

FCC PART 20.21, 24E & 90

## TEST REPORT

For

**ADC Telecommunications Inc.**

P.O. Box 1101, Minneapolis, Minnesota, United States

**FCC ID: NOO-S2195-011**

|                                                                                                                                                                                                                                                                                                                 |                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                                                                                                                                                                                          | <b>Product Type:</b><br>Data InterReach Spectrum |
| <div style="text-align: right;"><i>Rocky Kang</i></div> <b>Test Engineer:</b> <u>Rocky Kang</u>                                                                                                                                                                                                                 |                                                  |
| <b>Report Number:</b> <u>RSZ140122004-00A</u>                                                                                                                                                                                                                                                                   |                                                  |
| <b>Report Date:</b> <u>2014-05-06</u>                                                                                                                                                                                                                                                                           |                                                  |
| <div style="text-align: right;"><i>Jimmy Xiao</i></div> <b>Reviewed By:</b> <u>RF Engineer</u>                                                                                                                                                                                                                  |                                                  |
| <b>Prepared By:</b> Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F, the 3rd Phase of WanLi Industrial Building<br>ShiHua Road, FuTian Free Trade Zone<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008<br><a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a> |                                                  |

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *ADC Telecommunications Inc.*'s product, model number: *SPT-S3-8019-22-HP (FCC ID: NOO-S2195-011)* or the "EUT" in this report was a *Data InterReach Spectrum*, which was measured approximately: 27 cm (L) x 21 cm (W) x 8 cm (H), rated with input voltage: DC 54 V.

*\*All measurement and test data in this report was gathered from production sample serial number: 1401096 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2014-01-22.*

### Objective

This test report is prepared on behalf of *ADC Telecommunications Inc.* in accordance with Part 20.21, 24E, and Part 90 of the Federal Communication Commissions rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

### Related Submittal(s)/Grant(s)

FCC Part 90 B9B submission with FCC ID: NOO-S2195-011

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 24 Subpart E – Broadband PCS, Part 90 – Private Land Mobile Radio Service

Applicable Standards: TIA/EIA 603-D.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement uncertainty with radiated emission is 5.91 dB for 30 MHz-1 GHz and 4.92 dB for above 1GHz, 1.95 dB for conducted measurement.

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

### Equipment Modifications

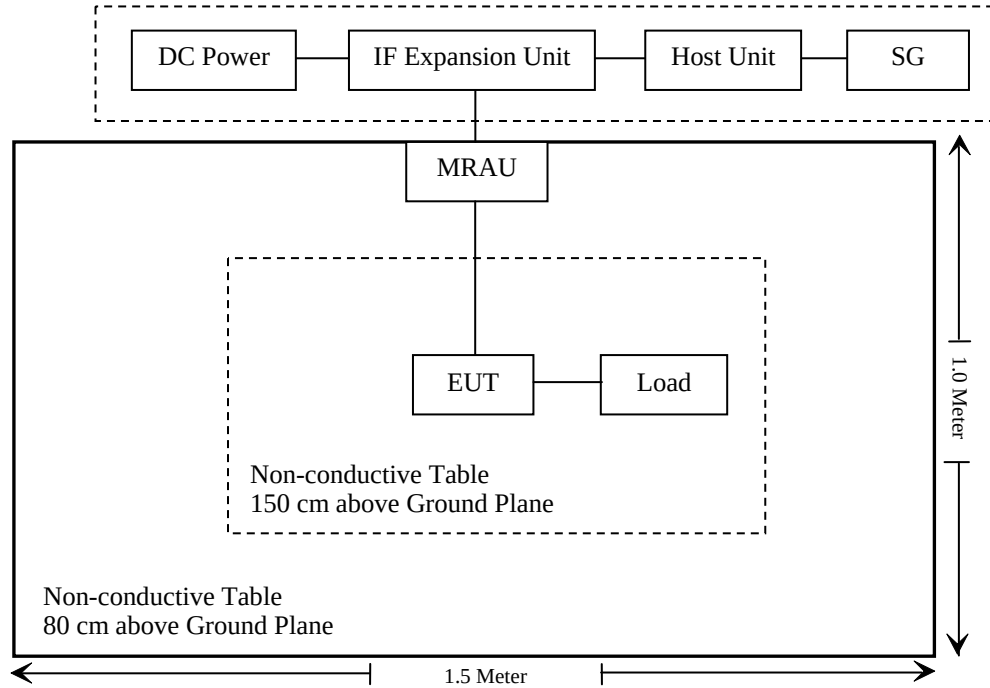
No modification was made to the EUT.

### Support Equipment List and Details

| Manufacturer                | Description       | Model             | Serial Number |
|-----------------------------|-------------------|-------------------|---------------|
| ADC Telecommunications Inc. | Host Unit         | FWP-0000HUII      | MR224BKL      |
| ADC Telecommunications Inc. | Rev Module        | SPT-0000000REV-1  | MR221NAU      |
| ADC Telecommunications Inc. | Controller Module | SPT-00000MICRO-1  | MR221NA3      |
| ADC Telecommunications Inc. | FWD Module        | SPT-0000000FWD-1  | MR221NA5      |
| ADC Telecommunications Inc. | DC Power          | SPT-2400ACDC-1    | N/A           |
| ADC Telecommunications Inc. | MRAU              | SPT-M3-8519-11-HP | MR226ZW1      |

### External I/O Cable

| Cable Description                      | Length (m) | From/Port         | To                |
|----------------------------------------|------------|-------------------|-------------------|
| Shielding Detachable RF Cable          | 0.4        | EUT               | Load              |
| Shielding Detachable RF Cable          | 1.2*2      | EUT               | MRAU              |
| Shielding Detachable RF Cable          | 50*2       | MRAU              | IF Expansion Unit |
| Un-shielding Detachable DC Power Cable | 1.0        | IF Expansion Unit | DC Power          |
| Shielding Detachable RF Cable          | 1.0        | IF Expansion Unit | Host Unit         |
| Shielding Detachable RF Cable          | 1.4        | Host Unit         | SG                |

**Block Diagram of Test Setup**

Note: IF Expansion Unit contains Rev Module, Controller Module and FWD Module

## SUMMARY OF TEST RESULTS

| FCC Rules                 | Description of Test                                                    | Result     |
|---------------------------|------------------------------------------------------------------------|------------|
| §2.1091                   | Maximum Permissible Exposure (MPE)                                     | Compliance |
| §2.1046, §24.232, §90.205 | RF Output Power                                                        | Compliance |
| §2.1047                   | Modulation Characteristics                                             | N/A*       |
| §2.1049; §24.238          | Bandwidth                                                              | Compliance |
| §90.691                   | Emission Mask                                                          | Compliance |
| §2.1051, §24.238          | Spurious Emissions at Antenna Terminal                                 | Compliance |
| §2.1053, §24.238, §90.669 | Field Strength of Spurious Radiation                                   | Compliance |
| §24.238                   | Out of band emission, Band Edge                                        | Compliance |
| §2.1055, §24.235, §90.213 | Frequency stability vs. temperature<br>Frequency stability vs. voltage | Compliance |
| §20.21                    | Out of Band Rejection                                                  | Compliance |

Note: N/A, the device is a booster.

## FCC §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Applicable Standard

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

#### Limits for General Population/Uncontrolled Exposure

| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (Minutes) |
| 0.3-1.34                                            | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                             | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                              | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                            | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                        | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

### MPE Prediction

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

| Frequency (MHz) | Antenna Gain |           | Conducted Power |       | Evaluation Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | MPE Limit (mW/cm <sup>2</sup> ) |
|-----------------|--------------|-----------|-----------------|-------|--------------------------|-------------------------------------|---------------------------------|
|                 | (dBi)        | (numeric) | (dBm)           | (mW)  |                          |                                     |                                 |
| 865.0           | 3            | 2.00      | 18.96           | 78.70 | 40                       | 0.00783                             | 0.577                           |
| 1994.8          | 3            | 2.00      | 26.58           | 455.0 | 40                       | 0.04528                             | 1.0                             |

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 40cm from nearby persons.

**Result:** Compliance

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## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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According to FCC § 2.1047(d), 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC § 2.1046 & § 24.232 & §90.205 - RF OUTPUT POWER

### Applicable Standard

According to FCC §2.1046, §24.232 and §90.205

Device Specifications: In addition to the general rules for equipment certification in §90.203(a)(2) and part 2, subpart J of this chapter, a signal booster must also meet the rules in this paragraph.

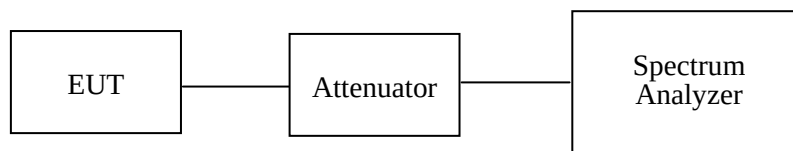
The output power capability of a signal booster must be designed for deployments providing a radiated power not exceeding 5 Watts ERP for each retransmitted channel.

The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

### Test Procedure

*Conducted method:*

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



### Test Equipment List and Details

| Manufacturer    | Description                 | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26 | 8386001028    | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 20 ~ 26 °C |
| Relative Humidity: | 48 ~ 56 %  |
| ATM Pressure:      | 101.0 kPa  |

*The testing was performed by Rocky Kang from 2014-02-24 to 2014-04-24.*

**Conducted Power****GSM/GPRS**

| Mode                            | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|---------------------------------|---------|-----------------|-------------------|--------------------|-------------|
| GSM/GPRS<br>(1900 MHz Downlink) | Low     | 1930.2          | -19               | 25.97              | 50          |
|                                 | Middle  | 1960.0          | -21               | 26.03              | 50          |
|                                 | High    | 1994.8          | -19               | 26.45              | 50          |

**EDGE**

| Mode                        | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|-----------------------------|---------|-----------------|-------------------|--------------------|-------------|
| EDGE<br>(1900 MHz Downlink) | Low     | 1930.2          | -21               | 25.93              | 50          |
|                             | Middle  | 1960.0          | -25               | 26.20              | 50          |
|                             | High    | 1994.8          | -22               | 26.58              | 50          |

**CDMA**

| Mode                        | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|-----------------------------|---------|-----------------|-------------------|--------------------|-------------|
| CDMA<br>(1900 MHz Downlink) | Low     | 1931.25         | -25               | 23.75              | 50          |
|                             | Middle  | 1960.0          | -26               | 23.47              | 50          |
|                             | High    | 1993.75         | -26               | 23.41              | 50          |

**WCDMA**

| Mode                         | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|------------------------------|---------|-----------------|-------------------|--------------------|-------------|
| WCDMA<br>(1900 MHz Downlink) | Low     | 1932.4          | -28               | 23.31              | 50          |
|                              | Middle  | 1960.0          | -27               | 23.72              | 50          |
|                              | High    | 1992.6          | -27               | 23.34              | 50          |

## PCS LTE Band -downlink

| Mode              | Modulation    | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|-------------------|---------------|-----------------|-------------------|--------------------|-------------|
| 1900 MHz Downlink | QPSK(1.4MHz)  | 1931            | -26               | 23.62              | 50          |
|                   |               | 1960            | -27               | 23.84              | 50          |
|                   |               | 1994            | -26               | 23.64              | 50          |
|                   | 16QAM(1.4MHz) | 1931            | -26               | 23.94              | 50          |
|                   |               | 1960            | -27               | 23.96              | 50          |
|                   |               | 1994            | -26               | 23.67              | 50          |
|                   | 64QAM(1.4MHz) | 1931            | -26               | 23.03              | 50          |
|                   |               | 1960            | -27               | 23.26              | 50          |
|                   |               | 1994            | -26               | 23.12              | 50          |
|                   | QPSK(3MHz)    | 1932            | -25               | 23.32              | 50          |
|                   |               | 1960            | -26               | 23.04              | 50          |
|                   |               | 1993            | -24               | 23.84              | 50          |
|                   | 16QAM(3MHz)   | 1932            | -25               | 23.18              | 50          |
|                   |               | 1960            | -25               | 23.78              | 50          |
|                   |               | 1993            | -26               | 23.54              | 50          |
|                   | 64QAM(3MHz)   | 1932            | -27               | 23.96              | 50          |
|                   |               | 1960            | -26               | 23.78              | 50          |
|                   |               | 1993            | -27               | 23.49              | 50          |
|                   | QPSK(5MHz)    | 1933            | -25               | 23.52              | 50          |
|                   |               | 1960            | -26               | 23.25              | 50          |
|                   |               | 1992            | -26               | 23.41              | 50          |
|                   | 16QAM(5MHz)   | 1933            | -26               | 23.71              | 50          |
|                   |               | 1960            | -25               | 23.43              | 50          |
|                   |               | 1992            | -26               | 23.65              | 50          |
|                   | 64QAM(5MHz)   | 1933            | -25               | 23.17              | 50          |
|                   |               | 1960            | -25               | 23.30              | 50          |
|                   |               | 1992            | -25               | 23.41              | 50          |
|                   | QPSK(10MHz)   | 1935            | -26               | 23.24              | 50          |
|                   |               | 1960            | -26               | 23.27              | 50          |
|                   |               | 1990            | -27               | 23.39              | 50          |
|                   | 16QAM(10MHz)  | 1935            | -26               | 23.91              | 50          |
|                   |               | 1960            | -27               | 23.72              | 50          |
|                   |               | 1990            | -26               | 23.42              | 50          |
|                   | 64QAM(10MHz)  | 1935            | -25               | 23.89              | 50          |
|                   |               | 1960            | -25               | 23.15              | 50          |
|                   |               | 1990            | -26               | 23.54              | 50          |

**IDEN (862-869MHz)**

| Mode                       | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|----------------------------|---------|-----------------|-------------------|--------------------|-------------|
| IDEN<br>(800 MHz Downlink) | Low     | 862.1           | -27               | 17.16              | 50          |
|                            | Middle  | 865.0           | -27               | 17.17              | 50          |
|                            | High    | 868.9           | -28               | 17.21              | 50          |

**CDMA (862-869MHz)**

| Mode                       | Channel | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|----------------------------|---------|-----------------|-------------------|--------------------|-------------|
| CDMA<br>(800 MHz Downlink) | Low     | 863.25          | -26               | 18.01              | 50          |
|                            | Middle  | 865.0           | -25               | 18.24              | 50          |
|                            | High    | 867.75          | -25               | 18.12              | 50          |

**LTE Band – Downlink (862-869MHz)**

| Mode                | Modulation    | Frequency (MHz) | Input Power (dBm) | Output Power (dBm) | Limit (dBm) |
|---------------------|---------------|-----------------|-------------------|--------------------|-------------|
| 800 MHz<br>Downlink | QPSK(1.4MHz)  | 863             | -29               | 18.62              | 50          |
|                     |               | 865             | -29               | 18.84              | 50          |
|                     |               | 868             | -30               | 18.64              | 50          |
|                     | 16QAM(1.4MHz) | 863             | -30               | 18.94              | 50          |
|                     |               | 865             | -30               | 18.96              | 50          |
|                     |               | 868             | -30               | 18.67              | 50          |
|                     | 64QAM(1.4MHz) | 863             | -29               | 18.03              | 50          |
|                     |               | 865             | -28               | 18.26              | 50          |
|                     |               | 868             | -29               | 18.12              | 50          |
|                     | QPSK(3MHz)    | 863.5           | -27               | 18.33              | 50          |
|                     |               | 865             | -29               | 18.15              | 50          |
|                     |               | 867.5           | -28               | 18.39              | 50          |
|                     | 16QAM(3MHz)   | 863.5           | -29               | 18.17              | 50          |
|                     |               | 865             | -29               | 18.05              | 50          |
|                     |               | 867.5           | -30               | 18.28              | 50          |
|                     | 64QAM(3MHz)   | 863.5           | -29               | 18.23              | 50          |
|                     |               | 865             | -29               | 18.41              | 50          |
|                     |               | 867.5           | -30               | 18.66              | 50          |
|                     | QPSK(5MHz)    | 865             | -28               | 18.33              | 50          |
|                     | 16QAM(5MHz)   | 865             | -29               | 18.11              | 50          |
|                     | 64QAM(5MHz)   | 865             | -29               | 18.05              | 50          |

Note: The limit is 100 watts=50 dBm

## FCC §2.1049 & §24.238 – BANDWIDTH

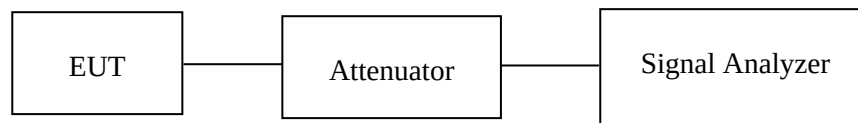
### Applicable Standard

FCC §2.1049 and §24.238.

### Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



### Test Equipment List and Details

| Manufacturer    | Description                 | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26 | 8386001028    | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 20 ~ 26 °C |
| Relative Humidity: | 48 ~ 56 %  |
| ATM Pressure:      | 101.0 kPa  |

The testing was performed by Rocky Kang from 2014-02-20 to 2014-03-13.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables and plots.

**PCS Band Downlink**

| Mode | Frequency (MHz) | Emission Bandwidth Input (kHz) | Emission Bandwidth Output (kHz) |
|------|-----------------|--------------------------------|---------------------------------|
| GSM  | 1960            | 244.4889                       | 246.4929                        |
| EDGE | 1960            | 246.4929                       | 246.4929                        |

| Mode  | Frequency (MHz) | Emission Bandwidth Input (MHz) | Emission Bandwidth Output (MHz) |
|-------|-----------------|--------------------------------|---------------------------------|
| CDMA  | 1960            | 1.2805                         | 1.2805                          |
| WCDMA | 1960            | 4.1683                         | 4.1883                          |

**PCS Band LTE Downlink**

| Mode                  | Modulation    | Frequency (MHz) | Emission Bandwidth Input (MHz) | Emission Bandwidth Output (MHz) |
|-----------------------|---------------|-----------------|--------------------------------|---------------------------------|
| Downlink<br>1930-1995 | QPSK(1.4MHz)  | 1960            | 1.1302                         | 1.1302                          |
|                       | 16QAM(1.4MHz) | 1960            | 1.1422                         | 1.1422                          |
|                       | 64QAM(1.4MHz) | 1960            | 1.1302                         | 1.1302                          |
|                       | QPSK(3MHz)    | 1960            | 2.7555                         | 2.7555                          |
|                       | 16QAM(3MHz)   | 1960            | 2.7655                         | 2.7755                          |
|                       | 64QAM(3MHz)   | 1960            | 2.7655                         | 2.7655                          |
|                       | QPSK(5MHz)    | 1960            | 4.5490                         | 4.5691                          |
|                       | 16QAM(5MHz)   | 1960            | 4.5490                         | 4.5490                          |
|                       | 64QAM(5MHz)   | 1960            | 4.5290                         | 4.5290                          |
|                       | QPSK(10MHz)   | 1960            | 8.9879                         | 8.9879                          |
|                       | 16QAM(10MHz)  | 1960            | 8.9879                         | 8.9879                          |
|                       | 64QAM(10MHz)  | 1960            | 8.9879                         | 8.9879                          |

**800 MHz Band – Downlink (862-869MHz)**

| Mode | Frequency (MHz) | Emission Bandwidth Input (kHz) | Emission Bandwidth Output (kHz) |
|------|-----------------|--------------------------------|---------------------------------|
| IDEN | 865             | 16.1322                        | 16.1322                         |

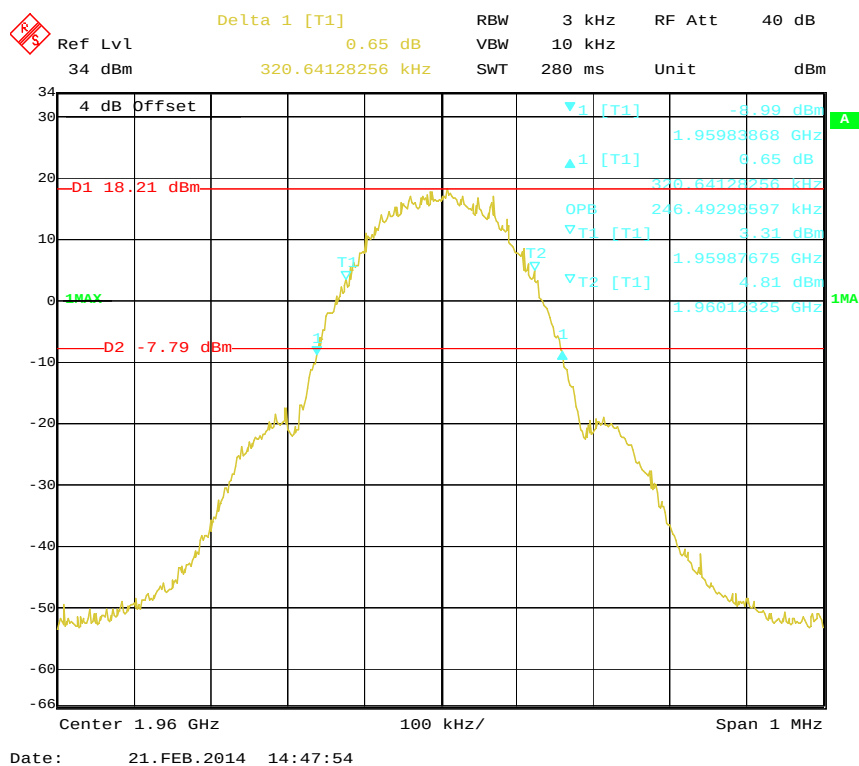
**800 MHz Band – Downlink (862-869MHz)**

| Mode | Frequency (MHz) | Emission Bandwidth Input (MHz) | Emission Bandwidth Output (MHz) |
|------|-----------------|--------------------------------|---------------------------------|
| CDMA | 865             | 1.2805                         | 1.2805                          |

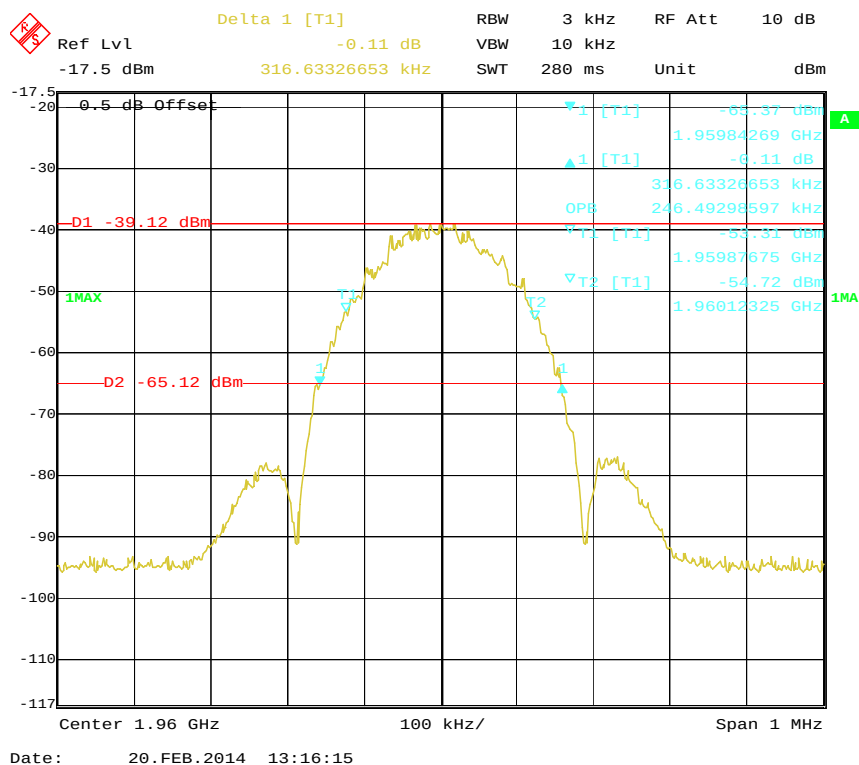
**800 MHz Band LTE – Downlink (862-869MHz)**

| Mode                    | Modulation    | Frequency (MHz) | Emission Bandwidth Input (MHz) | Emission Bandwidth Output (MHz) |
|-------------------------|---------------|-----------------|--------------------------------|---------------------------------|
| Downlink<br>862-869 MHz | QPSK(1.4MHz)  | 865             | 1.1302                         | 1.1302                          |
|                         | 16QAM(1.4MHz) | 865             | 1.1422                         | 1.1482                          |
|                         | 64QAM(1.4MHz) | 865             | 1.1302                         | 1.1302                          |
|                         | QPSK(3MHz)    | 865             | 2.7655                         | 2.7555                          |
|                         | 16QAM(3MHz)   | 865             | 2.7755                         | 2.7655                          |
|                         | 64QAM(3MHz)   | 865             | 2.7755                         | 2.7655                          |
|                         | QPSK(5MHz)    | 865             | 4.5891                         | 4.5891                          |
|                         | 16QAM(5MHz)   | 865             | 4.5691                         | 4.5490                          |
|                         | 64QAM(5MHz)   | 865             | 4.5490                         | 4.5290                          |

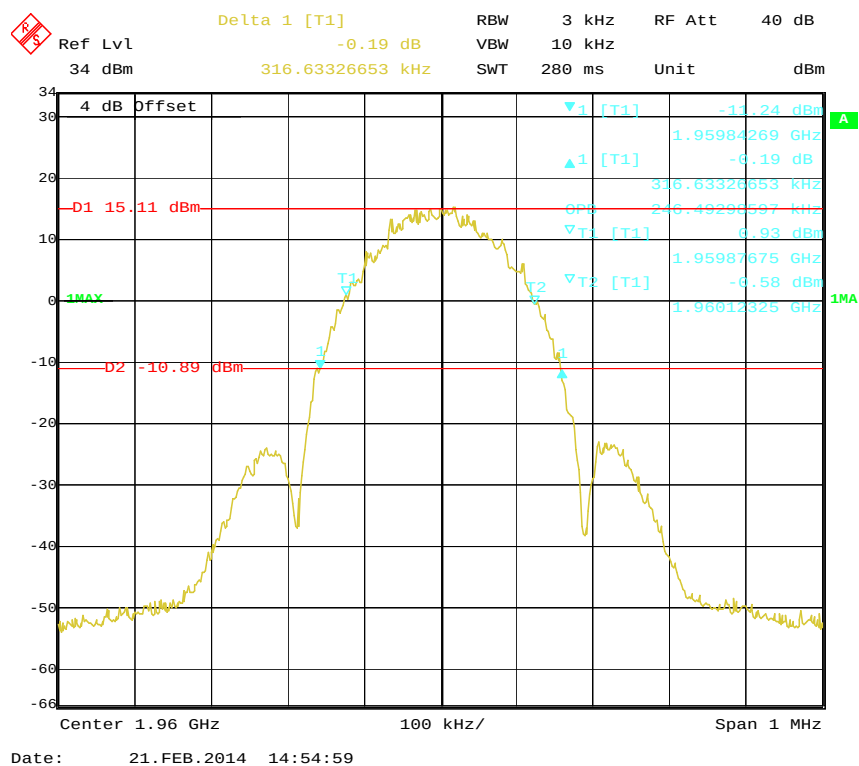
## GSM Mode, Input



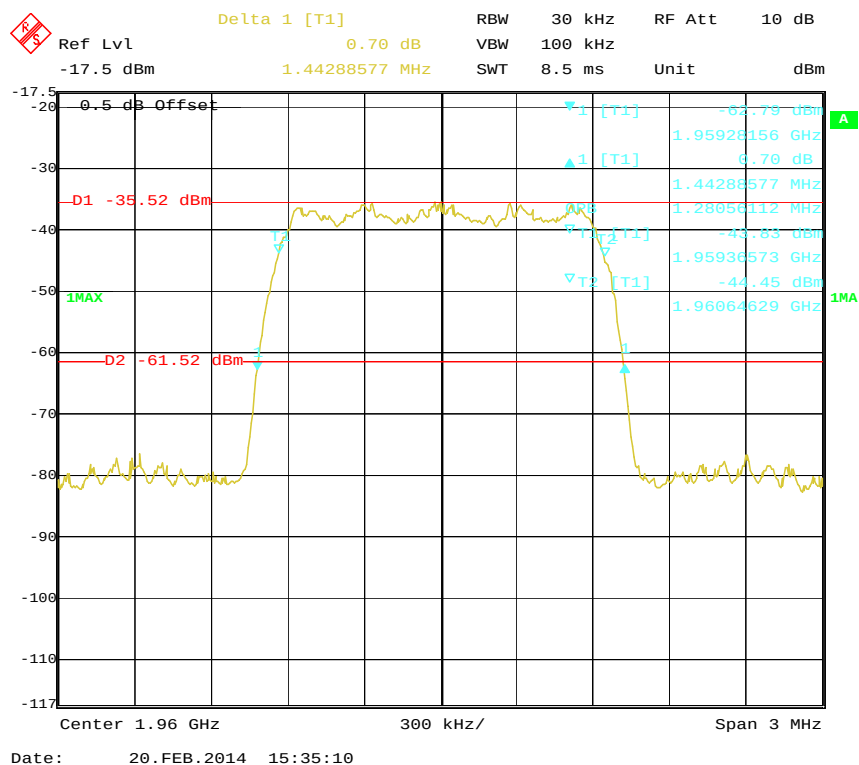
## EDGE Mode, Input



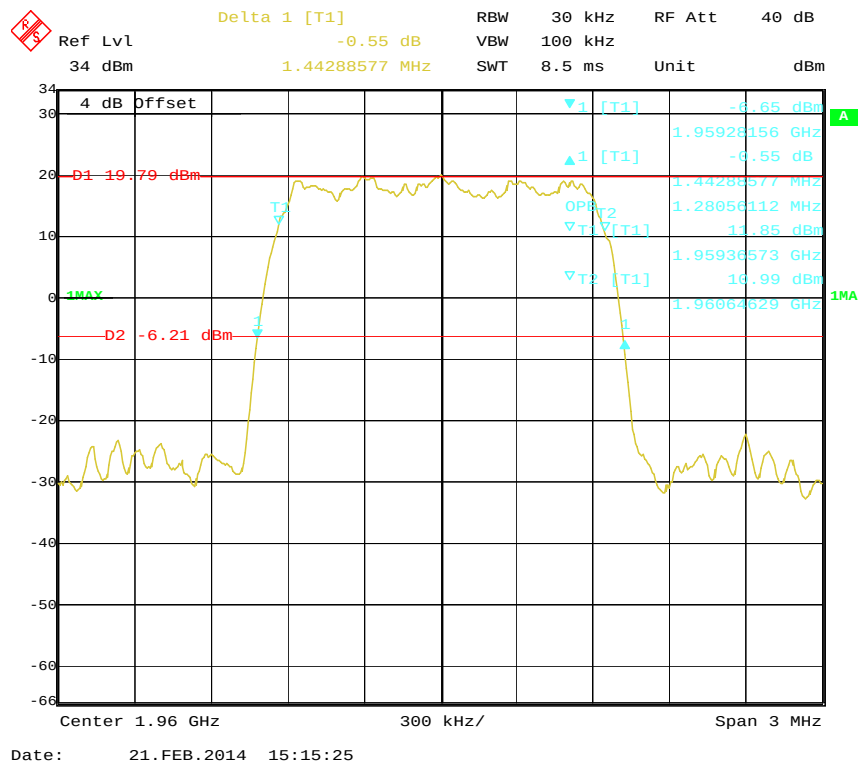
## EDGE Mode, Output



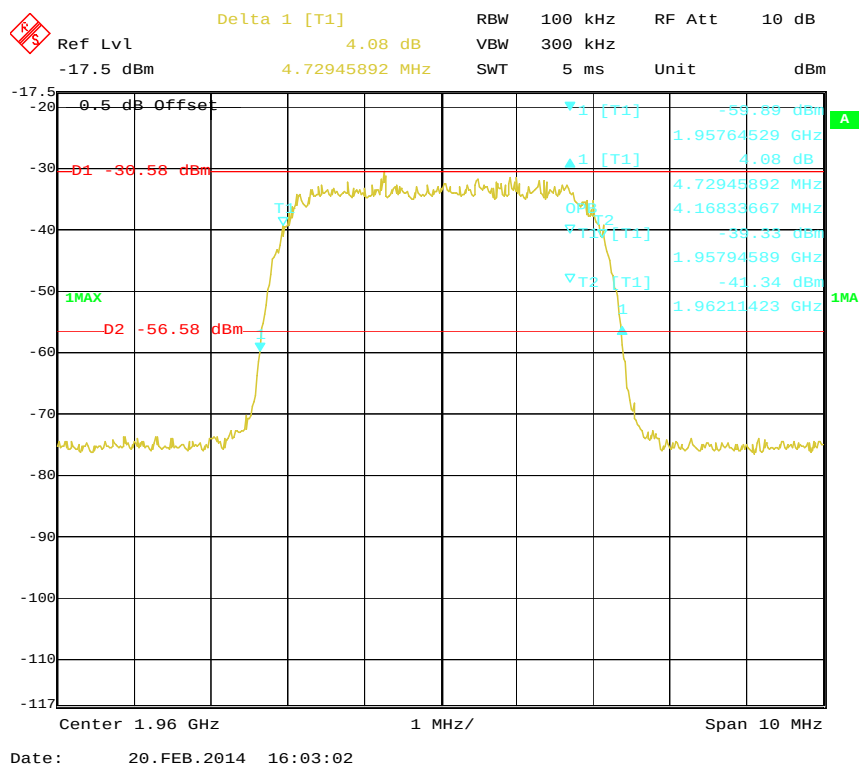
## CDMA Mode, Input



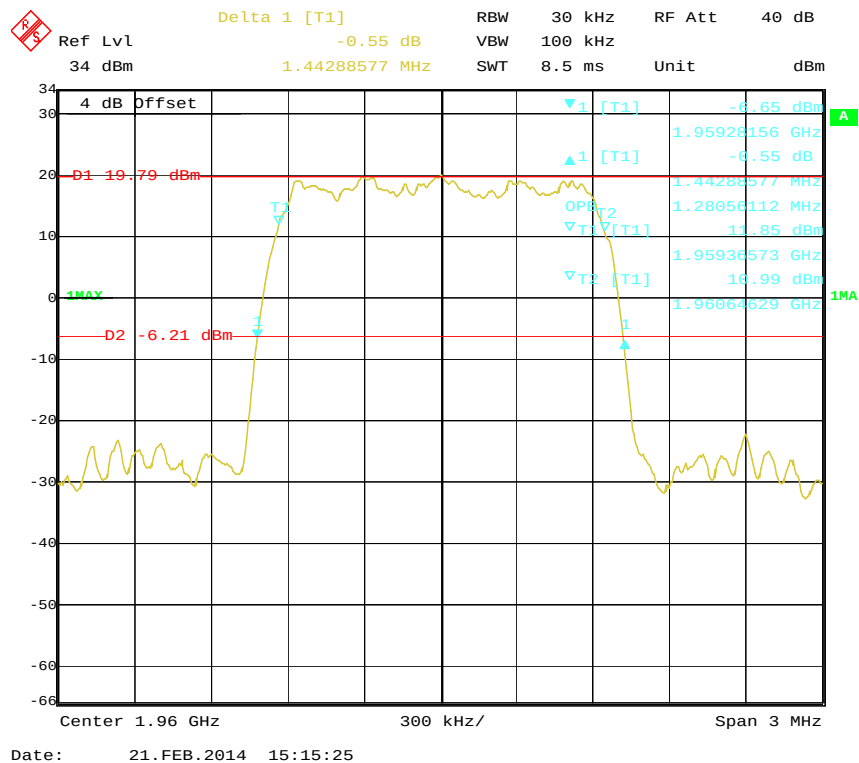
## CDMA Mode, Output



## WCDMA Mode, Input

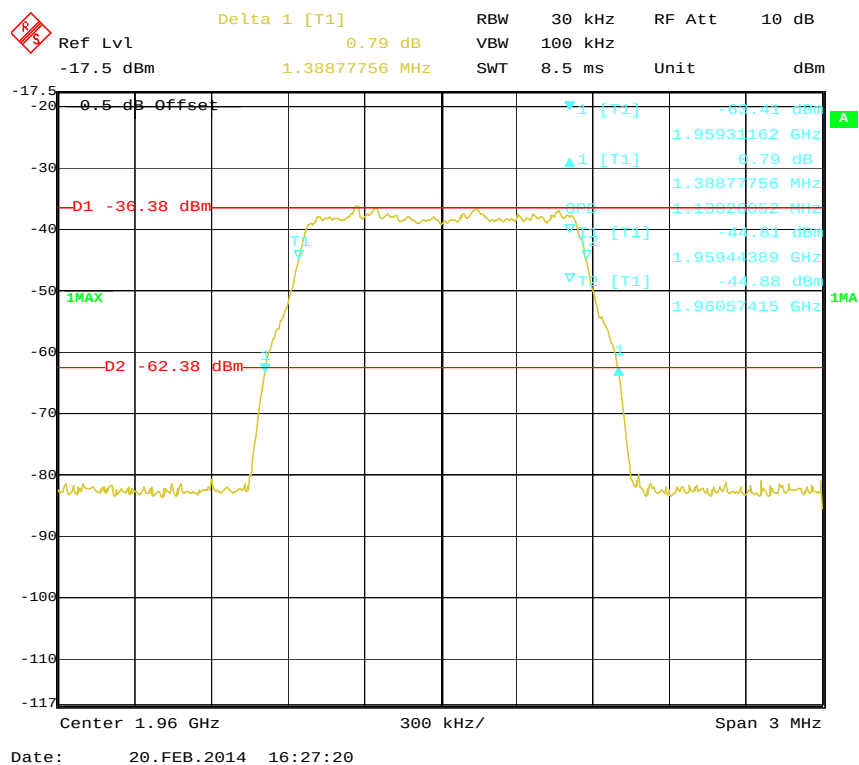


## WCDMA Mode, Output

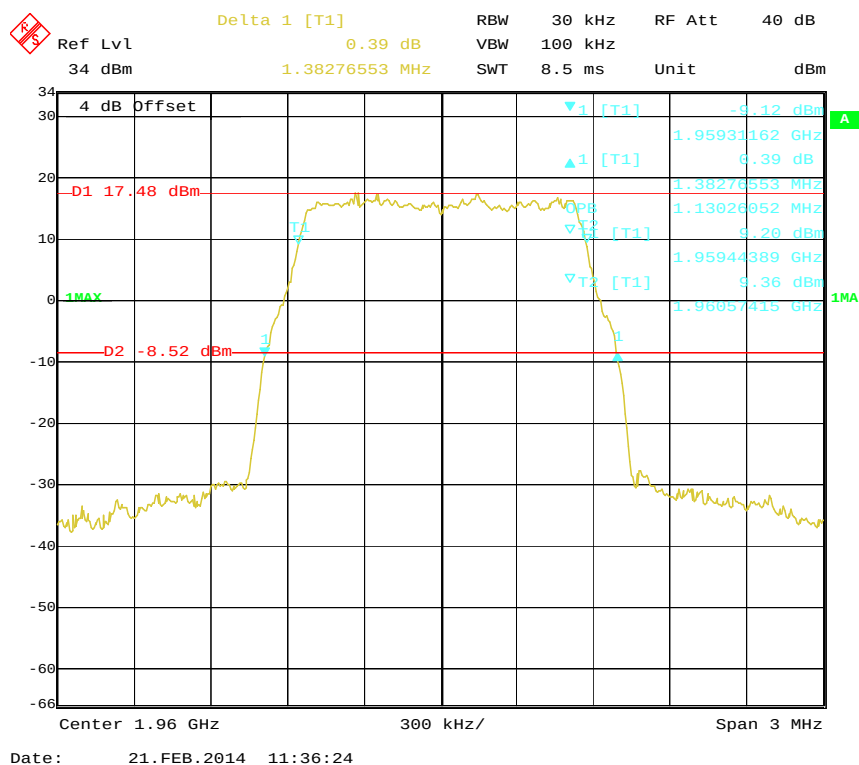


## PCS Band LTE Downlink:

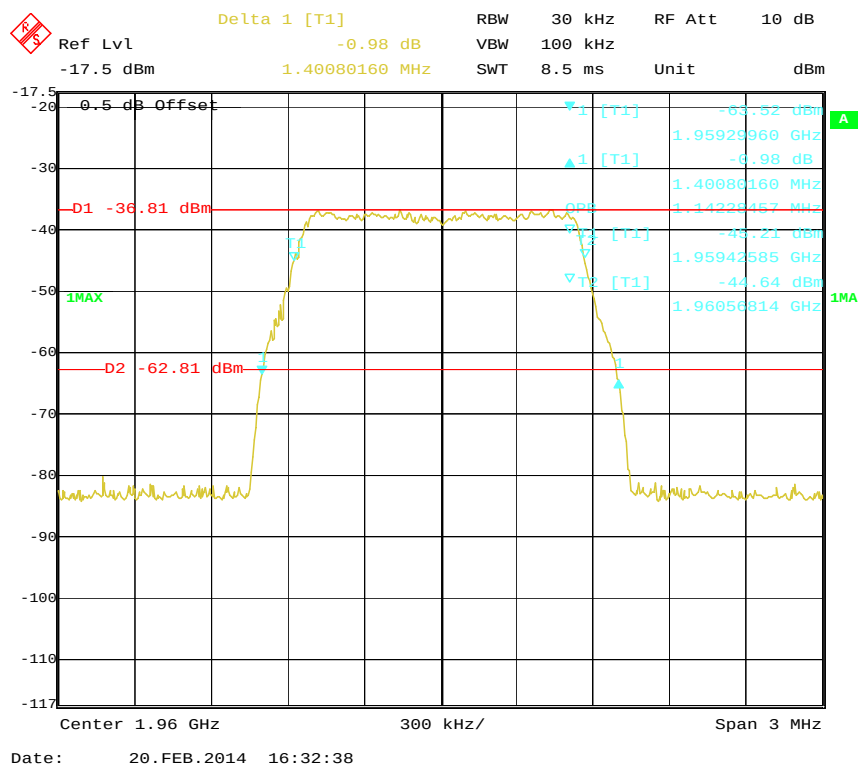
## QPSK (1.4MHz) Mode, Input



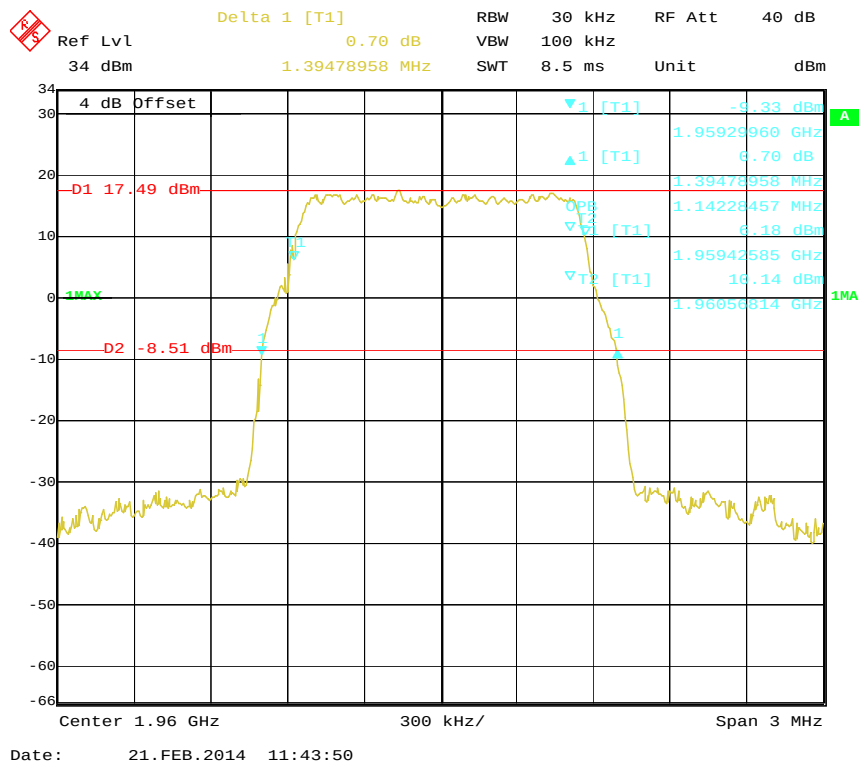
## QPSK (1.4MHz) Mode, Output



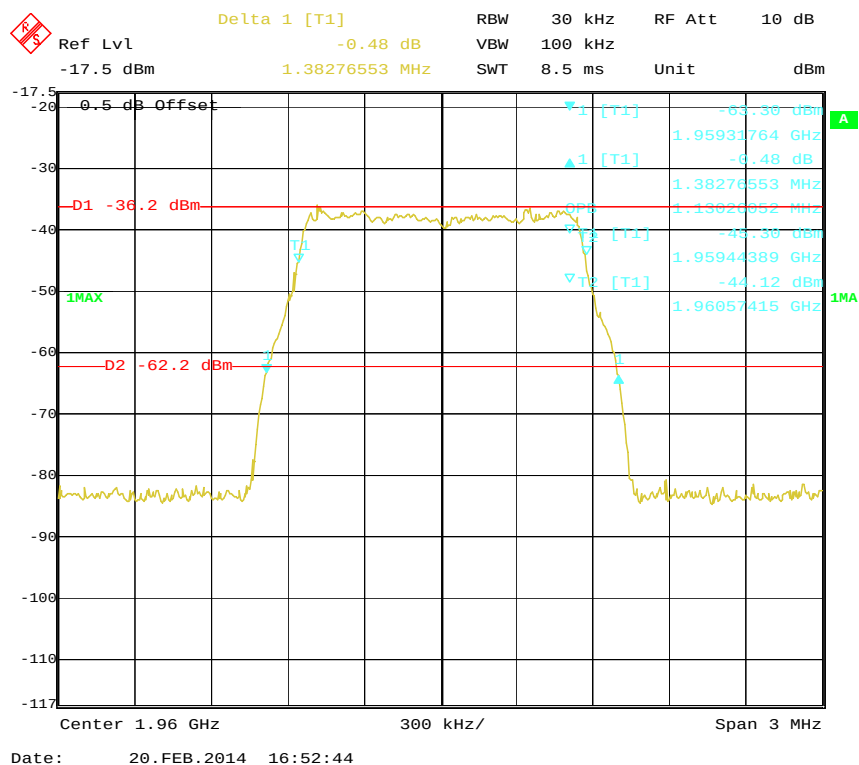
## 16QAM (1.4MHz) Mode, Input



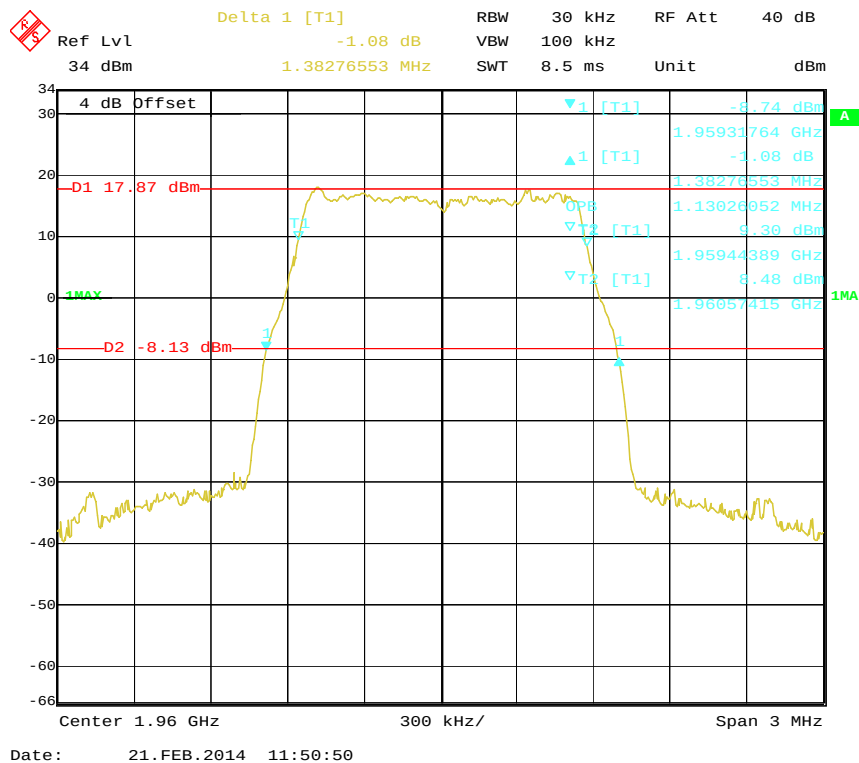
## 16QAM (1.4MHz) Mode, Output



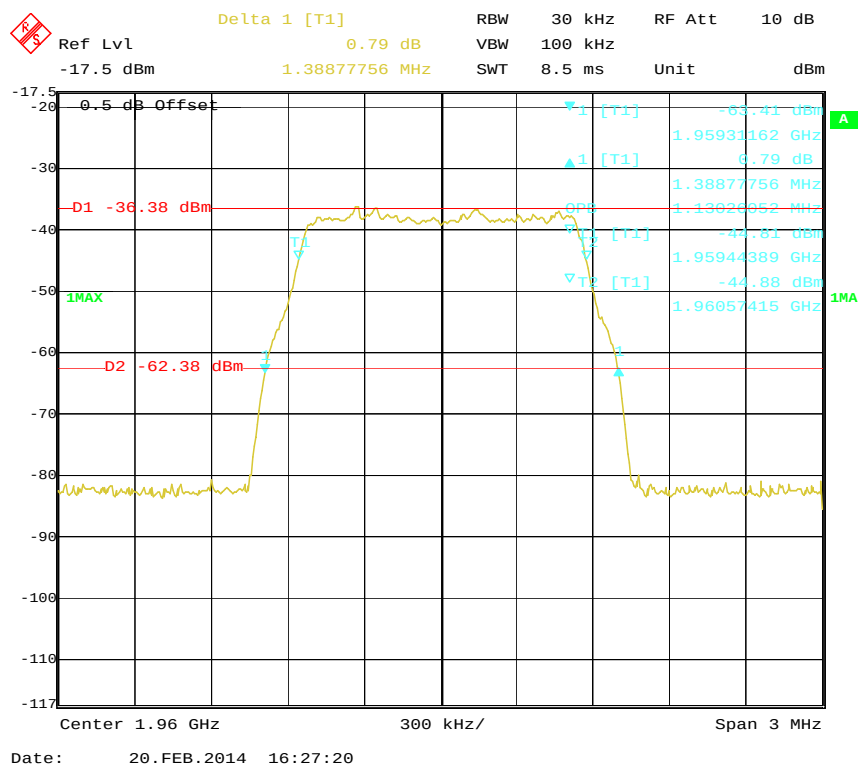
## 64QAM (1.4MHz) Mode, Input



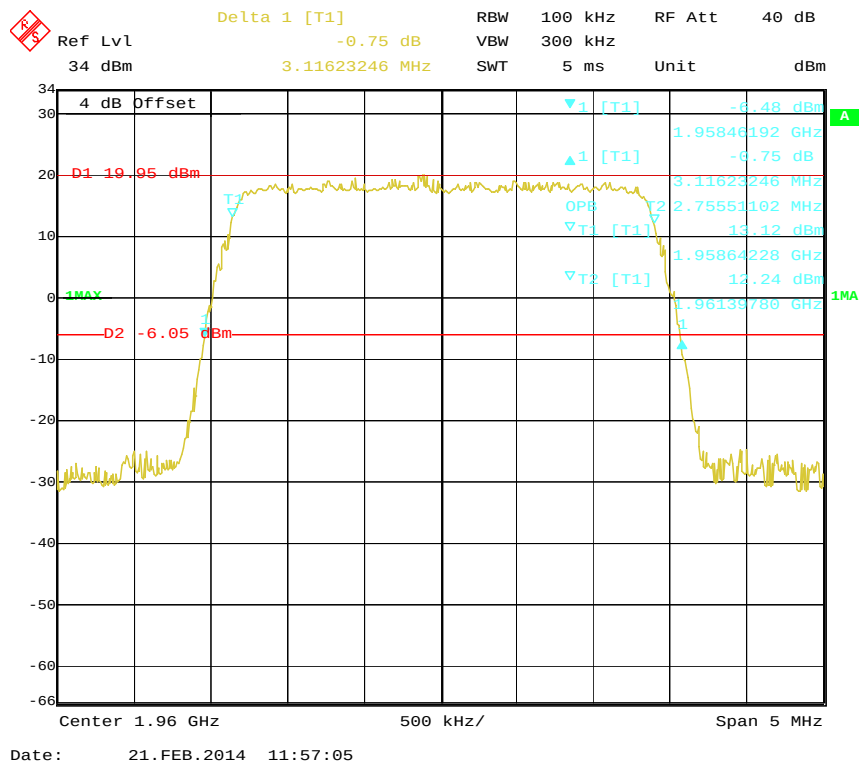
## 64QAM (1.4MHz) Mode, Output



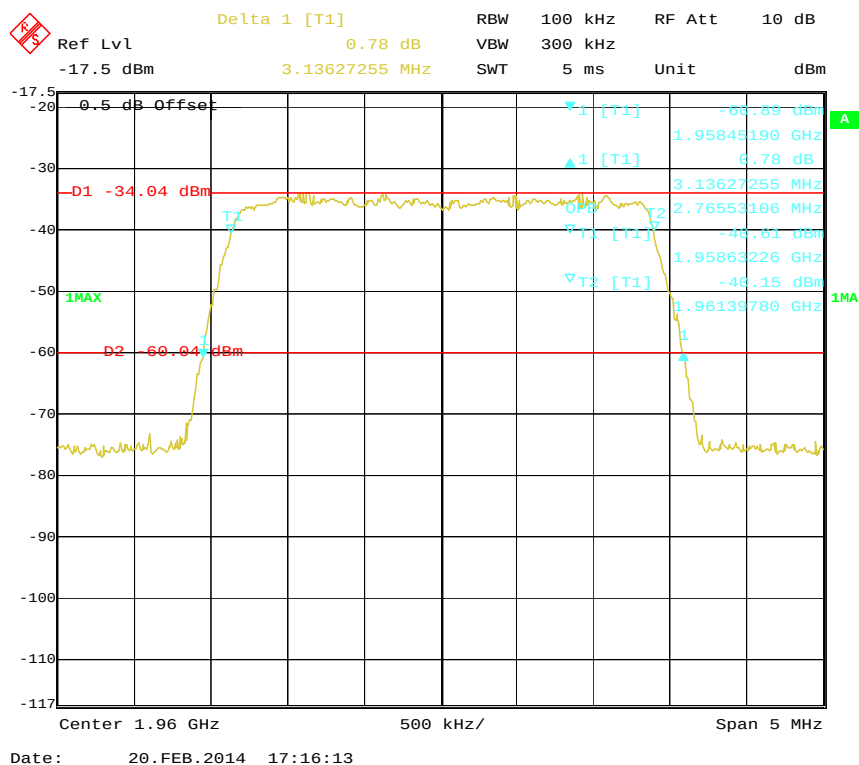
## QPSK (3MHz) Mode, Input



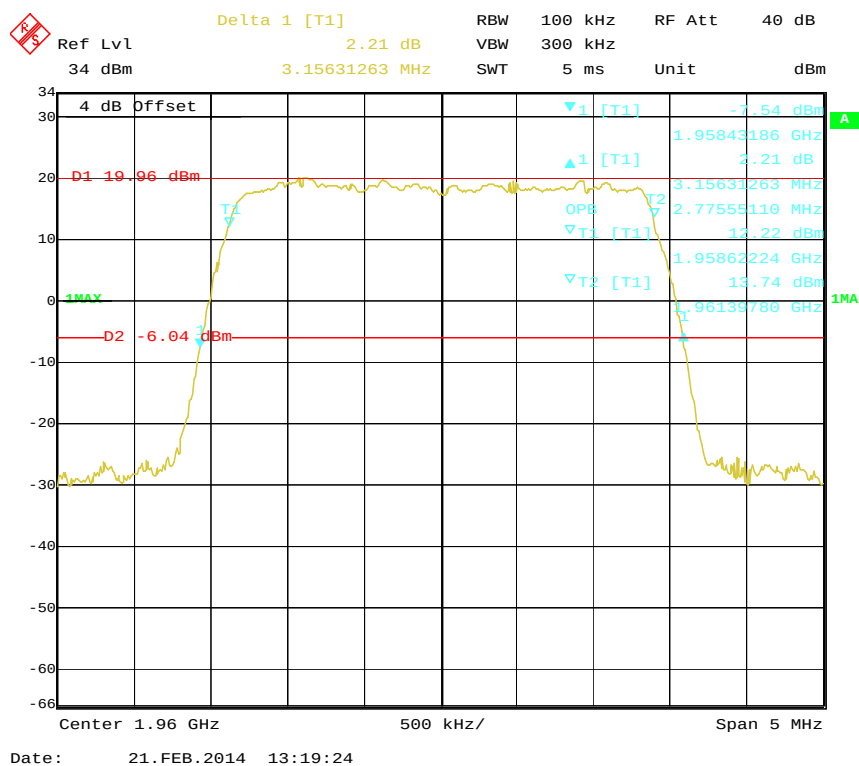
## QPSK (3MHz) Mode, Output



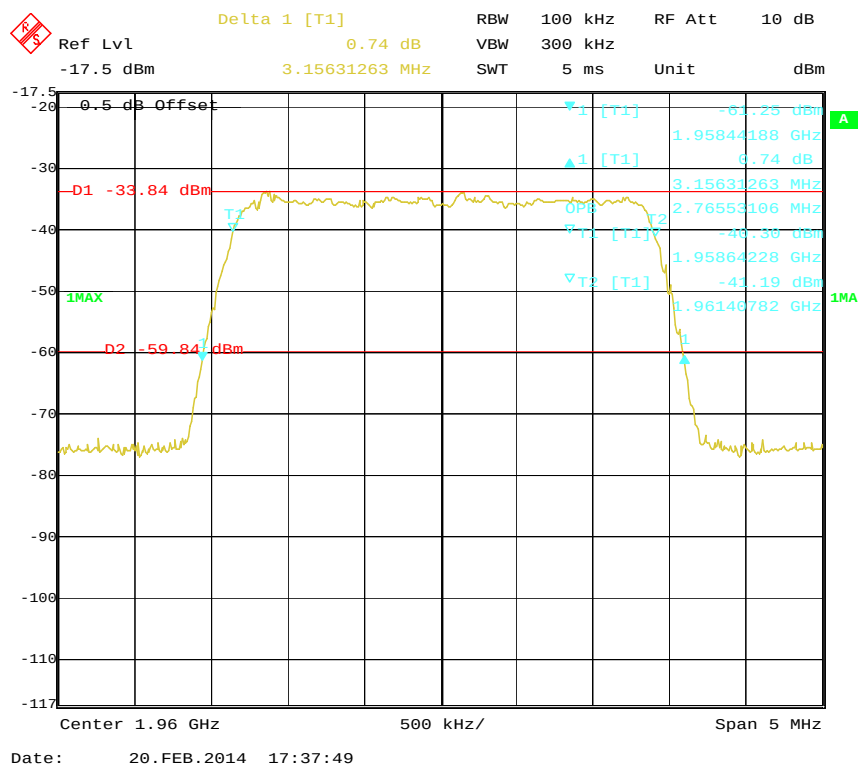
## 16QAM (3MHz) Mode, Input



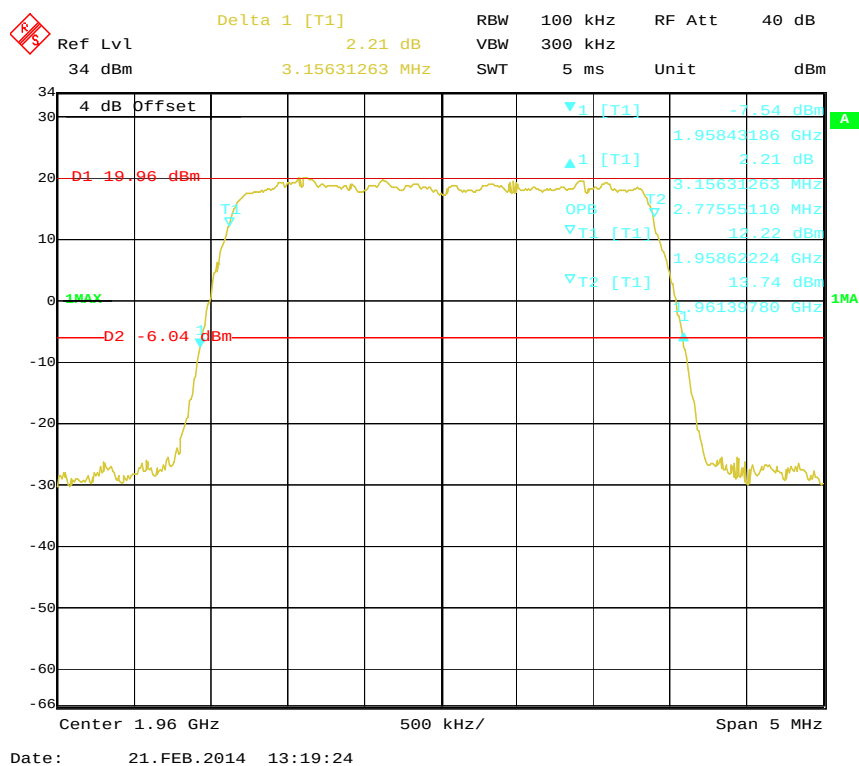
## 16QAM (3MHz) Mode, Output



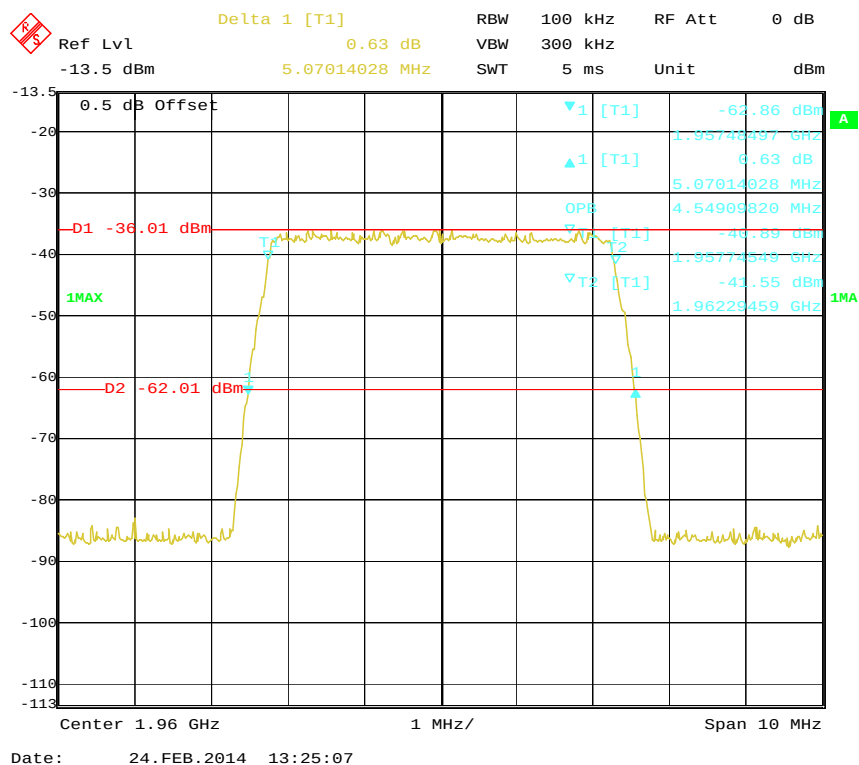
## 64QAM (3MHz) Mode, Input



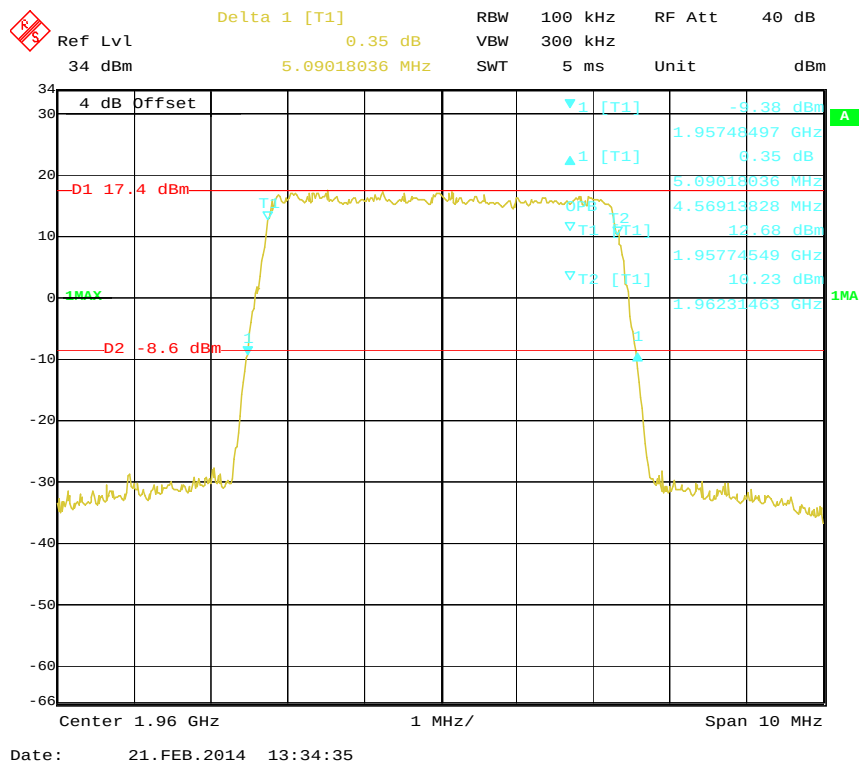
## 64QAM (3MHz) Mode, Output



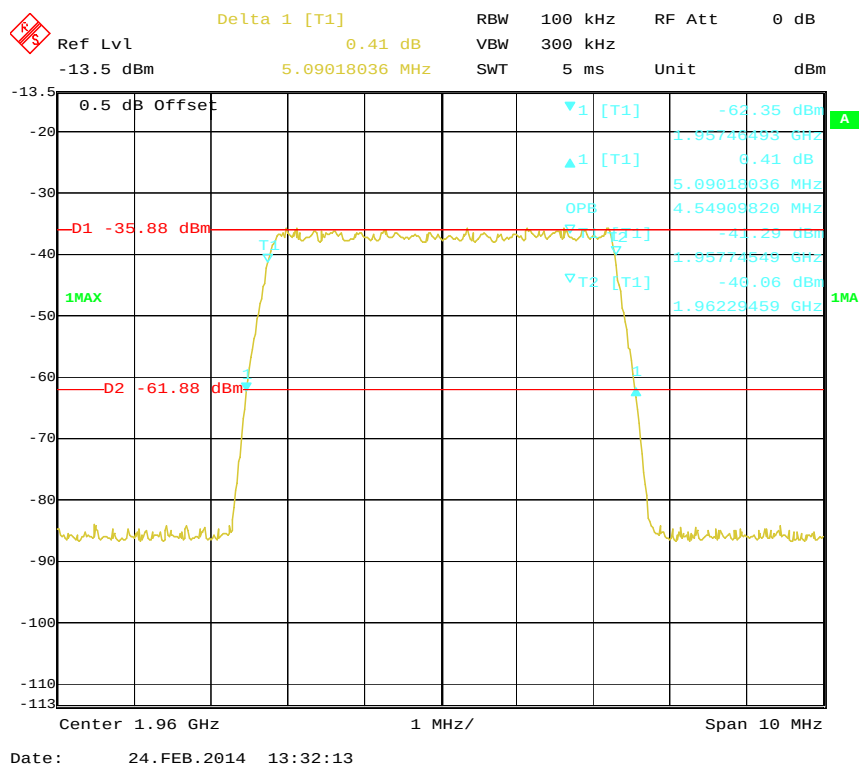
## QPSK (5MHz) Mode, Input



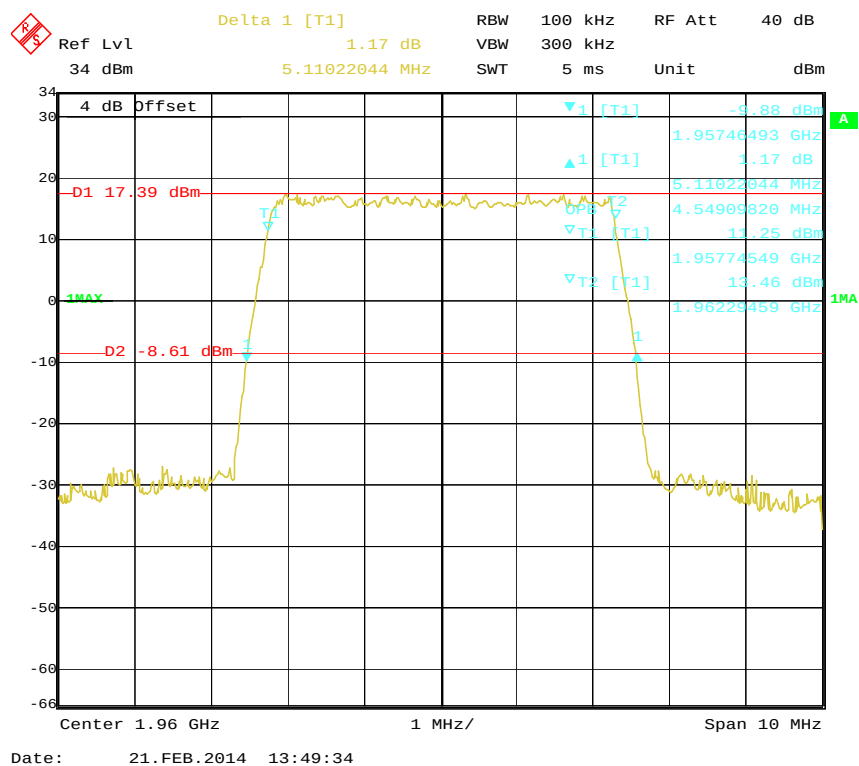
## QPSK (5MHz) Mode, Output



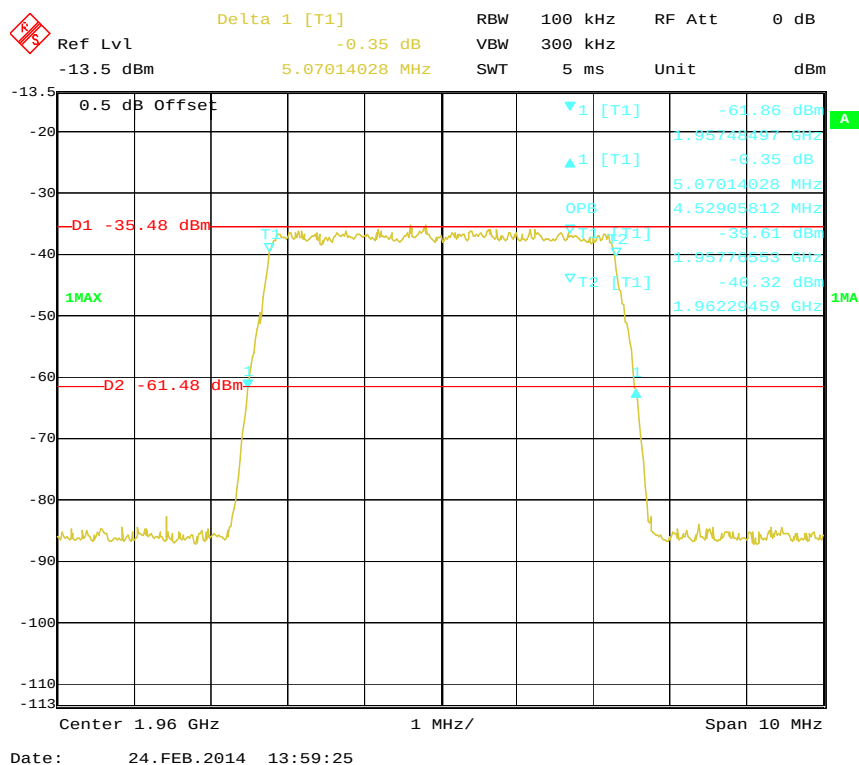
## 16QAM (5MHz) Mode, Input



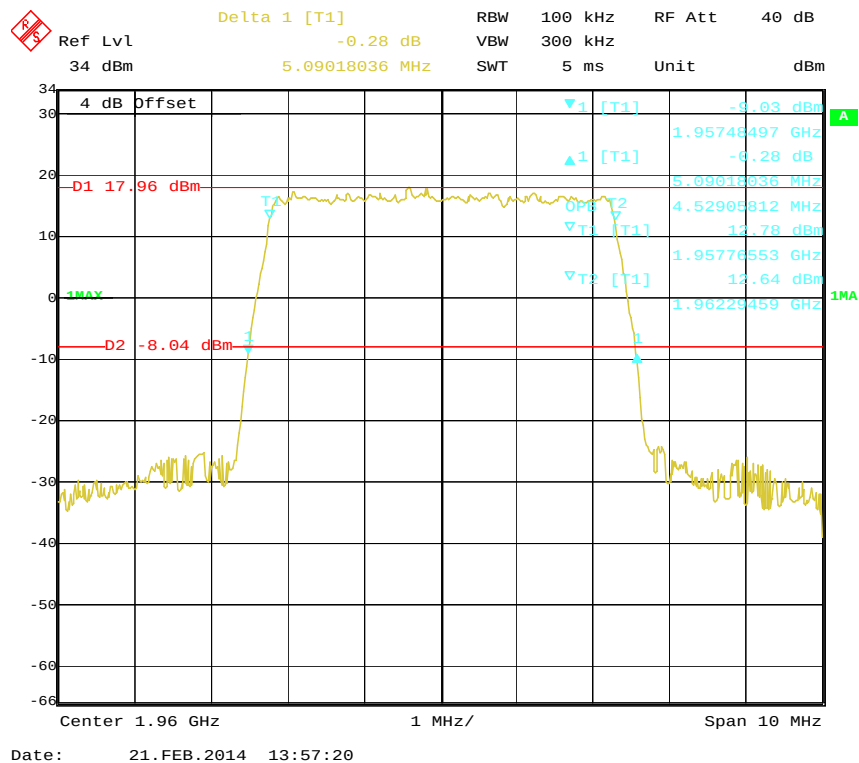
## 16QAM (5MHz) Mode, Output



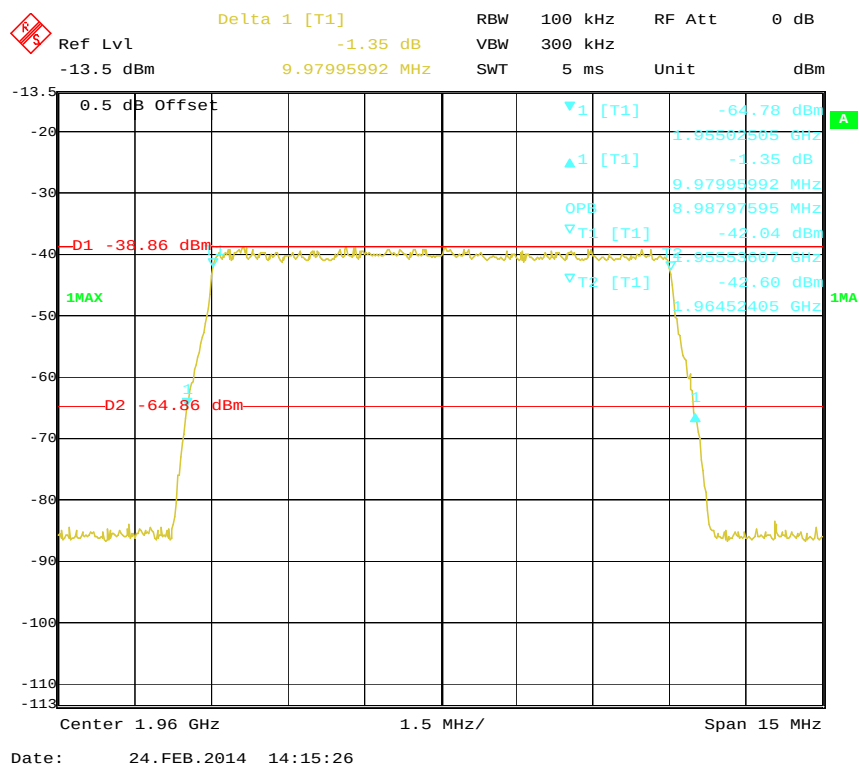
## 64QAM (5MHz) Mode, Input



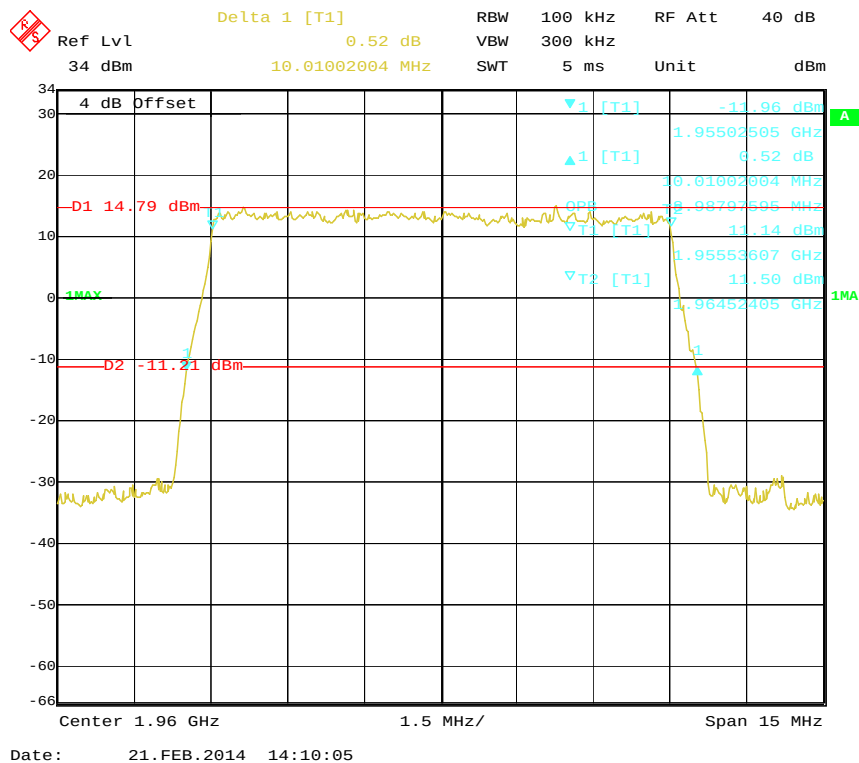
## 64QAM (5MHz) Mode, Output



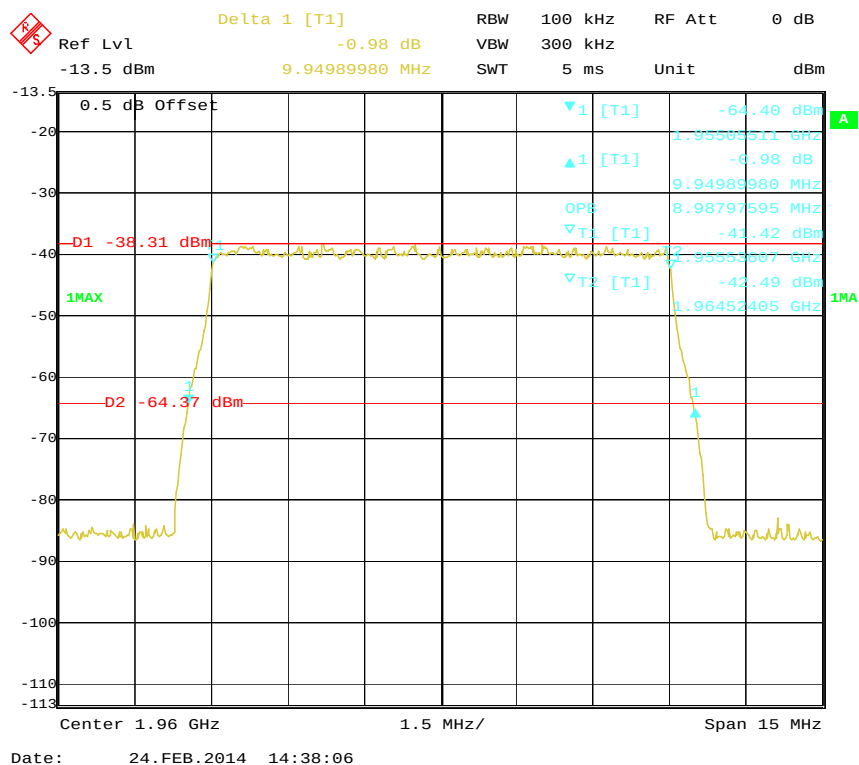
## QPSK (10MHz) Mode, Input



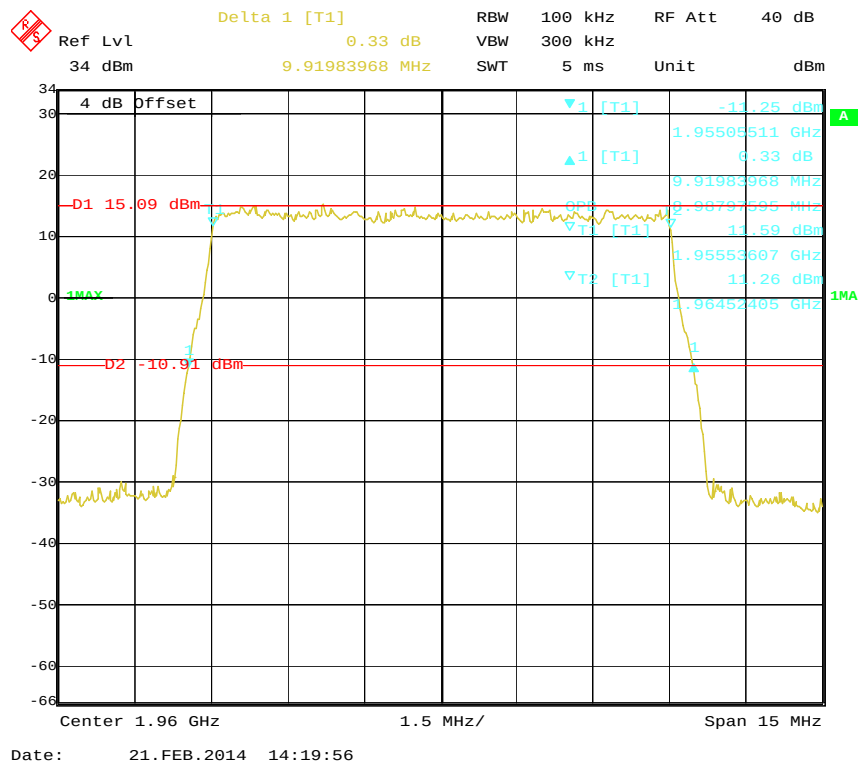
## QPSK (10MHz) Mode, Output



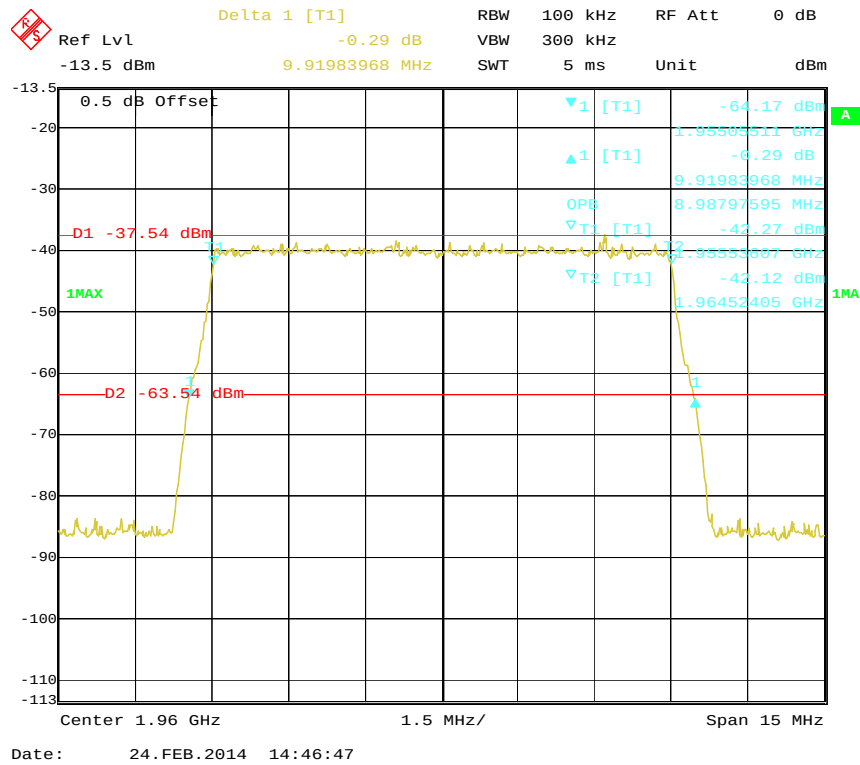
## 16QAM (10MHz) Mode, Input



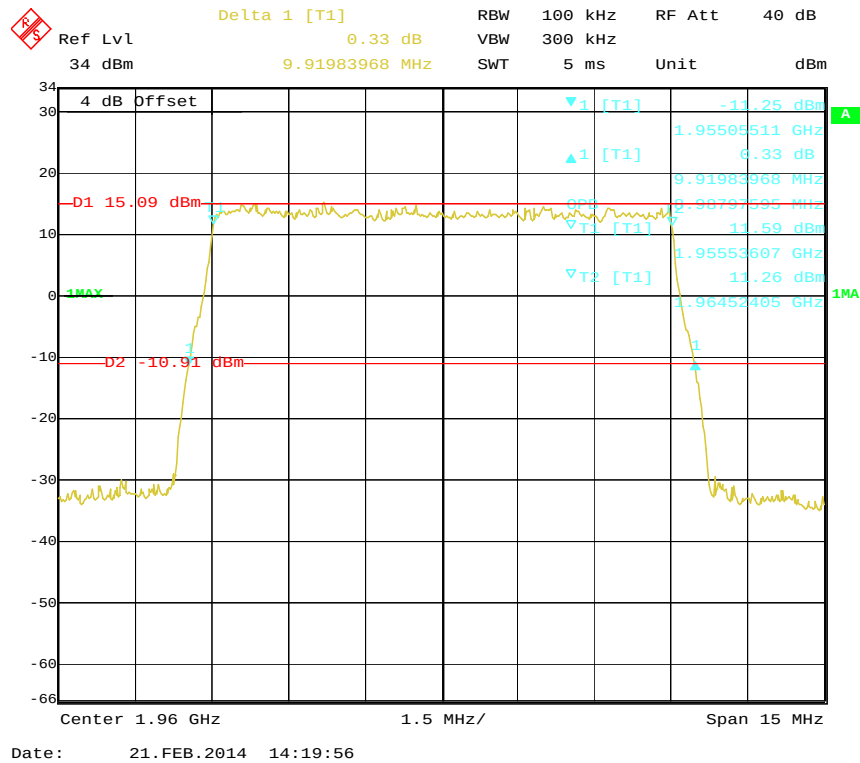
## 16QAM (10MHz) Mode, Output



## 64QAM (10MHz) Mode, Input

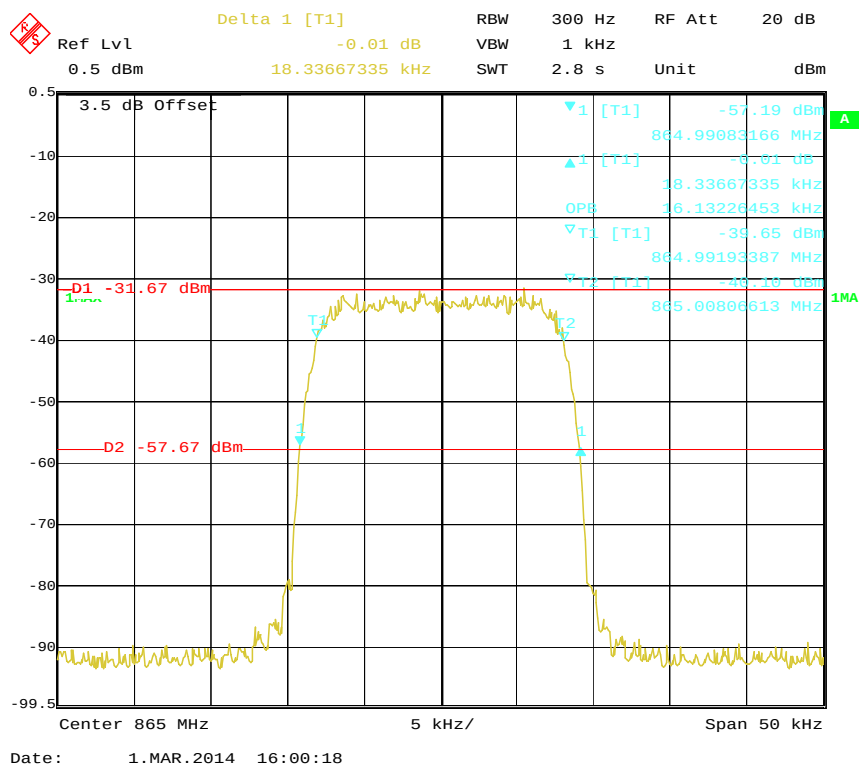


## 64QAM (10MHz) Mode, Output

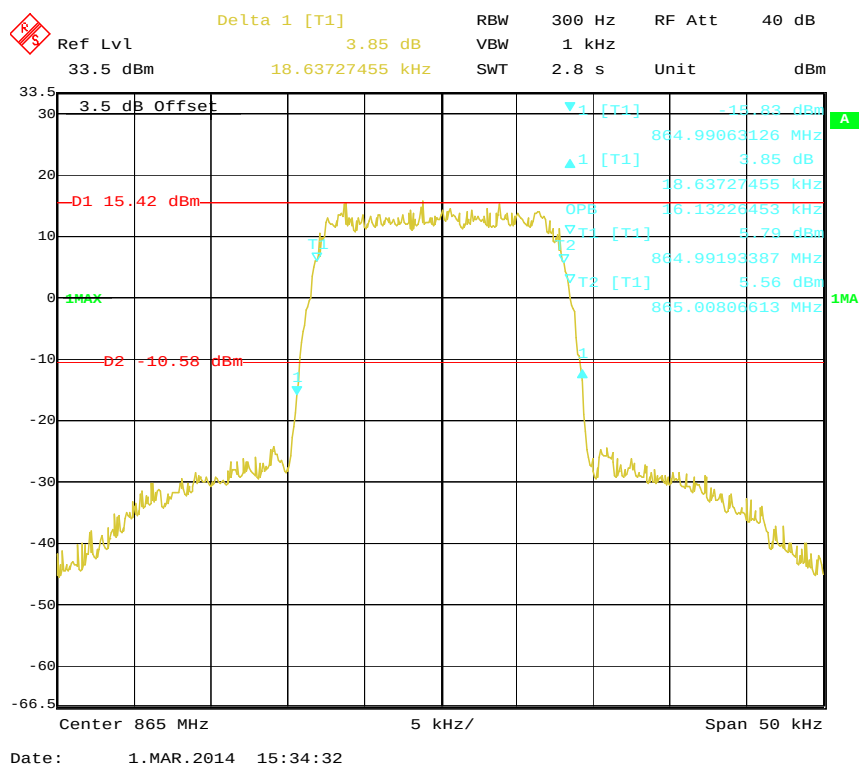


## 862-869MHz:

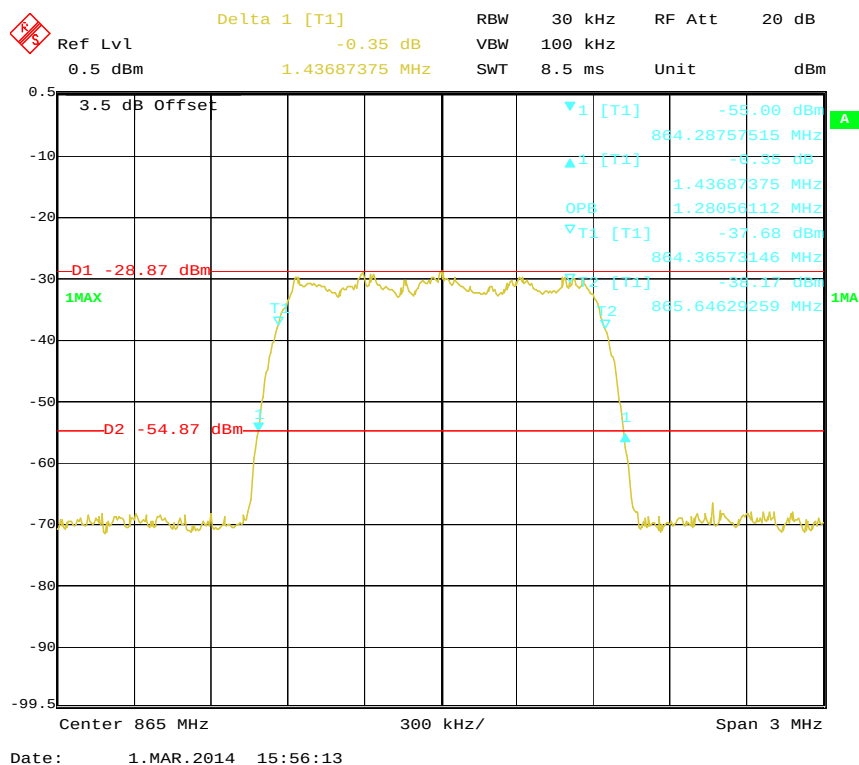
## IDEN Mode, Input



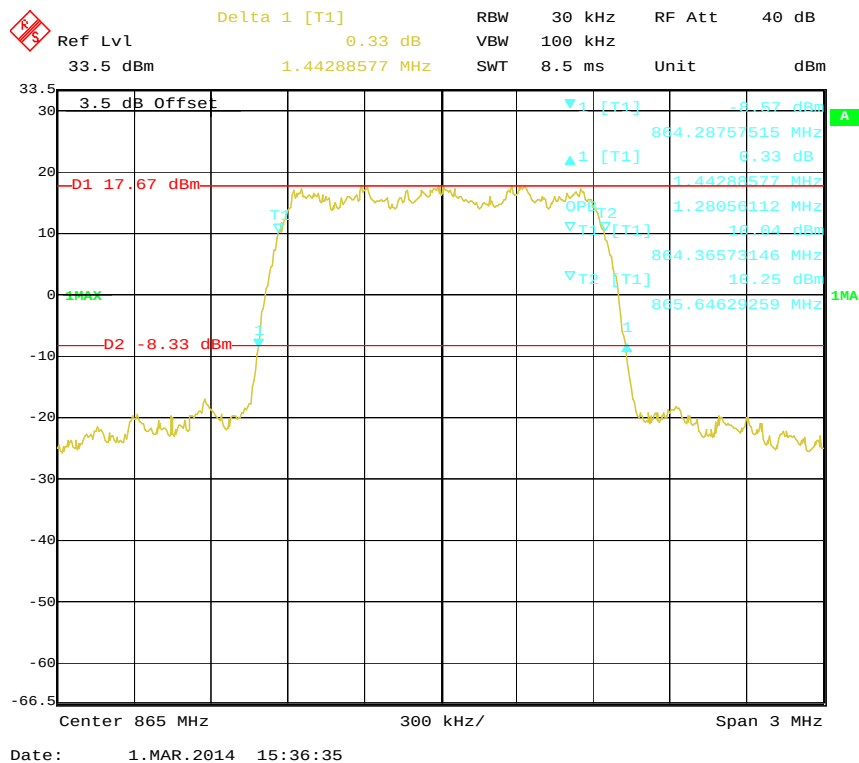
## IDEN Mode, Output



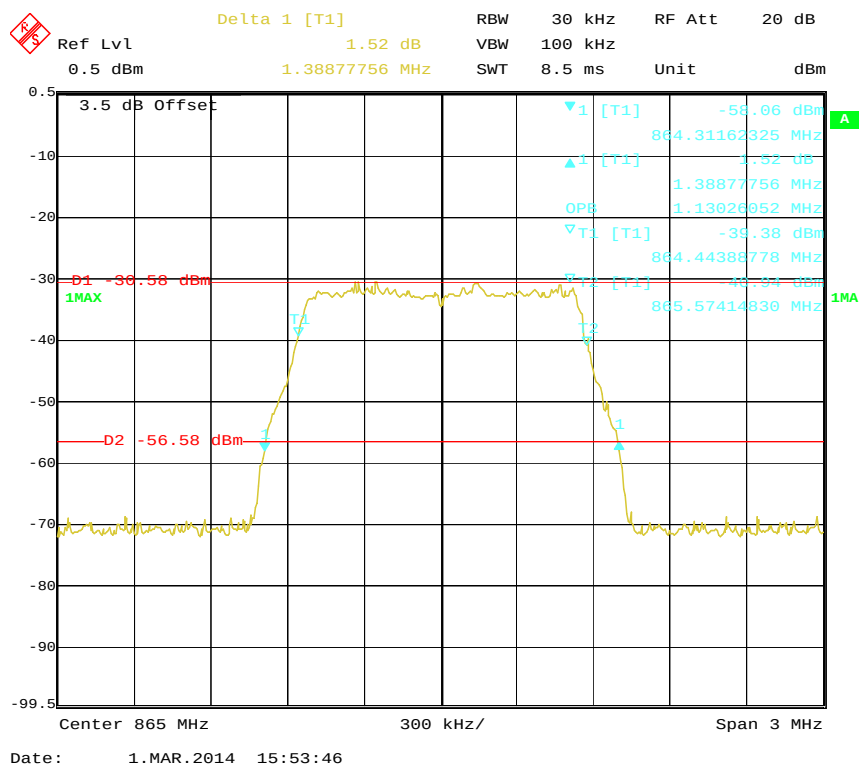
## CDMA Mode, Input



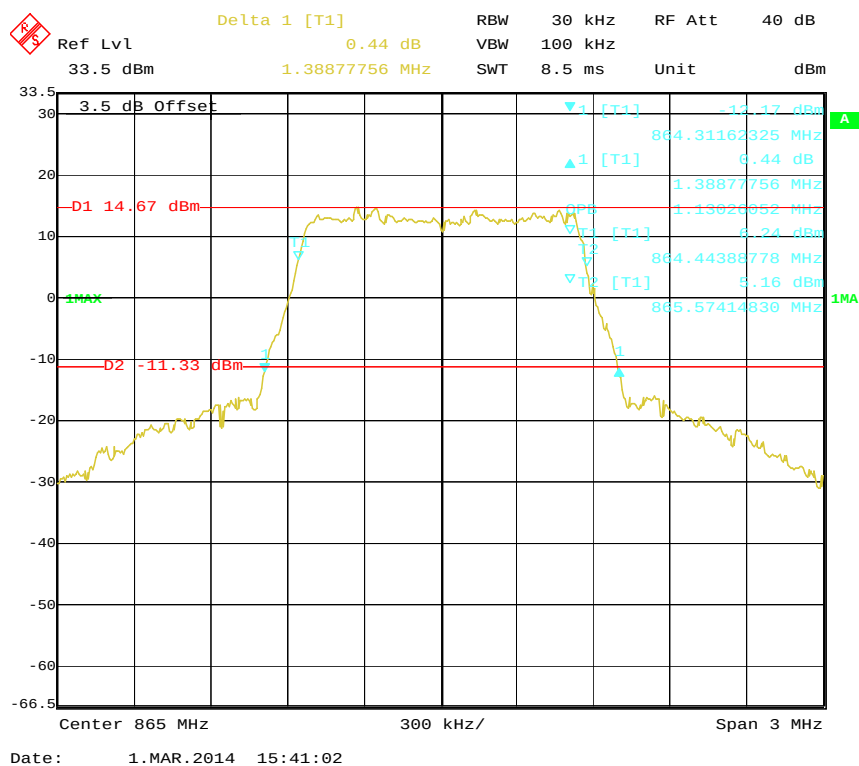
## CDMA Mode, Output



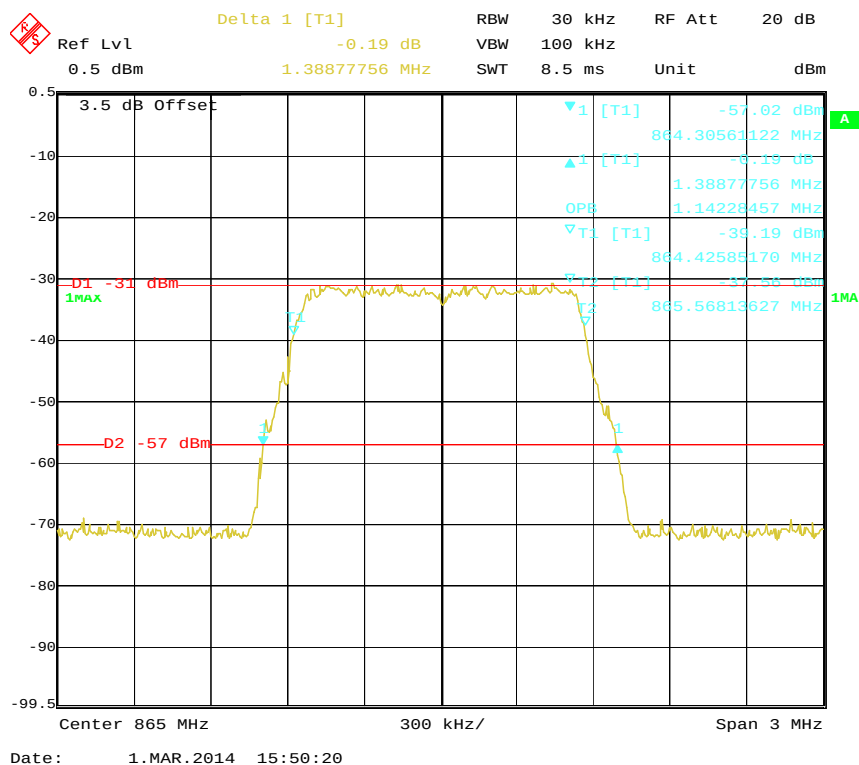
## QPSK (1.4MHz) Mode, Input



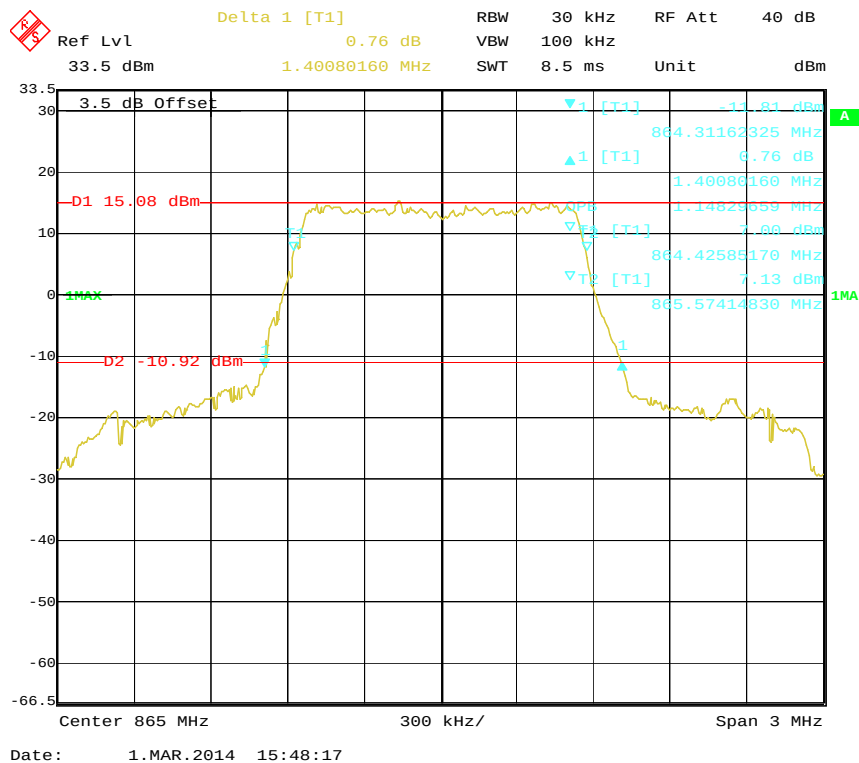
## QPSK (1.4MHz) Mode, Output



## 16QAM (1.4MHz) Mode, Input



## 16QAM (1.4MHz) Mode, Output



Ref Lvl 0.5 dBm

Delta 1 [T1] -0.99 dB

RBW 30 kHz VBW 100 kHz RF Att 20 dB

SWT 8.5 ms Unit dBm

3.5 dB Offset

D1 -56.04 dBm

1MAX

T1 [T1] -57.14 dBm

864.31763527 MHz

T1 [T1] -0.99 dB

1.38276553 MHz

OPB 1.13026952 MHz

T1 [T1] -35.60 dBm

864.44388778 MHz

T1 [T1] -35.07 dBm

865.57414830 MHz

1MAX

Center 865 MHz

300 kHz/

Span 3 MHz

Date: 1.MAR.2014 15:52:08

Ref Lvl 33.5 dBm Delta 1 [T1] 0.45 dB RBW 30 kHz RF Att 40 dB  
 33.5 dBm 1.38276553 MHz VBW 100 kHz SWT 8.5 ms Unit dBm

