Information Sciences Institute

Wireless Telecommunications Bureau And Office Of Engineering And Technology

Workshop On

Small Cell And Spectrum Sharing Concepts In The 3.5 GHz NPRM

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Opportunity in the Small Cell Operation in 3.5 GHz NPRM

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NPRM Opportunity

- **3.5 GHz NPRM Can Define Two Paths:**
  1. **A solution to the specific issues of 3.5 GHz**
  2. **A Framework for Sharing Many Spectrum Bands, with Tailoring for the issues specific to 3.5 GHz**
- **Discuss the Benefits of Taking a Long-Term, and Evolutionary View of Spectrum Access Services**
  - **Resolve More Issues through SAS Solutions**
  - **Different Band Specific Incumbent Issues**
- **This was the Substance of the PCAST Recommendations on Federal Spectrum**

A Broad View of Future SAS Roles

- **Coexistence**
  - Receiver Coexistence is Often the Constraint for Maximizing Density of Spectrum Usage – Not Deconfliction of Frequencies
  - Visibility of Receiver Characteristics Provides Mechanism for SAS to Avoid Adjacent Channel Conflicts
  - Critical as We Move to non-FDD Systems
- **Closed Loop Interference**
  - Interference Projections MUST Carry Massive Uncertainty Margins Well Beyond the "Mean" Case
  - All of this is Wasted Spectrum Access
  - SAS Can Provide an Anonymous "Lingua Franca" Between Users to resolve ACTUAL Interference
- **Additional Value Services**
  - Interference Alignment, …
- **Market-Based Mechanisms to Create Spectrum Liquidity, Transition Between Licensed/Unlicensed, …**

As a Community --Lets Avoid the Temptation

- 3.5 GHz is Exciting, but Also a Larger Opportunity to Lay the Groundwork for an Even More Fundamental Opportunity
- If we Do it Right, New Spectrum Can be Brought into the SAS Framework Incrementally and Rapidly
- White Spaces Should be a General Process, not a One Time, and Specific Activity
- Therefore -- We Should Work this NPRM with Many More Bands in Mind than Just 3.5

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Process

- **Goal: Establish the Framework for Sharing Spectrum through SAS Systems**
- **Organize Description into Two Categories:**
  1. **All SAS's (in any Band) Must …..**
  2. **In 3.5 GHz, SAS Systems should do this by …**
- **Whether you are a Potential Spectrum User, a Federal Agency, or an SAS Provider, Establishing this Framework is Highly Desirable**

Dynamic Spectrum Access (DSA) Role in White Spaces

- **Perception that PCAST and 3.5 Proceeding Has Precluded DSA as a solution**
- **Believe Opposite is True**
  - **DSA Always had a Challenge to Meet Absolute Protection Assurance Against all Incumbents in Aal Bands**
  - **Data Base Solution Creates Opportunity for Hybrid Solutions that Enhance DSA with Awareness of what Incumbent might be in a Channel, at a Location**
- **DSA is Advantageous to the Incumbent by Reducing the Bookkeeping of Actual Usage Reporting**
  - **For First Time, Incumbents Have Incentive to Support DSA Access Modes to Reduce their Burden**
- **DSA May turn out to be the Key technology for "Self Protection".**
- **DSA Key to the Next Spectrum Sharing Spiral, but Can Contribute to this One.**

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Questions

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