

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:	<u>P.O. Box 1101</u> <u>Minneapolis, MN 55440-1101</u>
Test Report Number:	<u>MN070803-RX</u>
Test Date(s):	<u>4, 5, 6, 7 September, 2007 (ETL)</u> <u>30 August, 2007 (ADC)</u>

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

Testing Conducted by (ADC): And Report Written by: ADC Telecommunications 5341 12th Ave E Shakopee, MN 55379 Phone: (952) 403-8340 Fax: (952) 403-8858

Mark F. Mesha

Mark F. Miska Compliance Engineer

ADC Telecommunications

1 of 100 MN070803-RX



EMC Emission – TEST REPORT

Test Report File Number:	MN070803-RX Date of Issue: 7 Sept, 2007			
Model Number(s):	<u>RPT-SHAA</u>	4120	000	
Product Name:	Bi-Directional Amplifier – PCS			
Product Type:	<u>Amplifier</u>			
Applicant:	ADC Teleco	omm	nunications	
Manufacturer:	ADC Teleco	omm	nunications	
License Holder:	ADC Teleco	omm	nunications	
Address:	P.O. Box 1101 <u>Minneapolis, MN 55440-1101</u>			
Test Result:		- 1	Positive	• Negative
Test Project Number: Reference(s)		<u>31</u> :	<u>32442MIN-00</u>	2
Total pages including App	endices:	<u>10</u>	<u>2</u>	



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1.0 **REVISION DESCRIPTION**

Rev	Total Pages	Date	Description
Α	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:

^D FCC Part 22

FCC Part 24

- ^D FCC Part 90
- [□] IC RSS-131 Issue 2

Environmental Conditions in the lab:

ADC	<u>ETL</u>
Temperature: 25° C	15-35° C
Relative Humidity: 28%	30-60%
Atmospheric Pressure: 95.8 kPa	86-106 kPa

Power Supply Utilized:

Power Supply System	: 1 phase, 60 Hz, 120 VAC
11 5 5	1 · · ·

2.2 Test Operation Mode

- ^D 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	То
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:

^D As indicated on the data sheet(s)

None

Test Specification Deviations; Additions to or Exclusions from:

- ^D As indicated in the Test Plan
- None

2.14 General Remarks:

None.

2.15 Summary:

The requirements according to the technical regulations are

met

^D not Met

The equipment under test does

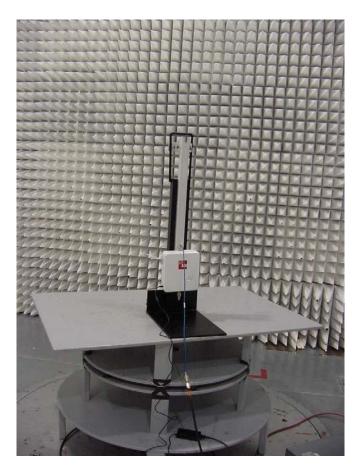
• fulfill the general approval requirements mentioned on page 4.

[□] 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



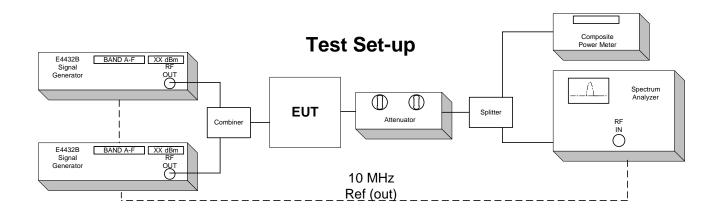
Conducted and Radiated Emission Limits Test for ADC Inc.

Conducted Output Power Test for ADC Inc

Inter-Modulation Test for ADC Inc.

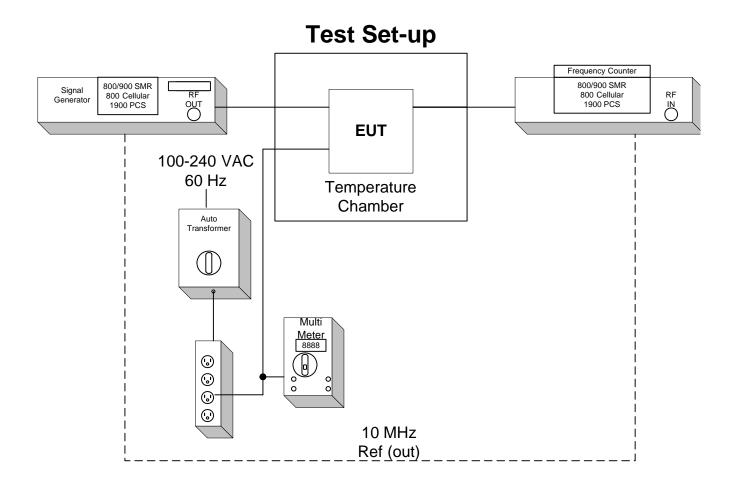
Occupied Bandwidth Modulation Test for ADC Inc.

Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000



Bi-Directional Amplifier – PCS Model Number RPT-SHAAA12000

EUT is specified for indoor use only with temperature range of -5° to +45° 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:

^D ETL (Oakdale, MN)

ADC facility (Shakopee, MN)

Test Distance:

- [□] 3 Meters
- ^D 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 D** 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:

^D 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 D** 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:

^D ETL (Oakdale, MN)

ADC facility (Shakopee, MN)

Test Equipment (ADC):

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	Staco	1520CT	MC44655	CNR
Transformer				
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 + 10log(P) dB, or –13 dBm.

Outside of the carrier emissions bandwidth: 26 dB below the transmitter power

Test Data:

<u>Conducted Emissions</u>, pages 15 – 36 <u>Intermodulation Test</u>, pages 38 – 70 <u>Occupied Bandwidth</u>, pages 71 – 77 Radiated Emissions, pages 79 – 99 (<u>Appendix B</u>) Test Engineer: Mark F. Miska Date: 30 August, 2007 Date: 30 August, 2007 Date: 30 August, 2007

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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

Back

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10_{th} 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 (19dBm - [43 + 10log(0.08W)])

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.

