INTERNATIONAL SYMPOSIUM ON ADVANCED RADIO TECHNOLOGIES

Spectrum Policy Challenges for Industry and Policymakers

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Commercial Mobile Radio Service (CMRS) Success Story Shows What Can Happen When Spectrum Policy Works

- Over 134 million U.S. customers as of June 2002
- 300 billion minutes of use in the first half of 2002

- 230 million U.S. subscribers projected by 2010
- 2 trillion minutes of use projected by 2010

Consumers' Reliance on Wireless vs. Wireline Service is Increasing Fast

- Wireless is increasingly substituting for wireline service:
  - 18 percent of wireless consumers consider their wireless phone their primary phone;
  - 10 million wireline access lines have already been replaced with wireless;
  - 10 million more wireline access lines will be replaced by 2005;
  - Wireless MOUs amounted to 17 percent of all telecommunications industry minutes in 2001;
  - DB Alex Brown projects total MOUs will grow 32 percent annually through 2007, "driven by increasing subscribers and usage and by the introduction of next generation wireless services'"
  - The Yankee Group expects wireless MOUs to amount to more than 40 percent of all telecommunications industry minutes by 2005.

Wireless Data Service Projections

- InStat/MDR predicts two-thirds of American workers will use wireless devices as part of their jobs by 2004.
- Jupiter Media Metrix estimates U.S. wireless web users will grow to 96 million by 2005.
- Gartner Group projects 90 percent of professionals / telecommuters will use high-speed wireless data services by 2005, with 137 million wireless data users in North America.
- AMI Partners projects half of entire U.S. workforce to be mobile by 2006, totaling 67 million workers, with over 26.4 million commercial wireless data users.
- In-Stat/MDR projects 52 million wireless data subscribers in 2005; 39 million business wireless data users in 2006.
- Ovum projects overall U.S. wireless data penetration of 67 percent by 2007.

What Policies Fostered CMRS Development?

- Adequate spectrum
- Service rules conducive to CMRS
- Protection from interference
- Multiple service providers
- Minimal regulatory rules

Current Spectrum Allocation Policies are Insufficient and Politicized

- The inherent inefficiency and politicized nature of the existing national spectrum allocation, licensing and use policies have drawn criticism from all sides
- The FCC, NTIA, GAO, and OMB are all engaged in serious studies to develop reform proposals
- Reform of the existing USG spectrum policies is essential to ensure that industries dependent on wireless will have a known, predictable path to meet the increasing demands of consumers for wireless voice and data services over the next decade and beyond

Policymakers Face a Daunting Challenge

- Need to reform processes and possibly structure
- Need to reform allocation policies
- Need to reform policies that apply to services not subject to market incentives to use spectrum efficiently (government users, satellite)
- Good News: No need to fundamentally reform the assignment process
  - Auctions work well
  - But need relocation fund

FCC's Spectrum Task Force Report – Basic Themes of Spectrum Reform

- Flexibility of Spectrum Use (evolution away from "command and control")
- Clearly Defining Rights & Responsibilities of Spectrum Users
- Interference Protection
- Promoting Spectrum Efficiency
- Spectrum Usage Models

Flexibility of Spectrum Use

- CTIA agrees with the Task Force that service rule flexibility can:
  - Improve access to spectrum
  - Promote efficiency
  - Allow spectrum to migrate to the most highly-valued uses
- CTIA supports flexible allocation and service rules that are established before spectrum is assigned or made available to new uses so those rights can be factored into auction decisions
- Carriers should be able to upgrade their networks on a technology-neutral basis without having to go to the FCC for minor rule waivers

"Retroactive" Flexibility is Not the Solution to Spectrum Shortage Woes

- Grant of retroactive flexibility to an incumbent licensee not subject to market incentives for a different service than contemplated may create:
  - Spectrum inefficiency
  - Interference concerns
  - Inequalities that will harm competition and consumers in the long run
  - Uncertainties and distortions in the competitive bidding process
  - The FCC should not resort to giving inefficient or commercially non-viable incumbents flexibility to provide service under the guise of increasing innovation

Clearly Defining the Rights and Responsibilities of Spectrum Users

- Spectrum users' rights and obligations are not always defined with sufficient clarity under the Commission's current rules
- Definition of a licensee's rights is critical for several reasons:
  - Creates predictability
  - Smoothes interference resolution process between licensees
  - Simplifies analysis of whether new products or services not controlled by a licensee can and should be introduced in license bands
  - Improves auction process and serves as a critical underpinning of the FCC's proposed secondary market policies

Task Force Identified Four Basic Spectrum Rights Parameters

- Task Force identified four basic spectrum rights parameters:
  - Designed frequency range and bandwidth
  - Geographic scope of right to operate
  - Maximum RF output (in-band and out-of-band)
  - Interference protection (maximum level of interference that the spectrum user must accept from other RF sources)
- Frequency range and bandwidth, geographic scope and output limits have been defined relatively well in the rules
- But there is virtually unanimous agreement that the interference protection parameter is not clearly defined

