

Sample Champion - Application note # 7

Average in time and frequency domains

TIME DOMAIN:

When performing MLS measures in noisy environments, a large part of the background noise (uncorrelated with MLS signal) is rejected automatically, but a small part still remains especially when the disturbance is louder than the MLS.

In these cases an average of impulse responses may be useful to increase considerably the Signal/Noise Ratio.

Here is an example of impulse response measurement:

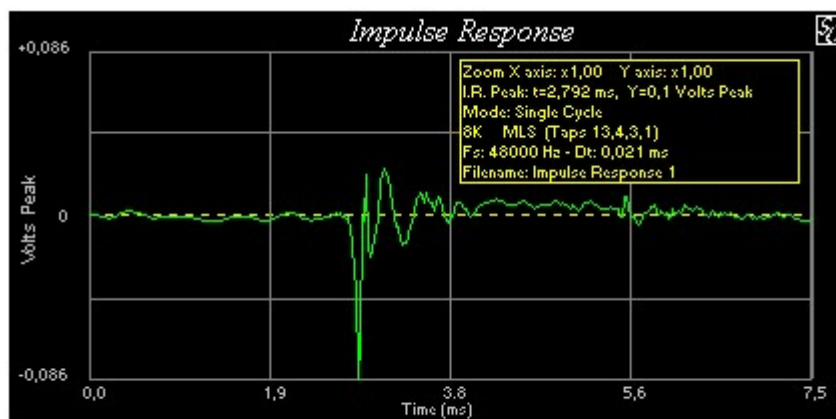


Figure 1 - Impulse response measured in a noisy environment

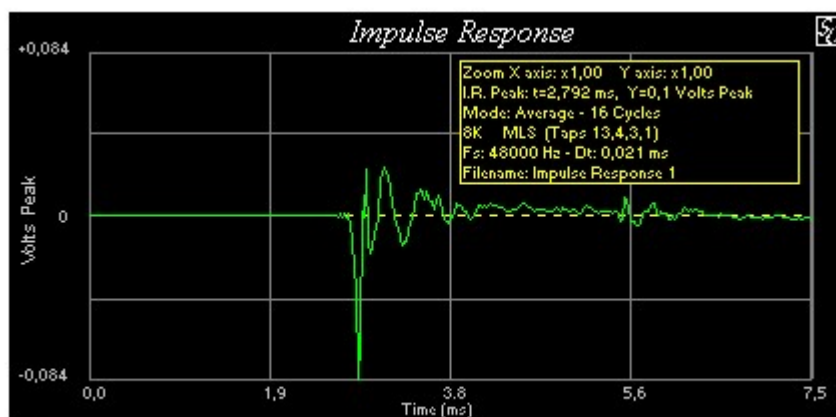


Figure 2 - Same impulse response of figure 1 measured in a noisy environment (16 averages)

FREQUENCY DOMAIN:

Averaging in frequency domain may be useful not only to maximize S/N Ratio, but also to obtain a lower noise floor.

The following example plots frequency data from a measurement of 2 tones at 19 kHz and 20 kHz (typically used for evaluating intermodulation distortion) windowed in the time domain using a Full Blackman-Harris window. Figure 3 is obtained from a single measure, figure 4 from an average of 64 cycles. Note that the noise floor is much lower, when data are averaged!

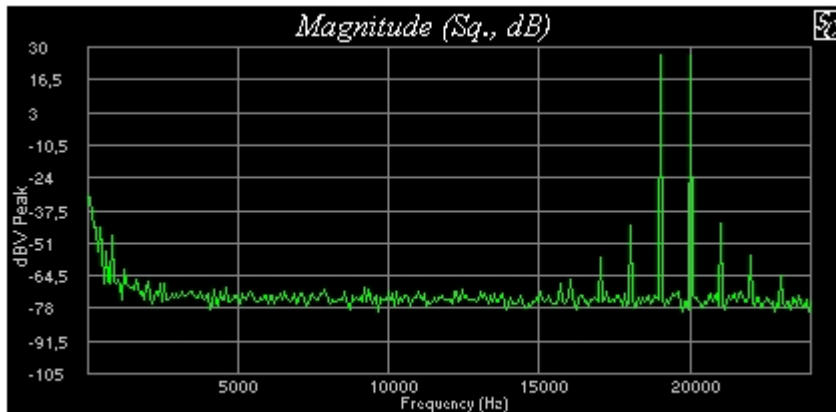


Figure 3 - Frequency data from a single measure

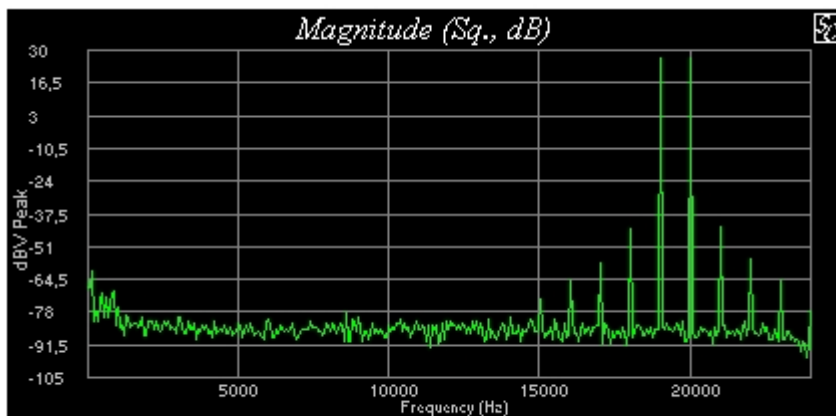


Figure 4 - Frequency data from an average of 64 measures