



# Retlif Testing Laboratories

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## REPORT OF MEASUREMENTS

for

### CELLULAR SPECIALTIES, INC. DIGITAL REPEATER

MODEL: CSI-DSP85-25X-AW

FCC ID: NVRC SI-DSP25XAW

IC: 4307A-DSP25XAW

Company Name: Cellular Specialties, Inc.

Date of Report: October 25, 2010

Test Report No: R-5372N

Test Start Date: August 30, 2010

Test Finish Date: October 1, 2010

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.



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Scott Wentworth  
Branch Manager  
NVLAP Approved Signatory



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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-5372N

## 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-DSP85-25X-AW
FCC ID Number:	FCC ID: NVRC SI-DSP25XAW
IC ID Number:	4307A-DSP25XAW
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 Intermodulation Data Composite Power	Uplink (WCDMA): 0.916W Uplink (CDMA 2000): 1.64W Downlink (WCDMA): 0.641W Downlink (CDMA 2000): 1.10W
Modulation Types:	WCDMA (F9W), CDMA 2000 (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: <ul style="list-style-type: none"><li>- Occupied Bandwidth (2.1049)</li><li>- Spurious Emissions at Antenna Terminals (27.53)</li><li>- Effective Radiated Power of Spurious Radiation (27.53)</li><li>- RF Power Output (27.50)</li><li>- Intermodulation Characteristics</li><li>- Frequency Stability (27.54)</li></ul>
Additional Measurements Required by RSS -131:	<ul style="list-style-type: none"><li>- Mean Output Power</li><li>- Passband Gain &amp; Bandwidth</li><li>- Spurious Emissions (two tone)</li></ul>



**Retlif Testing Laboratories**

Test Report No. R-5372N

## SECTION 1 SUMMARY OF TEST PROGRAM

### 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 CDMA 2000 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 CDMA 2000 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.

### 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.



**Retlif Testing Laboratories**

Test Report No. R-5372N

## RF POWER OUTPUT (Composite Power)

### Measurement Procedure:

The RF Power Output test was performed using RMS channel power measurements of a single WCDMA channel. 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 CDMA 2000 modulation. The measured output power matched the manufacturer's rated output power. 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. 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 WCDMA & CDMA 2000 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 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 -30 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.



**Retlif Testing Laboratories**

Test Report No. R-5372N

## 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 3<sup>rd</sup> 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<sub>mean</sub>) was calculated using the formula (P<sub>mean</sub> = P<sub>01</sub> + 3dB). Testing was performed for WCDMA & CDMA 2000 Modulation types. The P<sub>mean</sub> 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 (f<sub>0</sub>) of the passband up to at least f<sub>0</sub> ± 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.



**Retlif Testing Laboratories**

Test Report No. R-5372N

## SECTION 2 EQUIPMENT LISTS

### Spurious Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3001	EMPIRE DEVICES	TUNED DIPOLE ANTENNA	200 MHz - 400 MHz	T2	12/3/2007	12/3/2010
3116	MITEQ	PRE-AMPLIFIER	0.1 GHz - 18 GHz	AFS42-35	1/12/2010	1/12/2011
3117	BK PRECISION	DC POWER SUPPLY	0-30 Vdc, 3.0 A	1630	Calibrate Before Use	
3258	EMCO	DOUBLE RIDGE GUIDE	1 - 18 GHz	3115	1/14/2010	1/14/2011
3430	MCS	HORN ANTENNA	18 GHz - 26.5 GHz	K-5039	1/14/2010	1/14/2011
4003A	EMCO	DOUBLE RIDGE GUIDE	1 - 18 GHz	3105	Inspect Before Use	
4029	RETLIF	OPEN AREA TEST SITE	3 / 10 Meters	RNH	8/21/2009	8/21/2012
4029B	RETLIF	TEST SITE ATTENUATION	3 / 10 Meters	RNH	6/25/2009	10/25/2010
5053	EMCO	BICONILOG ANTENNA	26 MHz - 3 GHz	3142C	4/21/2010	4/21/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011
5107	AGILENT / HP	SIGNAL GENERATOR	100 kHz - 20 GHz	N5183A	2/25/2010	2/25/2011
R425B	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	5/28/2010	5/28/2011

### Mean Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	8/10/2011
3130	NARDA	20DB ATTENUATOR	DC - 18 GHz	768-20	1/11/2010	1/11/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011

### RF Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	8/10/2011
3130	NARDA	20DB ATTENUATOR	DC - 18 GHz	768-20	1/11/2010	1/11/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011

### Frequency Stability

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
4997	OMEGA	DIGITAL THERMOMETER		UNKNOWN	8/11/2010	8/11/2011
5013	POWERSTAT	VARIAC	0-140 V, 10 A, 60 Hz	116B	No Calibration Required	
5049B	FLUKE	DIGITAL MULTIMETER	True RMS Multimeter	111	8/9/2010	8/9/2011
5077	ASSOCIATED ENVIRONME	TEMPERATURE CHAMBER	-50 to 150° C	ZFD-531	8/11/2010	8/11/2011
R425B	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	5/28/2010	5/28/2011



**Retlif Testing Laboratories**

Test Report No. R-5372N

### Occupied Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	8/10/2011
3130	NARDA	20DB ATTENUATOR	DC - 18 GHz	768-20	1/11/2010	1/11/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011

### Spurious Emissions Antenna Ports

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	8/10/2011
3130	NARDA	20DB ATTENUATOR	DC - 18 GHz	768-20	1/11/2010	1/11/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011

### Passband Gain and Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA	ATTENUATOR	DC - 18GHz	776B-30	8/10/2010	8/10/2011
3130	NARDA	20DB ATTENUATOR	DC - 18 GHz	768-20	1/11/2010	1/11/2011
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	1/14/2009	3/14/2011



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Test Report No. R-5372N



**SETUP PHOTOGRAPH**  
**SPURIOUS RADIATED EMISSIONS**



Test Setup



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Test Report No. R-5372N

**SETUP PHOTOGRAPHS**  
**SPURIOUS RADIATED EMISSIONS**



Horizontal Antenna Polarization



Vertical Antenna Polarization



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Test Report No. R-5372N

**SETUP PHOTOGRAPHS  
SPURIOUS RADIATED EMISSIONS**



Horizontal Antenna Polarization



Vertical Antenna Polarization



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Test Report No. R-5372N

**SETUP PHOTOGRAPHS  
SPURIOUS RADIATED EMISSIONS**



ERP



ERP



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Test Report No. R-5372N

**SETUP PHOTOGRAPH  
OCCUPIED BANDWIDTH**



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Test Report No. R-5372N



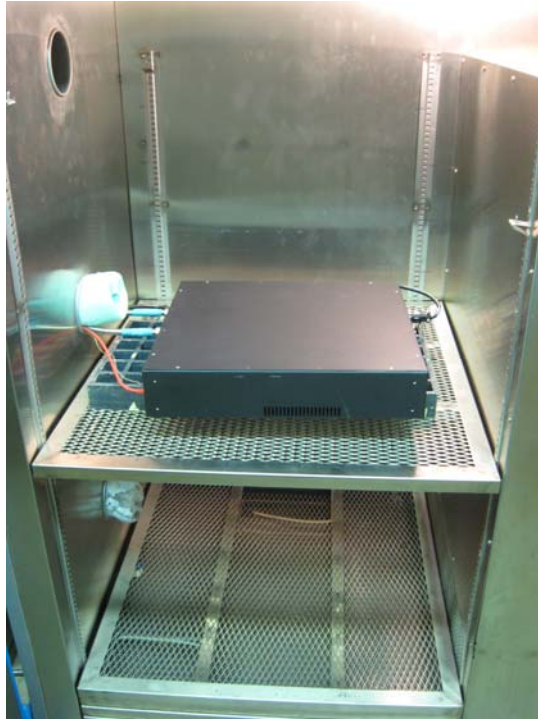
**SETUP PHOTOGRAPH**  
**SPURIOUS EMISSIONS AT ANTENNA TERMINALS, RF POWER OUTPUT,**  
**INTERMODULATION CHARACTERISTICS, PASSBAND GAIN, MEAN POWER**



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Test Report No. R-5372N

**SETUP PHOTOGRAPH  
FREQUENCY STABILITY**



**Retlif Testing Laboratories**

Test Report No. R-5372N

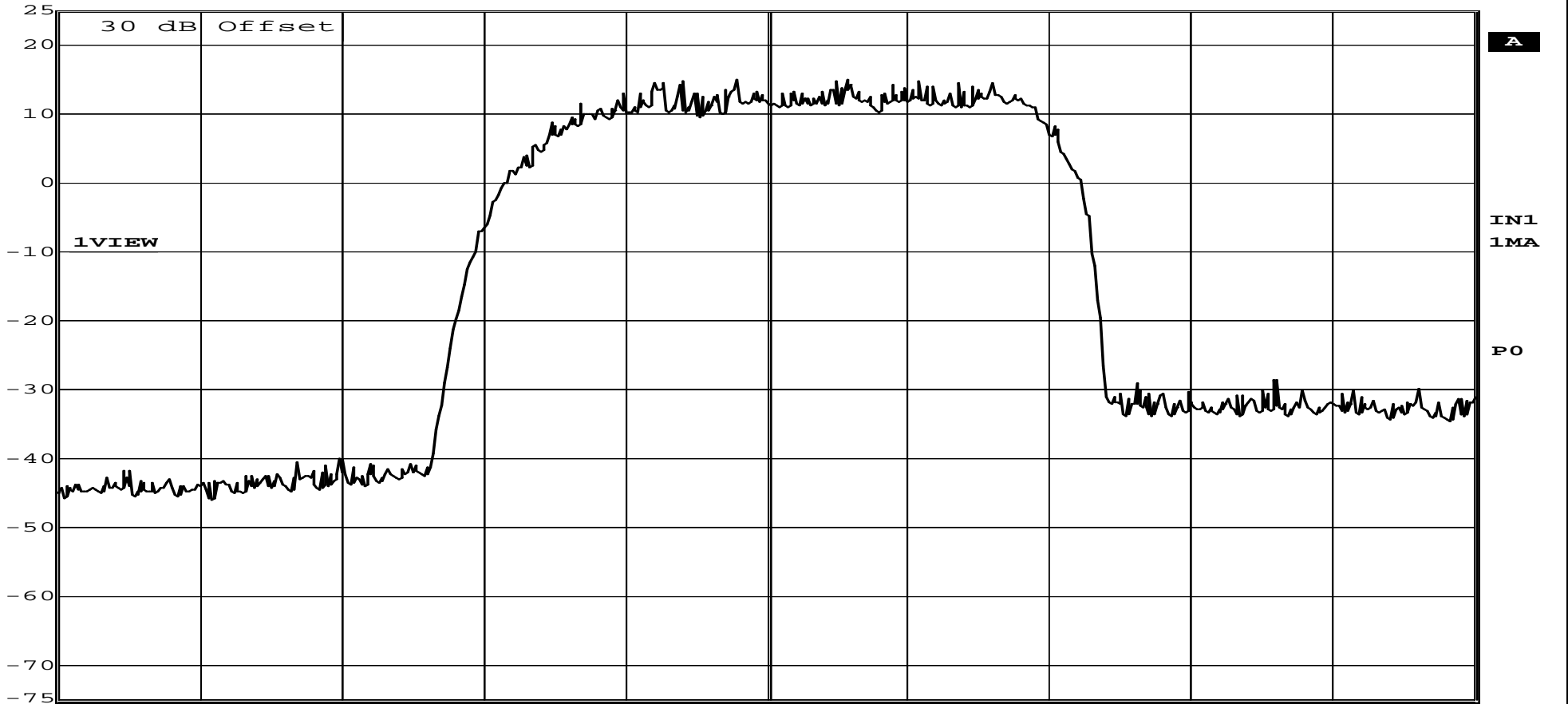
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Output at 2111 MHz		



Ref Lvl	RBW	30 kHz	RF Att	20 dB
25 dBm	VBW	100 kHz	Mixer	-10 dBm
	SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:22:10



# RETLIF TESTING LABORATORIES

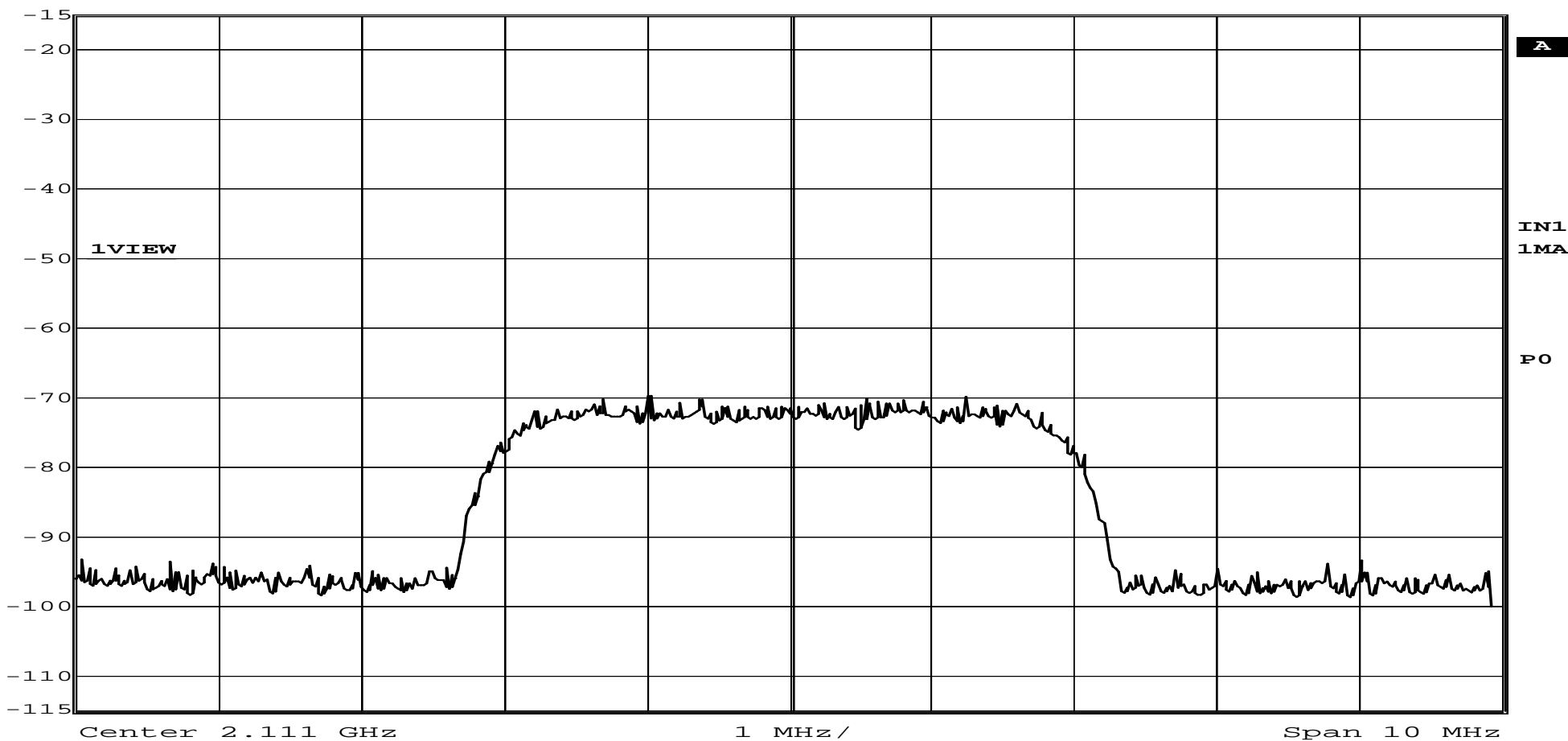
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input at 2111 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm

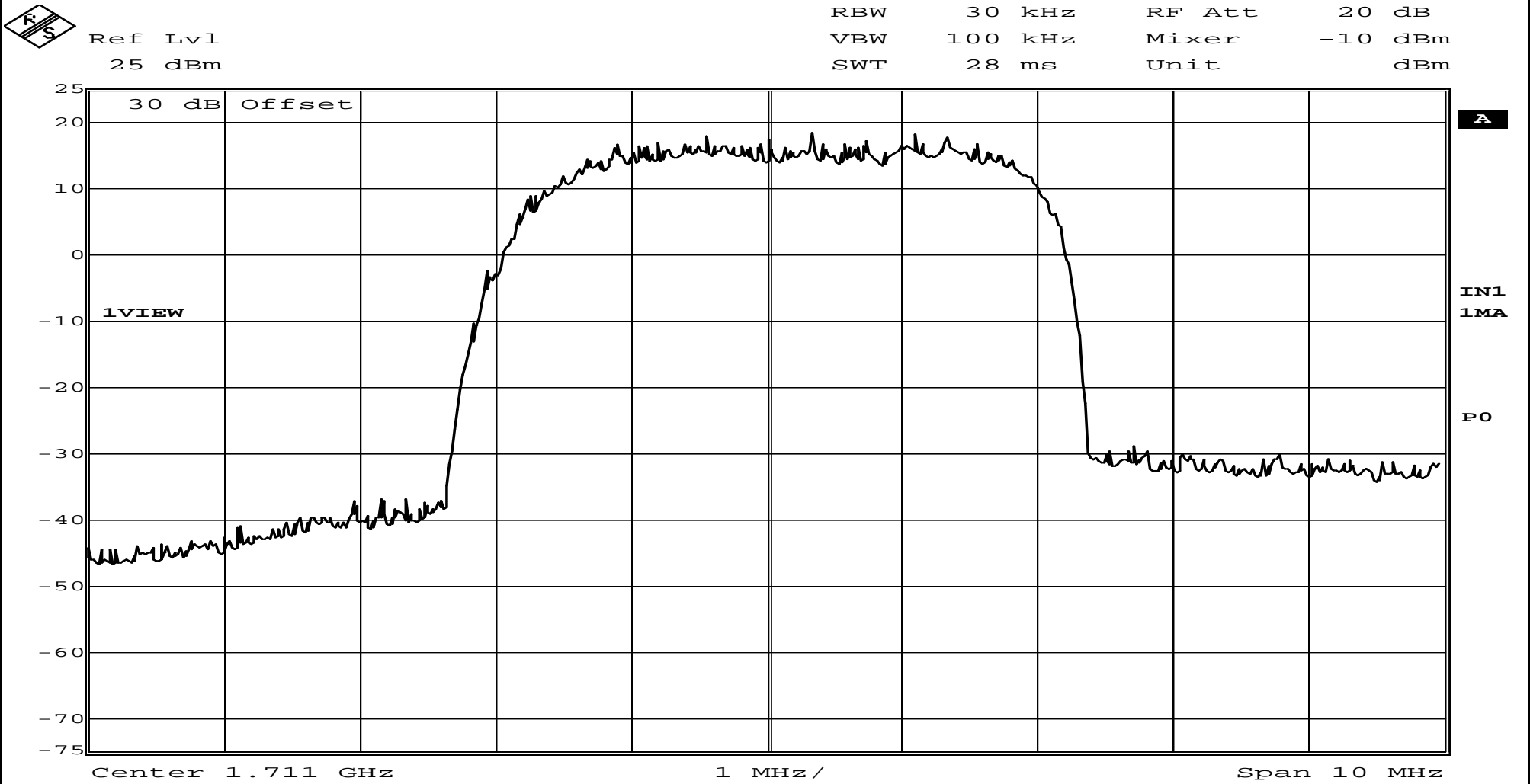


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# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Output at 1711 MHz		



