

AVAA C214

Active Velocity Acoustic Absorber

Test Report

Relec SA - Reverberant Room



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2 Summary

Explaining how active absorption works is often difficult as it requires significant theoretical background in acoustics and physics.

However, showing the effect in a particular room is easy through simple measurement.

And of course hearing the effect is even more spectacular.

This document explains the effect of PSI Audio's AVAA Technology by showing concrete measurements and effects in RELEC SA reverberant room.

This is the room that was built to be able to measure and compare different active absorbers in exactly the same conditions in ELEC SA premises.

3 Configuration

The room is setup as shown in Figure 1.

A subwoofer is placed in the bottom corner and the measurement microphone is placed in the corner above the subwoofer.

Absorption coefficient have been adjusted to fit the room's real behaviour.

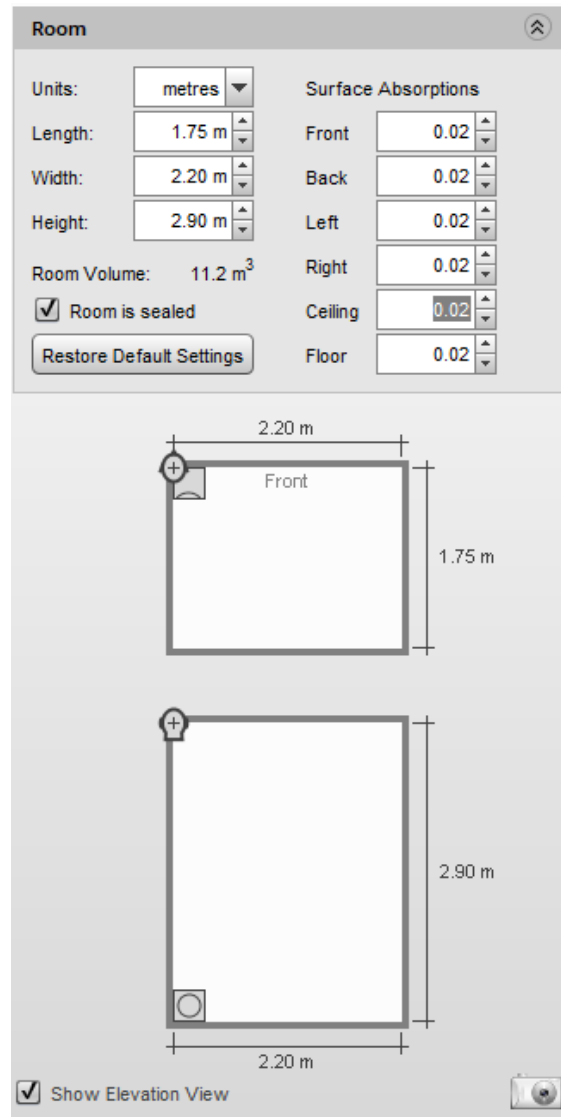


Figure 1 : Relec's reverberant room configuration

This configuration leads to the theoretical room modes shown in Figure 2.

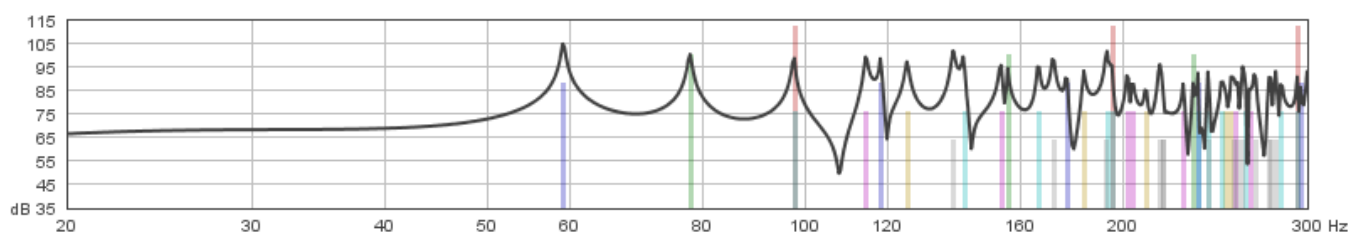


Figure 2 : Relec's reverberant room modes simulation

4 Measurements

In this section, we will show the frequency and time response to understand what effect the AVAA Technology has on room modes.

