



# ***Unleashing the Wireless Broadband Revolution - The President's Initiative to Repurpose 500 MHz***

**Federal Spectrum Management Class - December 2012**

**John Hunter  
Strategic Planning Division  
Office of Spectrum Management  
202-482-3803  
[jhunter@ntia.doc.gov](mailto:jhunter@ntia.doc.gov)**

# Presidential Memorandum – 28 June 2010

“This new era in global technology leadership will only happen if there is adequate spectrum available to support the forthcoming myriad of wireless devices, networks, and applications that can drive the new economy.” – President Barack Obama



- DOC, through NTIA, directed to complete a plan and timetable, in collaboration with the FCC, making available 500 MHz over 10 years suitable for wireless broadband on an exclusive or shared basis
- Fast Track Process as a down payment
- OMB to lay the groundwork to make available adequate funding, incentives, and assistance for affected entities to accomplish this
- NTIA to develop a plan to facilitate research, development, testing, and experimentation by researchers to explore innovative spectrum sharing technologies

# Plan and Timetable for 500 MHz

## *“The 10-Year Plan”*

Plan and Timetable to Make Available  
500 Megahertz of Spectrum  
for Wireless Broadband



U.S. Department of Commerce

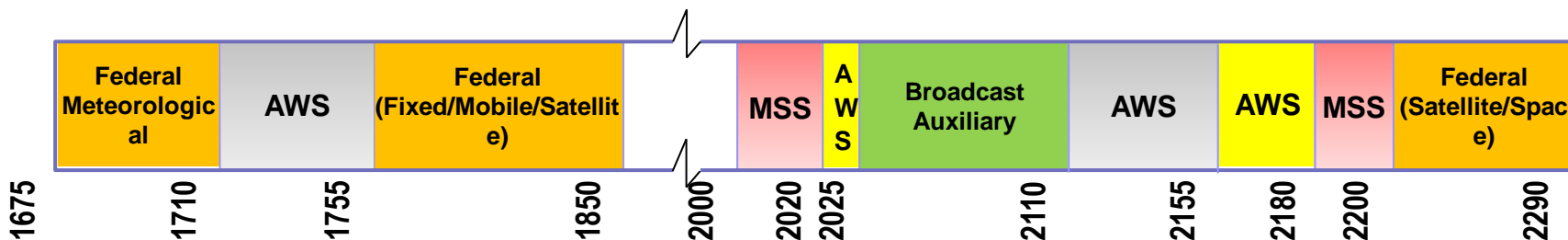
Gary Locke, Secretary

Lawrence E. Strickling, Assistant Secretary  
for Communications and Information

October 2010

- Plan released 15 Nov 2010
- Identifies over 2200 MHz below 4.4 GHz for consideration – recently added 195 MHz above 5 GHz
- Spectrum repurposing focused primarily for exclusive use but also to consider shared and unlicensed
- Bands offering possibilities will be prioritized for further evaluation
- Industry remains focused on the 1755 - 1780 MHz band

<http://www.ntia.doc.gov/reports.html>



# Fast Track Band Evaluation

An Assessment of the Near-Term Viability of  
Accommodating Wireless Broadband Systems in the  
1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and  
4200-4220 MHz, 4380-4400 MHz Bands



U.S. Department of Commerce

Gary Locke, Secretary

Lawrence E. Strickling, Assistant Secretary  
for Communications and Information

October 2010

- **To be made available within 5 years**
  - Only geographical sharing considered
  - Some modification of Federal operations may be required
- **Candidate Bands considered:**
  - 1675 - 1710 MHz
  - 1755 - 1780 MHz
  - 3500 - 3650 MHz
  - 4200 - 4220 and 4380 - 4400 MHz
- **Results : 115 MHz recommended for repurposing**
  - 1695 - 1710 MHz (15 MHz)
  - 3550 - 3650 MHz (100 MHz)

