Inter-Modulation Test for ADC Inc
Bi-Directional Amplifier – Cellular
Model Number RPT-SBAAA12000

Back

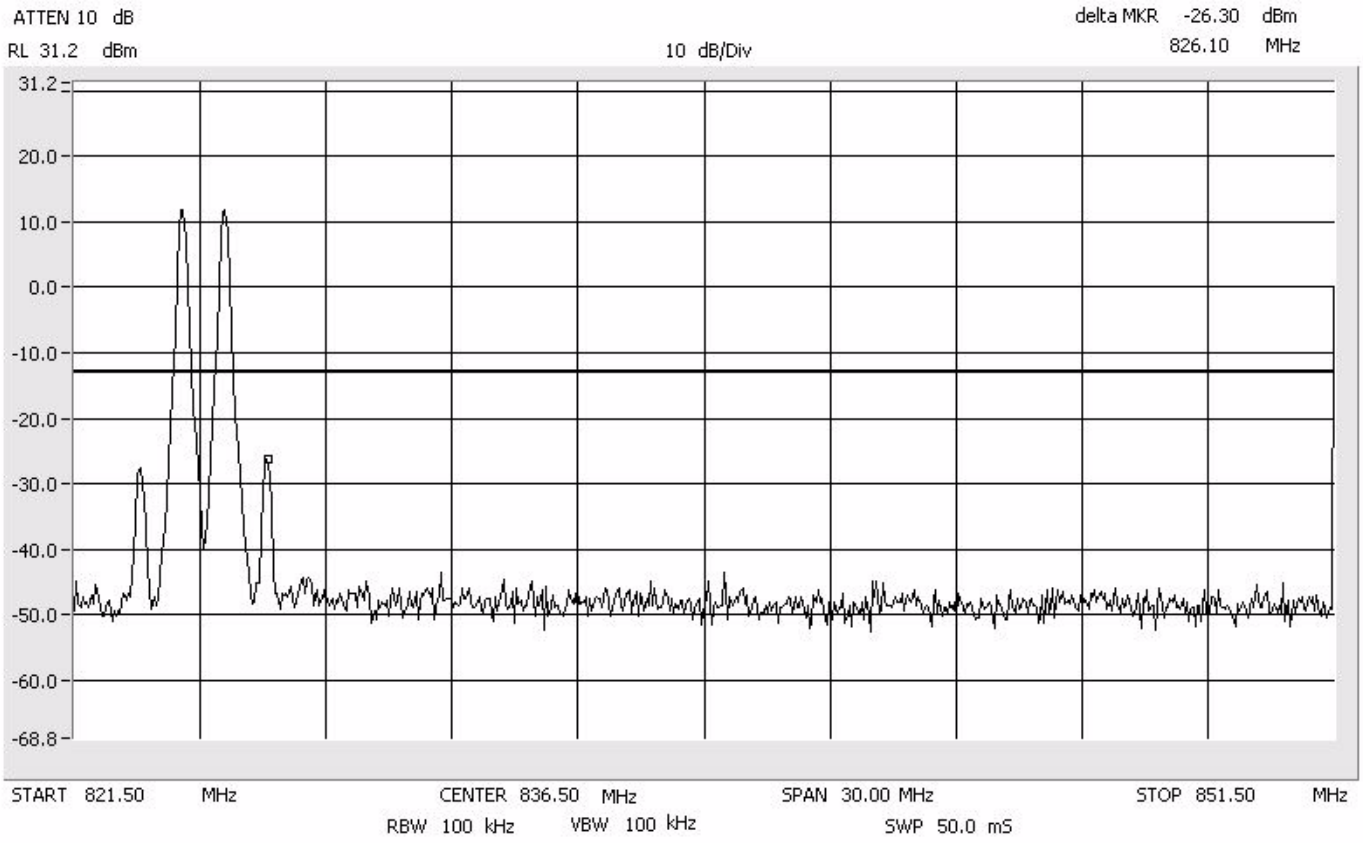
The inter-modulation products test was performed for the EUT. Three tests were preformed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were FM, TDMA, GSM, EDGE, CDMA, EVDO, and W-CDMA. An investigation was made from 30 MHz to the 10^{th} Harmonic of the highest fundamental frequency (~10 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)

FM

Intermodulation
Close - Lower
Cellular 800 MHz

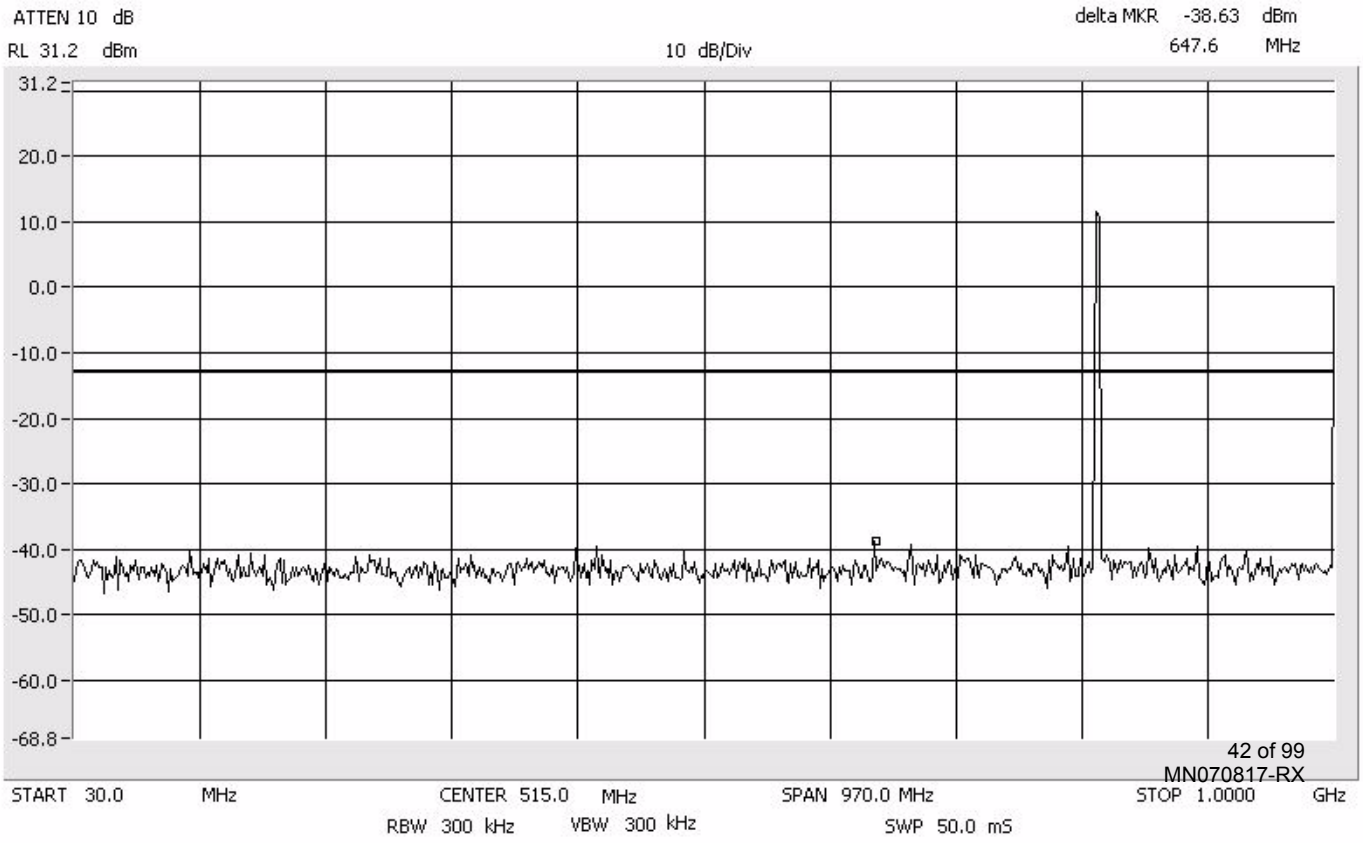
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



FM

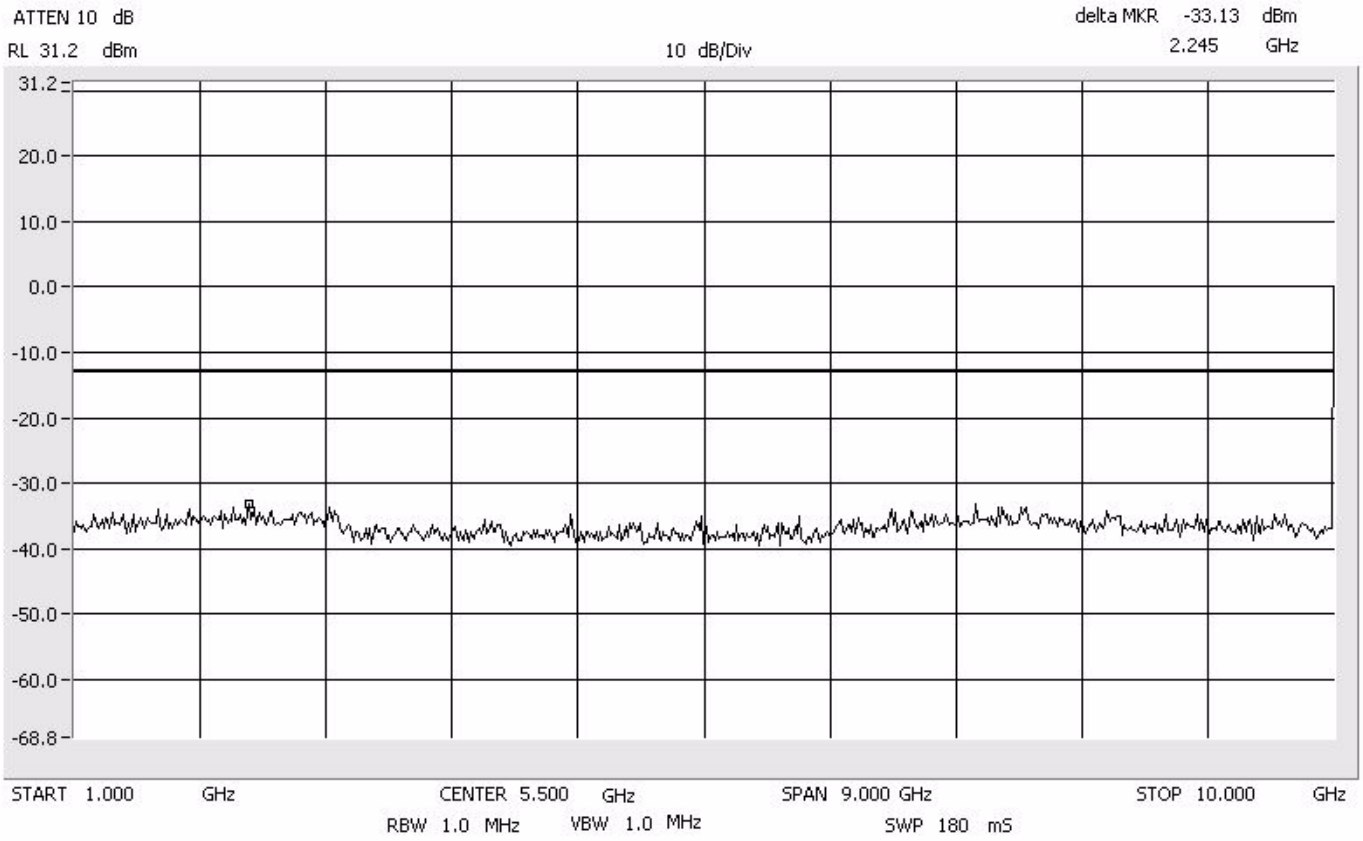
Intermodulation
Close - Lower
Cellular 800 MHz

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



Intermodulation
Close - Lower
Cellular 800 MHz

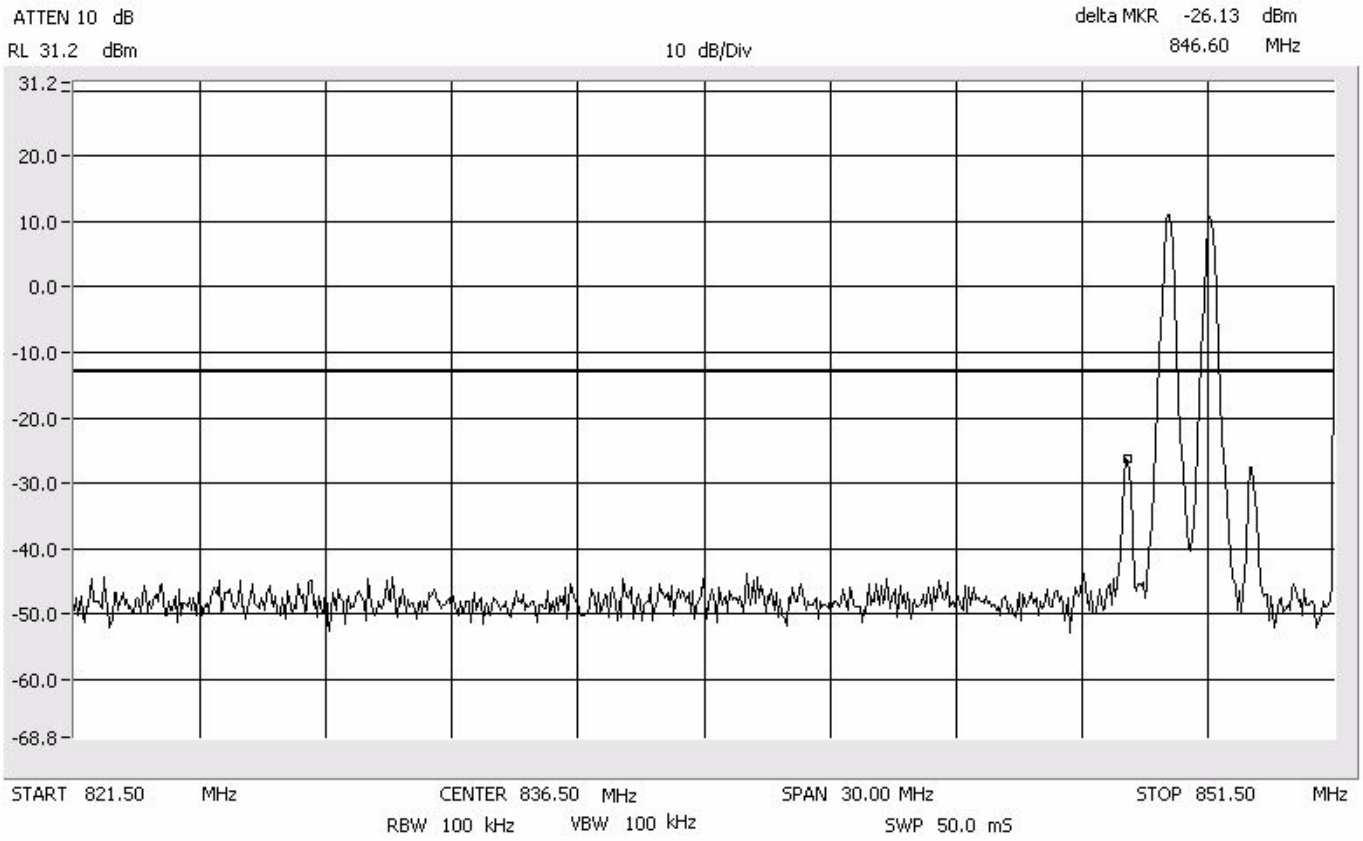
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



FM

Intermodulation
Close - Upper
Cellular 800 MHz

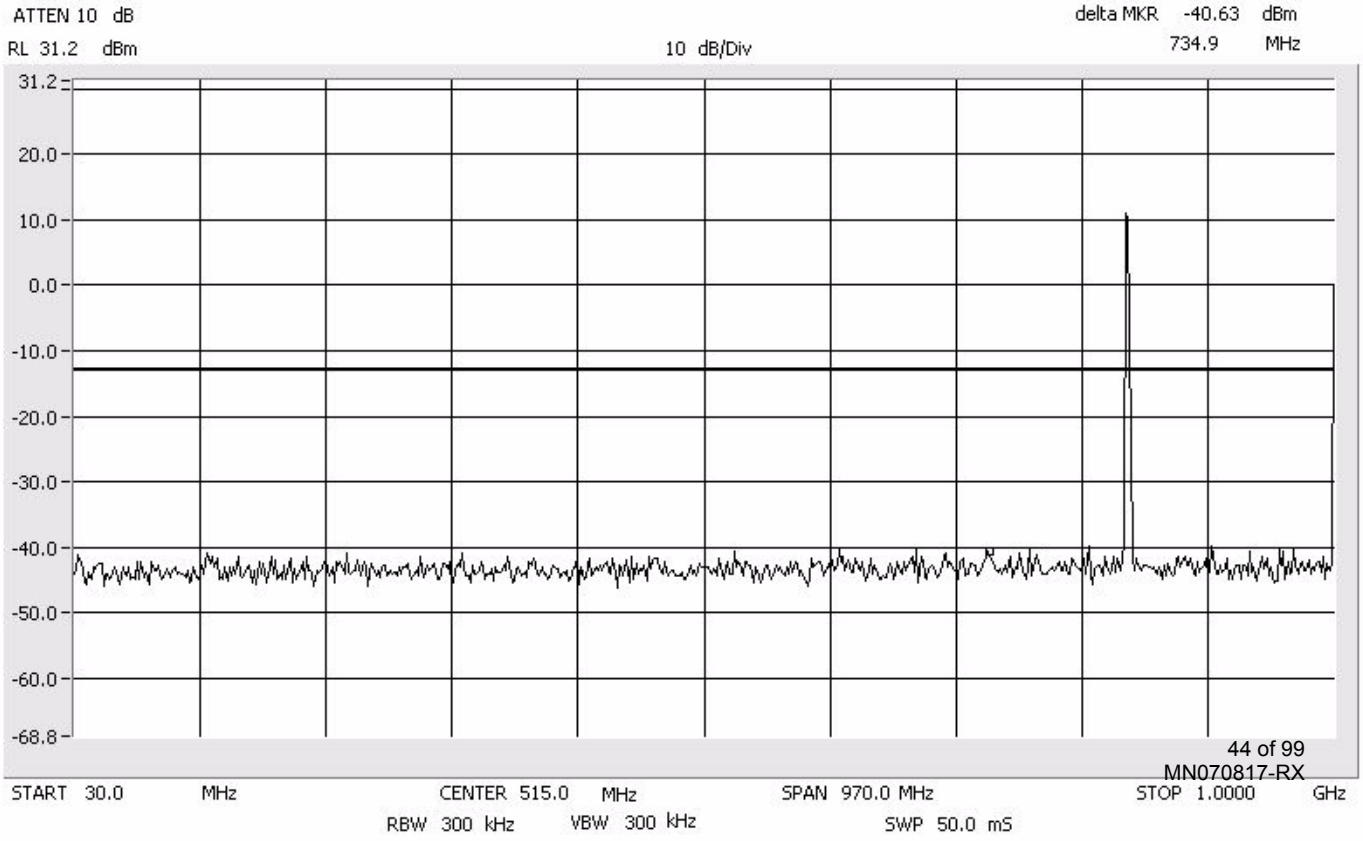
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



FM

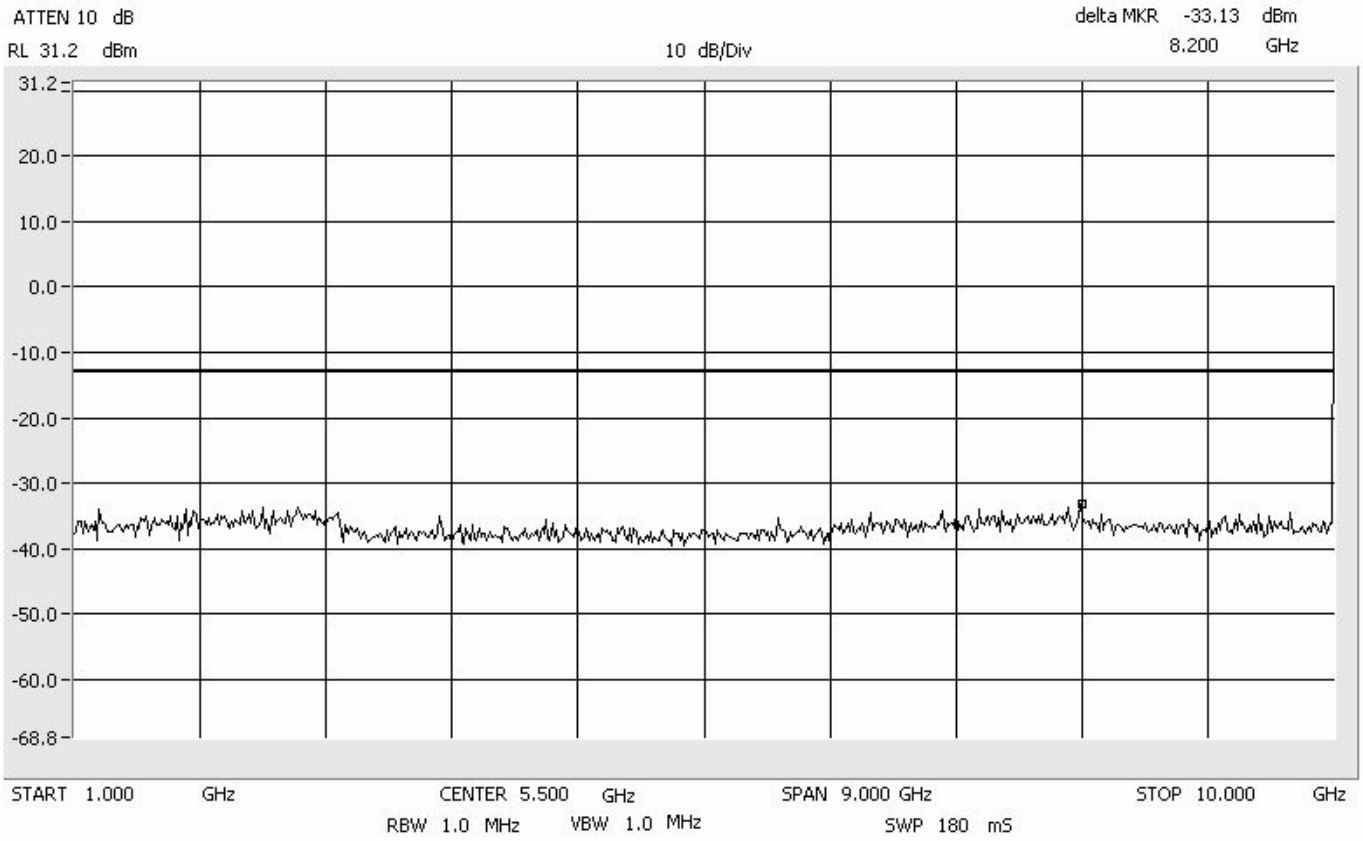
Intermodulation
Close - Upper
Cellular 800 MHz

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



Intermodulation
Close - Upper
Cellular 800 MHz

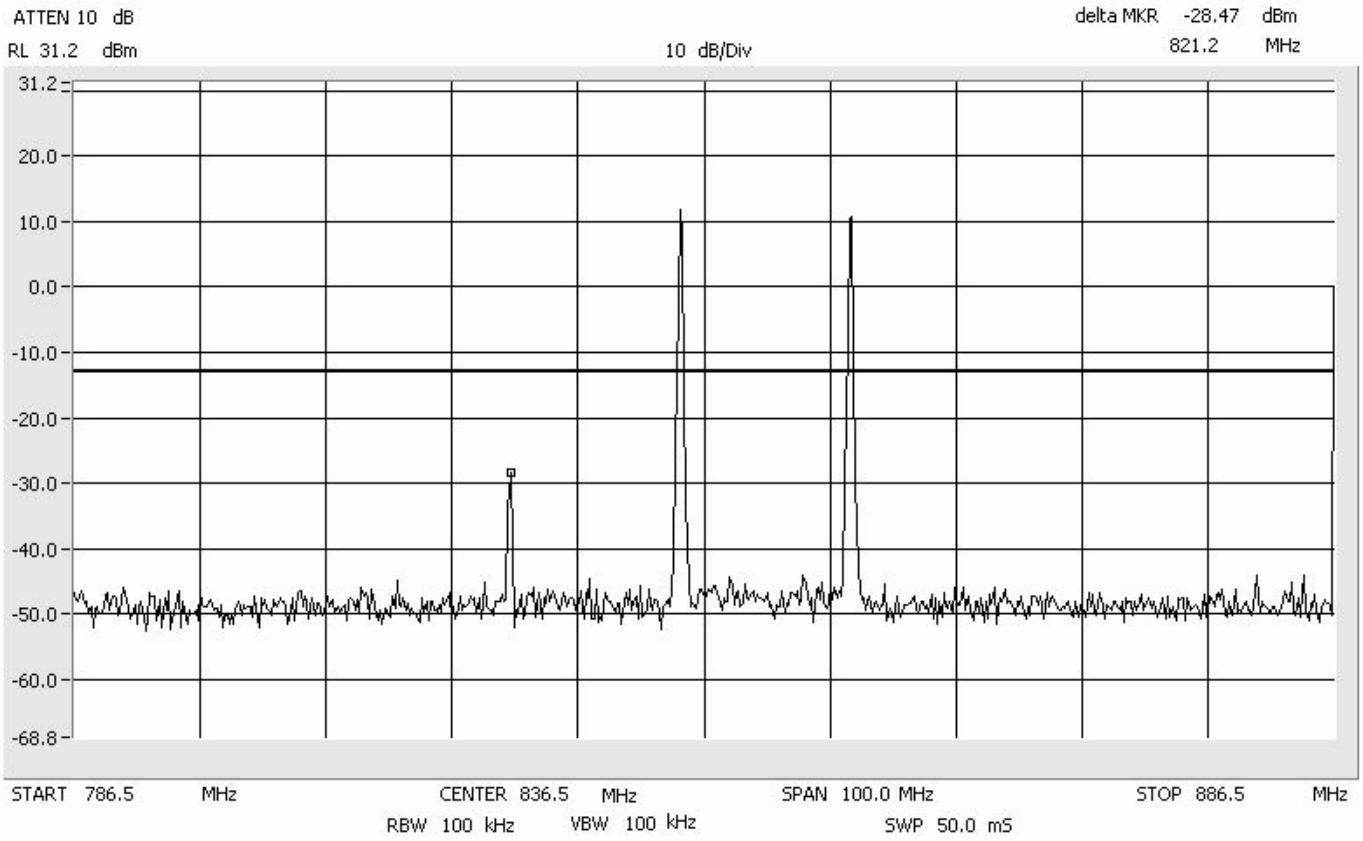
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



FM

Intermodulation
Apart
Cellular 800 MHz

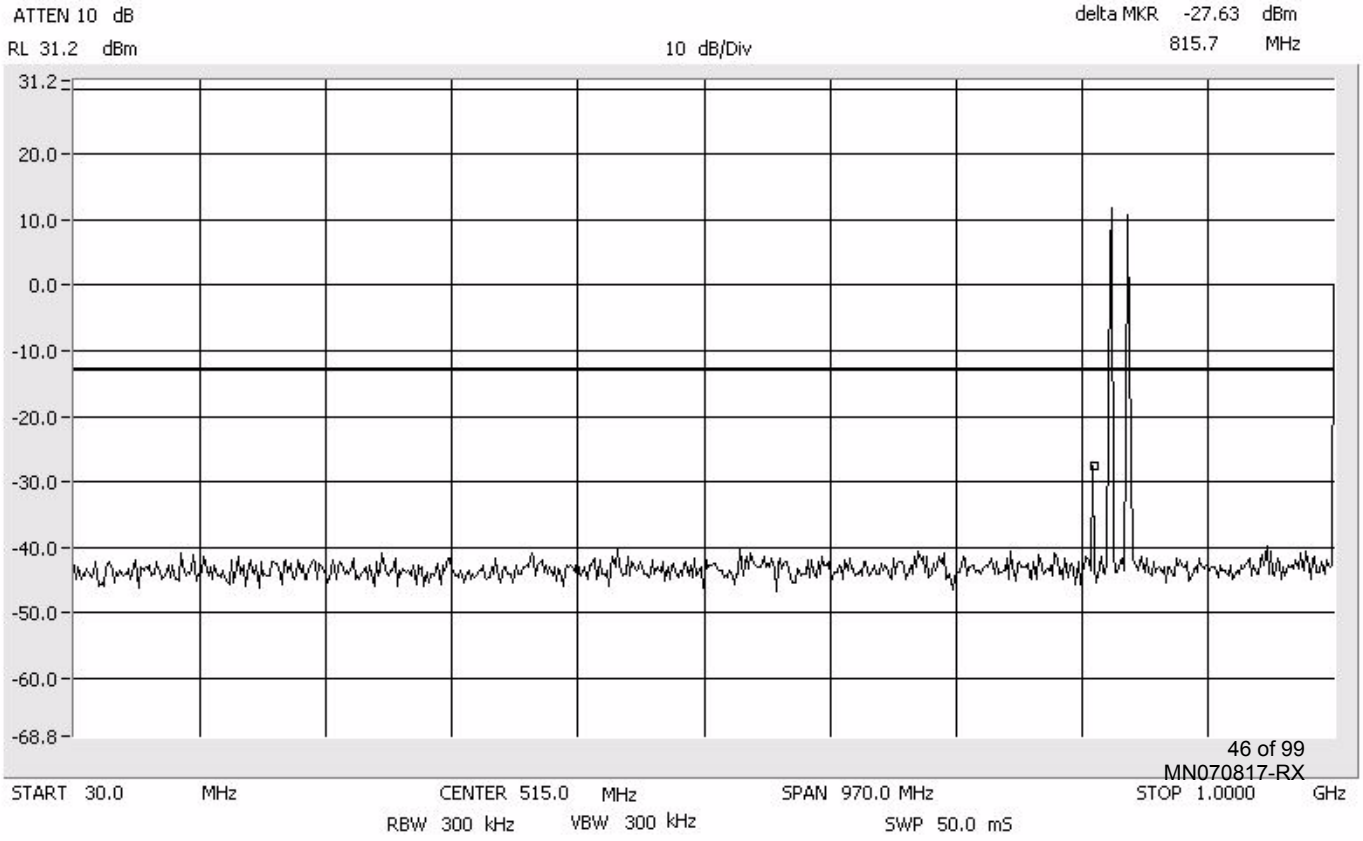
Center: 836.5 MHz
Span: 100 MHz
RBW/VBW: 100 kHz