3.5 dB Offset

D1 15.52 dBm

D2 -10.48 dBm

1 [T1] 864.31763527 MHz 0.45 dB

1 [T1] 1.38276553 MHz 1.13020052 MHz 6.73 dBm

1 [T1] 864.44388778 MHz 6.64 dBm

1 [T1] 865.57414930 MHz

Center 865 MHz 300 kHz/ Span 3 MHz

Date: 1.MAR.2014 15:46:06

Ref Lvl 0.5 dBm Delta 1 [T1] -0.43 dB RBW 100 kHz RF Att 20 dB

0.5 dBm 3.13627255 MHz SWT 5 ms Unit dBm

3.5 dB Offset

-10 1 [T1] -54.71 dBm 863.43186373 MHz

-20 1 [T1] -0.43 dB 3.13627255 MHz

-20 OPB 2.76553106 MHz

-30 1 [T1] -36.20 dBm 863.62224449 MHz

-30 D1 -28.16 dBm

-40 1 [T1] -36.18 dBm 863.38777555 MHz

-50 D2 -54.16 dBm

-60 1 [T1] -36.18 dBm 863.38777555 MHz

-70 1 [T1] -36.18 dBm 863.38777555 MHz

-80 1 [T1] -36.18 dBm 863.38777555 MHz

-90 1 [T1] -36.18 dBm 863.38777555 MHz

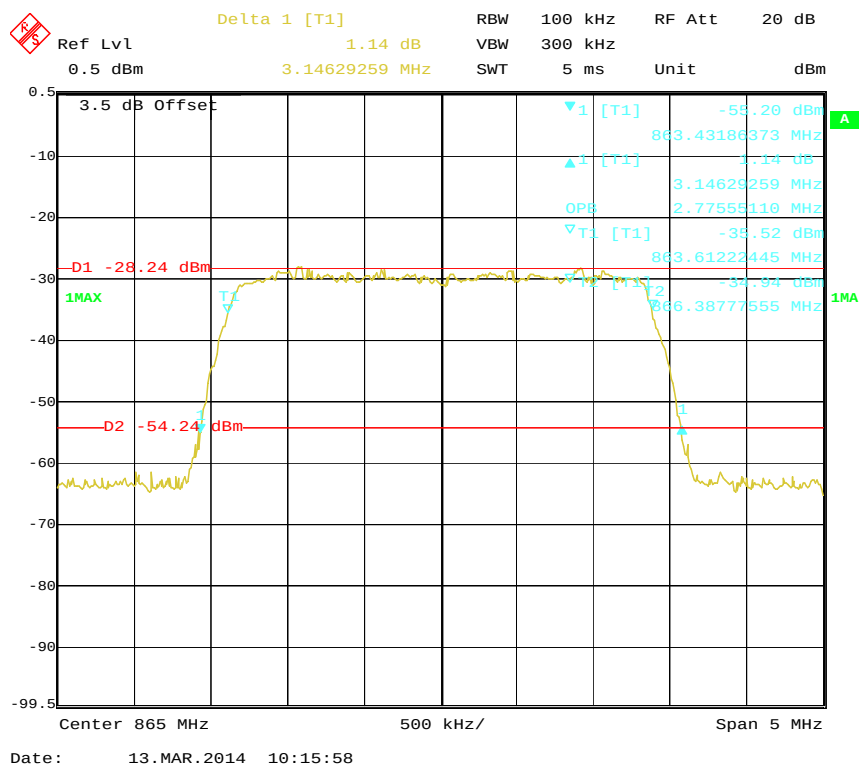
-99.5 1 [T1] -36.18 dBm 863.38777555 MHz

Center 865 MHz 500 kHz/ Span 5 MHz

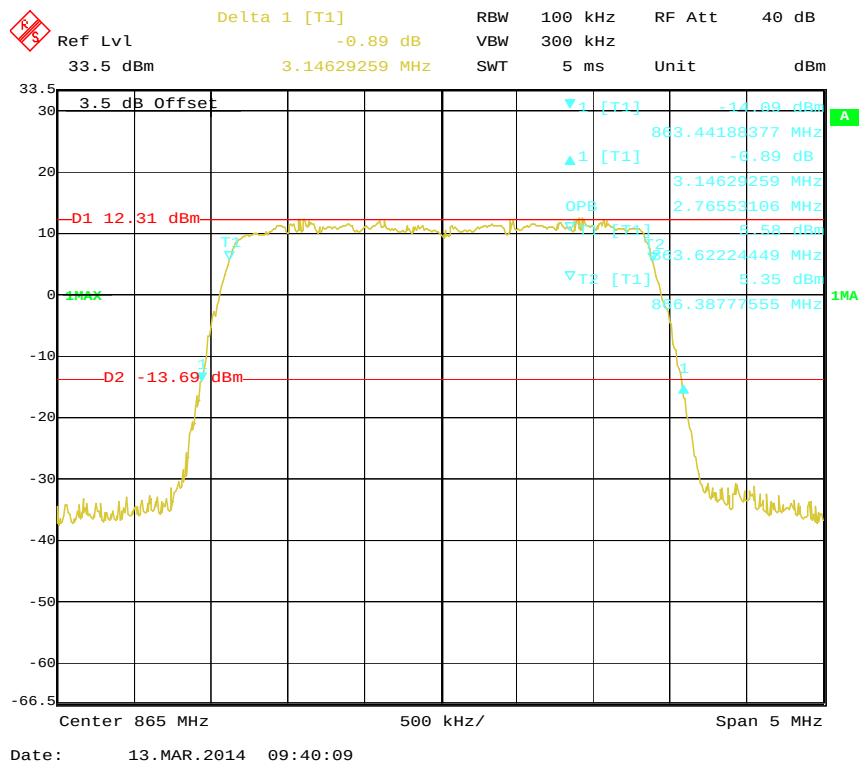
Date: 13.MAR.2014 10:08:54

Delta 1 [T1] 0.47 dB  
 RBW 100 kHz RF Att 40 dB  
 Ref Lvl 33.5 dBm 3.13627255 MHz SWT 5 ms Unit dBm  
 3.5 dB Offset  
 -D1 12.56 dBm  
 -D2 -13.44 dBm  
 1 [T1] -14.88 dBm  
 863.44188377 MHz  
 0.47 dB  
 3.13627255 MHz  
 2.75551102 MHz  
 0.46 dBm  
 863.63226453 MHz  
 4.99 dBm  
 865.38777555 MHz  
 Center 865 MHz 500 kHz/ Span 5 MHz  
 Date: 13.MAR.2014 09:31:07

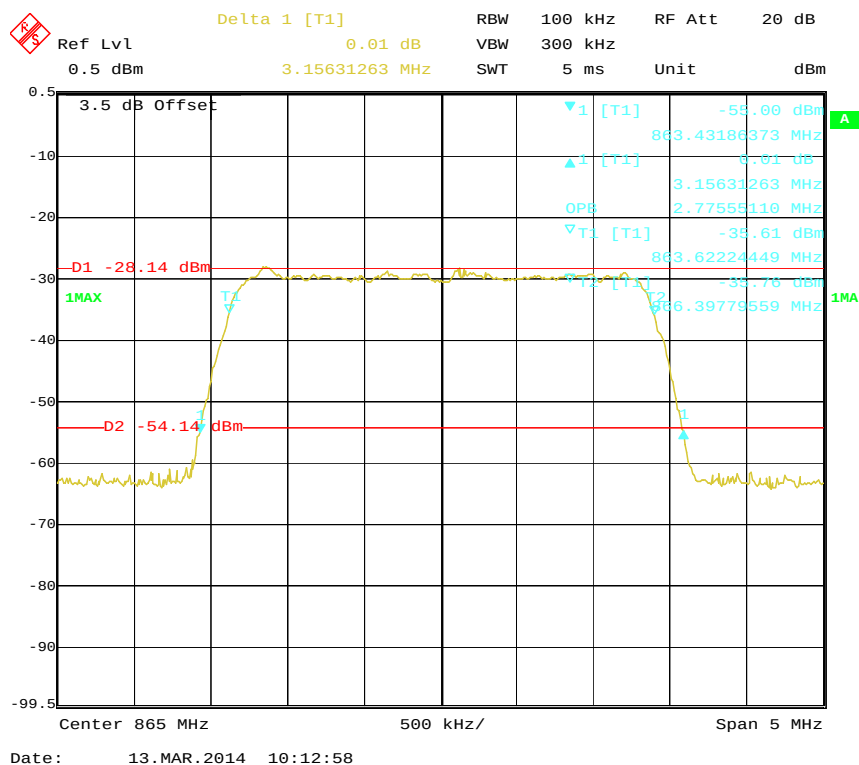
## 16QAM (3MHz) Mode, Input



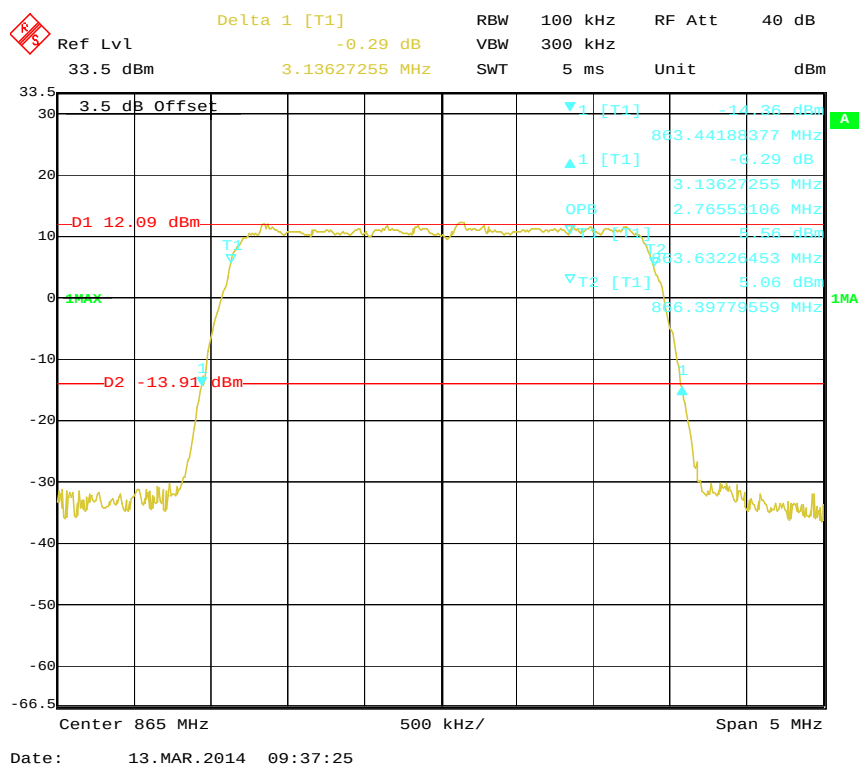
## 16QAM (3MHz) Mode, Output



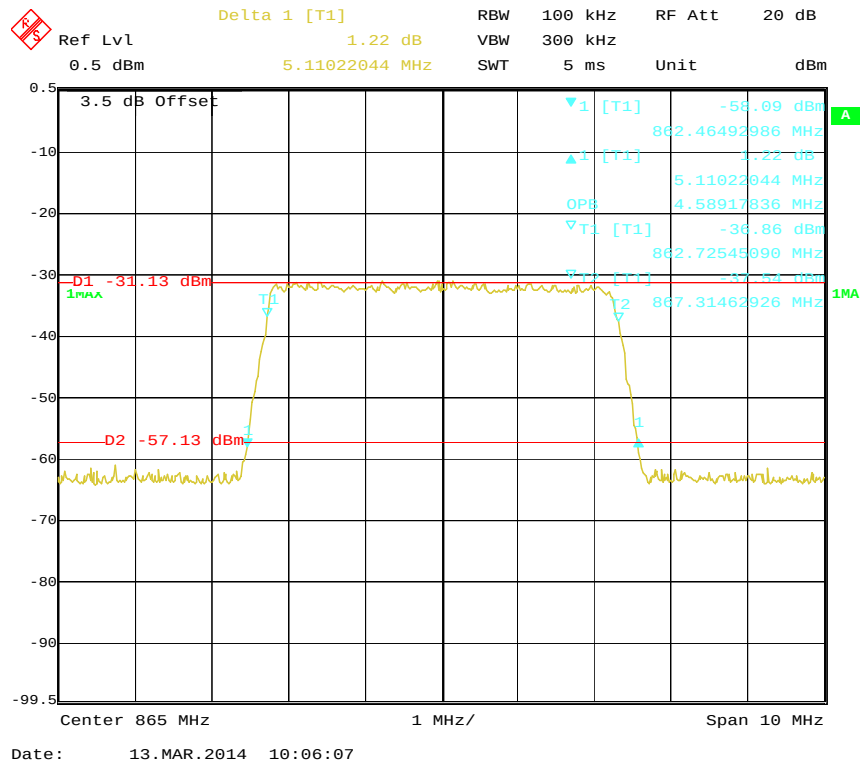
## 64QAM (3MHz) Mode, Input



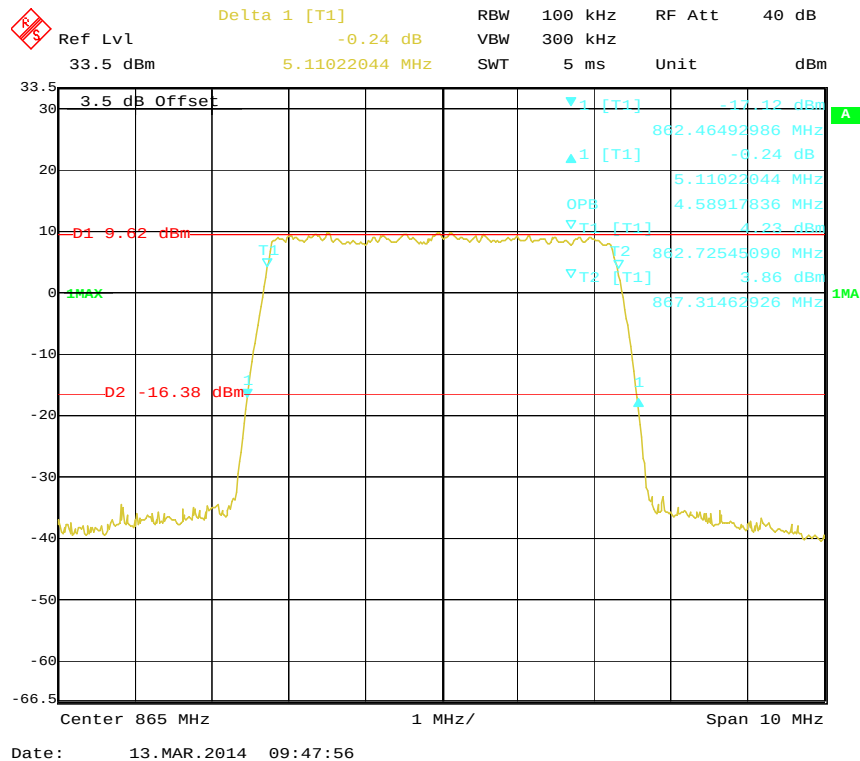
## 64QAM (3MHz) Mode, Output



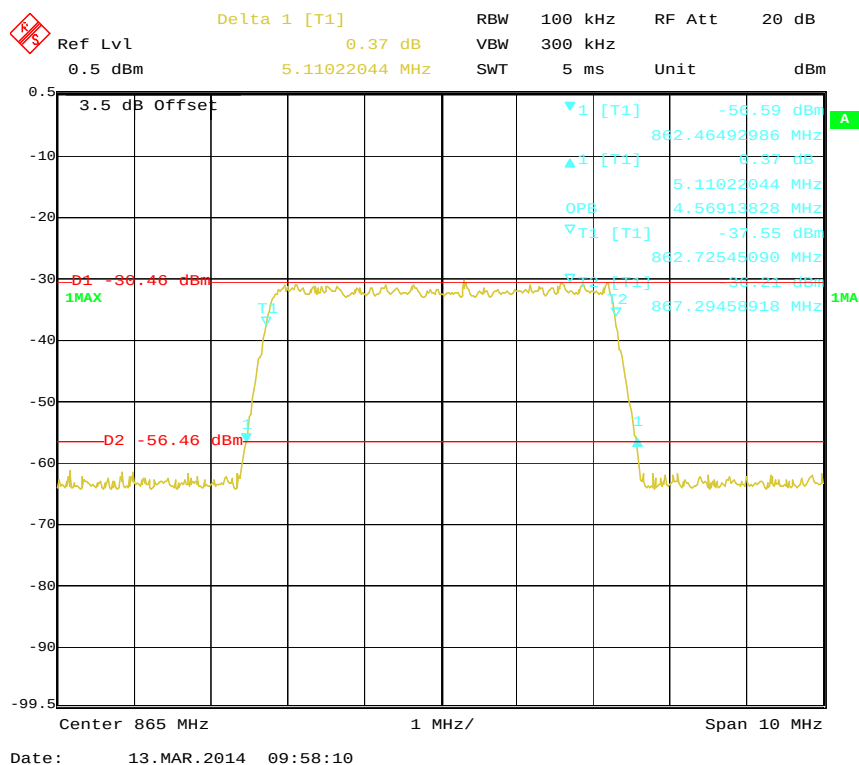
## QPSK (5MHz) Mode, Input



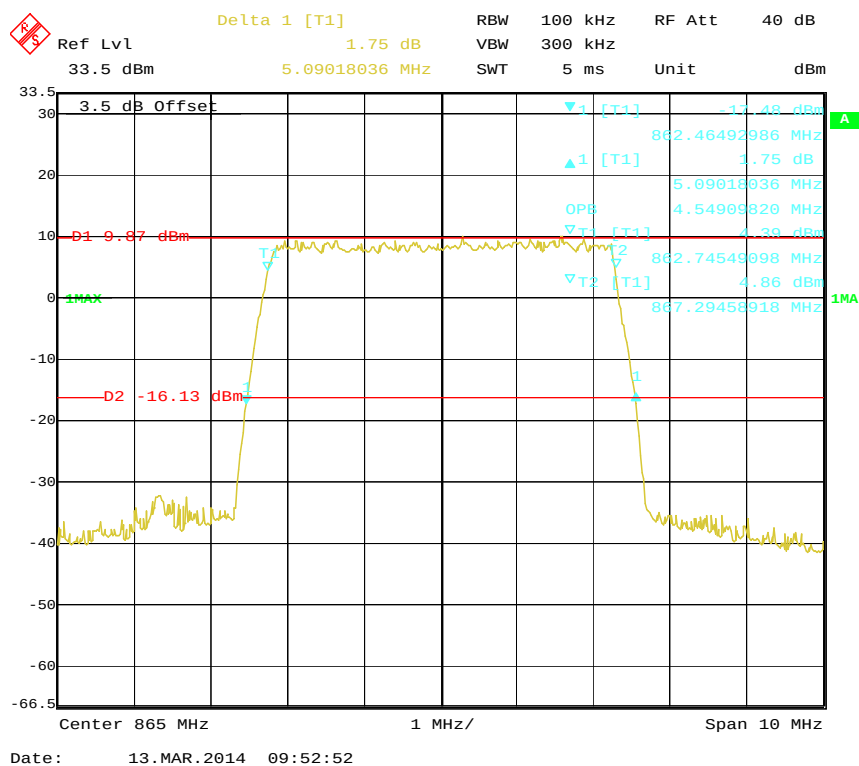
## QPSK (5MHz) Mode, Output



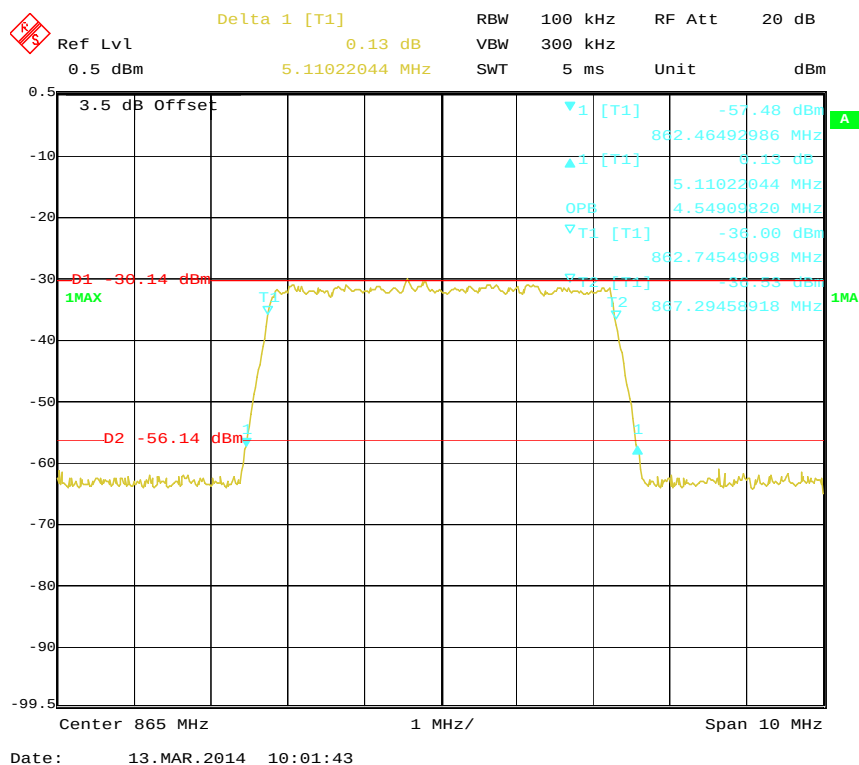
## 16QAM (5MHz) Mode, Input



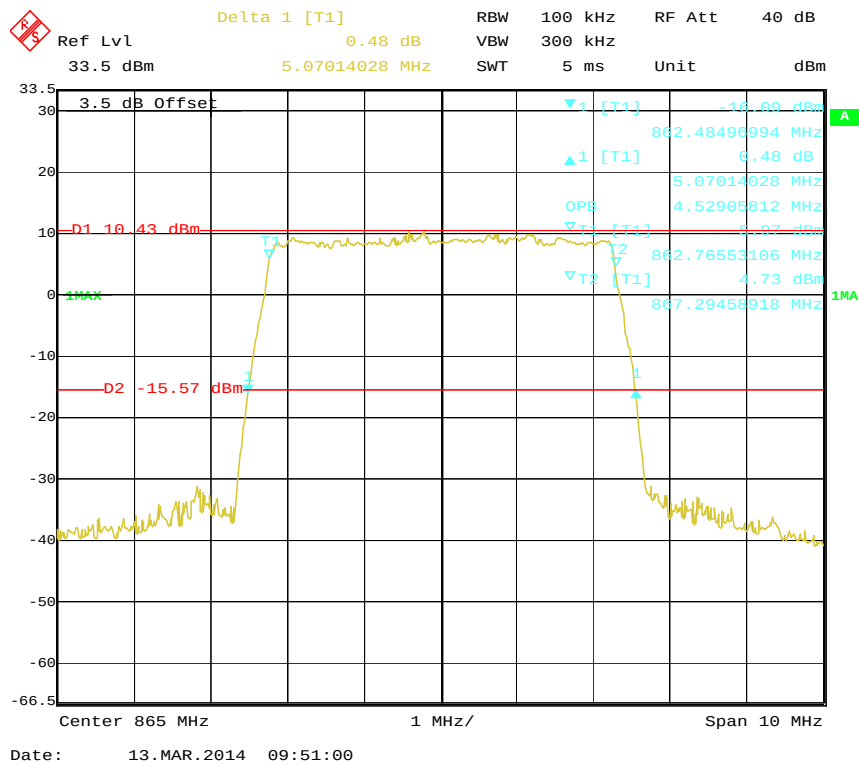
## 16QAM (5MHz) Mode, Output



## 64QAM (5MHz) Mode, Input



## 64QAM (5MHz) Mode, Output



## FCC §90.691 – EMISSION MASK

### Applicable Standard

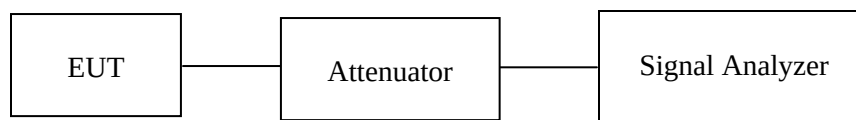
As per FCC §90.691 Emission mask requirements for EA-based systems

- (a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
- (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \log_{10}(f/6.1)$  decibels or  $50 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
  - (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.
- (b) (b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

### Test Procedure

The RF output of the transmitter was connected to spectrum analyzer through appropriate attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emission up to 10<sup>th</sup> harmonic.



### Test Equipment List and Details

| Manufacturer    | Description                 | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|-----------|------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26    | 8386001028 | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C    | US41461205 | 2013-11-12       | 2014-11-12           |

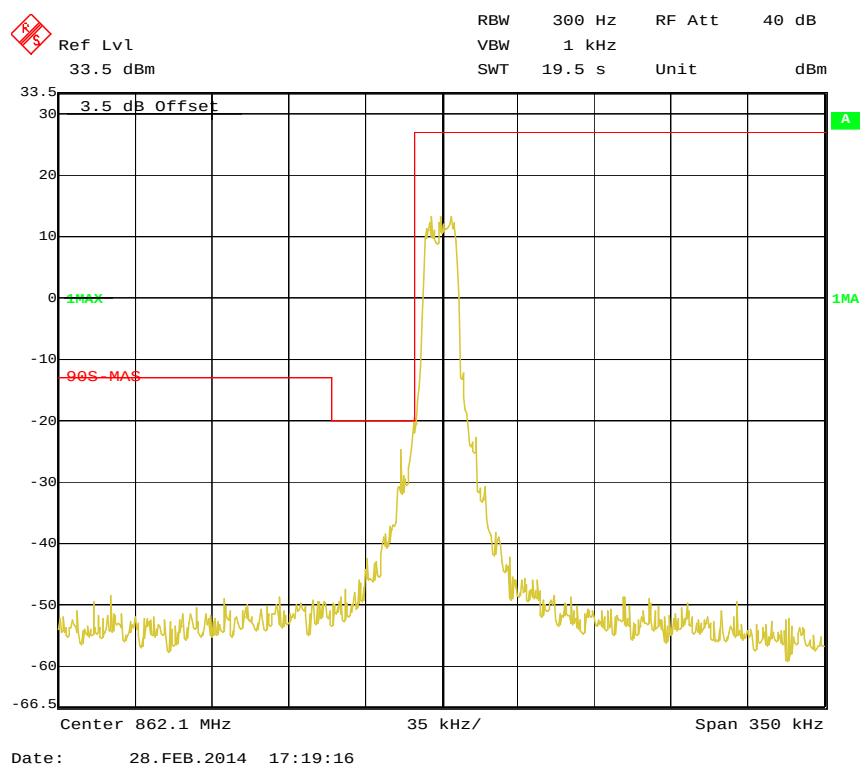
\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

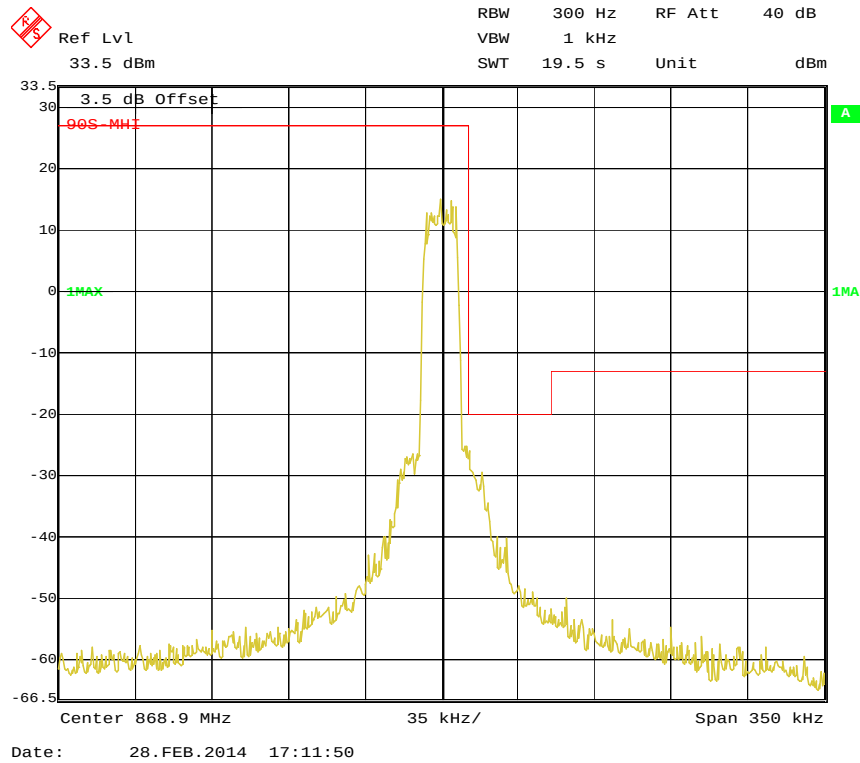
|                    |           |
|--------------------|-----------|
| Temperature:       | 24 °C     |
| Relative Humidity: | 53 %      |
| ATM Pressure:      | 101.0 kPa |

The testing was performed by Rocky Kang on 2014-02-28.

Test Mode: Transmitting

**SMR Band, Low Channel**

# SMR Band, High Channel



## FCC §2.1051 & §24.238 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

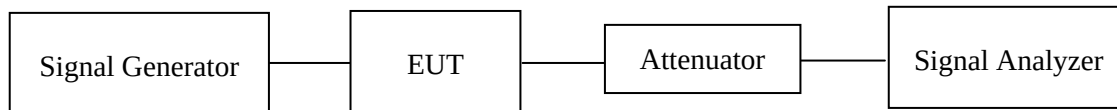
### Applicable Standard

FCC §2.1051 and §24.238

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Equipment List and Details

| Manufacturer    | Description                 | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26 | 8386001028    | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

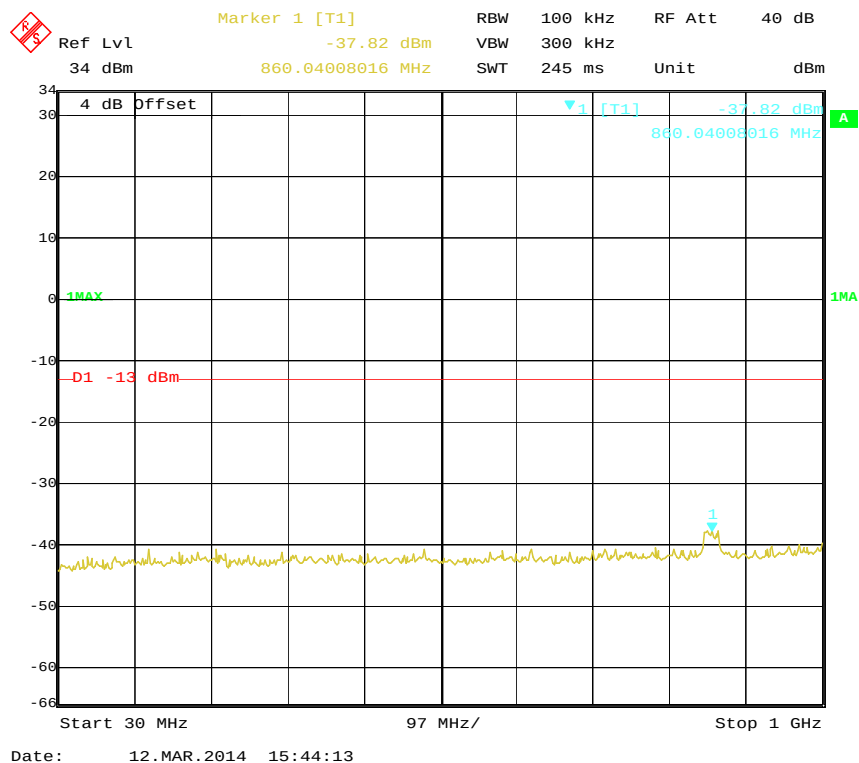
|                    |            |
|--------------------|------------|
| Temperature:       | 20 ~ 26 °C |
| Relative Humidity: | 48 ~ 56 %  |
| ATM Pressure:      | 101.0 kPa  |

The testing was performed by Rocky Kang from 2014-02-24 to 2014-05-06.

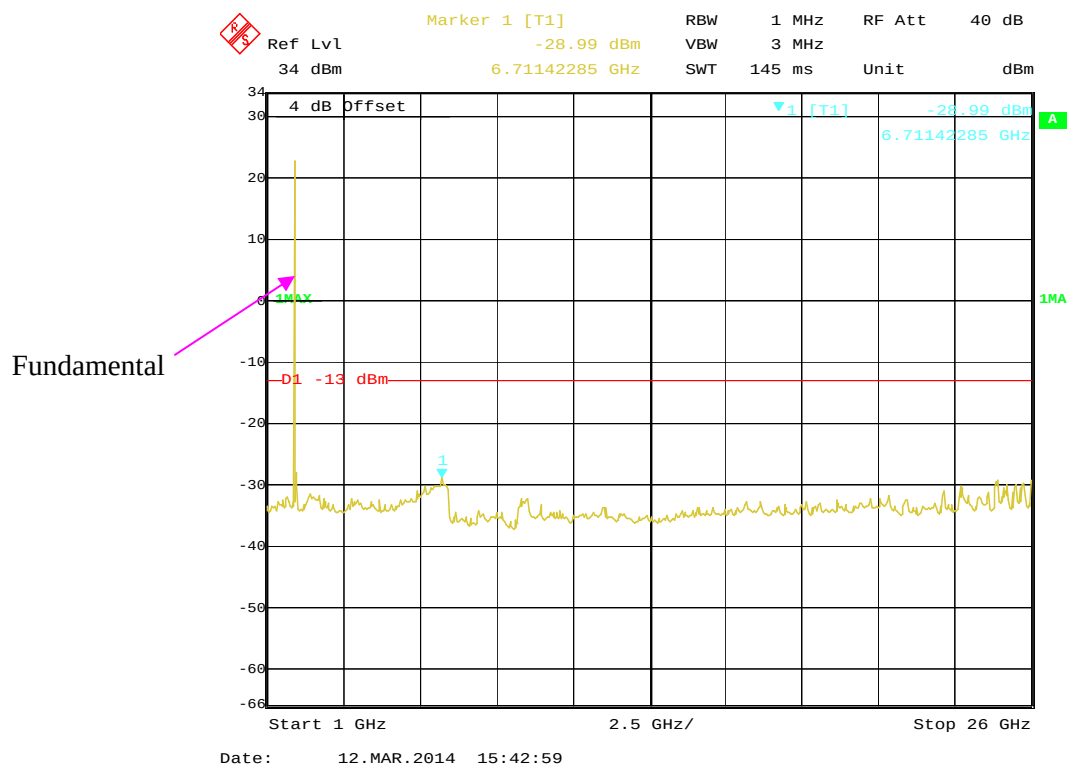
Test result: Compliance, please refer to the following plots.

1930 ~ 1995 MHz:

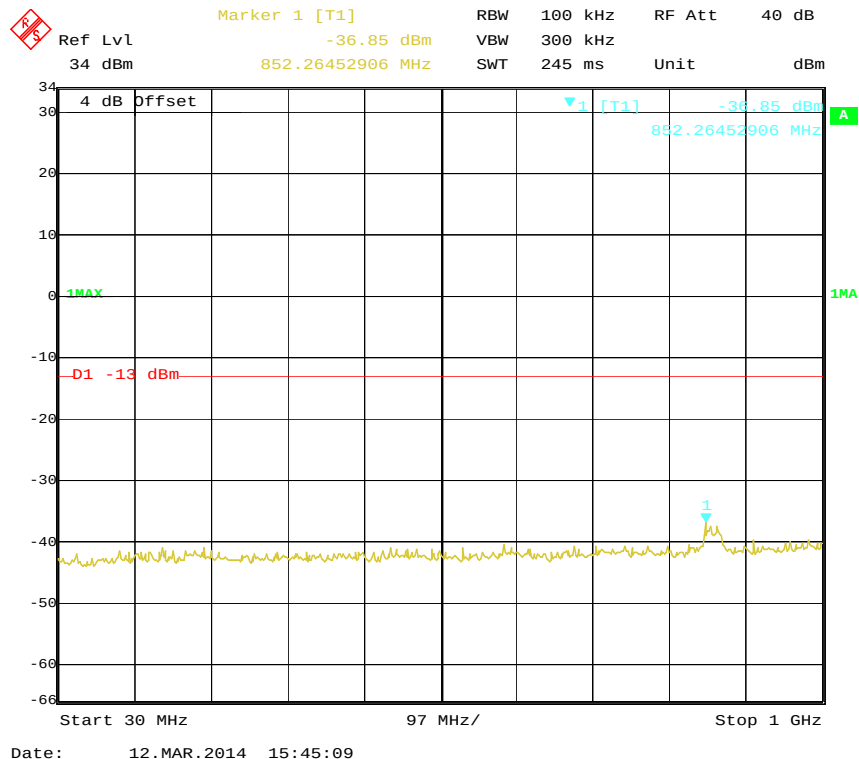
## PCS Mode: 30 MHz – 1 GHz (Low Channel)



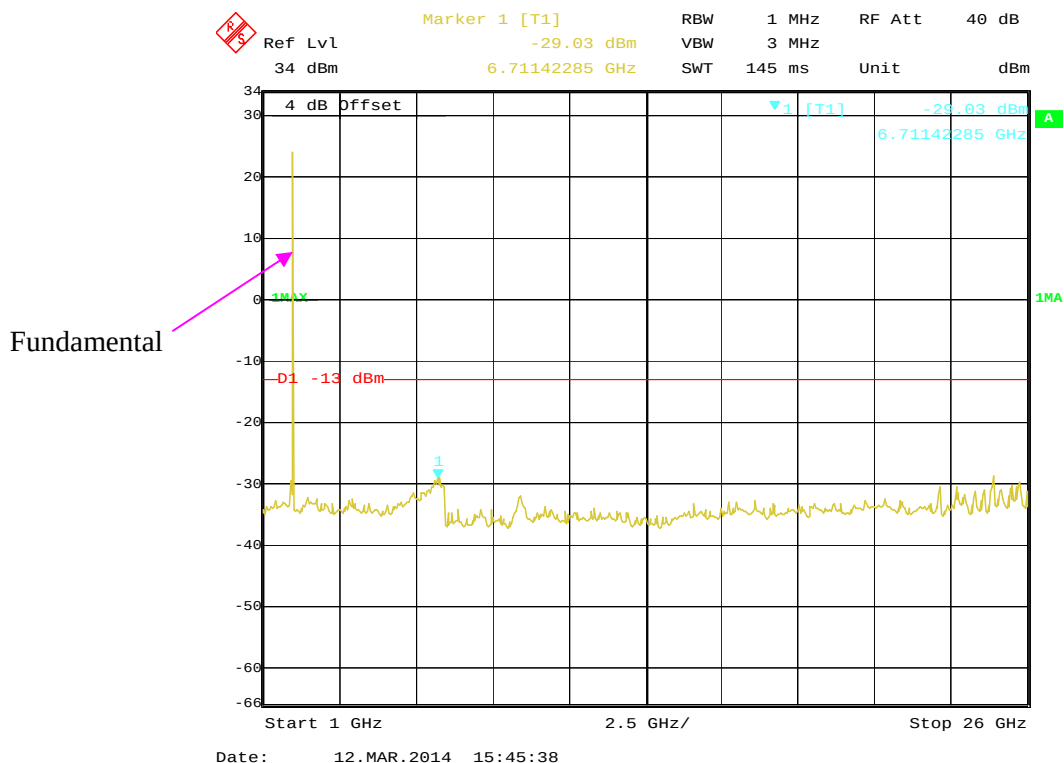
## PCS Mode: 1 GHz – 26 GHz (Low Channel)

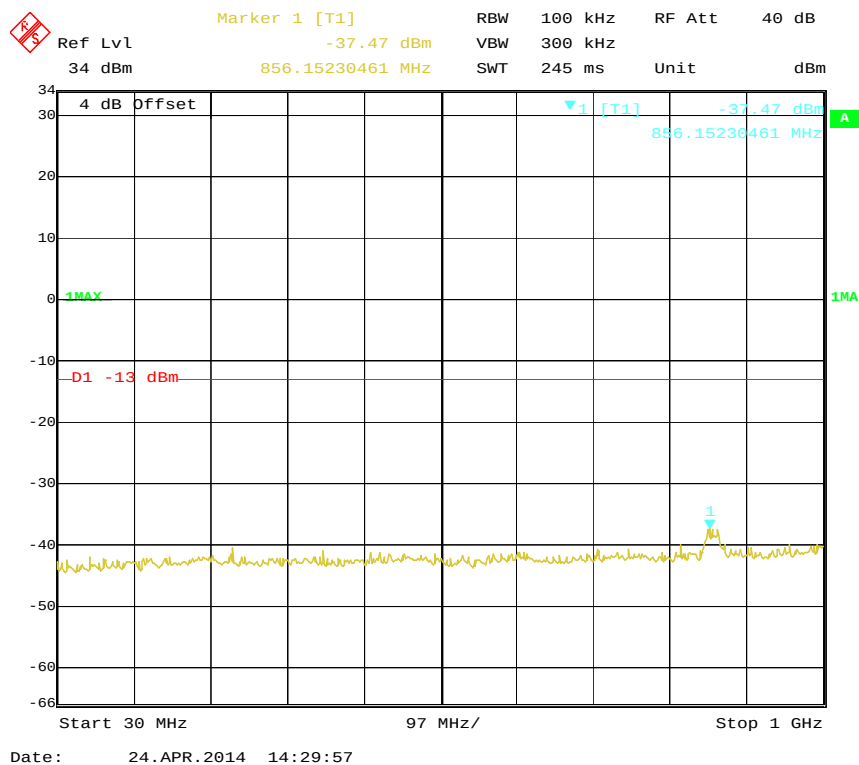
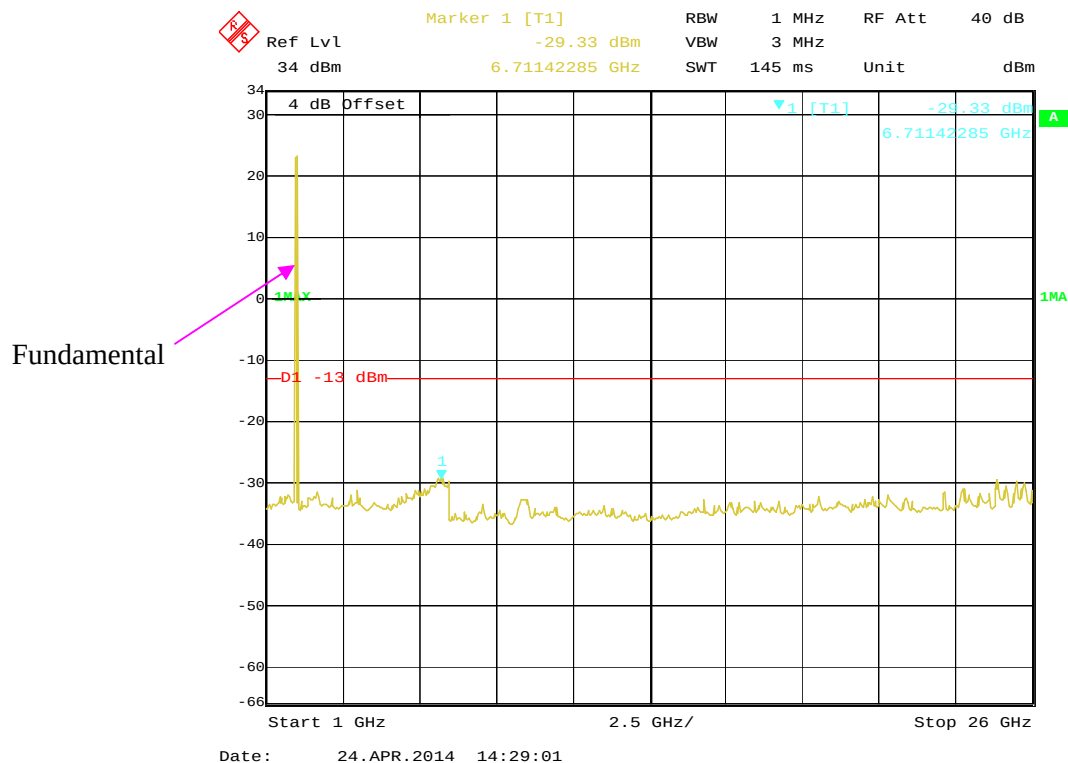


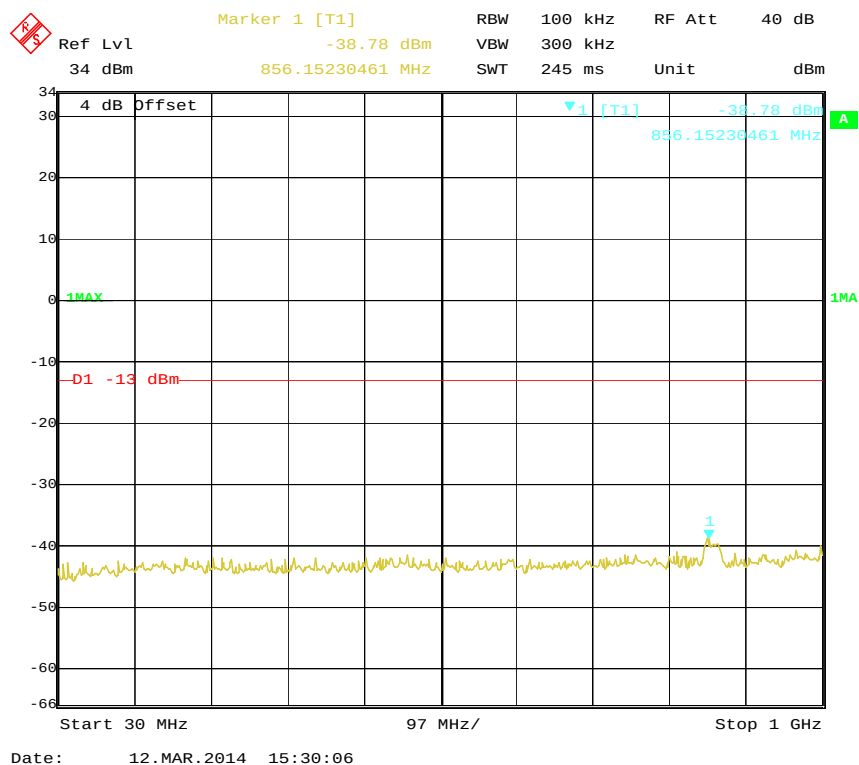
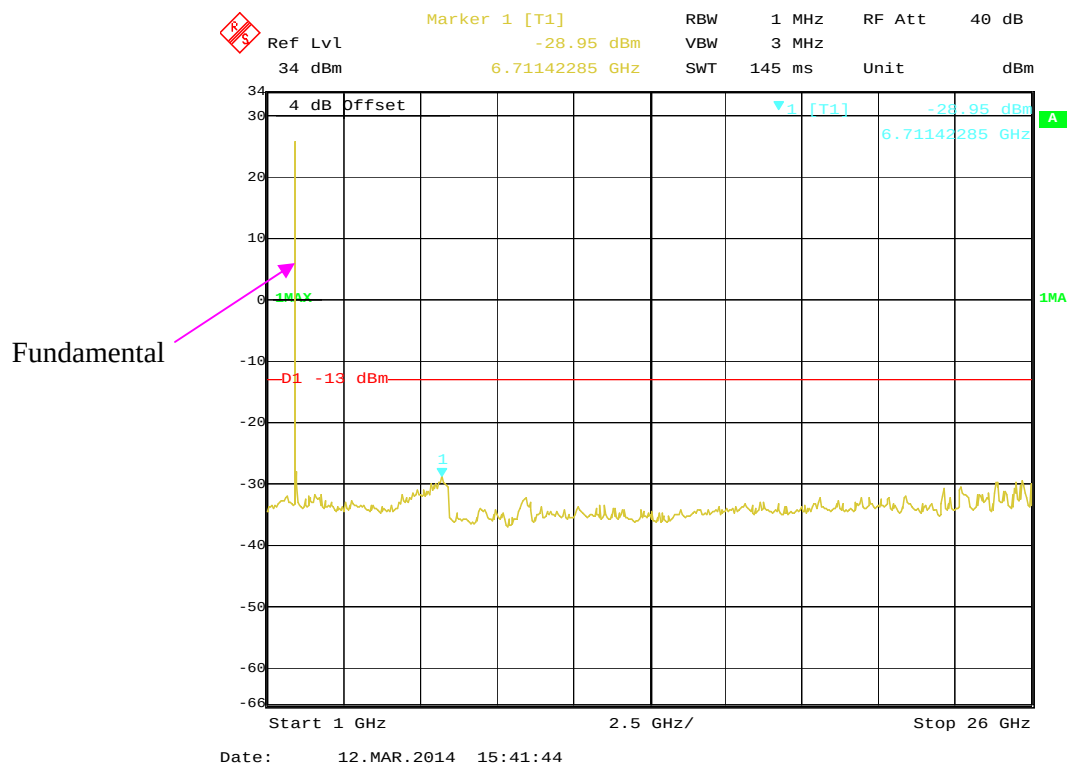
## PCS Mode: 30 MHz – 1 GHz (Middle Channel)

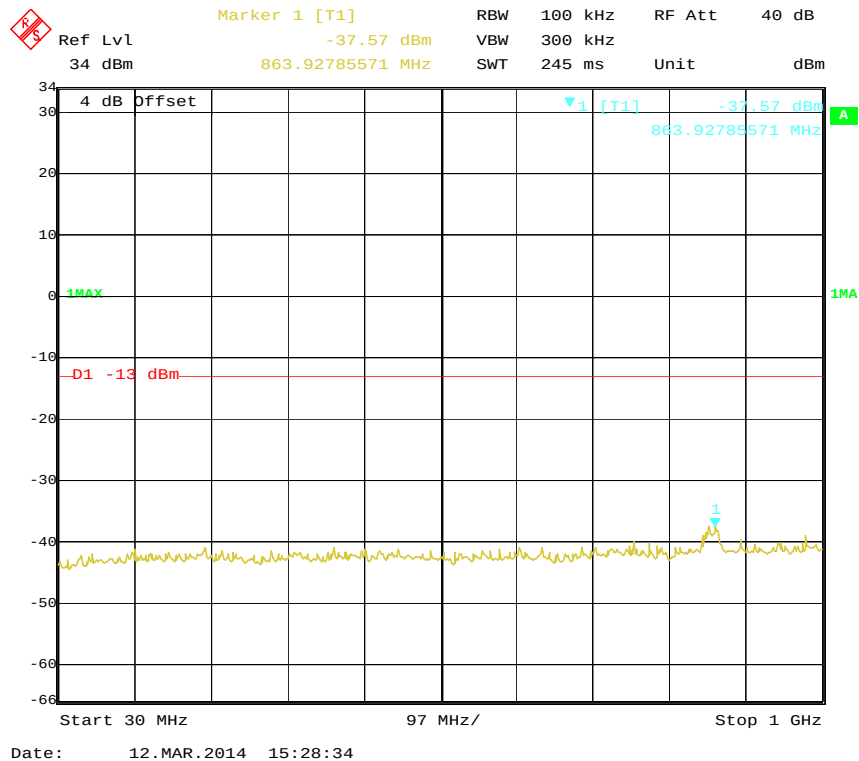
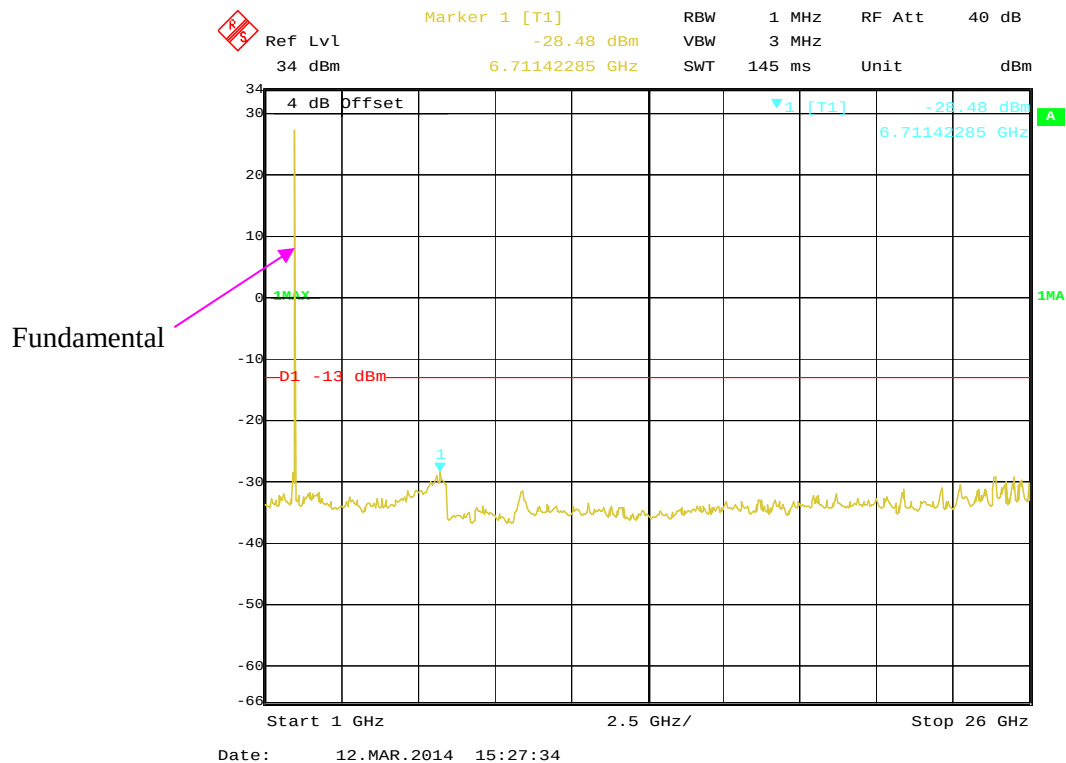


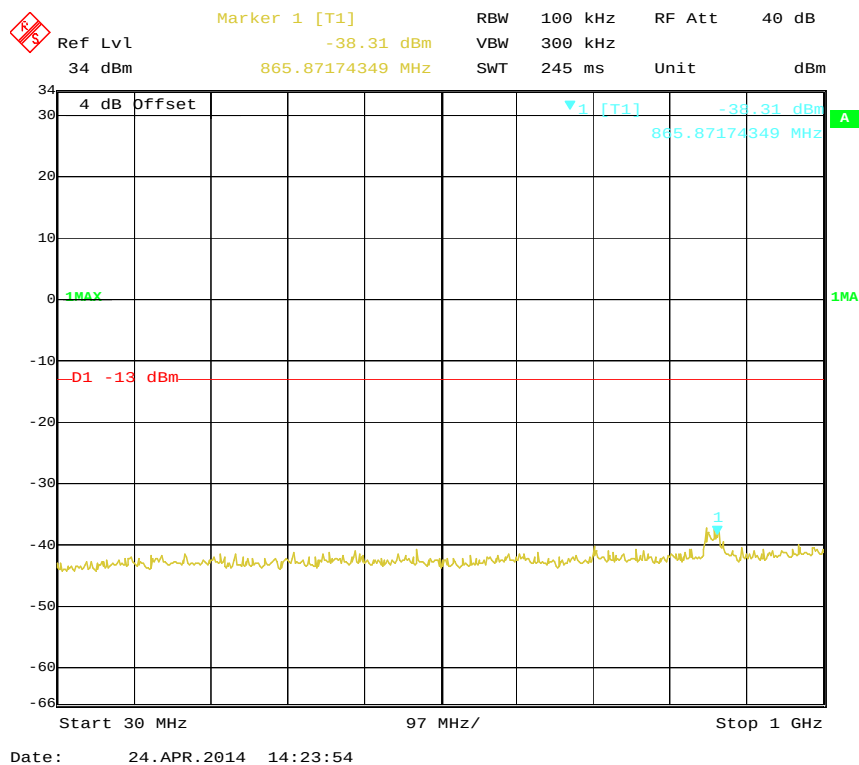
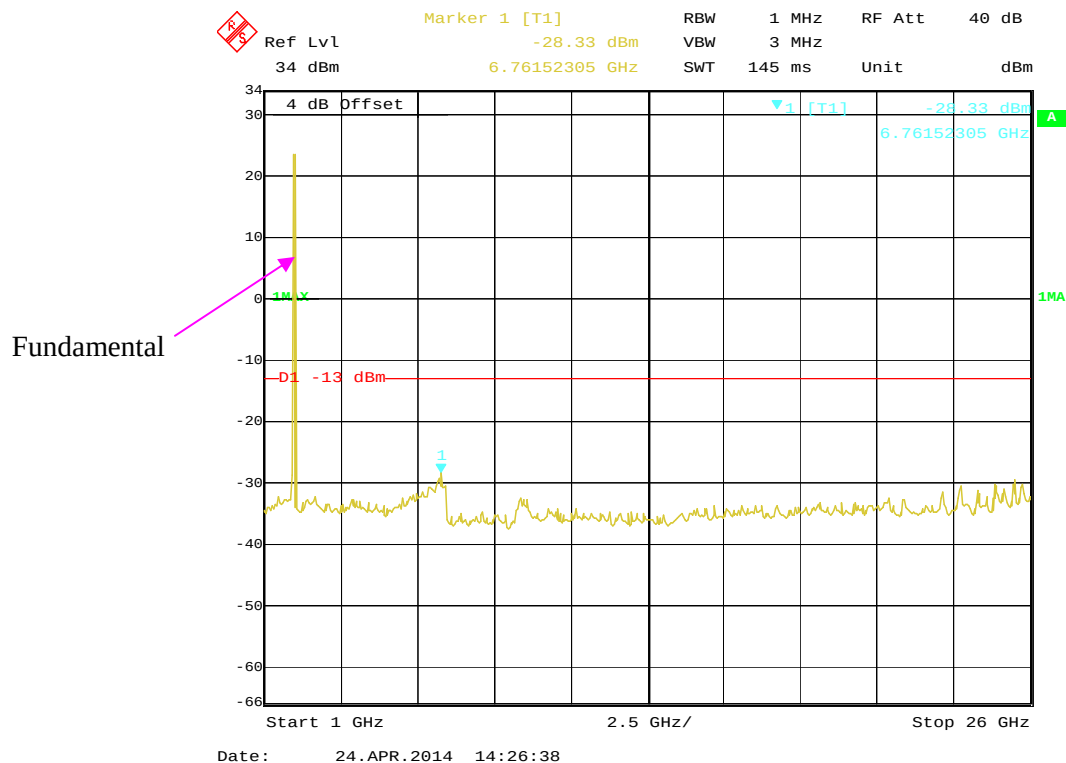
## PCS Mode: 1 GHz – 26 GHz (Middle Channel)



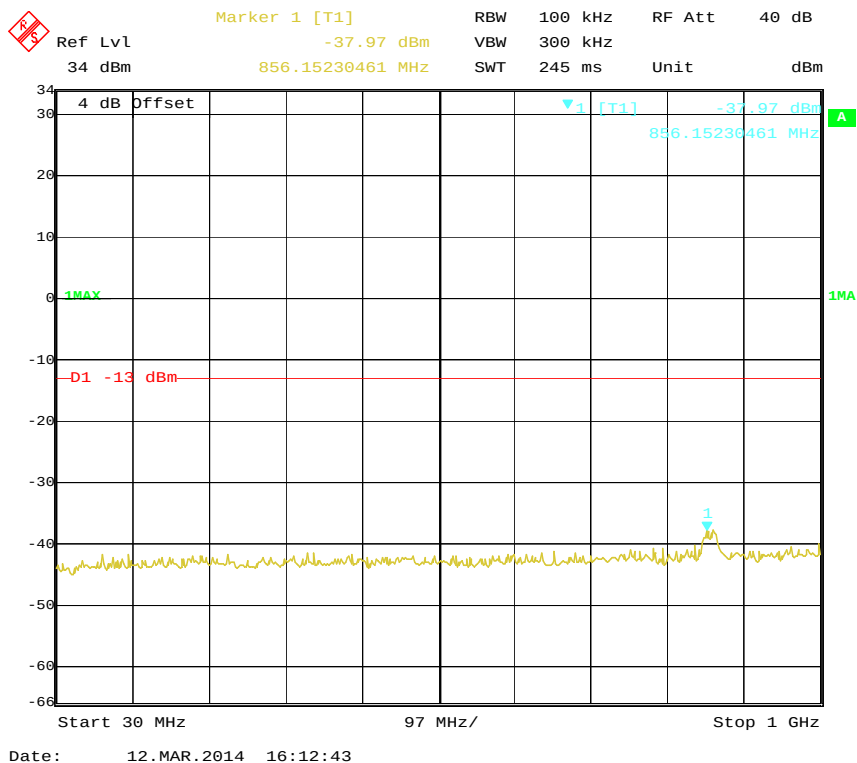
**PCS Mode: 30 MHz – 1 GHz (High Channel)****PCS Mode: 1 GHz – 26 GHz (High Channel)**

**EDGE Mode: 30 MHz – 1 GHz (Low Channel)****EDGE Mode: 1 GHz – 26 GHz (Low Channel)**

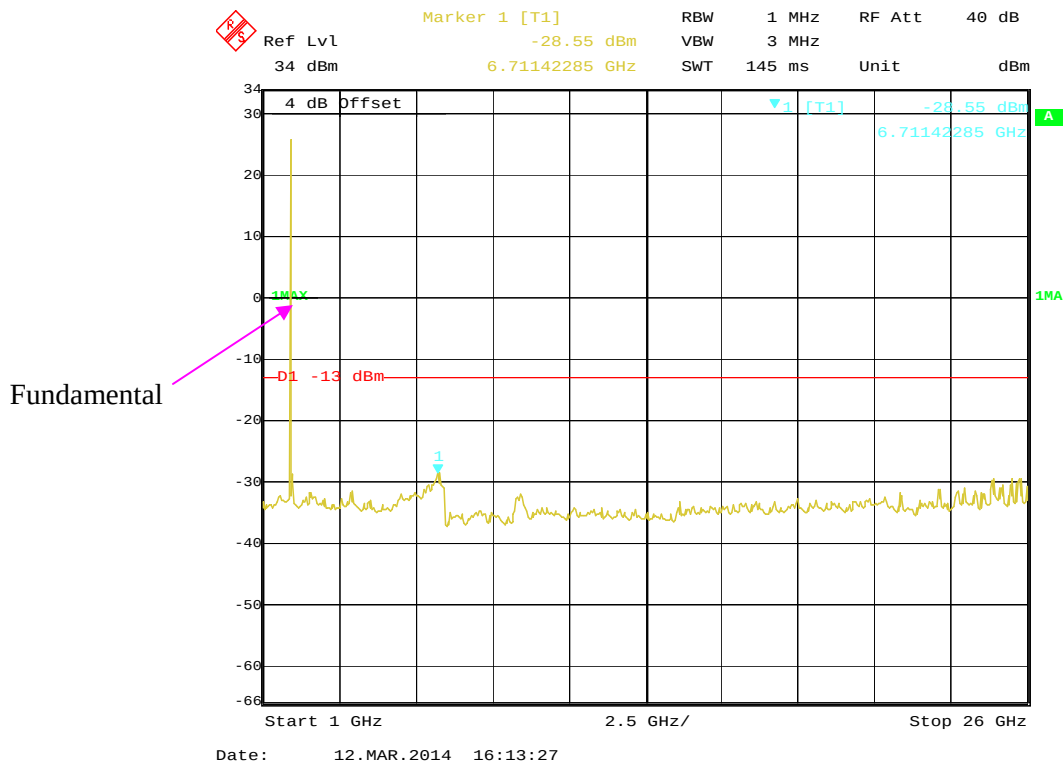
**EDGE Mode: 30 MHz – 1 GHz (Middle Channel)****EDGE Mode: 1 GHz – 26 GHz (Middle Channel)**

**EDGE Mode: 30 MHz – 1 GHz (High Channel)****EDGE Mode: 1 GHz – 26 GHz (High Channel)**

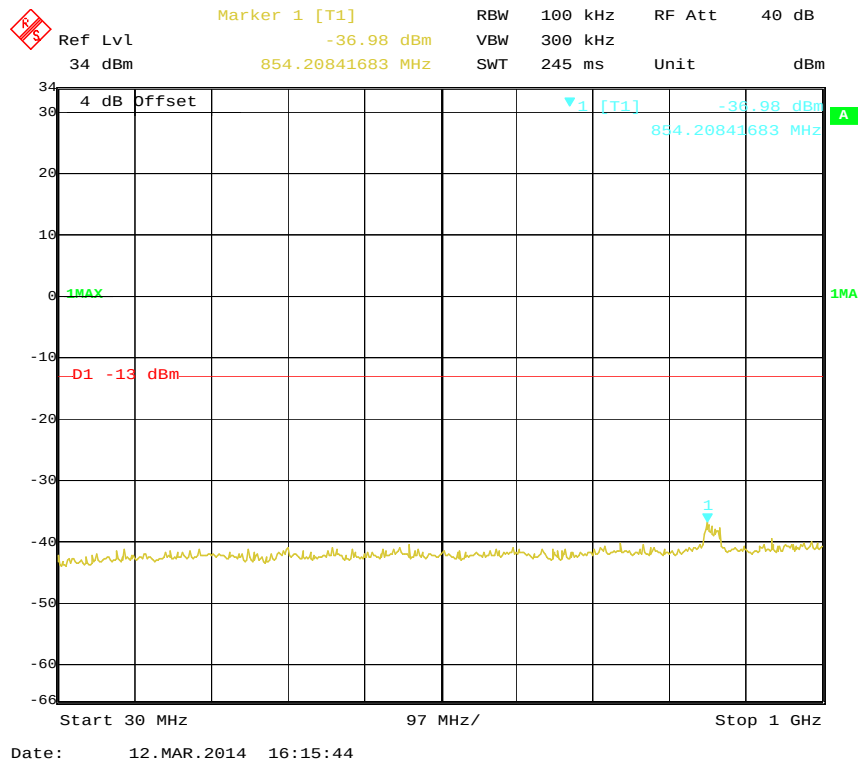
### CDMA Mode: 30 MHz – 1 GHz (Low Channel)



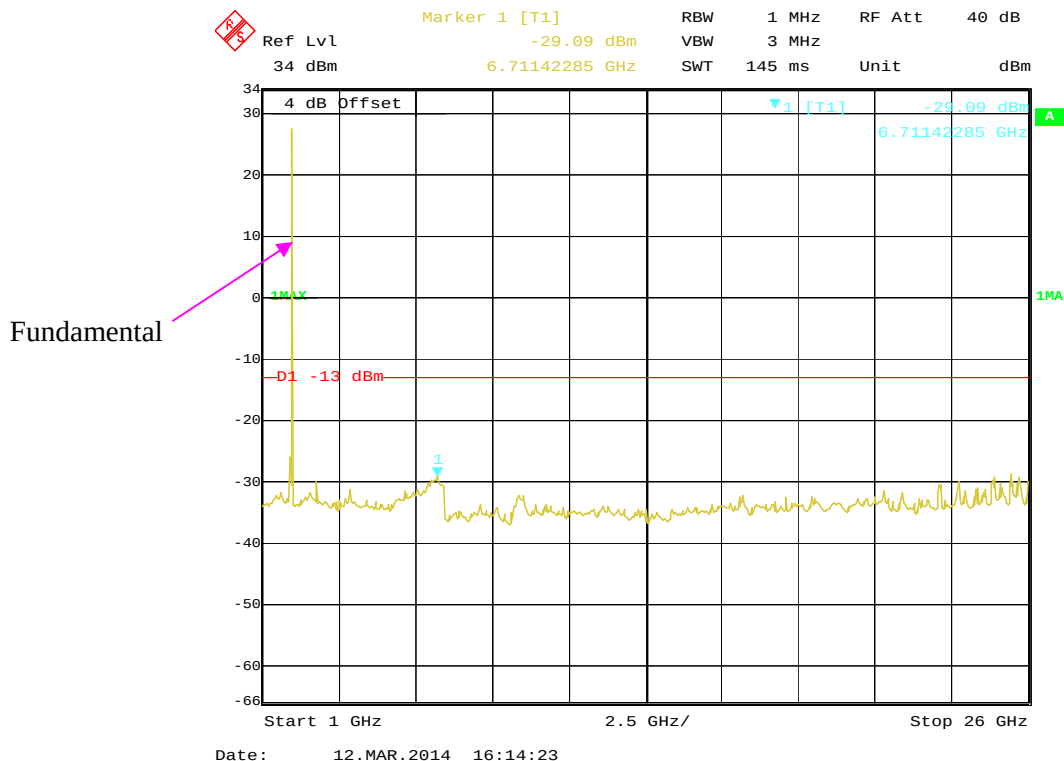
### CDMA Mode: 1 GHz – 26 GHz (Low Channel)

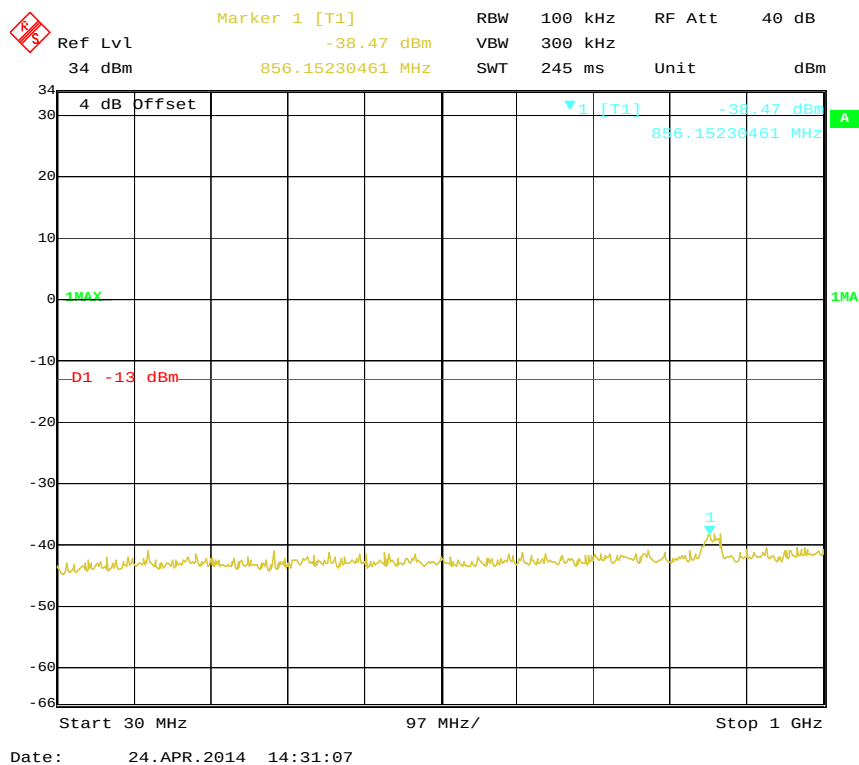
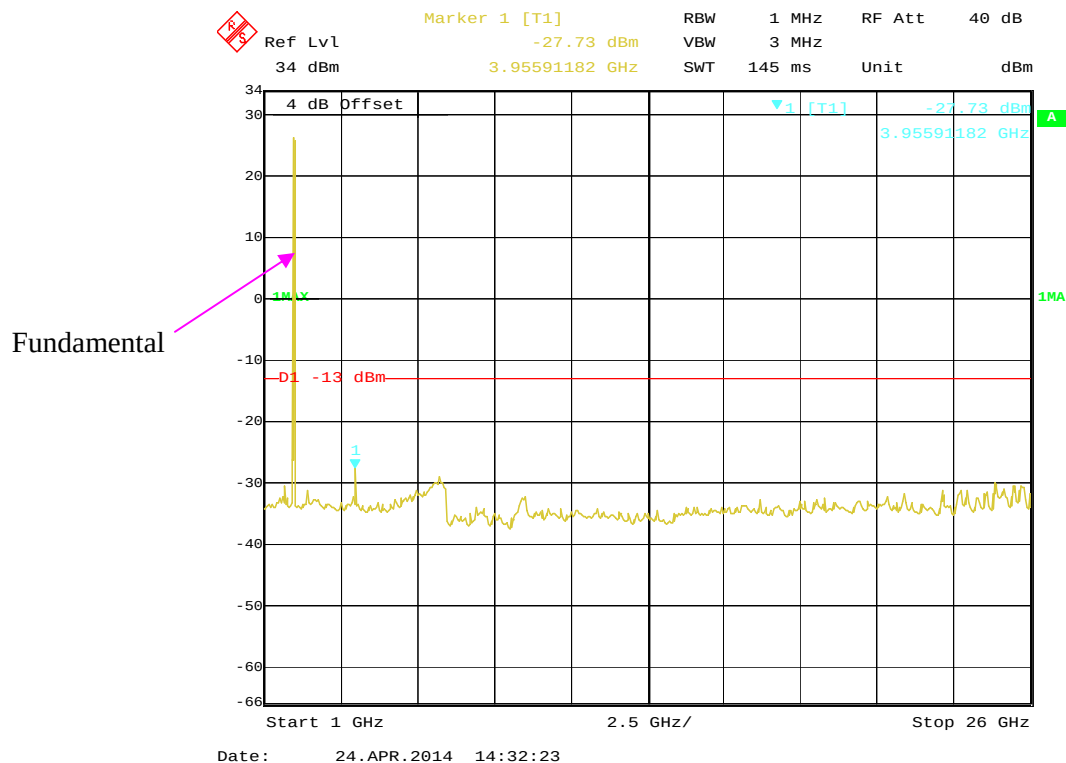


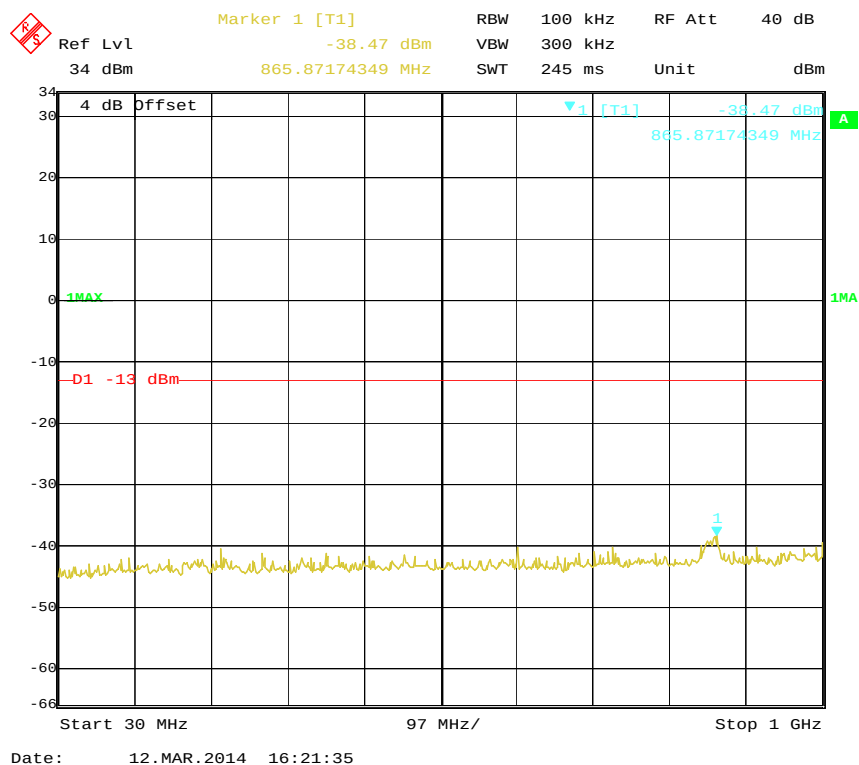
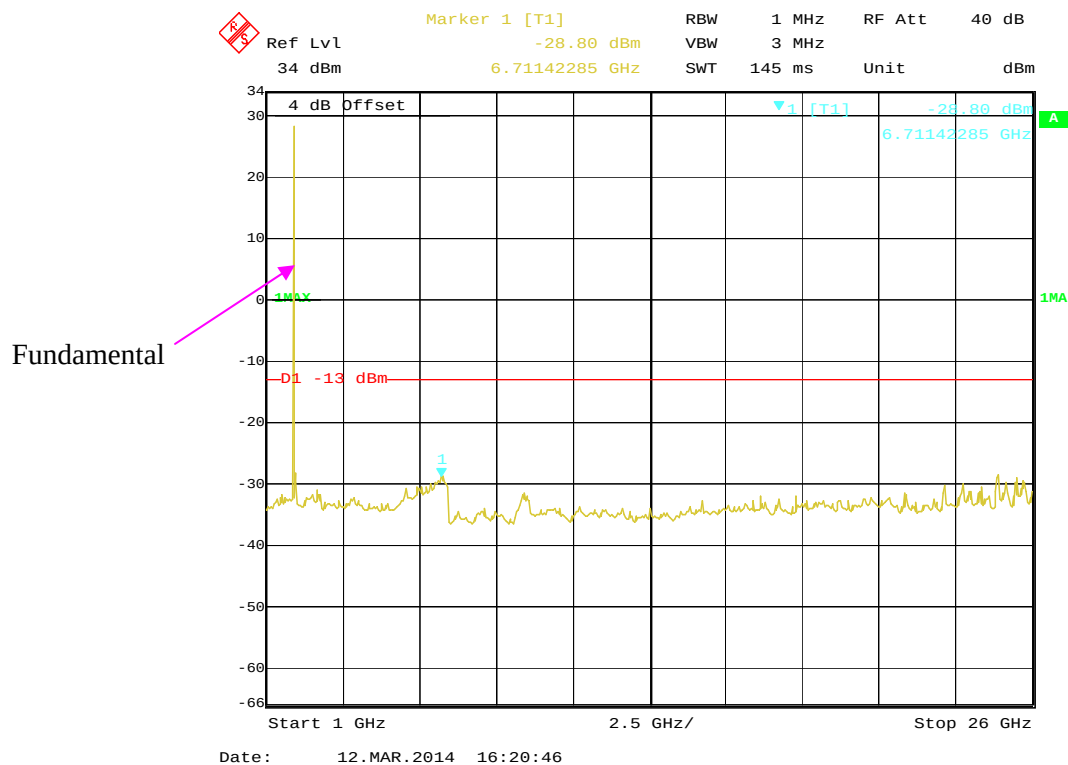
### CDMA Mode: 30 MHz – 1 GHz (Middle Channel)



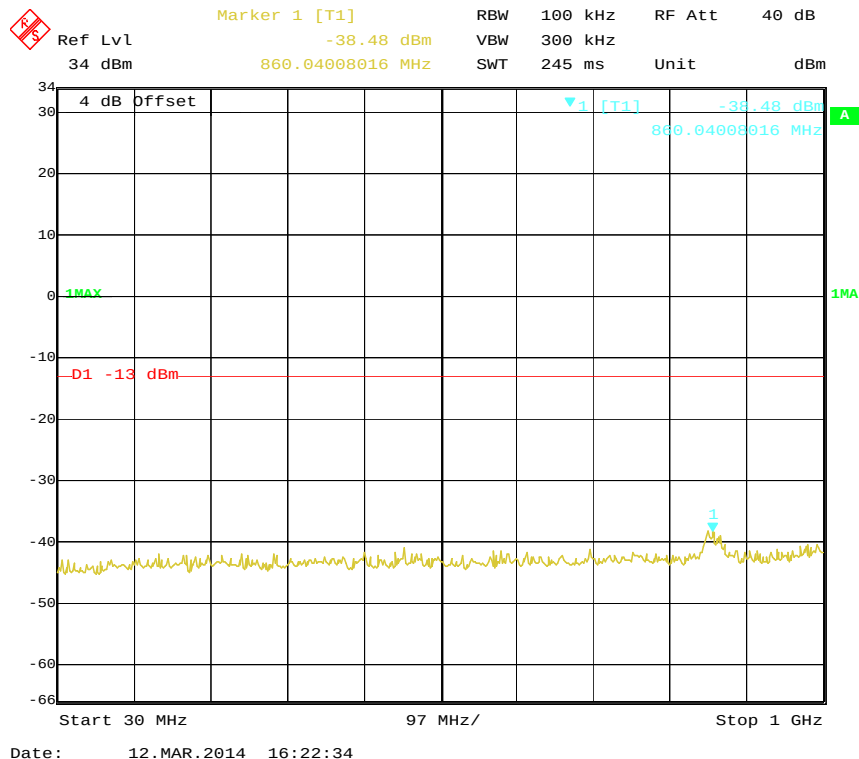
### CDMA Mode: 1 GHz – 26 GHz (Middle Channel)



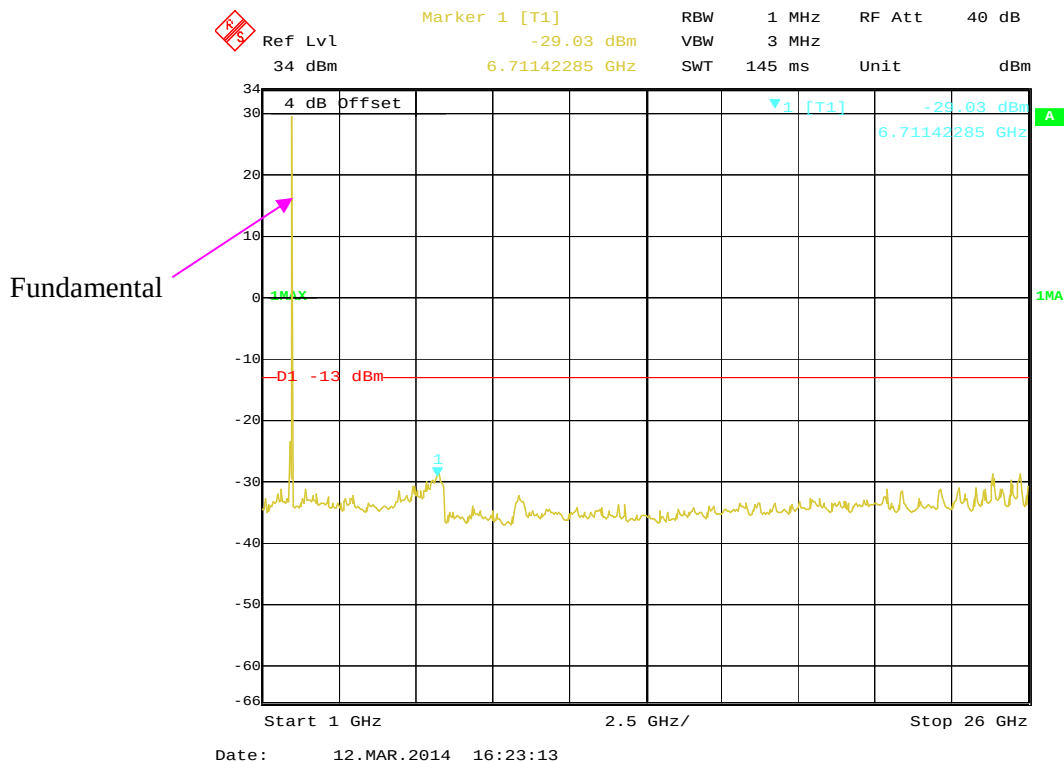
**CDMA Mode: 30 MHz – 1 GHz (High Channel)****CDMA Mode: 1 GHz – 26 GHz (High Channel)**

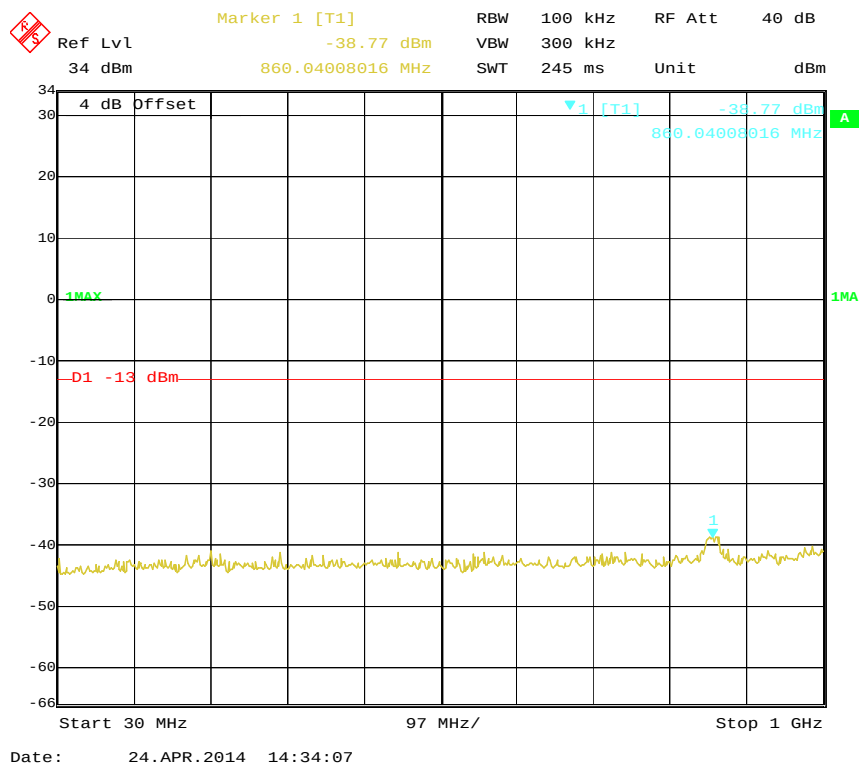
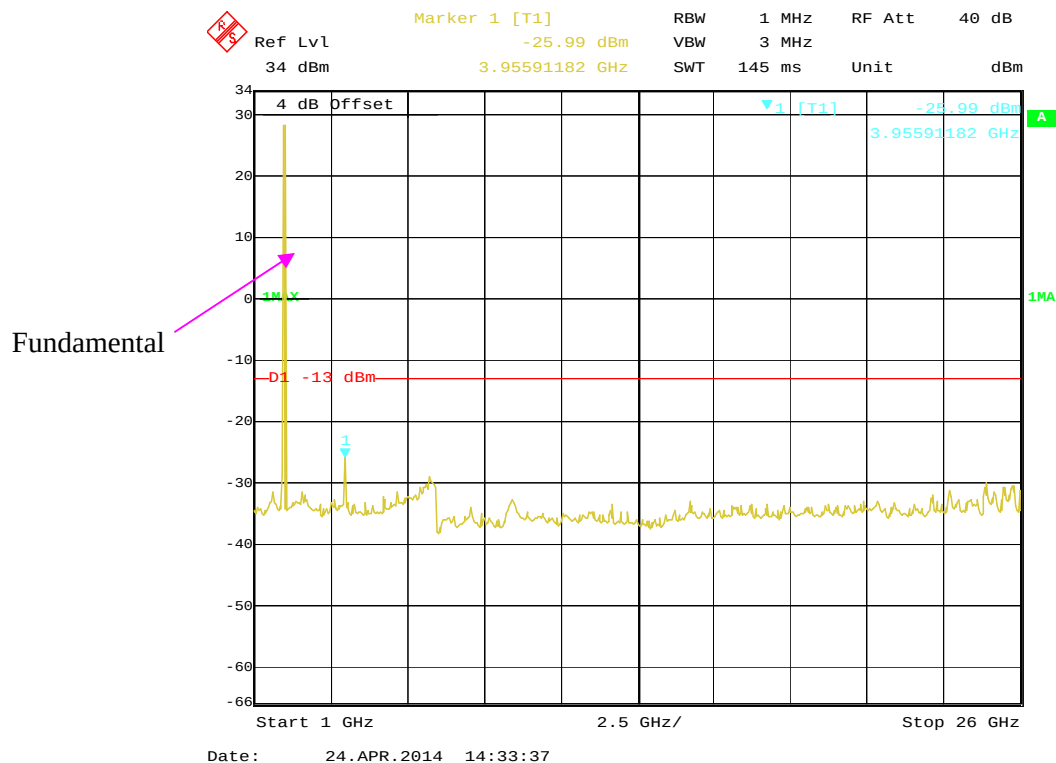
**WCDMA Mode: 30 MHz – 1 GHz (Low Channel)****WCDMA Mode: 1 GHz – 26 GHz (Low Channel)**

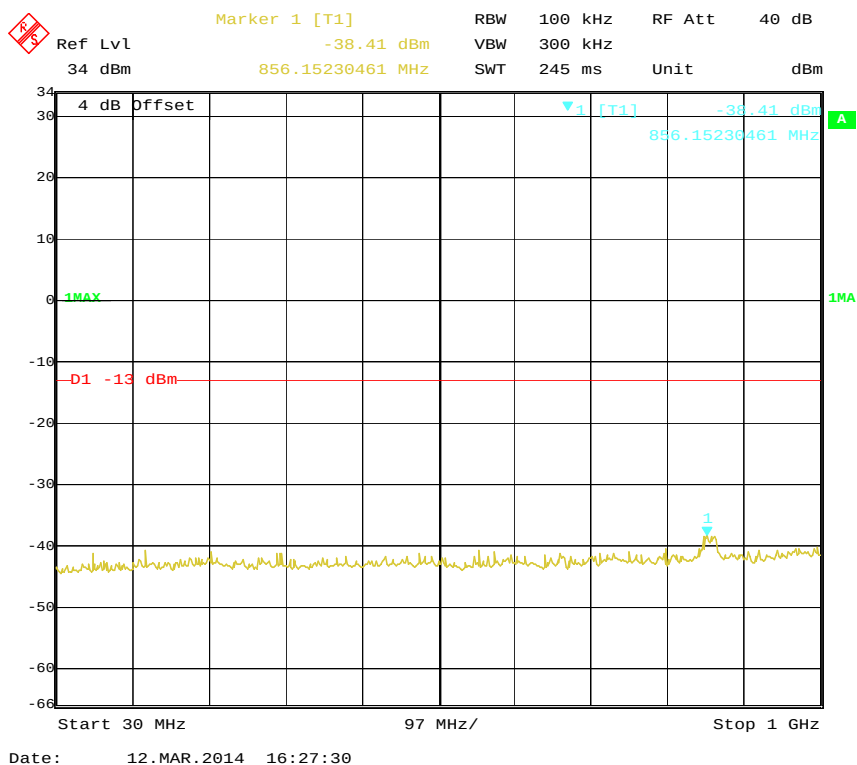
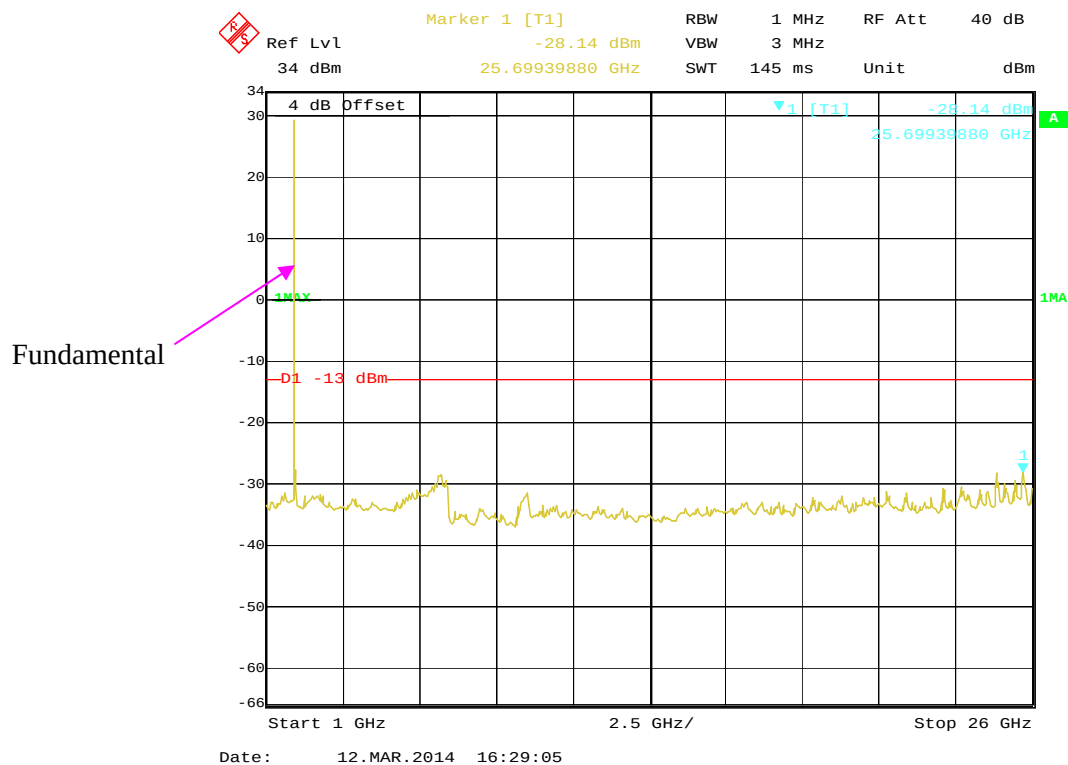
### WCDMA Mode: 30 MHz – 1 GHz (Middle Channel)



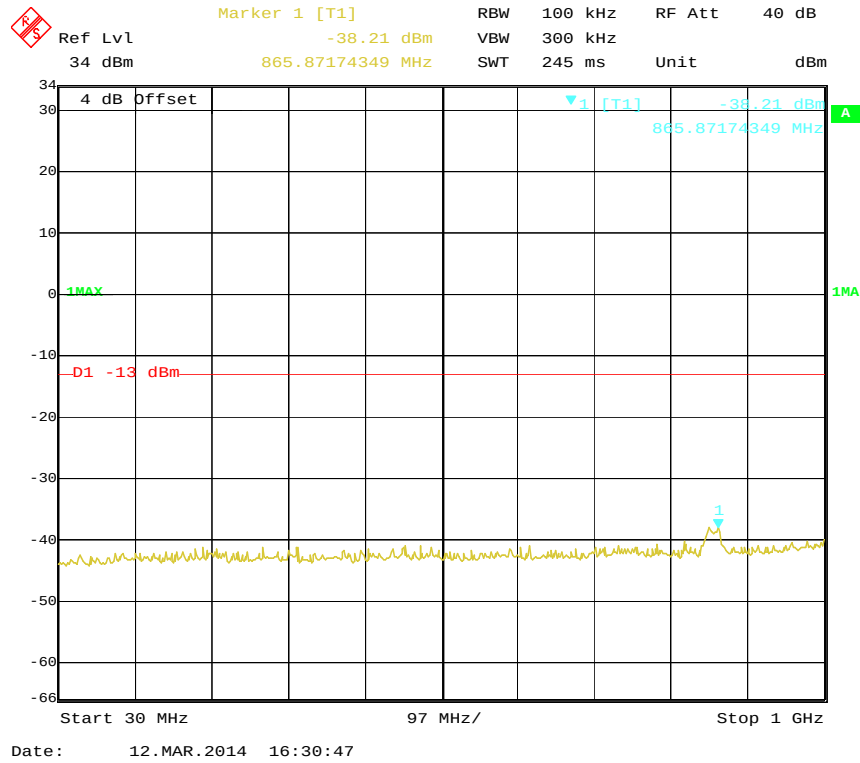
### WCDMA Mode: 1 GHz – 26 GHz (Middle Channel)



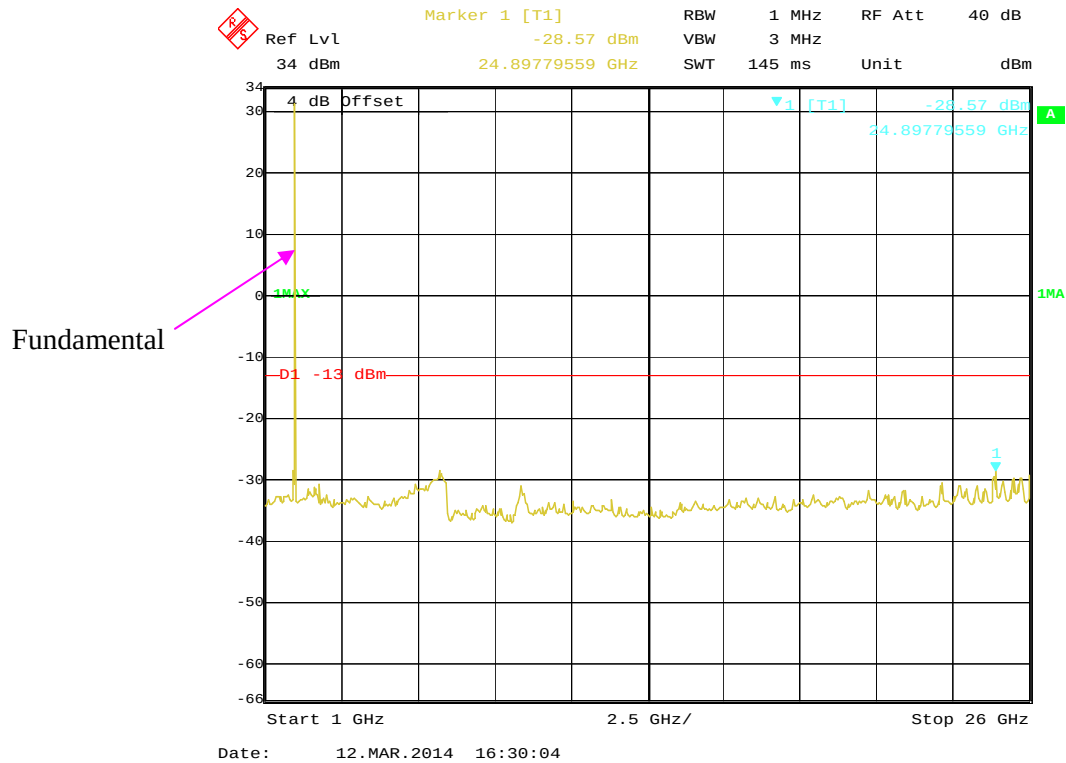
**WCDMA Mode: 30 MHz – 1 GHz (High Channel)****WCDMA Mode: 1 GHz – 26 GHz (High Channel)**

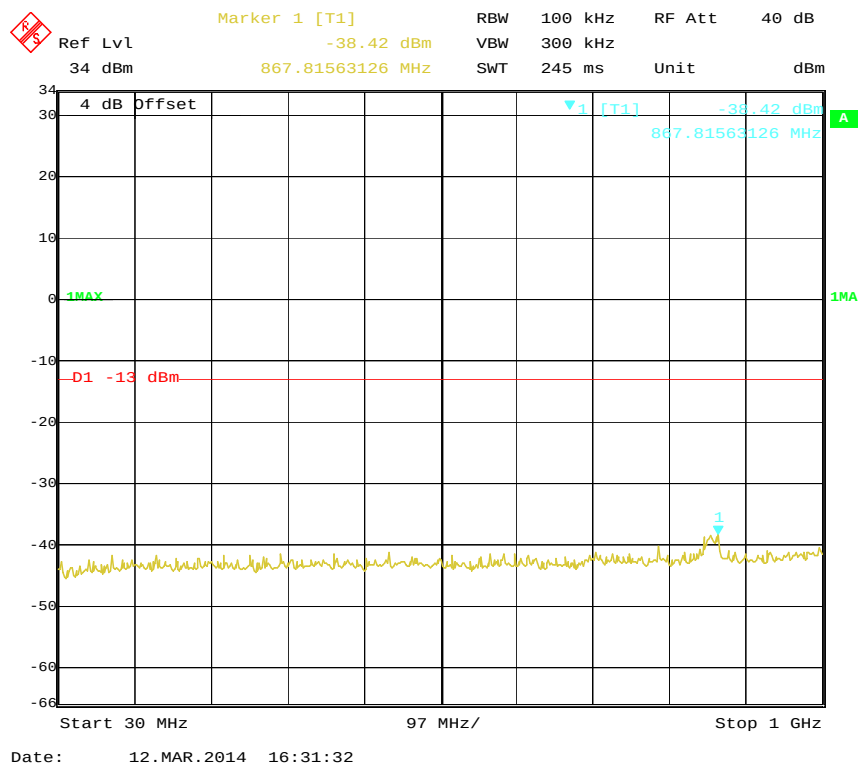
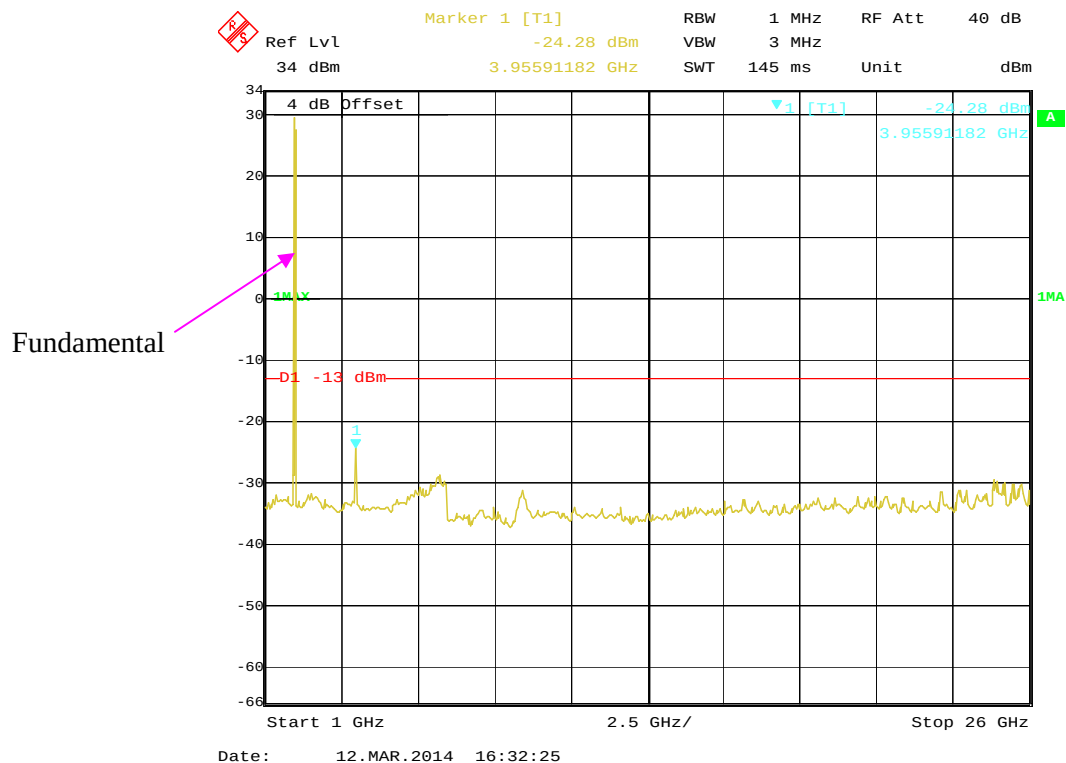
**QPSK (1.4MHz) Mode: 30 MHz – 1 GHz (Low Channel)****QPSK (1.4MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

