



# Retlif Testing Laboratories

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## REPORT OF MEASUREMENTS

FOR  
CELLULAR SPECIALTIES, INC.

CELLULAR REPEATER SYSTEM

MODEL: CS12-555-400

FCC ID: NVRCS12-555-400

**Company Name:** Cellular Specialties, Inc.

**Date of Report:** December 14, 2010

**Test Report No:** R-5240N-1

**Test Start Date:** November 5, 2009

**Test Finish Date:** December 14, 2010

**Test Technician:** Matt Seamans

**Laboratory Supervisor:** Todd Hannemann

**Report Prepared By:** Jamie Ramsey

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## Certification and Signatures

We certify that this report is a true report of the results obtained from the tests of the equipment stated and relates only to the equipment tested. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



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Scott Wentworth  
Branch Manager  
NVLAP Approved Signatory



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Todd Hannemann  
Laboratory Supervisor

### **Non-Warranty Provision**

The testing services have been performed, findings obtained, and reports prepared in accordance with generally accepted testing laboratory principles and practices. This warranty is in lieu of all other warranties, either express or implied.

### **Non-Endorsement**

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement, or certification of the product or material tested. This report must not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the U.S. Government.

## CERTIFICATION APPLICATION SUMMARY

Applicant/Manufacturer: Cellular Specialties  
670 North Commercial Street  
Manchester, NH 03101

Equipment under Test (EUT): The EUT is a Cellular Repeater System (Cellular Amplifier)

Model: CS12-555-400

FCC ID Number: FCC ID: NVRCS12-555-400

Applicable Test Standard: FCC Parts 2 & 22

Measurement Procedure: ANSI/TIA-603-C-2004

Device Classification: Mobile

EUT Frequency Range Band: Uplink: 824MHz to 849MHz  
Downlink: 869MHz to 894MHz

Power Output Rating for Certification Grant based on Max input single channel: Uplink: +32.38dBm = 1.73W  
Downlink: +26.97dBm = 0.50W

Modulation Type: CDMA (F9W)

RF Exposure + Antenna Installation: See Attached Installation/Users Manual and MPE Evaluation

Measurements Required by FCC: See Report Section 1 (Summary of Test Program) and the following Test Report Data Attachments:

- RF Power Output
- Intermodulation Characteristics (Two-Tone)
- Occupied Bandwidth
- Spurious Emissions at Antenna Terminals
- Effective Radiated Power of Spurious Radiation
- Frequency Stability

## SECTION 1 SUMMARY OF TEST PROGRAM

### INTERMODULATION CHARACTERISTICS (TWO TONE)

#### Measurement Procedure:

Two signals were injected, in turn, to each uplink and downlink frequency band via a two way power combiner. Testing was performed at both the low band edge and high band edge of each pass band. The output of each signal generator was adjusted so that the two output fundamental frequencies were equal in magnitude. Testing was performed for CDMA Modulation type. At the maximum specified input power levels all intermodulation products were at -13dBm or below. See attached test data.

### OCCUPIED BANDWIDTH

#### Measurement Procedure:

For Occupied Bandwidth, measurements were made to compare the input signal to the output signal. The signal generator output was connected to the spectrum analyzer. A CDMA modulation signal was then applied to the carrier. Waveforms were then noted on an X-Y plot. Next, the signal generator was connected to the EUT and the output of the EUT was connected to the spectrum analyzer. The output waveform after amplification was then compared to the original input signal to ensure that no significant differences occurred between the input signal and the amplified signal. Testing was performed at one frequency within each passband (uplink and downlink). See Occupied Bandwidth Data.

### SPURIOUS EMISSIONS AT ANTENNA TERMINALS

#### Measurement Procedure:

The signal generator output was connected in turn to the uplink and downlink input ports of the EUT. The input power level was at the maximum level which was ascertained during the Power Output test. A spectrum analyzer was connected to the output of the EUT. The input test frequencies used were three frequencies (low, mid & high) within each passband (uplink and downlink). The level of any spurious emission was recorded. Testing was performed in the frequency range of 30MHz to 9GHz. Testing was performed for CDMA modulation type. The spurious emissions limit is -13dBm as specified in FCC Part 22. All emissions were below the specified -13dBm limit. See attached test data.

## EFFECTIVE RADIATED POWER OF SPURIOUS RADIATION

### Measurement Procedure:

The test sample was placed on an 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed test site. A signal generator was connected to the input of the amplifier. The signal generator output was set to provide the input power level necessary to achieve maximum output power of the amplifier at 3 frequencies (low, mid & high) within each passband (uplink and downlink). The effective radiated power of each out of band spurious emission was measured using the substitution method specified in ANSI/TIA-603-C-2004. The frequency range of the test was 30MHz – 9GHz. The limit for out of band spurious emissions is -13dBm as specified in Part 22. All emissions were below the specified -13dBm limit. See attached test data.

## RF POWER OUTPUT

A signal generator was connected in turn to the uplink and downlink ports of the test sample. The signal generator was set to provide maximum input with the amplifier operating at maximum gain. The maximum single channel output power for both the uplink and down link was measured with a power meter connected to the output port. The measured output power matched the manufacturer's rated output power. See attached test data.

## FREQUENCY STABILITY MEASUREMENTS

The test sample was placed into a temperature chamber with the DC input power supplied through a variable power source. A signal generator was used to provide the input signal and the output was measured with a frequency counter. With the test sample operating at maximum output power the test sample's output frequency was measured and recorded at the extremes of the temperature range and at 10 degree increments from -30 degrees C to +50 degrees C while the DC input voltage was varied from 85 to 115% of nominal. The output frequency for both the uplink and downlink stayed within the assigned frequency band. See attached test data.

## SECTION 2

### EQUIPMENT LISTS

#### Spurious Radiated Emissions

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3116	Pre-Amplifier	Miteq	0.1 GHz - 18 GHz	AFS42-35	1/21/2009	1/21/2010
3117	Power Supply	B&K Precision	0-30 Vdc, 3.0 A	1630	1/31/2009	1/31/2010
3258	Double Ridge Guide	EMCO	1 - 18 GHz	3115	8/20/2009	8/20/2010
4029B	Test Site Attenuation	Retlif	3 / 10 Meters	RNH	6/25/2009	6/25/2010
5053	Biconilog	EMCO	26 MHz - 3 GHz	3142C	1/27/2009	1/27/2010
5070	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	1/14/2009	1/14/2010

#### RF Power Output

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/20/2009	1/20/2010
5127	Power Meter	Boonton Electronics	10 KHz - 100 GHz	4532	6/19/2009	6/19/2010
5129	Power Sensor	Boonton Electronics	50 MHz - 18 GHz	57518	6/10/2009	6/10/2010
5134	10 dB Atten.	Narda	DC - 12.4 GHz / 2 W	757C-10	8/18/2009	8/18/2010
5138	10 dB Atten.	Narda	DC - 11 GHz / 20 W	768-10	8/18/2009	8/18/2010
R420B	Signal Generator	Agilent	250 kHz - 3 GHz	AT/E4437B;F	9/9/2008	10/7/2010
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	5/11/2009	5/11/2010

#### Frequency Stability

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
4997	Digital Thermometer	Omega	N/A		8/5/2009	8/5/2010
5049B	Digital Multimeter	Fluke	N/A	111	8/19/2009	8/19/2010
5052	Power Supply	EPSCO INC.	125vdc - 8A	PS-1000-125	7/24/2008	7/24/2010
5077	Temperature Chamber	Associated Env. Systems	-50 to 150 Deg C	ZFD-531	8/5/2009	8/5/2010
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	5/11/2009	5/11/2010

#### Intermodulation Characteristics

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/20/2009	1/20/2010
5134	10 dB Atten.	Narda	DC - 12.4 GHz / 2 W	757C-10	8/18/2009	8/18/2010
5138	10 dB Atten.	Narda	DC - 11 GHz / 20 W	768-10	8/18/2009	8/18/2010
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	5/11/2009	5/11/2010

### Occupied Bandwidth

<b>EN</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Description</b>	<b>Model No.</b>	<b>Cal Date</b>	<b>Due Date</b>
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/20/2009	1/20/2010
5134	10 dB Atten.	Narda	DC - 12.4 GHz / 2 W	757C-10	8/18/2009	8/18/2010
5138	10 dB Atten.	Narda	DC - 11 GHz / 20 W	768-10	8/18/2009	8/18/2010
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	5/11/2009	5/11/2010

### Spurious Emissions Antenna Ports

<b>EN</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Description</b>	<b>Model No.</b>	<b>Cal Date</b>	<b>Due Date</b>
5026A	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/20/2009	1/20/2010
5134	10 dB Atten.	Narda	DC - 12.4 GHz / 2 W	757C-10	8/18/2009	8/18/2010
5138	10 dB Atten.	Narda	DC - 11 GHz / 20 W	768-10	8/18/2009	8/18/2010
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	5/11/2009	5/11/2010

SETUP PHOTOGRAPH  
SPURIOUS RADIATED EMISSIONS



Test Setup

SETUP PHOTOGRAPHS  
SPURIOUS RADIATED EMISSIONS



Horizontal Antenna Polarization, 30 to 1000 MHz



Vertical Antenna Polarization, 30 to 1000 MHz

SETUP PHOTOGRAPHS  
SPURIOUS RADIATED EMISSIONS



Horizontal Antenna Polarization, 1 to 9 GHz



Vertical Antenna Polarization, 1 to 9 GHz

SETUP PHOTOGRAPH  
SPURIOUS EMISSIONS AT ANTENNA TERMINALS,  
OCCUPIED BANDWIDTH & INTERMODULATION (TWO TONE)



Test Setup

SETUP PHOTOGRAPH  
RF POWER OUTPUT



SETUP PHOTOGRAPH  
FREQUENCY STABILITY



Test Setup



Test Setup



# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal			
Notes:	AMPS Band - CDMA - Downlink			

