



Report on the sound level impact of face coverings

Measurements performed: 7/10/2020

Location: Vistacom | 1902 Vultee St. Allentown Pa. | 610-791-9081 | www.vistacominc.com

Testing engineer and author: Matthew Boyer

Test Environment



Direct Sound: Reference

SPL Level (A-weighted)

SLMeter 123 XLR ASD 12:47

LAF

80.0dB

L_{Aeq}

79.5dB

L_{CPK}

93.6dB

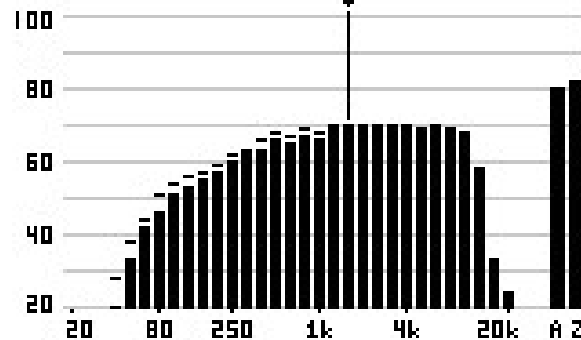
10 RANGE 110

SET ---:---:---
CNT 00:00:01

Measurement

SLMeter XLR ASD 13:33

LAFhold3 70.3dB 1/3 OCT
LAFlive 70.1dB @ 1.60kHz



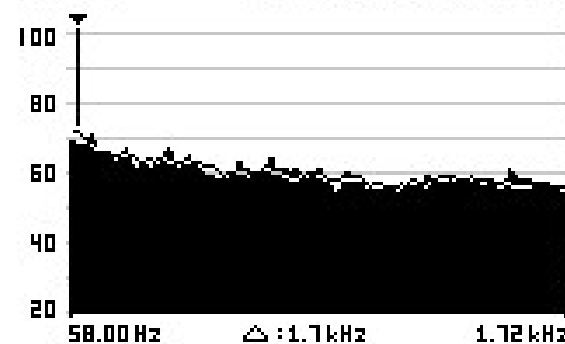
10 RANGE 110

SET ---:---:---
CNT 00:00:05

FFT Measurement

FFT + Tol 1k7 XLR ASD 13:34

EQ 71.9dB
Live 73.1dB @ 81.438Hz



10 RANGE 110

τ 0.1s SET ---:---:---
CNT 00:00:08

Filtered through N95 mask

SPL Level (A-weighted)

SLMeter 123 XLR ASD 12:48

LAF

76.3dB

LReq 76.9dB

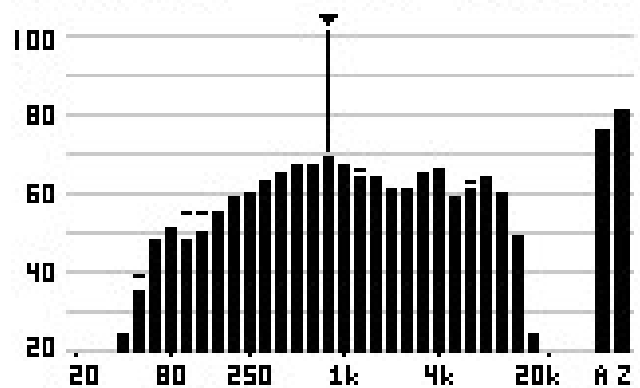
LCPK 91.1dB

10 RANGE 110 SET ---:---:---
CNT 00:00:32

RTA Measurement

SLMeter 123 XLR ASD 12:55

LAFhold3 69.2dB 1/3 OCT
LAFlive 68.1dB 800Hz

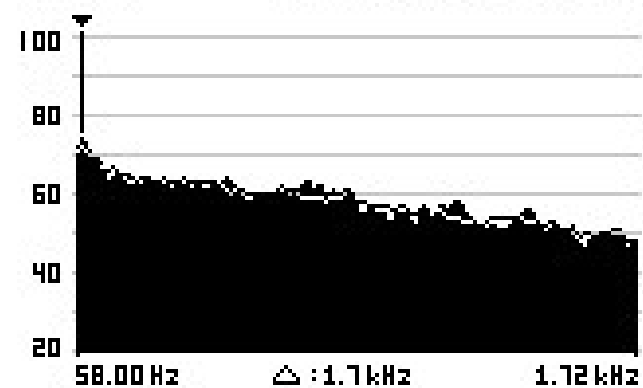


10 RANGE 110 SET ---:---:---
CNT 00:00:03

FFT Measurement

FFT + Tol 1k7 XLR ASD 12:56

EQ 71.9dB
Live 73.1dB 69.719Hz



10 RANGE 110 τ 0.1s SET ---:---:---
CNT 00:00:04

Filtered through double layer cotton mask

SPL Level (A-weighted)

