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FCC Part 90 Test Report

On

Bi-Directional Amplifier
Model: BDA510-S8
FCC ID: NVRBDA510-S8

Customer Name:	Westell Inc.
Customer P.O:	480897
Date of Report Revision:	January 17, 2017
Test Report No:	R-6142N-1, Rev. A
Test Start Date:	October 27, 2016
Test Finish Date:	December 1, 2016
Test Technician:	M. Seamans
Report Revision Approved By:	T. Hannemann
Report Revision Prepared By:	J. Ramsey

Technical Information

Report Number:	R-6142N-1, Rev. A
Customer:	Westell, Inc.
Address:	670 North Commercial St.
	Manchester, NH 03101
Manufacturer:	Westell, Inc.
Manufacturer Address:	670 North Commercial St.
	Manchester, NH 03101
Test Sample:	Bi-Directional Amplifier
Model Number:	BDA510-S8
Serial Number:	CPG62990
FCC ID:	NVRBDA510-S8
Type:	Class B Industrial Booster
Power Requirements:	120 VAC, 60 Hz
Frequency of Operation:	806 MHz – 816 MHz, 851 MHz – 861 MHz
Equipment Class:	B9B

Test Specification:
Nemko Test Plan Document Number: 317856-2. Rev. 4, Dated: November 29, 2016

Test Procedures:
FCC KDB 935210 D02 V03r02
FCC Part 90
FCC KDB 971168

Test Facility:
Retlif Testing Laboratories
101 New Boston Road
Goffstown, NH 03045

FCC Registered Test Site Number: 90899

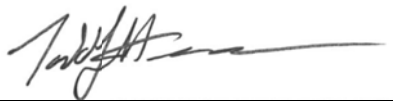
Table 1 – Tests Performed

Test Plan Paragraph	Test Method	Test Results
4.1	AGC Threshold Level	See Test Data
4.2	Out of Band Rejection	Complied
4.3	Input-Versus-Output Signal Comparison	See Test Data
4.4	Mean Output Power and Amplifier/Booster Gain	Complied
4.5	Noise Figure Measurements	Complied
4.6	Measuring Out-of-Band/Out-of-Block Emissions and Spurious Emissions	Complied
4.8	Field Strength of Spurious Emissions	Complied

EUT Operation:
During testing, the EUT was amplifying RF signal(s).

Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. 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.



Todd Hannemann
EMC Test Engineer
iNARTE Certified Technician ATL-0255-T

Non-Warranty Provision
The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed 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 test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

Revision History

Revisions to this document are listed below; the latest revised document supersedes all previous issues of this document:

Revision	Date	Pages Affected
-	December 20, 2016	Original Release
A	January 17, 2017	Global Changes: • Document changed from R-6142N-1 to R-6142N-1, Rev. A 2: • Revised first frequency range of operation from 800 MHz – 816 MHz to 806 MHz – 816 MHz 7-9: • Added Part 90.219(e) compliance statement to Paragraphs 4.3, 4.4 and 4.8 10: • Added Input vs Output Signal Comparison retest equipment list 20: • Added Input vs Output Signal Comparison retest photo 94-125: • Updated Input vs Output Signal Comparison data with retest data

Requirements and Test Results

NEMKO Test Plan Paragraph 4.1 – AGC Threshold Level
Using a signal generator configured to produce a CW sinusoidal signal at the center frequency of each uplink and downlink frequency band, the input level to the test sample was increased until a 1 dB increase in the input signal power no longer caused a 1 dB increase in the output signal power. This level was recorded as the AGC threshold level. See attached test data.

NEMKO Test Plan Paragraph 4.2 – Out-of-Band Rejection
Using a CW signal at a level 3 dB below the input level used during the AGC Threshold test, ±250 % of the manufacturer's specified pass band was swept. The spectrum analyzer was configured with the peak detector in Max-Hold. After the sweep was complete the 20 dB bandwidth of the test sample was measured. See attached test data.

NEMKO Test Plan Paragraph 4.3 – Input-versus-Output Signal Comparison

Measurements were made to compare the input signal to the output signal. The signal generator output was connected to the spectrum analyzer. The signal generator output level was set to a value that produces a EUT output level that is just below the AGC threshold. A 4K00F1E, FM modulation signal was then applied to the carrier. Waveforms were then noted on an X-Y plot with the appropriate mask per 90.210. Next, the signal generator was connected to the EUT input 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 (low, mid and high) on both the uplink and downlink. Testing was repeated for each modulation listed in the table below. Testing was then repeated with the input signal set 3dB above the AGC threshold.

Frequency	Emission Designator	Part 90.210 Mask
806.00625 MHz	4K00F1E	B
806.00625 MHz	11K3F3E	B
806.00625 MHz	16K0F3E	B
811.00000 MHz	4K00F1E	B
811.00000 MHz	11K3F3E	B
811.00000 MHz	16K0F3E	B
815.99375 MHz	4K00F1E	B
815.99375 MHz	11K3F3E	B
815.99375 MHz	16K0F3E	B
851.00625 MHz	4K00F1E	B
851.00625 MHz	11K3F3E	B
851.00625 MHz	16K0F3E	B
856.00000 MHz	4K00F1E	B
856.00000 MHz	11K3F3E	B
856.00000 MHz	16K0F3E	B
860.99375 MHz	4K00F1E	B
860.99375 MHz	11K3F3E	B
860.99375 MHz	16K0F3E	B
806.01250 MHz	8K10F1D	H
811.00000 MHz	8K10F1D	H
815.98750 MHz	8K10F1D	H
851.01250 MHz	8K10F1D	H
856.00000 MHz	8K10F1D	H
860.98750 MHz	8K10F1D	H

The EUT complies with the requirements of 90.219(e)(4). See attached test data.

Requirements and Test Results (con't)

NEMKO Test Plan Paragraph 4.4 – Mean Output Power and Amplifier/Booster Gain

A signal generator was configured to produce a CW sinusoidal signal at the center frequency of each uplink and downlink frequency band. The signal generator output level was set to a value that produced a EUT output level that was just below the AGC threshold, but not more than 0.5 dB below. The output power of the EUT was measured following "Power measurement Method 1: using a spectrum or signal analyzer" this value was recorded as the output power. The signal generator was connected directly to the signal analyzer (the EUT was removed from the test setup). Using the same signal generator settings, the power measurement was repeated at the signal generator port, which was used as the input signal to the EUT, and was record as the input power. The EUT gain was calculated by Gain (dB) = output power (dBm) − input power (dBm). These measurements were repeated with the input signal amplitude set to 3 dB above the AGC threshold level.

The EUT complies with the power output requirements of 90.219(e)(1). See attached test data.

NEMKO Test Plan Paragraph 4.5 – Noise Figure Measurements

Using a Low ENR noise source and a signal analyzer with a noise figure measurement option, the noise figure was measured on both the uplink and downlink frequency band with AGC disabled.

The EUT complies with the noise figure requirements of 90.219(e)(2). See attached test data.

NEMKO Test Plan Paragraph 4.6 – Measuring Out-of-Band/Out-of-Block (including intermodulation) Emissions and Spurious Emissions

A signal generator was configured to produce two CW sinusoidal signals, one at 810.996875 MHz and one at 811.003125 MHz on the input port of the uplink frequency band. The amplitude of the two signals was set to just below the AGC threshold. A Spectrum analyzer was connected to the output port of the EUT with a span of 100 KHz. Using a power averaging (RMS) detector the RF spectrum was swept and the markers were placed on the peak of the intermodulation signals. The EUT output plots were recorded. The input signals were increased so the composite input signal was 3dB over the AGC threshold (AGC activated) and plots of the EUT output were recorded. This was repeated for each of the following signal pairs corresponding to 6.25 kHz, 12.5 kHz and 25 kHz channel spacing.

Requirements and Test Results (con't)

Uplink:
810.993750 MHz, 811.006250 MHz
810.987500 MHz, 811.012500 MHz

Downlink:
855.996875 MHz, 856.003125 MHz
855.993750 MHz, 856.006250 MHz
856.98750 MHz, 856.012500 MHz

See attached test data.

NEMKO Test Plan Paragraph 4.8 – Field Strength of Spurious Emissions

- Spurious Emissions, Conducted Measurements

A signal generator was configured to produce a CW sinusoidal signal at the center frequency of each uplink and downlink frequency band. The signal generator output level was set to a value that produces a EUT output level that is just below the AGC threshold. A spectrum analyzer was connected to the output of the EUT using a peak detector and Max-Hold. The input test frequencies used were three frequencies (Low, Mid and High) within each passband (uplink and downlink). A marker was placed on the highest emission(s) outside the passband. Testing was performed in the frequency range of 30MHz to 10GHz to a -13dBm limit.

The EUT complies with the Spurious emissions requirements of 90.219(e)(3). See attached test data.

- Frequency Stability Measurements

As the test sample is designed to amplify input signals from a cellular network and contains no frequency determining components frequency stability measurements were not required/performed.

- Field Strength of Spurious Emissions

The test sample was placed on a 80cm high 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 within each passband (uplink and downlink). The frequency range of the test was 30MHz – 10GHz to a -13dBm limit.

The EUT complies with the Spurious emissions requirements of 90.219(e)(3). See attached test data.

Equipment List

AGC Threshold

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017

Out of Band Rejection

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017

Input-versus-Output Signal Comparison – Original Testing, December 1, 2016

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017

Input-versus-Output Signal Comparison – Retesting, January 17, 2017

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017

Mean Output Power and Amplifier/Booster Gain

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017

Noise Figure Measurements

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz - 26 GHz	N9020B	10/10/2016	10/10/2017
R475	AGILENT / HP	NOISE SOURCE	10 MHz - 26.5 GHz	N4000A	10/11/2016	10/11/2017

Measuring Out-of-Band/Out-of-Block (including intermodulation) Emissions and Spurious Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	6/16/2016	6/30/2017
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	10/13/2016	4/30/2018
3427B	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	2/5/2016	8/31/2017
4029B	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3 / 10 Meters	RNH	4/13/2016	4/30/2018
443	ELECTRO-METRICS	ANTENNA, LOG PERIODIC	200 MHz - 1000 MHz	LPA-25	10/6/2016	4/30/2018
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017
1345	NARDA MICROWAVE	ATTENUATOR, COAXIAL	30 dB, DC - 18 GHz, 50 W	776B-30	10/10/2016	10/31/2017
5138	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	10/10/2016	10/31/2017
5179B	MICRO-COAX	CABLE, COAXIAL	10 kHz - 18 GHz	UFB311A-1-036050U50U	10/7/2016	10/31/2017
R474	AGILENT / HP	ANALYZER, SIGNAL	10 Hz – 8.5 GHz	N9020B	10/10/2016	10/10/2017
R476	AGILENT / HP	GENERATOR, SIGNAL	9 kHz - 6 GHz	N5182B	9/9/2016	9/9/2017
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	11/17/2015	11/30/2016

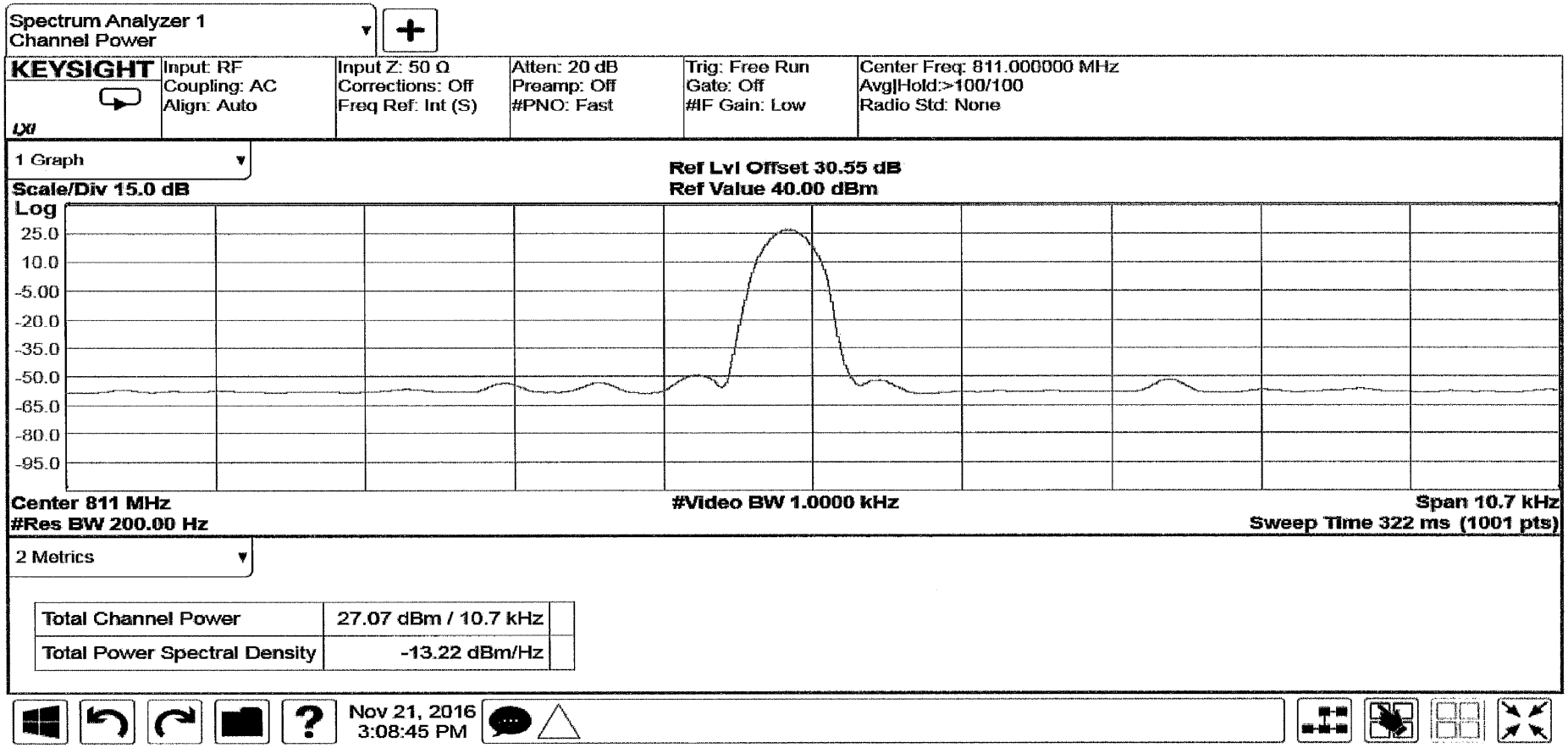
Test Photographs
AGC Threshold

Test Setup

AGC Threshold
Test Data

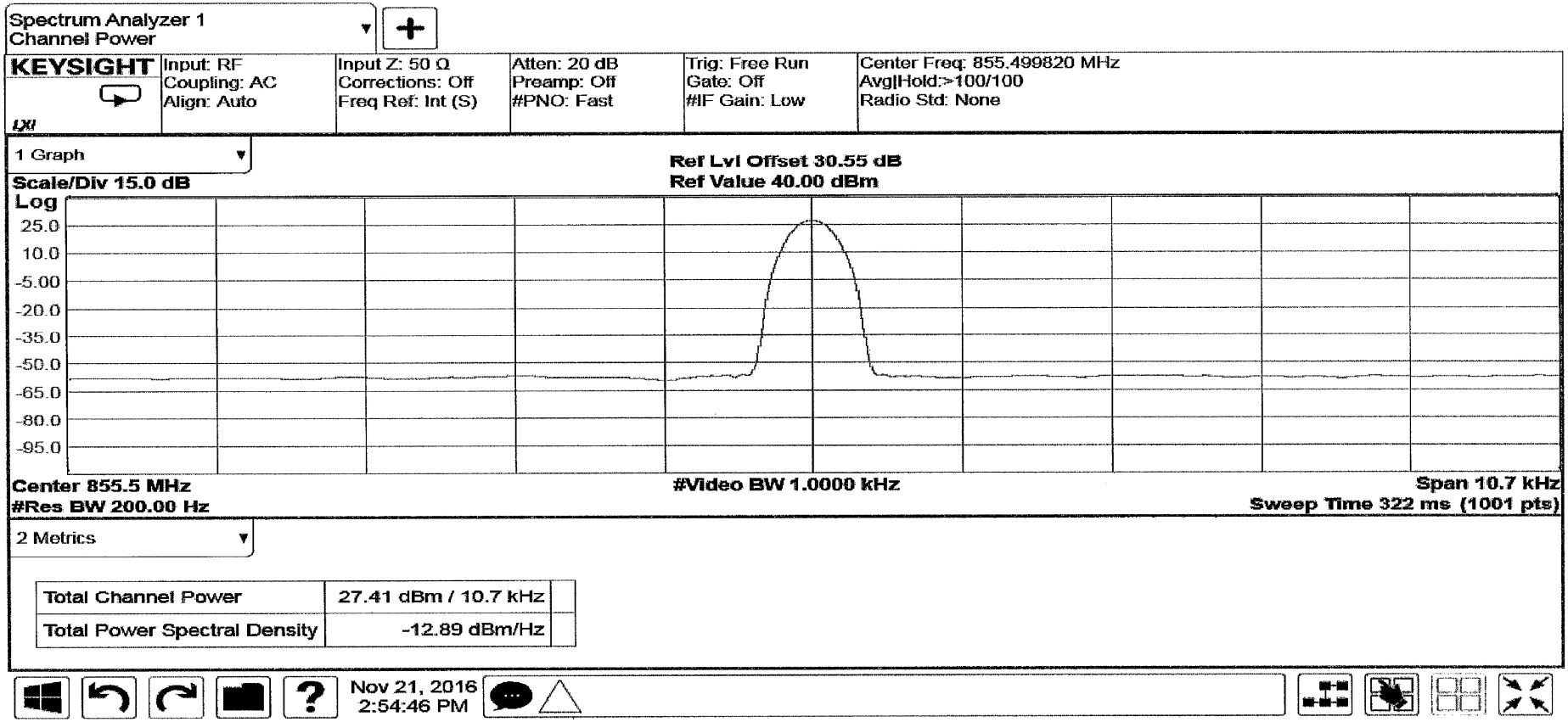
RETLIF TESTING LABORATORIES

Test Method	AGC Threshold		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying CW signal at 811 MHz		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	November 21st, 2016
Climatic Conditions	Temp: 19.0 °C Relative Humidity: 31.3 %		
Notes	Uplink Signal Generator Setting: -54.20dBm **(-53.35dBm** measured signal generator output) Amplifier Output: **27.07dBm** Gain: **80.42dB**		



RETLIF TESTING LABORATORIES

Test Method	AGC Threshold		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying CW signal at 855.5 MHz		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	November 21st, 2016
Climatic Conditions	Temp: 19.0 °C Relative Humidity: 31.3 %		
Notes	Downlink Signal Generator Setting: -54.00dBm **(-53.31dBm** measured signal generator output) Amplifier Output: **27.41dBm** Gain: **80.72dB**		



Test Photographs

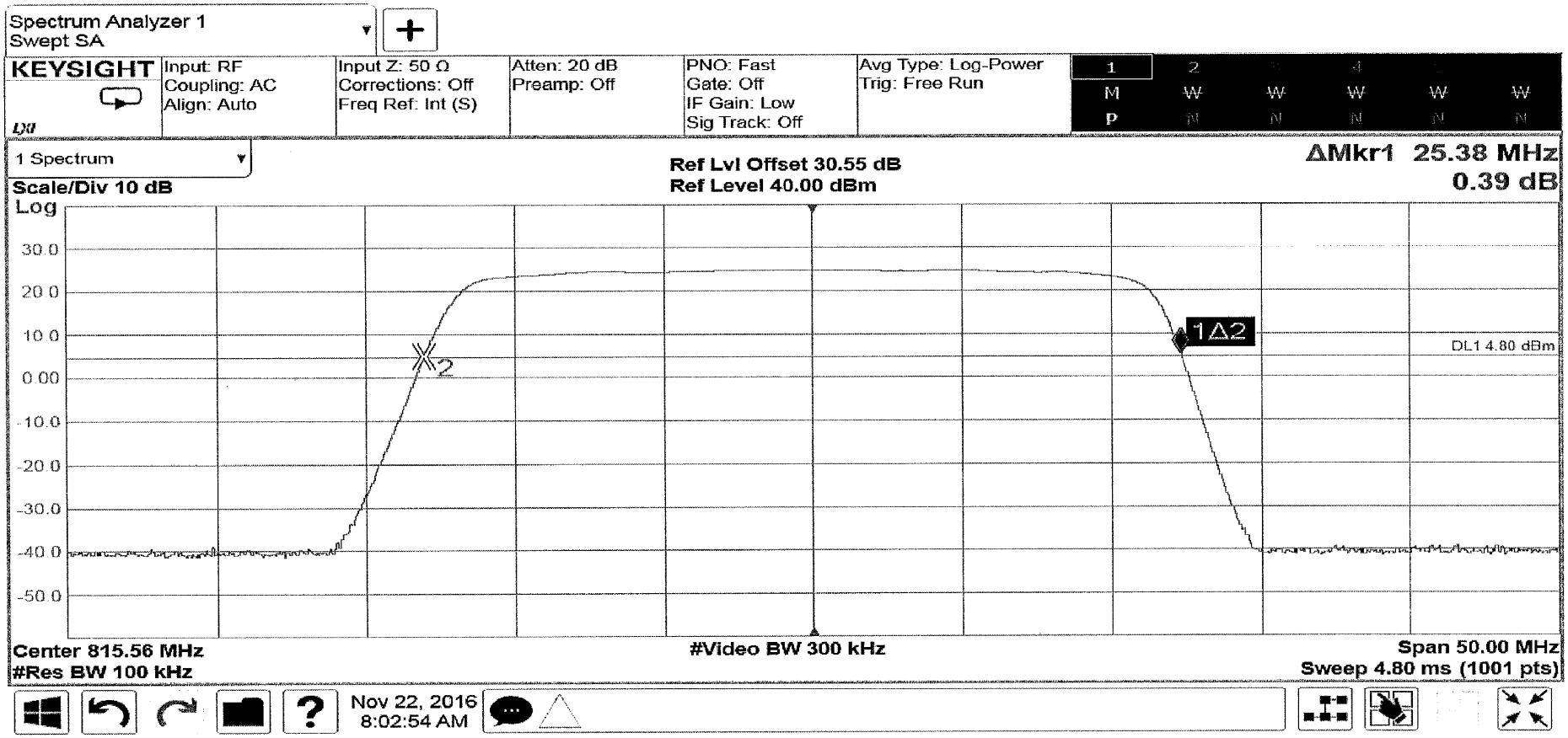
Out of Band Rejection

Test Setup

Out of Band Rejection
Test Data

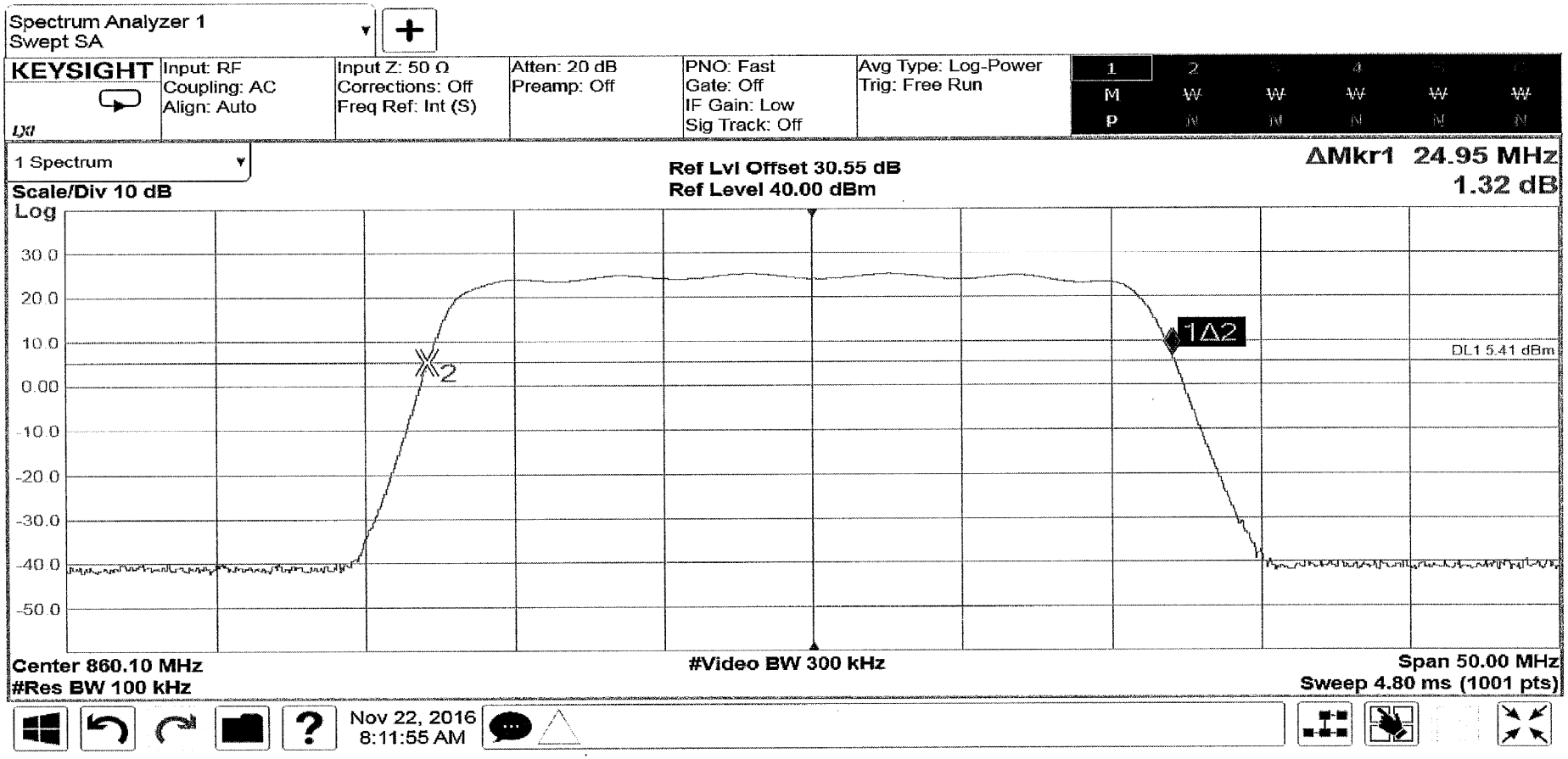
RETLIF TESTING LABORATORIES

Test Method	Out-of-Band Rejection		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying CW signals		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	November 21st, 2016
Climatic Conditions	Temp: 19.0 °C Relative Humidity: 31.3 %		
Notes	Uplink Signal Generator Setting: -57.20dBm **(-56.35dBm** measured signal generator output) 20dB Bandwidth: 25.38 MHz		



RETLIF TESTING LABORATORIES

Test Method	Out-of-Band Rejection		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying CW signals		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	November 21st, 2016
Climatic Conditions	Temp: 19.0 °C Relative Humidity: 31.3 %		
Notes	Downlink Signal Generator Setting: -57.00dBm **(-56.31dBm** measured signal generator output) 20dB Bandwidth: 24.95 MHz		