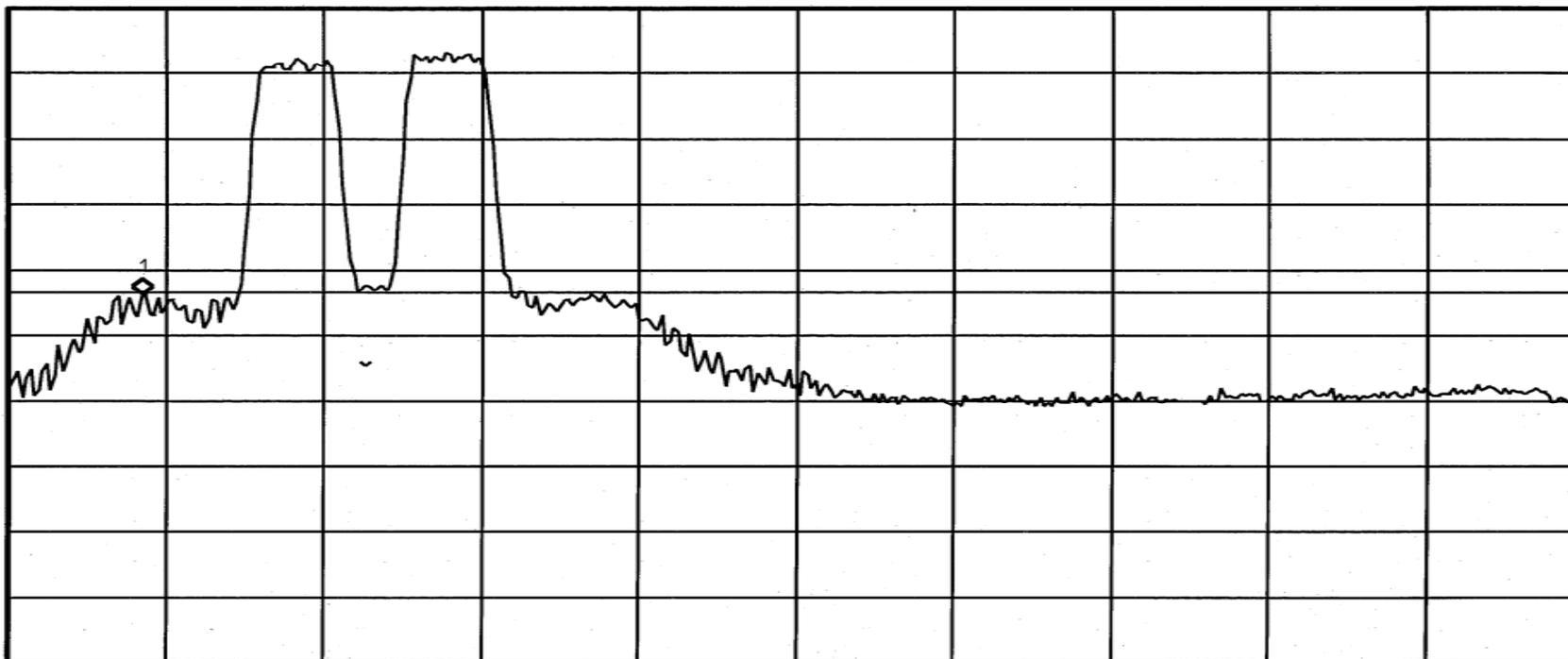
Agilent 15:15:18 Nov 5, 2009

Cntr1 870.209 MHz  
-13.27 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm



Start 868 MHz

Stop 894 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date: 11/5/2009
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		

Agilent 15:17:15 Nov 5, 2009

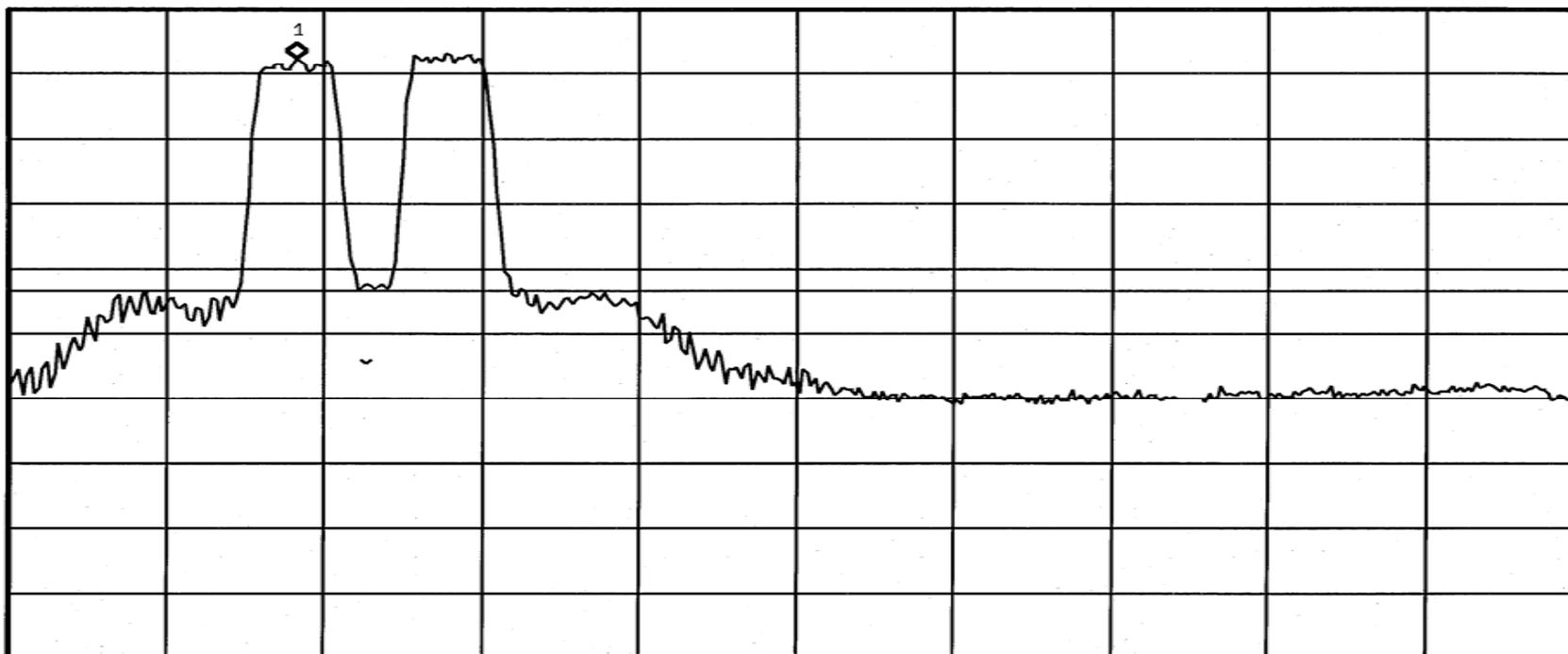
Cntr1 872.748 MHz  
22.75 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 868 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 894 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date: 11/5/2009
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		

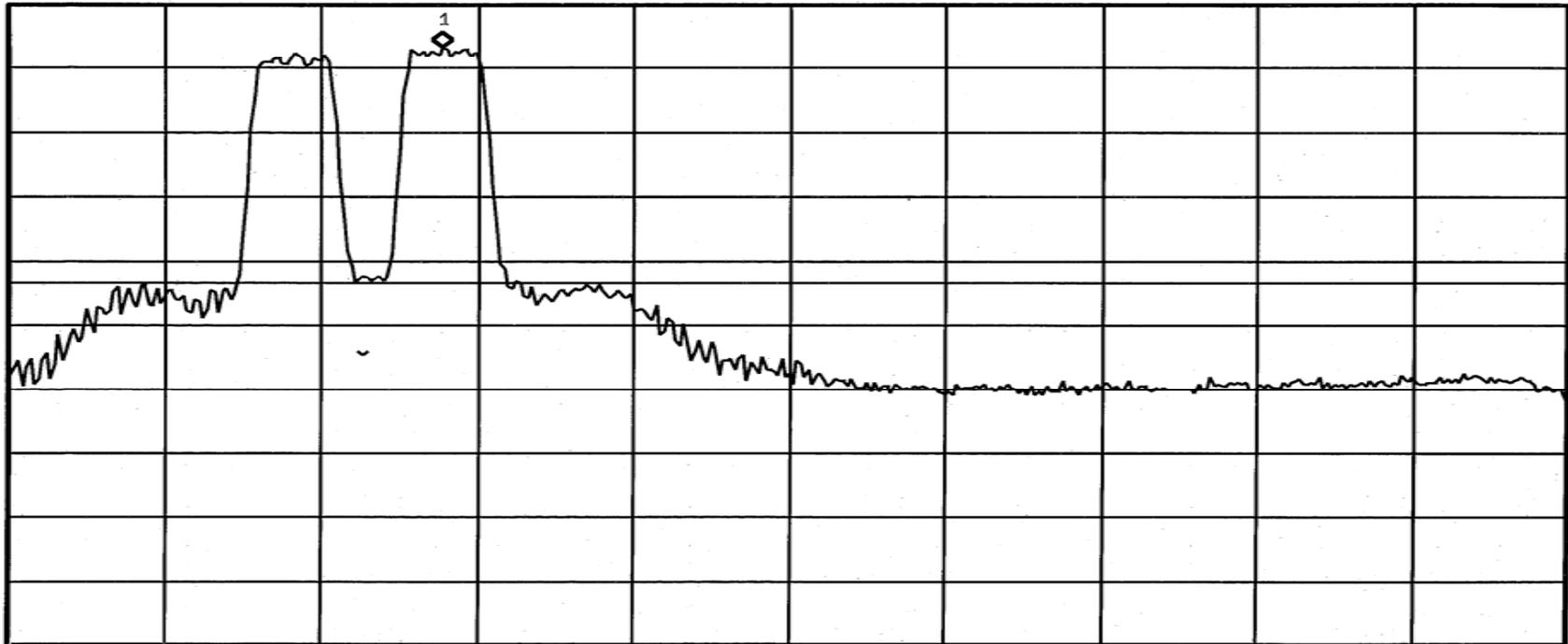
Agilent 15:18:43 Nov 5, 2009

Cntr1 875.218 MHz  
23.6 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm



V1 S2  
S3 FC  
AA

Start 868 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 894 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		
Job No:	R-5240N-1		Technician:
		M.Seamans	

Agilent 15:20:17 Nov 5, 2009

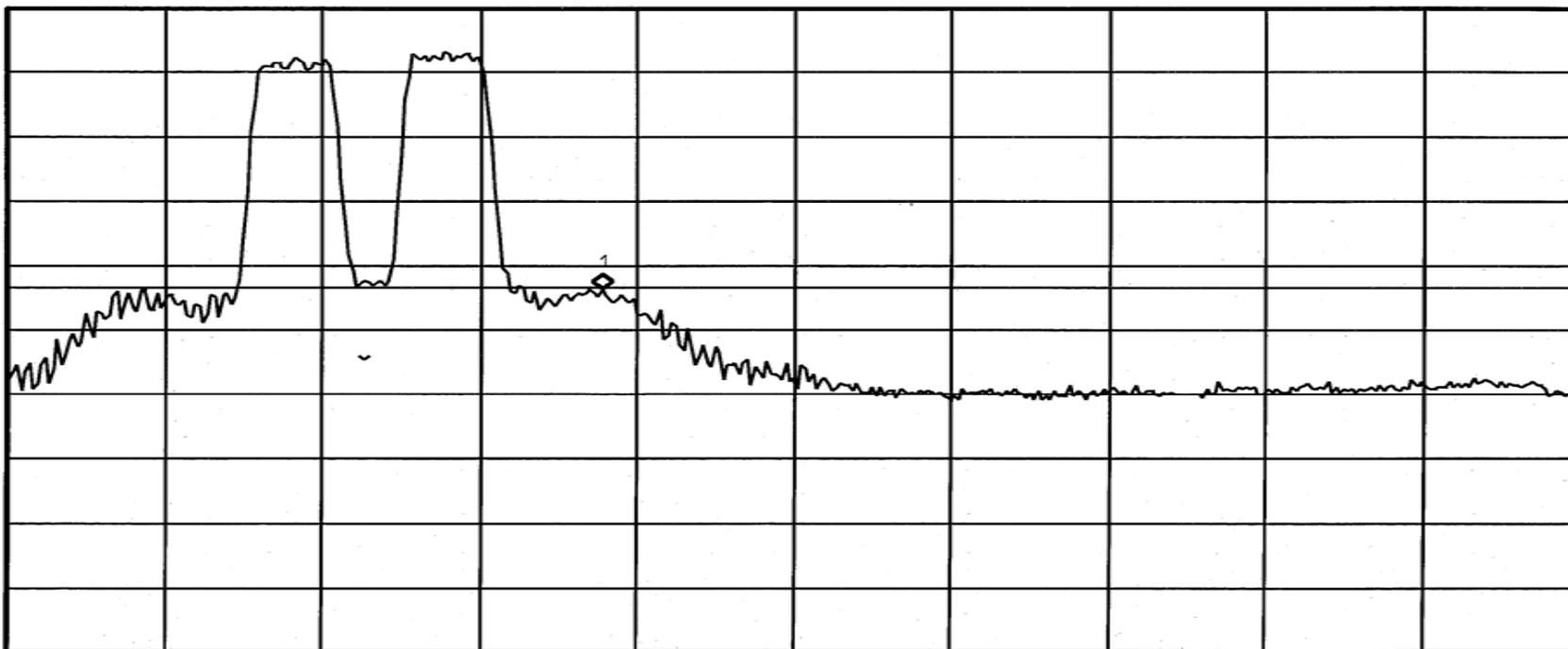
Cntr1 877.815 MHz  
-13.37 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 868 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 894 MHz

