CW Measurements with 818P thermopiles and 19xx/29xx-C[1] Power Meters

Thermopile detectors have become a popular choice for power measurements primarily due to the higher power measurement capability as well as the broadband nature of the detectors. The responsivity values for thermopiles are relatively flat across the operating wavelength range of the detector which makes it ideal for broadband applications such as solar measurements.

This technical note will highlight the filtering options available in the 19xx/29xx-C power meters for use with the 818P thermopiles for more effective power measurements.

Analog and Digital Filtering

The 19xx/29xx-C power meters are designed with user selectable analog and digital filtering options (see Figure 1). With both filters on, low level, continuous signals can be measured with a high degree of accuracy as explained below.

Figure 1. 19xx/29xx-C filter selection screen

The analog filter is a hardware based programmable low-pass filter. In general, the noise level tends to increase with bandwidth so by cutting the bandwidth one can obtain more precise measurements especially for smaller signals. For CW power measurements, with 818P thermopiles, the 5Hz analog filter option is generally used to minimize the effects of background noise.

The digital filter is a digital signal-processing filter and is only applied to the calculated measured values that are displayed on the meter screen. It is a moving average filter that can be set to off, 10, 100, 1000 or 10000 samples. The average value is calculated using a FIFO (first in first out) fashion. The digital filter helps minimize the background noise in the same manner as the analog filter. For CW power measurements, with 818P thermopiles, the 1000 or 10000 filter

[1] Excluding the 1930-C/2930-C and the 1916-C power meters

option is generally used. Due to the additional processing by the power meter, while averaging, a delay in response from the detector maybe noticed.