



# Test Report Summary

## FCC CFR 47, Part 90

### Private Land Mobile Radio Service

**Manufacturer:** ADC Telecommunications

**Name of Equipment:** FlexWave™ URH – SMR

**Model Number(s):** FWU-D20000002110RU

**Manufacturer's Address:** P.O. Box 1101  
Minneapolis, MN 55440-1101

**Test Report Number:** MN071213

**Test Date(s):** 30 November, 2007 (ETL)  
11 December, 2007 (ADC)

According to testing performed at Intertek, the above-mentioned unit is in accordance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 90.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

All testing was done in accordance with the Federal Communications Commission's CFR 47 Part 90 and the EUT fulfills the requirements of the Federal Communications Commission's CFR 47 Part 90.

Date: 13 December, 2007

Location: Intertek Testing Services (ETL)  
7250 Hudson Blvd., Suite 100  
Oakdale, MN 55128  
Phone: (651) 730-1188  
Fax: (651) 730-1282

ADC Telecommunications  
5341 12<sup>th</sup> Ave E  
Shakopee, MN 55379  
Phone: (952) 403-8340  
Fax: (952) 403-8858

Testing Conducted by (ADC):  
And Report Written by:

  
Mark F. Miska  
Mark F. Miska  
Compliance Engineer



## **EMC Emission – T E S T R E P O R T**

**Test Report File Number:** MN071213 **Date of Issue:** 13 December, 2007

**Model Number(s):** FWU-D20000002110RU

**Product Name:** FlexWave™ URH – SMR

**Product Type:** Repeater

**Applicant:** ADC Telecommunications

**Manufacturer:** ADC Telecommunications

**License Holder:** ADC Telecommunications

**Address:** P.O. Box 1101  
Minneapolis, MN 55440-1101

**Test Result:**  **Positive**  Negative

**Test Project Number:** 3136762MIN-001  
**Reference(s)**

**Total pages including Appendices:** 105



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## 1.0 REVISION DESCRIPTION

| Rev | Total Pages | Date              | Description      |
|-----|-------------|-------------------|------------------|
| A   | 105         | 13 December, 2007 | Original Release |
|     |             |                   |                  |
|     |             |                   |                  |
|     |             |                   |                  |
|     |             |                   |                  |
|     |             |                   |                  |

## 2.0 DOCUMENTATION

### 2.1 Test Regulations

- 90.213 Frequency stability
- 90.635 Limitations on power and antenna height
- 90.669 Emission limits

**The emissions tests were performed according to the following regulations:**

- FCC Part 22
- FCC Part 24
- FCC Part 90**
- IC RSS-131 Issue 2

#### **Environmental Conditions in the lab:**

##### **ADC**

Temperature: 24° C  
Relative Humidity: 21%  
Atmospheric Pressure: 98.8 kPa

##### **ETL**

15-35° C  
30-60%  
86-106 kPa

#### **Power Supply Utilized:**

Power Supply System : 1 phase, 60 Hz, 120 VAC

## 2.2 Test Operation Mode

- Standby
- Test Program
- Practice Operation

### ■ Max composite in and out

## 2.3 Configuration of the device under test:

Normal Operation – SMR - 863 to 869 MHz and 935 to 940 MHz

## 2.4 Product Options:

None

## 2.5 EUT Specifications and Requirements:

Length: 16.0"  
Width: 17.0"  
Height: 29.0"  
Weight: 190 pounds

## 2.6 Cables:

| Cable Type | Length | From            | To          |
|------------|--------|-----------------|-------------|
| RF         | > 3M   | Ancillary Equip | EUT         |
| RF         | < 3M   | EUT             | 50 Ohm Load |
| Power      | < 3M   | Power           | Input Power |
| Fiber      | > 3M   | Ancillary Equip | EUT         |

## 2.7 Power Requirements:

Voltage: 120 VAC  
Amps: 5.8 A

## 2.8 Typical Installation and/or Operating Environment:

Outdoor/Indoor. System is typically employed as an outdoor repeater.

## 2.9 Other Special Requirements:

None

## 2.10 EUT Software:

Revision Level: Version V.6 or greater  
Description: Internet Explorer

### 2.11 EUT System Components

| Description | Model #            | Serial # | FCC ID # |
|-------------|--------------------|----------|----------|
| URH         | FWU-D20000002110RU | URH      |          |
|             |                    |          |          |
|             |                    |          |          |

### 2.12 Support Equipment

| Description      | Manufacturer | Model #  | FCC ID # |
|------------------|--------------|----------|----------|
| Power Meter      | HP           | EPM-441A |          |
| Signal Generator | Agilent      | E4438C   |          |
| Attenuator       | Aeroflex     | 86-30-12 |          |
|                  |              |          |          |

### 2.13 Deviations from standard:

Modifications required to pass:

- As indicated on the data sheet(s)

- **None**

Test Specification Deviations; Additions to or Exclusions from:

- As indicated in the Test Plan

- **None**

### 2.14 General Remarks:

None.

### 2.15 Summary:

The requirements according to the technical regulations are

- **met**

- not Met

The equipment under test does

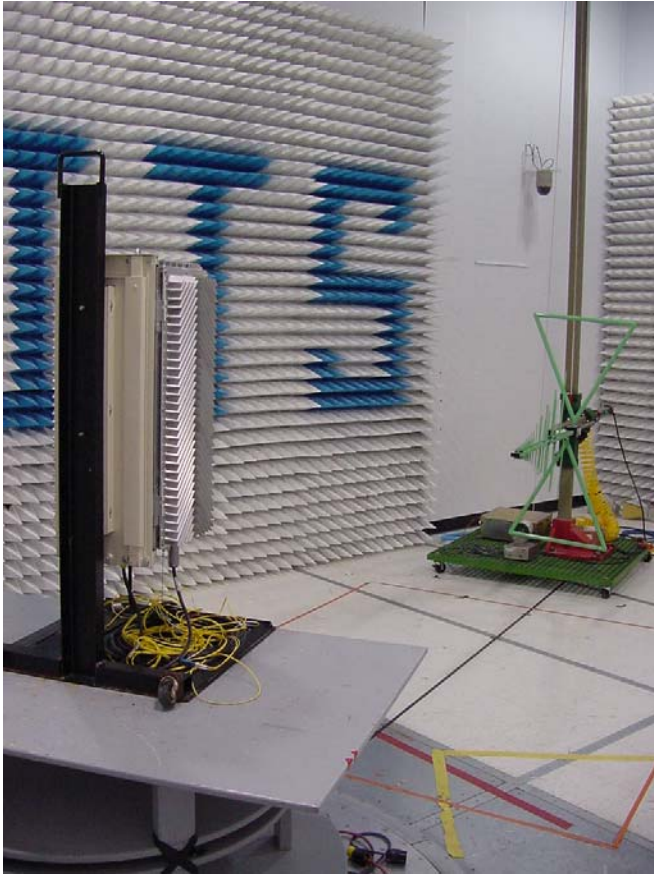
- **fulfill the general approval requirements mentioned on page 4.**

- not fulfill the general approval requirements mentioned on page 4.

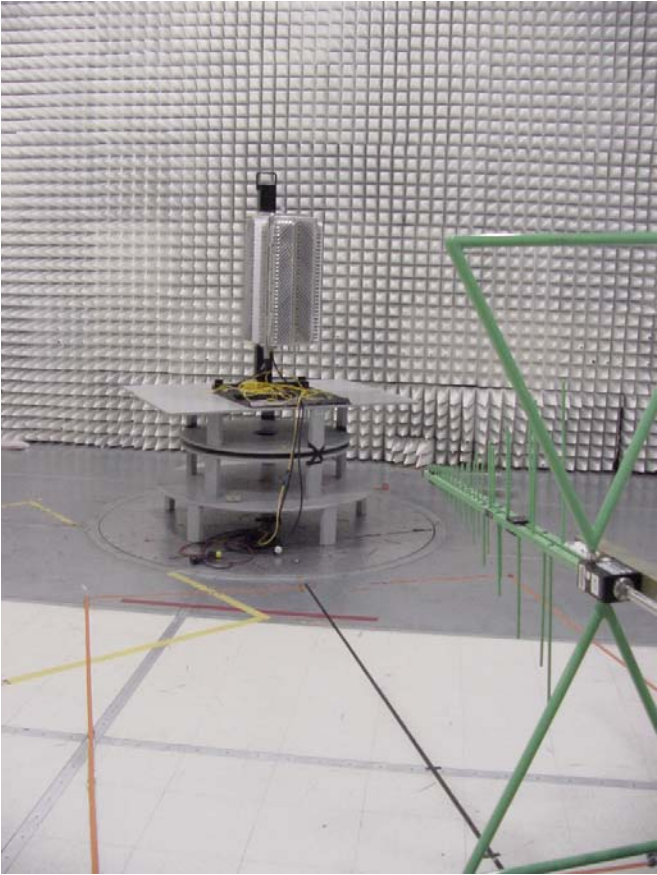
### 3.0 TEST SET-UP DRAWINGS AND PHOTOS

[Back to Table of Contents:](#)

#### 3.1 Test set-up photo, radiated emissions



**3.2 Test set-up photo, radiated emissions**





### 3.3 Test Set-up Drawings

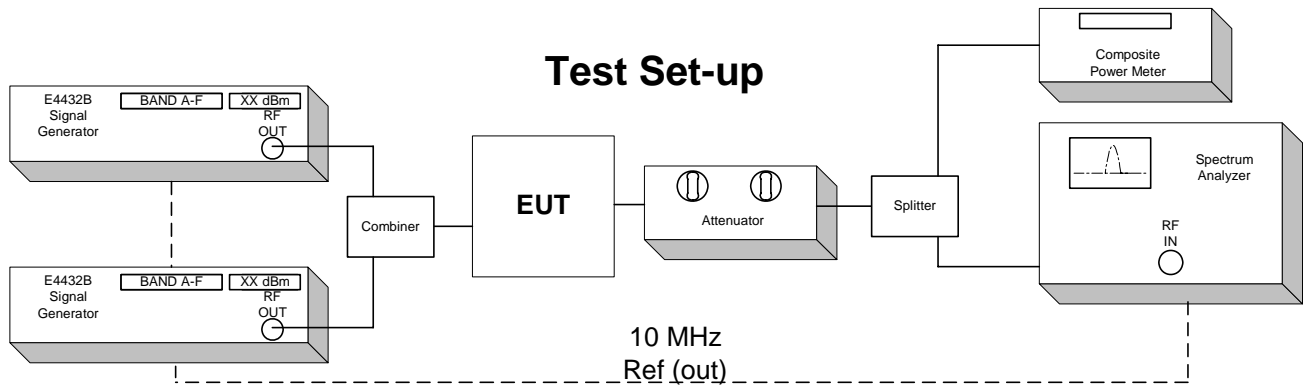
## Conducted and Radiated Emission Limits Test for ADC Inc

### Conducted Output Power Test for ADC Inc

### Inter-Modulation Test for ADC Inc

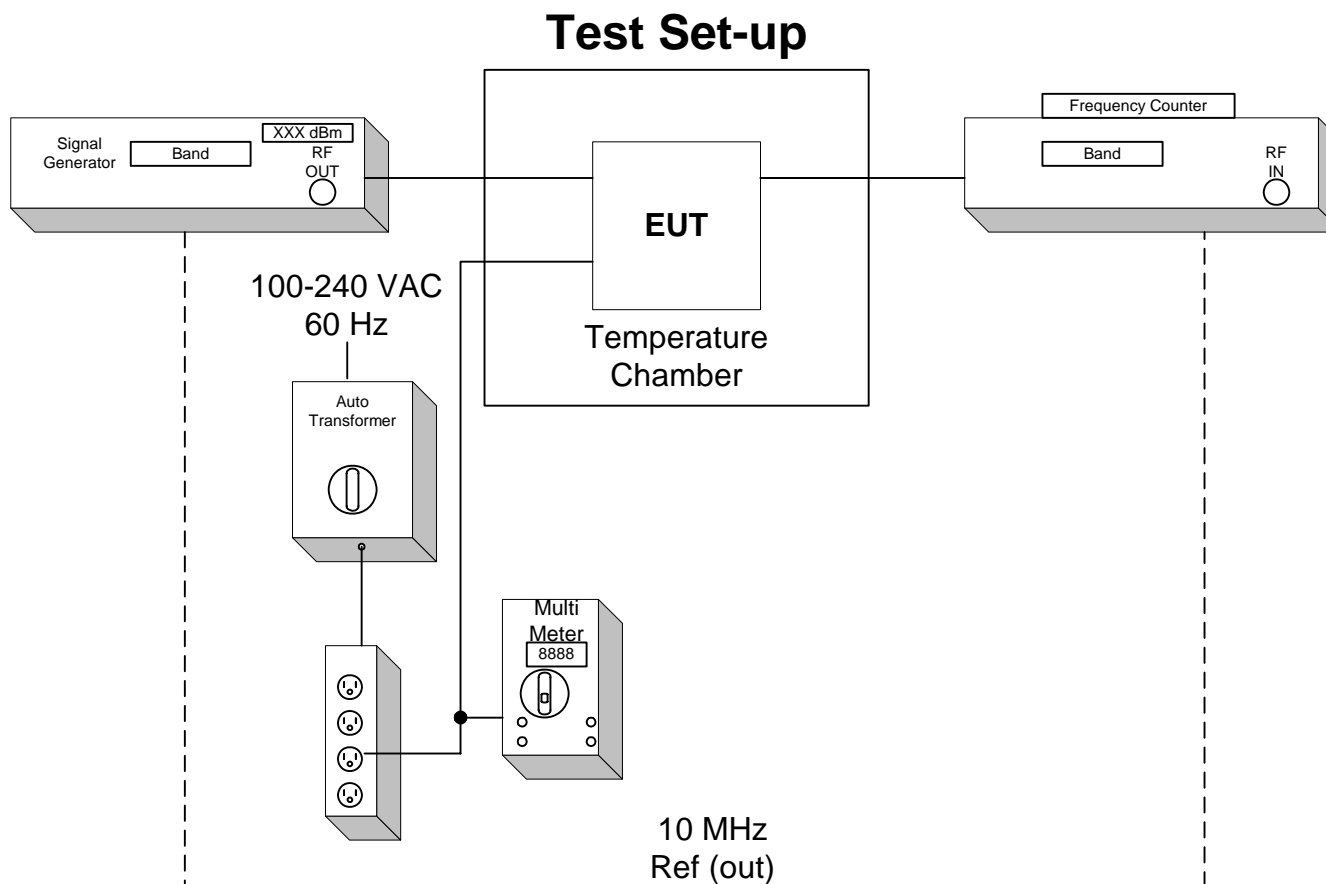
### Occupied Bandwidth Modulation Test for ADC Inc

## FlexWave™ URH – SMR Model Number FWU-D20000002110RU



# Frequency Tolerance Test for ADC Inc FlexWave™ URH – SMR Model Number FWU-D20000002110RU

EUT is specified for outdoor use with temperature range of  $-30^{\circ}$  to  $+50^{\circ}$  C, and was tested with its range.



## 4.0 TEST RESULTS

### 4.1.1 90.635 Limitations on power and antenna height

#### Test Summary:

- The requirements are:  **MET**  NOT MET
- Minimum margin of compliance is 15.47 dB at 935.2 MHz (FM)

#### Test Location:

- ETL (Oakdale, MN)
- ADC facility (Shakopee, MN)**

#### Test Distance:

- 3 Meters
- 10 Meters
- Conducted measurement**

#### Test Equipment (ADC):

1, 2, 6, 7, 13

#### Test Limit:

500 Watts or 57 dBm Limit

#### Test Data:

[See page](#) 41

**Test Engineer:** Mark F. Miska

**Date:** 11 December, 2007

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#### 4.1.2 90.213 Frequency stability

##### Test Summary:

- The requirements are:  **MET**  NOT MET
- The fundamental emission stays within the limit.
- Frequency measured over a temperature range of -30 to 50° C and an input voltage range of 100 to 240 VAC.

##### Test Location:

ETL (Oakdale, MN)

##### ADC facility (Shakopee, MN)

##### Test Equipment (ADC):

3, 4, 5, 6, 9, 13

##### Test Limit:

MINIMUM FREQUENCY STABILITY  
[Parts per million (ppm)]

| Frequency range (MHz)          | Fixed and base stations | Mobile stations           |                              |
|--------------------------------|-------------------------|---------------------------|------------------------------|
|                                |                         | Over 2 watts output power | 2 watts or less output power |
| Below 25 .....                 | <sup>1,2,3</sup> 100    | 100                       | 200                          |
| 25-50 .....                    | 20                      | 20                        | 50                           |
| 72-76 .....                    | 5                       | .....                     | 50                           |
| 150-174 .....                  | <sup>5,11</sup> 5       | <sup>6</sup> 5            | <sup>4,6</sup> 50            |
| 220-222 <sup>12</sup> .....    | 0.1                     | 1.5                       | 1.5                          |
| 421-512 .....                  | <sup>7,11,14</sup> 2.5  | <sup>8</sup> 5            | <sup>8</sup> 5               |
| 806-821 .....                  | <sup>14</sup> 1.5       | 2.5                       | 2.5                          |
| 821-824 .....                  | <sup>14</sup> 1.0       | 1.5                       | 1.5                          |
| 851-866 .....                  | 1.5                     | 2.5                       | 2.5                          |
| 866-869 .....                  | 1.0                     | 1.5                       | 1.5                          |
| 896-901 .....                  | <sup>14</sup> 0.1       | 1.5                       | 1.5                          |
| 902-928 .....                  | 2.5                     | 2.5                       | 2.5                          |
| 902-928 <sup>13</sup> .....    | 2.5                     | 2.5                       | 2.5                          |
| 929-930 .....                  | 1.5                     | .....                     | .....                        |
| 935-940 .....                  | 0.1                     | 1.5                       | 1.5                          |
| 1427-1435 .....                | <sup>9</sup> 300        | 300                       | 300                          |
| Above 2450 <sup>10</sup> ..... | .....                   | .....                     | .....                        |

##### Test Data:

[See pages 86-87](#)

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**Test Engineer:** Mark F. Miska

**Date:** 11 December, 2007

#### 4.1.3 90.669 Emission limits

##### **Test Summary:**

- The requirements are:                     **MET**                     NOT MET
- Out of band emissions were less than  $-13$  dBm.
- Outside the emission bandwidth of the carrier, all emissions are attenuated at least 26 dB below the transmitter power.

##### **Test Location:**

ETL (Oakdale, MN)

##### **ADC facility (Shakopee, MN)**

##### **Test Equipment (ADC):**

1, 2, 6, 7, 13

##### **Test Limit:**

Out of band emissions:

Attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB, or  $-13$  dBm.

Outside of the carrier emissions bandwidth:

26 dB below the transmitter power

##### **Test Data:**

[Conducted Emissions](#), pages 16 – 40

[Intermodulation Test](#), pages 42 – 78

[Occupied Bandwidth](#), pages 79 – 85

Radiated Emissions, pages 88 – 103 ([Appendix B](#))

**Test Engineer:** Mark F. Miska

**Date:** 11 December, 2007

**Date:** 11 December, 2007

**Date:** 11 December, 2007

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## 5.0 TEST EQUIPMENT

| Number | Description               | Manufacturer      | Model         | ADC Serial Number | Cal Due  | Used                                |
|--------|---------------------------|-------------------|---------------|-------------------|----------|-------------------------------------|
| 1      | Spectrum Analyzer         | HP                | 8563E         | MC27690           | 1-22-08  | <input checked="" type="checkbox"/> |
| 2      | Power Meter               | HP                | EPM-441A      | MC27670           | 10-9-08  | <input checked="" type="checkbox"/> |
| 3      | Multimeter                | Fluke             | 87            | MC17932           | 8-1-08   | <input checked="" type="checkbox"/> |
| 4      | Frequency Counter         | HP                | 5347A         | MC27548           | 1-18-08  | <input checked="" type="checkbox"/> |
| 5      | Temperature Chamber       | Thermotron        | SM-32C        | MC18966           | 4-9-08   | <input checked="" type="checkbox"/> |
| 6      | Signal Generator          | Agilent           | E4437B        | 967974            | 1-6-08   | <input checked="" type="checkbox"/> |
| 7      | Signal Generator          | Agilent           | E4438C        | 1013210           | 2-9-09   | <input checked="" type="checkbox"/> |
| 8      | Attenuator                | Huber Suhner      | 6810.17.A     | N/A               | CNR      | <input type="checkbox"/>            |
| 9      | Variable Auto Transformer | Staco             | 1520CT        | MC44655           | CNR      | <input checked="" type="checkbox"/> |
| 10     | Digital Barometer         | Fisher Scientific | 02-403        | MC50719           | 10-28-09 | <input checked="" type="checkbox"/> |
| 11     | Data Acquisition Unit     | Fluke             | Hydra         | MC27549           | 10-8-08  | <input type="checkbox"/>            |
| 12     | Attenuator                | Aeroflex          | 49-30-33      | N/A               | CNR      | <input type="checkbox"/>            |
| 13     | Attenuator                | Aeroflex          | 86-30-12      | N/A               | CNR      | <input checked="" type="checkbox"/> |
| 14     | LNA                       | Lucix Corp        | C020200L 1603 | N/A               | CNR      | <input type="checkbox"/>            |
|        |                           |                   |               |                   |          |                                     |

Equipment with a Calibration Not Required (CNR) listing is verified and compensated for with NIST traceable calibrated equipment.

6.0

## APPENDIX A

Test Data

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**Test Engineer:** Mark F. Miska

# Conducted Emission Limits Test for ADC Inc

## FlexWave™ URH - SMR

### Model Number FWU-D20000002110RU

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The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10<sup>th</sup> harmonic of the highest carrier frequency. Test signals used are FM, iDEN, and CDMA. The different signals were input one at a time to the EUT. In all cases, the out of band emissions were less than -13 dBm from the equation  
(19dBm - [43 + 10log(0.08W)])

Band edge compliance is also demonstrated using a FM, iDEN, and CDMA signal at the upper and lower limits of the band.

The Host unit connects directly to the BTS via coax. The Host unit does not connect to an antenna or amplifier, thus it is a Part 15 device and has been tested and is compliant as such. No FCC ID is necessary.

Industry practice has generally set the input signal power level. Test signal used was  $\approx$  -25 dBm input to DHU.  
Industry practice has generally set the output signal power level.

Universal Radio Head (URH):

Range: 100 - 240 VAC

Tested @: 120 VAC

Tested @: 5.8 A

Digital Host Unit (DHU):

Range: 21-60 VDC

Tested @: 48 VDC

Tested @: 4.55 A

Application details for 2.1033(c)(10), and 2.1033(c)(13):

The input to the host unit has a digital attenuation chip (ALC) to provide protection from overdrive with 5-10 millisecond attack time / 100 millisecond decay time and 31 dB of head room, such that single channel operation, or multi-channel operation will not exceed nominal gain of the system.

The frequency stability is derived by the BTS, base transceiver station. This product uses internal frequency stability to keep the signal inside our filter bandwidths. This means that the frequency can change, but the frequency that transmits is still at the original frequency. The remote system uses the data over the fiber optic path to phase/frequency lock to the host. The purpose is to frequency lock the up- and down-conversion local oscillators, and thereby eliminate any end-to-end frequency shift.

The spurious limitation is completed with the duplexer. The ALC also suppresses in-band spurious by preventing PA overdrive, while the duplexer suppresses out-of-band spurious. Internal to the electronics, the use of SAW filters provides for higher Q roll-off at band edges.

This equipment does not modulate the RF, so there is no modulation limiter. This equipment does not change the modulation of the RF or the occupied bandwidth of any channel. It transports the signal, as is, over an optical link. The RF input is not changed in the RF output.

This is a constant gain device, so the setup controls the output. There is an overdrive and overpower limit control that prevents excess power.