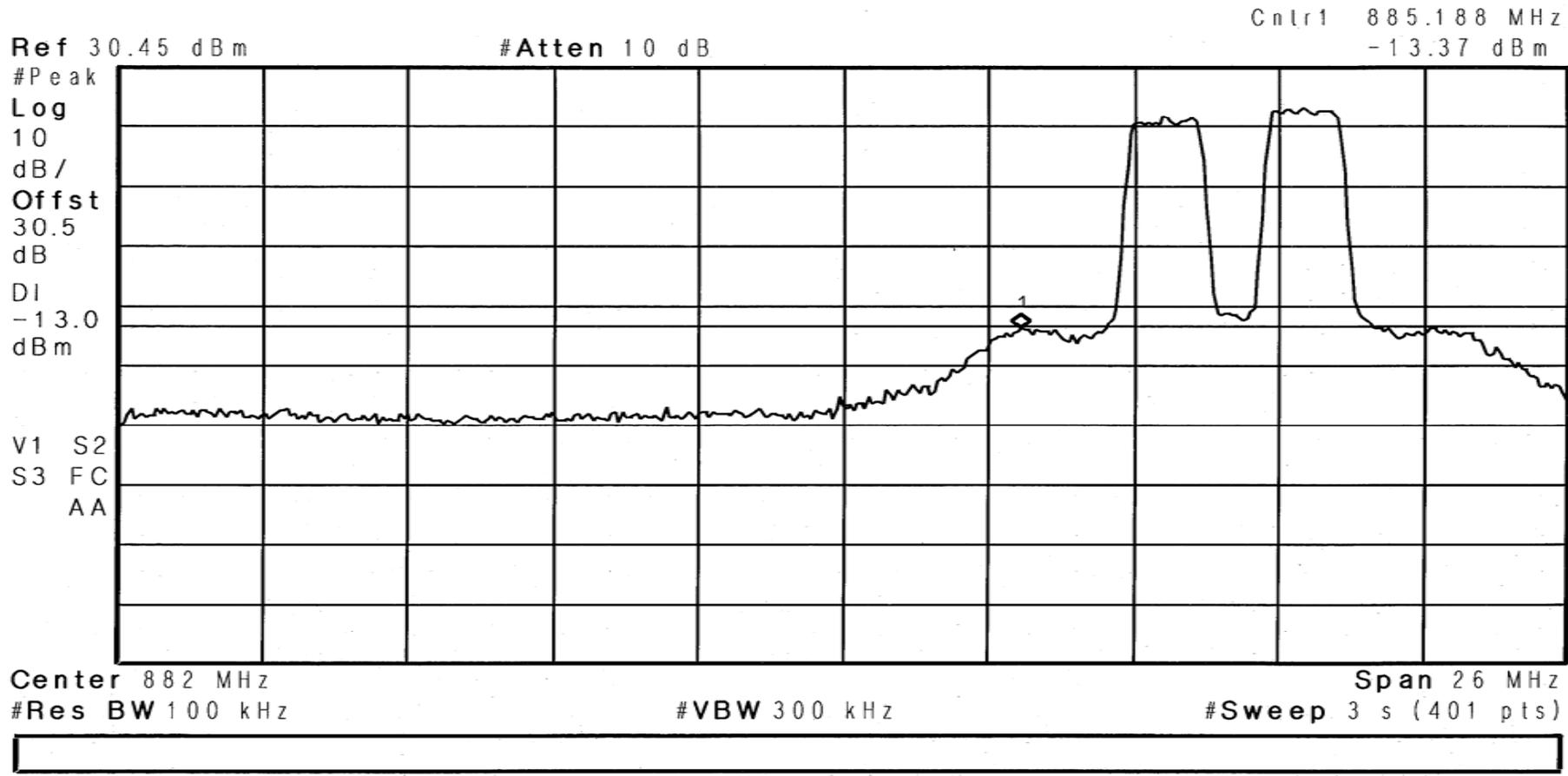
#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		
Job No:	R-5240N-1		Technician:
		M.Seamans	

Agilent 15:02:07 Nov 5, 2009



# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		
		Job No:	R-5240N-1
		Technician:	M.Seamans
		Date:	11/5/2009

Agilent 15:03:53 Nov 5, 2009

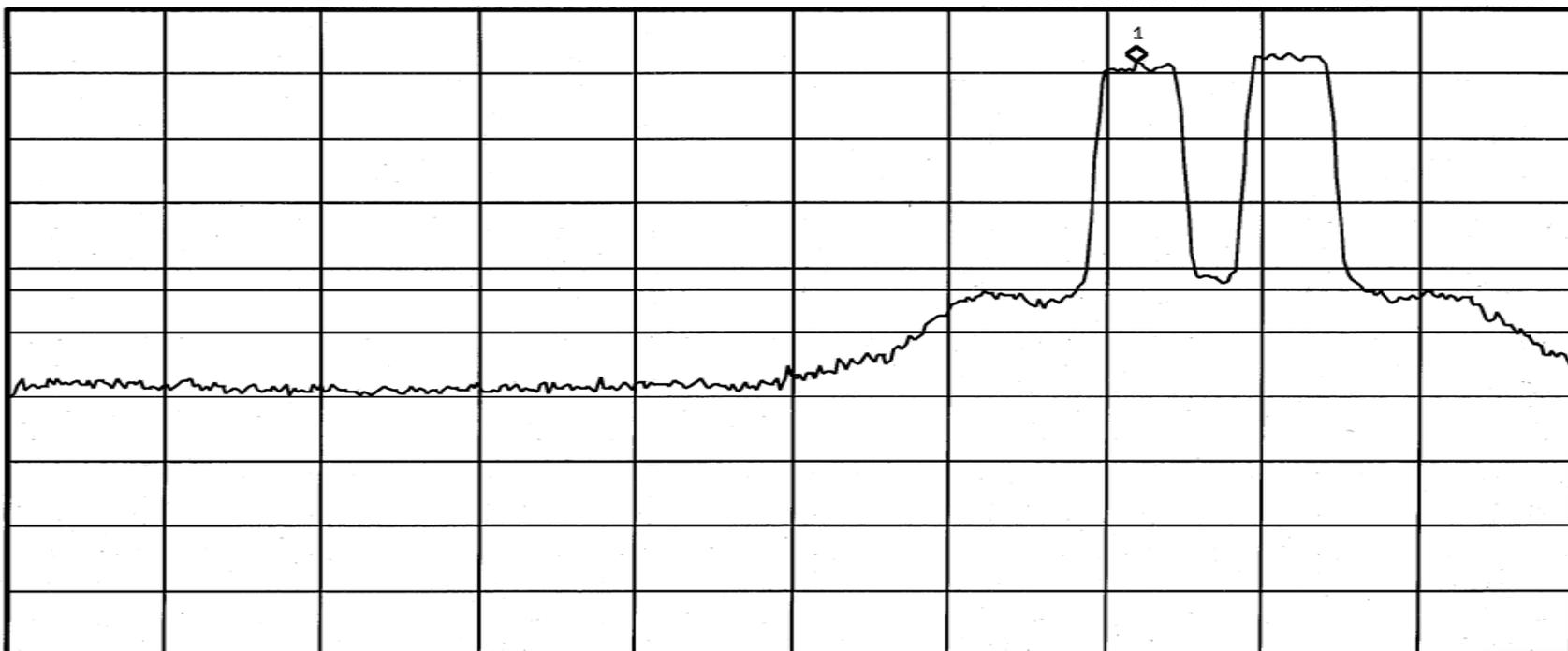
Cntr1 887.729 MHz  
22.13 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Ofst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Center 882 MHz

Span 26 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		
Job No:	R-5240N-1		Technician:
		M.Seamans	

