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MEMBER ACIL

REPORT OF MEASUREMENTS

FOR
CELLULAR SPECIALTIES, INC.

BI-DIRECTIONAL REPEATER

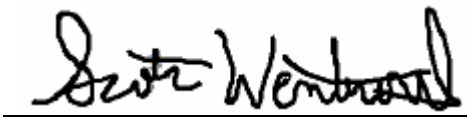
MODEL: C12-553-401

FCC ID: NVRCS12-553-401

Company Name:	Cellular Specialties, Inc.
Date of Report:	December 3, 2008
Test Report No:	R-5086N
Test Start Date:	November 13, 2008
Test Finish Date:	November 25, 2008
Test Technician:	Matt Seamans
Lab Supervisor:	Todd Hannemann
Report Prepared By:	Jamie Ramsey

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.



Scott Wentworth
Branch Manager
NVLAP Approved Signatory

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 Bi-Directional Repeater (Cellular Amplifier)
Model:	CS12-553-401
FCC ID Number:	FCC ID: NVRCS12-553-401
Applicable Test Standard:	FCC Parts 2 & 24
Measurement Procedure:	ANSI/TIA-603-C-2004
Device Classification:	Mobile
EUT Frequency Range Band:	PCS Band Uplink: 1850MHz to 1910MHz PCS Band Downlink: 1930MHz to 1990MHz
Power Output Rating Based on two tone composite power	PCS Band Uplink: +37.05dBm = 5.07W PCS Band Downlink: +28.23dBm = .665W
(For Certification Grant):	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 (pcs uplink and downlink). The level of any spurious emission was recorded. Testing was performed in the frequency range of 30MHz to 20GHz. Testing was performed for CDMA modulation type. The spurious emissions limit is -13dBm as specified in FCC Part 24. 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 a 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 (pcs 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 – 20GHz. The limit for out of band spurious emissions is -13dBm as specified in Part 24. All emissions were below the specified -13dBm limit. See attached test data.

RF POWER OUTPUT

The RF Power Output rating for both the uplink and downlink frequency bands was calculated using the composite power value from the intermodulation two tone test data. 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 pcs band 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	8/27/2008	8/27/2009
3258	Double Ridge Guide	EMCO	1 - 18 GHz	3115	8/20/2008	8/20/2009
3427B	Biconical Antenna	Electro-Mechanics	20MHz - 200MHz	3104	8/31/2007	12/31/2008
3430	Horn Antenna	MCS Corporation	18 GHz - 26.5 GHz	K-5039	1/30/2008	1/30/2009
4029B	Test Site Attenuation	Retlif	3 / 10 Meters	RNH	7/21/2008	7/21/2009
5070	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	12/7/2007	12/7/2008
7034	Log Periodic Antenna	EMCO	200 MHz - 1 GHz	3146	8/11/2008	8/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009

RF Power Output

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3128A	20 dB Attenuator	Lucas Weinschel	DC - 18 GHz	2	1/28/2008	1/28/2009
5026B	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/28/2008	1/28/2009
8368	10.0 dB Attenuator	Bird Electronics	DC - 2.4 GHz, 50 W	50-A-MFN-10	10/23/2007	12/23/2008
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009

Frequency Stability

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3128A	20 dB Attenuator	Lucas Weinschel	DC - 18 GHz	2	1/28/2008	1/28/2009
4997	Digital Thermometer	Omega	N/A		7/28/2008	7/28/2009
5026B	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/28/2008	1/28/2009
5049B	Digital Multimeter	Fluke	N/A	111	8/19/2008	8/19/2009
5077	Temperature Chamber	Associated Env. Sys.	-50 to 150 Deg C	ZFD-531	1/30/2008	1/30/2009
8368	10.0 dB Attenuator	Bird Electronics	DC - 2.4 GHz, 50 W	50-A-MFN-10	10/23/2007	12/23/2008
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009

Intermodulation Characteristics

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3128A	20 dB Attenuator	Lucas Weinschel	DC - 18 GHz	2	1/28/2008	1/28/2009
5026B	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/28/2008	1/28/2009
8368	10.0 dB Attenuator	Bird Electronics	DC - 2.4 GHz, 50 W	50-A-MFN-10	10/23/2007	12/23/2008
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009

Occupied Bandwidth

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3128A	20 dB Attenuator	Lucas Weinschel	DC - 18 GHz	2	1/28/2008	1/28/2009
5026B	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/28/2008	1/28/2009
8368	10.0 dB Attenuator	Bird Electronics	DC - 2.4 GHz, 50 W	50-A-MFN-10	10/23/2007	12/23/2008
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009

Spurious Emissions Antenna Ports

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3128A	20 dB Attenuator	Lucas Weinschel	DC - 18 GHz	2	1/28/2008	1/28/2009
5026B	20 dB Attenuator	Narda	DC - 11 GHz	768-20	1/28/2008	1/28/2009
8368	10.0 dB Attenuator	Bird Electronics	DC - 2.4 GHz, 50 W	50-A-MFN-10	10/23/2007	12/23/2008
R425B	Spectrum Analyzer	Agilent	100 Hz - 26.5 GHz	E7405A;A	4/11/2008	4/11/2009
R432	Signal Generator	Agilent	250kHz - 3GHz	E4436B:A	11/14/2008	11/14/2009

SETUP PHOTOGRAPHS

SPURIOUS RADIATED EMISSIONS

SETUP PHOTOGRAPHS

SPURIOUS RADIATED EMISSIONS

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

OCCUPIED BANDWIDTH/RF POWER OUTPUT

INTERMODULATION (TWO TONE)

FREQUENCY STABILITY

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	**RF Power Output**		
Customer:	Cellular Specialties, Inc.	**Job No:**	R-5086N
Test Sample:	Bi-directional Cellular Amplifier		
Model No:	C12-553-401	**Serial No:**	C08260806
Test Specification:	FCC Part 2 Paragraph: 2.1046		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	**Date:**	11/20/2008
Notes:	Low Band - Uplink Frequency Range: 1850-1910 MHz Downlink Frequency Range: 1930-1990 MHz RF Power output data taken from the two tone test combined power Modulation Type: CDMA		

Test Frequency	Measured Level	Measured Level		Combined Level	Combined Level					
MHz	dBm	mW		mW	dBm					
(Uplink) Low										
1861.35	33.86	2432.20		5074.61	37.05					
1868.70	34.22	2642.41								
(Uplink) High										
1889.38	34.02	2523.48		5461.13	37.37					
1896.73	34.68	2937.65								
(Downlink) Low										
1936.28	24.55	285.1		665.3	28.23					
1943.98	25.80	380.2								
(Downlink) High										
1974.45	24.57	286.4		673.7	28.28					
1981.80	25.88	387.3								
	Res. Bandwidth: 1MHz									
	Video Bandwidth: 3MHz									
	Sweep Time: 3 seconds									
	Detector: Average/RMS									

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

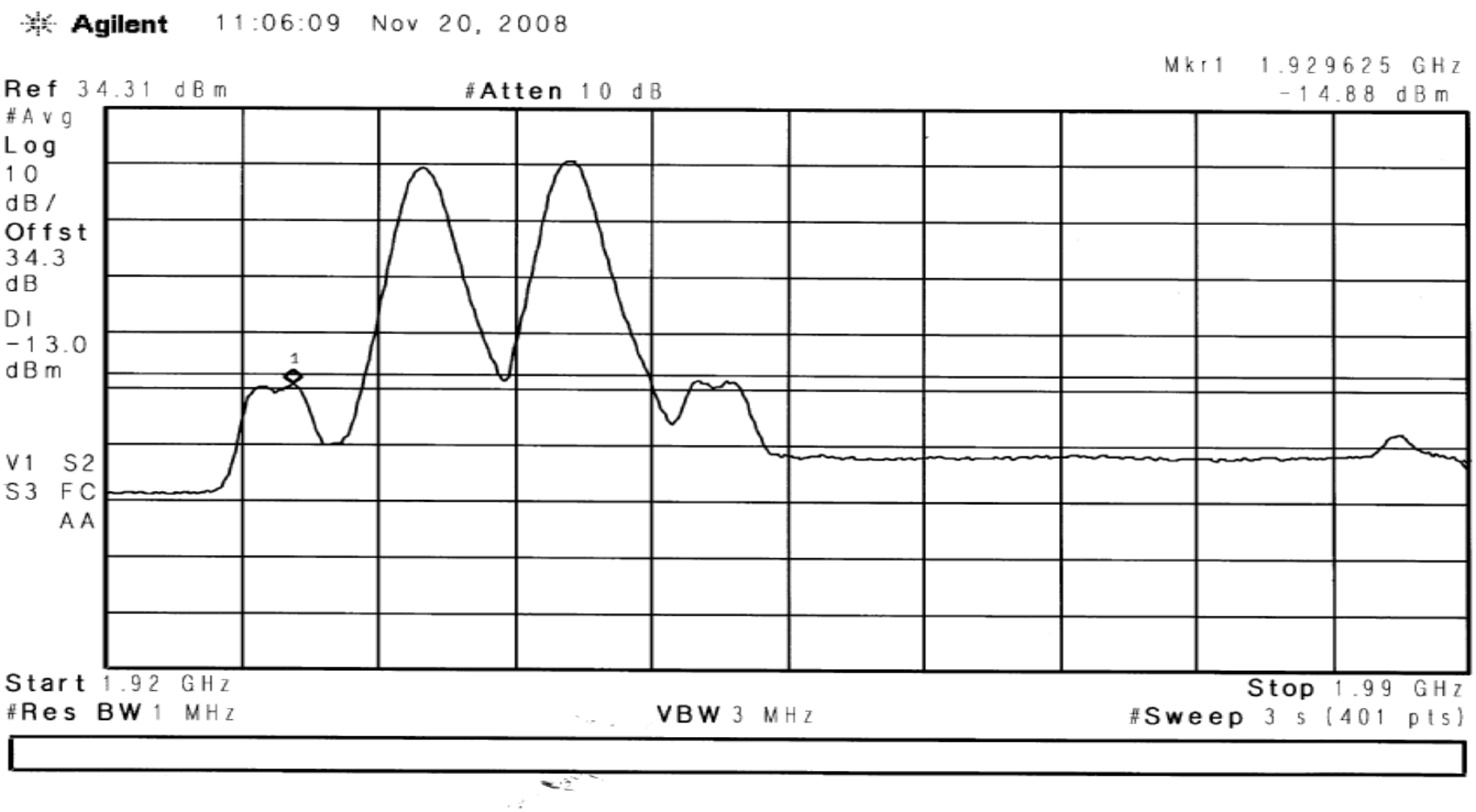
Test Method:	**Inter-modulation Characteristics (Two Tone Method)**		
Customer:	Cellular Specialties, Inc.	**Job No:**	R-5086N
Test Sample:	Bi-directional Cellular Amplifier		
Model No:	C12-553-401	**Serial No:**	C08260806
Test Specification:	FCC Part 2 Paragraph: 2.1047		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	**Date:**	11/20/2008
Notes:	Low Band - Uplink Frequency Range: 1850-1910 MHz Downlink Frequency Range: 1930-1990 MHz Two Tone Modulation Type: CDMA		

