



# **FCC RF Test Report**

**Product Name: LTE/CDMA 1X/EVDO Mobile Phone with  
Bluetooth**

**Model Number: HUAWEI M920**

**Report No: SYBH(Z-RF)005112011-2001  
FCC ID: QISM920**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

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## Notice

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
2. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-2.
4. The test report is invalid if not marked with "exclusive stamp for the test report".
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8. Normally, the test report is only responsible for the samples that have undergone the test.
9. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.



**Applicant:** Huawei Technologies Co., Ltd.  
**Address:** Huawei Base, Bantian, Longgang District, Shenzhen  
518129, P.R. China  
**Date of Receipt Test Item:** Nov.07, 2011  
**Start Date of Test:** Nov.07, 2011  
**End Date of Test:** Nov.14, 2011  
  
**Test Result:** Pass

|             |              |            |                                                                                       |
|-------------|--------------|------------|---------------------------------------------------------------------------------------|
| Approved By | Nov.16, 2011 | Dai Linjun |  |
|             | Date         | Name       | Signature                                                                             |

|             |              |          |                                                                                       |
|-------------|--------------|----------|---------------------------------------------------------------------------------------|
| Reviewed By | Nov.16, 2011 | Cousy Xu |  |
|             | Date         | Name     | Signature                                                                             |

|          |              |                |                                                                                       |
|----------|--------------|----------------|---------------------------------------------------------------------------------------|
| Operator | Nov.16, 2011 | Huang Qiuliang |  |
|          | Date         | Name           | Signature                                                                             |

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# 1 General Information

## 1.1 Applied Standard

Applied Rules: 47 CFR FCC Part 2, Subpart J  
47 CFR FCC Part 22, Subpart H  
ANSI/TIA 603C:2004

## 1.2 Test Location

Test Location 1: Reliability Laboratory of Huawei Technologies Co., Ltd.  
Address: Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R.  
China

## 1.3 Test Environment Condition

Ambient Temperature: 20 – 25 °C  
Ambient Relative Humidity: 45 – 55 %  
Atmospheric Pressure: 101 kPa

## 2 Summary

Table 1 Summary of results

| Cellular Band                          |                 |                                                                                                                                                 |        |
|----------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Test Case                              | FCC Part No.    | Requirements                                                                                                                                    | Result |
| Transmitter Output Power               | 2.1046 & 22.913 | ERP not exceed 7 W                                                                                                                              | Pass   |
| Modulation Characteristics             | 2.1047          | Digital modulation                                                                                                                              | Pass   |
| Occupied Bandwidth                     | 2.1049          | (Not specified)                                                                                                                                 | Pass   |
| Band Edges Compliance                  | 2.1051 & 22.917 | Below -13 dBm/1%*EBW, in 1 MHz range                                                                                                            | Pass   |
| Spurious Emission at Antenna Terminals | 2.1051 & 22.917 | Below -13 dBm/1 kHz, 9 kHz to 150 kHz<br>Below -13 dBm/10 kHz, 150 kHz to 30 MHz<br>Below -13 dBm/100 kHz, 30 MHz to 10 <sup>th</sup> harmonics | Pass   |
| Field Strength of Spurious Radiation   | 2.1053 & 22.917 | Below -13 dBm/100 kHz                                                                                                                           | Pass   |
| Frequency Stability                    | 2.1055 & 22.355 | Maintained within the tolerances of $\pm 2.5$ ppm                                                                                               | Pass   |

## 3 Product Description

### 3.1 Production Information

#### 3.1.1 General Description

LTE/CDMA 1X/EVDO Mobile Phone with Bluetooth HUAWEI M920 is subscriber equipment in the LTE/CDMA system. The LTE frequency band is Band II and Band IV. The CDMA frequency band includes US Cellular, PCS, AWS, only US Cellular band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/CDMA protocol processing, voice, video, MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service). It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

#### 3.1.2 Board

Table 1 Board Information

| LTE/CDMA 1X/EVDO Mobile Phone with Bluetooth |                  |                  |
|----------------------------------------------|------------------|------------------|
| HUAWEI M920                                  |                  |                  |
| Main board                                   |                  |                  |
| Software Version                             | Hardware Version | Serial Number    |
| M920V100R001C177B202SP08                     | Ver.A            | B7PIEC11A2600091 |

#### 3.1.3 Sub-Assembly

| Sub-Assembly Name | Manufacturer                  | Description                                                                                                                                                                                        |
|-------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC/DC Adapter     | Huawei Technologies Co., Ltd. | Model: HW-050100U1W<br>Input voltage: ~100-240V (AC)50/60Hz 0.2A<br>Output voltage: 5V  1A<br>Rated Power: 5W |

#### 3.1.4 Battery Technical Data

| Name                | Manufacture                   | Description                                                                                                                                                                                                                                                                        |
|---------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rechargeable Li-ion | Huawei Technologies Co., Ltd. | Battery Model: HB5F1H<br>Rated capacity: 1880 mAh<br>Nominal Voltage:  +3.7V<br>Charging Voltage:  +4.2V |

## 4 Test Description

### 4.1 Supported Frequency Range

| Characteristics | Description    |
|-----------------|----------------|
| Downlink        | 869 to 894 MHz |
| Uplink          | 824 to 849 MHz |

### 4.2 Transmitter / Receiver Characteristics

| Characteristics                    | Description                                                                  |
|------------------------------------|------------------------------------------------------------------------------|
| System Type                        | CDMA                                                                         |
| TX Output Power (per Antenna Port) | 7 W (= 38.5 dBm)                                                             |
| Channel Spacing(s) / Bandwidth(s)  | CDMA system: 1.23 MHz (Cellular band)<br>1.25 MHz (Other than Cellular band) |
| Designation of Emissions           | CDMA system: 1M23F9W (Cellular band)<br>1M25F9W (Other than Cellular band)   |

### 4.3 Antenna Gain

|                    |       |
|--------------------|-------|
| Antenna Gain(dBi): | -1.2  |
| Antenna Gain(dBd): | -3.35 |

### 4.4 Power Supply

|                         | Description                                                                                                                                                                                                                            |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Supply Type       | Directly Connected to DC /AC Power Supply                                                                                                                                                                                              |
| Input to EUT (DC power) | DC Voltage Nominal:  +5V<br>DC Voltage Range:  +4.75 V to +5.25V |
| Input to EUT (AC power) | AC Voltage Nominal: ~ 220V (50/60 Hz)<br>AC Voltage Range: ~ 100V-240V                                                                                                                                                                 |



## 5 General Test Conditions / Configurations

### 5.1 RF Channels under Test

| Test Mode                           | TX / RX | RF Channel   |             |             |
|-------------------------------------|---------|--------------|-------------|-------------|
|                                     |         | Bottom (B)   | Middle (M)  | Top (T)     |
| TM1/TM3/<br>Subtype 0/<br>Subtype 2 | TX      | Channel 1013 | Channel 384 | Channel 777 |
|                                     |         | 824.7MHz     | 836.52MHz   | 848.31MHz   |
|                                     | RX      | Channel 1013 | Channel 384 | Channel 777 |
|                                     |         | 869.7MHz     | 881.52MHz   | 893.31MHz   |

### 5.2 Test Modes

| Test Mode            | Test Modes Description |
|----------------------|------------------------|
| TM1/TM3              | CDMA2000 1x            |
| Subtype 0/ Subtype 2 | CDMA2000 1x EV-DO      |

### 5.3 Test Environments

| Environment Parameter | Selected Values During Tests |         |
|-----------------------|------------------------------|---------|
| Relative Humidity     | Ambient                      |         |
| Temperature           | TN                           | Ambient |
| Voltage               | VL                           | 3.6V    |
|                       | VN                           | 3.7V    |
|                       | VH                           | 4.2V    |

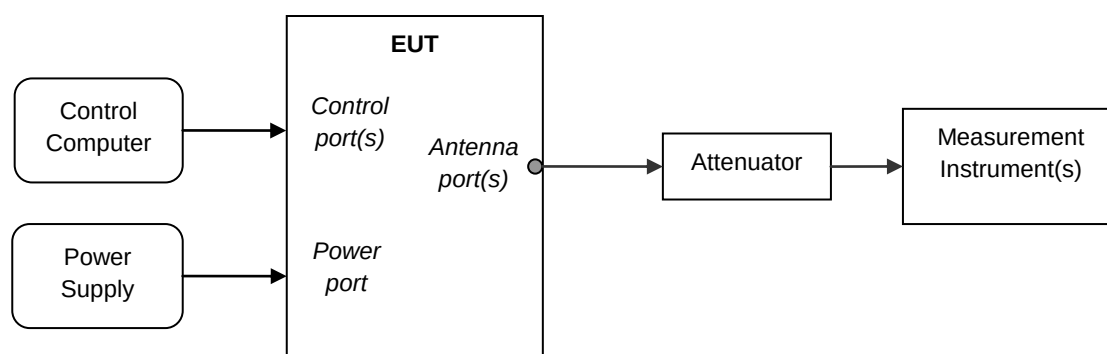
NOTE: VL= lower extreme test voltages  
VN= nominal voltage  
VH= upper extreme test voltage  
TN= normal temperature

## 5.4 Test Setups

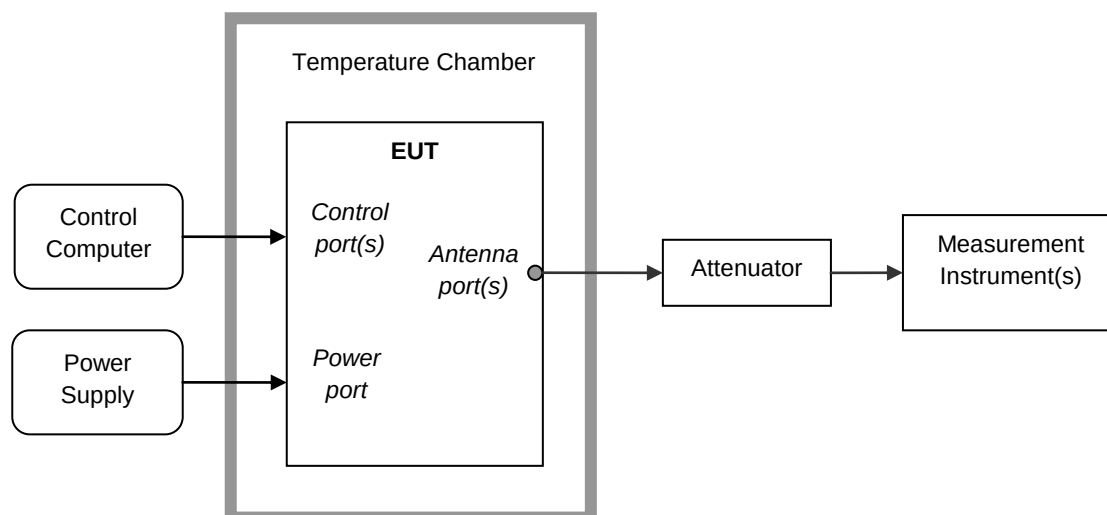
### 5.4.1 General Test Setup Configurations

| Configuration       | Description                                                                                                                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Antenna Ports  | Until otherwise declared, all TX tests are ONLY performed at the main Transmitter antenna port (e.g. TRXA, TXA and so on) of the EUT, and all RX tests are ONLY performed at the main Receiver antenna port (e.g. TRXA, RXA and so on) of the EUT. |
| Multiple RF Sources | Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.                                                                                                                                       |

### 5.4.2 Test Setup 1



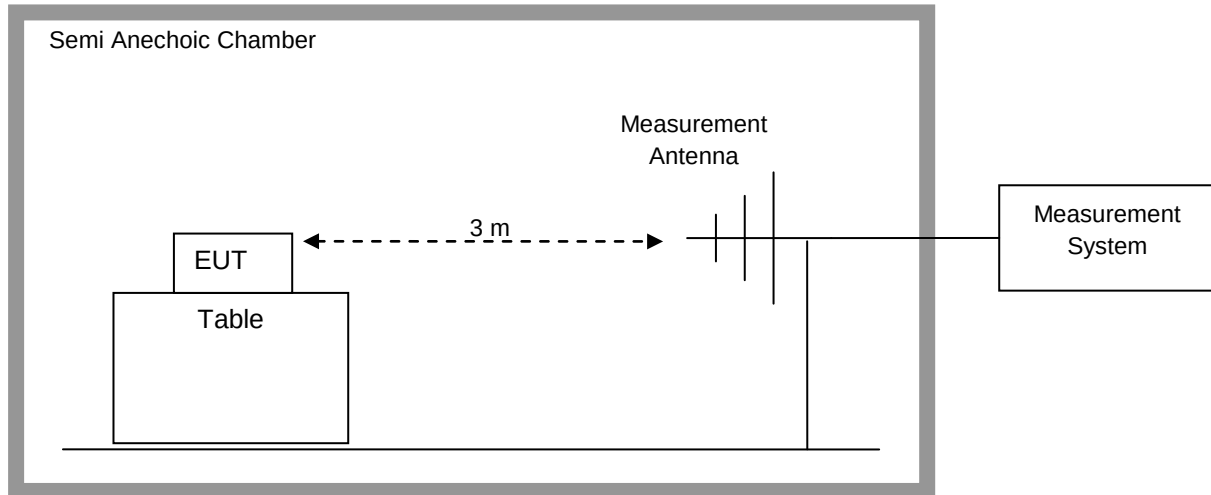
### 5.4.3 Test Setup 2



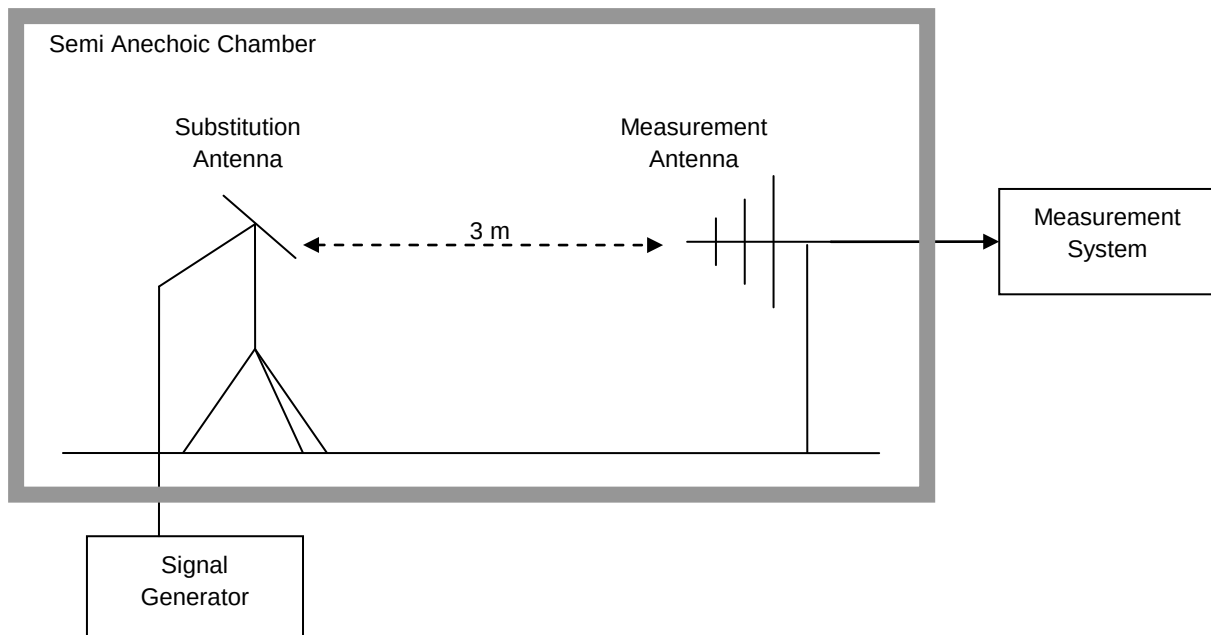
#### 5.4.4 Test Setup 3

NOTE: Effective radiated power (ERP) refers to the radiation power output of the EUT, assuming all emissions are radiated from half-wave dipole antennas.

##### Step 1: Pre-test



##### Step 2: Substitution method to verify the maximum ERP



## 5.5 Test Conditions

| Test Case                              | Test Conditions    |                                                                                                                           |
|----------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------|
| Transmitter Output Power               | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 1                                                                                                               |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | B, M, T                                                                                                                   |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Modulation Characteristics             | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 1                                                                                                               |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Occupied Bandwidth                     | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 1                                                                                                               |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | B, M, T                                                                                                                   |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Band Edges Compliance                  | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 1                                                                                                               |
|                                        | Detector           | RMS                                                                                                                       |
|                                        | RF Channels (TX)   | B, T                                                                                                                      |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Spurious Emission at Antenna Terminals | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 1                                                                                                               |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | B, M,T                                                                                                                    |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Field Strength of Spurious Radiation   | Test Configuration | Ambient Temperature & Rated Voltage                                                                                       |
|                                        | Test Setup         | Test Seup 3                                                                                                               |
|                                        | Detector           | PK                                                                                                                        |
|                                        | RF Channels (TX)   | M                                                                                                                         |
|                                        | Test Mode          | TM1/TM3/ Subtype 0/ Subtype 2                                                                                             |
| Frequency Stability                    | Test Configuration | (1) -30 °C to +50 °C with step 10 °C at Rated Voltage;<br>(2) 85%, 100% and 115% of Rated Voltage at Ambient Temperature. |
|                                        | Test Setup         | Test Seup 2                                                                                                               |



| Test Case | Test Conditions  |                               |
|-----------|------------------|-------------------------------|
|           | RF Channels (TX) | M                             |
|           | Test Mode        | TM1/TM3/ Subtype 0/ Subtype 2 |

## 6 Main Test Instruments

Table 2 Main Test Equipments

| Equipment Description                | Manufacturer | Model                   | Serial Number | Calibrated until |
|--------------------------------------|--------------|-------------------------|---------------|------------------|
| Power supply                         | KEITHLEY     | 2303                    | 1288003       | Sep.27,2012      |
| Universal Radio Communication Tester | R&S          | CMU200                  | 117341        | Jan.13.2012      |
| Universal Radio Communication Tester | Agilent      | E5515C                  | MY50260239    | Aug.31,2012      |
| Spectrum Analyzer                    | Agilent      | E4440A                  | MY49420179    | Apr.20,2012      |
| Signal Analyzer                      | R&S          | FSQ31                   | 200021        | Sep.27,2012      |
| Temperature Chamber                  | WEISS        | WKL64                   | 24600294      | Jan.03,2012      |
| Signal generator                     | Agilent      | E8257D                  | MY49281095    | Jul.9.2012       |
| Test receiver                        | R&S          | ESU26                   | 100150        | May.29.2012      |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 919/1009      | Jan.29.2012      |
| Tunable Dipole                       | Schwarzbeck  | D69250-UHAP/D69250-VHAP | 979/917       | Jan.29.2012      |
| Horn Antenna                         | R & S        | HF906                   | 100683        | May.15, 2012     |
| Horn Antenna                         | R & S        | HF906                   | 100684        | Jul.01, 2012     |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-357      | May.15, 2012     |
| Broadband Antenna                    | Schwarzbeck  | VULB 9163               | 9163-356      | May.15, 2012     |

## 7 Test Results

| No. | Test Item                              | Test Result |
|-----|----------------------------------------|-------------|
| 1   | Transmitter Output Power               | Appendix A  |
| 2   | Modulation Characteristics             | Appendix B  |
| 3   | Occupied Bandwidth                     | Appendix C  |
| 4   | Band Edges Compliance                  | Appendix D  |
| 5   | Spurious Emission at Antenna Terminals | Appendix E  |
| 6   | Field Strength of Spurious Radiation   | Appendix F  |
| 7   | Frequency Stability                    | Appendix G  |
| 8   | Photos of Radiated Spurious Emissions  | Appendix H  |

NOTE: The Appendix H only photos of Radiated Spurious Emissions, no test data.

## 8 Measurement Uncertainty

For a 95% confidence level ( $k=2$ ), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

| Test Item                            |                          | Extended Uncertainty                               |
|--------------------------------------|--------------------------|----------------------------------------------------|
| Transmitter Output Power             | Power (dBm)              | U =0.39 dB                                         |
| Occupied Bandwidth                   | Magnitude (%)            | U=0.2%                                             |
| Band Edge Compliance                 | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Conducted Spurious Emissions         | Disturbance Power (dBm)  | U=2.0 dB                                           |
| Field Strength of Spurious Radiation | ERP (dBm)                | U=4.6 dB (30 MHz – 1GHz)<br>U=3.0 dB (above 1 GHz) |
| Frequency Stability                  | Frequency Accuracy (ppm) | U=0.21 ppm                                         |





## **Appendix A**

# Transmitter Output Power

According to FCC Part 2.1046 & Part22.913



## Conducted Power of Transmitter

| TEST CONDITIONS<br>(TN /VN) | RF Output Power             |       |                             |       |                             |       |
|-----------------------------|-----------------------------|-------|-----------------------------|-------|-----------------------------|-------|
|                             | Channel 1013(B)<br>824.7MHz |       | Channel 384(M)<br>836.52MHz |       | Channel 777(T)<br>848.31MHz |       |
|                             | dBm                         |       | dBm                         |       | dBm                         |       |
|                             | Measured                    | Limit | Measured                    | Limit | Measured                    | Limit |
| TM1                         | 24.49                       | 38.5  | 24.22                       | 38.5  | 24.02                       | 38.5  |
| TM3                         | 24.37                       | 38.5  | 24.19                       | 38.5  | 23.97                       | 38.5  |
| Subtype 0                   | 24.15                       | 38.5  | 23.97                       | 38.5  | 23.85                       | 38.5  |
| Subtype 2                   | 24.45                       | 38.5  | 24.36                       | 38.5  | 24.12                       | 38.5  |

## Peak-to-Average Ratio

| TEST CONDITIONS<br>(TN /VN) | RF Output Power             |       |                             |       |                             |       |
|-----------------------------|-----------------------------|-------|-----------------------------|-------|-----------------------------|-------|
|                             | Channel 1013(B)<br>824.7MHz |       | Channel 384(M)<br>836.52MHz |       | Channel 777(T)<br>848.31MHz |       |
|                             | dB                          |       | dB                          |       | dB                          |       |
|                             | Measured                    | Limit | Measured                    | Limit | Measured                    | Limit |
| TM1                         | 6.48                        | 13.0  | 6.42                        | 13.0  | 6.45                        | 13.0  |
| TM3                         | 6.42                        | 13.0  | 6.45                        | 13.0  | 6.45                        | 13.0  |
| Subtype 0                   | 6.33                        | 13.0  | 6.34                        | 13.0  | 6.41                        | 13.0  |
| Subtype 2                   | 6.34                        | 13.0  | 6.33                        | 13.0  | 6.39                        | 13.0  |



## Effective Radiated Power of Transmitter (ERP)

| Test Mode | Freq. [MHz] | Meas. Level [dBm] | Substitution Antenna Type | SGP [dBm] | Substitution Gain [dBd] | Cable Loss [dB] | Substitution Level (ERP) [dBm] | Limit [dBm] | Result |
|-----------|-------------|-------------------|---------------------------|-----------|-------------------------|-----------------|--------------------------------|-------------|--------|
| TM1       | 824.7       | 23.29             | Dipole Ant.               | 26.77     | -2.95                   | 0.6             | 23.22                          | 38.5        | Pass   |
| TM1       | 836.5<br>2  | 23.02             | Dipole Ant.               | 26.69     | -3.02                   | 0.6             | 23.07                          | 38.5        | Pass   |
| TM1       | 848.3<br>1  | 22.82             | Dipole Ant.               | 26.59     | -3.11                   | 0.6             | 22.88                          | 38.5        | Pass   |
| TM3       | 824.7       | 23.17             | Dipole Ant.               | 26.68     | -2.95                   | 0.6             | 23.13                          | 38.5        | Pass   |
| TM3       | 836.5<br>2  | 22.99             | Dipole Ant.               | 26.54     | -3.02                   | 0.6             | 22.92                          | 38.5        | Pass   |
| TM3       | 848.3<br>1  | 22.77             | Dipole Ant.               | 26.47     | -3.11                   | 0.6             | 22.76                          | 38.5        | Pass   |
| Subtype   | 824.7       | 22.95             | Dipole Ant.               | 26.46     | -2.95                   | 0.6             | 22.91                          | 38.5        | Pass   |
| Subtype   | 836.5<br>2  | 22.77             | Dipole Ant.               | 26.35     | -3.02                   | 0.6             | 22.73                          | 38.5        | Pass   |
| Subtype   | 848.3<br>1  | 22.65             | Dipole Ant.               | 26.39     | -3.11                   | 0.6             | 22.68                          | 38.5        | Pass   |
| Subtype   | 824.7       | 23.25             | Dipole Ant.               | 26.78     | -2.95                   | 0.6             | 23.23                          | 38.5        | Pass   |
| Subtype   | 836.5<br>2  | 23.16             | Dipole Ant.               | 26.73     | -3.02                   | 0.6             | 23.11                          | 38.5        | Pass   |
| Subtype   | 848.3<br>1  | 22.92             | Dipole Ant.               | 26.68     | -3.11                   | 0.6             | 22.97                          | 38.5        | Pass   |

Note: a, For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,  

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$
  
 b, SGP=Signal Generator Level



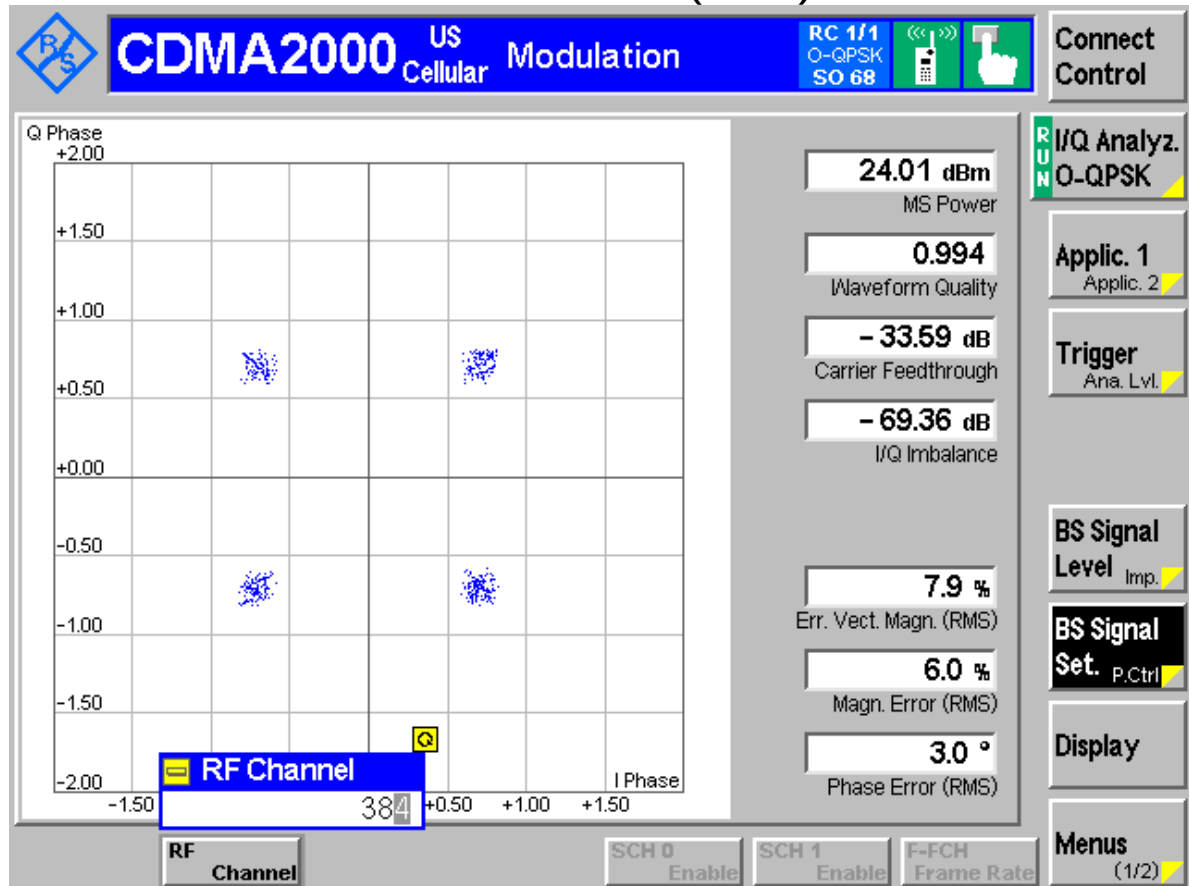
## **Appendix B**

### **Modulation Characteristics**

According to FCC Part 2.1047 & Part 22 Subpart H

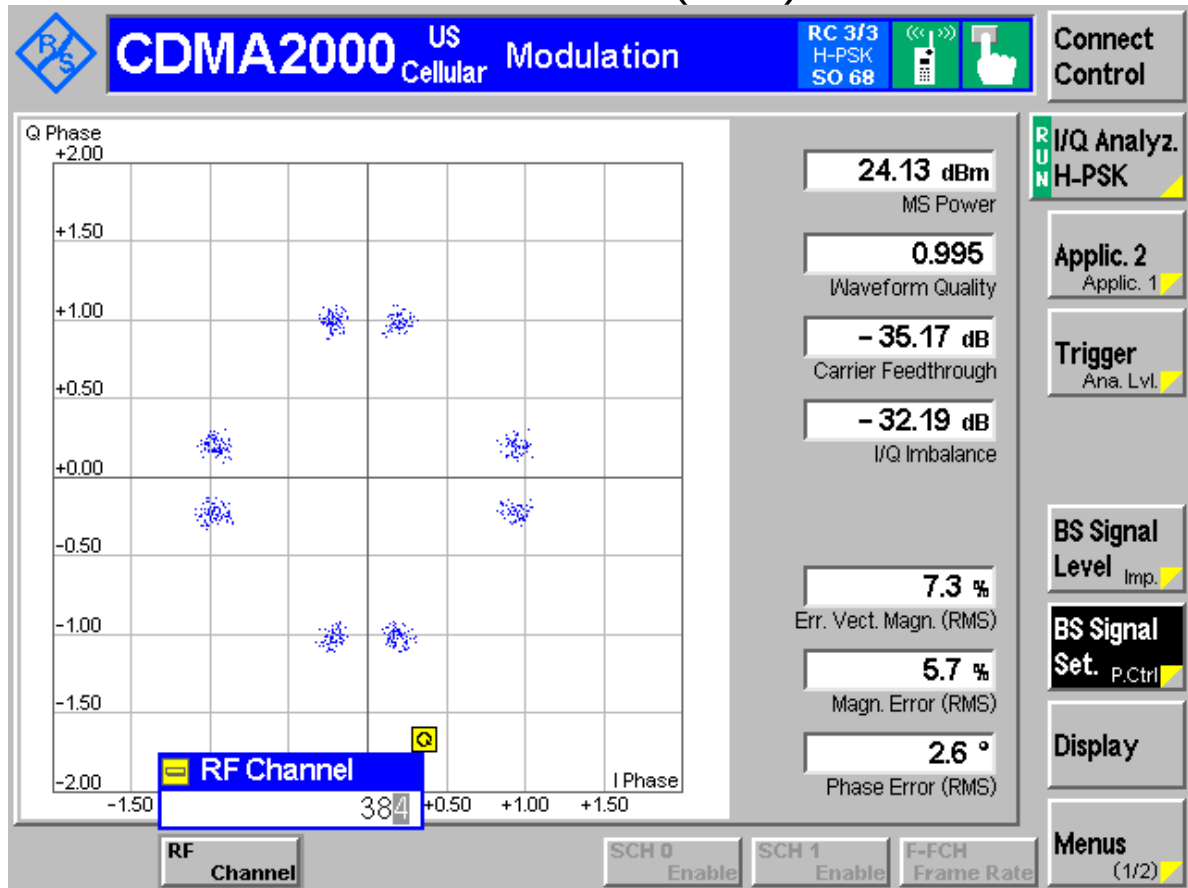


## Channel 384(TM1)



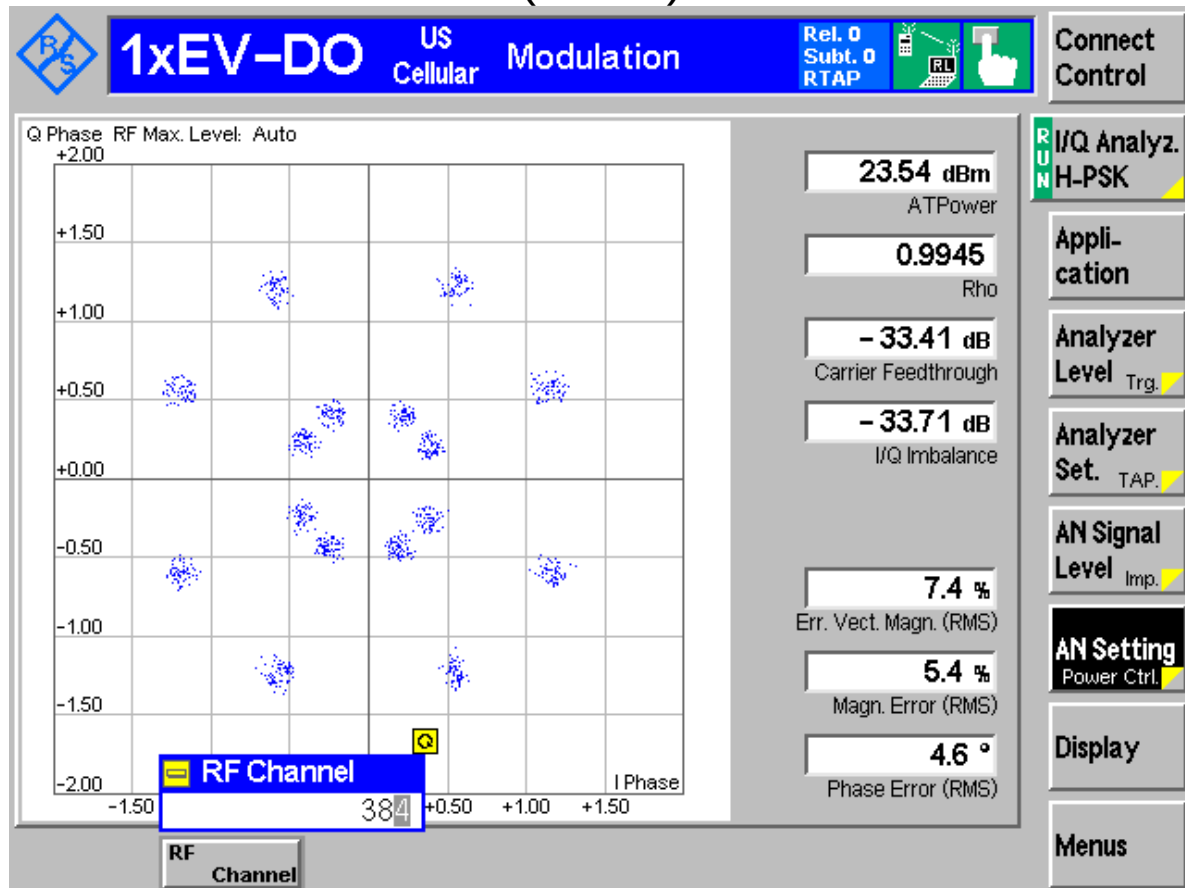


## Channel 384(TM3)





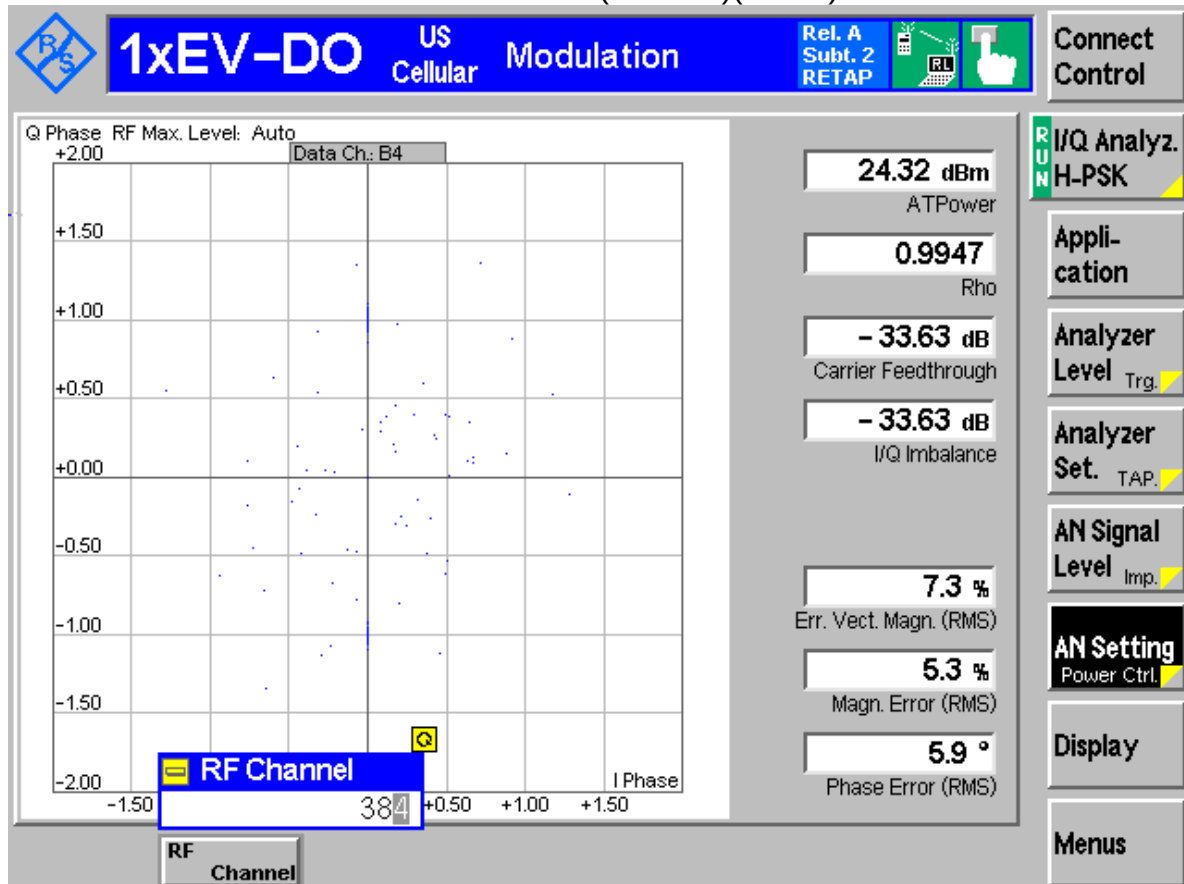
## Channel 384(Subtype 0) (HPSK)





## Channel 384(Subtype 2)

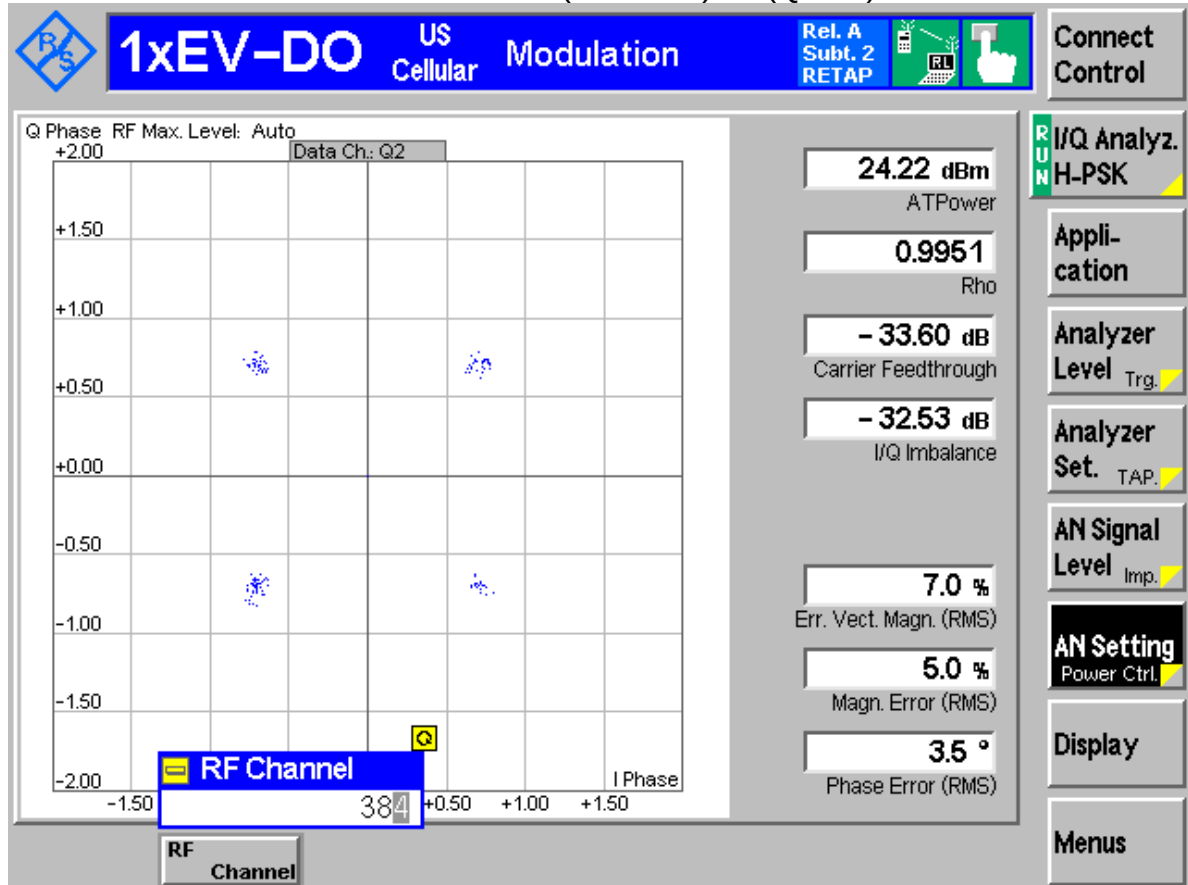
The R-Data packet size determines the modulation format:  
R-Data Pkt Size (256 bits)(BPSK)





