



# The FCC Broadband Spectrum Agenda: A Progress Report

Julius Knapp, **Chief**  
**Office of Engineering and Technology**

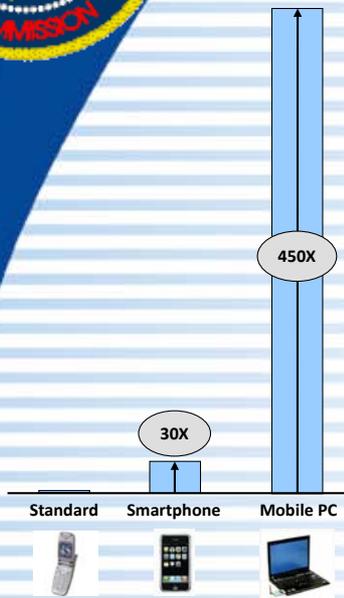
**National Spectrum  
Management Association**  
**May 24, 2011**

**Note: The views expressed in this presentation are those of the author and may not necessarily represent the views of the Federal Communications Commission**



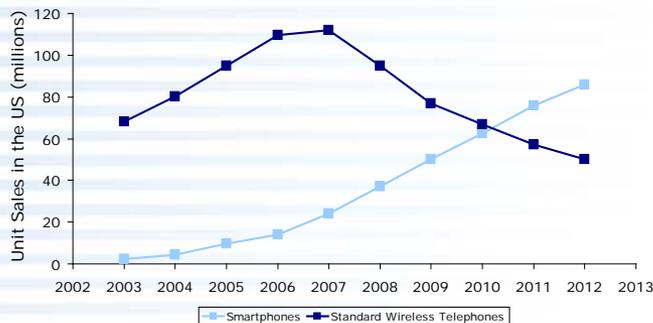
# Spectrum is the “oxygen” that wireless broadband needs to thrive

Hungry Devices



Source: Cisco

Smartphone sales to overtake standard phones by 2011



Source: TIA, Wilkofsky Gruen Associates from "TIA's 2009 ICT Market Review and Forecast".

