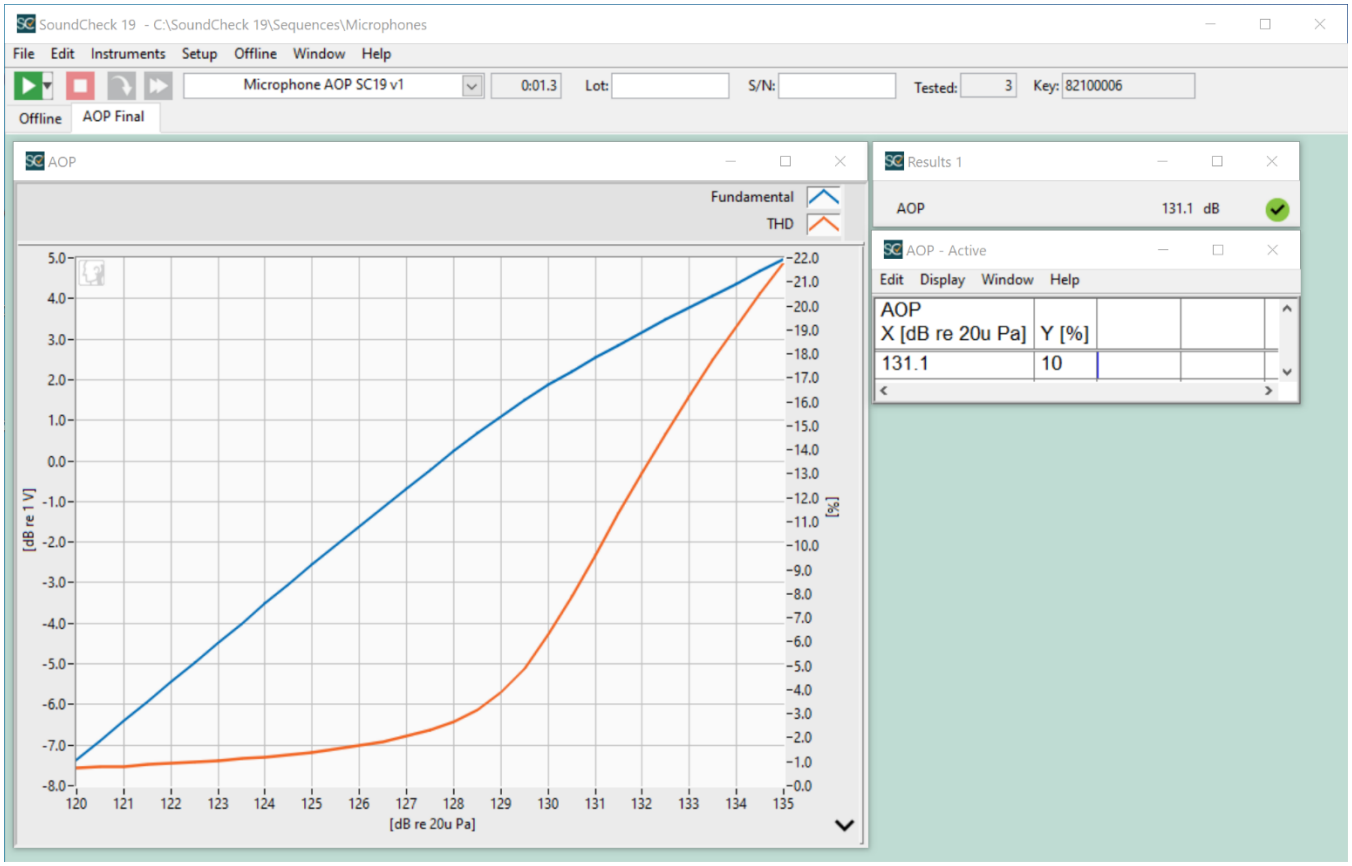
Microphone Acoustic Overload Point (AOP) Sequence

Introduction

The purpose of this sequence is to measure the acoustic overload point (AOP) of a microphone. AOP is the SPL required to produce 10% THD @ 1kHz from the microphone's output.

The sequence uses a 1 kHz amplitude sweep across a range of 120 dB SPL to 135 dB SPL from a calibrated source speaker. A Limit step is applied to the FSD-in value to warn the user of input clipping. The recorded time waveform is then analyzed using the HarmonicTrak algorithm to produce a Fundamental and THD vs. Level curve, both of which are shown on the final display. An intersection post processing function is applied to the THD curve to identify the level at which the curve intersects 10% THD and that level is then passed through a limit step to produce a Pass/Fail AOP verdict.