Date: 4.OCT.2010 13:13:12

# RETLIF TESTING LABORATORIES

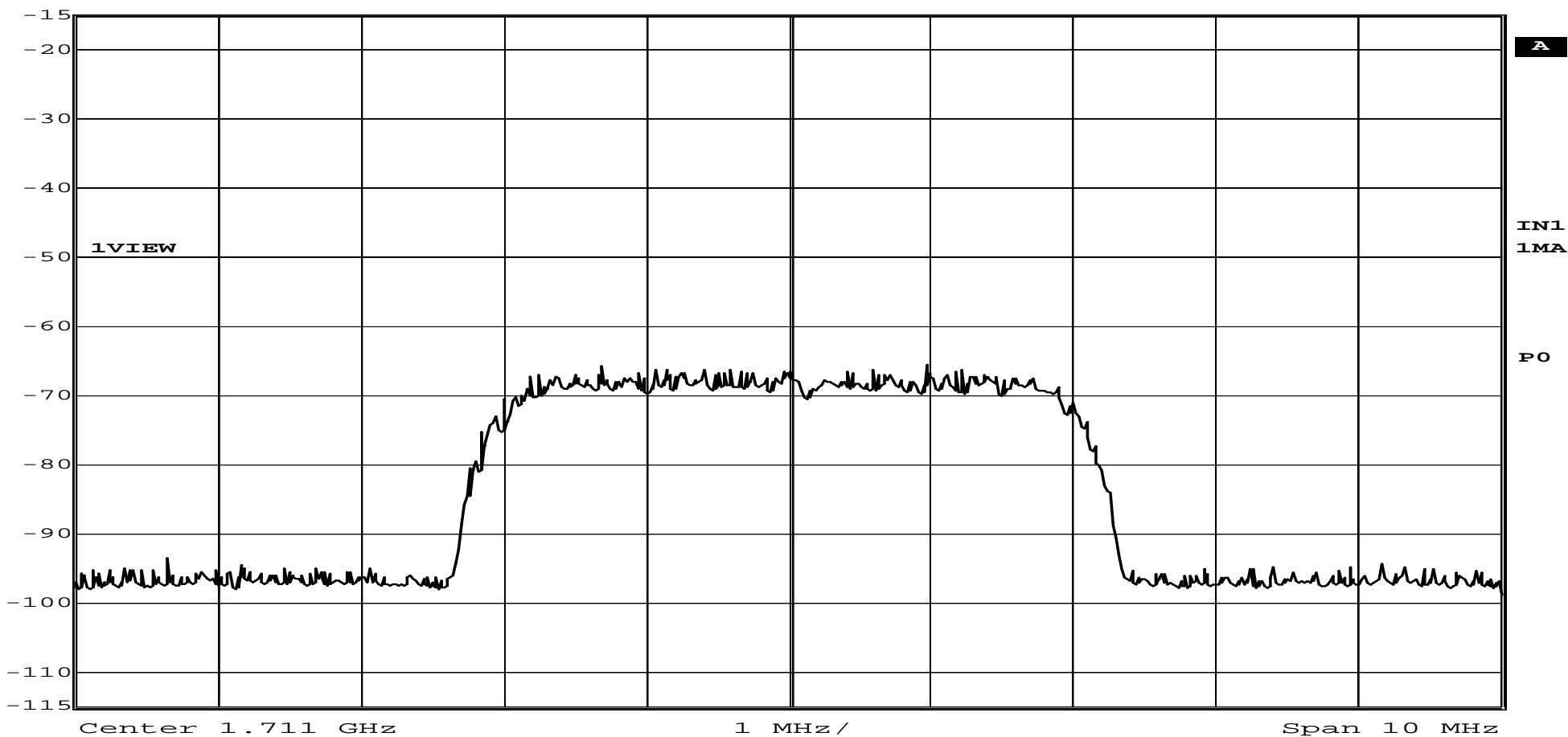
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Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Input at 1711 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



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# RETLIF TESTING LABORATORIES

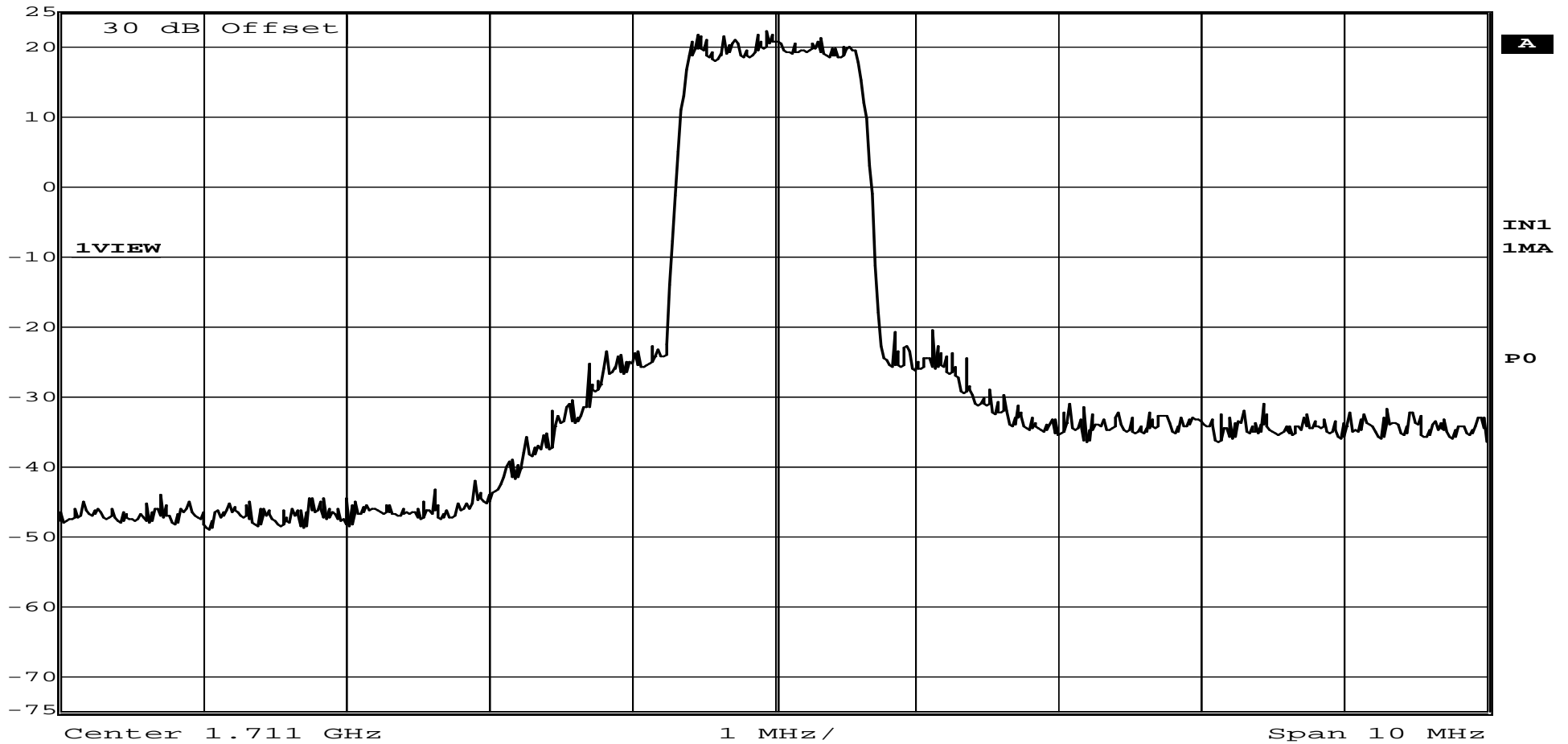
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Test Method:	Occupied Bandwidth		
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Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink - Output at 1711 MHz		



Ref Lvl  
25 dBm

RBW	30 kHz	RF Att	20 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:17:10

# RETLIF TESTING LABORATORIES

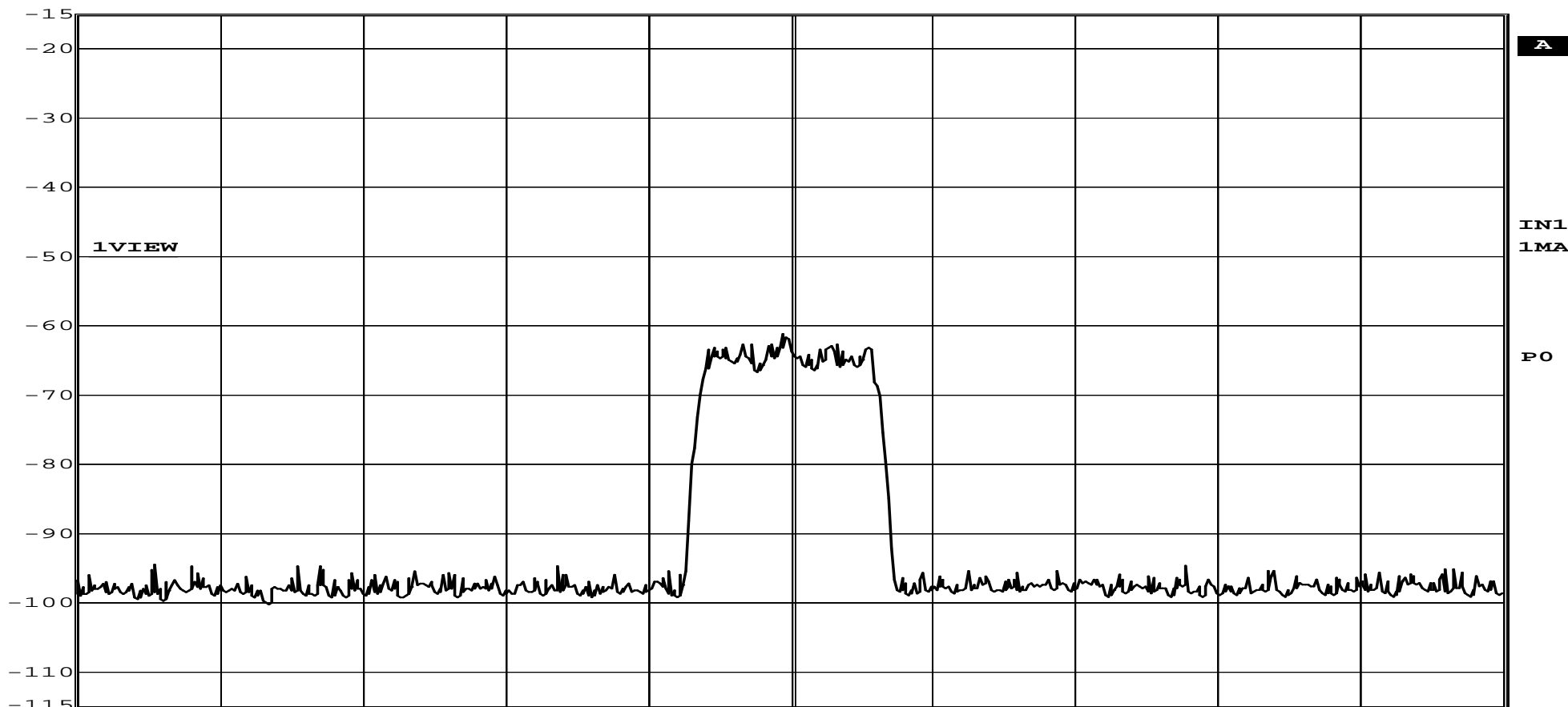
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Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink - Input at 1711 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Center 1.711 GHz

1 MHz/

Span 10 MHz

Date: 4.OCT.2010 13:37:21

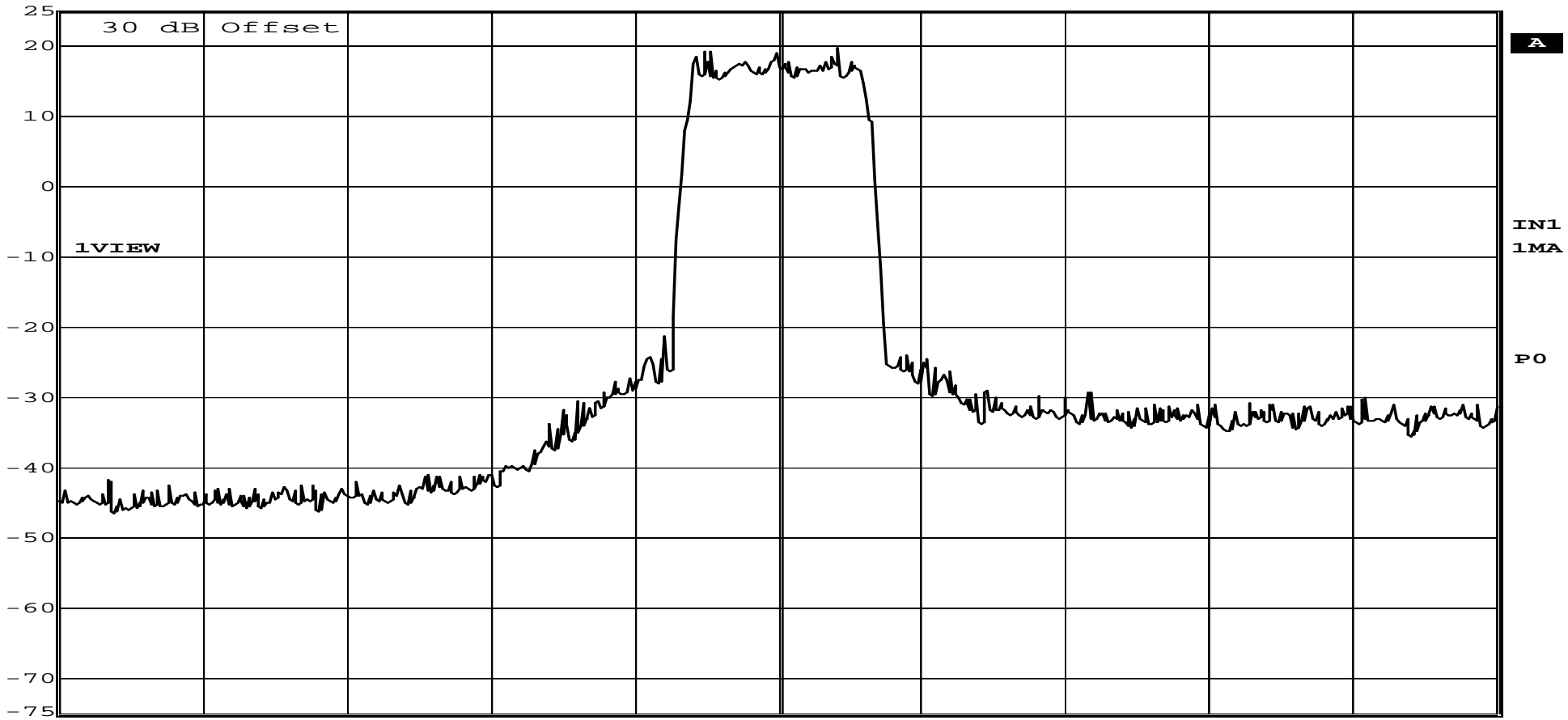
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5372N		
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
9/29/2010			
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink - Output at 2111 MHz		



Ref Lvl 25 dBm	RBW 30 kHz	RF Att 20 dB	Mixer -10 dBm
30 dB Offset	VBW 100 kHz	Unit dBm	
	SWT 28 ms		



Date: 4.OCT.2010 13:19:49

# RETLIF TESTING LABORATORIES

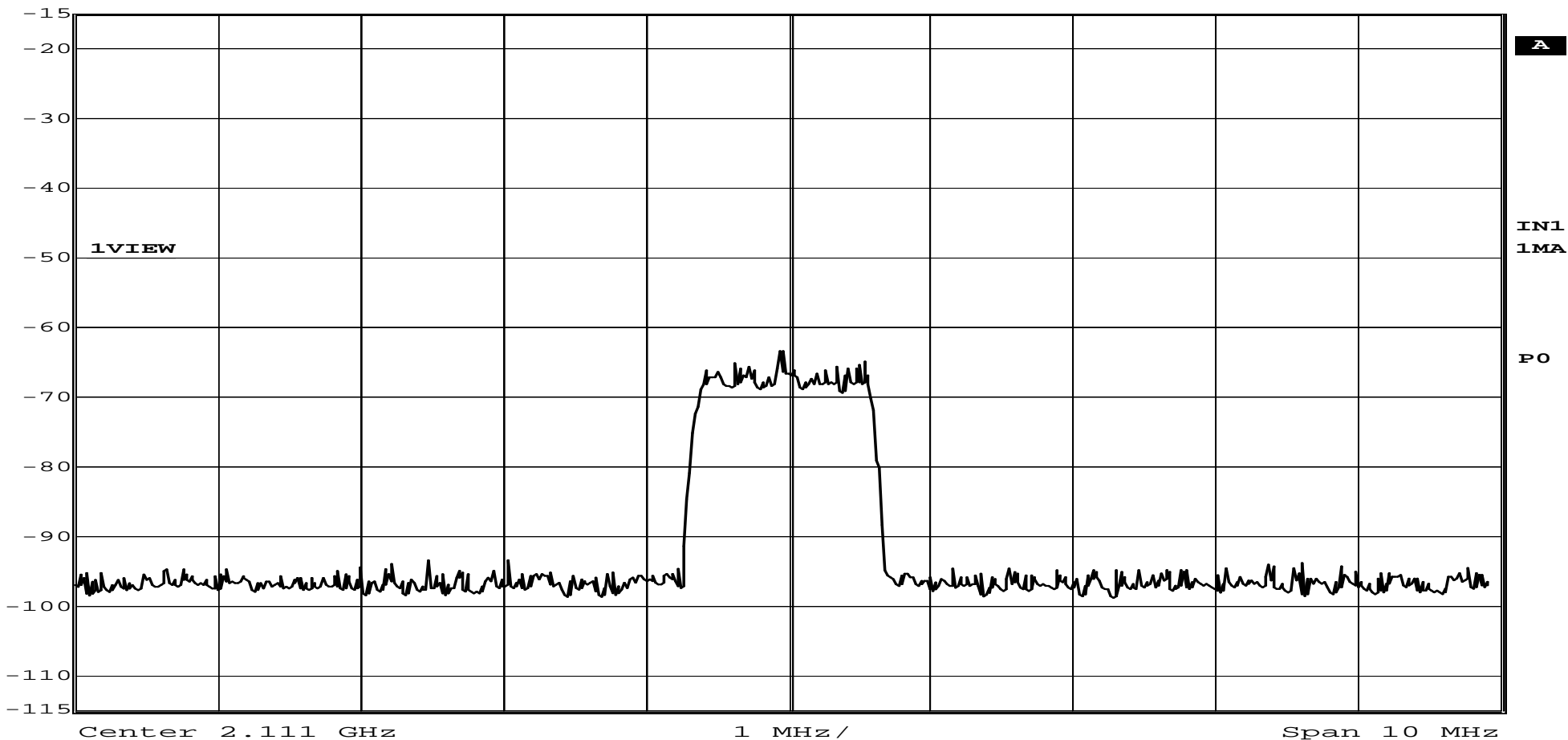
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink - Input at 2111 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:38:53

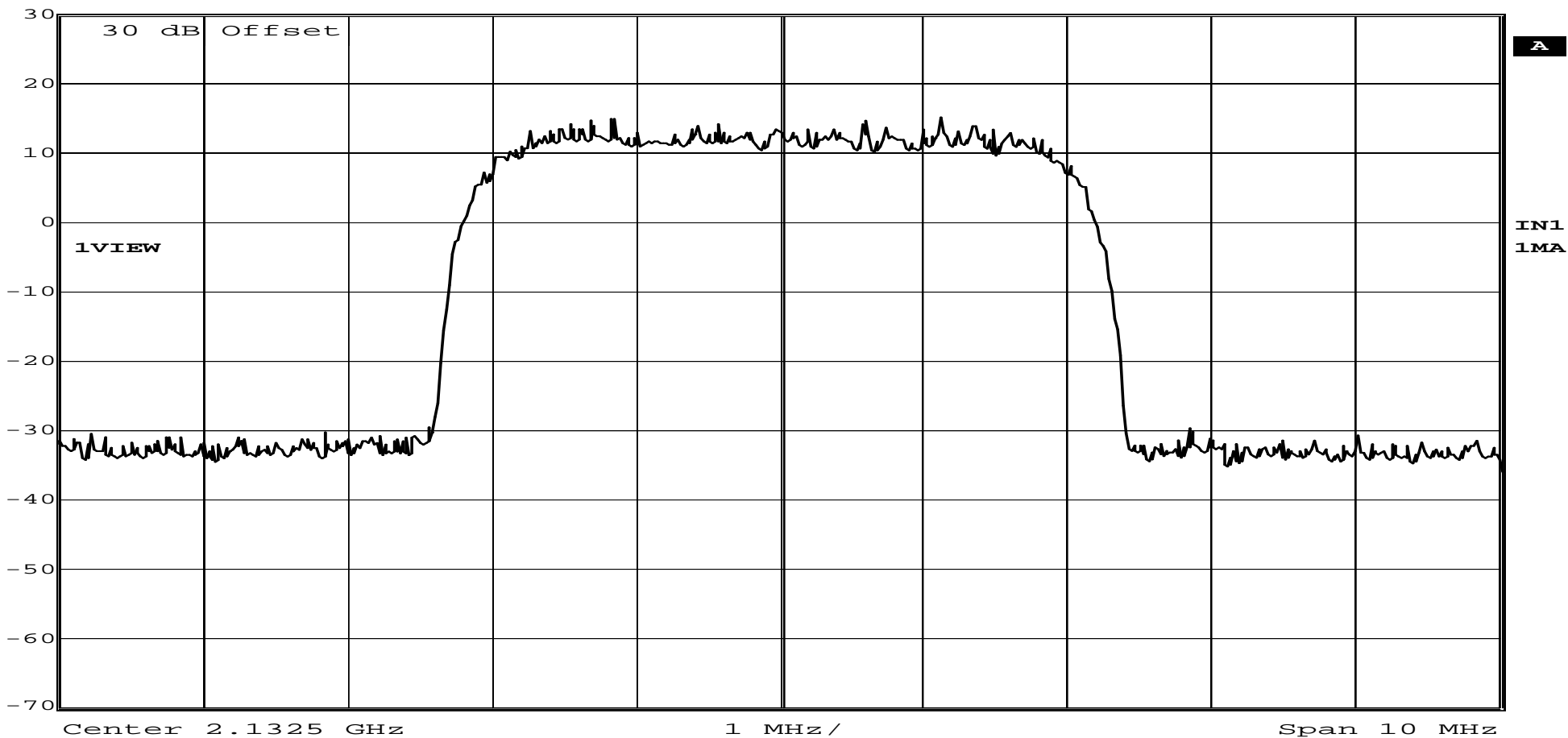
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Output at 2132.5 MHz		



