

Wireless Magnetic Sensors with Orthogonal Frequency Coding

A recent innovation has been the development of orthogonal frequency coding (OFC) for passive SAW RFID tags. In this scheme, instead of using a single-frequency RF burst, the interrogation signal is a stepped-frequency microwave “chirp” that cycles through several frequencies as shown in Fig. 1. The reflectors on the RFID tag, in turn, are set up with different grating spacings to reflect only specific component frequencies of the interrogation signal. Each RFID tag has a different permutation of reflector gratings to uniquely identify it. The response from each tag is a spread-spectrum noise-like signal which, after processing through a matched filter produces a short pulse at the receiver. The advantages of OFC coding include the security and processing gain associated with spread spectrum techniques.

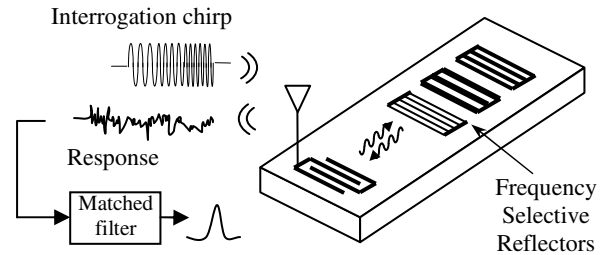


Fig. 1. RFID tag with orthogonal frequency coding.

Our research is seeking to combine magnetostrictive materials with OFC SAW transponders to produce inexpensive, individually coded, passive magnetic field sensors.

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