# Sample Champion - Application note # 1

Impulse and Frequency Response measurement of a Loudspeaker

It is assumed that a copy of Sample Champion is installed, working and calibrated.

🔴 Place your Loudspeaker on a trestle in the center of the room, away from obstacles, and a microphone about 2 meters in front of it.

🔴 Connect the output of the sound card to an external amplifier, to feed the loudspeaker, and the input of the sound card to the microphone (using, if necessary, a preamplifier).

🔴 Run a cycle of MLS Impulse Response measurements (in the example below the following setup has been used: Average 8 cycles, Sampling Frequency 48 kHz, MLS 64K).

🔴 When Sample Champion has finished the measure cycle, the impulse response must be windowed in order to analyze the anechoic part of the wave: start selecting the impulse (with the "Make Selection A" command) from its start until the first reflection (from the walls or from the floor) appears (as a little impulse, see Application Note #2).
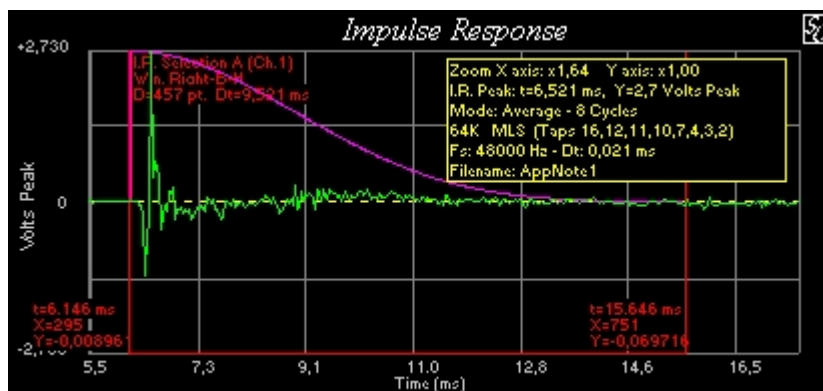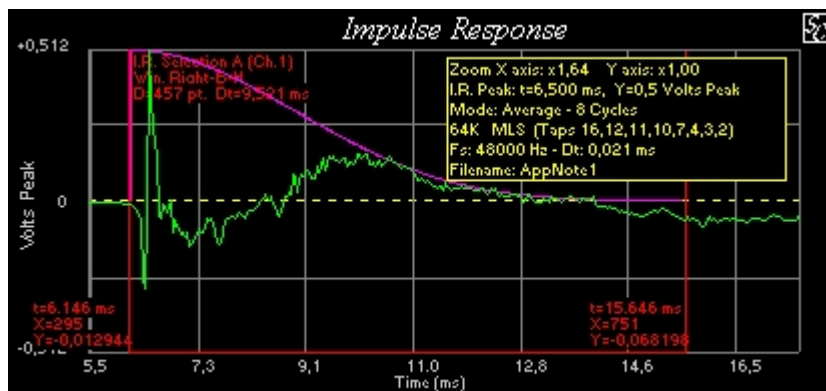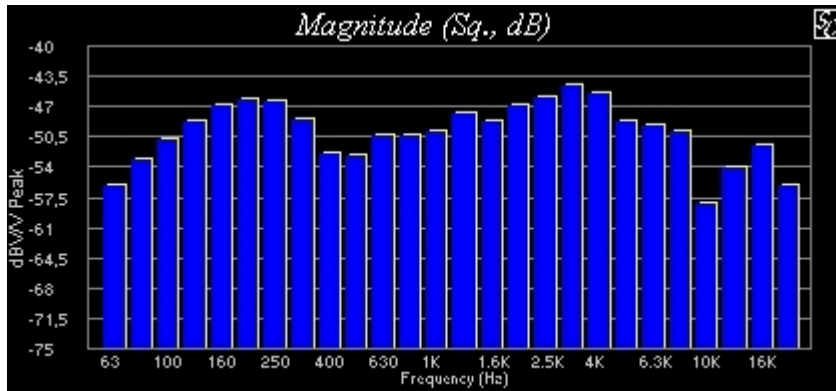

Now the impulse can be analyzed in the frequency domain by performing the FFT of the time data included within "Selection A" cursors. Open the "Measurement type selection" dialog and select "Selection A in Impulse Response window". In the example a FFT length of 64K and a Blackman-Harris Half-Right weighting window have been used.
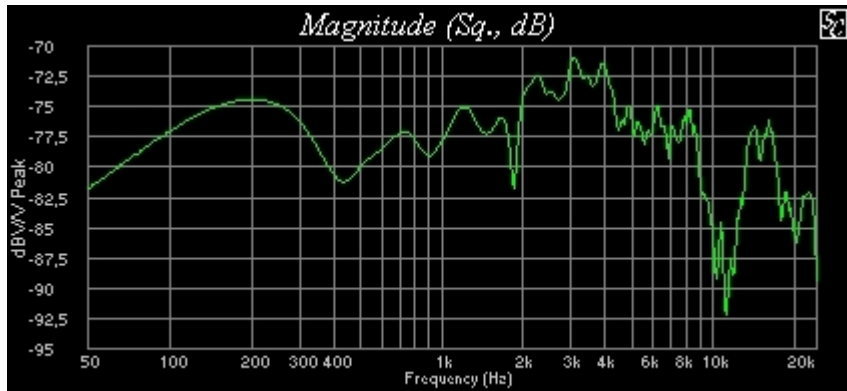
Set, for example, the view mode as "Logarithmic Magnitude Power (dB)" and the graph above will be shown. This is the **frequency response of the loudspeaker**. Remember that the lower resolution limit depends (for every measurement method) on the weighting window length and type. The rectangular window has a frequency resolution of 1/T Hz, the Blackman-Harris about twice.

🟠 It could be interesting seeing also the response in 1/3 third octave bands. This can be obtained by using an MLS coloured by the internal pink-filter (see also Application Note #6). The results are the following (the level is different from the previous measure one because of filtering):

Magnitude (Sq., dB)