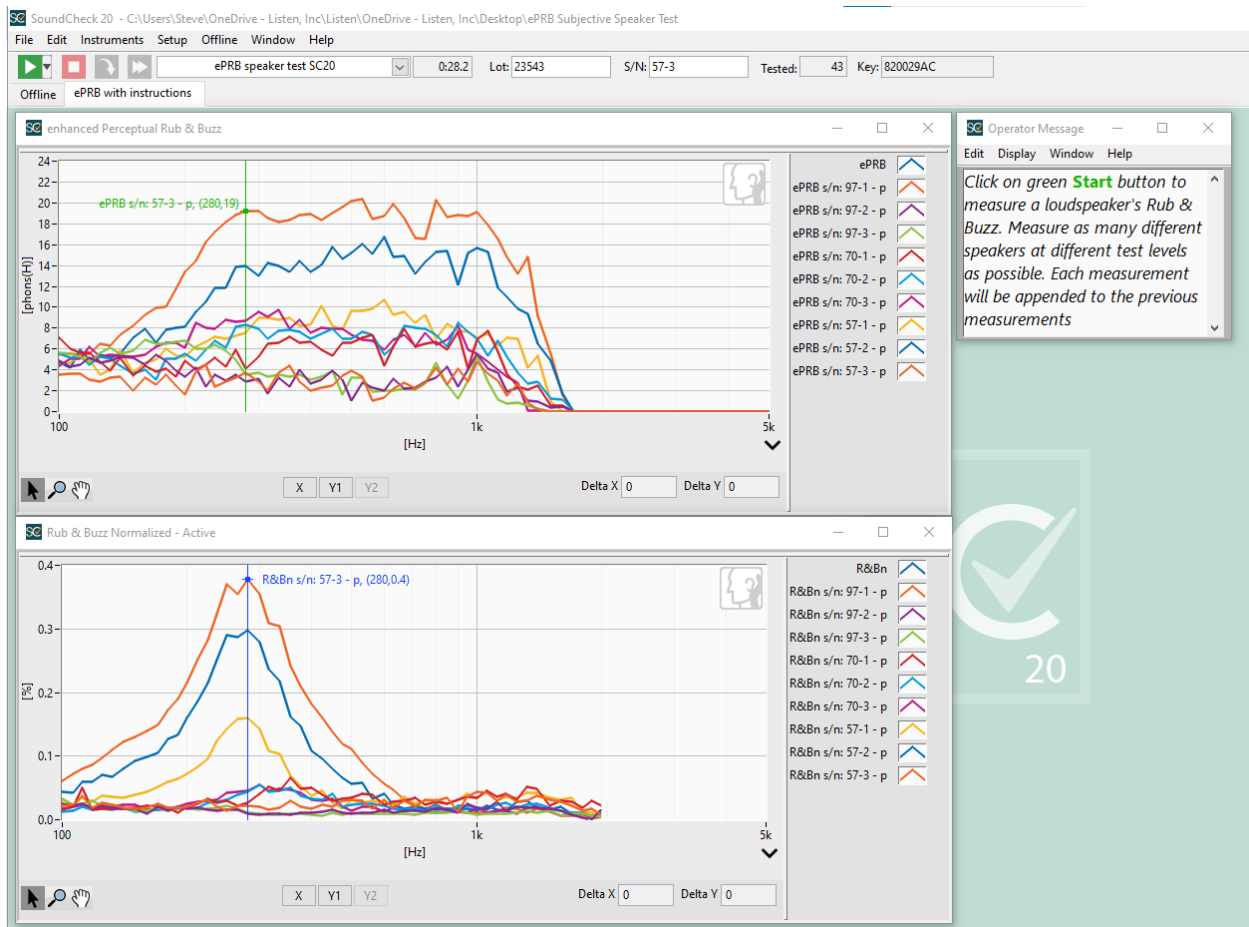


ePRB Subjective Speaker Test

Introduction

This sequence demonstrates how SC20's new enhanced Perceptual Rub & Buzz algorithm compares to normalized Rub & Buzz and subjective listening. Running this sequence on a batch of good and bad buzzing loudspeakers should help identify by measurement, audibly defective units and where to set production limits.