4.1 Frequency response

This first measurement highlights the room geometry and frequencies of its first room modes.

Figure 3 shows the frequency response of the room with no AVAA and with a single C214 set on calibrated gain (+/- 0 dB).

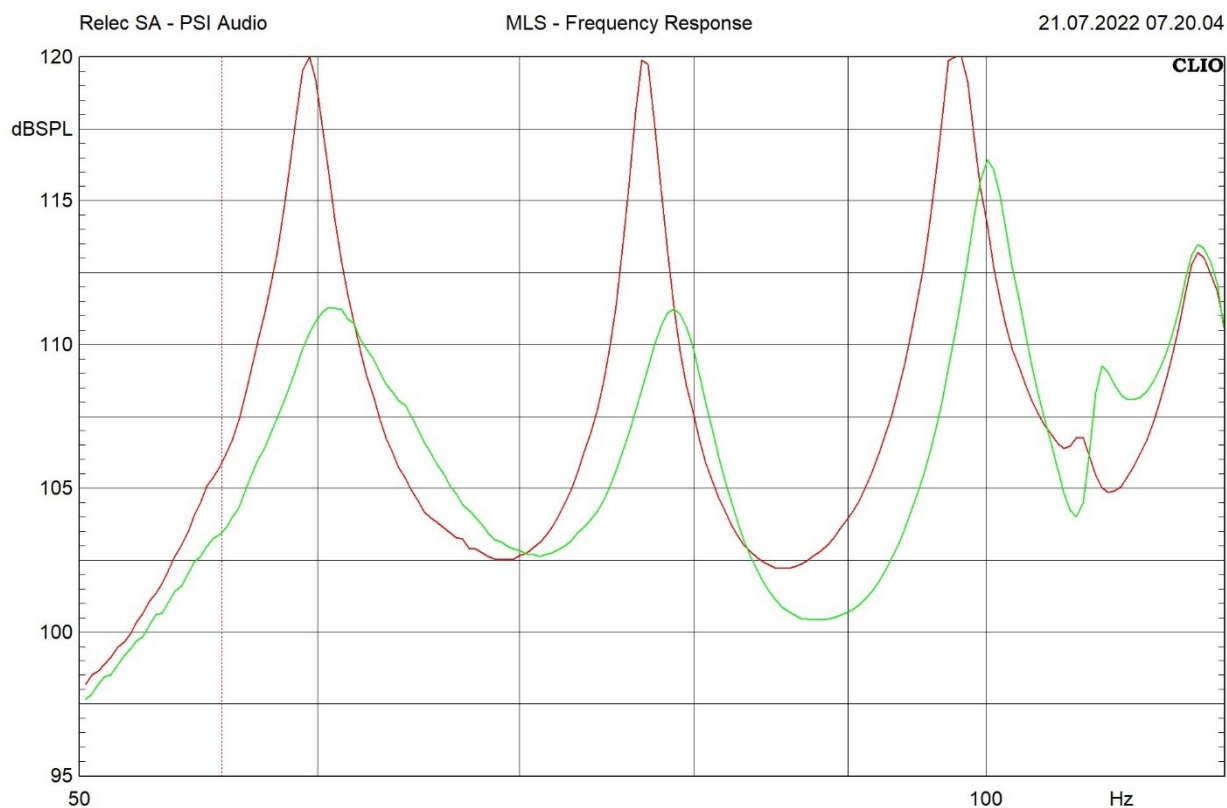


Figure 3 : Frequency response of reverberant room measured.

The measurements validate the room simulations shown in Figure 2 with room modes at 59 Hz, 76 Hz and 97 Hz.

4.2 Waterfall

The measurements were made in MLS which allows to extract the waterfall graph.