Ref Lvl 30 dBm	RBW 30 kHz	RF Att 10 dB	
	VBW 100 kHz		
	SWT 28 ms	Unit	dBm



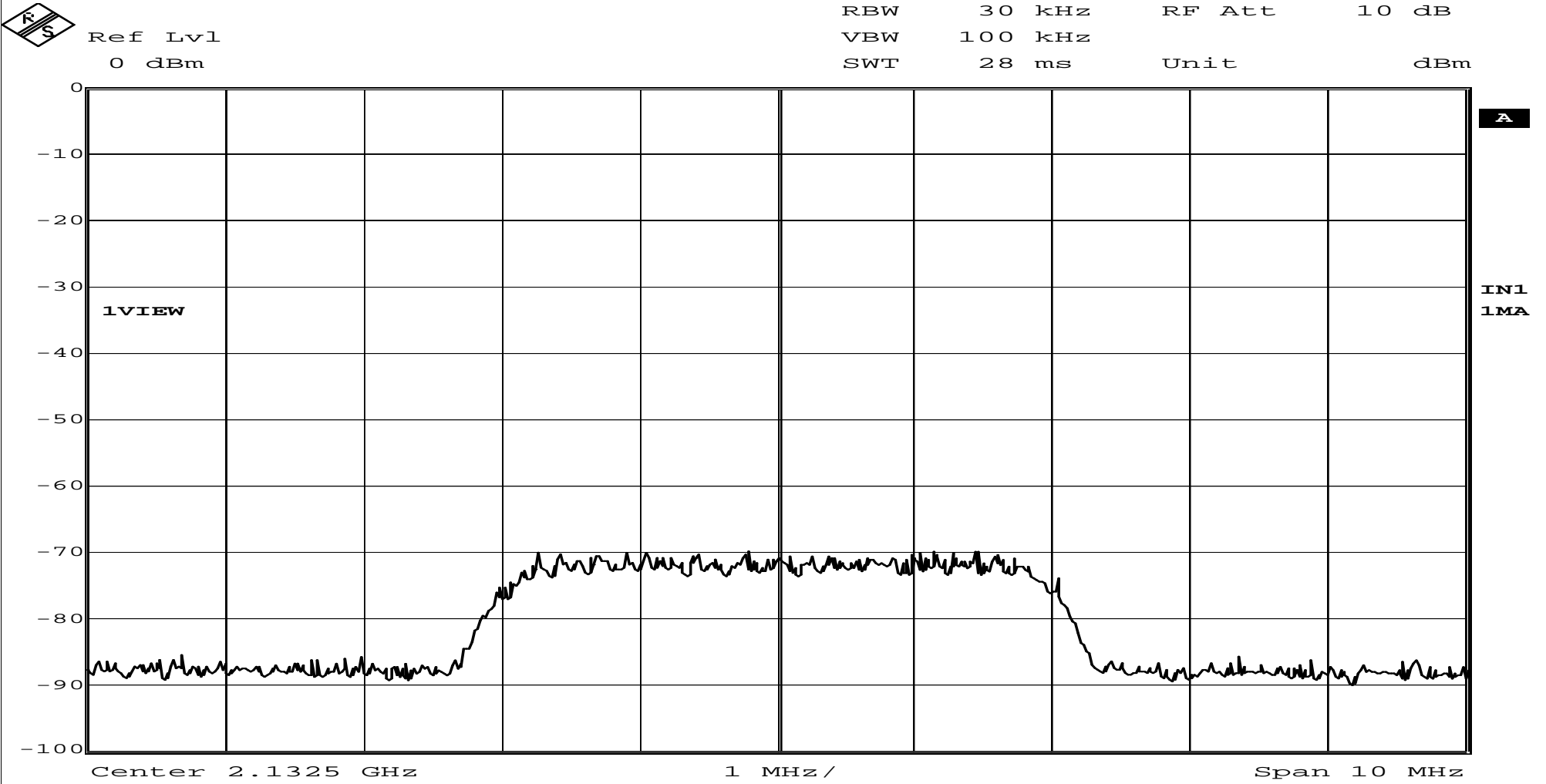
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# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input at 2132.5 MHz		



Date: 29.SEP.2010 11:39:22

# RETLIF TESTING LABORATORIES

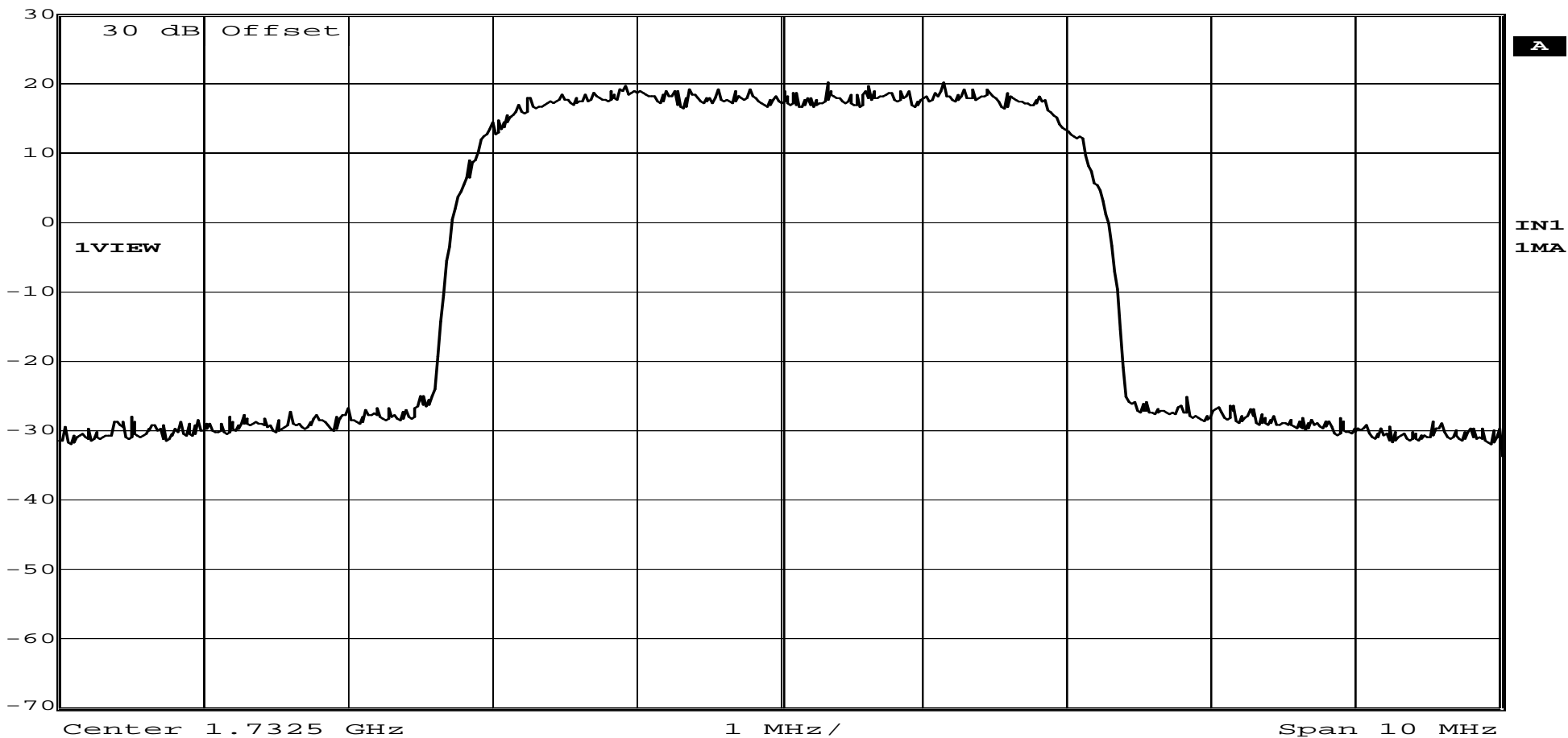
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Output at 1732.5 MHz		



Ref Lvl  
30 dBm

RBW 30 kHz RF Att 10 dB  
 VBW 100 kHz  
 SWT 28 ms Unit dBm

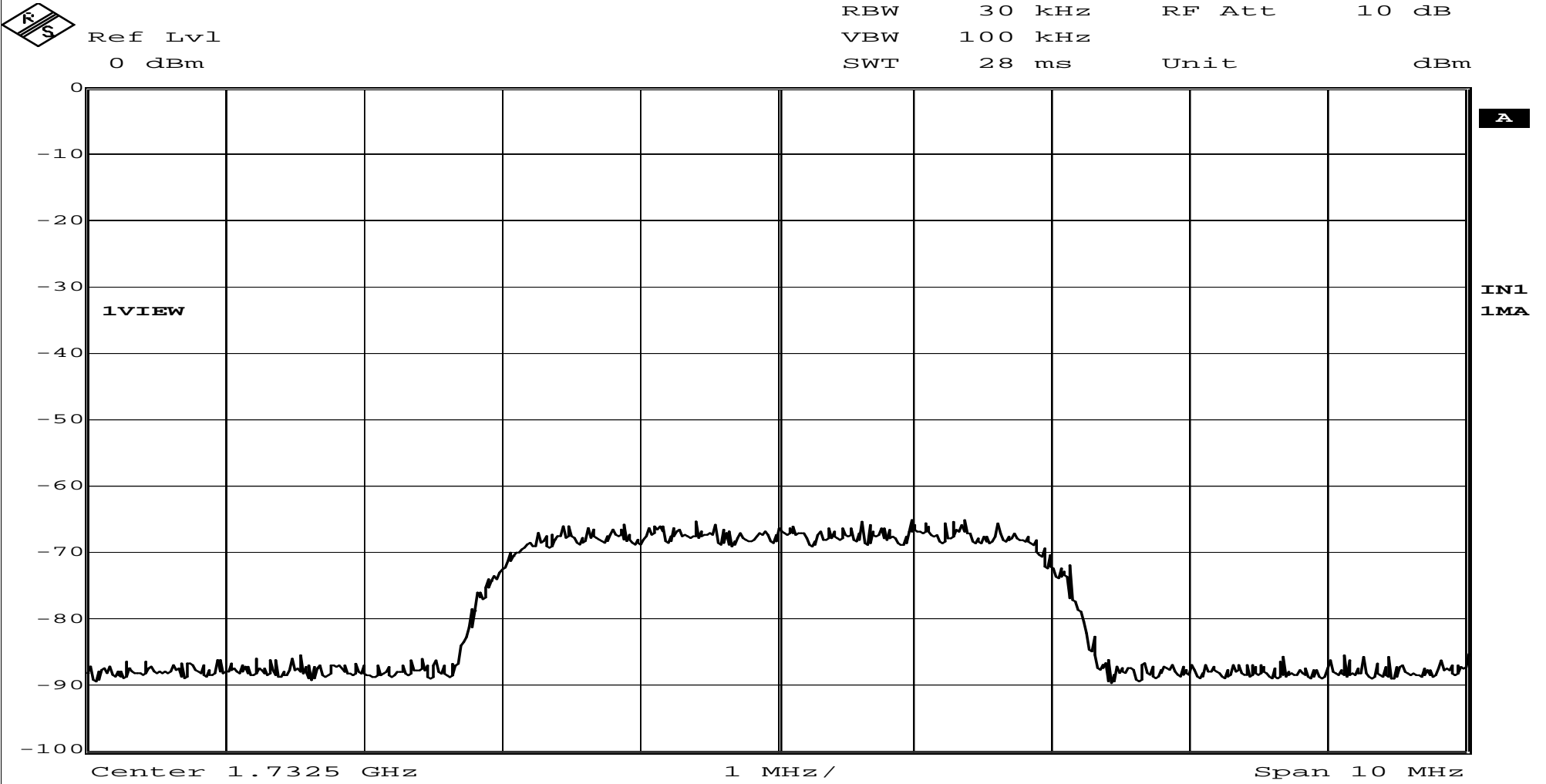


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# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Input at 1732.5 MHz		

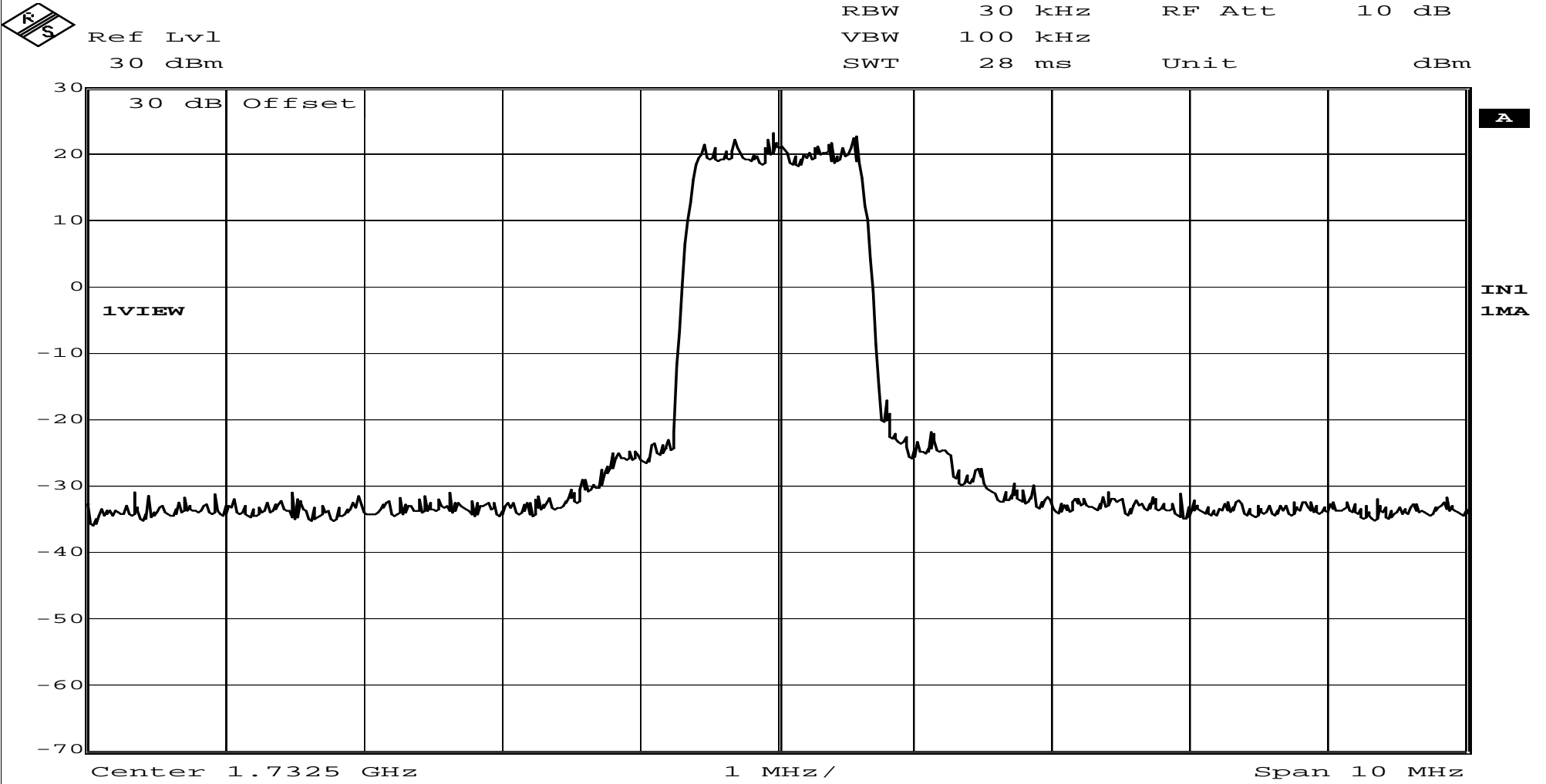


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# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink - Output at 1732.5 MHz		

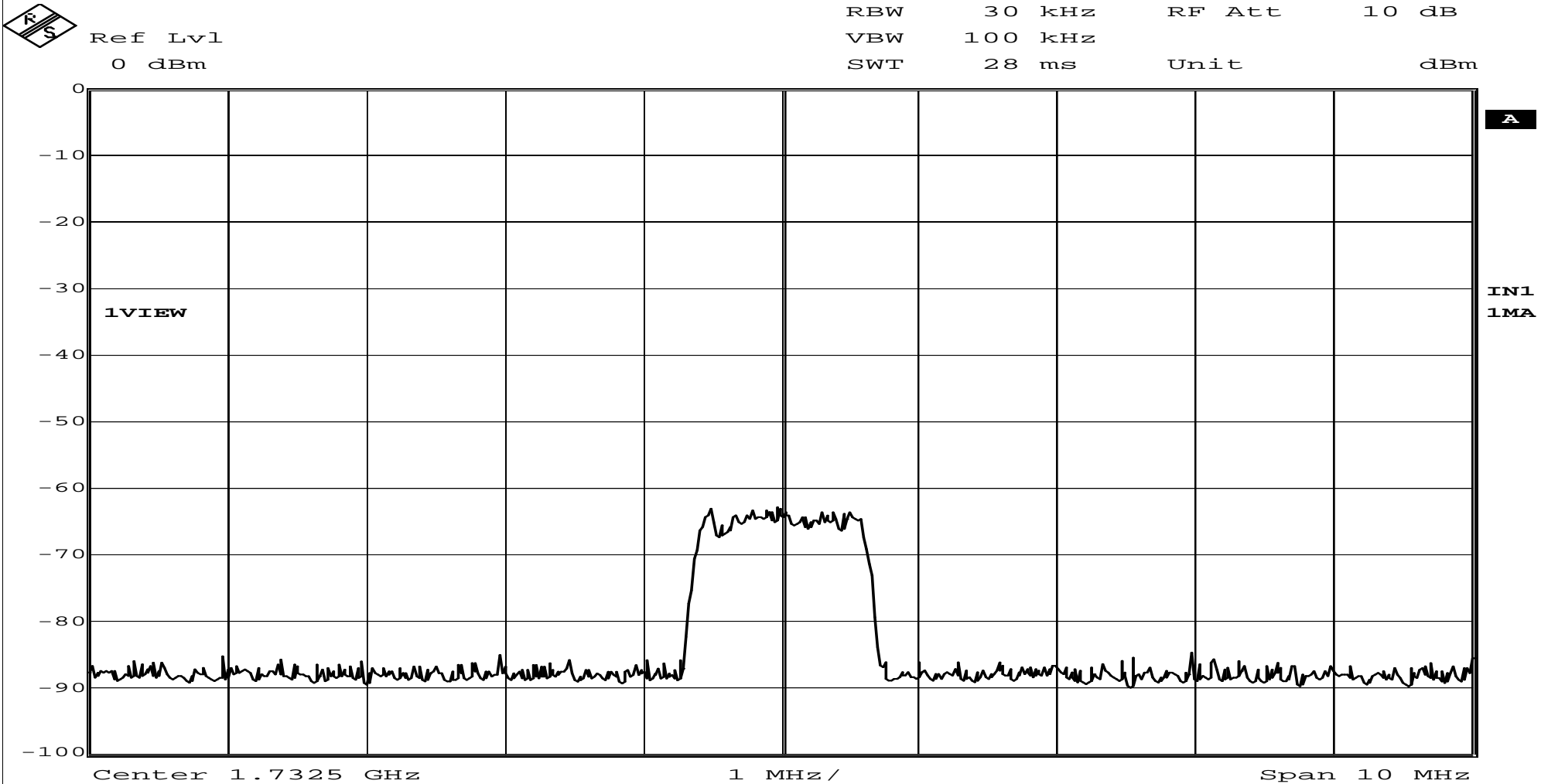


Date: 29.SEP.2010 11:33:23

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth			
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A	
Test Specification:	FCC Part 2	Paragraph:	2.1049	
Operating Mode:	Amplifying input signal			
Notes:	CDMA2000 - Uplink - Input at 1732.5 MHz			
Job No:	R-5372N		Technician:	M.Seamans
Date:	9/29/2010			