Test Frequency	Measured Level	Measured Level		Combined Level	Combined Level					
MHz	dBm	mW		mW	dBm					
(Uplink) Low										
1854.70	-14.45									
1861.35	33.86	2432.20		5074.61	37.05					
1868.70	34.22	2642.41								
1875.35	-13.16									
(Uplink) High										
1882.73	-14.49									
1889.38	34.02	2523.48		5461.13	37.37					
1896.73	34.68	2937.65								
1903.20	-13.47									
(Downlink) Low										
1929.63	-14.88									
1936.28	24.55	285.1		665.3	28.23					
1943.98	25.80	380.2								
1950.45	-13.85									
(Downlink) High										
1965.88	-15.02									
1974.45	24.57	286.4		673.7	28.28					
1981.80	25.88	387.3								
1988.45	-15.97									
	Res. Bandwidth: 1MHz									
	Video Bandwidth: 3MHz									
	Sweep Time: 3 seconds									
	Detector: Average/RMS									

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	**Inter-modulation Characteristics**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Downlink				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

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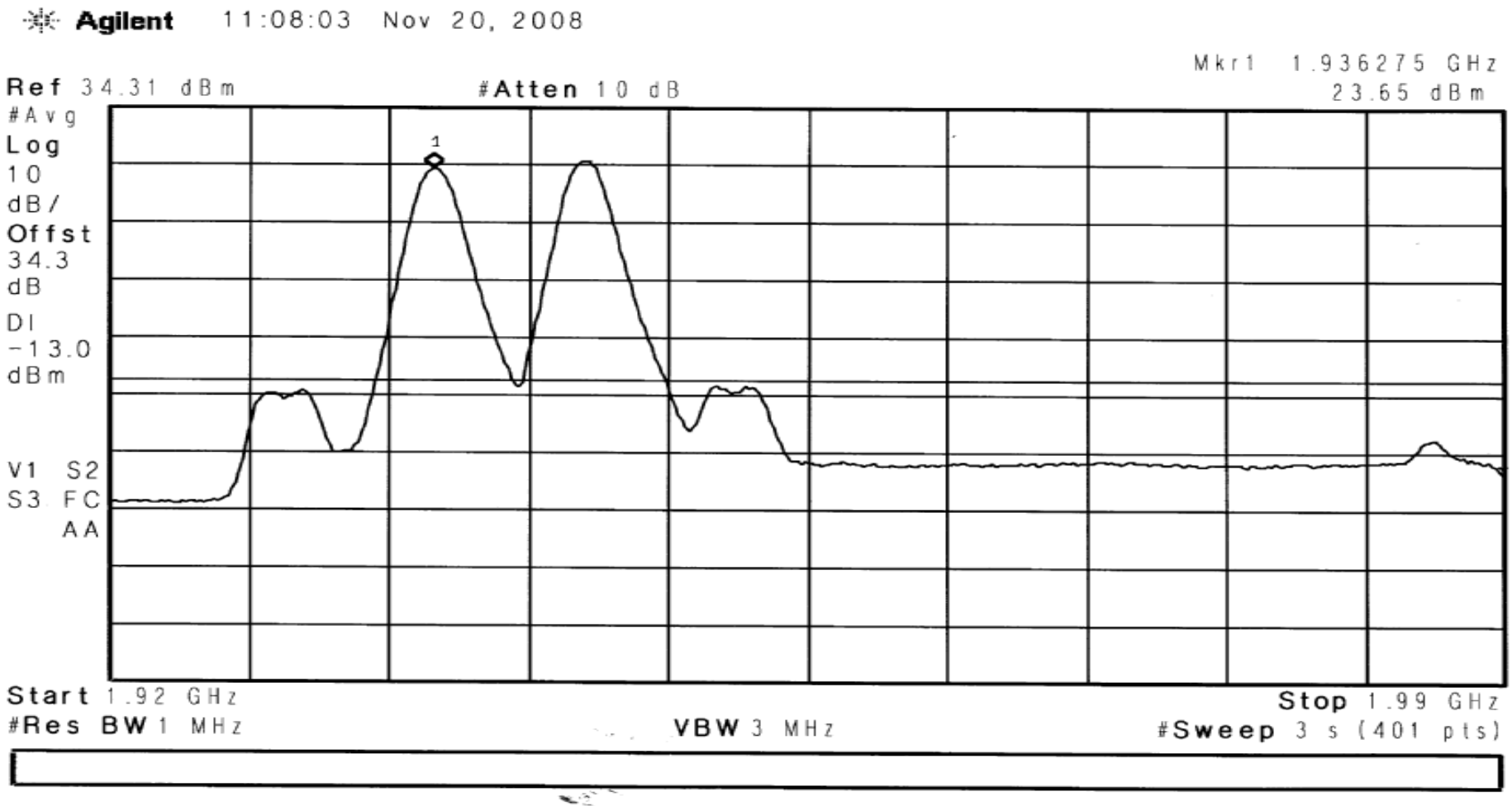
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Downlink				



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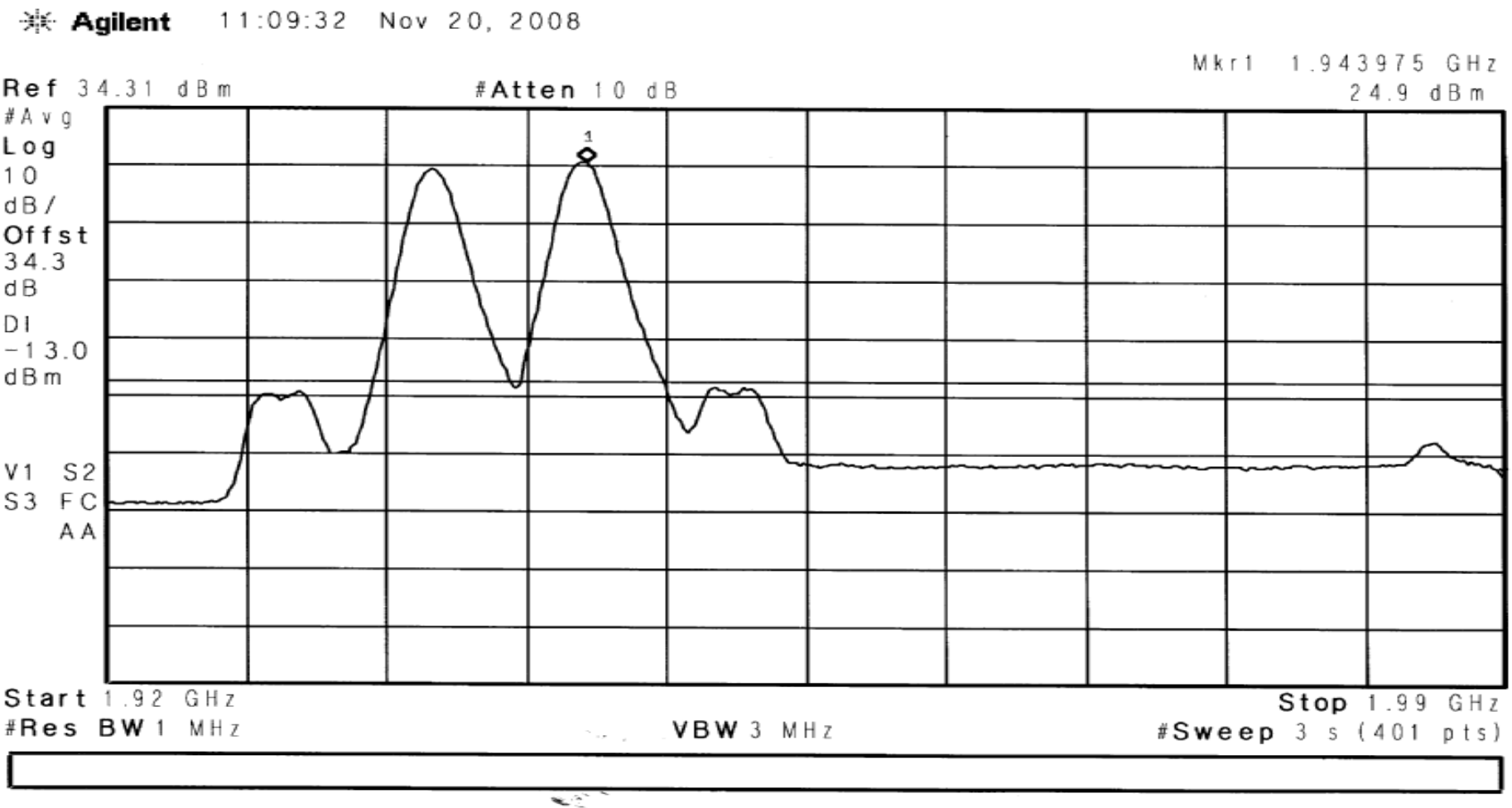

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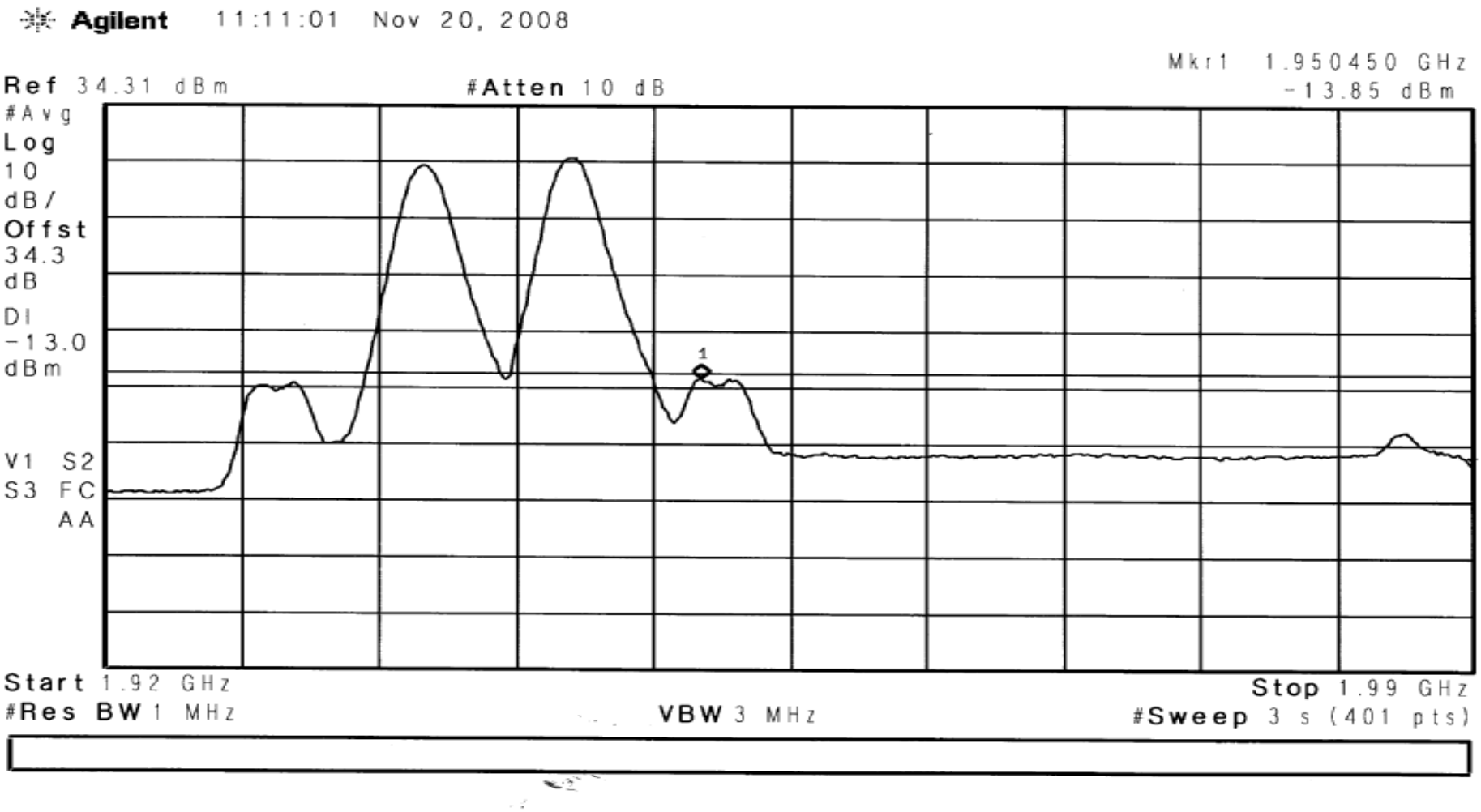
Notes:	PCS Band - CDMA - Downlink				



