



# Test Report Summary

## FCC CFR 47, Part 24

### Subpart E Broadband PCS

**Manufacturer:** ADC Telecommunications

**Name of Equipment:** Bi-Directional Amplifier – PCS

**Model Number(s):** RPT-SHAAA12000

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

**Test Report Number:** MN070803-RX

**Test Date(s):** 4, 5, 6, 7 September, 2007 (ETL)  
30 August, 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 24.

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 24 and the EUT fulfills the requirements of the Federal Communications Commission's CFR 47 Part 24.

Date: 7 September, 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 – TEST REPORT**

**Test Report File Number:** MN070803-RX **Date of Issue:** 7 Sept, 2007

**Model Number(s):** RPT-SHAAA12000

**Product Name:** Bi-Directional Amplifier – PCS

**Product Type:** Amplifier

**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:** 3132442MIN-002  
**Reference(s)**

**Total pages including Appendices:** 100



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## 1.0 REVISION DESCRIPTION

Rev	Total Pages	Date	Description
A	100	September 07, 2007	Original Release

## 2.0 DOCUMENTATION

### 2.1 Test Regulations

- 24.232 Power and antenna height limits
- 24.235 Frequency stability
- 24.238 Emission limits for Broadband PCS equipment

**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: 25° C  
Relative Humidity: 28%  
Atmospheric Pressure: 95.8 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 – PCS - 1850 to 1910 MHz

## 2.4 Product Options:

None

## 2.5 EUT Specifications and Requirements:

Length: 8.75"

Width: 8.0"

Height: 2.5"

Weight: 7.85 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

## 2.7 Power Requirements:

Voltage: 120 VAC

Amps: 0.8 A

## 2.8 Typical Installation and/or Operating Environment:

Indoor only. System is typically employed as an indoor repeater.

## 2.9 Other Special Requirements:

None

## 2.10 EUT Software:

Revision Level: Version 1.0.0

Description: Repeater PC Program. System Management Software

### 2.11 EUT System Components

Description	Model #	Serial #	FCC ID #
BDA	RPT-SHAAA12000	None	

### 2.12 Support Equipment

Description	Manufacturer	Model #	FCC ID #
Power Meter	HP	EPM-441A	
Signal Generator	Agilent	E4438C	
Attenuator	Aeroflex	49-30-33	

### 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

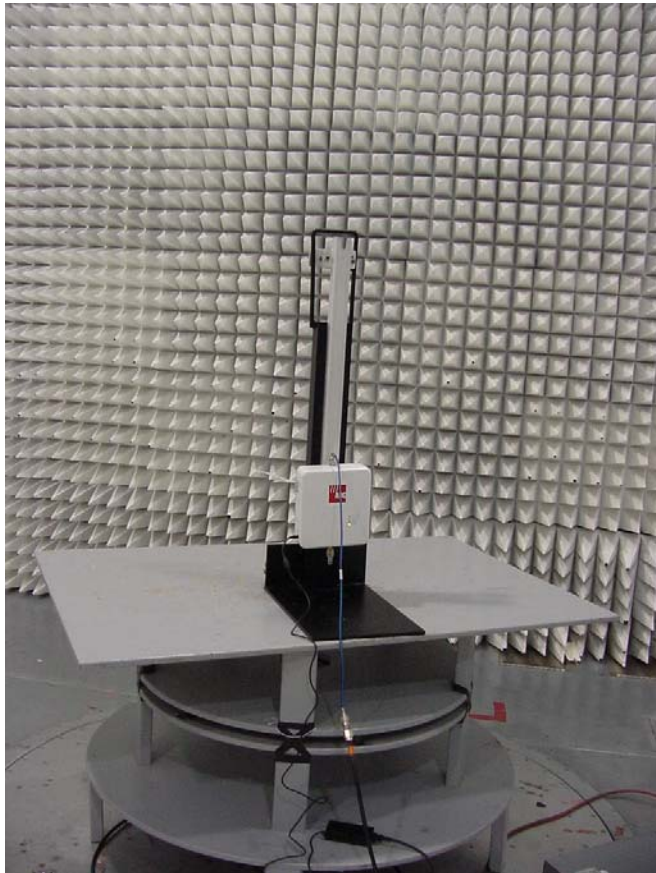
■ **fulfill the general approval requirements mentioned on page 4.**

not fulfill the general approval requirements mentioned on page 4.

### 3.0 TEST SET-UP DRAWINGS AND PHOTOS

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



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





### 3.3 Test Set-up Drawings

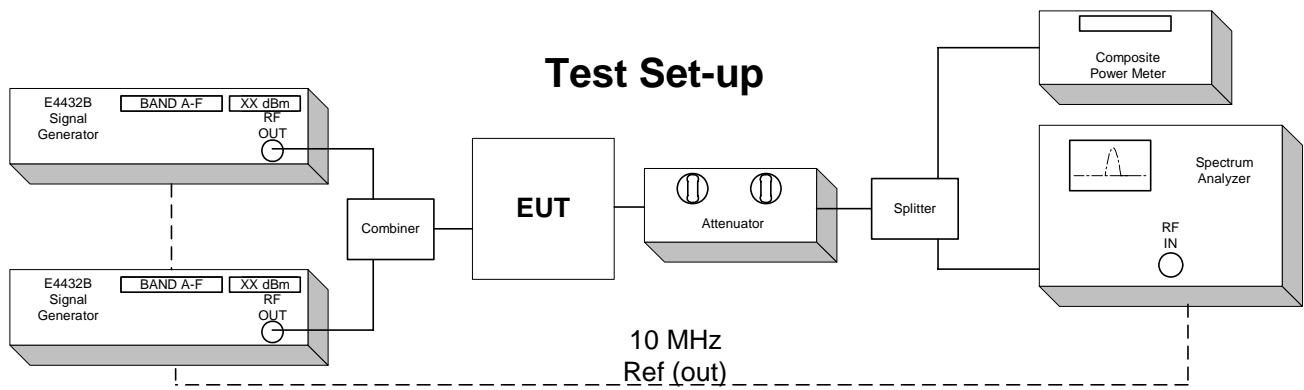
## Conducted and Radiated Emission Limits Test for ADC Inc.

### Conducted Output Power Test for ADC Inc

### Inter-Modulation Test for ADC Inc.

### Occupied Bandwidth Modulation Test for ADC Inc.

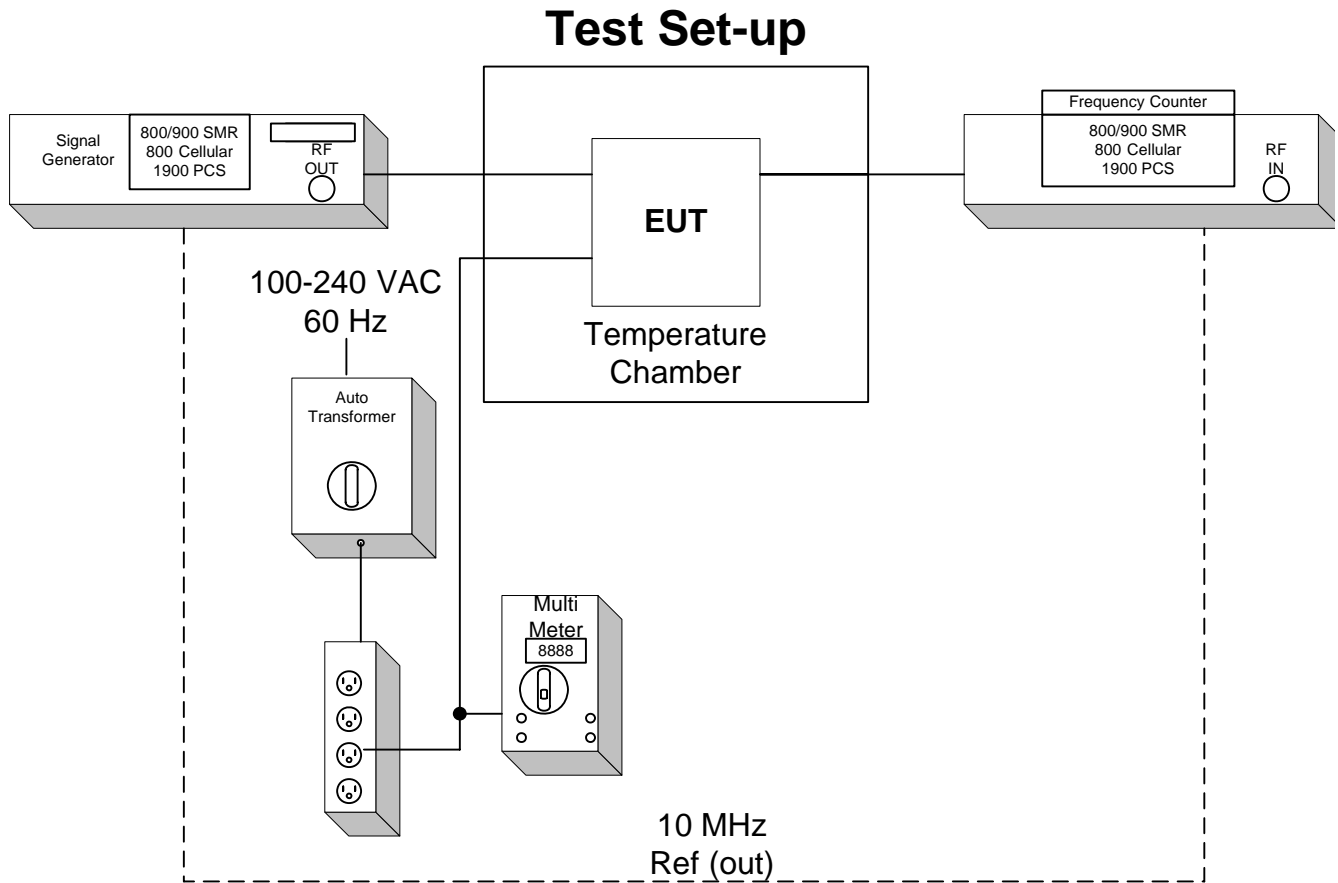
## Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000



# Frequency Tolerance Test for ADC Inc.

## Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000

EUT is specified for indoor use only with temperature range of  $-5^{\circ}$  to  $+45^{\circ}$  C, and was tested with its range.



## 4.0 TEST RESULTS

### 4.1.1 24.232 Power and antenna height limits

#### Test Summary:

- The requirements are:  **MET**  NOT MET
- Minimum margin of compliance is 29.37 dB at 1880.0 MHz (CDMA)

#### Test Location:

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

#### Test Distance:

- 3 Meters
- 10 Meters
- Conducted measurement**

#### Test Equipment (ADC):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Attenuator	Aeroflex	49-30-33	N/A	CNR
Spectrum Analyzer	HP	8563E	MC27690	11-22-07
Power Meter	HP	EPM-441A	MC27670	9-20-07
Signal Generator	Agilent	E4437B	83781	6-13-08

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

#### Test Limit:

100 Watts or 50 dBm Limit

#### Test Data:

[See page 37](#)

**Test Engineer:** Mark F. Miska

**Date:** 30 August, 2007

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#### 4.1.2 24.235 Frequency Stability

##### Test Summary:

- The requirements are:  **MET**  NOT MET
- The fundamental emission stays within the authorized frequency block.
- Frequency measured over a temperature range of -5 to 45° C and an input voltage range of 100 to 240 VAC.

##### Test Location:

ETL (Oakdale, MN)

**ADC facility (Shakopee, MN)**

##### Test Equipment (ADC):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Multimeter	Fluke	87	MC19056	8-20-08
Frequency Counter	HP	5347A	MC27548	2-18-07
Variable Auto Transformer	Staco	1520CT	MC44655	CNR
Signal Generator	Agilent	E4437B	83781	6-13-08

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

##### Test Limit:

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

##### Test Data:

[See page 78](#)

**Test Engineer:** Mark F. Miska

**Date:** 30 August, 2007

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#### 4.1.3 24.238 Emission limitations for broadband PCS equipment

##### 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):

Equipment	Manufacturer	Model	ADC Serial Number	Calibration Due.
Spectrum Analyzer	HP	8563E	MC27690	11-22-07
Power Meter	HP	EPM-441A	MC27670	9-20-07
Multimeter	Fluke	87	MC19056	8-20-08
Frequency Counter	HP	5347A	MC27548	2-18-08
Temperature Chamber	Ecosphere		MC21679	1-11-08
Variable Auto Transformer	Staco	1520CT	MC44655	CNR
Signal Generator	Agilent	E4437B	83781	6-13-08
Signal Generator	Agilent	E4436B	1283112C	4-4-08
Power Supply	Xantrex	HPD 60-5	MC27764	6-25-08
Attenuator	Aeroflex	49-30-33	N/A	CNR

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

##### Test Equipment (Intertek):

Equipment	Manufacturer	Model	Serial No.	Cal. Due.
Spectrum Analyzer	Rohde & Schwarz	FSP 40	100024	08/08
Spectrum Analyzer	Rohde & Schwarz	ESCI	100358	04/08
Instrument Control	TILE!	Ver. 3.4 K.15	N/A	N/A
Antenna	Schaffner-Chase	Bicono-Log	2468	07/08
Antenna	EMCO	Horn 3115	9507-4513	01/08
Antenna	EMCO	Horn 3116	9904-2423	07/08
Pre-Amp	MITEQ	AMF-5D	1122951	04/08
Pre-Amp	MITEQ	AMF-6F-16002600-25-10P	1222383	09/15/07

##### 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 15 – 36

[Intermodulation Test](#), pages 38 – 70

[Occupied Bandwidth](#), pages 71 – 77

Radiated Emissions, pages 79 – 99 ([Appendix B](#))

**Test Engineer:** Mark F. Miska

**Date:** 30 August, 2007

**Date:** 30 August, 2007

**Date:** 30 August, 2007

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5.0

## APPENDIX A

Test Data

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**Test Engineer:** Mark F. Miska      **Date:** 30 August, 2007

# Conducted Emission Limits Test for ADC Inc. Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000

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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 TDMA, GSM, EDGE, CDMA, EVDO, and W-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  $(19\text{dBm} - [43 + 10\log(0.08\text{W})])$

Band edge compliance is also demonstrated using a TDMA, GSM, EDGE, CDMA, EVDO, and W-CDMA signal at the upper and lower limits of the band.

Industry practice has generally set the input signal power level. Test signal used was  $\approx -47$  dBm input to EUT. Industry practice has generally set the output signal power level.

EUT:  
Range: 100 - 240 VAC  
Tested @: 120 VAC  
Tested @: 0.8 A

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

The input to the unit has a digital attenuation chip (ALC) to provide protection from overdrive. The circuit detects the power level of the final stage amplifier and compares with the pre-set value. If the detected value is bigger than the pre-set, ALC will increase the attenuation until the detect value is on level with pre-set value. If the detected value is smaller than the pre-set, ALC will decrease the attenuation until the detect value is on level with pre-set value. With above mentioned functions, the ALC circuit maintains the output power level at +13dBm (pre-set value). Single channel operation, or multi-channel operation will not exceed nominal gain of the system.

The frequency stability is derived from two 13MHz TCVCXOs (RTVS-104), separate for the Forward and Reverse paths. These each feed two PLLs for the IF down conversion.

The spurious limitation uses ALC to help suppress in-band spurious by preventing final stage amplifier overdrive, while the duplex filter suppresses out-of-band spurious. Internal to the electronics, the use of SAW filters provides for higher Q roll-off at band edges.

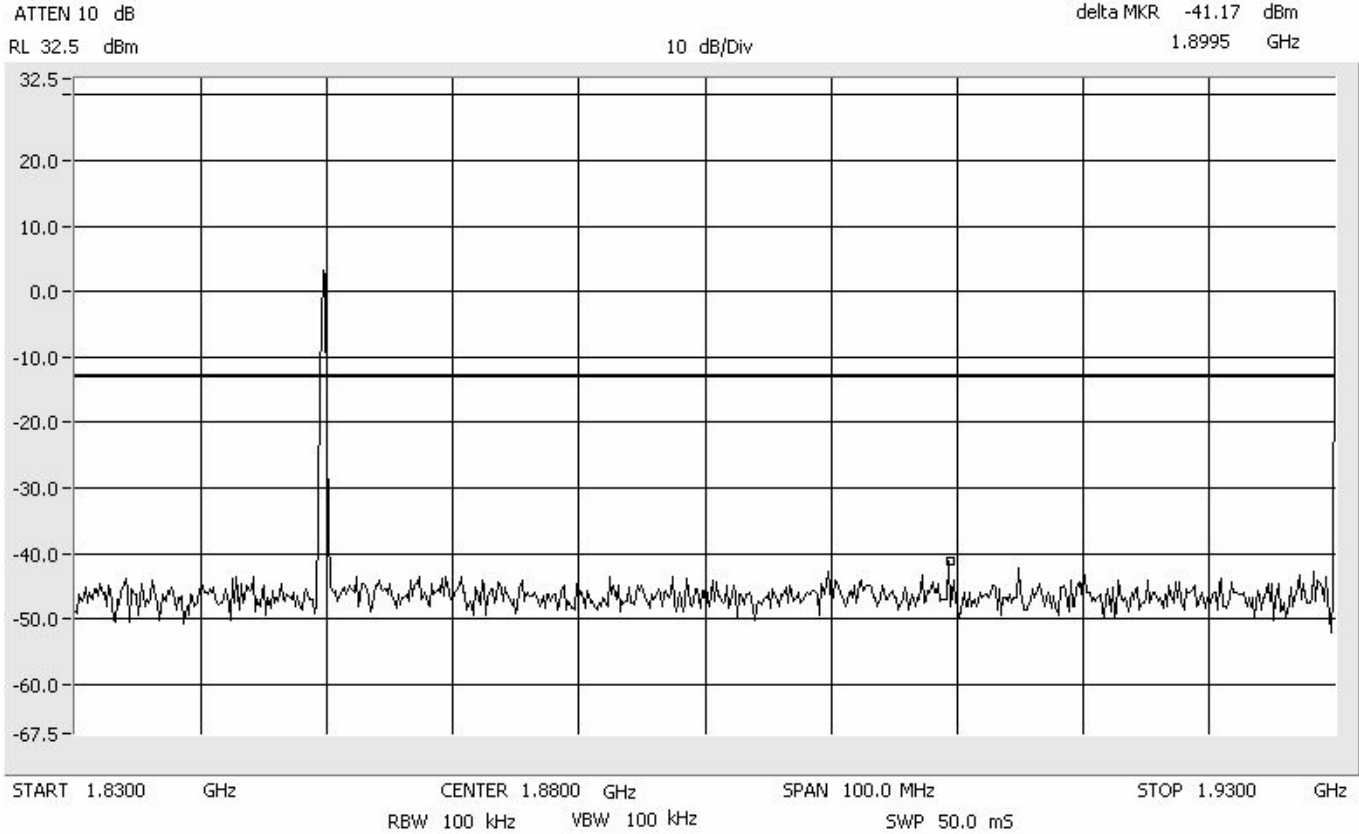
This equipment does not modulate the RF, so there is no modulation limiter. This equipment does not change the modulation of the RF or the occupied bandwidth of any channel. It transports the signal, as is, over an optical link. The RF input is not changed in the RF output.

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)

