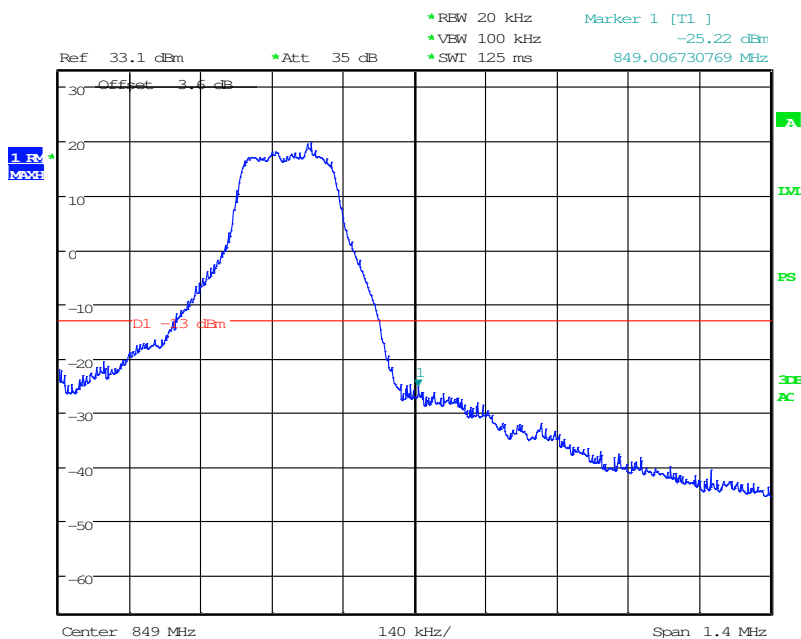


Date: 25.JUN.2015 11:54:16



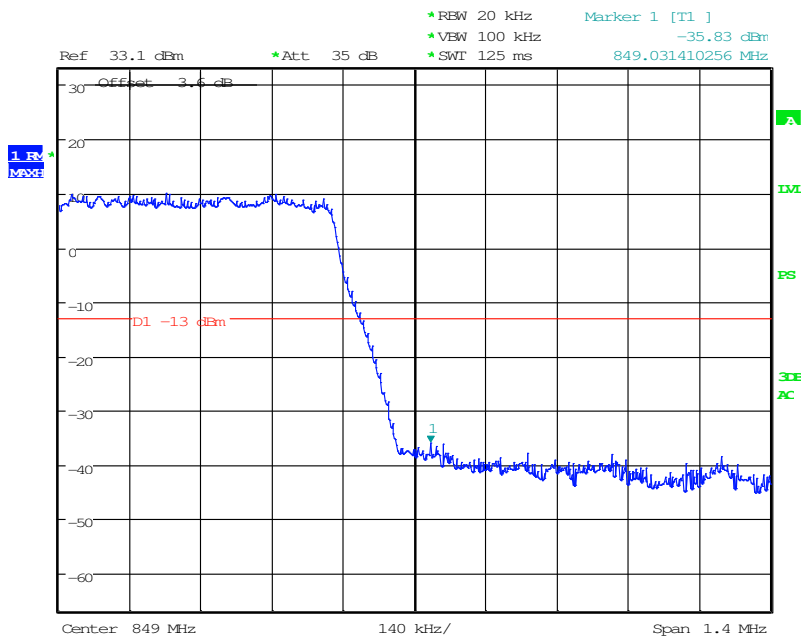
Date: 9.JUL.2015 15:58:19

## 1.4 MHz bandwidth, QPSK,(1,6) Mode, Above 849MHz



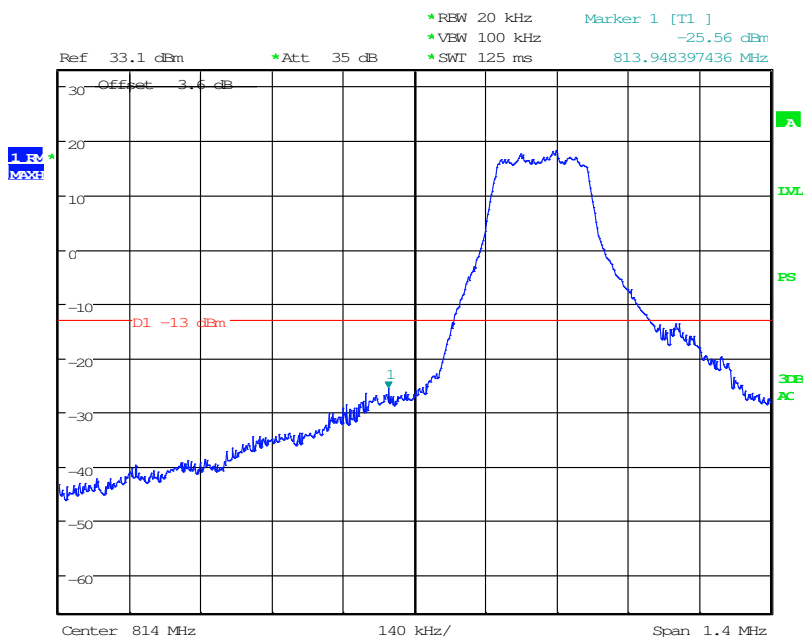
Date: 25.JUN.2015 11:57:09

## 1.4 MHz bandwidth, QPSK,(6,0) Mode, Above 849MHz

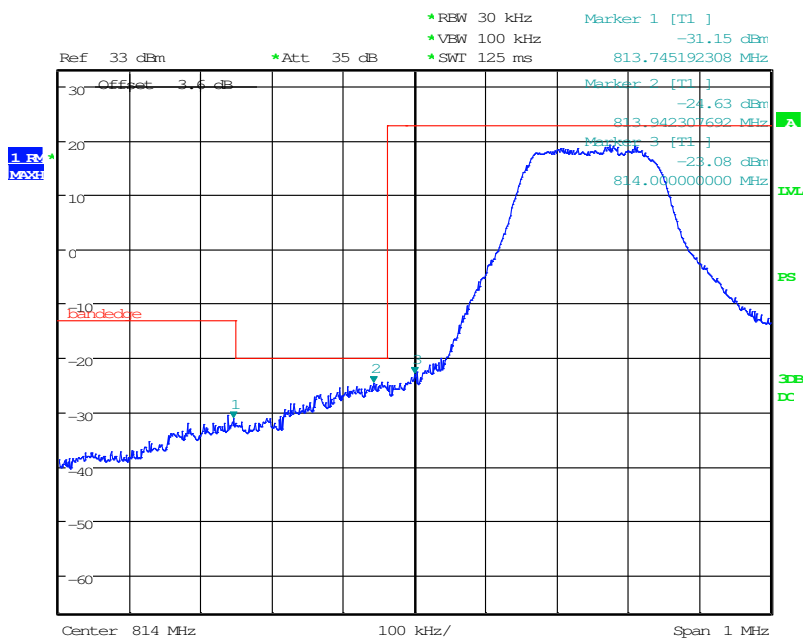


Date: 25.JUN.2015 11:57:54

## 1.4MHz bandwidth, 16QAM,(1,0) Mode , below 814MHz

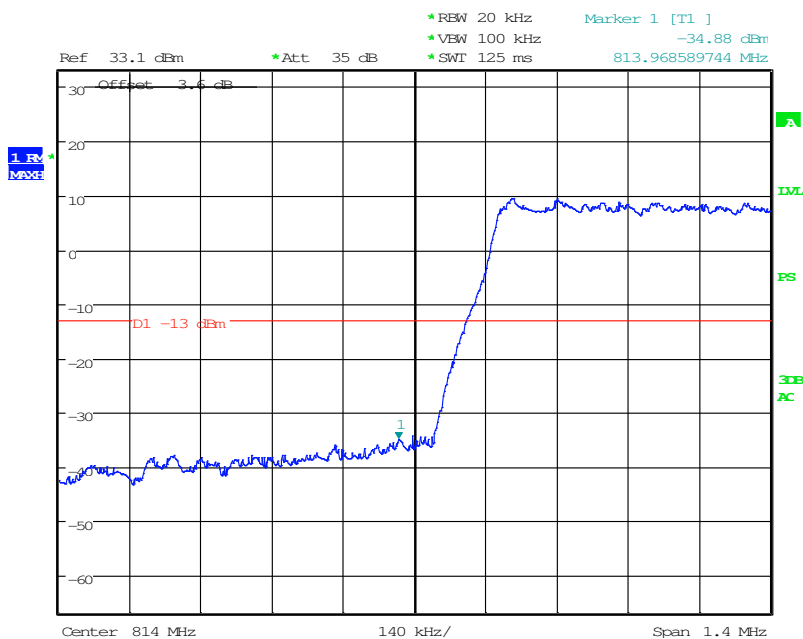


Date: 25.JUN.2015 11:55:44

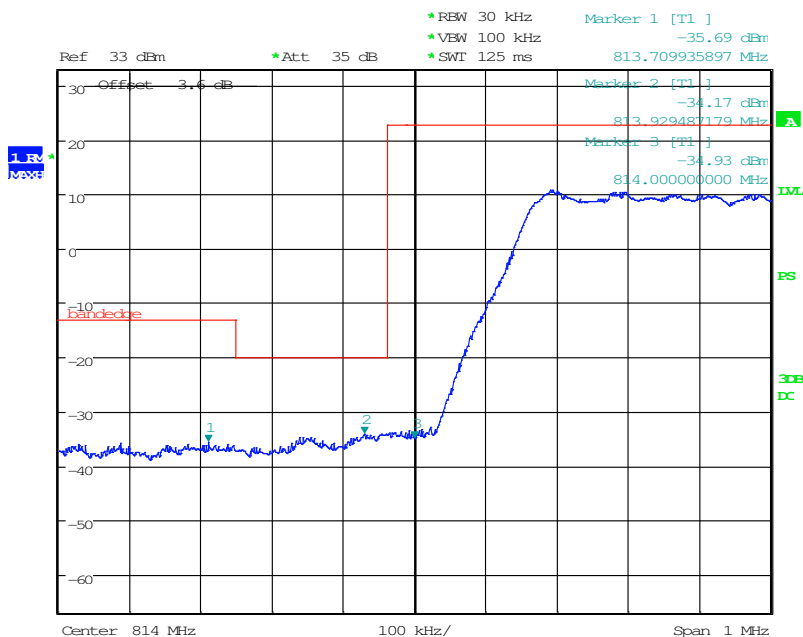


Date: 9.JUL.2015 16:00:02

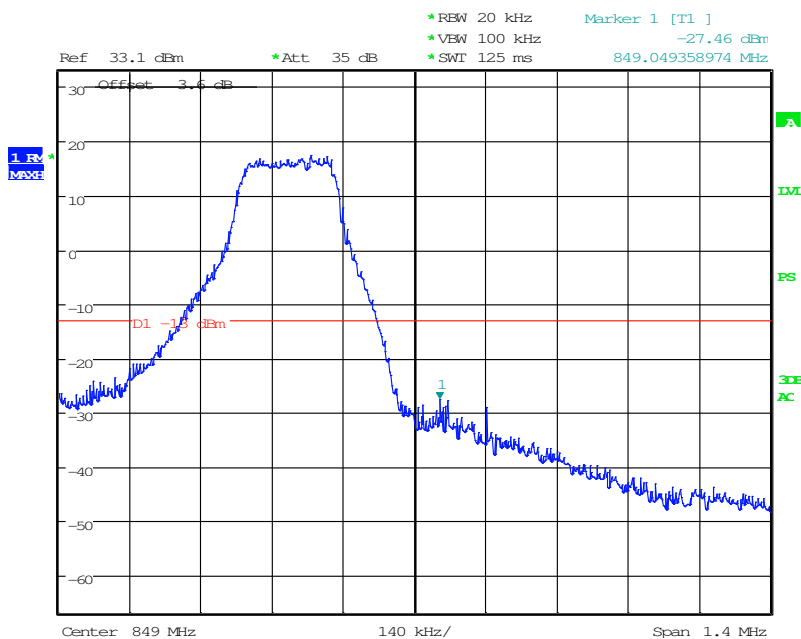
## 1.4 MHz bandwidth, 16QAM,(6,0) Mode , below 814MHz



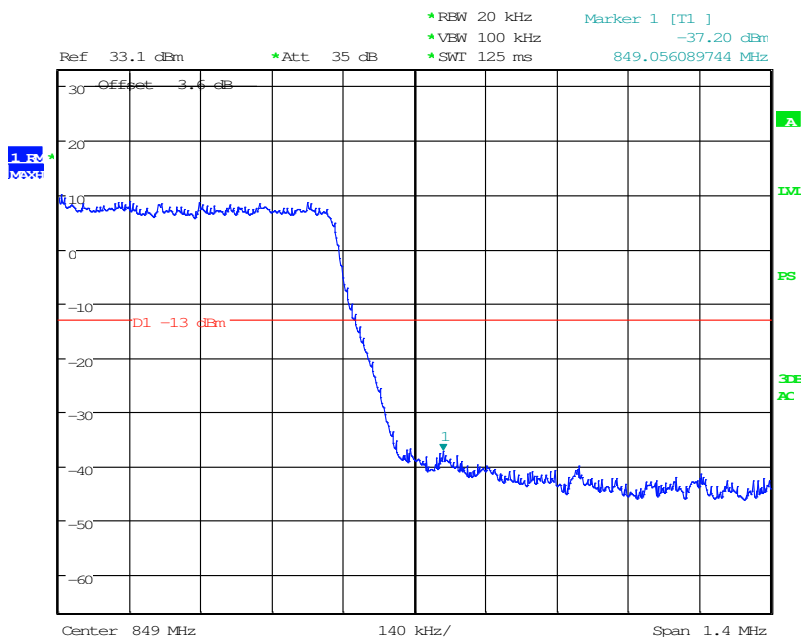
Date: 25.JUN.2015 11:54:57



Date: 9.JUL.2015 15:59:16

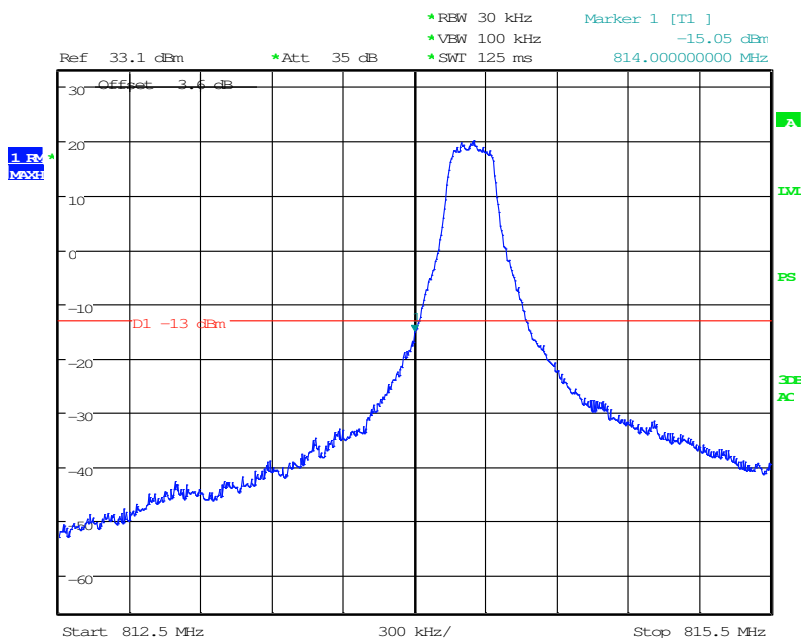
**1.4MHz bandwidth, 16QAM,(1,6) Mode, Above 849MHz**

Date: 25.JUN.2015 11:59:01

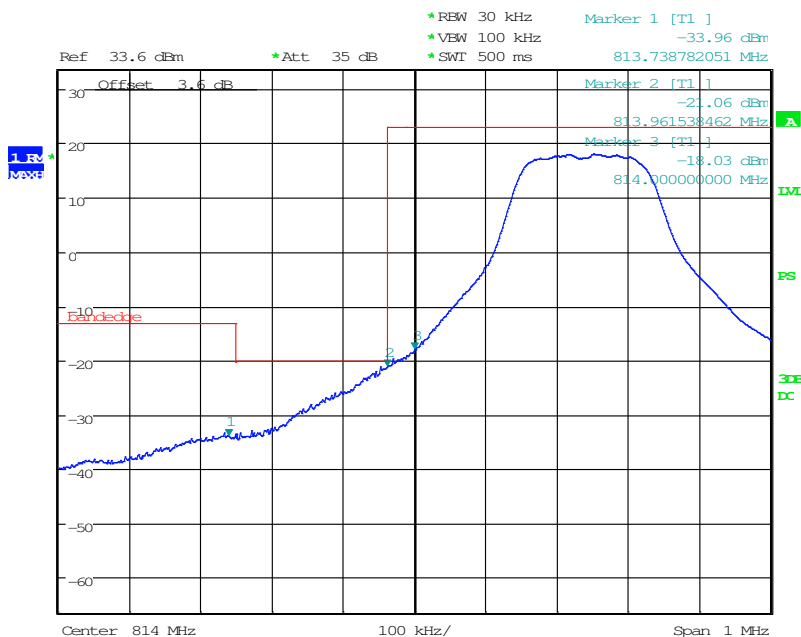
**1.4MHz bandwidth, 16QAM,(6,0) Mode, Above 849MHz**

Date: 25.JUN.2015 11:58:28

## 3MHz bandwidth,QPSK,(1,0) Mode , below 814MHz



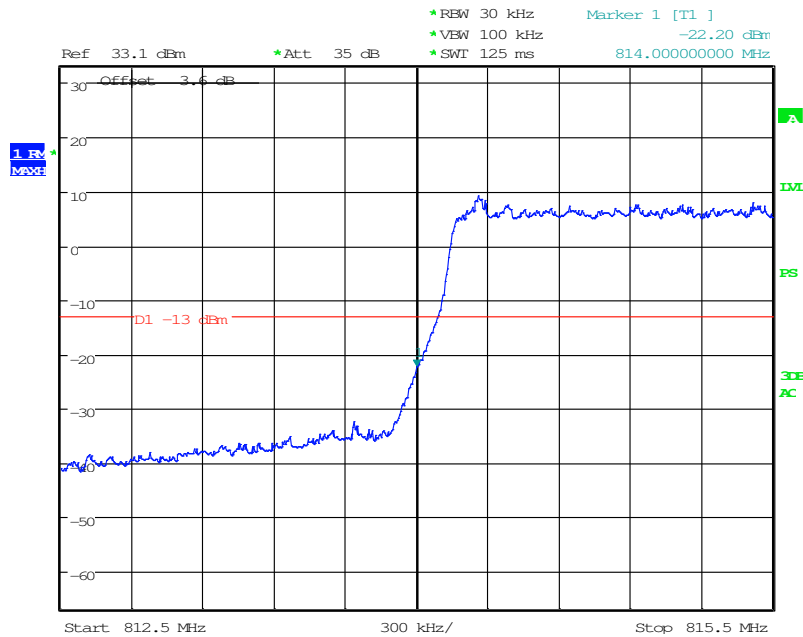
Date: 25.JUN.2015 11:45:44



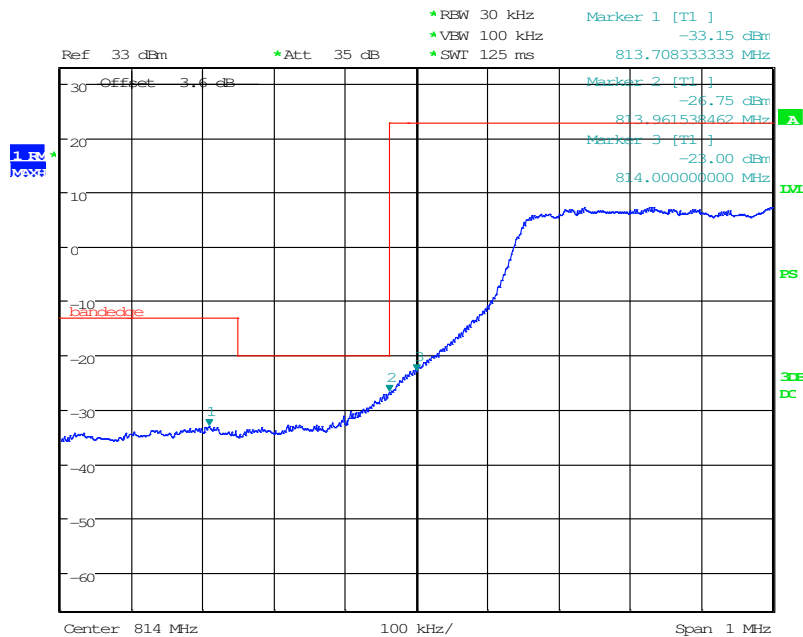
Date: 9.JUL.2015 16:11:34



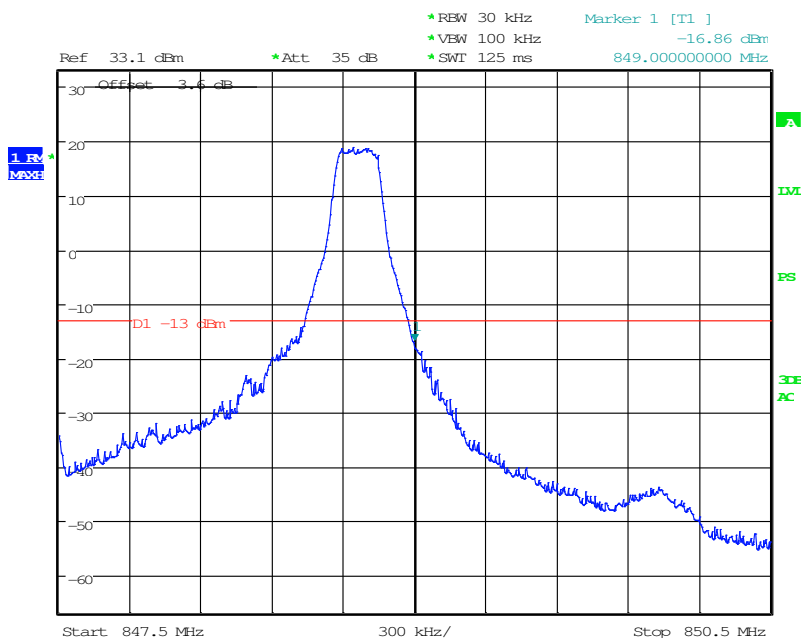
## 3MHz bandwidth,QPSK,(15,0) Mode , below 814MHz



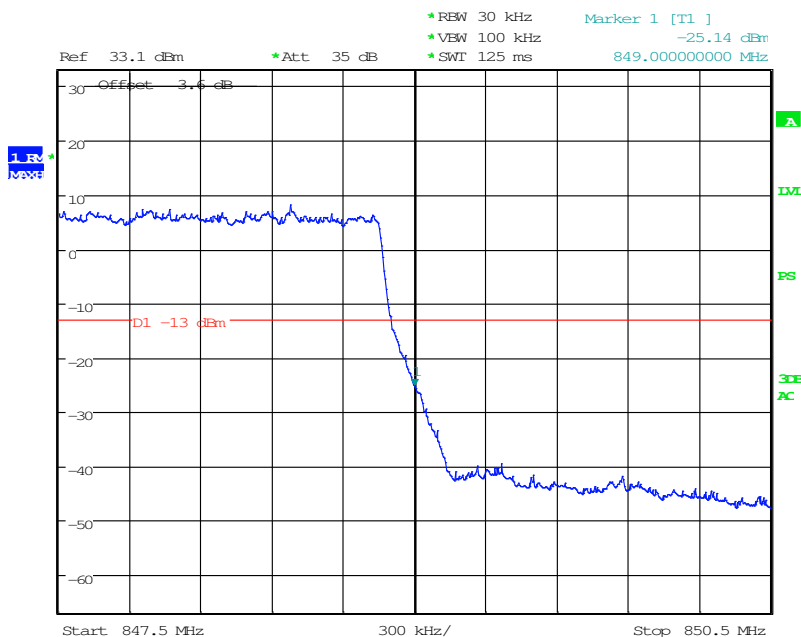
Date: 25.JUN.2015 11:46:10



Date: 9.JUL.2015 16:02:19

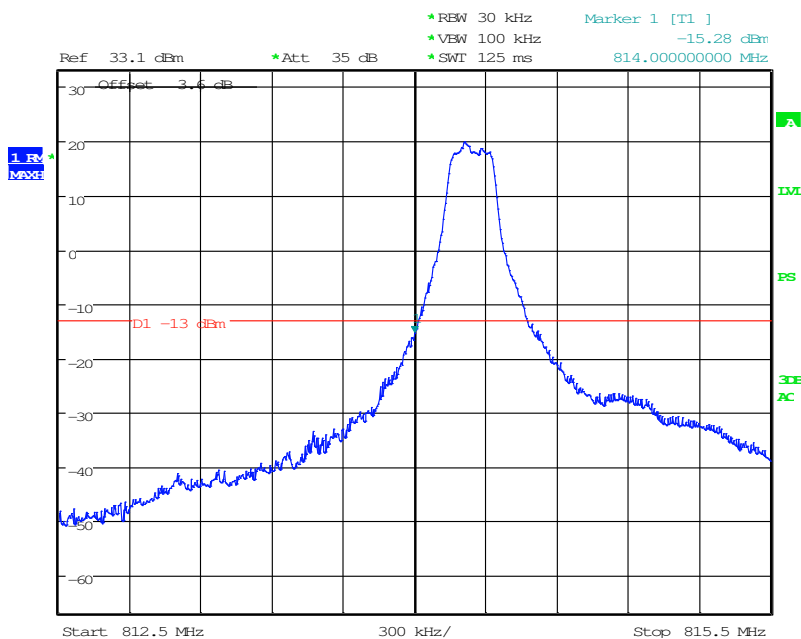
**3MHz bandwidth, QPSK,(1,15) Mode, Above 849MHz**

Date: 25.JUN.2015 11:48:15

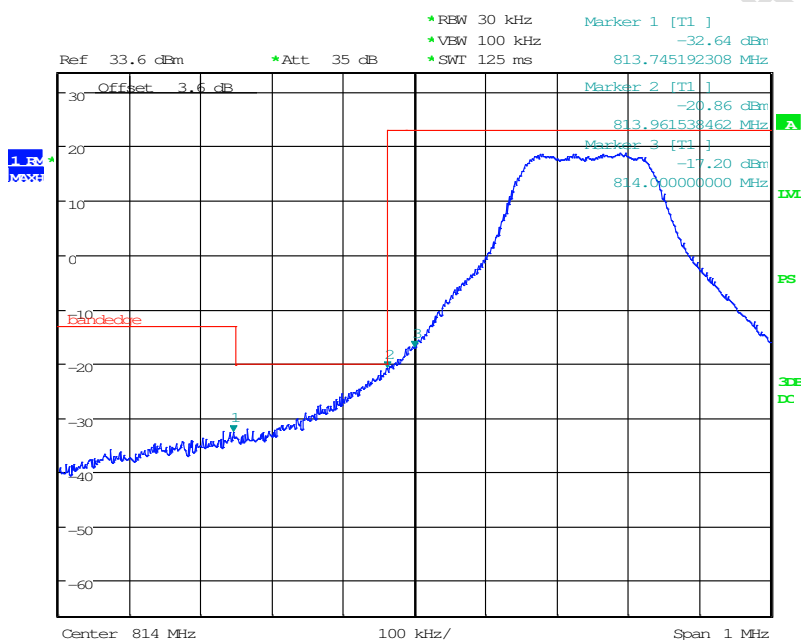
**3MHz bandwidth, QPSK,(15,0) Mode, Above 849MHz**

Date: 25.JUN.2015 11:48:42

## 3MHz bandwidth, 16QAM,(1,0) Mode , below 814MHz

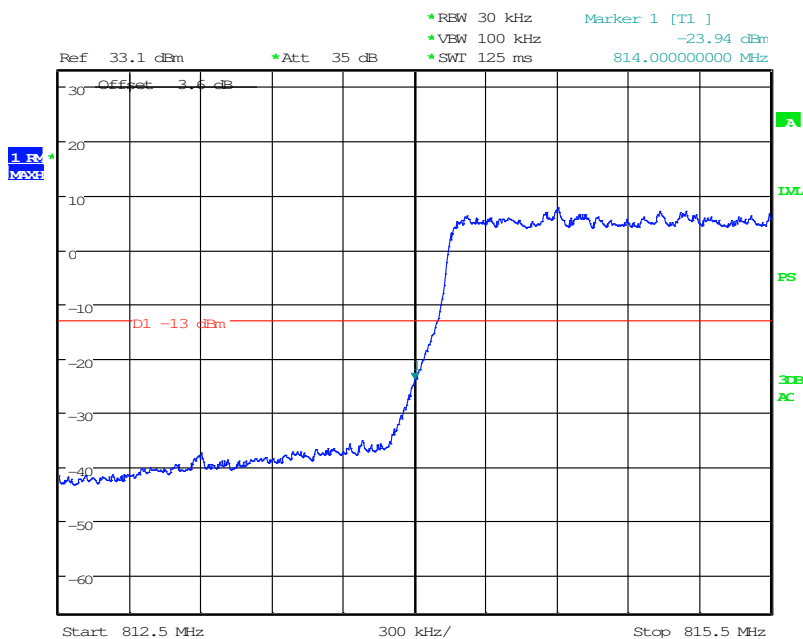


Date: 25.JUN.2015 11:44:59

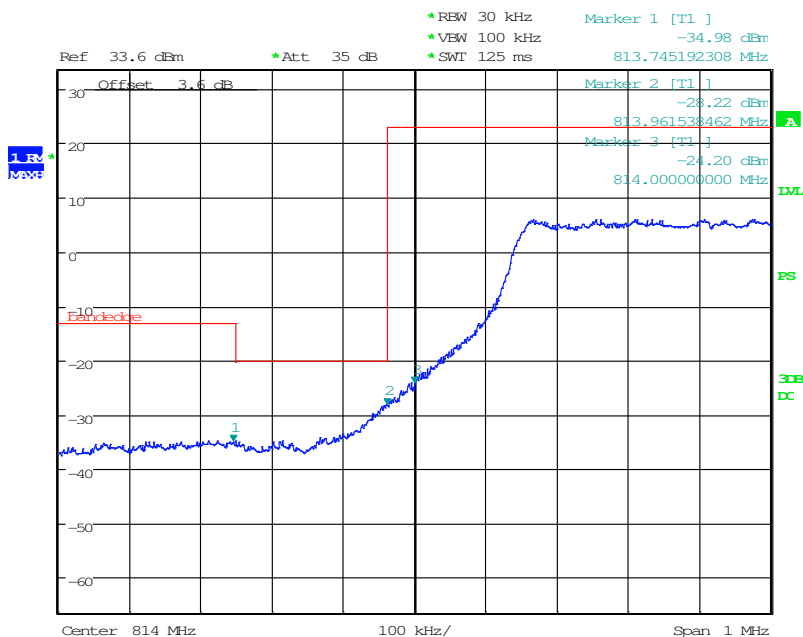


Date: 9.JUL.2015 16:12:41

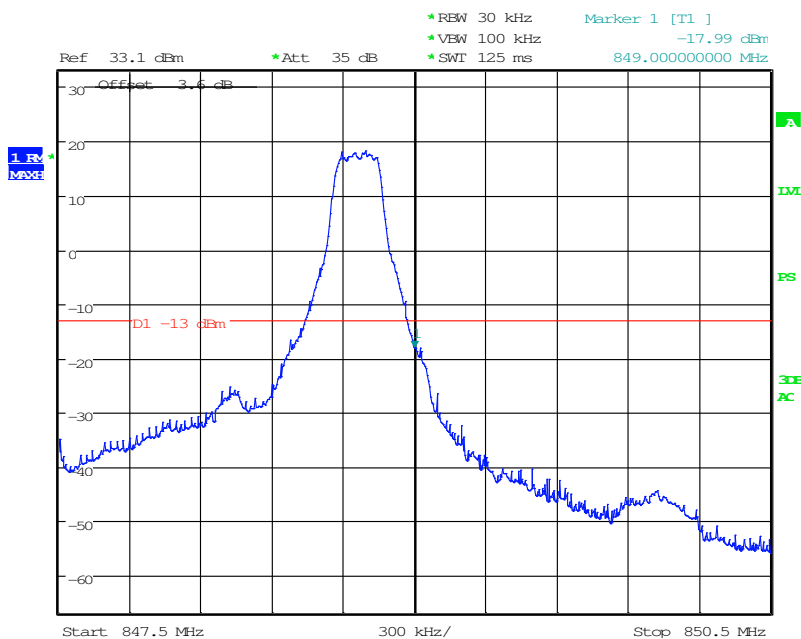
## 3MHz bandwidth, 16QAM,(15,0) Mode , below 814MHz



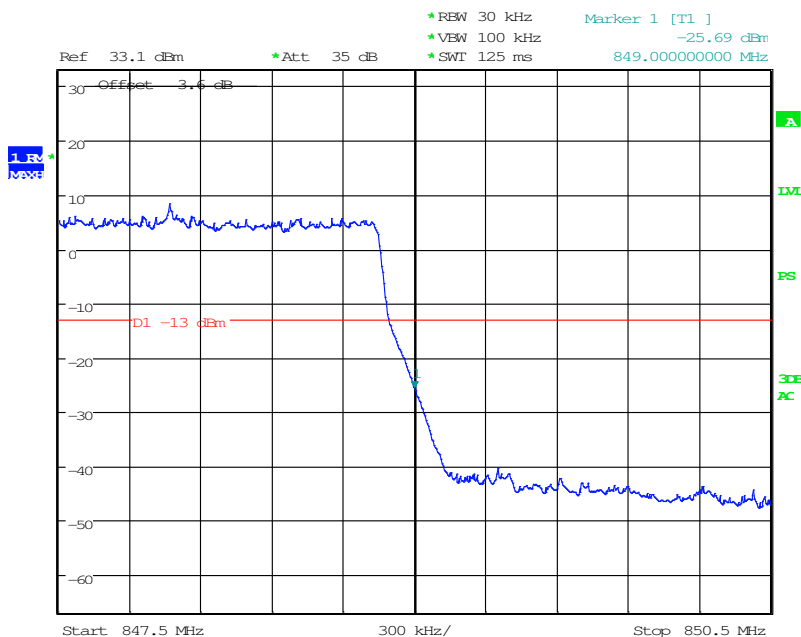
Date: 25.JUN.2015 11:44:01



Date: 9.JUL.2015 16:13:11

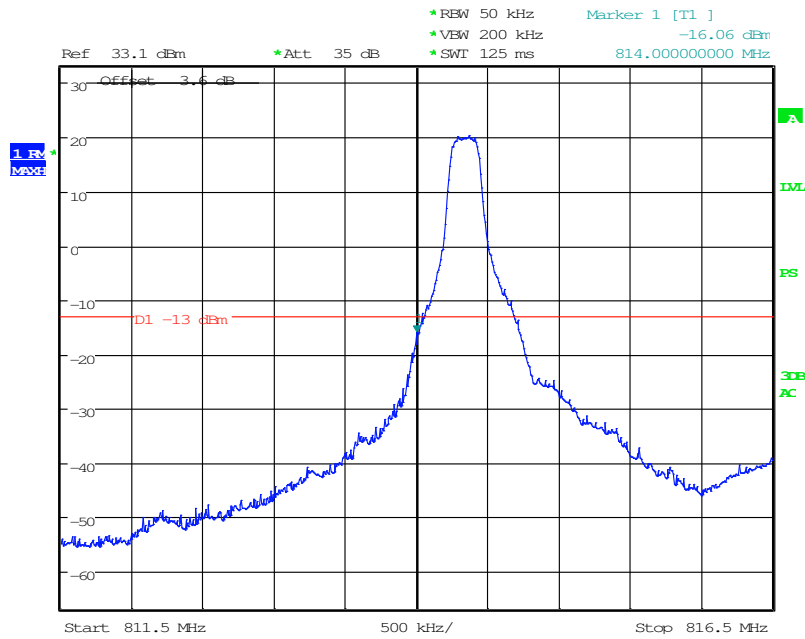
**3MHz bandwidth, 16QAM,(1,15) Mode, Above 849MHz**

Date: 25.JUN.2015 11:49:39

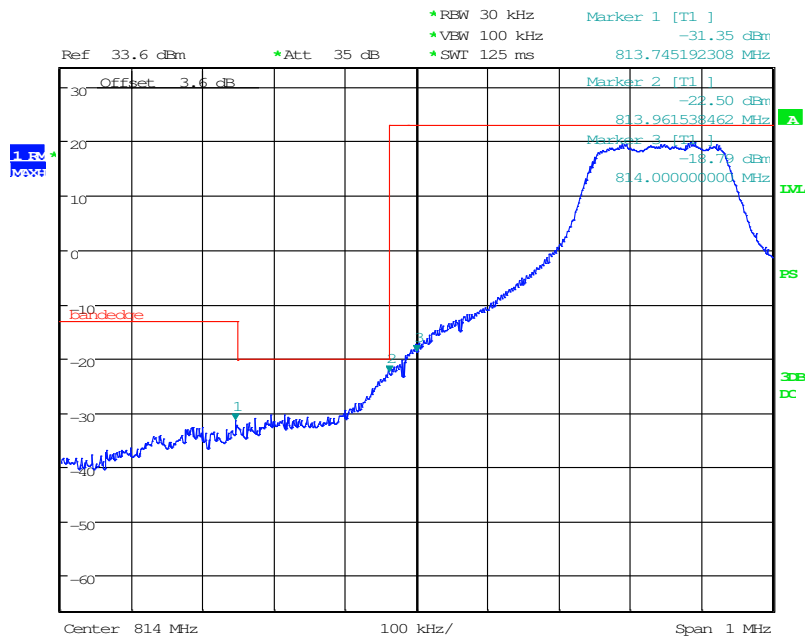
**3MHz bandwidth, 16QAM,(15,0) Mode, Above 849MHz**

Date: 25.JUN.2015 11:49:14

**5 MHz bandwidth, QPSK, (1,0) Mode, below 814 MHz**

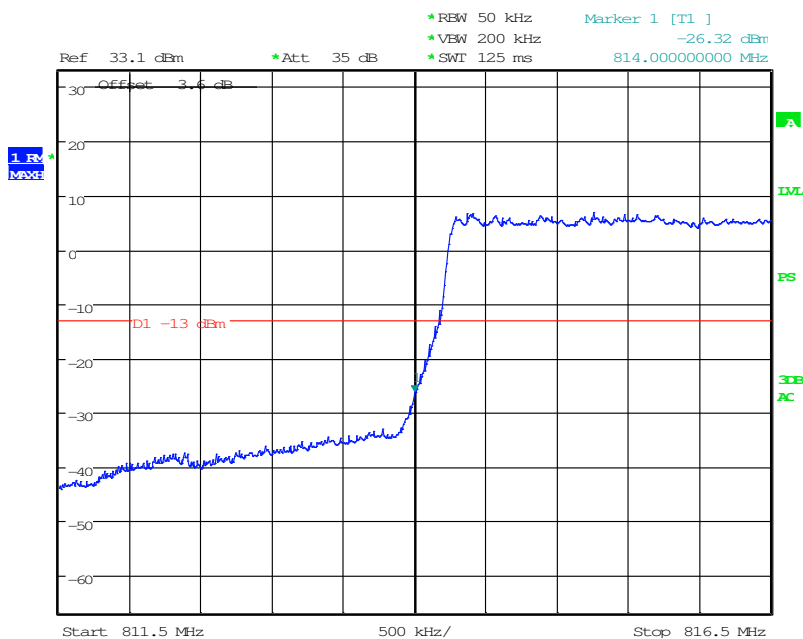


Date: 25.JUN.2015 13:42:19

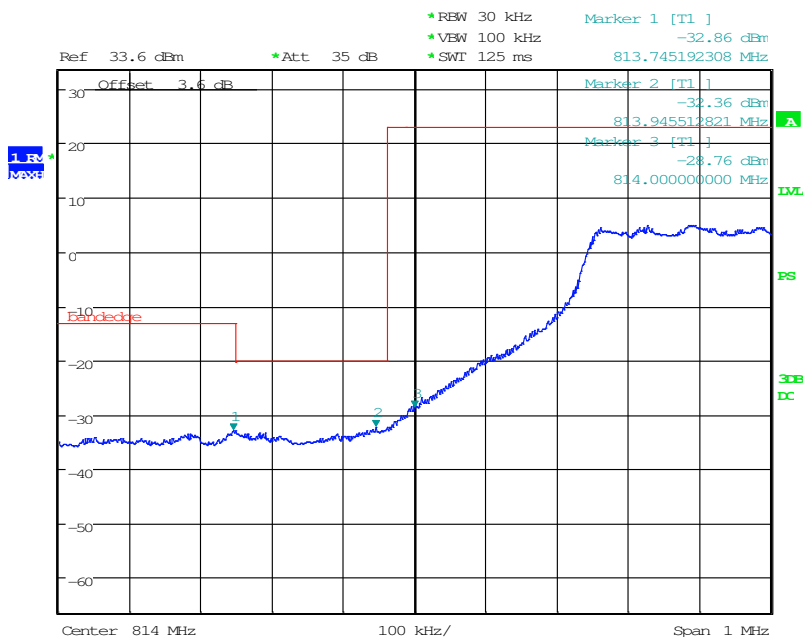


Date: 9.JUL.2015 16:15:05

## 5 MHz bandwidth, QPSK, (25,0) Mode, below 814 MHz

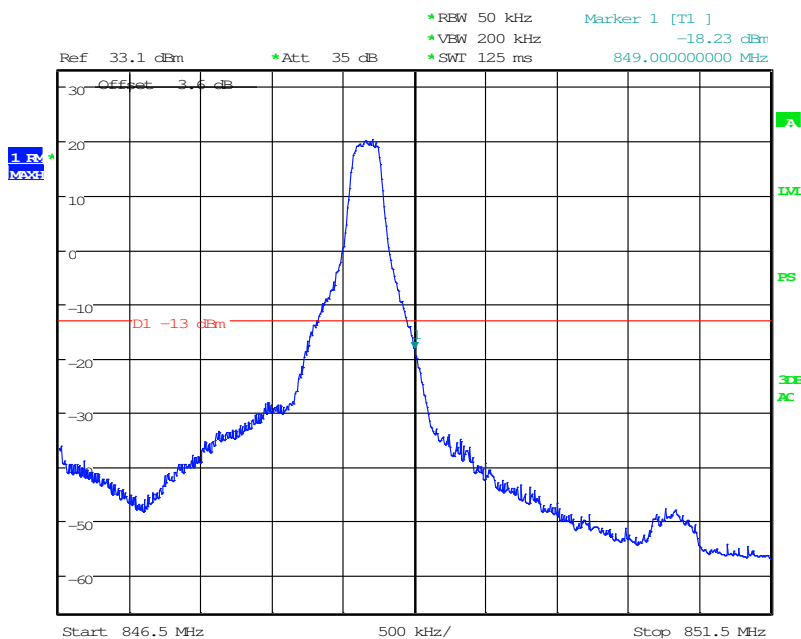


Date: 25.JUN.2015 13:43:02



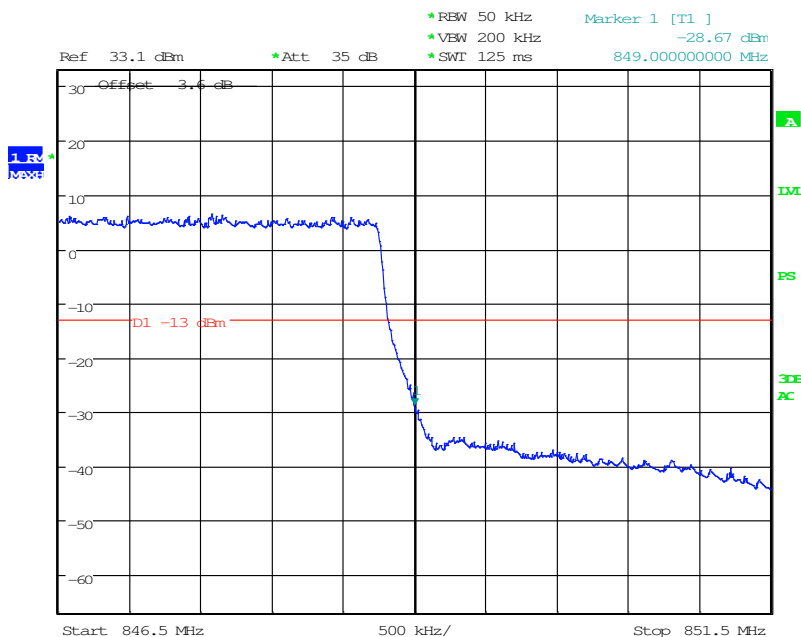
Date: 9.JUL.2015 16:14:24

## 5 MHz bandwidth, QPSK,(1,25) Mode, Above 849MHz



Date: 25.JUN.2015 13:47:17

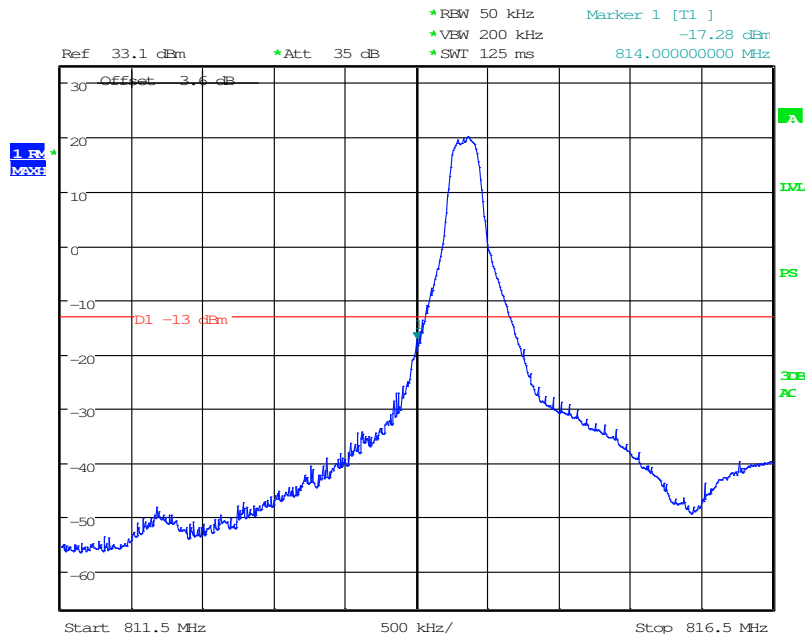
## 5 MHz bandwidth, QPSK,(25,0) Mode, Above 849MHz