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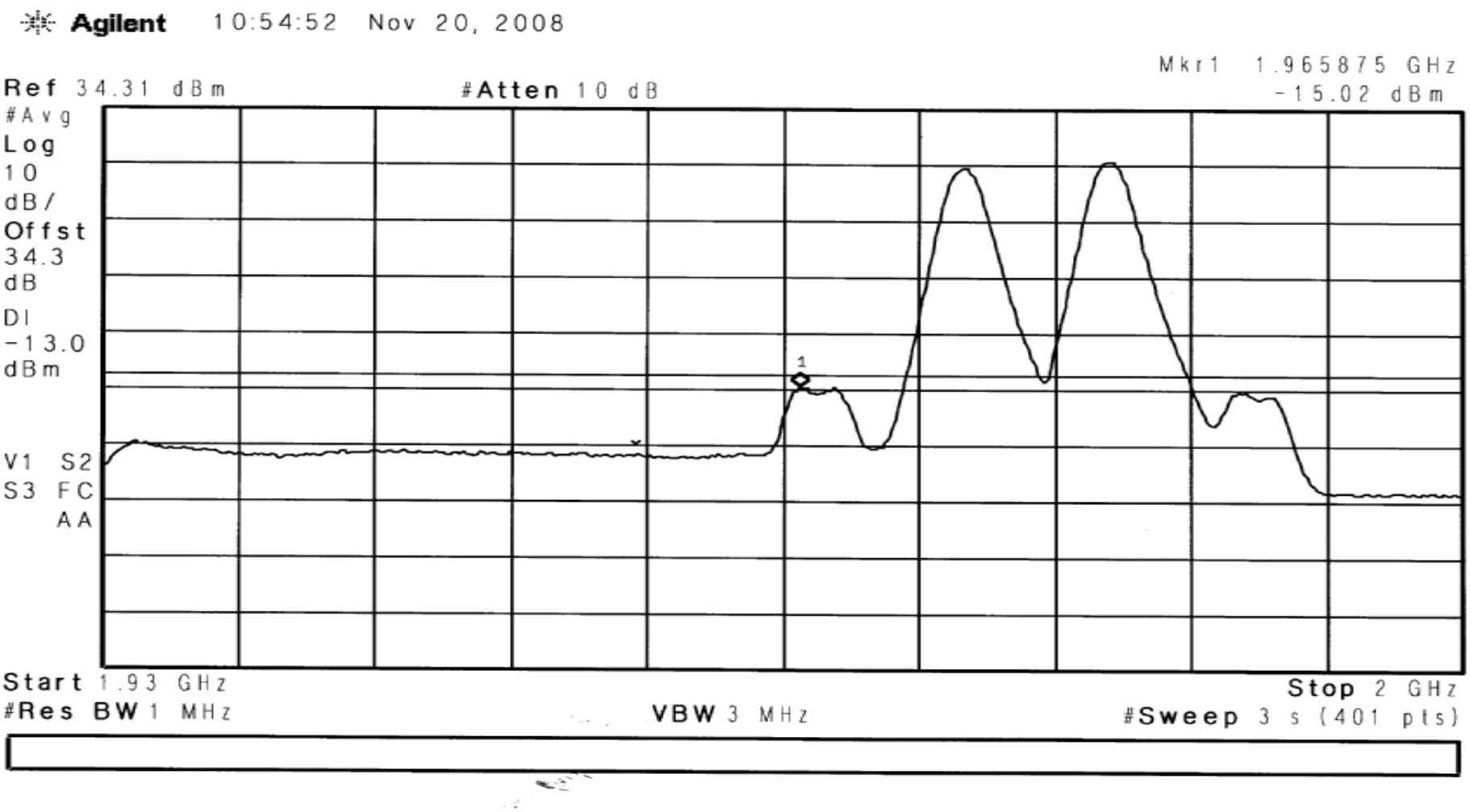

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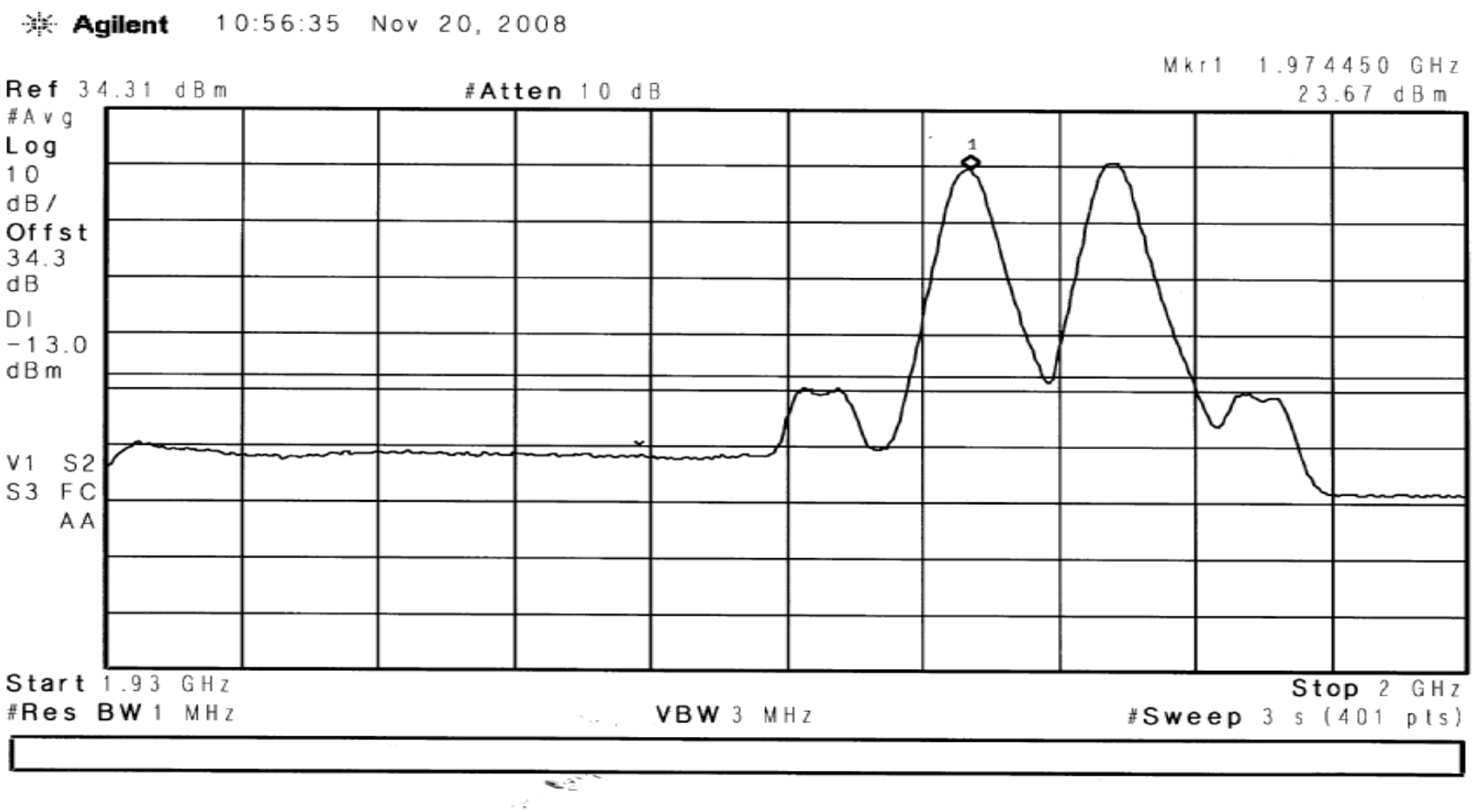

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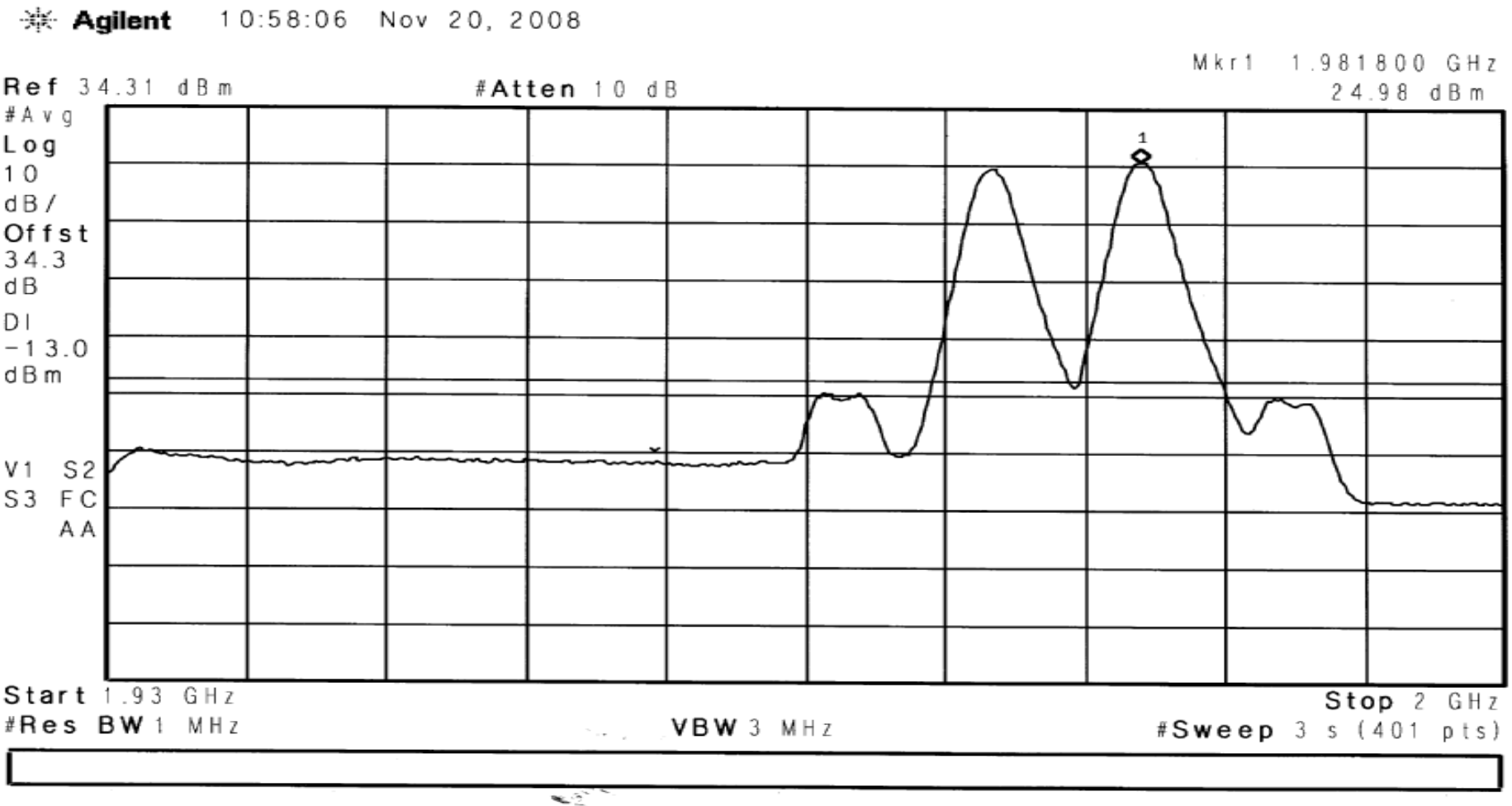