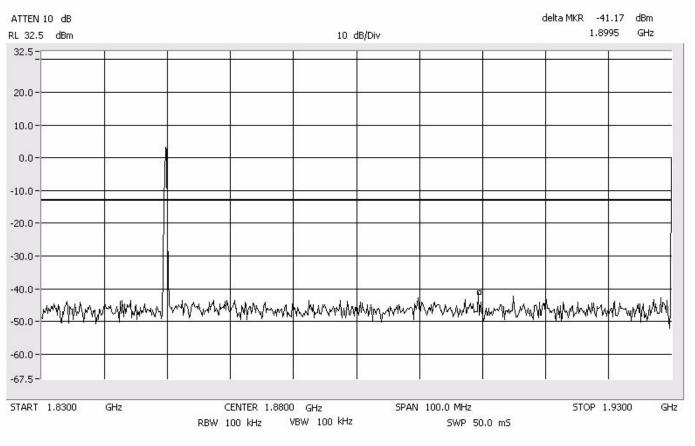
This equipment does not modulate the RF, so there is no modulation limiter. This equipment does not change the modulation of the RF or the occupied bandwidth of any channel. It transports the signal, as is, over an optical link. The RF input is not changed in the RF output.

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

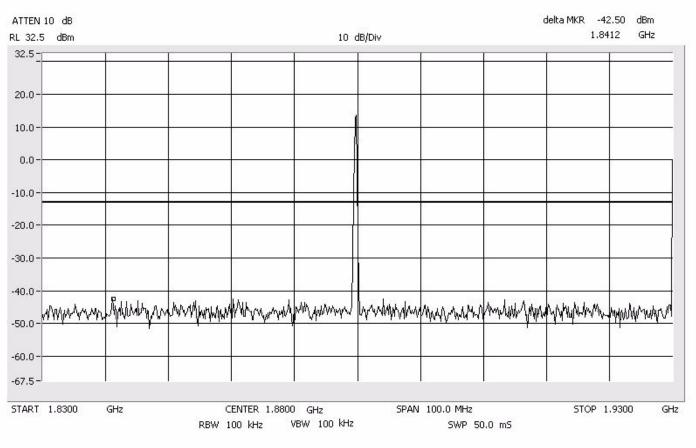


Conducted Emissions Low **PCS 1900 MHz**

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

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START	30	MHz		ENTER 10.02 .0 MHz \	GHz /BW 1.0 MHz		19.97 GHz SWP 40	10 mS	MN0 STOP 2)70803-RX	

Conducted Emissions Mid PCS 1900 MHz



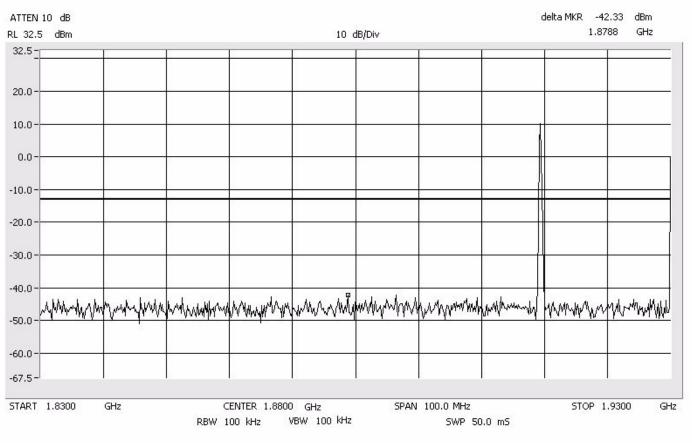
Conducted Emissions Mid PCS 1900 MHz

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

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Conducted Emissions High PCS 1900 MHz

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

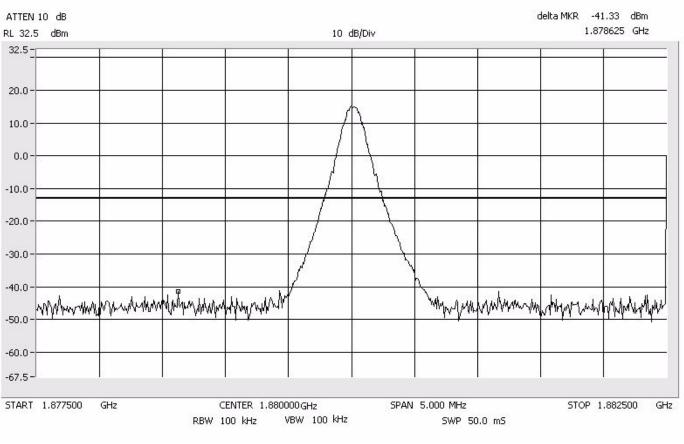


Conducted Emissions High PCS 1900 MHz

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

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RT 30 MHz	CENTER 10.02 GHz	SPAN 19.97 GHz	ST	TOP 20.00

Conducted Emissions TDMA 1900 MHz



Conducted Emissions TDMA 1900 MHz

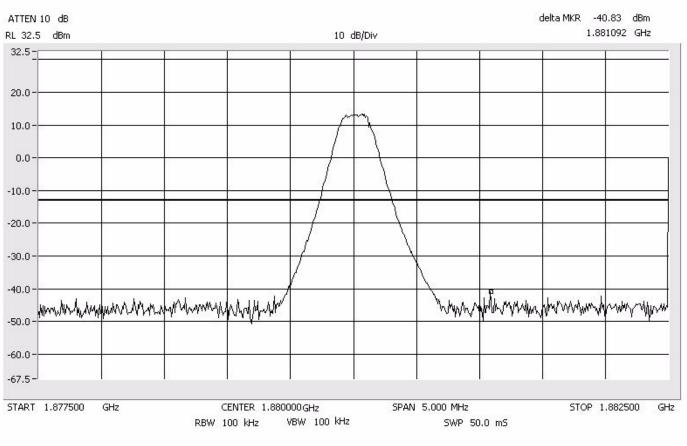
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

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5_			19 of 100
RT 30.0 MHz C	ENTER 515.0 MHz SPAN	970.0 MHz	MN070803-RX STOP 1.0000 G

Conducted Emissions TDMA 1900 MHz

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Conducted Emissions GSM 1900 MHz



Conducted Emissions GSM 1900 MHz

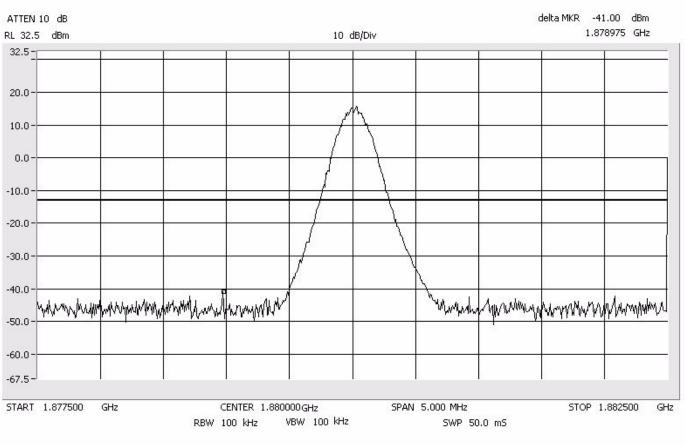
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