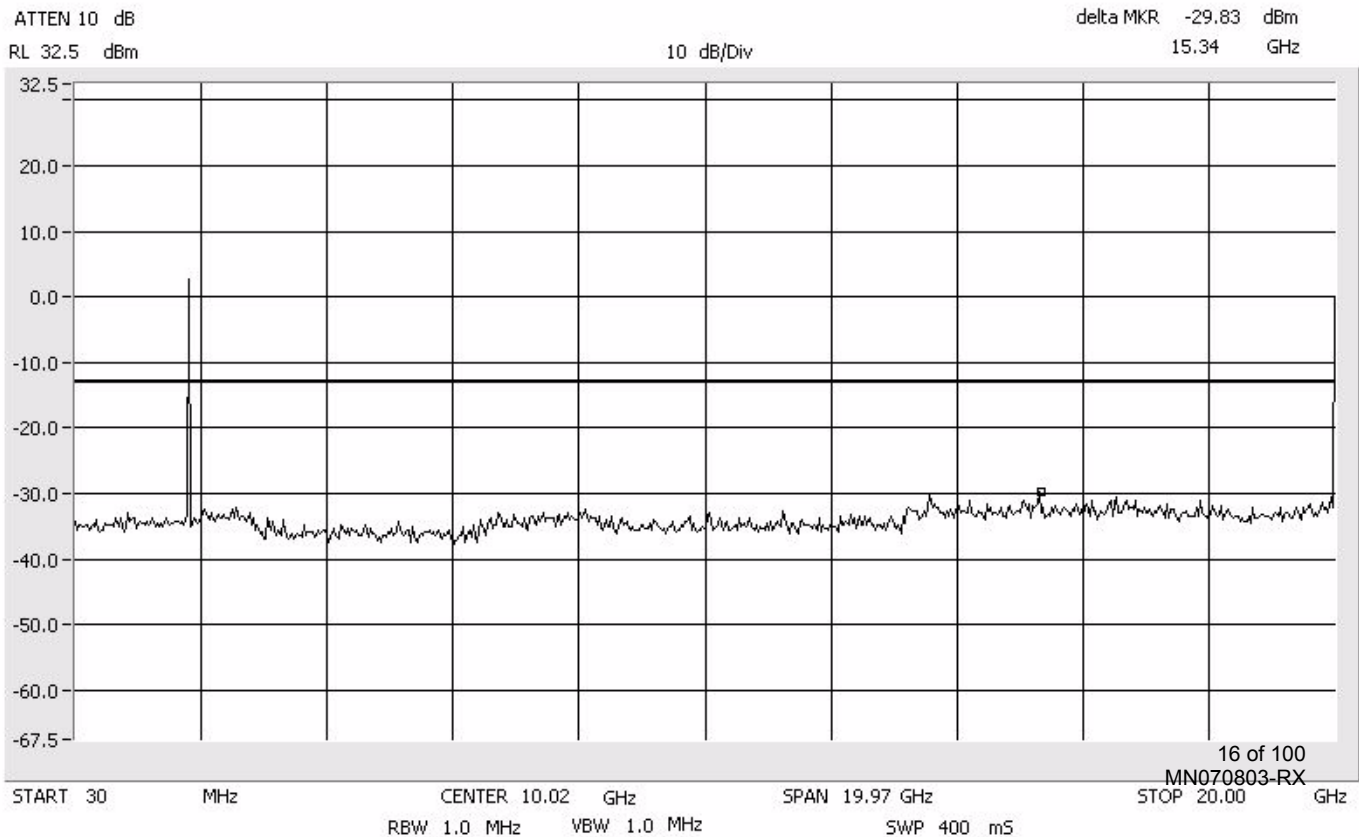
# Conducted Emissions Low PCS 1900 MHz

Center: 1880.0 MHz  
Span: 100 MHz  
RBW/VBW: 100 kHz



# Conducted Emissions Low PCS 1900 MHz

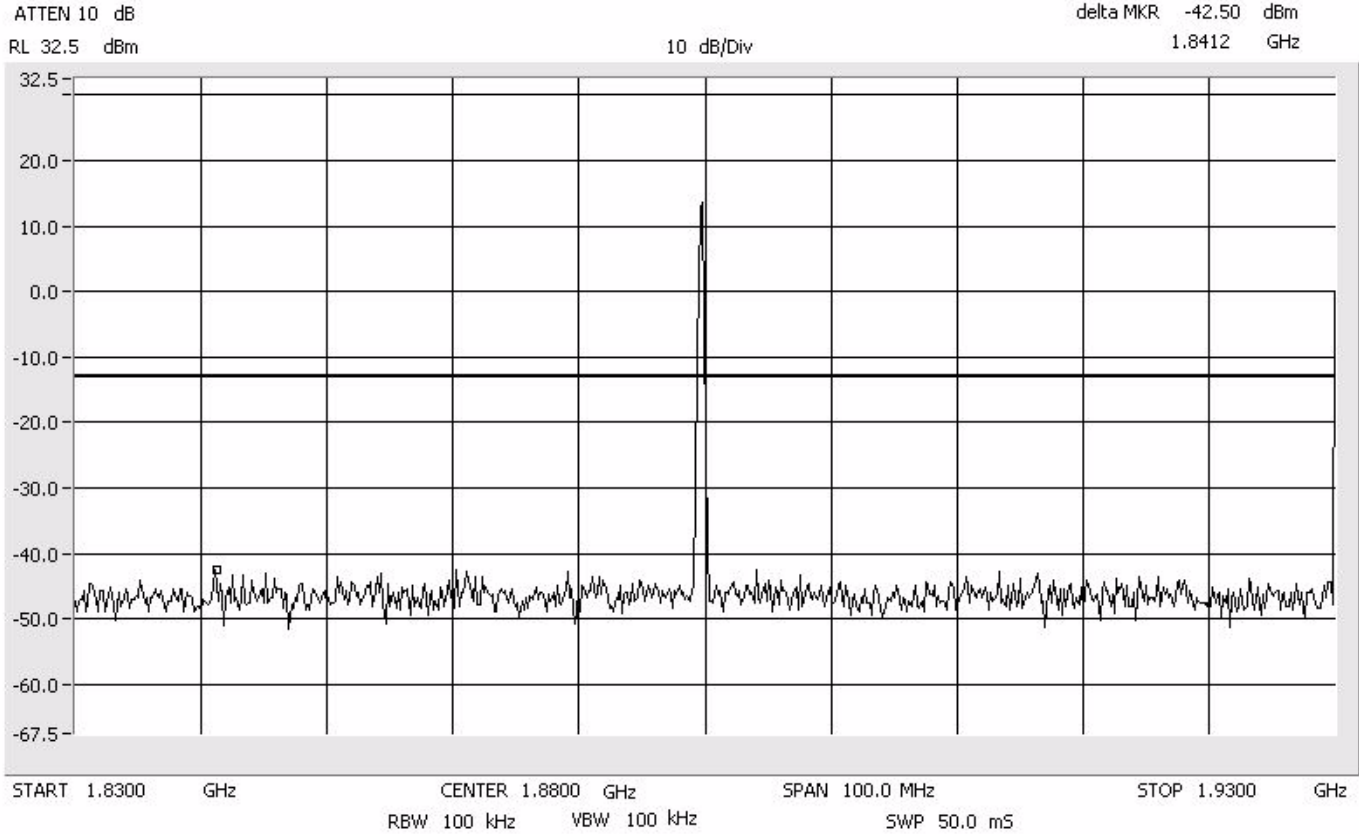
Span: 30 MHz to 20 GHz  
RBW/VBW: 1 MHz





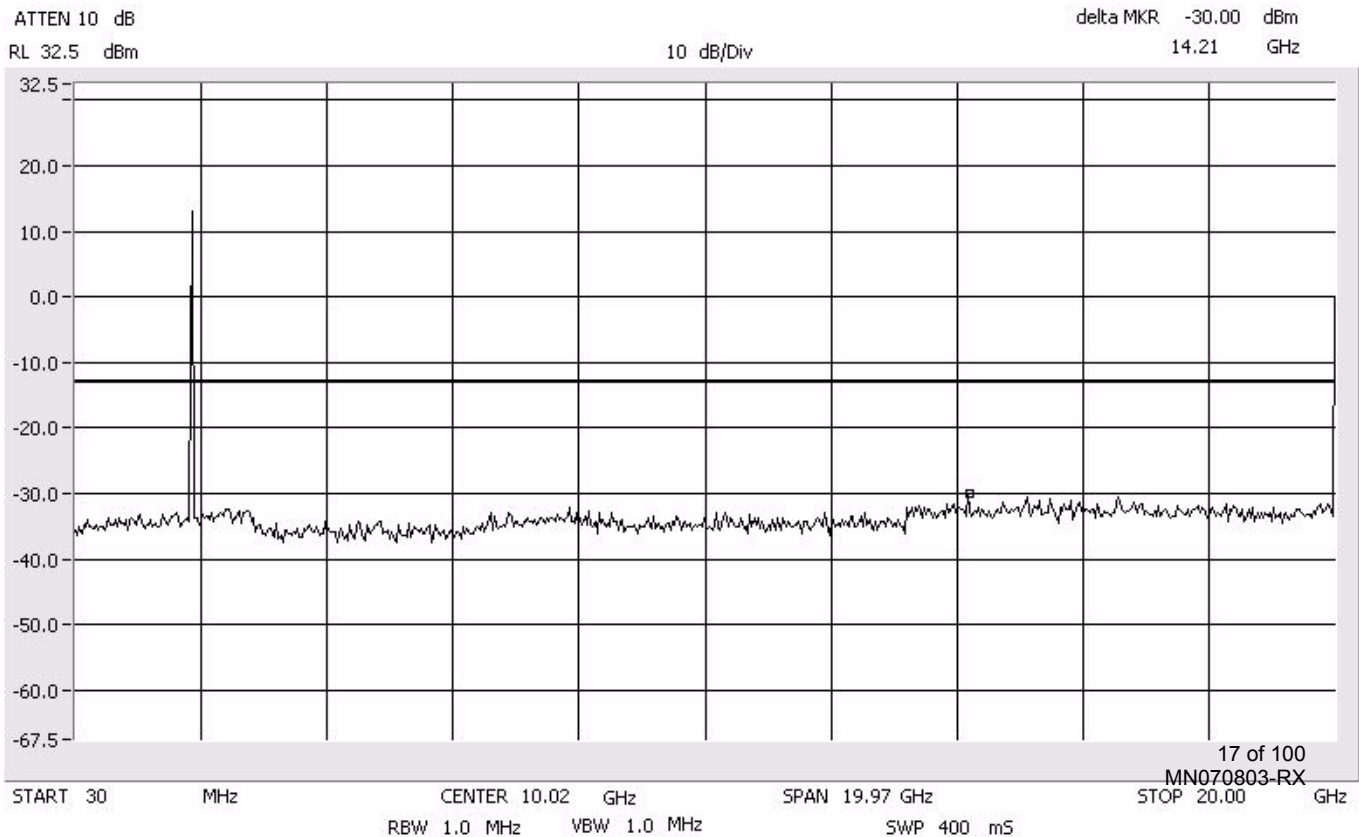
# Conducted Emissions Mid PCS 1900 MHz

Center: 1880.0 MHz  
Span: 100 MHz  
RBW/VBW: 100 kHz



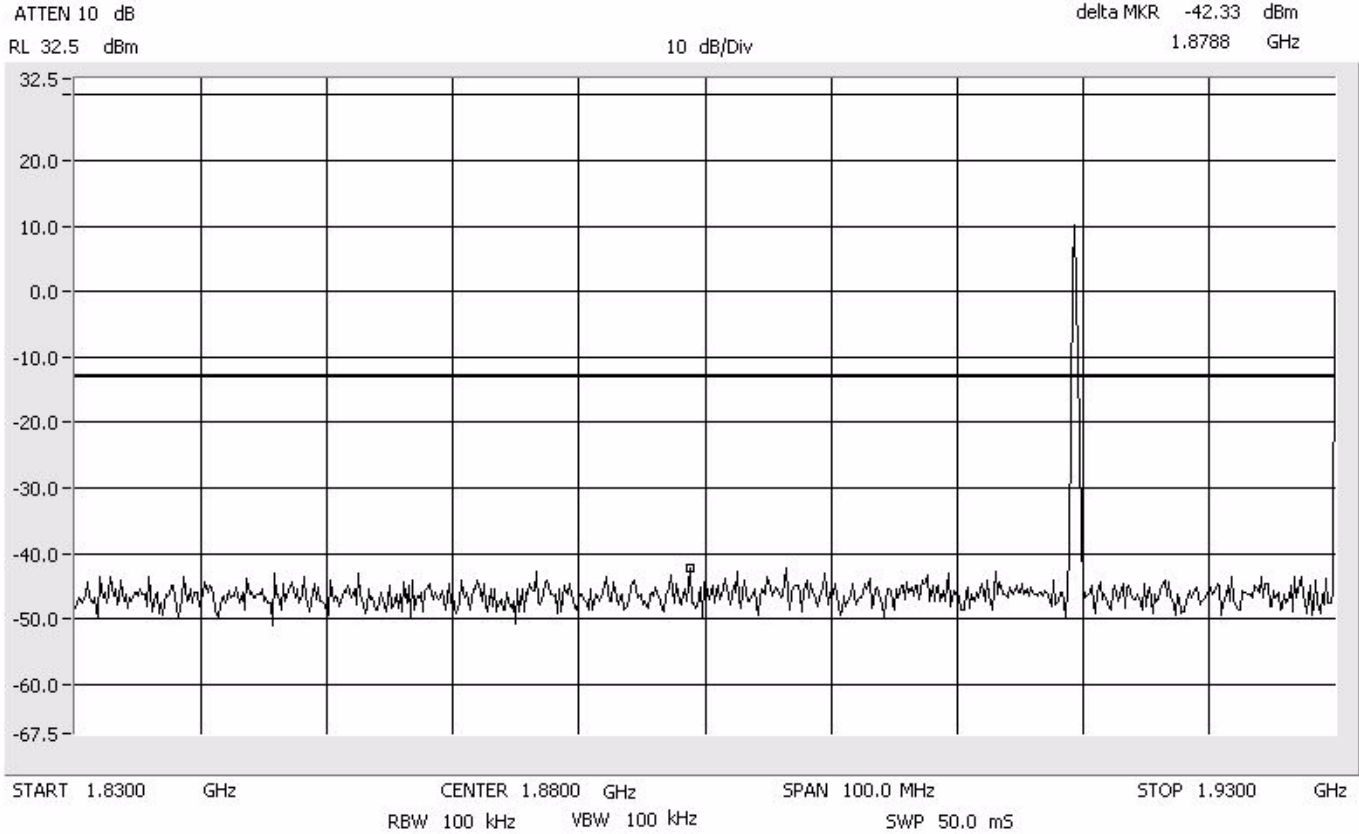
# Conducted Emissions Mid PCS 1900 MHz

Span: 30 MHz to 20 GHz  
RBW/VBW: 1 MHz



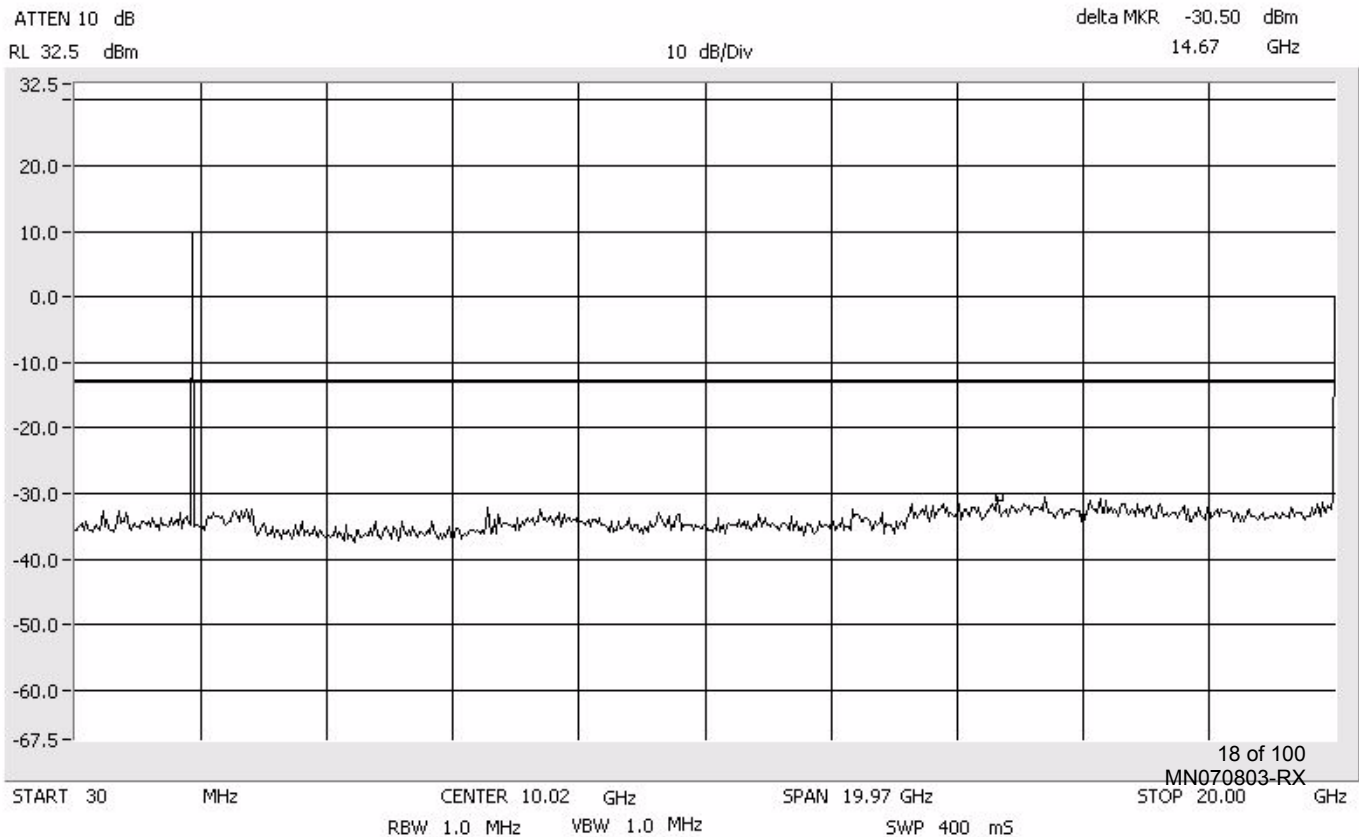
# Conducted Emissions High PCS 1900 MHz

Center: 1880.0 MHz  
Span: 100 MHz  
RBW/VBW: 100 kHz



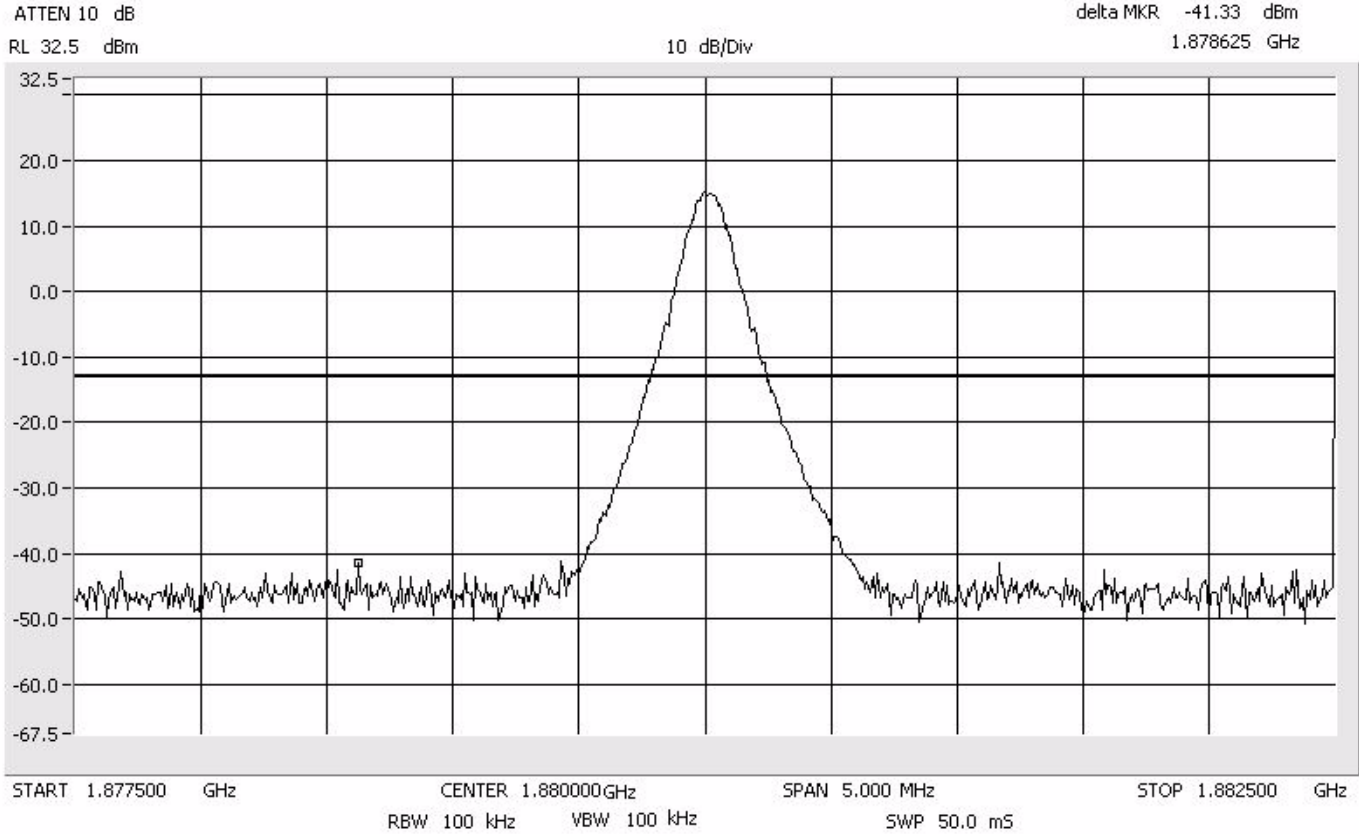
# Conducted Emissions High PCS 1900 MHz

Span: 30 MHz to 20 GHz  
RBW/VBW: 1 MHz



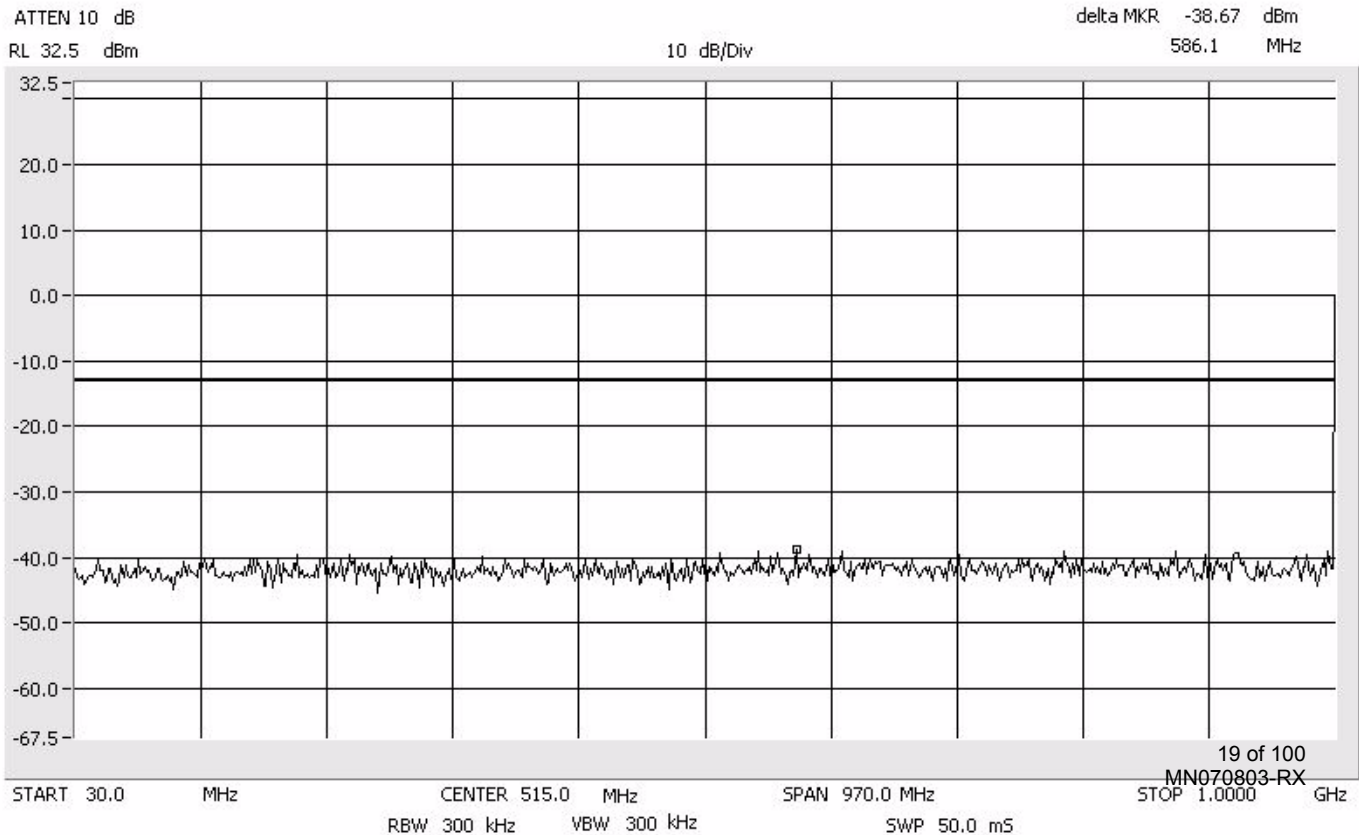
# Conducted Emissions TDMA 1900 MHz

Mid Band  
Span: 5 MHz  
RBW/VBW: 100 kHz



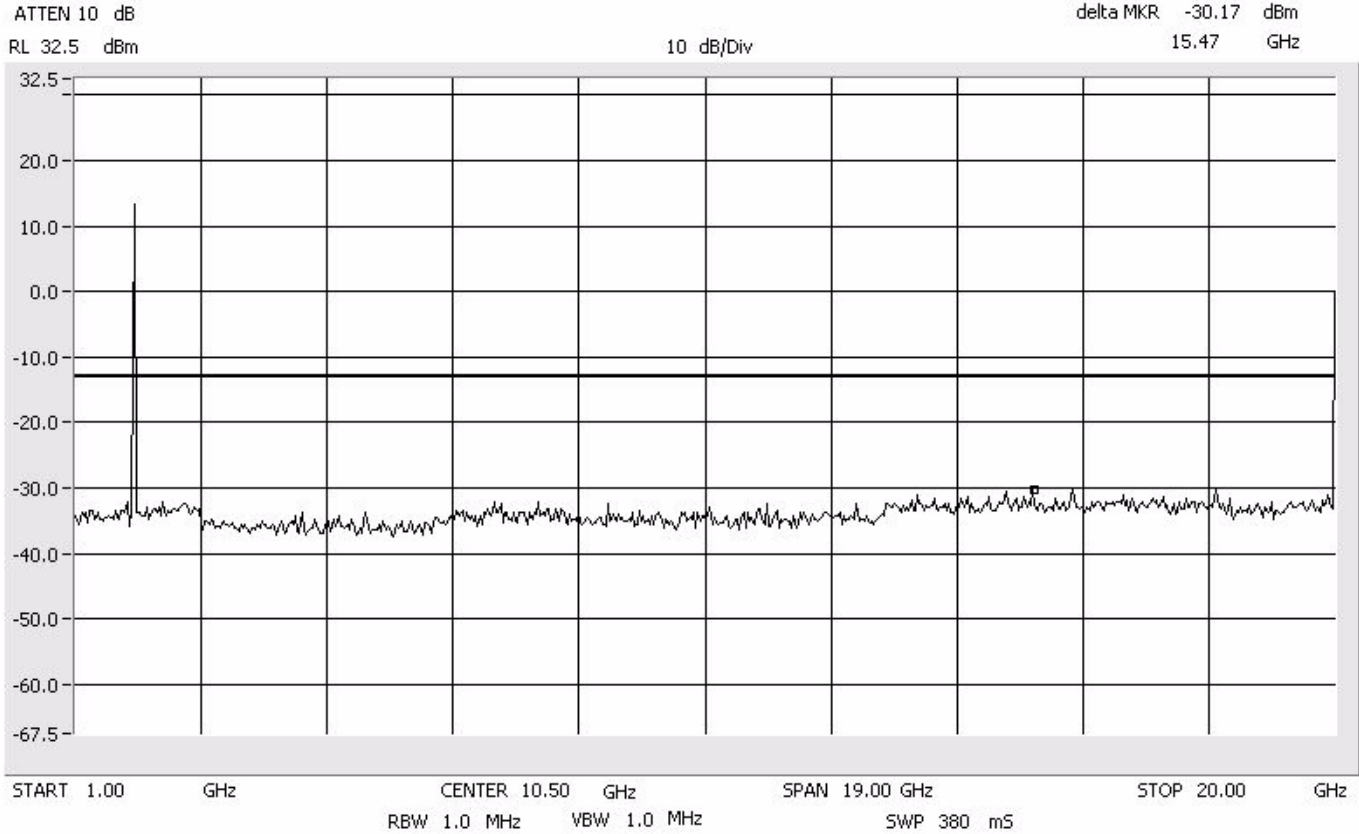
# Conducted Emissions TDMA 1900 MHz

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



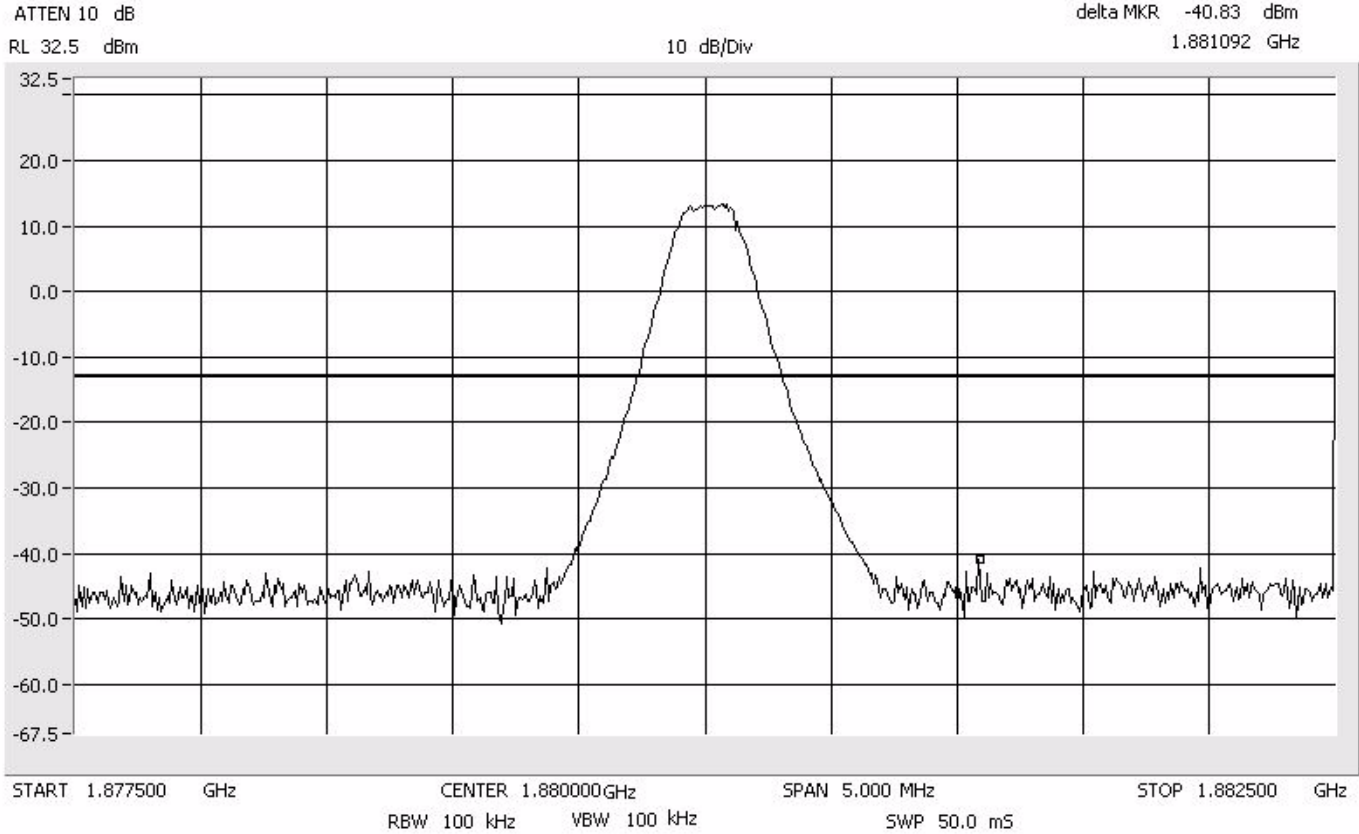
# Conducted Emissions TDMA 1900 MHz

1 GHz to 10 GHz  
RBW/VBW: 1 MHz



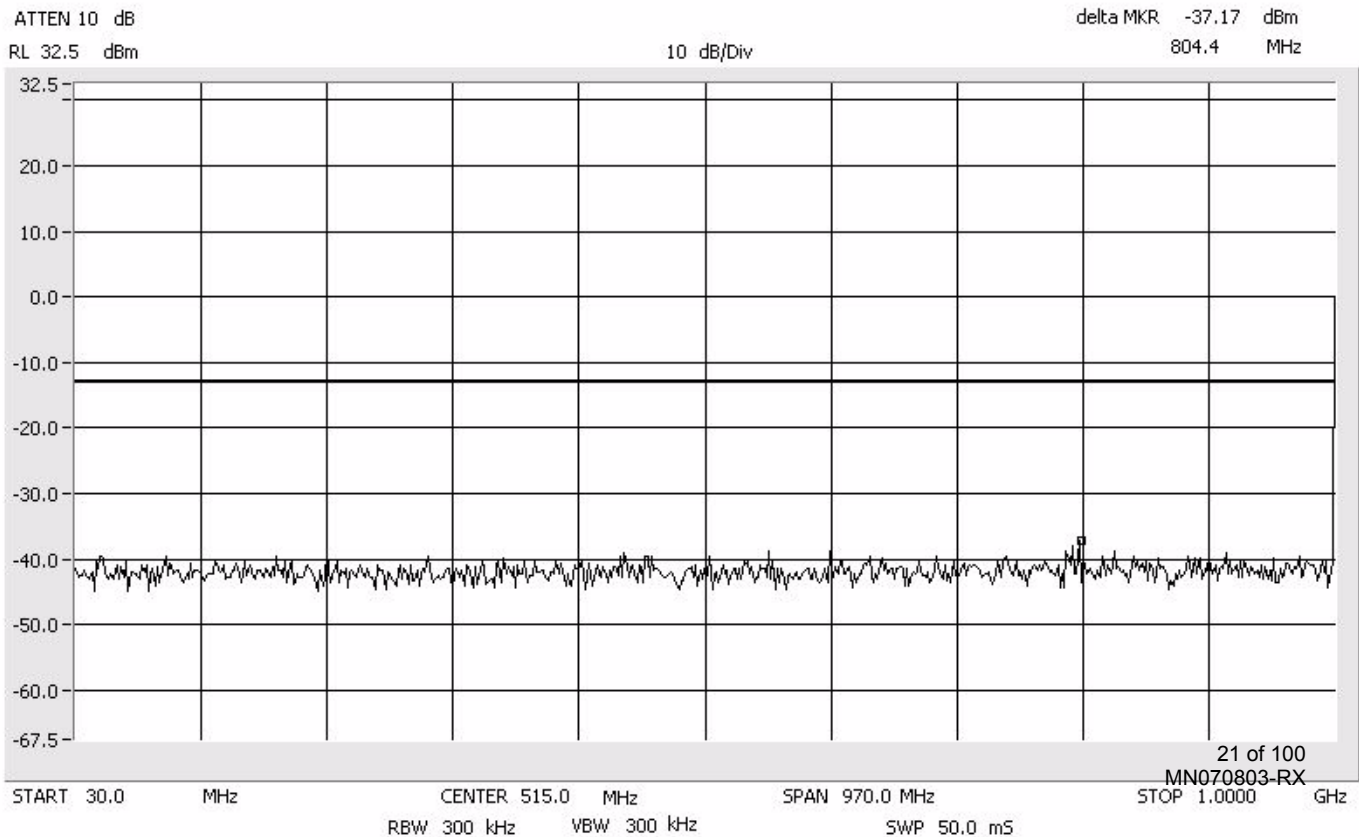
# Conducted Emissions GSM 1900 MHz

Mid Band  
Span: 5 MHz  
RBW/VBW: 100 kHz



