

FM

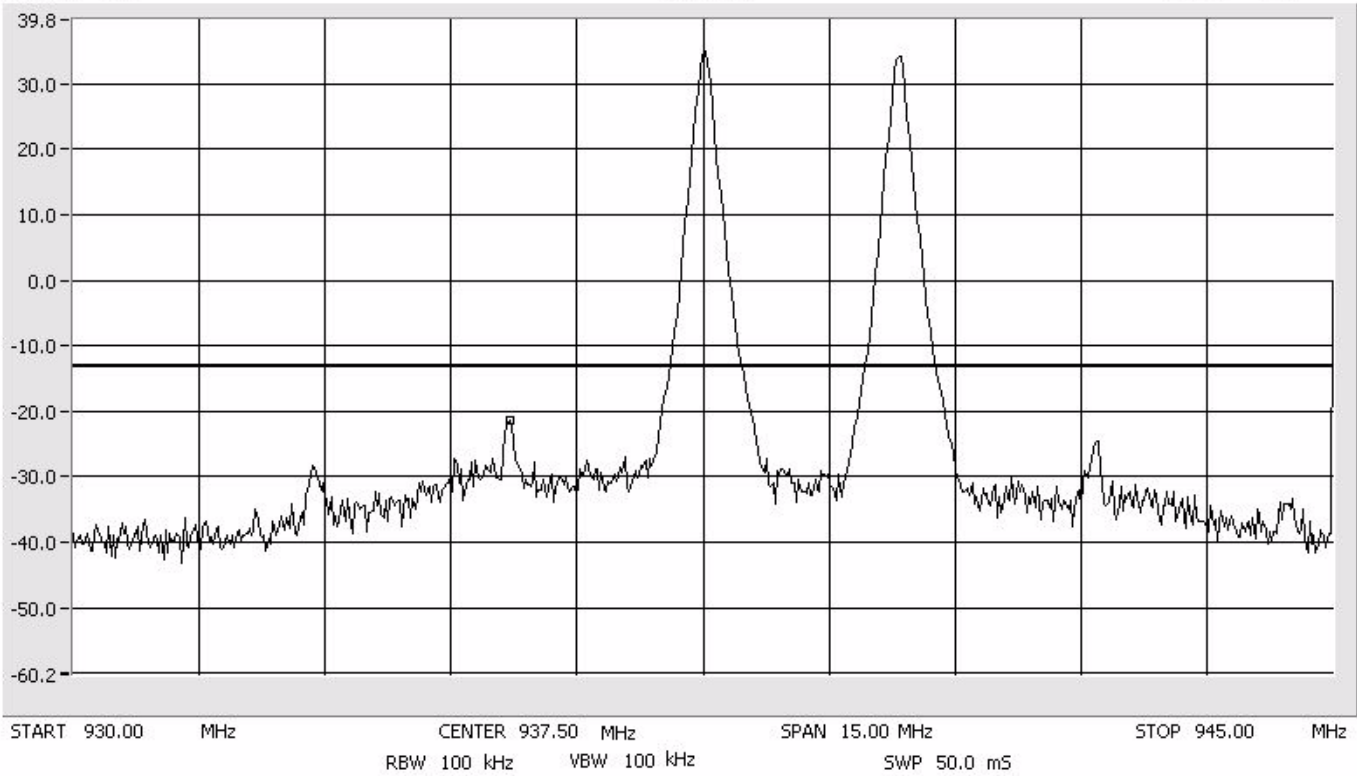
Intermodulation Close - Upper SMR 900 MHz

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

ATTEN 20 dB
RL 39.8 dBm

delta MKR -21.37 dBm
935.20 MHz

10 dB/Div



FM

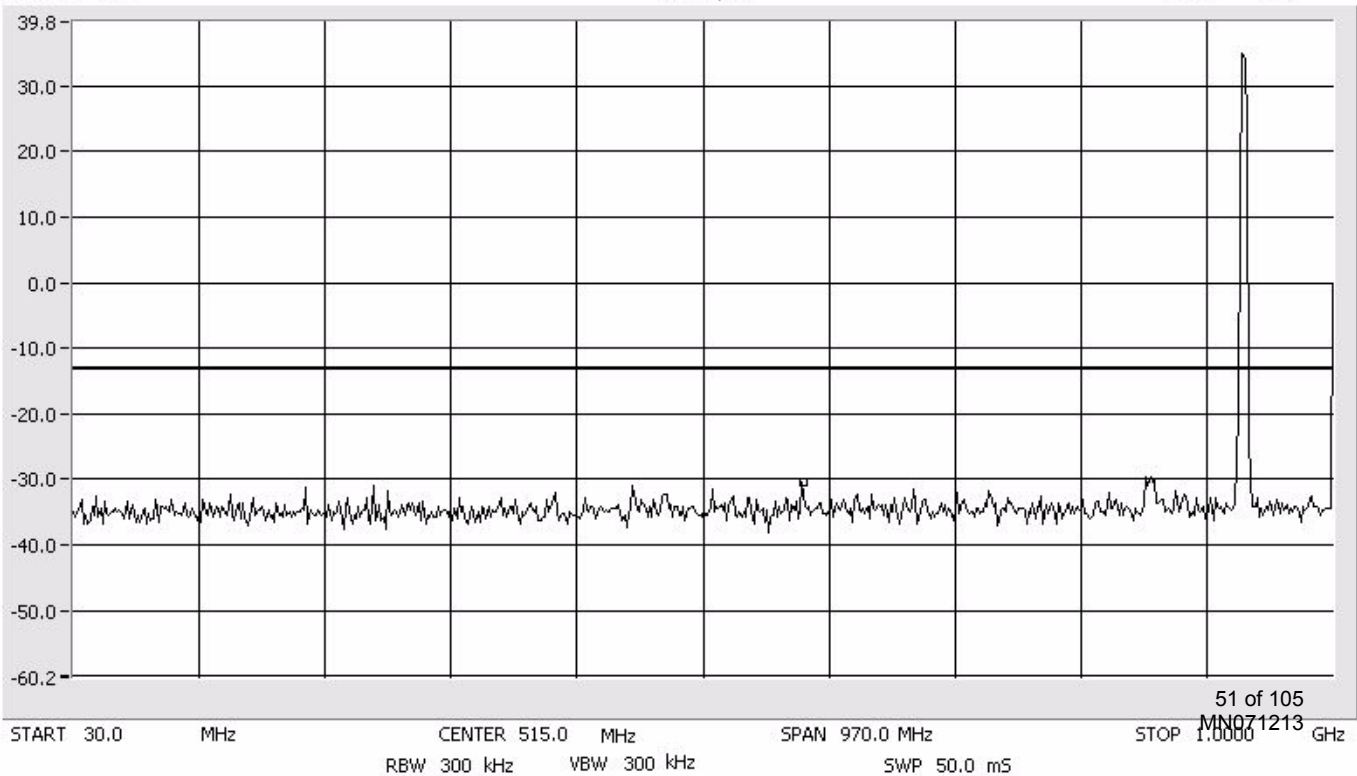
Intermodulation Close - Upper SMR 900 MHz

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

ATTEN 20 dB
RL 39.8 dBm

delta MKR -30.37 dBm
592.6 MHz

10 dB/Div



Intermodulation Close - Upper SMR 900 MHz

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

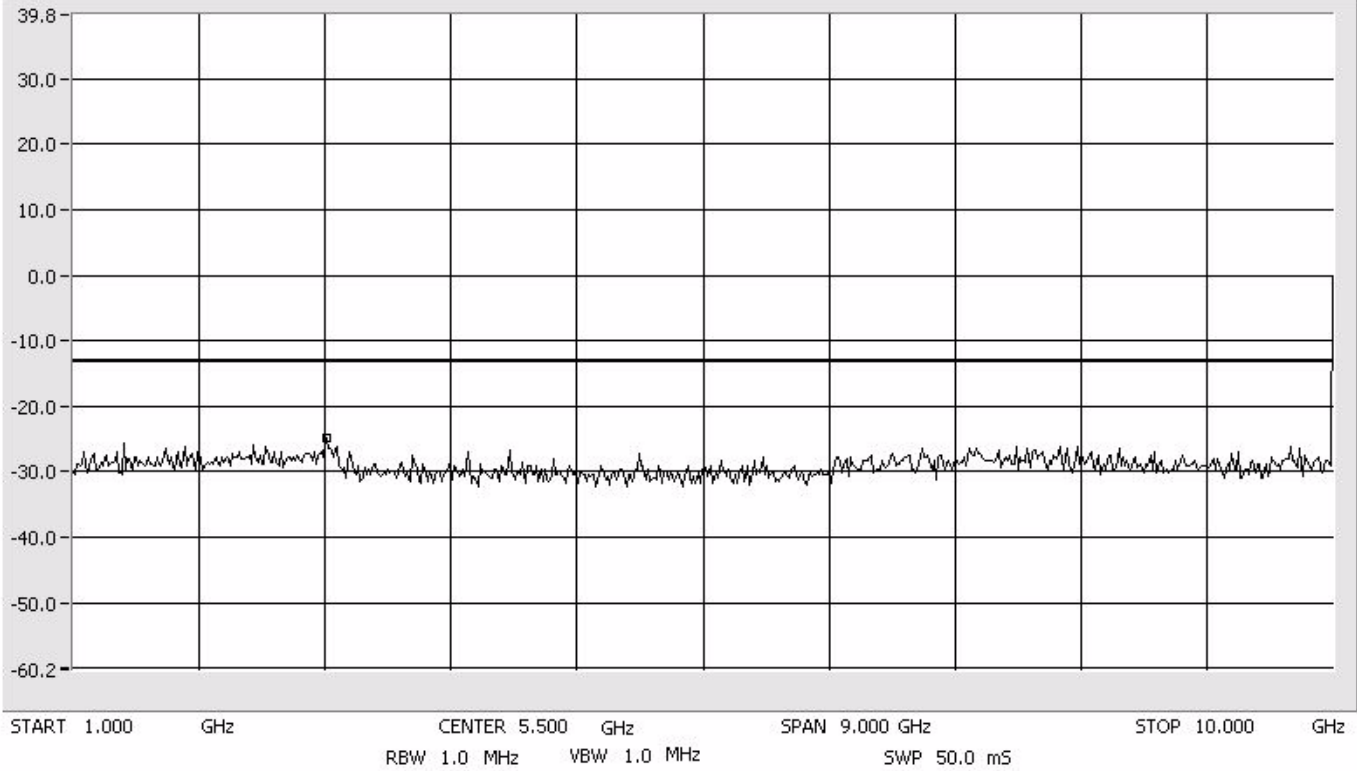
ATTEN 20 dB

delta MKR -24.70 dBm

RL 39.8 dBm

10 dB/Div

2.815 GHz



FM

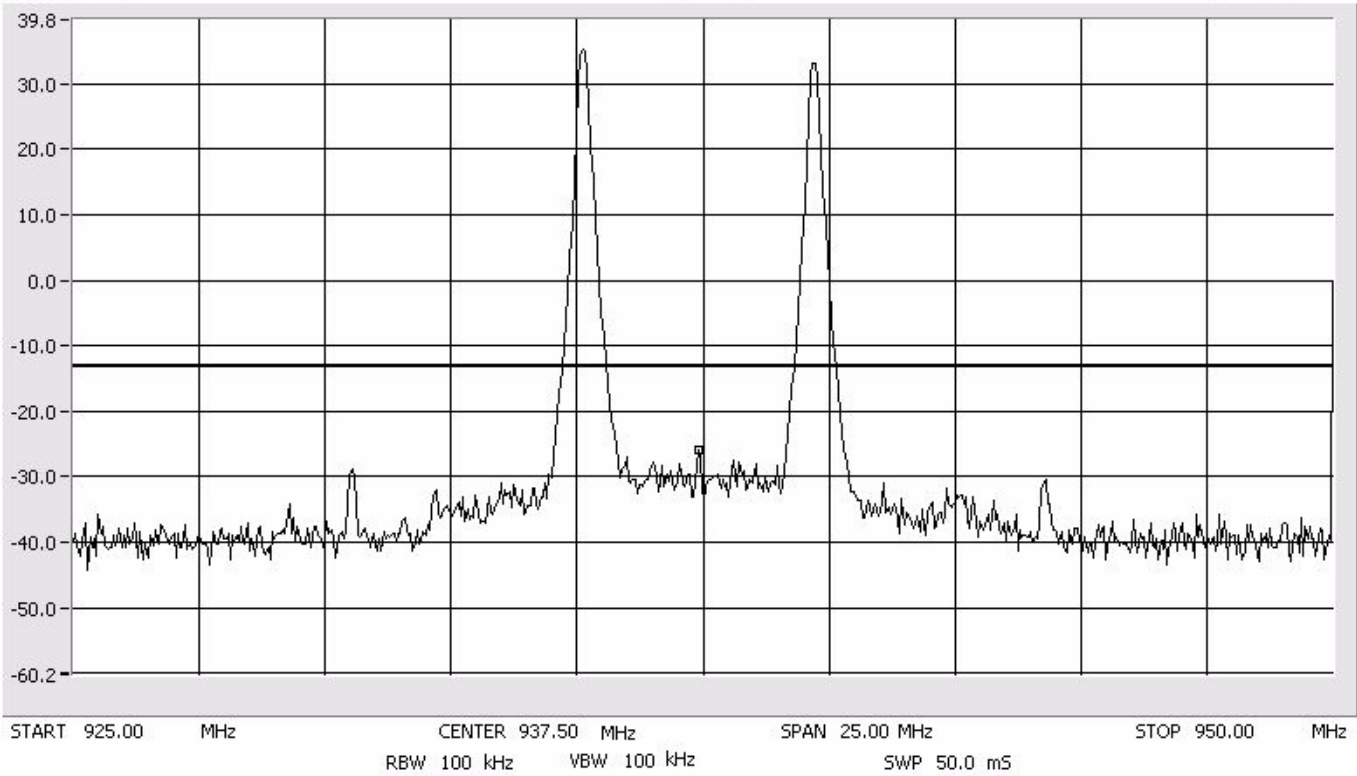
Intermodulation Apart SMR 900 MHz

Center: 937.5 MHz
Span: 25 MHz
RBW/VBW: 100 kHz

ATTEN 20 dB
RL 39.8 dBm

delta MKR -25.87 dBm
937.42 MHz

10 dB/Div



FM

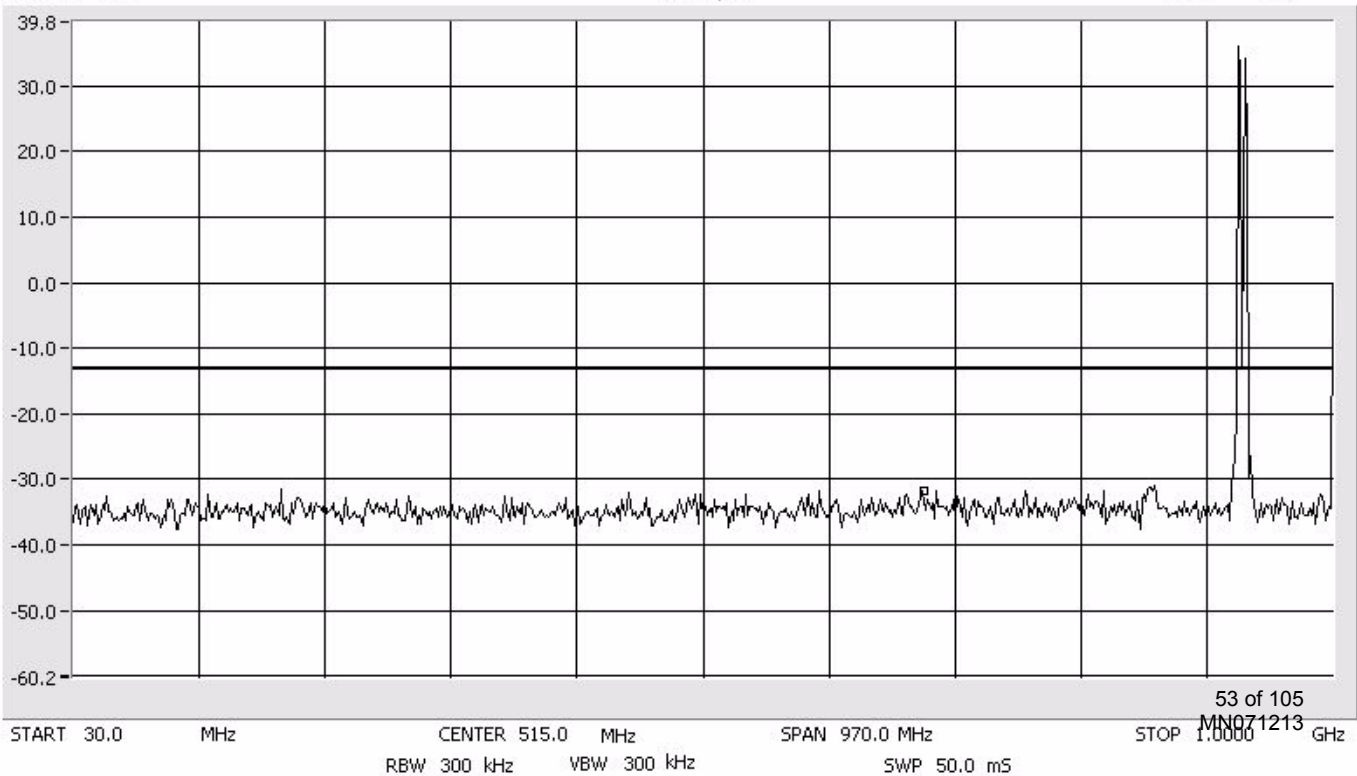
Intermodulation Apart SMR 900 MHz

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

ATTEN 20 dB
RL 39.8 dBm

delta MKR -31.70 dBm
684.8 MHz

10 dB/Div



Intermodulation Apart SMR 900 MHz

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

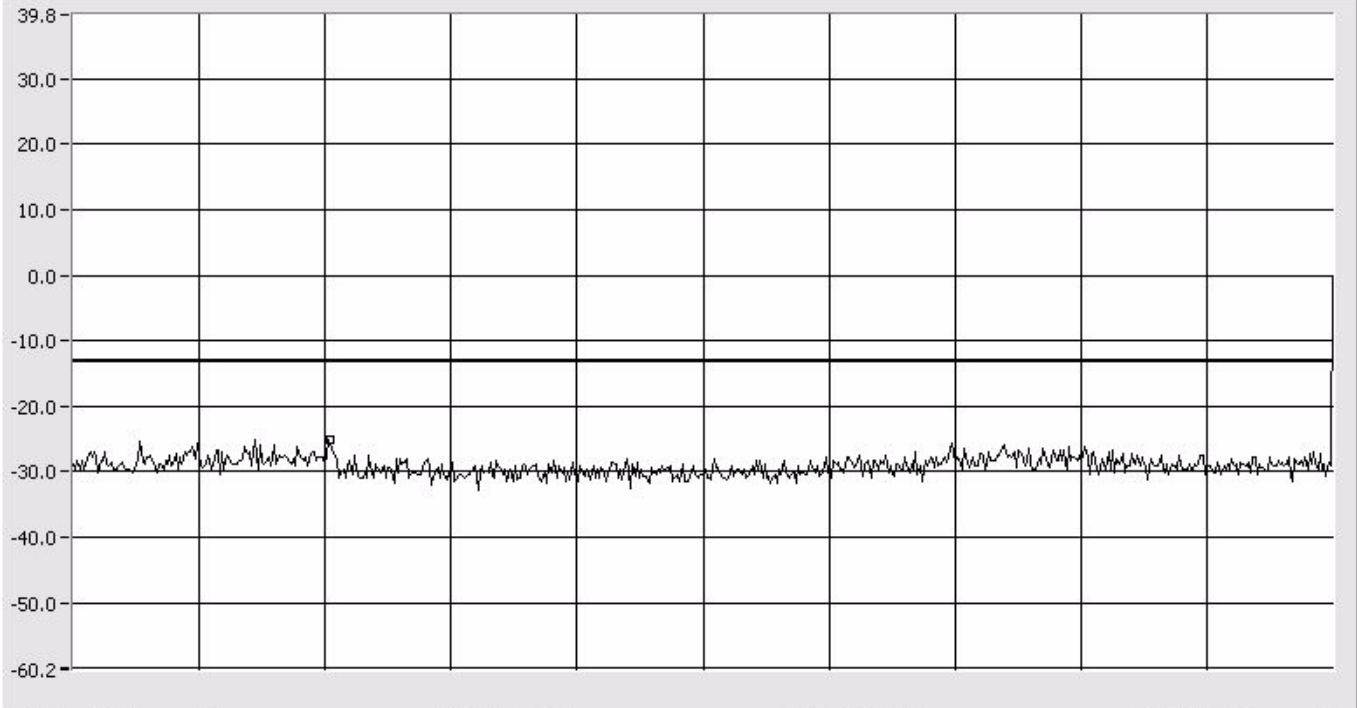
ATTEN 20 dB

delta MKR -25.03 dBm

RL 39.8 dBm

10 dB/Div

2.830 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

iDEN

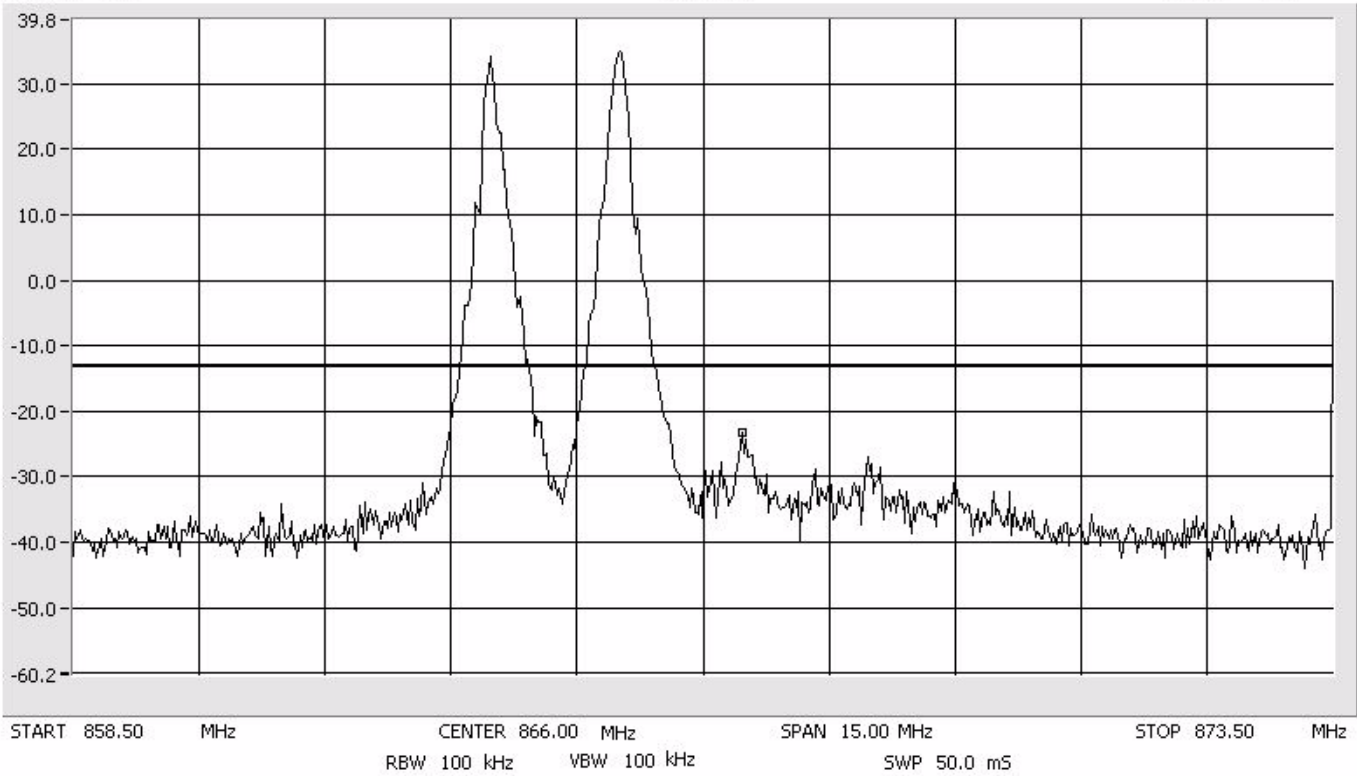
Intermodulation Close - Lower SMR 800 MHz

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

ATTEN 20 dB
RL 39.8 dBm

delta MKR -23.20 dBm
866.48 MHz

10 dB/Div



iDEN

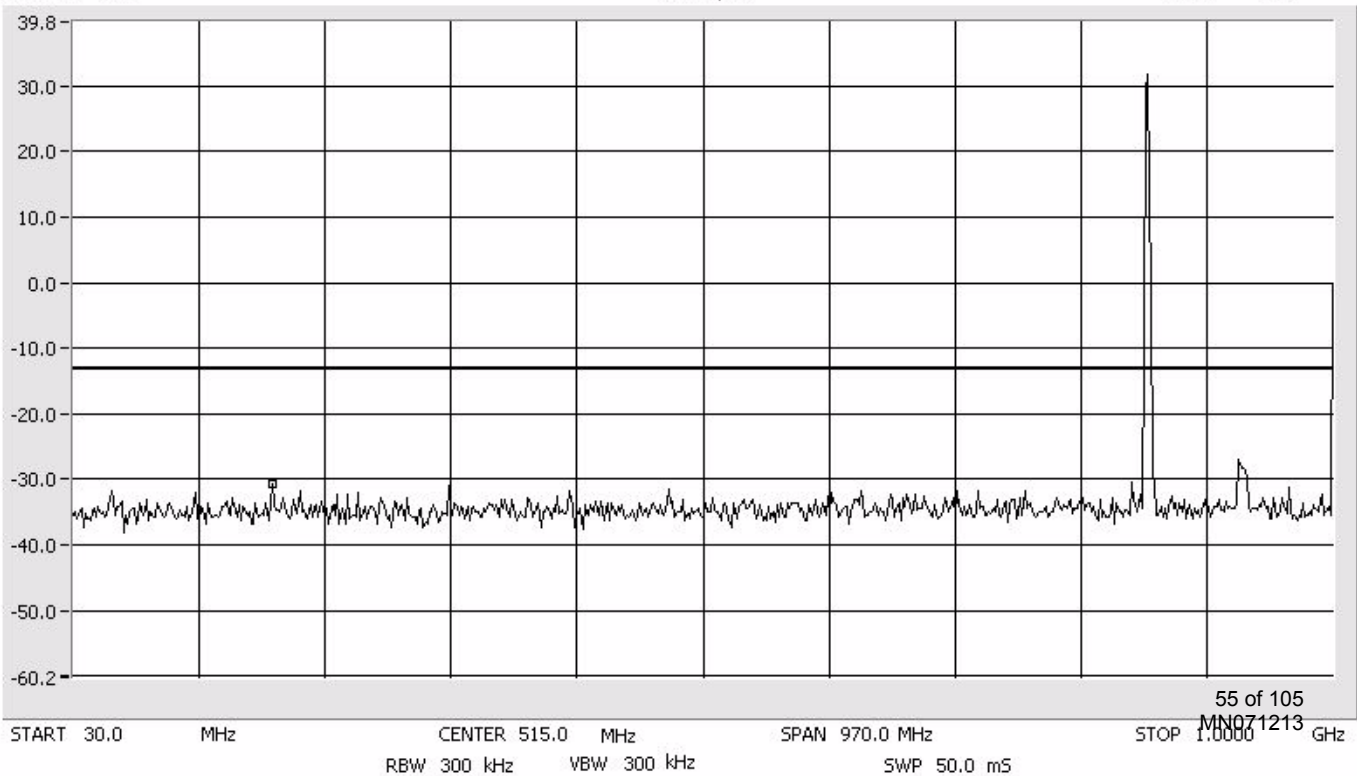
Intermodulation Close - Lower SMR 800 MHz

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

ATTEN 20 dB
RL 39.8 dBm

delta MKR -30.70 dBm
183.6 MHz

10 dB/Div



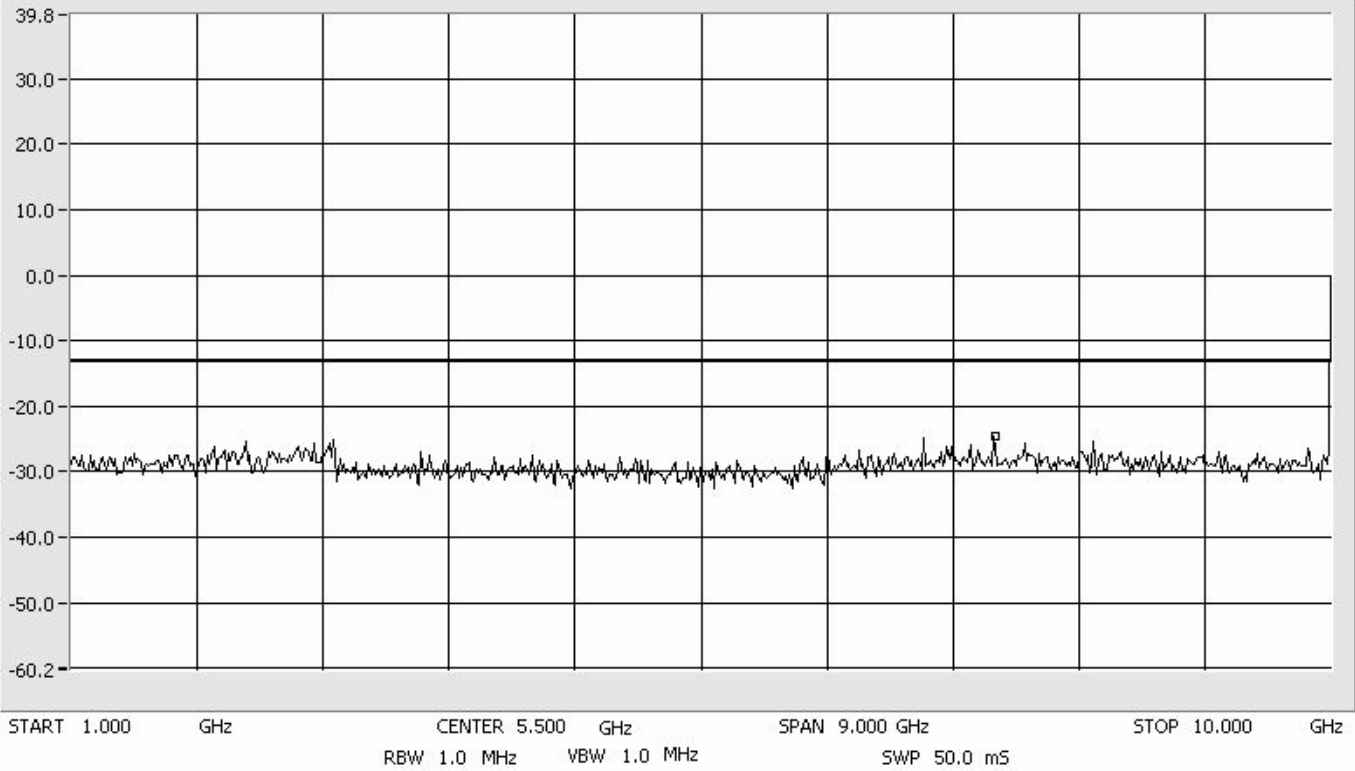
Intermodulation Close - Lower SMR 800 MHz

