

Printed magnetoinductive-wave (MIW) delay lines for chipless RFID applications

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Abstract— A novel fully passive and electromagnetic chipless radiofrequency identification (RFID) system is proposed. The system is based on printed tags implemented with magnetoinductive-wave (MIW) delay lines. Such lines are composed of a periodic array of coupled square split ring resonators (SSRRs) and propagate slow waves. The tag is codified by introducing reflectors (which provide the identification signature) between the elements of the array. When the tags are interrogated with a pulse in time domain, they produce replicas at the positions where the reflectors are placed. Thanks to the slow group velocity of the MIW delay line, the replicas of the original pulse are not overlapped in time domain and can be demodulated, thus providing the identification code of the tag. The design considerations to implement these chipless tags are studied in the present work. Moreover, a complete set of codified MIW lines for a two-bit system is designed, manufactured and measured. The reported experimental results validate the proposed approach.

Index Terms— Chipless tags, magnetoinductive waves (MIWs), passive tags, radio frequency identification (RFID).

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