Agilent 15:05:56 Nov 5, 2009

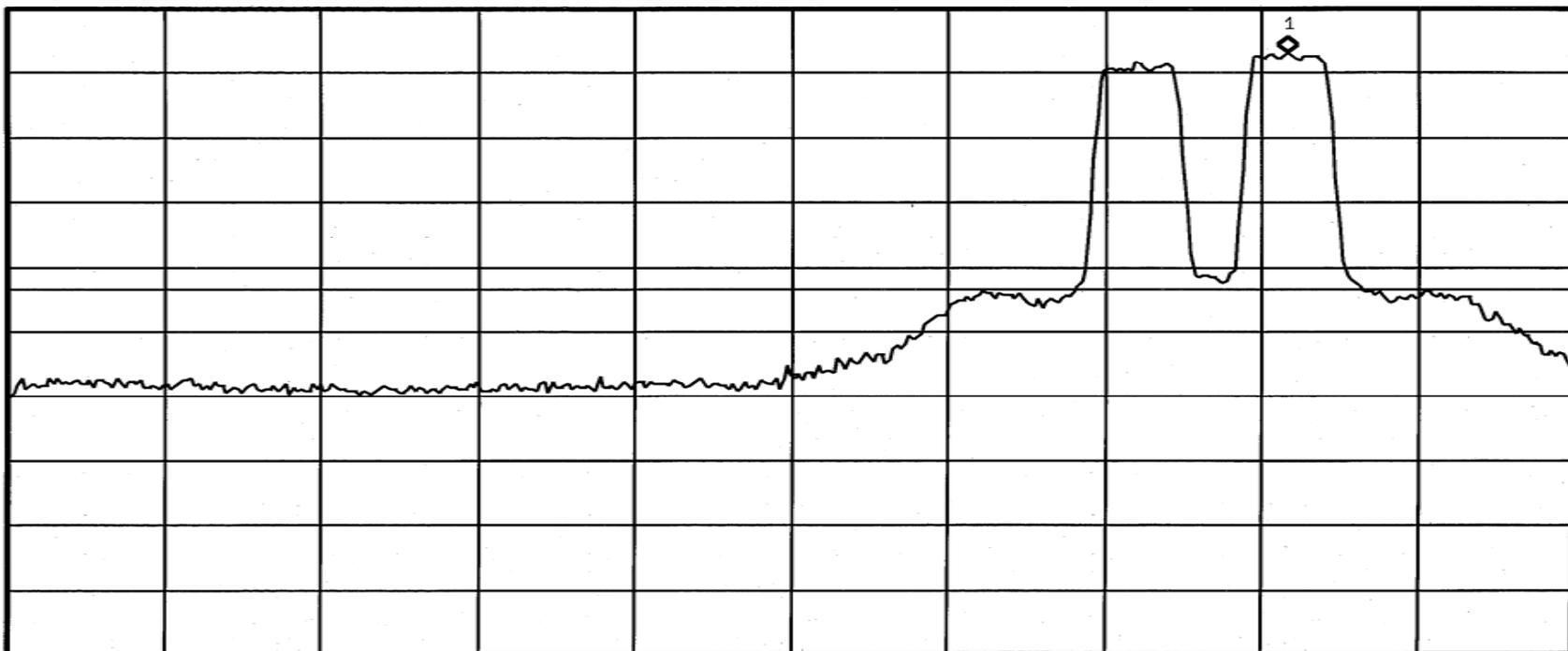
Cntr1 890.256 MHz  
23.54 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Center 882 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

Span 26 MHz

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Downlink		
Job No:	R-5240N-1		Technician:
		M.Seamans	

Agilent 15:07:48 Nov 5, 2009

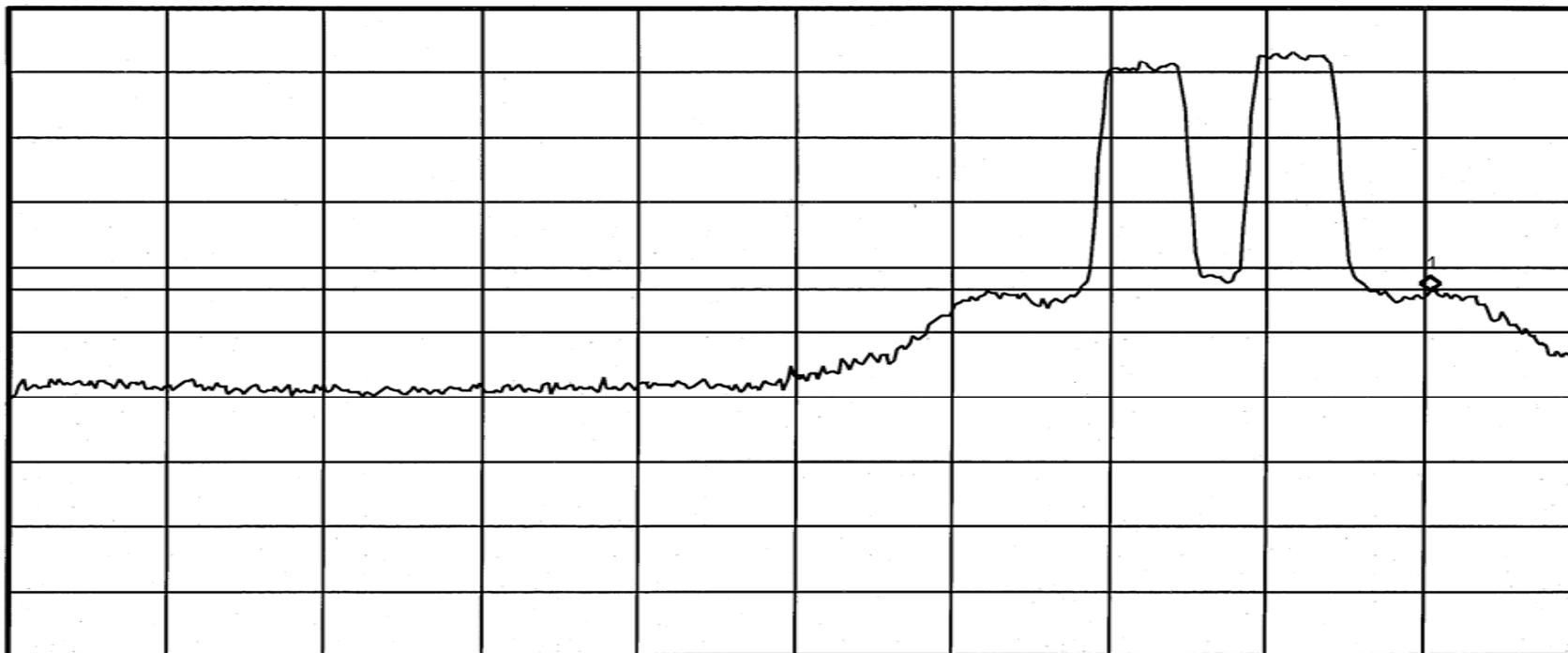
Cntr1 892.530 MHz  
-13.29 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Center 882 MHz

#Res BW 100 kHz

#VBW 300 kHz

Span 26 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal			
Notes:	AMPS Band - CDMA - Uplink			

Agilent 15:27:29 Nov 5, 2009

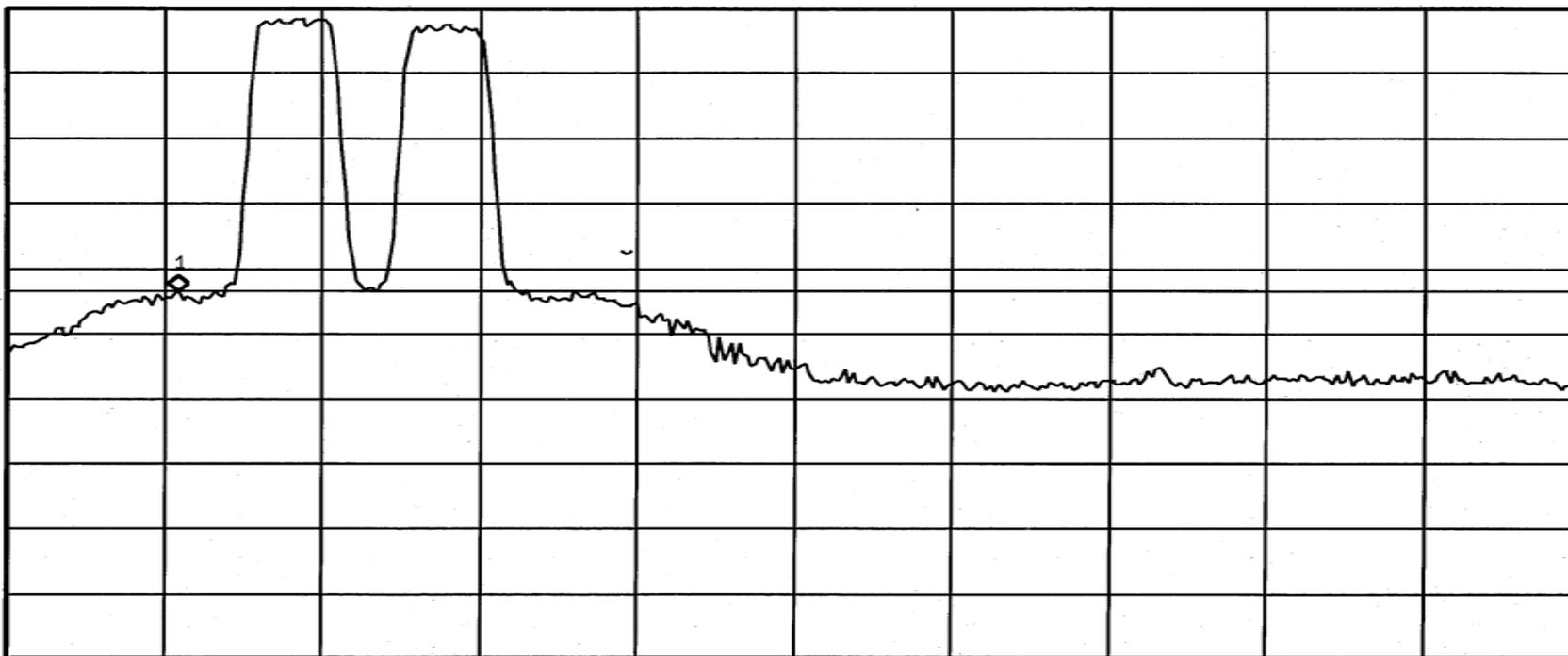
Cntr1 825.862 MHz  
-13.02 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 823 MHz

Stop 849 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal			
Notes:	AMPS Band - CDMA - Uplink			

Agilent 15:28:56 Nov 5, 2009

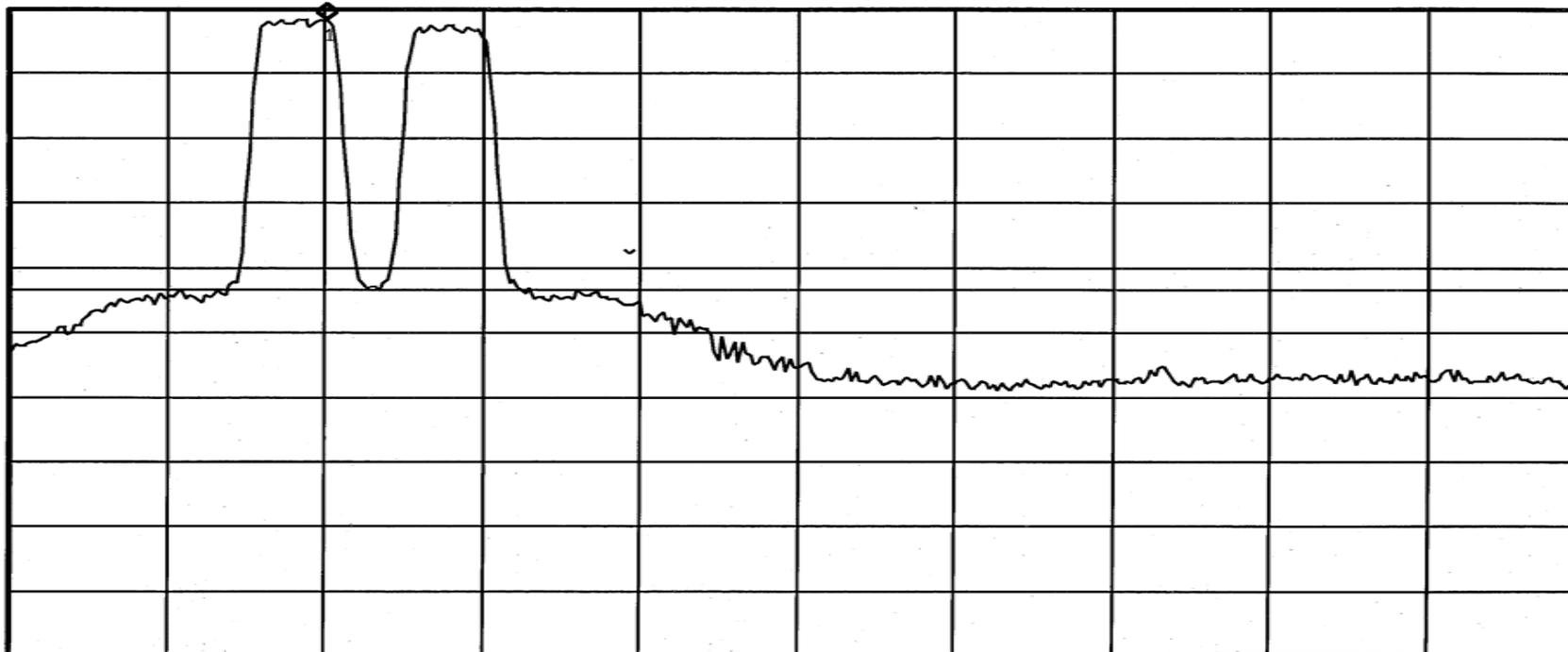
Cntr1 825.854 MHz  
28.88 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 823 MHz

