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Analysis of the Radiation Monitoring System's Initial Data from the GEM Detectors at the CMS Experiment

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Compact Muon Solenoid (CMS) is one of the two general purpose detectors at the Large Hadron Collider (LHC). It underwent several upgrades in preparation for LHC RUN-3. Among them is the installation of 144 new muon detectors based on Gas Electron Multiplier (GEM) technology at Station 1 in the endcap region. In each endcap, there are integrated RadMon (active radiation sensor) units that are integrated on six GEM detectors to measure the total dose and particle flux. Every RadMon contains Radiation-sensitive Field Effect Transistors (RadFETs) and p-i-n diodes for estimation of the absorbed dose and 1MeV neutron equivalent (neq) fluence respectively. This paper describes the radiation readout system structure and the analysis and visualization of the data collected before the start of LHC RUN-3.

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