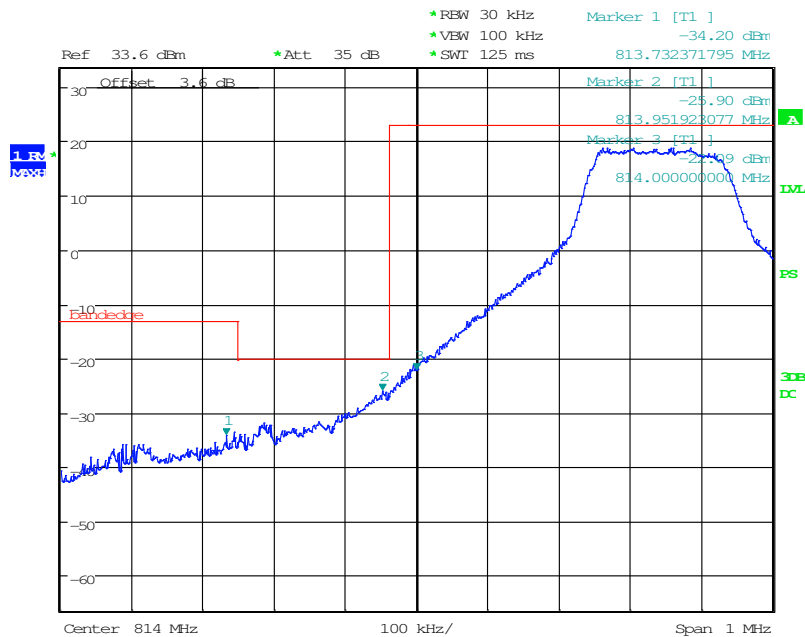
Date: 25.JUN.2015 13:47:47



## 5 MHz bandwidth, 16QAM,(1,0) Mode , below 814MHz

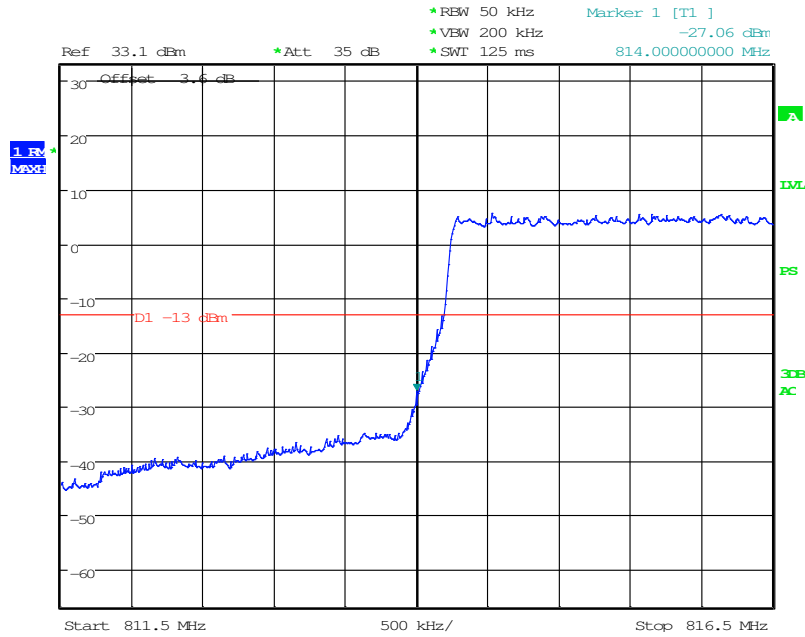


Date: 25.JUN.2015 13:44:24

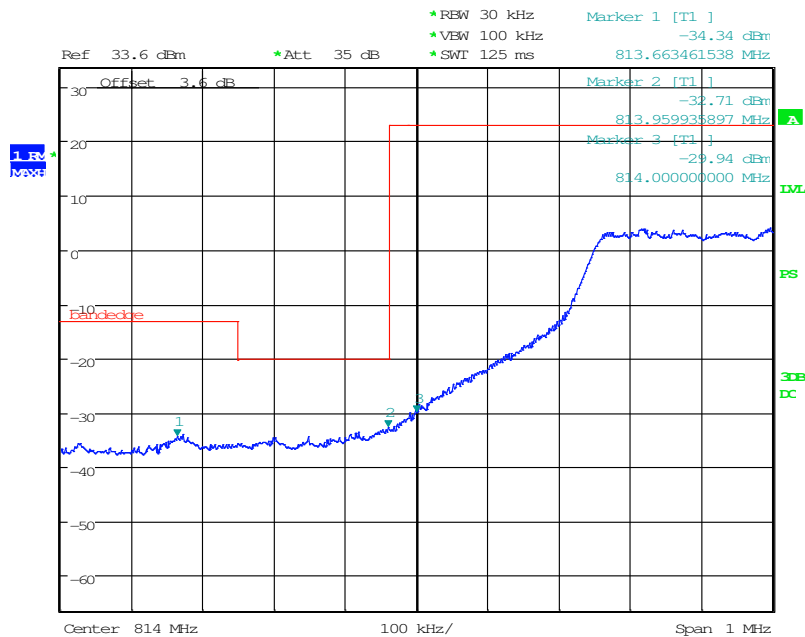


Date: 9.JUL.2015 16:15:48

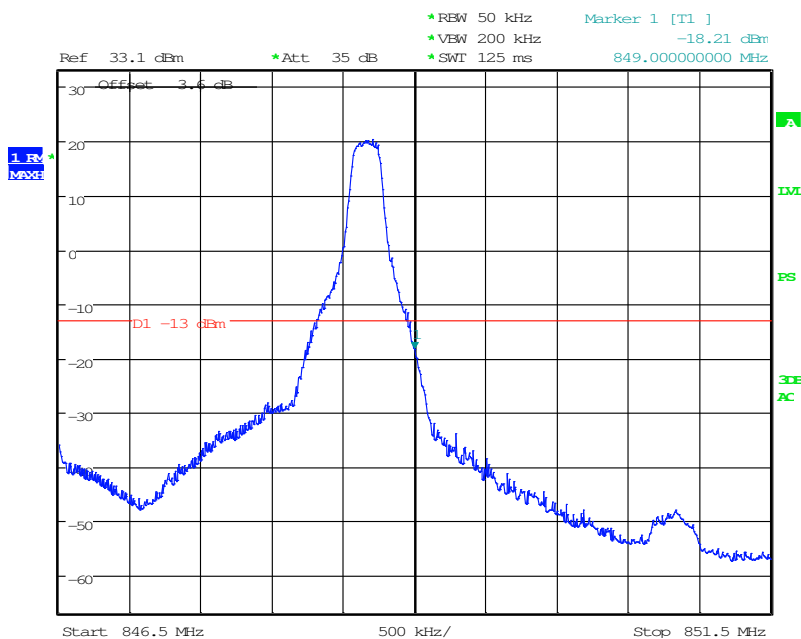
## 5MHz bandwidth, 16QAM,(25,0) Mode , below 814MHz



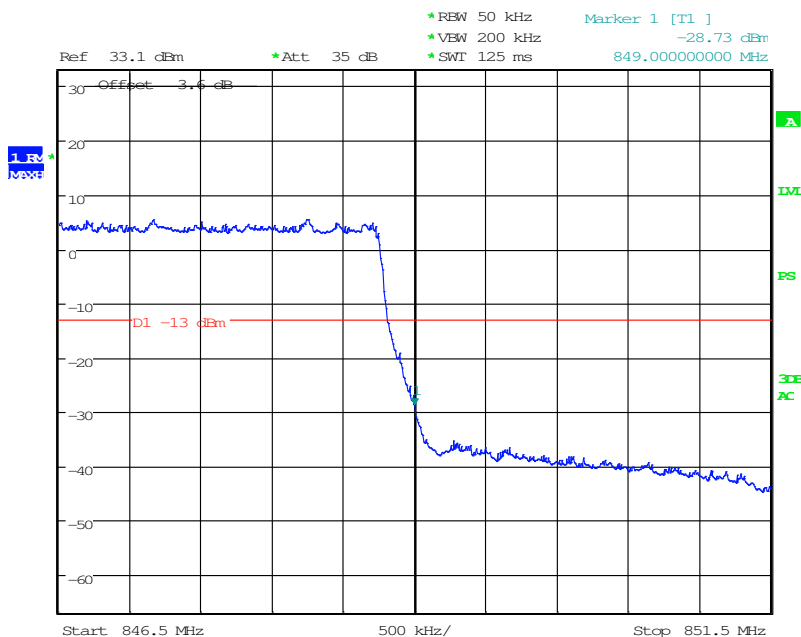
Date: 25.JUN.2015 13:43:50



Date: 9.JUL.2015 16:16:21

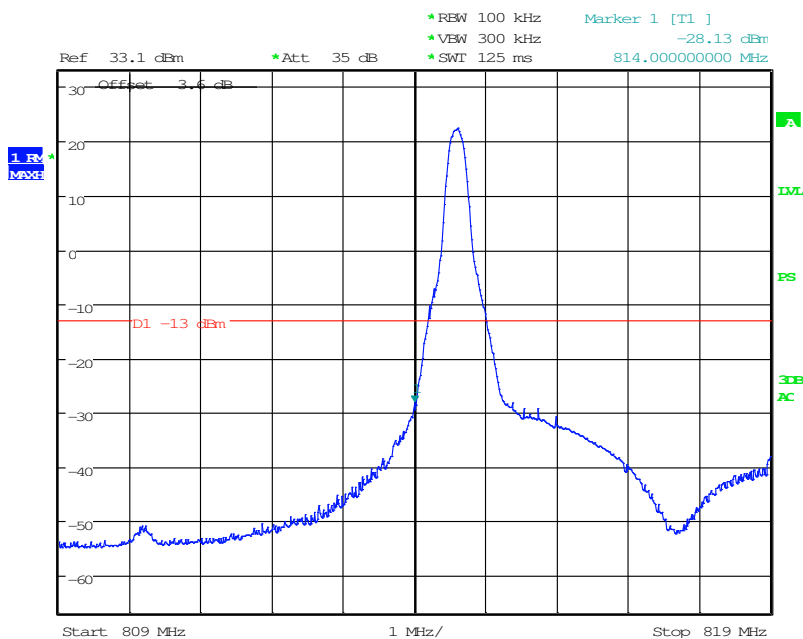
**5 MHz bandwidth, 16QAM,(1,25) Mode, Above 849MHz**

Date: 25.JUN.2015 13:48:44

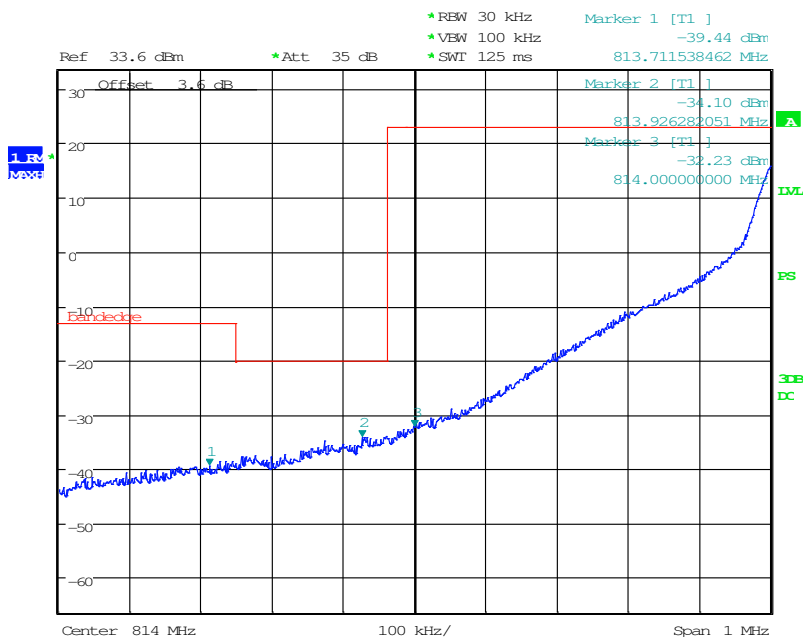
**5 MHz bandwidth, 16QAM,(25,0) Mode, Above 849MHz**

Date: 25.JUN.2015 13:48:10

## 10MHz bandwidth,QPSK,(1,0) Mode , below 814MHz



Date: 25.JUN.2015 13:50:52



Date: 9.JUL.2015 16:18:41

Ref 33.1 dBm \*Att 35 dB \*BW 100 kHz \*VEW 300 kHz \*SWT 125 ms Marker 1 [T1] -31.59 dBm 814.000000000 MHz

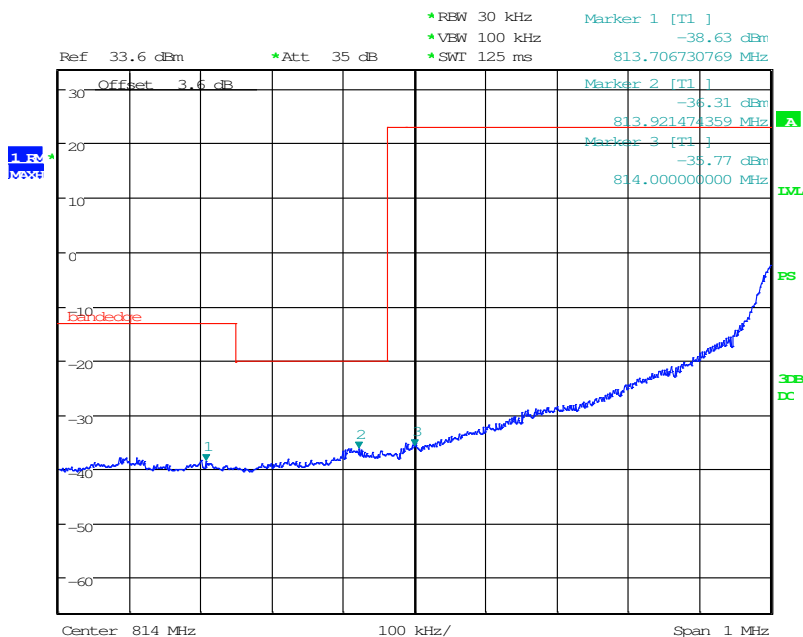
Offset 3.6 dB

1.9V Sine Wave

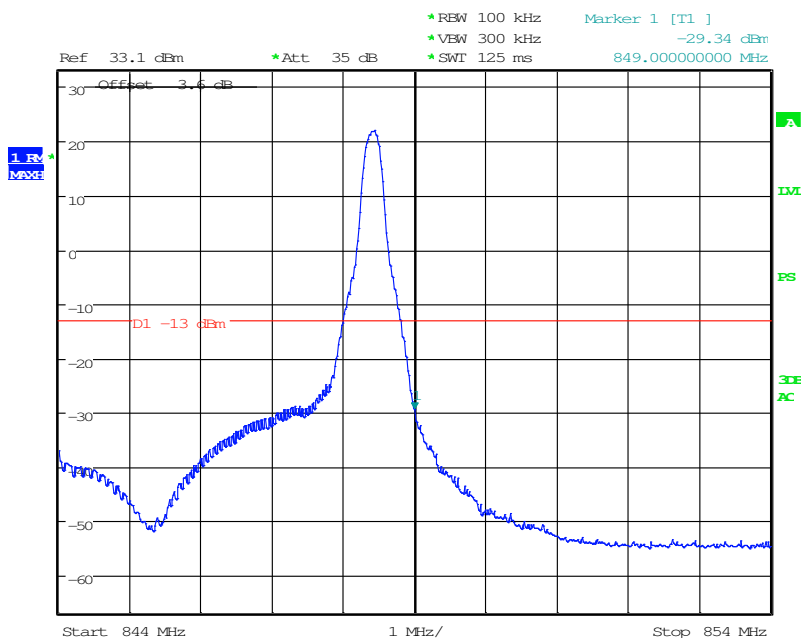
D1 -13 dBm

Start 809 MHz 1 MHz/ Stop 819 MHz

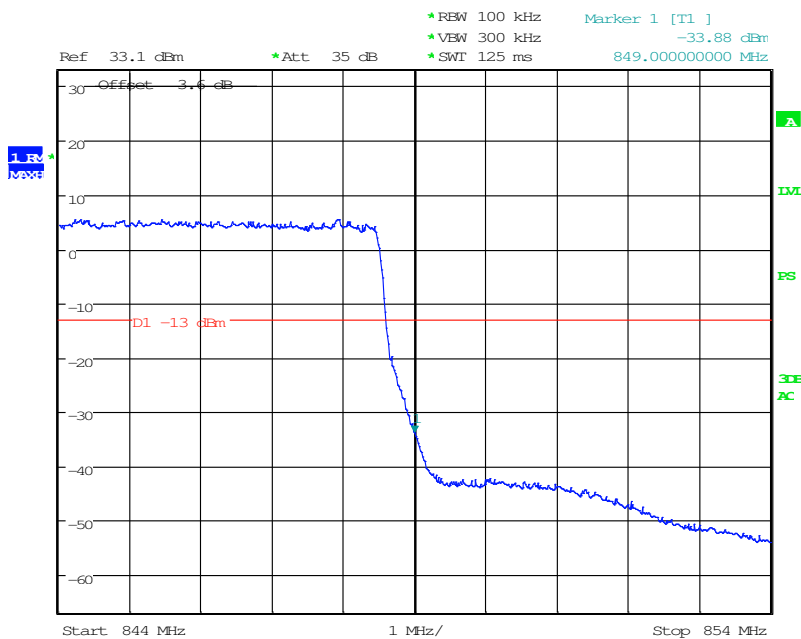
Date: 25.JUN.2015 13:51:20



Date: 9.JUL.2015 16:19:15

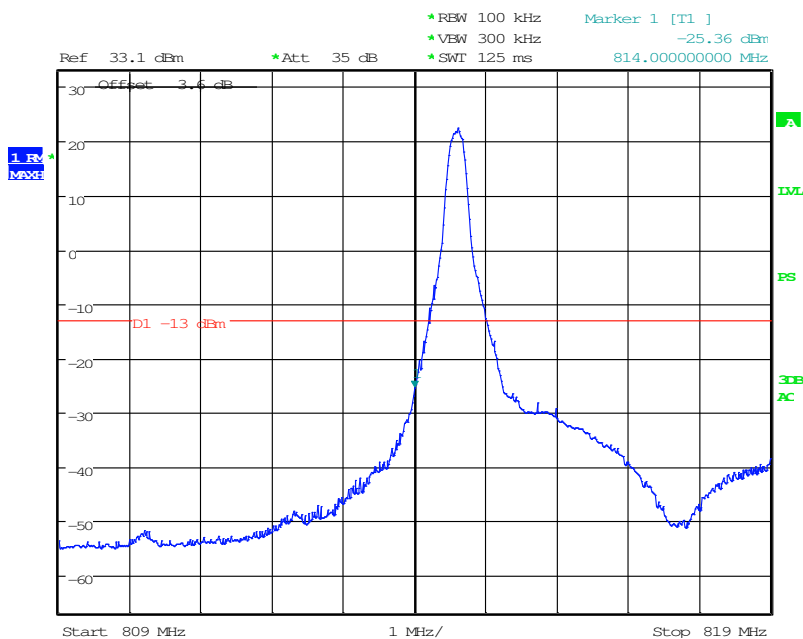
**10MHz bandwidth, QPSK,(1,50) Mode, Above 849MHz**

Date: 25.JUN.2015 13:54:22

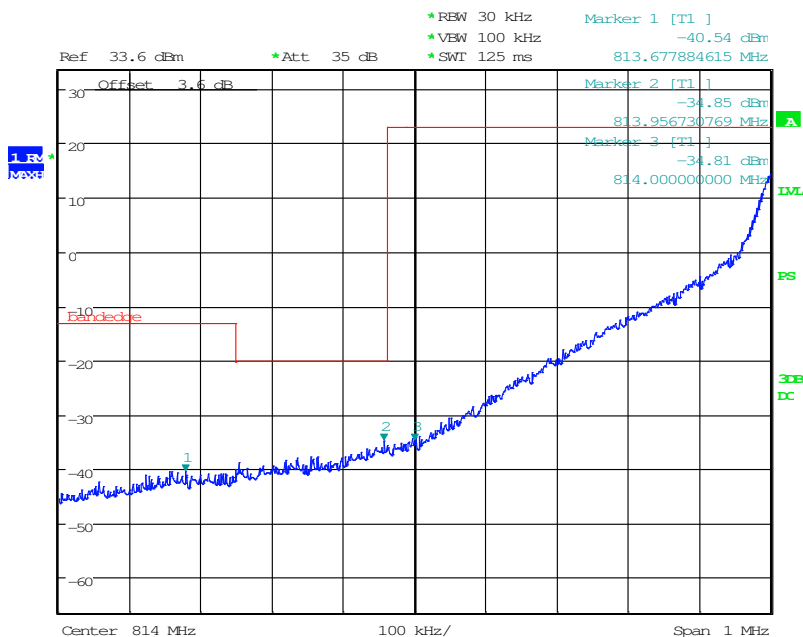
**10MHz bandwidth, QPSK,(50,0) Mode, Above 849MHz**

Date: 25.JUN.2015 13:54:43

## 10MHz bandwidth, 16QAM,(1,0) Mode , below 814MHz

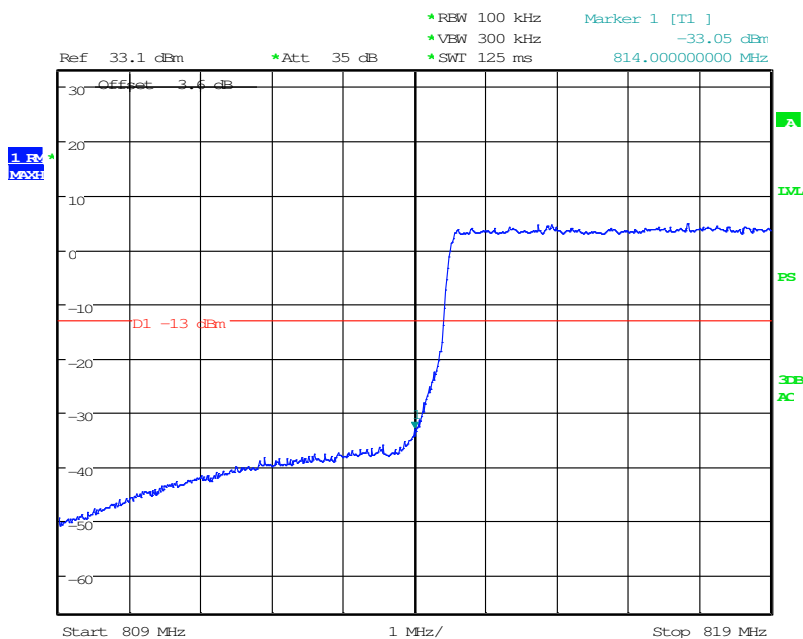


Date: 25.JUN.2015 13:52:33

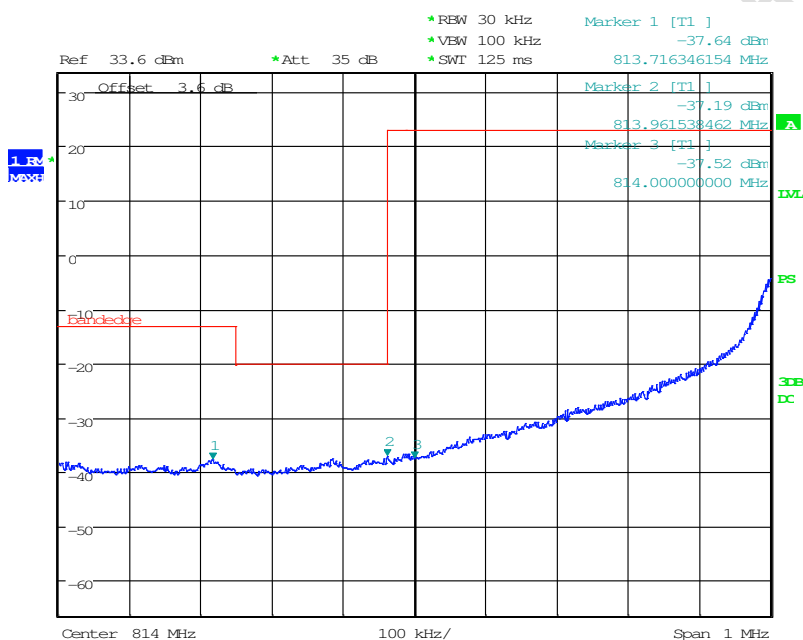


Date: 9.JUL.2015 16:18:04

## 10MHz bandwidth, 16QAM,(50,0) Mode , below 814MHz

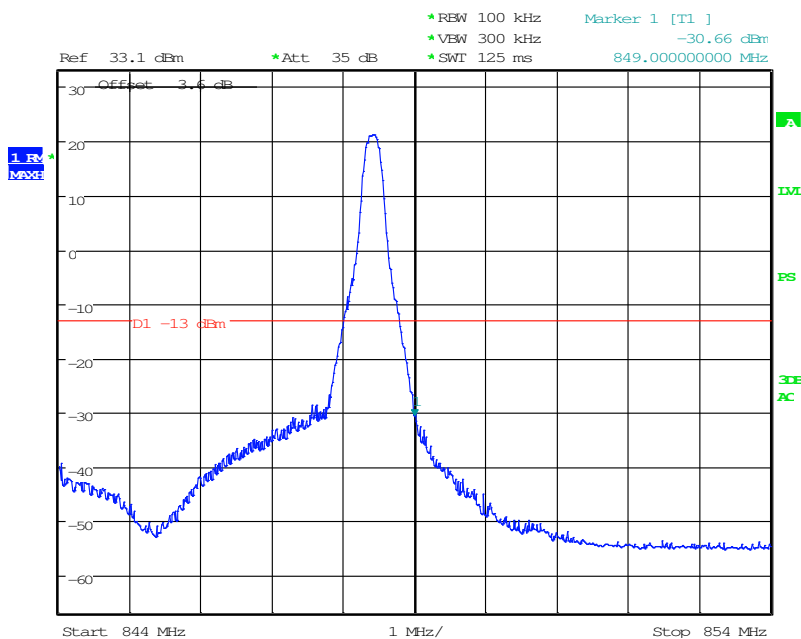


Date: 25.JUN.2015 13:51:52

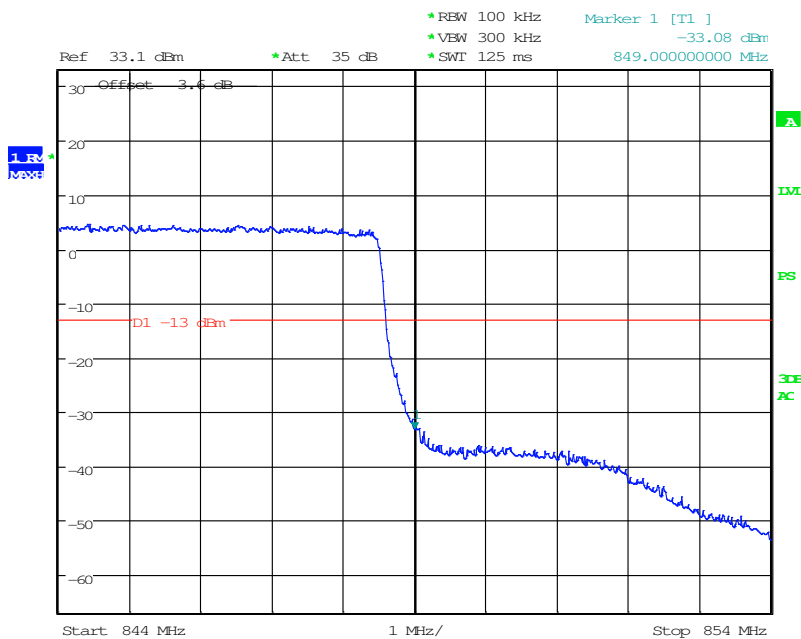


Date: 9.JUL.2015 16:17:27



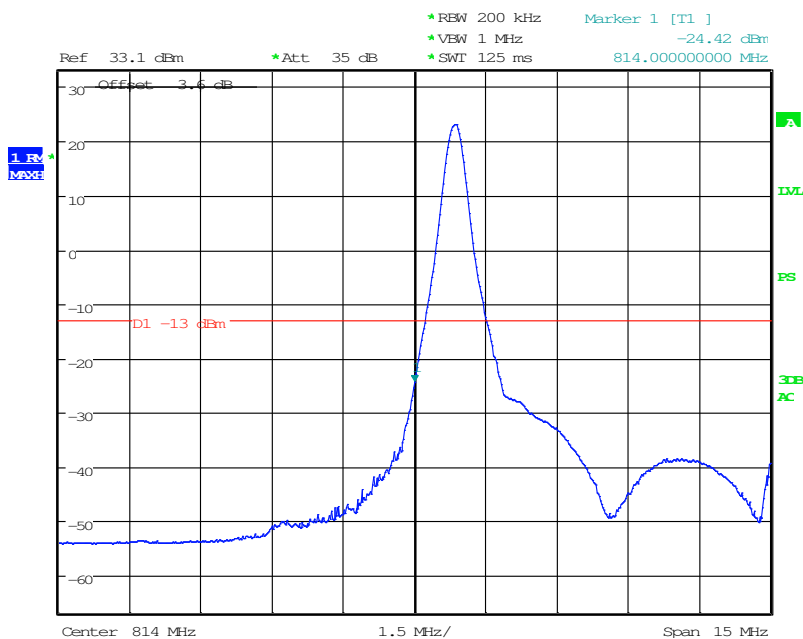
**10MHz bandwidth, 16QAM,(1,50) Mode, Above 849MHz**

Date: 25.JUN.2015 13:55:59

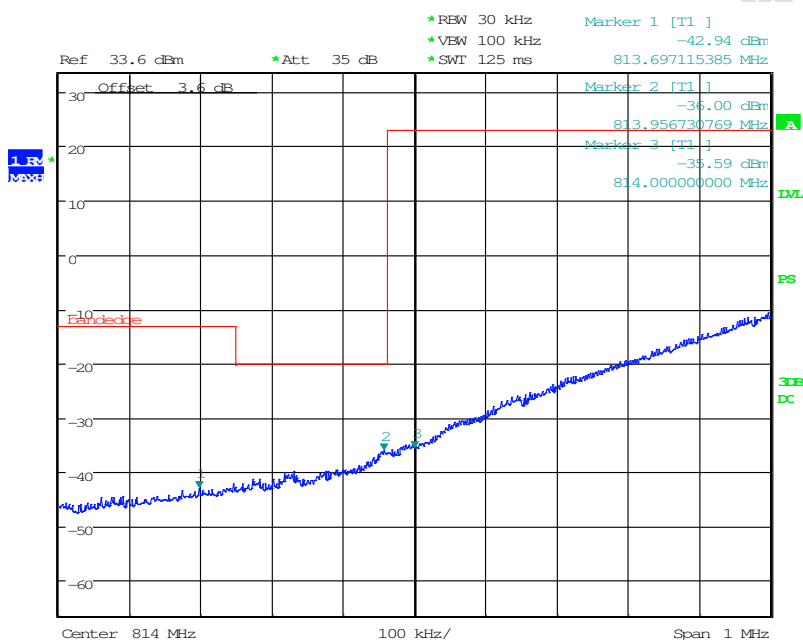
**10MHz bandwidth, 16QAM,(50,0) Mode, Above 849MHz**

Date: 25.JUN.2015 13:55:23

## 15MHz bandwidth,QPSK,(1,0) Mode , below 814MHz

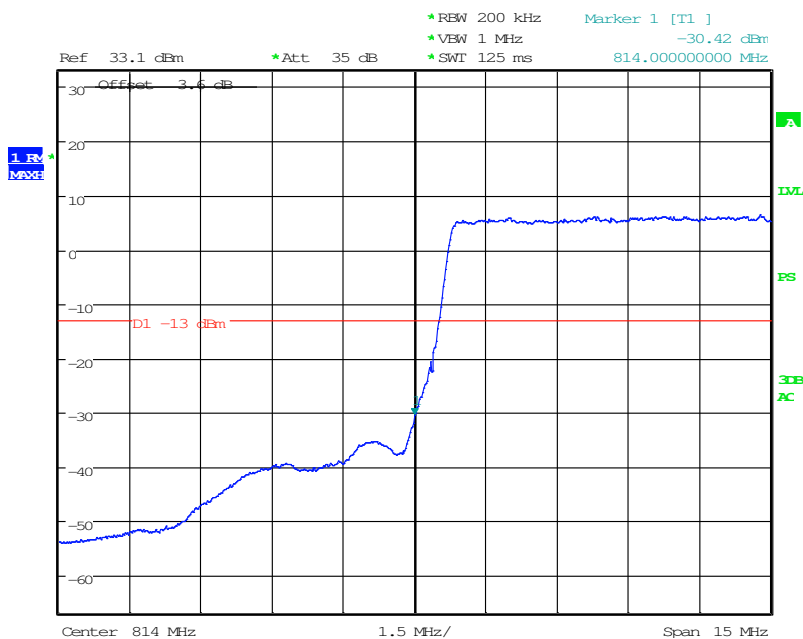


Date: 25.JUN.2015 13:57:47

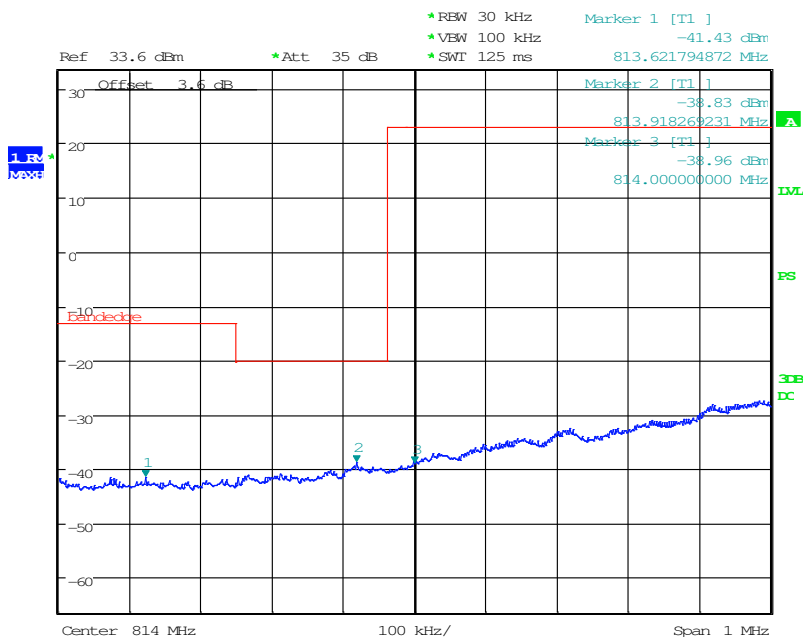


Date: 9.JUL.2015 16:20:40

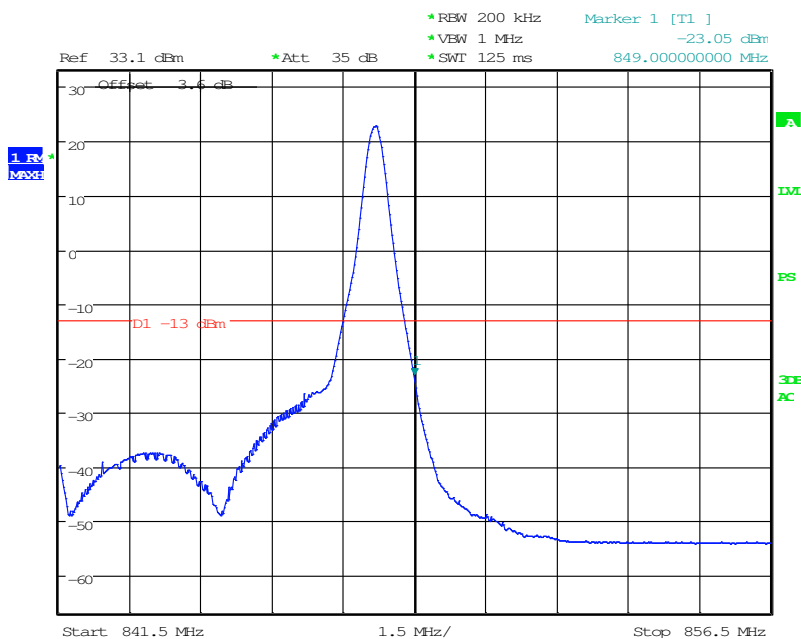
## 15MHz bandwidth,QPSK,(75,0) Mode , below 814MHz



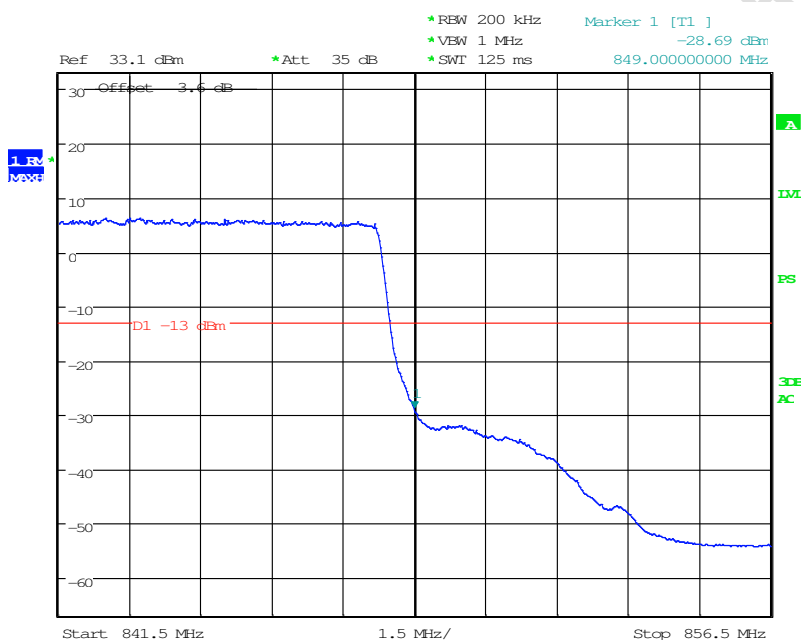
Date: 25.JUN.2015 13:58:12



Date: 9.JUL.2015 16:21:24

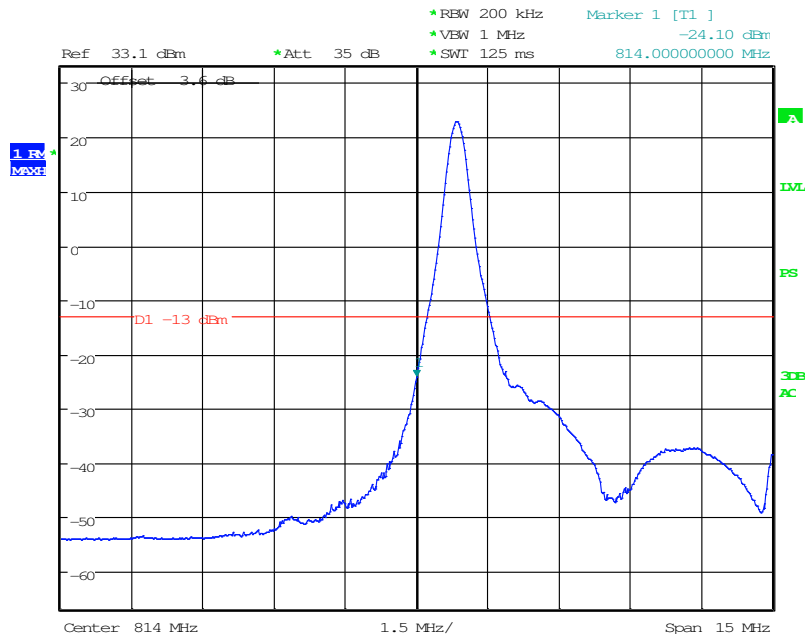
**15MHz bandwidth, QPSK,(1,75) Mode, Above 849MHz**

Date: 25.JUN.2015 14:04:06

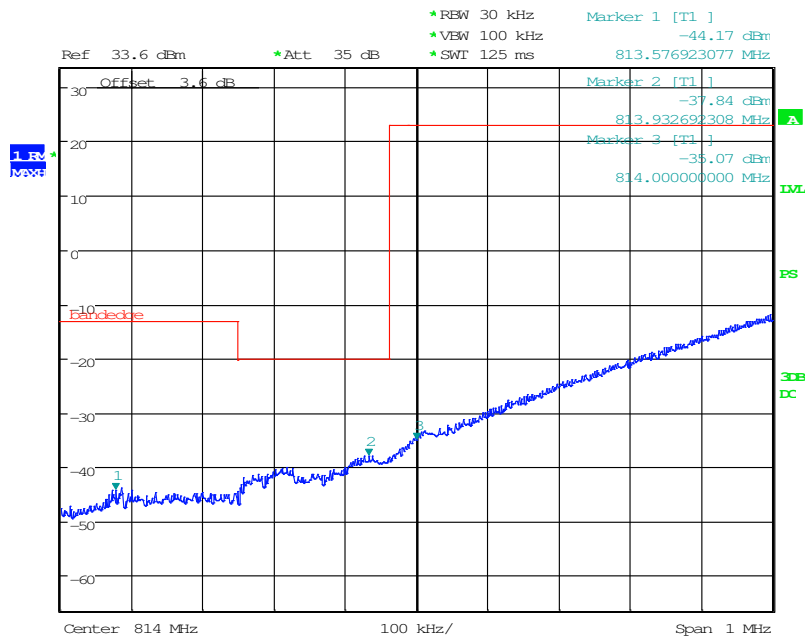
**15MHz bandwidth, QPSK,(75,0) Mode, Above 849MHz**

