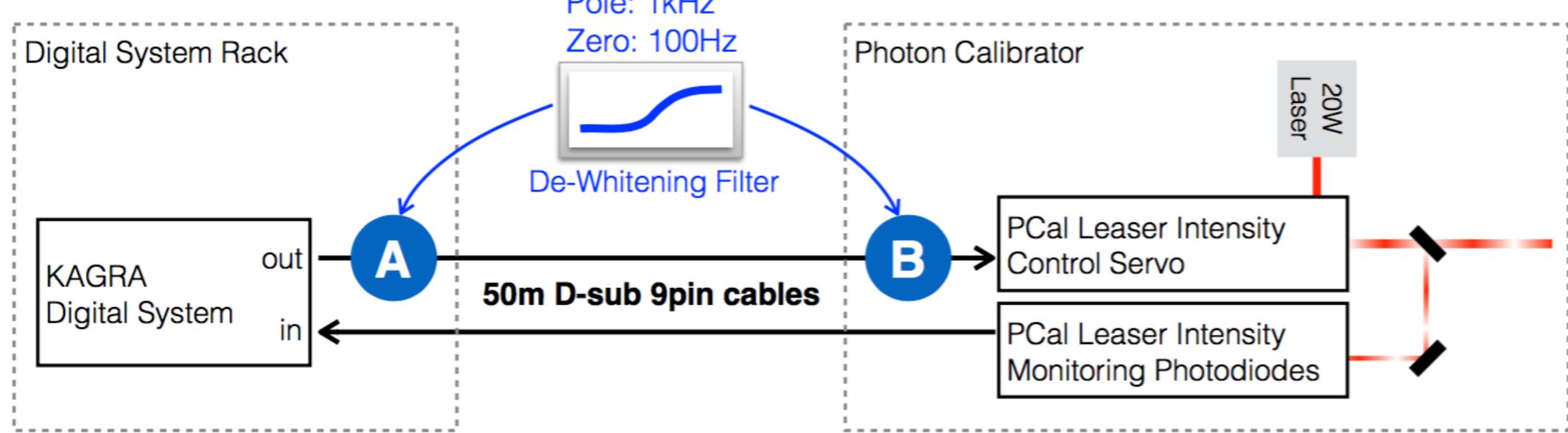


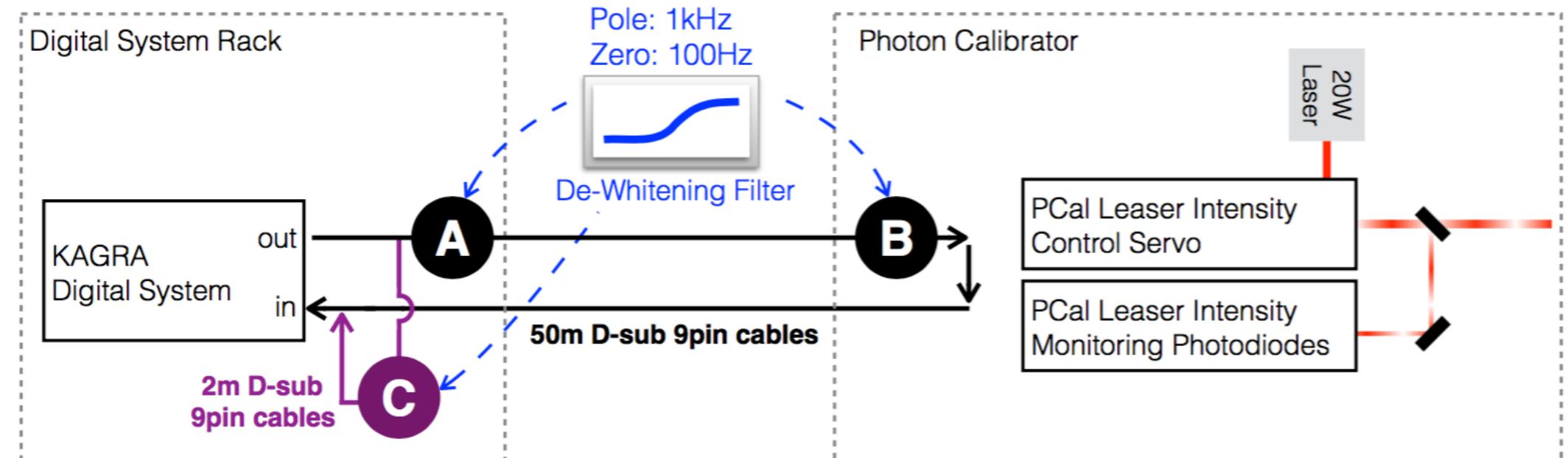
# Plots in Thesis

Cory Chu 2018.Oct.22

# Noise

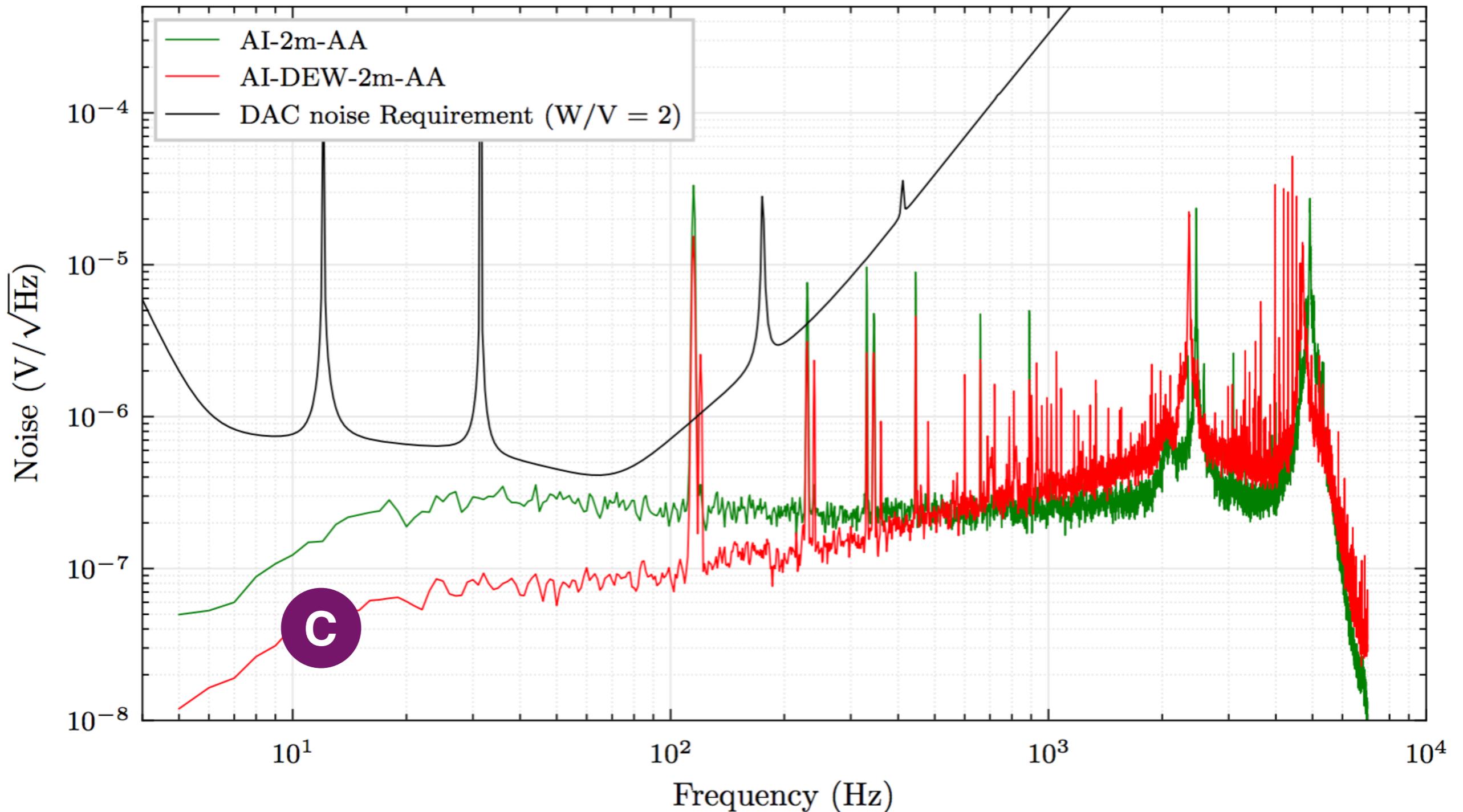


**Figure 4.5:** In order to reduce the noise coming from the digital system, the De-Whitening filter can be installed at either place A or B.



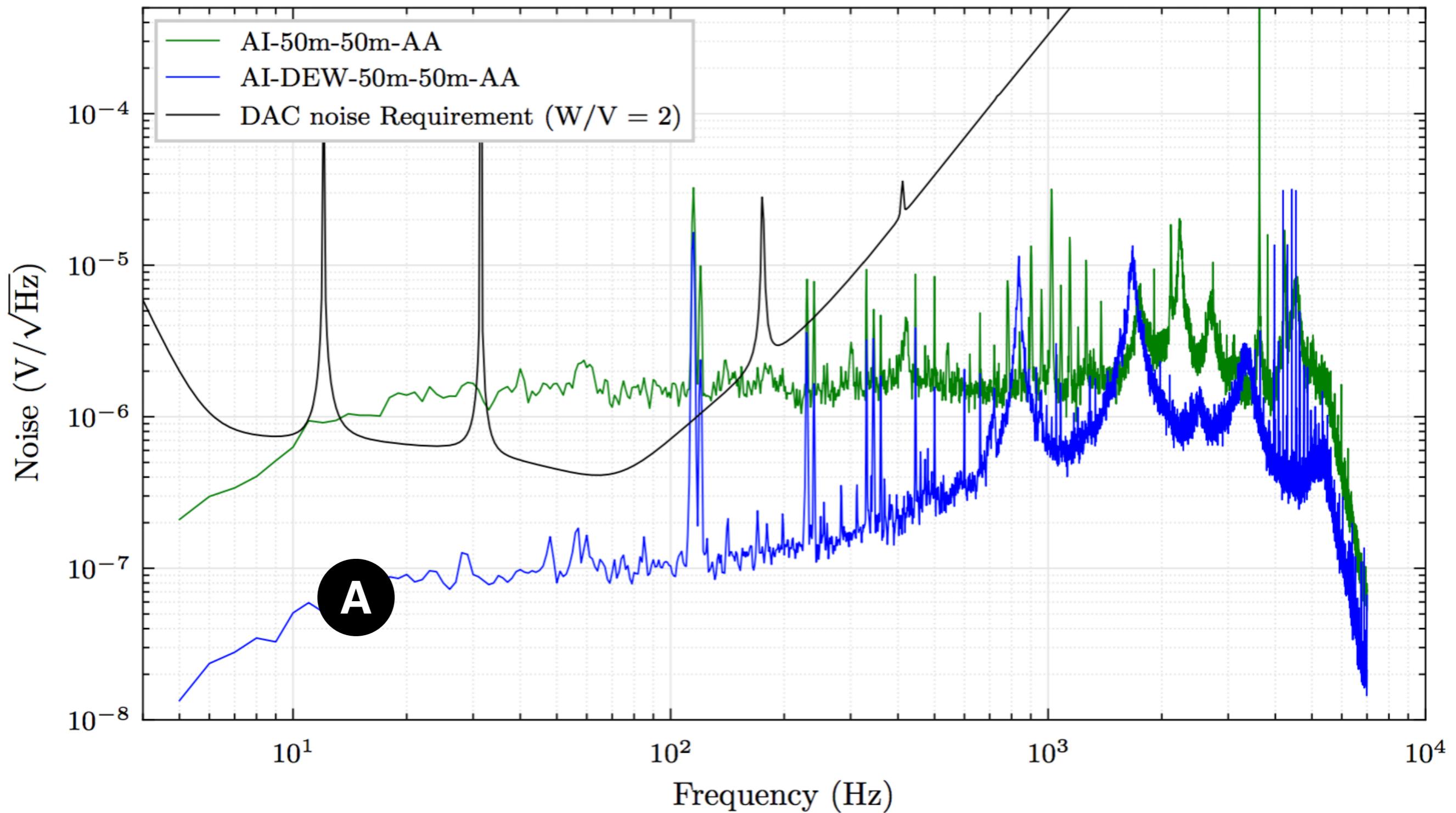
**Figure 4.6:** For our reference, we also measured the noise from the digital system without passing through the control loop of PCal. Place C means we connect De-Whitening filter in digital system rack with 2m cable only in order to investigate the influence from 50m cable.