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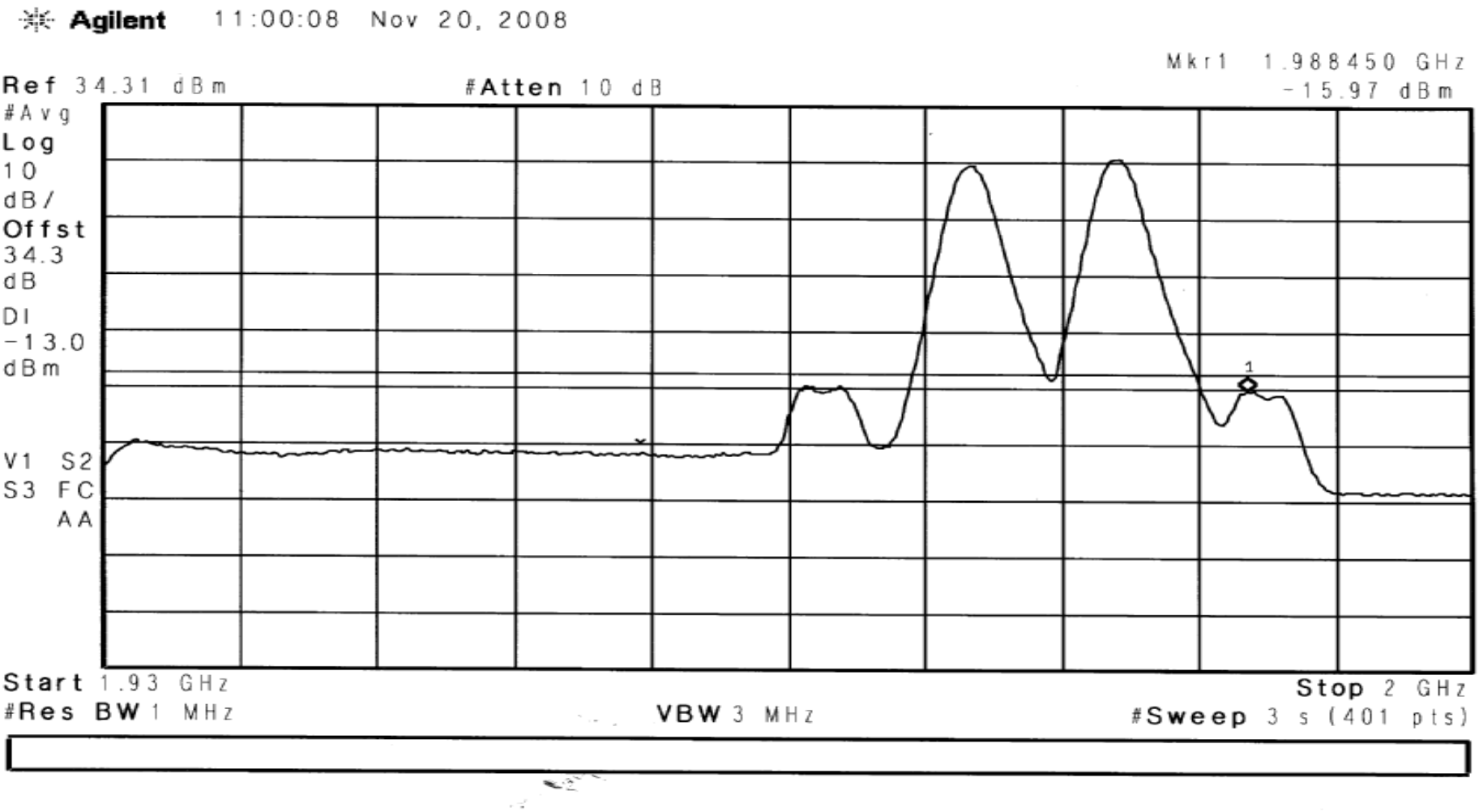

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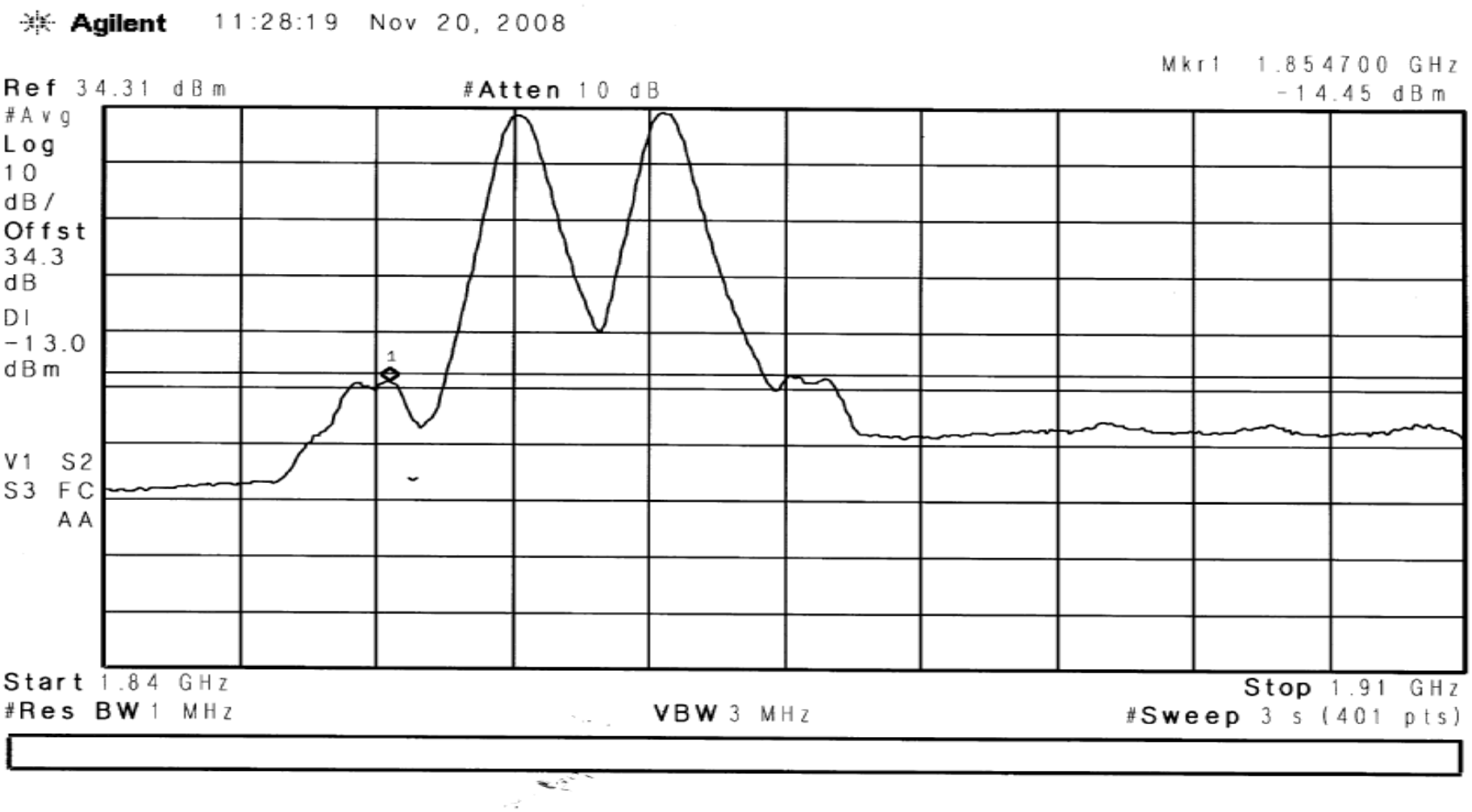
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Uplink				



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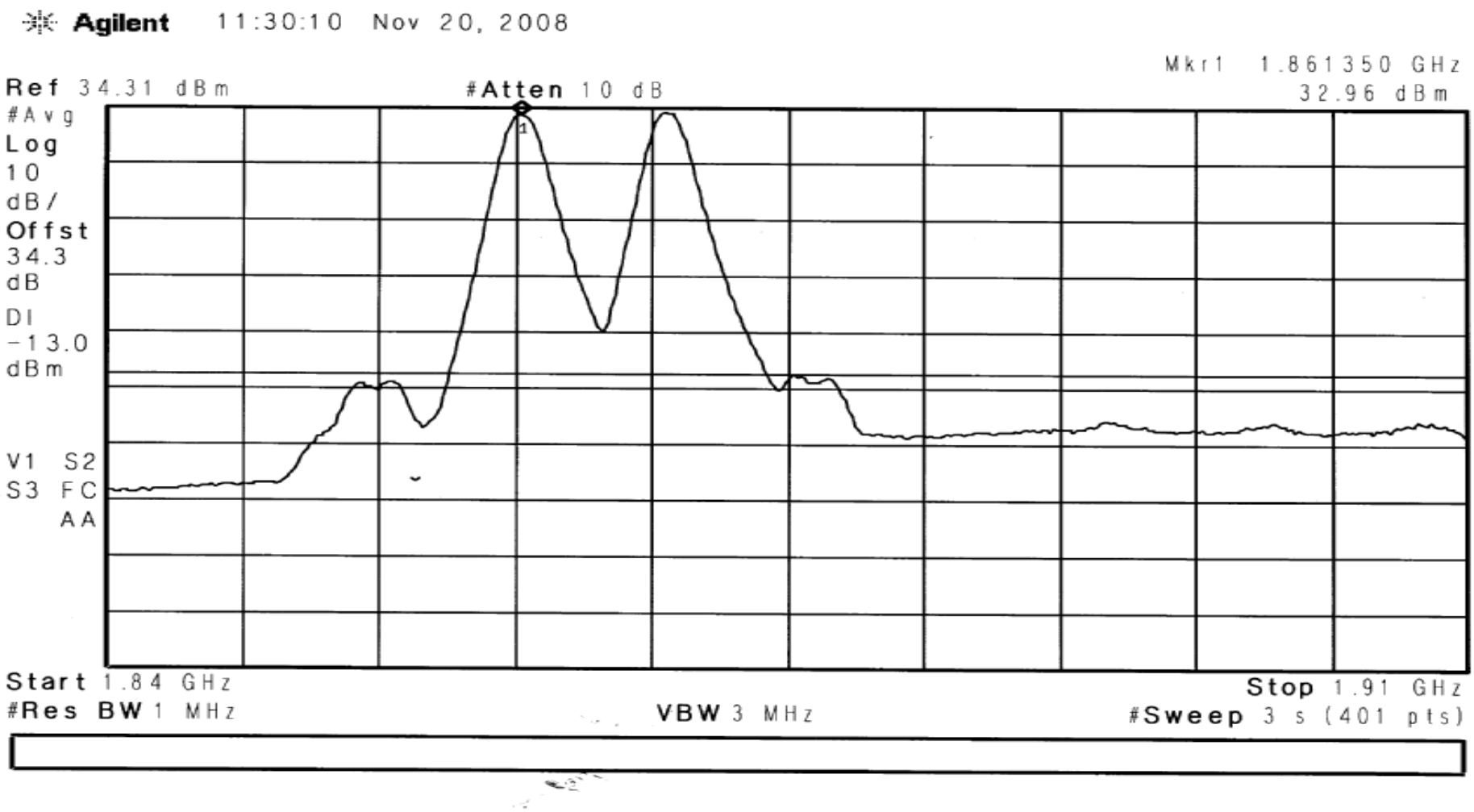

