



Retlif Testing Laboratories

101 New Boston Road, Goffstown, NH 03045
603-497-4600 - Fax: 603-497-5281

CORPORATE OFFICE
795 Marconi Avenue
Flonkonkoma, NY 11779
631-737-1500 Fax 631-737-1497
(A NY Corporation)

BRANCH LABORATORIES
3131 Delwiler Road
Harleysville, PA 19438
215-256-4133 Fax 215-256-4130

WASHINGTON
REGULATORY OFFICE
703-533-1614 Fax 703-533-1612



REPORT OF MEASUREMENTS

for

CELLULAR SPECIALTIES, INC. DIGITAL REPEATER

MODEL: CSI-DSP95-255-AW

FCC ID: NVRCSIDSP95255AW

IC: 4307A-DSP95255AW

Company Name: Cellular Specialties, Inc.

Date of Report: October 20, 2011

Test Report No: R-5522N

Test Start Date: October 3, 2011

Test Finish Date: October 13, 2011

Test Technician: M. Seamans

Laboratory Supervisor: T. Hannemann

Report Prepared By: J. 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.



Scott Wentworth
Branch Manager
NVLAP Approved Signatory



Todd Hannemann
Laboratory Supervisor
iNARTE Certified ATL-0255-T

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.



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Test Report No. R-5522N

CERTIFICATION APPLICATION SUMMARY

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

Equipment under Test (EUT): The EUT is a Digital Repeater System operating in the AWS band

Model: CSI-DSP95-255-AW

FCC ID Number: NVRCSIDSP95255AW

IC Certification Number: 4307A-DSP95255AW

Applicable Test Standards: FCC Parts 2 & 27, RSS-131, Issue 2

Measurement Procedure: ANSI/TIA-603-C-2004
RSS-131, Issue 2

Device Classification: Mobile

EUT Frequency Range Band: Uplink: 1710 MHz to 1755 MHz
Downlink: 2110 MHz to 2155MHz

Power Output Rating for Certification Grant based on RMS Channel Power: Uplink (WCDMA): 0.608W
Uplink (LTE): 0.606W
Downlink (WCDMA): 3.88W
Downlink (LTE): 2.95W

Modulation Types: WCDMA (F9W), LTE (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 (27.50)
- Occupied Bandwidth (2.1049)
- Spurious Emissions at Antenna Terminals (27.53)
- Effective Radiated Power of Spurious Radiation (27.53)
- Intermodulation Characteristics
- Frequency Stability (27.54)

Additional Measurements Required by RSS -131:

- Mean Output Power
- Passband Gain & Bandwidth
- Spurious Emissions (two tone)



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SECTION 1 SUMMARY OF TEST PROGRAM

RF POWER OUTPUT

Measurement Procedure:

The RF Power Output test was performed using RMS composite channel power measurements. The measurements were taken with the AGC turned off at maximum output power with all spurious emissions below the -13dBm limit. Testing was repeated with LTE modulation. The measured output power matched the manufacturer's rated output power. 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 WCDMA 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 three frequencies within each passband (uplink and downlink). Testing was repeated with LTE Modulation. 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 22GHz. Testing was performed for both WCDMA and LTE modulation types. The spurious emissions limit is -13dBm as specified in FCC Part 27. All emissions were below the specified -13dBm limit. See attached test data.



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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 – 22GHz. The limit for out of band spurious emissions is -13dBm as specified in Part 27. All emissions were below the specified -13dBm limit. See attached test data.

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. Due to the bandwidth of the modulated signals testing was performed with the two signals centered in the passband instead of at both the upper and lower band edges. The output of each signal generator was adjusted so that the two output fundamental frequencies were equal in magnitude. Testing was performed for WCDMA & LTE Modulation types. At the maximum specified input power levels all intermodulation products were at -13dBm or below. See attached test data.

FREQUENCY STABILITY MEASUREMENTS

Measurement Procedure:

The test sample does not perform band translation or contain frequency determining components however frequency stability was performed at the manufacturer's specified operating temperature range of 0 degrees C to +50 degrees C. The test sample was placed into a temperature chamber with the AC 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 -0 degrees C to +50 degrees C while the AC 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.



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MEAN POWER OUTPUT (RSS-131)

Measurement Procedure:

Two signals were injected, in turn, to each uplink and downlink frequency band via a two way power combiner so that the two input signals were equal in magnitude. A spectrum analyzer was connected to the test sample output. The frequencies of the two input signals were adjusted so that they and the 3rd order intermodulation frequencies were within the passband of the test sample. The level of the input signals were increased until either of the intermodulation products equaled -13dBm. The mean output power (P_{mean}) was calculated using the formula (P_{mean} = P₀₁ + 3dB). Testing was performed for WCDMA & LTE Modulation types. The P_{mean} did not exceed the manufacturers rated output power. See attached test data.

PASSBAND GAIN & BANDWIDTH (RSS-131)

Measurement Procedure:

A signal generator output was connected in turn to the uplink and downlink input ports of the EUT. A spectrum analyzer was connected to the output of the EUT. With the internal gain of the test sample set to nominal the 20dB bandwidth (point where the gain has fallen by 20dB) of the EUT was measured and recorded. The gain versus frequency response of the amplifier from the mid-band frequency (f₀) of the passband up to at least f₀ ± 250% of the 20dB bandwidth was measured and recorded. See Passband Gain & Bandwidth Data.

SPURIOUS EMISSIONS (RSS-131)

Measurement Procedure:

Spurious emissions from the EUT were measured using the two tone method specified for the Mean Power Output measurement with the two tones set to the required levels. A spectrum analyzer configured with a resolution bandwidth of 100kHz was used to measure spurious emissions in the frequency range of 30MHz to 5 times the highest passband frequency. All emissions were below the specified -13dBm limit. See attached test data.



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SECTION 2 EQUIPMENT LISTS

Spurious Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5GHz	8449B	5/10/2011	5/10/2012
3258	EMCO	DOUBLE RIDGED GUIDE ANTENNA	1 GHZ - 18GHZ	3115	1/12/2011	1/12/2012
4029	RETLIF	OPEN AREA TEST SITE	3 / 10 Meters	RNH	8/21/2009	8/21/2012
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/20/2011	1/20/2012
5152	GENERAL TECHNICS	Control Computer		INDUSTRIAL PC	No Calibration Required	
8165	EMCO	BICONILOG	26 - 2000 MHz	3142	6/13/2011	6/13/2012
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	6/4/2010	6/4/2012

Mean Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	11/10/2011
5026A	NARDA	20DB ATTENUATOR	DC - 11 GHz	768-20	1/11/2011	1/11/2012
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/20/2011	1/20/2012
5137	NARDA	10DB ATTENUATOR	DC - 11 GHz	768-10	10/8/2010	11/8/2011
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013

RF Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	11/10/2011
5026A	NARDA	20DB ATTENUATOR	DC - 11 GHz	768-20	1/11/2011	1/11/2012
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/20/2011	1/20/2012
5137	NARDA	10DB ATTENUATOR	DC - 11 GHz	768-10	10/8/2010	11/8/2011
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013

Frequency Stability

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
4997	OMEGA	DIGITAL THERMOMETER		UNKNOWN	8/11/2011	8/11/2012
5013	POWERSTAT	VARIAC	0-140 V, 10 A, 60 Hz	116B	No Calibration Required	
5049B	FLUKE	DIGITAL MULTIMETER	True RMS Multimeter	111	8/10/2011	8/10/2012
5077	ASSOCIATED ENVIRONME	TEMPERATURE CHAMBER	-50 to 150°C	ZFD-531	8/11/2010	11/11/2011
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	6/4/2010	6/4/2012



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Occupied Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	11/10/2011
5026A	NARDA	20DB ATTENUATOR	DC - 11 GHz	768-20	1/11/2011	1/11/2012
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	6/4/2010	6/4/2012

Spurious Emissions Antenna Ports

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	11/10/2011
5026A	NARDA	20DB ATTENUATOR	DC - 11 GHz	768-20	1/11/2011	1/11/2012
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	6/4/2010	6/4/2012

Passband Gain and Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	11/10/2011
4895	AGILENT / HP	SPECTRUM ANALYZER	9kHz - 22GHz	8593EM	12/23/2010	12/23/2011
5026A	NARDA	20DB ATTENUATOR	DC - 11 GHz	768-20	1/11/2011	1/11/2012
5137	NARDA	10DB ATTENUATOR	DC - 11 GHz	768-10	10/8/2010	11/8/2011
5150	DELL	Control Computer		Optiplex 755	No Calibration Required	
R442	AGILENT / HP	Vector Signal Generator	100 kHz - 3 GHz	N5182A	1/15/2011	1/15/2013



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**SETUP PHOTOGRAPH
SPURIOUS RADIATED EMISSIONS**



Test Setup, Front



Test Setup, Back



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**SETUP PHOTOGRAPHS
SPURIOUS RADIATED EMISSIONS**



Horizontal Antenna Polarization, 30 to 1000 MHz



Vertical Antenna Polarization



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**SETUP PHOTOGRAPHS
SPURIOUS RADIATED EMISSIONS**



Horizontal Antenna Polarization, 1 to 18 GHz



Vertical Antenna Polarization, 1 to 18 GHz



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**SETUP PHOTOGRAPHS
SPURIOUS RADIATED EMISSIONS**



Antenna Polarization, 18 to 26 GHz



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Test Report No. R-5522N

**SETUP PHOTOGRAPHS
SPURIOUS RADIATED EMISSIONS**



ERP



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Test Report No. R-5522N

SETUP PHOTOGRAPH
OCCUPIED BANDWIDTH & SPURIOUS EMISSIONS AT ANTENNA TERMINALS



Test Setup



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SETUP PHOTOGRAPH
RF POWER OUTPUT, INTERMODULATION CHARACTERISTICS &
MEAN POWER



Test Setup



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Test Report No. R-5522N

**SETUP PHOTOGRAPH
PASSBAND GAIN**



Test Setup



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**SETUP PHOTOGRAPH
FREQUENCY STABILITY**



Test Setup



Retlif Testing Laboratories

Test Report No. R-5522N

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	RF Power Output		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2 Paragraph: 2.1046		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/3/2011
Notes:	Uplink Frequency Range: 1710-1755 MHz Downlink Frequency Range: 2110-2155 MHz Modulation: LTE		

Test Frequency	Measured Level	Level								
MHz	dBm	mW								
(Uplink) Low										
1726.00	27.92	619.44								
(Uplink) High										
1740.00	27.83	606.74								
(Downlink) Low										
2123.00	34.70	2951.21								
(Downlink) High										
2140.00	35.38	3451.4								

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	RF Power Output		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2 Paragraph: 2.1046		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/3/2011
Notes:	Uplink Frequency Range: 1710-1755 MHz Downlink Frequency Range: 2110-2155 MHz Modulation: WCDMA		

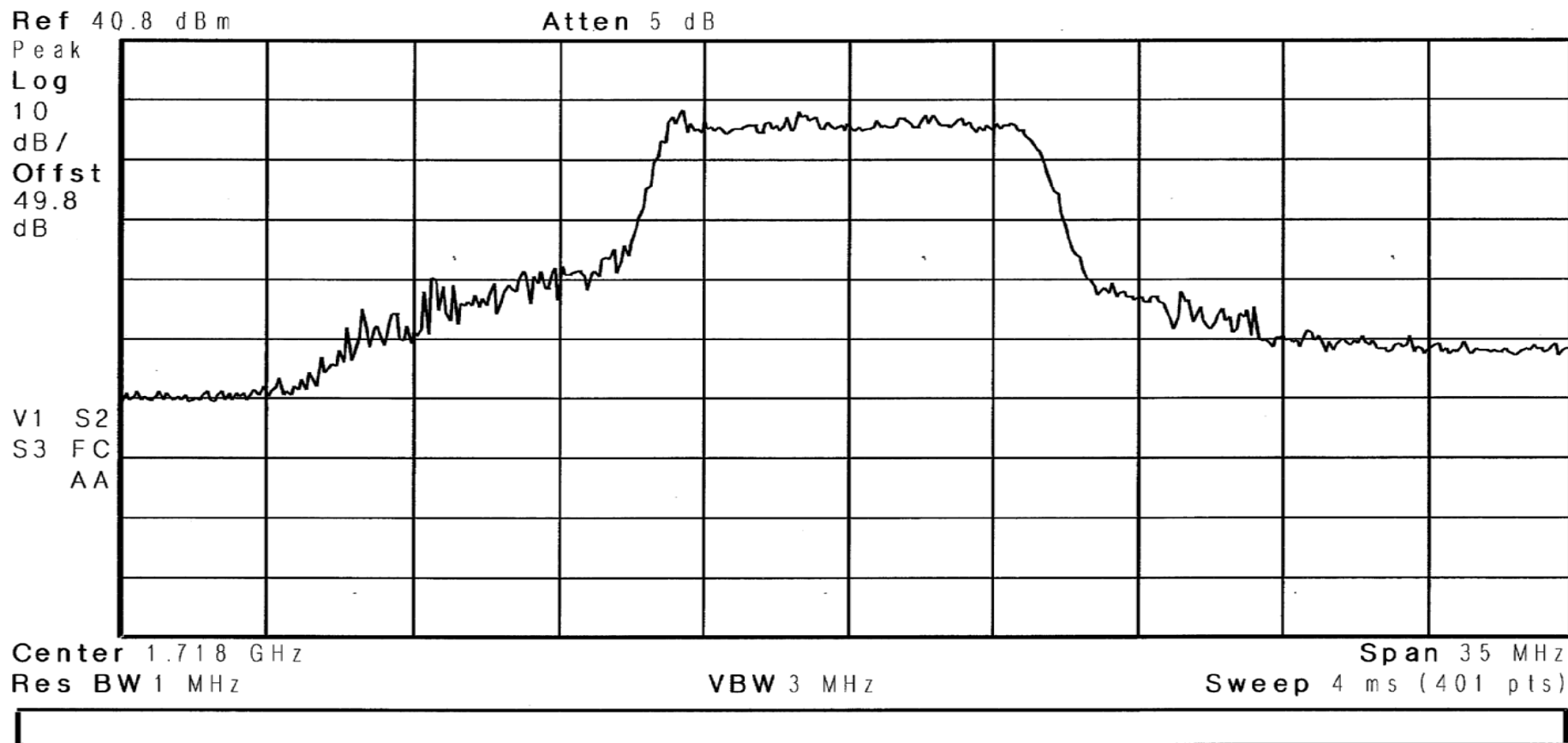
Test Frequency	Measured Level	Level								
MHz	dBm	mW								
(Uplink) Low										
1718.00	28.64	731.14								
(Uplink) High										
1748.00	27.84	608.14								
(Downlink) Low										
2118.00	35.95	3935.50								
(Downlink) High										
2147.00	35.89	3881.5								

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Digital Repeater	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Output Signal		

Agilent 14:20:35 Oct 12, 2011



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

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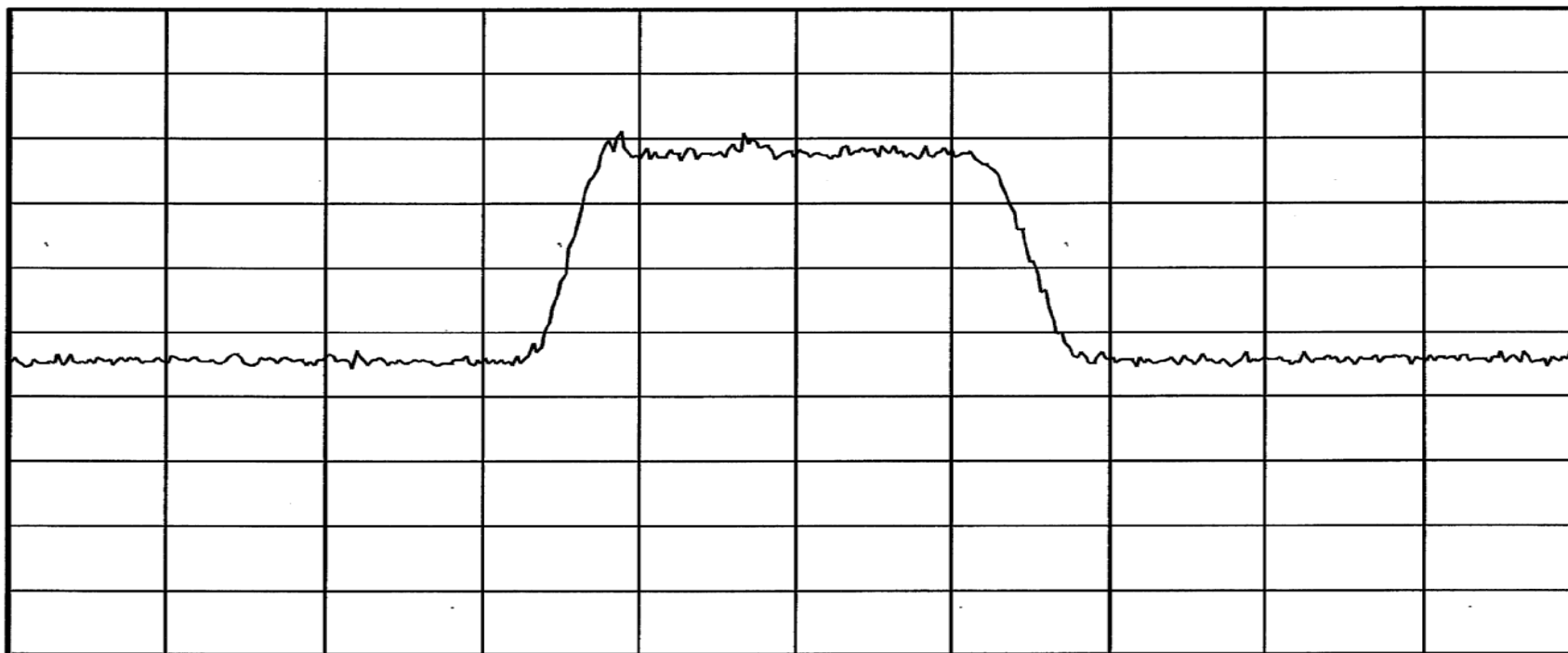
Ref - 42 dBm

#Atten 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 1.718 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

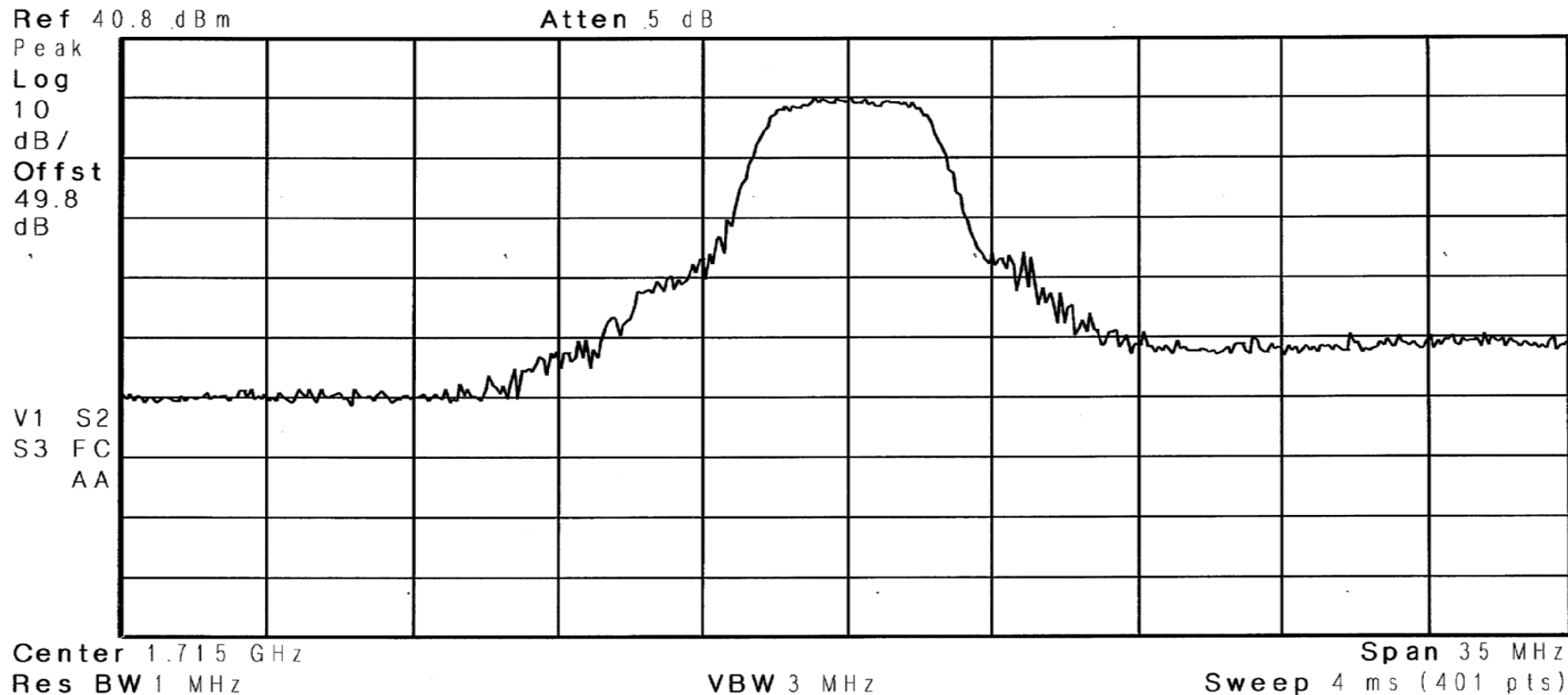
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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Output Signal		
Job No:	R-5422N		Technician:
			M.Seamans
Date:	10/12/2011		