Starting the sequence, the user is asked at what test level to play a stepped sine sweep (Stweep™) in 1/12th octaves, from 20 kHz to 50 Hz. The user is encouraged to try different test levels and change sweep parameters to find the optimum settings to catch buzzing loudspeakers. The loudspeaker is measured via two channels of the audio interface. A calibrated reference microphone is connected to one of the channels and an impedance reference built into the SC Amp or AmpConnect is connected to the other. A HarmonicTrak™ Analysis step analyzes the recorded waveform from the reference microphone, and displays both the enhanced Perceptual Rub & Buzz and normalized Rub & Buzz graphs.

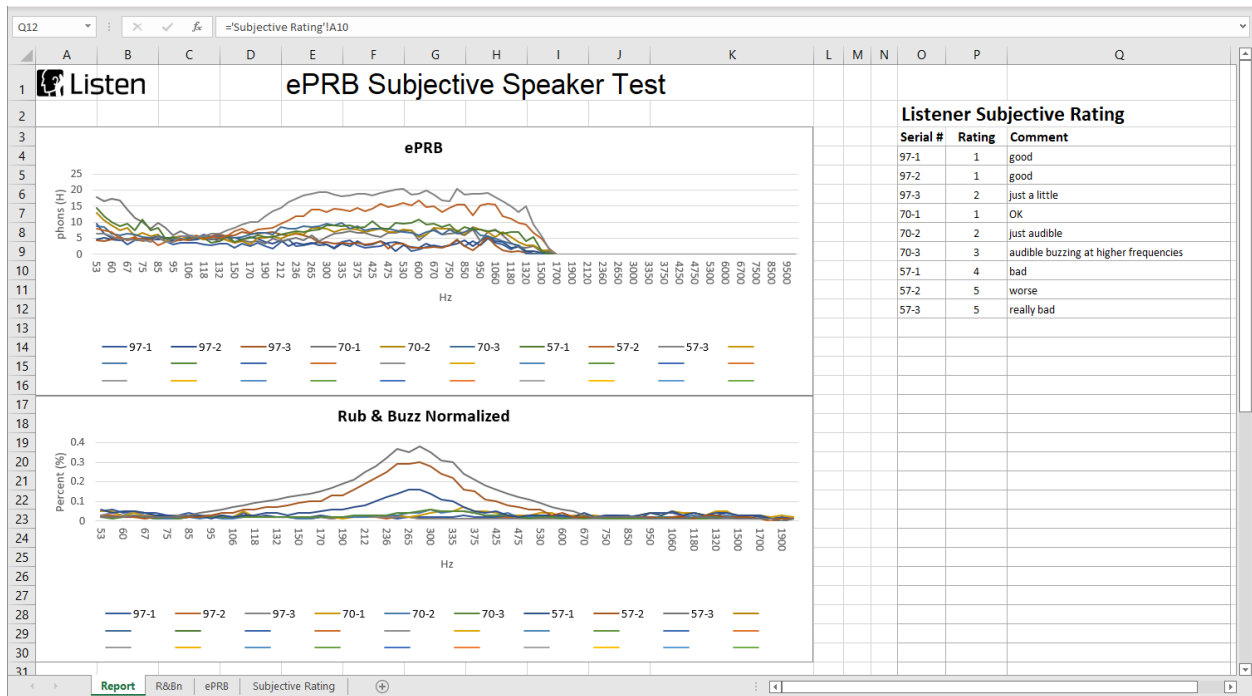


Final display for the ePRB Subjective Speaker Test sequence



The user is asked if they want to save the measurements and if yes, are prompted to subjectively rate the audible Rub & Buzz on a scale from 1 to 5 (1=no audible Rub & Buzz, 2=just audible, and 5=very audible) and a description of the sound quality in the following Prompt for Comment step. Then the recorded waveforms are saved and data plus rating exported to Excel for documentation.

We would appreciate if customers would share their data with us so we can confirm the subjective validity of their measurements and use it to further refine our algorithm if necessary. It will also be quite useful in helping customers define Rub & Buzz limits on the production line. Please zip your “Measurements” folder contained within the same folder as our “ePRB Subjective Speaker Test.sqc” to support@listeninc.com.