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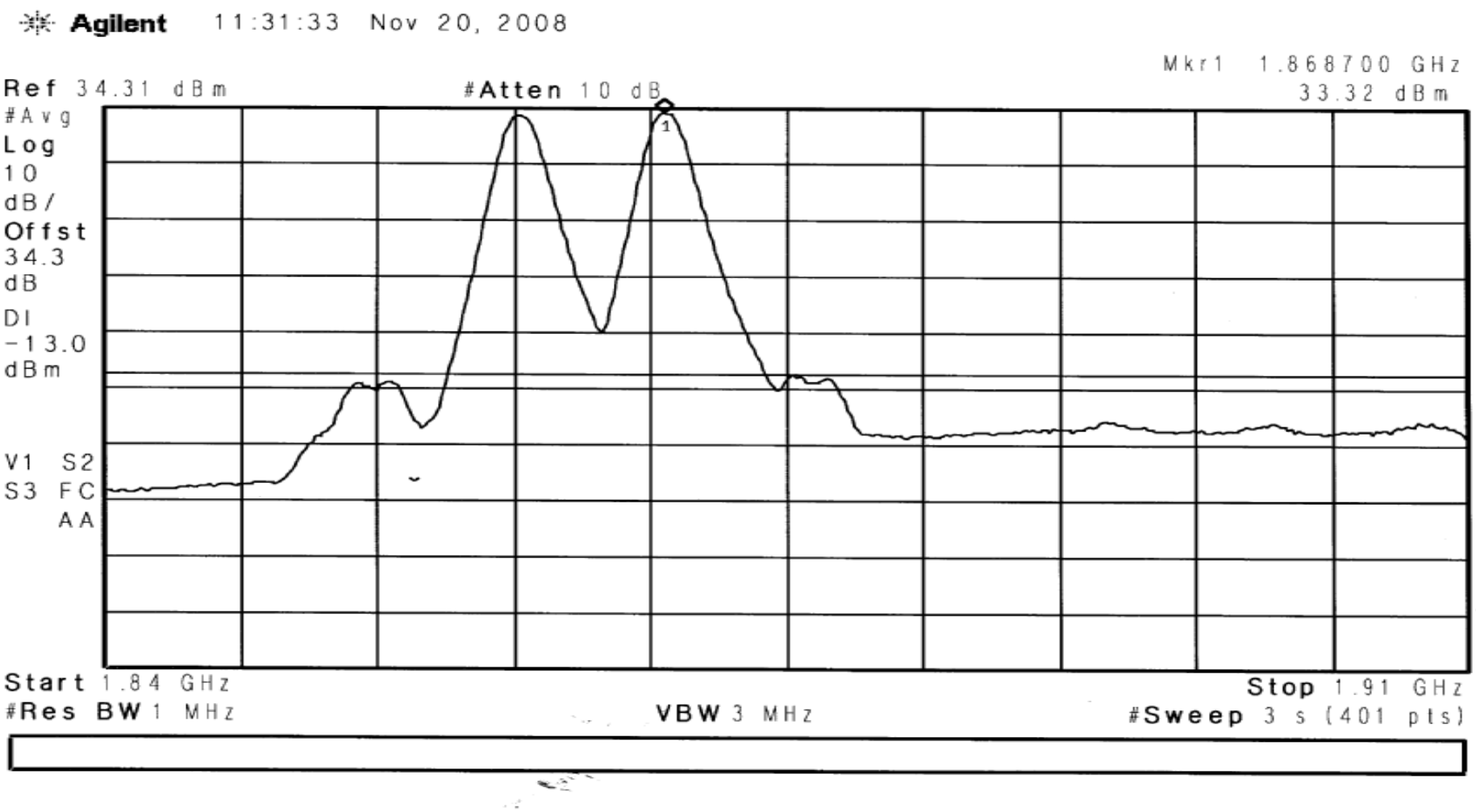

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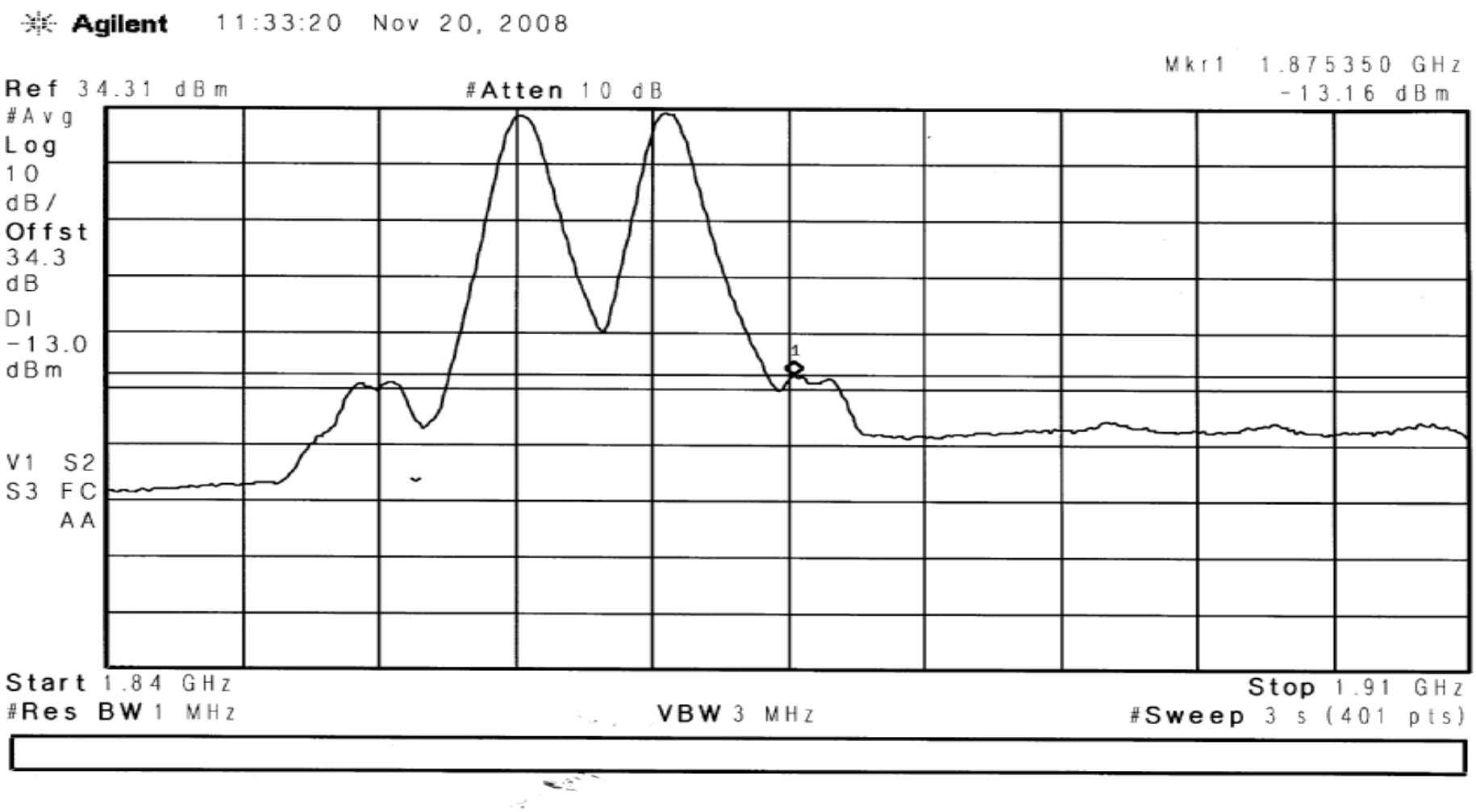