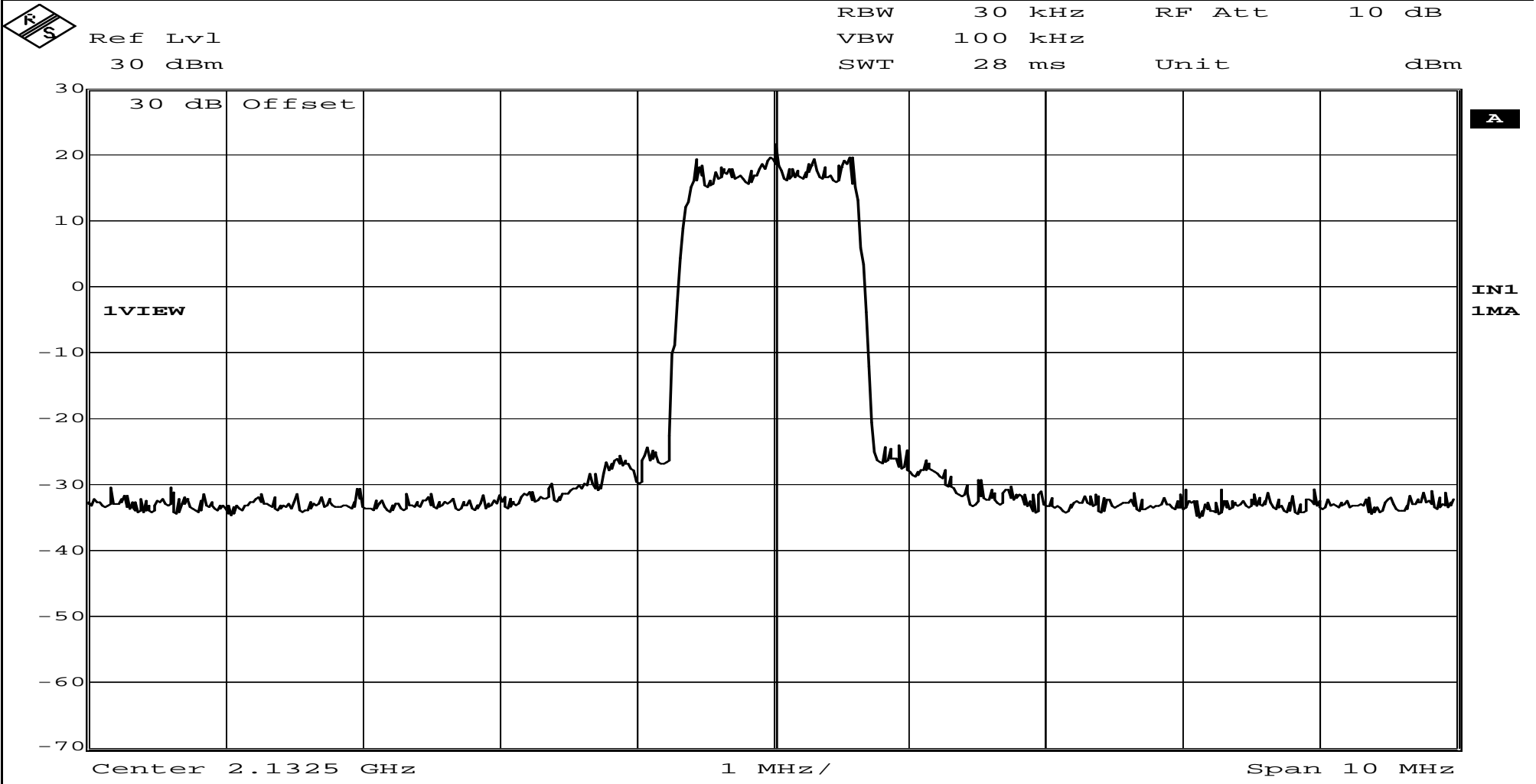


Date: 29.SEP.2010 11:41:44

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5372N		
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
9/29/2010			
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlnk - Output at 2132.5 MHz		



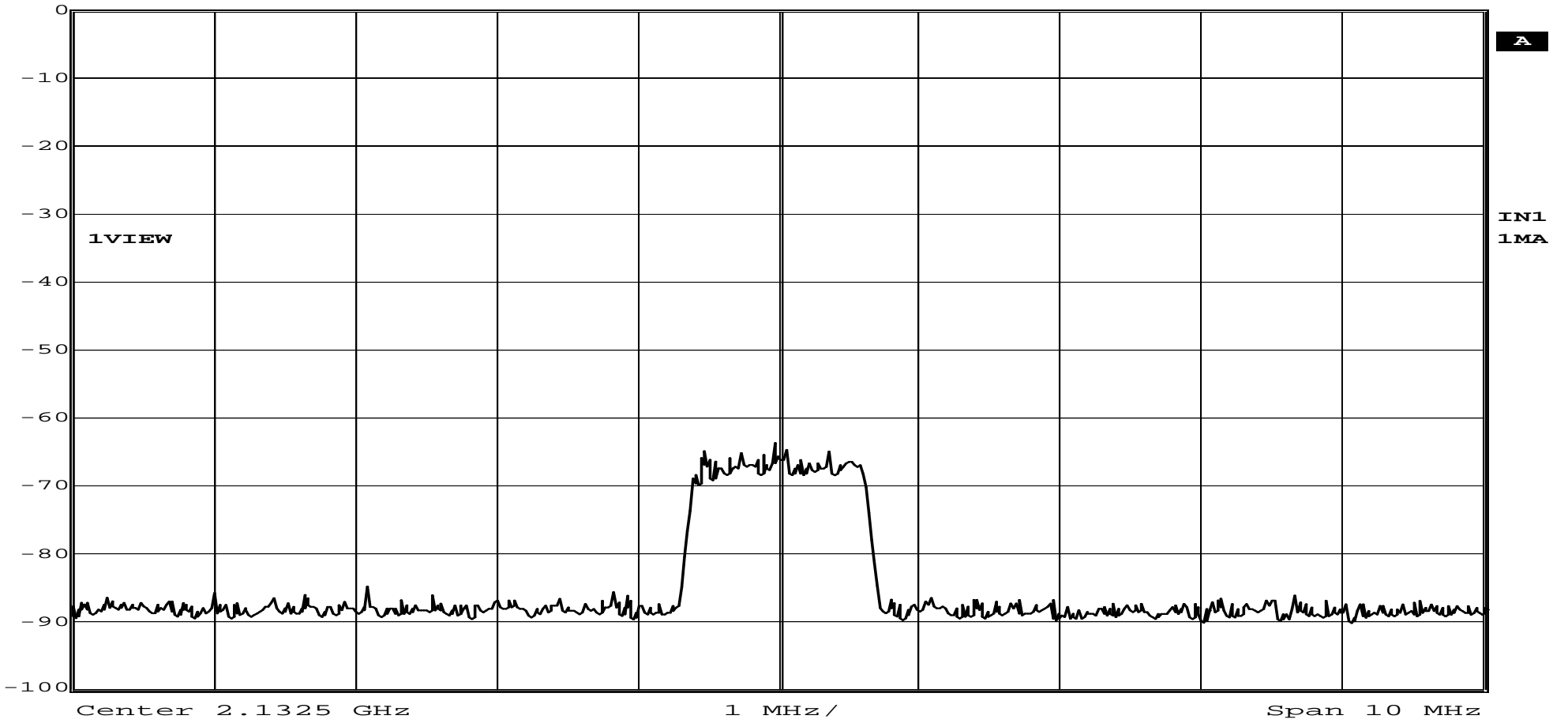
Date: 29.SEP.2010 11:35:16

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink - Input at 2132.5 MHz		

Ref Lvl 0 dBm	RBW      30 kHz VBW      100 kHz SWT      28 ms	RF Att    10 dB  Unit	dBm
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Date: 29.SEP.2010 11:42:42

# RETLIF TESTING LABORATORIES

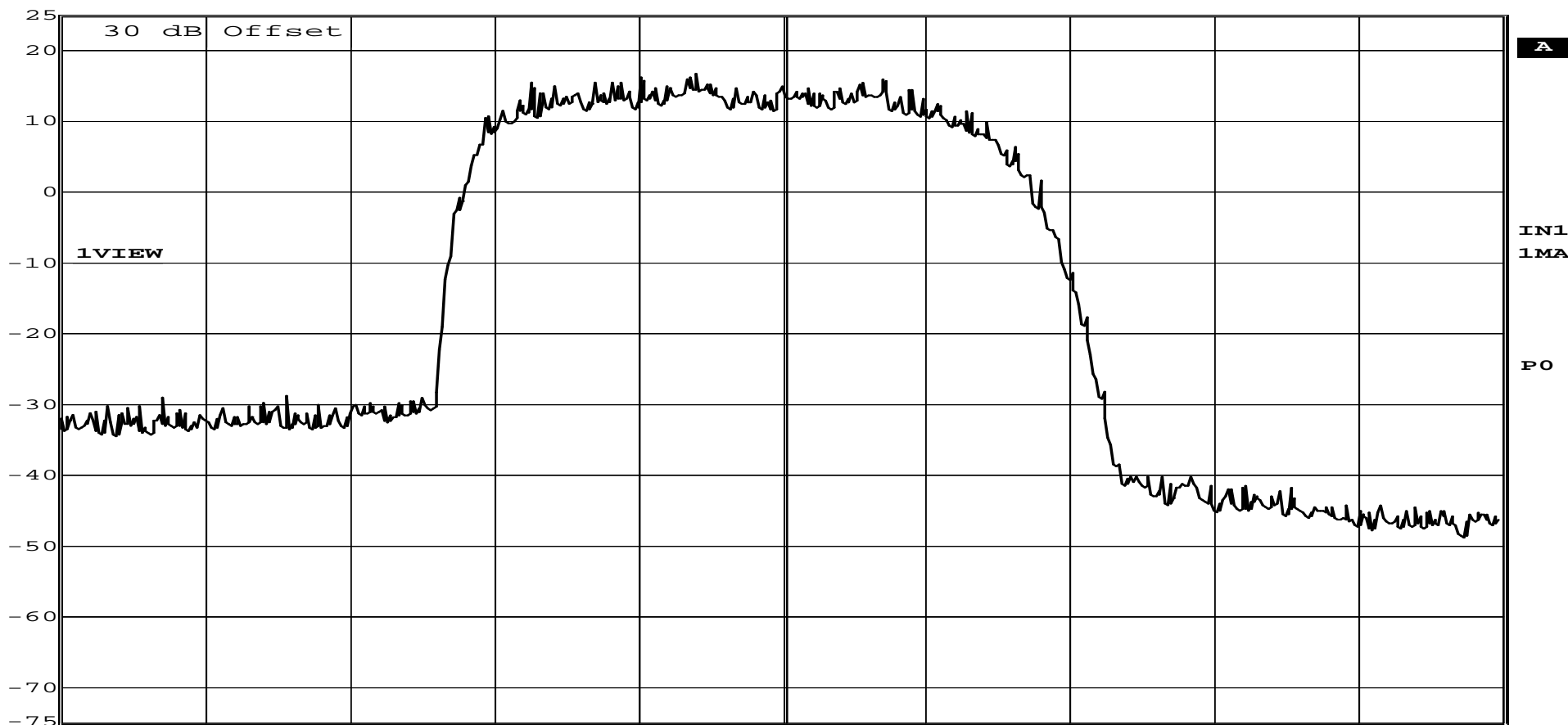
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Output at 2154 MHz		



Ref Lvl  
25 dBm

RBW	30 kHz	RF Att	20 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Center 2.154 GHz

1 MHz/

Span 10 MHz

Date: 4.OCT.2010 13:21:34



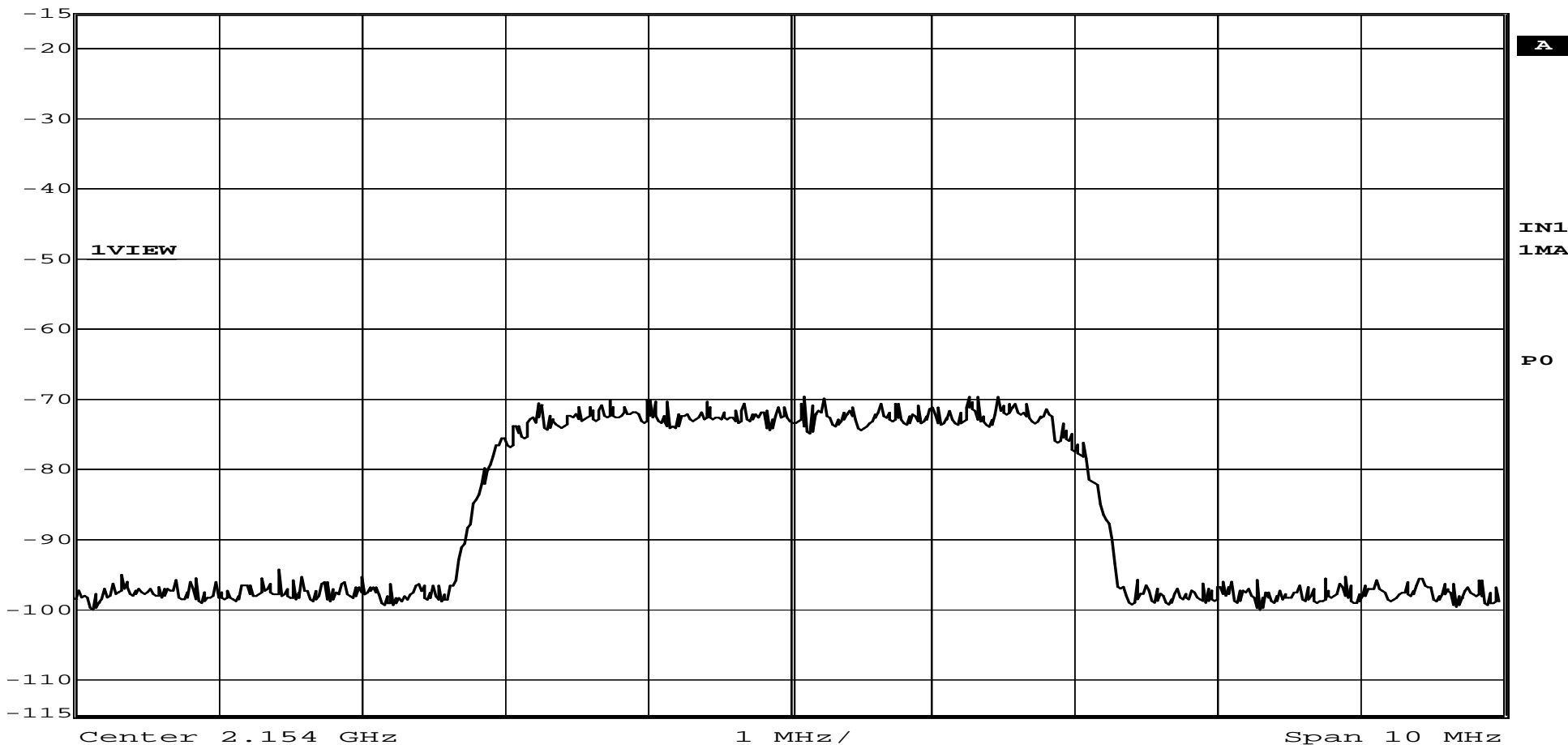
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink - Input at 2154 MHz		



Ref Lvl	-15 dBm	RBW	30 kHz	RF Att	0 dB
		VBW	100 kHz	Mixer	-10 dBm
		SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:34:38

# RETLIF TESTING LABORATORIES

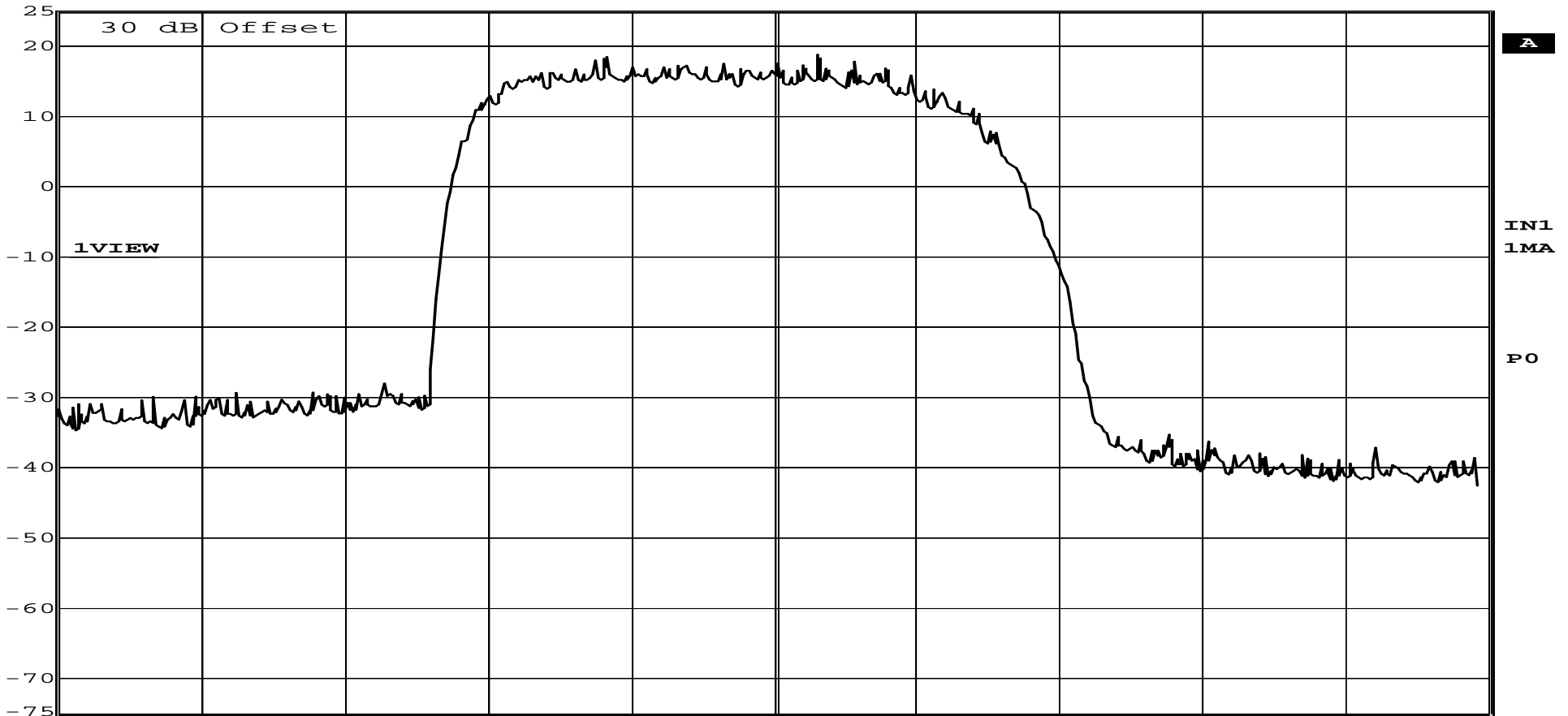
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Output at 1754 MHz		