Date: 25.JUN.2015 14:04:23

## 15MHz bandwidth, 16QAM,(1,0) Mode , below 814MHz

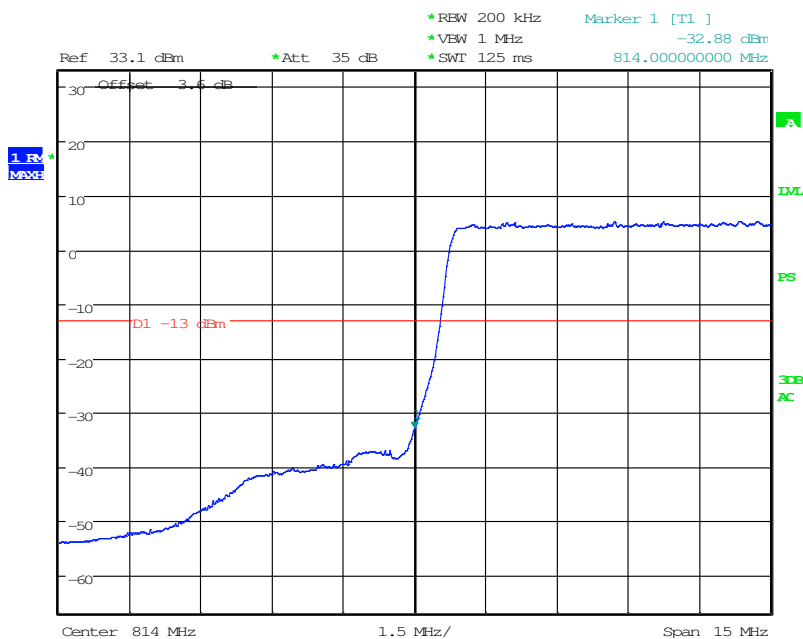


Date: 25.JUN.2015 13:59:15

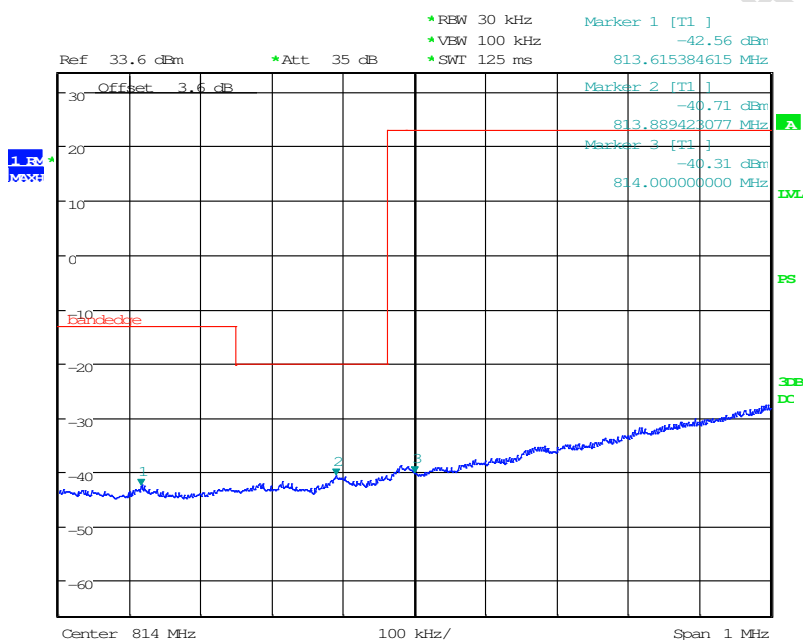


Date: 9.JUL.2015 16:23:07

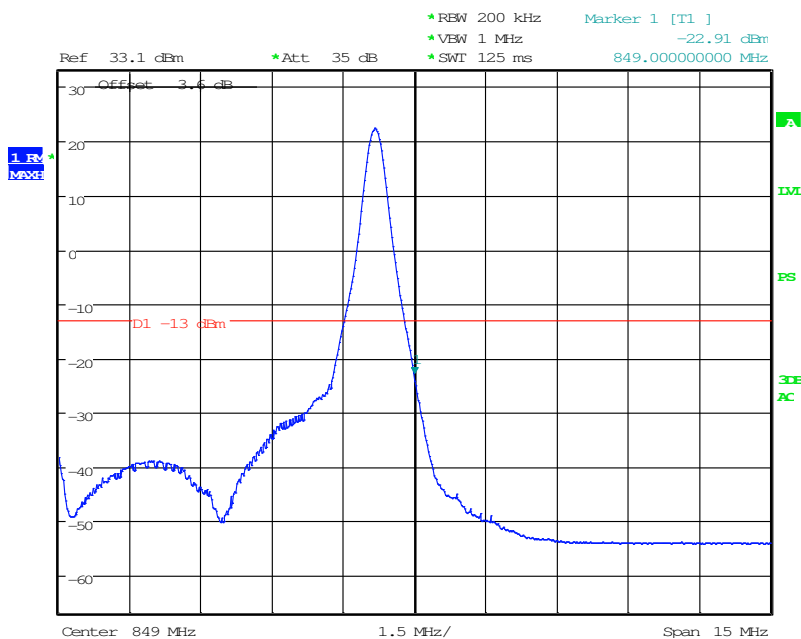
## 15MHz bandwidth, 16QAM,(75,0) Mode , below 814MHz



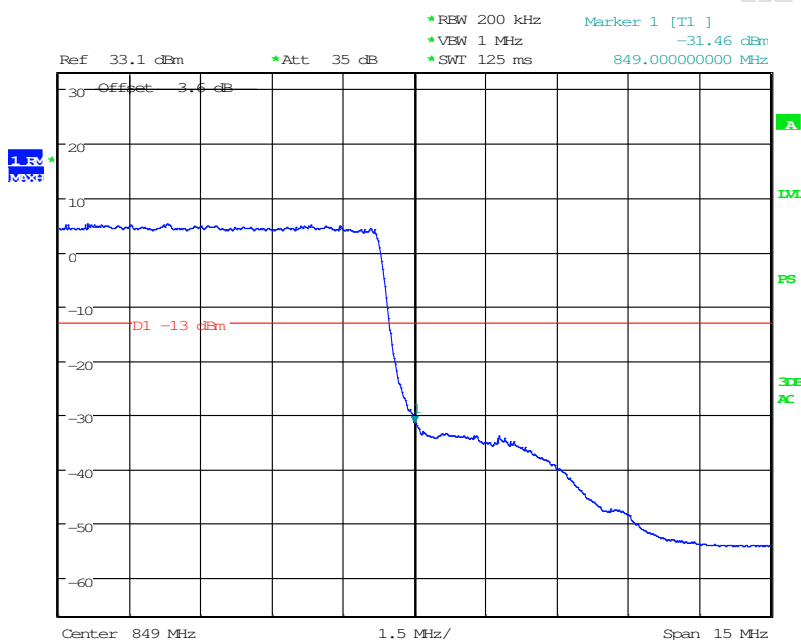
Date: 25.JUN.2015 13:58:32



Date: 9.JUL.2015 16:22:24

**15MHz bandwidth, 16QAM,(1,75) Mode, Above 849MHz**

Date: 25.JUN.2015 14:00:29

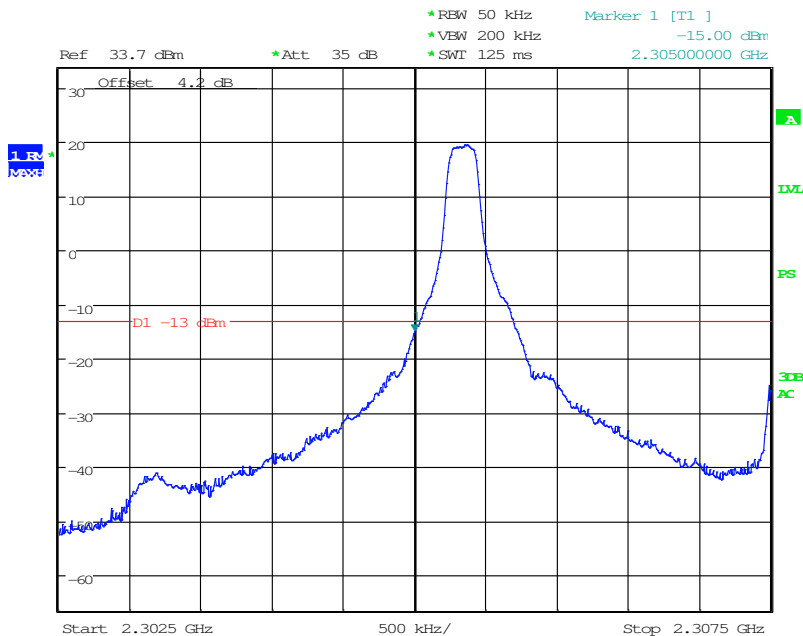
**15MHz bandwidth, 16QAM,(75,0) Mode, Above 849MHz**

Date: 25.JUN.2015 14:00:49

#### 4.5.7 LTE B30 Band Edge Results

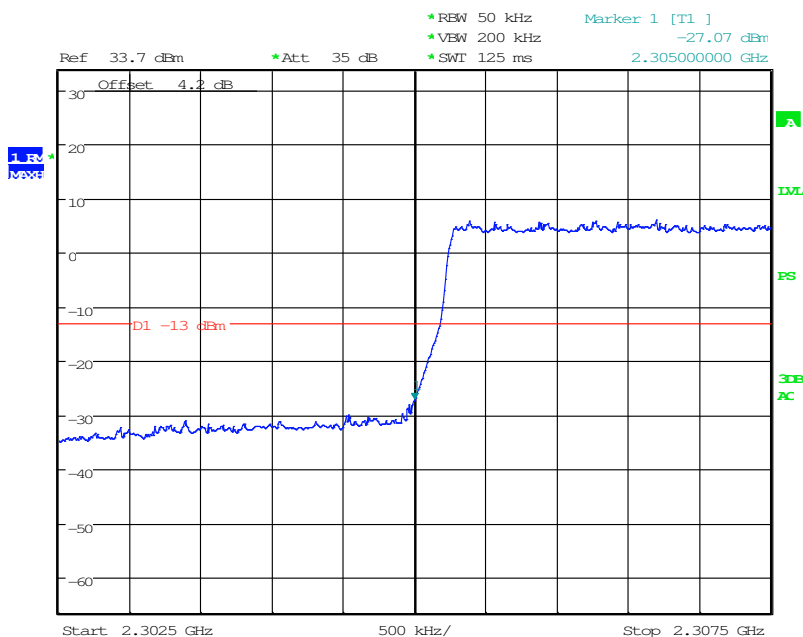
##### Graphical results:

5MHz bandwidth, QPSK,(1,0) Mode , below 2305MHz



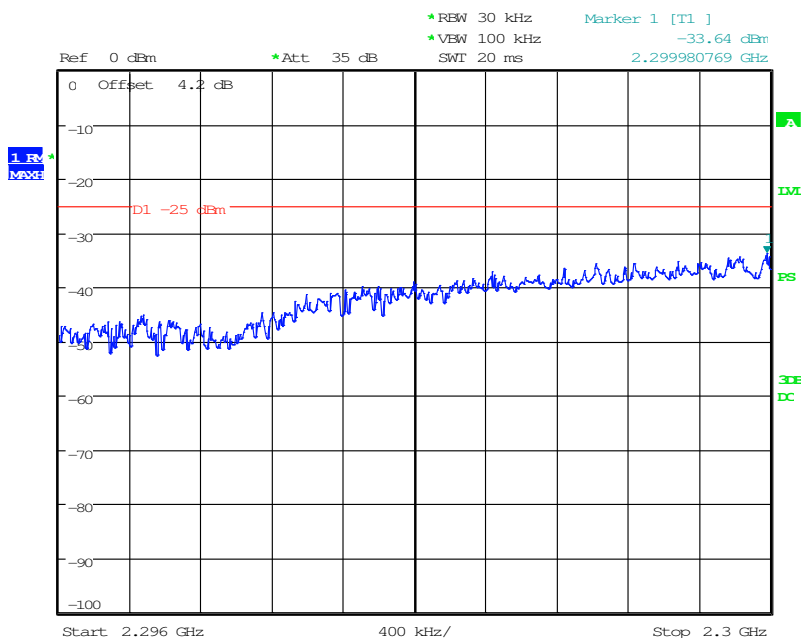
Date: 25.JUN.2015 14:08:58

5MHz bandwidth, QPSK,(25,0) Mode , below 2305MHz

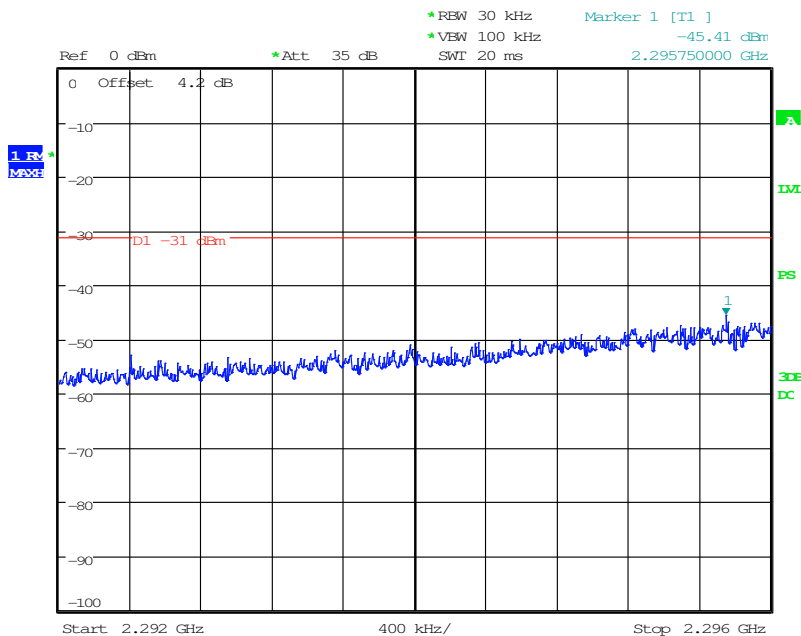


Date: 25.JUN.2015 14:09:26

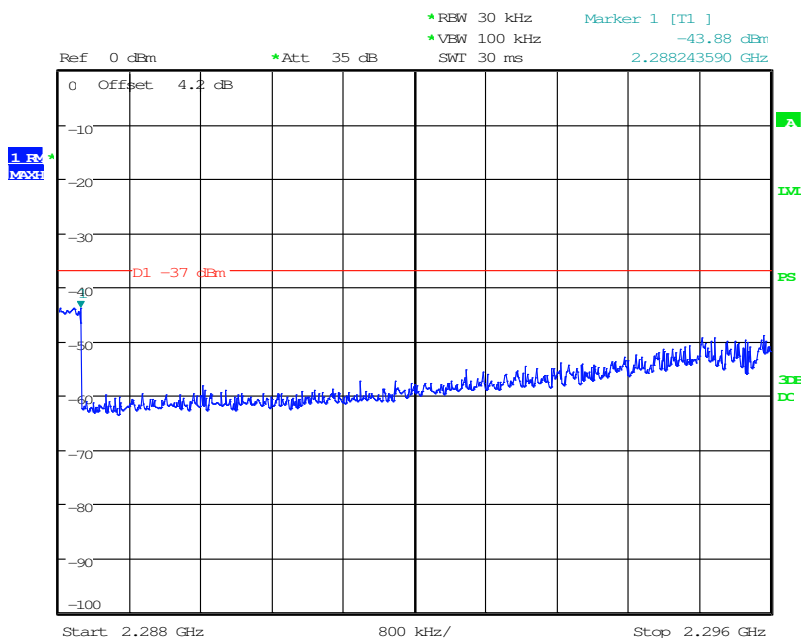


**5 MHz bandwidth, QPSK, 2296MHz-2300MHz, below 2305MHz**

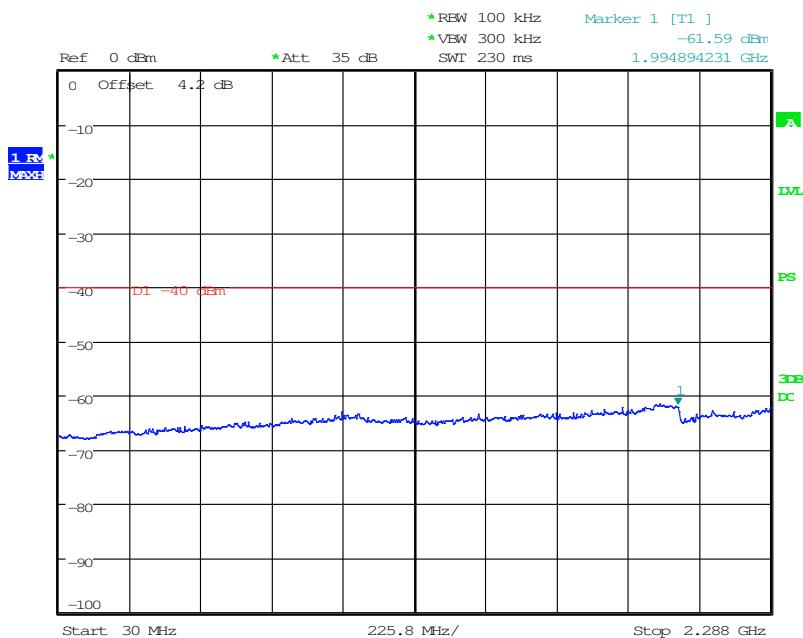
Date: 1.JUL.2015 15:35:47

**5 MHz bandwidth, QPSK, 2292MHz-2296MHz, below 2305MHz**

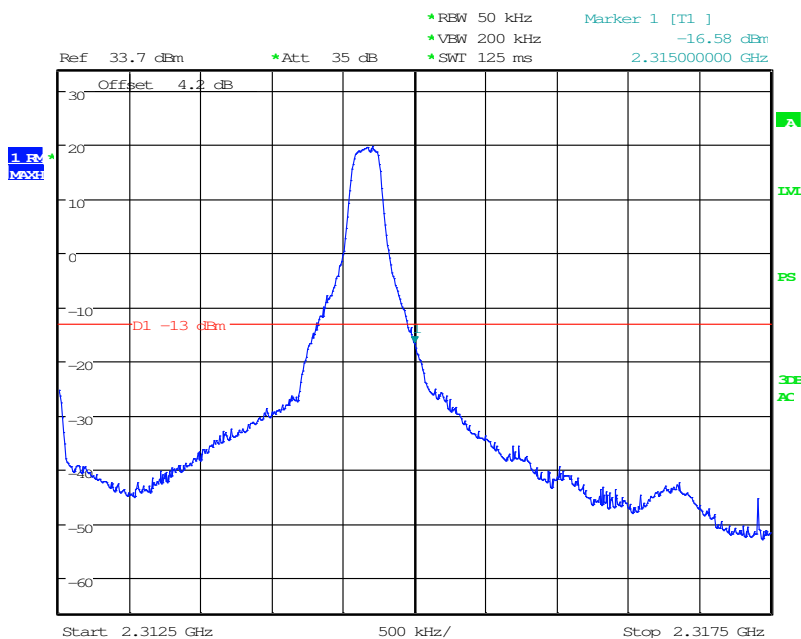
Date: 1.JUL.2015 15:39:07

**5 MHz bandwidth, QPSK, 2288MHz-2292MHz, below 2305MHz**

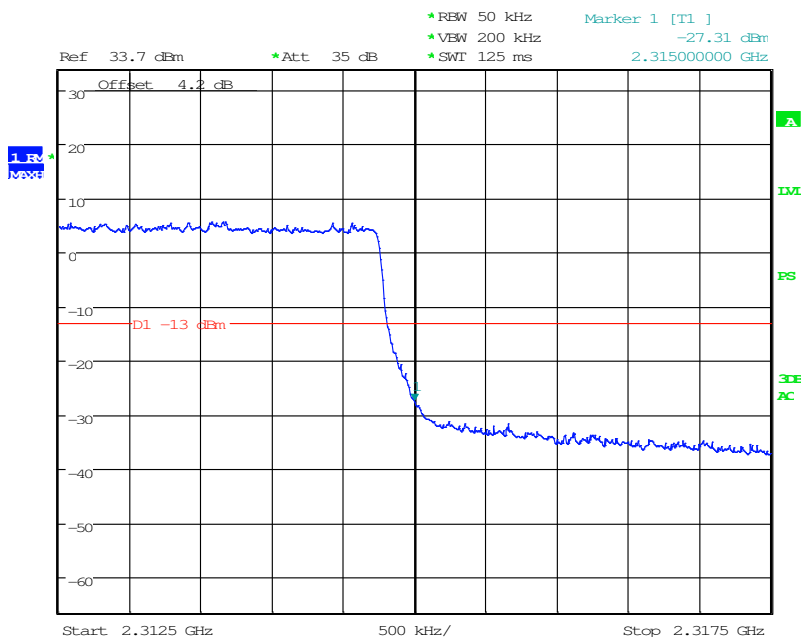
Date: 1.JUL.2015 15:41:03

**5 MHz bandwidth, QPSK, 30MHz-2288MHz, below 2305MHz**

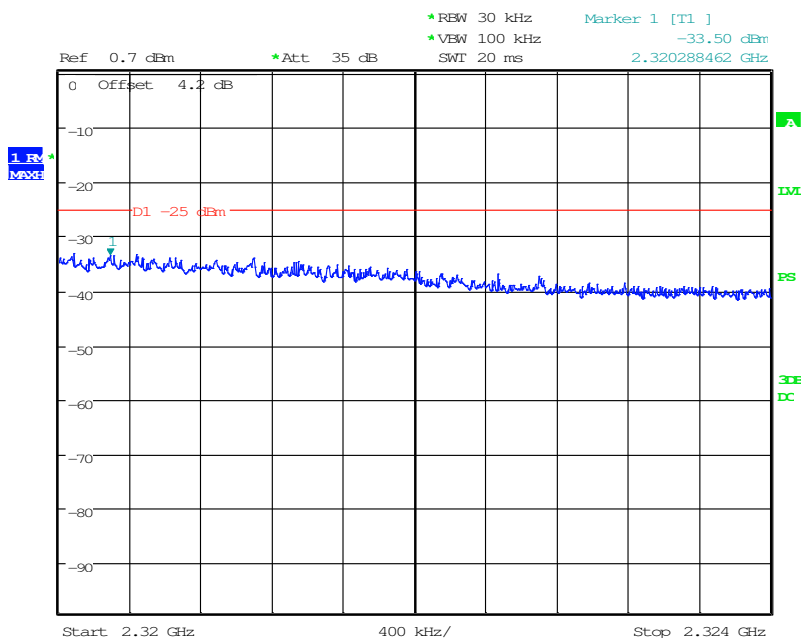
Date: 1.JUL.2015 15:46:54

**5 MHz bandwidth, QPSK,(1,25) Mode, Above 2315MHz**

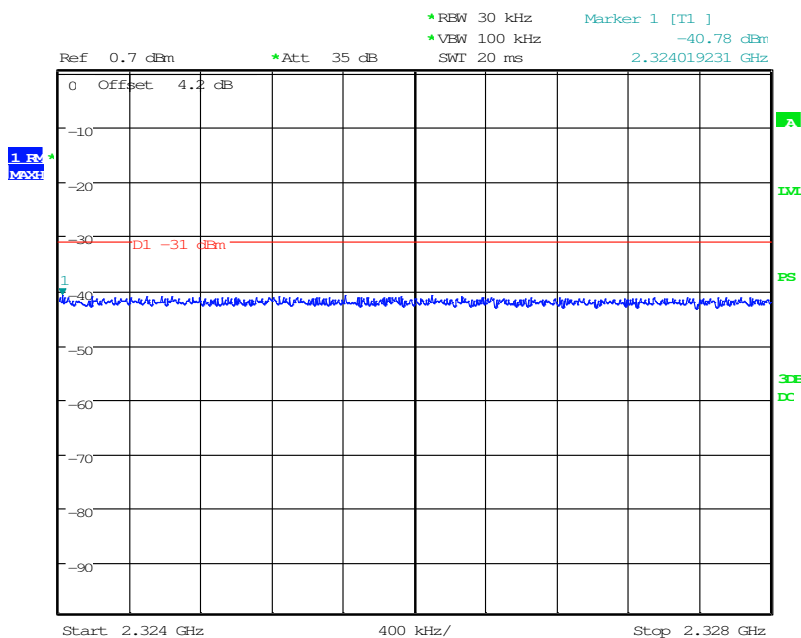
Date: 25.JUN.2015 14:11:32

**5 MHz bandwidth, QPSK,(25,0) Mode, Above 2315MHz**

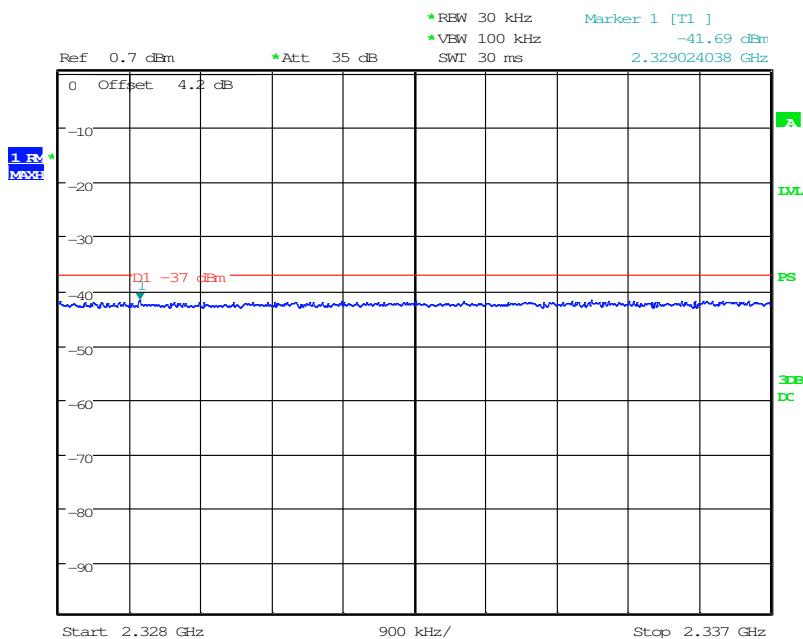
Date: 25.JUN.2015 14:12:02

**5 MHz bandwidth, QPSK, 2320MHz-2324MHz, Above 2315MHz**

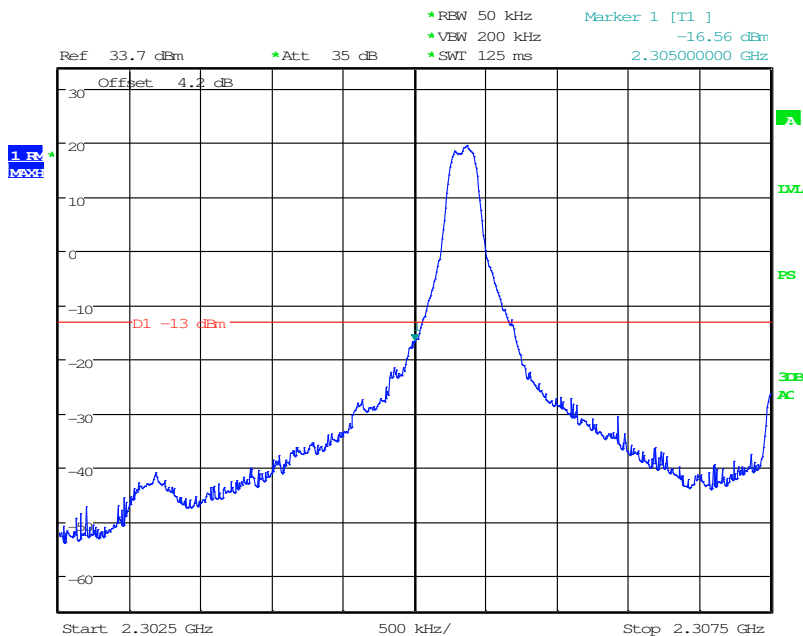
Date: 1.JUL.2015 15:18:07

**5 MHz bandwidth, QPSK, 2324MHz-2328MHz, Above 2315MHz**

Date: 1.JUL.2015 15:24:05

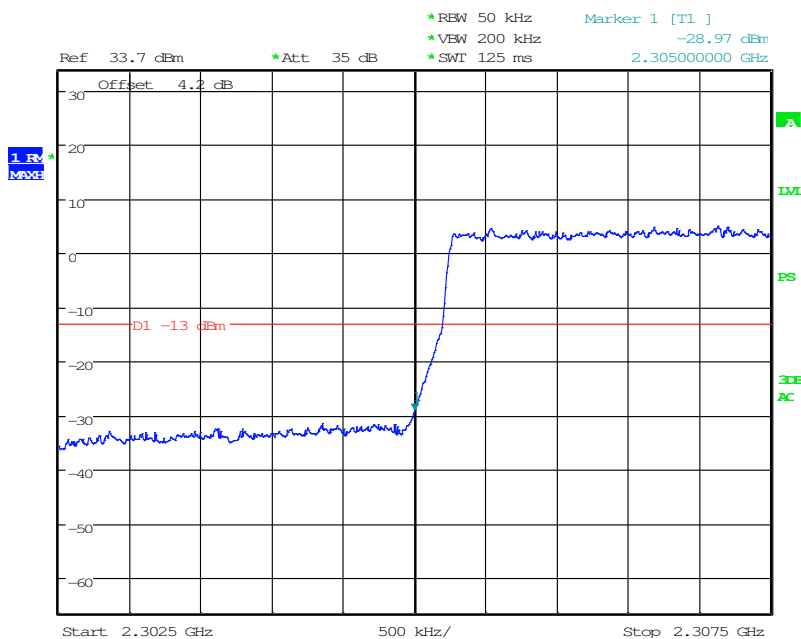
**5 MHz bandwidth, QPSK, 2328MHz-2337MHz, Above 2315MHz**

Date: 1.JUL.2015 15:25:45

**5 MHz bandwidth, 16QAM,(1,0) Mode , below 2305MHz**

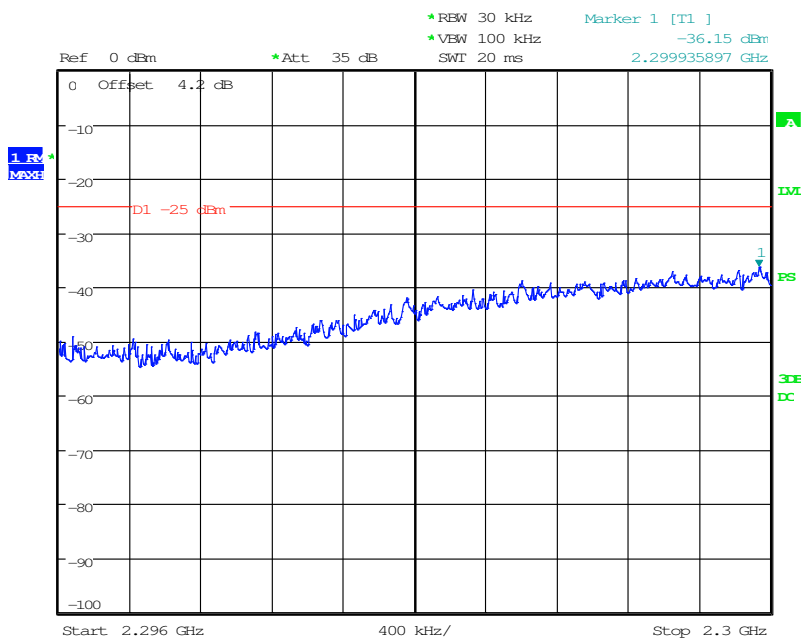
Date: 25.JUN.2015 14:10:22

## 5 MHz bandwidth, 16QAM,(25,0) Mode , below 2305MHz

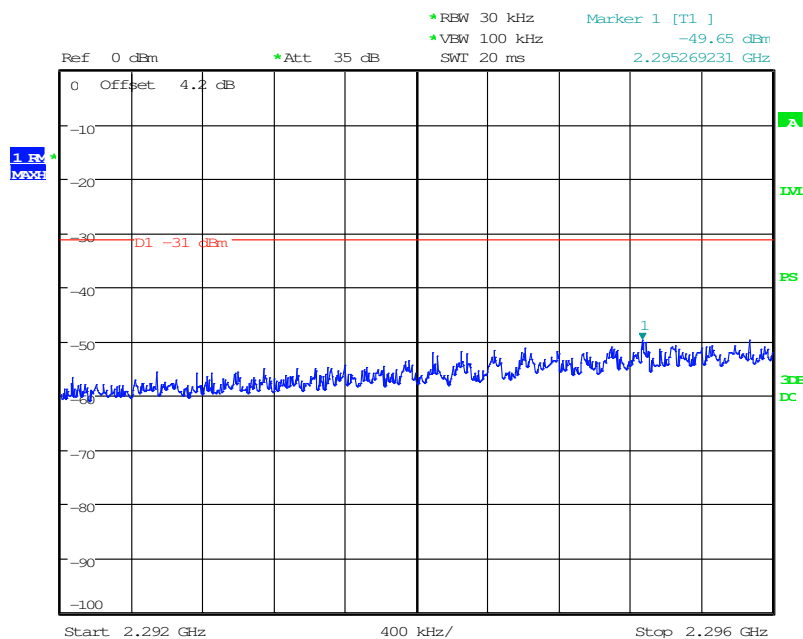


Date: 25.JUN.2015 14:09:47

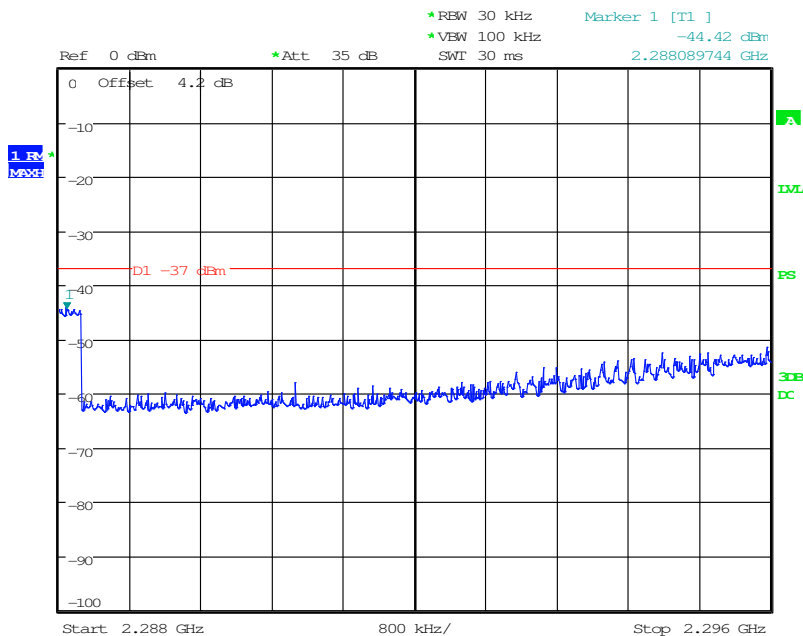
## 5 MHz bandwidth, 16QAM, 2296MHz-2300MHz, below 2305MHz



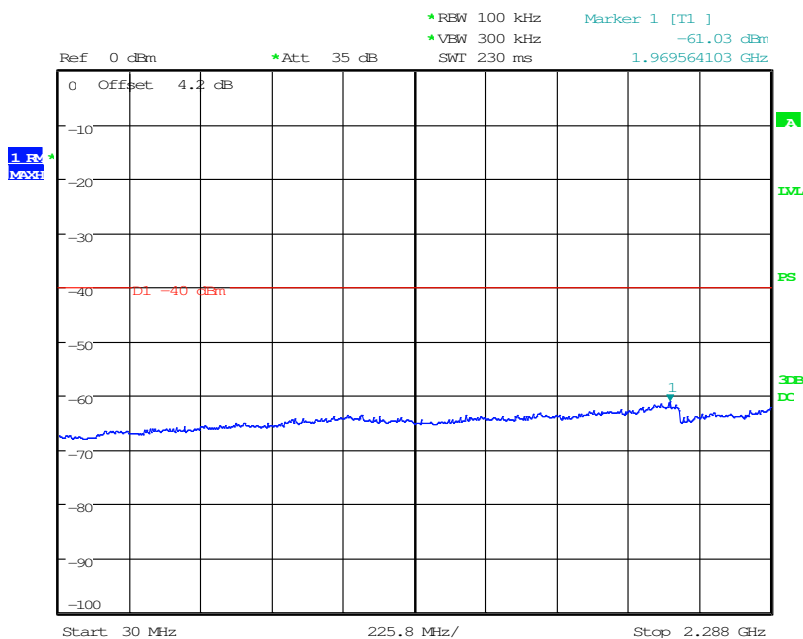
Date: 1.JUL.2015 15:35:22

**5 MHz bandwidth, 16QAM, 2292MHz-2296MHz, below 2305MHz**

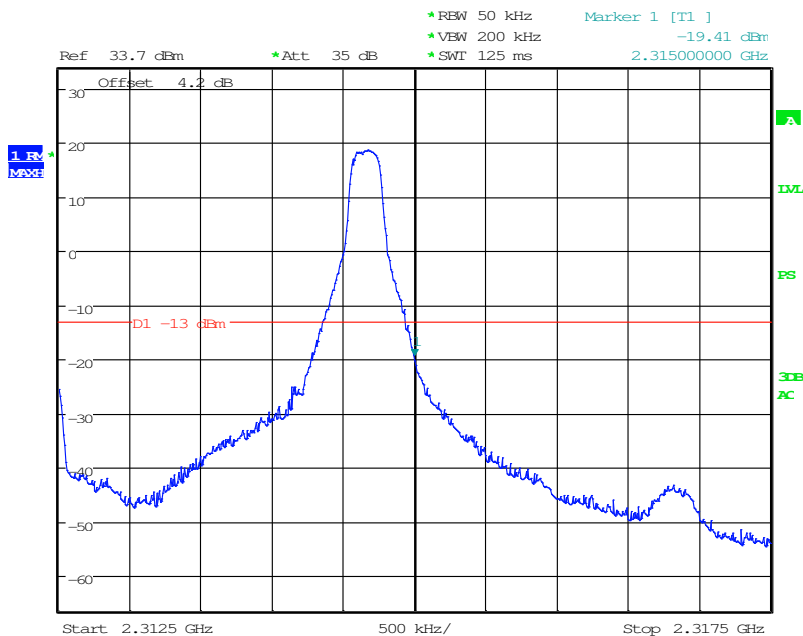
Date: 1.JUL.2015 15:39:31

**5 MHz bandwidth, 16QAM, 2288MHz-2292MHz, below 2305MHz**

Date: 1.JUL.2015 15:40:40

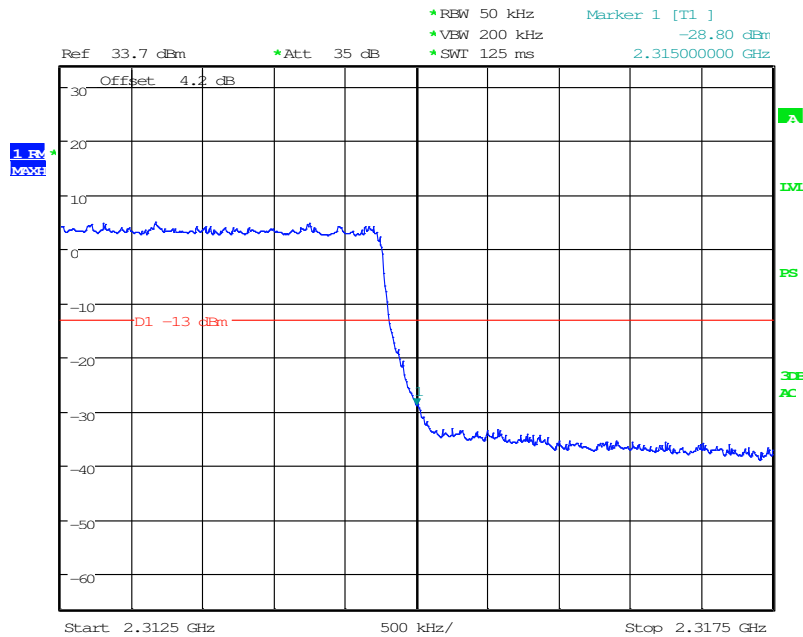
**5 MHz bandwidth, 16QAM, 30MHz-2288MHz, below 2305MHz**

Date: 1.JUL.2015 15:47:21

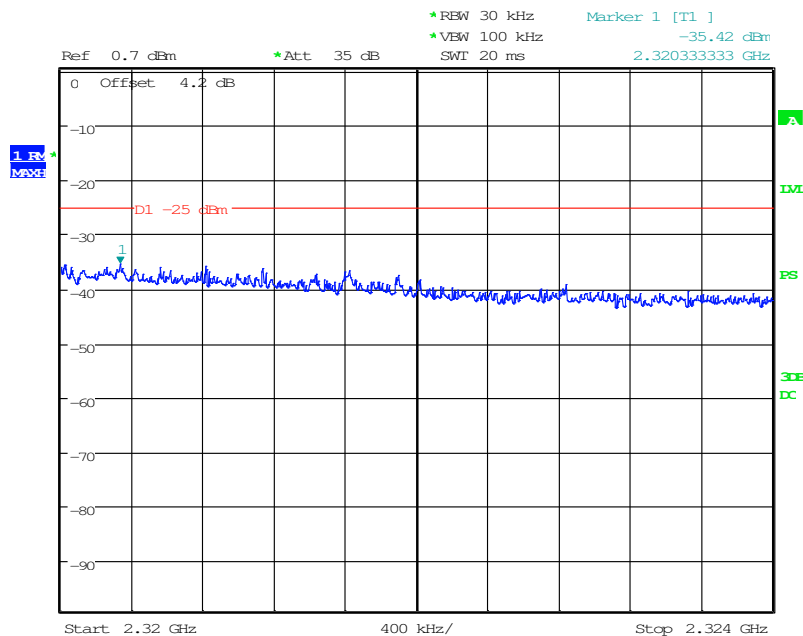
**5 MHz bandwidth, 16QAM,(1,25) Mode, Above 2315MHz**

Date: 25.JUN.2015 14:12:57

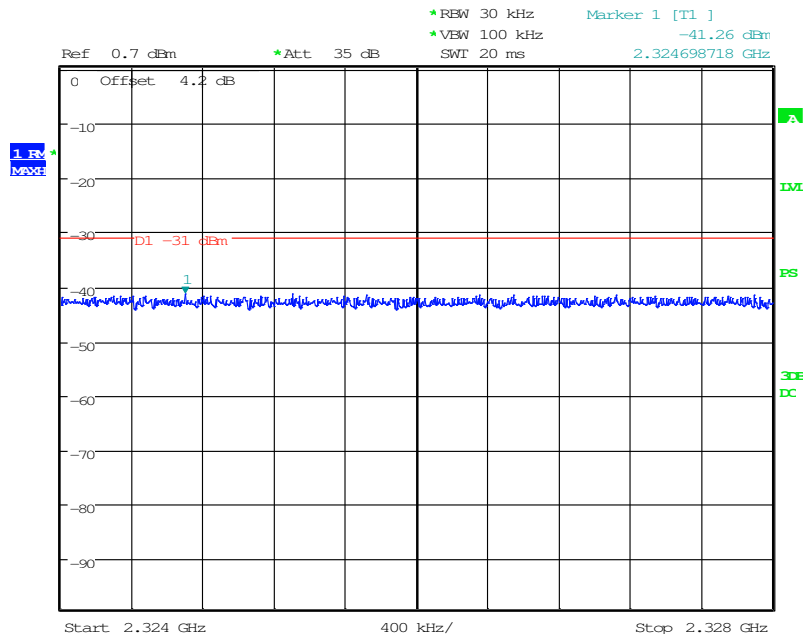


**5 MHz bandwidth, 16QAM,(25,0) Mode, Above 2315MHz**

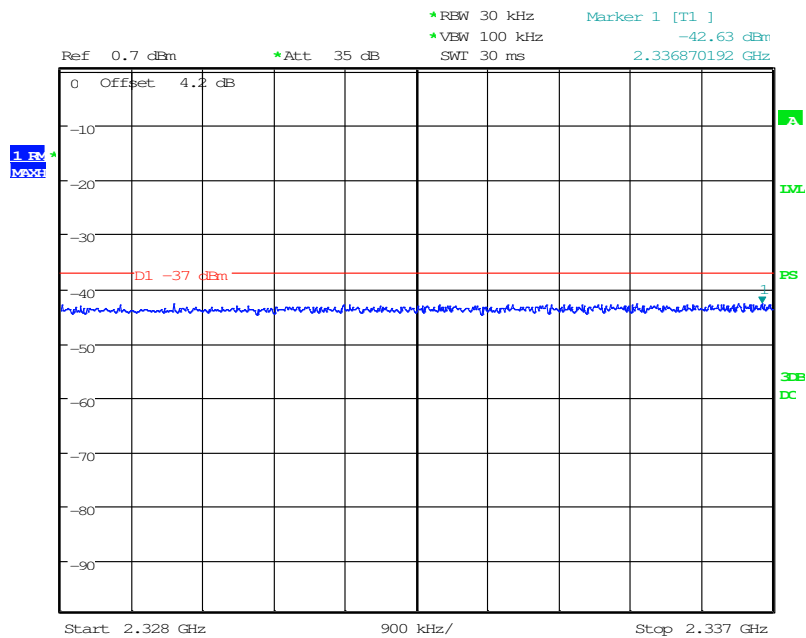
Date: 25.JUN.2015 14:12:28

**5 MHz bandwidth, 16QAM, 2320MHz-2324MHz, Above 2315MHz**

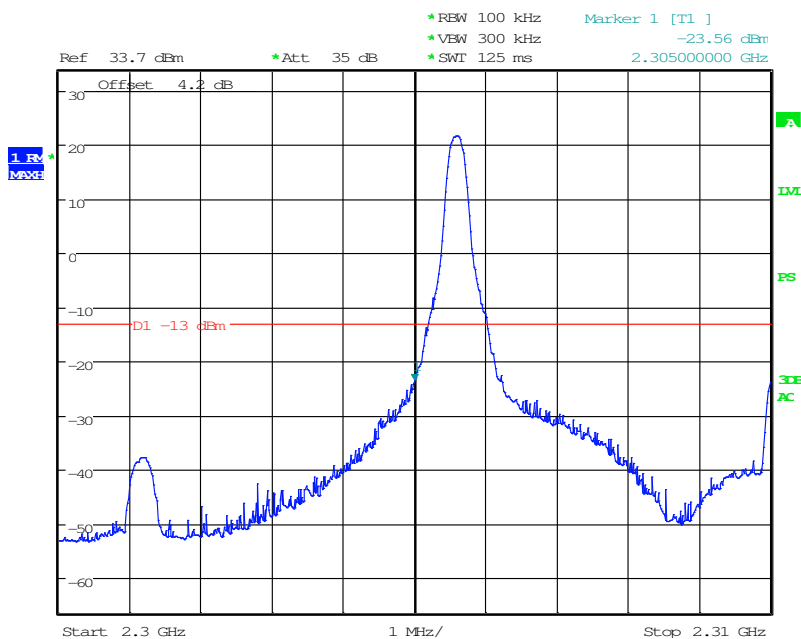
Date: 1.JUL.2015 15:18:33

**5 MHz bandwidth, 16QAM, 2324MHz-2328MHz, Above 2315MHz**

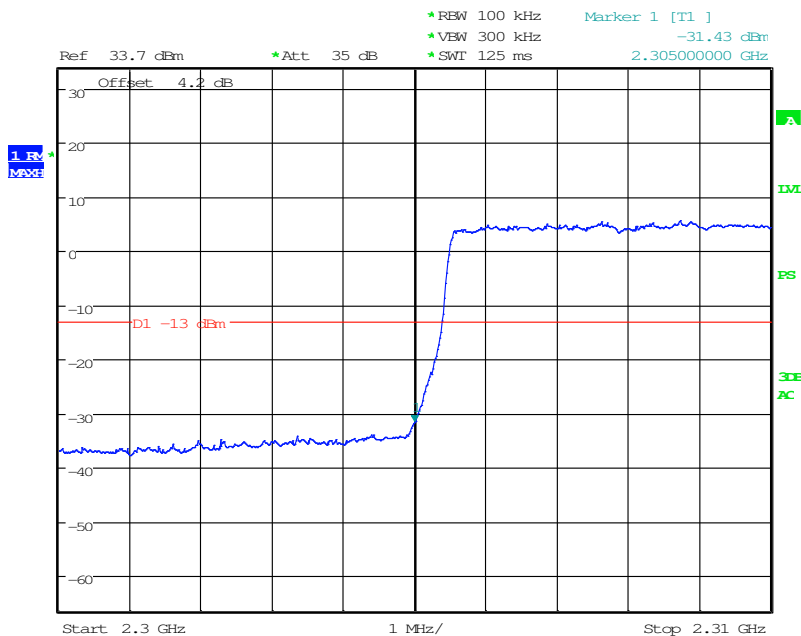
Date: 1.JUL.2015 15:23:36

**5 MHz bandwidth, 16QAM, 2328MHz-2337MHz, Above 2315MHz**

Date: 1.JUL.2015 15:26:14

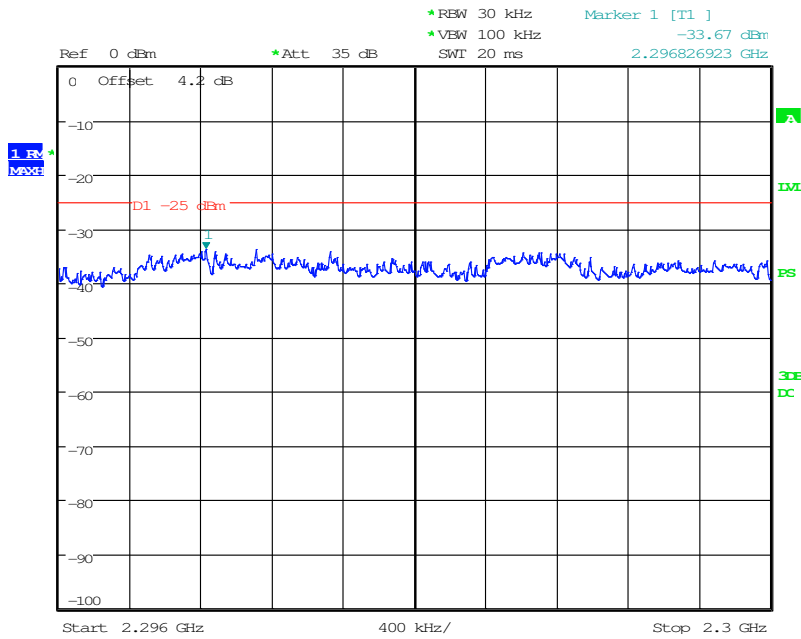
**10MHz bandwidth, QPSK,(1,0) Mode , below 2305MHz**