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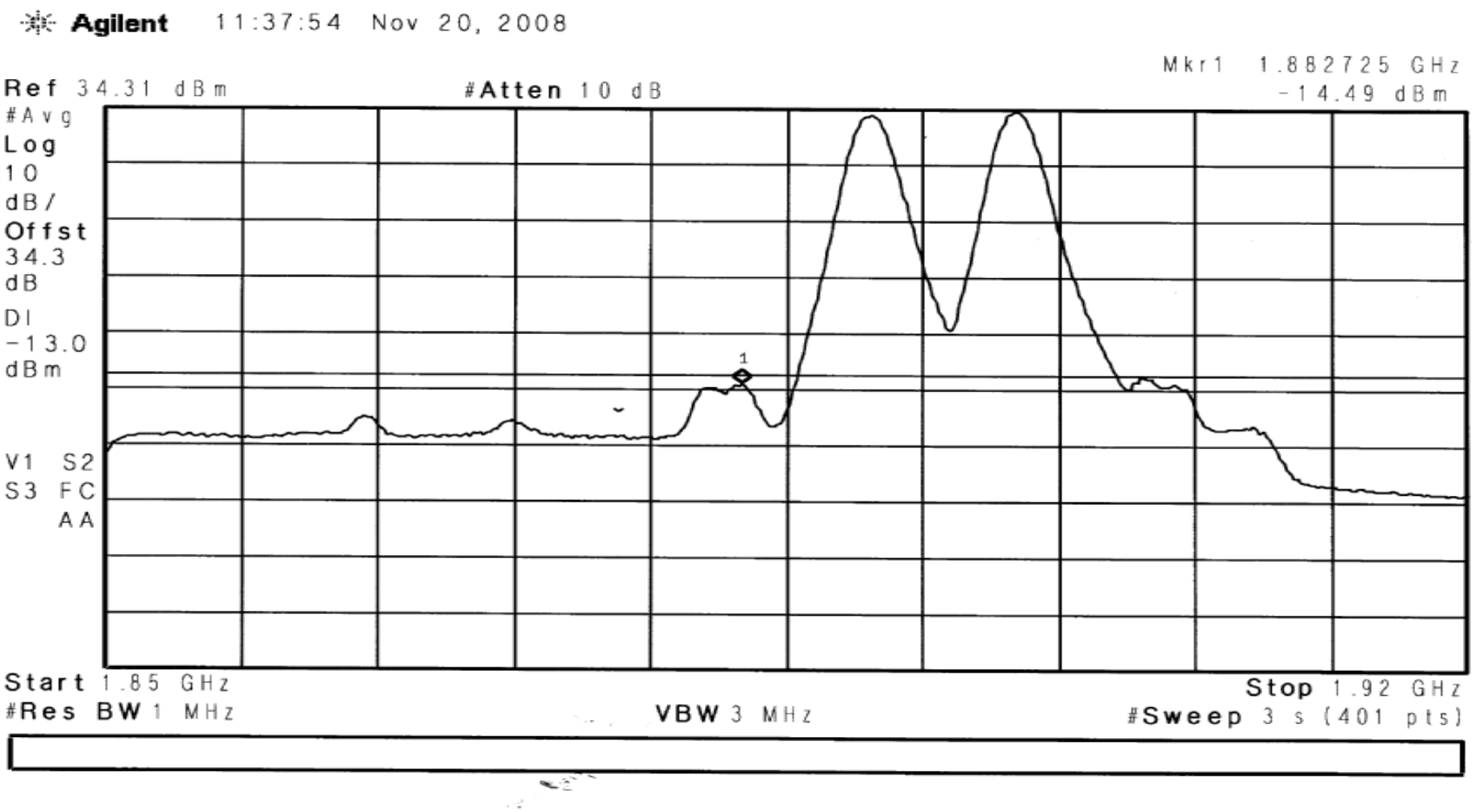
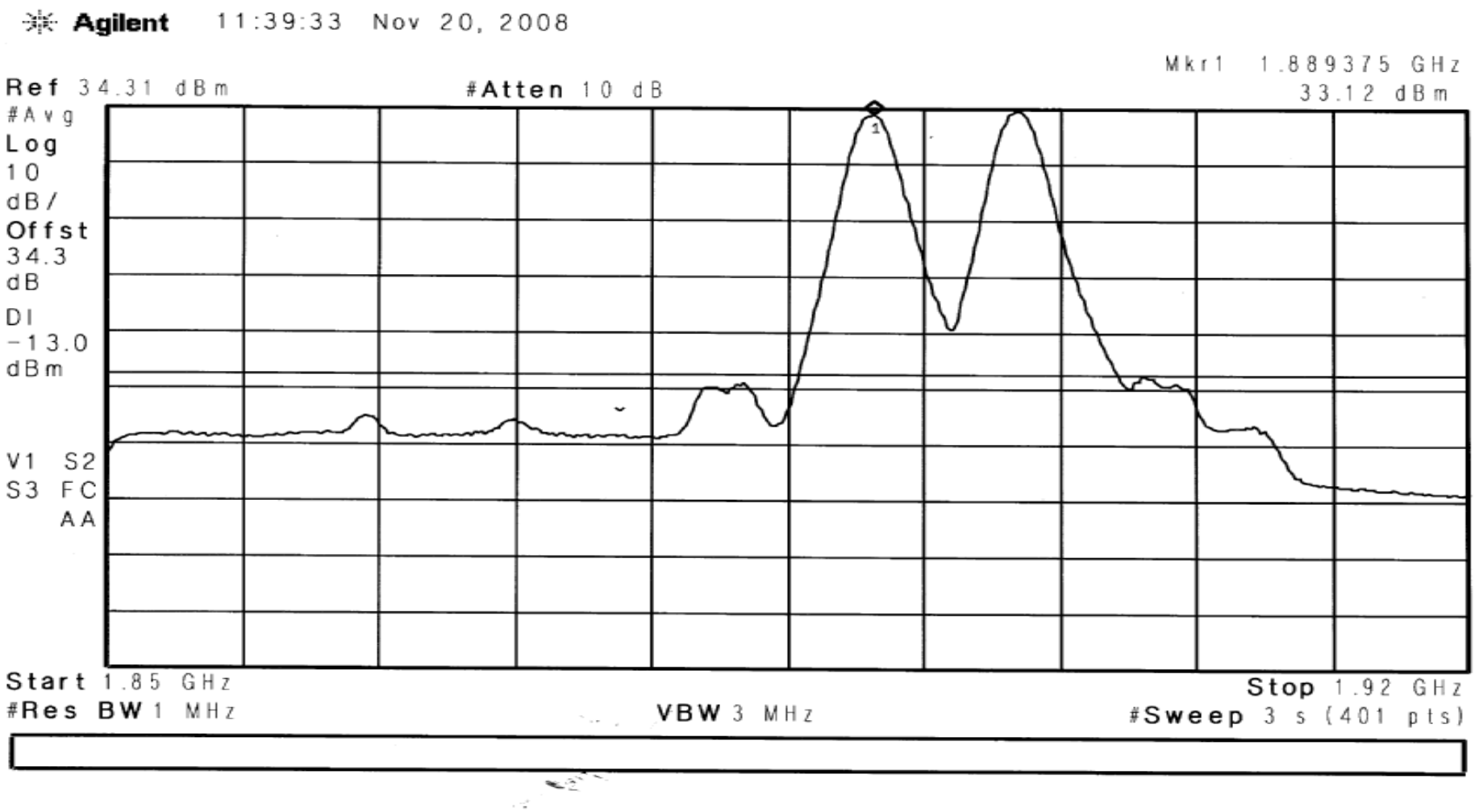
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Uplink				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

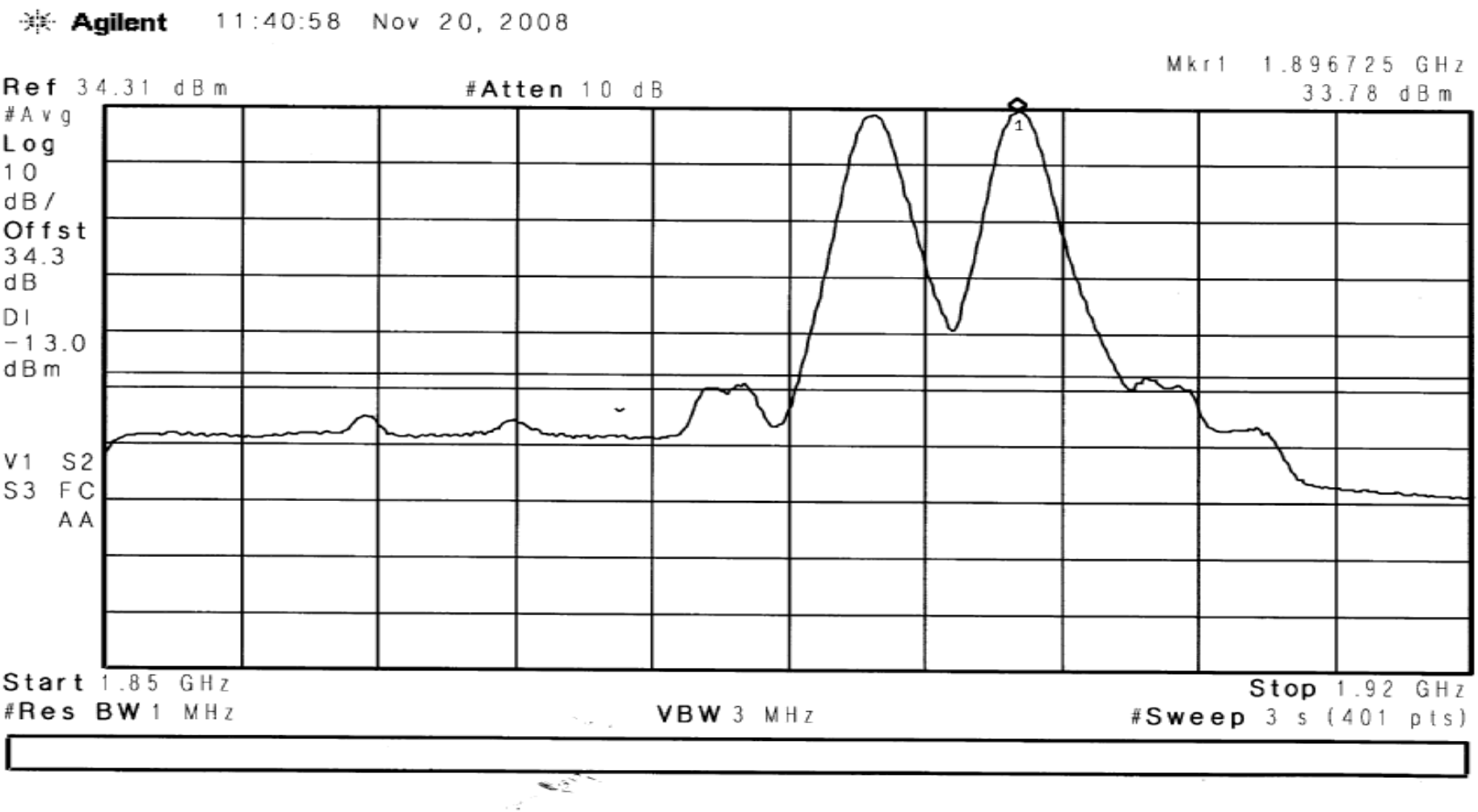
Test Method:	**Inter-modulation Characteristics**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Uplink				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

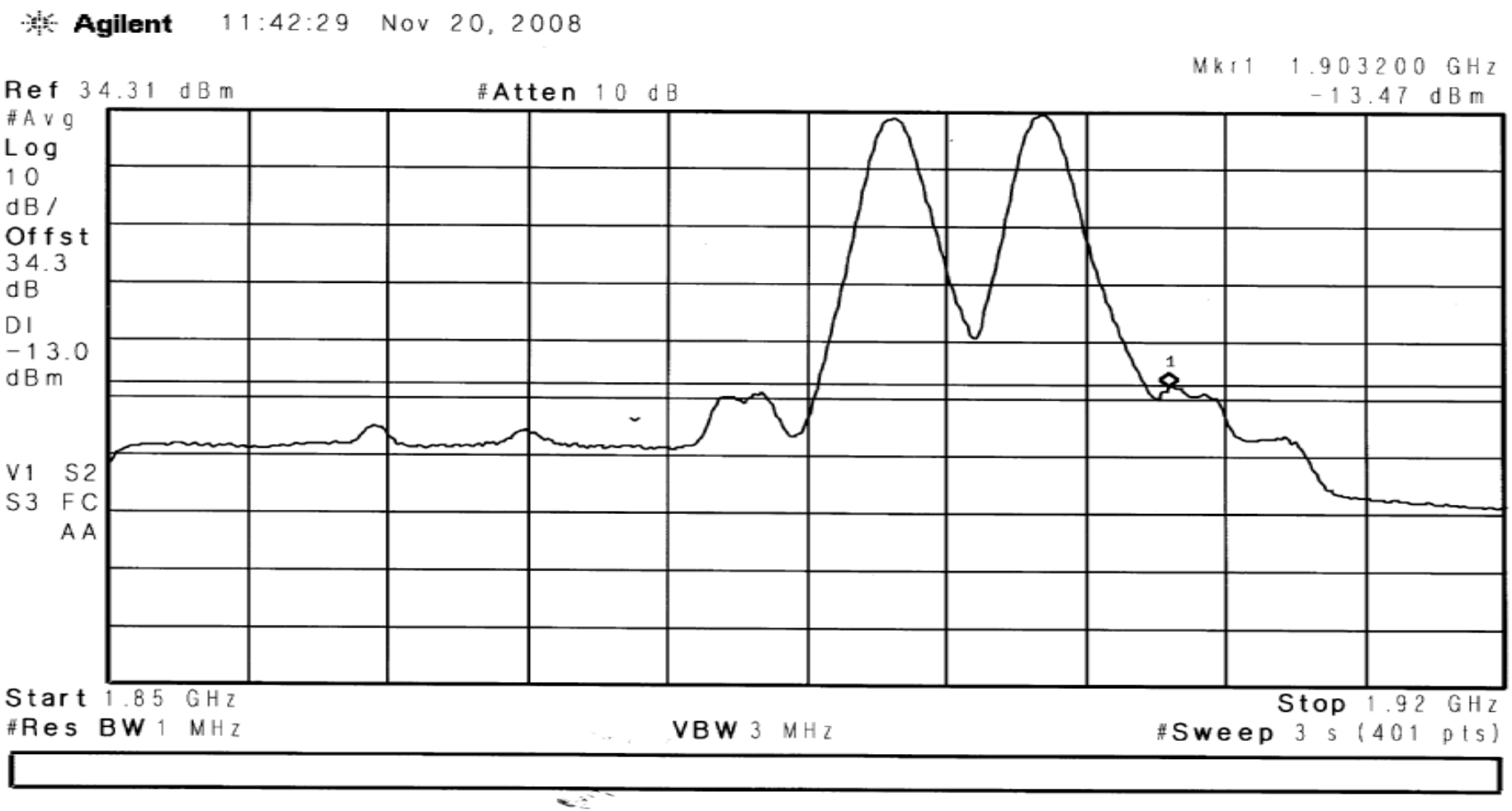
Test Method:	**Inter-modulation Characteristics**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Uplink				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