Agilent 14:12:55 Oct 12, 2011



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 14:43:10 Oct 12, 2011

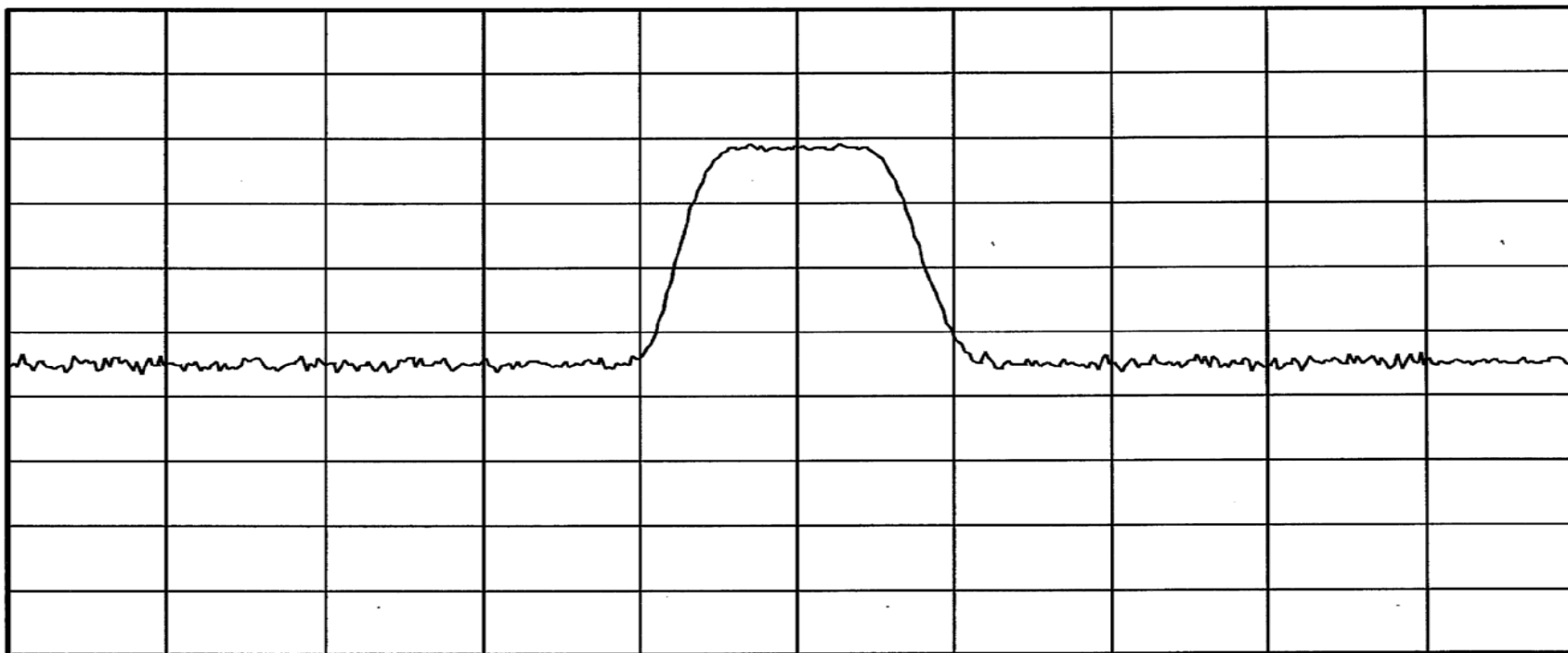
Ref -42 dBm

#Atten 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 1.715 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

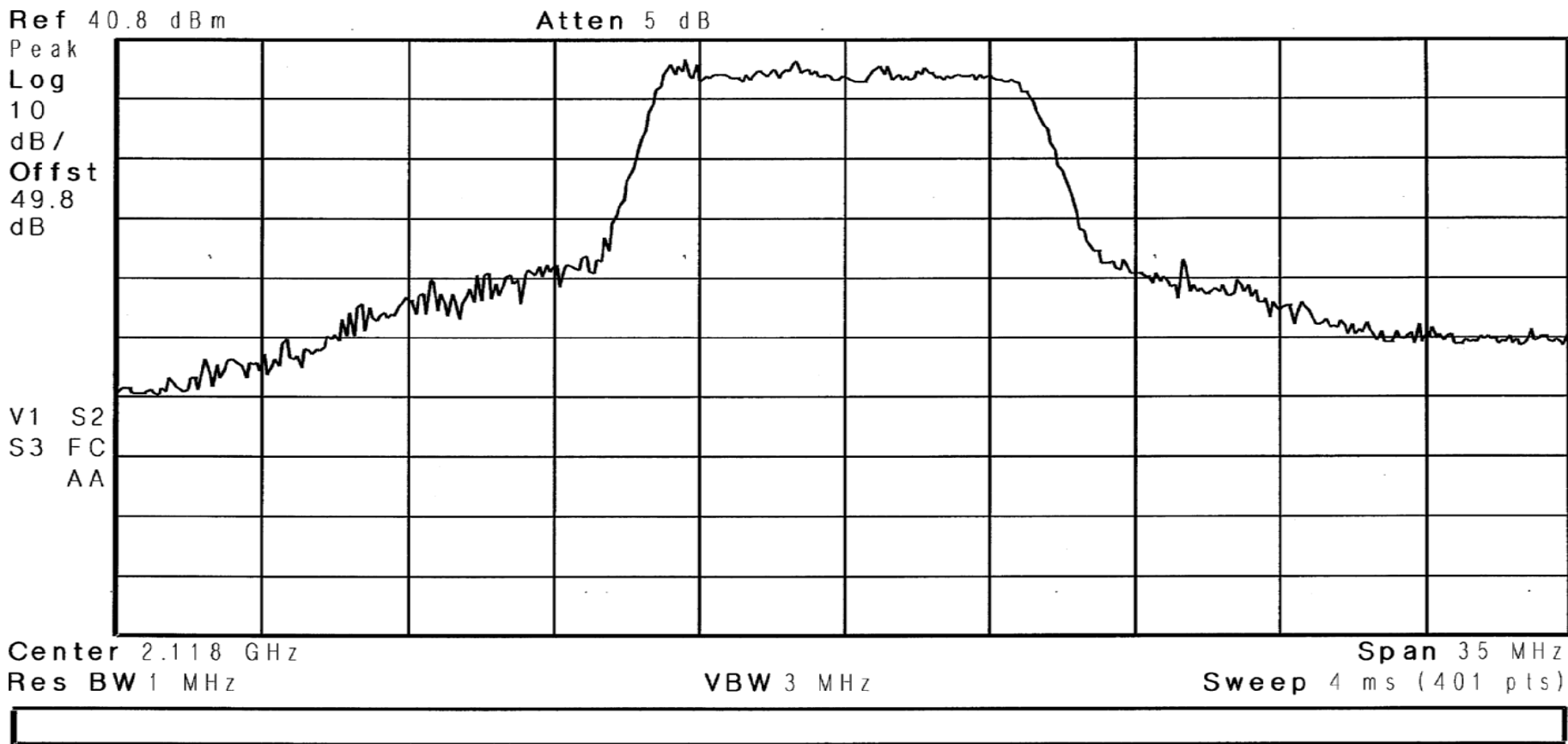
Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Output Signal		

* Agilent 13:57:36 Oct 12, 2011

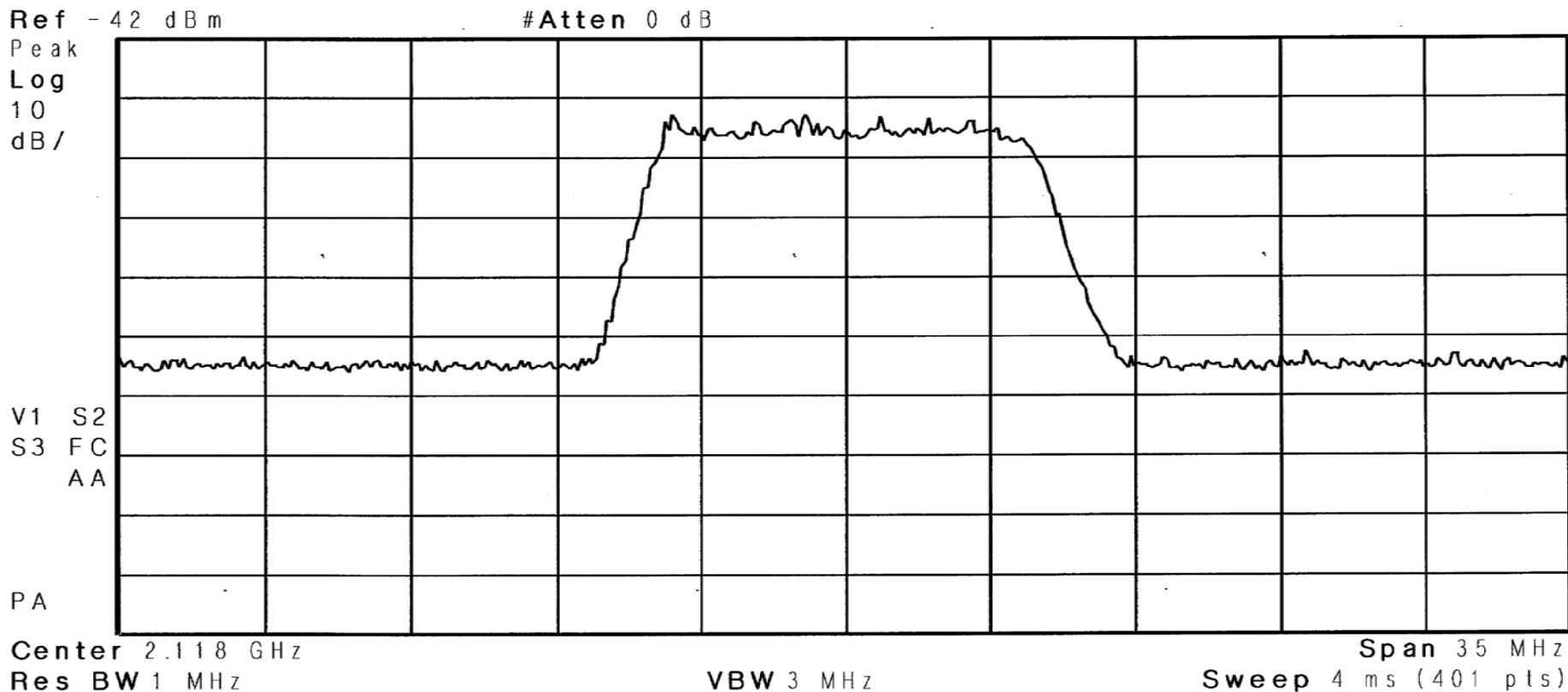


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 14:49:13 Oct 12, 2011

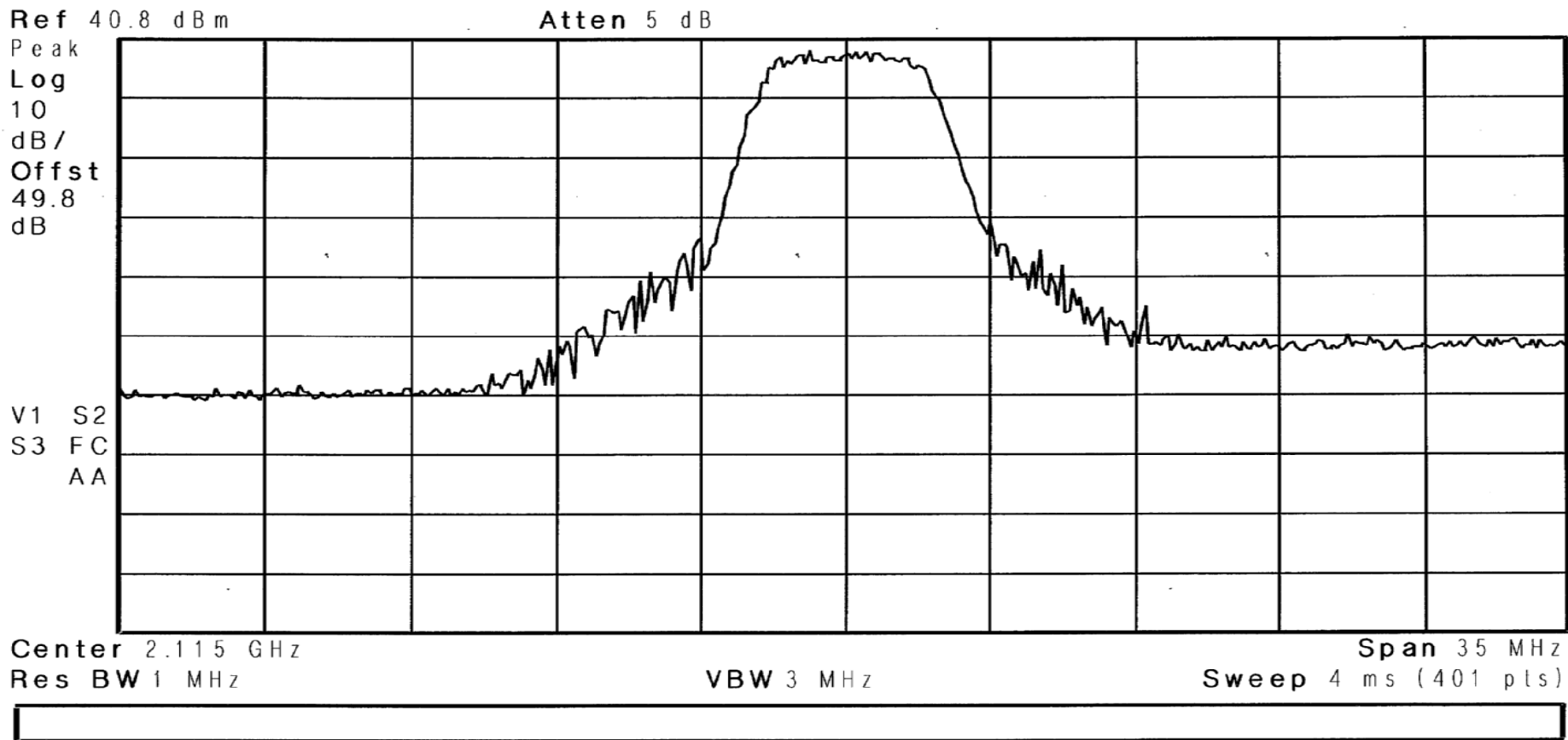


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 10/12/2011
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlnk - Output Signal		
Job No:	R-5422N		Technician: M.Seamans

Agilent 14:09:40 Oct 12, 2011



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 10/12/2011
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input Signal		

Agilent 14:44:54 Oct 12, 2011

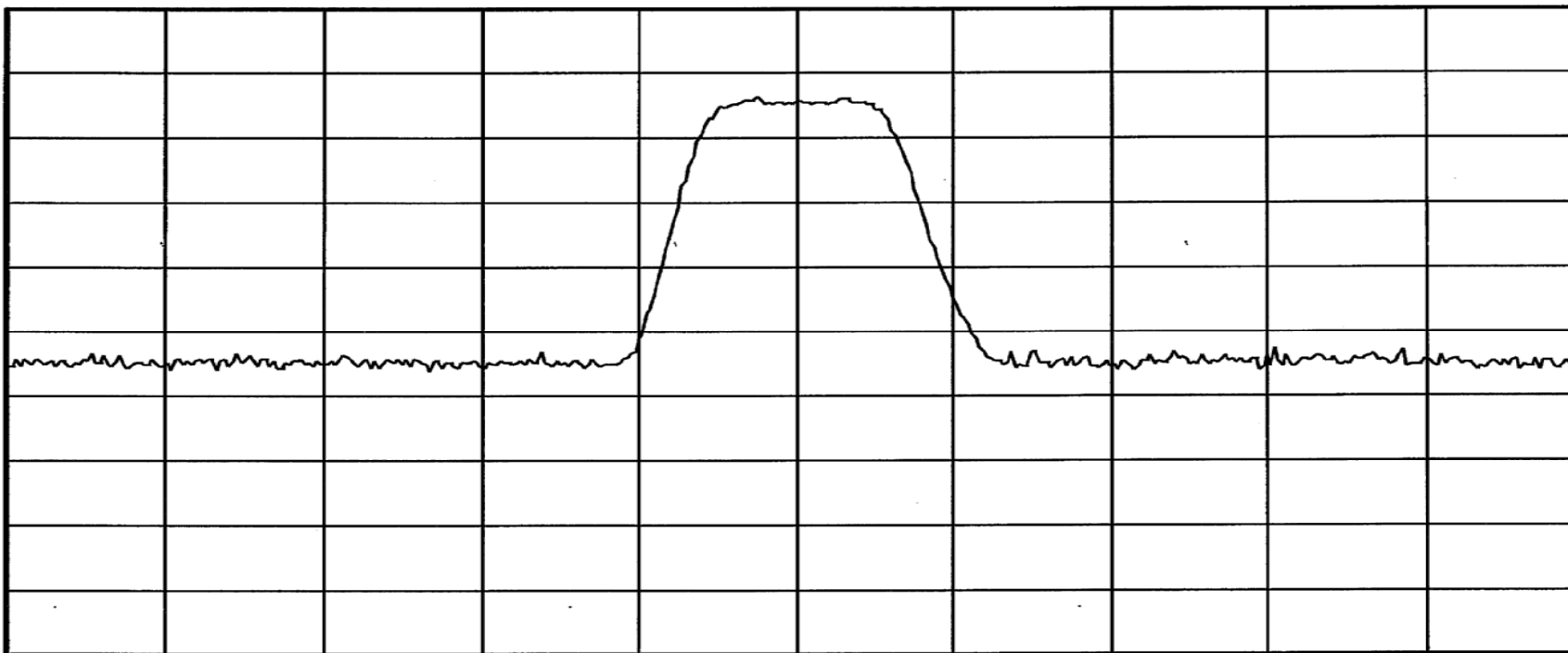
Ref - 42 dBm

#Atten 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 2.115 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Digital Repeater	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Output Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

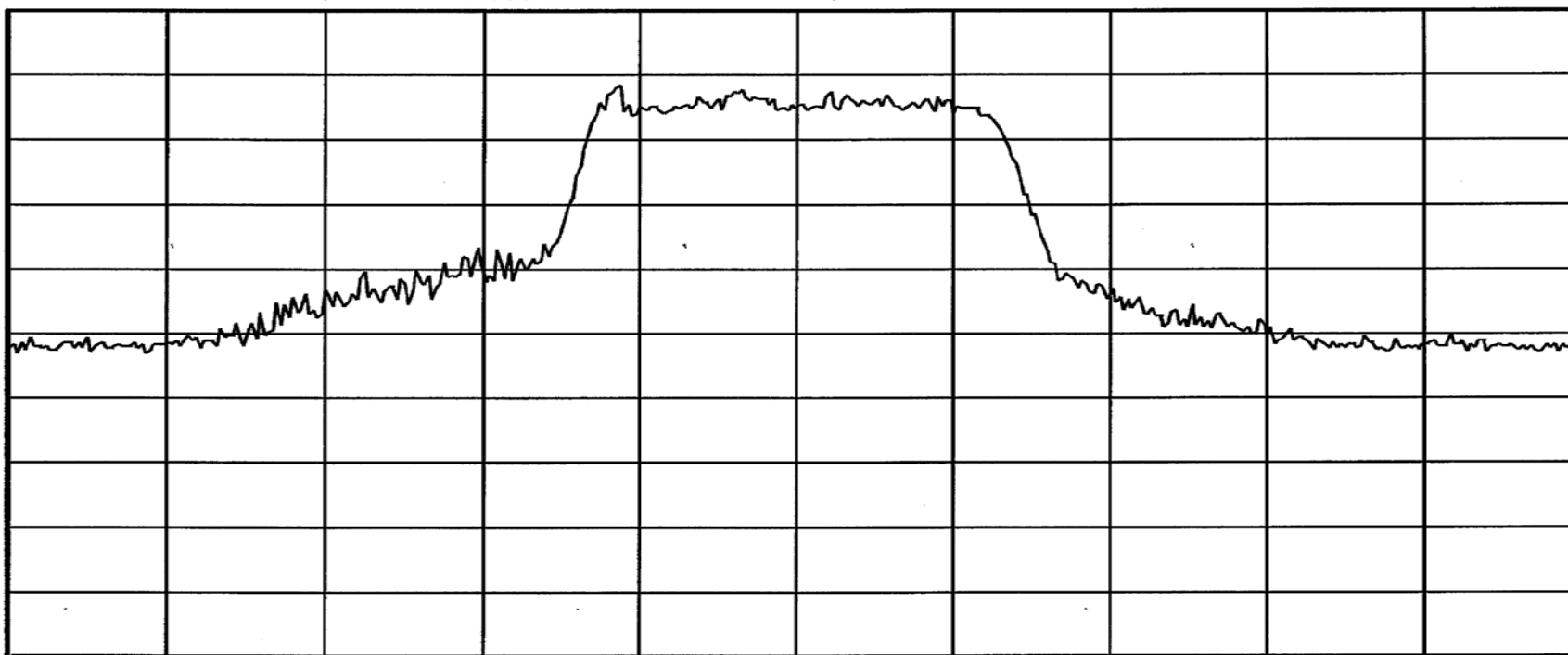
Agilent 14:19:20 Oct 12, 2011

Ref 40.8 dBm

Atten 5 dB

Peak
Log
10
dB/
Offst
49.8
dB

V1 S2
S3 FC
AA



Center 1.732 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 14:36:51 Oct 12, 2011

