

**West Caldwell  
Calibration  
Laboratories, Inc.**  
uncompromised calibration  
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005



Calibration Lab. Cert. # 1533.01

## REPORT OF CALIBRATION

Scarlet Tech Sound Level Meter

for  
Model No.: ST-11/11D

Serial No.: 820065

Company: Scarlet Tech


ID No.: XXXX

The procedure from IEC 61672-3-2013 were used to perform the periodic test. (Test limits are from IEC 61672-1-2013)  
Instrument submitted for testing has successfully completed the Class 1 periodic test of IEC 61672-3-2013 listed below.  
Also meets the requirements of ANSI/ASA S1.4 - 2014 / Part 3.

Absolute Acoustical Sensitivity Level, IEC 61672 - 3 (9)	Pass
Electrical Inherent Noise Level, Freq. Weig. Lin, IEC 61672-3 (10)	Pass
Determining Electrical Level for 1V at 1kHz	Pass
Frequency Response measured with Electrical Signal, Freq. Weig. A with HP filter, IEC 61672 Class 1 (12)	Pass
Frequency Response measured with Electrical Signal, Freq. Weig. C with HP filter, IEC 61672 Class 1 (12)	Pass
Frequency Response measured with Electrical Signal, Freq. Weig. Z with HP filter, IEC 61672 Class 1 (12)	Pass
Frequency Weightings at A - Weighting 1kHz, IEC 61672-3 (13)	Pass
Frequency Weightings at C - Weighting 1kHz, IEC 61672-3 (13)	Pass
Frequency Weightings at Z - Weighting 1kHz, IEC 61672-3 (13)	Pass
Frequency Weightings at B - Weighting 1kHz, IEC 61672-3 (13)	Pass
Linearity Range at 1kHz, IEC61672 - 3 (14)	Pass
Range Level at 1kHz, IEC61672 - 3 (15)	Pass
Time Weighting Response to Single Burst, 4kHz, 200ms, F Class 1, IEC61672 - 3 (16)	Pass
Time Weighting Response to Single Burst, 4kHz, 2ms, F Class 1, IEC61672 - 3 (16)	Pass
Time Weighting Response to Single Burst, 4kHz, 0.25ms, F Class 1, IEC61672 - 3 (16)	Pass
Time Weighting Response to Single Burst, 4kHz, 200ms, S Class 1, IEC61672 - 3 (16)	Pass
Time Weighting Response to Single Burst, 4kHz, 2ms, S Class 1, IEC61672 - 3 (16)	Pass
Overload Indication IEC 61672 - 3 (18)	Pass

Calibrated on WCCL system type 9700

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Measurements performed by: .....  
**James Zhu**

Rev. 7.0 Jan. 24, 2014 Doc. # 1038ST11ST

Calibration results:

Before & after data same: ...X...

Reading with mic.: Pass  
 Level accuracy: Pass  
 Meter linearity: Pass  
 Freq. Resp. w/ Mic.: Pass  
 Frequency Response: Pass  
 Functions: Pass  
 Crest Factor: Pass  
 Time Constant: Pass  
 Noise: Pass

Ambient Temperature: 20.4 °C  
 Ambient Humidity: 31.1 % RH  
 Ambient Pressure: 99.554 kPa  
 Calibration Date: 6-Feb-2019  
 Calibration Due: 6-Feb-2020  
 Report Number: 29621 -1  
 Control Number: 29621

All tests: Pass

The above listed instrument meets or exceeds the tested manufacturer's specifications.

IEC 60804:2000 Type 1, IEC 60651:1979 w.Am.1&2 Type 1 specification passed.

IEC 61672-1:2013 Class 1 specification passed.

IEC 60804:2000 Type 1 specification passed.

The absolute uncertainty of calibration: See last page. Unless otherwise noted, the reported values are both "as found" and "as left" data.