Date: 25.JUN.2015 14:21:34

**10MHz bandwidth, QPSK,(50,0) Mode , below 2305MHz**

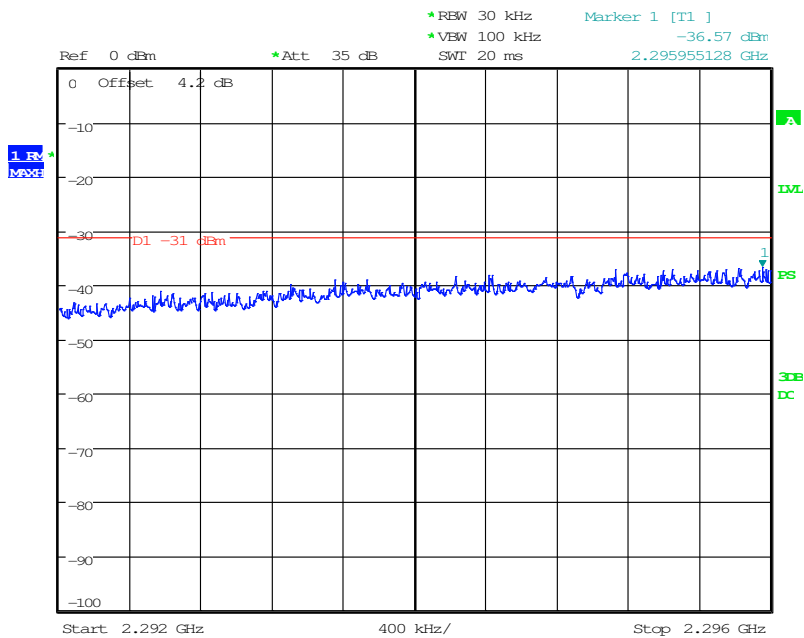
Date: 25.JUN.2015 14:20:46

**10MHz bandwidth, QPSK, 2296MHz-2300MHz, below 2305MHz**

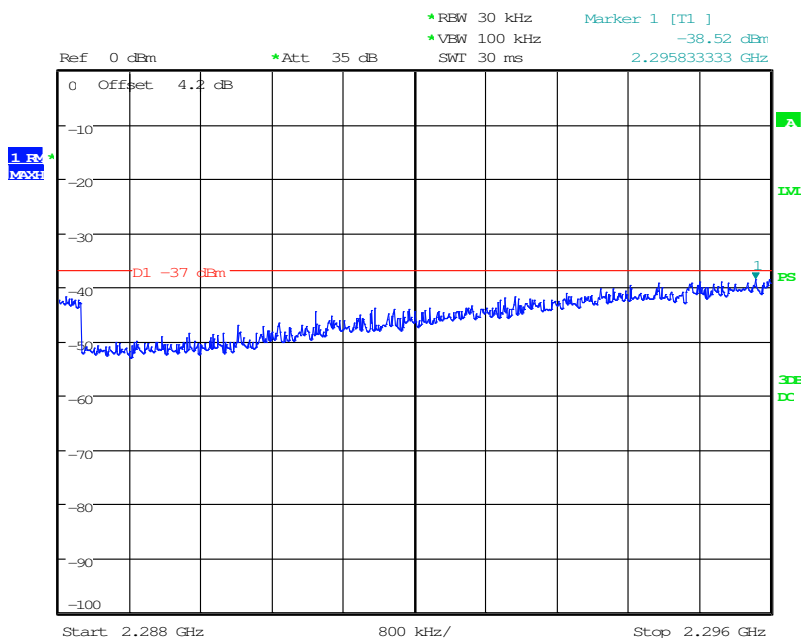


Date: 1.JUL.2015 15:36:53

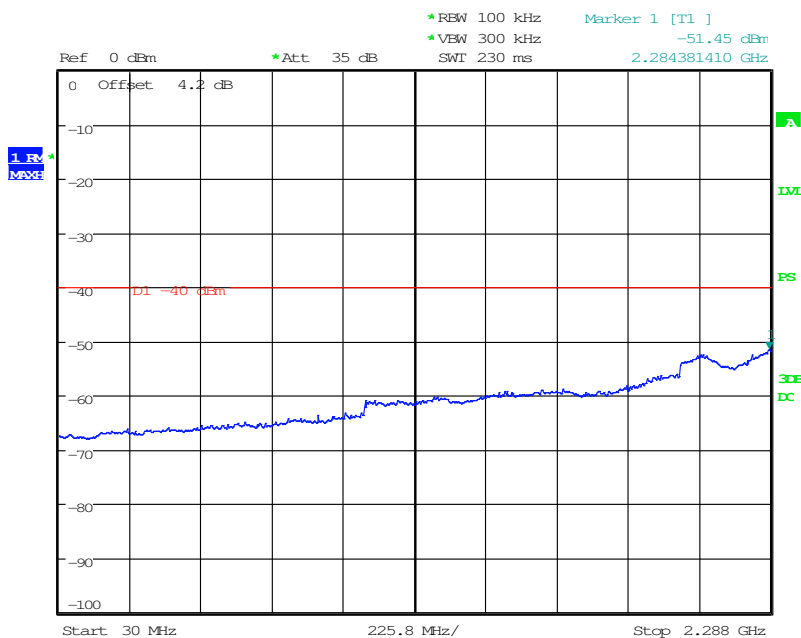
**10MHz bandwidth, QPSK, 2292MHz-2296MHz, below 2305MHz**



Date: 1.JUL.2015 15:37:37

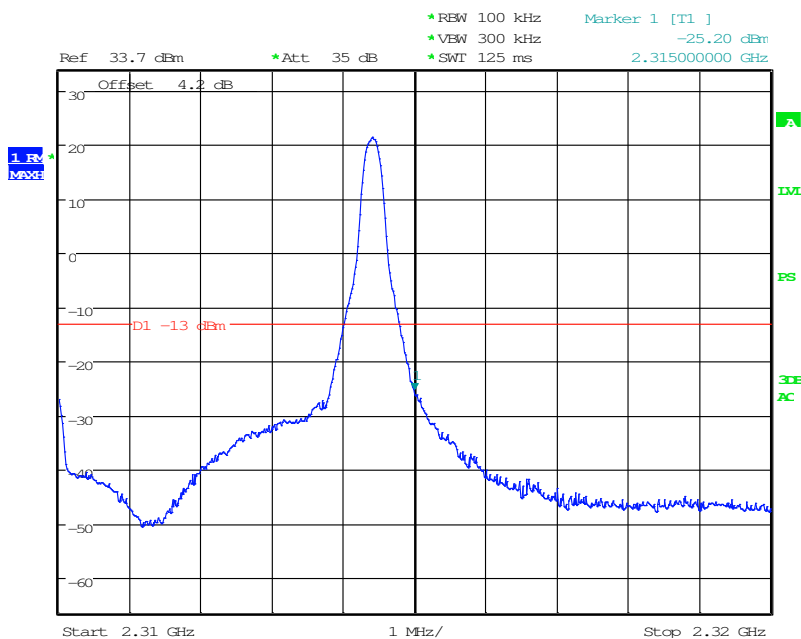
**10MHz bandwidth, QPSK, 2288MHz-2292MHz, below 2305MHz**

Date: 1.JUL.2015 15:43:10

**10MHz bandwidth, QPSK, 30MHz-2288MHz, below 2305MHz**

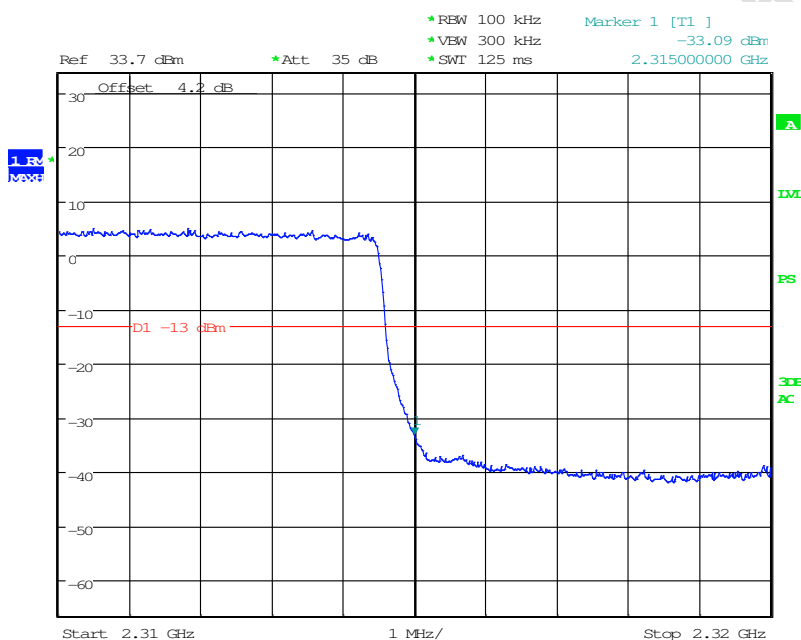
Date: 1.JUL.2015 15:44:37

## 10MHz bandwidth, QPSK,(1,50) Mode, Above 2315MHz

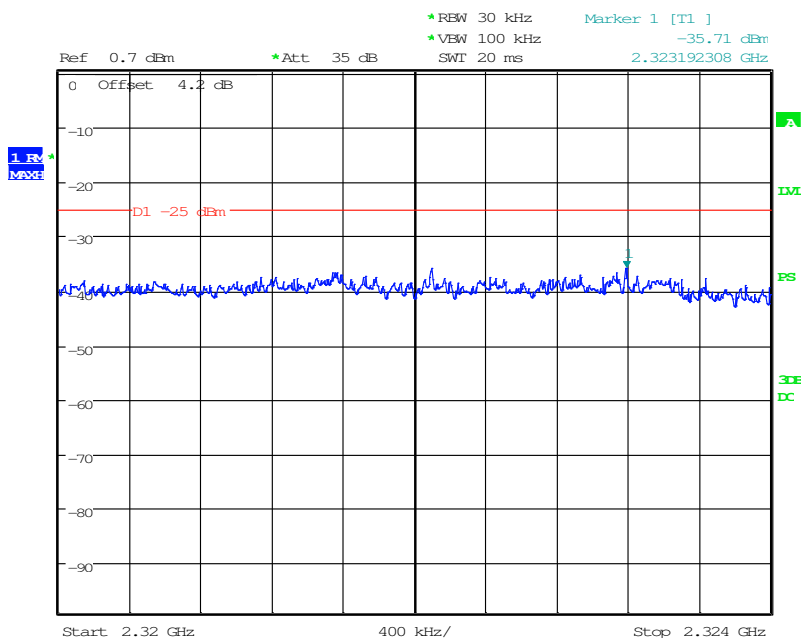


Date: 25.JUN.2015 14:19:23

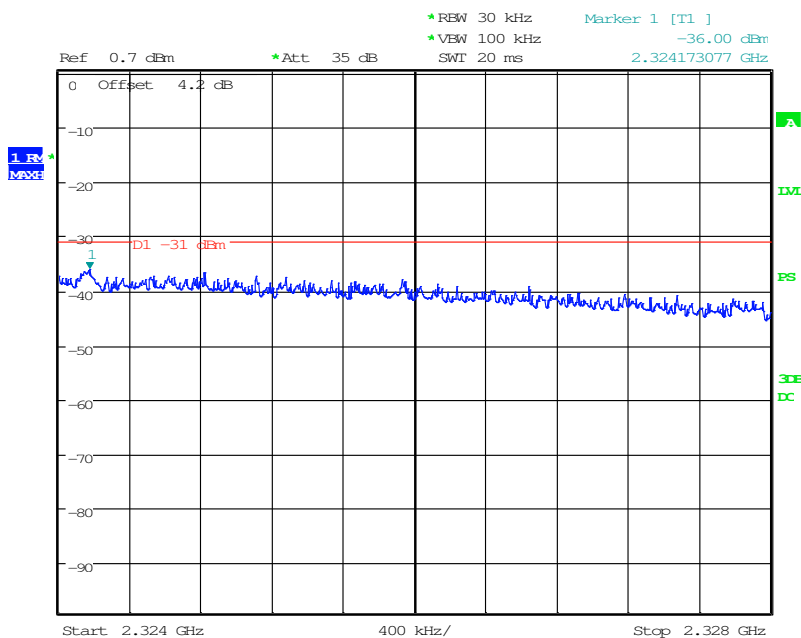
## 10MHz bandwidth, QPSK,(50,0) Mode, Above 2315MHz



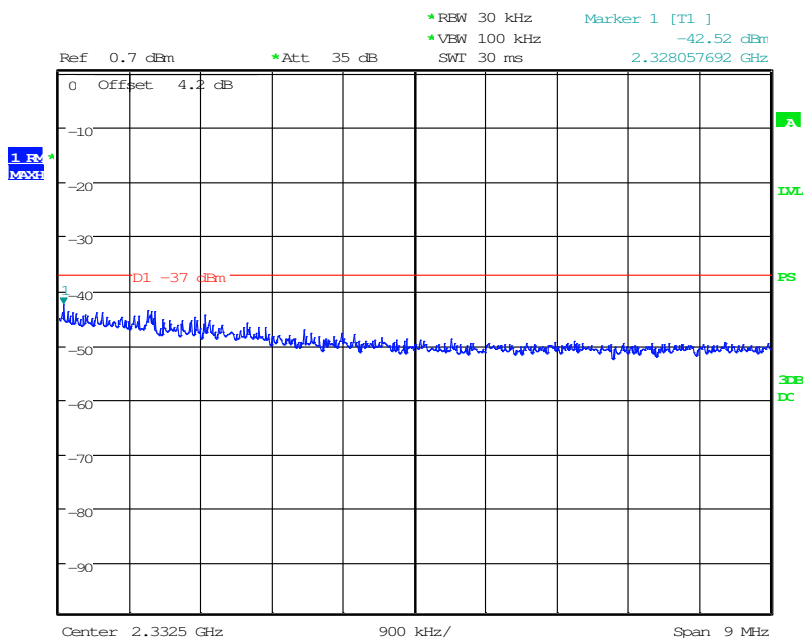
Date: 25.JUN.2015 14:19:40

**10MHz bandwidth, QPSK, 2320MHz-2324MHz, Above 2315MHz**

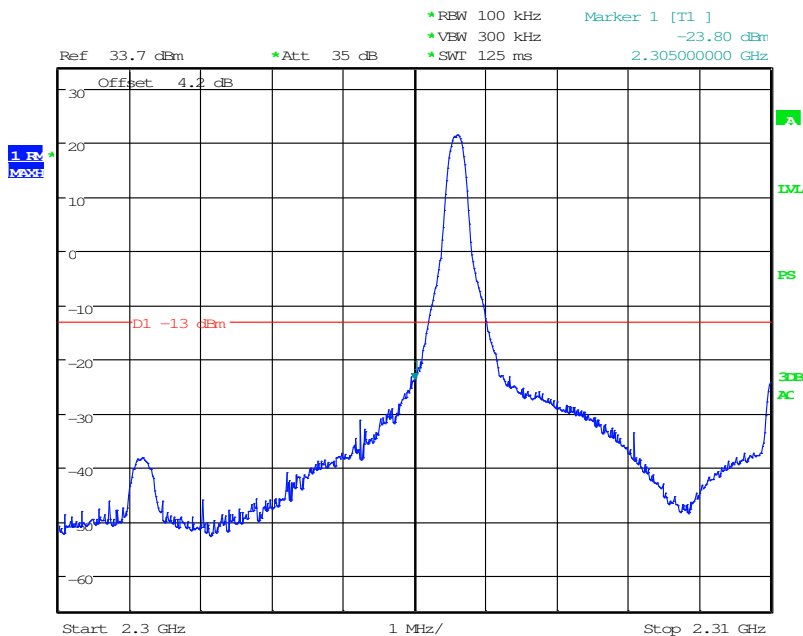
Date: 1.JUL.2015 15:20:18

**10MHz bandwidth, QPSK, 2324MHz-2328MHz, Above 2315MHz**

Date: 1.JUL.2015 15:22:10

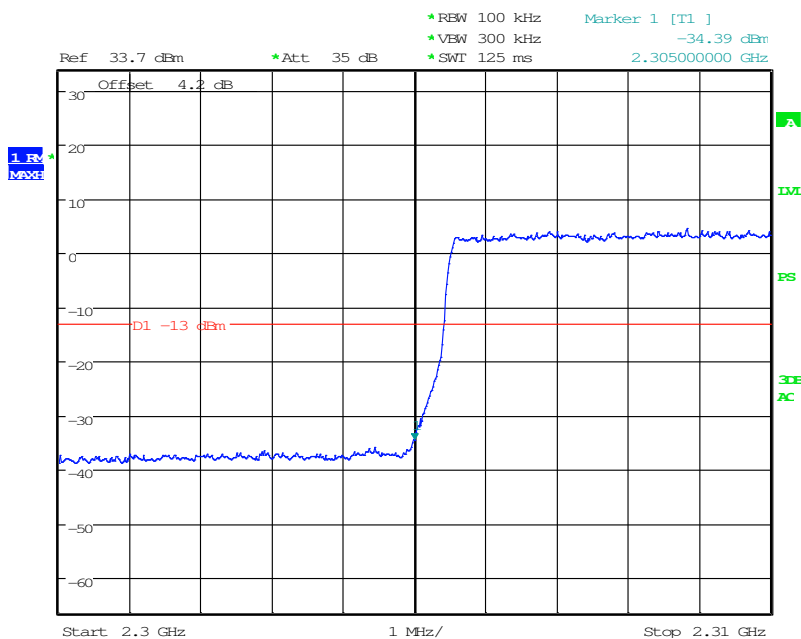
**10MHz bandwidth, QPSK, 2328MHz-2337MHz, Above 2315MHz**

Date: 1.JUL.2015 15:27:20

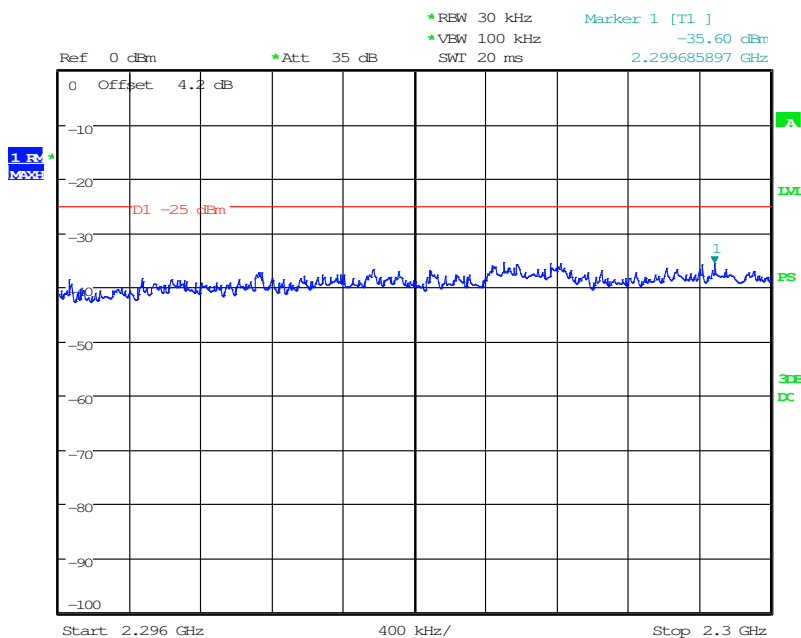
**10MHz bandwidth, 16QAM,(1,0) Mode , below 2305MHz**

Date: 25.JUN.2015 14:22:30

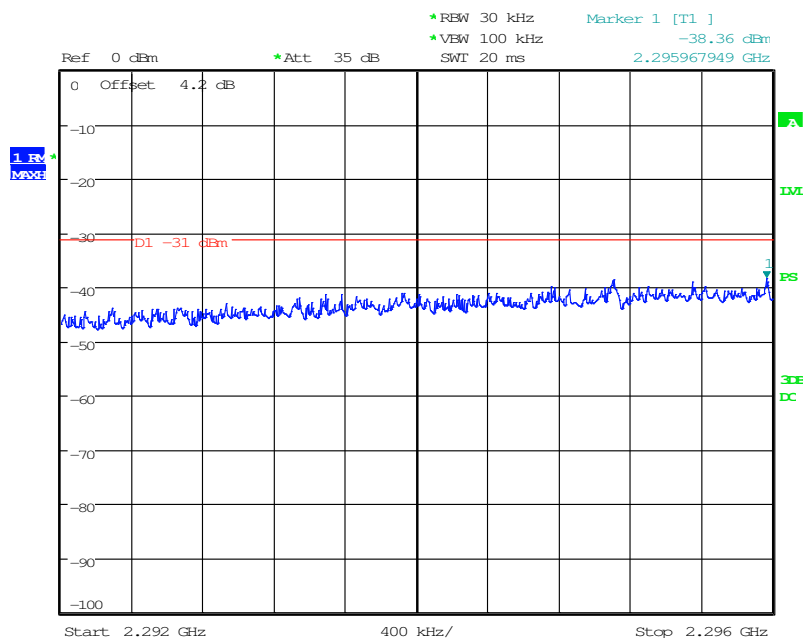


**10MHz bandwidth, 16QAM,(50,0) Mode , below 2305MHz**

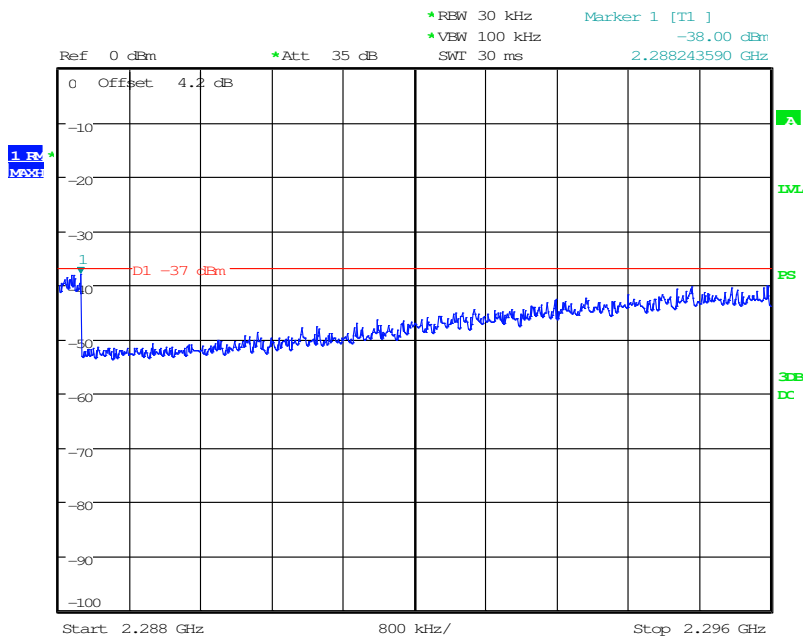
Date: 25.JUN.2015 14:22:48

**10MHz bandwidth, 16QAM, 2296MHz-2300MHz, below 2305MHz**

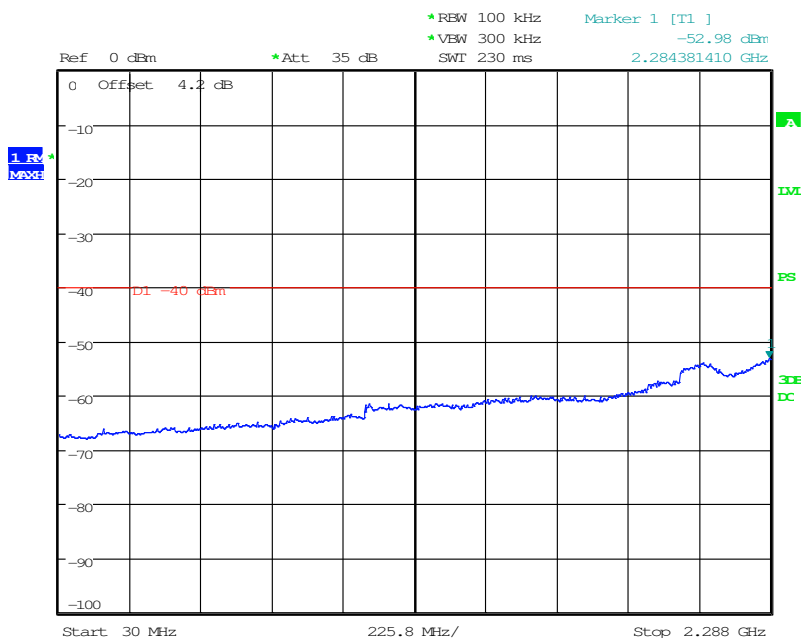
Date: 1.JUL.2015 15:36:26

**10MHz bandwidth, 16QAM, 2292MHz-2296MHz, below 2305MHz**

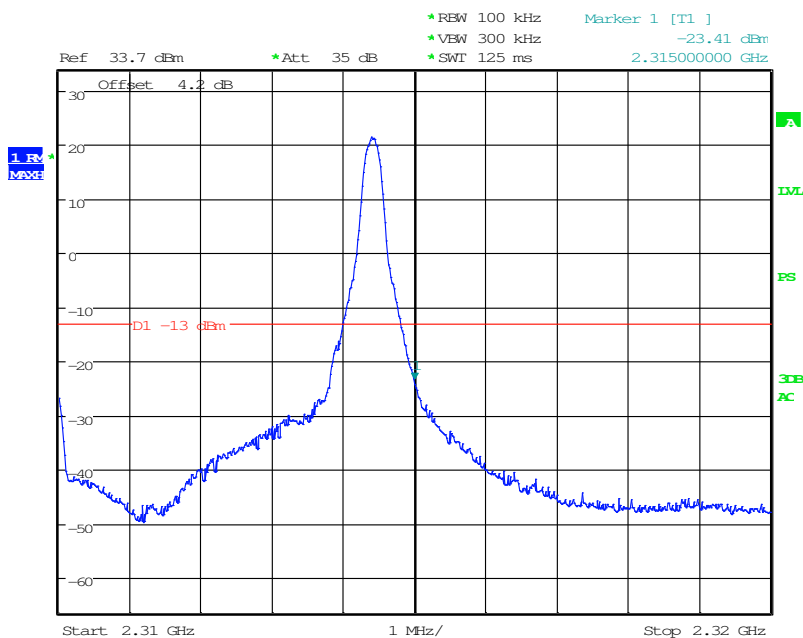
Date: 1.JUL.2015 15:38:17

**10MHz bandwidth, 16QAM, 2288MHz-2292MHz, below 2305MHz**

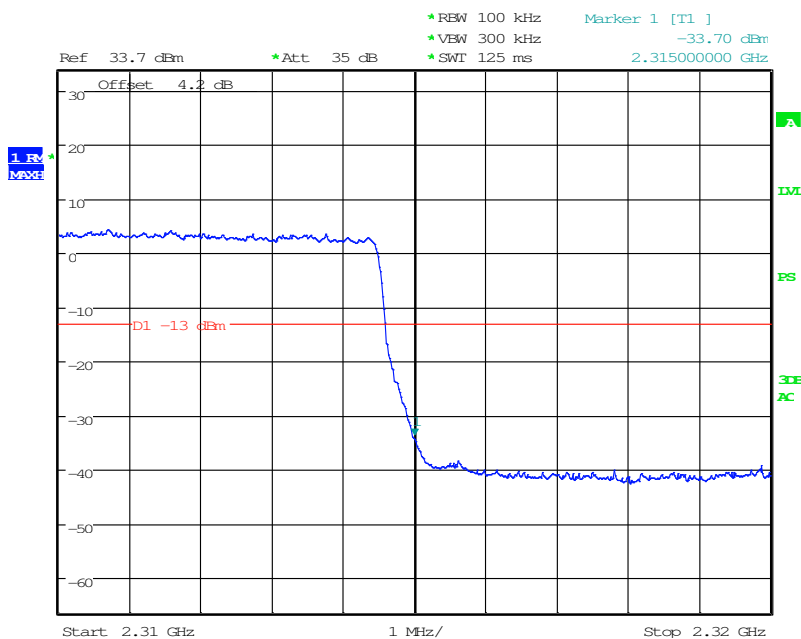
Date: 1.JUL.2015 15:42:43

**10MHz bandwidth, 16QAM, 30MHz-2288MHz, below 2305MHz**

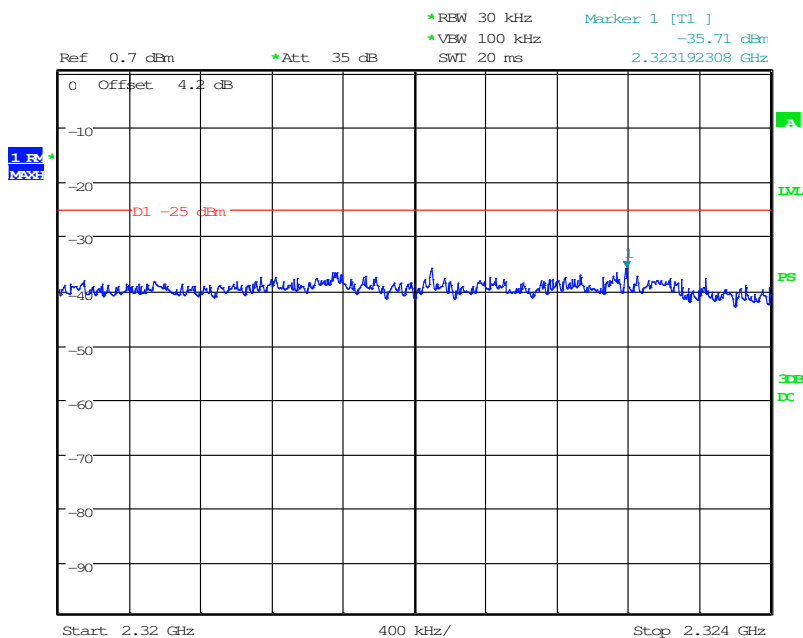
Date: 1.JUL.2015 15:45:16

**10MHz bandwidth, 16QAM,(1,50) Mode, Above 2315MHz**

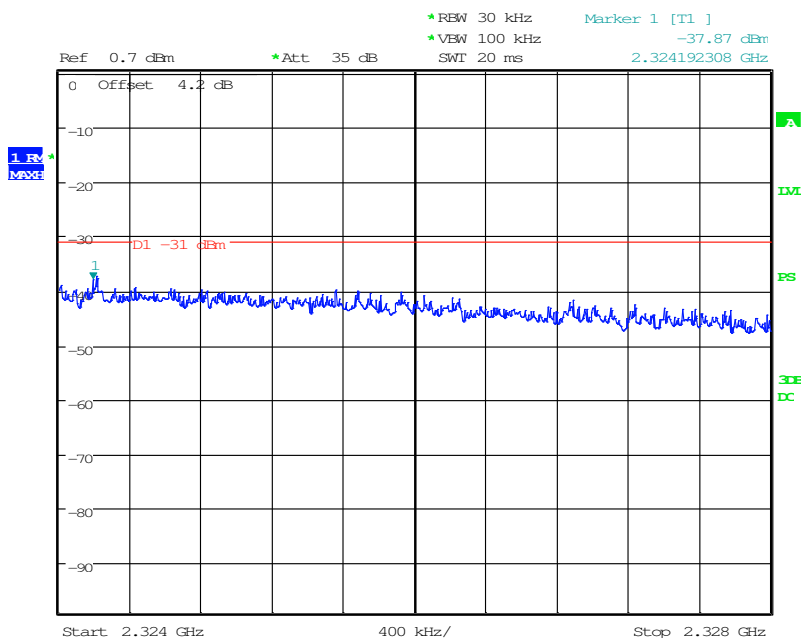
Date: 25.JUN.2015 14:24:14

**10MHz bandwidth, 16QAM,(50,0) Mode, Above 2315MHz**

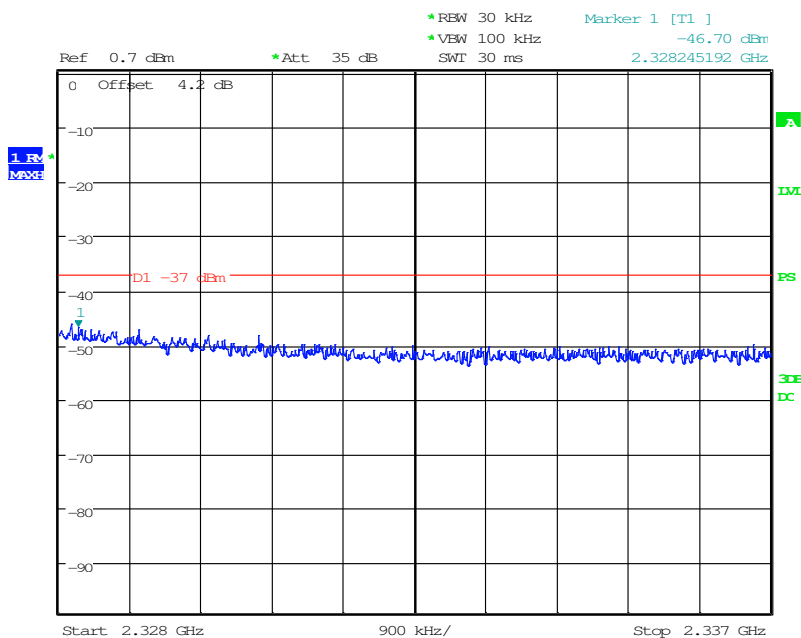
Date: 25.JUN.2015 14:23:23

**10MHz bandwidth, 16QAM, 2320MHz-2324MHz, Above 2315MHz**

Date: 1.JUL.2015 15:20:18

**10MHz bandwidth, 16QAM, 2324MHz-2328MHz, Above 2315MHz**

Date: 1.JUL.2015 15:22:40

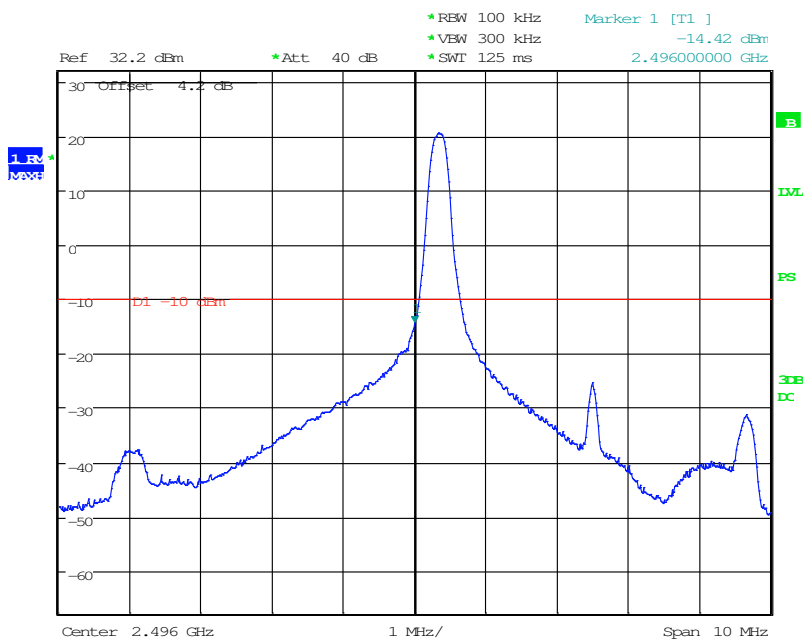
**10MHz bandwidth, 16QAM, 2328MHz-2337MHz, Above 2315MHz**

Date: 1.JUL.2015 15:26:53

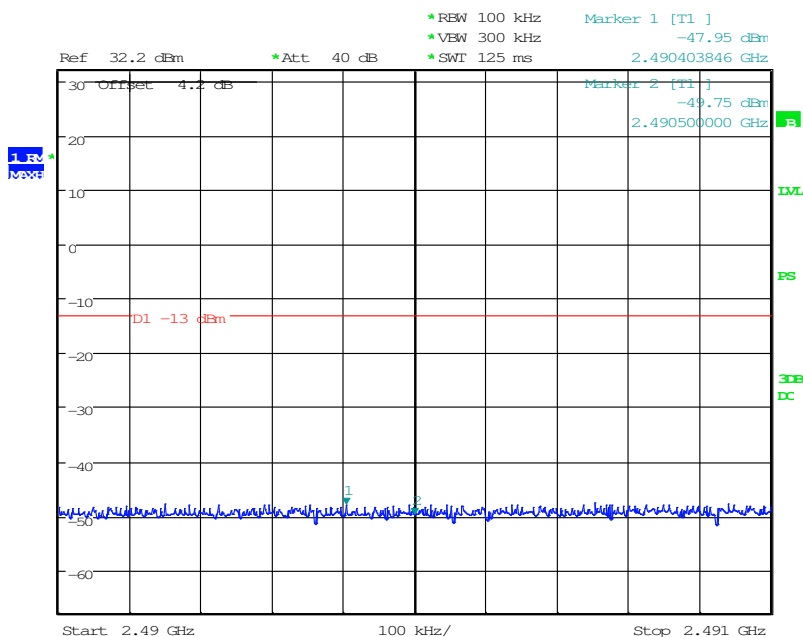
#### 4.5.8 LTE B41 Band Edge Results

##### Graphical results:

5MHz bandwidth, QPSK, (1,0) Mode, below 2496 MHz

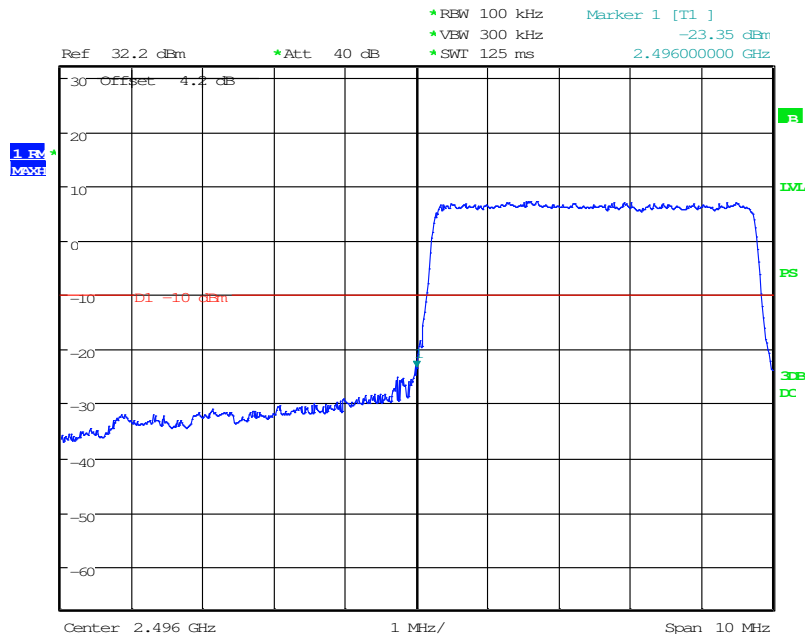


Date: 3.JUL.2015 19:07:24

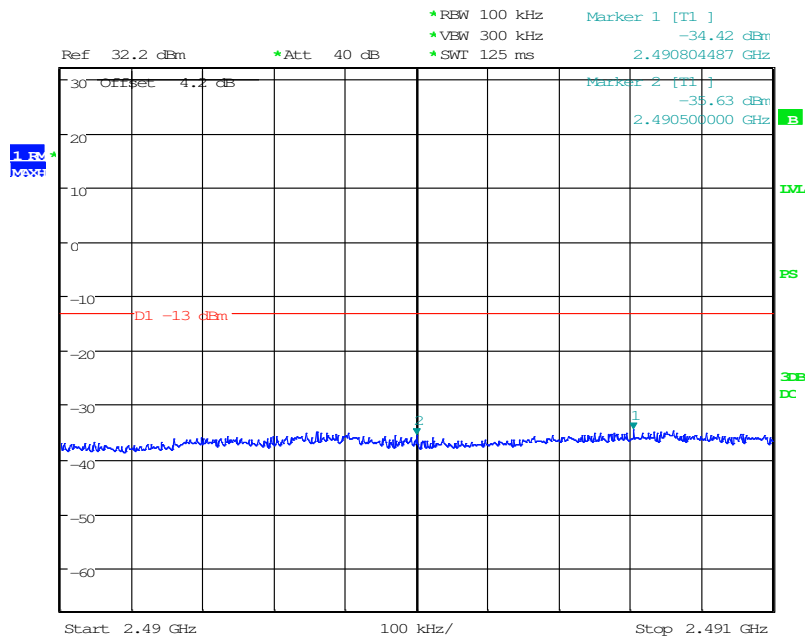


Date: 3.JUL.2015 19:10:14

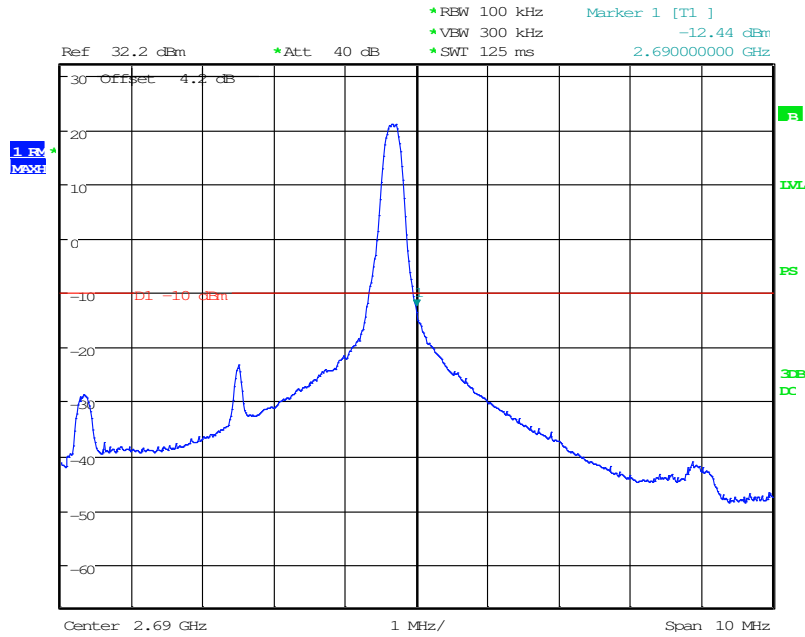
## 5 MHz bandwidth, QPSK, (25,0) Mode, below 2496 MHz