FM

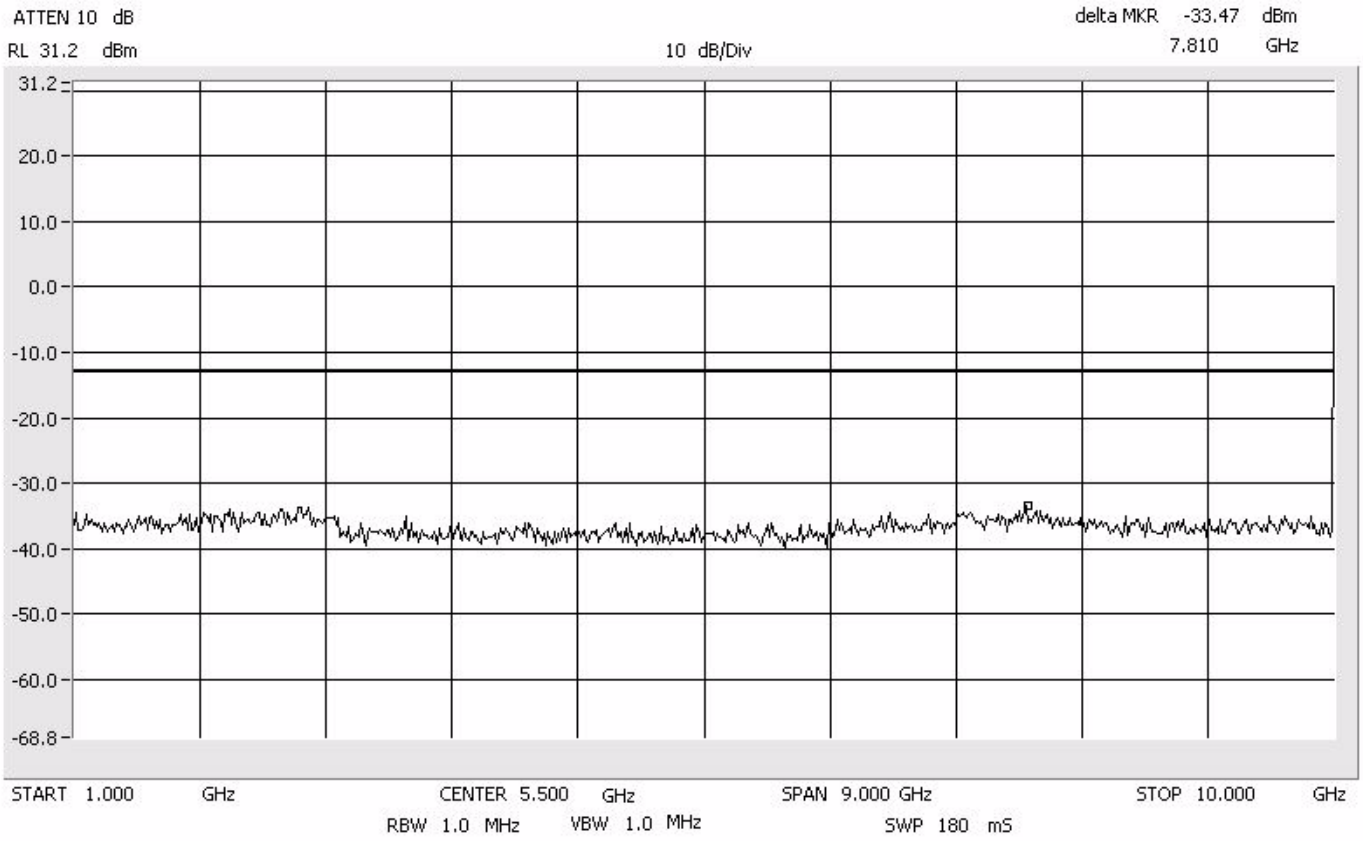
Intermodulation
Apart
Cellular 800 MHz

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



Intermodulation
Apart
Cellular 800 MHz

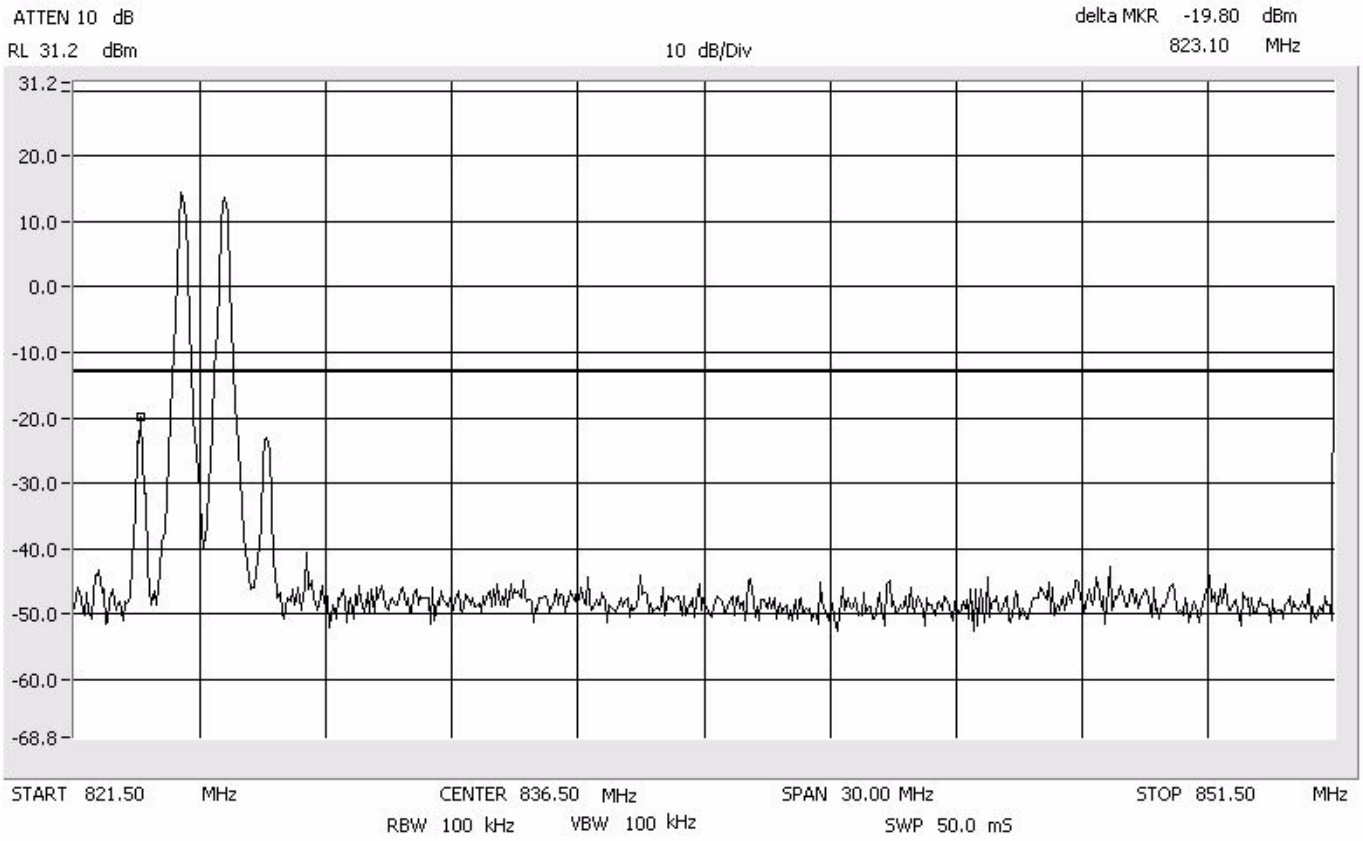
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



TDMA

Intermodulation
Close - Lower
Cellular 800 MHz

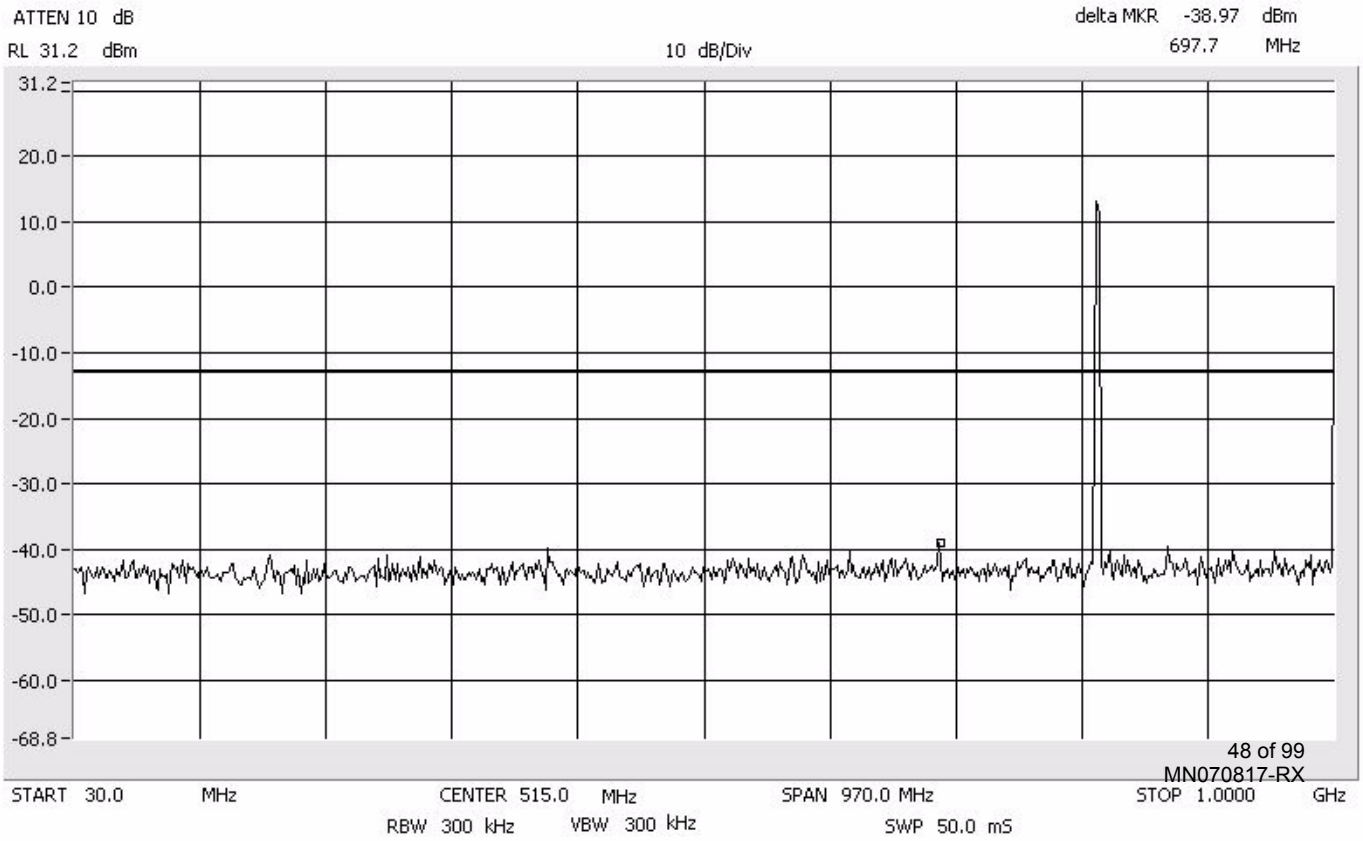
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



TDMA

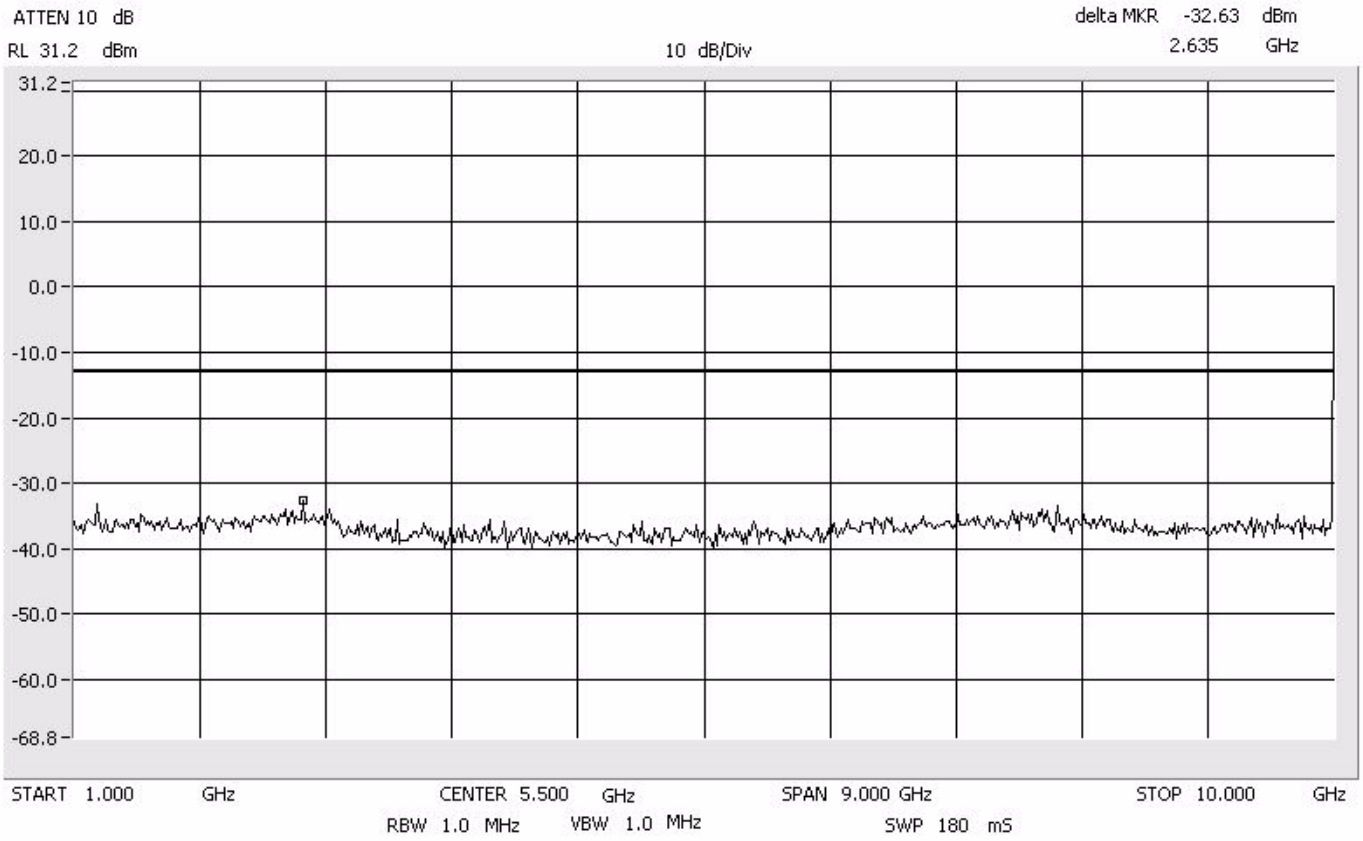
Intermodulation
Close - Lower
Cellular 800 MHz

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



Intermodulation
Close - Lower
Cellular 800 MHz

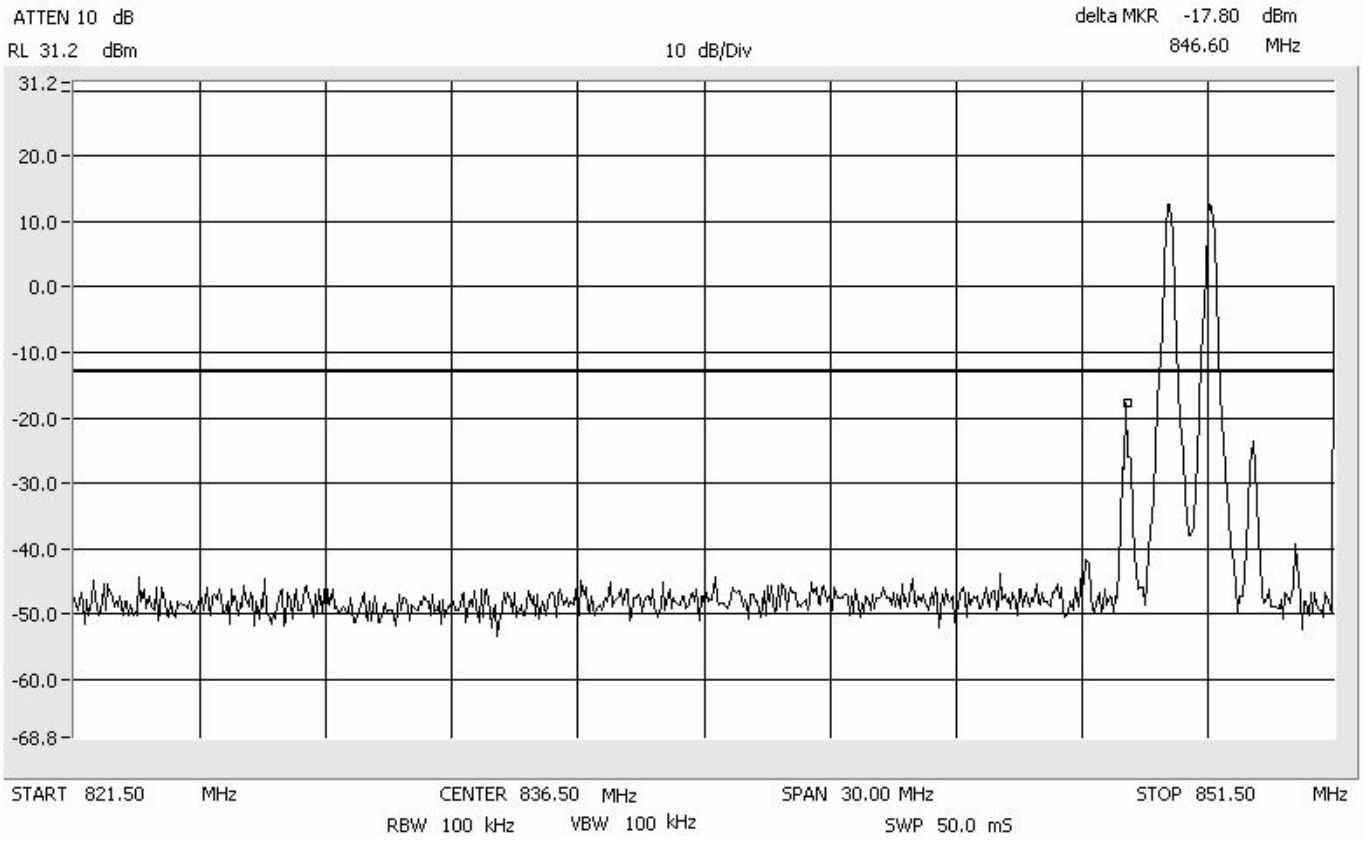
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



TDMA

Intermodulation
Close - Upper
Cellular 800 MHz

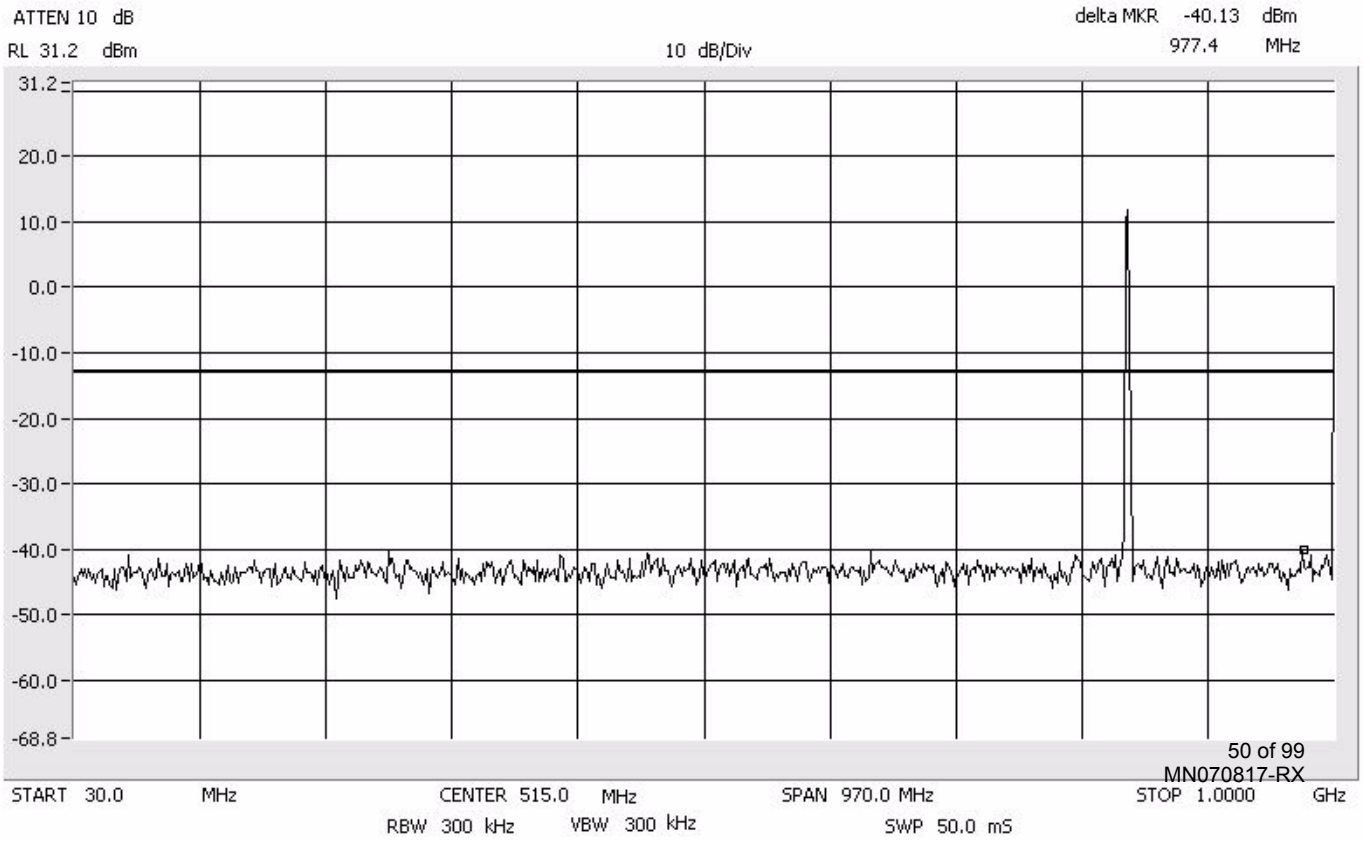
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



TDMA

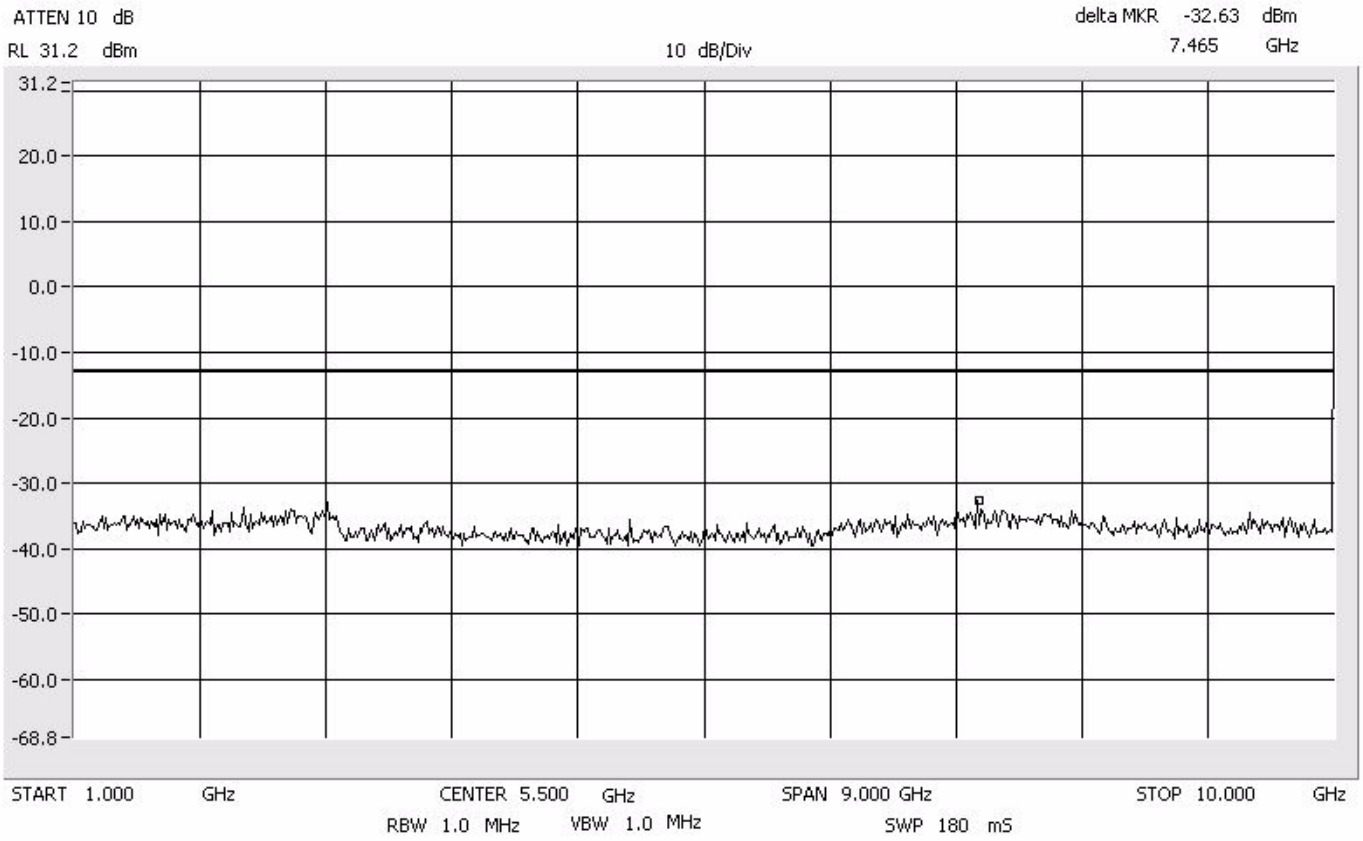
Intermodulation
Close - Upper
Cellular 800 MHz

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



Intermodulation
Close - Upper
Cellular 800 MHz

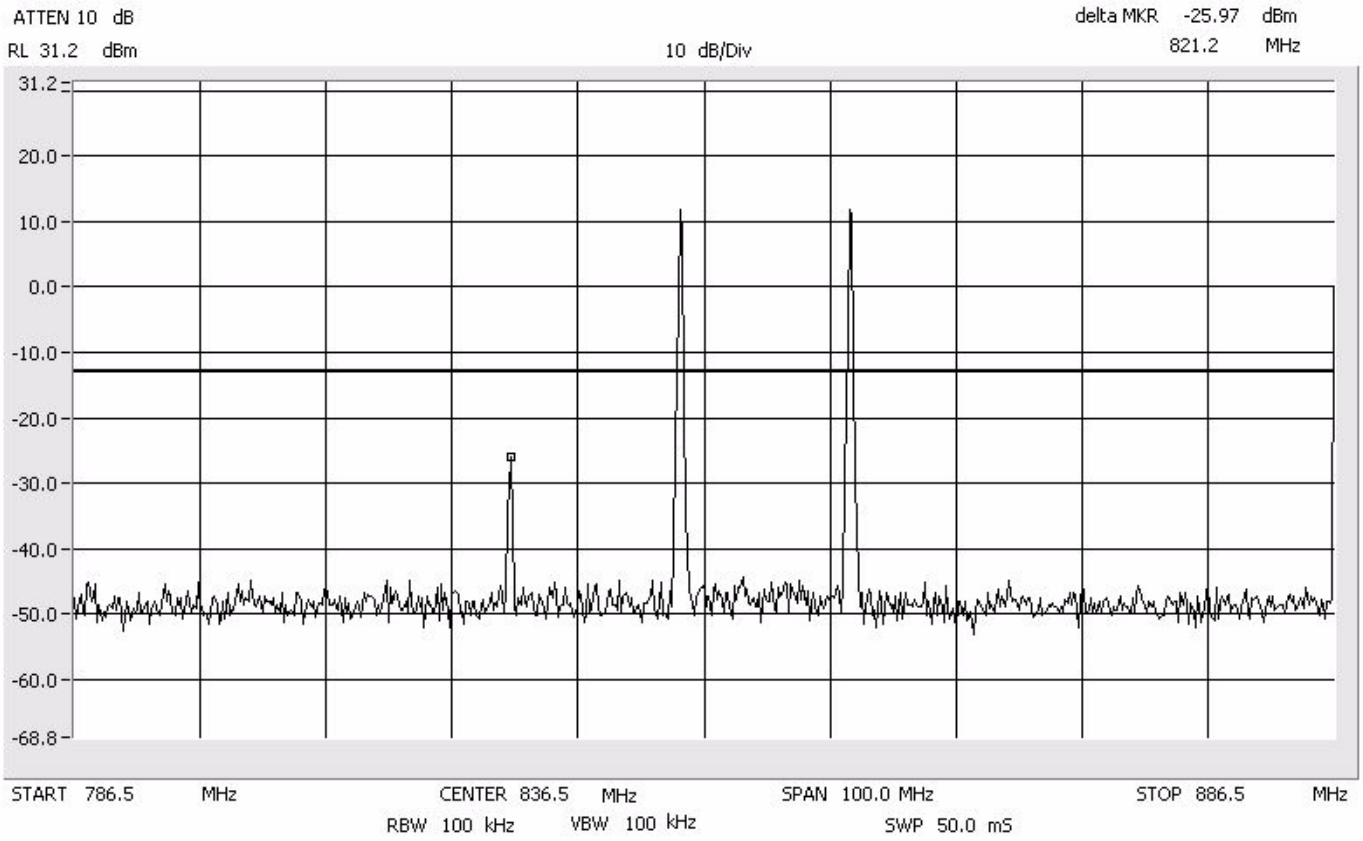
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



TDMA

Intermodulation
Apart
Cellular 800 MHz

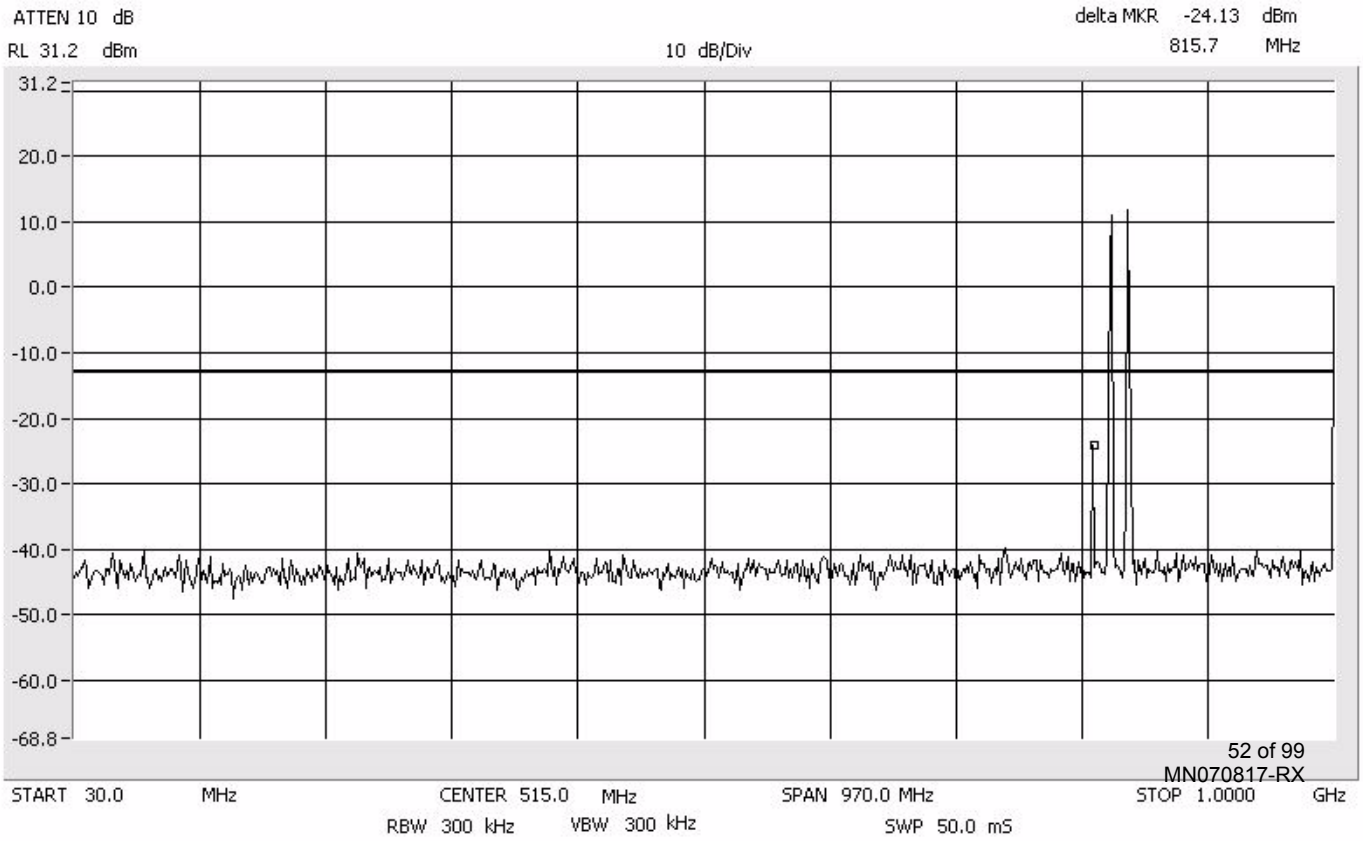
Center: 836.5 MHz
Span: 100 MHz
RBW/VBW: 100 kHz