Test Photographs

Input-versus-Output Signal Comparison

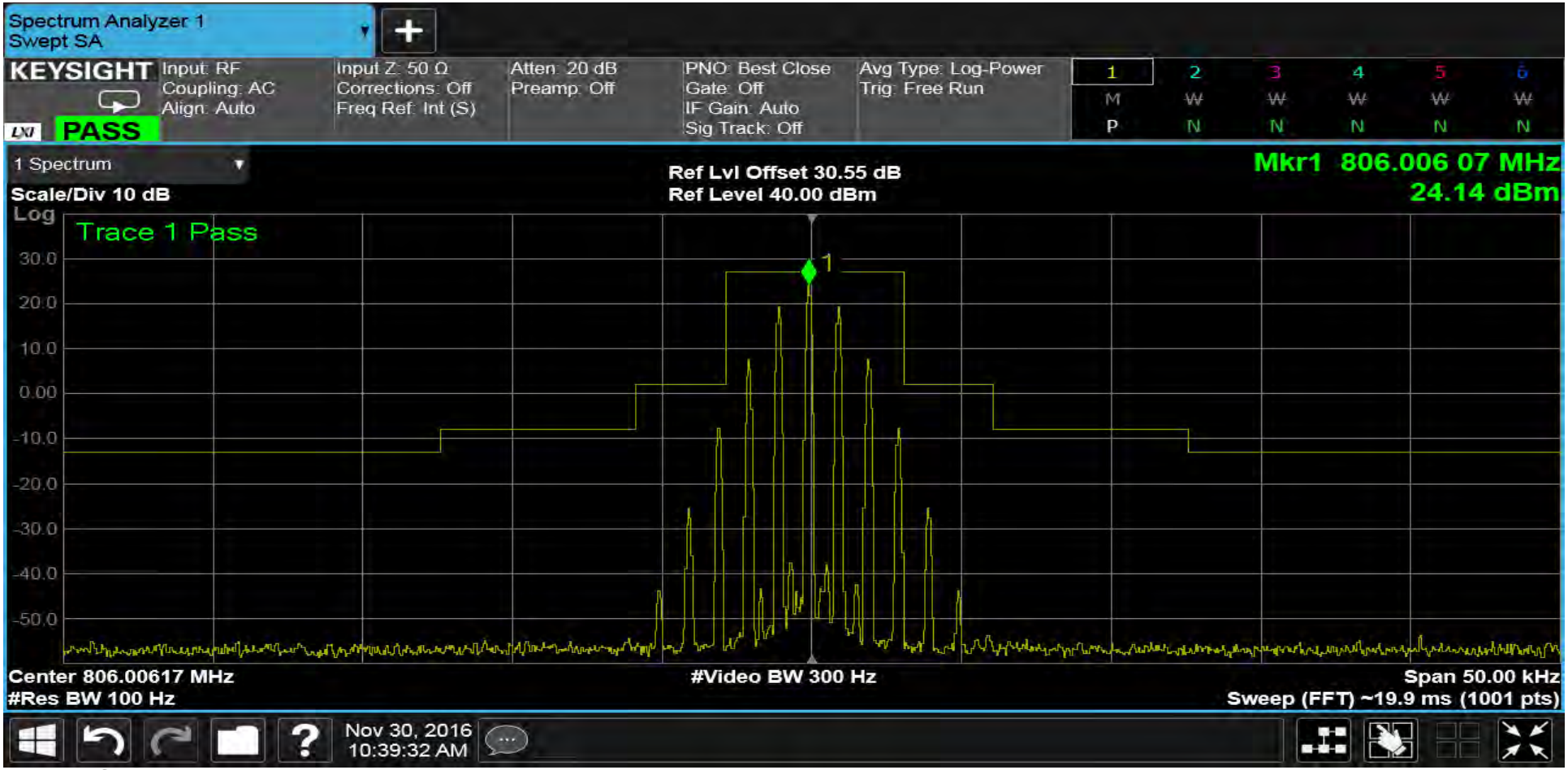
Original Test Setup, December 1, 2016

Retest Setup, January 17, 2017

Input-versus-Output Signal Comparison
Test Data

RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 806.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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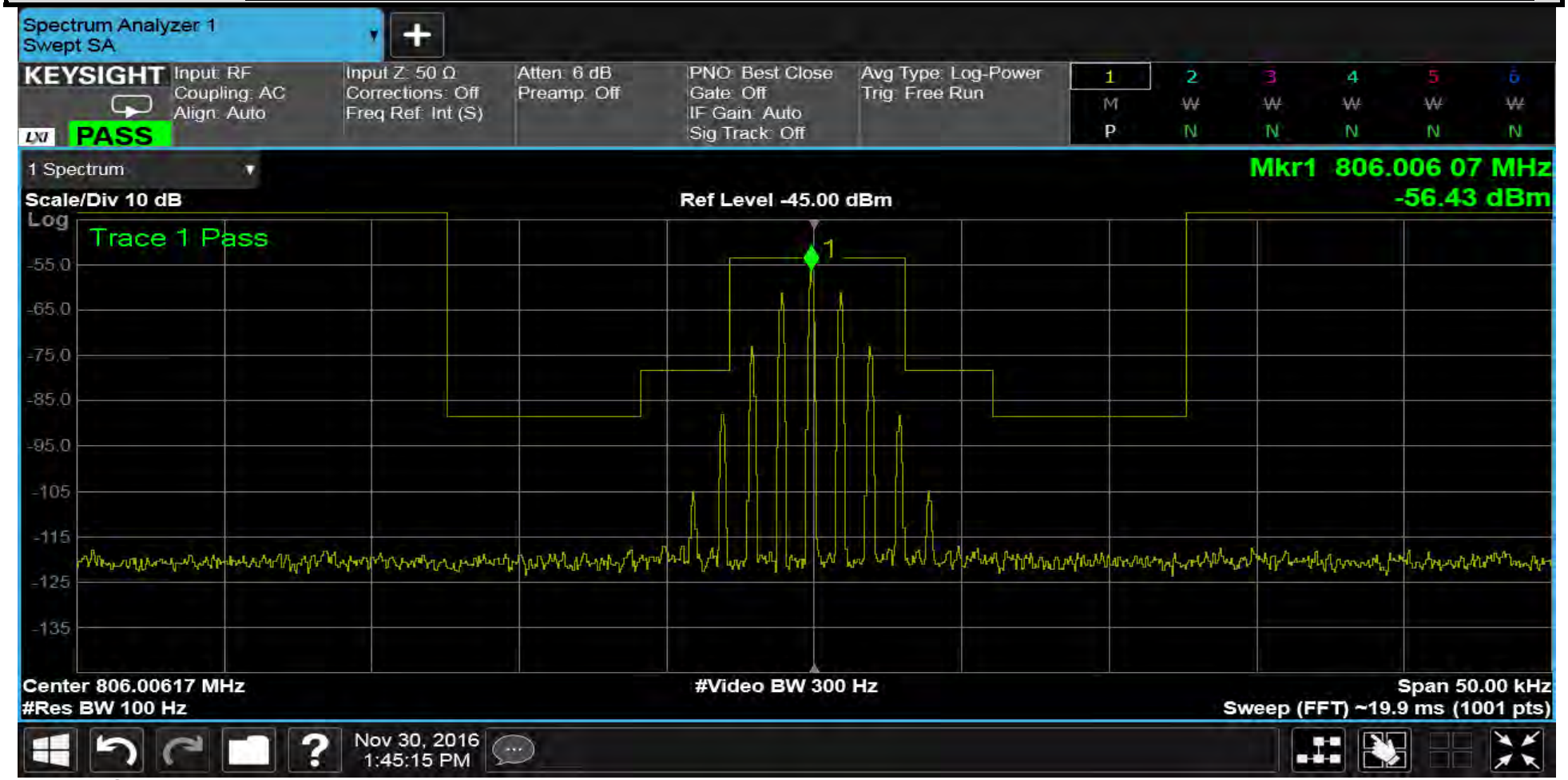
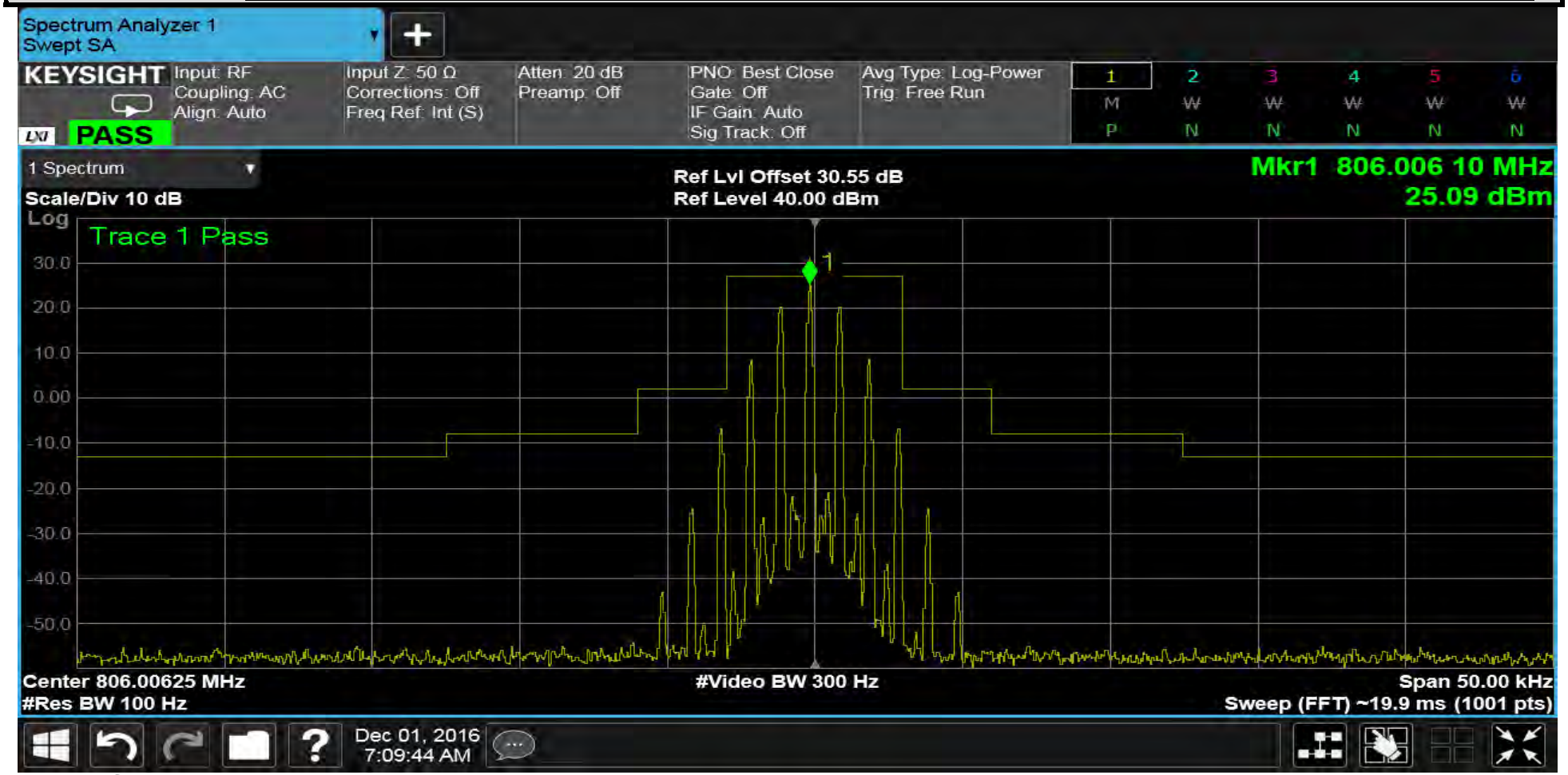
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 806.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 806.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		

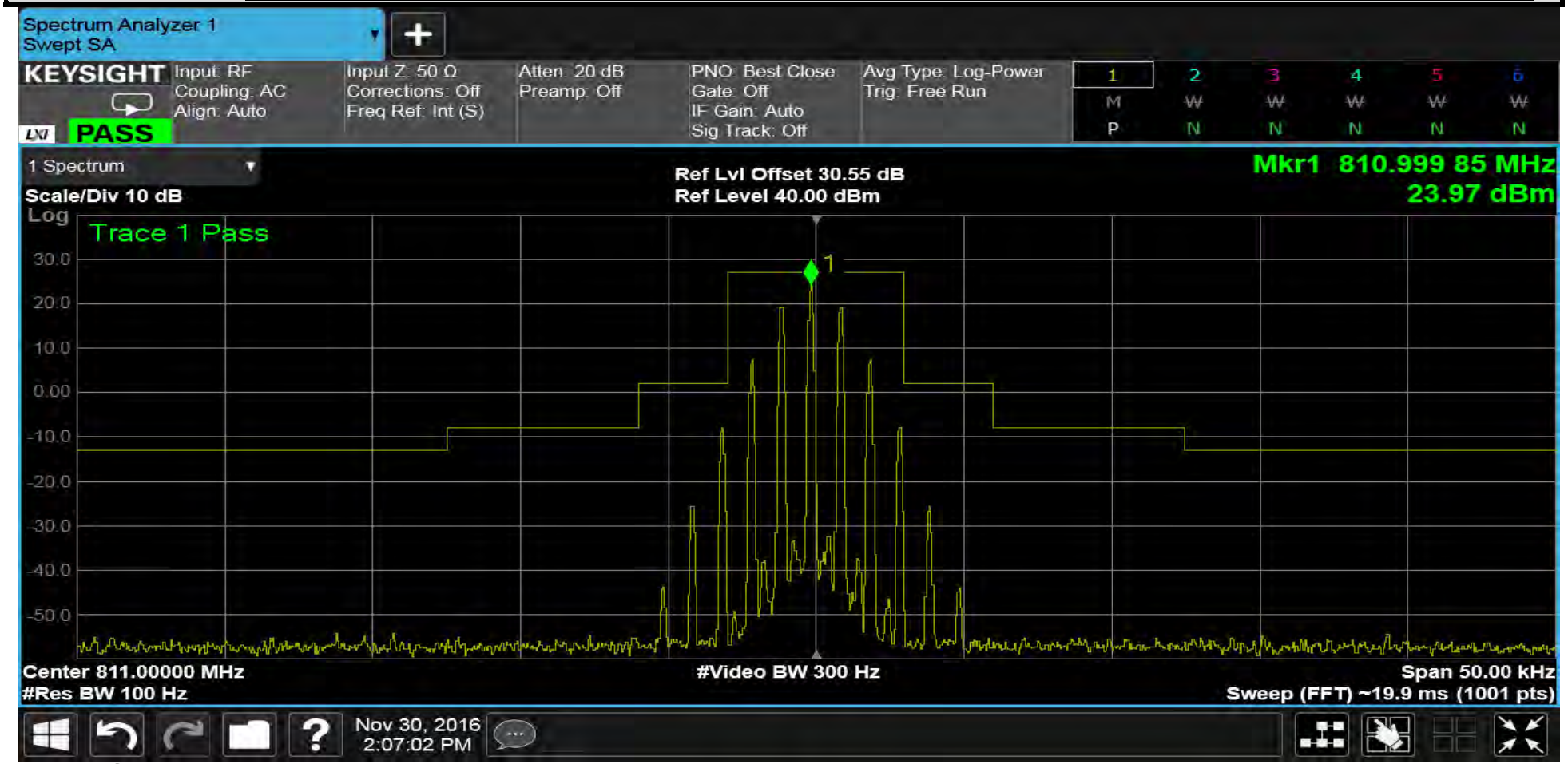


RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 806.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		

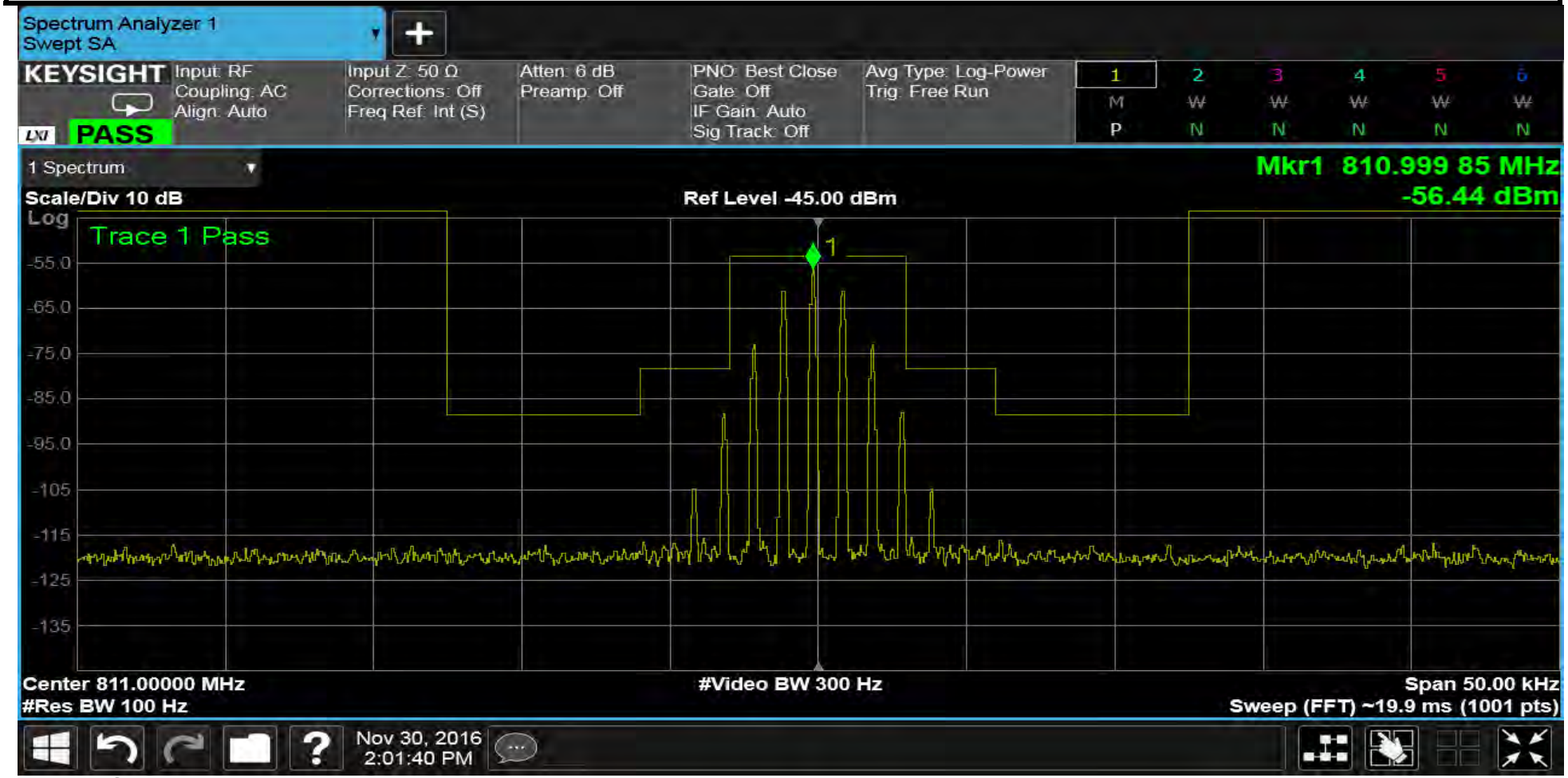
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 811.000MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



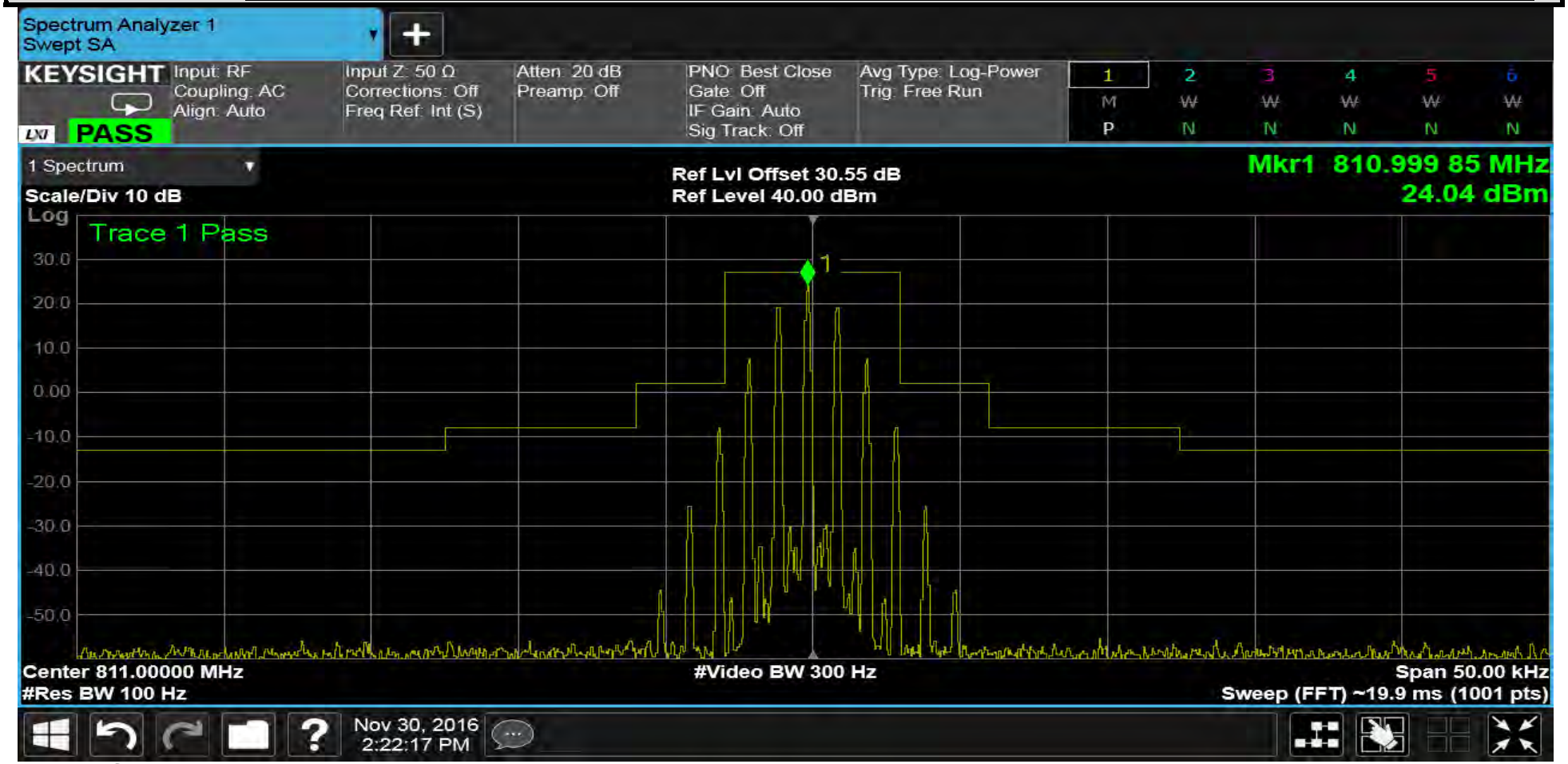
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 811.000MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 811.000MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		

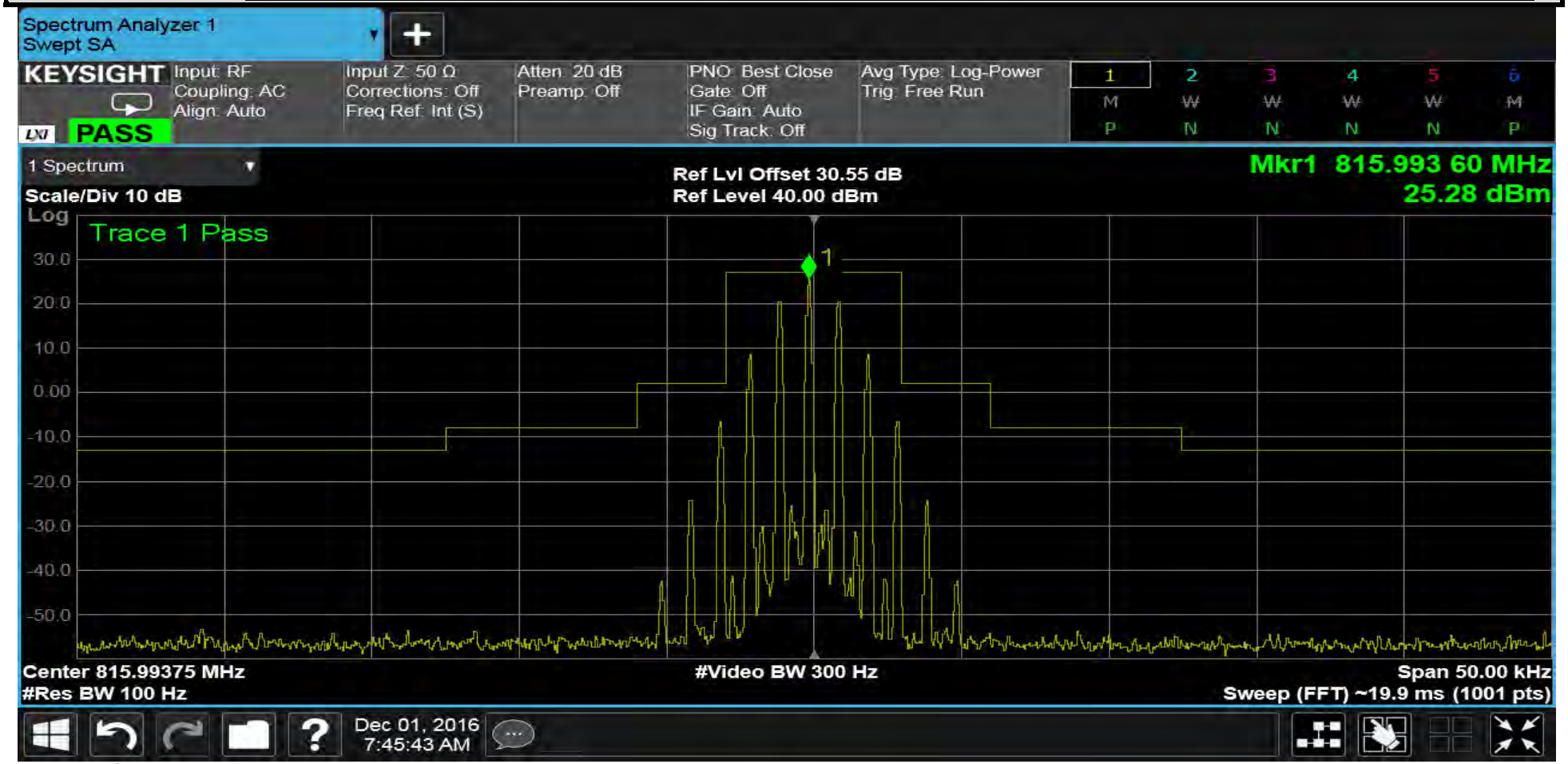


RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 811.000MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		

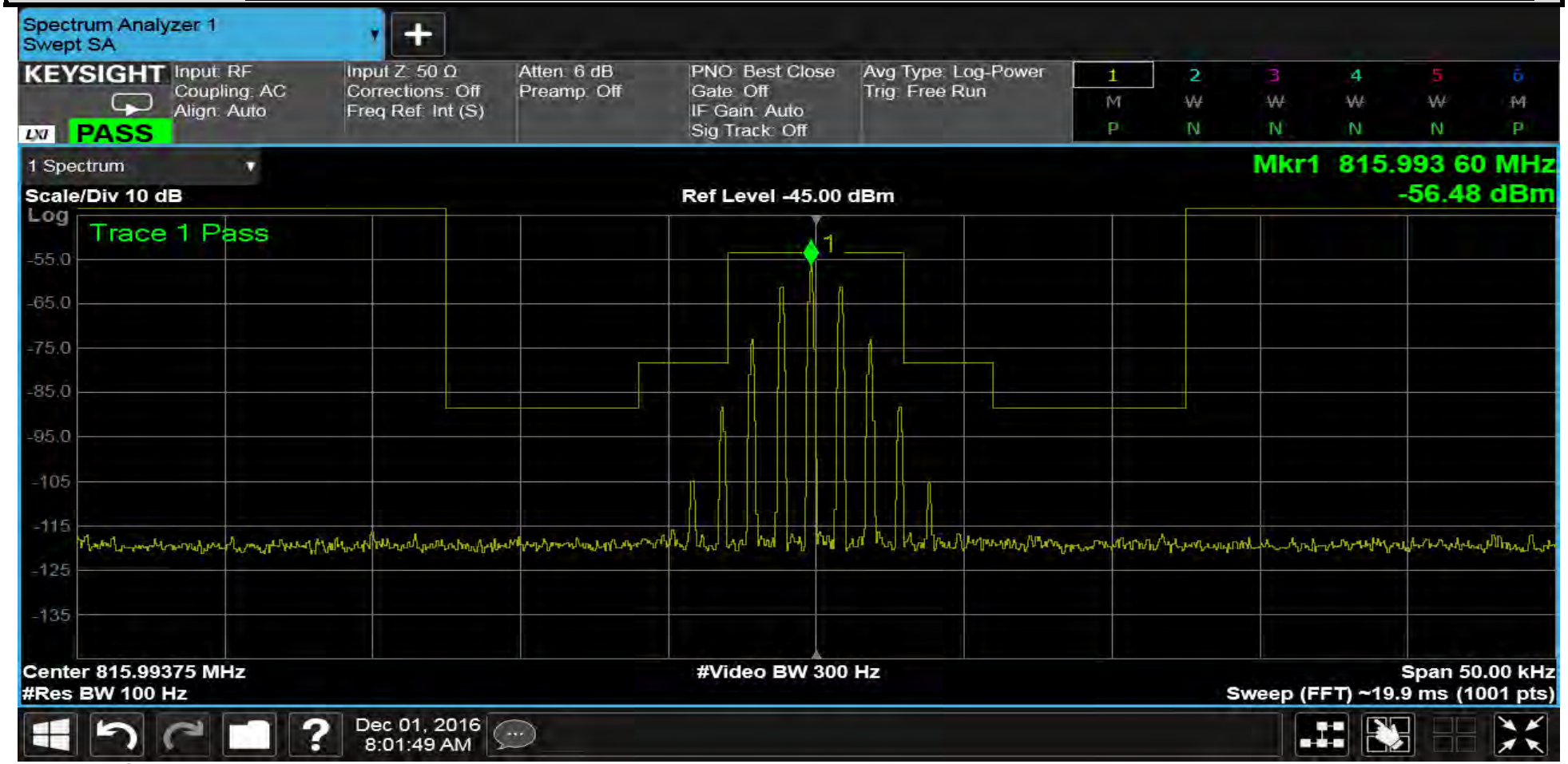
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
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Test Sample	Bi-Directional Amplifier		
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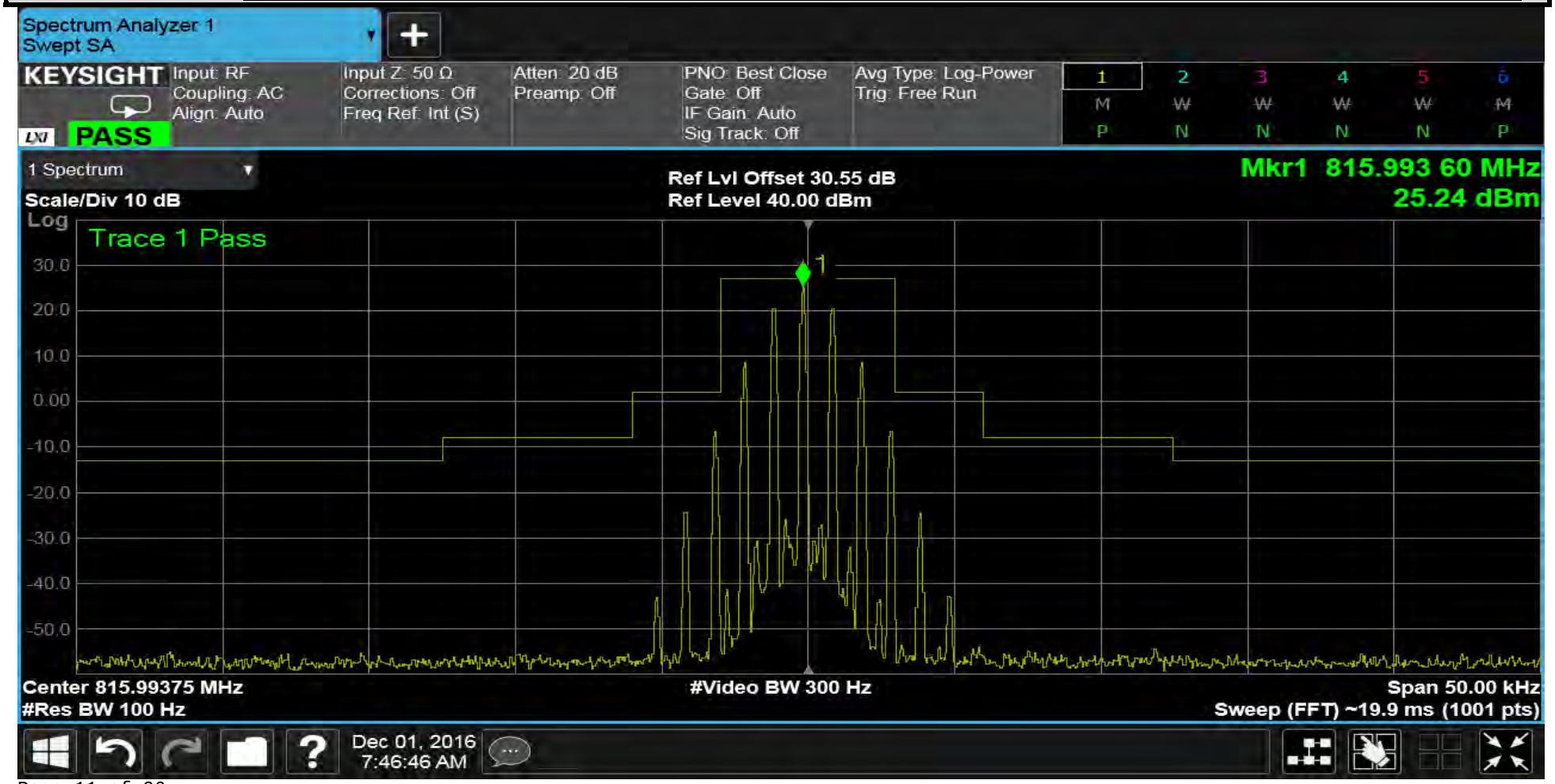
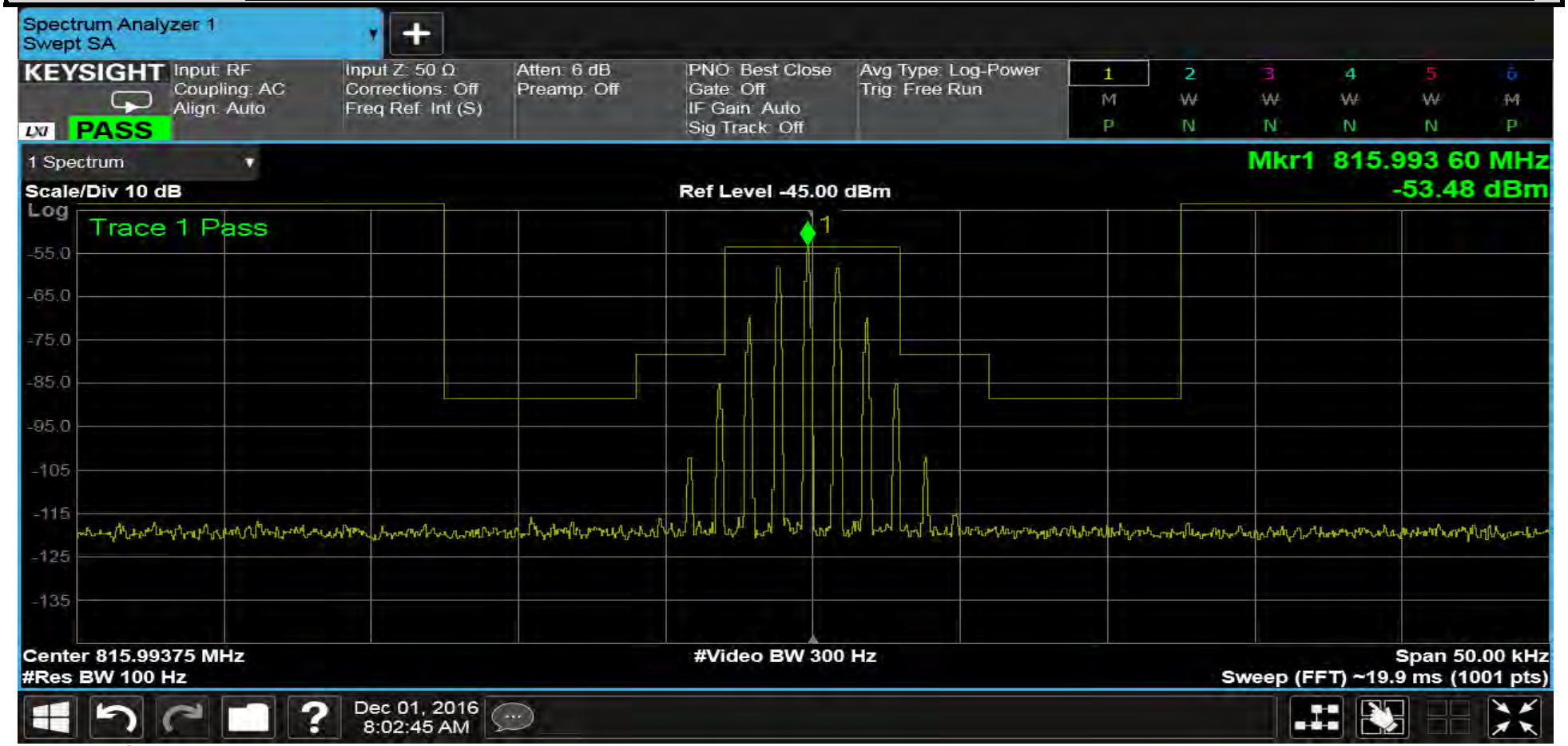
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