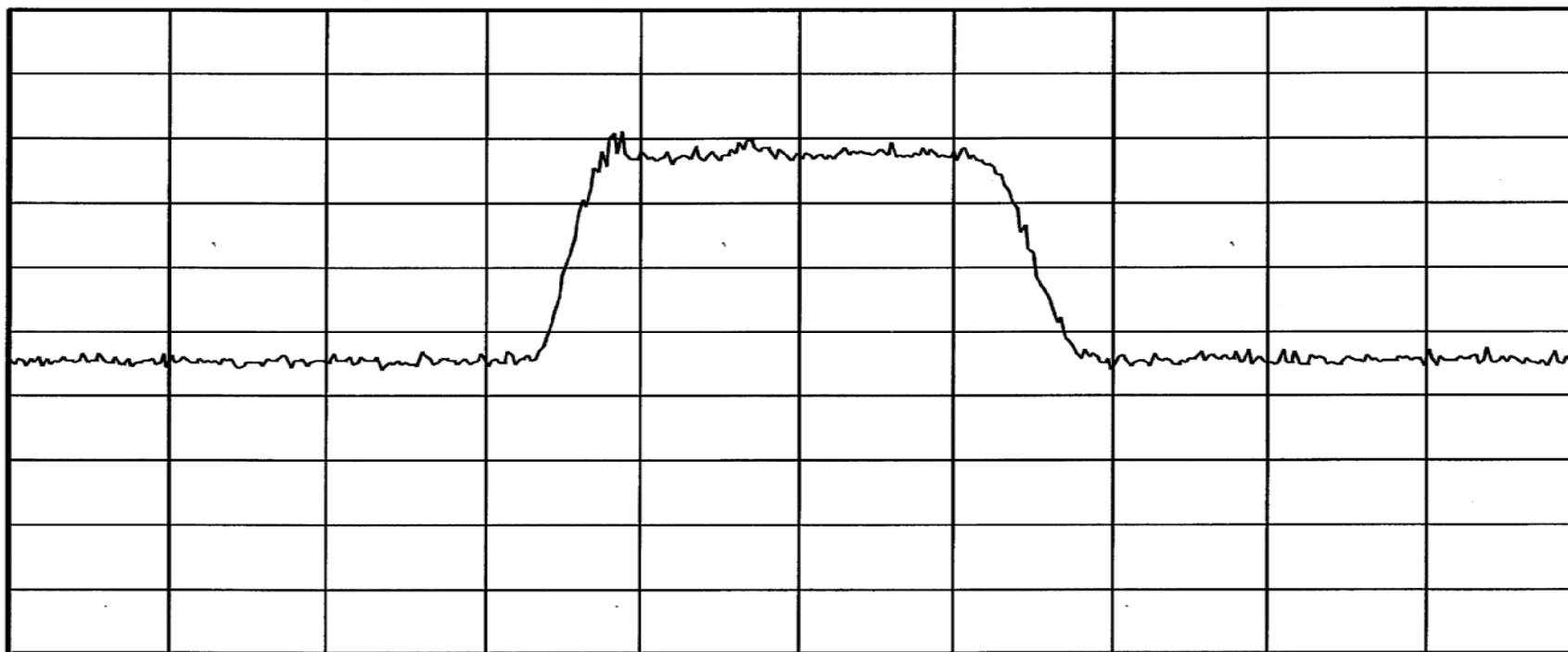
Ref -42 dBm

#Atten 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 1.732 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Output Signal		
Job No:	R-5422N		Technician:
			M.Seamans

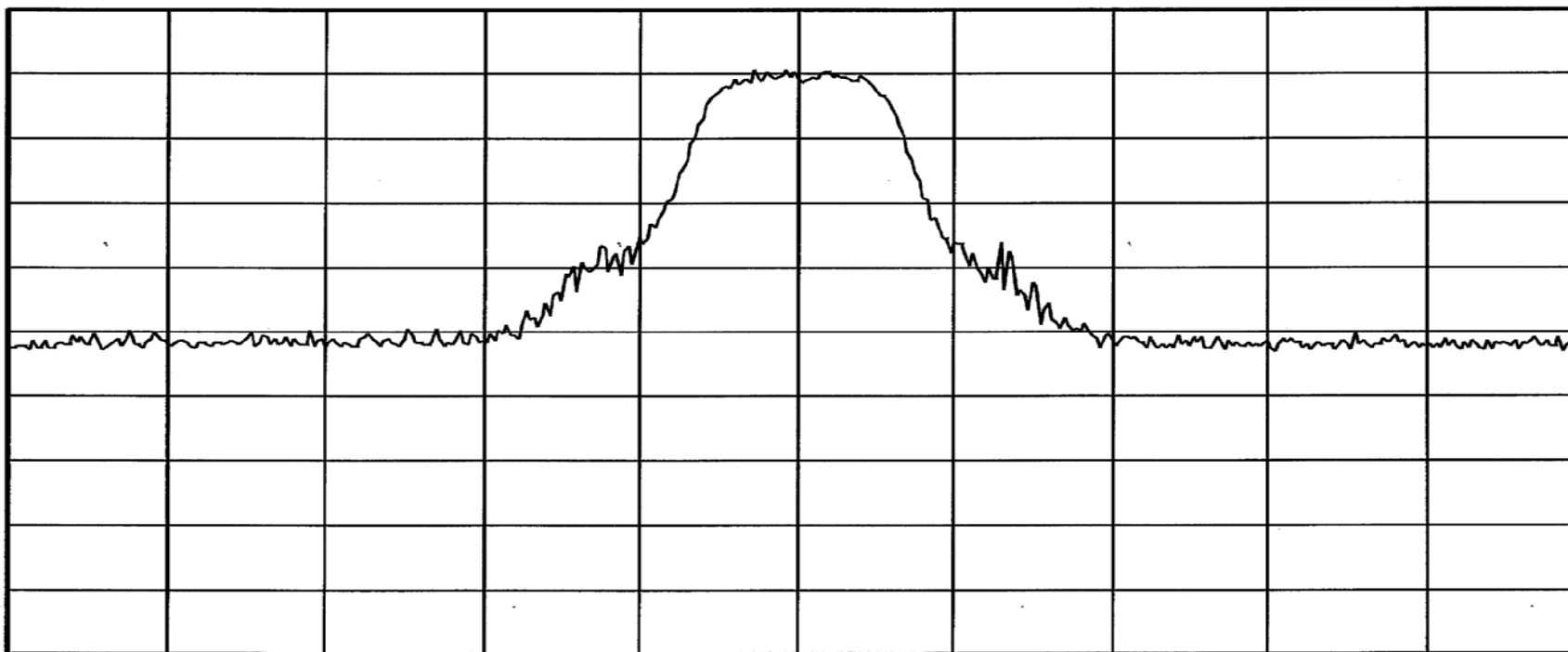
* Agilent 14:14:50 Oct 12, 2011

Ref 40.8 dBm

Atten 5 dB

Peak
Log
10
dB/
Offst
49.8
dB

V1 S2
S3 FC
AA



Center 1.732 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

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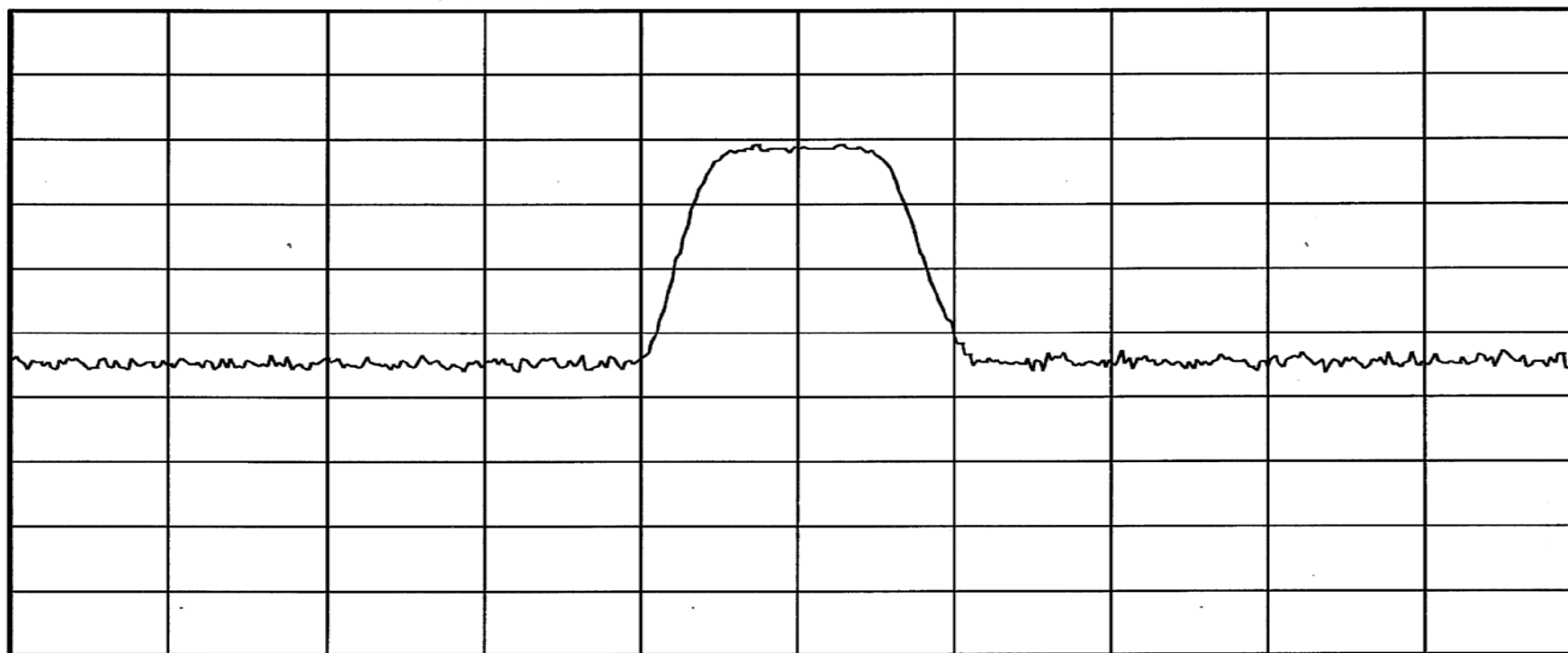
Ref - 42 dBm

#Atten 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 1.732 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

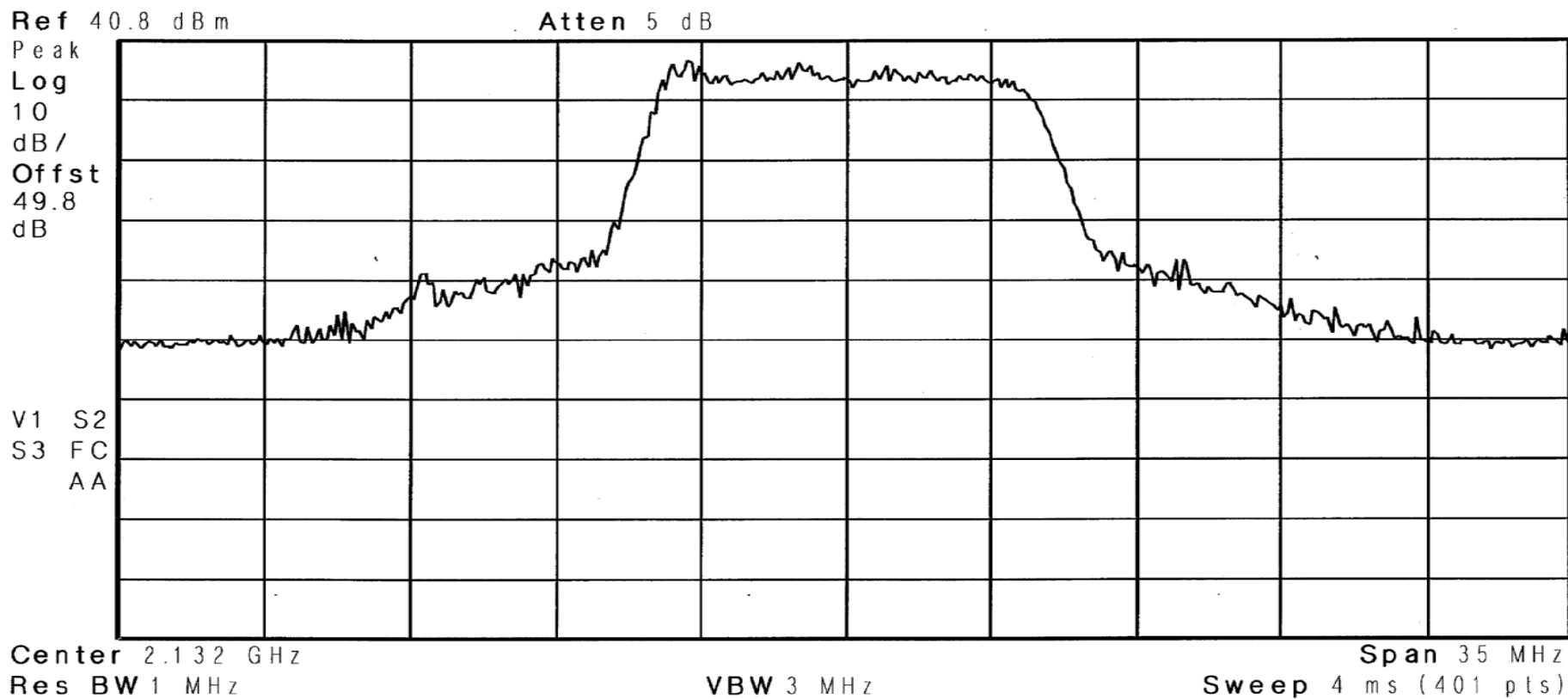
Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Output		
Job No:	R-5422N		Technician:
			M.Seamans

Agilent 13:58:57 Oct 12, 2011

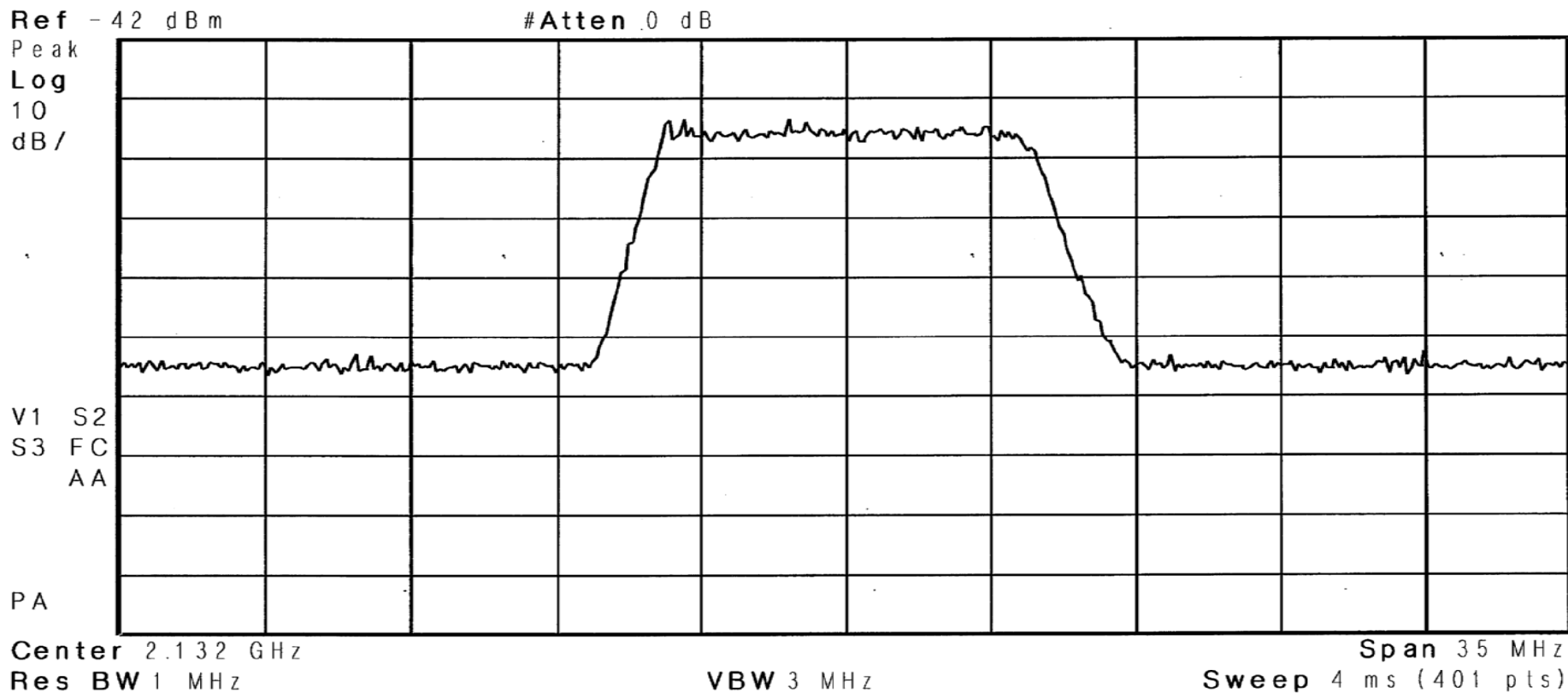


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Input		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 15:03:24 Oct 12, 2011

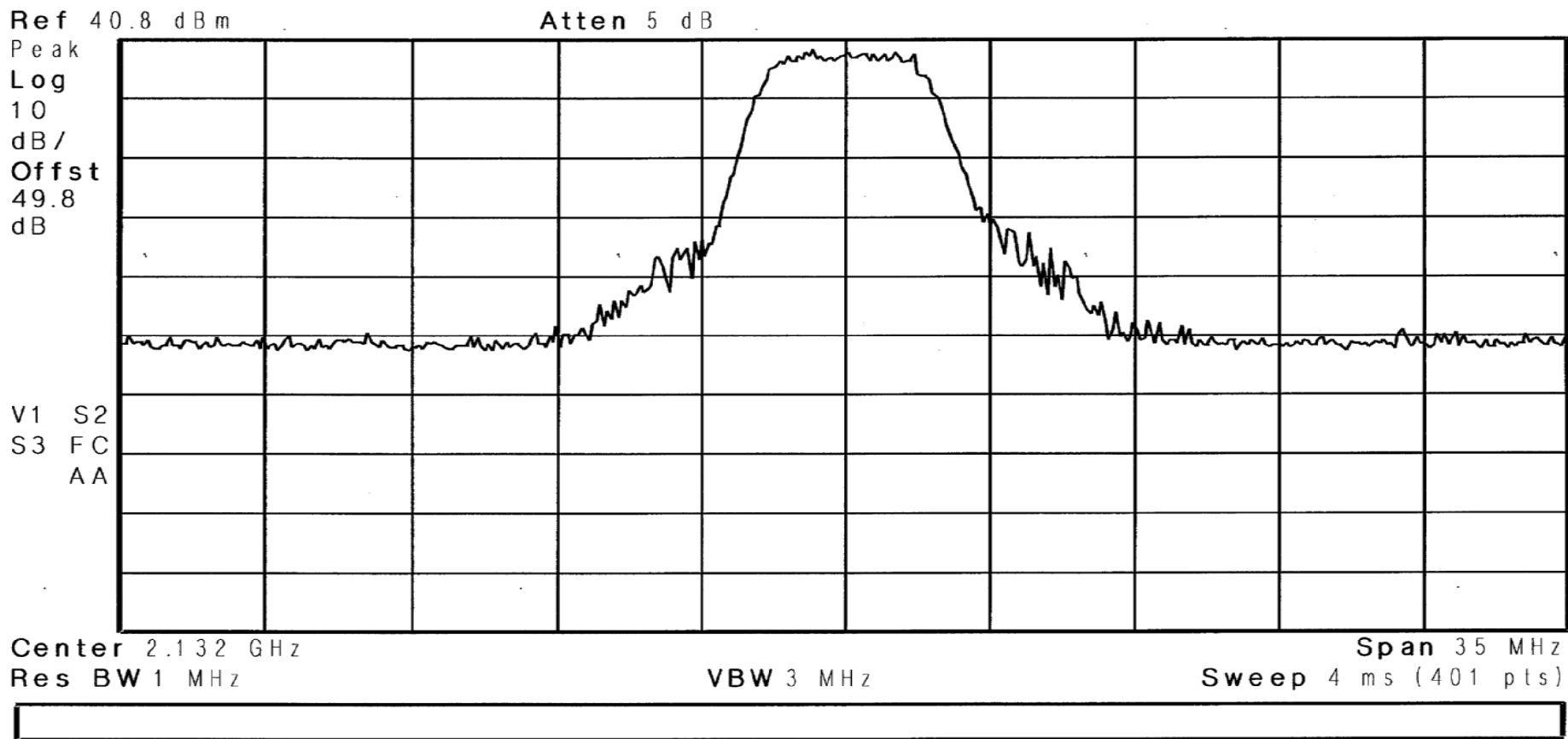


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlnk - Output		
Job No:	R-5422N		Technician:
		M.Seamans	

