Indoor Coverage Solutions

Eltel ”Going Mobile”

Copenhagen/Aarhus 18-19 September 2012

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The Voice, Video, Data Explosion
Our Place in Your World

We create the infrastructure that connects the world and evolves with every advance in technology.
Need for In-Building Wireless (IBW)

4 key reasons for in-building wireless systems

1. **Coverage** – Mobile phone signals cannot easily penetrate into larger buildings from the outside network leading to poor signal level. This is particularly the case for 3G/4G technologies.

2. **Capacity** – Each site in a radio network has a finite capacity for voice and data traffic. The traffic load from the occupants of a large building can easily exceed the outside radio network often overloading the nearby sites.

3. **Interference** – Tall buildings are susceptible to poor signal quality due to reception from many surrounding sites. For optimum performance, mobile devices require a clean signal from a single source.

4. **Radiation** – Concerns regarding radiation are actually opposite of the general believe. IBW solutions lower the radiation.

Each of these factors contribute to dropped calls, poor call quality and slow data rates
Services Supported

- **GSM/DCS (Digital Cellular System)**
  - 900, 1800 MHz

- **EDGE (Enhanced Datarate for GSM Evolution or Enhanced GPRS – 2.5G)**
  - 900, 1800 MHz

- **UMTS (Universal Mobile Telecommunications System – 3G)**
  - WCDMA (Wideband Code Division Multiple Access)
  - HSPA/HSPA+
  - 800, 900, 1700, 1800, 1900, 2100 MHz

- **LTE (Long Term Evolution – 3G, 4G)**
  - 800, 900, 1800, 2100, 2600 MHz (Europe)
  - Future LTE between 3400 – 3600 MHz will not be supported

- **Tetra (Terrestrial Trunk Radio)**
  - ‘Walkie-Talkie’
  - Specifically designed for use by government agencies, emergency services, for public safety networks, rail transportation staff for train radios, transport services and the military
  - 380 – 385, 390 – 395 MHz
All indoor systems have a signal source. There are two types:

**Base Station:** This device uses a fixed line or microwave backhaul and creates a signal from the information it receives. It adds capacity to the wireless network and requires a monthly fee. Base stations are owned and operated entirely by a licensed wireless carrier.

**Repeater:** This device uses the same RF frequencies that mobile phones use. All signals are passed over the air from a donor antenna to a corresponding donor base station which can be located miles away. This signal source does not add capacity to the network but optimizes that which is available already at the donor site. Repeaters may be owned and operated by an end user with the permission of a licensed wireless operator.
Why Multi Operator / Multi Band Systems?

• "Neutral System" – The users can chose the best operator or change operator later if needed.
• Possible to share the system cost or the building owner spend the cost only once.
• "Easier installation" – Only one installation for all operators. This is cheaper and it looks better due to less visible antennas, less cables etc.
• The building owner only have administrate one installation. If the useres what to change the operater a new installalation is avoided.
• All operators will have the same coverage.
• Changes in the capacity are done from a common central location in the building.
Indoor Coverage Solutions

- MRx18 miniRepeater: 2,500 m² or less
- Node A Digital Repeater
- Micro RF-card: 5000 m²
- Macro RF-card: 25000 m²
- ION-B Optical DAS: 5,000 – xx,000 m²
Mini Repeater Application

- Off-Air analog repeater used to boost signal
- Small sites
- Used with standard 50 ohm coax and antennas or stub antenna
Application Examples: Office

Donor Antenna

Coverage Antenna

Hidden Repeater
Applicatin Example: Shop

Hidden Repeater

Coverage Antenna (painted)
Node A - Passive Solution Example

Node A driving an optical distributed antenna system!
An excellent solution for high raised buildings and long car or train tunnels
• ION™ (Intelligent Optical Network) is CommScope’s platform for optical distribution solutions at different power classes

• Common management, operation and maintenance platform (A.I.M.O.S)
Distributed Systems: Multiple Antenna

- Multiple antennas provide more homogeneous coverage than single antenna
- Less interference from in-building to the outer world
- Easier to make in-building cells the best server everywhere in the building.
- Expandable to allow more operators to join the system at a later stage
- Increased trunking efficiency and more effective use of allocated spectrum (GSM: Only one BCCH to coordinate
  - UMTS: Less pilot pollution)
One System Distributes All Services with Maximum Flexibility

• THE MASTER OPTICAL TRX SUPPORTS DIFFERENT KINDS OF REMOTE UNIT TO MEET ANY DISTRIBUTION NEEDS AND GUARANTEES FLEXIBILITY
The Interconnect Link

- Enables to group a cluster of remote coverage systems at a common BTS hotel, thus providing consistent advantages in terms of management and maintenance.

- Enables to connect two fully populated subracks in a star configuration at a distance of up to 20 km.
Some Installation Examples: Master Unit
Some Installation Examples: Remote Unit

Remote Unit Room 1

Remote Unit Room 2

Antennas
Eksempler på danske referancer

Københavns Metro
Århus Universitetshospital
Øresundsfornbindelsen
Amager - Motorvejstuneller

Løsninger via operatører – flere hundrede repeater løsninger til en lang række virksomheder, og offentlige institutioner.
Hvordan kommer du videre?

Oplever du en eller flere af de typiske udfordringer?

- Dækning
- Kapacitet
- Interferens

IBW løsninger nedsætter strålingen fra håndsættet og øger batterilevetiden
Thank You