PAP02 Extended Work - Guidance on Use of Wireless in the Smart Grid

Proposed Framework
Updated 13Jun2011
Objectives

- Provide a fact-based assessment of wireless standards and representative technology implementations of those standards (using specific spectrum) for their ability to satisfy the business needs for the Smart Grid

- Build upon and extend NISTIR 7761

- Accomplished within 6-9 months of voluntary resources
In - Scope

- Wireless standards specifications, and representative technology implementations of those standards
- Spectrum in the range <700 MHz - <6GHz
- AMI networks and Distribution FANs
- “Last Mile” and backhaul networks
- Account for representative real-world deployment areas and their characteristics of: RF propagation factors, endpoint deployments, business application requirements
Out of - Scope

- Pricing or Costs (CapEx or OpEx)
- Simulation modeling of the wireless standards and technologies
- Detailed base-station and subscriber lat/lon RF propagation network design with associated detail clutter and typo terrain data
Framework Basics

- Use a model Smart Grid area concept described by:
  - Endpoint population and density category characteristics, based on USA-state census track data
  - RF propagation representative characteristics
  - NISTIR 7761 business application requirements
Framework Basics – cont'd

- Wireless standards/technology and spectrum modeling of the model area:
  - Using a multi-worksheet spreadsheet tool (with generalized parameter input for design factors)
  - Minimum output: quantity of wireless std/tech/spectrum network gear required by endpoint density category, incremental gear type/count for RF propagation factors & engineering work-arounds for subscribers, and declarations of no endpoint coverage conditions
Framework Basics – cont'd

- Deliverables - “Guidelines for use of Wireless in the Smart Grid”, (a separate NISTIR or volume or appendix to NISTIR 7761) containing:
  - Overview of process
  - Description of model Smart Grid Area and Characteristics
  - Description of Wireless Standards (with representative technologies and utilized spectrum bands and amount.
  - Matrix and summary of the assessment results categorized by wireless standard, spectrum band and containing: network gear type/count by density category, with incremental counts by RF propagation factor, noting work around conditions and areas of no coverage provided
Framework Basics — cont'd

Proposed Framework Details r0.1 tab Cell & External Inputs Linkage

- Census Bureau 2000 tracts & places
- USA-states
- Clutter issues
- Foliage issues
- AMI endpoints
- DA endpoints
- SG-Net Rqmts base
- SG-Net Ref Diagram
- SG-Net Rqmts Table or Database
- SG-Net Rqmts addlt-input
- SG-Net Rqmts addlt-load

- Std_Tech1-SpectrumA-inputs
- Std_Tech1-SpectrumA-calcs
- Std_Tech1-SpectrumB-inputs
- Std_Tech1-SpectrumB-calcs
- Std_Tech1-SpectrumF-inputs
- Std_Tech1-SpectrumF-calcs
- Std_Techn-Spectrumn-inputs
- Std_Techn-Spectrumn-calcs

- Wireless Stds
- Wireless Rep Tech
- Other shared parms
- Path loss & clutter/foliage models

- Sum-Outputs
## WorkPlan / Timelines

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<td><strong>Data Gathering:</strong> finalize model area characteristics, wireless stds, techs, spectrum, appropriate wireless models</td>
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<td><strong>Design and prototype spreadsheet assessment model,</strong> includes specifying inputs, outputs, format</td>
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<td><strong>Assemble Content and write guidance</strong></td>
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