

How is the length of a cable affecting my measurement?

The preamplifier is a device that takes the high impedance signal coming from the microphone capsules and converts it to a low impedance signal that can be feed into long cables. So it is basically an impedance converter. But this doesn't mean that I can use a 1 Km cable without expecting any signal loss. The cable can be seen as a low-pass filter that will change depending on the cable length. Other things that can influence the response of this low-pass filter are cable capacitance per meter and current available to drive the cable (coming from the preamplifier power supply). Below, it is possible to see different sets of curves for different cable capacitances:

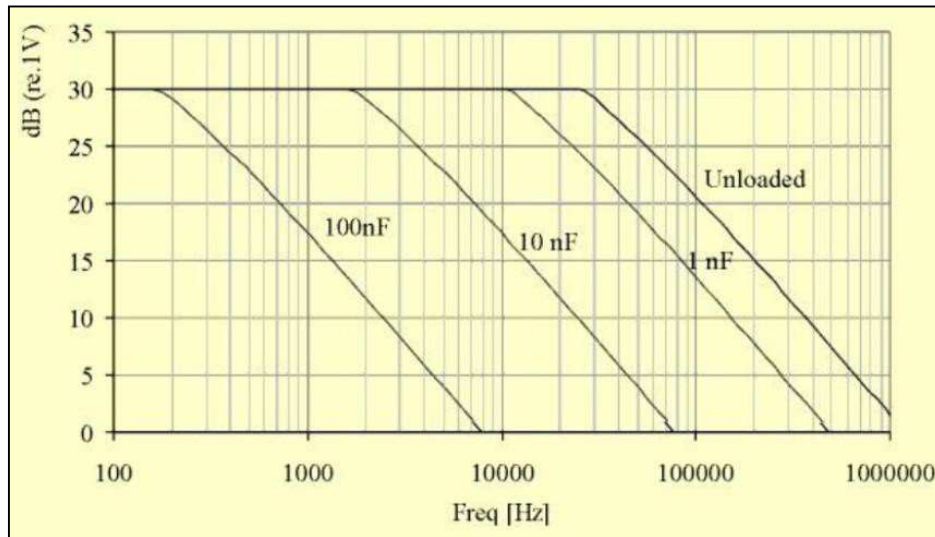


Figure 1. Cable influence in upper dynamic range limit and high frequency range limit of a microphone.

The higher the capacitance, the lower the cut-off frequency for the low-pass filter. Higher capacitances can be associated with longer cables or different cable constructions. Typical microphone cables have a capacitance of around 100 pF/m.

The 0dB in the chart above represents 120dB (re. 1V) for a 50 mV/Pa sensitivity microphone capsule. Therefore we can say that the longer the cables used, the lower the upper dynamic range limit and high frequency range limit.

So, according to the chart, a 50mV/Pa with a cable load of 100nF will be able to measure up to approx. 137 dB @1000 Hz, but will be limited to approx. 129 dB @ 3000 Hz.

The signals travelling through the cables can also be affected by electromagnetic interference, noise due to grounding issues, etc. But that is another discussion.

Contact Global Support if you need help to calculate the influence of your cables.