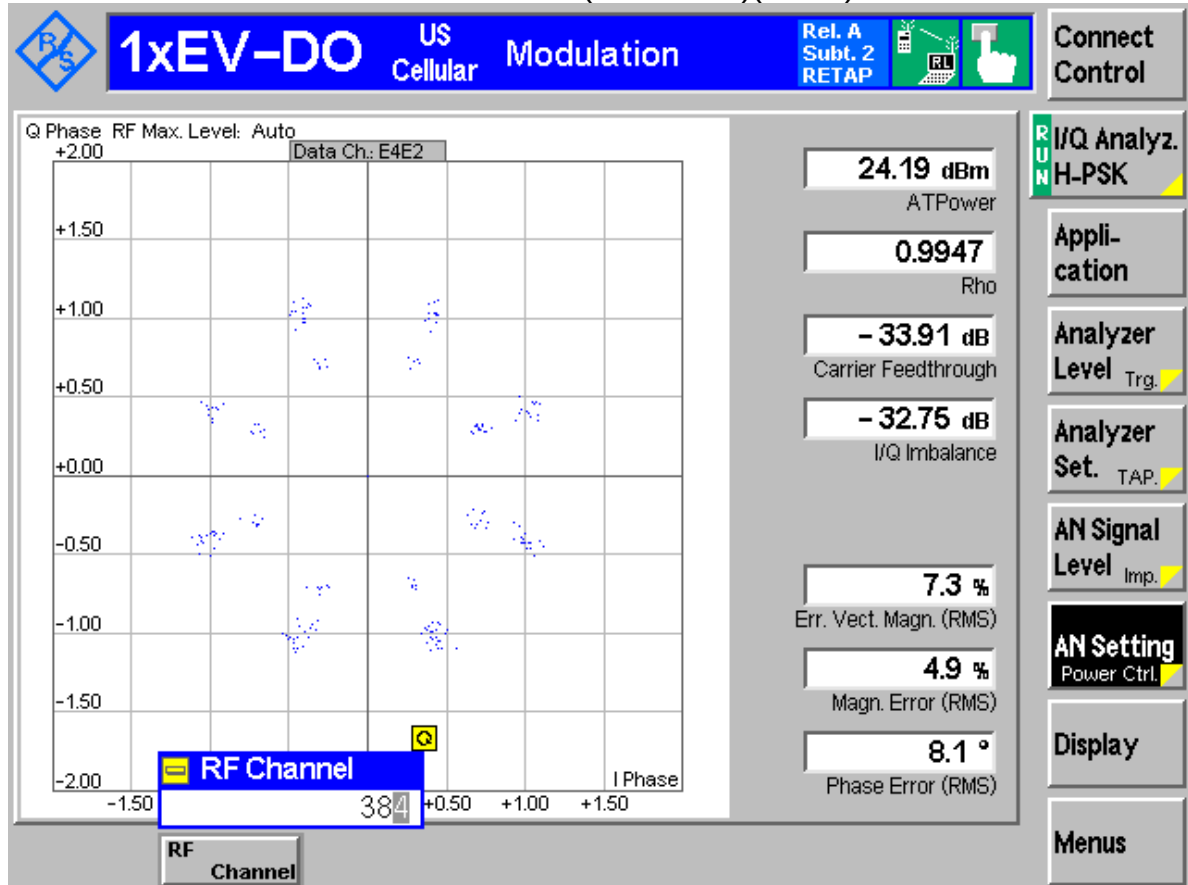


R-Data Pkt Size (4096 bits) (QPSK)





R-Data Pkt Size (12288 bits)(8PSK)



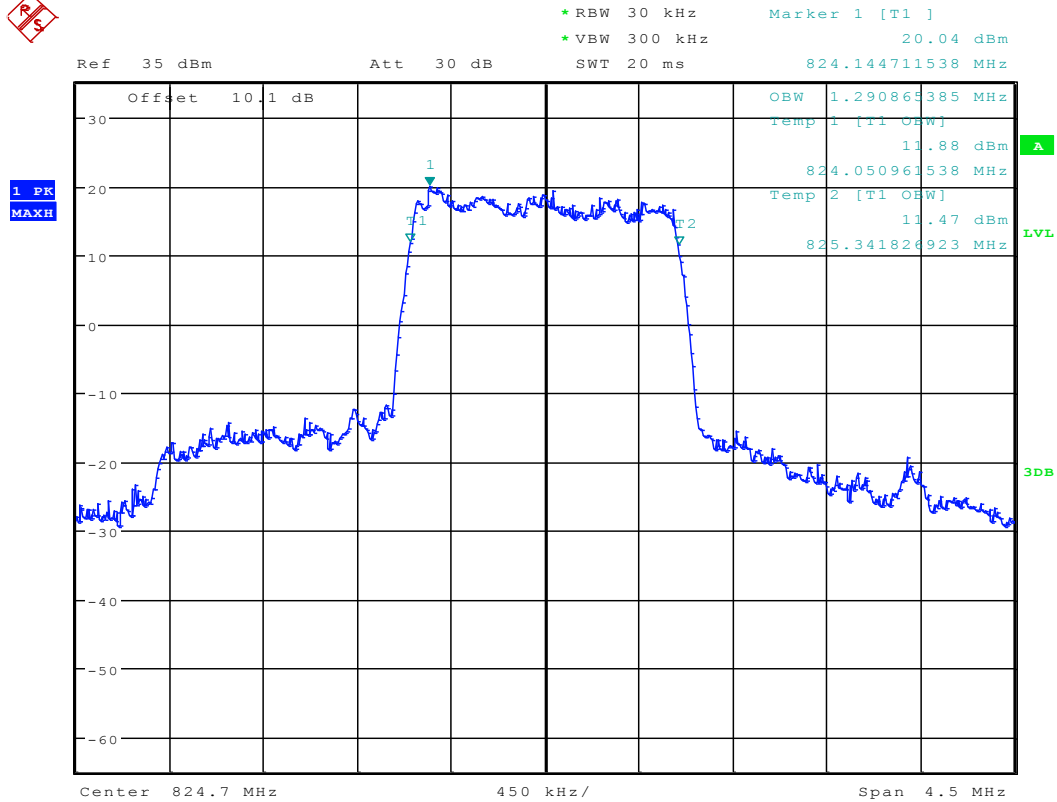


## **Appendix C**

### **Occupied Bandwidth** According to FCC Part 2.1049 & Part 22 Subpart H



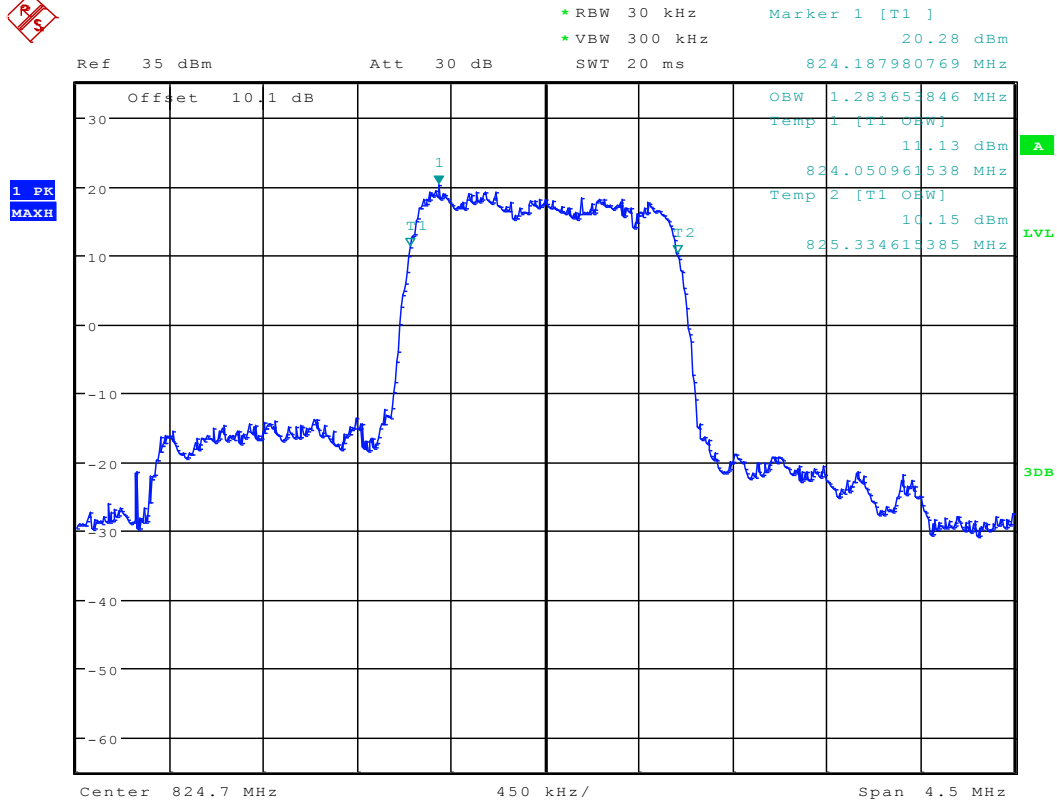
## Channel 1013(TM1)



Date: 8.NOV.2011 17:49:13



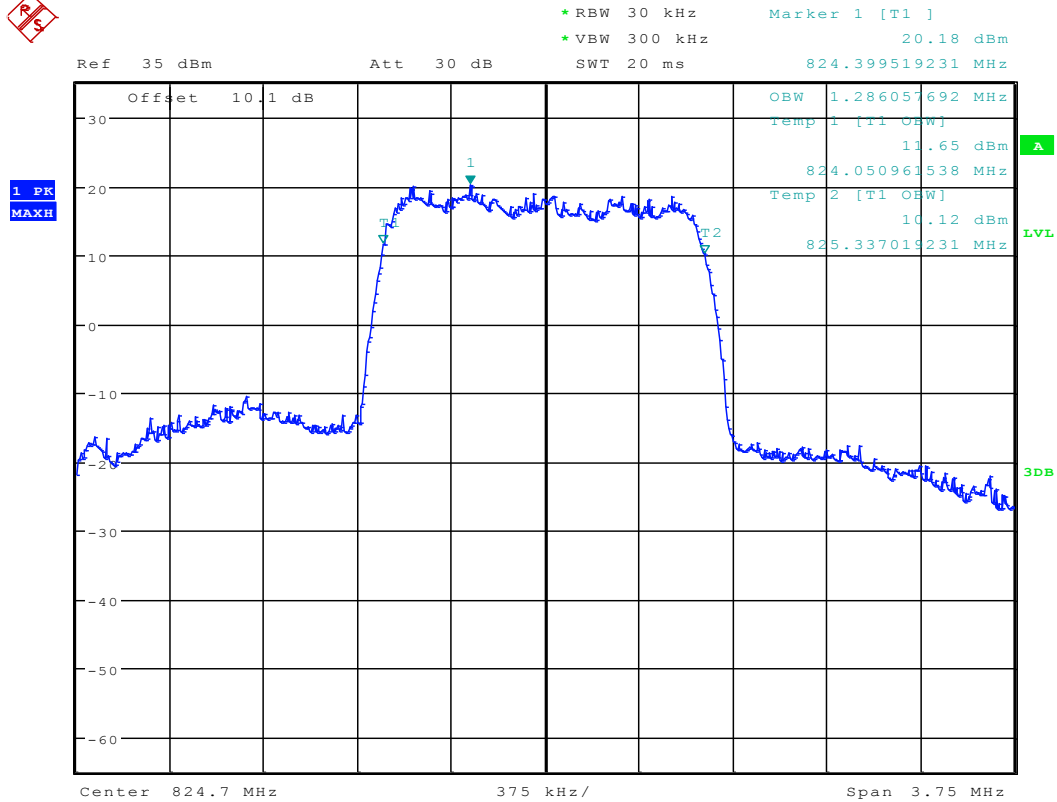
## Channel 1013(TM3)



Date: 8.NOV.2011 17:49:55



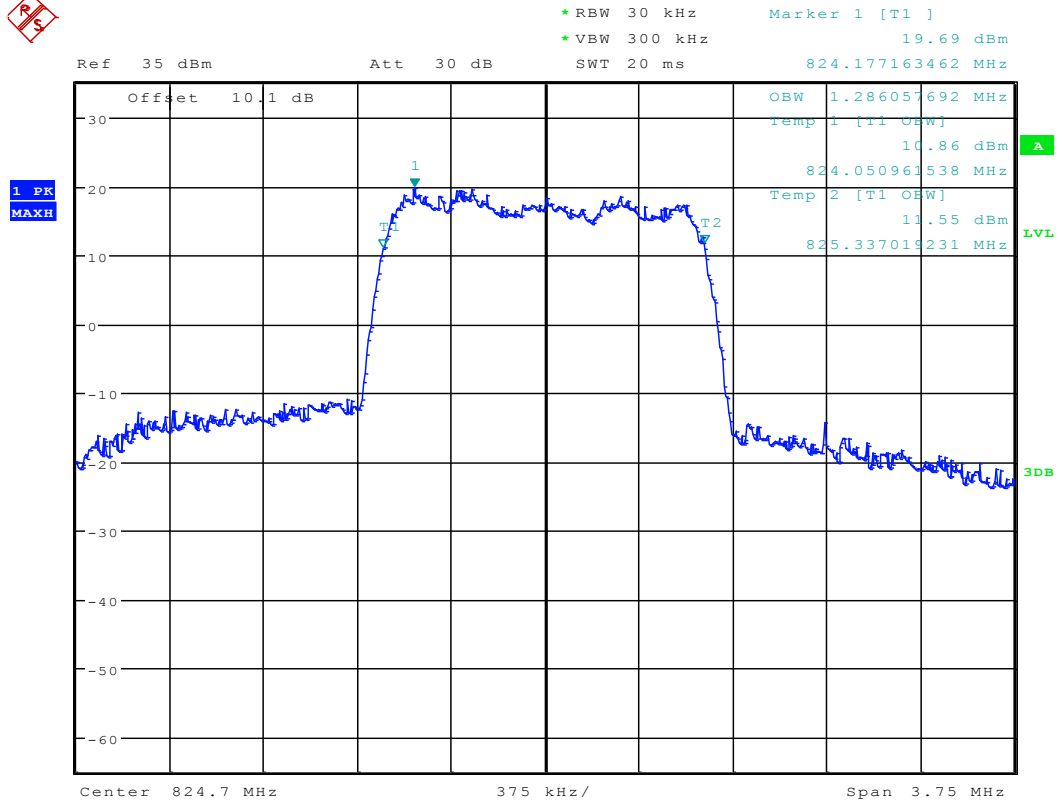
## Channel 1013(EVDO subtype 0)



Date: 8.NOV.2011 17:58:29



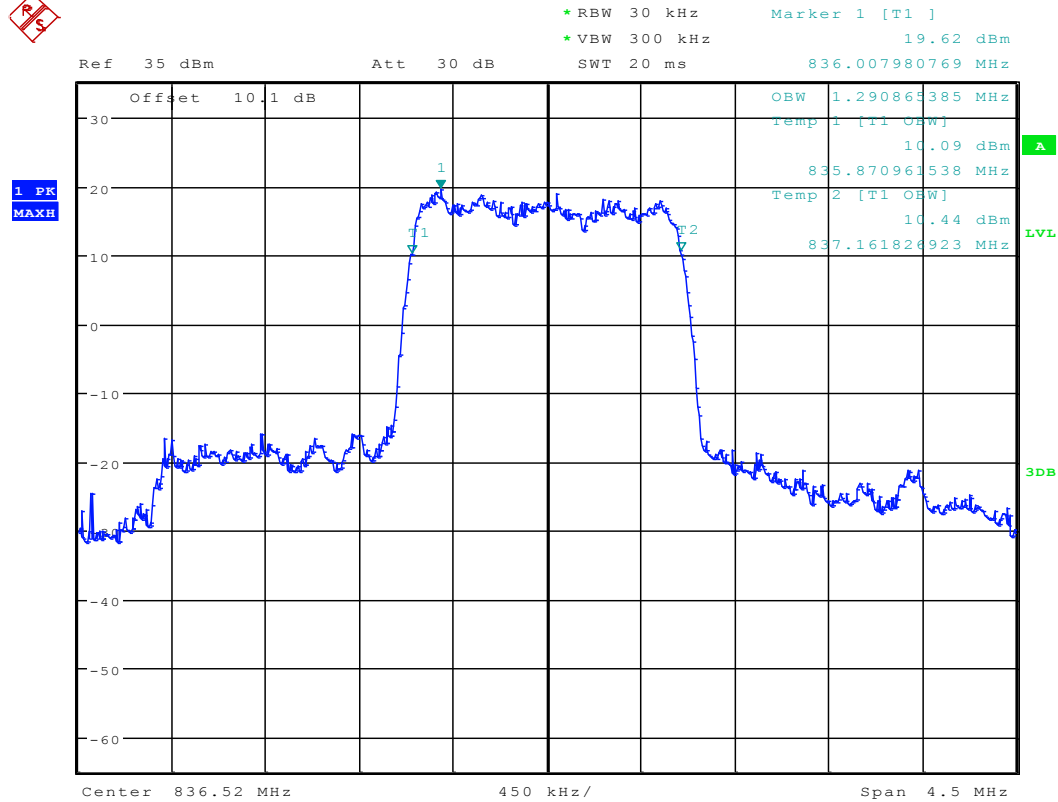
## Channel 1013(EVDO subtype 2)



Date: 8.NOV.2011 18:08:11



## Channel 384(TM1)

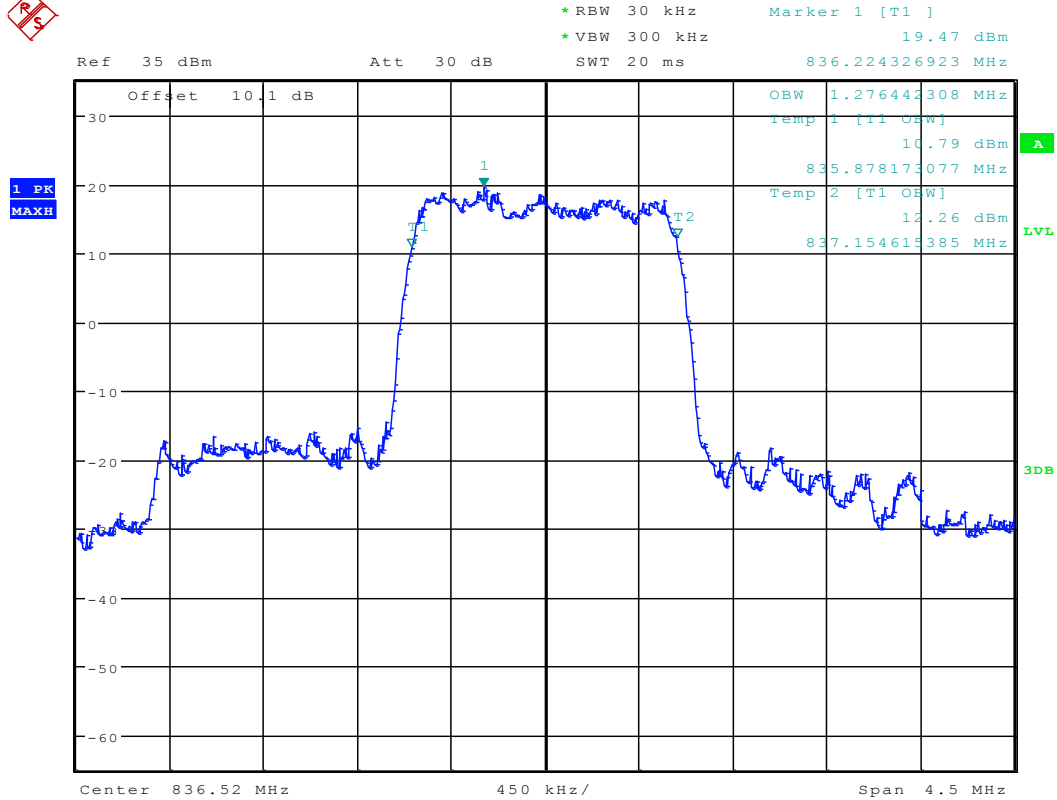


Date: 8.NOV.2011 17:49:26





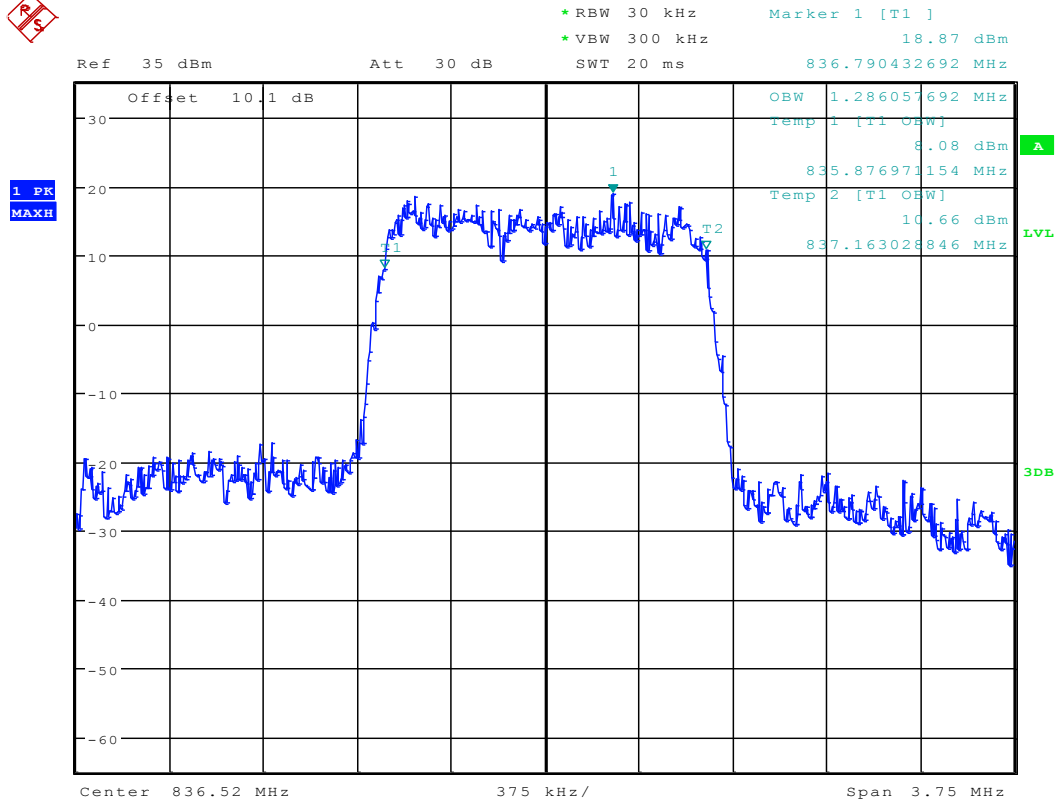
## Channel 384(TM3)



Date: 8.NOV.2011 17:50:09



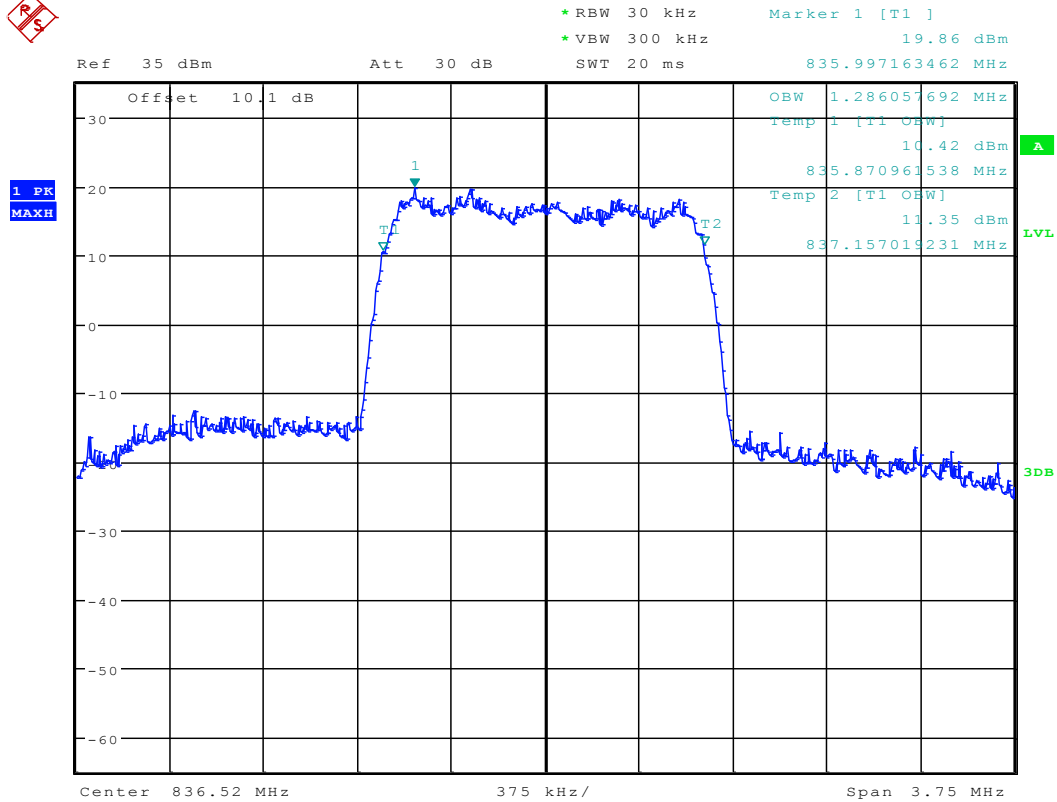
## Channel 384(EVDO subtype 0)



Date: 10.NOV.2011 09:48:37



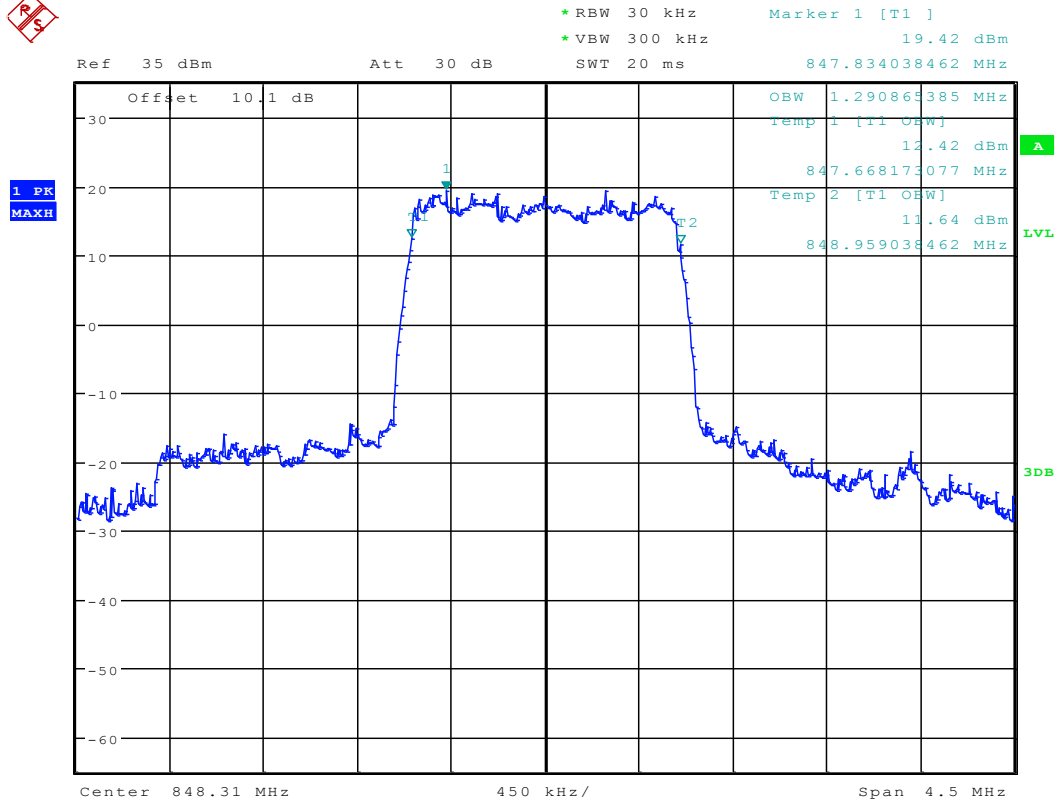
## Channel 384(EVDO Subtype 2)



Date: 8.NOV.2011 18:08:23



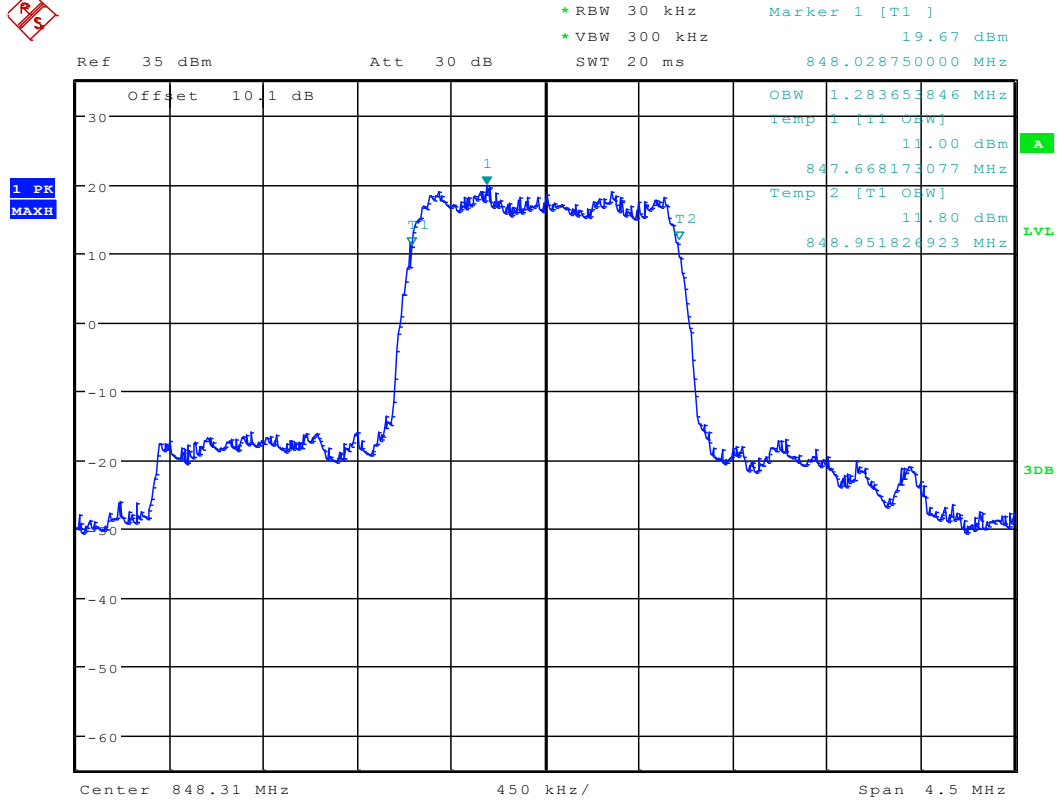
## Channel 777(TM1)



Date: 8.NOV.2011 17:49:40



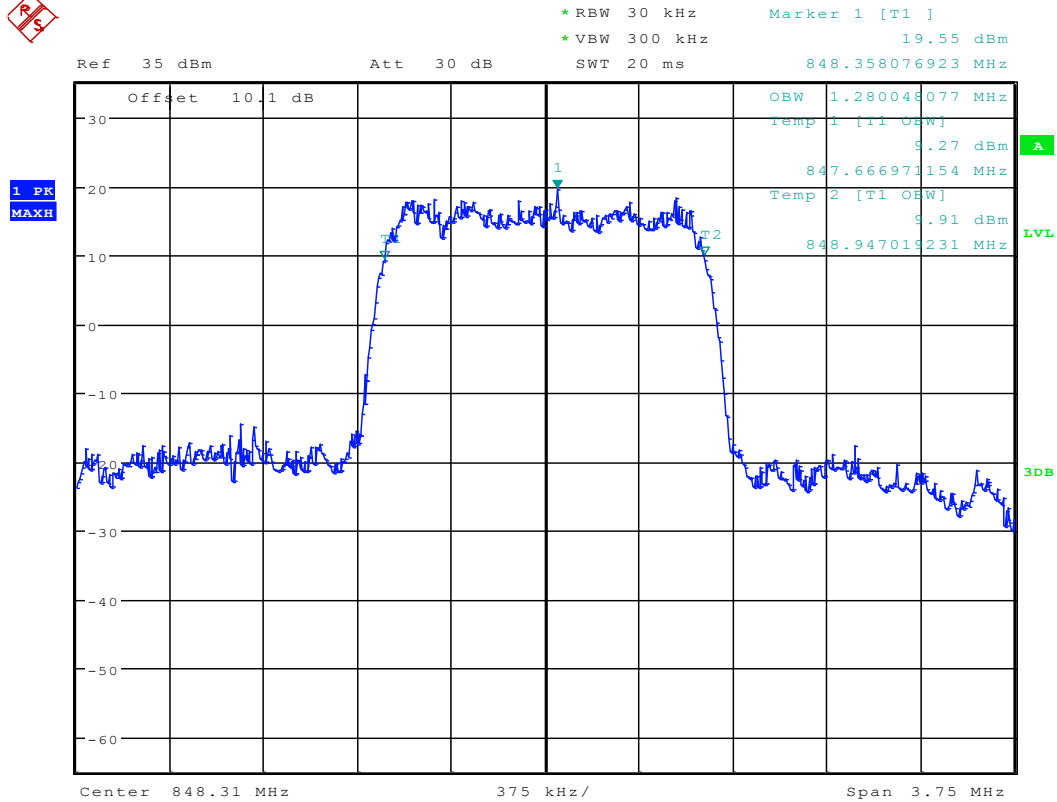
## Channel 777(TM3)



Date: 8.NOV.2011 17:50:23



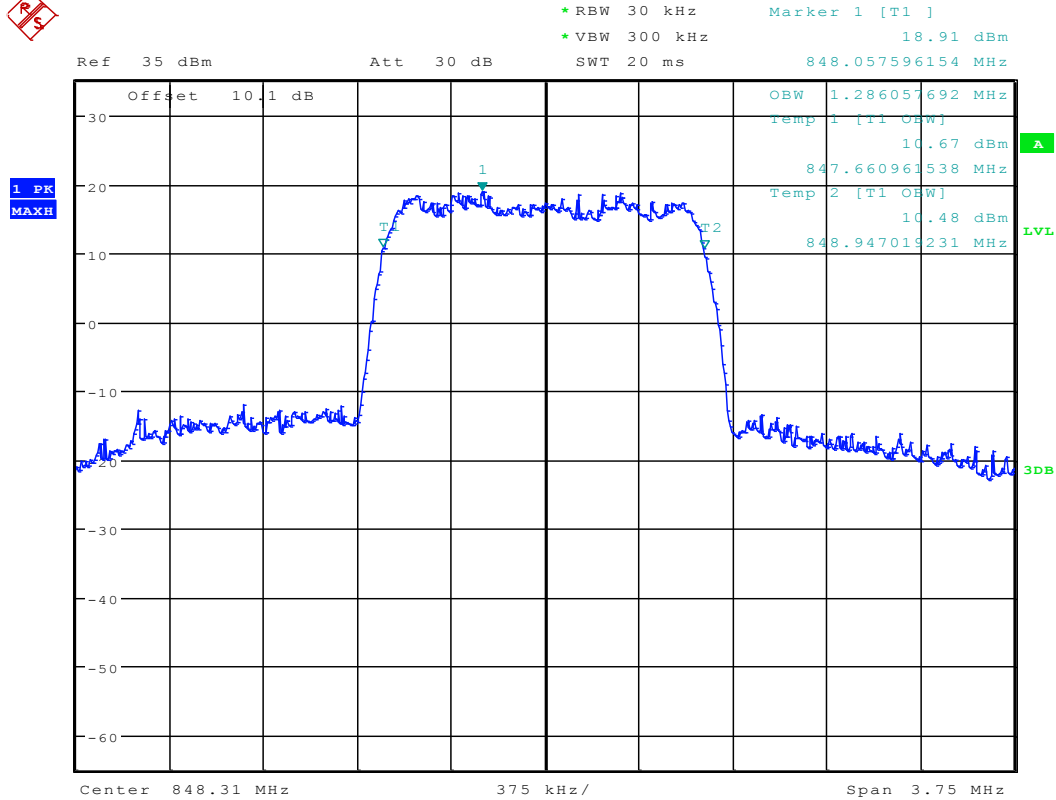
## Channel 777(EVDO subtype 0)



Date: 10.NOV.2011 09:48:57



## Channel 777(EVDO Subtype 2)



Date: 8.NOV.2011 18:08:34



## **Appendix D**

### **Band Edges Compliance** According to FCC Part 2.1051 & 22.917



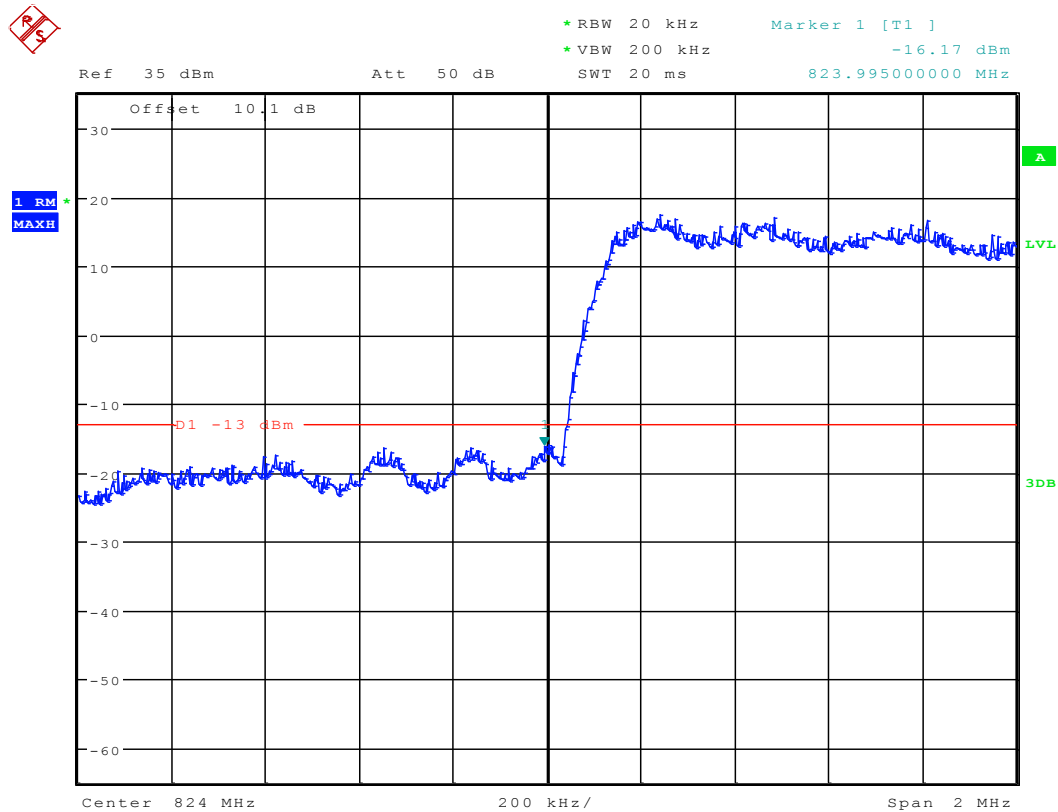


| Mode           | 26dB BW   | RBW to Measure Band Edge |
|----------------|-----------|--------------------------|
| CDMA, TM1, TM3 | <1300 kHz | $\geq 13k$ ,<br>used 20k |
| EVDO           | <1300 kHz | $\geq 13k$ ,<br>used 20k |