Consumer Apps



National Purposes



Civic Engagement



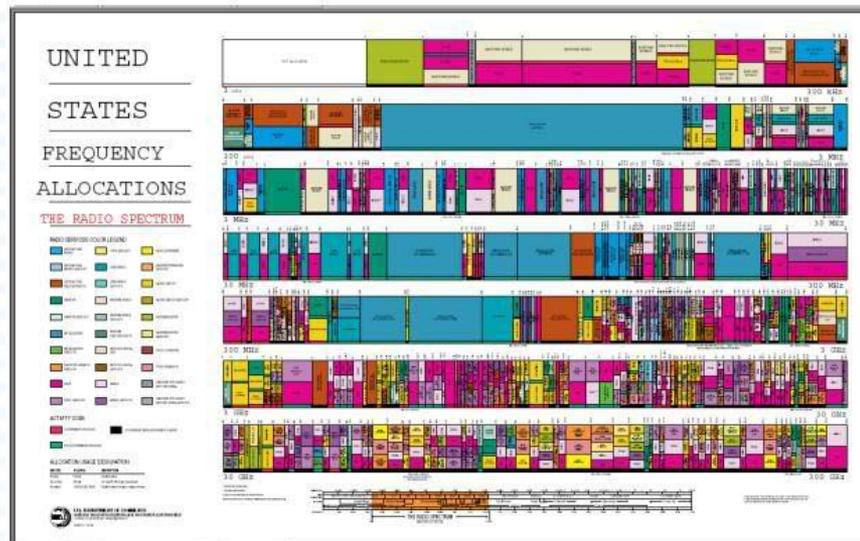
Telemedicine



Public Safety



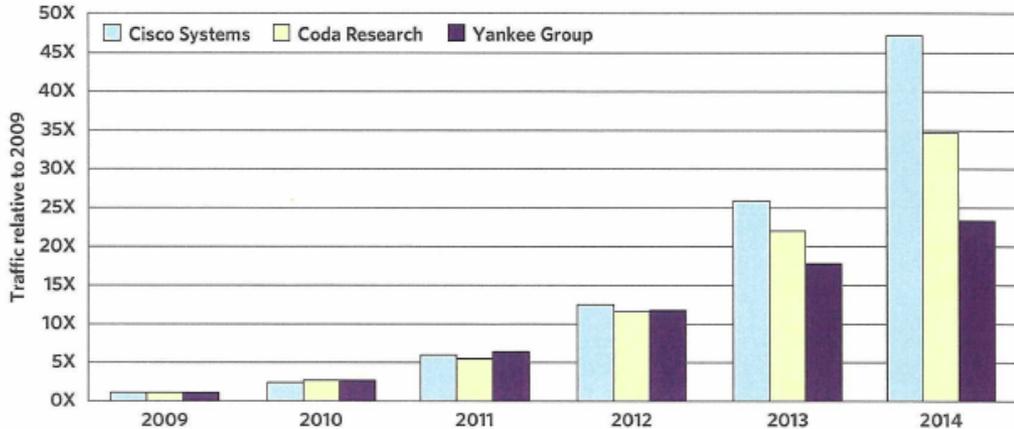
Smart Grid



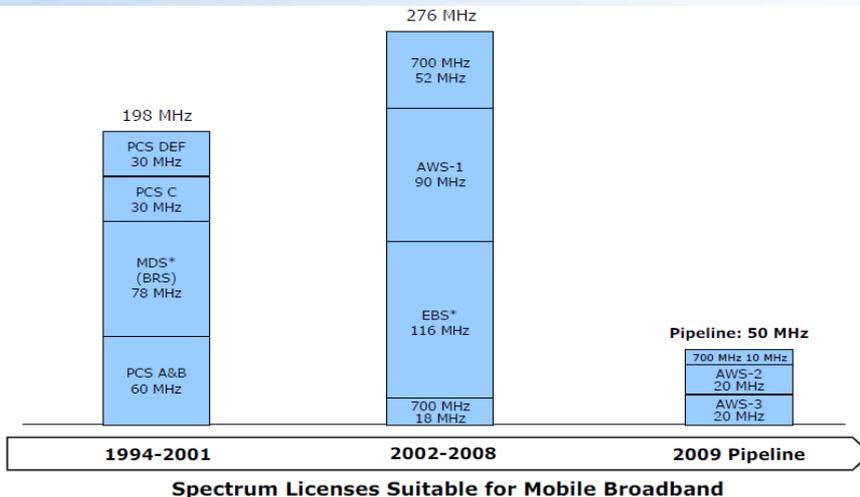


# Trends in demand and supply suggest a looming spectrum gap

Forecasted mobile data traffic in North America



Mobile broadband spectrum pipeline



Need to transform spectrum policy to meet wireless broadband demands

\*In 2004 MDS/ITFS was rebanded to create the EBS/BRS band



# Mobile Demand Is Continuing to Skyrocket

- 300 million mobile subscribers in the U.S., and 90% of us keep our mobile device within arms length 24 hours a day
- Smartphone sales have eclipsed PC sales
- Mobile broadband is being adopted faster than any computing platform in history
- A typical smartphone places 24 times as much demand on spectrum as an old feature phone
- Tablets demand 120 times as much
- Multiple experts expect that mobile demand for spectrum will increase more than 35x in the next few years (3,500%)



24/7



24X



120X



# New Businesses, New Jobs, and New Benefits to All Americans.

- Ability to send or receive video anywhere, any time:
  - Video conferencing
  - Check on an elderly parent living alone
  - 18 million college students - - see them every weekend
- **Consult with mechanic when car breaks down**
- **After accident - video link with a doctor**
- **School buses can become rolling study halls**
- **Farmers in their fields can track weather or commodity prices in real time**
- **Plumbers or electricians can consult in real time with colleagues, or download video tips**
- **TIA: \$860 billion in productivity gains for U.S. businesses by 2016**





# NBP Framework for Spectrum Recommendations

## 1 Ensure greater transparency in allocation and utilization

- Spectrum dashboard

## 2 Expand incentives and mechanisms available to reallocate or repurpose spectrum

- Incentive auctions
- Spectrum fees

## 3 Make more spectrum available

- Within 10 years, 500 megahertz total
- Bands under consideration include Broadcast TV, MSS, WCS and AWS

## 4 Facilitate deployment of spectrum for wireless backhaul

- More flexible rules

## 5 Expand opportunities for innovative spectrum access models

- New unlicensed allocation
- Opportunistic use
- R&D

## 6 Increase comprehensiveness of spectrum policy

- Work with NTIA
- Tribes
- International



# Unleash More Spectrum for Mobile Broadband

The Plan recommends that the FCC make 500 MHz newly available for broadband use within the next ten years, of which 300 MHz of high-value spectrum between 225 MHz and 3.7 gigahertz (GHz) should be made newly available for mobile use within five years.