## KAGRA X-END 2m Cable



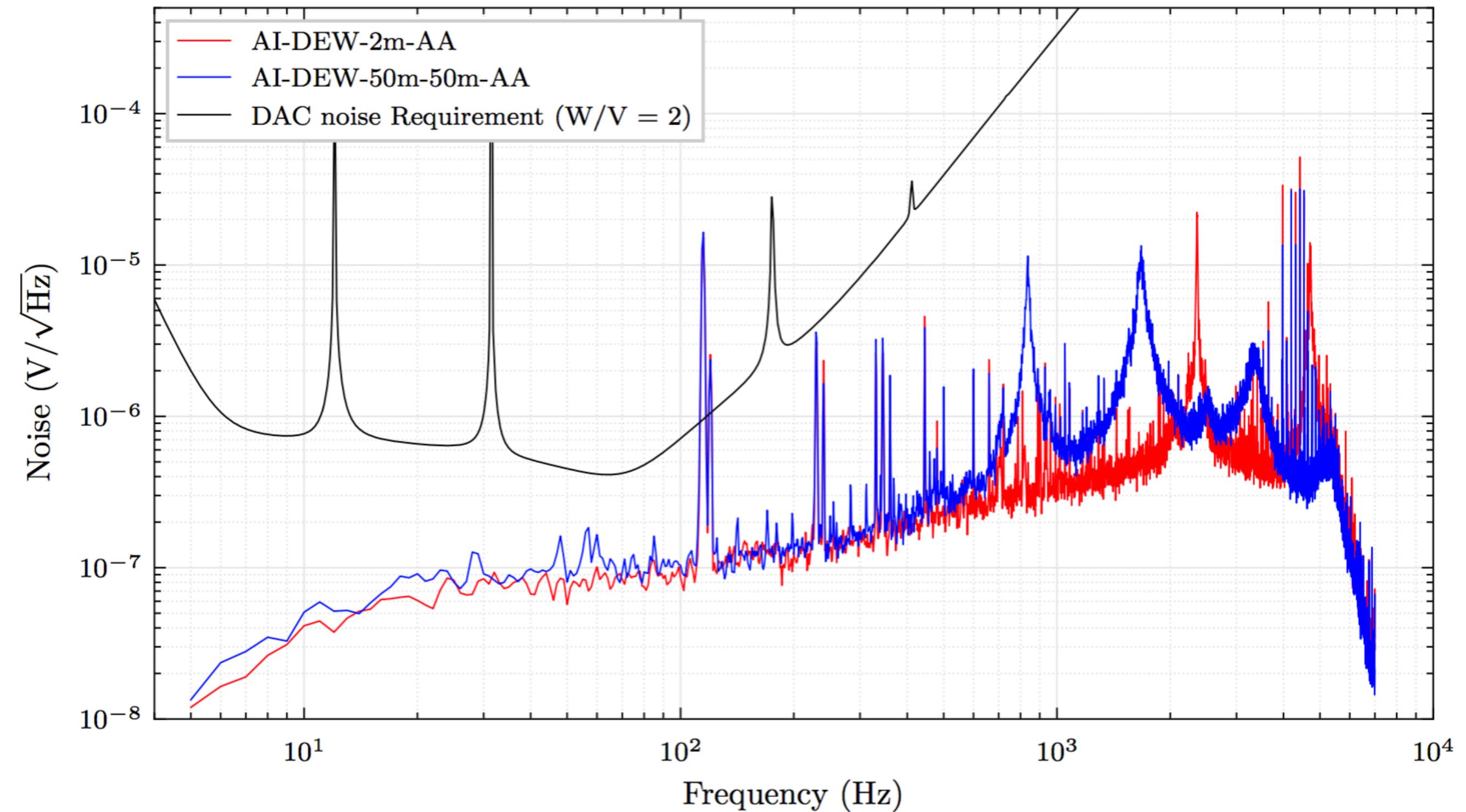
**Figure 4.7:** De-Whitening filter noise with short (2m) cable. The green line is the noise without De-Whitening filter, while the red one is the noise with De-Whitening filter.

## KAGRA X-END 50m Cable



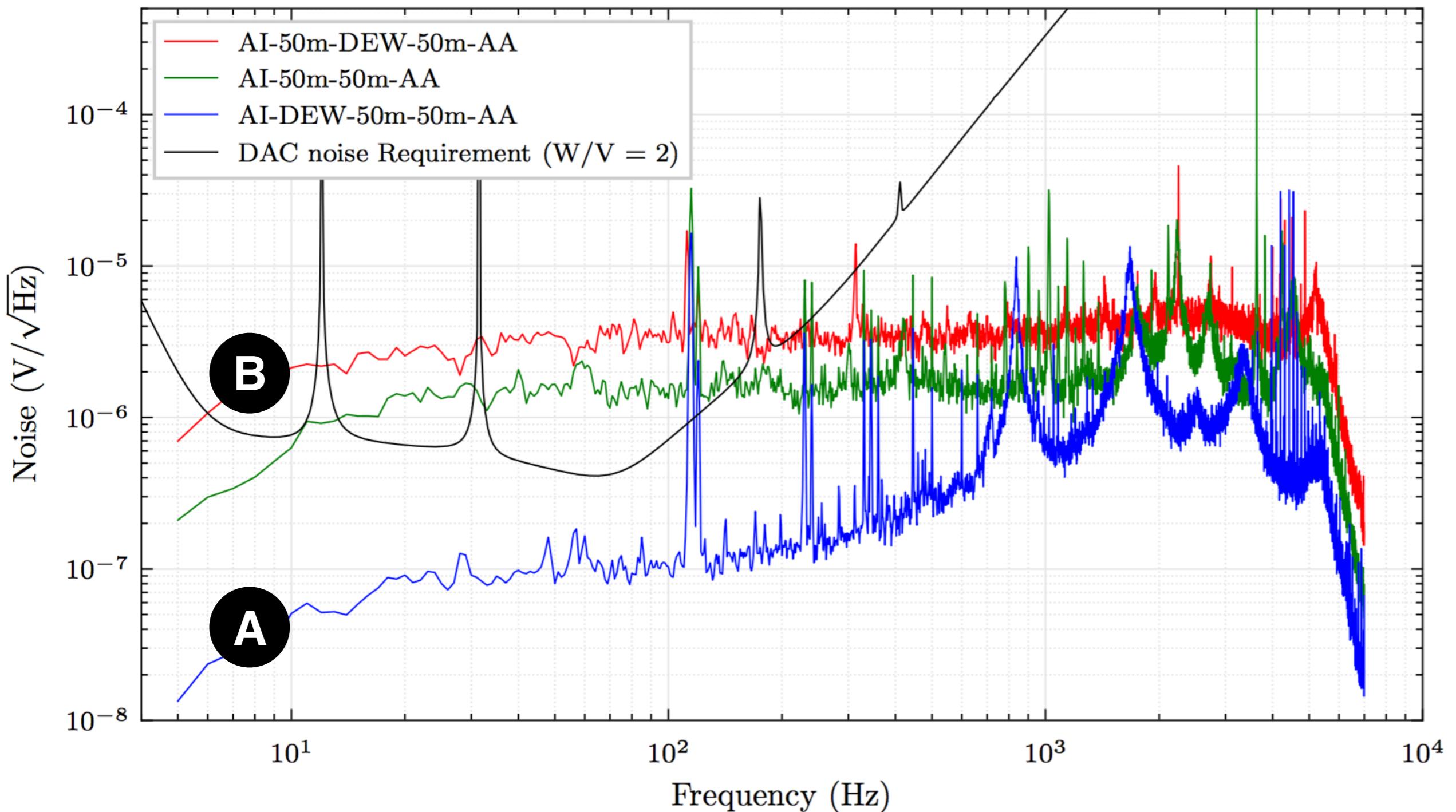
**Figure 4.8:** De-Whitening filter noise with long (50m) cable.