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

ATTEN 20 dB
RL 39.8 dBm

10 dB/Div

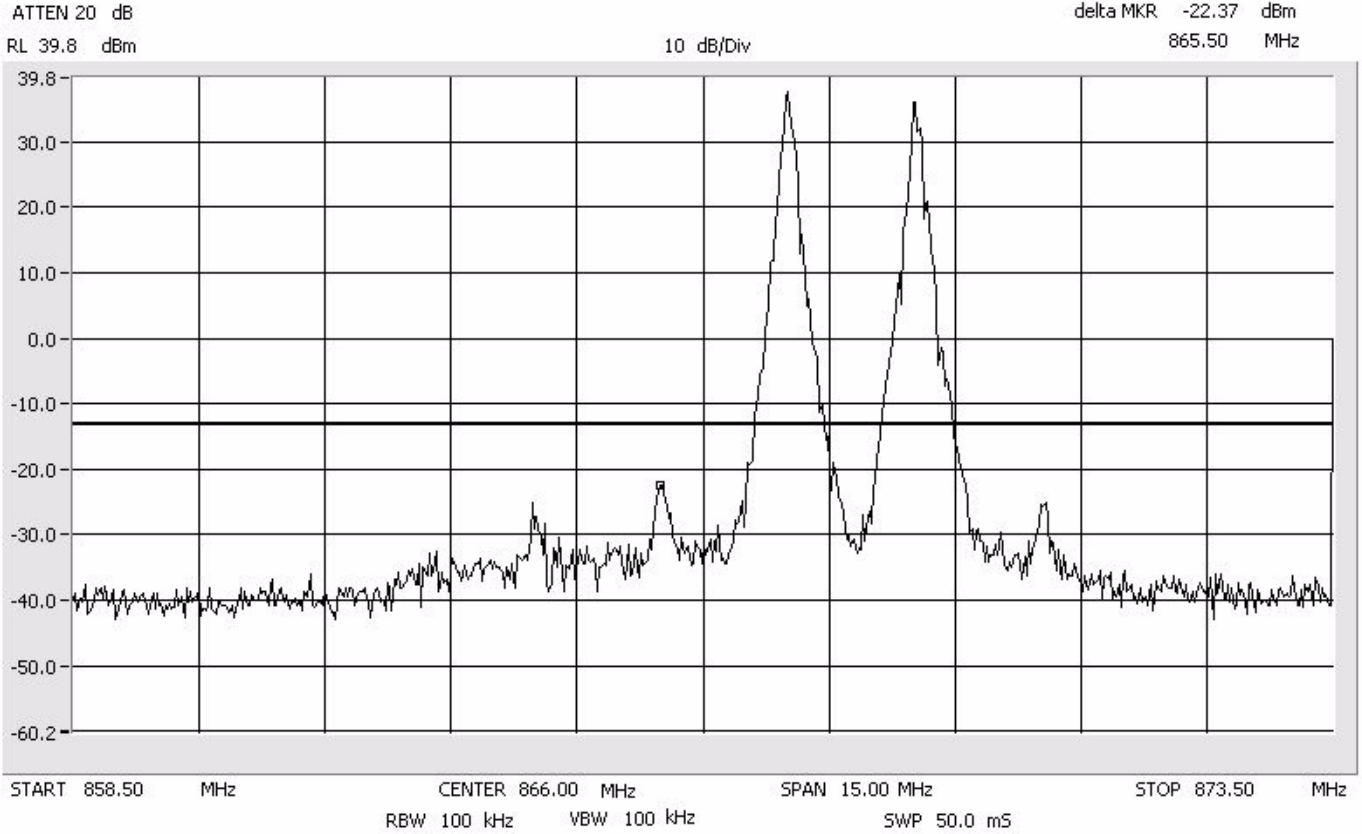
delta MKR -24.53 dBm
7.600 GHz



iDEN

Intermodulation Close - Upper SMR 800 MHz

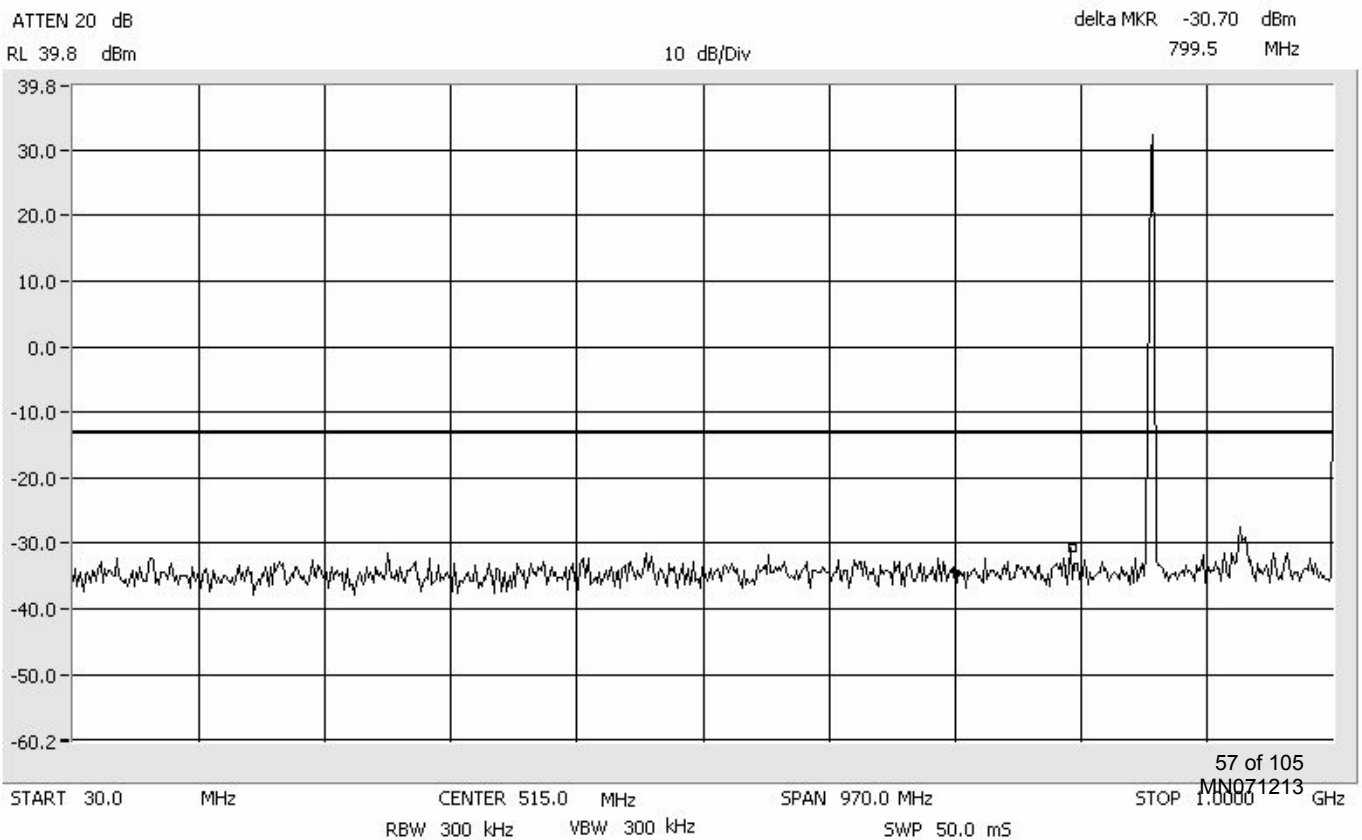
Center: 866.0 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



iDEN

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

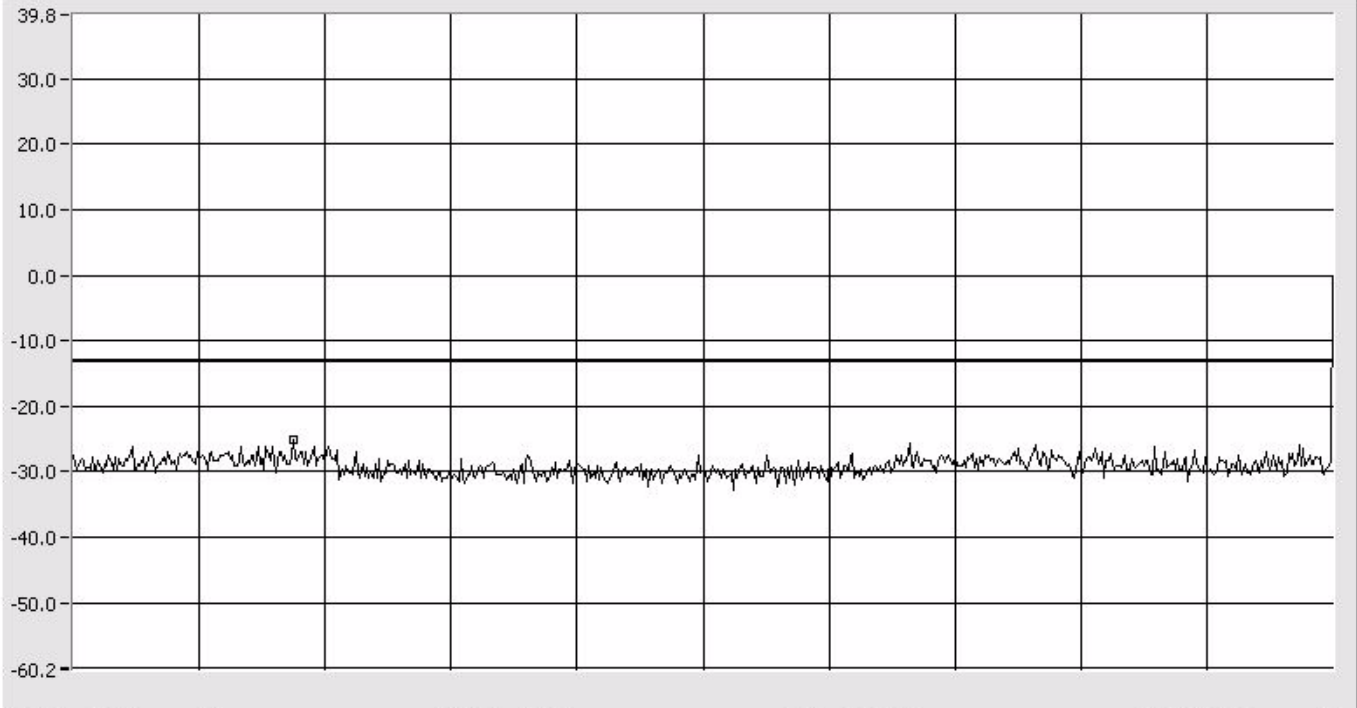
ATTEN 20 dB

delta MKR -25.03 dBm

RL 39.8 dBm

10 dB/Div

2.575 GHz

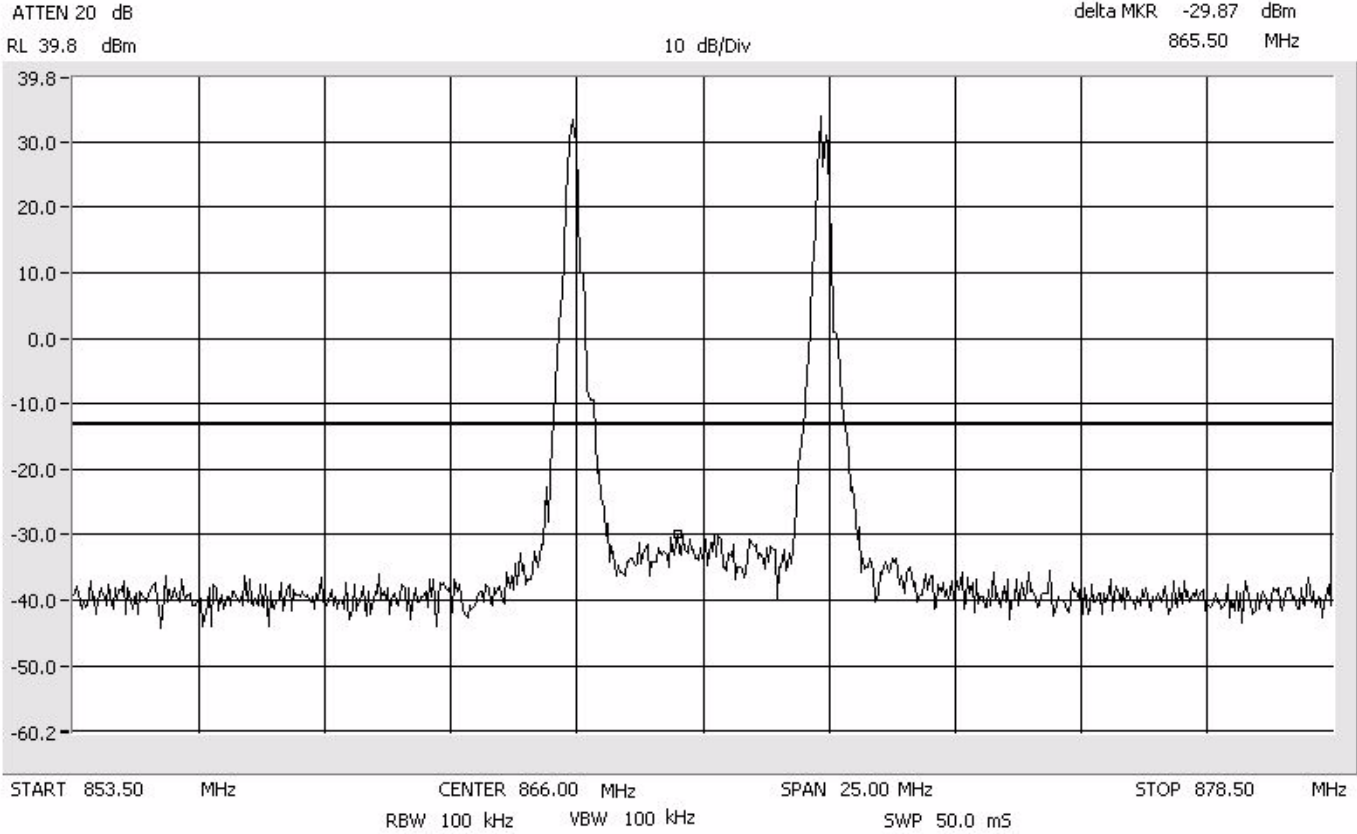


START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

iDEN

Intermodulation Apart SMR 800 MHz

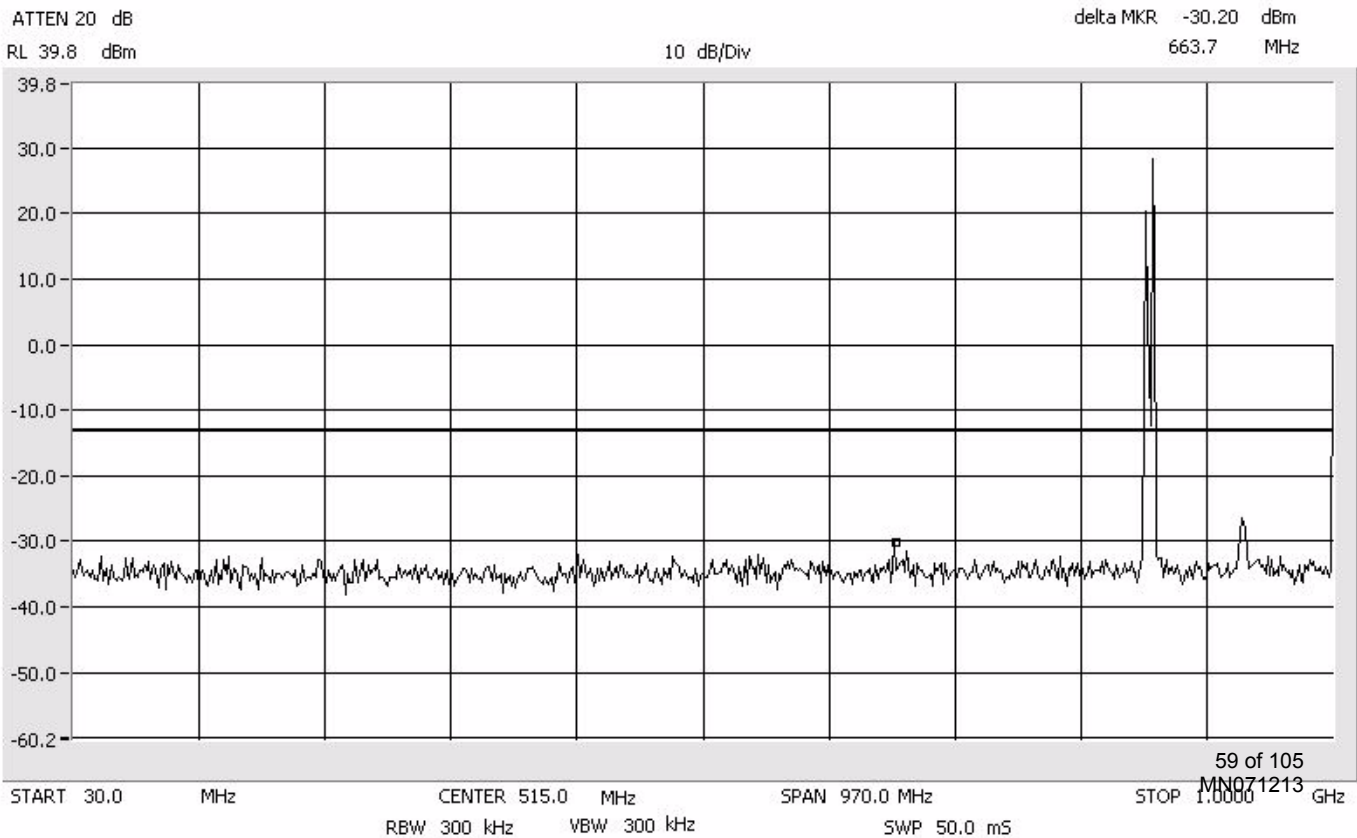
Center: 866.0 MHz
Span: 25 MHz
RBW/VBW: 100 kHz



iDEN

Intermodulation Apart SMR 800 MHz

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



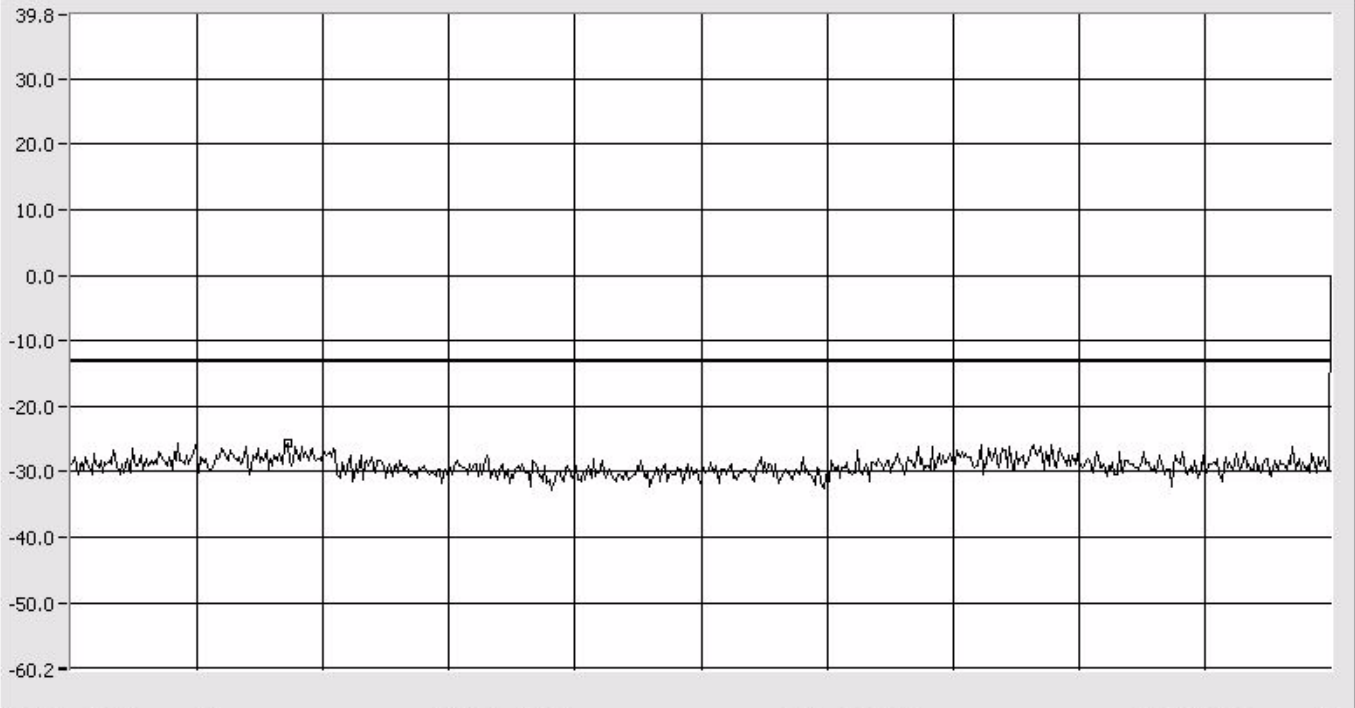
Intermodulation Apart SMR 800 MHz

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

ATTEN 20 dB
RL 39.8 dBm

10 dB/Div

delta MKR -25.53 dBm
2.545 GHz

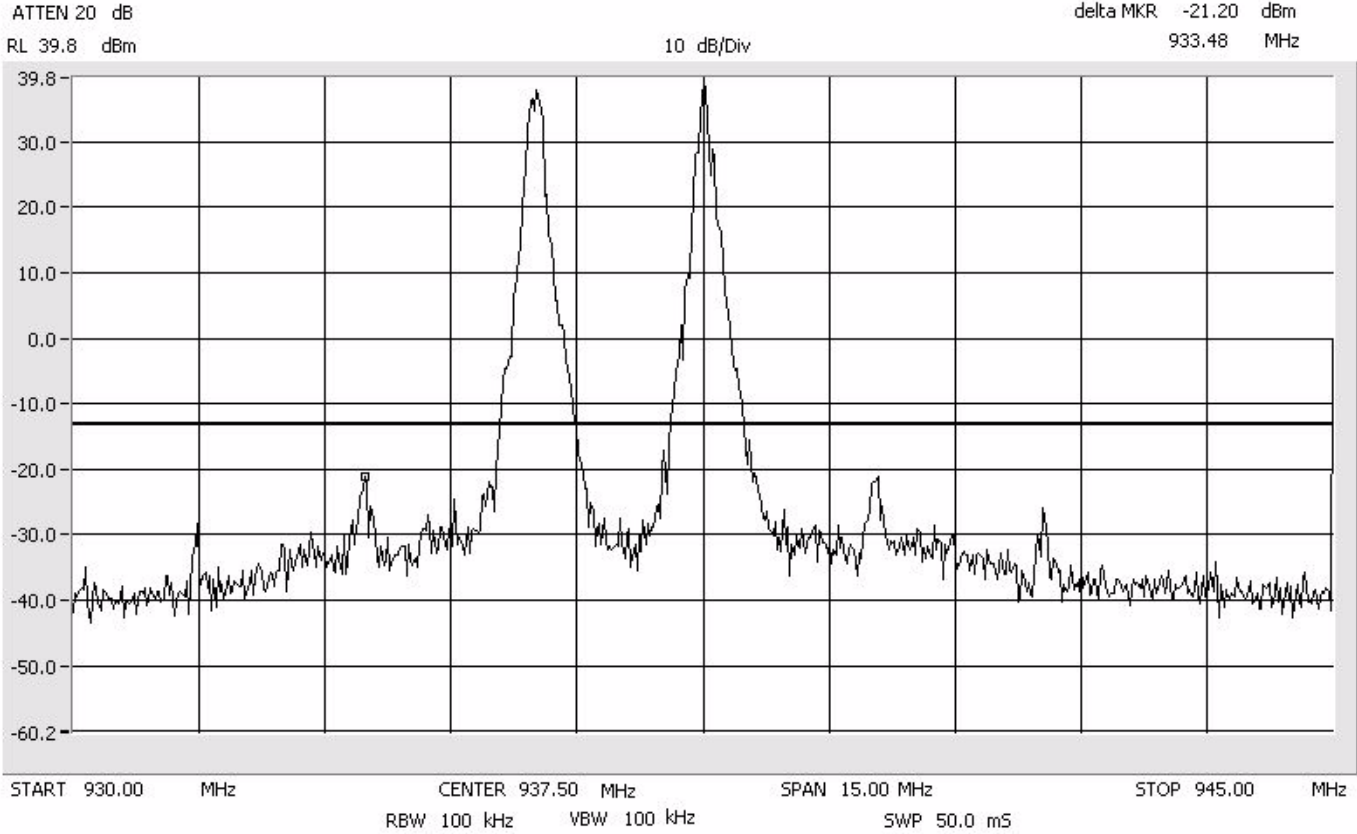


START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

iDEN

Intermodulation Close - Lower SMR 900 MHz

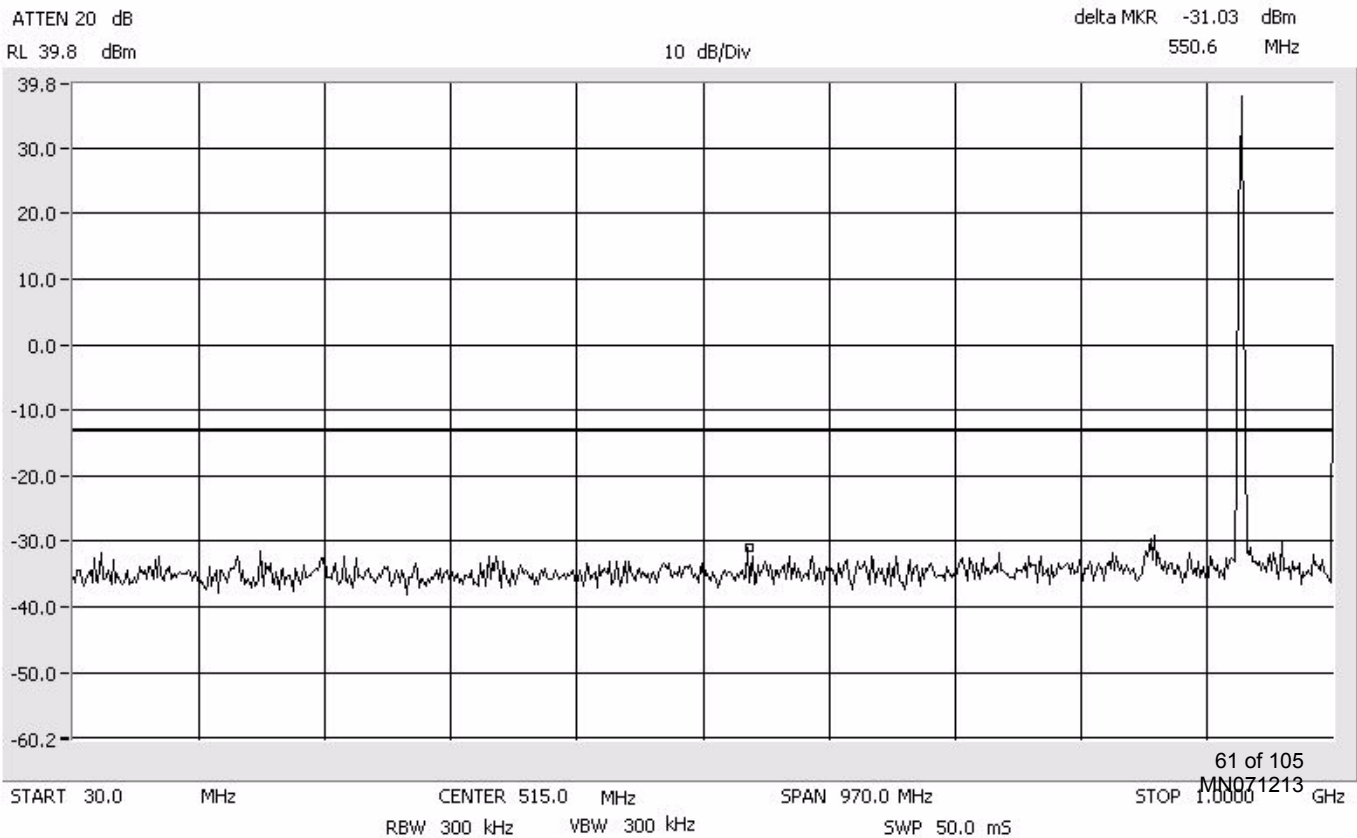
Center: 937.5 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



iDEN

Intermodulation Close - Lower SMR 900 MHz

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



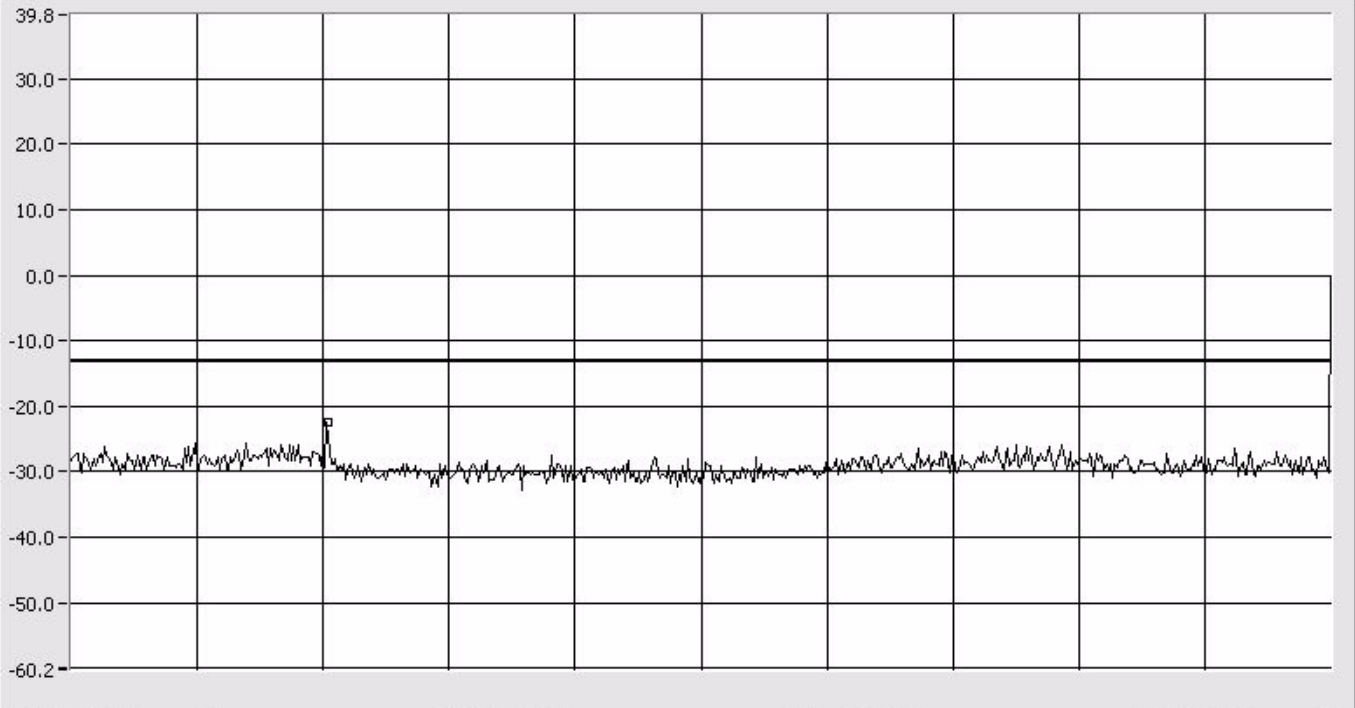
Intermodulation Close - Lower SMR 900 MHz

