

# Measurement of Lightning-Induced Overvoltage in Power Distribution Lines Using Ceramic- Capacitor Insulator

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**Abstract—** The measurement of overvoltage in a power distribution network is the basis for detecting lightning-induced overvoltage. This paper proposes a lightning-induced overvoltage monitoring device using a ceramic capacitor insulator that is powered by the line and employs wireless transmission. The sensing principle of the monitoring device, the power-supply principle of ceramic capacitor voltage division, and power electronic switching device, as well as the principle of signal acquisition and wireless transmission are expounded. The power self-acquisition module can take out 2 W of power from a single line to meet the requirements of the monitoring device. The monitoring system was tested with a 10 kV test platform. The transient response characteristics, the power self-acquisition capability, and the linearity of the sensor were obtained. The overall performance of the monitoring device was also tested. The operation status of the monitoring device on the distribution line and the monitored overvoltage signal showed that the device can capture lightning-induced overvoltage signals and be used in a distribution network system.

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**<http://dx.doi.org/10.1109/TEMC.2019.2916694>**