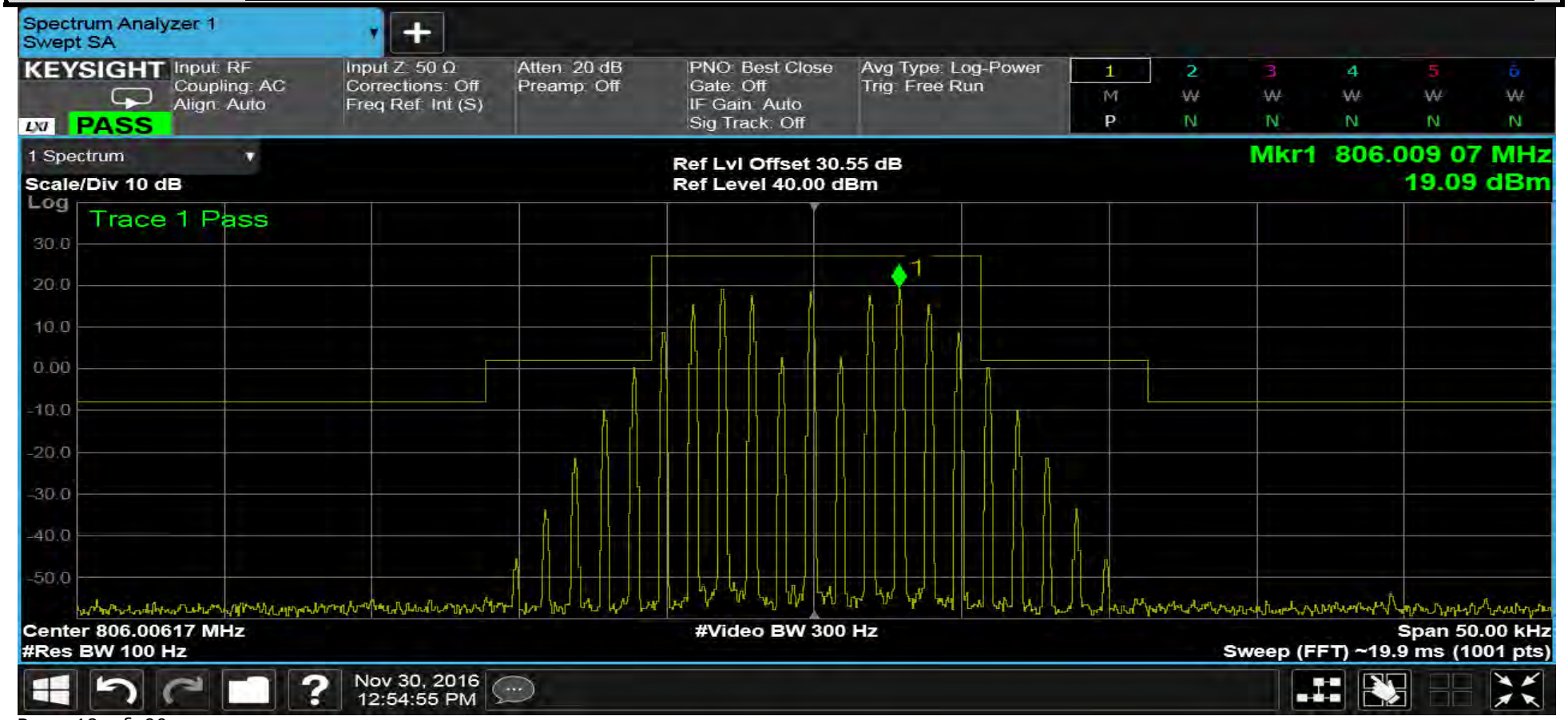
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



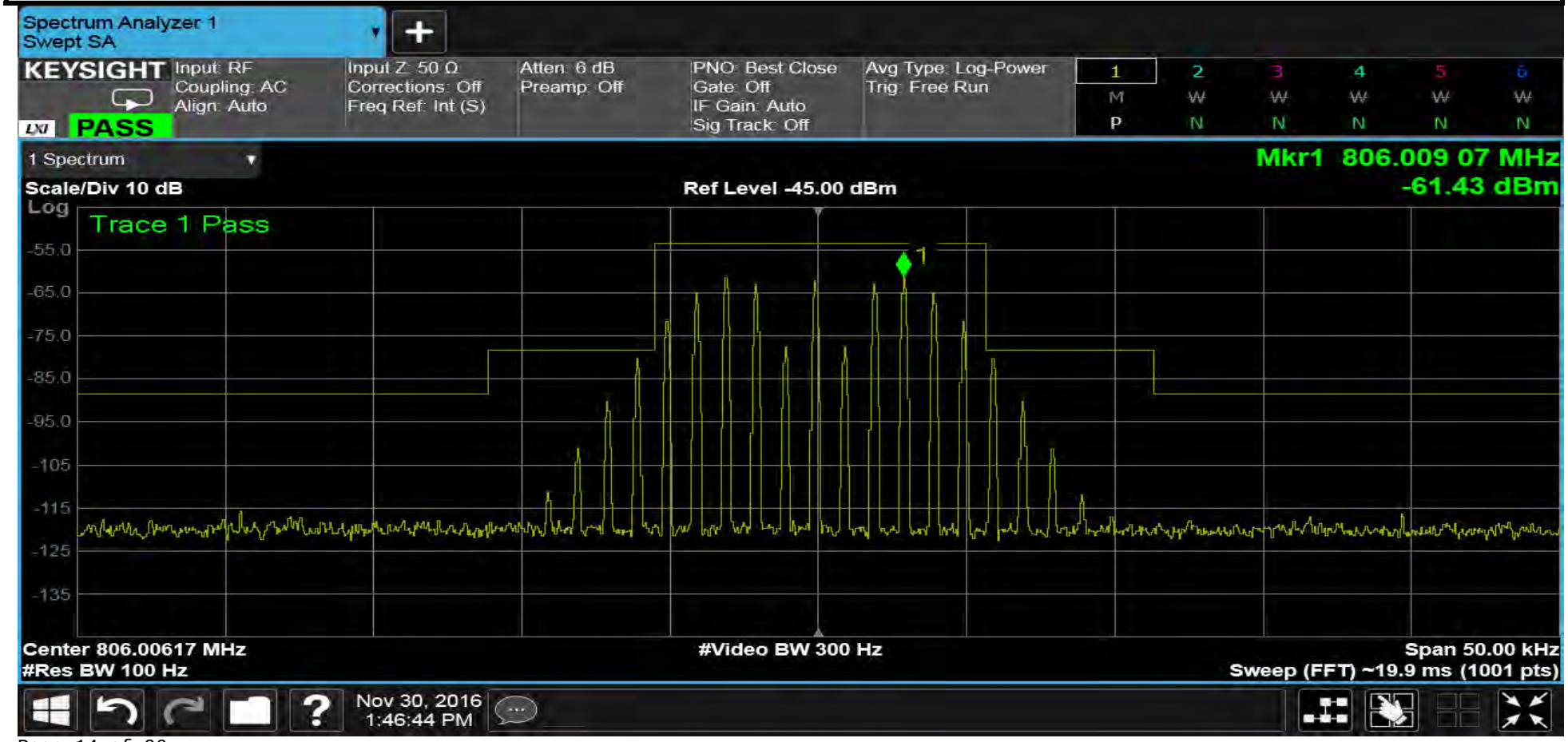
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 806.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



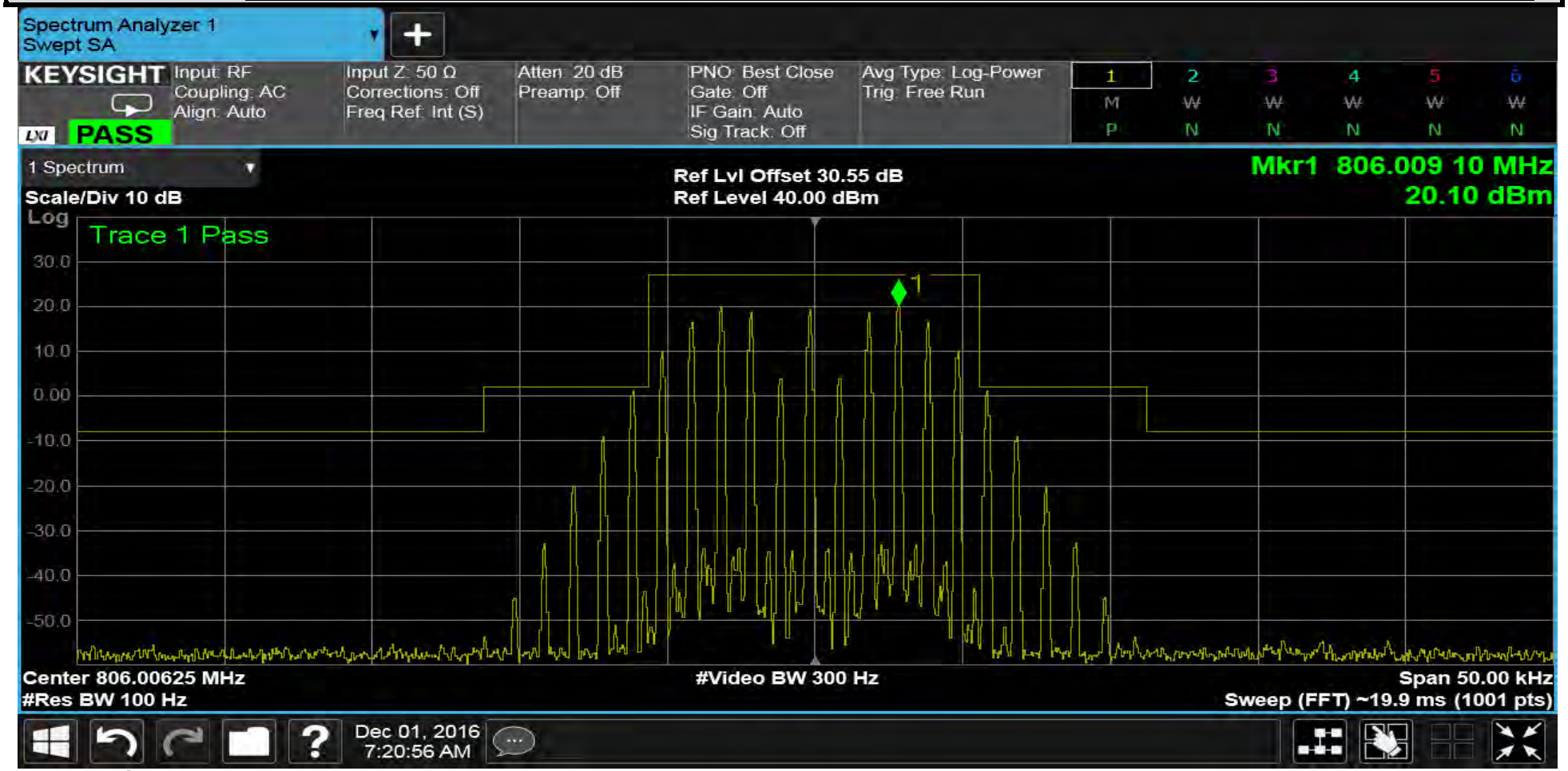
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 806.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



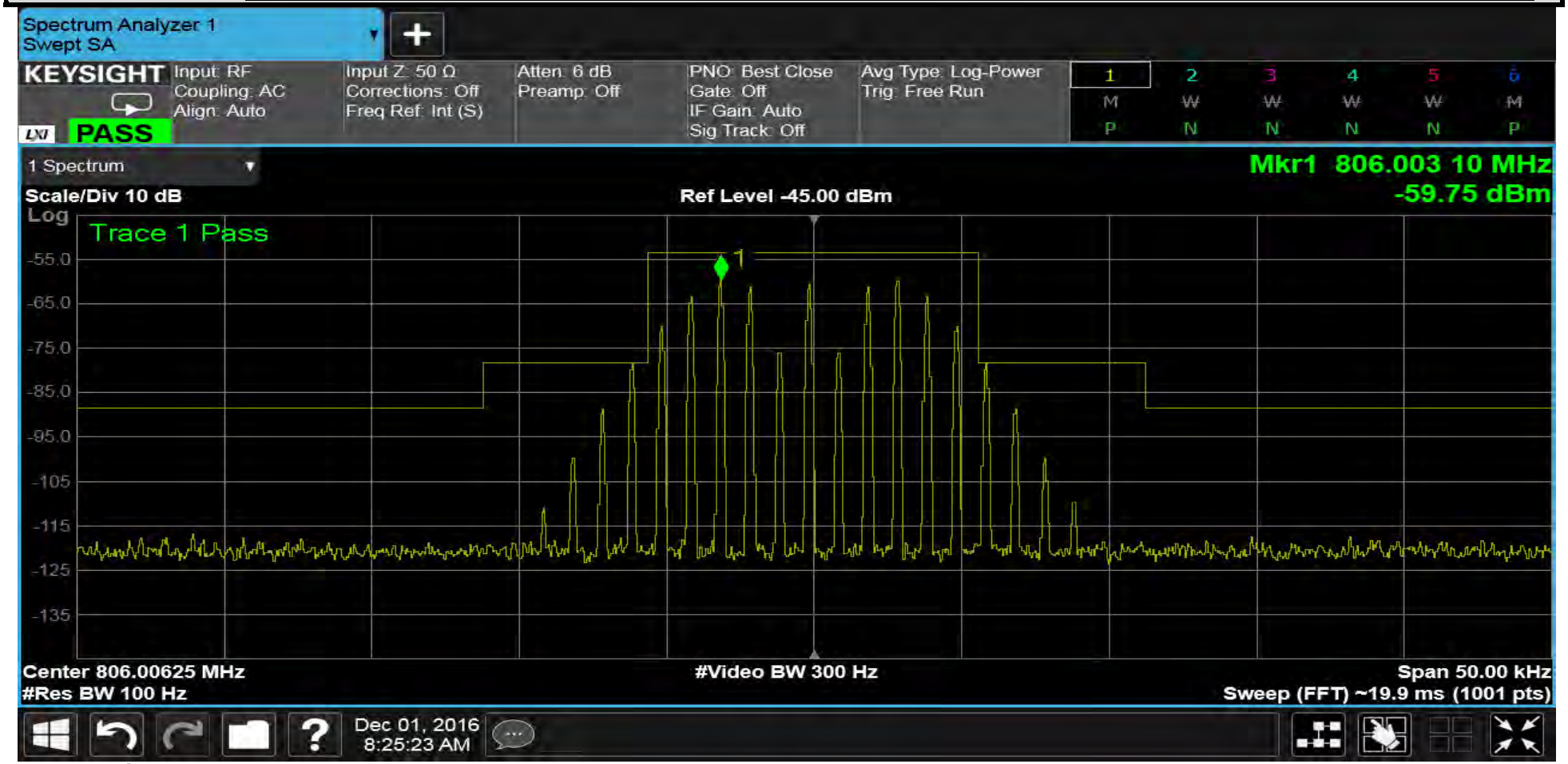
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 806.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 806.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
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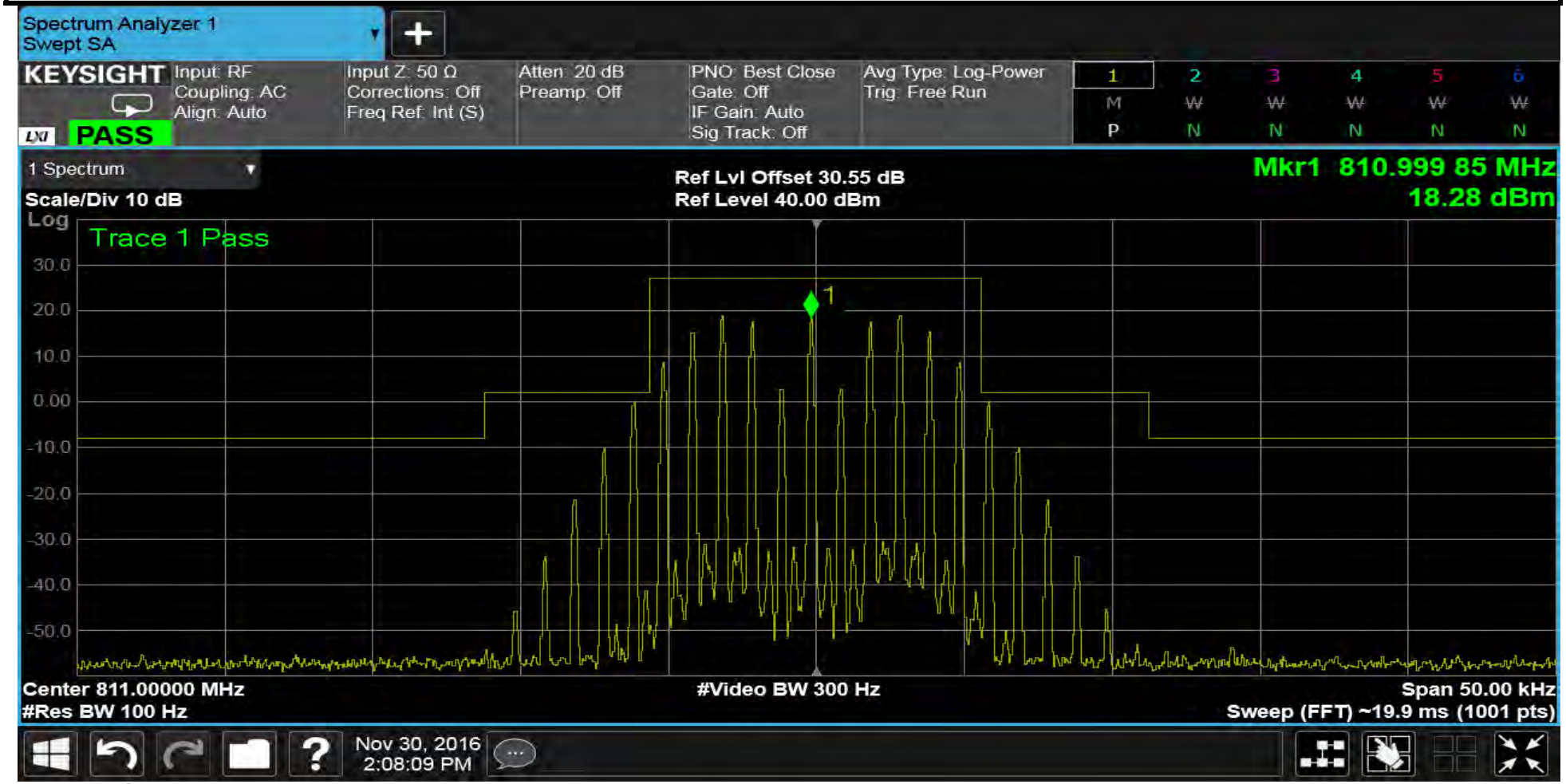
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 811.000MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
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RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
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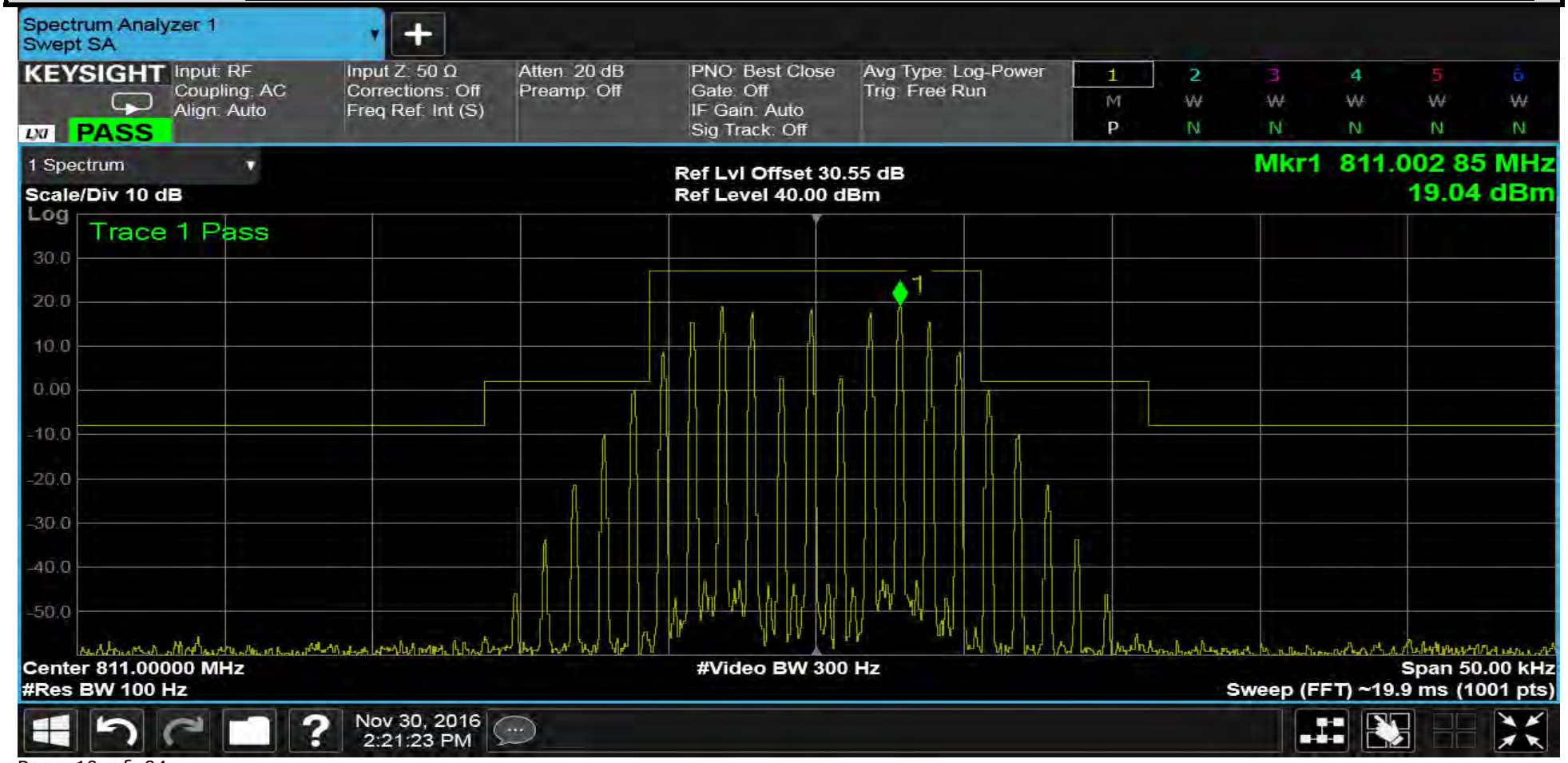

RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 811.000MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		

RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
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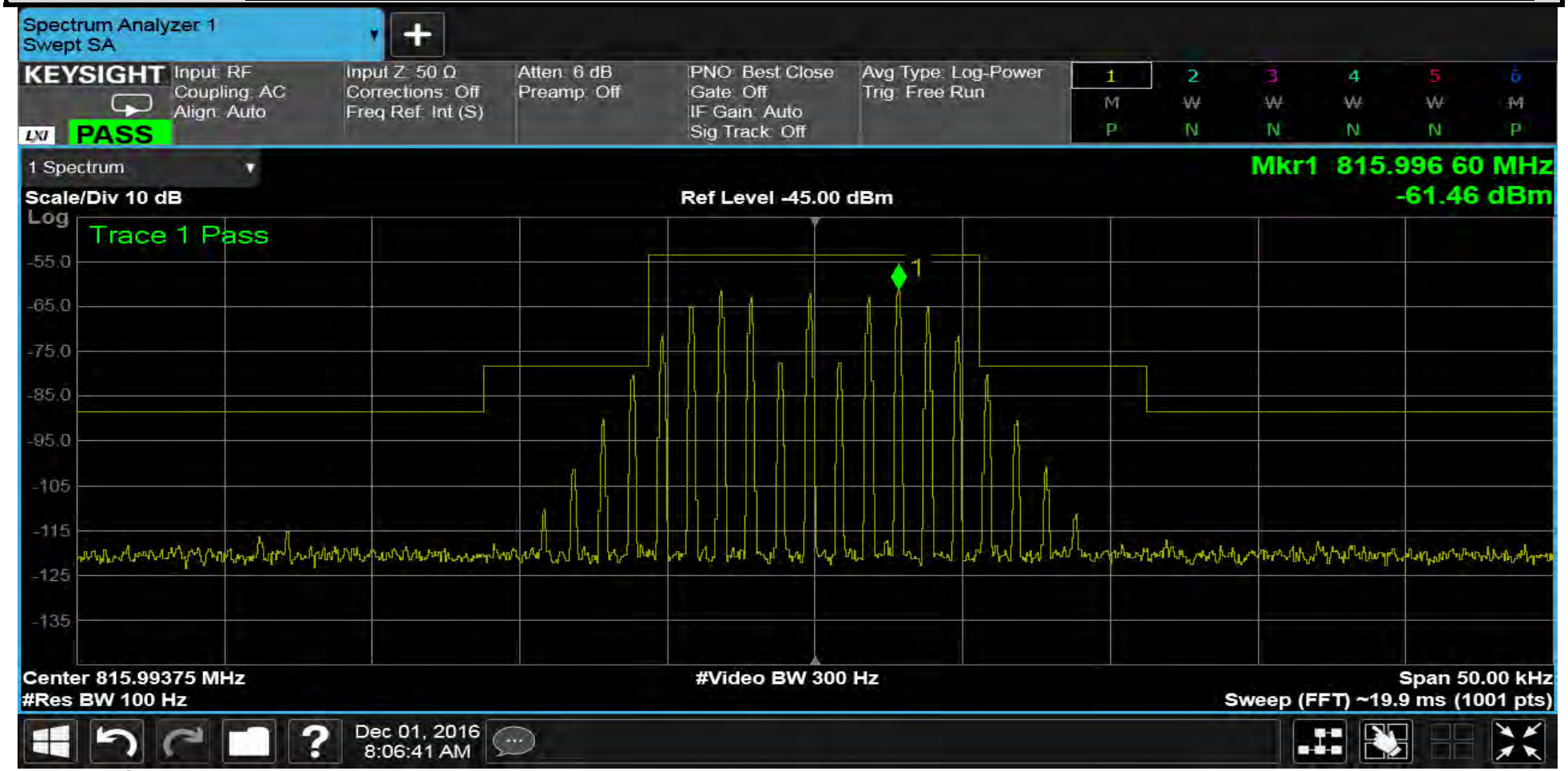
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		

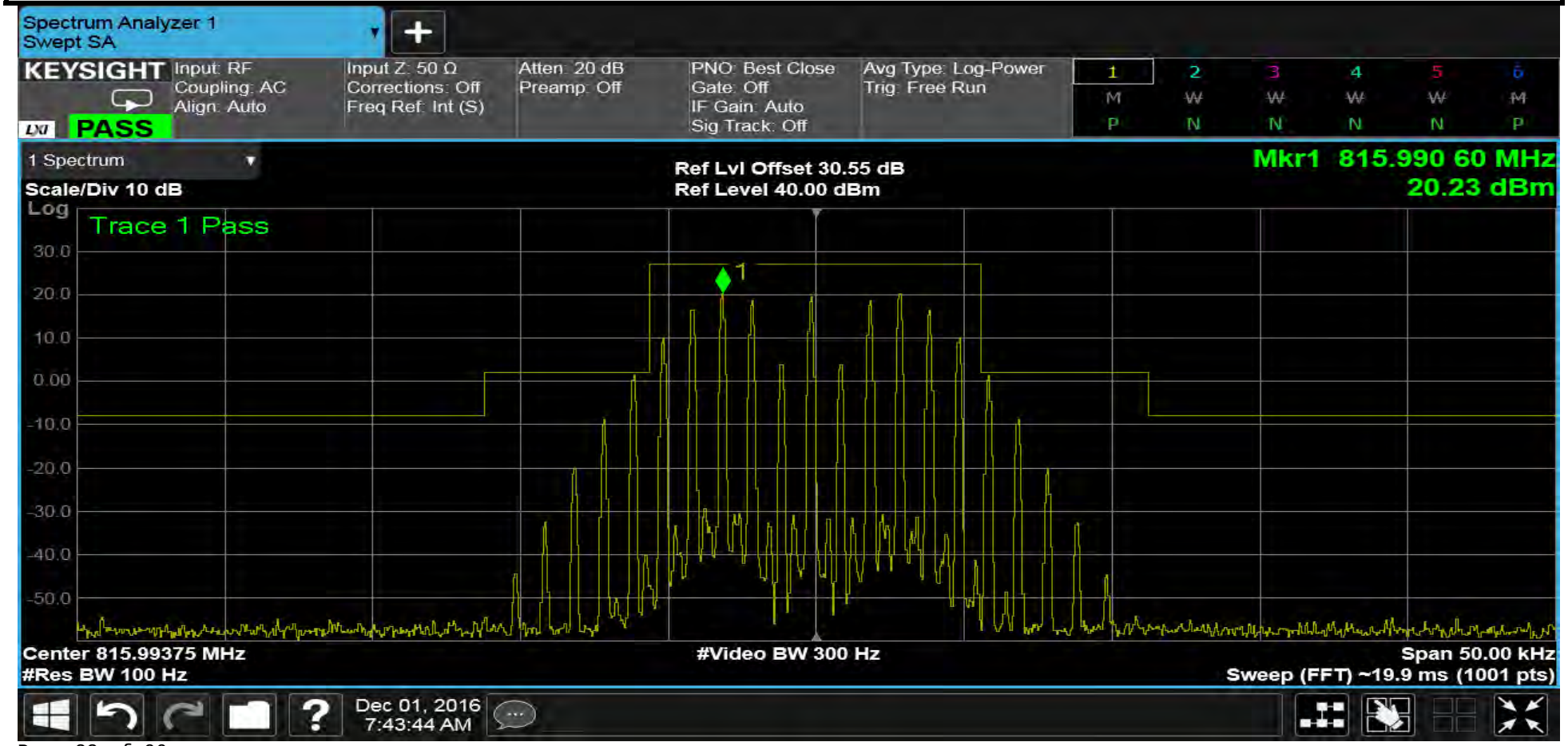
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
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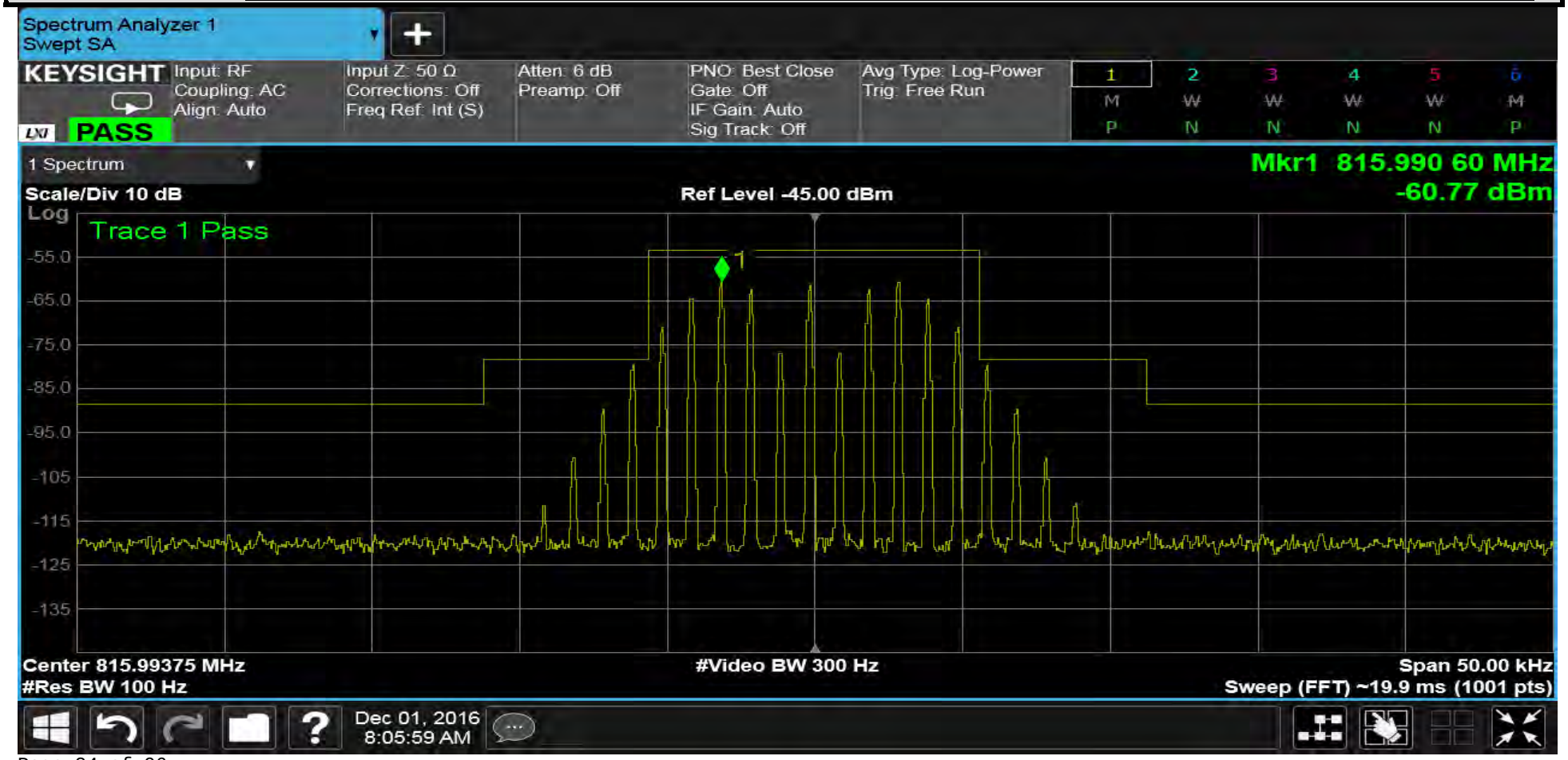
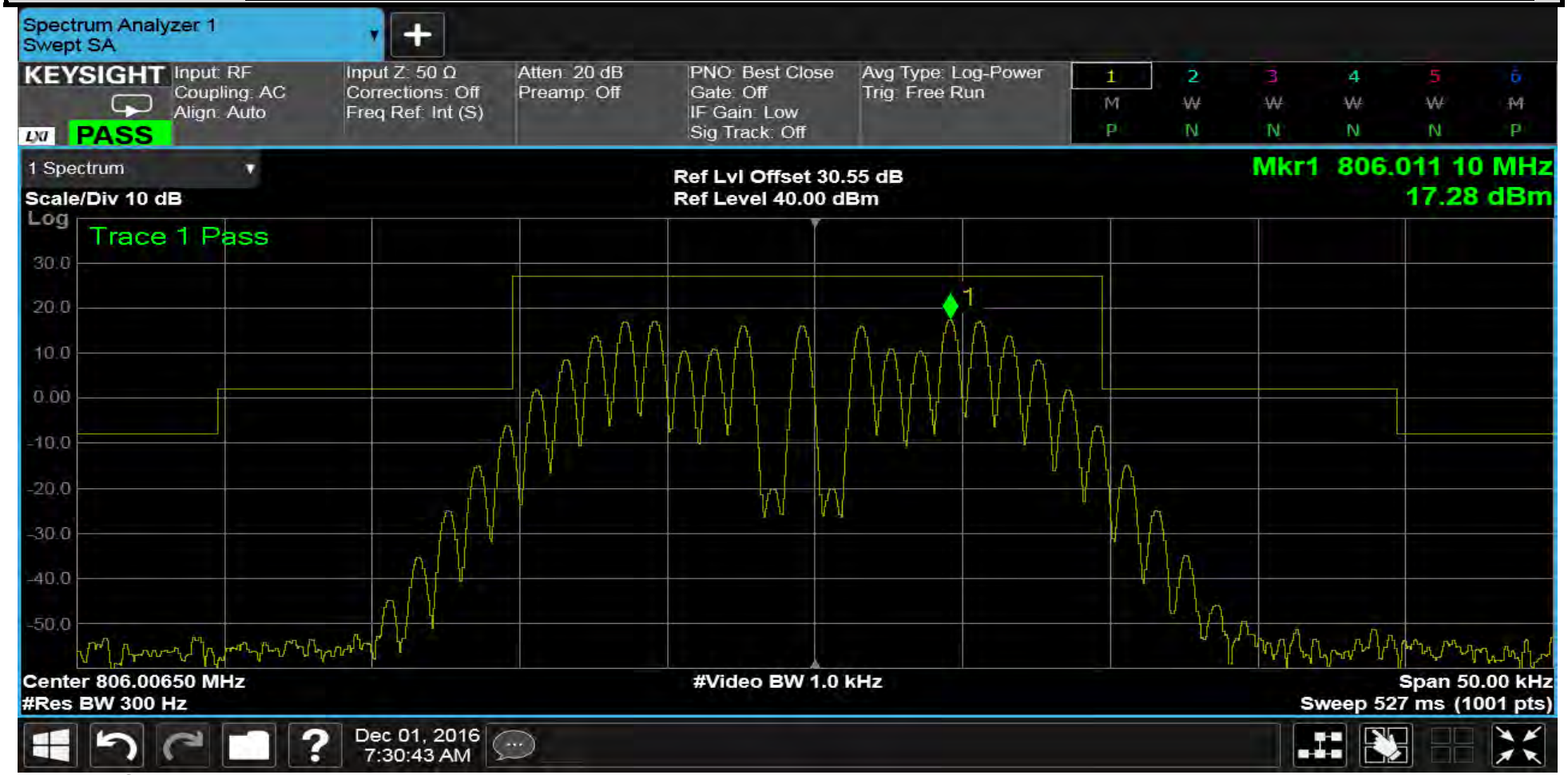
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



