waikatolink
University of Waikato Commercialisation

Acoustic Vector Network Analyzer

WaikatoLink Ltd. has developed a technology that accurately measures sound absorption coefficients of different materials.

A better way to understand Sound

Value Proposition

- Automated sweep for range of frequencies
- Capable of testing acoustic properties of materials for wide range of frequencies
- Reduced cost of engineering
- Rapid testing
- Easy to set up

Potential Applications

- Research and development of new sound absorbing material
- Calibration standards
- Design more sound efficient buildings, auditoriums and theatre

Where we're at now

- Patent application filed (NZ Pat. App. No. 757912)
- Working benchtop prototype

Commercial Plan

- Seek license or sale of IP

Acoustic properties of materials are measured using various techniques, the two most commonly used methods are standing wave method and transfer function method. Both these methods have drawbacks which result in the following:

- Inability to measure acoustic properties of different materials for the full human audible range
- Deviations in results from test to test
- Time consuming: Manual reset for each frequency to be tested

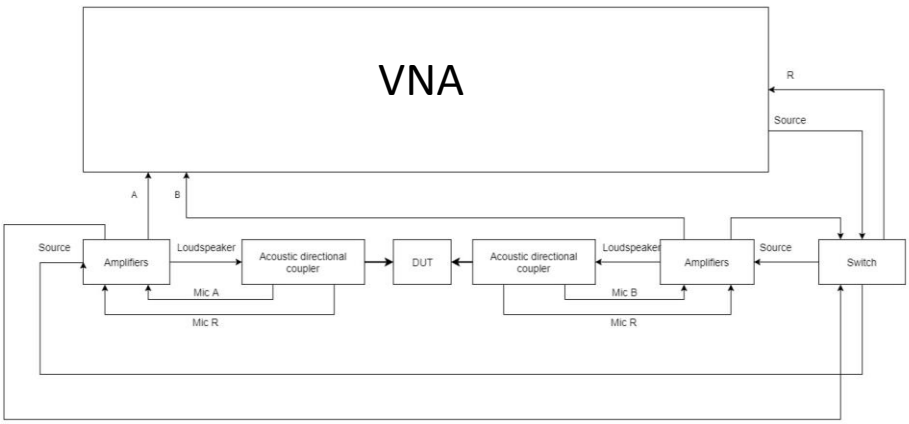
Our Technology

- A more accurate and reproducible way of measuring how sound interacts with different materials
- Novel combination of VNAs, acoustic hardware and proprietary software

How does it work?

- A dual port acoustic vector network analyser
- The acoustic properties like absorption, reflection and transmission of the material to be tested are measured
- Readings are then processed using our patent pending method.

AVNA Setup



	Frequency Range	Testing Time	Accuracy	Automated	Directionality
Impedance Tubes	50 Hz – 6.4KHz	Long	Low	No	Uni – Directional
Reverberation Rooms	100 Hz – 5Khz	Long	Low	No	**Multi – Directional**
AVNA	**20 Hz – 50KHz**	**Short**	**High**	**Yes**	Uni – Directional

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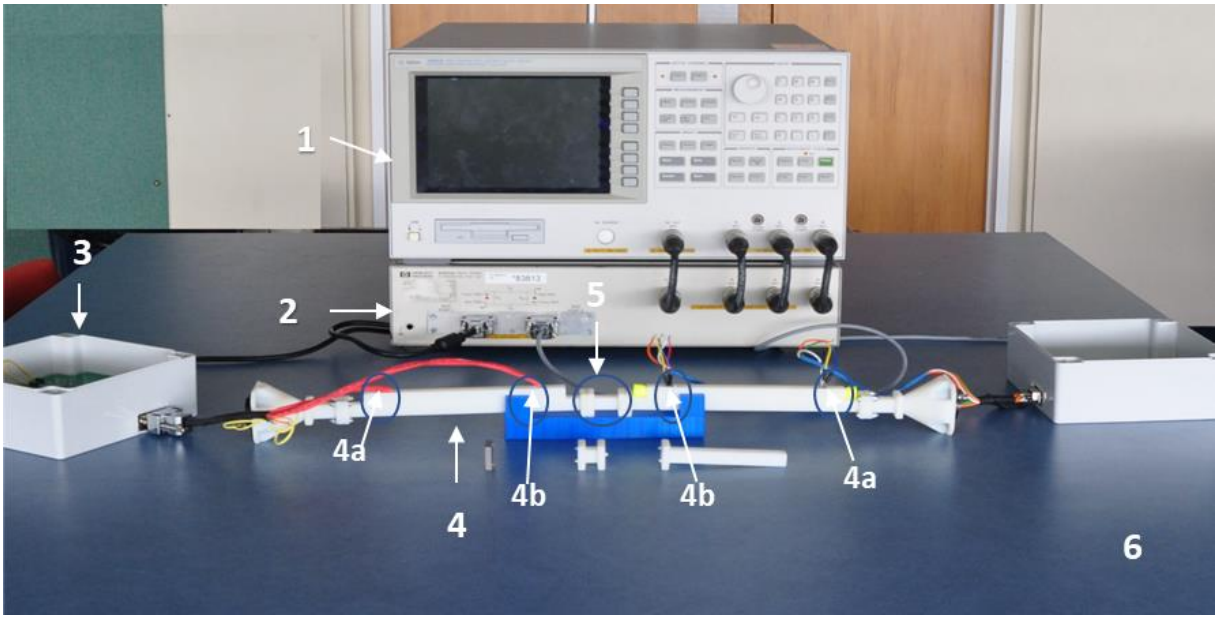
Benchtop Prototype



1. VNA machine: any standard VNA machine can be used (enables sweeping of a preselected range of frequencies)
2. Switch: Converts the electro-magnetic signal produced by the VNA machine into an acoustic signal
3. Custom amplifiers: Used to drive the loudspeakers and microphones, low cost component
4. Two Directional couplers, each with:
    a. a loudspeaker (e.g. Dayton ND20FB-4) source to produce the sound at the selected frequency (usually only utilized in one coupler during testing) and:
    b. microphones (4a and 4b) (e.g. MP23AB02B) used to detect both the sound produced by the loudspeaker and the sound reflected back from material to be tested.

    Dual couplers are required to determine results for both partial and full transmittal of acoustic signals, where the signals are either partially or fully transmitted through the material to be tested. For materials where sound is fully blocked, one coupler would be sufficient as there is no through signal to be detected. This would be the same for calibration of the device.
5. Device/Material to be tested: fixed in place using sealed plates that are screwed together
6. Controlling computer (not shown), where the results are then processed using the algorithm developed at the UoW.

How it works?