Spectrum for Broadband

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Summary

1. Mobile broadband is a huge opportunity for America—but we are facing a looming spectrum crunch

2. National Broadband Plan recommends making 500 megahertz (licensed and unlicensed) available for broadband over 10 years and 300 megahertz for mobile use in 5 years:

3. Combination of reallocation, changes to existing rules, and incentive-based mechanisms to free up spectrum for broadband

4. Band-by-band strategy for getting to 300 megahertz

Growing Demand for Mobile Broadband

U.S. has recently tripled stock of spectrum for mobile broadband (from 180 MHz to 540 MHz), but…

- AT&T network traffic up 5,000% over past 3 years
- Smartphone user consumes ~300 MB/month: ~30X a regular cell phone
- PC aircard user consumes ~1.4 GB/month: ~140X a regular cell phone
- Clearwire WiMAX user consumes ~7GB/month: ~700X a regular cell phone
- Smart phone users are now 25% of mobile phone users and growing rapidly
- Analysts predict ~25-50X rise in mobile network traffic in 5 years, accelerating curve

Without sufficient spectrum, costs will go up and quality will go down

Bands Under Consideration

Band	Frequency	Allocated Bandwidth	BB Usable Bandwidth
Broadcast Television	400-700 MHz	294 MHz	120 MHz[1]
Mobile Satellite Service (MSS)	1.6 GHz, 2.0 GHz, 2.4 GHz	139 MHz	90 MHz[2]
Advanced Wireless Services (AWS 2/3)	1.9-2.0 GHz	40-60 MHz	40-60+ MHz[3]
Wireless Communications Service (WCS)	2.3 GHz	30 MHz	20 MHz[4]
Upper 700 MHz D Block	700 MHz	10 MHz	10 MHz[5]
Total			280-300 MHz

Notes:

[1] Over-the-air broadcasts and unlicensed use over remaining spectrum

[2] Interleaved frequencies prevent use of all spectrum for terrestrial broadband

[3] Additional bandwidth depends on outcome of NTIA/FCC 1.7 GHz analysis

[4] Up to 10 megahertz reserved to protect satellite radio and federal aeronautical telemetry

[5] Assumes Congress does not reallocate D Block to Public Safety

Broadcast Television Bands

- Current Situation
  - 294 megahertz in VHF and UHF bands
  - Primary licensees include ~1700 full-power broadcast TV stations, and public safety land mobile users in 11 major metro areas; secondary licensees include ~7,000 low-power TV stations, and wireless microphone users

- Broadband Potential
  - Reallocation of 120 megahertz possible (84 MHz in UHF band), without unduly impacting consumers and public interests served by free, over-the-air television
  - Broadband plan recommends voluntary, incentive auction in which broadcasters receive a share of proceeds (requires authorization from Congress)

Mobile Satellite Service (MSS)

- Current Situation
  - 139 megahertz of MSS spectrum in 1.6 GHz, 2.0 GHz, and 2.4 GHz bands
  - Spectrum is currently licensed to 6 licensees
  - Mostly government users, public safety, maritime, and rural uses
  - Next-generation broadband-capable satellites currently being deployed

- Broadband Potential
  - Under the FCC's "Ancillary Terrestrial Component" (ATC) rules, licensees may deploy terrestrial networks subject to various "gating criteria"
  - ~ 90 MHz could be used for terrestrial broadband
    - 10 MHz Big LEO at 2.4 GHz authorized for ATC and under lease to Open Range
    - 40 MHz in L-Band at 1.6 GHz could be used for ATC pending resolution of international issues
    - 40 MHz S-Band at 2.0 GHz already ATC-authorized and could be co-allocated to terrestrial ("mobile") consistent with International Table of Allocations

Advanced Wireless Services (AWS)

- Current Situation
  - 40 megahertz in 1.9-2.0 GHz band
  - Allocated but not assigned

- Broadband Potential
  - All 40 megahertz could be used for broadband
    - 20 megahertz AWS-3 block
    - 10 MHz AWS-2 H Block
    - 10 MHz AWS-2 J Block
  - AWS-3 issues
    - Paired or unpaired
    - Free broadband proposal
    - Potential pairing with federal spectrum
  - Broadband plan recommends 6-mo. NTIA/FCC deadline on AWS-3 pairing decision
  - Disposition of J Block likely to depend on AWS-3 due to adjacency

Wireless Communications Service (WCS)

- Current Situation
  - 30 megahertz in 2.3 GHz band auctioned in 1997
  - Broadband potential limited due to interference protections to neighboring satellite radio bands
  - Original auction netted $14 million, some licenses have since traded hands with significantly higher valuations (e.g., 2006 Nextwave transaction: $160 million)
  - Licensees generally in compliance with original buildout requirements

- Broadband Potential
  - Band being used for Mobile WiMAX in Korea
  - FCC conducted tests in 2009 that suggest technical rule changes could allow mobile broadband on 20 megahertz while protecting satellite radio operations
  - Fierce opposition from satellite radio industry
  - Already licensed; FCC exploring options to encourage productive use of spectrum as condition of technical rule changes

Upper 700 MHz D Block

- Current Situation
  - 10 megahertz in 700 MHz band
  - Allocated but not licensed
  - Did not meet reserve price in 2008 auction due to rules requiring public-private partnership with public safety
  - Public safety has been advocating for reallocation

- Broadband Potential
  - All 10 megahertz usable for broadband
  - Prime spectrum for LTE due to propagation and tech ecosystem
  - Broadband plan recommends auctioning as commercial spectrum, with Public Safety technical requirements