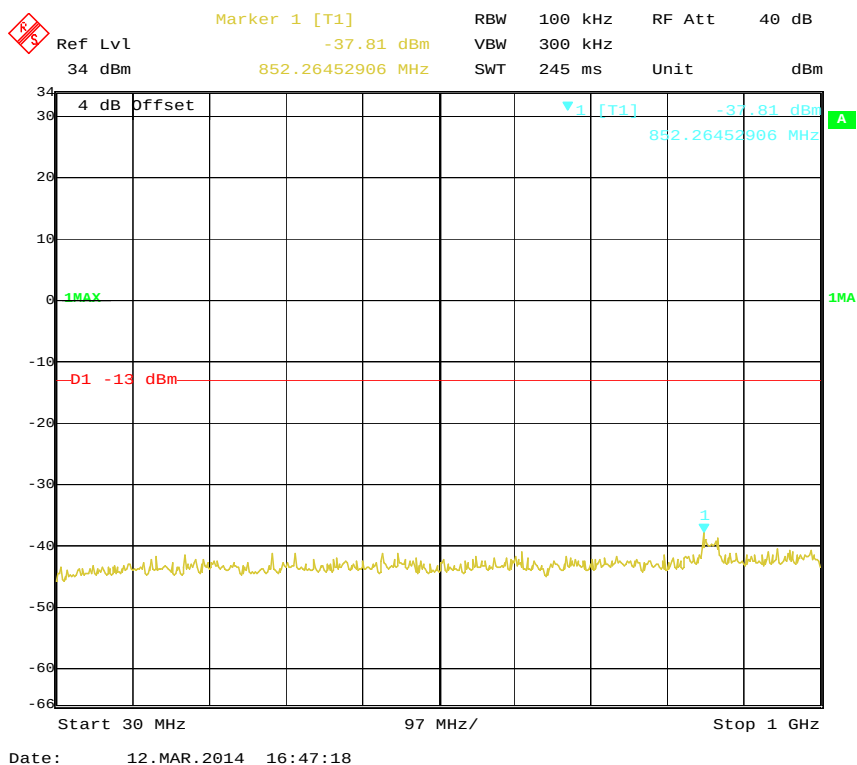
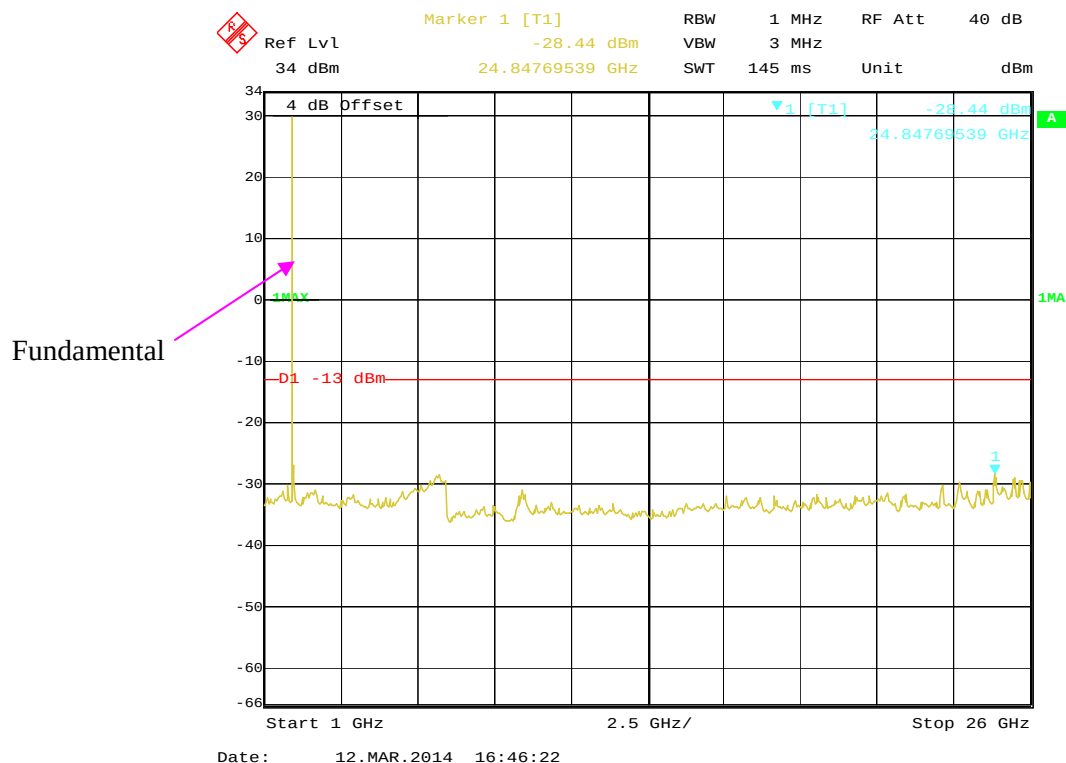
### QPSK (1.4MHz) Mode: 30 MHz – 1 GHz (Middle Channel)



### QPSK (1.4MHz) Mode: 1 GHz – 26 GHz (Middle Channel)



**QPSK (1.4MHz) Mode: 30 MHz – 1 GHz (High Channel)****QPSK (1.4MHz) Mode: 1 GHz – 26 GHz (High Channel)**

**16QAM (1.4MHz) Mode: 30 MHz – 1 GHz (Low Channel)****16QAM (1.4MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

Ref Lvl 34 dBm

Marker 1 [T1] -28.47 dBm 6.71142285 GHz

RBW 1 MHz RF Att 40 dB

VBW 3 MHz

SWT 145 ms Unit dBm

4 dB Offset

▼1 [T1] -28.47 dBm 6.71142285 GHz

1MAX

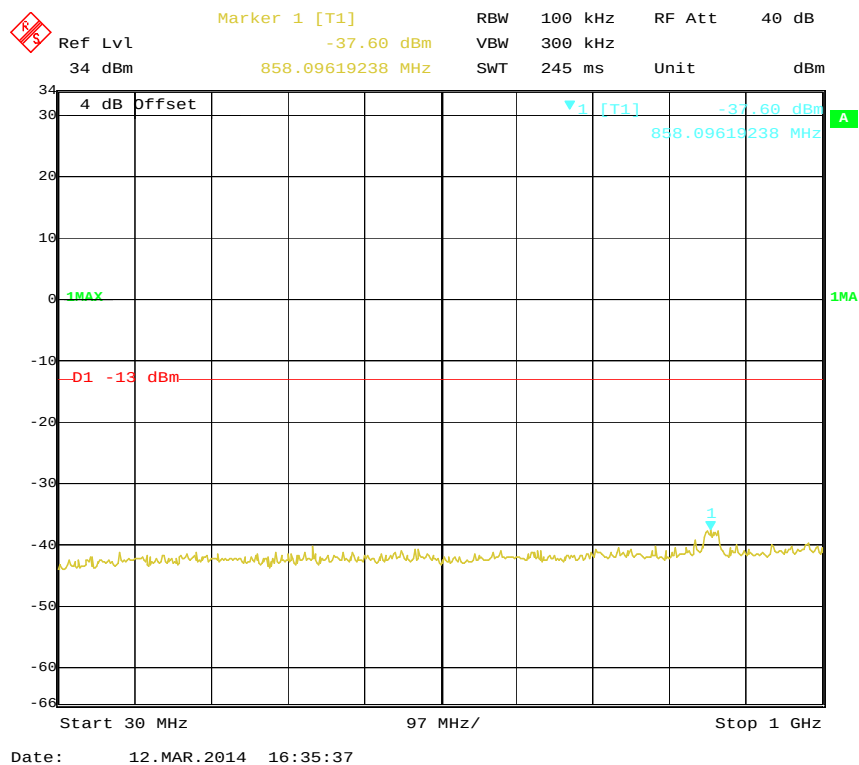
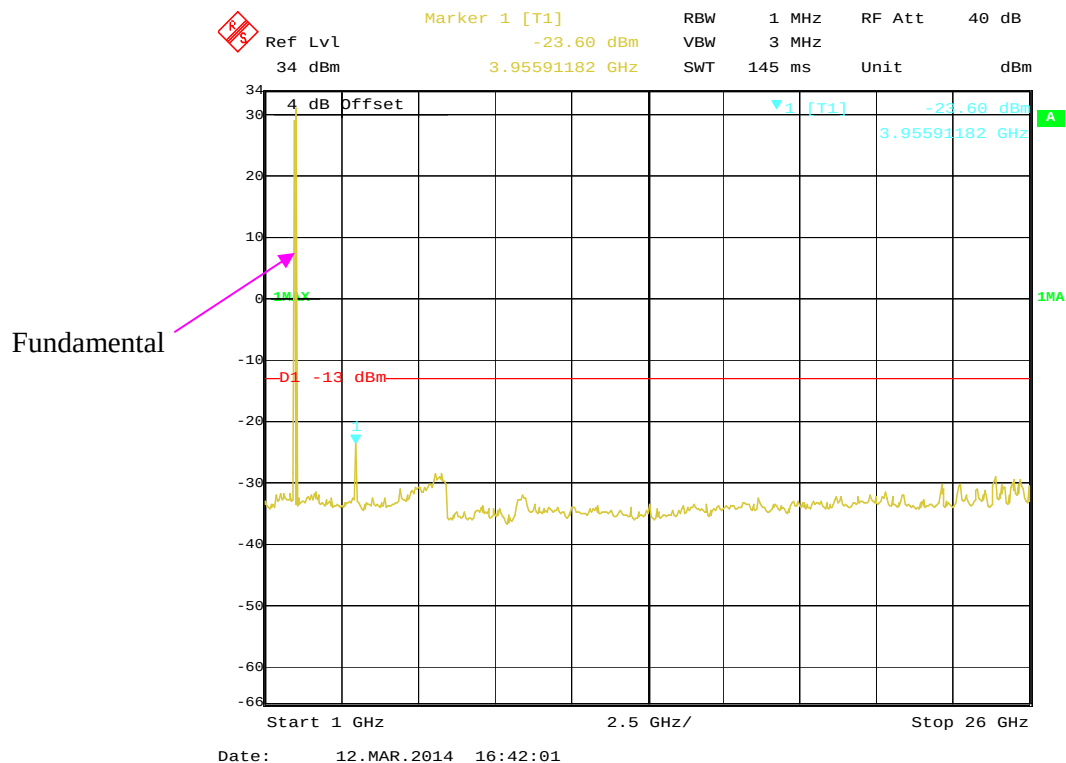
D1 -13 dBm

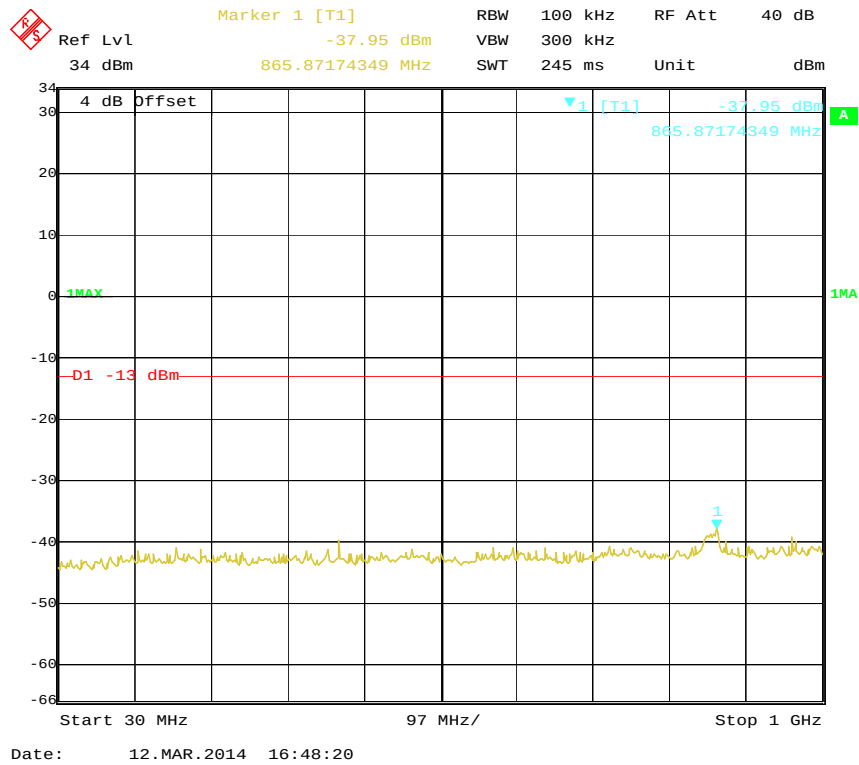
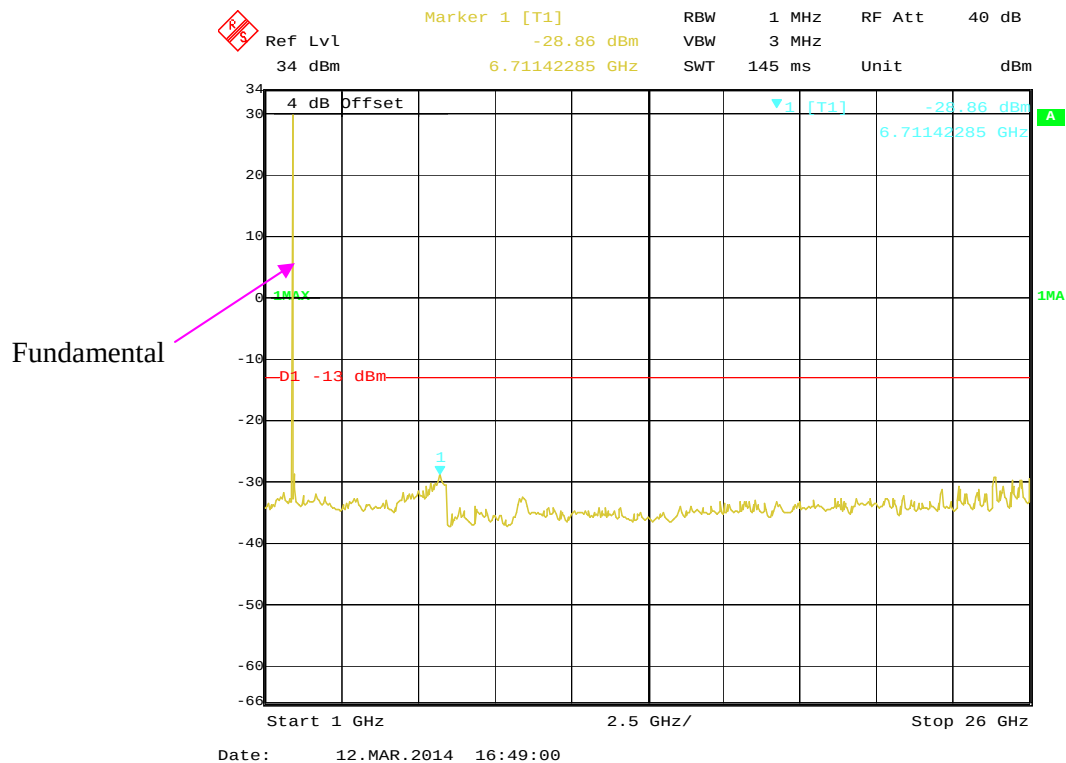
1

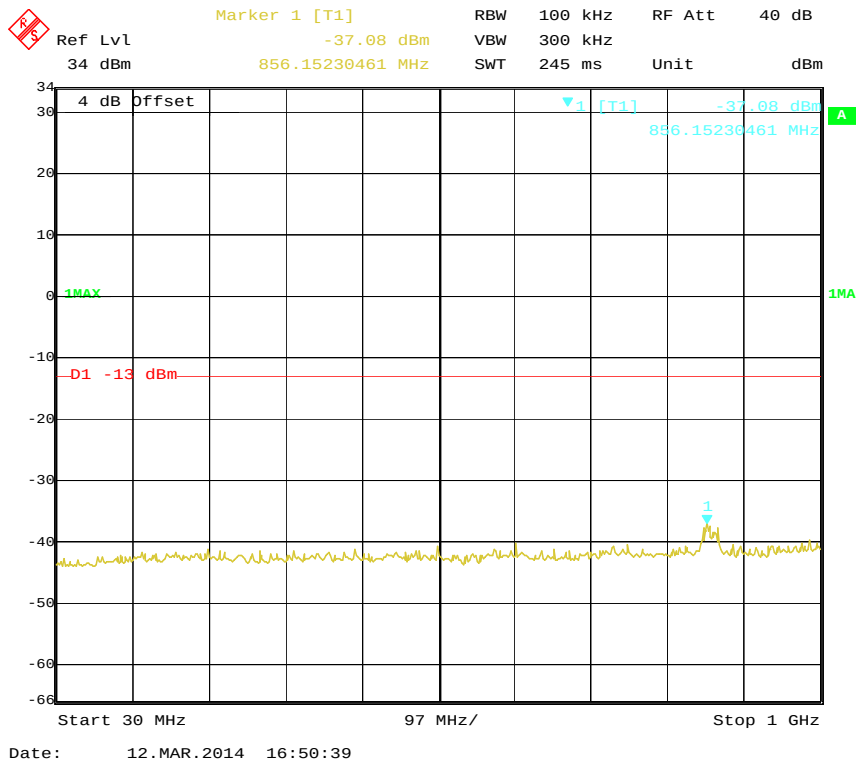
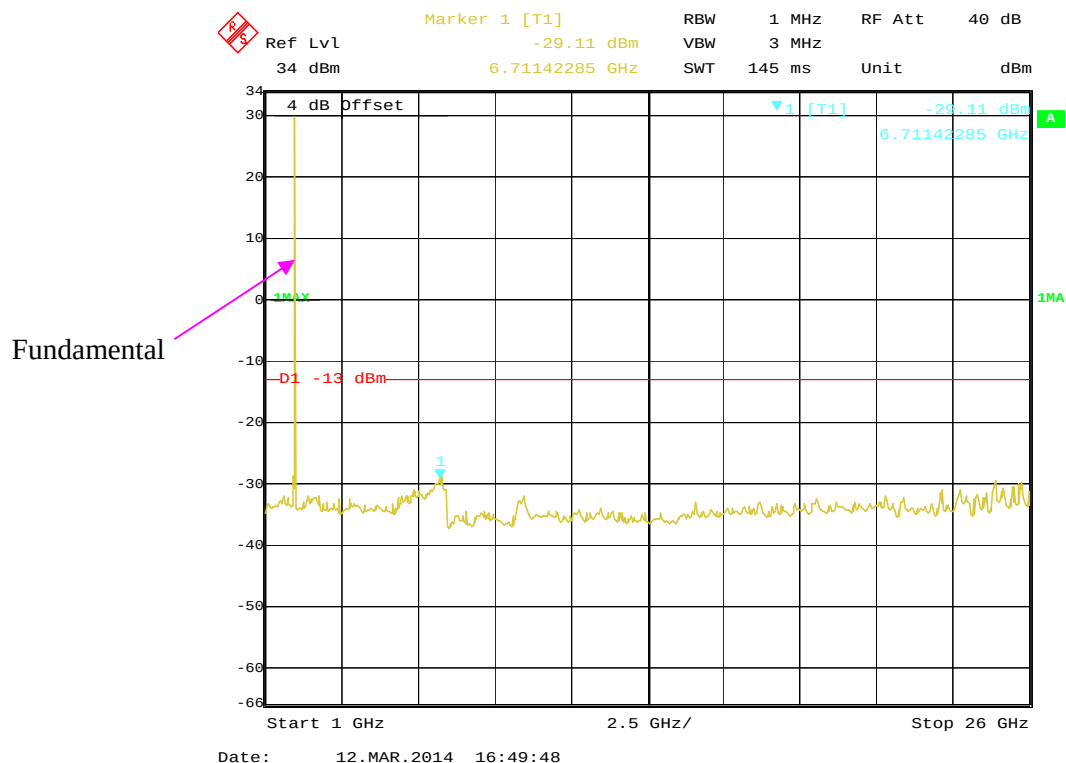
Fundamental

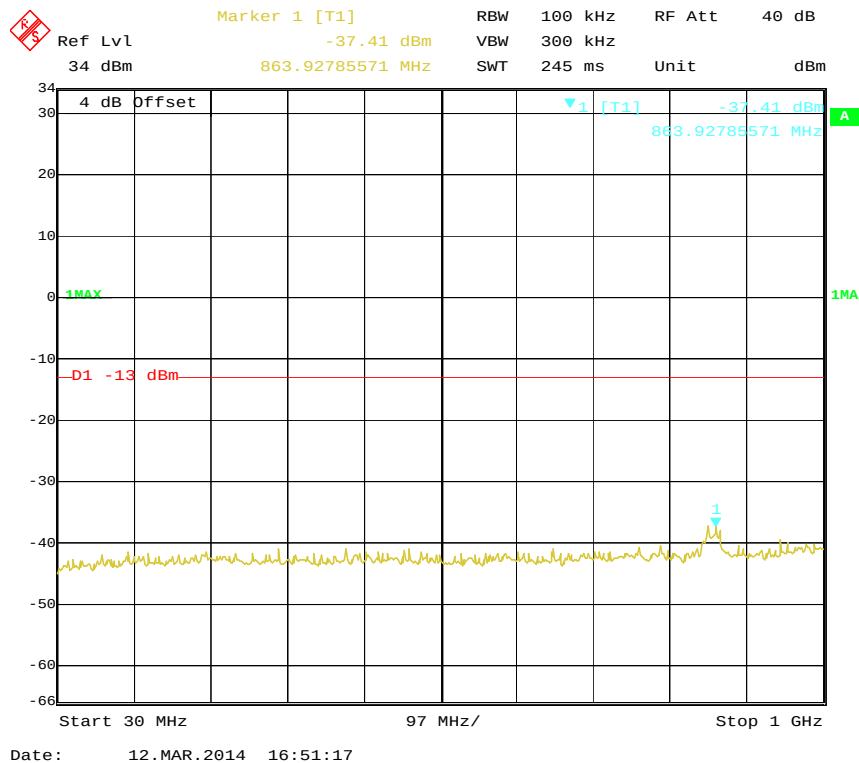
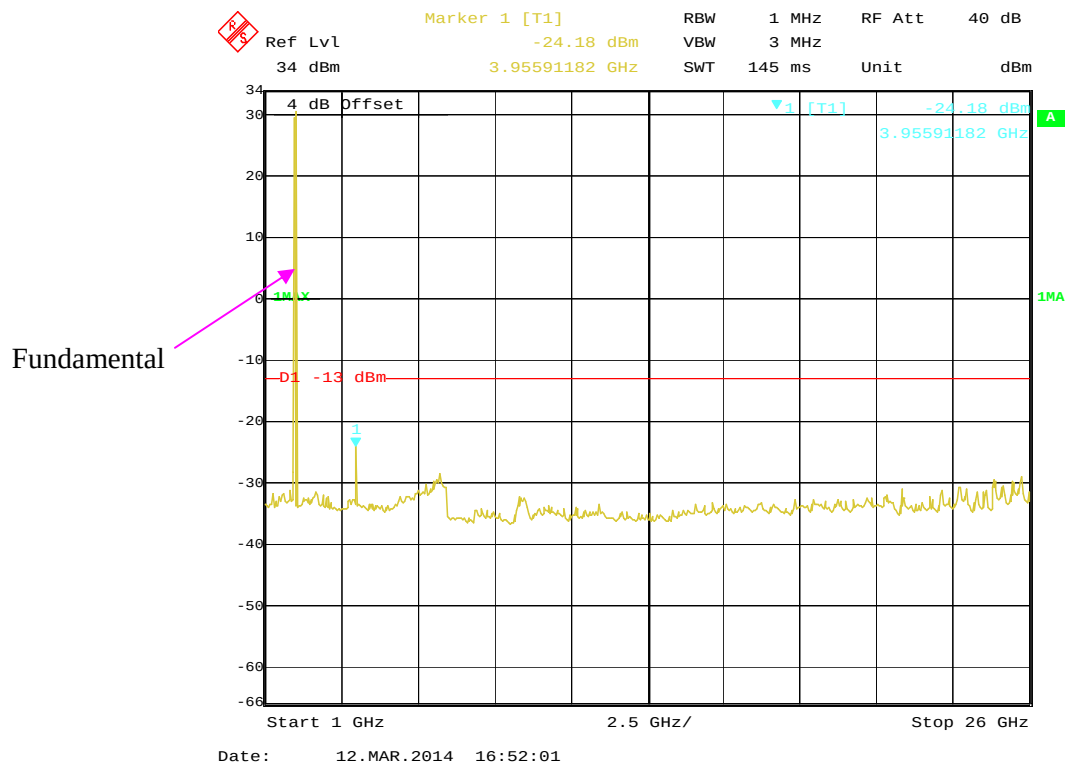
Start 1 GHz 2.5 GHz/ Stop 26 GHz

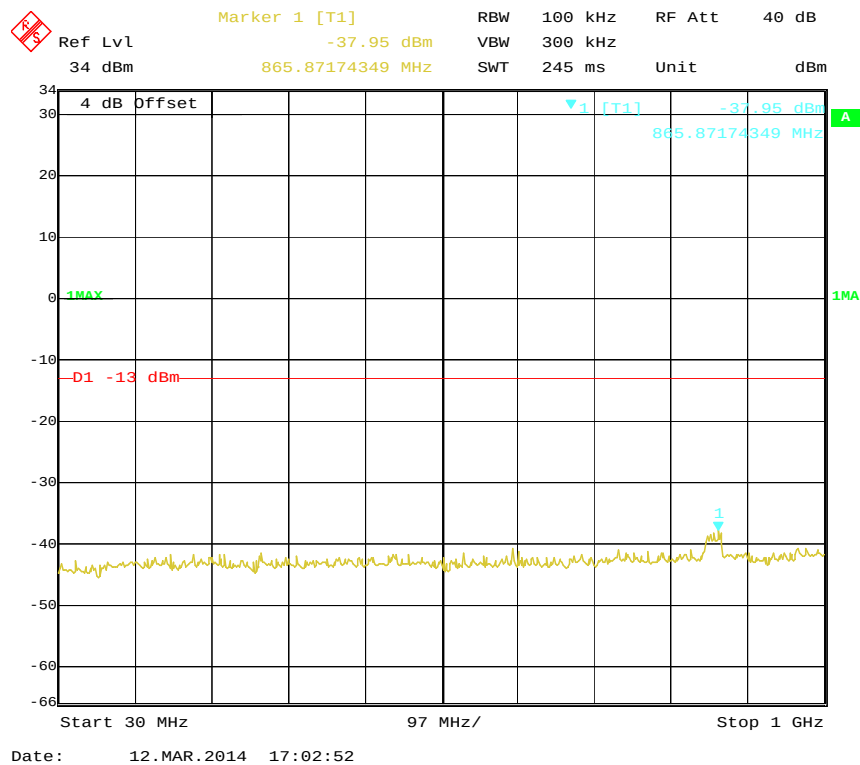
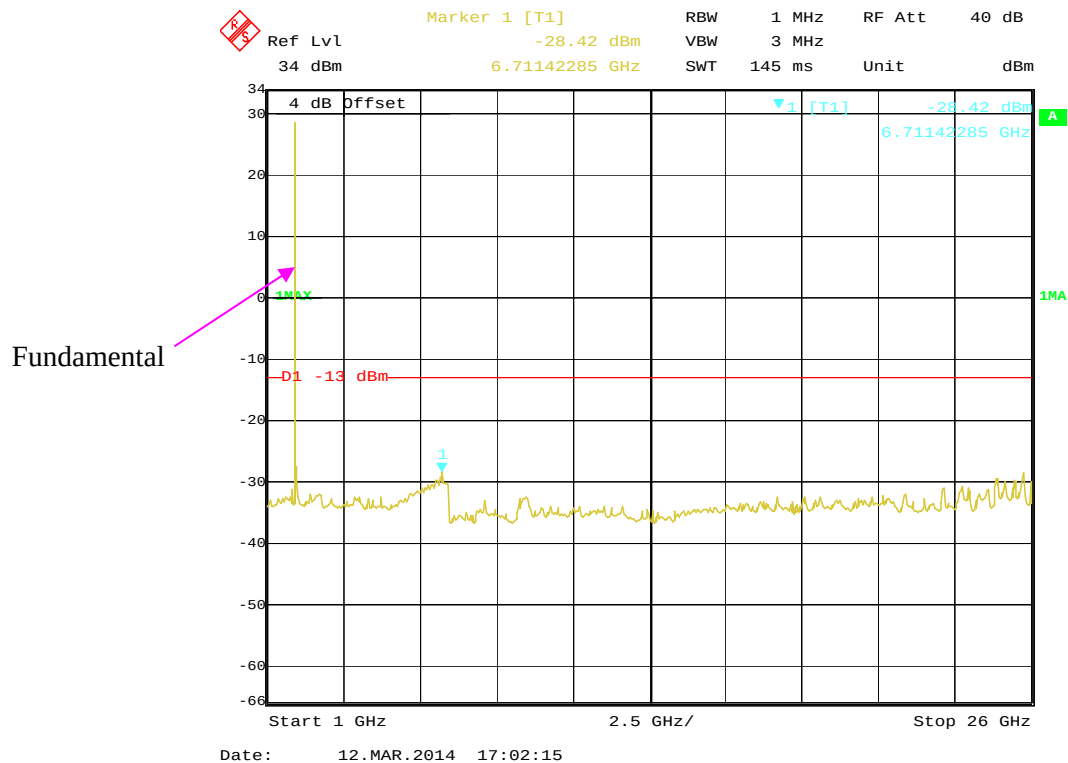
Date: 12.MAR.2014 16:40:05

**16QAM (1.4MHz) Mode: 30 MHz – 1 GHz (High Channel)****16QAM (1.4MHz) Mode: 1 GHz – 26 GHz (High Channel)**

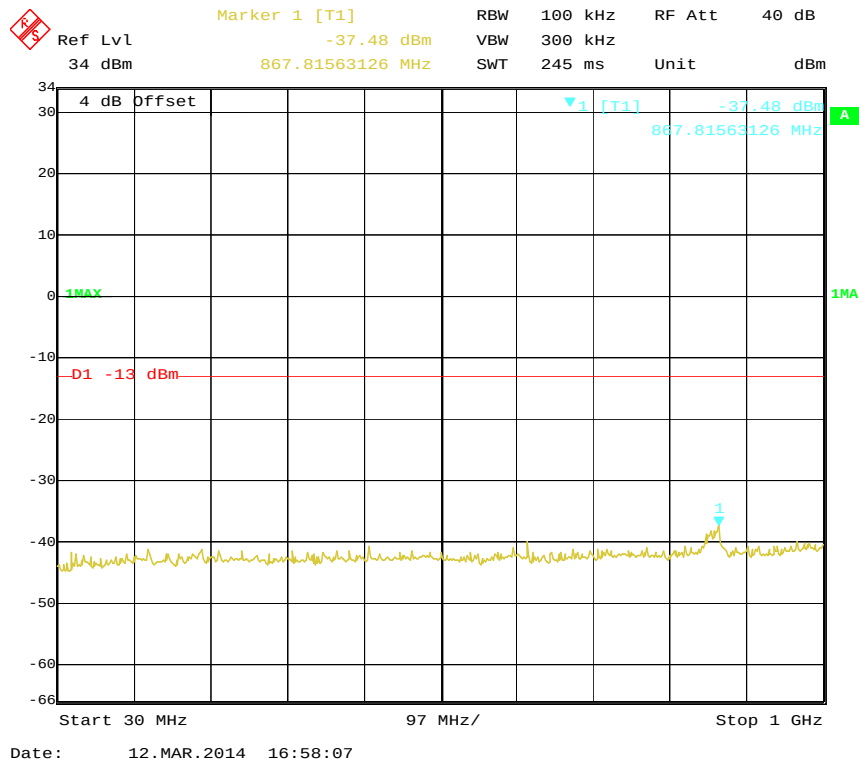
**64QAM (1.4MHz) Mode: 30 MHz – 1 GHz (Low Channel)****64QAM (1.4MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

**64QAM (1.4MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****64QAM (1.4MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

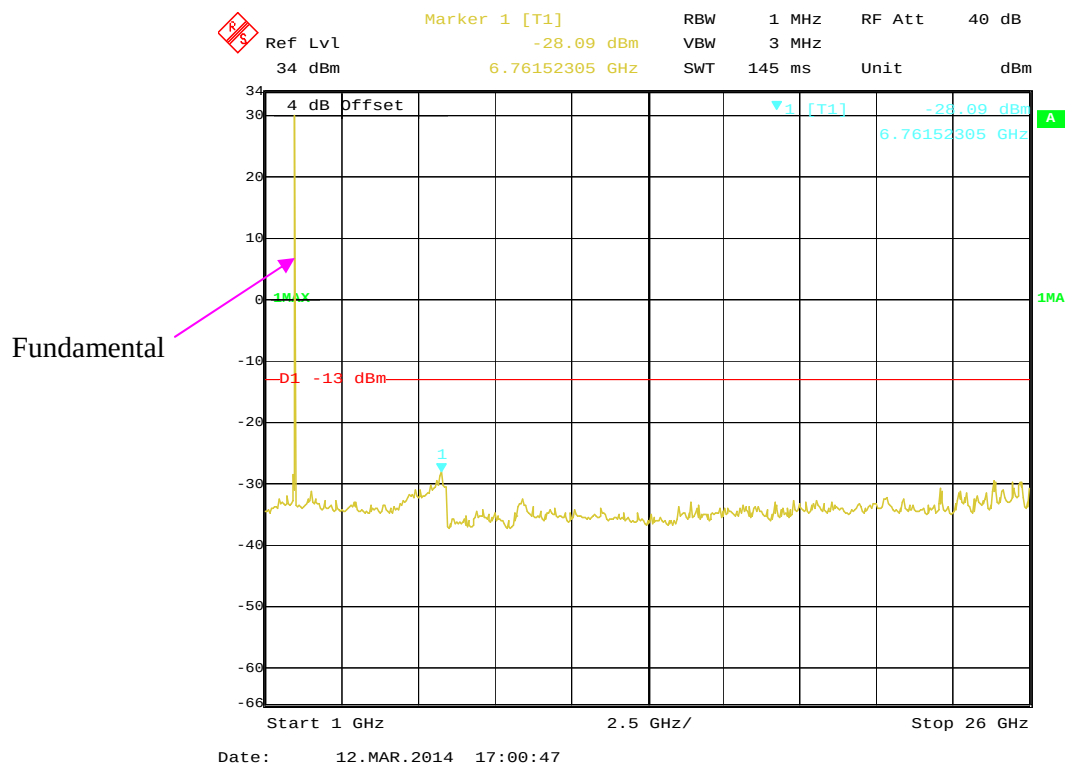
**64QAM (1.4MHz) Mode: 30 MHz – 1 GHz (High Channel)****64QAM (1.4MHz) Mode: 1 GHz – 26 GHz (High Channel)**

**QPSK (3MHz) Mode: 30 MHz – 1 GHz (Low Channel)****QPSK (3MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

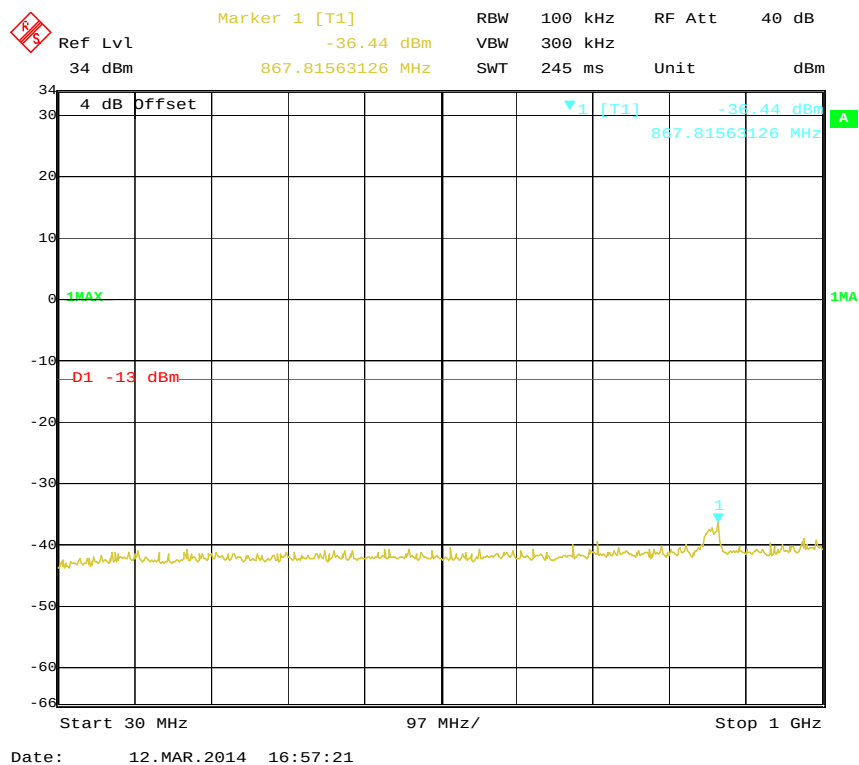
## QPSK (3MHz) Mode: 30 MHz – 1 GHz (Middle Channel)



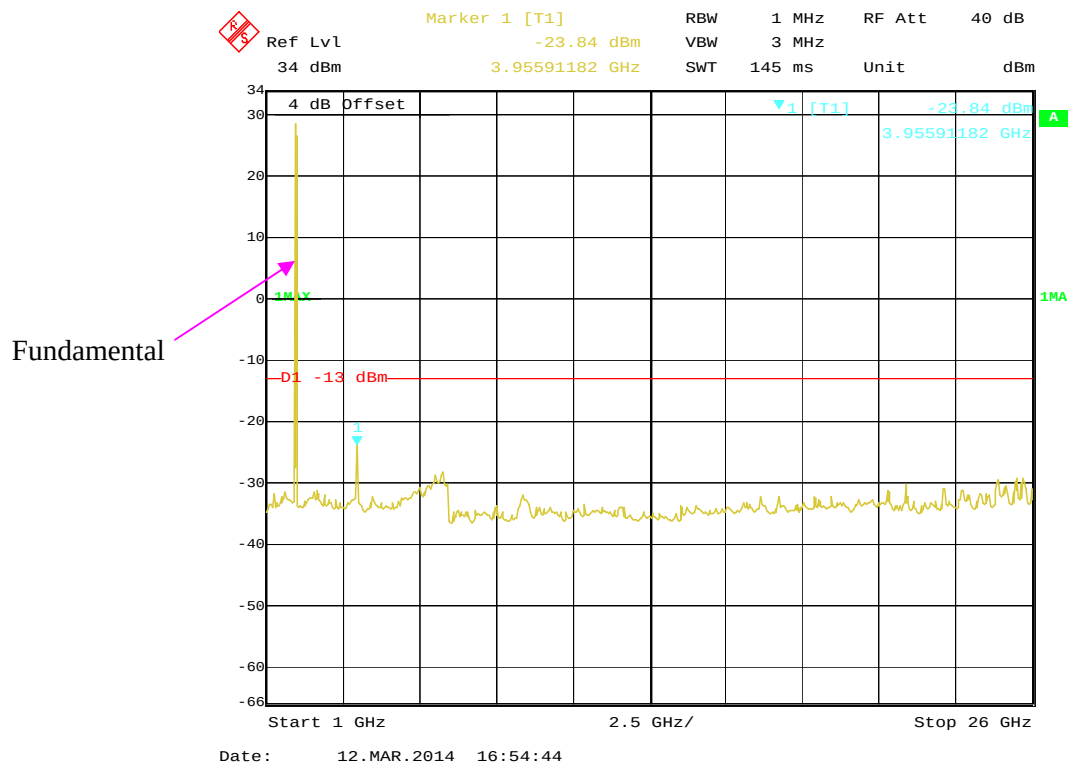
## QPSK (3MHz) Mode: 1 GHz – 26 GHz (Middle Channel)

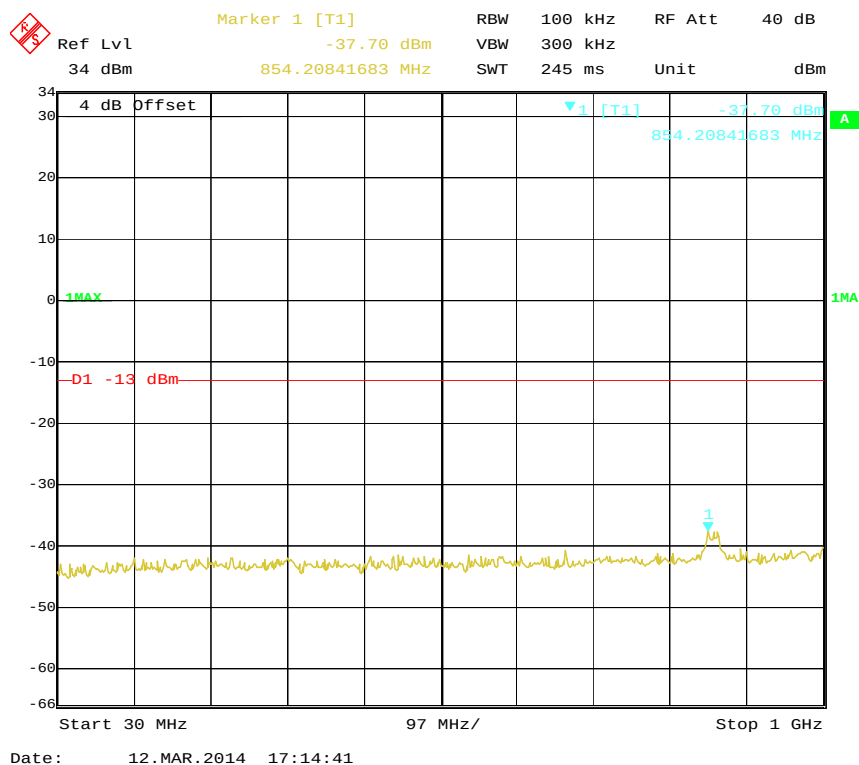
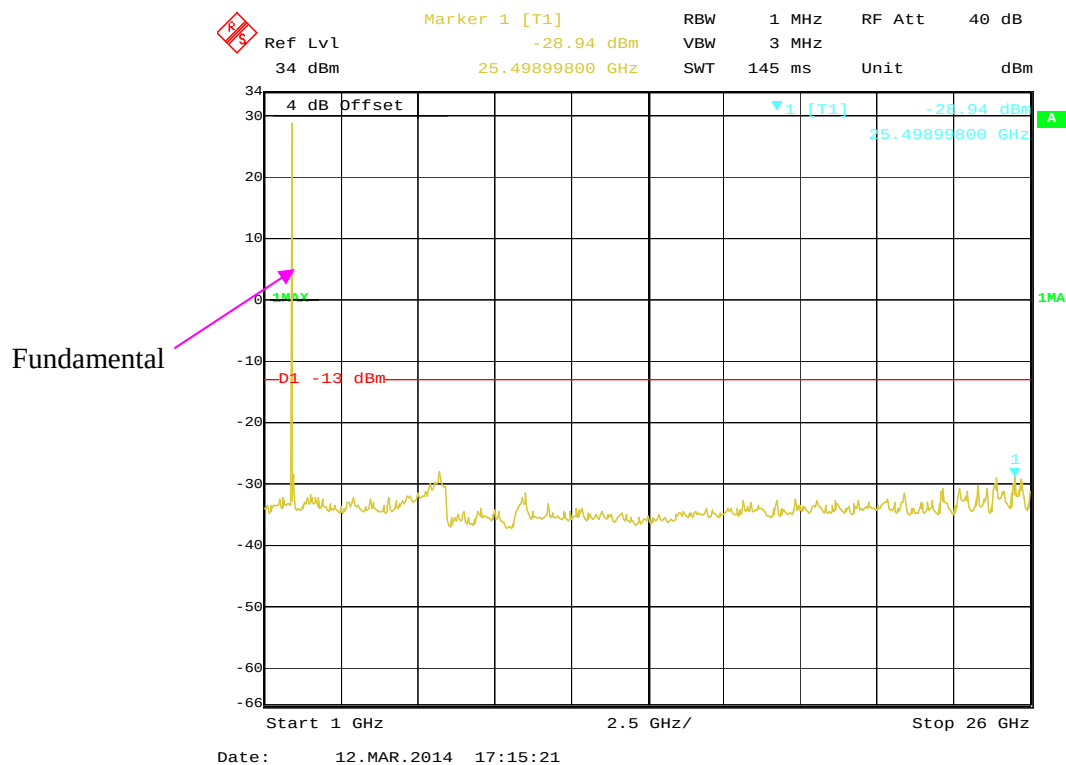


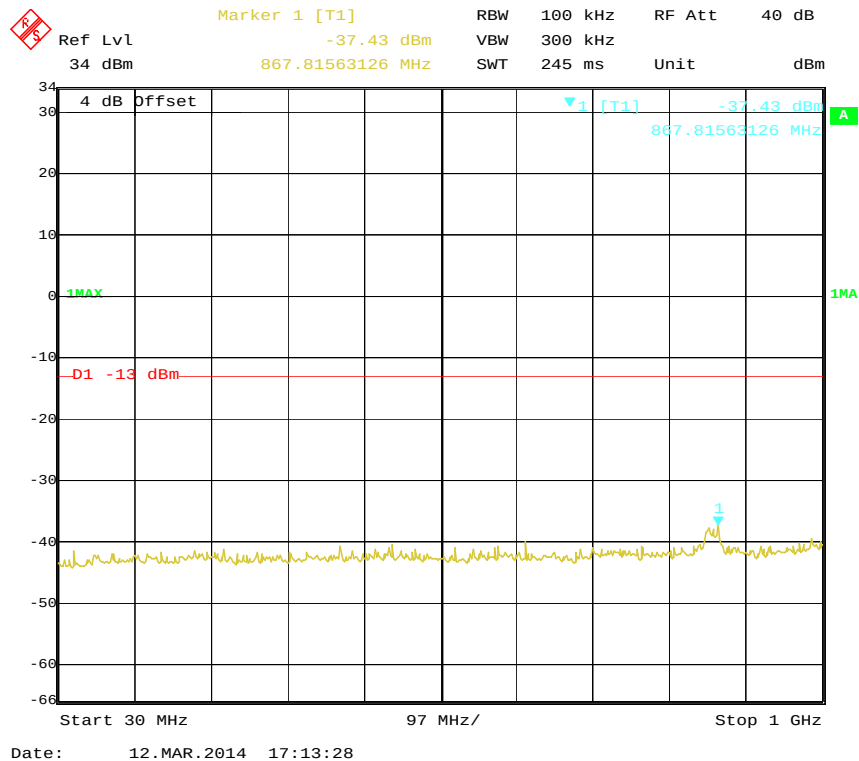
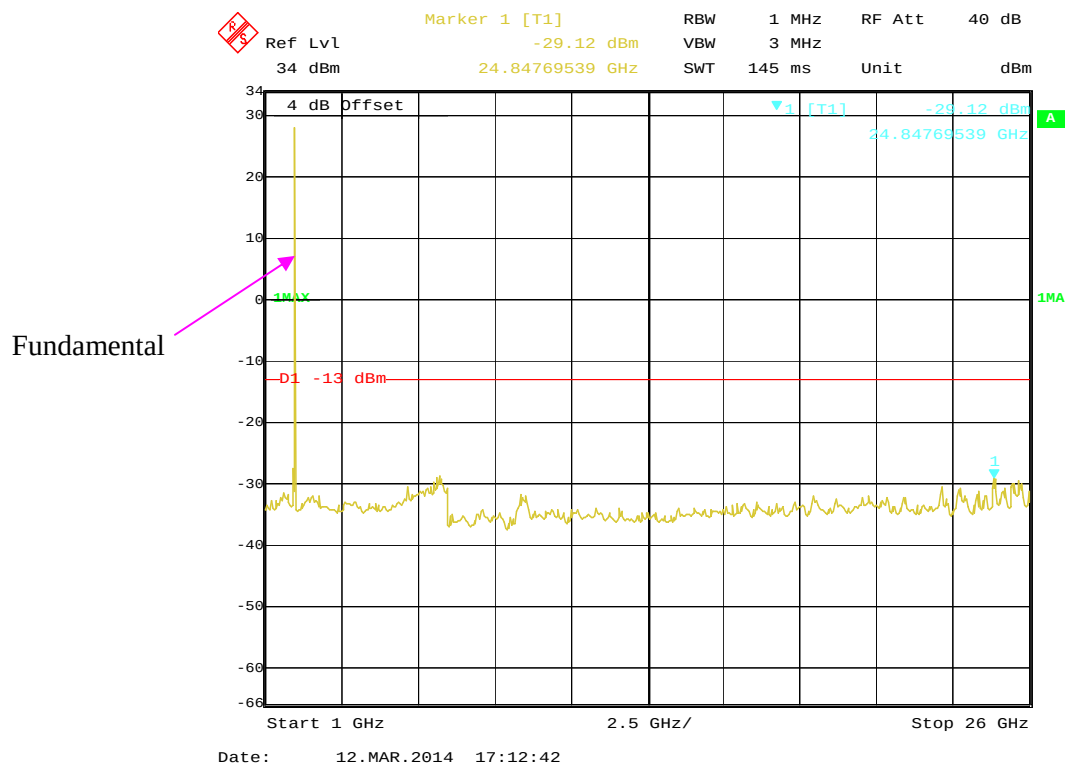
### QPSK (3MHz) Mode: 30 MHz – 1 GHz (High Channel)

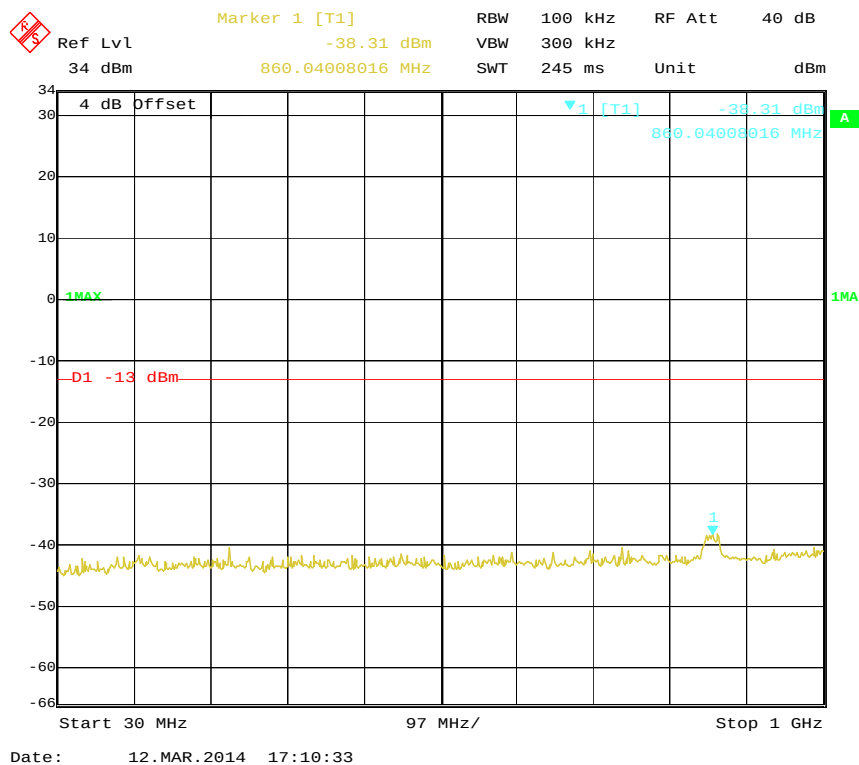
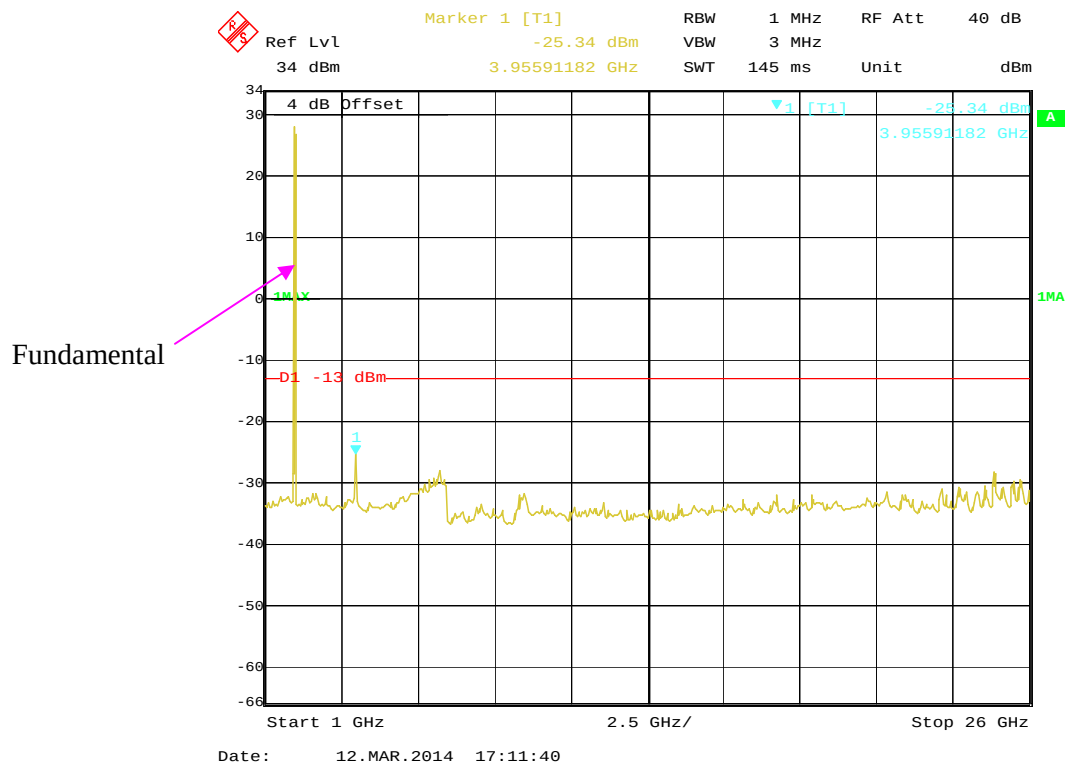


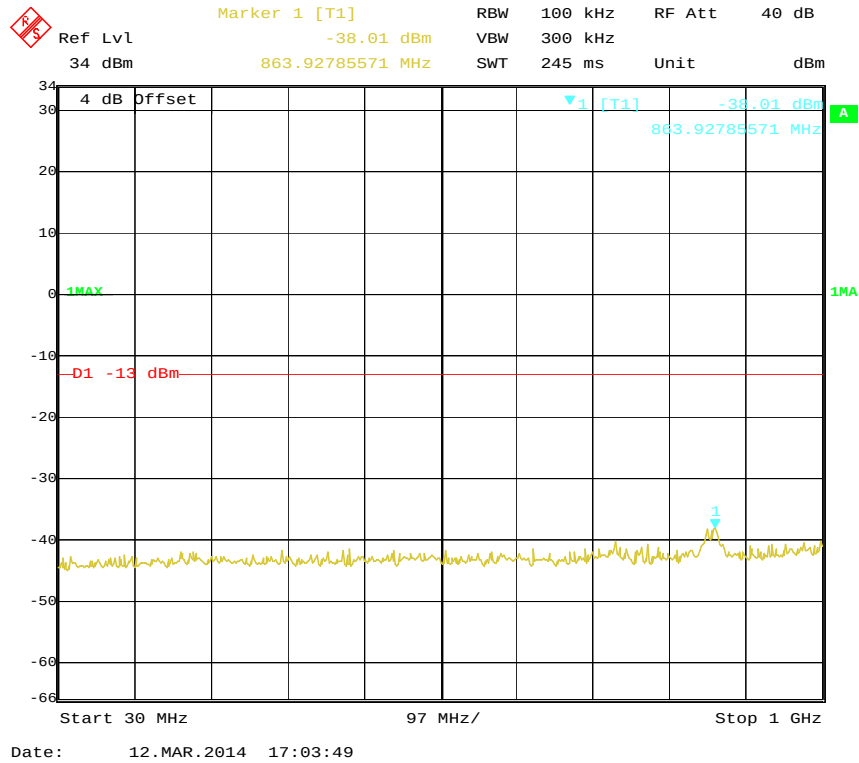
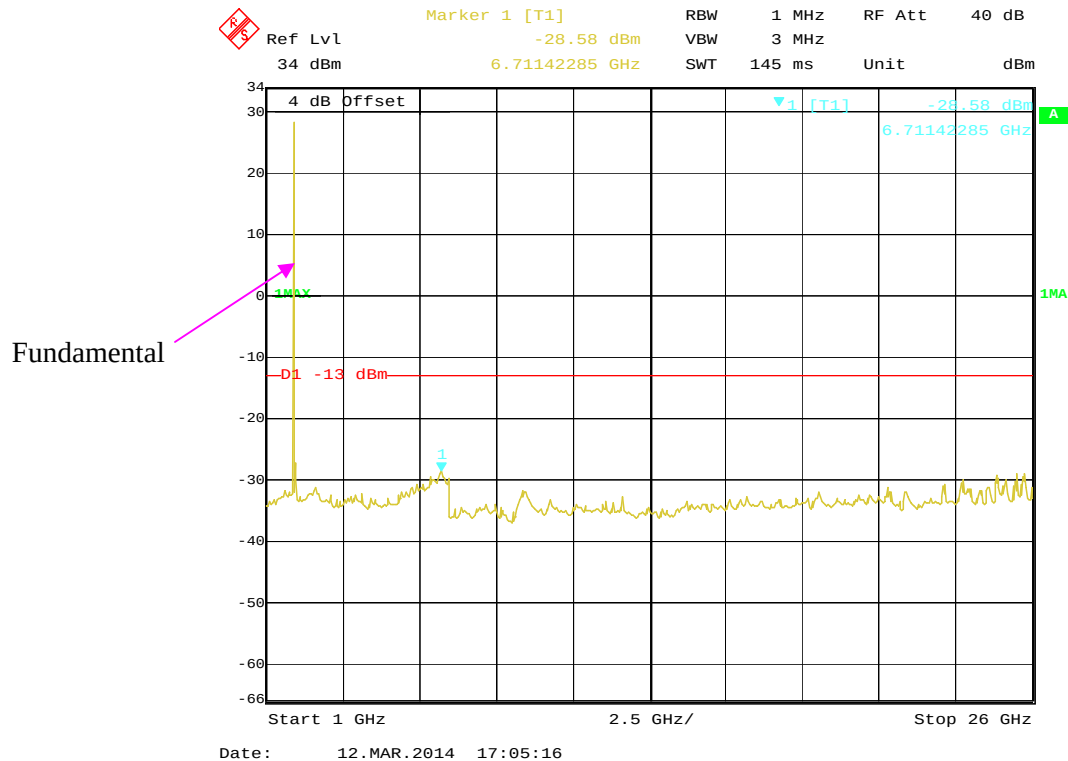
### QPSK (3MHz) Mode: 1 GHz – 26 GHz (High Channel)

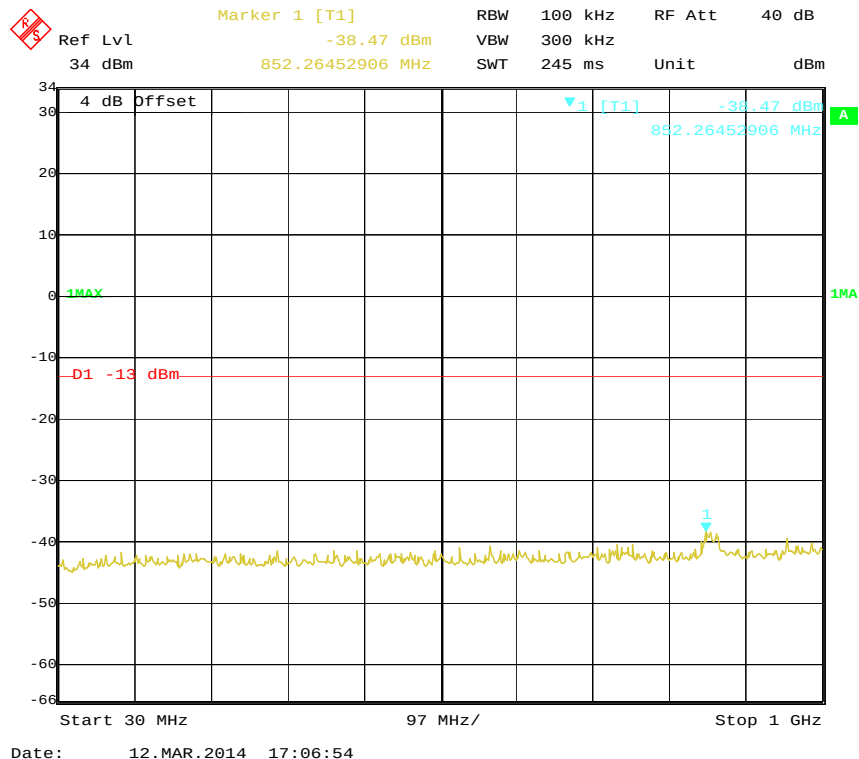
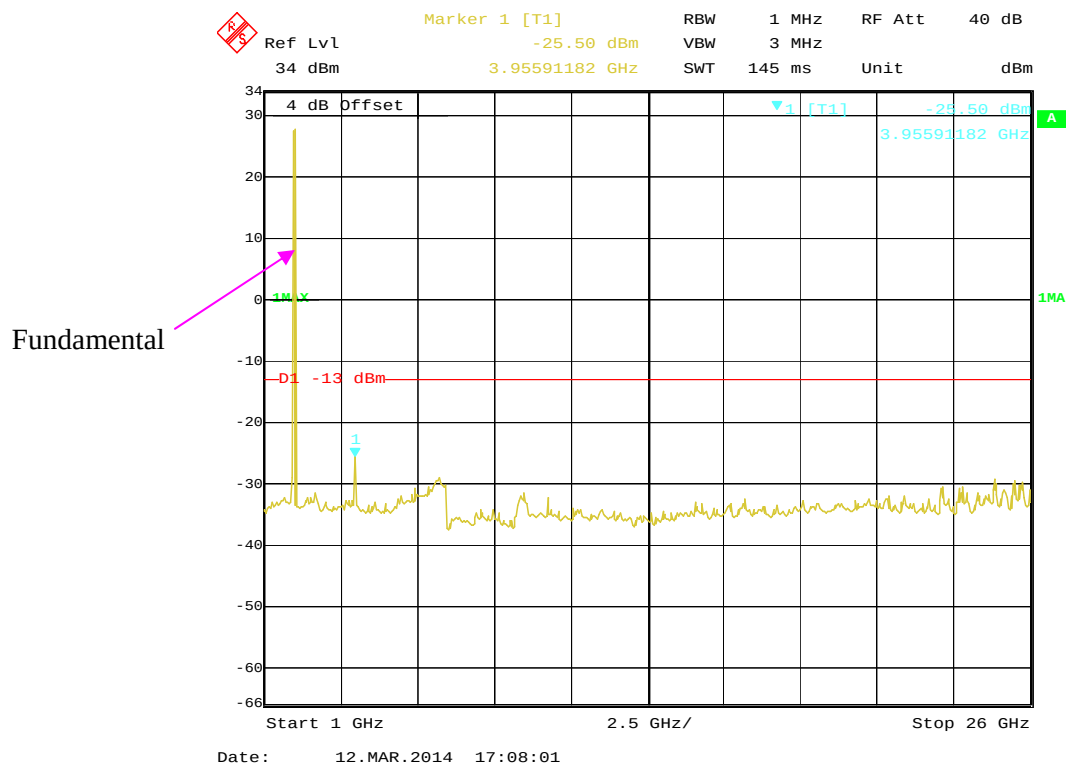


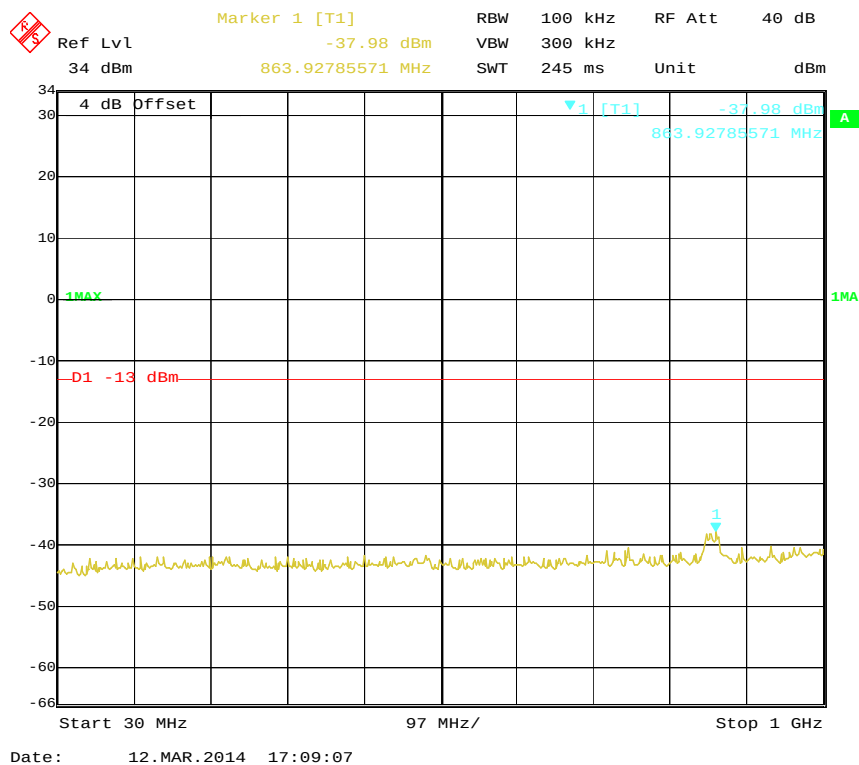
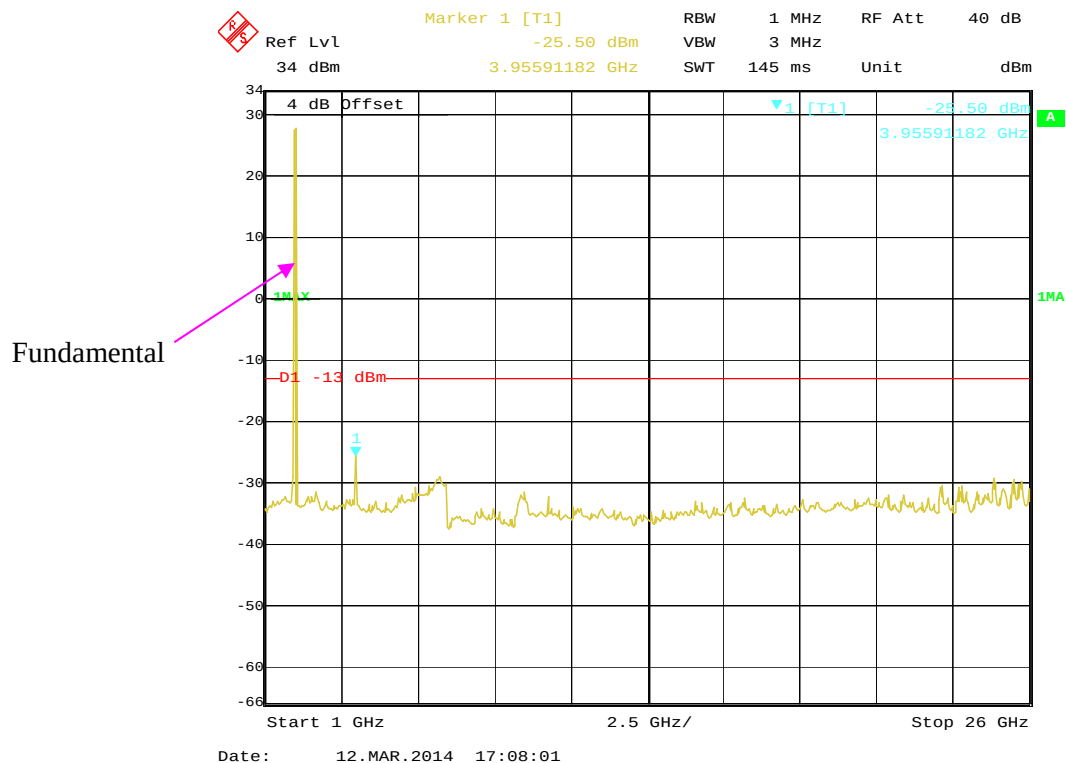
**16QAM (3MHz) Mode: 30 MHz – 1 GHz (Low Channel)****16QAM (3MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

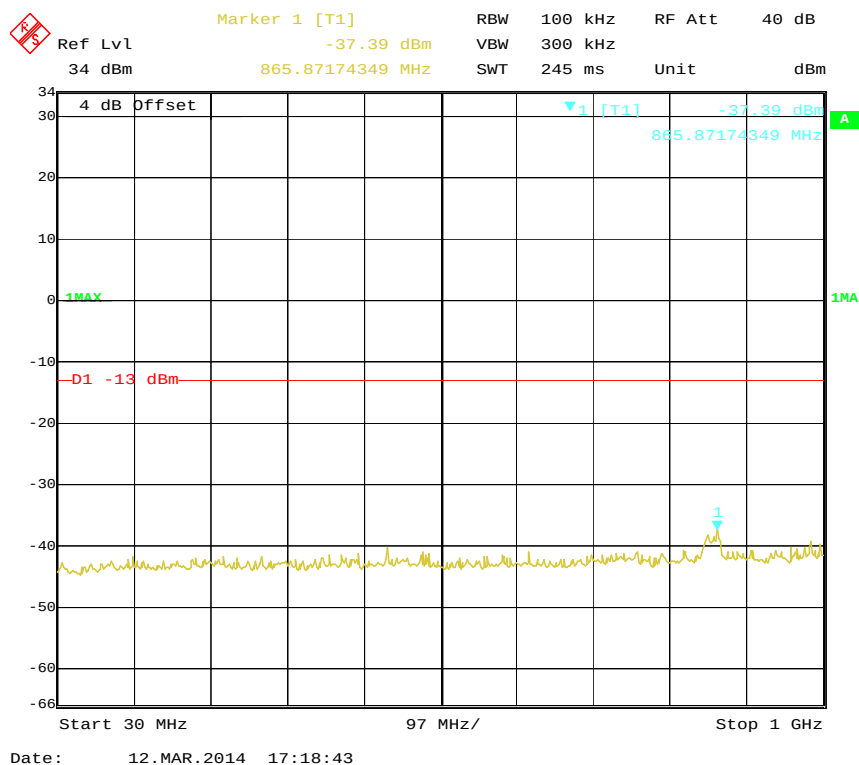
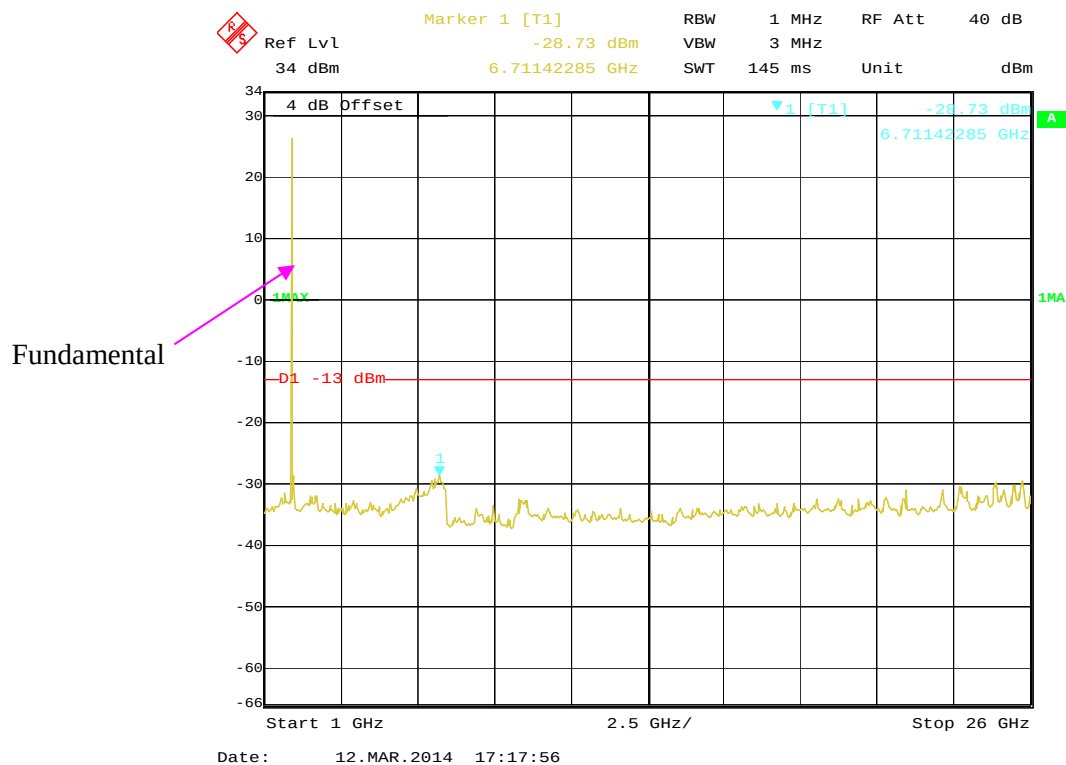
**16QAM (3MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****16QAM (3MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

**16QAM (3MHz) Mode: 30 MHz – 1 GHz (High Channel)****16QAM (3MHz) Mode: 1 GHz – 26 GHz (High Channel)**

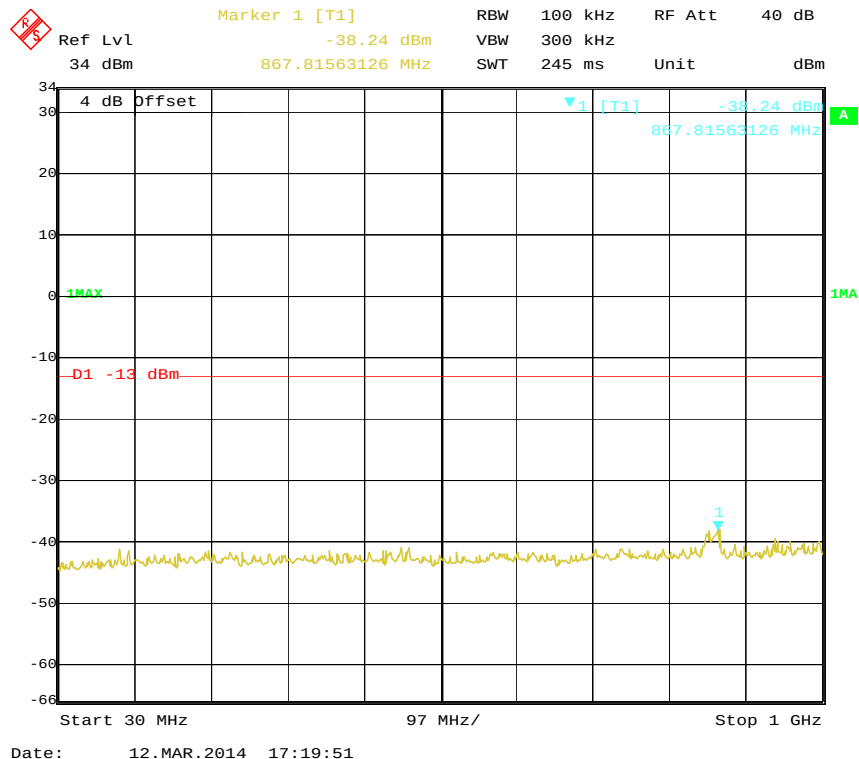
**64QAM (3MHz) Mode: 30 MHz – 1 GHz (Low Channel)****64QAM (3MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

**64QAM (3MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****64QAM (3MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

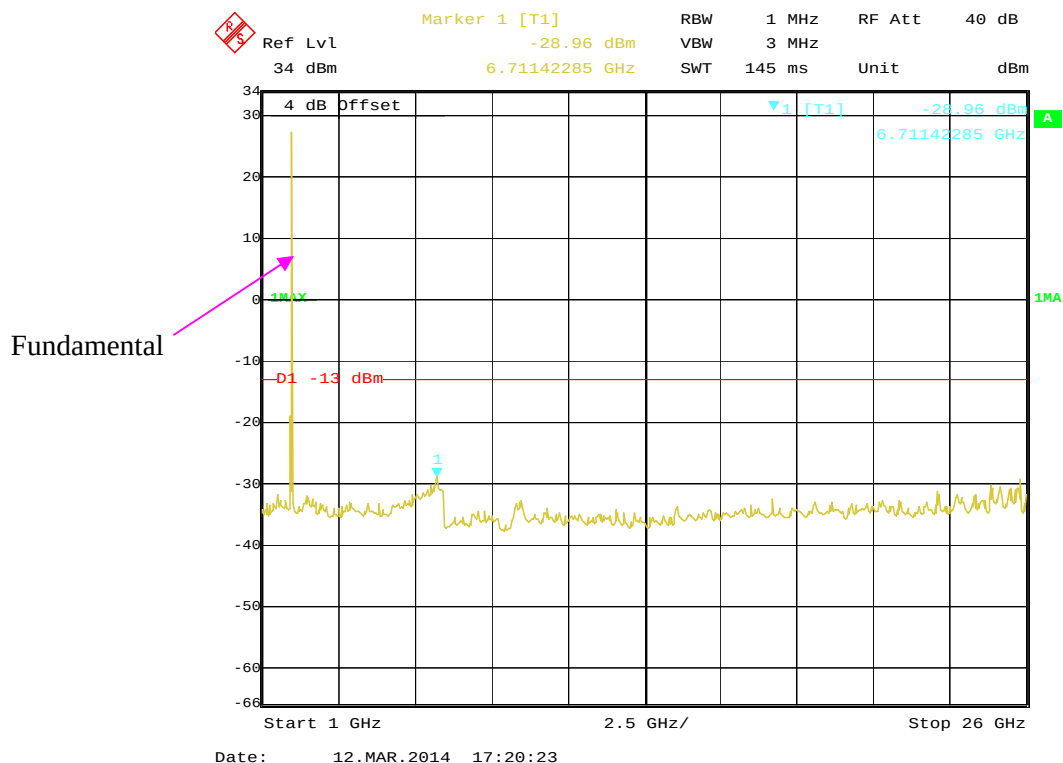
**64QAM (3MHz) Mode: 30 MHz – 1 GHz (High Channel)****64QAM (3MHz) Mode: 1 GHz – 26 GHz (High Channel)**

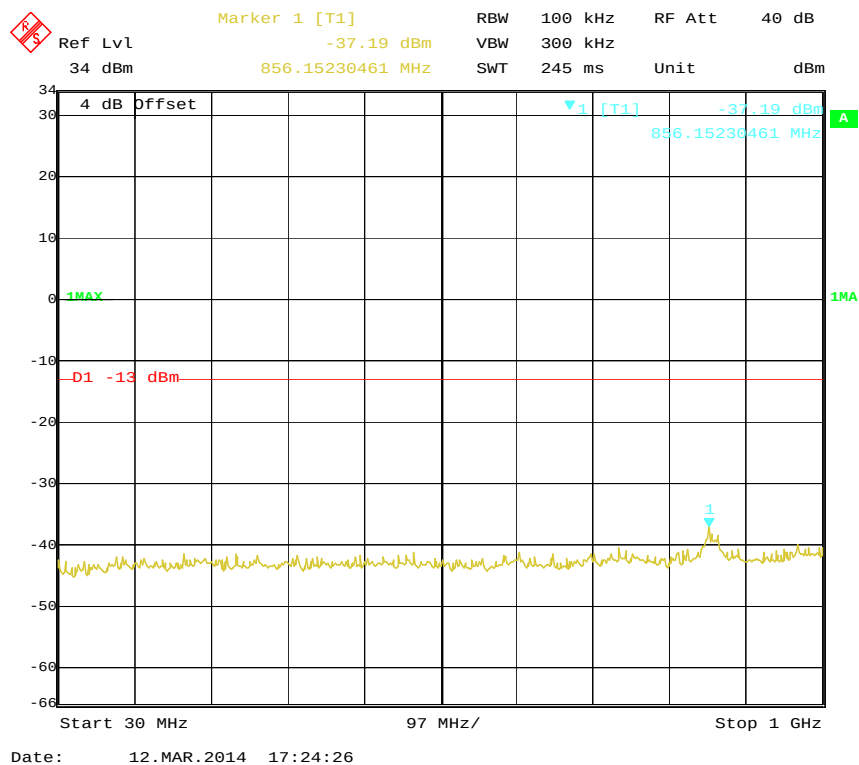
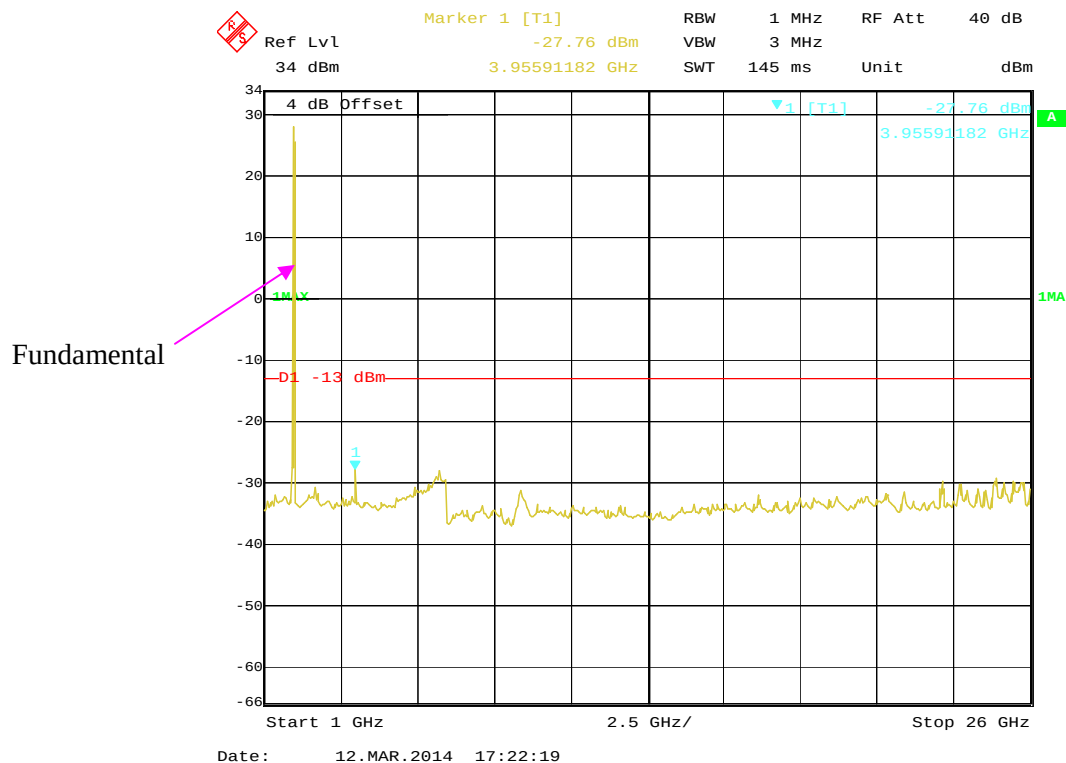
**QPSK (5MHz) Mode: 30 MHz – 1 GHz (Low Channel)****QPSK (5MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

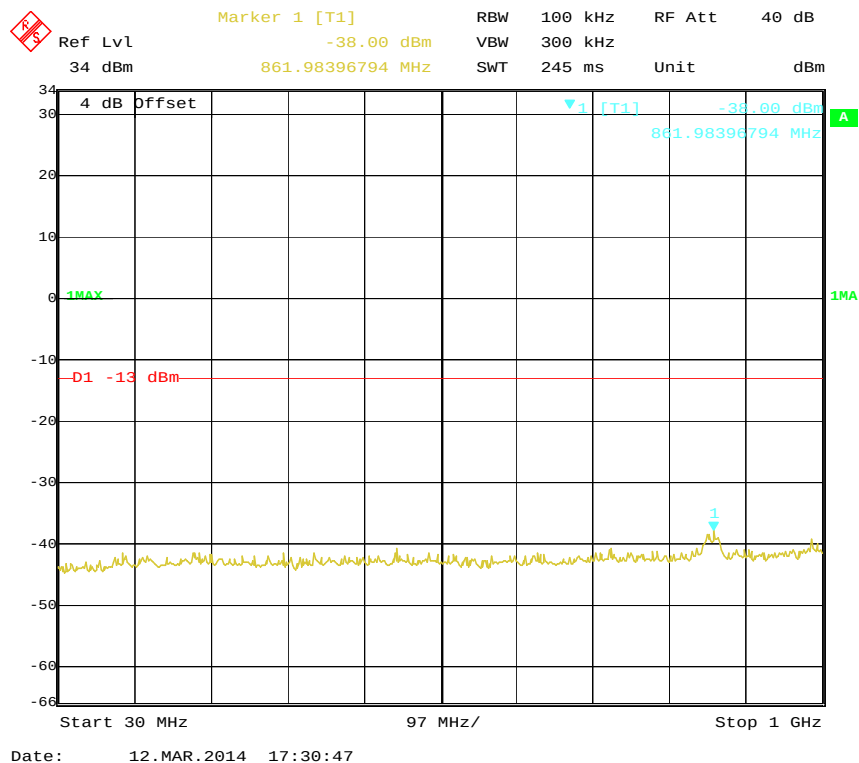
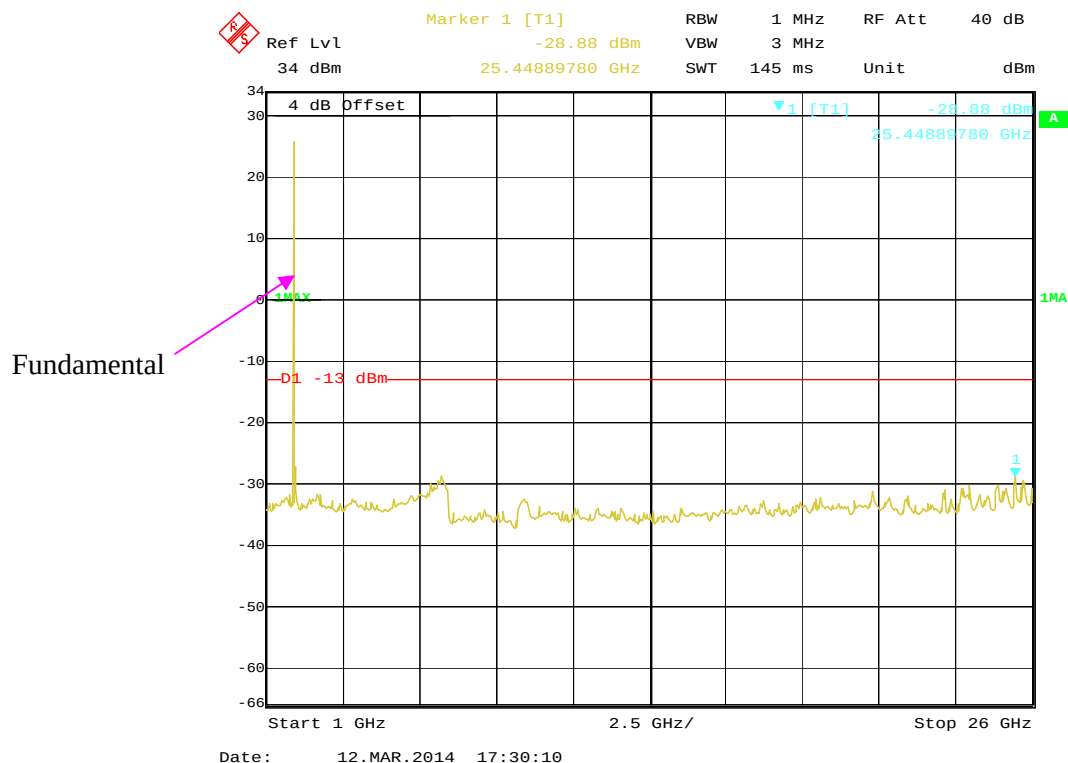
## QPSK (5MHz) Mode: 30 MHz – 1 GHz (Middle Channel)

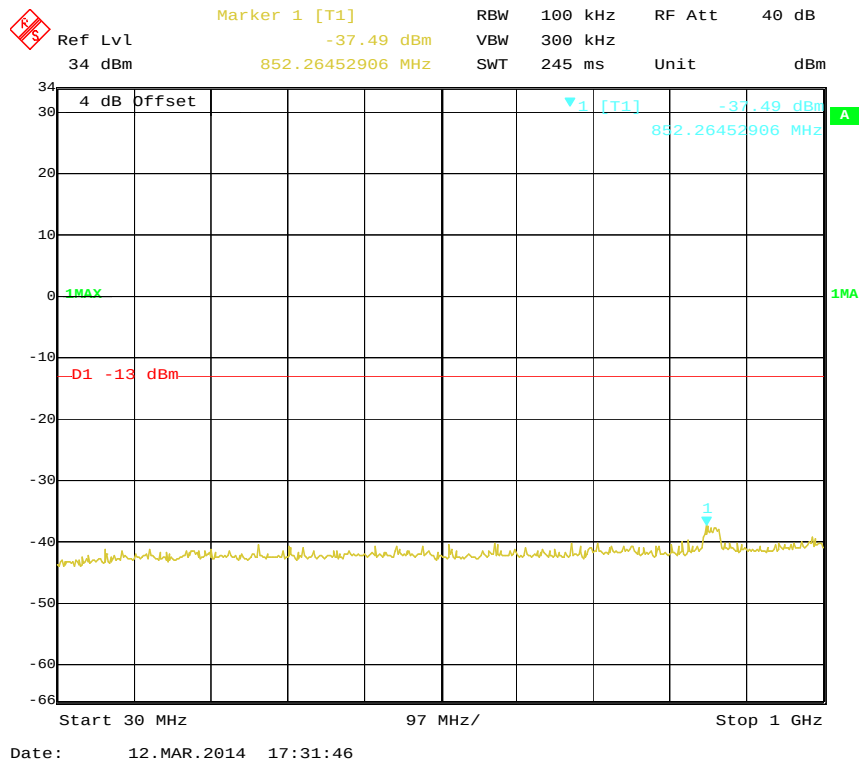
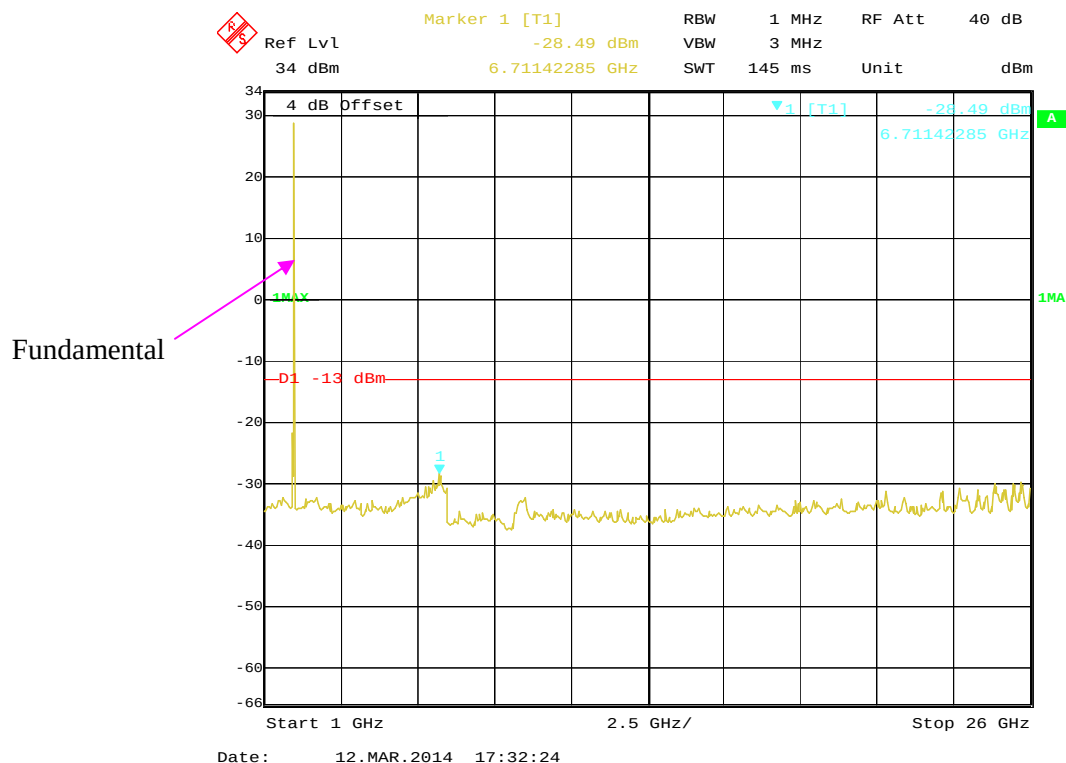


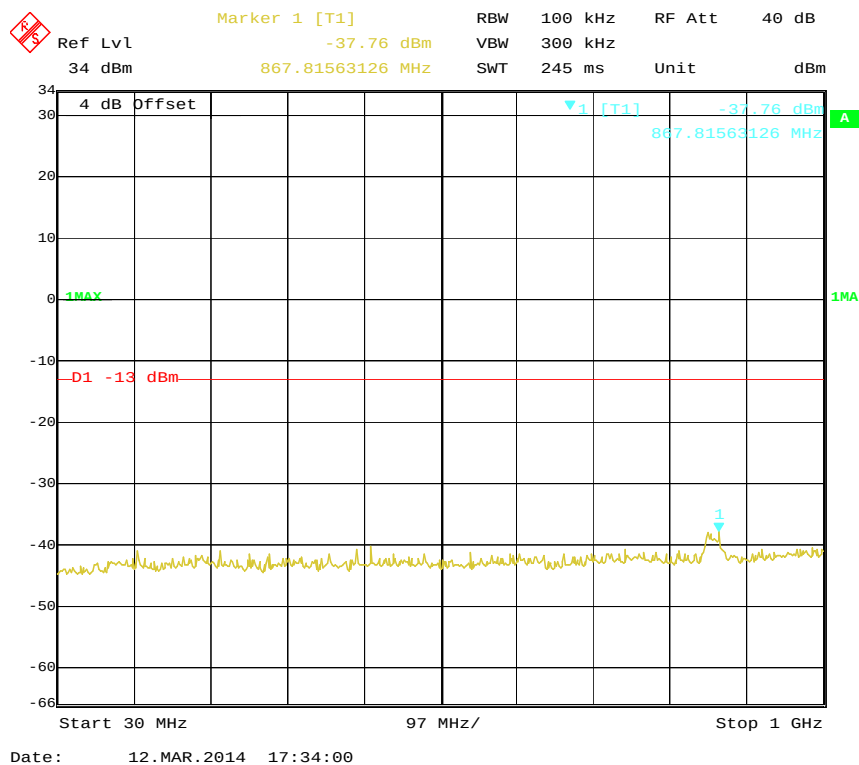
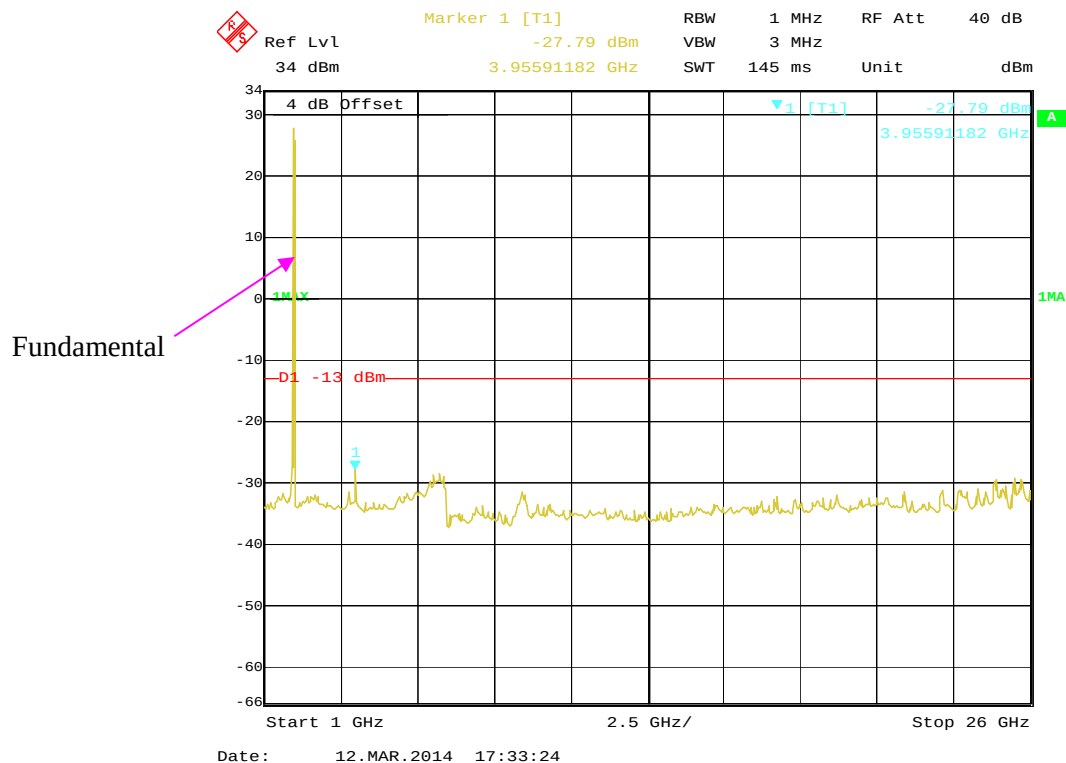
## QPSK (5MHz) Mode: 1 GHz – 26 GHz (Middle Channel)

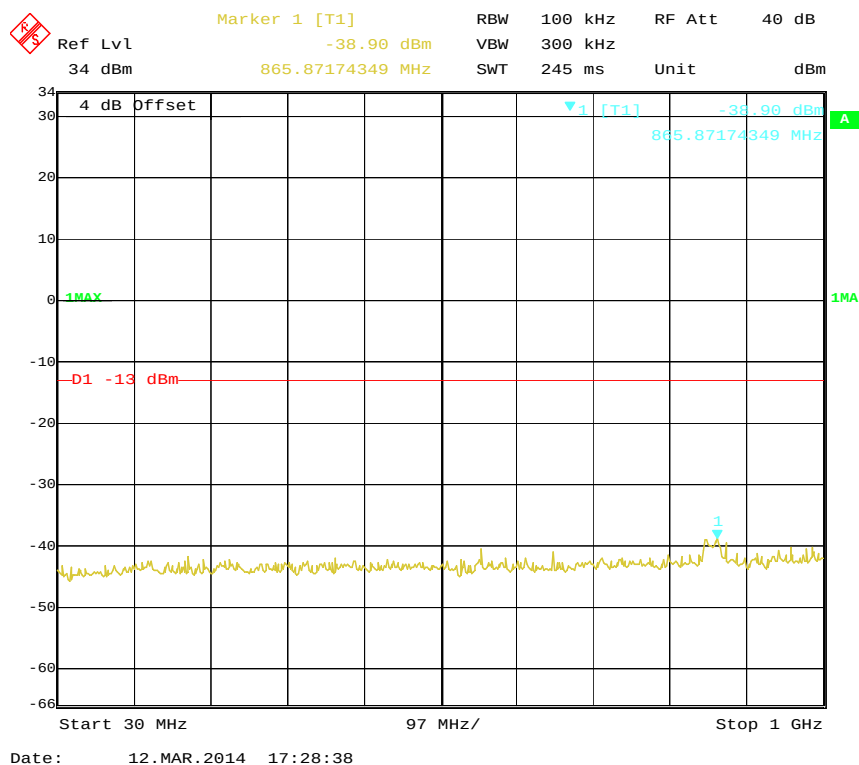
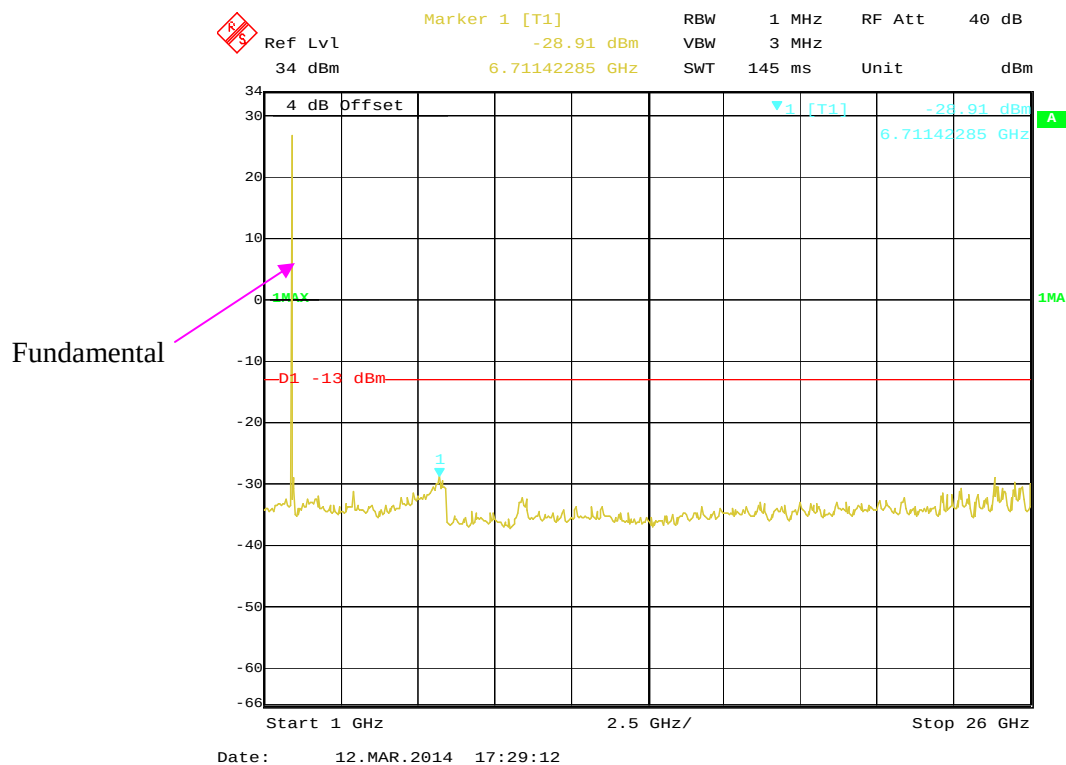