Final Display – *Microphone AOP*

Hardware Requirements

Audio Interface – Listen AudioConnect p/n 4050 (or similar)

Audio Power Amplifier – Listen SCAmp p/n 4060 (or similar)

Reference Microphone – Listen SCM-3 p/n 4002 (or similar)

Source speaker – High power loudspeaker capable of producing the desired SPL levels @ 1 kHz at the measurement reference position with minimal THD and thermal power compression.

Software Requirements

SoundCheck 19 or later – The SoundCheck Plus package has all the modules required to run the sequence

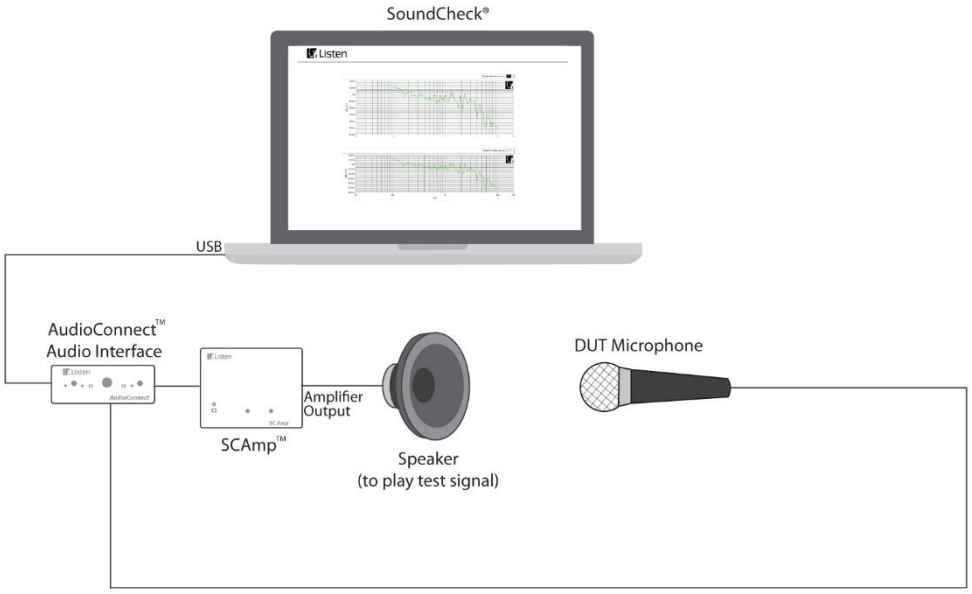
Hardware Setup & Calibration

Caution: Make sure that your source speaker can produce the required high SPL levels (120-135 dB SPL) while maintaining low levels of distortion and thermal power compression.

1. Connect the hardware as shown in the System Diagram below
2. Calibrate the Reference Microphone as described in the SoundCheck user manual and place it in front of the Source Speaker at the measurement reference point
3. Calibrate the Source Speaker as described in the SoundCheck user manual.
    a. The recommended calibration level is 120 dB SPL
    b. Since the test stimulus is a 1 kHz amplitude sweep, a narrow equalization frequency range can be used. Recommended frequency range is Start=800 Hz / Stop=1.12 kHz
4. Place the DUT Microphone at the measurement reference point

You are ready to start the sequence.

System diagram



Sequence Logic

Type	Step Name	#	Out	In	Comment
Mes	AOP THD Limit	1			// %THD for AOP (hidden)
Mes	Operator Dialog	2			// Recall example data?
Rec	Recall curves Amplitude	3			
Sti	Sweep	4	Source Speaker		
Acq	Play & Record	5	Source Speaker	DUT Mic	
Lim	Input FSD	6			// Monitors FSD In for input signal path clipping.
Mes	Warning	7			// Warns user that input clipping has occurred
Ana	THD	8			
Pos	Intersection	9			// Searches up the THD curve to find 10% point
Lim	AOP Limit	10			// AOP Limit (dB SPL)
Dis	AOP Final	11			

Further sequence development

This sequence has been designed for simplicity and has been written for a 2-channel system, to be accessible to 100% of SoundCheck customers. Ways in which you could modify or further develop the sequence include:

- If you are using Listen hardware that supports the Auto Gain and Auto Read functions (AmpConnect ISC, AmpConnect 621, Audio Connect, SoundConnect 2), enable them in the Acquisition Step and System Calibration respectively. This will automatically optimize the input gain to maximize the FSD-in value and guarantee that input clipping will not occur.