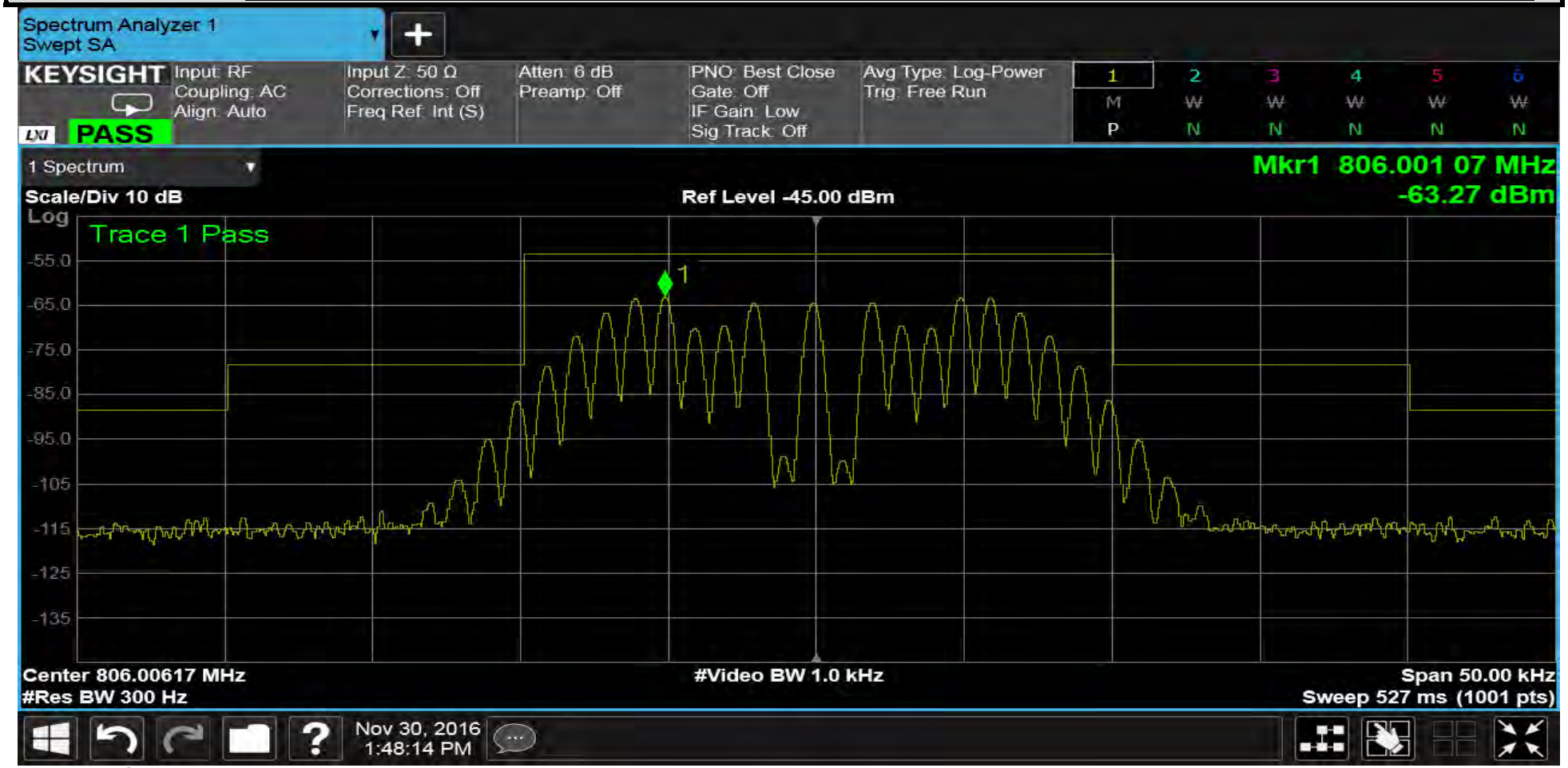
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 806.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 806.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



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Test Method	Input-vs-Output Signal Comparison		
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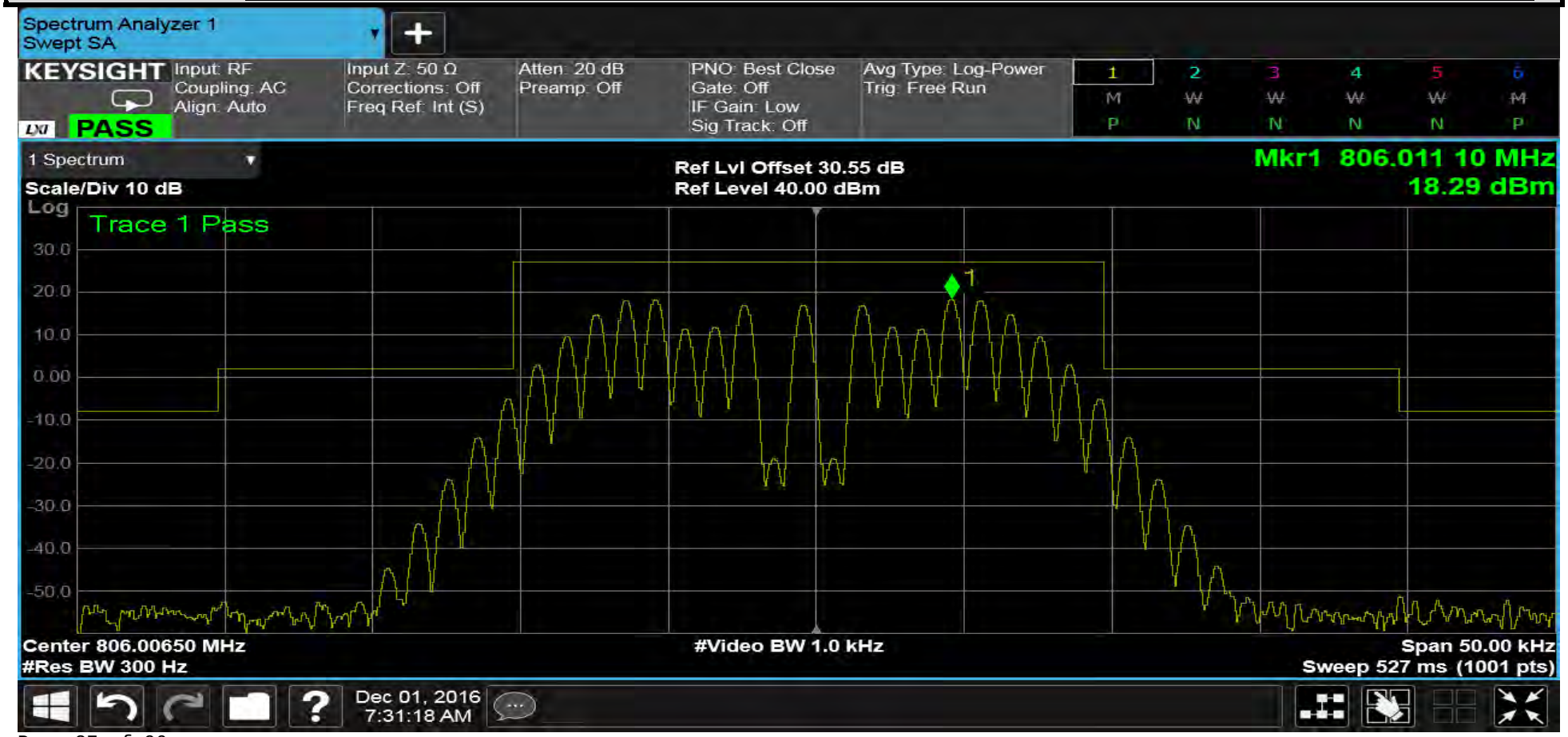

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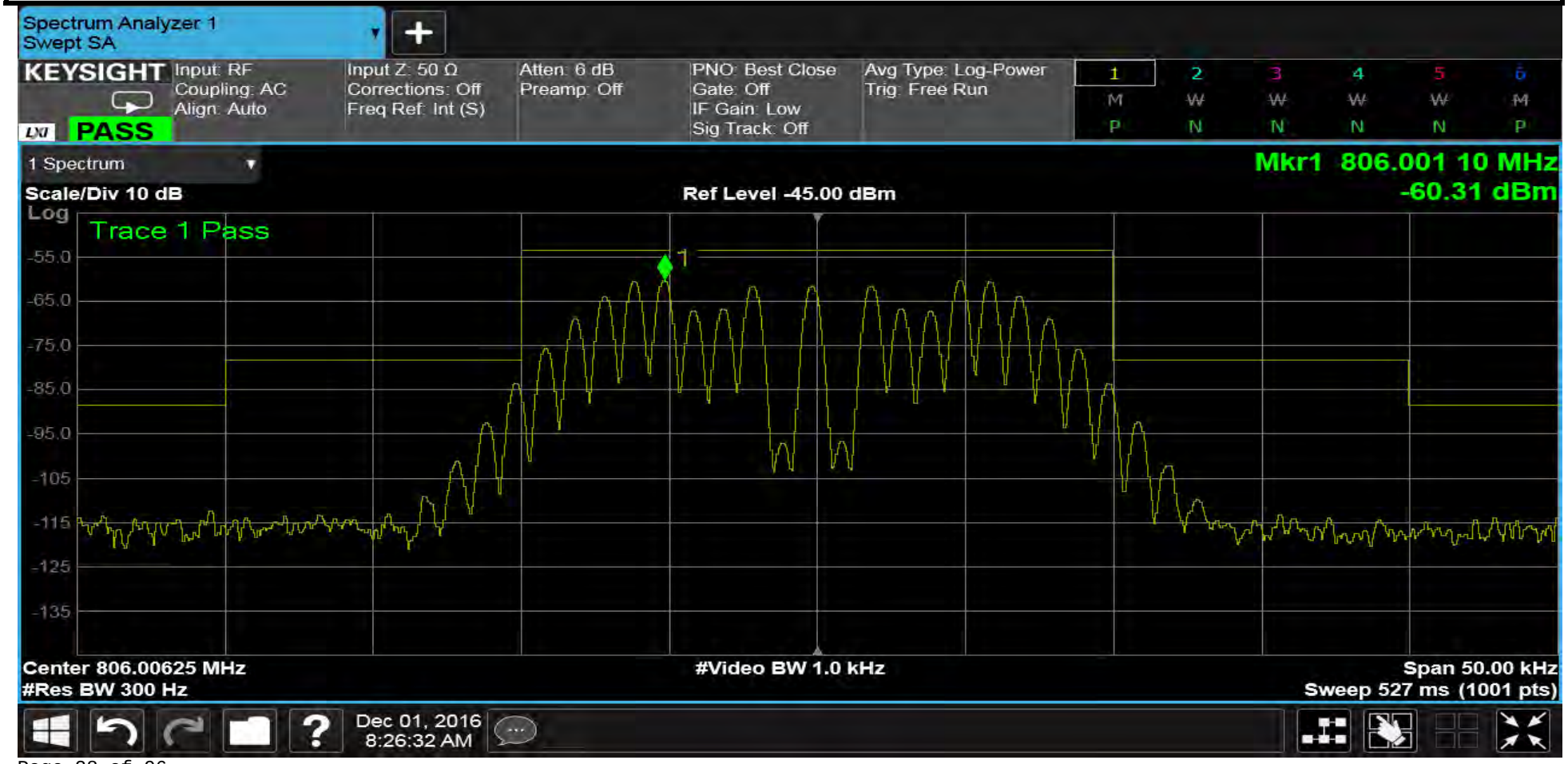

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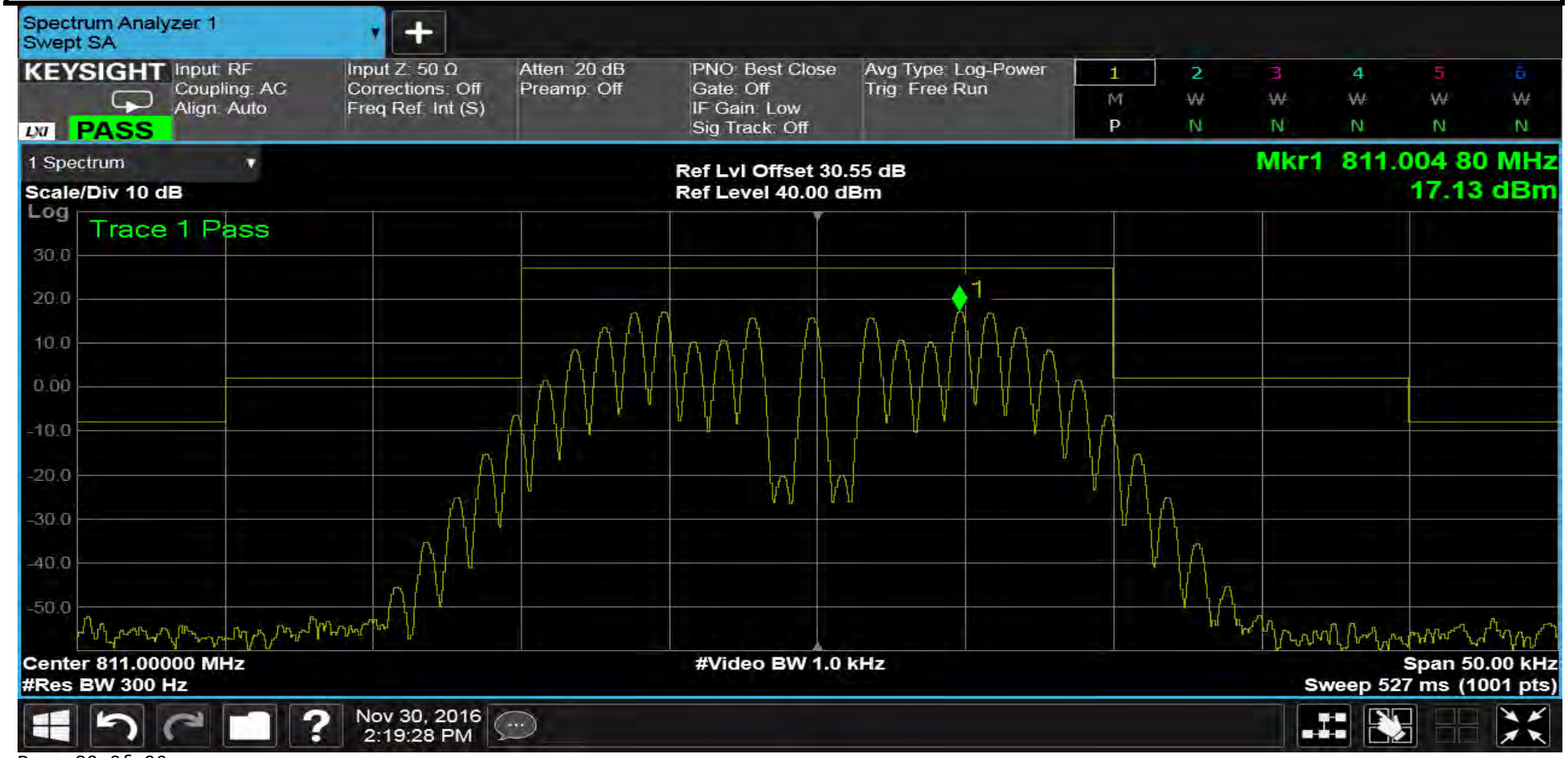

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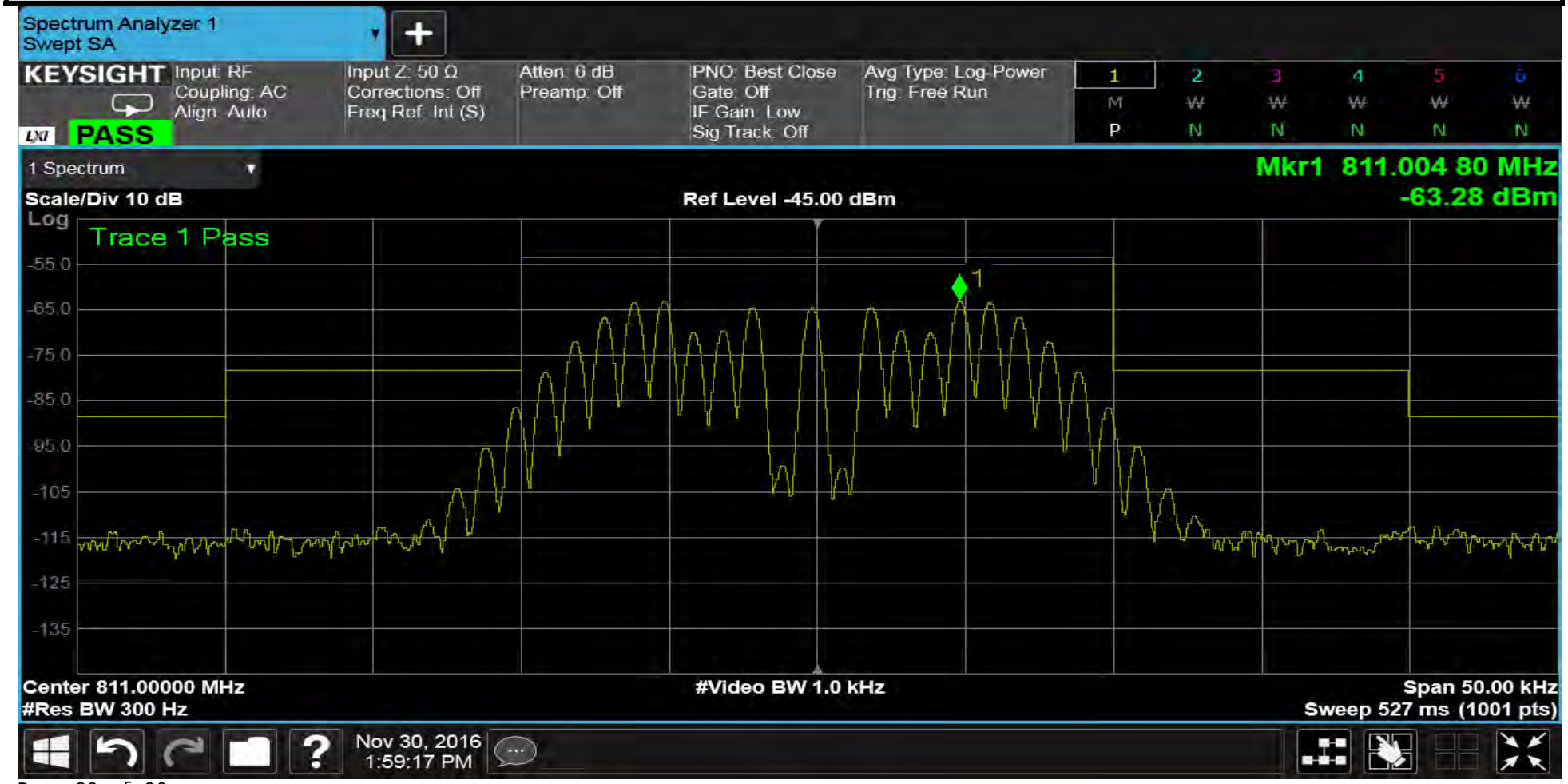

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Test Method	Input-vs-Output Signal Comparison		
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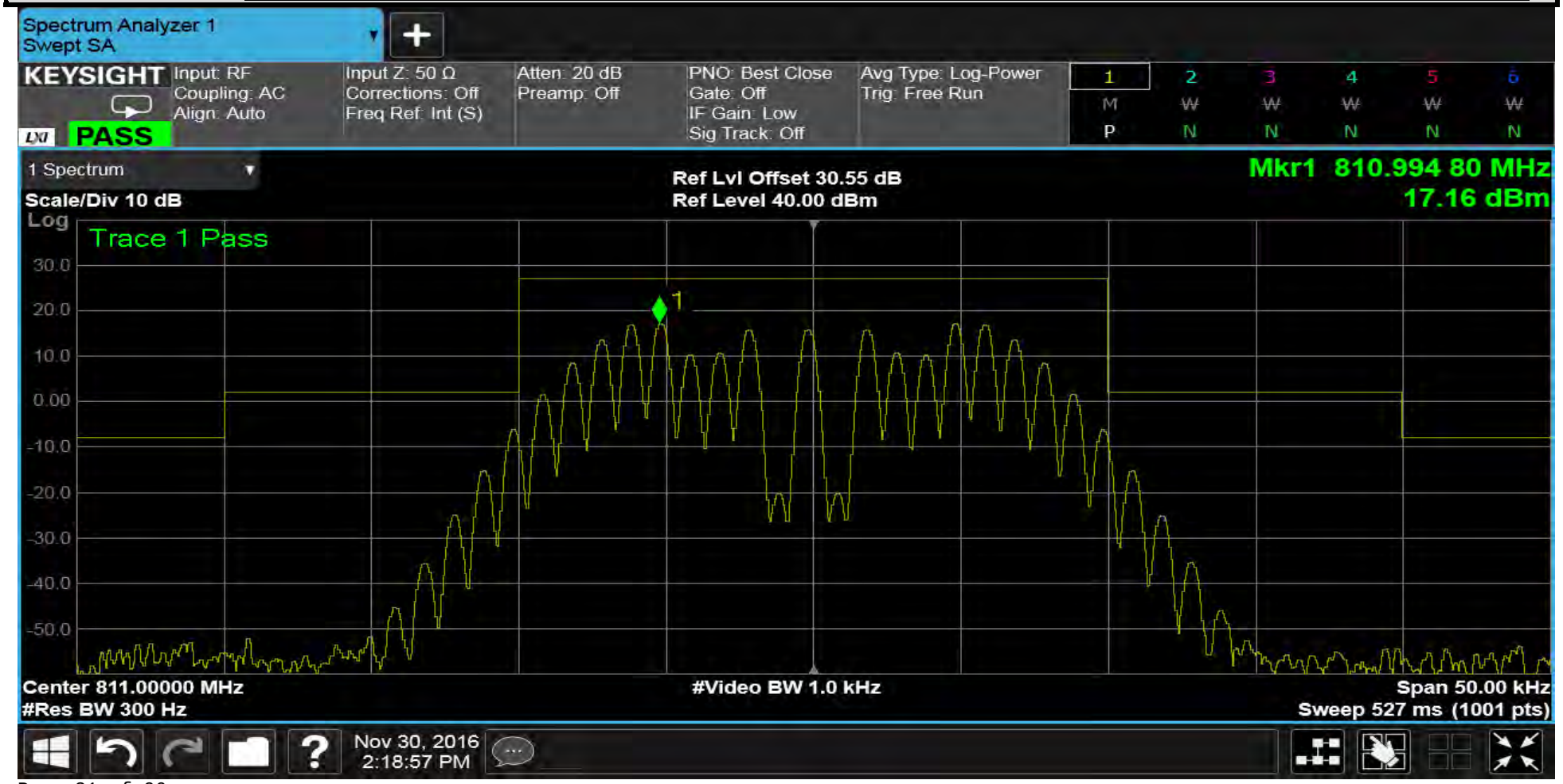

RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
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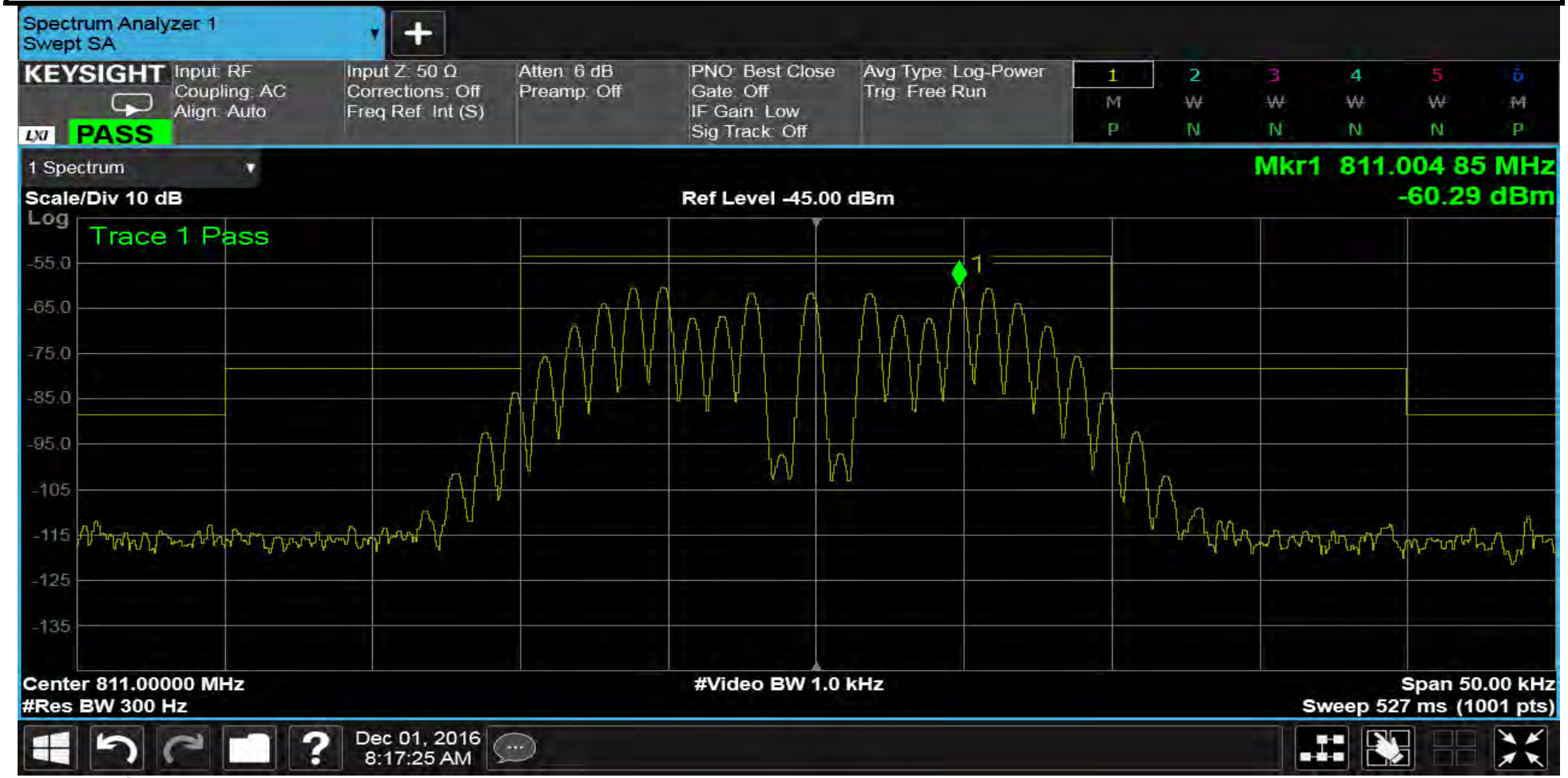
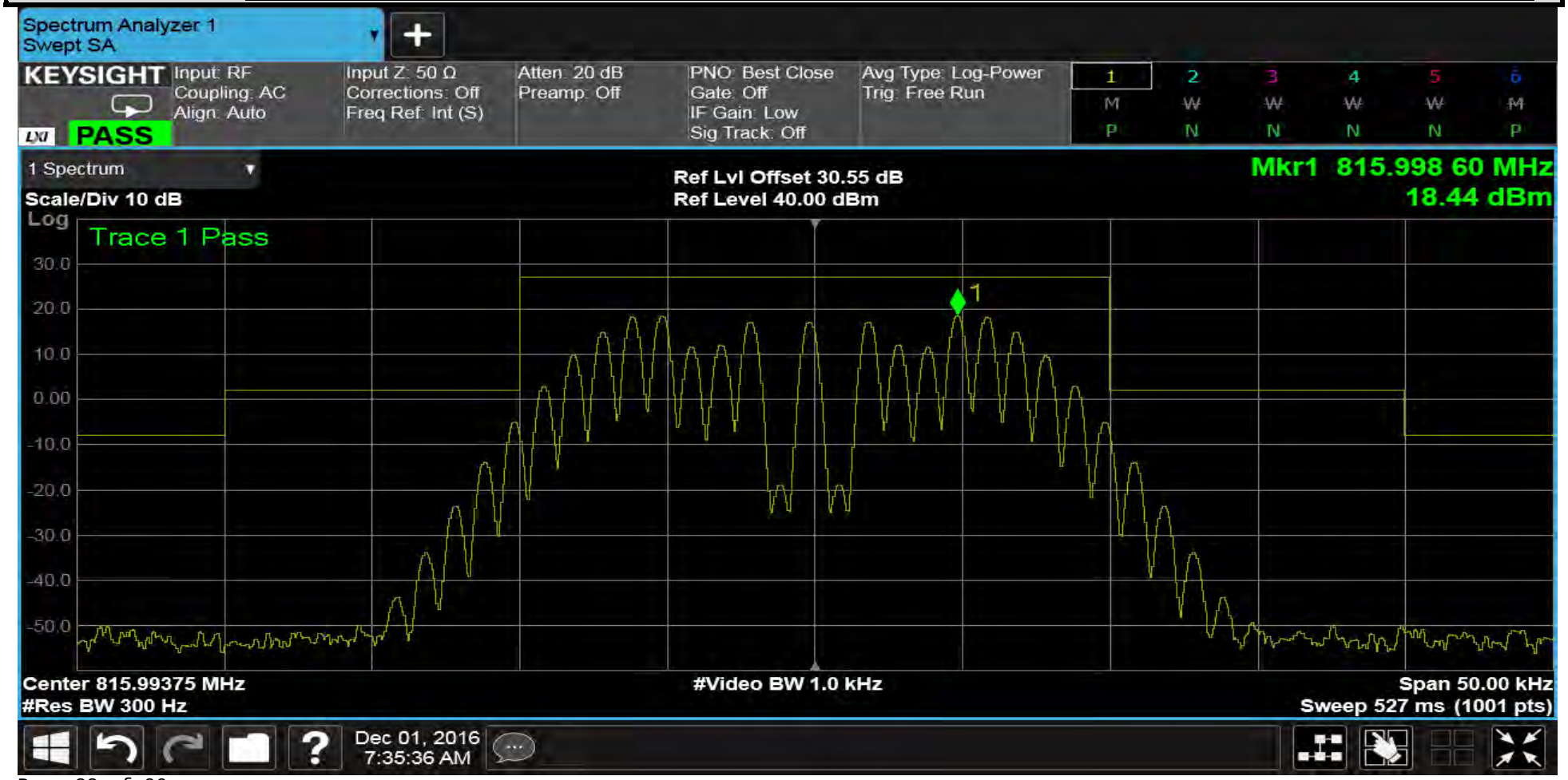