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

ATTEN 20 dB
RL 39.8 dBm

10 dB/Div

delta MKR -22.37 dBm
2.830 GHz

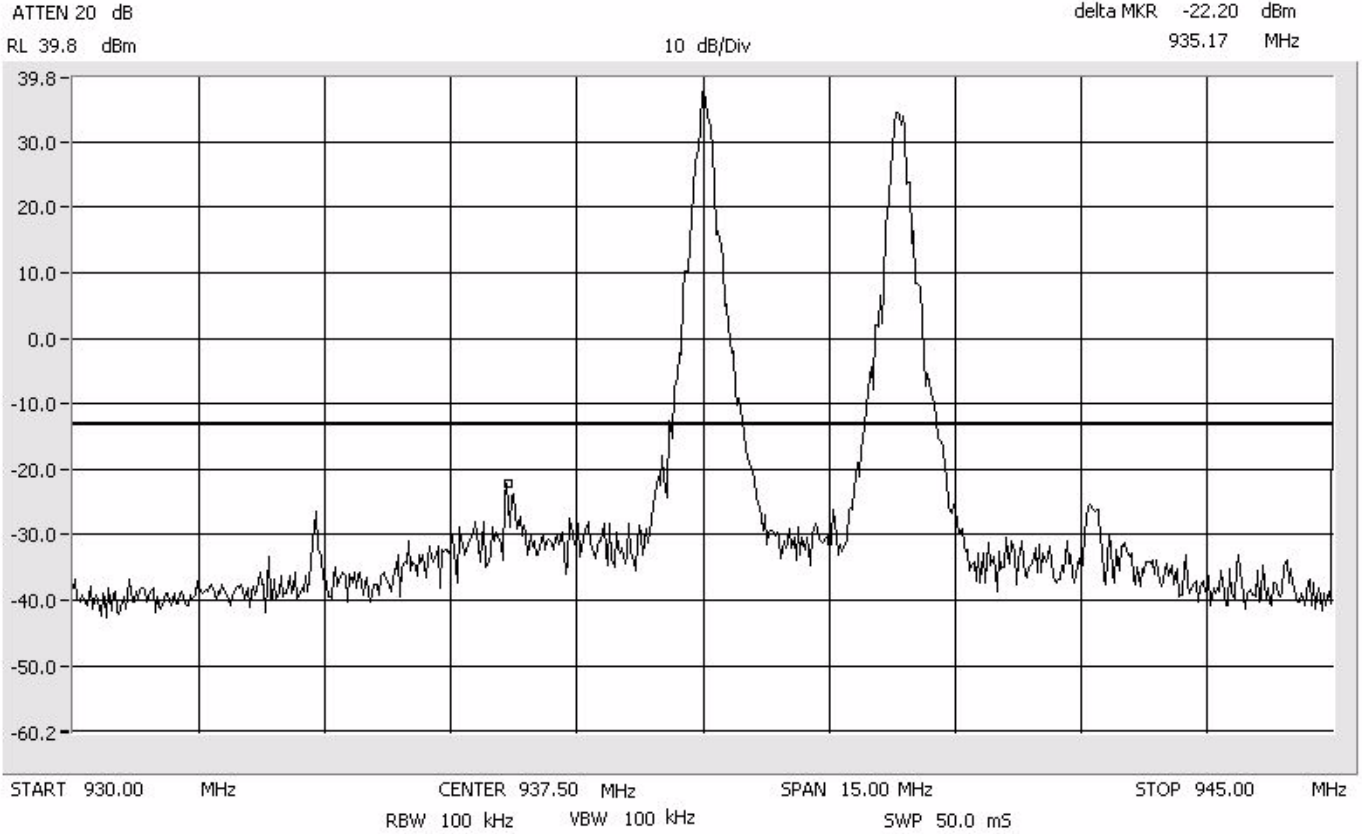


START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

iDEN

Intermodulation Close - Upper SMR 900 MHz

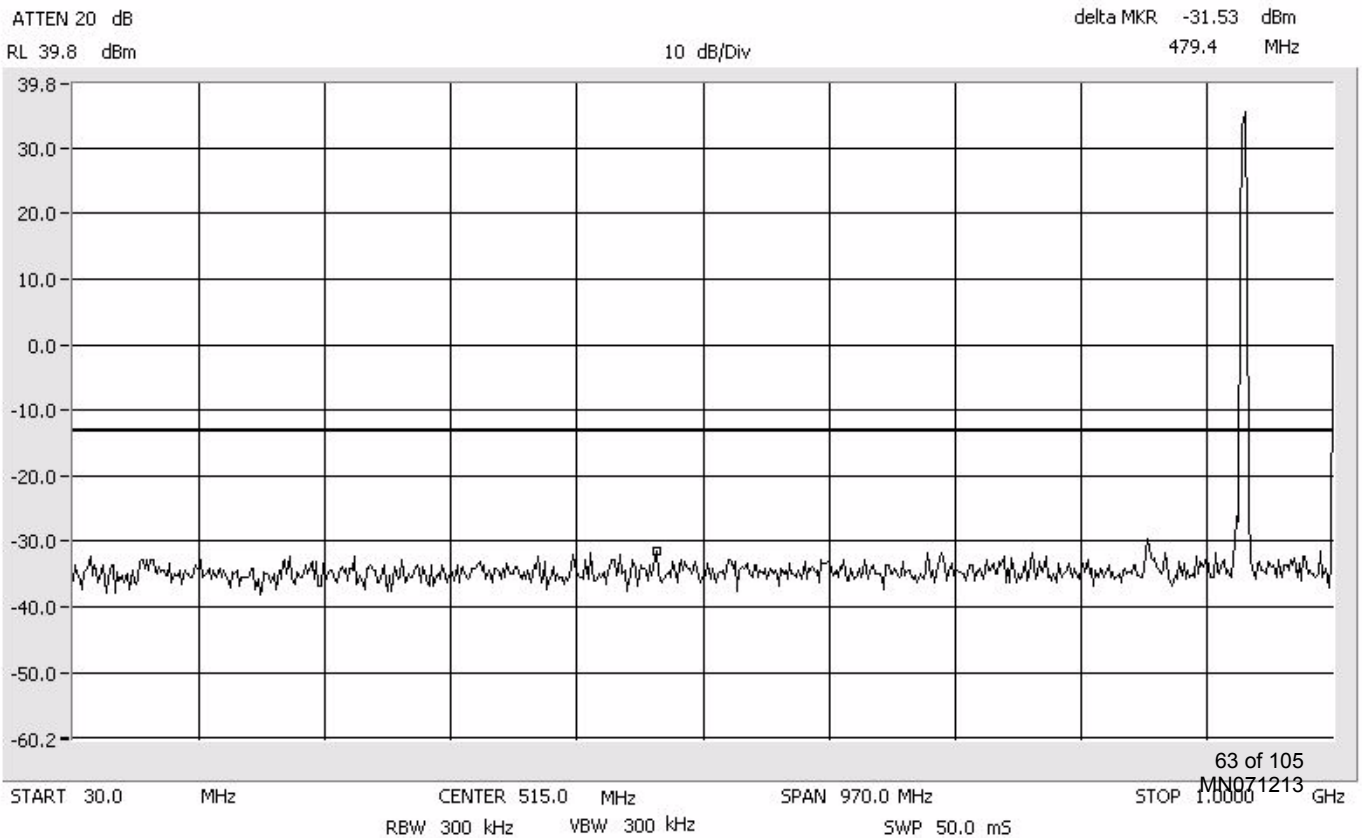
Center: 937.5 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



iDEN

Intermodulation Close - Upper SMR 900 MHz

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



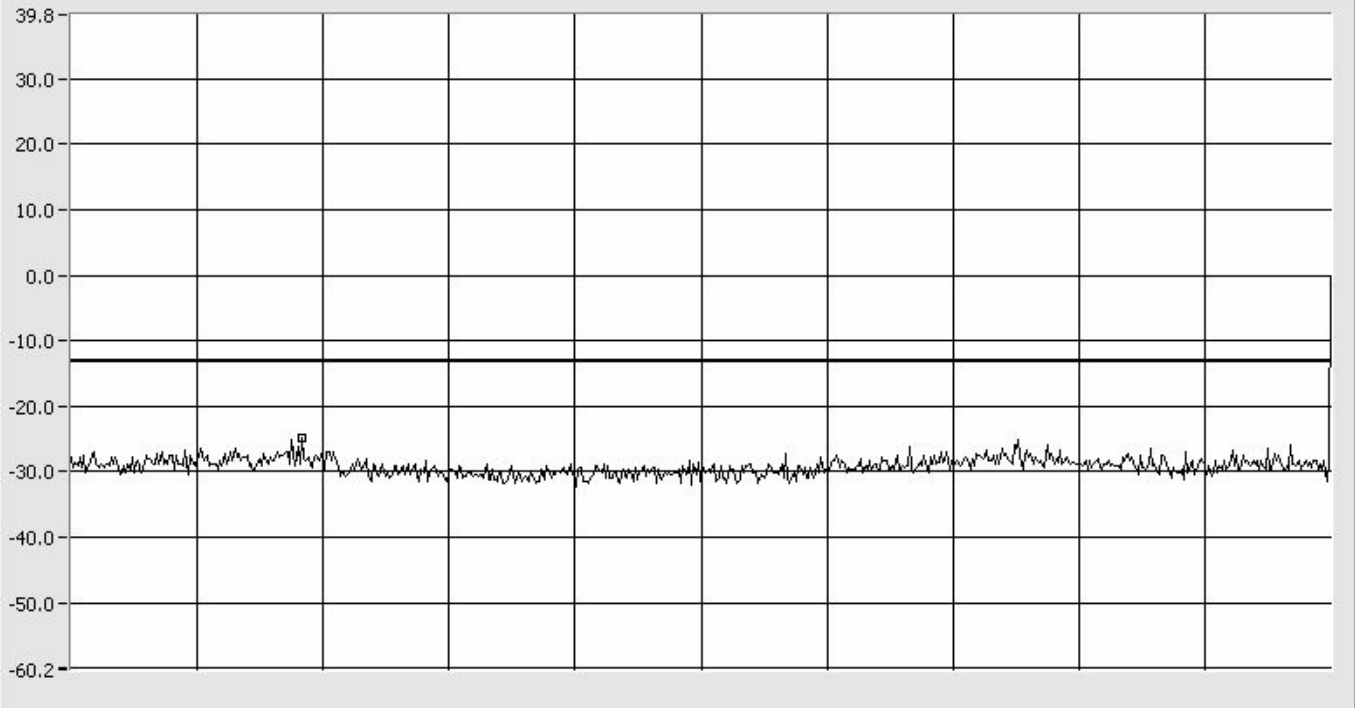
Intermodulation Close - Upper SMR 900 MHz

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

ATTEN 20 dB
RL 39.8 dBm

10 dB/Div

delta MKR -24.70 dBm
2.650 GHz

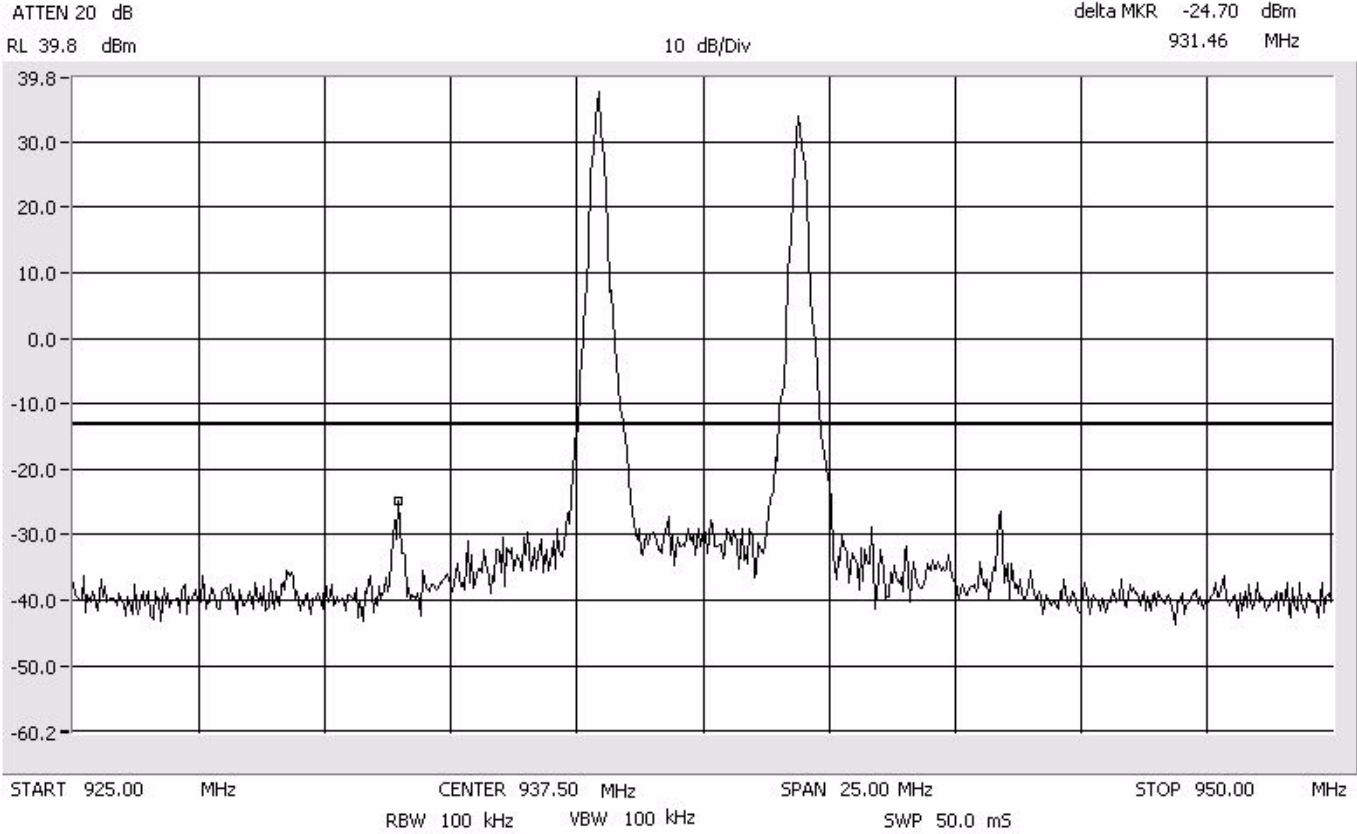


START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

iDEN

Intermodulation Apart SMR 900 MHz

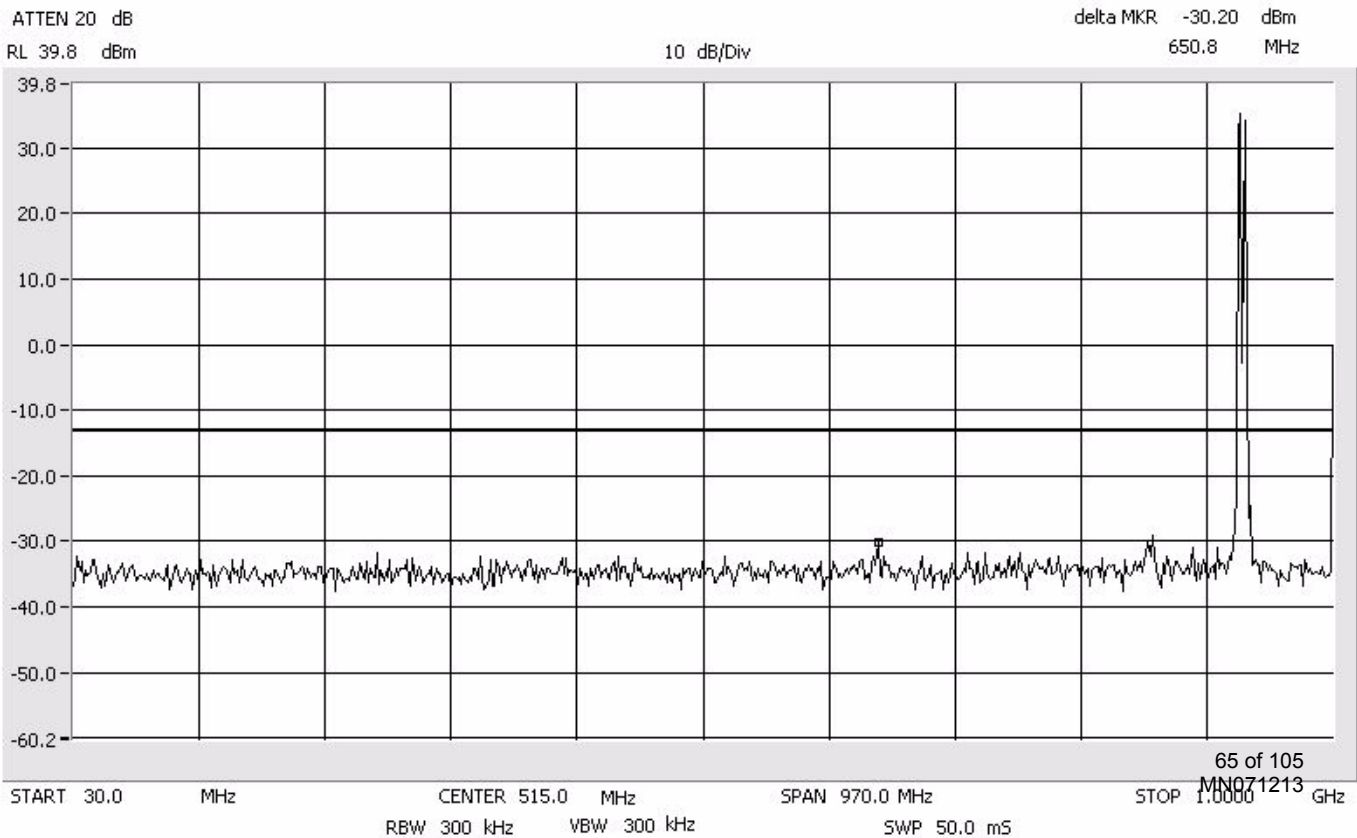
Center: 937.5 MHz
Span: 25 MHz
RBW/VBW: 100 kHz



iDEN

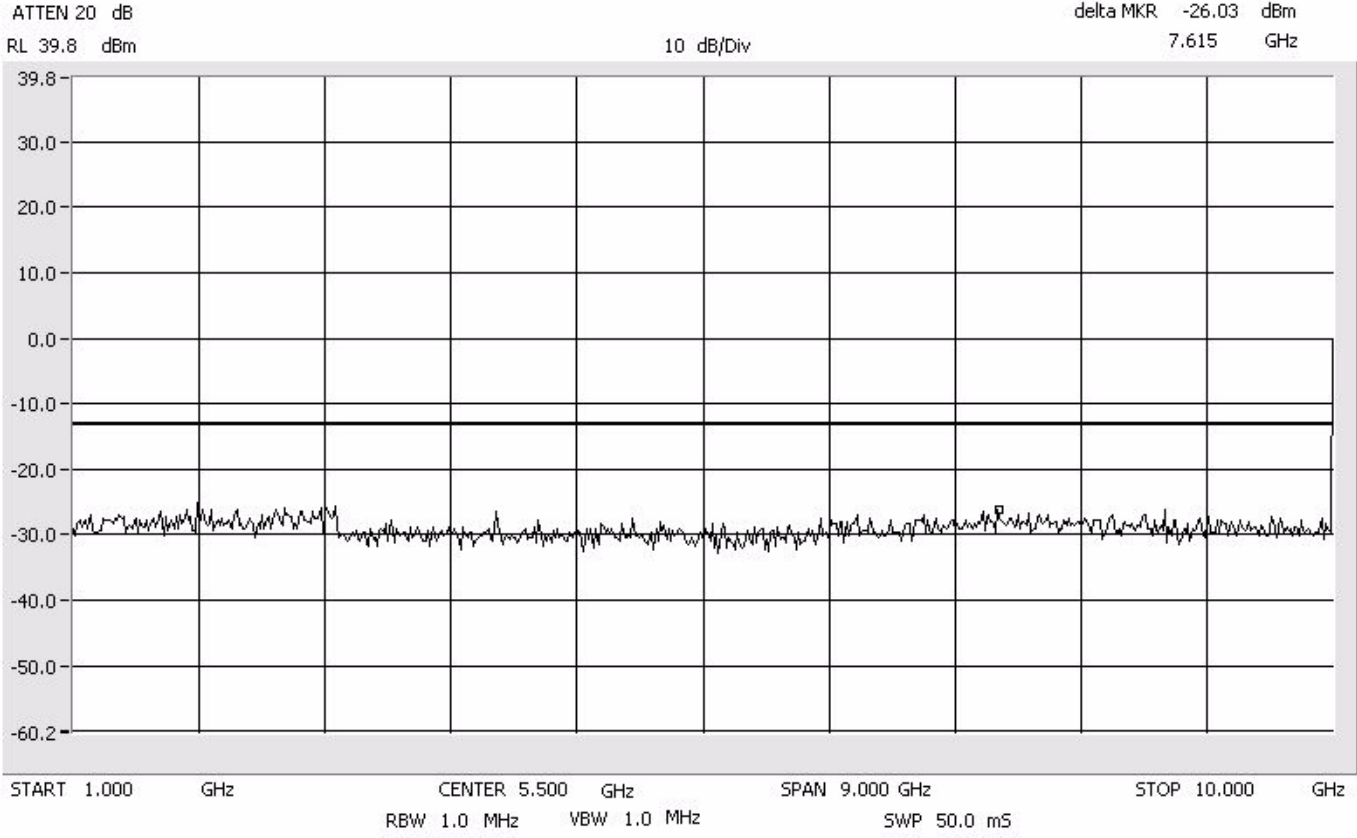
Intermodulation Apart SMR 900 MHz

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



Intermodulation Apart SMR 900 MHz

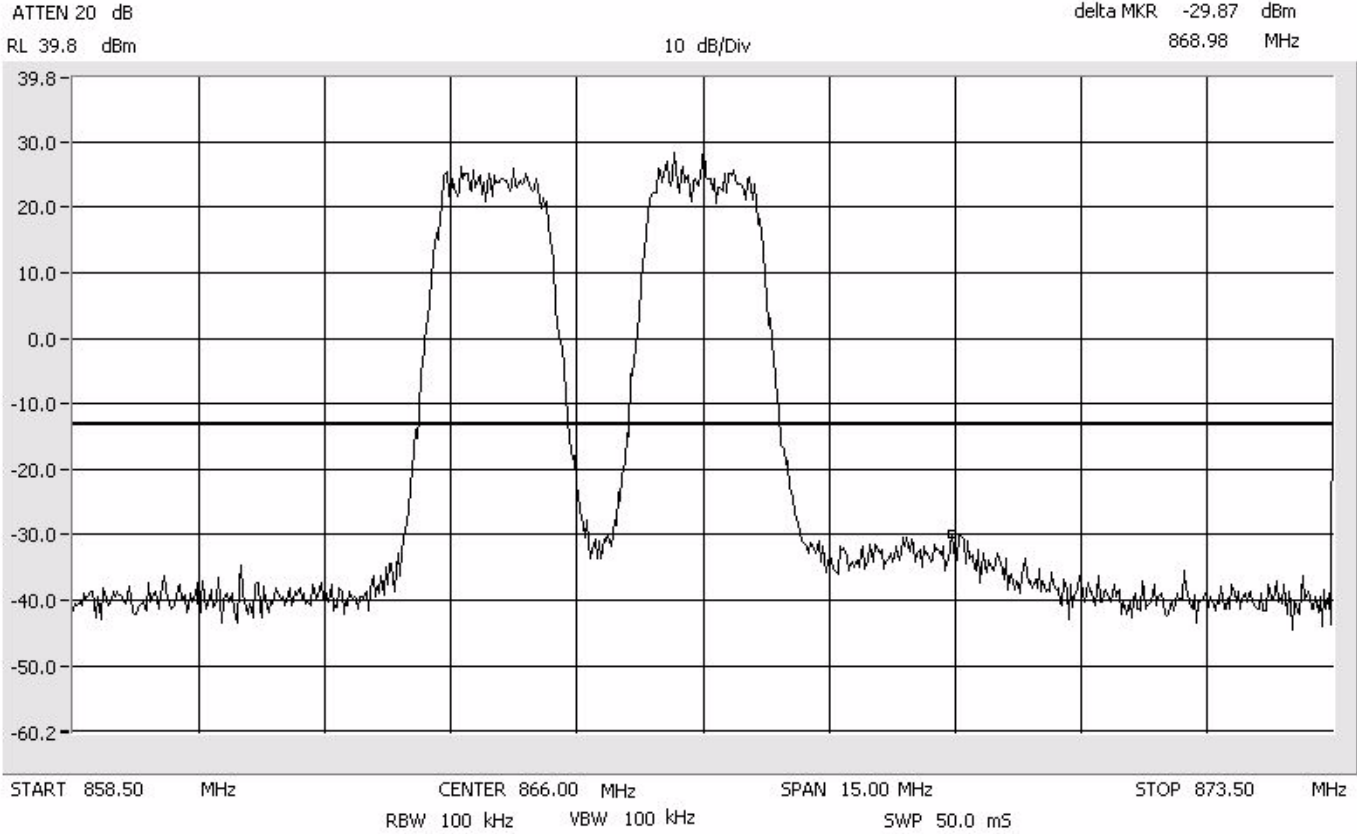
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation Close - Lower SMR 800 MHz

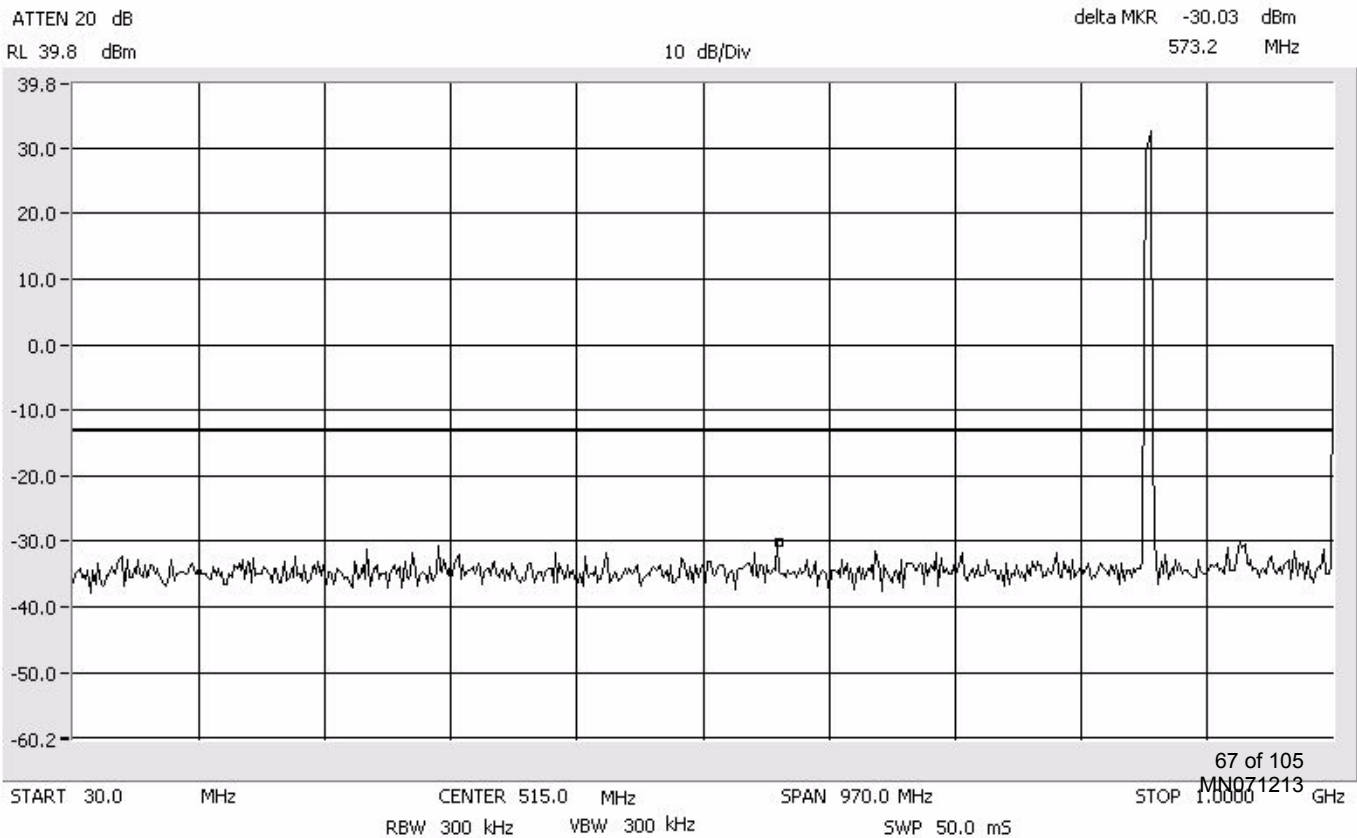
Center: 866.0 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