Ref Lvl  
25 dBm

RBW	30 kHz	RF Att	20 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:14:22

# RETLIF TESTING LABORATORIES

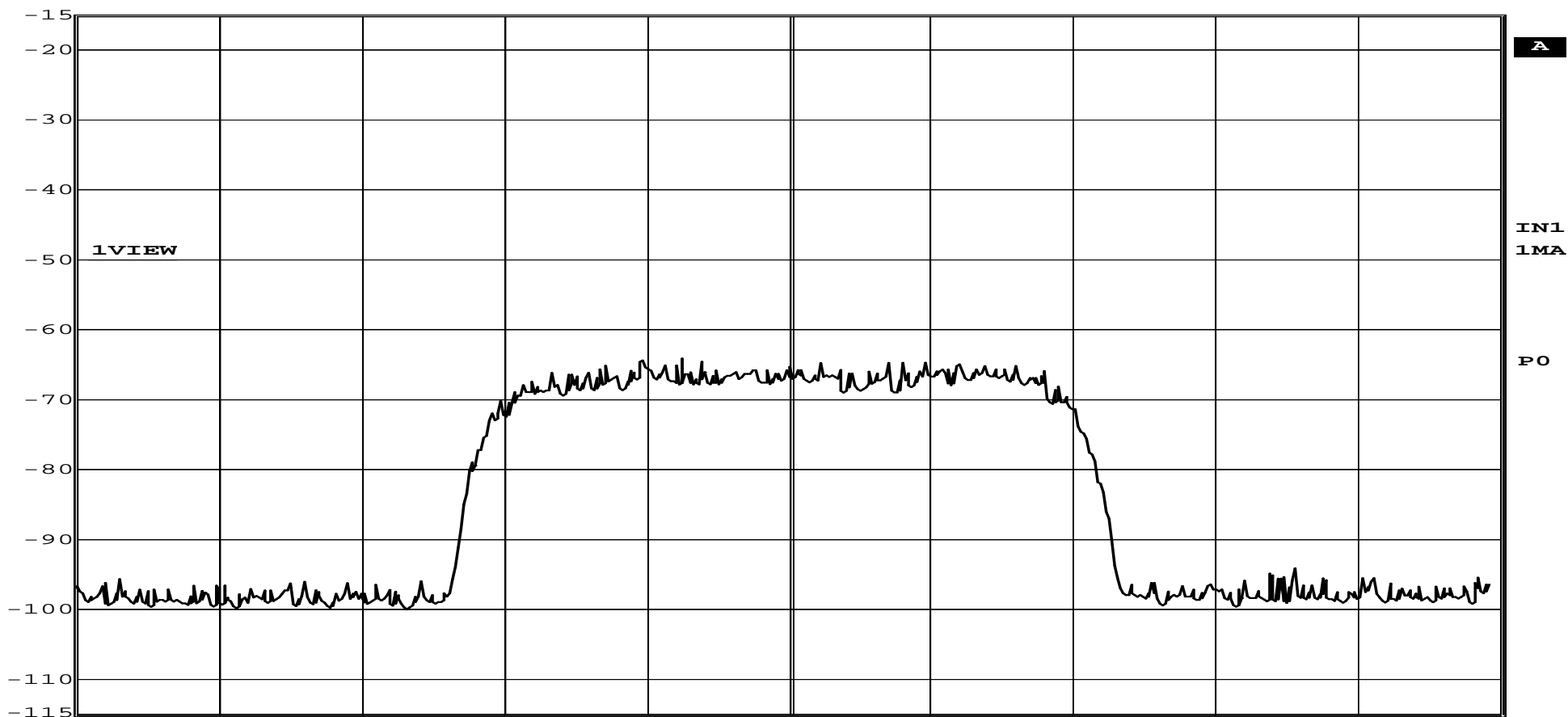
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1049
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink - Input at 1754 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Center 1.754 GHz      1 MHz/      Span 10 MHz

Date: 4.OCT.2010 13:35:57

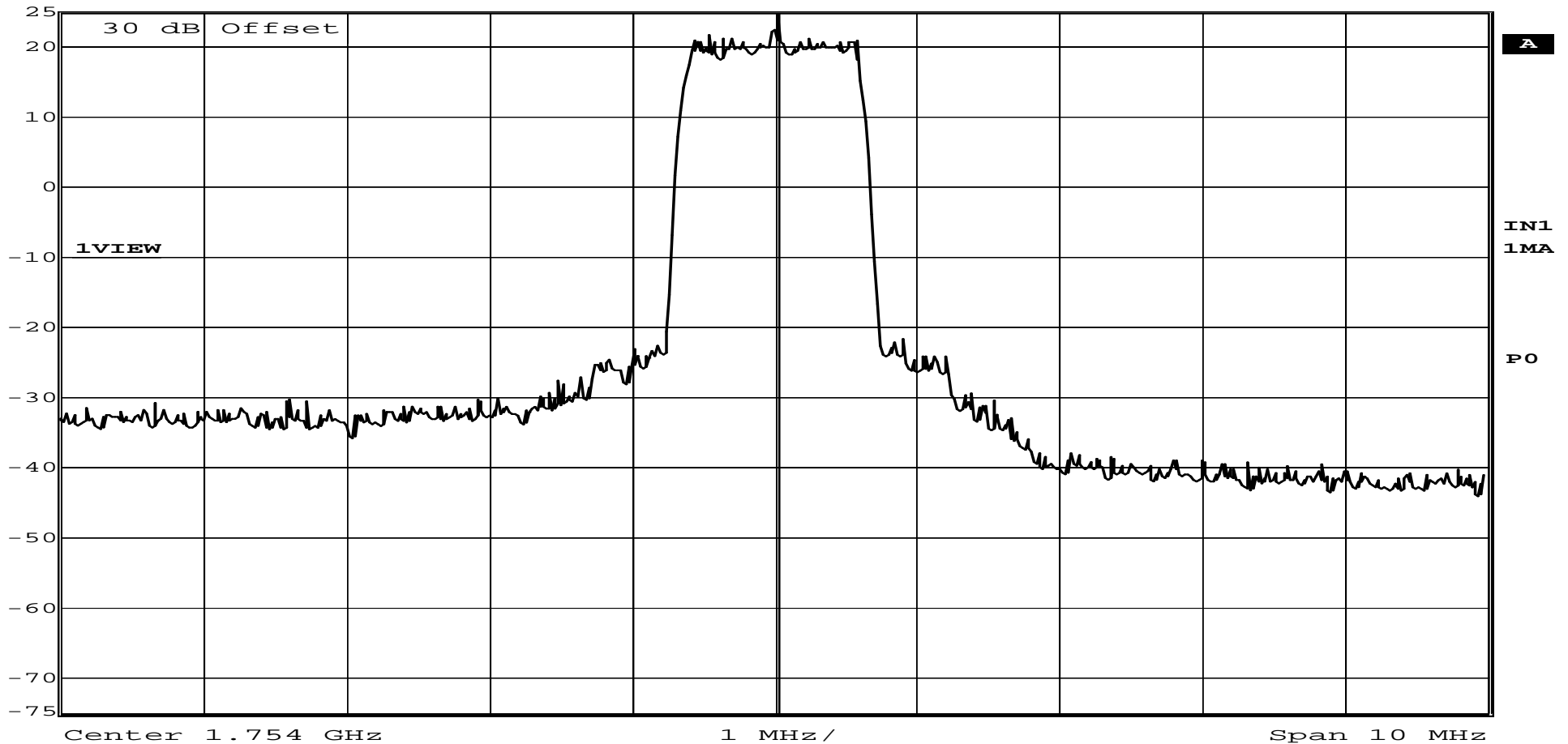
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date:
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink - Output at 1754 MHz		



Ref Lvl 25 dBm	RBW 30 kHz	RF Att 20 dB	Unit dBm
	VBW 100 kHz	Mixer -10 dBm	
	SWT 28 ms		



Date: 4.OCT.2010 13:16:37

# RETLIF TESTING LABORATORIES

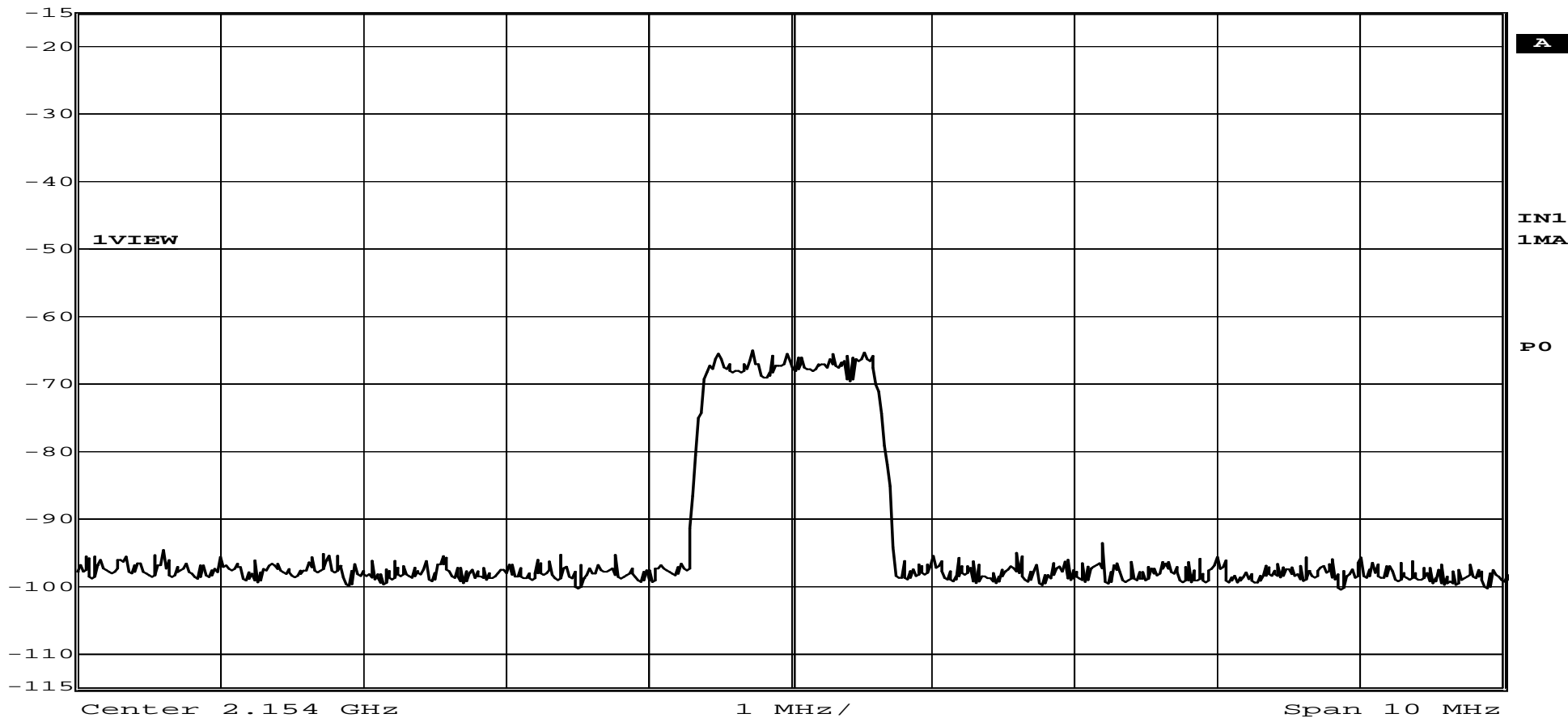
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink - Input at 1754 MHz		



Ref Lvl  
-15 dBm

RBW	30 kHz	RF Att	0 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm



Date: 4.OCT.2010 13:38:03

# RETLIF TESTING LABORATORIES

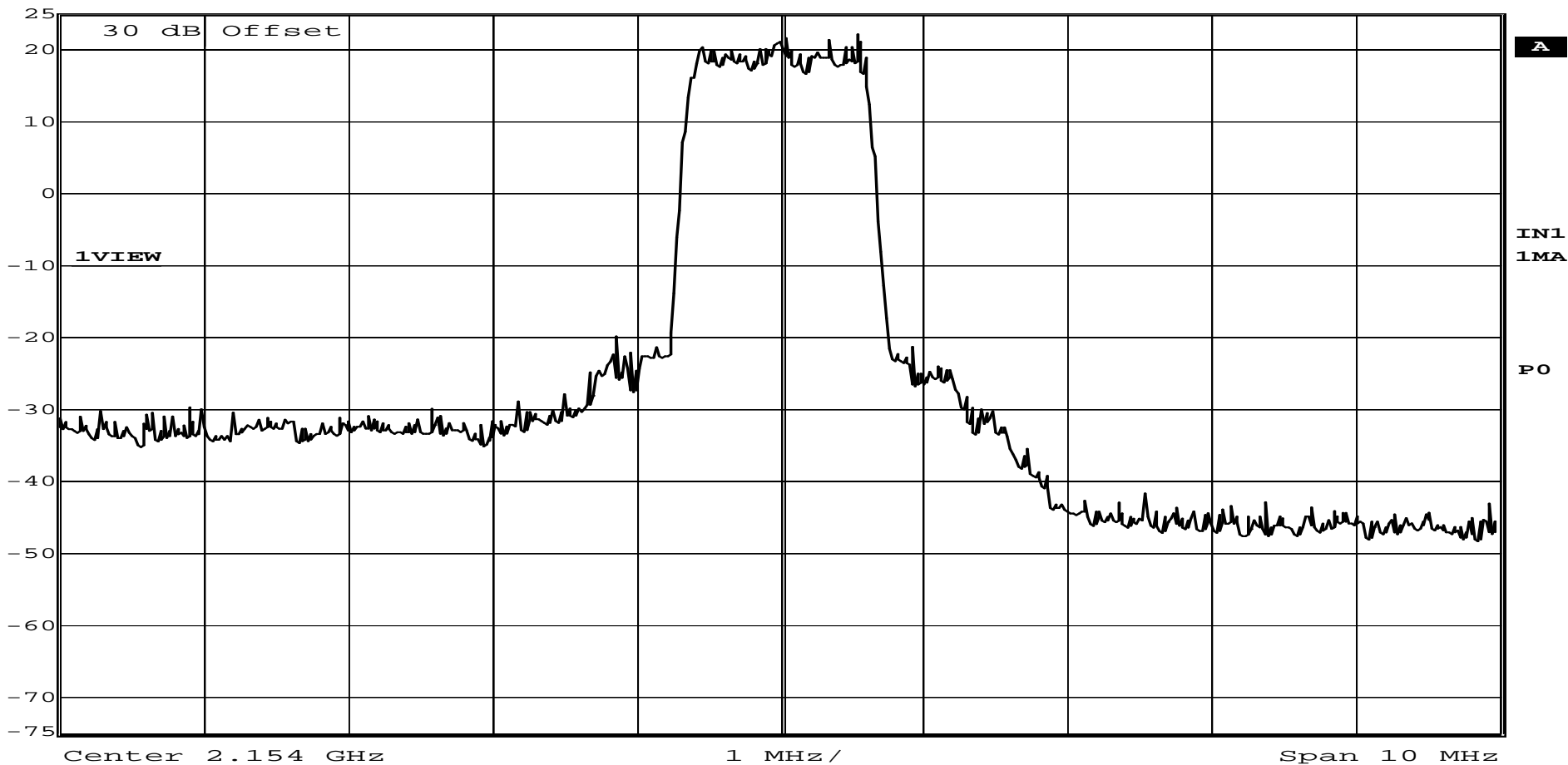
## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink - Output at 2154 MHz		



Ref Lvl  
25 dBm

RBW	30 kHz	RF Att	20 dB
VBW	100 kHz	Mixer	-10 dBm
SWT	28 ms	Unit	dBm

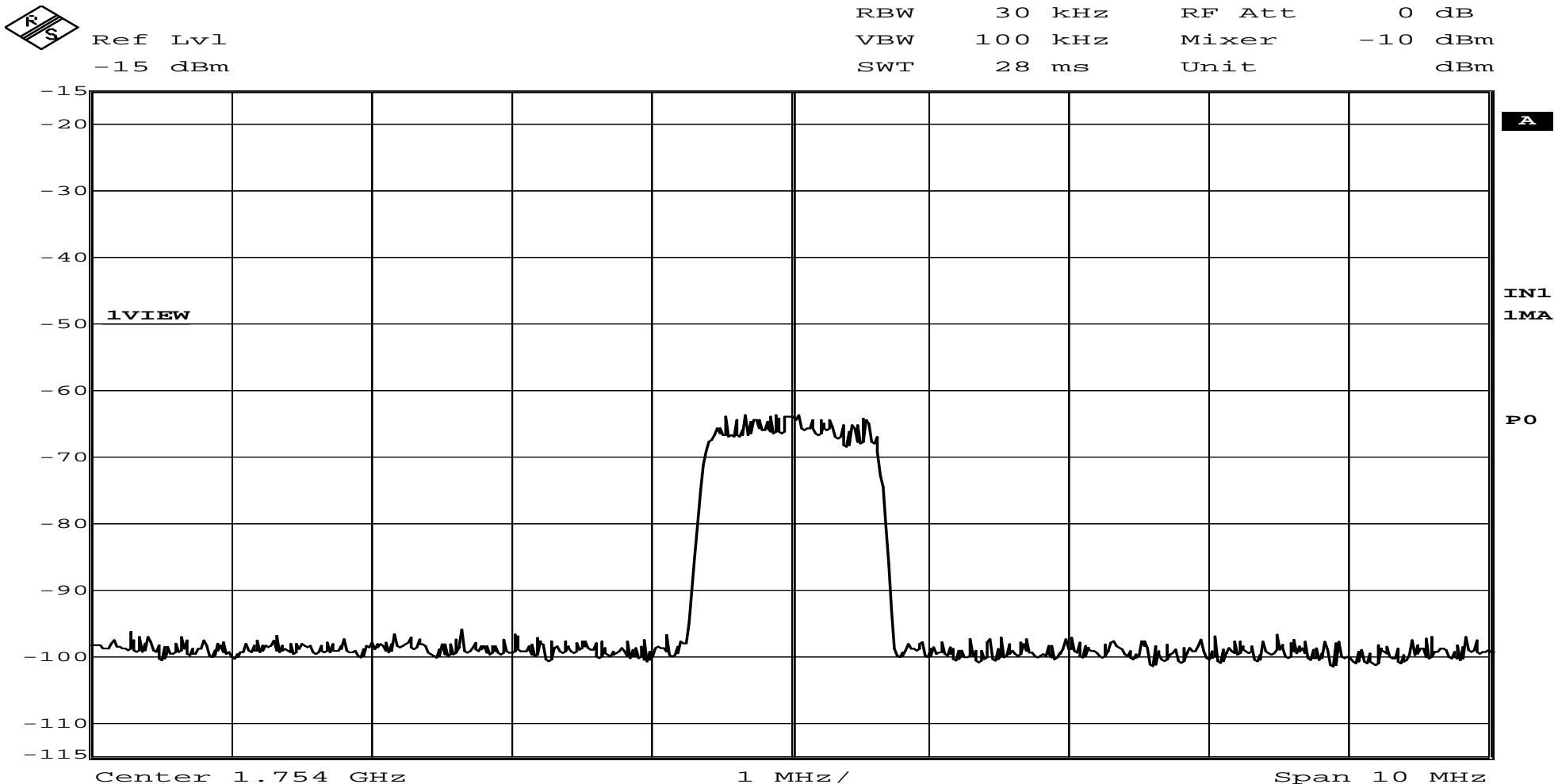


Date: 4.OCT.2010 13:20:48

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1049	Date: 9/29/2010
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink - Input at 2154 MHz		



Date: 4.OCT.2010 13:36:45

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<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>	9/29/2010
<b>Notes:</b>	Uplink Frequency: 1711 - 1755 MHz      Downlink Frequency: 2111 -2155 MHz CDMA2000 modulation      *-33.00dBm is the Noise floor of instrument		

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	
-55.00	1711.00				-57.00	2111.00				
		3422.00	-33.00	-13.0			4222.00	-33.00	-13.0	
		5133.00	-33.00				6333.00	-33.00		
		6844.00	-33.00				8444.00	-33.00		
		8555.00	-33.00				10555.00	-33.00		
		10266.00	-33.00				12666.00	-33.00		
		11977.00	-33.00				14777.00	-33.00		
		13688.00	-33.00				16888.00	-33.00		
		15399.00	-33.00				18999.00	-33.00		
-55.00	1711.00	17110.00	-33.00	-13.0	-57.00	2111.00	21110.00	-33.00	-13.0	
-55.00	1732.50				-57.00	2132.50				
		3465.00	-33.00	-13.0			4265.00	-33.00	-13.0	
		5197.50	-33.00				6397.50	-33.00		
		6930.00	-33.00				8530.00	-33.00		
		8662.50	-33.00				10662.50	-33.00		
		10395.00	-33.00				12795.00	-33.00		
		12127.50	-33.00				14927.50	-33.00		
		13860.00	-33.00				17060.00	-33.00		
		15592.50	-33.00				19192.50	-33.00		
-55.00	1732.50	17325.00	-33.00	-13.0	-57.00	2132.50	21325.00	-33.00	-13.0	
-55.00	1754.00				-57.00	2154.00				
		3508.00	-33.00	-13.0			4308.00	-33.00	-13.0	
		5262.00	-33.00				6462.00	-33.00		
		7016.00	-33.00				8616.00	-33.00		
		8770.00	-33.00				10770.00	-33.00		
		10524.00	-33.00				12924.00	-33.00		
		12278.00	-33.00				15078.00	-33.00		
		14032.00	-33.00				17232.00	-33.00		
		15786.00	-33.00				19386.00	-33.00		
-55.00	1754.00	17540.00	-33.00	-13.0	-57.00	2154.00	21540.00	-33.00	-13.0	



# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<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>	9/29/2010
<b>Notes:</b>	Uplink Frequency: 1711 - 1755 MHz      Downlink Frequency: 2111 -2155 MHz WCDMA modulation      *-33.00dBm is the Noise floor of instrument		

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	
-53.50	1711.00				-57.00	2111.00				
		3422.00	-33.00	-13.0			4222.00	-33.00	-13.0	
		5133.00	-33.00				6333.00	-33.00		
		6844.00	-33.00				8444.00	-33.00		
		8555.00	-33.00				10555.00	-33.00		
		10266.00	-33.00				12666.00	-33.00		
		11977.00	-33.00				14777.00	-33.00		
		13688.00	-33.00				16888.00	-33.00		
		15399.00	-33.00				18999.00	-33.00		
-53.50	1711.00	17110.00	-33.00	-13.0	-57.00	2111.00	21110.00	-33.00	-13.0	
-53.50	1732.50				-57.00	2132.50				
		3465.00	-33.00	-13.0			4265.00	-33.00	-13.0	
		5197.50	-33.00				6397.50	-33.00		
		6930.00	-33.00				8530.00	-33.00		
		8662.50	-33.00				10662.50	-33.00		
		10395.00	-33.00				12795.00	-33.00		
		12127.50	-33.00				14927.50	-33.00		
		13860.00	-33.00				17060.00	-33.00		
		15592.50	-33.00				19192.50	-33.00		
-53.50	1732.50	17325.00	-33.00	-13.0	-57.00	2132.50	21325.00	-33.00	-13.0	
-53.50	1754.00				-57.00	2154.00				
		3508.00	-33.00	-13.0			4308.00	-33.00	-13.0	
		5262.00	-33.00				6462.00	-33.00		
		7016.00	-33.00				8616.00	-33.00		
		8770.00	-33.00				10770.00	-33.00		
		10524.00	-33.00				12924.00	-33.00		
		12278.00	-33.00				15078.00	-33.00		
		14032.00	-33.00				17232.00	-33.00		
		15786.00	-33.00				19386.00	-33.00		
-53.50	1754.00	17540.00	-33.00	-13.0	-57.00	2154.00	21540.00	-33.00	-13.0	

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Radiated Emissions (ERP) 30 MHz to 18 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	FCC Part 2.1053 <span style="float: right;">Paragraph: 2.1053</span>		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	10/1/2010
<b>Notes:</b>	Uplink Frequency Range: 1710 - 1755 MHz    Tested at 3 Input frequencies: 1711, 1732.5, 1754 MHz 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
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
18000.00	-	-	-	-				-	-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

## TABULAR DATA SHEET

<b>Test Method:</b>	RF Power Output		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	FCC Part 2 Paragraph: 2.1046		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	8/30/2010
<b>Notes:</b>	Uplink Frequency Range: 1710 - 1755 MHz    Downlink Frequency Range: 2110 - 2155 MHz    Modulation: CDMA2000		

Test Frequency	Measured Level	Level								
MHz	dBm	mW								
(Uplink) Low										
1742.00	32.84	1923.09								
(Uplink) Mid										
1732.50	32.14	1636.82								
(Uplink) High										
1750.40	33.03	2009.09								
(Downlink) Low										
2114.68	31.63	1455.5								
(Downlink) Mid										
2132.50	30.58	1142.9								
(Downlink) High										
2150.40	30.41	1099.0								

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

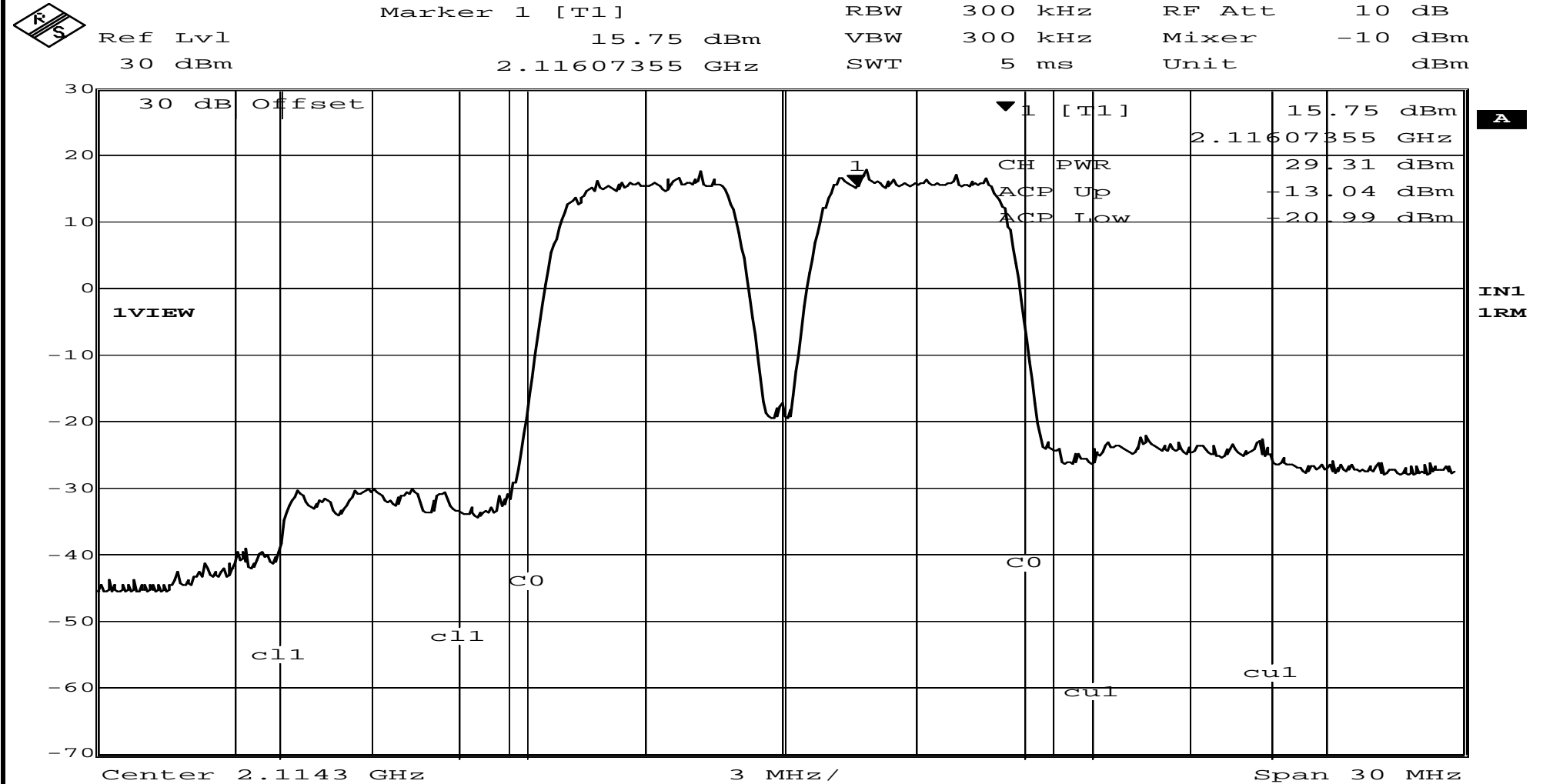
<b>Test Method:</b>	RF Power Output		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	FCC Part 2 Paragraph: 2.1046		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	8/30/2010
<b>Notes:</b>	Uplink Frequency Range: 1710 - 1755 MHz    Downlink Frequency Range: 2110 - 2155 MHz    Modulation: WCDMA		

Test Frequency	Measured Level	Level								
MHz	dBm	mW								
(Uplink) Low										
1743.00	30.73	1183.04								
(Uplink) Mid										
1732.50	29.62	916.22								
(Uplink) High										
1750.60	30.34	1081.43								
(Downlink) Low										
2114.30	29.31	853.1								
(Downlink) Mid										
2132.50	28.07	641.2								
(Downlink) High										
2150.70	28.31	677.6								

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink (2110-2155MHz)		

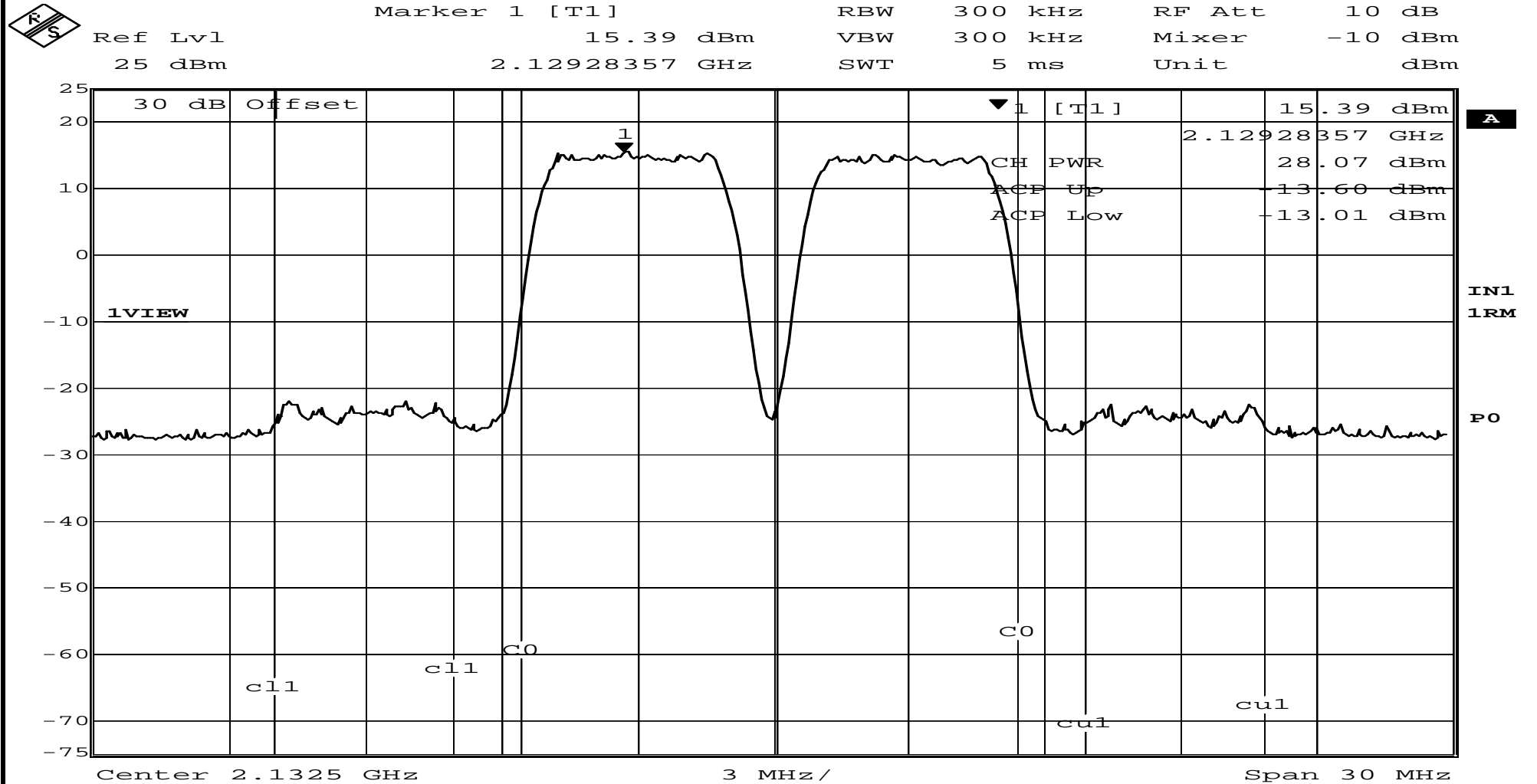


Date: 31.AUG.2010 15:44:23

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics				
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	Job No:	R-5372N
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A	Technician:	M.Seamans
Test Specification:	FCC Part 2	Paragraph:	2.1047	Date:	8/30/2010
Operating Mode:	Amplifying input signal				
Notes:	WCDMA - Downlink (2110-2155MHz)				



Date: 4.OCT.2010 12:17:07

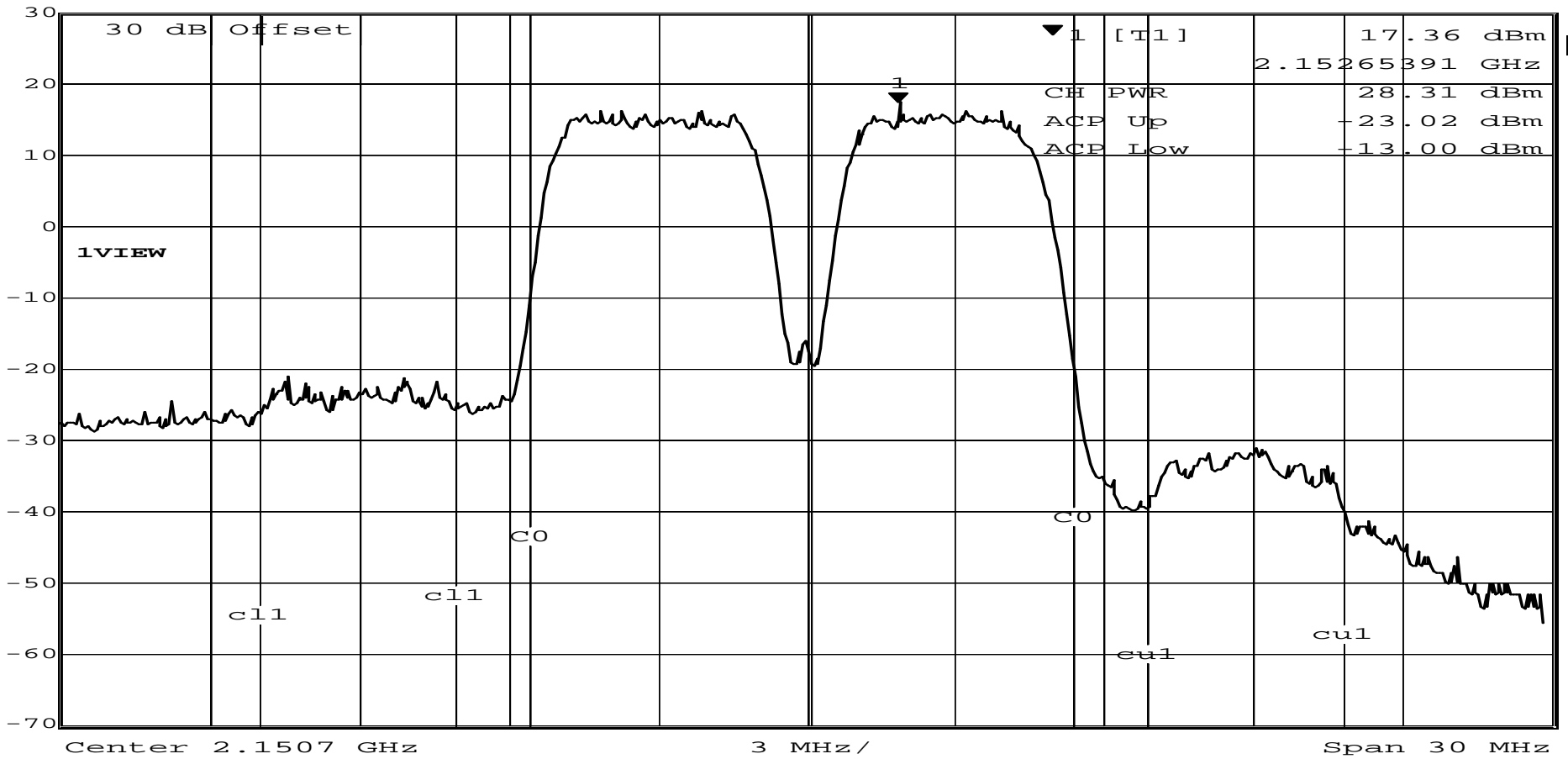
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Downlink (2110-2155MHz)		



Ref Lvl	30 dBm	Marker 1 [T1]	2.15265391 GHz	RBW	300 kHz	RF Att	10 dB
				VBW	300 kHz	Mixer	-10 dBm
				SWT	5 ms	Unit	dBm



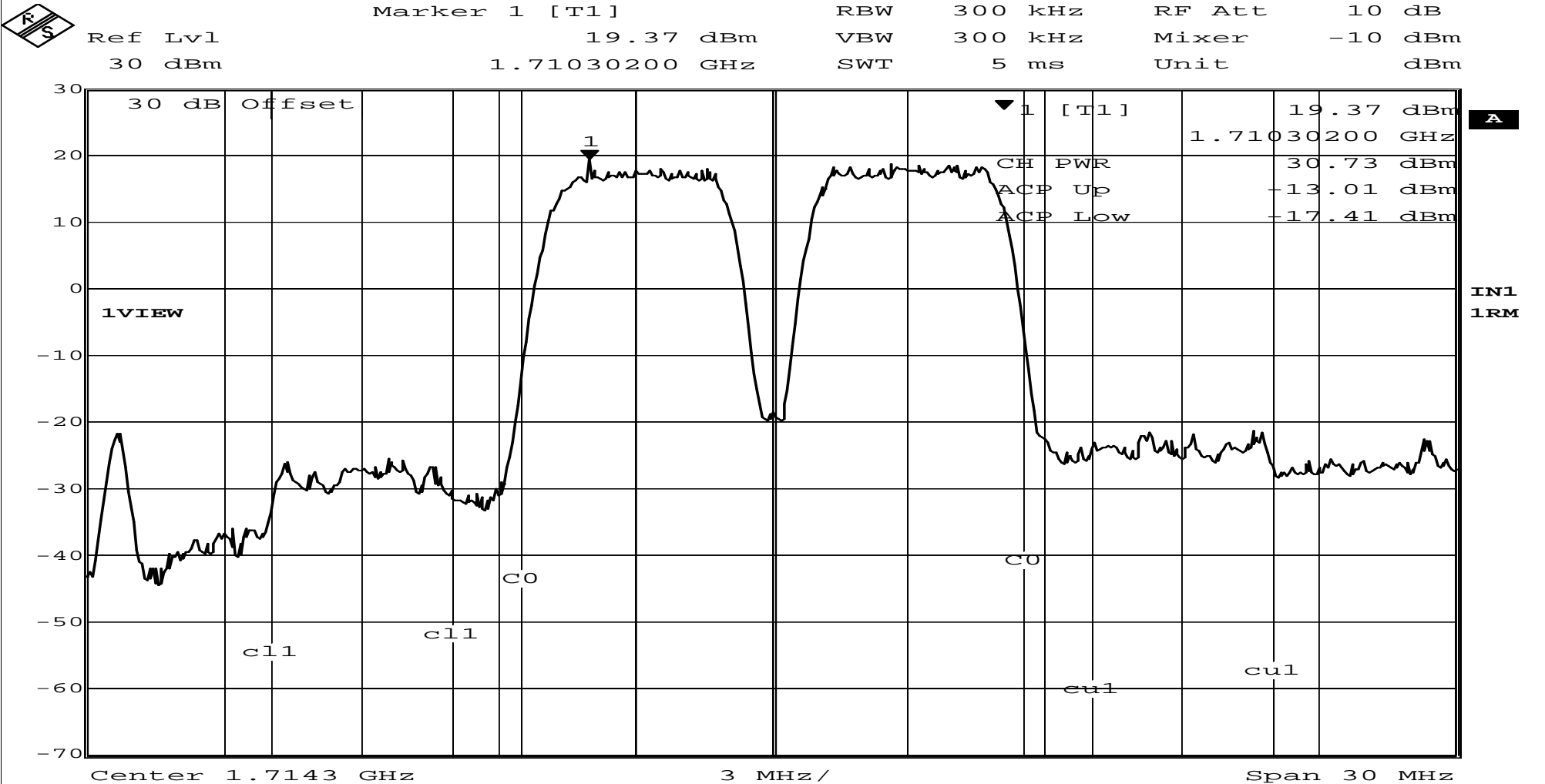
Date: 31.AUG.2010 15:41:44



# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink (1710-1755MHz)		

