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Review of New NPSTC In-Building Best Practices White Paper

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Notice

This presentation is for the purpose of introducing the public safety community to a NPSTC document, Best Practices for In-Building Communications.

This document was developed by the NPSTC In-Building Work Group, Stu Overby, Motorola, Chairman. Jack Daniel participates as Vice-chair of this committee. This is an on-going committee.

Jack Daniel does not officially represent NPSTC in any way.

National Public Safety Telecommunications Council

Formed on May 1, 1997, NPSTC is a federation of state and local organizations (not a federal agency) who want to work on consensus Issues that impact state and local public safety agencies.

www.npstc.org

In-Building Coverage Working Group

Mission: To promote the availability of affordable in-building and in-tunnel communications in ways that do not interfere with critical operations and to serve as NPSTC liaison with other entities addressing in-building/in-tunnel communications.

First Task: In-Building Best Practices White paper

guidelines, not specifications.

NPSTC initiated this compilation of Best Practices Due to;

- The rapidly expanding requirements for in-building communications for public Safety

- The rise in improper installations by untrained personnel

- The growing potential of interference to life critical communications

Attaining In-Building Coverage

Deployment of additional antenna sites:

- Increased levels do not cover lower levels

- Increases costs.

Attaining In-Building Coverage

Deployment of temporary systems

- In use by some Fire departments

- Incident specific

- Logistics, training required

- May not cover lower levels, Hi rises

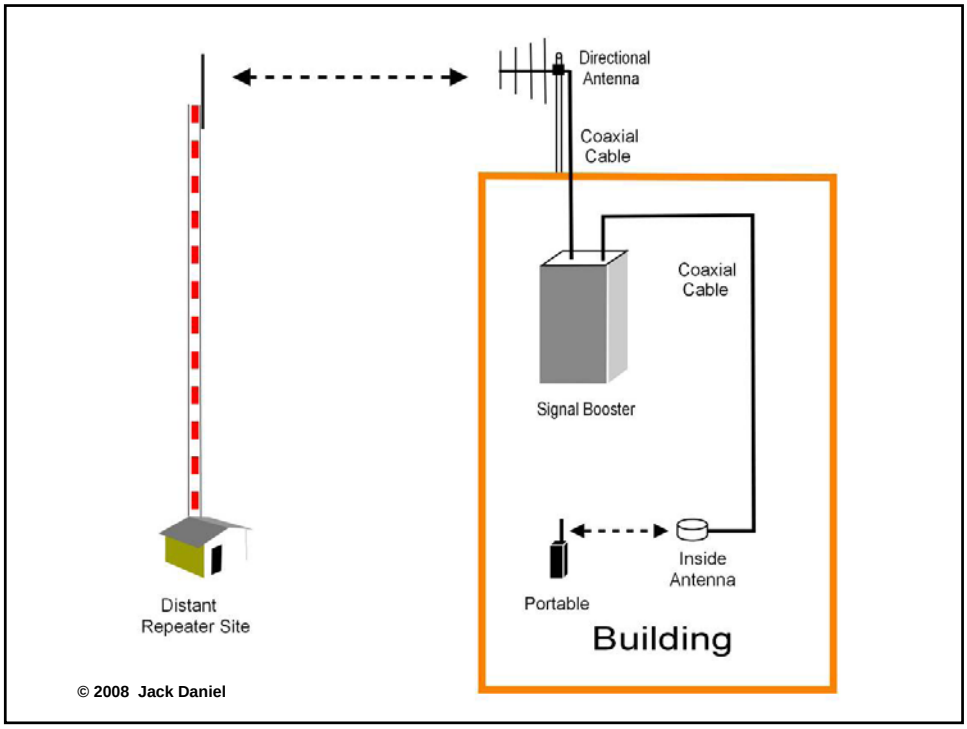