This Calibration is traceable through NIST test numbers: ,205342

The above listed instrument was checked using calibration procedure documented in West Caldwell

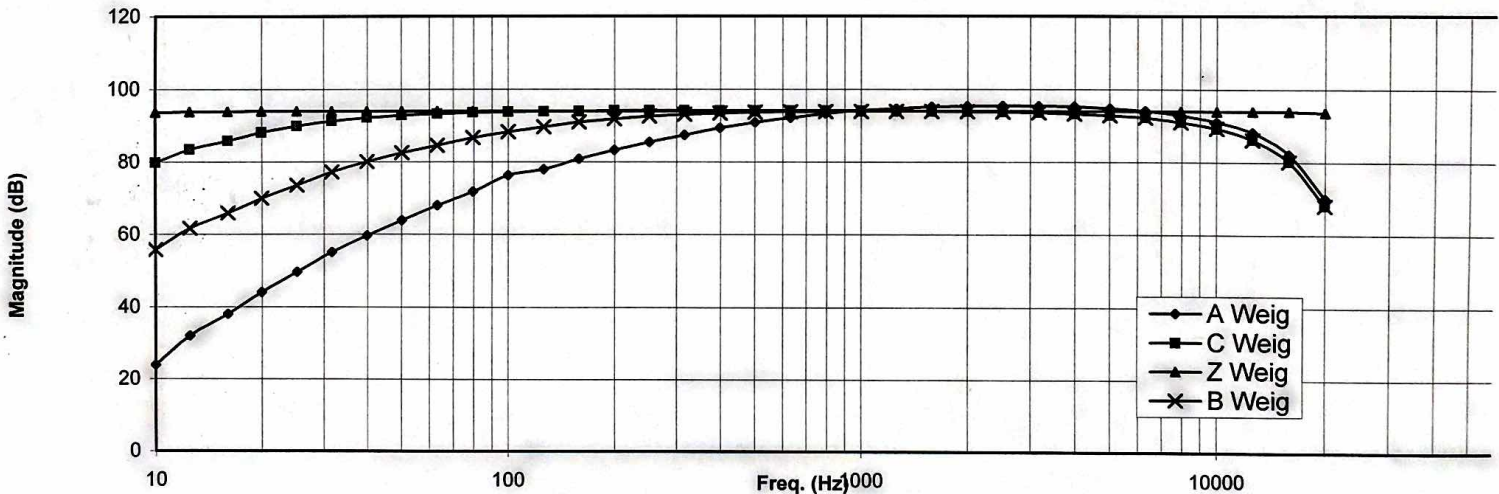
Calibration Laboratories Inc. procedure :

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 ST11ST

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures

intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NC SL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Frequency Response



Instruments used for calibration:

Instruments used for calibration:	Date of Cal.	Traceability No.	Re-cal. Due Date
HP 34401A S/N US360980	19-Jul-2018	,205342	19-Jul-2019
HP 33120A S/N US360458	19-Jul-2018	,205342	19-Jul-2019
Brüel & Kjær 4226 S/N 1939599	20-Jul-2018	822/275722-15	20-Jul-2019