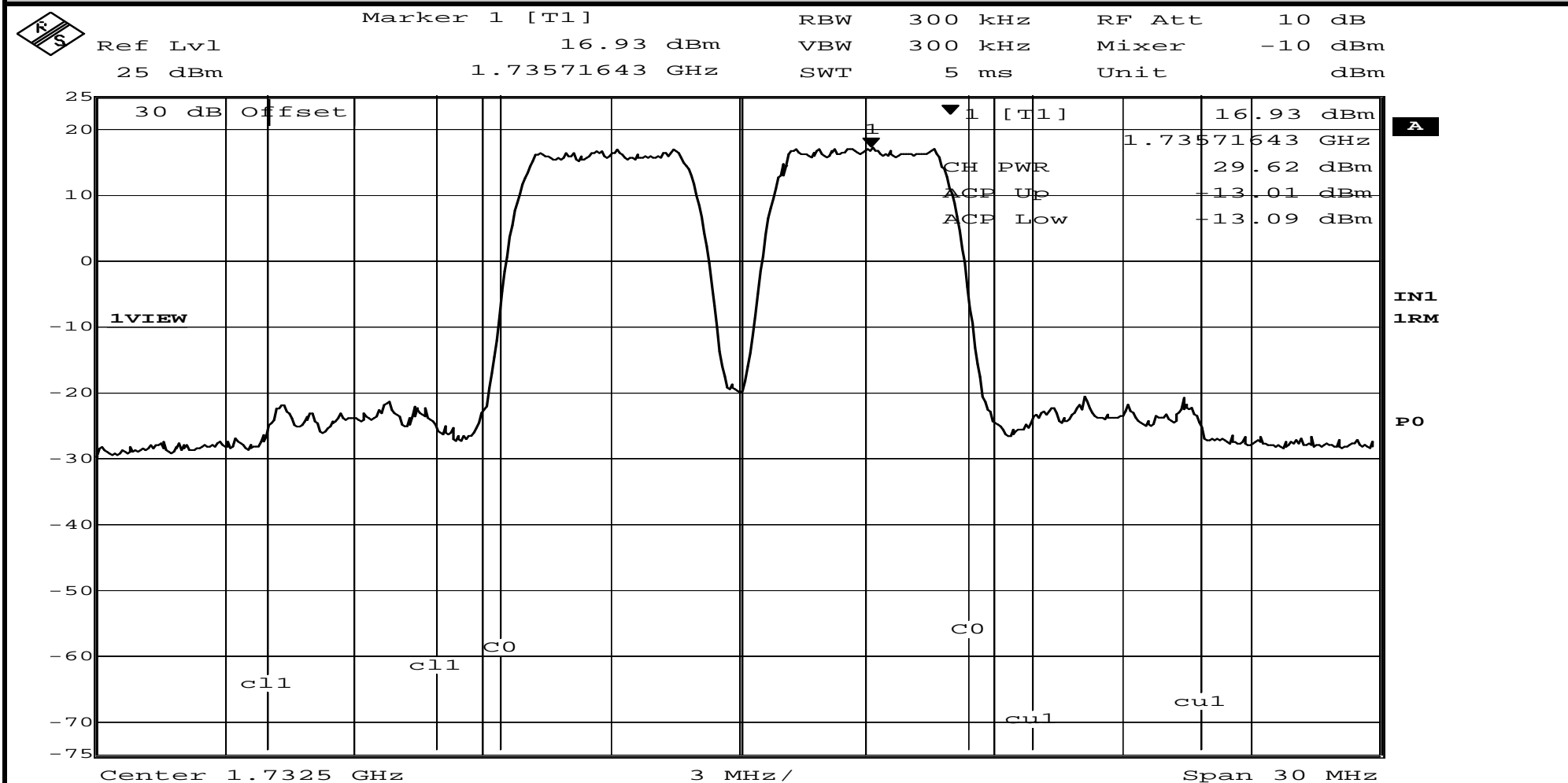


Date: 31.AUG.2010 15:39:36

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink (1710-1755MHz)		



Date: 4.OCT.2010 12:20:02

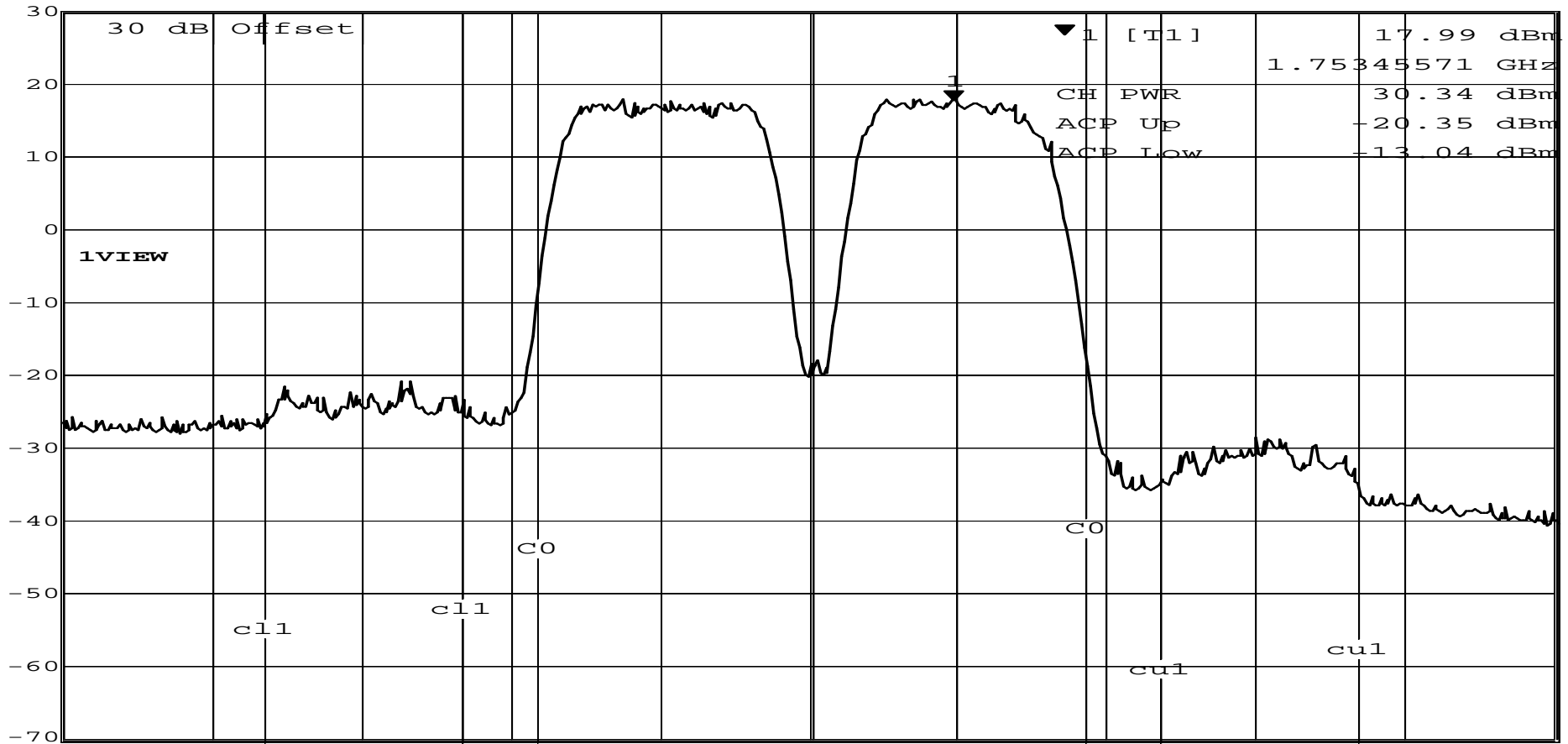
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	WCDMA - Uplink (1710-1755MHz)		



Ref Lvl	Marker 1 [T1]	RBW	300 kHz	RF Att	10 dB
30 dBm	17.99 dBm	VBW	300 kHz	Mixer	-10 dBm
30 dB Offset	1.75345571 GHz	SWT	5 ms	Unit	dBm



Center 1.7506 GHz      3 MHz/      Span 30 MHz

Date: 31.AUG.2010 15:37:34

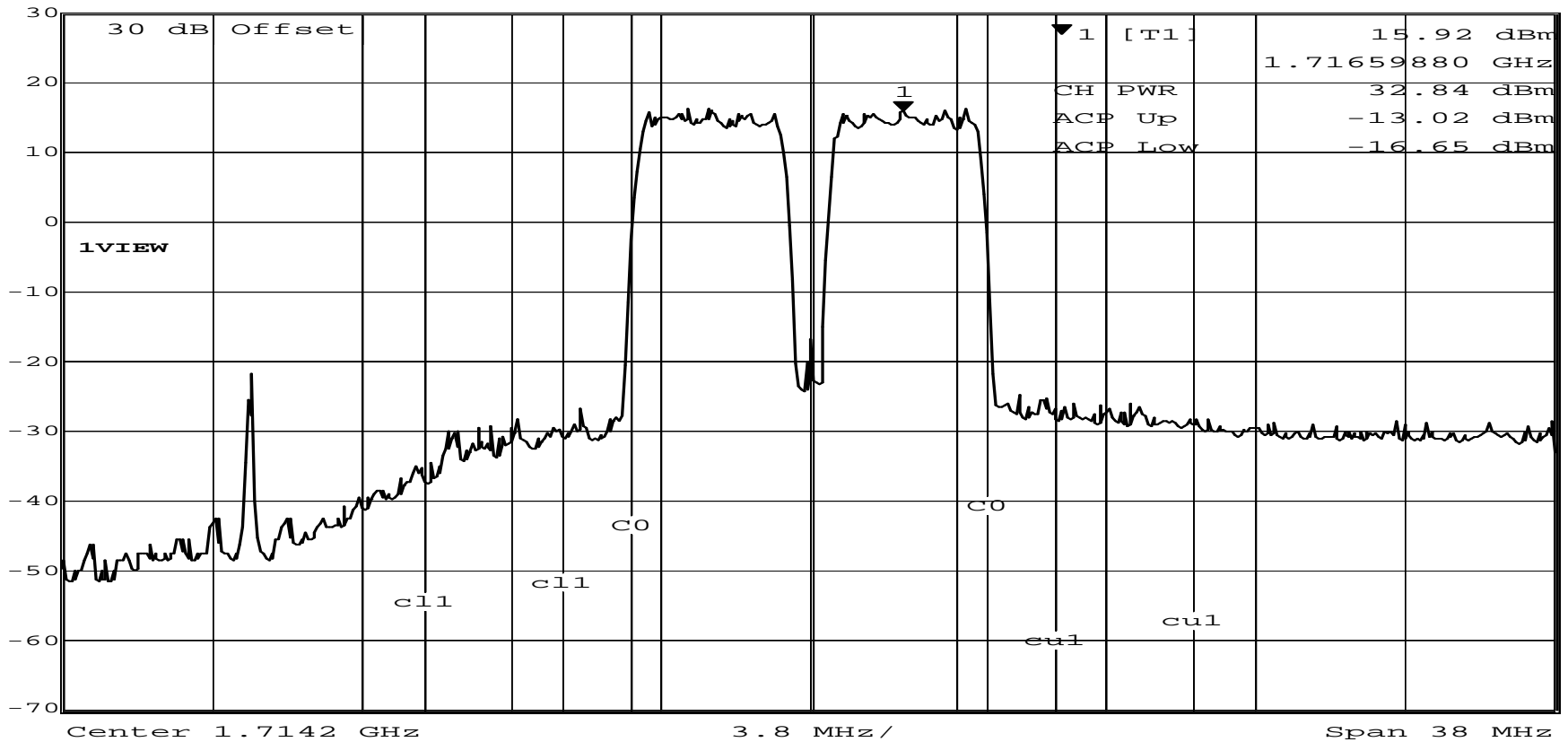
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5372N		
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph:	2.1047
Date:	8/30/2010		
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink (1710-1754MHz)		



Marker 1 [T1]      RBW    100 kHz      RF Att    10 dB  
 Ref Lvl                    15.92 dBm      VBW      1 MHz      Mixer     -10 dBm  
 30 dBm                    1.71659880 GHz      SWT      9.5 ms      Unit       dBm

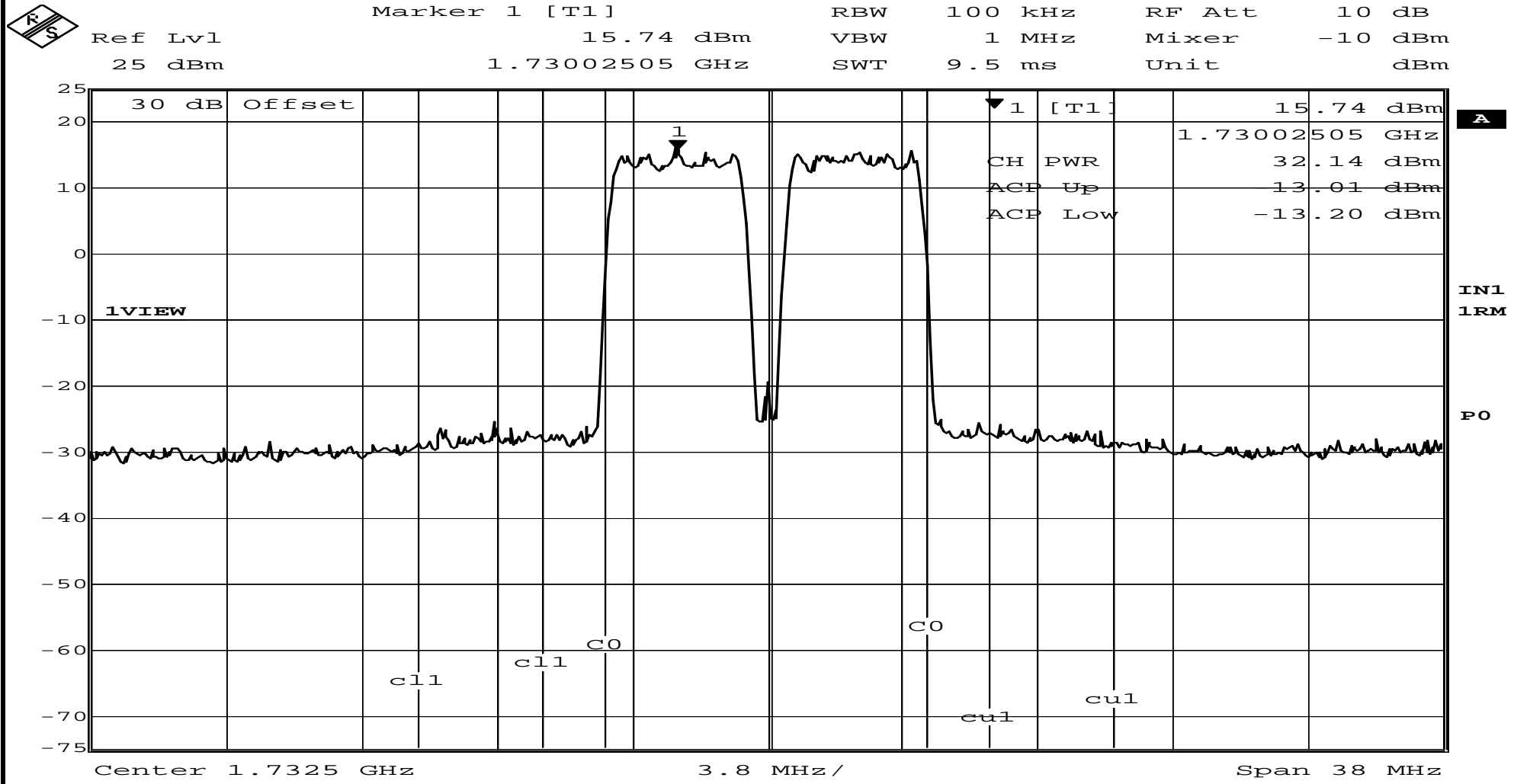


Date: 31.AUG.2010 14:57:23

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5372N		
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink (1710-1754MHz)		



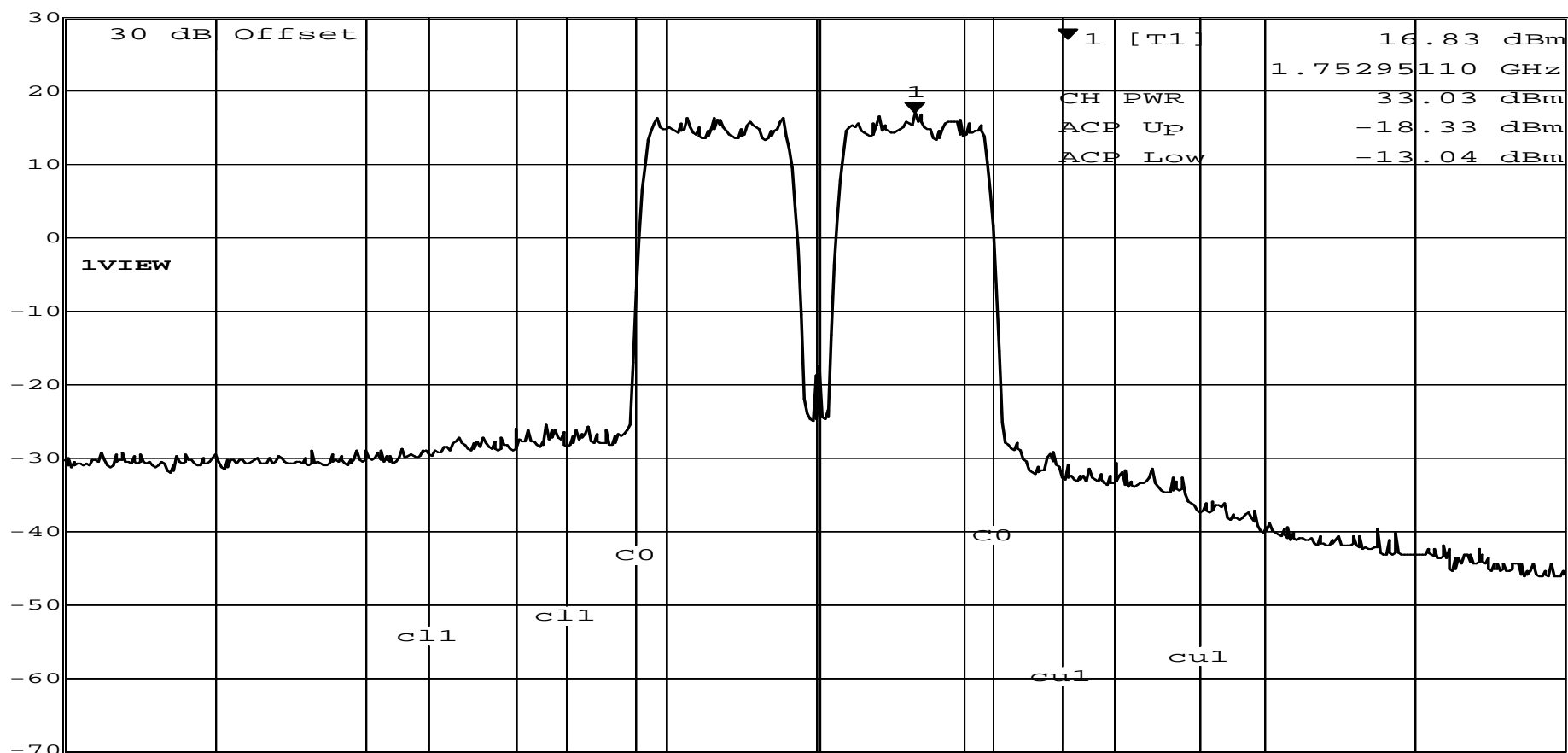
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Uplink (1710-1754MHz)		
Job No:	R-5372N	Technician:	M.Seamans
Date:	8/30/2010		



Marker 1 [T1] RBW 100 kHz RF Att 10 dB  
 Ref Lvl 16.83 dBm VBW 1 MHz Mixer -10 dBm  
 30 dBm 1.75295110 GHz SWT 9.5 ms Unit dBm