Attaining In-Building Coverage

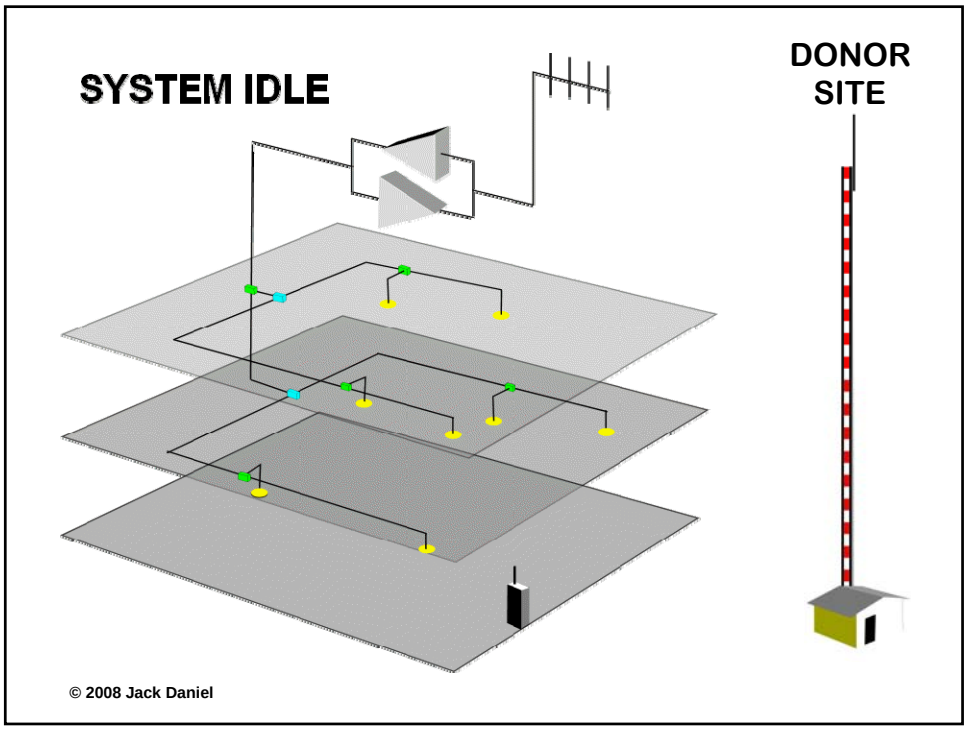
Perminant In-Building Installations

- Preferred current technology

- Proven

- Potential of cost sharing with other in-building wireless coverage systems and needs. Access/Security, HVAC, etc.


Directional Antenna
Coaxial Cable
Coaxial Cable
Signal Booster
Inside Antenna
Portable
Building
Distant Repeater Site
© 2008 Jack Daniel


SYSTEM IDLE
DONOR SITE
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Ordinances and Codes

- Local codes. 250+ in use
- Commonality of key requirements;
  - Signal levels
  - Percent of coverage
  - Hardware specifications
  - Design and testing methods
  - Pre-approvals

Ordinances and Codes

National codes: NFPA and ICC/IFC

- Not technology specific, local options
- Environmental: NEMA rated cases
- Minimum coverage levels, guidelines
- Redundancy and reliability, survivability
- Interference guidelines
- Mandatory local pre-approvals
- Standardized measurement methodology
- Use of industry/factory certified integrators

The Value Proposition

Increasing value of in-building systems to building owners

Predicated by the potential of sharing costs involved in cellular, PCS Distributed Antenna Systems (DAS), IBWA surveyed industry and public safety association members for potential sharing benefits to building owners.

The report comments on various wireless tasks and technologies that may be considered for cost sharing, present and future.

Interference Concerns

The NPSTC paper addresses Interference to and from in-buildings systems throughout the document.

Including:
- Interference from oscillating signal boosters

- Noise generated by signal boosters

- Interference to signal booster/DAS from other spectrum users; Sprint/Nextel, cellular, other licensed users inclding public safety.