ATTEN 10 dB			delta MKR -37.17 dBm 804.4 MHz
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			MN070803-RX
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Conducted Emissions GSM 1900 MHz

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Conducted Emissions EDGE 1900 MHz



Conducted Emissions EDGE 1900 MHz

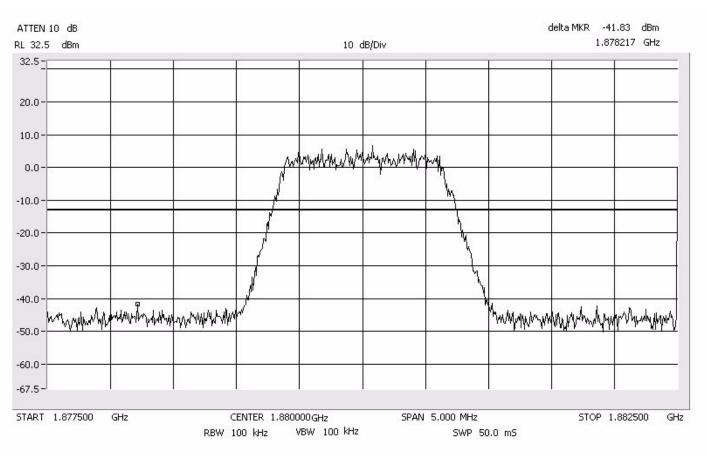
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

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Conducted Emissions EDGE 1900 MHz

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START	1.00		GHz		ENTER 10.50 .0 MHz \	GHz /BW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP 2	0.00 GHz

Conducted Emissions CDMA 1900 MHz



Conducted Emissions CDMA

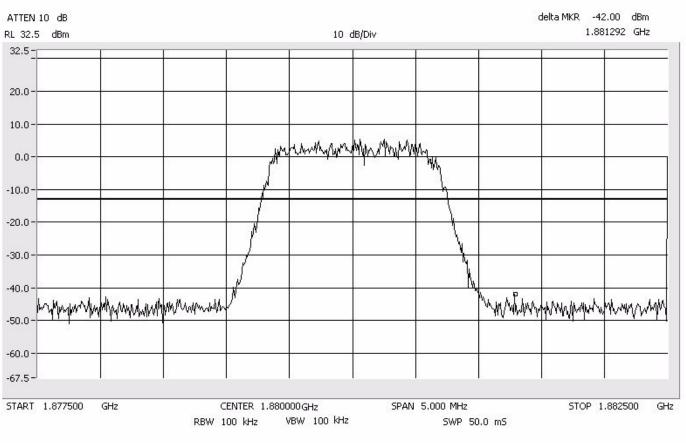
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

delta MKR -37.83 dBm ATTEN 10 dB 586.1 MHz RL 32.5 dBm 10 dB/Div 32.5-20.0 10.0 0.0 -10.0 -20.0 -30.0 In provide a second way when the second way we way the provide the second way way and the second way way and the -40.0 -50.0 -60.0 -67.5-25 of 100 MN070803-RX STOP 1.0000 START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz GHz RBW 300 kHz VBW 300 kHz SWP 50.0 mS

Conducted Emissions CDMA 1900 MHz

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Conducted Emissions EVDO 1900 MHz



Conducted Emissions EVDO 1900 MHz

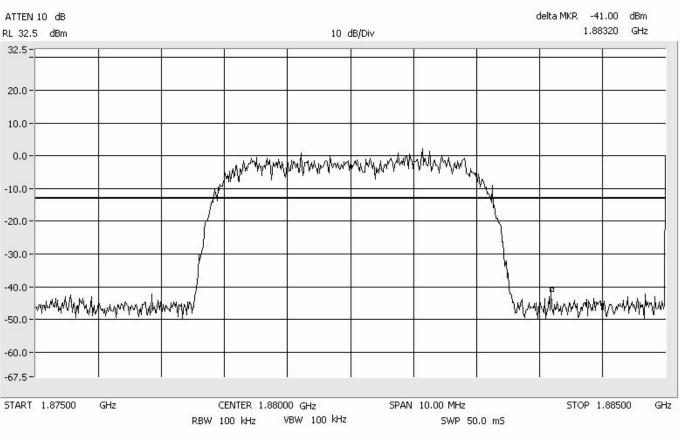
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

delta MKR -38.00 dBm ATTEN 10 dB 880.4 MHz RL 32.5 dBm 10 dB/Div 32.5-20.0 10.0 0.0 -10.0 -20.0 -30.0 han and a second and a second and the -40.0 -50.0 -60.0 -67.5-27 of 100 MN070803-RX STOP 1.0000 START 30.0 MHz CENTER 515.0 MHz SPAN 970.0 MHz GHz RBW 300 kHz VBW 300 kHz SWP 50.0 mS

Conducted Emissions EVDO 1900 MHz

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-50.0-	<u>~</u>										
-60.0-			-	-					-		
-67.5-						N			S.		
START	1.00		GHz		ENTER 10.50 .0 MHz \	GHz /BW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP 2	0.00 GHz

Conducted Emissions W-CDMA 1900 MHz



Conducted Emissions W-CDMA 1900 MHz

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

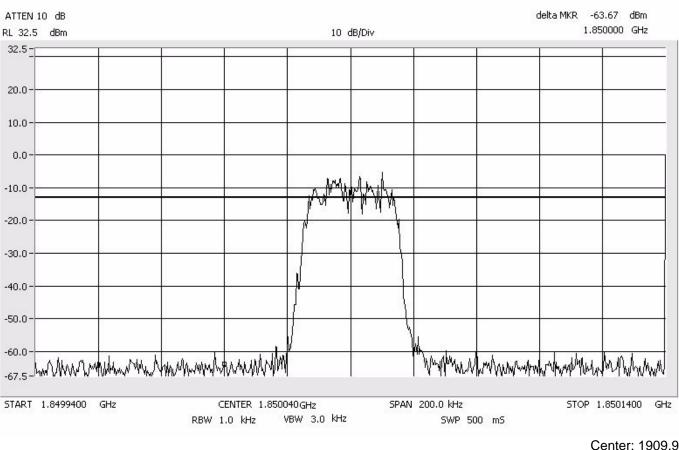
2.5 dBm		10 dB/Div			
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Ale hall cumpare Marker and a dealer a	water a feature of the second	e an col a constraine surface	And a state of the contract of	و القوا فجد عدا و البلو، همه ، عدره	
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.T 30.0 MHz	CENTER 515.0 MHz	SPAN 970.0	R.N. 1-	MN070803-RX STOP 1.0000	