## KAGRA X-END Different Cable Length

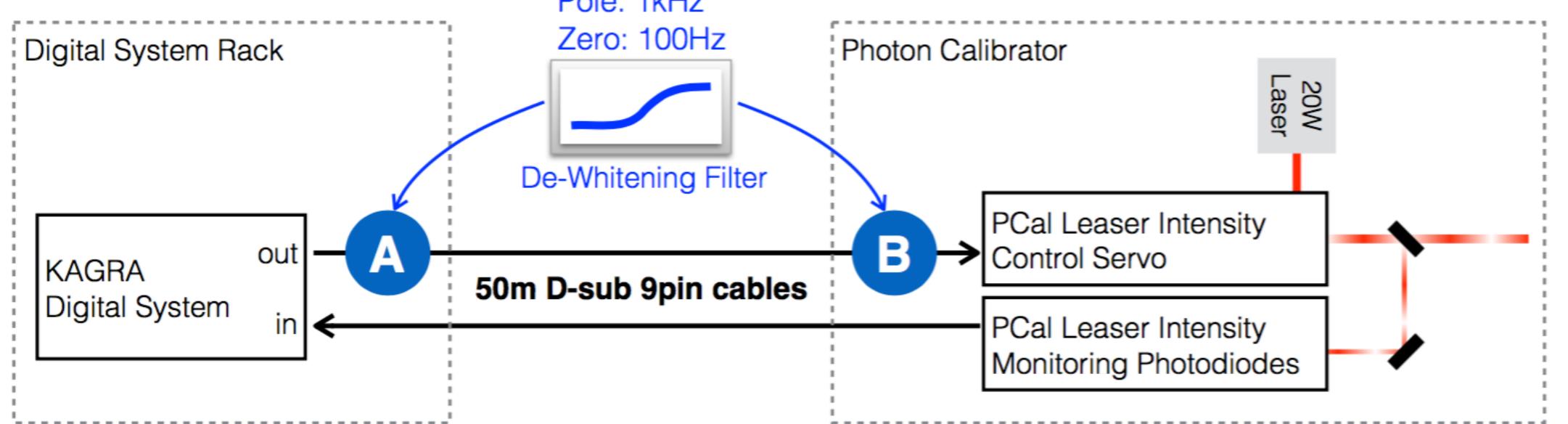


**Figure 4.9:** De-Whitening filter noise with different cable configuration.

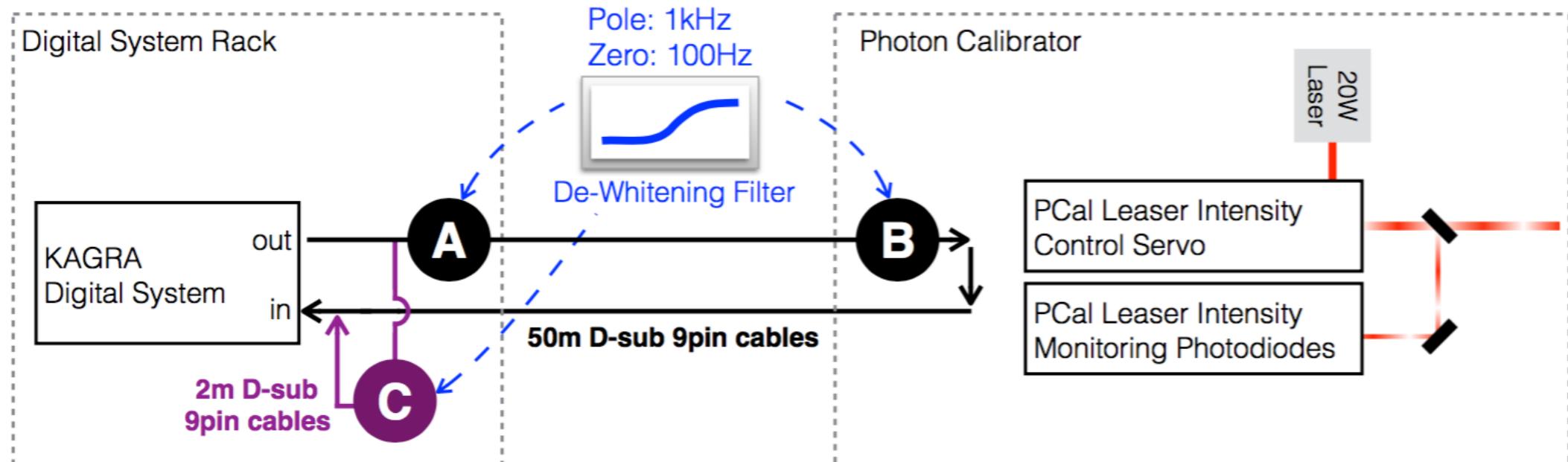
## KAGRA X-END DEW with Different Power Source