TDMA

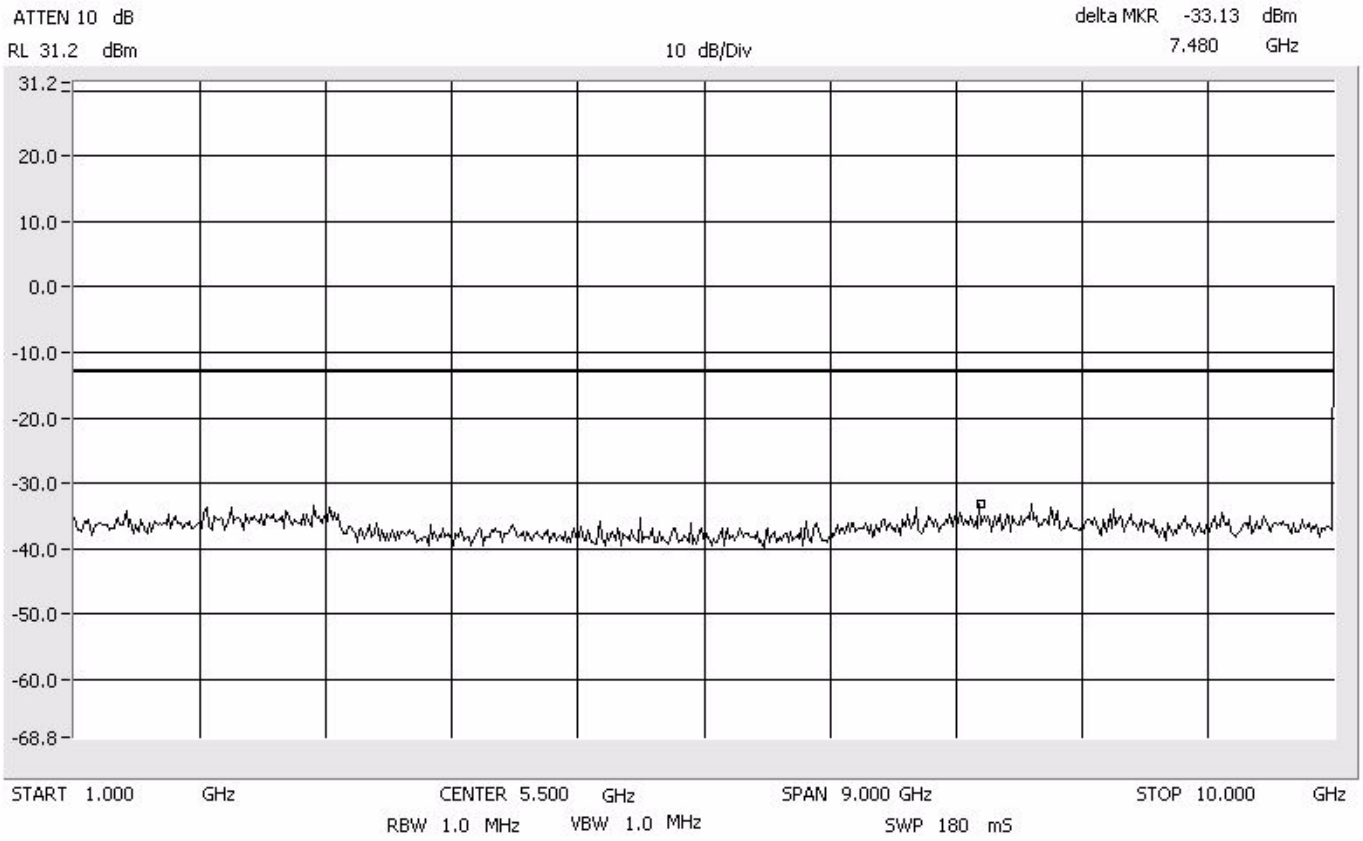
Intermodulation
Apart
Cellular 800 MHz

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



Intermodulation
Apart
Cellular 800 MHz

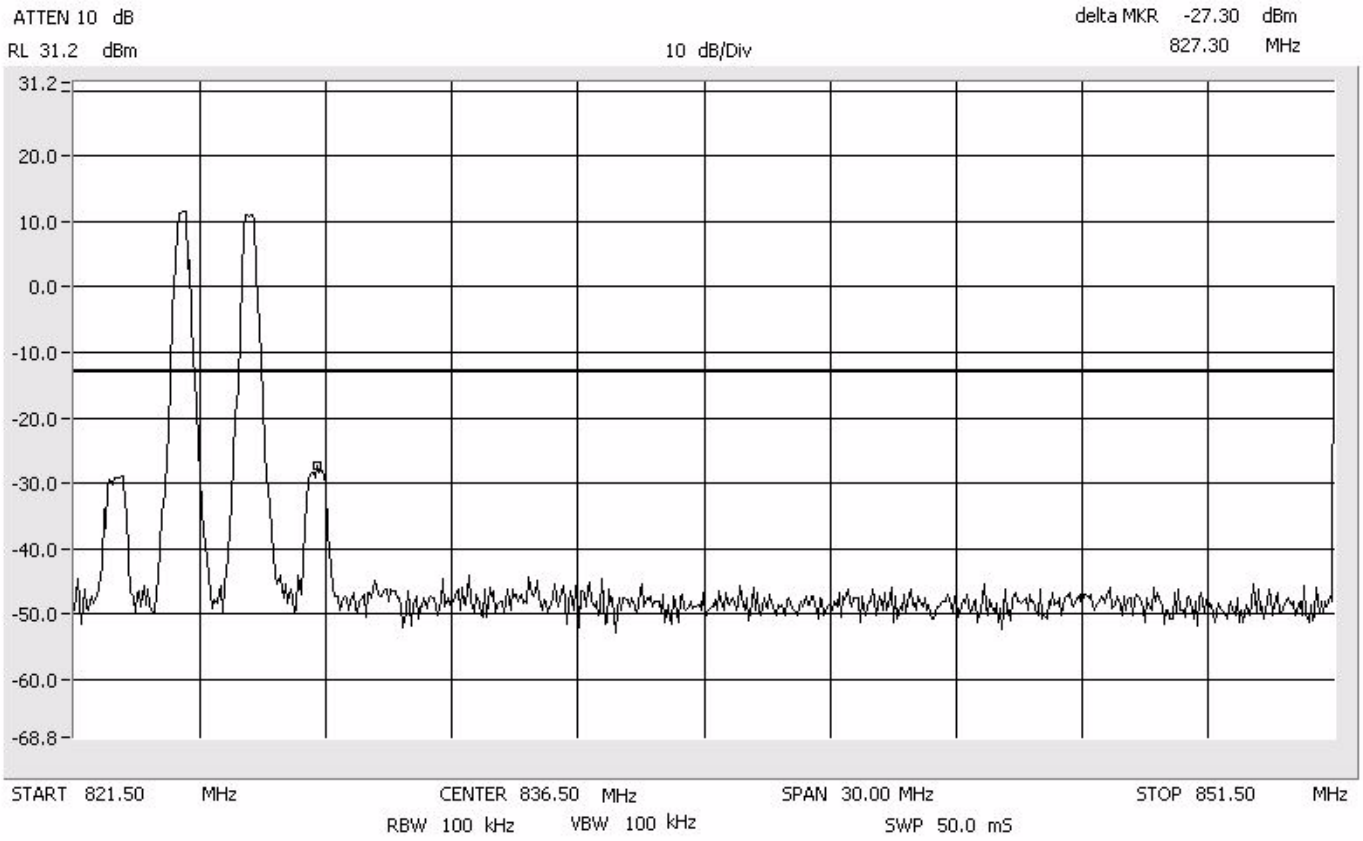
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



GSM

Intermodulation
Close - Lower
Cellular 800 MHz

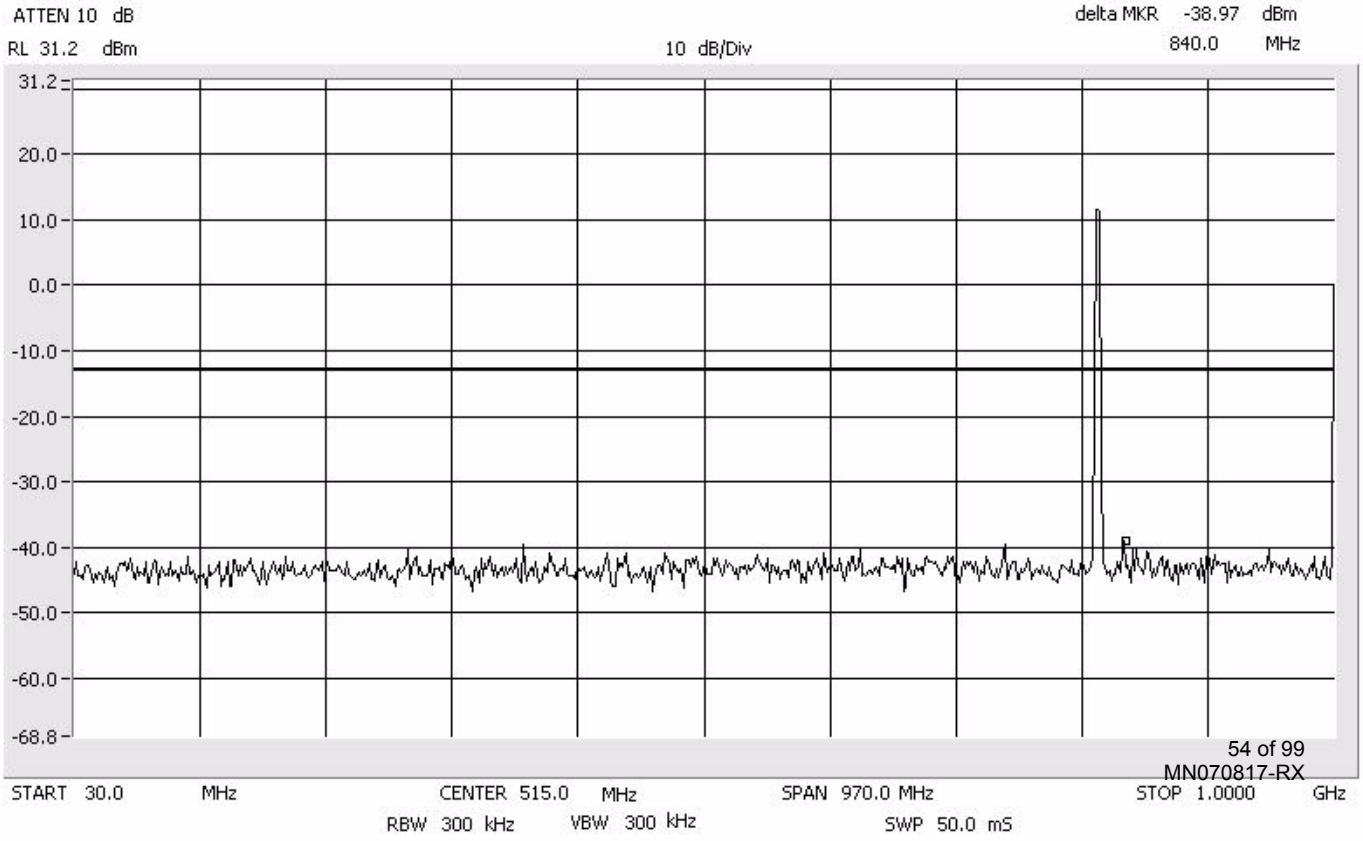
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



GSM

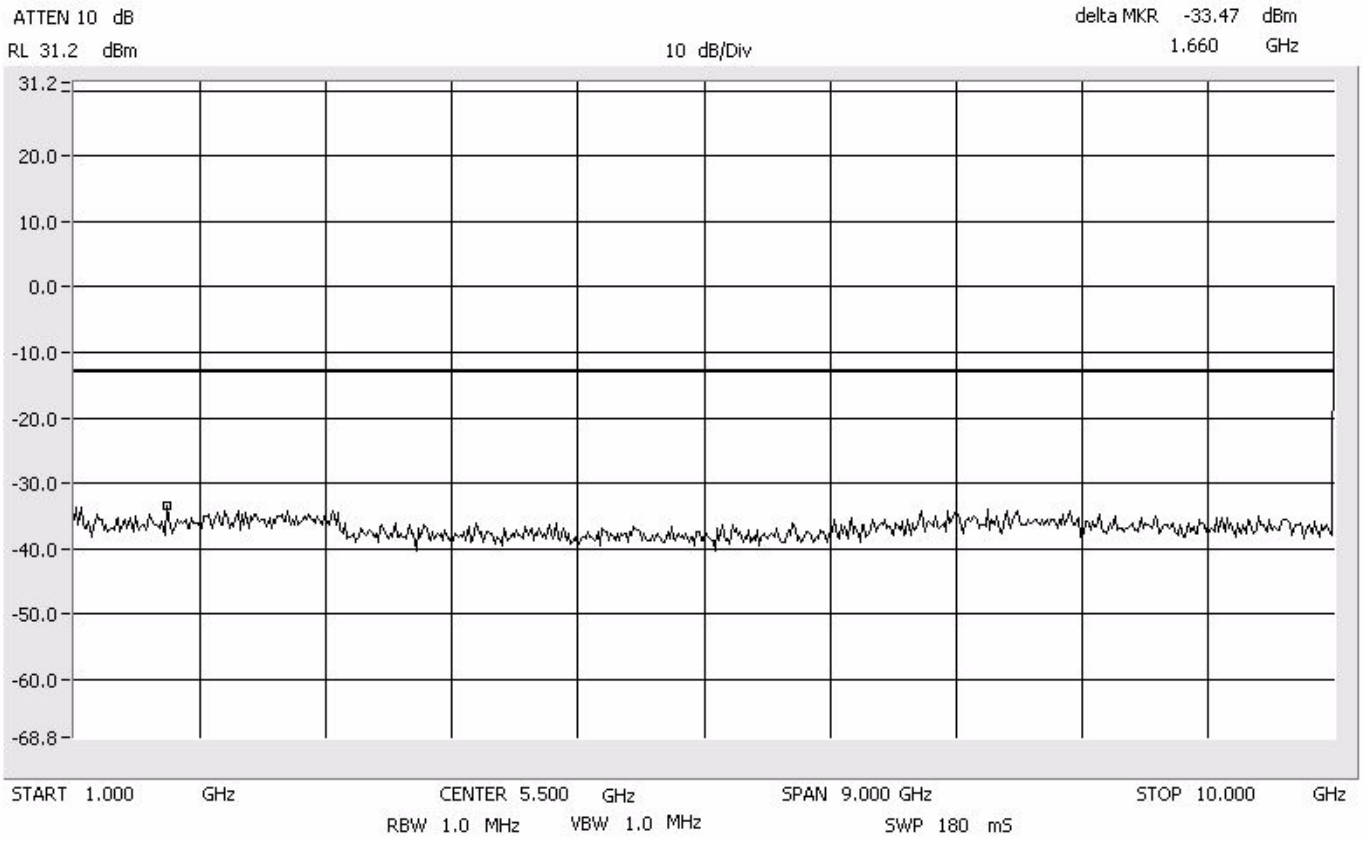
Intermodulation
Close - Lower
Cellular 800 MHz

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



Intermodulation
Close - Lower
Cellular 800 MHz

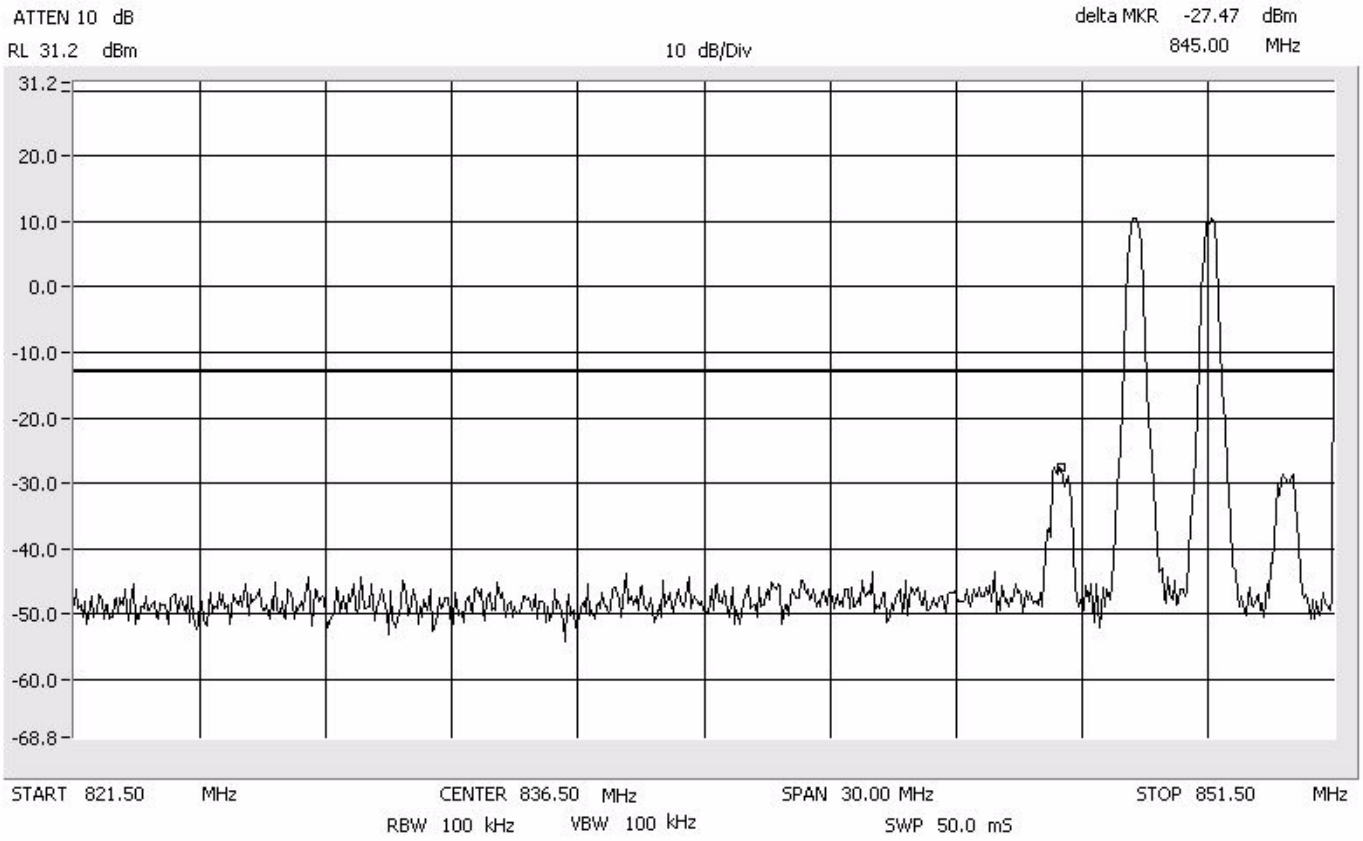
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



GSM

Intermodulation
Close - Upper
Cellular 800 MHz

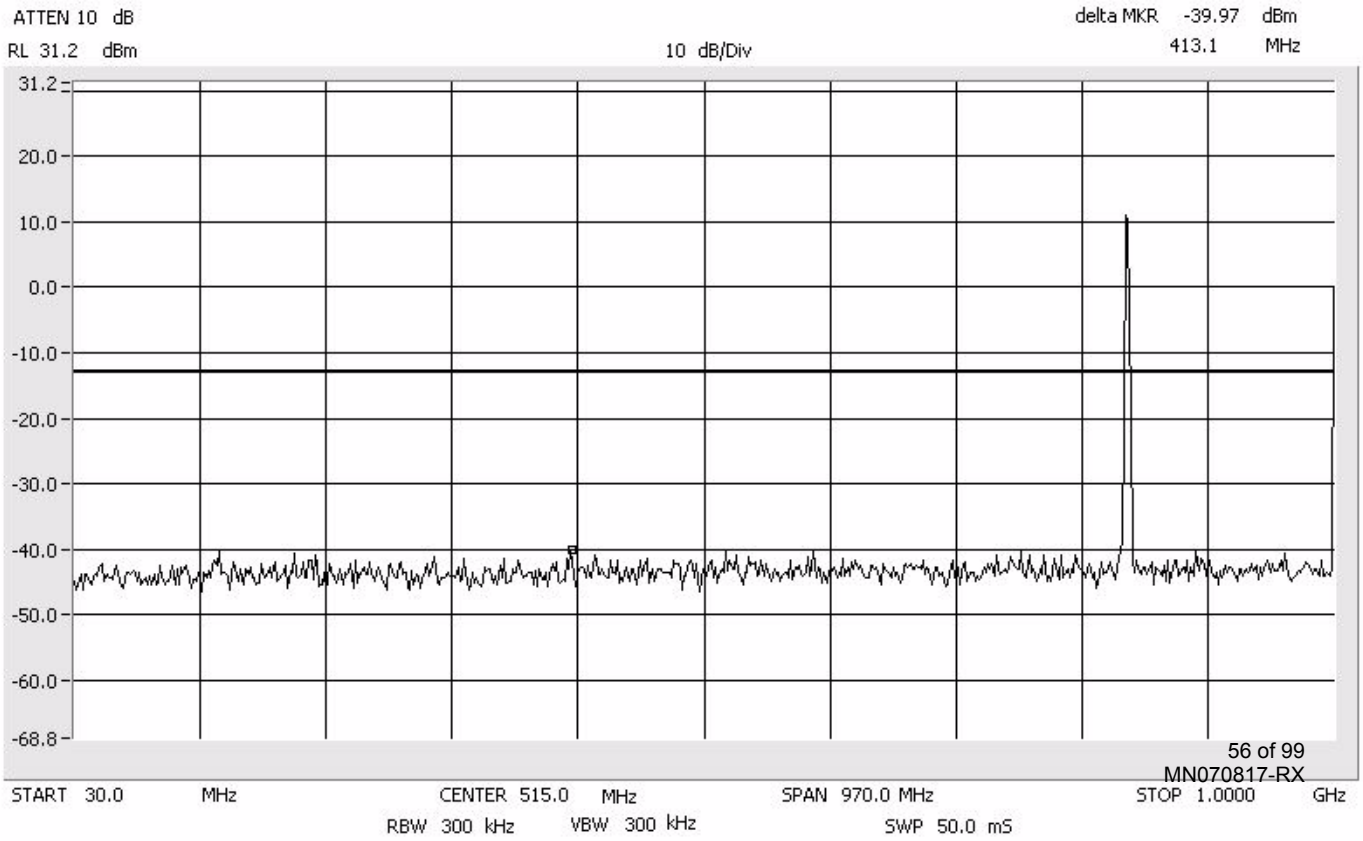
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



GSM

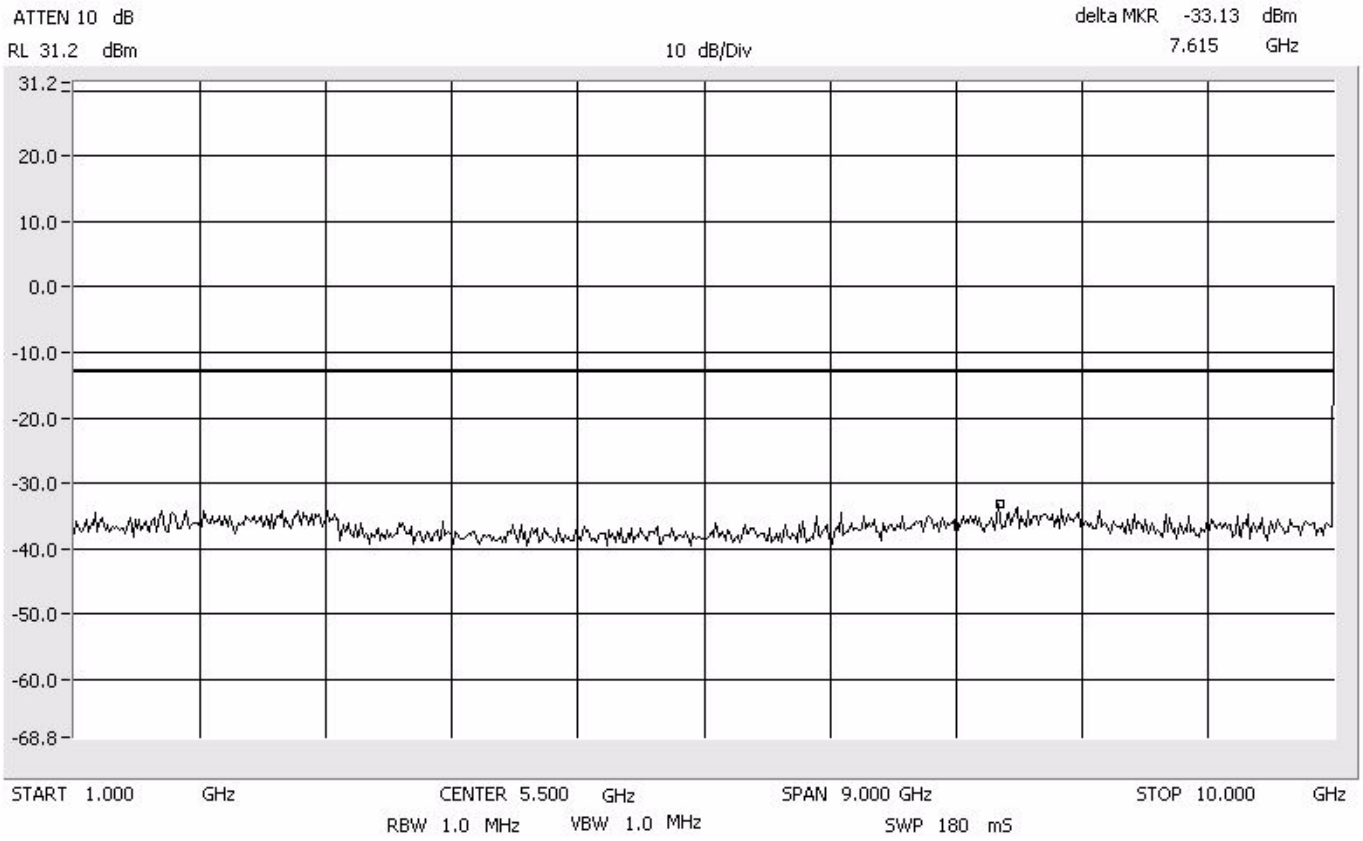
Intermodulation
Close - Upper
Cellular 800 MHz

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



Intermodulation
Close - Upper
Cellular 800 MHz

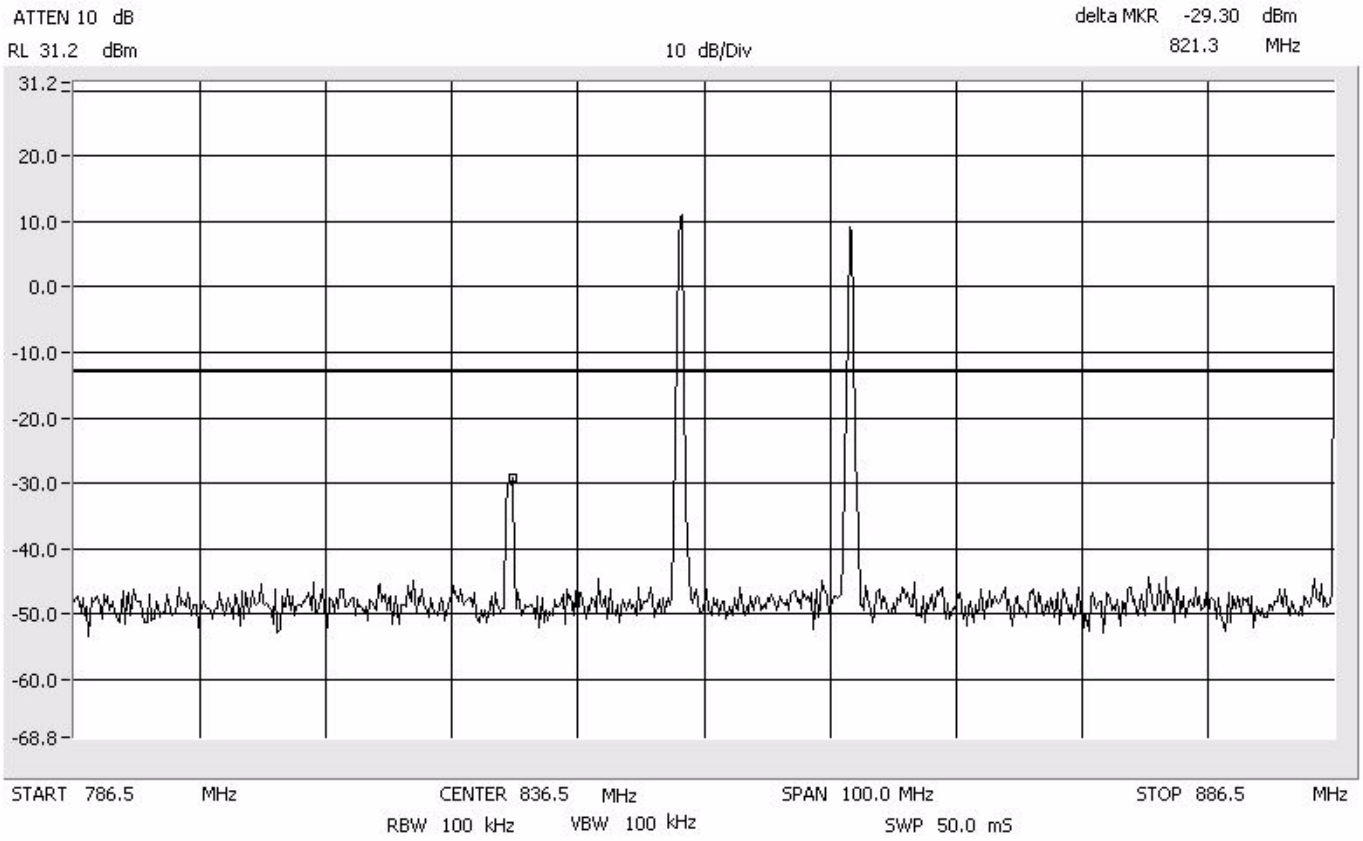
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



GSM

Intermodulation
Apart
Cellular 800 MHz

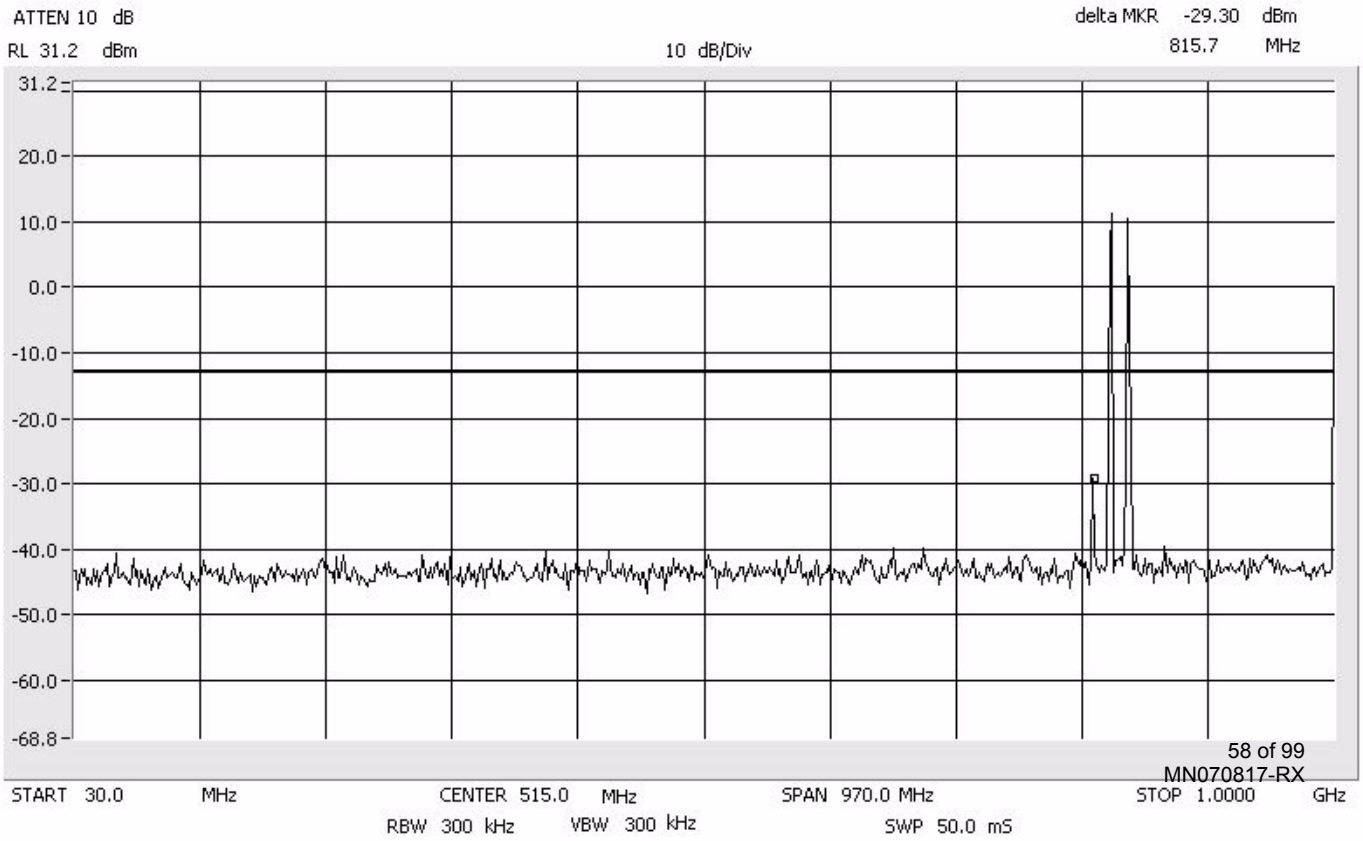
Center: 836.5 MHz
Span: 100 MHz
RBW/VBW: 100 kHz