SLMeter 123 XLR ASD 12:51

LAF

78.2dB

LReq

76.9dB

LCPK

91.6dB

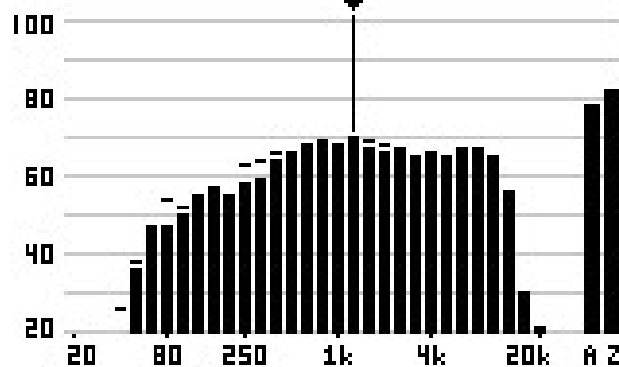
10 RANGE 110

SET ---:---:---
CNT 00:00:32

RTA Measurement

SLMeter 123 XLR ASD 12:53

LAFhold3 69.6dB 1/3 OCT
LAFlive 68.5dB @ 1.25kHz



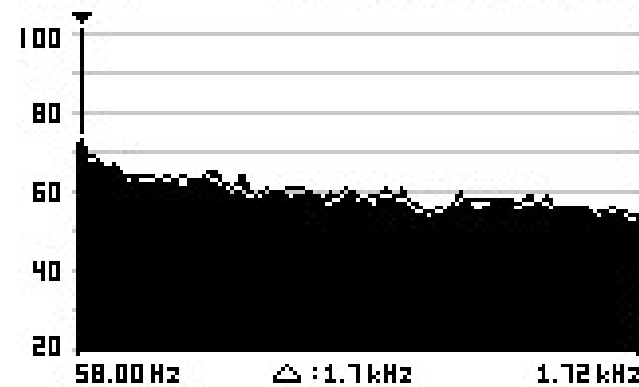
10 RANGE 110

SET ---:---:---
CNT 00:00:14

FFT Measurement

FFT + Tol 1k7 XLR ASD 12:52

EQ 72.8dB
Live 76.4dB @ 69.719Hz



10 RANGE 110

SET ---:---:---
CNT 00:00:10

Filtered through plastic face shield

SPL Level (A-weighted)

SLMeter 123 XLR RUN ASD 13:02

LAF

75.6dB

LReq

75.4dB

LCPK

90.2dB

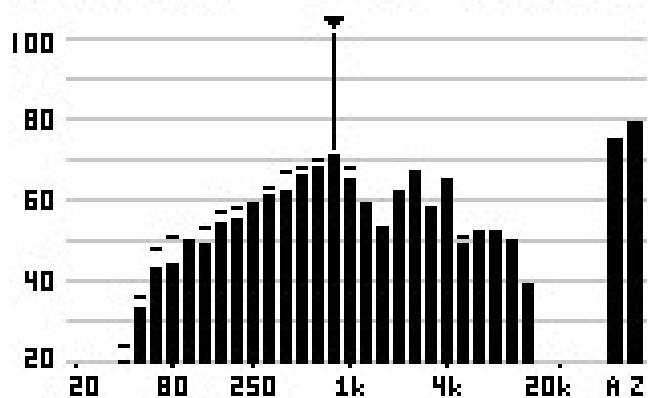
10 RANGE 110

SET ---:---:---
CNT 00:00:03

RTA Measurement

SLMeter 123 XLR RUN ASD 13:02

LAFhold3 71.3dB 1/3 OCT
LAFlive 69.8dB 800Hz



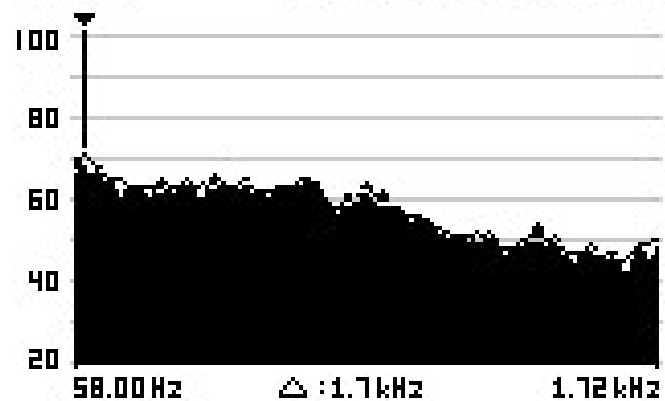
10 RANGE 110

SET ---:---:---
CNT 00:00:02

FFT Measurement

FFT + Tol 1k7 XLR RUN ASD 13:01

EQ 70.6dB
Live 69.9dB 81.438Hz



10 RANGE 110 τ 0.1s

SET ---:---:---
CNT 00:00:05

Synopsis:

Sound Pressure Level (SPL) is often measured in Decibels using a weighted scale that approximates human hearing response. This is called A-weighting and was used for these tests.

The SPL meter used for measurement was an NTI XL2 calibrated on 2/3/2020.

The sound source used for measurement was an NTI Talkbox calibrated on 6/22/2020.

With regards to SPL, a 6 dB SPL increase is equal to a doubling of intensity whereas a 6 dB SPL decrease is equal to half the sound intensity. That said, people perceive volume changes more subjectively and often a better measurement is the loudness scale. On this scale a 10 dB SPL level change is required to recognize a doubling or halving of sound level.

The tests indicate a measurable decrease in sound pressure level when the mask was placed in front of the sound source. There were also changes in the frequency spectral response. The masks would attenuate higher frequencies.

The mask with the greatest impact was the plastic face shield. The least impact was from the double layer cloth mask with the N95 mask in the middle.

While the level difference is measurable, if we consider the differences based on the loudness scale even the worst performer —the face shield— does not come close to a 10 dB drop in level which would be considered half as loud.

What we do find is the combination of slight attenuation coupled with a slight change of tonal quality combine to create a subjective decrease in intelligibility. I say subjective because all the masks maintained an Excellent STIPA rating.

These tests indicate that no face covering or at least a face covering that provides some layer of protection will be completely acoustically transparent. That said, with only a slight behavioral change i.e. speaking slightly louder and with more articulation, the negative acoustical impact of the mask can be circumvented.

End of report.