**West Caldwell Calibration Laboratories Inc.**

1575 State Route 96, Victor NY 14564  
 Tel. (585) 586-3900 FAX (585) 586-4327

**Calibration Data Record**

for

Scarlet Tech  
 Sound Level Meter

Model No.: ST-11/11D  
 Mic Model No.: AWA14425

S/N: 820065  
 S/N: 27834

Test	Function	Tolerance			Measured values	
		Min	Max		Data	Out
,0.	Reading with 94dB SPL Absolute Acoustical Sensitivity Level, IEC 61672 - 3 (9) ANSI/ASA S1.4 - 2014 / Part 3. -10	93.7	94.3	94dB	94.0	
,0.	Determining Electrical Level for 1V at 1kHz	119.7	120.3		120.0	
,1.	<b>Level accuracy</b> ANSI/ASA S1.4 - 2014 / Part 3.-10	93.7	94.3	94dB	94.0	
		103.7	104.3	104dB	104.0	
		113.7	114.3	114dB	114.0	
,1.	<b>Meter Linearity</b> Linearity Range at 1kHz, IEC61672 - 3 (14) ANSI/ASA S1.4 - 2014 / Part 3.-17 <b>A Weighting High</b>	139.5	140.5	140 dB	140.0	
		129.5	130.5	130 dB	130.0	
		119.5	120.5	120 dB	120.0	
		109.5	110.5	110 dB	110.1	
		99.5	100.5	100 dB	100.1	
		89.5	90.5	90 dB	90.1	
		79.5	80.5	80 dB	80.1	
		69.5	70.5	70 dB	70.1	
		59.5	60.5	60 dB	60.1	
		49.5	50.5	50 dB	50.1	
		39.5	40.5	40 dB	39.8	
	<b>A Weighting Low</b>	119.5	120.5	120 dB	120.1	
		109.5	110.5	110 dB	110.1	
		99.5	100.5	100 dB	100.1	
		89.5	90.5	90 dB	90.2	
		79.5	80.5	80 dB	80.2	
		69.5	70.5	70 dB	70.2	
		59.5	60.5	60 dB	60.2	
		49.5	50.5	50 dB	50.2	
		39.5	40.5	40 dB	40.2	
		29.5	30.5	30 dB	30.2	
		19.5	20.5	20 dB	19.6	

Test	Function	Tolerance		Measured values		
		Min	Max	Data	Out	
,2a	<b>Frequency Response with mic.</b>					
	<b>A Weighting</b>	0.0	90.3	16kHz	81.5	
	Frequency Weightings at A - Weighting 1kHz, IEC 61672-3 (13)	83.8	92.6	12.5kHz	87.1	
	ANSI/ASA S1.4 - 2014 / Part 3. -12	90.0	94.3	8kHz	93.1	
		94.1	95.9	4kHz	95.1	
		94.3	96.1	2kHz	95.2	
		93.1	94.9	1kHz	94.0	
		89.9	91.7	500Hz	90.5	
		84.5	86.3	250Hz	85.4	
		77.0	78.8	125Hz	78.0	
		66.9	68.7	63Hz	68.2	
		53.2	56.0	31.5Hz	54.7	
		<b>C Weighting</b>	0.0	88.4	16kHz	79.9
	Frequency Weightings at C - Weighting 1kHz, IEC 61672-3 (13)	81.9	90.7	12.5kHz	85.3	
	ANSI/ASA S1.4 - 2014 / Part 3. -12	88.1	92.4	8kHz	91.2	
		92.3	94.1	4kHz	93.3	
		92.9	94.7	2kHz	93.8	
		93.1	94.9	1kHz	94.0	
		93.1	94.9	500Hz	93.7	
		93.1	94.9	250Hz	94.0	
		92.9	94.7	125Hz	94.0	
		92.3	94.1	63Hz	93.3	
		89.6	92.4	31.5Hz	91.2	
		<b>Z Weighting</b>	0.0	96.9	16kHz	92.9
	Frequency Weightings at Z - Weighting 1kHz, IEC 61672-3 (13)	88.1	96.9	12.5kHz	93.2	
	ANSI/ASA S1.4 - 2014 / Part 3. -12	91.1	95.4	8kHz	94.3	
		93.1	94.9	4kHz	94.0	
		93.1	94.9	2kHz	93.9	
		93.1	94.9	1kHz	93.9	
		93.1	94.9	500Hz	93.7	
		93.1	94.9	250Hz	93.9	
		93.1	94.9	125Hz	94.1	
		93.1	94.9	63Hz	94.0	
		92.6	95.4	31.5Hz	93.9	
		<b>B Weighting</b>	0.0	88.5	16kHz	79.7
	Frequency Weightings at B - Weighting 1kHz, IEC 61672-3 (13)	82.0	90.8	12.5kHz	85.2	
	ANSI/ASA S1.4 - 2014 / Part 3. -12	88.2	92.5	8kHz	91.1	
		92.4	94.2	4kHz	93.3	
		93.0	94.8	2kHz	93.8	
		93.1	94.9	1kHz	93.8	
		92.8	94.6	500Hz	93.3	
		91.8	93.6	250Hz	92.5	
		88.9	90.7	125Hz	89.8	
		83.8	85.6	63Hz	84.7	
		75.6	78.3	31.5Hz	77.2	