**Figure 4.10:** Noise measurement when the De-Whitening filter is installed at different location.

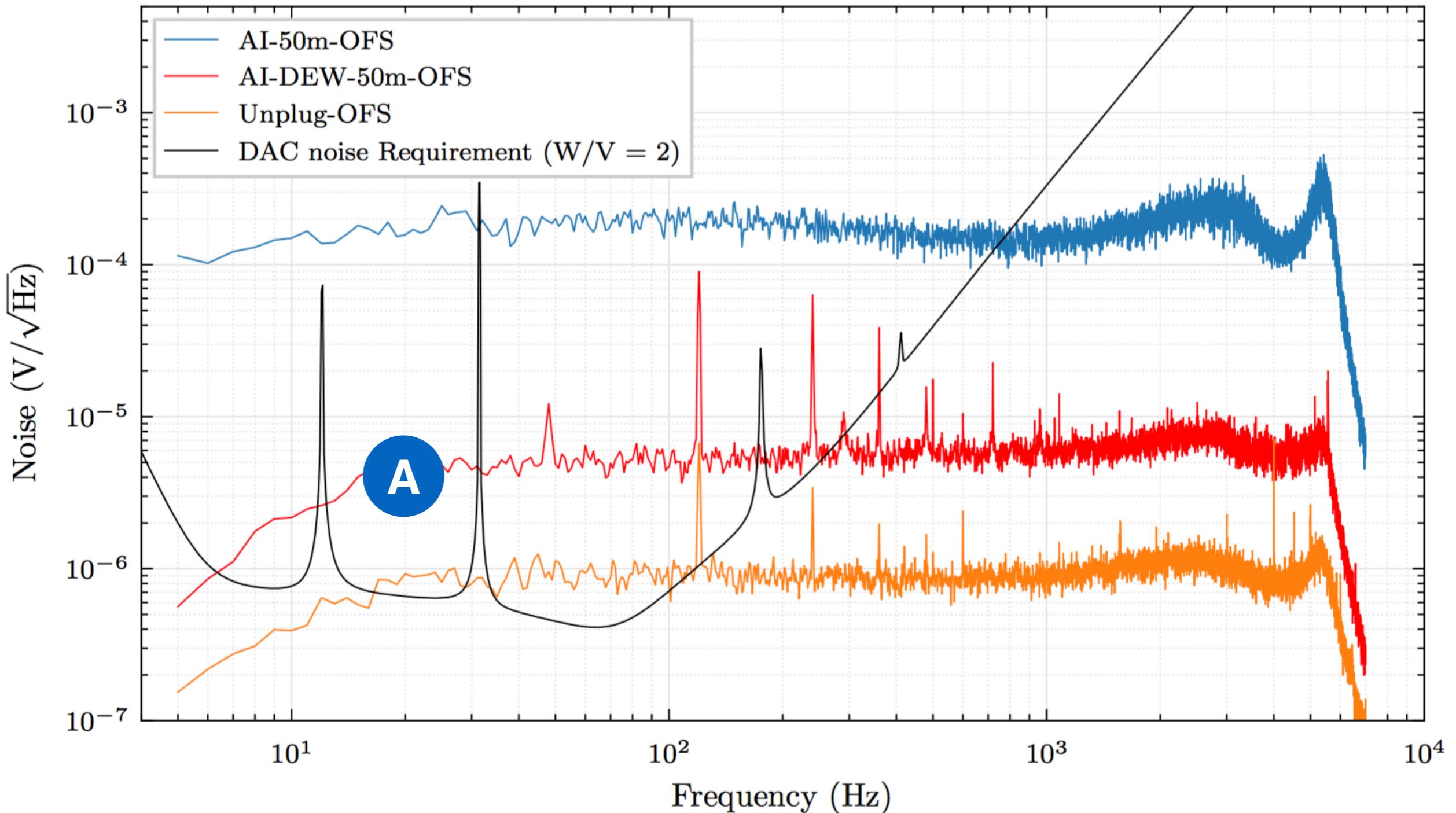


**Figure 4.5:** In order to reduce the noise coming from the digital system, the De-Whitening filter can be installed at either place A or B.



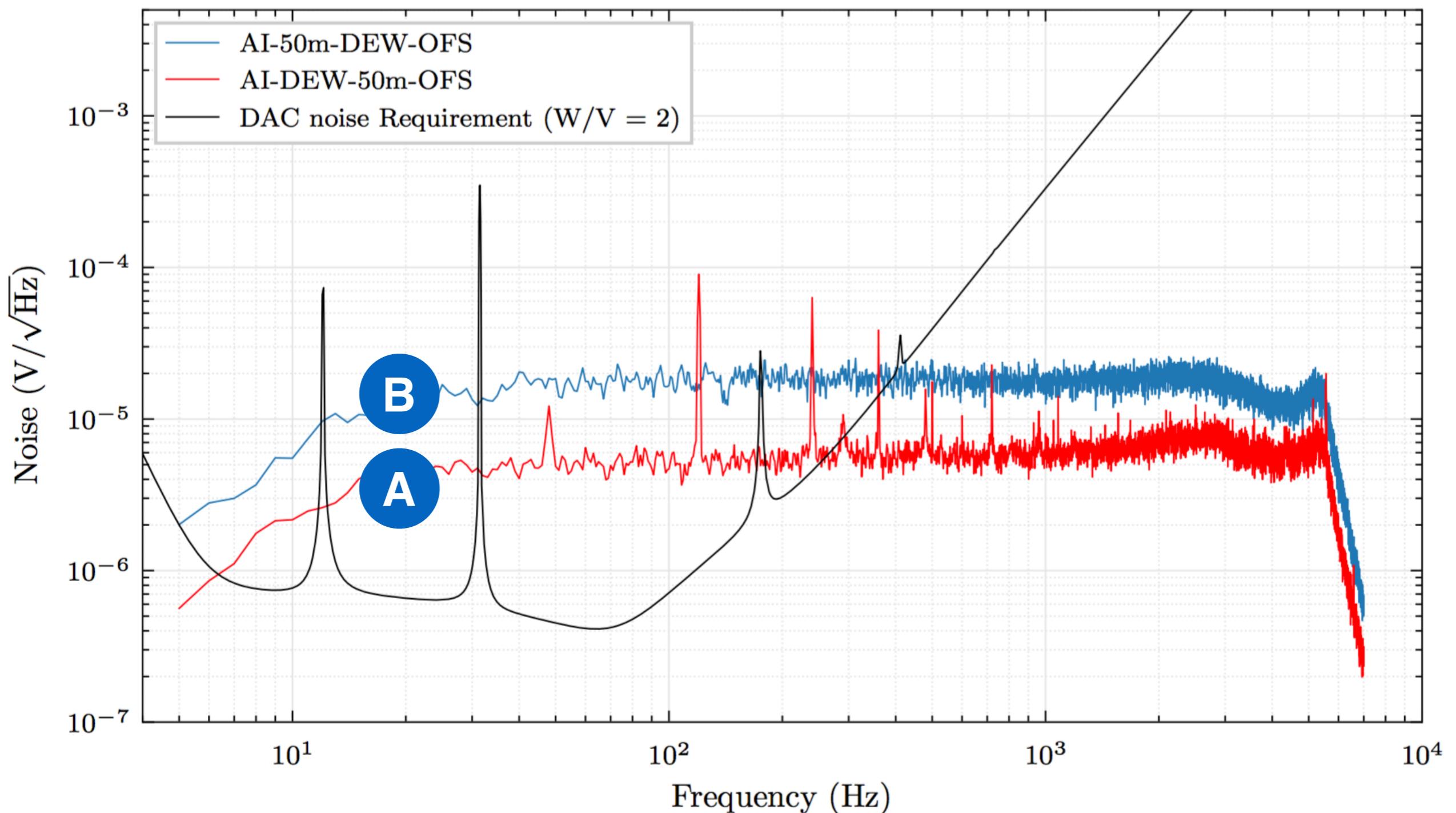
**Figure 4.6:** For our reference, we also measured the noise from the digital system without passing through the control loop of PCal. Place C means we connect De-Whitening filter in digital system rack with 2m cable only in order to investigate the influence from 50m cable.