Stop 849 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date: 11/5/2009
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Uplink		
Job No:	R-5240N-1		Technician: M.Seamans

Agilent 15:30:31 Nov 5, 2009

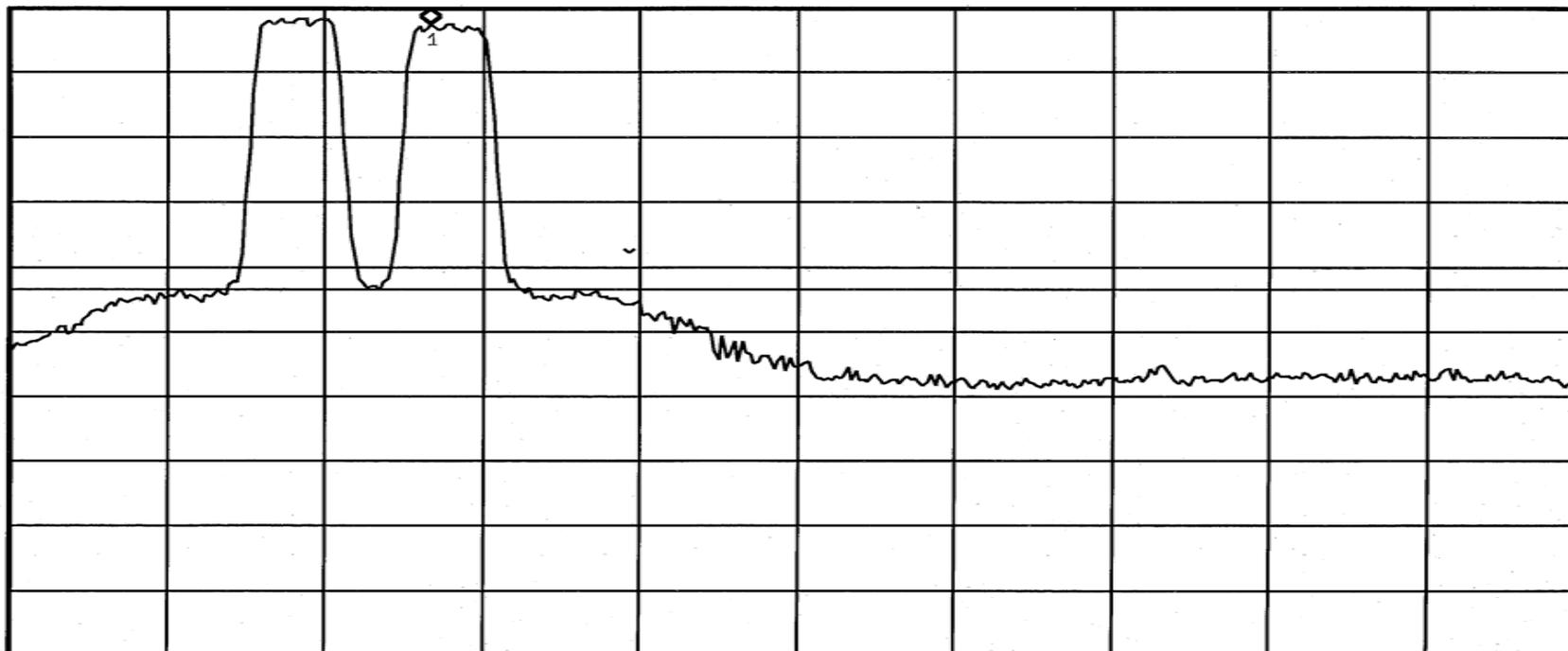
Cntr1 829.958 MHz  
27.94 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 823 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 849 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date: 11/5/2009
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Uplink		

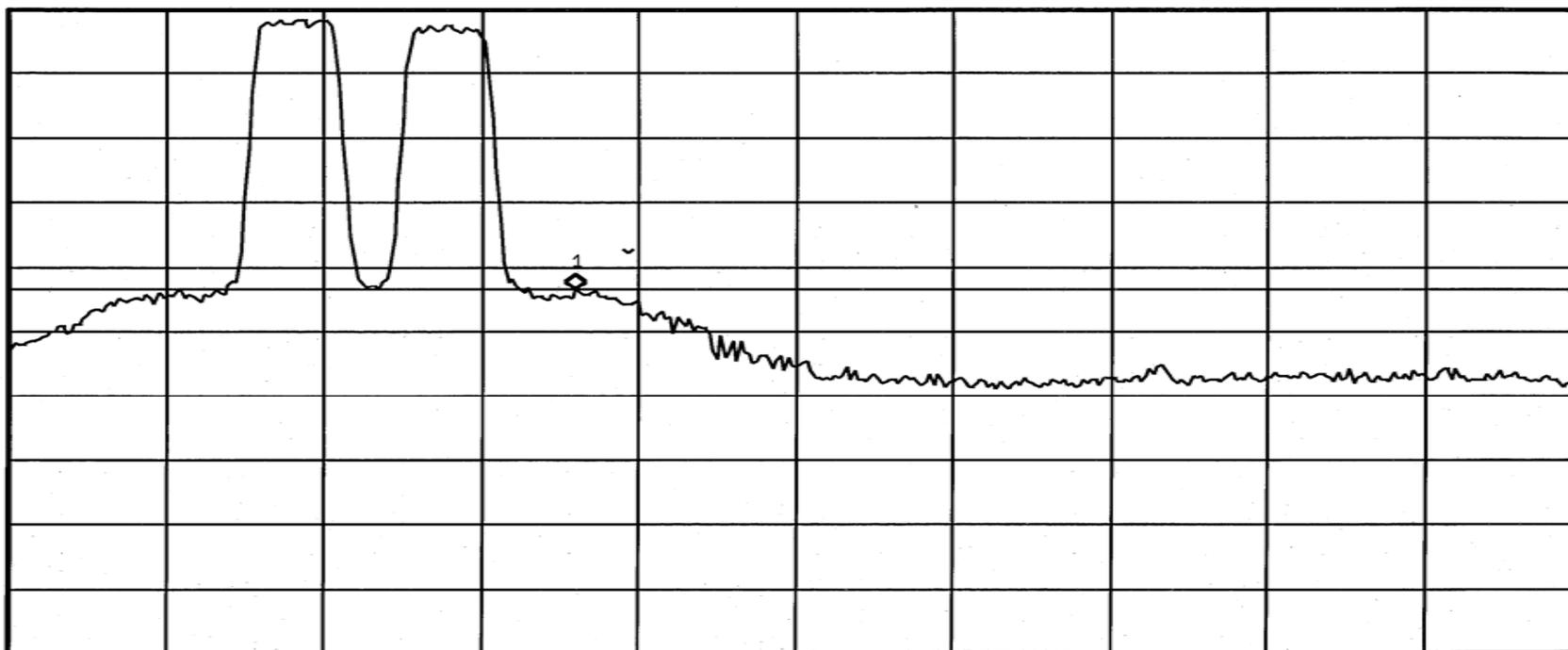
Agilent 15:32:17 Nov 5, 2009

Cntr1 832.354 MHz  
-13.04 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm



V1 S2  
S3 FC  
AA

Start 823 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 849 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics				
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	Job No:	R-5240N-1
Model No:	CS12-555-400	Serial No:	See Test Report	Technician:	M.Seamans
Test Specification:	FCC Part 2	Paragraph:	2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal				
Notes:	AMPS Band - CDMA - Uplink				

Agilent 15:39:18 Nov 5, 2009

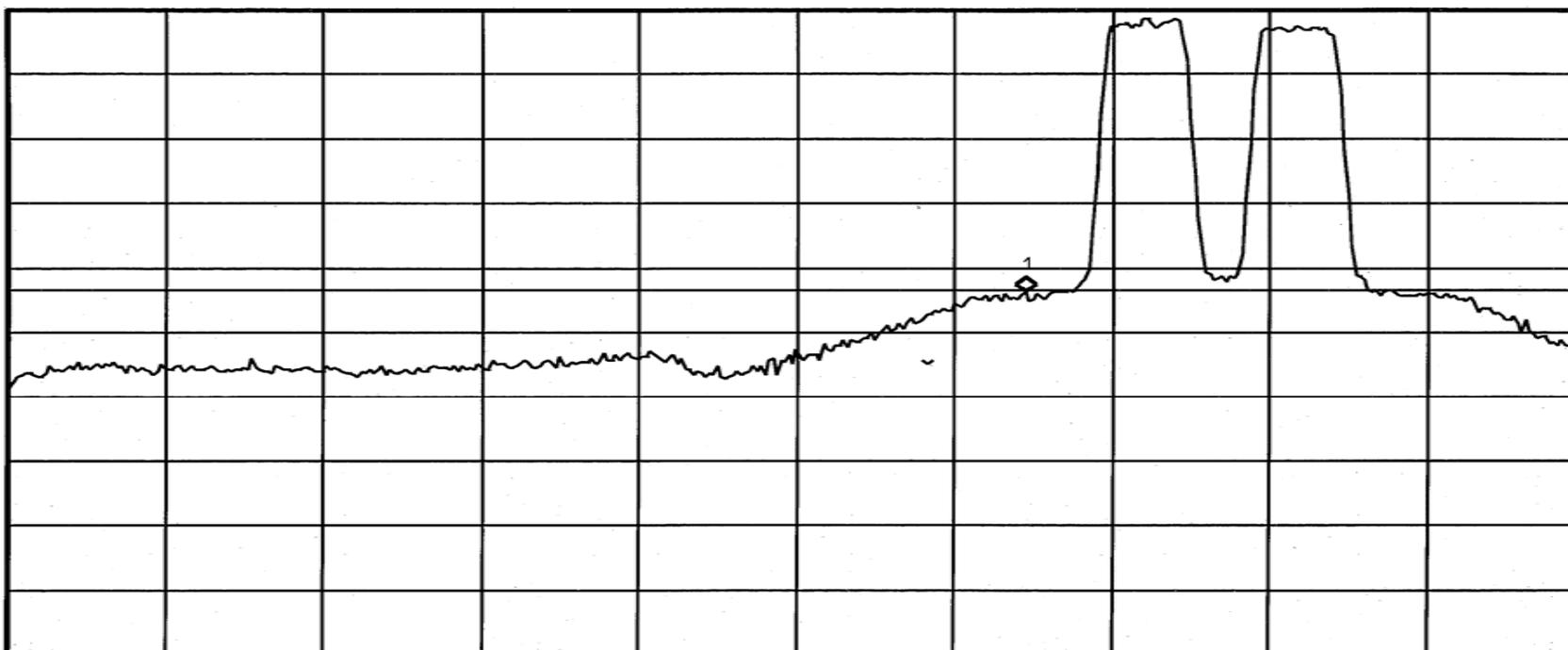
Cntr1 841.314 MHz  
-13.21 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 824 MHz

