

# **A contactless RFID system based on chipless MIW tags**

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**Abstract—** In this paper, a contactless RFID system formed by chipless tags based on the magneto-inductive wave (MIW) delay lines is proposed. In order to carry out the reading process, two reader probes have been designed, manufactured, and measured: the first one based on an axial to planar MIW transition and the second one based on a printed monopole. Moreover, a study is presented to verify the probe with better performance in terms of delay and losses when a tag is interrogated. By using the probe based on an axial to planar MIW transition, it is possible to transmit a pulse with a distance between tag and probe higher than 1 cm. Finally, two chipless tags are designed and manufactured to verify the performance of the proposed system. All the designed and manufactured elements are printed on a low-cost substrate (FR4). The manufactured 2 bit tags codify the 01 and 10 patterns. A good decodification of the time-domain response associated with the tags is achieved when using the proposed whole system.

**Index Terms—** Chipless, Contactless, Magneto-Inductive Wave (MIW), Radio Frequency Identification (RFID), Square SplitRing Resonator (SSRR).

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