Conducted Emissions W-CDMA 1900 MHz

	10 dB						1- 1			delta MKR -3 16. ¹	
	5 dBm	1				10	dB/Div			10,	52 902
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20.0-									-		
10.0-			•	5 ·	0	1	~	~			
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10.0-		3									
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50.0-					<u>.</u>				-		-
67.5-			h.			l.	ł.	ł.	l.		
START	1.00		GHz		ENTER 10.50 .0 MHz \	GHz /BW 1.0 MHz		l 19.00 GHz SWP 38	30 mS	STOP :	20.00 GH2

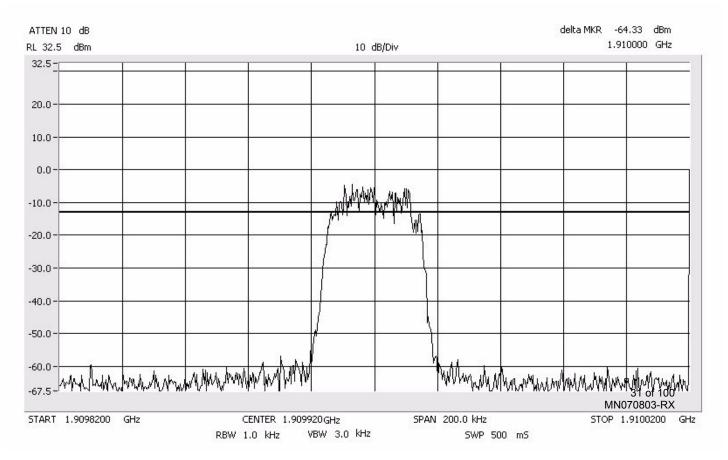
Center: 1850.04 Span: 200 kHz RBW: 1 kHz VBW: 3 kHz