CDMA

Intermodulation Close - Lower SMR 800 MHz

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



Intermodulation Close - Lower SMR 800 MHz

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

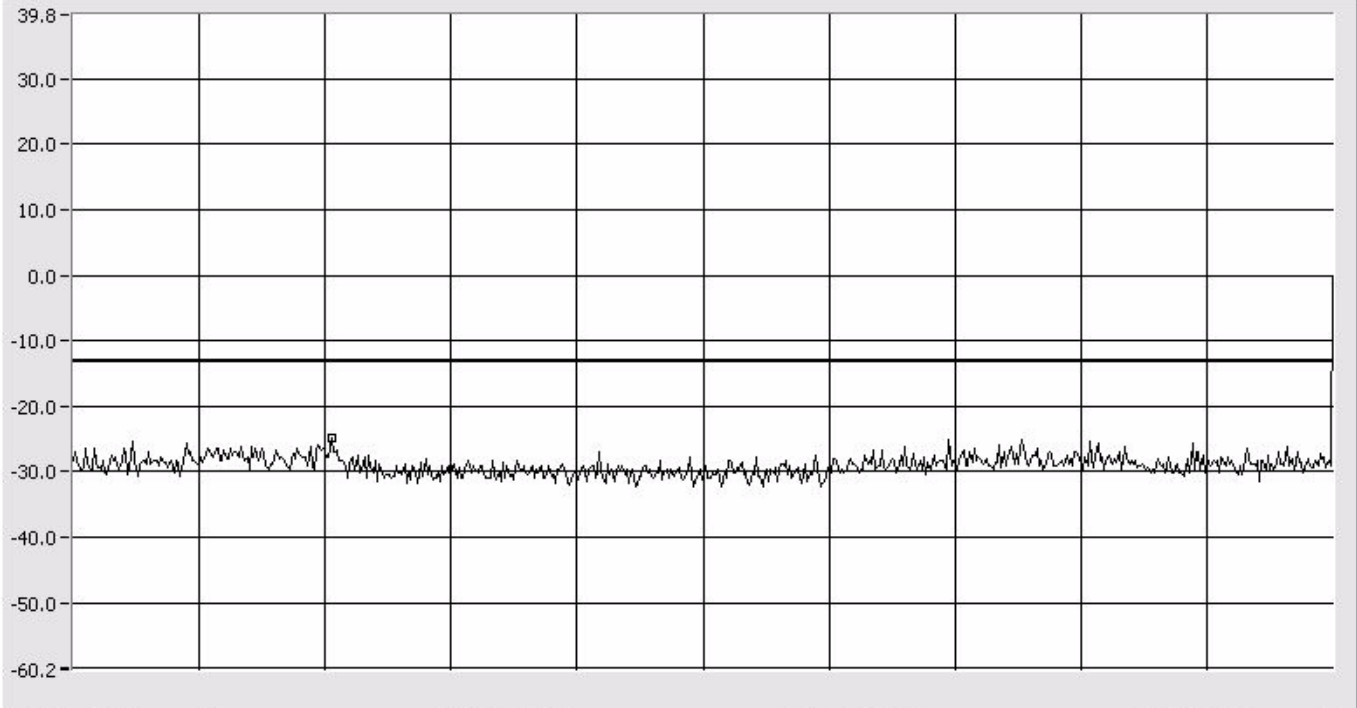
ATTEN 20 dB

delta MKR -24.87 dBm

RL 39.8 dBm

10 dB/Div

2.845 GHz

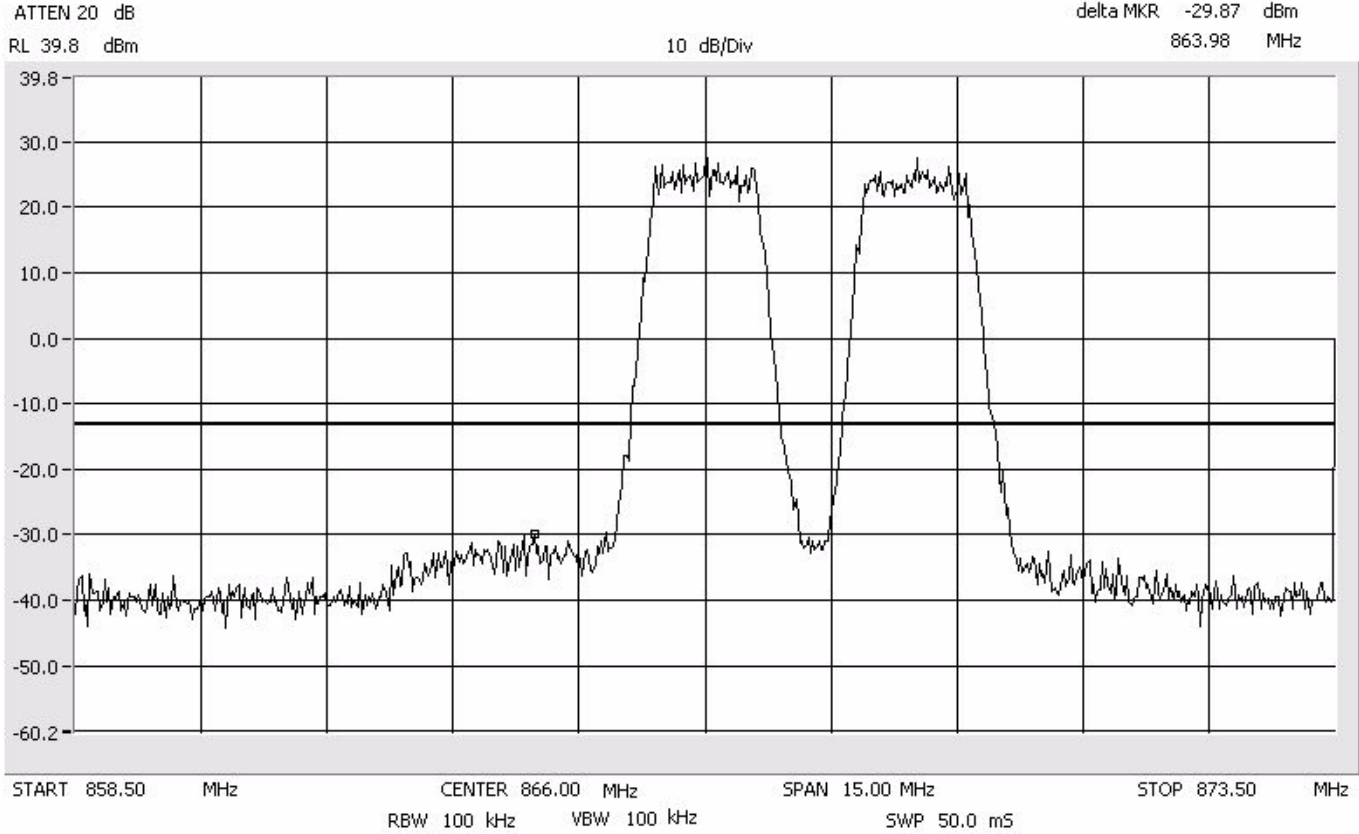


START 1.000 GHz CENTER 5.500 GHz SPAN 9.000 GHz STOP 10.000 GHz
RBW 1.0 MHz VBW 1.0 MHz SWP 50.0 mS

CDMA

Intermodulation Close - Upper SMR 800 MHz

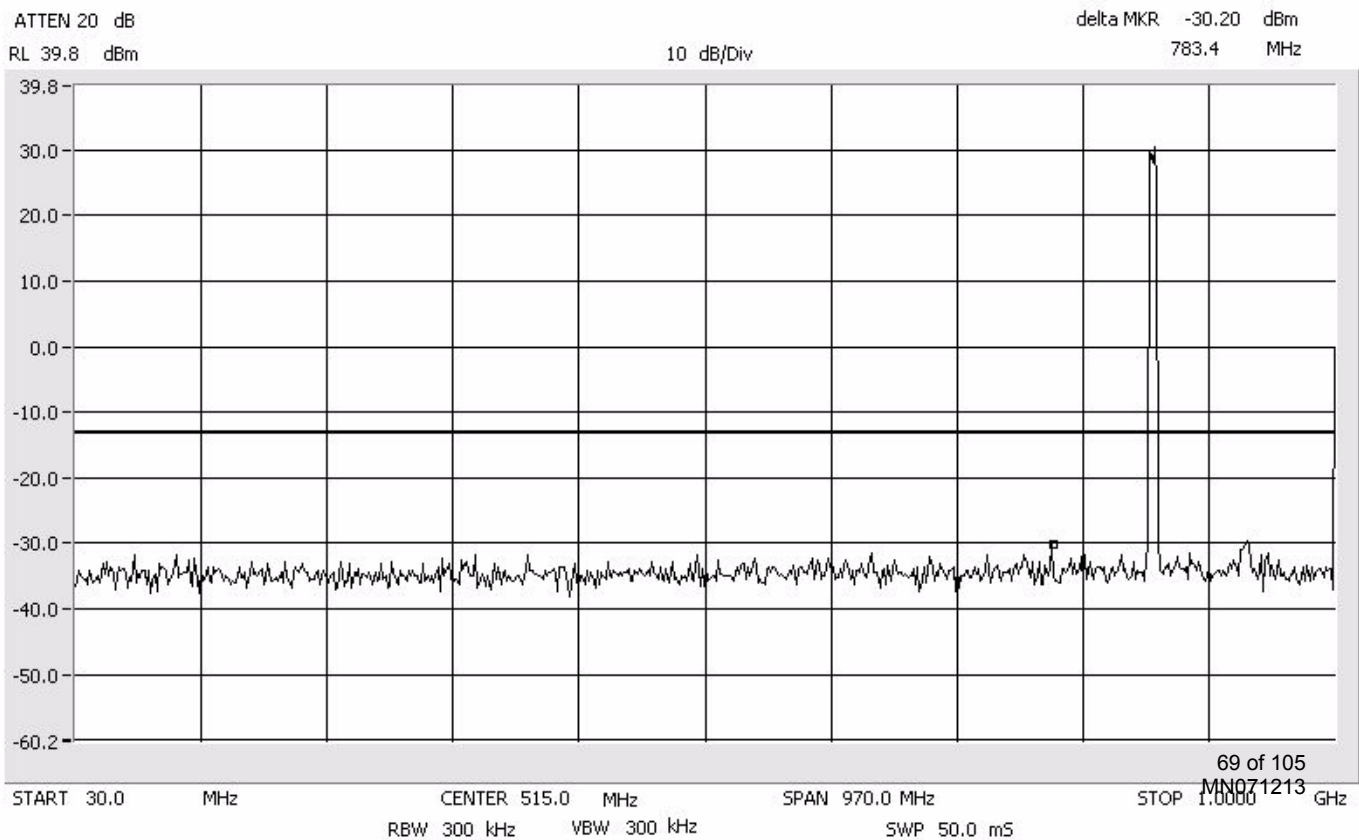
Center: 866.0 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



CDMA

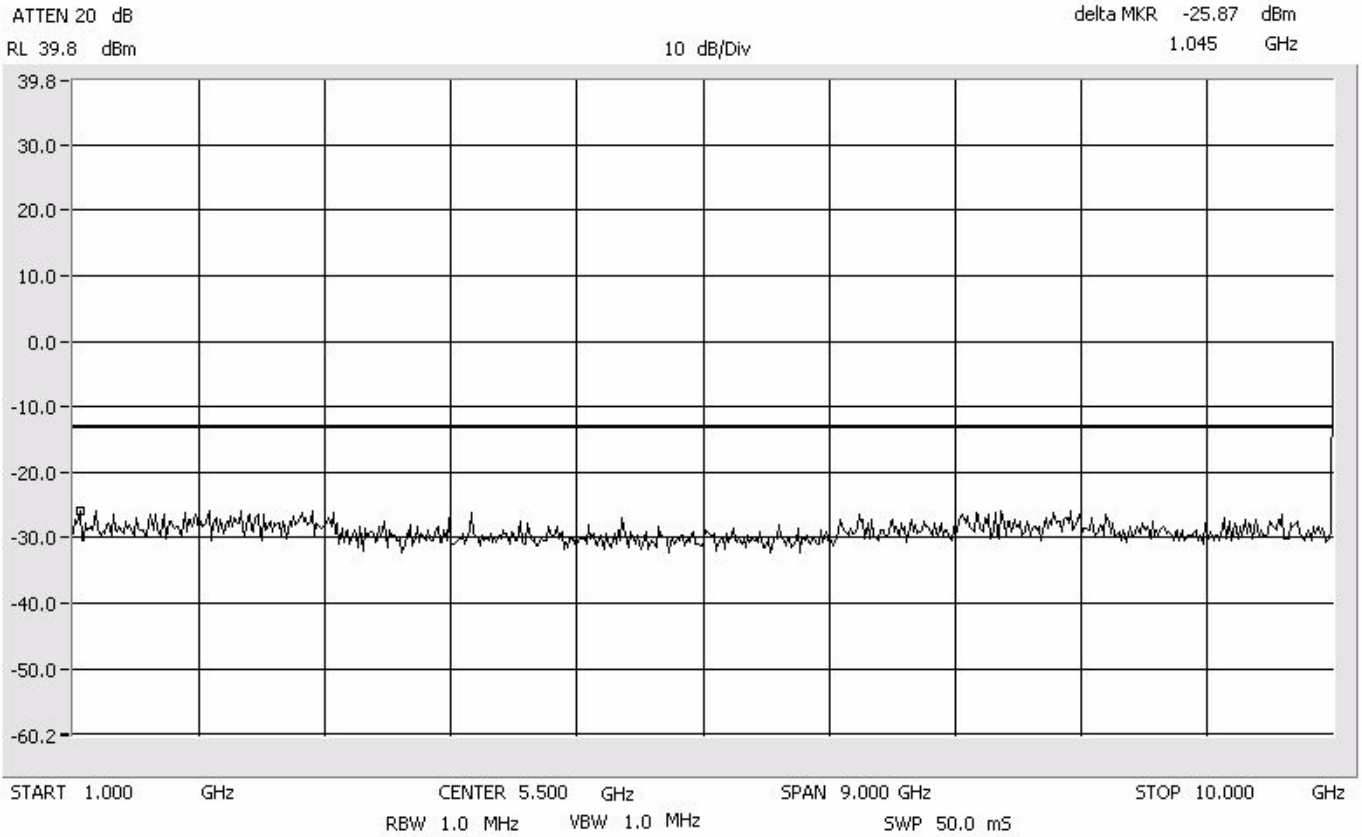
Intermodulation Close - Upper SMR 800 MHz

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



Intermodulation Close - Upper SMR 800 MHz

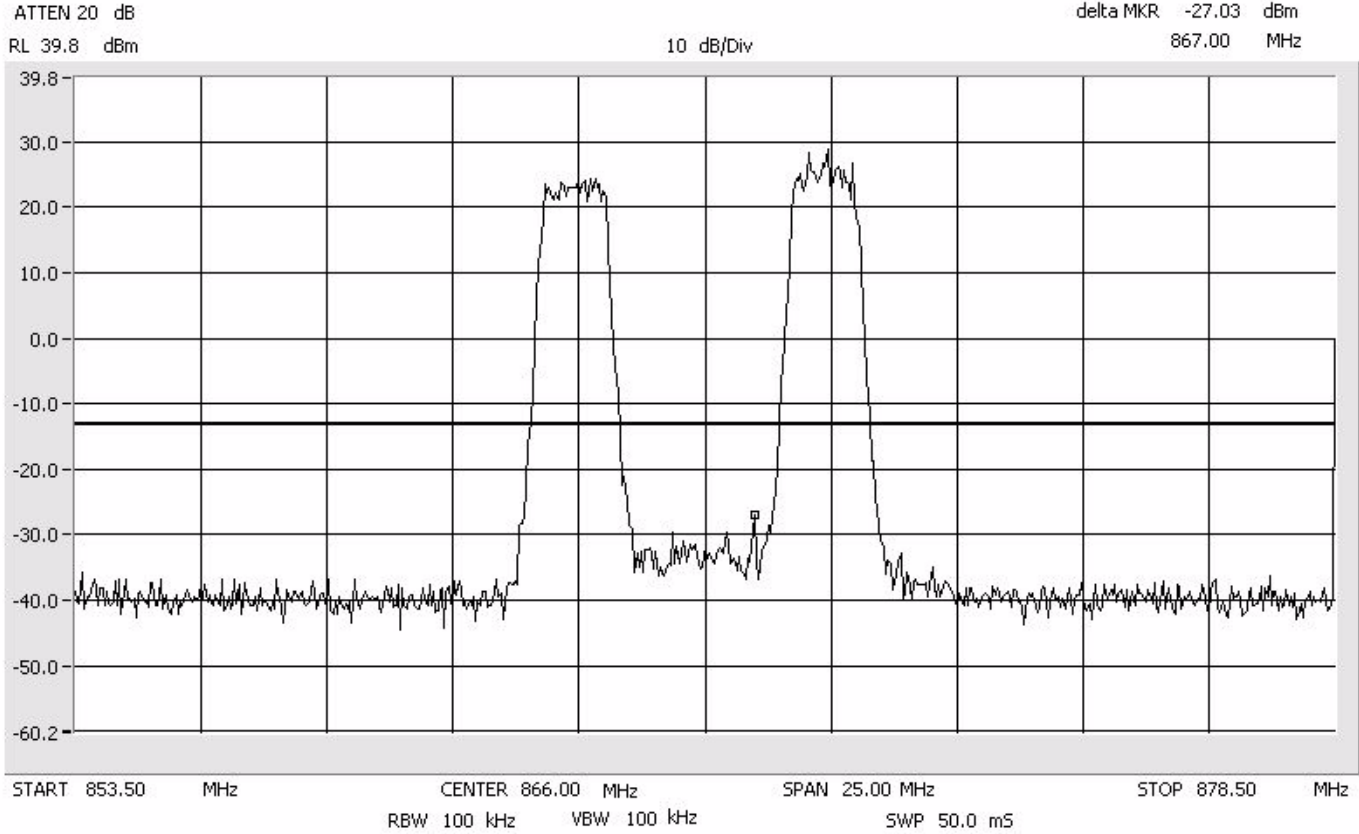
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation Apart SMR 800 MHz

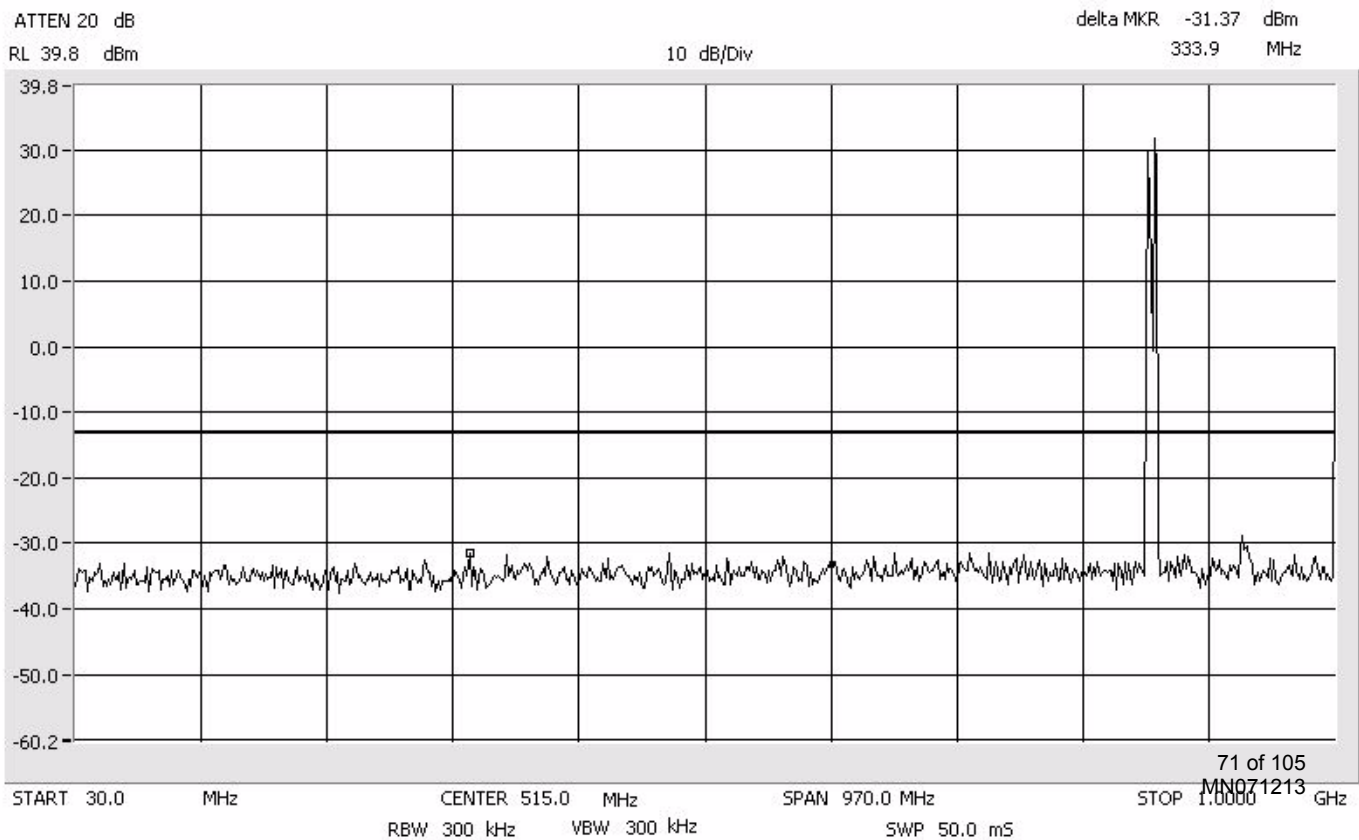
Center: 866.0 MHz
Span: 25 MHz
RBW/VBW: 100 kHz



CDMA

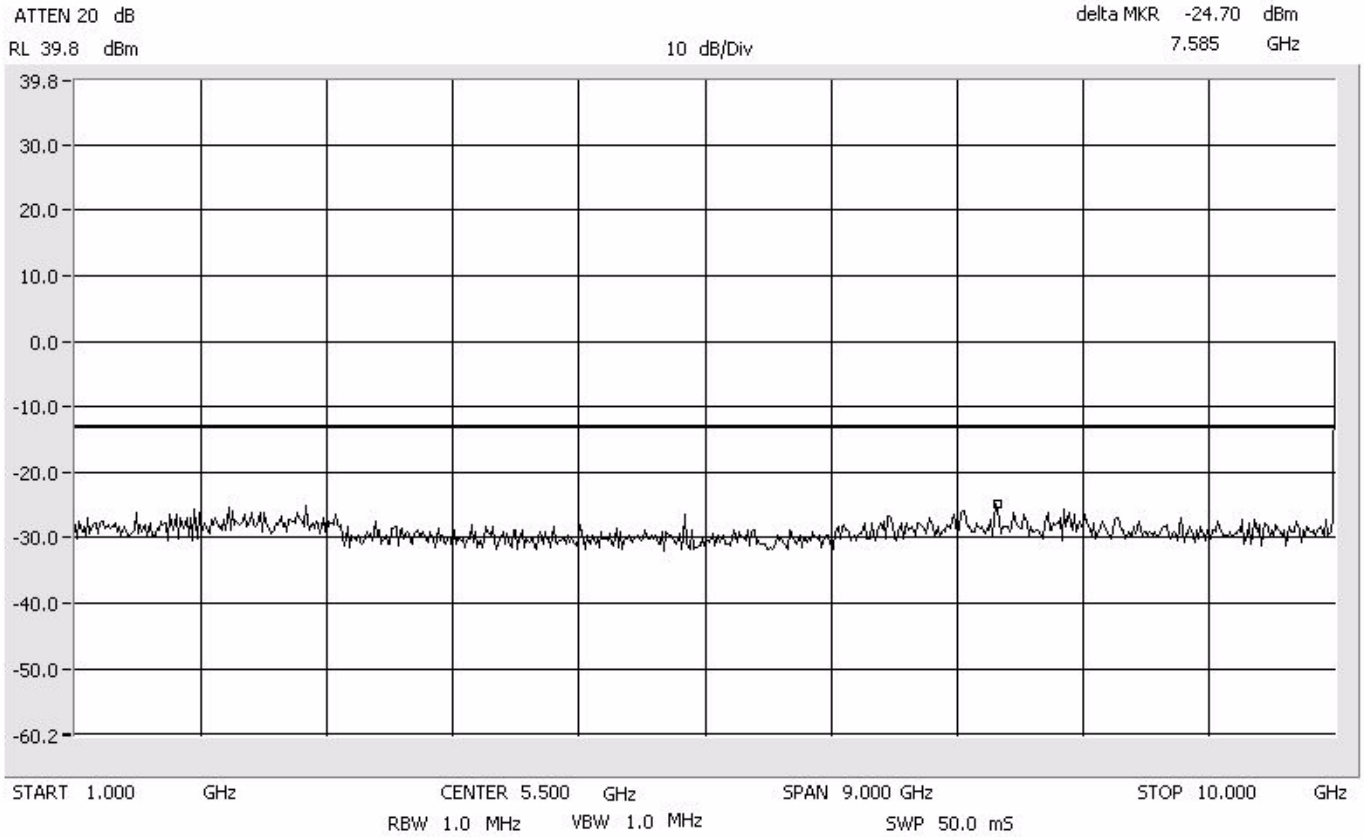
Intermodulation Apart SMR 800 MHz

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



Intermodulation Apart SMR 800 MHz

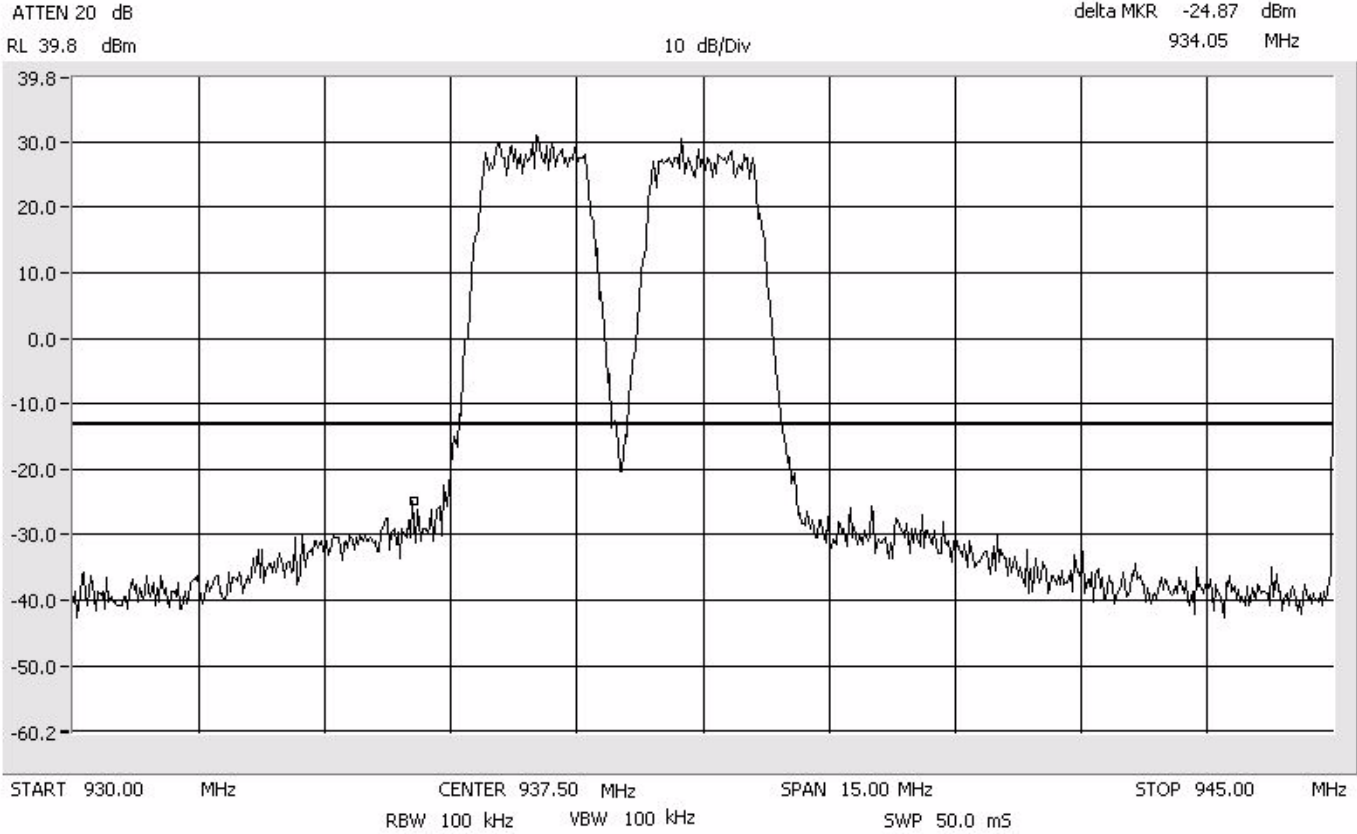
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation Close - Lower SMR 900 MHz