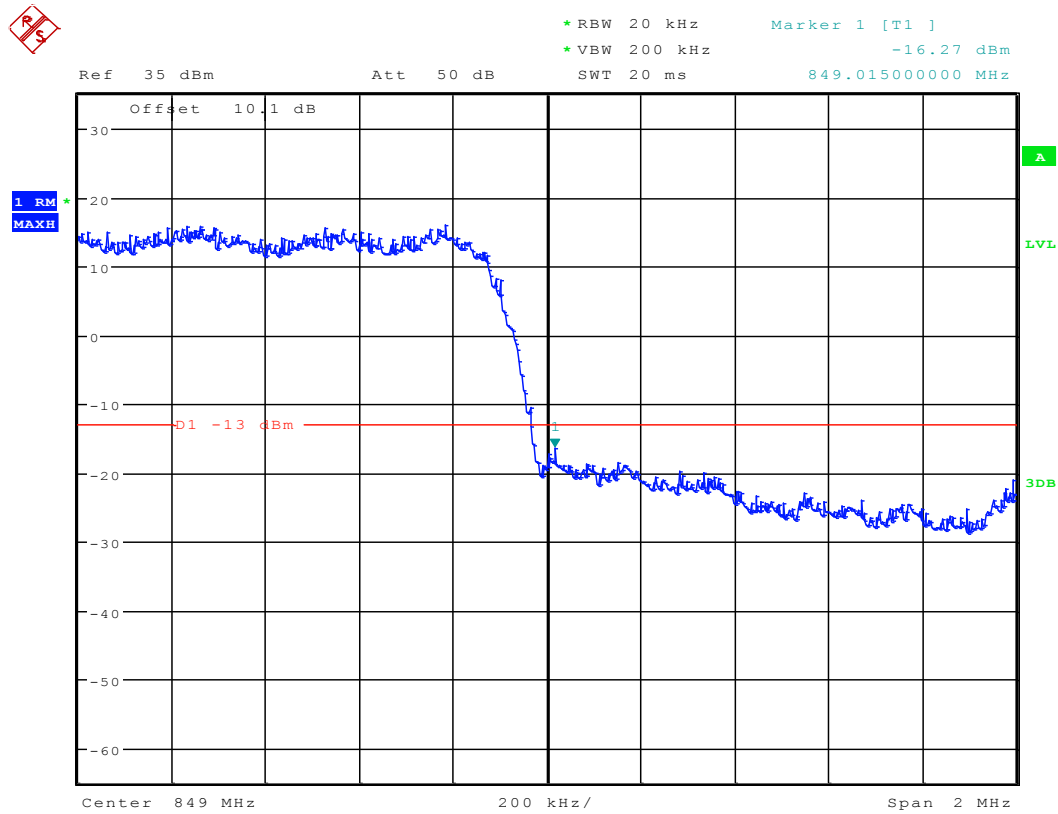
## TM1

### Left Edge (824 MHz) Channel 1013



Date: 10.NOV.2011 09:42:55

Right Edge (849MHz)  
Channel 777

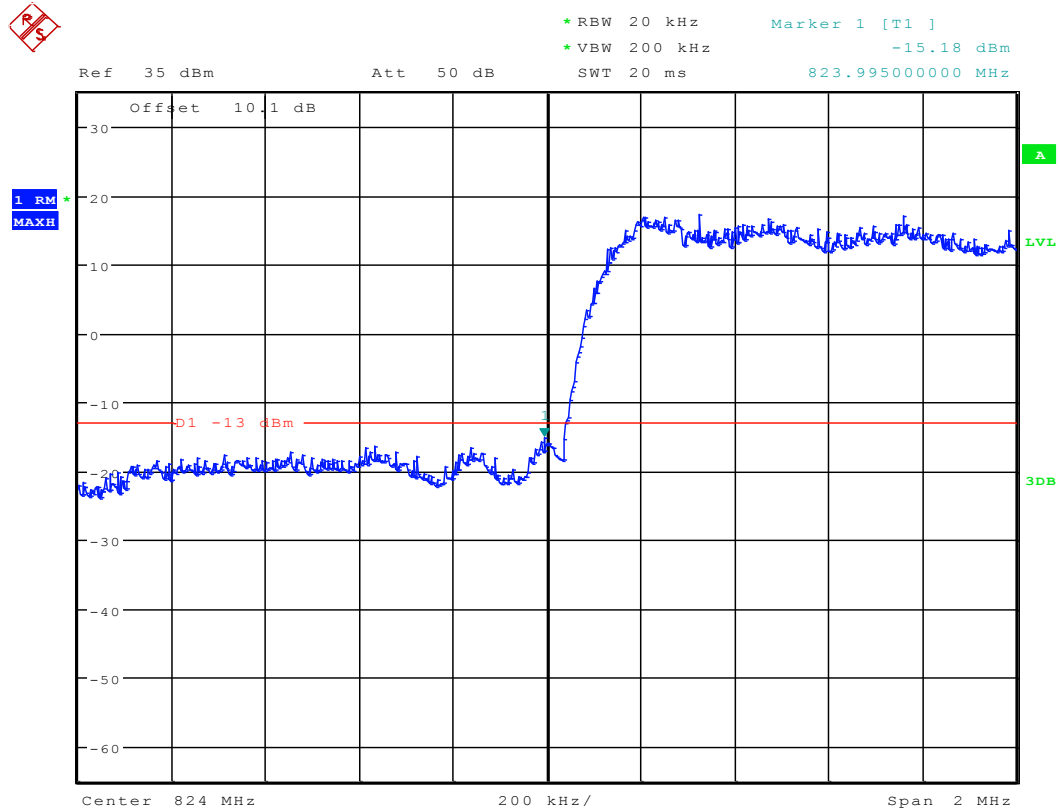


Date: 8.NOV.2011 17:48:27



## TM3

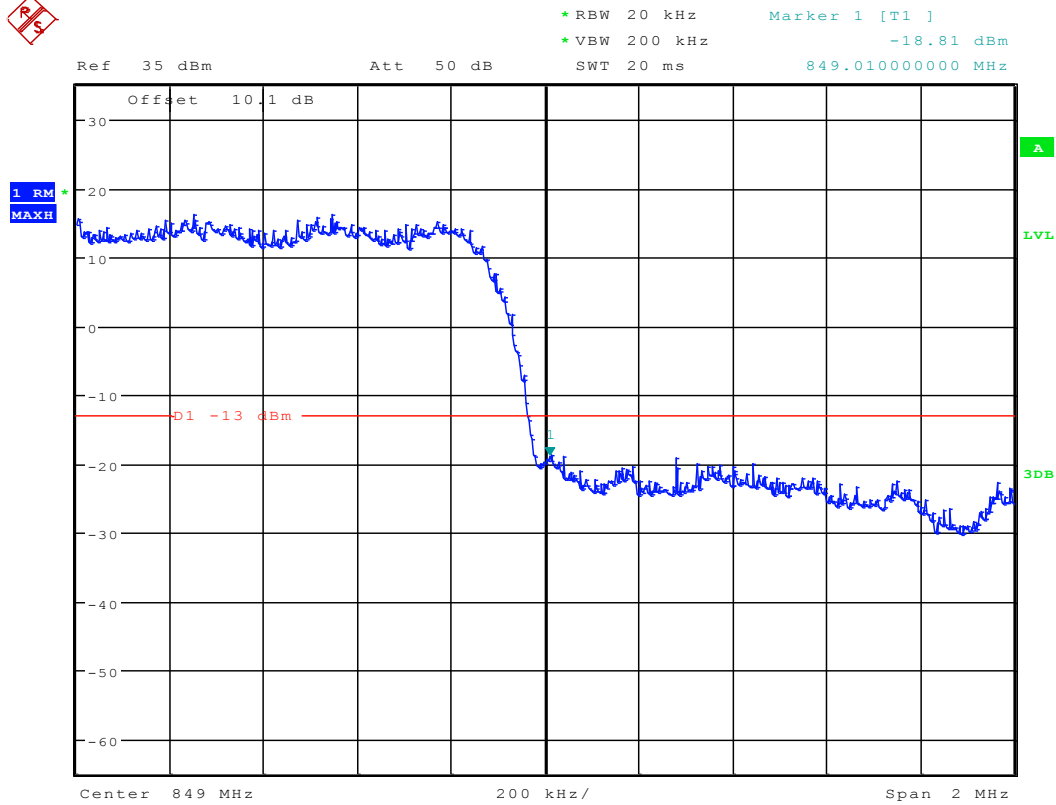
### Left Edge (824 MHz) Channel 1013



Date: 8.NOV.2011 17:48:43



## Right Edge (849MHz) Channel 777

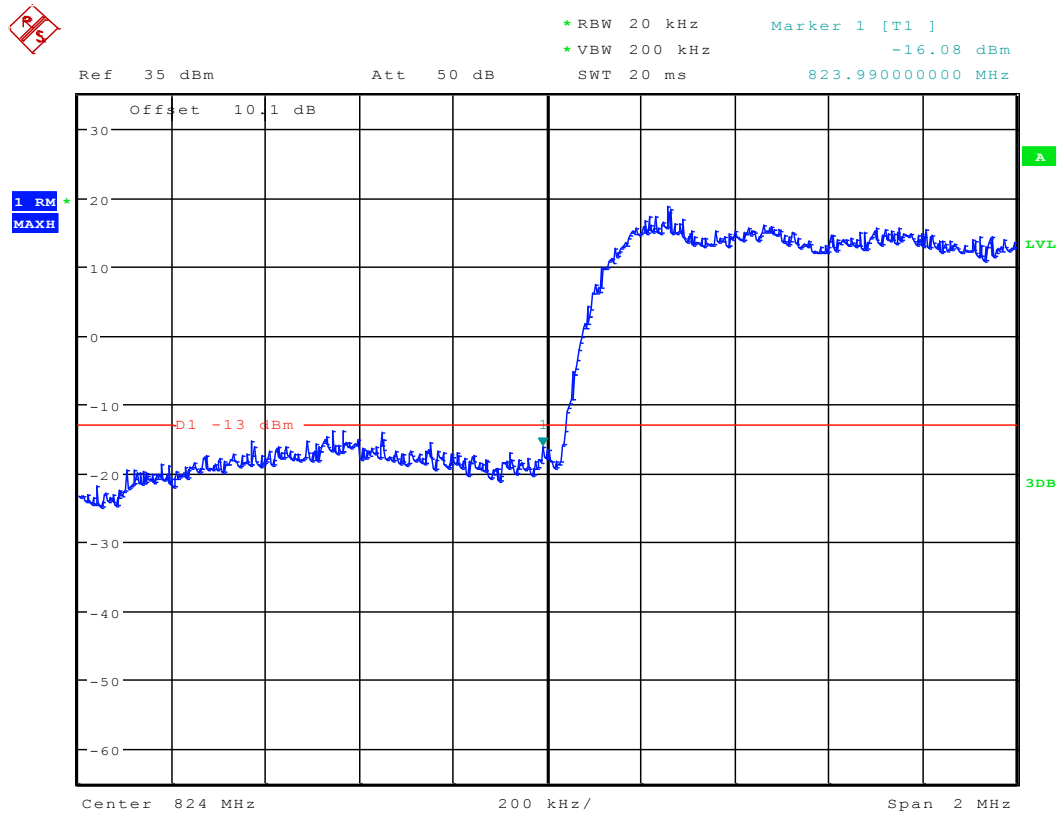


Date: 8.NOV.2011 17:48:57



## EVDO Subtype 0

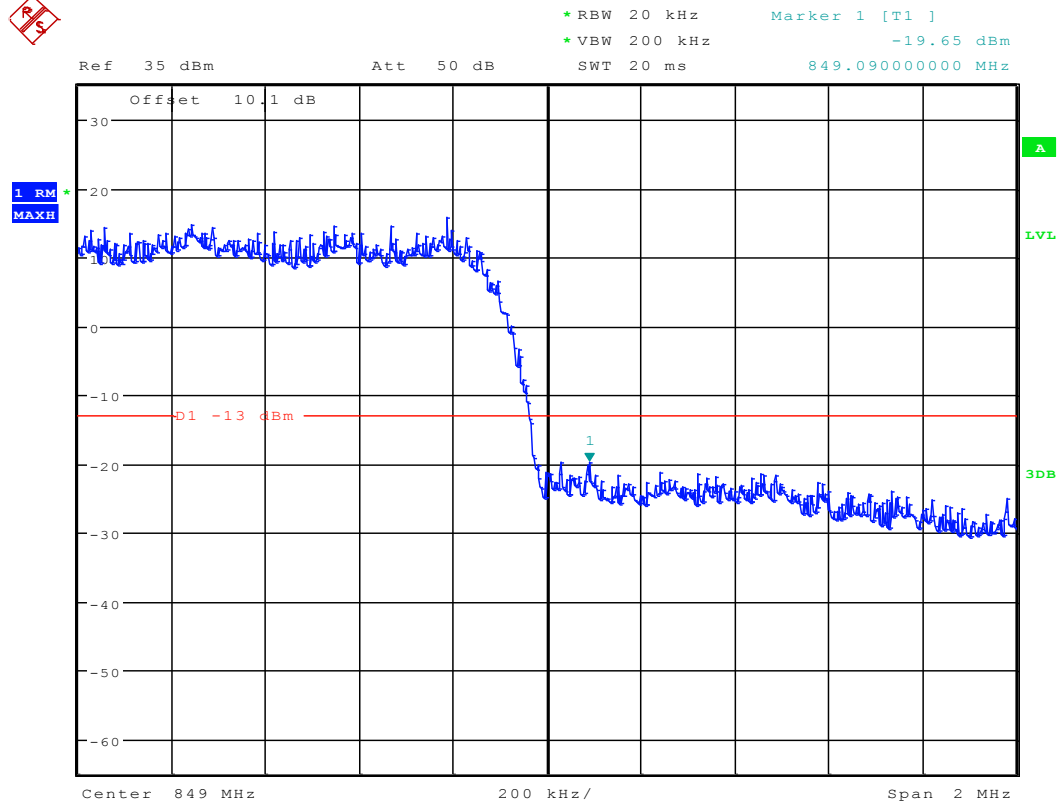
### Left Edge (824 MHz) Channel 1013



Date: 10.NOV.2011 09:47:02



## Right Edge (849MHz) Channel 777

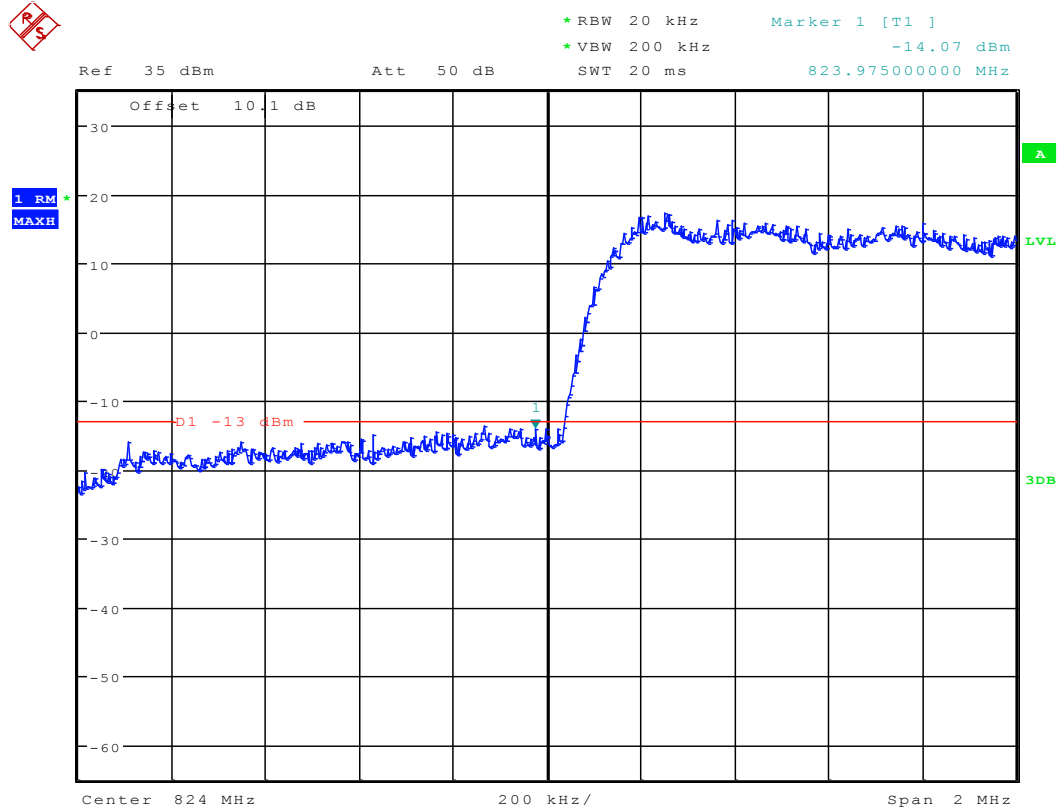


Date: 8.NOV.2011 17:58:04



## EVDO Subtype 2

Modulation: BPSK  
Left Edge (824 MHz)  
Channel 1013

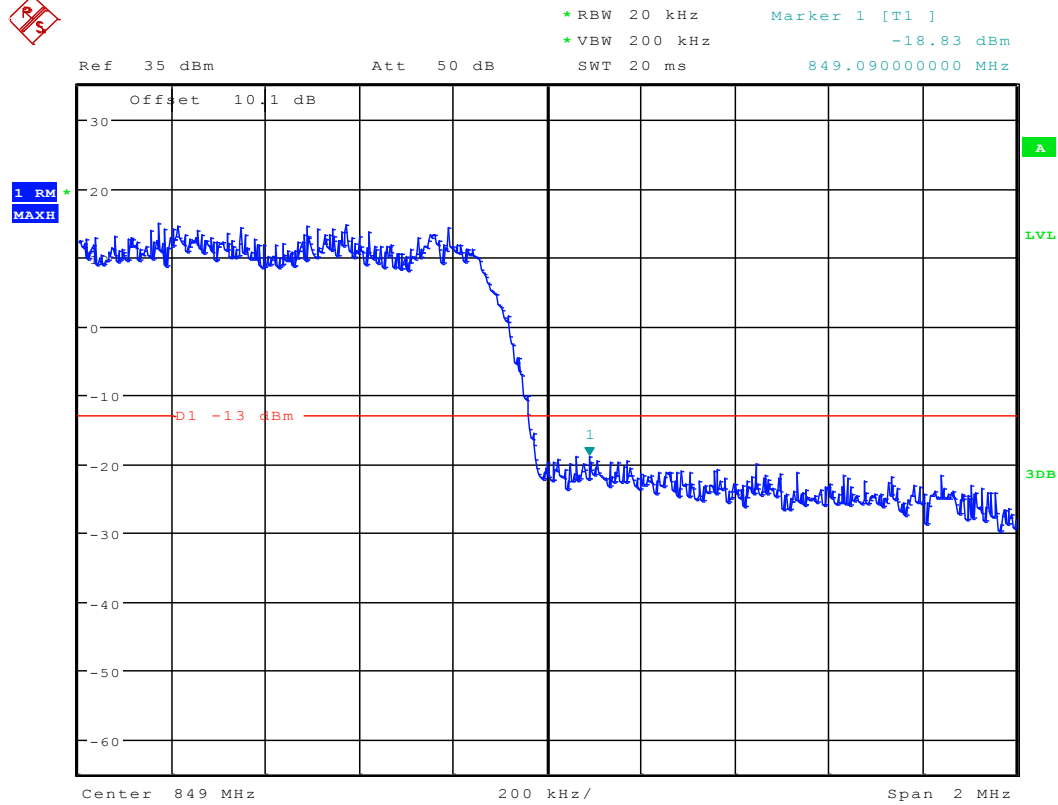


Date: 8.NOV.2011 18:18:21





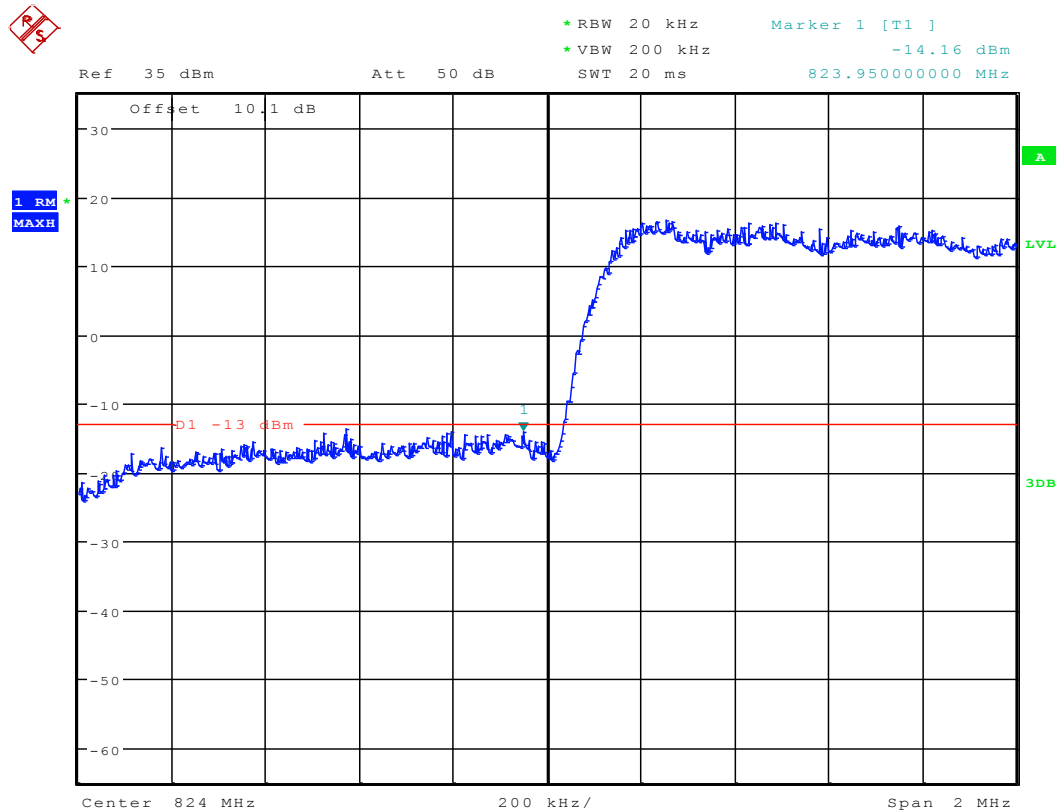
## Right Edge (849MHz) Channel 777



Date: 8.NOV.2011 18:03:19



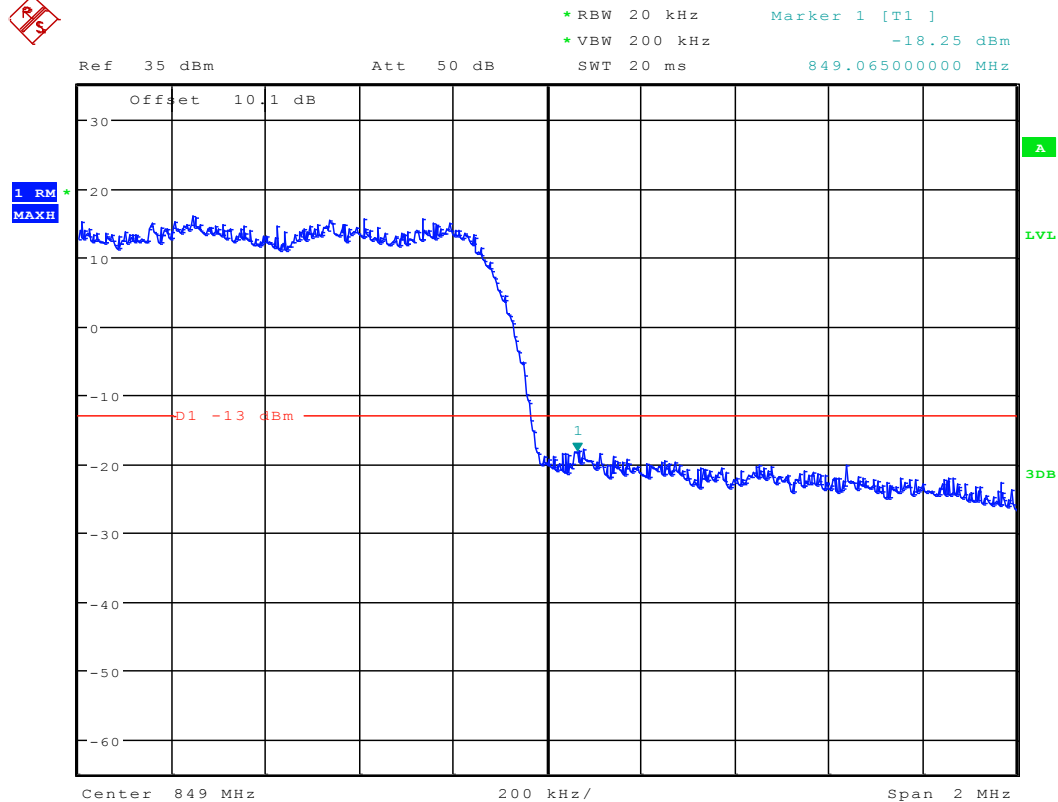
**Modulation: QPSK**  
**Left Edge (824 MHz)**  
**Channel 1013**



Date: 8.NOV.2011 18:18:49



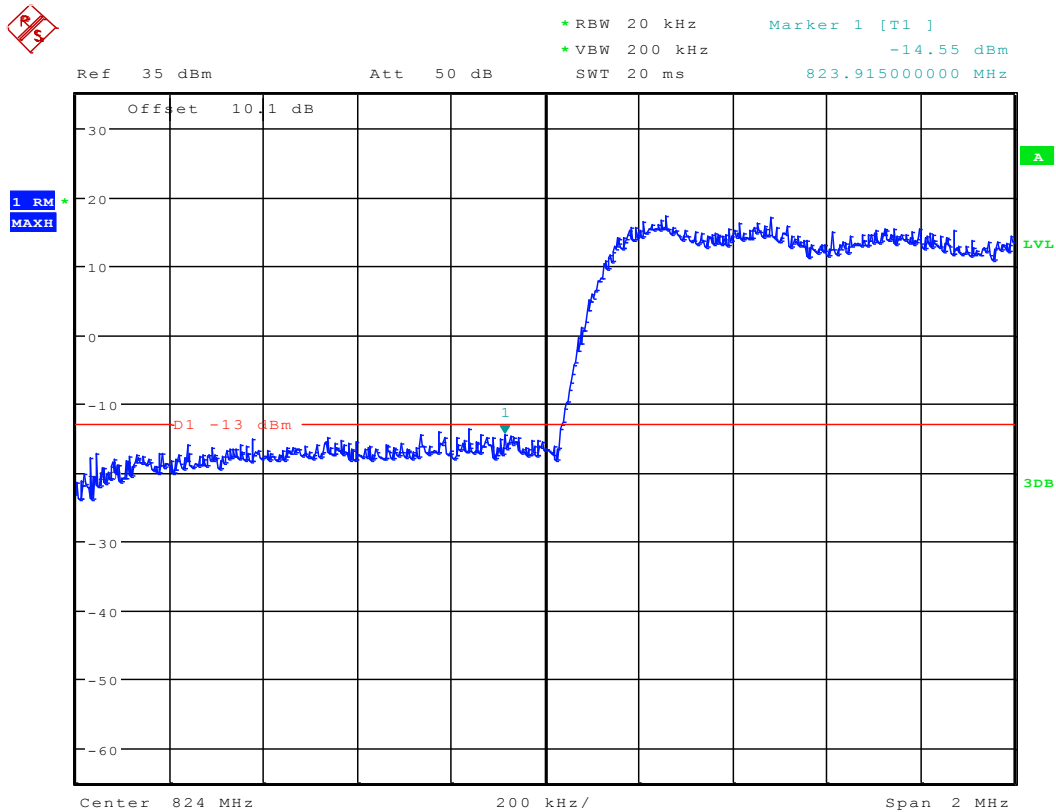
## Right Edge (849MHz) Channel 777



Date: 8.NOV.2011 18:19:02



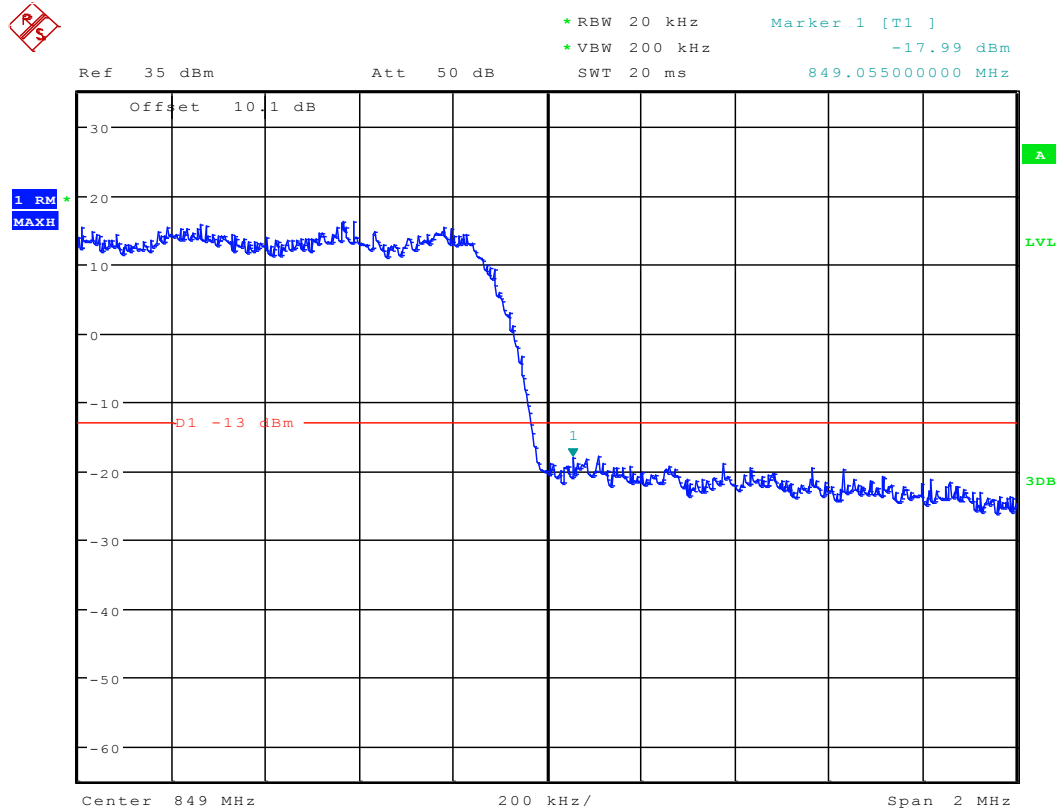
**Modulation: 8PSK**  
**Left Edge (824 MHz)**  
**Channel 1013**