**QPSK (5MHz) Mode: 30 MHz – 1 GHz (High Channel)****QPSK (5MHz) Mode: 1 GHz – 26 GHz (High Channel)**

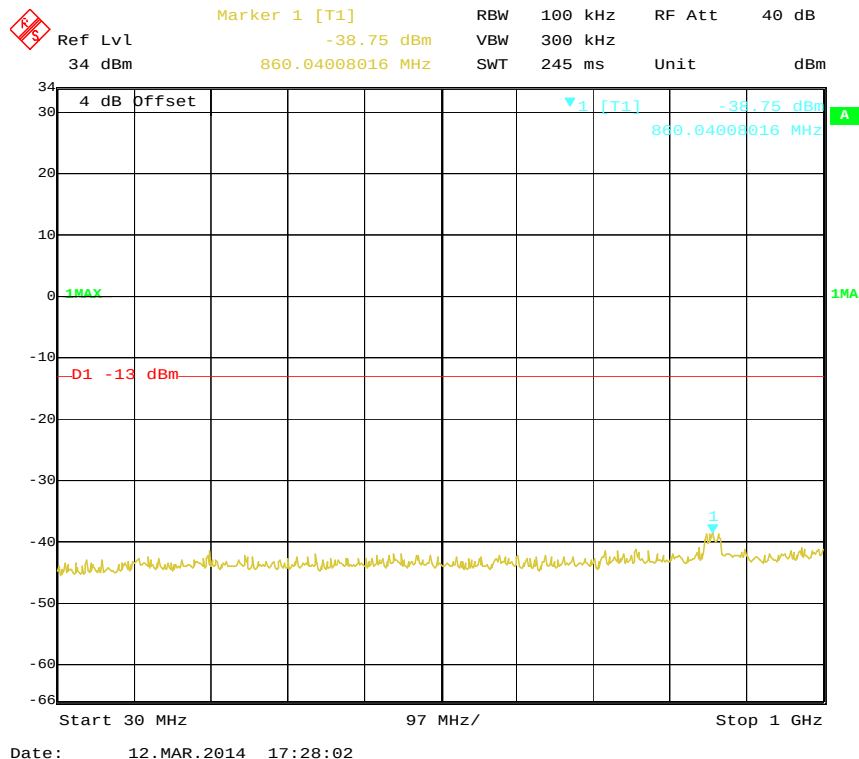
**16QAM (5MHz) Mode: 30 MHz – 1 GHz (Low Channel)****16QAM (5MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

**16QAM (5MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****16QAM (5MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

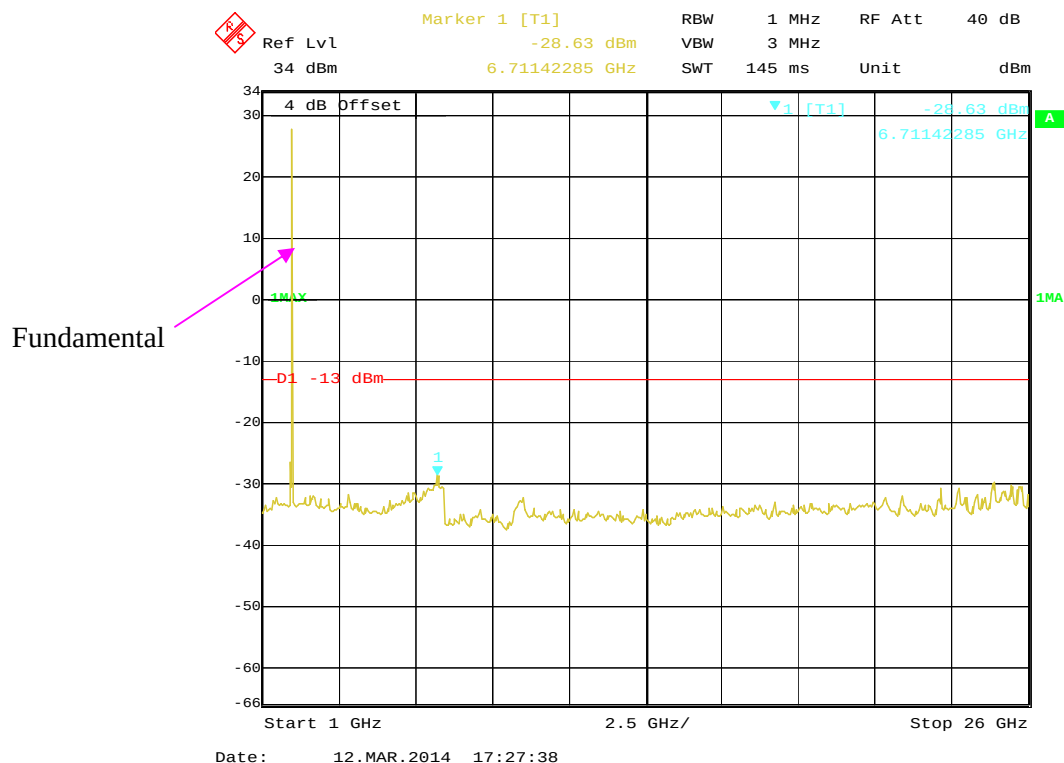
**16QAM (5MHz) Mode: 30 MHz – 1 GHz (High Channel)****16QAM (5MHz) Mode: 1 GHz – 26 GHz (High Channel)**

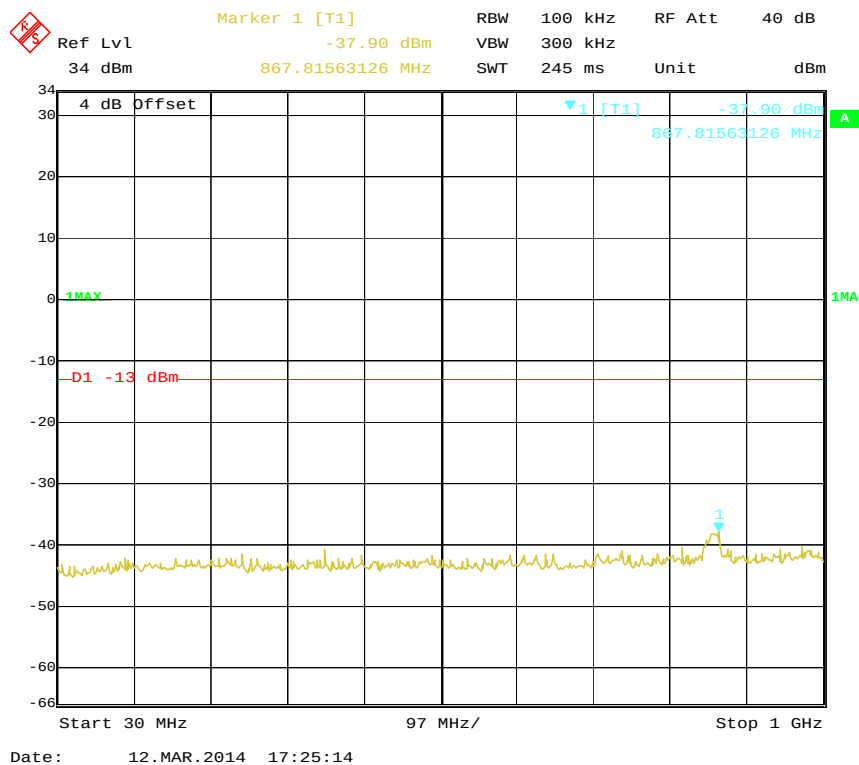
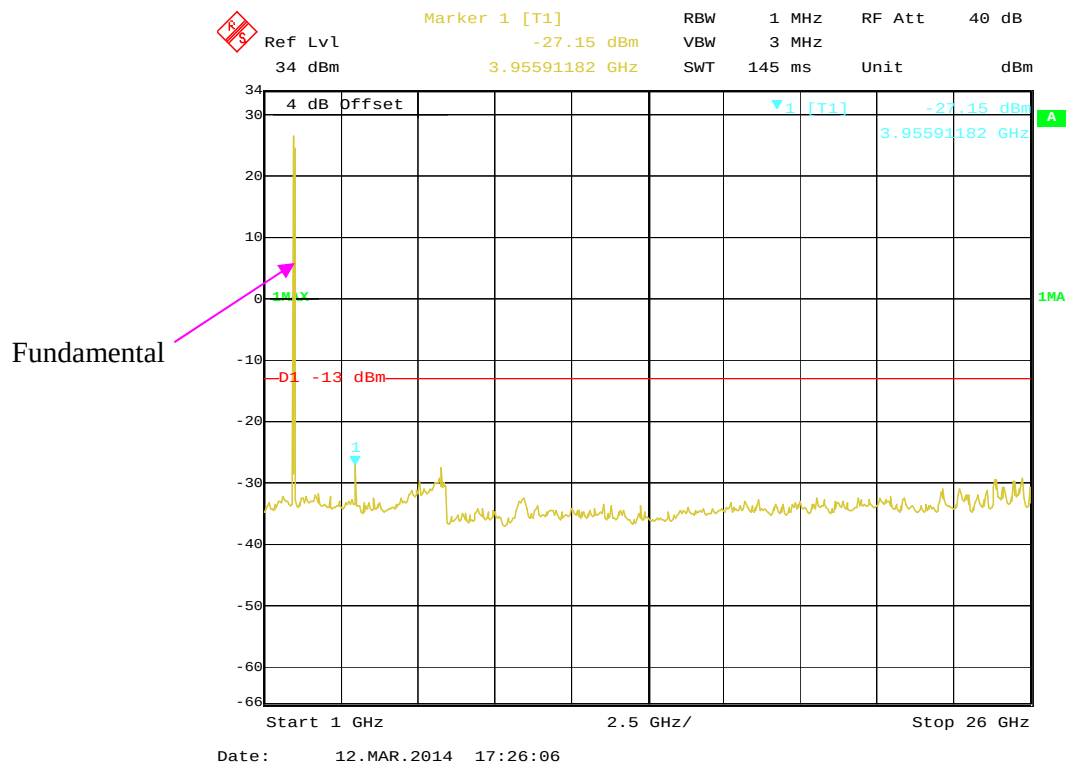
**64QAM (5MHz) Mode: 30 MHz – 1 GHz (Low Channel)****64QAM (5MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

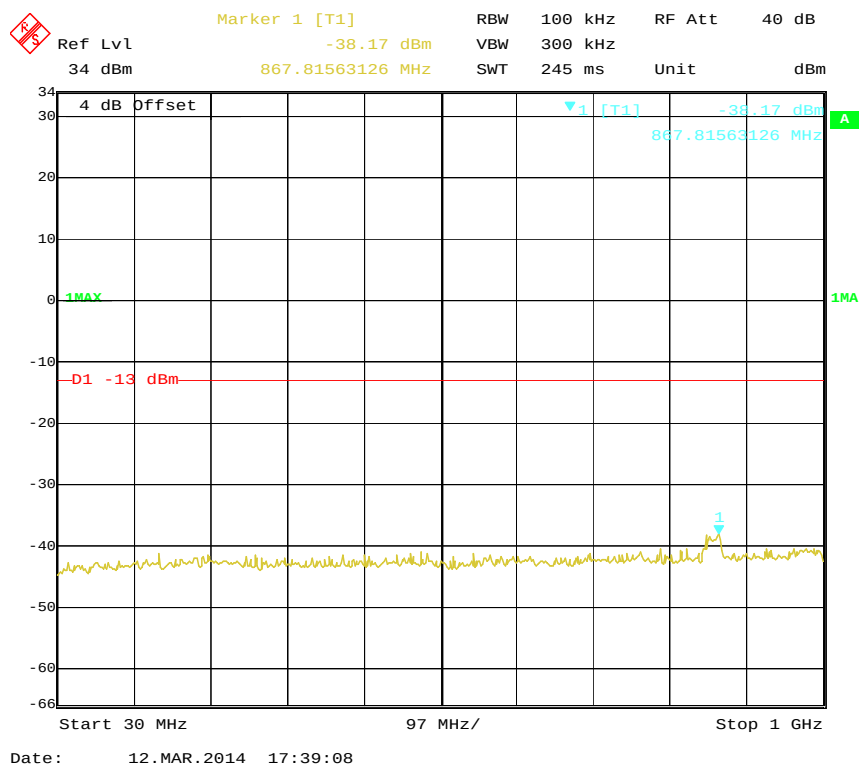
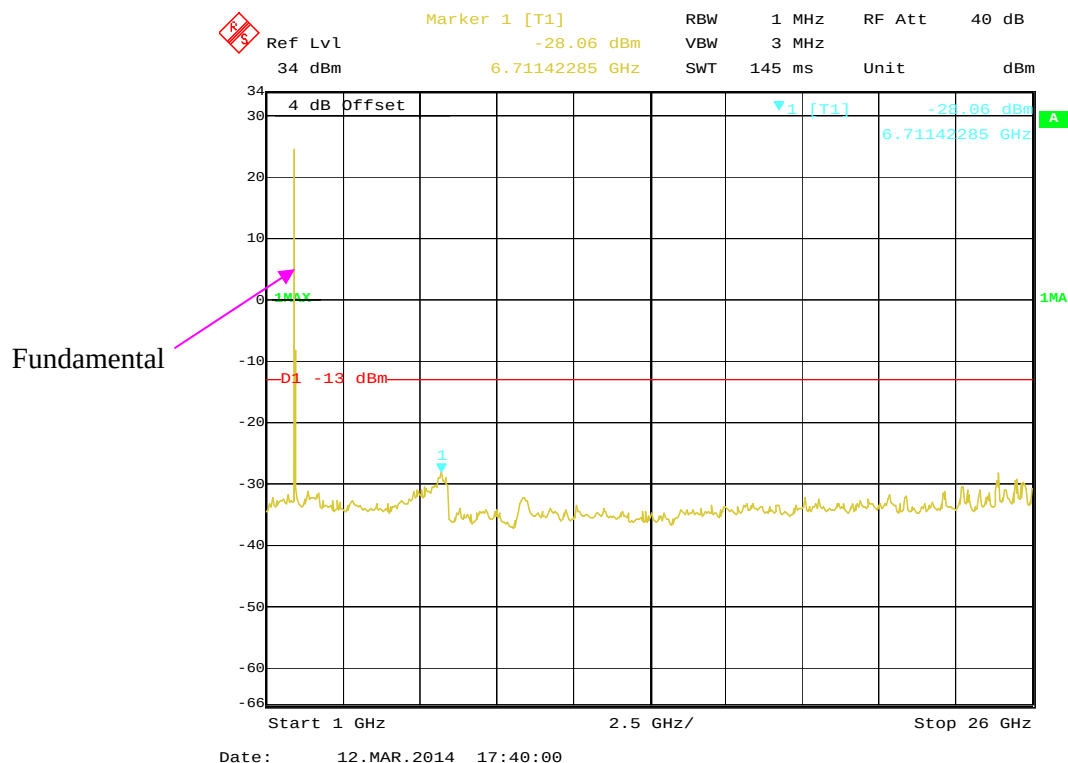
### 64QAM (5MHz) Mode: 30 MHz – 1 GHz (Middle Channel)

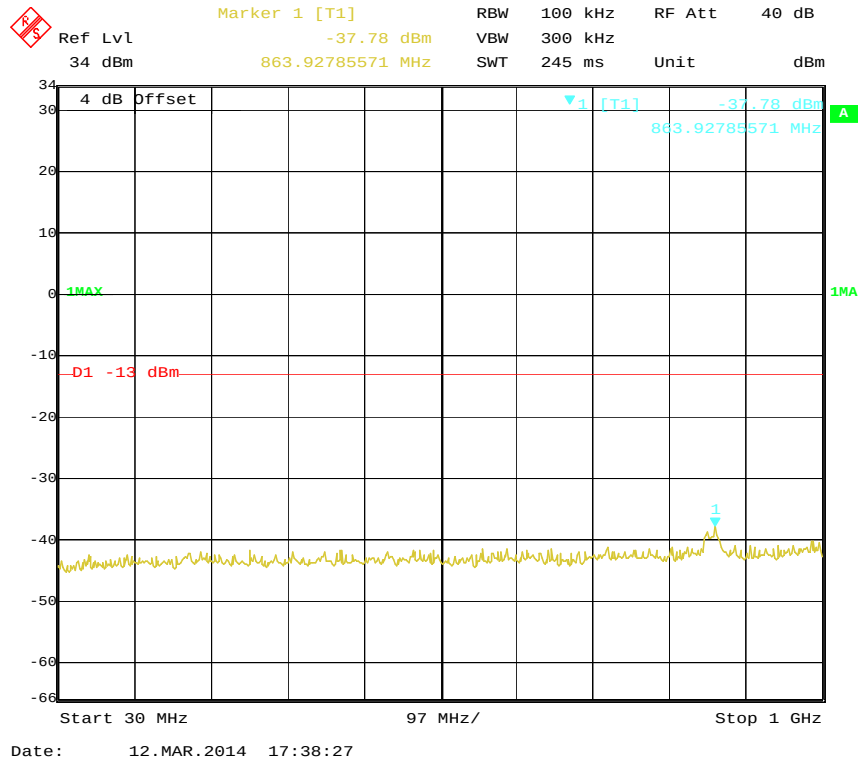
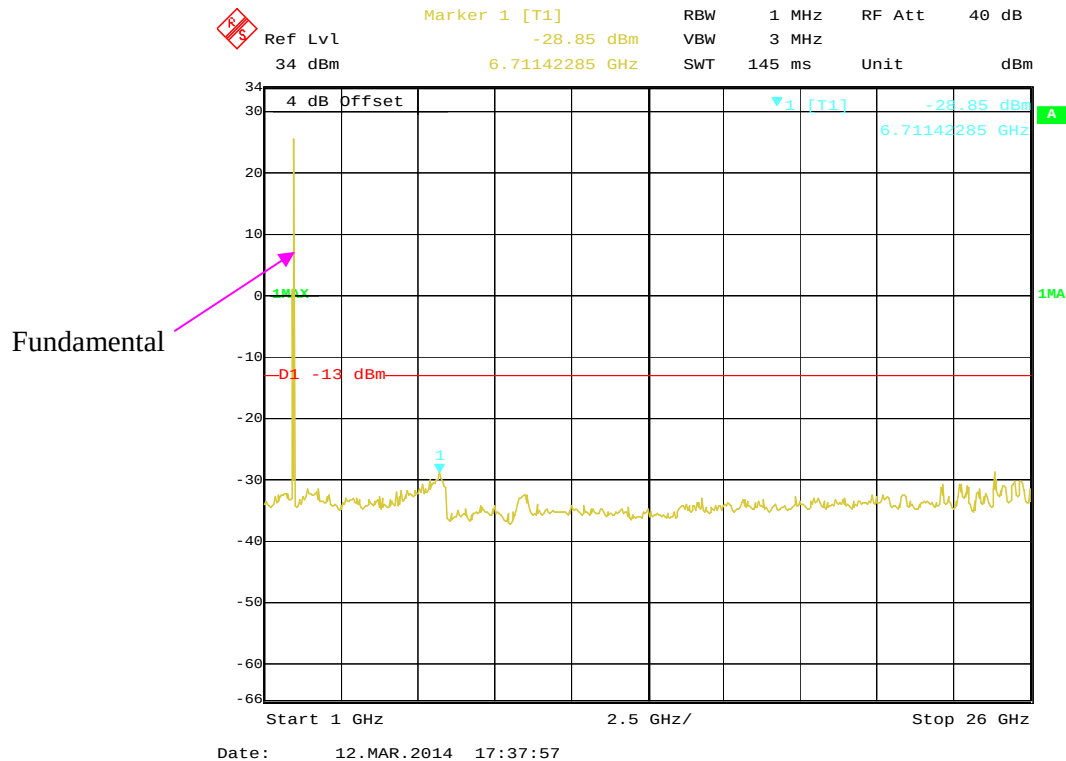


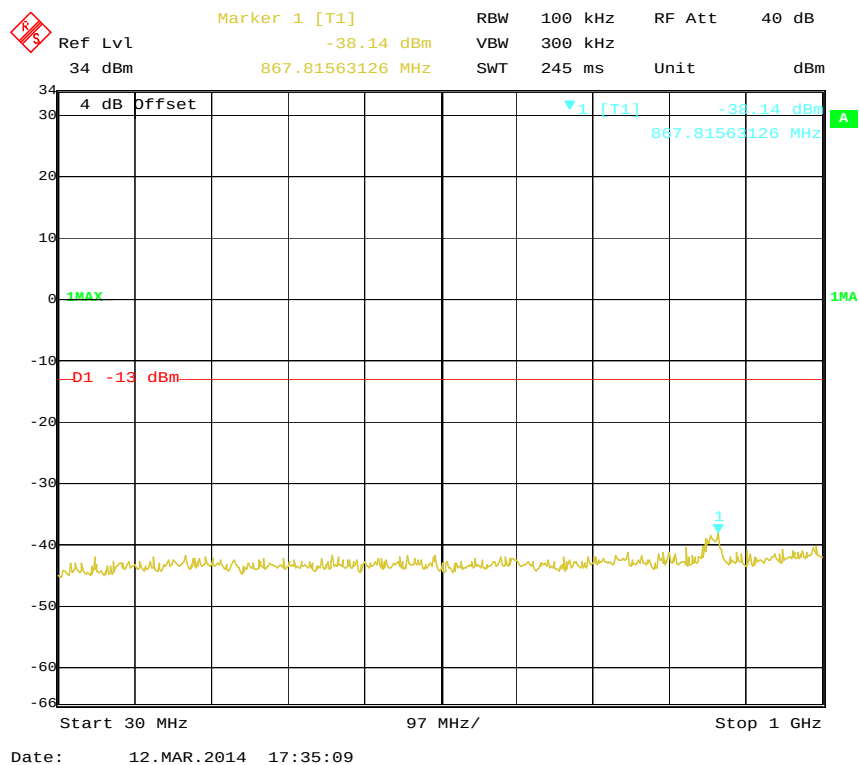
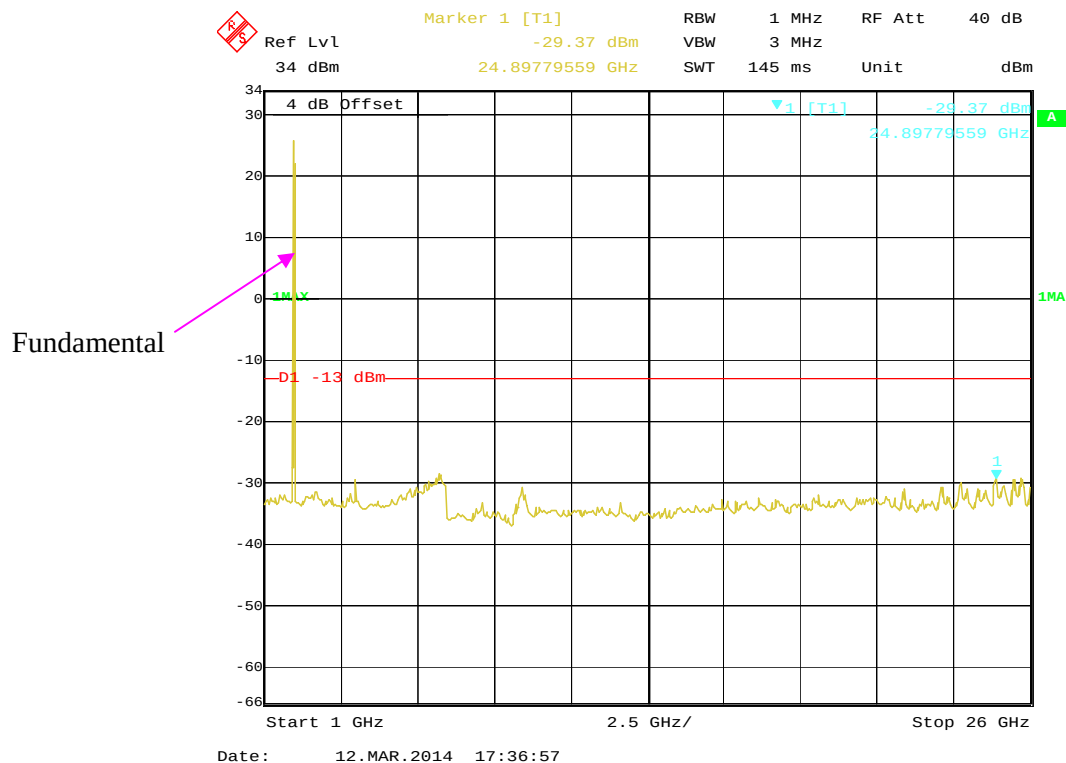
### 64QAM (5MHz) Mode: 1 GHz – 26 GHz (Middle Channel)

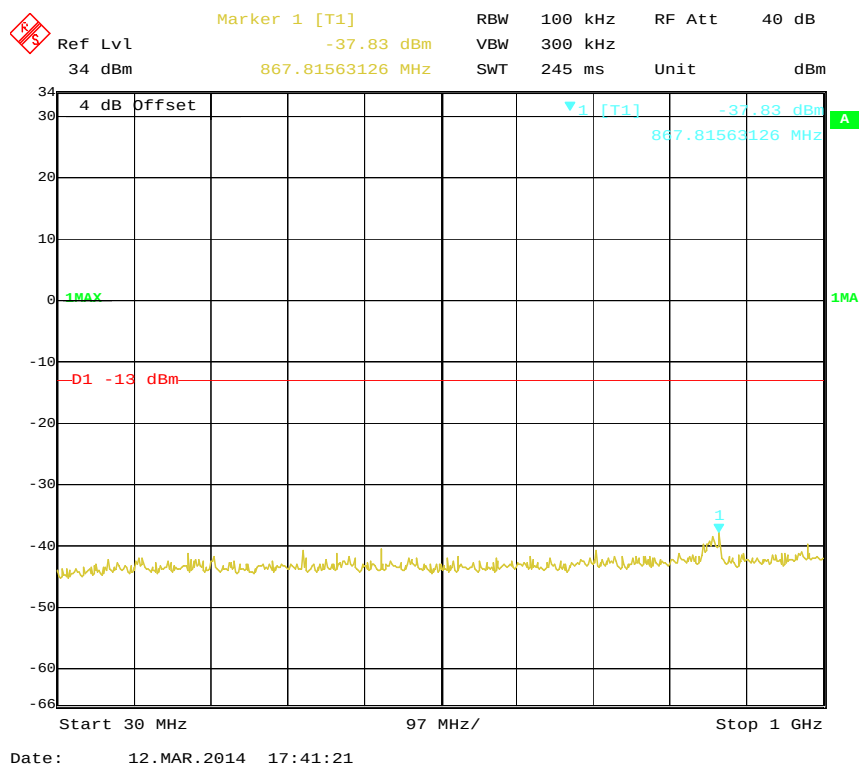
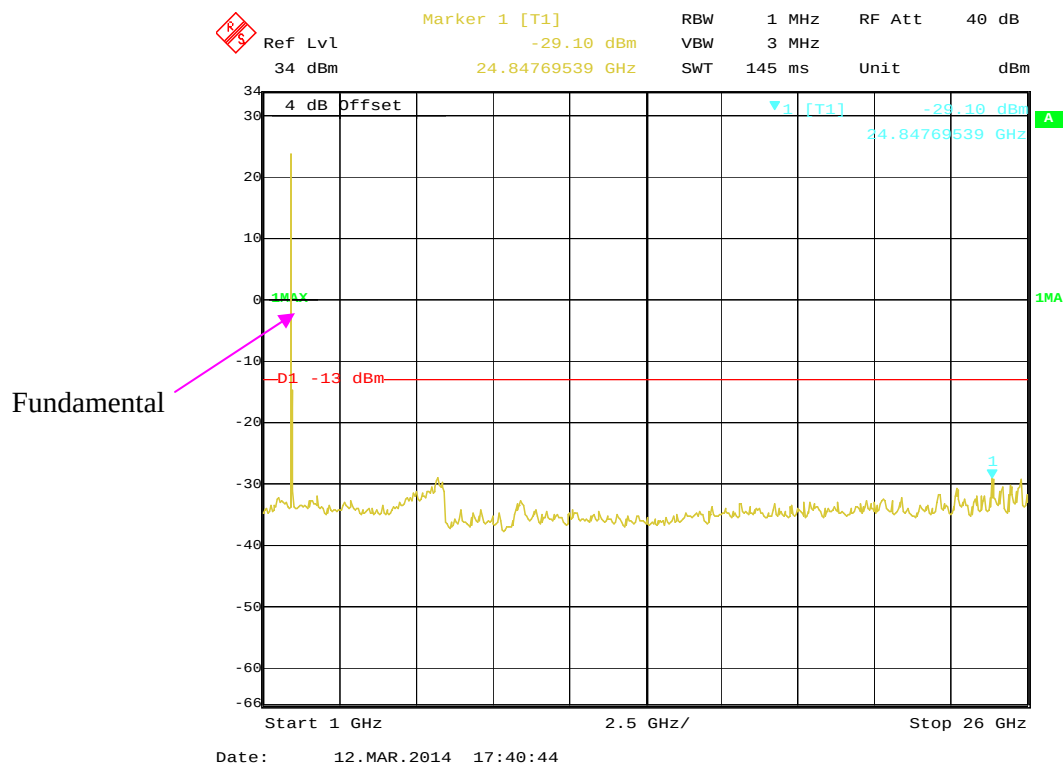


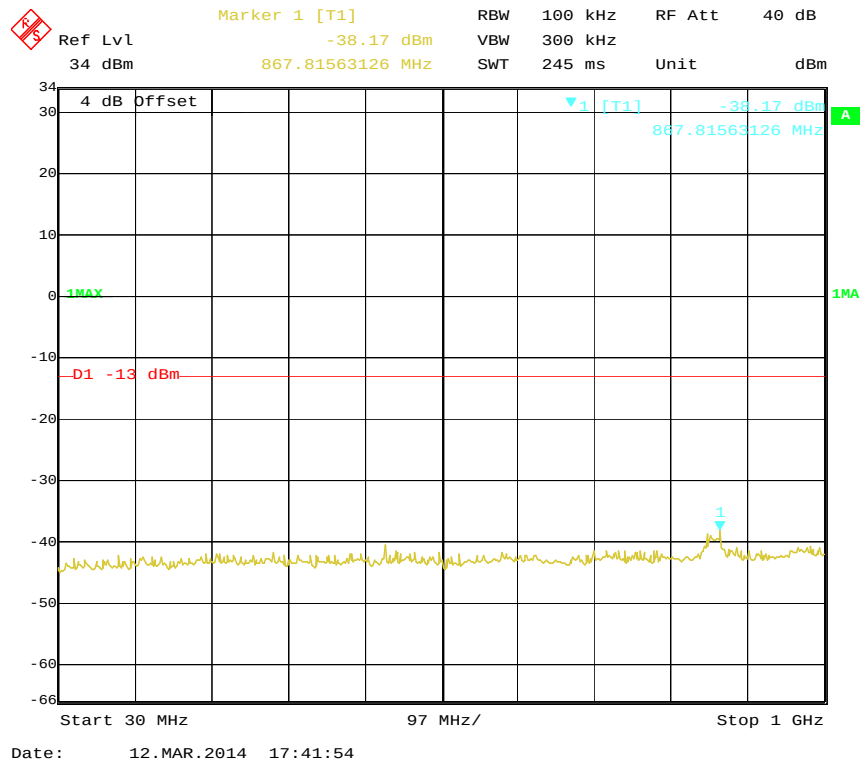
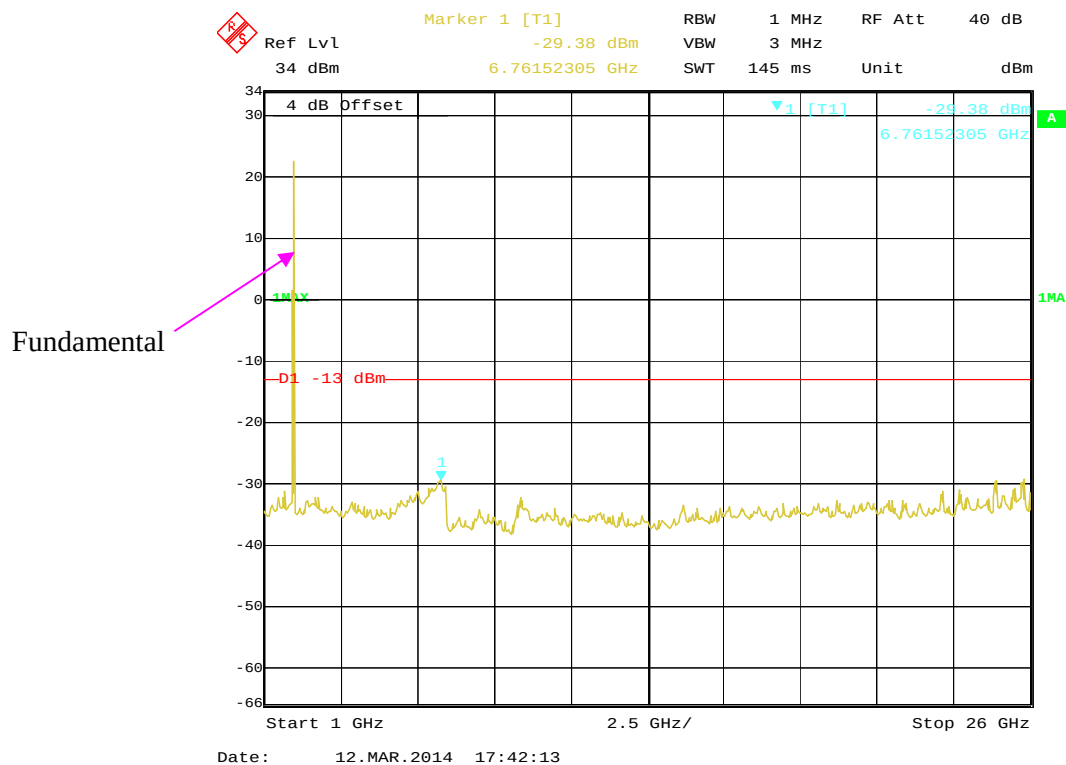
**64QAM (5MHz) Mode: 30 MHz – 1 GHz (High Channel)****64QAM (5MHz) Mode: 1 GHz – 26 GHz (High Channel)**

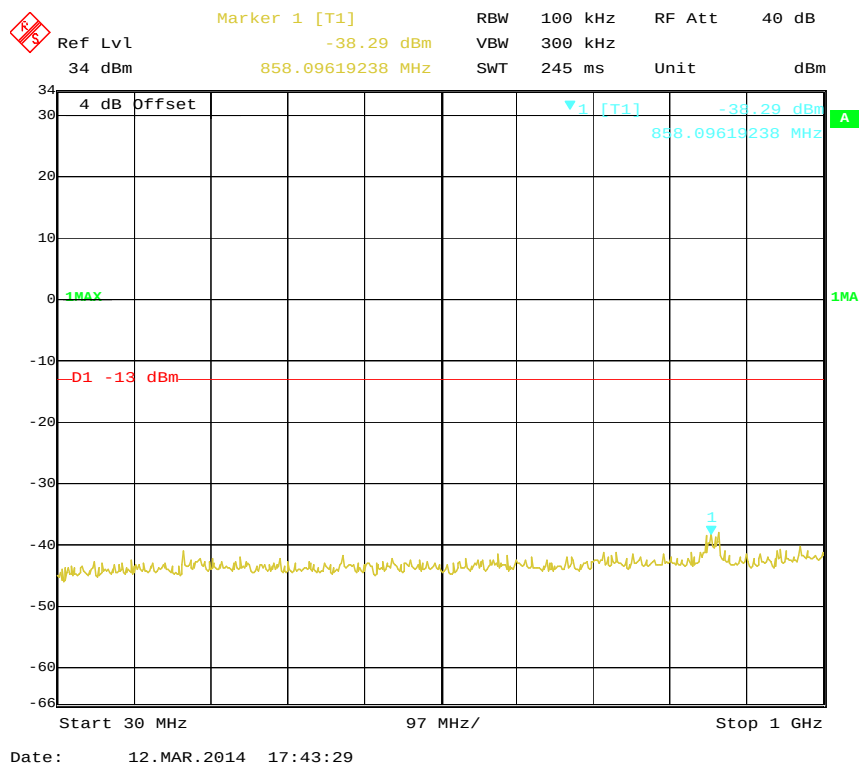
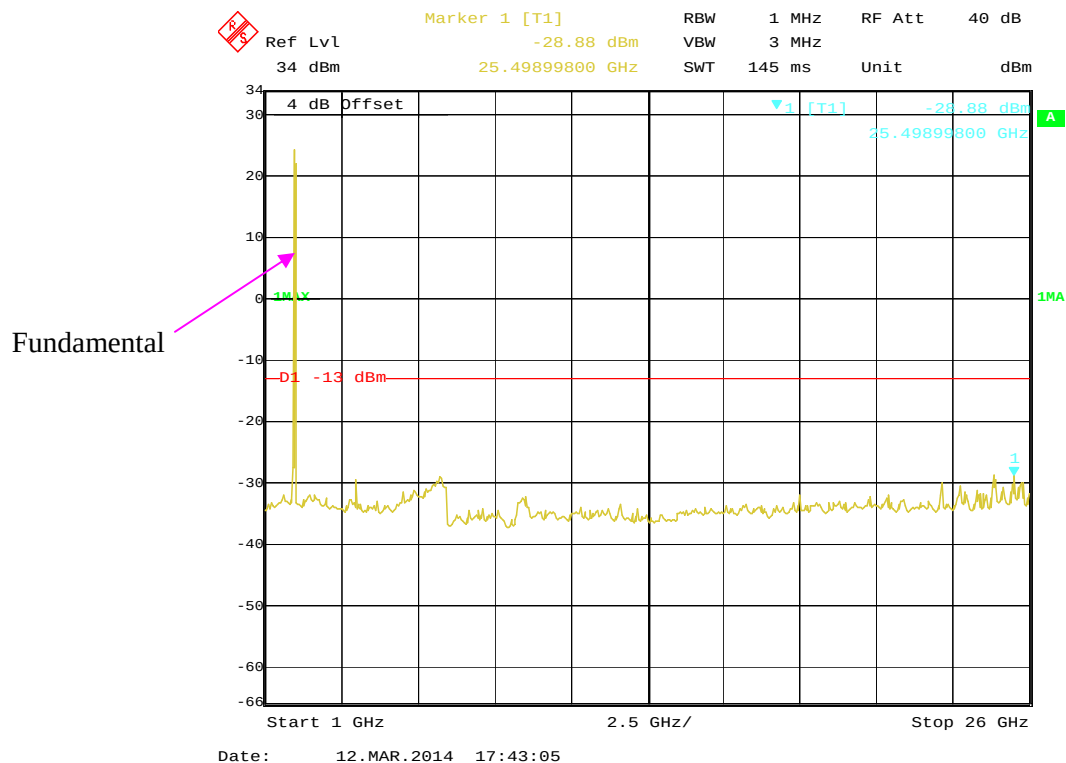
**QPSK (10MHz) Mode: 30 MHz – 1 GHz (Low Channel)****QPSK (10MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

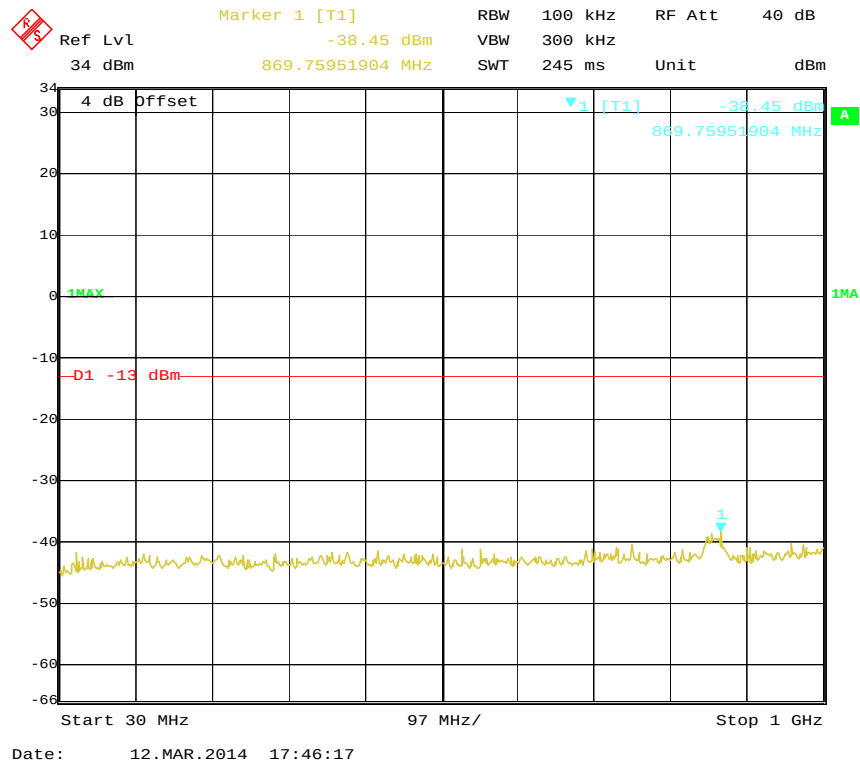
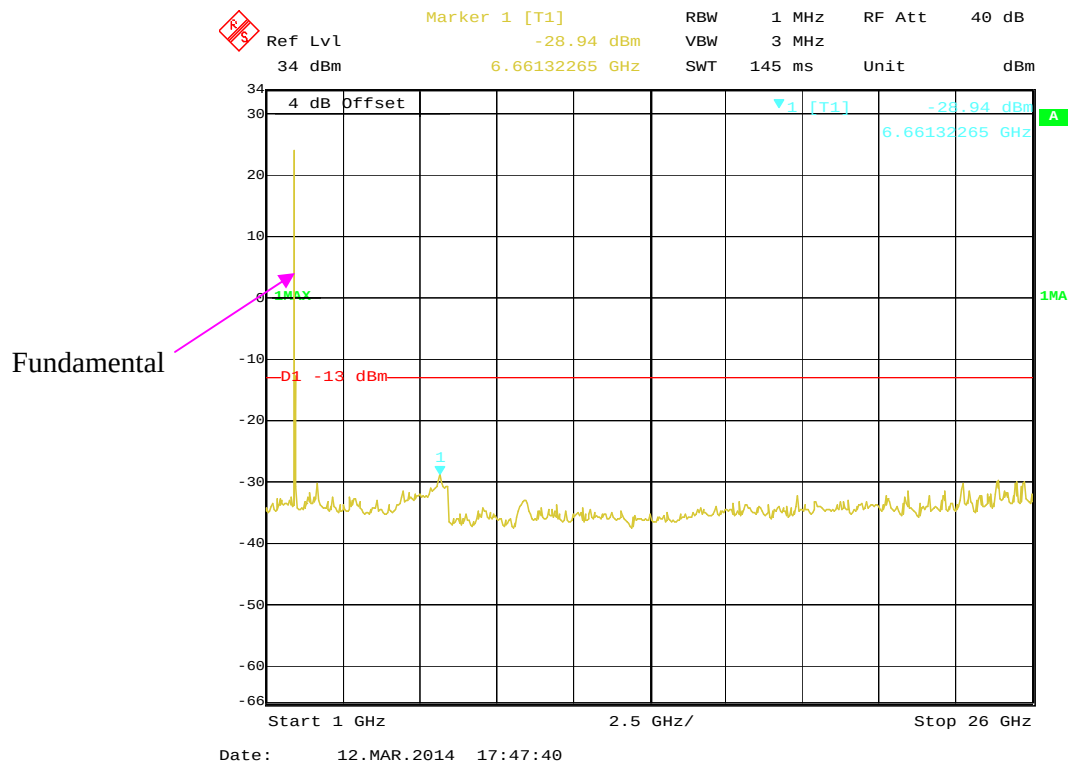
**QPSK (10MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****QPSK (10MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

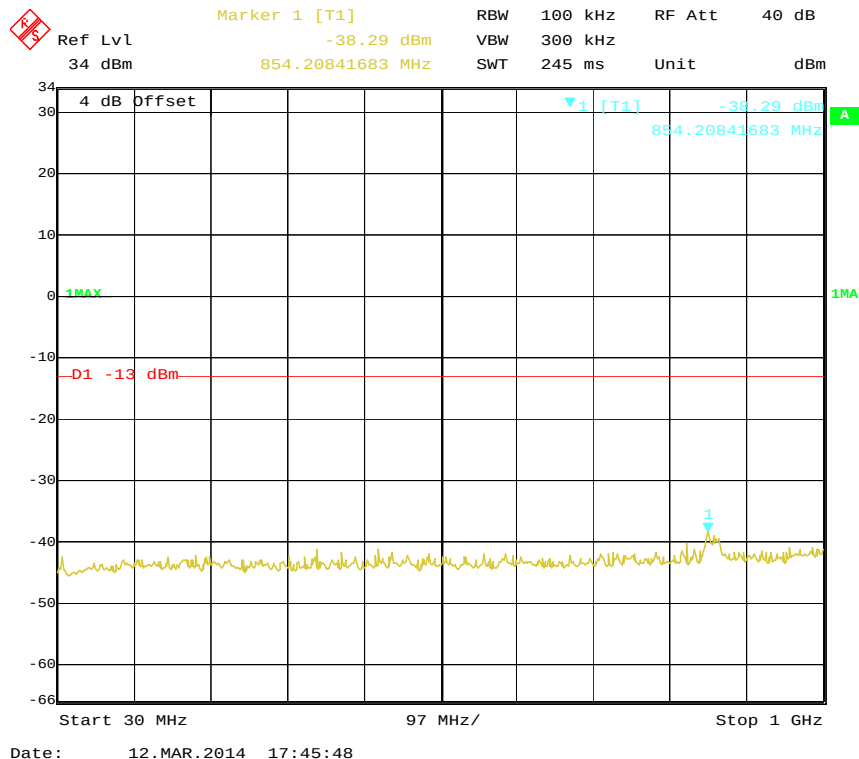
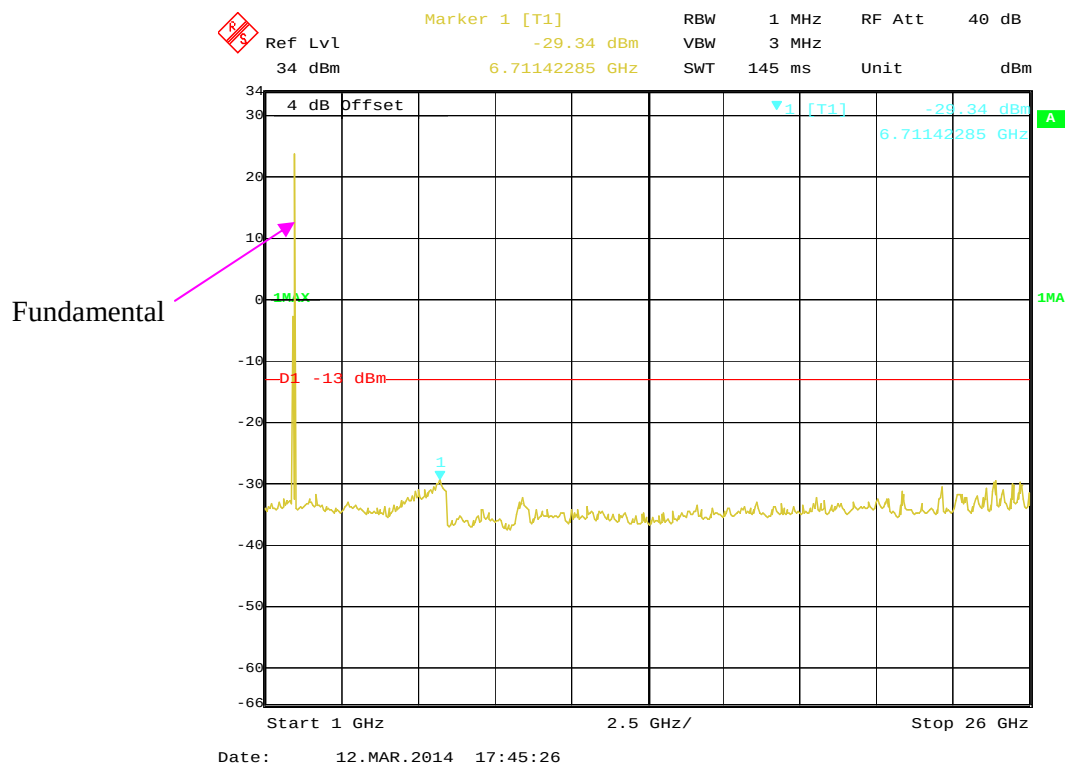
**QPSK (10MHz) Mode: 30 MHz – 1 GHz (High Channel)****QPSK (10MHz) Mode: 1 GHz – 26 GHz (High Channel)**

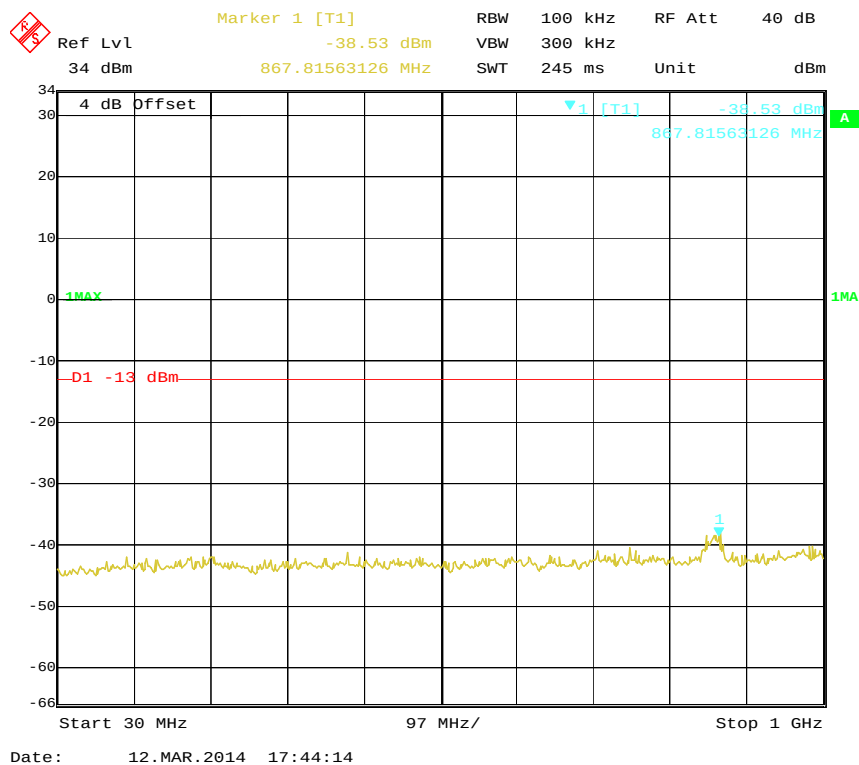
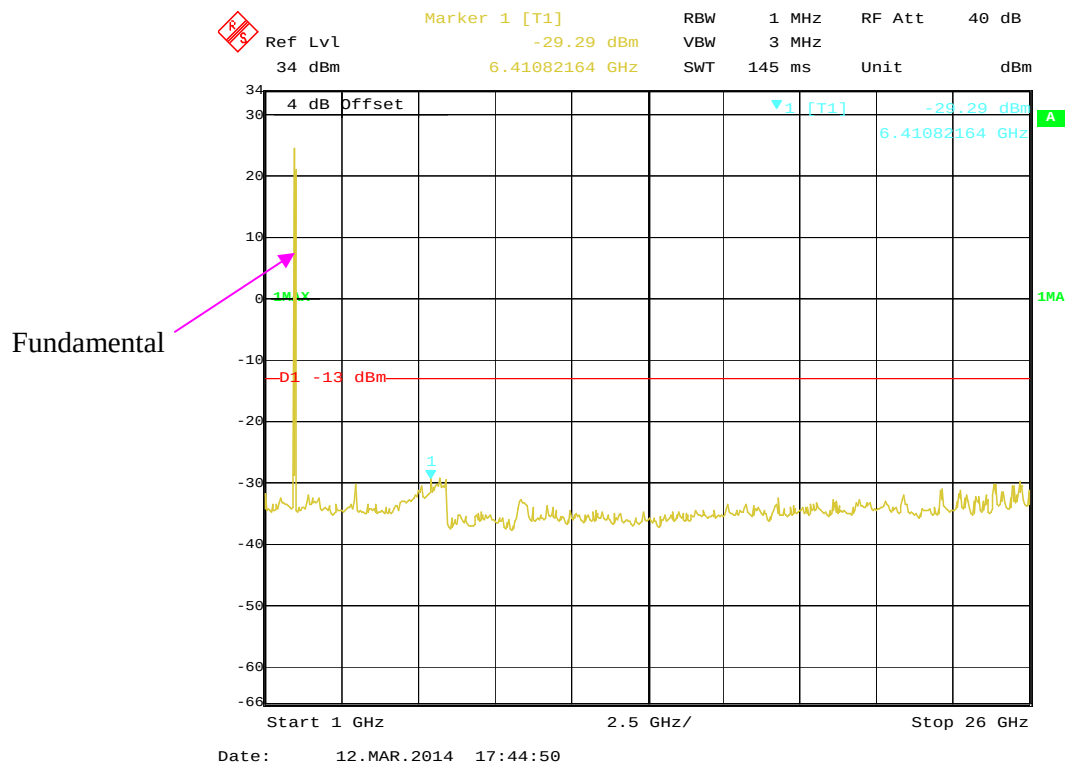
**16QAM (10MHz) Mode: 30 MHz – 1 GHz (Low Channel)****16QAM (10MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

**16QAM (10MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****16QAM (10MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

**16QAM (10MHz) Mode: 30 MHz – 1 GHz (High Channel)****16QAM (10MHz) Mode: 1 GHz – 26 GHz (High Channel)**

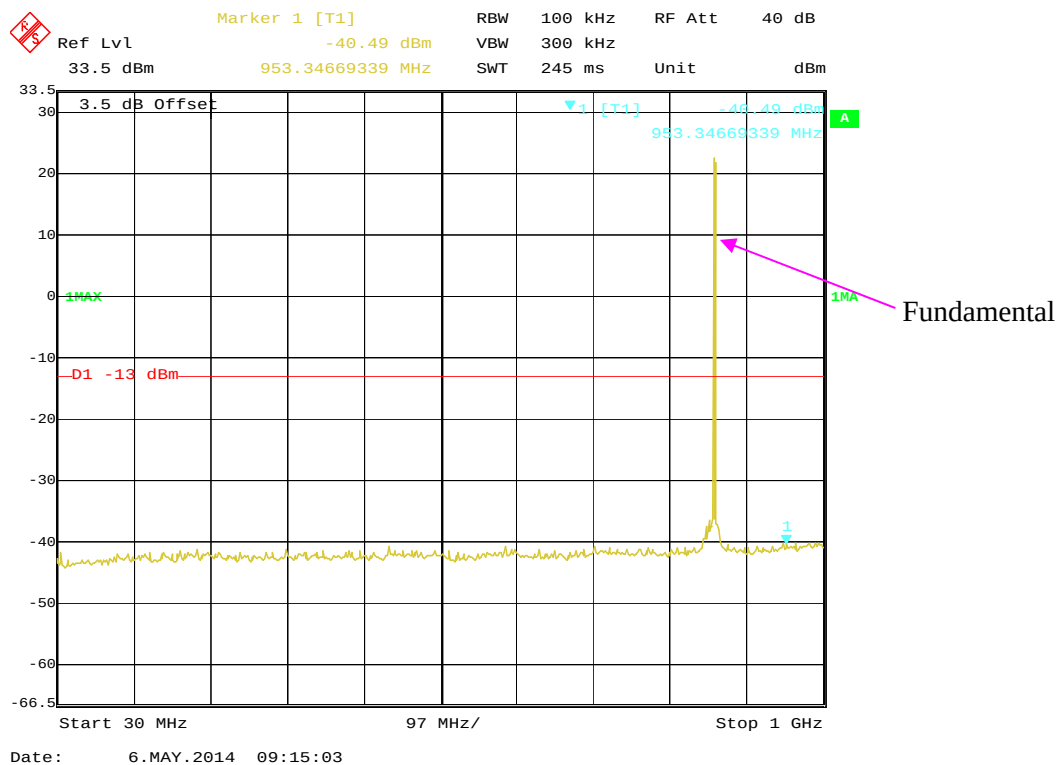
**64QAM (10MHz) Mode: 30 MHz – 1 GHz (Low Channel)****64QAM (10MHz) Mode: 1 GHz – 26 GHz (Low Channel)**

**64QAM (10MHz) Mode: 30 MHz – 1 GHz (Middle Channel)****64QAM (10MHz) Mode: 1 GHz – 26 GHz (Middle Channel)**

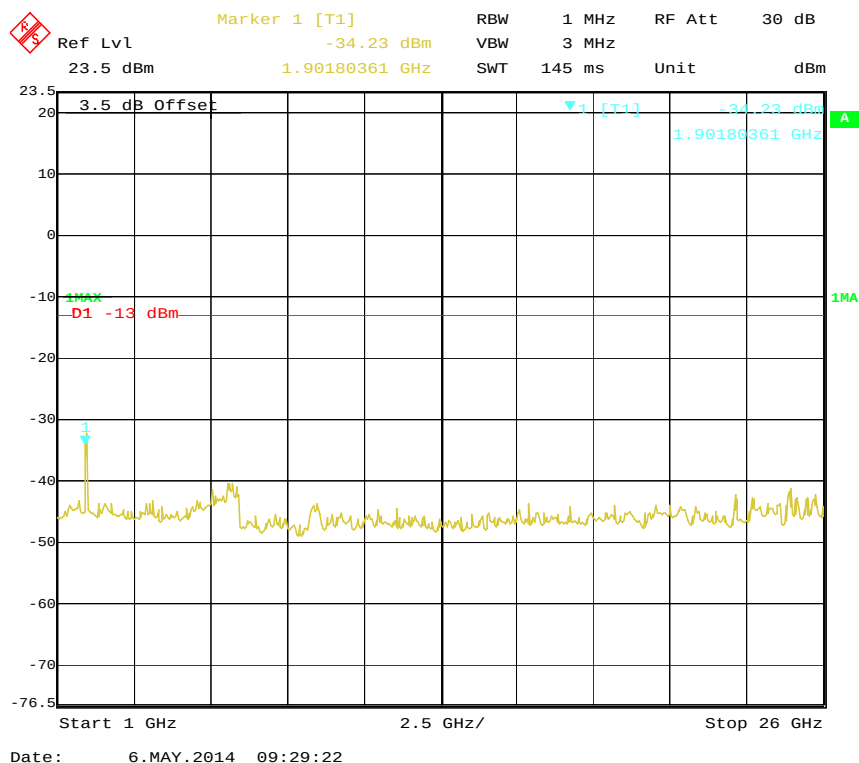
**64QAM (10MHz) Mode: 30 MHz – 1 GHz (High Channel)****64QAM (10MHz) Mode: 1 GHz – 26 GHz (High Channel)**

862 ~ 869 MHz:

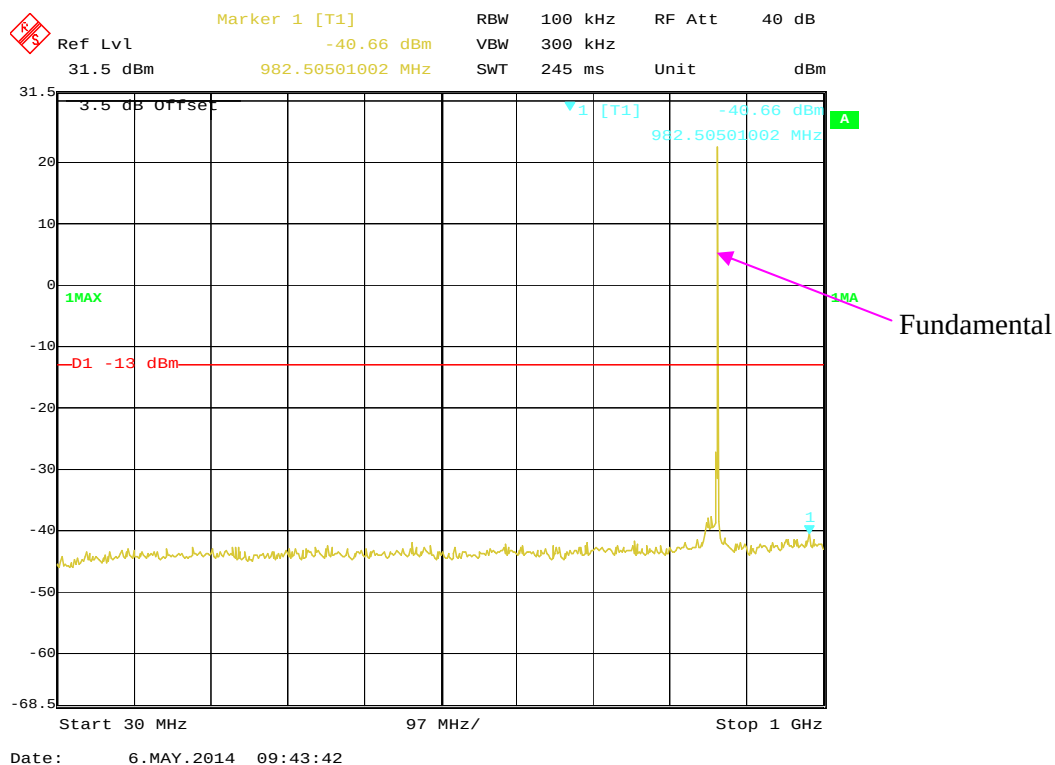
## IDEN Mode, 30 MHz – 1 GHz (Low Channel)



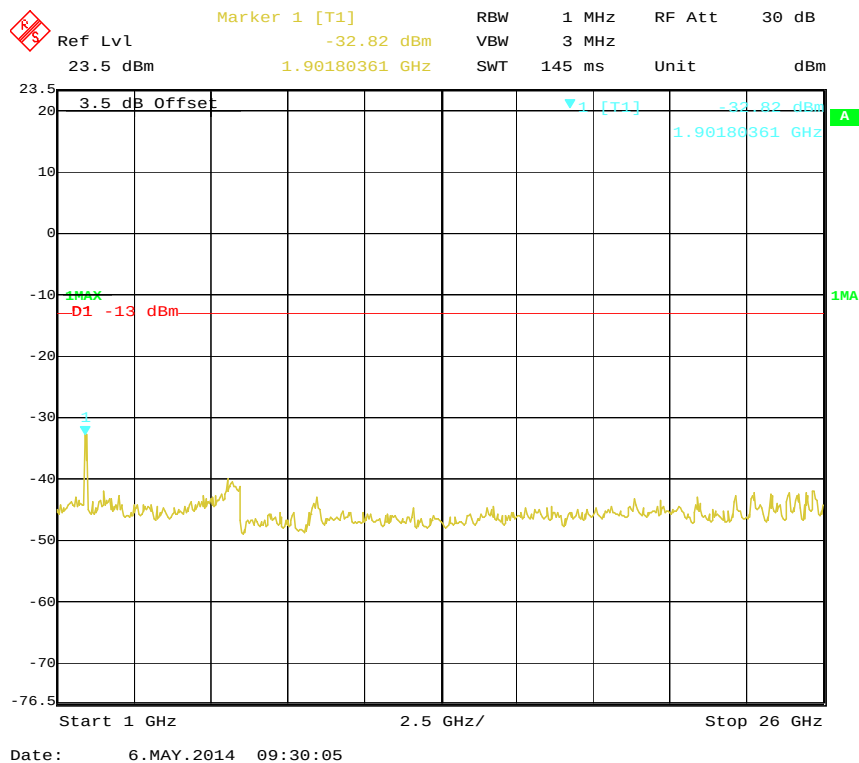
## IDEN Mode, 1 GHz – 26 GHz (Low Channel)

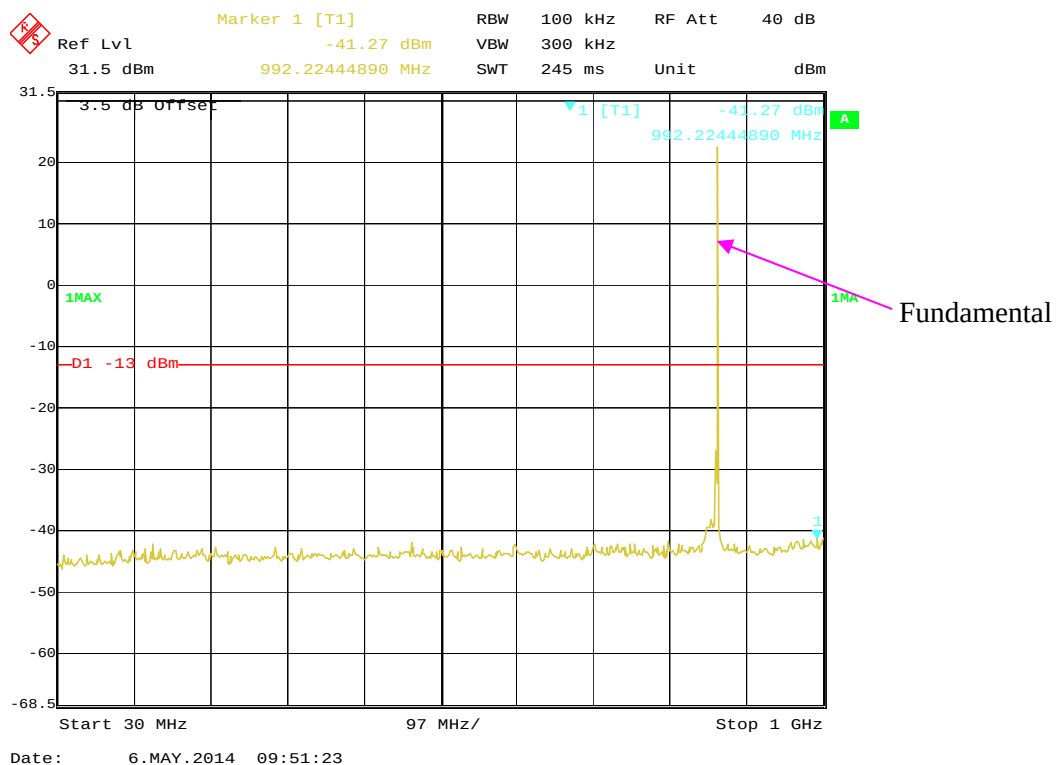
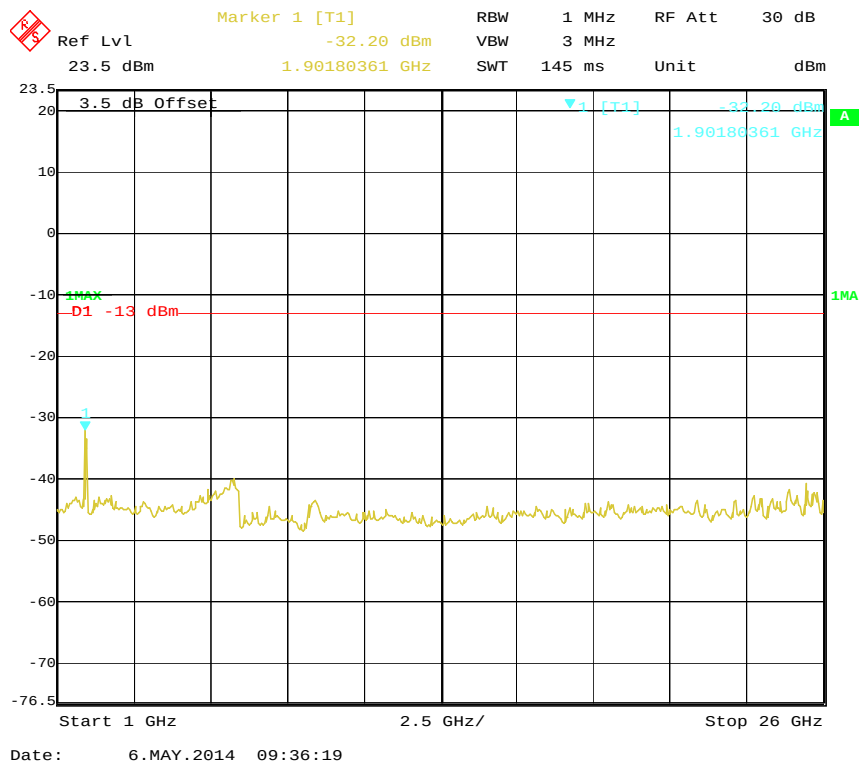


## IDEN Mode, 30 MHz – 1 GHz, Middle Channel

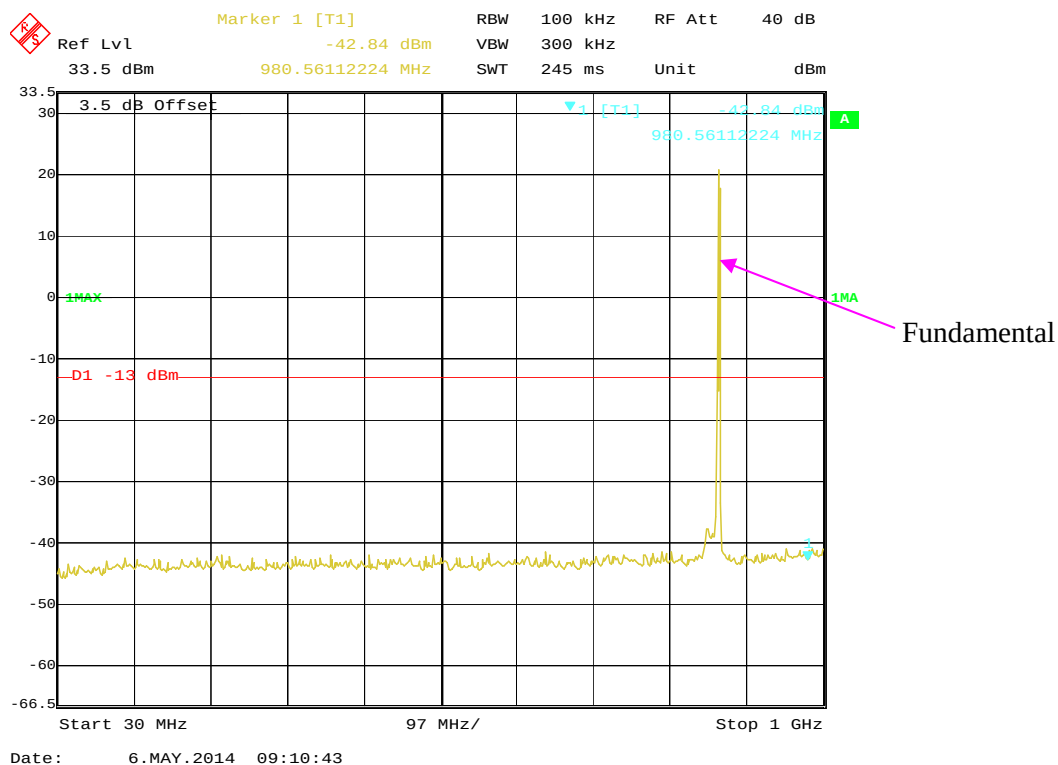


## IDEN Mode, 1 GHz – 26 GHz, Middle Channel

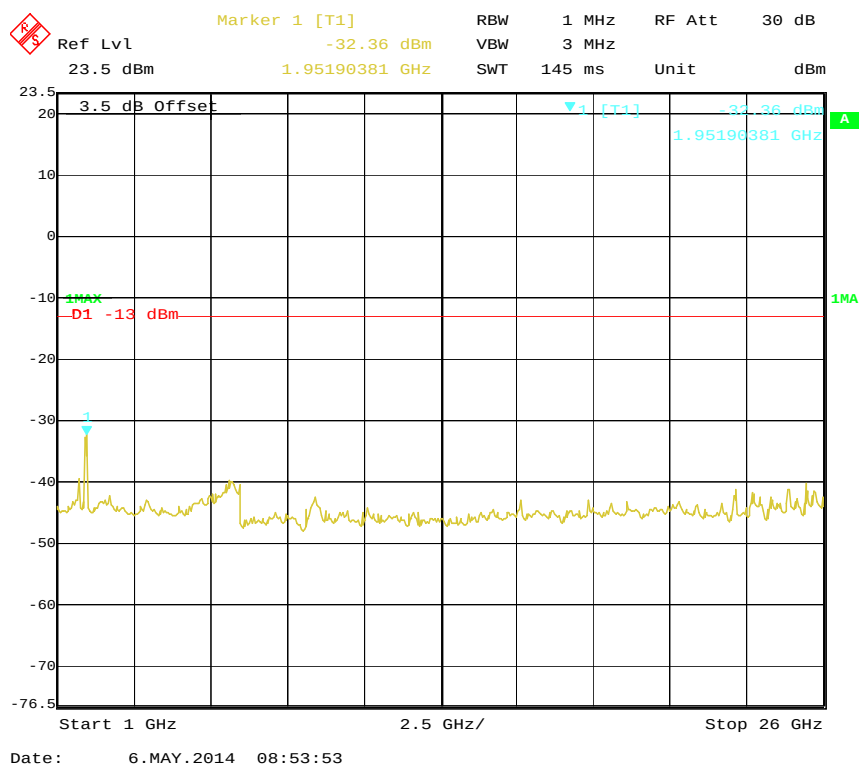


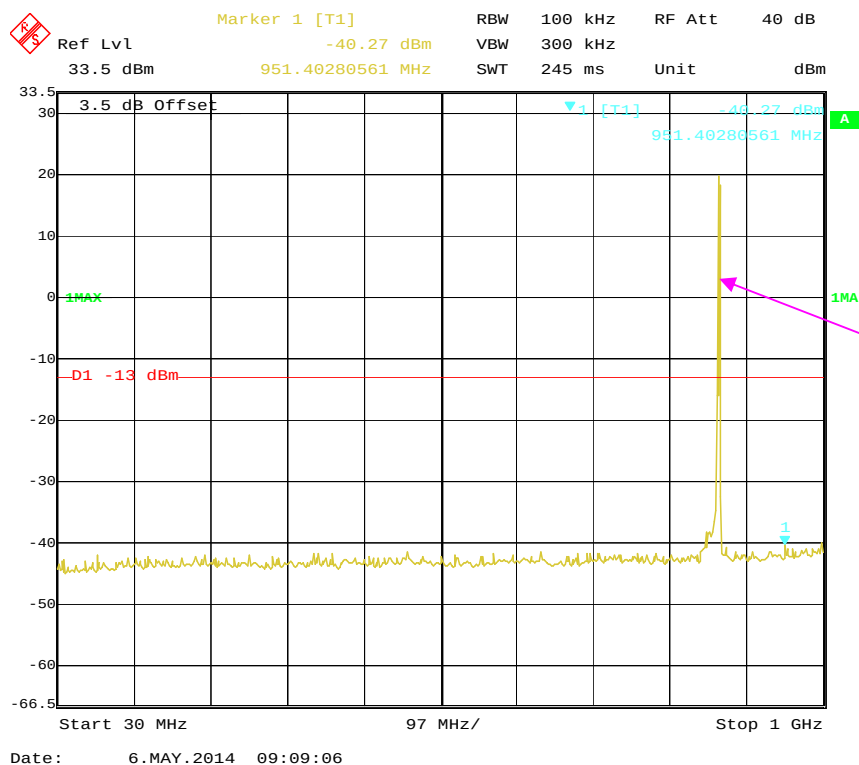
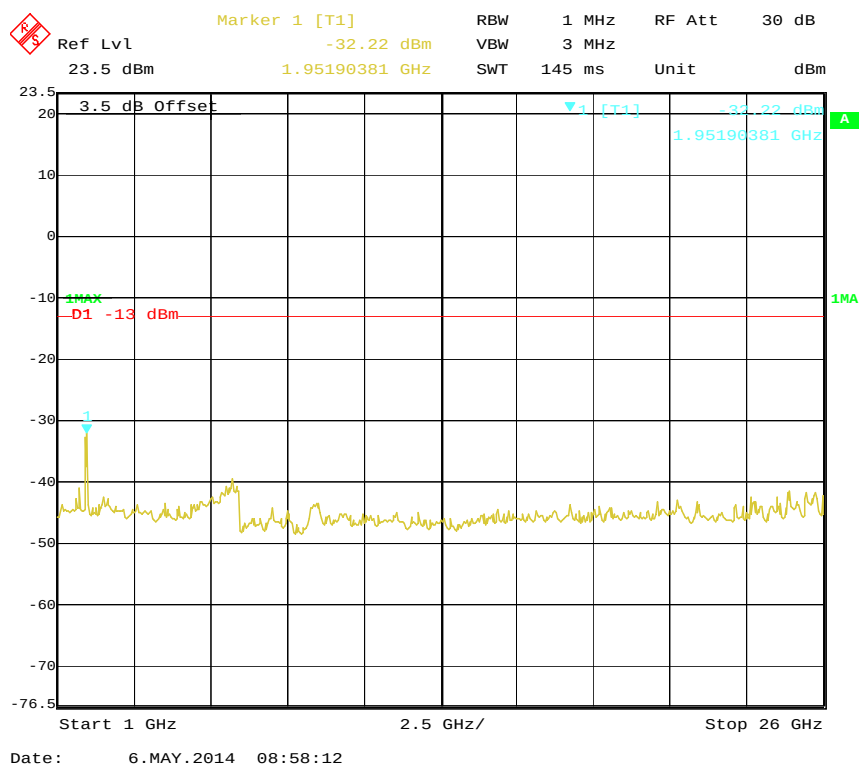
**IDEN Mode, 30 MHz – 1 GHz, High Channel****IDEN Mode, 1 GHz – 26 GHz, High Channel**

## CDMA Mode, 30 MHz – 1 GHz, Low Channel

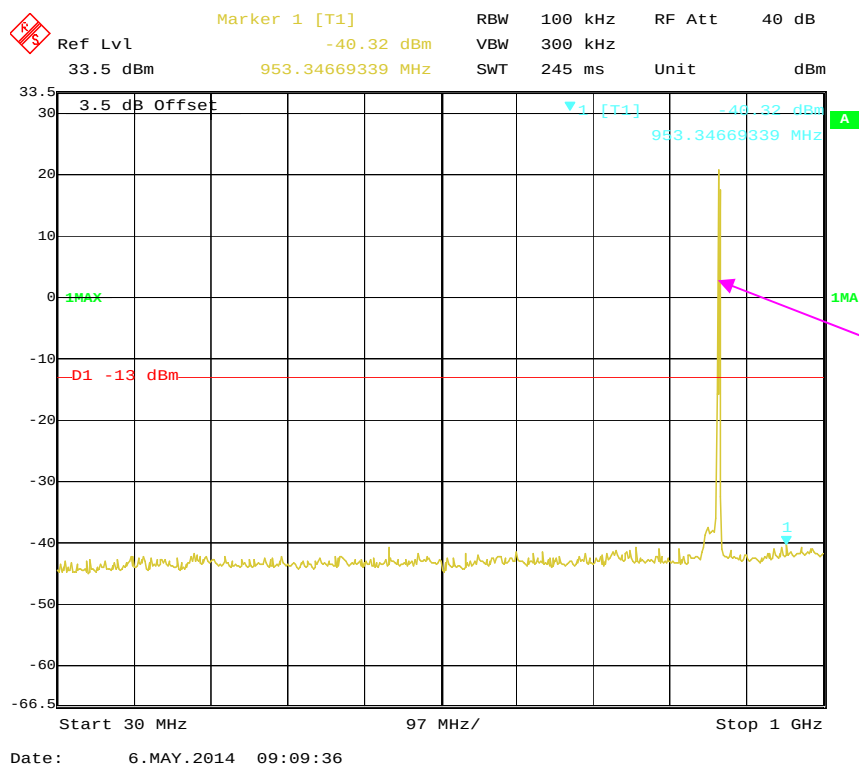


## CDMA Mode, 1 GHz – 26 GHz, Low Channel

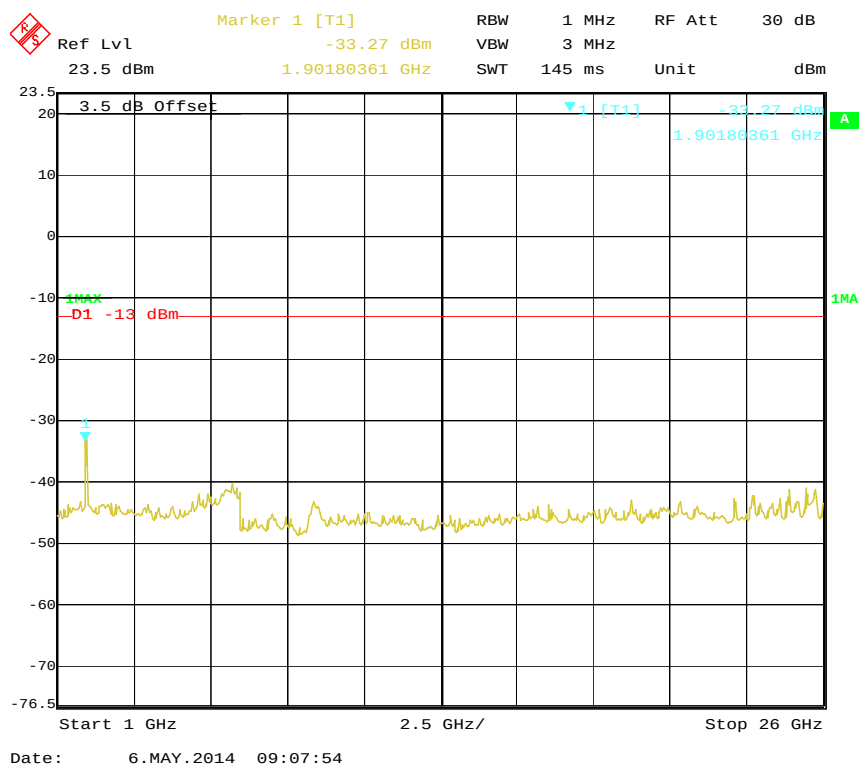


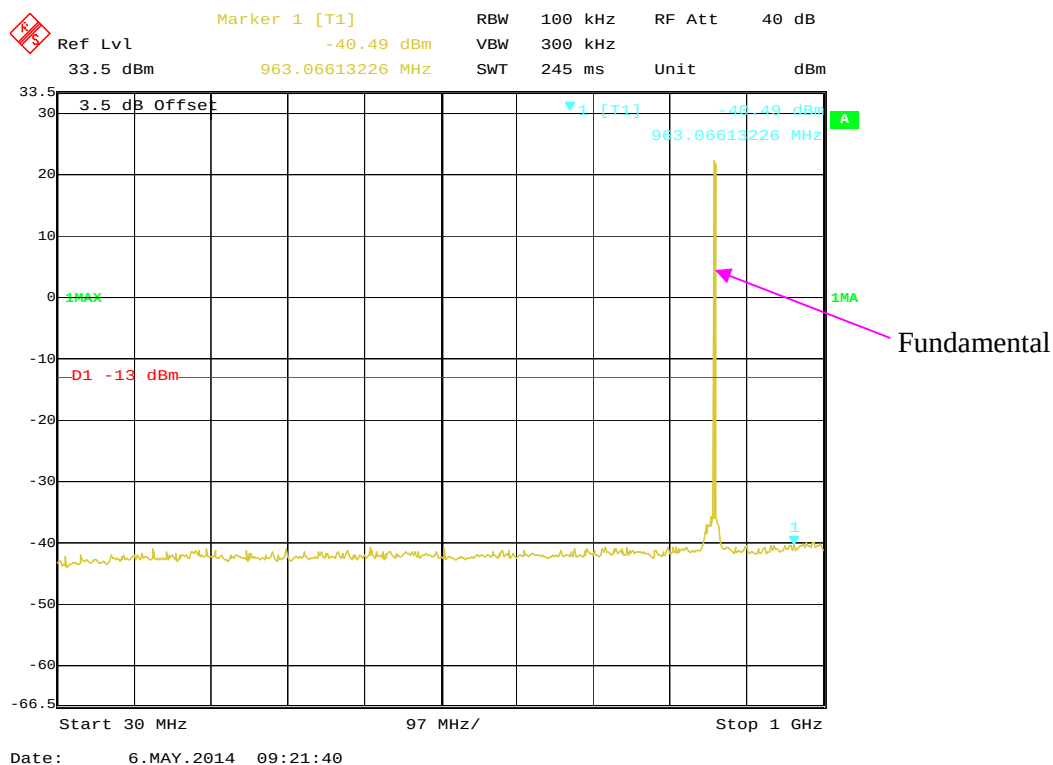
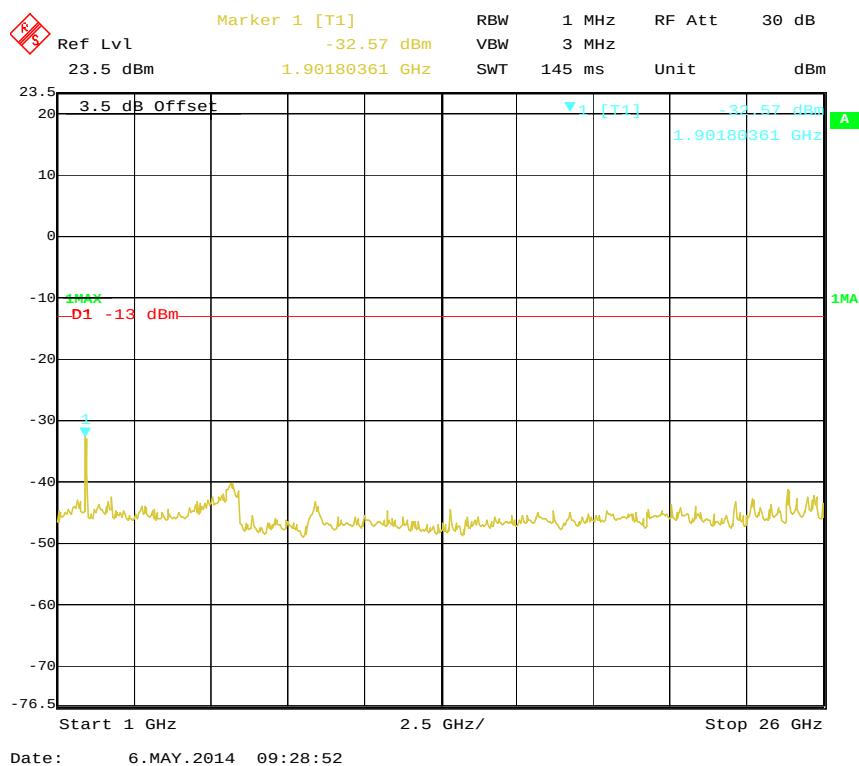
**CDMA Mode, 30 MHz – 1 GHz, Middle Channel****CDMA Mode, 1 GHz – 26 GHz, Middle Channel**

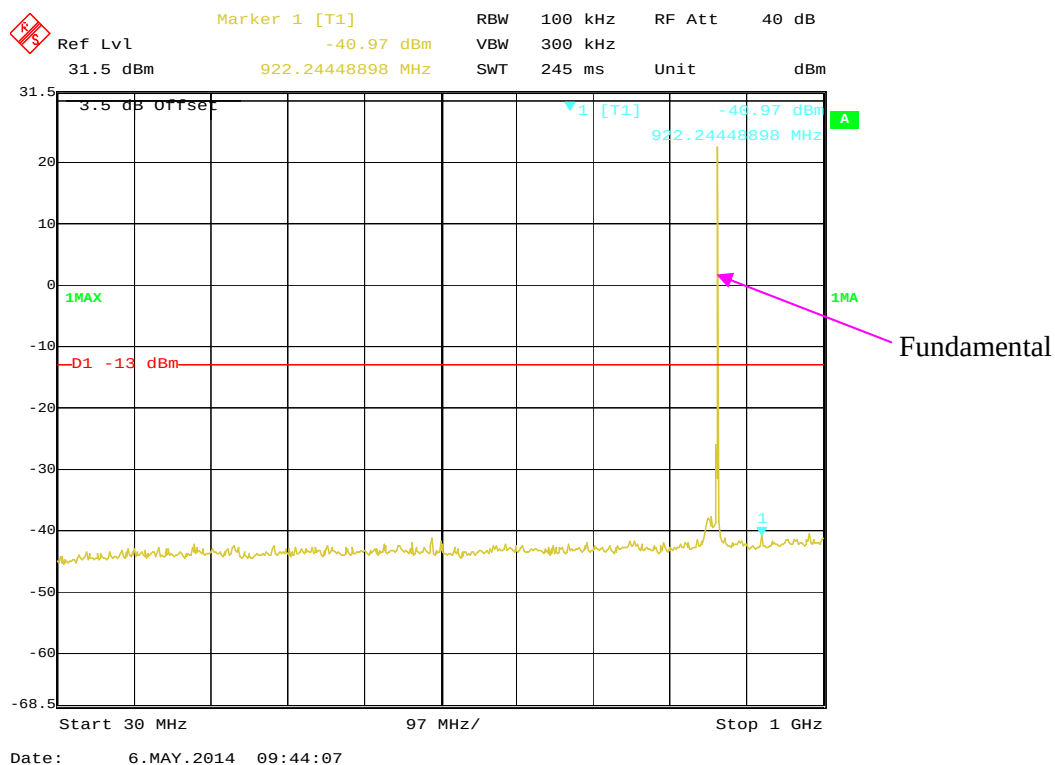
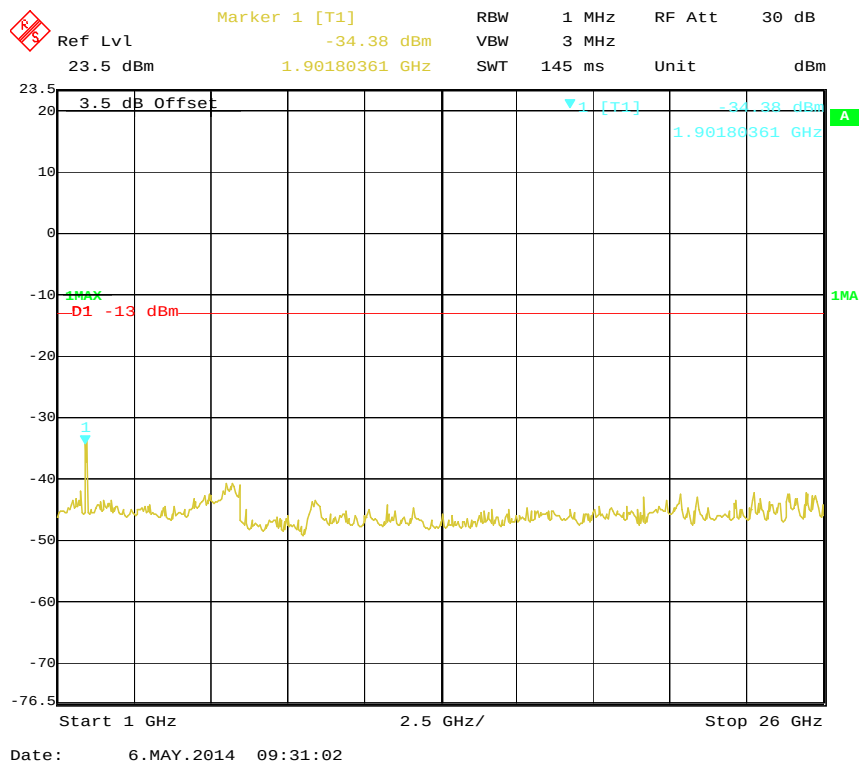
## CDMA Mode, 30 MHz – 1 GHz, High Channel

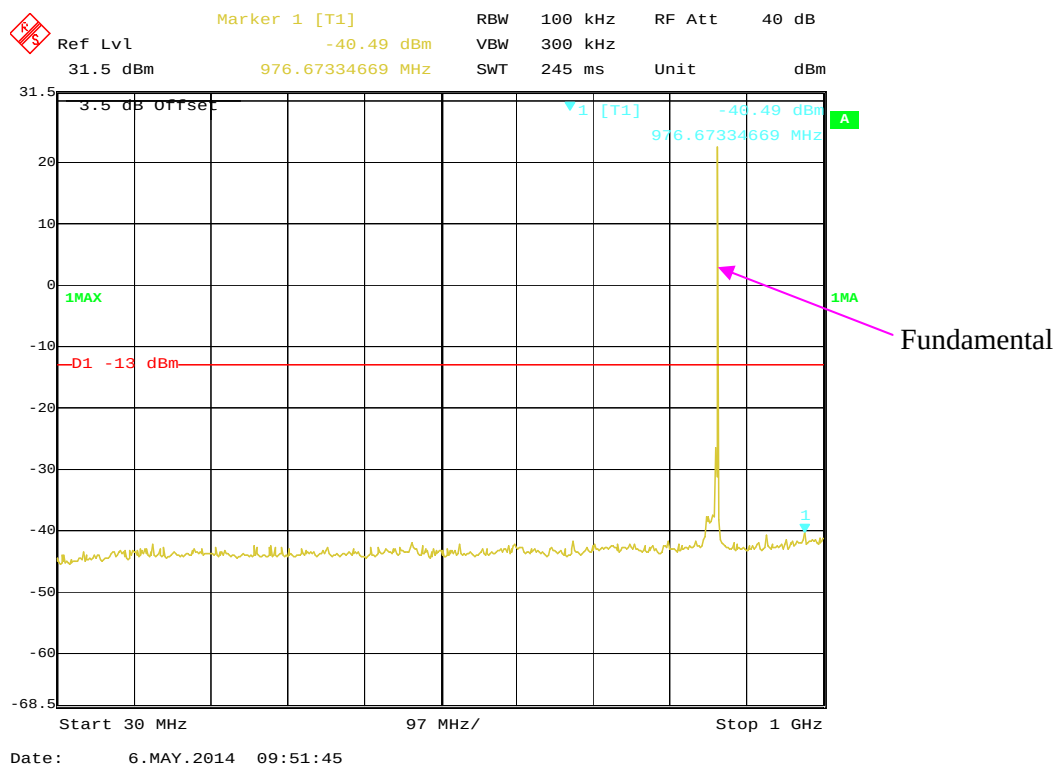
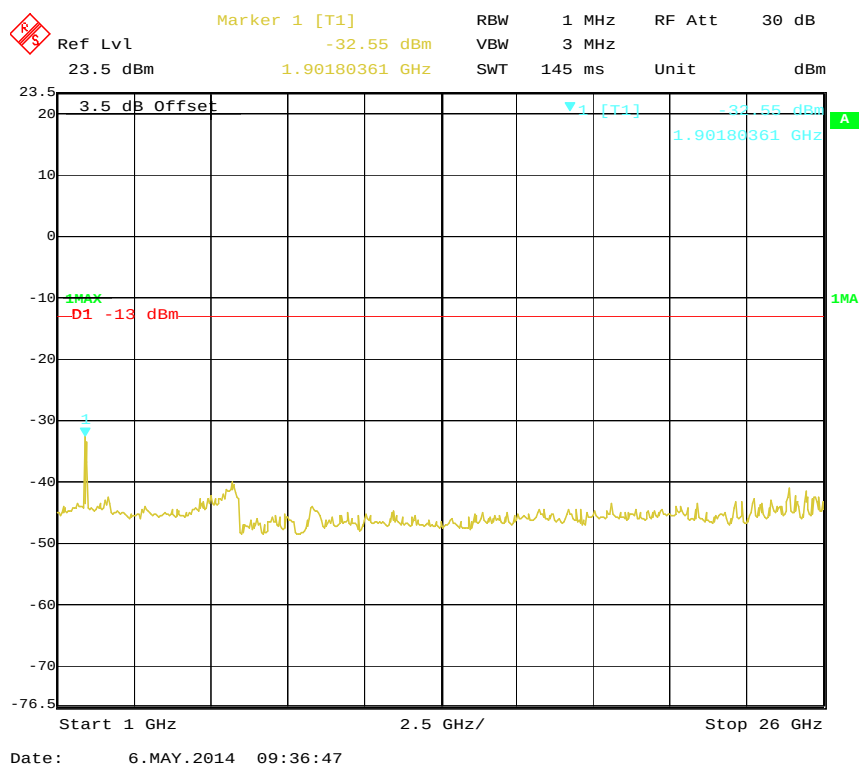


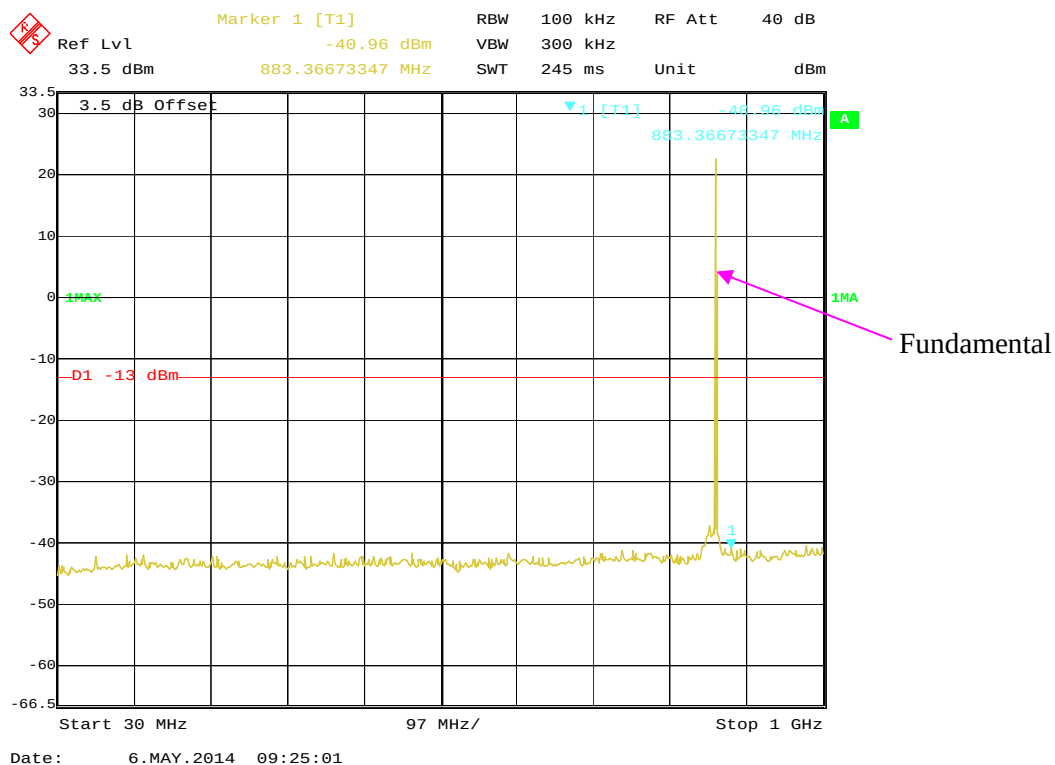
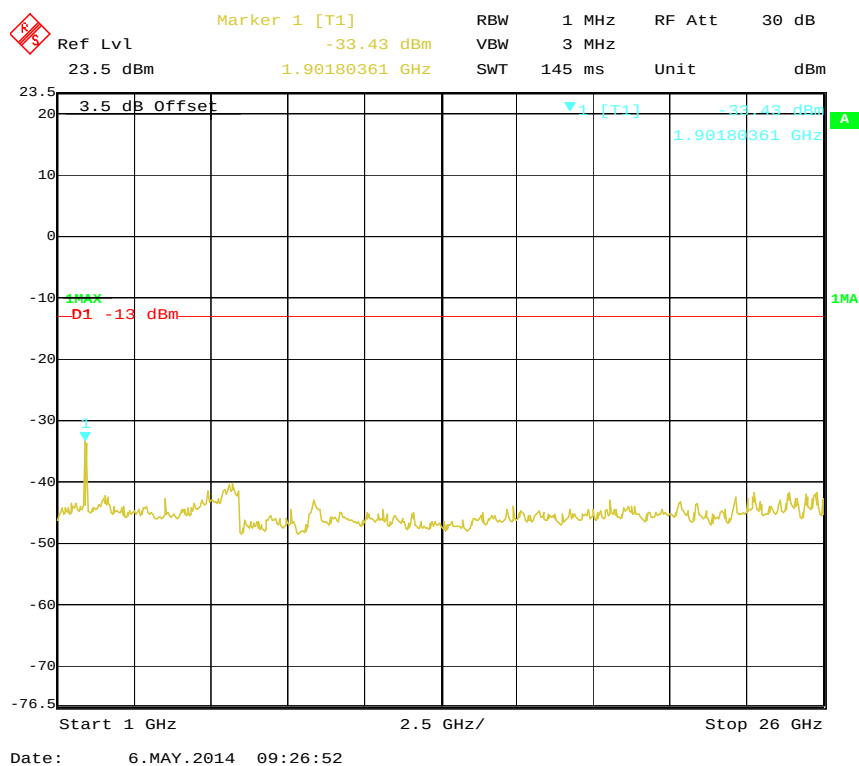
## CDMA Mode, 1 GHz – 26 GHz, High Channel

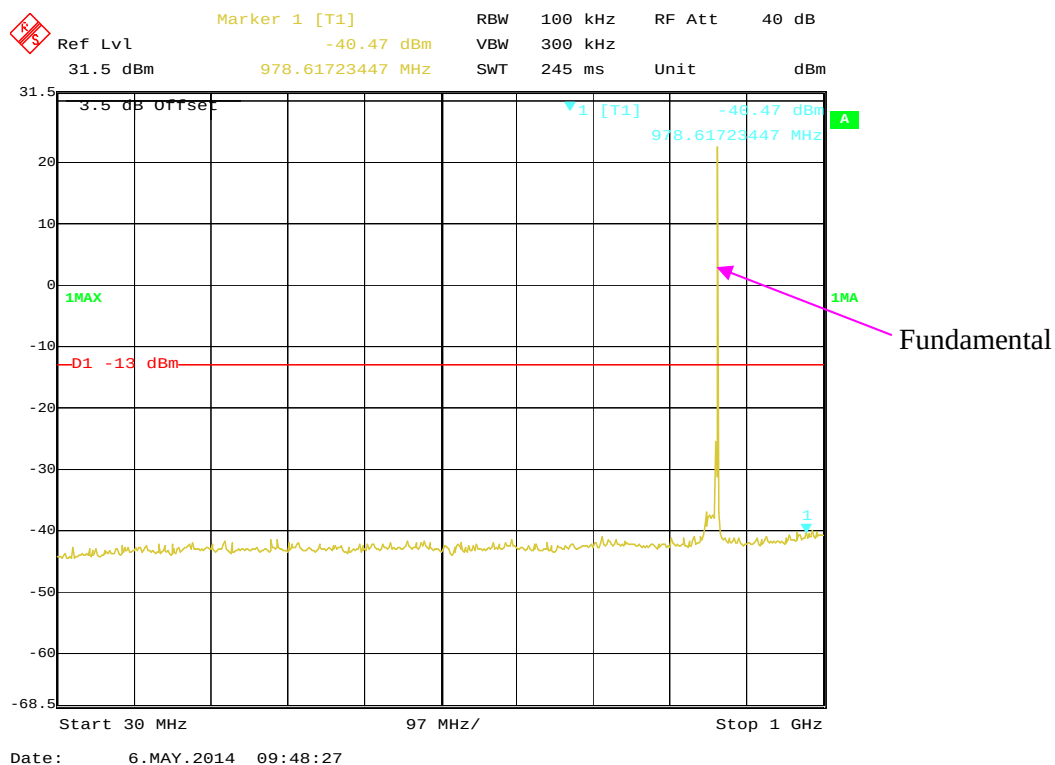
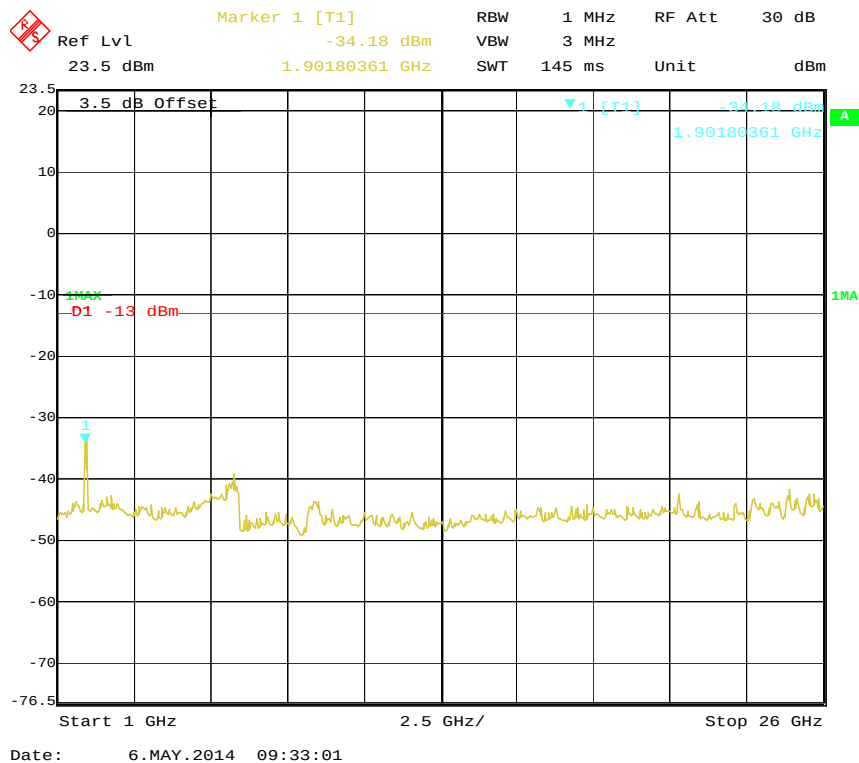