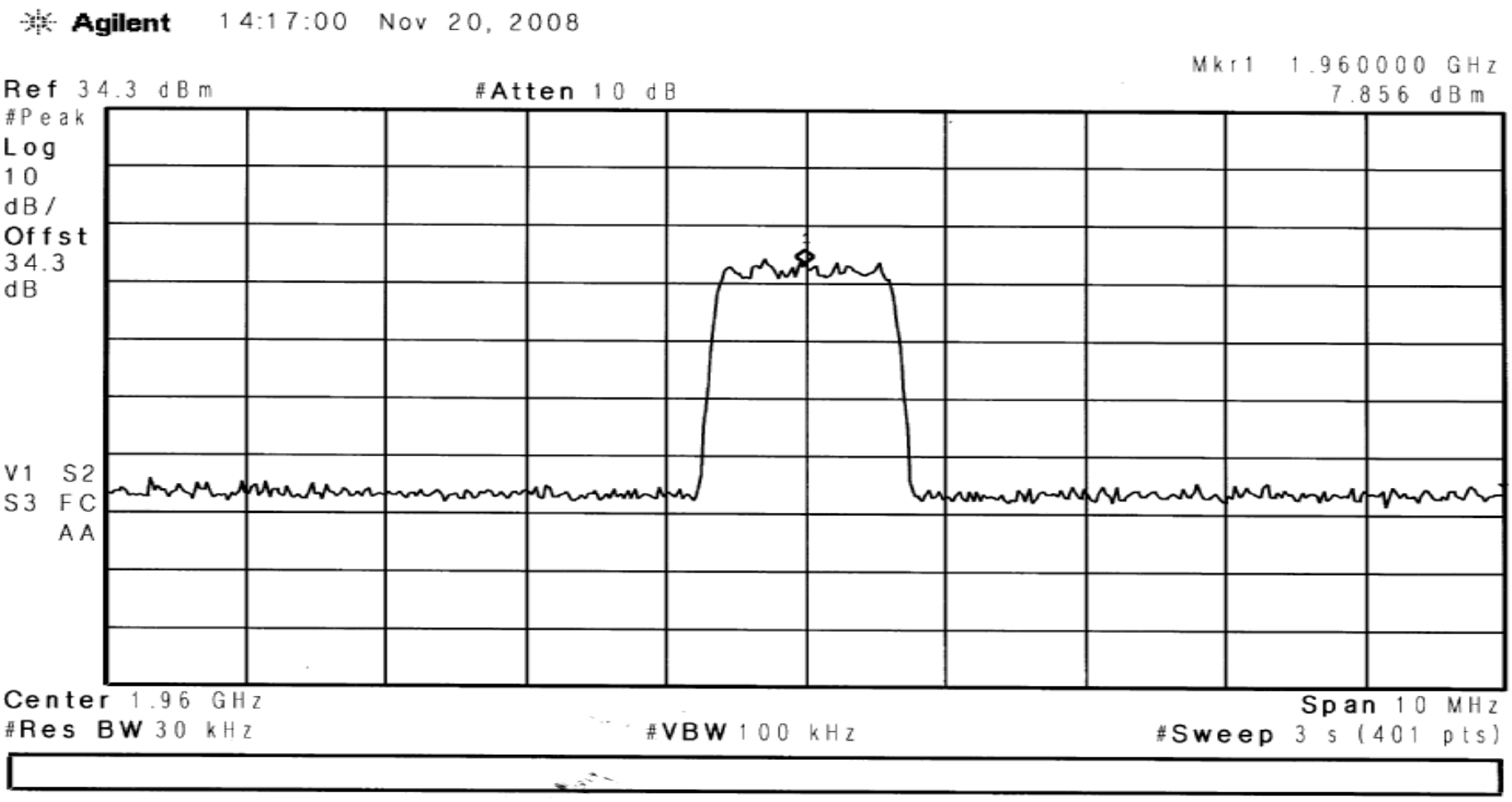
Test Method:	**Inter-modulation Characteristics**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1047		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	PCS Band - CDMA - Uplink				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

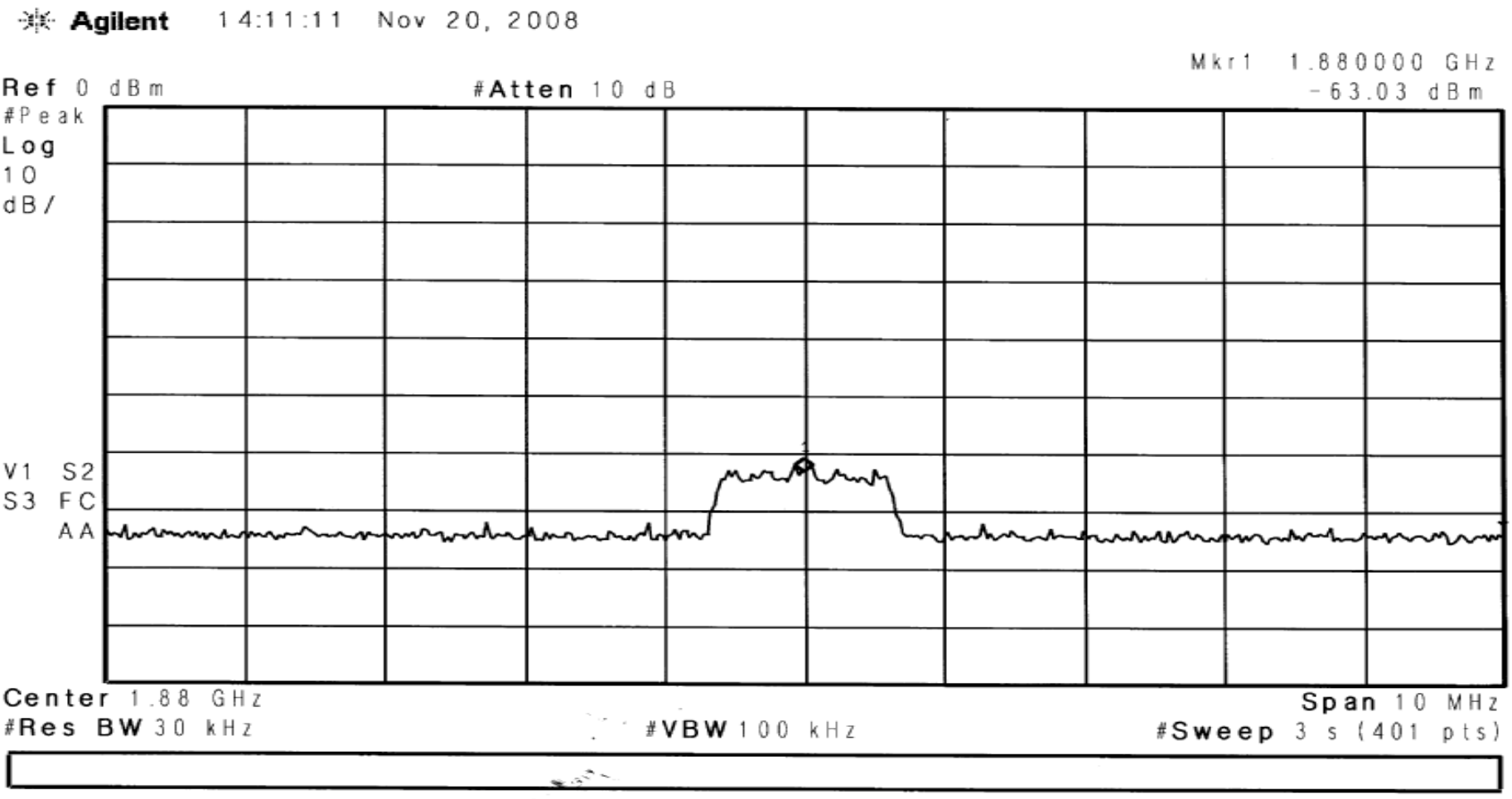
Test Method:	**Occupied Bandwidth**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1049		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	CDMA - Uplink - Output at 1880 MHz				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

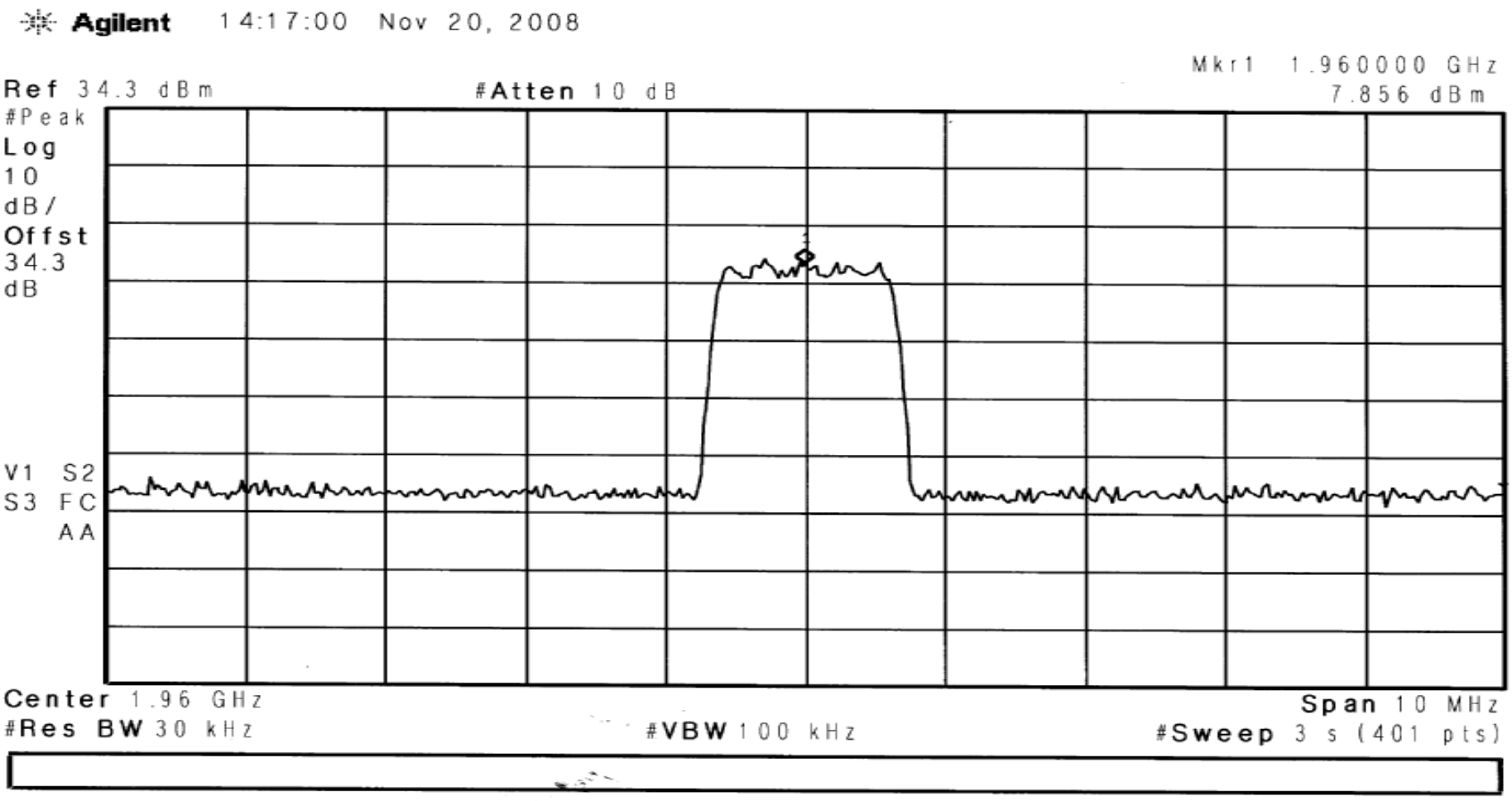
Test Method:	**Occupied Bandwidth**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1049		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	CDMA - Uplink - Input at 1880 MHz				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