Results:

Pass (See plots)



# Conducted Emissions Low SMR 800 MHz

Center: 866.0 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

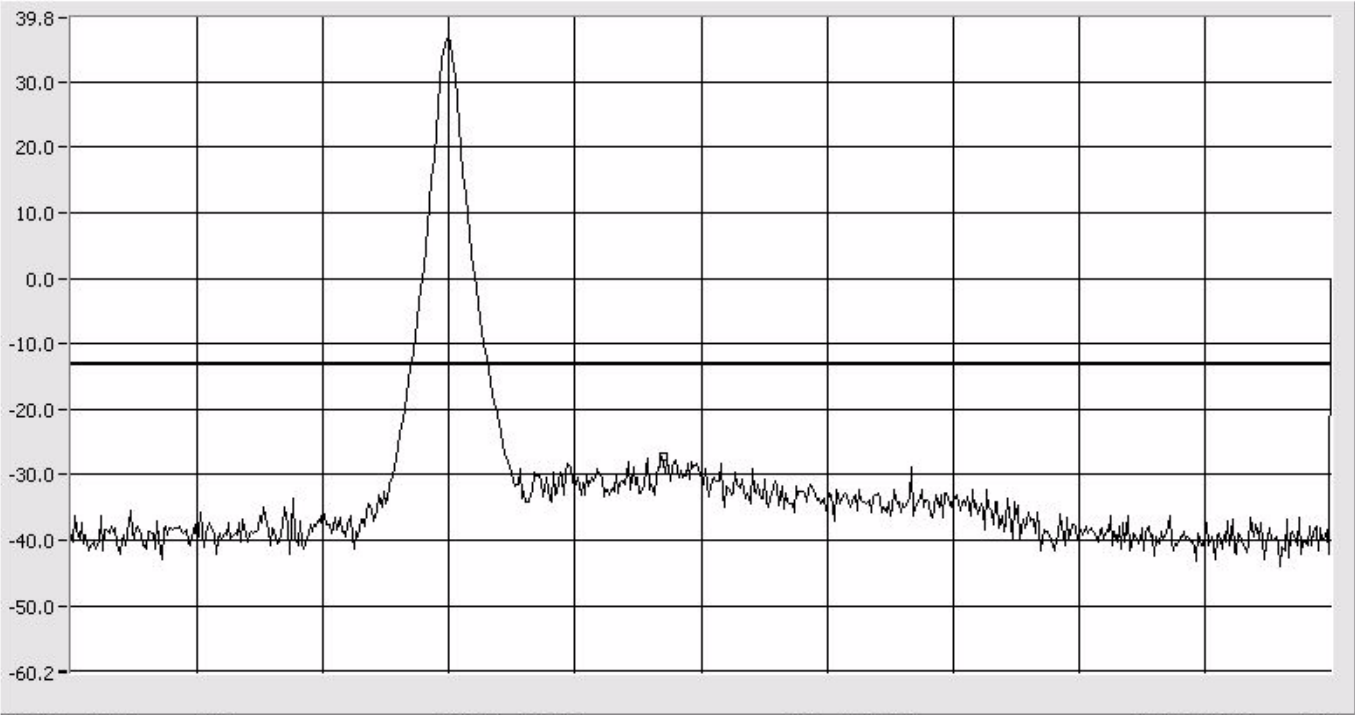
ATTEN 20 dB

delta MKR -27.20 dBm

RL 39.8 dBm

10 dB/Div

865.55 MHz



START 858.50 MHz CENTER 866.00 MHz SPAN 15.00 MHz STOP 873.50 MHz  
RBW 100 kHz VBW 100 kHz SWP 50.0 mS

# Conducted Emissions Low SMR 800 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

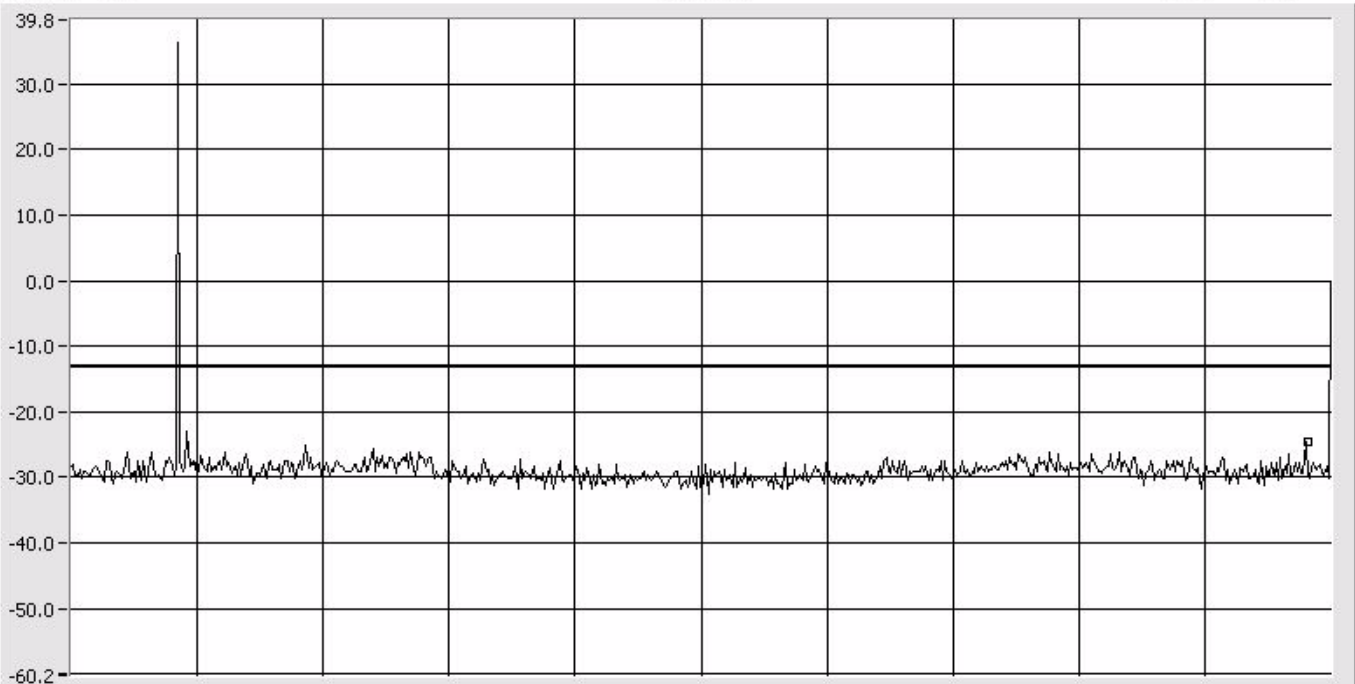
ATTEN 20 dB

delta MKR -24.53 dBm

RL 39.8 dBm

10 dB/Div

9.817 GHz



START 30 MHz CENTER 5.015 GHz SPAN 9.970 GHz STOP 10.000 GHz  
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

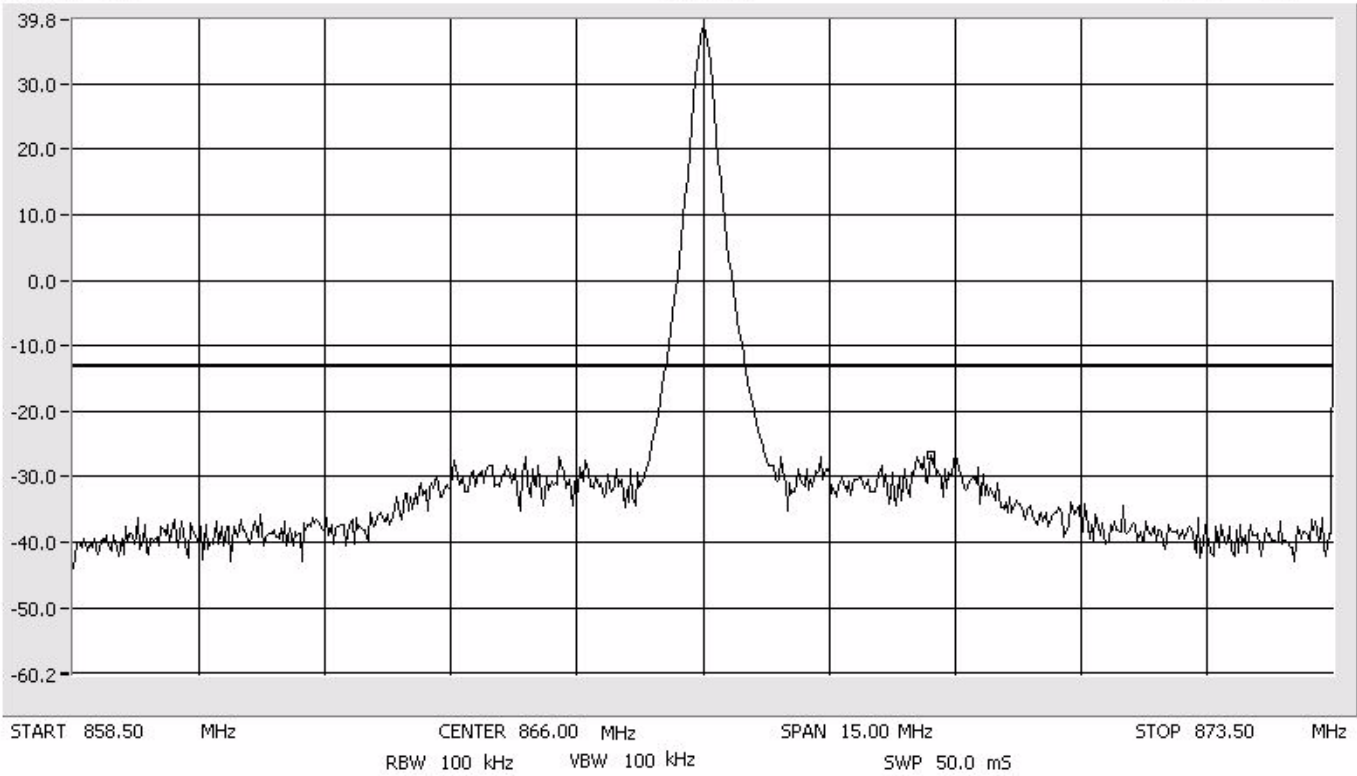
# Conducted Emissions Mid SMR 800 MHz

Center: 866.0 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -26.70 dBm  
868.73 MHz

10 dB/Div



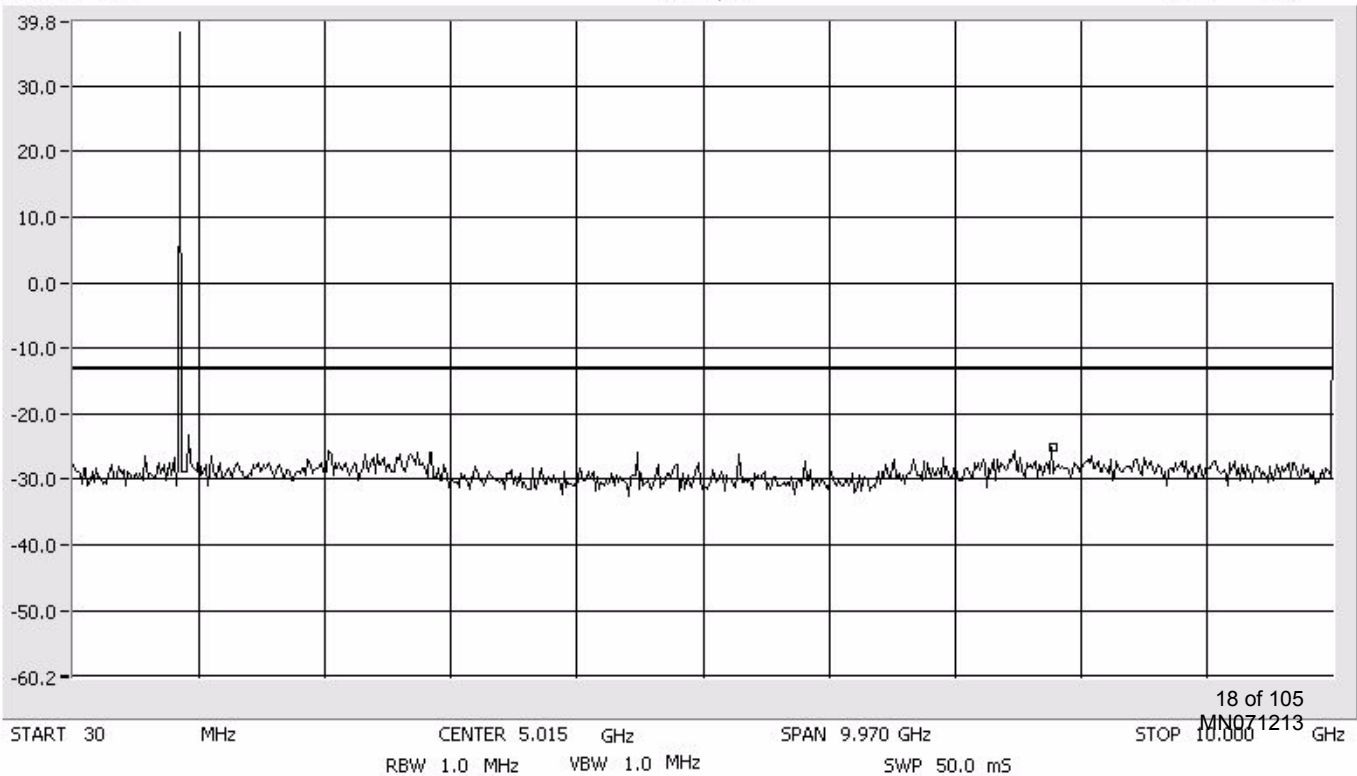
# Conducted Emissions Mid SMR 800 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -25.03 dBm  
7.790 GHz

10 dB/Div



# Conducted Emissions High SMR 800 MHz

Center: 866.0 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

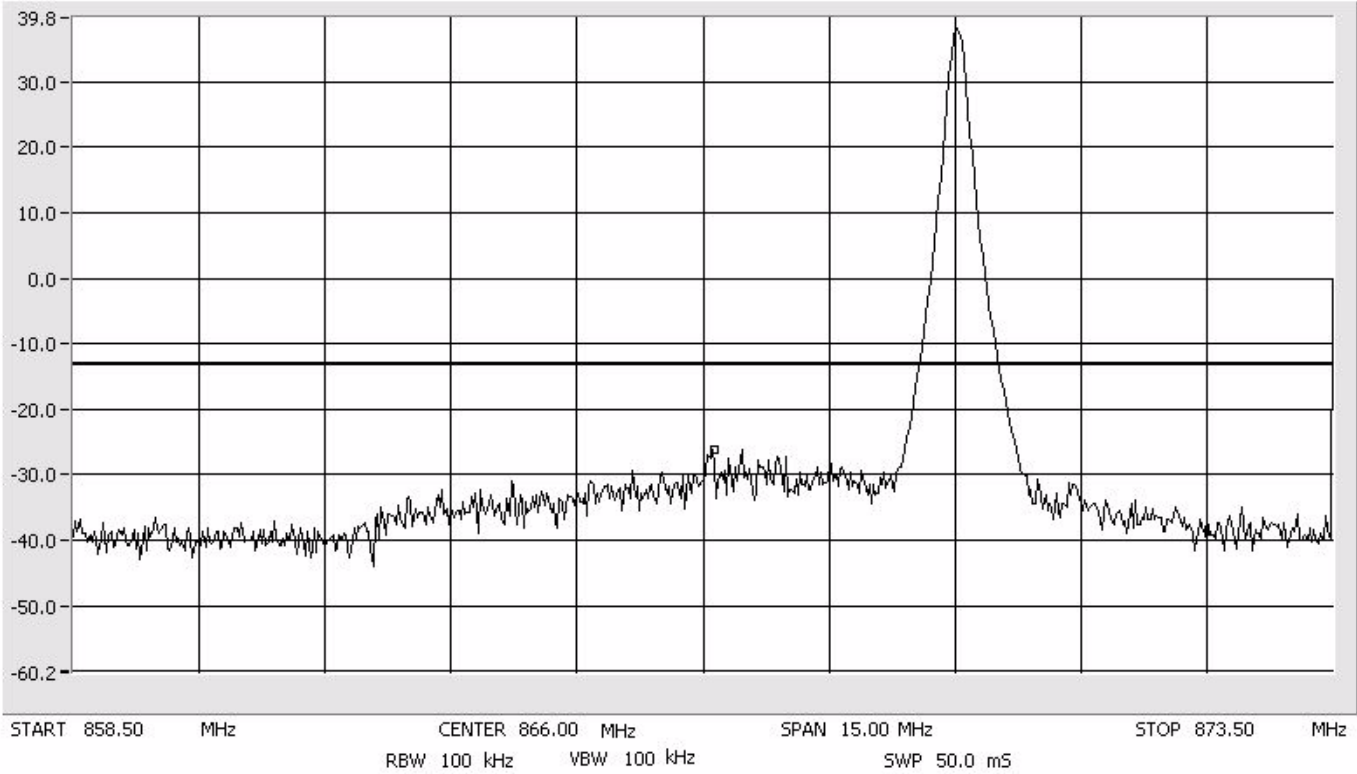
ATTEN 20 dB

delta MKR -26.03 dBm

RL 39.8 dBm

10 dB/Div

866.12 MHz



# Conducted Emissions High SMR 800 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

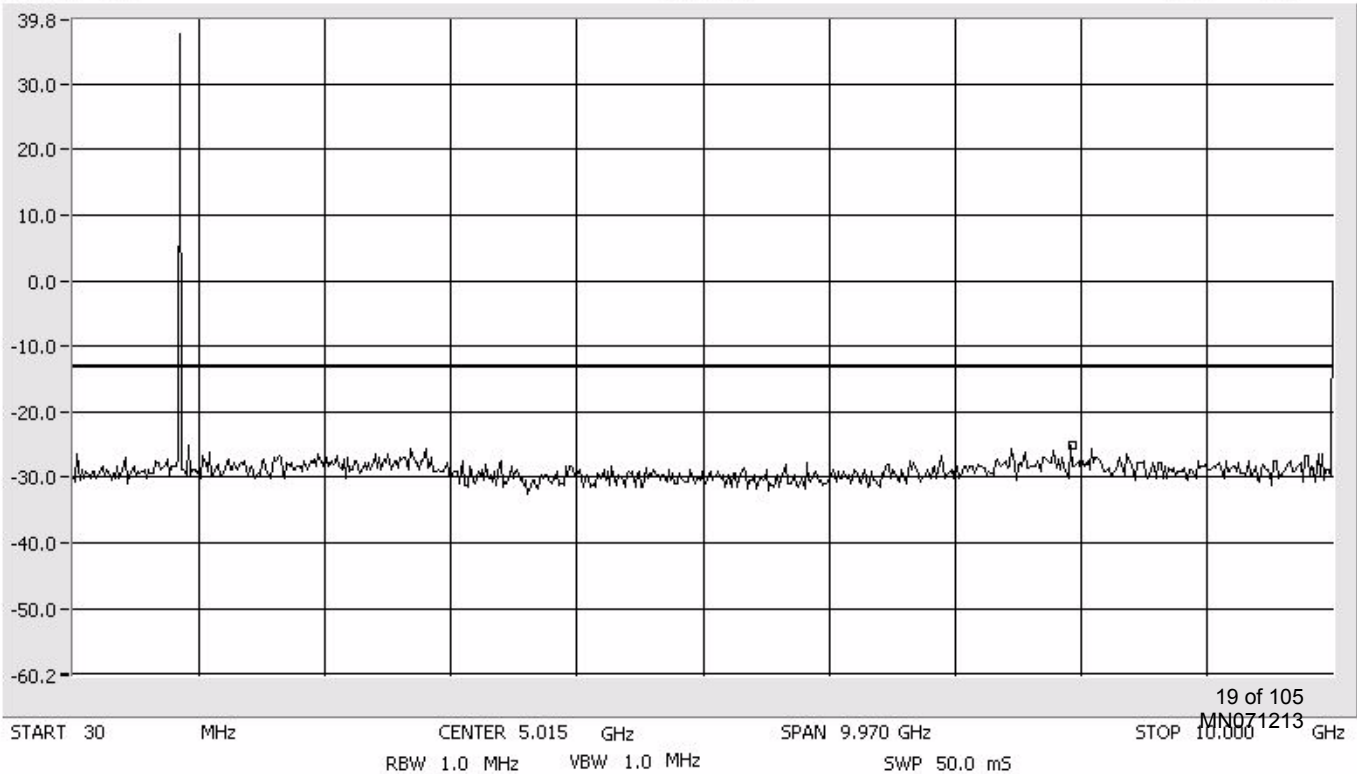
ATTEN 20 dB

delta MKR -25.20 dBm

RL 39.8 dBm

10 dB/Div

7.940 GHz



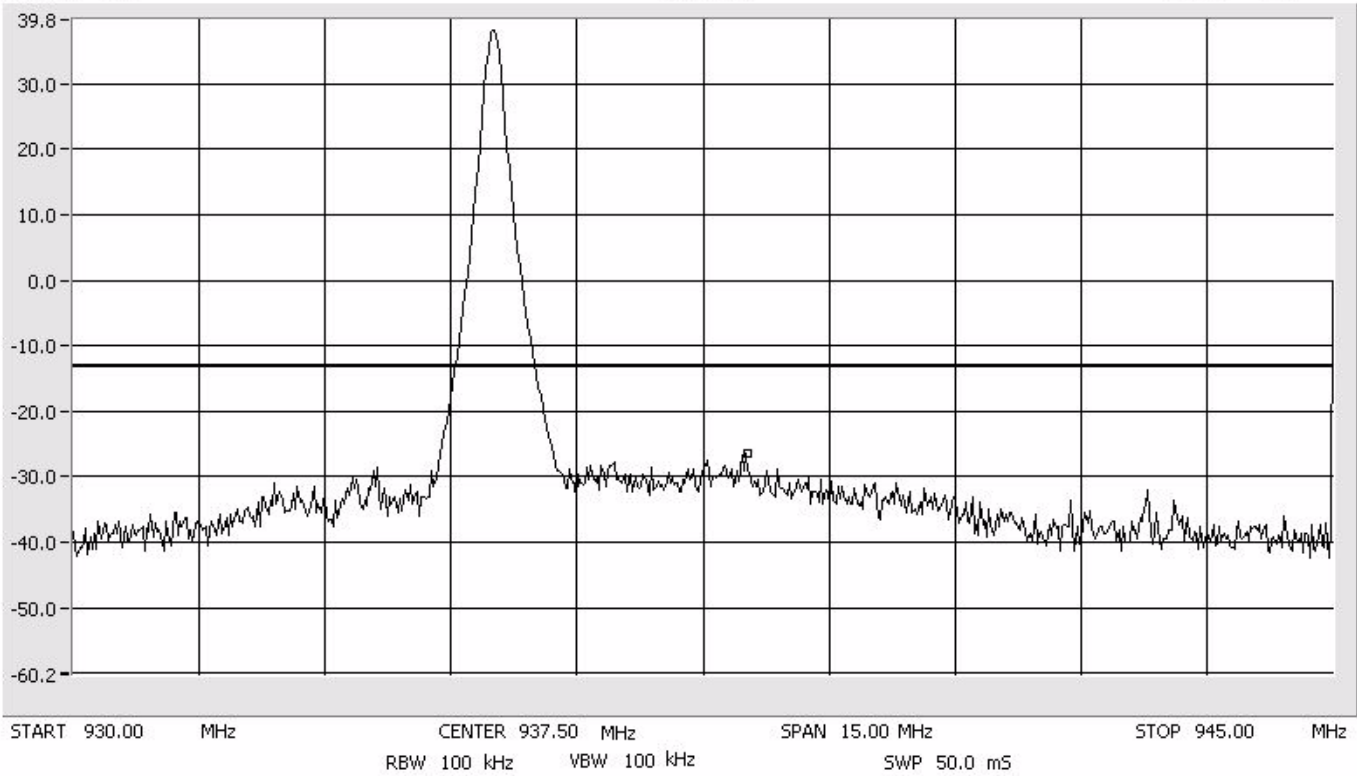
# Conducted Emissions Low SMR 900 MHz

Center: 937.5 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -26.37 dBm  
938.02 MHz

10 dB/Div



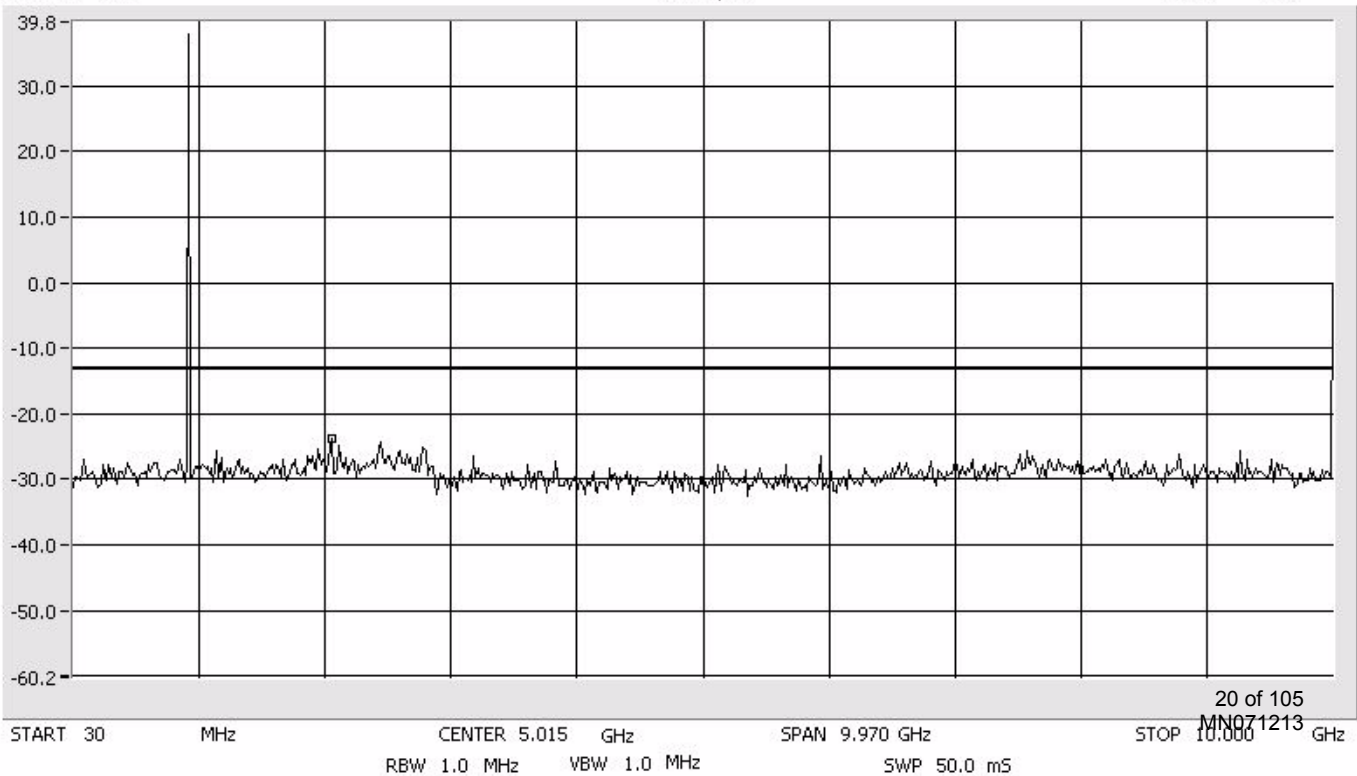
# Conducted Emissions Low SMR 900 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -23.87 dBm  
2.074 GHz

10 dB/Div



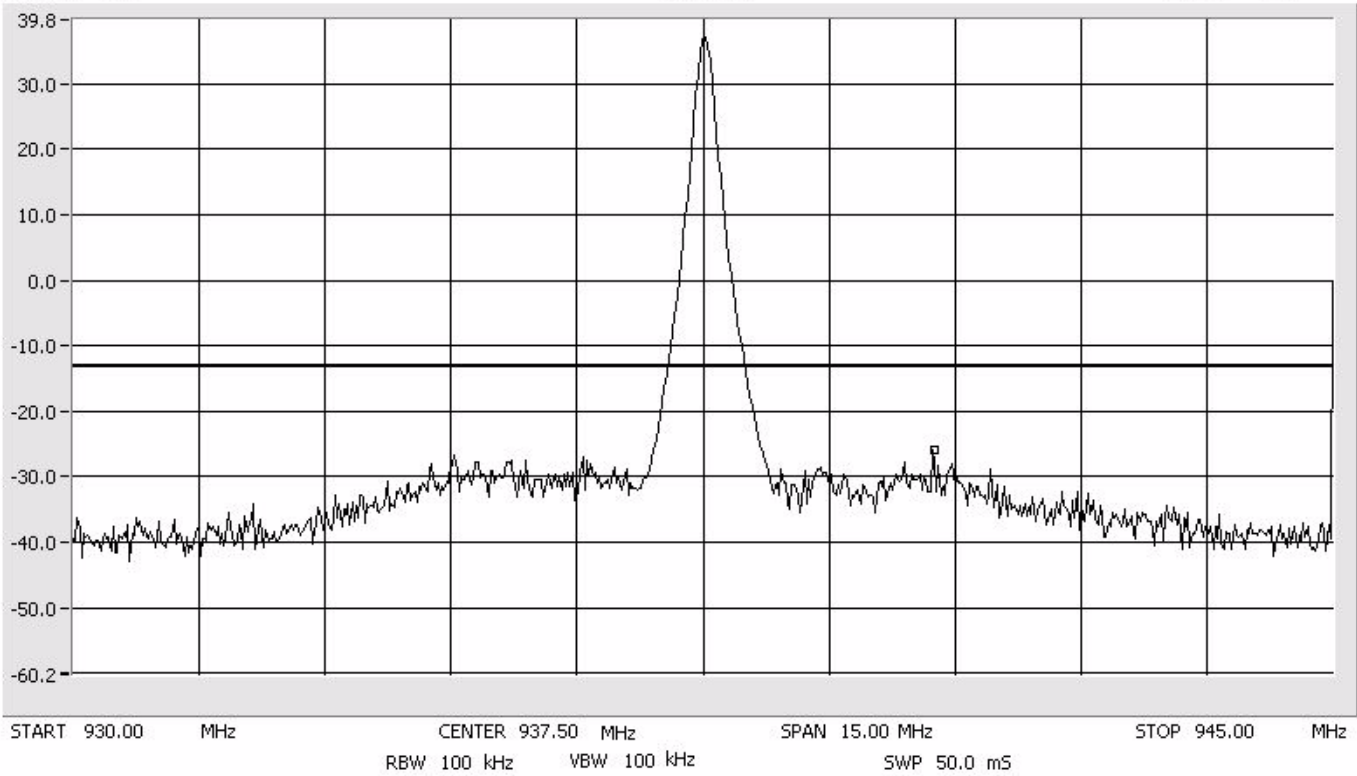
# Conducted Emissions Mid SMR 900 MHz

Center: 937.5 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -25.87 dBm  
940.25 MHz