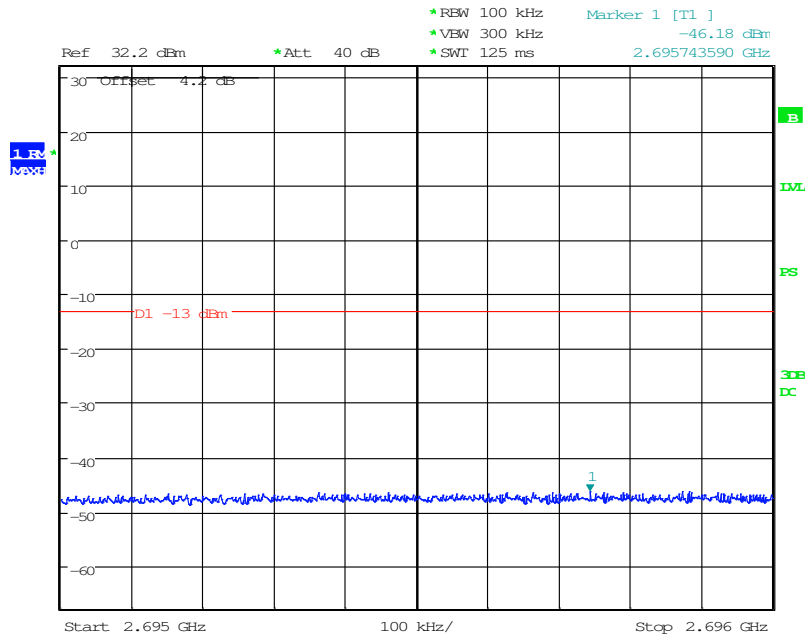
Date: 3.JUL.2015 19:07:45



Date: 3.JUL.2015 19:09:59

**5 MHz bandwidth, QPSK,(1,25) Mode, Above 2690MHz**

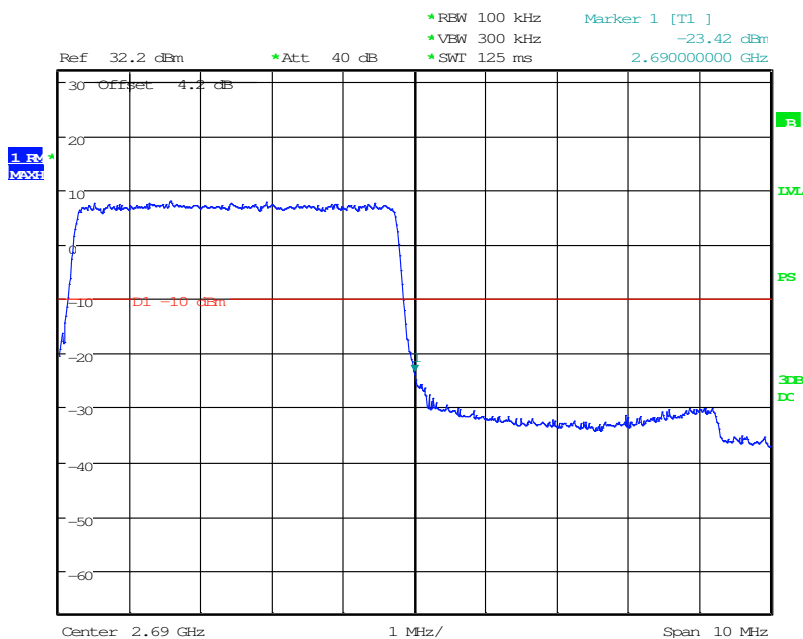
Date: 3.JUL.2015 19:13:34



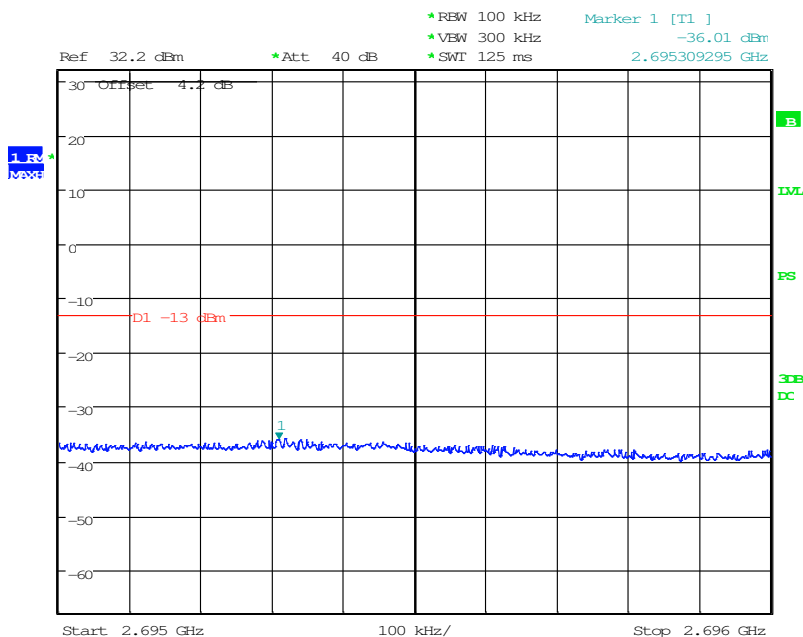
Date: 3.JUL.2015 19:15:47



## 5 MHz bandwidth, QPSK,(25,0) Mode, Above 2690MHz

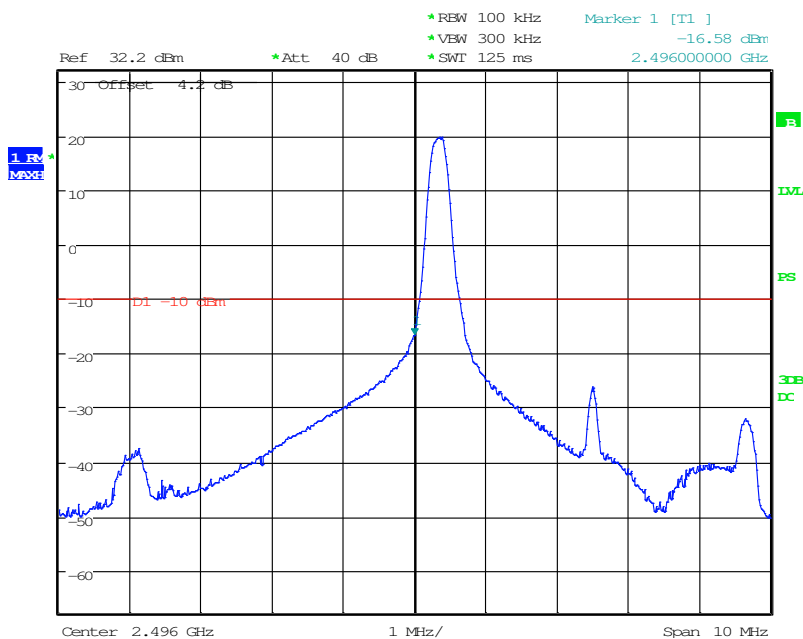


Date: 3.JUL.2015 19:13:48

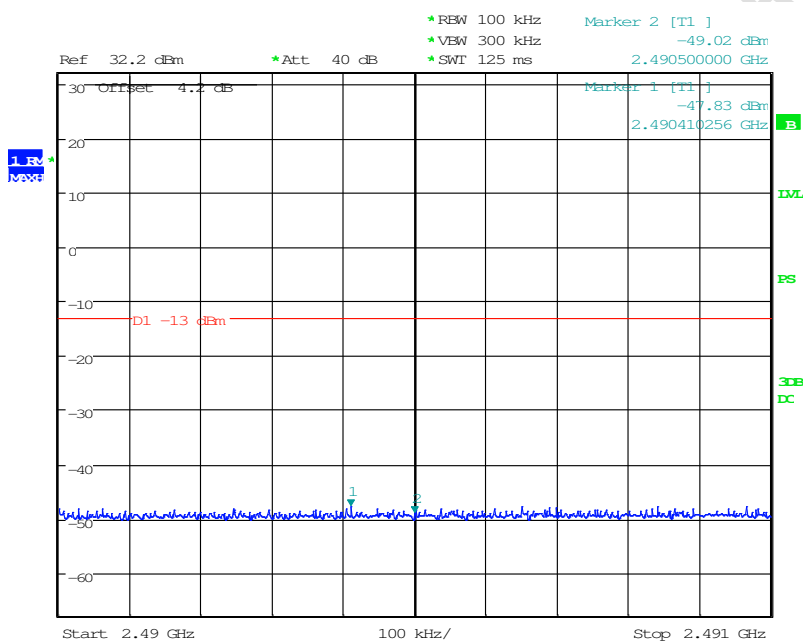


Date: 3.JUL.2015 19:15:19

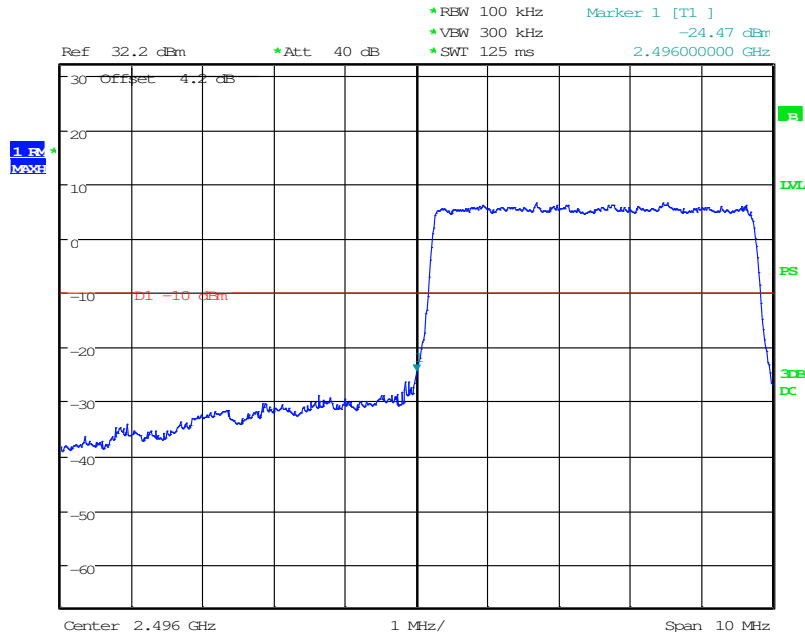
## 5MHz bandwidth, 16QAM,(1,0) Mode , below 2496MHz



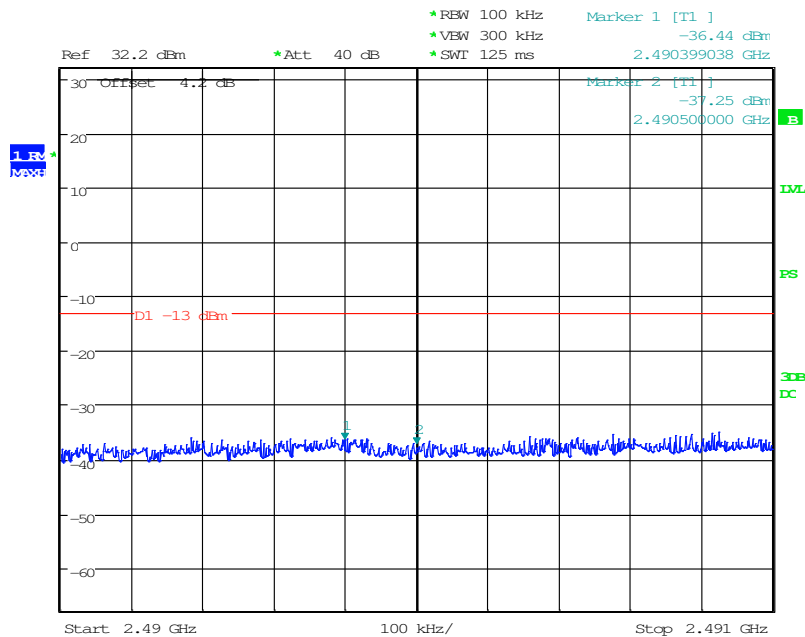
Date: 3.JUL.2015 19:08:26



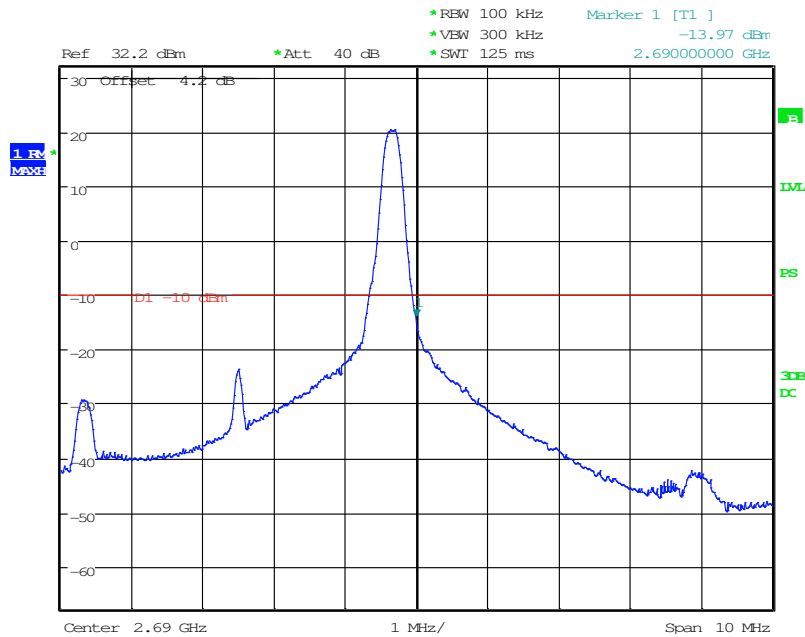
Date: 3.JUL.2015 19:09:26

**5MHz bandwidth, 16QAM,(25,0) Mode , below 2496MHz**

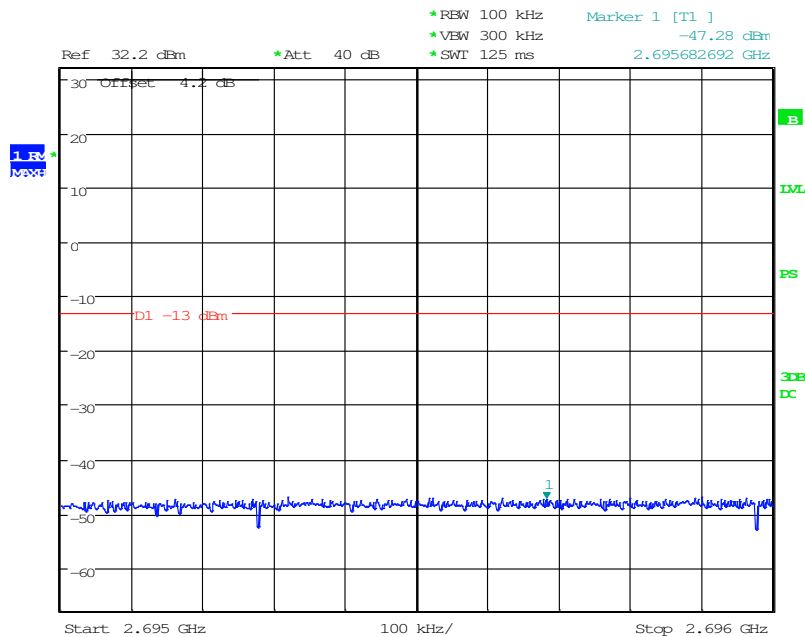
Date: 3.JUL.2015 19:08:00



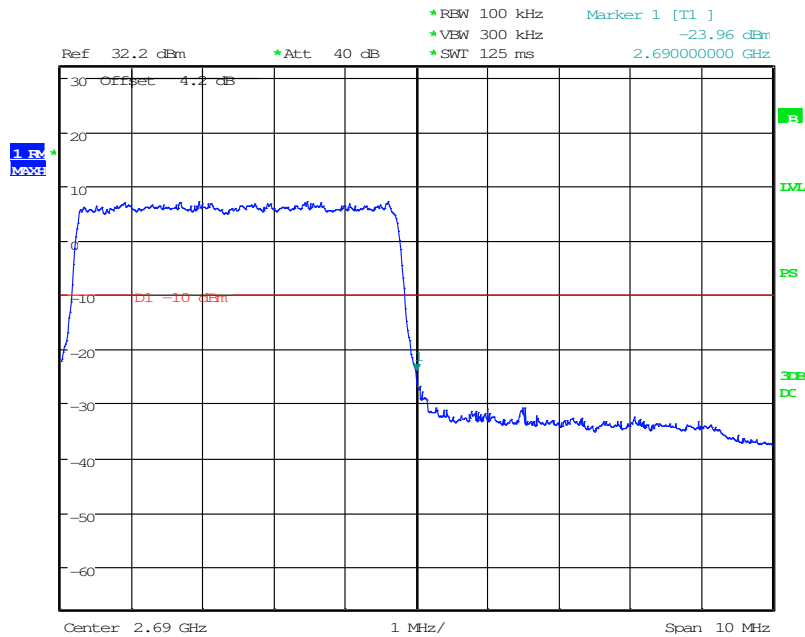
Date: 3.JUL.2015 19:09:45

**5MHz bandwidth, 16QAM,(1,25) Mode, Above 2690MHz**

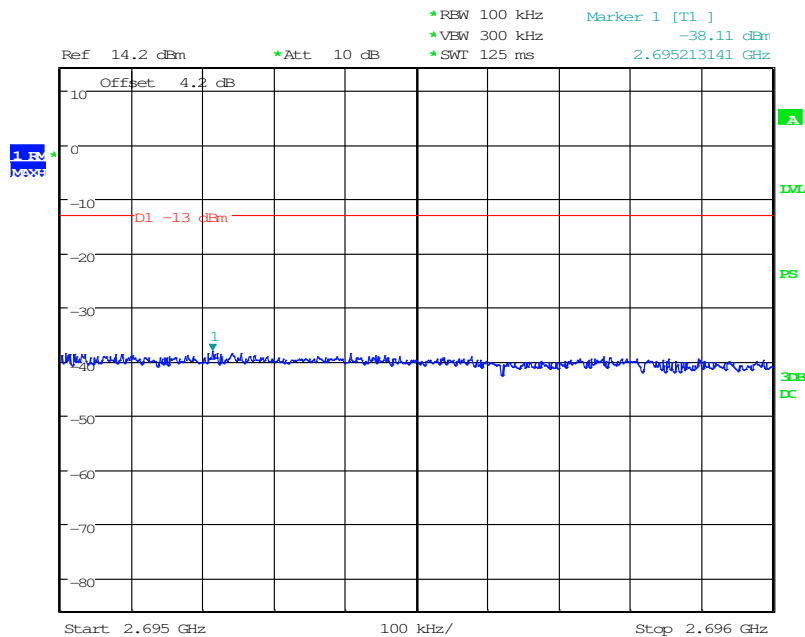
Date: 3.JUL.2015 19:14:21



Date: 3.JUL.2015 19:14:53

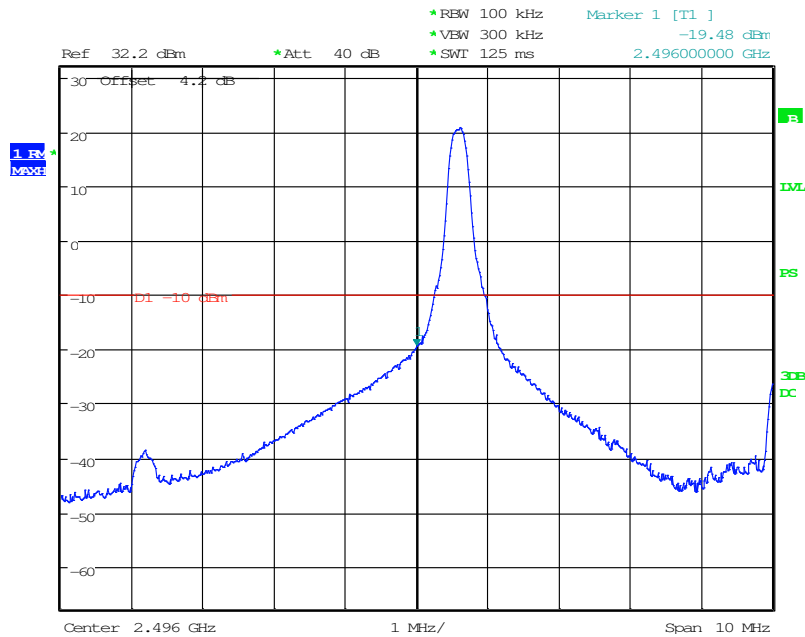
**5 MHz bandwidth, 16QAM,(25,0) Mode, Above 2690MHz**