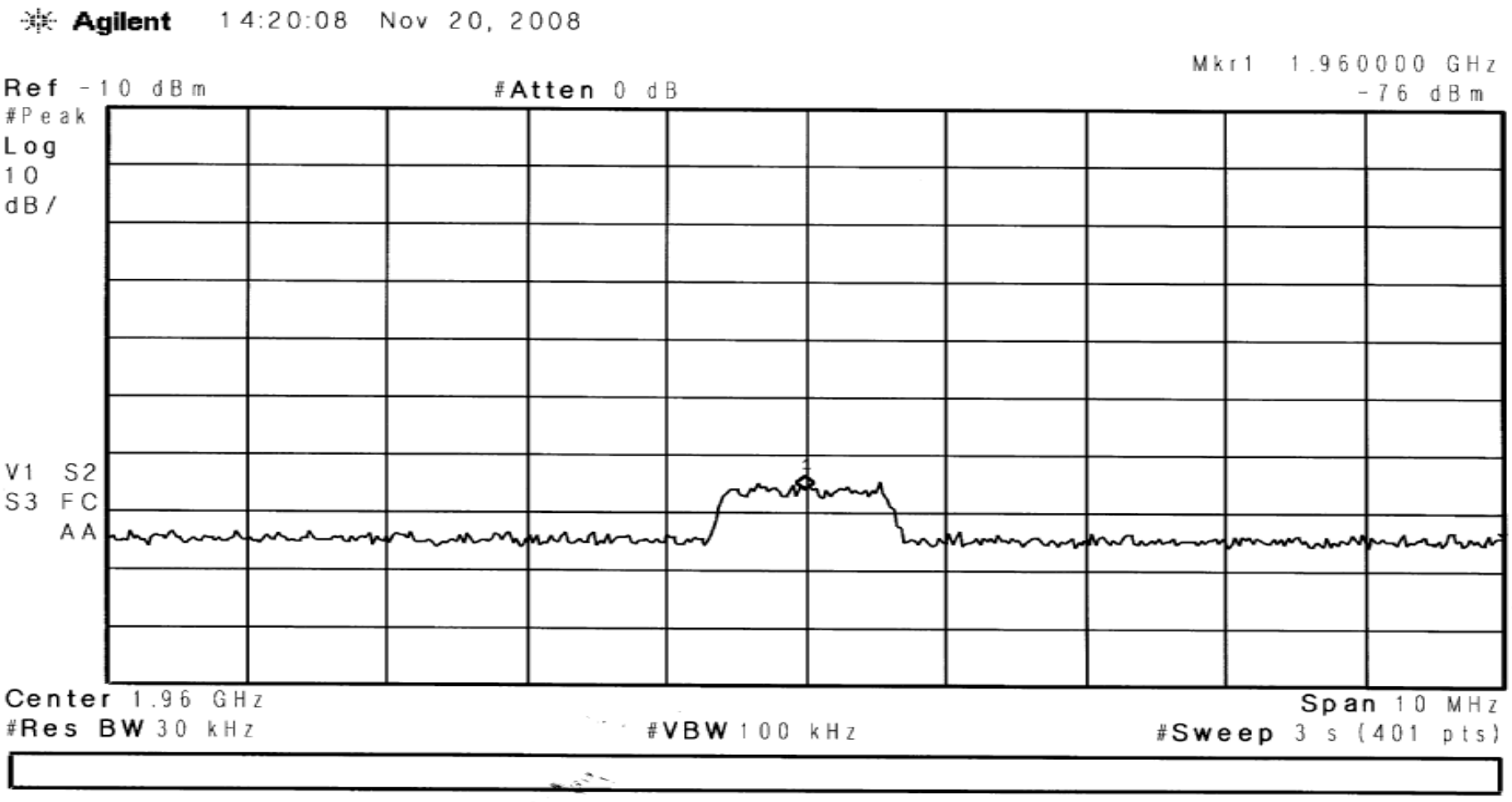
Test Method:	**Occupied Bandwidth**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1049		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	CDMA - Uplink - Output at 1960 MHz				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	**Occupied Bandwidth**				
Customer:	Cellular Specialties, Inc.	**Test Sample:**	Bi-directional Cellular Amplifier	**Job No:**	R-5086N
Model No:	C12-553-401	**Serial No:**	C08260806	**Technician:**	M.Seamans
Test Specification:	FCC Part 2	Paragraph: 2.1049		**Date:**	11/20/2008
Operating Mode:	Amplifying input signal				
Notes:	CDMA - Uplink - Input at 1880.00 MHz				



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method: **Spurious Emissions at the Antenna Terminals 30 MHz to 20 GHz**

Customer: Cellular Specialties, Inc. **Job No:** R-5086N

Test Sample: Bi-directional Cellular Amplifier

Model No: C12-553-401 **Serial No:** C08260806

Test Specification: FCC Part 2
Paragraph: 2.1051

Operating Mode: Amplifying input signal

Technician: M.Seamans **Date:** 11/20/2008

Notes: Uplink Frequency: 1850 - 1910 MHz Downlink Frequency: 1930 - 1990 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	
-46.60	1855.00				-55.30	1945.00				
I	I	3710.00	-24.68	-13.0	I	I	3890.00	-24.70	-13.0	
I	I	5565.00	-25.36	I	I	I	5835.00	-24.85	I	
I	I	7420.00	-25.07	I	I	I	7780.00	-25.35	I	
I	I	9275.00	-26.02	I	I	I	9725.00	-25.90	I	
I	I	11130.00	-26.91	I	I	I	11670.00	-25.53	I	
I	I	12985.00	-25.16	I	I	I	13615.00	-24.73	I	
I	I	14840.00	-24.51	I	I	I	15560.00	-25.40	I	
I	I	16695.00	-24.28	I	I	I	17505.00	-25.56	I	
-46.60	1855.00	18550.00	-24.74	-13.0	-55.30	1945.00	19450.00	-25.10	-13.0	
-46.60	1880.00				-55.30	1960.00				
I	I	3760.00	-24.25	-13.0	I	I	3920.00	-24.86	-13.0	
I	I	5640.00	-25.39	I	I	I	5880.00	-25.02	I	
I	I	7520.00	-25.48	I	I	I	7840.00	-23.93	I	
I	I	9400.00	-26.12	I	I	I	9800.00	-23.62	I	
I	I	11280.00	-25.48	I	I	I	11760.00	-26.51	I	
I	I	13160.00	-25.69	I	I	I	13720.00	-23.24	I	
I	I	15040.00	-24.13	I	I	I	15680.00	-24.05	I	
I	I	16920.00	-25.46	I	I	I	17640.00	-24.44	I	
-46.60	1880.00	18800.00	-24.69	-13.0	-55.30	1960.00	19600.00	-25.35	-13.0	
-46.60	1895.00				-55.30	1975.00				
I	I	3790.00	-24.97	-13.0	I	I	3950.00	-24.58	-13.0	
I	I	5685.00	-25.41	I	I	I	5925.00	-24.60	I	
I	I	7580.00	-25.43	I	I	I	7900.00	-25.44	I	
I	I	9475.00	-25.70	I	I	I	9875.00	-26.20	I	
I	I	11375.00	-25.36	I	I	I	11850.00	-25.57	I	
I	I	13265.00	-23.33	I	I	I	13825.00	-23.79	I	
I	I	15160.00	-23.80	I	I	I	15800.00	-24.26	I	
I	I	17055.00	-24.98	I	I	I	17775.00	-24.03	I	
-46.60	1895.00	18950.00	-23.97	-13.0	-55.30	1975.00	19750.00	-25.77	-13.0	

Data Sheet 1 of 1 **R-5086N**

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 20GHz		
Customer:	Cellular Specialties, Inc.	**Job No:**	R-5086N
Test Sample:	Bi-directional Cellular Amplifier		
Model No:	C12-553-401	**Serial No:**	C08260806
Test Specification:	FCC Part 2.1053 TIA/EIA-603 Paragraph: 2.1053		
Operating Mode:	Amplifying input signal		
Technician:	M. Hippert	**Date:**	11/25/2008
Notes:	Uplink Frequency Range: 1850-1910 MHz Tested at 3 Input frequencies:1865, 1880, 1895 MHz Peak Detector Modulation: CW Testing performed at 3 Meters		

Test Frequency	Antenna Position	Reference Reading	Signal Gen Level	Reference Ant Gain					Corrected Reading	Spurious Limit
MHz	(H/V) - Height	dBuV	dBm	dBI					dBm	dBm
30.00	-	-	-	-					-	-13.00
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
20000.00	-	-	-	-					-	-13.00

No emissions observed above the noise floor of the test equipment which was a minimum of 10dB below the limit.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 20GHz		
Customer:	Cellular Specialties, Inc.	**Job No:**	R-5086N
Test Sample:	Bi-directional Cellular Amplifier		
Model No:	C12-553-401	**Serial No:**	C08260806
Test Specification:	FCC Part 2.1053 TIA/EIA-603 Paragraph: 2.1053		
Operating Mode:	Amplifying input signal		
Technician:	M. Hippert	**Date:**	11/25/2008
Notes:	Downlink Frequency Range: 1930-1990 MHz Tested at 3 Input frequencies:1945, 1960, 1975 MHz Peak Detector Modulation: CW Testing performed at 3 Meters		

Test Frequency	Antenna Position	Reference Reading	Signal Gen Level	Reference Ant Gain					Corrected Reading	Spurious Limit
MHz	(H/V) - Height	dBuV	dBm	dBI					dBm	dBm
30.00	-	-	-	-					-	-13.00
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
20000.00	-	-	-	-					-	-13.00

No emissions observed above the noise floor of the test equipment which was a minimum of 10dB below the limit.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method: **Frequency Stability**

Customer: Cellular Specialties, Inc. **Job No:** R-5086N

Test Sample: Bi-directional Cellular Amplifier

Model No: C12-553-401 **Serial No:** C08260806

Test Specification: FCC Part 2
Paragraph: 2.1055

Operating Mode: Amplifying input signal

Technician: M.Seamans **Date:** 11/21/2008

Notes: Uplink Frequency 1880 MHz Nominal Voltage = 72 VDC
Downlink Frequency 1960 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
	(Uplink)									
-30	1880.0000			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
-20	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
-10	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
0	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
10	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
20	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
30	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
40	|			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
50	1880.0000			1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995	1.87999995
	(Downlink)									
-30	1960.0000			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
-20	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
-10	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
0	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
10	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
20	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
30	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
40	|			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950
50	1960.0000			1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999995	1.95999950

Data Sheet 1 of 1 **R-5086N**