<b>Band</b>	<b>Key Actions and Timing</b>	<b>Megahertz Made Available for Terrestrial Broadband</b>
WCS	2010—Order	20
AWS 2/3 <sup>2</sup>	2010—Order 2011—Auction	60
D Block	2010—Order 2011—Auction	10
Mobile Satellite Services (MSS)	2010—NPRM 2010—L-Band and Big LEO Orders 2011—S-Band Order	90
Broadcast TV <sup>3</sup>	2010—NPRM 2011—Order 2012/13—Auction 2015—Band transition	120
Total		300



# Mobile Satellite Service: Flexibility for Terrestrial Service

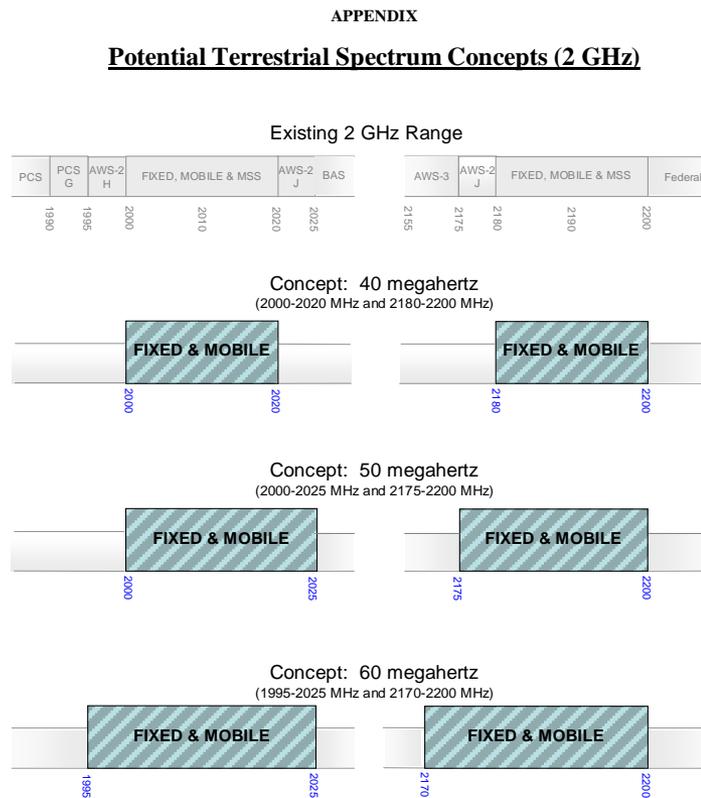
- Order adopted April 5, 2011
- Adds co-primary Fixed and Mobile allocations to the MSS 2 GHz band, consistent with the International Table of Allocations, laying groundwork for more flexible use of the band, including for terrestrial broadband services, in the future
- Extends existing secondary market “spectrum manager” spectrum leasing policies, procedures, and rules that currently apply to wireless terrestrial services to the use of MSS/ATC spectrum for the provision of terrestrial services

MSS Band	Allocated Bandwidth	Bandwidth Usable for Terrestrial Broadband	Licensees	Subscribers <sup>ZZ</sup>
<i>L-band</i>	Two 34-megahertz blocks at 1525–1559 MHz, 1626.5–1660.5 MHz <sup>ZB</sup>	40 megahertz	SkyTerra	18,235
			Inmarsat	254,000
<i>S-band</i>	Two 20-megahertz blocks at 2000–2020 MHz, 2180–2200 MHz	40 megahertz	DBSD (ICO)	-
			TerreStar	-
<i>Big LEO</i>	Two 16.5-megahertz blocks at 1610–1626.5 MHz, 2483.5–2500 MHz.	10 megahertz	Globalstar	382,313
			Iridium	359,000



# 2 GHz Allocations

- On 05/20/11 the FCC Spectrum Task Force invited technical input on approaches to maximize broadband use of fixed/mobile spectrum allocations in the 2 GHz range
- Involves MSS S-band, AWS-2 & 3 Spectrum