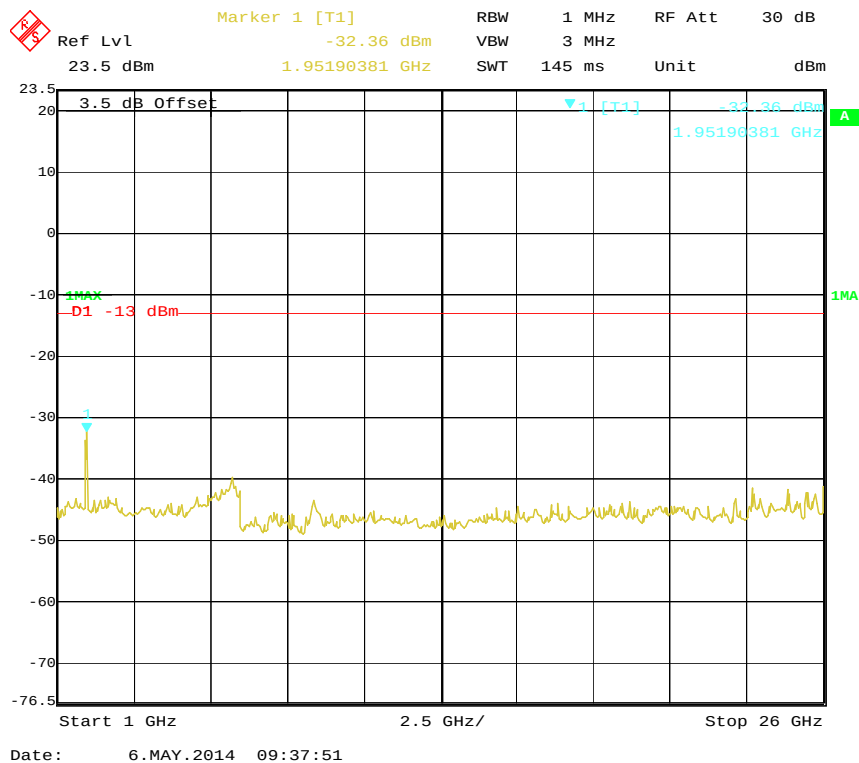
**QPSK (1.4MHz) Mode, 30 MHz – 1 GHz, Low Channel****QPSK (1.4MHz) Mode, 1 GHz – 26 GHz, Low Channel**

**QPSK (1.4MHz) Mode, 30 MHz – 1 GHz, Middle Channel****QPSK (1.4MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

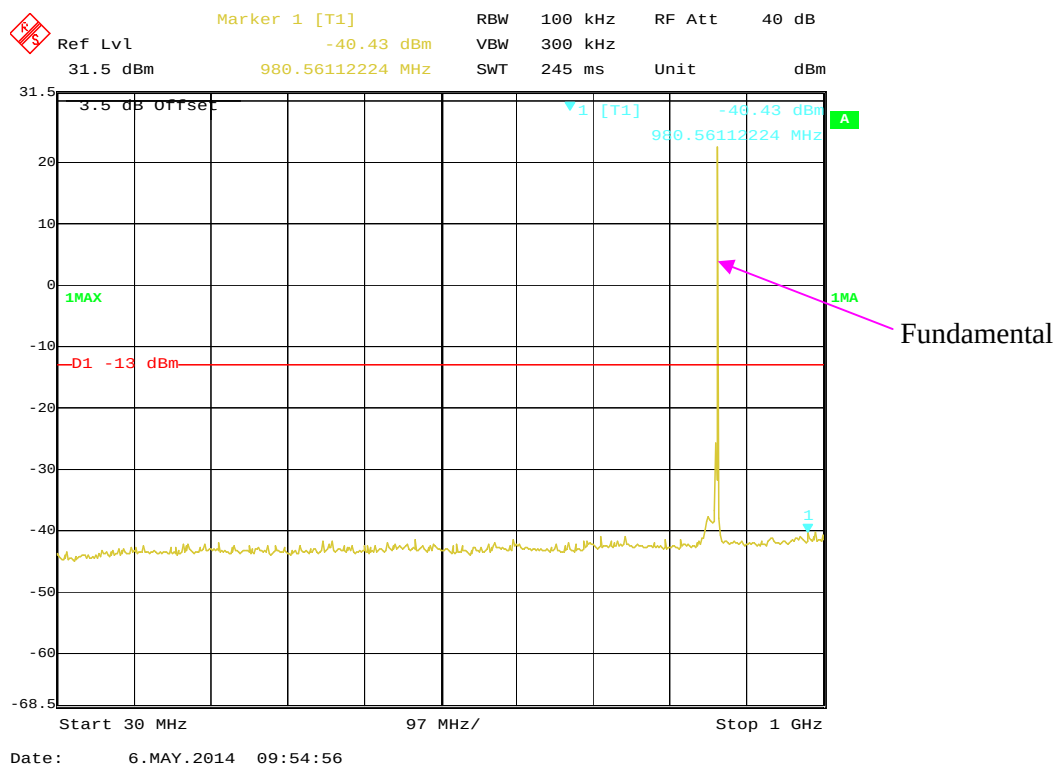
**QPSK (1.4MHz) Mode, 30 MHz – 1 GHz, High Channel****QPSK (1.4MHz) Mode, 1 GHz – 26 GHz, High Channel**

**QPSK (1.4MHz) Mode, 30 MHz – 1 GHz, Low Channel****QPSK (3MHz) Mode, 1 GHz – 26 GHz, Low Channel**

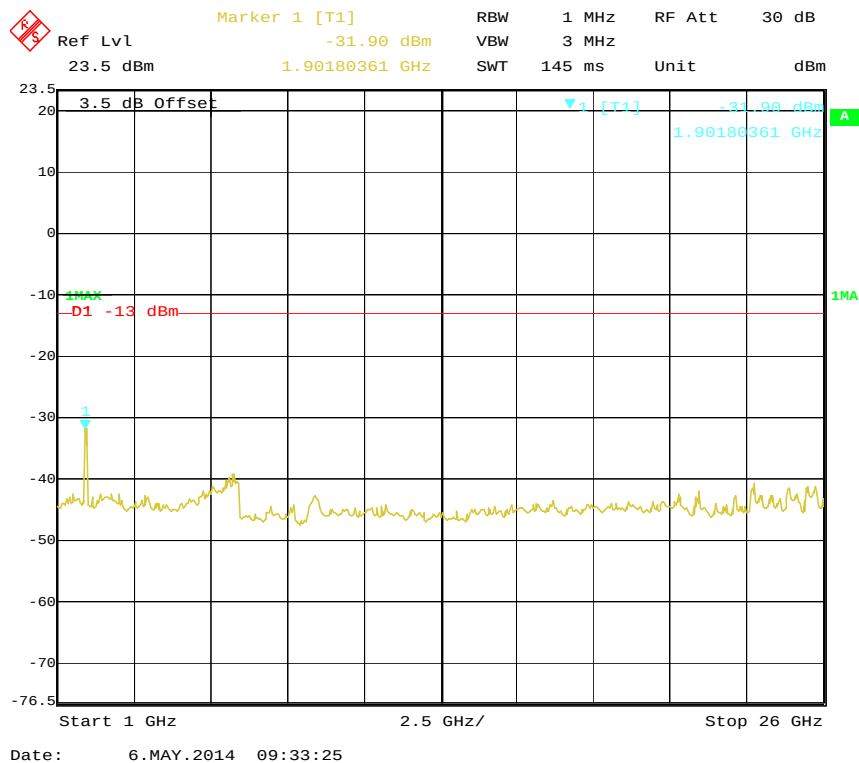
**QPSK (3MHz) Mode, 30 MHz – 1 GHz, Middle Channel****QPSK (3MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

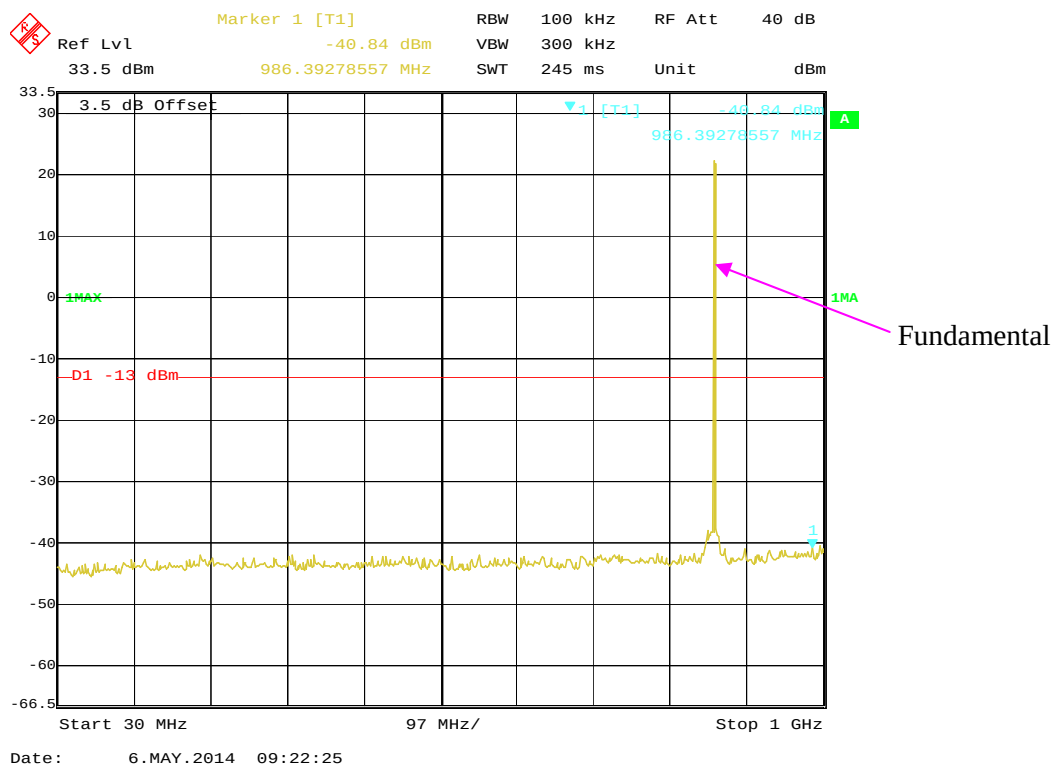
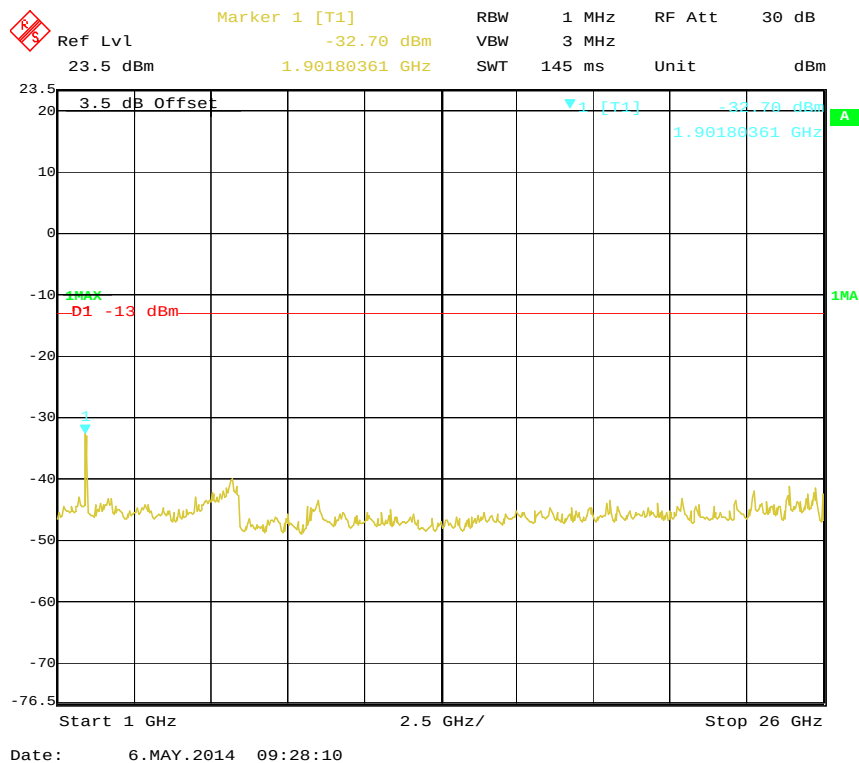
**QPSK (3MHz) Mode, 30 MHz – 1 GHz, High Channel****QPSK (3MHz) Mode, 1 GHz – 26 GHz, High Channel**

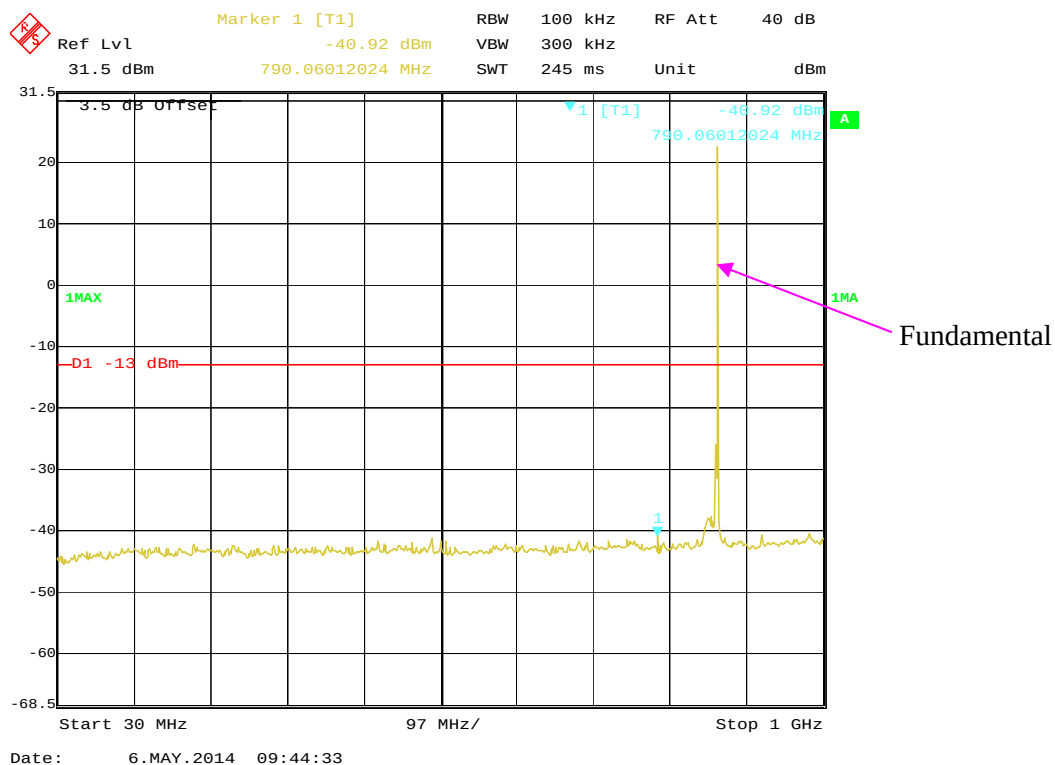
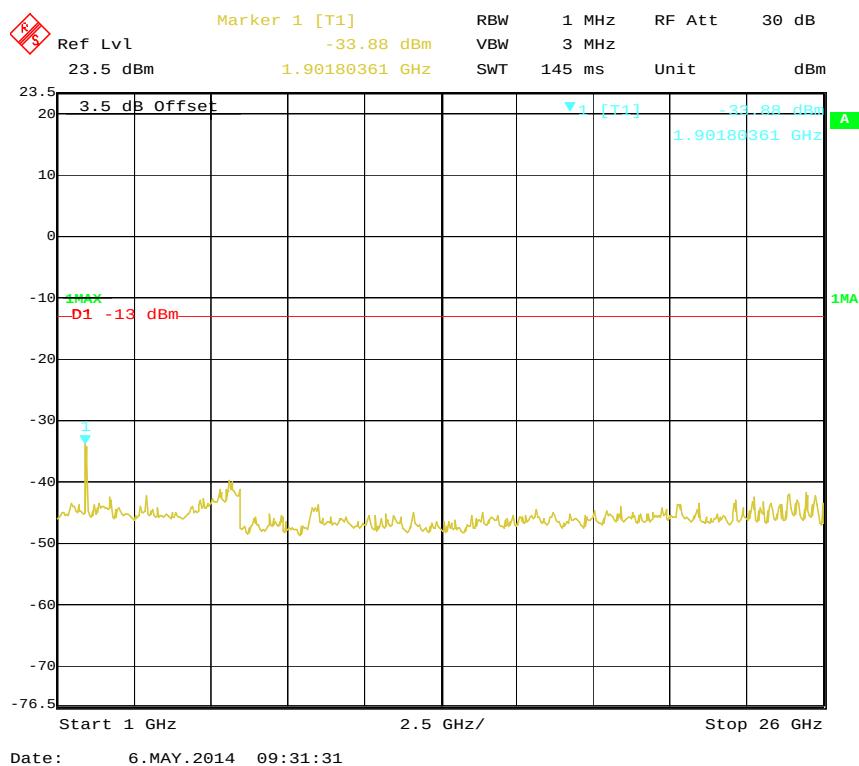
## QPSK (5MHz) Mode, 30 MHz – 1 GHz

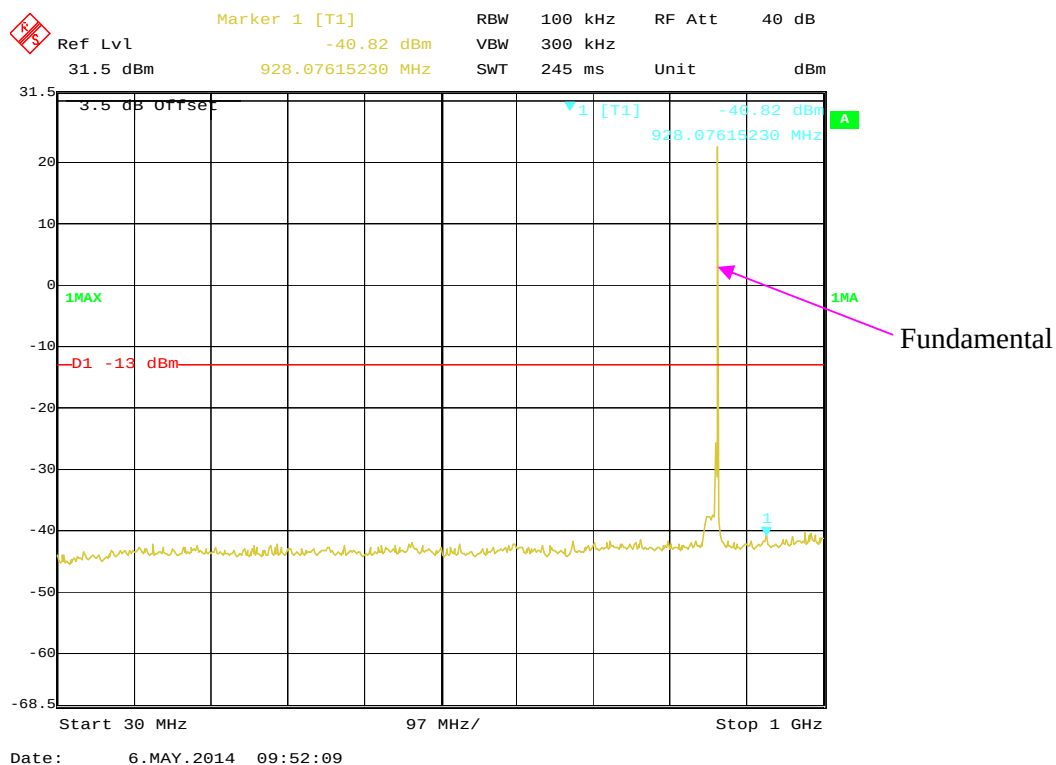
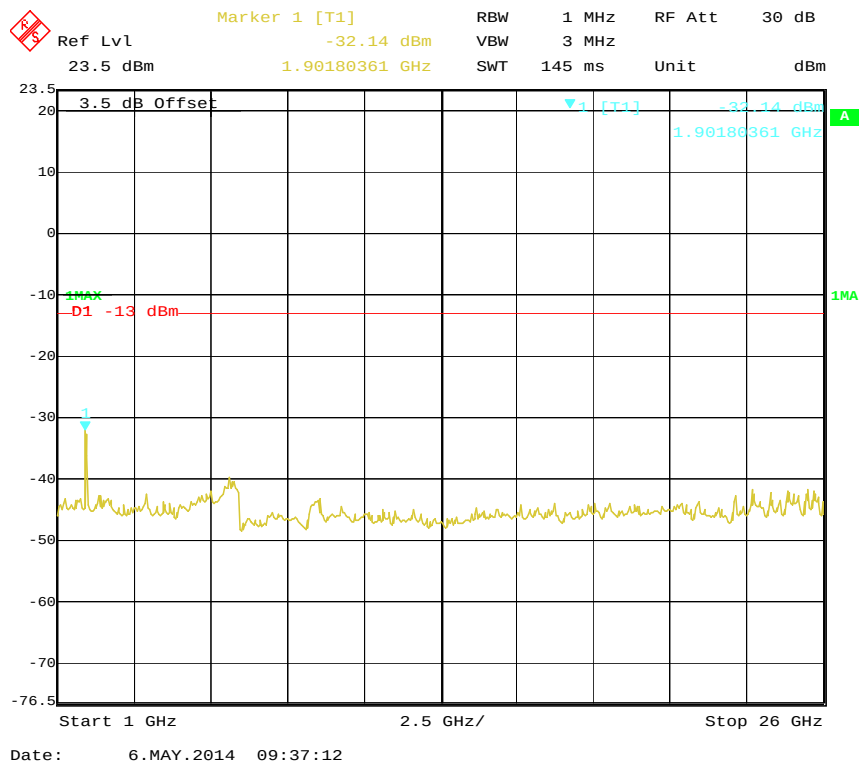


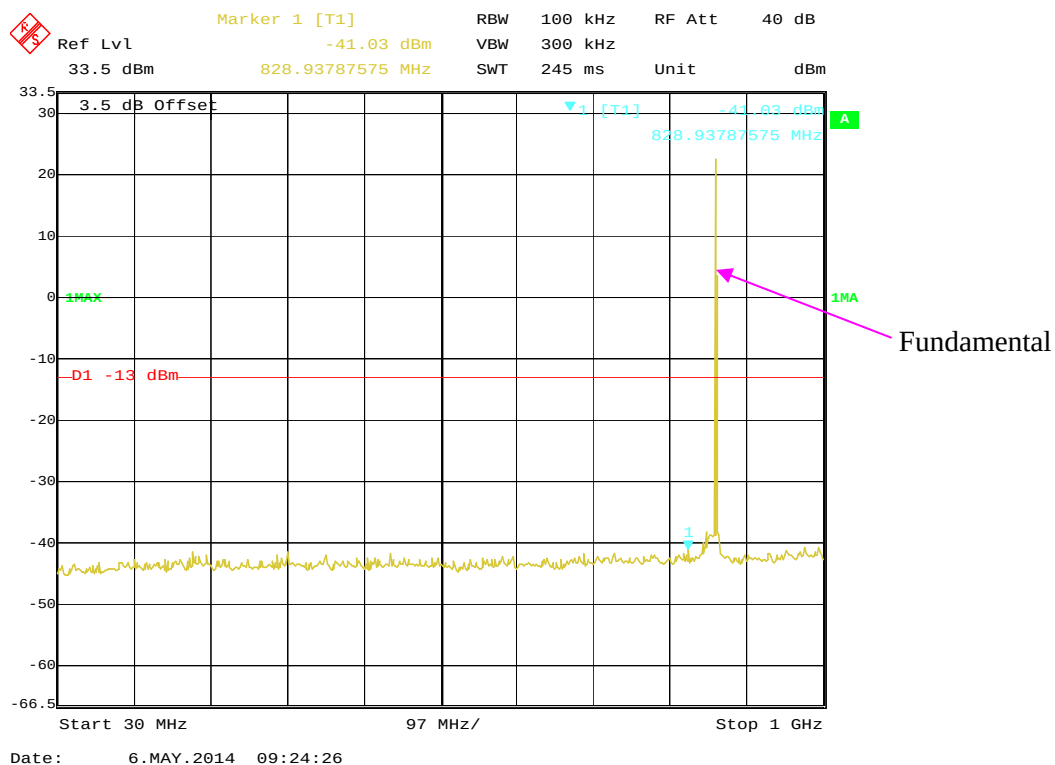
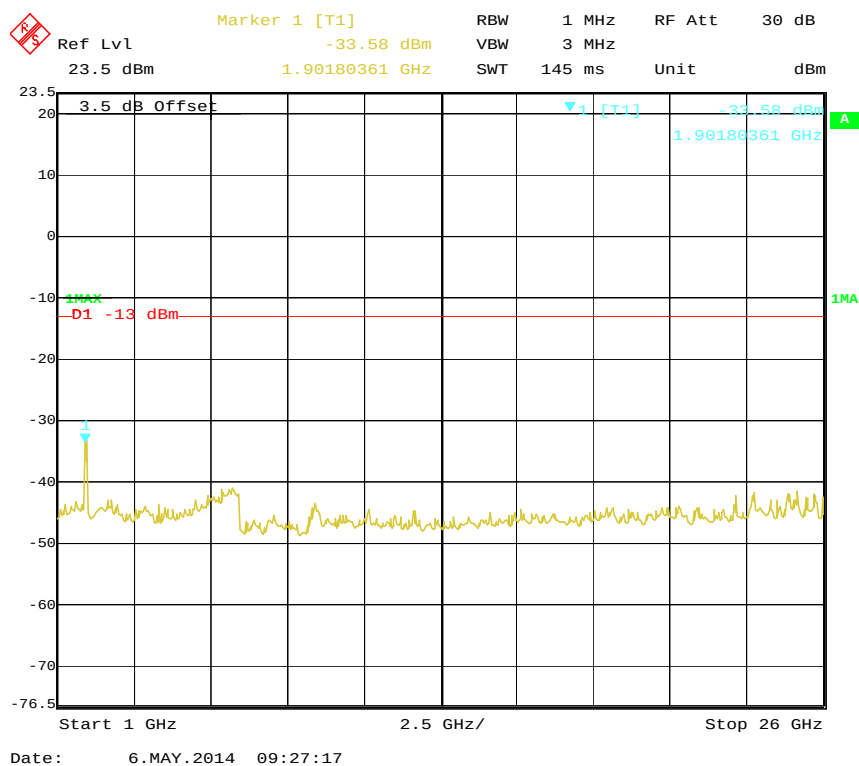
## QPSK (5MHz) Mode, 1 GHz – 26 GHz

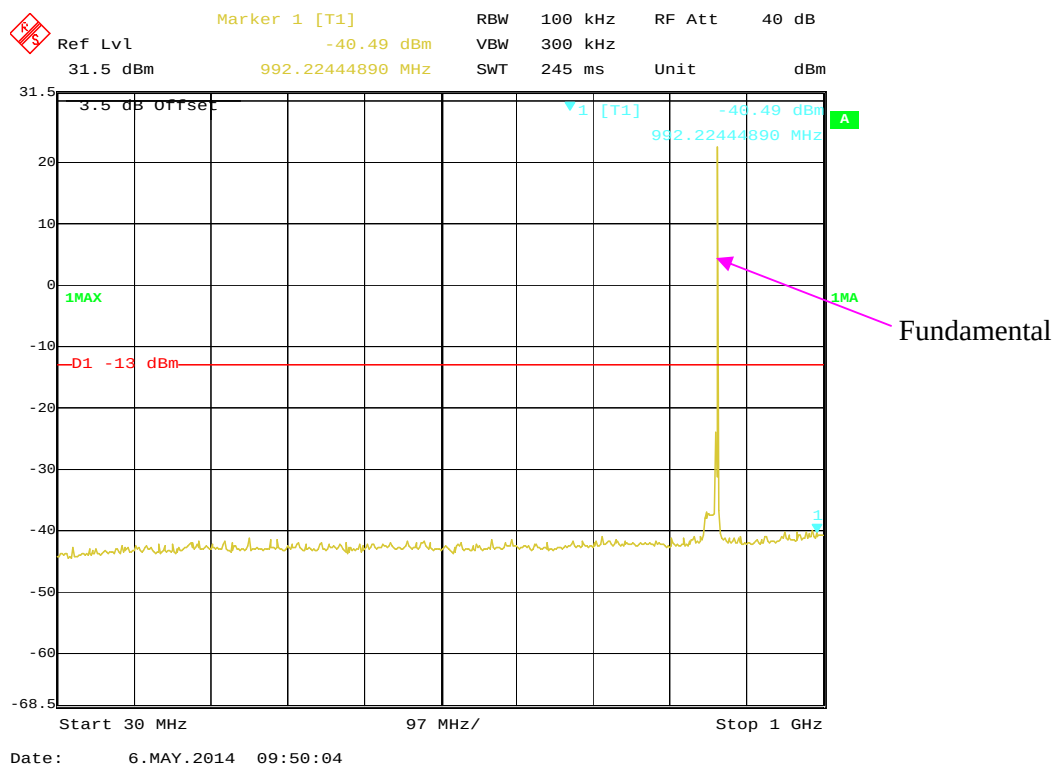
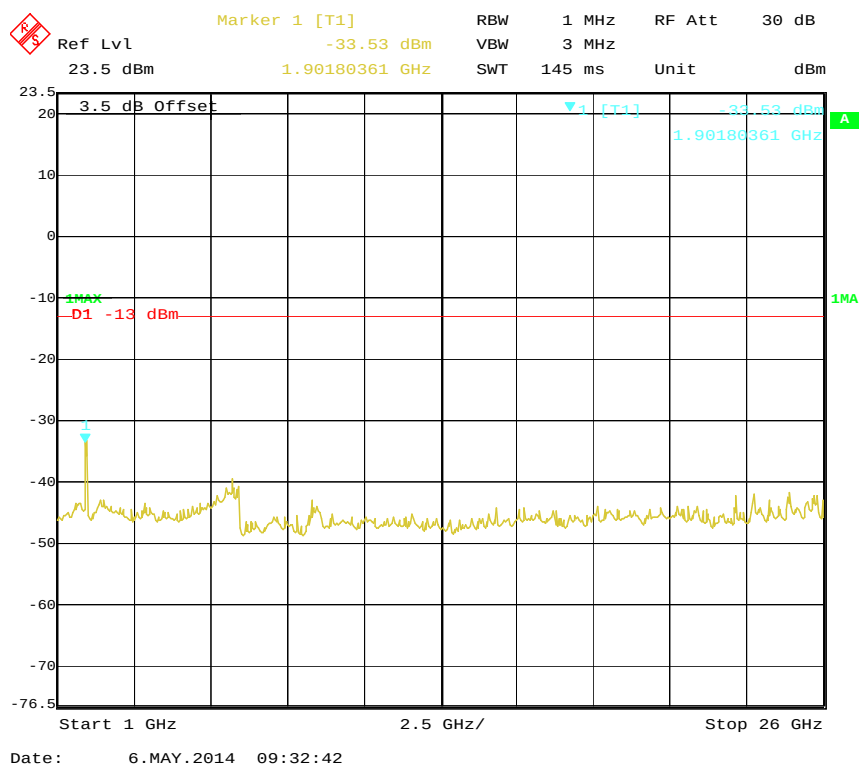


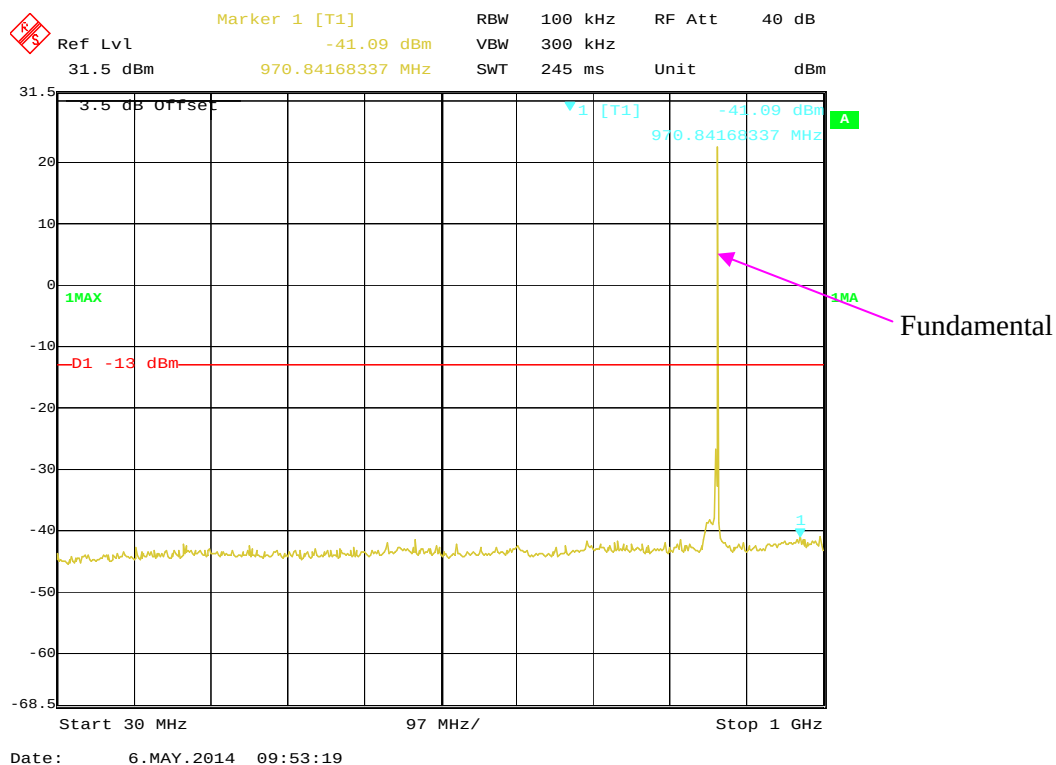
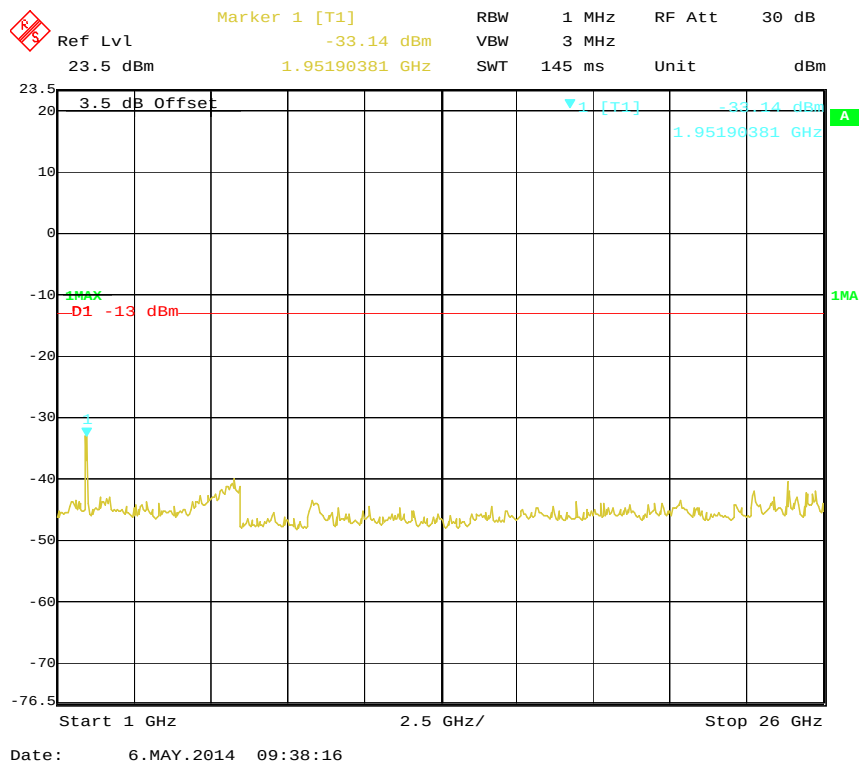
**16QAM (1.4MHz) Mode, 30 MHz – 1 GHz, Low Channel****16QAM (1.4MHz) Mode, 1 GHz – 26 GHz, Low Channel**

**16QAM (1.4MHz) Mode, 30 MHz – 1 GHz, Middle Channel****16QAM (1.4MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

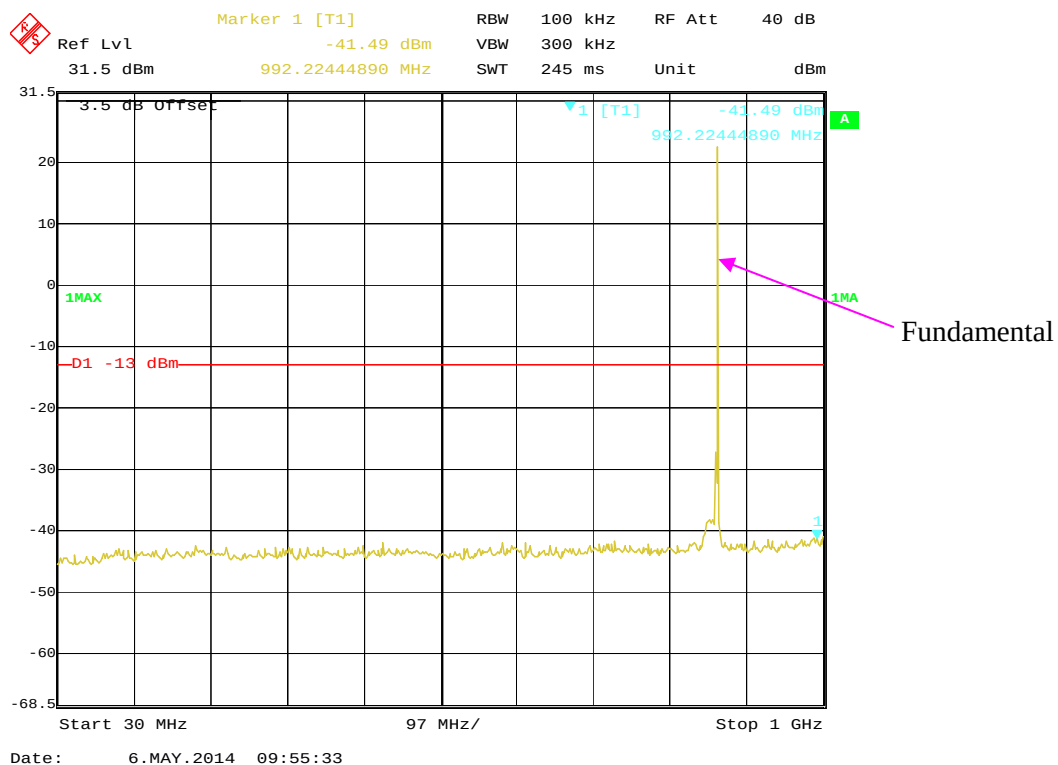
**16QAM (1.4MHz) Mode, 30 MHz – 1 GHz, High Channel****16QAM (1.4MHz) Mode, 1 GHz – 26 GHz, High Channel**

**16QAM (3MHz) Mode, 30 MHz – 1 GHz, Low Channel****16QAM (3MHz) Mode, 1 GHz – 26 GHz, Low Channel**

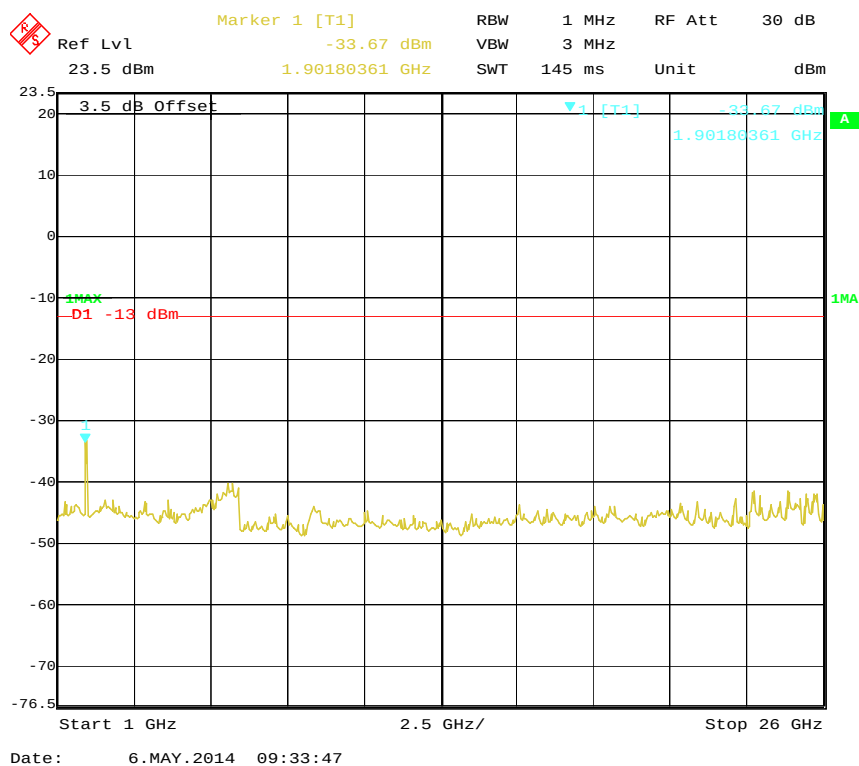
**16QAM (3MHz) Mode, 30 MHz – 1 GHz, Middle Channel****16QAM (3MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

**16QAM (3MHz) Mode, 30 MHz – 1 GHz, High Channel****16QAM (3MHz) Mode, 1 GHz – 26 GHz, High Channel**

## 16QAM (5MHz) Mode, 30 MHz – 1 GHz



## 16QAM (5MHz) Mode, 1 GHz – 26 GHz



Ref Lvl 33.5 dBm

Marker 1 [T1] -40.44 dBm

RBW 100 kHz RF Att 40 dB

VBW 300 kHz SWT 245 ms Unit dBm

3.5 dB Offset

1 [T1] -40.44 dBm

968.89779559 MHz

1MAX

D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

Date: 6.MAY.2014 09:22:48

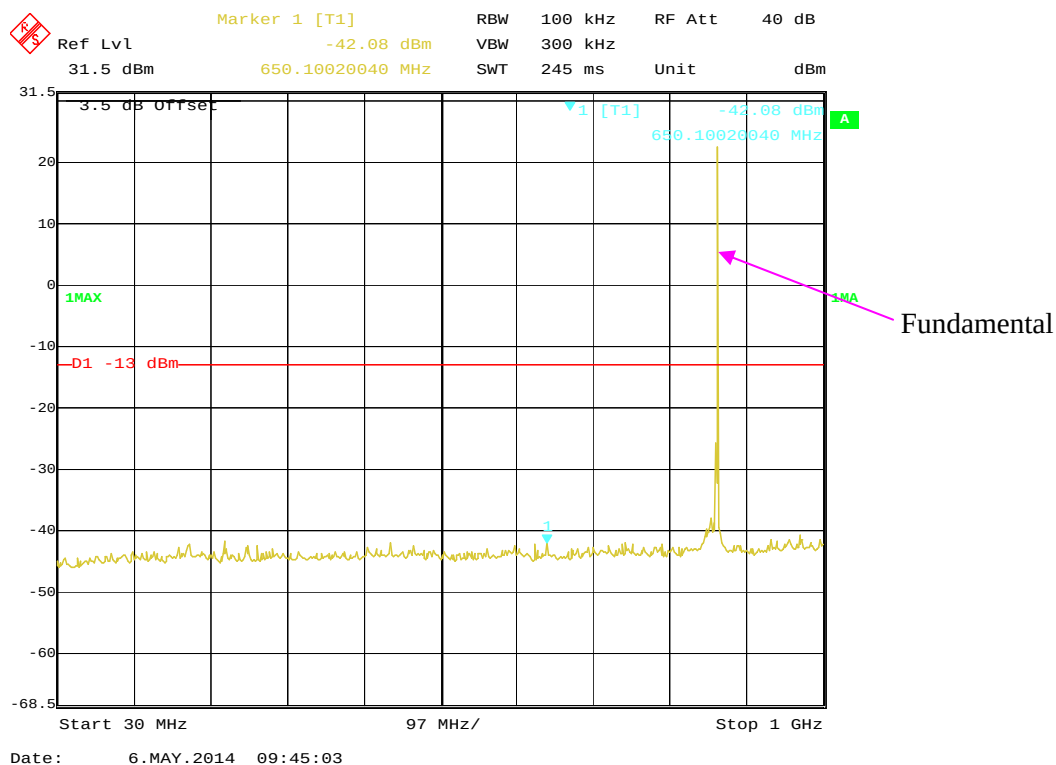
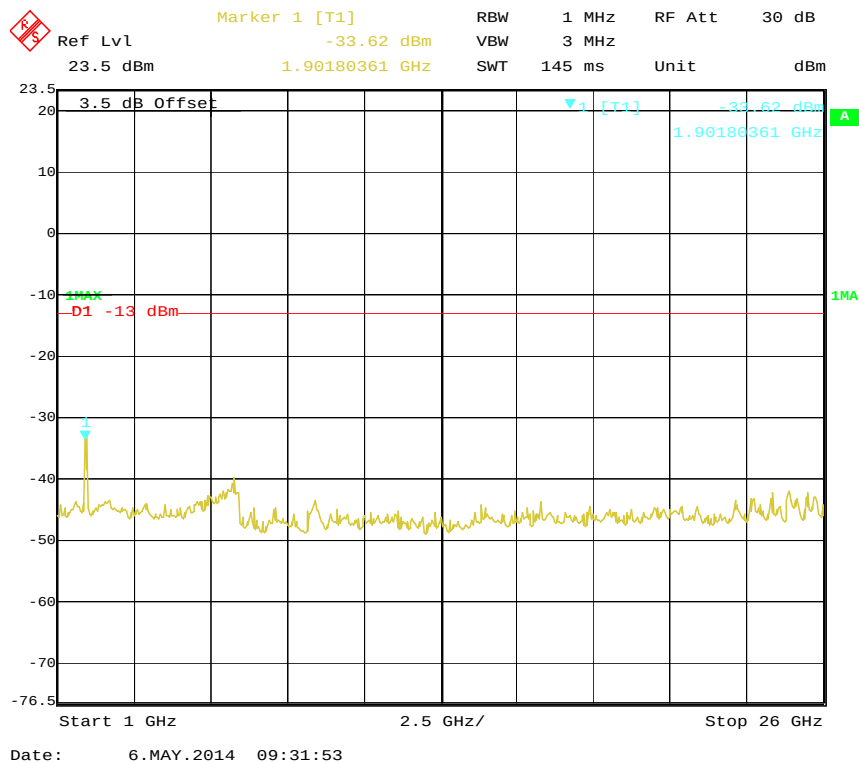
## Fundamental

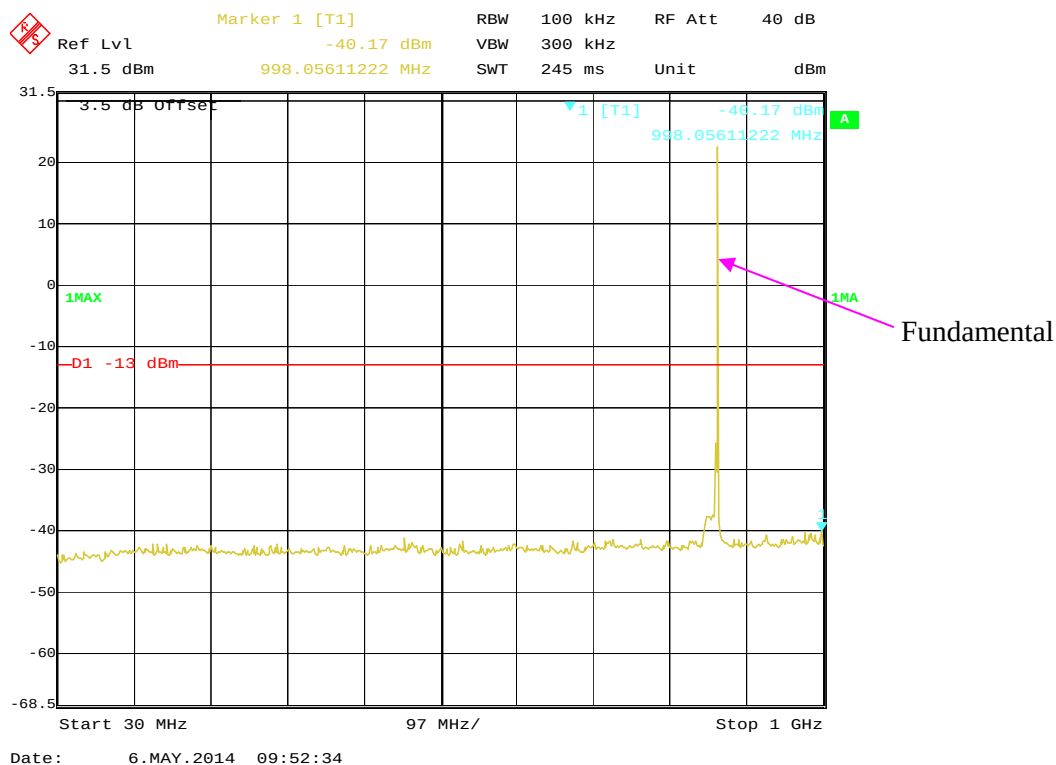
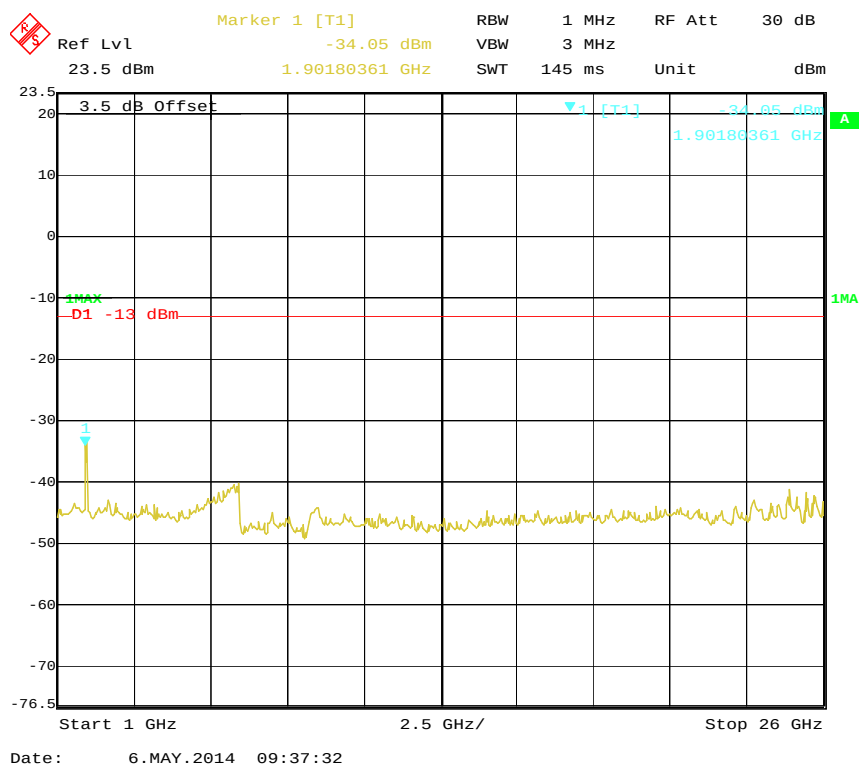
Ref Lvl: 23.5 dBm  
 Marker 1 [T1]: -33.64 dBm  
 RBW: 1 MHz  
 VBW: 3 MHz  
 SWT: 145 ms  
 RF Att: 30 dB  
 Unit: dBm

3.5 dB Offset  
 1.90180361 GHz  
 -13 dBm  
 -33.64 dBm  
 1.90180361 GHz

Start 1 GHz  
 2.5 GHz/  
 Stop 26 GHz

Date: 6.MAY.2014 09:27:53

**64QAM (1.4MHz) Mode, 30 MHz – 1 GHz, Middle Channel****64QAM (1.4MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

**64QAM (1.4MHz) Mode, 30 MHz – 1 GHz, High Channel****64QAM (1.4MHz) Mode, 1 GHz – 26 GHz, High Channel**

Ref Lvl 33.5 dBm

Marker 1 [T1] -41.39 dBm

RBW 100 kHz

VBW 300 kHz

SWT 245 ms

RF Att 40 dB

Unit dBm

3.5 dB Offset

1 [T1] -41.39 dBm

990.28056112 MHz

-1MAX

-D1 -13 dBm

Start 30 MHz

97 MHz/

Stop 1 GHz

Date: 6.MAY.2014 09:23:53

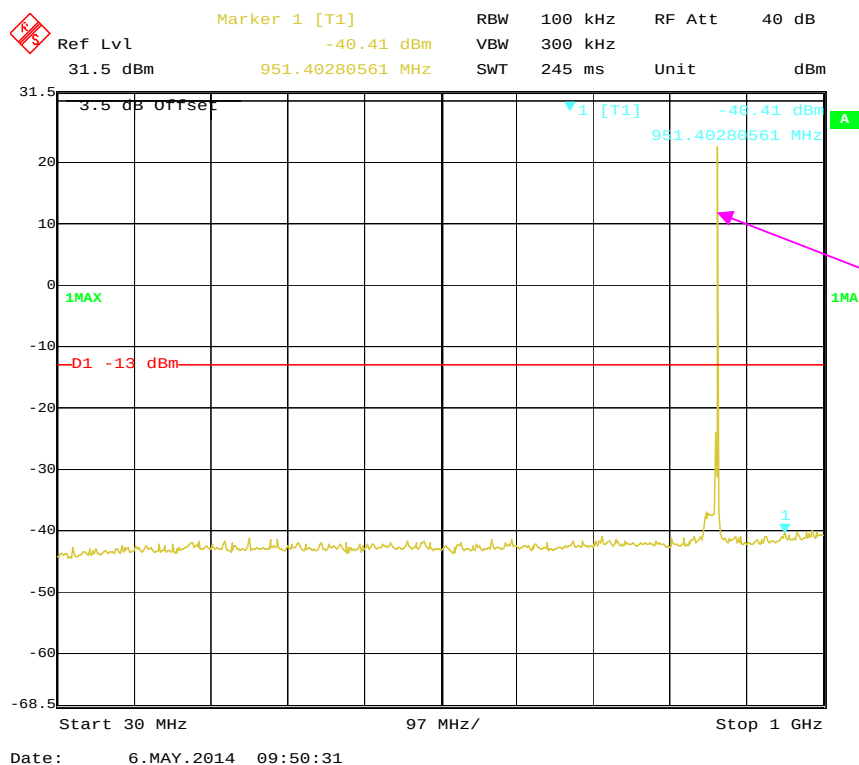
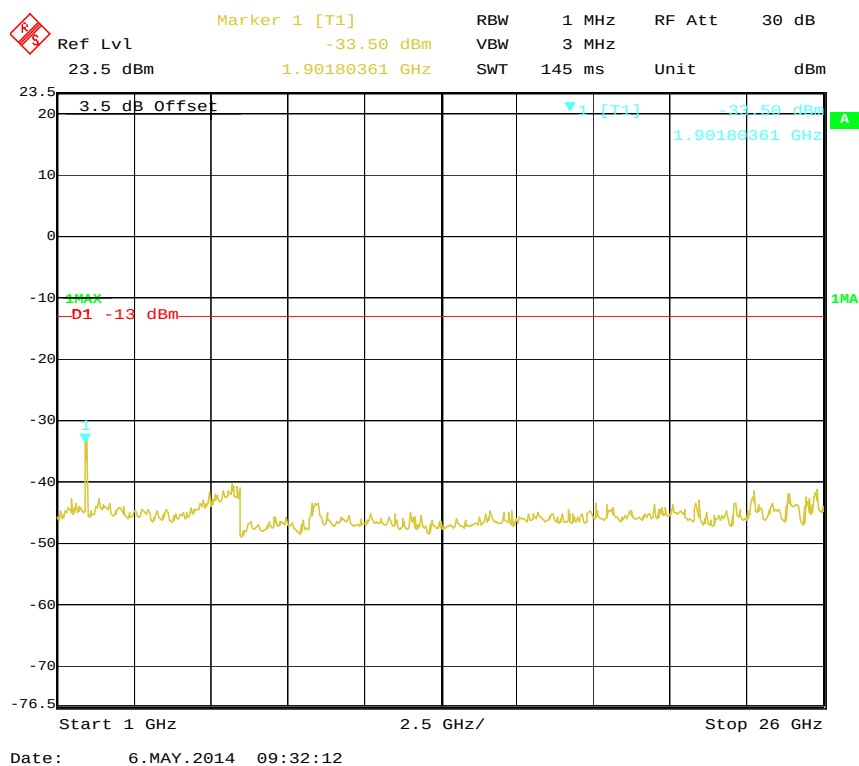
## Fundamental

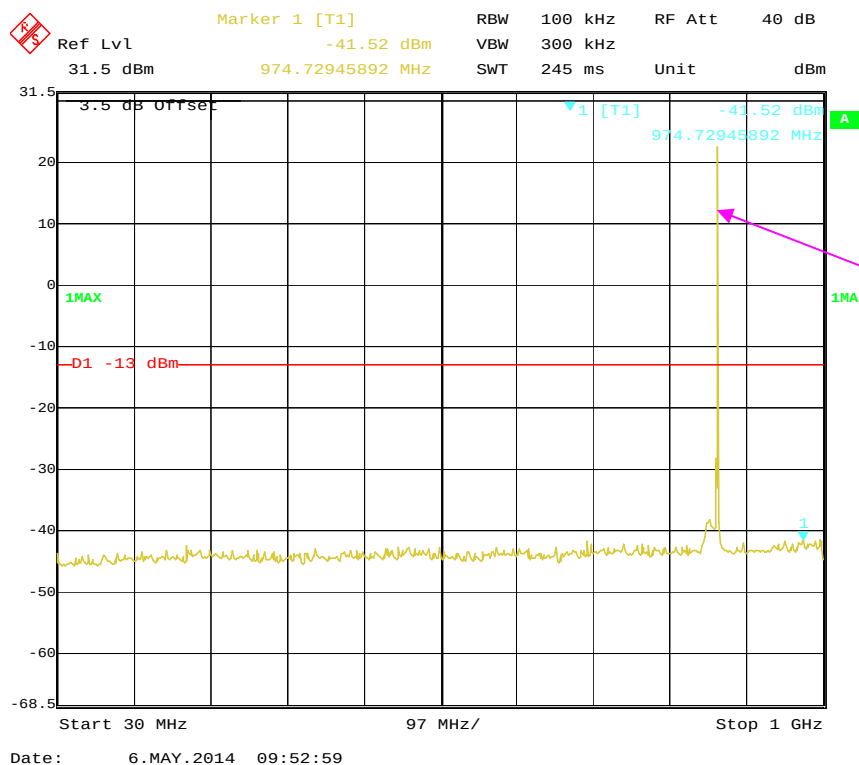
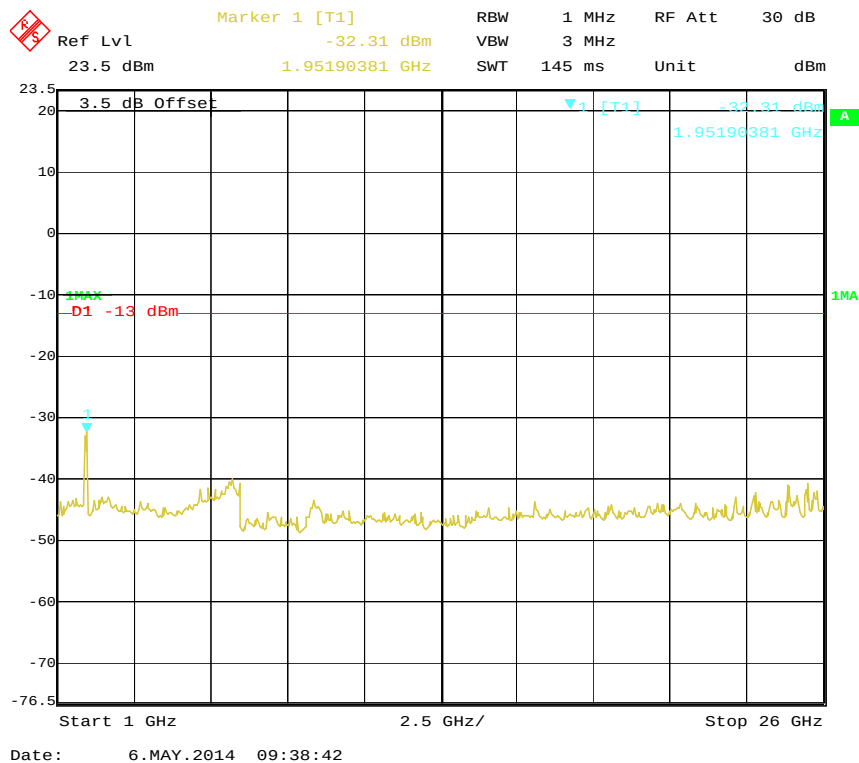
Ref Lvl 23.5 dBm  
 Marker 1 [T1] 1.90180361 GHz -33.39 dBm  
 RBW 1 MHz RF Att 30 dB  
 VBW 3 MHz  
 SWT 145 ms Unit dBm

3.5 dB Offset  
 -13 dBm  
 -33.39 dBm  
 1.90180361 GHz

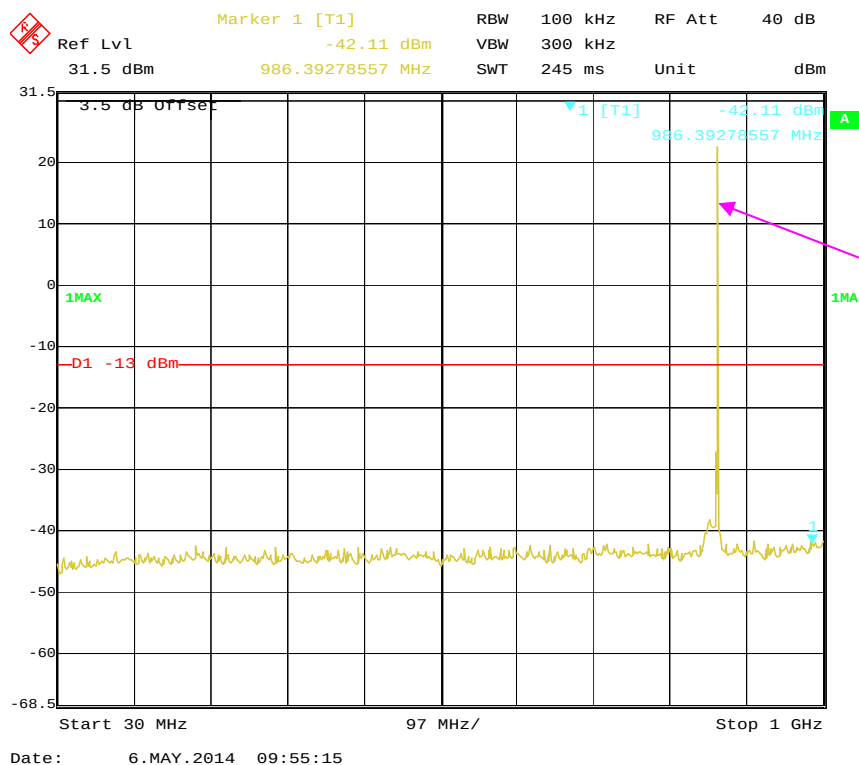
Start 1 GHz 2.5 GHz/ Stop 26 GHz

Date: 6.MAY.2014 09:27:38

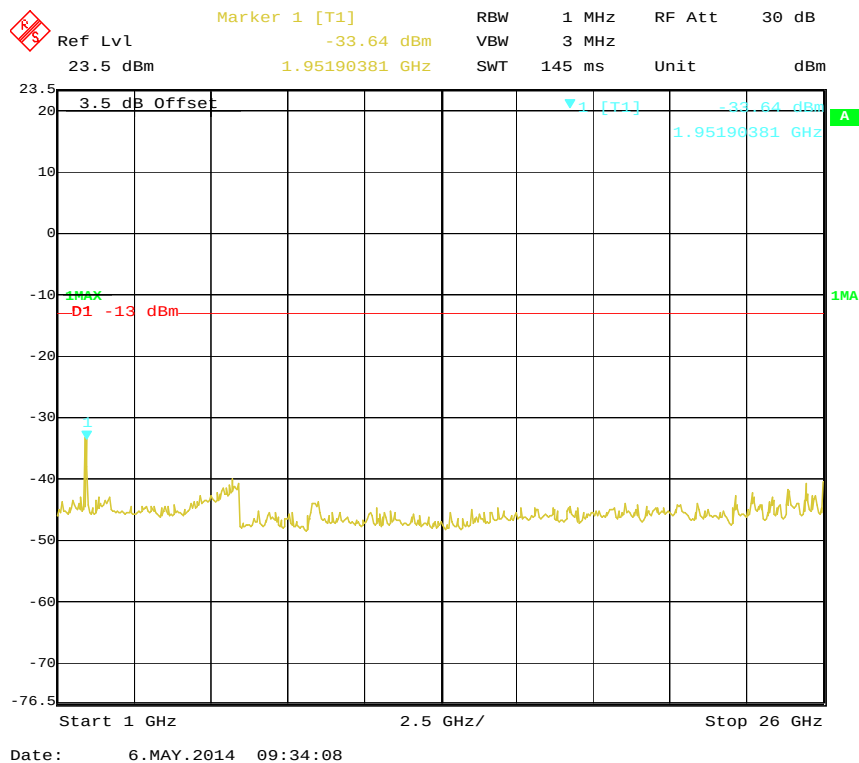
**64QAM (3MHz) Mode, 30 MHz – 1 GHz, Middle Channel****64QAM (3MHz) Mode, 1 GHz – 26 GHz, Middle Channel**

**64QAM (3MHz) Mode, 30 MHz – 1 GHz, High Channel****64QAM (3MHz) Mode, 1 GHz – 26 GHz, High Channel**

## 64QAM (5MHz) Mode, 30 MHz – 1 GHz

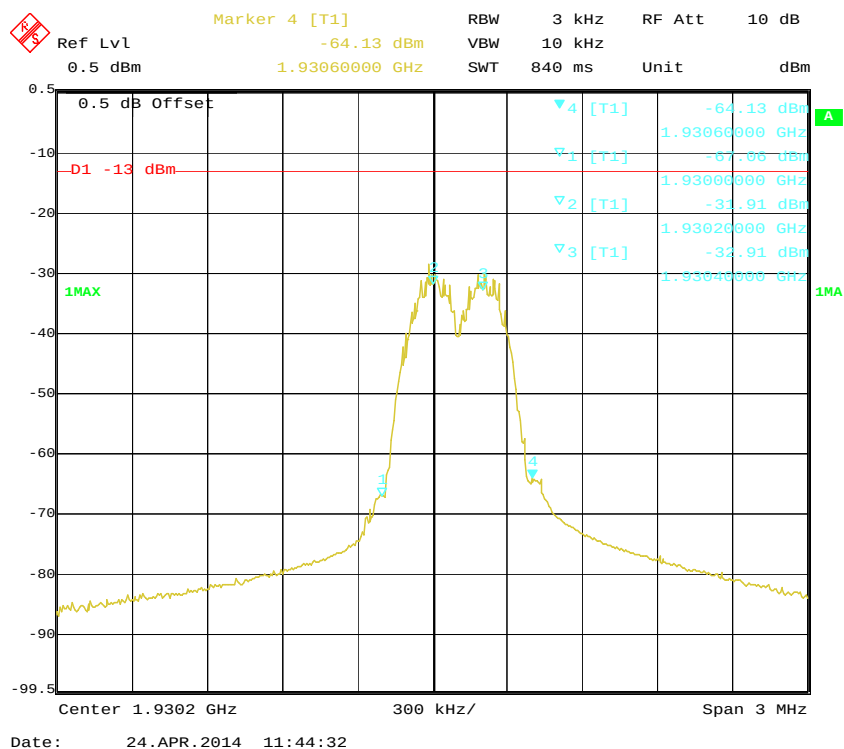


## 64QAM (5MHz) Mode, 1 GHz – 26 GHz

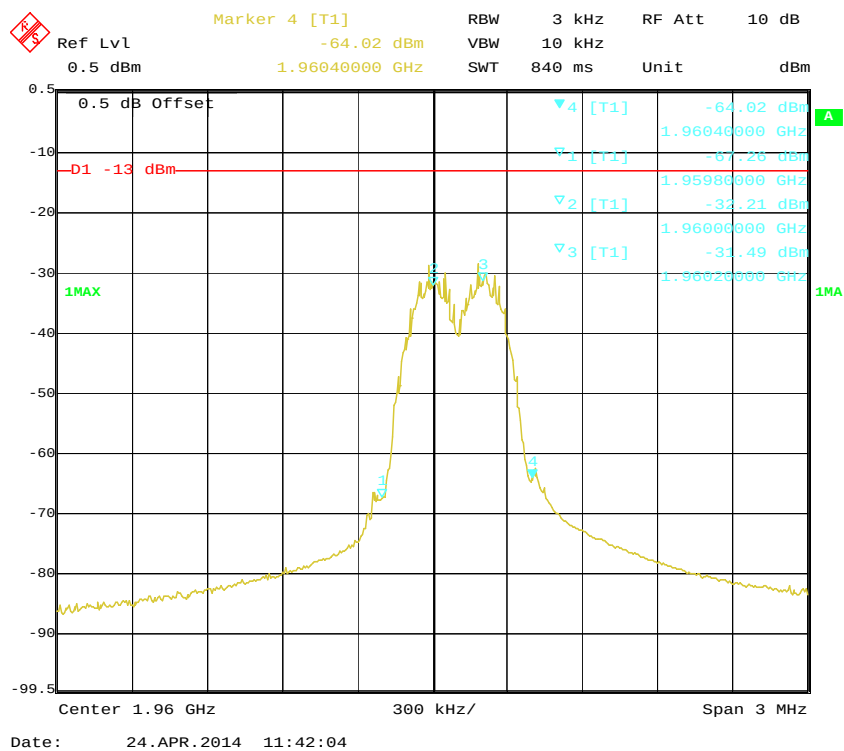


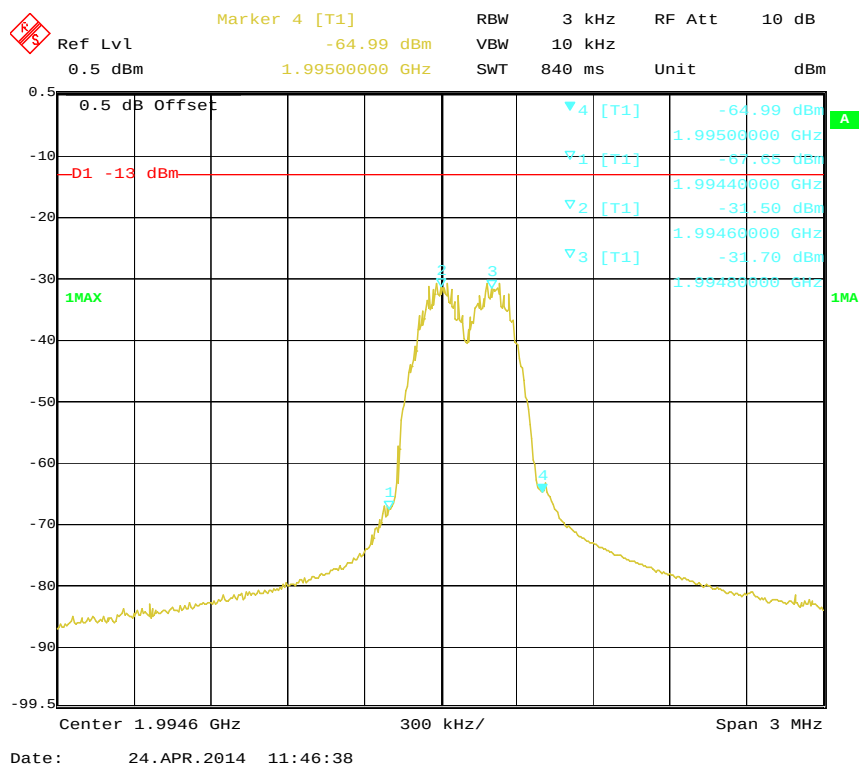
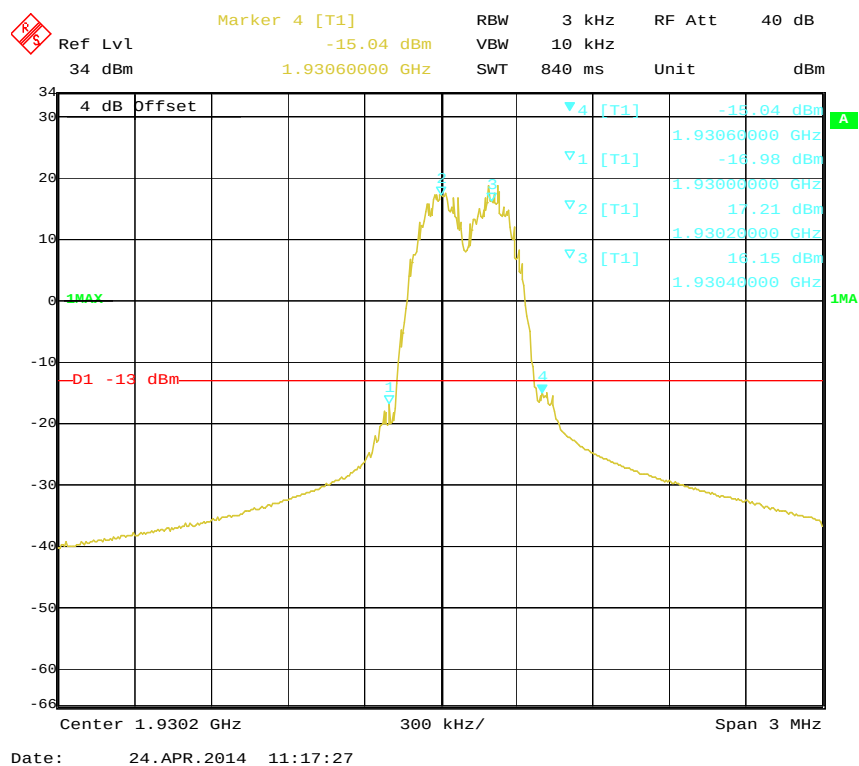
## Intermodulation (PCS Band Downlink)