Test	Function	Tolerance		Measured values		
		Min	Max	Data	Out	
.2b	A Weighting Response (Direct input without mic.) ANSI/ASA S1.4 - 2014 / Part 3. -13	0.0	27.1	10Hz	23.9	
		0.0	33.6	12.5Hz	32.0	
		32.8	39.8	16Hz	38.0	
		41.0	46.0	20Hz	44.0	
		47.3	51.8	25Hz	49.6	
		52.6	56.6	31.5Hz	55.1	
		57.9	60.9	40Hz	59.7	
		62.3	65.3	50Hz	63.9	
		66.3	69.3	63Hz	68.0	
		70.0	73.0	80Hz	71.8	
		73.4	76.4	100Hz	76.3	
		76.4	79.4	125Hz	78.0	
		79.1	82.1	160Hz	80.9	
		81.6	84.6	200Hz	83.3	
		84.0	86.8	250Hz	85.5	
		86.0	88.8	315Hz	87.5	
		87.8	90.6	400Hz	89.4	
		89.4	92.2	500Hz	90.9	
		90.7	93.5	630Hz	92.2	
		91.8	94.6	800Hz	93.4	
92.9	95.1	1kHz	94.2			
93.2	96.0	1.25kHz	94.7			
93.4	96.6	1.6kHz	95.2			
93.6	96.8	2kHz	95.4			
93.7	96.9	2.5kHz	95.5			
93.6	96.8	3.15kHz	95.4			
93.4	96.6	4kHz	95.3			
92.4	96.6	5kHz	94.8			
91.3	96.0	6.3kHz	94.1			
89.8	95.0	8kHz	93.0			
87.9	94.1	10kHz	91.1			
83.7	92.7	12.5kHz	88.2			
70.4	90.9	16kHz	82.2			
	0.0	88.7	20kHz	70.1		
Frequency Response measured with Electrical Signal, Freq. Weig. A with HP filter, IEC 61672 Class 1 (12)						

Test	Function	Tolerance		Measured values	
		Min	Max	Data	Out
	<b>C Weighting response (Direct input without mic. )</b>				
	ANSI/ASA S1.4 - 2014 / Part 3. -13	0.0	83.2	10Hz	79.9
		0.0	85.8	12.5Hz	83.5
		81.0	88.0	16Hz	85.9
		85.3	90.3	20Hz	88.1
		87.6	92.1	25Hz	89.9
		89.0	93.0	31.5Hz	91.3
		90.5	93.5	40Hz	92.2
		91.2	94.2	50Hz	92.9
		91.7	94.7	63Hz	93.3
		92.0	95.0	80Hz	93.6
		92.2	95.2	100Hz	93.8
		92.3	95.3	125Hz	93.9
		92.4	95.4	160Hz	94.0
		92.5	95.5	200Hz	94.1
		92.6	95.4	250Hz	94.1
		92.6	95.4	315Hz	94.1
		92.6	95.4	400Hz	94.1
		92.6	95.4	500Hz	94.1
		92.6	95.4	630Hz	94.1
		92.6	95.4	800Hz	94.1
		92.9	95.1	1kHz	94.1
		92.6	95.4	1.25kHz	94.1
		92.3	95.5	1.6kHz	94.0
		92.2	95.4	2kHz	93.9
		92.1	95.3	2.5kHz	93.8
		91.9	95.1	3.15kHz	93.6
		91.6	94.8	4kHz	93.3
		90.6	94.8	5kHz	92.9
		89.4	94.1	6.3kHz	92.3
		87.9	93.1	8kHz	91.0
		86.0	92.2	10kHz	89.2
		81.8	90.8	12.5kHz	86.2
		68.5	89.0	16kHz	80.2
		0.0	86.8	20kHz	68.1
Frequency Response measured with Electrical Signal, Freq. Weig. C with HP filter, IEC 61672 Class 1 (12)					

