

February 17, 2015 Hearing Protective Device Test Report Number Q3525A Revision 0



Lab Code 100427-0

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Date of Sample Receipt: 1/29/15
Date of tests: 2/2/15-2/16/14

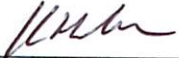
Attenuation measurements have been performed according to the American National Standards Institute (ANSI) Specifications, ANSI S3.19-1974, using the experimenter-fit protocol, on the Libus Quantum reusable insert-type hearing protector (test ID Q3525A). The specified threshold measurement data were obtained using ten normal-hearing listeners, six male and four female. These listeners were selected from a standby group of about 35 volunteers, mostly graduate students, who regularly serve as listeners for measurements of this kind.

The measurements were made in a room designed for this purpose. All acoustic characteristics of the room meet the requirements outlined in ANSI S3.19-1974. The ambient noise levels in this room are below the limits specified in ANSI S3.19-1974, and open ear thresholds are used on a continuing basis to monitor the background noise levels. An automatic recording attenuator was used to record both open and occluded ear thresholds.

Each of ten subjects was tested three times at each of nine test frequencies. The attached Tables show grand mean attenuation values in decibels (dB) for each test signal along with group attenuation values. Standard deviations (S.D.) for the 30 different attenuation determinations for each test signal are also given. The results presented in this report pertain to the samples tested only.

Michael & Associates is accredited by the National Institute of Standards and Technology (NIST) National Laboratory Accreditation Program (NVLAP) for tests performed according to ANSI S3.19-1974, ANSI S12.6-2008, AS/NZ S1270:2002, ANSI S12.42-2010 and EN352 parts 1-8. These accreditation criteria encompass the requirements of international standard ISO Guide 17025. This report may only be reproduced or transmitted electronically in its' entirety. This report shall not be used to claim product endorsement by NIST, NVLAP or by any agency of the U.S. Government. All measurement equipment are calibrated with instrumentation traceable to the NIST.

Use these laboratory-derived attenuation data for comparison purposes only. The amount of protection afforded in field use is often significantly lower depending on how the protectors are fitted and worn.



