

# Indoor Radio Planning: A Practical Guide for GSM, DCS, UMTS, HSPA and LTE

Morten Tolstrup

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**Indoor Radio Planning: A Practical Guide for GSM, DCS, UMTS, HSPA and LTE** Morten Tolstrup Why is indoor coverage needed, and how it is best implemented? As the challenge of providing higher data speeds and quality for mobile applications intensifies, ensuring adequate in-building and tunnel coverage and capacity is increasingly important.

A unique, single-source reference on the theoretical and practical knowledge behind indoor and tunnel radio planning, *Indoor Radio Planning, Second Edition* provides an overview of mobile networks systems and coverage solutions with GSM, UMTS, HSPA and LTE cellular systems technologies as a backdrop.

All of the available solutions, from basic passive distributed antenna systems (DAS) through to advanced fiber optic systems supporting MIMO and LTE, are discussed in detail to give the reader a good understanding. In addition, there is a section covering multi-operator systems, as this becomes a more and more utilized approach. Systematically moving from the basic considerations through to advanced indoor planning, aspects such as upgrading passive DAS from 2G to 3G, noise analysis, link budgets, traffic calculations and software tools that can be used to help create in-building designs are also covered. Femtocells, outdoor DAS and tunnel radio planning are newly included in this edition.

- A new version of the bestseller, updated with an introduction to LTE and treatments of modulation principle, DAS systems for MIMO/LTE, designing repeater systems and elevator coverage
- Addresses the challenge of providing coverage inside train, and high speed rail
- Outlines the key parameters and metrics for designing DAS for GSM, DCS, UMTS, HSPA & LTE
- Essential reading for engineering and planning personnel at mobile operators, also giving a sound grounding in indoor radio planning for equipment manufacturers
- Written by a leading practitioner in the field with more than 20 years of practical experience



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