Recent Spectrum Developments 2013

NSMA
Spectrum Management
May 14, 2013

Overview

- **Changes at the FCC**
- An Extraordinary Year of Activity in Spectrum
- Repurposing Initiatives at the FCC
- Government Repurposing Efforts
- A New Sharing Paradigm
- Other Spectrum Hot Topics

FCC: The Times They are a-Changin'

- Chairman Julius Genachowski (D)
  - Leaving May 17
- President Obama's Pick for FCC Chair… Tom Wheeler (D)
- Commissioner Robert McDowell (R)
  - Leaving soon too
  - Replacement TBD
- Commissioner Mignon Clyburn (D) to be Acting Chair
  - Designated by the President

Tom Wheeler
President Obama's Pick as Next FCC Chairman

- Current
  - Managing Director, Core Capital Partners
  - Chairman, FCC Technology Advisory Committee
- Former
  - President of CTIA
  - President of NCTA
- Author, Mobile Musings blog
  - "It is time to abandon the concept of perfection in spectrum allocation. The rules for 21st century spectrum allocation need to evolve from the avoidance of interference to interference tolerance." (Oct. 2011)

Interim Commissioner Lineup



- Acting Chair
  - Mignon Clyburn (D) (term expires June 2017)
- Commissioners
  - Jessica Rosenworcel (D) (term expires June 2015)
  - Ajit Pai (R) (term expires June 2016)
- The nominations of Tom Wheeler and the replacement for Commissioner McDowell require Senate confirmation

Overview

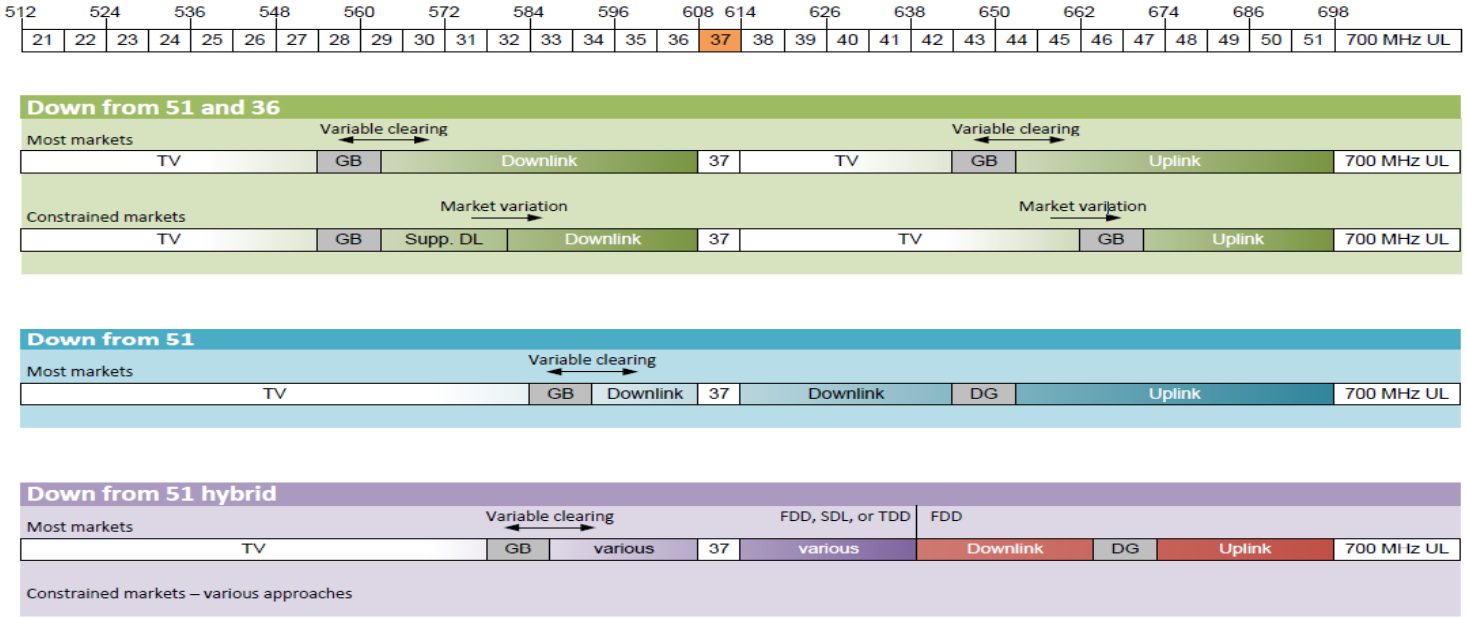
- Changes at the FCC
- **An Extraordinary Year of Activity in Spectrum**
- **Repurposing Initiatives at the FCC**
  - **-- Incentive Auction**
  - **-- WCS**
  - **-- AWS-4**
  - **-- H-Block**
  - **-- T-Band**
  - **-- LightSquared**
  - **-- Globalstar**
- Government Repurposing Efforts
- A New Sharing Paradigm
- Other Spectrum Hot Topics

