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SAW Resonator Based Sensor System for Wireless Interrogation

Surface acoustic wave (SAW) based sensors have been widely reported as strong candidates for passively measuring temperature, pressure or stress under harsh environmental conditions over the last decade. SAW resonator based sensor systems can be used as cost efficient alternatives to SAW delay line based wireless interrogation solutions for physical parameters. This article describes a few applications of such systems for temperature measurement and how SAW resonator sensors can be adapted to meet the requirements of these application areas. Applications for such a system can be found in high voltage electrical environments, in rotating or reciprocating equipment, in food safety or food cooking or in otherwise difficult to reach or isolated locations. This paper summarizes the pros and cons of absolute frequency measurement and of differential frequency measurement. In addition, the paper will discuss advantages and disadvantages of time domain and frequency domain reader approaches.

Index Term – SAW temperature sensors, passive wireless sensors, SAW sensors, wireless temperature sensors, acoustic wave temperature sensors, wireless interrogation system