Test	Function	Tolerance		Measured values	
		Min	Max	Data	Out
Z Weighting response (Direct input without mic. ) ANSI/ASA S1.4 - 2014 / Part 3. -13		0.0	97.5	10Hz	93.6
		0.0	97.0	12.5Hz	93.8
		89.5	96.5	16Hz	93.9
		91.5	96.5	20Hz	94.0
		92.0	96.5	25Hz	94.0
		92.0	96.0	31.5Hz	94.0
		92.5	95.5	40Hz	94.0
		92.5	95.5	50Hz	94.0
		92.5	95.5	63Hz	94.0
		92.5	95.5	80Hz	94.0
		92.5	95.5	100Hz	94.0
		92.5	95.5	125Hz	94.0
		92.5	95.5	160Hz	94.0
		92.5	95.5	200Hz	94.0
		92.6	95.4	250Hz	94.0
		92.6	95.4	315Hz	94.0
		92.6	95.4	400Hz	94.0
		92.6	95.4	500Hz	94.0
		92.6	95.4	630Hz	94.0
		92.6	95.4	800Hz	94.0
	92.9	95.1	1kHz	94.0	
	92.6	95.4	1.25kHz	94.0	
	92.4	95.6	1.6kHz	94.0	
	92.4	95.6	2kHz	94.0	
	92.4	95.6	2.5kHz	94.0	
	92.4	95.6	3.15kHz	94.0	
	92.4	95.6	4kHz	94.0	
	91.9	96.1	5kHz	94.0	
	91.4	96.1	6.3kHz	94.0	
	90.9	96.1	8kHz	94.0	
	90.4	96.6	10kHz	94.0	
	88.0	97.0	12.5kHz	94.0	
	77.0	97.5	16kHz	94.0	
	0.0	98.0	20kHz	93.6	

Frequency Response measured with Electrical Signal, Freq. Weig. Z with HP filter, IEC 61672 Class 1 (12)

Test	Function	Tolerance		Measured values	
		Min	Max	Data	Out
	<b>B Weighting response (Direct input without mic. )</b>				
	ANSI/ASA S1.4 - 2014 / Part 3. -13				
		0.0	59.8	10Hz	55.8
		0.0	64.3	12.5Hz	61.7
		62.5	68.5	16Hz	65.9
		67.3	72.3	20Hz	70.0
		71.6	75.6	25Hz	73.6
		75.4	78.4	31.5Hz	77.2
		78.3	81.3	40Hz	80.1
		81.4	83.4	50Hz	82.6
		83.7	85.7	63Hz	84.6
		85.6	87.6	80Hz	86.7
		87.4	89.4	100Hz	88.3
		88.8	90.8	125Hz	89.7
		90.0	92.0	160Hz	91.0
		91.0	93.0	200Hz	91.9
		91.7	93.7	250Hz	92.6
		92.2	94.2	315Hz	93.1
		92.5	94.5	400Hz	93.5
		92.7	94.7	500Hz	93.7
		92.9	94.9	630Hz	93.8
		93.0	95.0	800Hz	93.9
		93.0	95.0	1kHz	94.0
		93.0	95.0	1.25kHz	94.0
		93.0	95.0	1.6kHz	94.0
		92.9	94.9	2kHz	93.9
		92.8	94.8	2.5kHz	93.8
		92.6	94.6	3.15kHz	93.6
		92.3	94.3	4kHz	93.3
		91.3	94.3	5kHz	92.9
		90.1	93.6	6.3kHz	92.3
		88.1	92.6	8kHz	91.0
		85.7	91.7	10kHz	89.3
		81.9	90.9	12.5kHz	86.2
		0.0	88.6	16kHz	80.2
		0.0	90.7	20kHz	68.1