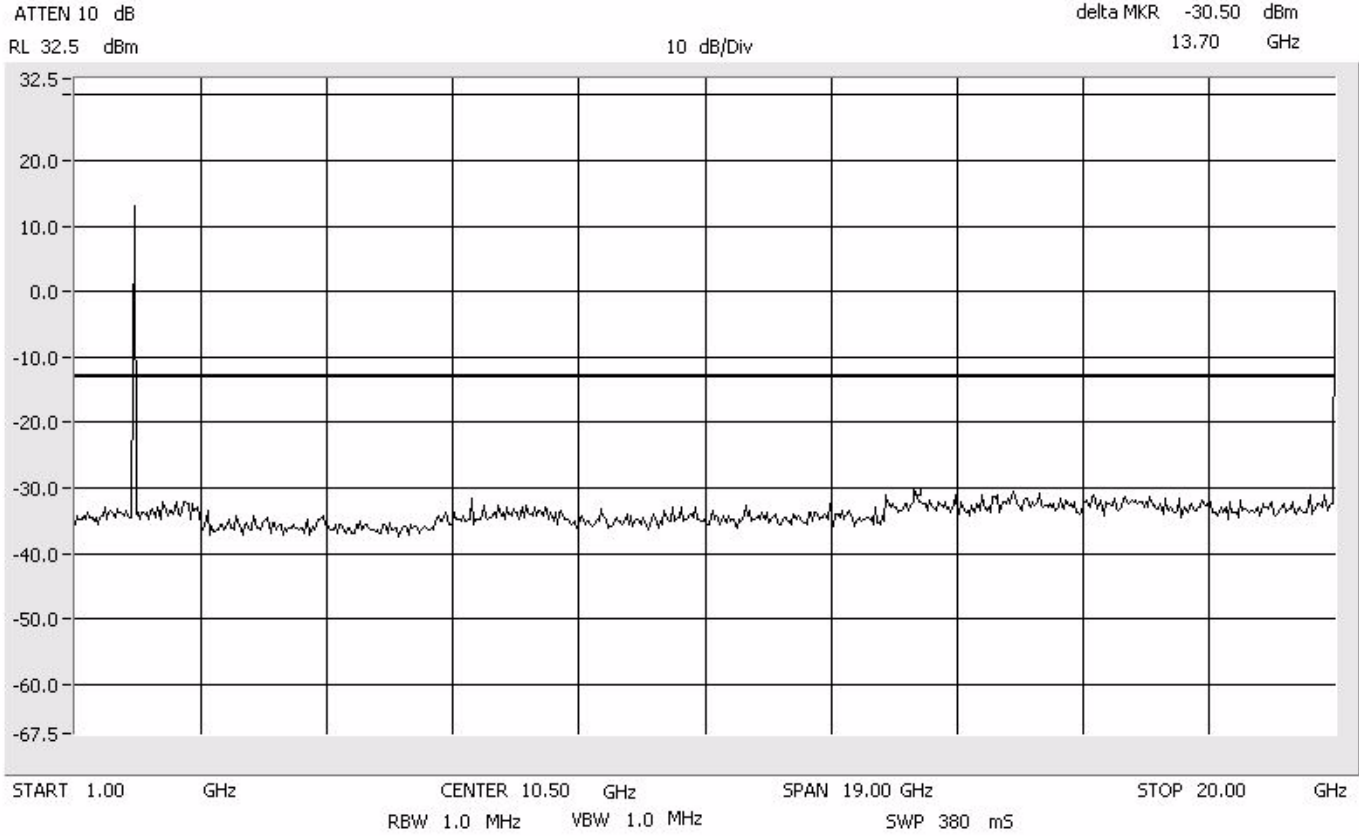
# Conducted Emissions GSM 1900 MHz

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



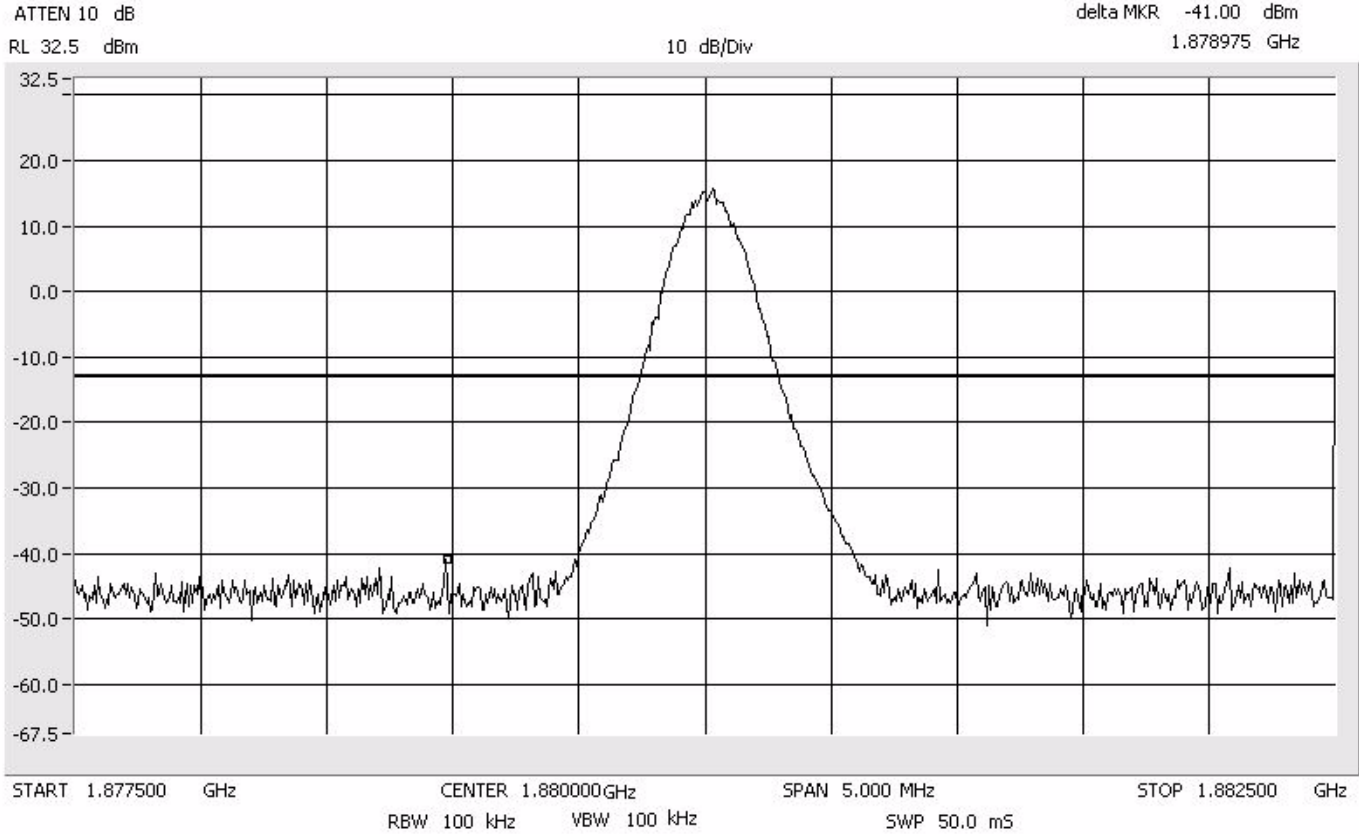
# Conducted Emissions GSM 1900 MHz

1 GHz to 20 GHz  
RBW/VBW: 1 MHz



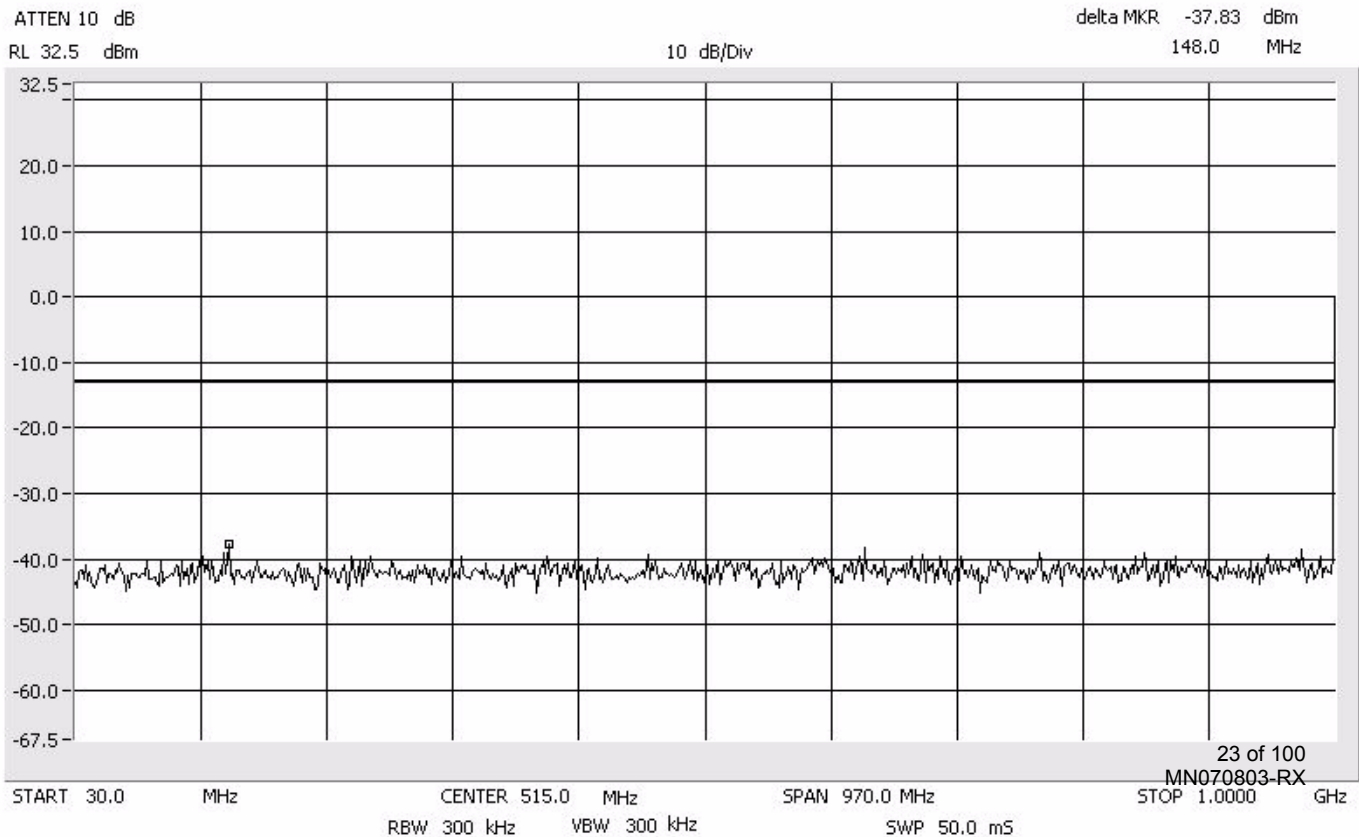
# Conducted Emissions EDGE 1900 MHz

Mid Band  
Span: 5 MHz  
RBW/VBW: 100 kHz



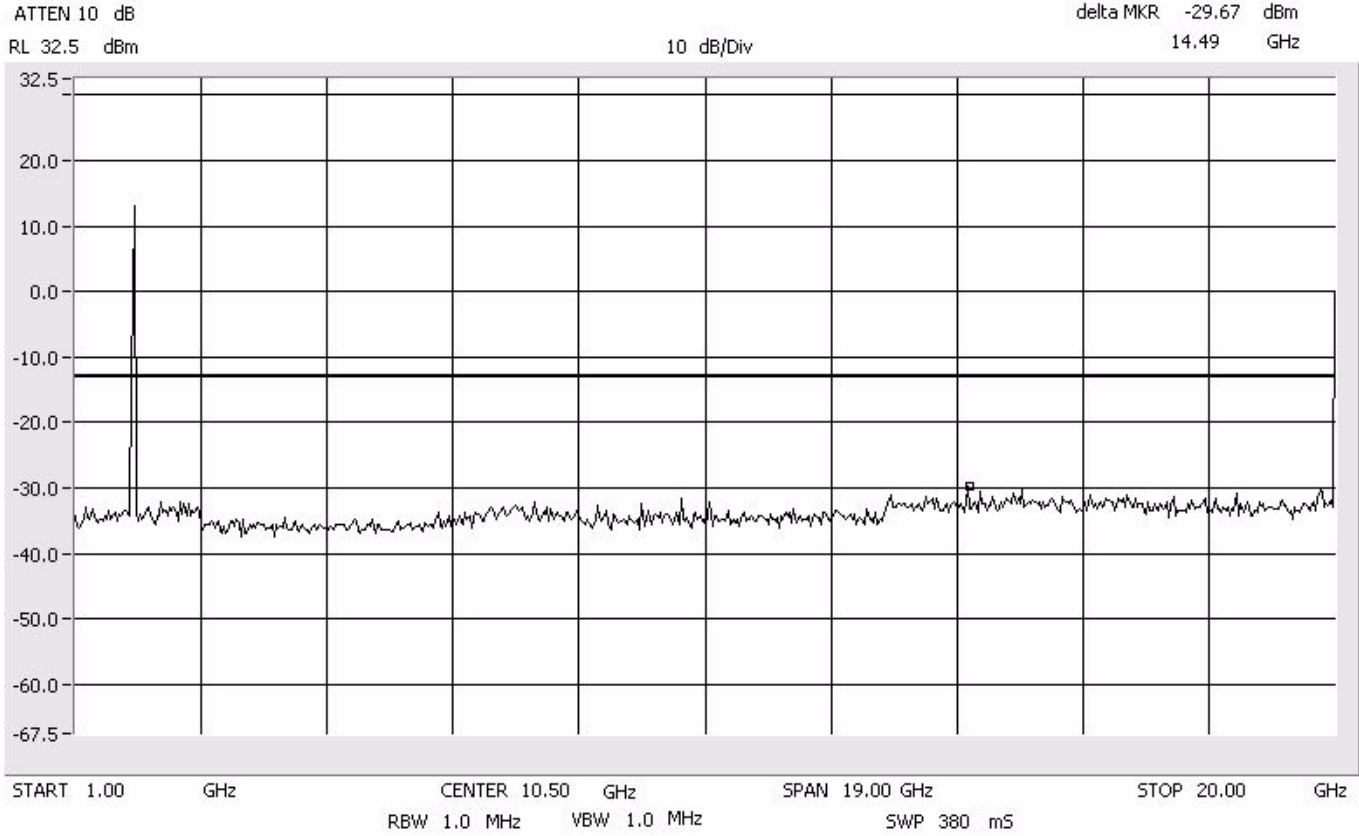
# Conducted Emissions EDGE 1900 MHz

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



# Conducted Emissions EDGE 1900 MHz

1 GHz to 20 GHz  
RBW/VBW: 1 MHz





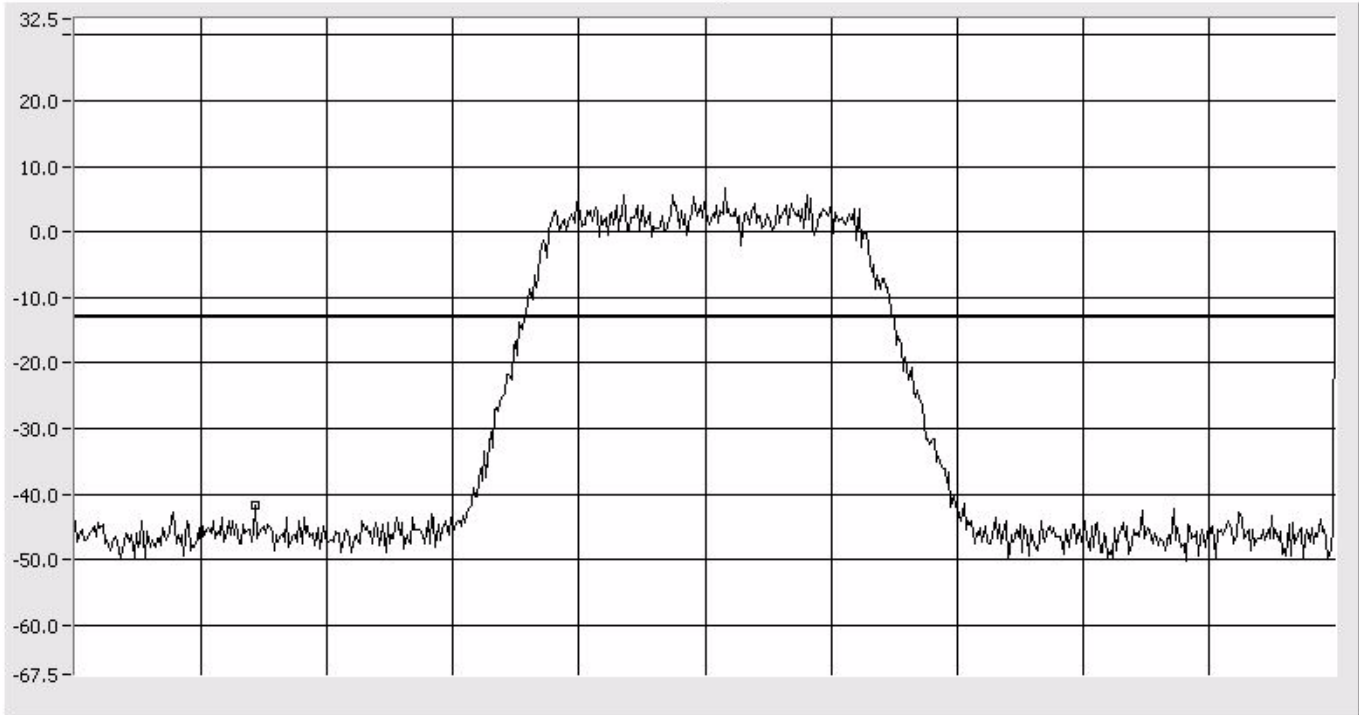
# Conducted Emissions CDMA 1900 MHz

Mid Band  
Span: 5 MHz  
RBW/VBW: 100 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -41.83 dBm  
1.878217 GHz

10 dB/Div



START 1.877500 GHz CENTER 1.880000 GHz SPAN 5.000 MHz STOP 1.882500 GHz  
RBW 100 kHz VBW 100 kHz SWP 50.0 mS

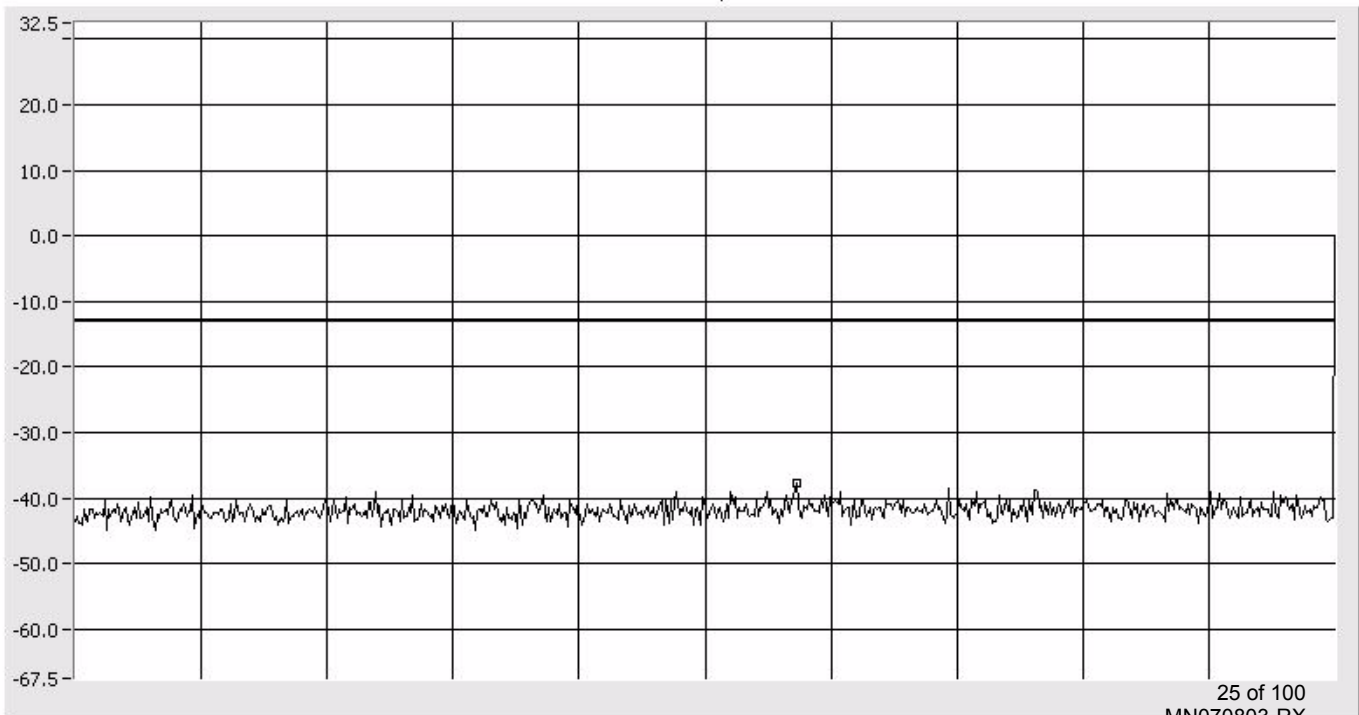
# Conducted Emissions CDMA 1900 MHz

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

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -37.83 dBm  
586.1 MHz

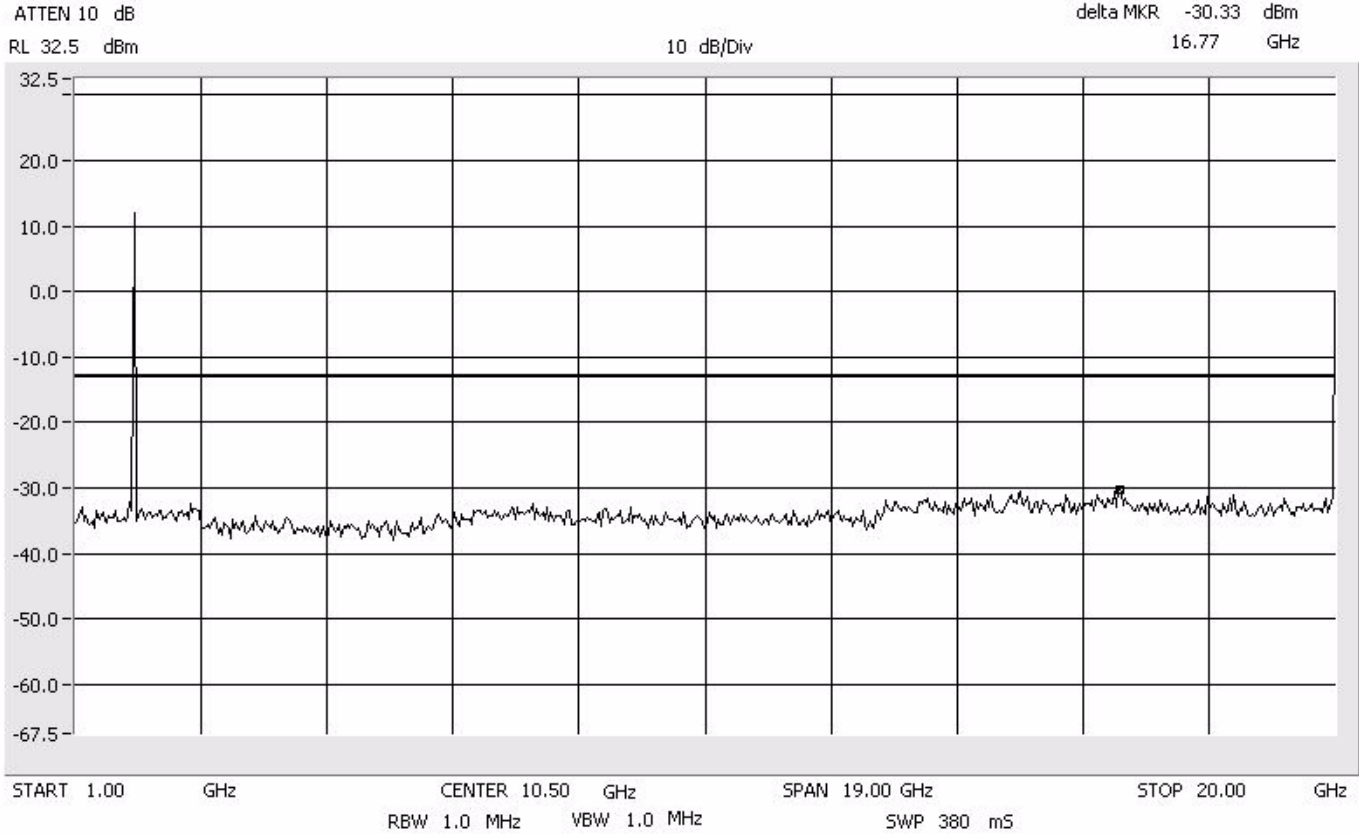
10 dB/Div



START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz STOP 1.0000 GHz  
RBW 300 kHz VBW 300 kHz SWP 50.0 mS