10 dB/Div



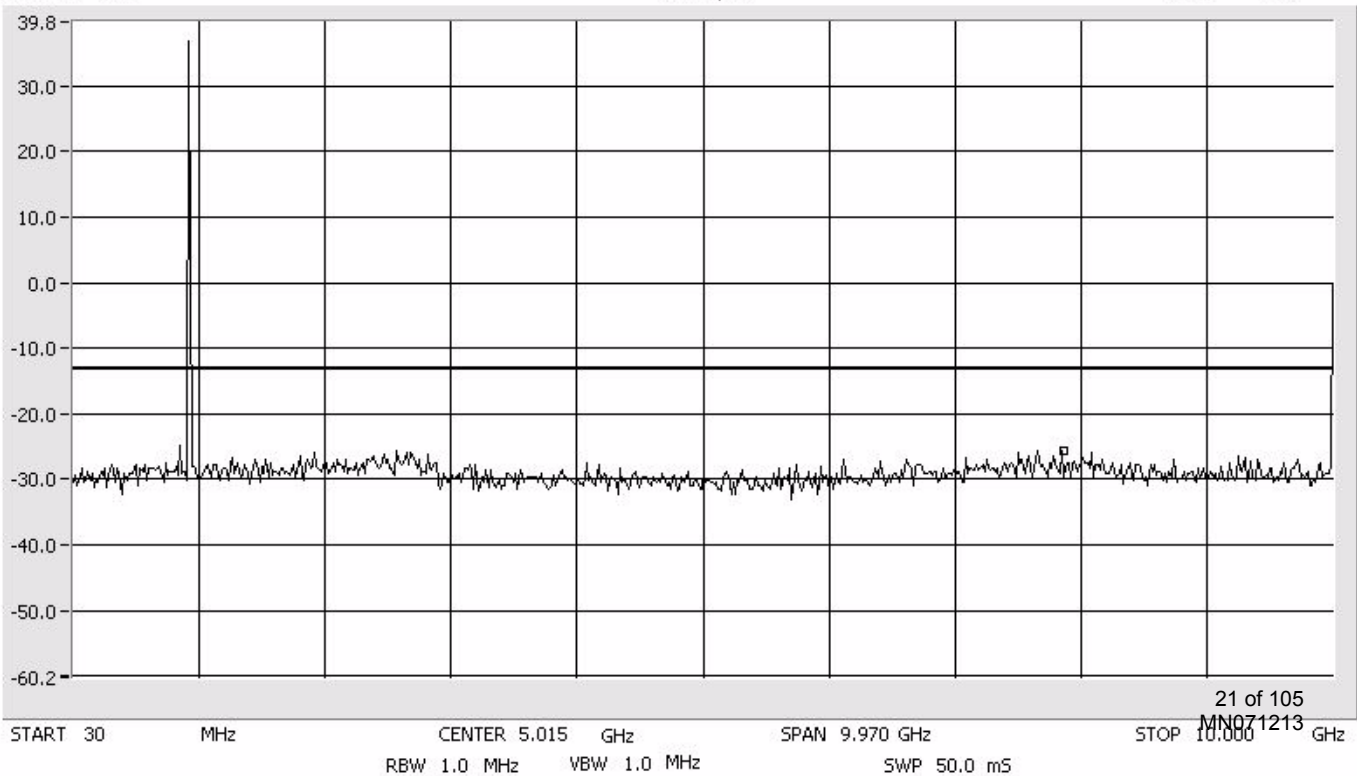
# Conducted Emissions Mid SMR 900 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -25.53 dBm  
7.873 GHz

10 dB/Div



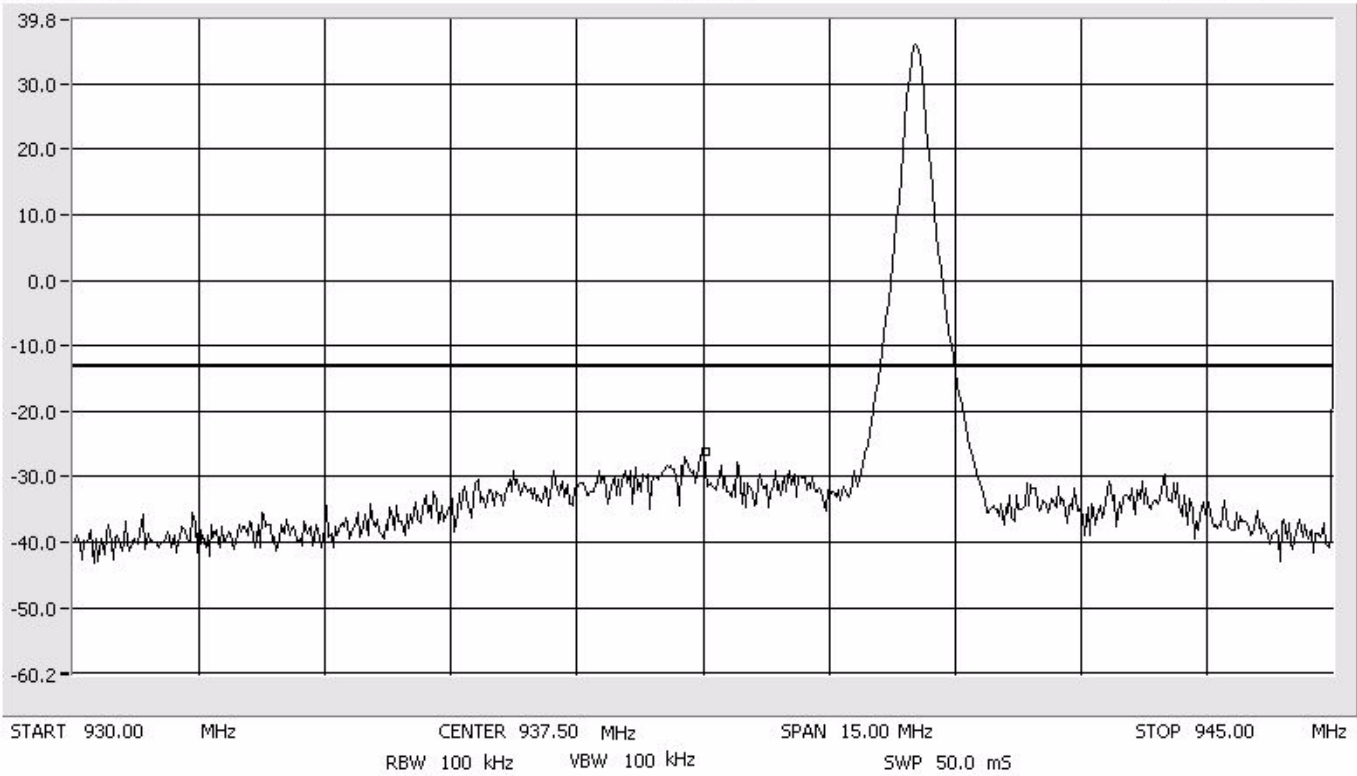
# Conducted Emissions High SMR 900 MHz

Center: 937.5 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -26.20 dBm  
937.52 MHz

10 dB/Div



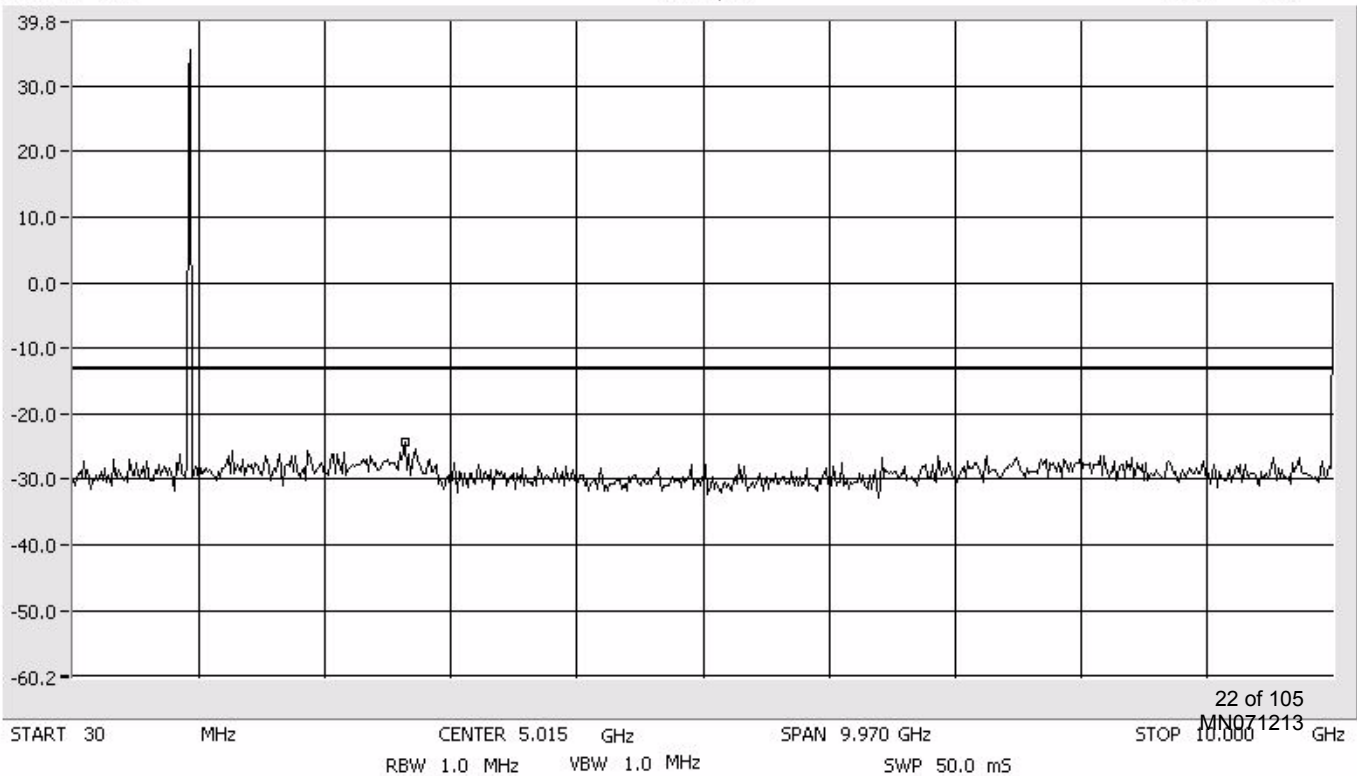
# Conducted Emissions High SMR 900 MHz

Span: 30 MHz to 10 GHz  
RBW/VBW: 1 MHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -24.20 dBm  
2.655 GHz

10 dB/Div



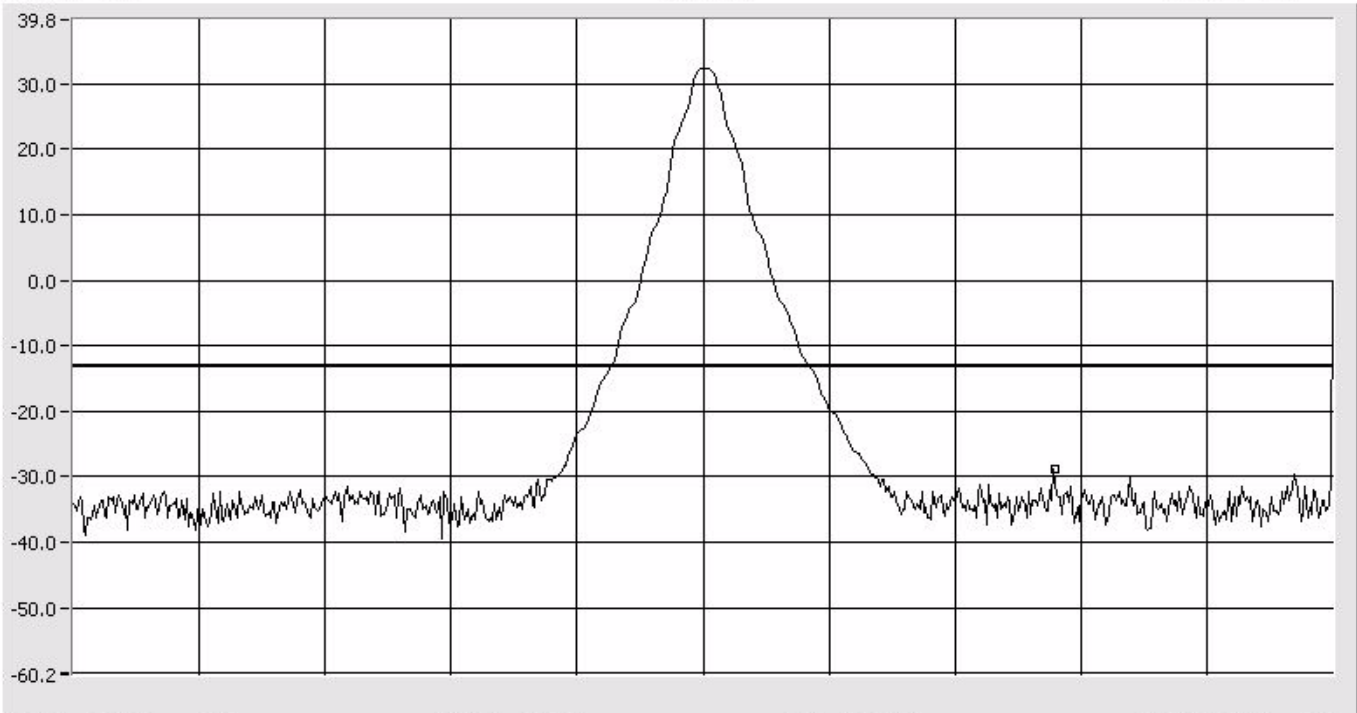
# Conducted Emissions FM SMR 800 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -28.70 dBm  
867.400 MHz

10 dB/Div



START 863.500 MHz CENTER 866.000 MHz SPAN 5.000 MHz STOP 868.500 MHz  
RBW 100 kHz VBW 100 kHz SWP 50.0 mS

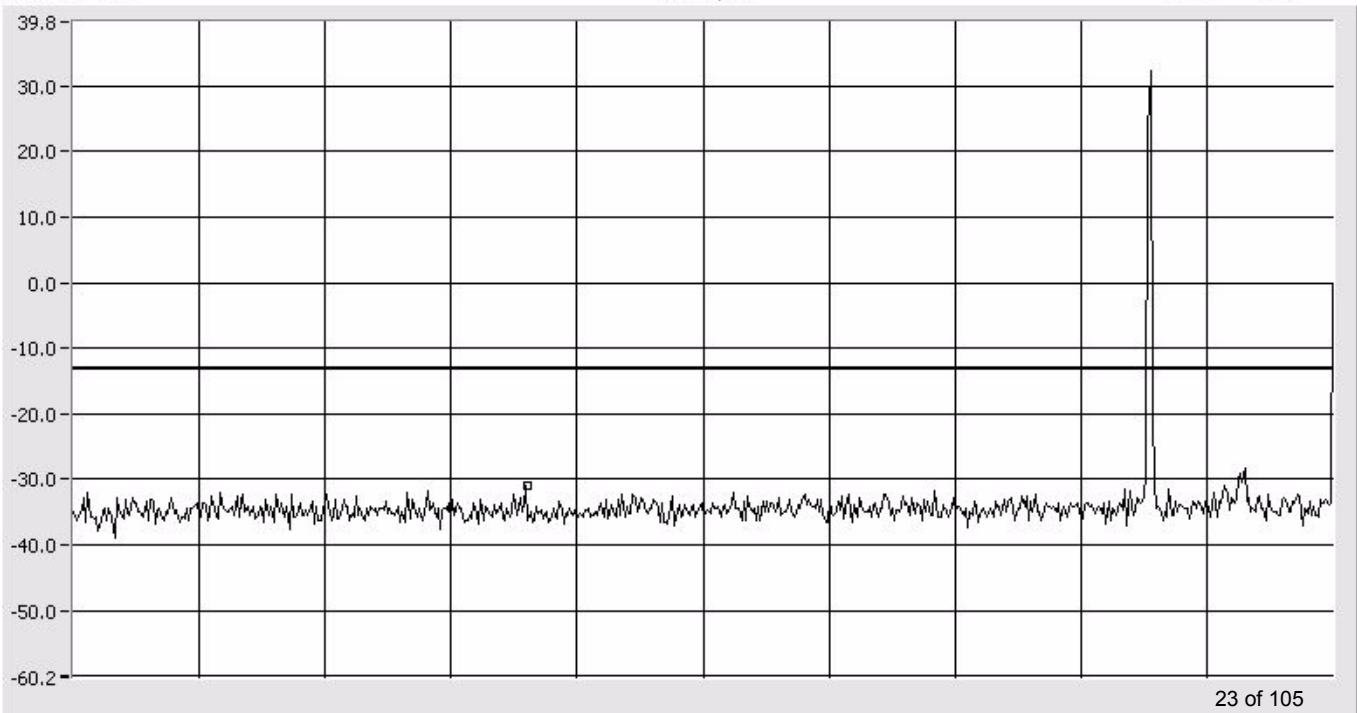
# Conducted Emissions FM SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -31.03 dBm  
379.2 MHz

10 dB/Div



START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz STOP 1.000 GHz  
RBW 300 kHz VBW 300 kHz SWP 50.0 mS



# Conducted Emissions FM SMR 800 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz

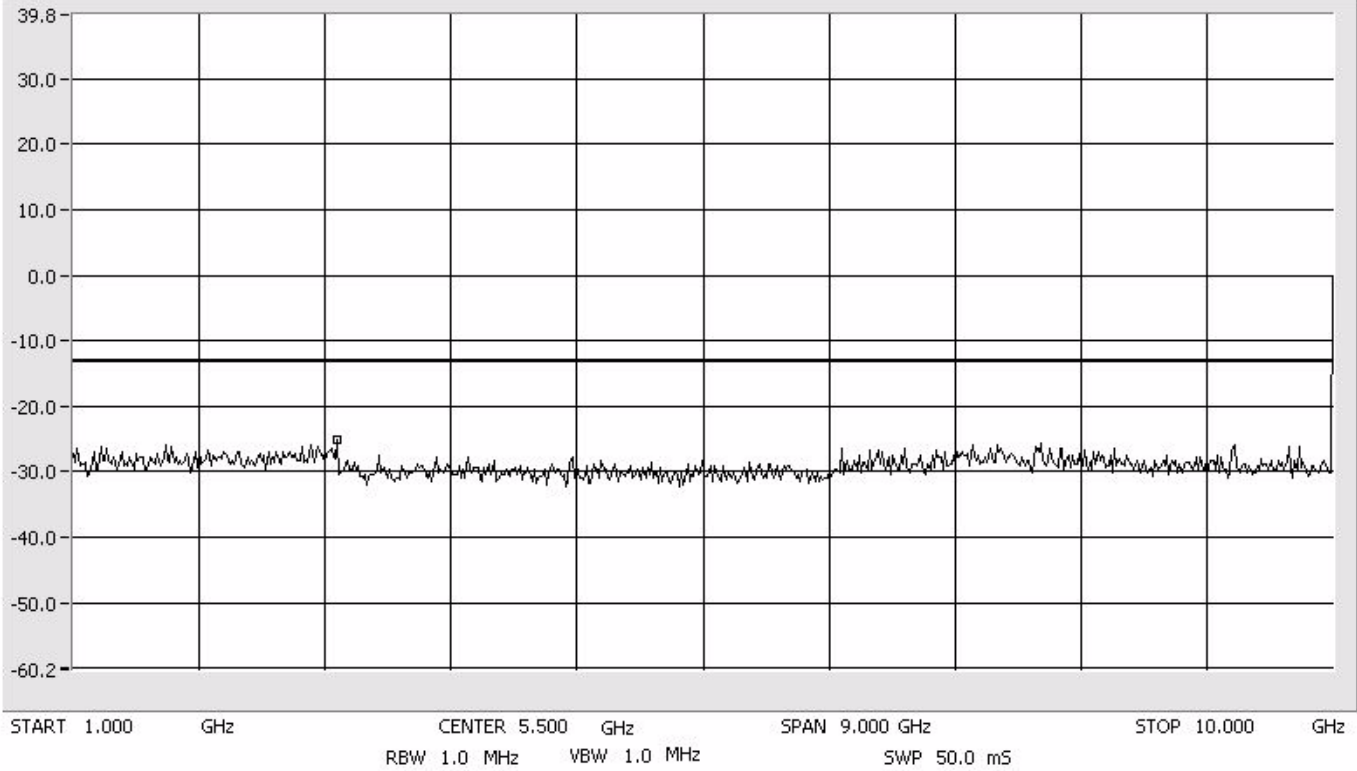
ATTEN 20 dB

delta MKR -25.03 dBm

RL 39.8 dBm

10 dB/Div

2.890 GHz





# Conducted Emissions FM SMR 900 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

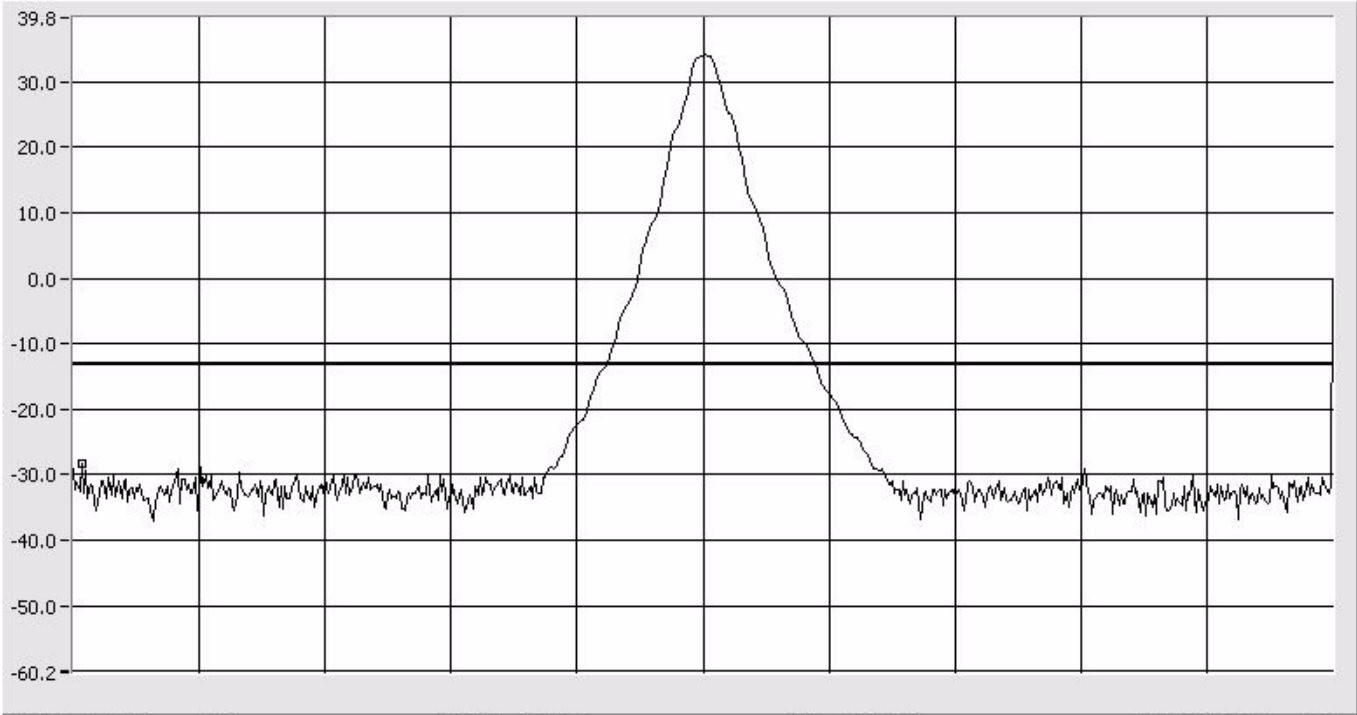
ATTEN 20 dB

delta MKR -28.37 dBm

RL 39.8 dBm

10 dB/Div

935.033 MHz



START 935.000 MHz CENTER 937.500 MHz SPAN 5.000 MHz STOP 940.000 MHz  
RBW 100 kHz VBW 100 kHz SWP 50.0 mS

# Conducted Emissions FM SMR 900 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

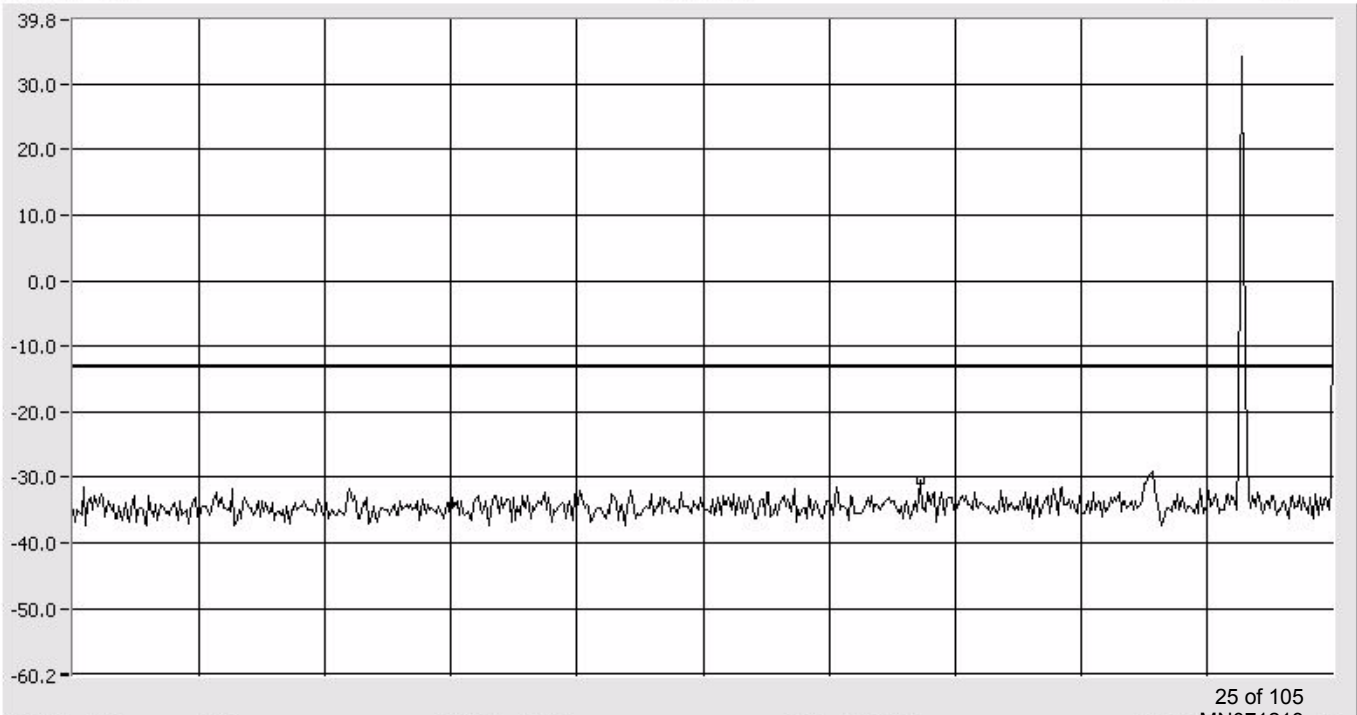
ATTEN 20 dB

delta MKR -30.53 dBm

RL 39.8 dBm

10 dB/Div

683.1 MHz



START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz STOP 1.000 GHz  
RBW 300 kHz VBW 300 kHz SWP 50.0 mS