Frequency Response measured with Electrical Signal, Freq. Weig. Z with HP filter, IEC 61672 Class 1 (12)



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Test	Function	Tolerance			Measured values	
		Min	Max		Data	Out
,3	<b>Functions</b>					
	ANSI/ASA S1.4 - 2014 / Part 3. -12	93.5	94.5	SPL	94.0	
		93.5	94.5	Leq	94.0	
		93.5	94.5	Max	94.0	
		93.5	94.5	Min	94.0	
		96.0	98.0	Peak	97.3	
		102.9	104.9	SEL	104.0	
	Frequency Weightings at A - Weighting 1kHz, IEC 61672-3 (13)	93.5	94.5	A <sub>Fast</sub>	95.2	
	Frequency Weightings at C - Weighting 1kHz, IEC 61672-3 (13)	93.5	94.5	C <sub>Fast</sub>	93.8	
	Frequency Weightings at Z - Weighting 1kHz, IEC 61672-3 (13)	93.5	94.5	Z <sub>Fast</sub>	93.9	
	Frequency Weightings at B - Weighting 1kHz, IEC 61672-3 (13)	93.5	94.5	B <sub>Fast</sub>	93.8	
		93.6	94.4	Fast	94.0	
		93.6	94.4	Slow	94.0	
	93.6	94.4	Impulse	94.0		
,5.	<b>Crest Factor</b>					
		89.5	90.5	Fast	90.2	
	89.5	90.5	Slow	89.9		
,6a	<b>Time Constant</b>					
	Time Weighting Response to Single Burst, 4kHz, 200ms, F Class 1, IEC61672 - 3 (16)	-1.5	0.5		-1.0	
	Time Weighting Response to Single Burst, 4kHz, 2ms, F Class 1, IEC61672 - 3 (16)	-19.5	-17		-18.3	
	Time Weighting Response to Single Burst, 4kHz, 0.25ms, F Class 1, IEC61672 - 3 (16)	-30	-26		-27.1	
	Time Weighting Response to Single Burst, 4kHz, 200ms, S Class 1, IEC61672 - 3 (16)	-7.9	-6.4		-7.4	
	Time Weighting Response to Single Burst, 4kHz, 2ms, S Class 1, IEC61672 - 3 (16)	-27.5	-26.5		-26.9	
	ANSI/ASA S1.4 - 2014 / Part 3. -18					
	<b>Acoustic test at 2kHz.</b>	88.0	90.0	Fast	89.0	
	84.9	86.9	Slow	86.1		
,7	<b>Inherent noise level</b>	Less than	29	A Slow	28.3	
		Less than	29	C Slow	28.1	
	ANSI/ASA S1.4 - 2014 / Part 3. -11	Less than	34	F Slow	33.3	
		Less than	29	B Slow	34.3	
	Electrical Inherent Noise Level, Freq. Weig. Lin, IEC 61672-3 (10)					
	Overload Indication IEC 61672 - 3 (18)				Pass	

The expanded uncertainty of calibration at 95% confidence level with a coverage factor of k=2.

Parameter	Test Instrumentation Uncertainty	DUT Uncertainty	Total DUT Uncertainty
Reading with mic. @ 1kHz:	0.11	0.1	0.21
Meter linearity:	0.46	0.1	0.56
Attenuator accuracy:	0.46	0.1	0.56
Freq. Response: 63Hz to 8kHz	0.10	0.1	0.20
Freq. Response: 12.5kHz & 16kHz	0.11	0.1	0.21
Electrical Freq. Resp.: 20Hz to 20kHz	0.024	0.1	0.12
Inherent noise level:	0.11	0.1	0.21
Crest Factor:	0.11	0.1	0.21
Time Constant:	0.11	0.1	0.21
Overload:	0.11	0.1	0.21
Functions:	0.11	0.1	0.21
Sensitivity:	0.11	0.1	0.21

Measurements performed by:

Calibration Date: 6-Feb-2019

James Zhu