- Industry interference survey results

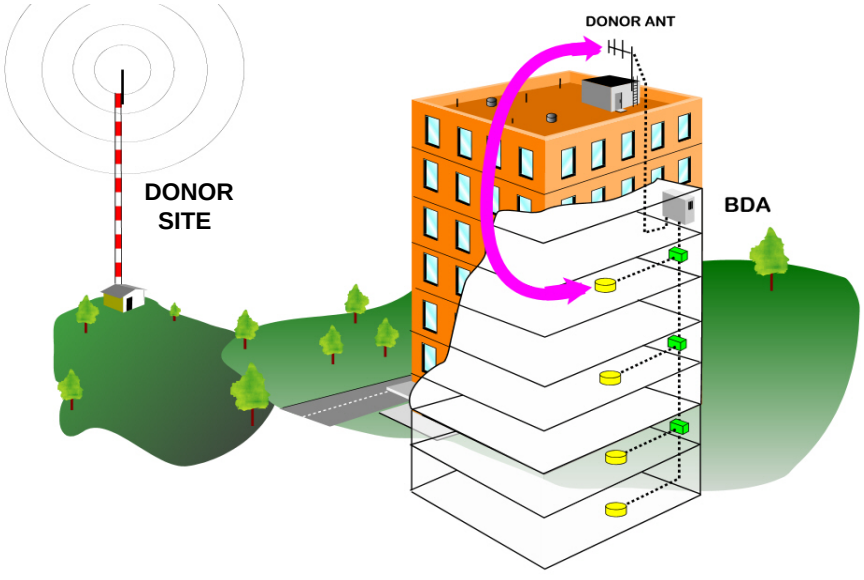
Antenna – Antenna Isolation

This is the most cited reason for In-building system generated interference: Oscillations.

The minimum loss (isolation) between the donor (roof) antenna and every inside Antenna must be 15 dB or greater.

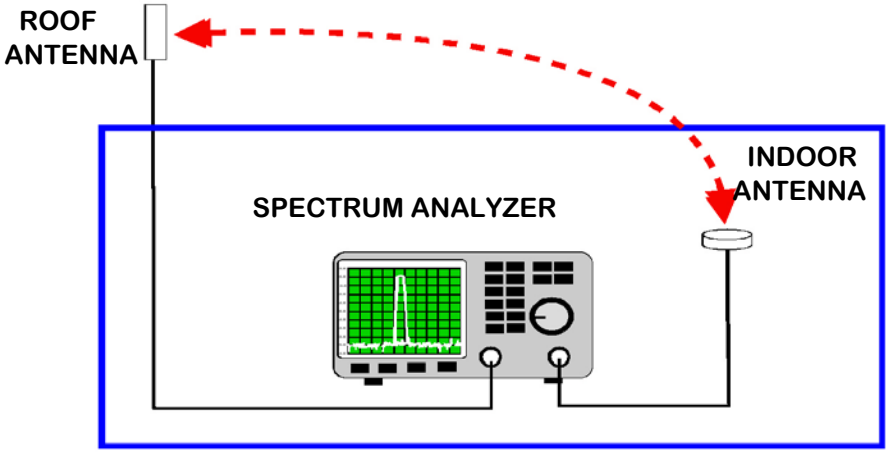
Note: Since publishing some are recommending 16 – 20 dB for newer digital systems.