<http://www.ntia.doc.gov/reports.html>

# Executing the Ten-year Process – Entrance Evaluation

## □ Priority Relocation bands

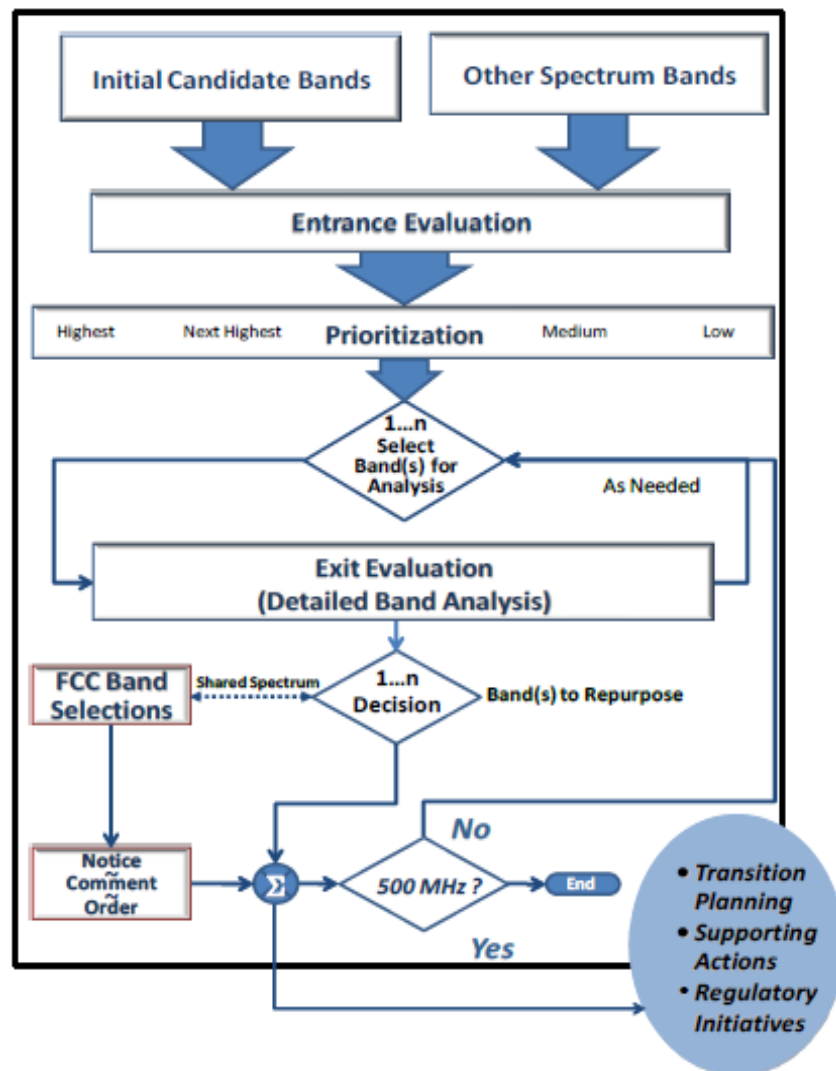
- 1755 - 1850 MHz
- 1695 - 1710 MHz
- 406.1 - 420 MHz
- 2700 - 2900 MHz
- 4200 - 4400 MHz
- 3500 - 3650 MHz

## □ Priority Sharing Bands

- 1300 - 1390 MHz
- 1675 - 1695 MHz
- 2900 - 3100 MHz
- 3100 - 3500 MHz
- 2200 - 2290 MHz