Band Edge TDMA



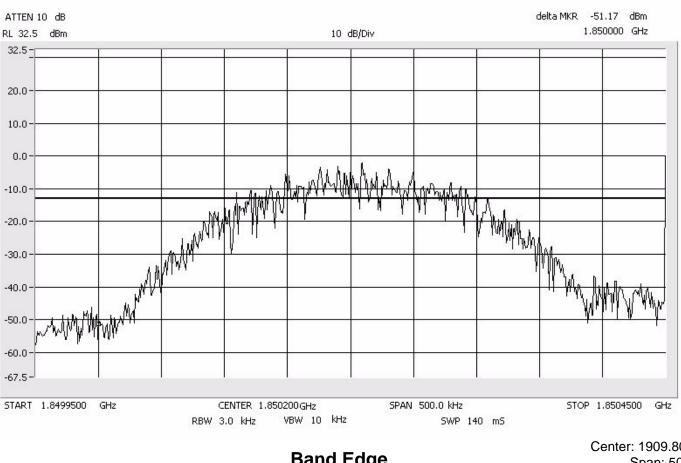
Band Edge TDMA

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

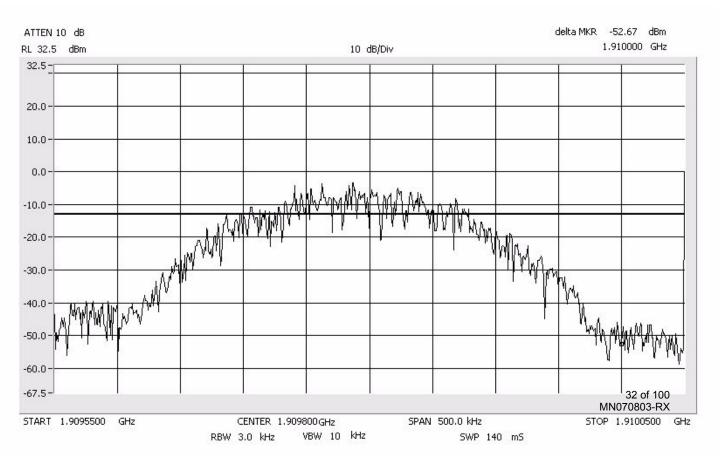


Center: 1850.20 Span: 500 kHz RBW: 3 kHz VBW: 10 kHz

Band Edge GSM

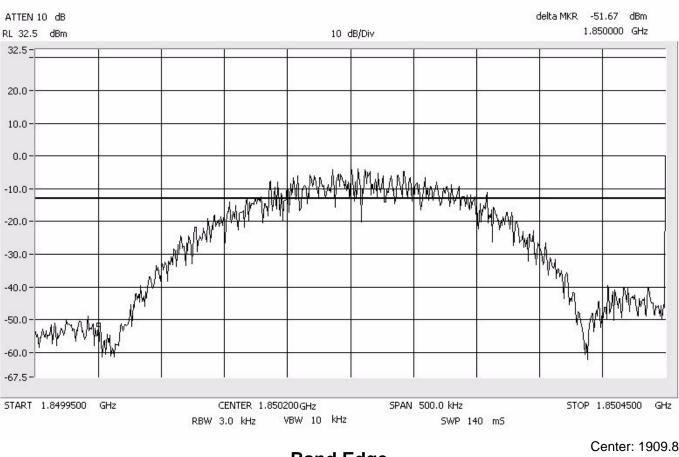


Band Edge GSM Center: 1909.80 MHz Span: 500 kHz RBW: 3 kHz VBW: 10 kHz

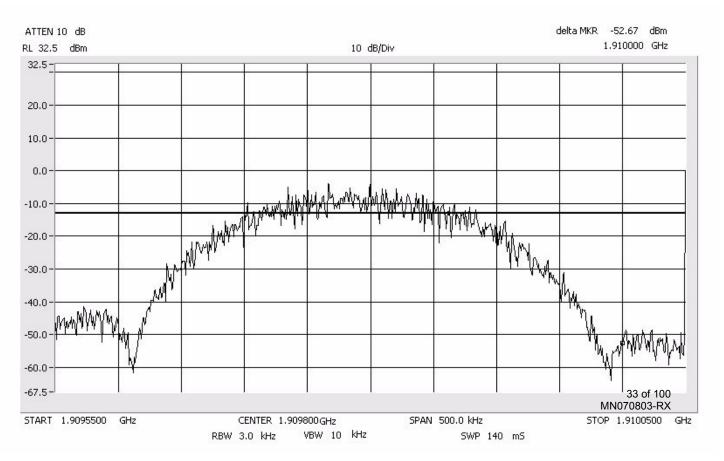


Center: 1850.20 Span: 500 kHz RBW: 3 kHz VBW: 10 kHz

Band Edge EDGE

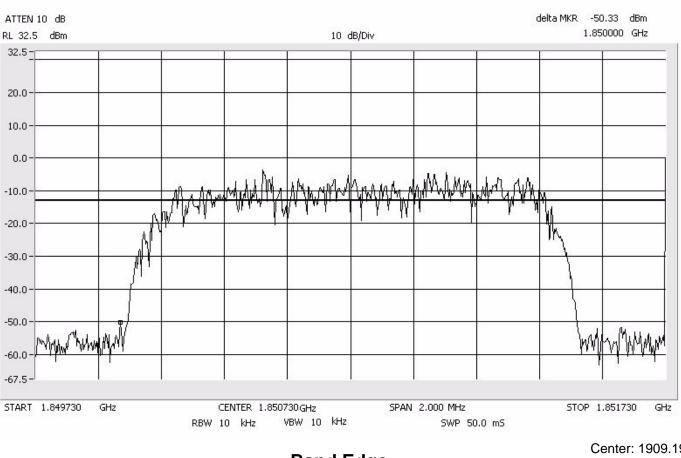


Band Edge EDGE Center: 1909.80 MHz Span: 500 kHz RBW: 3 kHz VBW: 10 kHz



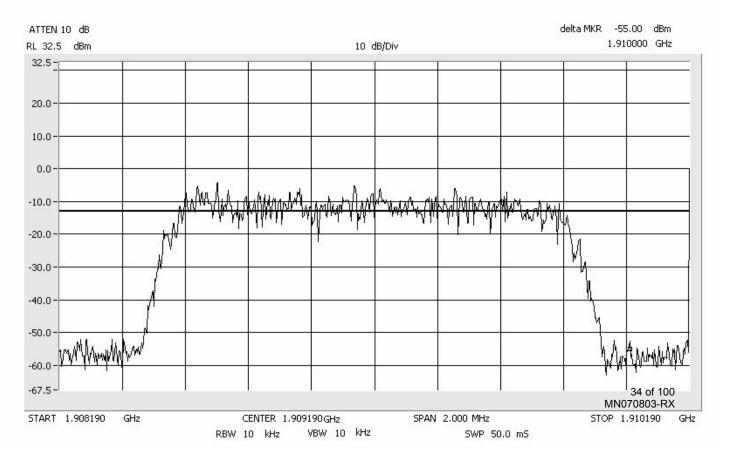
Center: 1850.73 Span: 2 MHz RBW: 10 kHz VBW: 10 kHz

Band Edge CDMA



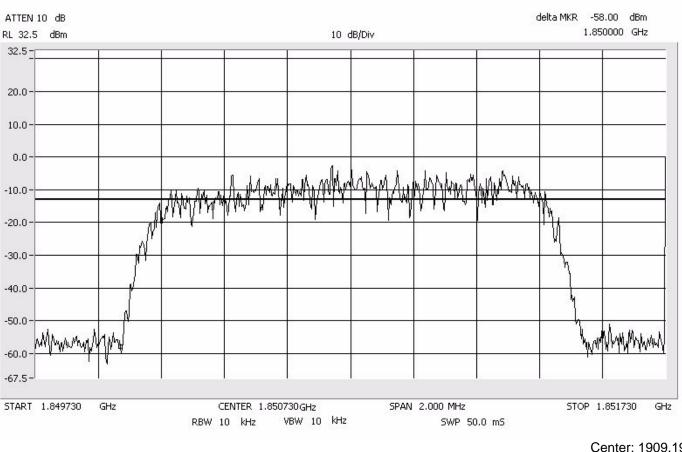
Band Edge CDMA

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



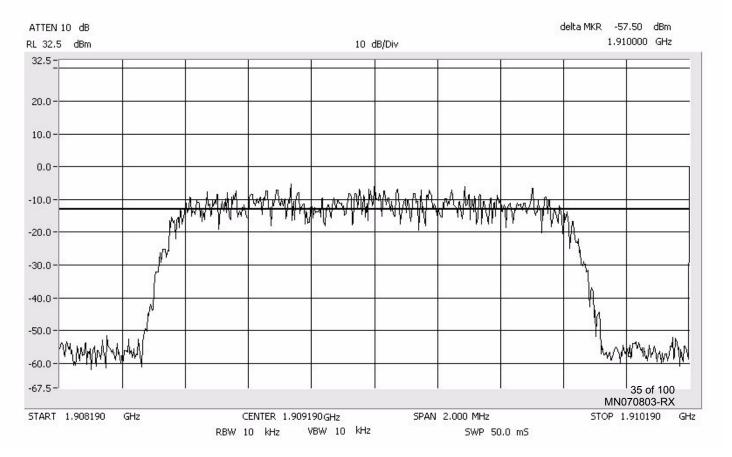
Center: 1850.73 Span: 2 MHz RBW: 10 kHz VBW: 10 kHz

Band Edge EVDO



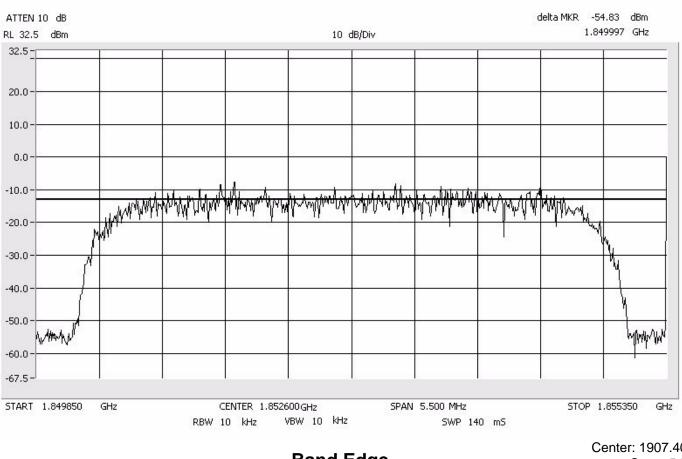
Band Edge EVDO

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



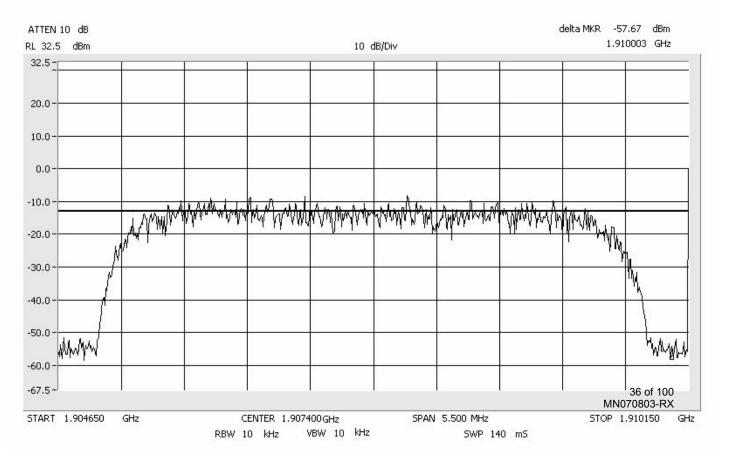
Center: 1852.60 Span: 5.5 MHz RBW: 10 kHz VBW: 10 kHz

Band Edge W-CDMA



Band Edge W-CDMA

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



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.