Agilent 14:08:17 Oct 12, 2011

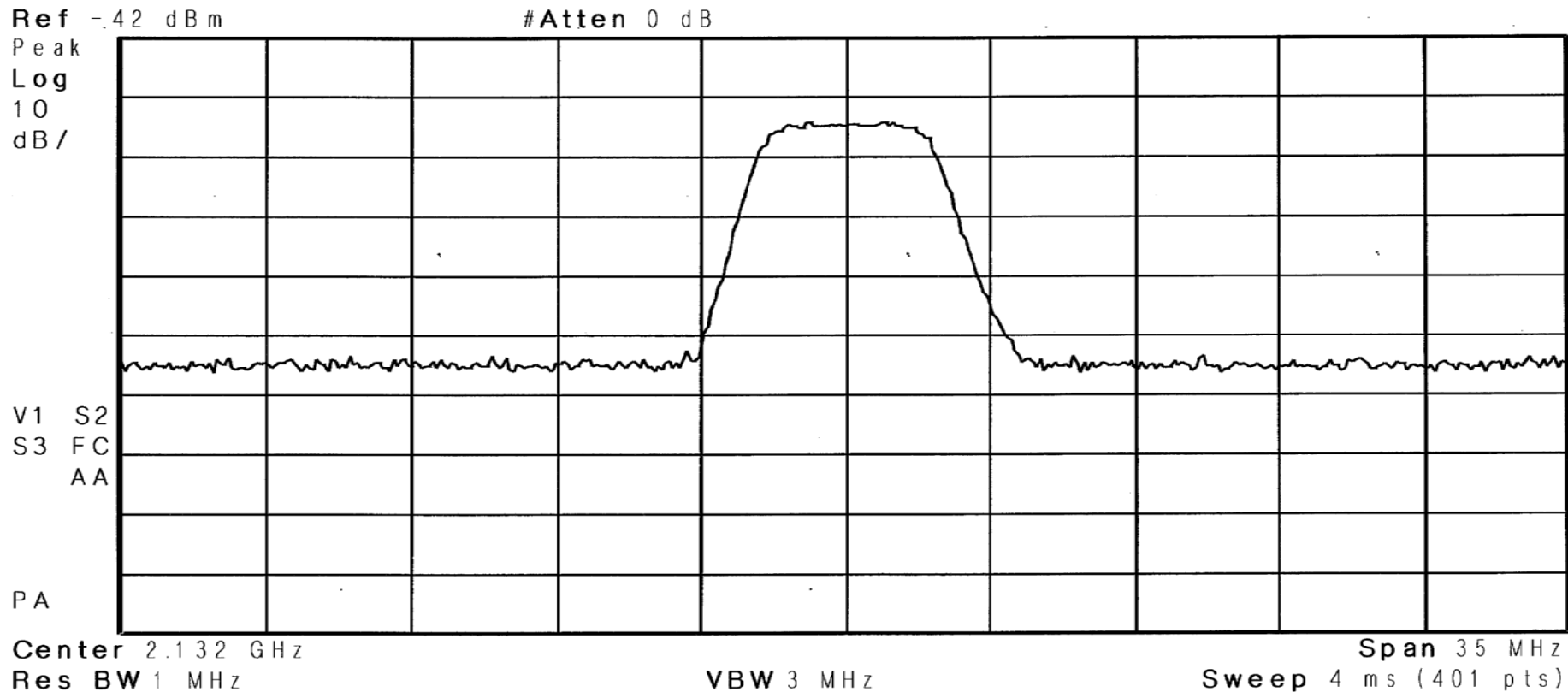


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 10/12/2011
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input		

Agilent 14:46:07 Oct 12, 2011



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Digital Repeater	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Output Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

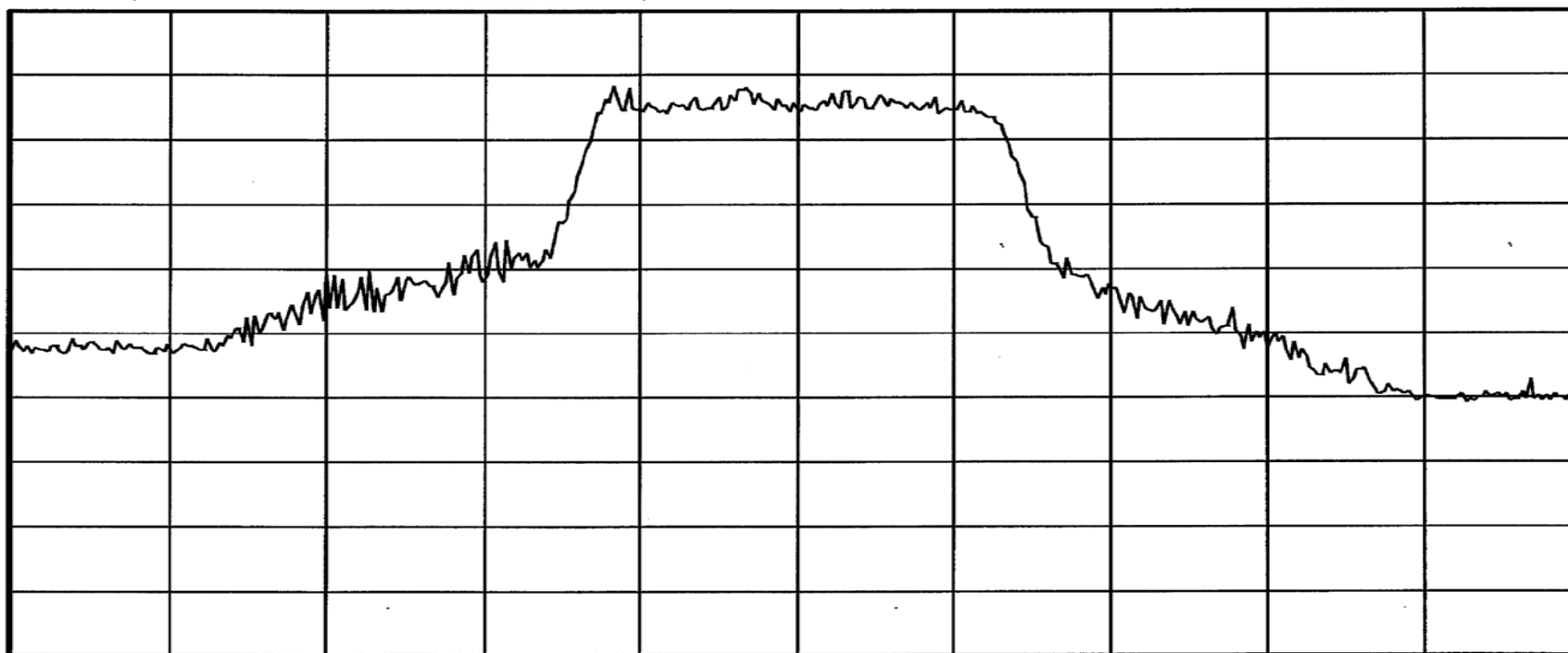
Agilent 14:17:58 Oct 12, 2011

Ref 40.8 dBm

Atten 5 dB

Peak
Log
10
dB/
Offst
49.8
dB

V1 S2
S3 FC
AA



Center 1.748 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink, Input Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 14:38:23 Oct 12, 2011

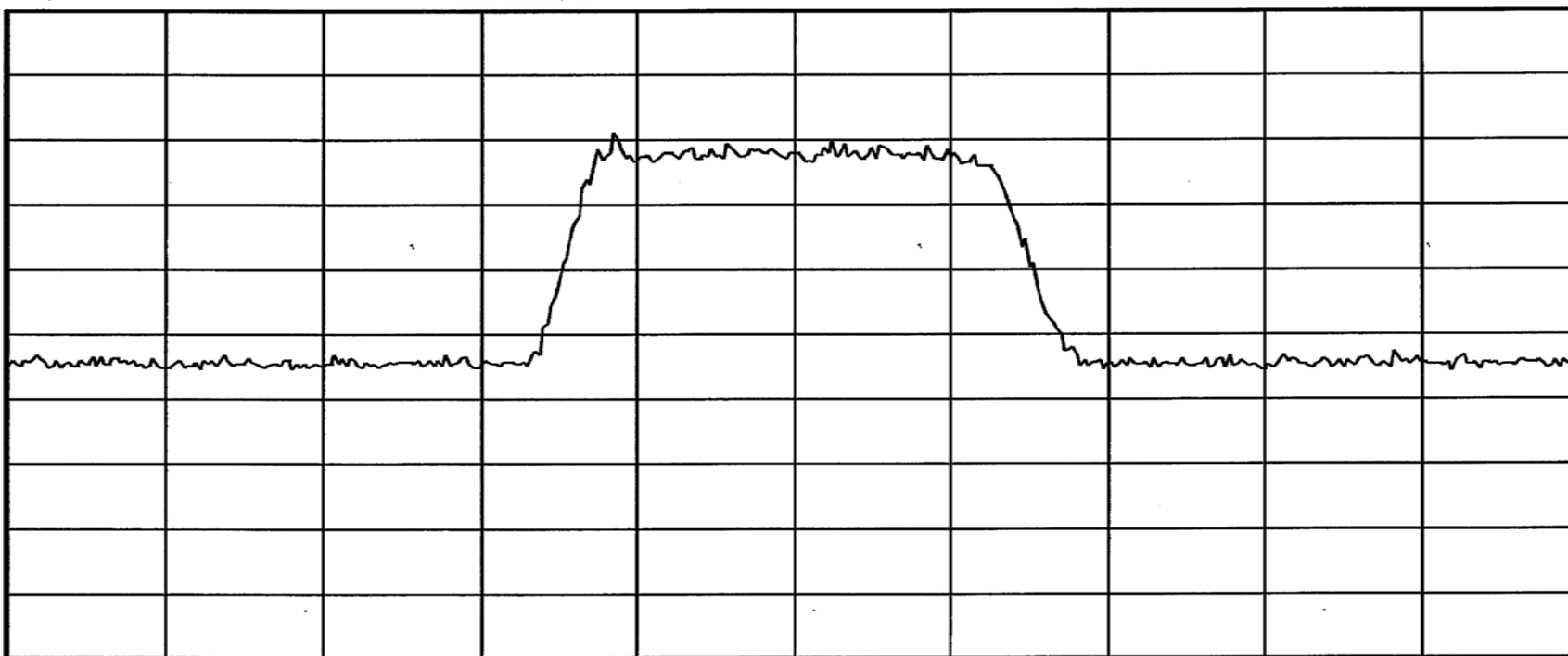
Ref - 42 dBm

#Atten. 0 dB

Peak
Log
10
dB/

V1 S2
S3 FC
AA

PA



Center 1.748 GHz
Res BW 1 MHz

VBW 3 MHz

Span 35 MHz
Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Output Signal		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

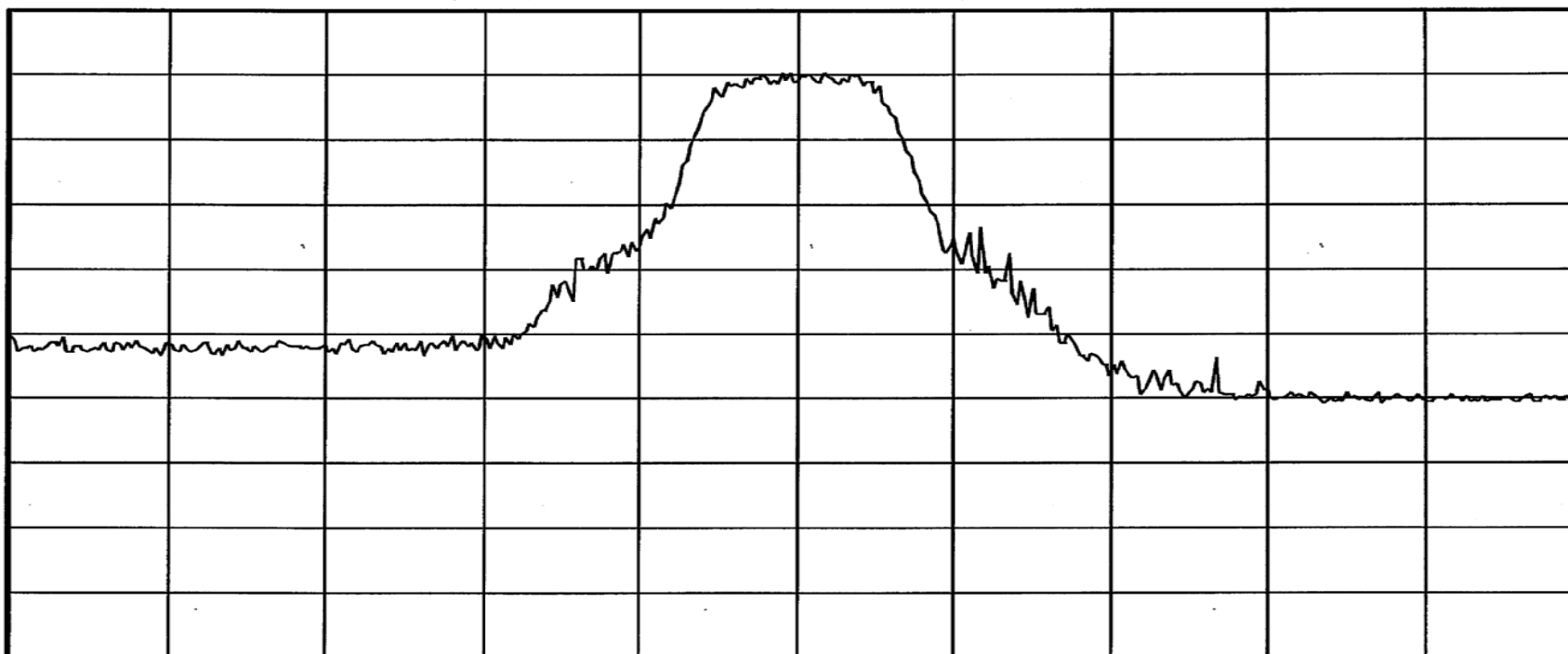
Agilent 14:16:11 Oct 12, 2011

Ref 40.8 dBm

Atten 5 dB

Peak
Log
10
dB/
Offst
49.8
dB

V1 S2
S3 FC
AA



Center 1.75 GHz

Res BW 1 MHz

VBW 3 MHz

Span 35 MHz

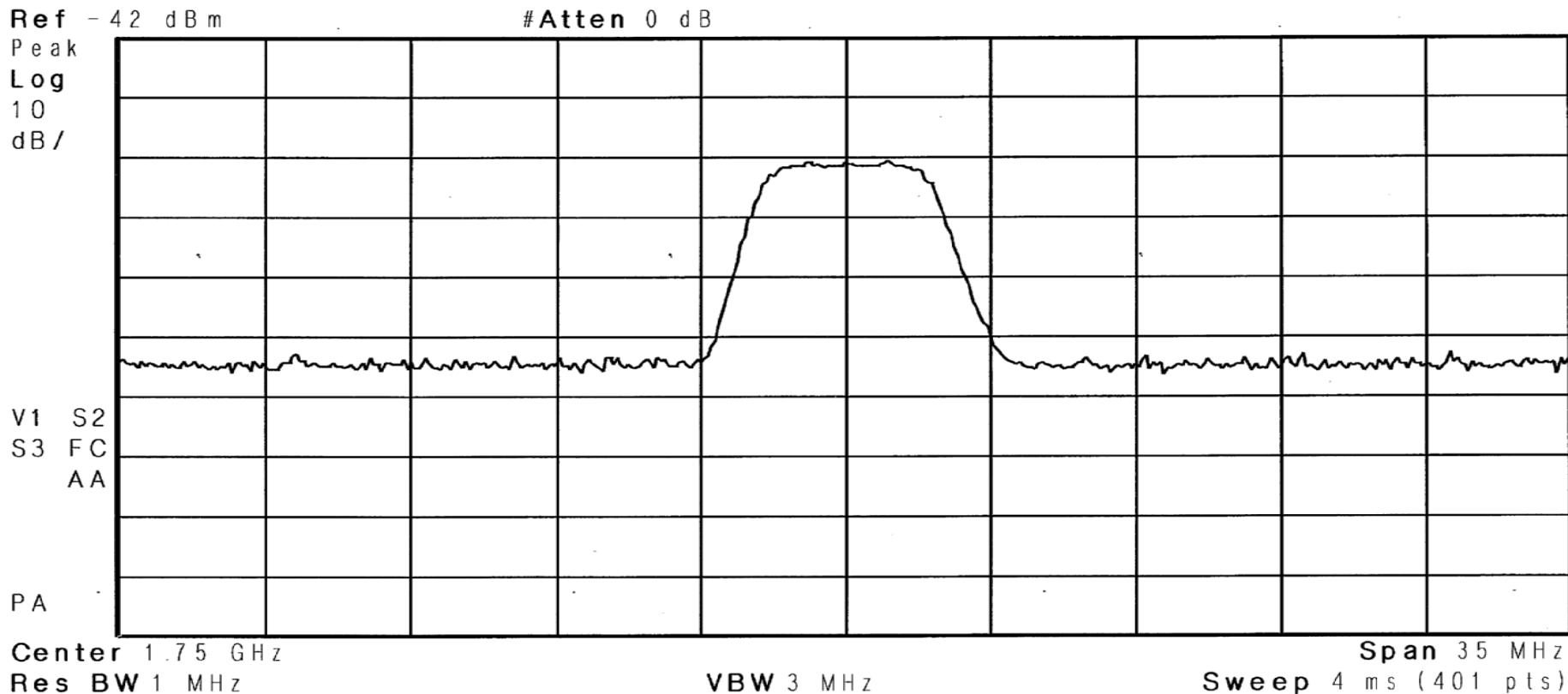
Sweep 4 ms (401 pts)

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink, Input Signal		
Job No:	R-5422N		Technician:
			M.Seamans

* Agilent 14:40:31 Oct 12, 2011

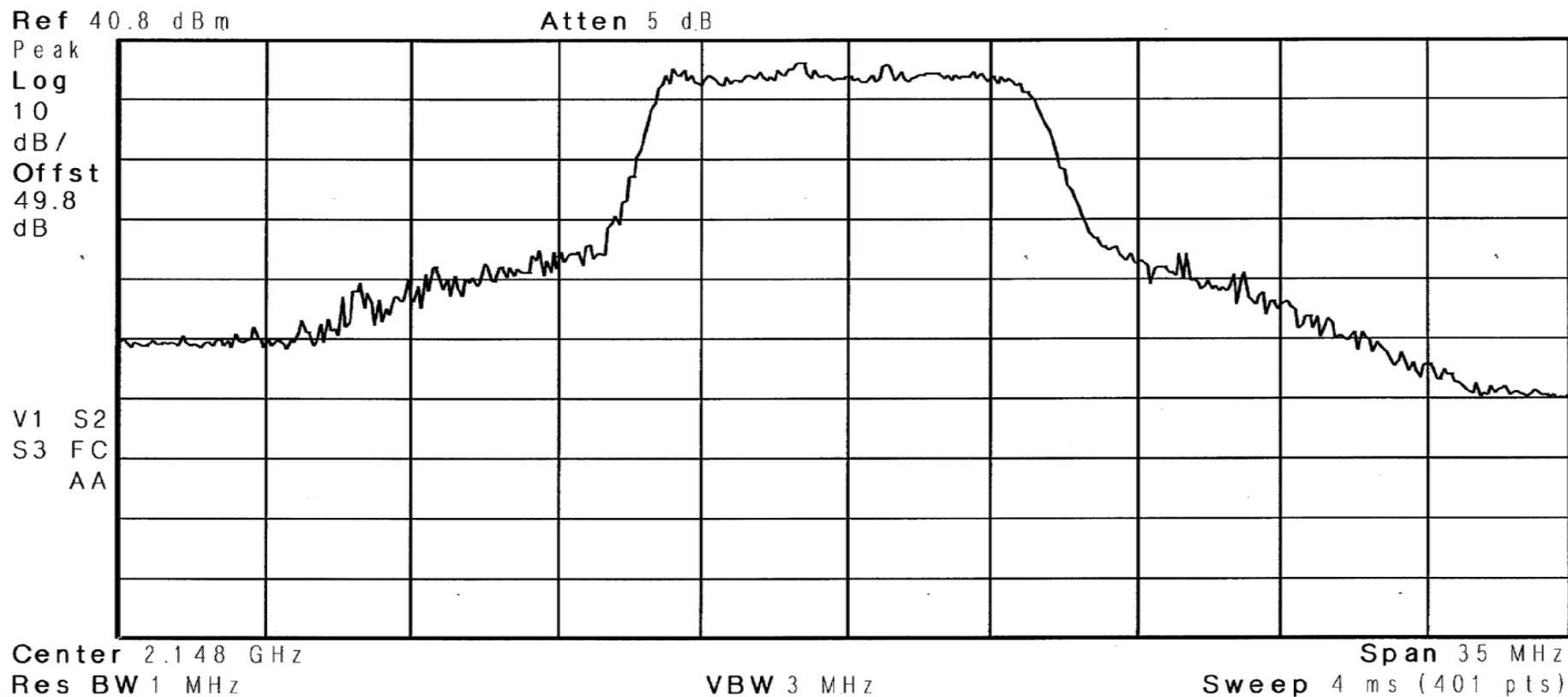


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Output		
Job No:	R-5422N		Technician:
			M.Seamans

Agilent 14:00:36 Oct 12, 2011

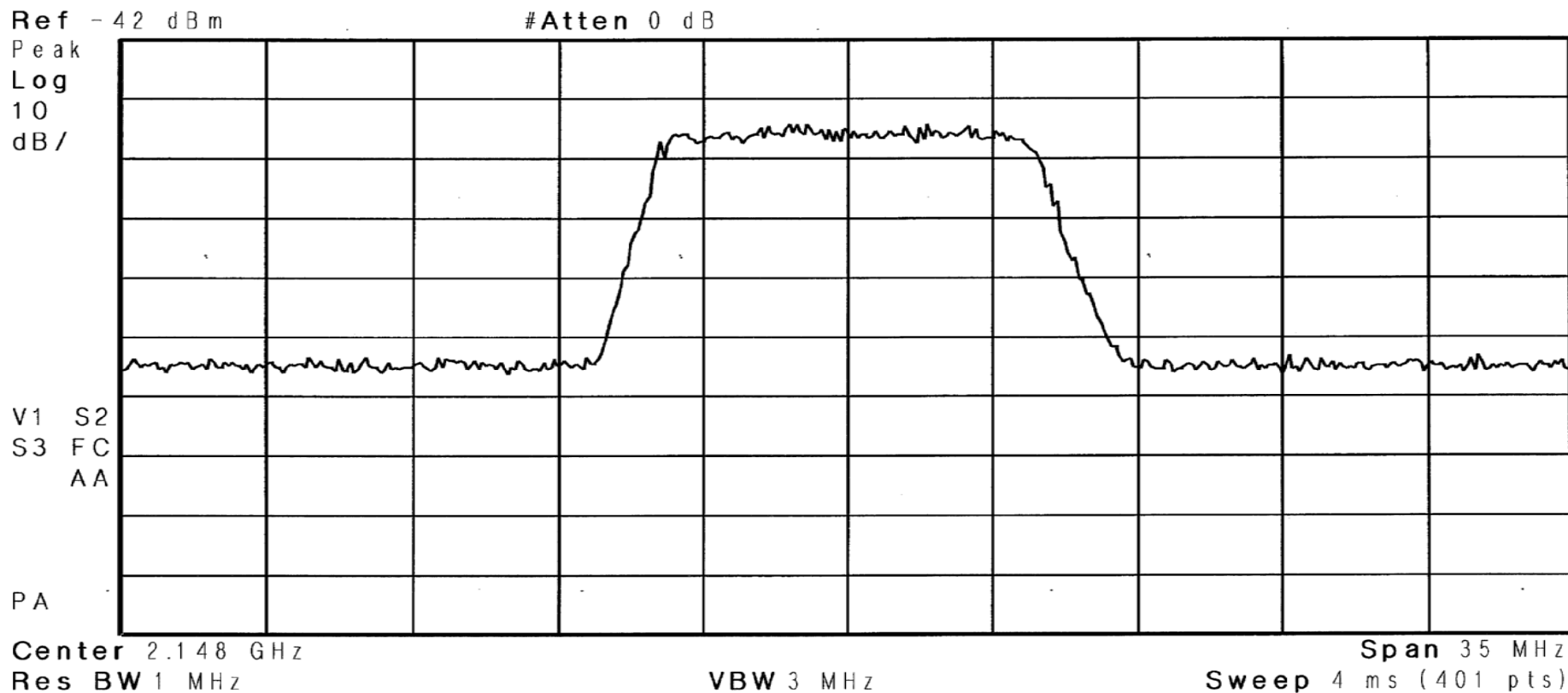


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink - Input		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 15:04:32 Oct 12, 2011