Interference Protection

- The concept of an interference threshold should be *cautiously* explored as one way to provide licensees with further clarity
- Wireless industry supports the concept of establishing a clearly defined threshold to set maximum permissible levels of interference, BUT:
  - The precise meaning of the Report's "interference temperature" approach remains unclear
  - The establishment of an interference temperature metric will require a great deal of additional work before it can be shown to be an effective tool for quantifying and managing interference
  - Any interference threshold must be based on actual tests, in coordination with industry engineers
  - Requires a corrective mechanism if interference should occur
  - "Smart" technologies, such as software-defined radios, should not be positioned as a spectrum management panacea until their technical ***and*** economic feasibility is proven

Promoting Efficiency

- Technically compatible systems should be grouped together
  - Placing like services in "spectrum neighborhoods" during allocation and licensing phases will result in a reduced need for guardbands and other forms of interference protection
  - This will save spectrum resources and reduce the need for expensive technical fixes
- Encouraging applicants with concrete realistic plans
  - Discourage speculative filings
  - Ensure that spectrum is not left unused indefinitely
  - Adopt more aggressive construction and service milestones for services without market incentives to use spectrum efficiently

Spectrum Usage Models

- One size does not fit all when it comes to managing spectrum effectively
- Future spectrum policies should attempt to achieve a balance between the three basic spectrum rights models, moving towards an increased reliance on both the exclusive use and commons models, and away from command-and-control regulation
- The exclusive rights model should be applied to most of the spectrum
- The commons model is of more limited usefulness in the vast majority of bands

Exclusive Use Model

- Applying the exclusive use licensed model to most spectrum is sound because:
  - It creates a strong incentive to put spectrum to its highest valued use
  - Interference protection is important to most user experiences
  - It can provide a clear framework for market-based assignments and negotiation of access rights among competing users
- The benefits of this model can only occur if the rights and responsibilities of licensed users are clearly defined and effectively enforced
- Spectrum users operating above the interference threshold should only be permitted to operate in licensed spectrum if they obtain express permission to do so through the use of secondary markets

Commons Model

- Additional commons spectrum for unlicensed use appropriate ***if*** need is demonstrated
- The commons model should be applied primarily in higher spectrum bands, and should be internationally harmonized
- Any unlicensed use must not interfere with licensed uses
- Unlicensed operations have no rights to protection from interference, regardless of whether its source is in-band or out-of-band emissions

Limited Use of Command and Control

- Critical to distinguish between special interest and public interest when deciding whether to retain command and control regulation in any particular context
- Commission's spectrum management policies must create incentives for all services to use spectrum more efficiently, including those services that are not subject to market discipline
- There should be a more aggressive rethinking of whether command-and-control regulation remains justified in these areas and how these services can be transitioned to more flexible and market-oriented rules to the maximum extent possible

Transition Issues

- Underutilized or inefficiently used bands should be reallocated utilizing auctions to grant new licenses with expanded usage rights (PCS model)
  - Incumbents should be subject to mandatory, reimbursed relocation (through a relocation fund, for federal users)
- FCC and NTIA should explore market-based incentives to encourage voluntary band-clearing or restructuring
- "Overlay" uses in licensed spectrum of limited usefulness unless protections against interference can be assured
- Granting expansive additional functionality ("flexibility") to inefficient incumbents merely perpetuates inefficient spectrum allocations

Secondary Market Rights and Easements

- The leasing of spectrum through secondary markets should promote more efficient use of spectrum and allow more entities to gain access to spectrum so that it may be put to innovative uses
- Liberal spectrum leasing policies will ensure that spectrum is put to its highest and best use
- An “easements” approach affords licensees no interference protection
  - Huge legal and political difficulties with shutting down supposedly “non-interfering” operations that are widely deployed

Other Spectrum Policy Reforms

- The most important overall reform of the spectrum management process should be the initiation of a more systematic longer-term spectrum planning process
- The goal of such a process would be to identify what spectrum could be made available for uses other than the status quo in the future
- It would provide more predictability and policy guidance to the allocation process
- A multi-level long-term “rolling” spectrum management process, perhaps in combination with a review mechanism like BRAC, could help to identify spectrum
- FCC & NTIA should support positive incentives for inefficient users to make their spectrum use more efficient, such as a relocation fund

What Do Commercial Users Want?

- Predictability in regulatory environment to
  - Promote investment
  - Foster innovation
  - Prevent interference
- Sufficient technical and service flexibility to enable carriers to keep pace with technological advances and consumers' changing needs
- Sufficient harmonized spectrum
  - Commission should prioritize the search for licensed spectrum first and foremost to promote innovation

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For Further Information About the Wireless Industry, visit CTIA's website: http://www.wow-com.com