Date: 3.JUL.2015 19:13:59

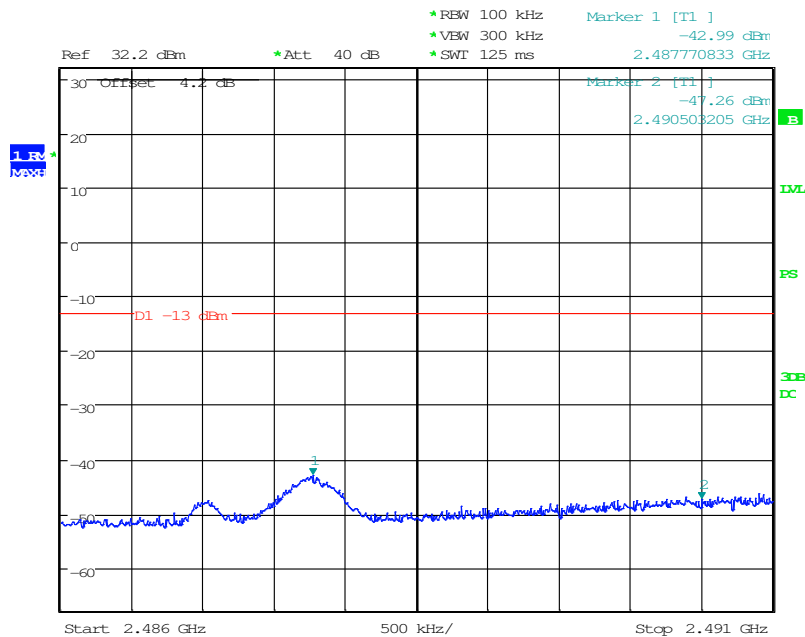


Date: 3.JUL.2015 19:57:36

## 10MHz bandwidth,QPSK,(1,0) Mode , below 2496MHz

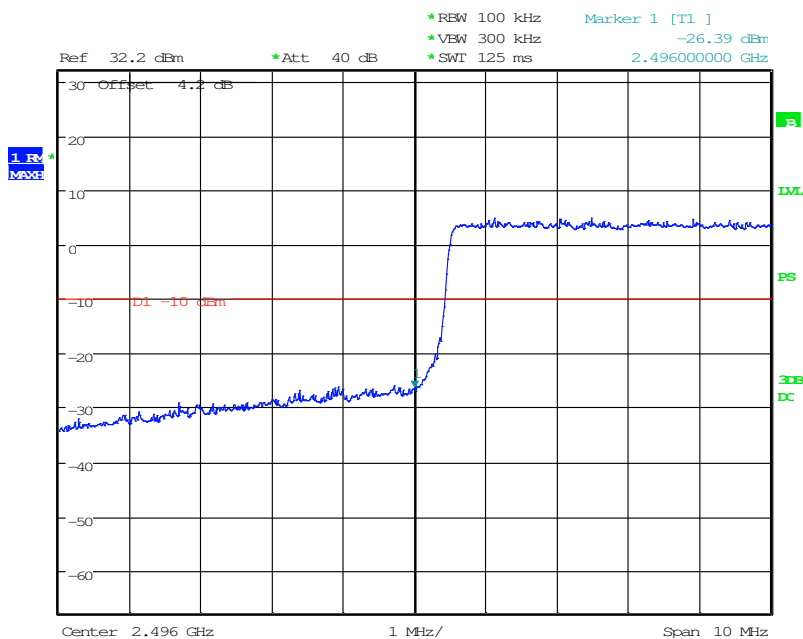


Date: 3.JUL.2015 19:18:45

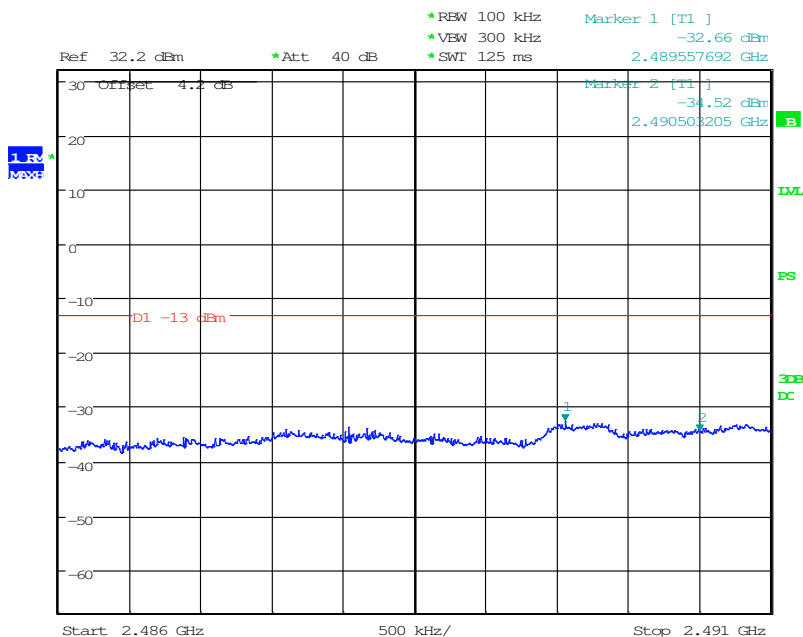


Date: 3.JUL.2015 19:19:51

## 10MHz bandwidth,QPSK,(50,0) Mode , below 2496MHz

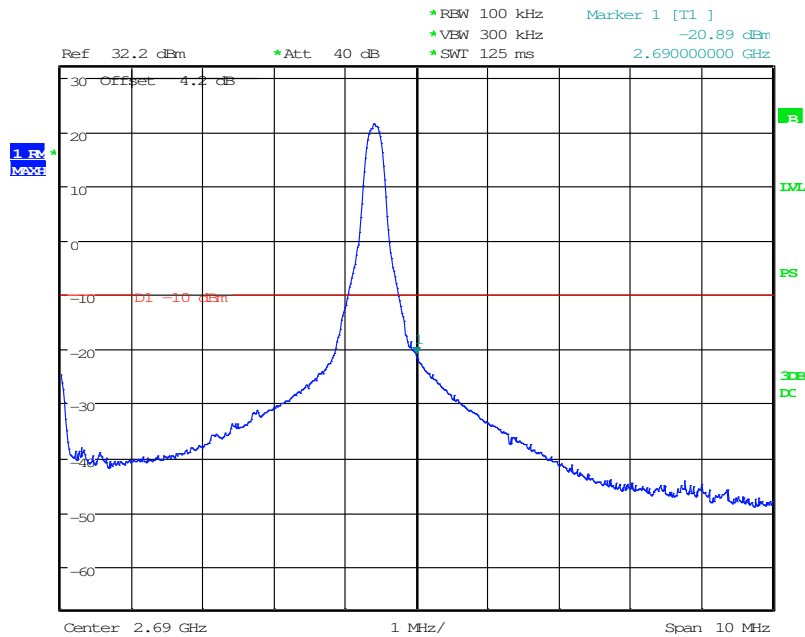


Date: 3.JUL.2015 19:18:15

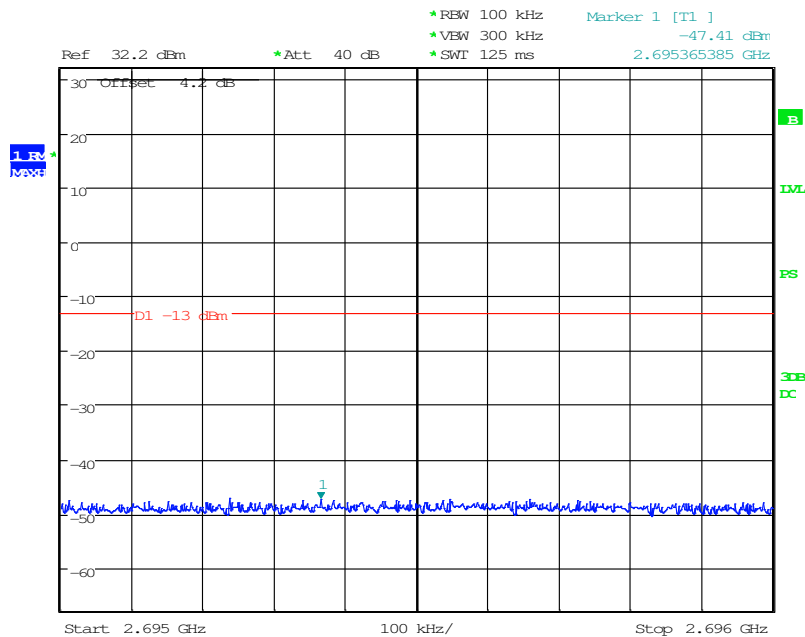


Date: 3.JUL.2015 19:20:03

## 10MHz bandwidth, QPSK,(1,50) Mode, Above 2690MHz



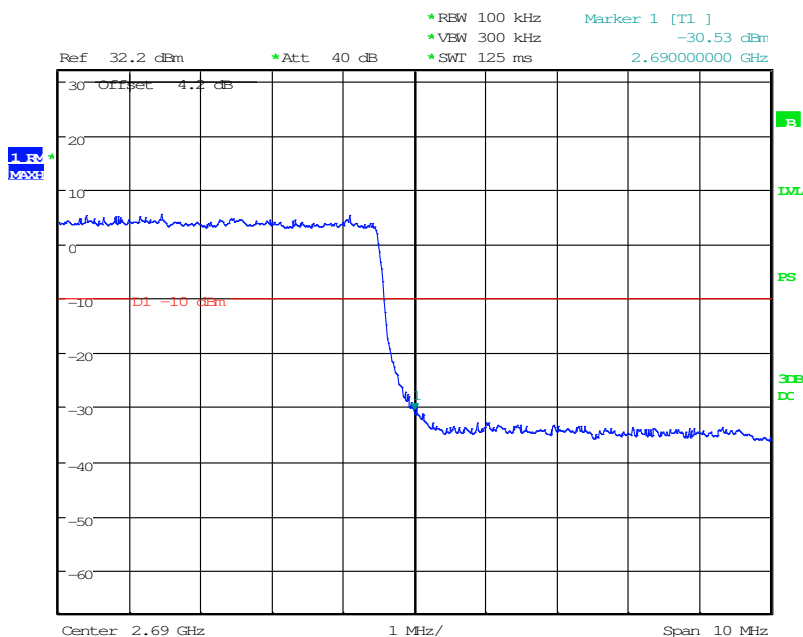
Date: 3.JUL.2015 19:21:56



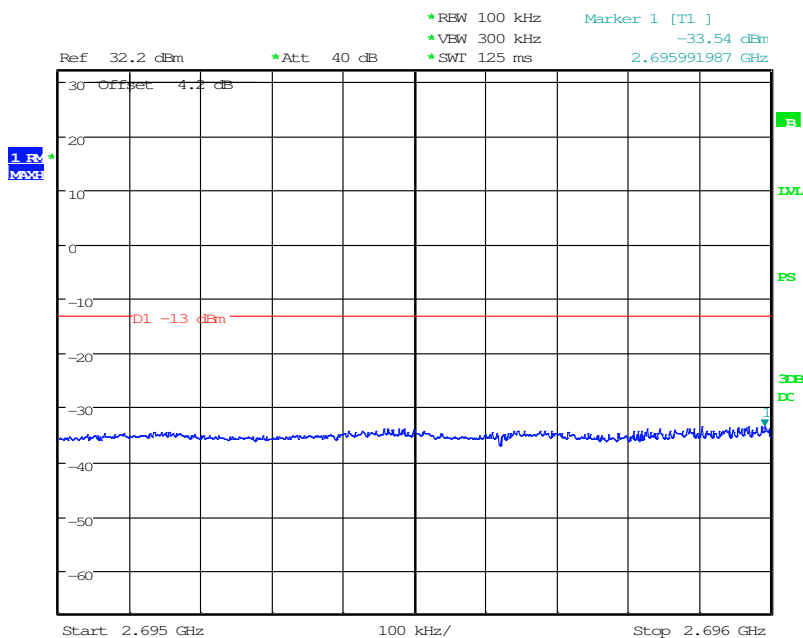
Date: 3.JUL.2015 19:24:10



## 10MHz bandwidth, QPSK,(50,0) Mode, Above 2690MHz

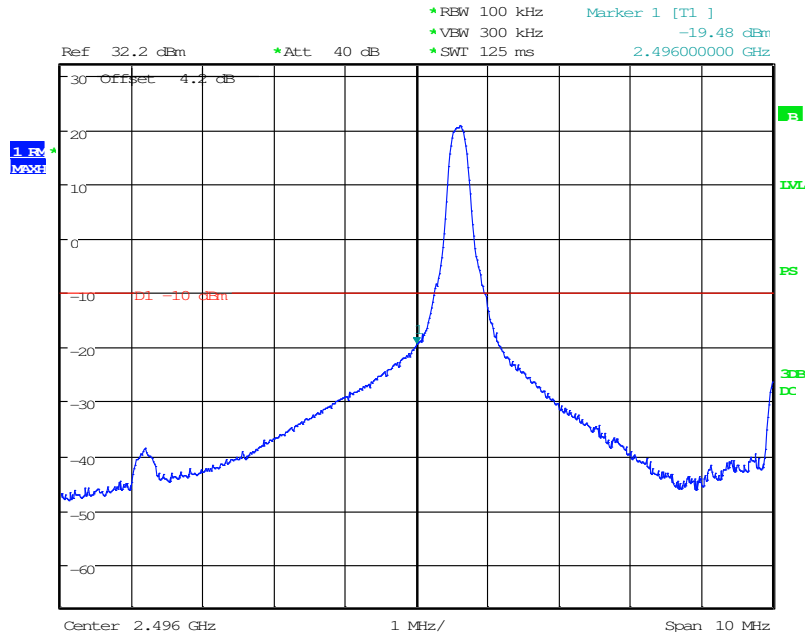


Date: 3.JUL.2015 19:22:08

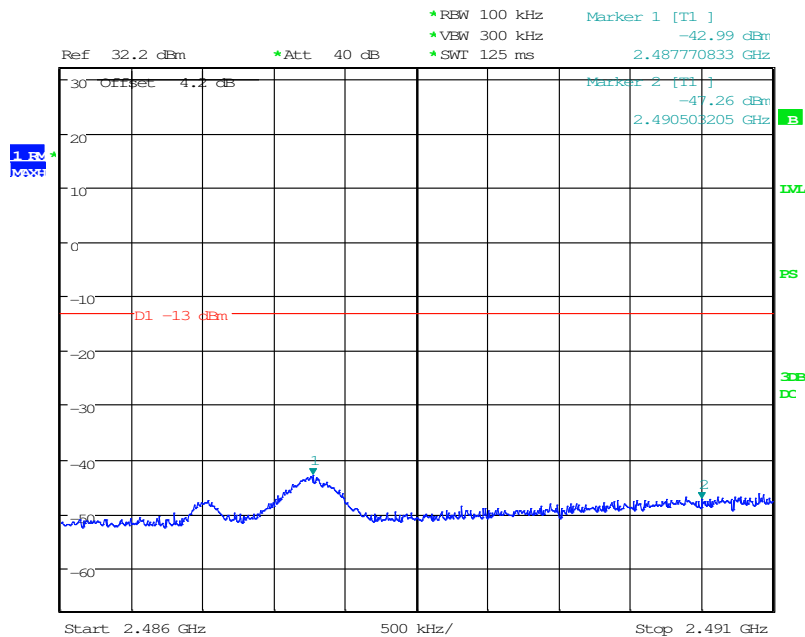


Date: 3.JUL.2015 19:23:57

## 10MHz bandwidth, 16QAM,(1,0) Mode , below 2496MHz

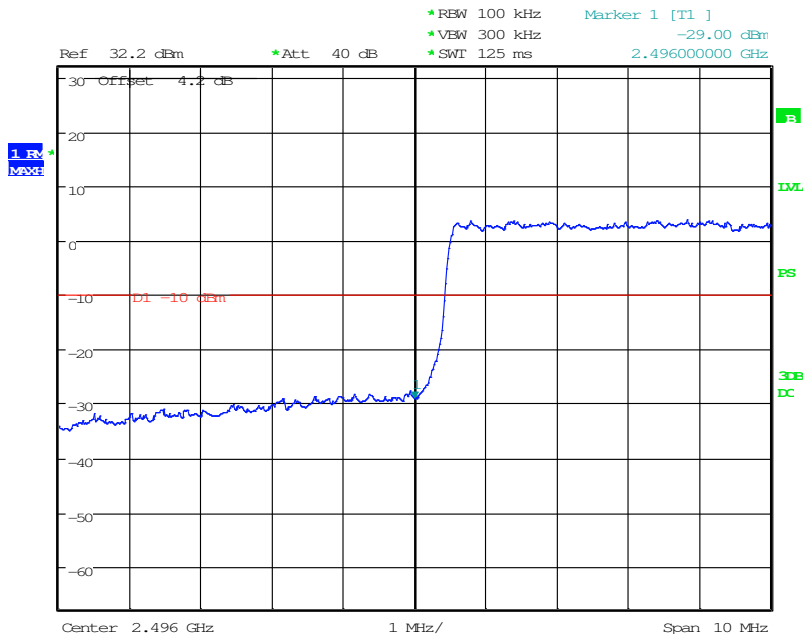


Date: 3.JUL.2015 19:18:45

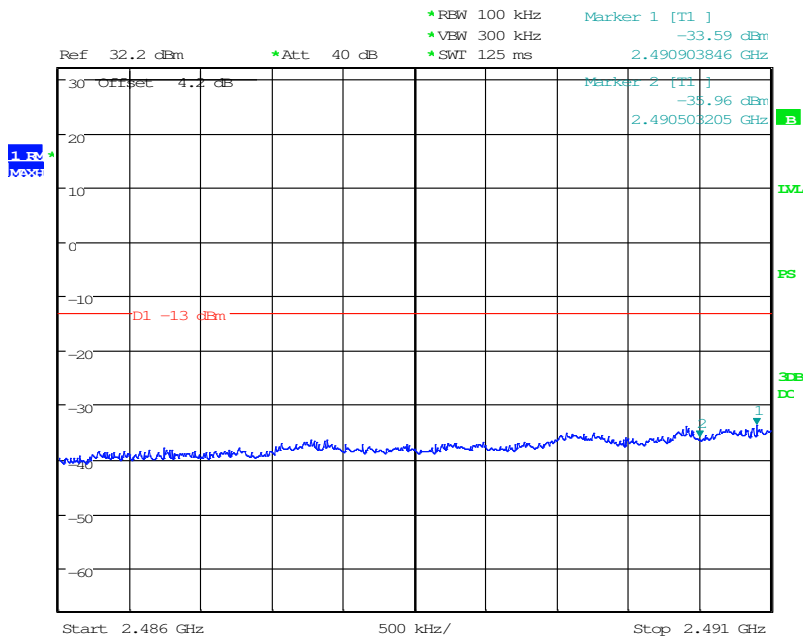


Date: 3.JUL.2015 19:19:51

## 10MHz bandwidth, 16QAM,(50,0) Mode , below 2496 MHz

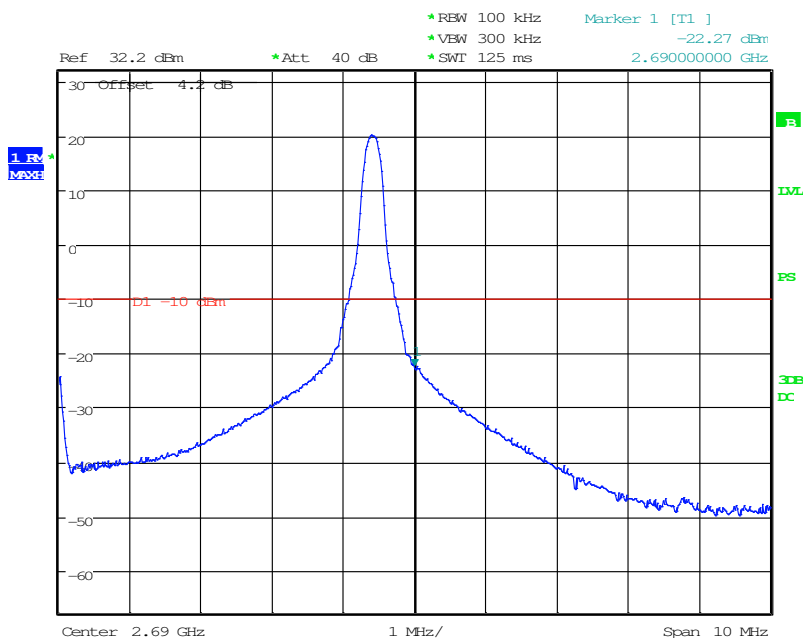


Date: 3.JUL.2015 19:18:03

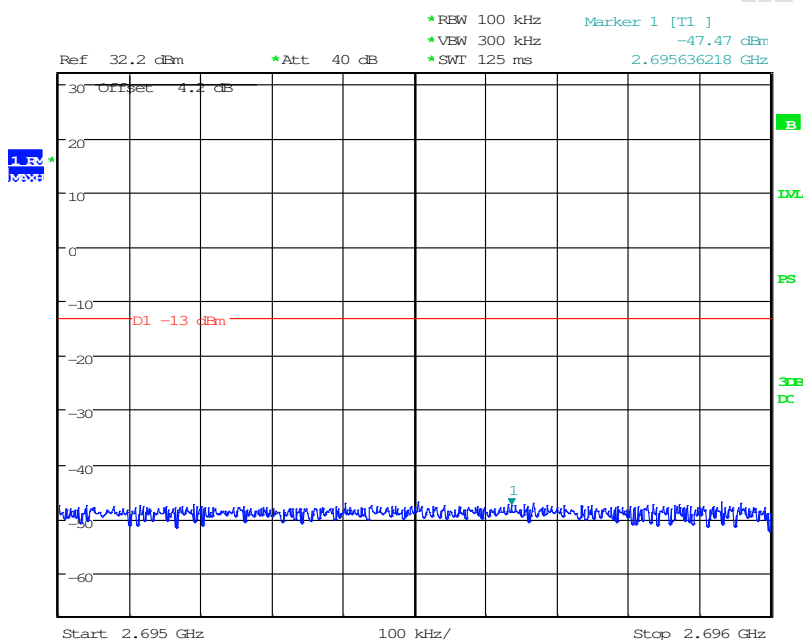


Date: 3.JUL.2015 19:20:19

## 10MHz bandwidth, 16QAM,(1,50) Mode, Above 2690MHz

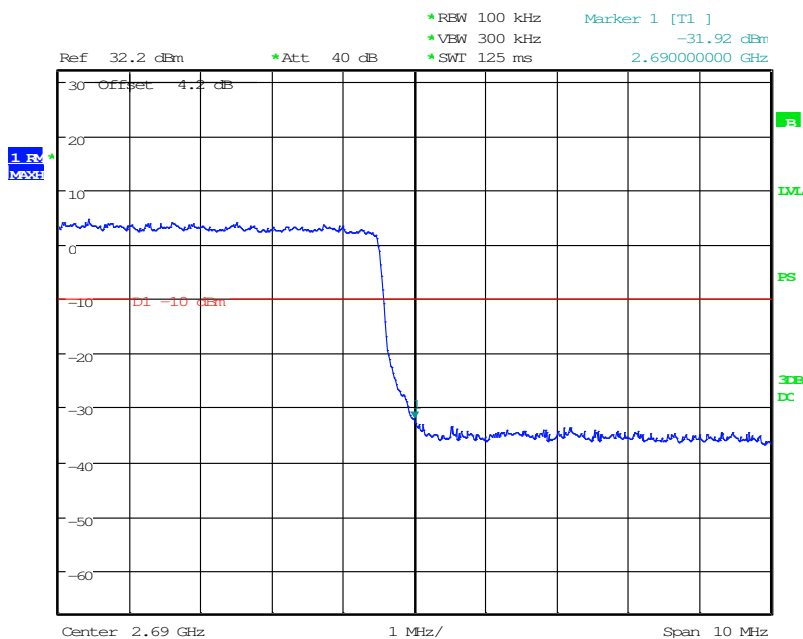


Date: 3.JUL.2015 19:22:58

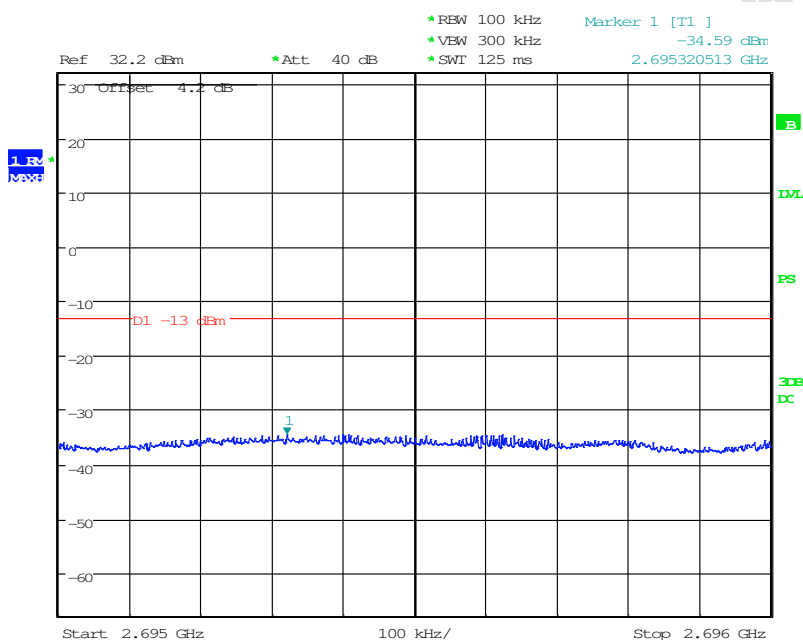


Date: 3.JUL.2015 19:23:26

## 10MHz bandwidth, 16QAM,(50,0) Mode, Above 2690MHz

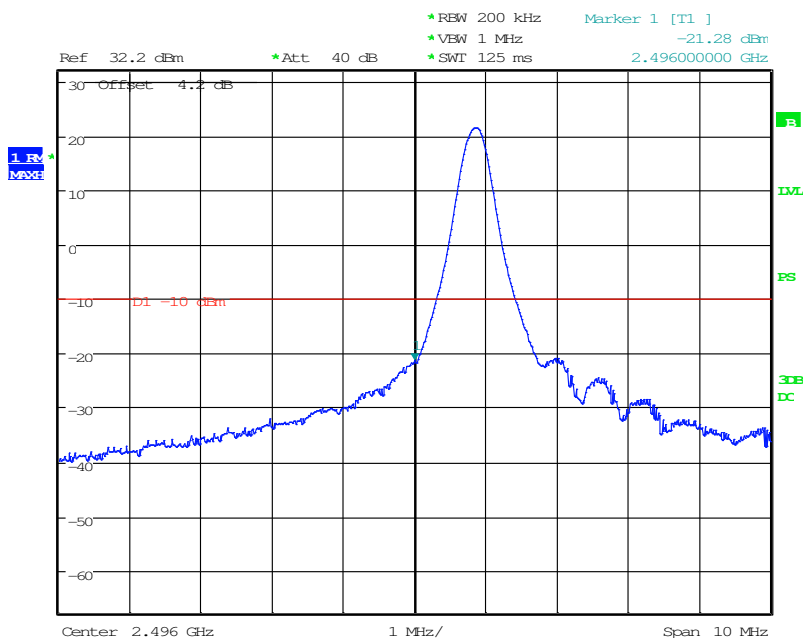


Date: 3.JUL.2015 19:22:35

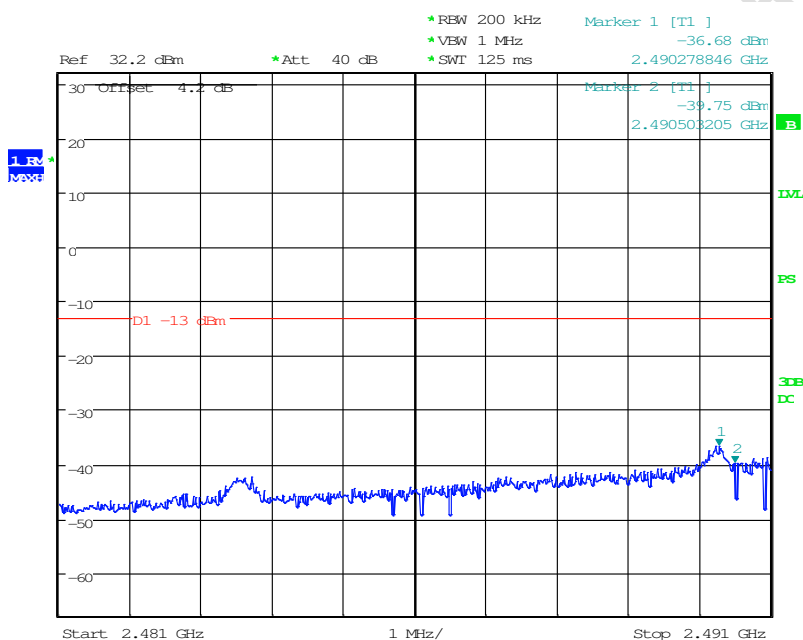


Date: 3.JUL.2015 19:23:39

## 15MHz bandwidth,QPSK,(1,0) Mode , below 2496MHz

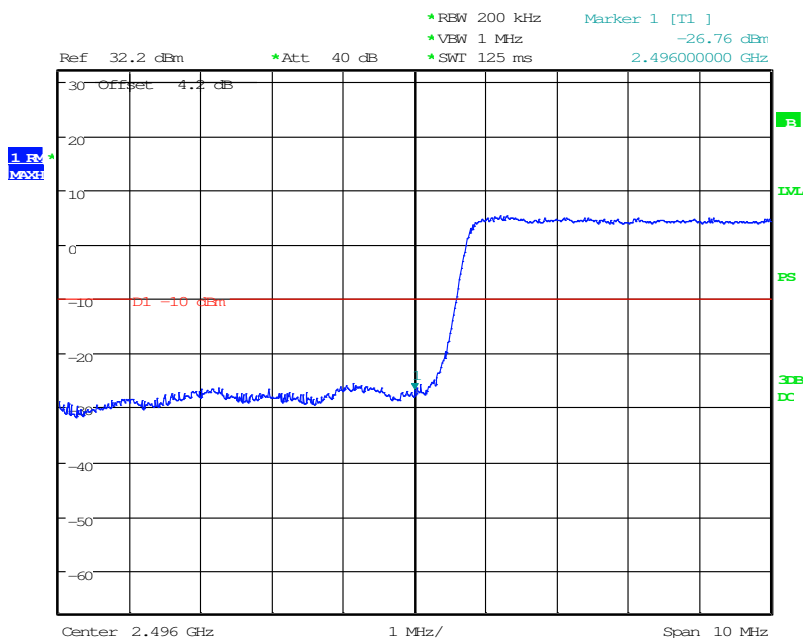


Date: 3.JUL.2015 19:25:42

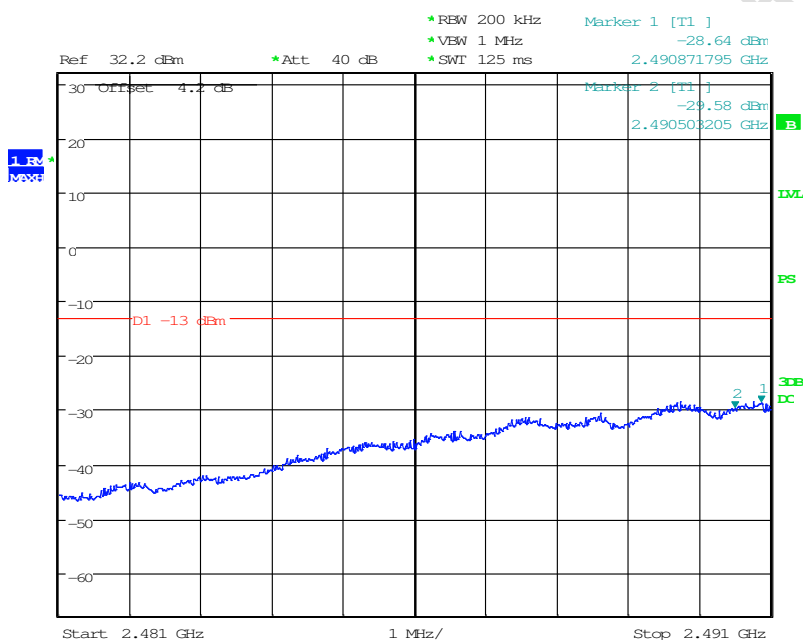


Date: 3.JUL.2015 19:28:07

## 15MHz bandwidth,QPSK,(75,0) Mode , below 2496MHz

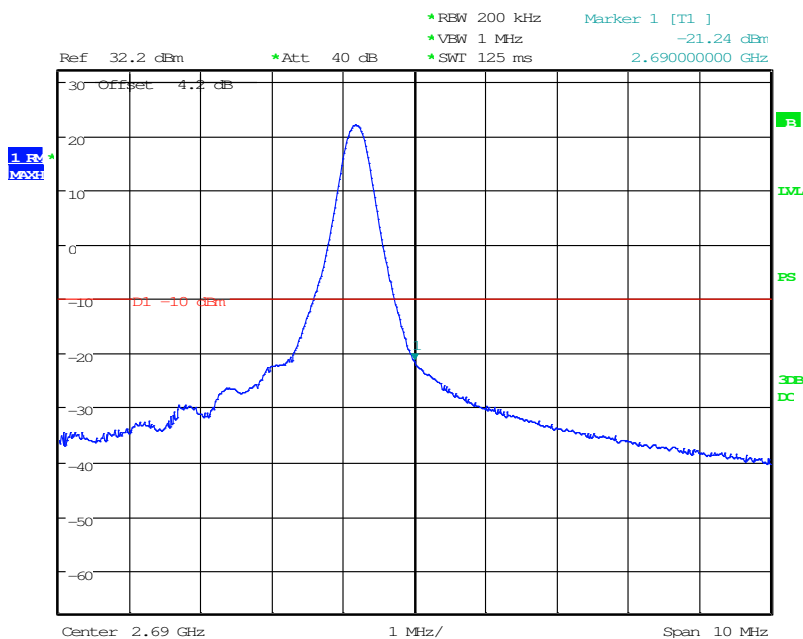


Date: 3.JUL.2015 19:25:54

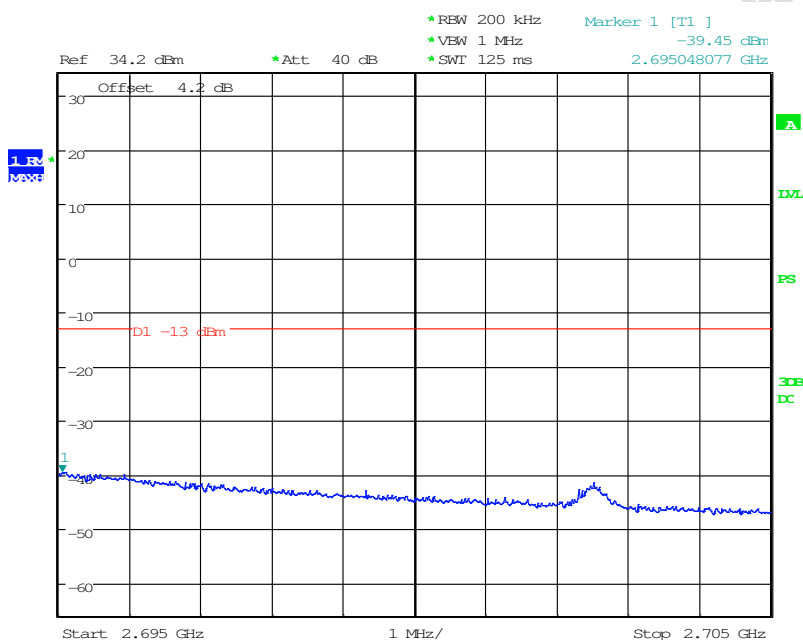


Date: 3.JUL.2015 19:27:40

## 15MHz bandwidth, QPSK,(1,75) Mode, Above 2690MHz



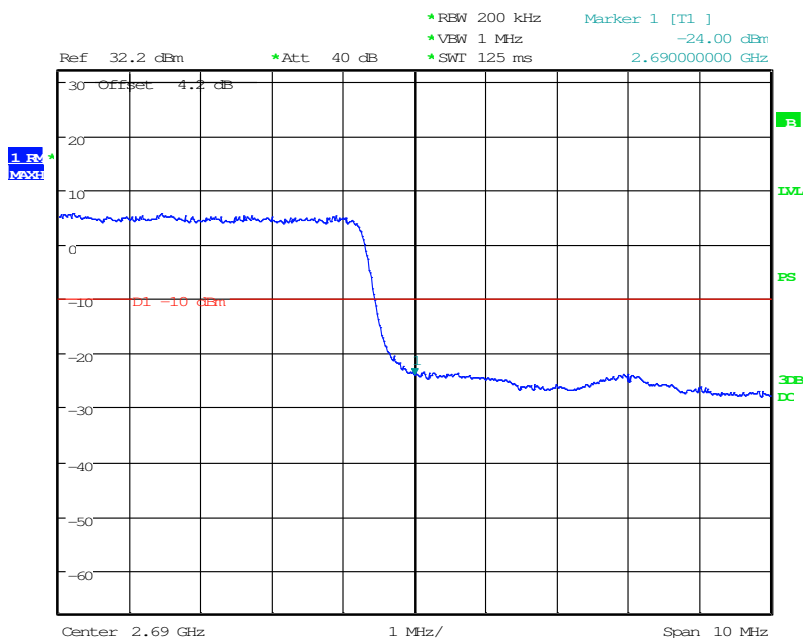
Date: 3.JUL.2015 19:29:24



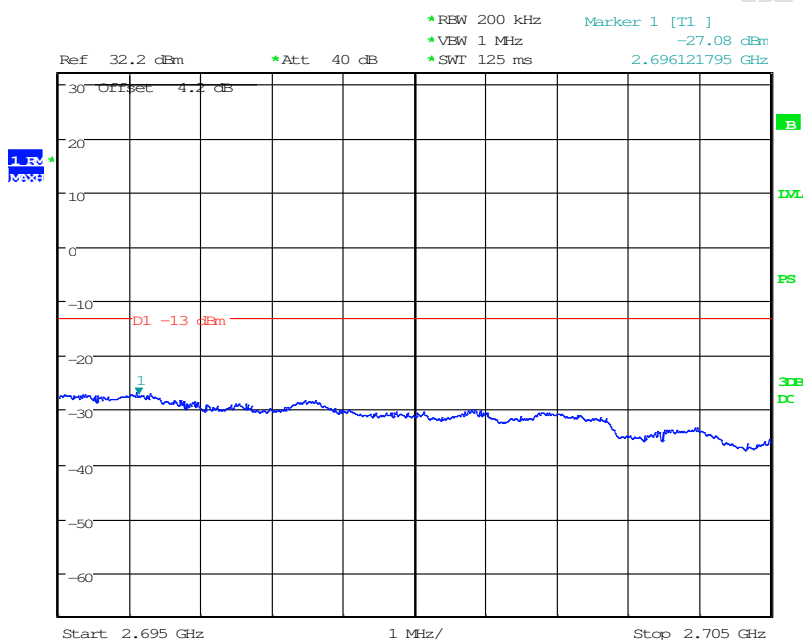
Date: 3.JUL.2015 19:35:15



## 15MHz bandwidth, QPSK,(75,0) Mode, Above 2690MHz

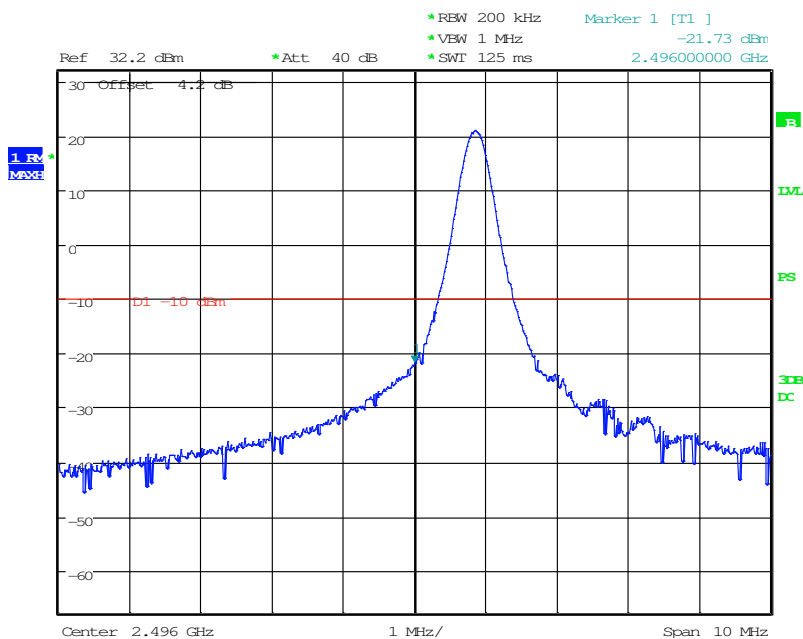


Date: 3.JUL.2015 19:29:39

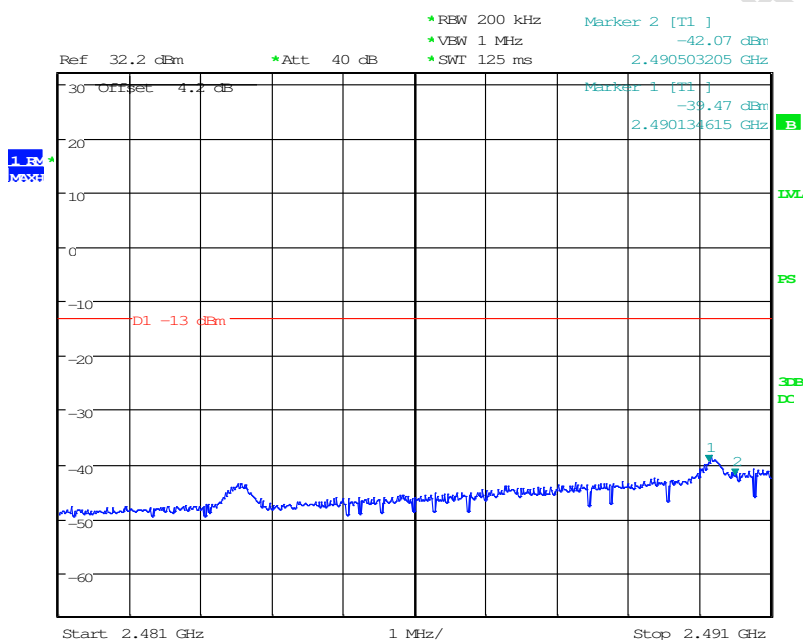


Date: 3.JUL.2015 19:31:46

## 15MHz bandwidth, 16QAM,(1,0) Mode , below 2496MHz

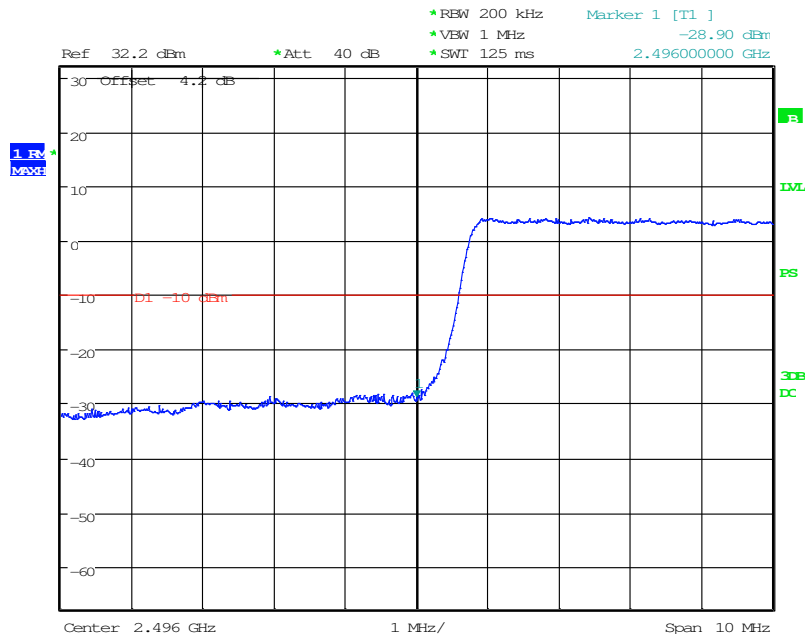


Date: 3.JUL.2015 19:26:34

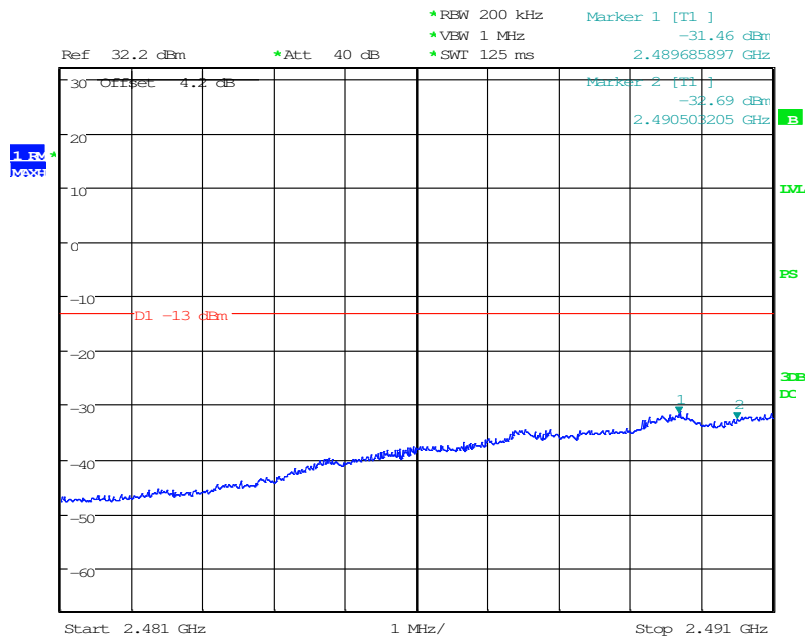


Date: 3.JUL.2015 19:27:14

## 15MHz bandwidth, 16QAM,(75,0) Mode , below 2496MHz

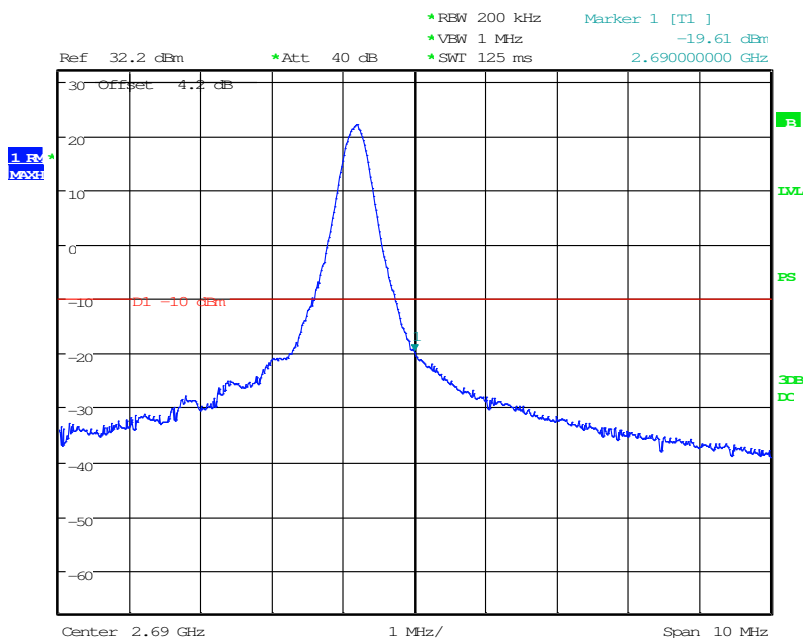


Date: 3.JUL.2015 19:26:10

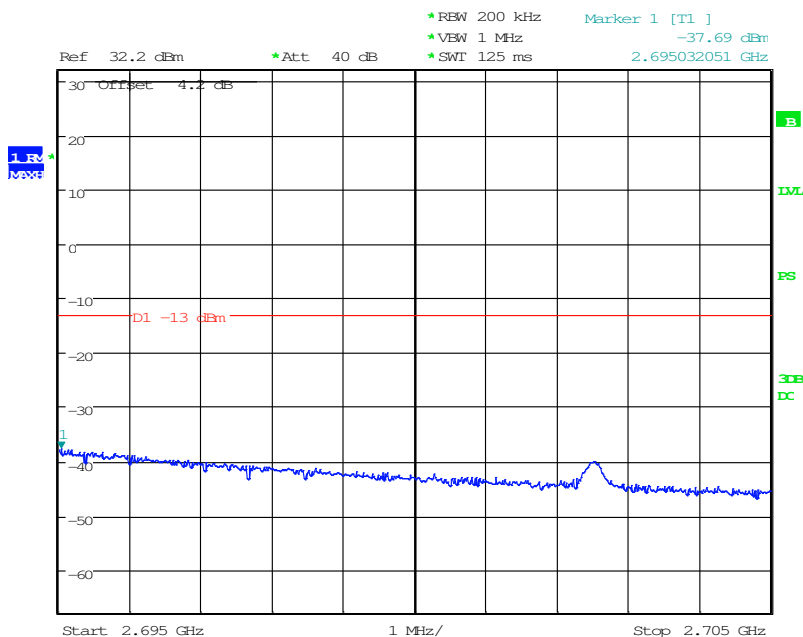


Date: 3.JUL.2015 19:27:26

## 15MHz bandwidth, 16QAM,(1,75) Mode, Above 2690MHz

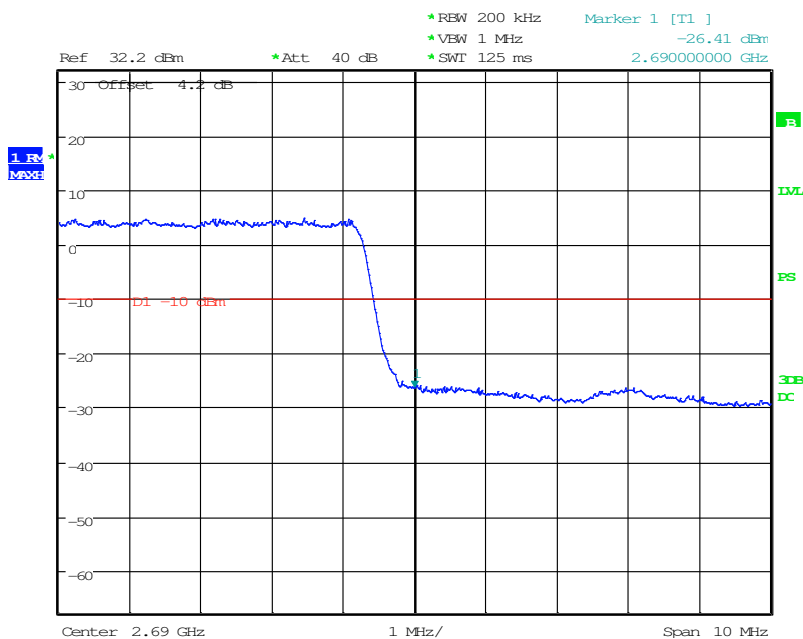


Date: 3.JUL.2015 19:30:16

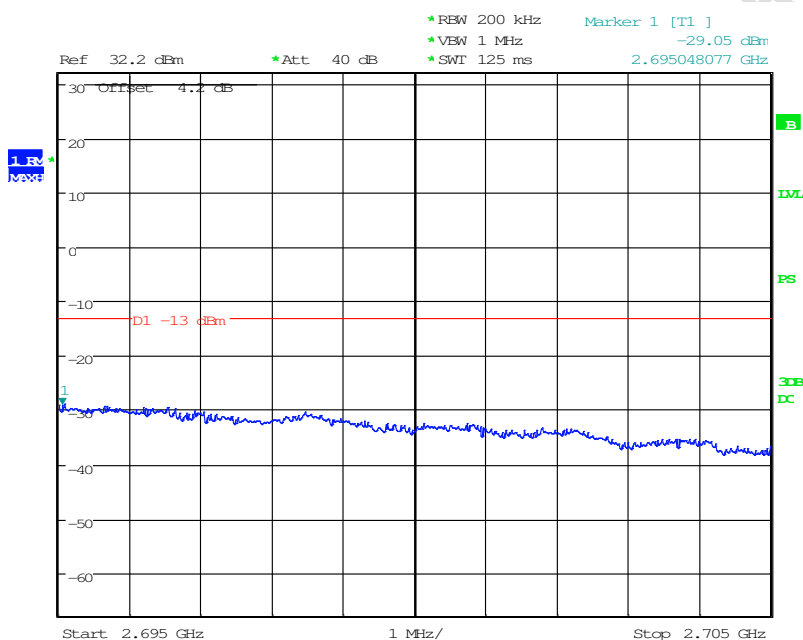


Date: 3.JUL.2015 19:31:18

## 15MHz bandwidth, 16QAM,(75,0) Mode, Above 2690MHz

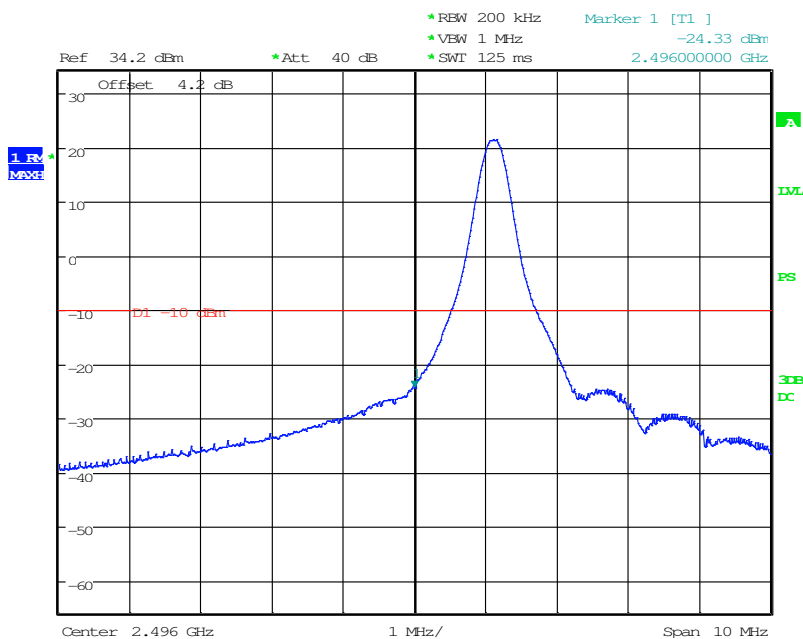


Date: 3.JUL.2015 19:29:52

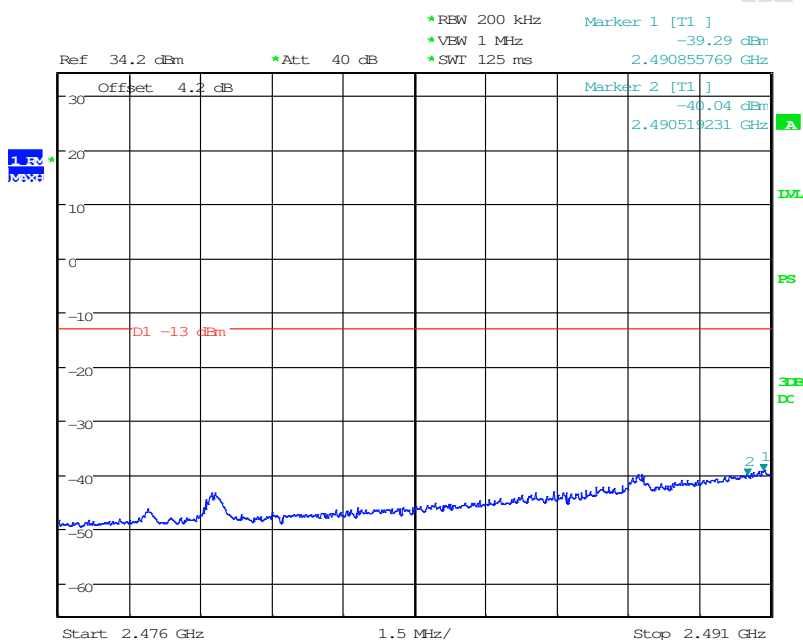


Date: 3.JUL.2015 19:31:30

## 20MHz bandwidth,QPSK,(1,0) Mode , below 2496MHz

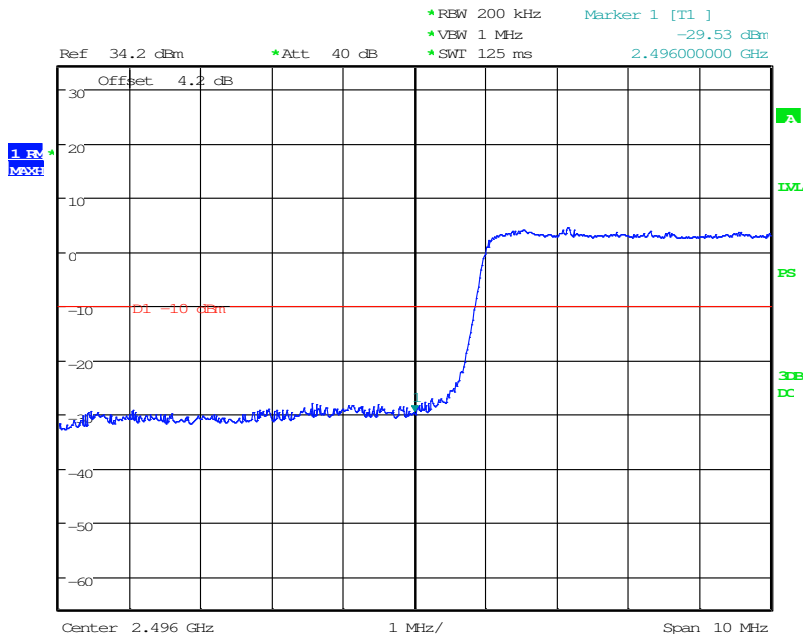


Date: 3.JUL.2015 19:36:37

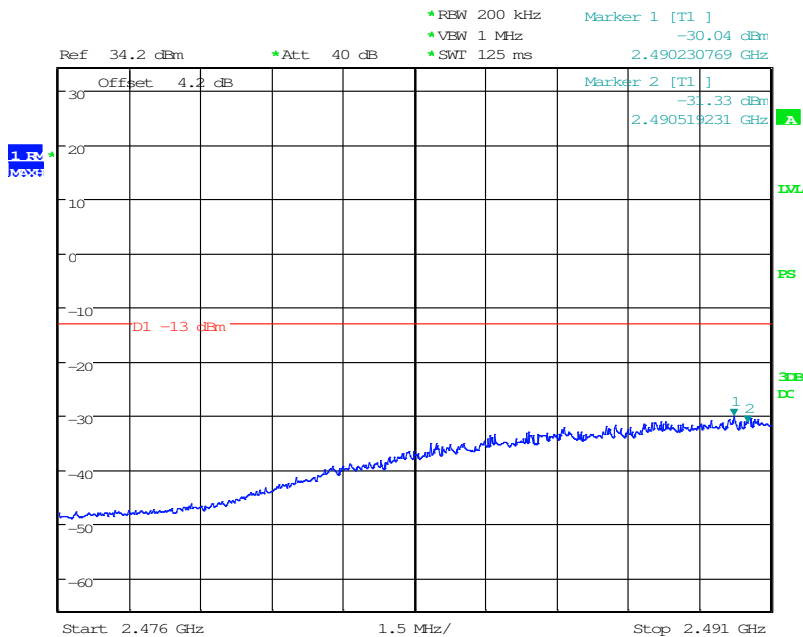


Date: 3.JUL.2015 19:39:34

## 20MHz bandwidth,QPSK,(100,0) Mode , below 2496MHz

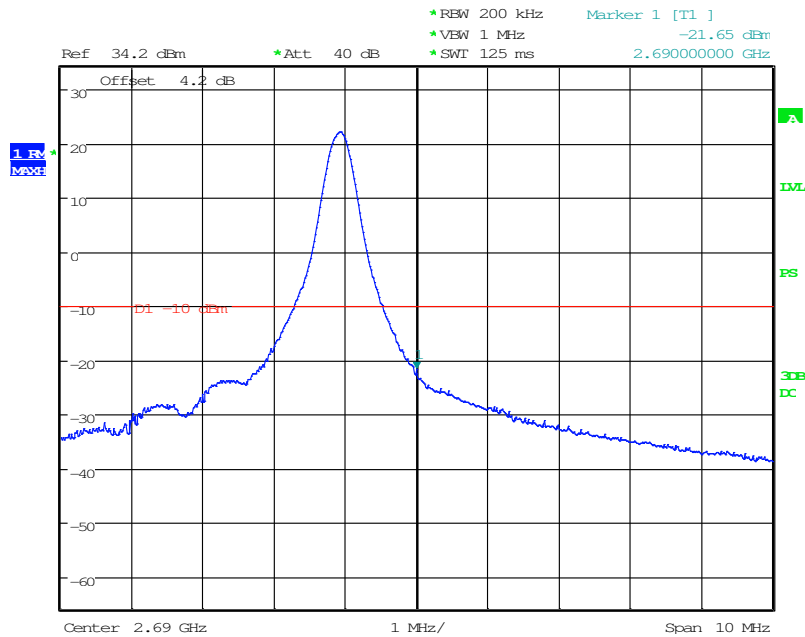


Date: 3.JUL.2015 19:36:53

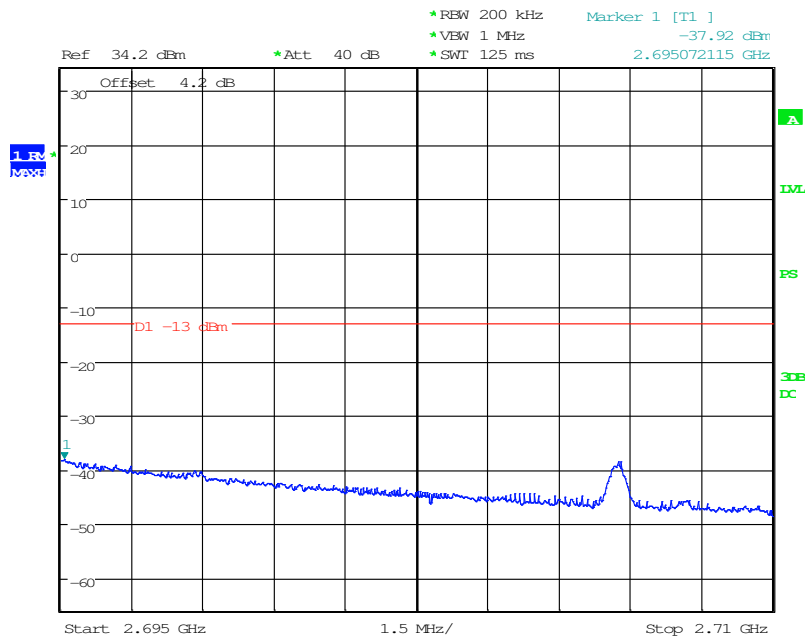


Date: 3.JUL.2015 19:39:02

## 20MHz bandwidth, QPSK,(1,100) Mode, Above 2690MHz



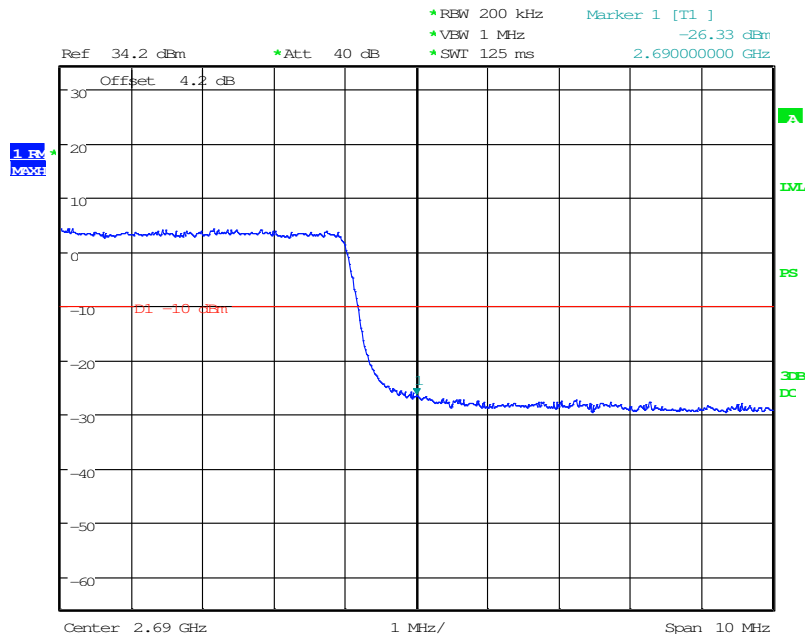
Date: 3.JUL.2015 19:41:10



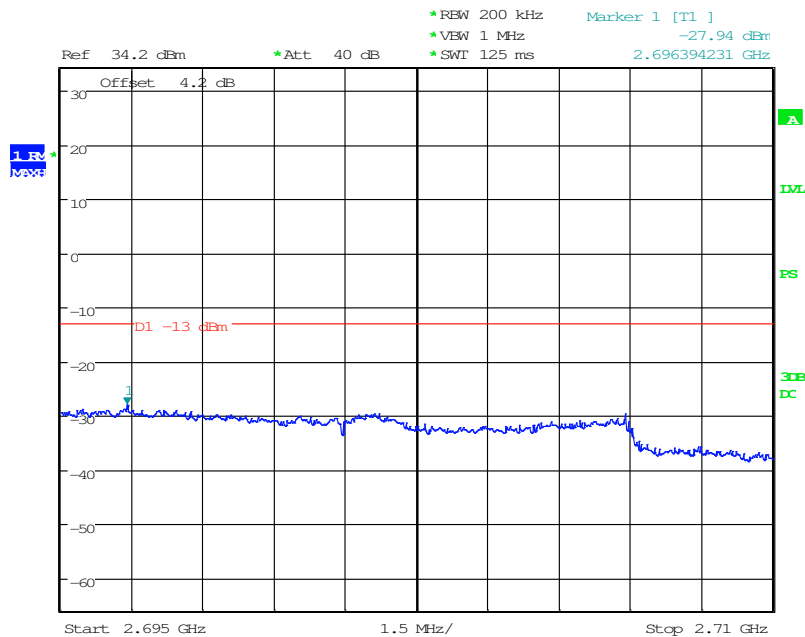
Date: 3.JUL.2015 19:43:53



## 20MHz bandwidth, QPSK,(100,0) Mode, Above 2690MHz

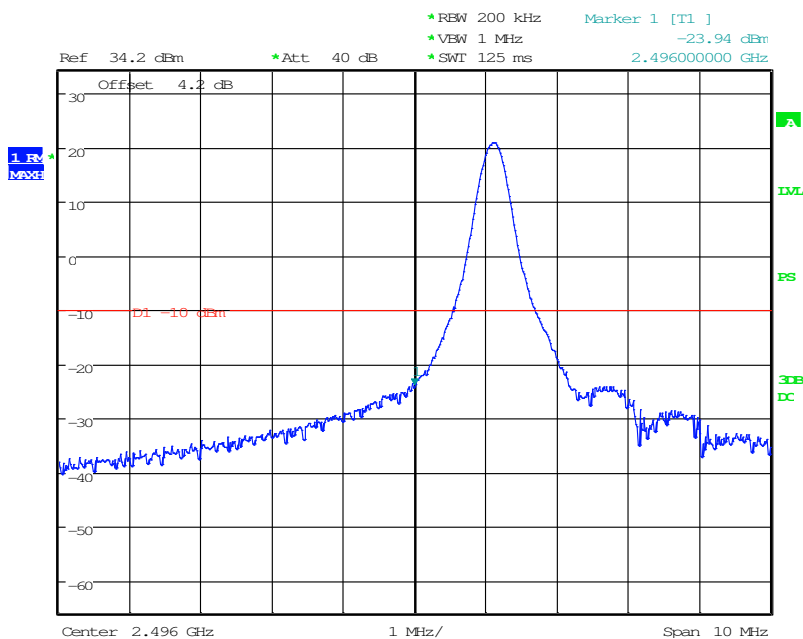


Date: 3.JUL.2015 19:41:25

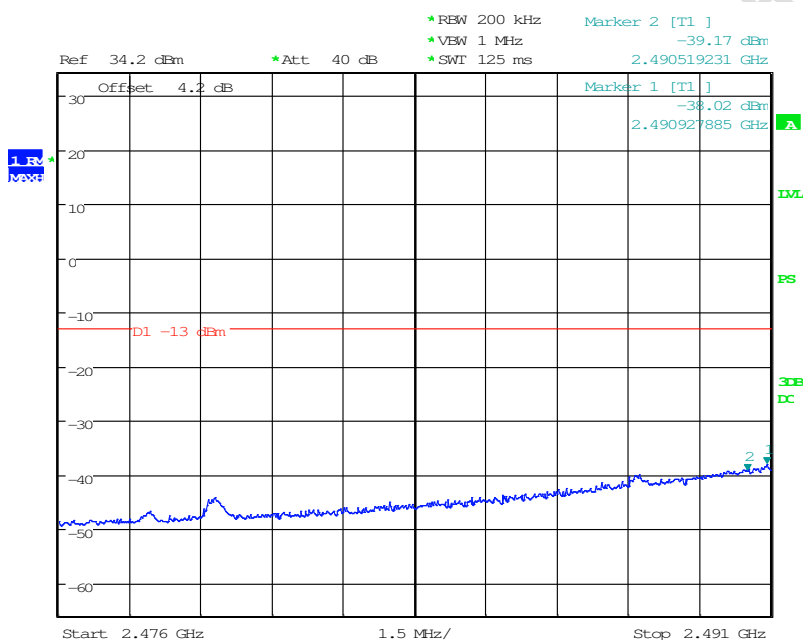


Date: 3.JUL.2015 19:43:14

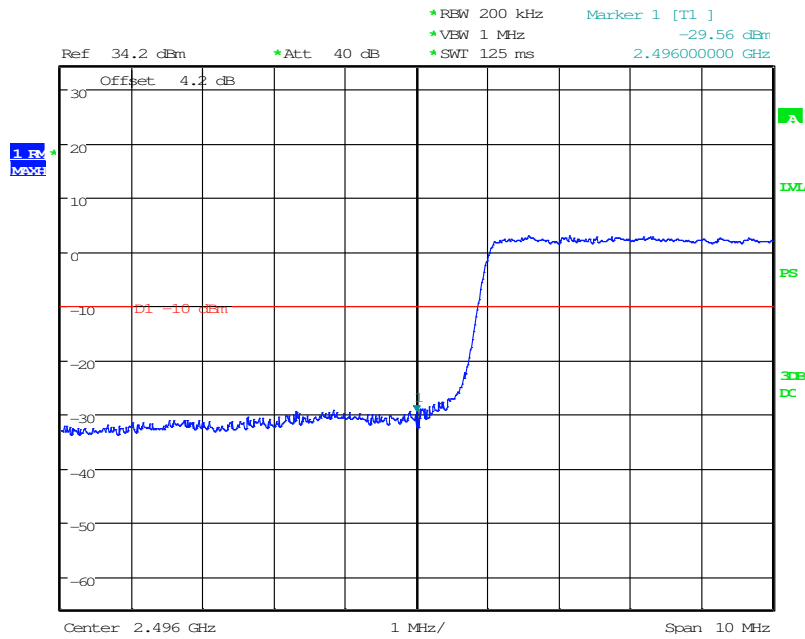
## 20MHz bandwidth, 16QAM,(1,0) Mode , below 2496MHz