Date: 8.NOV.2011 18:19:16



## Right Edge (849MHz) Channel 777



Date: 8.NOV.2011 18:19:29



## **Appendix E**

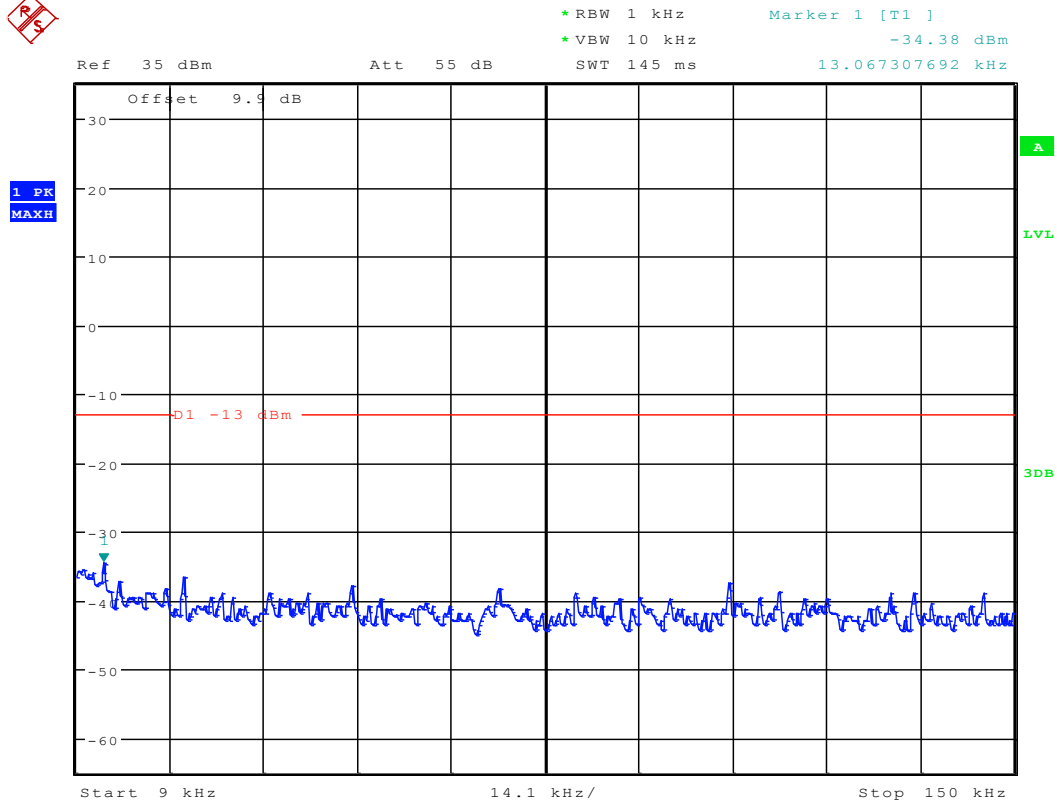
# Spurious Emission at Antenna Terminal

According to FCC Part 2.1051 & 22.917

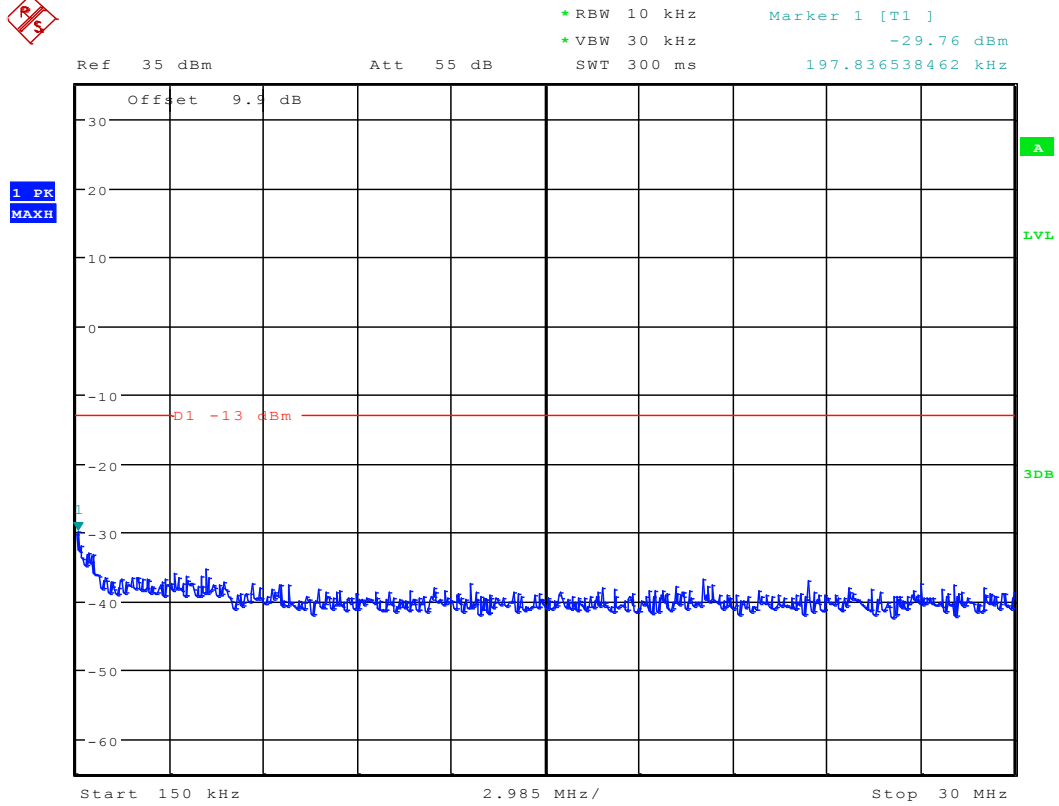


## TM1

### Channel 1013

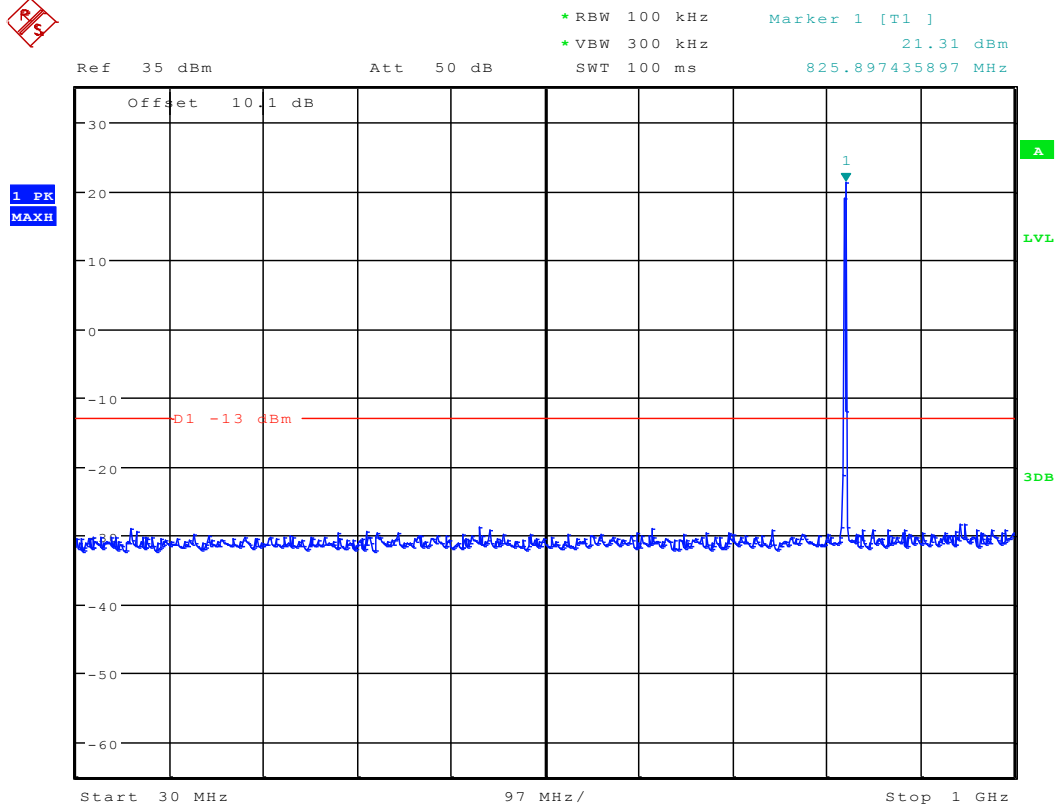


Date: 8.NOV.2011 17:50:34

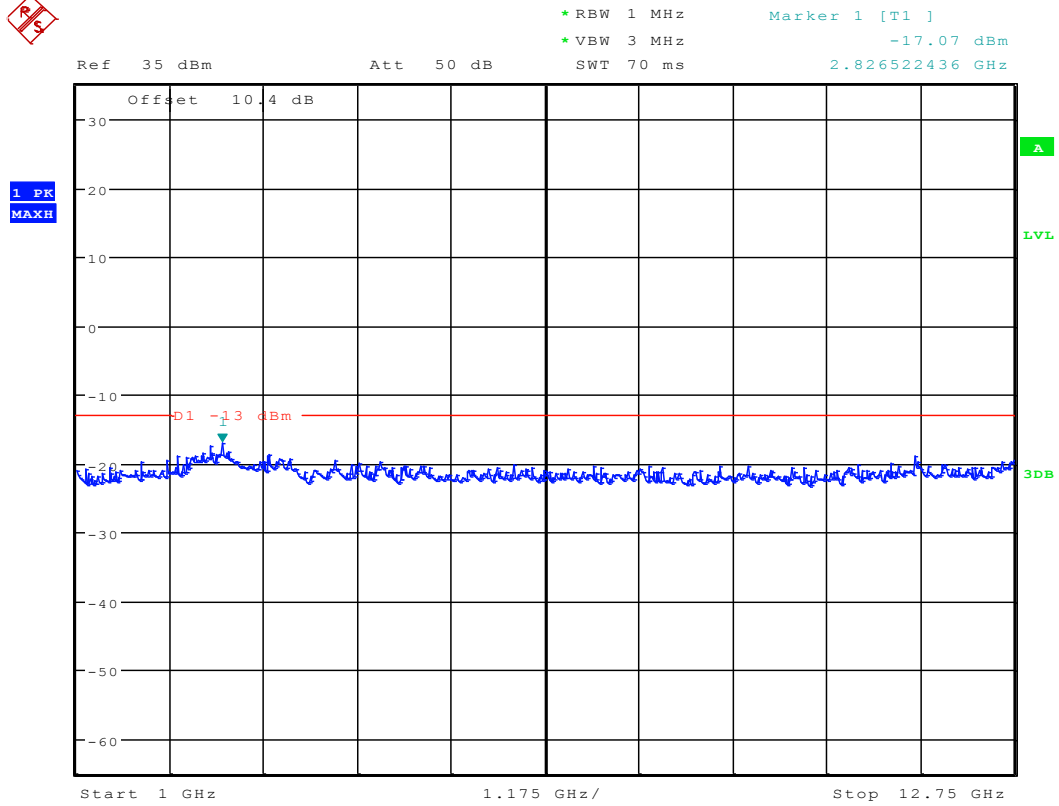


Date: 8.NOV.2011 17:50:59





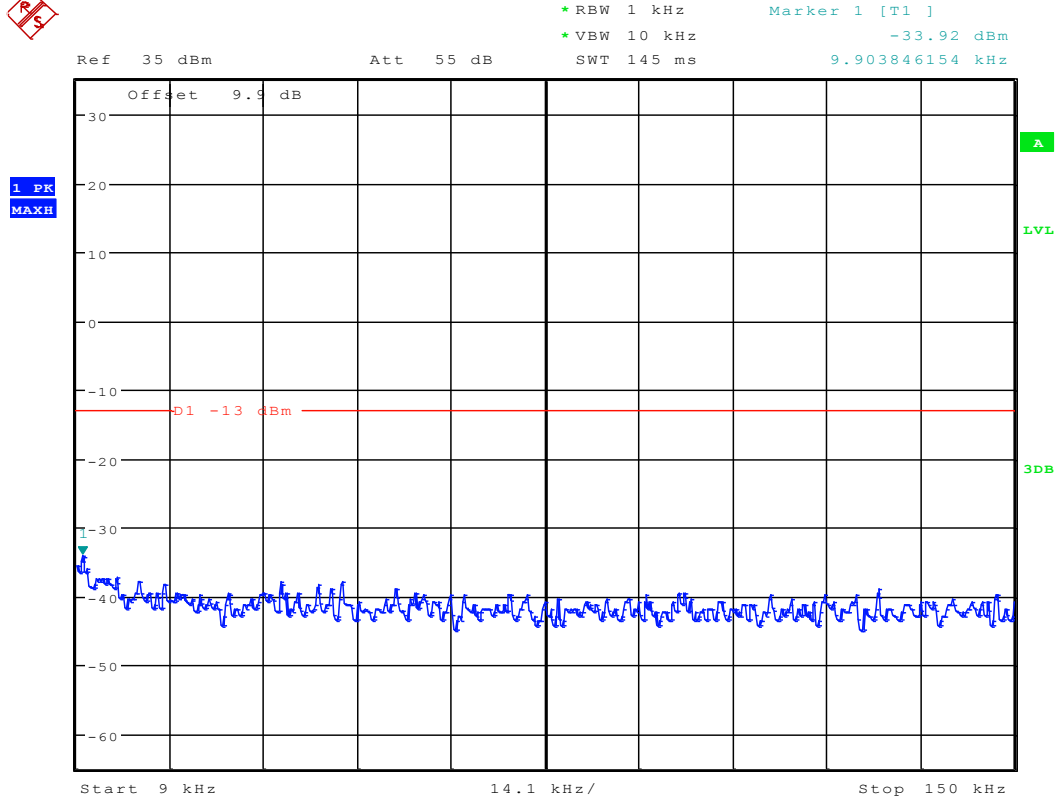
Date: 8.NOV.2011 17:51:25



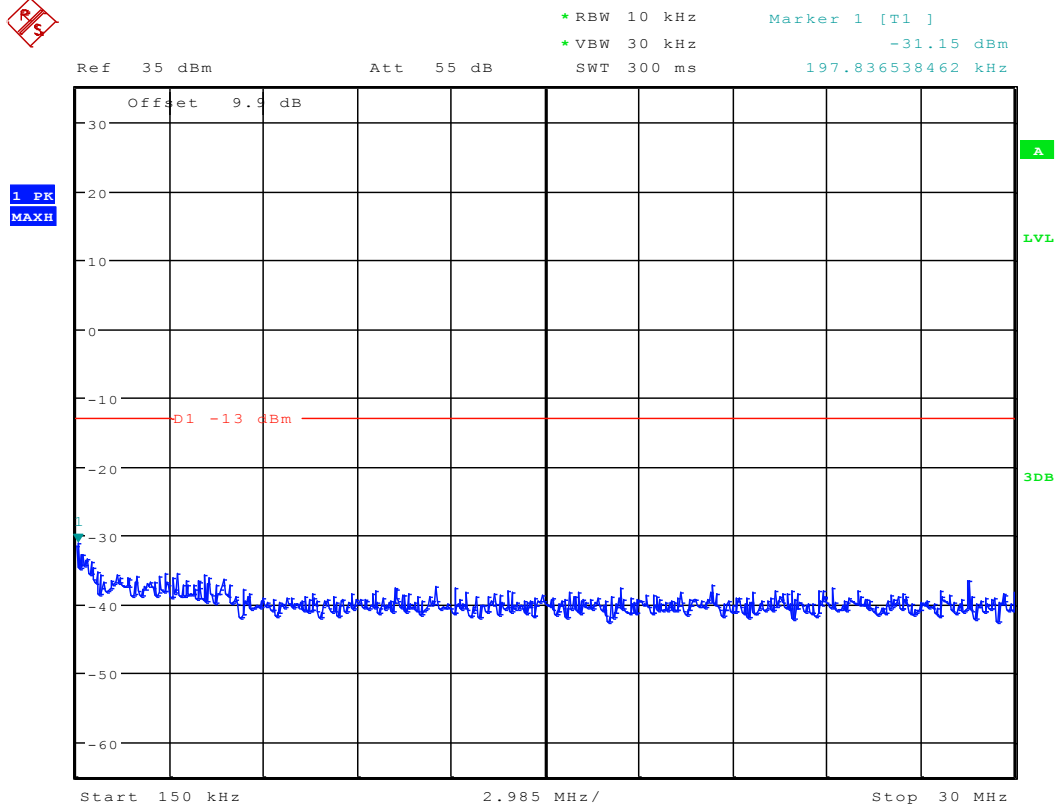
Date: 8.NOV.2011 17:51:51



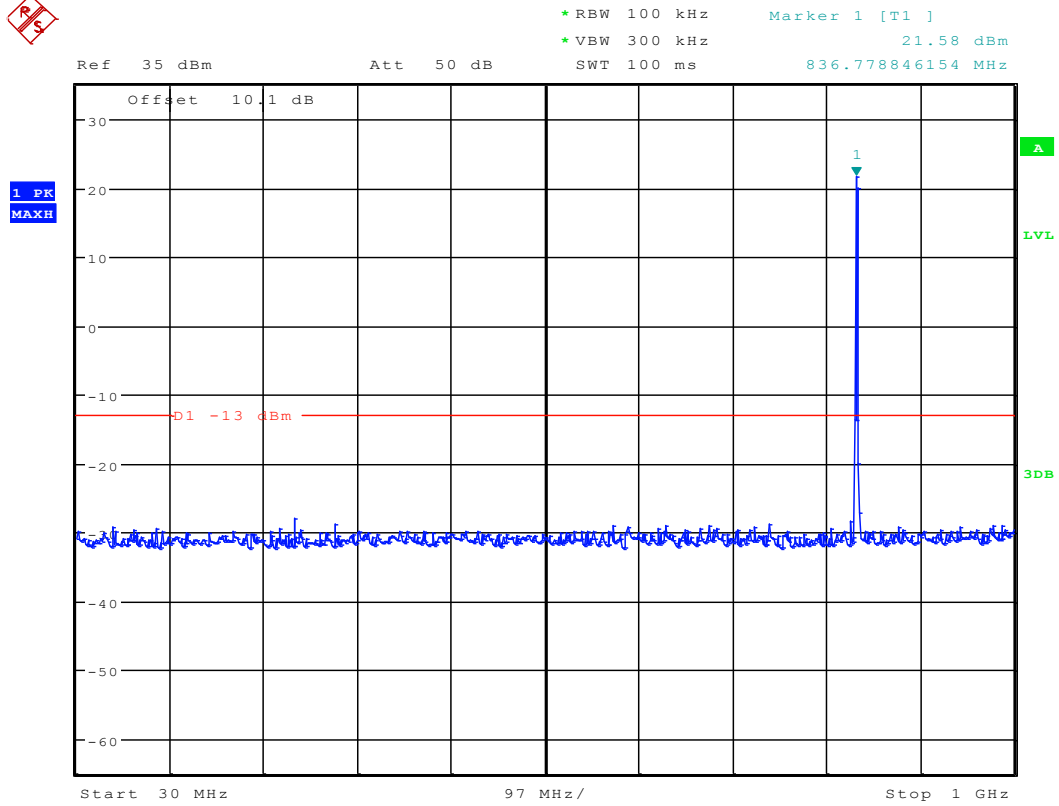
## Channel 384



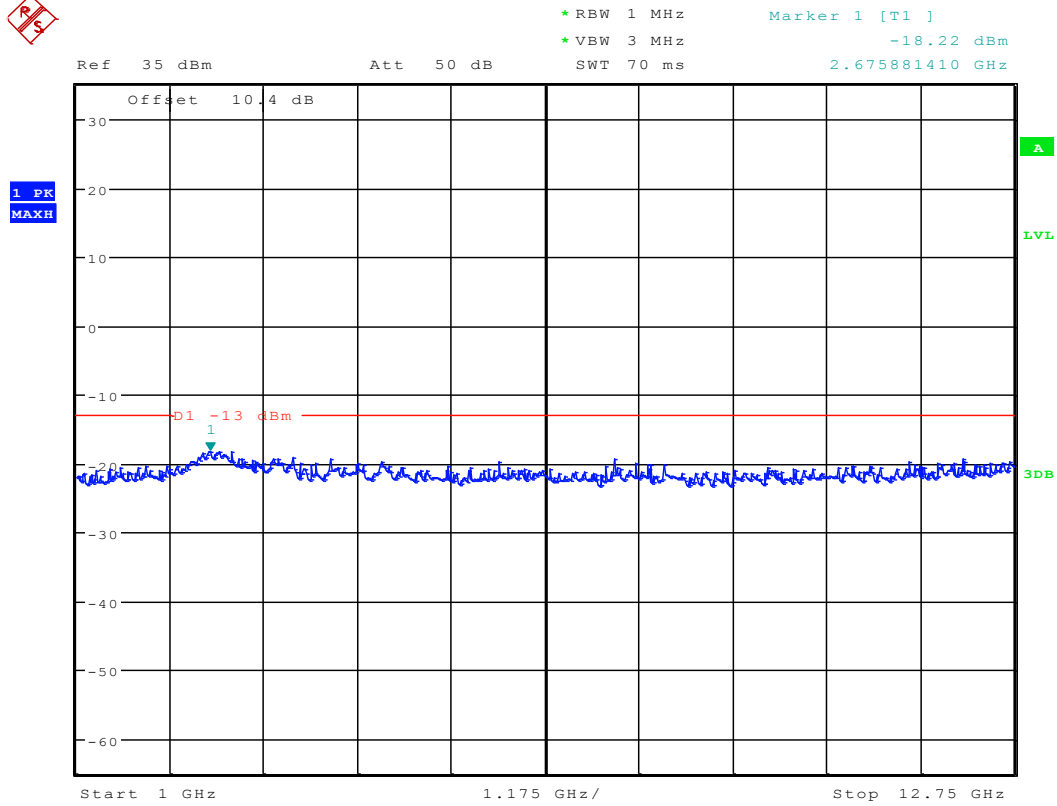
Date: 8.NOV.2011 17:50:42



Date: 8.NOV.2011 17:51:08



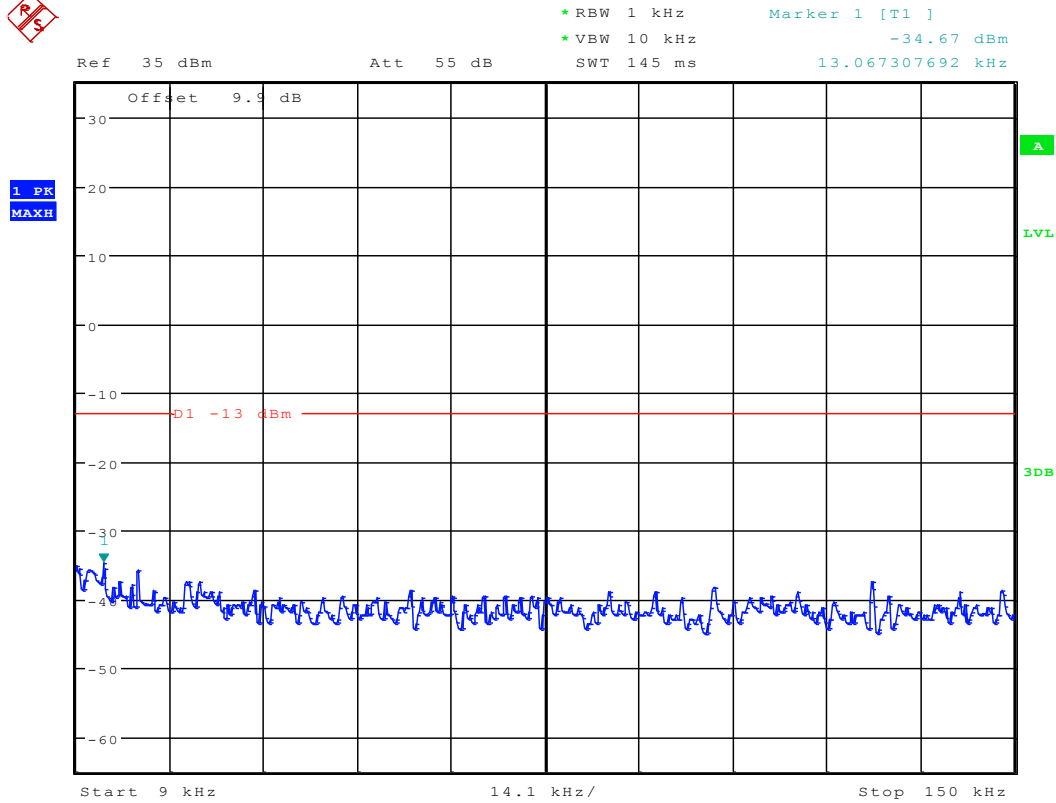
Date: 8.NOV.2011 17:51:33



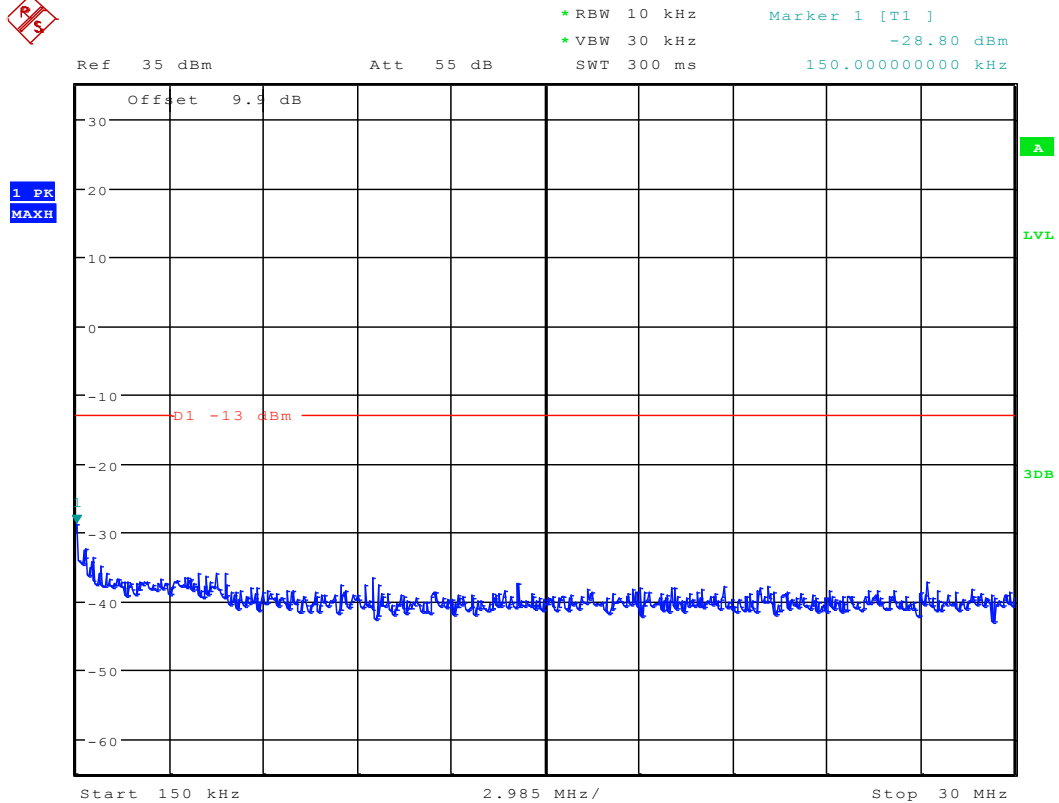
Date: 8.NOV.2011 17:51:59



## Channel 777

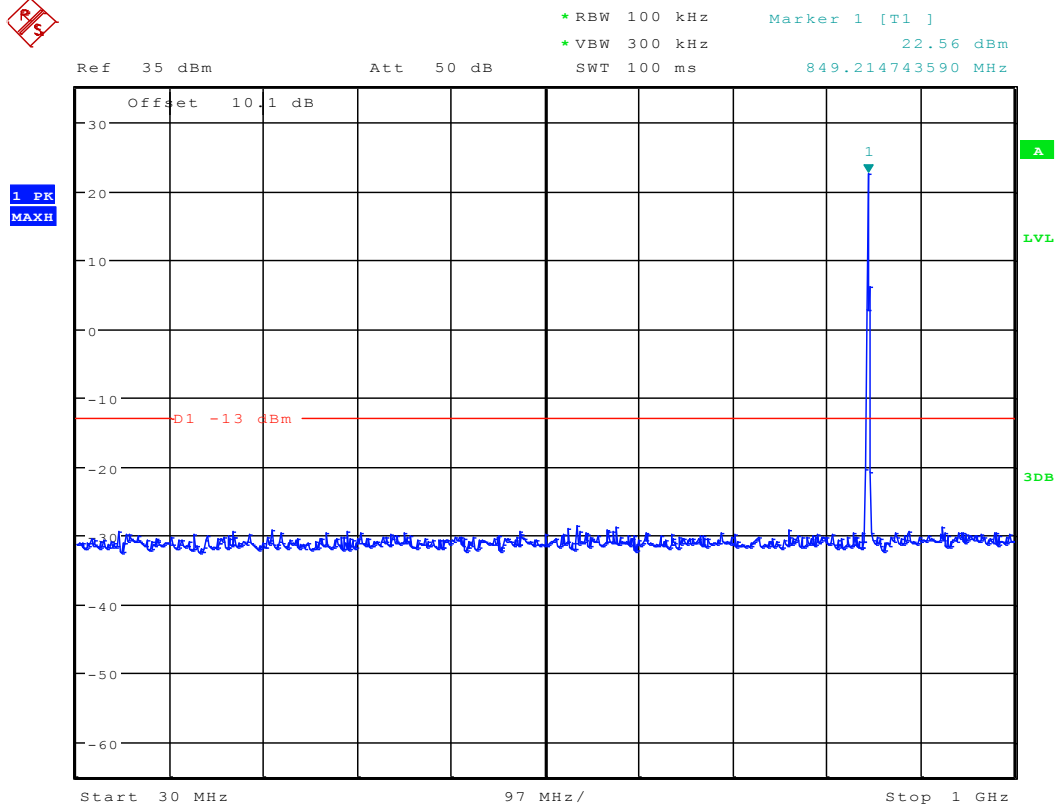


Date: 8.NOV.2011 17:50:50

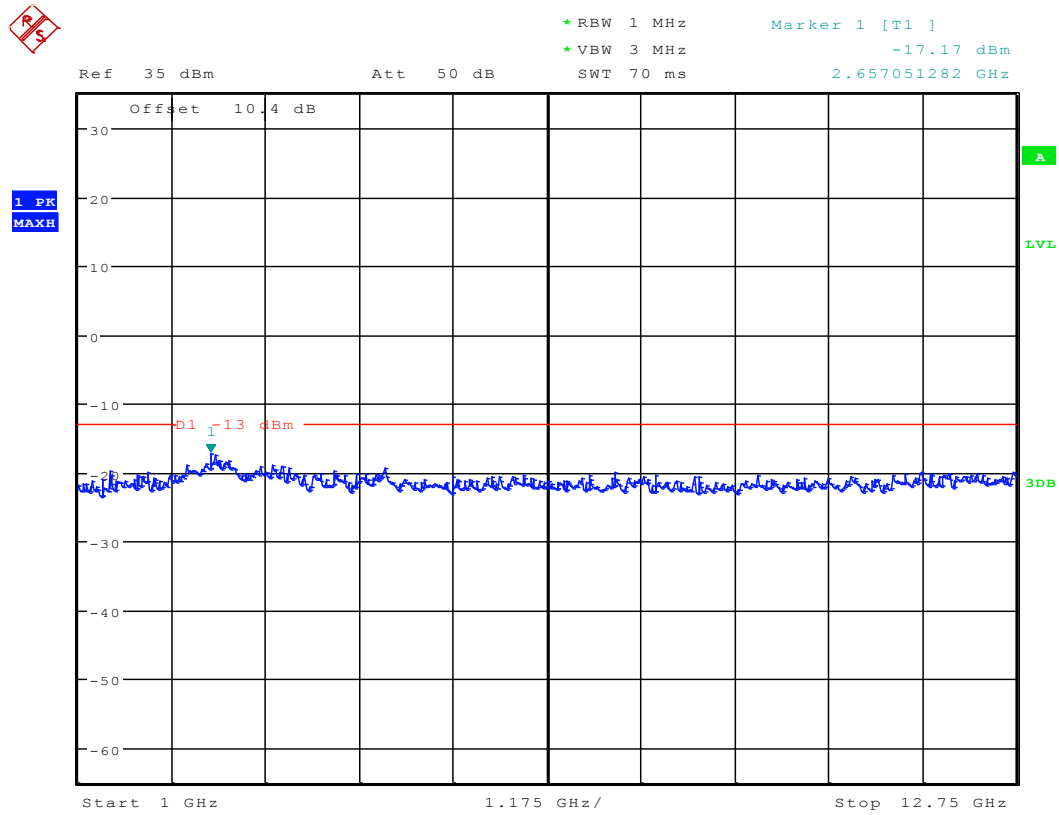


Date: 8.NOV.2011 17:51:16





Date: 8.NOV.2011 17:51:42

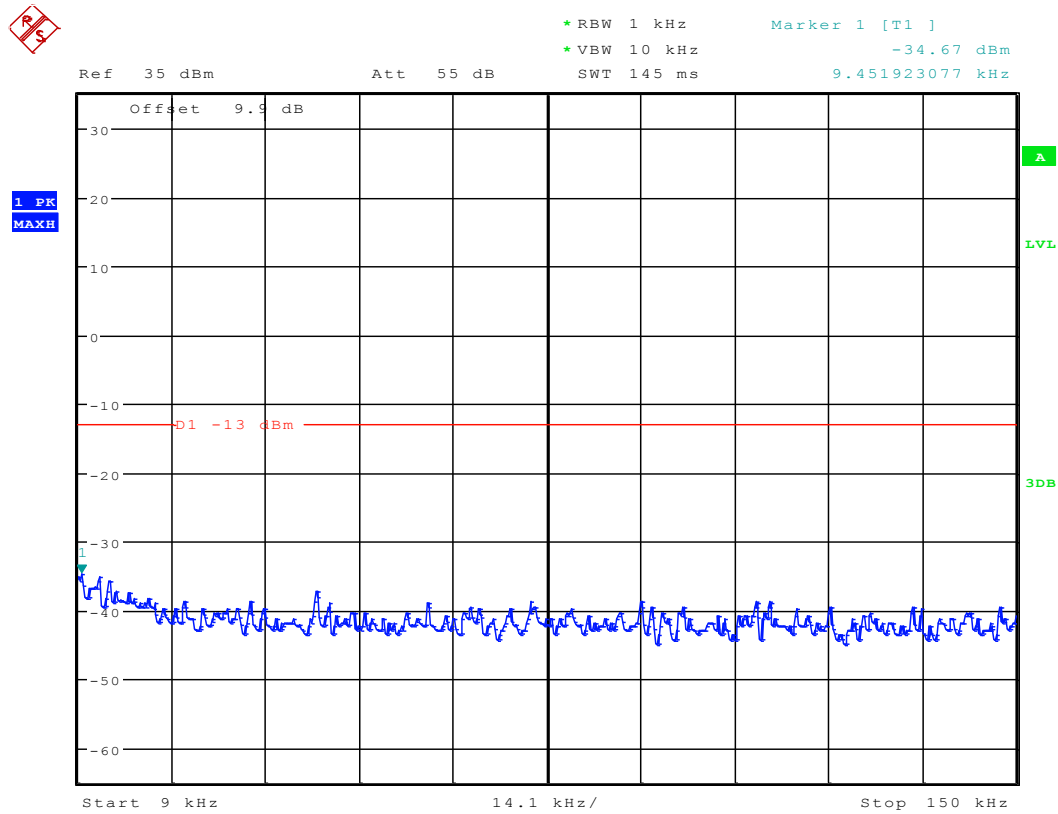


Date: 8.NOV.2011 17:52:07

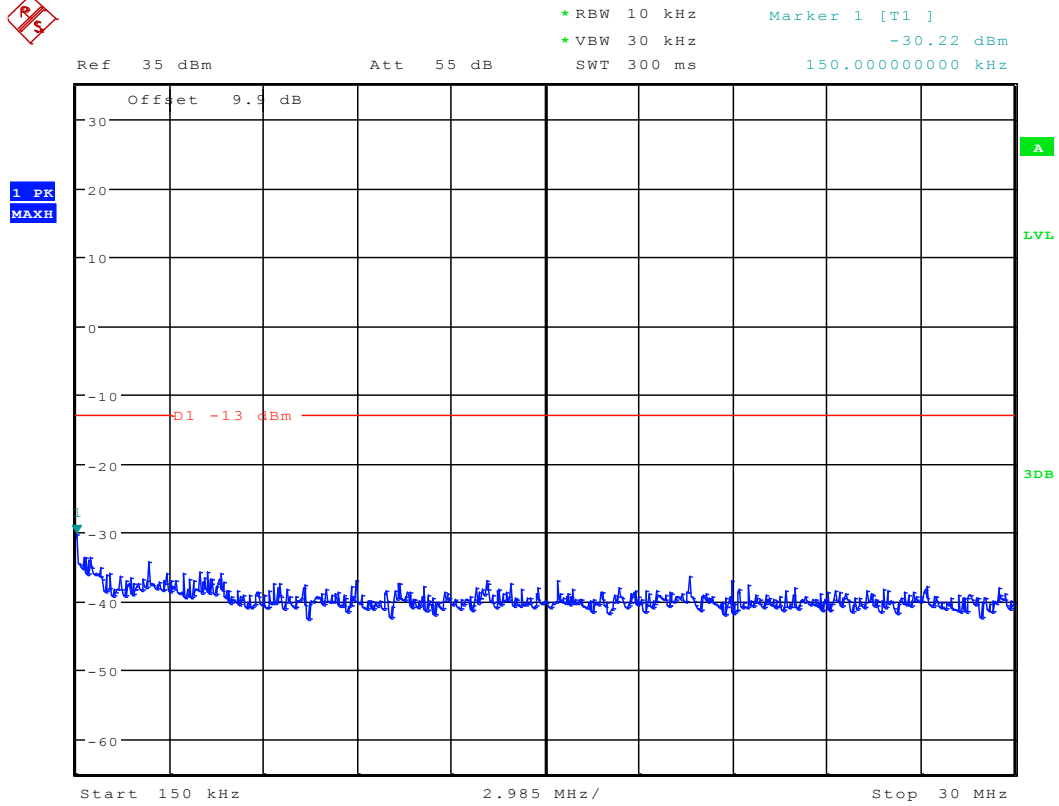


## TM3

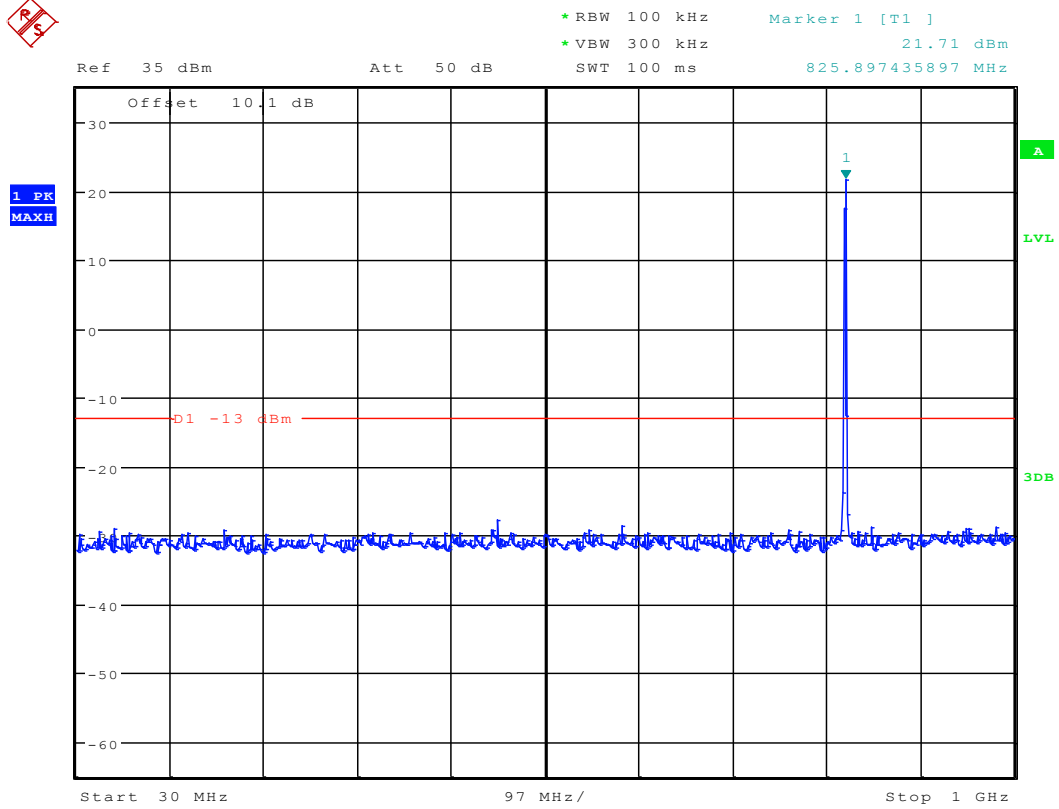
### Channel 1013



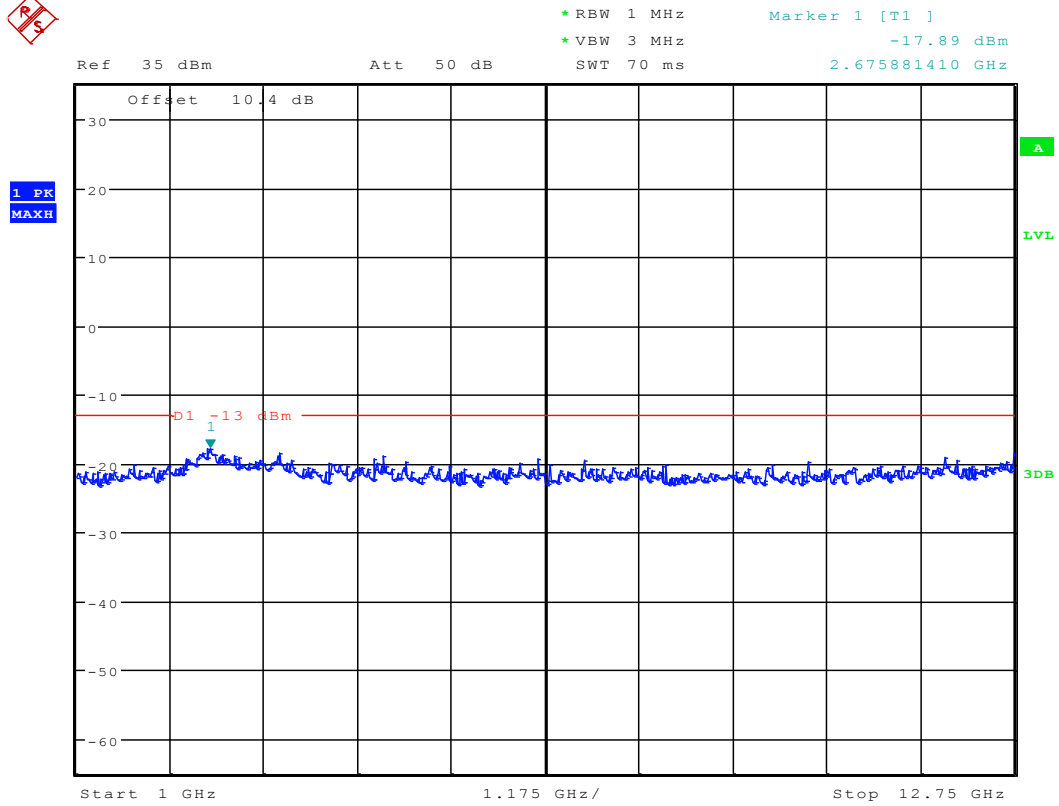
Date: 8.NOV.2011 17:52:18



Date: 8.NOV.2011 17:52:43



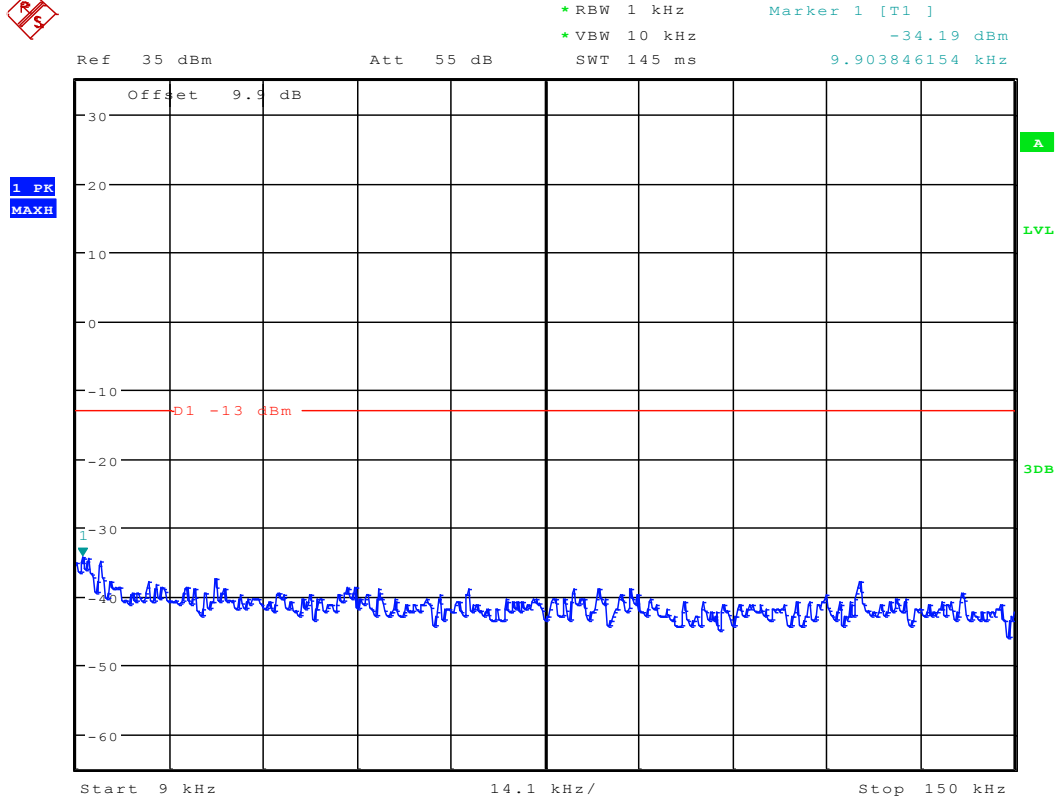
Date: 8.NOV.2011 17:53:09



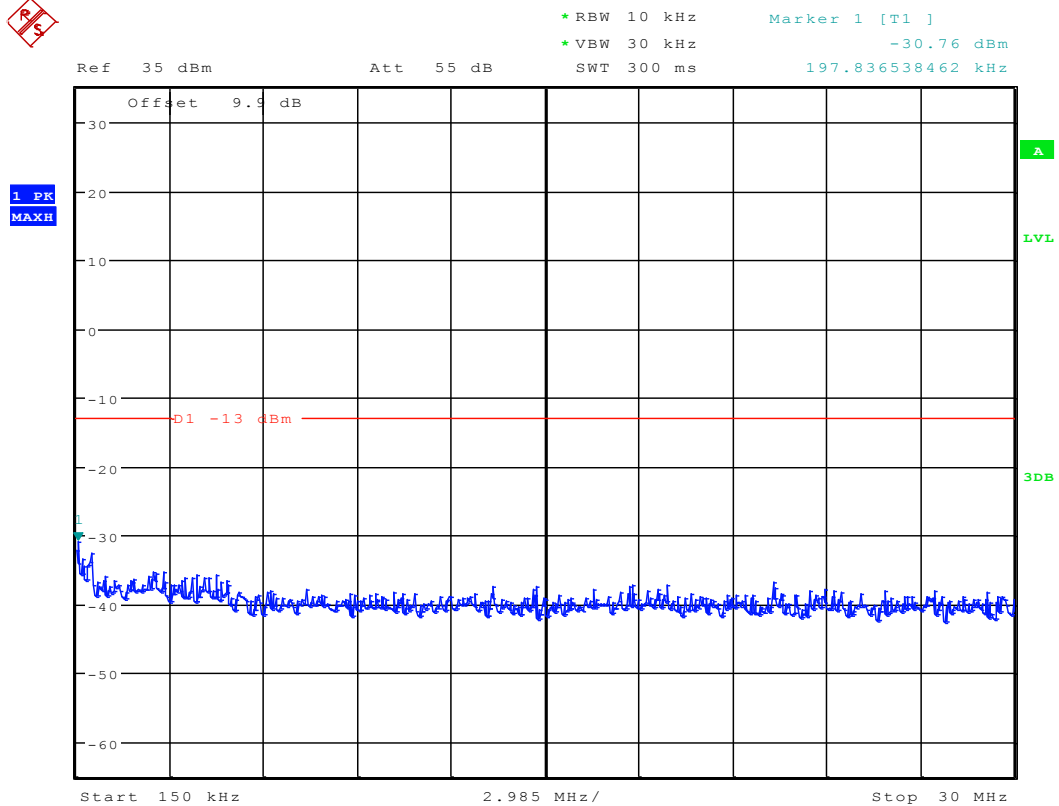
Date: 8.NOV.2011 17:53:35



## Channel 384

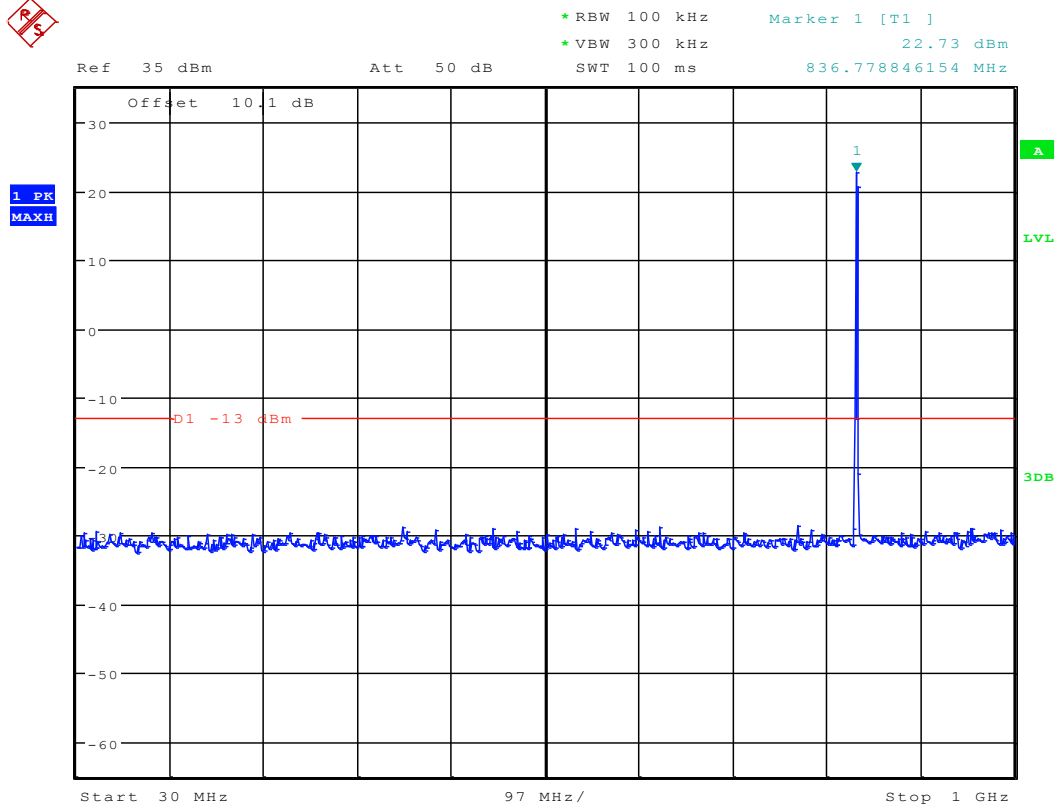


Date: 8.NOV.2011 17:52:26

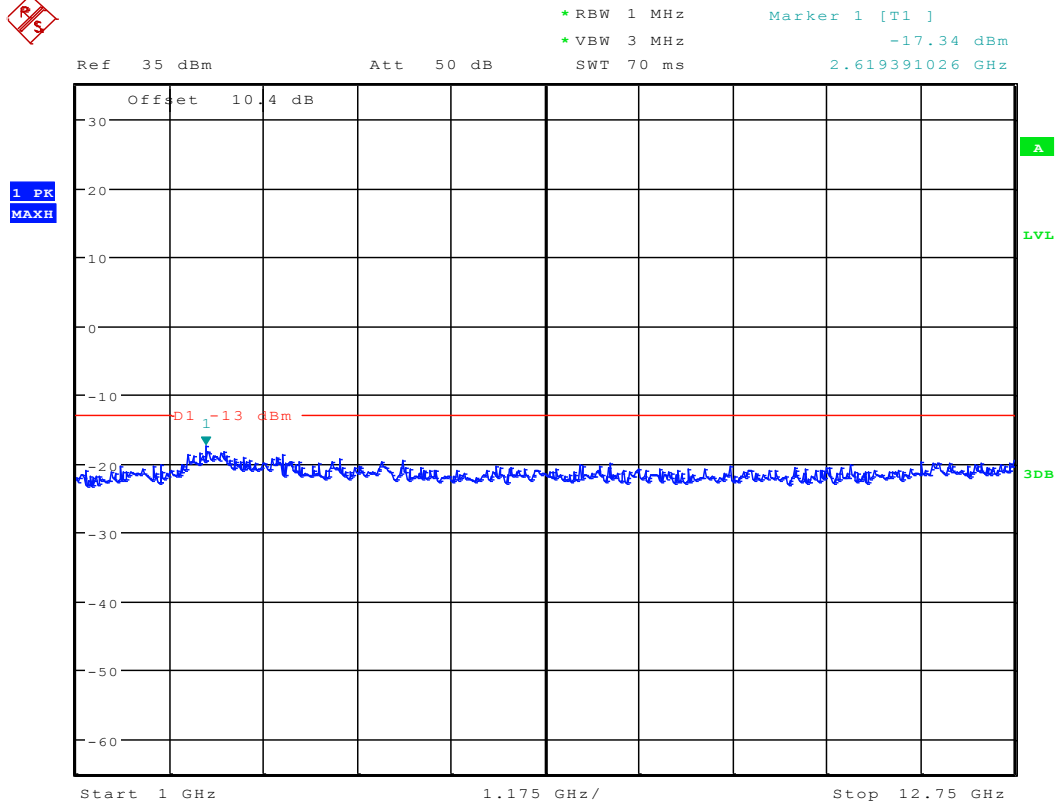


Date: 8.NOV.2011 17:52:52



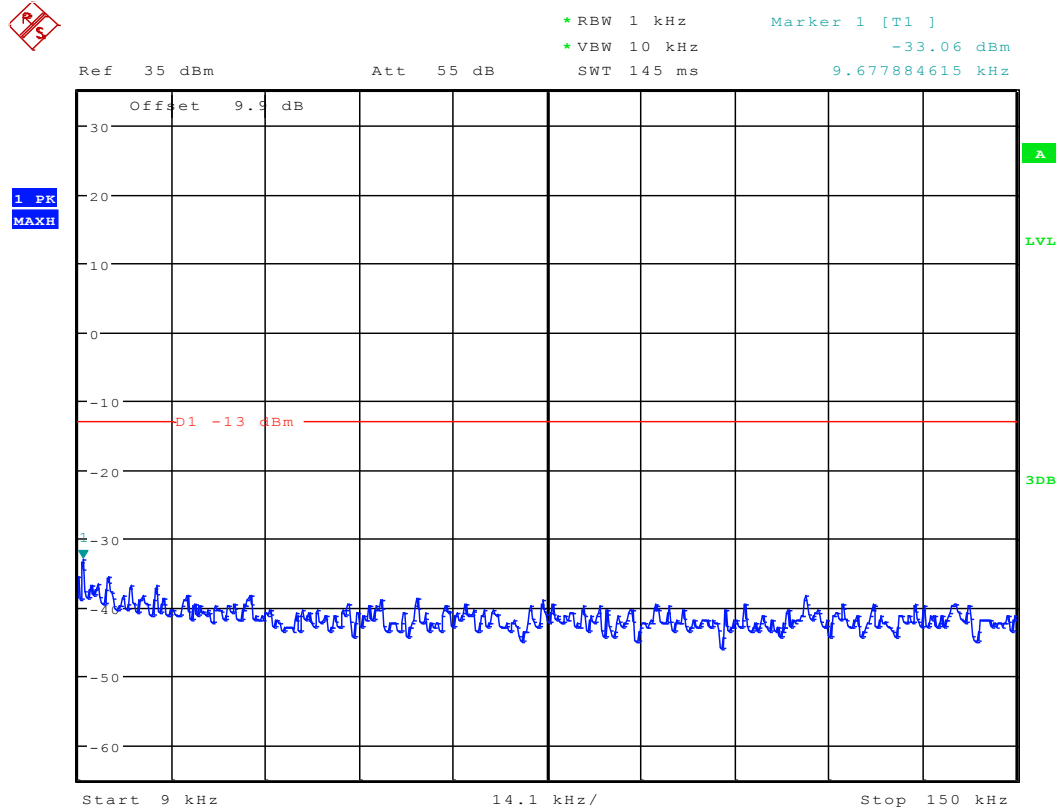


Date: 8.NOV.2011 17:53:17

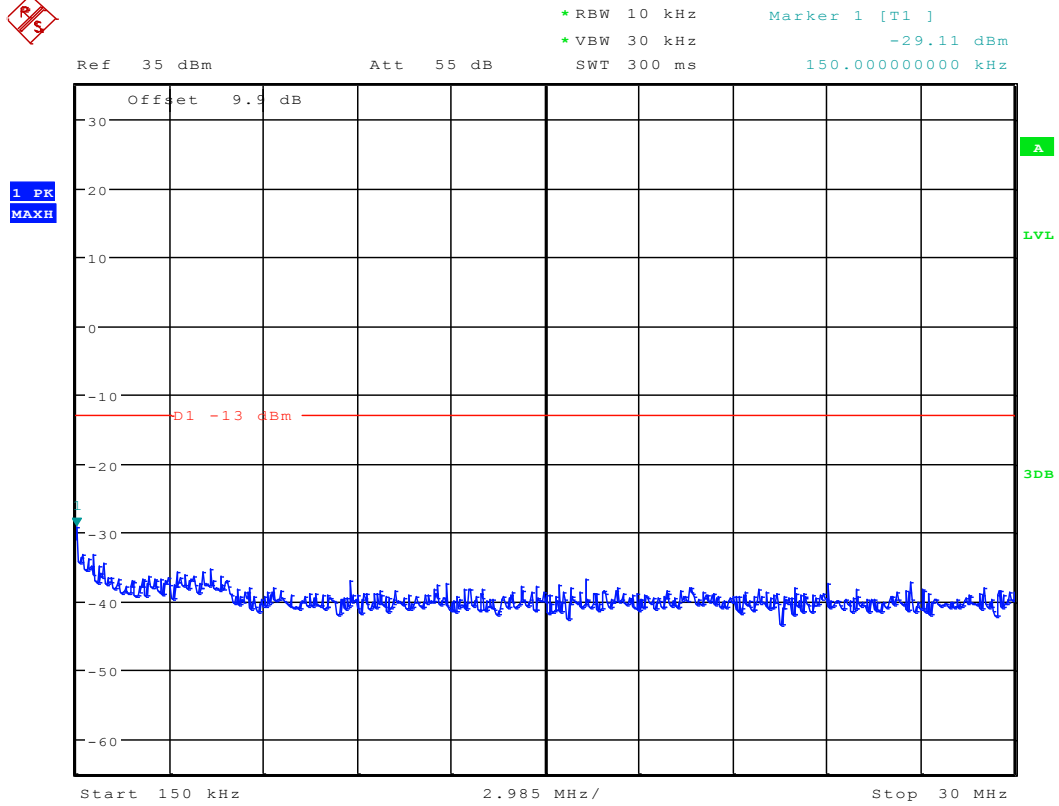


Date: 8.NOV.2011 17:53:43

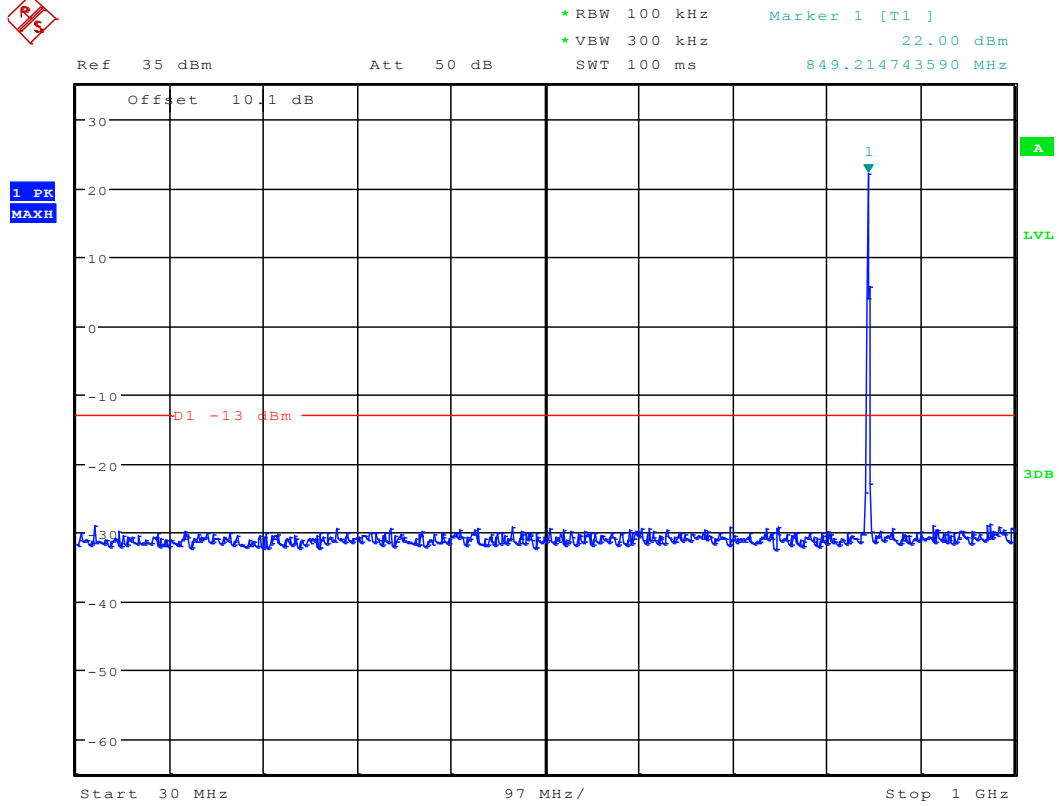
## Channel 777



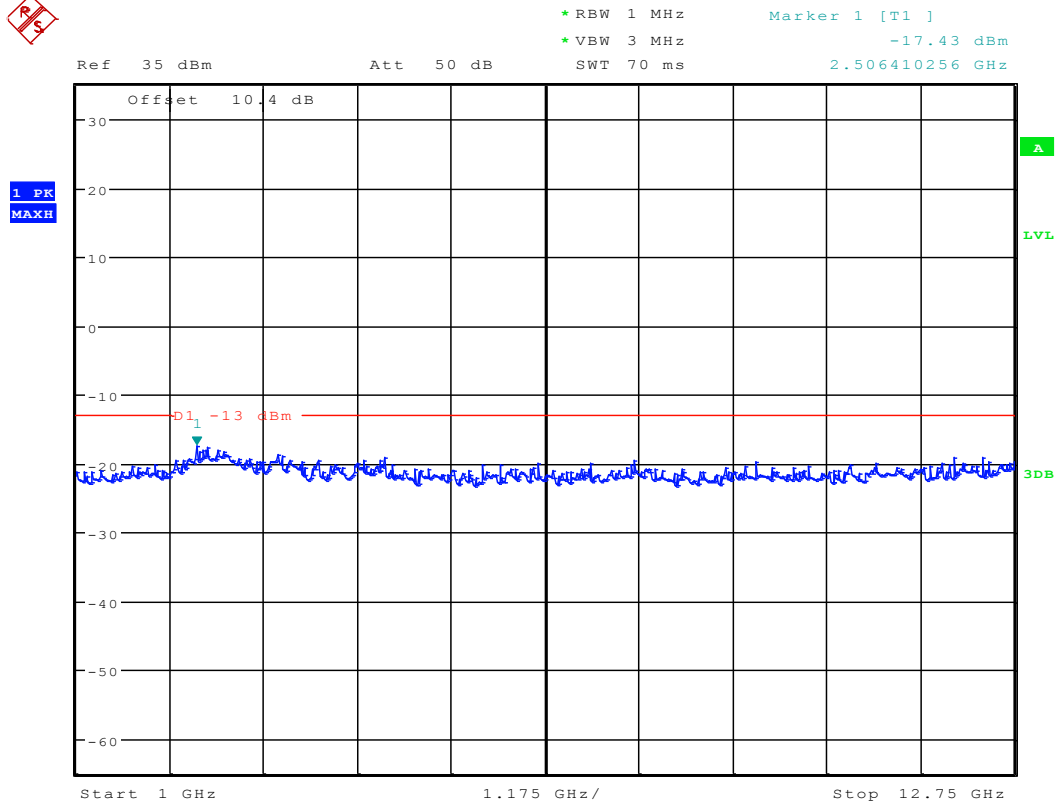
Date: 8.NOV.2011 17:52:34



Date: 8.NOV.2011 17:53:00



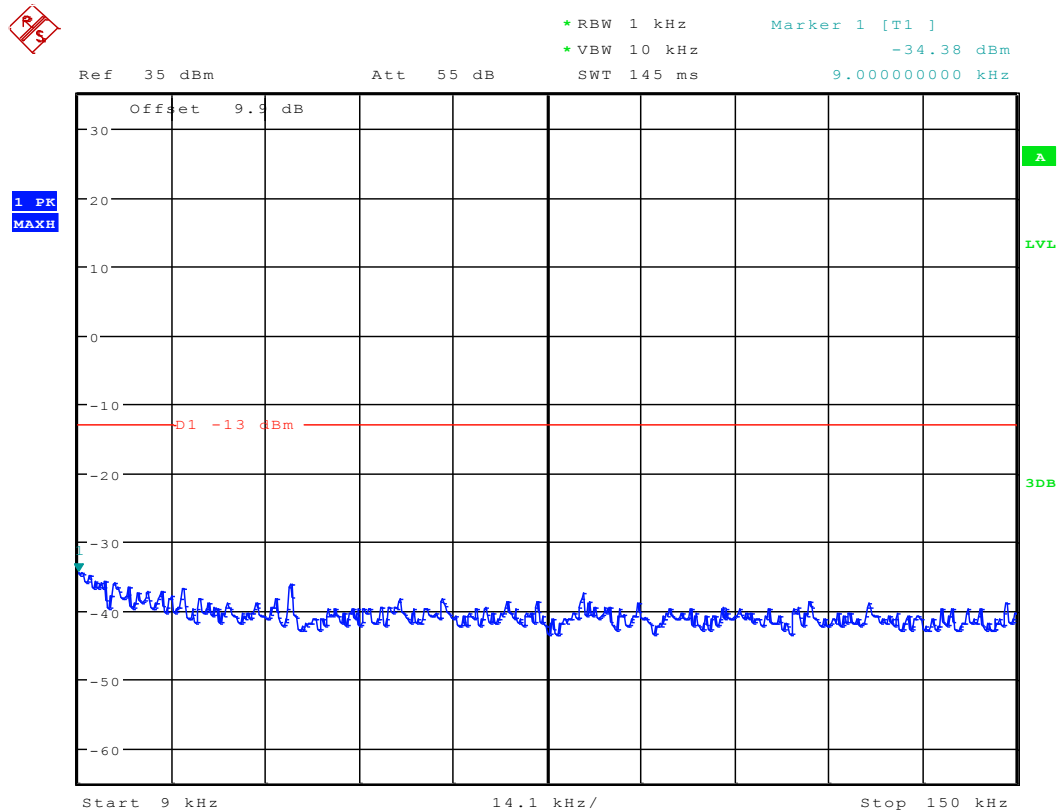
Date: 8.NOV.2011 17:53:26



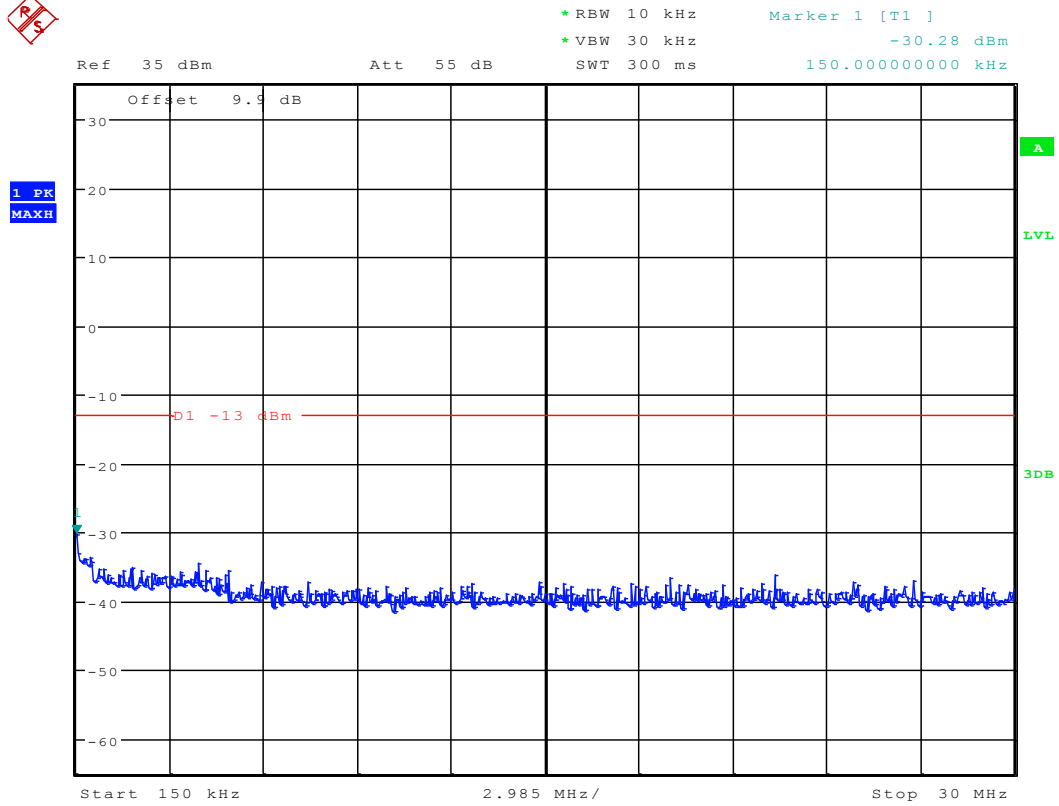
Date: 8.NOV.2011 17:53:51

## EVDO subtype 0

## Channel 1013

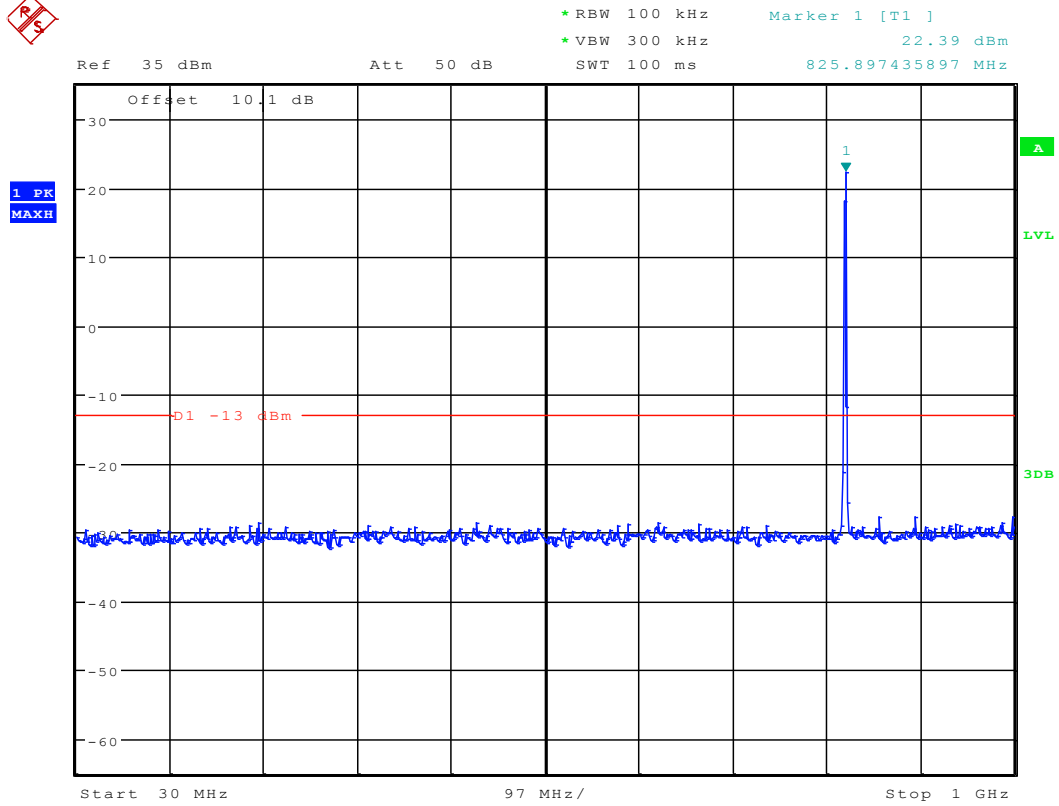


Date: 8.NOV.2011 17:59:38

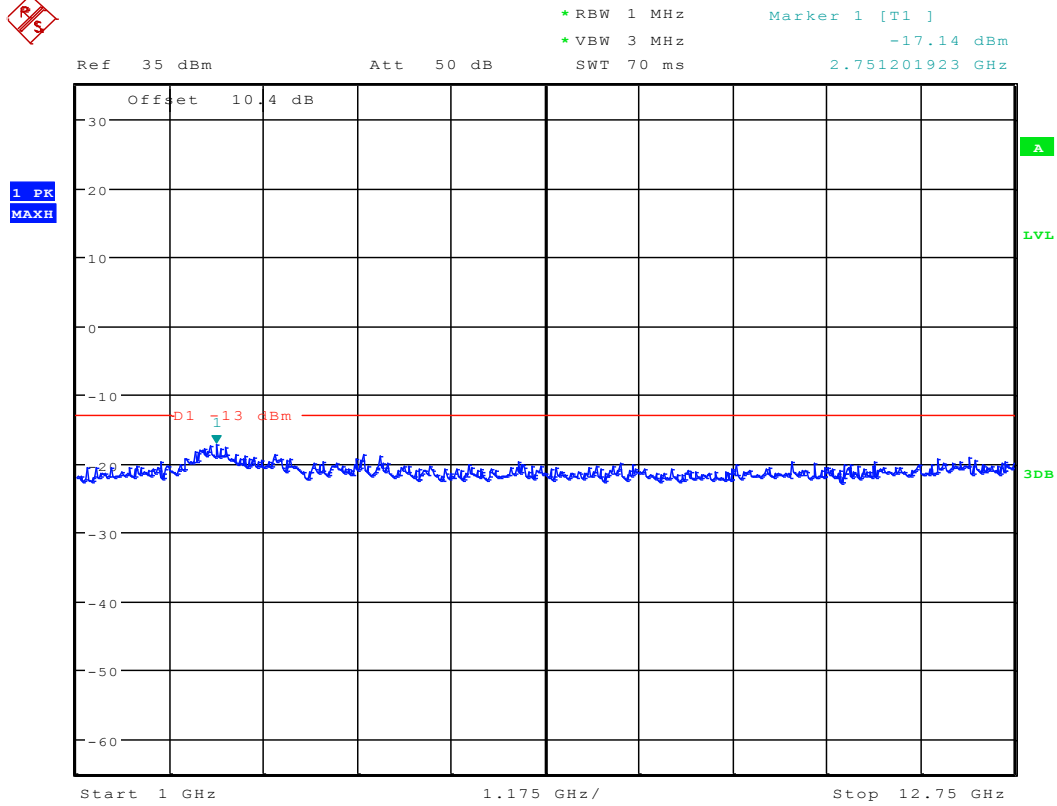


Date: 8.NOV.2011 18:00:22





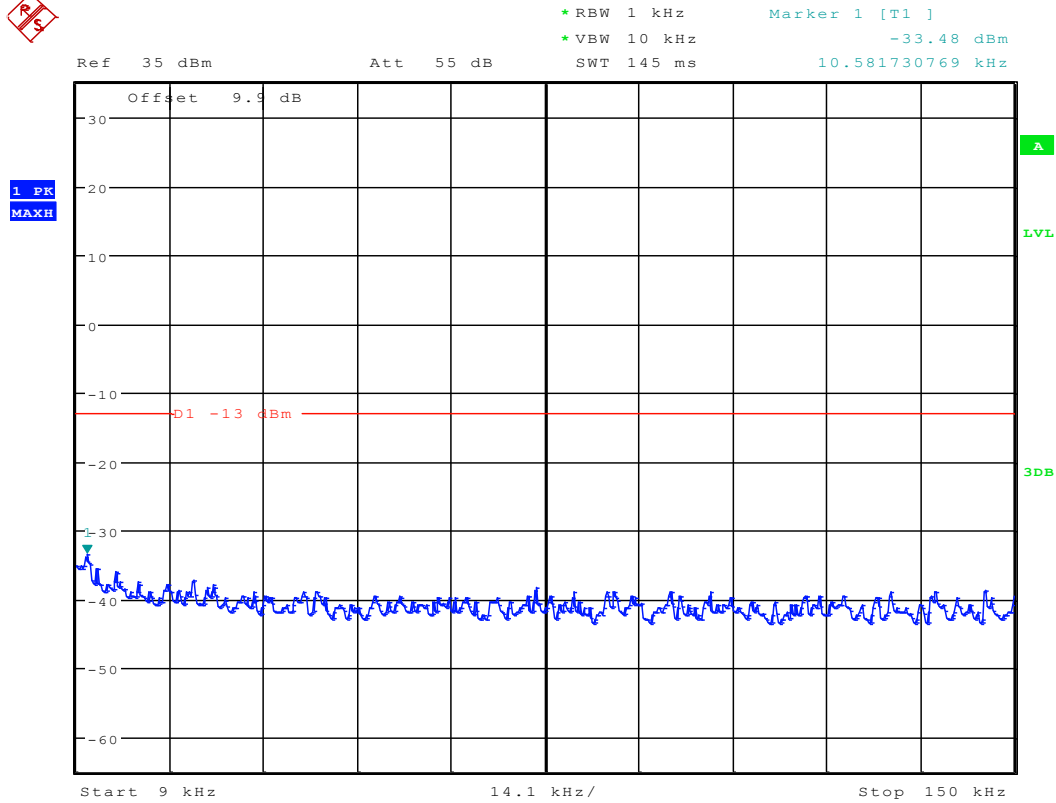
Date: 8.NOV.2011 18:01:05



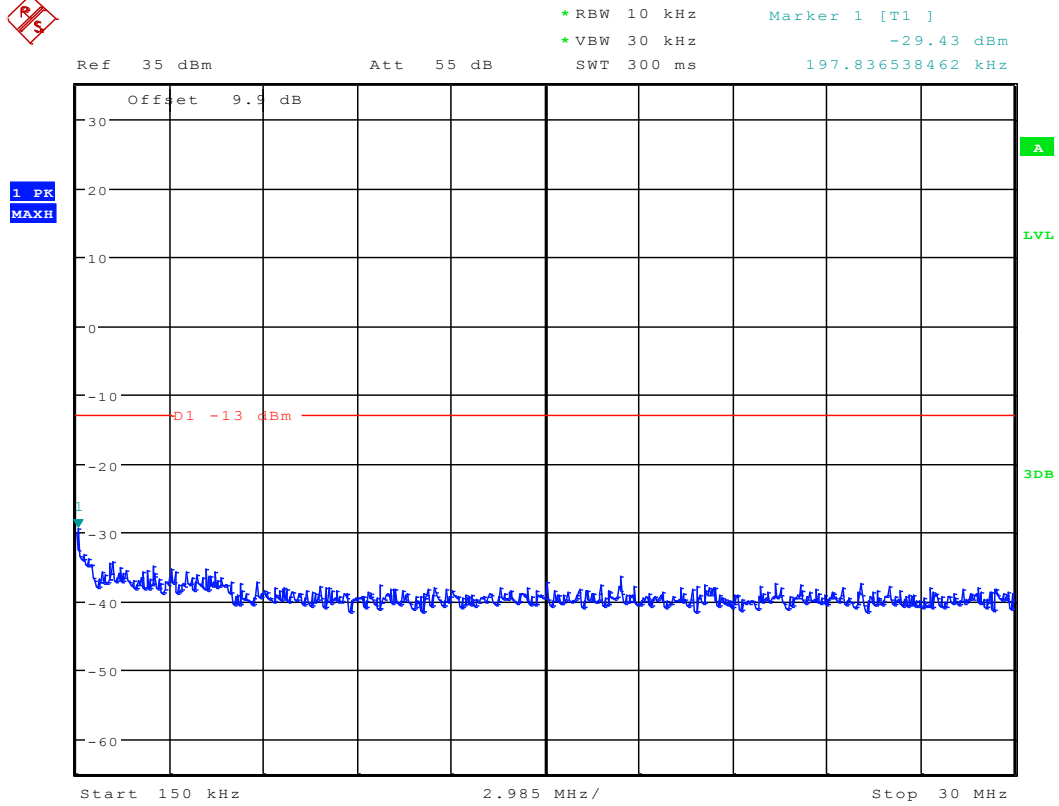
Date: 8.NOV.2011 18:01:49



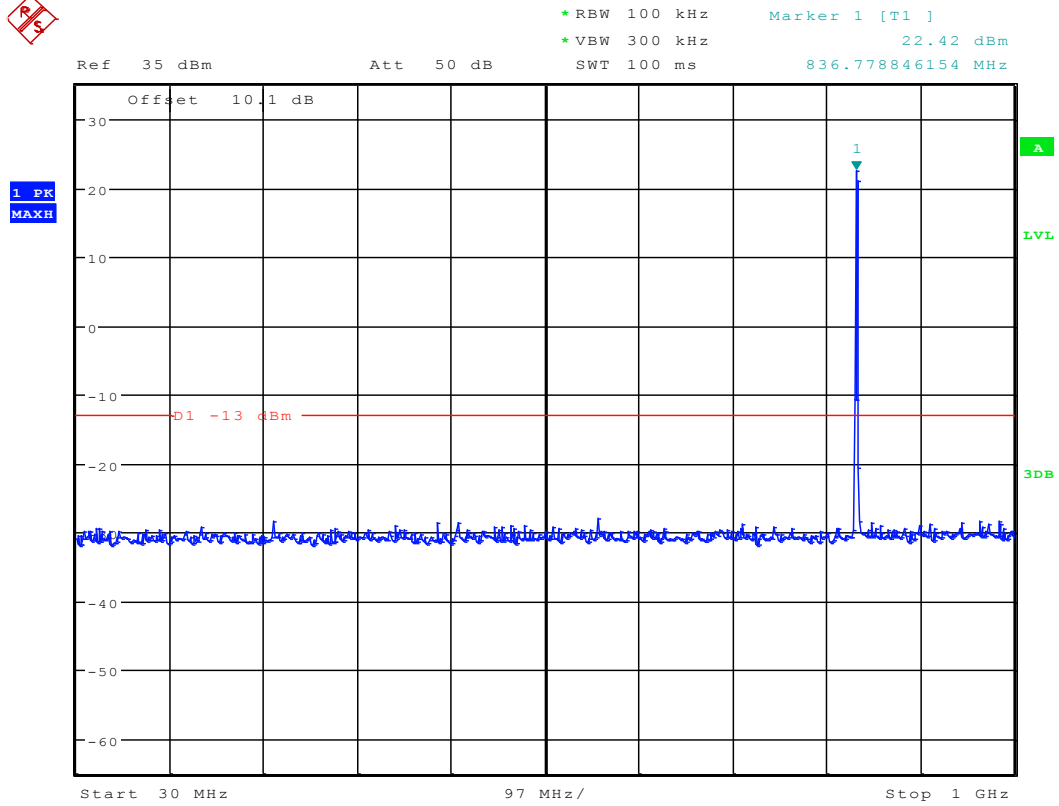
## Channel 384



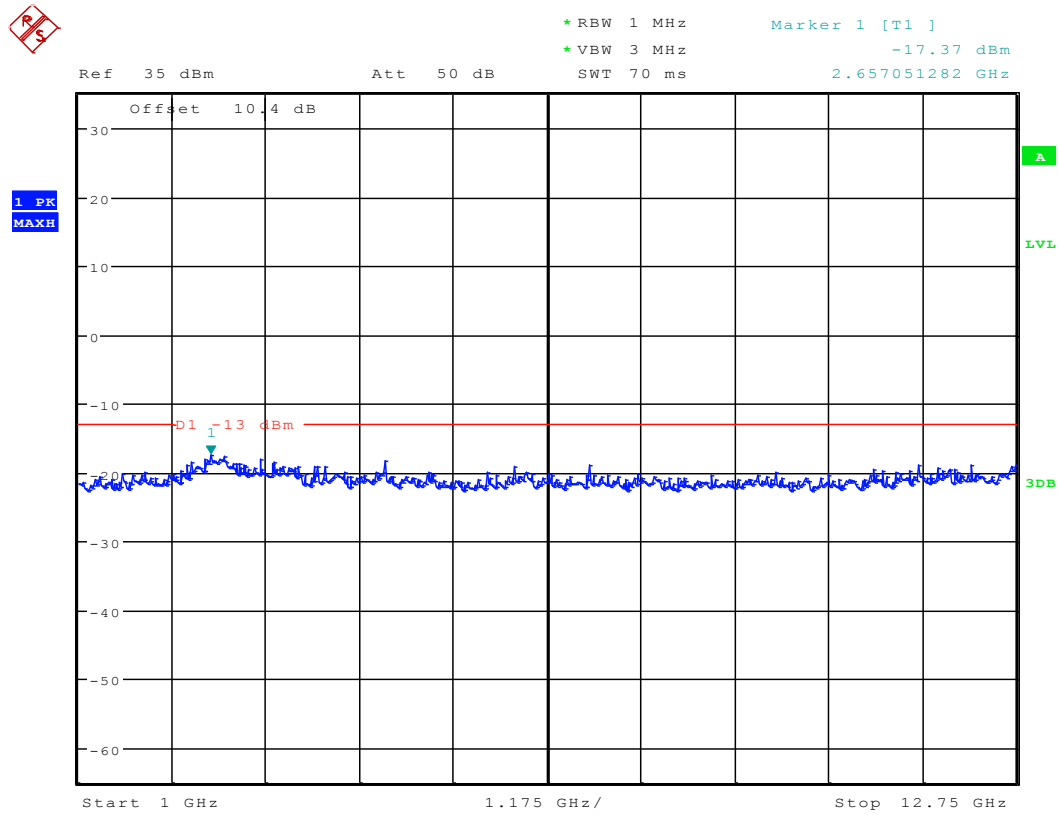
Date: 8.NOV.2011 17:59:53



Date: 8.NOV.2011 18:00:36