Stop 850 MHz

#Res BW 100 kHz

#VBW 300 kHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	AMPS Band - CDMA - Uplink		
Job No:	R-5240N-1		Technician:
		M.Seamans	

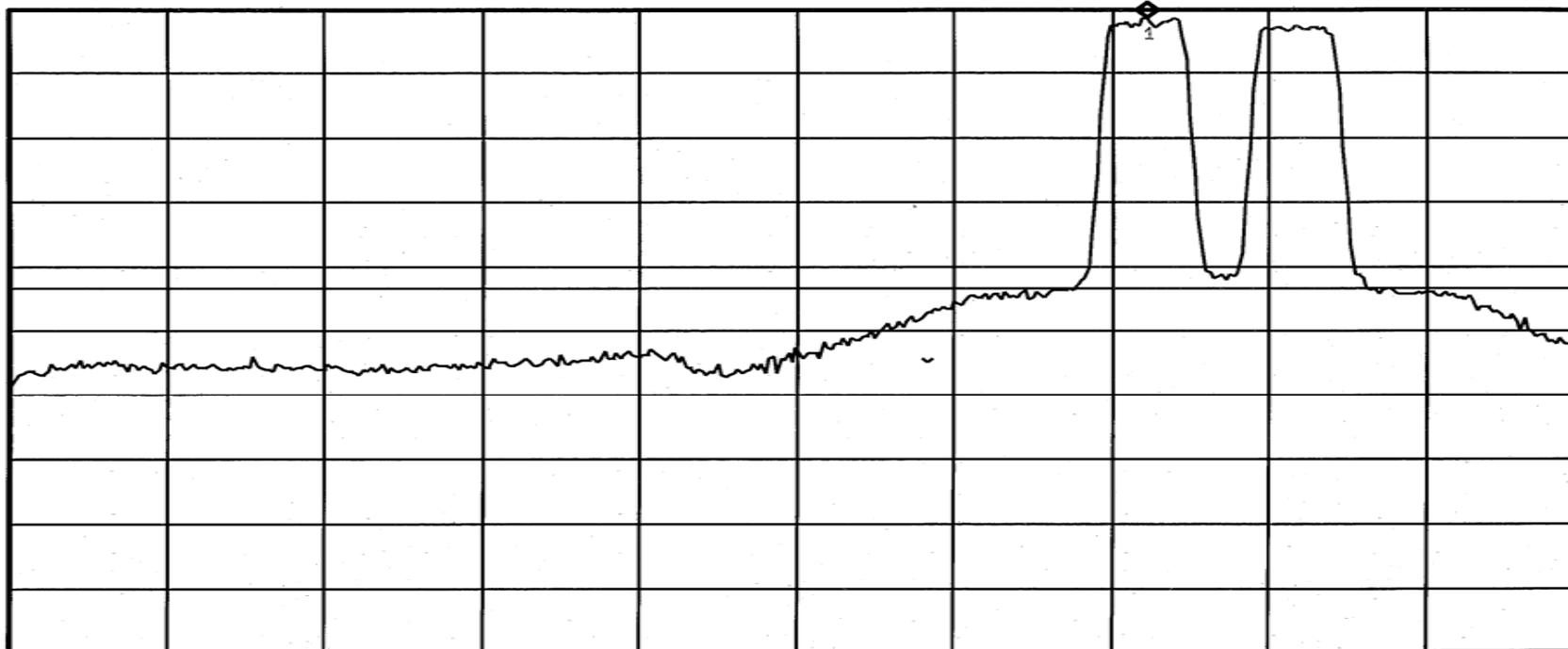
Agilent 15:40:50 Nov 5, 2009

Cntr1 842.783 MHz  
29.1 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm  
  
V1 S2  
S3 FC  
AA



Start 824 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 850 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal			
Notes:	AMPS Band - CDMA - Uplink			

Agilent 15:42:11 Nov 5, 2009

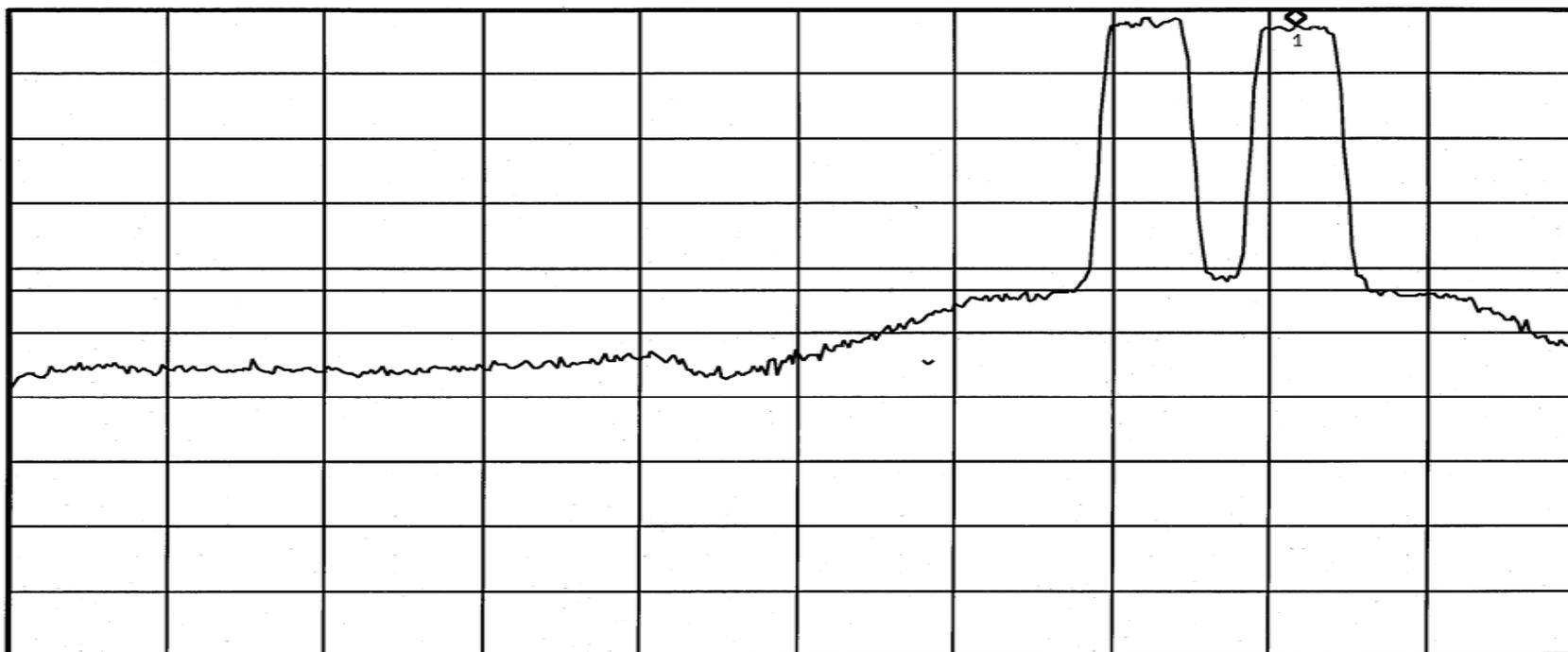
Cntr1 845.256 MHz  
27.8 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 824 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 850 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:	11/5/2009
Operating Mode:	Amplifying input signal			
Notes:	AMPS Band - CDMA - Uplink			

Agilent 15:43:51 Nov 5, 2009

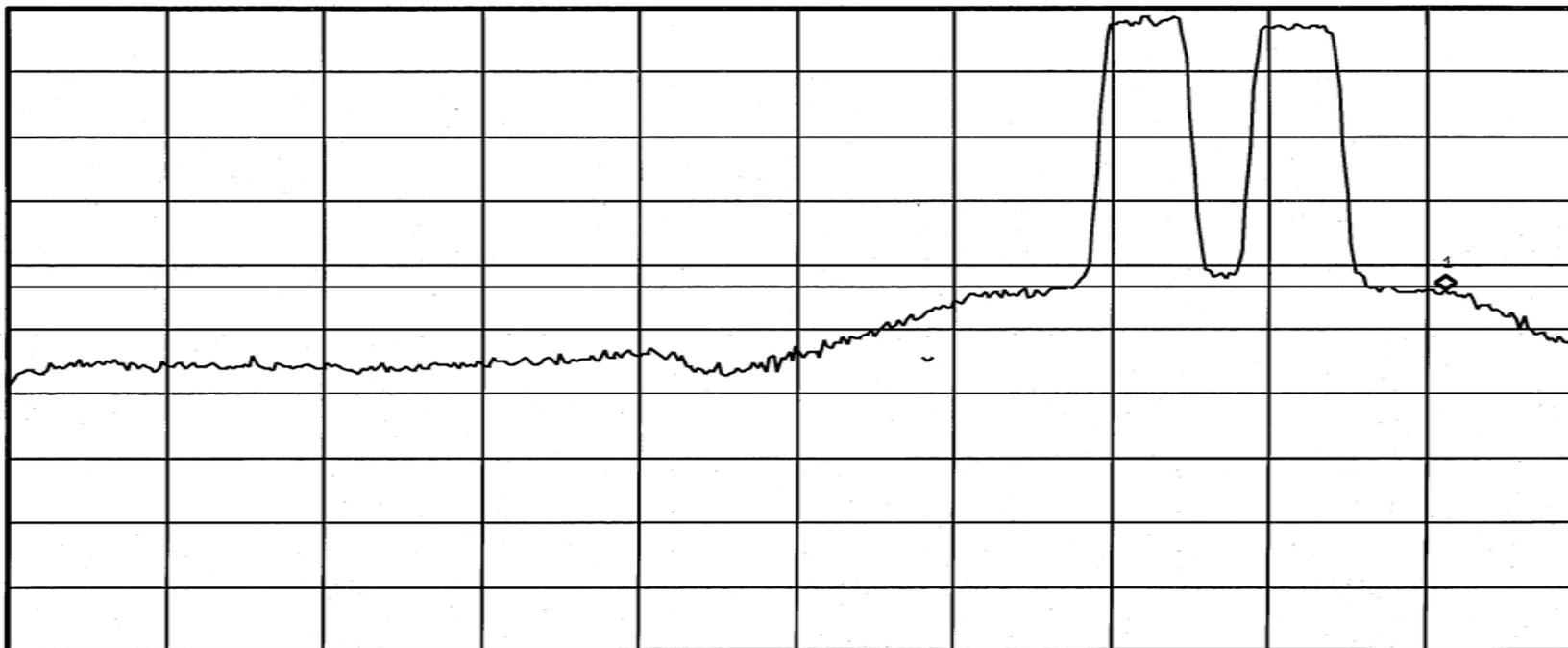
Cntr1 847.730 MHz  
-13.44 dBm

Ref 30.45 dBm

#Atten 10 dB

#Peak  
Log  
10  
dB/  
Offst  
30.5  
dB  
DI  
-13.0  
dBm

V1 S2  
S3 FC  
AA



Start 824 MHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 850 MHz

#Sweep 3 s (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph:	2.1049	
Operating Mode:	Amplifying input signal			
Notes:	CDMA - Uplink - Output at 836.5 MHz			
Job No:	R-5240N-1		Technician:	M.Seamans
Date:	11/23/2009			