## GSM Mode, Input, Low Channel

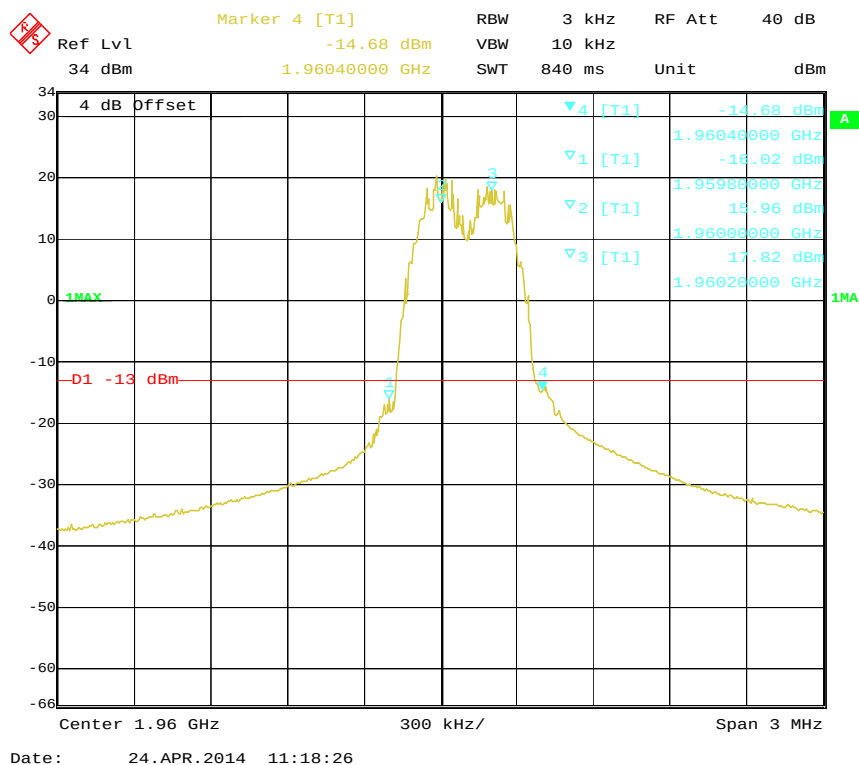


## GSM Mode, Input, Middle Channel

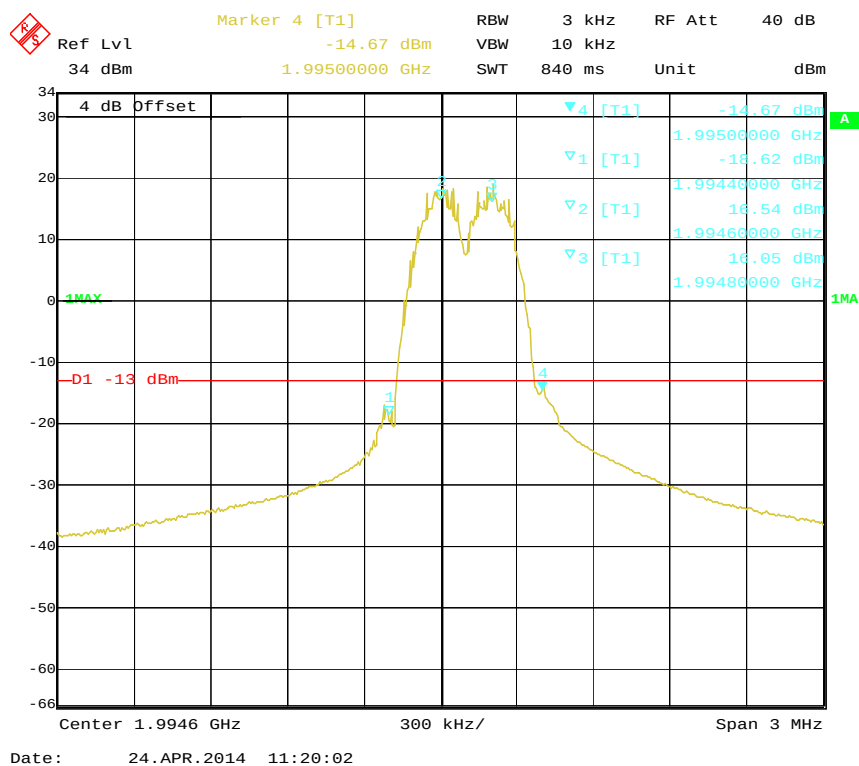


**GSM Mode, Input, High Channel****GSM Mode, Output, Low Channel**

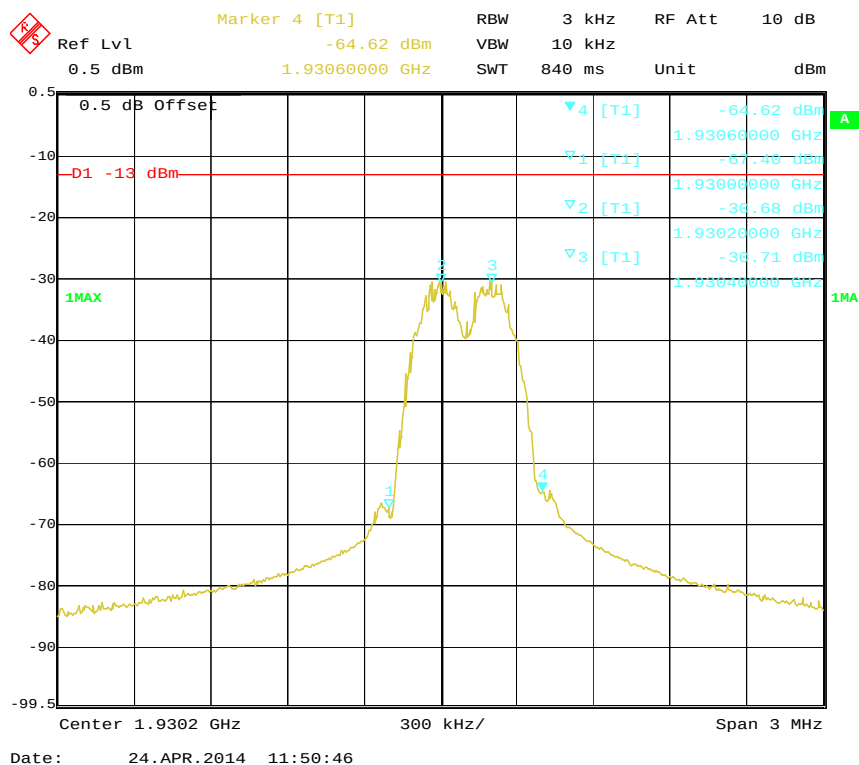
## GSM Mode, Output, Middle Channel



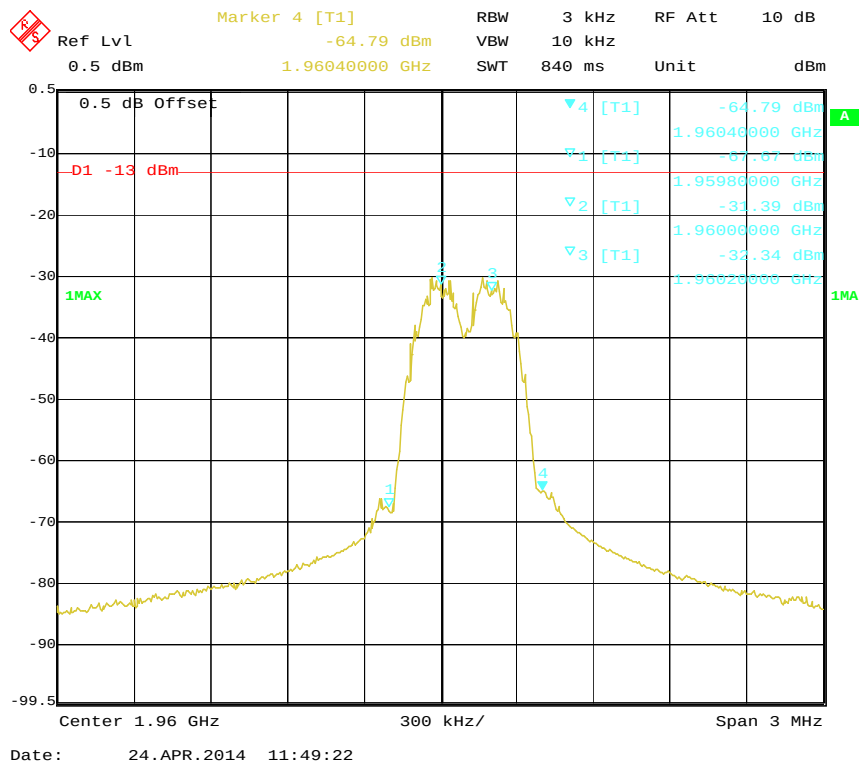
## GSM Mode, Output, High Channel



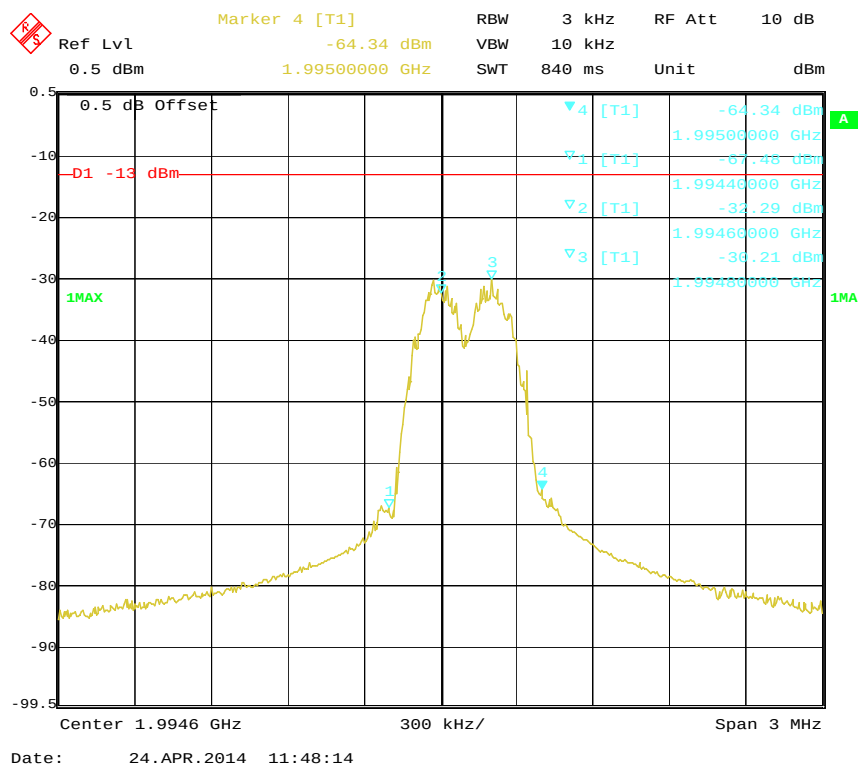
## EDGE Mode, Input, Low Channel



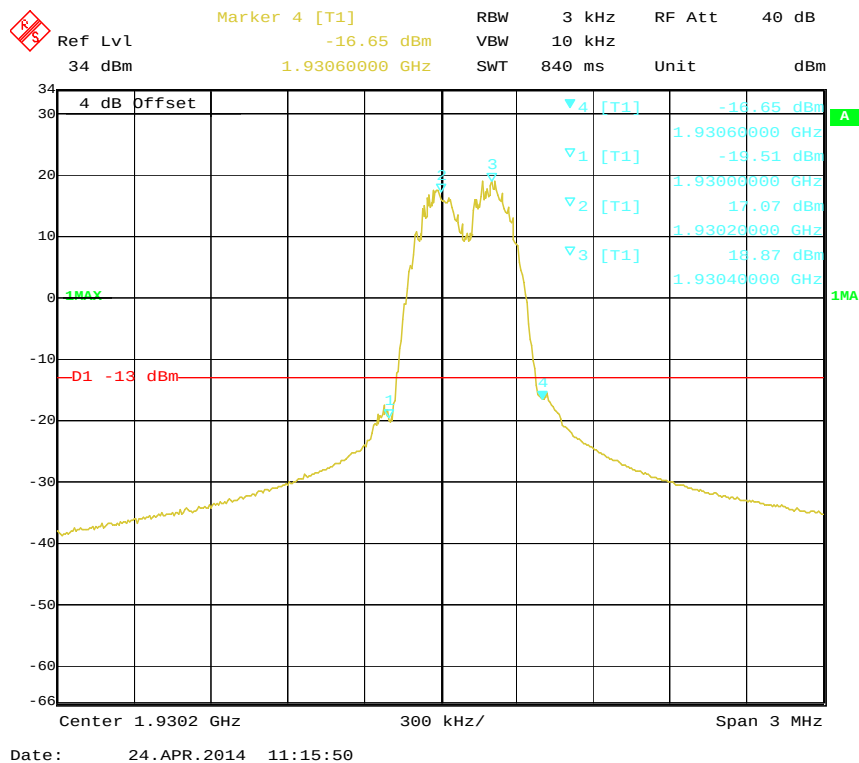
## EDGE Mode, Input, Middle Channel



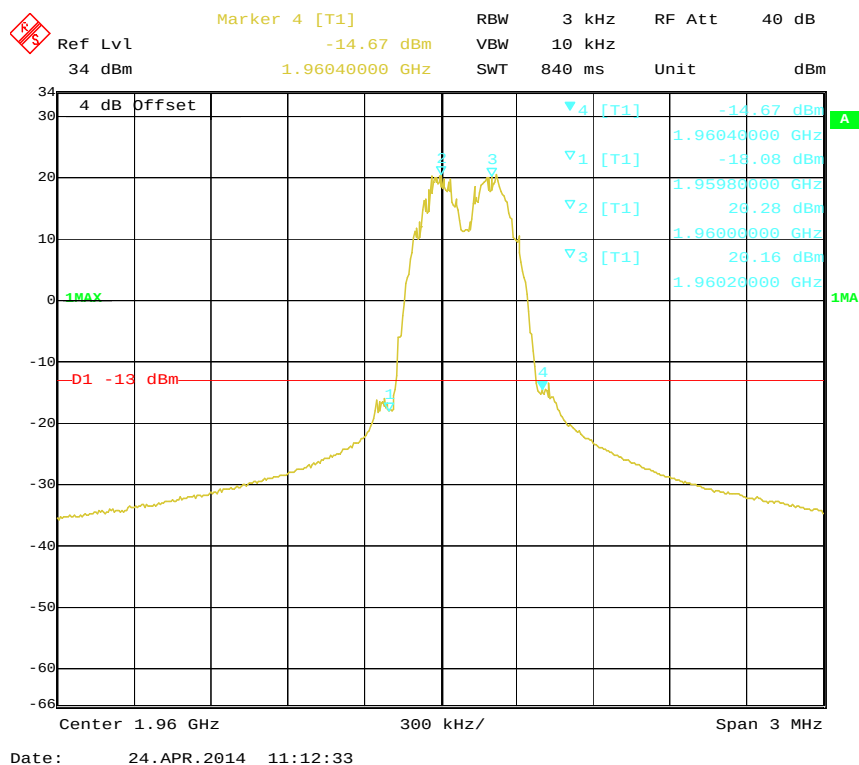
## EDGE Mode, Input, High Channel



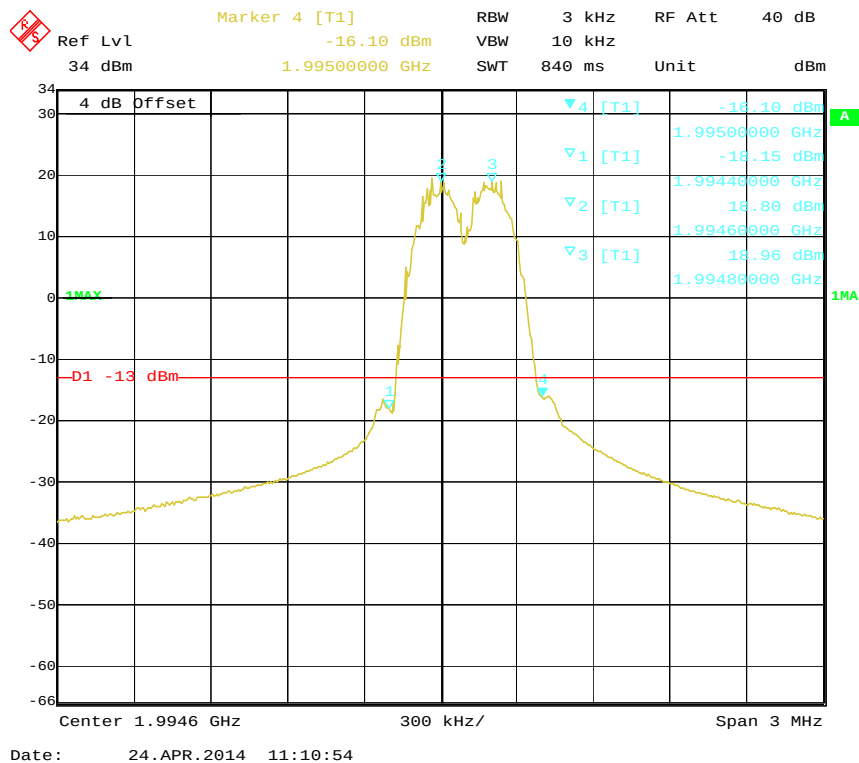
## EDGE Mode, Output, Low Channel



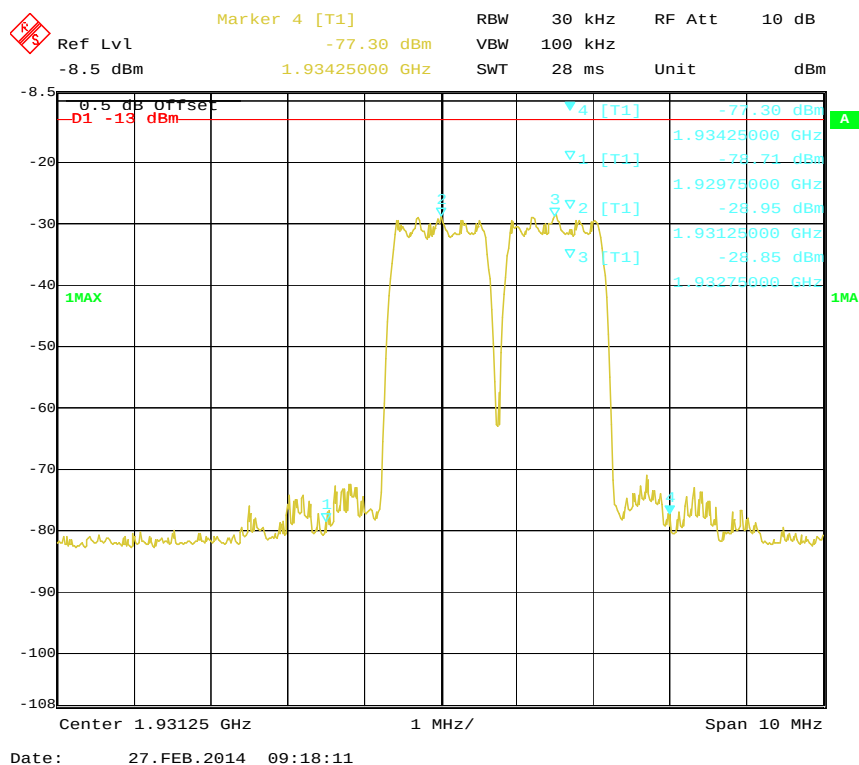
## EDGE Mode, Output, Middle Channel



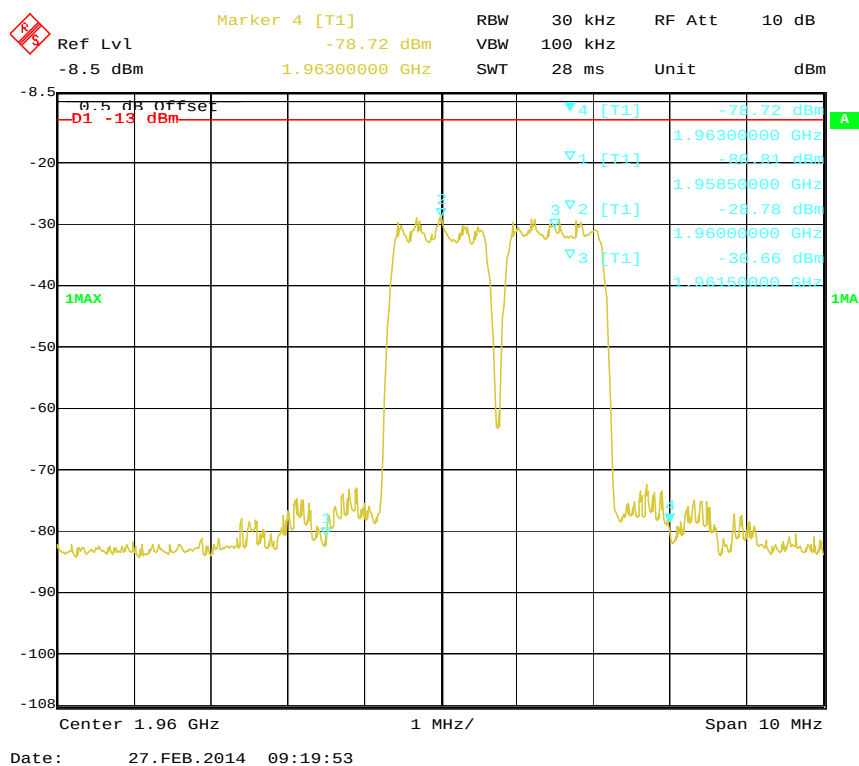
## EDGE Mode, Output, High Channel



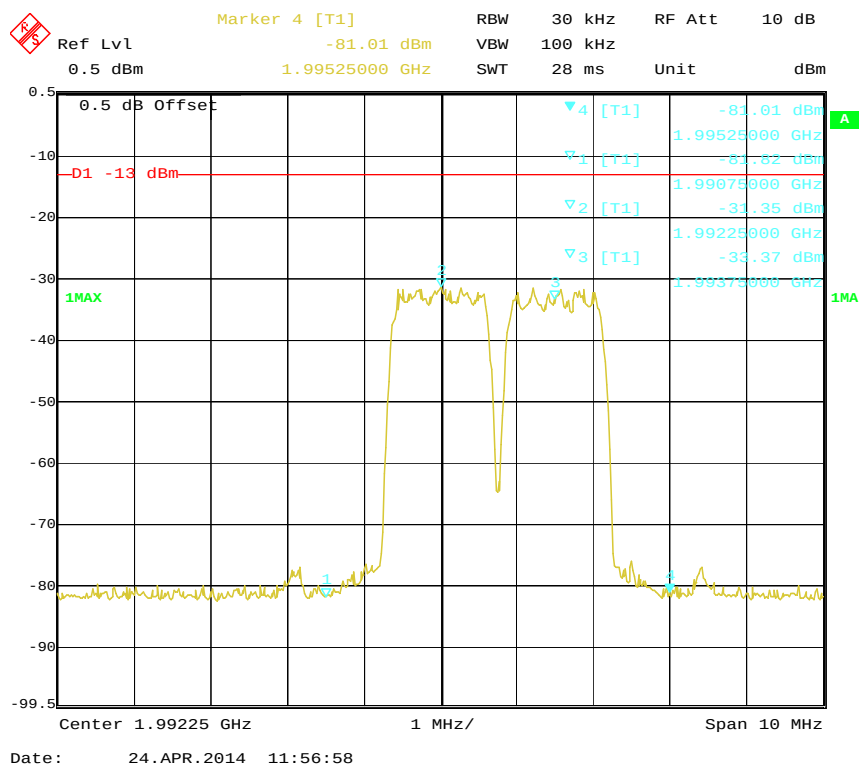
## CDMA Mode, Input, Low Channel



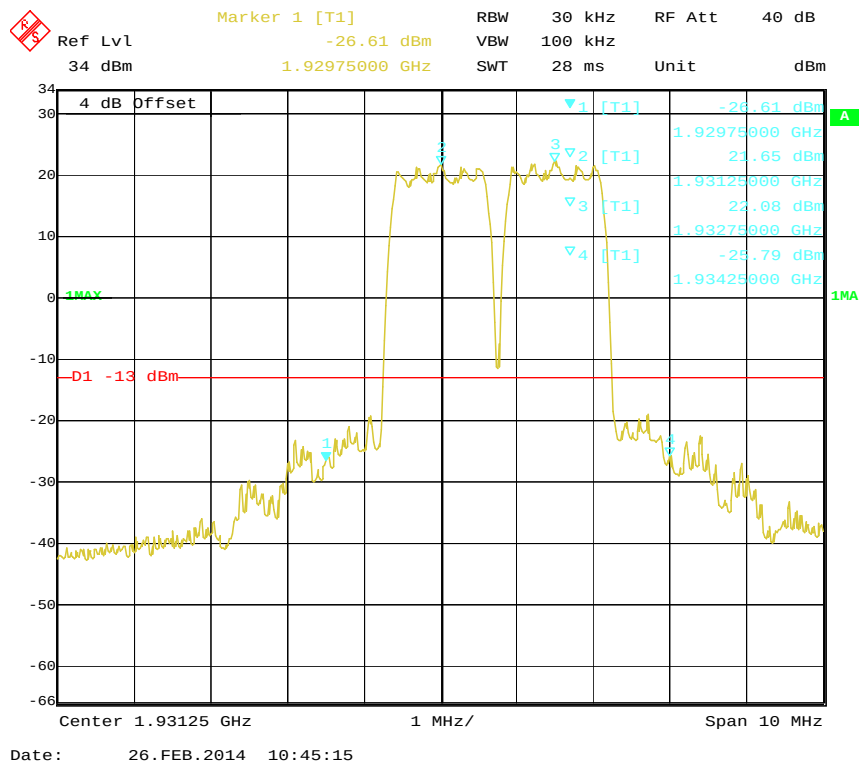
## CDMA Mode, Input, Middle Channel



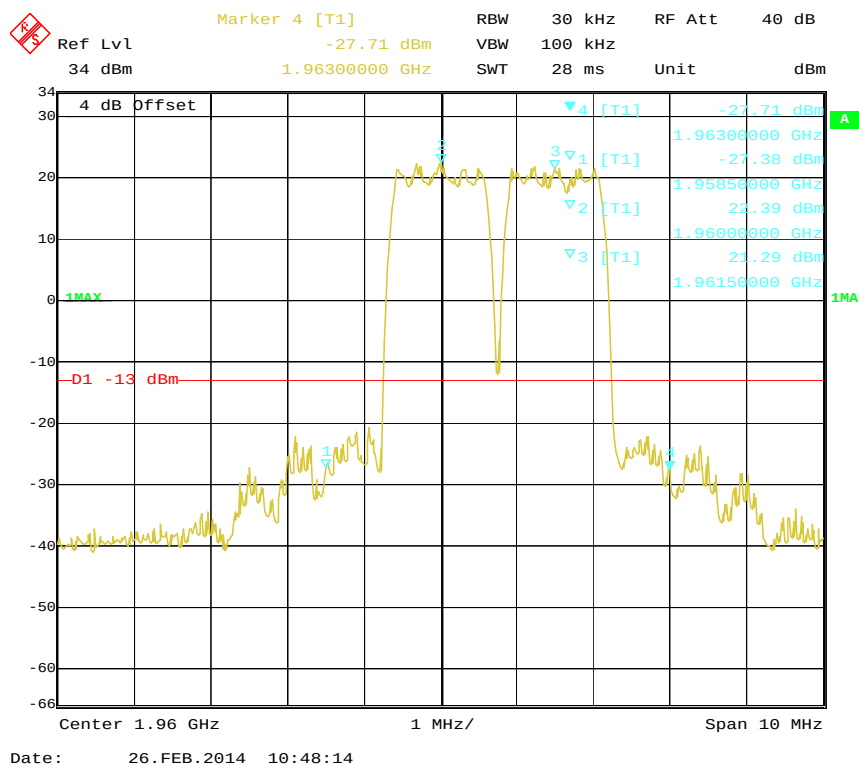
## CDMA Mode, Input, High Channel



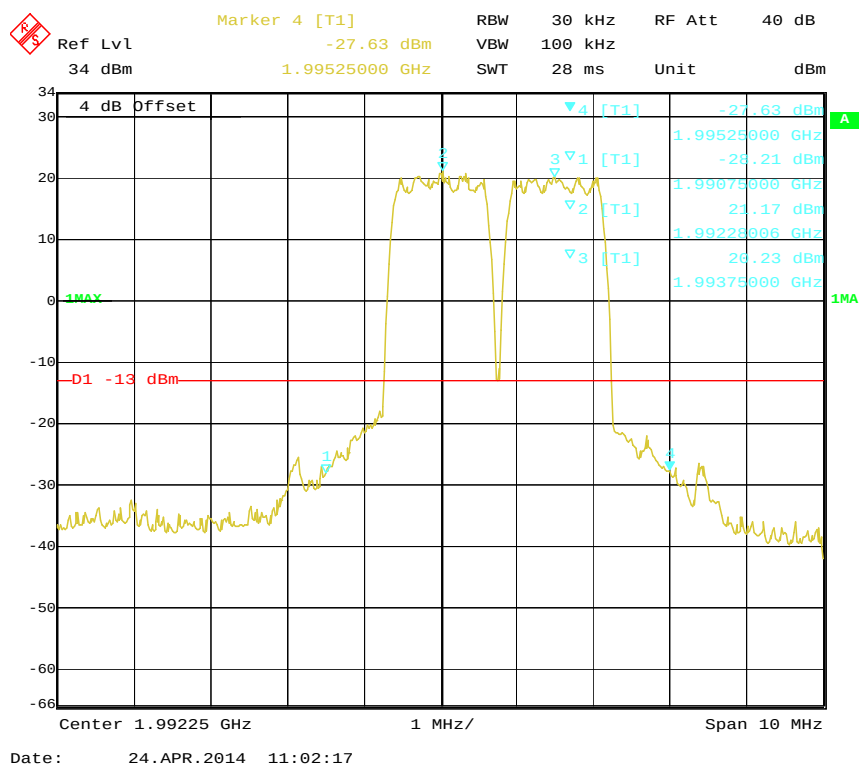
## CDMA Mode, Output, Low Channel



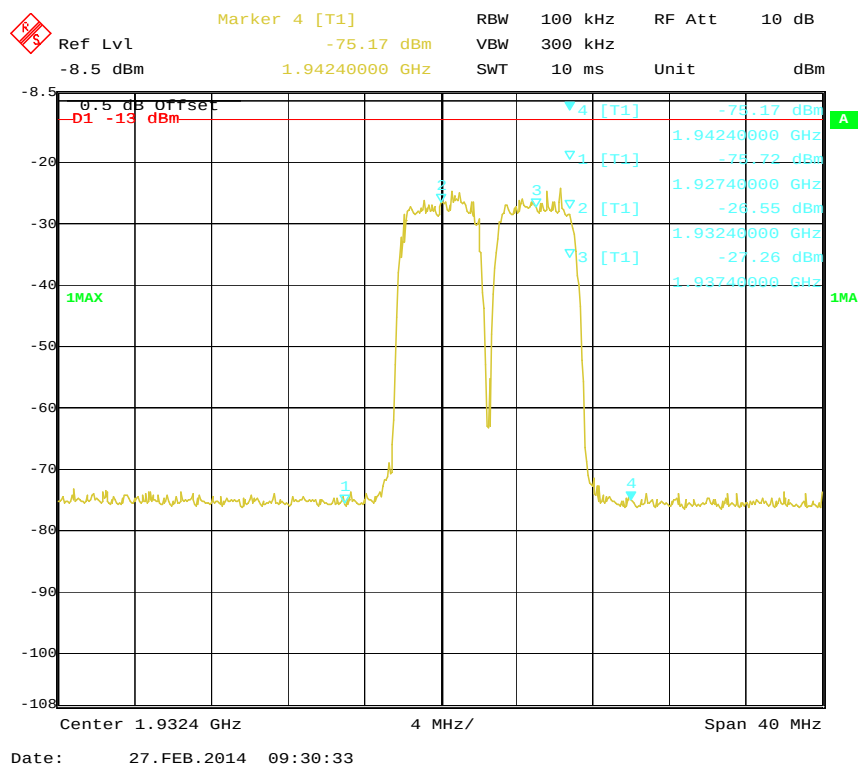
## CDMA Mode, Output, Middle Channel



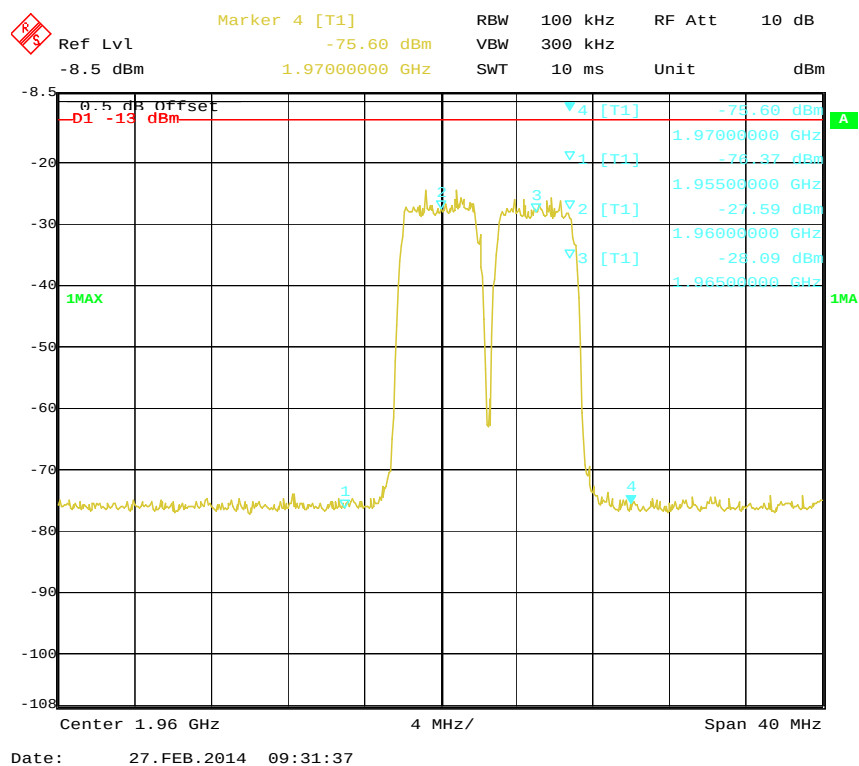
## CDMA Mode, Output, High Channel



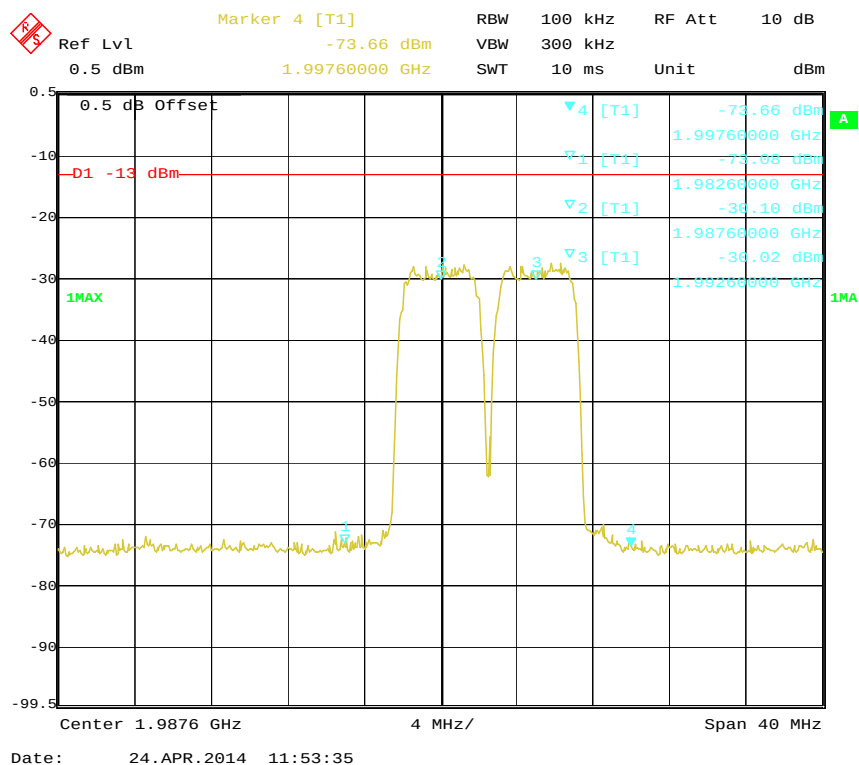
## WCDMA Mode, Input, Low Channel



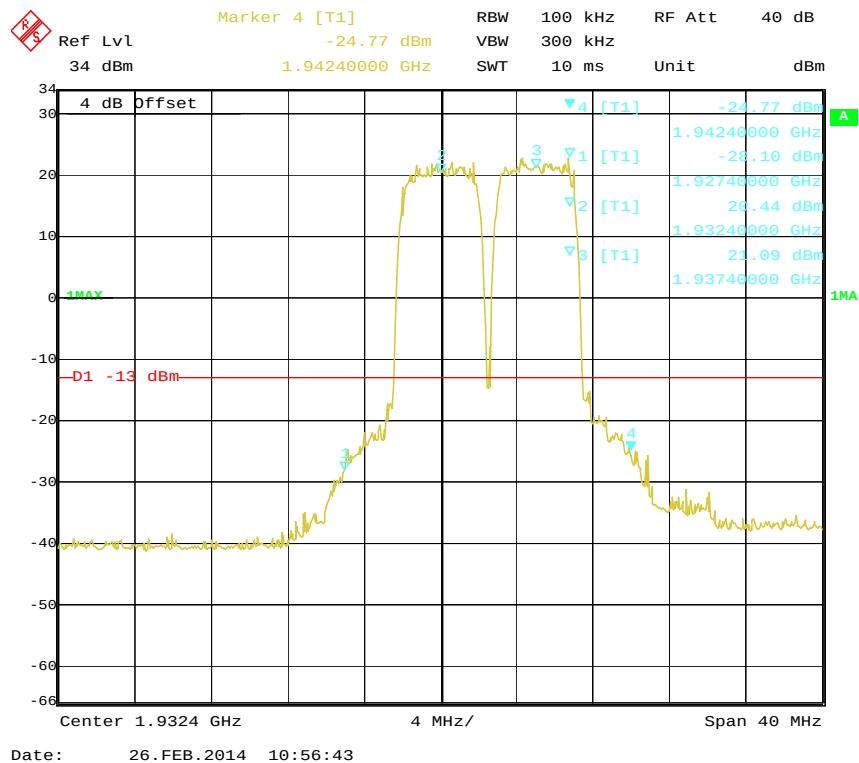
## WCDMA Mode, Input, Middle Channel



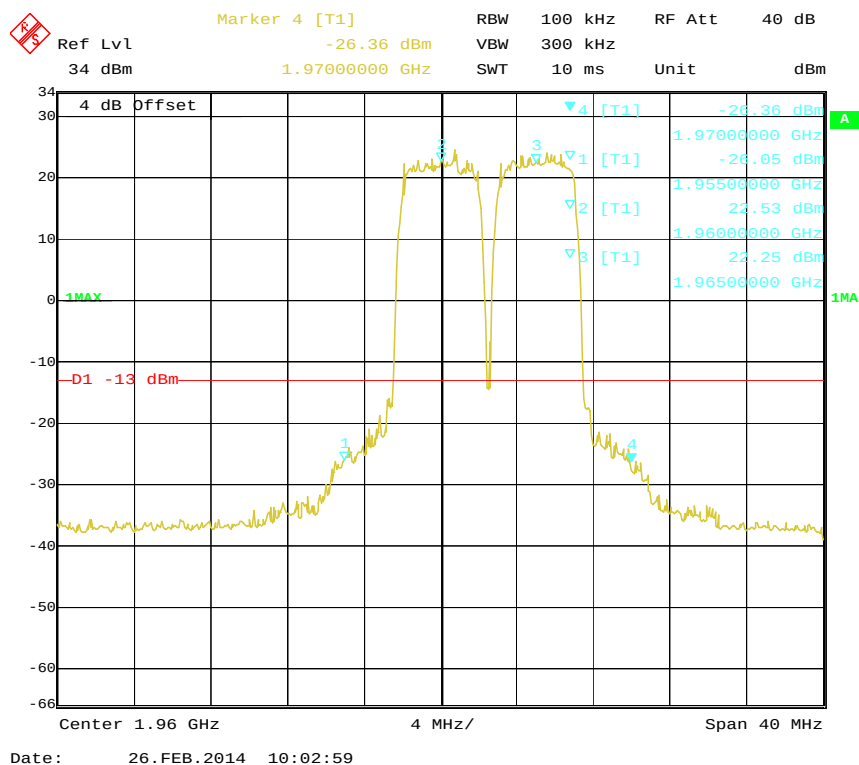
## WCDMA Mode, Input, High Channel



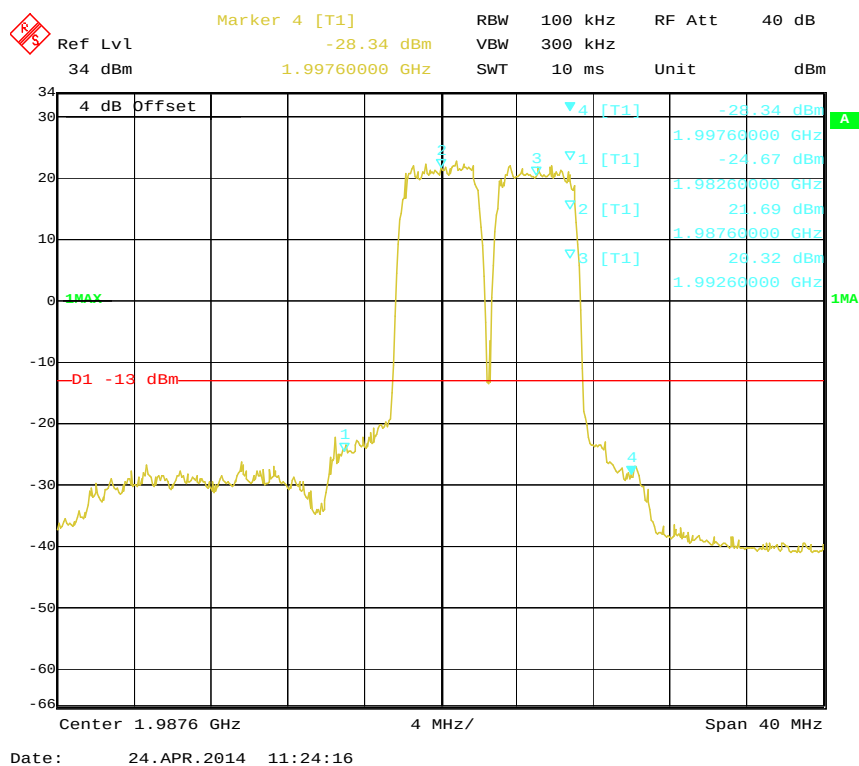
## WCDMA Mode, Output, Low Channel

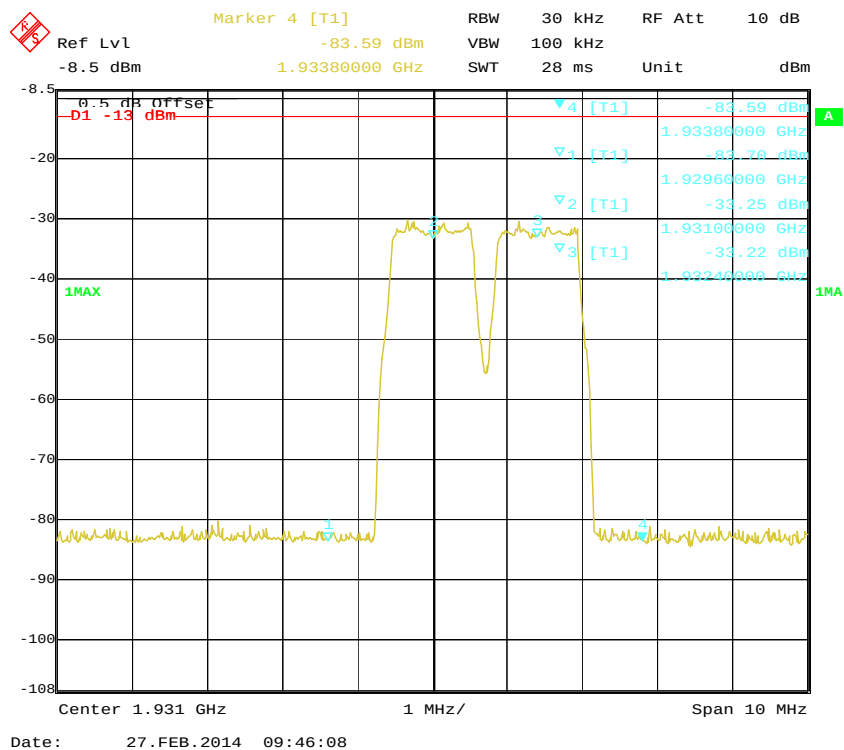
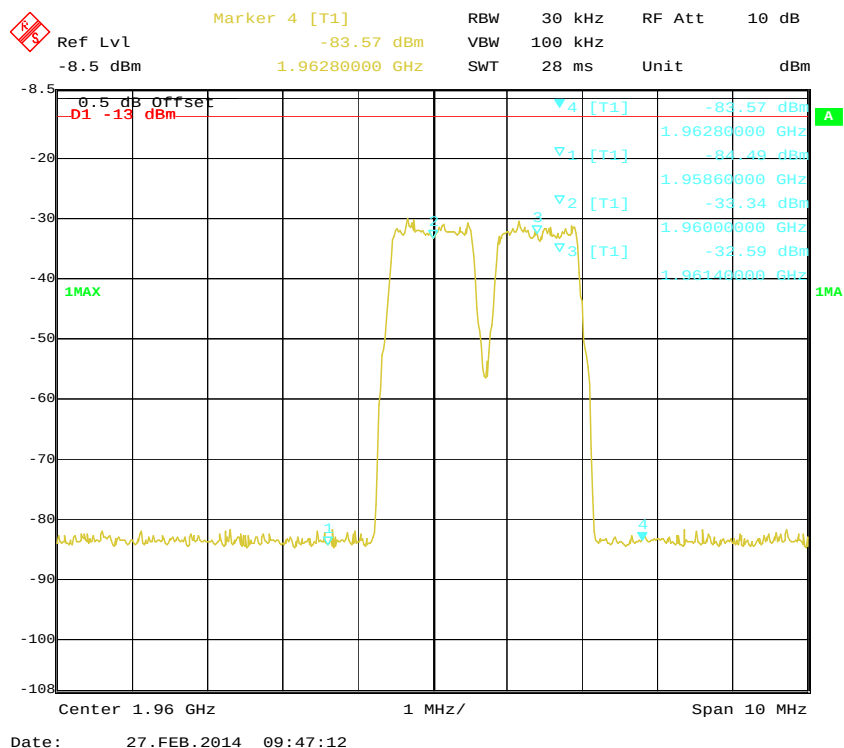


## WCDMA Mode, Output, Middle Channel

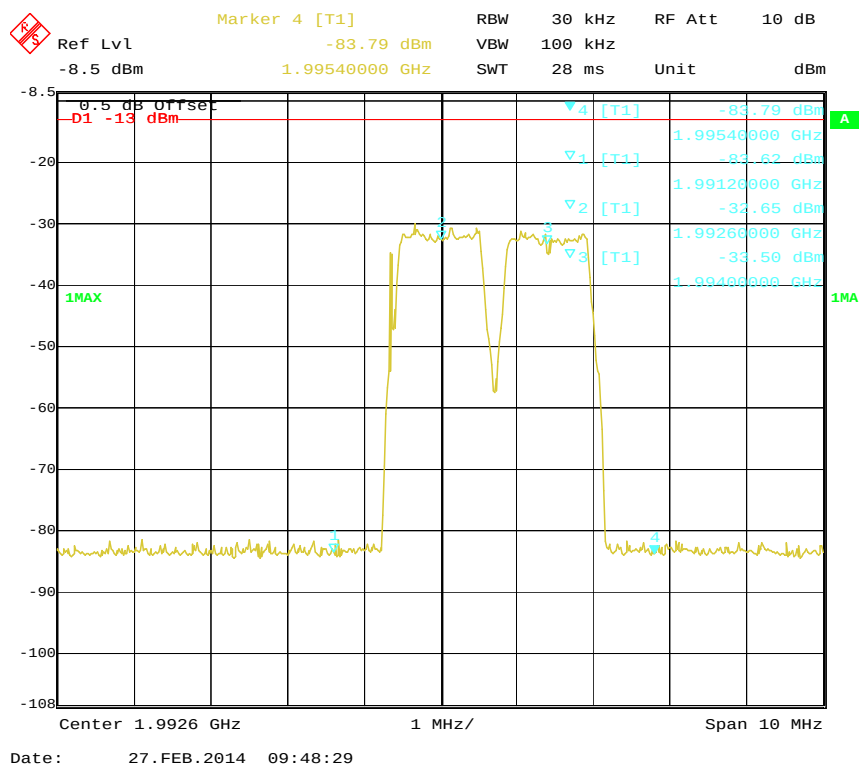


## WCDMA Mode, Output, High Channel

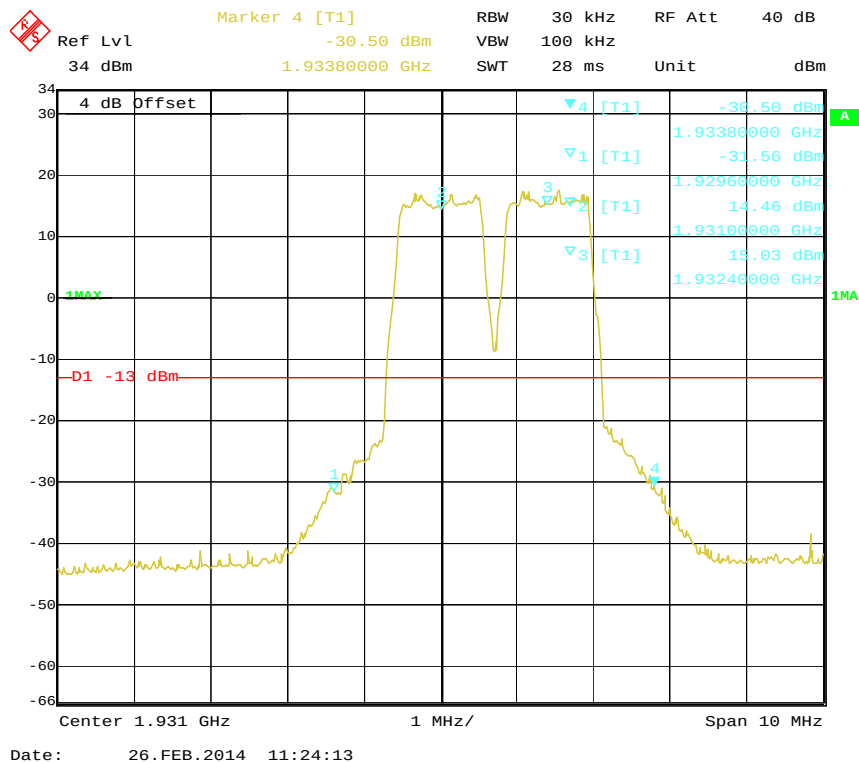


**Intermodulation (PCS Band LTE Downlink):****QPSK (1.4MHz) Mode, Input, Low Channel****QPSK (1.4MHz) Mode, Input, Middle Channel**

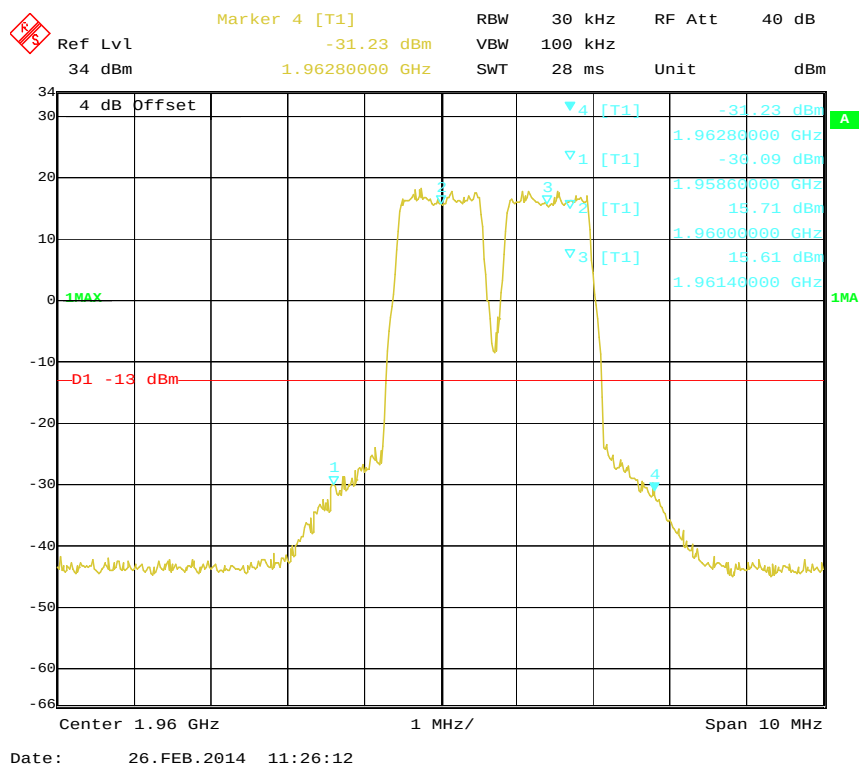
## QPSK (1.4MHz) Mode, Input, High Channel



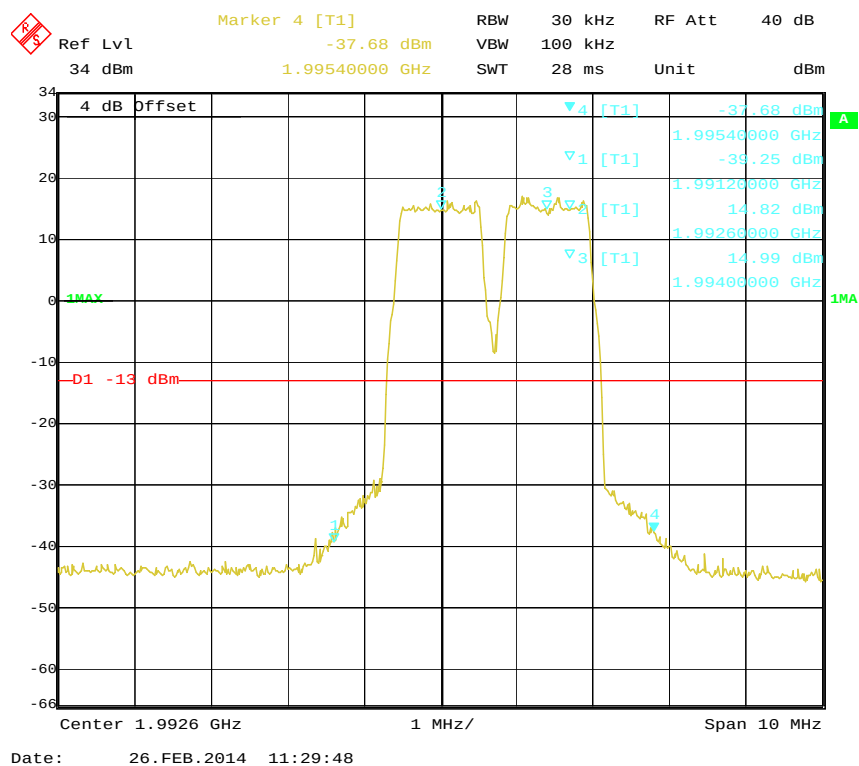
## QPSK (1.4MHz) Mode, Output, Low Channel

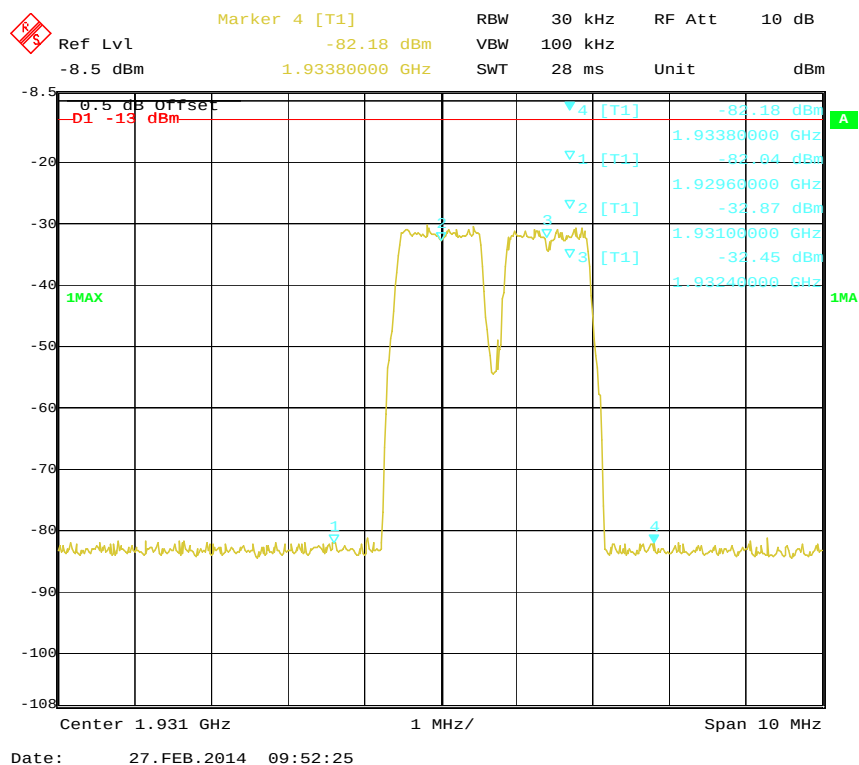
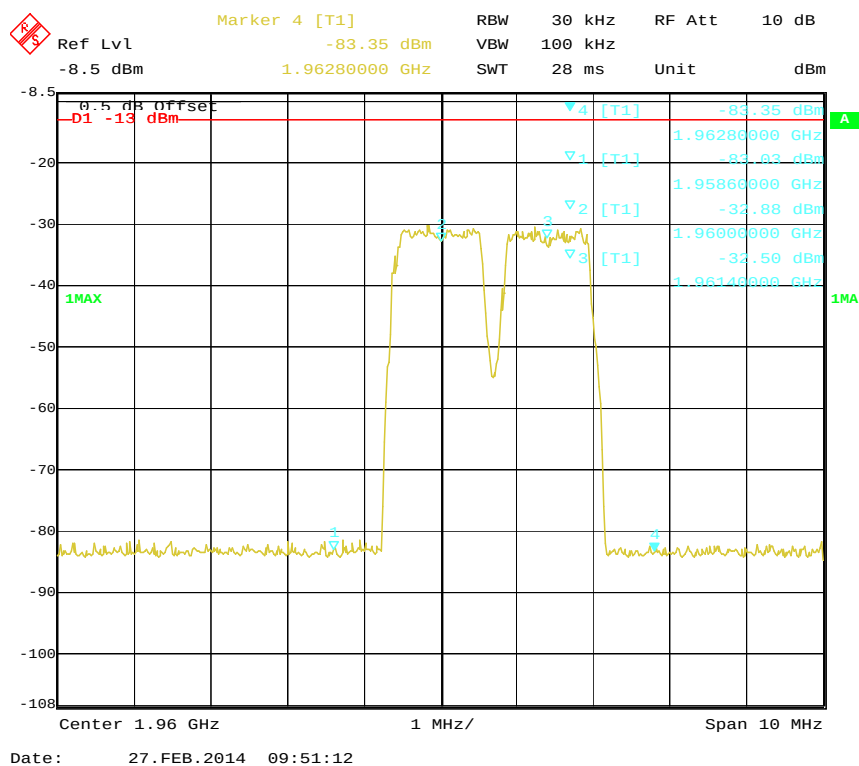


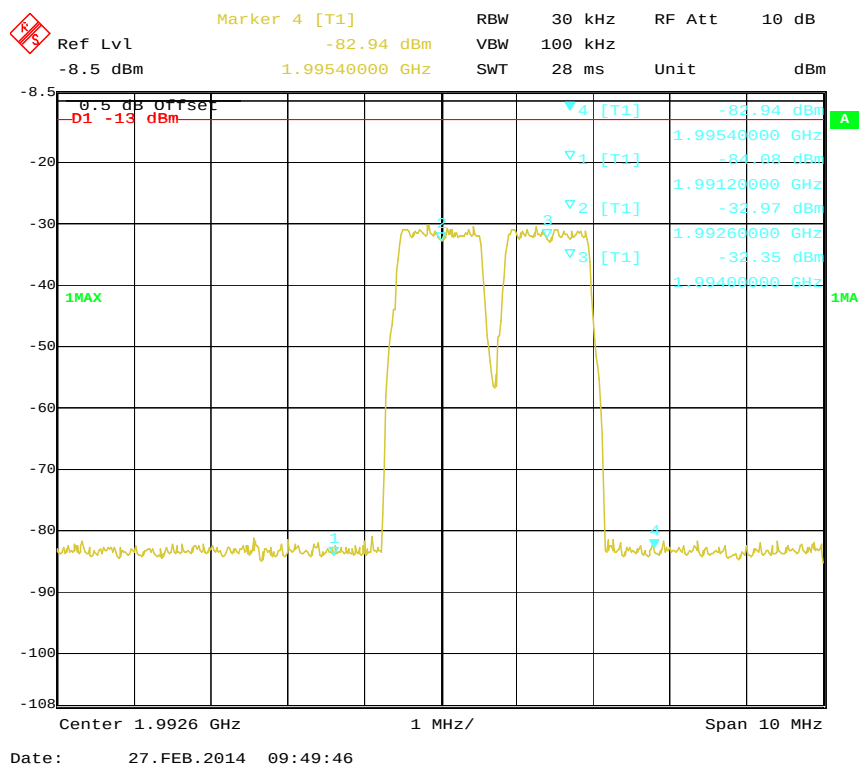
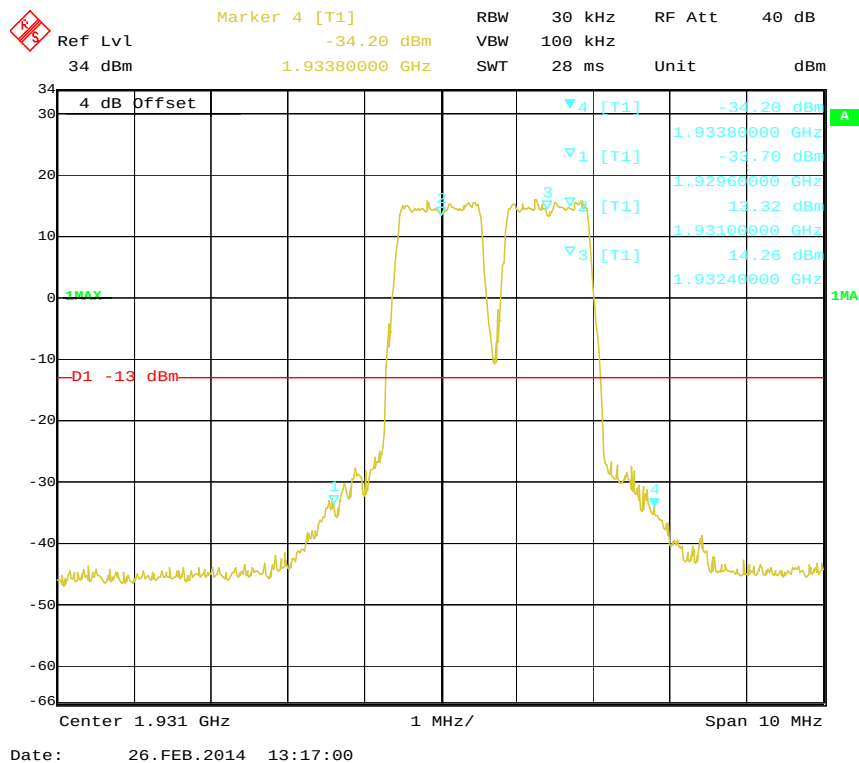
## QPSK (1.4MHz) Mode, Output, Middle Channel

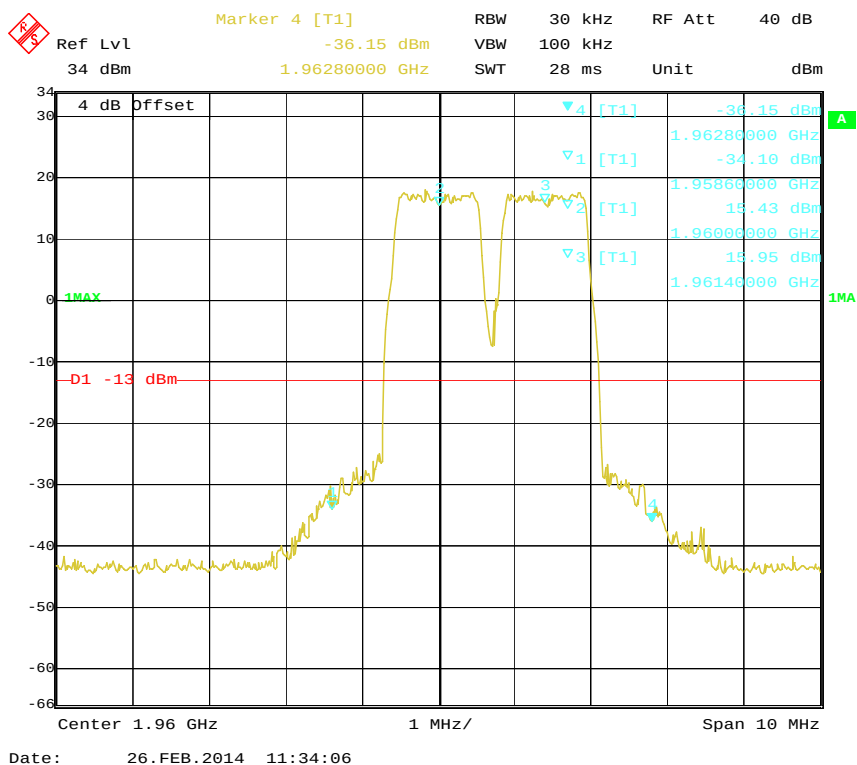
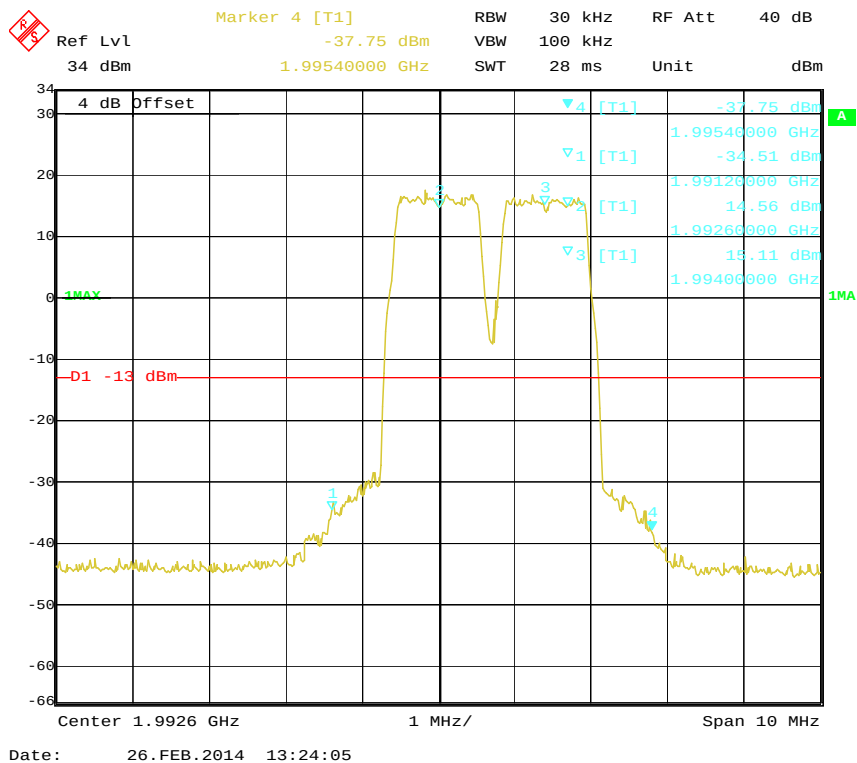


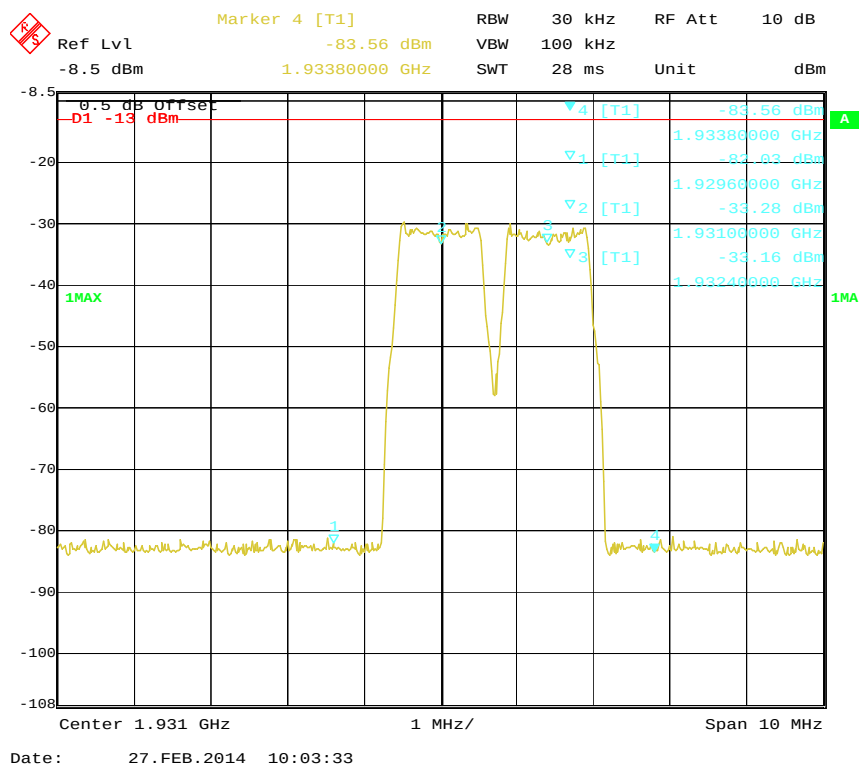
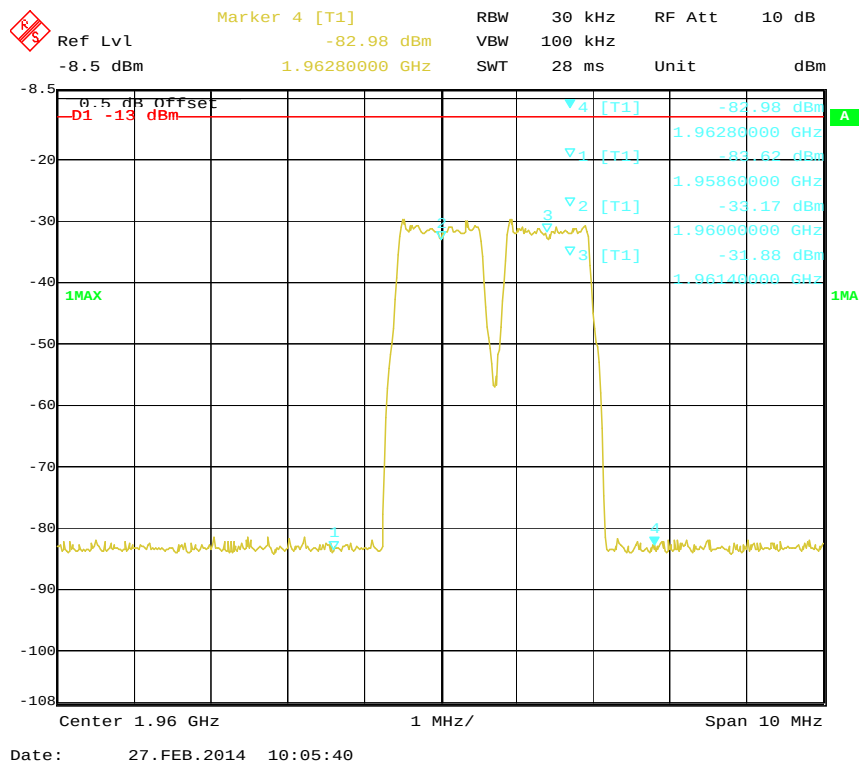
## QPSK (1.4MHz) Mode, Output, High Channel

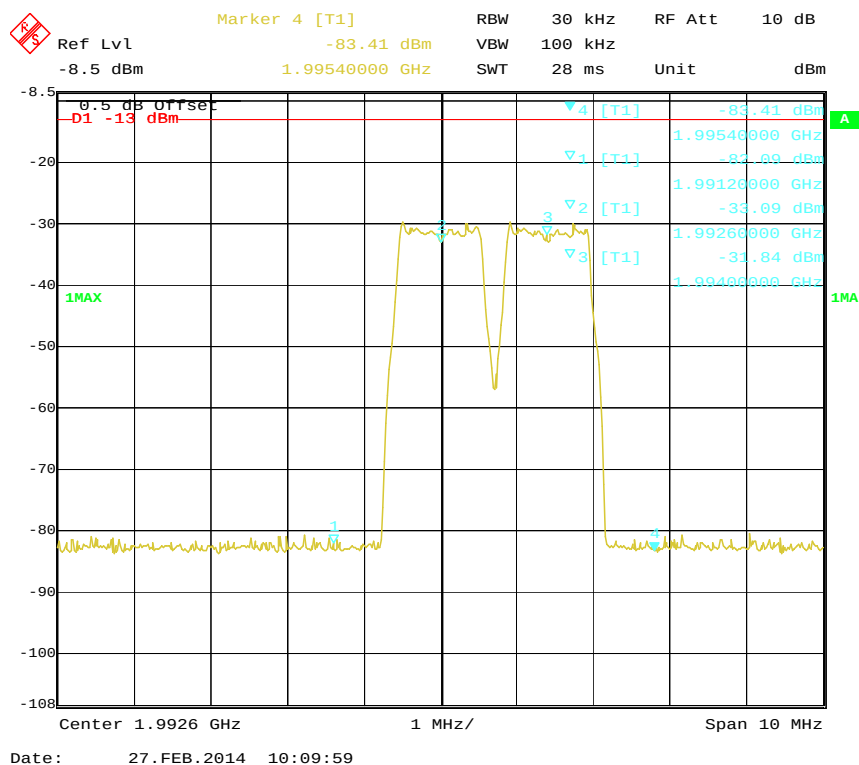
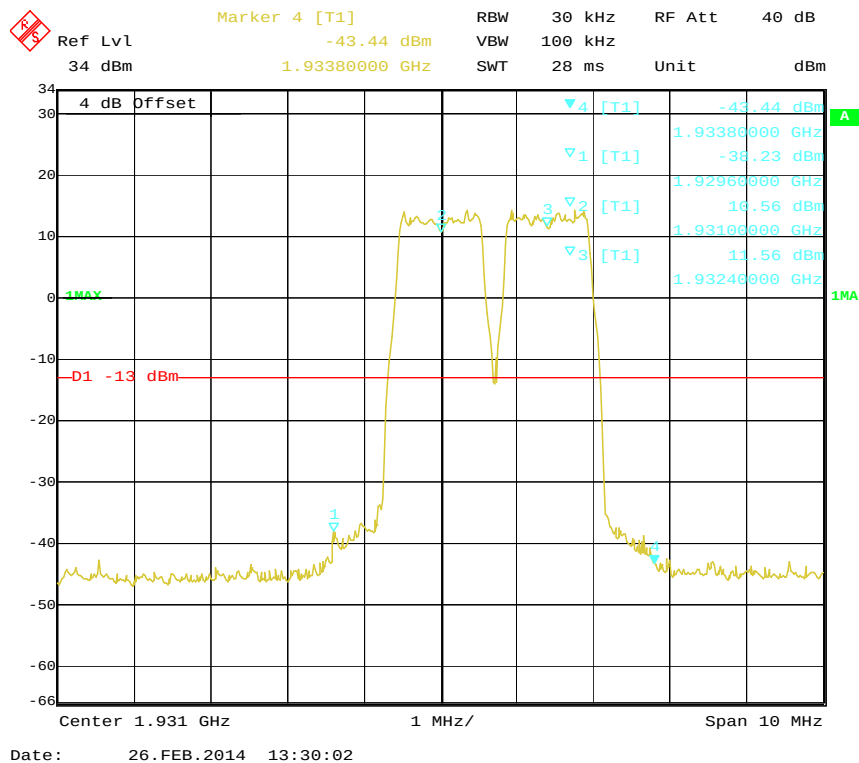


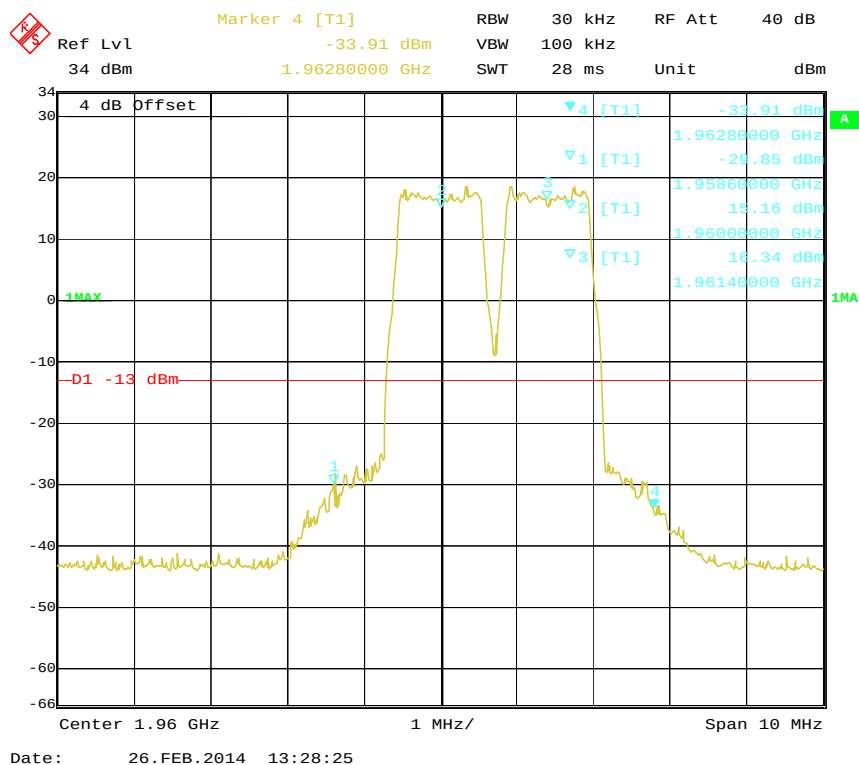
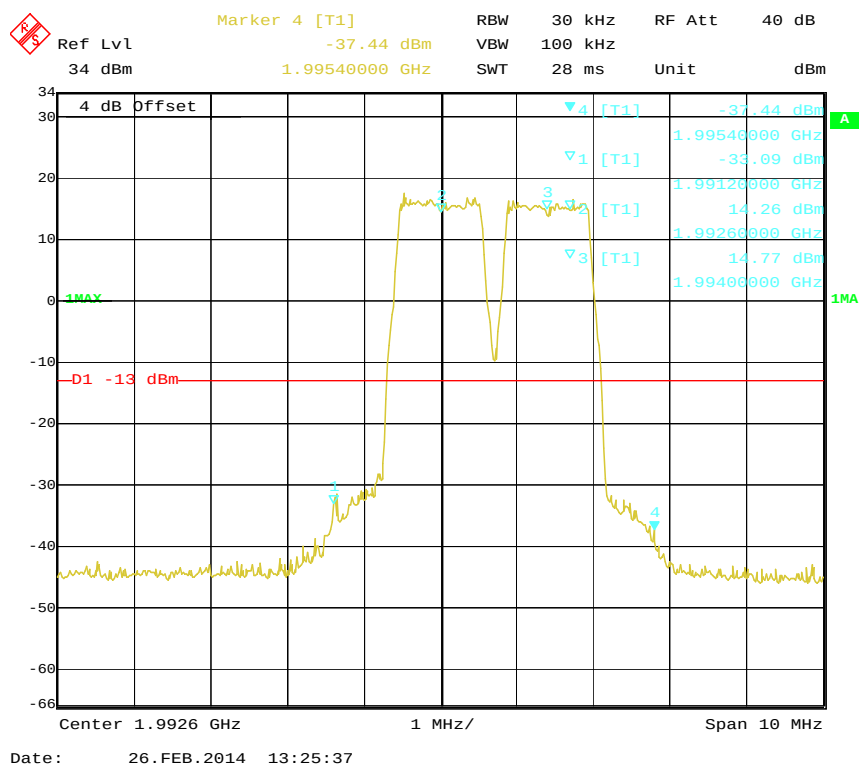
**16QAM (1.4MHz) Mode, Input, Low Channel****16QAM (1.4MHz) Mode, Input, Middle Channel**

**16QAM (1.4MHz) Mode, Input, High Channel****16QAM (1.4MHz) Mode, Output, Low Channel**

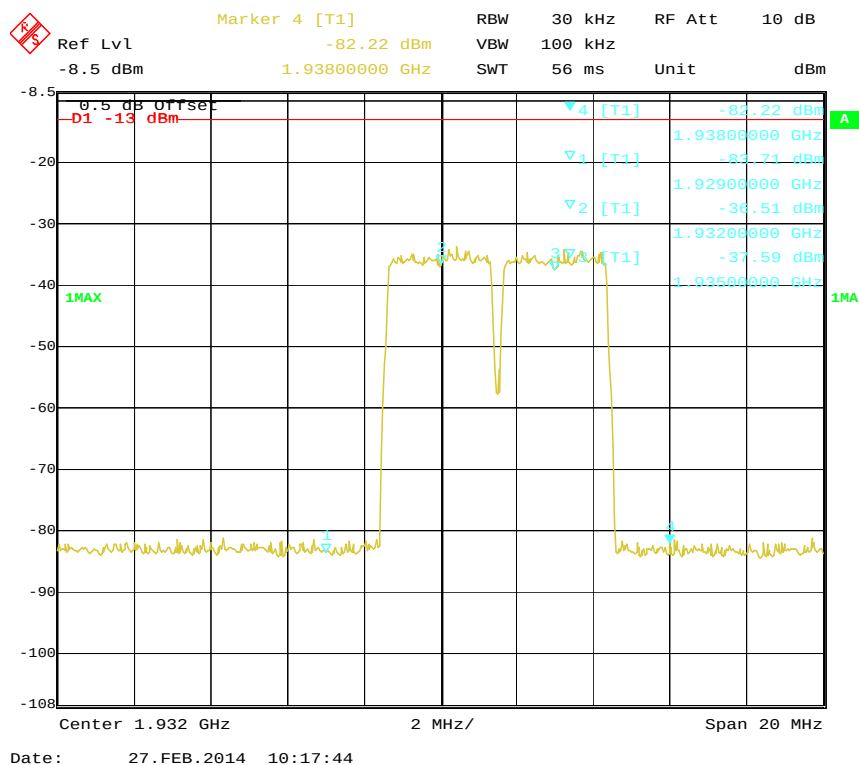
**16QAM (1.4MHz) Mode, Output, Middle Channel****16QAM (1.4MHz) Mode, Output, High Channel**

**64QAM (1.4MHz) Mode, Input, Low Channel****64QAM (1.4MHz) Mode, Input, Middle Channel**

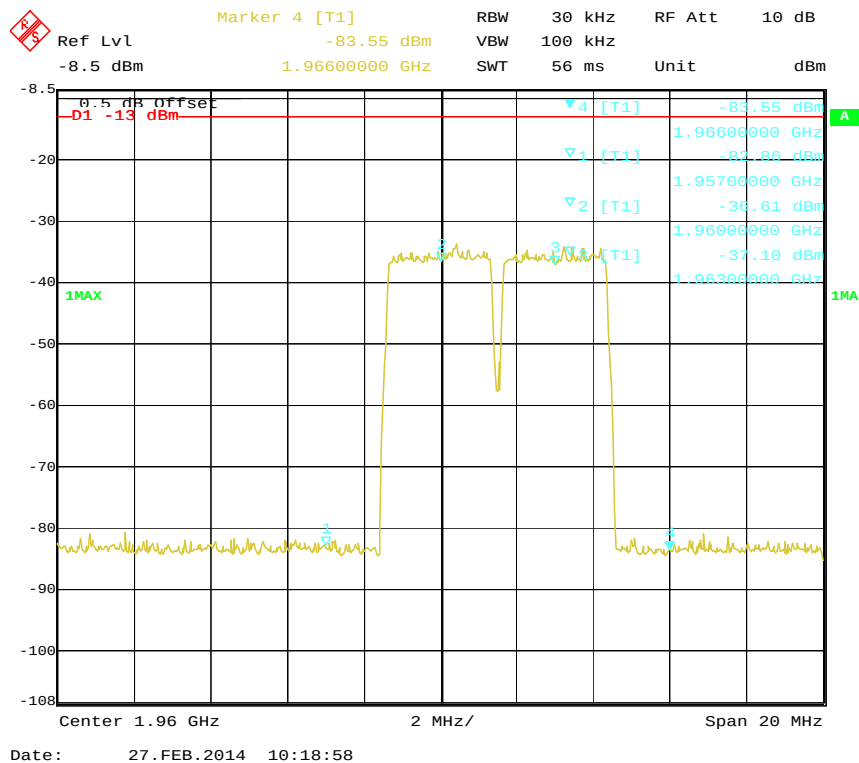
**64QAM (1.4MHz) Mode, Input, High Channel****64QAM (1.4MHz) Mode, Output, Low Channel**

**64QAM (1.4MHz) Mode, Output, Middle Channel****64QAM (1.4MHz) Mode, Output, High Channel**

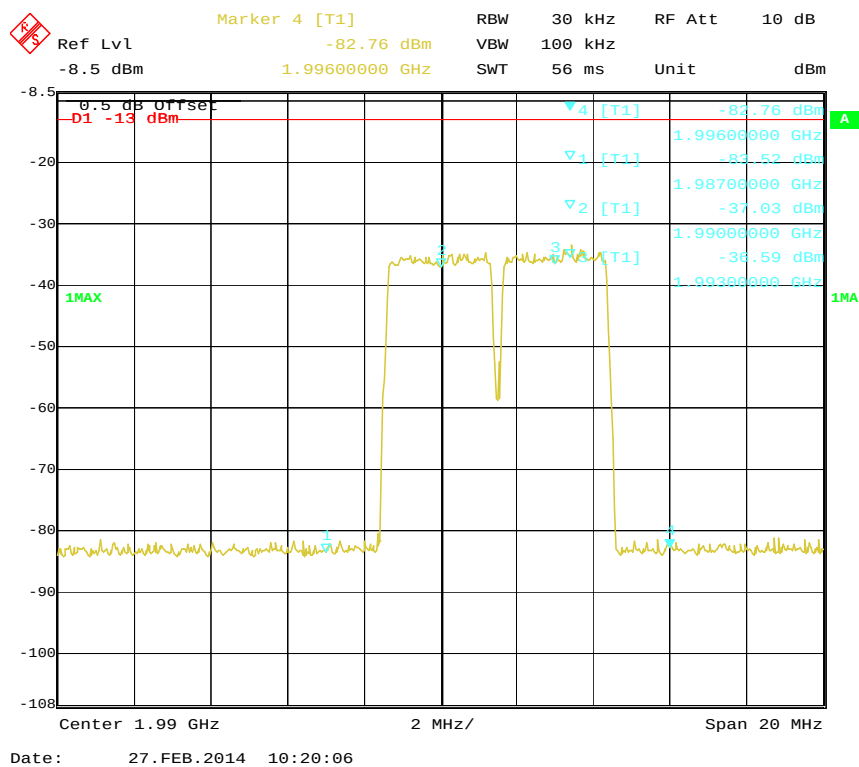
## QPSK (3MHz) Mode, Input, Low Channel



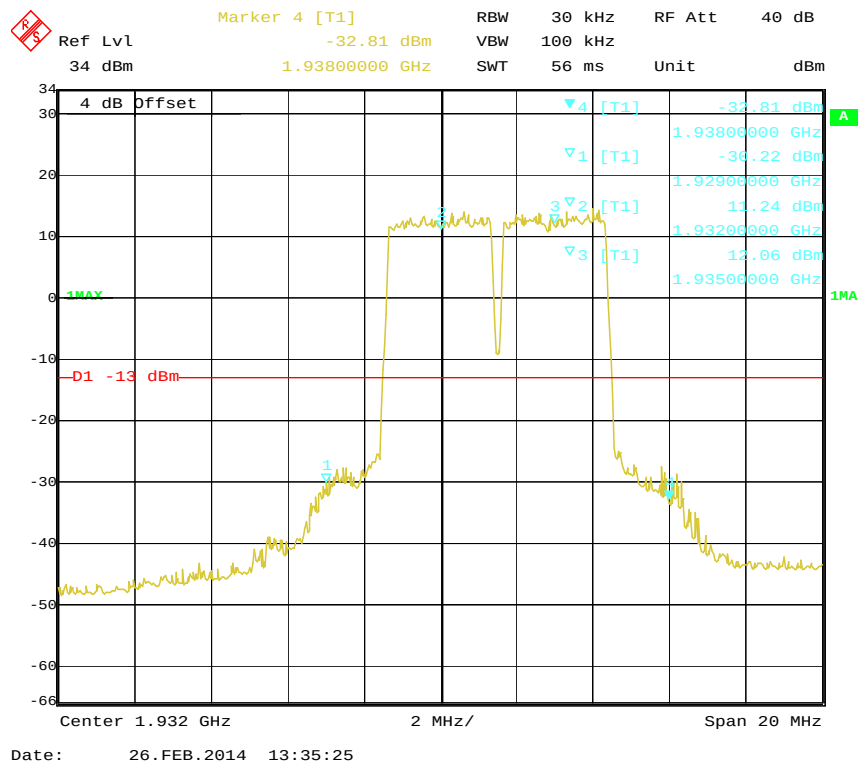
## QPSK (3MHz) Mode, Input, Middle Channel



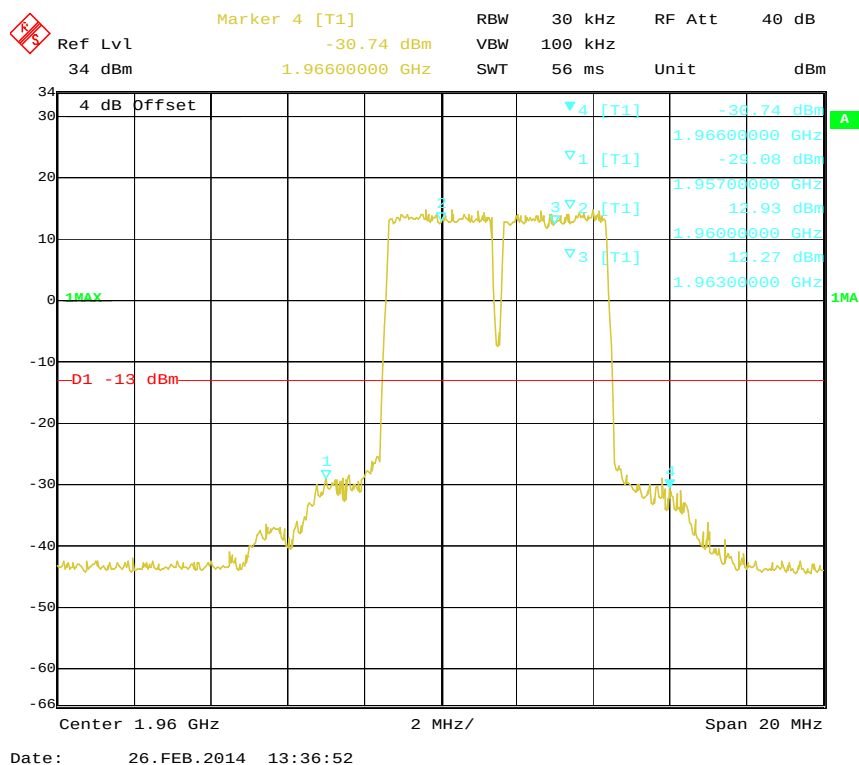
## QPSK (3MHz) Mode, Input, High Channel



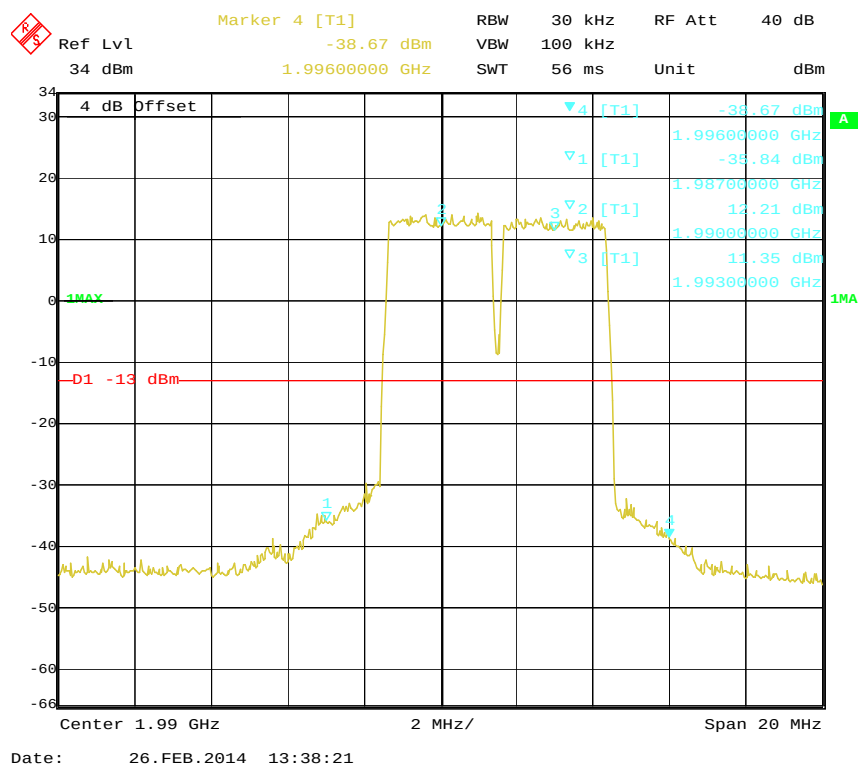
## QPSK (3MHz) Mode, Output, Low Channel

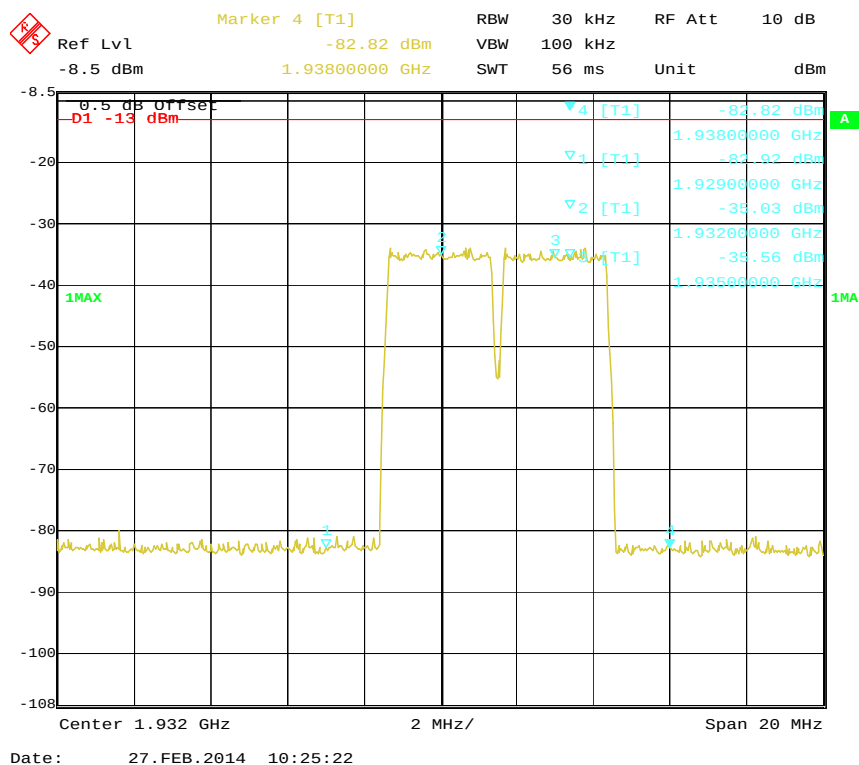
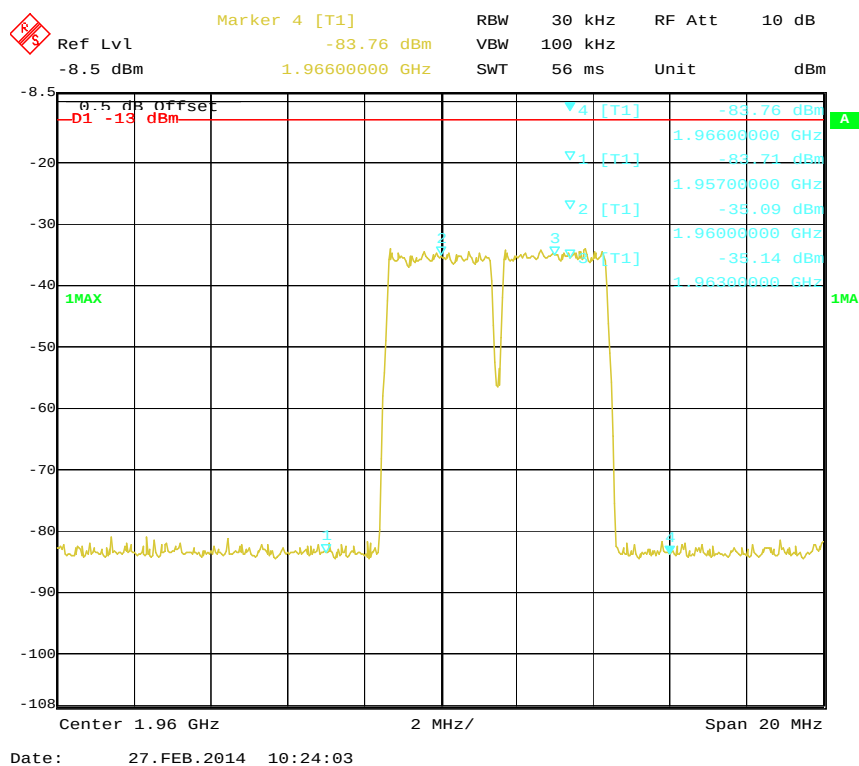


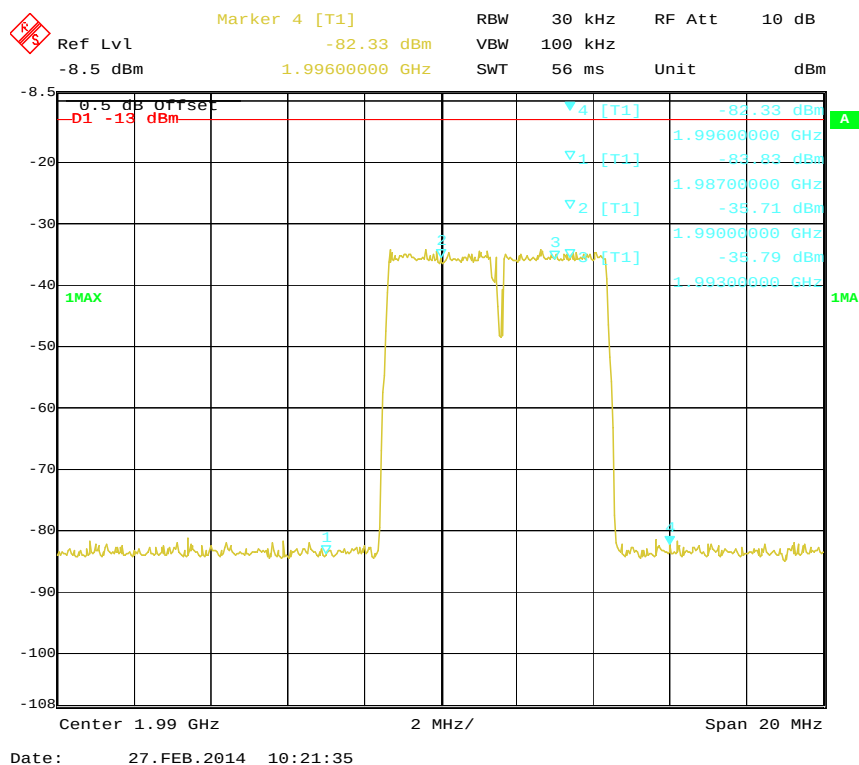
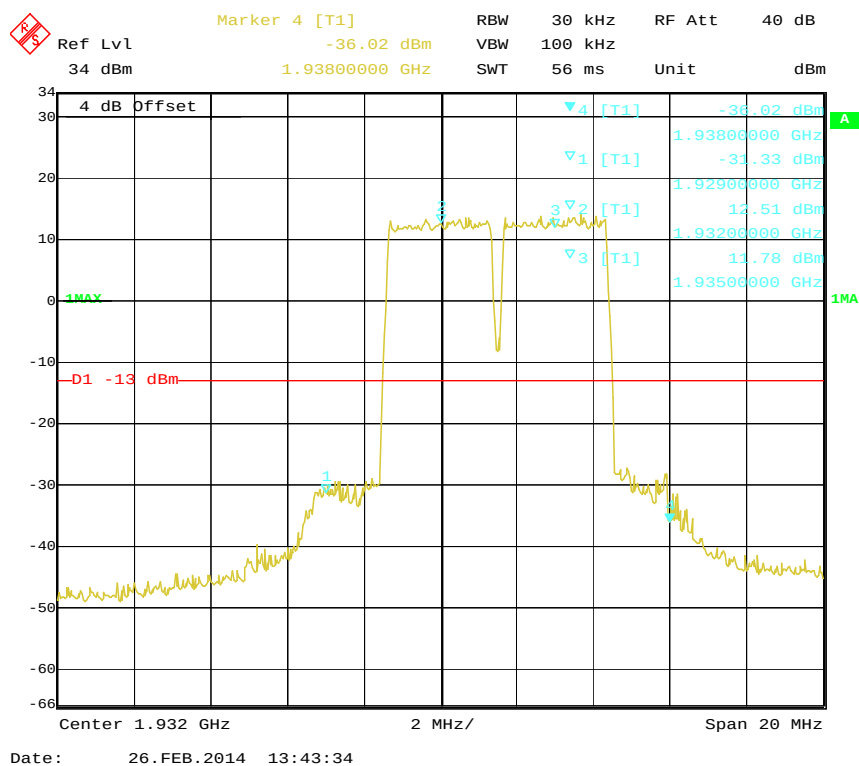
## QPSK (3MHz) Mode, Output, Middle Channel

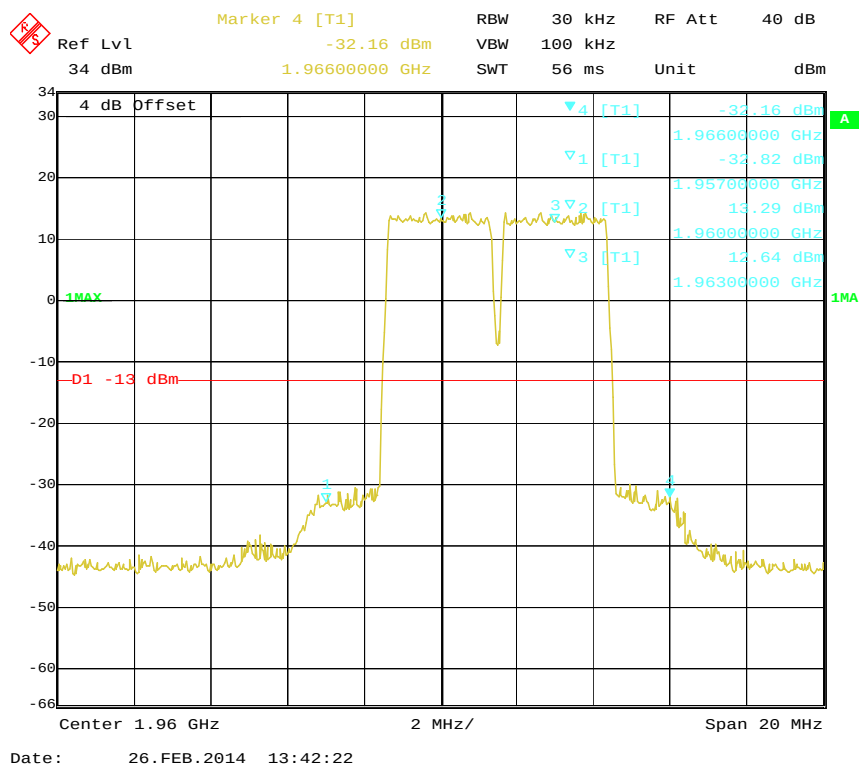
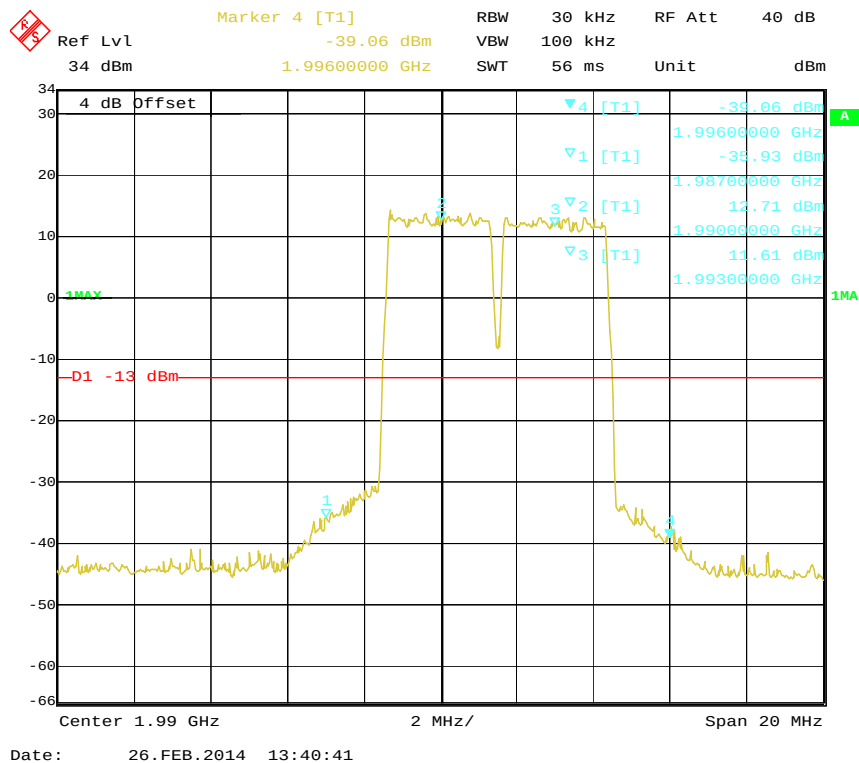


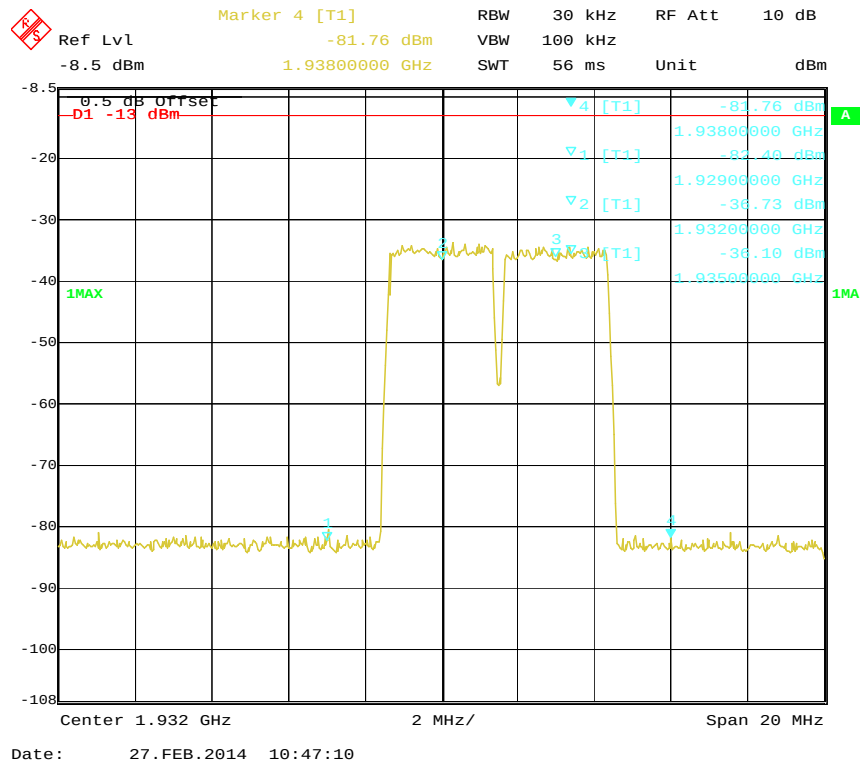
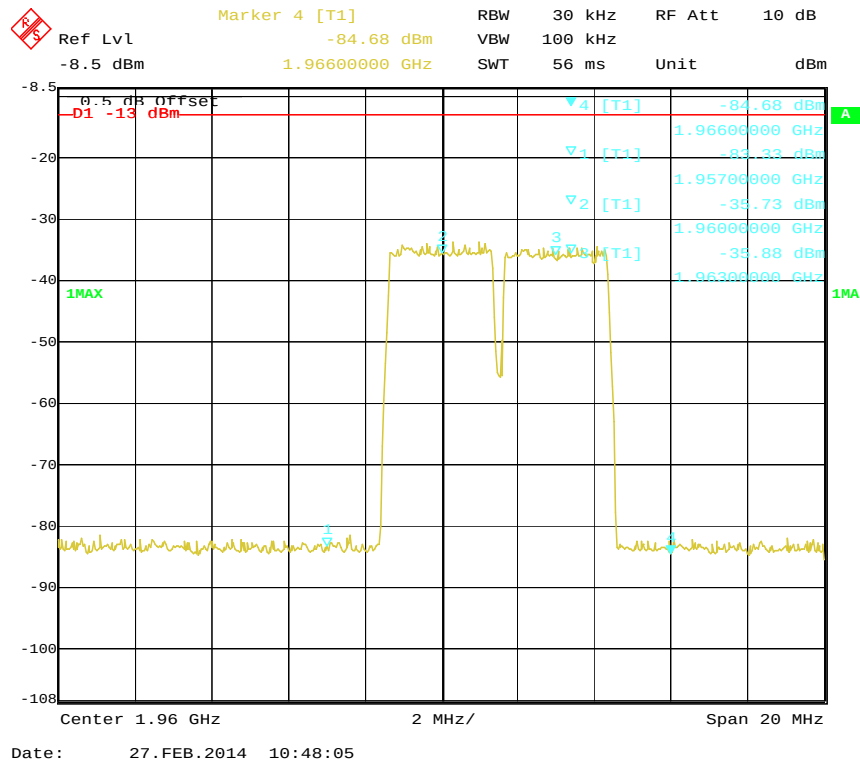
## QPSK (3MHz) Mode, Output, High Channel

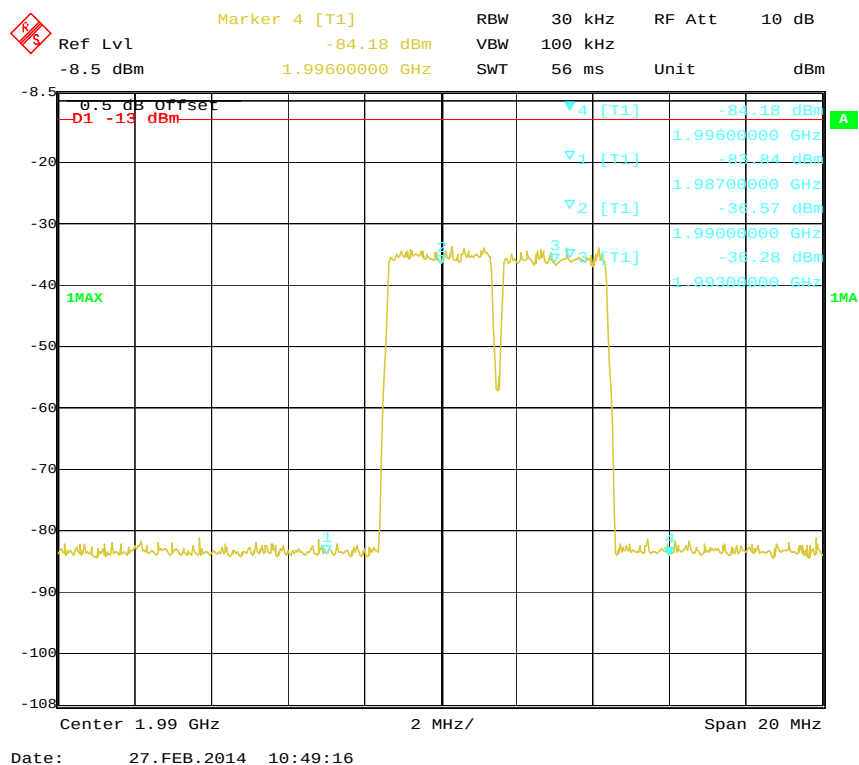
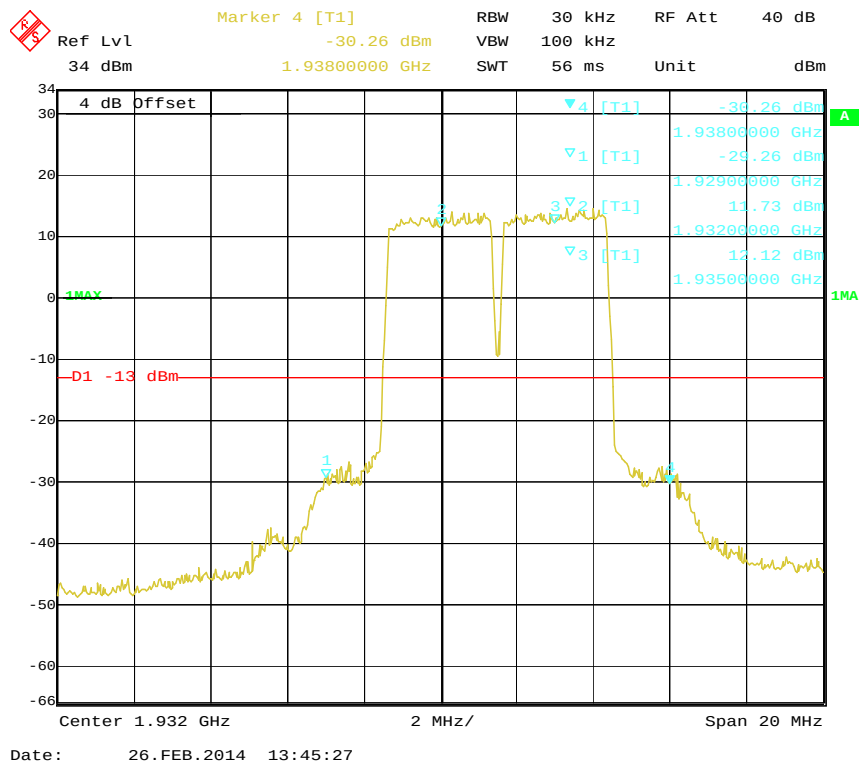


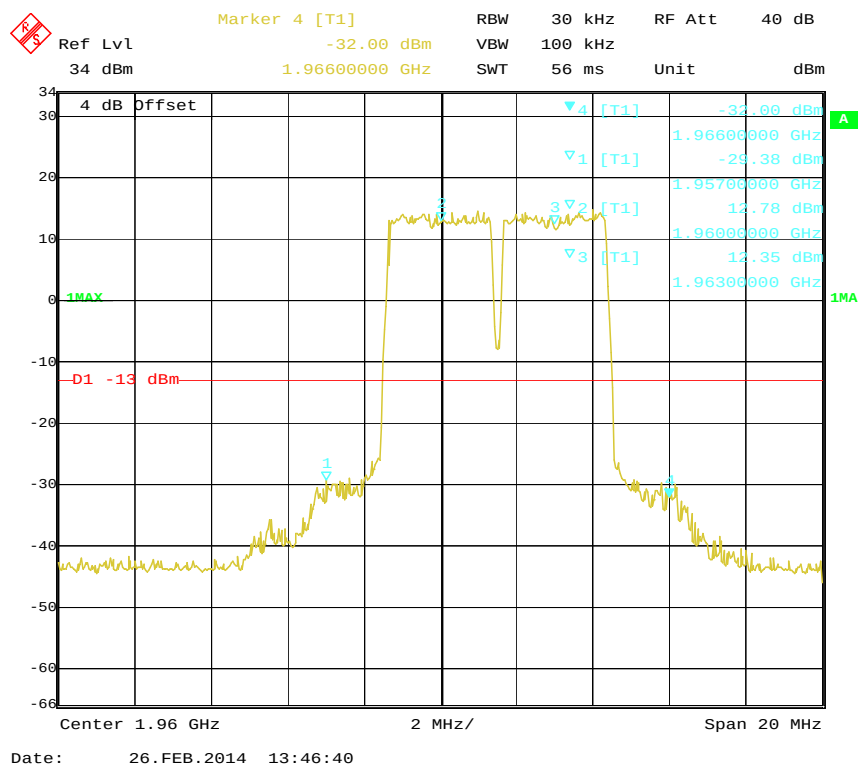
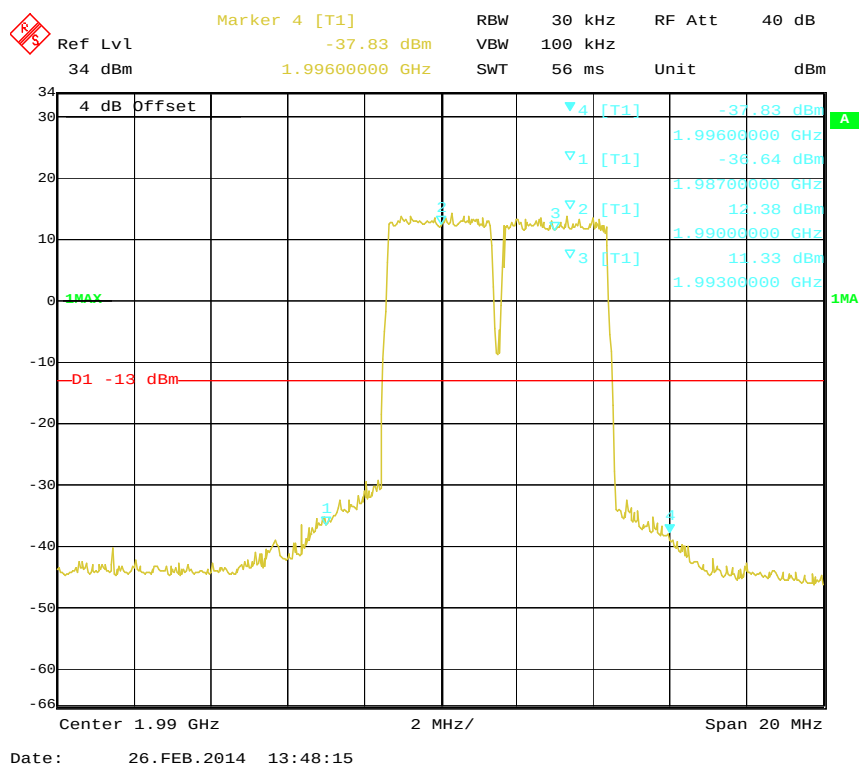
**16QAM (3MHz) Mode, Input, Low Channel****16QAM (3MHz) Mode, Input, Middle Channel**

**16QAM (3MHz) Mode, Input, High Channel****16QAM (3MHz) Mode, Output, Low Channel**

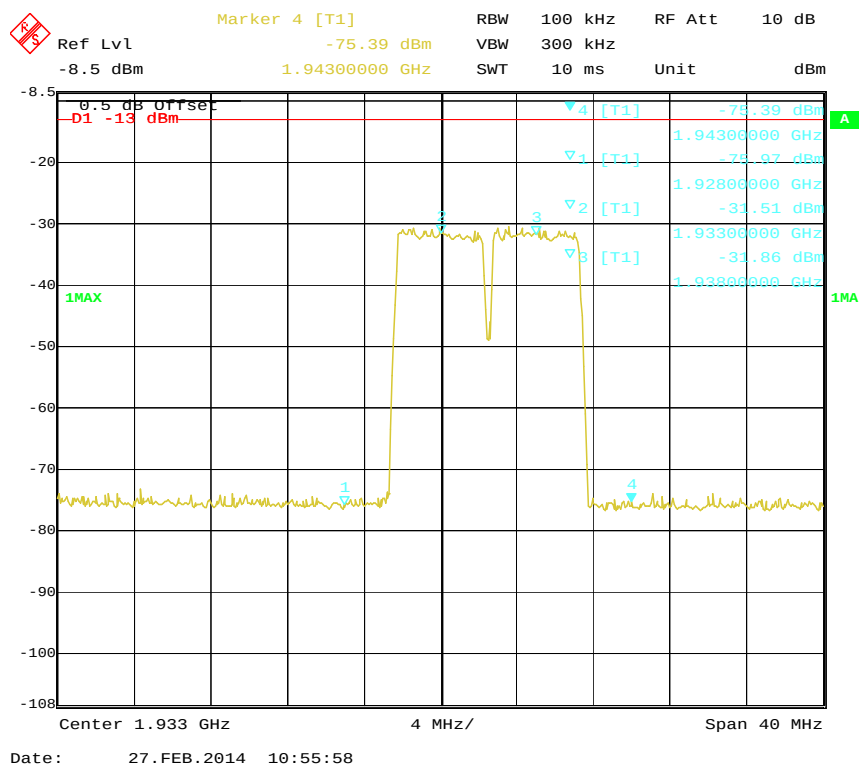
**16QAM (3MHz) Mode, Output, Middle Channel****16QAM (3MHz) Mode, Output, High Channel**

**64QAM (3MHz) Mode, Input, Low Channel****64QAM (3MHz) Mode, Input, Middle Channel**

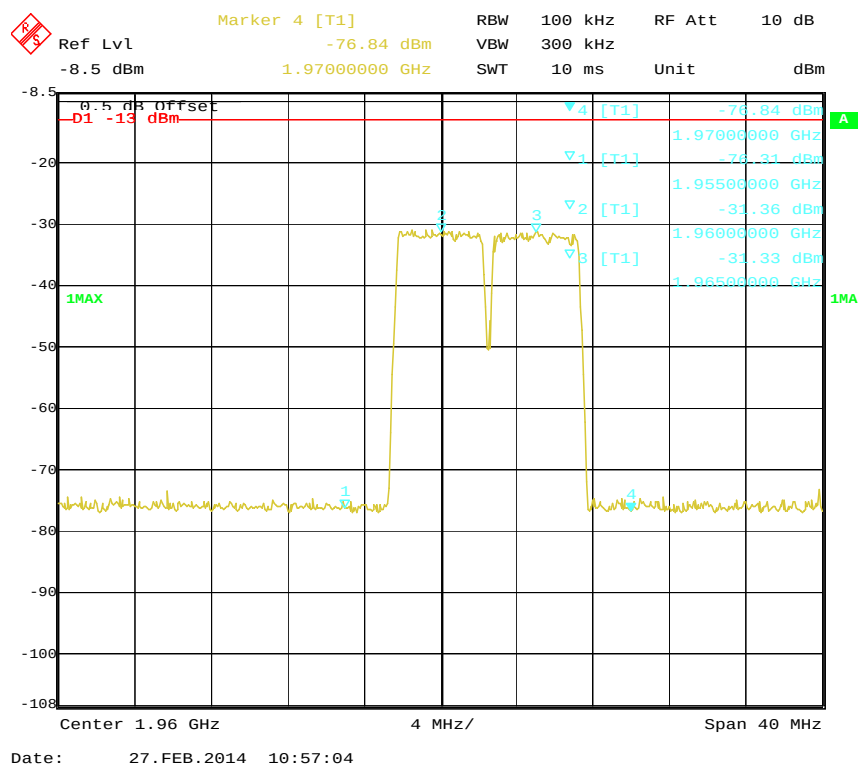
**64QAM (3MHz) Mode, Input, High Channel****64QAM (3MHz) Mode, Output, Low Channel**

**64QAM (3MHz) Mode, Output, Middle Channel****64QAM (3MHz) Mode, Output, High Channel**

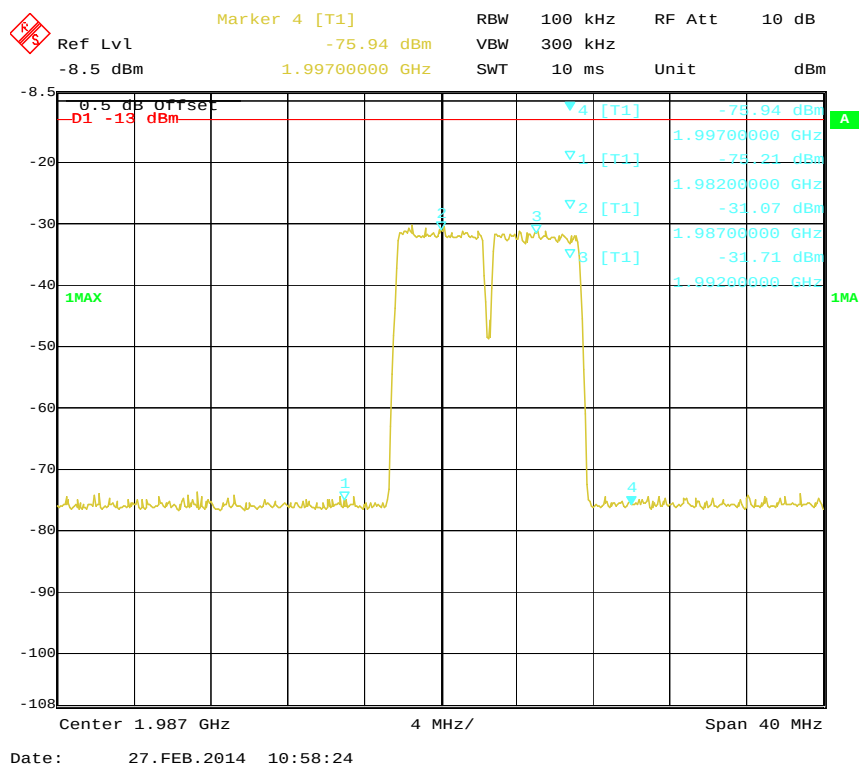
## QPSK (5MHz) Mode, Input, Low Channel



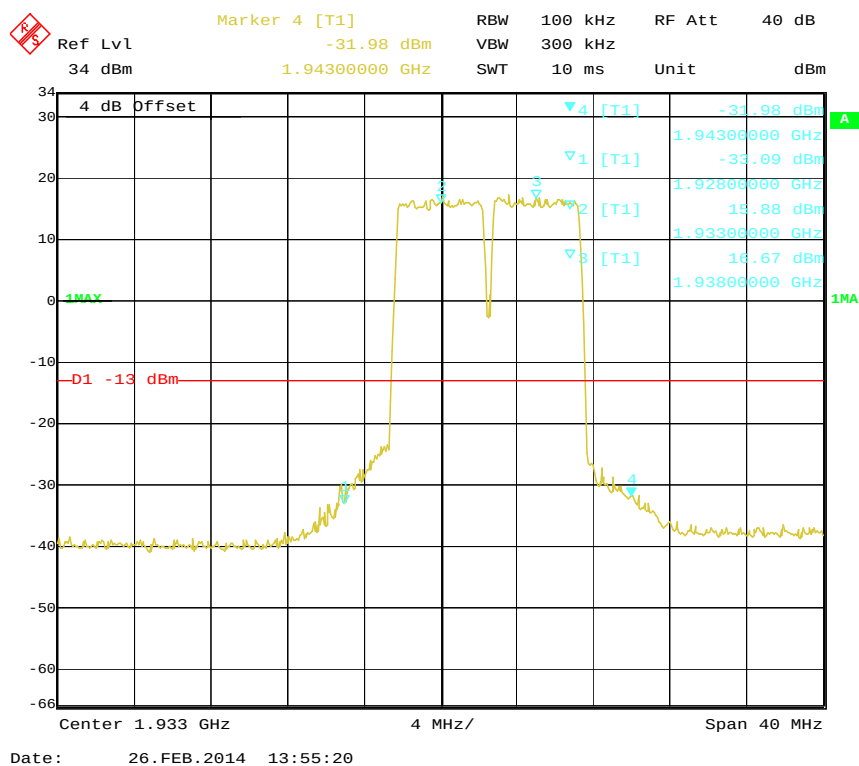
## QPSK (5MHz) Mode, Input, Middle Channel



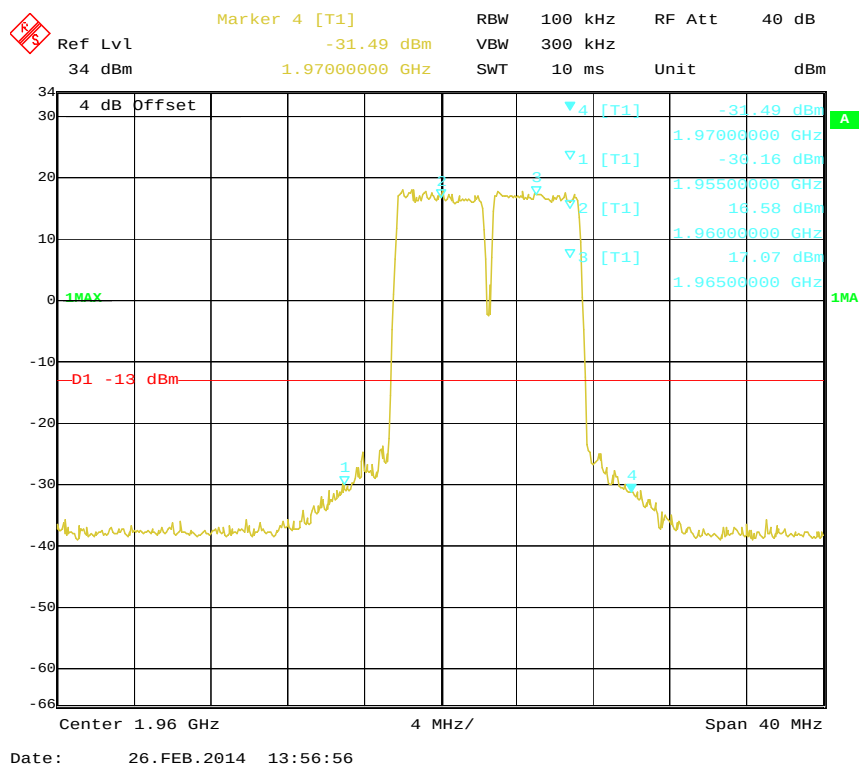
## QPSK (5MHz) Mode, Input, High Channel