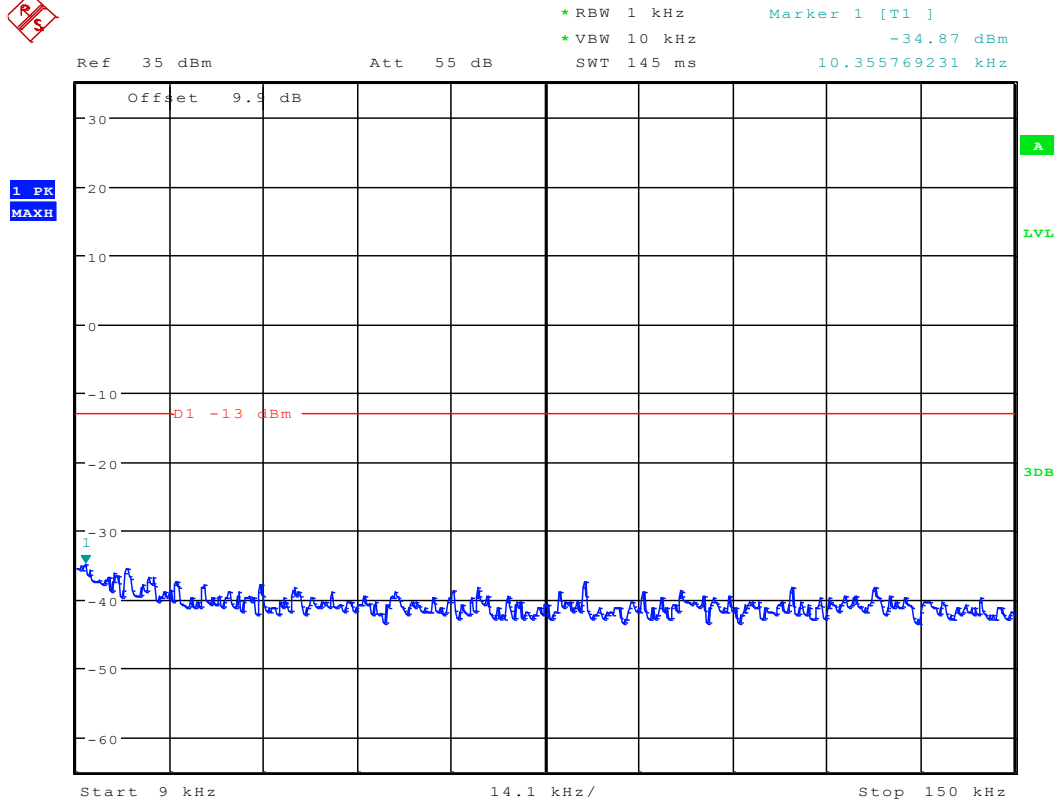
Date: 8.NOV.2011 18:01:20



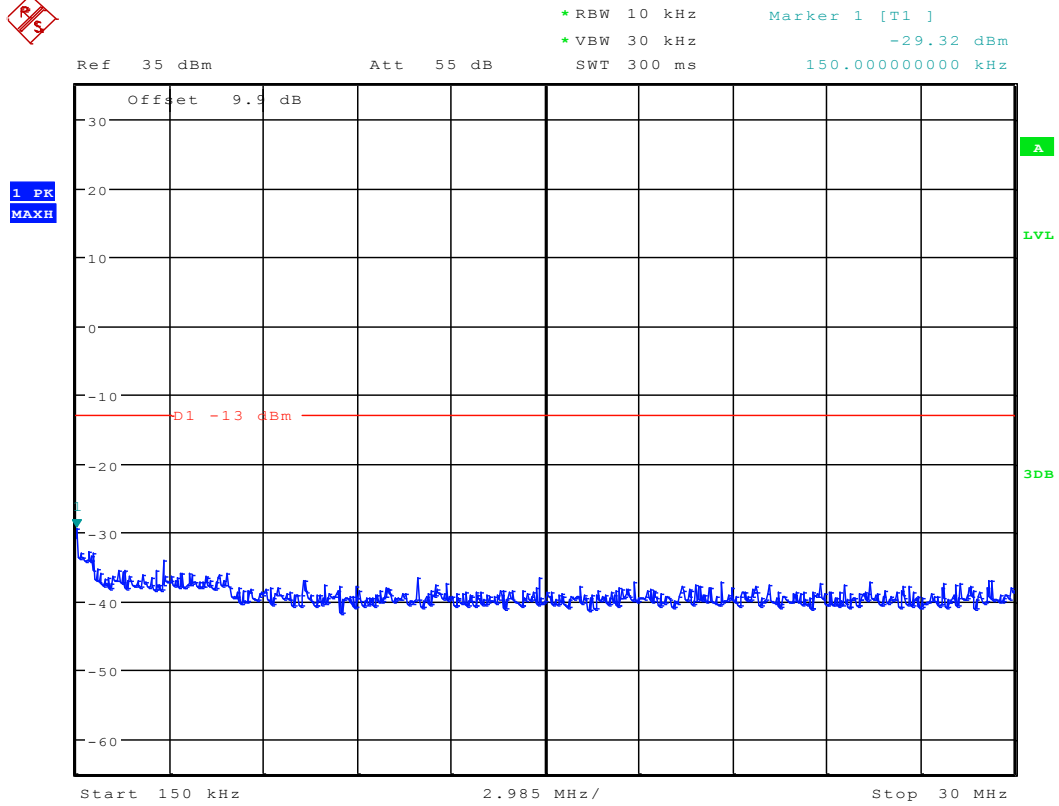
Date: 8.NOV.2011 18:02:04



## Channel 777

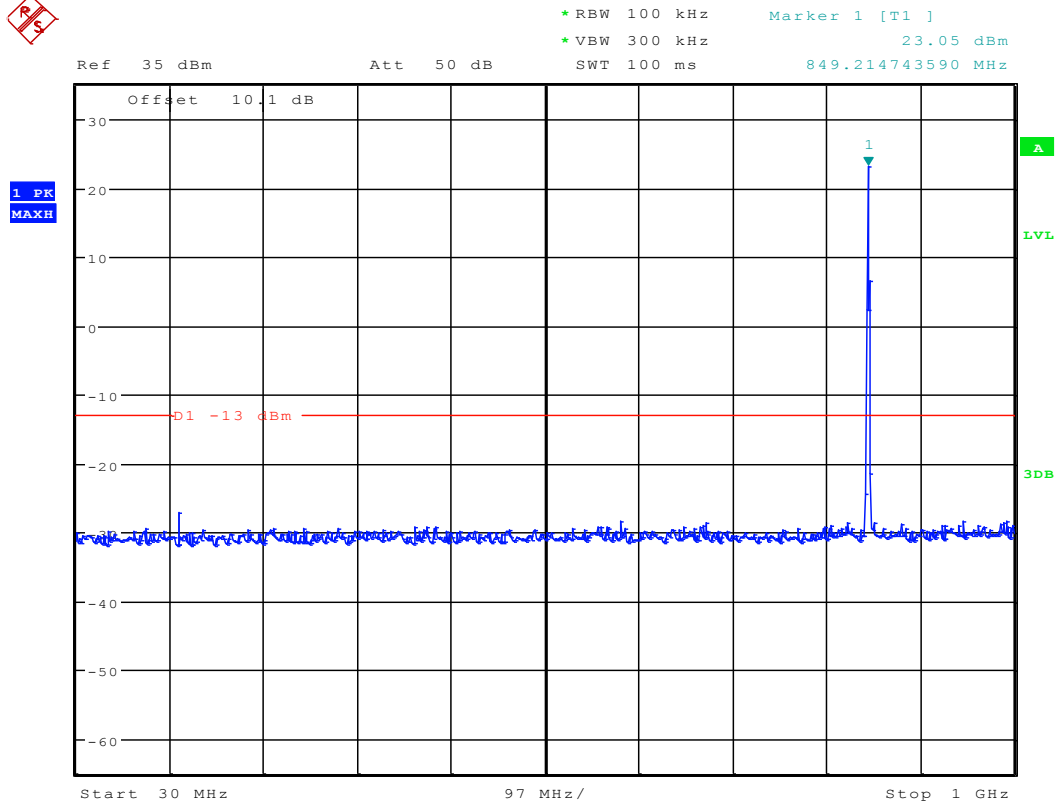


Date: 8.NOV.2011 18:00:07

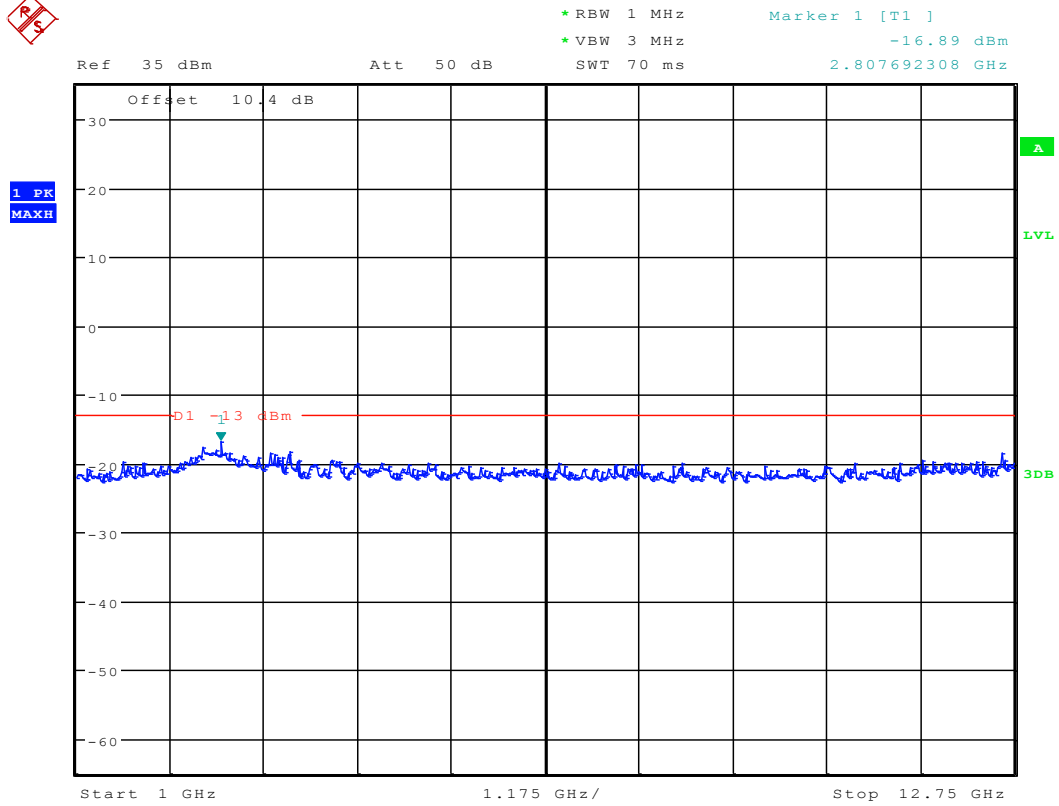


Date: 8.NOV.2011 18:00:51





Date: 8.NOV.2011 18:01:34



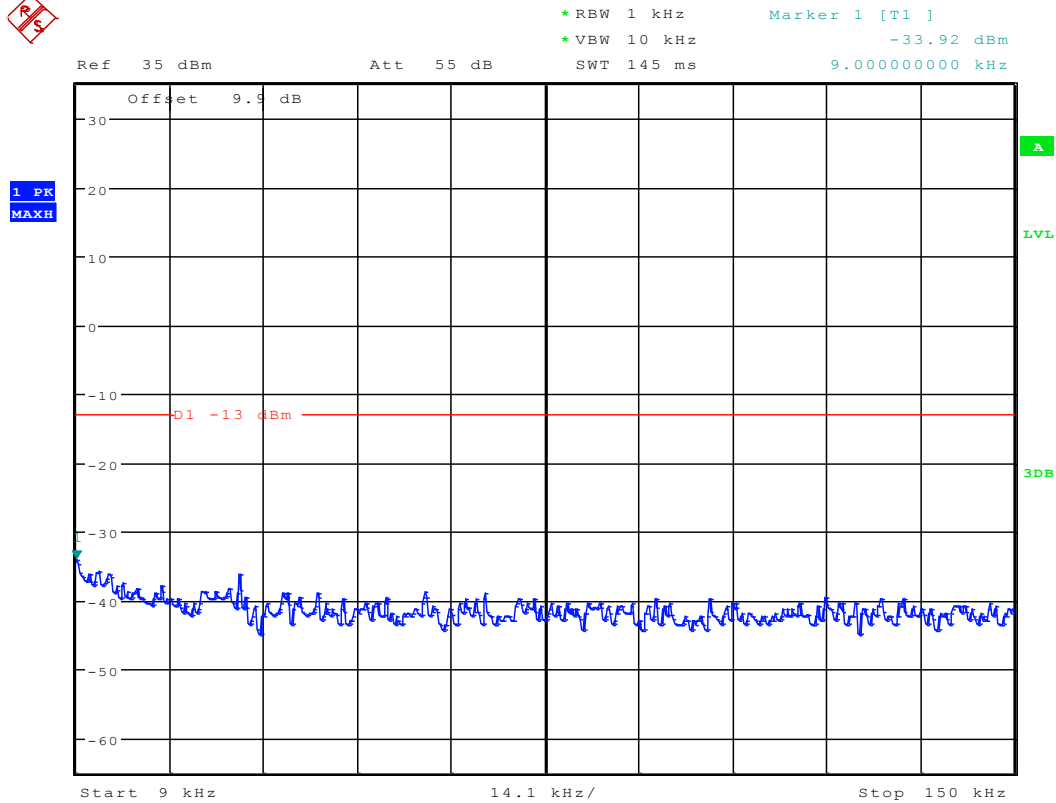
Date: 8.NOV.2011 18:02:18



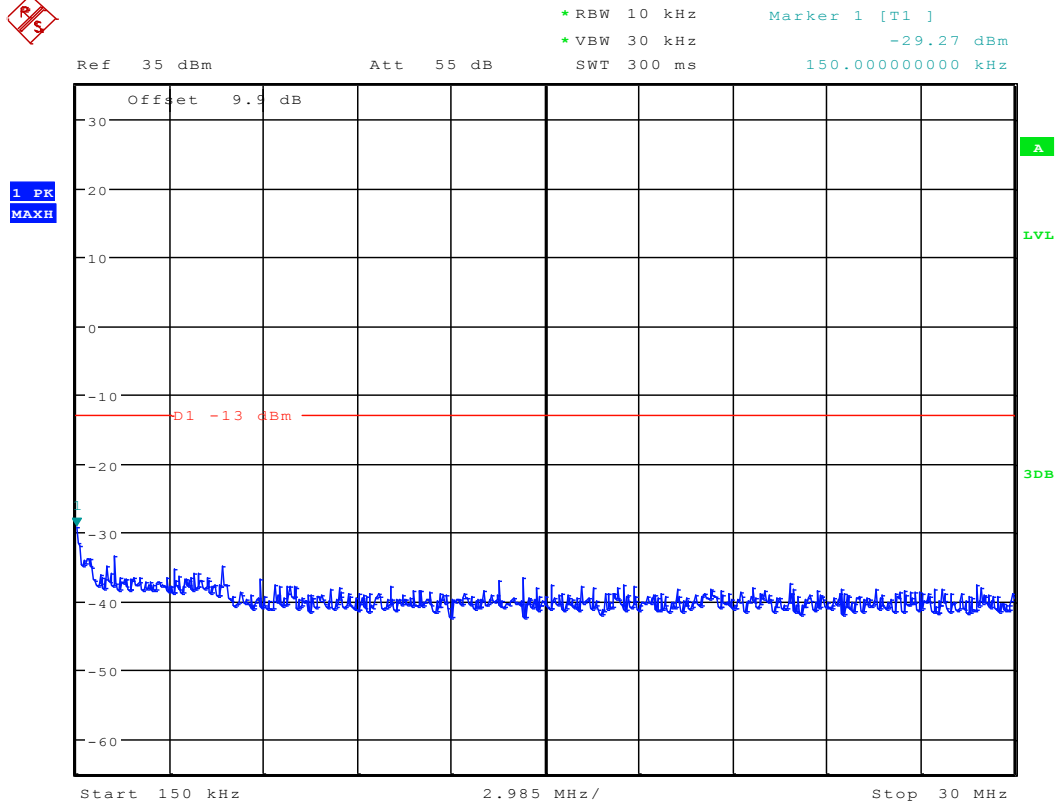
## EVDO subtype 2

### Modulation: BPSK

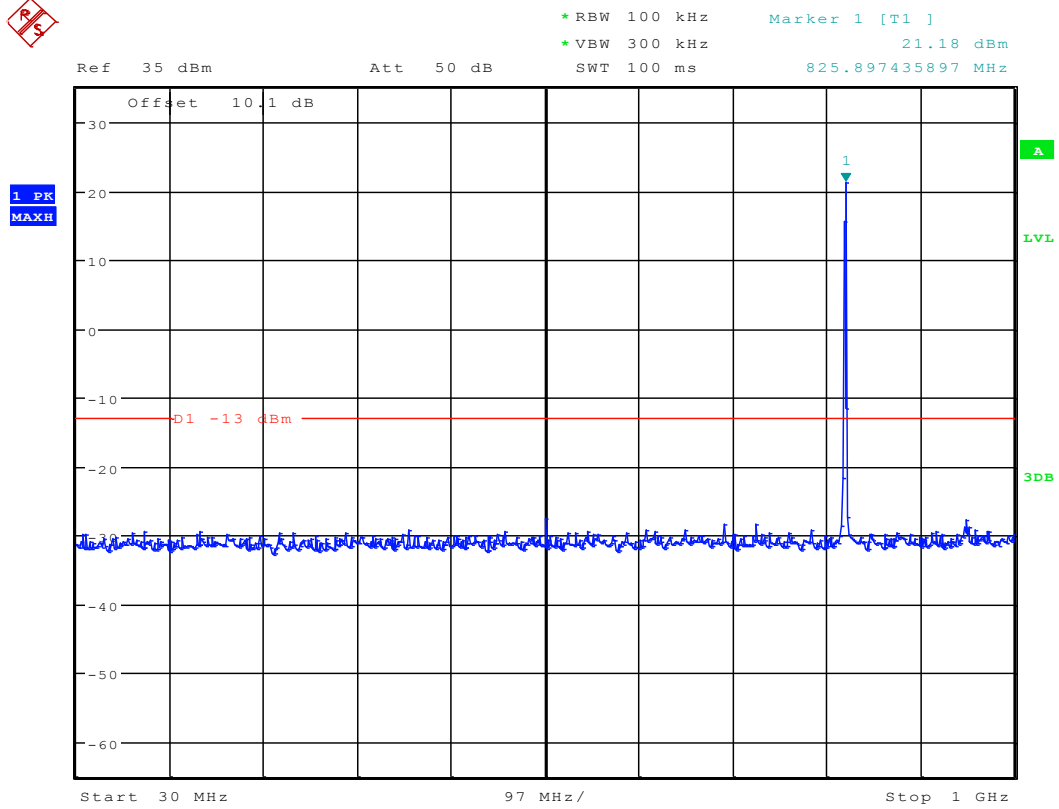
### Channel 1013



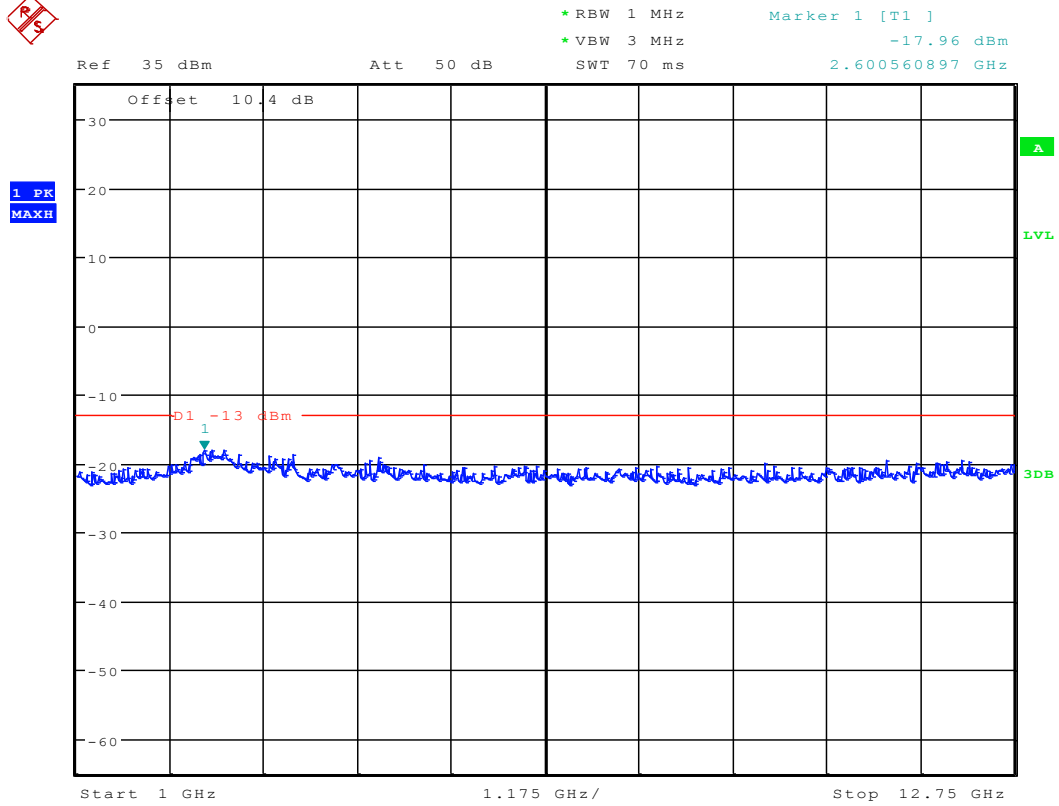
Date: 8.NOV.2011 18:09:55



Date: 8.NOV.2011 18:10:21



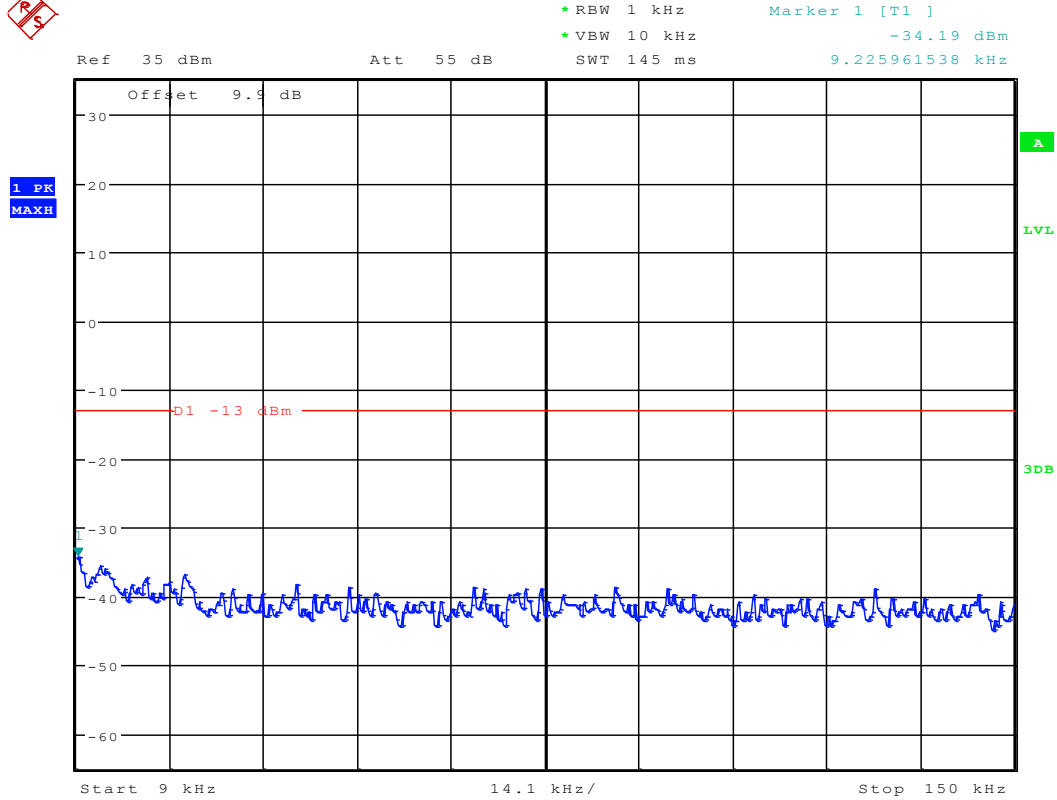
Date: 8.NOV.2011 18:10:47



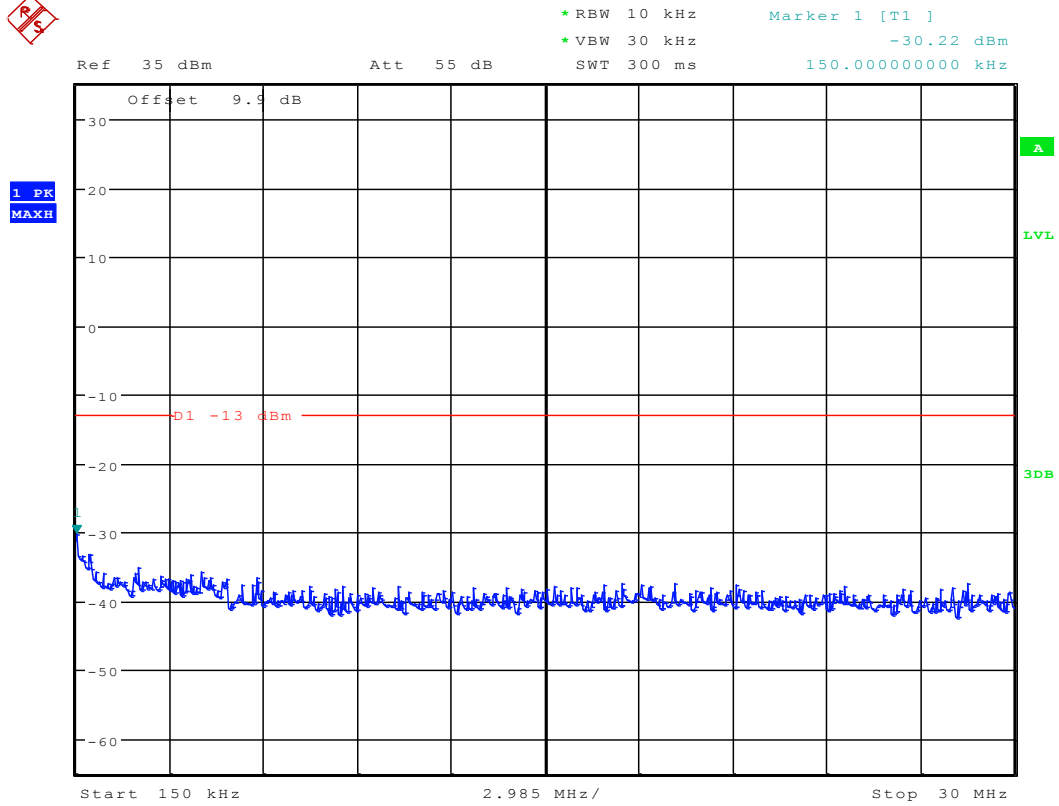
Date: 8.NOV.2011 18:11:12



## Channel 384

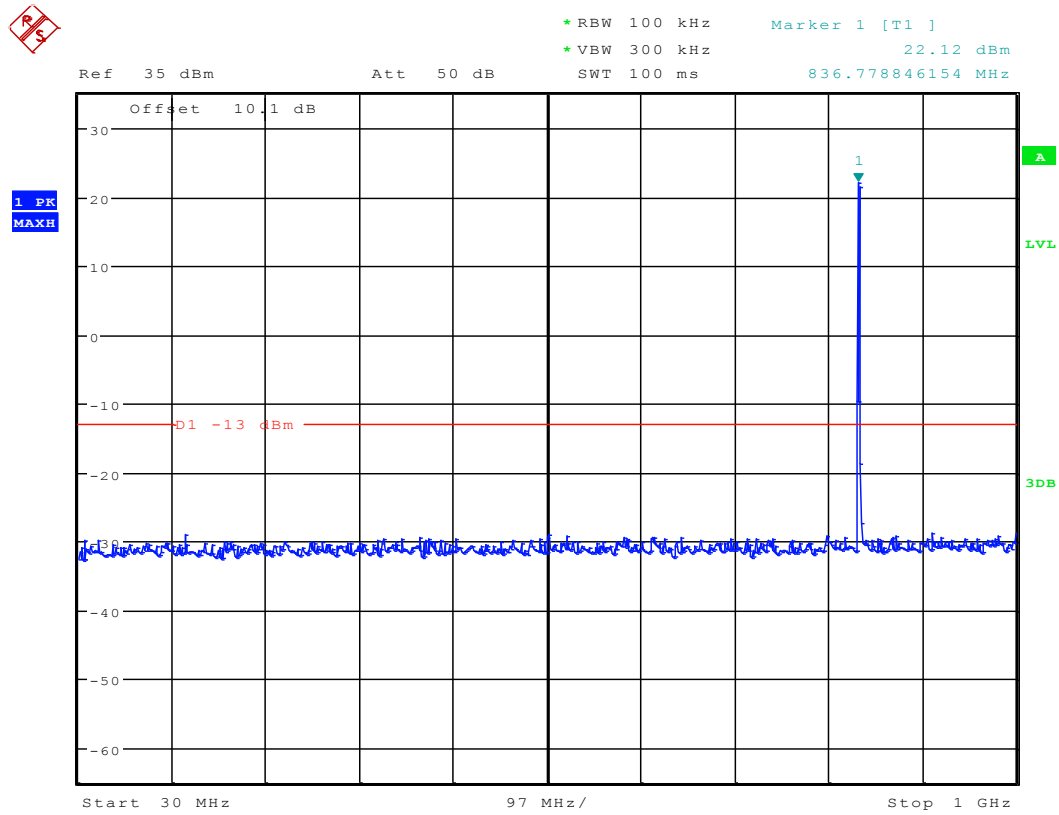


Date: 8.NOV.2011 18:10:04

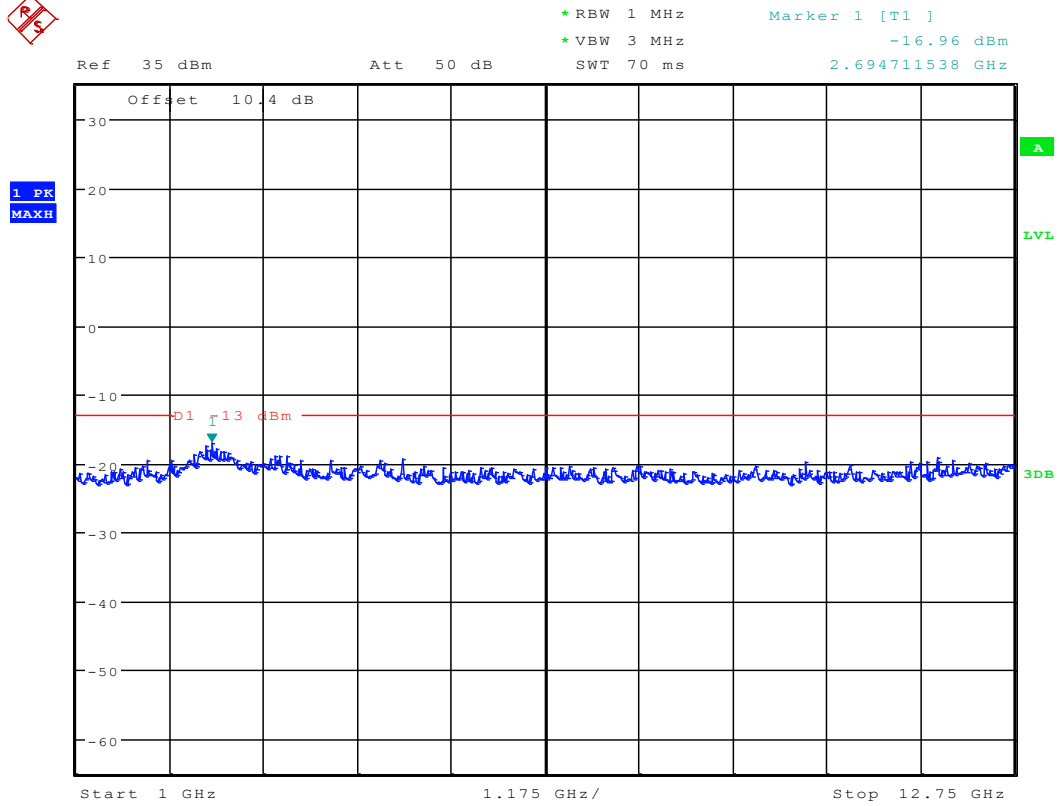


Date: 8.NOV.2011 18:10:29





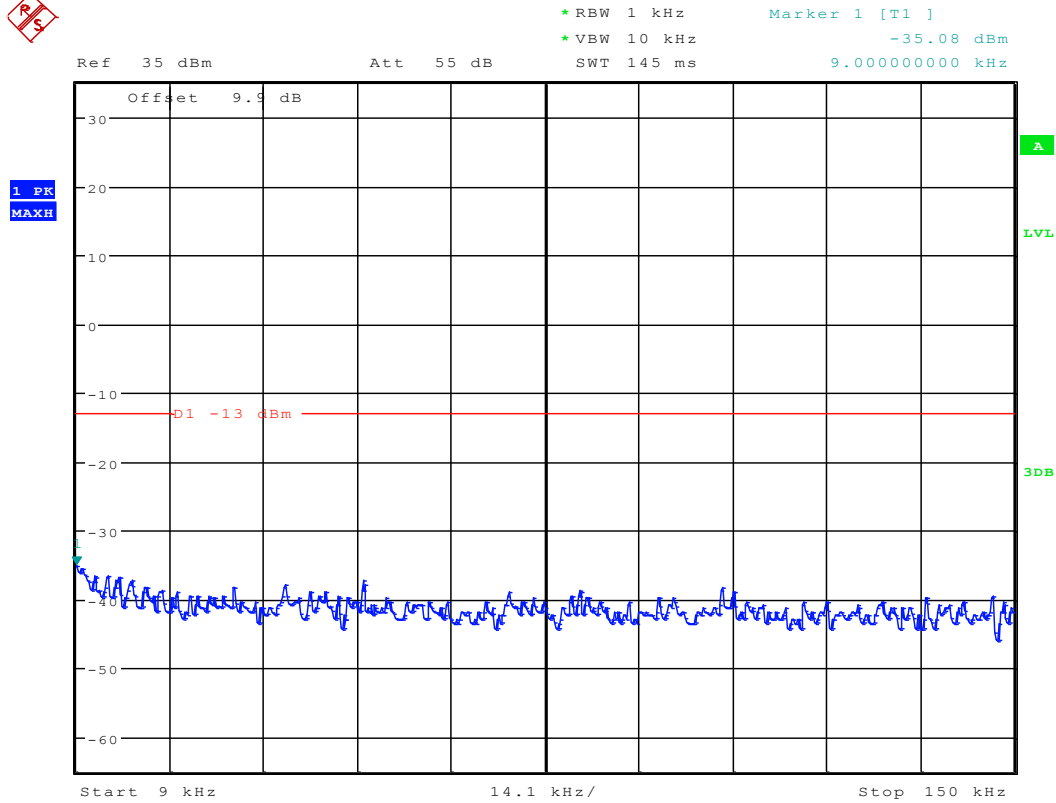
Date: 8.NOV.2011 18:10:55



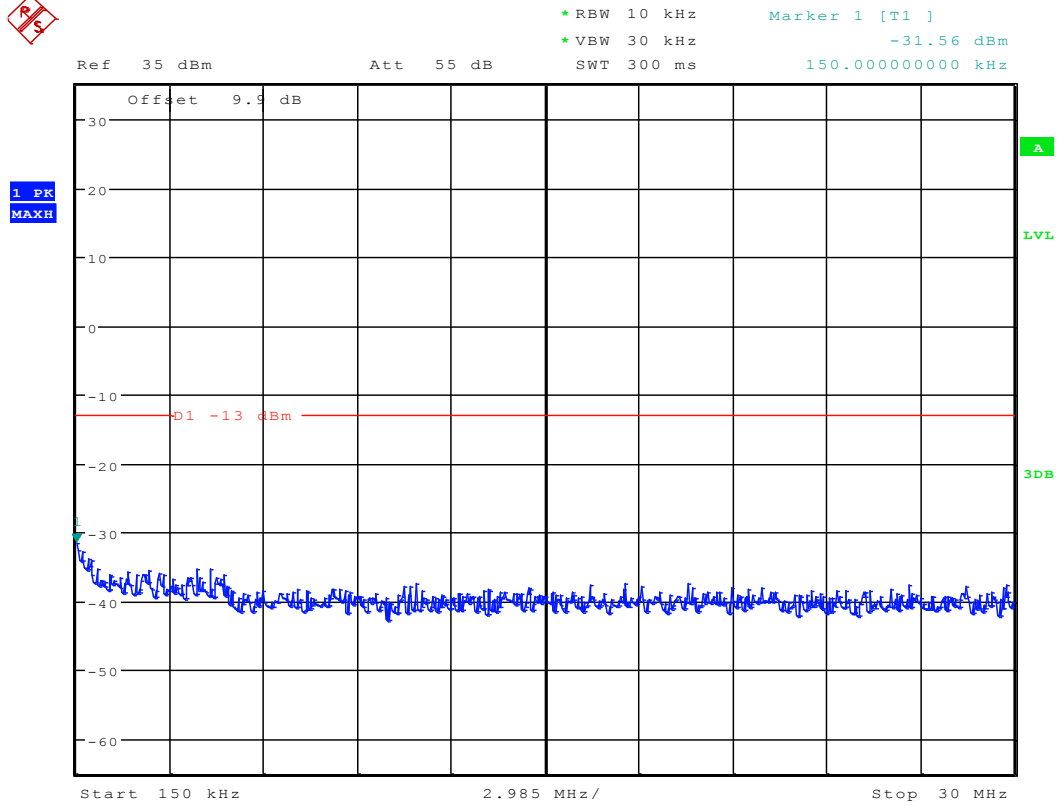
Date: 8.NOV.2011 18:11:21



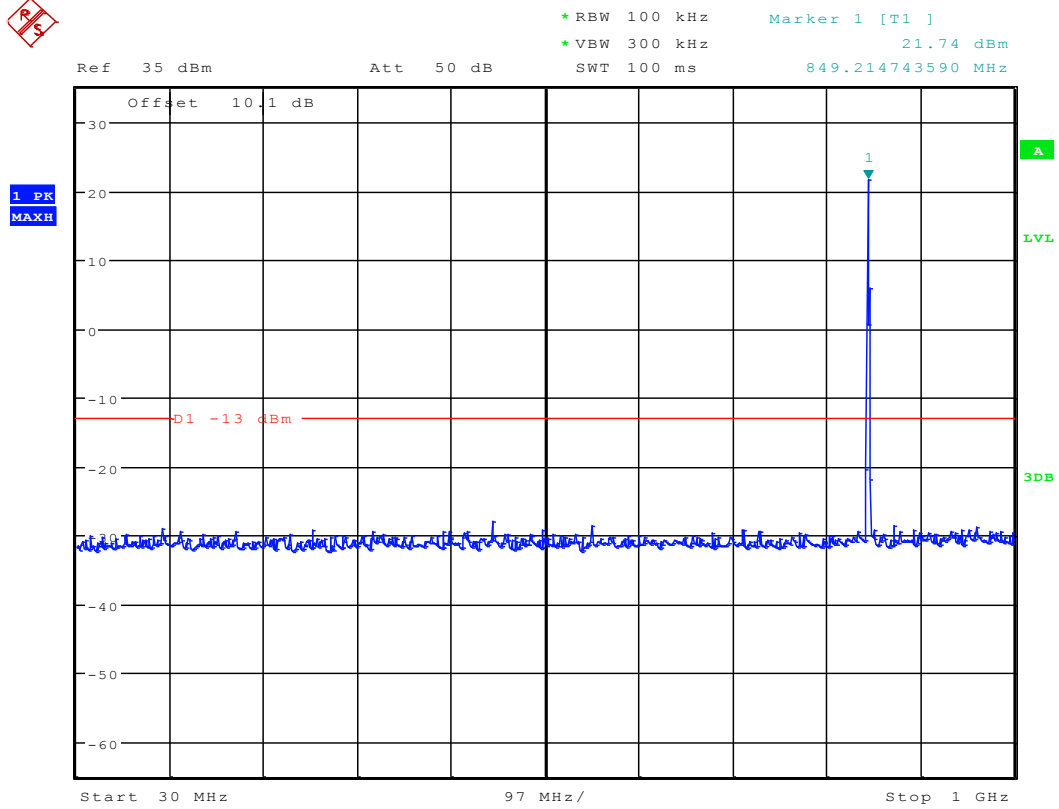
## Channel 777



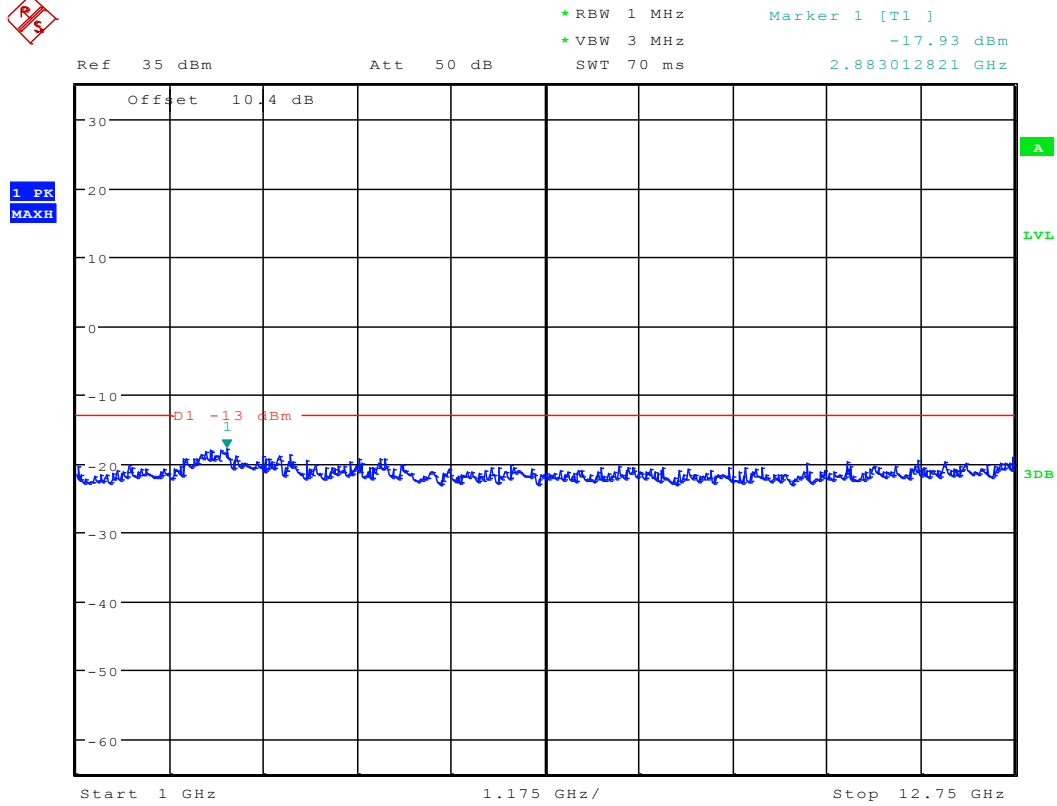
Date: 8.NOV.2011 18:10:12



Date: 8.NOV.2011 18:10:38



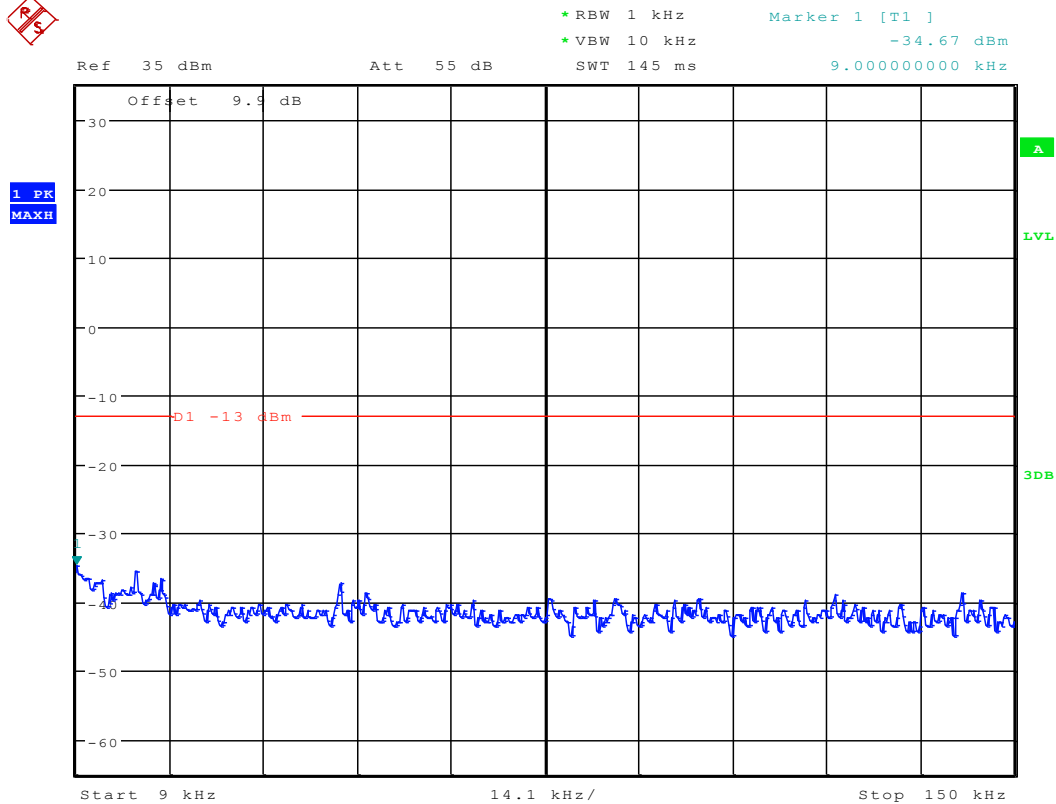
Date: 8.NOV.2011 18:11:03



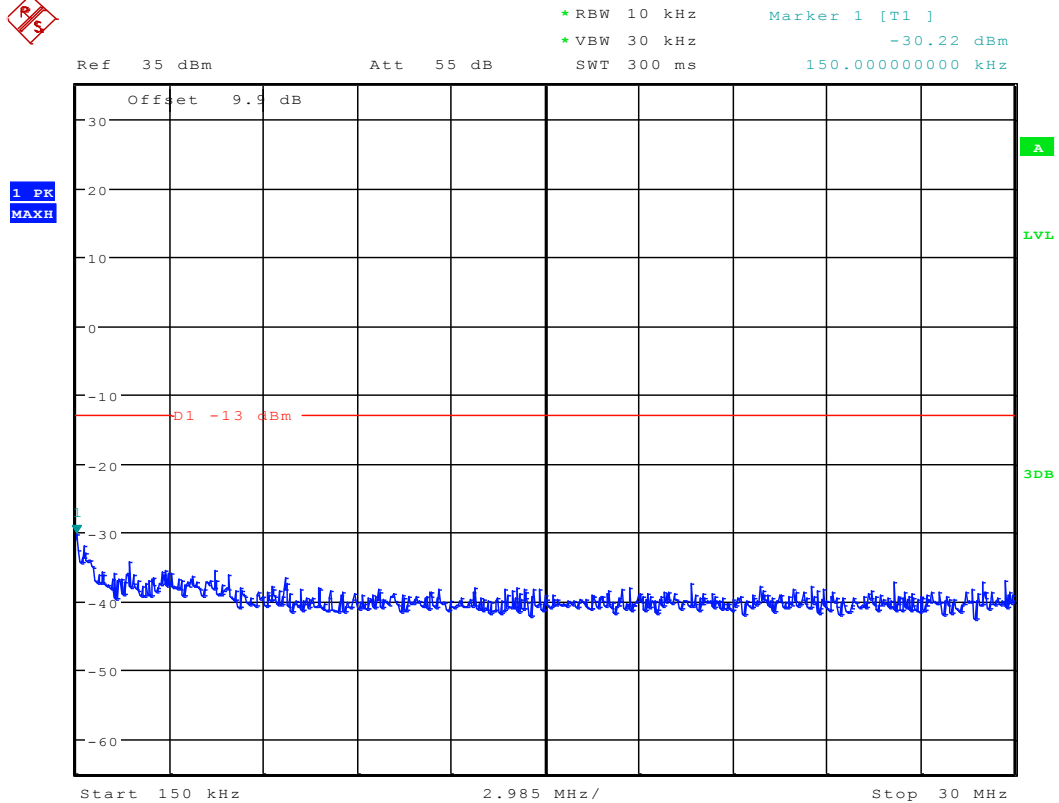
Date: 8.NOV.2011 18:11:29



## Modulation: QPSK Channel 1013

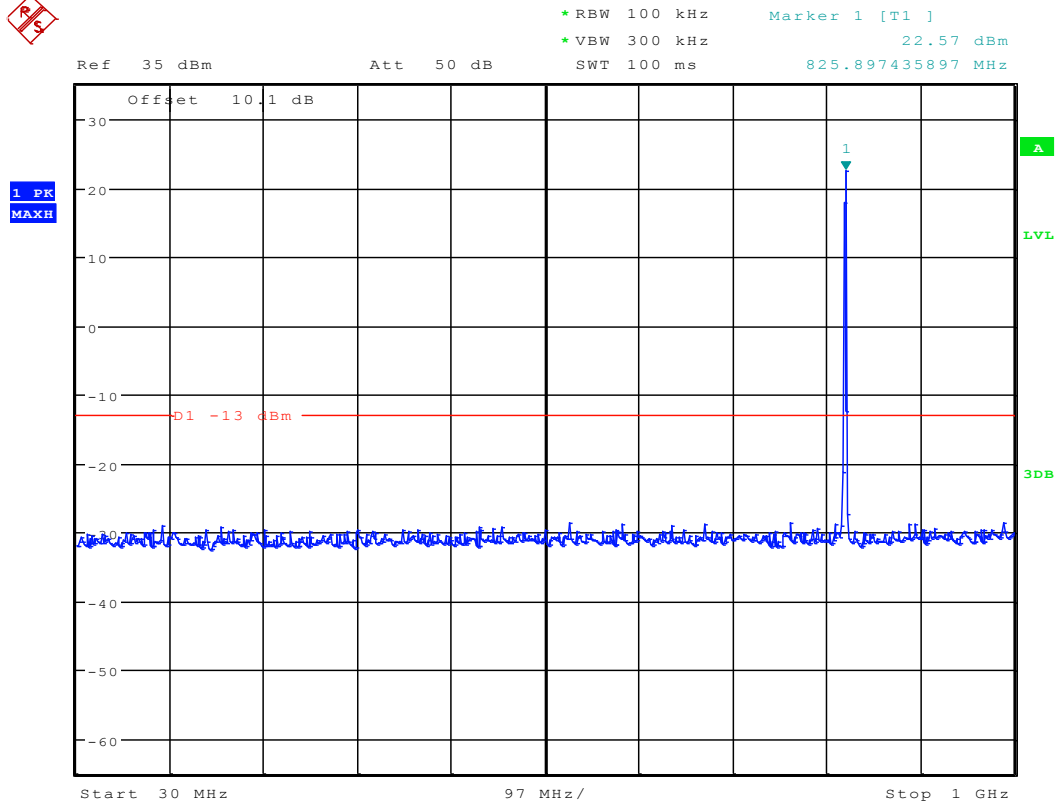


Date: 8.NOV.2011 18:11:38

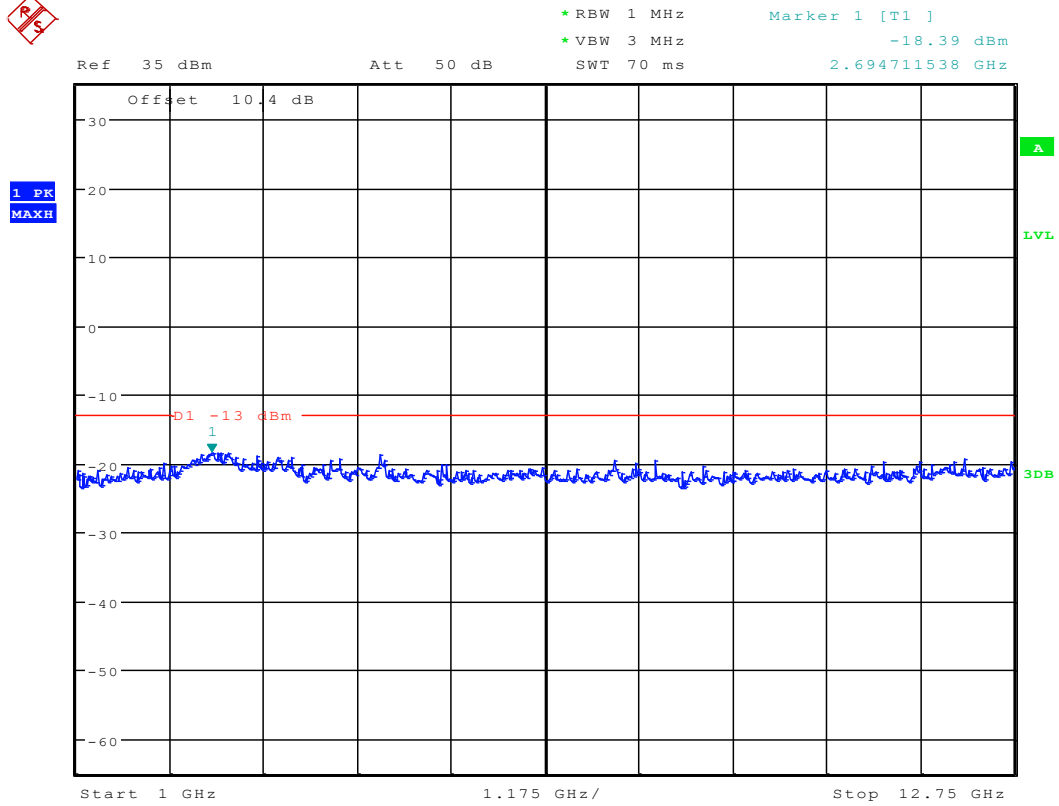


Date: 8.NOV.2011 18:12:04





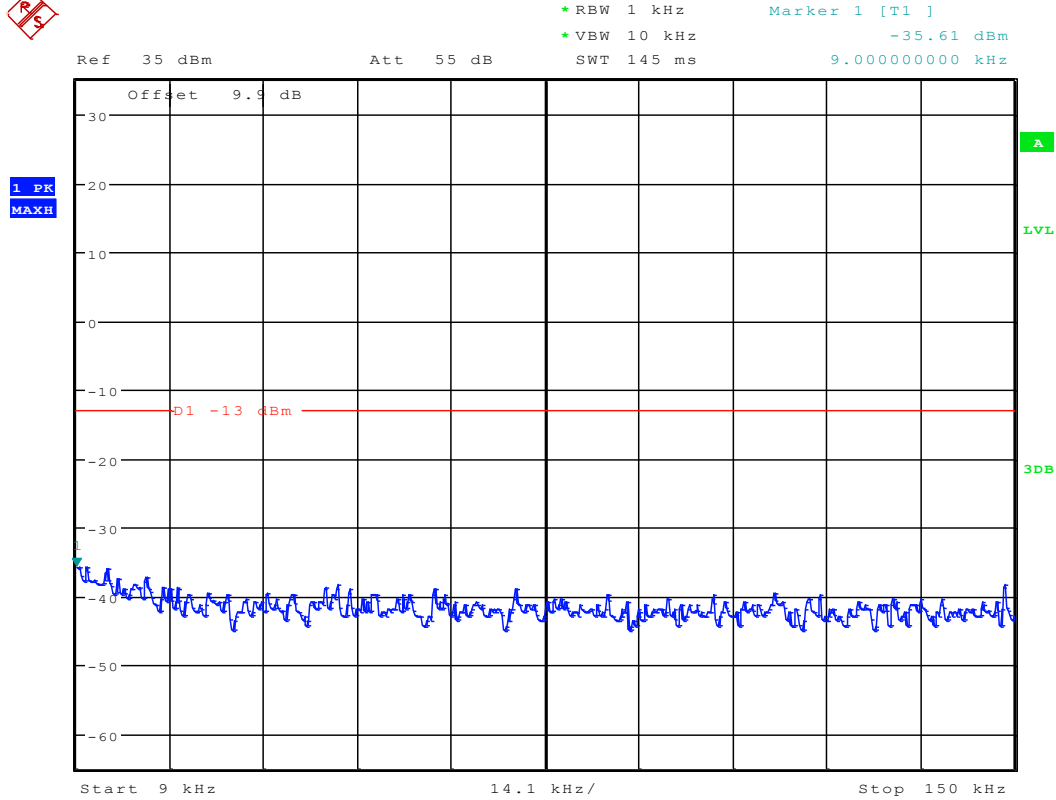
Date: 8.NOV.2011 18:12:29



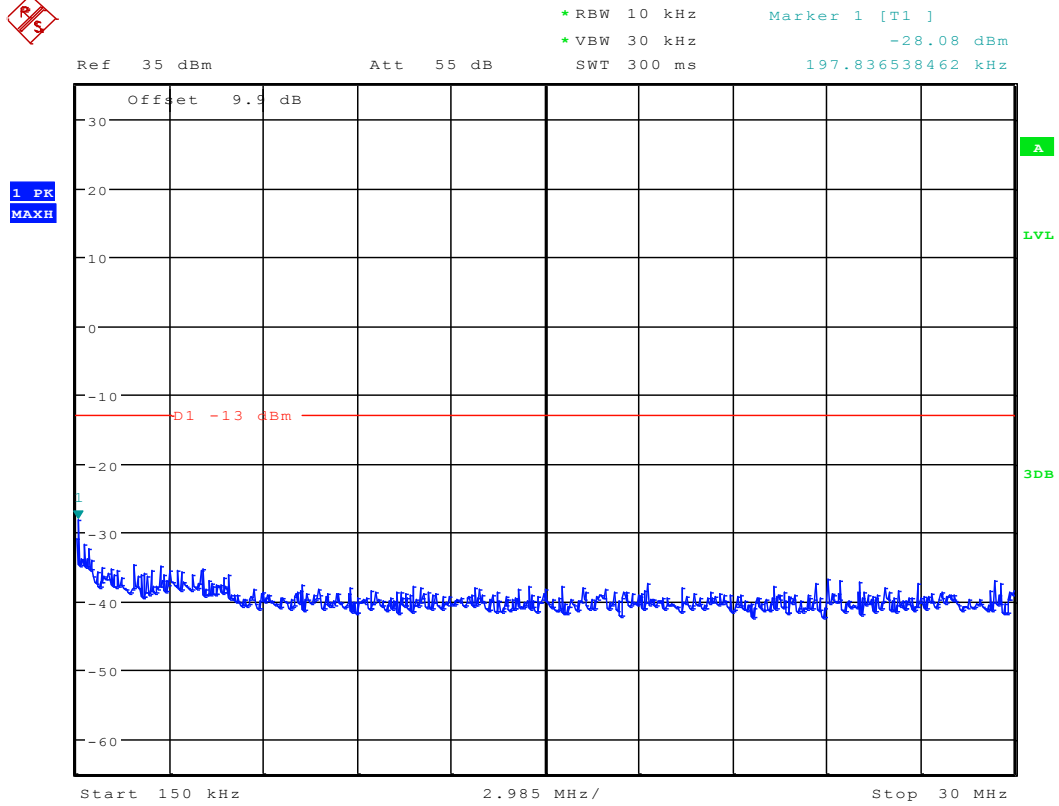
Date: 8.NOV.2011 18:12:55



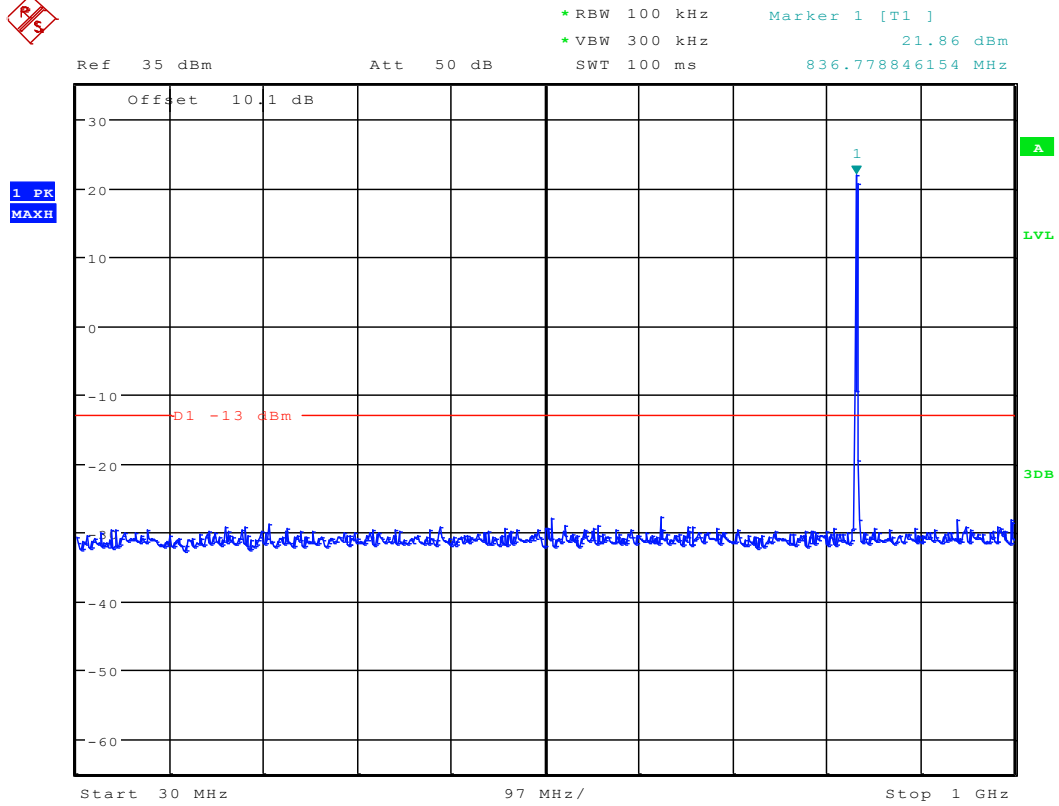
## Channel 384



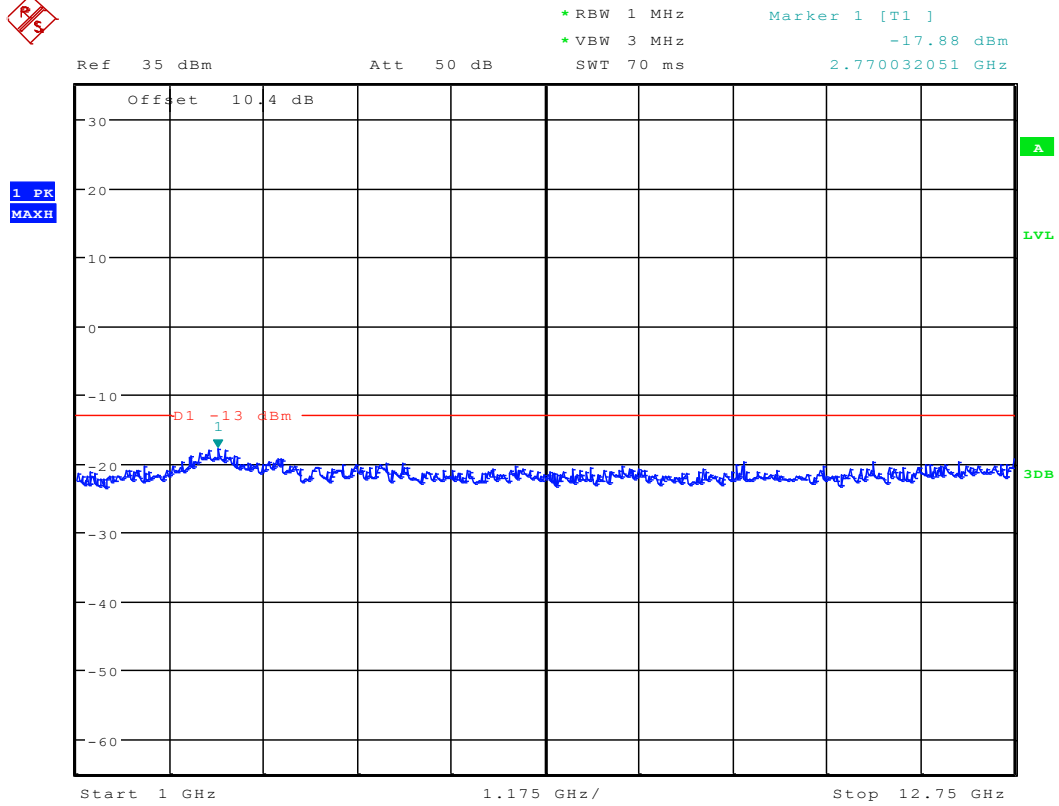
Date: 8.NOV.2011 18:11:46



Date: 8.NOV.2011 18:12:12



Date: 8.NOV.2011 18:12:38



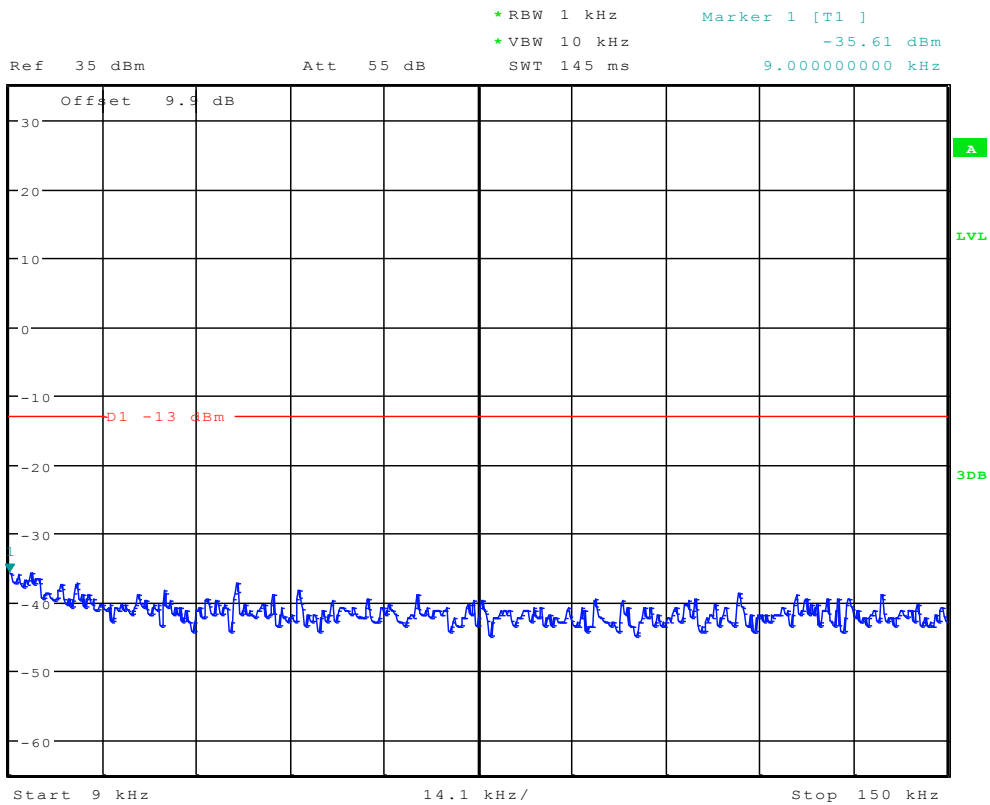
Date: 8.NOV.2011 18:13:03



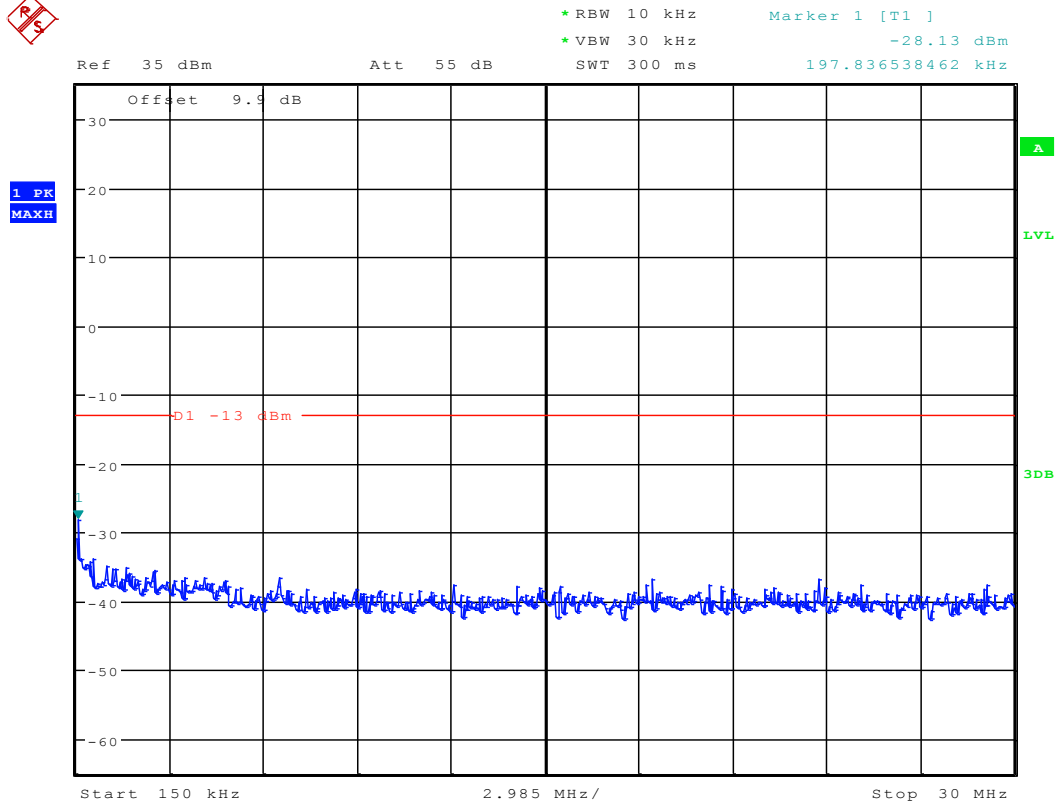
## Channel 777



1 PK  
MAXH

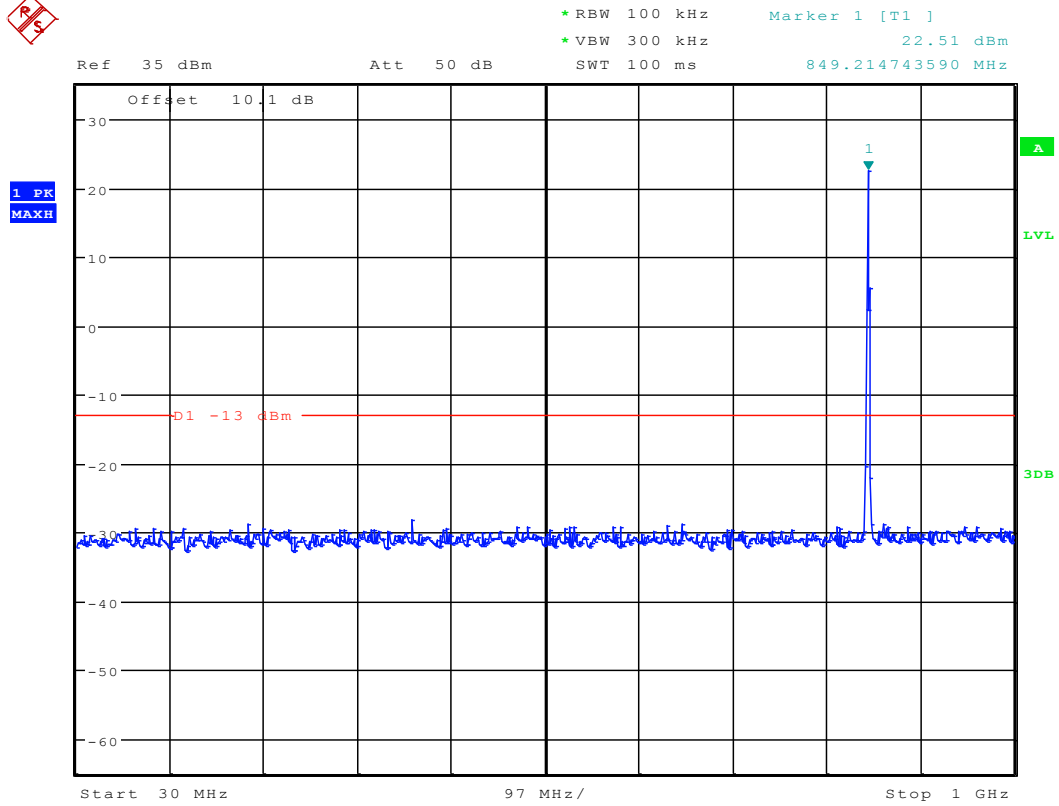


Date: 8.NOV.2011 18:11:55

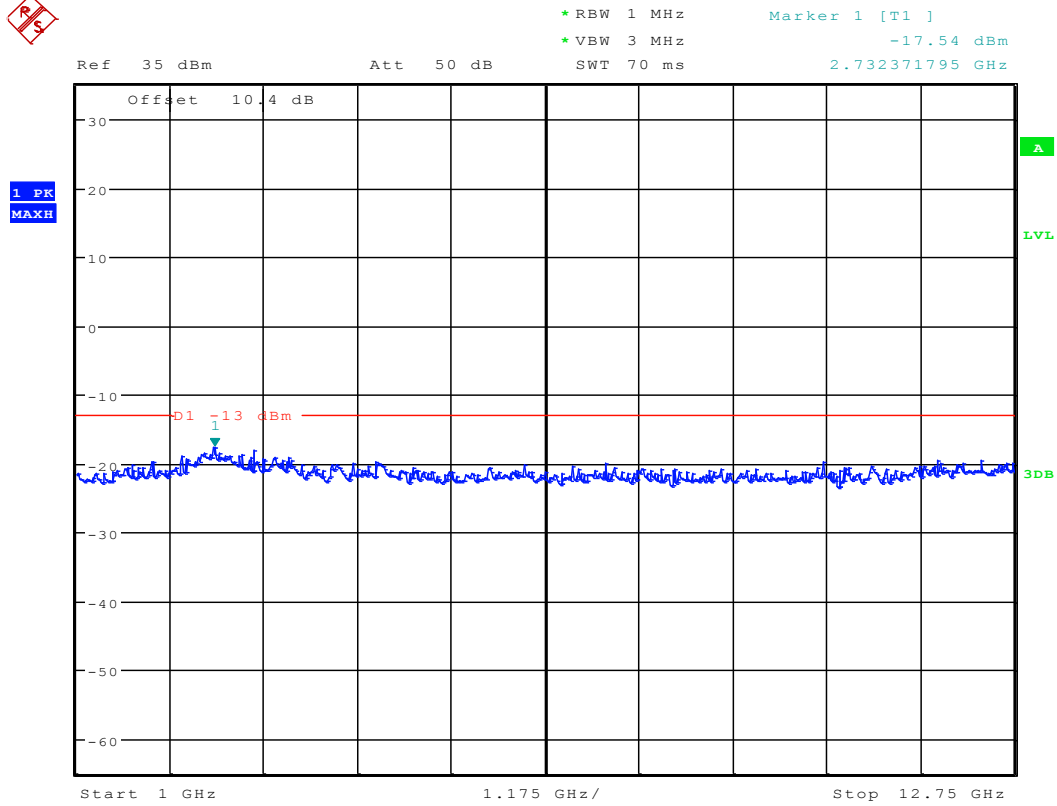


Date: 8.NOV.2011 18:12:20





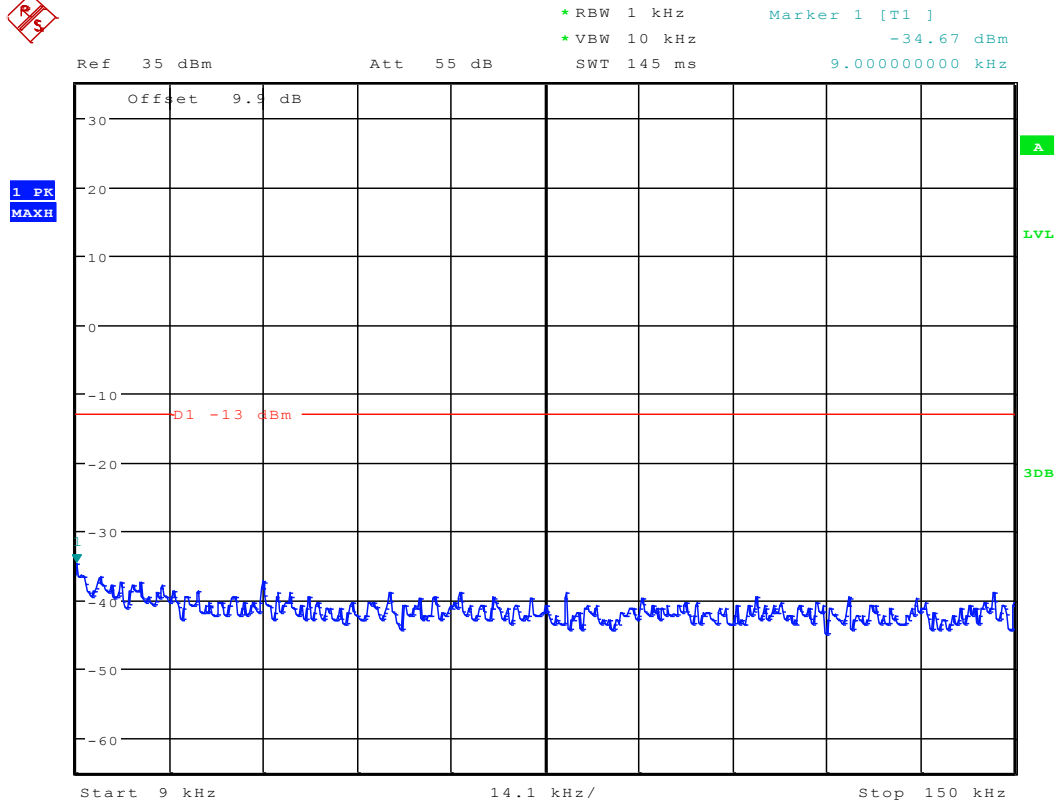
Date: 8.NOV.2011 18:12:46



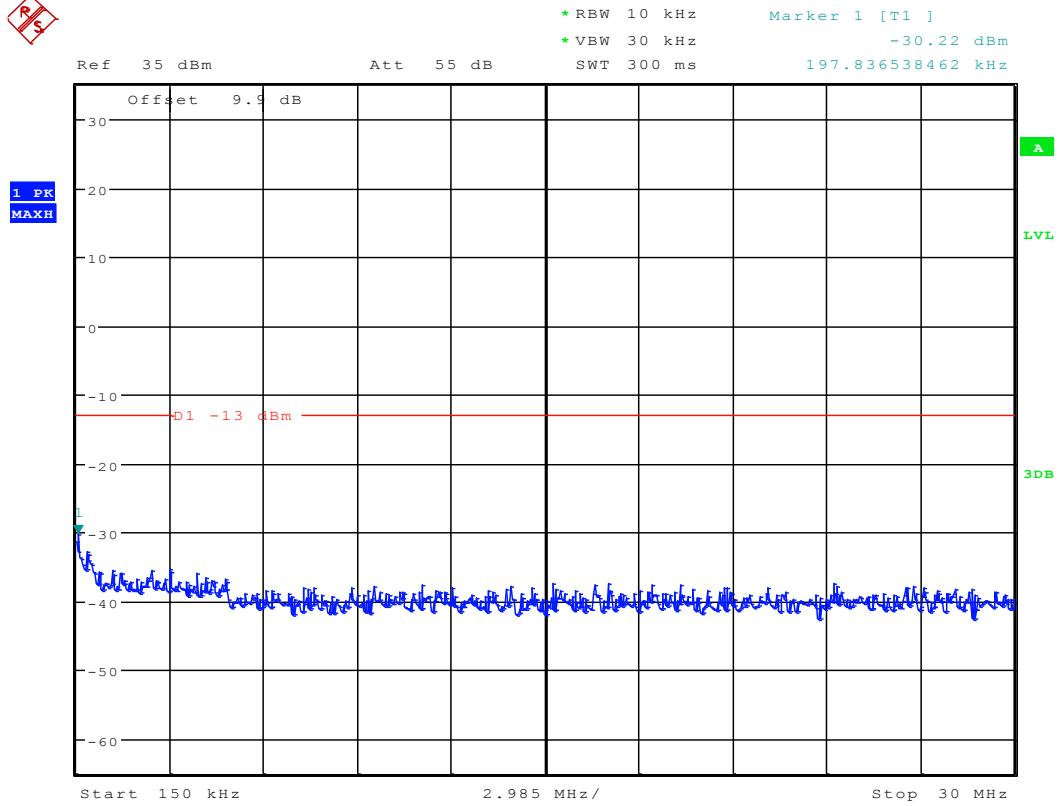
Date: 8.NOV.2011 18:13:12



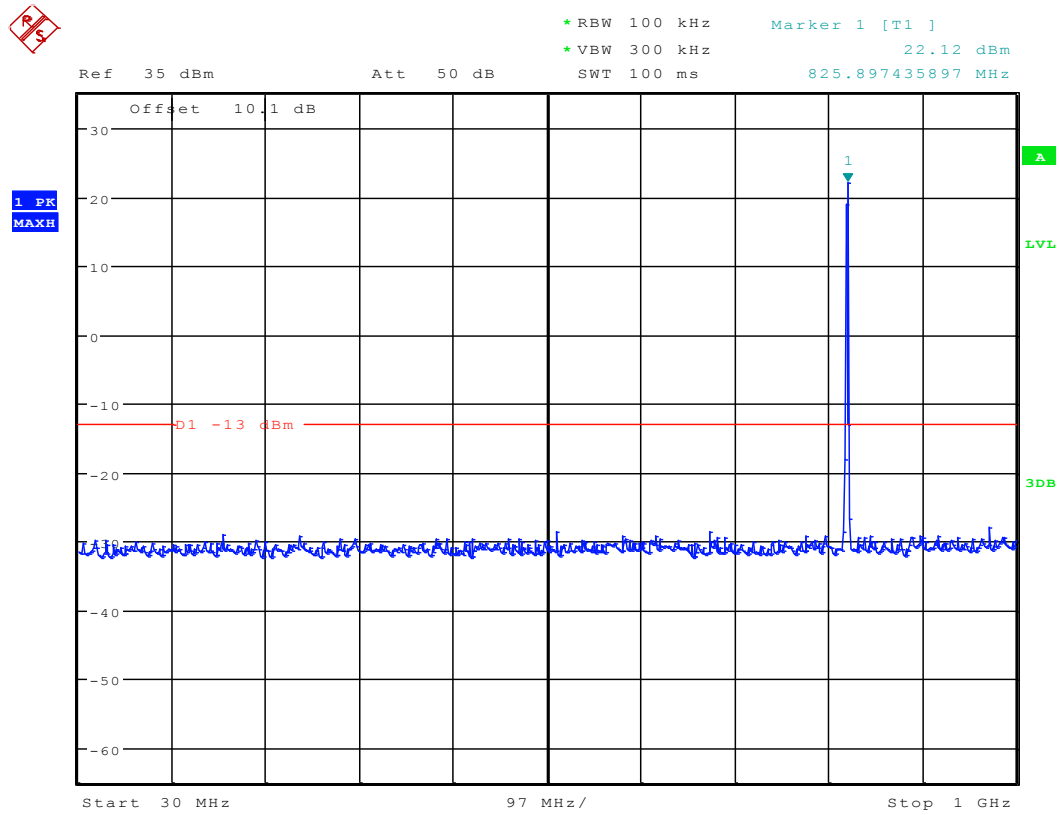
## Modulation: 8PSK Channel 1013



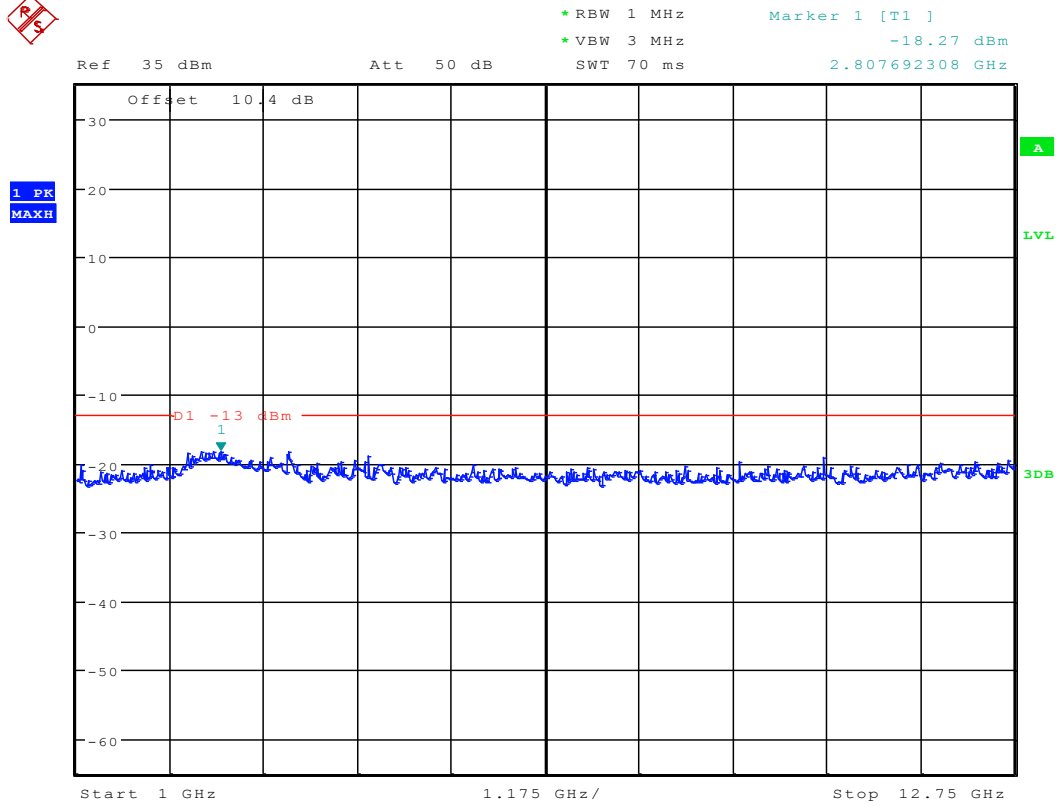
Date: 8.NOV.2011 18:13:21



Date: 8.NOV.2011 18:13:46



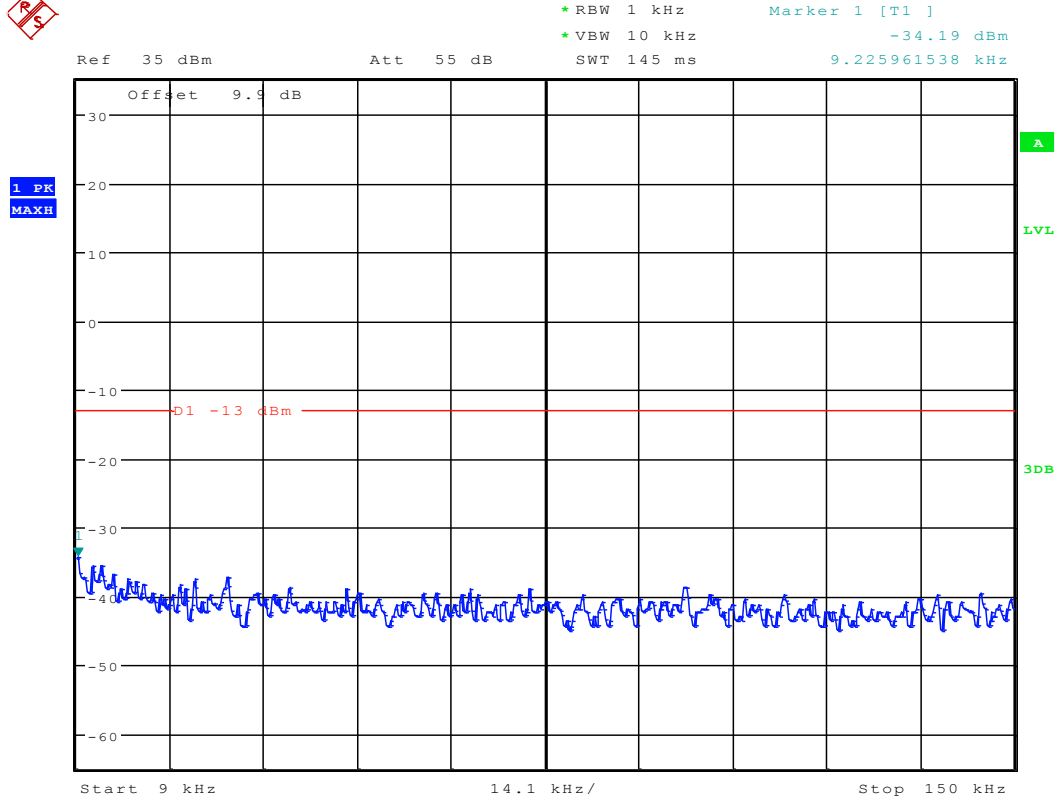
Date: 8.NOV.2011 18:14:12



