

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

Microphone

Manufactured By: Bruel & Kjaer
Model No: 4155
Serial No: 1582239
Calibration Recall No: 32391

Submitted by:

Customer:

Company:

Address: 1575 State Rt 96

Victor, NY 14564

The subject instrument was calibrated to the indicated specification using standards traceable to the SI through National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Specification No. 4155 B&K

Upon receipt for calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.

The information supplied certifies that the item listed above meets acceptance criteria under the decision rule: $A = (L - (U95))$, where A is the acceptance criteria, L is manufacturer specifications and U95 is confidence level of 95% at $K=2$. The decision rule has been communicated and approved by customer during contract review. Measurements marked with (*) are not covered by the scope of of current A2LA accreditation.

West Caldwell Calibration Laboratories' calibration control system meets the requirements, ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Note: With this Certificate, Report of Calibration is Included

Approved by:



James Zhu

Calibration Date: 5-Oct-21
Certificate Issue Date: 10-Oct-21

Certificate No: 32391-1

Quality Manager
ISO/IEC 17025:2017

QA Doc. #1051 Rev 2.1 12/20/19

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



Calibration Lab. Cert. # 1533.01

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



REPORT OF CALIBRATION

Brüel & Kjær Microphone for Model No.: 4155 Serial No.: 1582239
 Company: ID No.: 7941

Calibration results:		Ambient Temperature: 22.0 °C	
Before & after data same: ...X...		Ambient Humidity: 59.5 % RH	
Sensitivity @ 250 Hz and pressure of 99.929 kPa	0 Volts Polarization voltage (External):	Ambient Pressure: 99.929 kPa	
-26.59 dB re.1V/Pascal	46.84 mV/Pascal	Calibration Date: 5-Oct-2021	
0.59 Ko (- dB re 50 mV/Pascal)		Calibration Due: 5-Oct-2022	
Sensitivity: Pass		Report Number: 32391 -1	
Freq. Response: Pass		Control Number: 32391	
All tests: Pass			

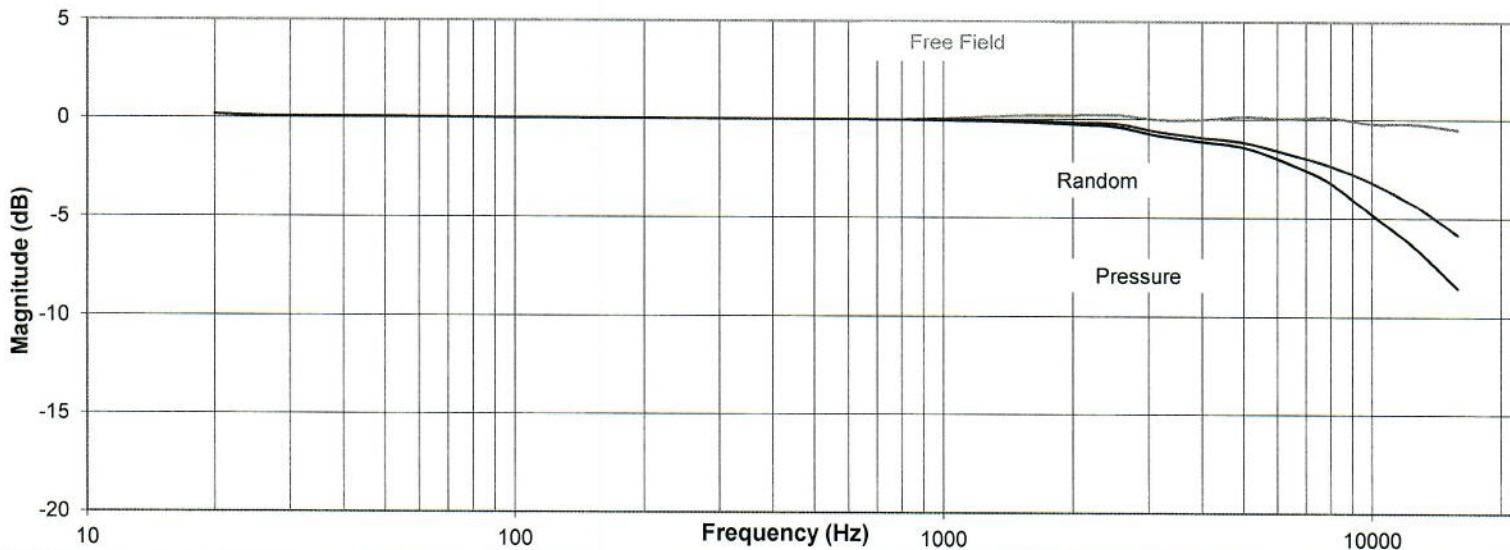
The above listed instrument meets or exceeds the tested manufacturer's specifications.

