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Problems Relating to 'Long Distance' RFID Systems; 3 The Market and Applications for Contactless Technology; 3.1 The Market for Contactless Technology and RFID; 3.2 Applications for Tags 3.3 Operators and Participants in the MarketPart Two Wave Propagation: Principles, Theories. . . and the Reality; 4 Some Essential Theory; 4.1 The Phenomenon of Propagation and Radiation; 4.2 The Hertzian Dipole; 4.3 Classification of Fields and Regions of Space; 4.4 RFID Applications Using UHF and SHF, i.e. Far Field Applications; 4.5 The Hertzian Dipole and a Dipole of any Length,  $\lambda/n$  and  $\lambda/2$ ; 4.6 List of the Main Formulae in this Chapter; 4.7 Appendix 1: Brief Notes on Maxwell's Equations; 4.8 Appendix 2: Brief Notes on Complex Numbers 4.9 Appendix 3: Brief Notes on Powers Expressed as Complex Numbers4.10 Appendix 4: Brief Notes on Vectors; 5 Wave Propagation in Free Space; 5.1 Isotropic and Anisotropic Antennas; 5.2 Antenna Gain; 5.3 Power Flux Density at One Point in Space; 5.4 Effective Radiated Power PERP; 6 Power Recovery at the Terminals of the Tag Antenna; 6.1 Recovering the Transmitted Radiated Power (or Some of It); 6.2 The Concept of Aperture or Surface; 6.3 Definition of the Main Parameters Required for an RFID Application; 7 Reality Check: How to Manage Everyday Problems 7.1 Effects of the Application Environment7.2 Tag Polarization Losses, polarization = p; 7.3 Antenna Load Mismatch Factor, load matching = q; 7.4 Voltage Standing Wave Ratio (VSWR); 7.5 Losses Due to the Physical Design of the Antenna, antenna; 7.6 By Way of Conclusion; 7.7 Real-World Examples of RFID at UHF and 2.45GHz; 7.8 Effects of the Mounting of the Integrated Circuit on the Tag Substrate; 7.9 By Way of Conclusion; 7.10 Example at UHF and SHF; 7.11 Appendix: Fact and Fantasy About UHF Tags and Water; 8 Reflection and/or Reradiation of Waves and RFID Applications 8.1 The Physical Phenomenon of Wave Scattering

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## Sommario/riassunto

In the past, very little practical information or training has been available for engineers, technicians and students in the area of radio frequency identification (RFID) systems at ultra high frequencies (UHF) and super high frequencies (SHF). Here, Dominique Paret offers you a complete guide to the theory, components, practical application areas and standards in RFID at UHF and SHF. He achieves an expert balance between theory and technology, finance and other aspects, providing a clear view of the entire field. This book deals with the real aspects of contactless applications in

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