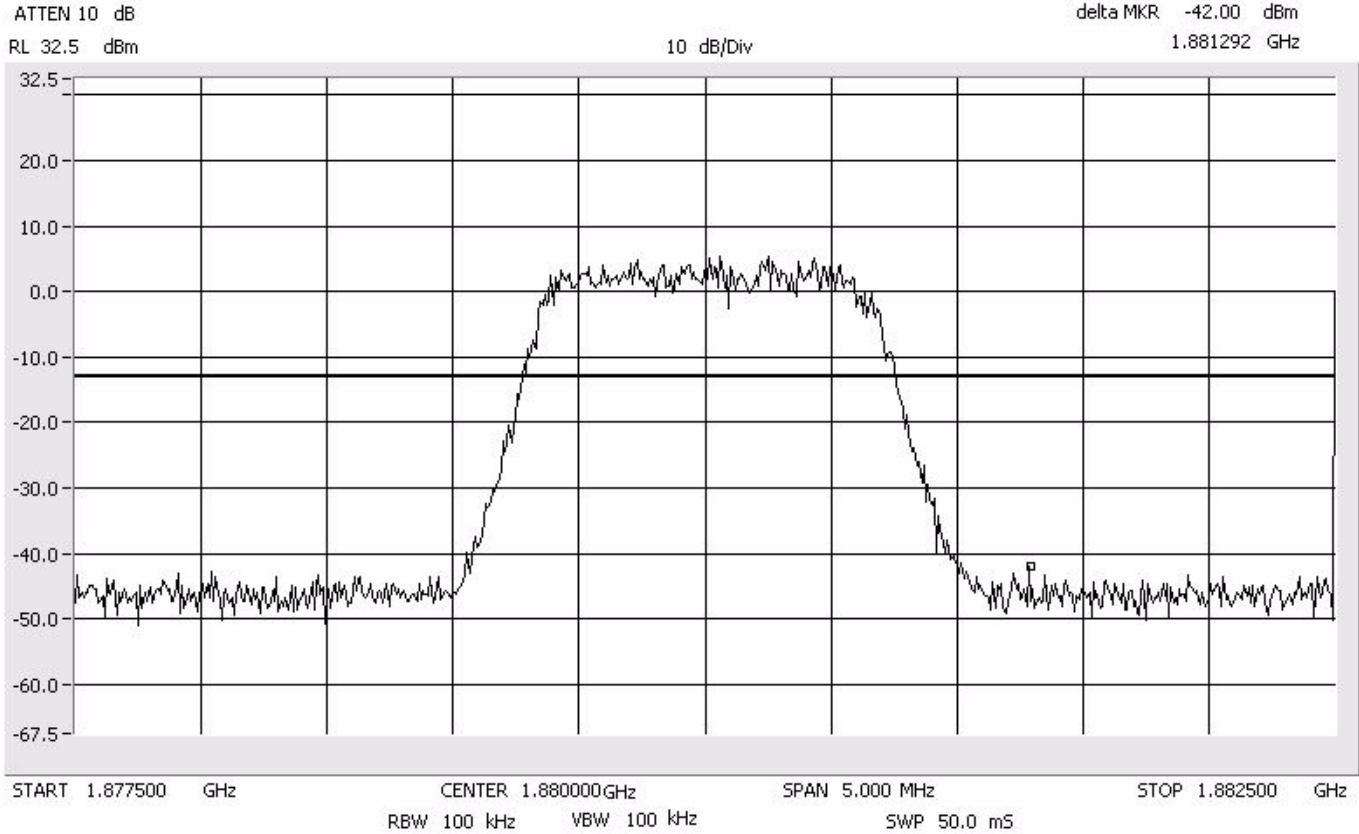
# Conducted Emissions CDMA 1900 MHz

1 GHz to 20 GHz  
RBW/VBW: 1 MHz



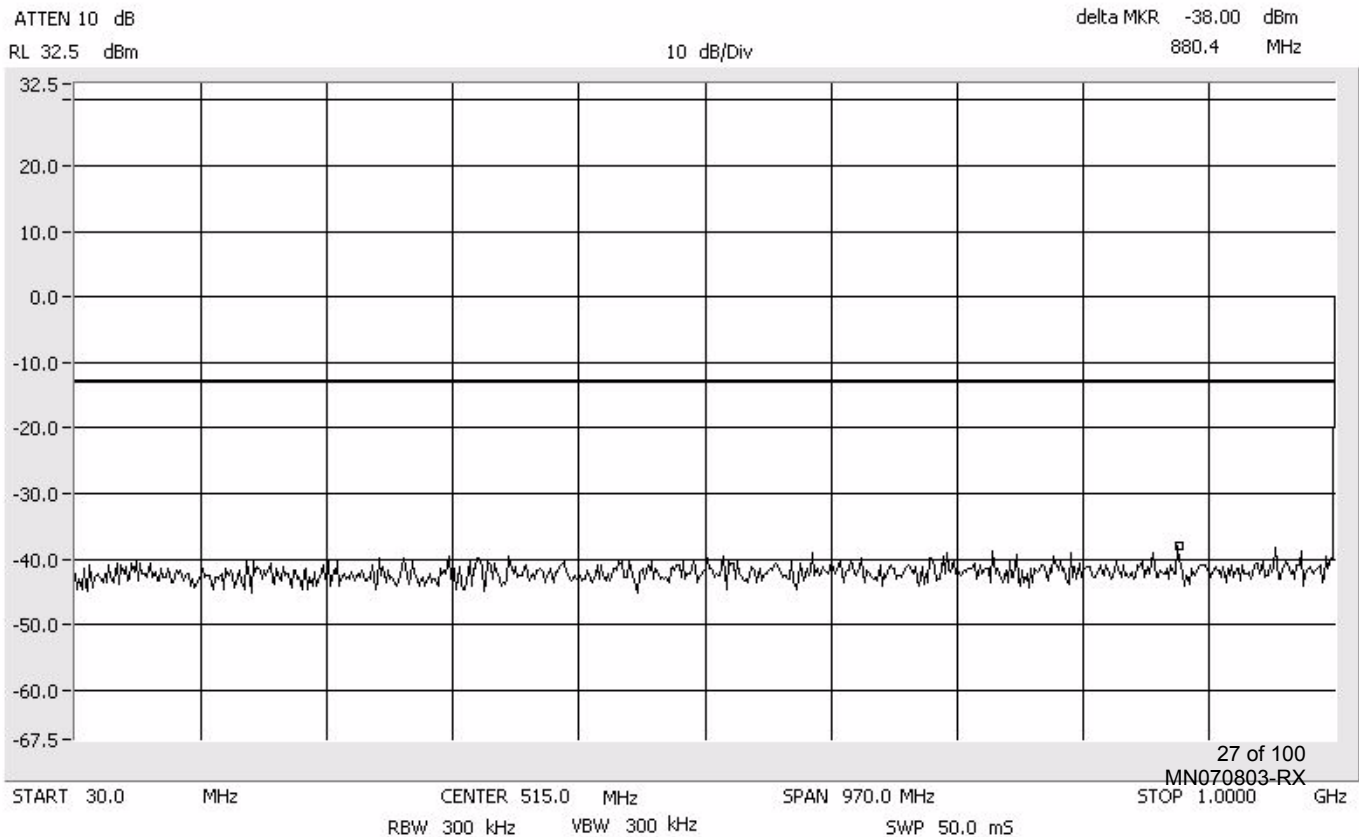
# Conducted Emissions EVDO 1900 MHz

Mid Band  
Span: 5 MHz  
RBW/VBW: 100 kHz



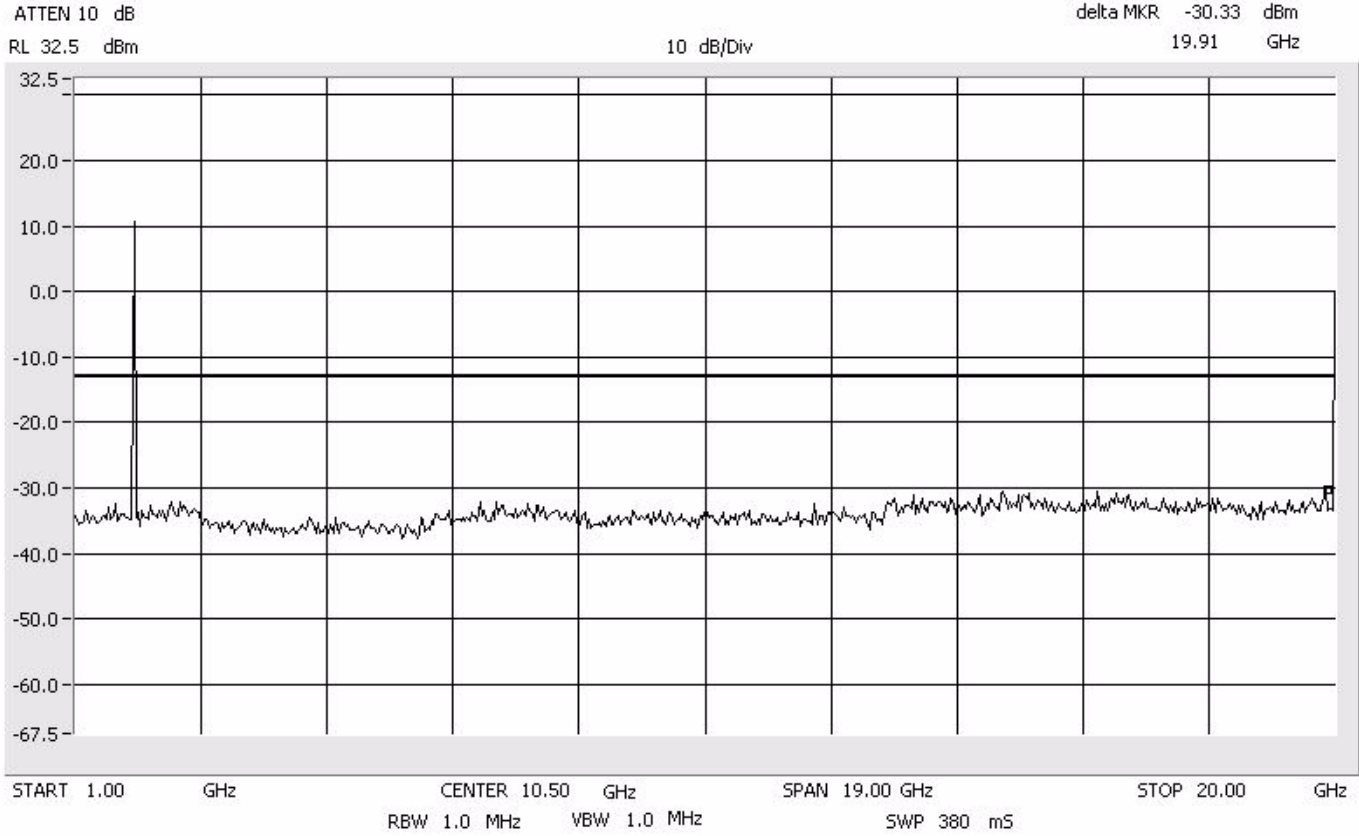
# Conducted Emissions EVDO 1900 MHz

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



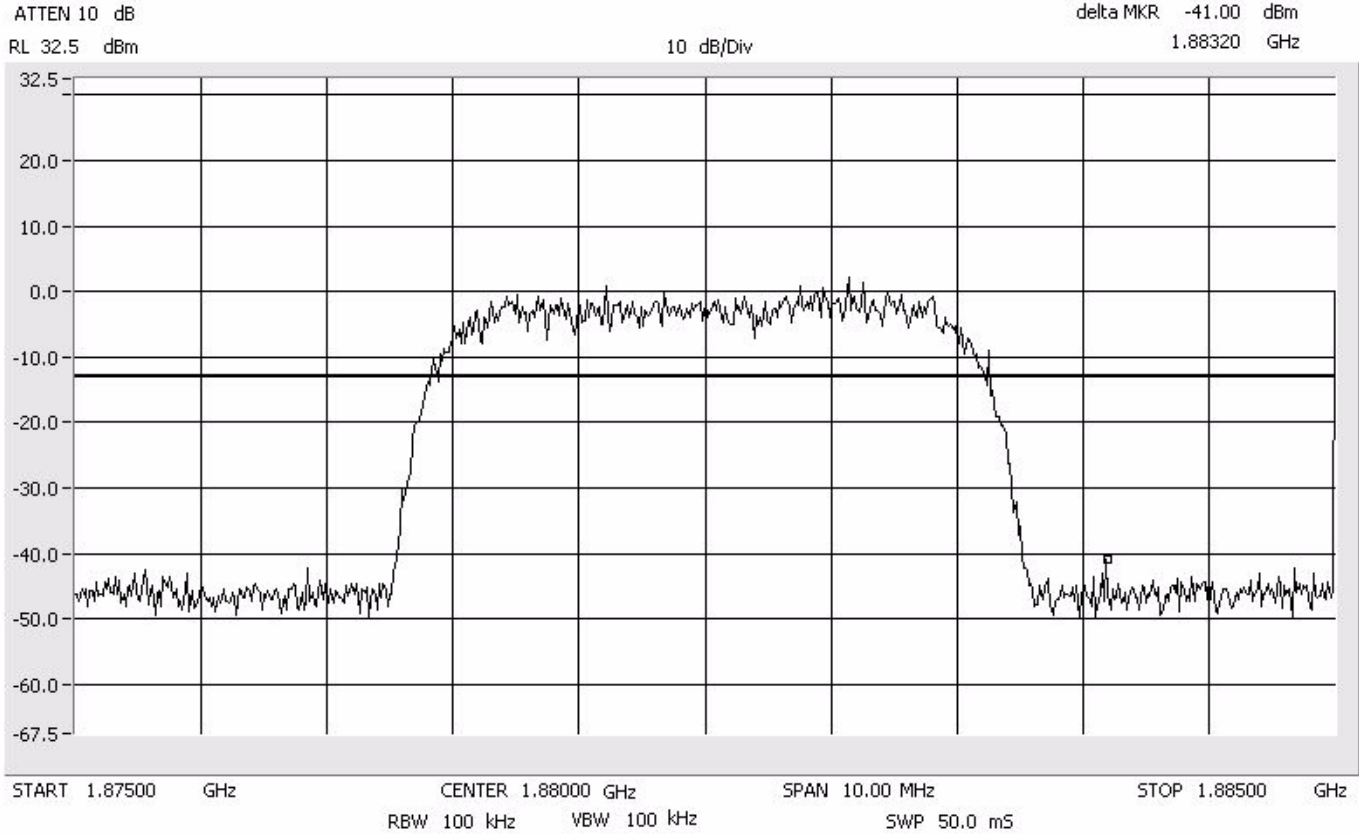
# Conducted Emissions EVDO 1900 MHz

1 GHz to 20 GHz  
RBW/VBW: 1 MHz



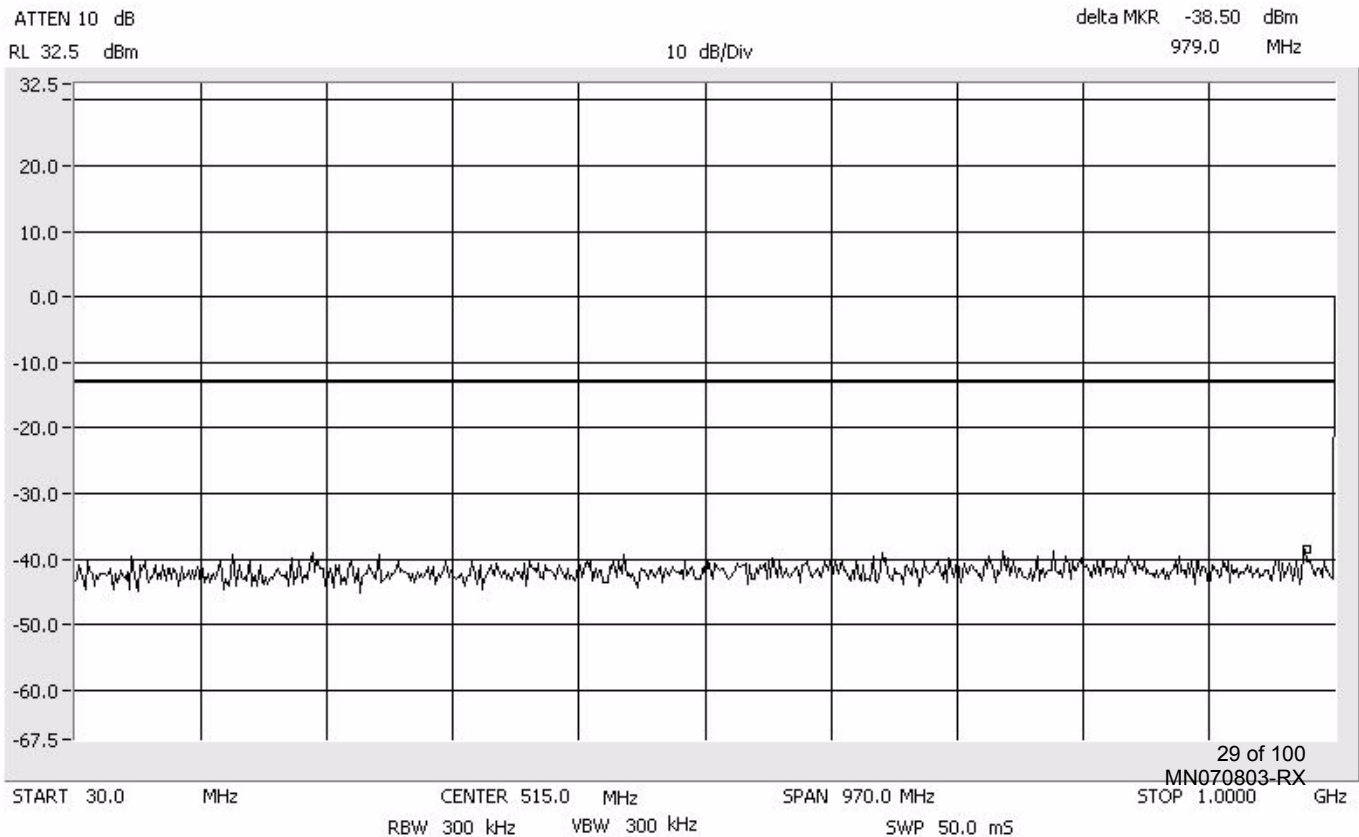
# Conducted Emissions W-CDMA 1900 MHz

Mid Band  
Span: 10 MHz  
RBW/VBW: 100 kHz



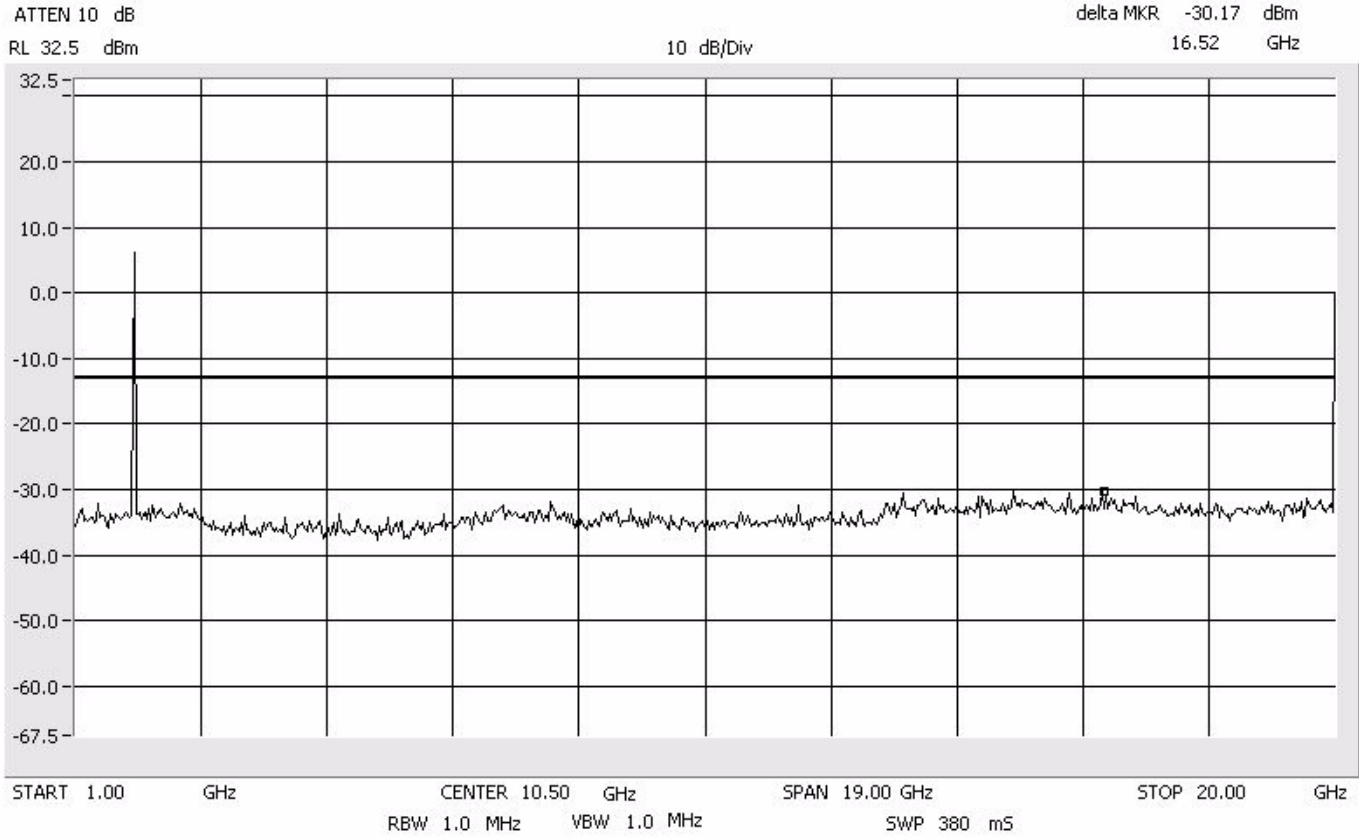
# Conducted Emissions W-CDMA 1900 MHz

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



# Conducted Emissions W-CDMA 1900 MHz

1 GHz to 20 GHz  
RBW/VBW: 1 MHz



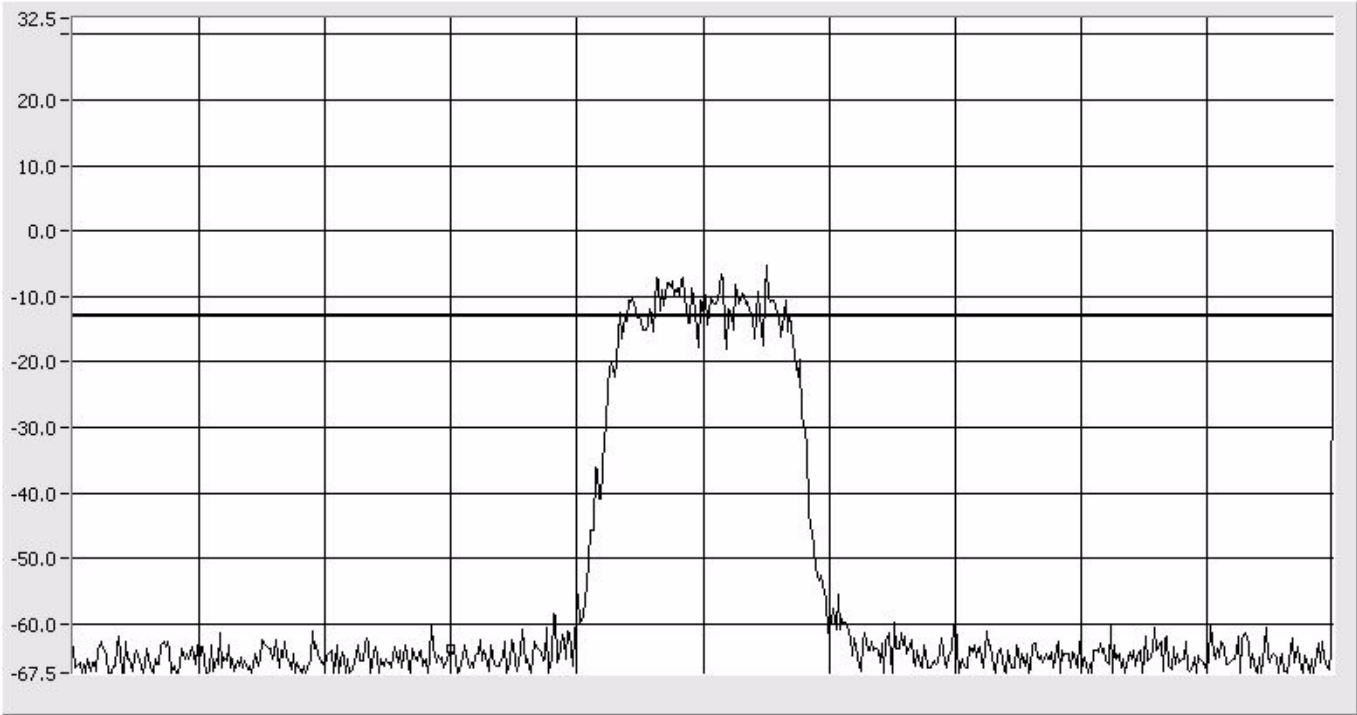
# Band Edge TDMA

Center: 1850.04  
Span: 200 kHz  
RBW: 1 kHz  
VBW: 3 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -63.67 dBm  
1.850000 GHz