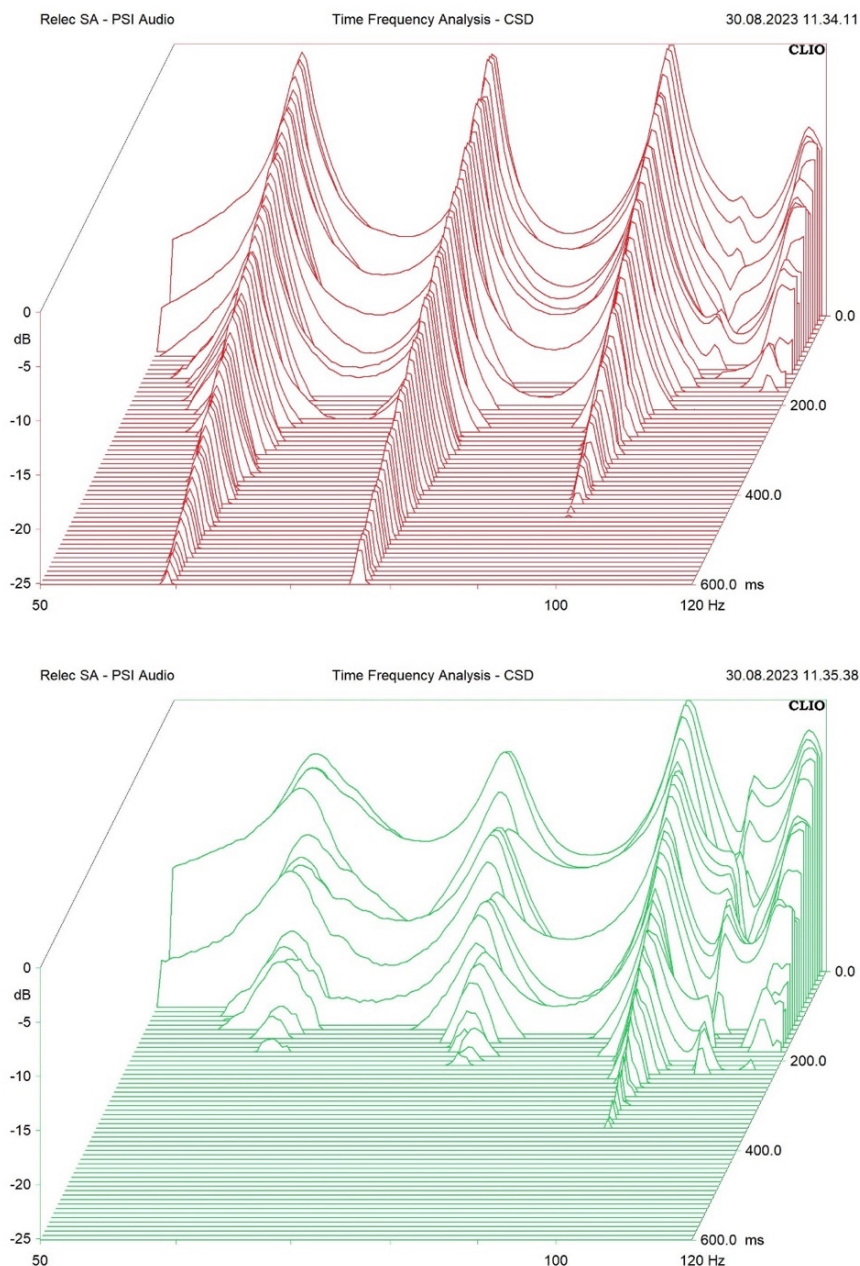


Figure 4 : Waterfall in reverberant room OFF (red) / ON (green)

The first graph (red) shows the waterfall with no low frequency acoustic treatment and the second graph (green) show the same but with a single C214 activated.

Table 1 hereunder shows the RT60 resonance time without and with AVAA Technology.

Table 1 : RT60 comparison AVAA OFF/ON

Freq [Hz]	58.7	76.2	96.6
RT60 OFF [Hz]	1.13	1.68	0.98
RT60 AVAA C214 [Hz]	0.60	0.71	0.60
RT60 diminution [%]	47%	58%	38%

4.3 Burst CEA on room modes

Our last measurement uses a Burst CEA as source signal.

The frequency response is chosen to coincide with a room mode, and the time signal from the microphone in the room was measured. Figure 5, Figure 6 and Figure 7 show the three room modes with the corresponding reference signal and the measured pressure with AVAA OFF and ON.