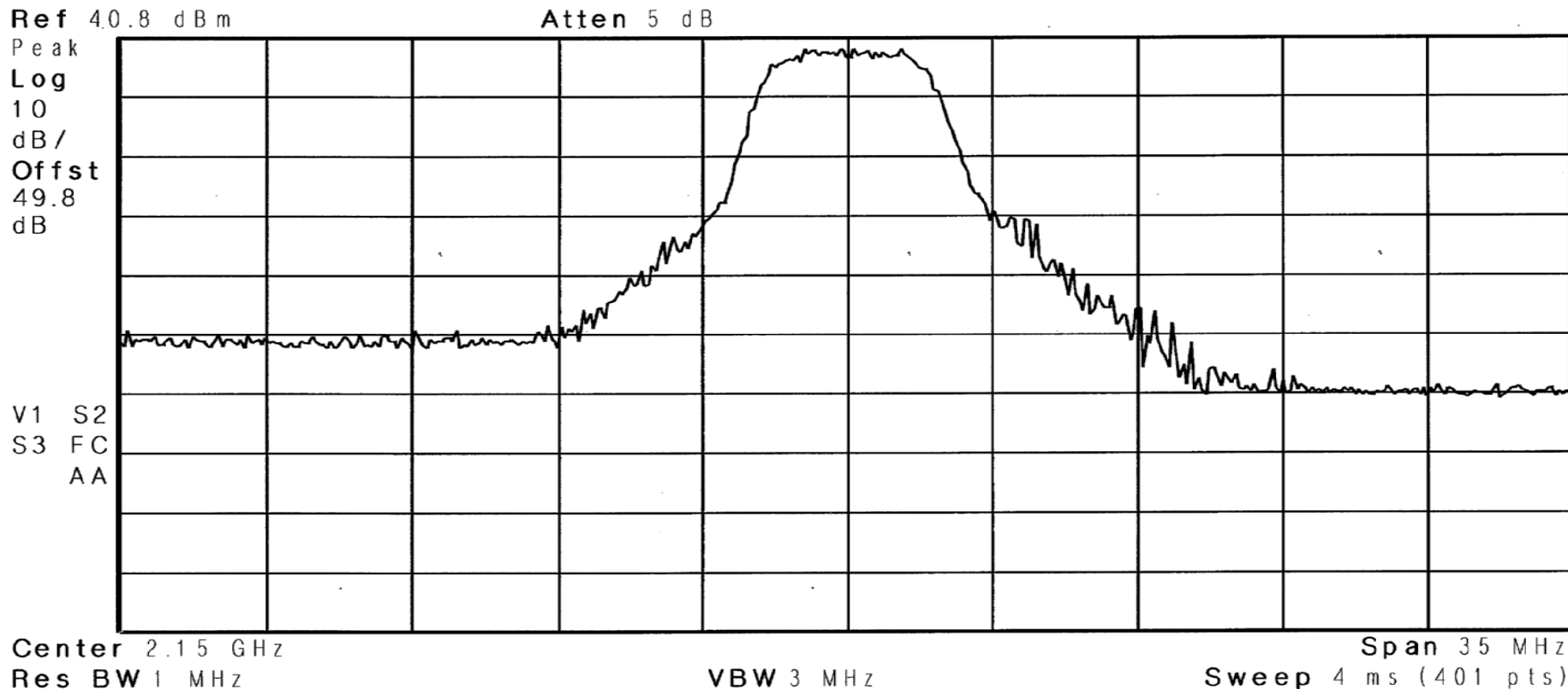


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlnk - Output		
	Job No:	R-5422N	
	Technician:	M.Seamans	
	Date:	10/12/2011	

Agilent 14:06:38 Oct 12, 2011

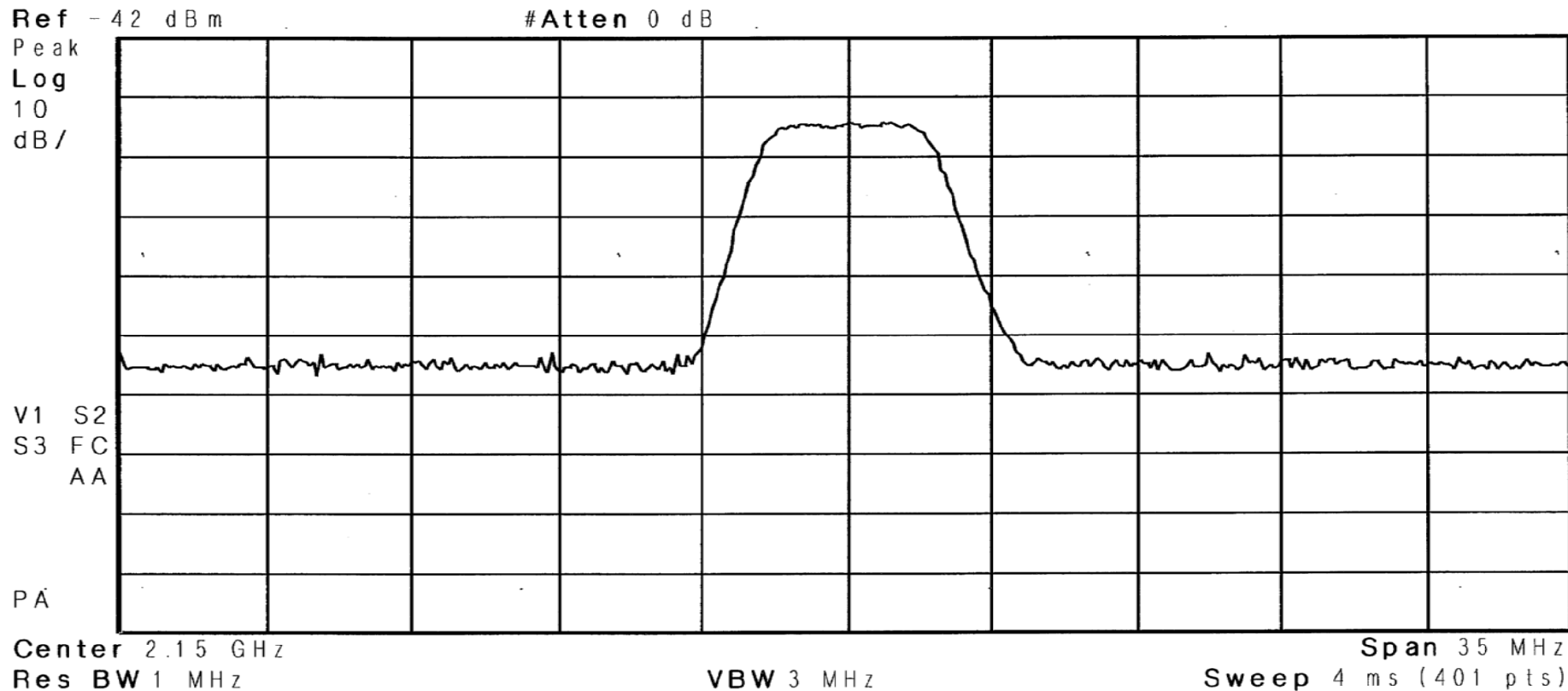


RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input		
Job No:	R-5422N		Technician:
		M.Seamans	

✱ Agilent 14:47:51 Oct 12, 2011



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2 Paragraph: 2.1051		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/13/2011
Notes:	Uplink Frequency: 1710-1755 MHz Downlink Frequency: 2110-2155 MHz LTE modulation Readings are noise floor measurements		

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
-62.00	1718.00				-54.00	2118.00			
		3436.00	-21.67	-13.0			4236.00	-22.46	-13.0
		5154.00	-22.67				6354.00	-23.63	
		6872.00	-23.05				8472.00	-21.61	
		8590.00	-20.53				10590.00	-22.48	
		10308.00	-22.42				12708.00	-22.57	
		12026.00	-22.43				14826.00	-21.97	
		13744.00	-21.51				16944.00	-21.32	
		15462.00	-21.99				19062.00	-22.94	
-62.00	1718.00	17180.00	-22.76	-13.0	-54.00	2118.00	21180.00	-21.57	-13.0
-62.00	1732.50				-54.00	2132.50			
		3465.00	-21.97	-13.0			4265.00	-22.69	-13.0
		5197.50	-23.66				6397.50	-22.42	
		6930.00	-23.20				8530.00	-21.74	
		8662.50	-21.71				10662.50	-22.75	
		10395.00	-22.11				12795.00	-22.52	
		12127.50	-21.76				14927.50	-21.92	
		13860.00	-22.48				17060.00	-21.33	
		15592.50	-21.92				19192.50	-22.89	
-62.00	1732.50	17325.00	-22.15	-13.0	-54.00	2132.50	21325.00	-21.32	-13.0
-62.00	1748.00				-54.00	2147.00			
		3496.00	-21.77	-13.0			4294.00	-22.80	-13.0
		5244.00	-23.77				6441.00	-23.48	
		6992.00	-22.99				8588.00	-21.68	
		8740.00	-21.27				10735.00	-23.42	
		10488.00	-22.23				12882.00	-22.59	
		12236.00	-22.14				15029.00	-21.35	
		13984.00	-20.62				17176.00	-21.46	
		15732.00	-21.48				19323.00	-22.10	
-62.00	1748.00	17480.00	-21.58	-13.0	-54.00	2147.00	21470.00	-21.51	-13.0

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2 Paragraph: 2.1051		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/13/2011
Notes:	Uplink Frequency: 1710-1755 MHz Downlink Frequency: 2110-2155 MHz WCDMA modulation Readings are noise floor measurements		

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
-62.00	1712.00				-54.00	2112.00			
		3424.00	-28.91	-13.0			4224.00	-22.48	-13.0
		5136.00	-30.54				6336.00	-22.77	
		6848.00	-28.51				8448.00	-22.25	
		8560.00	-27.34				10560.00	-23.04	
		10272.00	-27.68				12672.00	-21.47	
		11984.00	-29.10				14784.00	-21.32	
		13696.00	-26.59				16896.00	-21.24	
		15408.00	-25.73				19008.00	-22.25	
-62.00	1712.00	17120.00	-26.76	-13.0	-54.00	2112.00	21120.00	-21.99	-13.0
-62.00	1732.50				-54.00	2132.50			
		3465.00	-28.62	-13.0			4265.00	-22.37	-13.0
		5197.50	-29.97				6397.50	-22.98	
		6930.00	-28.49				8530.00	-21.14	
		8662.50	-28.32				10662.50	-23.45	
		10395.00	-28.49				12795.00	-22.67	
		12127.50	-27.19				14927.50	-20.72	
		13860.00	-26.10				17060.00	-21.30	
		15592.50	-25.96				19192.50	-23.09	
-62.00	1732.50	17325.00	-26.42	-13.0	-54.00	2132.50	21325.00	-21.46	-13.0
-62.00	1753.00				-54.00	2153.00			
		3506.00	-28.69	-13.0			4306.00	-22.23	-13.0
		5259.00	-29.35				6459.00	-23.12	
		7012.00	-28.05				8612.00	-21.74	
		8765.00	-28.23				10765.00	-23.44	
		10518.00	-28.67				12918.00	-22.60	
		12271.00	-27.23				15071.00	-20.88	
		14024.00	-26.58				17224.00	-23.06	
		15777.00	-26.26				19377.00	-21.88	
-62.00	1753.00	17530.00	-27.18	-13.0	-54.00	2153.00	21530.00	-21.68	-13.0

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2.1053 Paragraph: 2.1053		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/12/2011
Notes:	Uplink Frequency Range: 1710-1755 MHz Tested at 3 Input frequencies: 1712, 1732.5, 1753MHz Peak Detector Modulation: CW		

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
	-	-	-	-					-	
116.09	V-1m	67.72	-19.70	0.00					-19.70	
122.13	V-1m	67.40	-19.80	0.00					-19.80	
134.16	H-1m	65.70	-20.60	0.00					-20.60	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-13.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2.1053 <div style="text-align: right;">Paragraph: 2.1053</div>		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/12/2011
Notes:	Downlink Frequency Range: 2110-2155MHz Tested at 3 Input frequencies: 2112, 2132.5, 2153MHz Peak Detector Modulation: CW		

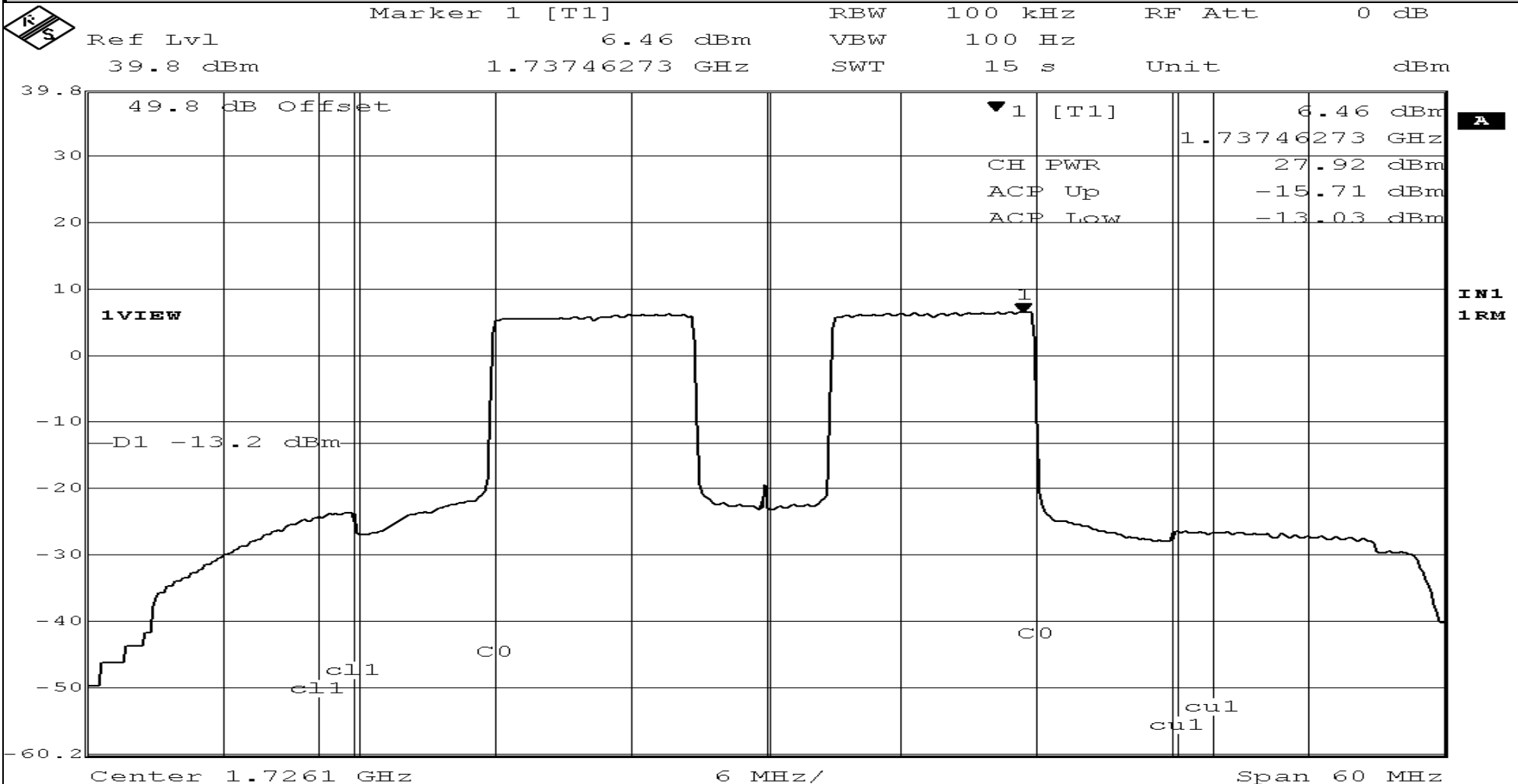
Test Frequency	Antenna Position	Reference Reading	Signal Gen Level	Reference Ant Gain					Corrected Reading	Spurious Limit
MHz	(H/V) - Height	dBuV	dBm	dBi					dBm	dBm
30.00	-	-	-	-					-	-13.00
	-	-	-	-					-	
116.09	V-1m	67.72	-19.70	0.00					-19.70	
122.13	V-1m	67.40	-19.80	0.00					-19.80	
134.16	H-1m	65.70	-20.60	0.00					-20.60	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-13.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink (1710-1755MHz)		

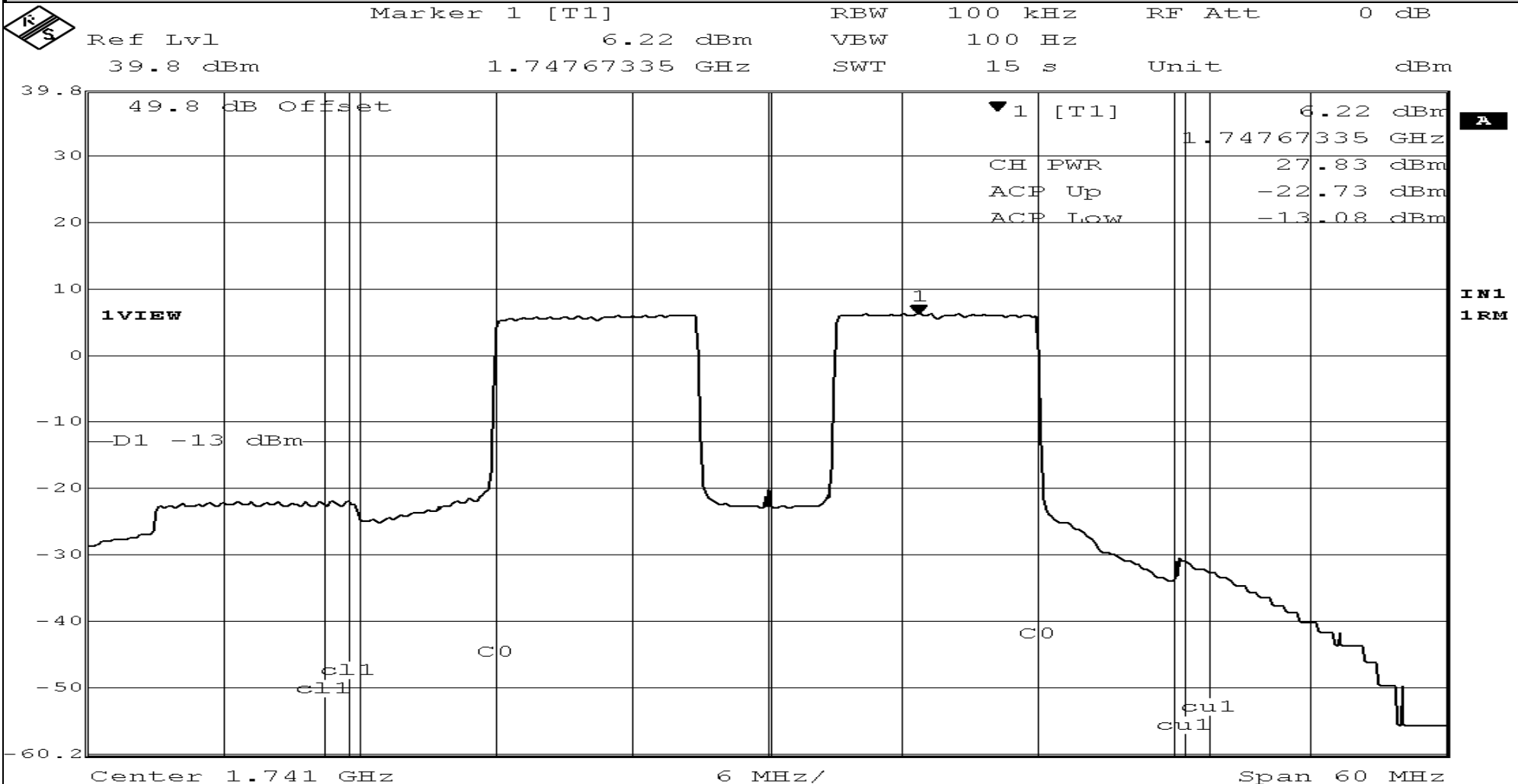


Date: 3.OCT.2011 14:56:00

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	LTE - Uplink (1710-1755MHz)		