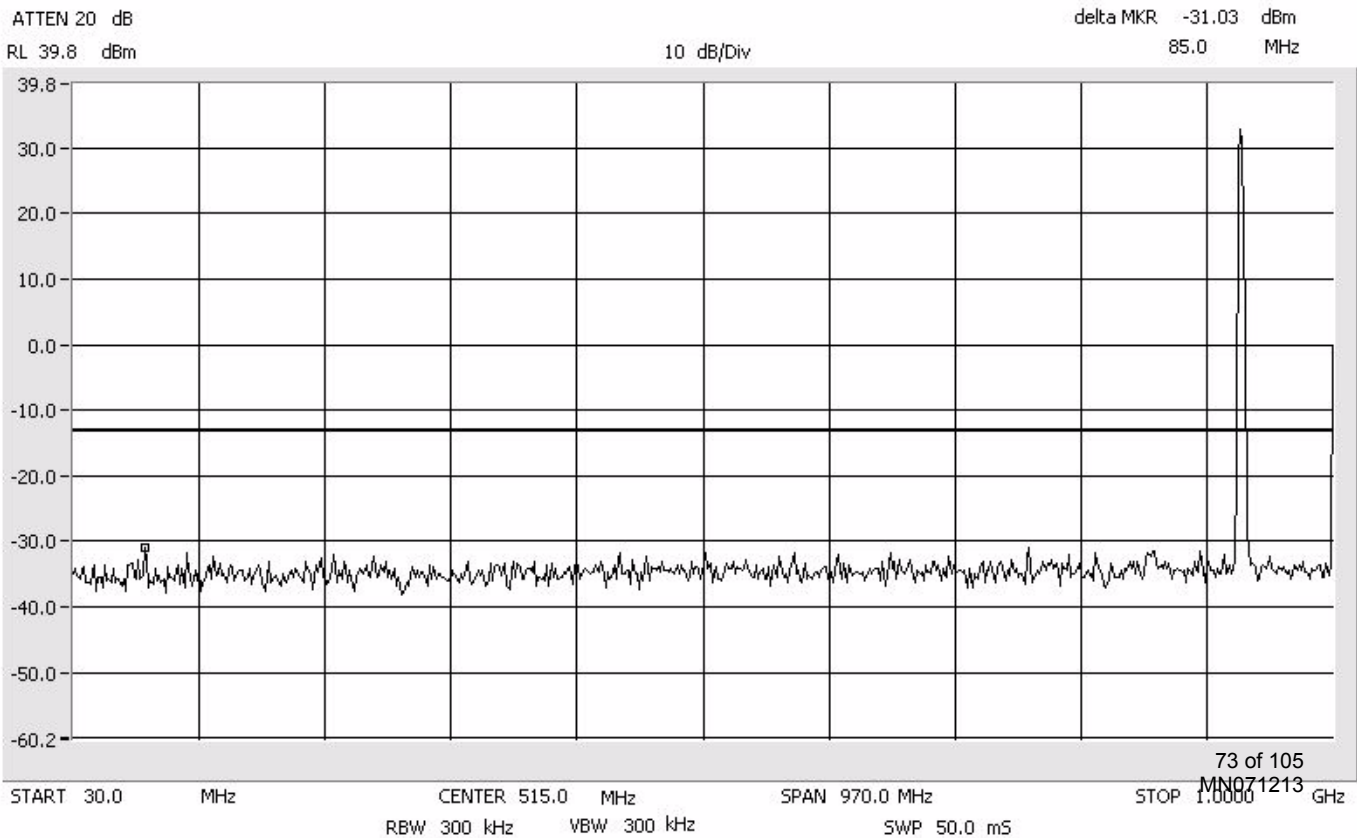
Center: 937.5 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



CDMA

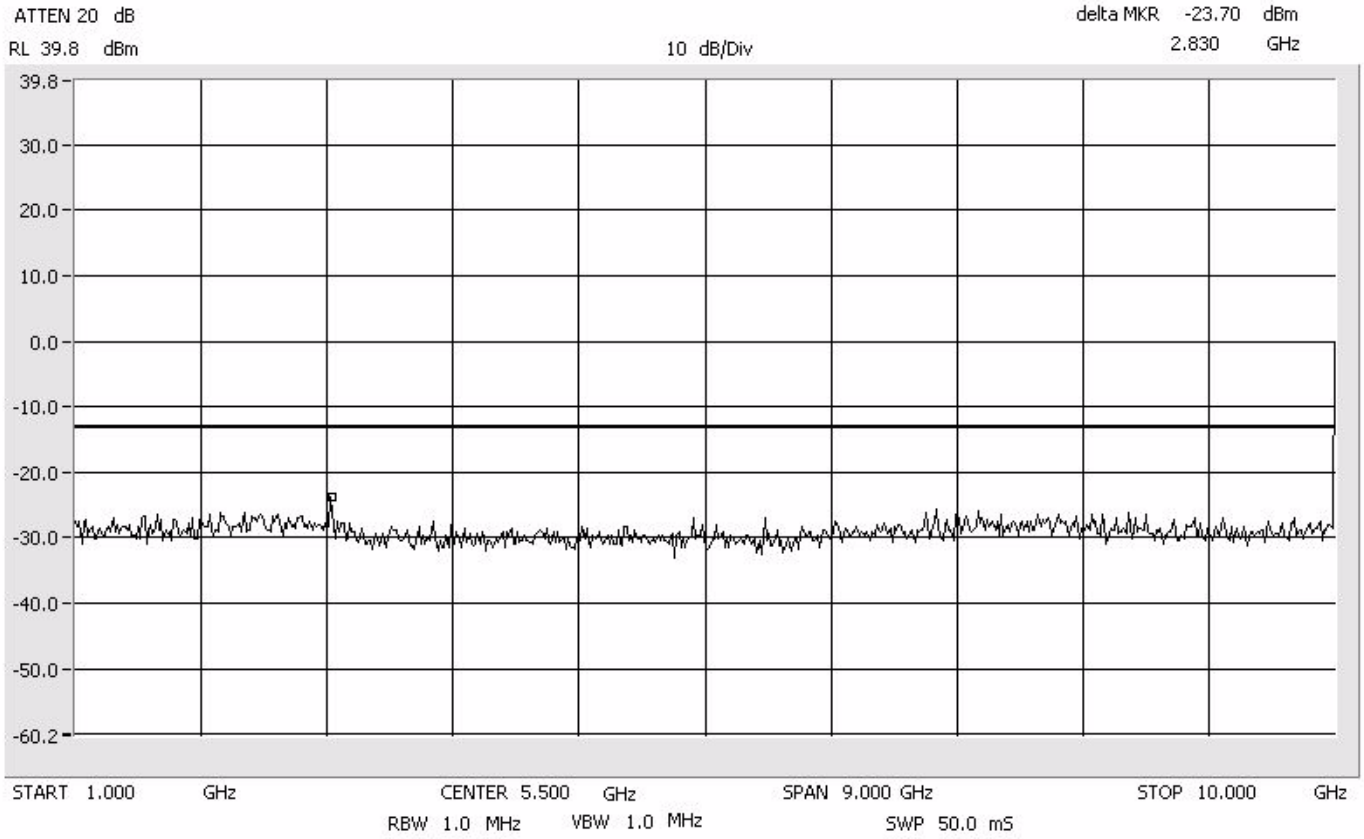
Intermodulation Close - Lower SMR 900 MHz

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



Intermodulation Close - Lower SMR 900 MHz

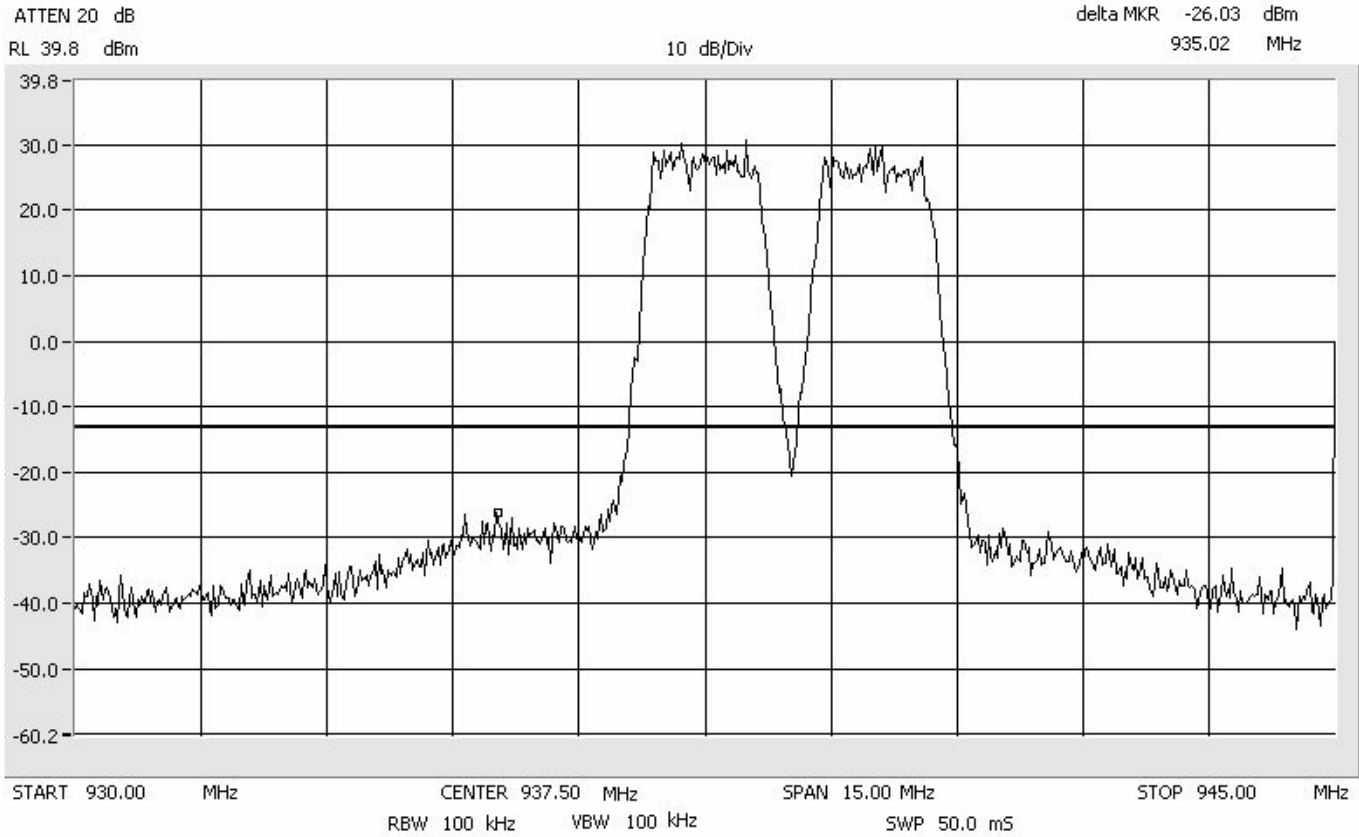
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation Close - Upper SMR 900 MHz

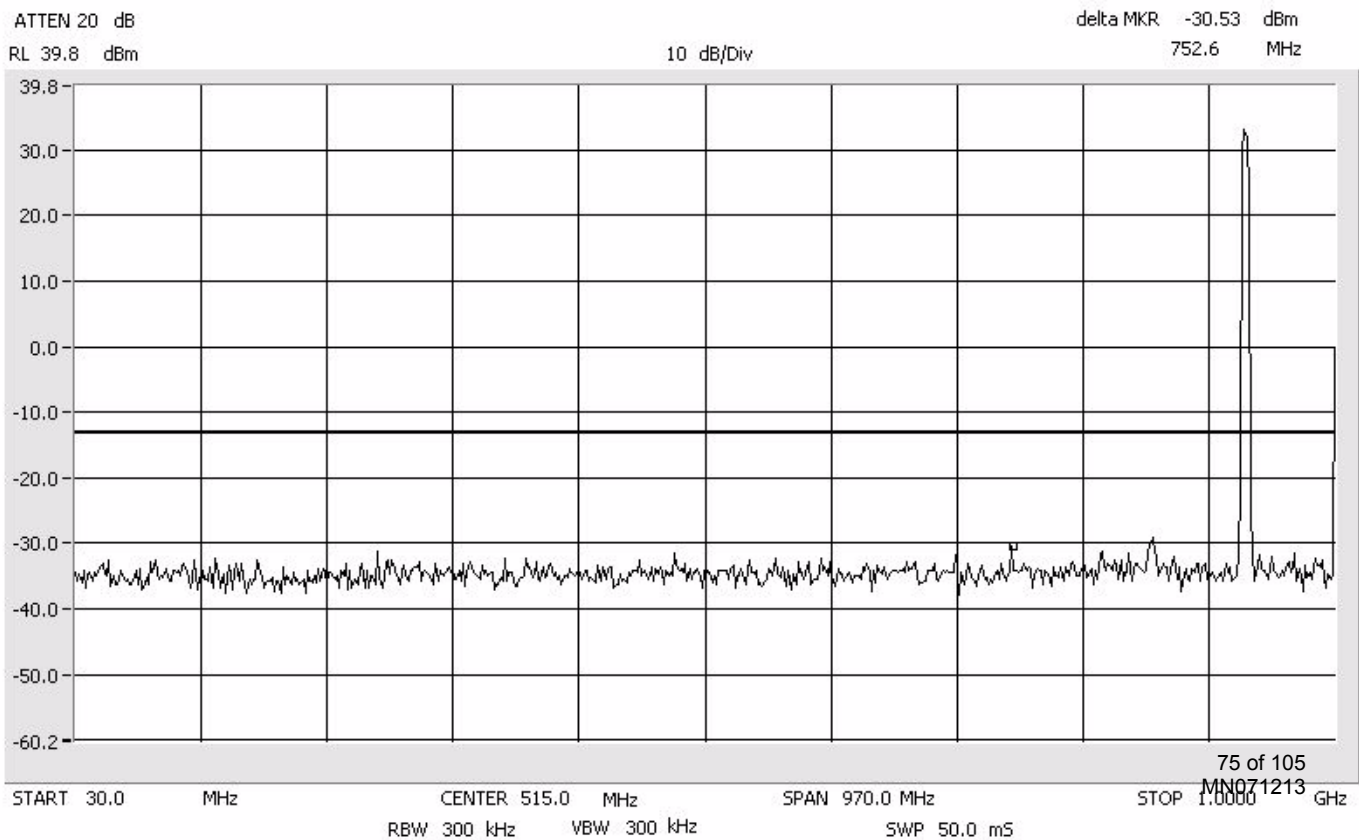
Center: 937.5 MHz
Span: 15 MHz
RBW/VBW: 100 kHz



CDMA

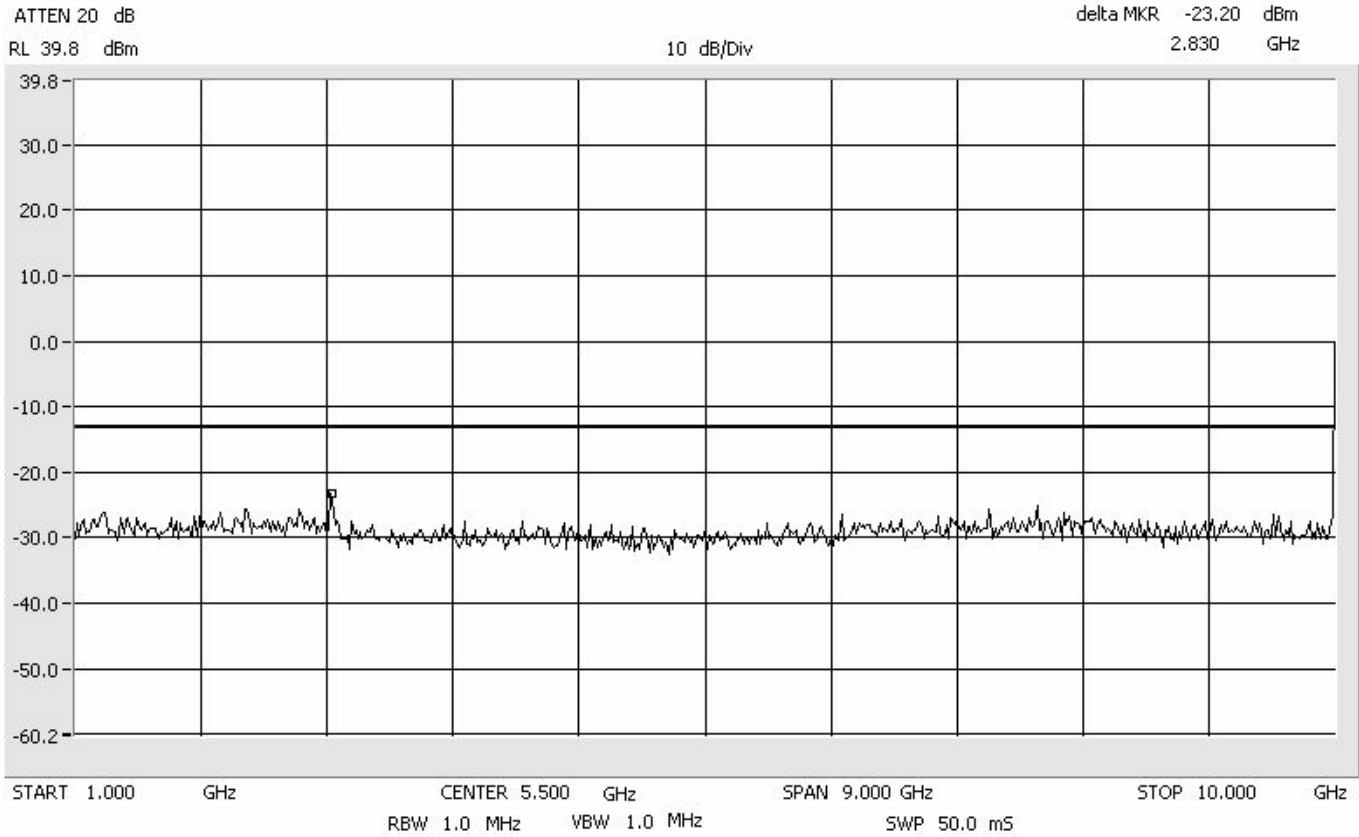
Intermodulation Close - Upper SMR 900 MHz

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



Intermodulation Close - Upper SMR 900 MHz

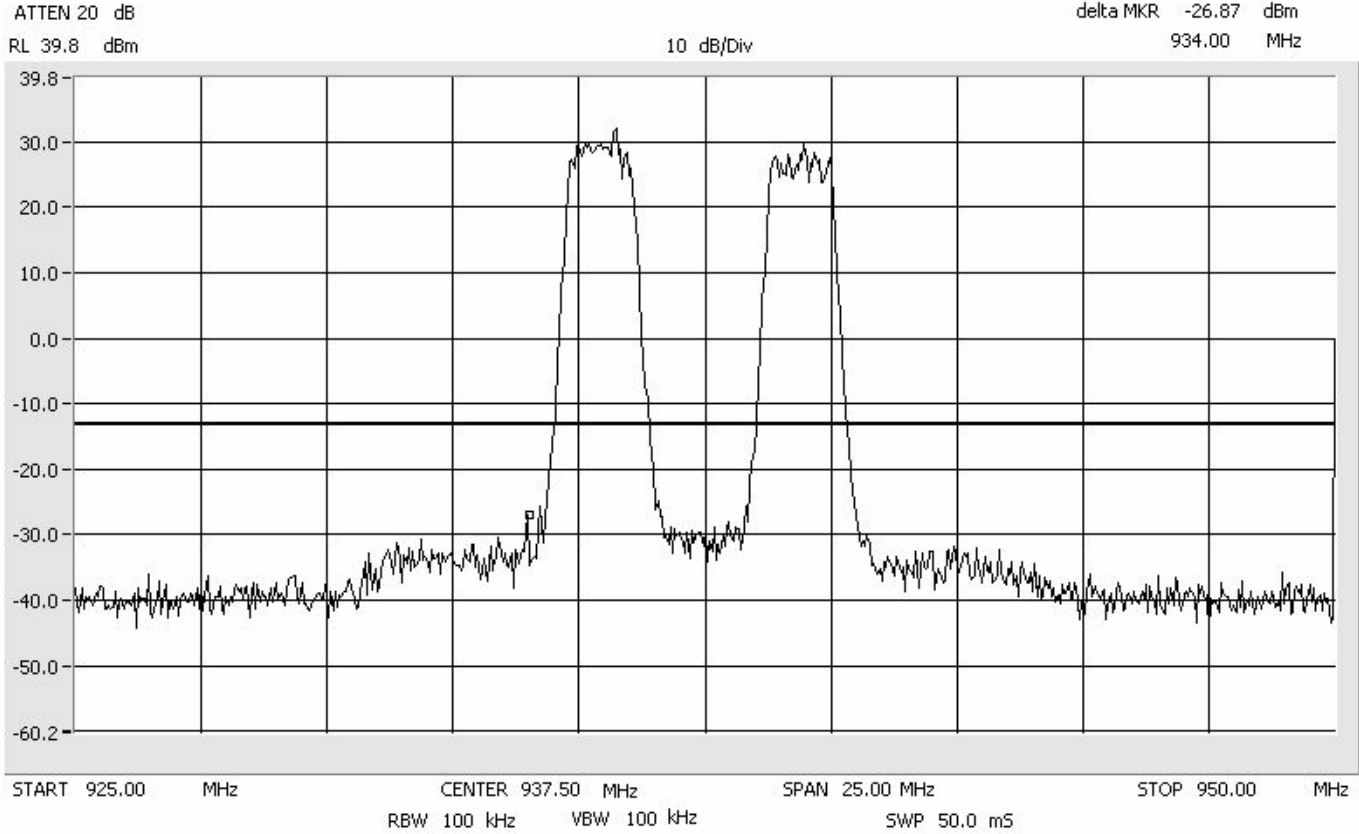
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation Apart SMR 900 MHz

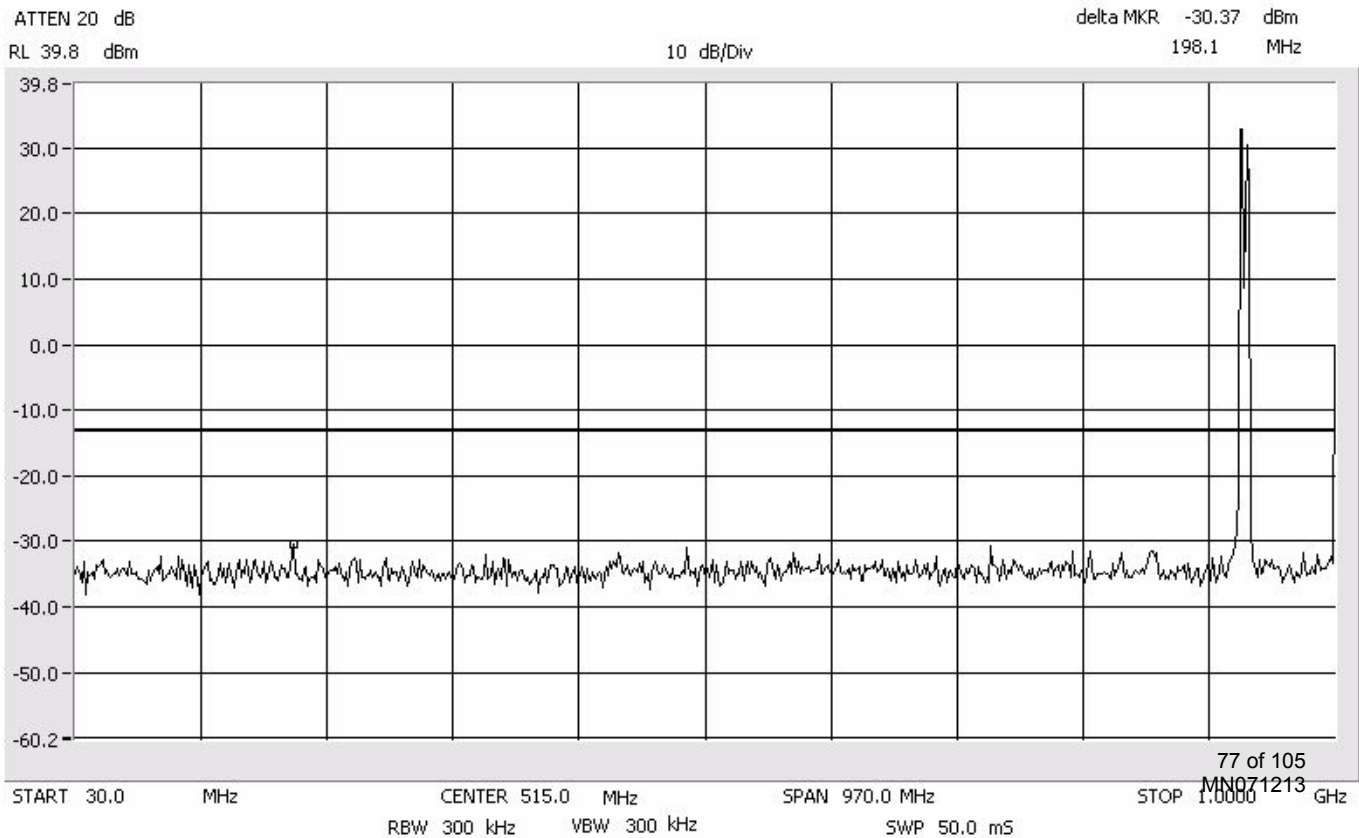
Center: 937.5 MHz
Span: 25 MHz
RBW/VBW: 100 kHz



CDMA

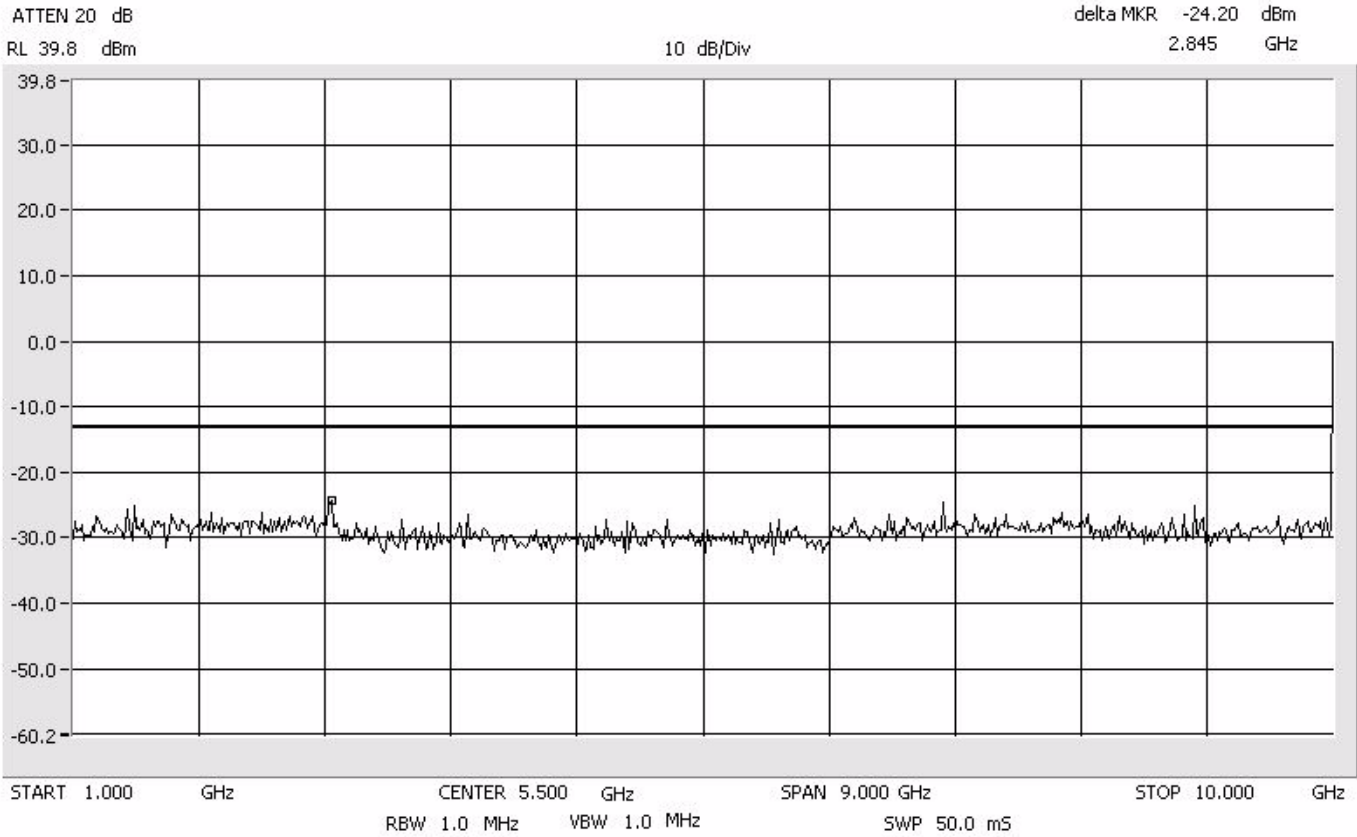
Intermodulation Apart SMR 900 MHz

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



Intermodulation Apart SMR 900 MHz

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



Occupied Bandwidth Modulation Test for ADC Inc
FlexWave™ URH - SMR
Model Number FWU-D20000002110RU

[Back](#)

An input/output Occupied Bandwidth test was done with modulation types: FM, iDEN, and CDMA. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT. The following plots show input signals vs. output signals.

