Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth

PCAST May 25, 2012 Update
President Obama and Spectrum Management

- Spectrum important for U.S. economic and technological leadership.
- Requires 500 MHz of spectrum to be cleared for commercial use within 10 years by
  - Finding ways to use spectrum more efficiently;
  - Unlocking the value of otherwise underutilized spectrum;
  - Open new avenues for spectrum users to derive value through the development of advanced, situation-aware spectrum-sharing technologies.
- This PCAST reports proposes the next step to respond to the President’s spectrum mandate.
Why Do We Need to Repurpose Spectrum?

- **Huge WW Mobile Device Growth Opportunity (2020)**
  - $4.5T Global Value
  - M2M Wave next
  - 50B devices
  - Zetta-bytes of Data

- **Enhanced Mobile Devices are Already Leading to a US Spectrum Deficit**
  - Data more than doubled 4 years in a row
  - Smartphones generate 24X data of basic-feature cell phones
  - Tablets create 5X more traffic than smartphones

- **Fragmentation of spectrum** for exclusive Federal use leads to inefficiency, artificial scarcity, and constraints on current and future users.
PCAST Study Concentrated on Federal Spectrum

- Clearing and Reallocation of Federal Spectrum is Not Sustainable.
  - Recent Study - Clearing of just one 95 MHz band will take 10 years, **cost $18 billion**, and cause significant disruption.
  - Net revenue from last successful auction of 45 MHz realized a **net income of just $5.35 billion** for the government.
  - Most Federal Bands not highly valued if they need to be cleared.
- More Efficient Use of Federal Spectrum will be Obtained through Sharing
New Technologies Allow for A New Federal Spectrum Policy

- **New Cognitive Technologies**
  - Agile Radios
- **Small Cell Technologies**
  - Optimized for Aggregate Capacity
- **New Spectrum Architecture**
  - Divide spectrum into substantial blocks with common characteristics
  - Make sharing by Federal users with commercial users the norm
  - Make spectrum access available and affordable to a wide range of services and applications.
- **New Metric for Utilization**
  - Measure spectrum effectiveness
  - Potential impact that could be 1,000’s times current capacity.
Overarching Recommendation

PCAST recommends the President:

• issue a new memorandum regarding spectrum;
• state the policy of the U.S. government is to share underutilized Federal spectrum; and
• identify immediately 1,000 MHz of Federal spectrum for sharing with the private sector.

This would lead to creation of the first shared-use spectrum superhighways.
Recommended: New Federal Spectrum Access System

Implement a Federal Spectrum Access System

- Hierarchy of Users
- Federal Primary Access (Incumbent)
- Secondary Access (Quality of Service Applications)
- General Authorized Access
- Geo-location Database with policy information
- Sensing option for Federal Systems
- Allow Access to Unused Spectrum
**Recommended: Receiver Management Framework**

- **Receiver not just Transmitter Focus**
  - Establish minimum technical standards for coexistence of transmitters and receivers to enable flexible sharing. Many ways to consider it.
Recommended: Immediate Actions to Get Started

3550-3650 MHz NTIA Exclusion Zones*

- Modify Rules to Allow “General Authorized Access” Devices to Operate in two bands in the NTIA Fast Track List – specifically the 3550-3650 MHz (radar bands) and a second band to be determined

- Use Extended TV White Space System Already in Operation

NTIA Fast-Track Report, Figure 5-3. Composite Depiction of Exclusion Zone Distances, Shipborne Radar Systems
Recommended: Immediate Actions to Get Started

- **Establish Spectrum Sharing Partnership Steering Committee** - an Advisory Committee of Industry Representatives – to Advise on Federal Spectrum Sharing System Implementation

- **Provide Scalable Real-World Test Services** (a Test City and Mobile Test Service) to test Federal Bands and Public Safety

**Recommendation: Federal Spectrum Management Oversight**

- Formalize the White House-based Spectrum Management Team (SMT) of the U.S. Chief Technology Officer, National Security Staff, Office of Management and Budget, and National Economic Council to work with the National Telecommunications and Information Administration.
- **Reexamine Partitioning of Federal Spectrum** Usage in Light of Current and Emerging Technologies
- **Support International Harmonization of new Shared Federal Bands**
- Implement a Mechanism that gives Federal Agencies Incentives to Share Spectrum (e.g., Spectrum Currency)
- **Redefine Spectrum Relocation Fund to Revolving “Spectrum Efficiency Fund”**
- Experiment with new shorter-term license economic licensing models (foster innovation, provide quality of service, generate revenue)
Thank You