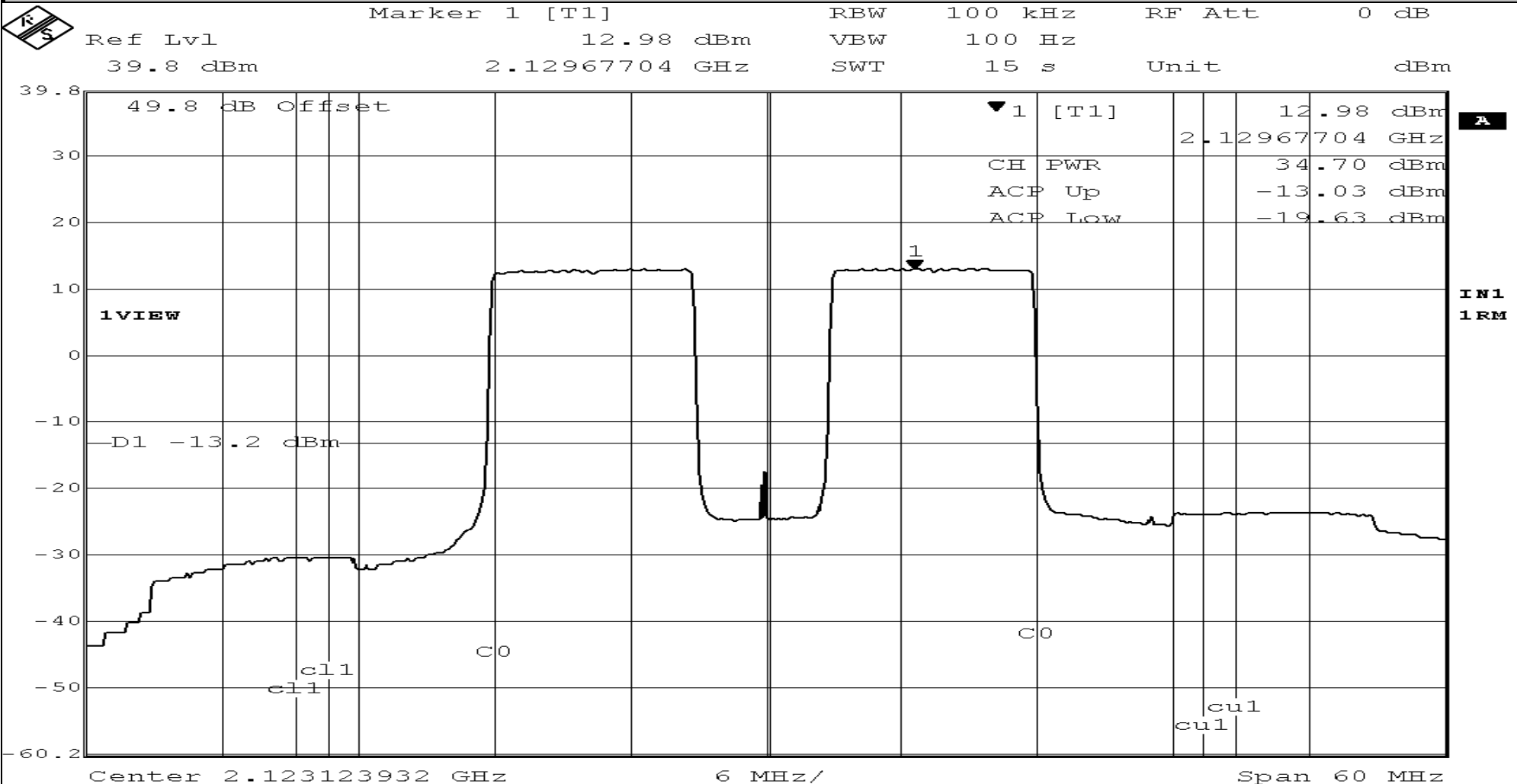


Date: 3.OCT.2011 15:49:15

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink (2110-2155MHz)		

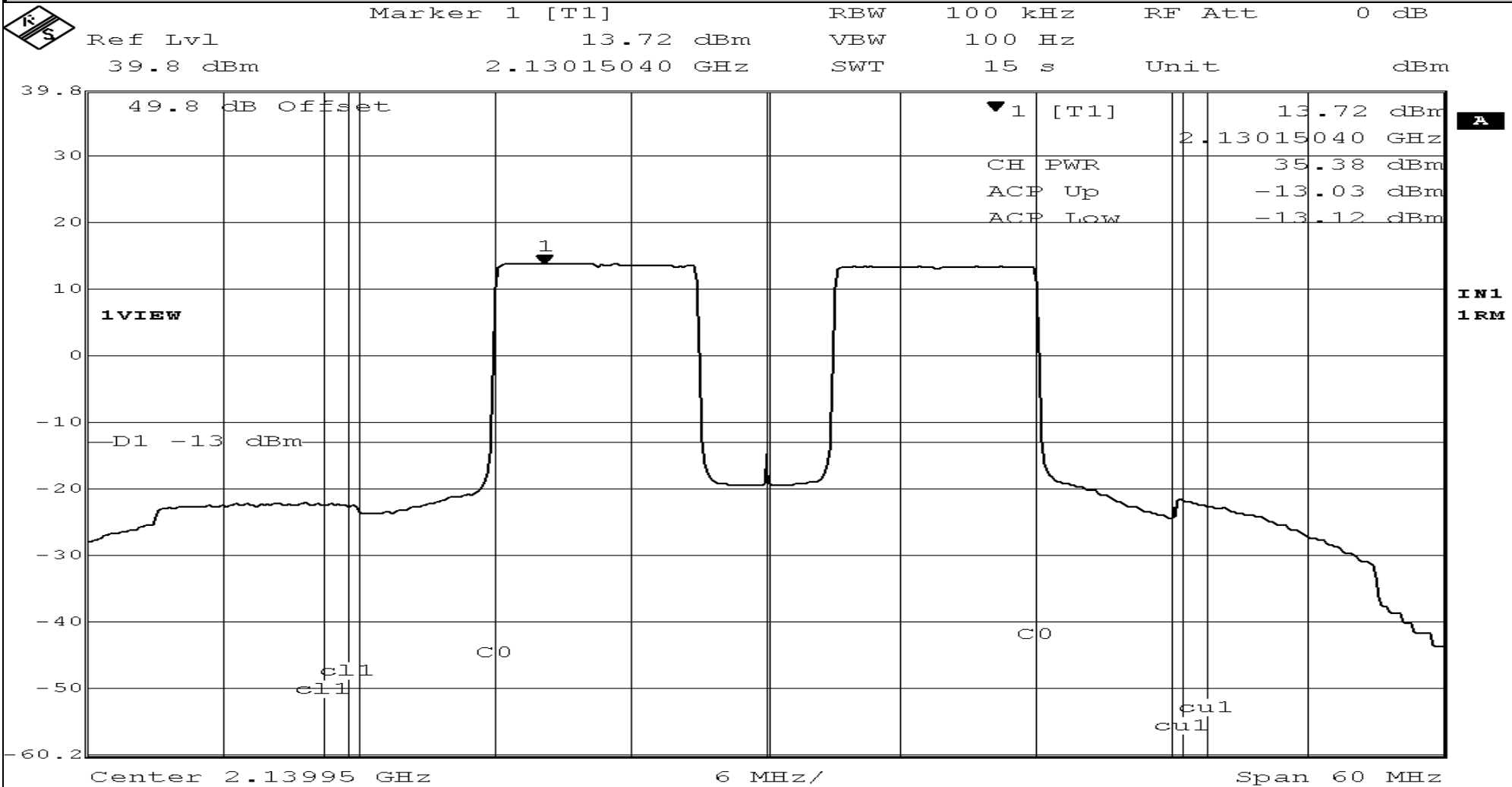


Date: 3.OCT.2011 13:55:40

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	LTE - Downlink (2110-2155MHz)		

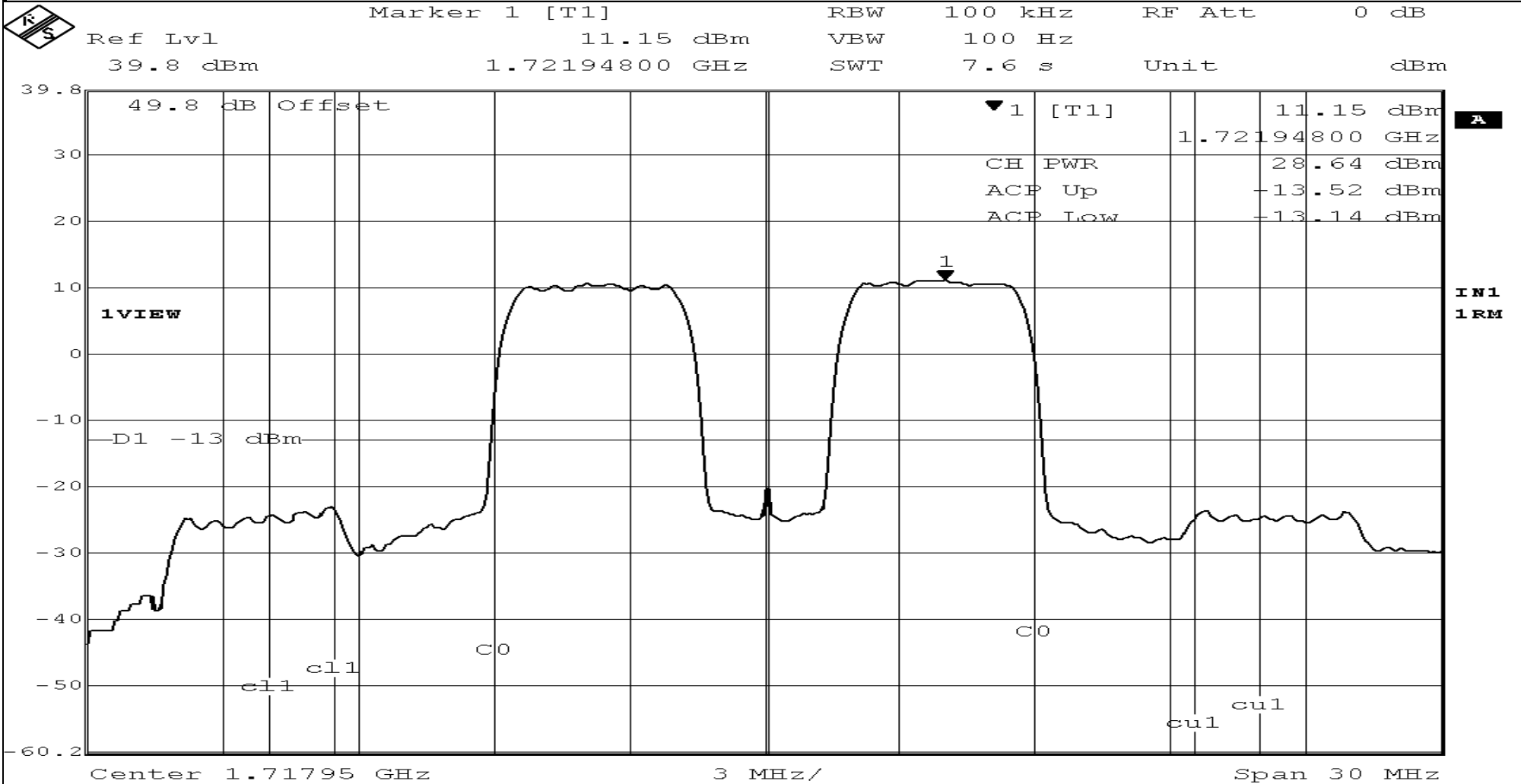


Date: 3.OCT.2011 15:37:24

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	FCC Part 2	Paragraph:	2.1047	
Operating Mode:	Amplifying input signal			
Notes:	WCDMA - Uplink (1710-1755MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/3/2011			

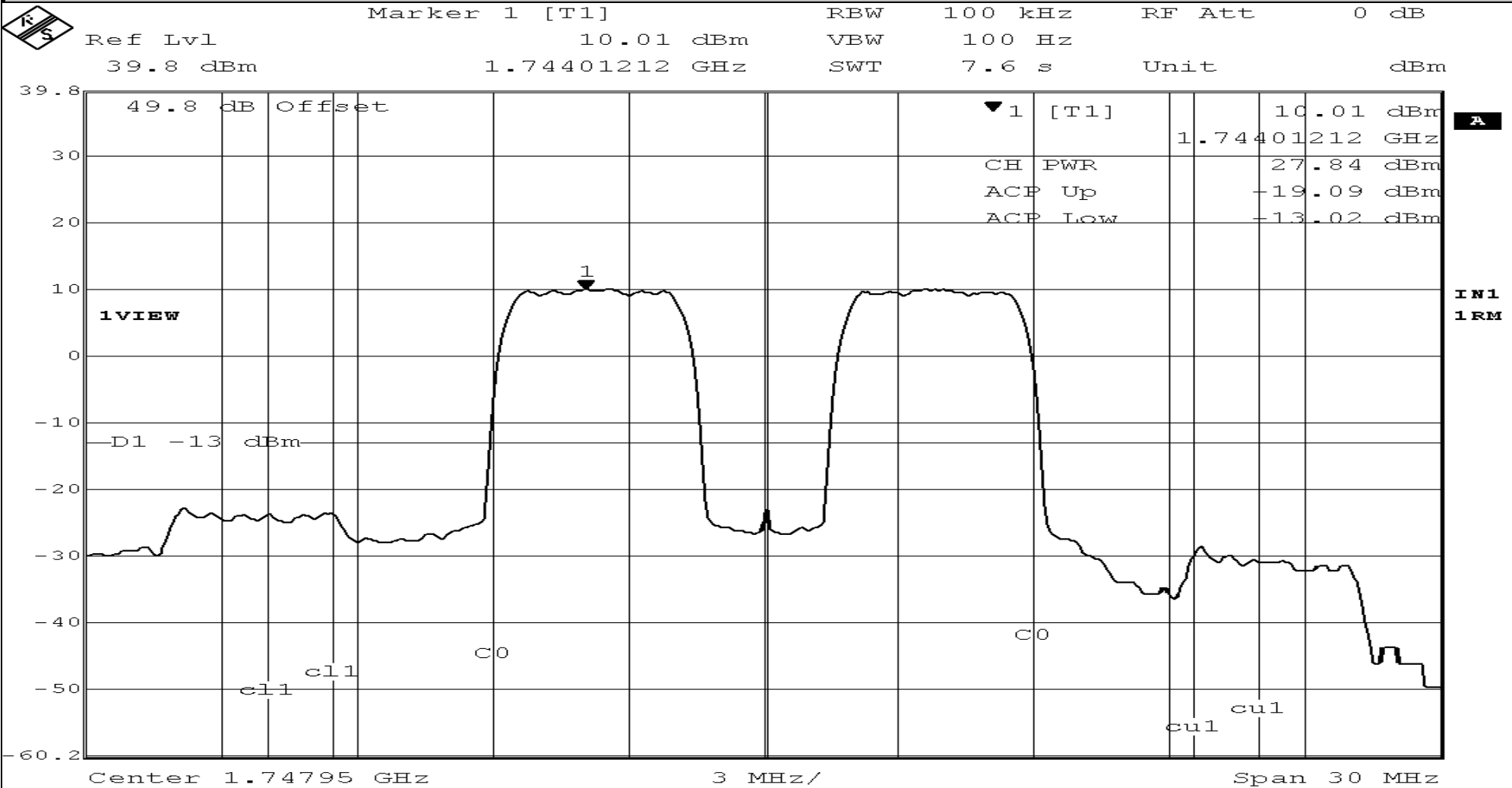


Date: 3.OCT.2011 15:15:56

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink (1710-1755MHz)		

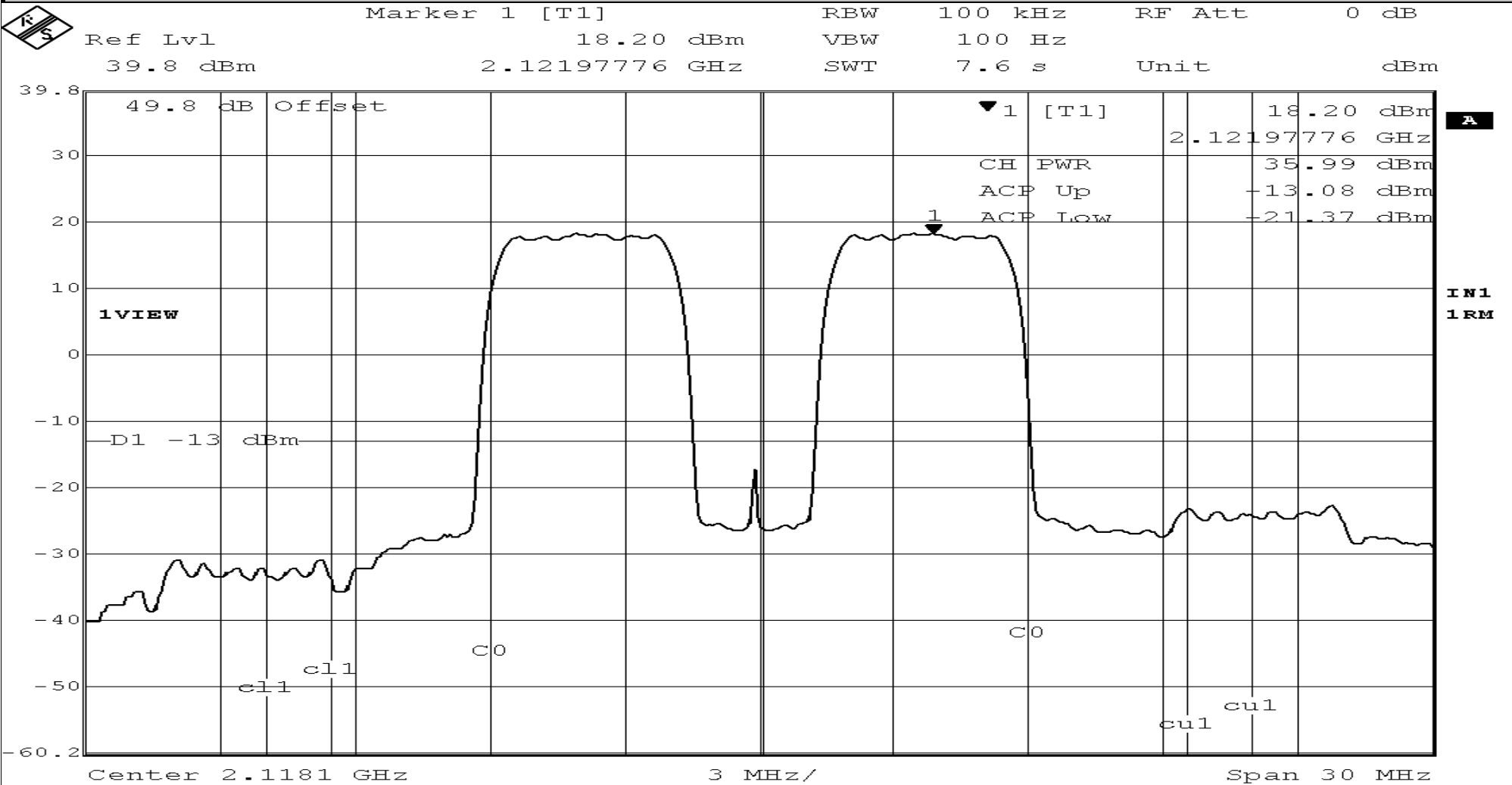


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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

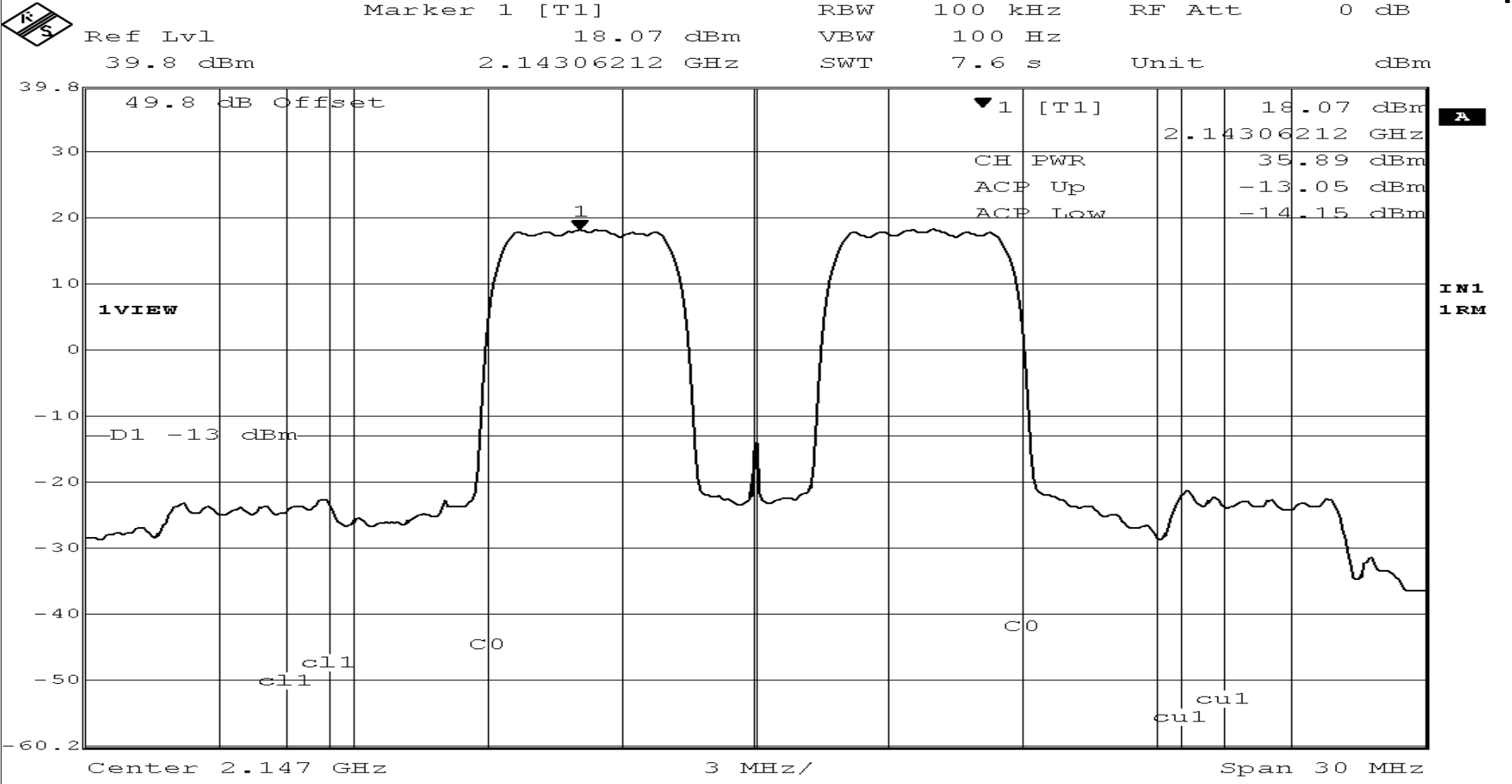
Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink (2110-2155MHz)		
Job No:	R-5408N		Technician:
		M.Seamans	