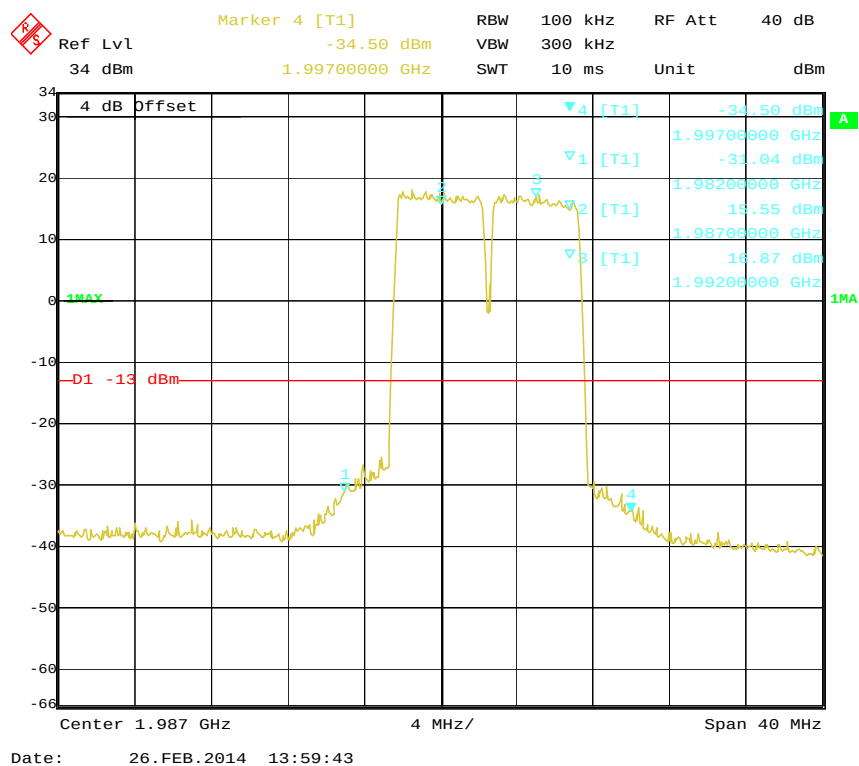
## QPSK (5MHz) Mode, Output, Low Channel

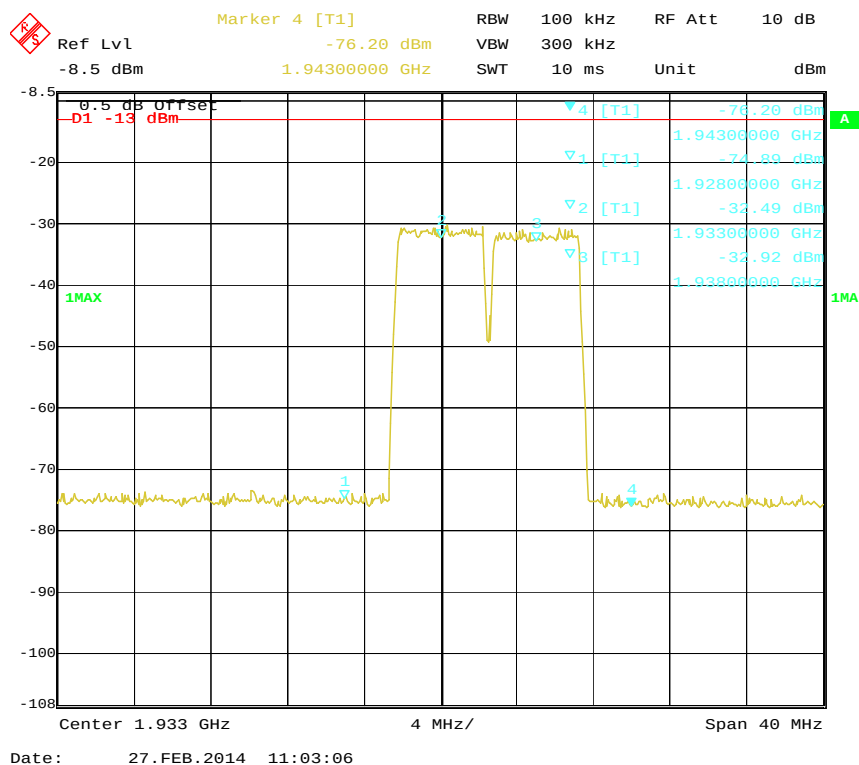
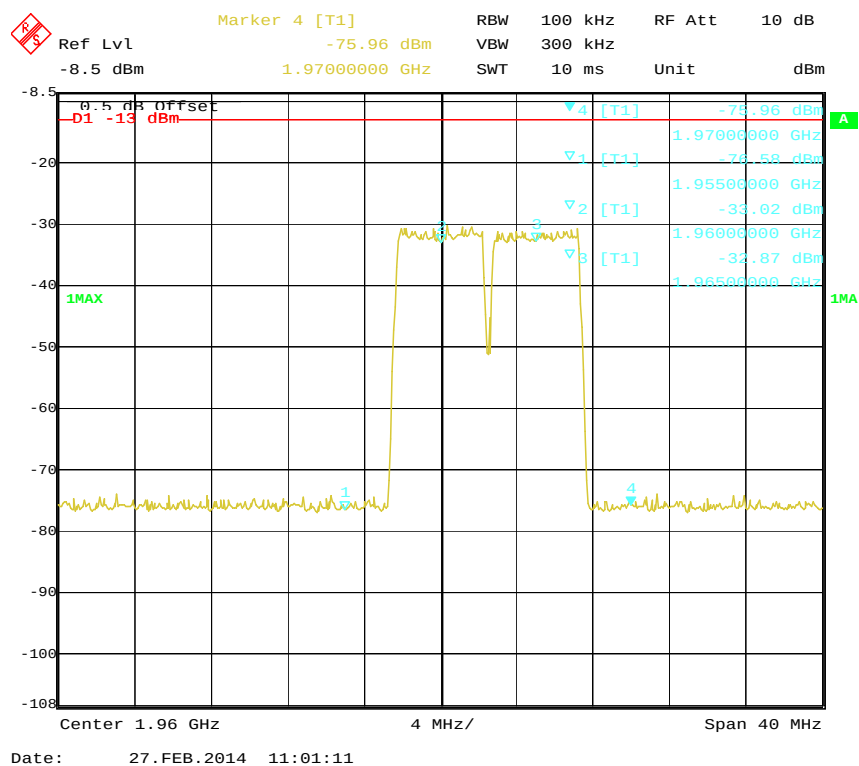


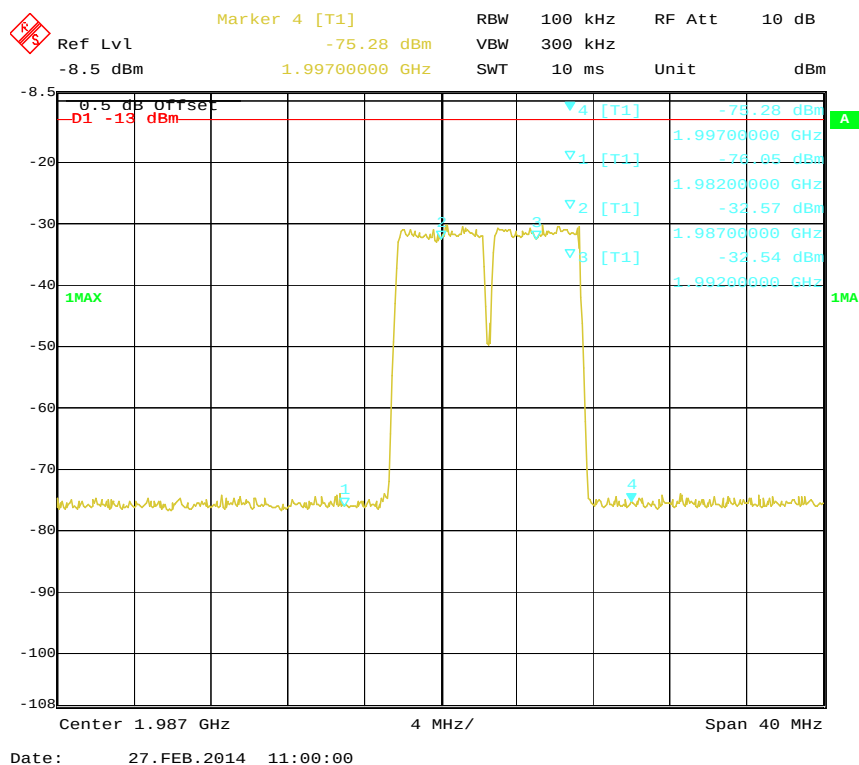
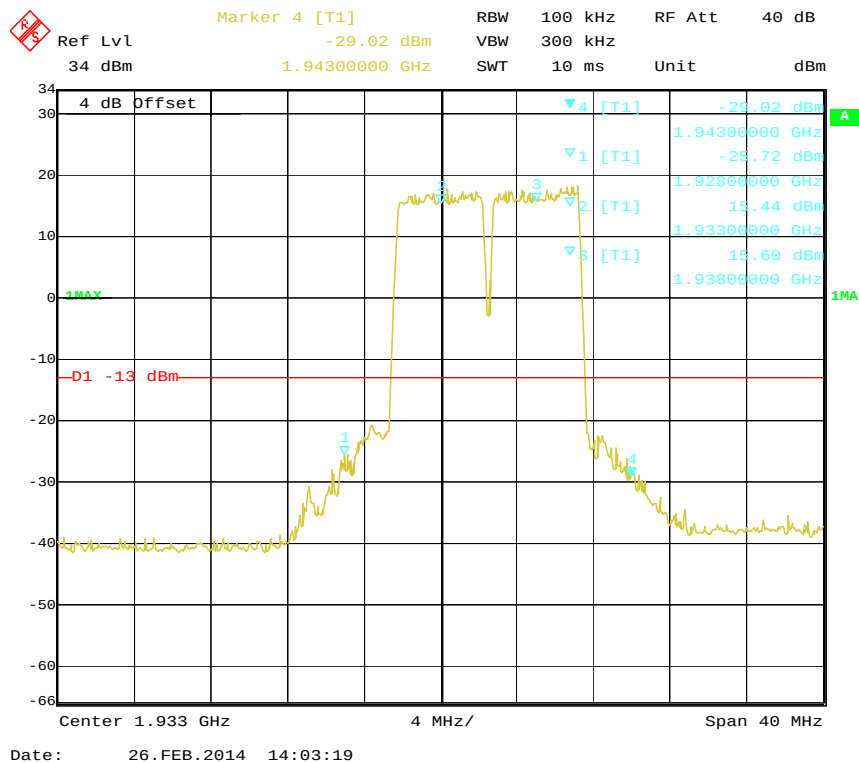
## QPSK (5MHz) Mode, Output, Middle Channel

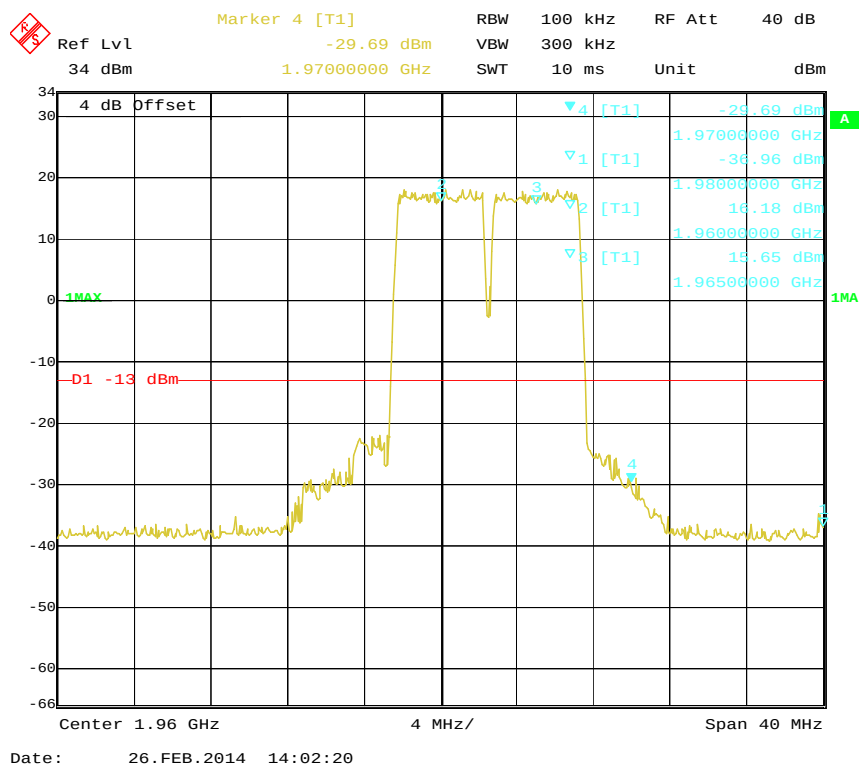
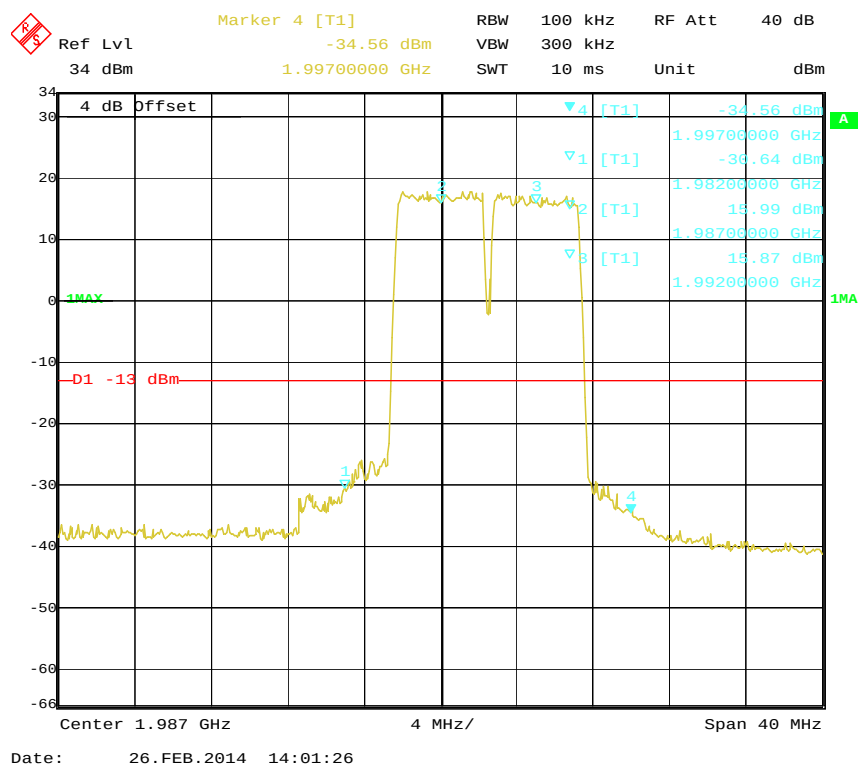


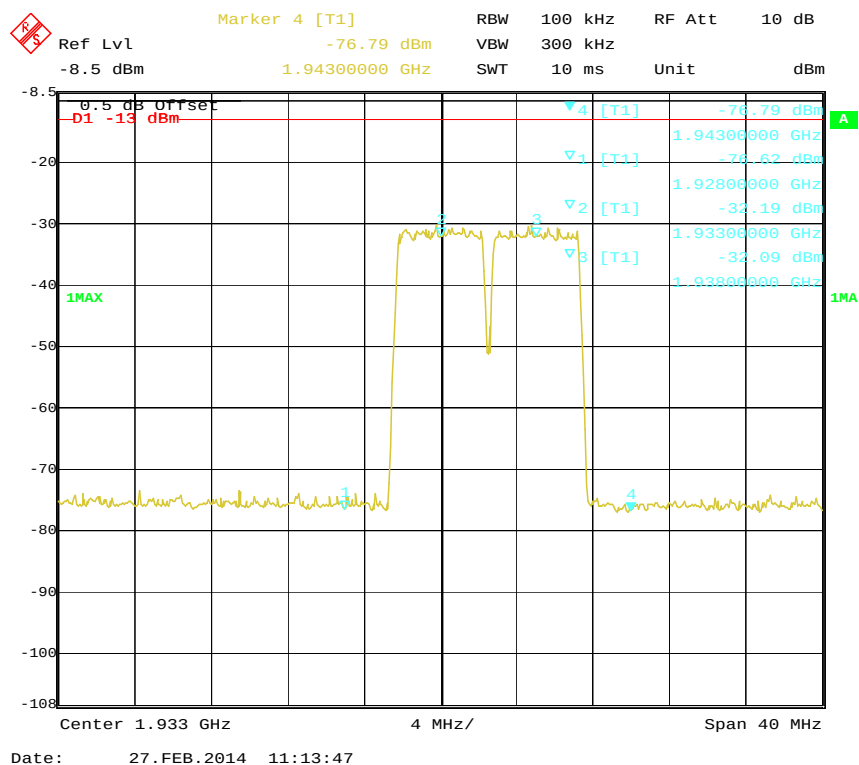
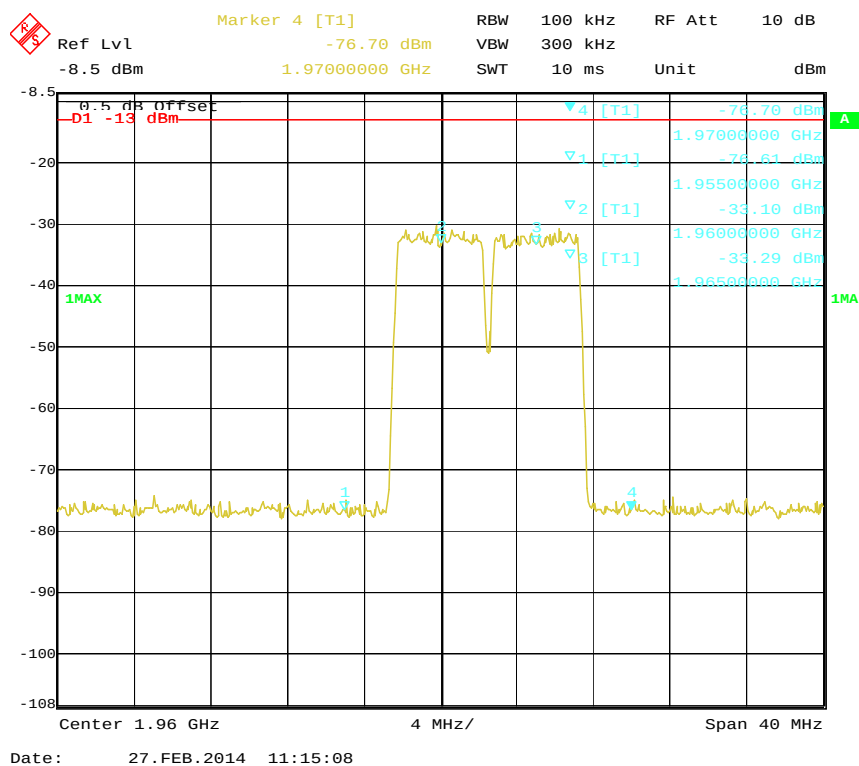
## QPSK (5MHz) Mode, Output, High Channel

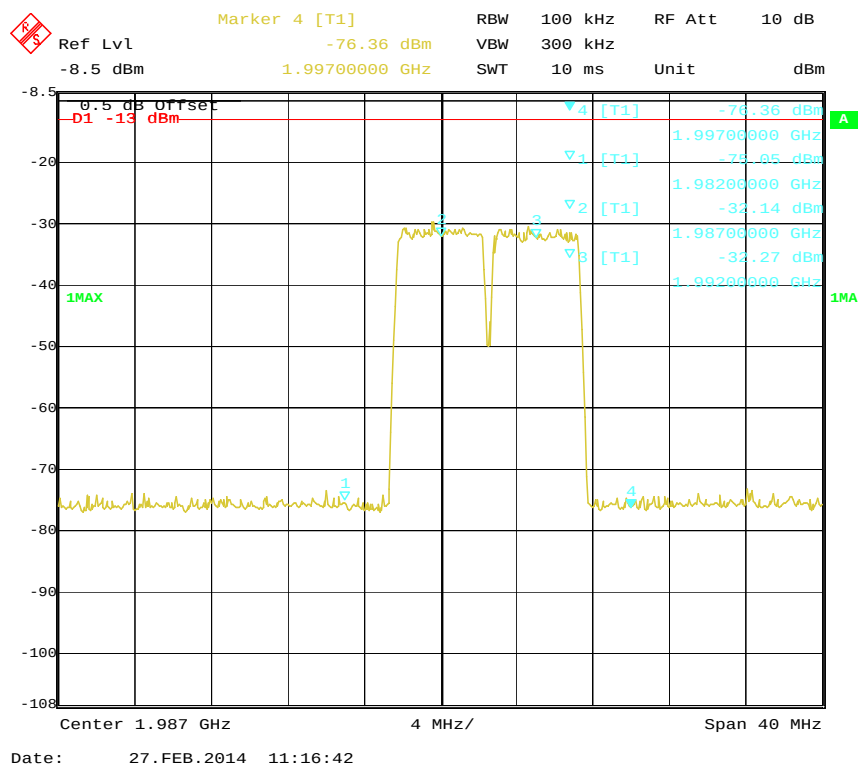
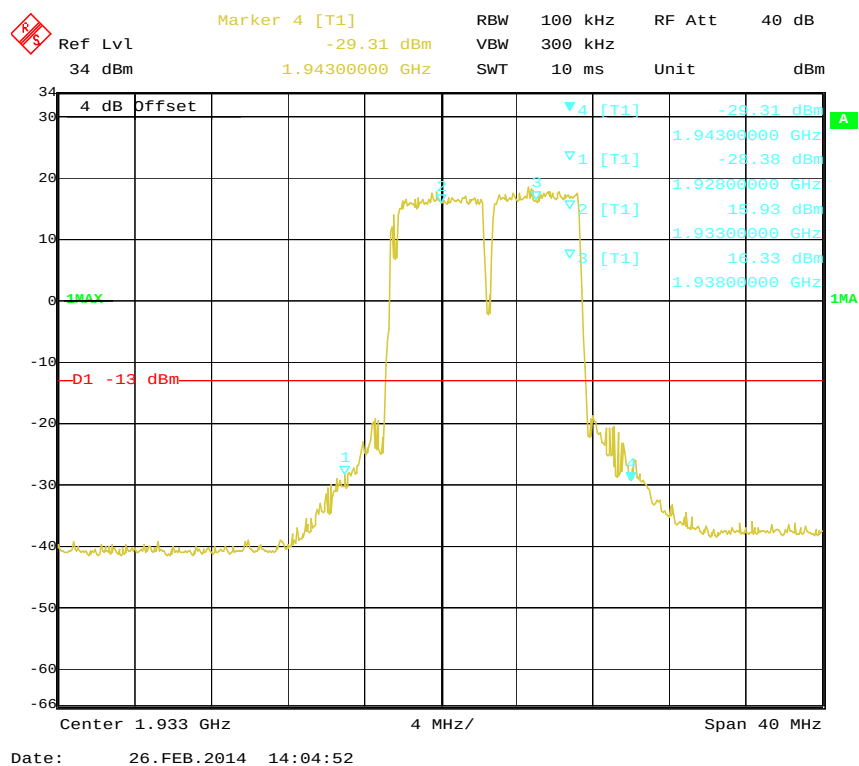


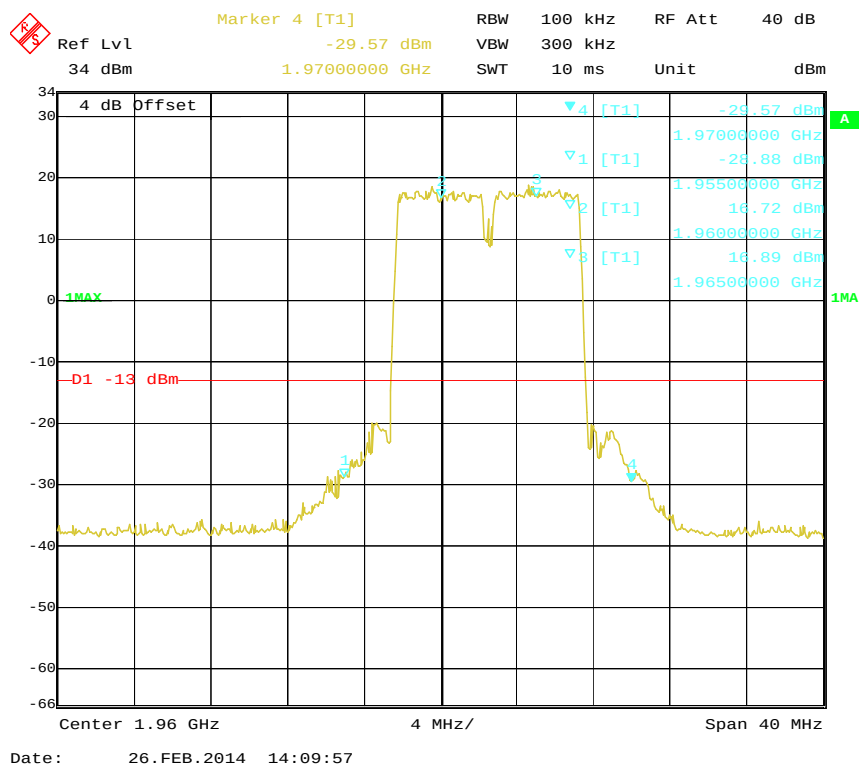
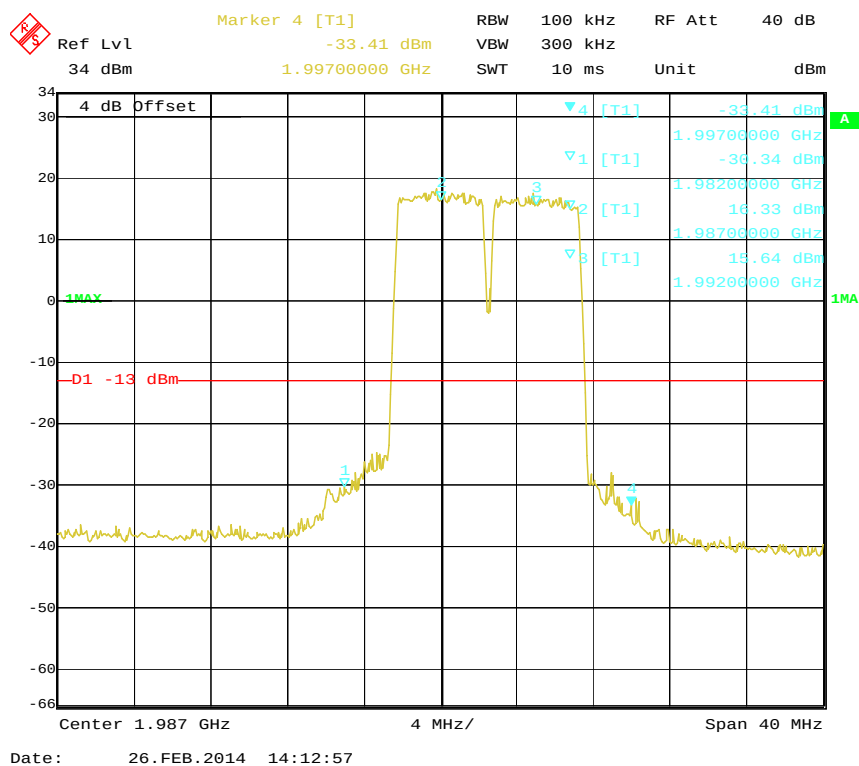
**16QAM (5MHz) Mode, Input, Low Channel****16QAM (5MHz) Mode, Input, Middle Channel**

**16QAM (5MHz) Mode, Input, High Channel****16QAM (5MHz) Mode, Output, Low Channel**

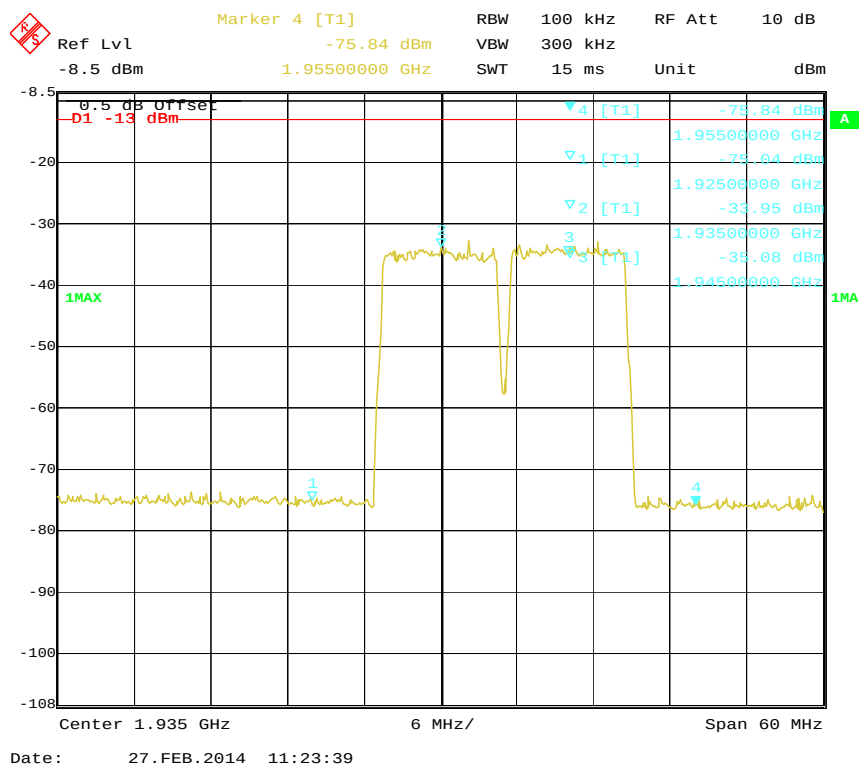
**16QAM (5MHz) Mode, Output, Middle Channel****16QAM (5MHz) Mode, Output, High Channel**

**64QAM (5MHz) Mode, Input, Low Channel****64QAM (5MHz) Mode, Input, Middle Channel**

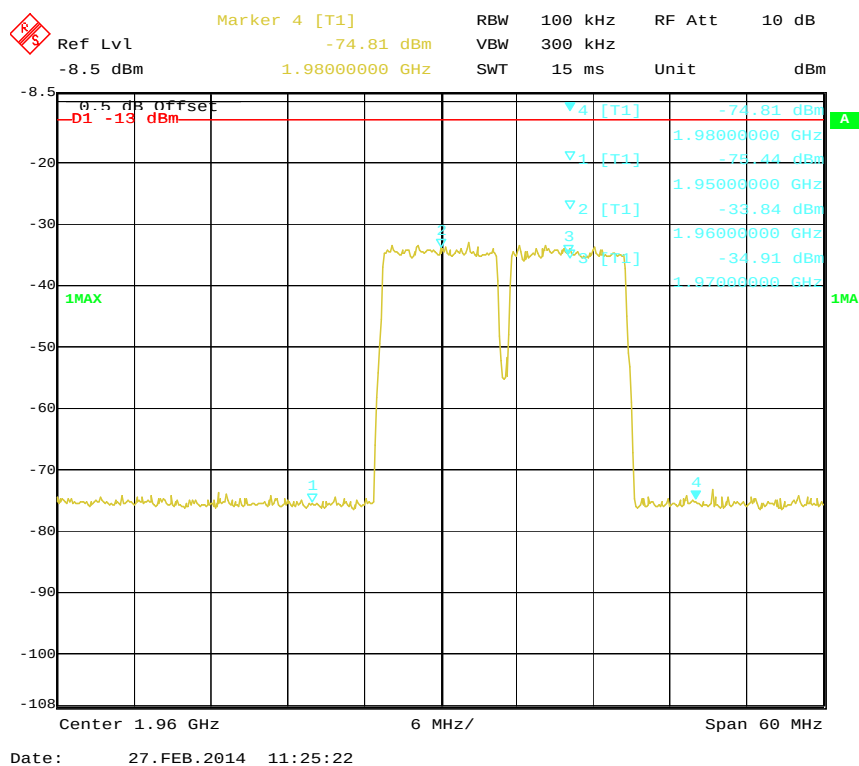
**64QAM (5MHz) Mode, Input, High Channel****64QAM (5MHz) Mode, Output, Low Channel**

**64QAM (5MHz) Mode, Output, Middle Channel****64QAM (5MHz) Mode, Output, High Channel**

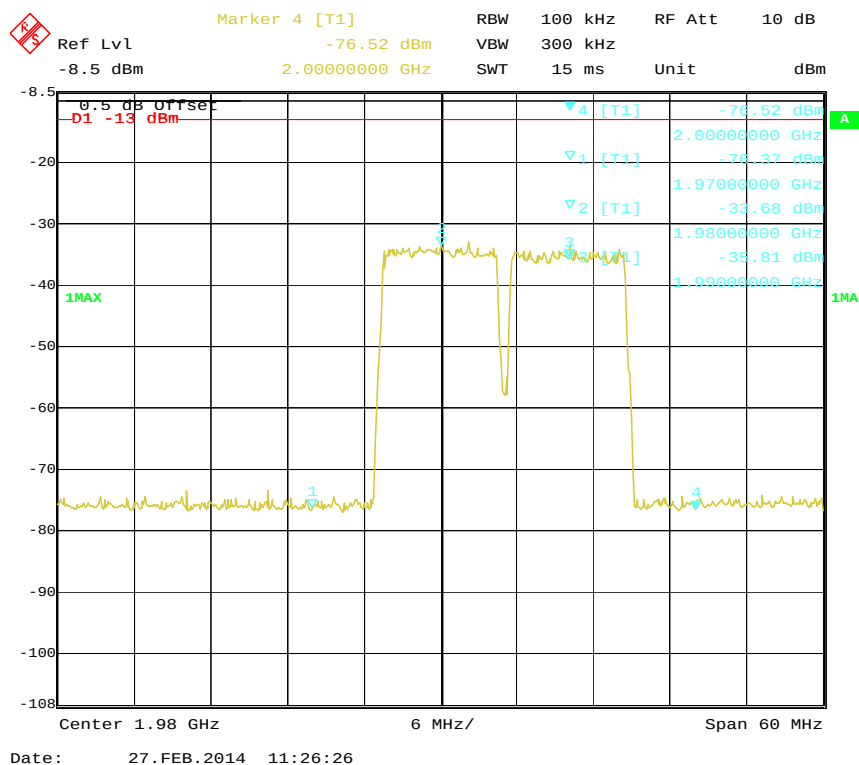
## QPSK (10MHz) Mode, Input, Low Channel



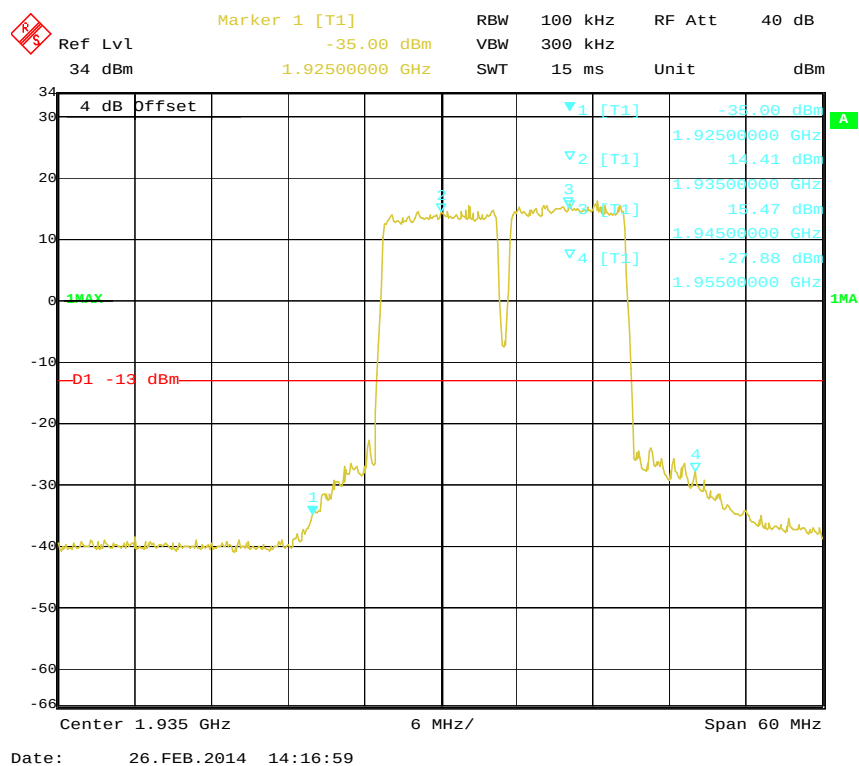
## QPSK (10MHz) Mode, Input, Middle Channel



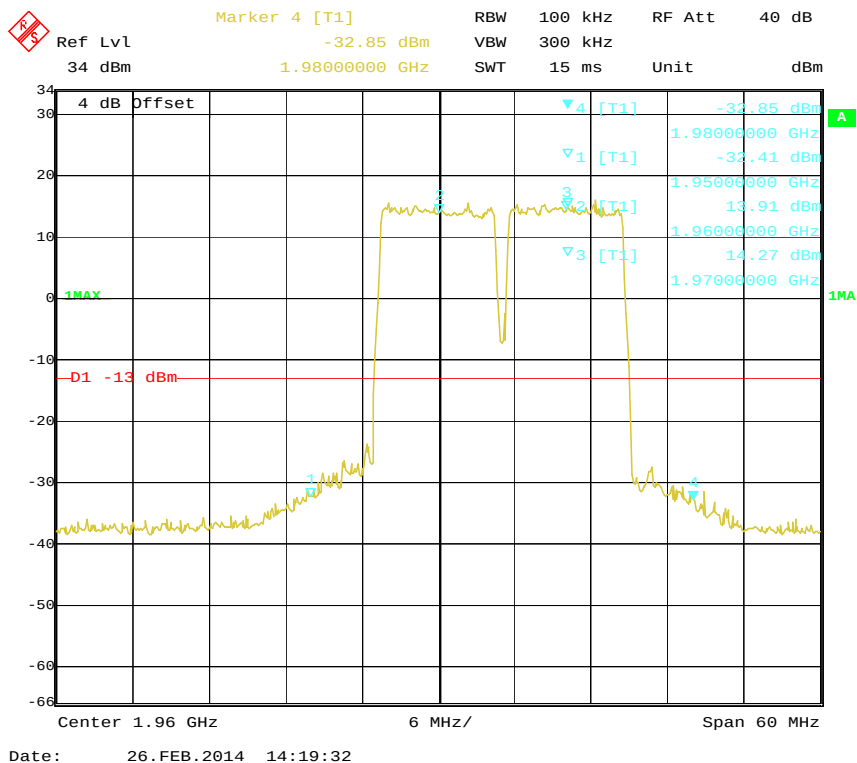
## QPSK (10MHz) Mode, Input, High Channel



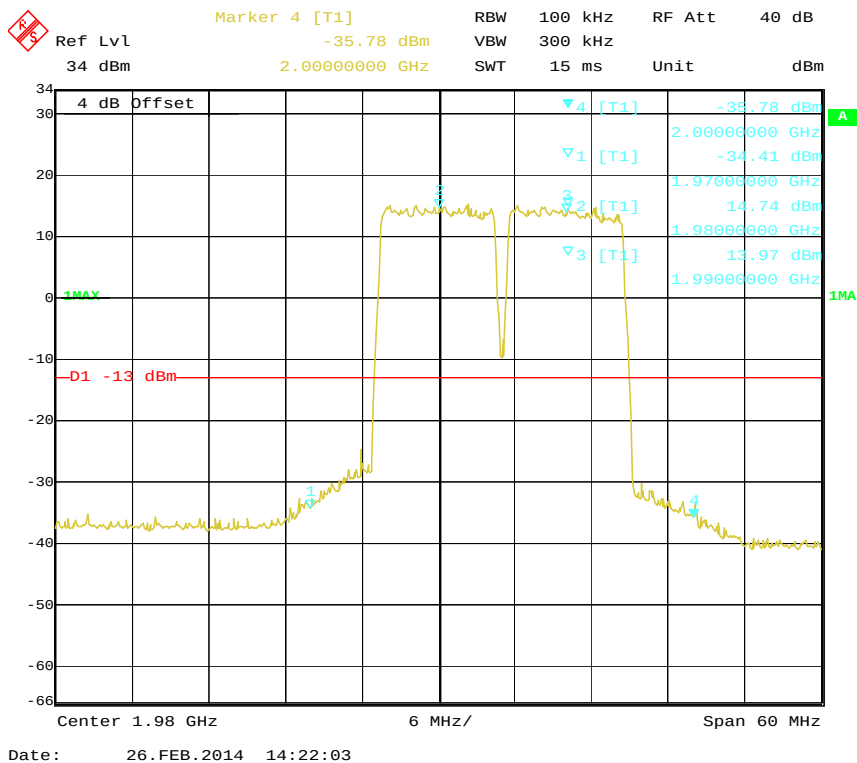
## QPSK (10MHz) Mode, Output, Low Channel

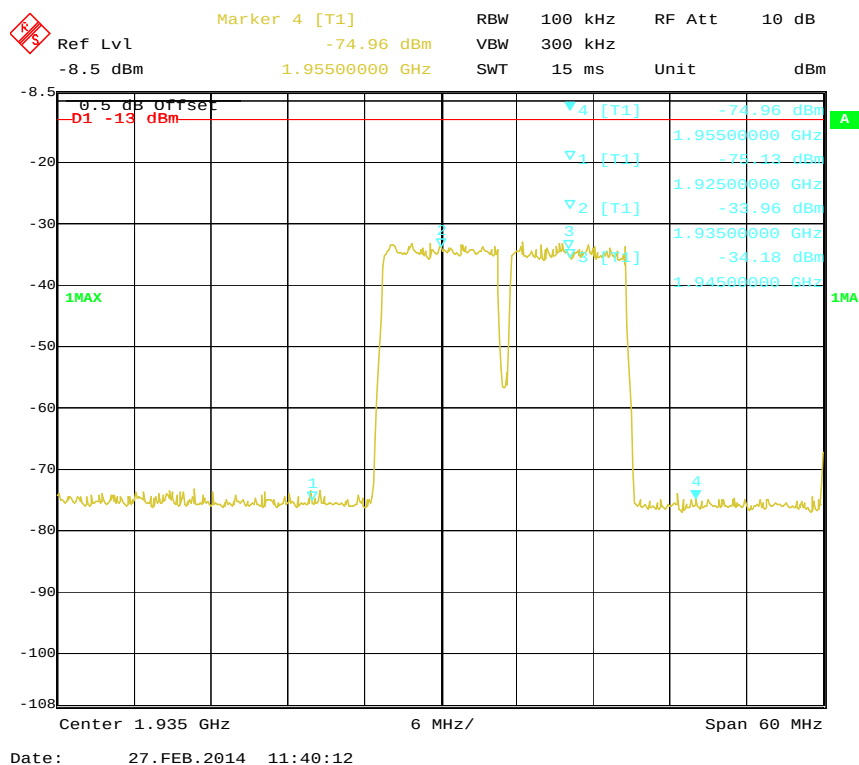
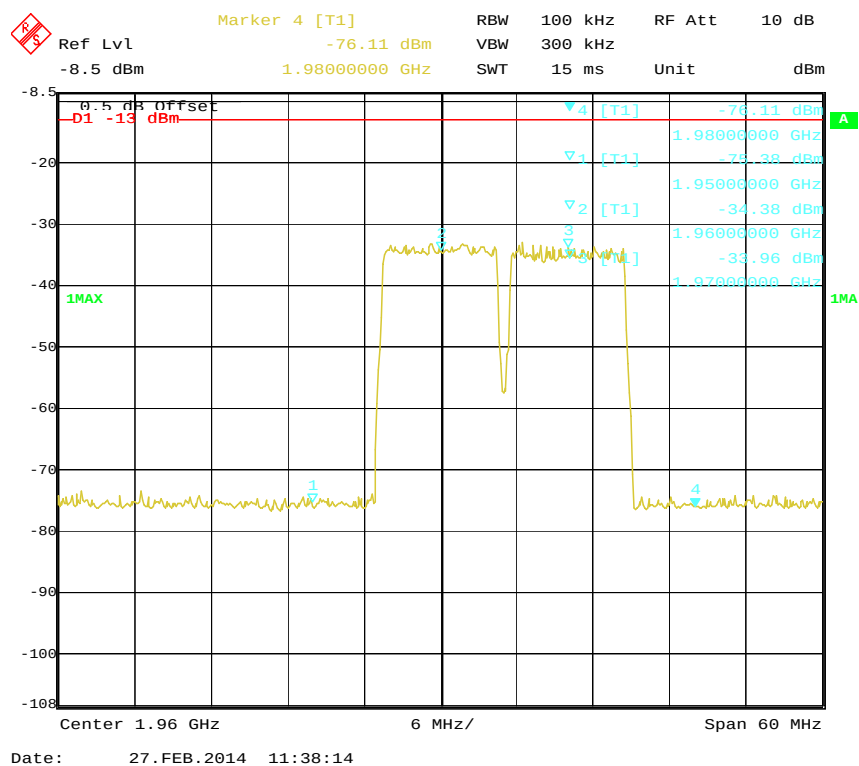


## QPSK (10MHz) Mode, Output, Middle Channel



## QPSK (10MHz) Mode, Output, High Channel



**16QAM (10MHz) Mode, Input, Low Channel****16QAM (10MHz) Mode, Input, Middle Channel**

RBW 100 kHz RF Att 10 dB  
 VBW 300 kHz  
 SWT 15 ms Unit dBm

Ref Lvl -8.5 dBm  
 Marker 4 [T1] -75.81 dBm  
 2.00000000 GHz

0.5 dB Offset  
 D1 -13 dBm

1MAX

4 [T1] -75.81 dBm  
 2.00000000 GHz  
 1 [T1] -76.32 dBm  
 1.97000000 GHz  
 2 [T1] -34.19 dBm  
 1.98000000 GHz  
 3 [T1] -34.37 dBm  
 1.99000000 GHz

Center 1.98 GHz  
 6 MHz/  
 Span 60 MHz

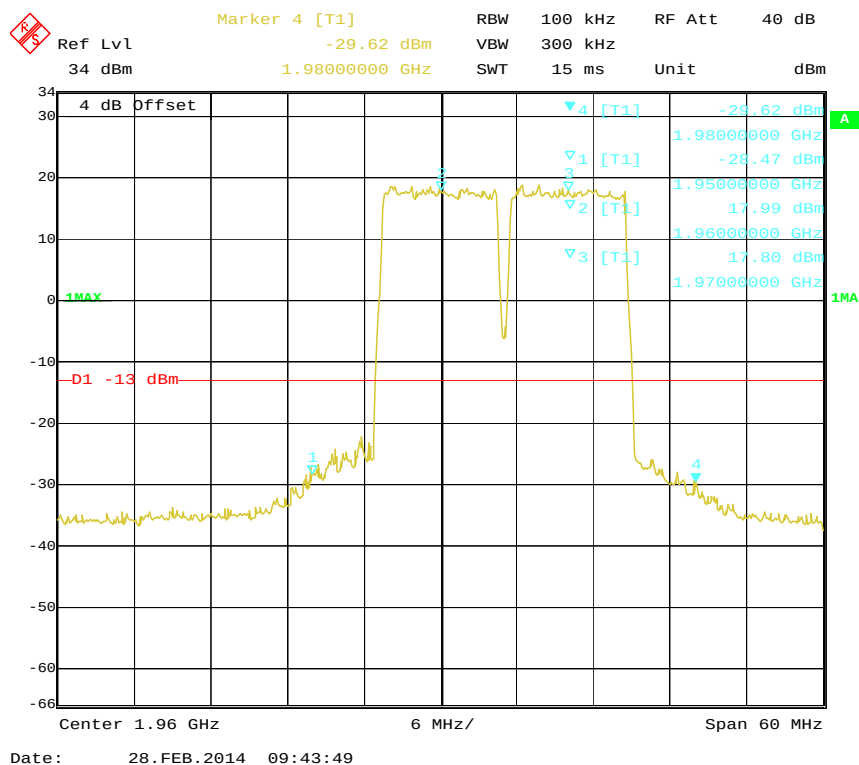
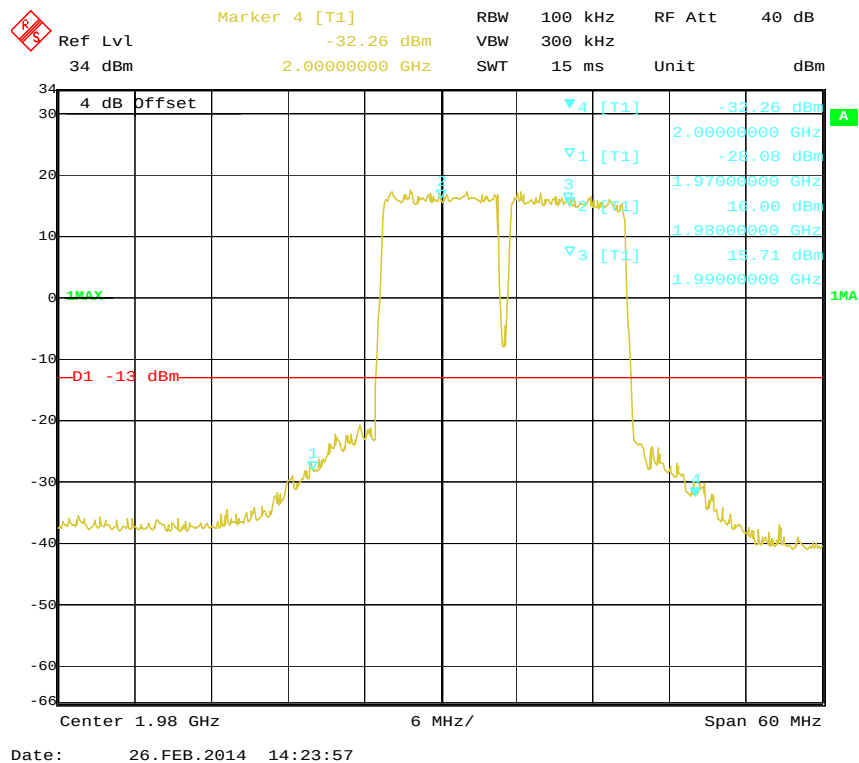
Date: 27.FEB.2014 11:27:43

Ref Lvl 34 dBm  
 Marker 4 [T1] -27.50 dBm  
 RBW 100 kHz  
 VBW 300 kHz  
 SWT 15 ms  
 RF Att 40 dB  
 Unit dBm

| Marker | Frequency [GHz] | Power [dBm] |
|--------|-----------------|-------------|
| 1      | 1.92500000      | -33.50      |
| 2      | 1.92500000      | -16.50      |
| 3      | 1.93500000      | -27.50      |
| 4      | 1.94500000      | -17.92      |

Center 1.935 GHz  
 6 MHz/  
 Span 60 MHz

Date: 28.FEB.2014 09:46:03

**16QAM (10MHz) Mode, Output, Middle Channel****16QAM (10MHz) Mode, Output, High Channel**

Marker 4 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -76.17 dBm VBW 300 kHz

-8.5 dBm 1.95500000 GHz SWT 15 ms Unit dBm

0.5 dB Offset

D1 -13 dBm

1MAX

4 [T1] -76.17 dBm

1 [T1] -78.05 dBm

2 [T1] -34.93 dBm

3 [T1] -35.16 dBm

4 [T1] -34.50 dBm

Center 1.935 GHz 6 MHz/ Span 60 MHz

Date: 27.FEB.2014 11:47:11

Ref Lvl -8.5 dBm  
 Marker 4 [T1] -75.86 dBm  
 RBW 100 kHz  
 VBW 300 kHz  
 RF Att 10 dB  
 1.98000000 GHz  
 SWT 15 ms  
 Unit dBm

0.5 dB Offset  
 D1 -13 dBm

1MAX

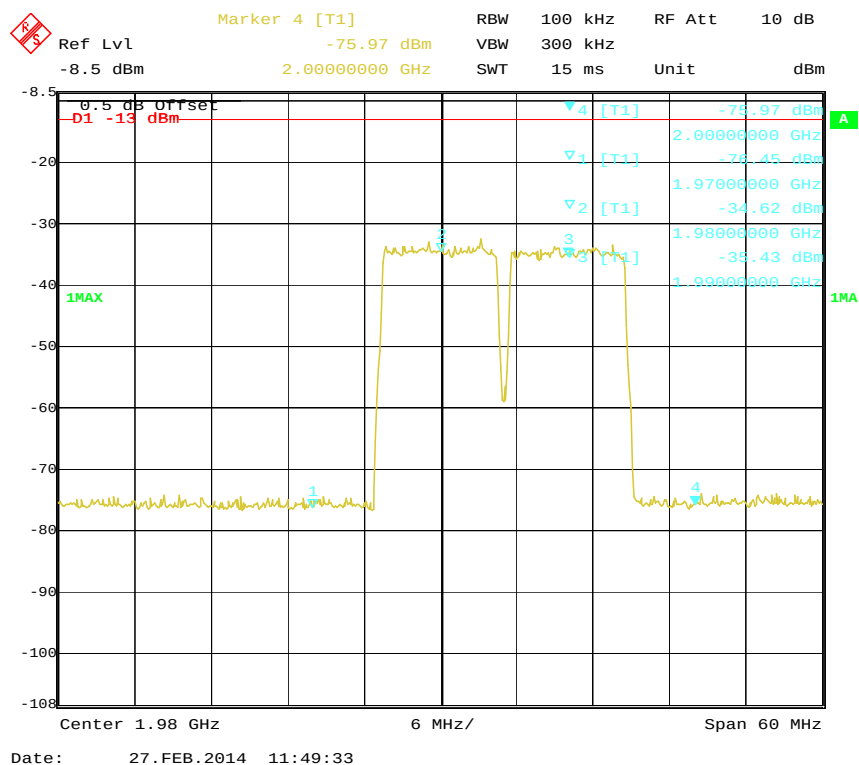
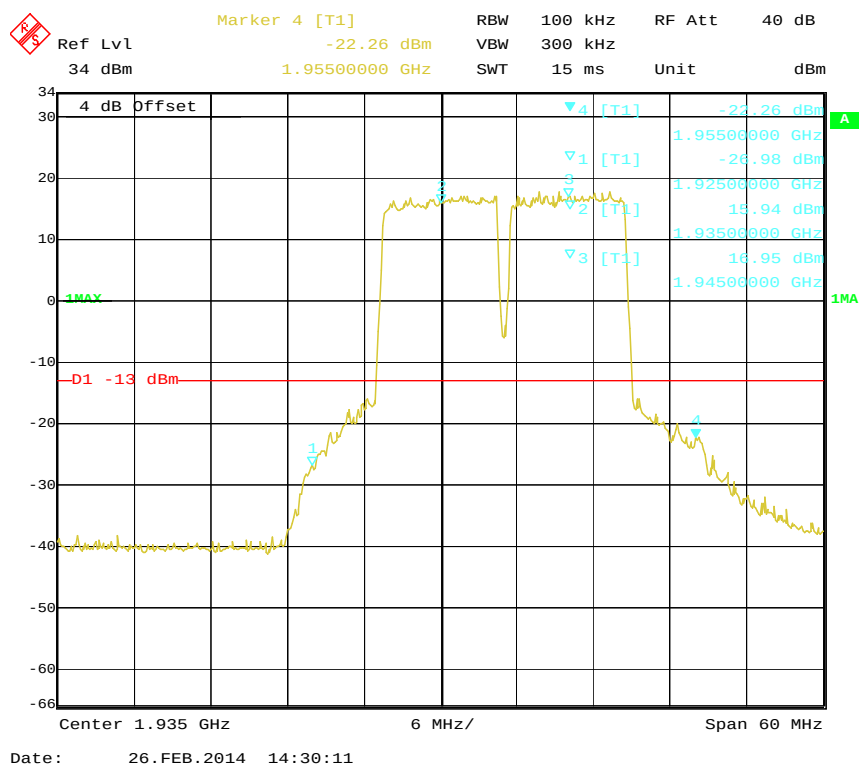
1 2 3 4

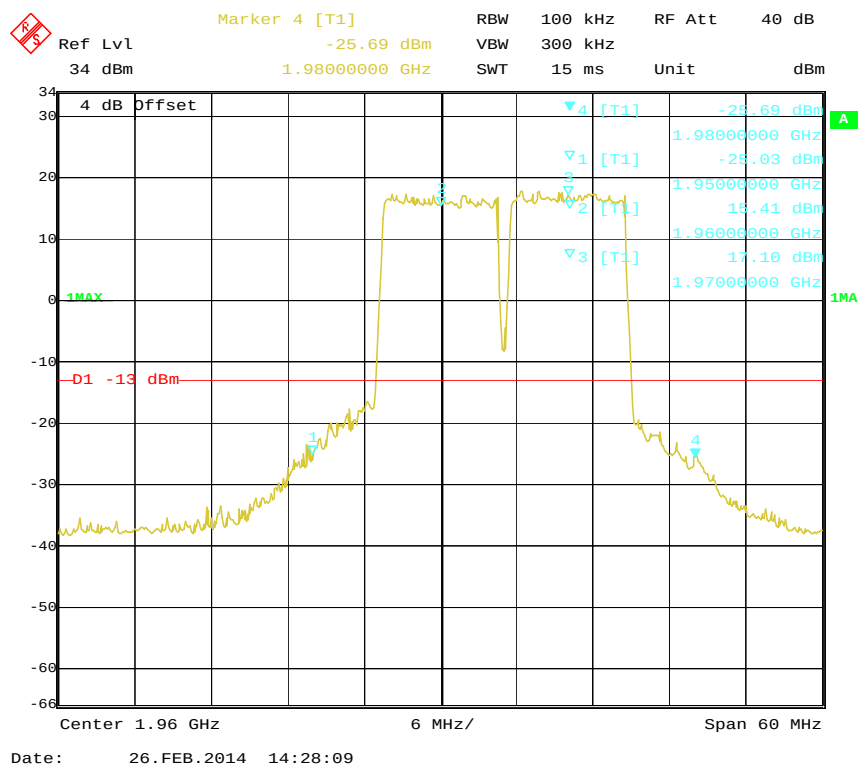
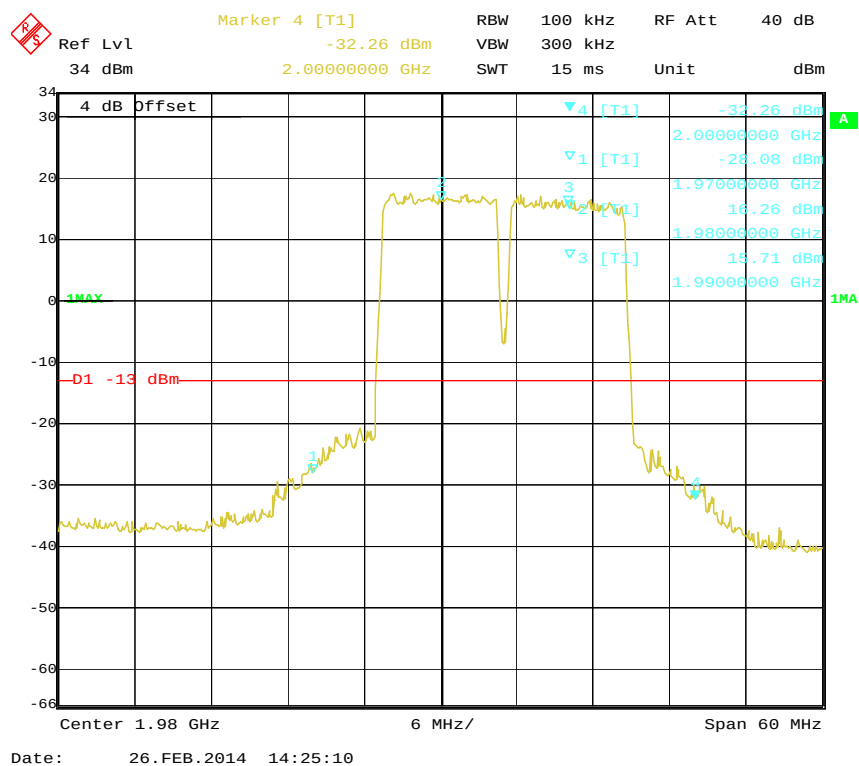
1.98000000 GHz  
 1.95000000 GHz  
 1.96000000 GHz  
 1.97000000 GHz

-8.5  
 -20  
 -30  
 -40  
 -50  
 -60  
 -70  
 -80  
 -90  
 -100

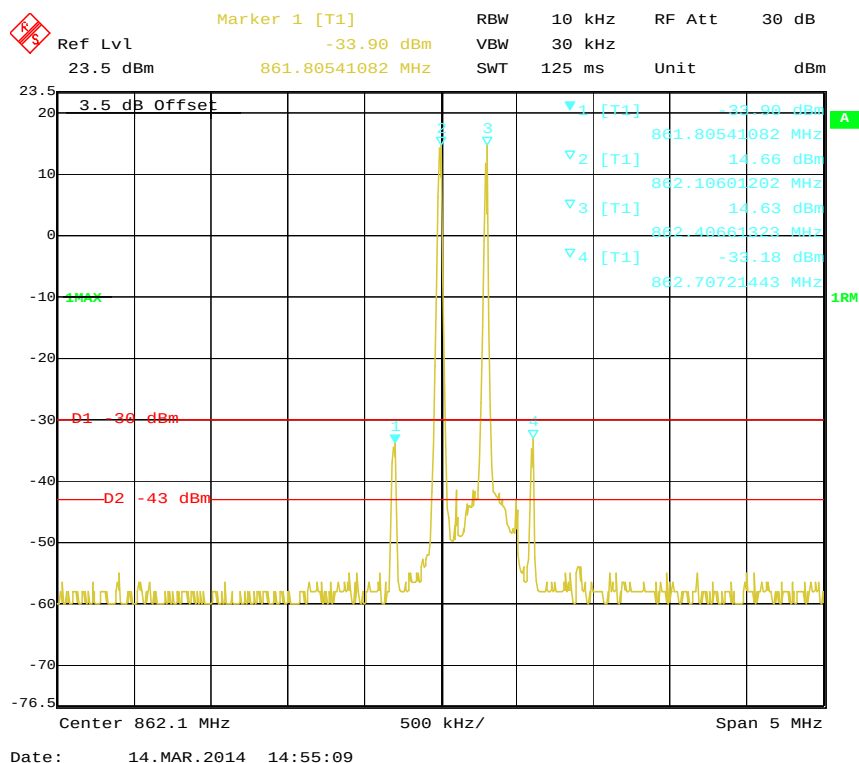
Center 1.96 GHz  
 6 MHz/  
 Span 60 MHz

Date: 27.FEB.2014 11:47:58

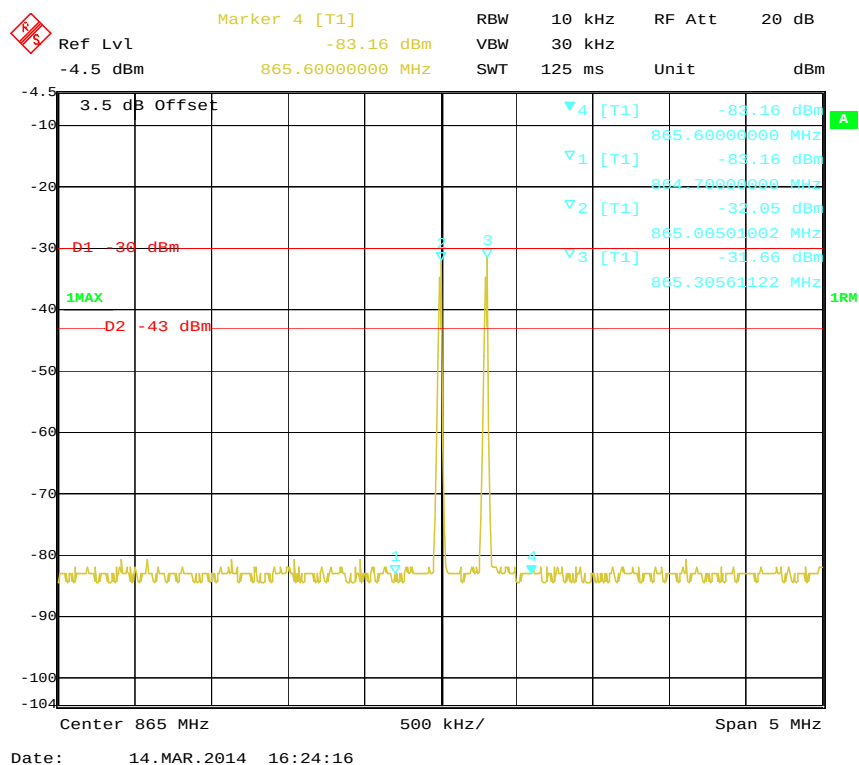
**64QAM (10MHz) Mode, Input, High Channel****64QAM (10MHz) Mode, Output, Low Channel**

**64QAM (10MHz) Mode, Output, Middle Channel****64QAM (10MHz) Mode, Output, High Channel**

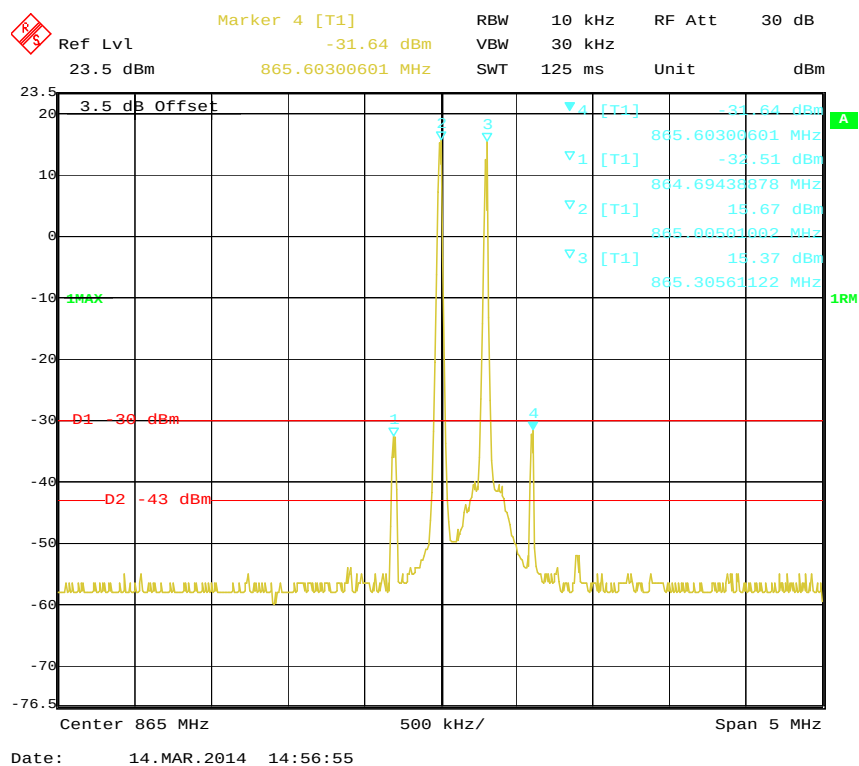
### **IDEN Mode, Input, Low Channel**



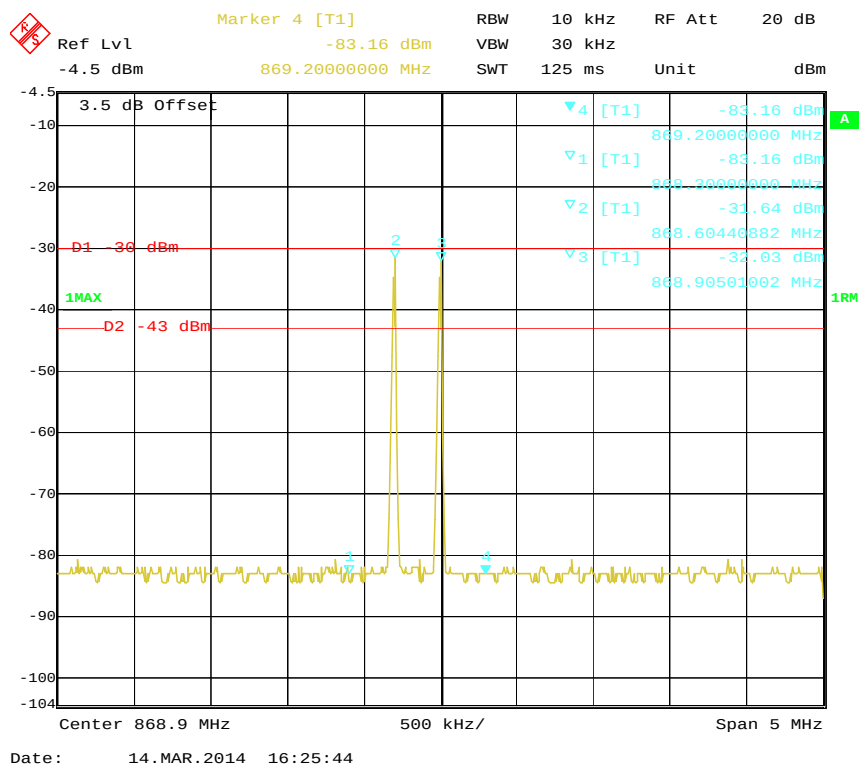
## IDEN Mode, Input, Middle Channel



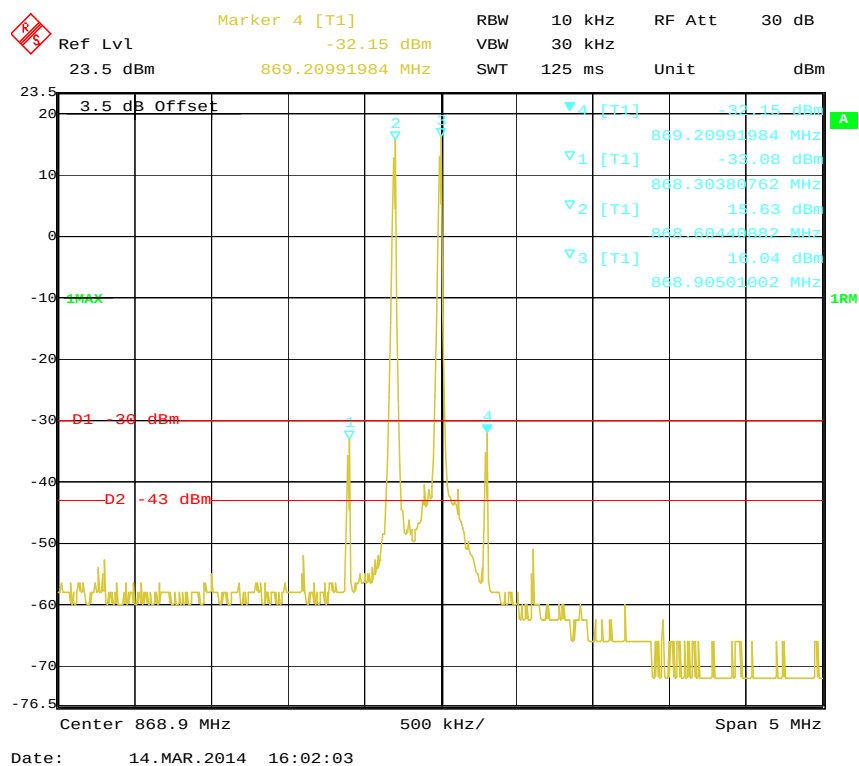
## IDEN Mode, Output, Middle Channel



## IDEN Mode, Input, High Channel



## IDEN Mode, Output, High Channel



Ref Lvl -4.5 dBm

Marker 4 [T1] -84.50 dBm

RBW 10 kHz RF Att 20 dB

VBW 30 kHz

SWT 250 ms Unit dBm

3.5 dB Offset

▼4 [T1] -84.50 dBm 866.2500000 MHz

▼1 [T1] -83.16 dBm 866.2500000 MHz

▼2 [T1] -48.36 dBm 863.2500000 MHz

▼3 [T1] -47.38 dBm 864.7500000 MHz

D1 -39 dBm

1MAX

D2 -43 dBm

1RM

Center 863.25 MHz 1 MHz/ Span 10 MHz

Date: 14.MAR.2014 16:32:17

Ref Lvl 23.5 dBm  
 Marker 4 [T1] -50.48 dBm  
 RBW 10 kHz  
 VBW 30 kHz  
 RF Att 30 dB  
 866.25000000 MHz  
 SWT 250 ms  
 Unit dBm

3.5 dB Offset

23.5  
20  
10  
0  
-10  
-20  
-30  
-40  
-50  
-60  
-70  
-76.5

3.5 dB Offset

D1 -30 dBm  
 D2 -43 dBm

1 MAX

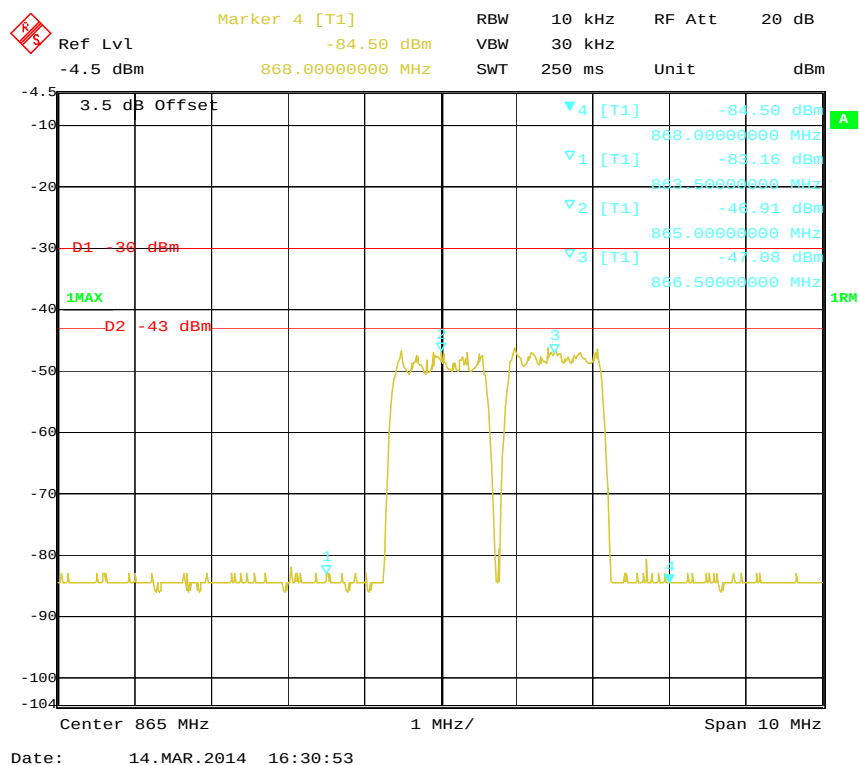
1 RM

Marker 4 [T1] -50.48 dBm  
 866.25000000 MHz  
 -50.50 dBm  
 861.75000000 MHz  
 -3.53 dBm  
 863.25000000 MHz  
 -3.89 dBm  
 864.75000000 MHz

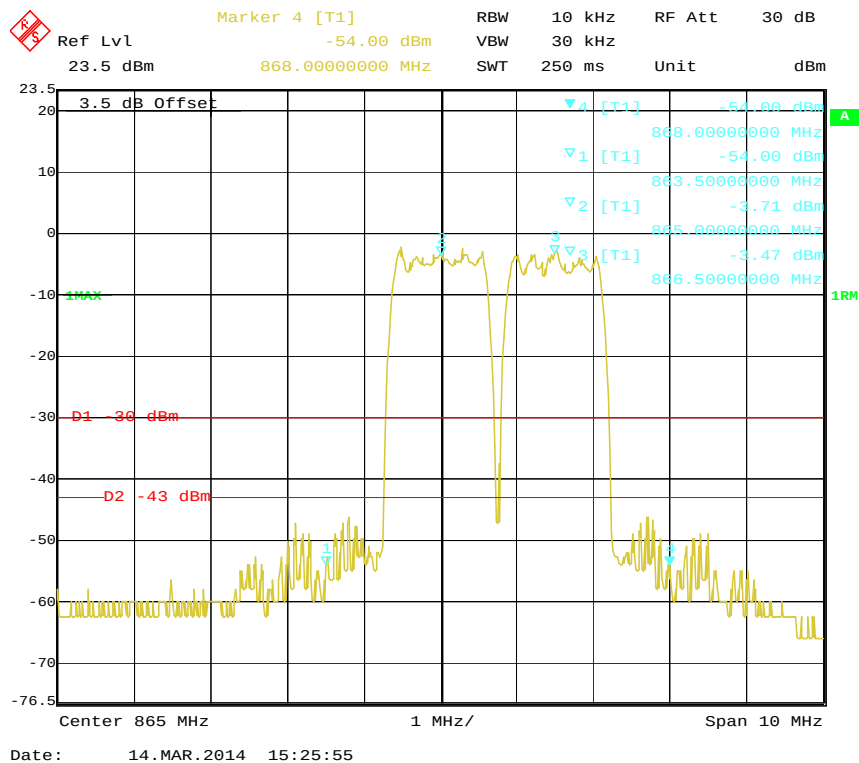
Center 863.25 MHz  
 1 MHz/  
 Span 10 MHz

Date: 14.MAR.2014 15:23:03

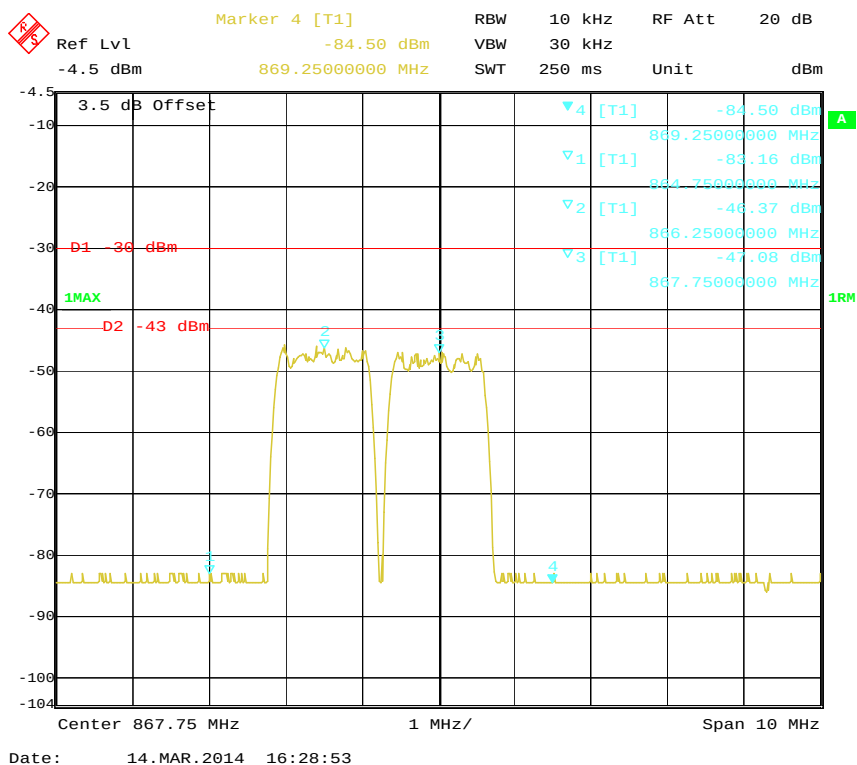
## CDMA Mode, Input, Middle Channel



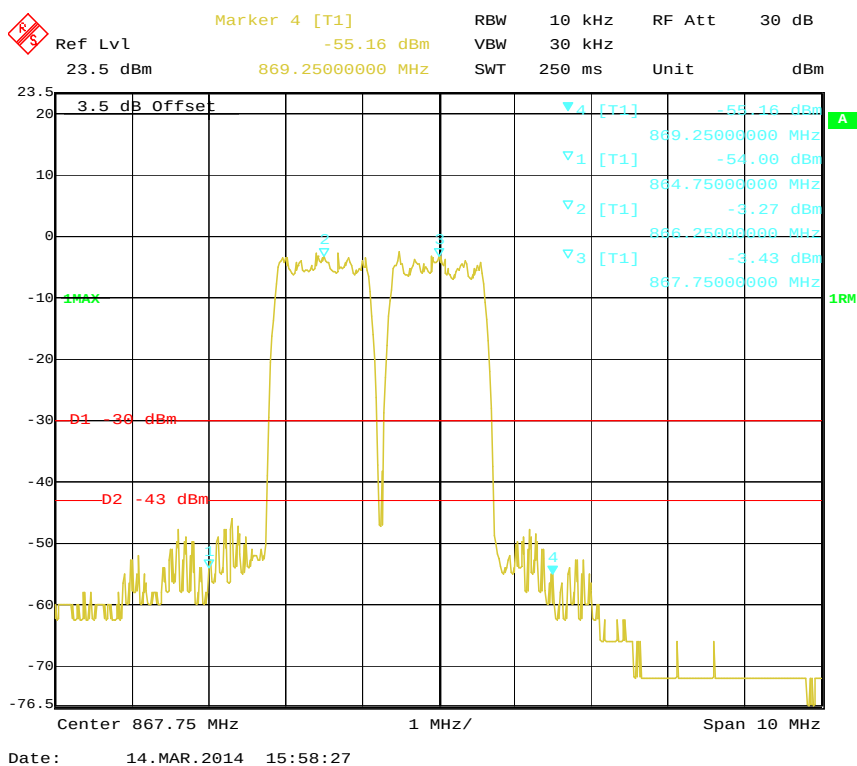
## CDMA Mode, Output, Middle Channel



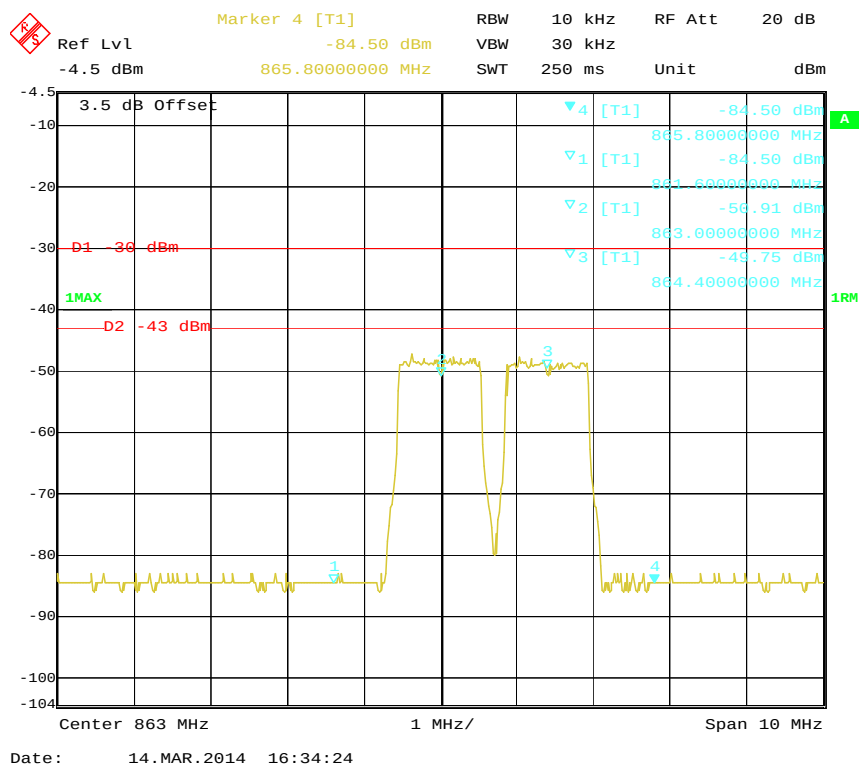
## CDMA Mode, Input, High Channel



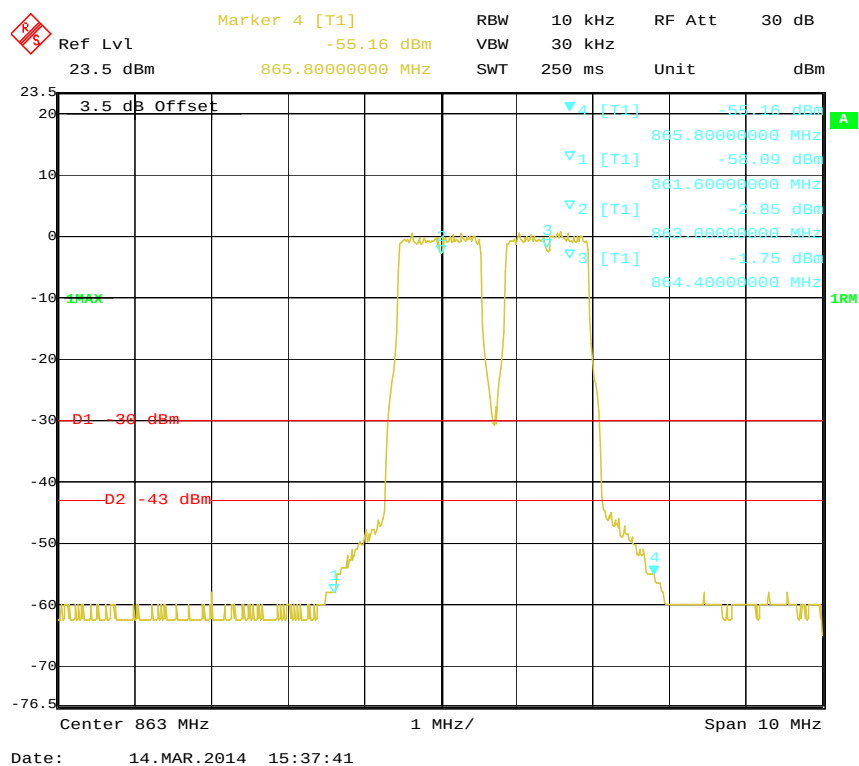
## CDMA Mode, Output, High Channel



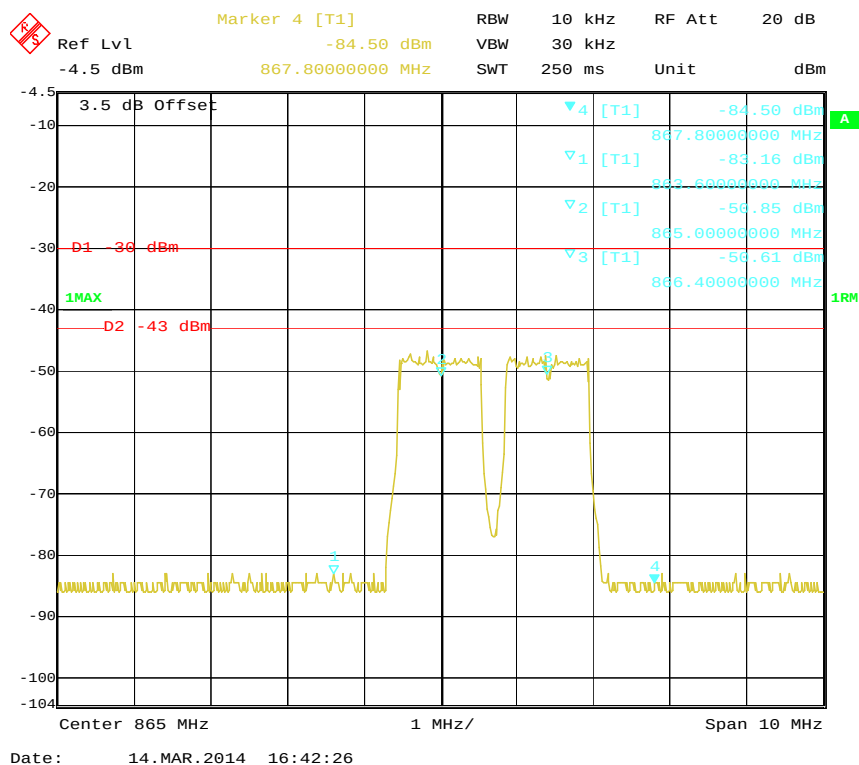
## QPSK (1.4MHz) Mode, Input, Low Channel



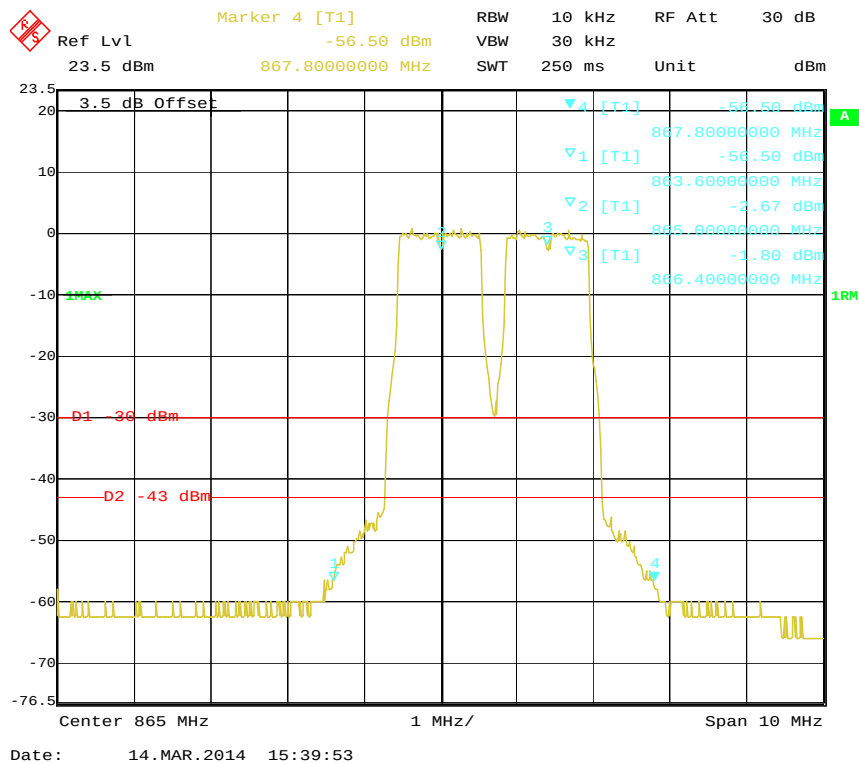
## QPSK (1.4MHz) Mode, Output, Low Channel



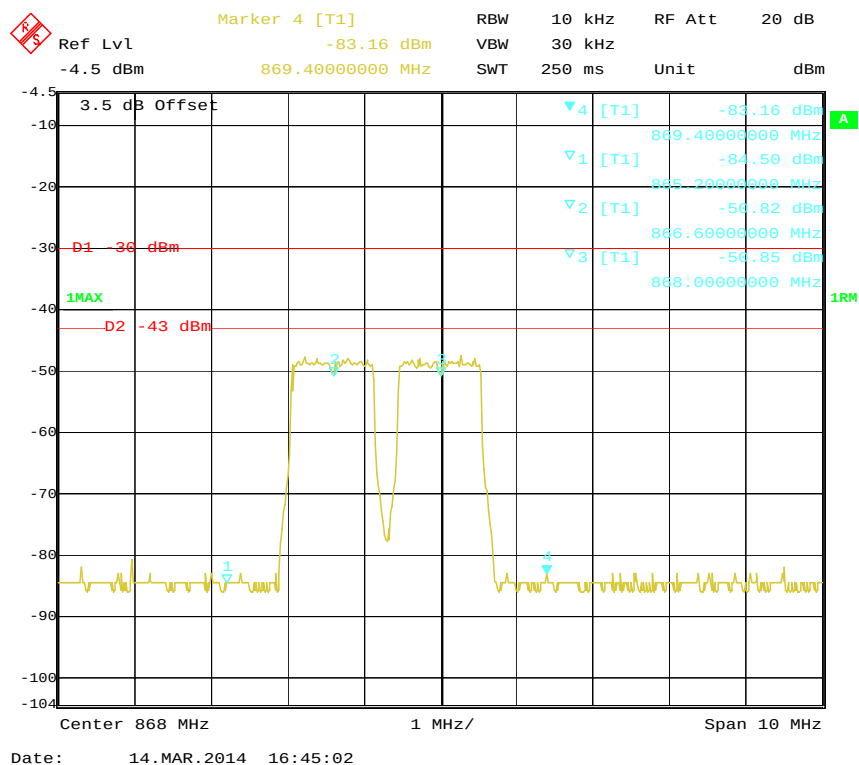
## QPSK (1.4MHz) Mode, Input, Middle Channel



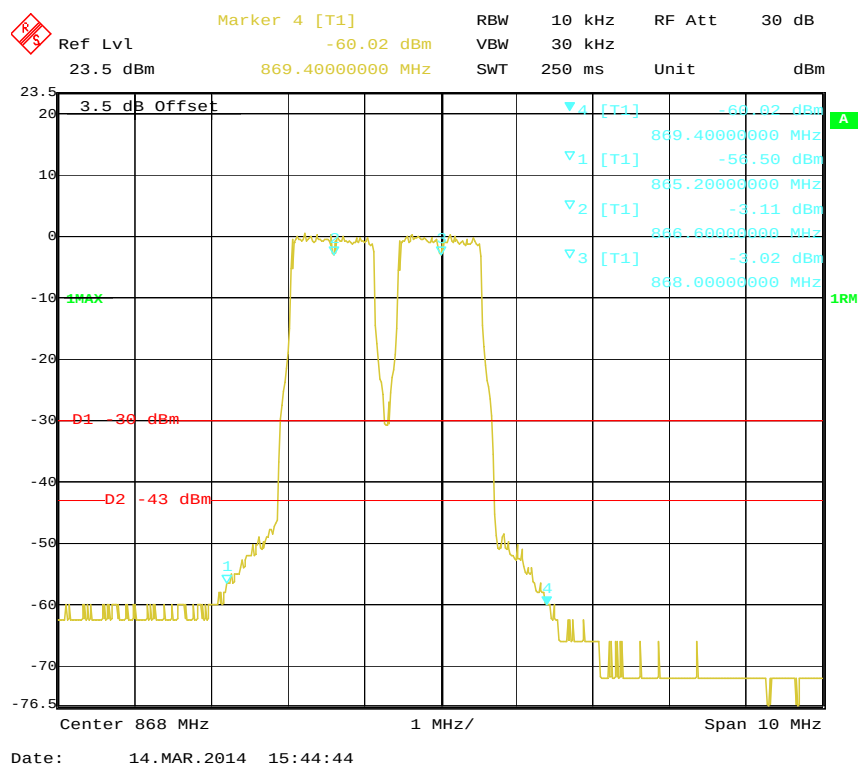
## QPSK (1.4MHz) Mode, Output, Middle Channel

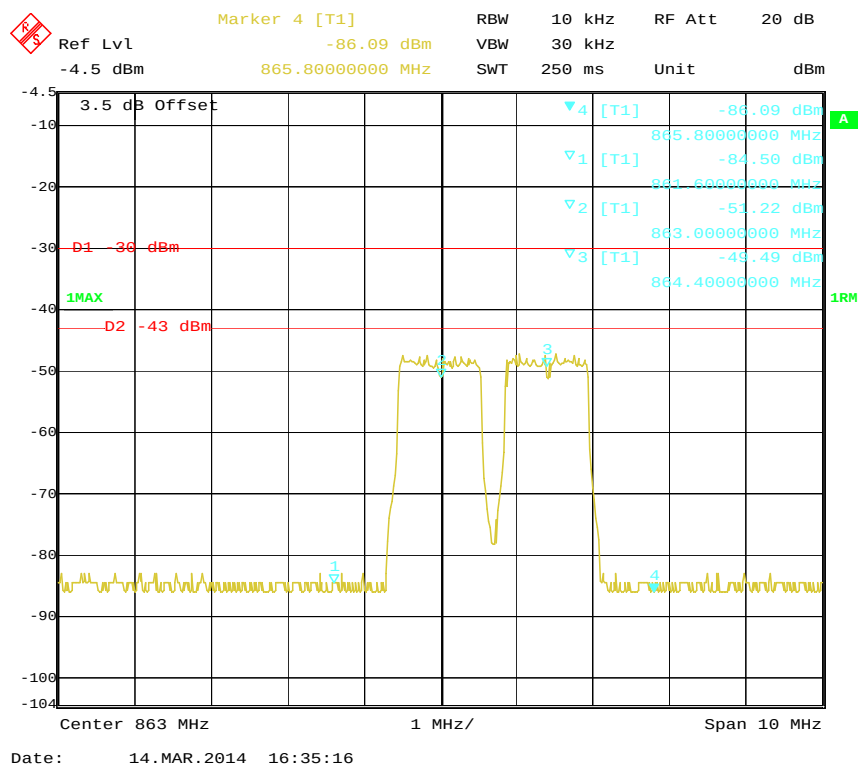
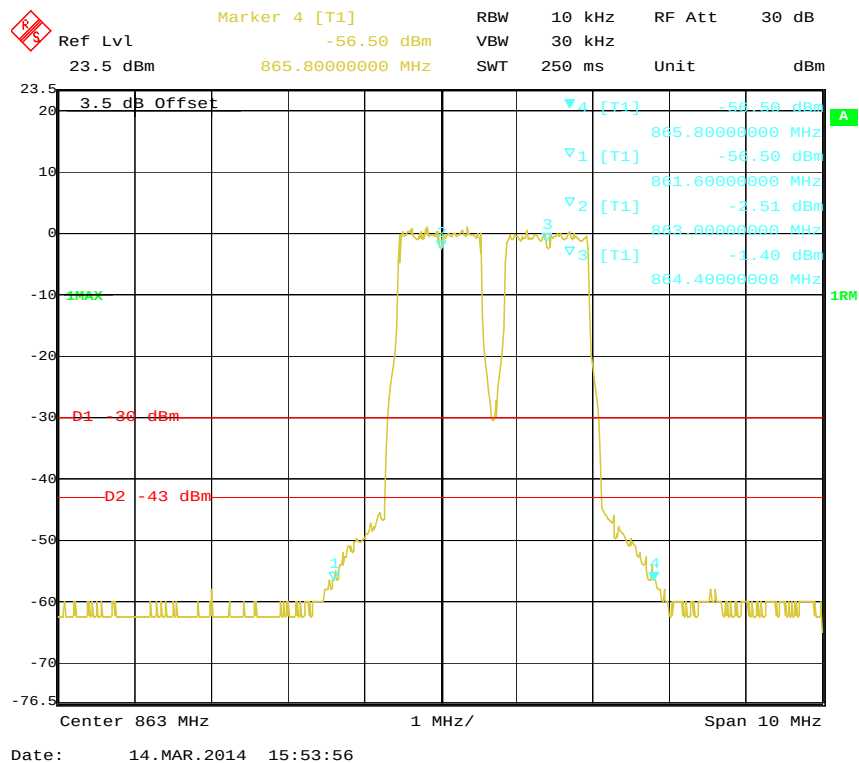


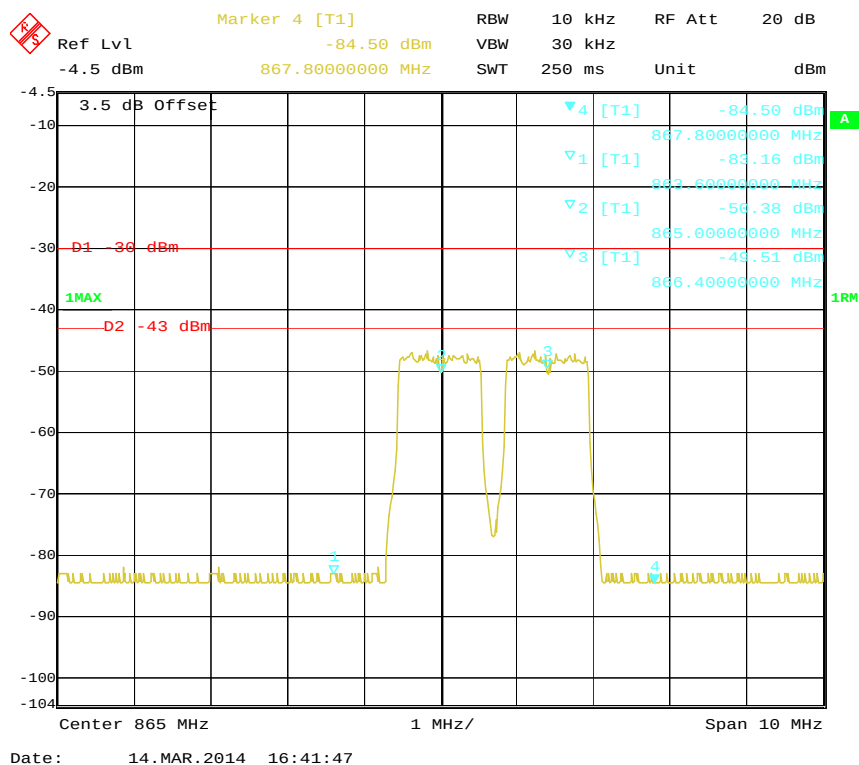
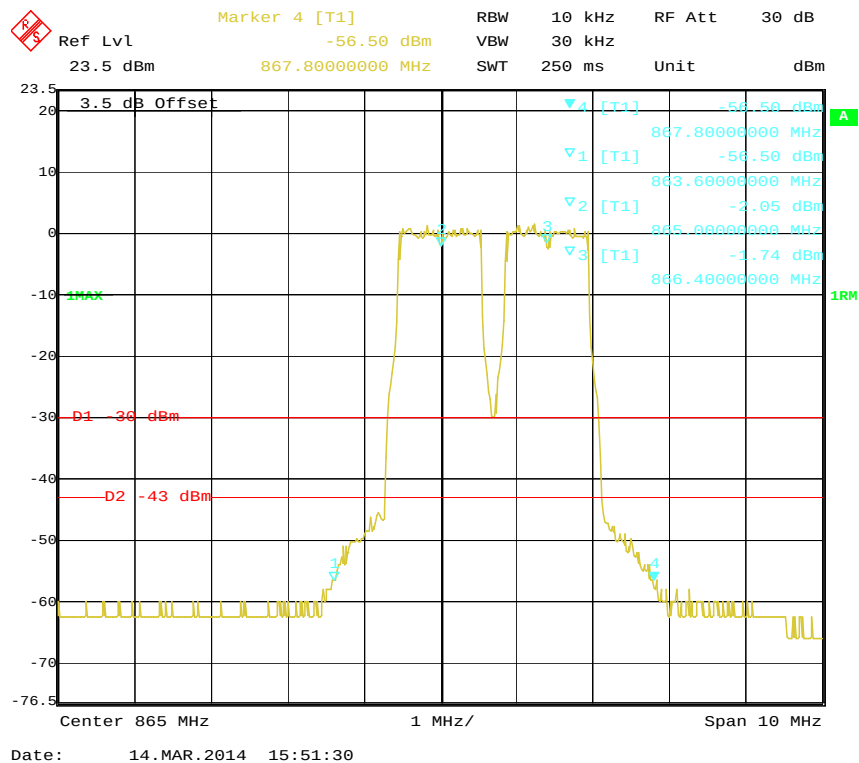
## QPSK (1.4MHz) Mode, Input, High Channel



## QPSK (1.4MHz) Mode, Output, High Channel



**16QAM (1.4MHz) Mode, Input, Low Channel****16QAM (1.4MHz) Mode, Output, Low Channel**

**16QAM (1.4MHz) Mode, Input, Middle Channel****16QAM (1.4MHz) Mode, Output, Middle Channel**

RBW 10 kHz RF Att 20 dB  
 VBW 30 kHz  
 SWT 250 ms Unit dBm

Marker 4 [T1]  
 -84.50 dBm  
 869.40000000 MHz

Ref Lvl  
 -4.5 dBm

3.5 dB Offset

D1 -36 dBm  
 D2 -43 dBm

1MAX  
 1RM

4 [T1] -84.50 dBm  
 869.40000000 MHz  
 1 [T1] -86.09 dBm  
 869.20000000 MHz  
 2 [T1] -56.85 dBm  
 866.60000000 MHz  
 3 [T1] -53.37 dBm  
 868.00000000 MHz

Center 868 MHz 1 MHz/ Span 10 MHz

Date: 14.MAR.2014 16:46:10

Ref Lvl 23.5 dBm

Marker 4 [T1] -60.02 dBm

RBW 10 kHz

VBW 30 kHz

RF Att 30 dB

SWT 250 ms

Unit dBm

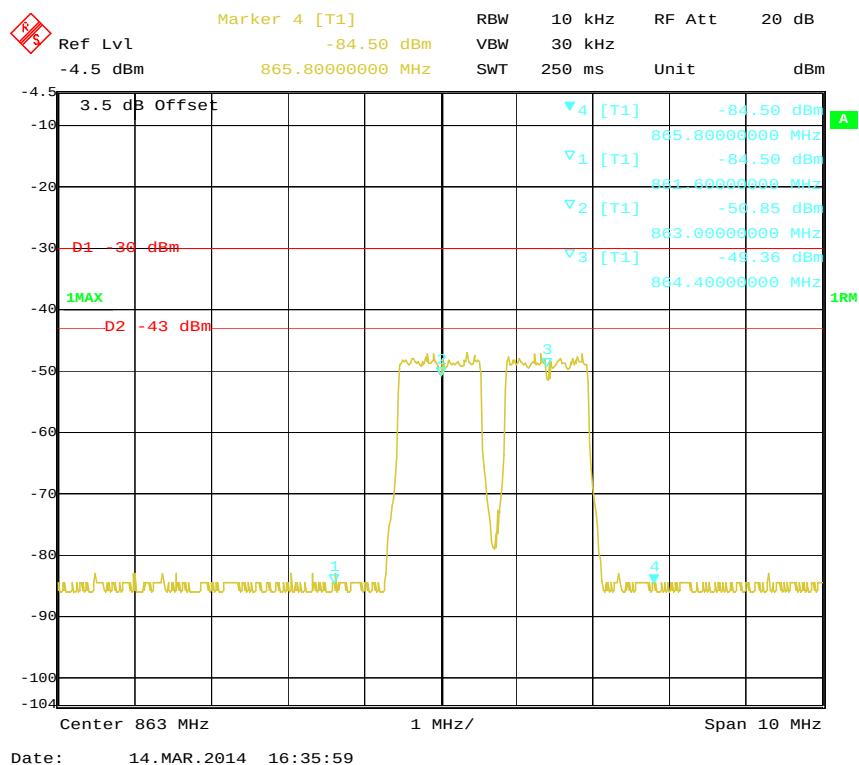
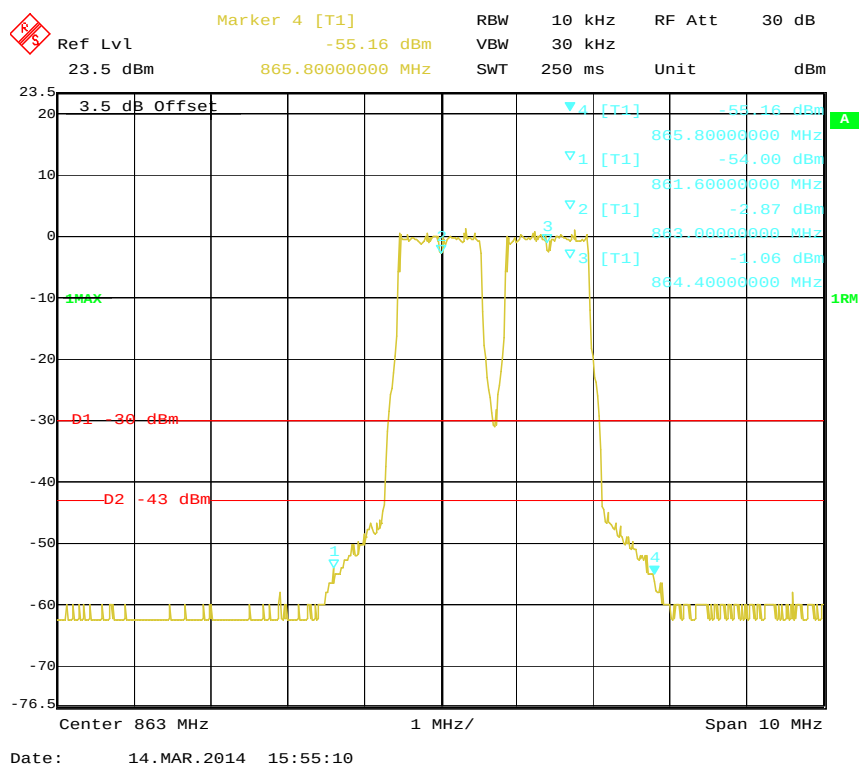
3.5 dB Offset

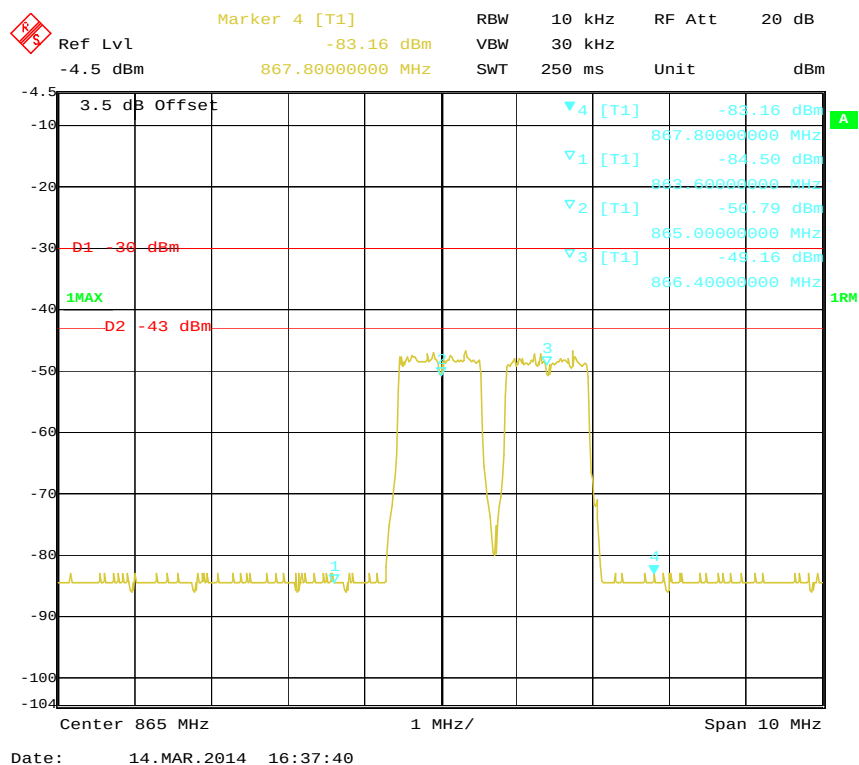
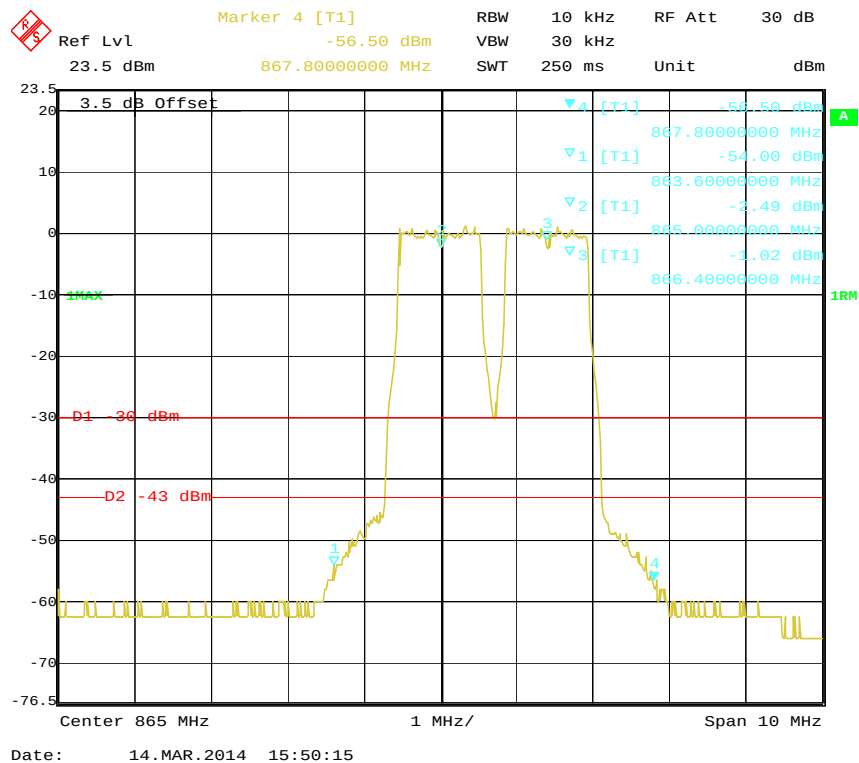
Center 868 MHz

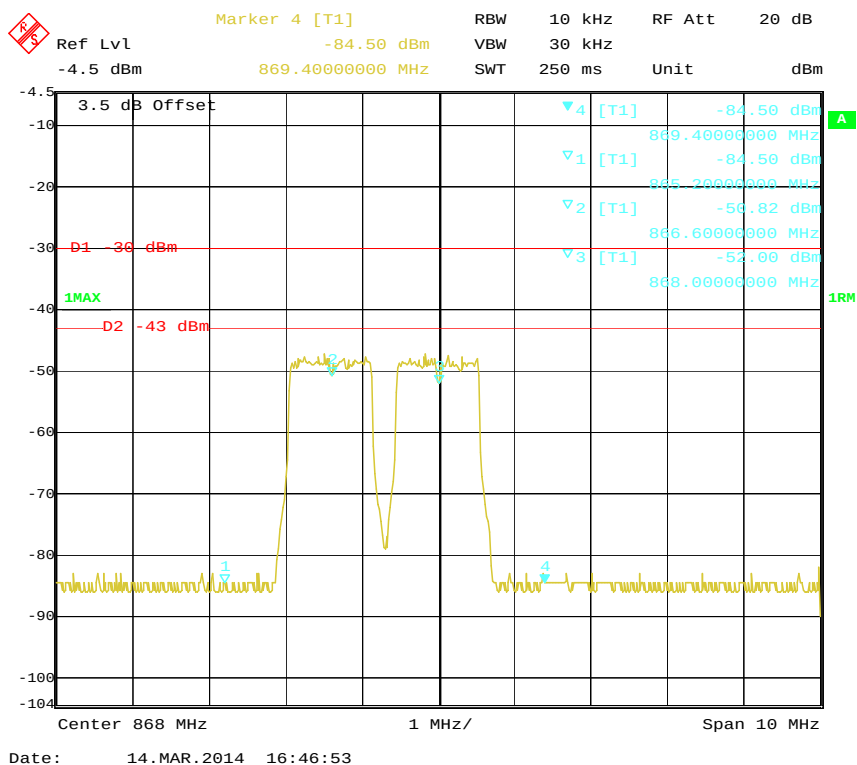
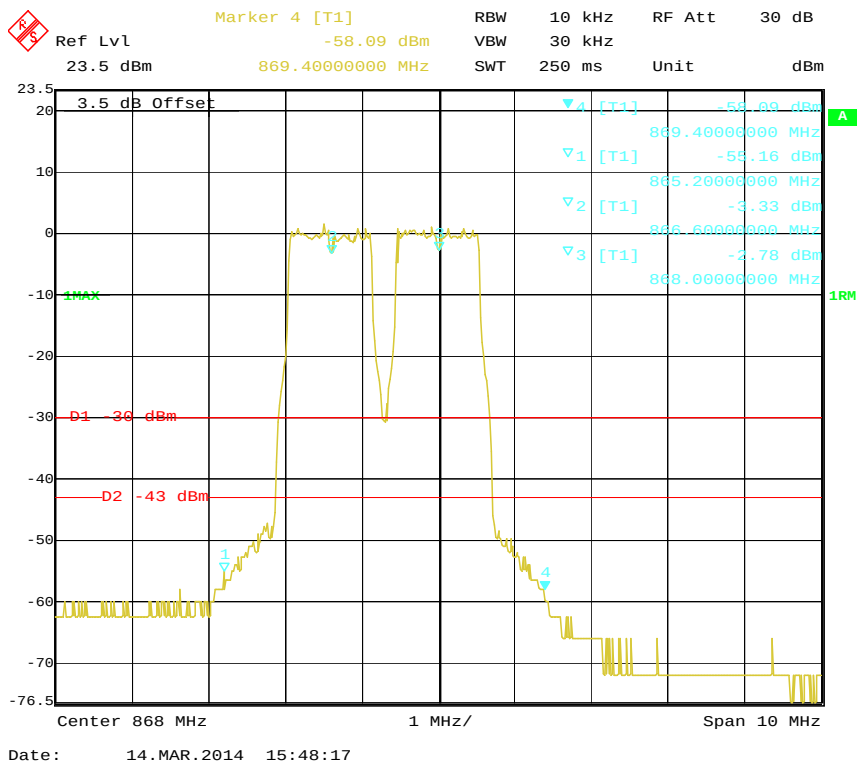
1 MHz/

Span 10 MHz

Date: 14.MAR.2014 15:46:38

**64QAM (1.4MHz) Mode, Input, Low Channel****64QAM (1.4MHz) Mode, Output, Low Channel**

**64QAM (1.4MHz) Mode, Input, Middle Channel****64QAM (1.4MHz) Mode, Output, Middle Channel**

**64QAM (1.4MHz) Mode, Input, High Channel****64QAM (1.4MHz) Mode, Output, High Channel**

## FCC §2.1053 & §24.238 & §90.669 - SPURIOUS RADIATED EMISSIONS

### Applicable Standard

FCC § 2.1053, § 24.238 and § 90.669

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg(\text{TXpwr in Watts}/0.001)$  – the absolute level  
 Spurious attenuation limit in dB =  $43 + 10 \lg(\text{power out in Watts})$

### Test Equipment List and Details

| Manufacturer      | Description                 | Model       | Serial Number | Calibration Date | Calibration Due Date |
|-------------------|-----------------------------|-------------|---------------|------------------|----------------------|
| Sunol Sciences    | Horn Antenna                | DRH-118     | A052304       | 2011-12-01       | 2014-11-30           |
| Sunol Sciences    | Broadband Antenna           | JB1         | A040904-2     | 2011-11-28       | 2014-11-27           |
| Rohde & Schwarz   | Signal Analyzer             | FSIQ26      | 8386001028    | 2013-11-12       | 2014-11-12           |
| Rohde & Schwarz   | EMI Test Receiver           | ESCI        | 101122        | 2013-09-17       | 2014-09-17           |
| Mini              | Pre-amplifier               | ZVA-183-S+  | 5969001149    | 2014-04-03       | 2015-04-03           |
| HP                | Amplifier                   | 8447E       | 1937A01046    | 2013-09-30       | 2014-09-30           |
| HP                | Signal Generator            | 8341B       | 2624A00116    | 2013-05-09       | 2014-05-09           |
| COM POWER         | Dipole Antenna              | AD-100      | 041000        | NCR              | NCR                  |
| A.H. System       | Horn Antenna                | SAS-200/571 | 135           | 2012-02-11       | 2015-02-10           |
| Electro-Mechanics | Horn Antenna                | 3116        | 9510-2270     | 2013-10-14       | 2016-10-13           |
| Agilent           | ESG Vector Signal Generator | E4438C      | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

|                           |            |
|---------------------------|------------|
| <b>Temperature:</b>       | 20 ~ 26 °C |
| <b>Relative Humidity:</b> | 49 ~ 55 %  |
| <b>ATM Pressure:</b>      | 101.0 kPa  |

The testing was performed by Rocky Kang from 2014-03-13 to 2014-04-24.