10 dB/Div



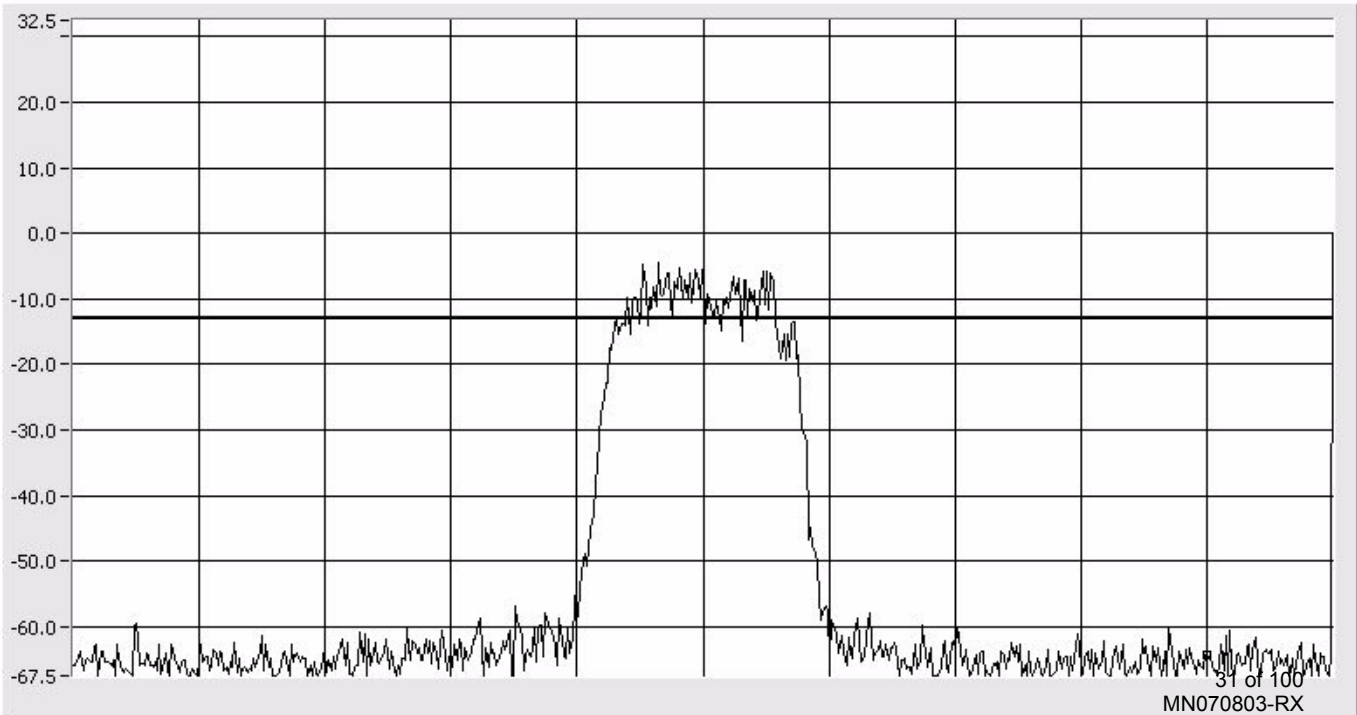
# Band Edge TDMA

Center: 1909.92 MHz  
Span: 200 kHz  
RBW: 1 kHz  
VBW: 3 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -64.33 dBm  
1.910000 GHz

10 dB/Div



START 1.9098200 GHz

CENTER 1.909920GHz

SPAN 200.0 kHz

STOP 1.9100200 GHz

RBW 1.0 kHz VBW 3.0 kHz

SWP 500 mS

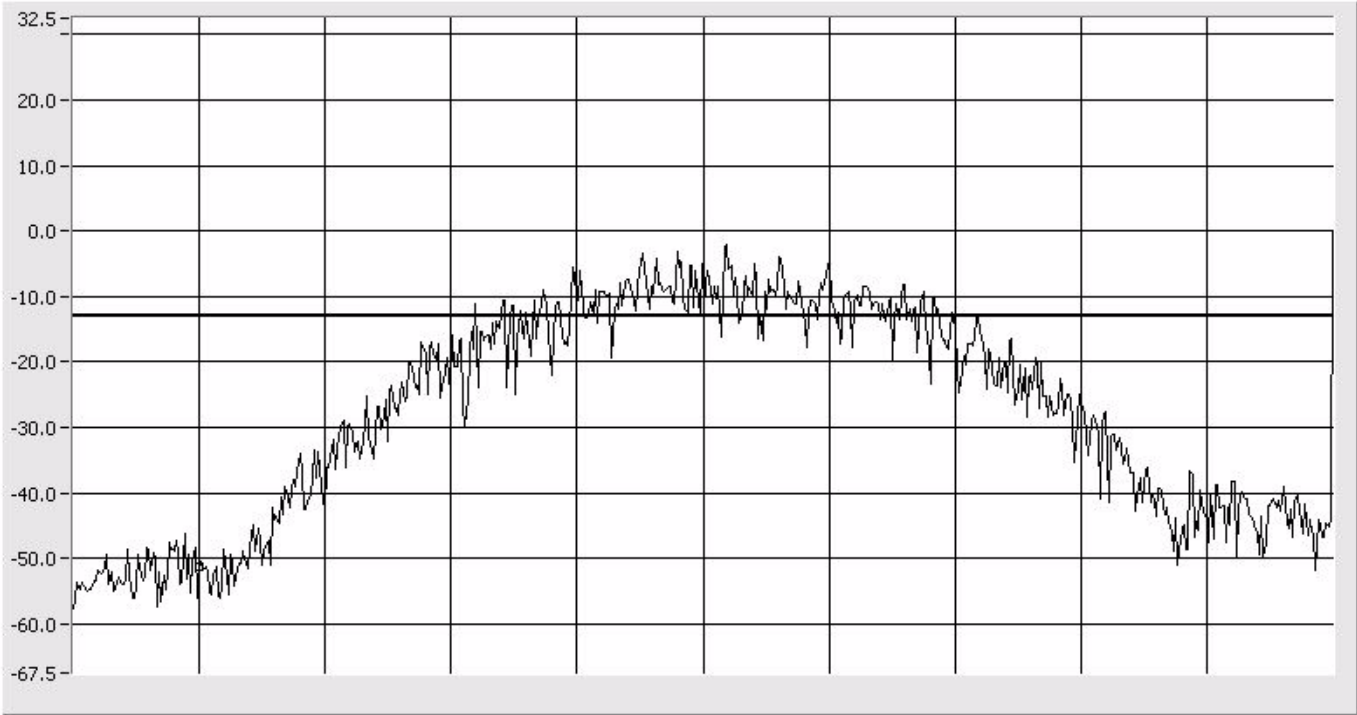
# Band Edge GSM

Center: 1850.20  
Span: 500 kHz  
RBW: 3 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -51.17 dBm  
1.850000 GHz

10 dB/Div



START 1.8499500 GHz CENTER 1.850200GHz SPAN 500.0 kHz STOP 1.8504500 GHz  
RBW 3.0 kHz VBW 10 kHz SWP 140 mS

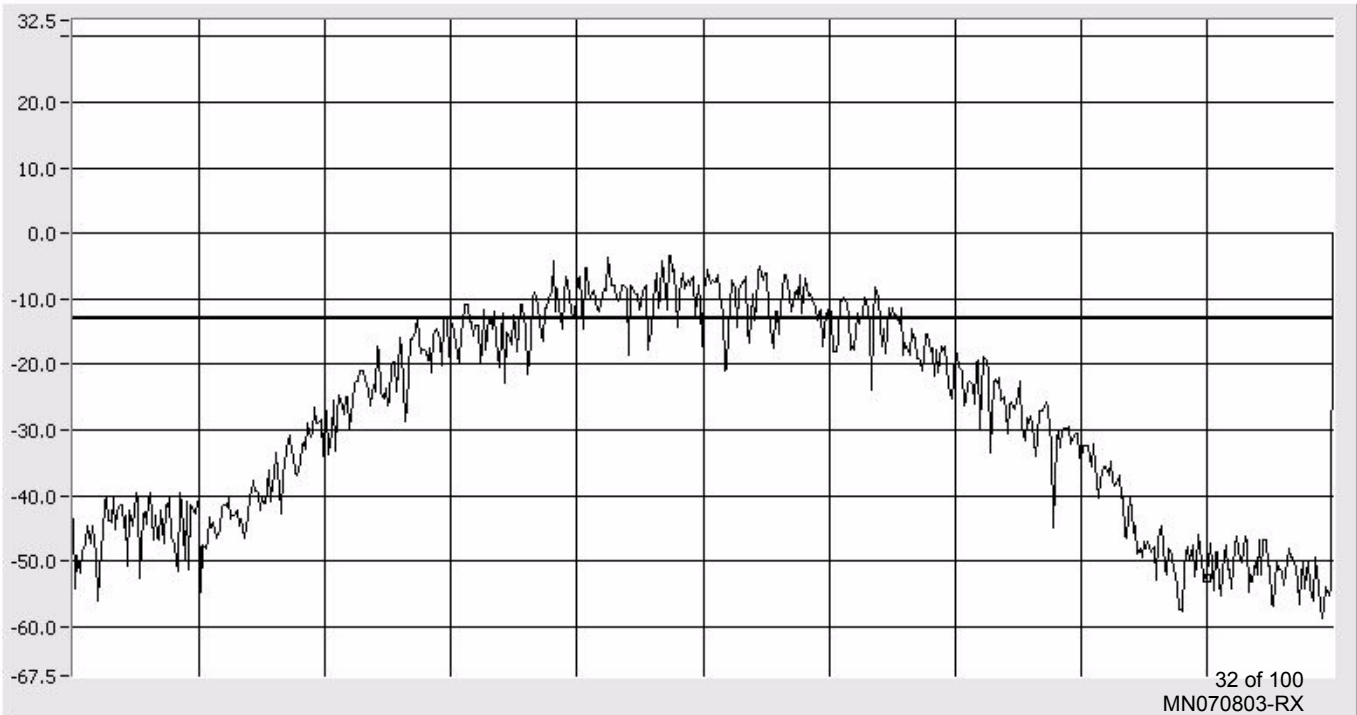
# Band Edge GSM

Center: 1909.80 MHz  
Span: 500 kHz  
RBW: 3 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -52.67 dBm  
1.910000 GHz

10 dB/Div



START 1.9095500 GHz CENTER 1.909800GHz SPAN 500.0 kHz STOP 1.9100500 GHz  
RBW 3.0 kHz VBW 10 kHz SWP 140 mS



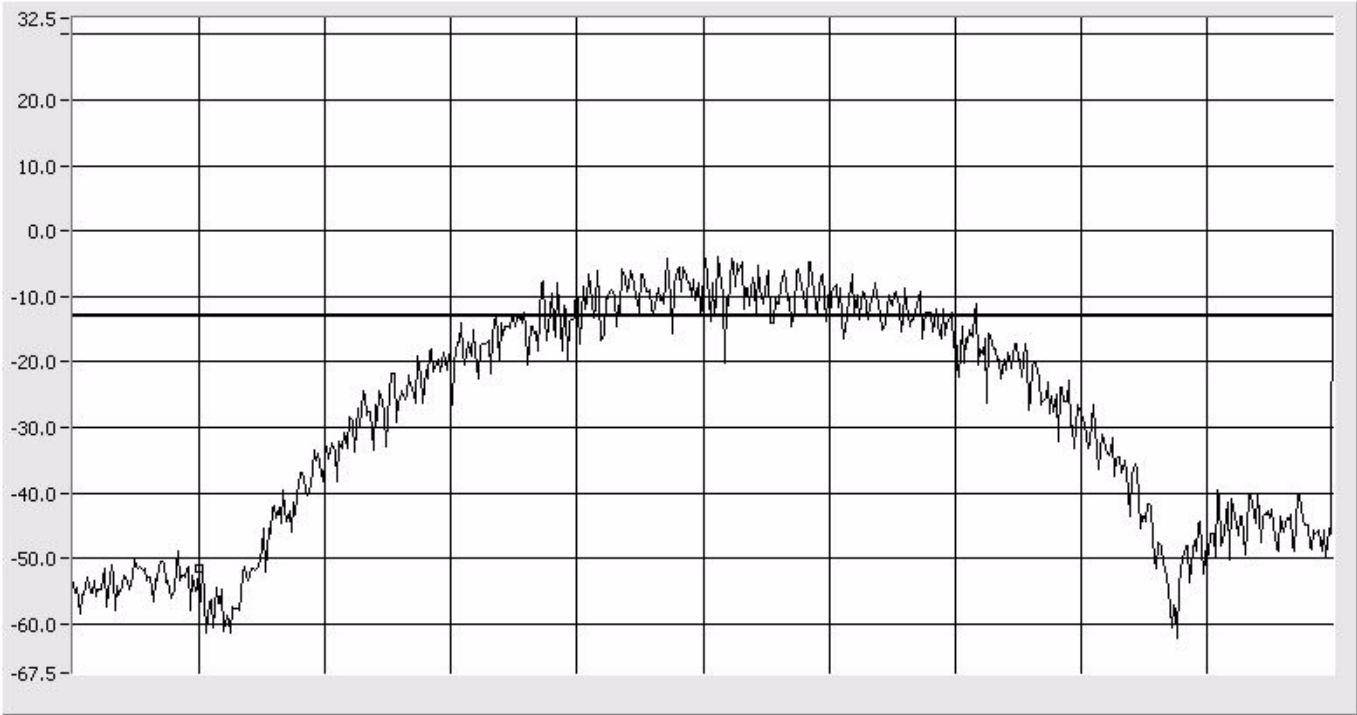
# Band Edge EDGE

Center: 1850.20  
Span: 500 kHz  
RBW: 3 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -51.67 dBm  
1.850000 GHz

10 dB/Div



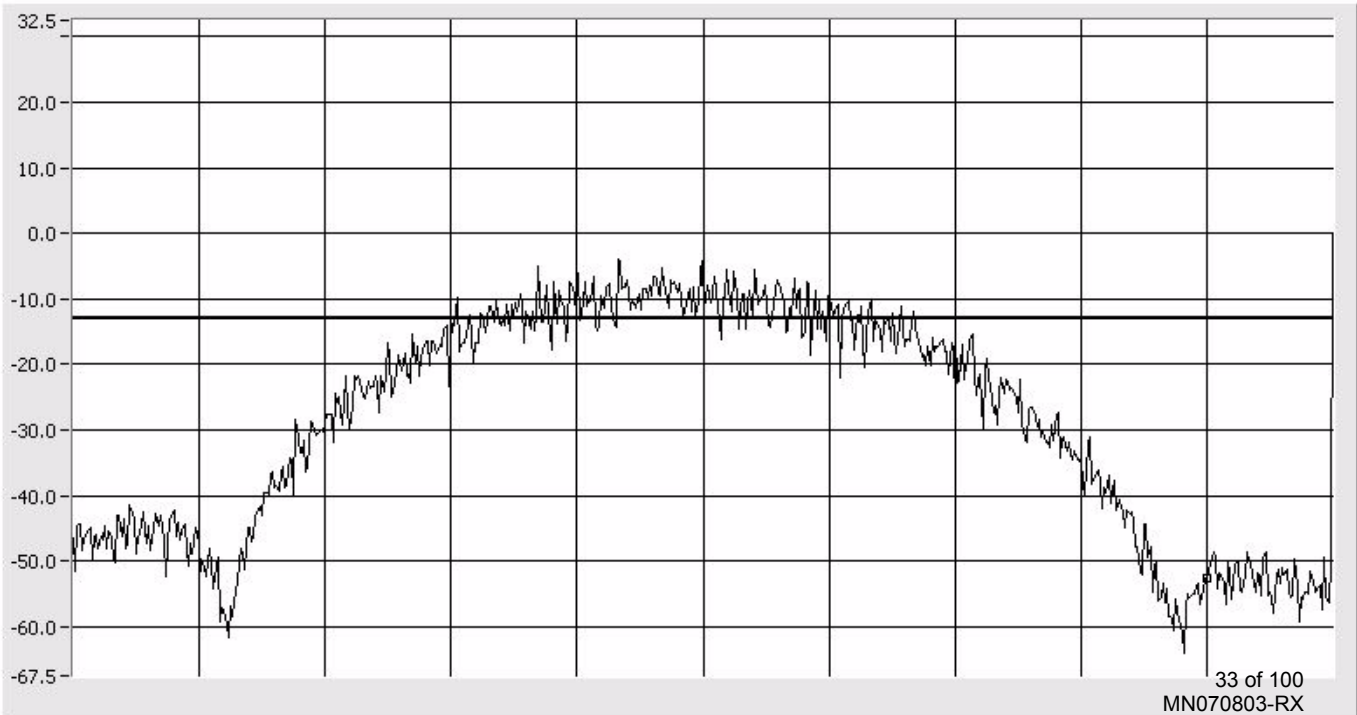
# Band Edge EDGE

Center: 1909.80 MHz  
Span: 500 kHz  
RBW: 3 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -52.67 dBm  
1.910000 GHz

10 dB/Div



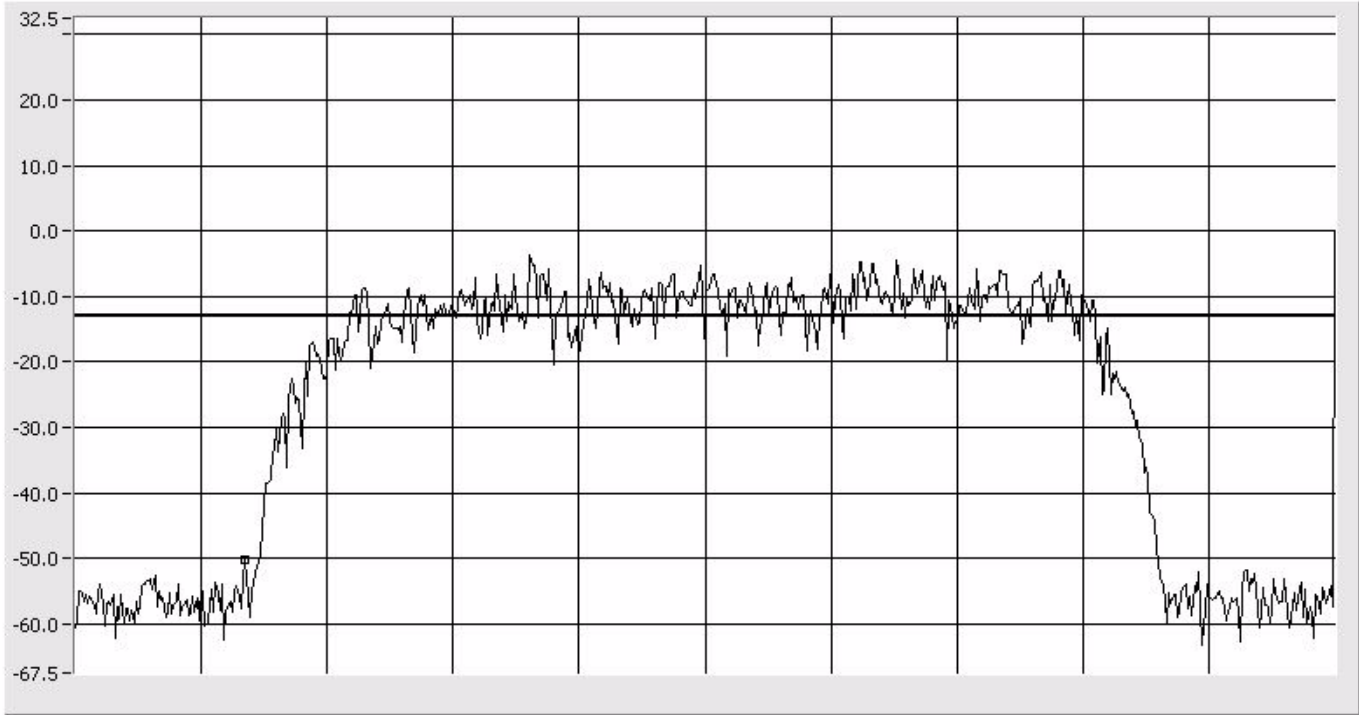
# Band Edge CDMA

Center: 1850.73  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -50.33 dBm  
1.850000 GHz

10 dB/Div



START 1.849730 GHz CENTER 1.850730GHz SPAN 2.000 MHz STOP 1.851730 GHz  
RBW 10 kHz VBW 10 kHz SWP 50.0 mS

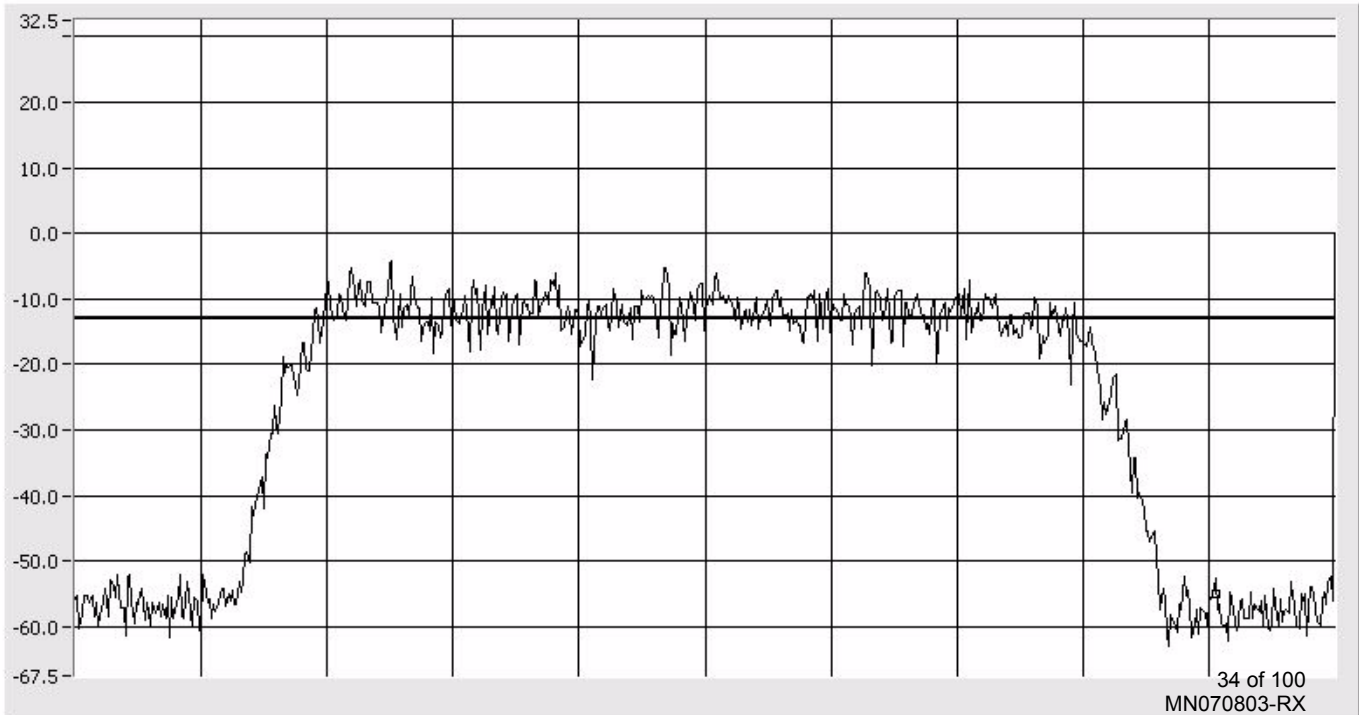
# Band Edge CDMA

Center: 1909.19 MHz  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -55.00 dBm  
1.910000 GHz