# Conducted Emissions FM SMR 900 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz

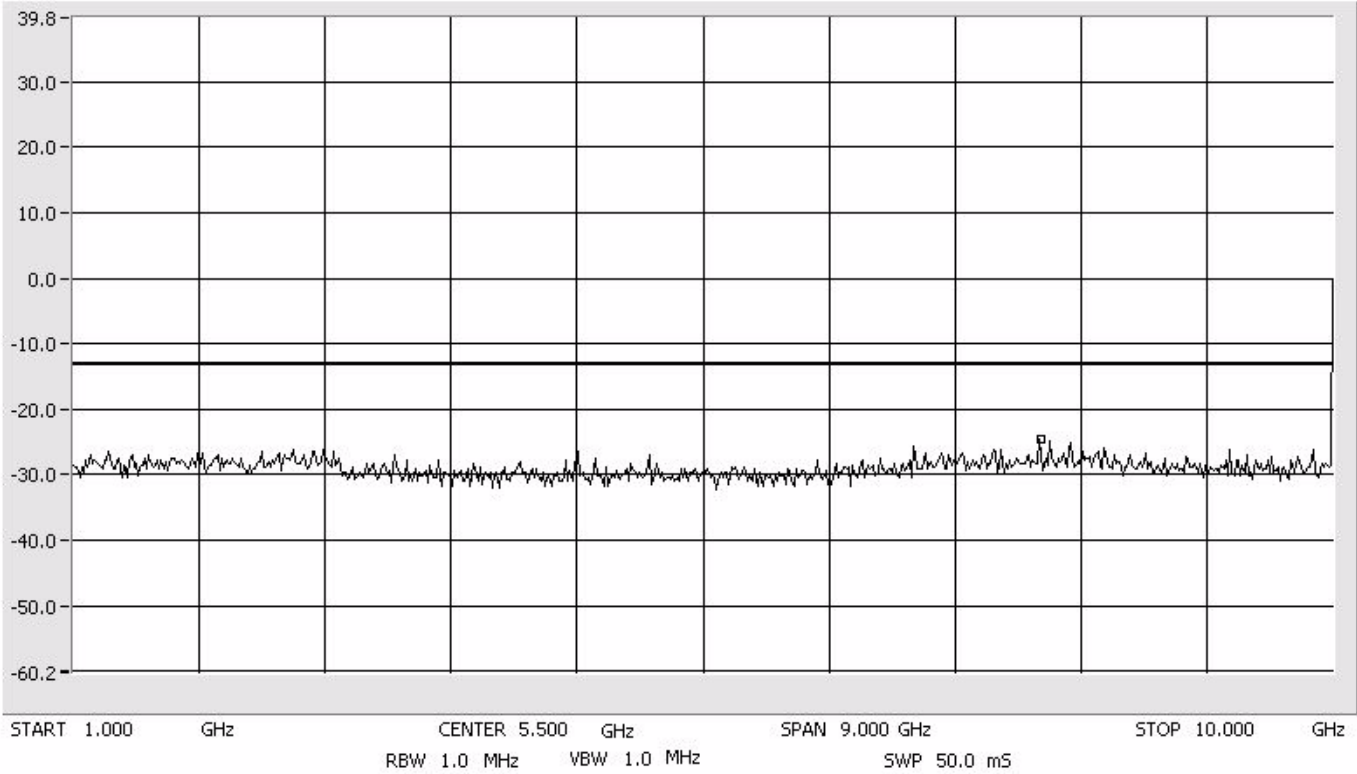
ATTEN 20 dB

delta MKR -24.53 dBm

RL 39.8 dBm

10 dB/Div

7.915 GHz



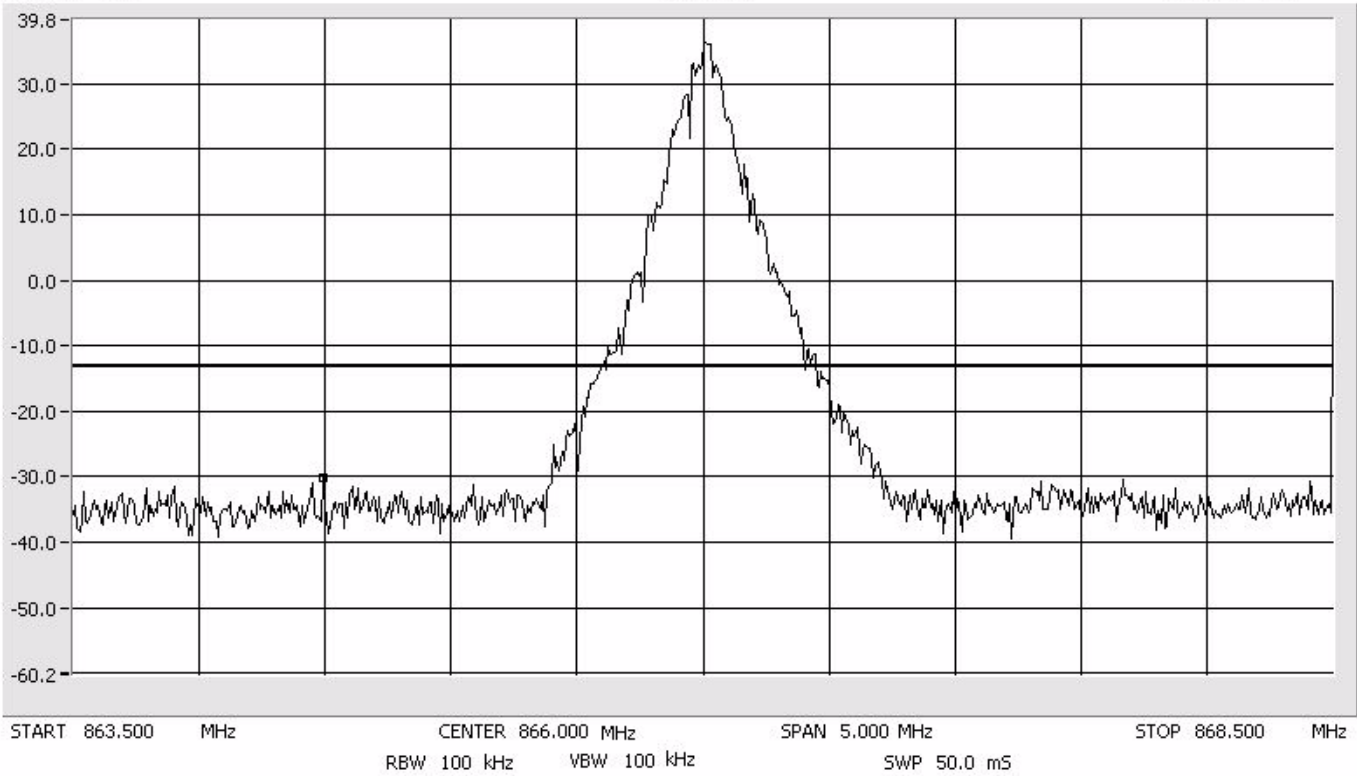
# Conducted Emissions iDEN SMR 800 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -30.03 dBm  
864.492 MHz

10 dB/Div



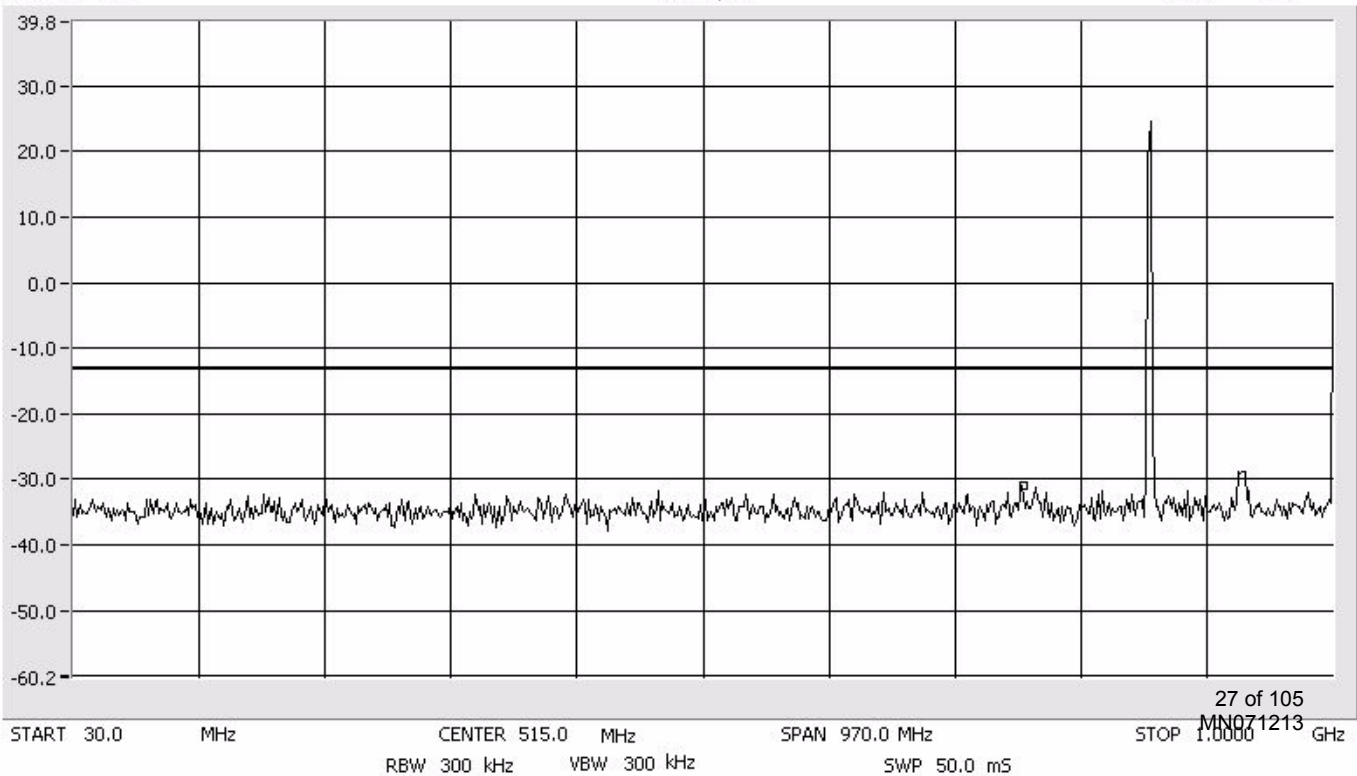
# Conducted Emissions iDEN SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

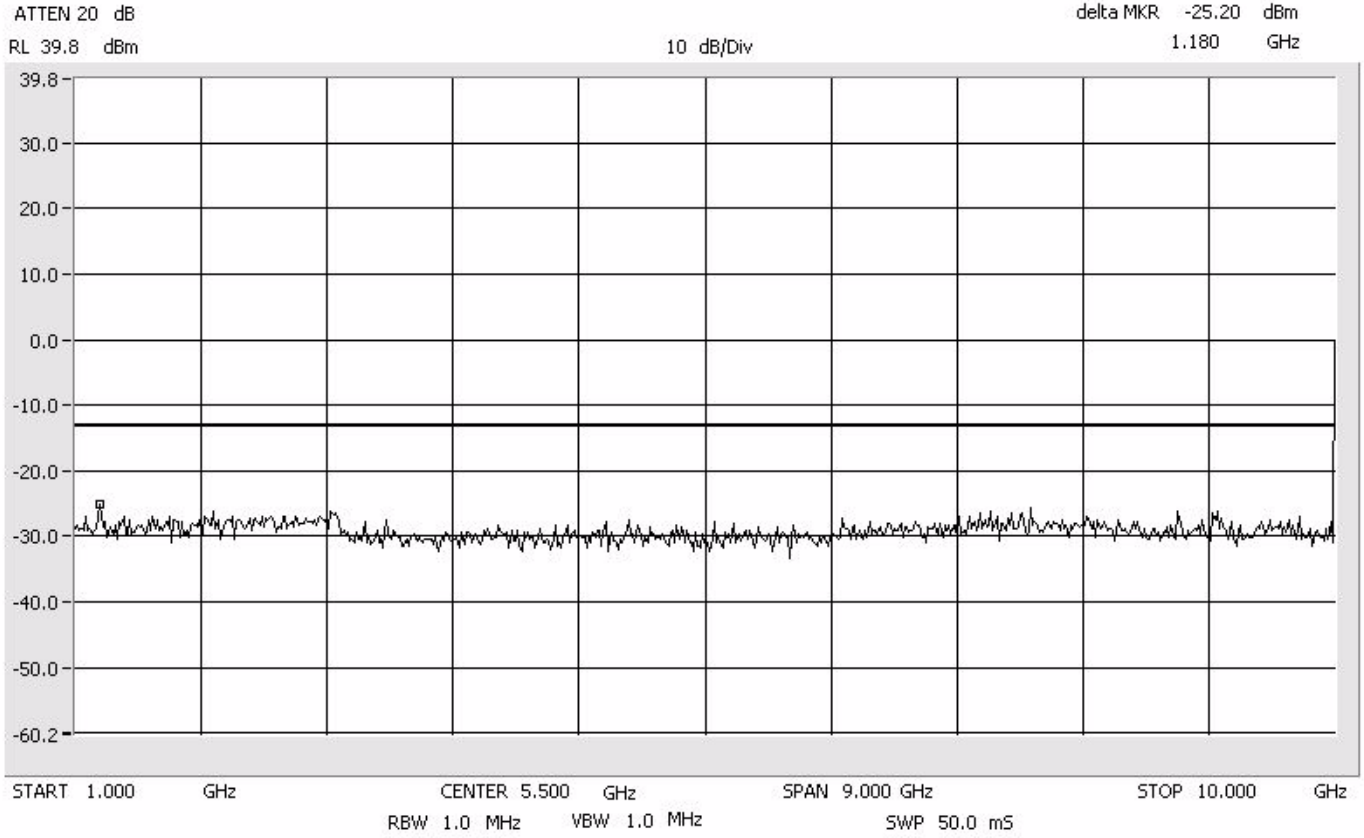
delta MKR -31.03 dBm  
762.4 MHz

10 dB/Div



# Conducted Emissions iDEN SMR 800 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz



# Conducted Emissions iDEN SMR 900 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

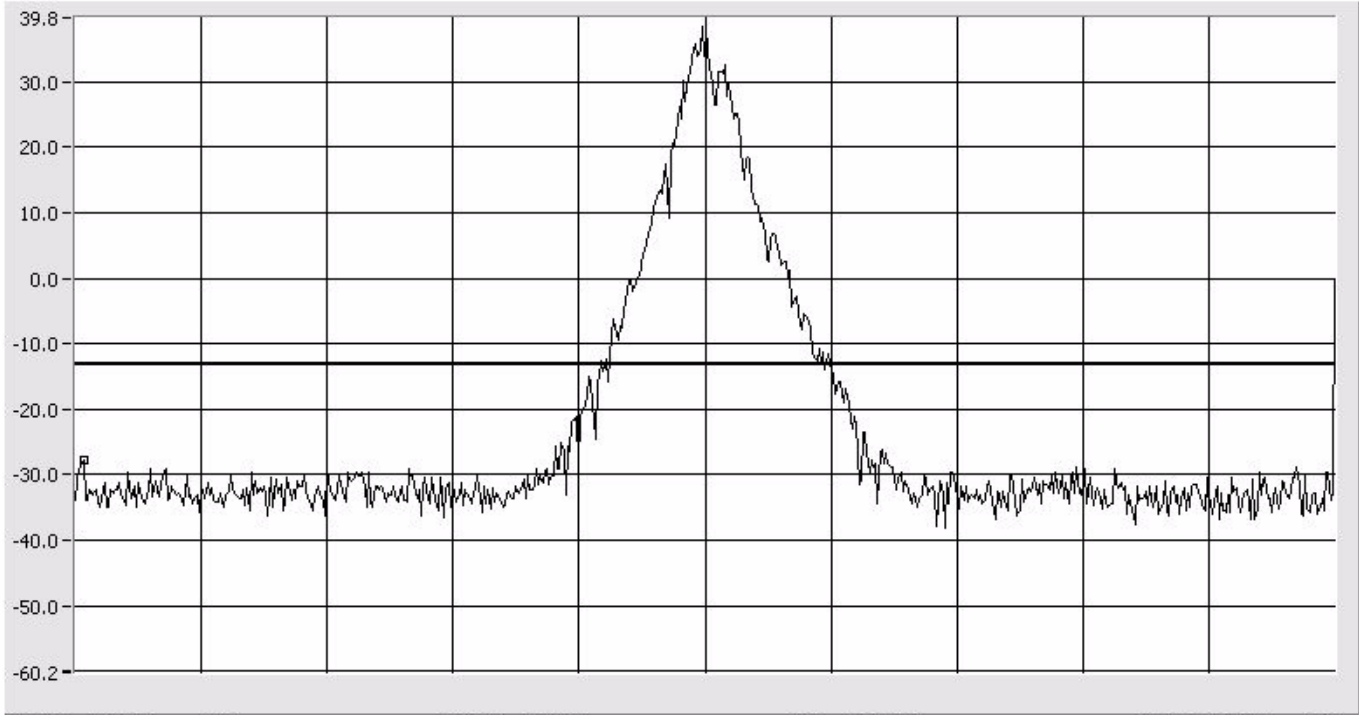
ATTEN 20 dB

delta MKR -27.87 dBm

RL 39.8 dBm

10 dB/Div

935.033 MHz



START 935.000 MHz CENTER 937.500 MHz SPAN 5.000 MHz STOP 940.000 MHz  
RBW 100 kHz VBW 100 kHz SWP 50.0 mS

# Conducted Emissions iDEN SMR 900 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

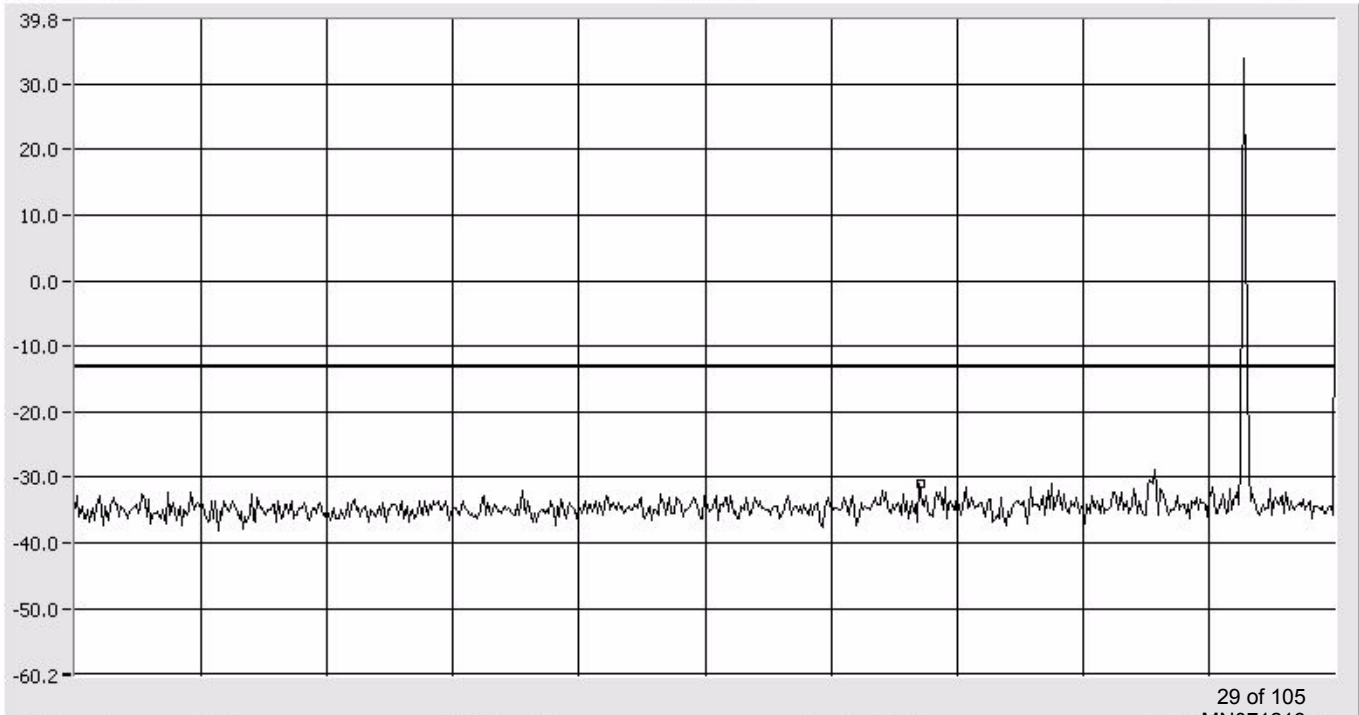
ATTEN 20 dB

delta MKR -31.03 dBm

RL 39.8 dBm

10 dB/Div

681.5 MHz



START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz STOP 1.000 GHz  
RBW 300 kHz VBW 300 kHz SWP 50.0 mS

# Conducted Emissions iDEN SMR 900 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz

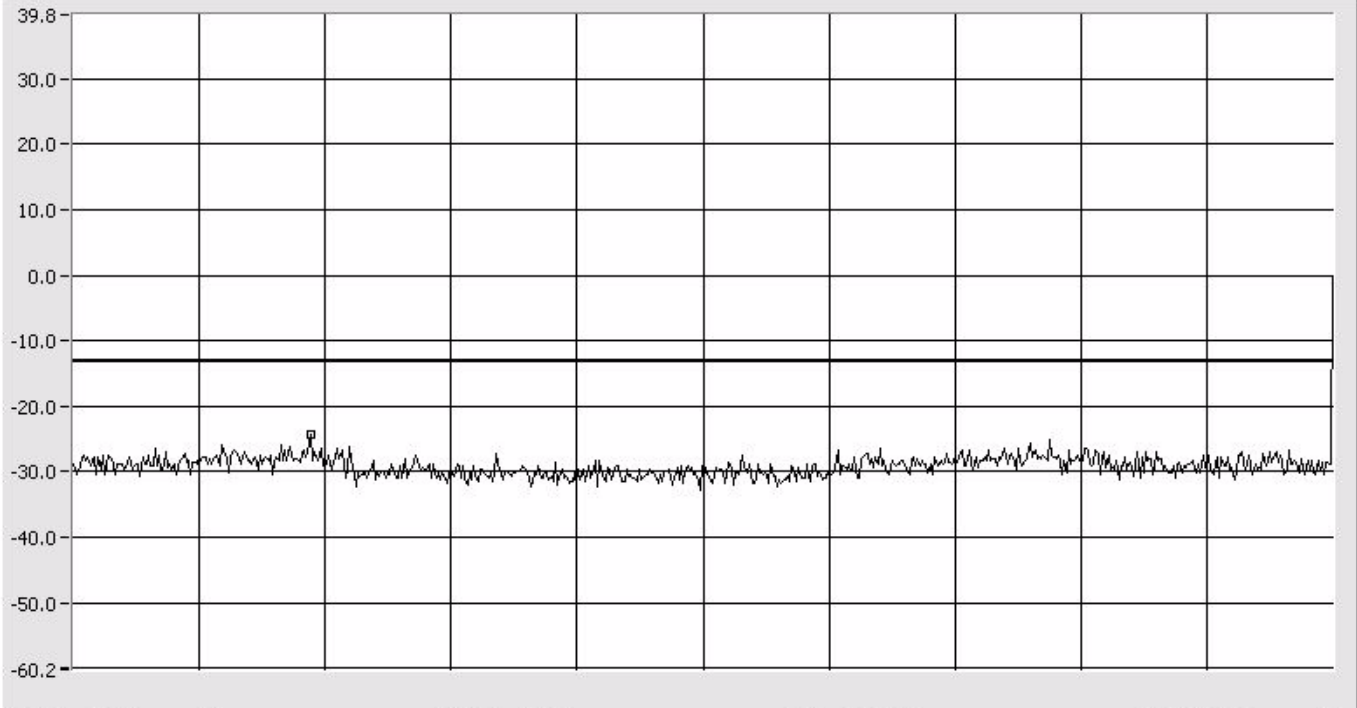
ATTEN 20 dB

delta MKR -24.37 dBm

RL 39.8 dBm

10 dB/Div

2.695 GHz



START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz  
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