## □ Unlicensed Use opportunities

- 5350 – 5470 MHz
- 5850 - 5925 MHz



# Selection Factors

## Selection Factors

Band-Selection Repurposing Factors for Non-Federal Exclusive Use, Shared Use, Shared Use with Unlicensed & Exclusive Unlicensed			
Non-federal exclusive use	Non-federal/federal shared use (licensed wireless systems)	Non-federal/federal shared use (unlicensed wireless devices)	Exclusive use by unlicensed devices
Available bandwidth	Shared bandwidth	Shared Bandwidth	TBD
Estimated revenue potential	Geographical coverage	Geographical coverage	
Technology	Estimated revenue potential	Within ten years	
Comparable spectrum	Technological complexity	Level of difficulty of required international agreements	
Relocation costs	Within ten years	Sharing cost	
Within ten years	Level of difficulty of required international agreements		
Level of difficulty of required international agreements	Sharing cost		

# Executing the Ten-year Process: Where We are Today

- **Detailed Analysis Phase for 1755 - 1850 MHz completed**
  - Determined comparable bands for the various types of operations
  - Determined a first order cost for relocation
  - Determined some systems may remain in band thereby resulting federal/industry *sharing* of the band
  - NTIA concluded that the entire 95 megahertz can be repurposed with caveats – several challenges to overcome
- **Preparing transition planning**
- **Initiating feasibility study on 5350 - 5470 and 5850 - 5925 MHz bands for unlicensed use**
- **Work with Industry to find more opportunities for 3550 – 3650 and 1695 - 1710 MHz Fast Track Band**

# Facts from the 1755-1850 MHz Report

- **3200+ Assignments**

- **12 Primary Operations/System Categories**

- ☐ Fixed point-to-point microwave
- ☐ Military tactical radio relay
- ☐ Air combat training system
- ☐ Precision guided munitions
- ☐ Law enforcement mobile video surveillance applications
- ☐ High-resolution (fixed or transportable) video data links for surveillance
- ☐ Tracking, telemetry, and commanding for federal space systems
- ☐ Air-to-ground telemetry
- ☐ Land mobile robotic video functions (e.g., explosive ordnance disposal (EOD) and hazardous material investigations and disposals)
- ☐ Unmanned aerial systems (UAS), unmanned aerial vehicles (UAV), and remotely piloted vehicles (RPV)
- ☐ Others: EW



# Preliminary Estimated Cost to Relocate Federal Operations from the 1755 - 1850 MHz Band

Operation	Estimated Cost (\$M)
Fixed Point-to-Point Microwave	186
Military Tactical Radio Relay	160
Air Combat Training System	4,500
Precision Guided Munitions	518
Tracking, Telemetry, and Commanding	2,350
Aeronautical Mobile Telemetry	3,140
Video Surveillance	5,097
Unmanned Aerial Systems	1,511
Other DOD Systems	364
<b>Total (\$M)</b>	<b>17,826</b>

# The Establishment of CSMAC Working Groups (WGs)

## ■ Purpose:

- Explore ways to lower the repurposing costs and/or improve or facilitate industry access while protecting federal operations from adverse impact
- Identify solutions that can be incorporated into FCC Service Rules

## ■ Approach:

- Establish WGs under the CSMAC/FACA Guidelines
- Breakout systems in the band into 5 WGs
  - WG-1: Met-Sat Systems in the 1695MHz – 1710MHz band (Tax Relief & Jobs Act)
  - WG-2: Law Enforcement Surveillance Systems
  - WG-3: SGLS Satellite Systems
  - WG-4: Tactical Radio Relay/Fixed Microwave
  - WG-5: Aeronautical Operations (e.g., ACTS, AMT, UAVs/SUAS, PGMs)

# Summary of Challenges

- **Achieving Comparable Capability for Federal Systems (considering Incumbent Operations in any Spectrum Selected for Relocated Federal Operations):**
  - There is little to no spectrum today that is unencumbered
  - Incumbents will maintain their status.
  - Relocated systems will need to provide adequate protection
- **Supporting Federal Relocation Costs:**
  - Auction proceeds must exceed expected federal relocation costs
- **Sharing must be a consideration**
  - Spectrum sharing is a vital component
  - A balanced approach
- **Sharing FOUO, Sensitive and/or Otherwise Classified Information**