10 dB/Div



START 1.908190 GHz CENTER 1.909190GHz SPAN 2.000 MHz STOP 1.910190 GHz  
RBW 10 kHz VBW 10 kHz SWP 50.0 mS

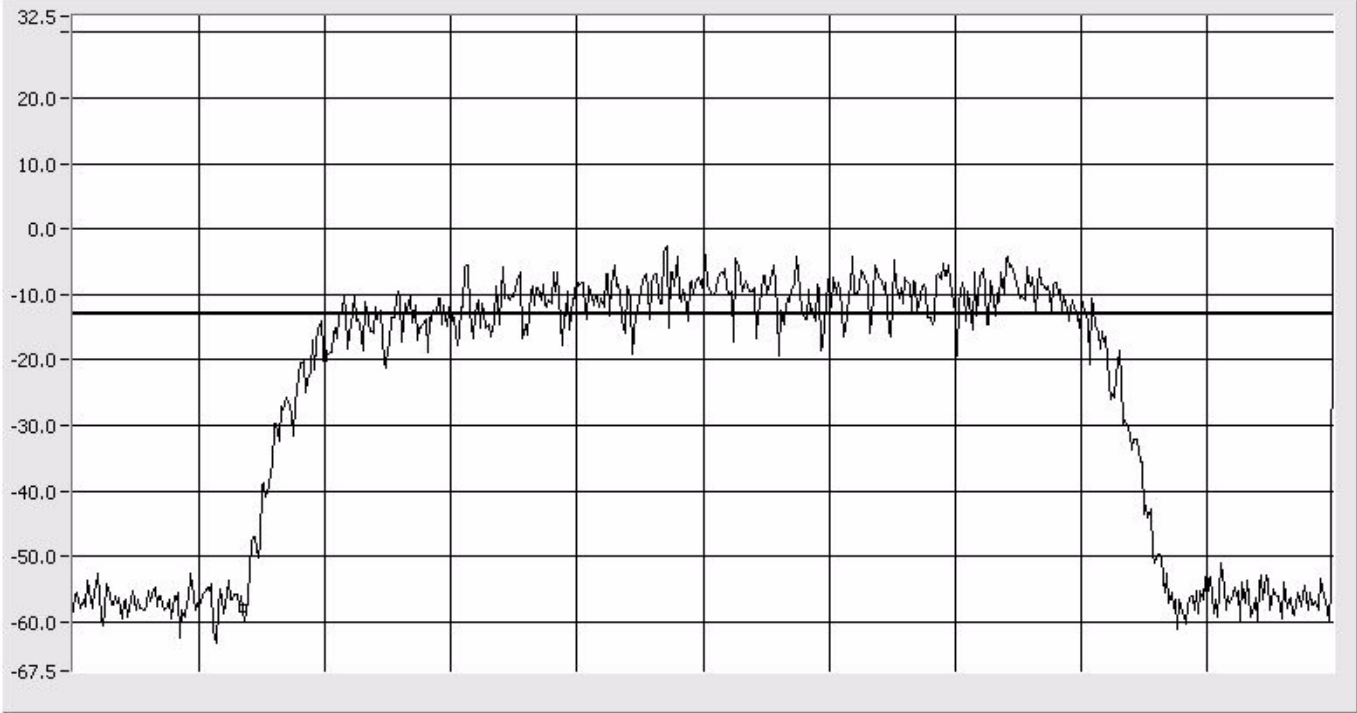
# Band Edge EVDO

Center: 1850.73  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -58.00 dBm  
1.850000 GHz

10 dB/Div



START 1.849730 GHz CENTER 1.850730GHz SPAN 2.000 MHz STOP 1.851730 GHz  
RBW 10 kHz VBW 10 kHz SWP 50.0 mS

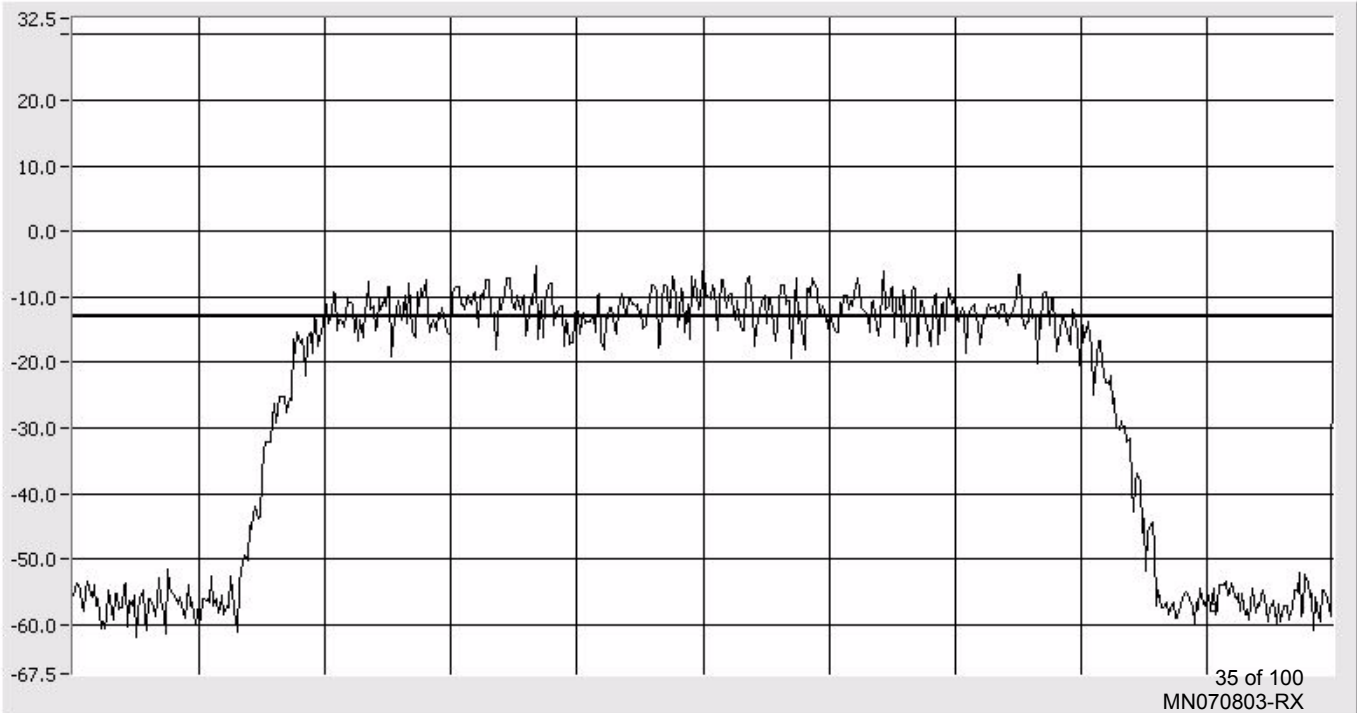
# Band Edge EVDO

Center: 1909.19 MHz  
Span: 2 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -57.50 dBm  
1.910000 GHz

10 dB/Div



START 1.908190 GHz CENTER 1.909190GHz SPAN 2.000 MHz STOP 1.910190 GHz  
RBW 10 kHz VBW 10 kHz SWP 50.0 mS

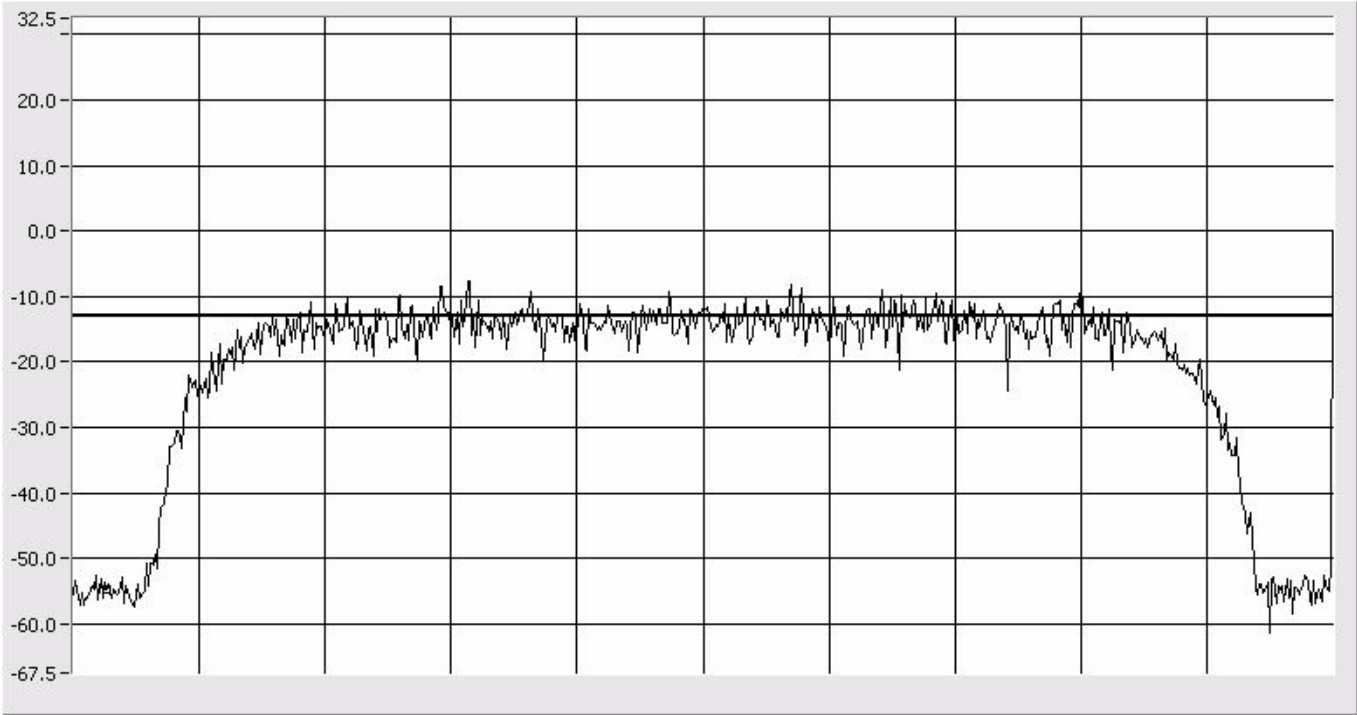
# Band Edge W-CDMA

Center: 1852.60  
Span: 5.5 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -54.83 dBm  
1.849997 GHz

10 dB/Div



START 1.849850 GHz CENTER 1.852600GHz SPAN 5.500 MHz STOP 1.855350 GHz  
RBW 10 kHz VBW 10 kHz SWP 140 mS

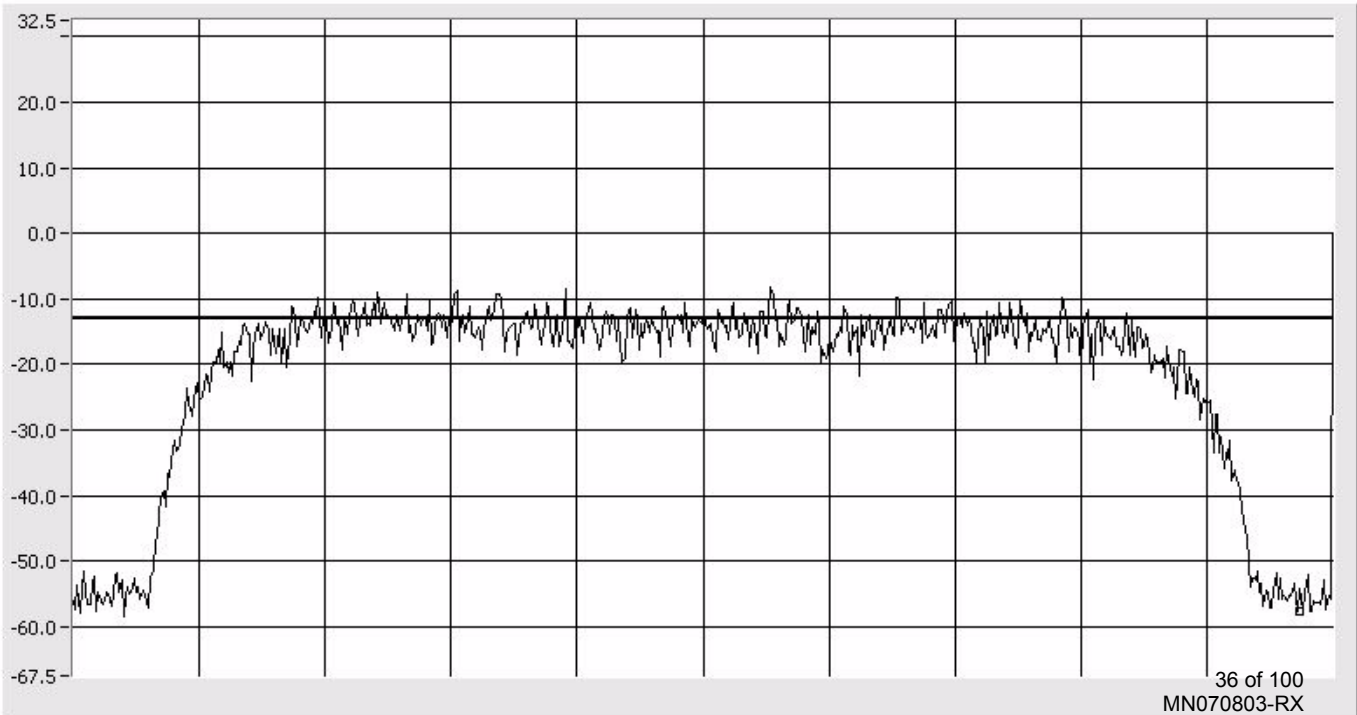
# Band Edge W-CDMA

Center: 1907.40 MHz  
Span: 5.5 MHz  
RBW: 10 kHz  
VBW: 10 kHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -57.67 dBm  
1.910003 GHz

10 dB/Div



START 1.904650 GHz CENTER 1.907400GHz SPAN 5.500 MHz STOP 1.910150 GHz  
RBW 10 kHz VBW 10 kHz SWP 140 mS

# Conducted Output Power Test for ADC Inc. Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000

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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 TDMA, GSM, EDGE, CDMA, EVDO, and W-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 32.5 dB to compensate for attenuators and cable loss between the EUT and the power meter.

## **TDMA** **103.03 mWatts**

Carrier Frequency	Carrier Output
1850.2 MHz	<u>19.57</u> dBm
1880.0 MHz	<u>20.13</u> dBm
1909.8 MHz	<u>19.87</u> dBm

## **GSM** **99.77 mWatts**

Carrier Frequency	Carrier Output
1850.2 MHz	<u>19.67</u> dBm
1880.0 MHz	<u>19.99</u> dBm
1909.8 MHz	<u>19.10</u> dBm

## **EDGE** **112.20 mWatts**

Carrier Frequency	Carrier Output
1850.2 MHz	<u>20.10</u> dBm
1880.0 MHz	<u>20.50</u> dBm
1909.8 MHz	<u>20.13</u> dBm

## **CDMA** **115.61 Watts**

Carrier Frequency	Carrier Output
1850.8 MHz	<u>20.27</u> dBm
1880.0 MHz	<u>20.63</u> dBm
1909.2 MHz	<u>20.20</u> dBm

## **EVDO** **103.03 Watts**

Carrier Frequency	Carrier Output
1850.8 MHz	<u>20.13</u> dBm
1880.0 MHz	<u>19.87</u> dBm
1909.2 MHz	<u>19.87</u> dBm

## **W-CDMA** **107.89 Watts**

Carrier Frequency	Carrier Output
1852.6 MHz	<u>20.25</u> dBm
1880.0 MHz	<u>20.20</u> dBm
1907.4 MHz	<u>20.33</u> dBm

# **Intermodulation Test for ADC Inc Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000**

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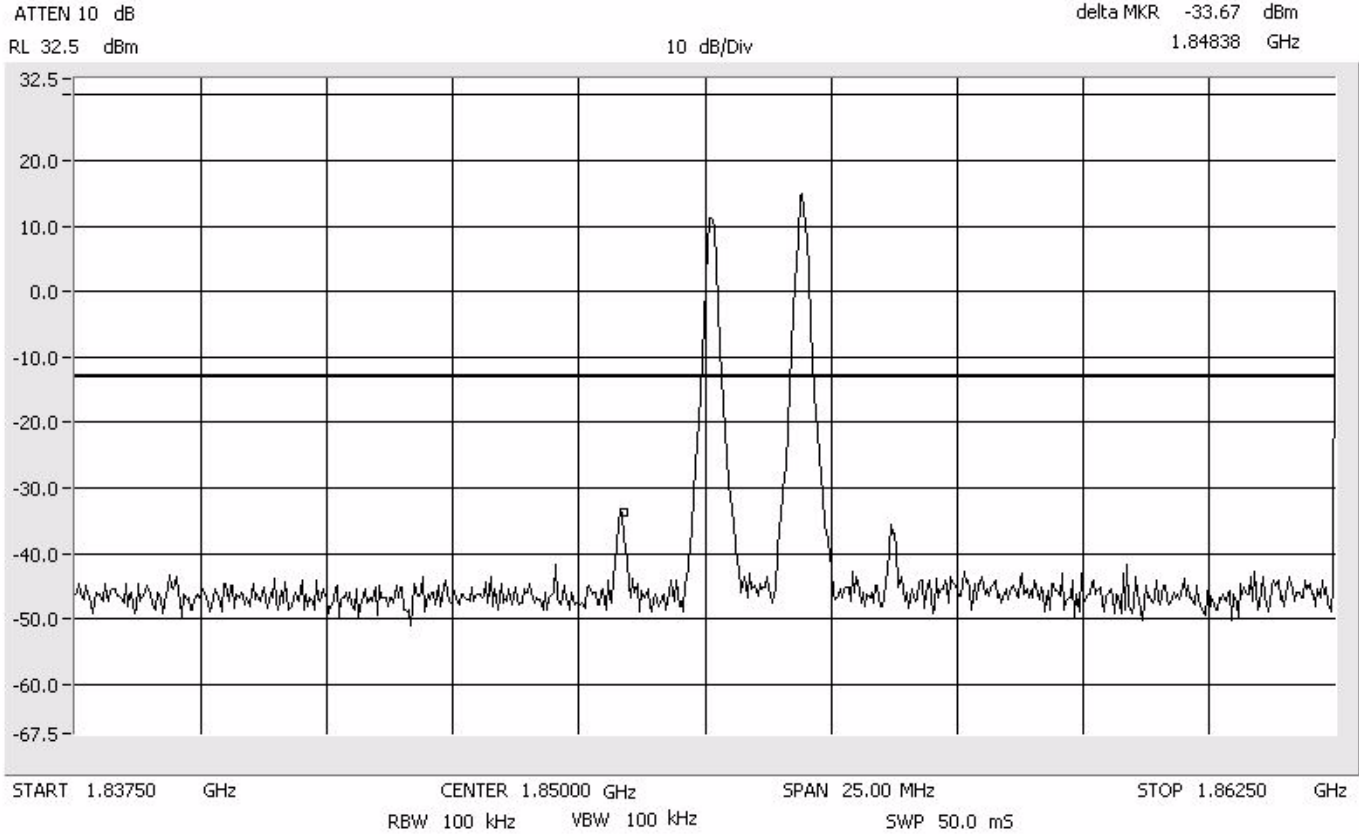
The inter-modulation products test was performed for the EUT. Three tests were performed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were TDMA, GSM, EDGE, CDMA, EVDO, and W-CDMA. An investigation was made from 30 MHz to the 10<sup>th</sup> Harmonic of the highest fundamental frequency (~20 GHz). The following plots show the results. Modulation types EVDO and CDMA have the same mask and intermodulation properties. Modulation types GSM and EDGE have the same mask and intermodulation properties.

Results:  
(See Plots)

TDMA

# Intermodulation Close - Lower PCS 1900 MHz

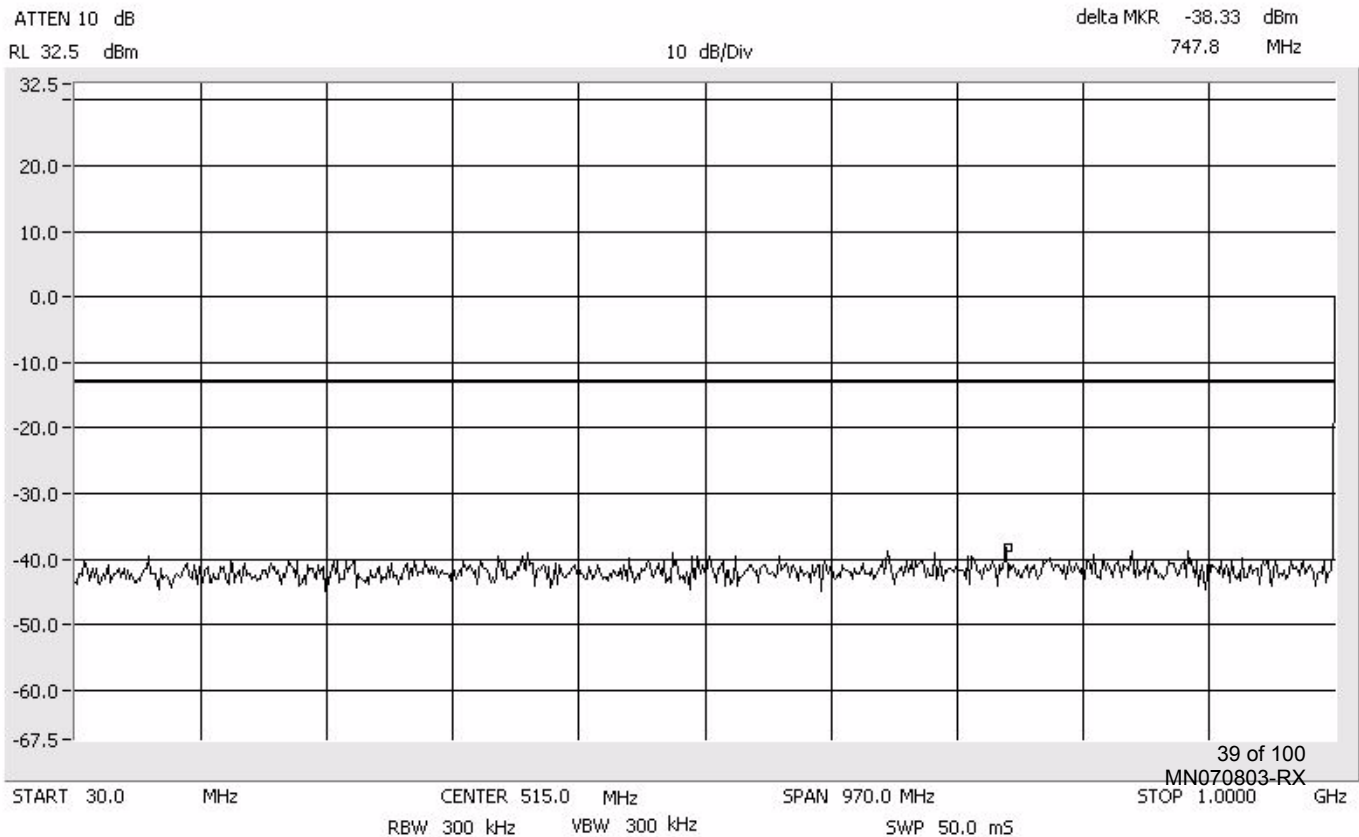
Center: 1850.0 MHz  
Span: 25 MHz  
RBW/VBW: 100 kHz



TDMA

# Intermodulation Close - Lower PCS 1900 MHz

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



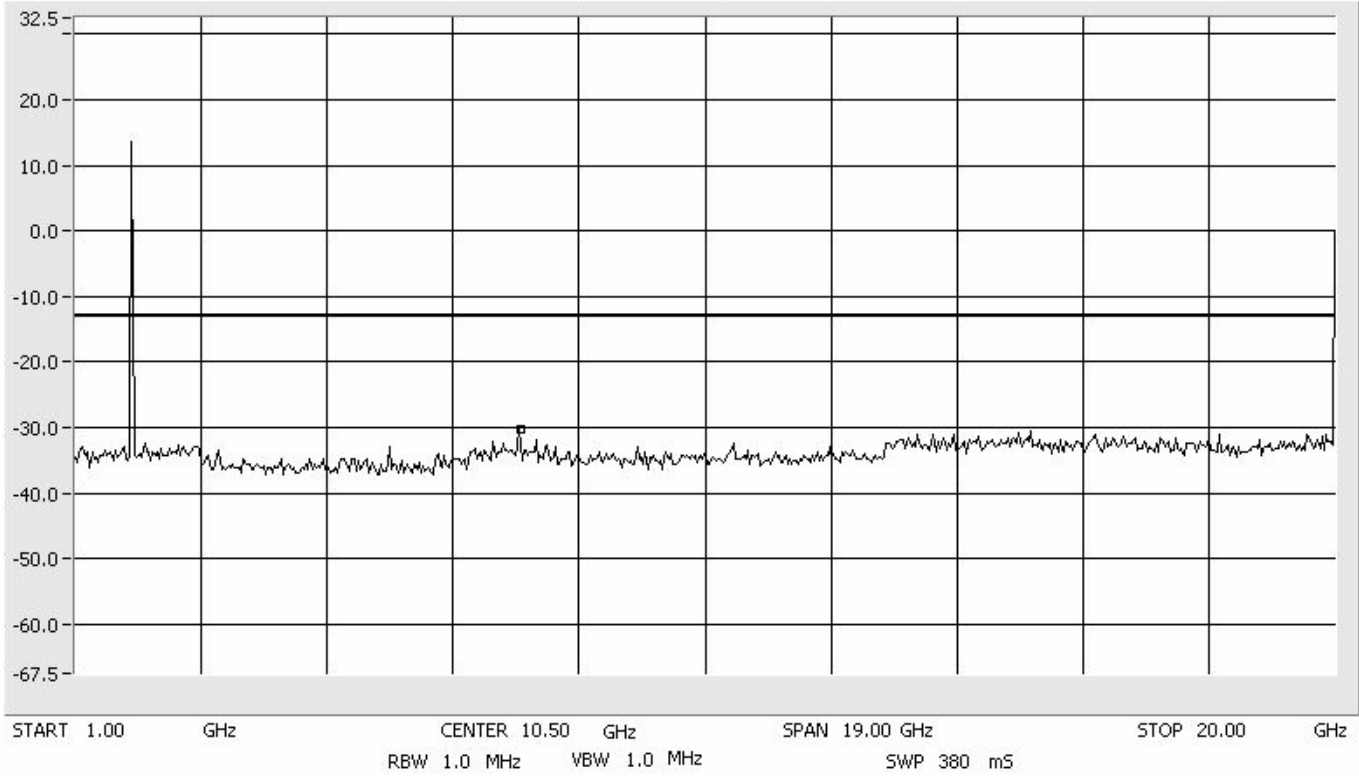
# Intermodulation Close - Lower PCS 1900 MHz

Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz

ATTEN 10 dB  
RL 32.5 dBm

delta MKR -30.17 dBm  
7.71 GHz

10 dB/Div

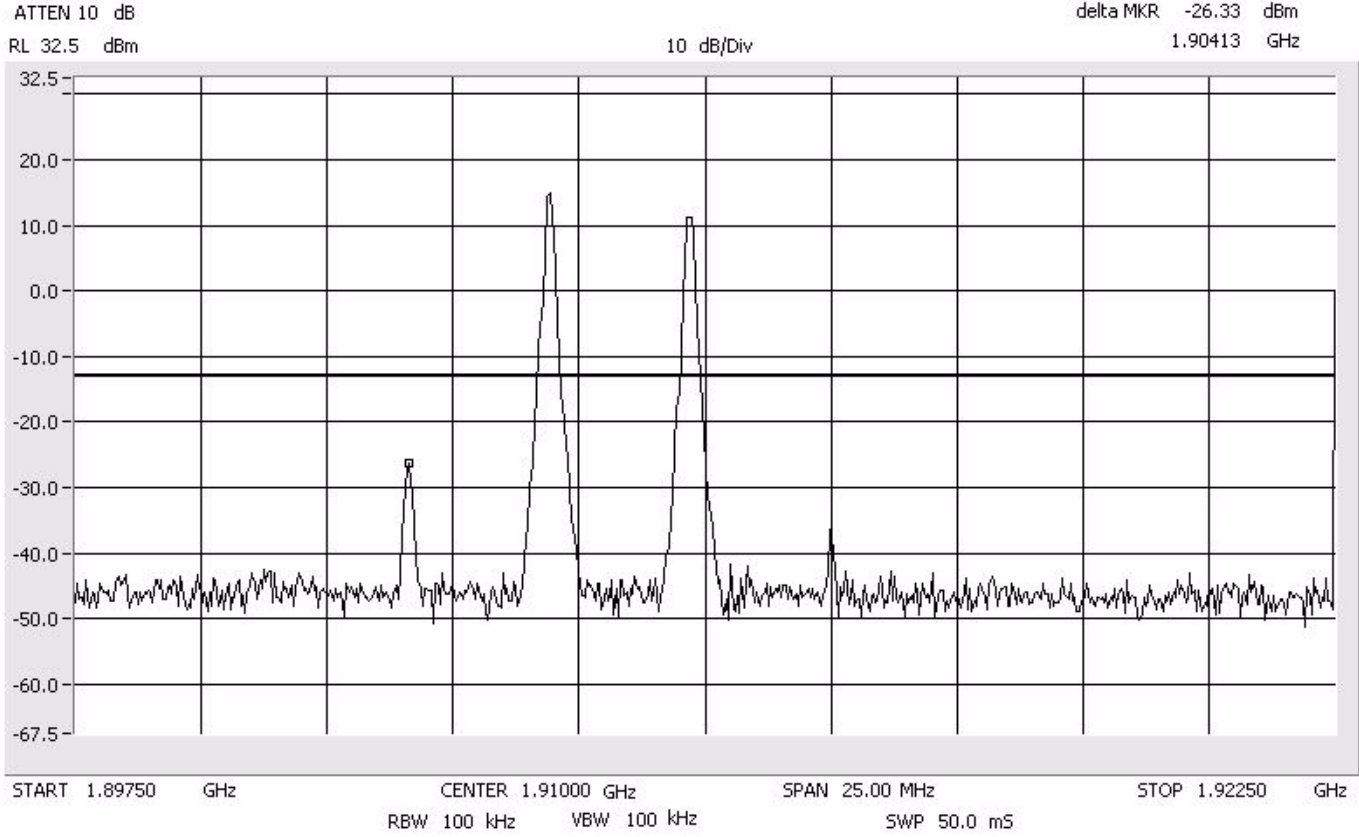




TDMA

# Intermodulation Close - Upper PCS 1900 MHz

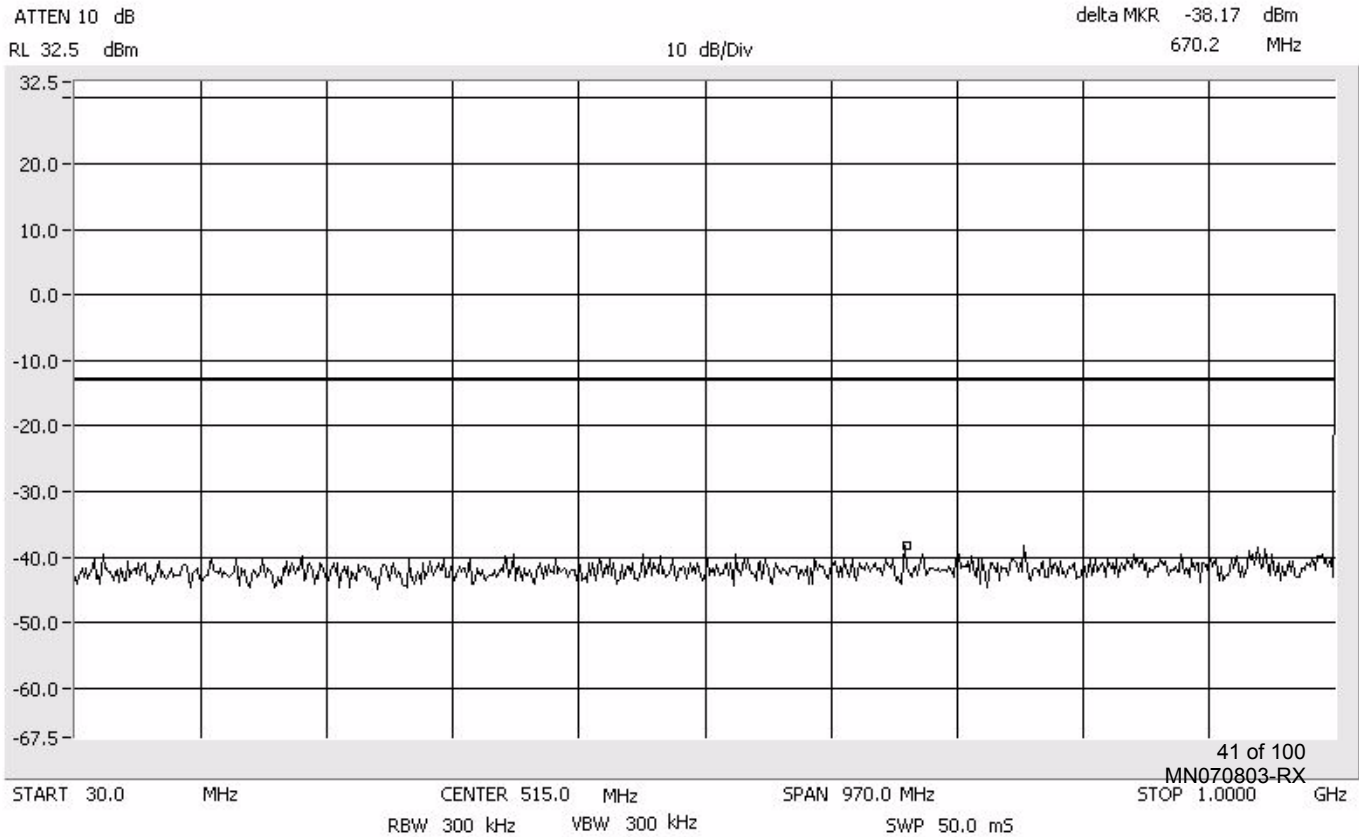
Center: 1910.0 MHz  
Span: 25 MHz  
RBW/VBW: 100 kHz



TDMA

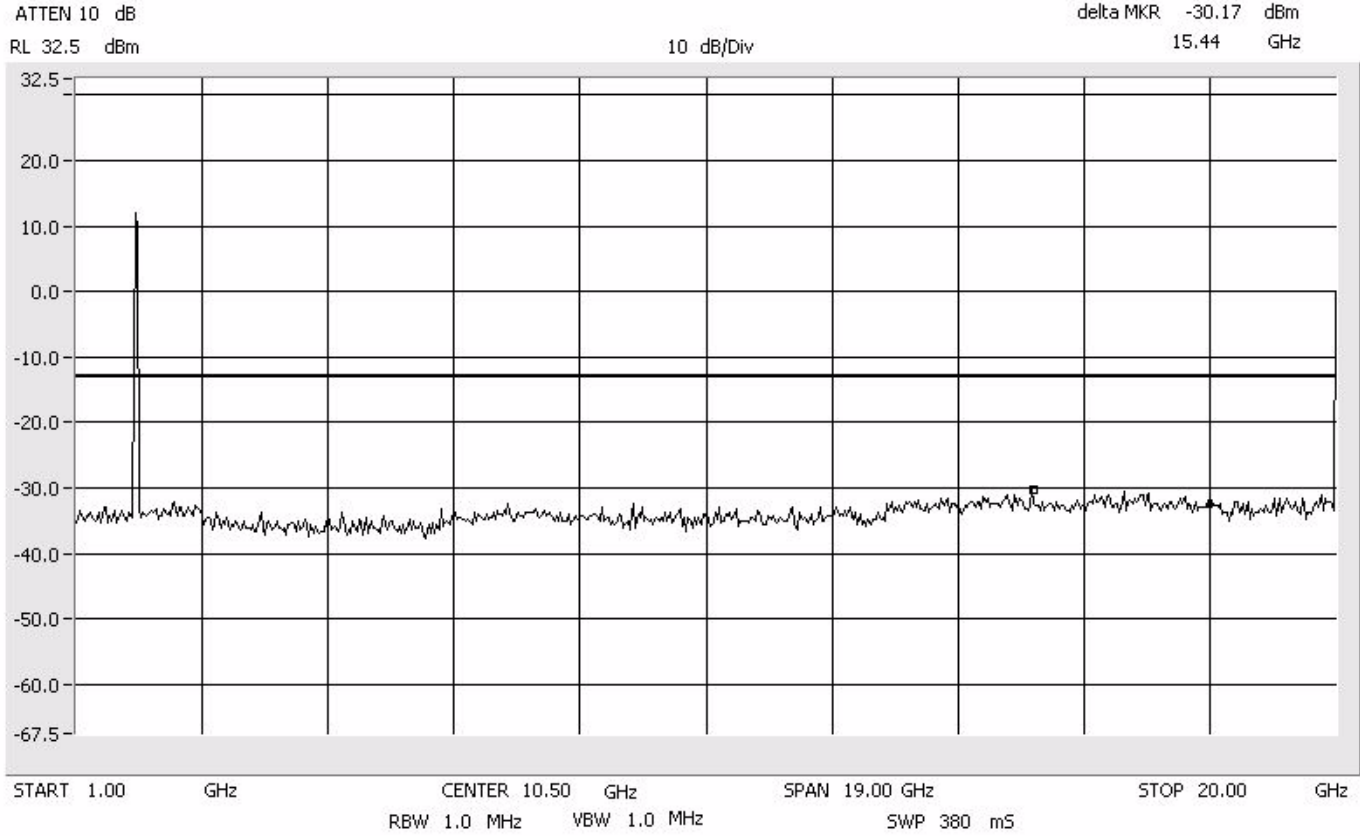
# Intermodulation Close - Upper PCS 1900 MHz

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



# Intermodulation Close - Upper PCS 1900 MHz

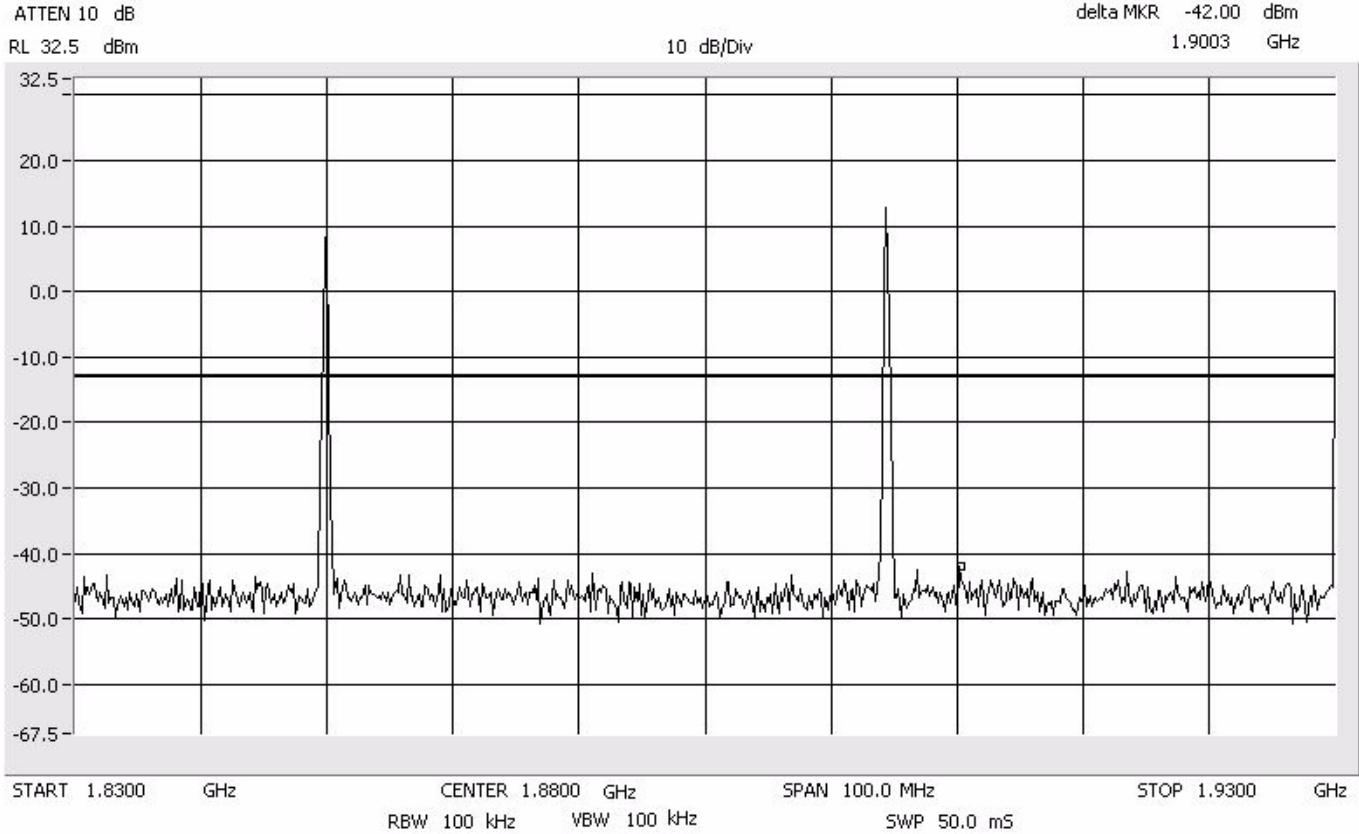
Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz



TDMA

# Intermodulation Apart - AF PCS 1900 MHz

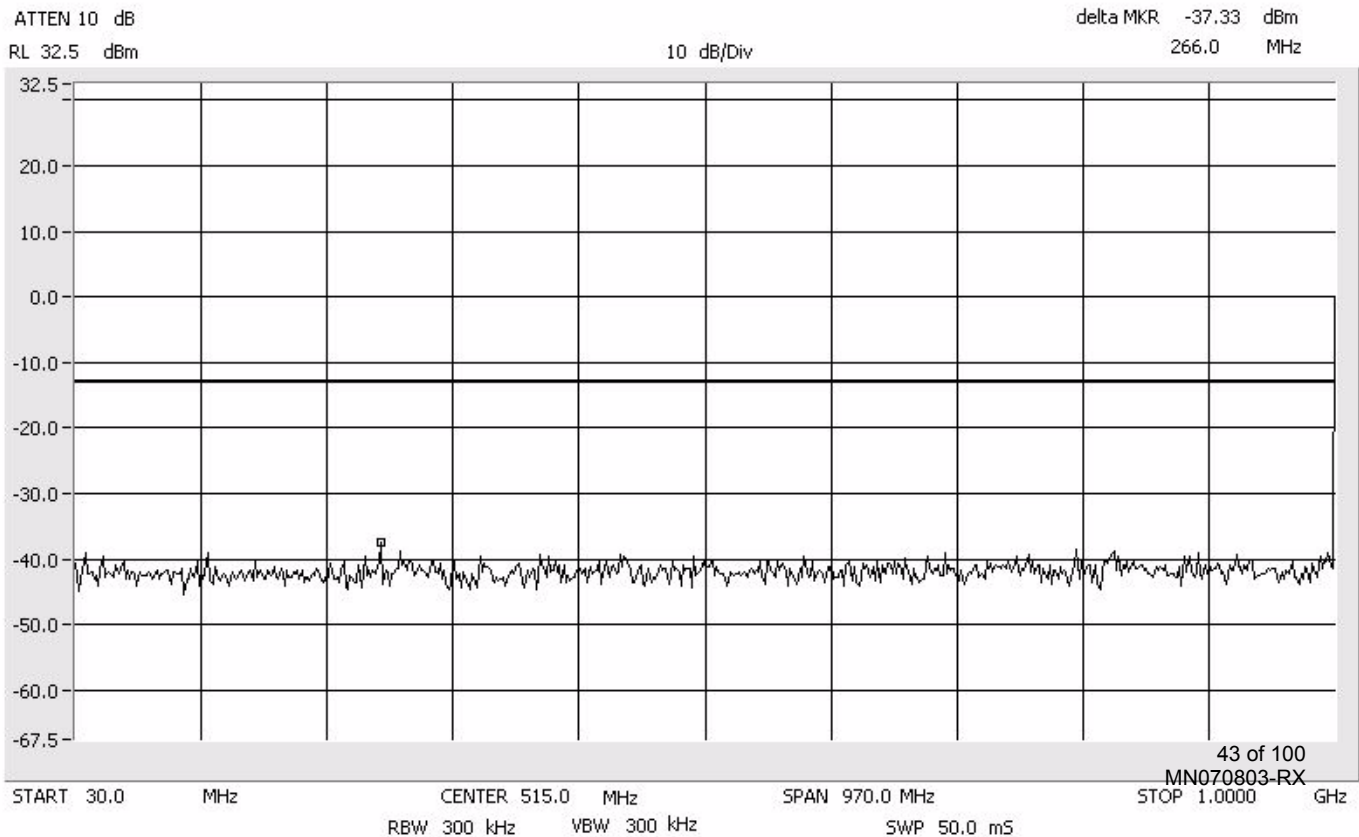
Center: 1880.0 MHz  
Span: 100 MHz  
RBW/VBW: 100 kHz



TDMA

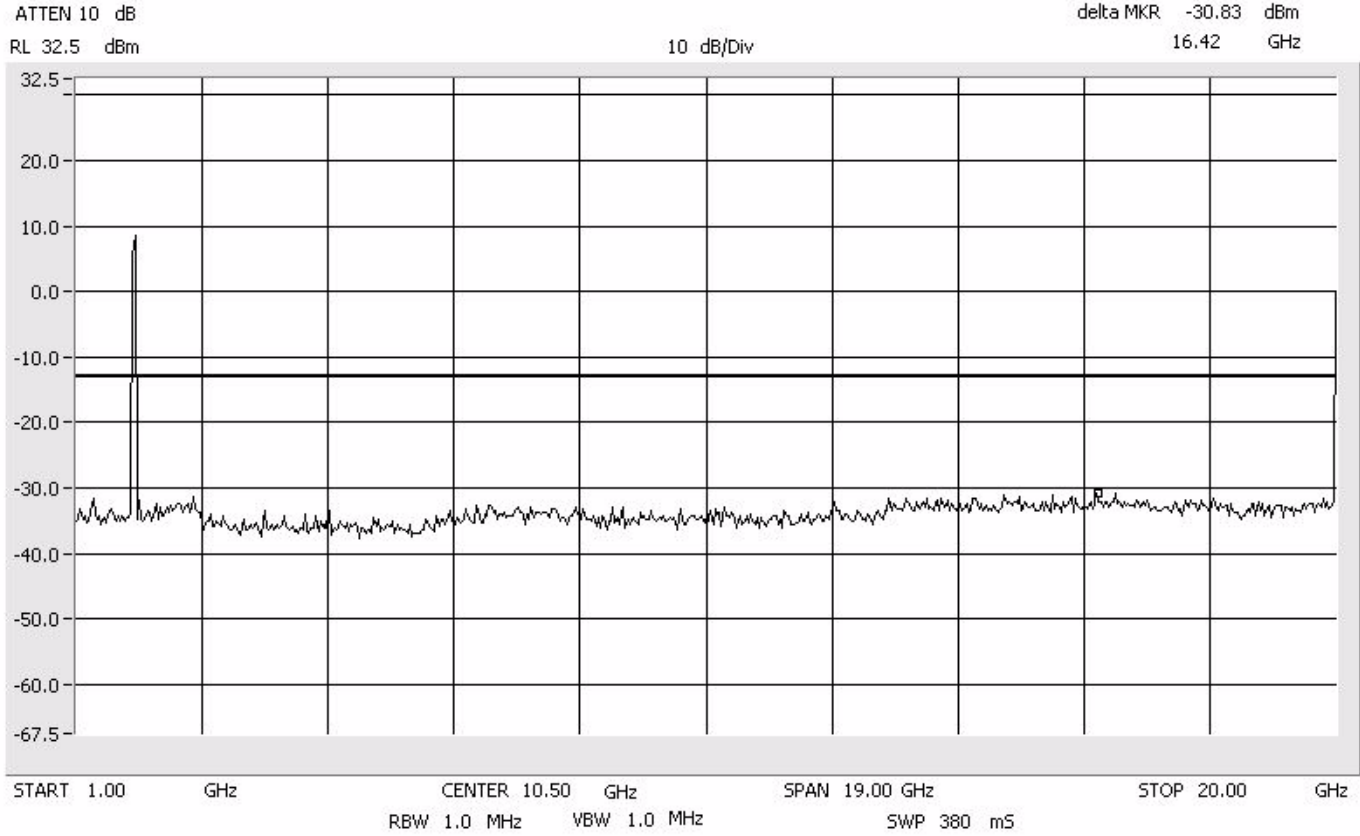
# Intermodulation Apart - AF PCS 1900 MHz

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



# Intermodulation Apart - AF PCS 1900 MHz

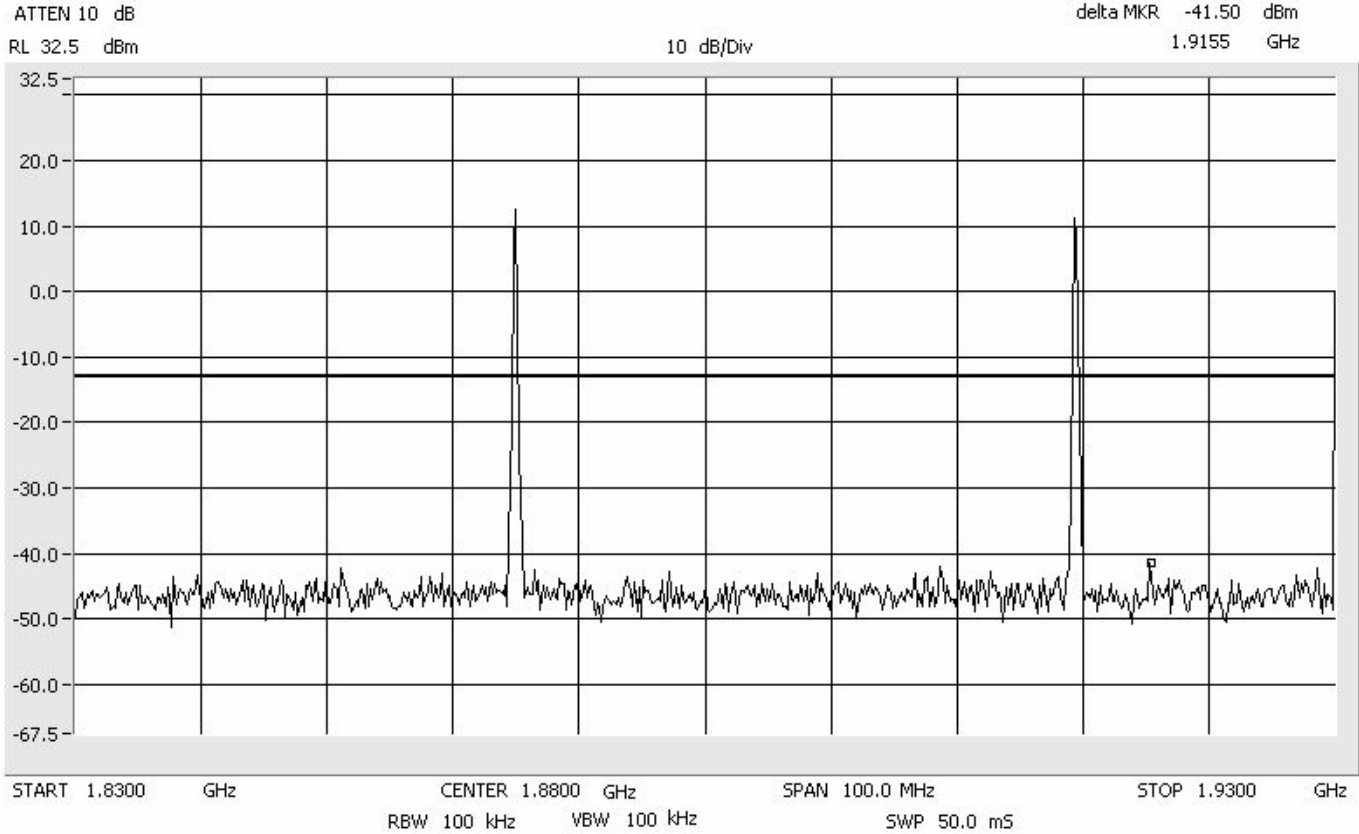
Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz



TDMA

# Intermodulation Apart - DC PCS 1900 MHz

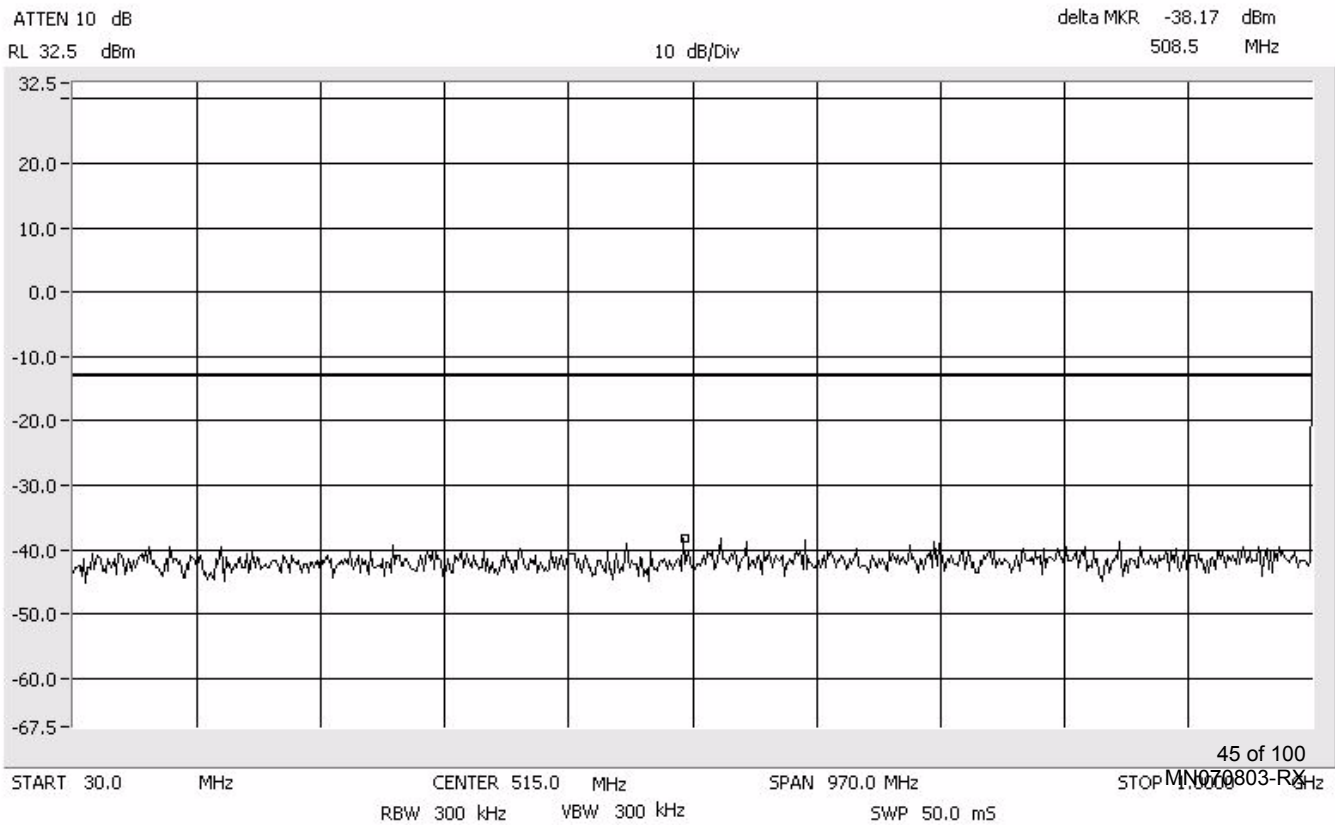
Center: 1880.0 MHz  
Span: 100 MHz  
RBW/VBW: 100 kHz



TDMA

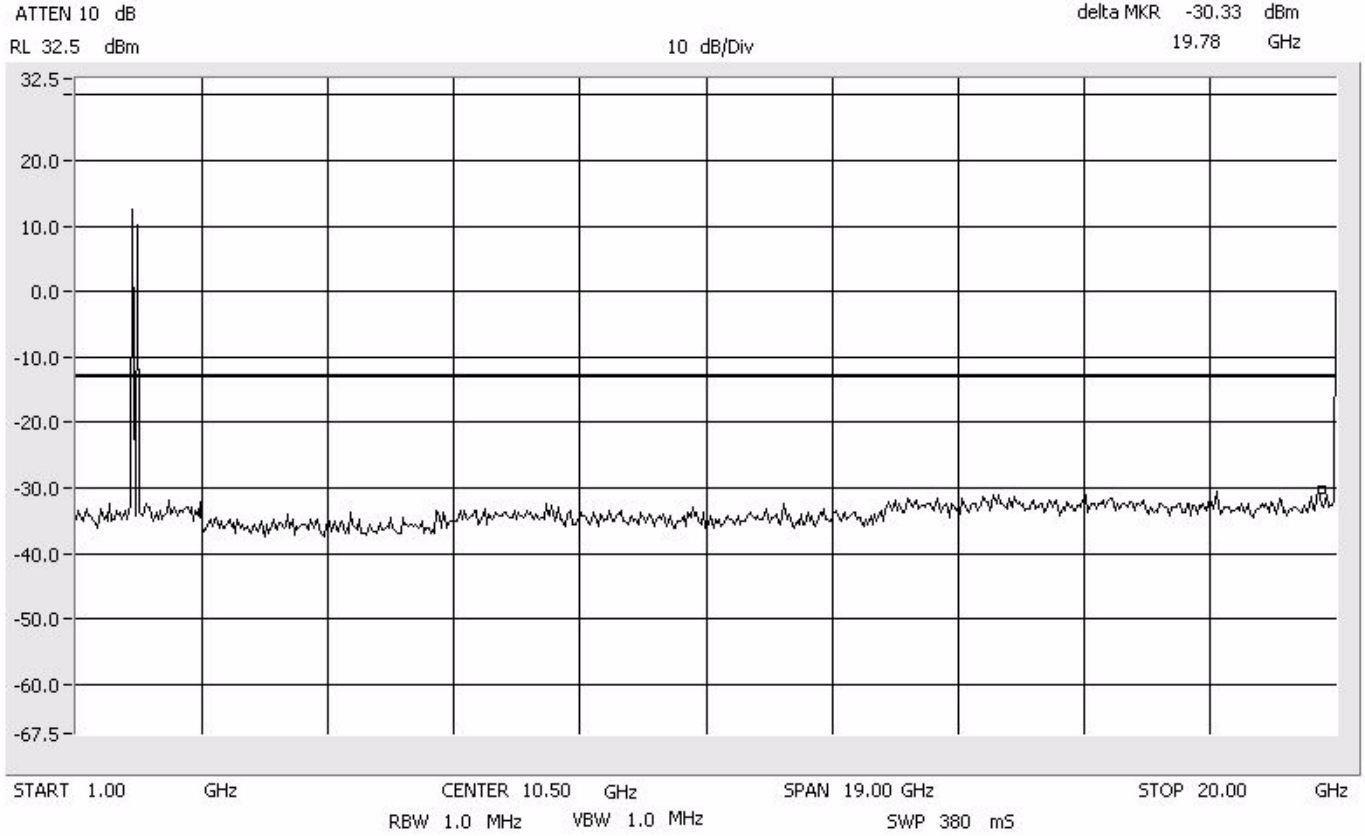
# Intermodulation Apart - DC PCS 1900 MHz

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



# Intermodulation Apart - DC PCS 1900 MHz

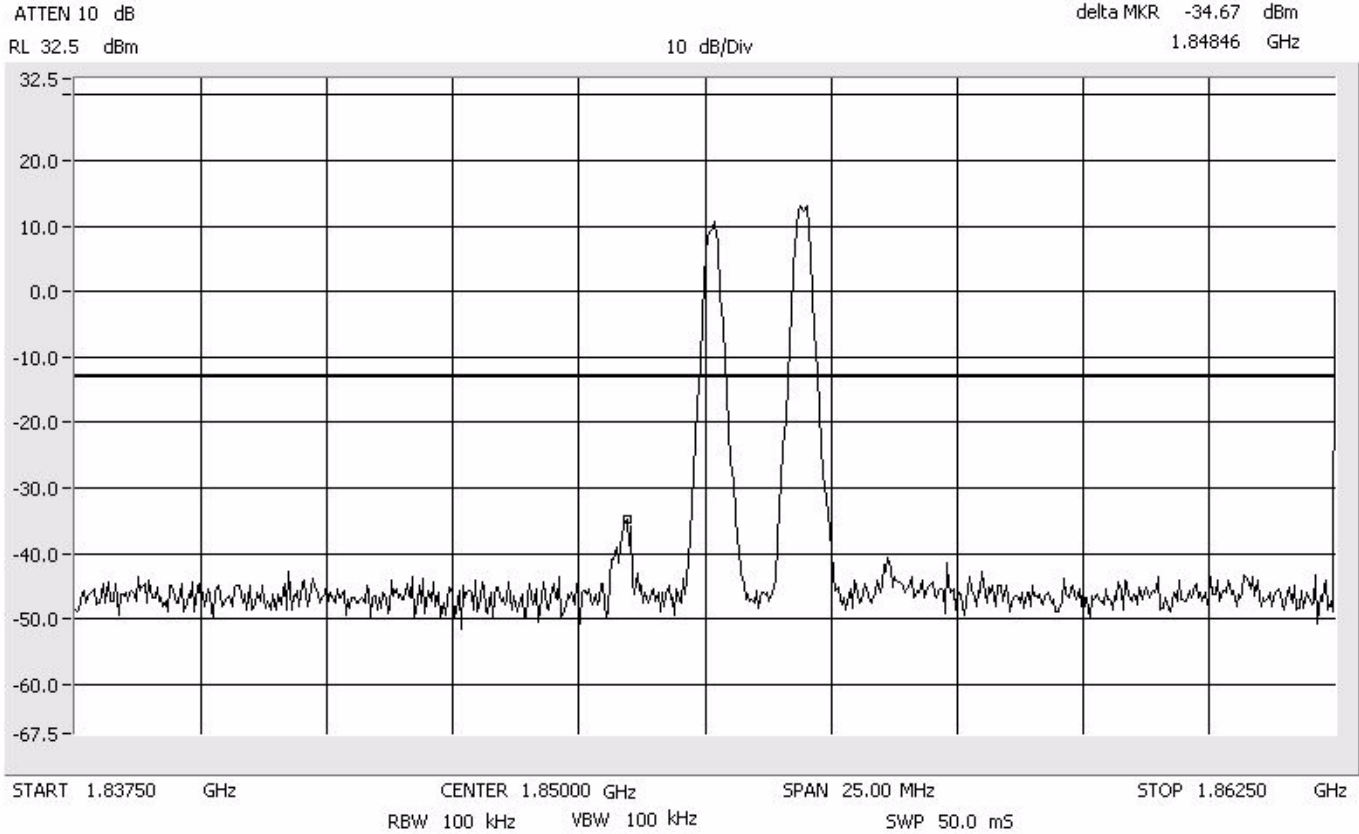
Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz



GSM

# Intermodulation Close - Lower PCS 1900 MHz

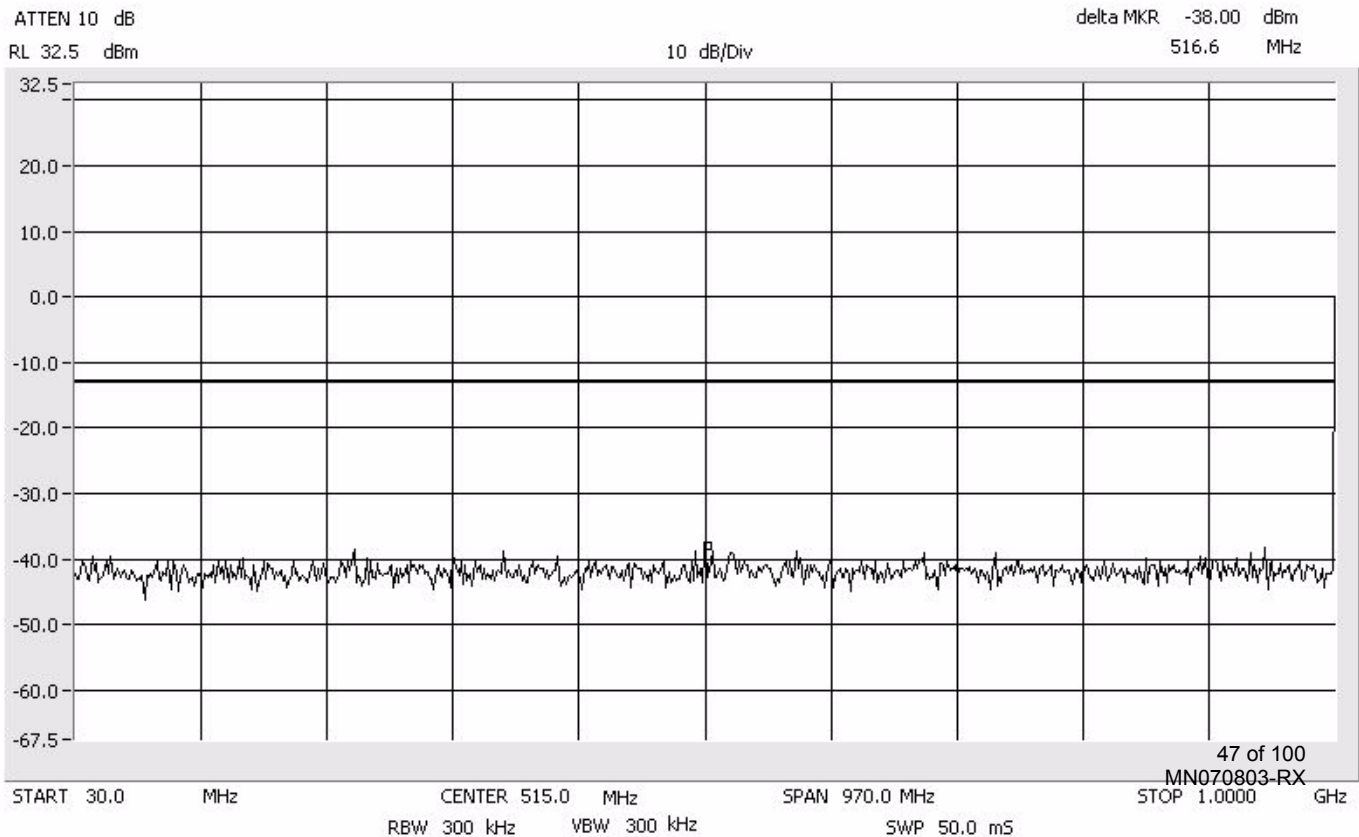
Center: 1850.0 MHz  
Span: 25 MHz  
RBW/VBW: 100 kHz



GSM

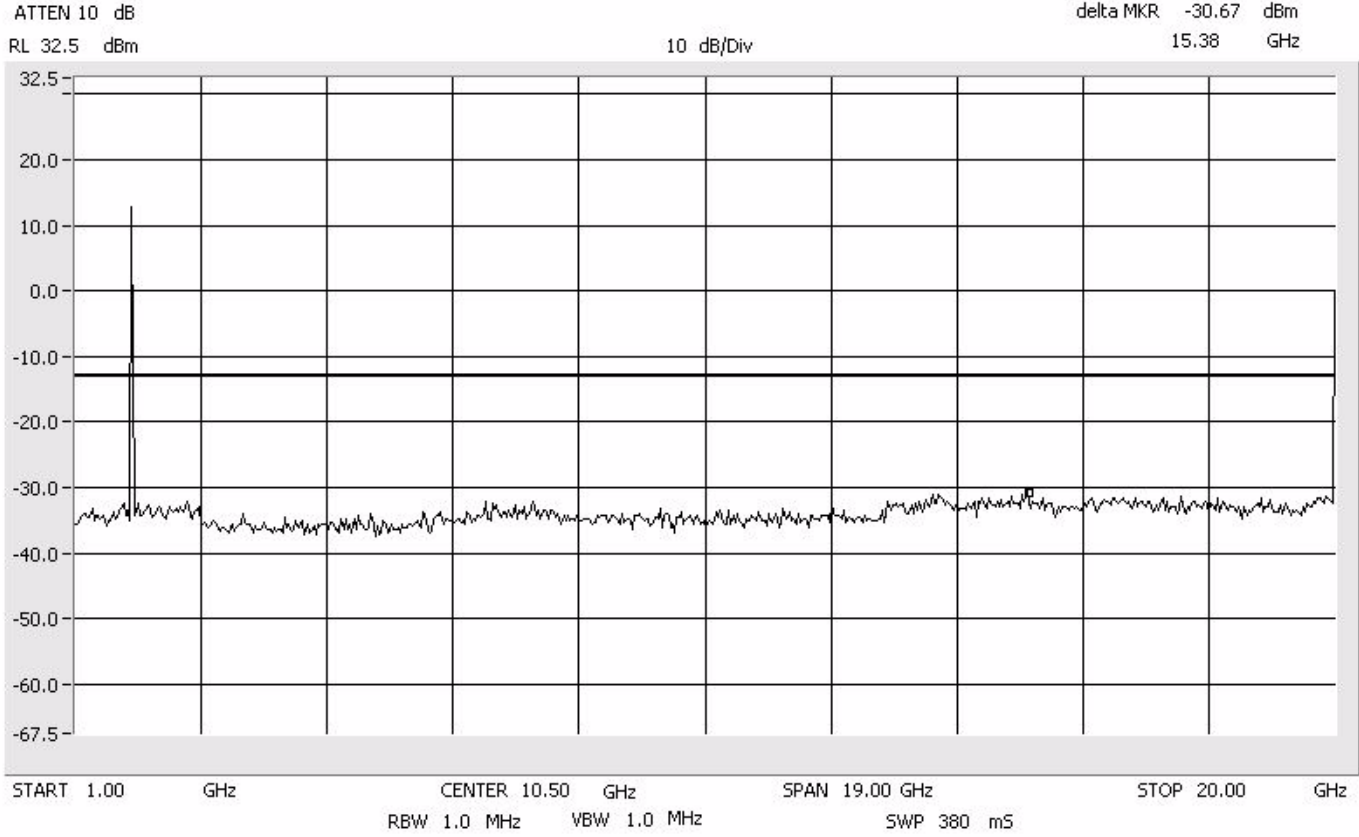
# Intermodulation Close - Lower PCS 1900 MHz

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



# Intermodulation Close - Lower PCS 1900 MHz

Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz

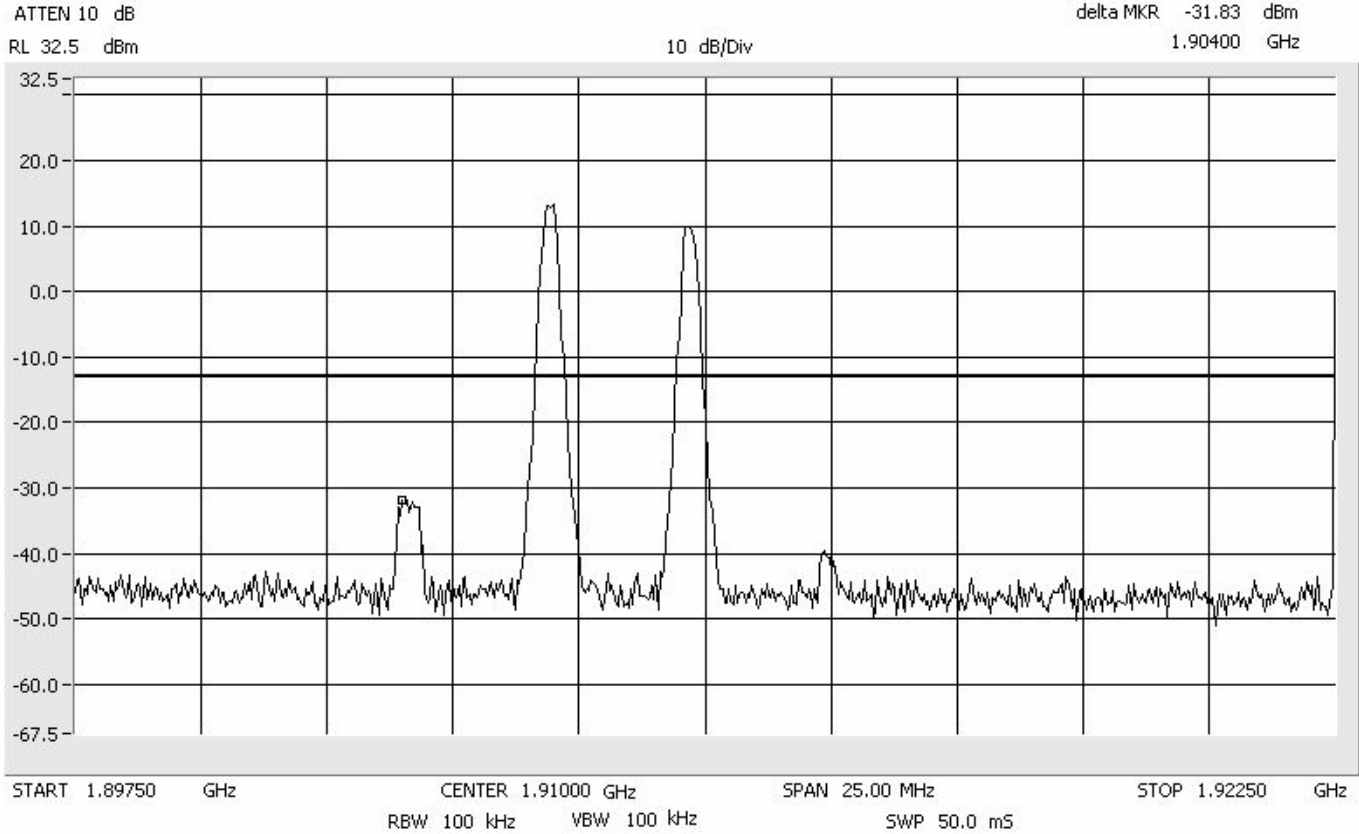




GSM

# Intermodulation Close - Upper PCS 1900 MHz

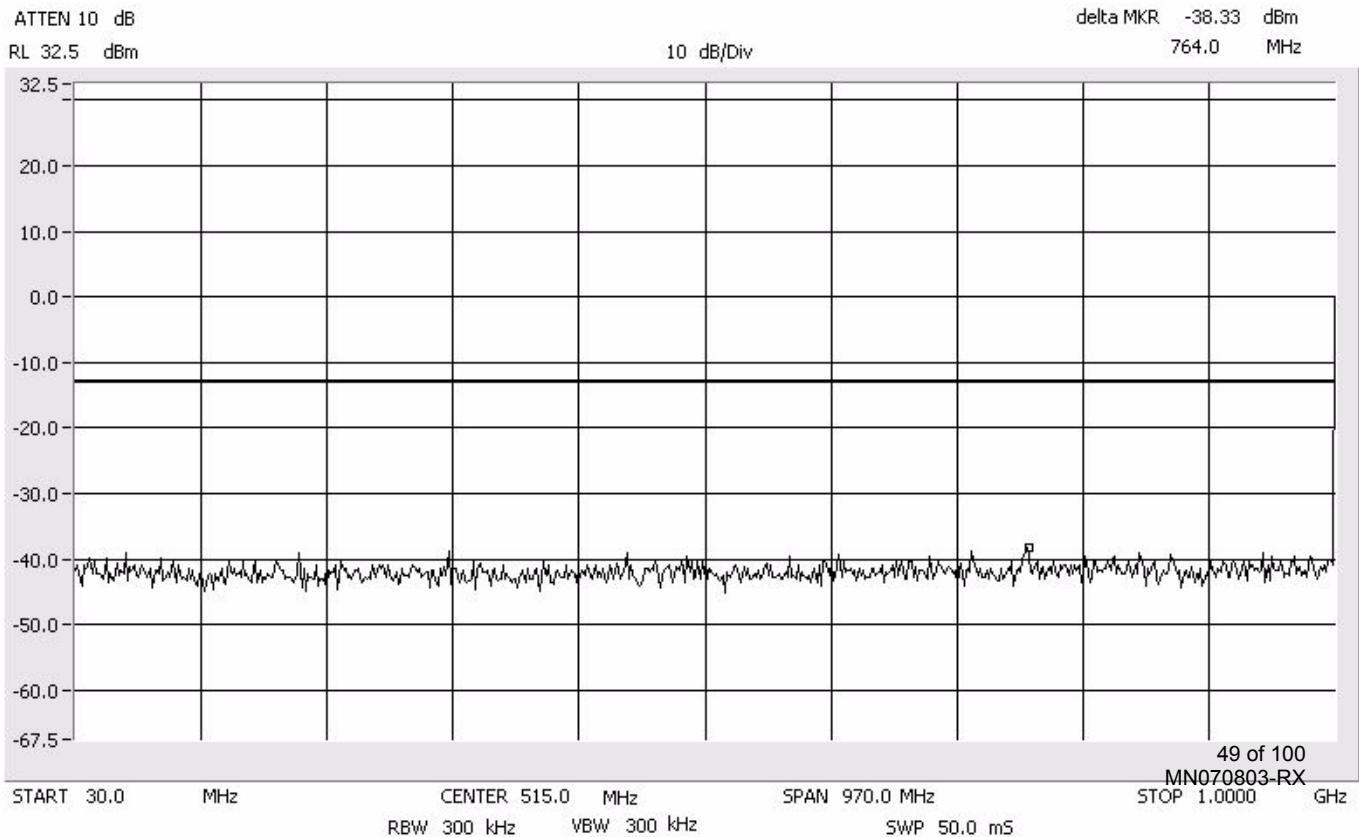
Center: 1910.0 MHz  
Span: 25 MHz  
RBW/VBW: 100 kHz



GSM

# Intermodulation Close - Upper PCS 1900 MHz

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



# Intermodulation Close - Upper PCS 1900 MHz

Span: 1 GHz to 20 GHz  
RBW/VBW: 1 MHz