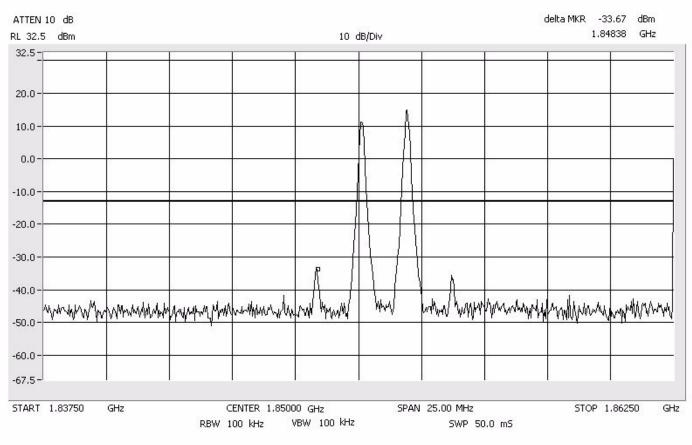
TDMA	103.03 mWatts
Carrier Frequency	Carrier Output
1850.2 MHz	<u>19.57</u> dBm
1880.0 MHz	<u>20.13</u> dBm
1909.8 MHz	<u>19.87</u> dBm
GSM	99.77 mWatts
Carrier Frequency	Carrier Output
1850.2 MHz	<u>19.67</u> dBm
1880.0 MHz	<u>19.99</u> dBm
1909.8 MHz	<u>19.10</u> dBm
EDGE	112.20 mWatts
Carrier Frequency	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	<u>115.61 Watts</u> Carrier Output
Carrier Frequency 1850.8 MHz	Carrier Output 20.27 dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm
Carrier Frequency 1850.8 MHz	Carrier Output 20.27 dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u>
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm <u>19.87</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz W-CDMA	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm <u>19.87</u> dBm <u>107.89 Watts</u>
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz 1909.2 MHz W-CDMA Carrier Frequency	Carrier Output 20.27 dBm 20.63 dBm 20.20 dBm 103.03 Watts Carrier Output 20.13 dBm 19.87 dBm 19.87 dBm 107.89 Watts Carrier Output
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz W-CDMA Carrier Frequency 1852.6 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm <u>19.87</u> dBm <u>107.89 Watts</u> Carrier Output <u>20.25</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz W-CDMA Carrier Frequency 1852.6 MHz 1880.0 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm <u>19.87</u> dBm <u>107.89 Watts</u> Carrier Output <u>20.25</u> dBm <u>20.20</u> dBm
Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz EVDO Carrier Frequency 1850.8 MHz 1880.0 MHz 1909.2 MHz W-CDMA Carrier Frequency 1852.6 MHz	Carrier Output <u>20.27</u> dBm <u>20.63</u> dBm <u>20.20</u> dBm <u>103.03 Watts</u> Carrier Output <u>20.13</u> dBm <u>19.87</u> dBm <u>19.87</u> dBm <u>107.89 Watts</u> Carrier Output <u>20.25</u> dBm

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

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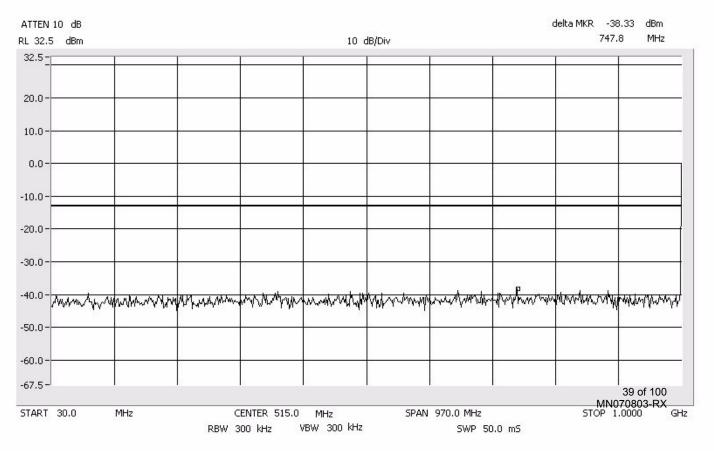
The inter-modulation products test was performed for the EUT. Three tests were preformed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and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

Results: (See Plots)