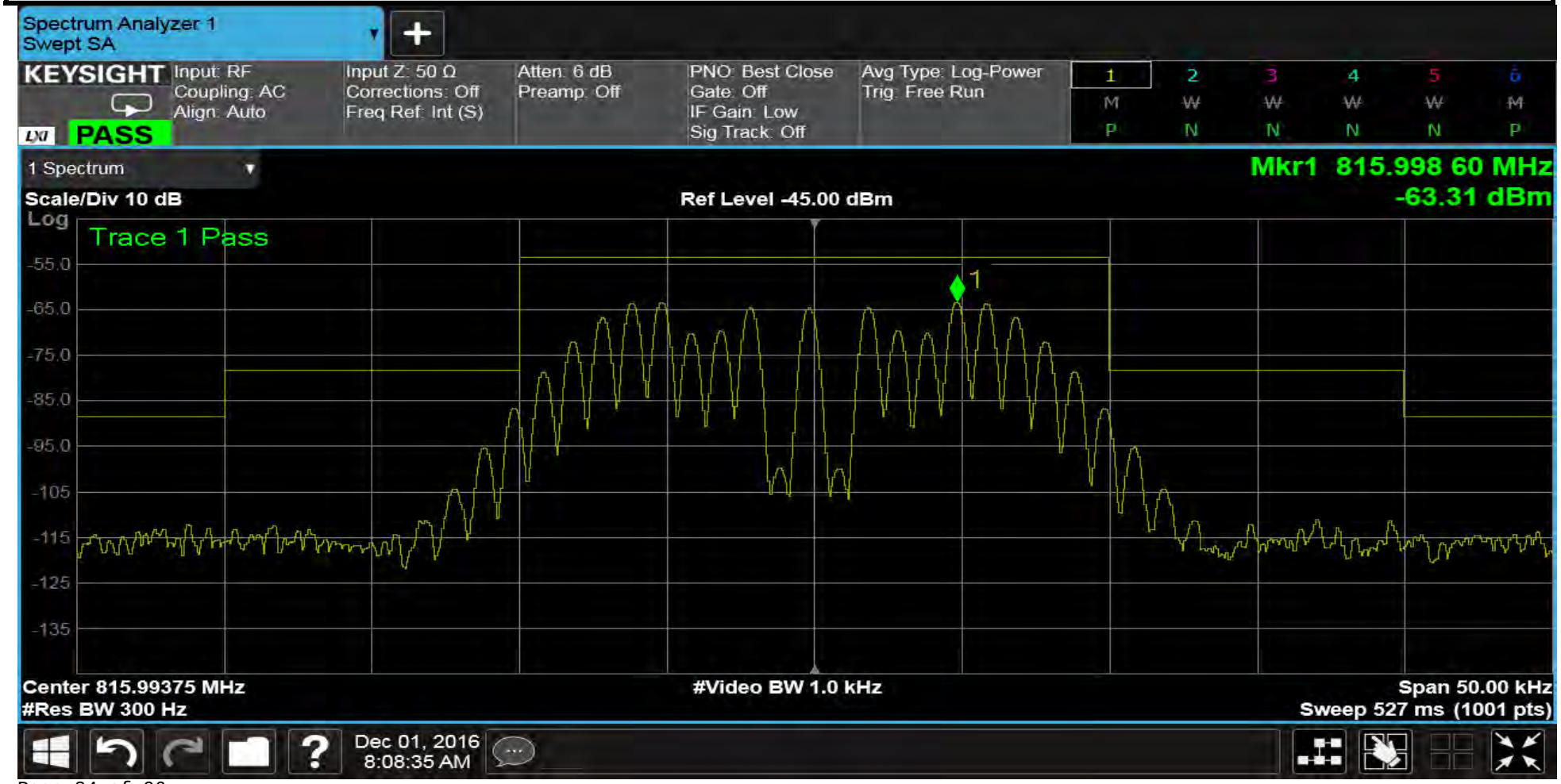
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



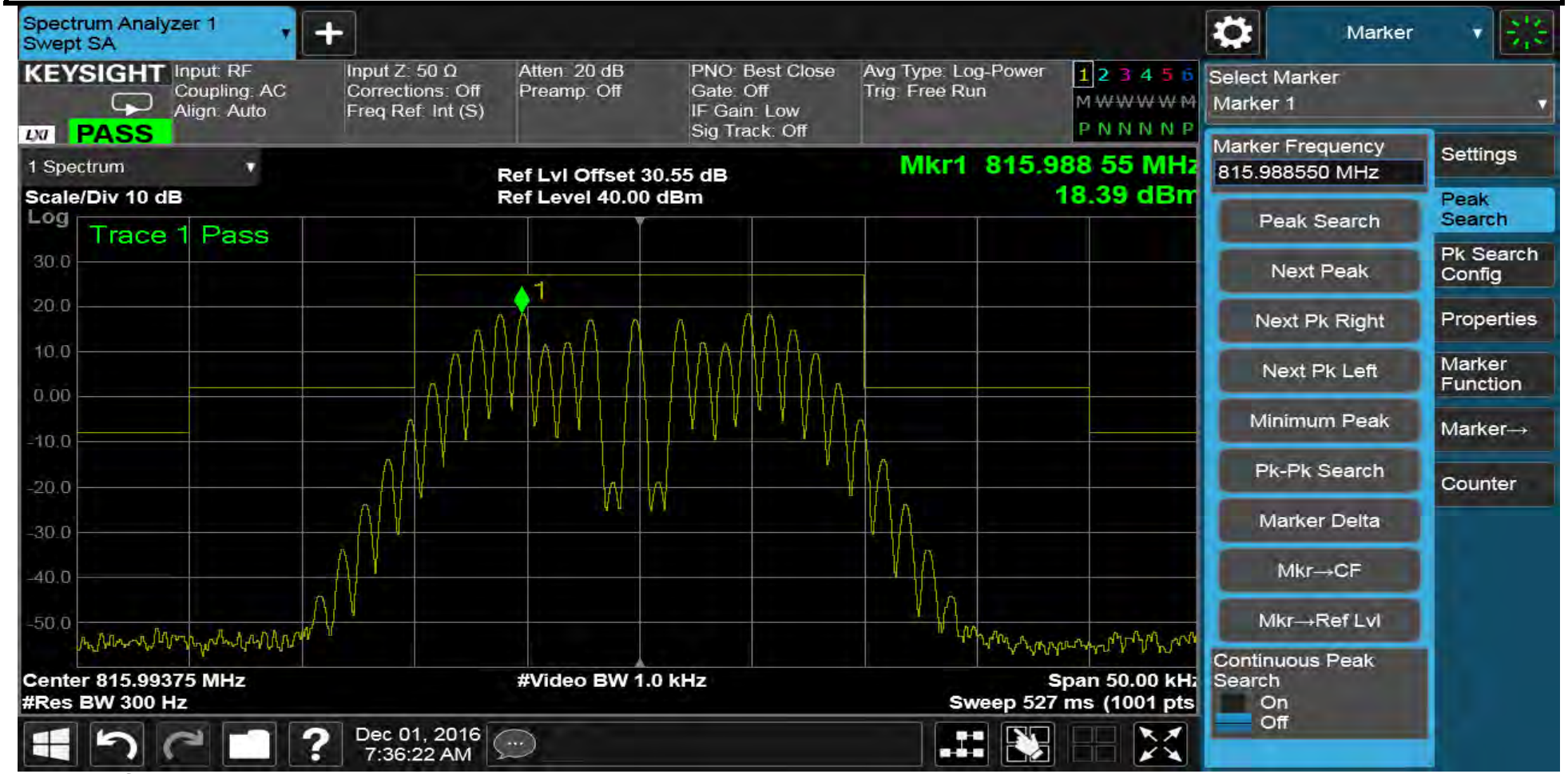
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



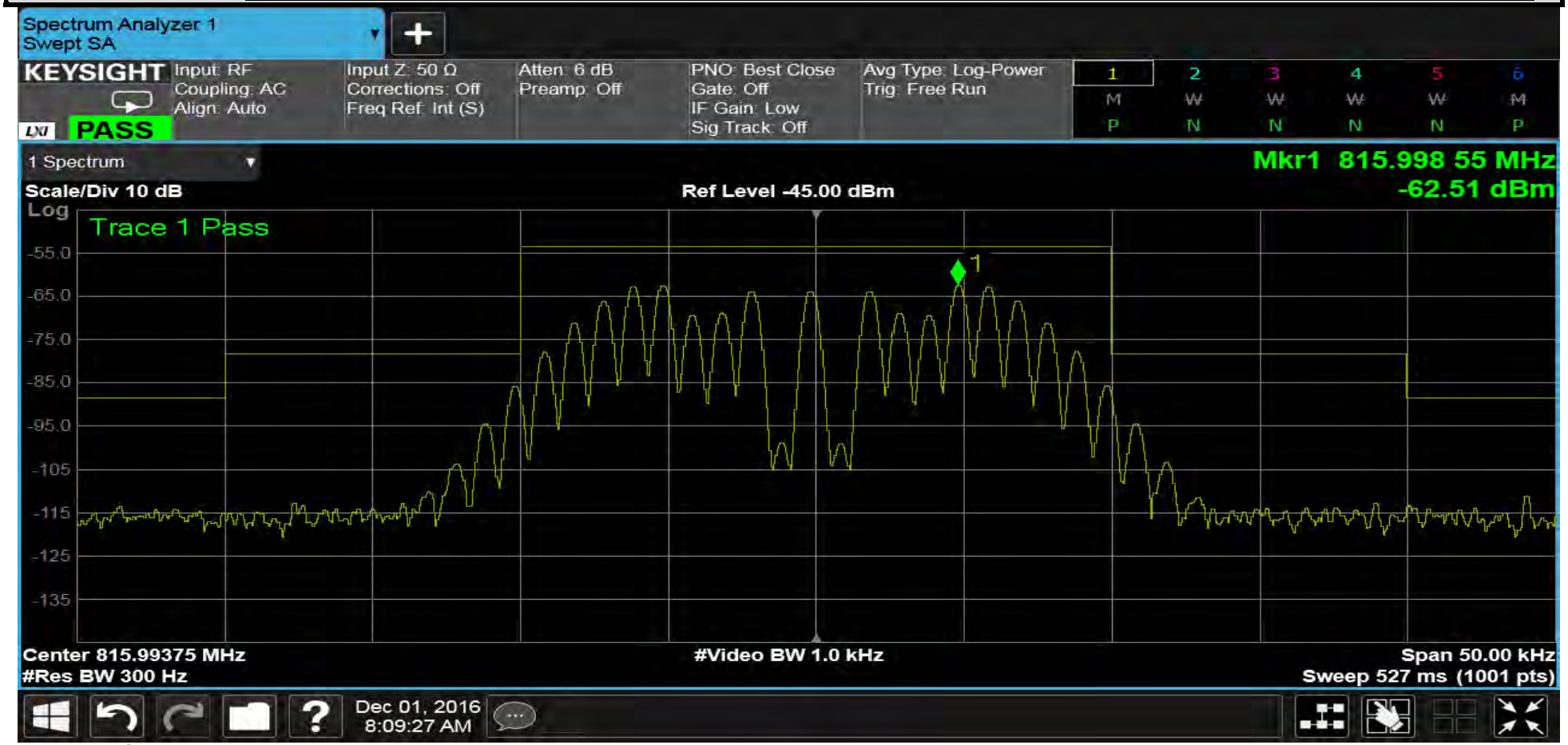
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Output: 815.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



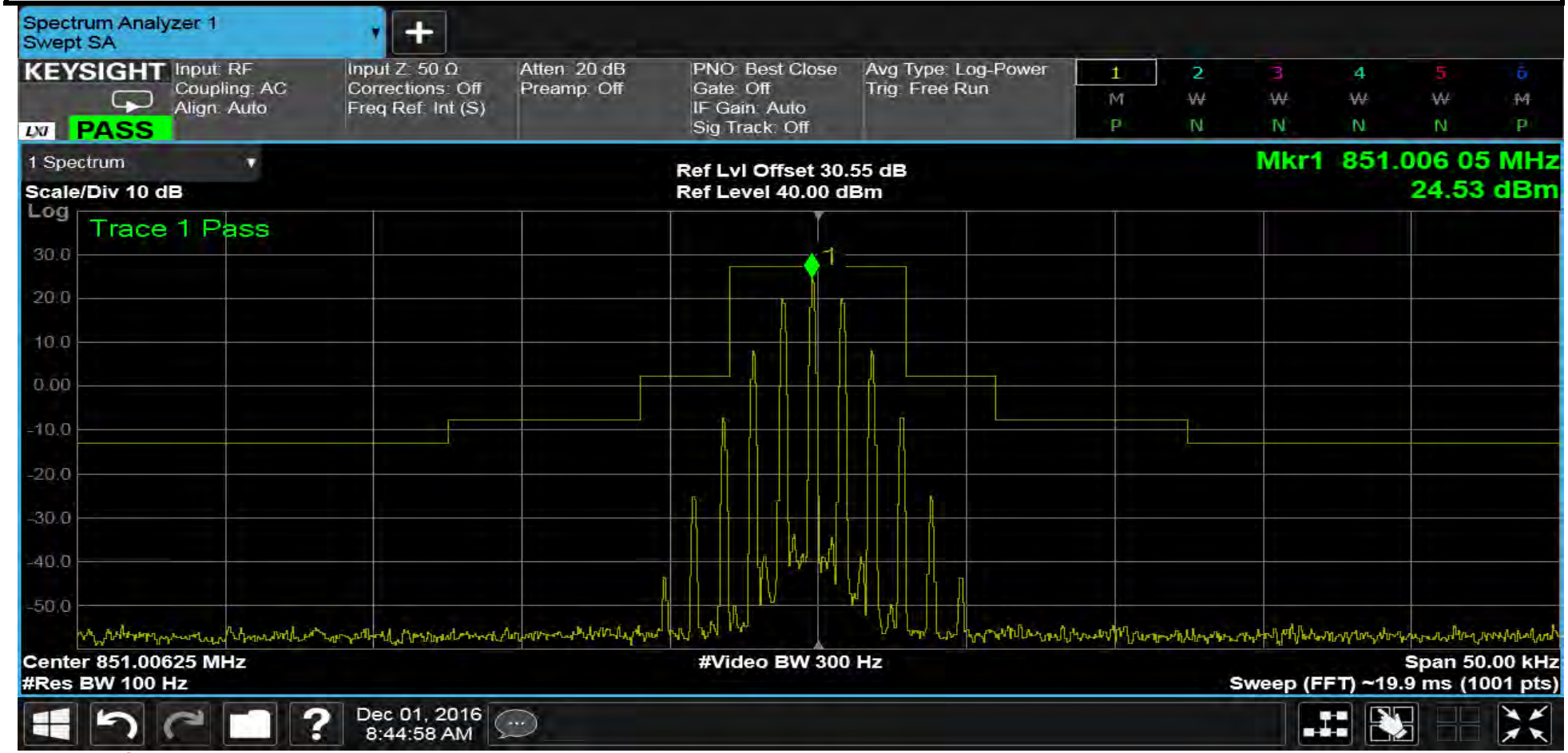
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Uplink Input: 815.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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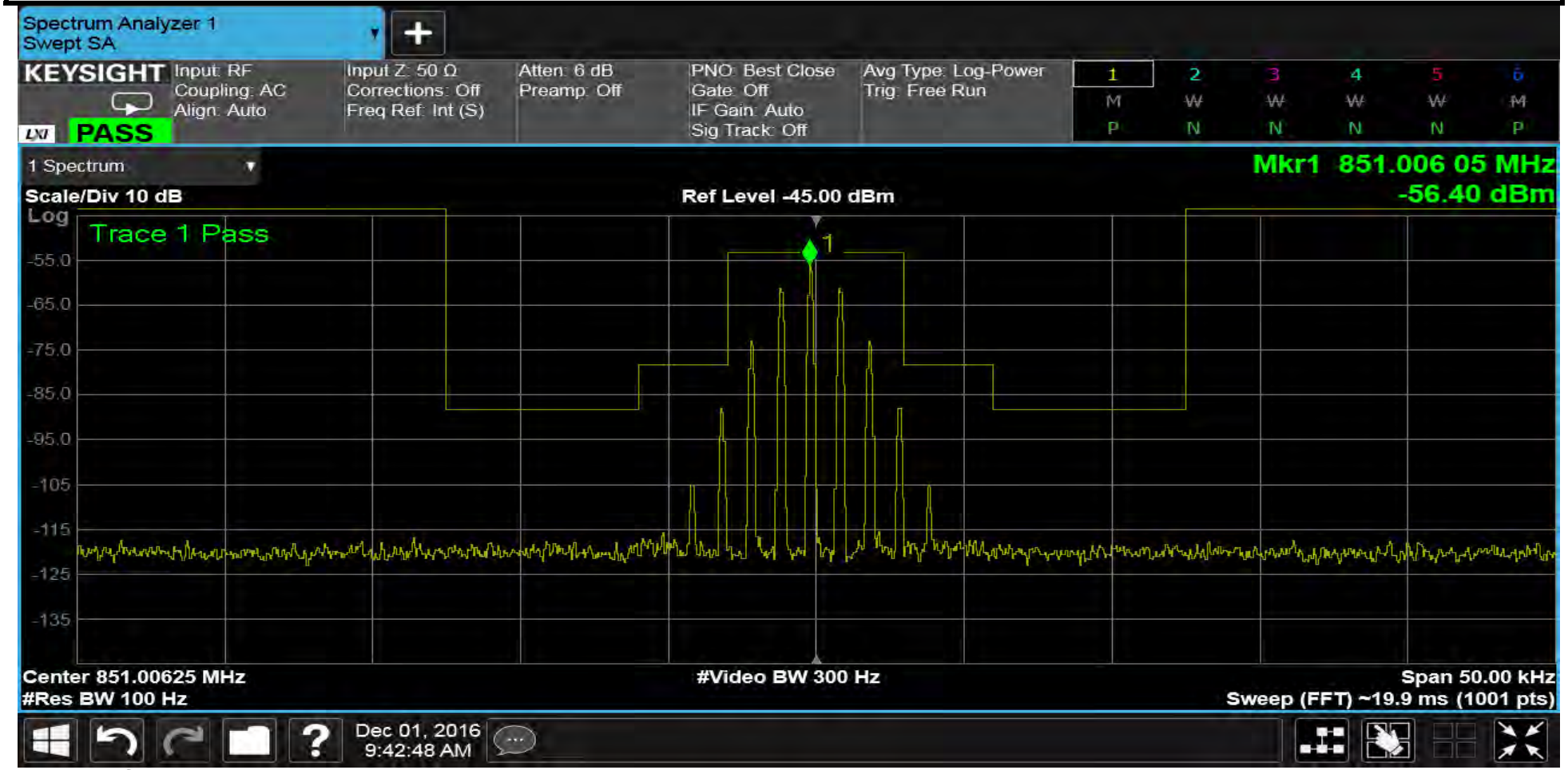
Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 851.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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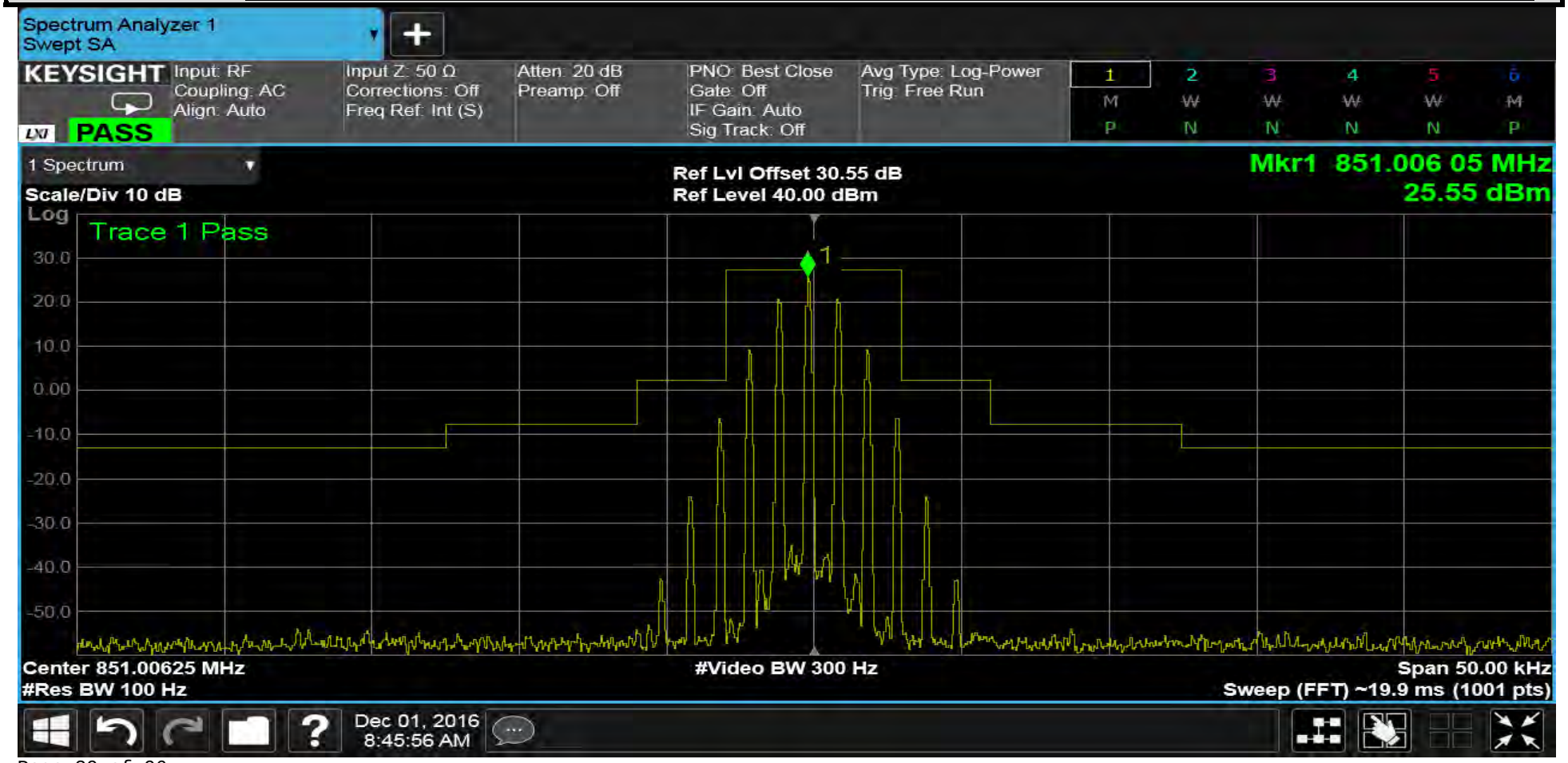
Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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Test Sample	Bi-Directional Amplifier		
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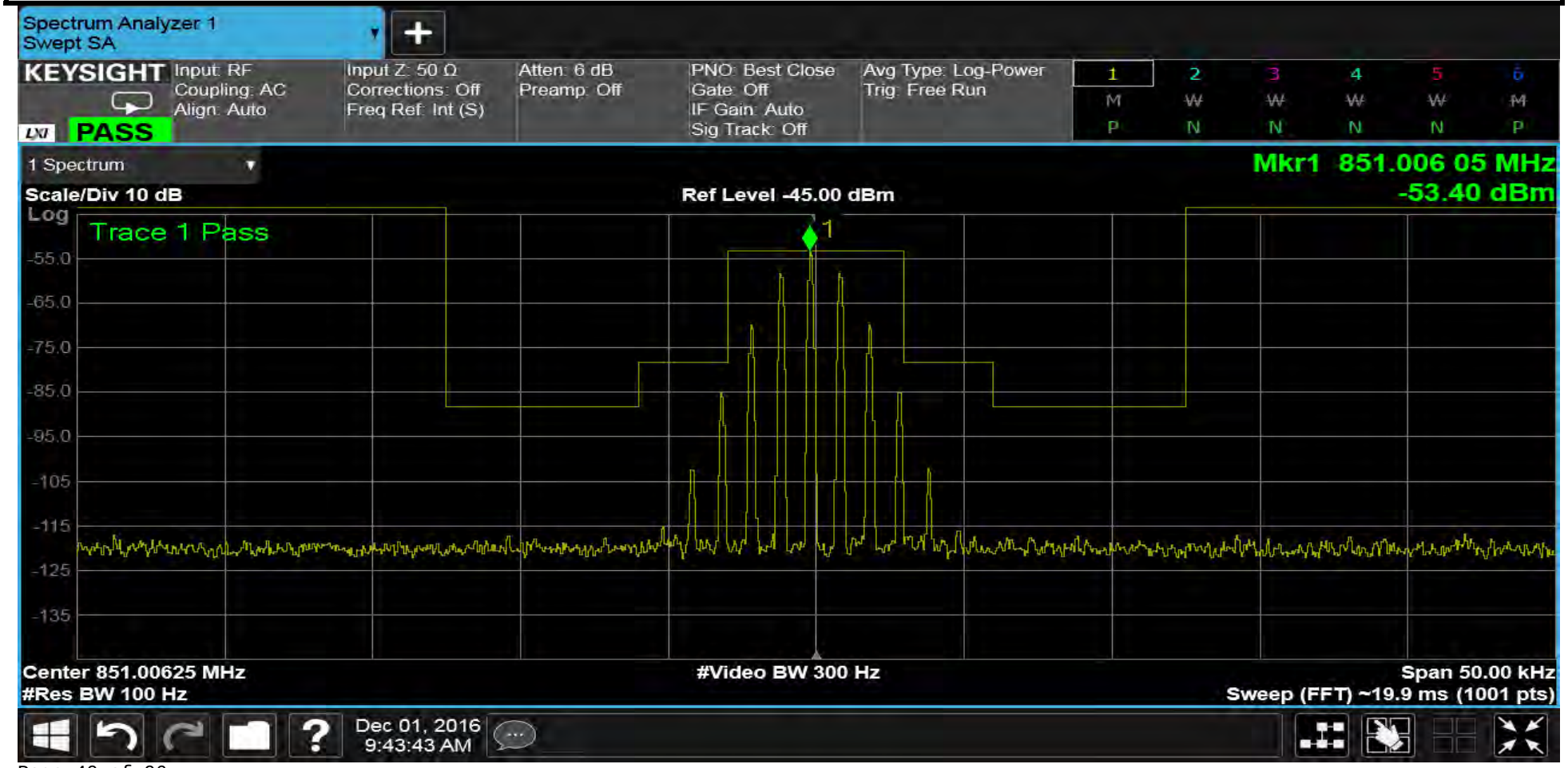
Notes	Downlink Input: 851.00625MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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Test Method	Input-vs-Output Signal Comparison		
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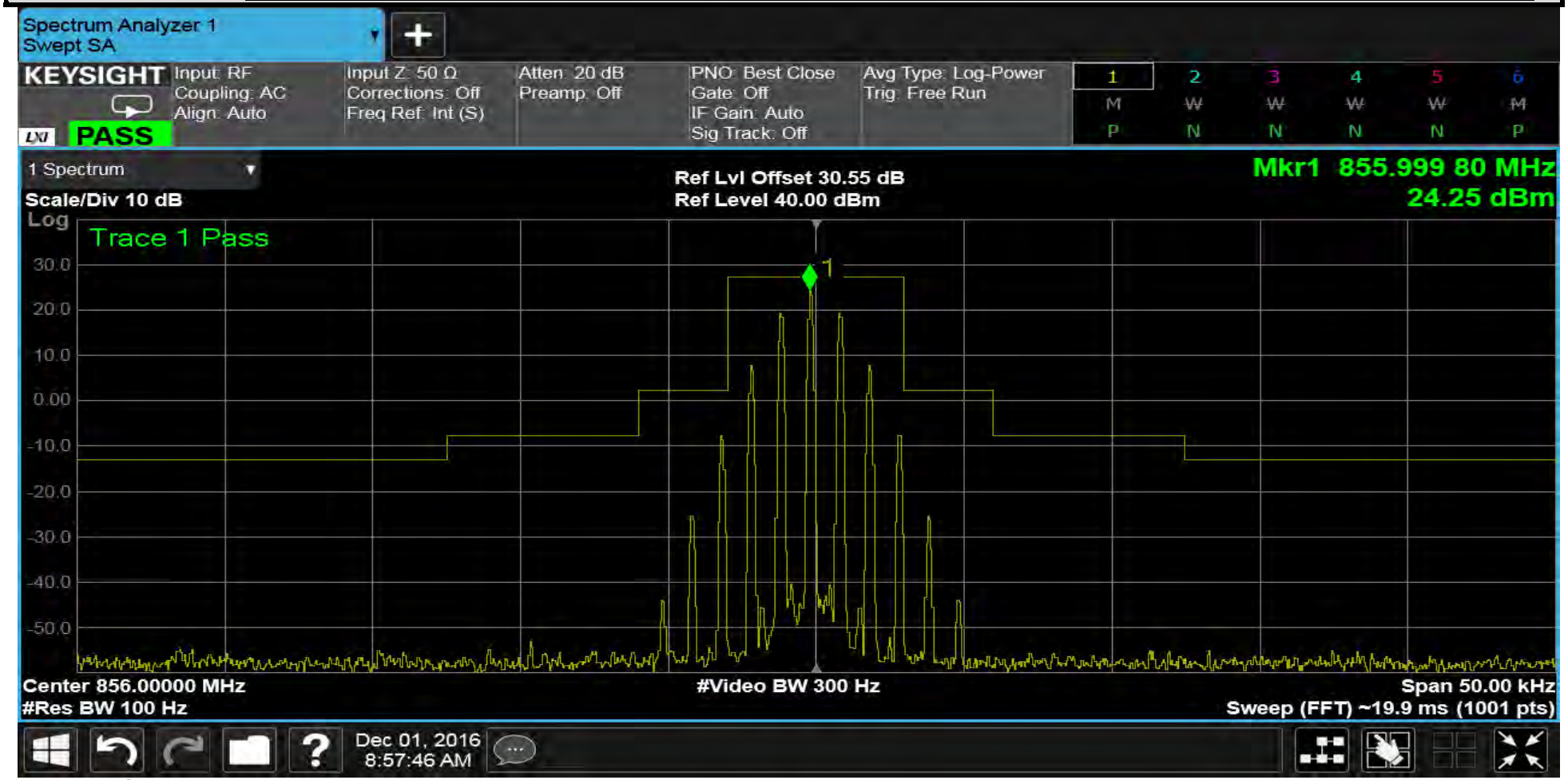