Center 1.7504 GHz 3.8 MHz / Span 38 MHz

Date: 31.AUG.2010 15:01:48

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics				
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater	Job No:	R-5372N
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A	Technician:	M.Seamans
Test Specification:	FCC Part 2	Paragraph:	2.1047	Date:	8/30/2010
Operating Mode:	Amplifying input signal				
Notes:	CDMA2000 - Downlink (2110-2154MHz)				



Marker 1 [T1]

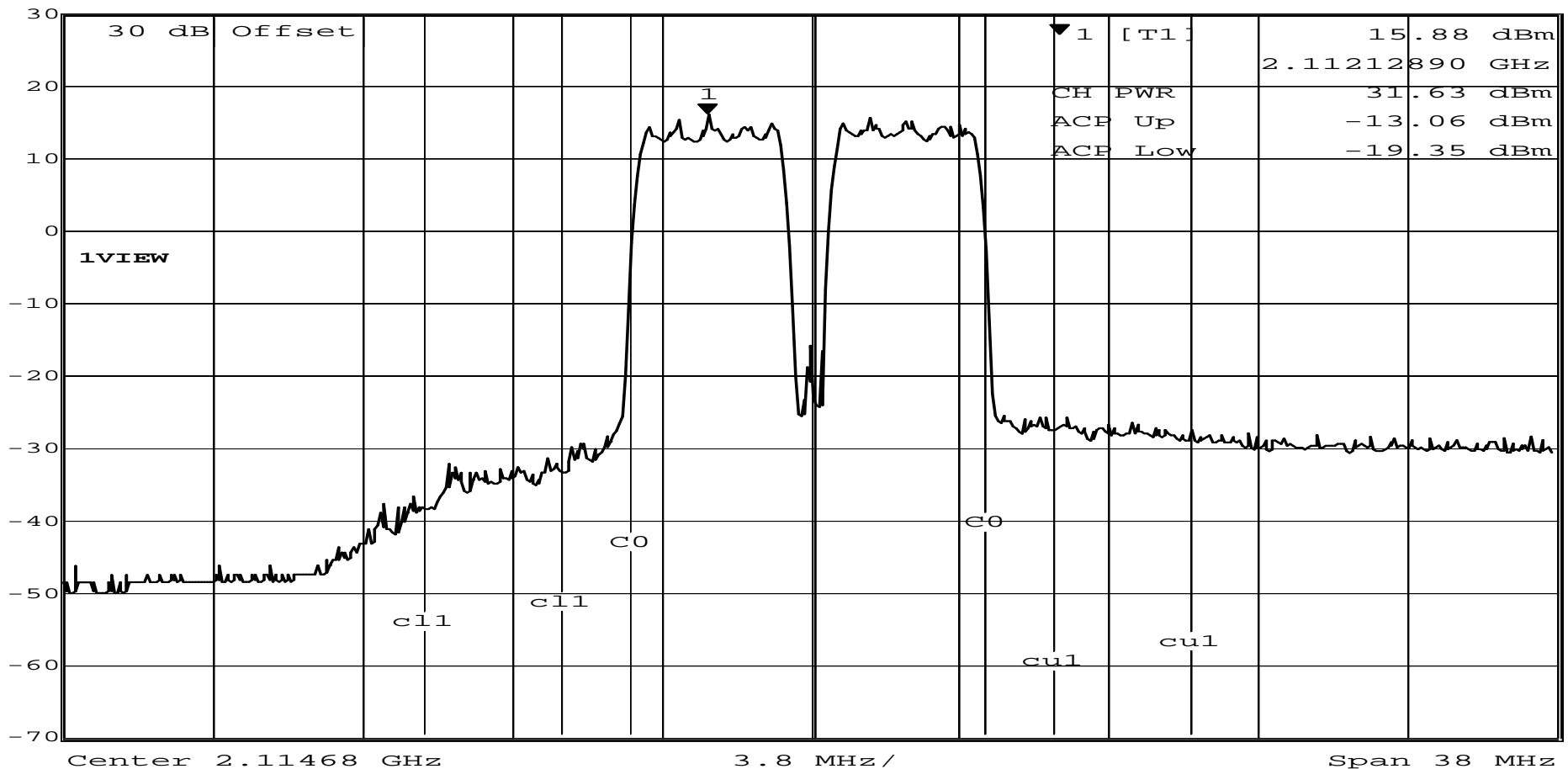
RBW 100 kHz RF Att 10 dB

Ref Lvl 15.88 dBm

VBW 1 MHz Mixer -10 dBm

30 dBm 2.11212890 GHz

SWT 9.5 ms Unit dBm

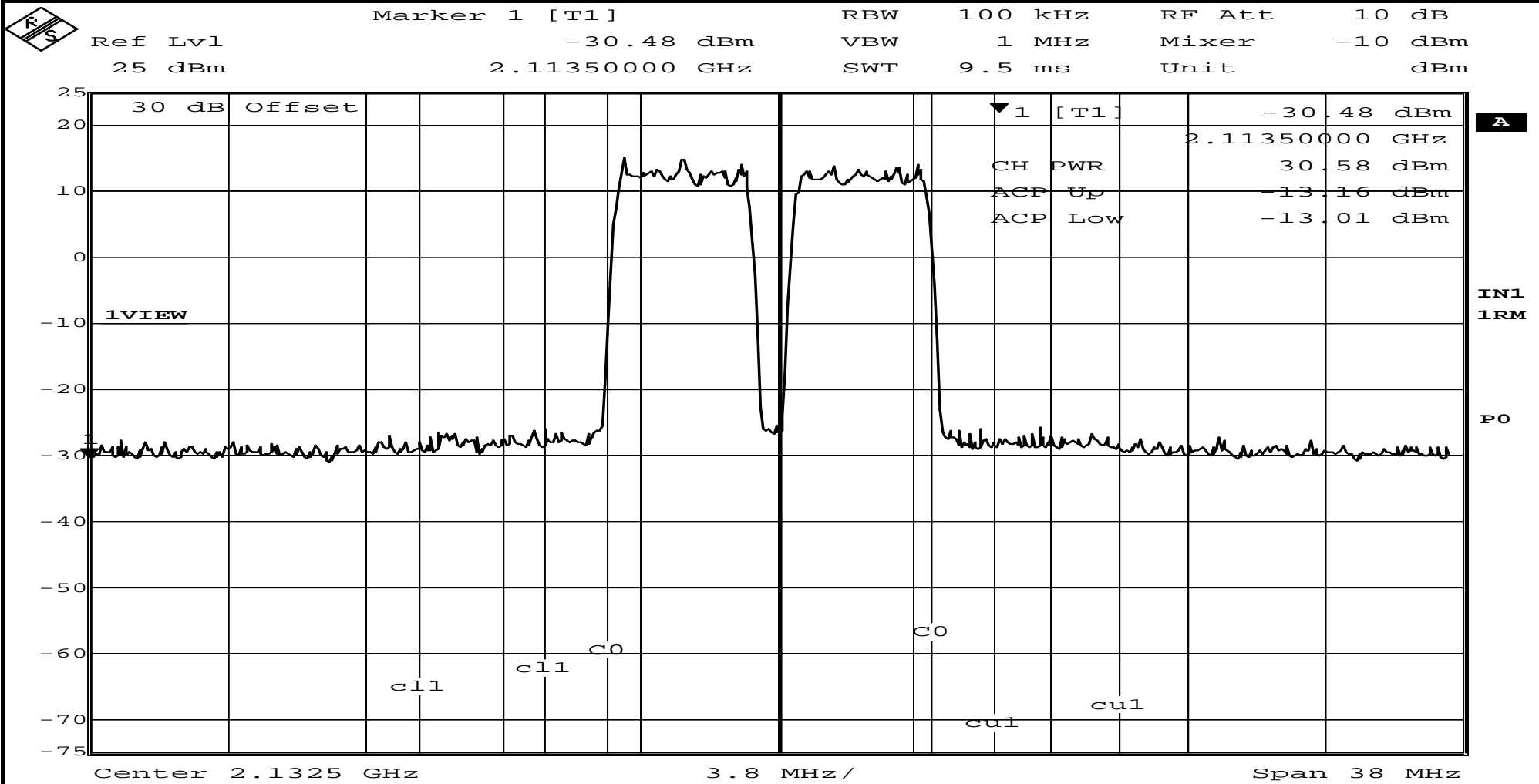


Date: 31.AUG.2010 14:49:46

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Job No:	R-5372N		
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Technician:	M.Seamans		
Test Specification:	FCC Part 2	Paragraph: 2.1047	Date:
Date:	8/30/2010		
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink (2110-2154MHz)		



Date: 4.OCT.2010 12:06:25



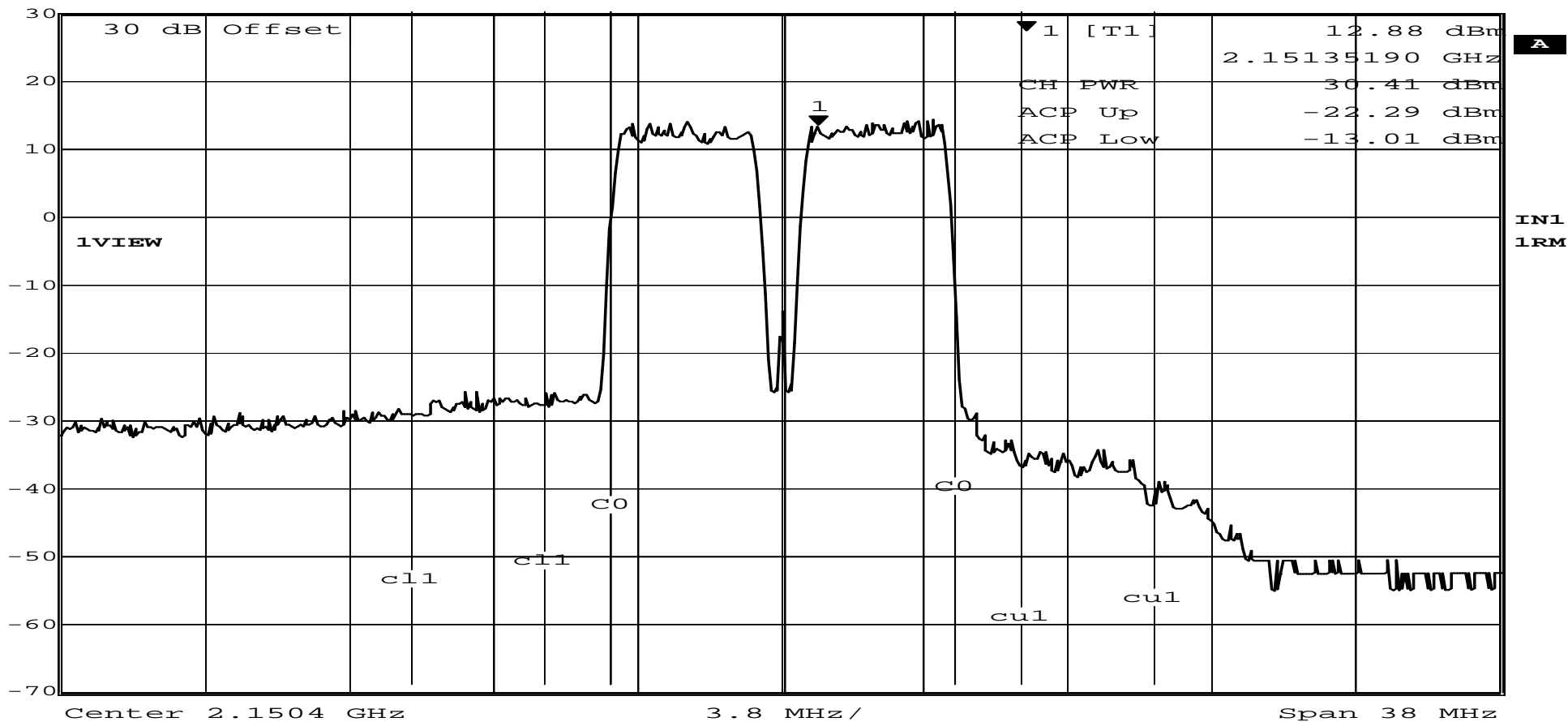
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Inter-modulation Characteristics		
Customer:	Cellular Specialties, Inc.	Test Sample:	Digital Repeater
Model No:	CSI-DSP85-25X-AW	Serial No:	N/A
Test Specification:	FCC Part 2	Paragraph:	2.1047
Operating Mode:	Amplifying input signal		
Notes:	CDMA2000 - Downlink (2110-2154MHz)		
Job No:	R-5372N	Technician:	M.Seamans
Date:	8/30/2010		



	Marker 1 [T1]	RBW	100 kHz	RF Att	10 dB
Ref Lvl	12.88 dBm	VBW	1 MHz	Mixer	-10 dBm
30 dBm	2.15135190 GHz	SWT	9.5 ms	Unit	dBm



Date: 31.AUG.2010 14:41:05

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Frequency Stability	
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b> R-5372N
<b>Test Sample:</b>	Digital Repeater	
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b> N/A
<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> 9/30/2010
<b>Notes:</b>	Uplink Frequency 1732.5 MHz      Nominal Voltage = 120 VAC Downlink Frequency 2132.5 MHz	

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			1732.51500	1732.51500	1732.51500	1732.51500	1732.51500	1732.51500	1732.51500
-20				1732.51500	1732.51500	1732.51500	1732.51500	1732.51500	1732.51500	1732.51500
-10				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
0				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
10				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
20				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
30				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
40				1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
50	1732.5000			1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500	1732.50500
	(Downlinl)									
-30	2132.5000			2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500
-20				2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500
-10				2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500	2132.49500
0				2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000
10				2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000
20				2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000
30				2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000
40				2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000
50	2132.5000			2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000	2132.50000



# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

<b>Test Method:</b>	<b>Mean Power</b>		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	RSS-131 Paragraph: 4.3		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	8/30/2010
<b>Notes:</b>	Uplink Frequency Range: 1710 - 1755 MHz    Downlink Frequency Range: 2110 - 2155 MHz    Modulation: WCDMA		

Test Frequency	Measured Level	Level								
MHz	dBm	mW								
(Uplink) Low										
1743.00	30.73	1183.04								
(Uplink) Mid										
1732.50	29.62	916.22								
(Uplink) High										
1750.60	30.34	1081.43								
(Downlink) Low										
2114.30	29.31	853.1								
(Downlink) Mid										
2132.50	28.07	641.2								
(Downlink) High										
2150.70	28.31	677.6								



# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	RSS-131 Paragraph: 4.4		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	9/29/2010
<b>Notes:</b>	Uplink Frequency: 1711 - 1755 MHz      Downlink Frequency: 2111 -2155 MHz CDMA2000 modulation      *-33.00dBm is the Noise floor of instrument		

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	
-55.00	1711.00				-57.00	2111.00				
		3422.00	-33.00	-13.0			4222.00	-33.00	-13.0	
		5133.00	-33.00				6333.00	-33.00		
		6844.00	-33.00				8444.00	-33.00		
		8555.00	-33.00				10555.00	-33.00		
		10266.00	-33.00				12666.00	-33.00		
		11977.00	-33.00				14777.00	-33.00		
		13688.00	-33.00				16888.00	-33.00		
		15399.00	-33.00				18999.00	-33.00		
-55.00	1711.00	17110.00	-33.00	-13.0	-57.00	2111.00	21110.00	-33.00	-13.0	
-55.00	1732.50				-57.00	2132.50				
		3465.00	-33.00	-13.0			4265.00	-33.00	-13.0	
		5197.50	-33.00				6397.50	-33.00		
		6930.00	-33.00				8530.00	-33.00		
		8662.50	-33.00				10662.50	-33.00		
		10395.00	-33.00				12795.00	-33.00		
		12127.50	-33.00				14927.50	-33.00		
		13860.00	-33.00				17060.00	-33.00		
		15592.50	-33.00				19192.50	-33.00		
-55.00	1732.50	17325.00	-33.00	-13.0	-57.00	2132.50	21325.00	-33.00	-13.0	
-55.00	1754.00				-57.00	2154.00				
		3508.00	-33.00	-13.0			4308.00	-33.00	-13.0	
		5262.00	-33.00				6462.00	-33.00		
		7016.00	-33.00				8616.00	-33.00		
		8770.00	-33.00				10770.00	-33.00		
		10524.00	-33.00				12924.00	-33.00		
		12278.00	-33.00				15078.00	-33.00		
		14032.00	-33.00				17232.00	-33.00		
		15786.00	-33.00				19386.00	-33.00		
-55.00	1754.00	17540.00	-33.00	-13.0	-57.00	2154.00	21540.00	-33.00	-13.0	

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Emissions at the Antenna Terminals 30 MHz to 22 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	RSS-131 <div style="text-align: right;">Paragraph: 4.4</div>		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	9/29/2010
<b>Notes:</b>	Uplink Frequency: 1711 - 1755 MHz      Downlink Frequency: 2111 -2155 MHz WCDMA modulation                      *-33.00dBm is the Noise floor of instrument		

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	
-53.50	1711.00				-57.00	2111.00				
		3422.00	-33.00	-13.0			4222.00	-33.00	-13.0	
		5133.00	-33.00				6333.00	-33.00		
		6844.00	-33.00				8444.00	-33.00		
		8555.00	-33.00				10555.00	-33.00		
		10266.00	-33.00				12666.00	-33.00		
		11977.00	-33.00				14777.00	-33.00		
		13688.00	-33.00				16888.00	-33.00		
		15399.00	-33.00				18999.00	-33.00		
-53.50	1711.00	17110.00	-33.00	-13.0	-57.00	2111.00	21110.00	-33.00	-13.0	
-53.50	1732.50				-57.00	2132.50				
		3465.00	-33.00	-13.0			4265.00	-33.00	-13.0	
		5197.50	-33.00				6397.50	-33.00		
		6930.00	-33.00				8530.00	-33.00		
		8662.50	-33.00				10662.50	-33.00		
		10395.00	-33.00				12795.00	-33.00		
		12127.50	-33.00				14927.50	-33.00		
		13860.00	-33.00				17060.00	-33.00		
		15592.50	-33.00				19192.50	-33.00		
-53.50	1732.50	17325.00	-33.00	-13.0	-57.00	2132.50	21325.00	-33.00	-13.0	
-53.50	1754.00				-57.00	2154.00				
		3508.00	-33.00	-13.0			4308.00	-33.00	-13.0	
		5262.00	-33.00				6462.00	-33.00		
		7016.00	-33.00				8616.00	-33.00		
		8770.00	-33.00				10770.00	-33.00		
		10524.00	-33.00				12924.00	-33.00		
		12278.00	-33.00				15078.00	-33.00		
		14032.00	-33.00				17232.00	-33.00		
		15786.00	-33.00				19386.00	-33.00		
-53.50	1754.00	17540.00	-33.00	-13.0	-57.00	2154.00	21540.00	-33.00	-13.0	







# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz		
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N
<b>Test Sample:</b>	Digital Repeater		
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A
<b>Test Specification:</b>	RSS-131 <p style="text-align: center;">Paragraph: 4.4</p>		
<b>Operating Mode:</b>	Amplifying input signal		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	10/1/2010
<b>Notes:</b>	Downlink Frequency Range: 2110 - 2155 MHz     Tested at 3 Input frequencies: 2111, 2132.5, 2154 MHz Peak Detector     Modulation: CDMA2000		

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
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
	-	-	-	-					-	
22000.00	-	-	-	-					-	-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

<b>Test Method:</b>	Spurious Radiated Emissions (ERP) 30 MHz to 22 GHz								
<b>Customer:</b>	Cellular Specialties, Inc.	<b>Job No:</b>	R-5372N						
<b>Test Sample:</b>	Digital Repeater								
<b>Model No:</b>	CSI-DSP85-25X-AW	<b>Serial No:</b>	N/A						
<b>Test Specification:</b>	RSS-131 <div style="text-align: right;">Paragraph: 4.4</div>								
<b>Operating Mode:</b>	Amplifying input signal								
<b>Technician:</b>	M.Seamans	<b>Date:</b>	10/1/2010						
<b>Notes:</b>	Downlink Frequency Range: 2110 - 2155 MHz      Tested at 3 Input frequencies: 2111, 2132.5, 2154 MHz Peak Detector      Modulation: WCDMA								

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
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
	-	-	-	-				-	
22000.00	-	-	-	-				-	-13.00

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