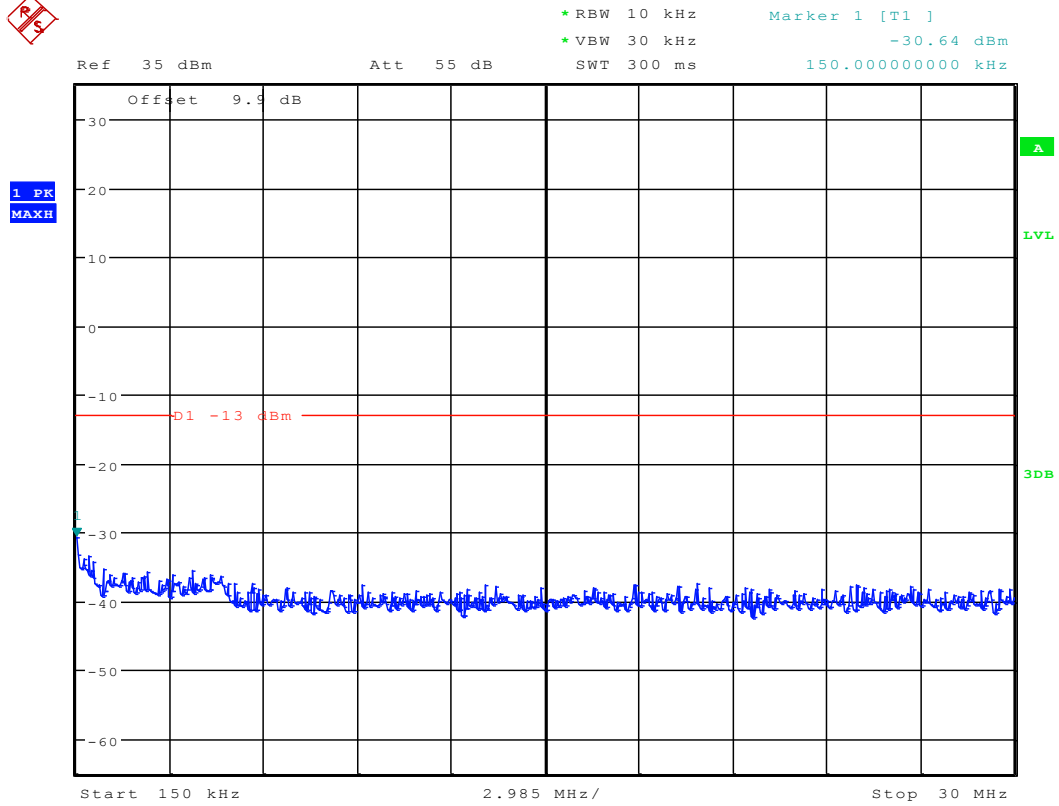
Date: 8.NOV.2011 18:14:38



## Channel 384

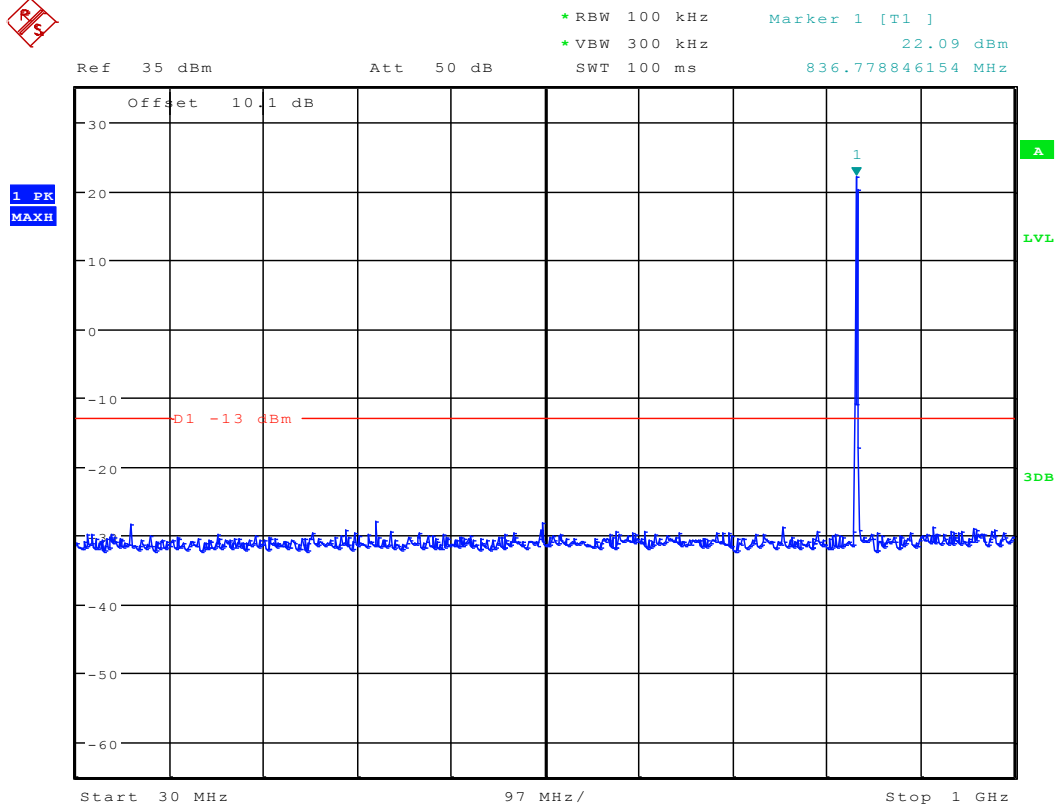


Date: 8.NOV.2011 18:13:29

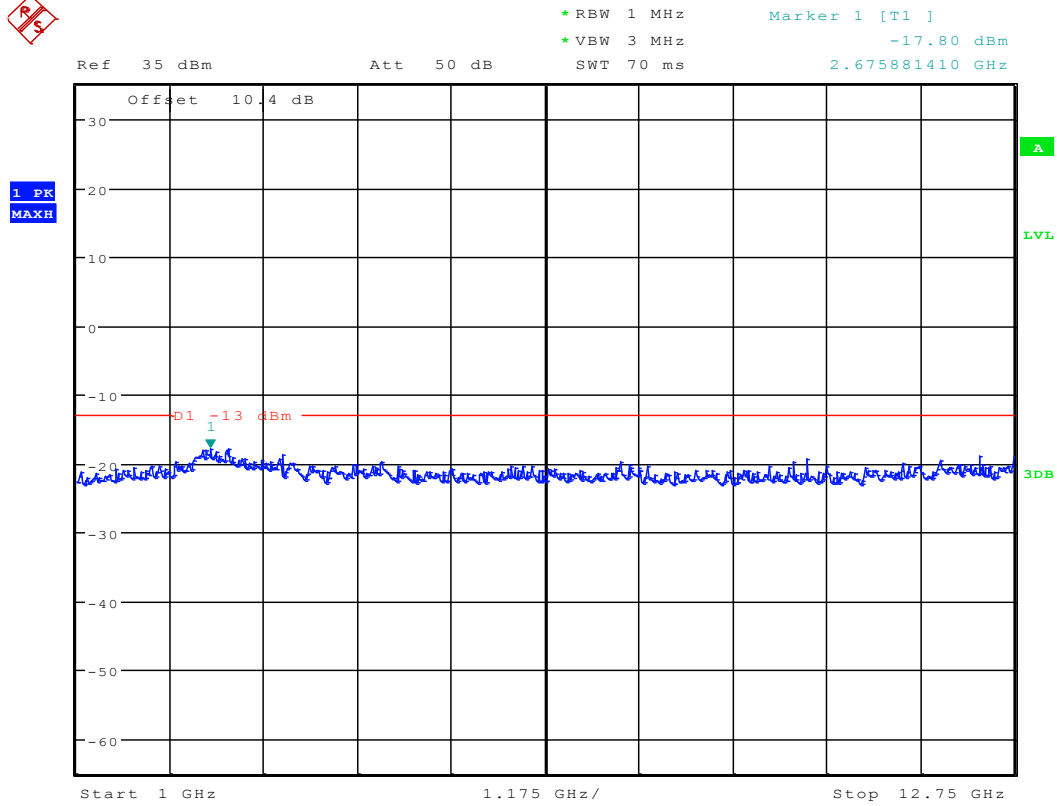


Date: 8.NOV.2011 18:13:55





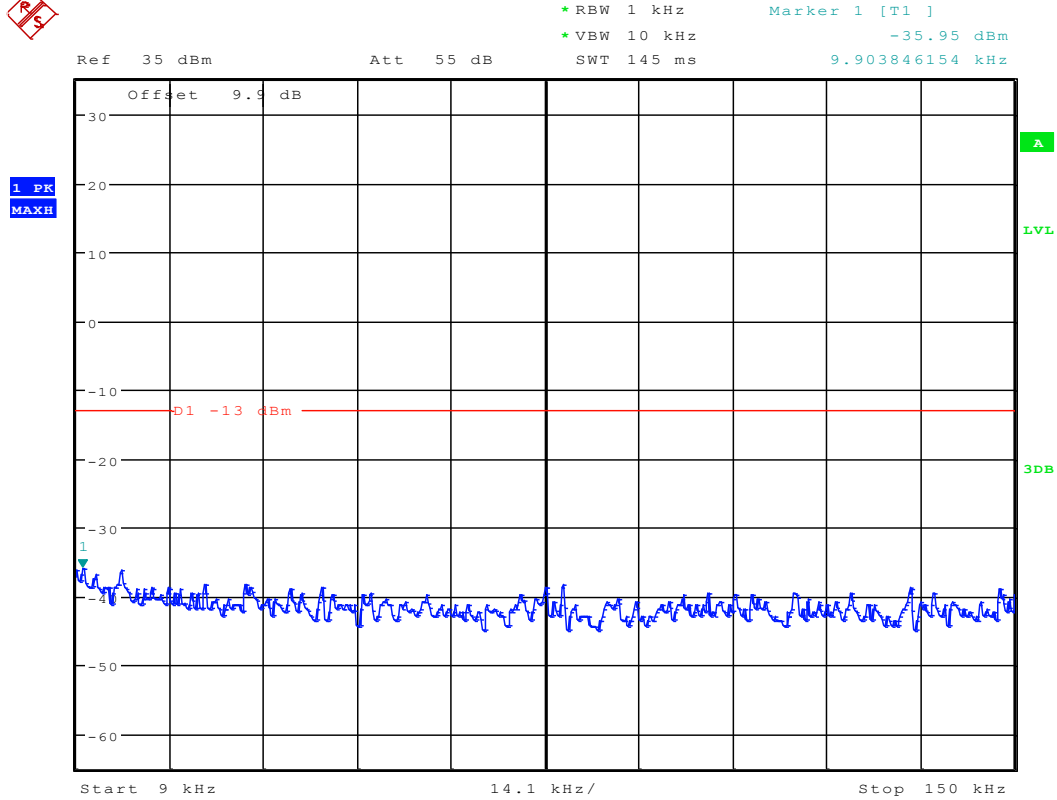
Date: 8.NOV.2011 18:14:21



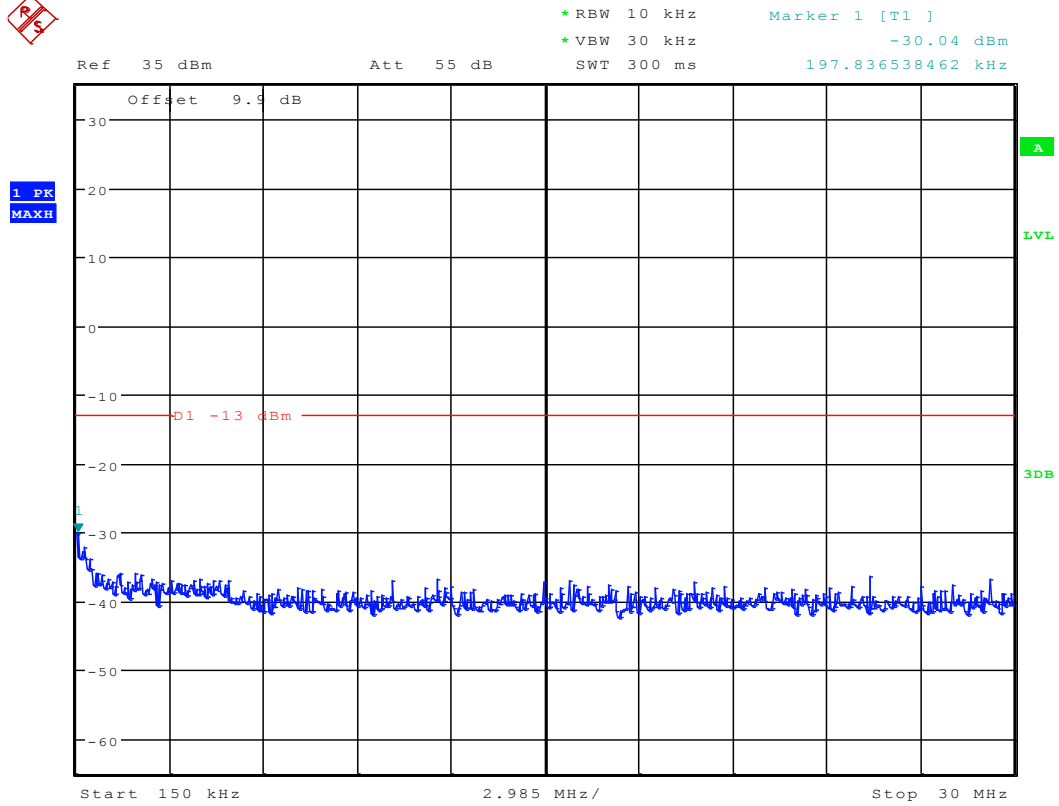
Date: 8.NOV.2011 18:14:46



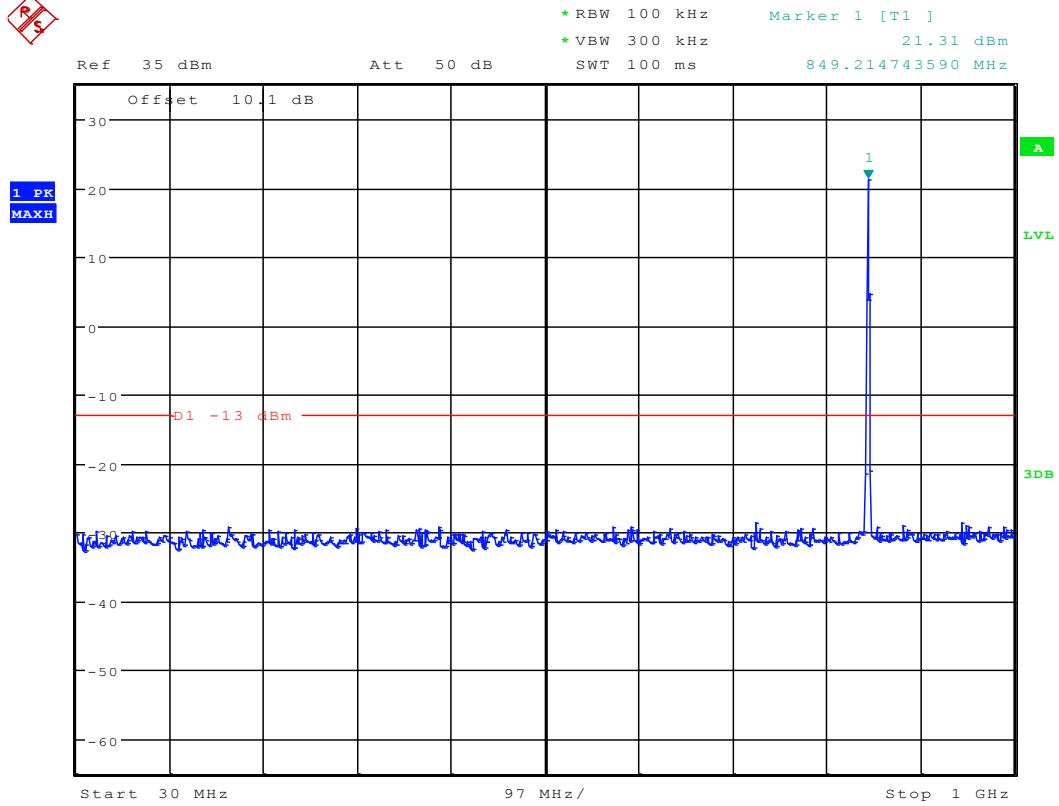
## Channel 777



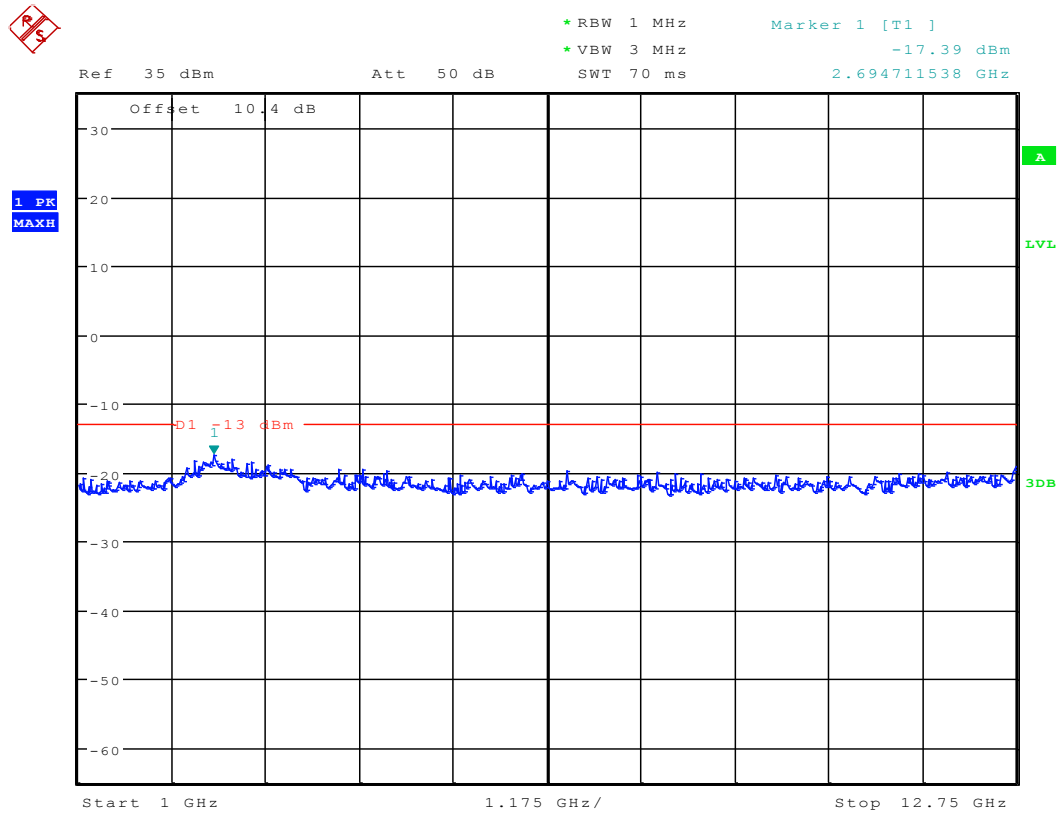
Date: 8.NOV.2011 18:13:38



Date: 8.NOV.2011 18:14:03



Date: 8.NOV.2011 18:14:29



Date: 8.NOV.2011 18:14:55



# **Appendix F**

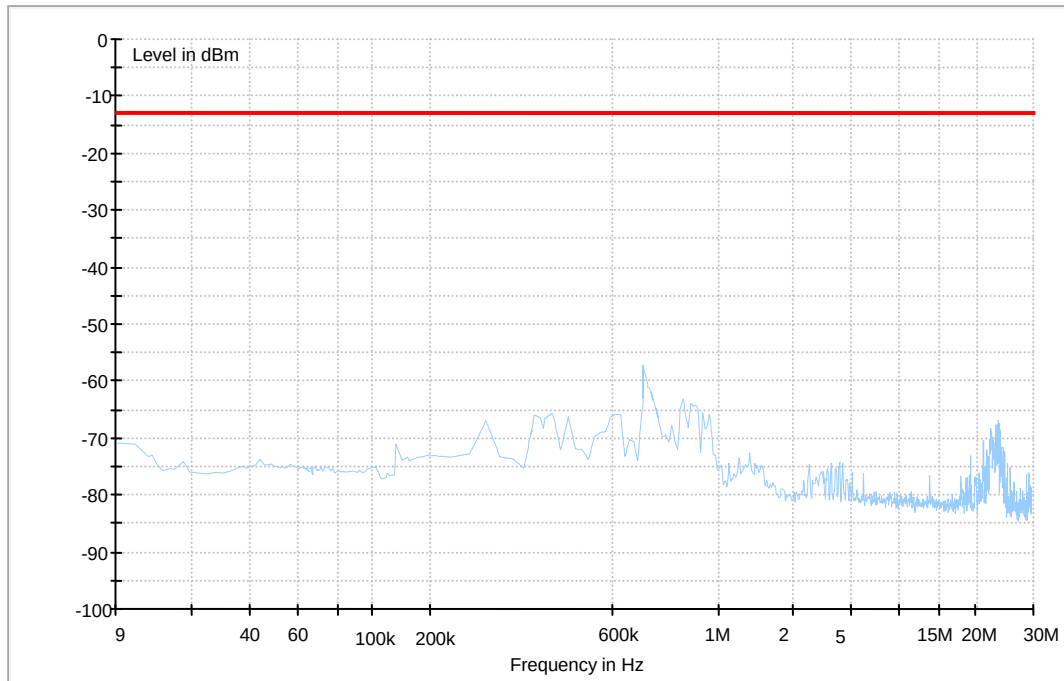
## **Radiated spurious emission**

According to FCC Part 2.1053& Part 22.917



## CDMA800

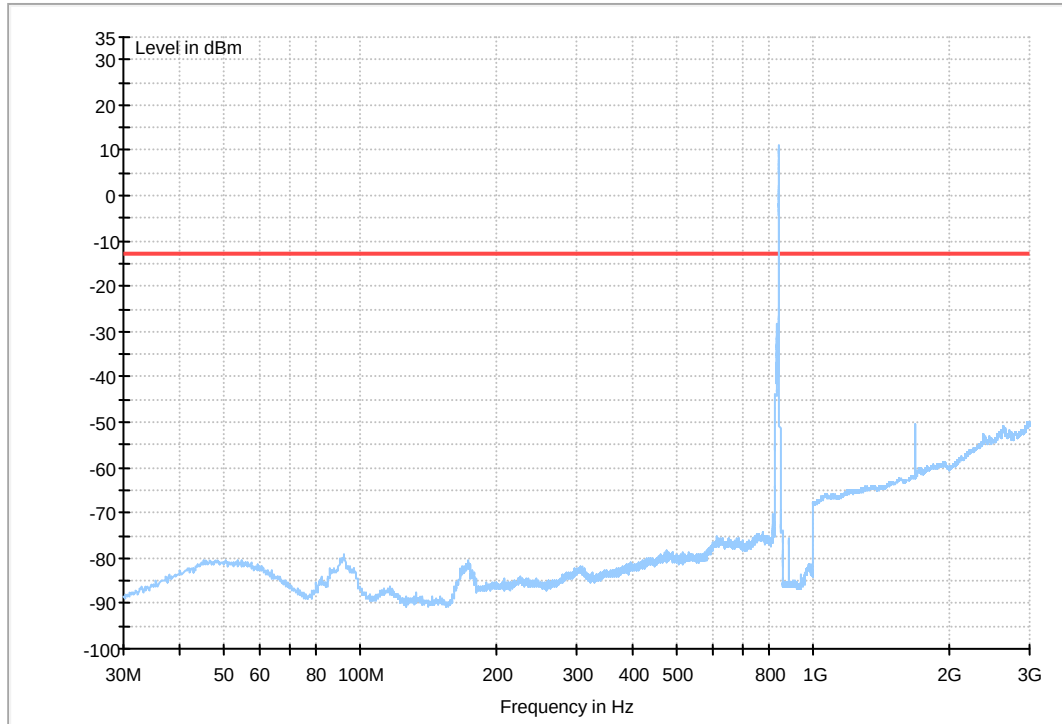
(9kHz~30MHz)





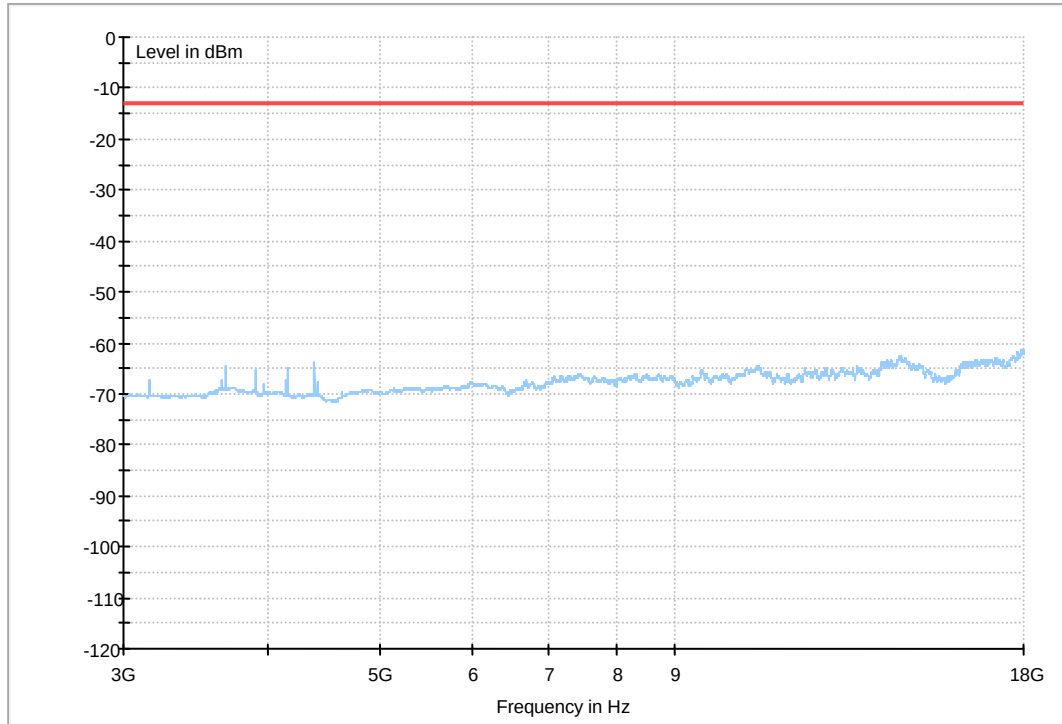


(30MHz~3GHz)





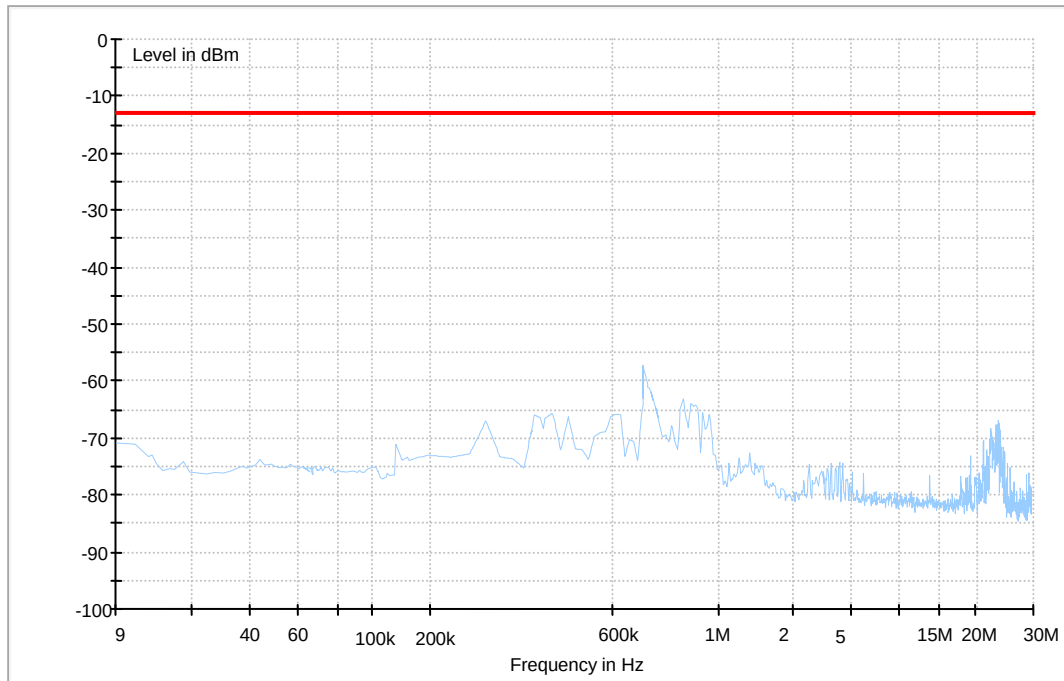
(3GHz~18GHz)





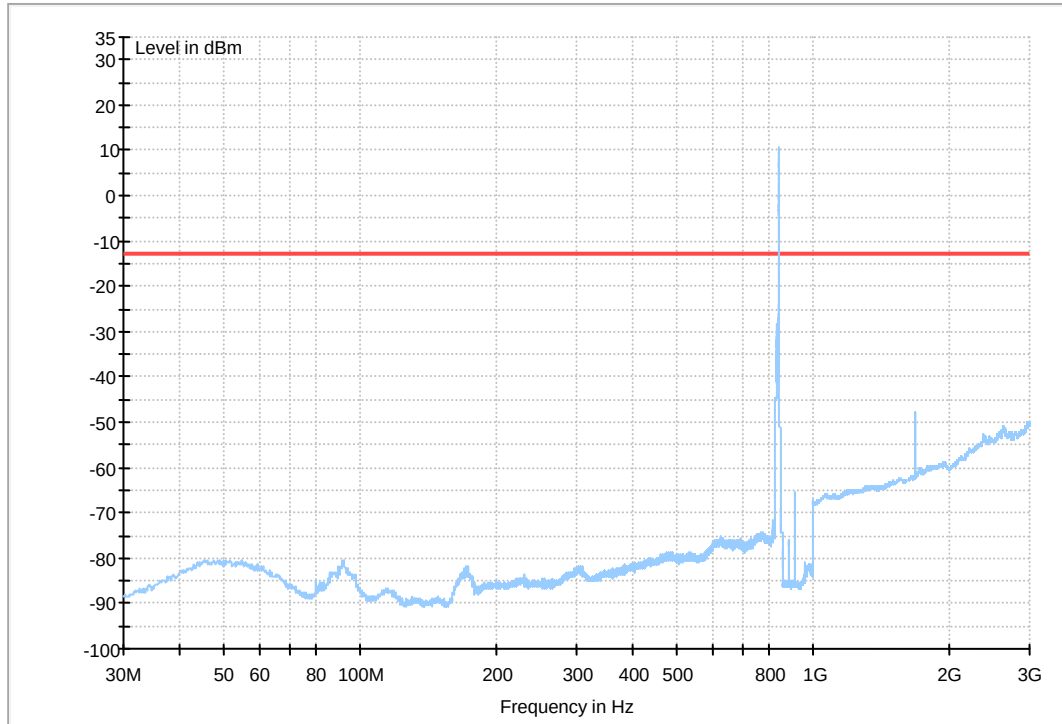
## EVDO 800 R.0

(9kHz~30MHz)



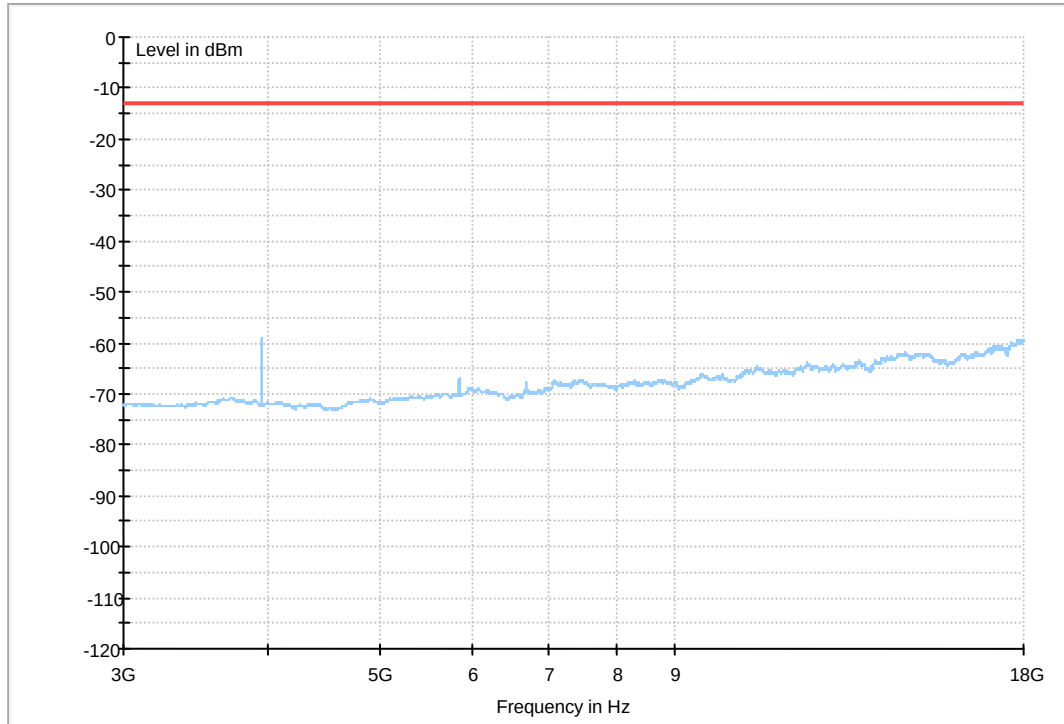


(30MHz~3GHz)





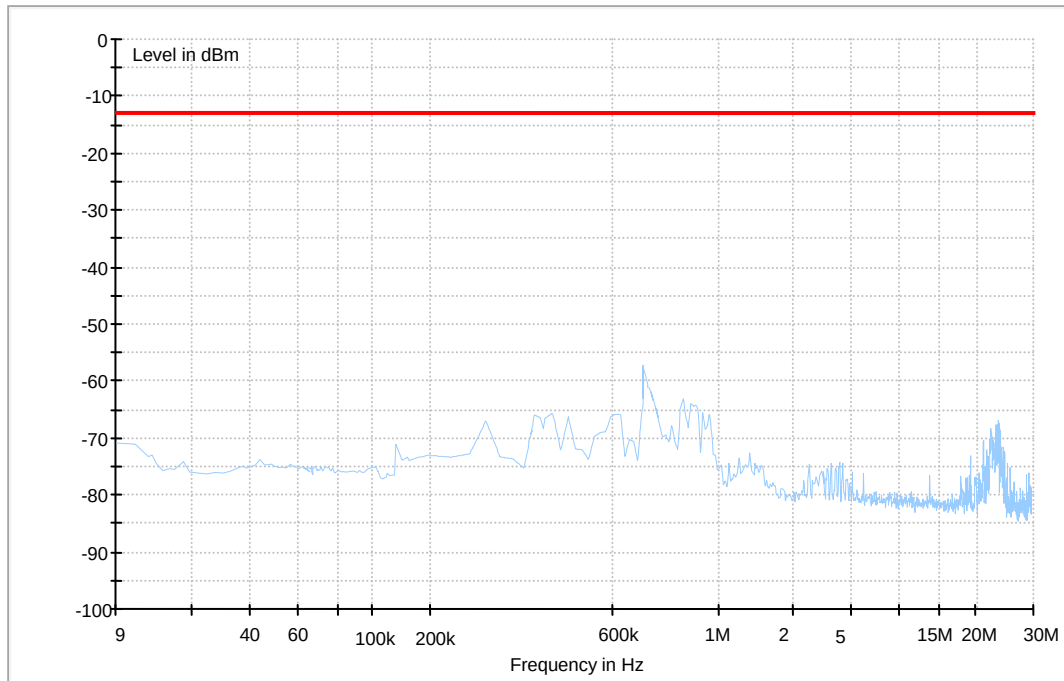
(3GHz~18GHz)





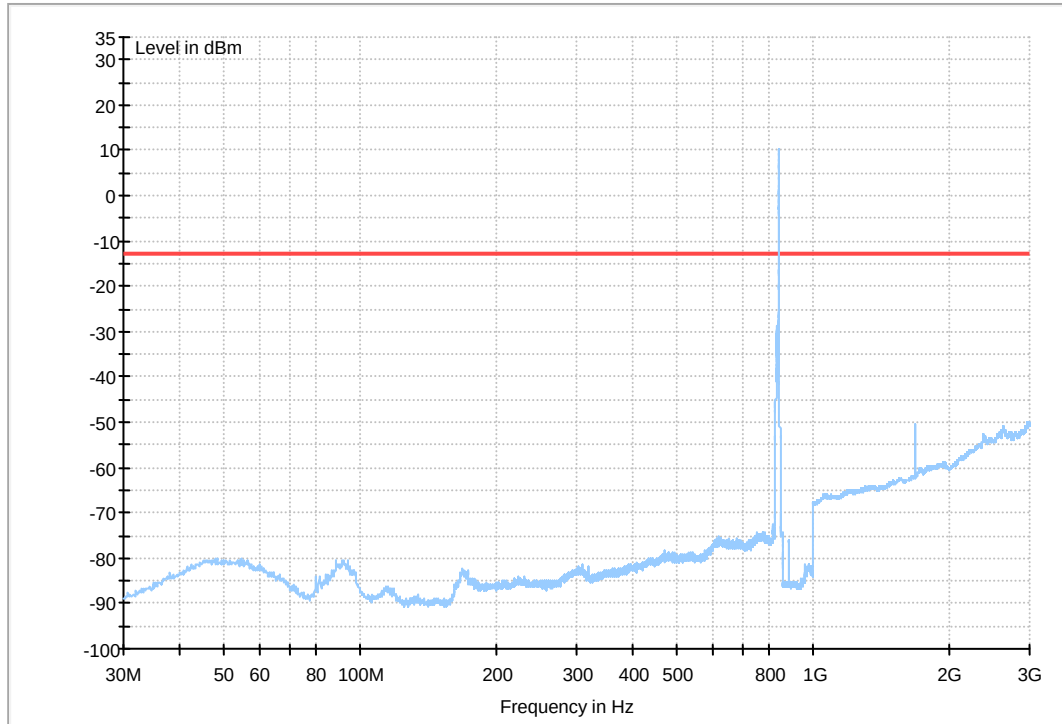
## EVDO 800 R.A

(9kHz~30MHz)



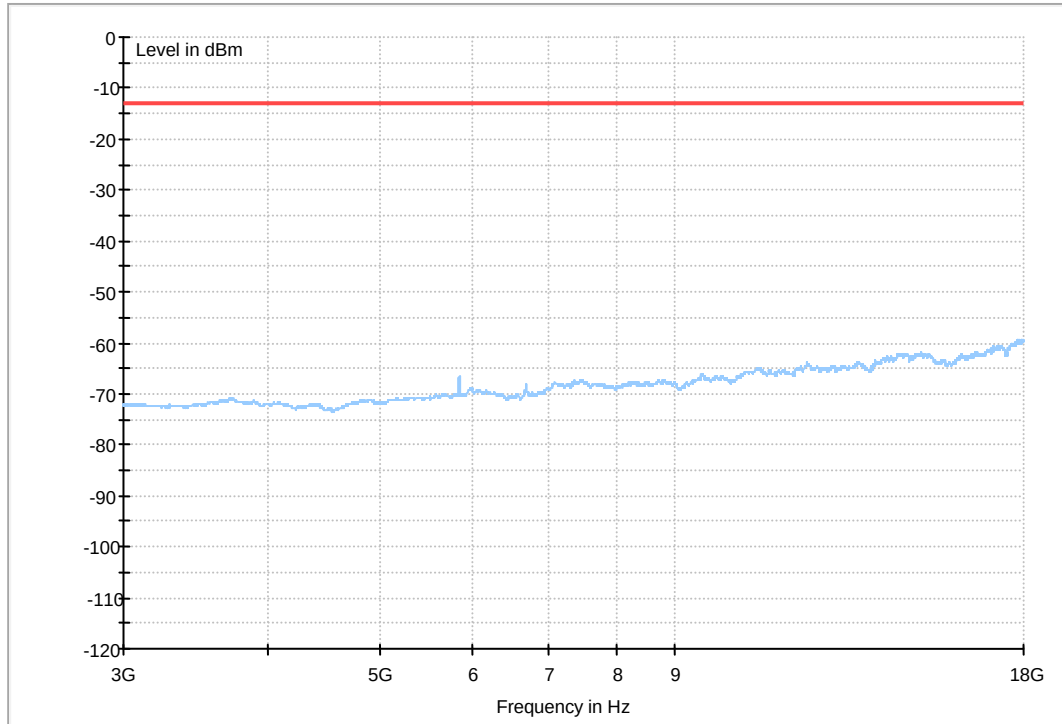


(30MHz~3GHz)





(3GHz~18GHz)







# **Appendix G**

## **Frequency Stability**

According to FCC Part 2.1055& Part 22.355



## **Frequency Error vs. Temperature:**

| Test Mode | RF Ch. | Volt. | Temp.  | Freq. Error [Hz] | Freq. vs. rated [ppm] | Freq. vs. 20 °C [ppm] | Limit [ppm] | Verdict |
|-----------|--------|-------|--------|------------------|-----------------------|-----------------------|-------------|---------|
| TM 1      | M      | 100%  | -30 °C | -11              | -0.0131               | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | 15               | 0.0179                | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | 14               | 0.0167                | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | -12              | -0.0143               | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | -12              | -0.0143               | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | 9                | 0.0108                | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | 7                | 0.0084                | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | 6                | 0.0072                | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | -15              | -0.0179               | ---                   | ±2.5        | Pass    |