GSM

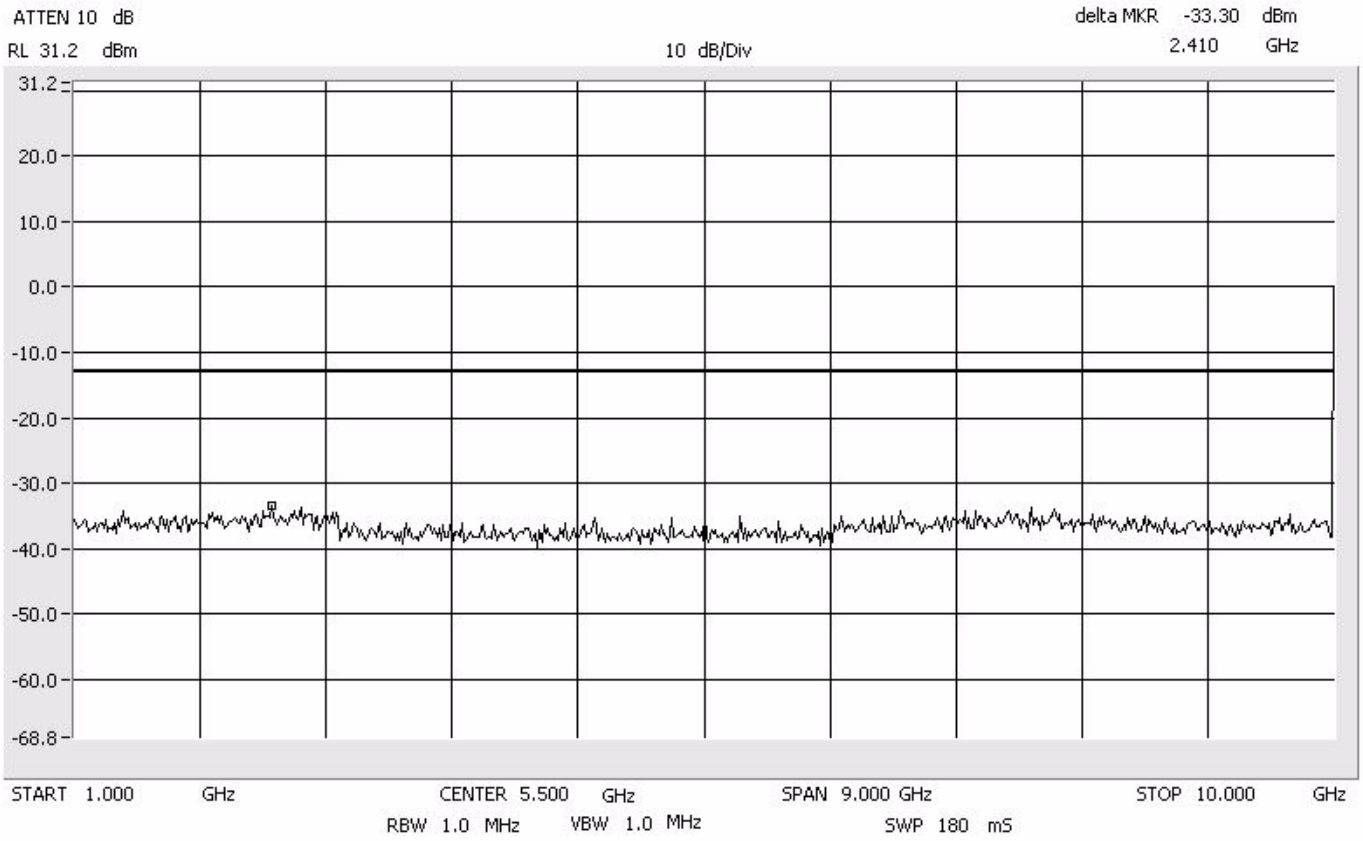
Intermodulation
Apart
Cellular 800 MHz

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



Intermodulation
Apart
Cellular 800 MHz

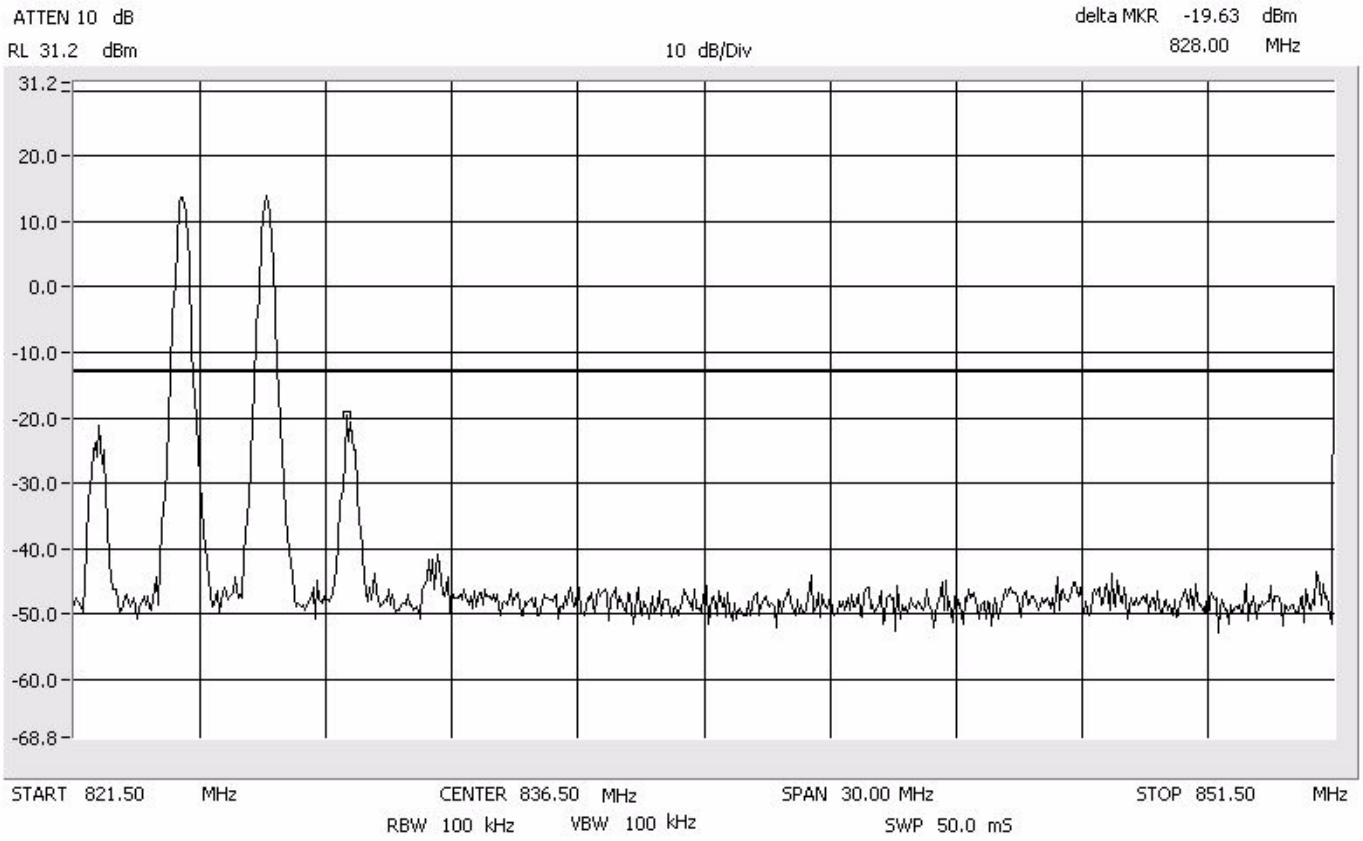
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Close - Lower
Cellular 800 MHz

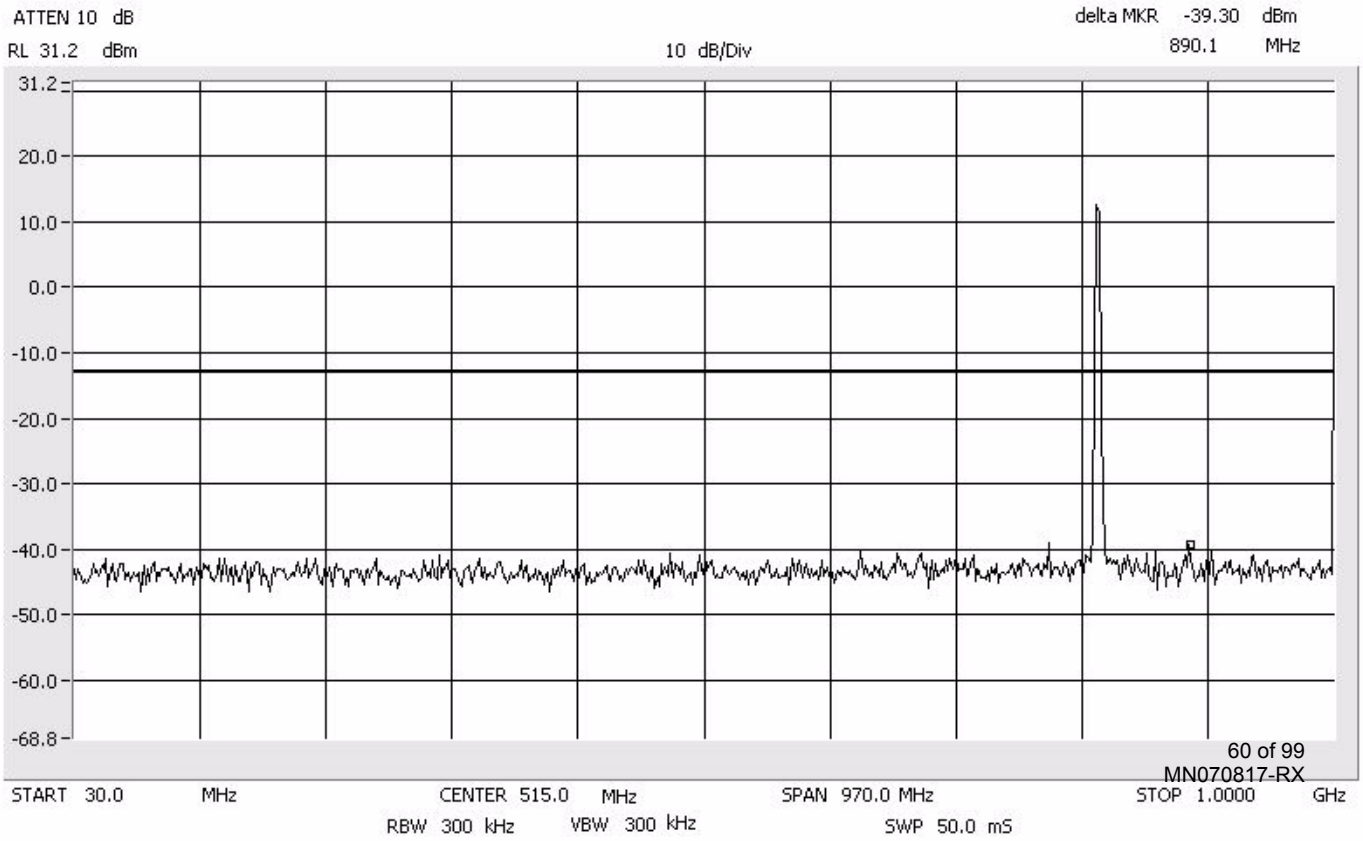
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



EDGE

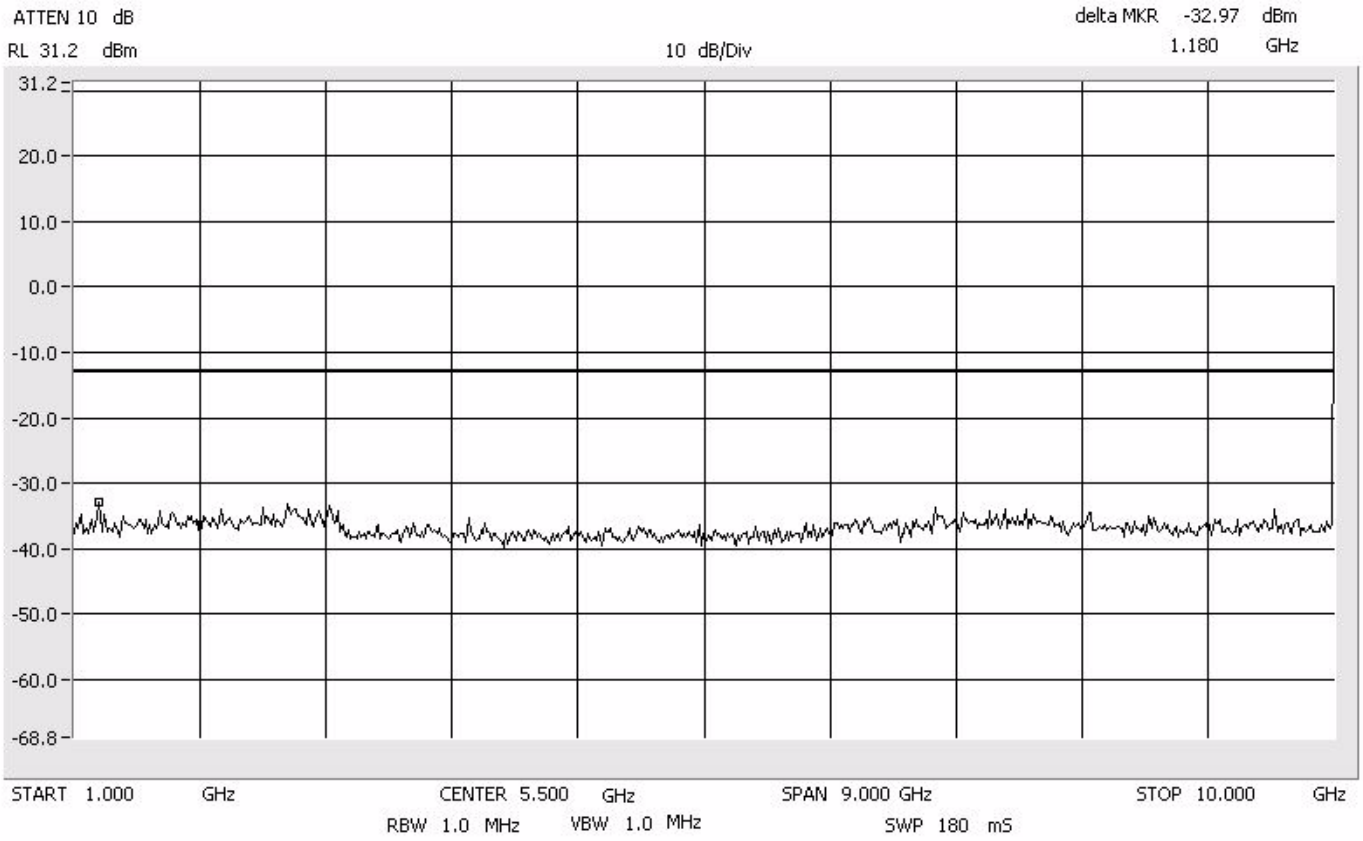
Intermodulation
Close - Lower
Cellular 800 MHz

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



Intermodulation
Close - Lower
Cellular 800 MHz

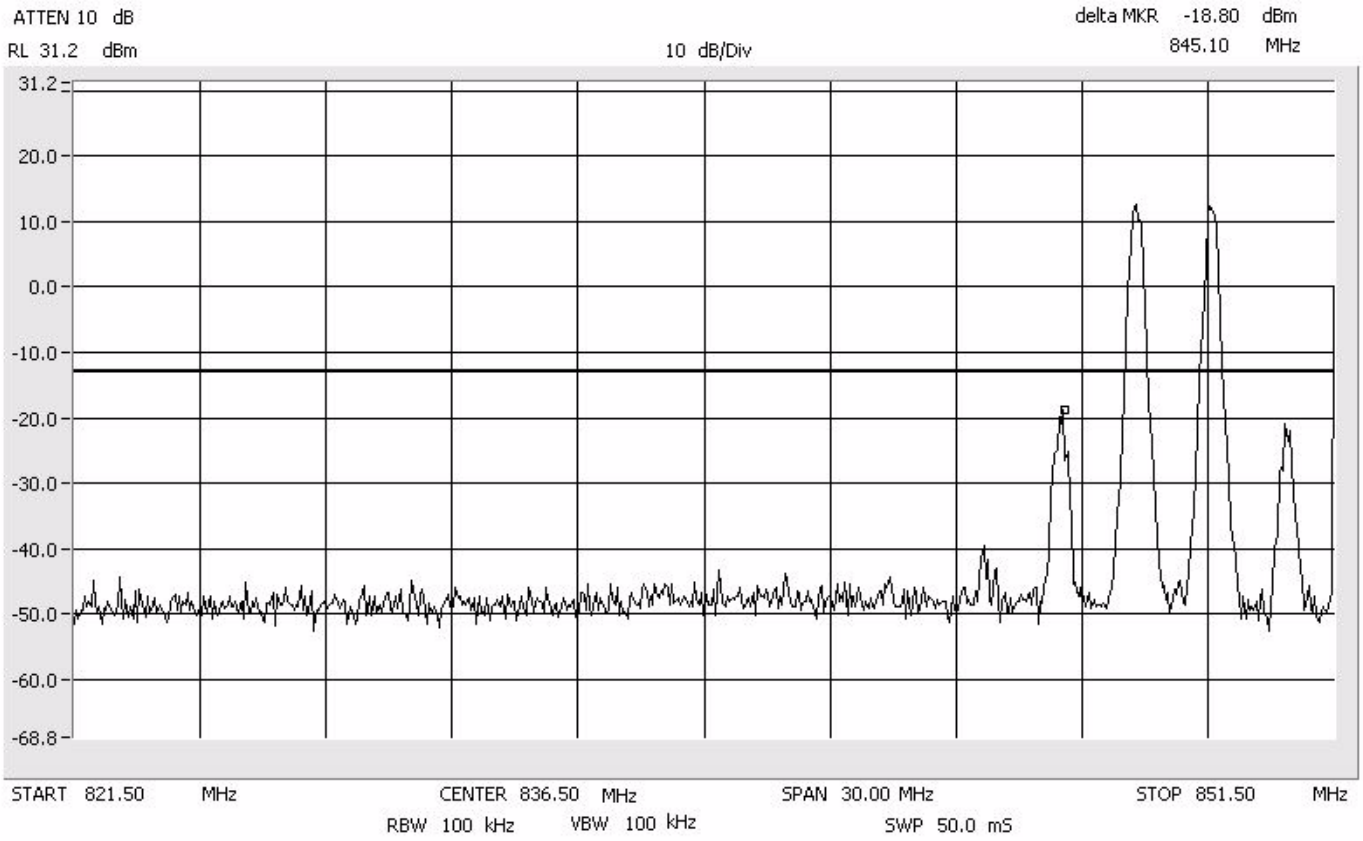
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Close - Upper
Cellular 800 MHz

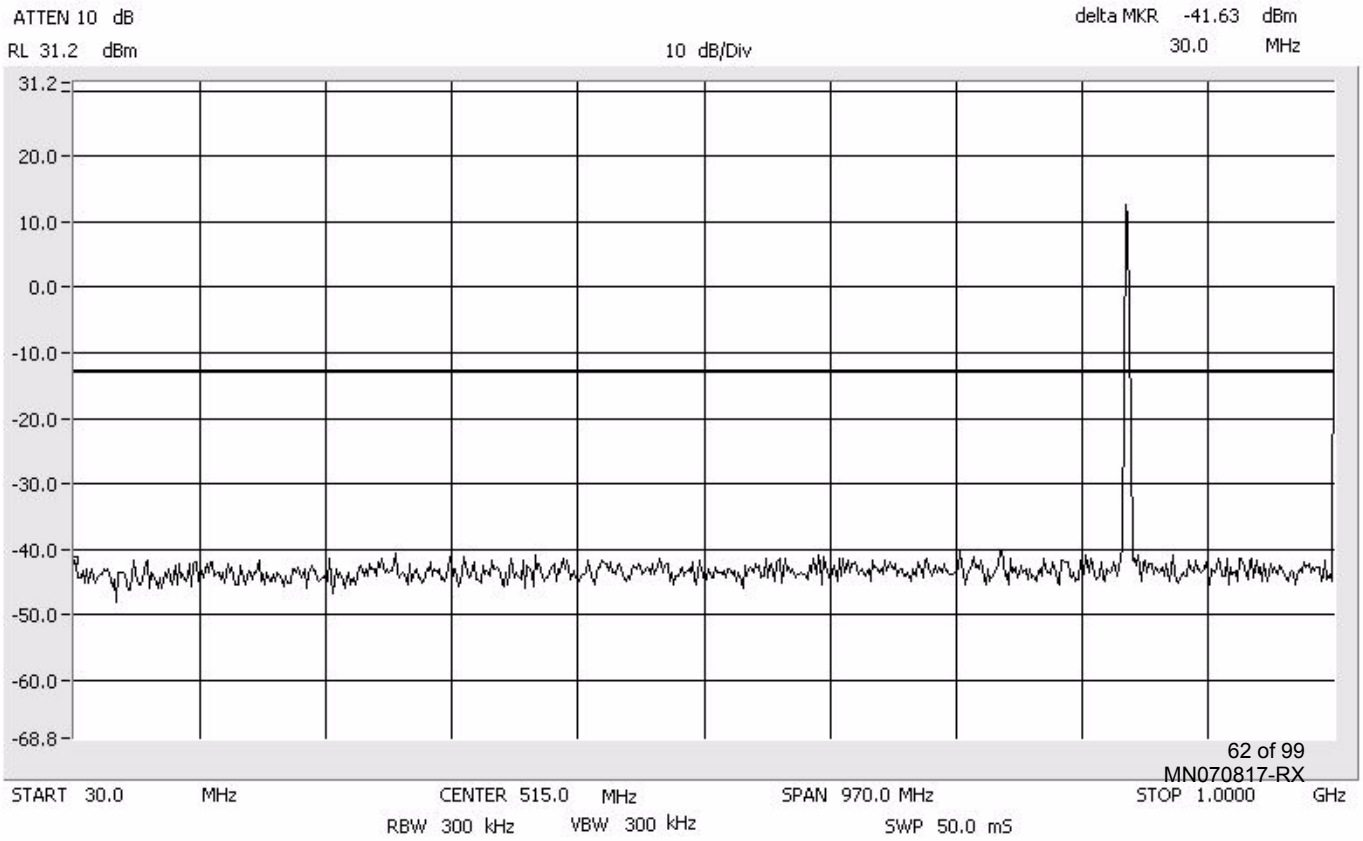
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



EDGE

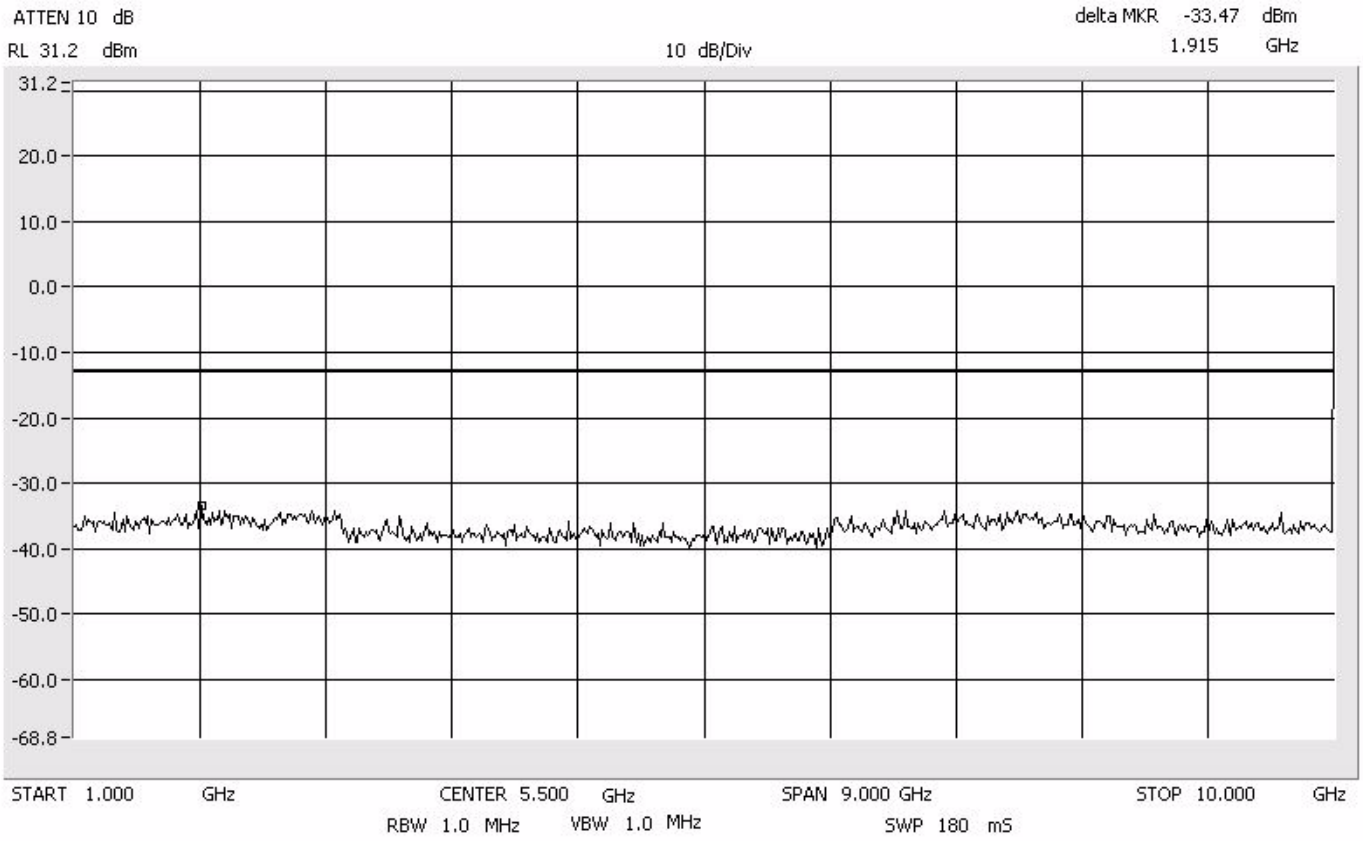
Intermodulation
Close - Upper
Cellular 800 MHz

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



Intermodulation
Close - Upper
Cellular 800 MHz

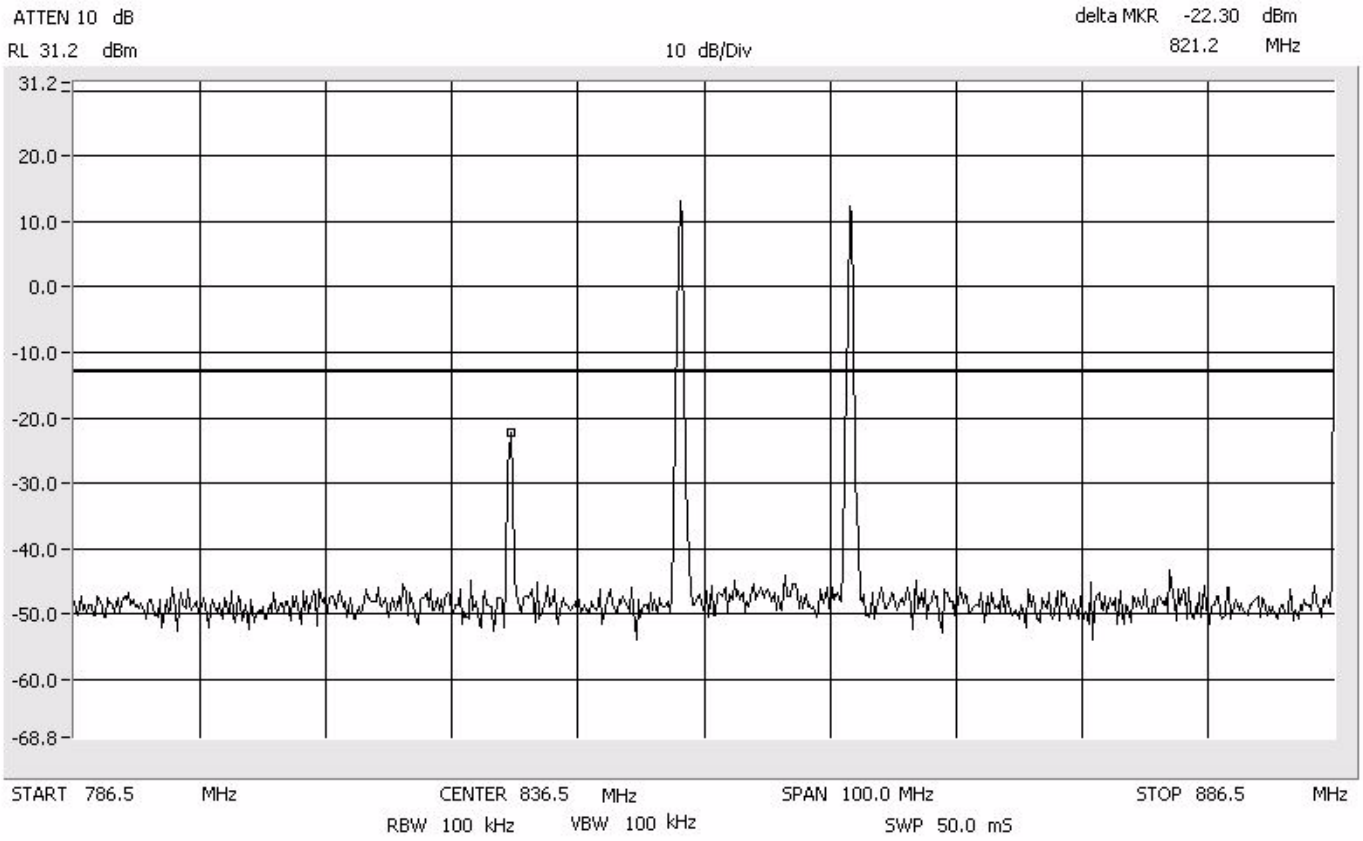
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



EDGE

Intermodulation
Apart
Cellular 800 MHz

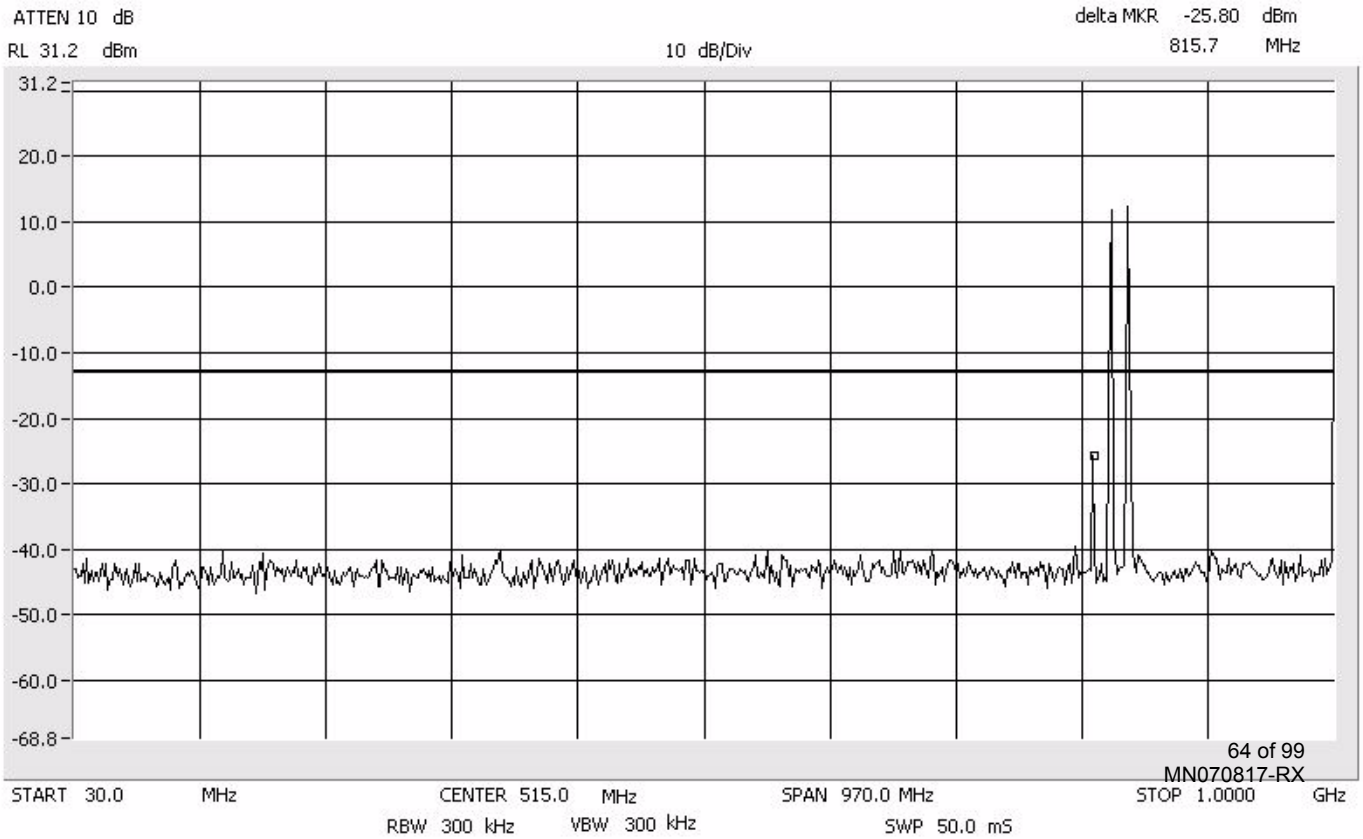
Center: 836.5 MHz
Span: 100 MHz
RBW/VBW: 100 kHz