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5408N		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph:	2.1047
Date:	10/3/2011		
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink (2110-2155MHz)		



Date: 3.OCT.2011 16:00:25

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Frequency Stability	
Customer:	Cellular Specialties, Inc.	Job No: R-5522N
Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No: N/A
Test Specification:	FCC Part 2 Paragraph: 2.1055	
Operating Mode:	Amplifying input signal	
Technician:	M.Seamans	Date: 10/11/2011
Notes:	Uplink Frequency 1732.5 MHz Nominal Voltage = 120 VAC Downlink Frequency 2132.5 MHz EUT Operating temperature range: 0 to 50 Degrees C	

Temp	Test Frequency			Frequency @ 102 VAC	Frequency @ 108 VAC	Frequency @ 114 VAC	Frequency @ 120 VAC	Frequency @ 126 VAC	Frequency @ 132 VAC	Frequency @ 138 VAC
C	MHz			MHz	MHz	MHz	MHz	MHz	MHz	MHz
	(Uplink)									
-30	1732.5000			N/A	N/A	N/A	N/A	N/A	N/A	N/A
-20				N/A	N/A	N/A	N/A	N/A	N/A	N/A
-10				N/A	N/A	N/A	N/A	N/A	N/A	N/A
0				815.00250	815.00250	815.00250	815.00250	815.00250	815.00250	815.00250
10				815.00000	815.00000	815.00000	815.00000	815.00000	815.00000	815.00000
20				815.00000	815.00000	815.00000	815.00000	815.00000	815.00000	815.00000
30				815.00000	815.00000	815.00000	815.00000	815.00000	815.00000	815.00000
40				814.99500	814.99500	814.99500	814.99500	814.99500	814.99500	814.99500
50	1732.5000			814.99750	814.99750	814.99500	814.99500	814.99500	814.99500	814.99500
	(Downlink)									
-30	2132.5000			N/A	N/A	N/A	N/A	N/A	N/A	N/A
-20				N/A	N/A	N/A	N/A	N/A	N/A	N/A
-10				N/A	N/A	N/A	N/A	N/A	N/A	N/A
0				860.00500	860.00500	860.00500	860.00500	860.00500	860.00500	860.00500
10				860.00000	860.00000	860.00000	860.00000	860.00000	860.00000	860.00000
20				860.00000	860.00000	860.00000	860.00000	860.00000	860.00000	860.00000
30				860.00000	860.00000	860.00000	860.00000	860.00000	860.00000	860.00000
40				859.99750	859.99750	859.99750	859.99750	859.99750	859.99500	859.99500
50	2132.5000			859.99750	859.99750	859.99750	859.99750	859.99750	859.99750	859.99750

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

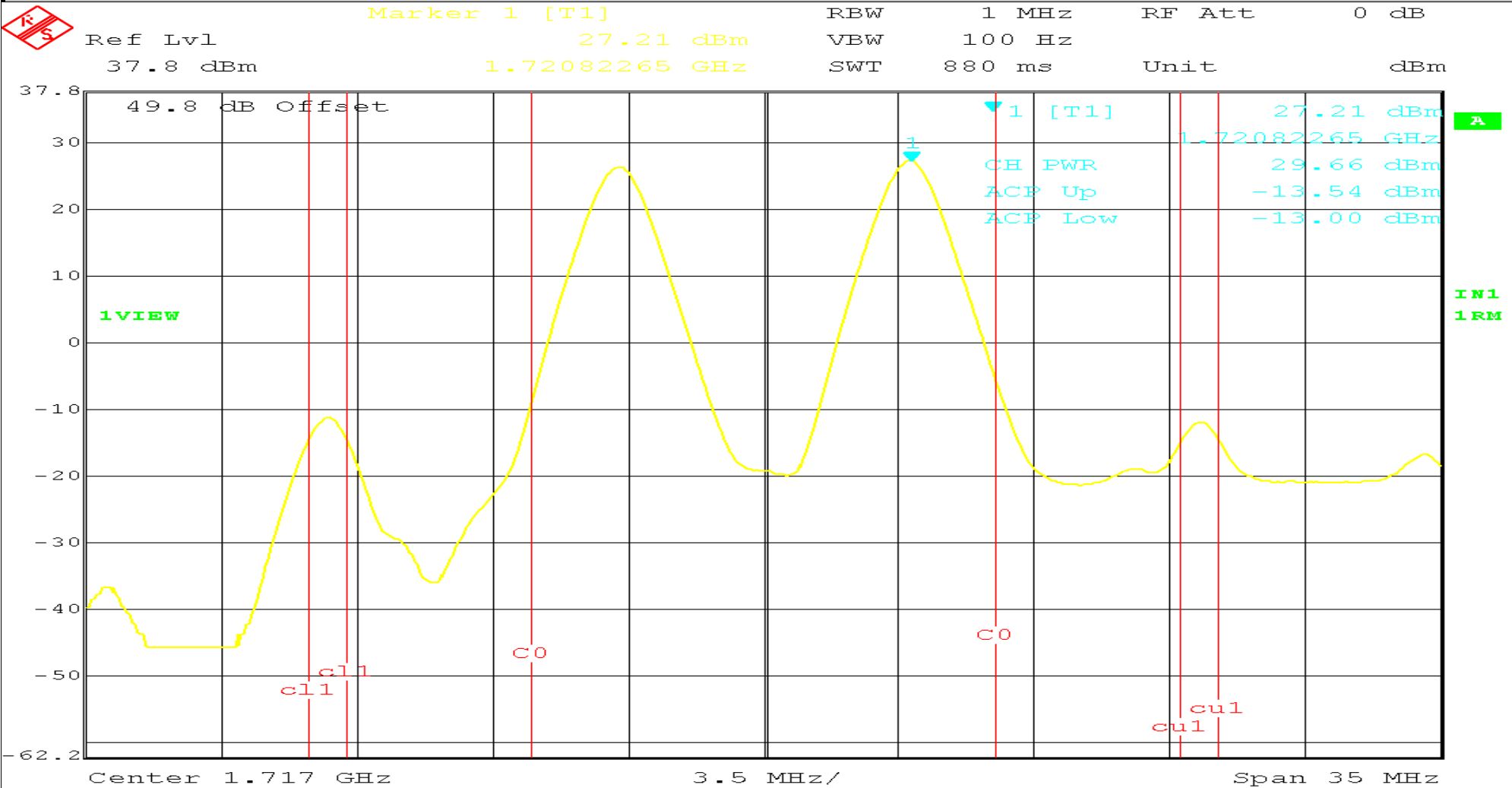
Test Method:	Mean Power		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	RSS-131 Paragraph: 4.3		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/3/2011
Notes:	Uplink Frequency Range: 1710-1755 MHz Downlink Frequency Range: 2110-2155 MHz Modulation: CW Two Tone		

Test Frequency	Measured Level	Add 3dB	Mean Power							
MHz	dBm	dB	dBm							
(Uplink) Low										
1720.00	27.21	3.00	30.21							
(Uplink) Mid										
1736.00	26.21	3.00	29.21							
(Uplink) High										
1751.00	26.12	3.00	29.12							
(Downlink) Low										
2120.00	34.40	3.0	37.40							
(Downlink) Mid										
2128.00	34.03	3.0	37.03							
(Downlink) High										
2151.00	34.13	3.0	37.13							

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Mean Power			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	RSS 131	Paragraph:	4.4	
Operating Mode:	Amplifying input signal			
Notes:	Uplink (1710-1755MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/13/2011			

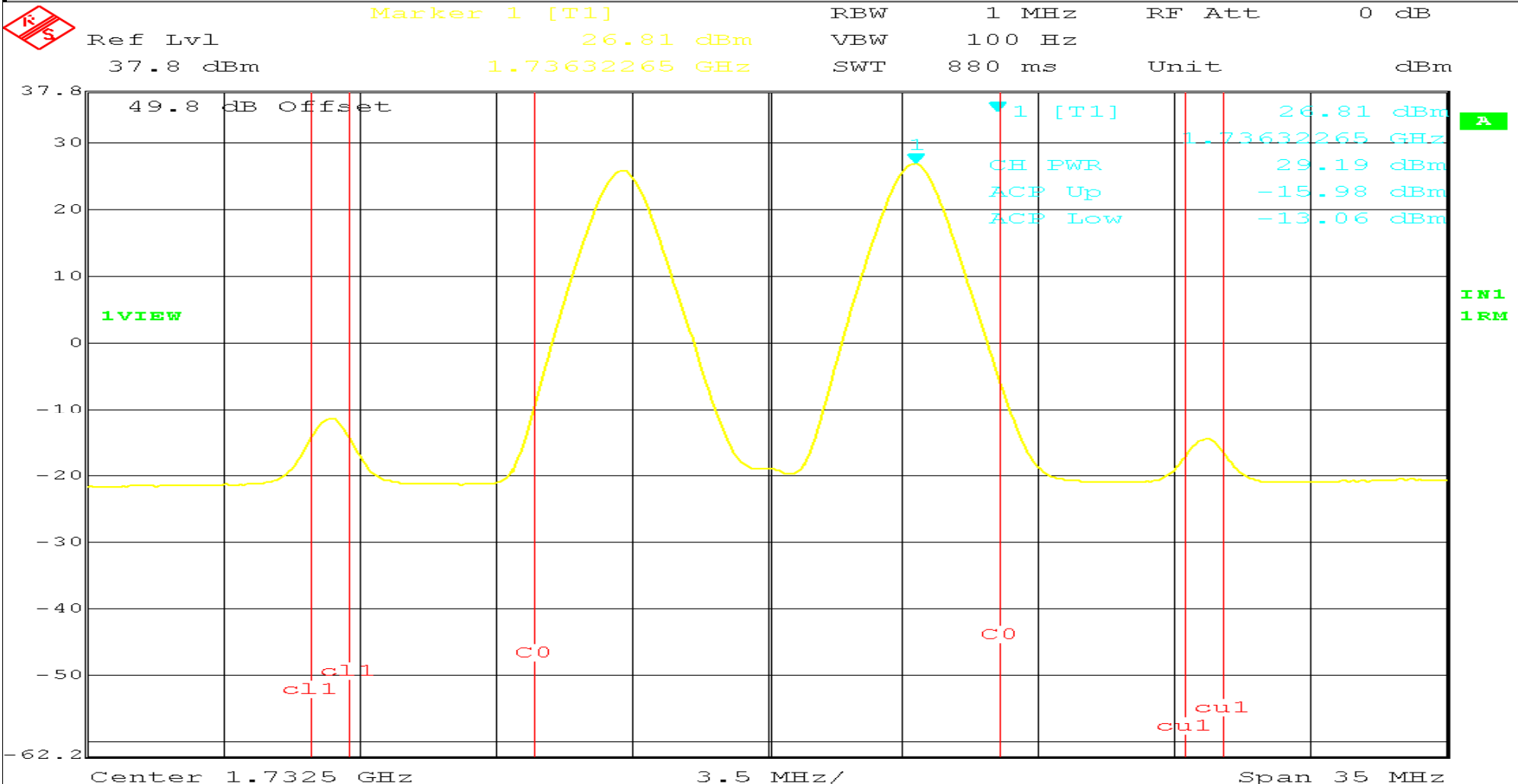


Date: 13.OCT.2011 13:28:52

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Mean Power			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	RSS 131	Paragraph:	4.4	
Operating Mode:	Amplifying input signal			
Notes:	Uplink (1710-1755MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/13/2011			

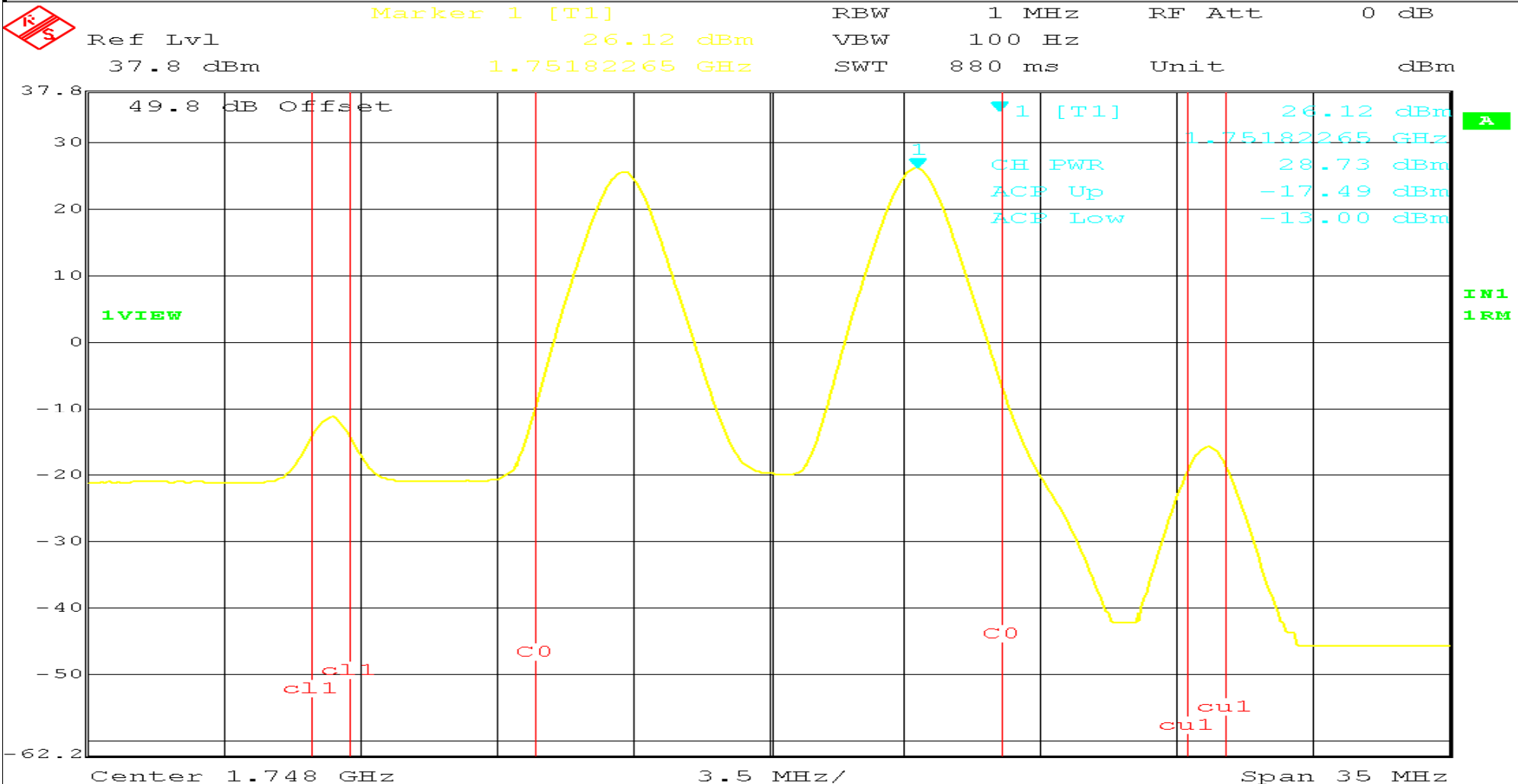


Date: 13.OCT.2011 13:00:48

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Mean Power			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	RSS 131	Paragraph:	4.4	
Operating Mode:	Amplifying input signal			
Notes:	Uplink (1710-1755MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/13/2011			

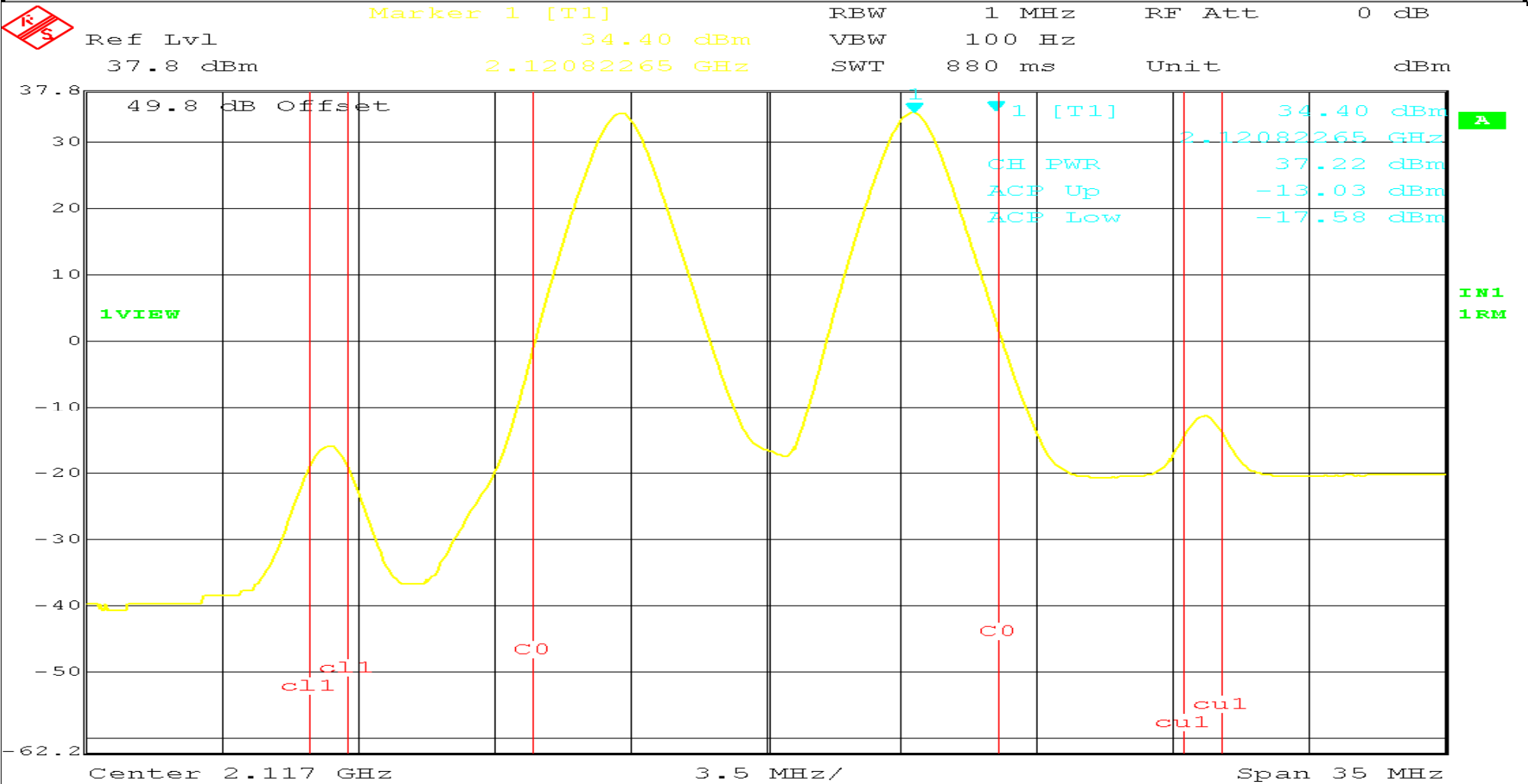


Date: 13.OCT.2011 12:58:07

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Mean Power			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	RSS 131	Paragraph:	4.4	
Operating Mode:	Amplifying input signal			
Notes:	Downlink (2110-2155MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/13/2011			