| TM 3      | M      | 100%  | -30 °C | -10              | -0.0120               | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | 11               | 0.0131                | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | -14              | -0.0167               | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | -13              | -0.0155               | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | 18               | 0.0215                | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | -19              | -0.0227               | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | 8                | 0.0096                | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | -18              | -0.0215               | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | 9                | 0.0108                | ---                   | ±2.5        | Pass    |
| Subtype 0 | M      | 100%  | -30 °C | -11              | -0.0131               | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | 12               | 0.0143                | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | -18              | -0.0215               | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | -12              | -0.0143               | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | 13               | 0.0155                | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | 10               | 0.0120                | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | -7               | -0.0084               | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | -11              | -0.0131               | ---                   | ±2.5        | Pass    |
|           |        |       | 50 °C  | 16               | 0.0191                | ---                   | ±2.5        | Pass    |
| Subtype 2 | M      | 100%  | -30 °C | -14              | -0.0167               | ---                   | ±2.5        | Pass    |
|           |        |       | -20 °C | -7               | -0.0084               | ---                   | ±2.5        | Pass    |
|           |        |       | -10 °C | 15               | 0.0179                | ---                   | ±2.5        | Pass    |
|           |        |       | 0 °C   | -14              | -0.0167               | ---                   | ±2.5        | Pass    |
|           |        |       | 10 °C  | 12               | 0.0143                | ---                   | ±2.5        | Pass    |
|           |        |       | 20 °C  | -11              | -0.0131               | ---                   | ±2.5        | Pass    |
