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## Preliminary Design of a FADC Readout System for the Alpha/Beta Discrimination in a Large Area Plastic Scintillation Detector

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This paper describes a FADC Readout system developed for the tap water  $\alpha/\beta$  dose monitoring system which is based on EJ444 phoswich scintillation detector and wavelength shifting fiber readout. The Readout system contains dual sampling channels that can supply sampling rate up to 1 GSPS, 14-Bit vertical resolution and adequate effective number of bits (9.7 Bits at 10 MHz), which is optimum for the discrimination of the minimal difference between alpha/beta signals. Moreover, the system is based on a ZYNQ SoC which provides high data throughput speed, low latency and excellent flexibility. As for the discrimination algorithms, a simple least-square classification method is used to discriminate the  $\alpha/\beta$  signals and shows high discrimination capability. Besides, the front-end electronics and high voltage supply modules are also briefly introduced in the paper.

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