Excel Rub & Buzz Report

Hardware Requirements

- Reference Microphone – Listen SCM-4 or similar
- Audio Interface – Listen AudioConnect, AmpConnect or similar (**note:** AudioConnect provides bias voltage for Listen’s SCM microphones. If you use a different microphone or interface, you will likely need to add a microphone power supply such as the Listen SoundConnect to your hardware setup.)
- Power Amplifier – Listen SC Amp or similar

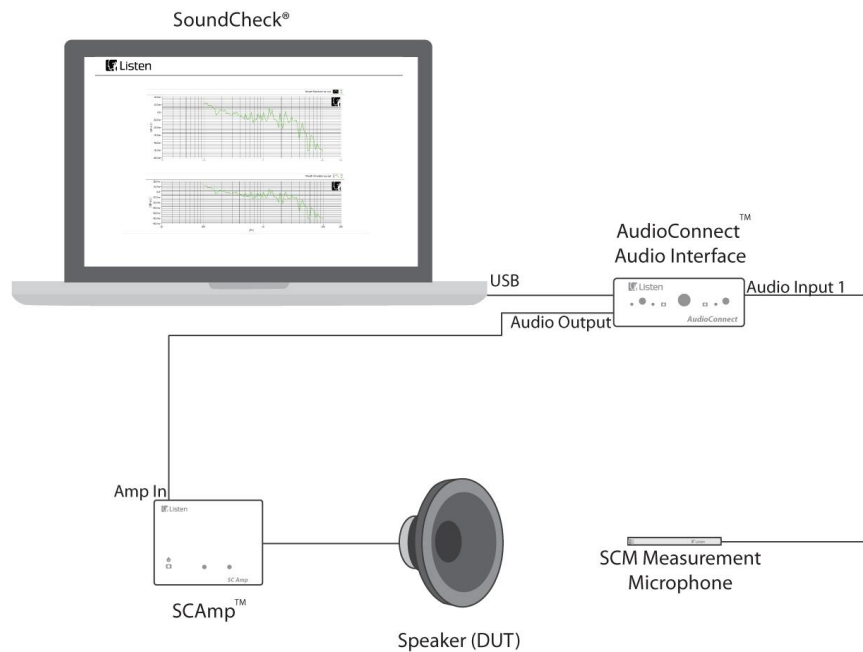


Hardware Setup & Calibration

1. Calibrate the amplifier as instructed in the SoundCheck manual.
2. Calibrate the reference microphone as instructed in the SoundCheck manual.
3. Connect output 1 of your audio interface to the input of the amplifier.
4. Connect the output of the amplifier to your loudspeaker.
5. Position your reference microphone at the desired test distance from the loudspeaker and connect it to the microphone power supply.
6. Connect the mic to input 1 of your audio interface
7. Connect the impedance sense out from the amplifier to the input 2.

You are ready to start the sequence.

System Diagram





Sequence Logic

Sequence Steps	#	Out	In	Comment
(Overall sequence)				
Mes - Recall WFM	1			// Recall previously measured waveform or measure a new speaker?
Mes - Stweep Test Level	2			
Sti - Stweep stimulus	3	Amp ch 1		
Rec - Recall waveforms	4			
Mes - Play Recorded WFM	5			
Acq - Play only	6	Amp ch 1		// Play recalled waveform so that you can hear it
Acq - Play & Record	7	Amp ch 1	Reference	
Ana - THD+Rub&Buzz+PRB+LP	8			
Ana - Impedance	9			
Pos - Curve Average	10			// Takes a linear average of the Fundamental
Lim - Ave Sensitivity	11			
Lim - Polarity	12			
	13			// All of the limits are set for the recalle
				// Obviously useful limits would have t
				// your specific device.
Lim - Response margin	14			
Lim - THD margin	15			
Lim - Rub & Buzz margin	16			
Lim - Perceptual Rub & Buzz margin	17			
Lim - loose particles	18			
Pos - Est. Resonance	19			// Estimates the resonance of the impedance curve
Lim - Impedance Zmax	20			
	21			// -----
Lim - Impedance fo	22			
Lim - Impedance Q	23			
Mes - Operator Dialog	24			
Aut - Save to WFM	25			
Dis - Complete Test	26			