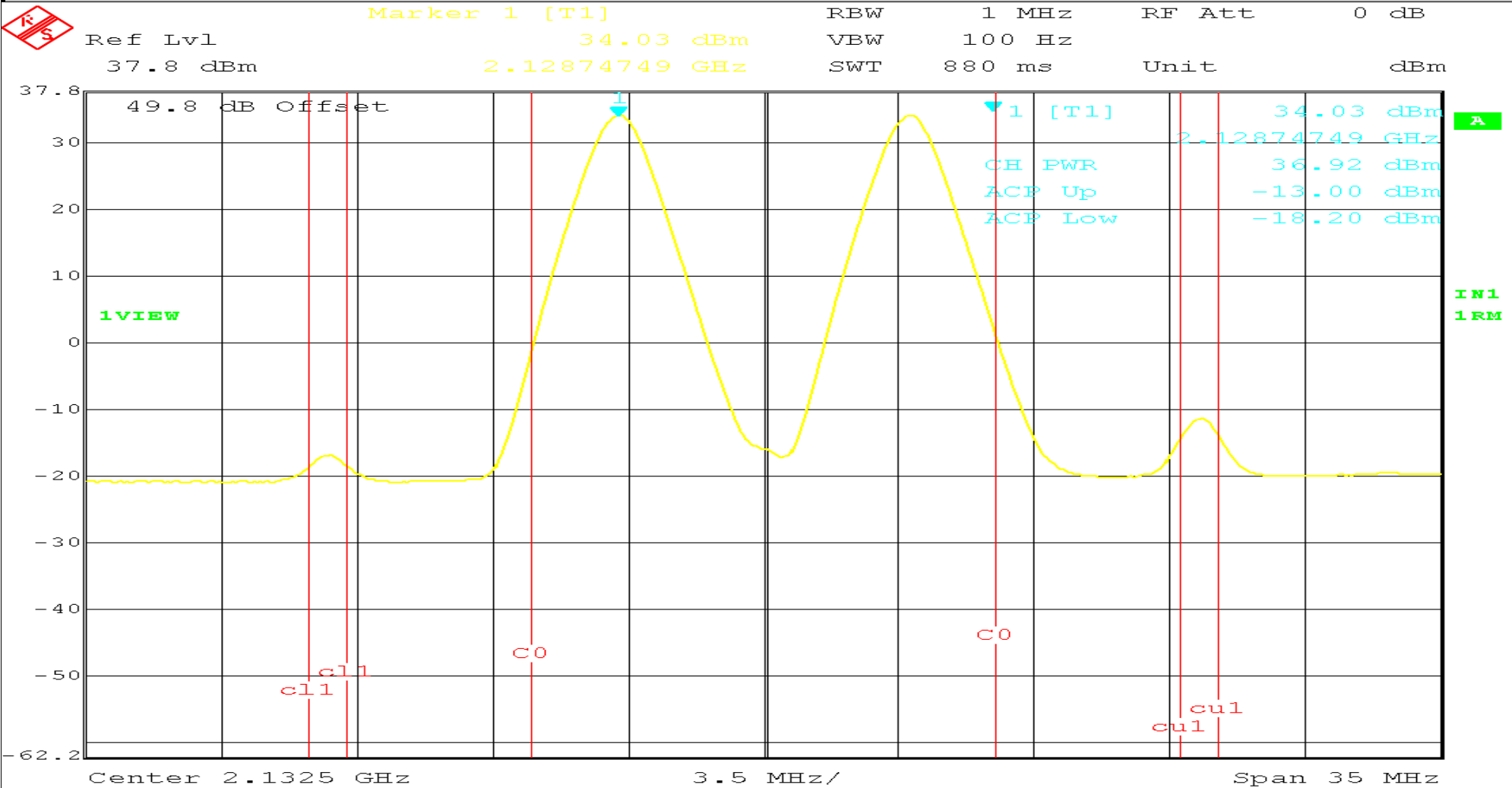


Date: 13.OCT.2011 13:19:58

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	RSS 131	Paragraph:	4.4
Operating Mode:	Amplifying input signal		
Notes:	Downlink (2110-2155MHz)		
		Job No:	R-5408N
		Technician:	M.Seamans
		Date:	10/13/2011

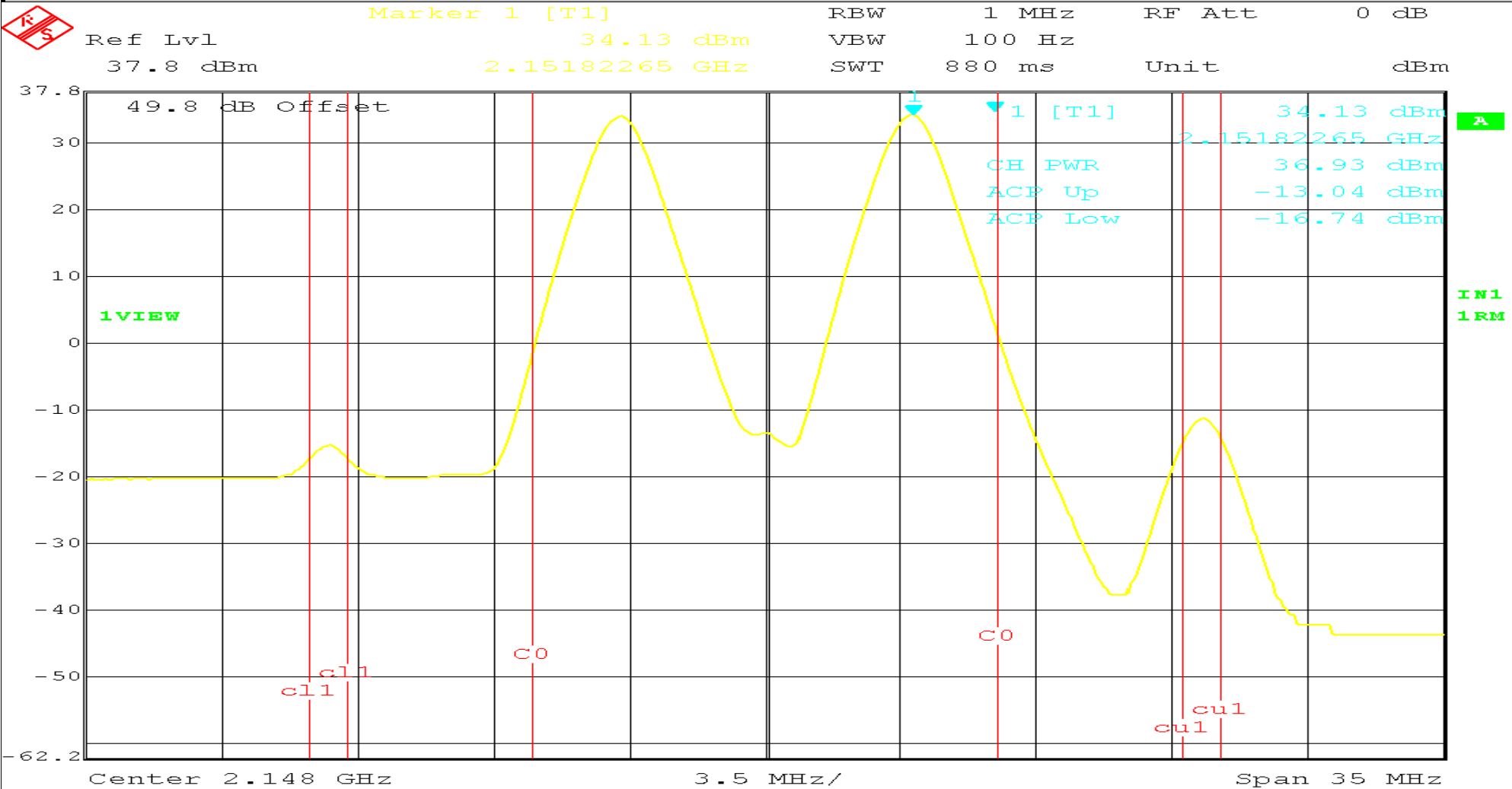


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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	
Test Specification:	RSS 131	Paragraph:	4.4	
Operating Mode:	Amplifying input signal			
Notes:	Downlink (2110-2155MHz)			
Job No:	R-5408N		Technician:	M.Seamans
Date:	10/13/2011			



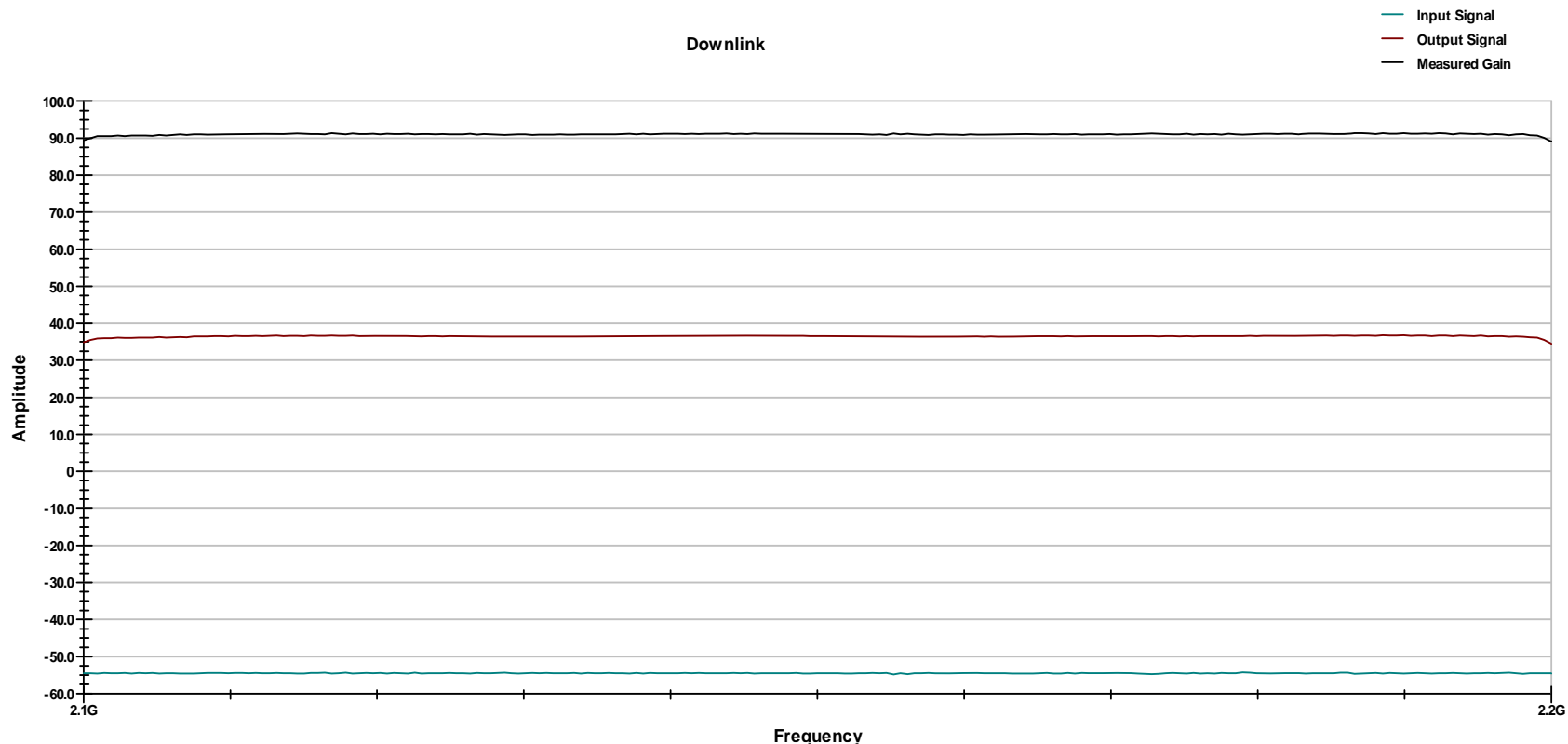
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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Passband Gain and Bandwidth				
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	Job No:	R-5408N
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	Technician:	T. Hannemann
Test Specification:	RSS			Date:	10/17/2011
Operating Mode:	Amplifying input signal				
Notes:	Downlink				

Passband Gain Plot



Graph Start and Stop Frequencies are Band Edges

Operator: T. Hannemann

Customer: Cellular Specialties, Inc.

03:51:12 PM, Monday, October 17, 2011

Job Number: R-5422N

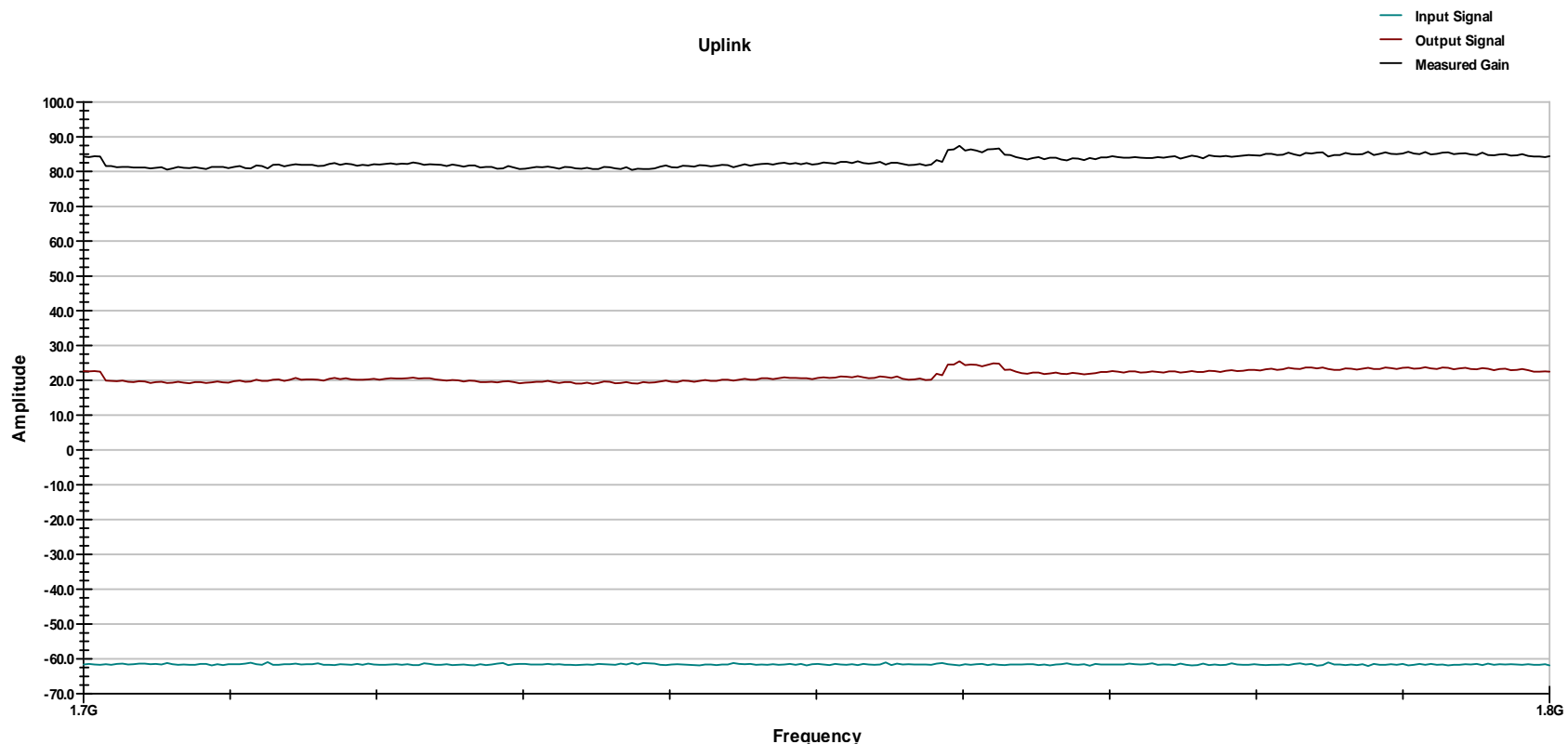
RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Passband Gain and Bandwidth				
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	Job No:	R-5408N
Model No:	CSI-DSP95-255-AW	Serial No:	N/A	Technician:	T. Hannemann
Test Specification:	RSS			Date:	10/17/2011
Operating Mode:	Amplifying input signal				
Notes:	Uplink				

Passband Gain Plot

Uplink



Graph Start and Stop Frequencies are Band Edges

Operator: T. Hannemann

Customer: Cellular Specialties, Inc.

03:51:12 PM, Monday, October 17, 2011

Job Number: R-5422N

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz	
Customer:	Cellular Specialties, Inc.	Job No: R-5522N
Test Sample:	Digital Repeater	
Model No:	CSI-DSP95-255-AW	Serial No: N/A
Test Specification:	RSS-131 Paragraph: 4.4	
Operating Mode:	Amplifying input signal	
Technician:	T. Hannemann	Date: 11/9/2010
Notes:	Uplink Frequency Range: 1710-1755 MHz Tested at 2 Input frequencies: 1718 and 1748MHz Peak Detector Modulation: WCDMA Two Tone	

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
	-	-	-	-					-	
116.09	V-1m	67.72	-19.70	0.00					-19.70	
122.13	V-1m	67.40	-19.80	0.00					-19.80	
134.16	H-1m	65.70	-20.60	0.00					-20.60	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-13.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz								
Customer:	Cellular Specialties, Inc.				Job No:	R-5522N			
Test Sample:	Digital Repeater								
Model No:	CSI-DSP95-255-AW				Serial No:	N/A			
Test Specification:	RSS-131 Paragraph: 4.4								
Operating Mode:	Amplifying input signal								
Technician:	M.Seamans				Date:	10/12/2011			
Notes:	Downlink Frequency Range: 2110-2155 MHz Tested at 2 Input frequencies: 2123 and 2140MHz Peak Detector Modulation: LTE Two Tone								

Test Frequency	Antenna Position	Reference Reading	Signal Gen Level	Reference Ant Gain					Corrected Reading	Spurious Limit
MHz	(H/V) - Height	dBuV	dBm	dBd					dBm	dBm
30.00	-	-	-	-					-	-13.00
	-	-	-	-					-	
116.09	V-1m	67.72	-19.70	0.00					-19.70	
122.13	V-1m	67.40	-19.80	0.00					-19.80	
134.16	H-1m	65.70	-20.60	0.00					-20.60	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-13.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	RSS-131 Paragraph: 4.4		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/12/2011
Notes:	Downlink Frequency Range: 2110-2155 MHz Tested at 2 Input frequencies: 2118 and 2147MHz Peak Detector Modulation: WCDMA Two Tone		

Test Frequency	Antenna Position	Reference Reading	Signal Gen Level	Reference Ant Gain					Corrected Reading	Spurious Limit
MHz	(H/V) - Height	dBuV	dBm	dBd					dBm	dBm
30.00	-	-	-	-					-	-13.00
	-	-	-	-					-	
116.09	V-1m	67.72	-19.70	0.00					-19.70	
122.13	V-1m	67.40	-19.80	0.00					-19.80	
134.16	H-1m	65.70	-20.60	0.00					-20.60	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-13.00

EUT emissions observed throughout the given frequency spectrum were recorded and evaluated. Emission levels closest to the limit are listed on this data sheet.

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	RSS-131 Paragraph: 4.4		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/13/2011
Notes:	Uplink Frequency: 1710-1755 MHz Downlink Frequency: 2110-2155 MHz LTE modulation Readings are noise floor measurements		

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
-62.00	1718.00				-54.00	2118.00			
		3436.00	-21.67	-13.0			4236.00	-22.46	-13.0
		5154.00	-22.67				6354.00	-23.63	
		6872.00	-23.05				8472.00	-21.61	
		8590.00	-20.53				10590.00	-22.48	
		10308.00	-22.42				12708.00	-22.57	
		12026.00	-22.43				14826.00	-21.97	
		13744.00	-21.51				16944.00	-21.32	
		15462.00	-21.99				19062.00	-22.94	
-62.00	1718.00	17180.00	-22.76	-13.0	-54.00	2118.00	21180.00	-21.57	-13.0
-62.00	1732.50				-54.00	2132.50			
		3465.00	-21.97	-13.0			4265.00	-22.69	-13.0
		5197.50	-23.66				6397.50	-22.42	
		6930.00	-23.20				8530.00	-21.74	
		8662.50	-21.71				10662.50	-22.75	
		10395.00	-22.11				12795.00	-22.52	
		12127.50	-21.76				14927.50	-21.92	
		13860.00	-22.48				17060.00	-21.33	
		15592.50	-21.92				19192.50	-22.89	
-62.00	1732.50	17325.00	-22.15	-13.0	-54.00	2132.50	21325.00	-21.32	-13.0
-62.00	1748.00				-54.00	2147.00			
		3496.00	-21.77	-13.0			4294.00	-22.80	-13.0
		5244.00	-23.77				6441.00	-23.48	
		6992.00	-22.99				8588.00	-21.68	
		8740.00	-21.27				10735.00	-23.42	
		10488.00	-22.23				12882.00	-22.59	
		12236.00	-22.14				15029.00	-21.35	
		13984.00	-20.62				17176.00	-21.46	
		15732.00	-21.48				19323.00	-22.10	
-62.00	1748.00	17480.00	-21.58	-13.0	-54.00	2147.00	21470.00	-21.51	-13.0

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
Customer:	Cellular Specialties, Inc.	Job No:	R-5522N
Test Sample:	Digital Repeater		
Model No:	CSI-DSP95-255-AW	Serial No:	N/A
Test Specification:	RSS-131 Paragraph: 4.4		
Operating Mode:	Amplifying input signal		
Technician:	M.Seamans	Date:	10/13/2011
Notes:	Uplink Frequency: 1710-1755 MHz Downlink Frequency: 2110-2155 MHz WCDMA modulation Readings are noise floor measurements		

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
-62.00	1712.00				-54.00	2112.00			
		3424.00	-28.91	-13.0			4224.00	-22.48	-13.0
		5136.00	-30.54				6336.00	-22.77	
		6848.00	-28.51				8448.00	-22.25	
		8560.00	-27.34				10560.00	-23.04	
		10272.00	-27.68				12672.00	-21.47	
		11984.00	-29.10				14784.00	-21.32	
		13696.00	-26.59				16896.00	-21.24	
		15408.00	-25.73				19008.00	-22.25	
-62.00	1712.00	17120.00	-26.76	-13.0	-54.00	2112.00	21120.00	-21.99	-13.0
-62.00	1732.50				-54.00	2132.50			
		3465.00	-28.62	-13.0			4265.00	-22.37	-13.0
		5197.50	-29.97				6397.50	-22.98	
		6930.00	-28.49				8530.00	-21.14	
		8662.50	-28.32				10662.50	-23.45	
		10395.00	-28.49				12795.00	-22.67	
		12127.50	-27.19				14927.50	-20.72	
		13860.00	-26.10				17060.00	-21.30	
		15592.50	-25.96				19192.50	-23.09	
-62.00	1732.50	17325.00	-26.42	-13.0	-54.00	2132.50	21325.00	-21.46	-13.0
-62.00	1753.00				-54.00	2153.00			
		3506.00	-28.69	-13.0			4306.00	-22.23	-13.0
		5259.00	-29.35				6459.00	-23.12	
		7012.00	-28.05				8612.00	-21.74	
		8765.00	-28.23				10765.00	-23.44	
		10518.00	-28.67				12918.00	-22.60	
		12271.00	-27.23				15071.00	-20.88	
		14024.00	-26.58				17224.00	-23.06	
		15777.00	-26.26				19377.00	-21.88	
-62.00	1753.00	17530.00	-27.18	-13.0	-54.00	2153.00	21530.00	-21.68	-13.0