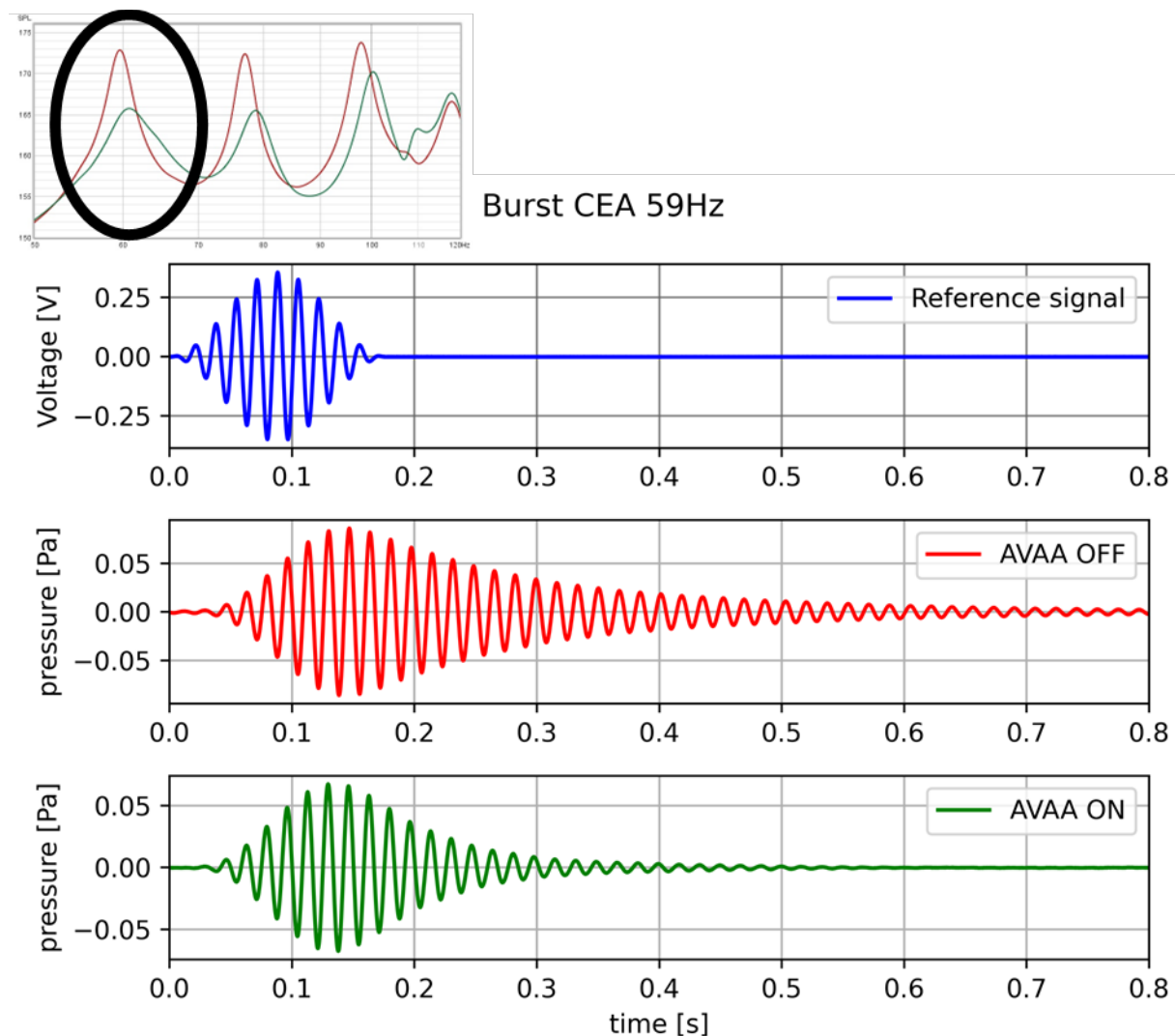


Figure 5: Burst CEA measurements @ 59Hz

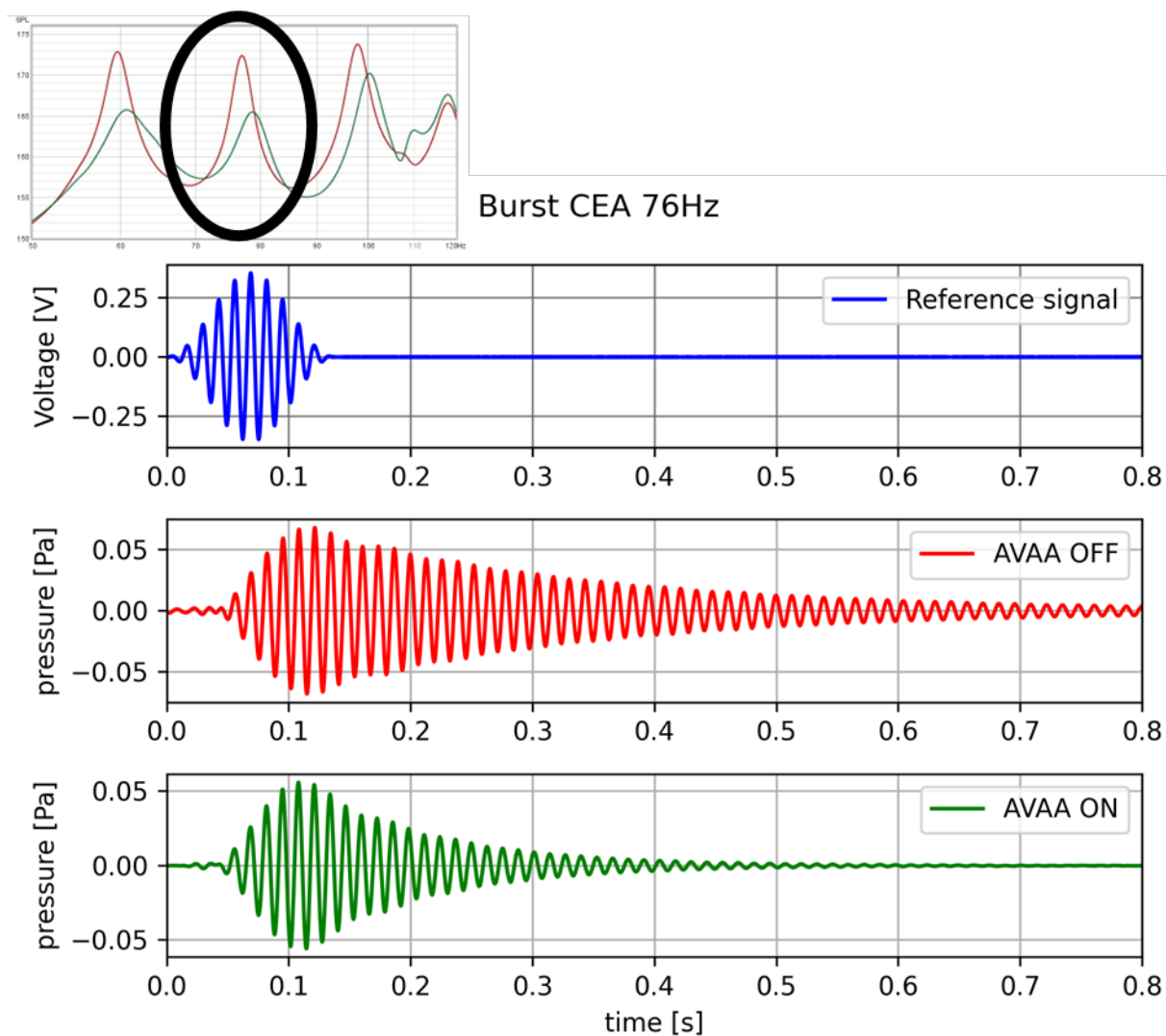


Figure 6 : Burst CEA measurements @ 76Hz

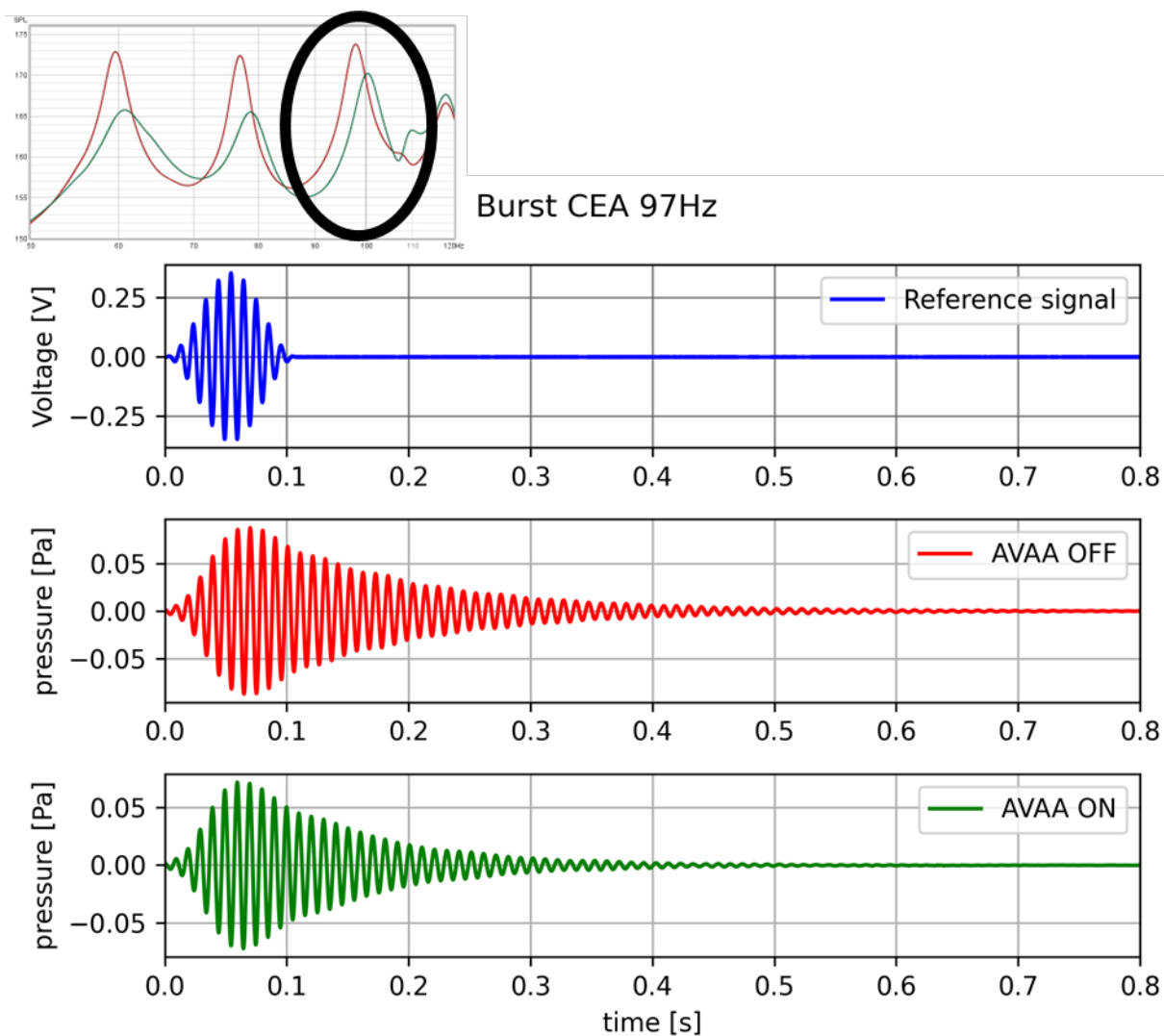


Figure 7 : Burst CEA measurements @ 97Hz

5 Conclusions

The measurements done in RELEC SA standard reverberant room show that the AVAA Technology is extremely effective in reducing room mode reverberation time. Reduction of reverberation time by 36% to 58 % was measured with a single unit in this room.

The effect on the frequency response is also very clear with significant SPL reduction on the room modes.

These results are consistent with many other rooms measured over the years with AVAA Technology C20 and C214 products and for room mode frequencies down to 15 Hz.

Yverdon-les-Bains, le 1 September 2023

Signature : Becher Yvan