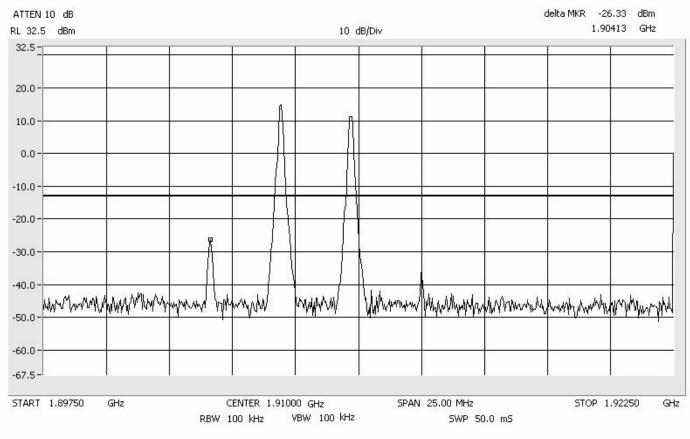


TDMA

Intermodulation Close - Lower PCS 1900 MHz

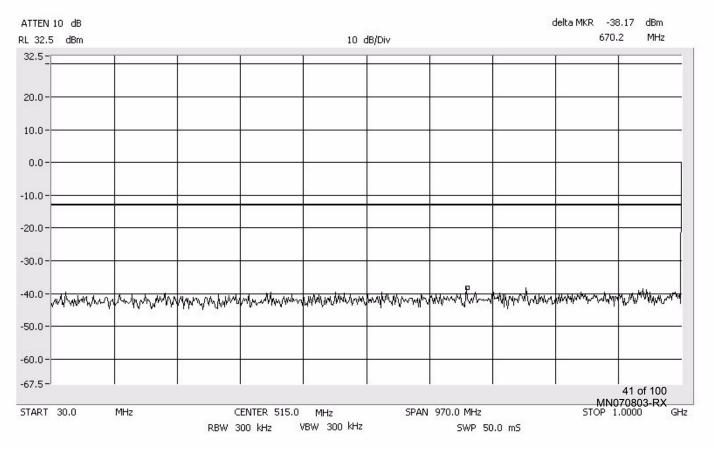


ATTEN RL 32.	J10 dE 5 dBn					10	dB/Div		c	lelta MKR -30 7.71	
32.5								ŀ			
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10.0-								·			
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50.0-	-										
60.0-	-			-		-			-		
67.5-			57 57		97		ł.				
5TART	1.00		GHz		ENTER 10.50 .0 MHz '	GHz VBW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP 2	0.00 GH:



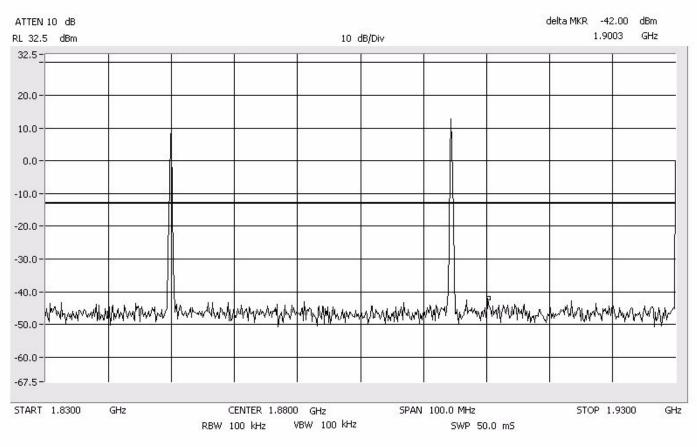
TDMA

Intermodulation Close - Upper PCS 1900 MHz



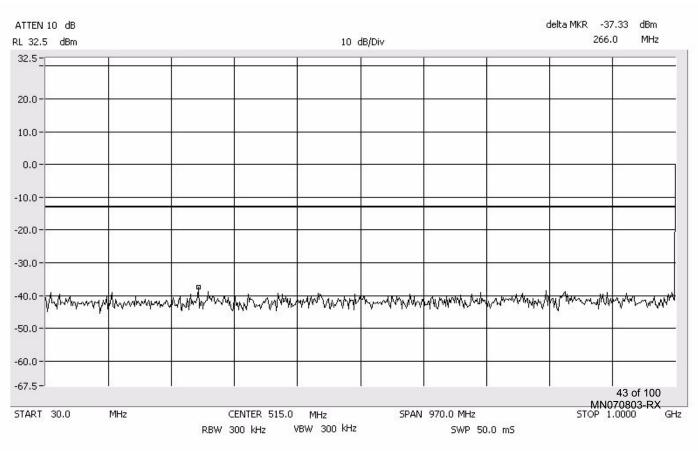
	10 de 5 dBr							delta MKR -30.17 dBm 15.44 GHz			
RL 32. 32.5-		n	Γ	1		10 (B/Div	l		1	
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0.0-	- 				2					è	ļ
-10.0-					22		-	-		-	-
-20.0-			1		-				-		
-30.0-		aster				1.44.54		n Marman	mm	mound	when the state
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-50.0-											
-60.0-				1.		- 	e ¹	1 ² 3	-	-1	
-67.5 -											
START	1.00		GHz		ENTER 10.50 .0 MHz \	GHz /BW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP 2	:0.00 GHz

Intermodulation Apart - AF PCS 1900 MHz



TDMA

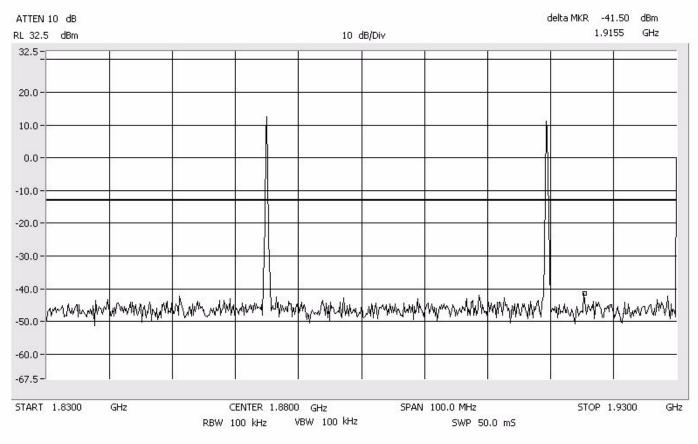
Intermodulation Apart - AF PCS 1900 MHz



Intermodulation Apart - AF PCS 1900 MHz

	10 dE						delta MKR -30.83 dB 10 dB/Div 16.42 GF					
RL 32.5-		n	2.55 1			10	arinin arinin					
- 22.5												
20.0-										-		
10.0-		1	0	1		n -			5			
0.0-	- 								-			
-10.0-					5>	25						
-20.0-							-			-		
-30.0-	sh a	Laborer			110-00-0			handhriden	www.howhere	Anna	Mar Marrian	
-40.0-			mangunah	programme and	our r m	-whwhere and a	and found that the		<u>.</u>	93 0		
-50.0-					2.	2						
-60.0-					5							
-67.5-			1								ł:	
START	1.00		GHz		ENTER 10.50 .0 MHz ^V	GHz VBW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP 2	20.00 GHz	