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Test Method	Input-vs-Output Signal Comparison		
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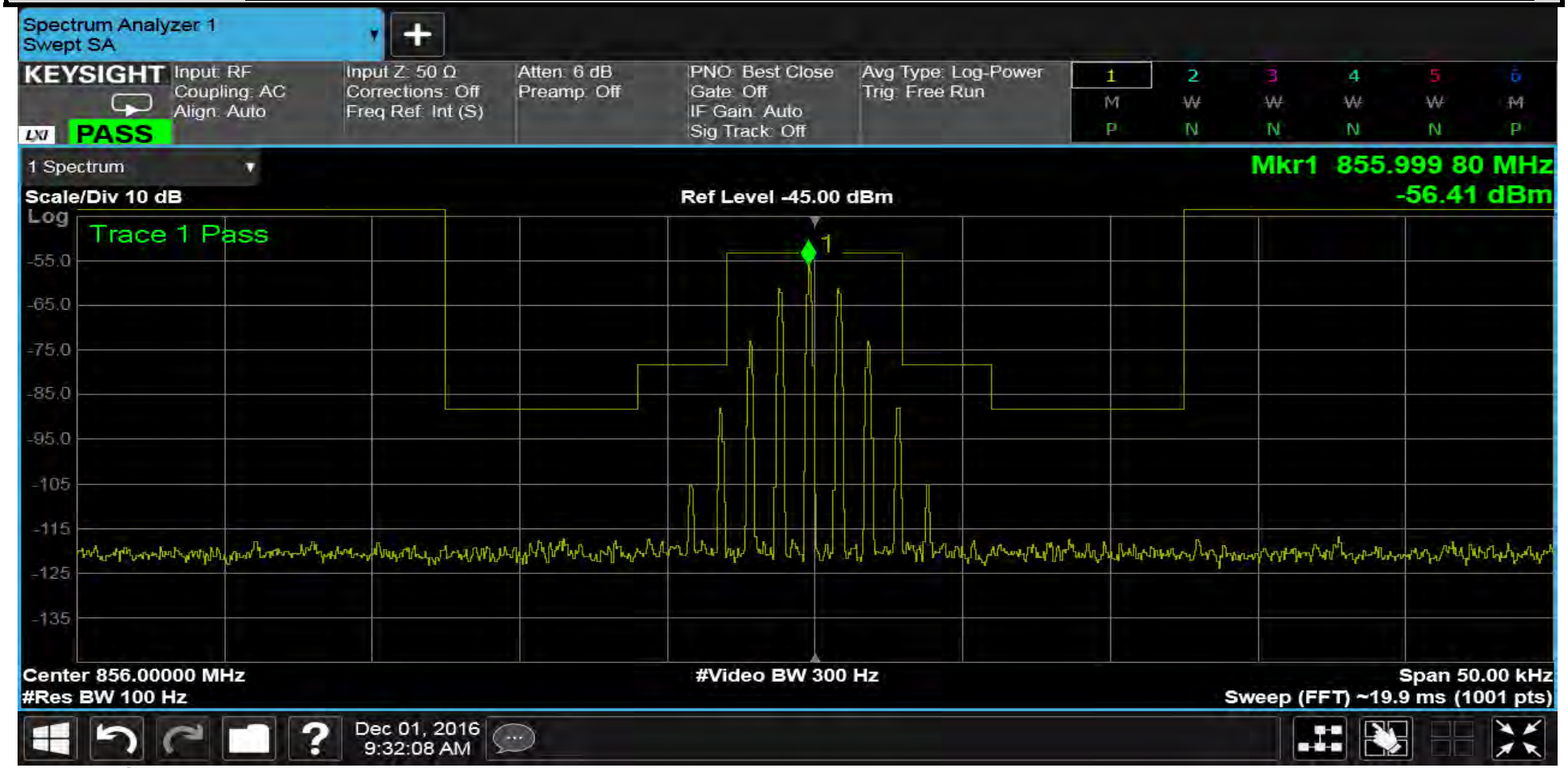

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Test Method	Input-vs-Output Signal Comparison		
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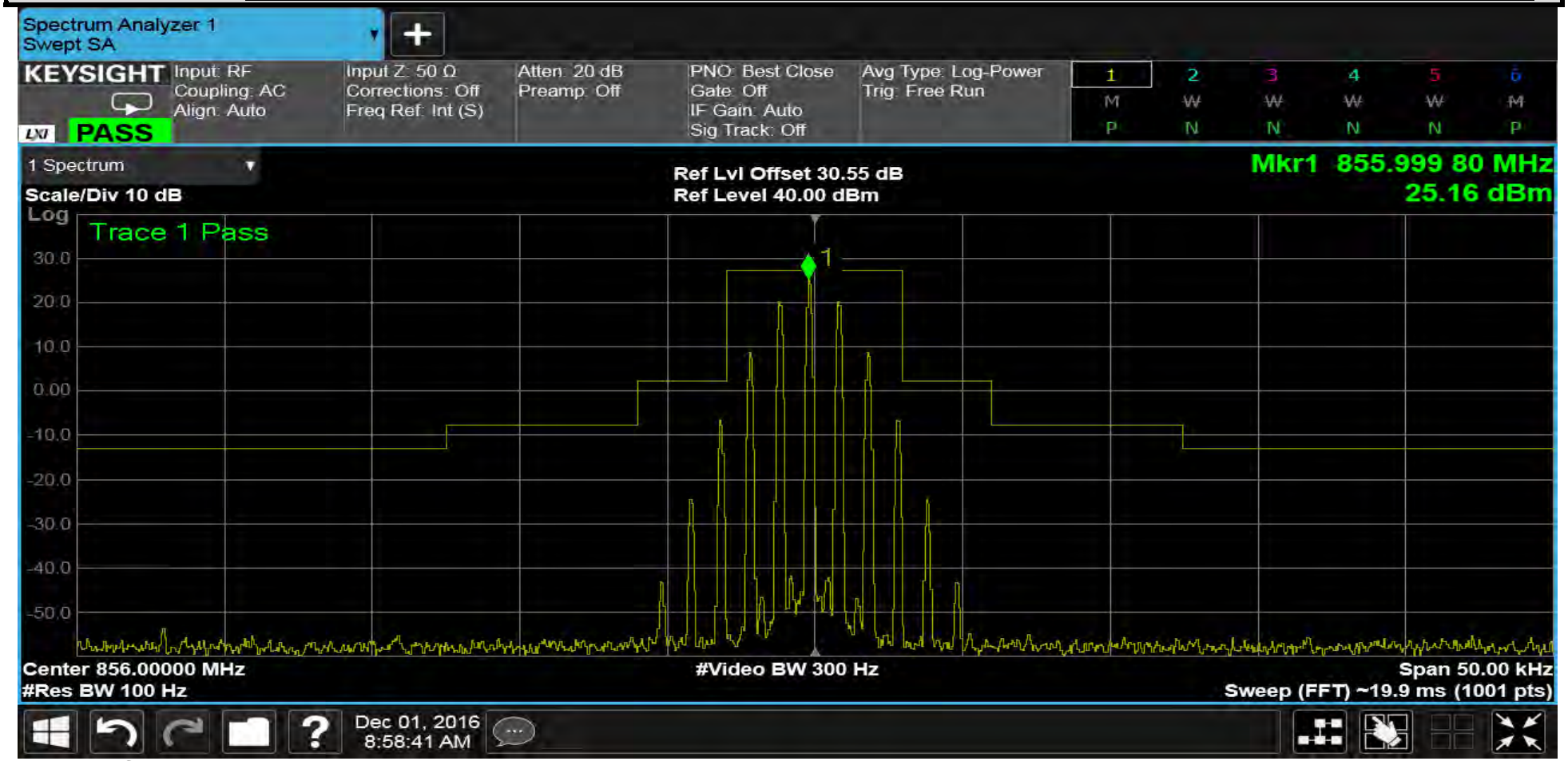

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Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
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Technician	M. Seamans	**Date**	December 1st, 2016
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Test Method	Input-vs-Output Signal Comparison		
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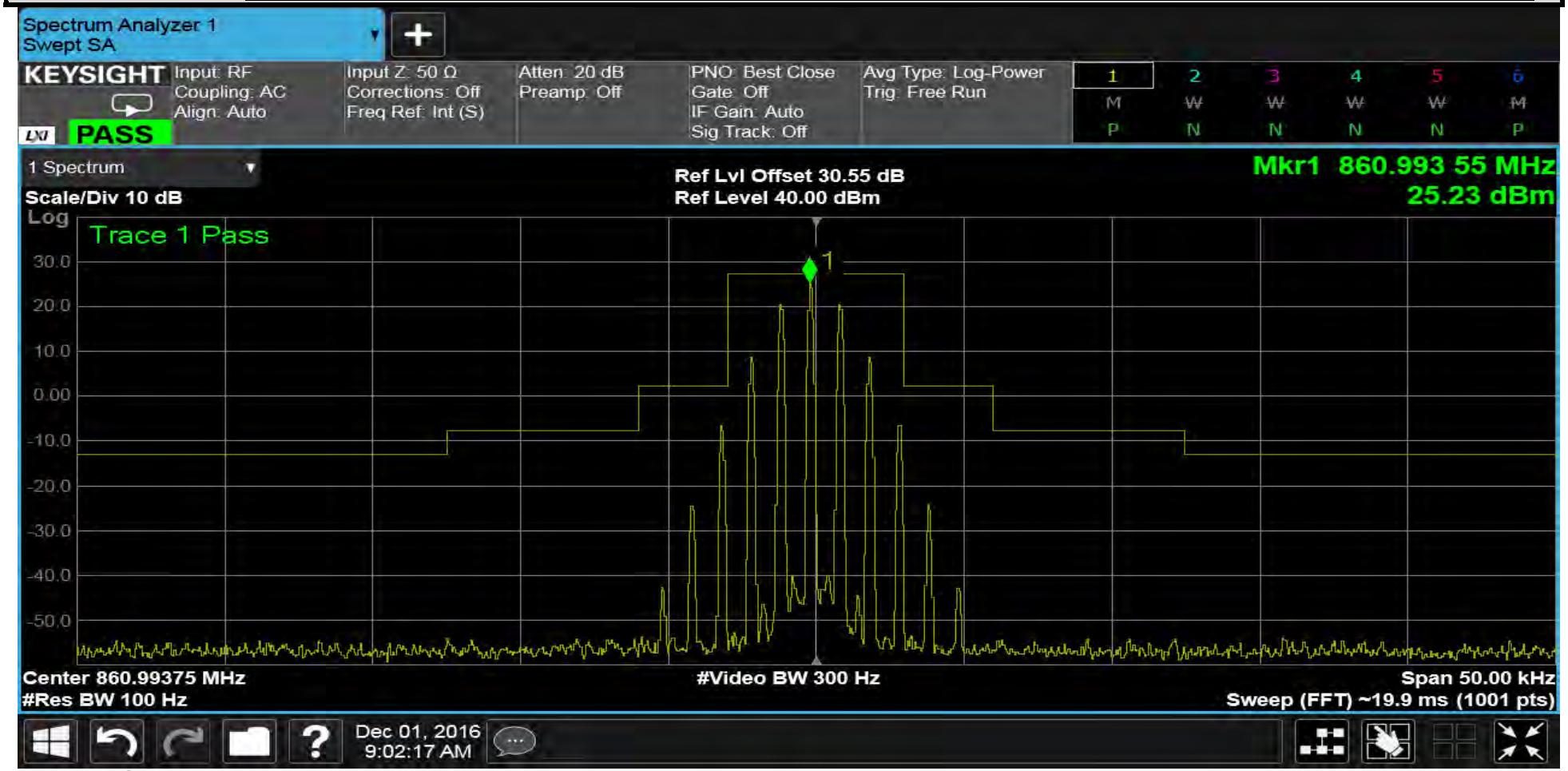
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 860.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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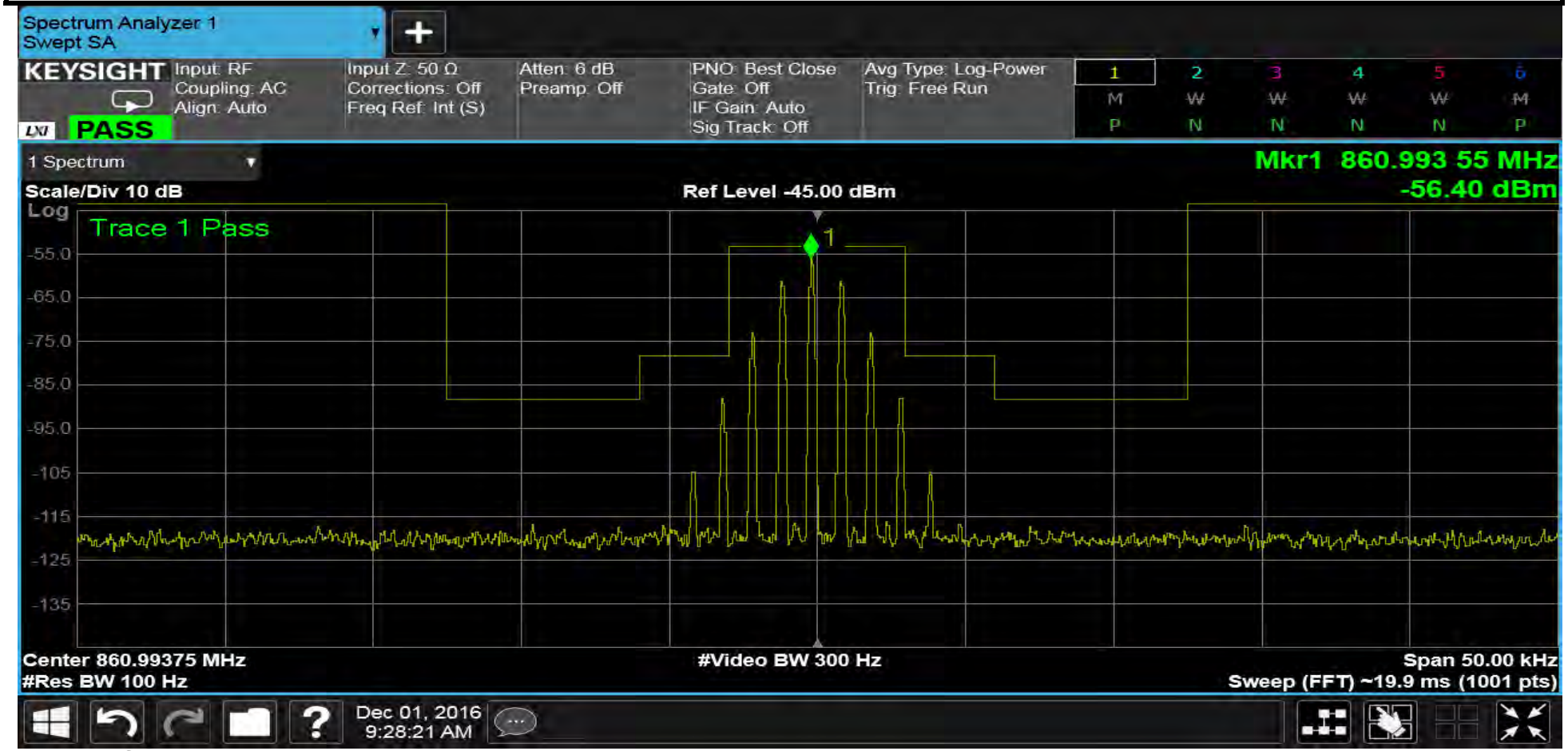
Notes	Downlink Input: 860.99375MHz Modulation: 4K00F1E Authorized BW: 6kHz Emission Mask: B		



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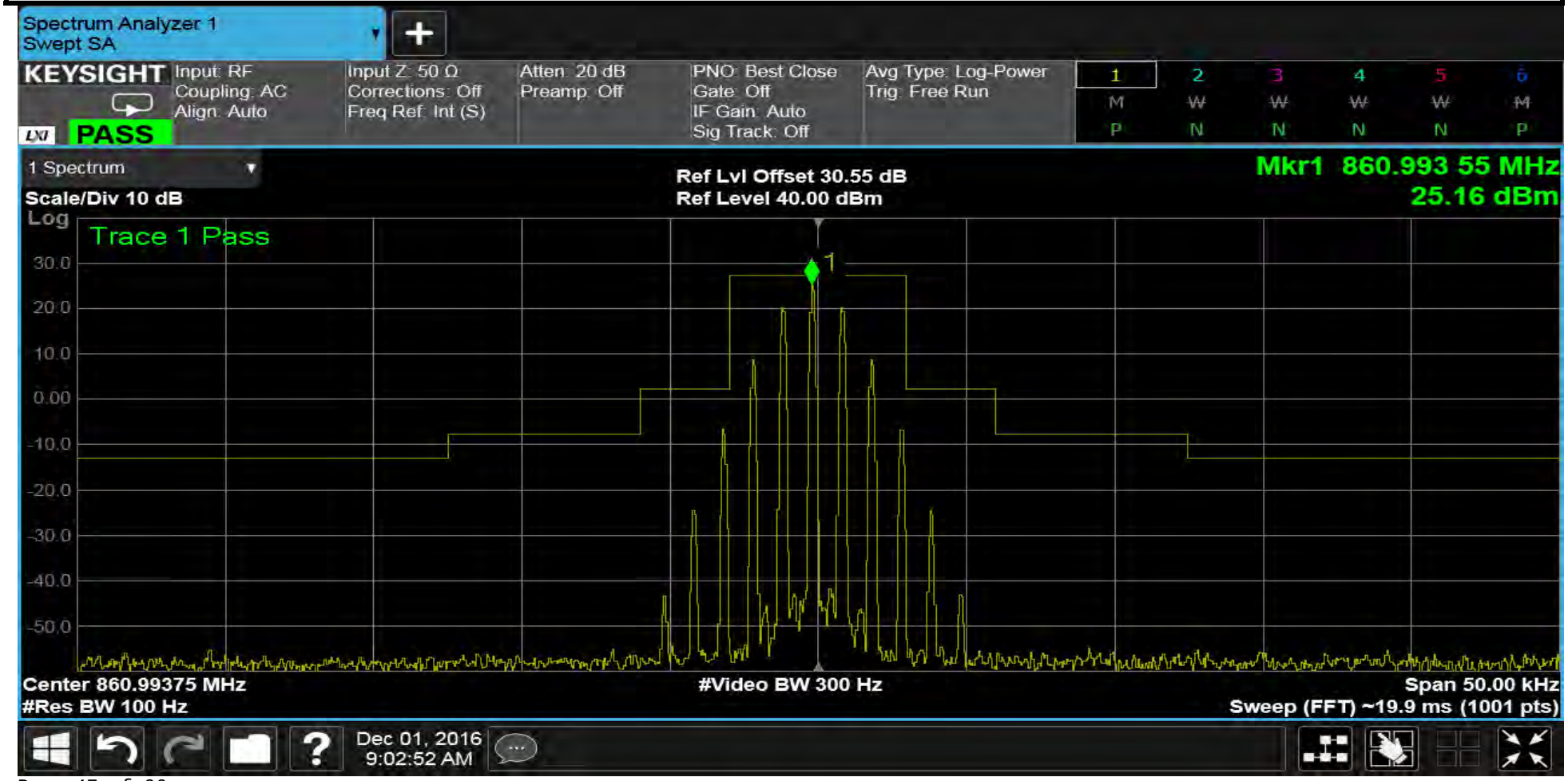

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Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
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Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
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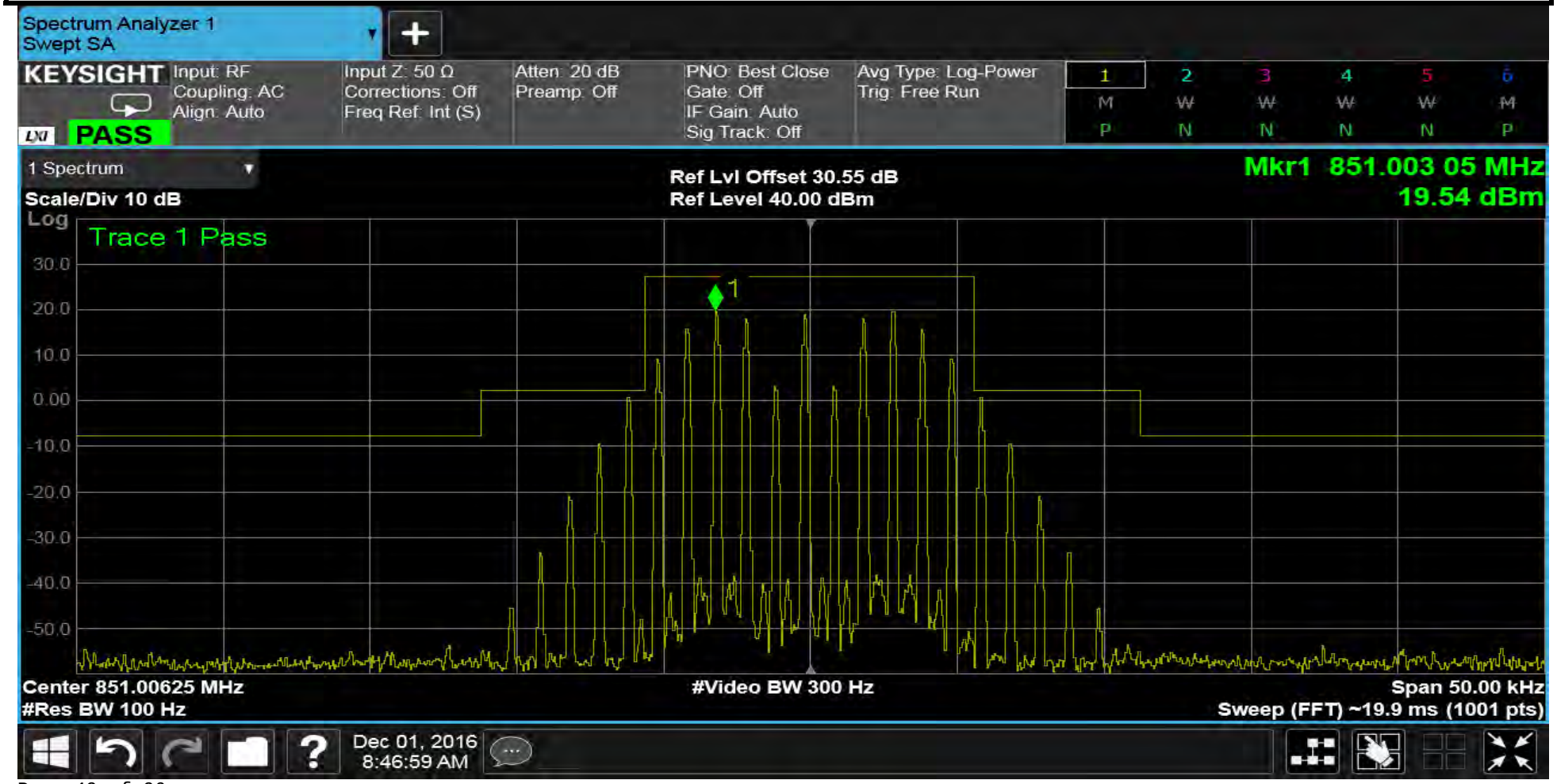
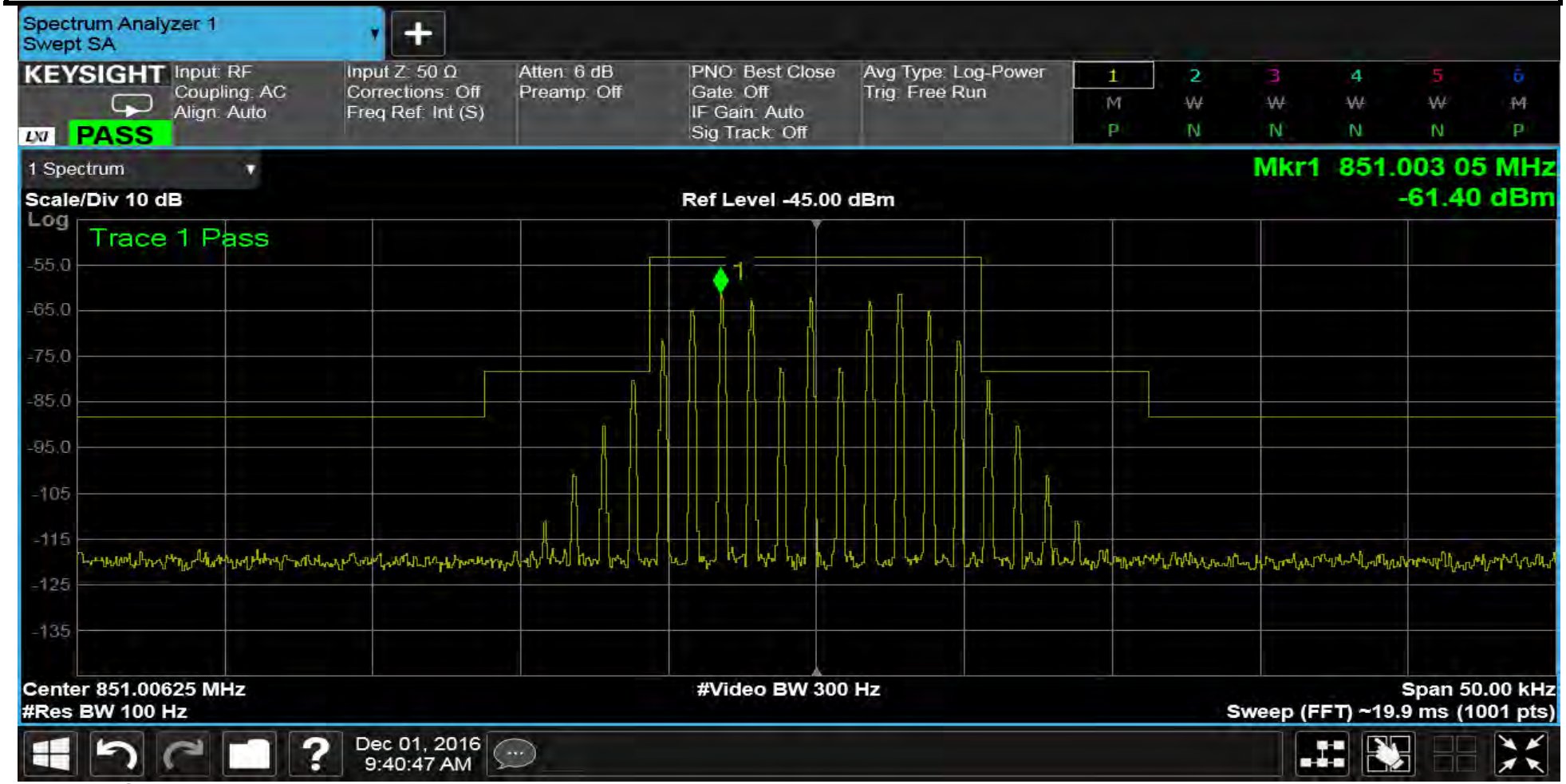
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 851.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