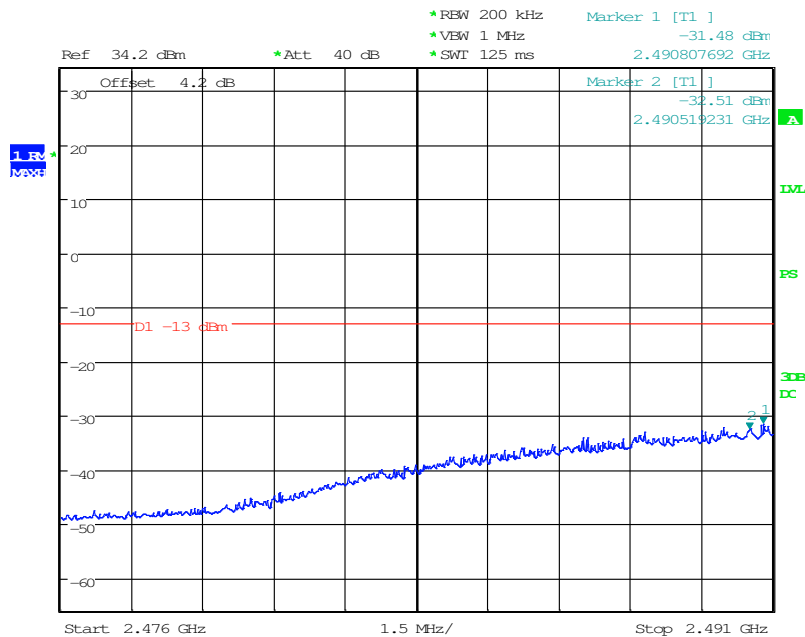
Date: 3.JUL.2015 19:37:26



Date: 3.JUL.2015 19:38:22

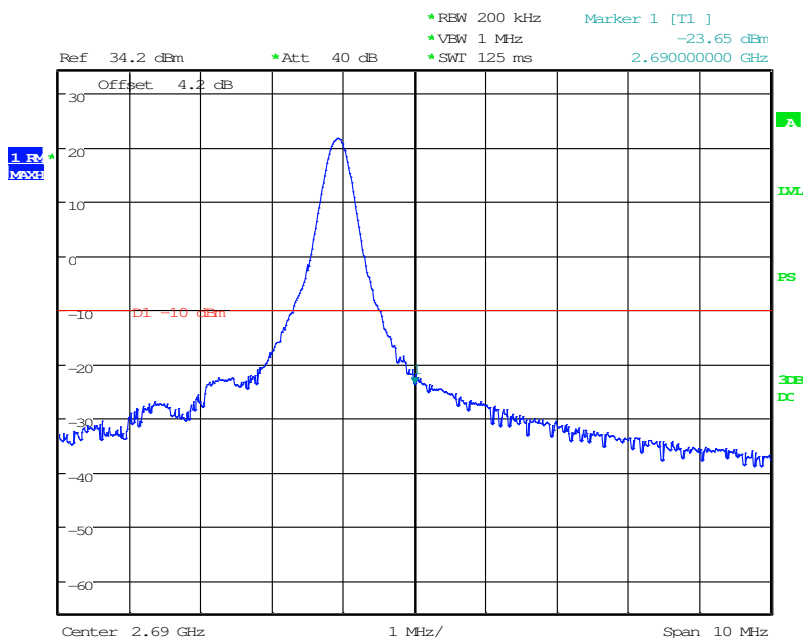
**20MHz bandwidth, 16QAM,(100,0) Mode , below 2496MHz**

Date: 3.JUL.2015 19:37:11

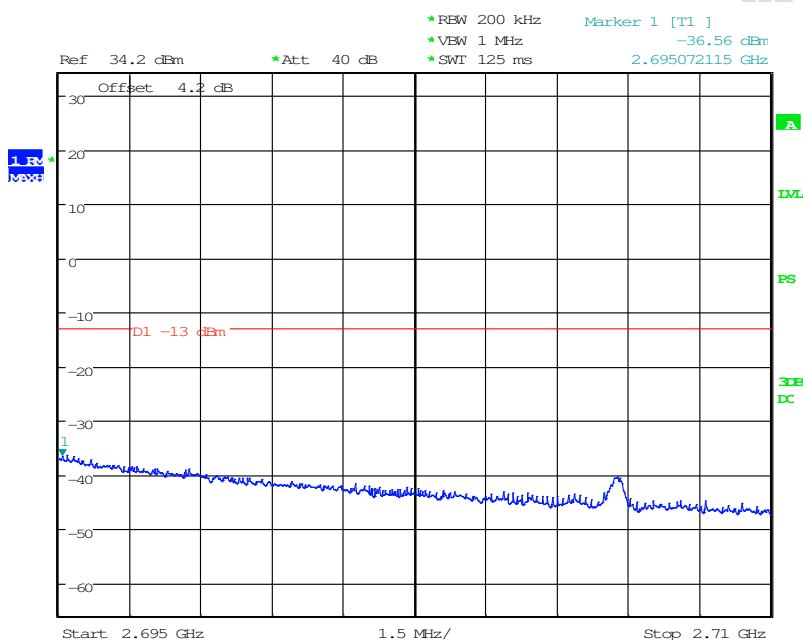


Date: 3.JUL.2015 19:38:38

## 20MHz bandwidth, 16QAM,(1,100) Mode, Above 2690MHz

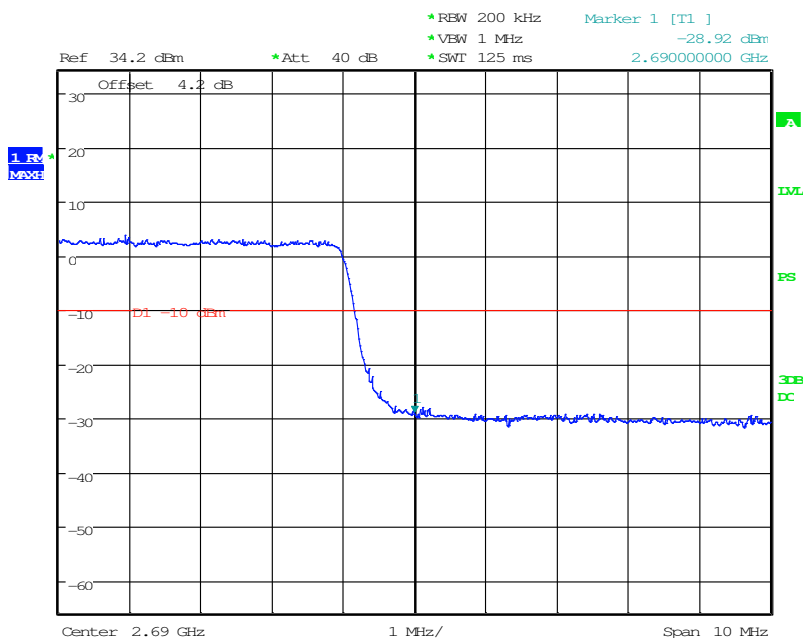


Date: 3.JUL.2015 19:41:53

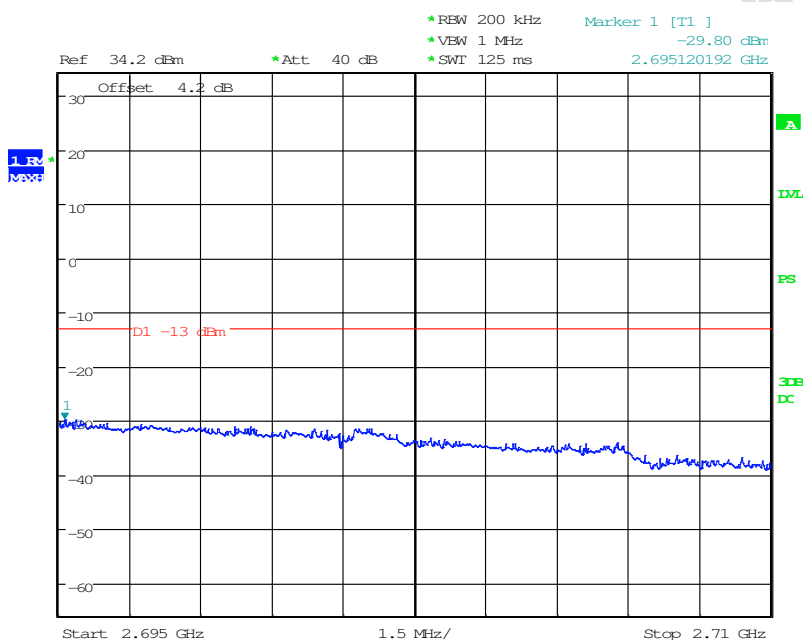


Date: 3.JUL.2015 19:42:44

## 20MHz bandwidth, 16QAM,(100,0) Mode, Above 2690MHz



Date: 3.JUL.2015 19:41:38

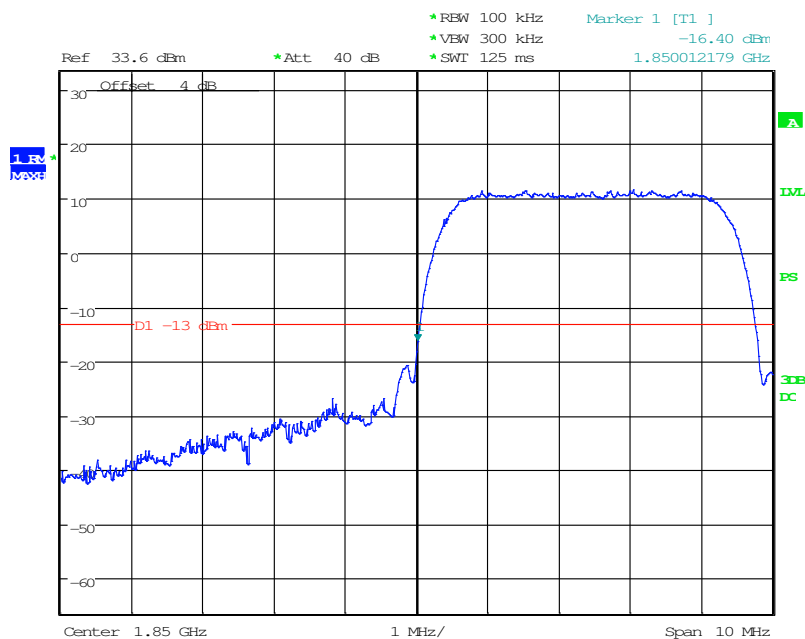


Date: 3.JUL.2015 19:42:56

#### 4.5.9 WCDMA B2 Band Edge Results

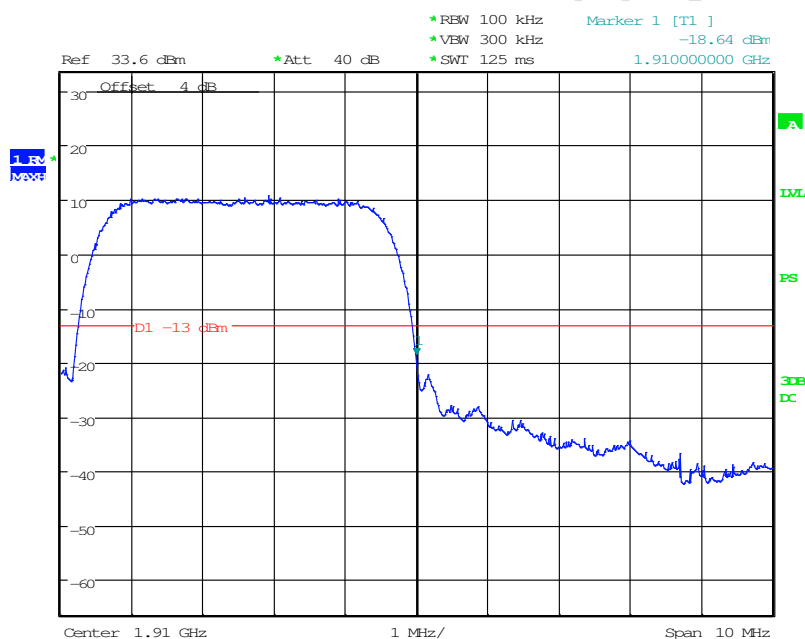
##### Graphical results:

##### Low Channel , Below 1850MHz



Date: 3.JUL.2015 13:18:16

##### High Channel , Above 1910MHz

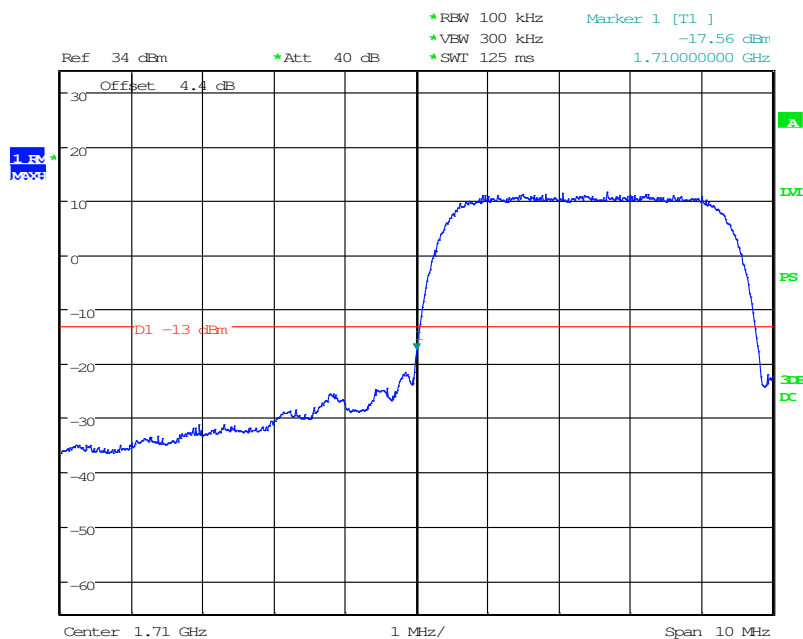


Date: 3.JUL.2015 13:19:00

#### 4.5.10 WCDMA B4 Band Edge Results

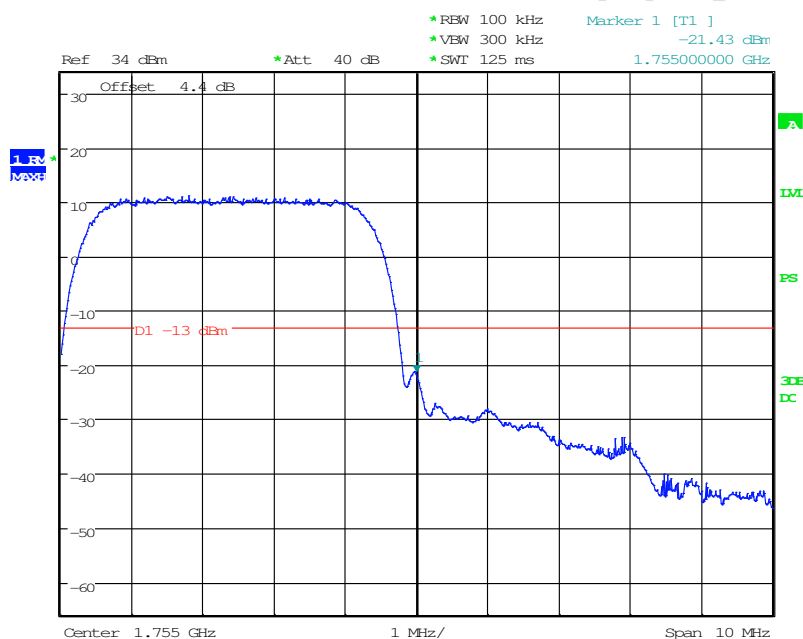
##### Graphical results:

##### Low Channel , Below 1710MHz



Date: 3.JUL.2015 13:20:34

##### High Channel , Above 1755MHz

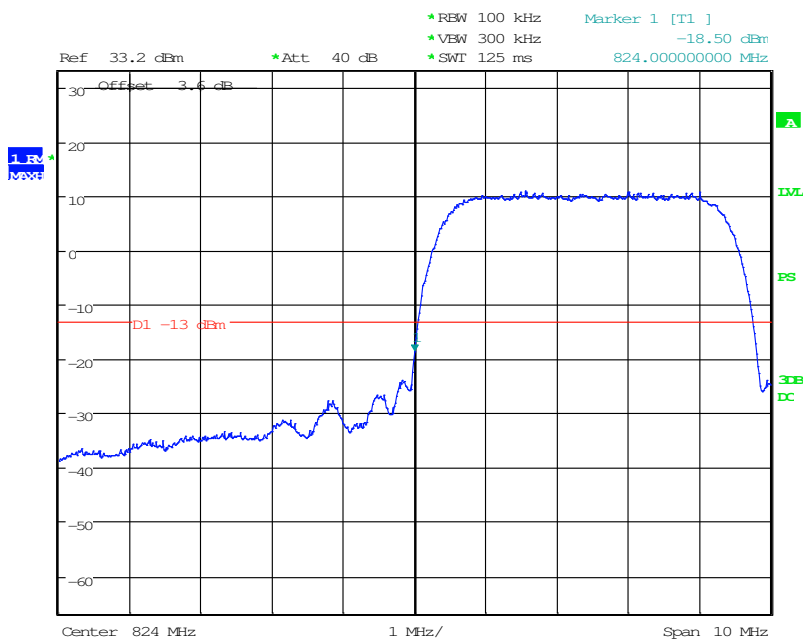


Date: 3.JUL.2015 13:21:13

#### 4.5.11 WCDMA B5 Band Edge Results

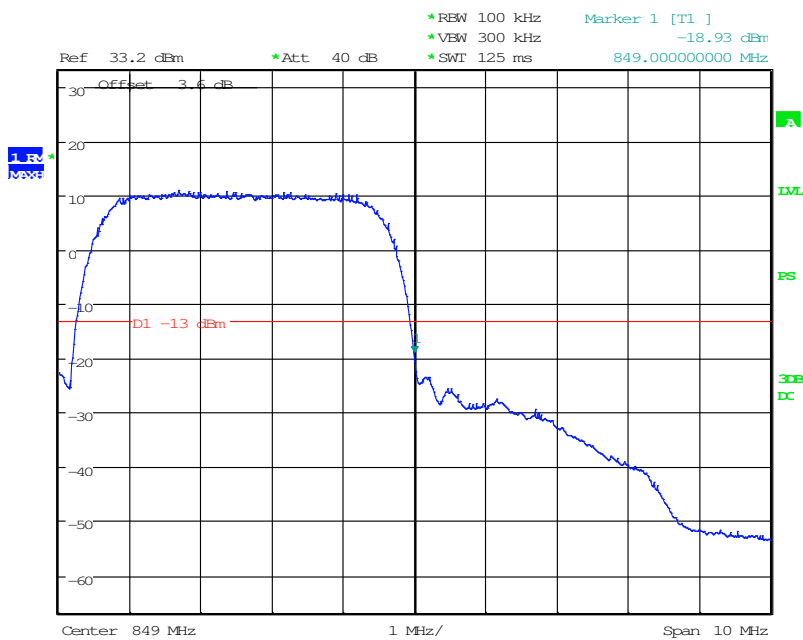
##### Graphical results:

##### Low Channel , Below 824MHz



Date: 3.JUL.2015 13:23:52

##### High Channel , Above 849MHz



Date: 3.JUL.2015 13:24:23



#### 4.6 Frequency Stability over Temperature Variation

|                         |                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------|
| <b>Specifications:</b>  | FCC Part 2.1055, 22.355, 24.235, 27.54, 90.213<br>RSS-130 4.3, RSS-132 4.3, RSS-133 6.3, RSS-199 4.3 |
| <b>Date of Test</b>     | 2015-06-24 to 2015-06-25                                                                             |
| <b>Test conditions:</b> | Ambient Temperature: -30℃-50℃<br>Relative Humidity: 30%-60%<br>Air pressure: 86-106kPa               |
| <b>Test Results:</b>    | Pass                                                                                                 |

| Limit                     |       |
|---------------------------|-------|
| Frequency deviation [ppm] | ± 2.5 |

#### Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.

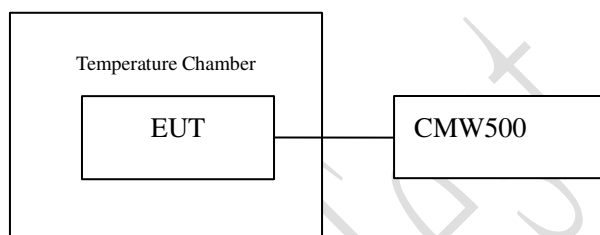


Figure T: setup for measurement of frequency stability over temperature variation

#### Test Method

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30℃ and allowed to stabilize.
3. The EUT temperature was allowed to stabilize for 45 minutes.
4. The EUT was turned on and set to transmit with Wireless Telecommunications Test Set.
5. The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.
6. The steps 3-5 were repeated for -30℃, -20℃, -10℃, 0℃, 10℃, 20℃, 30℃, 40℃ and 50℃.

**4.6.1 LTE Band Frequency Stability over Temperature Variation Results****Test data:**

Frequency stability is not affected by transmission bandwidth or modulation mode (QPSK, 16-QAM). The measurements below were performed with a 10 MHz transmission bandwidth and QPSK modulation.

| BAND | Offset | Temperature[°C] |         |         |         |         |         |         |         |         |
|------|--------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|
|      |        | -30             | -20     | -10     | 0       | 10      | 20      | 30      | 40      | 50      |
| 4    | Hz     | 14.97           | 12.13   | 18.59   | -22.34  | 21.50   | 7.88    | 13.87   | 10.57   | -18.81  |
|      | ppm    | 0.0086          | 0.0070  | 0.0107  | -0.0129 | 0.0124  | 0.0045  | 0.0080  | 0.0061  | -0.0109 |
| 7    | Hz     | 15.50           | -18.61  | 14.40   | 21.60   | -13.29  | 8.57    | 17.22   | -13.69  | 5.25    |
|      | ppm    | 0.0061          | -0.0073 | 0.0057  | 0.0085  | -0.0052 | 0.0034  | 0.0068  | -0.0054 | 0.0021  |
| 12   | Hz     | 8.19            | -12.81  | 15.72   | -11.28  | 18.74   | -14.13  | -18.56  | 20.97   | -14.40  |
|      | ppm    | 0.0116          | -0.0181 | 0.0222  | -0.0159 | 0.0265  | -0.0200 | -0.0262 | 0.0296  | -0.0204 |
| 13   | Hz     | -19.76          | 18.64   | -18.58  | 12.90   | 14.75   | -10.89  | 17.69   | 11.15   | 14.51   |
|      | ppm    | -0.0253         | 0.0238  | -0.0238 | 0.0165  | 0.0189  | -0.0139 | 0.0226  | 0.0143  | 0.0186  |
| 25   | Hz     | -20.14          | 19.91   | 10.88   | 11.15   | -15.70  | 14.72   | 13.37   | -18.94  | 10.10   |
|      | ppm    | -0.0107         | 0.0106  | 0.0058  | 0.0059  | -0.0083 | 0.0078  | 0.0071  | -0.0101 | 0.0054  |
| 26   | Hz     | -14.50          | -11.06  | -10.52  | 22.78   | 15.36   | -12.05  | 14.09   | 15.81   | -8.33   |
|      | ppm    | -0.0174         | -0.0133 | -0.0127 | 0.0274  | 0.0185  | -0.0145 | 0.0169  | 0.0190  | -0.0100 |
| 30   | Hz     | -22.20          | 11.85   | 16.98   | 16.68   | -13.21  | -14.80  | 15.55   | -4.11   | 18.37   |
|      | ppm    | -0.0096         | 0.0051  | 0.0074  | 0.0072  | -0.0057 | -0.0064 | 0.0067  | -0.0018 | 0.0080  |
| 41   | Hz     | -12.04          | 10.31   | -11.06  | 2.10    | 17.80   | -11.31  | -20.27  | 19.75   | 16.22   |
|      | ppm    | -0.0046         | 0.0040  | -0.0043 | 0.0008  | 0.0069  | -0.0044 | -0.0078 | 0.0076  | 0.0063  |

**4.6.2 WCDMA Band Frequency Stability over Temperature Variation****Results****Test data:**

| Band | Offset | Temperature[ °C] |         |         |         |         |         |         |         |        |
|------|--------|------------------|---------|---------|---------|---------|---------|---------|---------|--------|
|      |        | -30              | -20     | -10     | 0       | 10      | 20      | 30      | 40      | 50     |
| 2    | Hz     | 3.04             | 1.86    | 2.93    | -0.86   | 2.53    | 3.52    | 2.57    | -3.89   | 4.13   |
|      | ppm    | 0.0016           | 0.0010  | 0.0016  | -0.0005 | 0.0013  | 0.0019  | 0.0014  | -0.0021 | 0.0022 |
| 4    | Hz     | 2.33             | 0.78    | 2.12    | -2.13   | 4.80    | 2.37    | 4.70    | -2.12   | 3.29   |
|      | ppm    | 0.0013           | 0.0005  | 0.0012  | -0.0012 | 0.0028  | 0.0014  | 0.0027  | -0.0012 | 0.0019 |
| 5    | Hz     | 3.59             | -2.63   | -2.07   | 0.27    | -0.66   | -0.15   | -3.05   | 4.71    | 0.73   |
|      | ppm    | 0.0043           | -0.0031 | -0.0025 | 0.0003  | -0.0008 | -0.0002 | -0.0036 | 0.0056  | 0.0009 |

#### 4.7 Frequency Stability over Voltage Variation

|                         |                                                                                                      |
|-------------------------|------------------------------------------------------------------------------------------------------|
| <b>Specifications:</b>  | FCC Part 2.1055, 22.355, 24.235, 27.54, 90.213<br>RSS-130 4.3, RSS-132 4.3, RSS-133 6.3, RSS-199 4.3 |
| <b>Date of Test</b>     | 2015-06-24 to 2015-06-25                                                                             |
| <b>Test conditions:</b> | Ambient Temperature: 15°C-35°C<br>Relative Humidity: 30%-60%<br>Air pressure: 86-106kPa              |
| <b>Test Results:</b>    | Pass                                                                                                 |

| Limit                     |           |
|---------------------------|-----------|
| Frequency deviation [ppm] | $\pm 2.5$ |

#### Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.

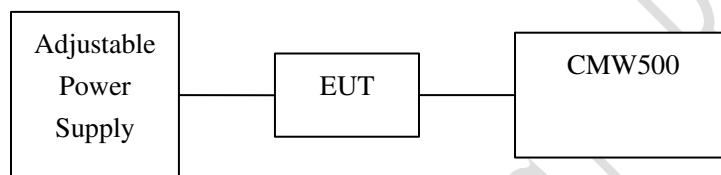


Figure V: test setup for measurement of frequency stability over voltage variation

#### Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

## 4.7.1 LTE Band Frequency Stability over Voltage Variation Results

## Test data:

| BAND | Offset | Voltage (V) |         |         |
|------|--------|-------------|---------|---------|
|      |        | 3.15        | 3.7     | 4.25    |
| 4    | Hz     | -10.77      | 5.69    | -24.48  |
|      | ppm    | -0.0062     | 0.0033  | -0.0141 |
| 7    | Hz     | -16.28      | 5.06    | 29.17   |
|      | ppm    | -0.0064     | 0.0020  | 0.0115  |
| 12   | Hz     | -7.08       | -12.92  | 21.73   |
|      | ppm    | -0.0100     | -0.0183 | 0.0307  |
| 13   | Hz     | -17.67      | -8.25   | 28.94   |
|      | ppm    | -0.0226     | -0.0105 | 0.0370  |
| 25   | Hz     | 16.48       | 15.12   | 11.13   |
|      | ppm    | 0.0088      | 0.0080  | 0.0059  |
| 26   | Hz     | -21.29      | -11.40  | 15.28   |
|      | ppm    | -0.0256     | -0.0137 | 0.0184  |
| 30   | Hz     | 27.37       | -17.85  | 8.48    |
|      | ppm    | 0.0118      | -0.0077 | 0.0037  |
| 41   | Hz     | 32.22       | -12.56  | -15.85  |
|      | ppm    | 0.0124      | -0.0048 | -0.0061 |

**4.7.2 WCDMA Band Frequency Stability over Voltage Variation Results****Test data:**

| Band | Offset | Voltage (V) |         |         |
|------|--------|-------------|---------|---------|
|      |        | 3.15        | 3.7     | 4.25    |
| 2    | Hz     | 0.40        | 3.68    | -0.92   |
|      | ppm    | 0.0002      | 0.0020  | -0.0005 |
| 4    | Hz     | 2.37        | -1.18   | -2.98   |
|      | ppm    | 0.0014      | -0.0007 | -0.0017 |
| 5    | Hz     | -0.60       | -0.64   | 0.14    |
|      | ppm    | -0.0007     | -0.0008 | 0.0002  |

#### 4.8 Peak to Average Ratio

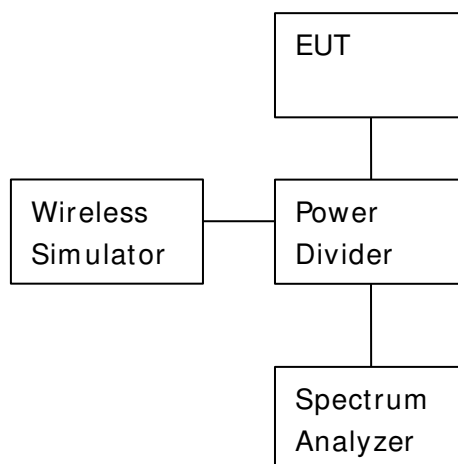
|                         |                                                                                         |
|-------------------------|-----------------------------------------------------------------------------------------|
| <b>Specifications:</b>  | FCC Part 24.232, 27.50, RSS-130 4.4                                                     |
| <b>Date of Tests</b>    | 2015-06-18-2015-07-03                                                                   |
| <b>Test conditions:</b> | Ambient Temperature: 15°C-35°C<br>Relative Humidity: 30%-60%<br>Air pressure: 86-106kPa |
| <b>Test Results:</b>    | Pass                                                                                    |

##### Limit

The EUT meets the requirement of having a peak to average ratio of less than 13dB.

##### Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



##### Test Method

The transmitter output was connected to a CMW500 through a coaxial RF cable and directional coupler, and configured to operate at maximum power. The peak to average ratio was measured at the required operating frequencies in each band on the Spectrum Analyzer.

**4.8.1 LTE B4 Peak to Average Ratio Results****Test Data**

|       | EUT channel No.      | bandwidth | Peak to Average Ratio |
|-------|----------------------|-----------|-----------------------|
| QPSK  | 20175<br>(1732.5MHz) | 10MHz     | 5.48                  |
| 16QAM |                      |           | 6.39                  |

**4.8.2 LTE B7 Peak to Average Ratio Results****Test Data**

|       | EUT channel No.    | bandwidth | Peak to Average Ratio |
|-------|--------------------|-----------|-----------------------|
| QPSK  | 21100<br>(2535MHz) | 10MHz     | 6.26                  |
| 16QAM |                    |           | 7.13                  |

**4.8.3 LTE B12 Peak to Average Ratio Results****Test Data**

|       | EUT channel No.     | bandwidth | Peak to Average Ratio |
|-------|---------------------|-----------|-----------------------|
| QPSK  | 23095<br>(707.5MHz) | 10MHz     | 6.60                  |
| 16QAM |                     |           | 7.33                  |

**4.8.4 LTE B13 Peak to Average Ratio Results****Test Data**

|       | EUT channel No.   | bandwidth | Peak to Average Ratio |
|-------|-------------------|-----------|-----------------------|
| QPSK  | 23230<br>(782MHz) | 10MHz     | 6.41                  |
| 16QAM |                   |           | 7.58                  |



**4.8.5 LTE B25 Peak to Average Ratio Results****Test Data**

|       | EUT channel No. | bandwidth | Peak to Average Ratio |
|-------|-----------------|-----------|-----------------------|
| QPSK  | 26365           | 10MHz     | 6.61                  |
| 16QAM | (1882.5MHz)     |           | 7.34                  |

**4.8.6 LTE B26 Peak to Average Ratio Results****Test Data**

|       | EUT channel No. | bandwidth | Peak to Average Ratio |
|-------|-----------------|-----------|-----------------------|
| QPSK  | 26865           | 10MHz     | 6.74                  |
| 16QAM | (831.5MHz)      |           | 7.58                  |

**4.8.7 LTE B30 Peak to Average Ratio Results****Test Data**

|       | EUT channel No. | bandwidth | Peak to Average Ratio |
|-------|-----------------|-----------|-----------------------|
| QPSK  | 27710           | 10MHz     | 6.23                  |
| 16QAM | (2310MHz)       |           | 6.99                  |

**4.8.8 LTE B41 Peak to Average Ratio Results****Test Data**

|       | EUT channel No. | bandwidth | Peak to Average Ratio |
|-------|-----------------|-----------|-----------------------|
| QPSK  | 40620           | 10MHz     | 11.14                 |
| 16QAM | (2593MHz)       |           | 11.15                 |

**4.8.9 WCDMA B2 Peak to Average Ratio Results****Test Data**

| Frequency<br>(MHz) | EUT channel<br>No. | Modulation | Peak to Average Ratio |
|--------------------|--------------------|------------|-----------------------|
| 1880               | 9400               | QPSK       | 3.61                  |

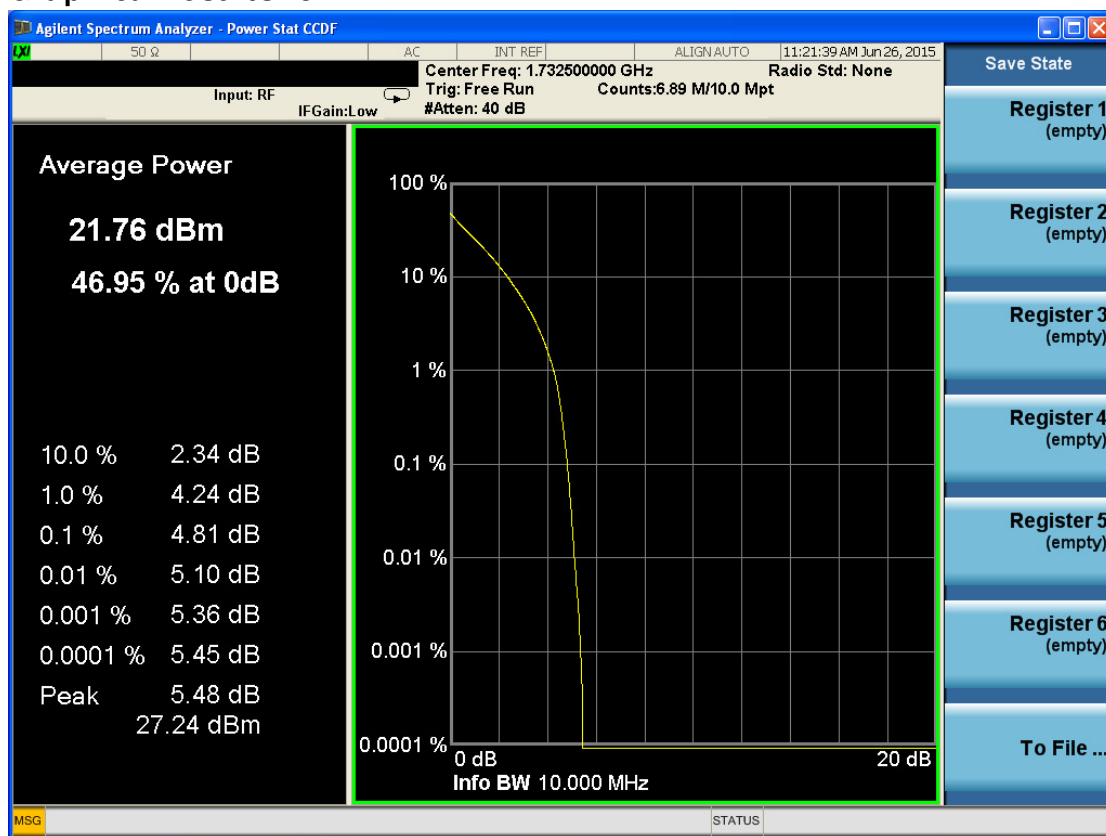
**4.8.10 WCDMA B4 Peak to Average Ratio Results****Test Data**

| Frequency<br>(MHz) | EUT channel<br>No. | Modulation | Peak to Average Ratio |
|--------------------|--------------------|------------|-----------------------|
| 1732.4             | 1412               | QPSK       | 2.97                  |

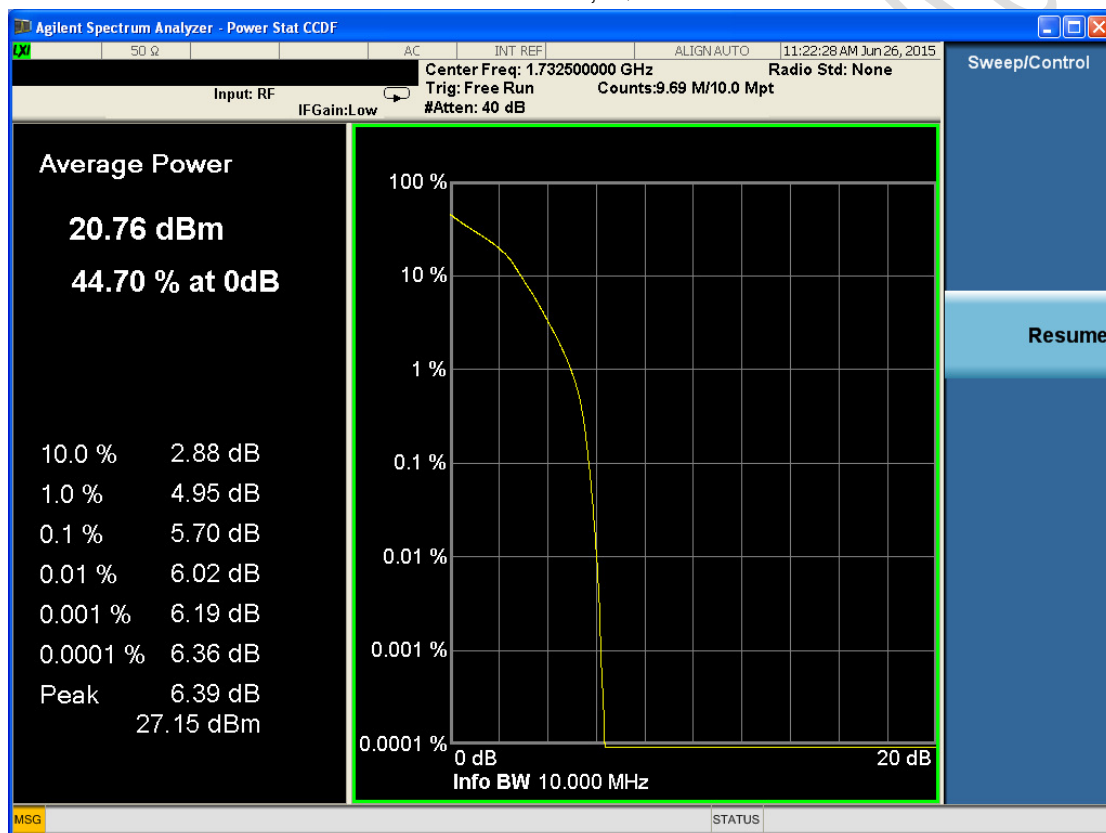
**4.8.11 WCDMA B5 Peak to Average Ratio Results****Test Data**

| Frequency<br>(MHz) | EUT channel<br>No. | Modulation | Peak to Average Ratio |
|--------------------|--------------------|------------|-----------------------|
| 836.4              | 4182               | QPSK       | 3.69                  |

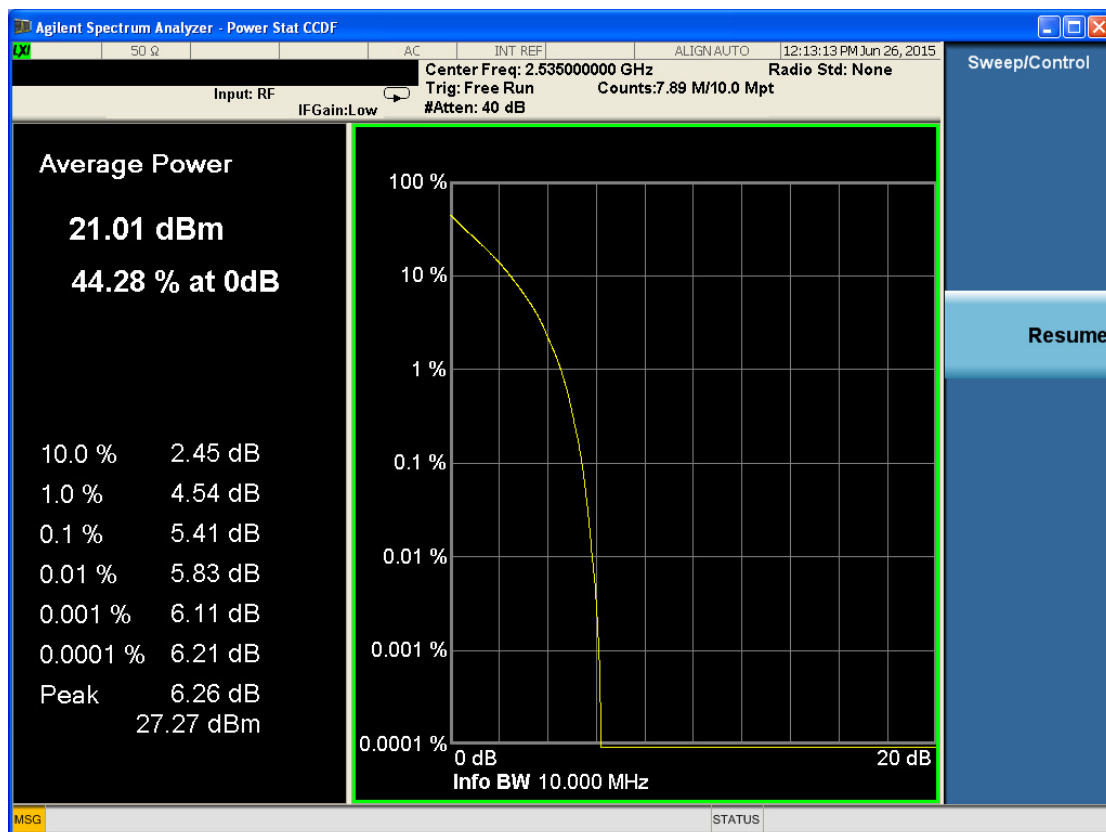
## Graphical results for LTE B4:



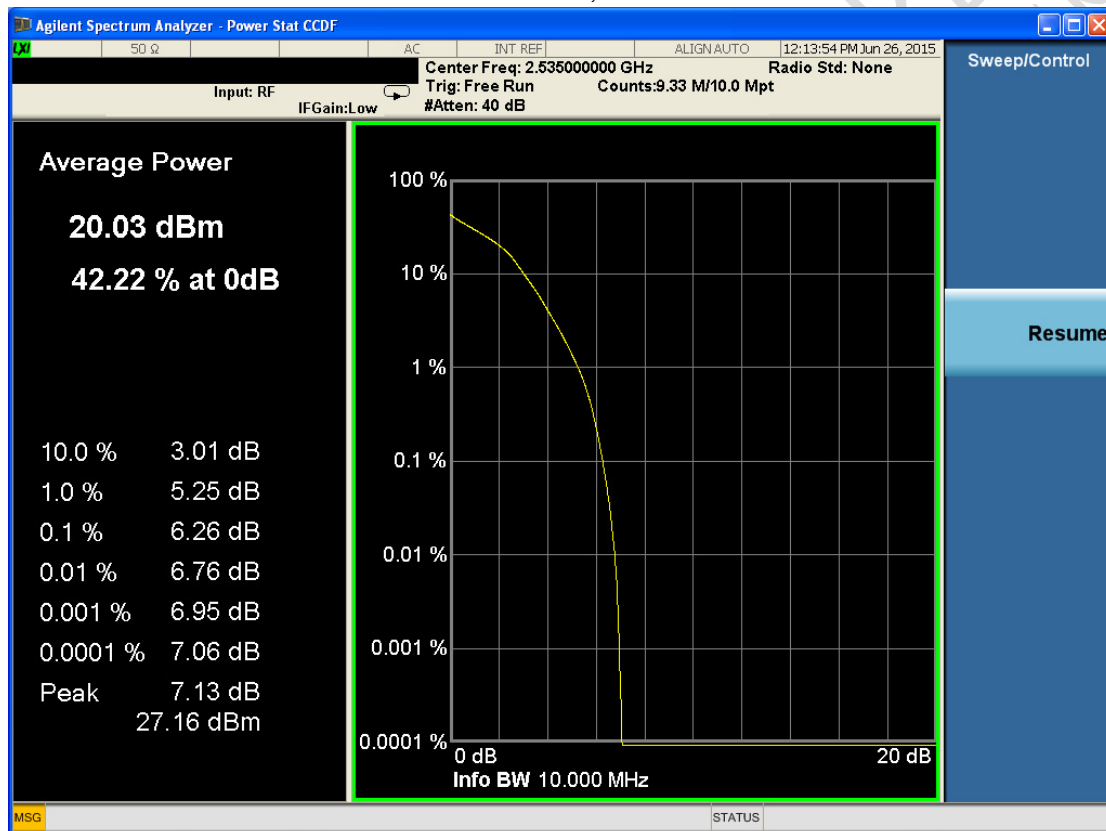
LTE Band4, QPSK



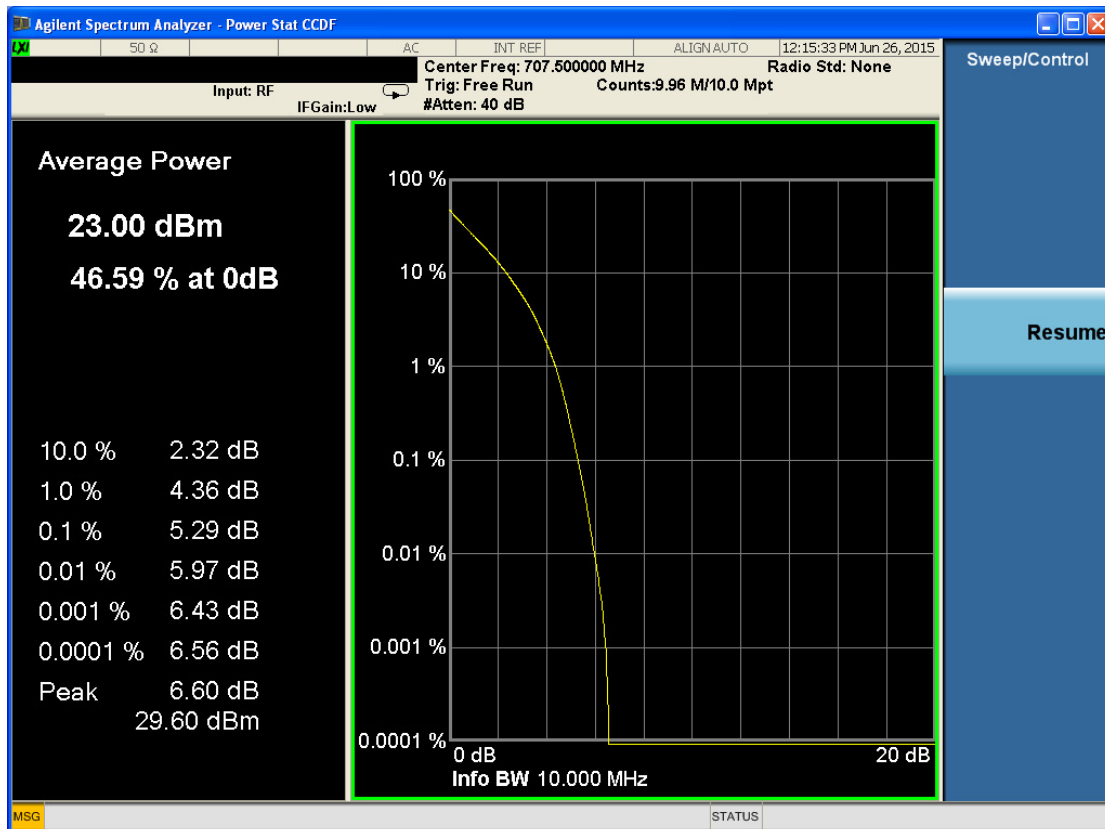
LTE Band4, 16QAM



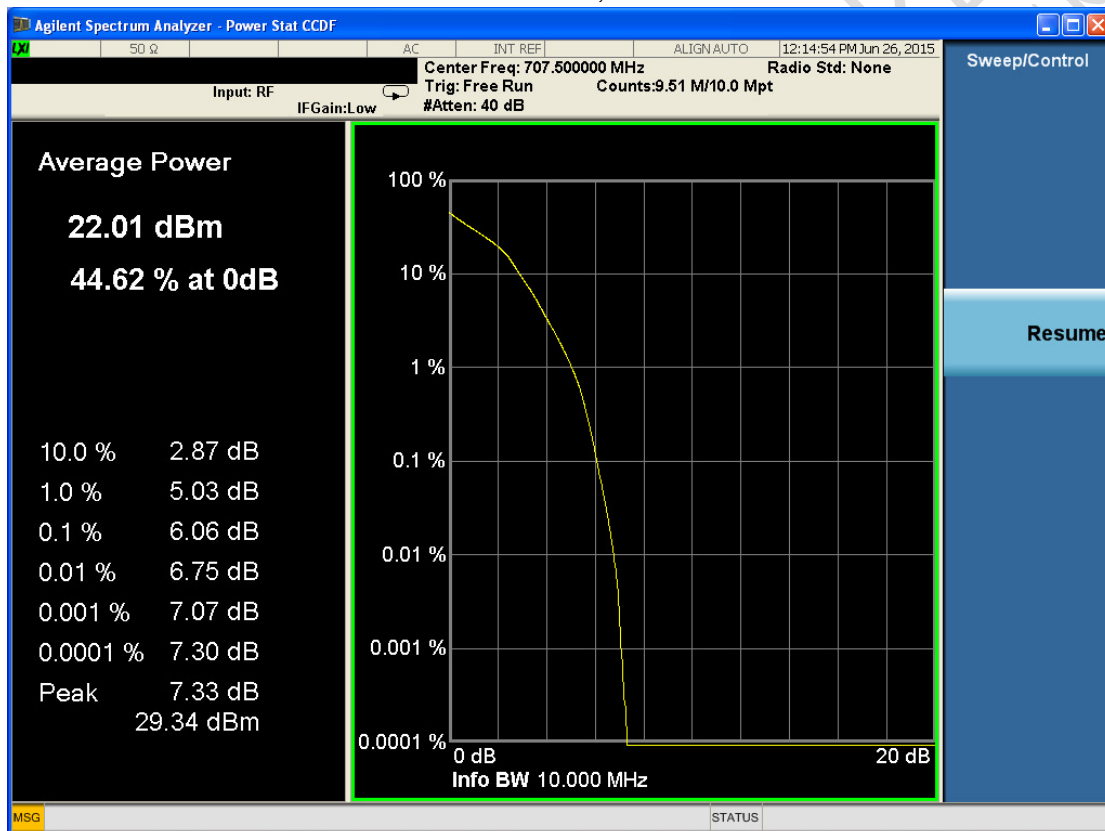
LTE Band7, QPSK



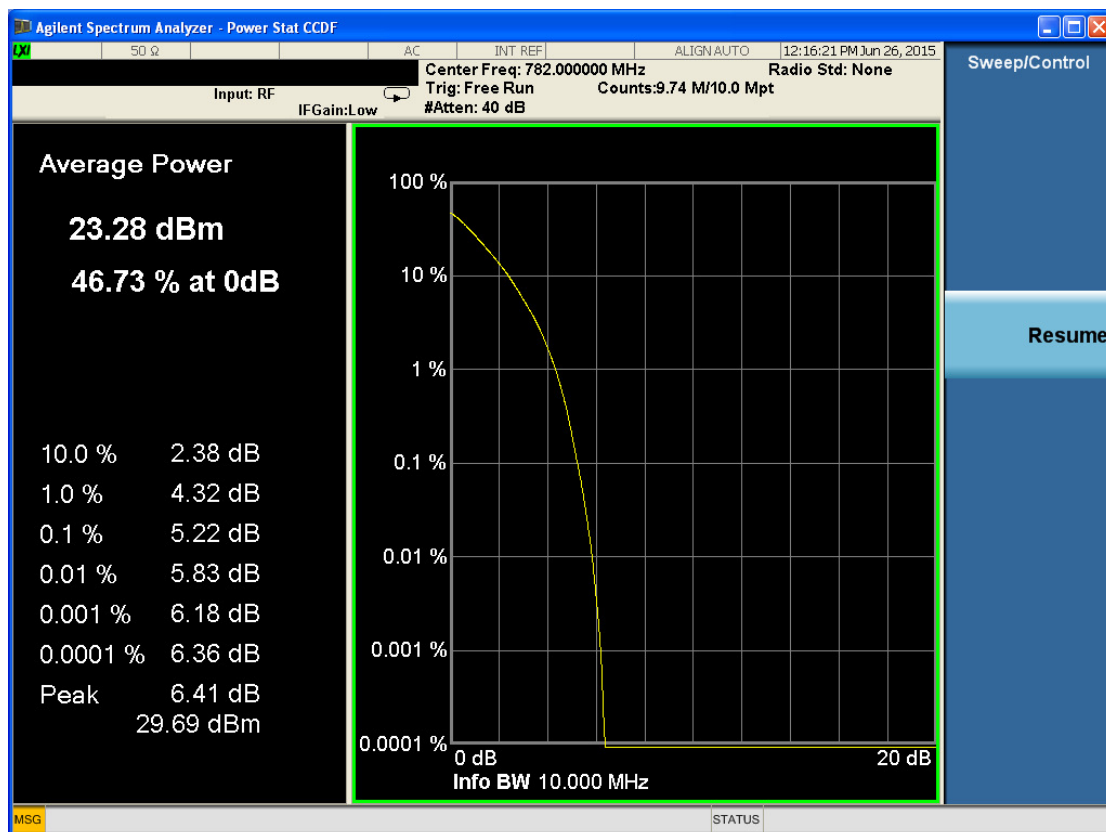
LTE Band7, 16QAM



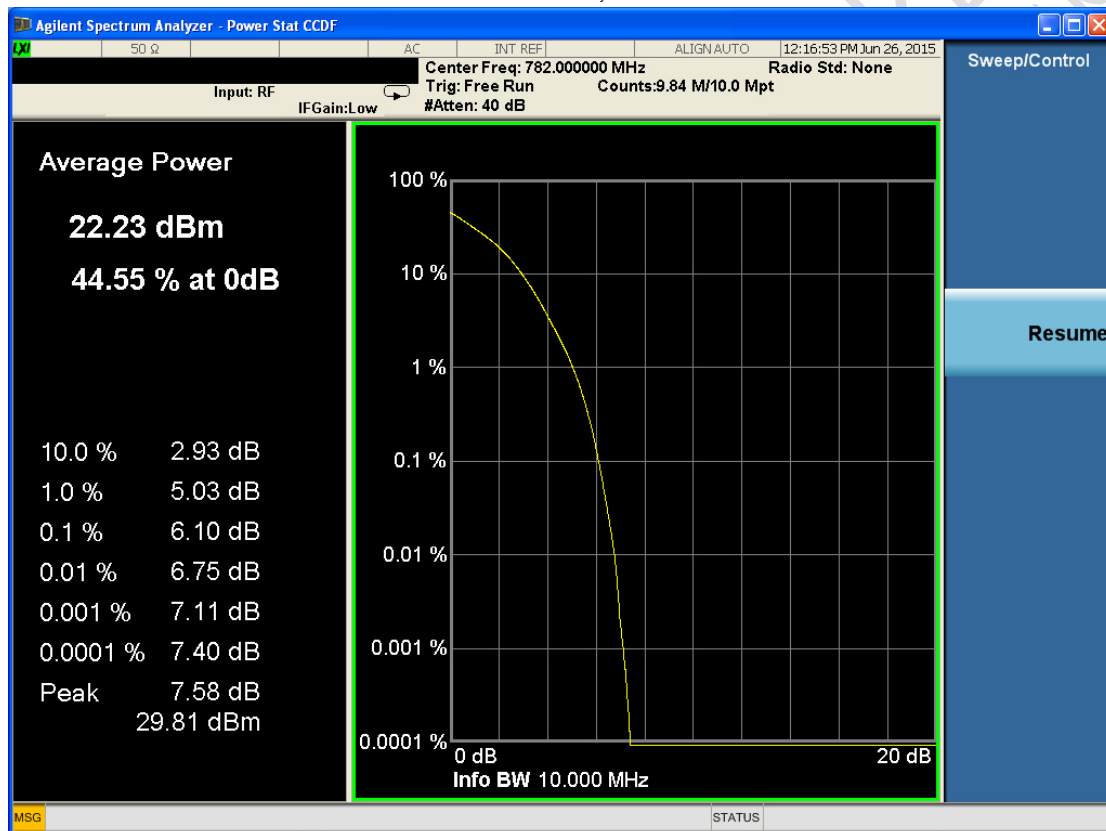
LTE Band12, QPSK



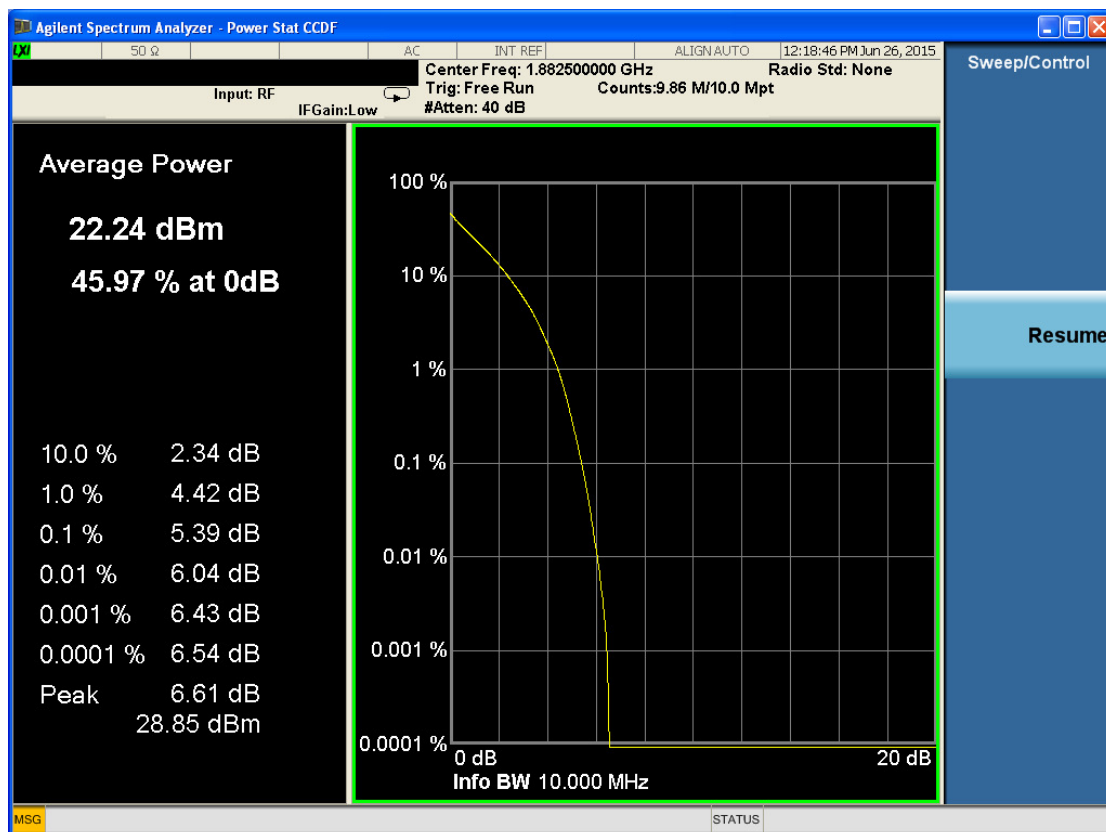
LTE Band12, 16QAM



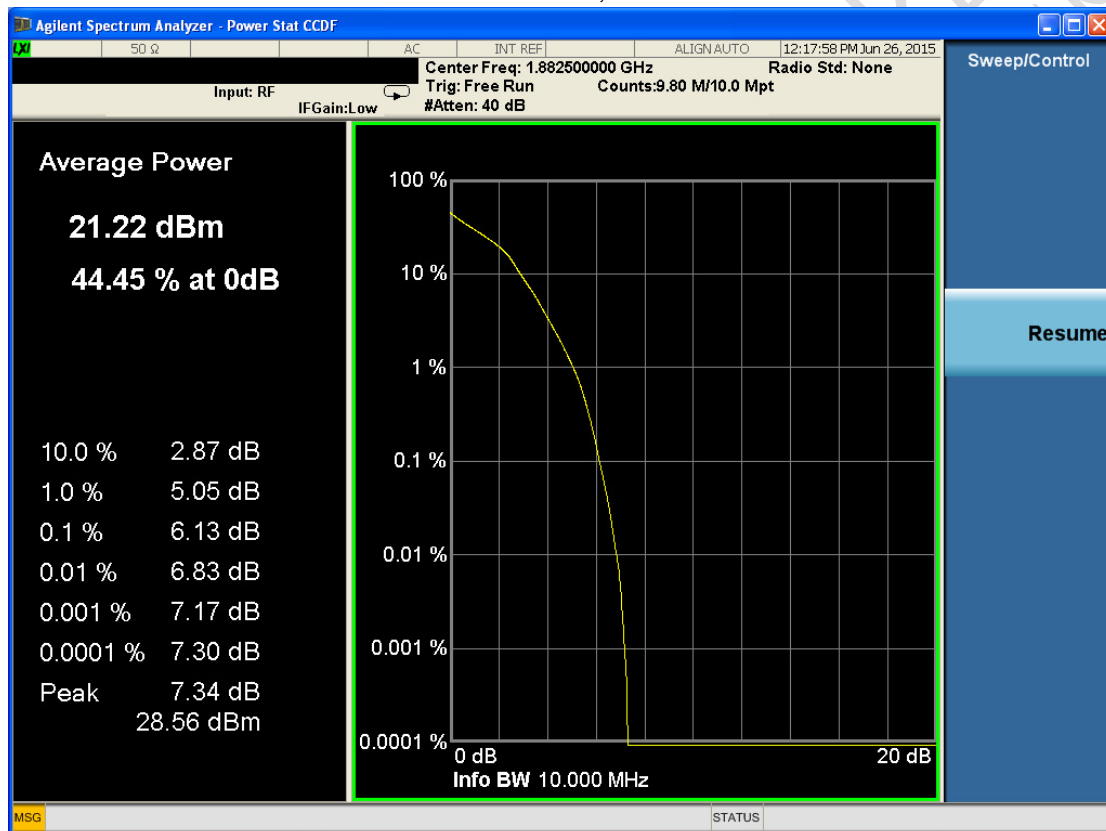
LTE Band13, QPSK



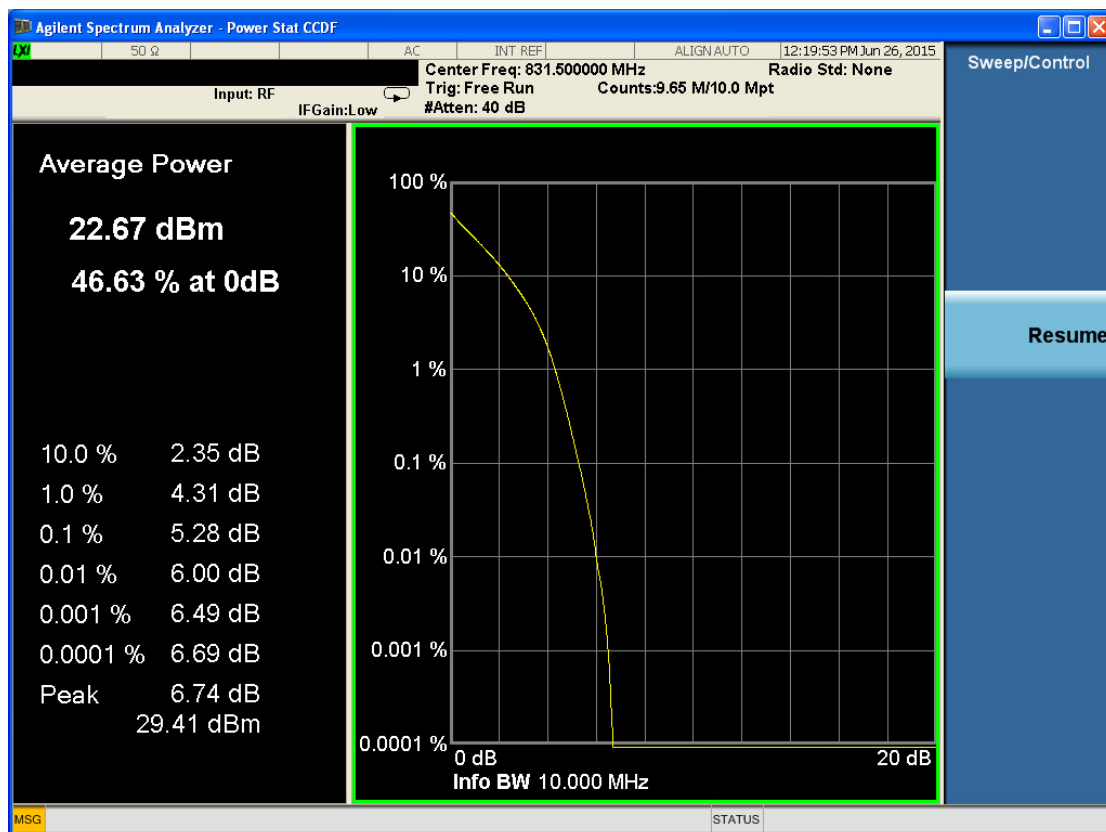
LTE Band13, 16QAM



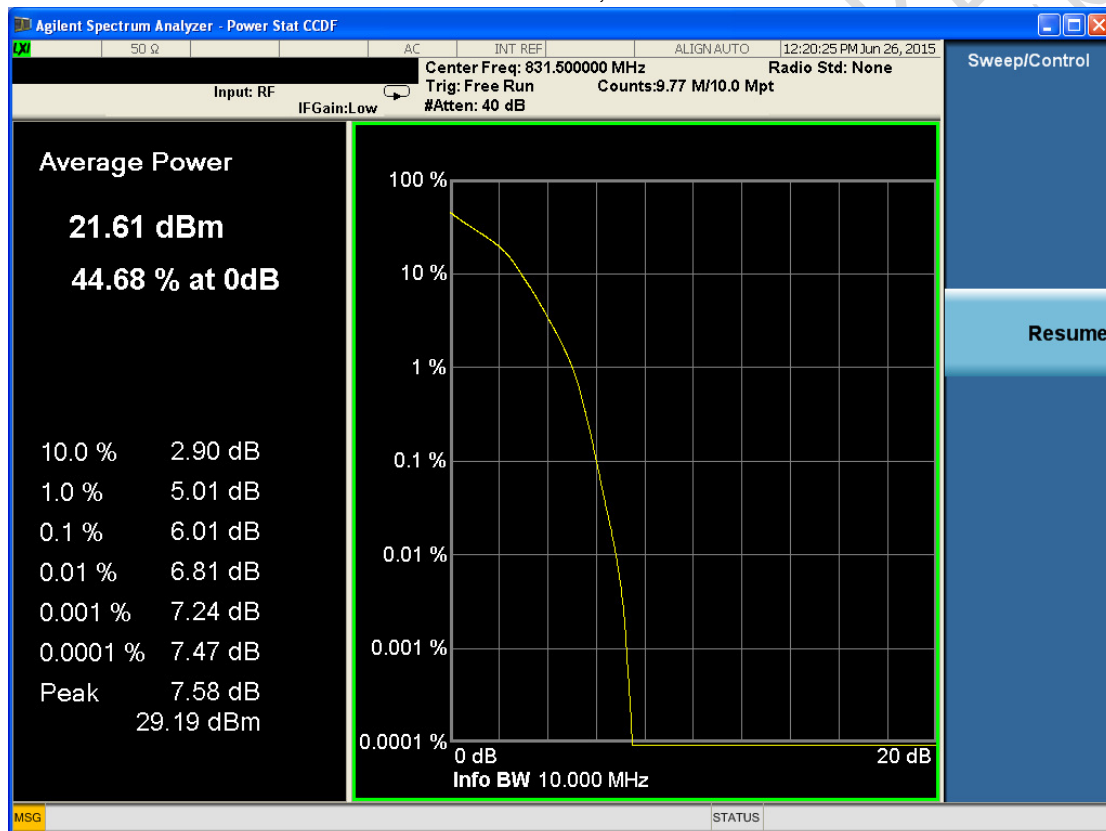
LTE Band25, QPSK



LTE Band25, 16QAM

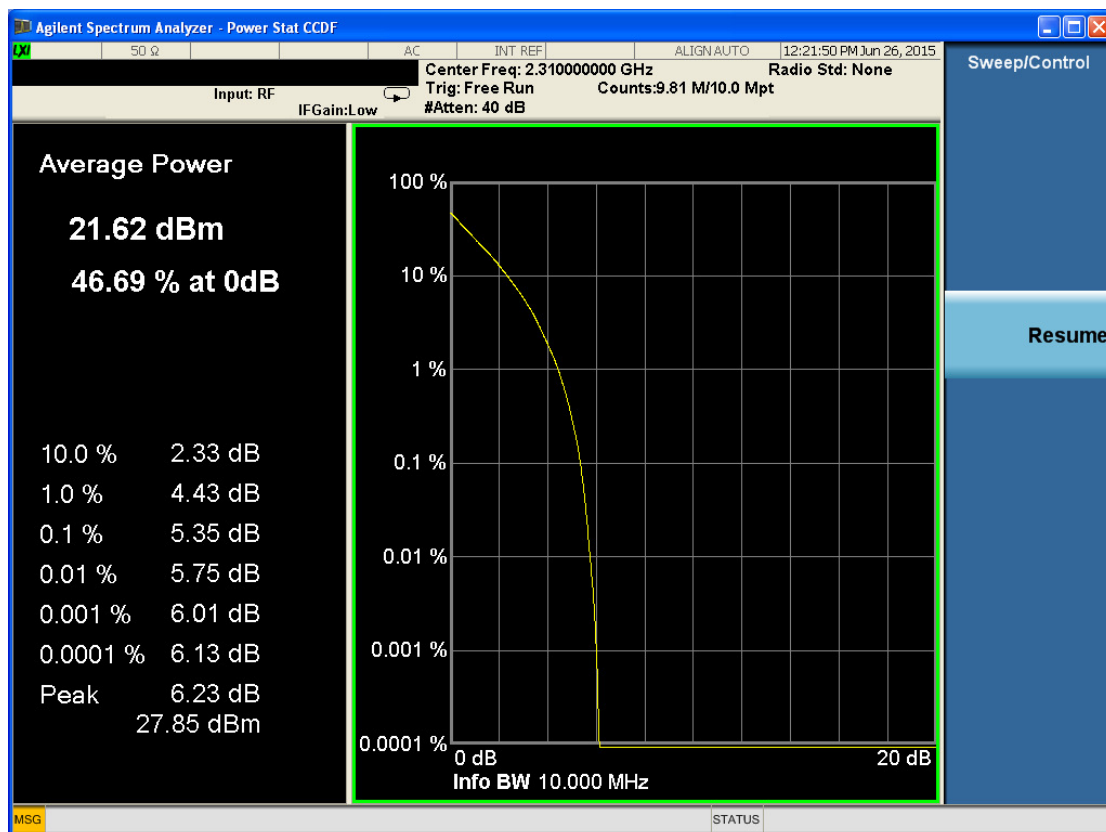


LTE Band26, QPSK

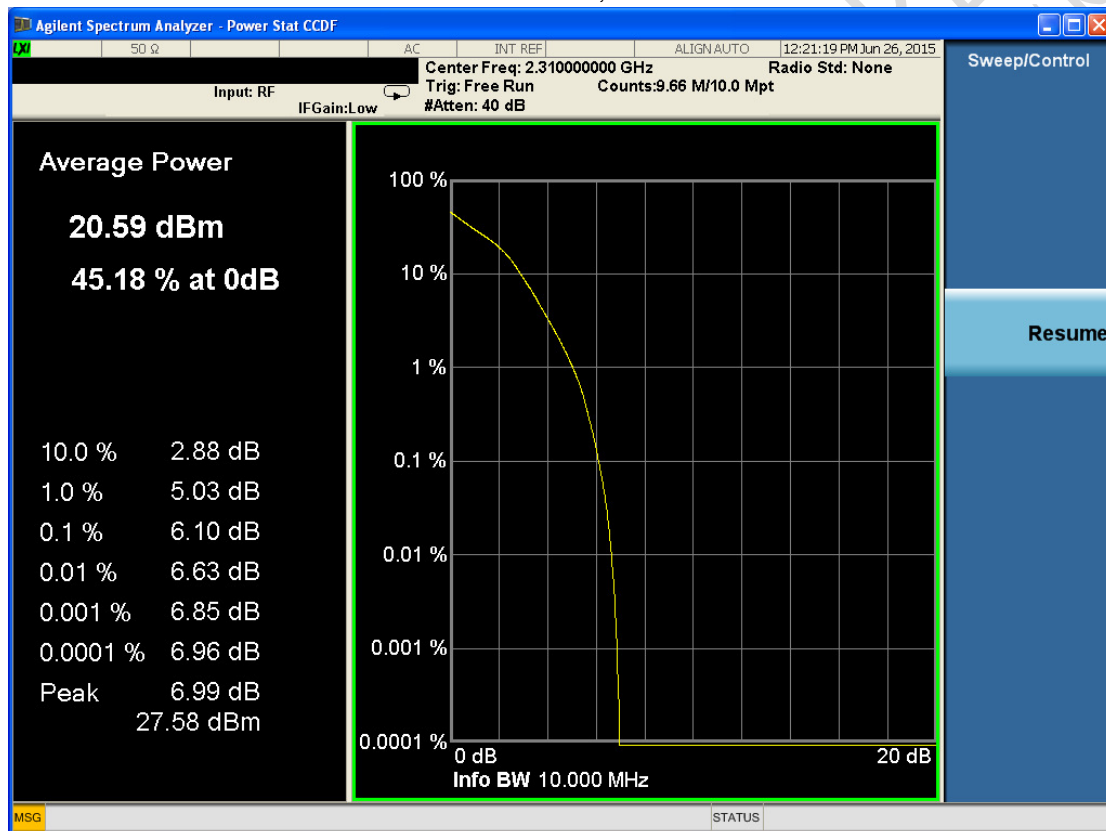


LTE Band26, 16QAM

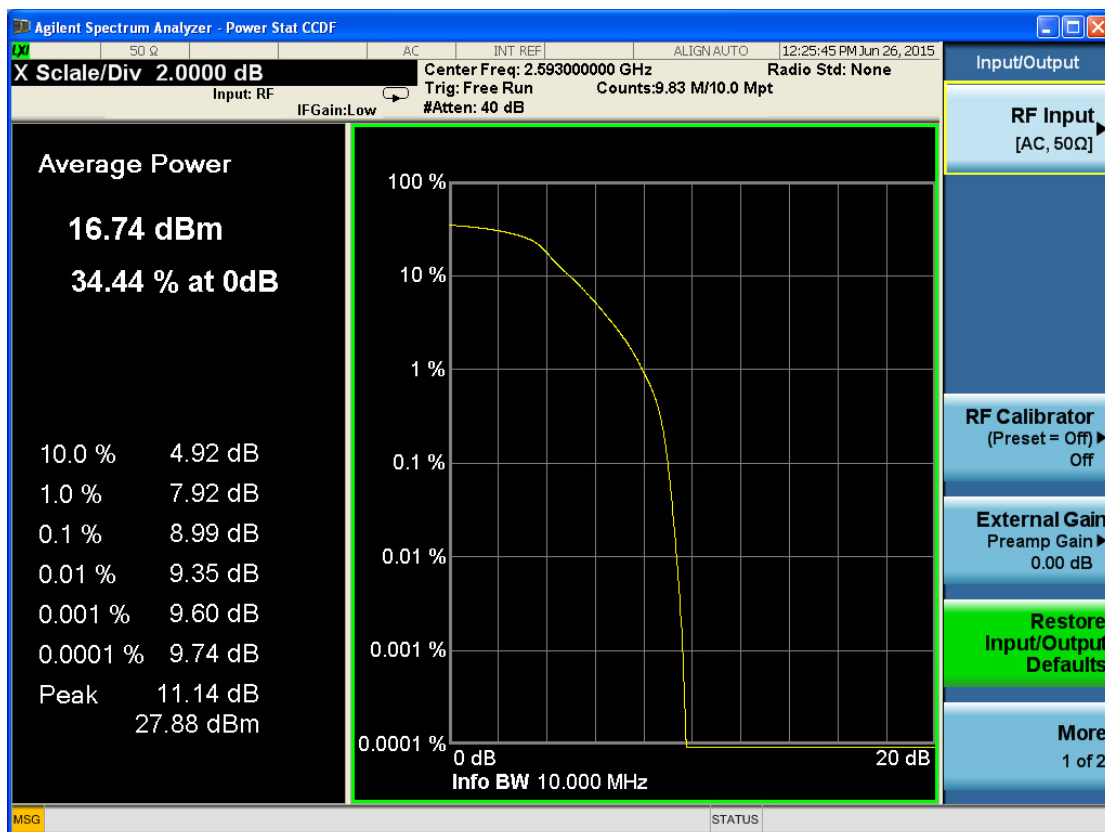




LTE Band30, QPSK



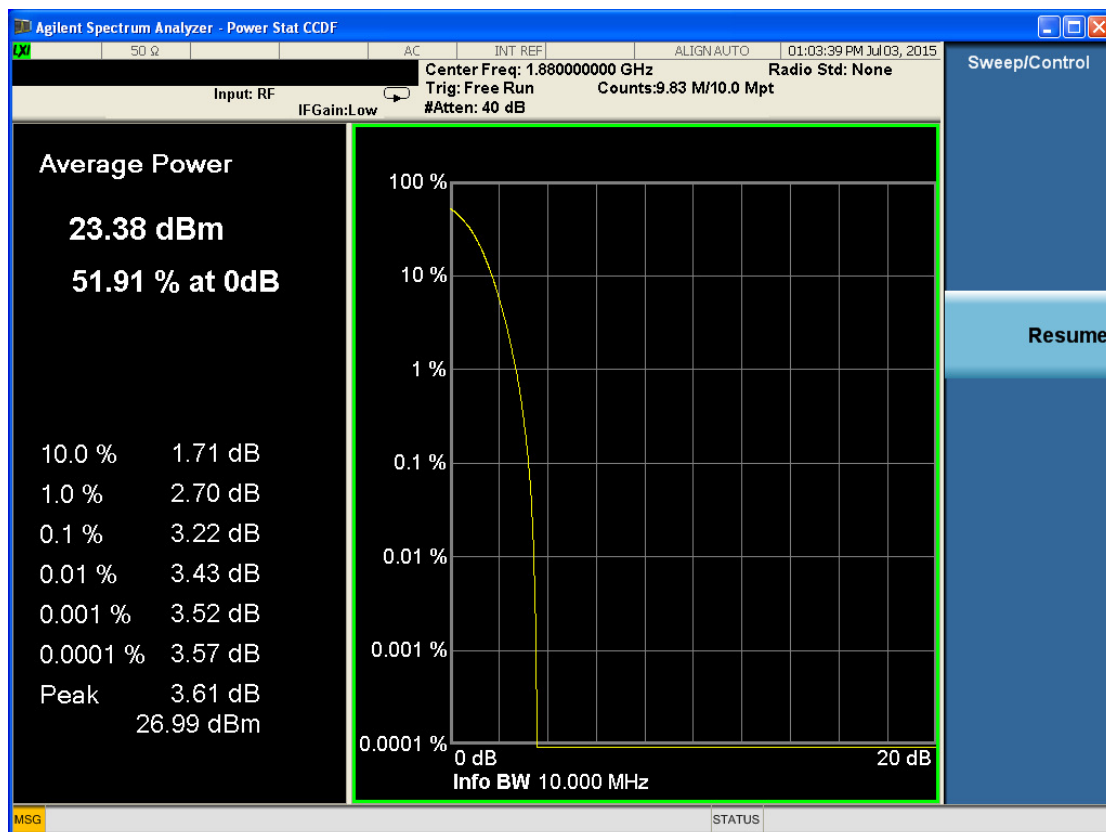
LTE Band30, 16QAM



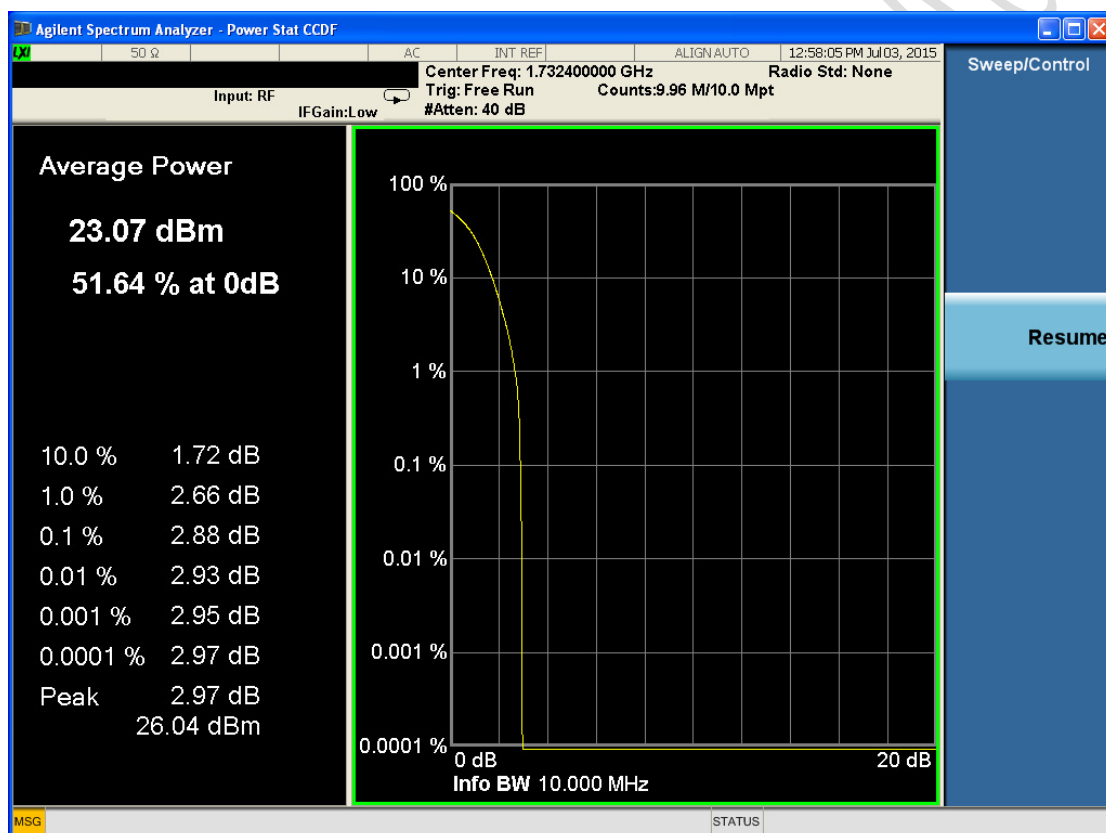
LTE Band41, QPSK



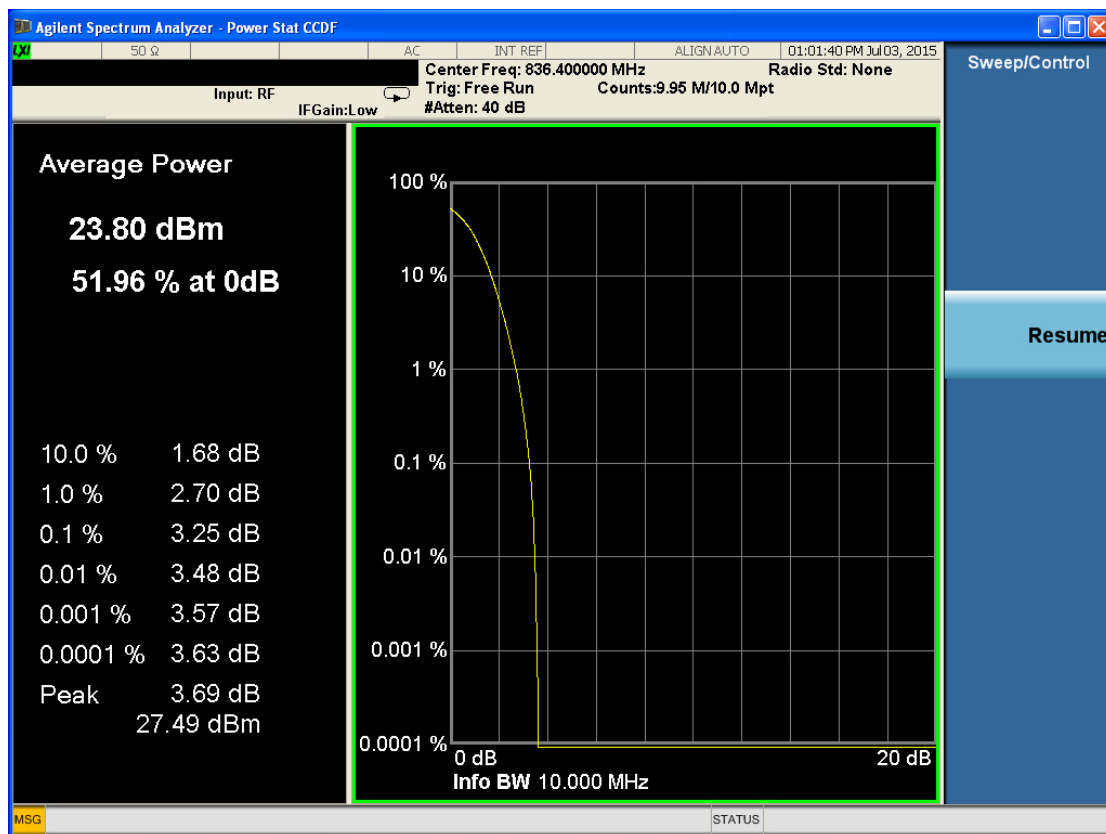
LTE Band41, 16QAM



WCDMA Band2, QPSK



WCDMA Band4, QPSK



WCDMA Band5, QPSK

## **Annex A Photos of EM7455**

See Attachment Annex A.

## **Annex B Photos of development board**

See Attachment Annex B.

## **ANNEX C Deviations from Prescribed Test Methods**

No deviation from Prescribed Test Methods.

\_\_\_\_\_ **The End of this Report** \_\_\_\_\_