EUT operation mode: Transmitting (worst case)

**30 MHz ~ 20 GHz:**

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | Turntable<br>Angle<br>Degree | Rx Antenna    |                | Substituted          |                       |                         | Absolute<br>Level<br>(dBm) | FCC Part 24E   |                |
|--------------------|-------------------------------|------------------------------|---------------|----------------|----------------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                    |                               |                              | Height<br>(m) | Polar<br>(H/V) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            | Limit<br>(dBm) | Margin<br>(dB) |
| 1930.2 MHz         |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 470.2              | 41.93                         | 17                           | 2.4           | H              | -55.1                | 0.47                  | 0                       | -55.57                     | -13            | 42.57          |
| 470.2              | 37.78                         | 225                          | 1.1           | V              | -59.2                | 0.47                  | 0                       | -59.67                     | -13            | 46.67          |
| 3860.4             | 42.63                         | 165                          | 1.8           | H              | -44.5                | 3.20                  | 10.40                   | -37.30                     | -13            | 24.30          |
| 3860.4             | 37.44                         | 202                          | 1.9           | V              | -49.2                | 3.20                  | 10.40                   | -42.00                     | -13            | 29.00          |
| 5790.6             | 55.38                         | 63                           | 1.4           | H              | -37.0                | 3.19                  | 11.70                   | -28.49                     | -13            | 15.49          |
| 5790.6             | 44.93                         | 284                          | 1.2           | V              | -46.5                | 3.19                  | 11.70                   | -37.99                     | -13            | 24.99          |
| 1960 MHz           |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 470.2              | 42.35                         | 85                           | 1.3           | H              | -55.2                | 0.47                  | 0                       | -55.67                     | -13            | 42.67          |
| 470.2              | 37.65                         | 160                          | 1.4           | V              | -59.9                | 0.47                  | 0                       | -60.37                     | -13            | 47.37          |
| 3920               | 42.78                         | 185                          | 1.5           | H              | -53.3                | 3.20                  | 10.40                   | -46.05                     | -13            | 33.05          |
| 3920               | 38.73                         | 155                          | 1.5           | V              | -56.6                | 3.20                  | 10.40                   | -49.36                     | -13            | 36.36          |
| 5660.0             | 55.07                         | 47                           | 1.4           | H              | -39.4                | 3.39                  | 11.70                   | -31.09                     | -13            | 18.09          |
| 5660.0             | 45.14                         | 224                          | 2.4           | V              | -44.5                | 3.39                  | 11.70                   | -36.19                     | -13            | 23.19          |
| 1994.8 MHz         |                               |                              |               |                |                      |                       |                         |                            |                |                |
| 470.2              | 42.04                         | 250                          | 1.4           | H              | -55.0                | 0.47                  | 0                       | -55.47                     | -13            | 42.47          |
| 470.2              | 37.84                         | 140                          | 1.5           | V              | -59.2                | 0.47                  | 0                       | -59.67                     | -13            | 46.67          |
| 3989.6             | 41.14                         | 230                          | 1.2           | H              | -45.6                | 2.89                  | 10.30                   | -38.19                     | -13            | 25.19          |
| 3989.6             | 37.47                         | 83                           | 1.4           | V              | -50.5                | 2.89                  | 10.30                   | -43.09                     | -13            | 30.09          |
| 5984.4             | 54.97                         | 124                          | 1.5           | H              | -37.1                | 3.09                  | 11.80                   | -28.39                     | -13            | 15.39          |
| 5984.4             | 44.85                         | 21                           | 1.2           | V              | -46.4                | 3.09                  | 11.80                   | -37.69                     | -13            | 24.69          |

| Frequency<br>(MHz) | Receiver<br>Reading<br>(dBμV) | Turn<br>Table<br>Angle<br>Degree | Rx Antenna    |                | Substituted          |                       |                         | Absolute<br>Level<br>(dBm) | FCC Part 90    |                |
|--------------------|-------------------------------|----------------------------------|---------------|----------------|----------------------|-----------------------|-------------------------|----------------------------|----------------|----------------|
|                    |                               |                                  | Height<br>(m) | Polar<br>(H/V) | SG<br>Level<br>(dBm) | Cable<br>Loss<br>(dB) | Antenna<br>Gain<br>(dB) |                            | Limit<br>(dBm) | Margin<br>(dB) |
| 868.9 MHz          |                               |                                  |               |                |                      |                       |                         |                            |                |                |
| 470.5              | 42.44                         | 175                              | 1.7           | H              | -55.1                | 0.47                  | 0                       | -55.57                     | -13            | 42.57          |
| 470.5              | 42.13                         | 220                              | 1.6           | V              | -55.4                | 0.47                  | 0                       | -55.87                     | -13            | 42.87          |
| 1739.8             | 52.39                         | 105                              | 1.3           | H              | -50.6                | 0.97                  | 9.4                     | -42.17                     | -13            | 29.17          |
| 1739.8             | 55.68                         | 212                              | 1.4           | V              | -44.7                | 0.97                  | 9.4                     | -36.27                     | -13            | 23.27          |

Note:

1) Absolute Level = SG Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level

## FCC §24.238 - BAND EDGES

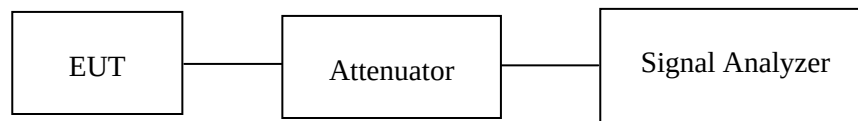
### Applicable Standard

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



### Test Equipment List and Details

| Manufacturer    | Description                 | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26 | 8386001028    | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 20 ~ 26 °C |
| Relative Humidity: | 49 ~ 55 %  |
| ATM Pressure:      | 101.0 kPa  |

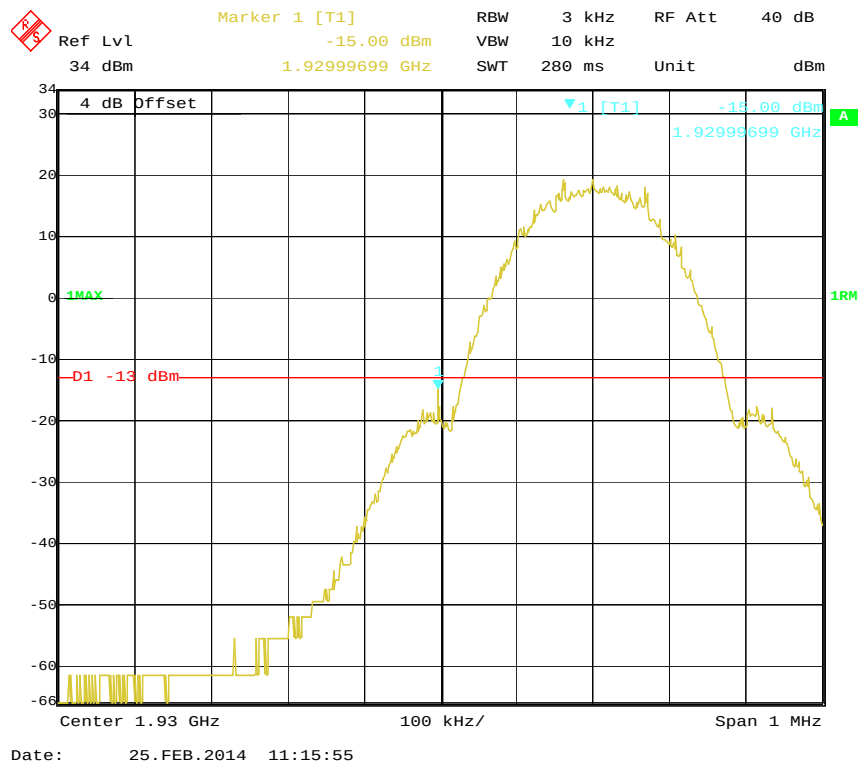
The testing was performed by Rocky Kang from 2014-02-25 to 2014-04-24.

EUT operation mode: Transmitting

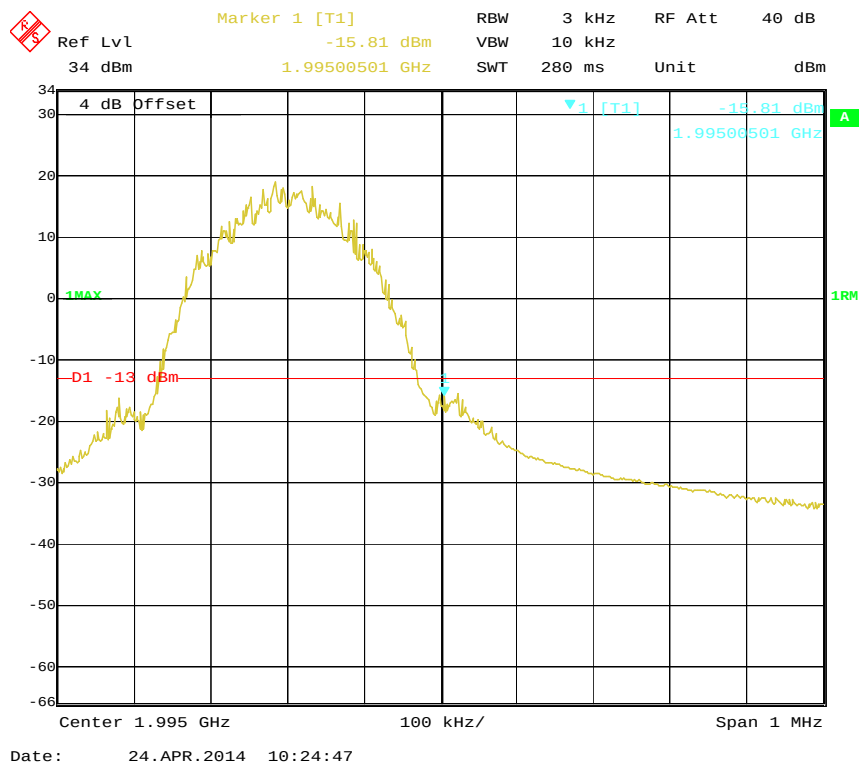
Test Result: Compliance. Please refer to the following plots.

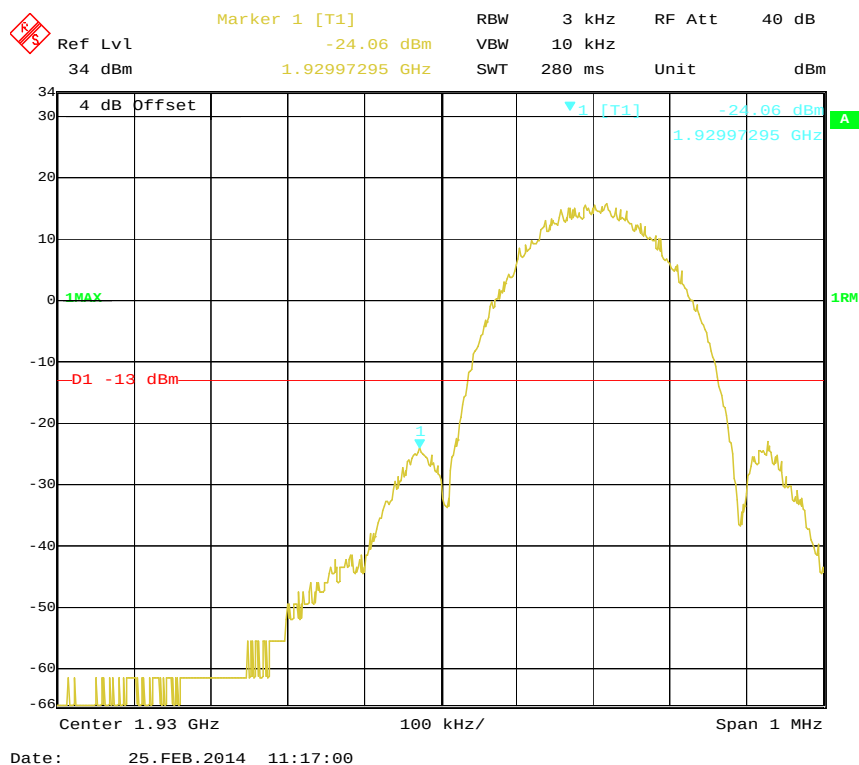
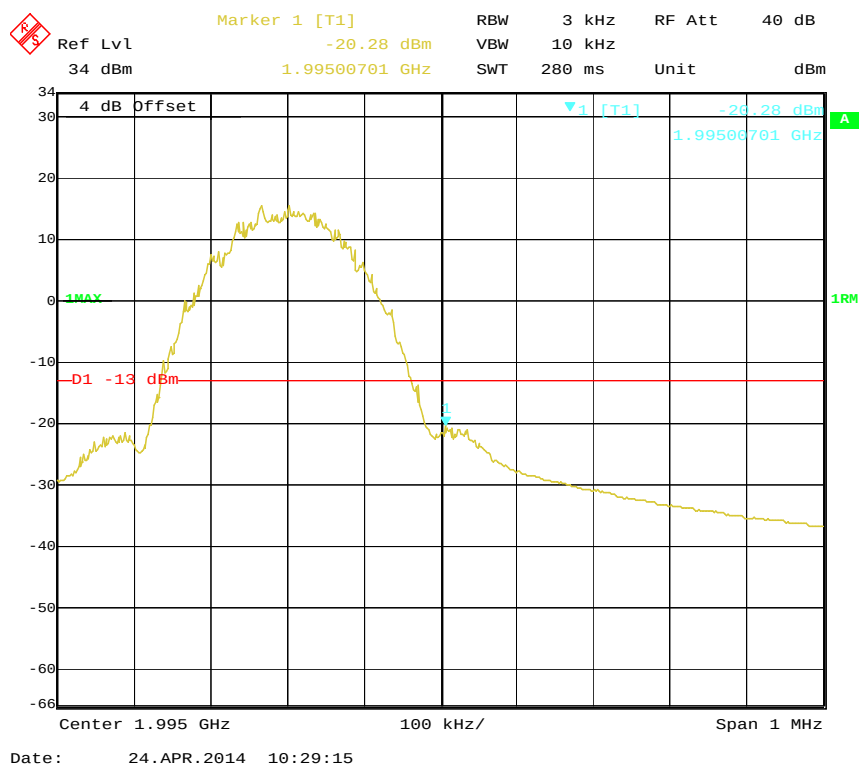
## PCS Band Downlink:

## GSM Mode, Left Band

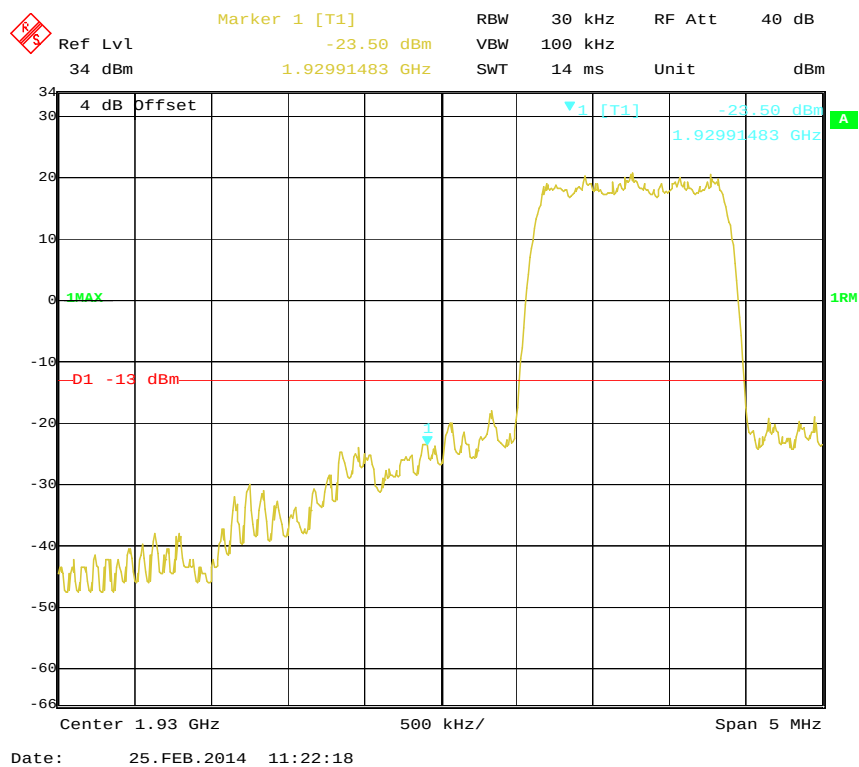


## GSM Mode, Right Band

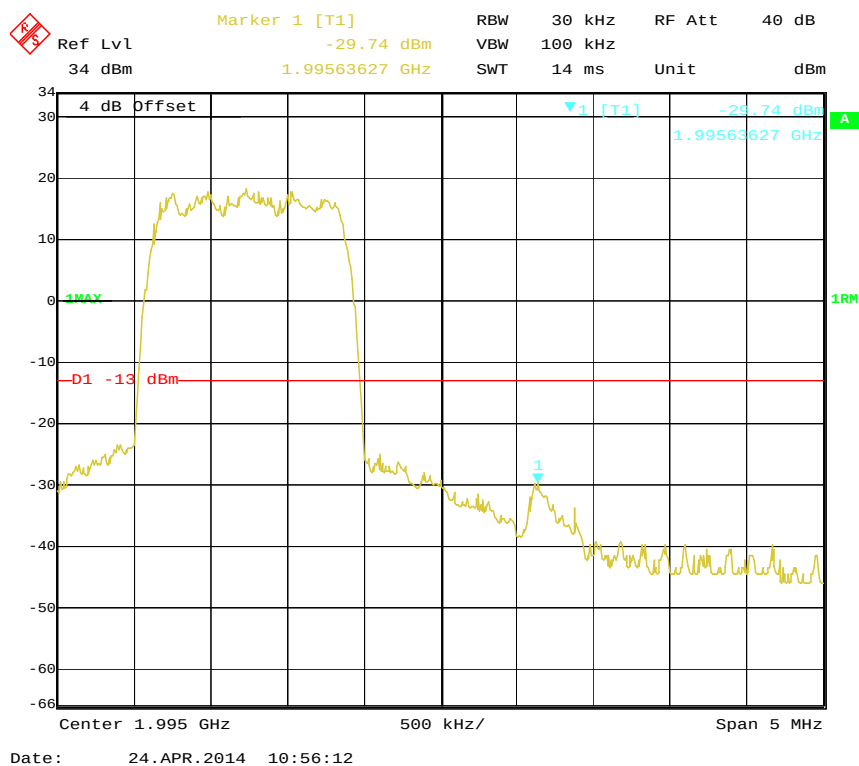


**EDGE Mode, Left Band****EDGE Mode, Right Bands**

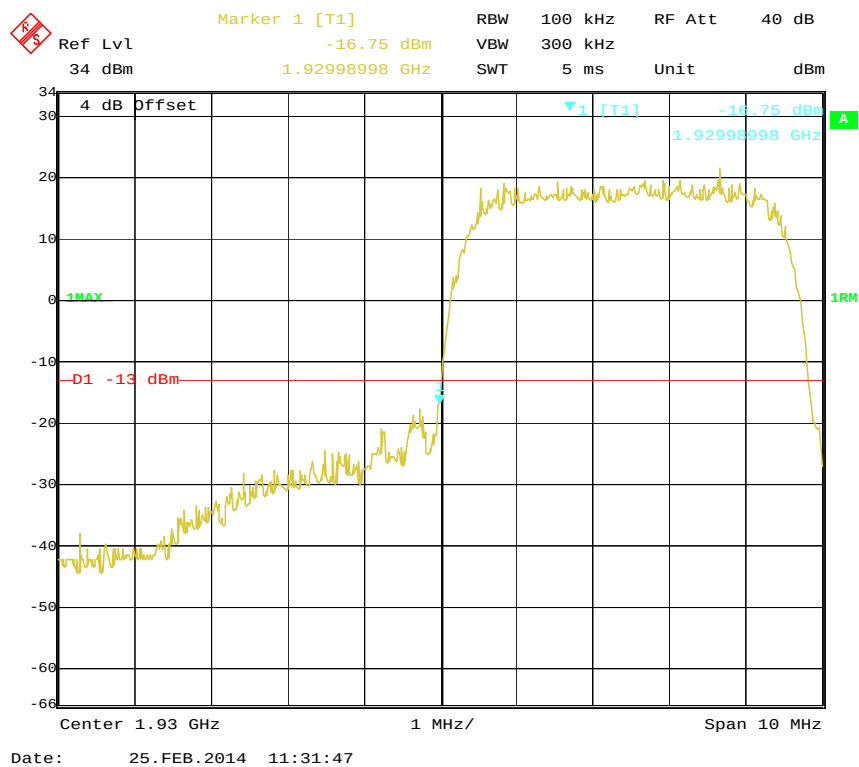
## CDMA Mode, Left Band



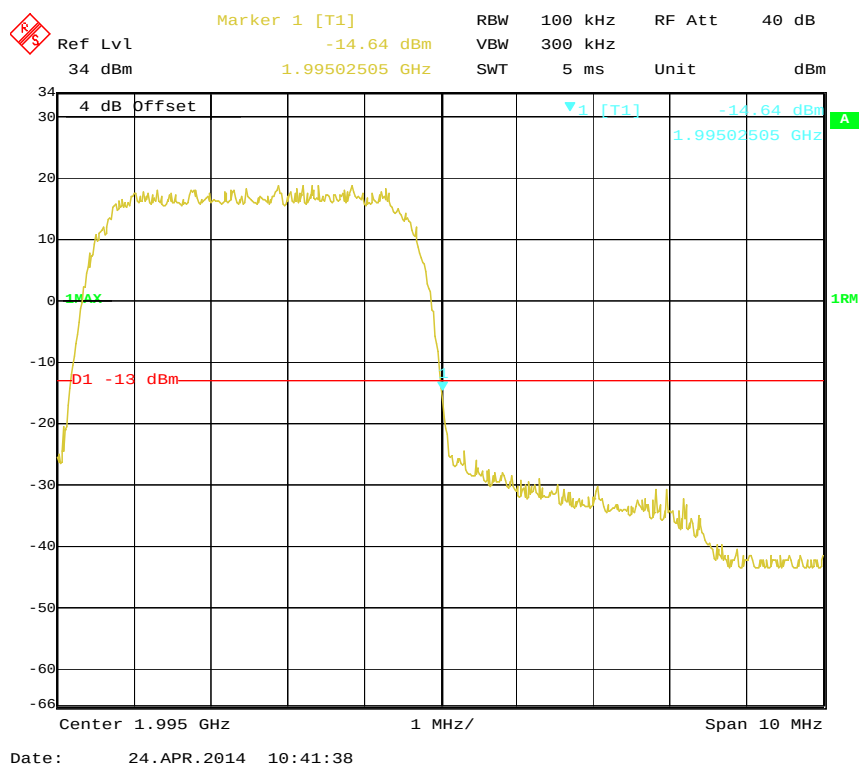
## CDMA Mode, Right Band



## WCDMA Mode, Left Band

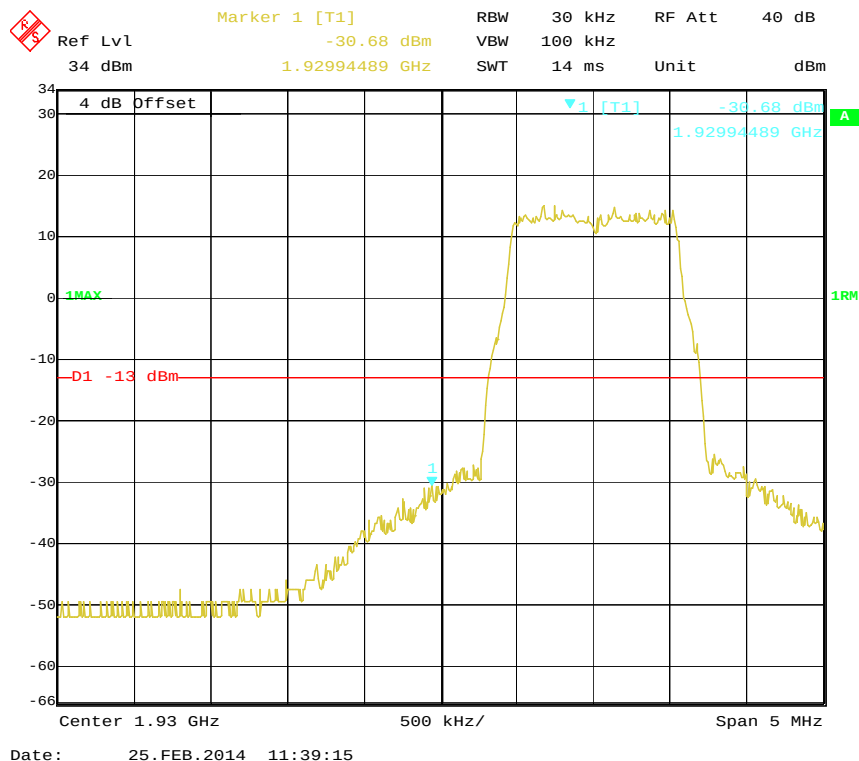


## WCDMA Mode, Right Band

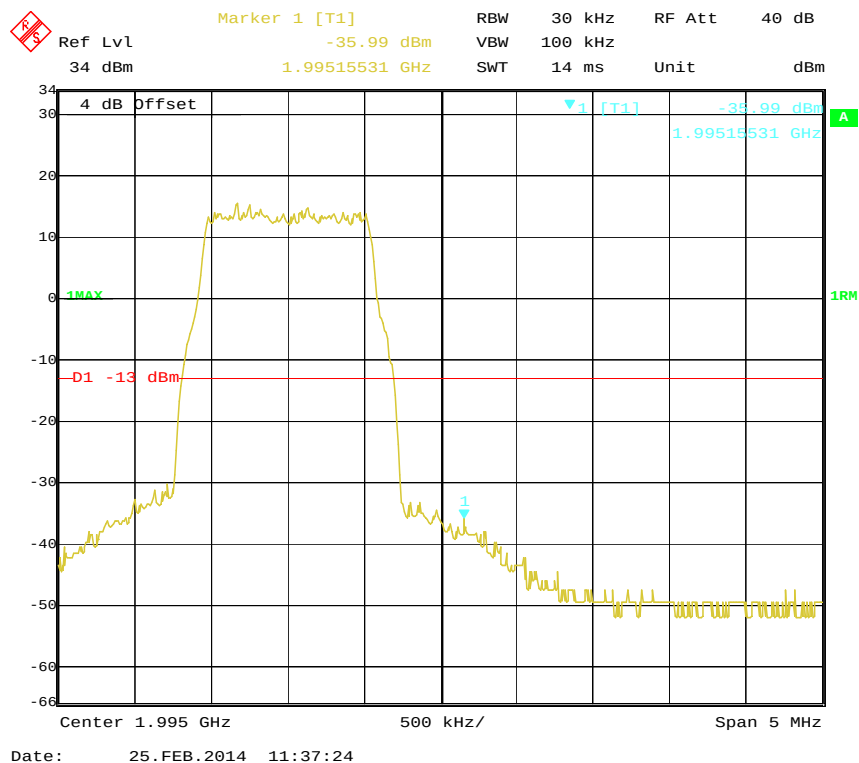


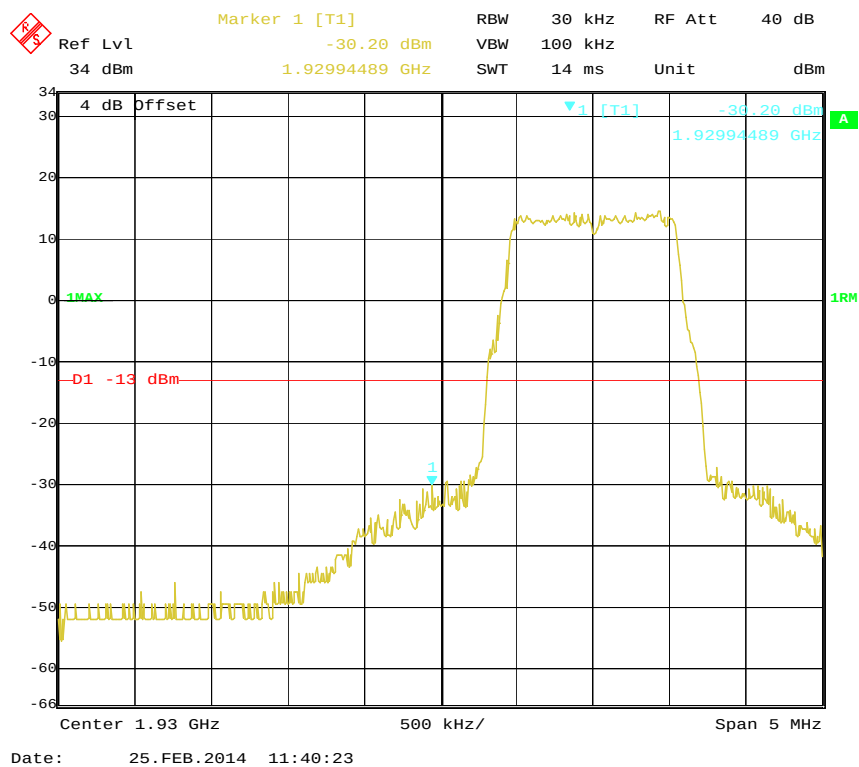
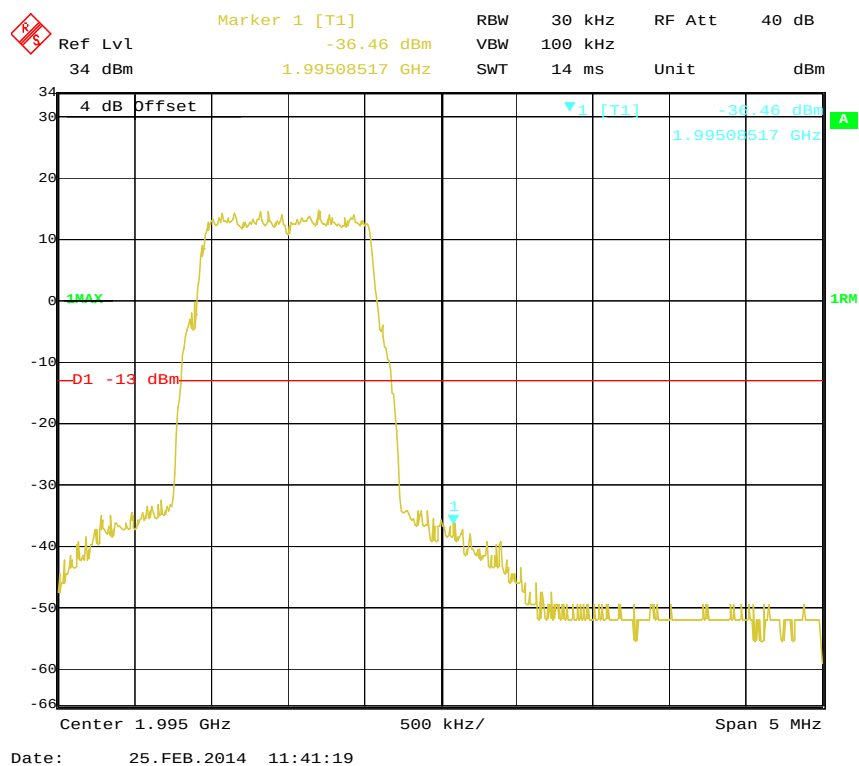
## PCS Band LTE Downlink:

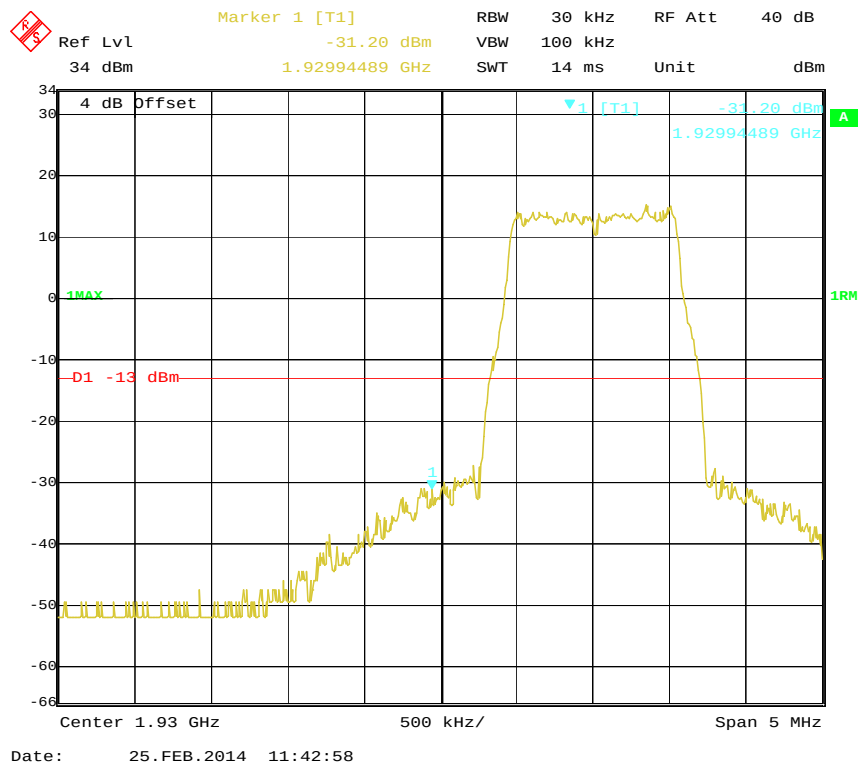
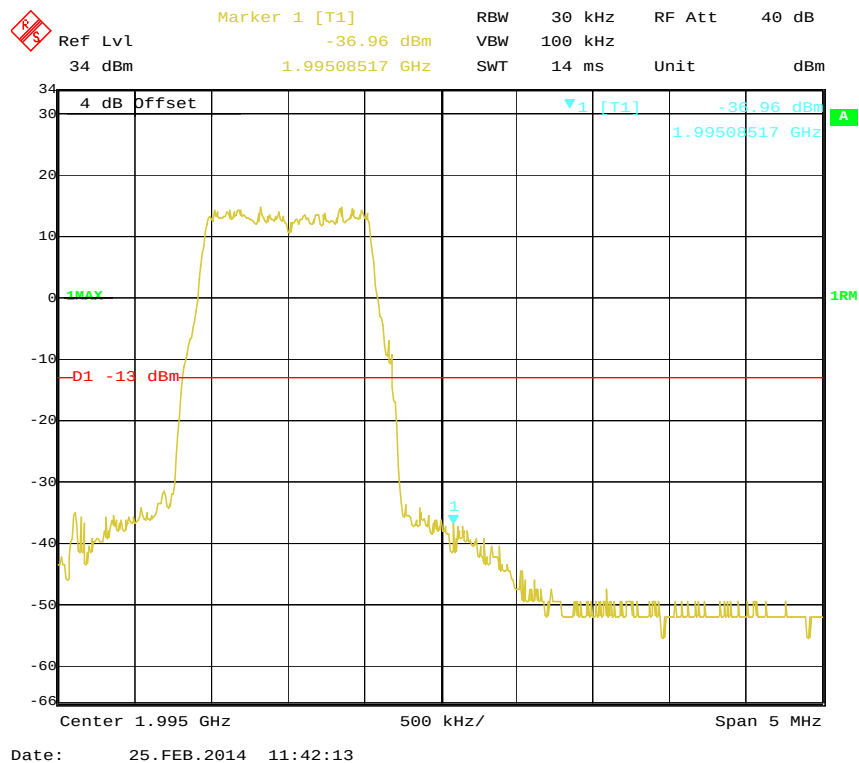
## QPSK (1.4MHz) Mode, Left Band

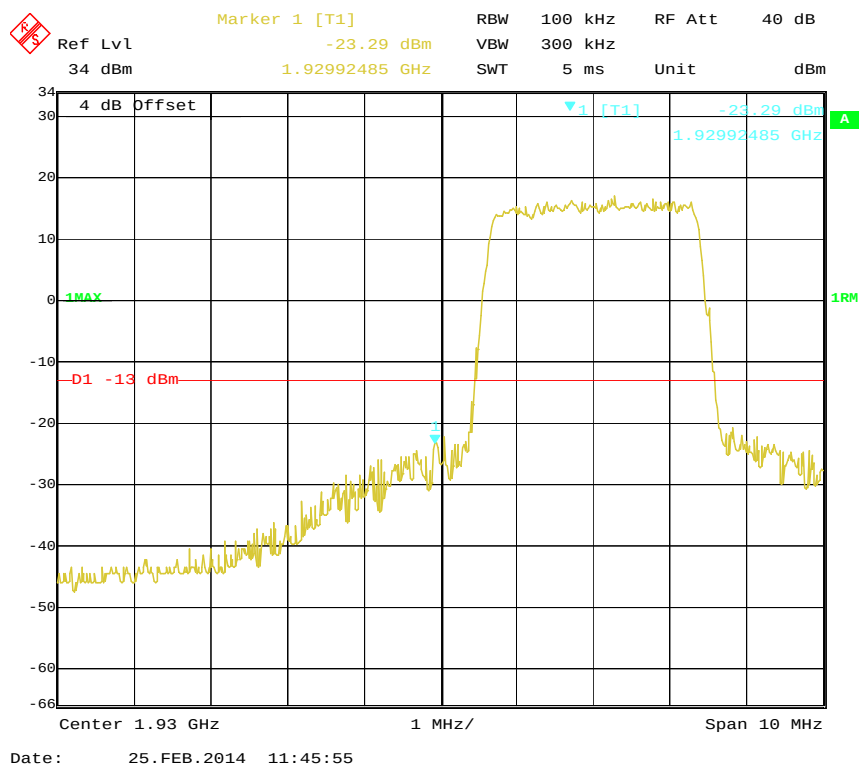
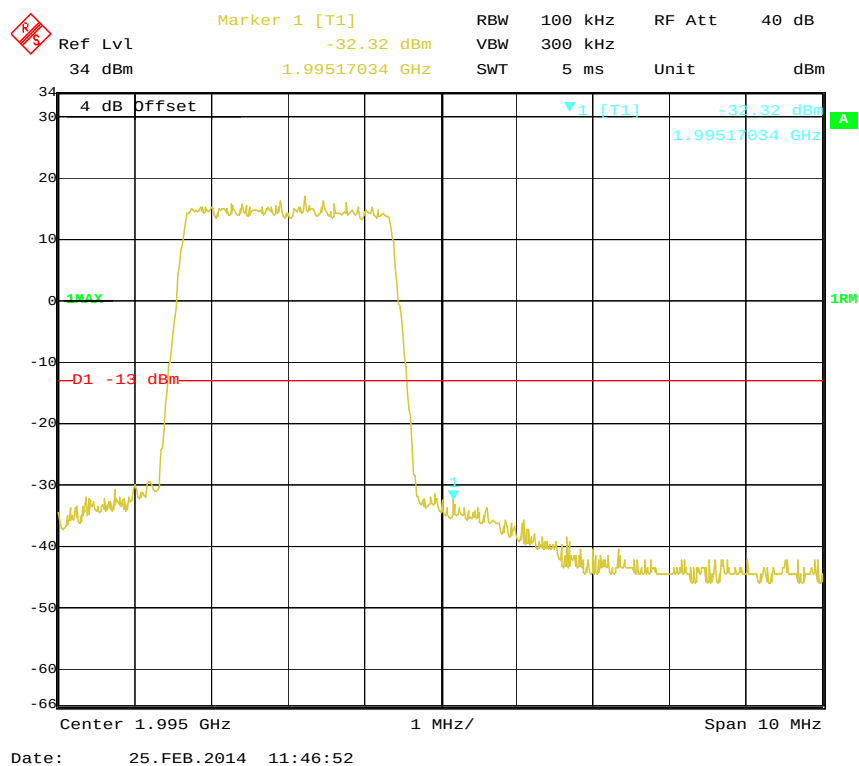


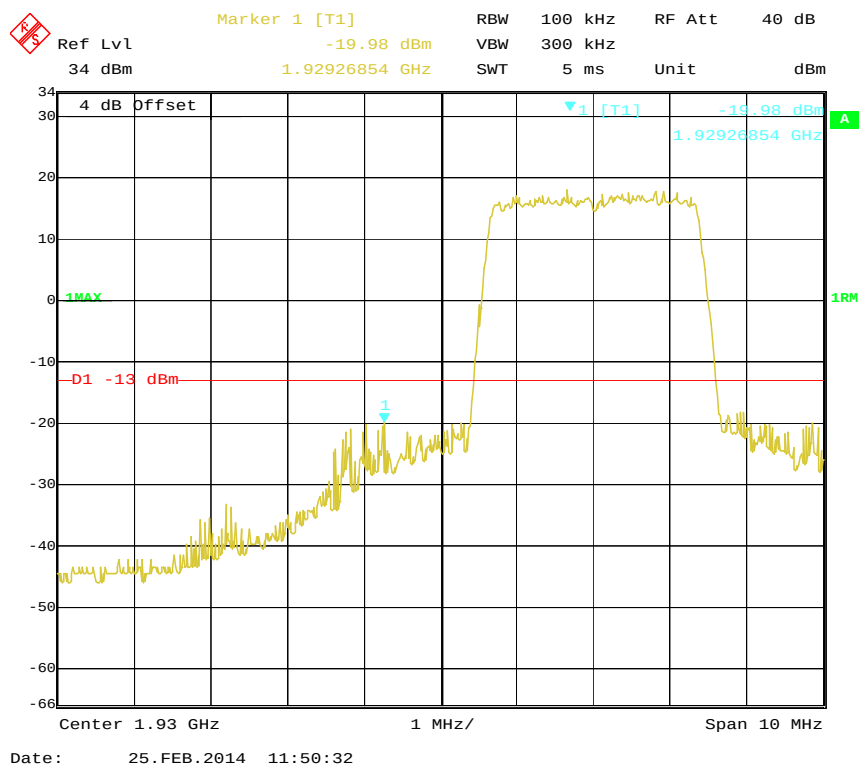
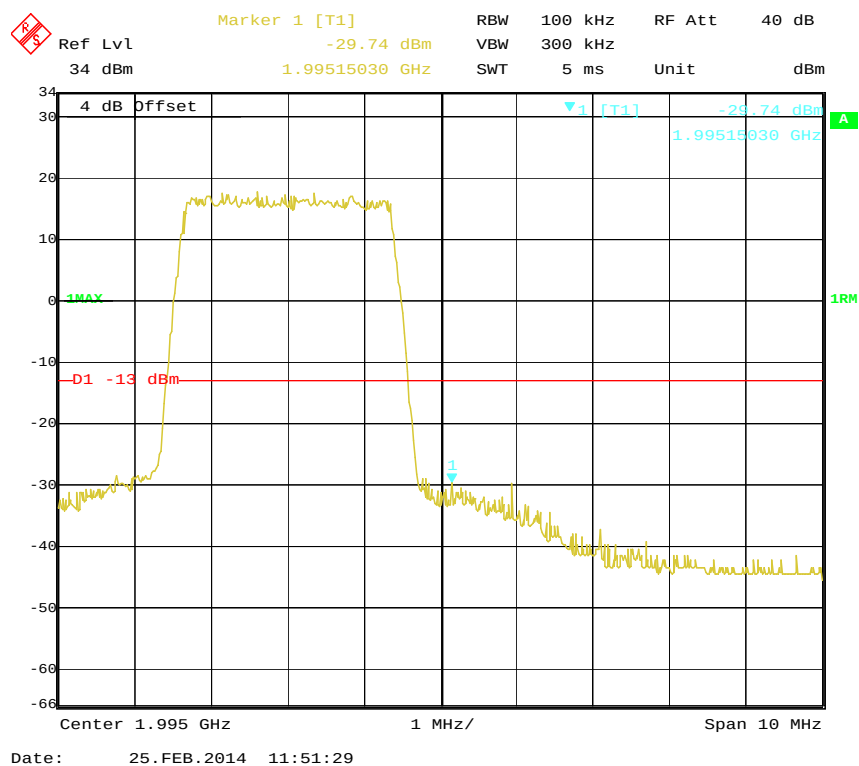
## QPSK (1.4MHz) Mode, Right Band

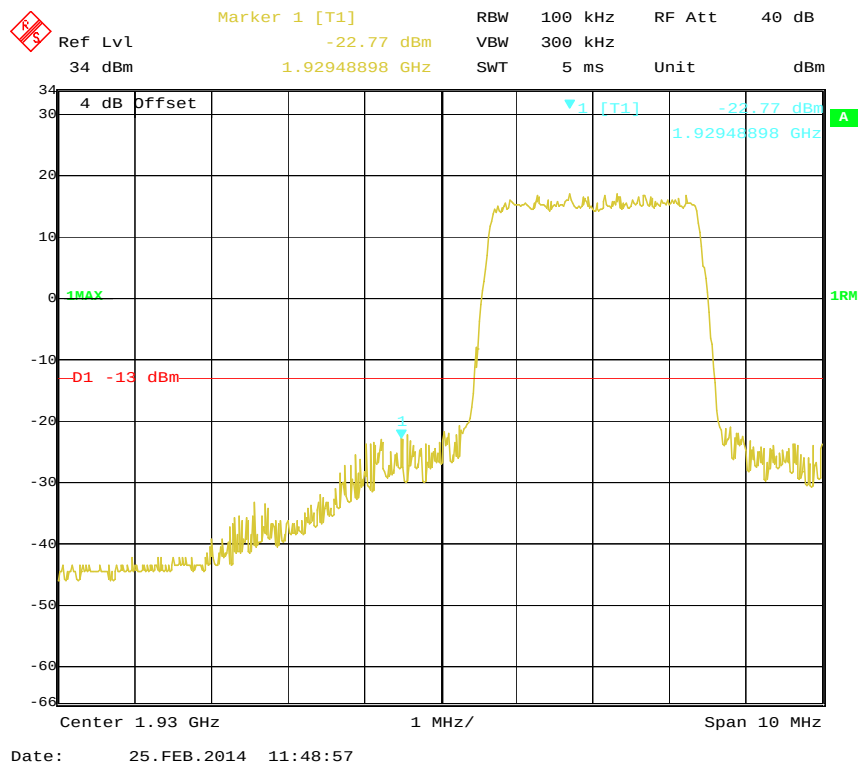
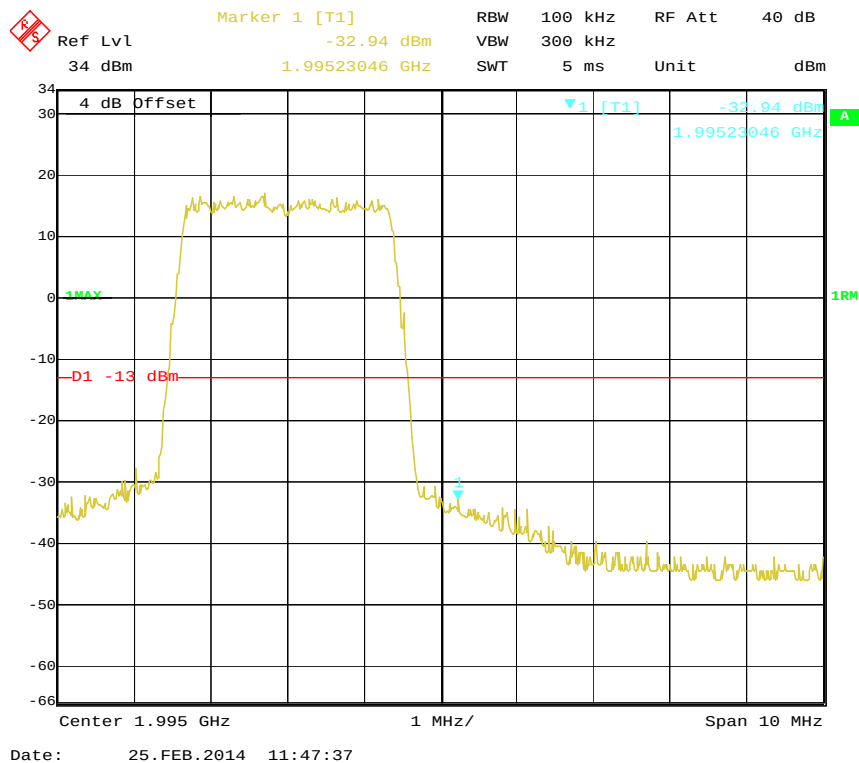


**16QAM (1.4MHz) Mode, Left Band****16QAM (1.4MHz) Mode, Right Band**

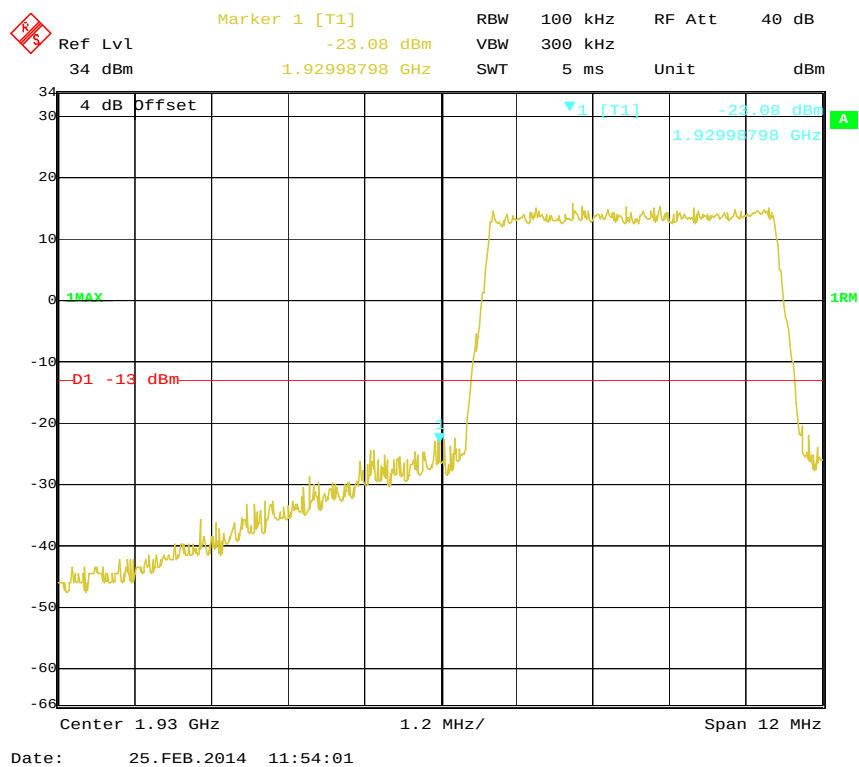
**64QAM (1.4MHz) Mode, Left Band****64QAM (1.4MHz) Mode, Right Band**

**QPSK (3MHz) Mode, Left Band****QPSK (3MHz) Mode, Right Band**

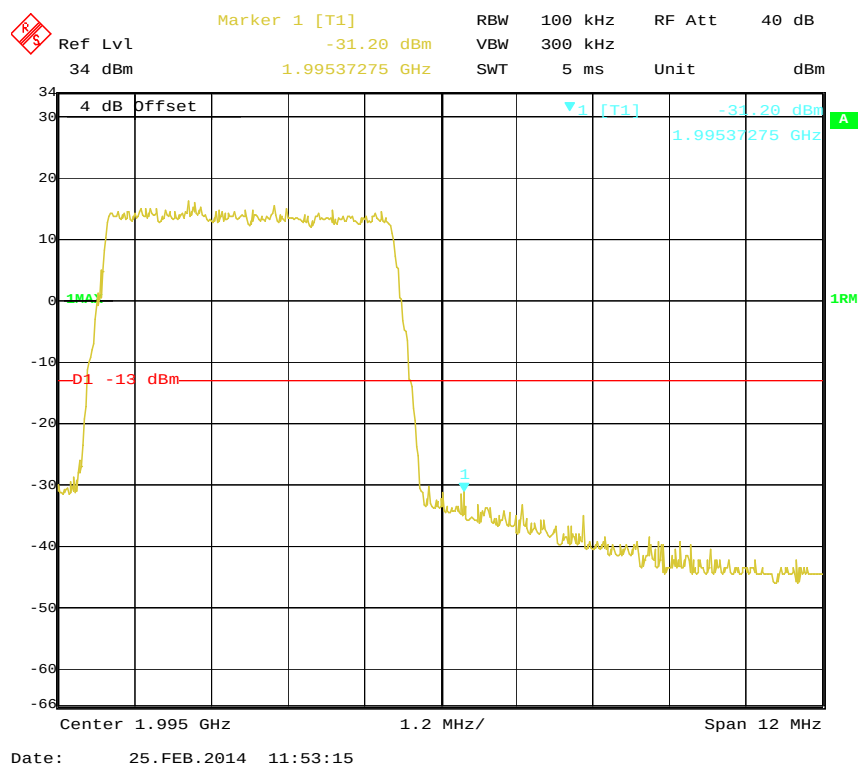
**16QAM (3MHz) Mode, Left Band****16QAM (3MHz) Mode, Right Band**

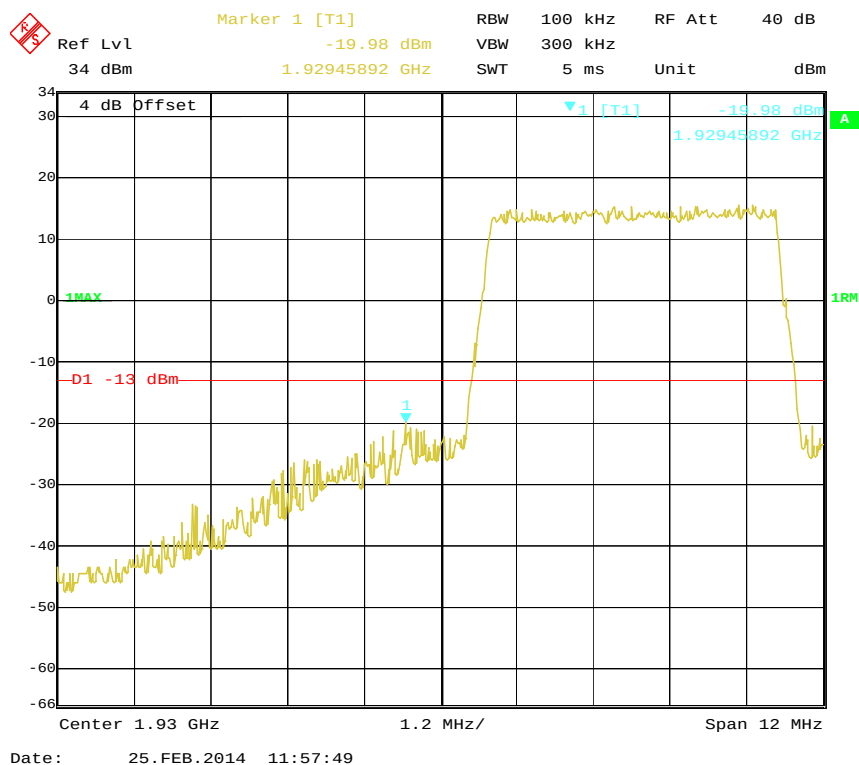
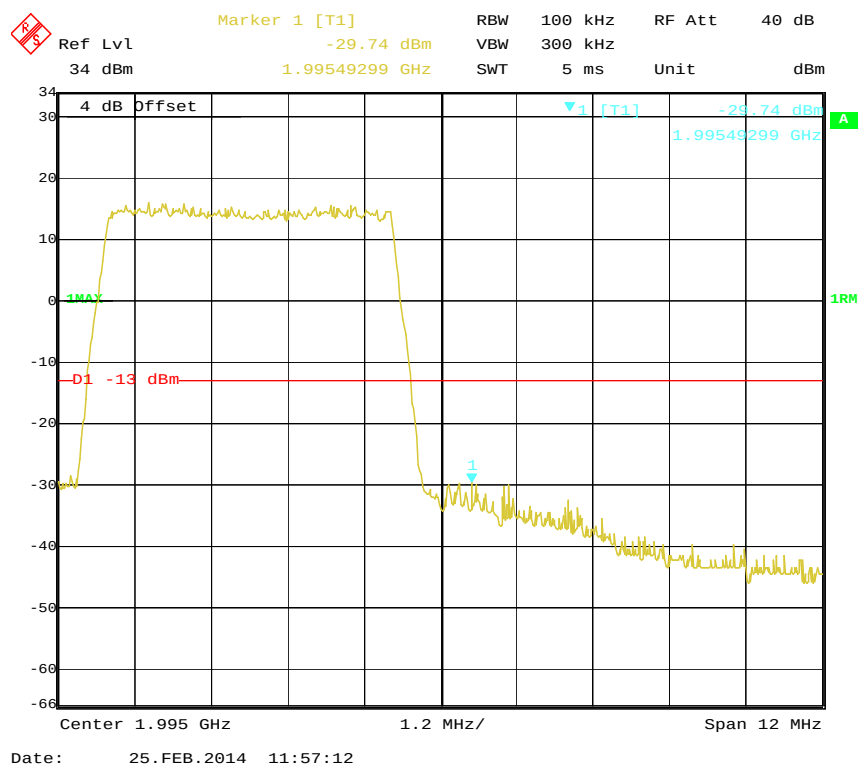
**64QAM (3MHz) Mode, Left Band****64QAM (3MHz) Mode, Right Band**

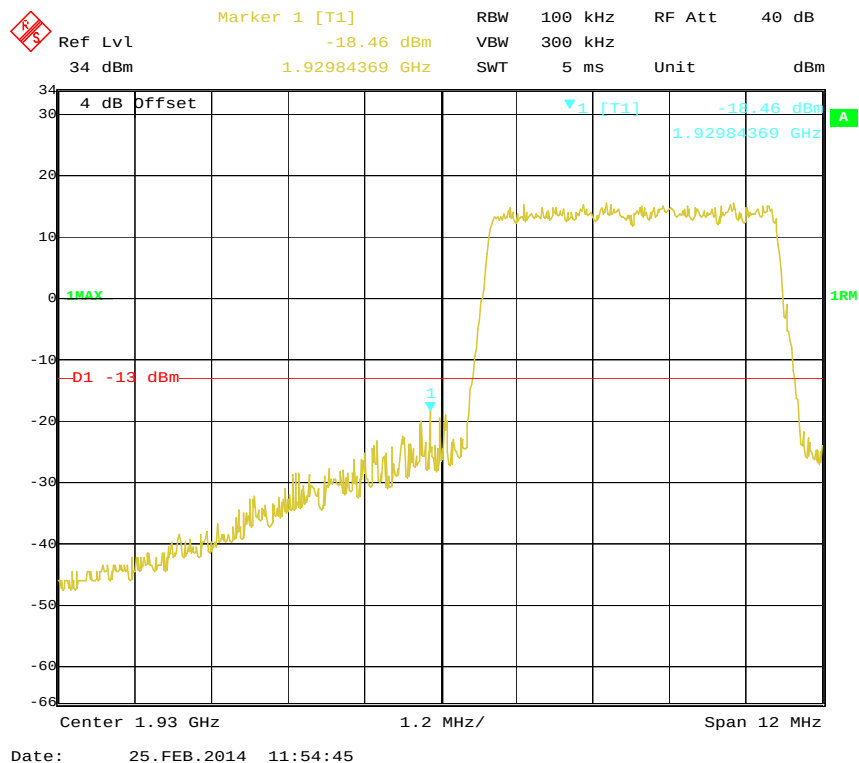
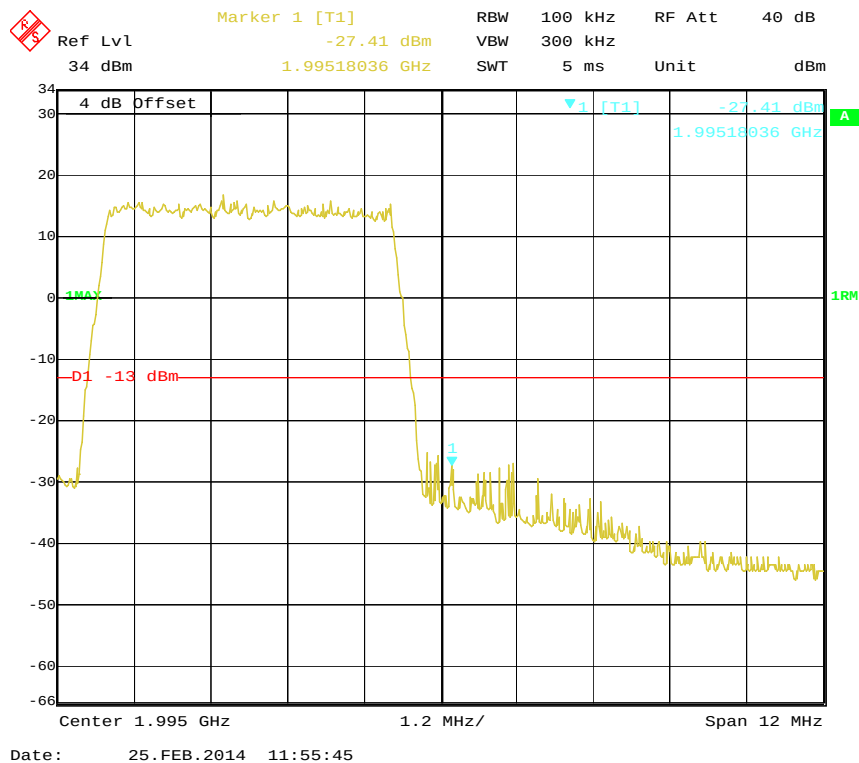
## QPSK (5MHz) Mode, Left Band



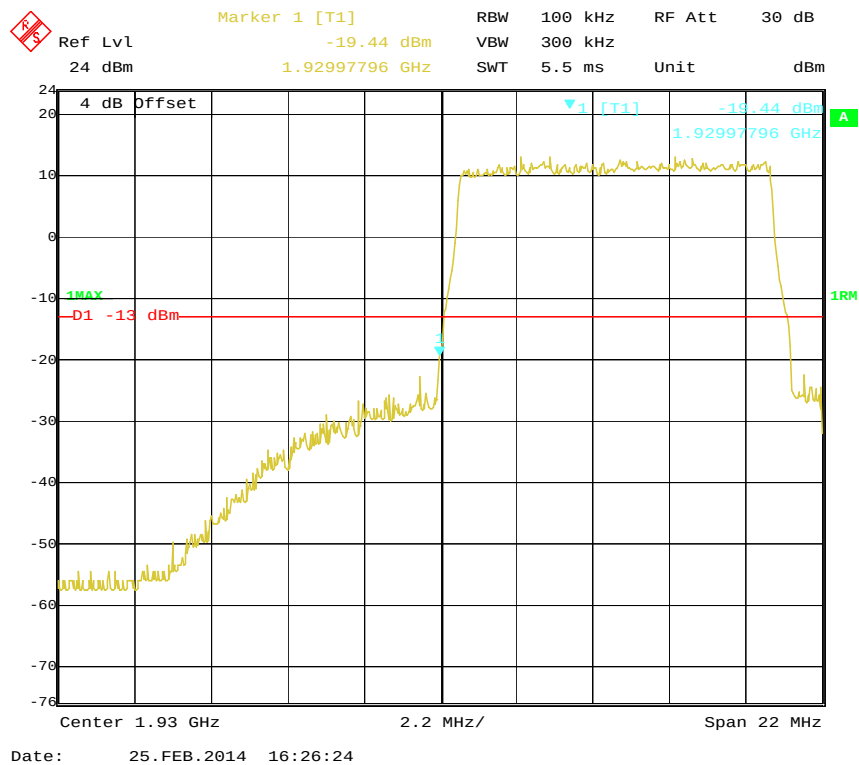
## QPSK (5MHz) Mode, Right Band



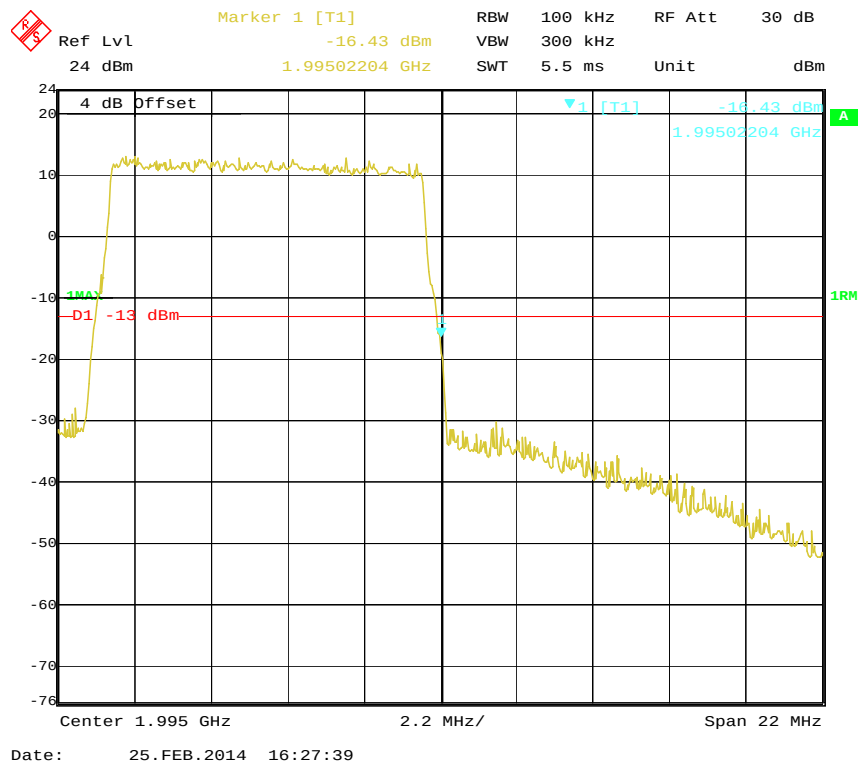
**16QAM (5MHz) Mode, Left Band****16QAM (5MHz) Mode, Right Band**

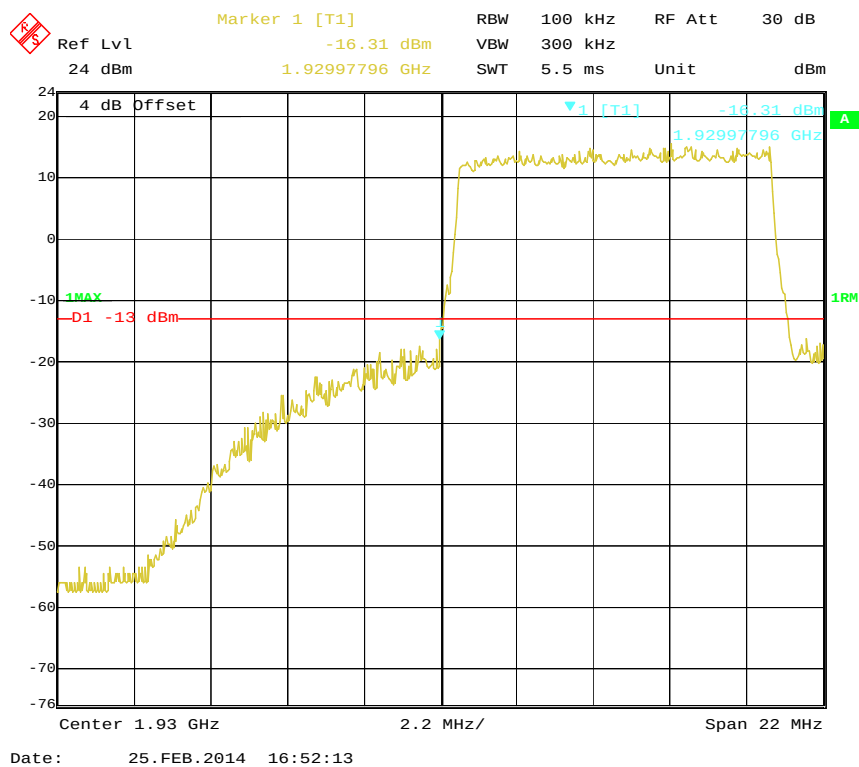
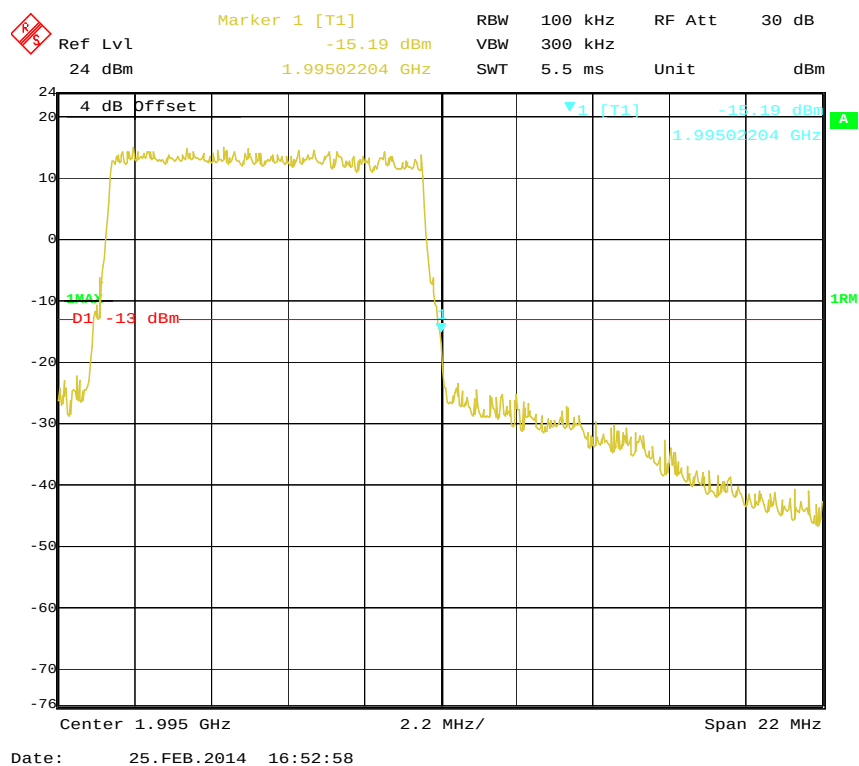
**64QAM (5MHz) Mode, Left Band****64QAM (5MHz) Mode, Right Band**

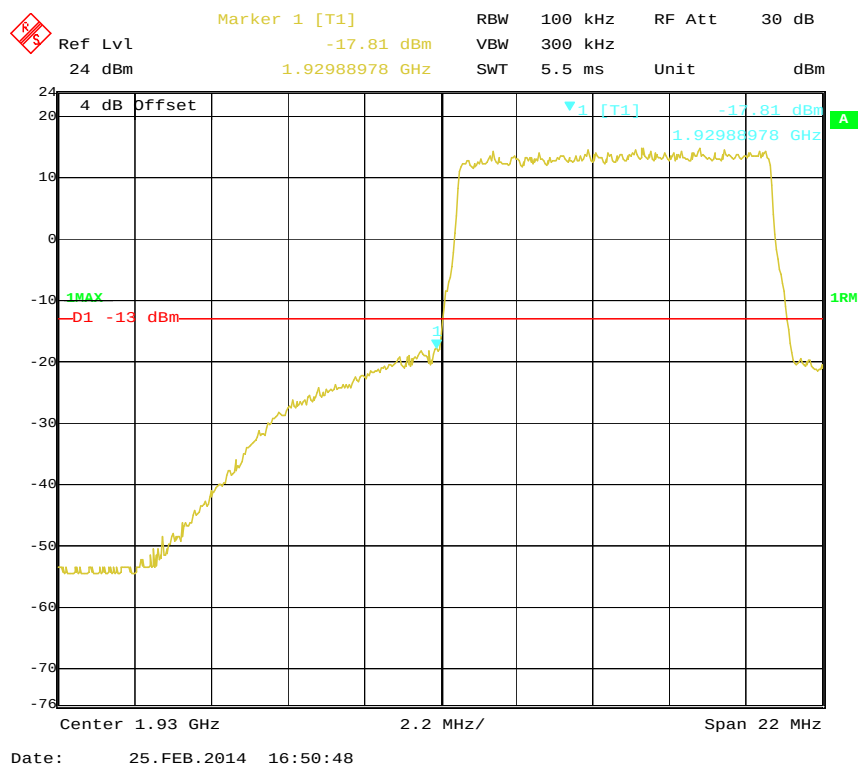
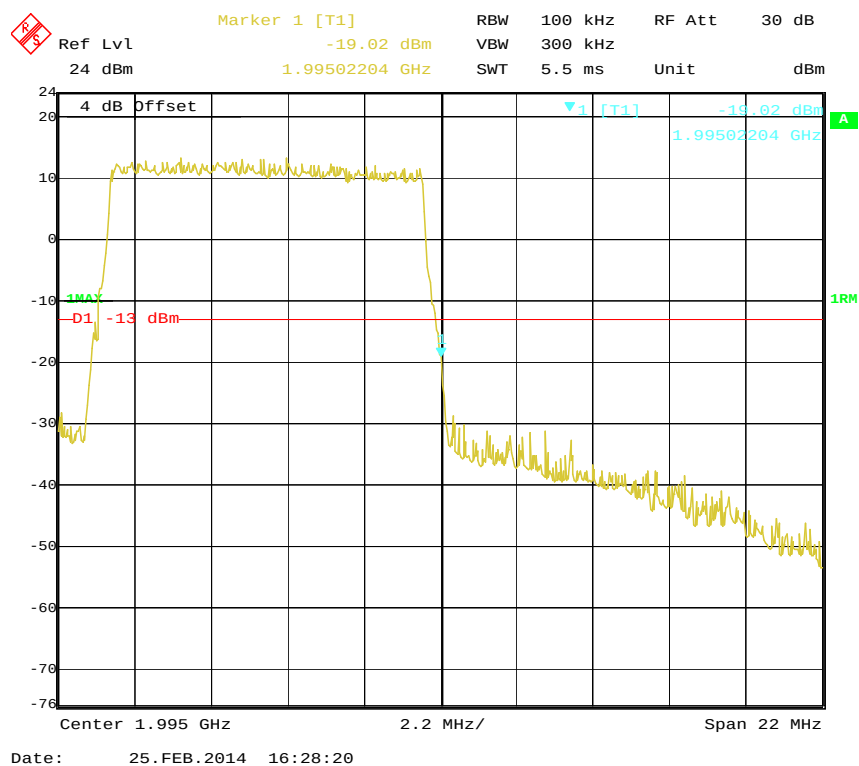
## QPSK (10MHz) Mode, Left Band



## QPSK (10MHz) Mode, Right Band



**16QAM (10MHz) Mode, Left Band****16QAM (10MHz) Mode, Right Band**

**64QAM (10MHz) Mode, Left Band****64QAM (10MHz) Mode, Right Band**

## FCC §2.1055 & §24.235 & §90.213 - FREQUENCY STABILITY

### Applicable Standard

FCC § 2.1055, §24.235, and §90.213

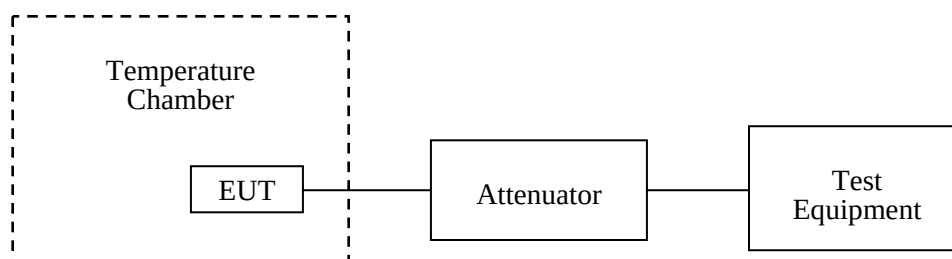
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### Test Procedure

Frequency Stability vs. Temperature: The equipment is varied from -30°C to + 50°C using an environmental chamber

Frequency Stability vs. Voltage: the primary supply voltage is varied from battery end point to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification – the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.



### Test Equipment List and Details

| Manufacturer | Description                    | Model   | Serial Number | Calibration Date | Calibration Due Date |
|--------------|--------------------------------|---------|---------------|------------------|----------------------|
| ESPEC        | Temperature & Humidity Chamber | EL-10KA | 09107726      | 2013-11-01       | 2014-11-01           |
| Agilent      | ESG Vector Signal Generator    | E4438C  | US41461205    | 2013-11-12       | 2014-11-12           |
| ESPEC        | Temperature & Humidity Chamber | EL-10KA | 09107726      | 2013-11-01       | 2014-11-01           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 22 °C     |
| <b>Relative Humidity:</b> | 55 %      |
| <b>ATM Pressure:</b>      | 101.0 kPa |

The testing was performed by Rocky Kang on 2014-02-24.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

**1930-1995 MHz**

| Test Condition                    |                  | Reference Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (ppm) | Results |
|-----------------------------------|------------------|---------------------------|--------------------------|-----------------------|---------|
| Power Supplied (V <sub>DC</sub> ) | Temperature (°C) |                           |                          |                       |         |
| Frequency vs. Temperature         |                  |                           |                          |                       |         |
| 54                                | 50               | 1960                      | 1960.000235              | 0.12                  | Pass    |
|                                   | 35               | 1960                      | 1960.000154              | 0.08                  | Pass    |
|                                   | 25               | 1960                      | 1960.000254              | 0.13                  | Pass    |
|                                   | 15               | 1960                      | 1960.000547              | 0.28                  | Pass    |
|                                   | 5                | 1960                      | 1960.000485              | 0.25                  | Pass    |
|                                   | -5               | 1960                      | 1960.000554              | 0.28                  | Pass    |
|                                   | -15              | 1960                      | 1960.000457              | 0.23                  | Pass    |
|                                   | -25              | 1960                      | 1960.000477              | 0.24                  | Pass    |
| Frequency vs. Voltage             |                  |                           |                          |                       |         |
| 51                                | 25               | 1960                      | 1960.000154              | 0.08                  | Pass    |
| 57                                | 25               | 1960                      | 1960.000187              | 0.10                  | Pass    |

**862-869 MHz**

| Test Condition                       |                     | Reference<br>Frequency<br>(MHz) | Measured<br>Frequency<br>(MHz) | Frequency<br>Error<br>(ppm) | Limited<br>(ppm) |
|--------------------------------------|---------------------|---------------------------------|--------------------------------|-----------------------------|------------------|
| Power Supplied<br>(V <sub>DC</sub> ) | Temperature<br>(°C) |                                 |                                |                             |                  |
| Frequency vs. Temperature            |                     |                                 |                                |                             |                  |
| 54                                   | 45                  | 865                             | 865.00029                      | 0.34                        | ±1.5             |
|                                      | 35                  | 865                             | 865.00042                      | 0.49                        | ±1.5             |
|                                      | 25                  | 865                             | 865.00023                      | 0.27                        | ±1.5             |
|                                      | 15                  | 865                             | 865.00073                      | 0.84                        | ±1.5             |
|                                      | 5                   | 865                             | 865.00035                      | 0.40                        | ±1.5             |
|                                      | -5                  | 865                             | 865.00027                      | 0.31                        | ±1.5             |
|                                      | -15                 | 865                             | 865.00046                      | 0.53                        | ±1.5             |
|                                      | -25                 | 865                             | 865.00019                      | 0.22                        | ±1.5             |
| Frequency vs. Voltage                |                     |                                 |                                |                             |                  |
| 51                                   | 25                  | 865                             | 865.00064                      | 0.74                        | ±1.5             |
| 57                                   | 25                  | 865                             | 865.00034                      | 0.39                        | ±1.5             |

## FCC §20.21 - OUT OF BAND REJECTION

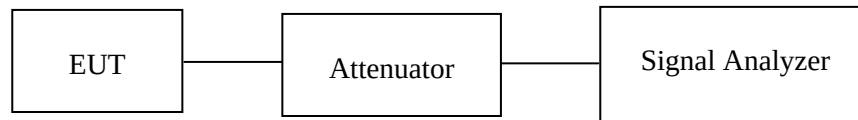
### Applicable Standard

FCC § 20.21

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



### Test Equipment List and Details

| Manufacturer    | Description                 | Model  | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-----------------------------|--------|---------------|------------------|----------------------|
| Rohde & Schwarz | Signal Analyzer             | FSIQ26 | 8386001028    | 2013-11-12       | 2014-11-12           |
| Agilent         | ESG Vector Signal Generator | E4438C | US41461205    | 2013-11-12       | 2014-11-12           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

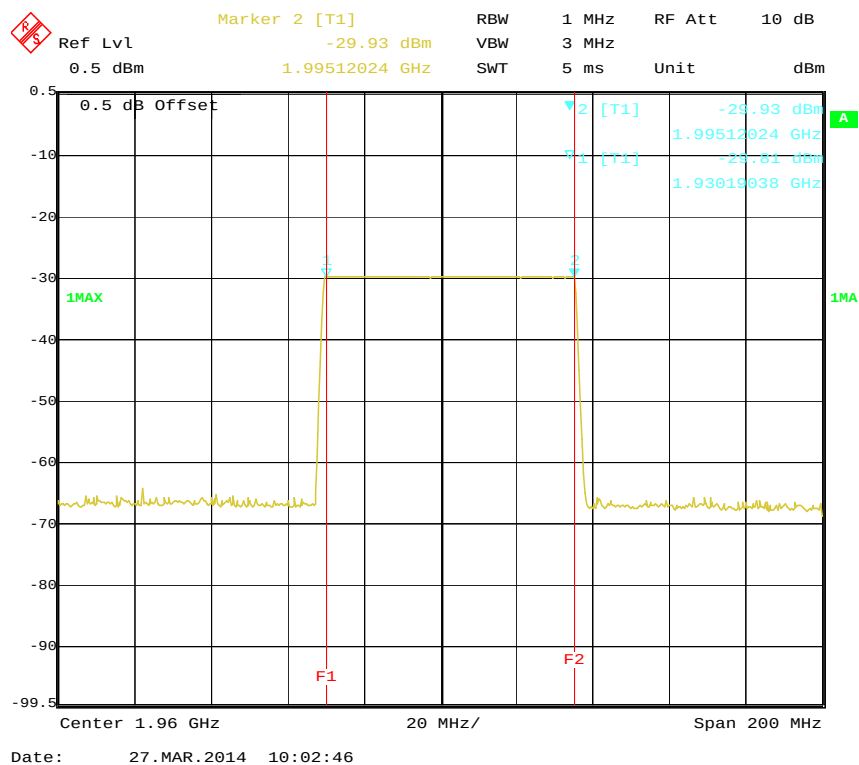
|                    |            |
|--------------------|------------|
| Temperature:       | 20 ~ 25 °C |
| Relative Humidity: | 50~ 56 %   |
| ATM Pressure:      | 101.0 kPa  |

The testing was performed by Rocky Kang from 2014-03-14 to 2014-03-27.

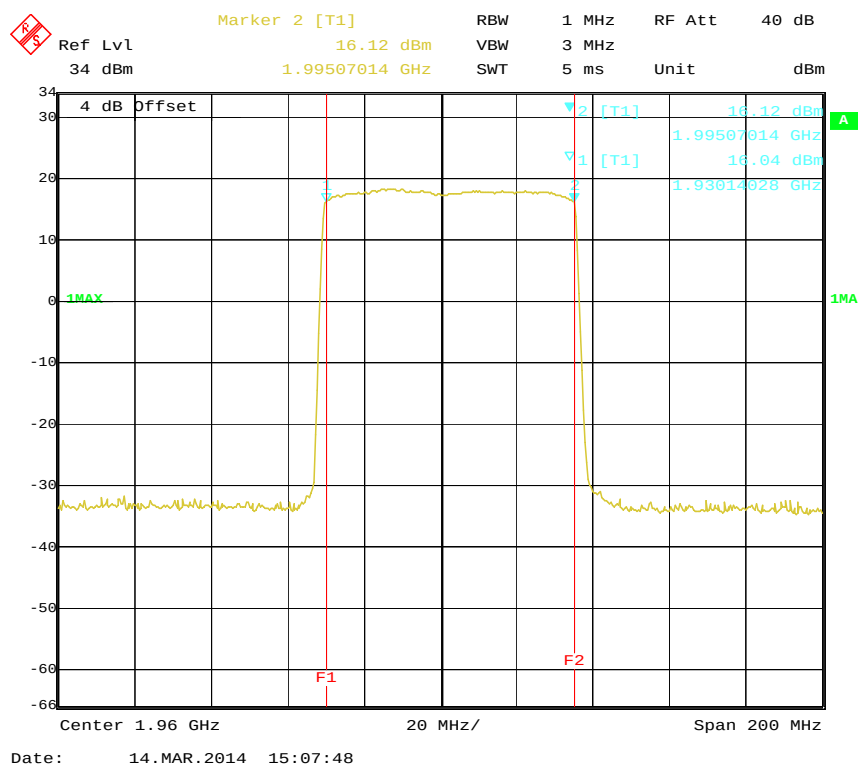
EUT operation mode: Transmitting

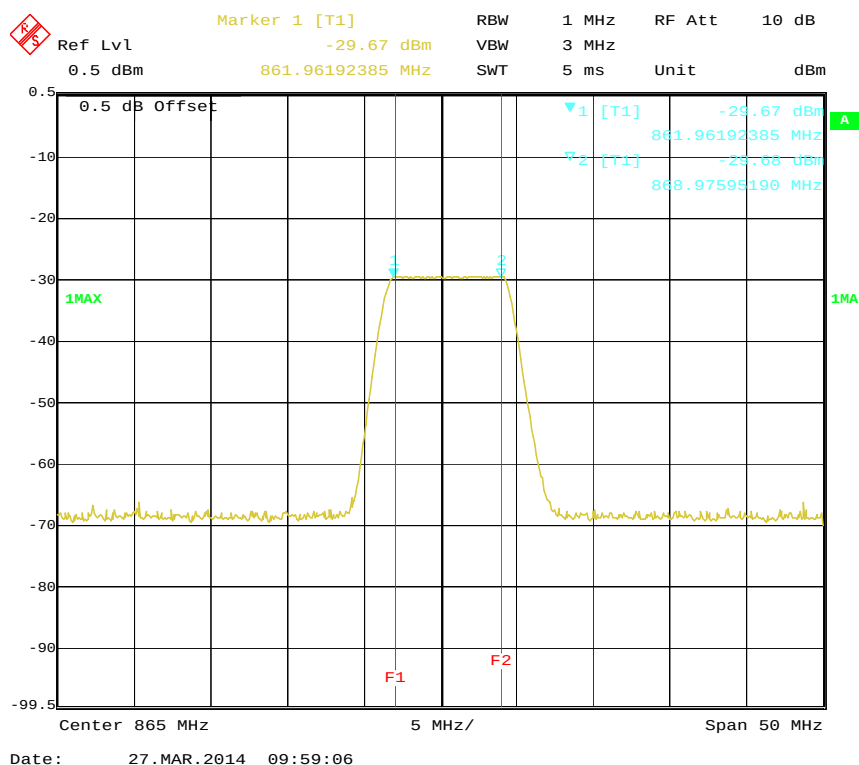
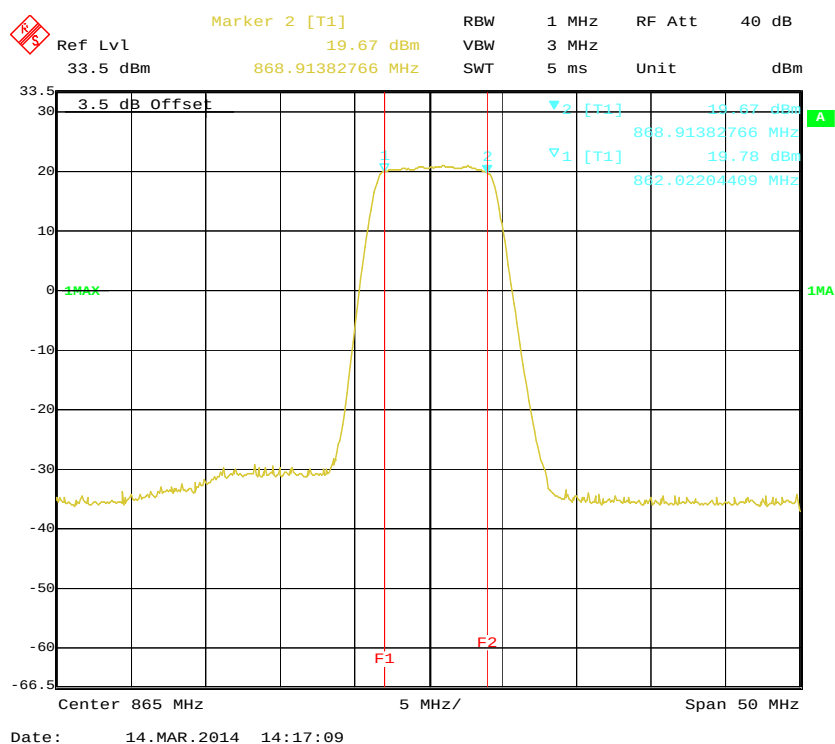
Test Result: Compliance. Please refer to the following plots.

## 1930-1995 MHz, Input



## 1930-1995 MHz, Output



**862-869 MHz, Input****862-869 MHz, Output****\*\*\*\*\* END OF REPORT \*\*\*\*\***