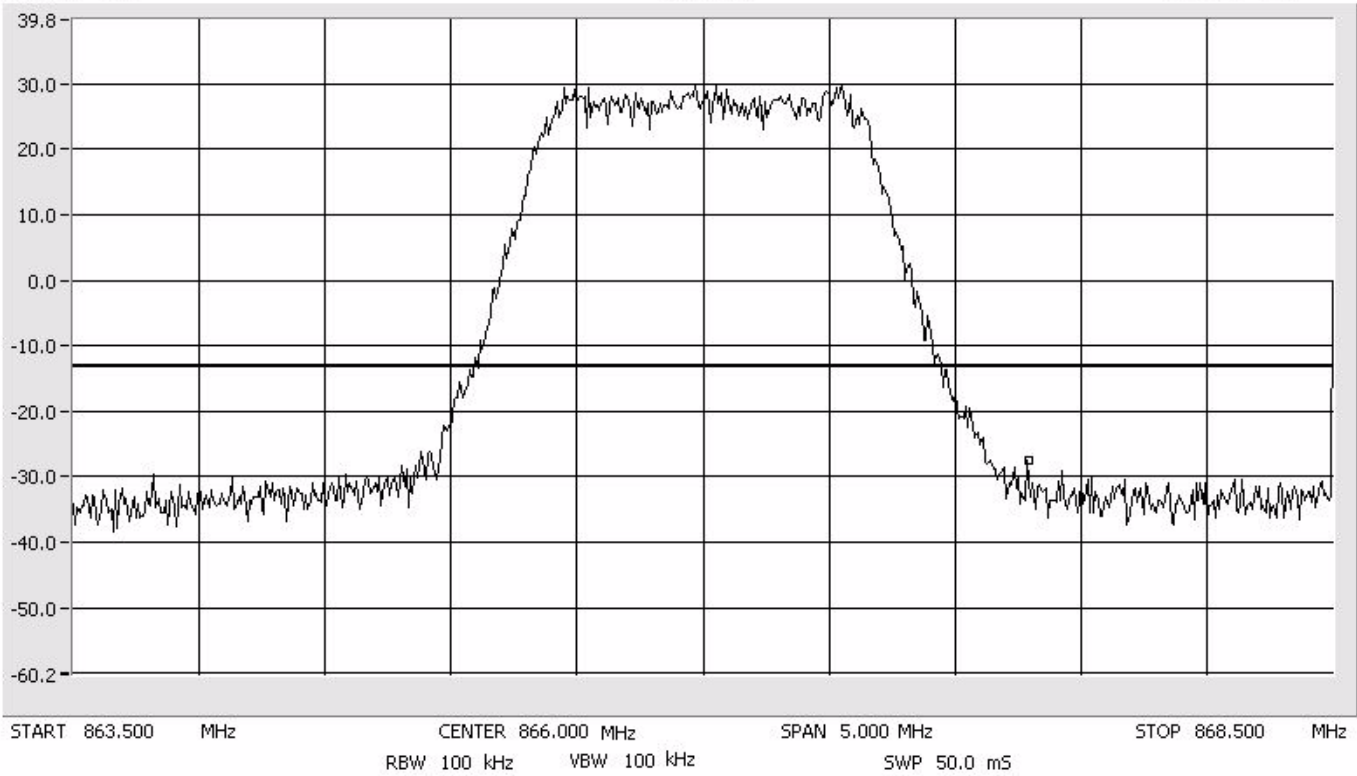
# Conducted Emissions CDMA SMR 800 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -27.37 dBm  
867.292 MHz

10 dB/Div



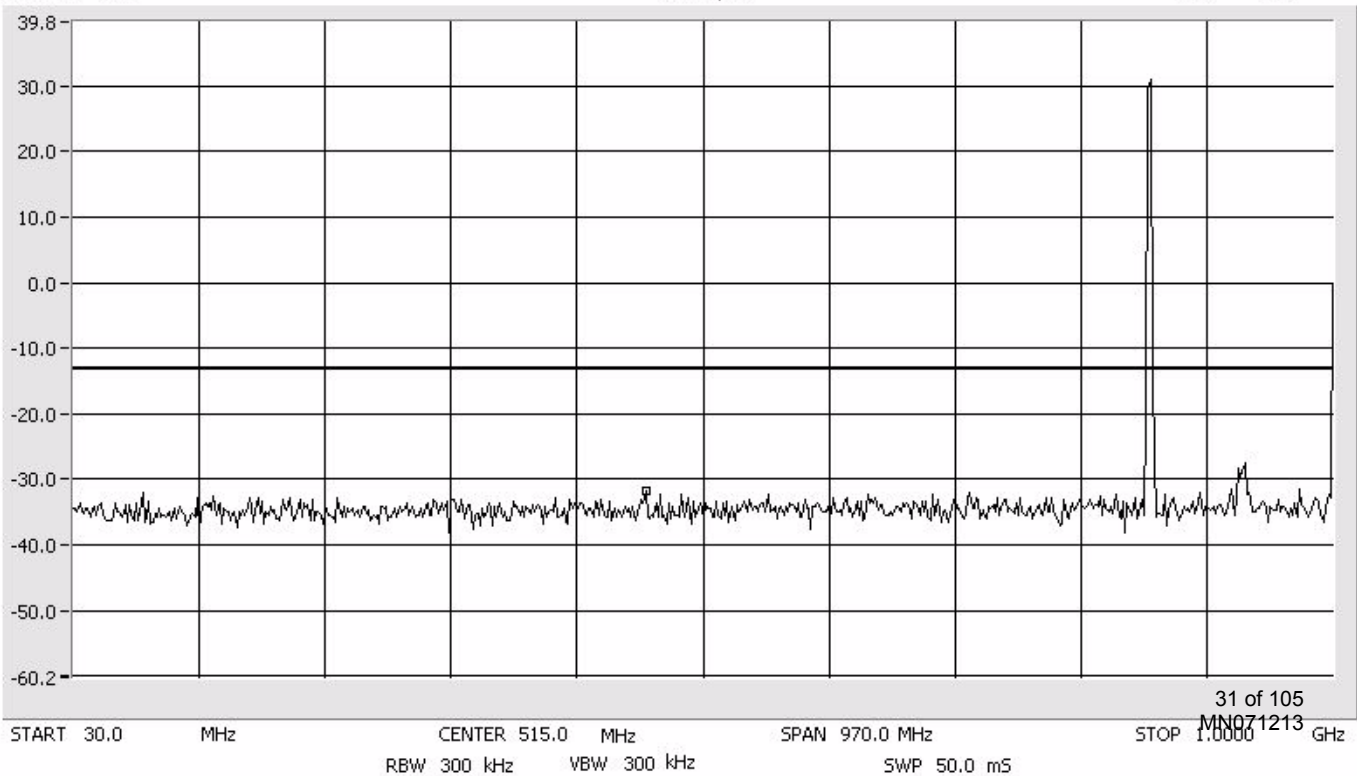
# Conducted Emissions CDMA SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -31.87 dBm  
471.4 MHz

10 dB/Div



# Conducted Emissions CDMA SMR 800 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz

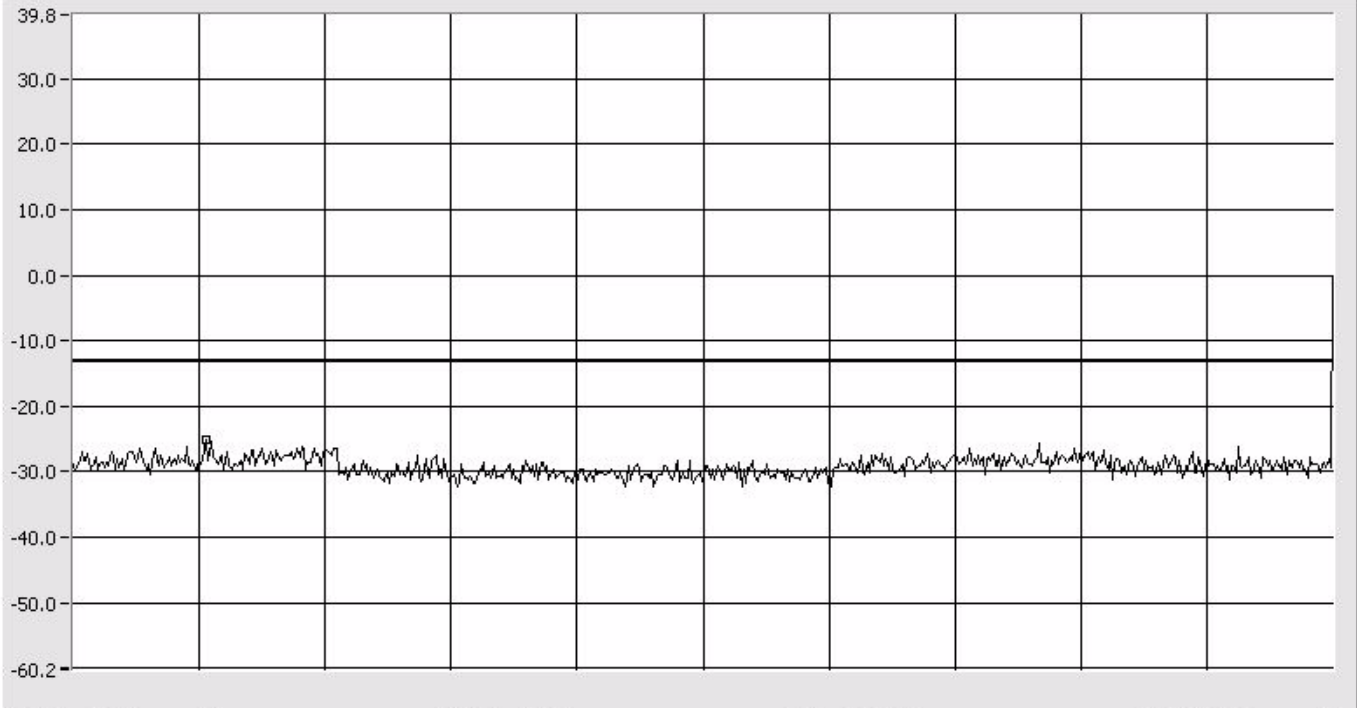
ATTEN 20 dB

delta MKR -25.20 dBm

RL 39.8 dBm

10 dB/Div

1.945 GHz



START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz  
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS



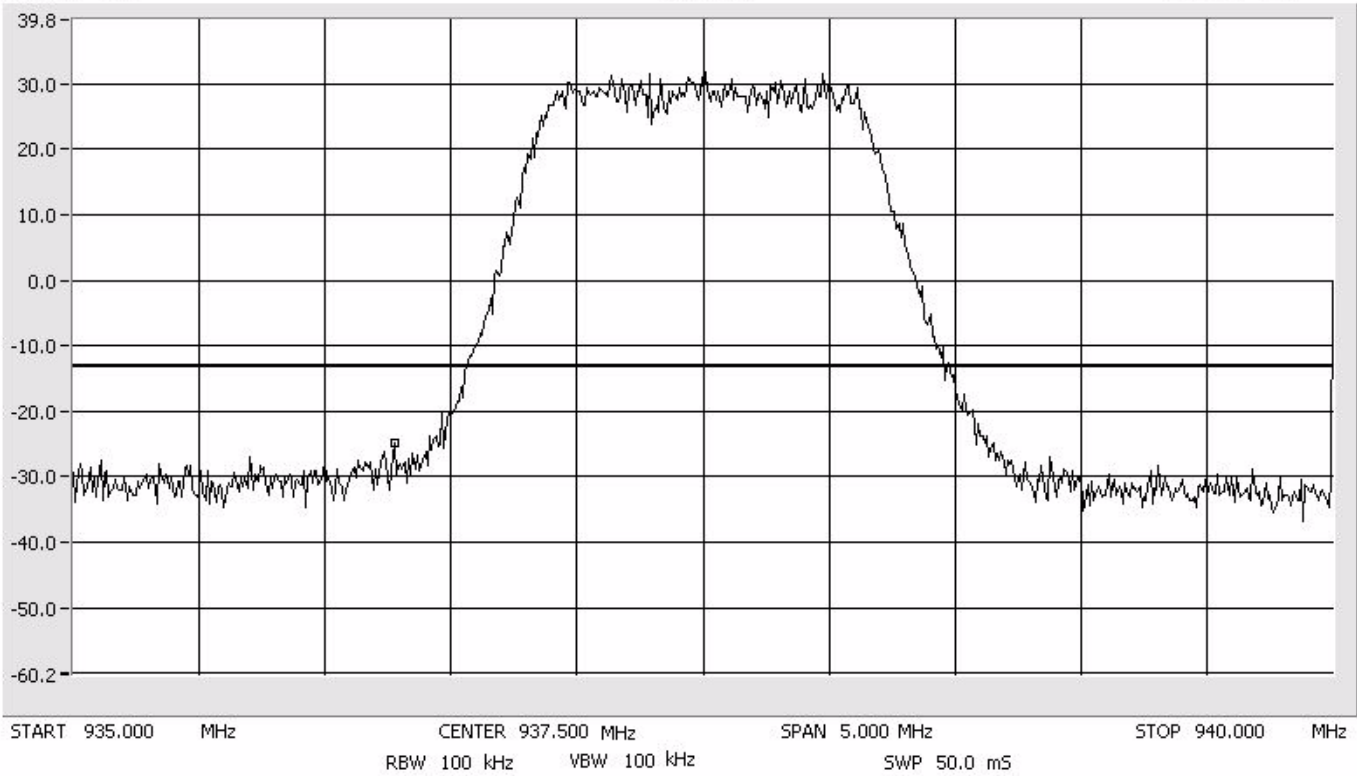
# Conducted Emissions CDMA SMR 900 MHz

Midband  
Span: 5 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -24.70 dBm  
936.275 MHz

10 dB/Div



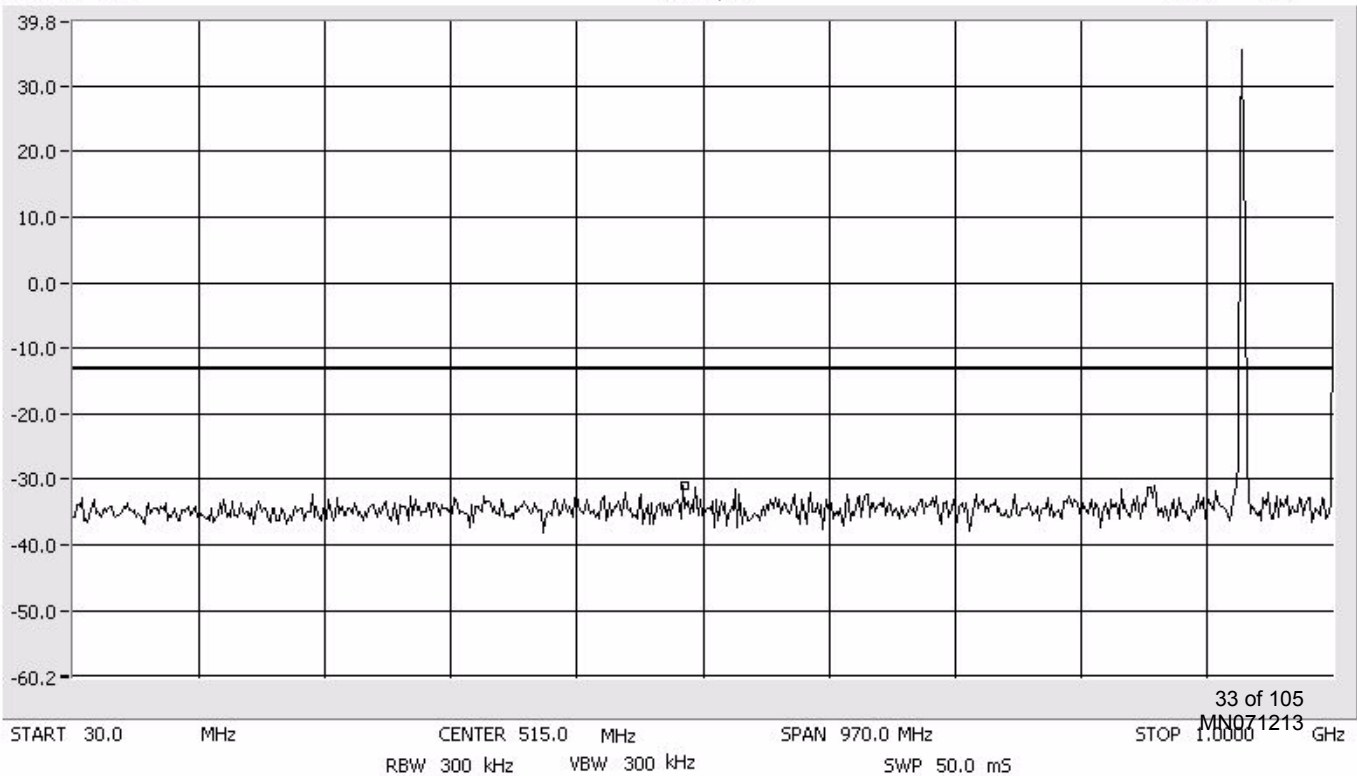
# Conducted Emissions CDMA SMR 900 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -31.03 dBm  
500.4 MHz

10 dB/Div



# Conducted Emissions CDMA SMR 900 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz

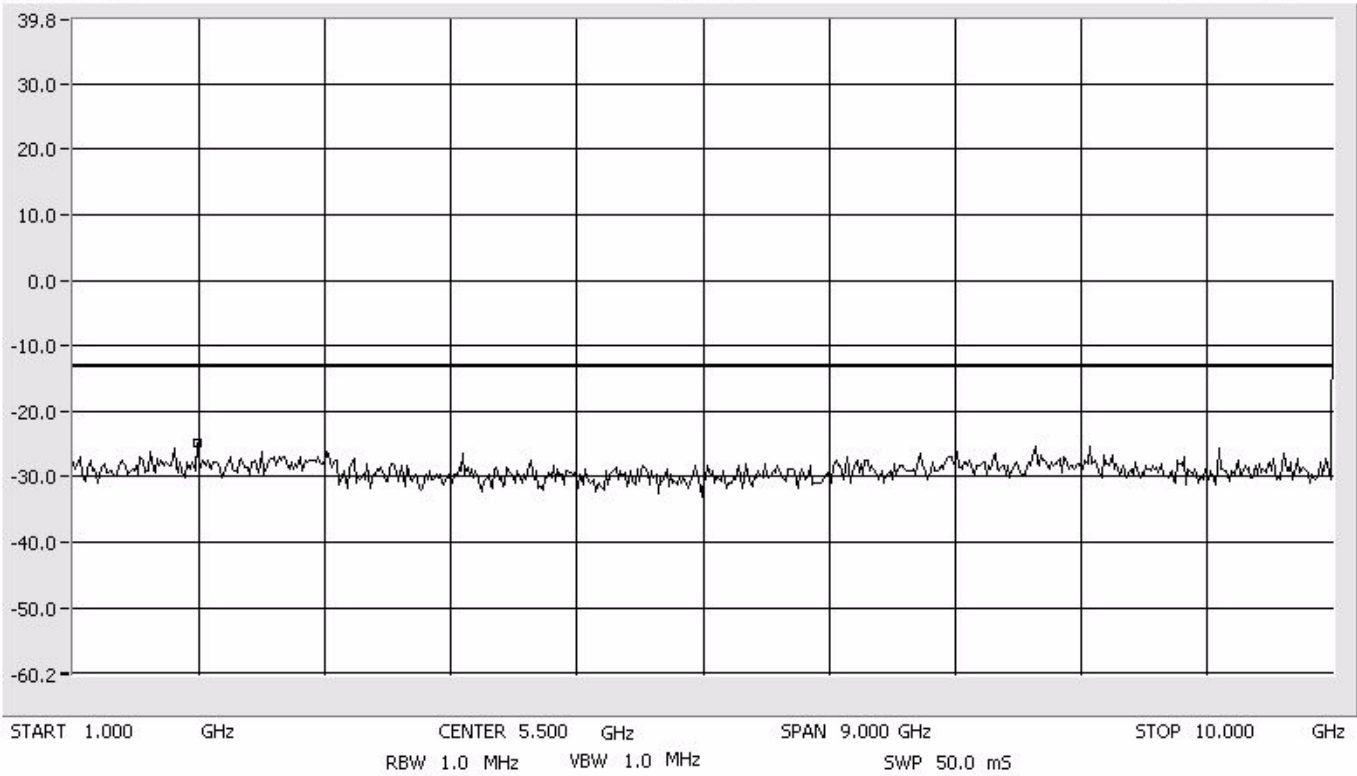
ATTEN 20 dB

delta MKR -24.70 dBm

RL 39.8 dBm

10 dB/Div

1.885 GHz



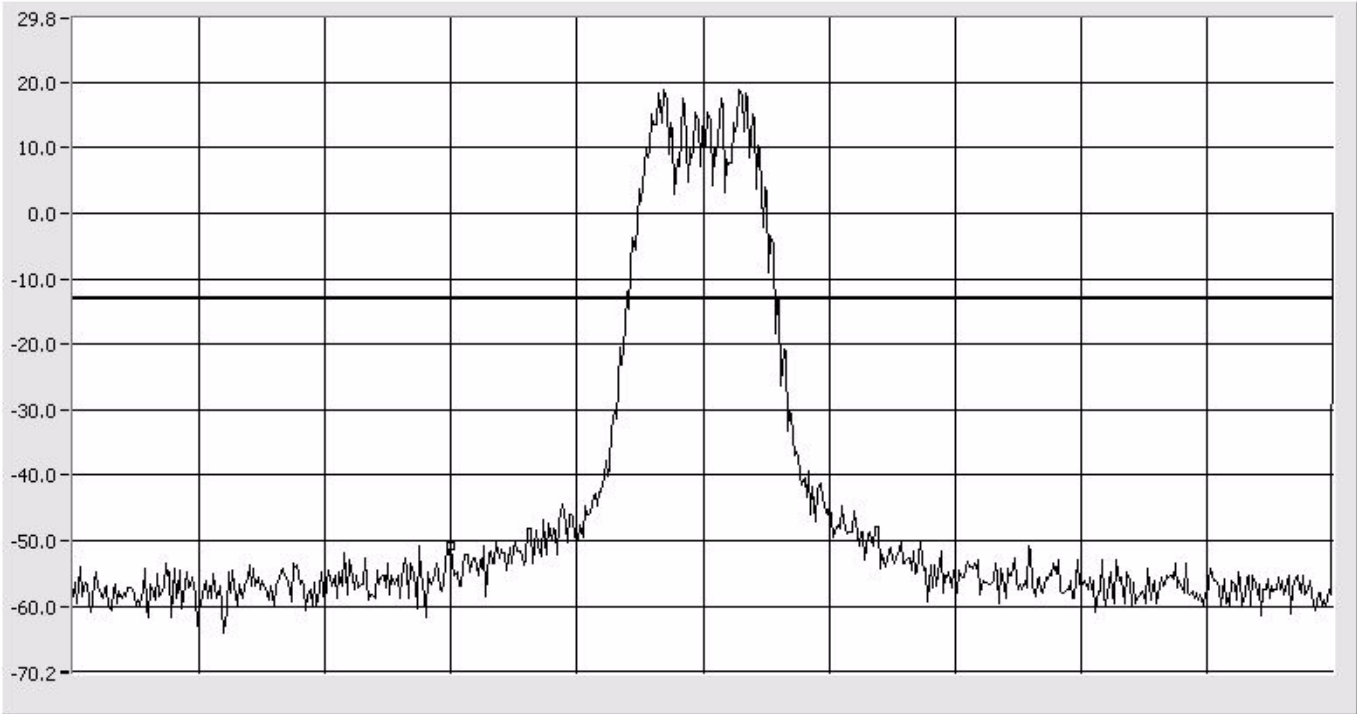
# Band Edge FM

Center: 863.04 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -50.87 dBm  
863.0000 MHz

10 dB/Div



START 862.9400 MHz CENTER 863.0400MHz SPAN 200.0 kHz STOP 863.1400 MHz  
RBW 300 Hz VBW 1.0 kHz SWP 5.60 Sec

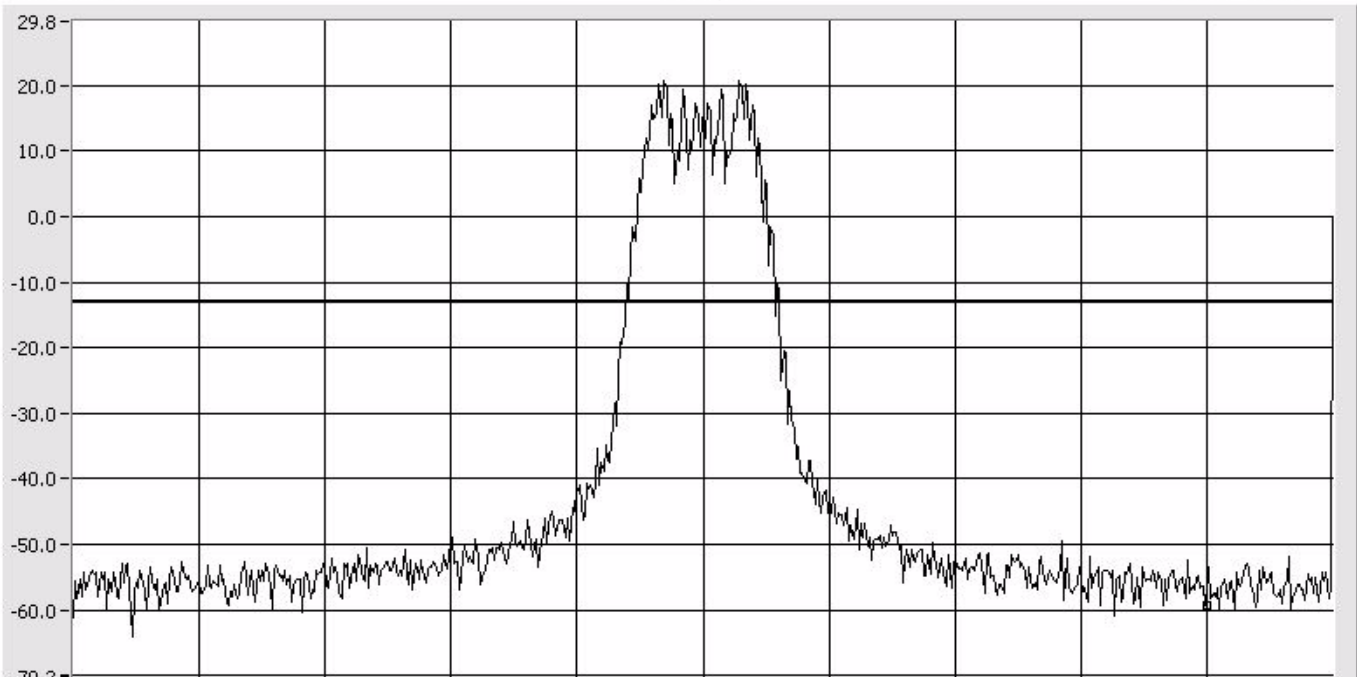
# Band Edge FM

Center: 868.92 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -59.20 dBm  
869.0000 MHz