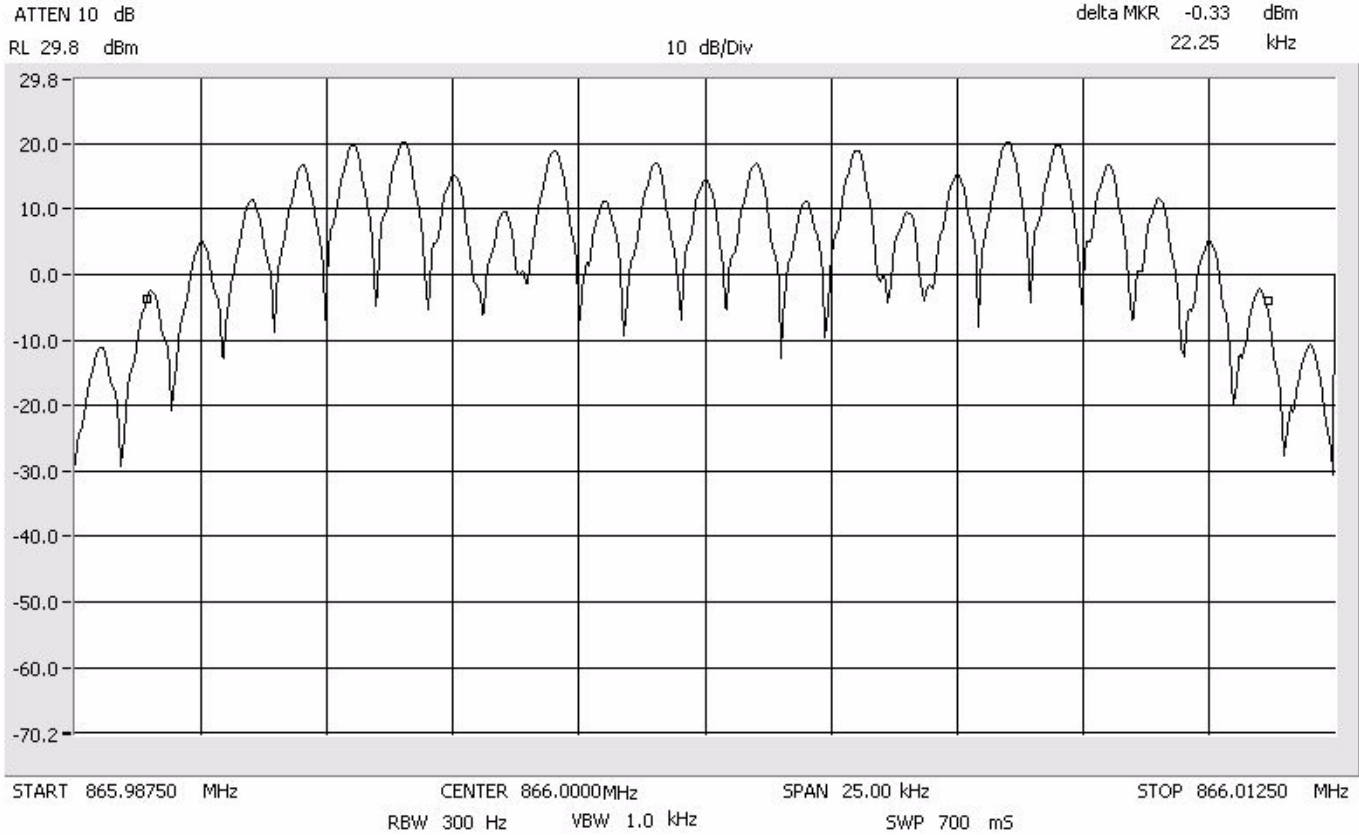
The resolution bandwidth is reduced to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are moved to the -20 dB points (from the previously established center frequency level) on either side of center frequency.

Results:

Pass (see plots)