Broadcast Incentive Auction

- Spectrum Act granted FCC authority for a market-based mechanism to clear incumbent spectrum licensees and assign new licenses
- Three elements:
  - Reverse Auction ("supply side") – incumbents give up spectrum rights for a stated price
  - Repacking the Band – relocating remaining broadcasters to clear spectrum for wireless
  - Forward Auction ("demand side") – cleared spectrum is organized into new licenses and auctioned to highest bidders
- First two-sided spectrum auction in the world
- NPRM issued September 2012
  - 173 different parties filed comments or replies; many more ex partes
- Many complex issues; key spectrum issues include:
  - Band Plan
  - Licensed / Unlicensed

Broadcast Incentive Auction – Band Plan

- Challenges: amount of spectrum recovered and variability among markets



- FCC proposed top band plan: "Down from 51 and Down from 36"
- Commenters – NAB, nearly all of wireless industry – favor "Down from 51"
  - Avoids TV in the duplex gap and risk of intermodulation interference
  - "Down from 51 hybrid" provides even greater flexibility – FDD, SDL, TDD

Broadcast Incentive Auction – Amount of Unlicensed

- Spectrum Act:
  - Permits unlicensed use in guard bands, which "shall be no larger than is technically reasonable to prevent harmful interference"
- NPRM proposes unlicensed use in:
  - 6 MHz+ guard bands between mobile and broadcast
  - Channel 37 and channels currently used by unlicensed wireless microphones
  - Continued use of TV White Spaces
- Under "Down from 51" approach, unlicensed could operate in Guard Bands and Duplex Gap – but what size?
  - Unlicensed proponents urge 12-14 MHz guard bands and 18-22 MHz duplex gap
  - Wireless industry generally urges no more than 10 MHz guard band and no more than 12 MHz duplex gap
- Spectrum Act directive on forward auction revenues:
  - Must pay to clear vacating stations and up to $1.75B to relocate remaining stations
  - Remaining proceeds to pay up to $7B for buildout of FirstNet; deficit reduction

Wireless Communications Service (WCS)

- 2305-2320/2345-2360 MHz
- Difficult history
  - Interference challenges with satellite digital radio audio service (SDARS)
  - May 2010 Order challenged by SDARS and WCS
- FCC Order on Reconsideration
  - Based on AT&T/Sirius XM proposal to promote coexistence of LTE and SDARS
  - Enables 20 MHz, and potentially 30 MHz, for mobile broadband
    - Mobile transmit permitted in 2305-2315 MHz; base transmit in 2350-2360 MHz
    - Remaining blocks at 2315-2320/2360-2365 MHz available for fixed/base station operations at lower power levels
- AT&T roll-up of WCS licenses
  - AT&T now holds maximum 30 MHz of WCS in most areas in country

Advanced Wireless Services (AWS)-4

- 2000-2020/2180-2200 MHz (formerly 2 GHz MSS)
- DISH roll-up (2012)
  - Acquired both 2 GHz MSS licensees, DBSD and TerreStar, gaining full 40 MHz nationwide
- FCC adopted AWS-4 NPRM *and* issued Order in 2012
  - Established flexible use, terrestrial-only rules; no MSS required
  - Adopted technical rules generally based on AWS-1 rules, but with specific modifications designed to protect adjacent-band operations from harmful interference
    - OOBE and power limits to protect prospective H Block downlink operations at 1995-2000 MHz; FCC acknowledged rules may limit usable uplink spectrum to 15 MHz
    - AWS-4 operations must accept interference received from H Block operations

H Block: In the Hopper

- 1915-1920/1995-2000 MHz
- Spectrum Act mandate
  - Auction 1915-1920 MHz and 1995-2000 MHz by February 2015, provided no interference to 1930-1995 MHz PCS downlink band
  - Interference concerns involve Lower H Block transmit causing OOBE and intermodulation interference to PCS mobile receive in 1930-1995 MHz
- FCC H Block NPRM
  - Anticipates a 2013 H Block auction (first of those required under Spectrum Act)
  - Tentatively concludes to license as a paired band and proposed to prohibit high power base station operations in Lower H Block
  - Some carriers believe more testing is needed to ensure that H Block operations do not interfere with adjacent PCS operations
  - DISH holds adjacent AWS-4 spectrum and seeks stricter restrictions due to interference concern for 2005-2010 MHz

T-Band

- 470-512 MHz (TV Channels 14-20)
- Spectrum Act mandate
  - Reallocate from public safety use and auction new initial licenses by 2021; only requires that public safety frequencies be auctioned, not all of T-Band
- Public safety operates in 11 large markets around the U.S.
- FCC Public Notice
  - Does not propose any change to current T-Band rules and does not address how reallocation might interact with broadcast incentive auction
  - Seeks information as to when, how, and under what circumstances FCC should relocate incumbent T-Band users to implement the statute
  - Asks what alternative bands are available; if licensees can migrate operations to FirstNet
  - Asks if FCC should consider relocating non-public safety licensees from T-Band, e.g. into a smaller segment of the T-Band?