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Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
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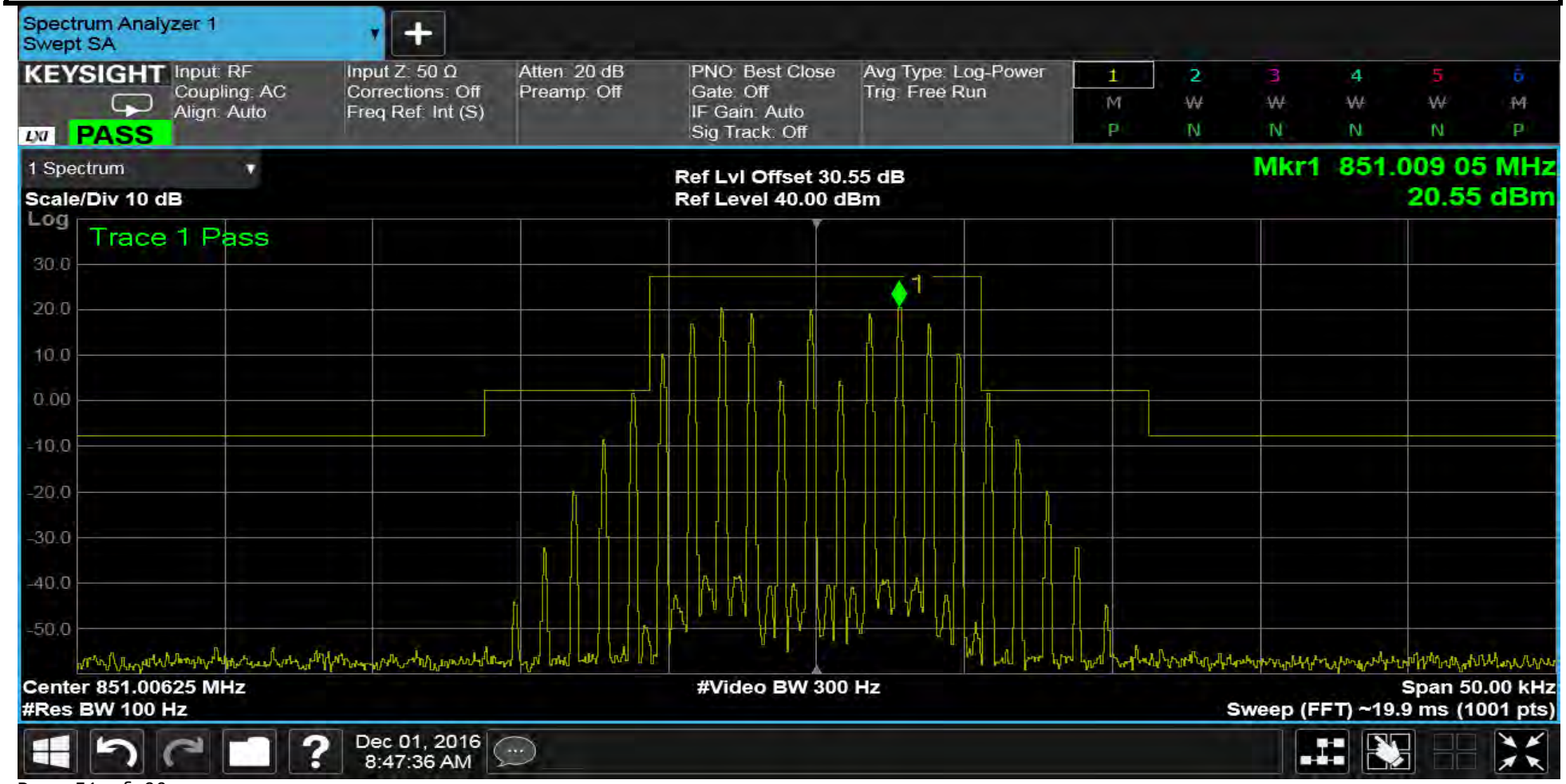
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
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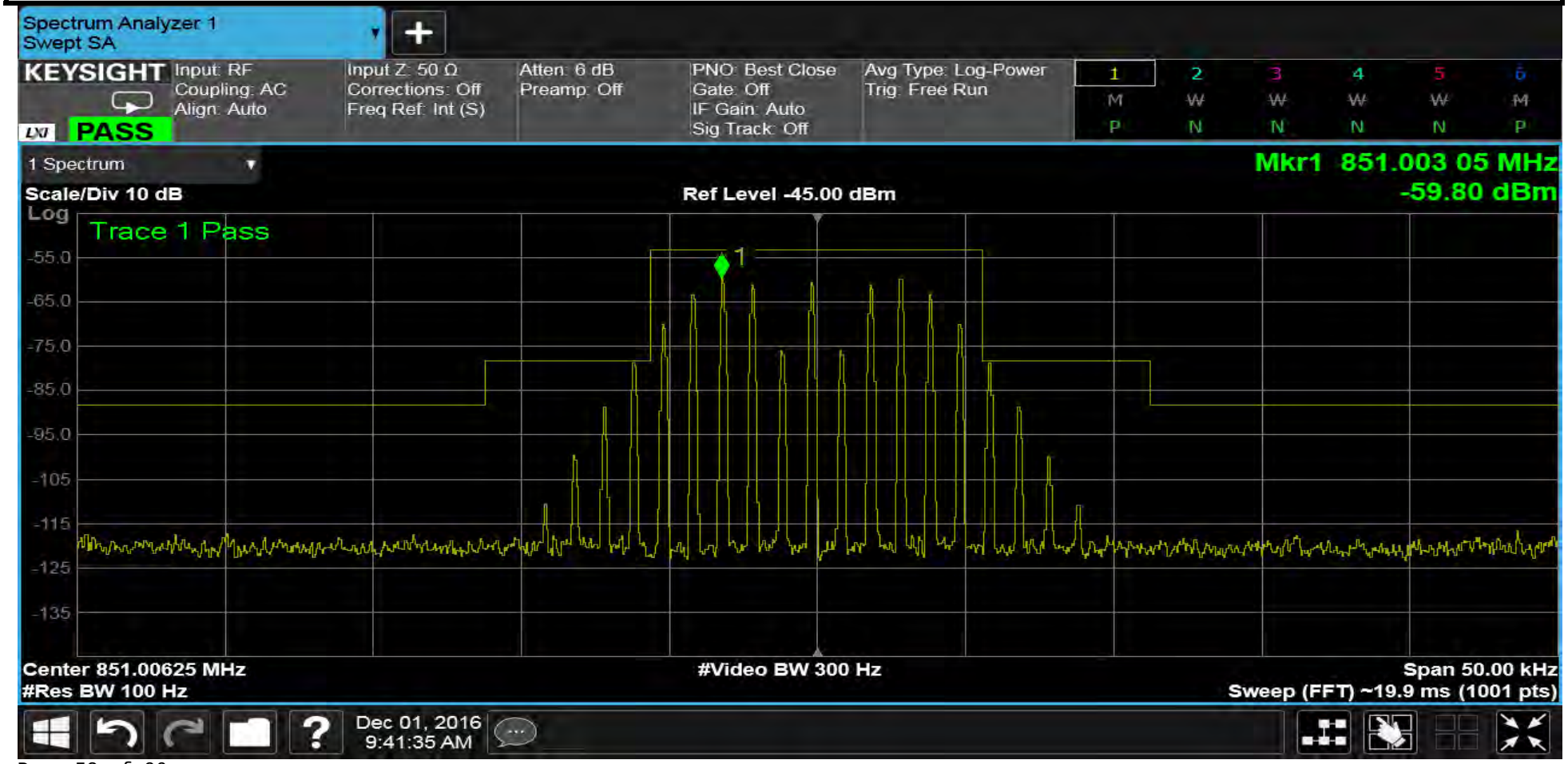
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 851.00625MHz Modulation:11K3F3E Authorized BW: 11.25kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
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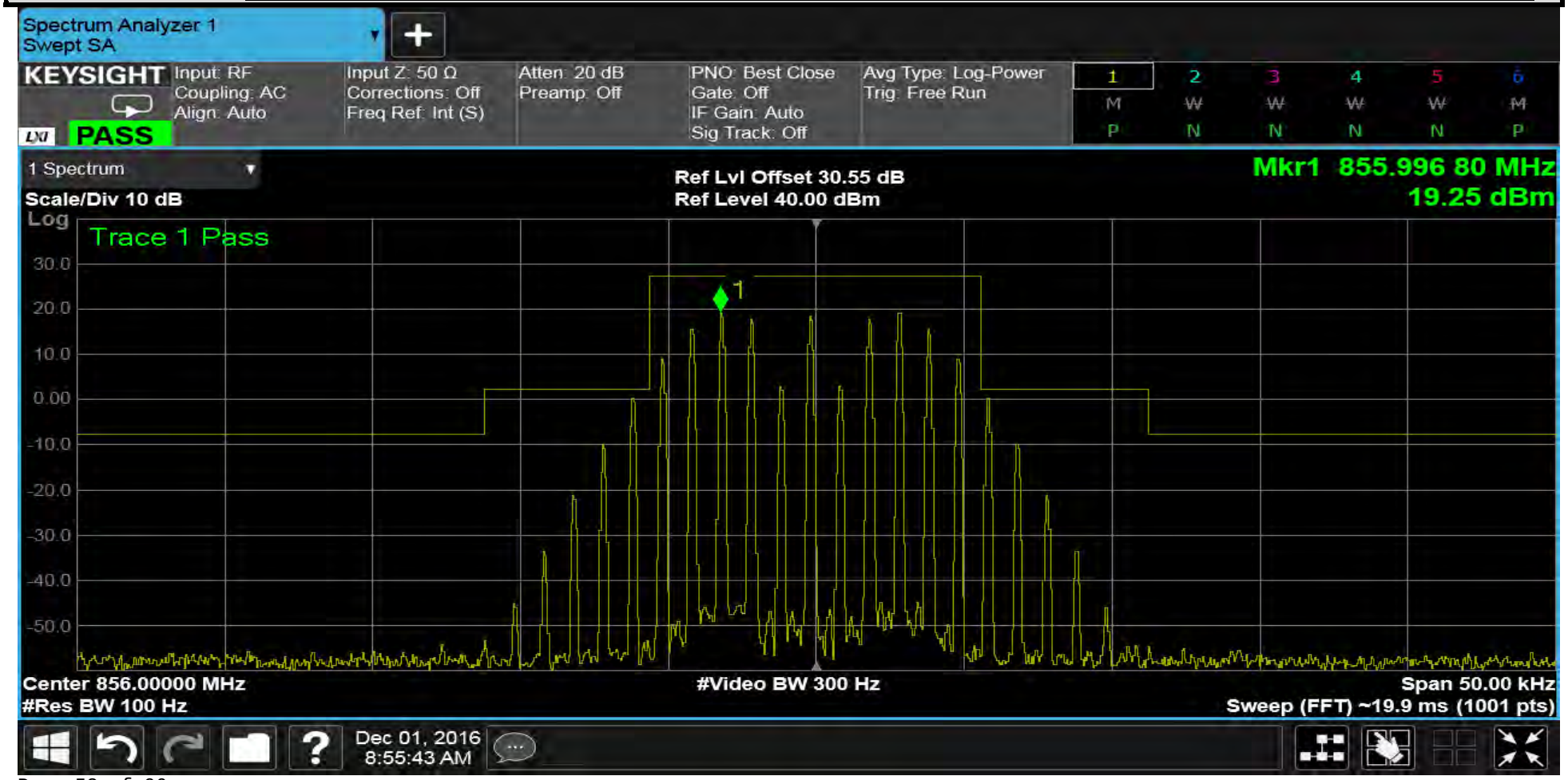

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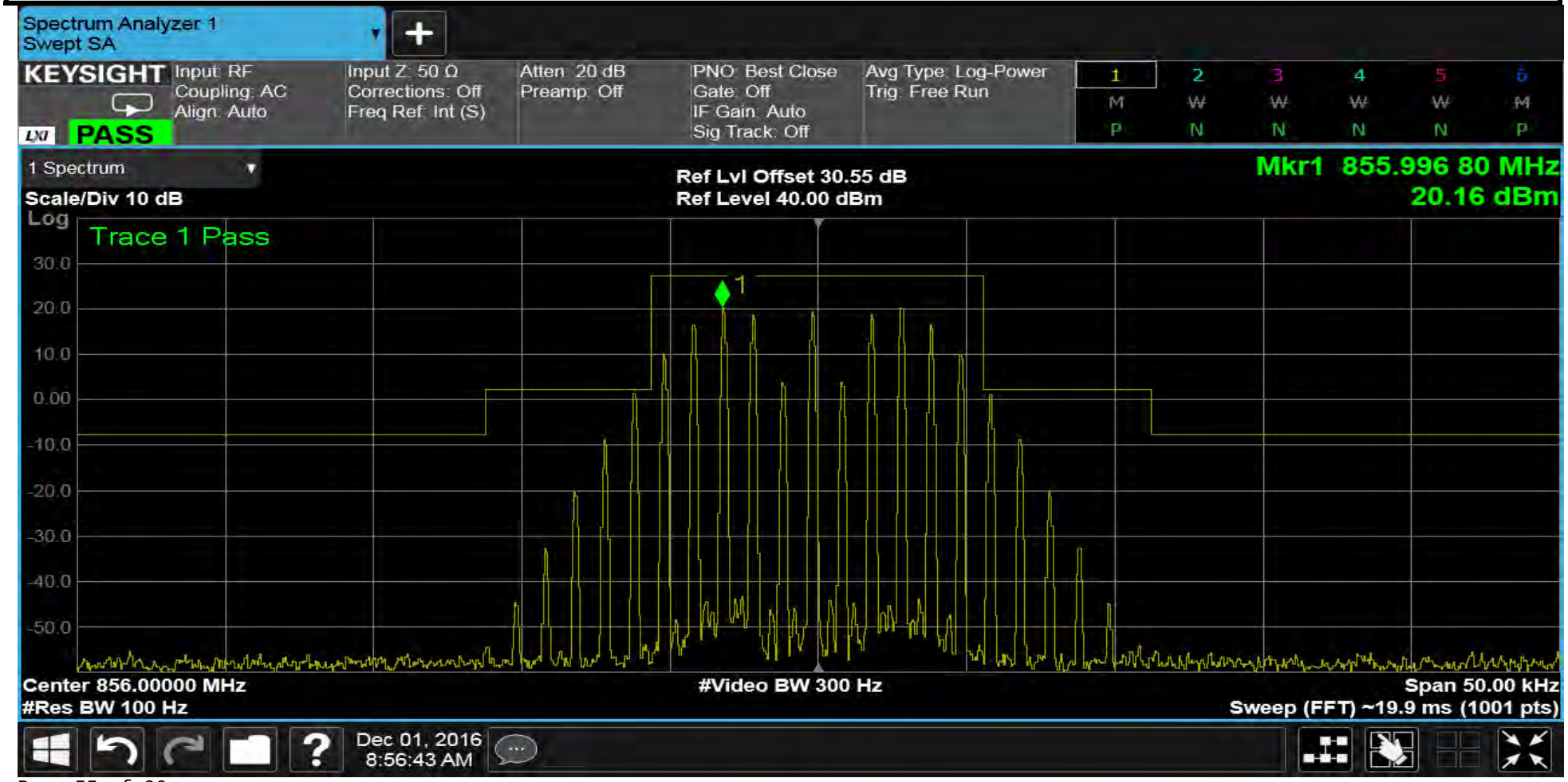

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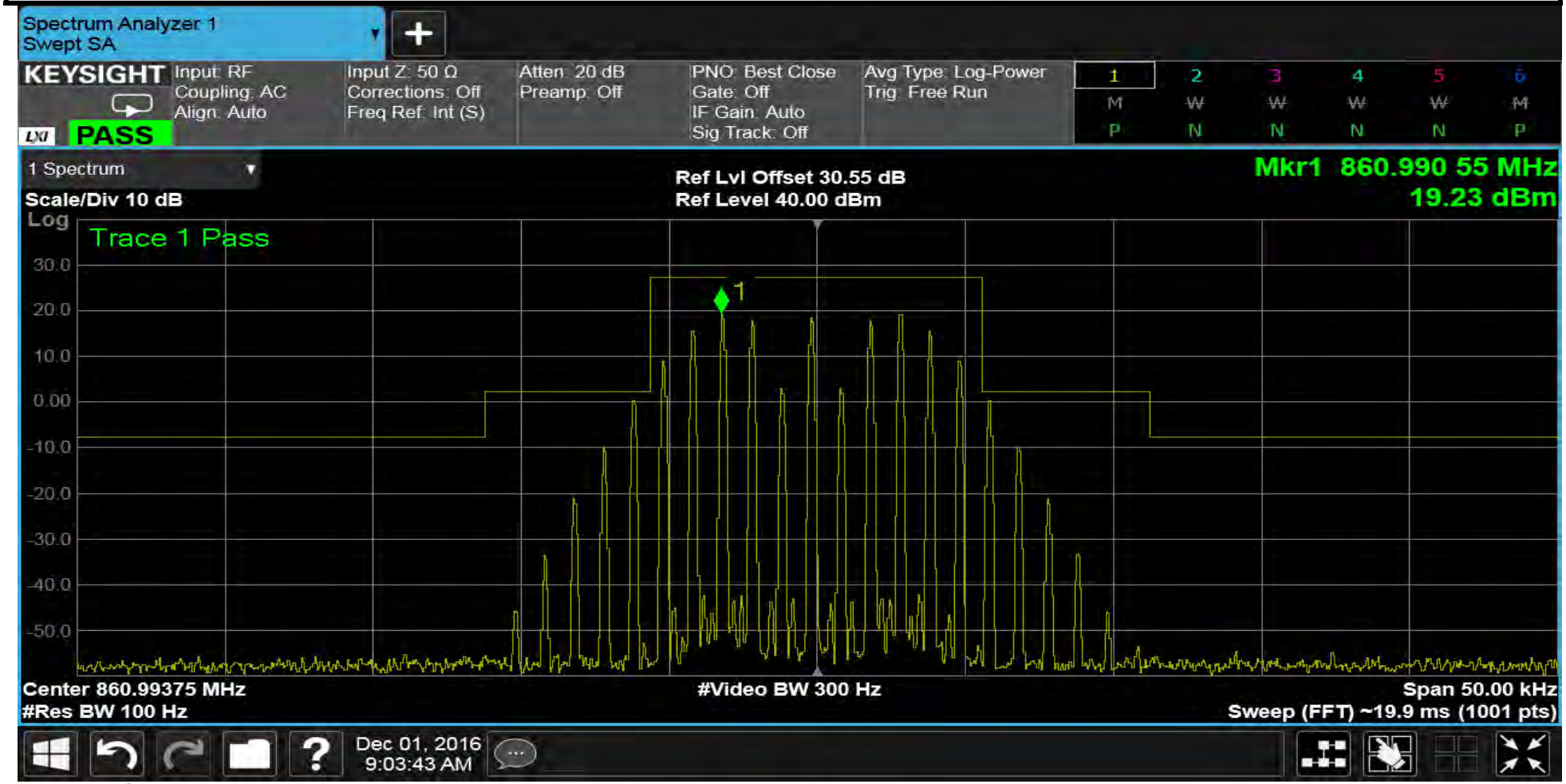

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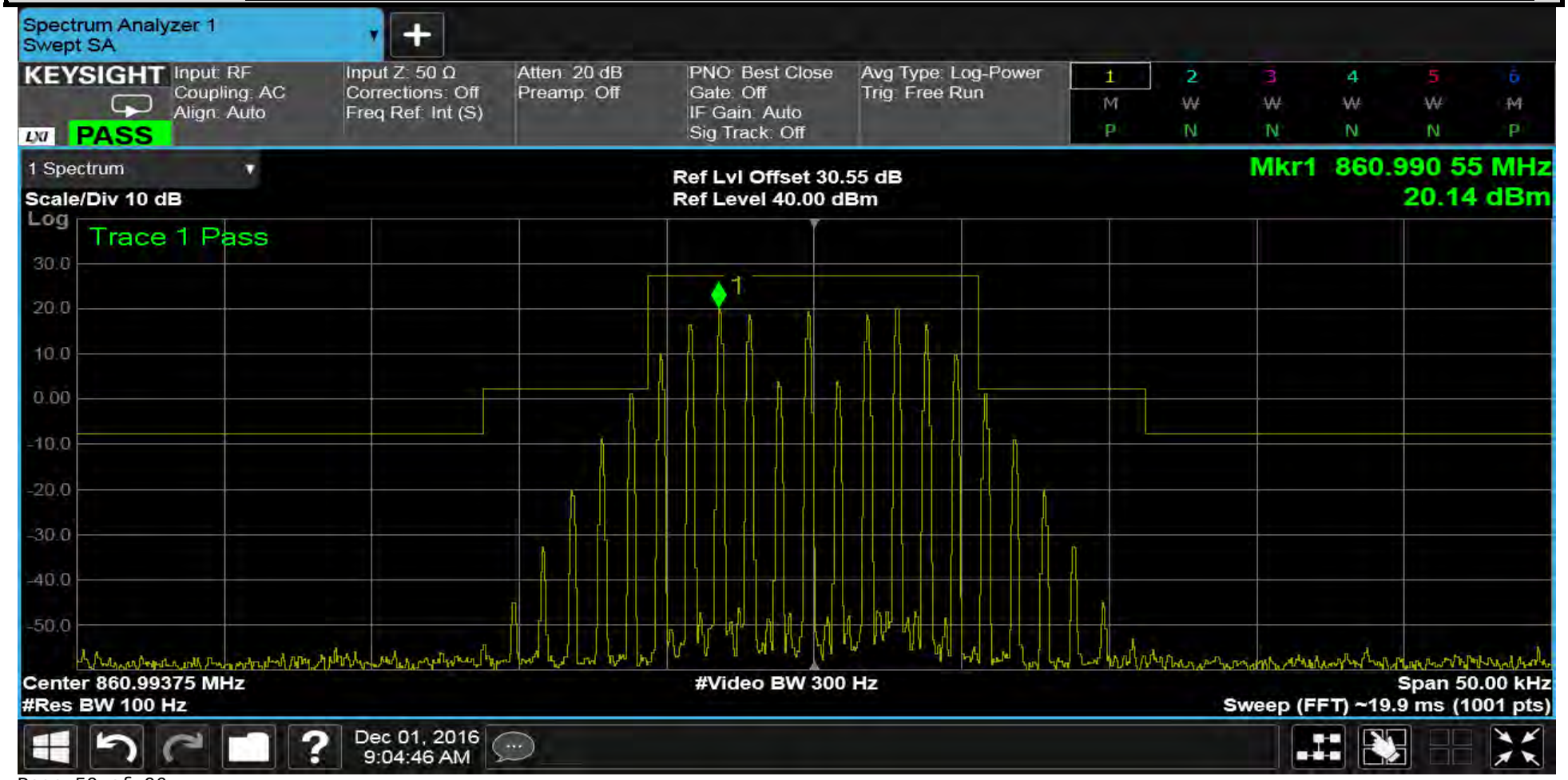

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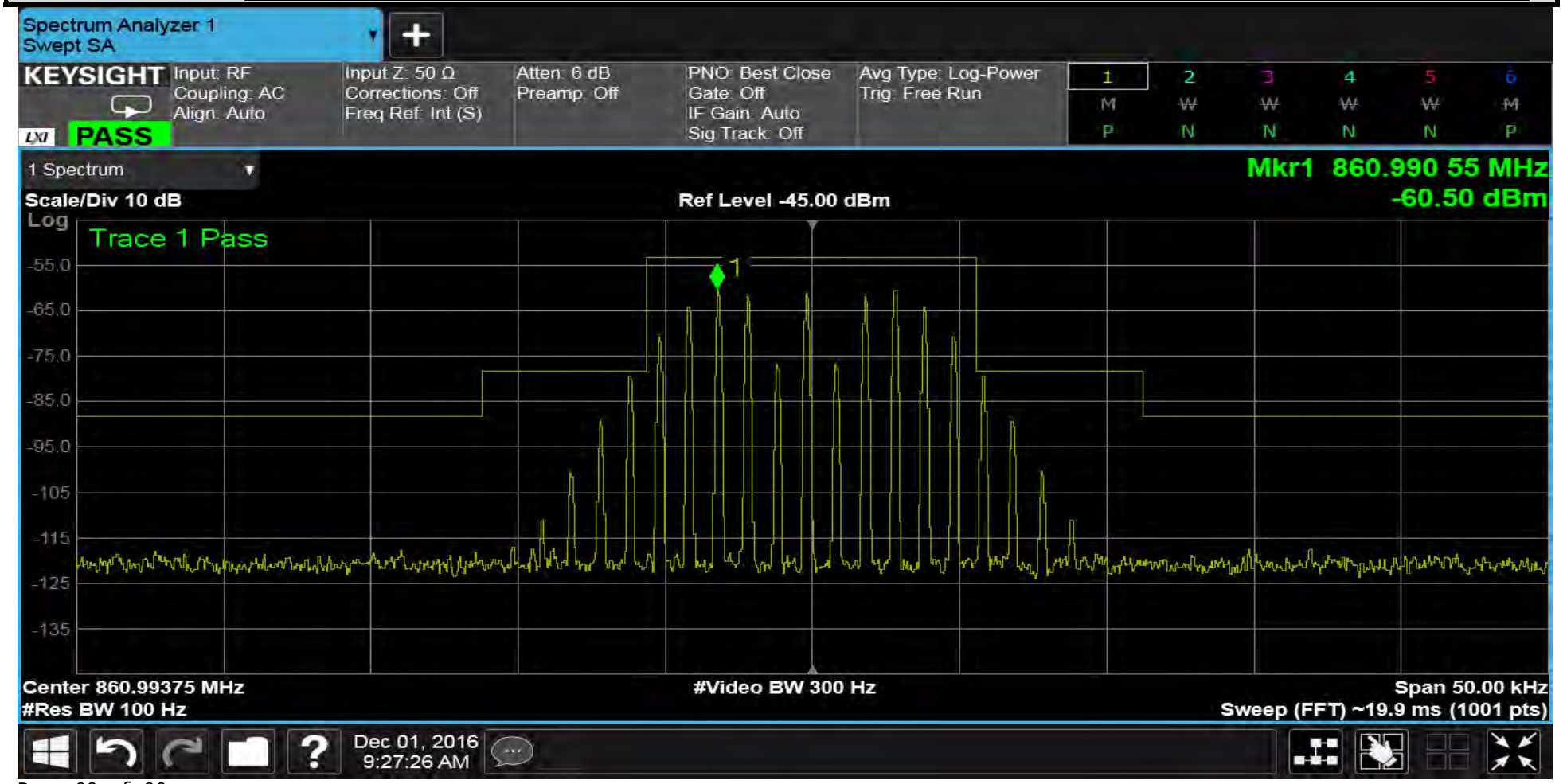

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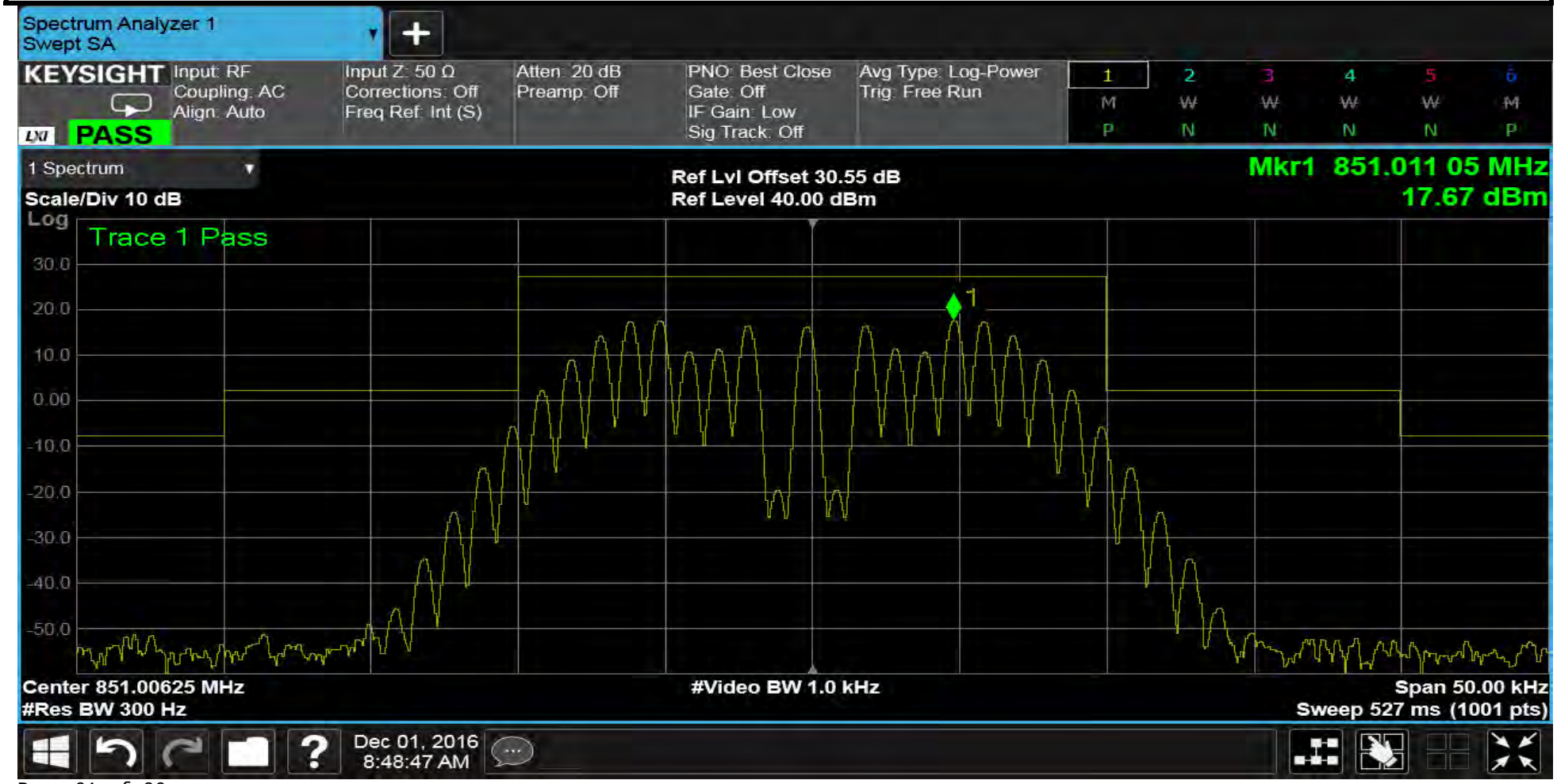
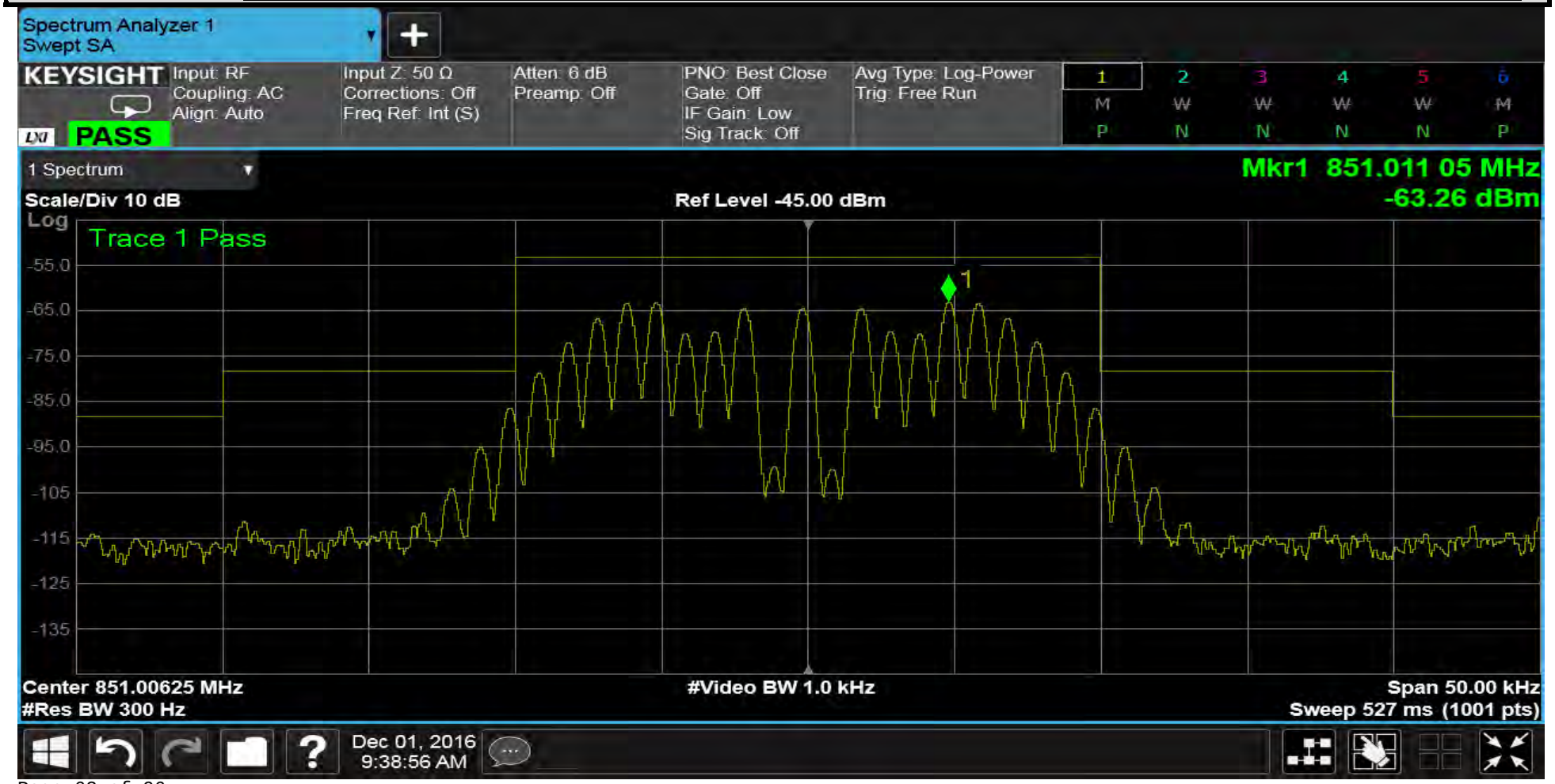
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



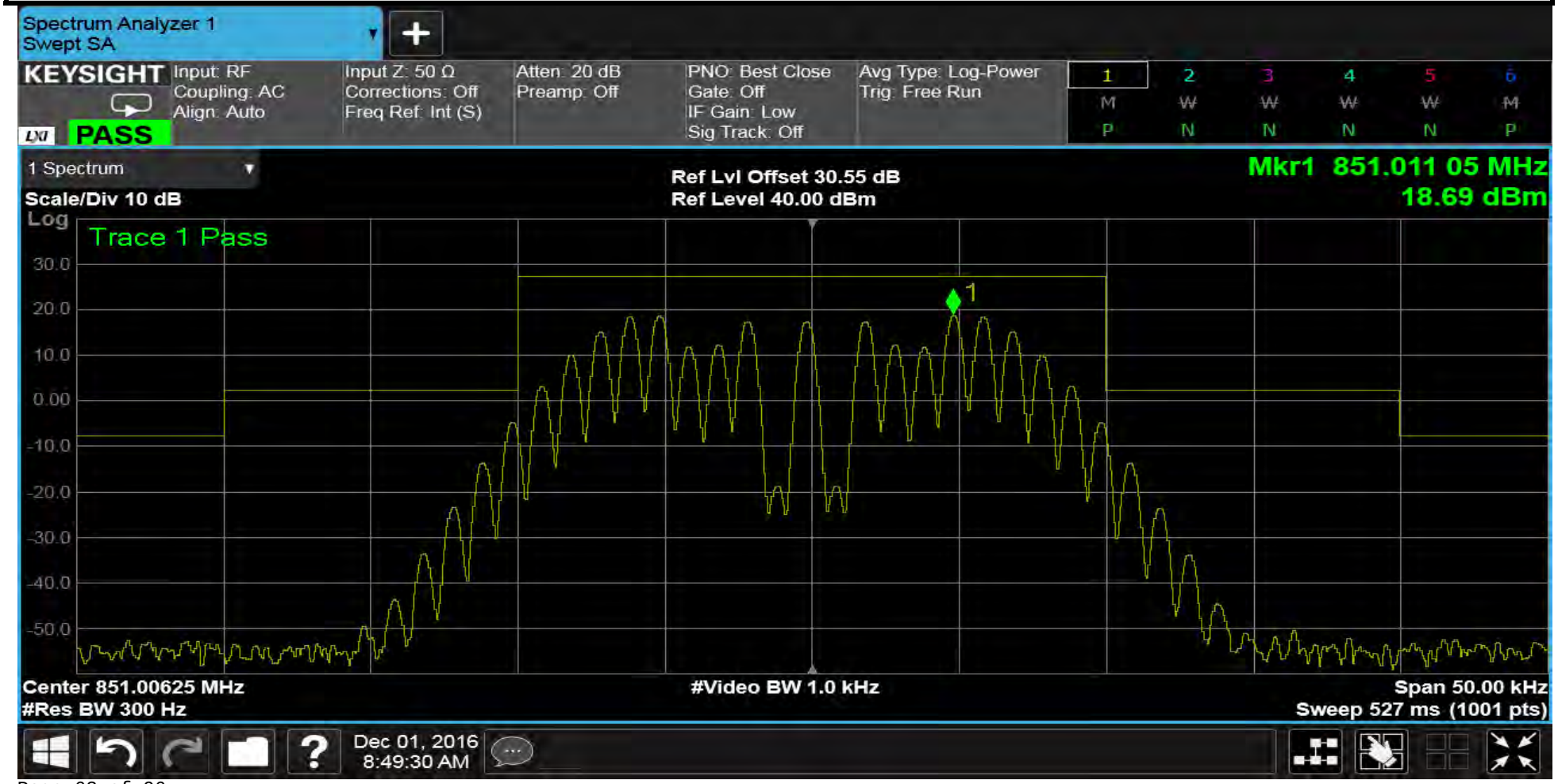
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 851.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