|           |        |       | 30 °C  | 17               | 0.0203                | ---                   | ±2.5        | Pass    |
|           |        |       | 40 °C  | -9               | -0.0108               | ---                   | ±2.5        | Pass    |



| Test Mode | RF Ch. | Volt. | Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Freq. vs. 20 °C [ppm] | Limit [ppm] | Verdict |
|-----------|--------|-------|-------|------------------|-----------------------|-----------------------|-------------|---------|
|           |        |       | 50 °C | 7                | 0.0084                | ---                   | ±2.5        | Pass    |

### **Frequency Error vs. Voltage:**

| Test Mode | RF Ch. | Temp. | Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Freq. vs. 20 °C [ppm] | Limit [ppm] | Verdict |
|-----------|--------|-------|-------|------------------|-----------------------|-----------------------|-------------|---------|
| TM 1      | M      | 20 °C | VL    | 19               | 0.0227                | ---                   | ±2.5        | Pass    |
|           |        |       | VN    | 17               | 0.0203                | ---                   | ±2.5        | Pass    |
|           |        |       | VH    | -10              | -0.0120               | ---                   | ±2.5        | Pass    |
| TM 3      | M      | 20 °C | VL    | -14              | -0.0167               | ---                   | ±2.5        | Pass    |
|           |        |       | VN    | 11               | 0.0131                | ---                   | ±2.5        | Pass    |
|           |        |       | VH    | 15               | 0.0179                | ---                   | ±2.5        | Pass    |
| Subtype 0 | M      | 20 °C | VL    | 16               | 0.0191                | ---                   | ±2.5        | Pass    |
|           |        |       | VN    | -17              | -0.0203               | ---                   | ±2.5        | Pass    |
|           |        |       | VH    | -10              | -0.0120               | ---                   | ±2.5        | Pass    |
| Subtype 2 | M      | 20 °C | VL    | 14               | 0.0167                | ---                   | ±2.5        | Pass    |
|           |        |       | VN    | -18              | -0.0215               | ---                   | ±2.5        | Pass    |
|           |        |       | VH    | -14              | -0.0167               | ---                   | ±2.5        | Pass    |