EDGE

Intermodulation
Apart
Cellular 800 MHz

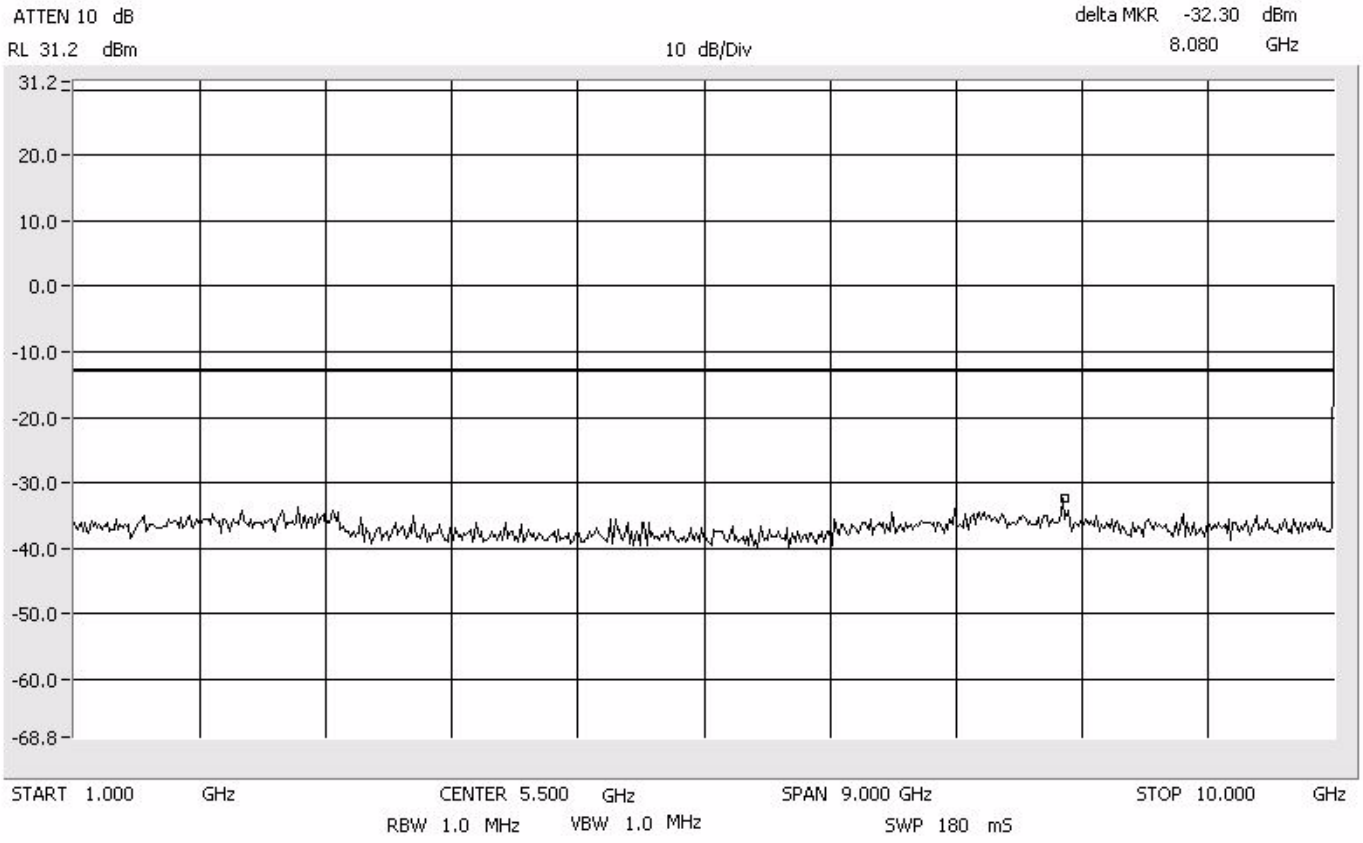
Span: 30 MHz to 1 GHz
RBW/VBW: 300 kHz



EDGE

Intermodulation
Apart
Cellular 800 MHz

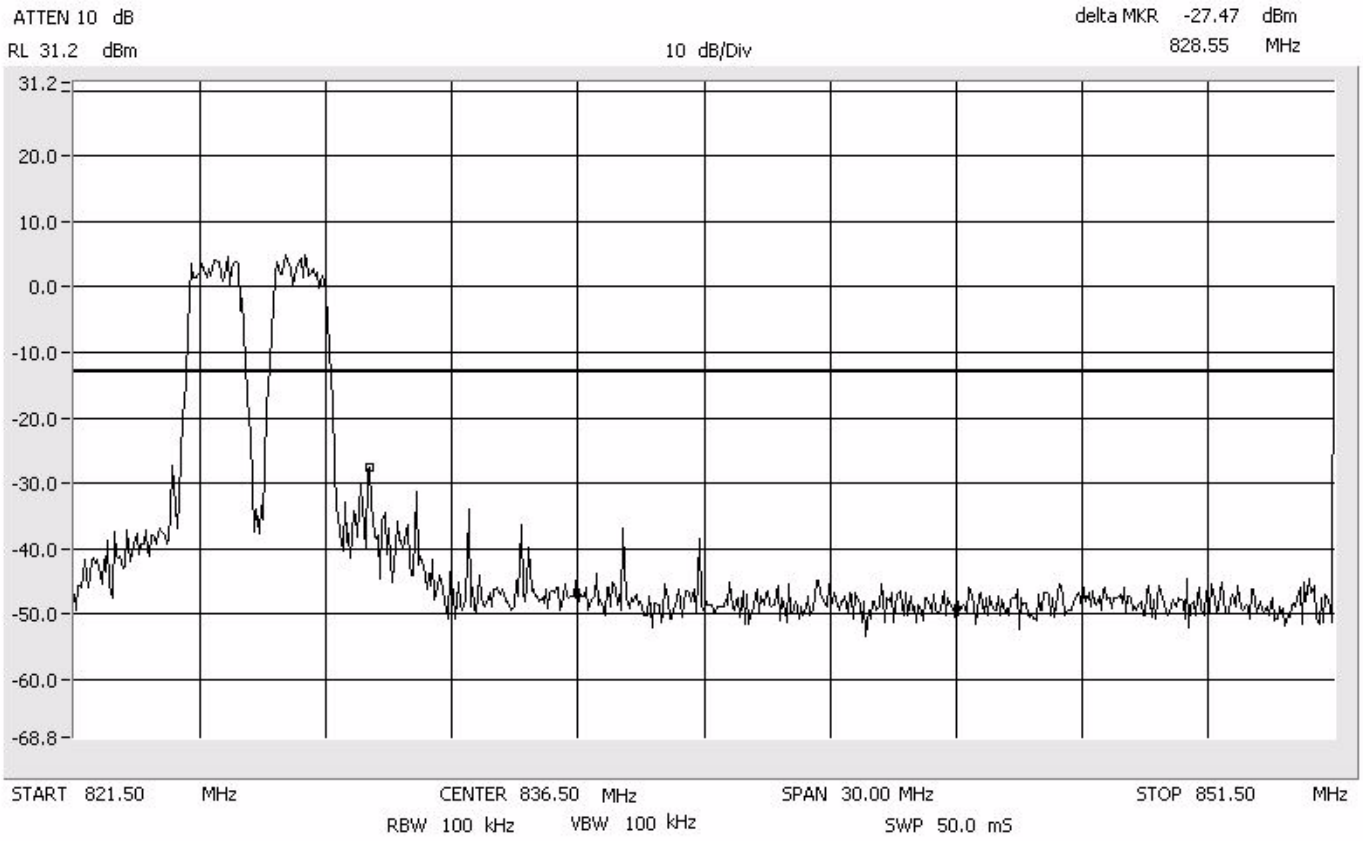
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation
Close - Lower
Cellular 800 MHz

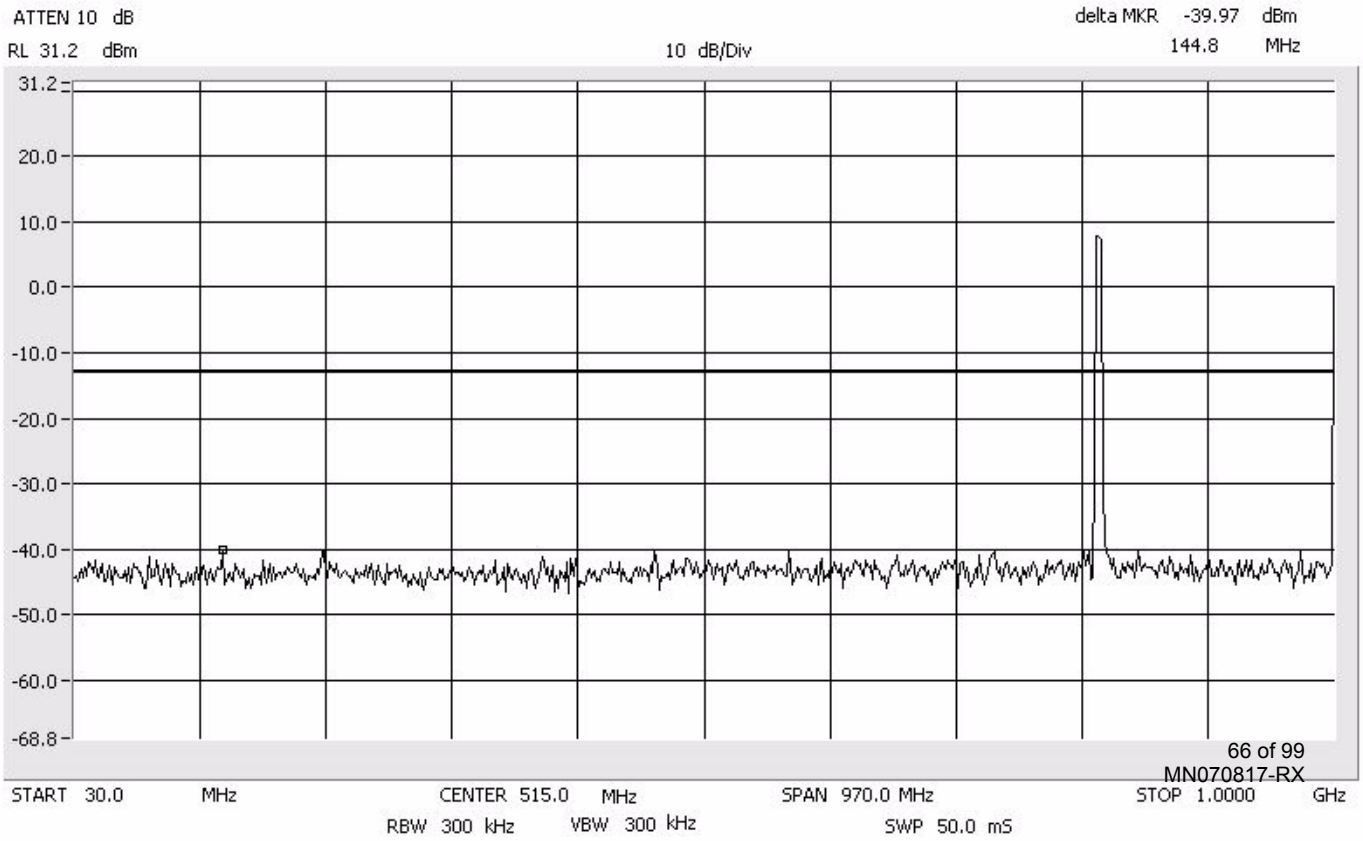
Center: 836.5 MHz
Span: 30 MHz
RBW/VBW: 100 kHz



CDMA

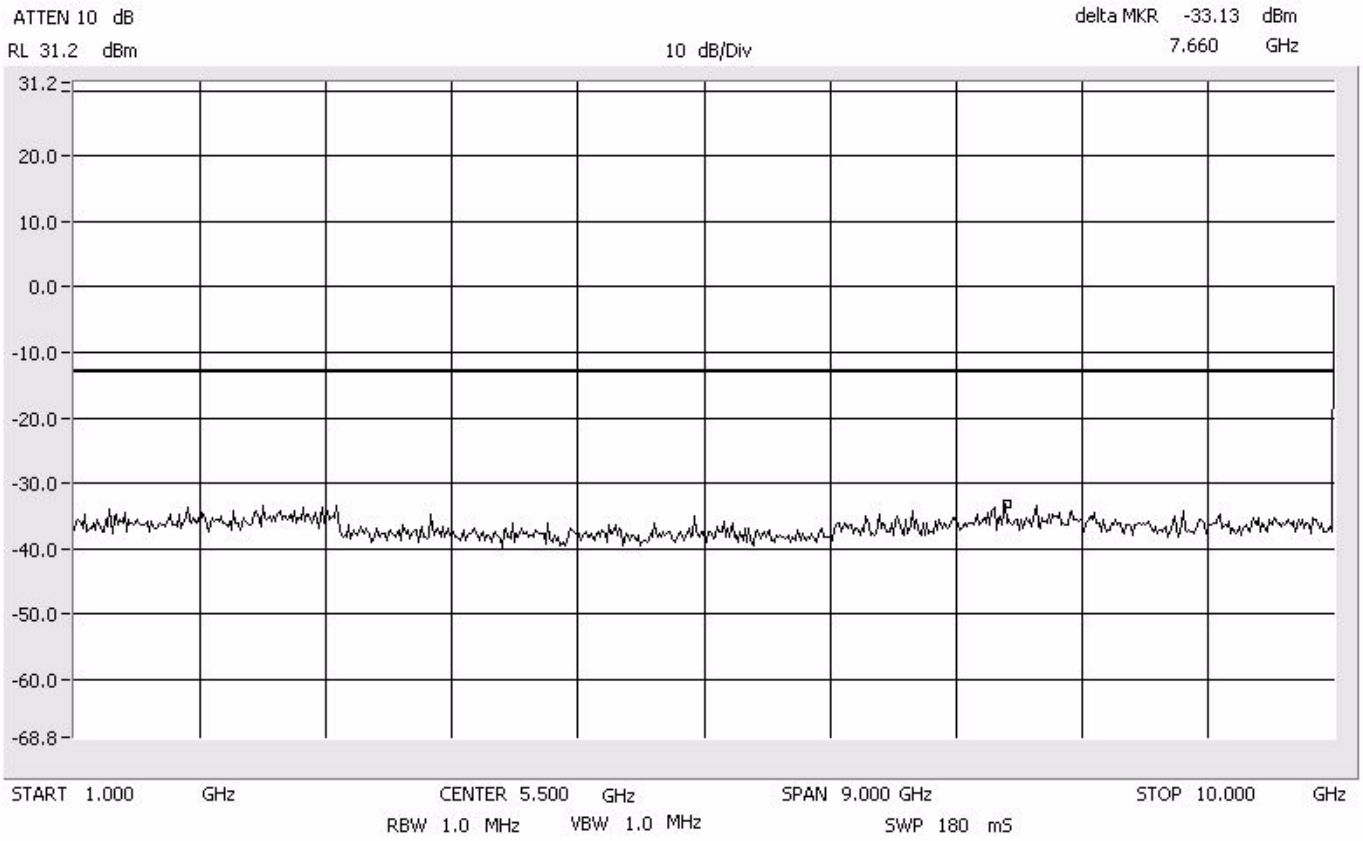
Intermodulation
Close - Lower
Cellular 800 MHz

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



Intermodulation
Close - Lower
Cellular 800 MHz

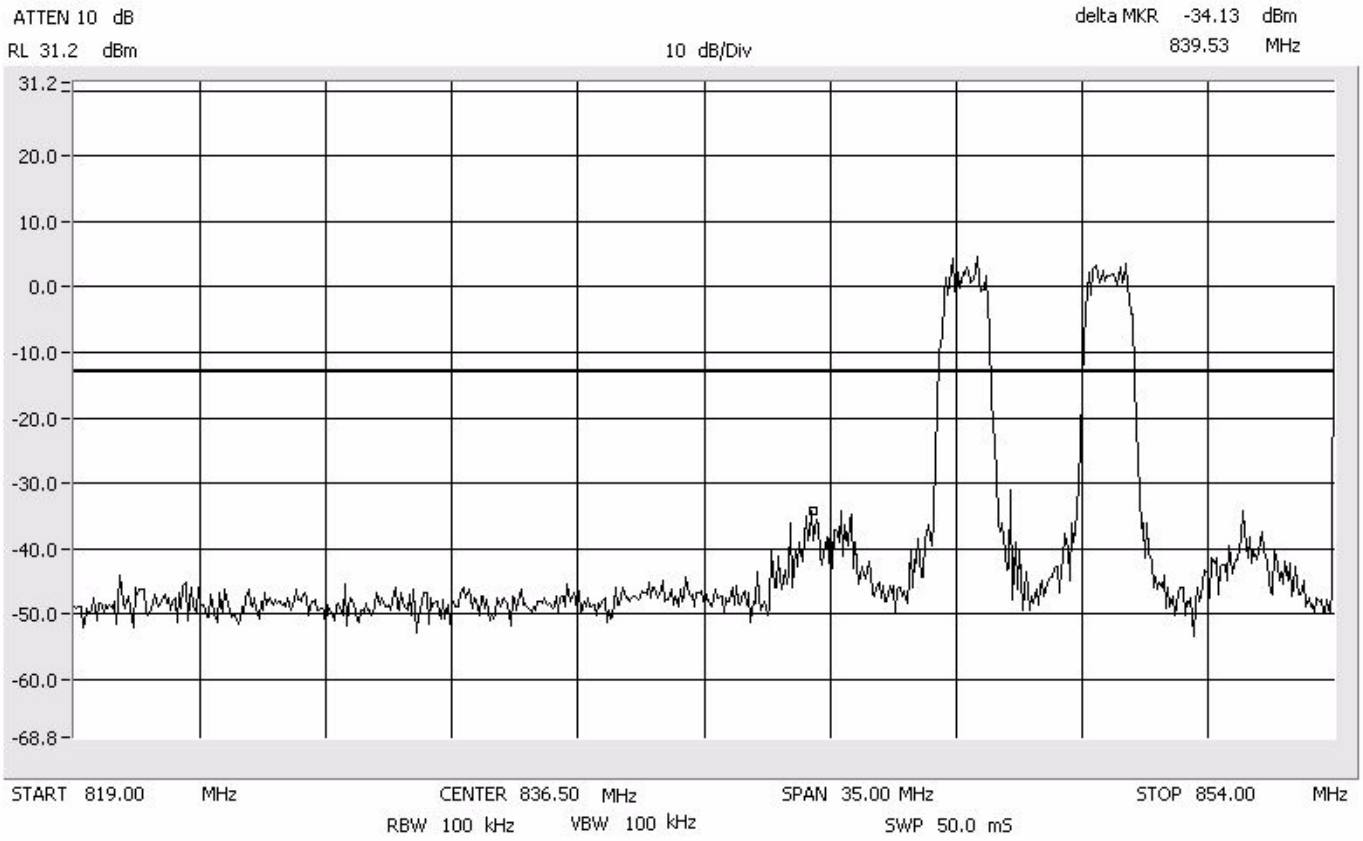
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation
Close - Upper
Cellular 800 MHz

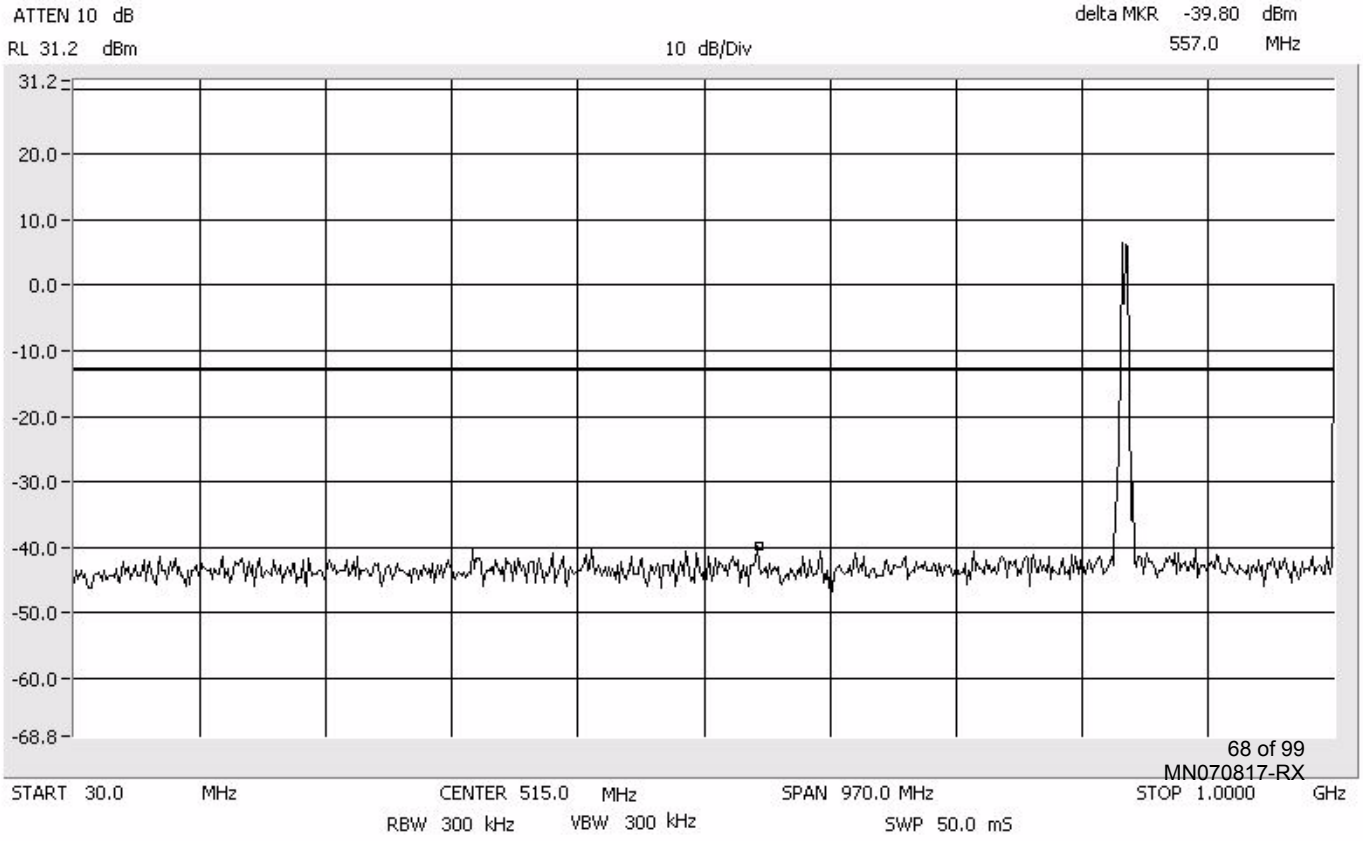
Center: 836.5 MHz
Span: 35 MHz
RBW/VBW: 100 kHz



CDMA

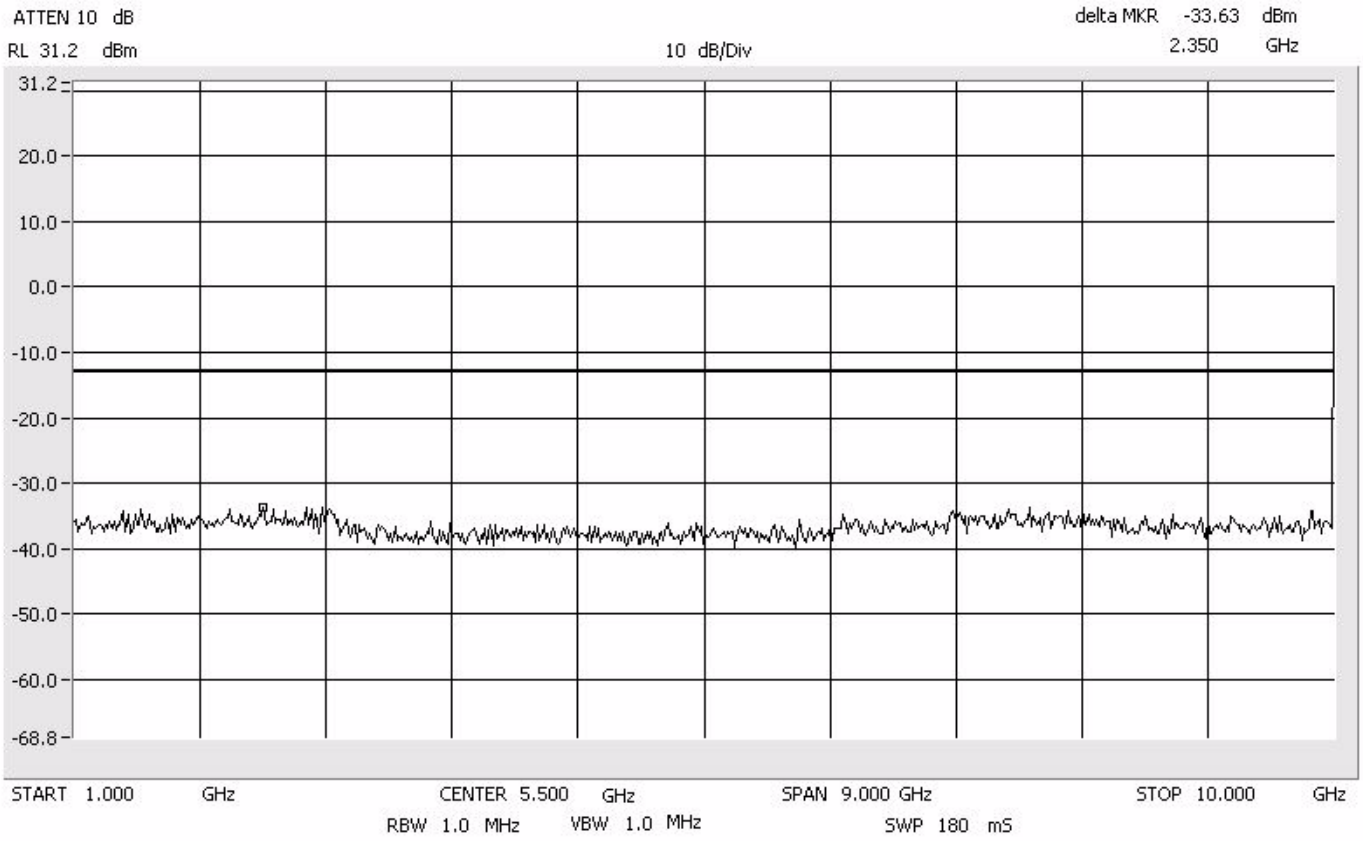
Intermodulation
Close - Upper
Cellular 800 MHz

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



Intermodulation
Close - Upper
Cellular 800 MHz

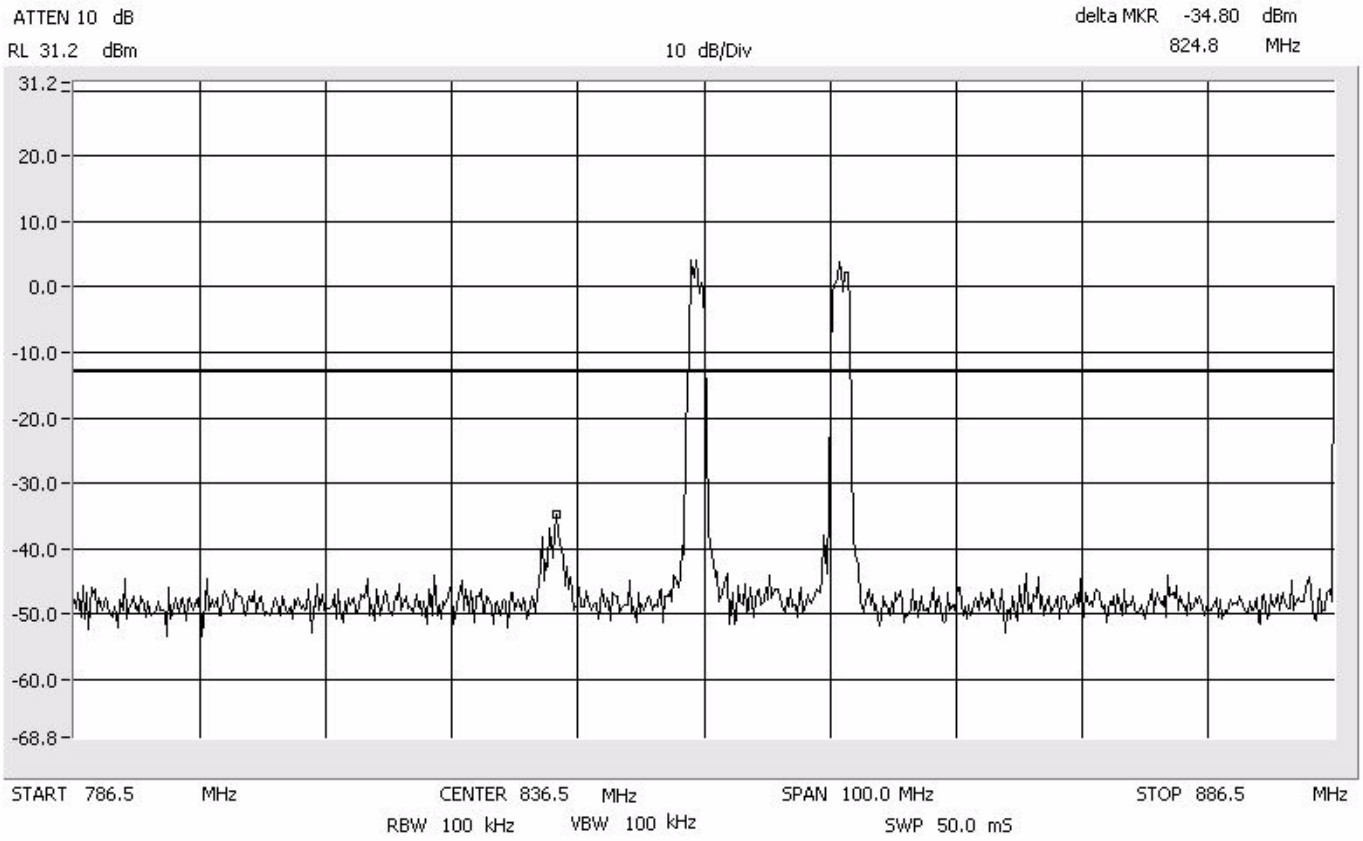
Span: 1 GHz to 10 GHz
RBW/VBW: 1 MHz



CDMA

Intermodulation
Apart
Cellular 800 MHz

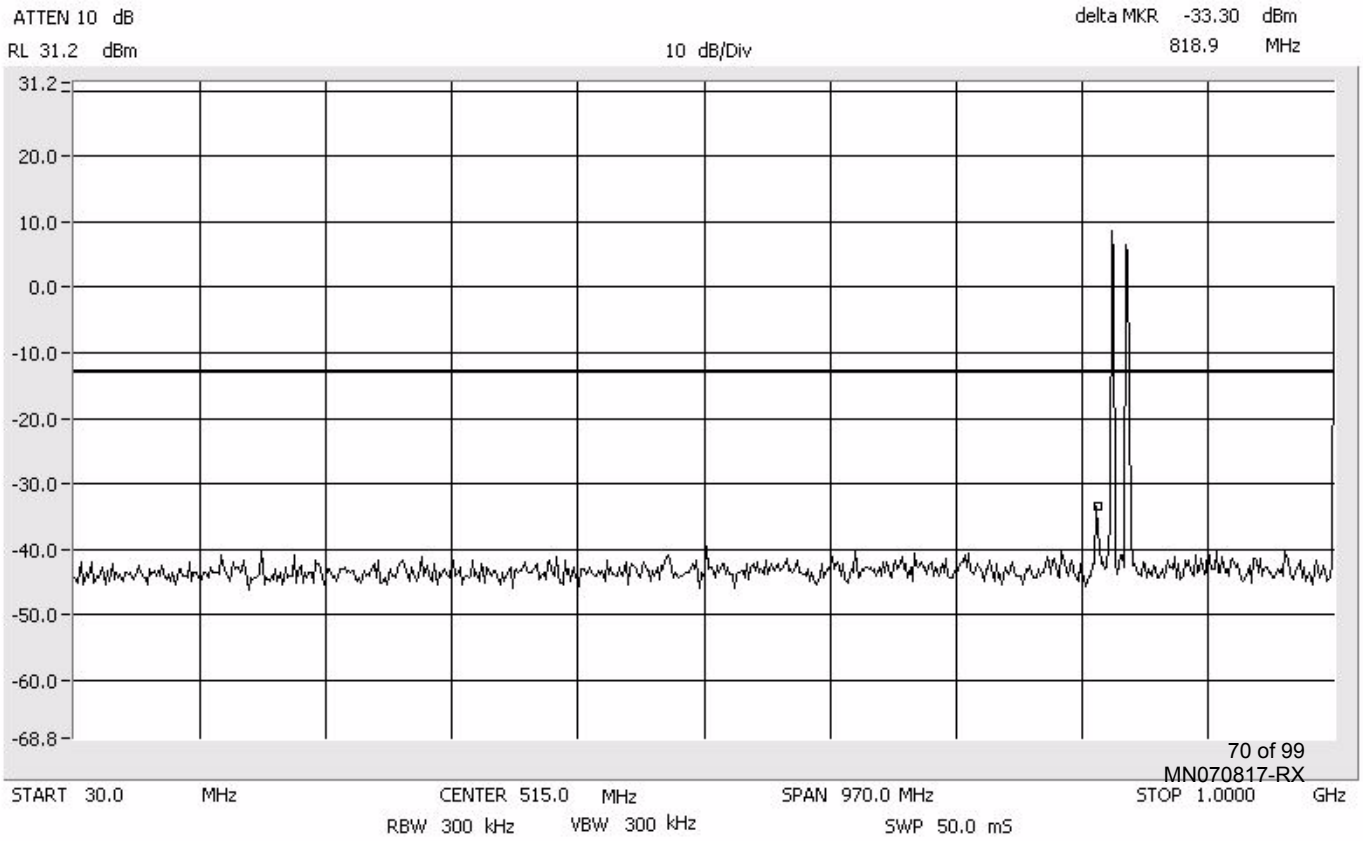
Center: 836.5 MHz
Span: 100 MHz
RBW/VBW: 100 kHz



CDMA

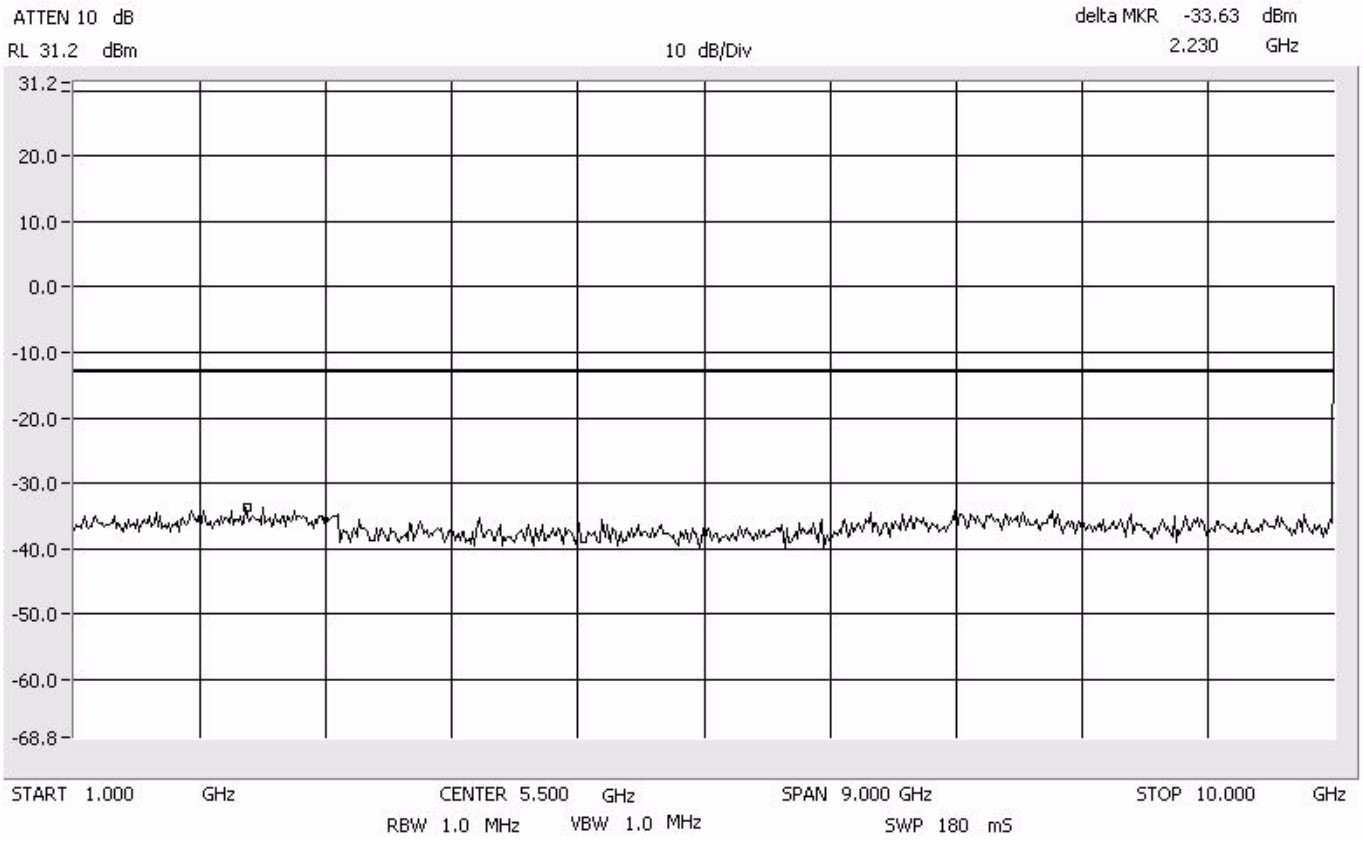
Intermodulation
Apart
Cellular 800 MHz

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



Intermodulation
Apart
Cellular 800 MHz

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



Occupied Bandwidth Modulation Test for ADC Inc.
Bi-Directional Amplifier – Cellular
Model Number RPT-SBAAA12000

Back

An input/output Occupied Bandwidth test was done with modulation types: FM, TDMA, GSM, EDGE, CDMA, EVDO, and W-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.