# **Spectrum Implications from the Middle Class Tax Relief and Job Creation Act of 2012**

## **■ Clearing federal spectrum: 15 megahertz of spectrum between 1675 - 1710 MHz**

- ☐ NTIA: Submit a report within one year (2/2013) to the President on 1675 - 1710 MHz
- ☐ FCC: Start auction proceedings NLT 3 years

## **■ Reallocate and auction (FCC) the following:**

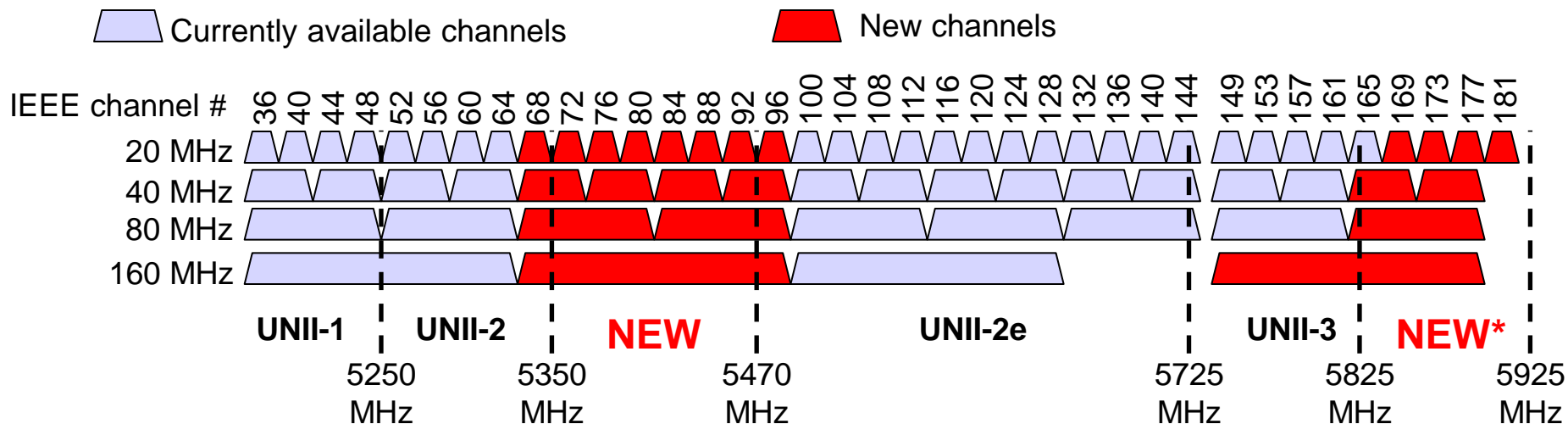
- ☐ 1915 - 1920 MHz; 1995 - 2000 MHz
- ☐ 15 MHz of spectrum between 1675 - 1710 MHz
- ☐ **2155 - 2180 MHz (Will need to pair with another band!)**
- ☐ 15 megahertz of contiguous spectrum to be identified by the Commission

# Spectrum Implications from the Middle Class Tax Relief and Job Creation Act of 2012

## -continued-

### ■ Unlicensed use in the 5 GHz band

- NTIA: Accomplish a study of the 5350 - 5470 MHz band in 8 months (10/2012) and 5850 - 5925 MHz band in 18 months (8/2013) in consultation with PPSG and PPSG SWG
- FCC: Initiate public rules proceedings not later than one year for the 5350 - 5470 MHz band





# **Spectrum Implications from the Middle Class Tax Relief and Job Creation Act of 2012 -continued-**

- Study on receiver performance and spectrum efficiency
- The Comptroller General submits report in 1 year (2/2013)
- Functional responsibility of NTIA to ensure efficient use of spectrum



# **Spectrum Implications from the Middle Class Tax Relief and Job Creation Act of 2012**

## **-continued-**

### **■ System Certification**

- ☐ The Director of the Office of Management and Budget to revise OMB circular A-11 in 6 months (8/2012)