10 dB/Div



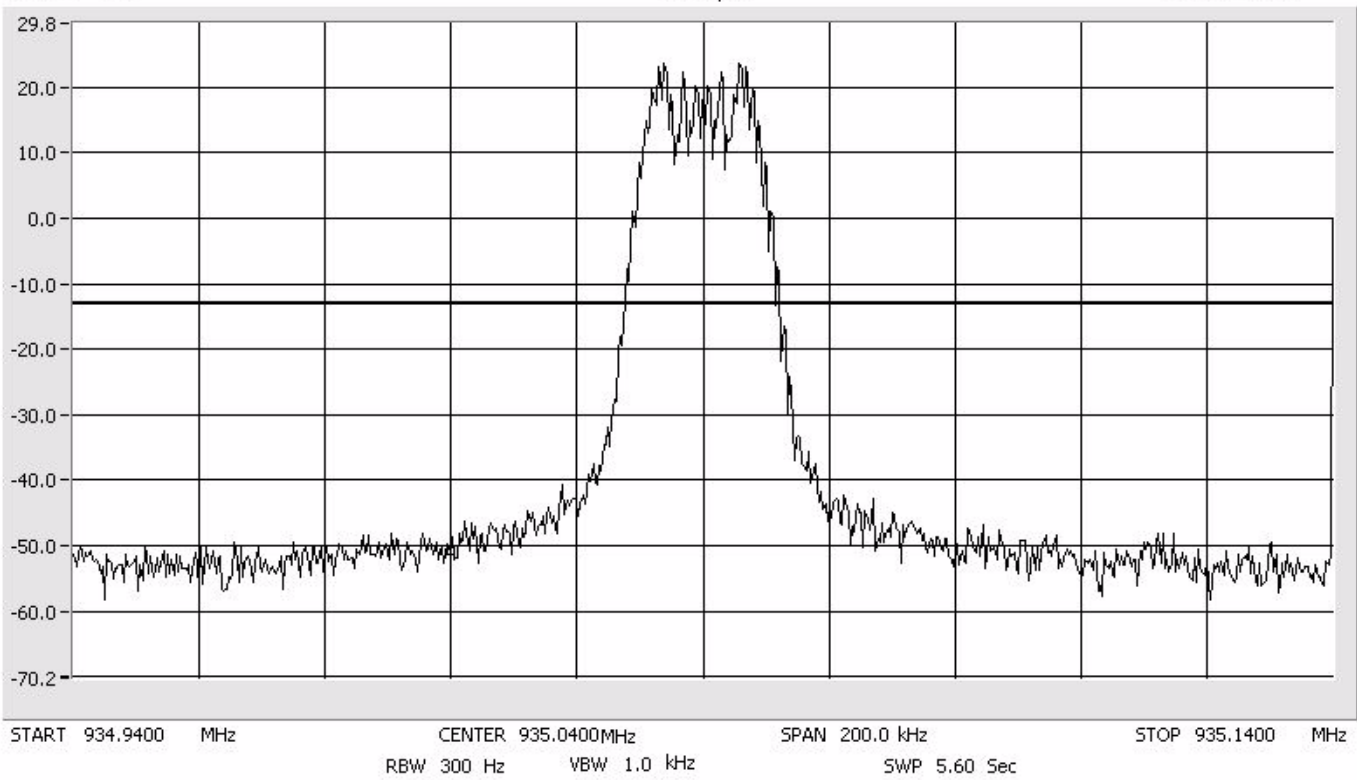
START 868.8200 MHz CENTER 868.9200MHz SPAN 200.0 kHz STOP 869.0200 MHz  
RBW 300 Hz VBW 1.0 kHz SWP 5.60 Sec

# Band Edge FM

Center: 935.04 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -50.70 dBm  
935.0000 MHz

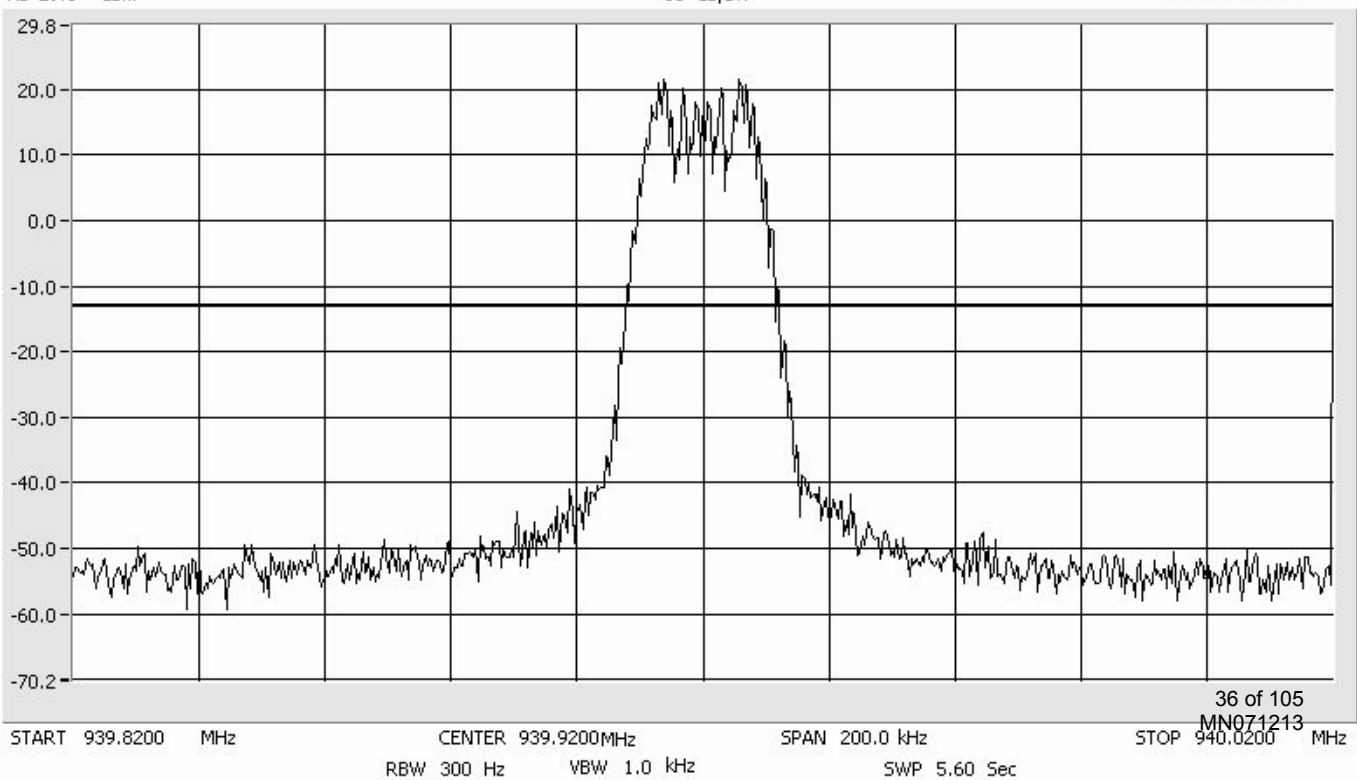


# Band Edge FM

Center: 939.92 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -53.87 dBm  
940.0000 MHz



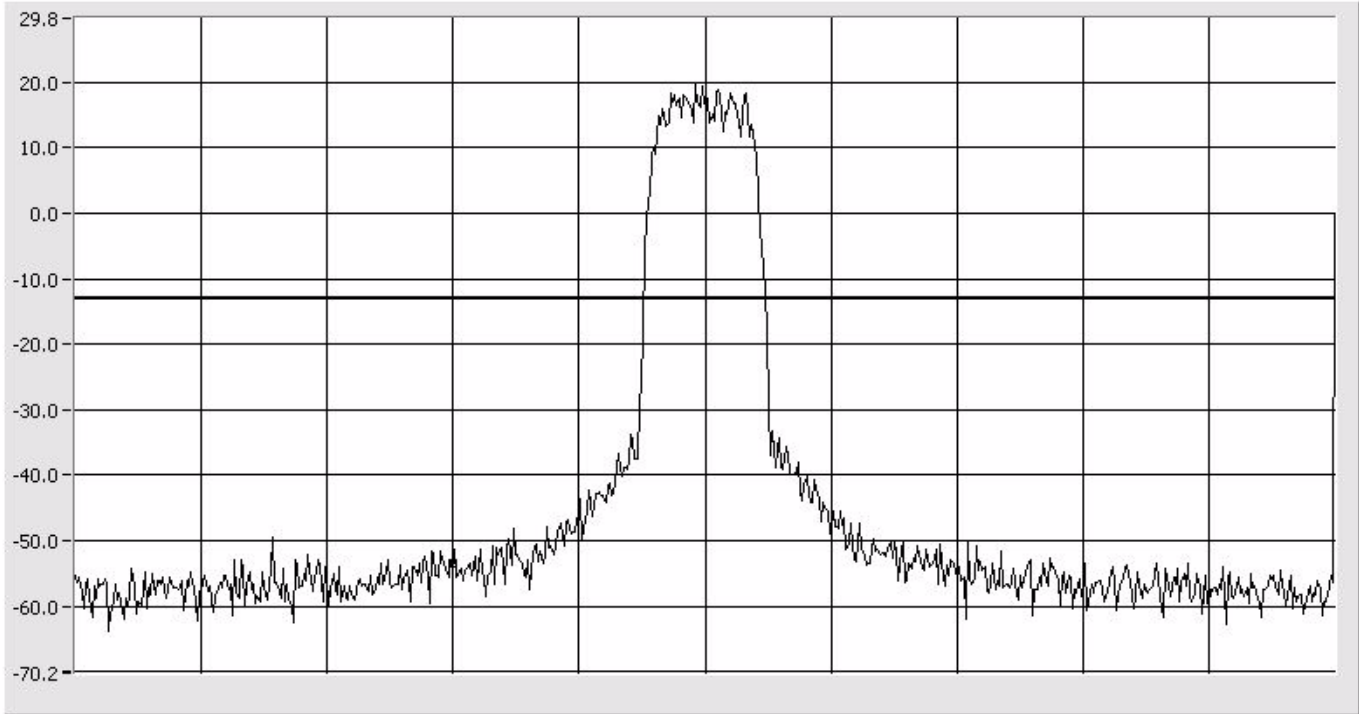
# Band Edge iDEN

Center: 863.04  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -53.53 dBm  
863.0000 MHz

10 dB/Div



START 862.9400 MHz CENTER 863.0400MHz SPAN 200.0 kHz STOP 863.1400 MHz  
RBW 300 Hz VBW 1.0 kHz SWP 5.60 Sec

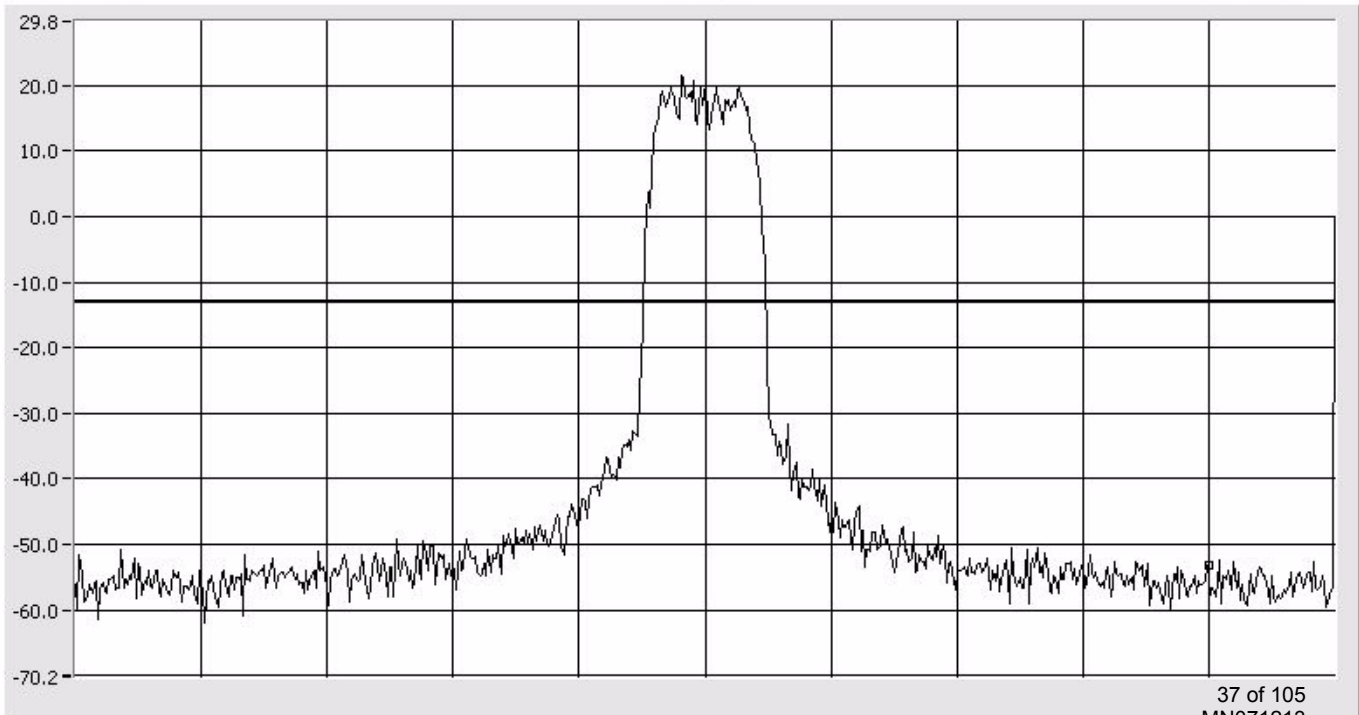
# Band Edge iDEN

Center: 868.92 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -53.20 dBm  
869.0000 MHz

10 dB/Div



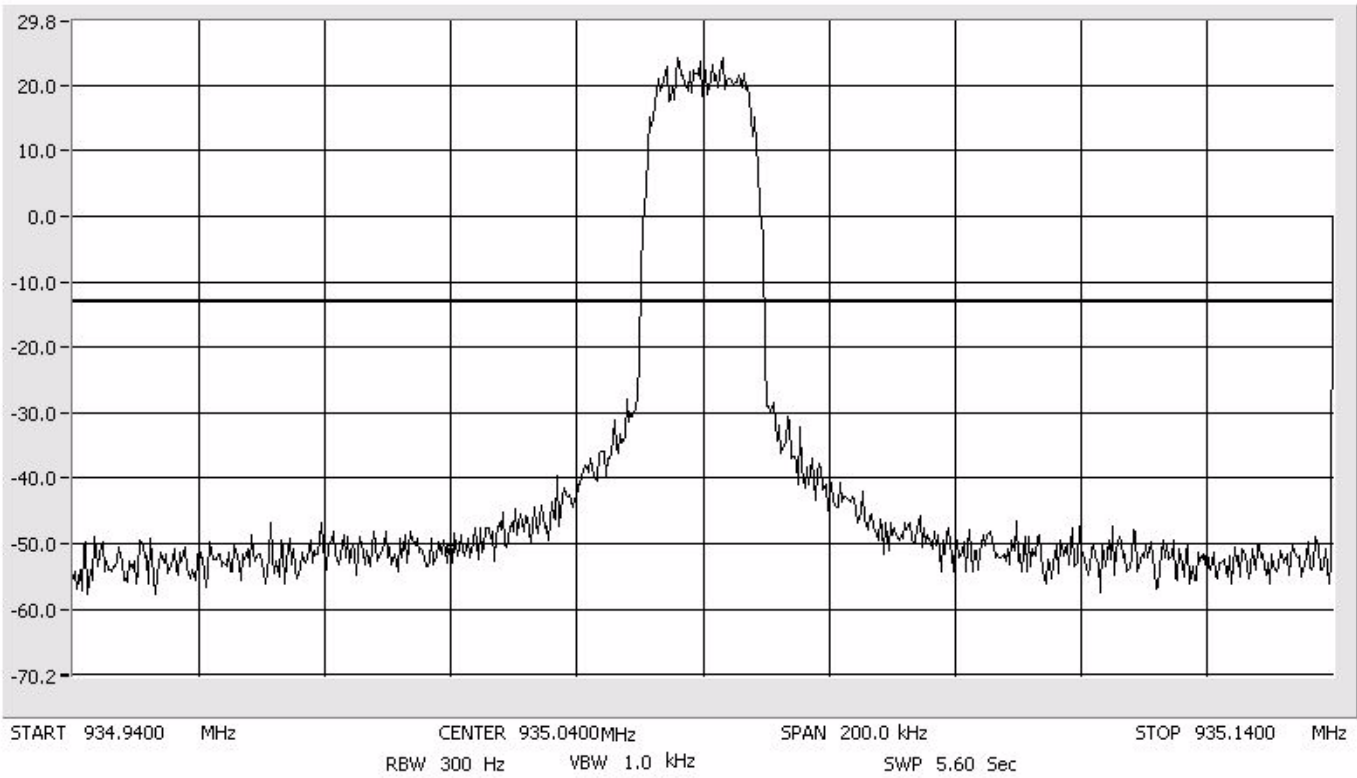
START 868.8200 MHz CENTER 868.9200MHz SPAN 200.0 kHz STOP 869.0200 MHz  
RBW 300 Hz VBW 1.0 kHz SWP 5.60 Sec