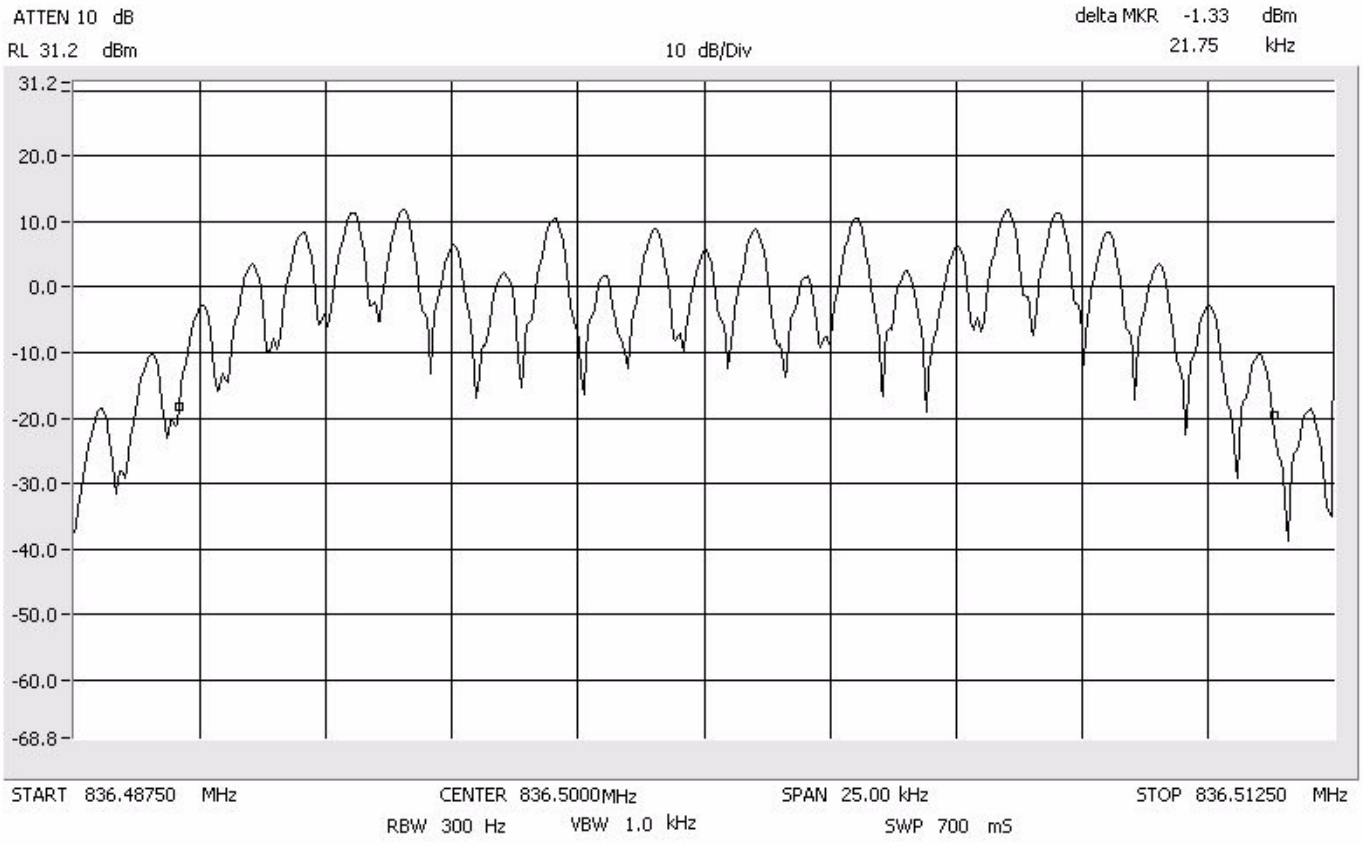
The resolution bandwidth is reduced to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are moved to the -20 dB points (from the previously established center frequency level) on either side of center frequency.

Results:

Pass (see plots)