This Calibration is traceable through NIST test numbers: 684.07/O-0000001126-20

The expanded uncertainty of calibration: 0.15 dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.

Frequency Response



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 P4155B&K
 Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ANSI/NCSL Z540-1, ISO 9001, and ISO 17025.

Calibrated on WCCL system type 9700

This document shall not be reproduced, except in full, without the written approval from West Caldwell Cal. Labs. Inc.

Measurements performed by: *[Signature]*
James Zhu

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4155B&K

West Caldwell Calibration Laboratories Inc.

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

Calibration Data Record

for
 Model No.: 4155

Brüel & Kjær Microphone
 Company:

Serial No.: 1582239
 ID No.: 7941

Frequency Response (Reference = 0 dB @ 250Hz)

Frequency [Hz]	Pressure [dB]	Free Field [dB]	Random [dB]
19.95	0.17	0.17	0.17
25.12	0.08	0.08	0.08
31.62	0.07	0.07	0.07
39.81	0.06	0.06	0.06
50.12	0.06	0.06	0.06
63.10	0.05	0.05	0.05
79.43	0.03	0.03	0.03
100.00	0.03	0.03	0.03
125.89	0.02	0.02	0.02
158.49	0.01	0.01	0.01
199.53	0.01	0.01	0.01
251.19	0.00	0.00	0.00
316.23	-0.01	-0.01	-0.01
398.11	-0.01	-0.01	-0.01
501.19	-0.01	-0.01	-0.01
630.96	-0.02	-0.02	-0.02
794.33	-0.03	-0.03	-0.03
1000.00	-0.06	0.04	-0.01
1258.93	-0.09	0.11	-0.04
1584.89	-0.15	0.20	-0.05
1995.26	-0.26	0.19	-0.16
2511.89	-0.38	0.22	-0.23
3162.28	-0.82	-0.02	-0.62
3981.07	-1.12	-0.02	-0.92
5011.87	-1.41	0.14	-1.16
6309.57	-2.15	0.05	-1.70
7943.28	-3.15	0.10	-2.30
10000.00	-4.81	-0.21	-3.16
12589.25	-6.48	-0.23	-4.33
15848.93	-8.55	-0.50	-5.85

Freq. response: Expanded Uncertainty (dB) with coverage factor K = 2
 20 to 63Hz 0.22 dB, 63 to 12.5kHz 0.20 dB, 12.5k to 16kHz 0.22 dB, 16k to 20kHz 0.5 dB.

Instruments used for calibration:	Date of Cal.	Traceability No.	Re-cal. Due Date
Brüel & Kjær 4226 S/N 1445428	23-Jun-2021	684.07/O-0000001126-20	23-Jun-2022
Brüel & Kjær 3560 S/N 2241893	28-Jun-2021	684.07/O-0000001126-20	28-Jun-2022
HP 33120A S/N US370447	25-Jun-2021	,610119	25-Jun-2022
HP 34401A S/N US360942	25-Jun-2021	,610119	25-Jun-2022

Cal. Date: 5-Oct-2021

Tested by: James Zhu

Calibrated on WCCL system type 9700