# Band Edge iDEN

Center: 935.04  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

ATTEN 10 dB  
RL 29.8 dBm

delta MKR -50.70 dBm  
935.0000 MHz

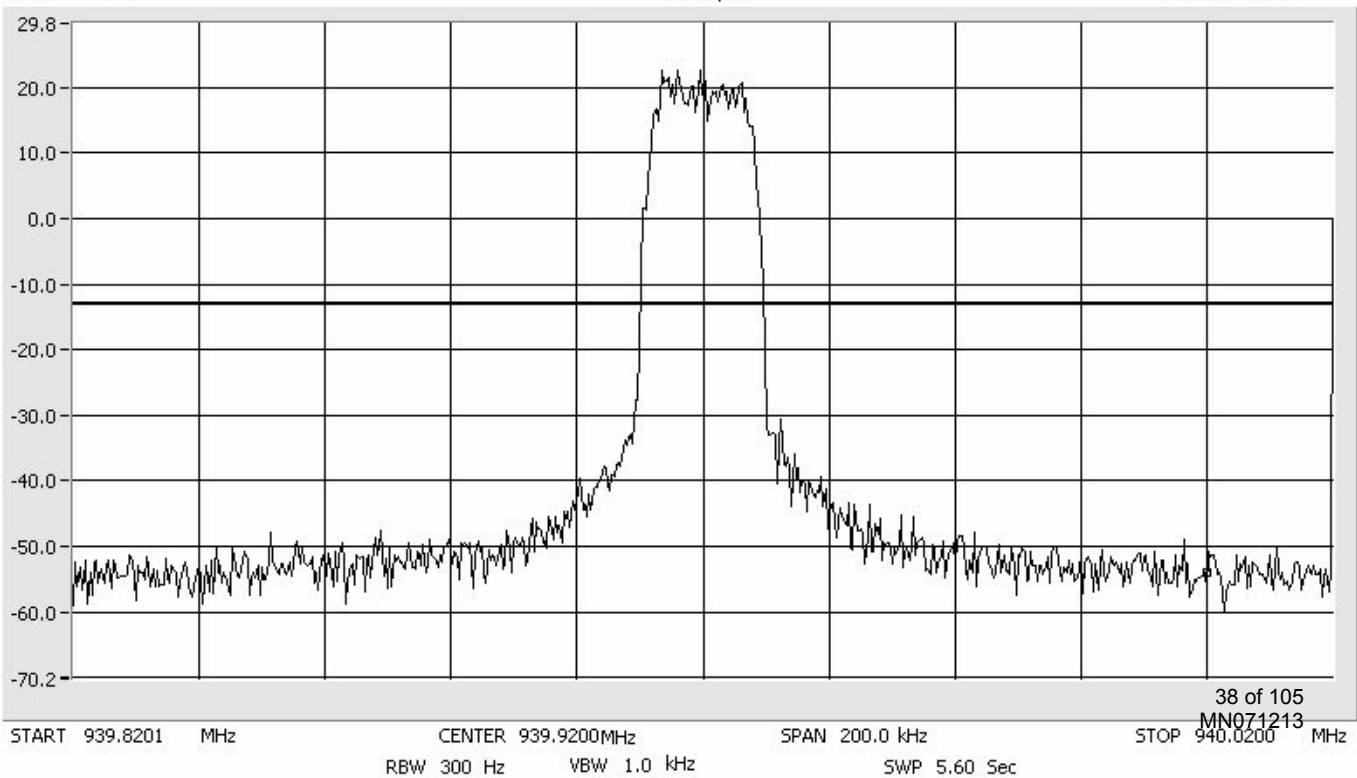


# Band Edge iDEN

Center: 939.92 MHz  
Span: 200 kHz  
RBW: 300 Hz  
VBW: 1 kHz

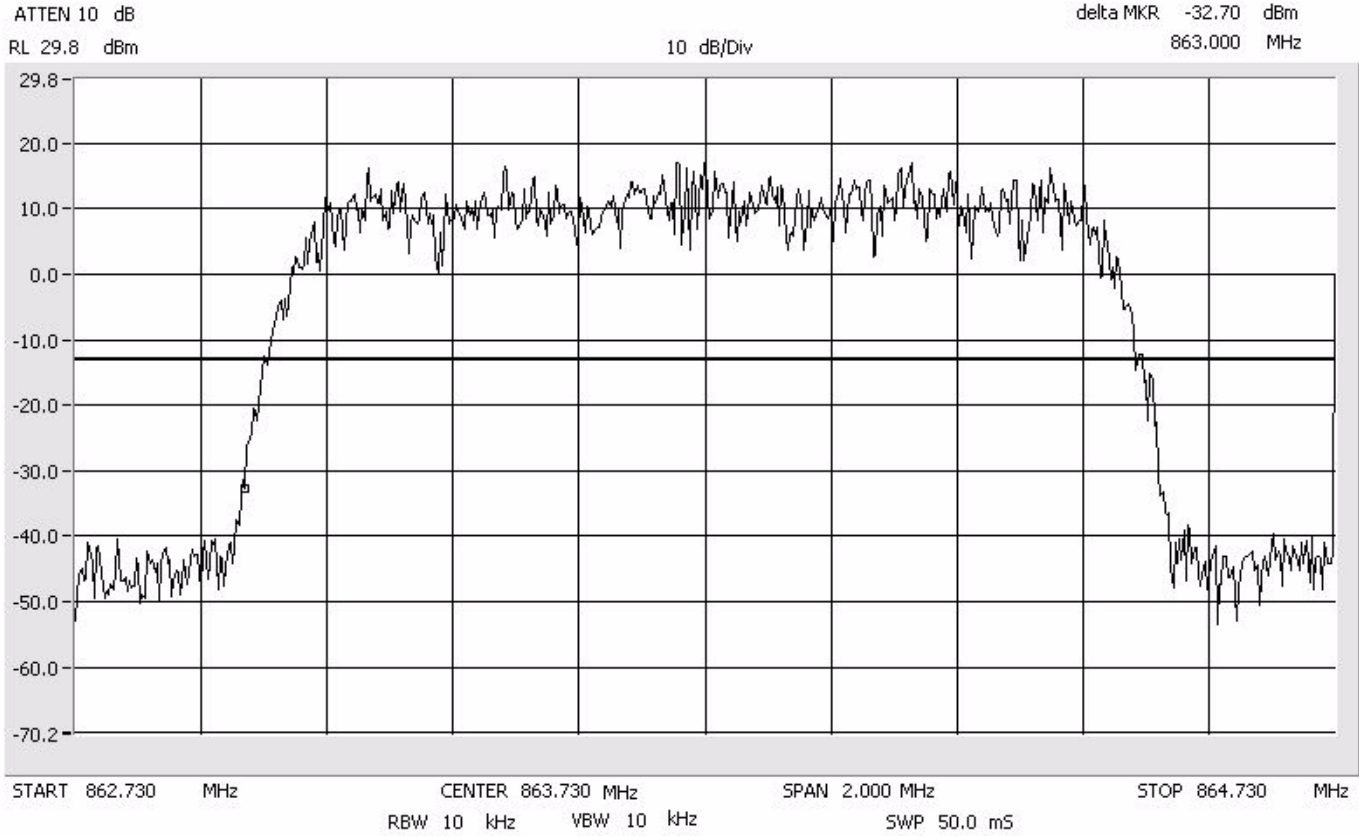
ATTEN 10 dB  
RL 29.8 dBm

delta MKR -54.03 dBm  
940.0000 MHz



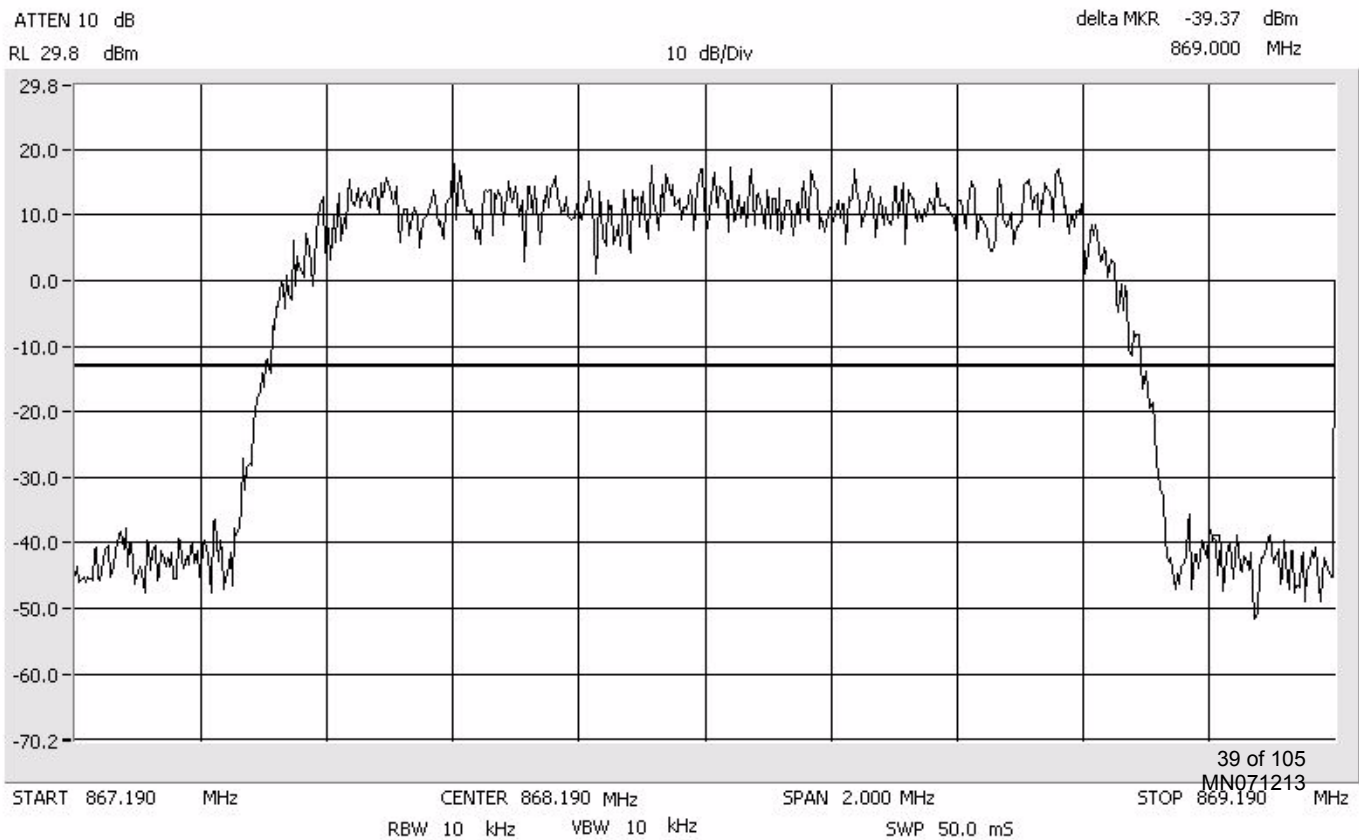
# Band Edge CDMA

Center: 863.73  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz



# Band Edge CDMA

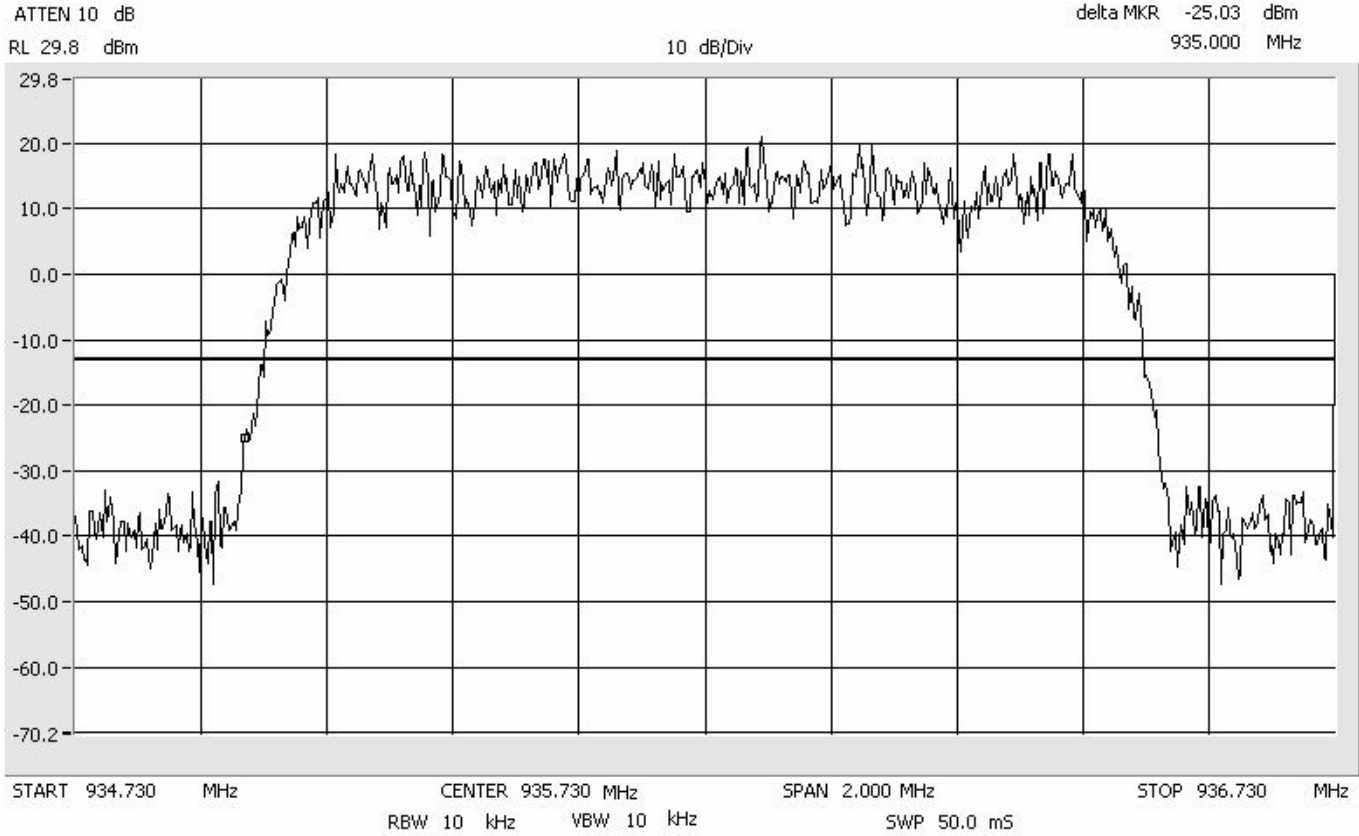
Center: 868.19 MHz  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz





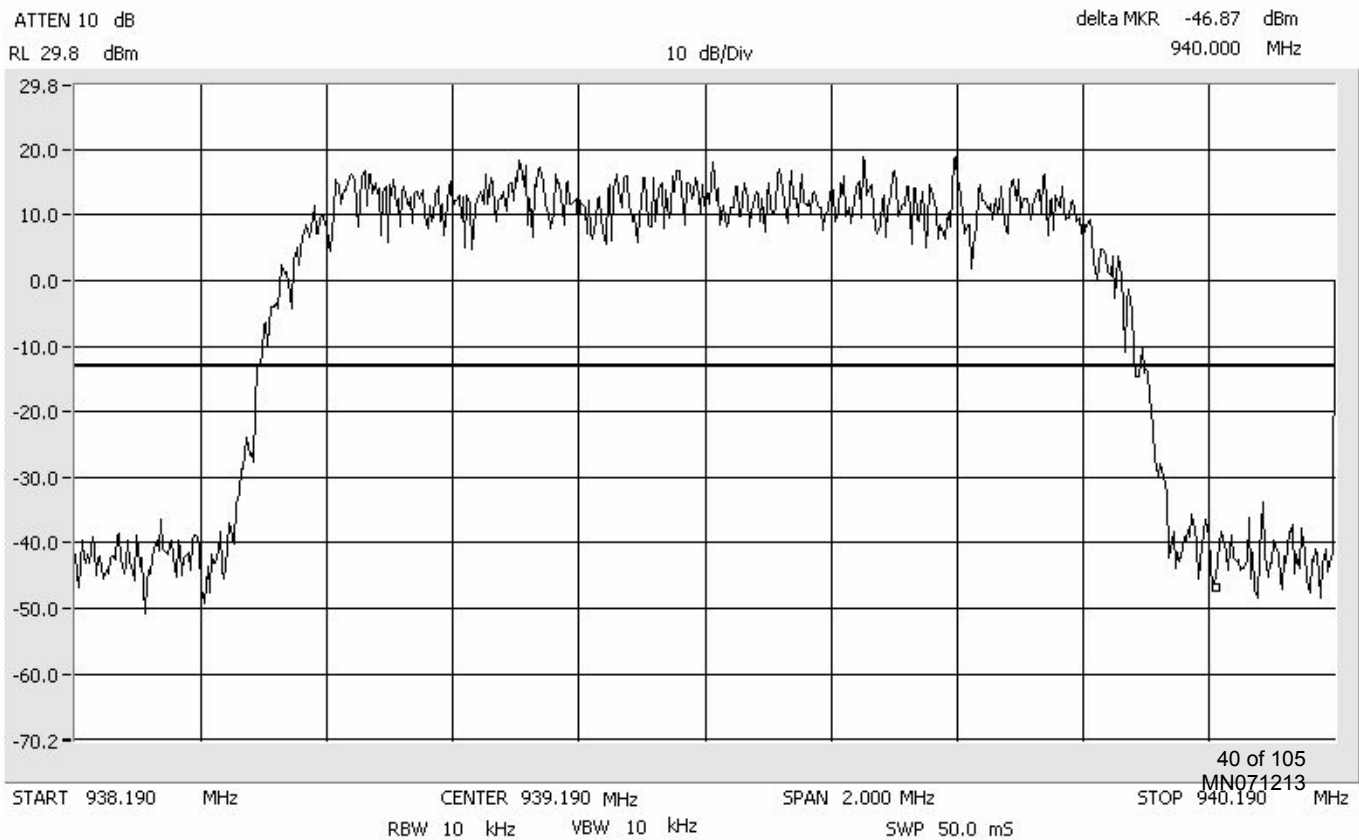
# Band Edge CDMA

Center: 935.73  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz



# Band Edge CDMA

Center: 939.19 MHz  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz





# Conducted Output Power Test for ADC Inc FlexWave™ URH - SMR Model Number FWU-D20000002110RU

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\*Note: The EUT is a fixed repeater and not a base station.

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected to the power meter. The carrier output, below, was conducted using a single FM, iDEN, and CDMA signal generator. The power meter level was offset to compensate for attenuators and cable loss between the EUT and the power meter.

A signal was used at the low, mid and high parts of the selected band. The power meter level was offset by 39.8 dB to compensate for attenuators and cable loss between the EUT and the power meter.

| <b><u>FM</u></b>  |                    | <b><u>iDEN</u></b> |                    |
|-------------------|--------------------|--------------------|--------------------|
|                   | <b>12.02 Watts</b> |                    | <b>12.22 Watts</b> |
| Carrier Frequency | Carrier Output     | Carrier Frequency  | Carrier Output     |
| 851.2 MHz         | <u>39.57</u> dBm   | 851.2 MHz          | <u>39.83</u> dBm   |
| 860.0 MHz         | <u>40.67</u> dBm   | 860.0 MHz          | <u>40.43</u> dBm   |
| 868.8 MHz         | <u>40.80</u> dBm   | 868.8 MHz          | <u>40.87</u> dBm   |

| <b><u>CDMA</u></b> |                    |
|--------------------|--------------------|
|                    | <b>11.94 Watts</b> |
| Carrier Frequency  | Carrier Output     |
| 851.75 MHz         | <u>40.05</u> dBm   |
| 860.0 MHz          | <u>40.77</u> dBm   |
| 868.25 MHz         | <u>40.54</u> dBm   |

| <b><u>FM</u></b>  |                    | <b><u>iDEN</u></b> |                    |
|-------------------|--------------------|--------------------|--------------------|
|                   | <b>14.22 Watts</b> |                    | <b>13.74 Watts</b> |
| Carrier Frequency | Carrier Output     | Carrier Frequency  | Carrier Output     |
| 935.2 MHz         | <u>41.53</u> dBm   | 935.2 MHz          | <u>41.38</u> dBm   |
| 937.5 MHz         | <u>41.13</u> dBm   | 937.5 MHz          | <u>41.25</u> dBm   |
| 939.8 MHz         | <u>41.08</u> dBm   | 939.8 MHz          | <u>40.88</u> dBm   |

| <b><u>CDMA</u></b> |                    |
|--------------------|--------------------|
|                    | <b>13.40 Watts</b> |
| Carrier Frequency  | Carrier Output     |
| 935.75 MHz         | <u>41.27</u> dBm   |
| 937.5 MHz          | <u>41.17</u> dBm   |
| 939.25 MHz         | <u>40.93</u> dBm   |

**Intermodulation Test for ADC Inc**  
**FlexWave™ URH - SMR**  
**Model Number FWU-D20000002110RU**

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The inter-modulation products test was performed for the EUT. Three tests were performed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were FM, iDEN, and CDMA. An investigation was made from 30 MHz to the 10<sup>th</sup> Harmonic of the highest fundamental frequency (~10 GHz). The following plots show the results.

Results:  
(See Plots)

FM

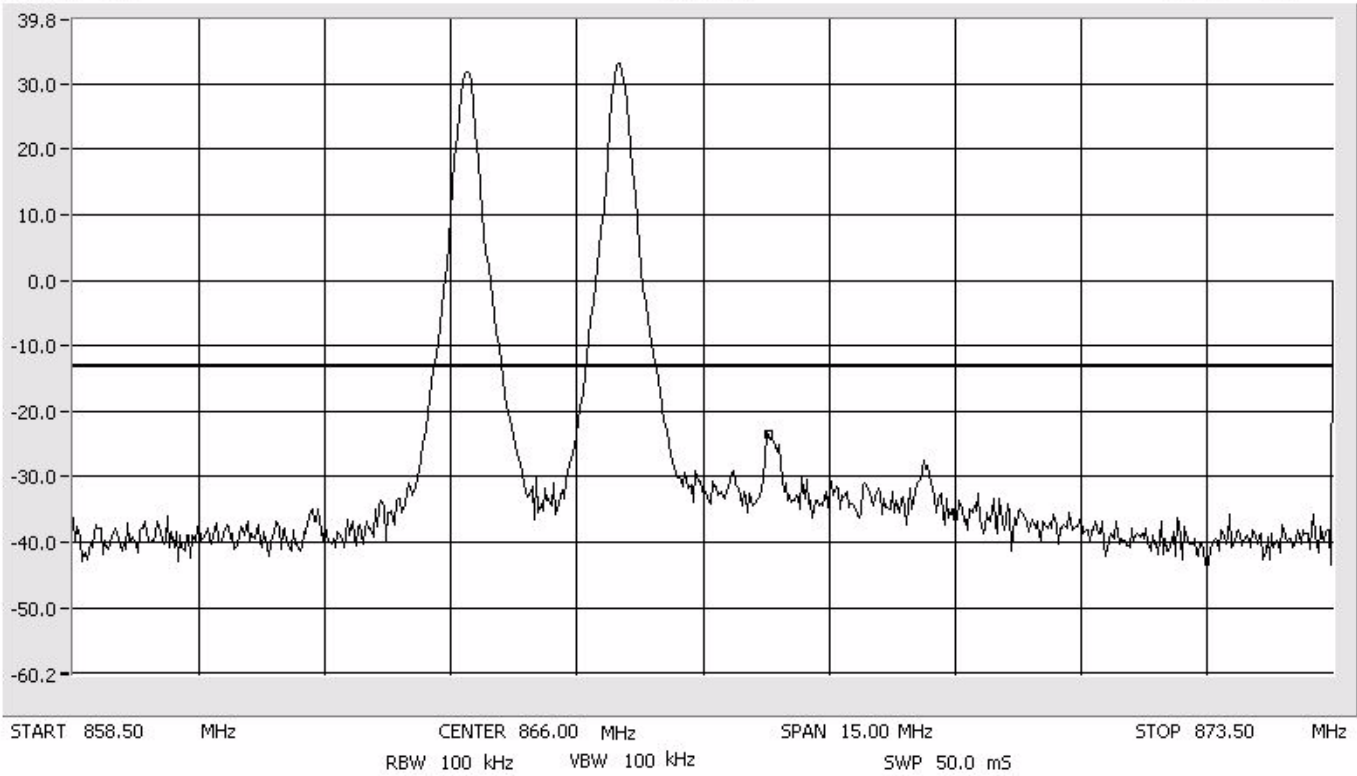
# Intermodulation Close - Lower SMR 800 MHz

Center: 866.0 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -23.37 dBm  
866.77 MHz

10 dB/Div



FM

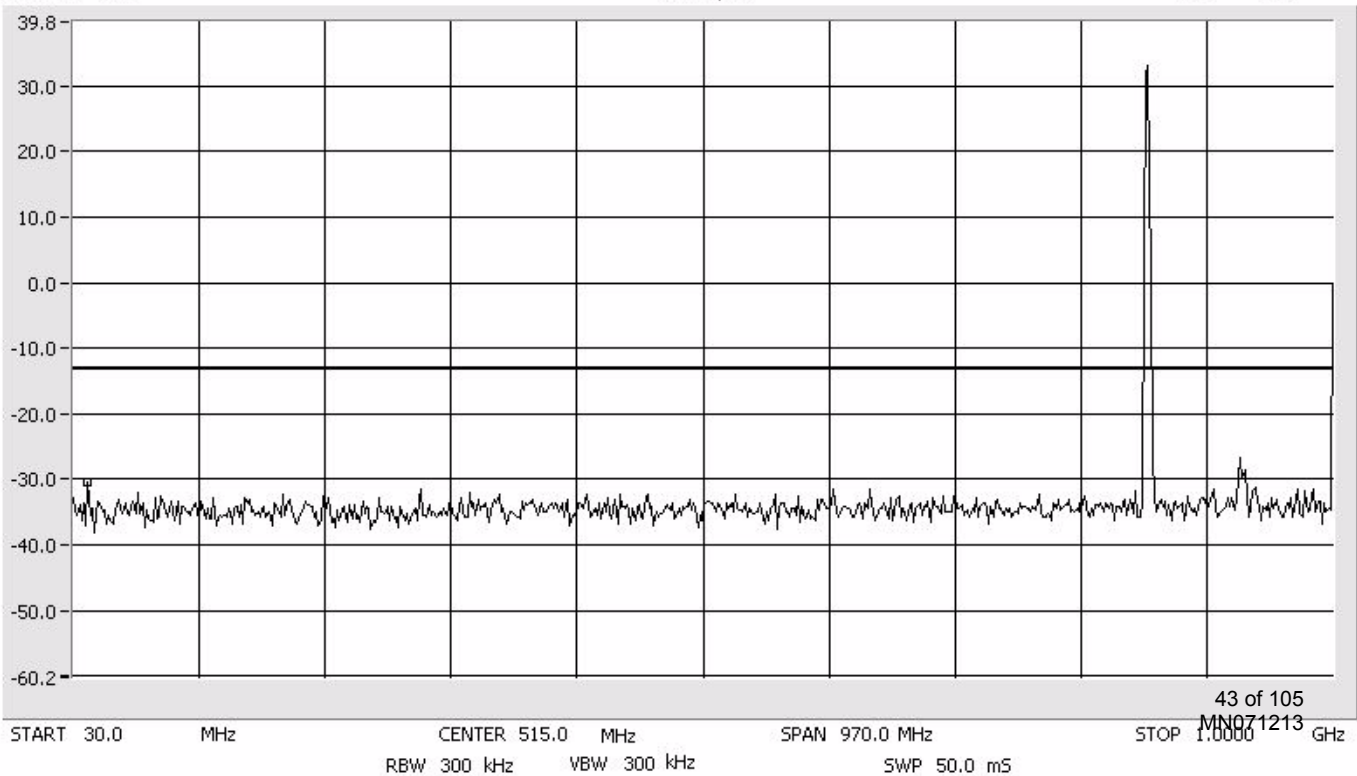
# Intermodulation Close - Lower SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -30.53 dBm  
41.3 MHz

10 dB/Div



# Intermodulation Close - Lower SMR 800 MHz

Span: 1 GHz to 10 GHz  
RBW/VBW: 1 MHz

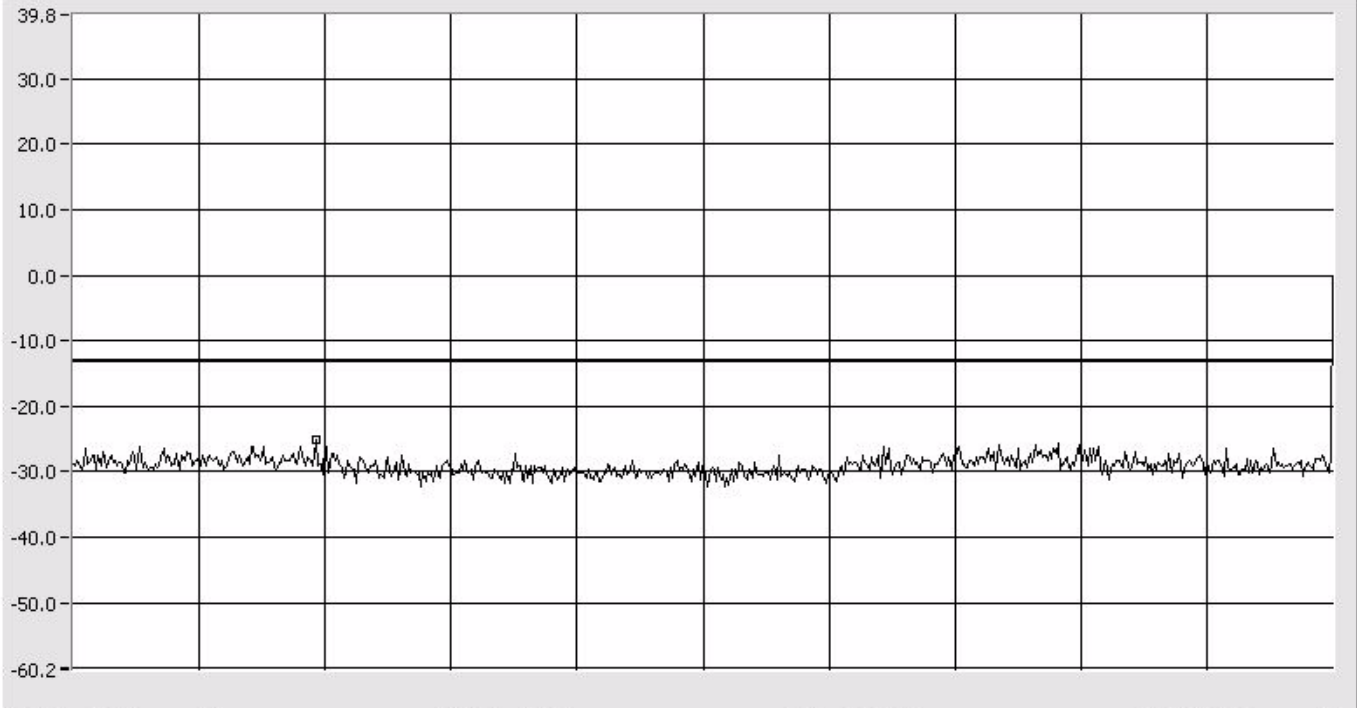
ATTEN 20 dB

delta MKR -25.03 dBm

RL 39.8 dBm

10 dB/Div

2.740 GHz

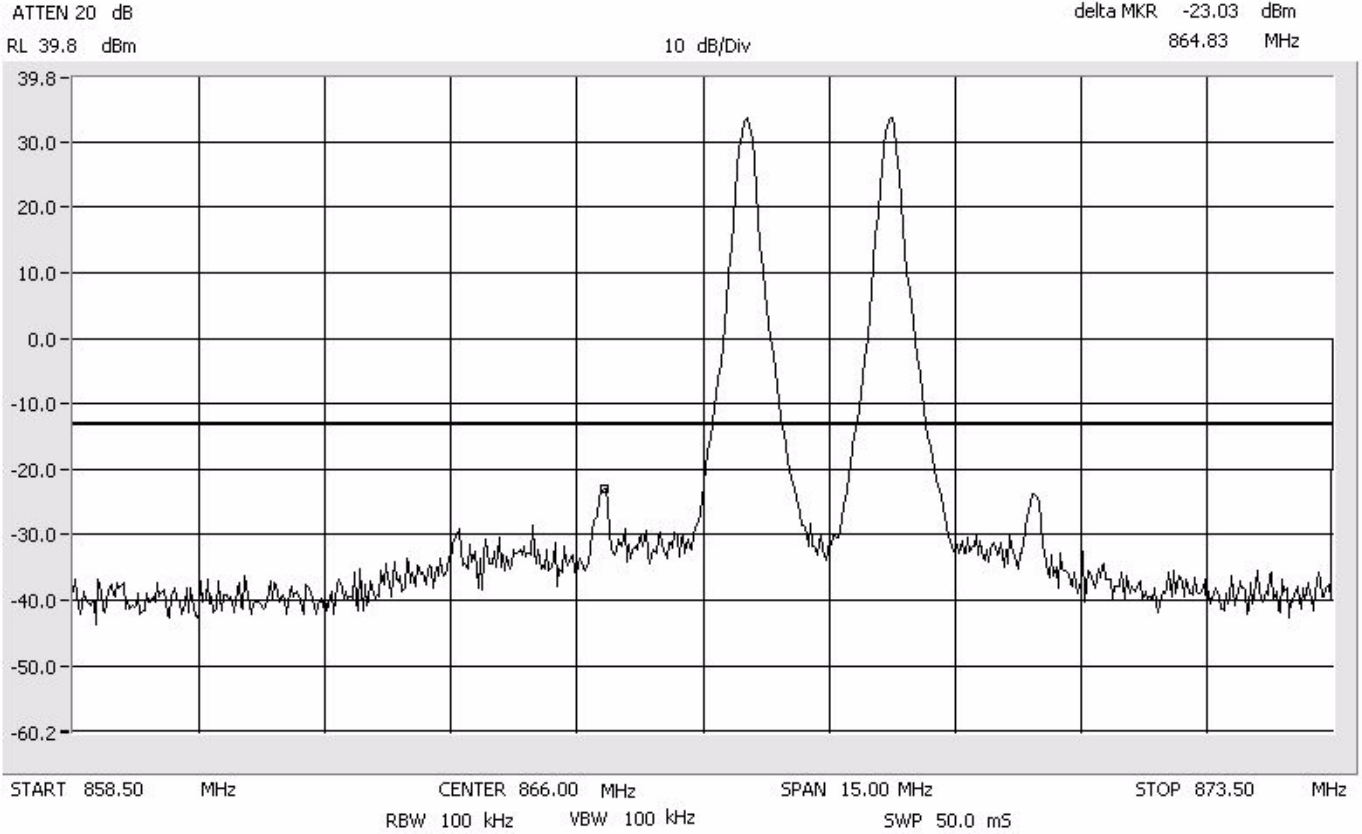


START 1.000 GHz      CENTER 5.500 GHz      SPAN 9.000 GHz      STOP 10.000 GHz  
RBW 1.0 MHz      VBW 1.0 MHz      SWP 50.0 mS

FM

# Intermodulation Close - Upper SMR 800 MHz

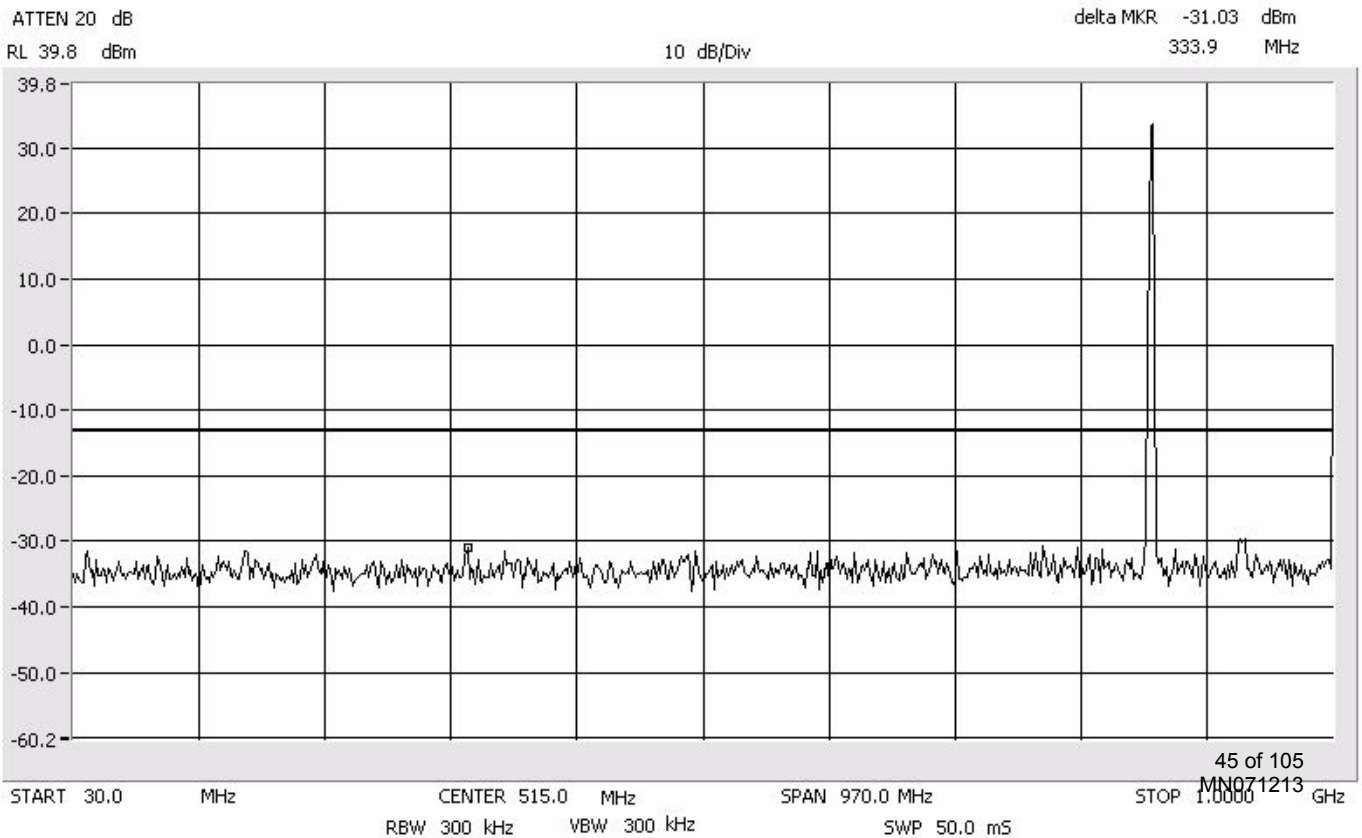
Center: 866.0 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz



FM

# Intermodulation Close - Upper SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz



# Intermodulation Close - Upper SMR 800 MHz

Span: 1 GHz to 10 GHz  
RBW/VBW: 1 MHz

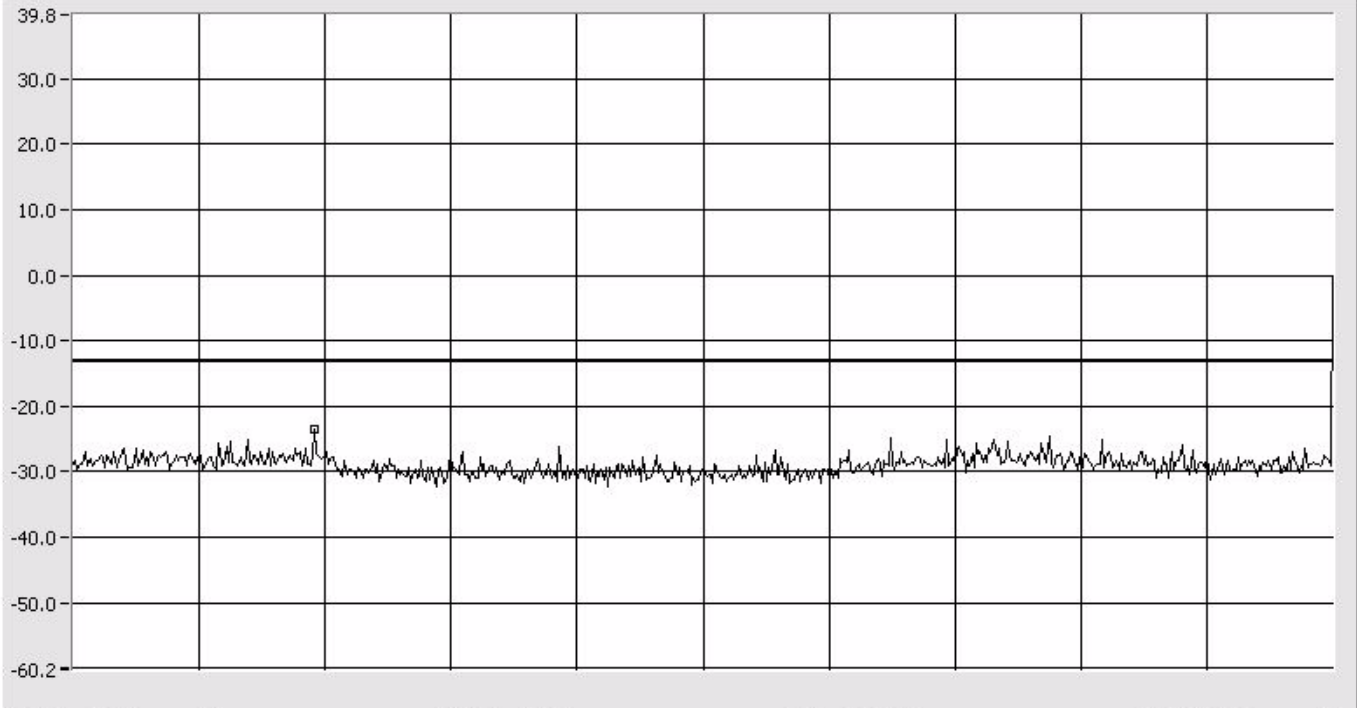
ATTEN 20 dB

delta MKR -23.53 dBm

RL 39.8 dBm

10 dB/Div

2.725 GHz



START 1.000 GHz      CENTER 5.500 GHz      SPAN 9.000 GHz      STOP 10.000 GHz  
RBW 1.0 MHz      VBW 1.0 MHz      SWP 50.0 mS

FM

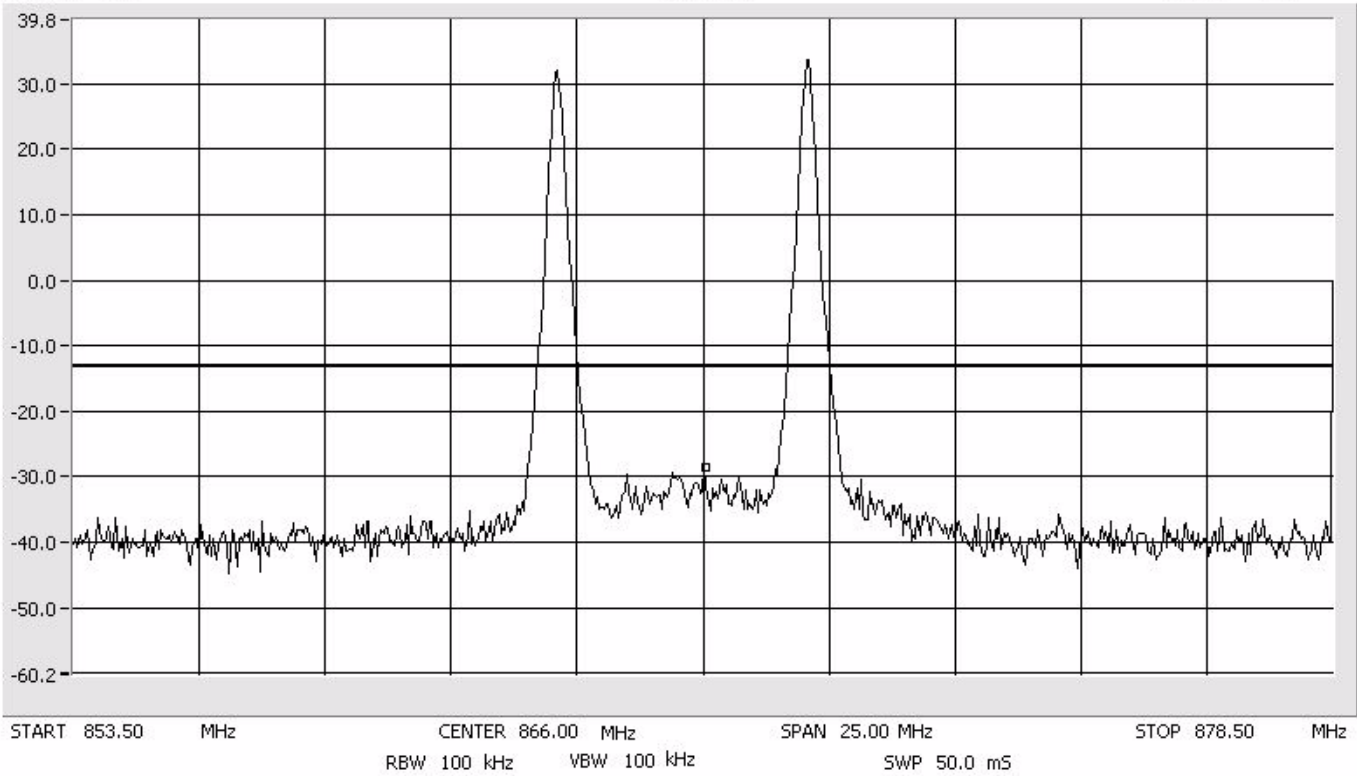
# Intermodulation Apart SMR 800 MHz

Center: 866.0 MHz  
Span: 25 MHz  
RBW/VBW: 100 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -28.53 dBm  
866.04 MHz

10 dB/Div



FM

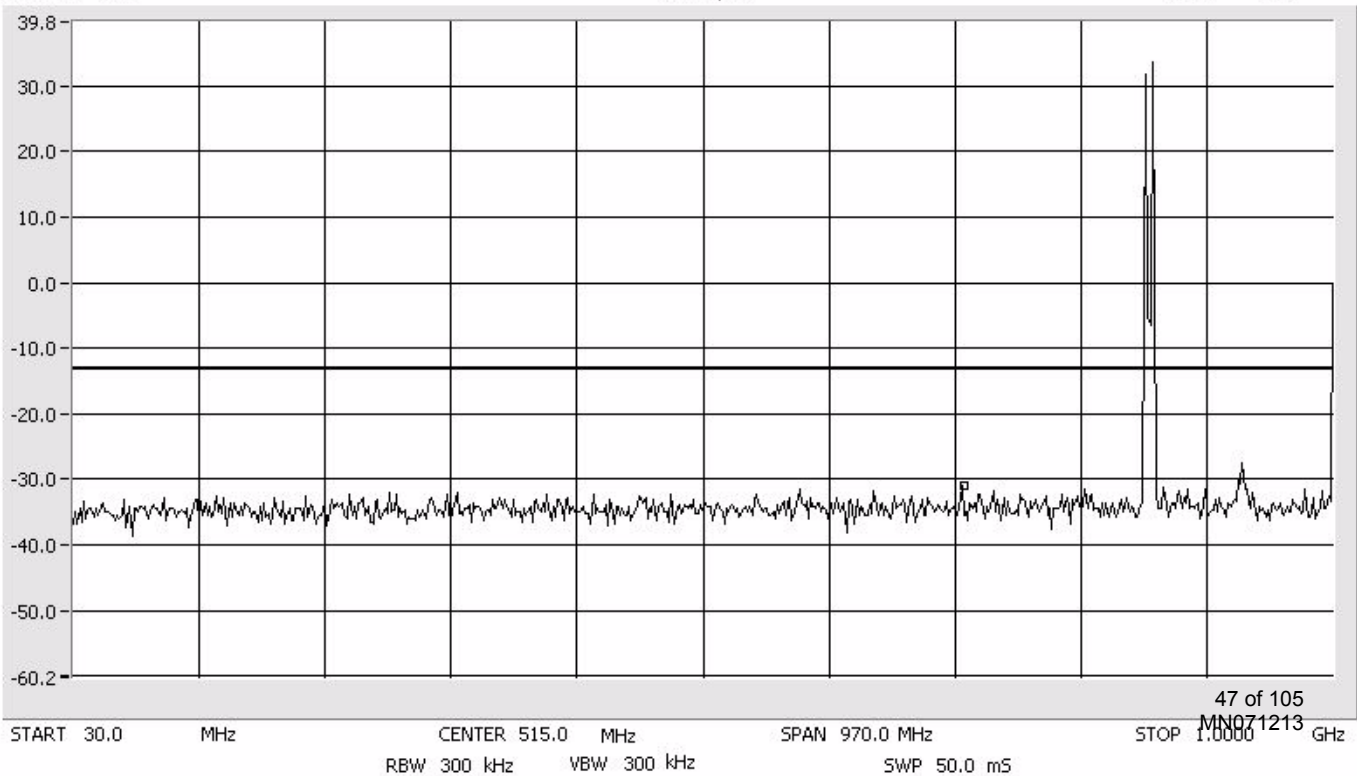
# Intermodulation Apart SMR 800 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz

ATTEN 20 dB  
RL 39.8 dBm

delta MKR -31.03 dBm  
715.5 MHz

10 dB/Div



# Intermodulation Apart SMR 800 MHz

Span: 1 GHz to 10 GHz  
RBW/VBW: 1 MHz

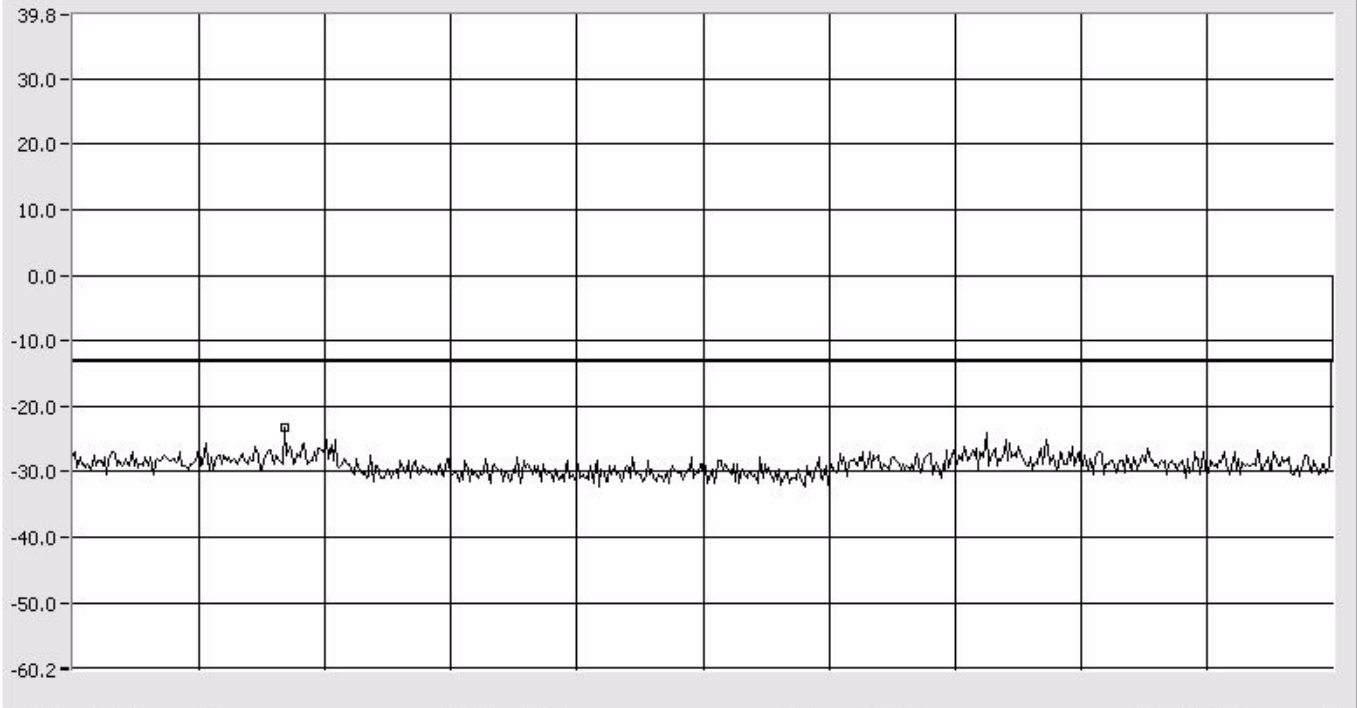
ATTEN 20 dB

delta MKR -23.20 dBm

RL 39.8 dBm

10 dB/Div

2.515 GHz



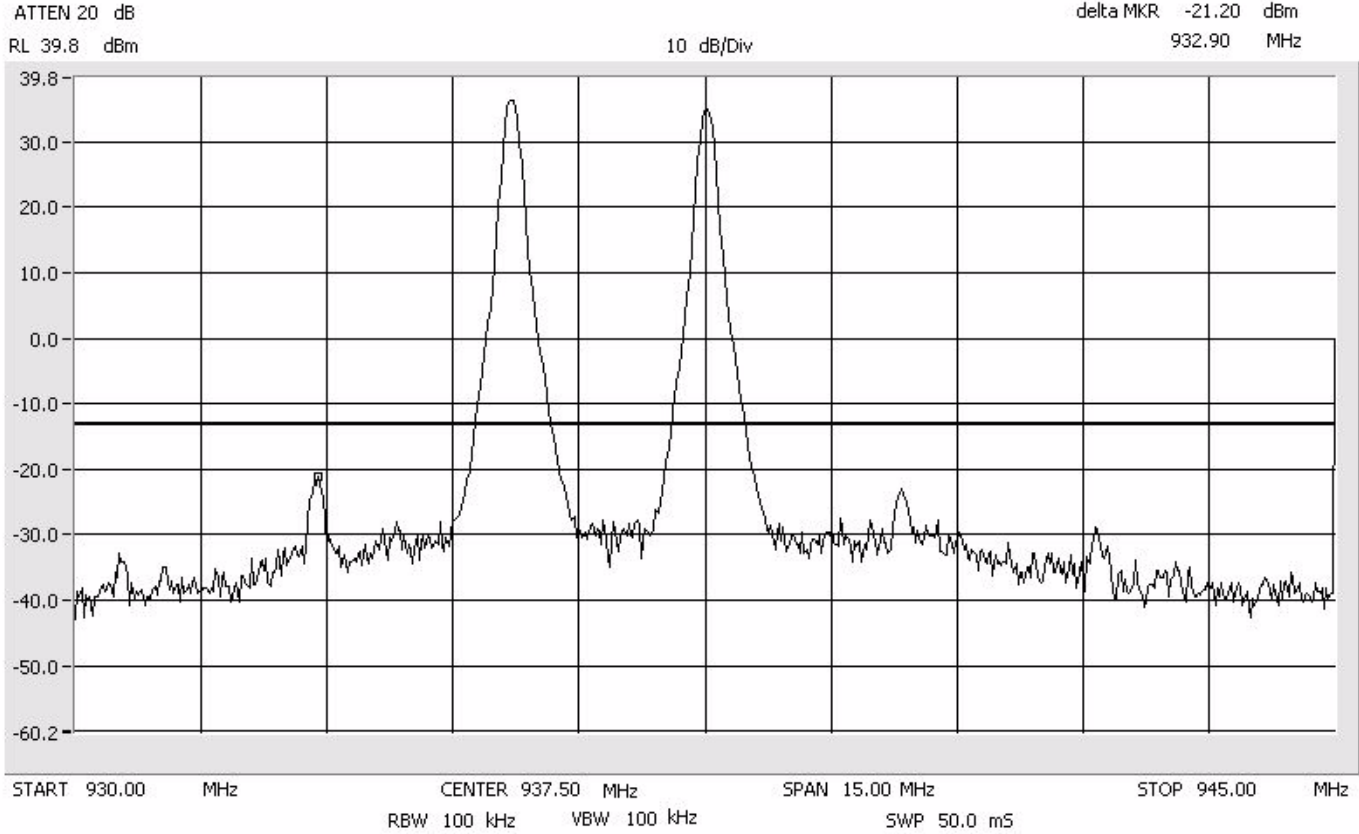
START 1.000 GHz      CENTER 5.500 GHz      SPAN 9.000 GHz      STOP 10.000 GHz  
RBW 1.0 MHz      VBW 1.0 MHz      SWP 50.0 mS



FM

# Intermodulation Close - Lower SMR 900 MHz

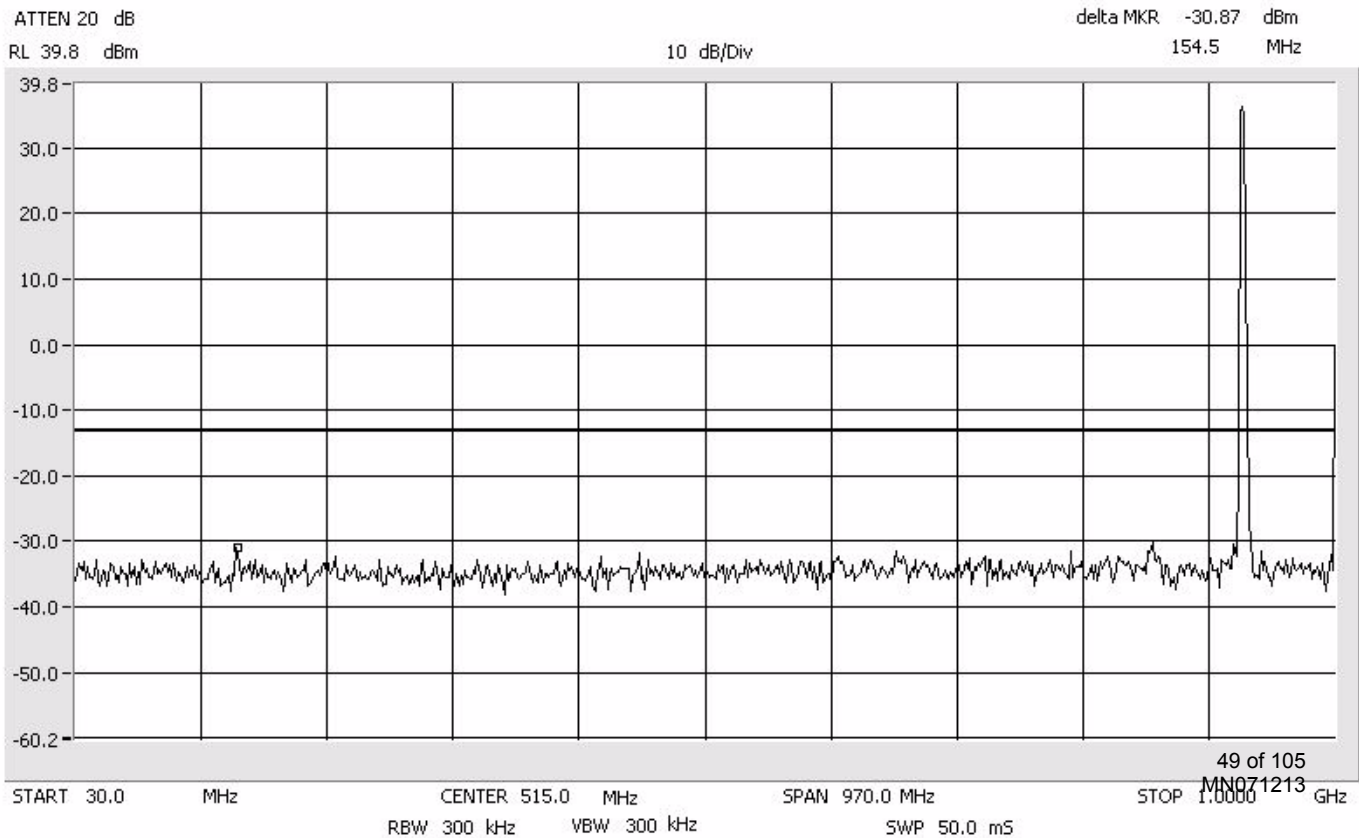
Center: 937.5 MHz  
Span: 15 MHz  
RBW/VBW: 100 kHz



FM

# Intermodulation Close - Lower SMR 900 MHz

Span: 30 MHz to 1 GHz  
RBW/VBW: 300 kHz



# Intermodulation Close - Lower SMR 900 MHz

Span: 1 GHz to 10 GHz  
RBW/VBW: 1 MHz

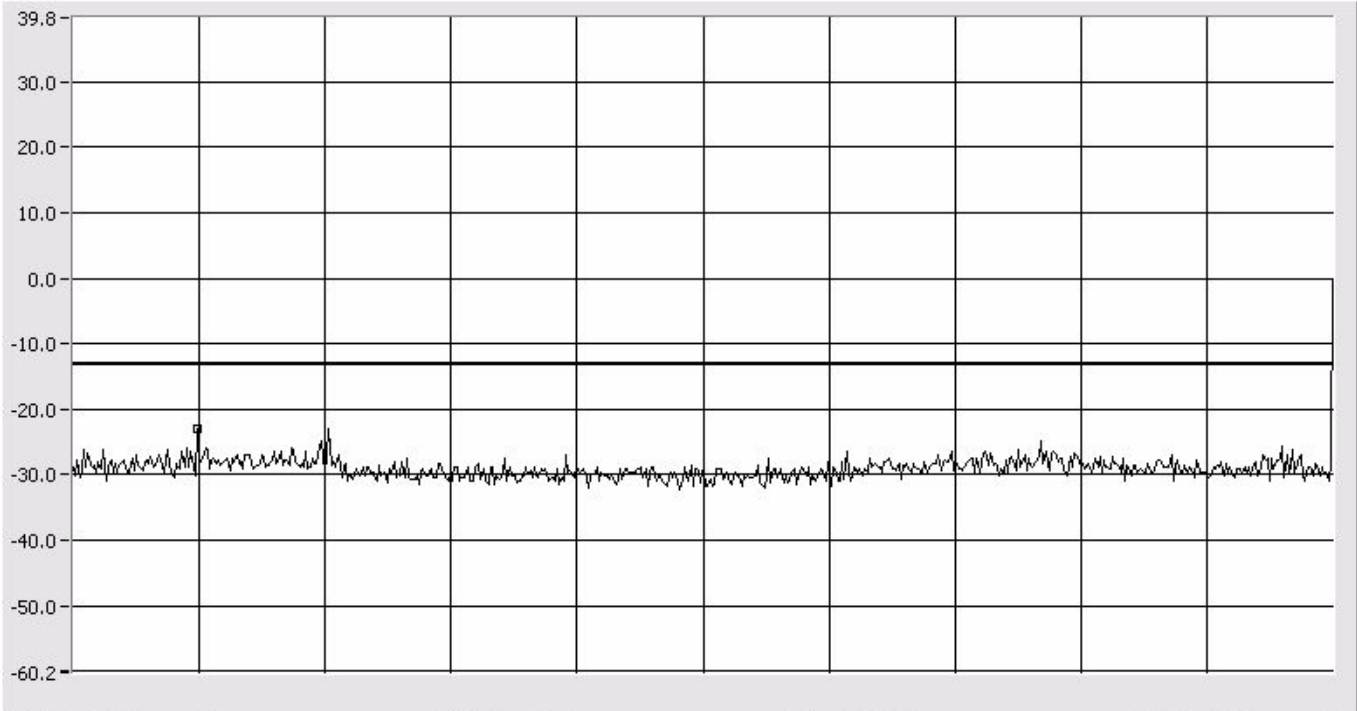
ATTEN 20 dB

delta MKR -23.03 dBm

RL 39.8 dBm

10 dB/Div

1.885 GHz



START 1.000 GHz      CENTER 5.500 GHz      SPAN 9.000 GHz      STOP 10.000 GHz  
RBW 1.0 MHz      VBW 1.0 MHz      SWP 50.0 mS