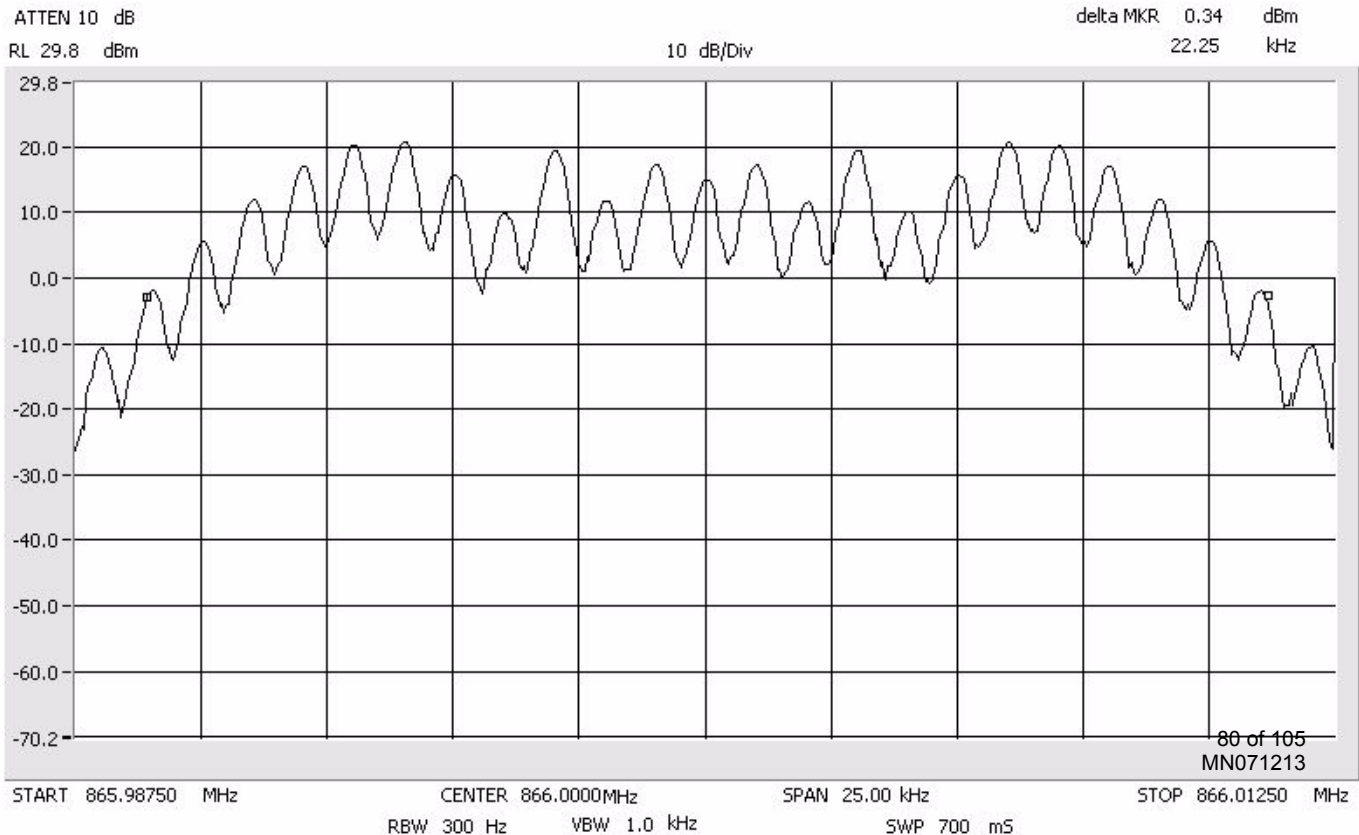
Occupied Bandwidth FM Signal In

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



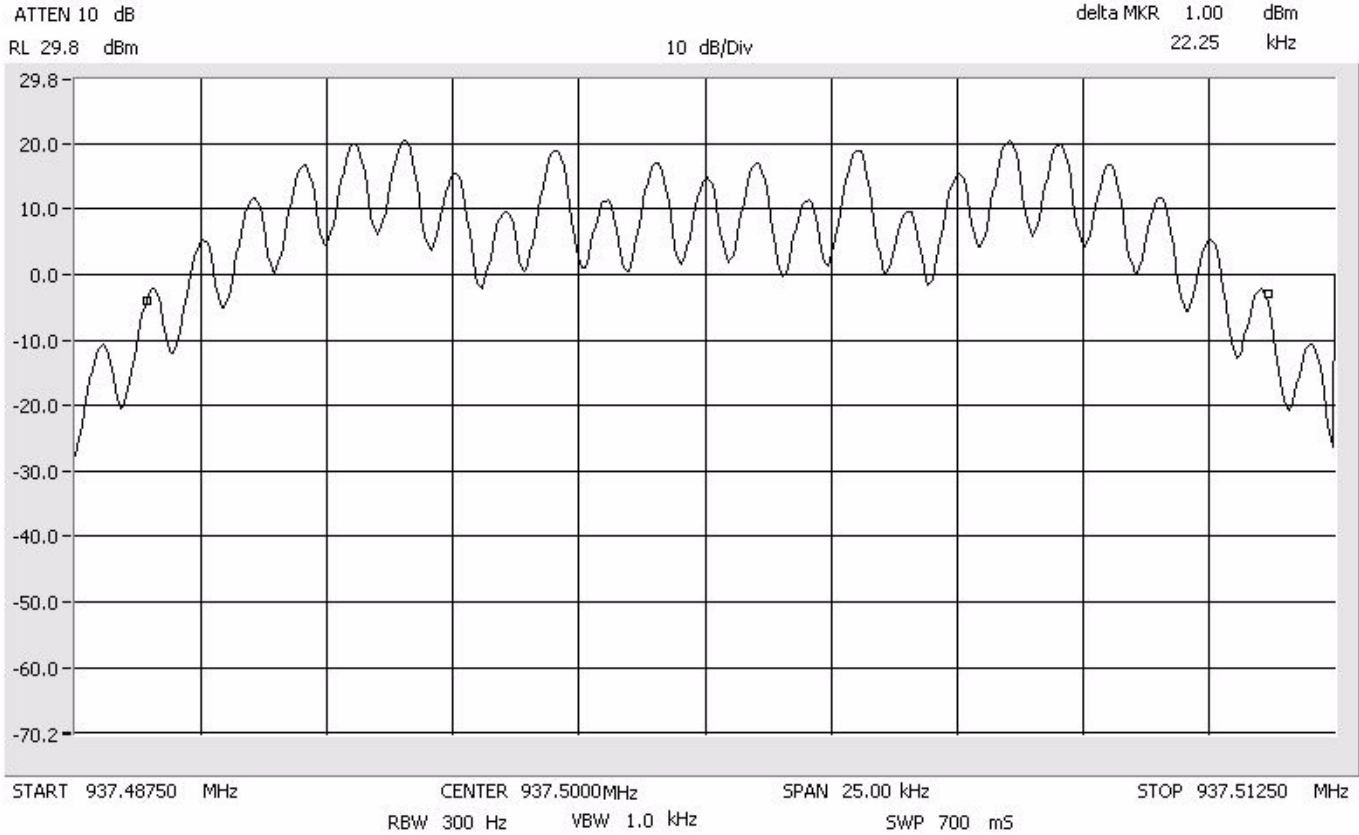
Occupied Bandwidth FM Signal Out

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



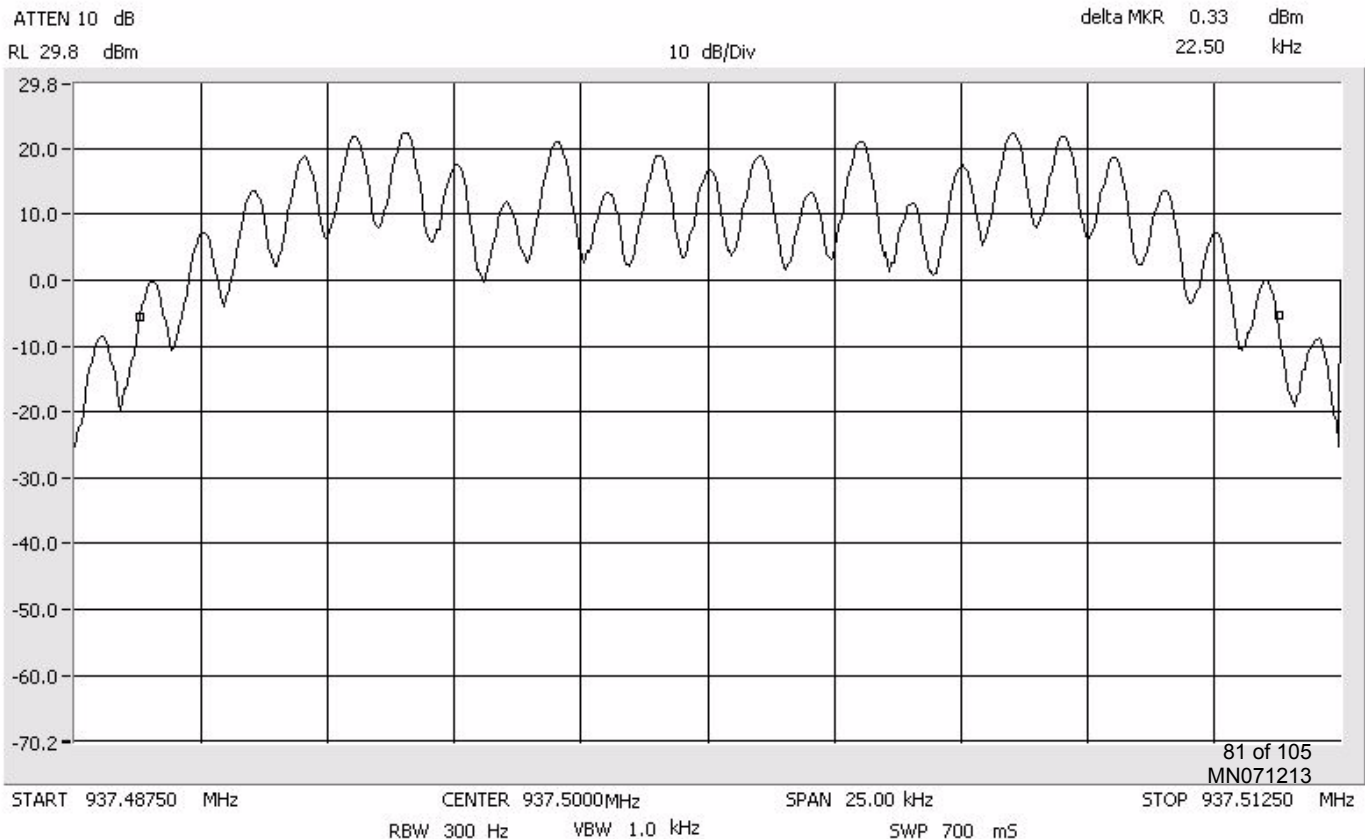
Occupied Bandwidth FM Signal In

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



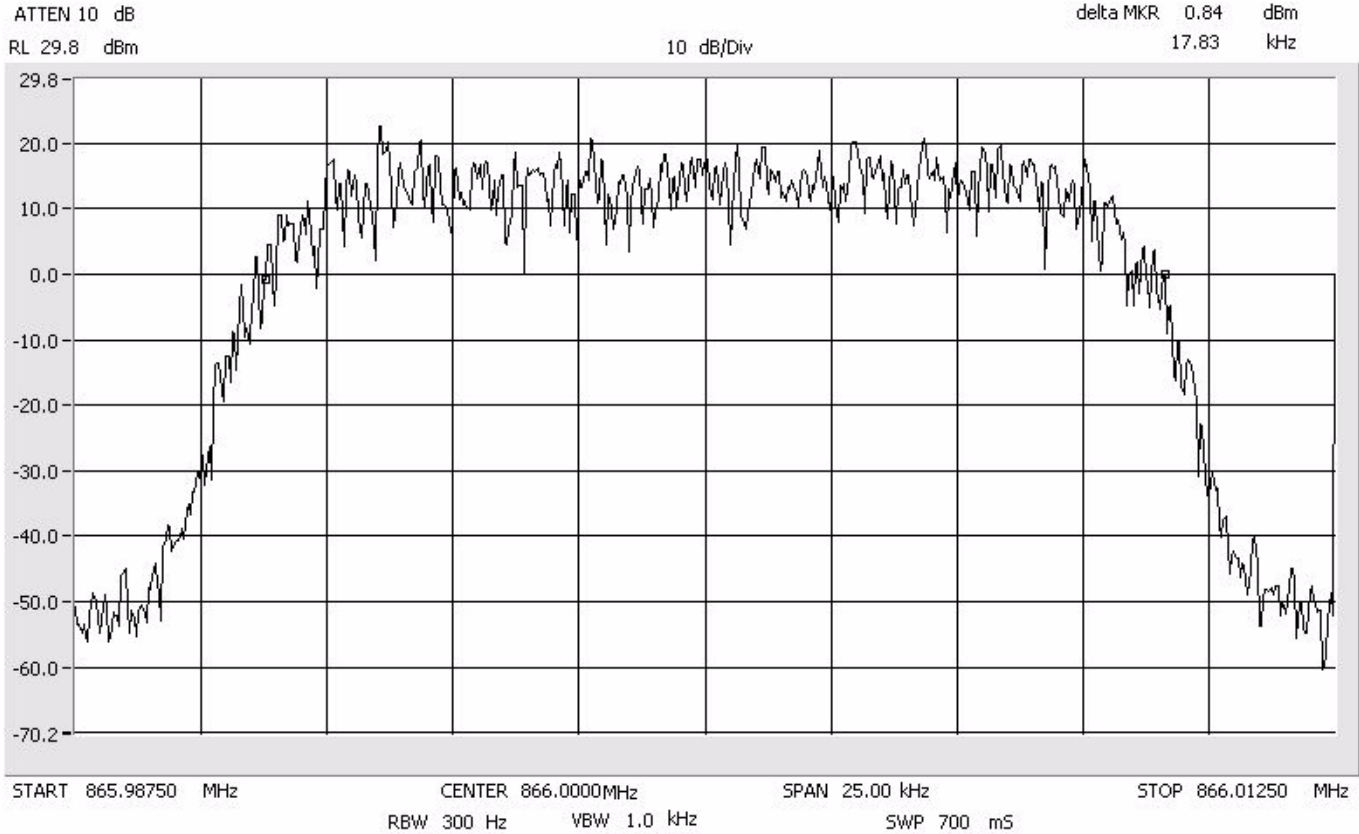
Occupied Bandwidth FM Signal Out

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



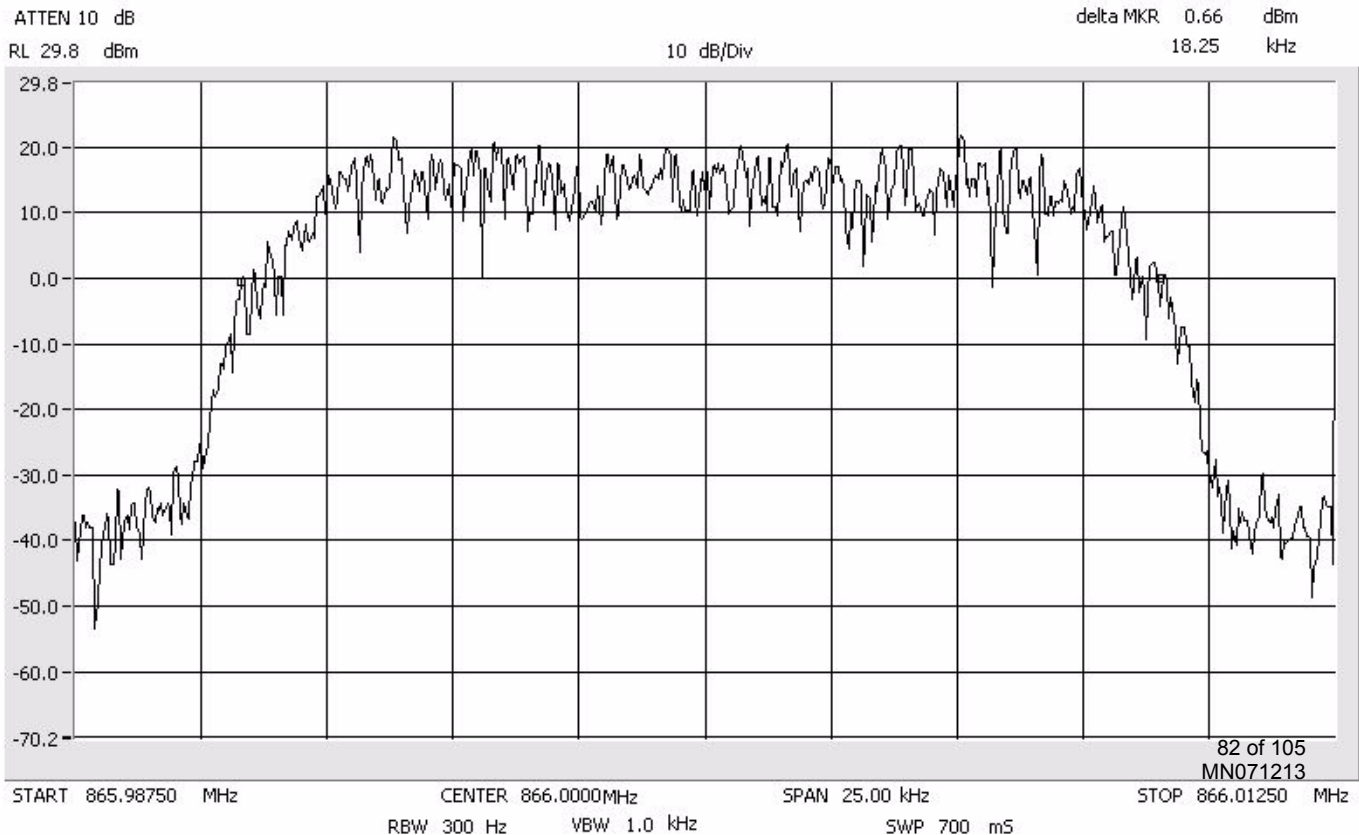
Occupied Bandwidth iDEN Signal In

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



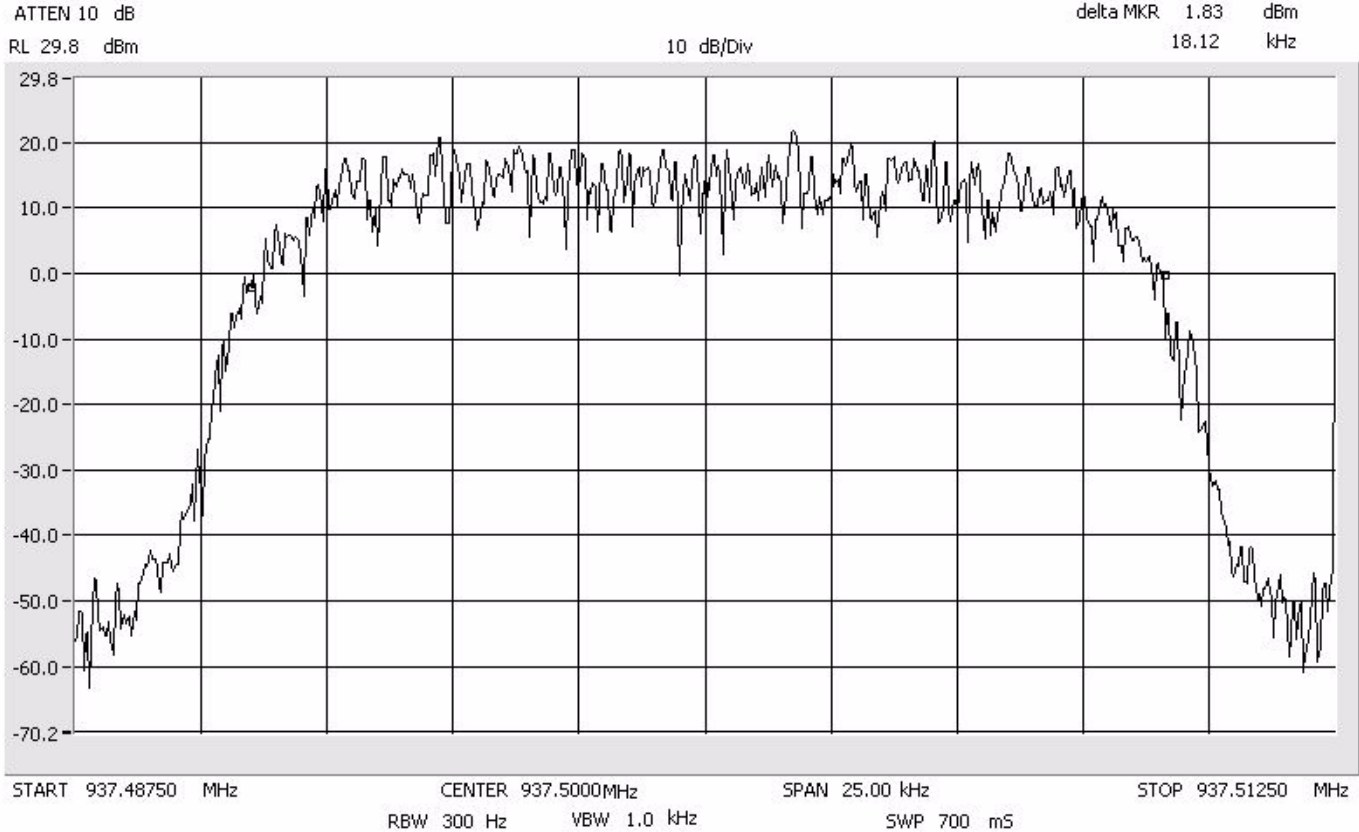
Occupied Bandwidth iDEN Signal Out

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



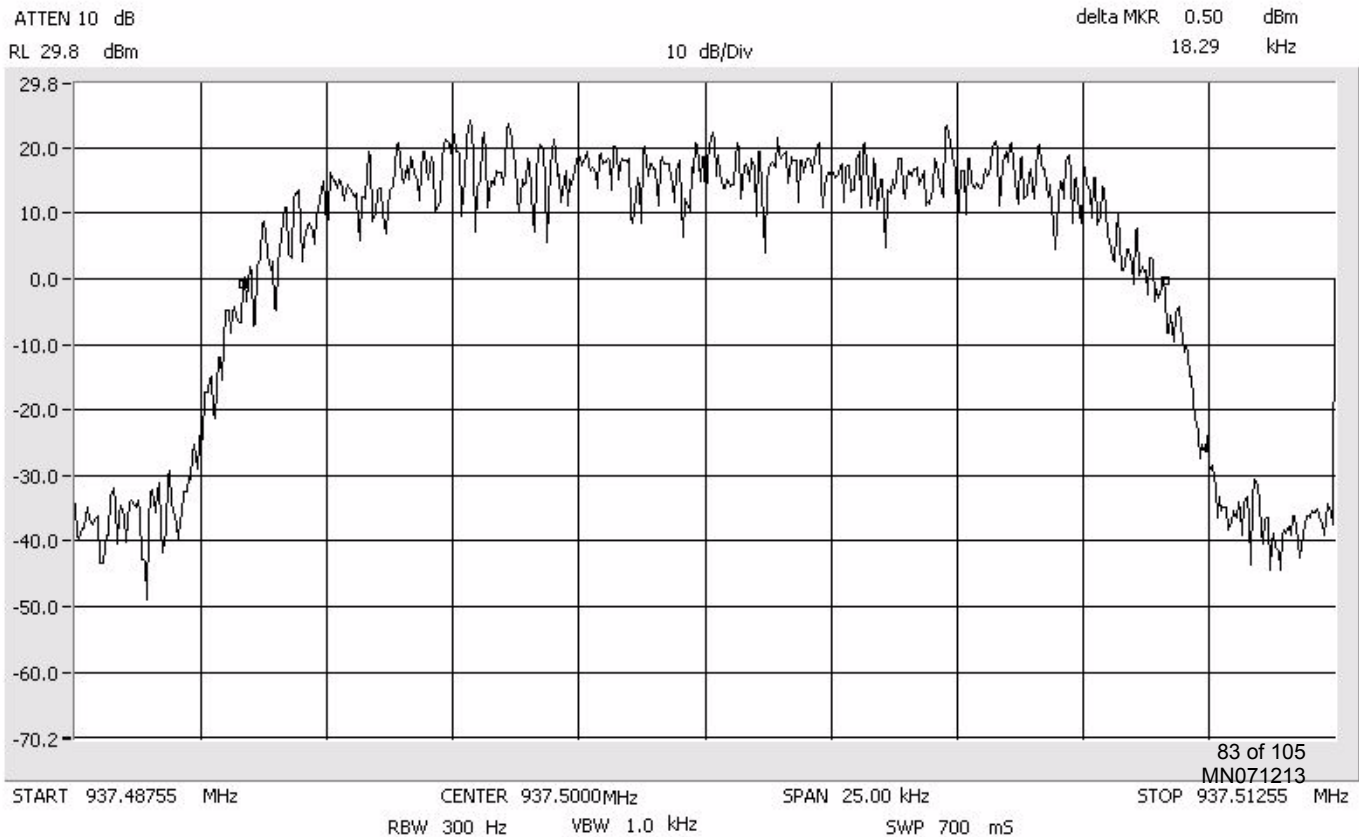
Occupied Bandwidth iDEN Signal In

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



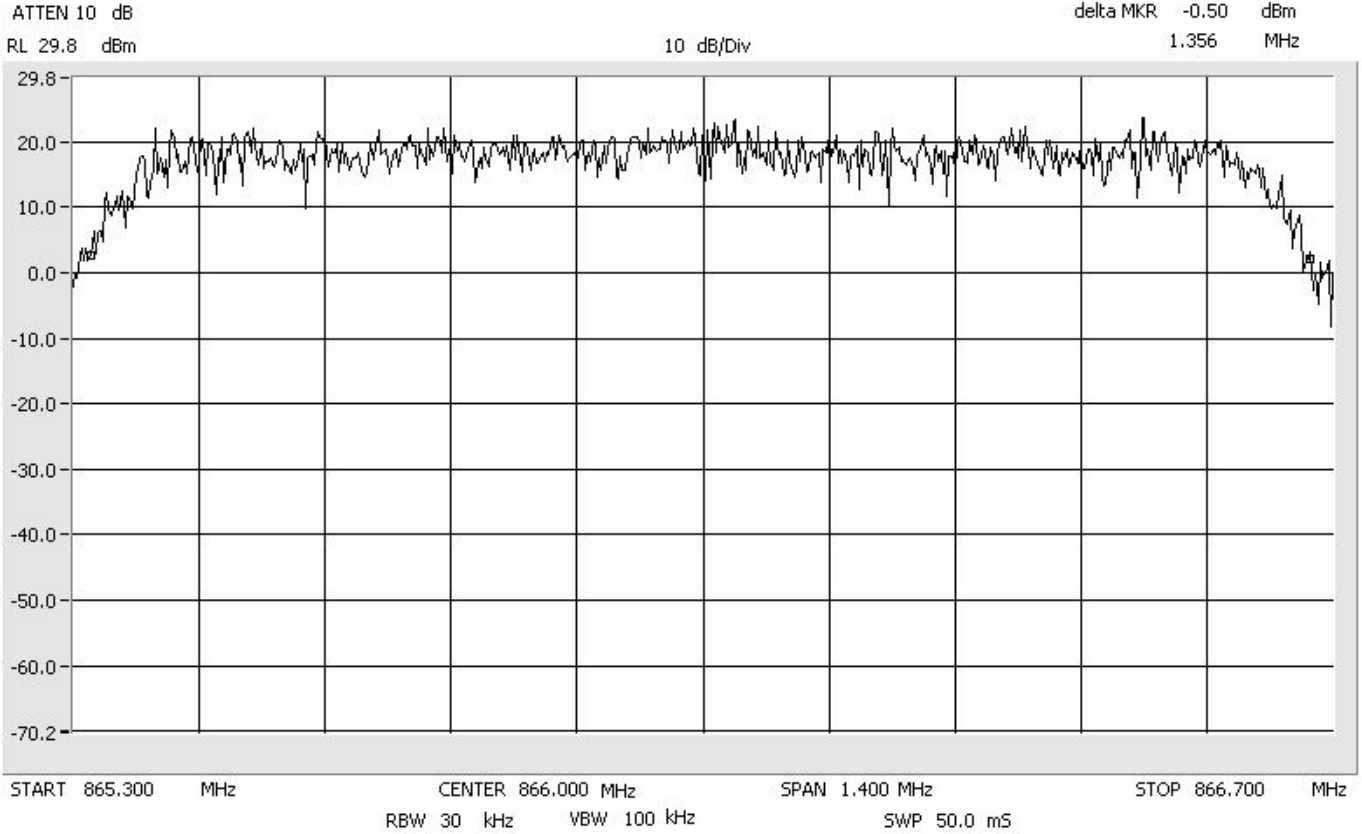
Occupied Bandwidth iDEN Signal Out

Span: 25 kHz
RBW: 300 kHz
VBW: 1.0 kHz



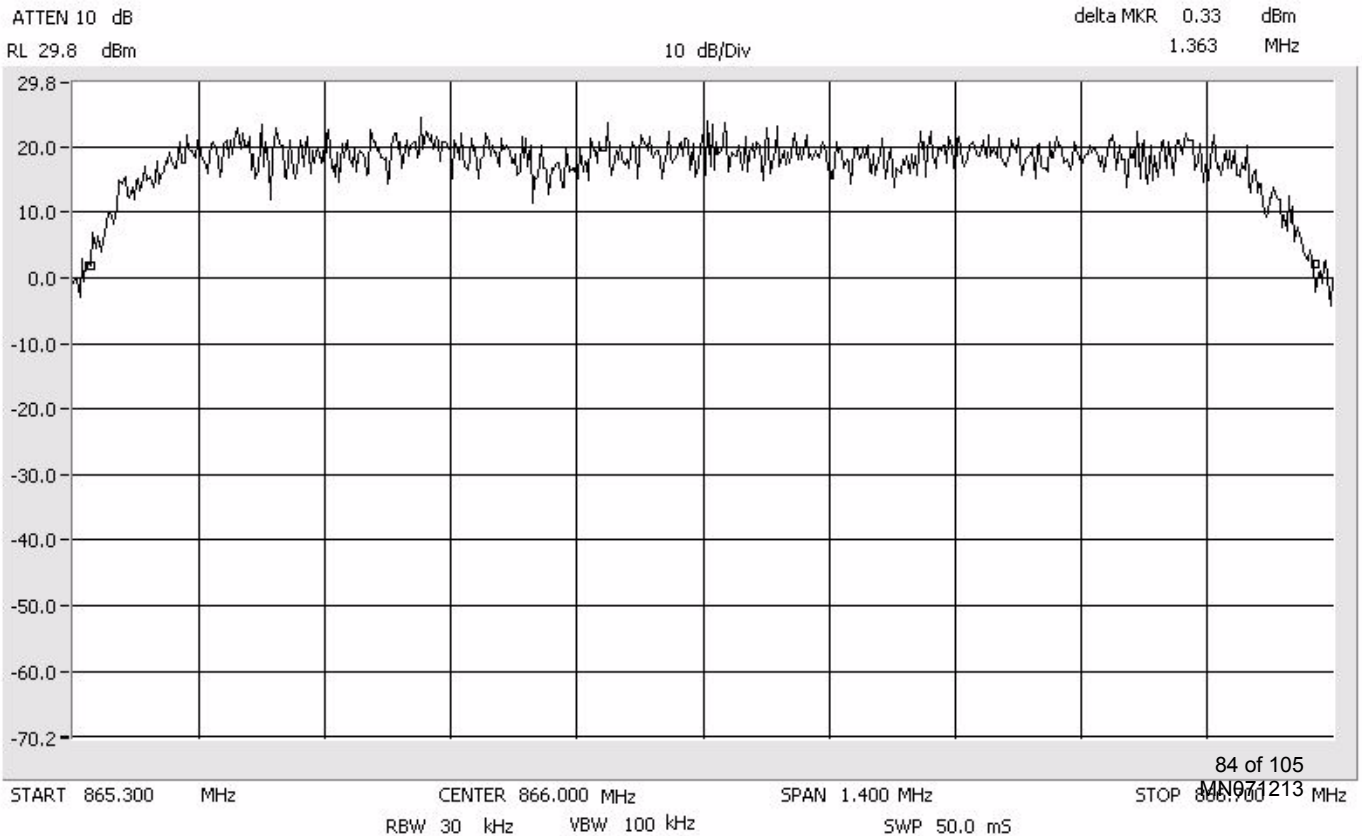
Occupied Bandwidth CDMA Signal In

Span: 1.4 MHz
RBW: 30 kHz
VBW: 100 kHz



Occupied Bandwidth CDMA Signal Out

Span: 1.4 MHz
RBW: 30 kHz
VBW: 100 kHz



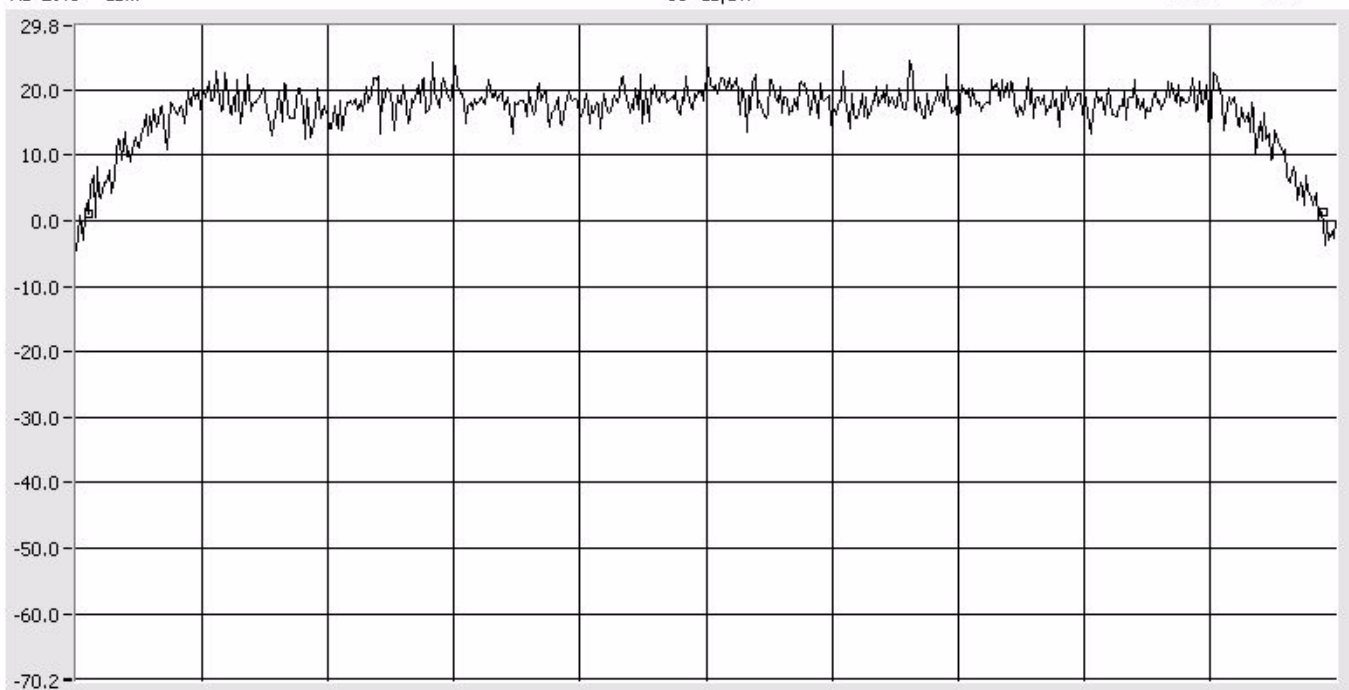
Occupied Bandwidth CDMA Signal In

Span: 1.4 MHz
RBW: 30 kHz
VBW: 100 kHz

ATTEN 10 dB
RL 29.8 dBm

delta MKR 0.33 dBm
1.372 MHz

10 dB/Div



START 936.800 MHz CENTER 937.500 MHz SPAN 1.400 MHz STOP 938.200 MHz
RBW 30 kHz VBW 100 kHz SWP 50.0 mS

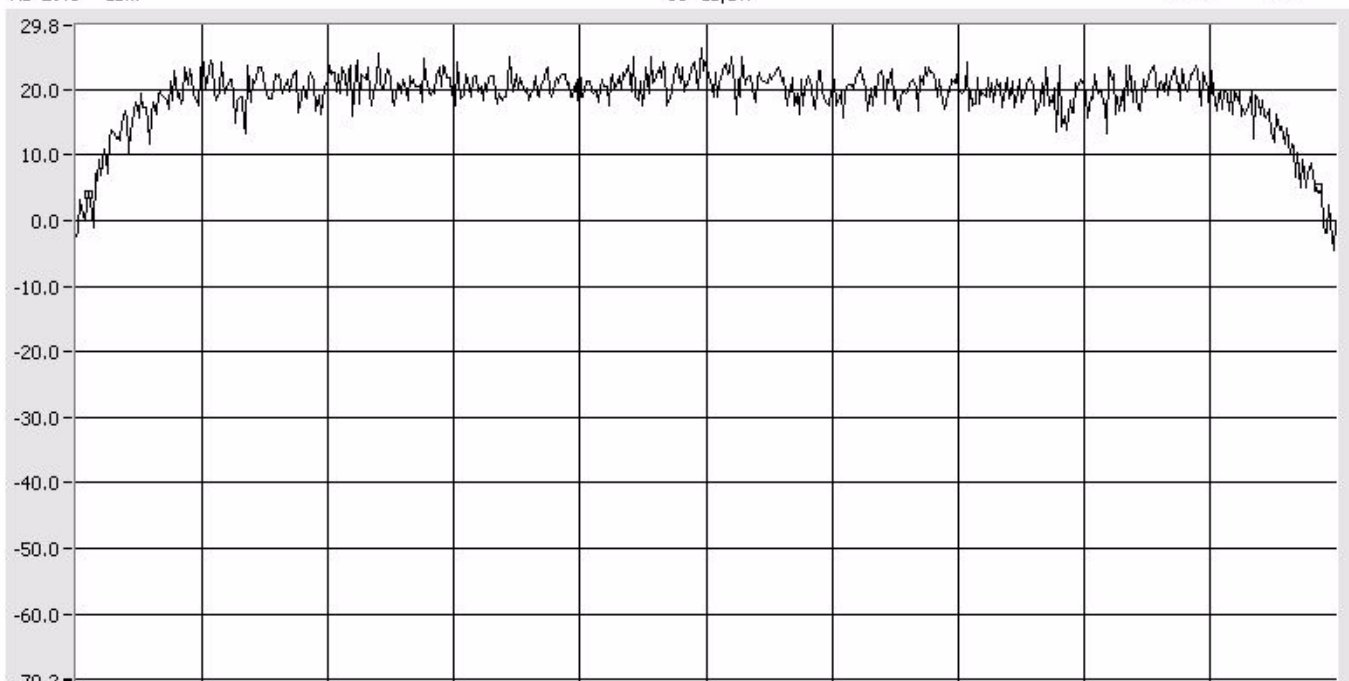
Occupied Bandwidth CDMA Signal Out

Span: 1.4 MHz
RBW: 30 kHz
VBW: 100 kHz

ATTEN 10 dB
RL 29.8 dBm

delta MKR 0.84 dBm
1.367 MHz

10 dB/Div



START 936.800 MHz CENTER 937.500 MHz SPAN 1.400 MHz STOP 938.200 MHz
RBW 30 kHz VBW 100 kHz SWP 50.0 mS

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

[Back](#)

EUT SMR 800 MHz

HOST	REMOTE			
Input Voltage	Input Voltage	Carrier Frequency	Measured Frequency	Meets Requirements?
21 VDC	100 VAC	863.200 MHz	863.200 MHz	Yes
48 VDC	170 VAC	863.200 MHz	863.200 MHz	Yes
60 VDC	240 VAC	863.200 MHz	863.200 MHz	Yes
21 VDC	100 VAC	866.000 MHz	866.000 MHz	Yes
48 VDC	170 VAC	866.000 MHz	866.000 MHz	Yes
60 VDC	240 VAC	866.000 MHz	866.000 MHz	Yes
21 VDC	100 VAC	868.800 MHz	868.800 MHz	Yes
48 VDC	170 VAC	868.800 MHz	868.800 MHz	Yes
60 VDC	240 VAC	868.800 MHz	868.800 MHz	Yes
Temperature		Carrier Frequency	Measured Frequency	Meets Requirements?
-30 Deg. C		863.200 MHz	863.200 MHz	Yes
-20 Deg. C		863.200 MHz	863.200 MHz	Yes
-10 Deg. C		863.200 MHz	863.200 MHz	Yes
0 Deg. C		863.200 MHz	863.200 MHz	Yes
10 Deg. C		863.200 MHz	863.200 MHz	Yes
20 Deg. C		863.200 MHz	863.200 MHz	Yes
30 Deg. C		863.200 MHz	863.200 MHz	Yes
40 Deg. C		863.200 MHz	863.200 MHz	Yes
50 Deg. C		863.200 MHz	863.200 MHz	Yes
-30 Deg. C		866.000 MHz	866.000 MHz	Yes
-20 Deg. C		866.000 MHz	866.000 MHz	Yes
-10 Deg. C		866.000 MHz	866.000 MHz	Yes
0 Deg. C		866.000 MHz	866.000 MHz	Yes
10 Deg. C		866.000 MHz	866.000 MHz	Yes
20 Deg. C		866.000 MHz	866.000 MHz	Yes
30 Deg. C		866.000 MHz	866.000 MHz	Yes
40 Deg. C		866.000 MHz	866.000 MHz	Yes
50 Deg. C		866.000 MHz	866.000 MHz	Yes
-30 Deg. C		868.800 MHz	868.800 MHz	Yes
-20 Deg. C		868.800 MHz	868.800 MHz	Yes
-10 Deg. C		868.800 MHz	868.800 MHz	Yes
0 Deg. C		868.800 MHz	868.800 MHz	Yes
10 Deg. C		868.800 MHz	868.800 MHz	Yes
20 Deg. C		868.800 MHz	868.800 MHz	Yes
30 Deg. C		868.800 MHz	868.800 MHz	Yes
40 Deg. C		868.800 MHz	868.800 MHz	Yes
50 Deg. C		868.800 MHz	868.800 MHz	Yes

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

EUT SMR 900 MHz

HOST	REMOTE			
Input Voltage	Input Voltage	Carrier Frequency	Measured Frequency	Meets Requirements?
21 VDC	100 VAC	935.200 MHz	935.200 MHz	Yes
48 VDC	170 VAC	935.200 MHz	935.200 MHz	Yes
60 VDC	240 VAC	935.200 MHz	935.200 MHz	Yes
21 VDC	100 VAC	937.500 MHz	937.500 MHz	Yes
48 VDC	170 VAC	937.500 MHz	937.500 MHz	Yes
60 VDC	240 VAC	937.500 MHz	937.500 MHz	Yes
21 VDC	100 VAC	939.800 MHz	939.800 MHz	Yes
48 VDC	170 VAC	939.800 MHz	939.800 MHz	Yes
60 VDC	240 VAC	939.800 MHz	939.800 MHz	Yes
Temperature		Carrier Frequency	Measured Frequency	Meets Requirements?
-30 Deg. C		935.200 MHz	935.200 MHz	Yes
-20 Deg. C		935.200 MHz	935.200 MHz	Yes
-10 Deg. C		935.200 MHz	935.200 MHz	Yes
0 Deg. C		935.200 MHz	935.200 MHz	Yes
10 Deg. C		935.200 MHz	935.200 MHz	Yes
20 Deg. C		935.200 MHz	935.200 MHz	Yes
30 Deg. C		935.200 MHz	935.200 MHz	Yes
40 Deg. C		935.200 MHz	935.200 MHz	Yes
50 Deg. C		935.200 MHz	935.200 MHz	Yes
-30 Deg. C		937.500 MHz	937.500 MHz	Yes
-20 Deg. C		937.500 MHz	937.500 MHz	Yes
-10 Deg. C		937.500 MHz	937.500 MHz	Yes
0 Deg. C		937.500 MHz	937.500 MHz	Yes
10 Deg. C		937.500 MHz	937.500 MHz	Yes
20 Deg. C		937.500 MHz	937.500 MHz	Yes
30 Deg. C		937.500 MHz	937.500 MHz	Yes
40 Deg. C		937.500 MHz	937.500 MHz	Yes
50 Deg. C		937.500 MHz	937.500 MHz	Yes
-30 Deg. C		939.800 MHz	939.800 MHz	Yes
-20 Deg. C		939.800 MHz	939.800 MHz	Yes
-10 Deg. C		939.800 MHz	939.800 MHz	Yes
0 Deg. C		939.800 MHz	939.800 MHz	Yes
10 Deg. C		939.800 MHz	939.800 MHz	Yes
20 Deg. C		939.800 MHz	939.800 MHz	Yes
30 Deg. C		939.800 MHz	939.800 MHz	Yes
40 Deg. C		939.800 MHz	939.800 MHz	Yes
50 Deg. C		939.800 MHz	939.800 MHz	Yes

Intertek Test Data

[Back to Test Data:](#)

[Back to Table of Contents:](#)

Test Engineer: Norman Shpilsher

Date: 30, November, 2007

Test Procedure:

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

Test Site Location:

The test site is a 3 meter Semi-Anechoic Chamber, constructed by Panashield™ Inc. and located inside the building at 7250 Hudson Blvd. Suite 100, Oakdale, MN 55128.

Test Site Description:

The 3 meter Semi-Anechoic Chamber is constructed of Panabolt™ modular RF shielding and self-supported with structural steel designed for the local seismic zone rating. The chamber has the nominal size of 20' wide x 29' long x 18' high. All walls and ceiling of the chamber are treated with FFG-1000 Ferrite Grid absorber which was developed specifically to meet international requirements for EMC anechoic chambers for emissions and immunity measurements. To meet high frequency testing white HY-35 hybrid absorber is mounted on the ferrites in specular regions of the chamber.

The chamber has a 2 meter diameter ANSI test volume area and meets the requirements of ANSI C63.4 (1992), EN55022, and FCC Part 15 standards for testing at a 3 meter path length.

FCC Registration Number: 90706

IC Registration Number: 4359

TEST DATA

**Test Data Number: 3136762MIN-001
Project Number: 3136762**

**Testing performed on the
URH-SMR, Universal Radio Head-SMR**

**To
47 CFR, Part 90**

**For
ADC Telecommunications Inc.**

Test Performed by:
Intertek Testing Services NA, Inc.
7250 Hudson Blvd., Suite 100
Oakdale, MN 55128

Test Authorized by:
ADC Telecommunications Inc.
5341 12th Avenue East
Shakopee, MN 55379

Prepared by: *Norman Shpilsher*
Norman Shpilsher

Date: December 7, 2007

Reviewed by: *Uri Spector*
Uri Spector

Date: December 7, 2007

TABLE OF CONTENTS

1.0 DESCRIPTION OF THE SAMPLE (EUT)..... 3

2.0 TEST SUMMARY 4

 2.1 Statement of the Measurement Uncertainty..... 4

3.0 TEST RESULTS 5

 3.1 Environmental conditions 12

5.0 TEST EQUIPMENT.....15

1.0 DESCRIPTION OF THE SAMPLE (EUT)

Model:	URH-SMR, Universal Radio Head-SMR
Type of EUT:	Outdoor Repeater
Serial Number:	N/A
Company:	ADC Telecommunications Inc.
Customer:	Mr. Mark Miska
Address:	1187 Park Place Shakopee, MN 55379
Phone:	952-403-8340
Fax:	952-403-8858
Test Standards:	<input type="checkbox"/> EN 55022:2006, Class <input type="checkbox"/> EN 55011:1998 + A1:1999 + A2:2002, Group, Class <input checked="" type="checkbox"/> 47 CFR, Part 90:2006 <input type="checkbox"/> 47 CFR, Part 15:2006, §15.109, Class <input type="checkbox"/> EN 55014-1:2000 + A1:2001 + A2:2002 <input type="checkbox"/> EN 61326-1:2006 <input type="checkbox"/> Class for Radiated and Conducted Emissions <input type="checkbox"/> EN 60601-1-2:2001 +A1:2006 <input type="checkbox"/> Class Radiated and Conducted Emissions <input type="checkbox"/> EN 61000-6-3:2001 <input type="checkbox"/> EN 61000-6-4:2001 <input type="checkbox"/> EN 61000-3-2:2006 <input type="checkbox"/> EN 61000-3-3:1995 +A1:2001 +A2:2006 <input type="checkbox"/> Other

2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST STANDARD	TEST	RESULT
Part 90	Spurious Enclosure Radiated Emissions	Pass

2.1 Statement of the Measurement Uncertainty

Note: The measured result in this report is within the specification limits by more than the measurement uncertainty; the measured result indicates that the product tested complies with the specification limit.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be: ± 4 dB at 10m and ± 5.4 dB at 3m

The expanded uncertainty ($k = 2$) for conducted emissions from 150 kHz to 30 MHz has been determined to be: ± 2.6 dB

General notes:

1. Test was performed with the EUT tuned to the middle frequency of 866MHz of the low band, and to the middle frequency of 937MHz of the upper band.

Testing was performed in frequency range from 30MHz to 10GHz.

2. The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dB μ V/m during field strength measurements at 3m measurement distance

3.0 TEST RESULTS

Radiated Emissions from 30MHz to 1GHz

Date: 11-30-2007

Company: ADC Telecommunications Inc.
Model: URH-SMR
Test Engineer: Norman Shpilsher
Special Info: Direct Measurements
Standard: FCC Part 90
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 Measurements were taken using a Peak detector

Table # 1

Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Operating Frequency 866MHz						
38.81 MHz	V	59.0	13.9	72.9	82.2	-9.3
52.433 MHz	V	52.7	8.2	60.8	82.2	-21.4
88.318 MHz	V	46.8	9.6	56.4	82.2	-25.8
94.775 MHz	V	46.4	11.0	57.4	82.2	-24.8
140.23 MHz	V	44.0	12.9	56.9	82.2	-25.3
Operating Frequency 937MHz						
38.904 MHz	H	46.3	13.8	60.1	82.2	-22.1
437.63 MHz	H	36.5	19.5	56.0	82.2	-26.2
Operating Frequency 937MHz						
39.652 MHz	V	58.3	13.4	71.7	82.2	-10.5
52.563 MHz	V	52.4	8.2	60.6	82.2	-21.6
89.571 MHz	V	46.0	9.9	55.9	82.2	-26.3
94.712 MHz	V	45.4	11.0	56.4	82.2	-25.8
113.22 MHz	V	41.4	13.7	55.1	82.2	-27.1
140.49 MHz	V	43.0	12.9	55.9	82.2	-26.3
937.15 MHz	V	28.3	25.5	53.8	82.2	-28.4
Operating Frequency 937MHz						
34.604 MHz	H	44.9	16.3	61.2	82.2	-21.0
39.348 MHz	H	46.2	13.6	59.8	82.2	-22.4
437.63 MHz	H	36.6	19.5	56.1	82.2	-26.1
499.98 MHz	H	33.1	20.6	53.7	82.2	-28.5

Radiated Emissions from 1GHz to 10GHz

Date: 11-30-2007

Company: ADC Telecommunications Inc.
Model: URH-SMR
Test Engineer: Norman Shpilsher
Special Info: Direct Measurements
Standard: FCC Part 90
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 All measurements were taken using a Peak detector

Table # 2

Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Operating Frequency 866MHz							
1.106 GHz	V	57.8	27.2	39.7	45.3	82.2	-36.9
1.25 GHz	V	58.9	27.5	39.6	46.8	82.2	-35.4
9.77 GHz	V	36.3	44.2	34.8	45.7	82.2	-36.5
Operating Frequency 937MHz							
1.752 GHz	H	53.2	29.3	39.0	43.6	82.2	-38.6
1.844 GHz	H	61.9	29.8	38.9	52.8	82.2	-29.4
2.95 GHz	H	51.3	33.1	38.0	46.4	82.2	-35.8
3.134 GHz	H	56.2	33.6	37.9	51.9	82.2	-30.3
3.318 GHz	H	52.4	34.0	37.8	48.7	82.2	-33.5
Operating Frequency 937MHz							
1.25 GHz	V	57.7	27.5	39.6	45.6	82.2	-36.6
1.752 GHz	V	54.1	29.3	39.0	44.5	82.2	-37.7
1.844 GHz	V	54.4	29.8	38.9	45.3	82.2	-36.9
9.742 GHz	V	36.7	44.1	34.8	46.0	82.2	-36.2
1.25 GHz	H	61.8	27.5	39.6	49.7	82.2	-32.5
1.844 GHz	H	62.4	29.8	38.9	53.3	82.2	-28.9
2.95 GHz	H	51.5	33.05	38.0	46.6	82.2	-35.6
3.134 GHz	H	56.1	33.6	37.9	51.8	82.2	-30.4
3.318 GHz	H	52.9	34.0	37.8	49.2	82.2	-33.0
9.936 GHz	H	36.1	44.5	34.6	45.9	82.2	-36.3

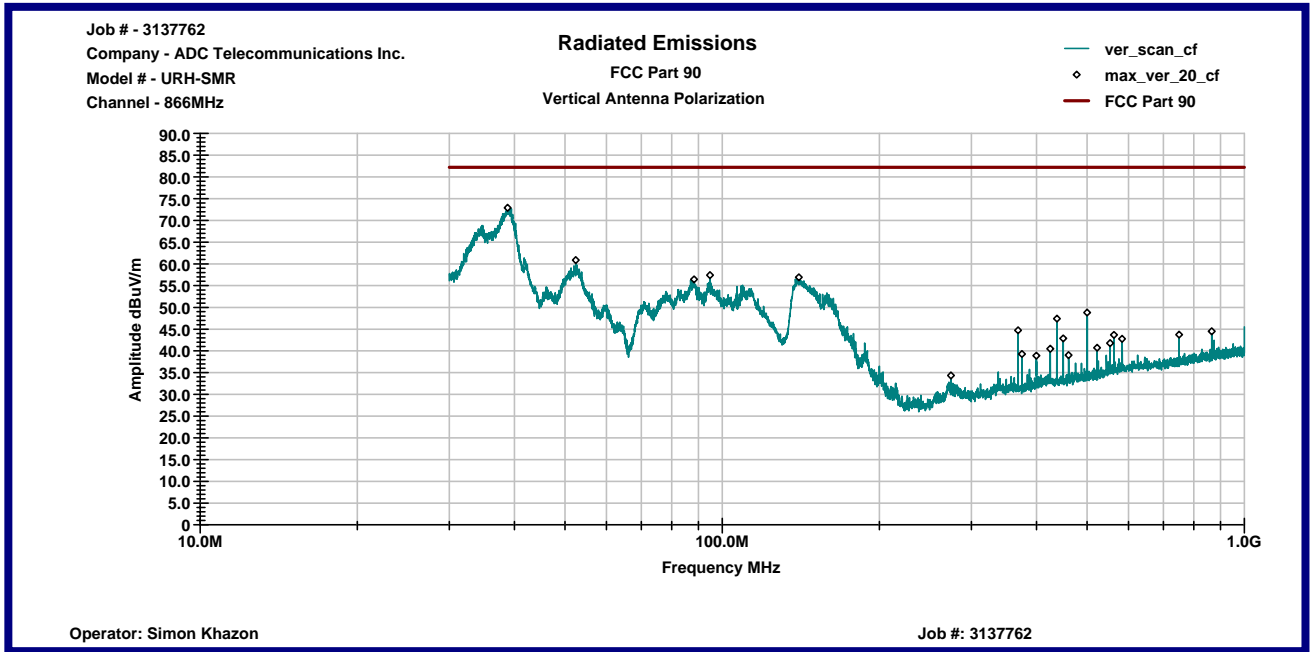
Spurious Emissions

Date: 12-04-2007

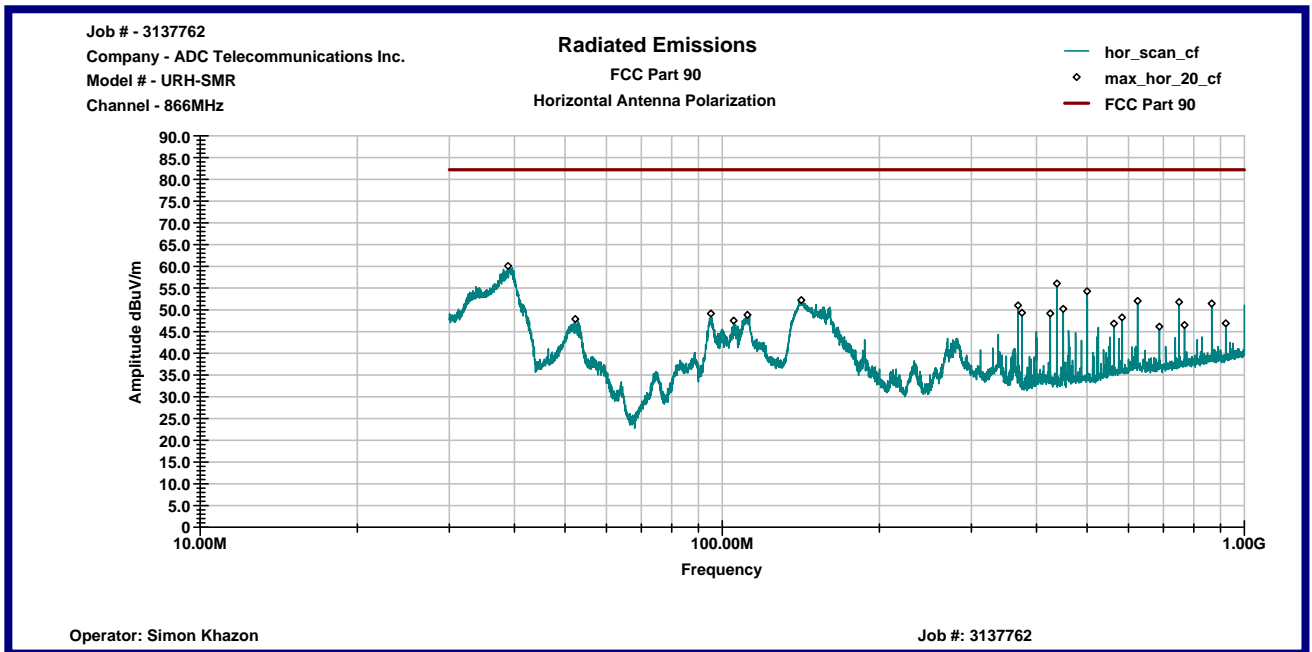
Company: ADC Telecommunications Inc.
Model: URH-SMR
Test Engineer: Norman Shpilsher
Special Config. Info: Substitution Method
Limits: FCC Part 90
Frequency Range: 30MHz - 10GHz
Test Site: 3m Anechoic Chamber
Note: The table shows radiated emissions with margin less than 20dB below straight measurements limits