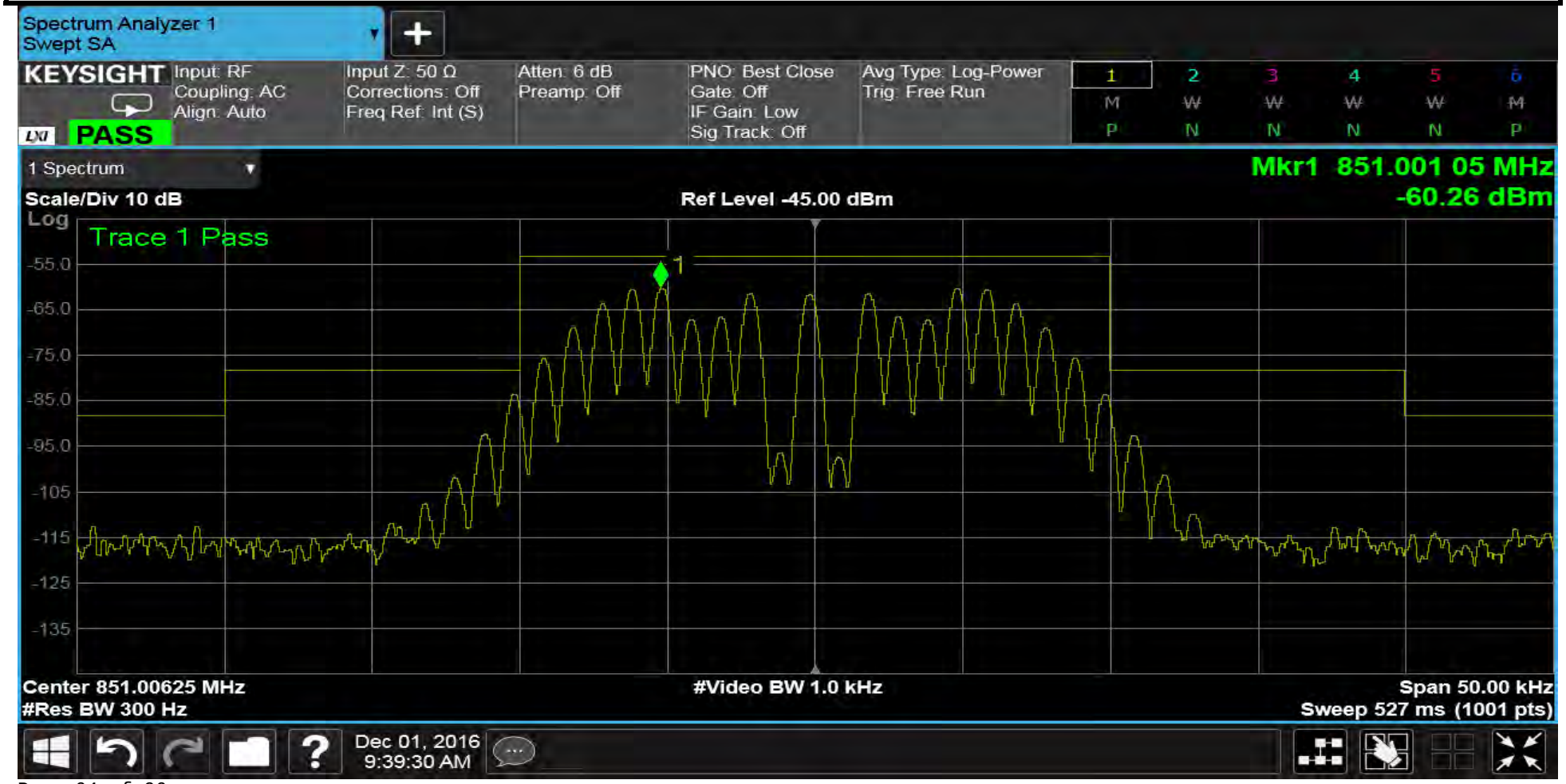
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 851.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



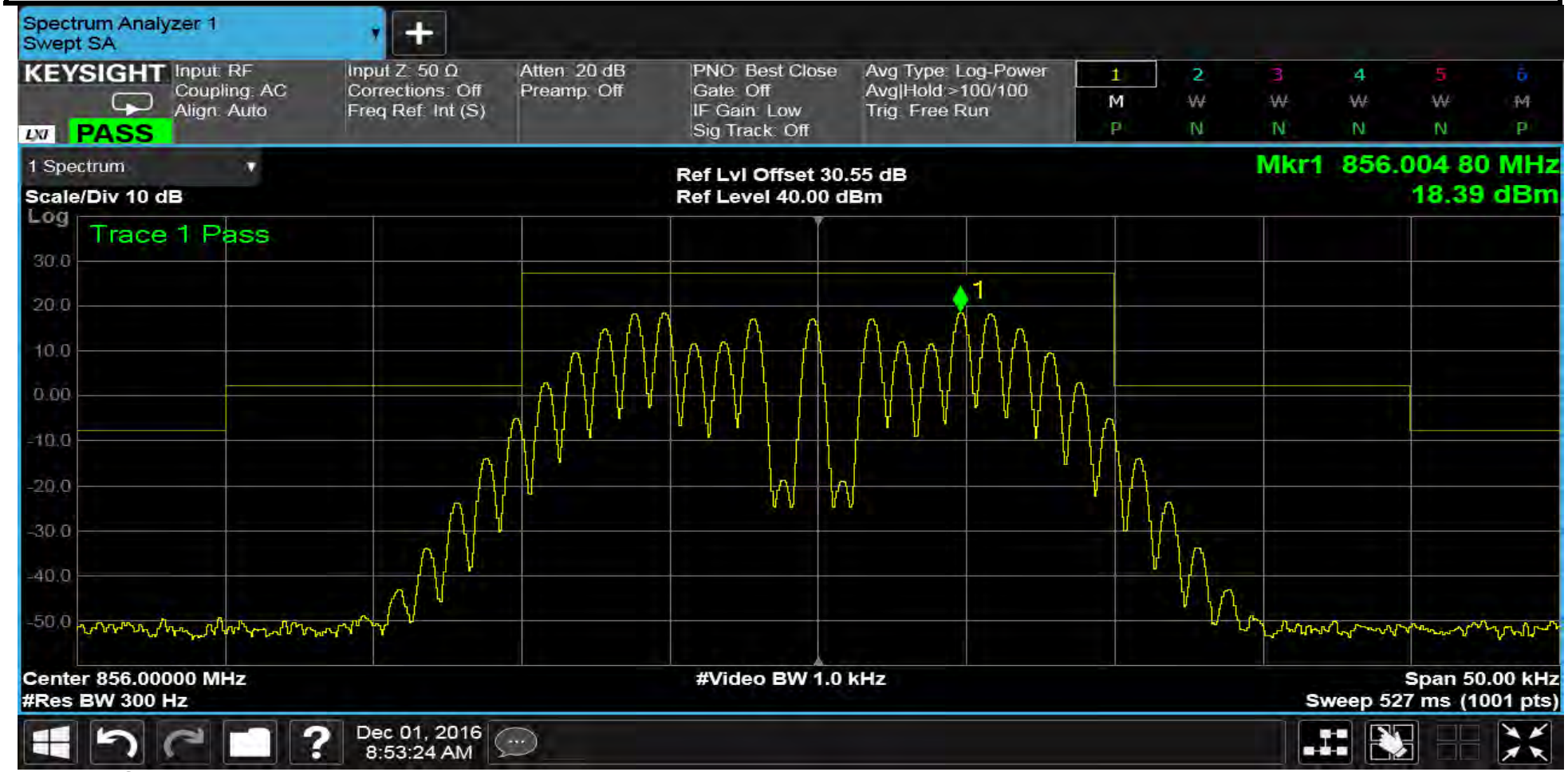
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 851.00625MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



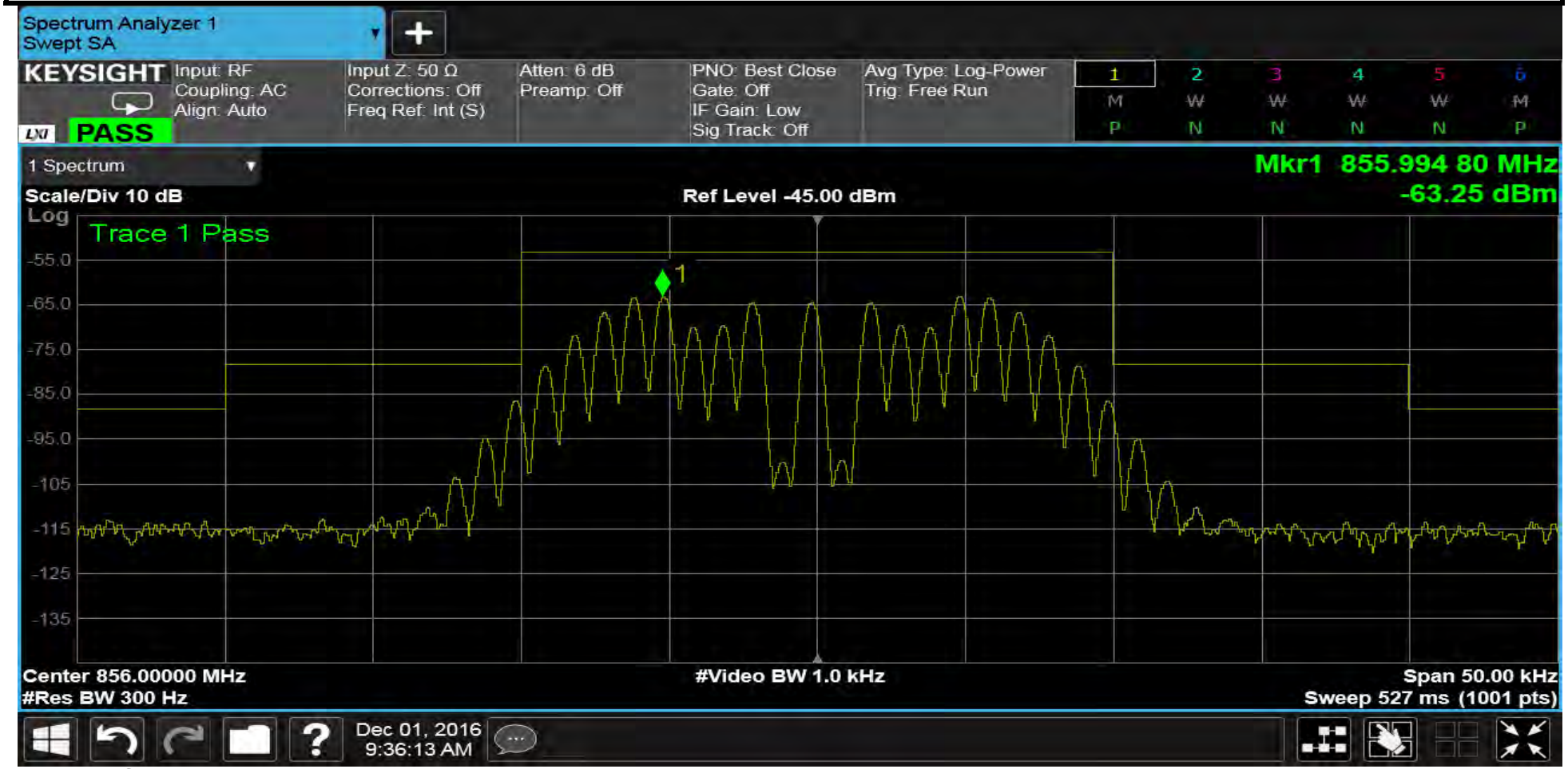
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 856.000MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



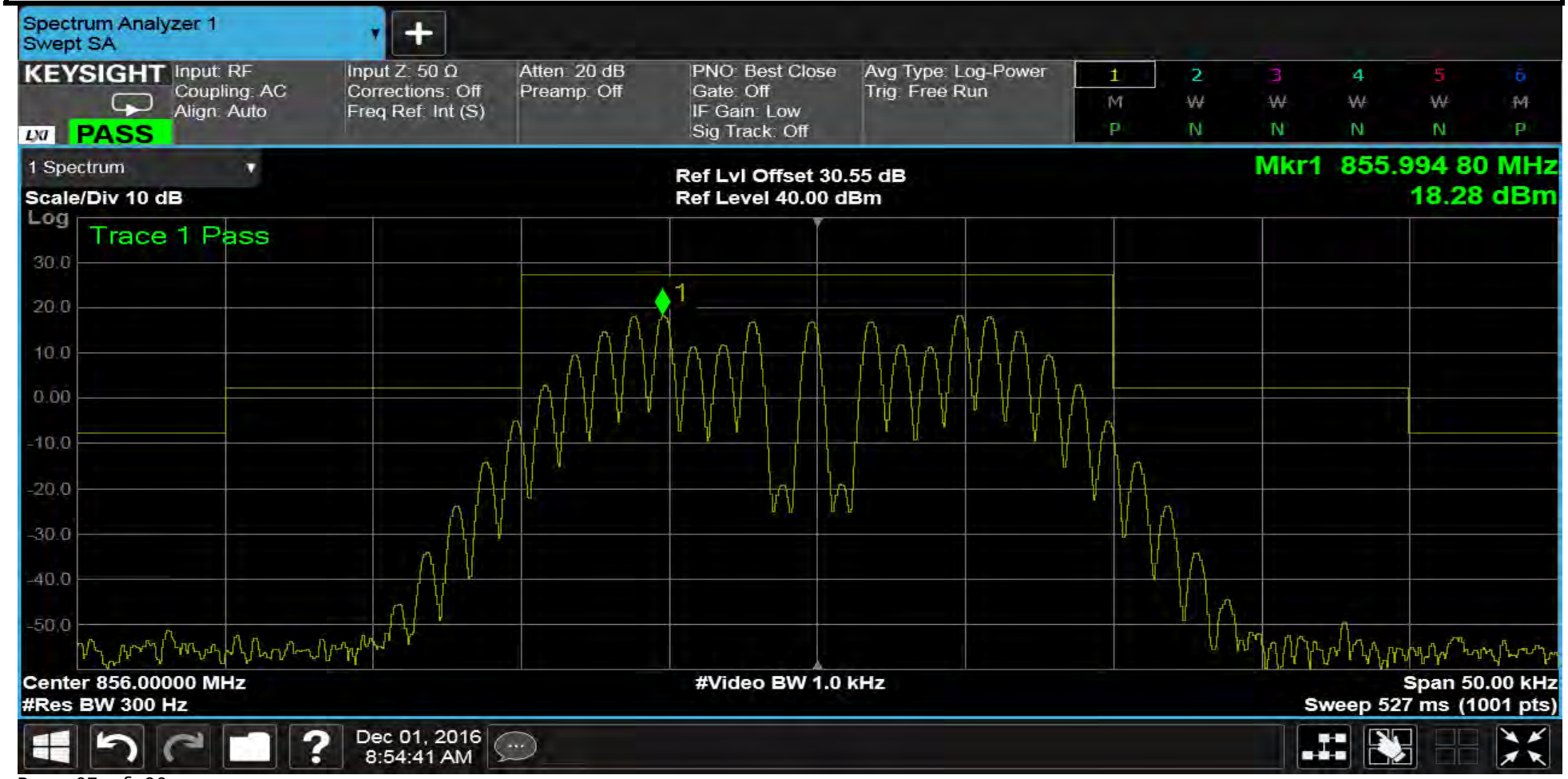
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 856.000MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



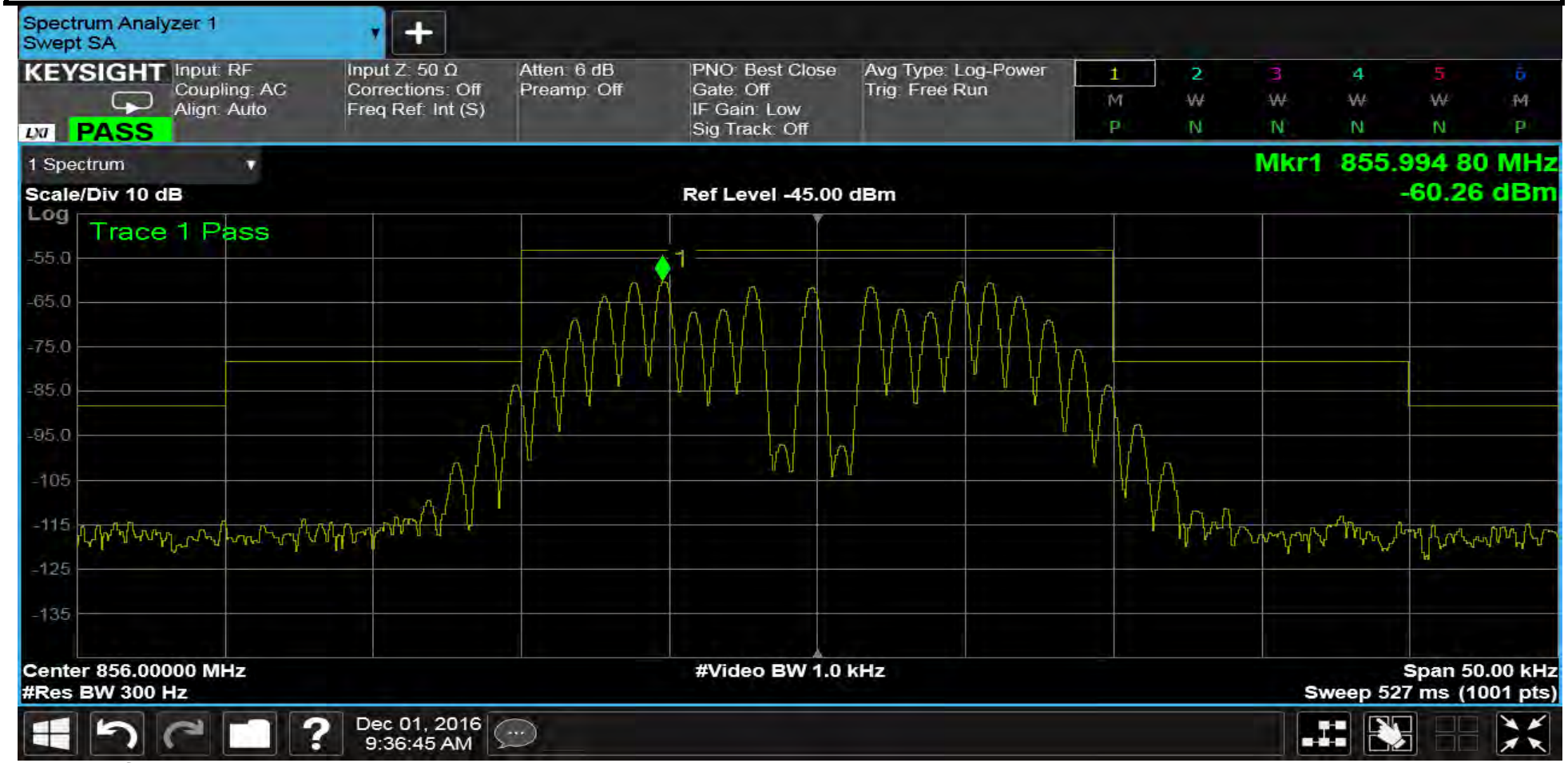
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 856.000MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



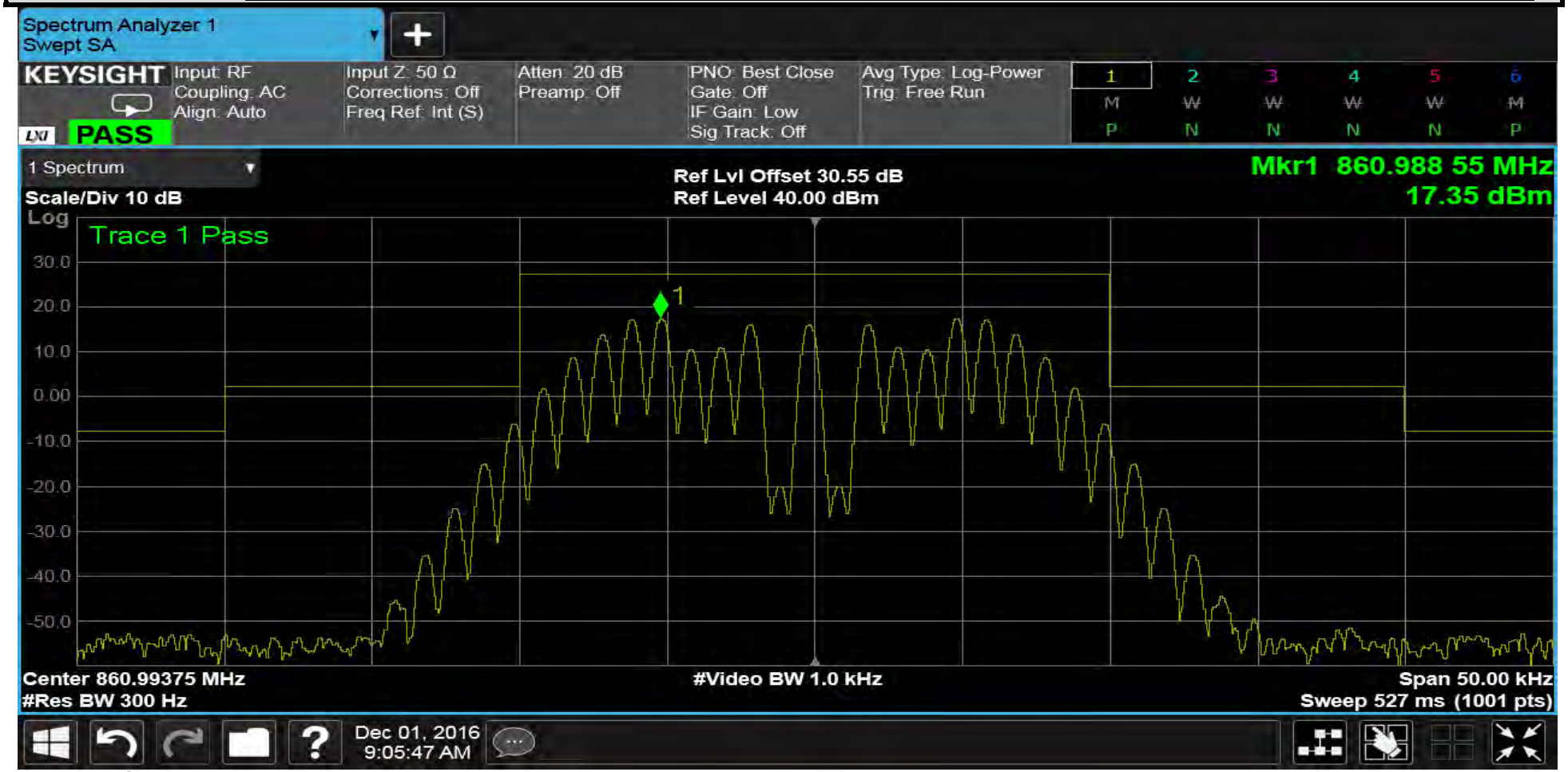
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 856.000MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



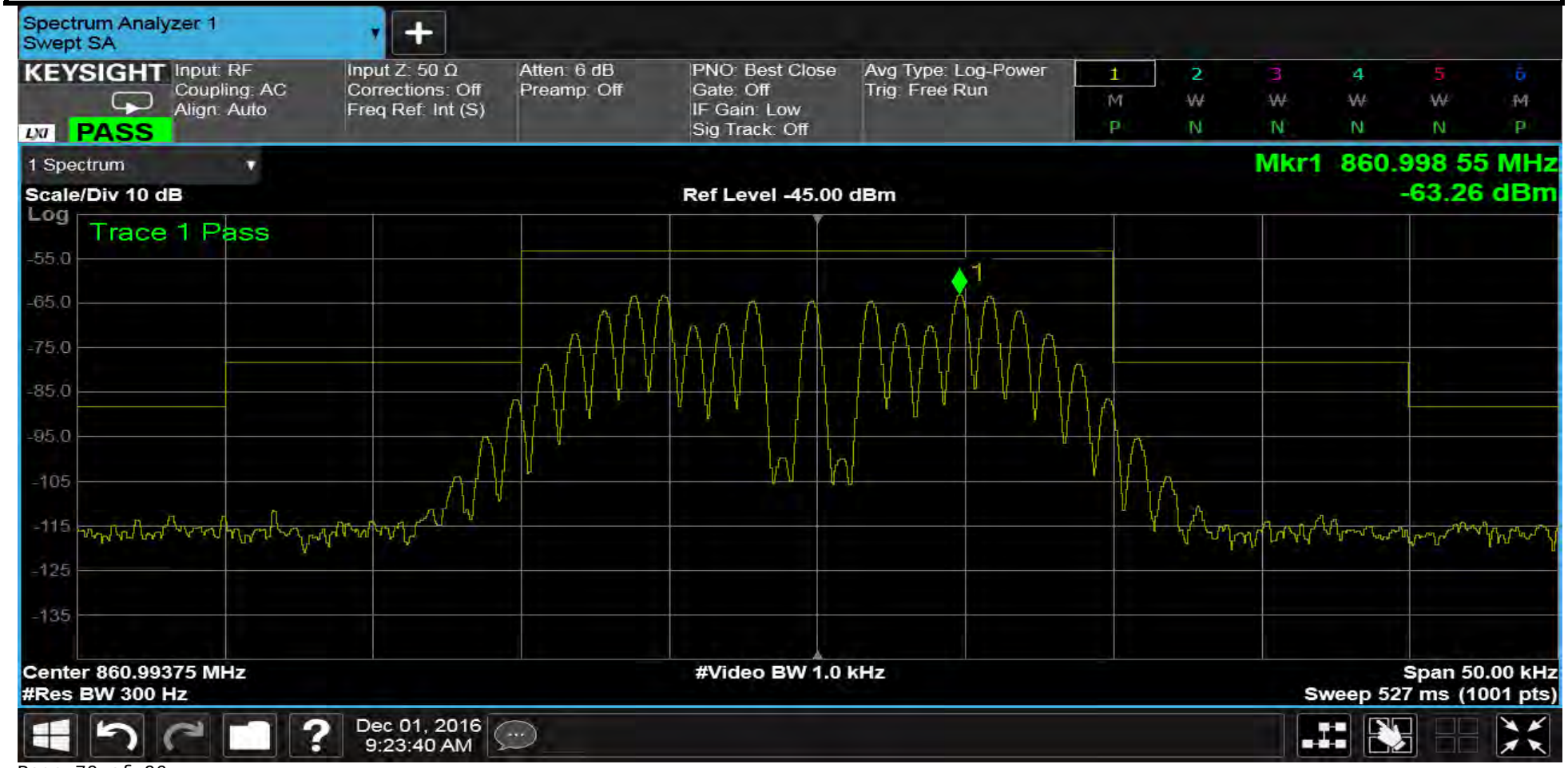
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 860.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



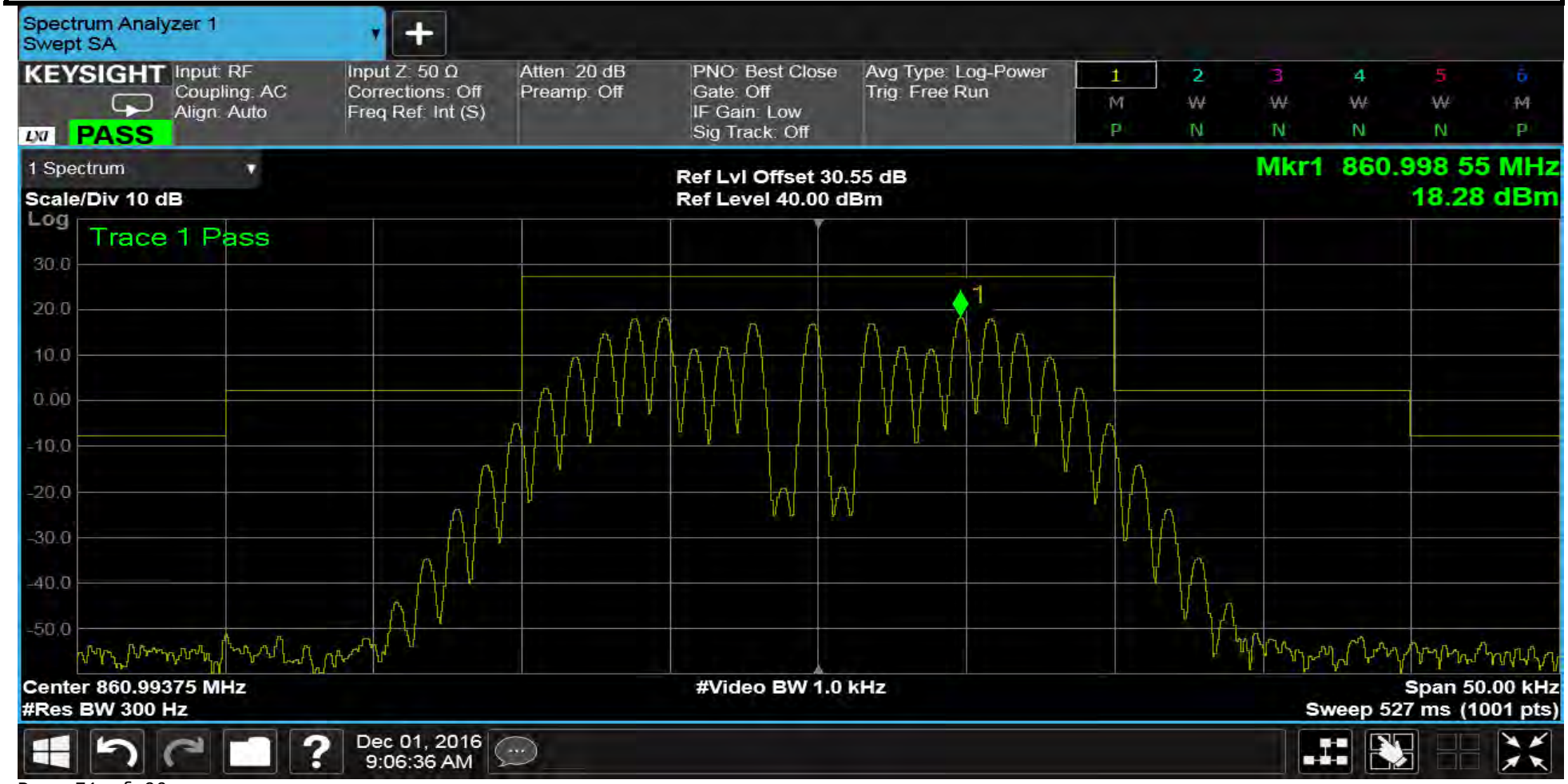
RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 860.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Amplifying signal, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Output: 860.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B		



RETLIF TESTING LABORATORIES

Test Method	Input-vs-Output Signal Comparison		
Customer	Westell, Inc.	**Job No.**	R-6142N-1
Test Sample	Bi-Directional Amplifier		
Model Number	BDA510-S8	**Serial No.**	CPG62990
Operating Mode	Signal Generator Output, AGC Activated		
Test Specification	Nemko Test Plan 317856-2		
Technician	M. Seamans	**Date**	December 1st, 2016
Climatic Conditions	Temp: 20.0 °C Relative Humidity: 31.0 %		
Notes	Downlink Input: 860.99375MHz Modulation:16K0F3E Authorized BW: 20kHz Emission Mask: B