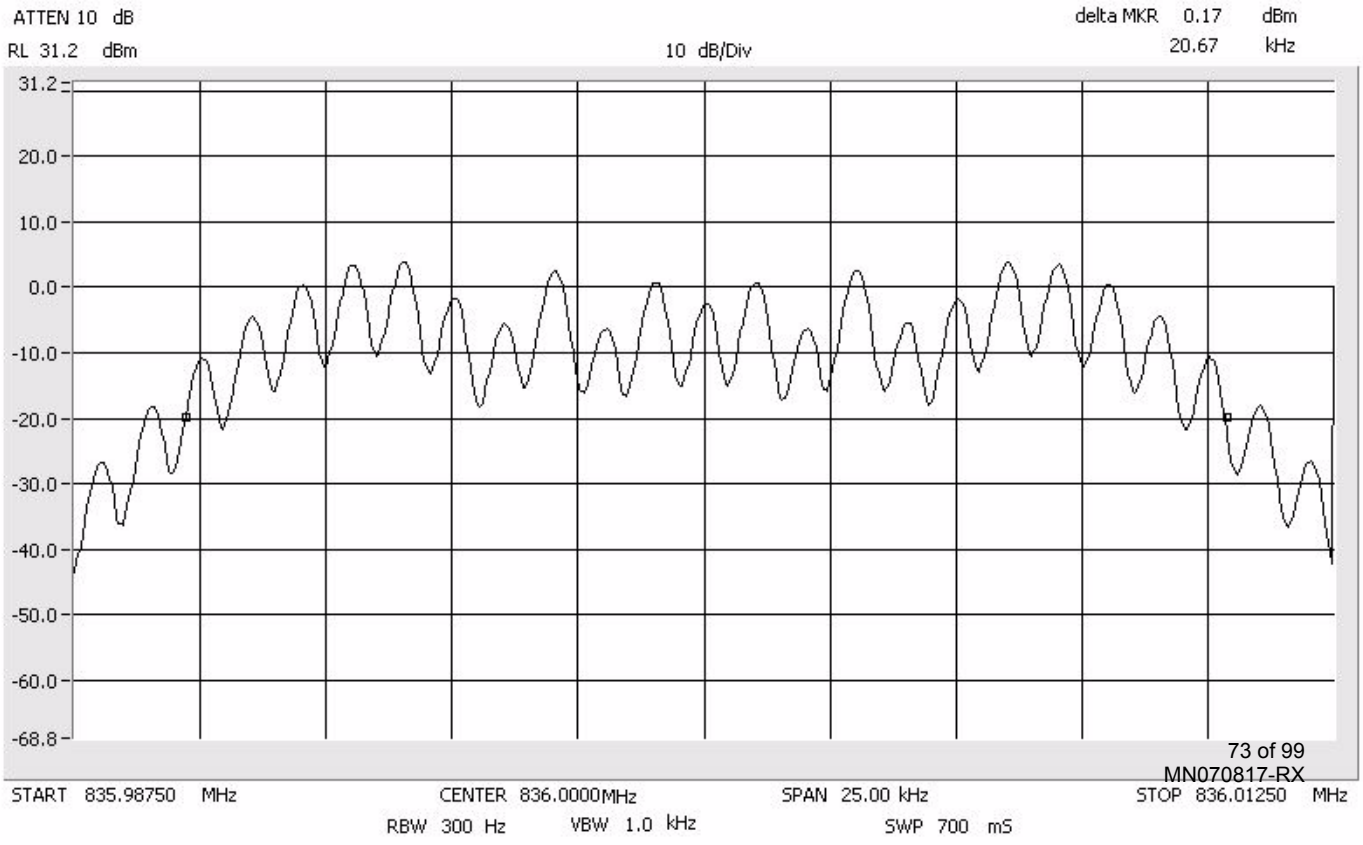
Occupied Bandwidth
FM
Signal In

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



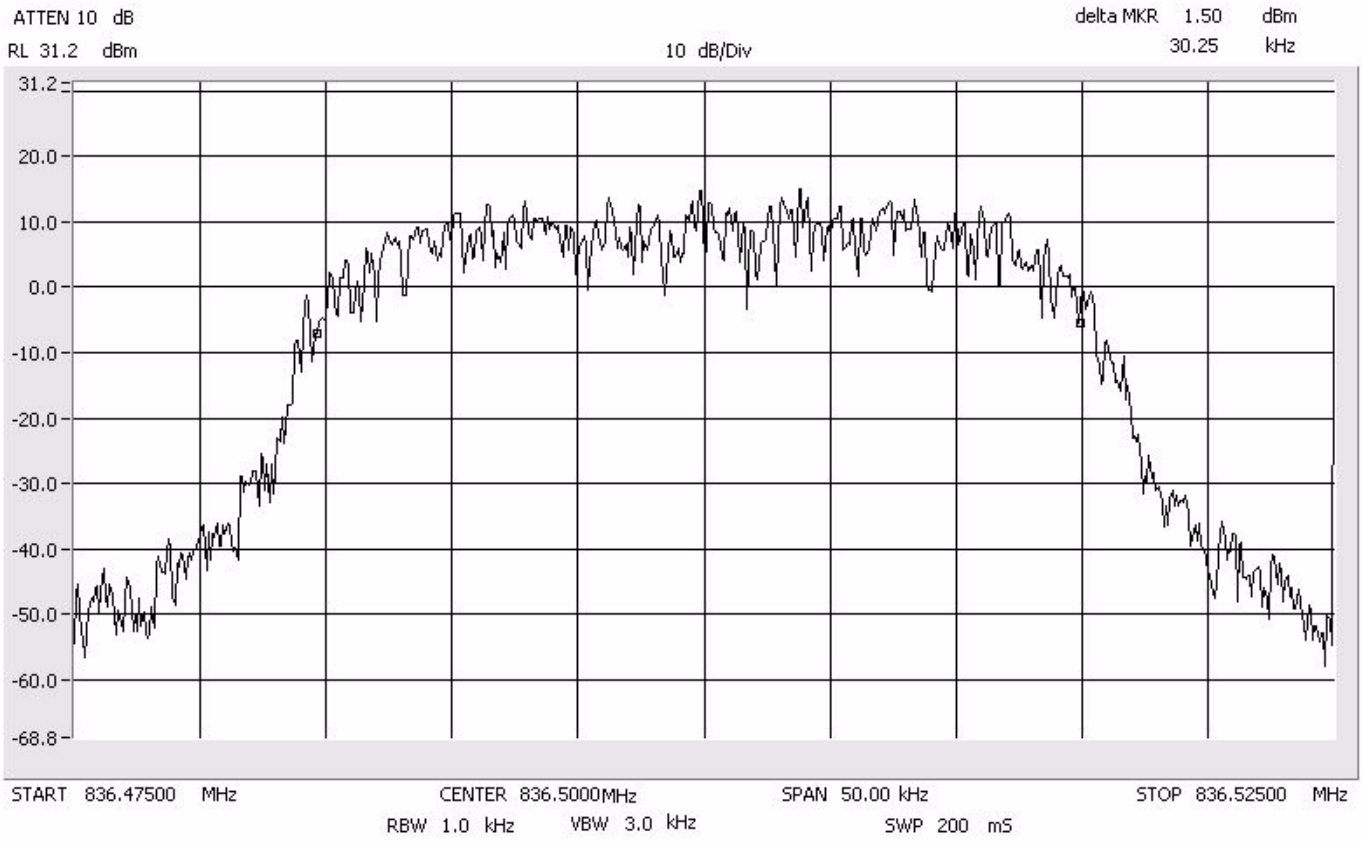
Occupied Bandwidth
FM
Signal Out

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



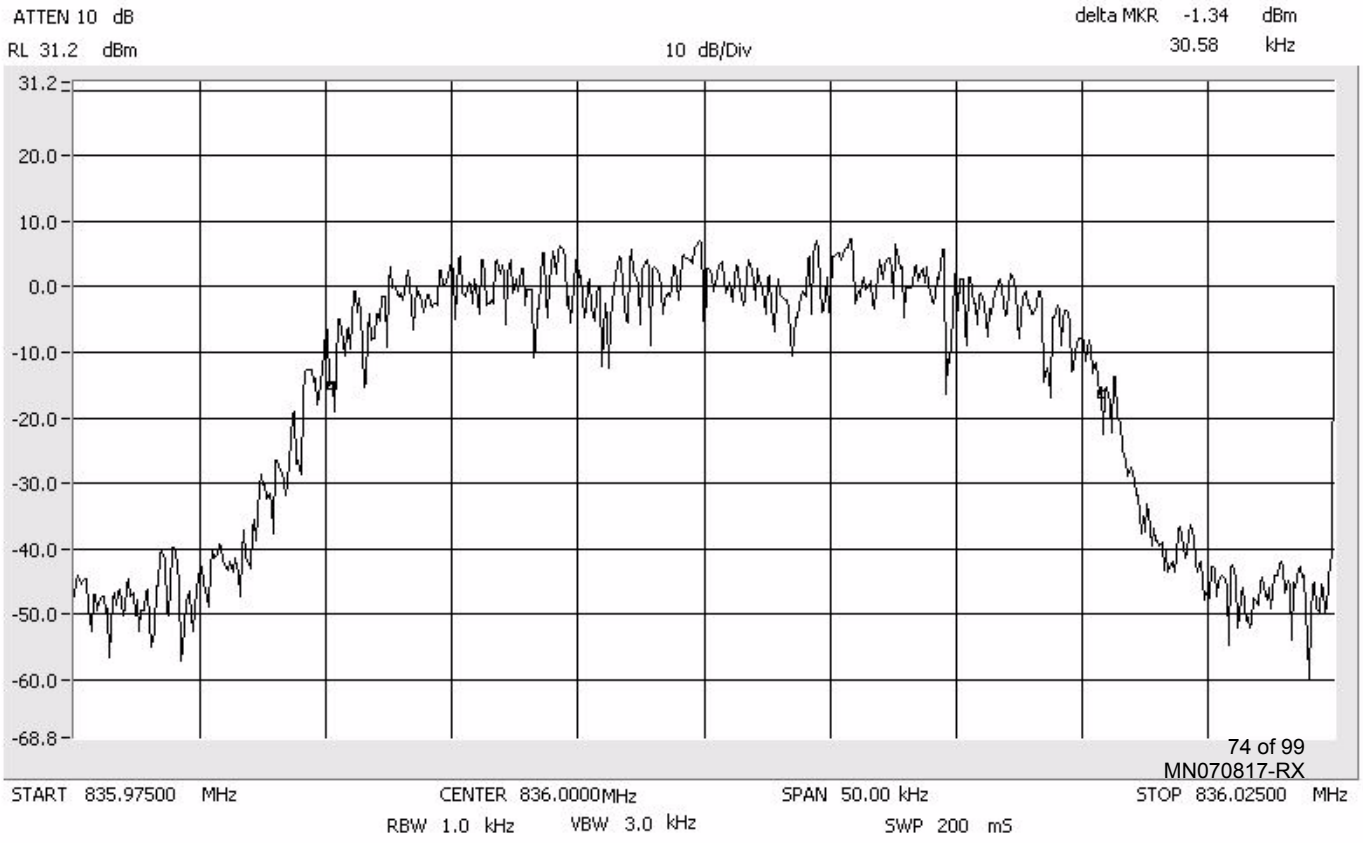
Occupied Bandwidth
TDMA
Signal In

Span: 50 kHz
RBW: 1 kHz
VBW: 3 kHz



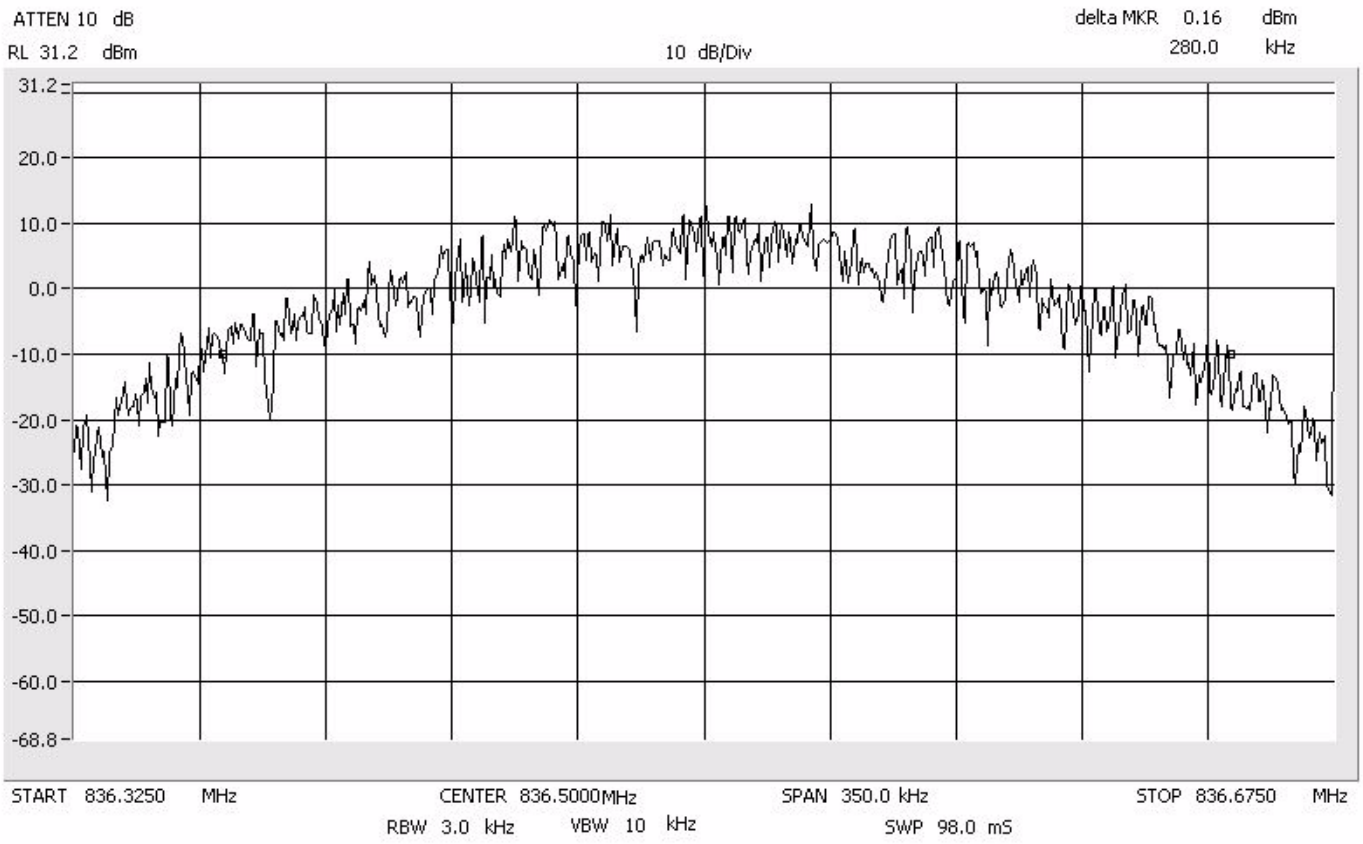
Occupied Bandwidth
TDMA
Signal Out

Span: 50 kHz
RBW: 1 kHz
VBW: 3 kHz



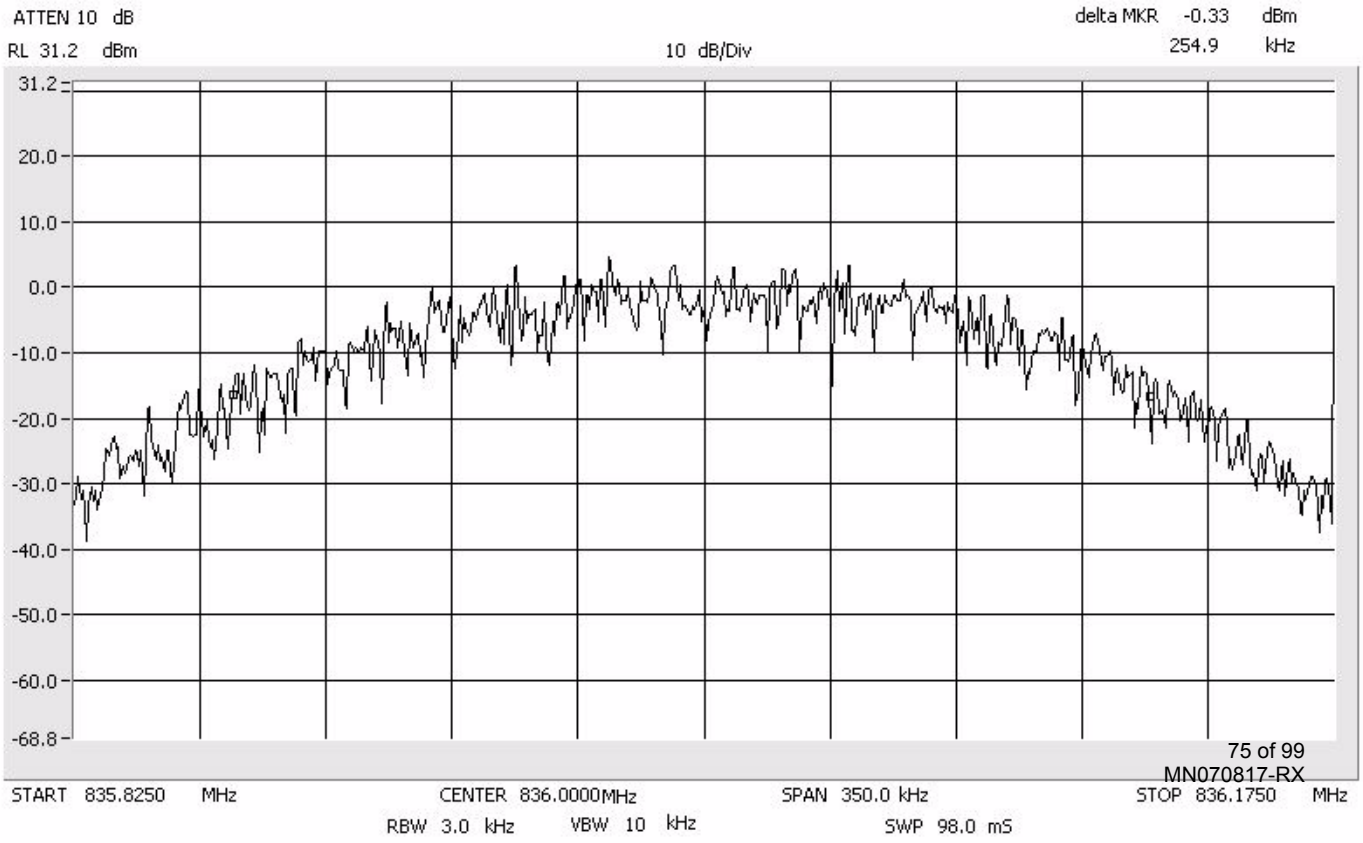
Occupied Bandwidth
GSM
Signal In

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



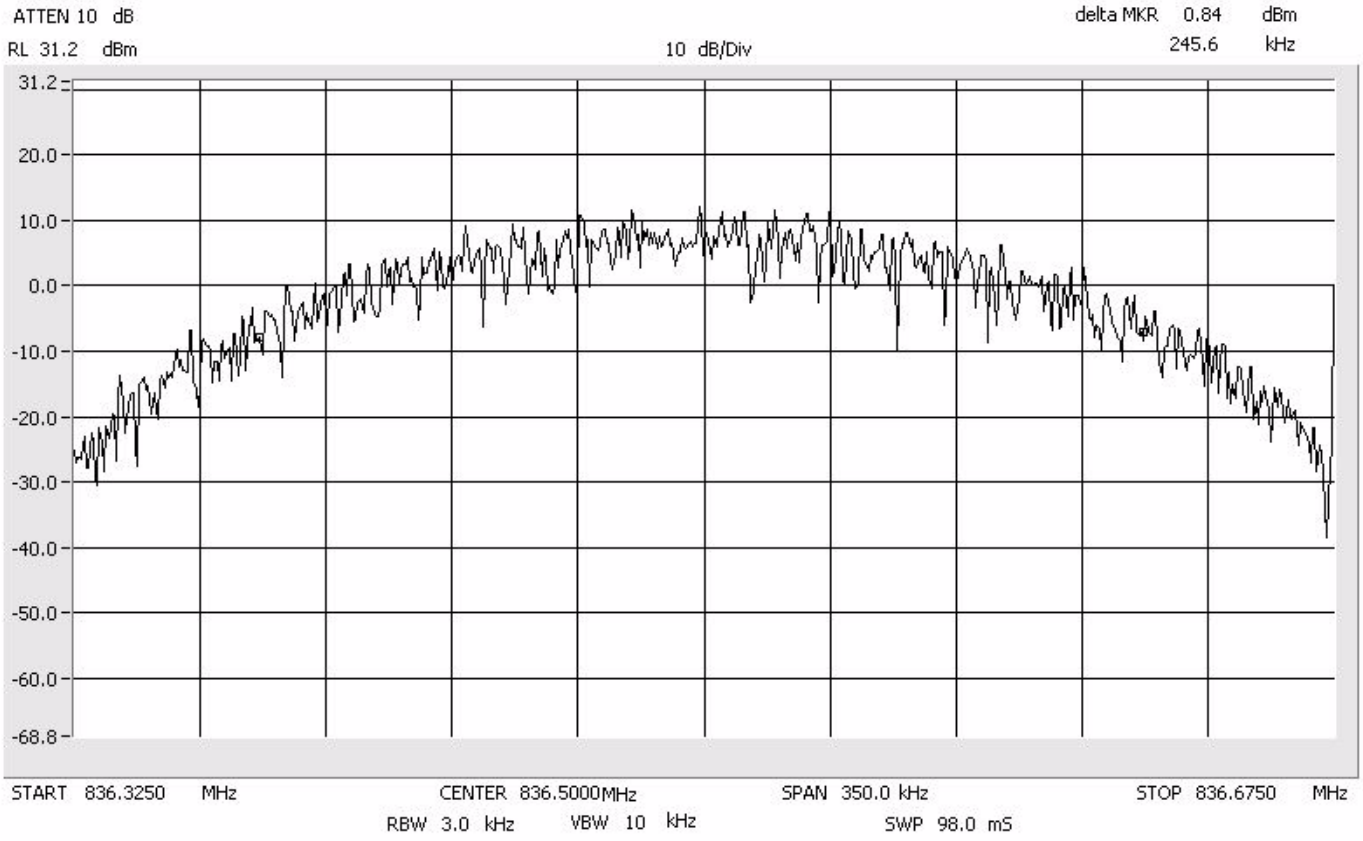
Occupied Bandwidth
GSM
Signal Out

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



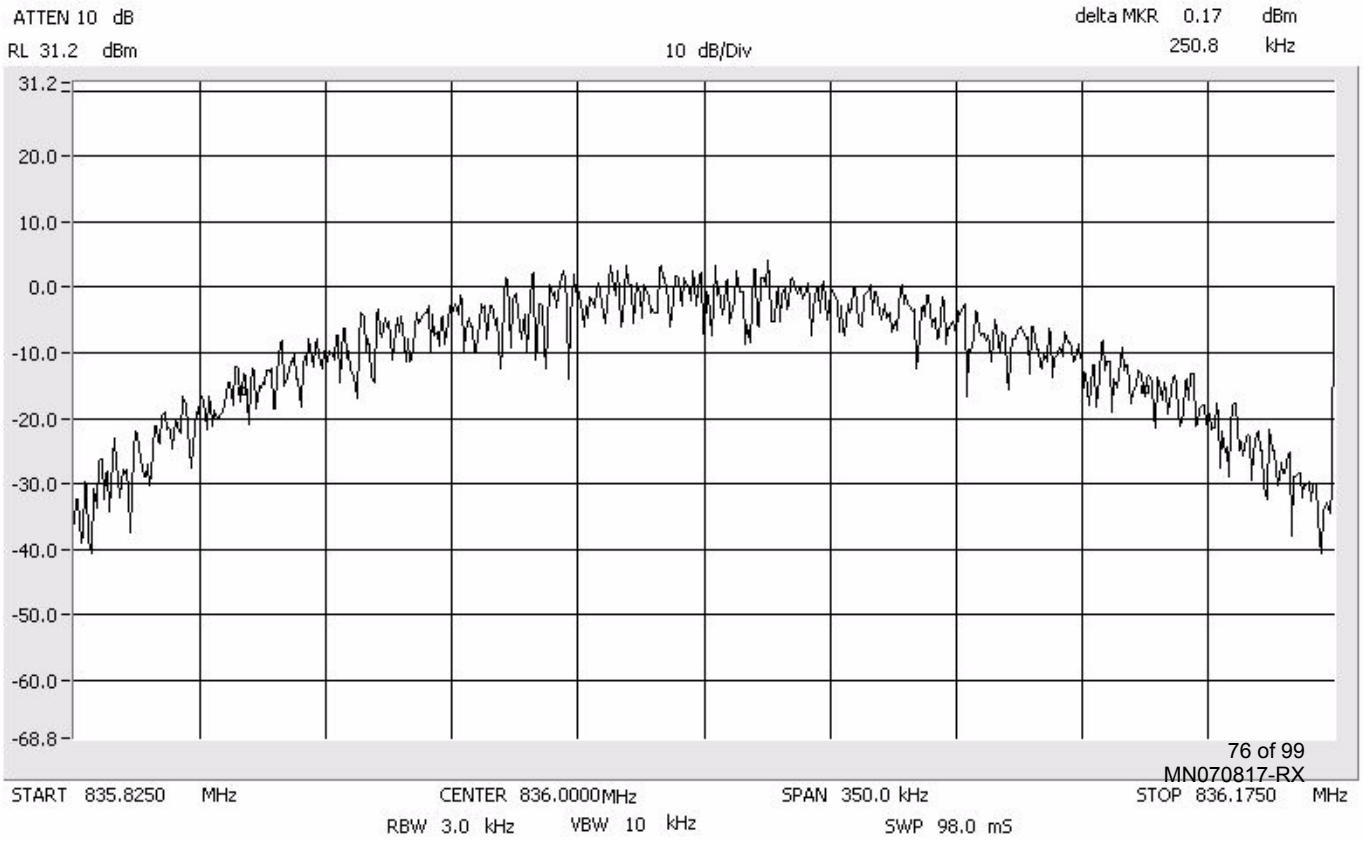
Occupied Bandwidth
EDGE
Signal In

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



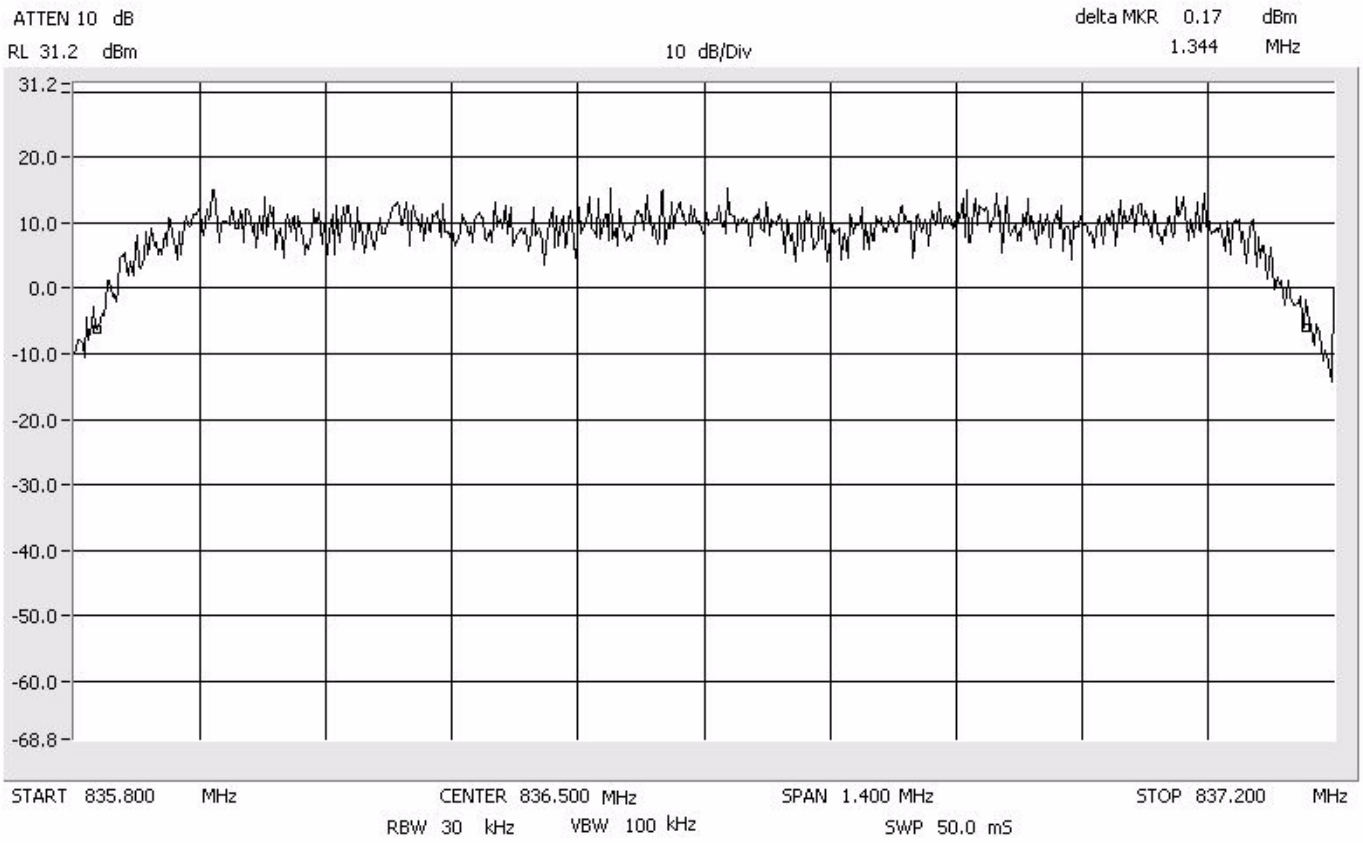
Occupied Bandwidth
EDGE
Signal Out

Span: 350 kHz
RBW: 3 kHz
VBW: 10 kHz



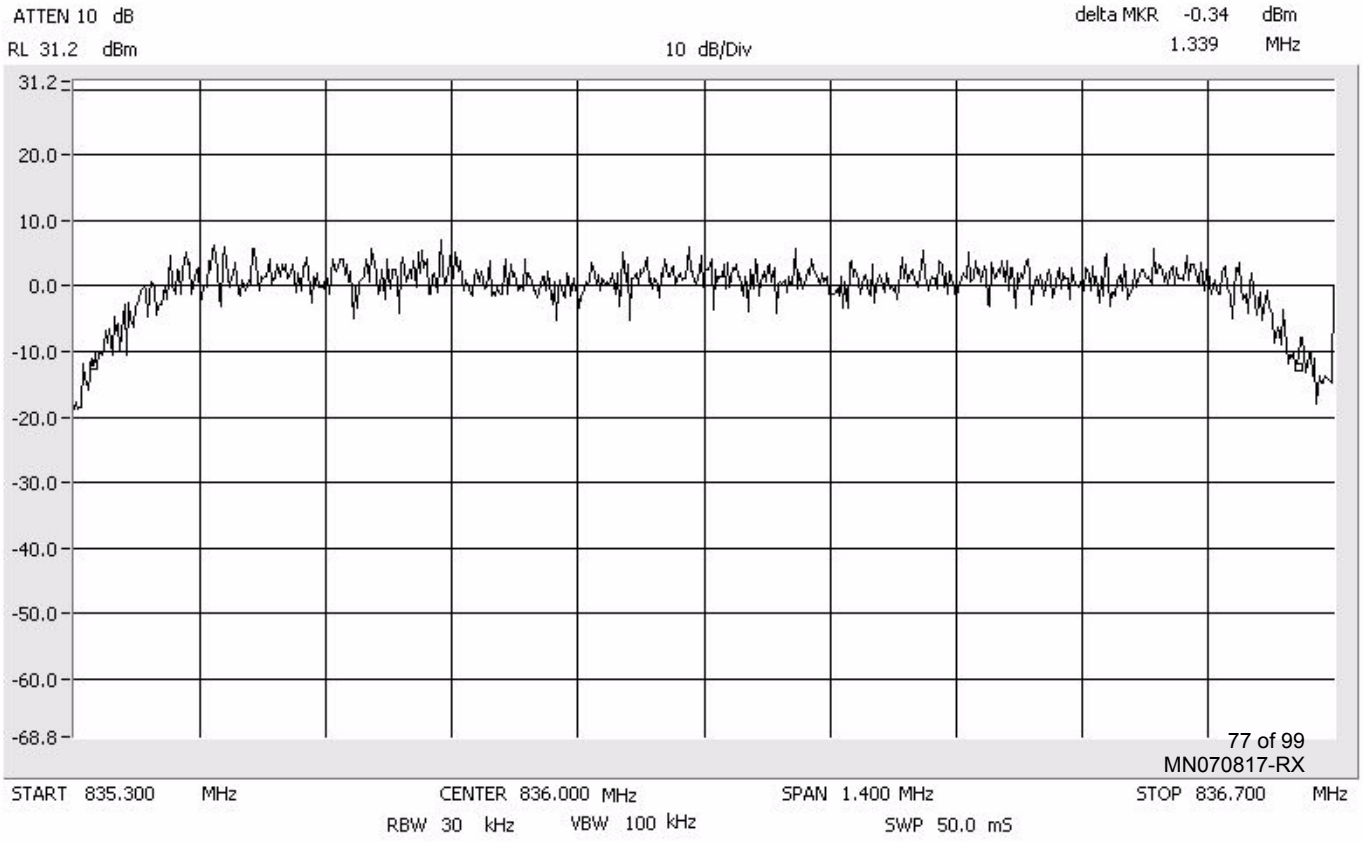
Occupied Bandwidth
CDMA
Signal In

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



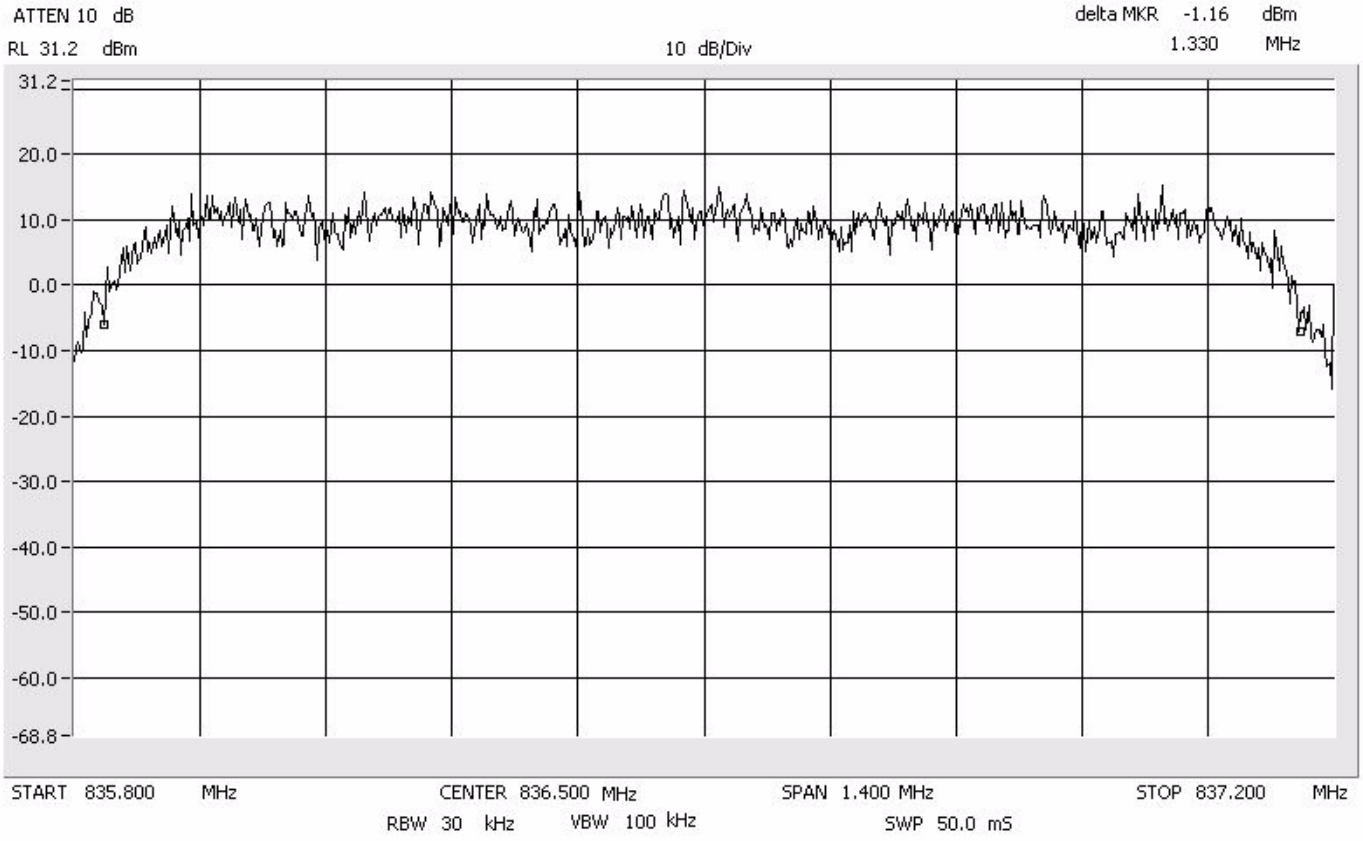
Occupied Bandwidth
CDMA
Signal Out

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



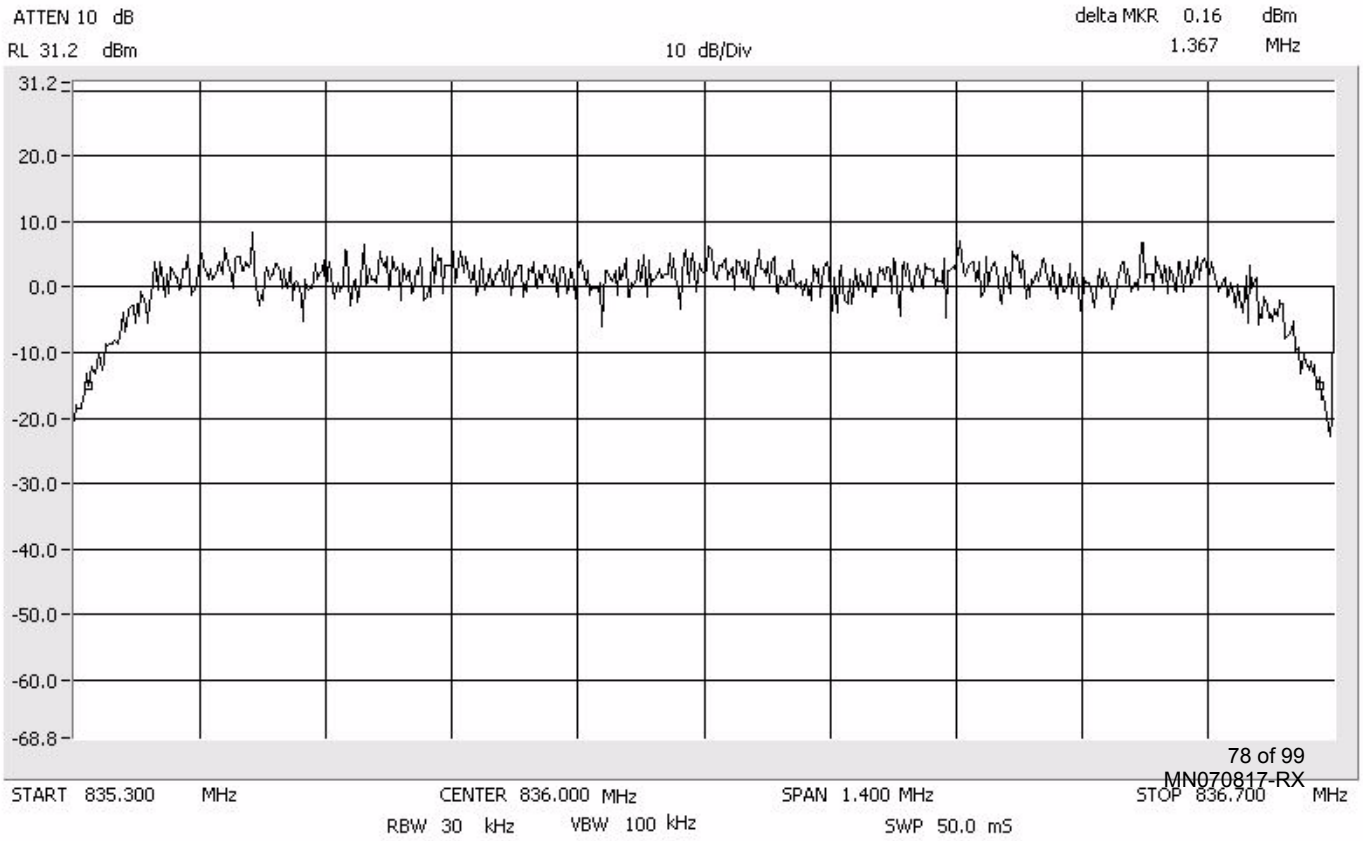
Occupied Bandwidth
EVDO
Signal In

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



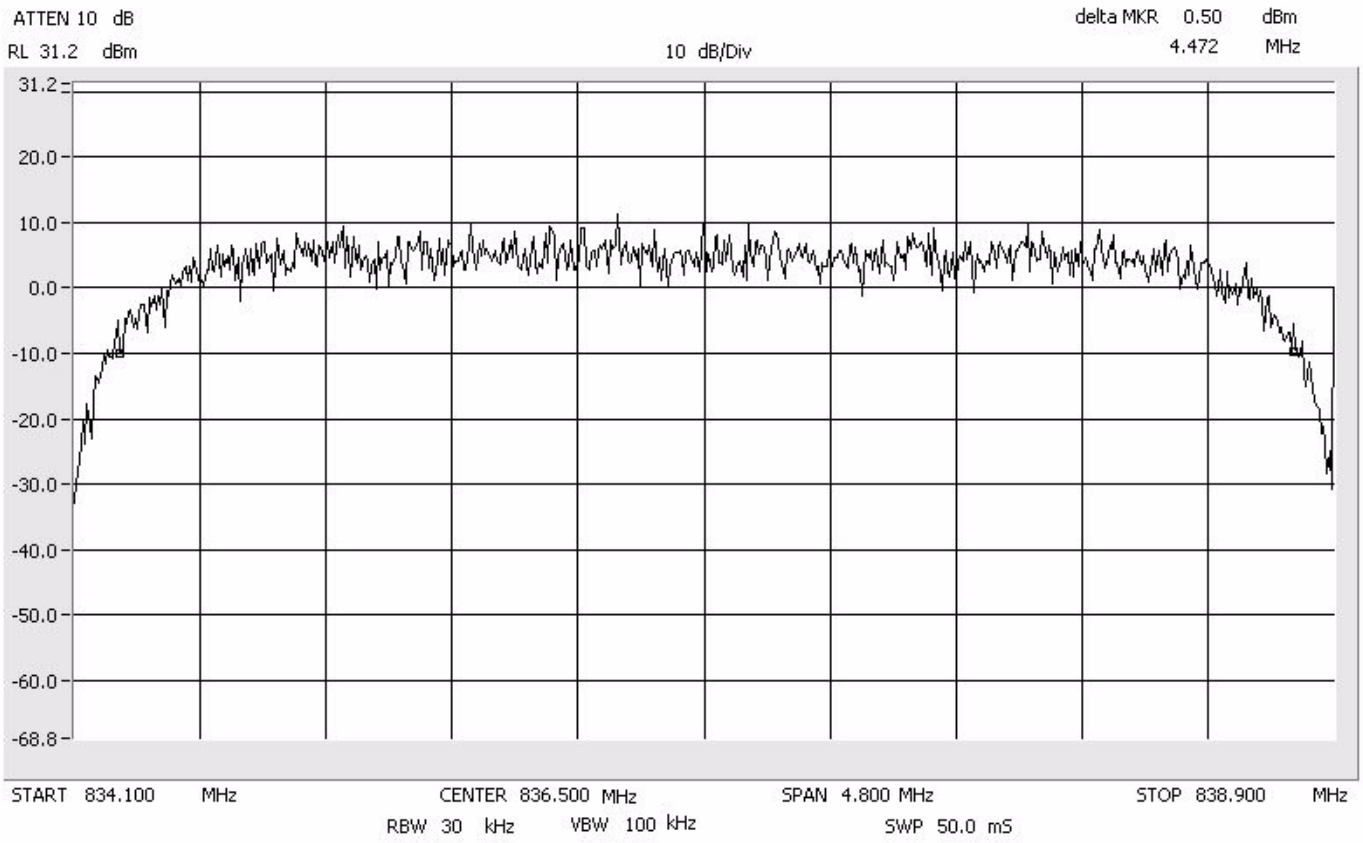
Occupied Bandwidth
EVDO
Signal Out

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



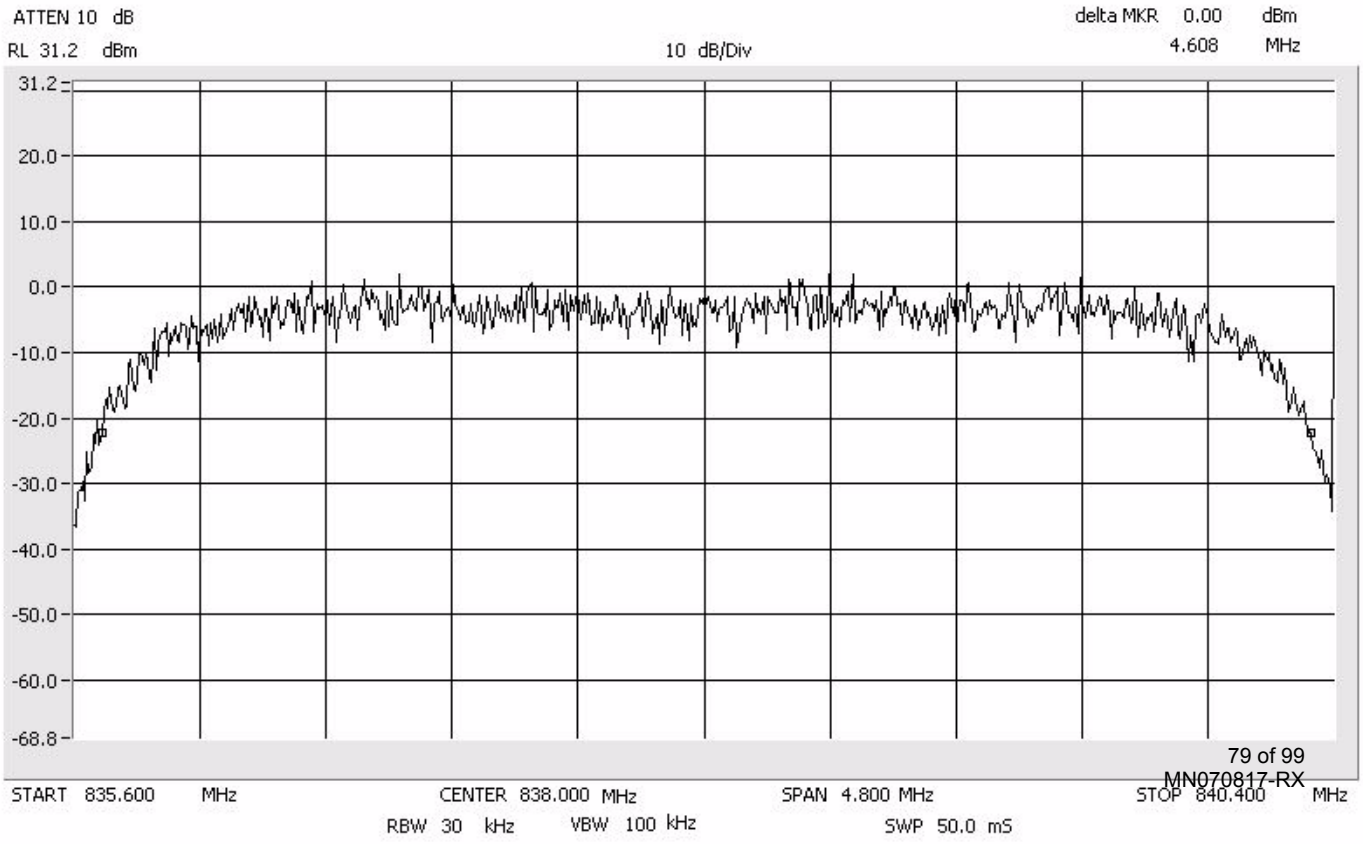
Occupied Bandwidth
W-CDMA
Signal In

Span: 4.8 MHz
RBW: 30 kHz
VBW: 100 kHz



Occupied Bandwidth
W-CDMA
Signal Out

Span: 4.8 MHz
RBW: 30 kHz
VBW: 100 kHz



Frequency Tolerance Test for ADC Inc.
Bi-Directional Amplifier – Cellular
Model Number RPT-SBAAA12000

Back

The frequency stability shall be within ± 1.5 parts per million (0.00015%).

EUT Cellular (800 MHz)

EUT				
Input Voltage	**Input Voltage**	**Carrier Frequency**	**Measured Frequency**	**Meets Requirements?**
100 VAC		824.200 MHz	824.200 MHz	Yes
170 VAC		824.200 MHz	824.200 MHz	Yes
240 VAC		824.200 MHz	824.200 MHz	Yes
100 VAC		836.500 MHz	836.500 MHz	Yes
170 VAC		836.500 MHz	836.500 MHz	Yes
240 VAC		836.500 MHz	836.500 MHz	Yes
100 VAC		848.800 MHz	848.800 MHz	Yes
170 VAC		848.800 MHz	848.800 MHz	Yes
240 VAC		848.800 MHz	848.800 MHz	Yes
Temperature		**Carrier Frequency**	**Measured Frequency**	**Meets Requirements?**
-5 Deg. C		824.200 MHz	824.200 MHz	Yes
10 Deg. C		824.200 MHz	824.200 MHz	Yes
20 Deg. C		824.200 MHz	824.200 MHz	Yes
30 Deg. C		824.200 MHz	824.200 MHz	Yes
40 Deg. C		824.200 MHz	824.200 MHz	Yes
45 Deg. C		824.200 MHz	824.200 MHz	Yes
-5 Deg. C		836.500 MHz	836.500 MHz	Yes
10 Deg. C		836.500 MHz	836.500 MHz	Yes
20 Deg. C		836.500 MHz	836.500 MHz	Yes
30 Deg. C		836.500 MHz	836.500 MHz	Yes
40 Deg. C		836.500 MHz	836.500 MHz	Yes
45 Deg. C		836.500 MHz	836.500 MHz	Yes
-5 Deg. C		848.800 MHz	848.800 MHz	Yes
10 Deg. C		848.800 MHz	848.800 MHz	Yes
20 Deg. C		848.800 MHz	848.800 MHz	Yes
30 Deg. C		848.800 MHz	848.800 MHz	Yes
40 Deg. C		848.800 MHz	848.800 MHz	Yes
45 Deg. C		848.800 MHz	848.800 MHz	Yes

6.0 APPENDIX B

Intertek Test Data

Back to Test Data:

Back to Table of Contents:

Test Engineer: Norman Shpilsher **Date:** 7 September, 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: 3132442MIN-001
Project Number: 3132442

Testing performed on the
BDA-800

to
47 CFR, Part 22:2006

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: _____ Date: September 7, 2007
Norman Shpilsher

Reviewed by: _____ Date: September 7, 2007
Simon Khazon

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1.0 DESCRIPTION OF THE SAMPLE (EUT)

Model:	BDA-800
Type of EUT:	Bi-Directional Amplifier
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:	☐ EN 55022:2006, Class ☐ EN 55011:1998 + A1:1999 + A2:2002, Group , Class ☐ 47 CFR, Part 15:2006, §15.107 and §15.109, Class ☒ 47 CFR, Part 22:2006 ☐ 47 CFR, Part 24:2006 ☐ EN 55014-1:2000 + A1:2001 + A2:2002 ☐ EN 61326-1:2006 ☐ Class for Radiated and Conducted Emissions ☐ EN 60601-1-2:2001 +A1:2006 ☐ Class Radiated and Conducted Emissions ☐ EN 61000-6-3:2001 ☐ EN 61000-6-4:2001 ☐ EN 61000-3-2:2006 ☐ EN 61000-3-3:1995 +A1:2001 +A2:2006 ☐ 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 22	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 low channel (824MHz), middle channel (836.5MHz), and upper channel (849MHz) of the operating frequency.
Testing was performed in frequency range from 30MHz to 10GHz.
The Signal Generator – Support Equipment (HP ESG-2000A) was located outside of the test site.
3. The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dBµV/m during field strength measurements at 3m measurement distance.
4. Substitution method measurements were not performed as the EUT passed Spurious Radiated Emissions with a margin of more than 20dB below the limits.

3.0 TEST RESULTS

Radiated Emissions from 30MHz to 1GHz **Date:** 09/04-05/2007

Company: ADC Telecommunications Inc.
Model: BDA-800
Test Engineer: Norman Shpilsher
Special Info:
Standard: FCC Part 22
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 824MHz				
30.561 MHz	V	15.2	18.7	33.9	82.2	-48.3
94.485 MHz	V	22.1	10.9	33.0	82.2	-49.2
100.3 MHz	V	22.6	12.2	34.8	82.2	-47.4
30.842 MHz	H	15.0	18.5	33.5	82.2	-48.7
99.51 MHz	H	20.4	12.0	32.4	82.2	-49.8
100.3 MHz	H	22.0	12.2	34.1	82.2	-48.1
		Operating Frequency 836.5MHz				
30.175 MHz	V	14.8	18.9	33.7	82.2	-48.5
44.704 MHz	V	25.6	10.8	36.4	82.2	-45.8
93.78 MHz	V	23.7	10.8	34.5	82.2	-47.7
30.491 MHz	H	14.1	18.7	32.8	82.2	-49.4
93.692 MHz	H	21.0	10.7	31.7	82.2	-50.5
100.3 MHz	H	21.0	12.2	33.2	82.2	-49.0
		Operating Frequency 849MHz				
30.281 MHz	V	15.1	18.8	33.9	82.2	-48.3
44.178 MHz	V	23.9	11.1	35.0	82.2	-47.2
89.373 MHz	V	24.4	9.8	34.3	82.2	-47.9
100.3 MHz	V	21.4	12.2	33.6	82.2	-48.6
159.67 MHz	V	21.0	11.8	32.9	82.2	-49.3
30.035 MHz	H	14.2	19.0	33.2	82.2	-49.0
93.692 MHz	H	20.8	10.7	31.6	82.2	-50.6
100.3 MHz	H	20.5	12.2	32.7	82.2	-49.5

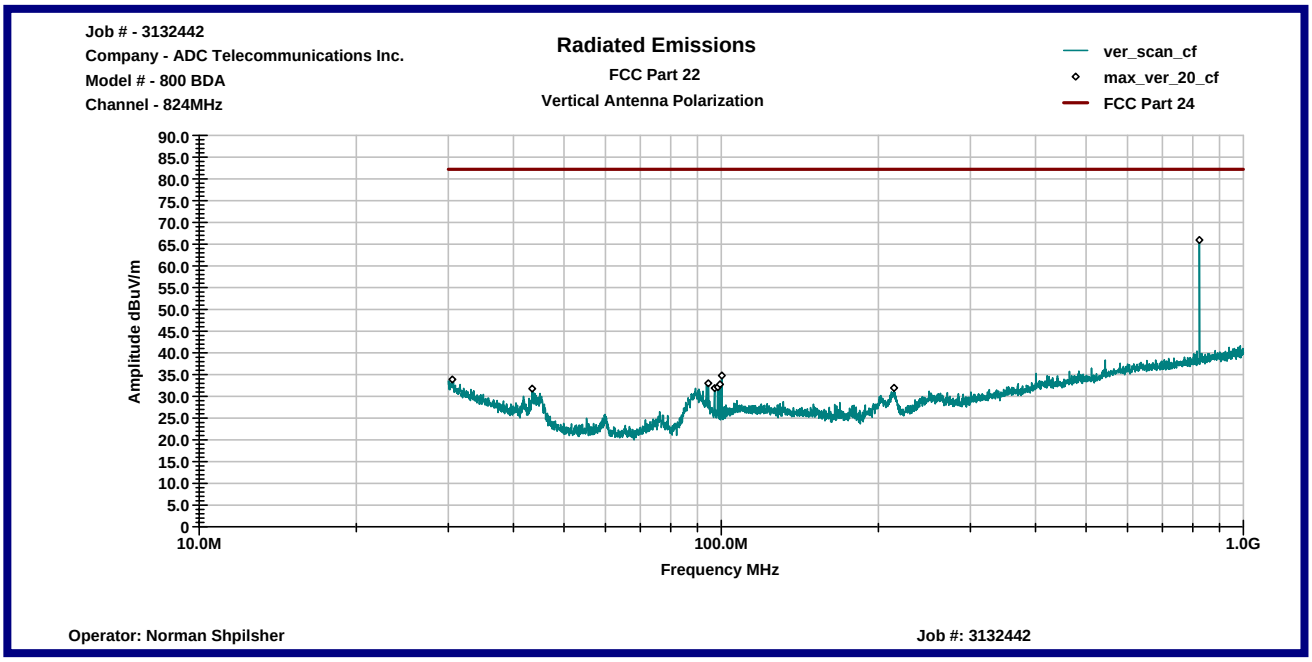
Note: Emissions at operating frequencies were removed from the Table

Radiated Emissions from 1 to 10GHz **Date:** 09/05-06/2007

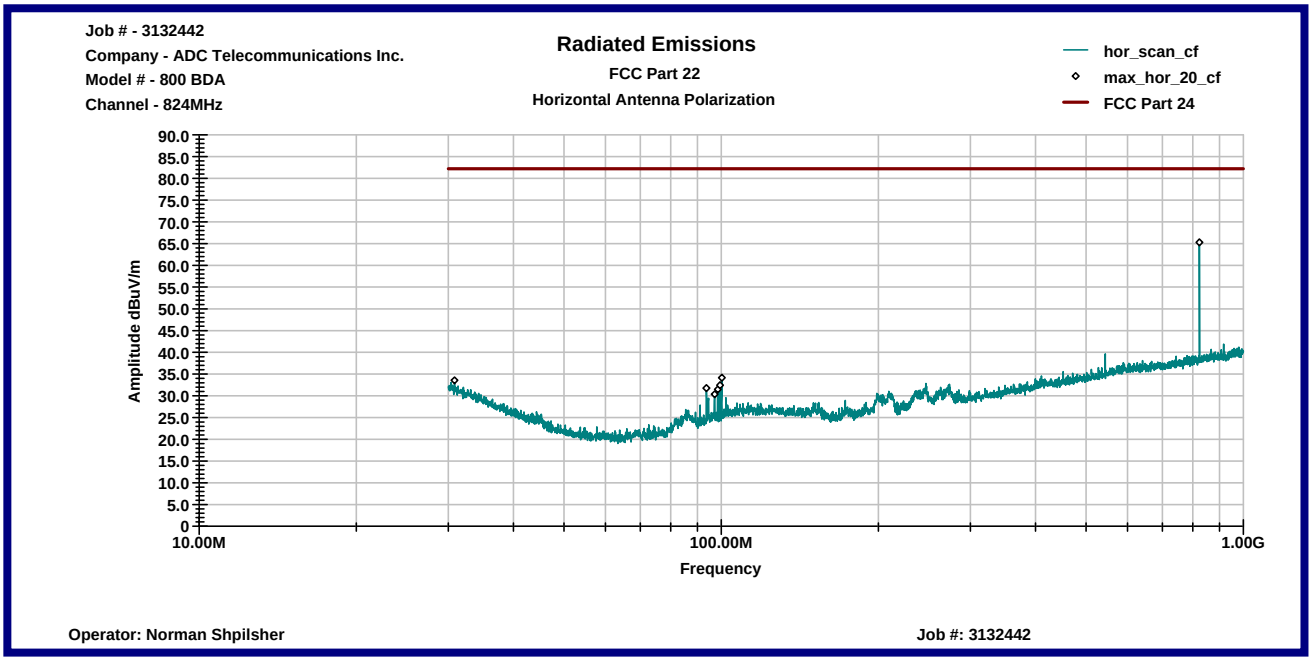
Company: ADC Telecommunications Inc.
Model: BDA-800
Test Engineer: Norman Shpilsher
Special Info:
Standard: FCC Part 22
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
All measurements were taken using a Peak detector