# KAGRA X-END



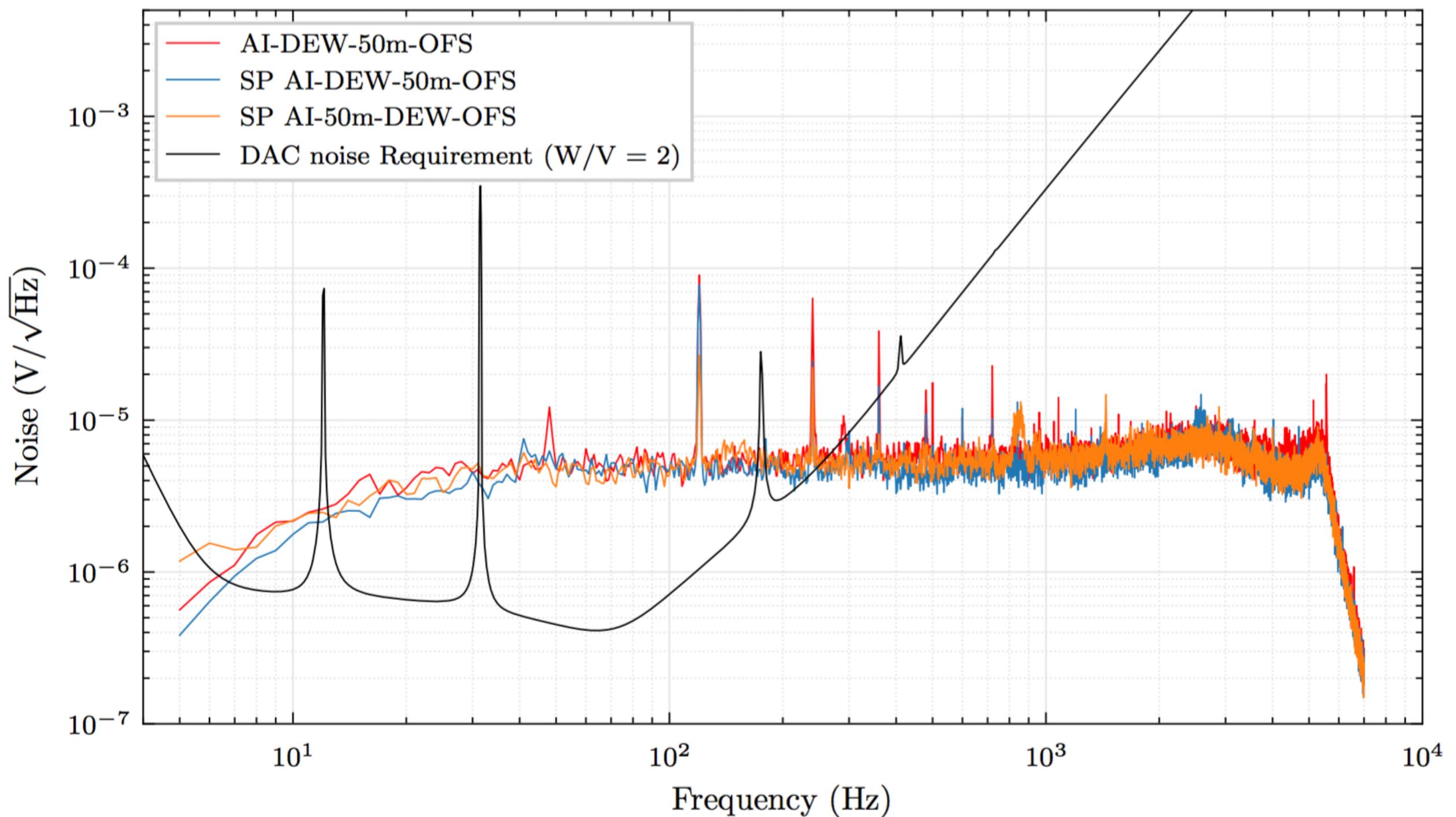
**Figure 4.11:** Noise measurement with PCal. These noises can be considered as laser intensity noises since we are measuring photodiode readout as depicted in Fig. 4.5. The blue line is the case without De-Whitening filer, while the red line is the case when De-Whitening filer has been installed at place A in Fig. 4.5. The orange line is measured when we disconnect our signal cable from the Laser Intensity Control Servo input port.

## KAGRA X-END



**Figure 4.12:** The red line and the blue line are measured when De-whitening is located at Place A and Place B in Fig. 4.5 respectively.