### **■ Relocation of and spectrum sharing by federal government stations – Establish Technical Panel**

- ☐ By Aug of 2012
- ☐ Appoint members within 180 days
- ☐ Development and publication of relocation or sharing transition plans 240 days prior to commencement of any auction

### **■ Establish Dispute resolution process**



# **Facilitating Spectrum Sharing Technologies**

## ***The Wireless Spectrum R&D Senior Steering Group***

- **Goal - One way to make spectrum available for useful purposes is to increase spectrum efficiency and innovative sharing**
- **Purpose - Fulfill the EM's 3<sup>rd</sup> objective**
  - Effort to create a US Government-wide plan for spectrum-related activities by researchers
  - President's CTO directed that a group be formed within the Network IT Research & Development (NITRD) Program Subcommittee
  - Set out 3 objectives: Transparency, Smart Investment, Solicit Opportunities
  - Collaboration must be within the R&D community
  - Co-chairs from NSF and NTIA
  - Considers a broad range of activities
  - US Government participants – DOD (includes DARPA & Labs), DHS, NASA, DOJ(NIJ), DOE (Idaho National Labs), DOC (NIST/NTIA/ITS), DOT(FAA)





# **WSRD SSG**

## **Accomplishments:**

- 1. First Interim Report , June 2011, evaluated the initial results of the Federal R&D project inventory (670+ projects) and summarized the initial analysis of the inventory - 12 projects highlighted.**
- 2. First Workshop - Industry/Academia Roundtable July 2011. Panelists addressed R&D gaps and how R&D investment could be targeted to promote wireless innovation.**
- 3. Second Interim Report, November 2011, reviewed the results of the July 2011 workshop and presented a roadmap of key technologies to pursue.**
- 4. Second Industry/Academia Roundtable January 2012. Panelists addressed the need and constructs of a national-level testing/demonstration environment.**
- 5. Third Industry/Academia Roundtable July 2012 developed a specific set of R&D projects to address immediate challenges being confronted today.**

# A Broad Range of Questions

## Questions about Spectrum Use



?

**Broad-based, National-level:** What and how spectrum should be repurposed?

**Broad-based, Economic:**  
Does the supply meet the demand?  
What value is assigned to spectrum?

?

**Broad-based, National-level:**  
What are the Aggregate future spectrum use estimates for The National Interests?

**Single Mission:** What LMR frequencies are needed to support peak capacity during a natural disaster?

?

**Single Agency:** What total BW and in what bands is it needed to support a new radar system?

?

**Single user:** What assignments are needed to support operation of radio XYZ?

?

Specific Assignment

Total System/Network Bandwidth

?

Total National Functional Capacity

General Spectrum Use

Detailed Spectrum Use

Spectrum Use Performance

Increasing Level of Complexity & Participation



## **In Summary**

- **Spectrum Demand today is definitely increasing and will continue do so into the future**
- **It's getting harder to find**
- **It costs time and money to make it happen**
- **Paradigm shift toward sharing**
- **Inventory is important**
- **All of this - Technology can help us**

# Information Sources for 500 Megahertz Initiative & Spectrum Sharing/WSRD

## ■ 500 Megahertz Initiative

- <http://www.ntia.doc.gov/category/500-mhz-initiative>
  - An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, and 4200-4220 MHz, 4380-4400 MHz Bands (Fast-Track Evaluation)
  - Plan and Timetable to Make Available 500 Megahertz of Spectrum for Wireless Broadband. (Ten-Year Plan)
  - First and Second Interim Progress Reports on Ten-Year Plan
  - *An Assessment of the Viability of Accommodating Wireless Broadband in the 1755 – 1850 MHz Band*

## ■ WSRD SSG - Facilitating Spectrum Sharing

- <http://www.nitrd.gov/SubCommittee/wirelesspectrumrd.aspx>
- Group information, events, reports, test-bed information portal



**Questions?**