Not to scale



# TV Bands NPRM

- Notice of Proposed Rule Making (NPRM) initiates process to make more efficient use of TV broadcast spectrum
- Would add Fixed and Mobile allocations to TV spectrum
- Invites comment on channel sharing where two or more stations voluntarily combine their operations on a single TV “channel” by means of “multicast” capability
- Seeks comment on steps to improve TV reception on the VHF channels (2-13), such as by increasing transmitting power, and establishing standards for indoor antennas
- Lays the initial groundwork for incentive auctions if FCC were granted legislative authority



# Experimental Licensing NPRM

- Notice of Proposed Rule Making (NPRM) seeks to promote research and development of new radio technologies, devices, and applications
- Proposed to create a new type of Program License, which would give qualified entities broad authority to conduct a program of research without the need for approval of each experiment
- Proposed three types of Program Licenses:
  - **Research license** would allow universities, laboratories, and other qualified research institutions to conduct experiments over a wide variety of frequencies and other operating parameters, without the need for individual authorization or reauthorization for each individual experiment.
  - **Geographic “innovation zones”** – generally relatively remote locations - where researchers could conduct a wide range of experiments under certain general conditions.
  - **Medical institutions** to innovate and develop new devices that can save lives, have a significant impact on reducing medical costs, and provide new treatment options for our wounded service men and women.
- Proposed ways to streamline and clarify the existing rules such as expanding opportunities for researchers and manufacturers to conduct market trials



# Dynamic Spectrum Access NOI

- Notice of Inquiry (NOI) considers how dynamic access radios and techniques can provide a more intensive and efficient use of spectrum
- Seeks comment on the current state of the art and how FCC can promote these technologies - - test-beds or modifying its spectrum management practices and policies
- Covers both licensed services and unlicensed devices
- What spectrum bands would be most suitable?
- Asks whether TV White Space model might be used for other bands
- Asks whether and how to incorporate spectrum sensing for other bands
- Asks whether FCC provisions for secondary market arrangements could be enhanced to increase use by dynamic access radios
- Asks how to improve FCC "Spectrum Dashboard" for DSA

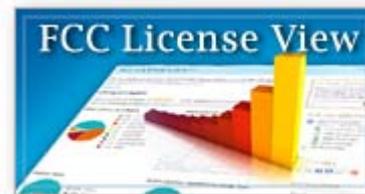


# TV White Spaces

- Final Rules Adopted September 23, 2010
- Highlights:
  - Super-Wi-Fi via access to beachfront spectrum
  - Establishes a new spectrum access model
  - Smart devices select locally unused TV channels based on location and access to a data base of protected services
  - Reserved 2 TV chs for wireless microphones & provided for registration of major venues/events in data base
  - Equipment certification ensures compliance
  - Provided for certification of sensing-only devices
- Nine data base managers selected Jan 26, 2011; Microsoft applied recently & PN invited comment
- Workshops held 3/10/11 & 4/20/11; planned 5/25/11



# Baseline Spectrum Inventory



- New tool that provides an overview of FCC license management data
- Enables users to digest licensing information via a simple & easy-to-use portal
- The tool includes data for active licenses from all of the Commission's licensing systems:
  - CDBS - Consolidated Database System,
  - COALS - Cable Operations and Licensing System
  - ELS - Experimental Licensing System
  - IBFS - International Bureau Filing System
  - And ULS - Universal Licensing System
- Based on information currently stored in the FCC's electronic licensing records and our rules, such as the table of frequency allocations
- Provides "one-stop shopping" for much of this information, using plain language and providing new data aggregation and display functions, such as mapping capabilities



# NTIA-FCC Activities

- Presidential Memo issued on June 28, 2010 on unleashing the wireless broadband revolution
- NTIA to collaborate with the FCC to make available a total of 500 MHz of Federal and nonfederal spectrum over the next 10 years:
  - Suitable for both mobile and fixed wireless broadband use
  - Available to be licensed by the FCC for exclusive use or made available for shared access by commercial and Government users in order to enable licensed or unlicensed wireless broadband technologies to be deployed
- NTIA released spectrum reports in November 2010
  - Fast-track bands – 1695 – 1710 MHz; 3550 – 3650 MHz
  - Plan to Identify 500 MHz of spectrum
- FCC Spectrum Task Force issued public notice on March 8, 2011 inviting comment on frequency bands identified by NTIA
- NTIA Policy & Planning Steering Group focusing on 1755 – 1850 MHz; analysis expected by end of September



# Conclusion

Questions and  
Answers