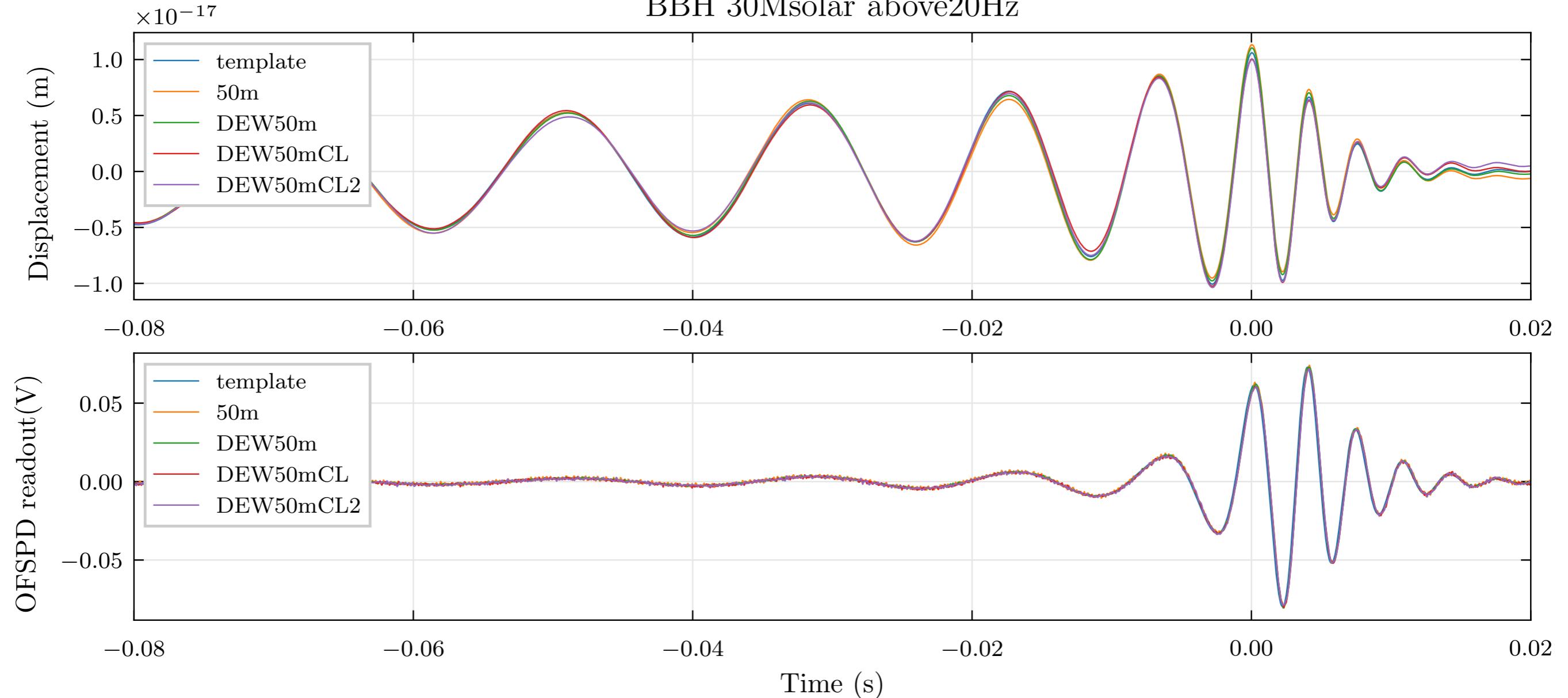
## KAGRA X-END



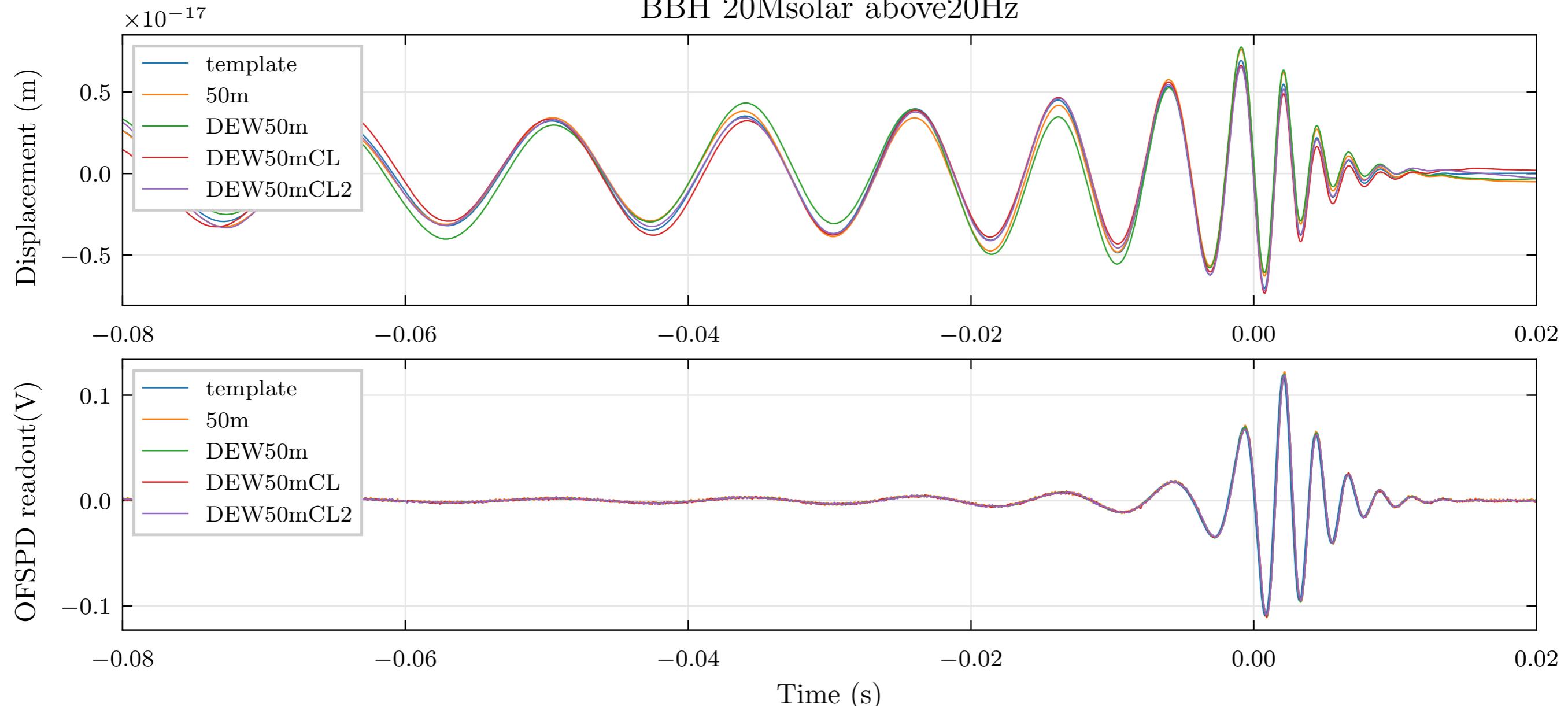
**Figure 4.13:** Lines labeled with “SP” were measured when we supplied digital system, De-Whitening filter and PCal with Same Power source located in digital system rack.