Agilent 10:13:57 Nov 23, 2009

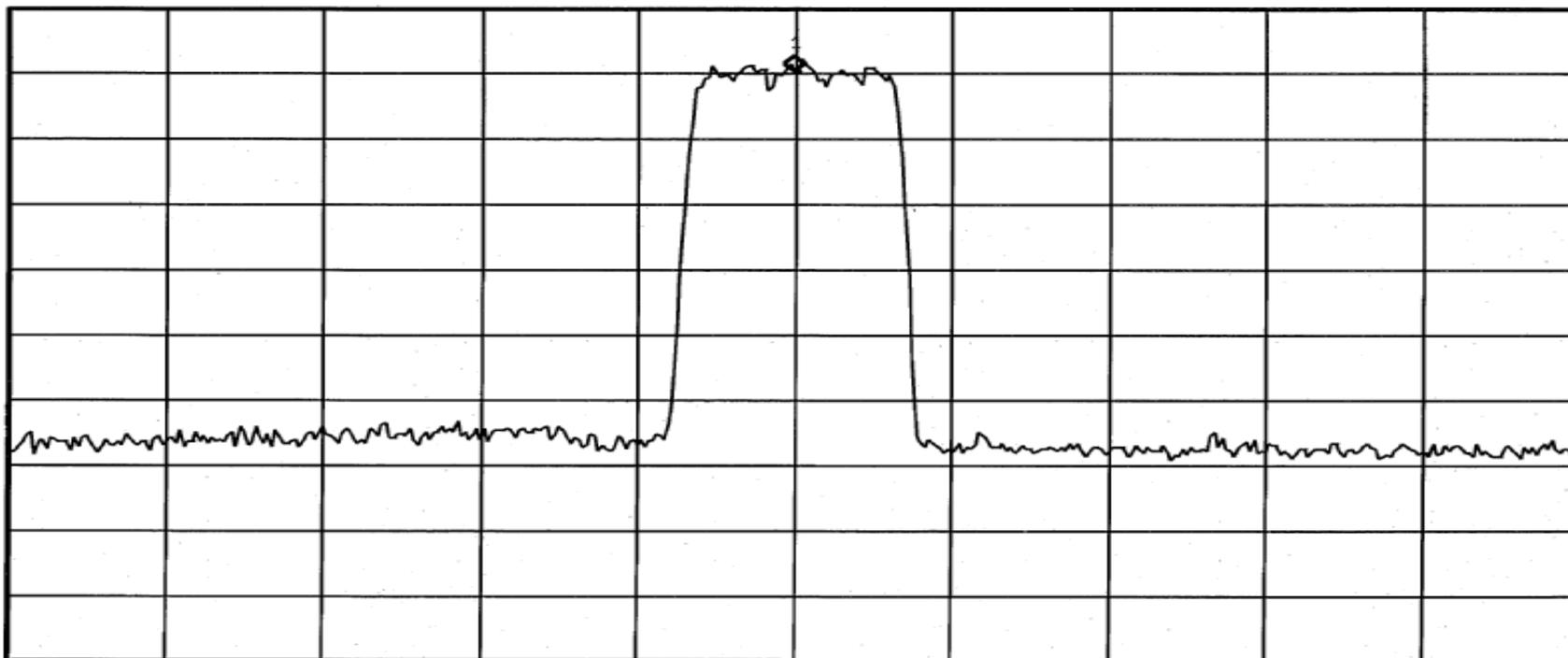
Mkr1 836.500 MHz  
25.16 dBm

Ref 35 dBm

Atten 15 dB

Peak  
Log  
10  
dB/  
Offst  
30.5  
dB

V1 S2  
S3 FC  
AA



Center 836.5 MHz

#Res BW 30 kHz

#VBW 100 kHz

Span 10 MHz  
Sweep 11.44 ms (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth				
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	Job No:	R-5240N-1
Model No:	CS12-555-400	Serial No:	See Test Report	Technician:	M.Seamans
Test Specification:	FCC Part 2	Paragraph:	2.1049	Date:	11/23/2009
Operating Mode:	Amplifying input signal				
Notes:	CDMA - Uplink - Input at 836.5 MHz				

\* Agilent 10:23:21 Nov 23, 2009

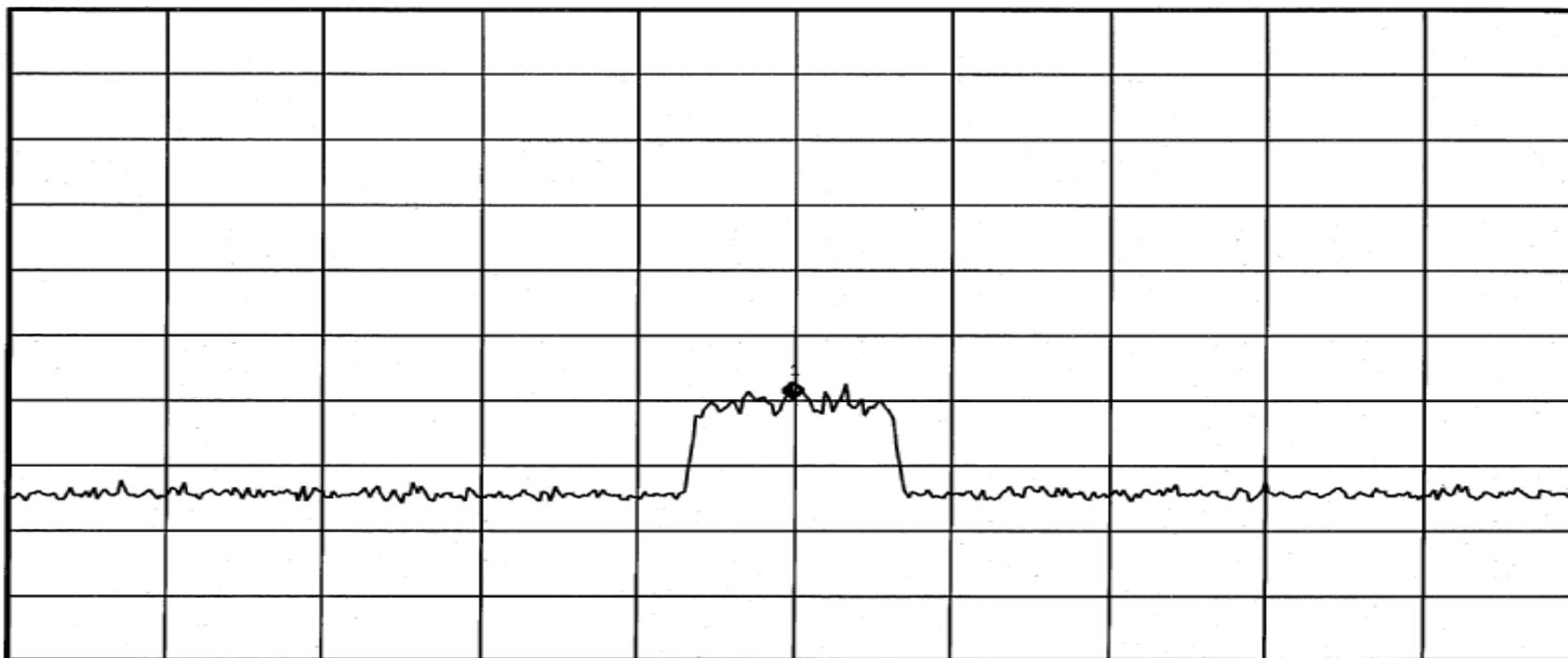
Mkr1 836.500 MHz  
-55.04 dBm

Ref 4.54 dBm

Atten 15 dB

Peak  
Log  
10  
dB/

V1 S2  
S3 FC  
AA



Center 836.5 MHz

#Res BW 30 kHz

#VBW 100 kHz

Span 10 MHz

Sweep 11.44 ms (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System
Model No:	CS12-555-400	Serial No:	See Test Report
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 11/23/2009
Operating Mode:	Amplifying input signal		
Notes:	CDMA - Uplink - Output at 881.5 MHz		