FEEDBACK MECHANISM: IN-BUILDING

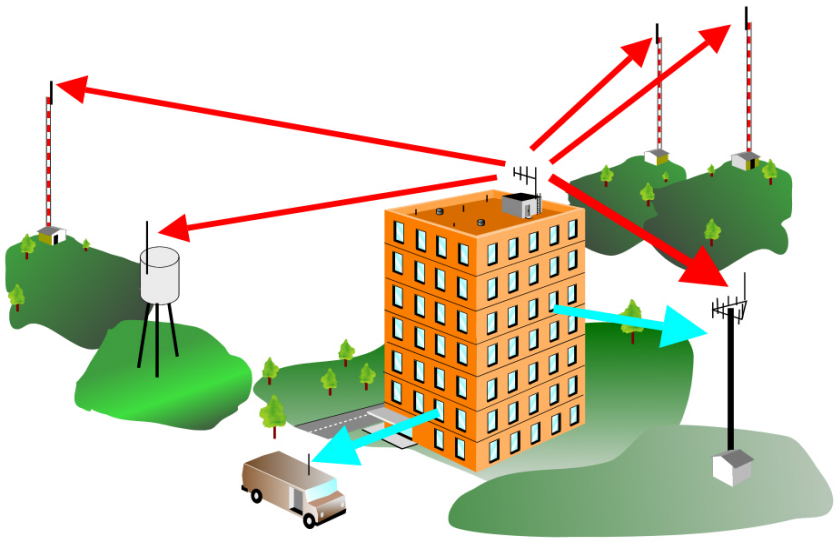


FEEDBACK PREVENTION: BEST PRACTICES

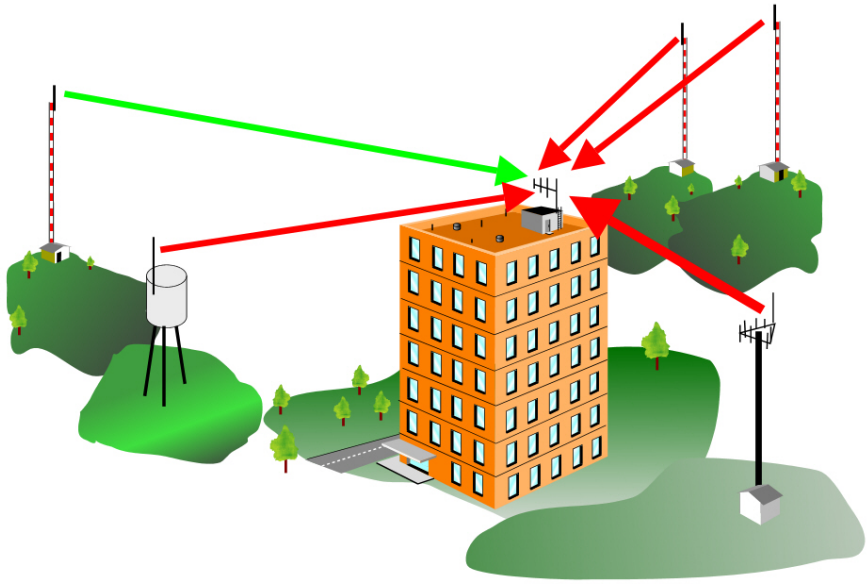
ANTENNA ISOLATION TESTING USING SPECTRUM ANALYZER WITH TRACKING GENERATOR



INTERFERENCE TO OTHERS



INTERFERENCE FROM OTHER SITES



Interference between Services

Interference is not limited to one radio service.

Interactions between 800 public safety and celluar services does occur.

Rebanding does not eliminate and raises new concerns.

FCC Rules : 90.219

Current FCC Rules are presented with emphasis on:

Class A: Channelized signal boosters
Class B: Broadband signal boosters

Licensees only authorized
No Mobile use of signal boosters
Power (ERP) Limitations

Potential rule revisions

Engineering an In-Building System

This paper describes some system engineering methodologies. Others may be used.

The basis of in-building designs have the same basis as outdoor coverage designs, but includes special considerations that are not common to outdoor coverage:

- Antenna isolation
- Noise mitigation
- Nearby IM source potentials
- Interaction with other wireless services.

Engineering an In-Building System

Topics include:

- In-Building coverage surveys

- Propagation prediction

- Coverage validation

- Records

- Interference reporting

ADDENDUMS

A very important component of the NPSTC white paper are the addendums.

Each addendum supports material within the main document and expands the detail of specific subjects

ADDENDUMS

Addendum A: Interference survey

Addendum B: Introduction to In-Building wireless signal distribution for public safety

Addendum C; Providing robust In-building coverage in Public Safety wireless networks

Addendum D: Optimizing Class B signal boosters

Addendum E: Optimizing Class A signal boosters

The complete guideline and addendums are available at:

www.RFSolutions.com/npstc-wp.pdf

Questions or Comments ?

THANK YOU !

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