BBH signal

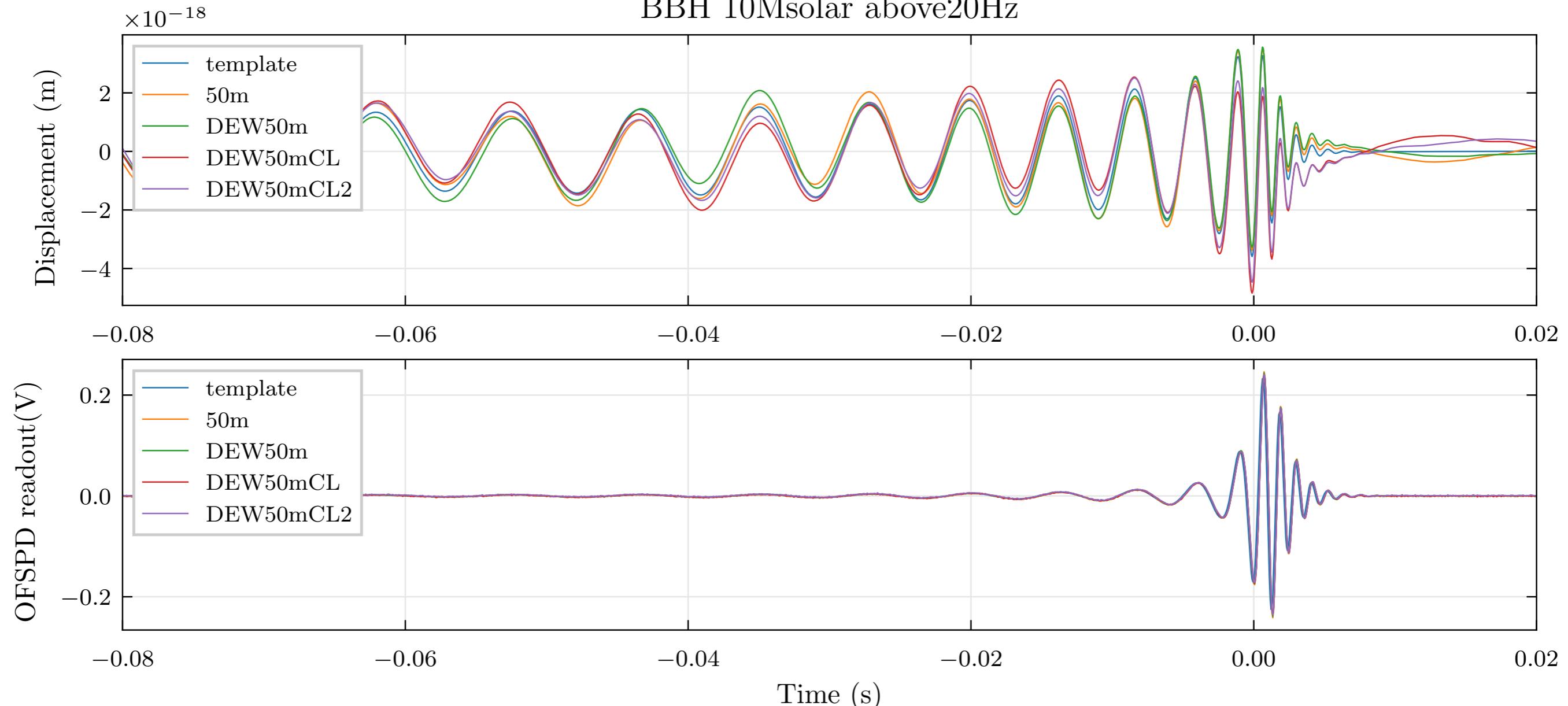
### BBH 30Msolar above20Hz



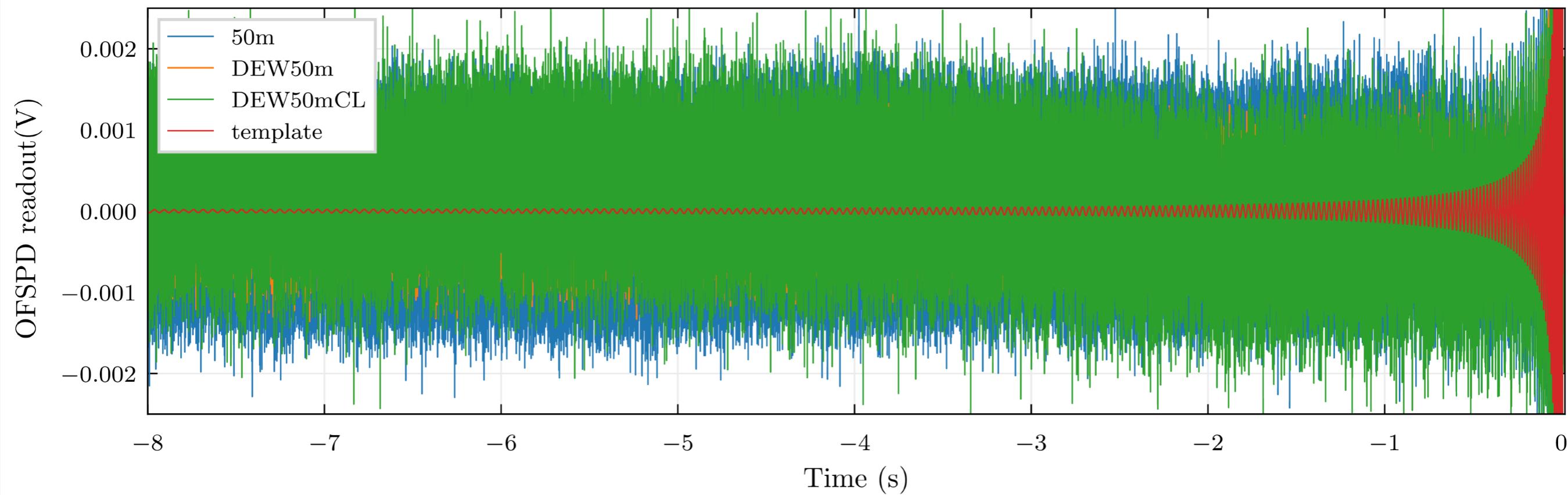
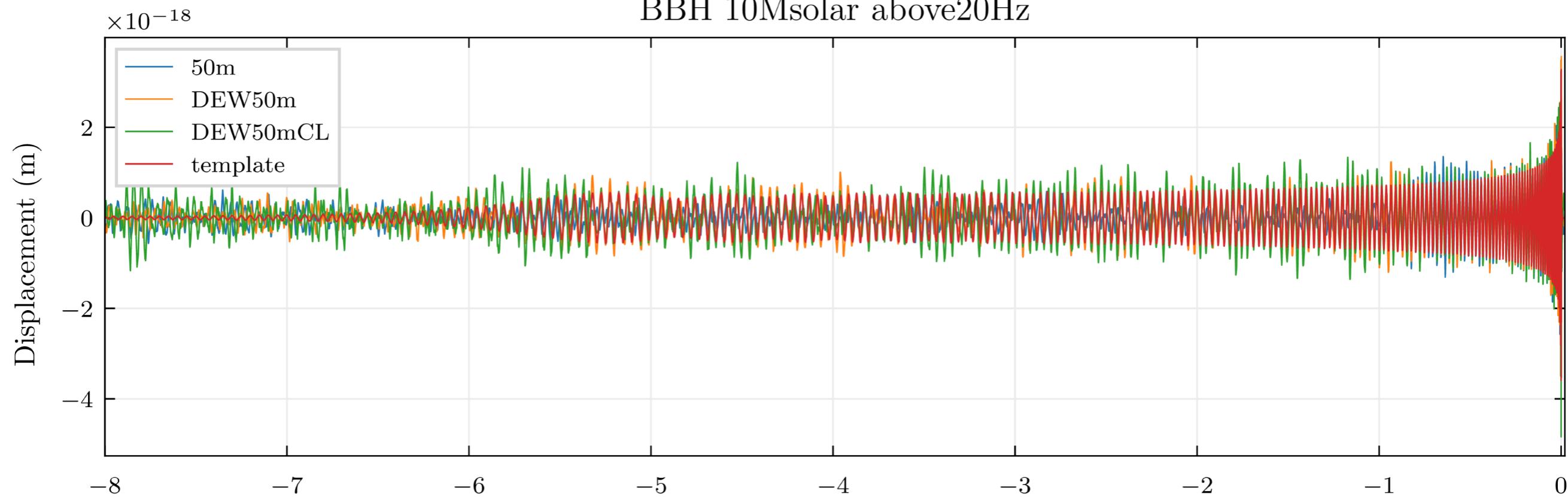
### BBH 20Msolar above20Hz



### BBH 10Msolar above20Hz



# BBH 10Msolar above20Hz



# Transfer Function