Intermodulation Apart - DC PCS 1900 MHz



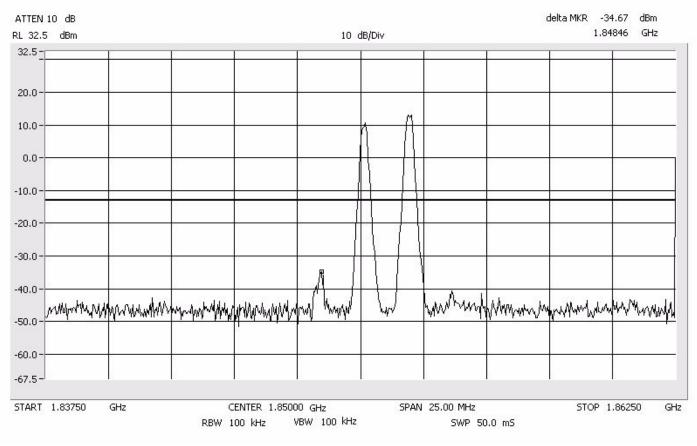
TDMA

Intermodulation Apart - DC PCS 1900 MHz

ATTEN 10 dB			delta MKR -38.17 dBm 508.5 MHz
L 32.5 dBm	10 dB/Di	N.	500.5 MHz
32.5			
20.0-			
10.0-			
0.0 -			
10.0 -			
20.0-			_
30.0-			
40.0- WWWWWWWWWWW	when more and the second s	ntopopoliticon	and the for the second of the second s
50.0-			
60.0-			
67.5-	L L L		
			45 of 100
5TART 30.0 MHz	CENTER 515.0 MHz	SPAN 970.0 MHz	STOP MIND 0803-RAH

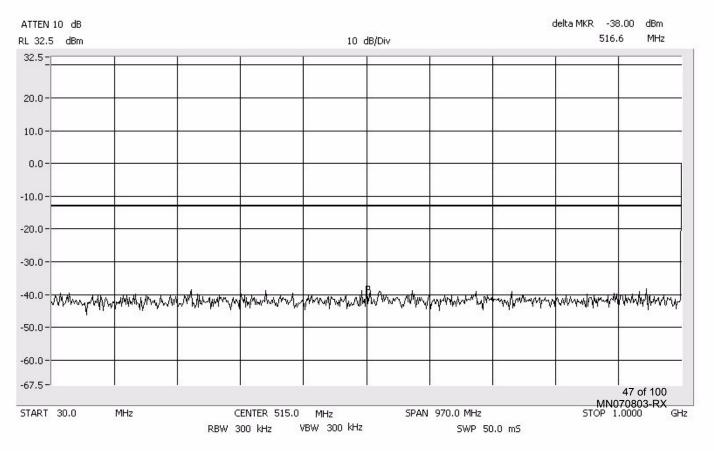
Intermodulation Apart - DC PCS 1900 MHz

ATTEN 10 L 32.5					10.5	dB/Div			delta MKR -3 19.	
32.5	dom	1	-	F					-	1
20.0										
10.0										
0.0-	1 1 1 1 1				11 11				- C-	
10.0-										
20.0							S.			
30.0-	Mullum	Waren werden	manharaman	mpromition	hunna	munuhan	manymon	harman	hannara	Mummul
+0.0-		b. a downlike out	a dhadhar da an a'							
50.0			2				-		-	
50.0-					2. 1.			-1		
67.5-		ŀ	<u> </u>	ł.		ł.		L	ł.	
TART 1	.00	GHz		CENTER 10.50 1.0 MHz ³	GHz VBW 1.0 MHz		19.00 GHz SWP 38	30 mS	STOP	20.00 GH

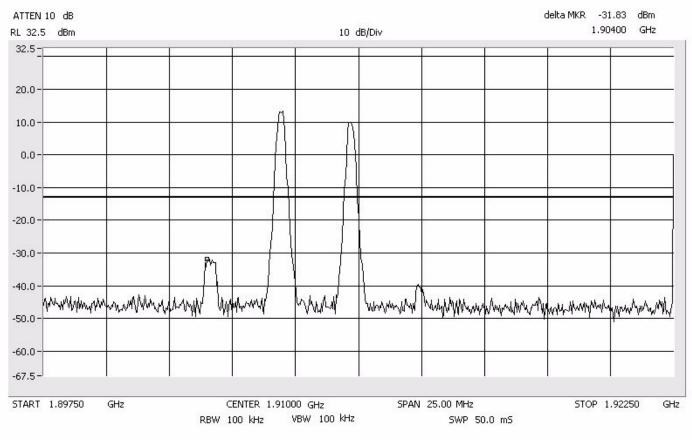


GSM

Intermodulation Close - Lower PCS 1900 MHz

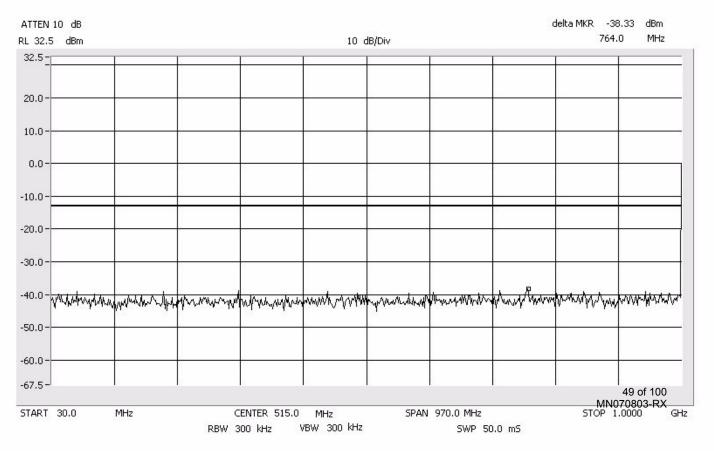


ATTEN						10-2	dB/Div			delta MKR - 15	30.67 dBm .38 GHz
RL 32.5 32.5 -					I	10 1					
20.0-											
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-10.0-		2	5-			52					-
-20.0-											
-30.0-	de 1	mm			. Markan	una da da da		L. Maryan	www.	www.w	www.www.
40.0-	J-myr 1	0.000	· www.where	- MANANA-AV "	odre a me	w na han	en andre den verber		92. 39 g	10 	2. 40. 2629
-50.0-	~			v							
60.0-											
67.5-	8							ł.		ł.	ł
START	1.00		GHz		ENTER 10.50	GHz /BW 1.0 MHz		I 19.00 GHz SWP 38	30 mS	STOP	20.00 GHz



GSM

Intermodulation Close - Upper PCS 1900 MHz



ATTEN RL 32.5						10 -	∃B/Div		c	delta MKR -3 16.3	
32.5-						10 0		-			
20.0-				-							
10.0-				1	1.						
0.0-				-							
-10.0-				52		32					
-20.0 -											
-30.0-	mak	Much	1		noutronterne	to the sume state.	mathing in the	Man Normal	www.		mmm
-40.0-			- Www.w	when the second		defed and an an	la ant a concertrat	A			
-50.0 -	~										
-60.0-											
-67.5-	8				I.						ŧ:
START	1.00		GHz		ENTER 10.50	GHz /BW 1.0 MHz		19.00 GHz SWP 38	0 mS	STOP 2	20.00 GHz