First Experimental Evaluation of the Smart IoT Based Radiation Measurement Nodes at STU

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Abstract. This paper deals with the development the smart IoT based radiation monitoring nodes which will be part of the STU-GUARD and STU-RMS radiation monitoring systems. The smart devices consist of a microcontroller, communication module and several configurations of radiation measurement tubes. In this paper we are focusing on the setup consisting of Geiger-Muller detectors measuring gamma radiation from two sources, the COMET SMART EVO160D X-ray generator with acceleration voltage of 160 kV and the IBN-07 Pu-Be radioisotope source. The experiments were conducted at the V6-50-L configuration of the Mini Labyrinth experiment located at the Neutron Physics Laboratory of the Institute of Nuclear and Physical Engineering as well as at the new Laboratory of Neutron Applications at the Centre of Nuclear Technology and Applications. The experiments focused on the comparison of the gamma dose rate in the beam area of the Mini Labyrinth experiment and near the walls of the Laboratory of Neutron Applications with a certified gamma dose rate meter and with Monte Carlo simulations.