Kevin Michael, Ph.D.
President

2/17/15

Date

**Individual and Summary Attenuation Data for
Hearing Protective Devices**

Test Method: ANSI S3.19-1974
 Manufacturer: Libus
 Model: Quantum

Position: Insert
 Date: 2/17/15
 Test ID # Q3525A

| SUBJECT | FREQUENCY IN HERTZ | | | | | | | | |
|-----------|--------------------|------|------|------|------|------|------|------|------|
| | 125 | 250 | 500 | 1000 | 2000 | 3150 | 4000 | 6300 | 8000 |
| 1 | 43 | 40 | 40 | 40 | 41 | 41 | 42 | 42 | 47 |
| | 36 | 36 | 35 | 33 | 38 | 39 | 41 | 44 | 43 |
| | 40 | 42 | 42 | 38 | 40 | 41 | 44 | 47 | 43 |
| 2 | 36 | 30 | 36 | 37 | 41 | 42 | 45 | 48 | 45 |
| | 34 | 29 | 36 | 36 | 41 | 42 | 44 | 48 | 45 |
| | 30 | 26 | 31 | 32 | 38 | 44 | 48 | 55 | 46 |
| 3 | 26 | 26 | 30 | 28 | 33 | 32 | 41 | 42 | 46 |
| | 34 | 27 | 32 | 29 | 37 | 38 | 46 | 44 | 47 |
| | 32 | 24 | 29 | 27 | 39 | 37 | 44 | 43 | 47 |
| 4 | 42 | 36 | 38 | 35 | 40 | 44 | 41 | 49 | 50 |
| | 38 | 28 | 38 | 35 | 39 | 47 | 47 | 52 | 50 |
| | 38 | 27 | 39 | 34 | 36 | 47 | 46 | 49 | 53 |
| 5 | 35 | 30 | 32 | 28 | 33 | 42 | 40 | 41 | 39 |
| | 30 | 27 | 31 | 27 | 32 | 41 | 38 | 40 | 38 |
| | 26 | 25 | 29 | 26 | 32 | 41 | 38 | 41 | 40 |
| 6 | 31 | 28 | 29 | 29 | 31 | 38 | 38 | 42 | 40 |
| | 25 | 26 | 27 | 28 | 30 | 38 | 39 | 41 | 37 |
| | 28 | 26 | 28 | 28 | 32 | 35 | 39 | 42 | 40 |
| 7 | 39 | 33 | 38 | 28 | 38 | 39 | 40 | 45 | 52 |
| | 34 | 32 | 39 | 32 | 39 | 40 | 39 | 47 | 52 |
| | 31 | 30 | 39 | 35 | 36 | 39 | 39 | 48 | 53 |
| 8 | 35 | 34 | 41 | 35 | 40 | 44 | 46 | 46 | 49 |
| | 36 | 31 | 40 | 35 | 39 | 43 | 48 | 51 | 50 |
| | 33 | 31 | 36 | 32 | 38 | 41 | 47 | 48 | 50 |
| 9 | 38 | 34 | 35 | 29 | 37 | 44 | 45 | 51 | 51 |
| | 37 | 35 | 38 | 32 | 39 | 43 | 46 | 51 | 48 |
| | 38 | 32 | 36 | 33 | 39 | 43 | 48 | 52 | 49 |
| 10 | 37 | 29 | 31 | 31 | 36 | 41 | 42 | 47 | 42 |
| | 36 | 29 | 31 | 30 | 34 | 43 | 45 | 47 | 43 |
| | 39 | 32 | 34 | 34 | 35 | 44 | 46 | 46 | 42 |
| MEANS | 34.5 | 30.3 | 34.6 | 31.7 | 36.8 | 41.0 | 43.0 | 46.2 | 45.9 |
| STD. DEV. | 4.7 | 4.4 | 4.3 | 3.6 | 3.3 | 3.2 | 3.4 | 3.9 | 4.7 |

NRR = 26 dB

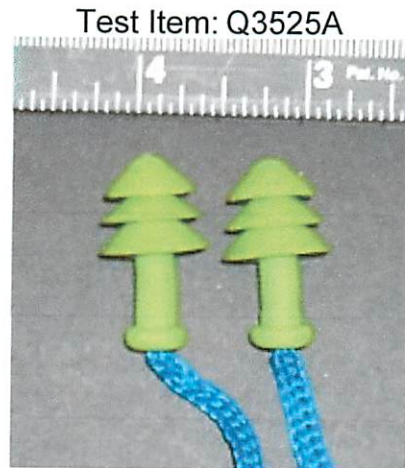
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Manufacturer: Libus
Model: Quantum
Position: Insert

Date: 2/17/15
Test ID: Q3525A

Measurements were made according to American National Standards Institute Specifications ANSI S3.19-1974.

| Center Frequency in Hz | Mean Attenuation in dB | Group Attenuation in dB | Standard Deviation in dB |
|---------------------------|---------------------------|----------------------------|-----------------------------|
| 125 | 34.5 | 64.8 | 4.7 |
| 250 | 30.3 | | 4.4 |
| 500 | 34.6 | | 4.3 |
| 1000 | 31.7 | | 3.6 |
| 2000 | 36.8 | 187.2 | 3.3 |
| 3150 | 41.0 | | 3.2 |
| 4000 | 43.0 | | 3.4 |
| 6300 | 46.2 | 92.1 | 3.9 |
| 8000 | 45.9 | | 4.7 |



These data were obtained through measurements made at the laboratories of Michael & Associates, Inc., State College, PA, USA. Michael & Associates, Inc., is accredited to test to ANSI S3.19-1974, ANSI S12.6-2008, ANSI S12.42-2010, EN352 parts 1-8 and AS/NZ S1270:2002 by the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP).


Kevin L. Michael, Ph.D.
President

2/17/15
Date