\* Agilent 10:04:23 Nov 23, 2009

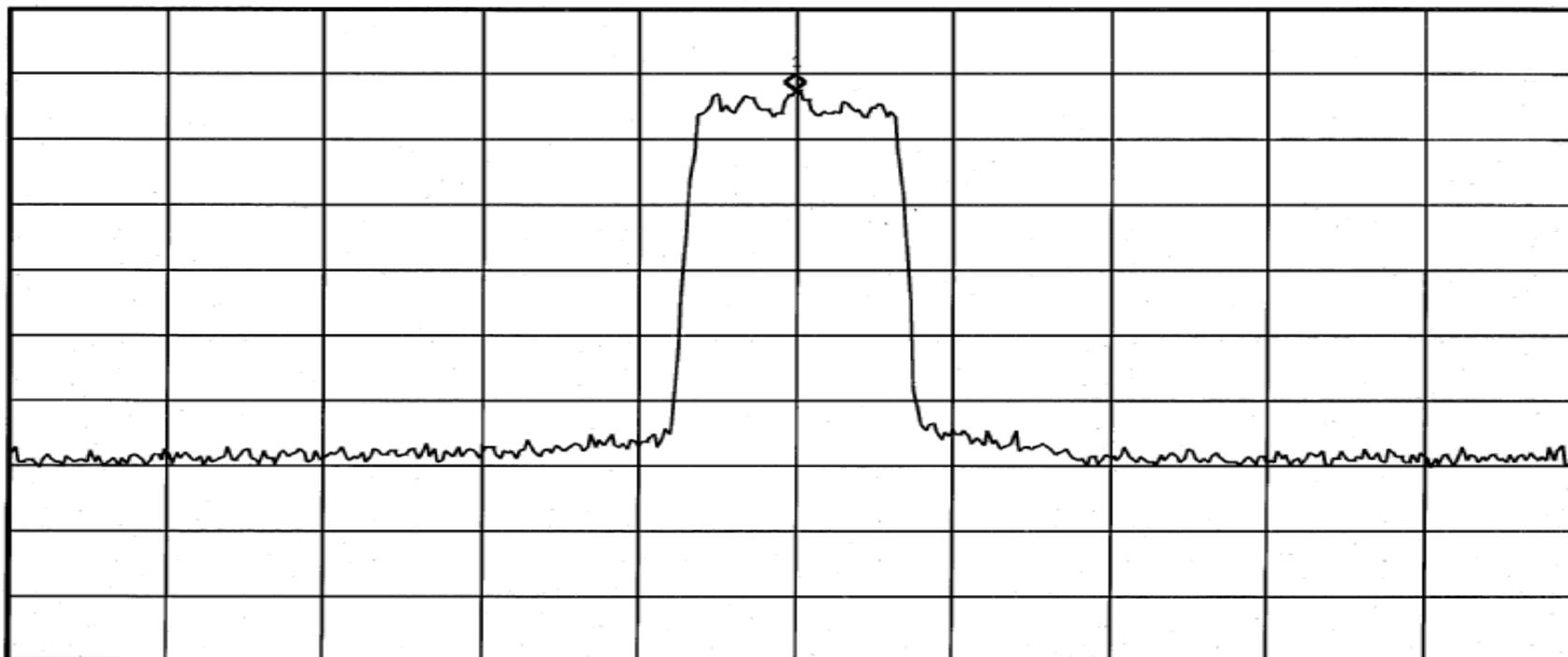
Mkr1 881.500 MHz  
22.43 dBm

Ref 35 dBm

Atten 15 dB

Peak  
Log  
10  
dB/  
Offst  
30.5  
dB

V1 S2  
S3 FC  
AA



Center 881.5 MHz

#Res BW 30 kHz

#VBW 100 kHz

Span 10 MHz  
Sweep 11.44 ms (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth			
Customer:	Cellular Specialties, Inc.	Test Sample:	Cellular Repeater System	
Model No:	CS12-555-400	Serial No:	See Test Report	
Test Specification:	FCC Part 2	Paragraph:	2.1049	
Operating Mode:	Amplifying input signal			
Notes:	CDMA - Uplink - Input at 881.5 MHz			
Job No:	R-5240N-1		Technician:	M.Seamans
Date:	11/23/2009			

Agilent 10:07:37 Nov 23, 2009

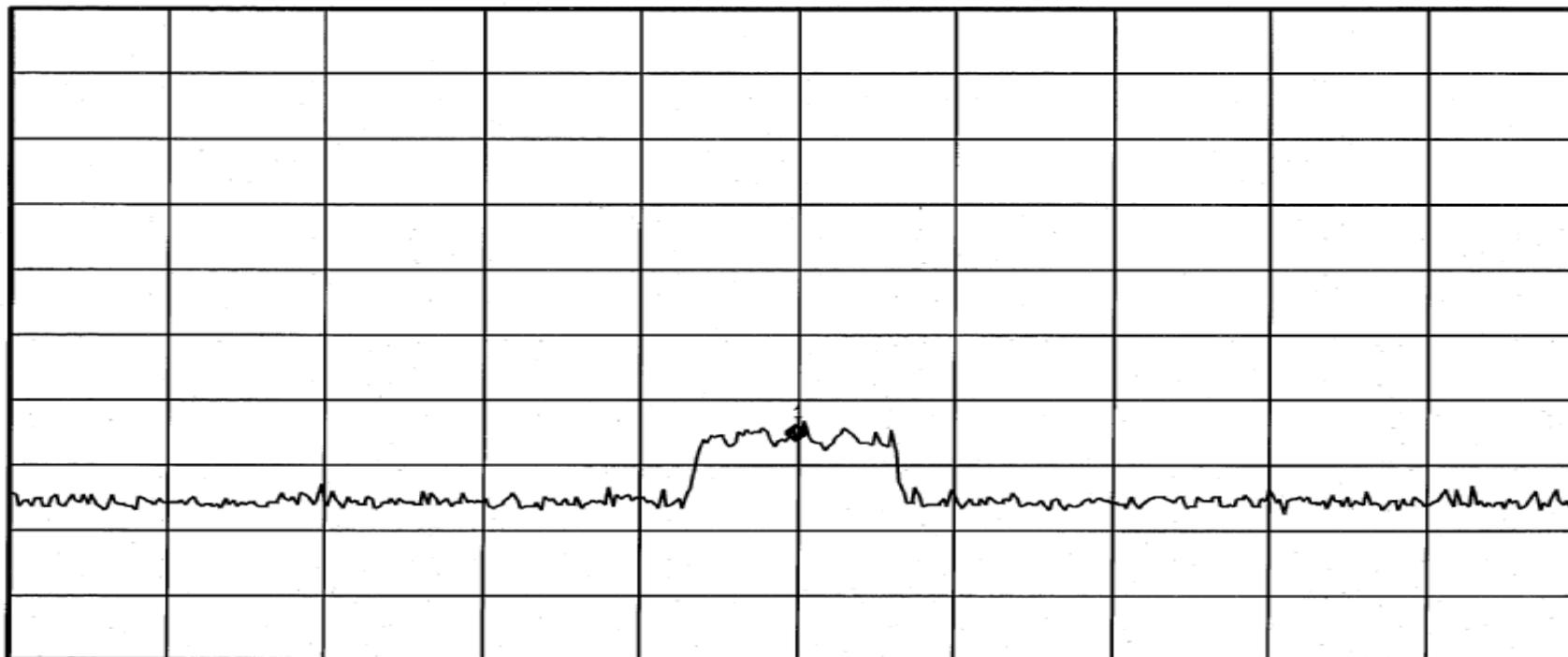
Mkr1 881.500 MHz  
- 61.7 dBm

Ref 4.54 dBm

Atten 15 dB

Peak  
Log  
10  
dB/

V1 S2  
S3 FC  
AA



Center 881.5 MHz

#Res BW 30 kHz

#VBW 100 kHz

Span 10 MHz  
Sweep 11.44 ms (401 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Emissions at the Antenna Terminals 30 MHz to 9 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5240N-1
<b>Test Sample:</b>	Cellular Repeater System		
<b>Model No:</b>	CS12-555-400	<b>Serial No:</b>	See Test Report
<b>Test Specification:</b>	FCC Part 2 Paragraph: 2.1051		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	11/23/2009
<b>Notes:</b>	Uplink Frequency: 824-849 MHz      Downlink Frequency: 869-894 MHz CDMA modulation		

Uplink Input Signal	Test Frequency	Frequencies	Reading	Limit	Downlink Input Signal	Test Frequency	Frequencies	Reading	Limit
dBm	MHz	MHz	dBm	dBm	dBm	MHz	MHz	dBm	dBm
-49.20	824.00				-54.40	869.00			
		1648.00	-25.71	-13.0			1738.00	-25.06	-13.0
		2472.00	-24.29				2607.00	-23.85	
		3296.00	-23.67				3476.00	-25.61	
		4120.00	-24.71				4345.00	-26.61	
		4944.00	-25.55				5214.00	-25.37	
		5768.00	-24.77				6083.00	-25.30	
		6592.00	-25.45				6952.00	-24.95	
		7416.00	-24.00				7821.00	-22.66	
-49.20	824.00	8240.00	-24.86	-13.0	-54.40	869.00	8690.00	-23.98	-13.0
-49.20	836.50				-54.40	881.50			
		1673.00	-23.88	-13.0			1763.00	-23.60	-13.0
		2509.50	-23.00				2644.50	-223.25	
		3346.00	-24.77				3526.00	-25.22	
		4182.50	-25.38				4407.50	-26.73	
		5019.00	-24.53				5289.00	-24.75	
		5855.50	-25.15				5170.50	-25.58	
		6692.00	-25.06				7052.00	-24.48	
		7528.50	-24.80				7933.50	-25.01	
-49.20	836.50	8365.00	-25.00	-13.0	-54.40	881.50	8815.00	-24.56	-13.0
-49.20	849.00				-54.40	894.00			
		1698.00	-24.82	-13.0			1788.00	-23.82	-13.0
		2547.00	-23.22				2682.00	-23.23	
		3396.00	-25.22				3576.00	-25.87	
		4245.00	-26.10				4470.00	-26.17	
		5094.00	-25.09				5364.00	-26.49	
		5943.00	-25.51				6258.00	-26.07	
		6792.00	-24.81				7152.00	-24.23	
		7641.00	-24.44				8046.00	-24.34	
-49.20	849.00	8490.00	-25.22	-13.0	-54.40	894.00	8940.00	-25.40	-13.0





# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Frequency Stability		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5240N-1
<b>Test Sample:</b>	Cellular Repeater System		
<b>Model No:</b>	CS12-555-400	<b>Serial No:</b>	See Test Report
<b>Test Specification:</b>	FCC Part 2 Paragraph: 2.1055		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	11/25/2009
<b>Notes:</b>	Uplink Frequency 836.5 MHz      Nominal Voltage = 72 VDC Downlink Frequency 881.5 MHz		

Temp	Test Frequency			Frequency @ 61.2 VDC	Frequency @ 64.8 VDC	Frequency @ 68.4 VDC	Frequency @ 72 VDC	Frequency @ 75.6 VDC	Frequency @ 79.2 VDC	Frequency @ 82.8 VDC
C	MHz			MHz	MHz	MHz	MHz	MHz	MHz	MHz
	(Downlink)									
-30	881.5000			881.49750	881.49750	881.49750	881.49750	881.49750	881.49750	881.49750
-20				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
-10				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
0				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
10				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
20				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
30				881.49750	881.49750	881.49750	881.49750	881.49750	881.49750	881.49750
40				881.50000	881.50000	881.50000	881.50000	881.50000	881.50000	881.50000
50	881.5000			881.50500	881.50500	881.50500	881.50500	881.50500	881.50500	881.50500
	(Uplink)									
-30	836.5000			836.49750	836.49750	836.49750	836.49750	836.49750	836.49750	836.49750
-20				836.50000	836.50000	836.50000	836.50000	836.50000	836.50000	836.50000
-10				836.49750	836.49750	836.49750	836.50000	836.49750	836.49750	836.49750
0				836.49750	836.49750	836.49750	836.49750	836.49750	836.49750	836.49750
10				836.50000	836.50000	836.50000	836.49750	836.50000	836.50000	836.50000
20				836.50000	836.50000	836.50000	836.50000	836.50000	836.50000	836.50000
30				836.50000	836.50000	836.50000	836.50000	836.50000	836.50000	836.50000
40				836.50000	836.50000	836.50000	836.50000	836.50000	836.50000	836.50000
50	836.5000			836.49750	836.49750	836.49750	836.49750	836.49750	836.49750	836.49750