

Effects of antenna detuning and gain penalty on the read range of UHF RFID

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Abstract

When an UHF RFID tag is adhered to a specific material, its performance experiences several negative effects, being detuning and gain penalty the most important, and the ones addressed in this paper. An analytical study of the link budget is presented and those parameters affected by materials, which permit to analyze detuning and gain penalty, are pointed out and quantified for two typical tag antenna topologies: a dipole antenna and a slot antenna. Their performance and sensitivity in front of the material parameters are analyzed and compared. Finally, the impact of detuning and gain penalty on the read range is also studied.