Table # 2

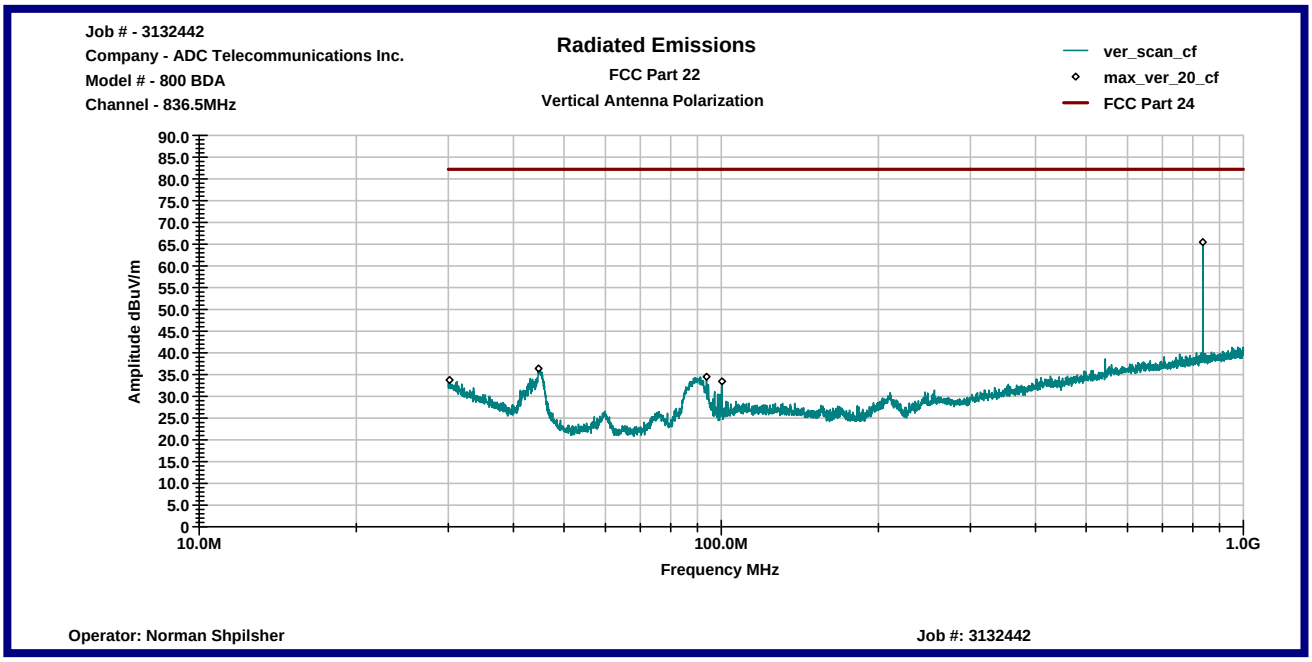
Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
		Operating Frequency 824MHz					
5.3668 GHz	V	43.1	38.4	37.4	44.1	82.2	-38.1
5.68 GHz	V	44.2	38.9	37.0	46.1	82.2	-36.1
10.0 GHz	V	36.5	44.6	34.6	46.4	82.2	-35.8
2.2996 GHz	H	44.9	31.1	38.1	37.9	82.2	-44.4
5.3668 GHz	H	49.3	38.4	37.4	50.2	82.2	-32.0
5.68 GHz	H	47.8	38.9	37.0	49.7	82.2	-32.5
9.4924 GHz	H	37.2	43.8	34.9	46.0	82.2	-36.2
		Operating Frequency 836.5MHz					
5.3668 GHz	V	44.1	38.4	37.4	45.1	82.2	-37.1
5.68 GHz	V	44.2	38.9	37.0	46.0	82.2	-36.2
9.6724 GHz	V	37.0	44.0	34.8	46.2	82.2	-36.0
2.2996 GHz	H	45.0	31.1	38.1	37.9	82.2	-44.3
3.8404 GHz	H	50.0	35.7	37.7	48.0	82.2	-34.2
5.3668 GHz	H	49.0	38.4	37.4	50.0	82.2	-32.2
5.68 GHz	H	47.6	38.9	37.0	49.4	82.2	-32.8
9.91 GHz	H	36.3	44.4	34.7	46.0	82.2	-36.2
		Operating Frequency 849MHz					
9.9352 GHz	V	37.6	44.5	34.6	47.4	82.2	-34.8
2.2996 GHz	H	45.1	31.1	38.1	38.0	82.2	-44.2
5.3668 GHz	H	49.3	38.4	37.4	50.3	82.2	-31.9
5.68 GHz	H	47.8	38.9	37.0	49.6	82.2	-32.6
9.964 GHz	H	36.3	44.5	34.6	46.2	82.2	-36.1



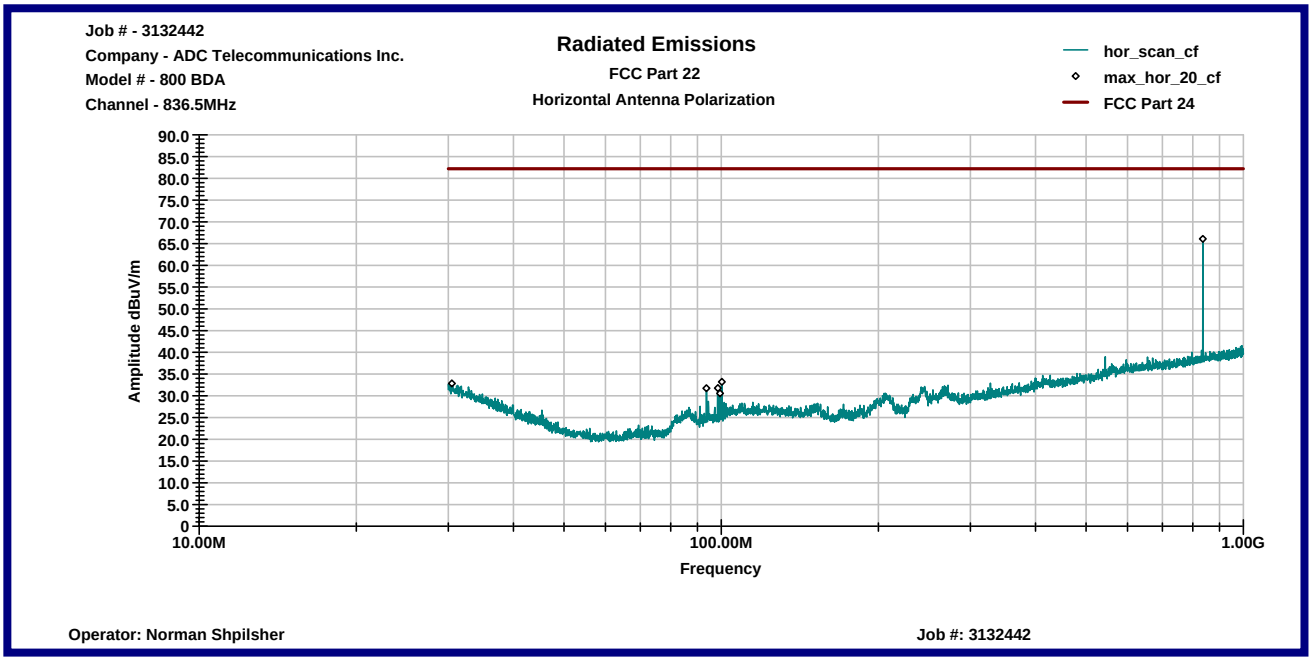
Graph 1



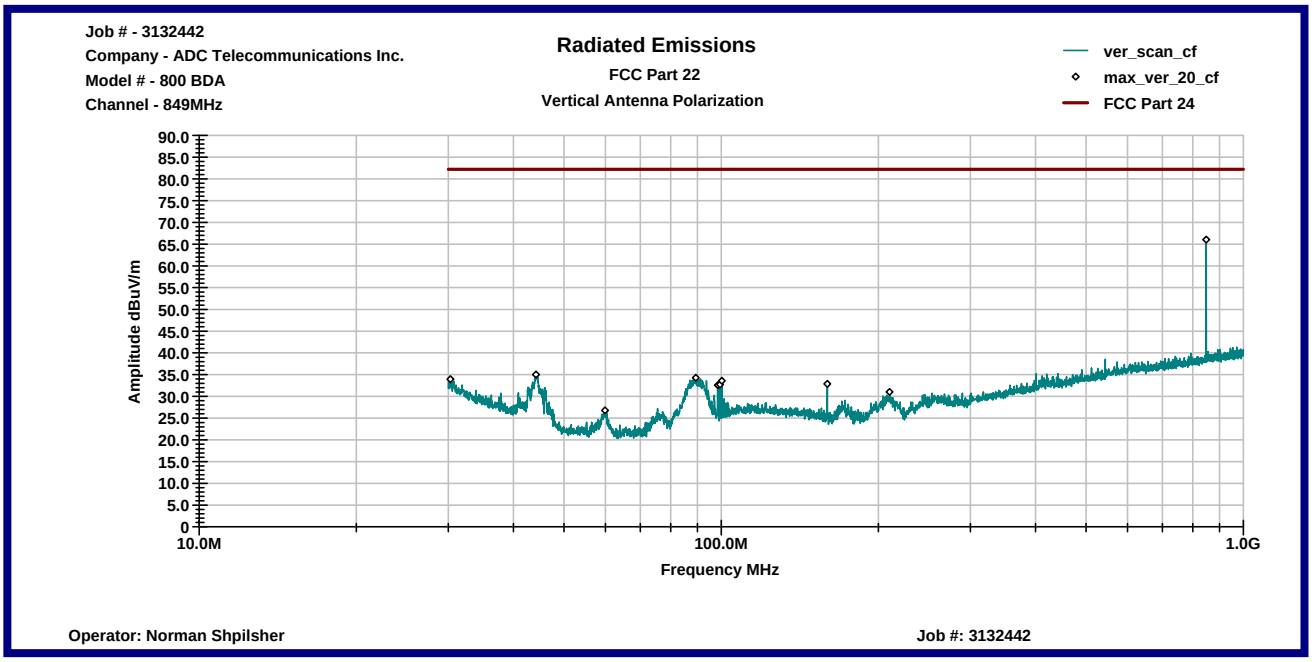
Graph 2



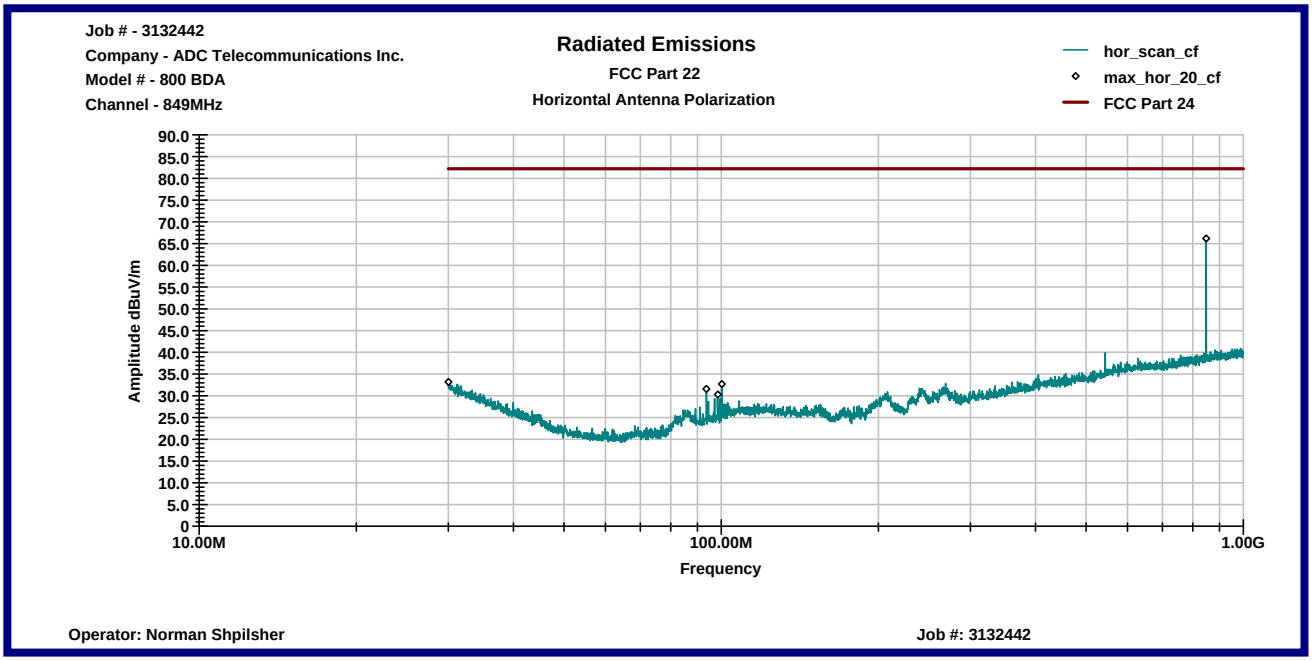
Graph 3



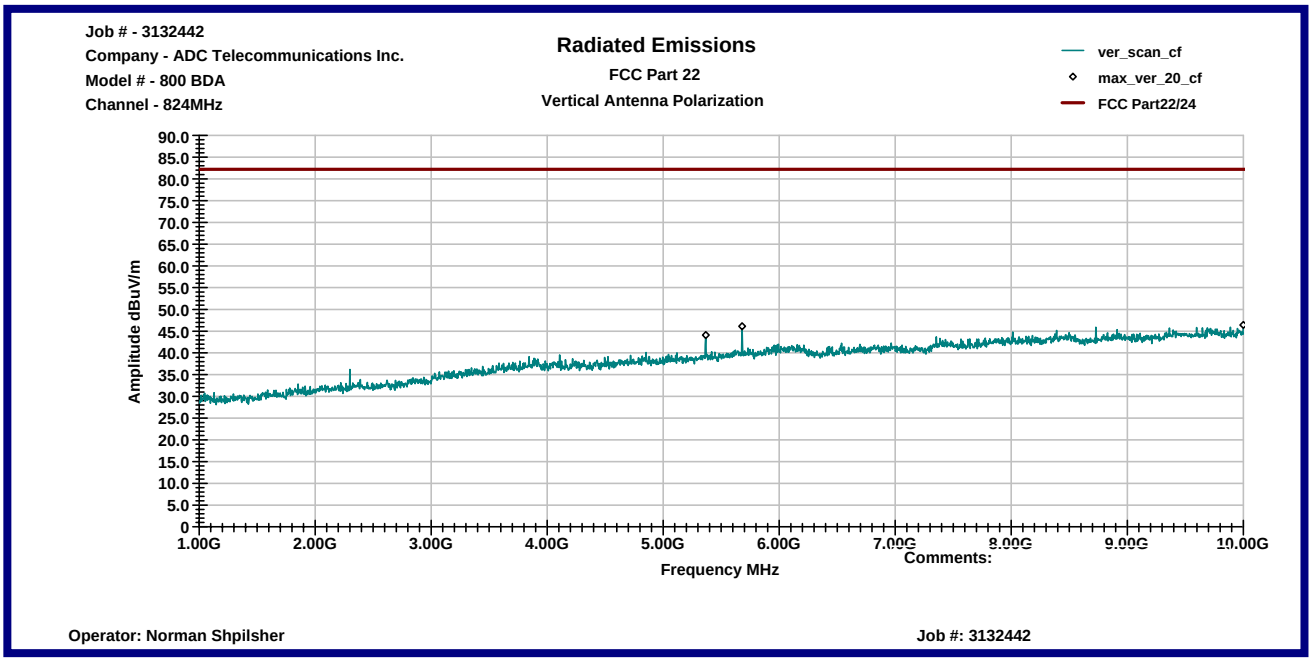
Graph 4



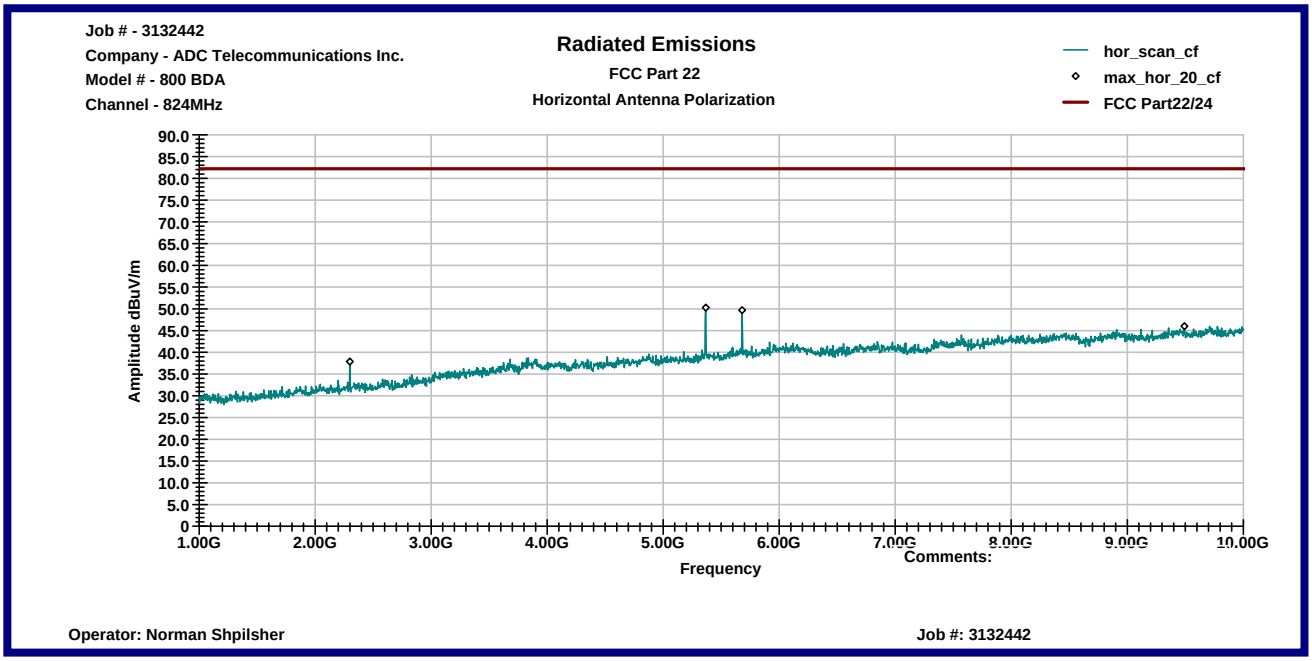
Graph 5



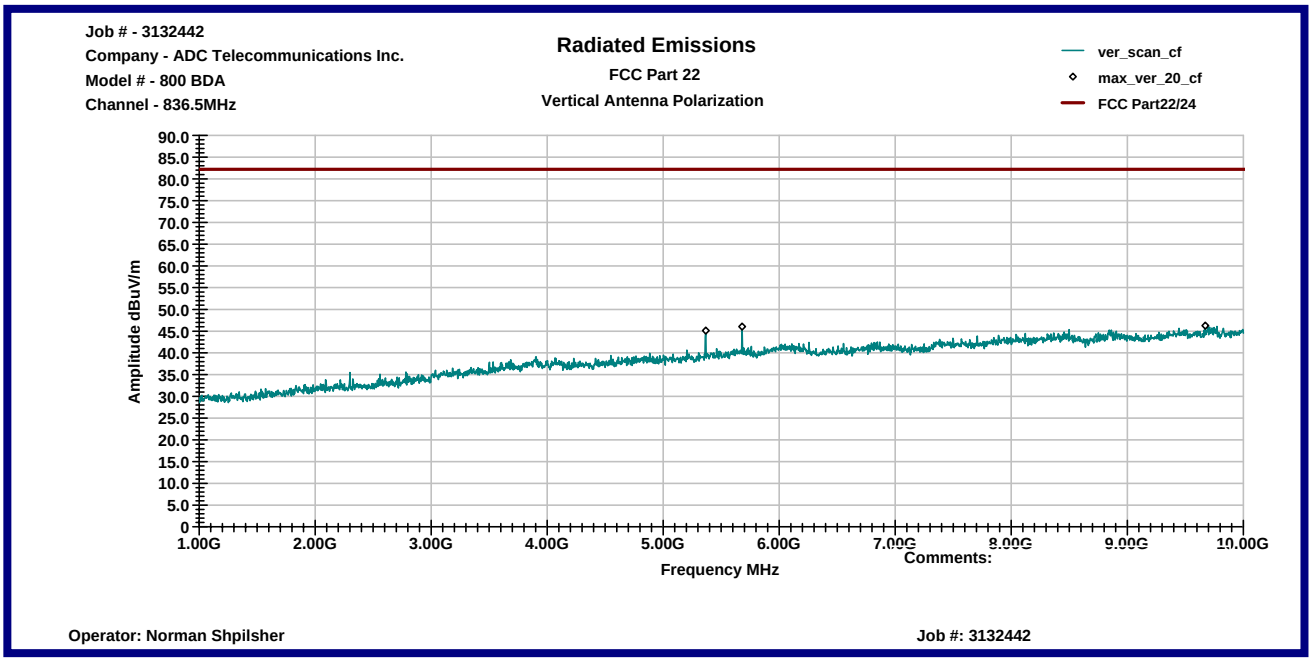
Graph 6



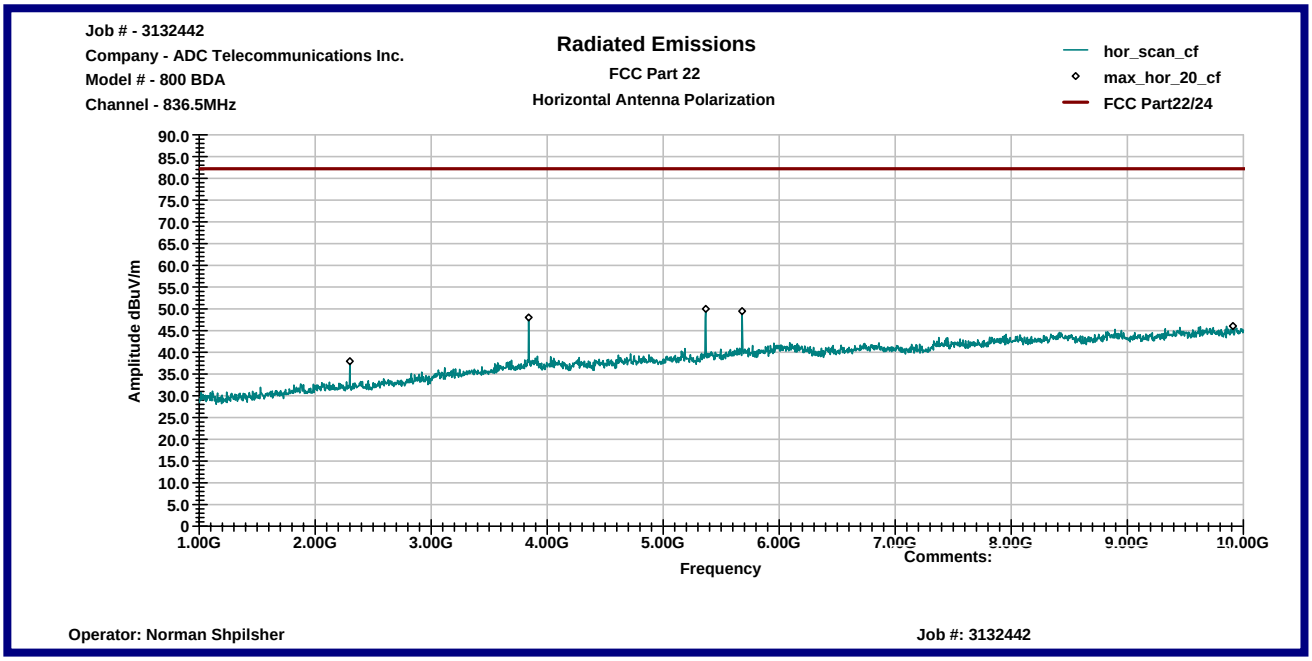
Graph 7



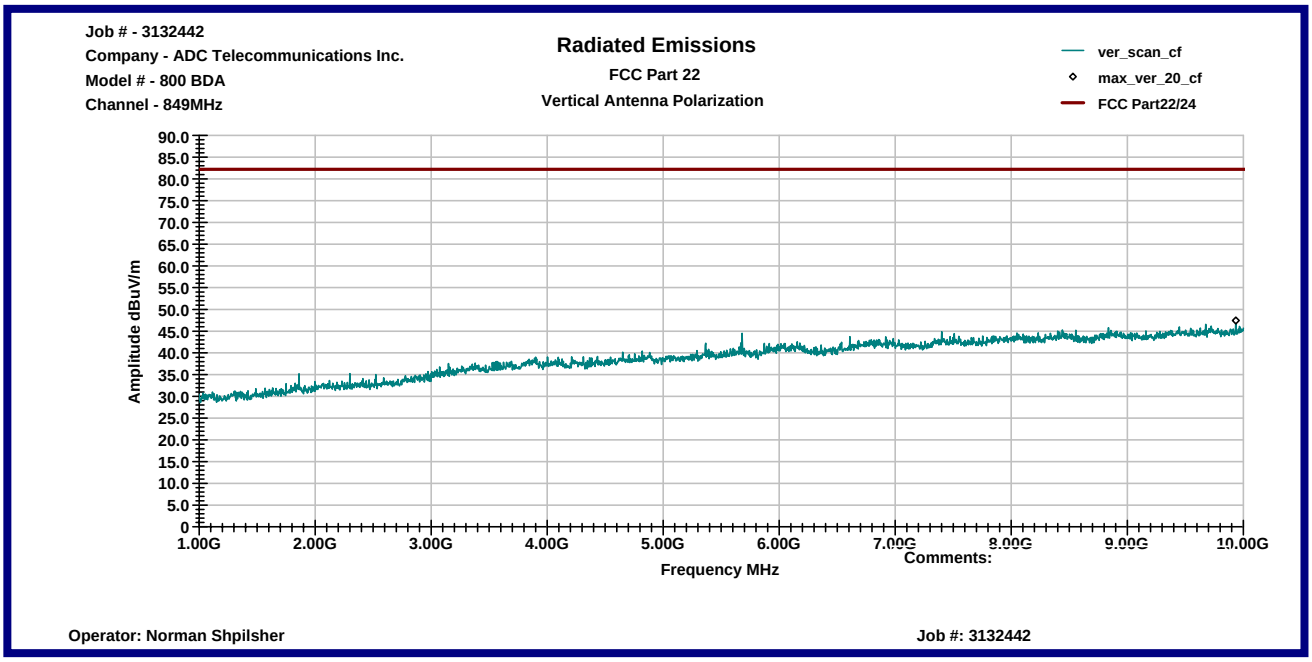
Graph 8



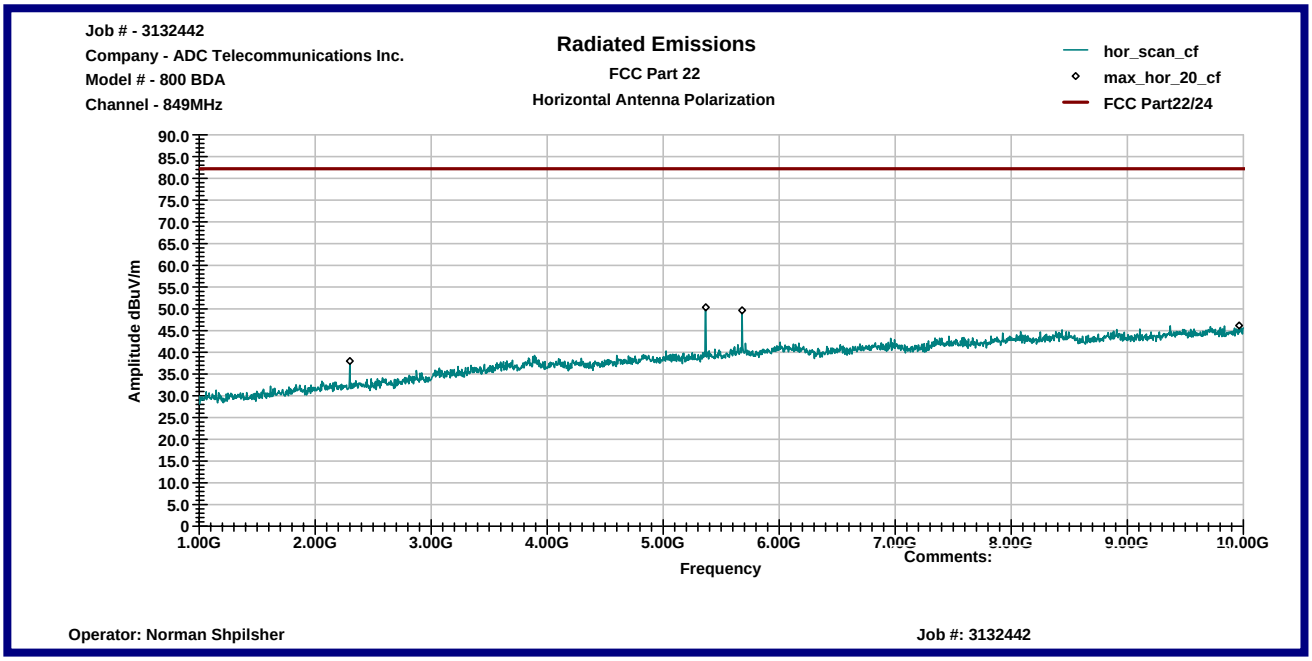
Graph 9



Graph 10



Graph 11



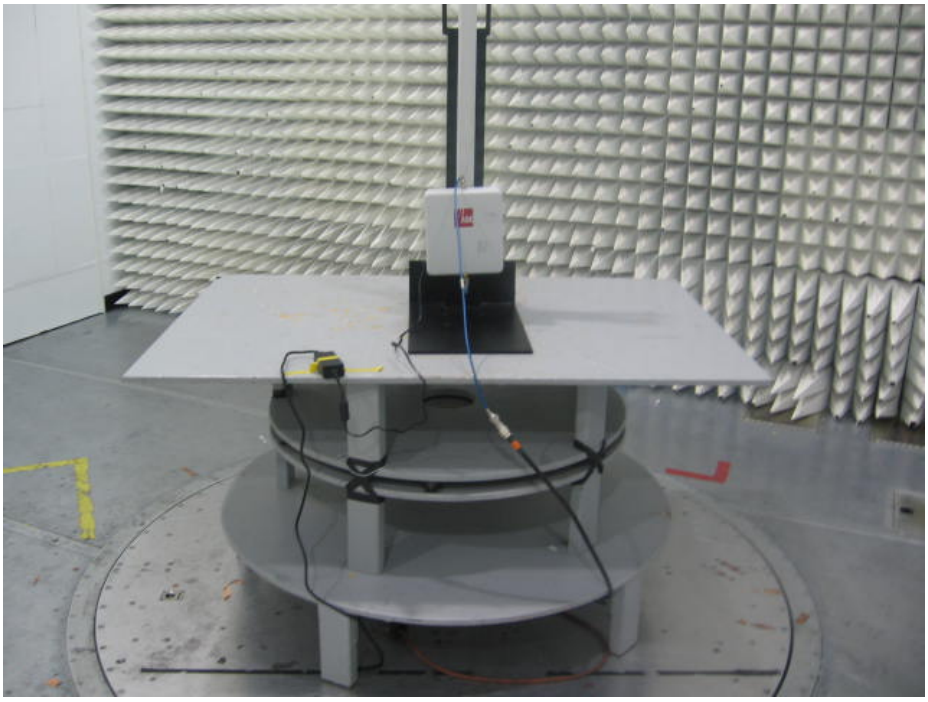
Graph 12

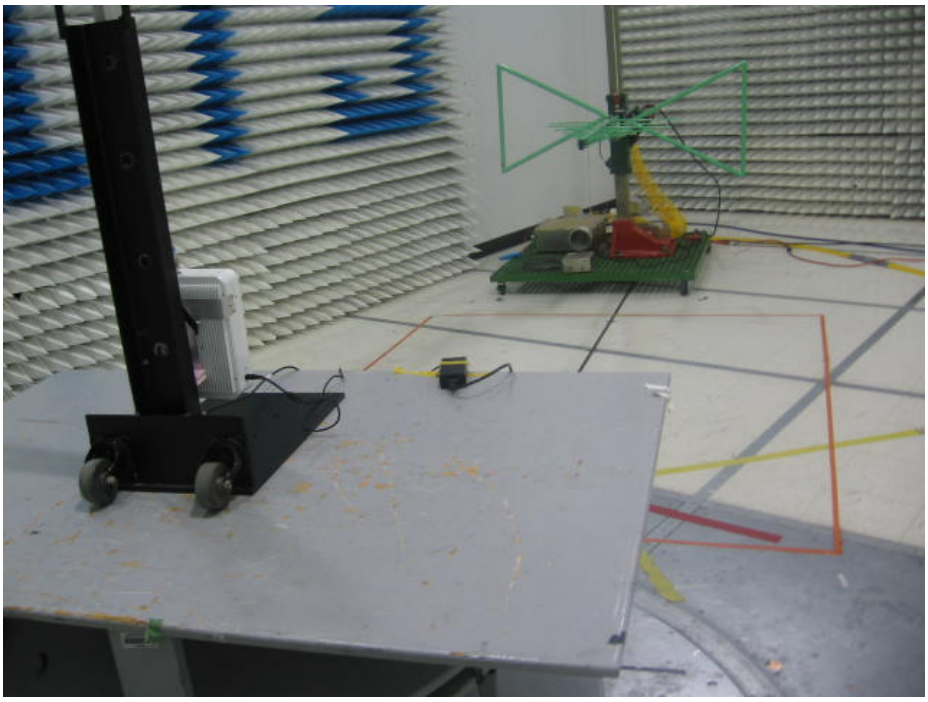
3.1 Environmental conditions

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





5.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Receiver RF Section	HP	85462A	3549A00306	02/27/2008	☐
RF Filter Section	HP	85460A	3448A00276	02/27/2008	☐
Spectrum Analyzer	R & S	FSP 40	100024	08/23/2008	☒
Spectrum Analyzer	R & S	ESCI	100358	04/27/2008	☒
Spectrum Analyzer	Advantest	R3271A	55050084	10/09/2007	☐
Spectrum Analyzer	Agilent	E7402A	MY44212200	10/10/2007	☐
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	07/30/2008	☒
Horn Antenna	EMCO	3115	9507-4513	01/09/2008	☒
Horn Antenna	EMCO	3115	6579	03/06/2008	☐
Waveguide Horn Antenna	EMCO	3116	9904-2423	07/20/2008	☐
Loop Antenna	A.H.Systems	SAS-200/562	215	05/04/2008	☐
Monopole Antenna	A.H.Systems	SAS-200/550-1	692	05/09/2008	☐
LISN	Fischer Custom Communications	FCC-LISN-50-25-2	2014	10/10/2007	☐
LISN	Fischer Custom Communications	FCC-LISN-50-50-4.02	07005	01/30/2008	☐
LISN	Fischer Custom Communications	FCC-TLISN-T4	15333.01	03/01/2008	☐
RF Current Probe	Fischer Custom Communications	F-33-2	330	03/07/2008	☐
Absorbing Clamp	Fischer Custom Communications	F-201	167	03/07/2008	☐
Absorbing Clamp	Fischer Custom Communications	F-201	213	11/09/2007	☐
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	04/24/2008	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	09/15/2007	☐
Pre-Amplifier	HP	8447F OPT H64	3113A04974	03/07/2008	☐
System	TILE! Instrument Control		Ver. 3.4.K.29	VBU	☒
5001ix	California Instruments System	5001	55864, 55863, 55862, 72277	11/09/2007	☐
CTS 3.0.19	California Instruments Harmonic/Flicker Software	632		11/09/2007	☐

7.0 APPENDIX C

Measurement Protocol

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Measurement Protocol

Environmental conditions of the lab, (ADC)
Temperature: 21 - 26º 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 FINAL (dB) (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 place directly on the turntable/ground plane. Interface cable 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.