Table # 3

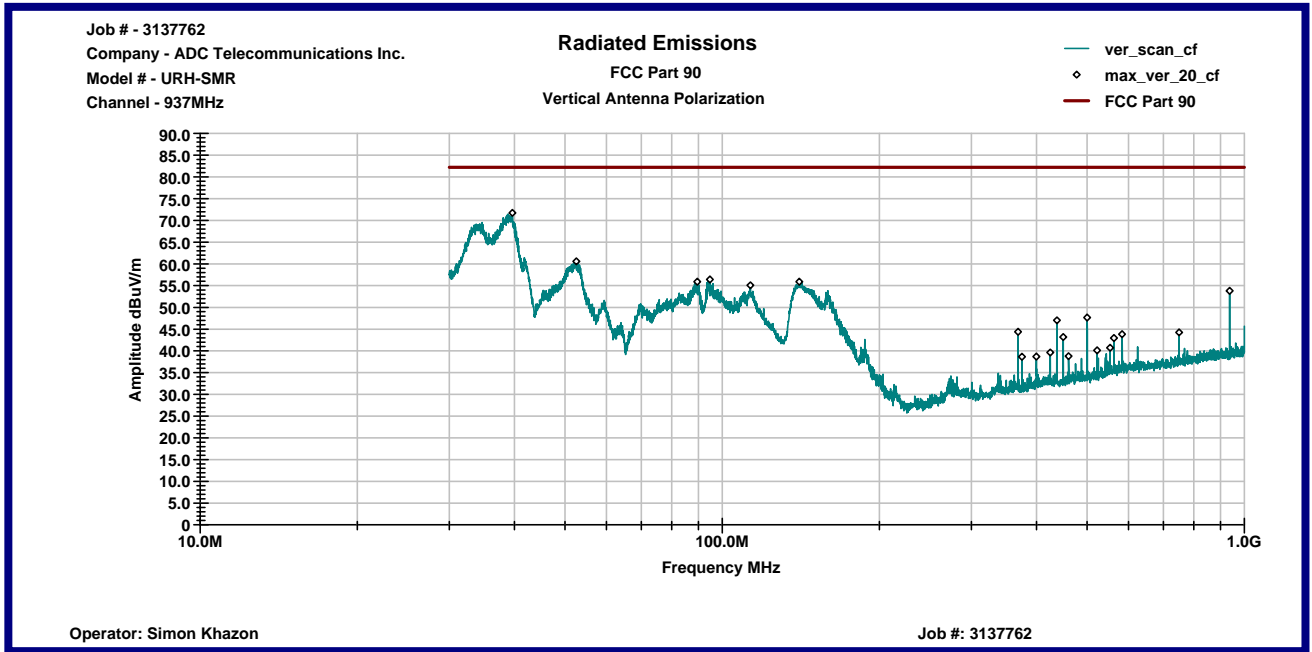
Frequency MHz	Antenna Polarity	Measured Emissions dBµV	Substitution Antenna Power dBm	Substitution Antenna Gain dBi	Cable Loss dB	ERP Spur. Emissions dBm	Limit dBm	Margin dB
Operating frequency 866MHz								
34.15	V	49.0	-25.0	-9.1	0.1	-34.2	-13.0	-21.2
38.88	V	59.0	-15.8	-8.5	0.1	-24.4	-13.0	-11.4
Operating frequency 937MHz								
34.35	V	48.9	-25.1	-9.1	0.1	-34.3	-13.0	-21.3
39.68	V	58.3	-16.5	-8.3	0.1	-24.9	-13.0	-11.9



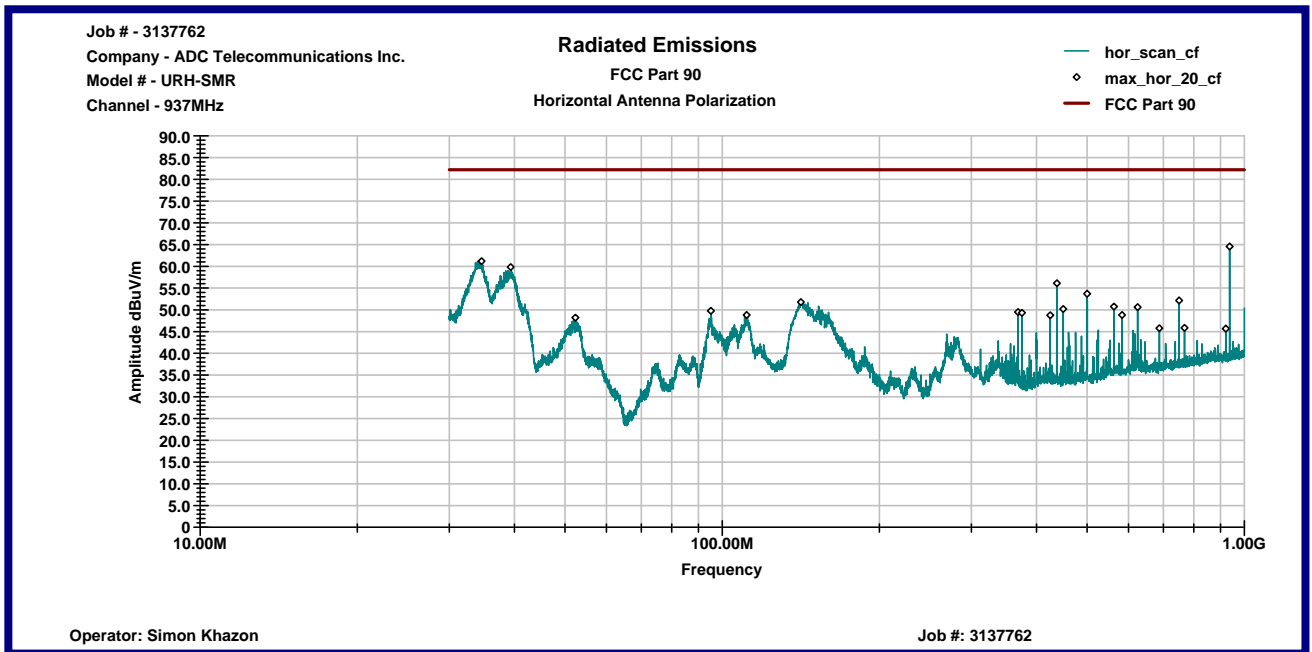
Graph 1



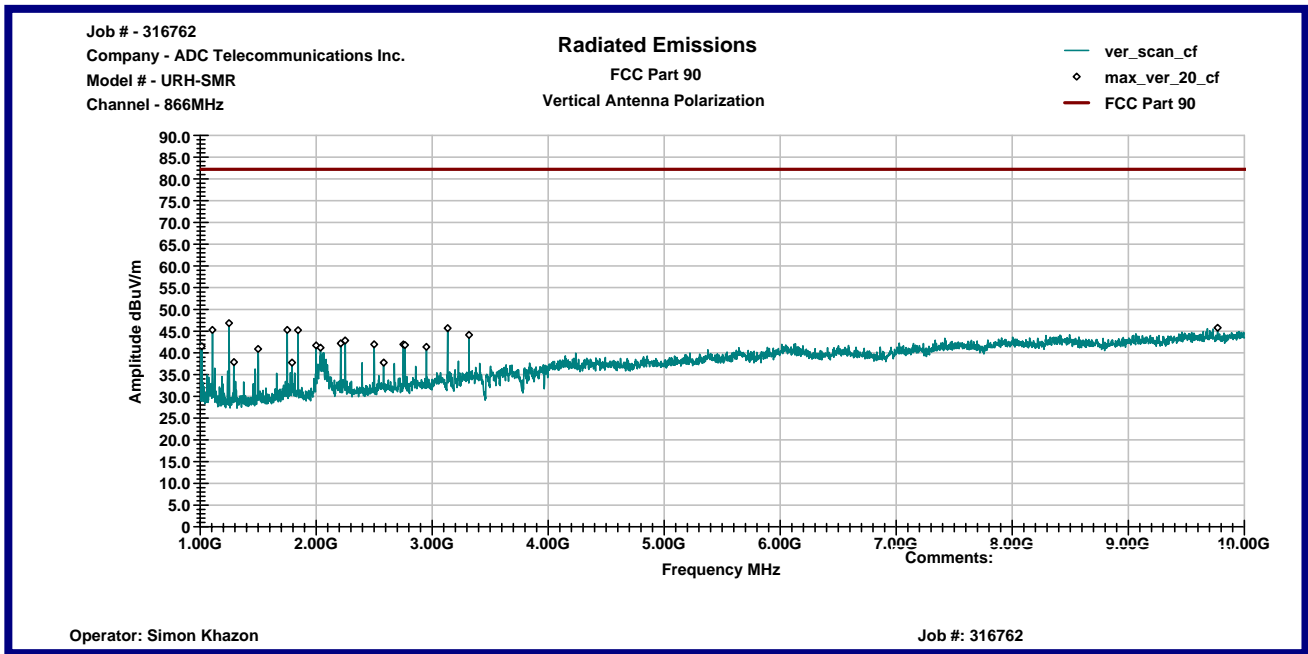
Graph 2



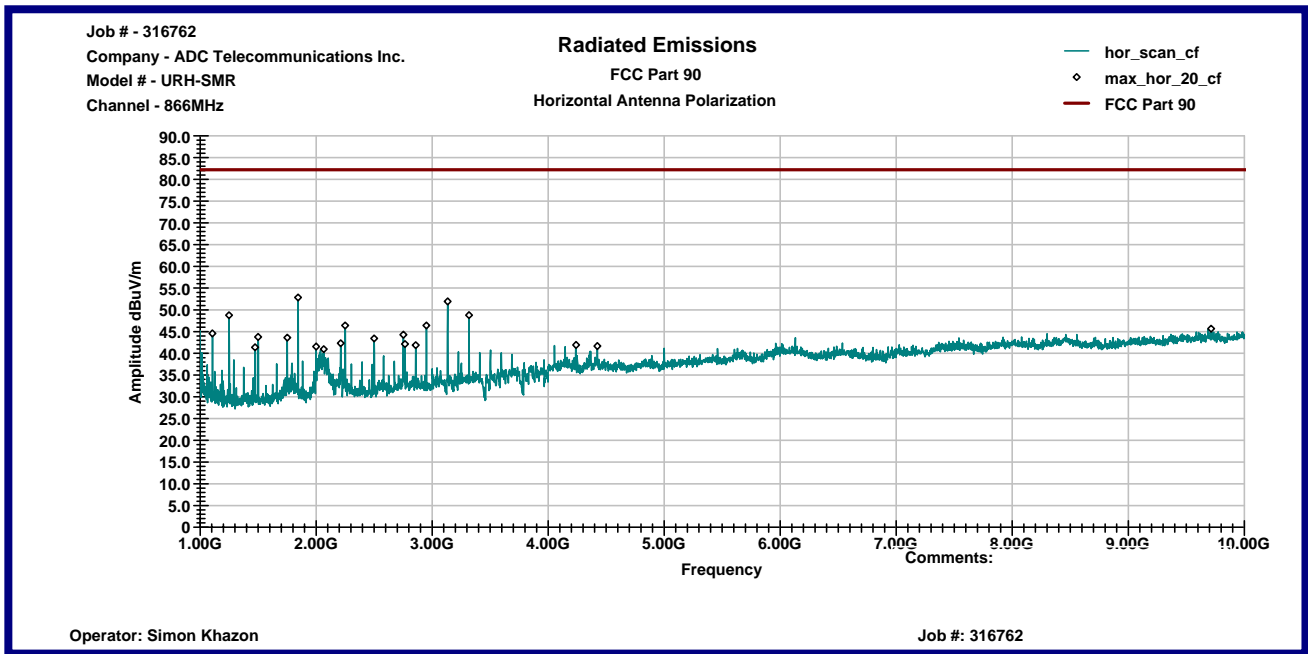
Graph 3



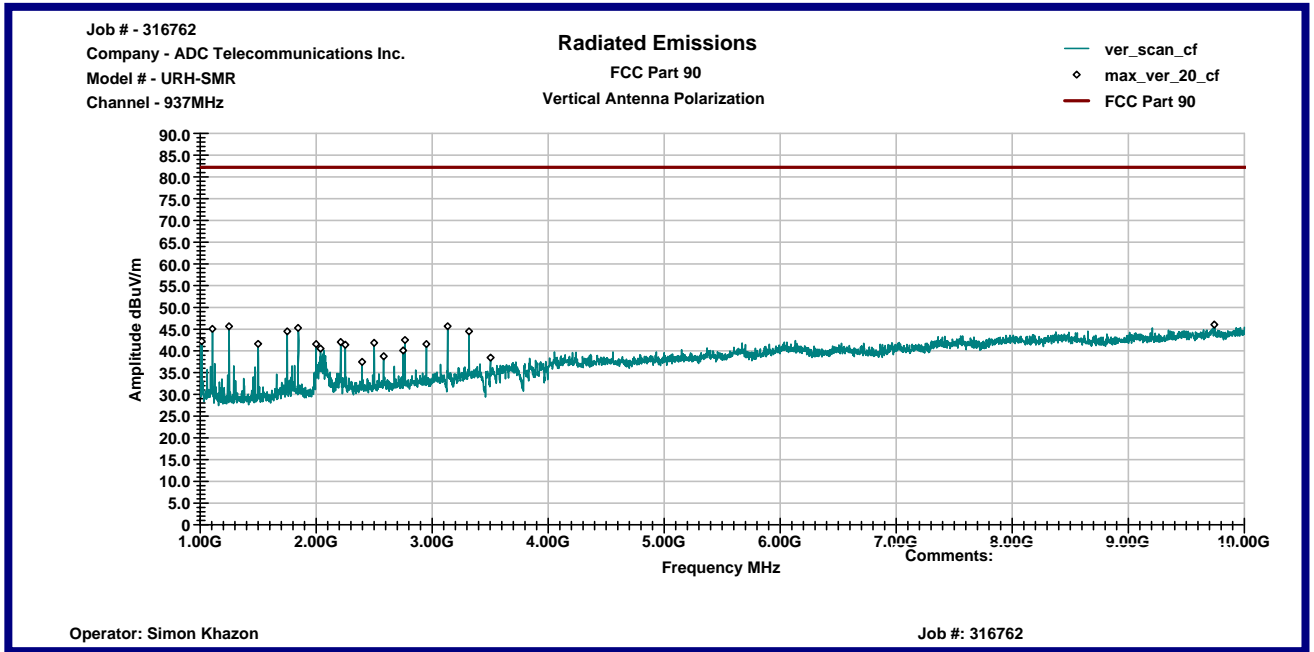
Graph 4



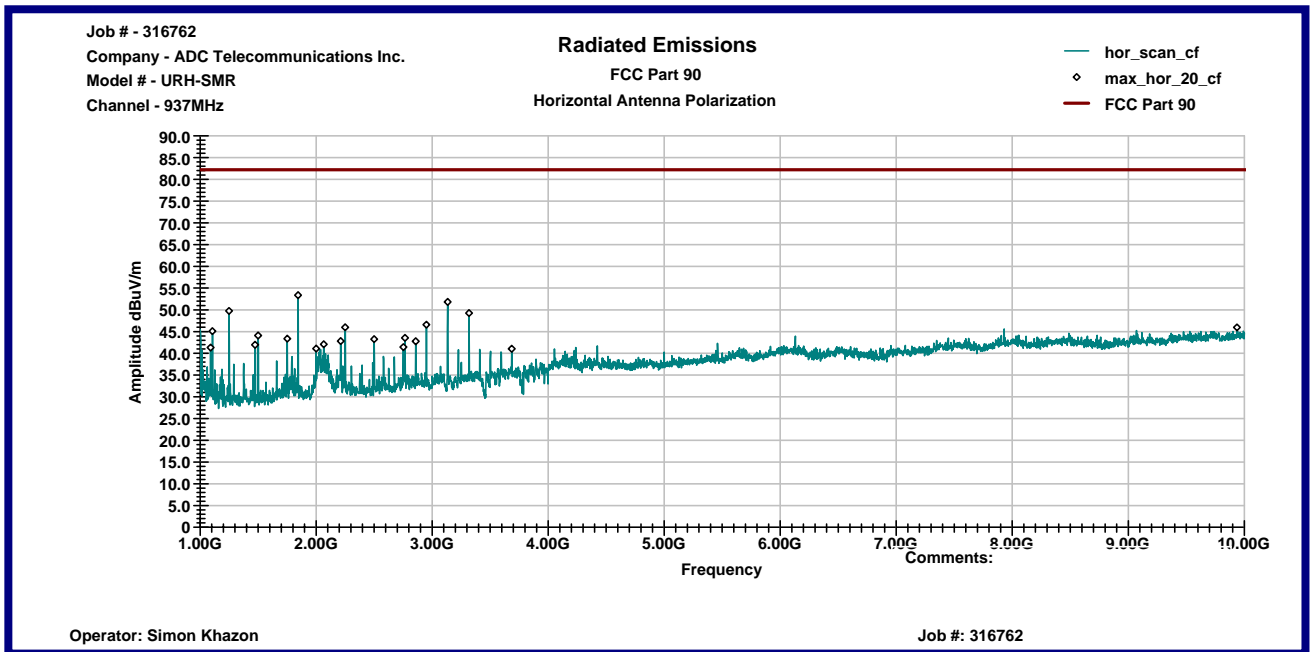
Graph 5



Graph 6



Graph 7



Graph 8

3.1 Environmental conditions

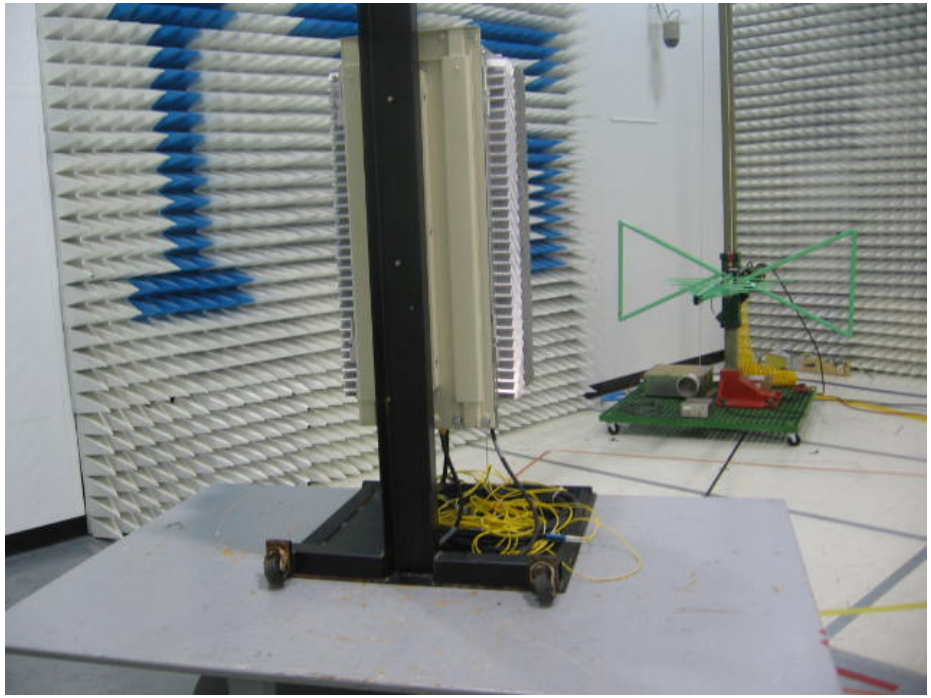
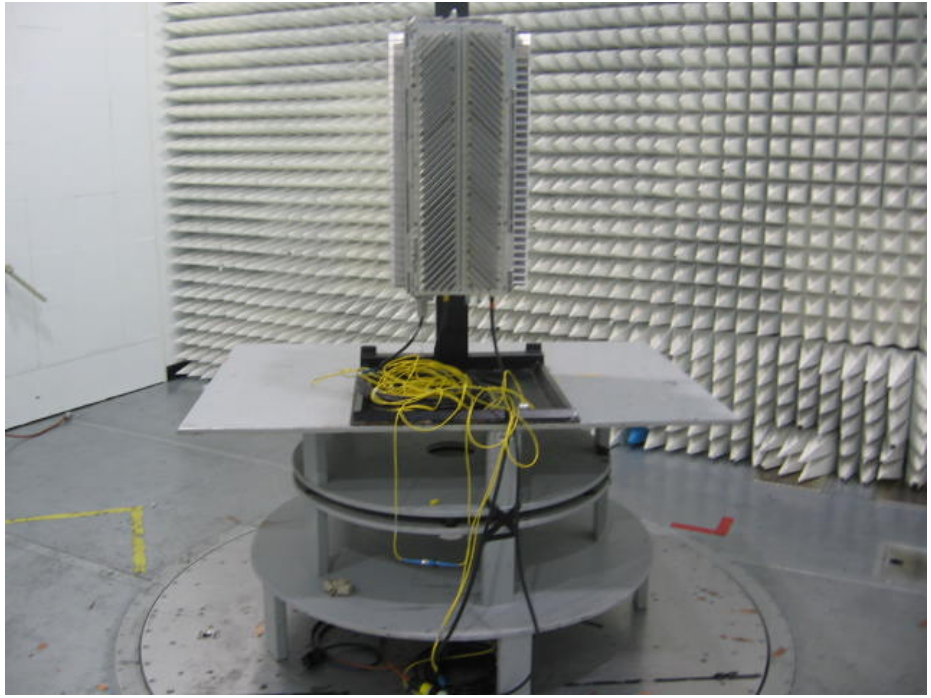
During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

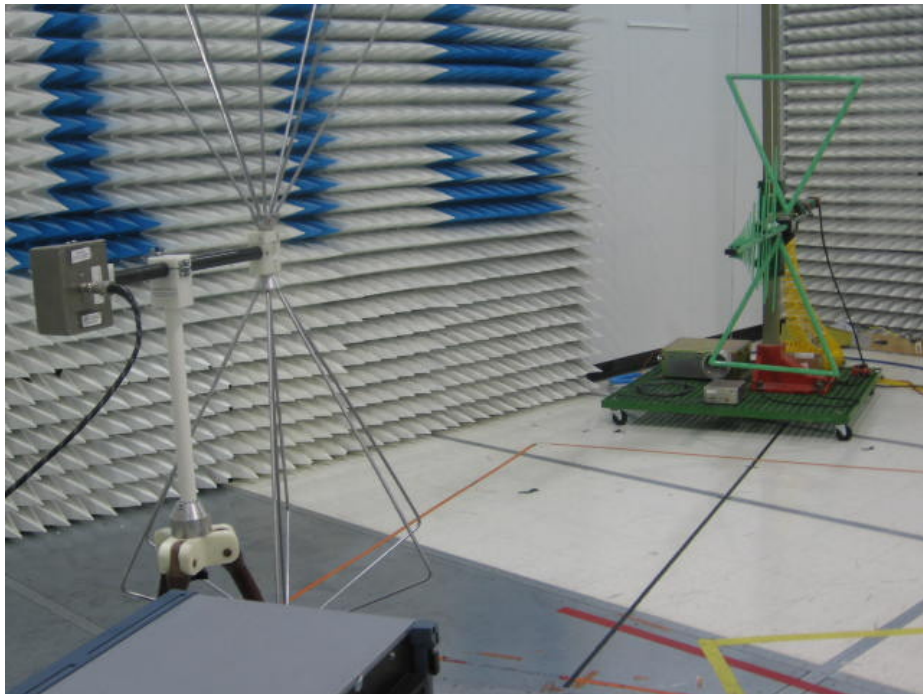
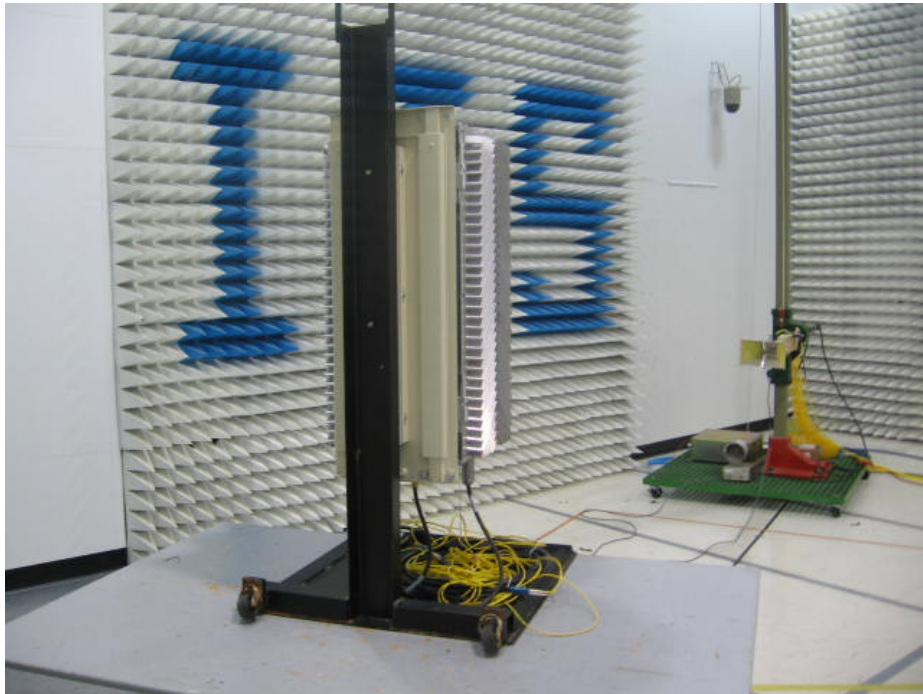
Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.0 PHOTOS



Test Setup Photos



Test Setup Photos

5.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Receiver RF Section	HP	85462A	3549A00306	02/27/2008	<input type="checkbox"/>
RF Filter Section	HP	85460A	3448A00276	02/27/2008	<input type="checkbox"/>
Spectrum Analyzer	R & S	FSP 40	100024	08/23/2008	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	ESCI	100358	04/27/2008	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	07/30/2008	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2630	09/07/2008	<input type="checkbox"/>
Horn Antenna	EMCO	3115	9507-4513	01/09/2008	<input checked="" type="checkbox"/>
Horn Antenna	EMCO	3115	6579	03/06/2008	<input type="checkbox"/>
Waveguide Horn Antenna	EMCO	3116	9904-2423	07/20/2008	<input type="checkbox"/>
Loop Antenna	A.H.Systems	SAS-200/562	215	05/04/2008	<input type="checkbox"/>
Monopole Antenna	A.H.Systems	SAS-200/550-1	692	05/09/2008	<input type="checkbox"/>
Biconical Antenna	CDI	B100	00632	08/01/2008	<input checked="" type="checkbox"/>
Signal Generator	R & S	SMT 03	DE12157	8/13/2008	<input checked="" type="checkbox"/>
LISN	Fischer Custom Communications	FCC-LISN-2	316	09/24/2008	<input type="checkbox"/>
LISN	Fischer Custom Communications	FCC-TLISN-T4	15333.01	03/01/2008	<input type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	04/24/2008	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	11/05/2008	<input type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-6F-26004000-40-8P	13224444	11/05/2008	<input type="checkbox"/>
Pre-Amplifier	HP	8447F OPT H64	3113A04974	03/07/2008	<input type="checkbox"/>
System	TILE! Instrument Control		Ver. 3.4.K.29	VBU	<input checked="" type="checkbox"/>

8.0

APPENDIX C

Measurement Protocol

[Back to Table of Contents:](#)

Measurement Protocol

Environmental conditions of the lab, (ADC)

Temperature: 21 - 26° C

Relative Humidity: 21 - 24 %

Atmospheric Pressure: 97.8 - 100.0 kPa

Test Methodology:

Emission testing is performed according to the procedures in ANSI C63.4-2003.

Measurement Uncertainty

The test system for conducted emissions is defined as the signal generator(s), the power meter, the spectrum analyzer and the coaxial cable. The equipment comprising the test systems is calibrated prior to testing the EUT.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left un-terminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

Radiated Emissions

The final level, in dBuV/m, equals the reading from the spectrum analyzer (Level dBuV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Appendix B.

Example:

FREQ (MHz)	LEVEL (dBuV)	CABLE/ANT/PREAMP (dB)	FINAL (dB/m) (dB) (dBuV/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

Substitution Method

A cabinet (or enclosure) radiated emission scan was also made, at Intertek, with the EUT's antenna replaced with a termination to demonstrate case radiation compliance to the -13 dBm requirement. Radiated emissions from the EUT are measured in the frequency range of 30 to 20,000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The field strength levels were measured per ANSI C63.4. The EUT is then replaced with a tuned dipole antenna (below 1GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the highest level measured from the EUT. The signal generator level minus the cable loss from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level.

Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.