LightSquared

- Access to spectrum in the 1525-1559 MHz/1626.5-1660.5 MHz band
- FCC has proposed to suspend LightSquared authority for terrestrial service due to GPS community interference concerns from 1525-1559 MHz band
- LightSquared is pursuing a new approach – 20 MHz L-Band uplink and 1670-1680 MHz for downlink
  - Proposes swap of terrestrial downlink rights in spectrum closest to GPS (1545-1555 MHz) in exchange for terrestrial downlink rights at 1670-1680 MHz
    - Needs access to 1675-1680 MHz, to be shared with Federal users; currently holds rights to 1670-1675 MHz
    - FCC granted special temporary authority for LightSquared to test compatibility with the incumbent meteorological aids at 1675-1680 MHz
  - Proposes to forego use of 1526-1536 MHz as part of swap above, pending a rulemaking to create new rules for terrestrial downlink operations in 1526-1536 MHz
- Genachowski (May 2013): "Clearance will ultimately happen in the L-band for LightSquared. The spectrum will be freed for terrestrial use."

Globalstar

- 1610-1617.775/2483.5-2495 MHz
- Globalstar petition for rulemaking seeks flexibility for terrestrial-only offerings and removal of ATC gating requirements
- Proposed two separate terrestrial service offerings:
  - Near-term terrestrial low power service at 2483.5-2495 MHz and adjacent unlicensed ISM spectrum at 2473-2483.5 MHz
  - Long-term FDD-LTE system at 1610-1617.775 MHz (for mobile device uplink) and 2483.5-2495 MHz (for LTE base station downlink), after rulemaking to ensure co-existence with GPS at 1559-1610 MHz
- Concerns in record: lack of interference studies for an NPRM; elimination of de facto guard band for WiFi; impact on Bluetooth, BRS, BAS; impact on future availability of the band for MSS
- Iridium petition seeks Big LEO reallocation for more TDMA MSS

Overview

- Changes at the FCC
- An Extraordinary Year of Activity in Spectrum
- FCC Repurposing Initiatives
- **Government Repurposing Efforts**
  - 1755-1850 MHz
  - 1695-1710 MHz
  - 5 GHz
- A New Sharing Paradigm
- Other Spectrum Hot Topics

1755-1850 MHz

- NTIA March 2012 report concluded that it was possible to repurpose entire band, but doing so would…
  - Be complex – more than 3,100 frequencies are assigned to 20+ Federal agencies
  - Take significant time – up to ten years or more
  - Come at a high cost – approximately $18B
- NTIA tasked Commerce Spectrum Management Advisory Committee (CSMAC), a FACA, with considering ways to facilitate wireless broadband in 1755-1850 MHz (and 1695-1710 MHz)
  - 4 working groups devoted to various Federal systems in 1755-1850 (e.g. law enforcement surveillance, satellite control links and electronic warfare, tactical radio and fixed microwave, and airborne operations)
  - Target date for some reports extended from January 2013 to June 2013

1755-1780 MHz (Lower 25 MHz)

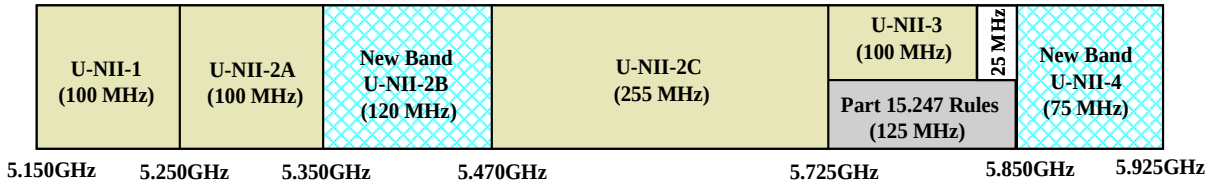
- For years wireless industry has focused on lower 25 MHz, 1755-1780 MHz, to pair with AWS-3, 2155-2180 MHz; this paired band would be contiguous with AWS-1
- Spectrum Act mandate
  - Auction 2155-2180 MHz by February 2015
- March 2013 FCC notification letter to NTIA
  - FCC plans to auction 1755-1780 MHz as early as September 2014 (statutory provision requires 18 month notice to NTIA)
  - FCC wishes to preserve the possibility of pairing with 2155-2180 MHz
- April 2013 NTIA letter in response
  - Agencies' estimated relocation and sharing costs/timing due as early as January 2014
  - FCC must consider potential for a phased-in transition to 1755-1780 MHz
  - If necessary, must identify replacement spectrum, e.g. 2025-2110 and 5150-5250 MHz

1695-1710 MHz

- Spectrum Act Mandate
  - NTIA must identify 15 MHz between 1675-1710 MHz for reallocation from federal to non-federal use and FCC must auction by February 2015 (FCC must separately come up with an additional 15 MHz to auction by February 2015)
- In February 2013, NTIA reaffirmed recommendation to reallocate 1695-1710 MHz for shared commercial use
- CSMAC adopted a report on a spectrum sharing framework for the band
  - Using improved modeling of commercial LTE deployment, provides for commercial systems within the protection zones around meteorological-satellite receive sites, following successful coordination
- CTIA has called on the FCC to pair 1695-1710 MHz with the 15 MHz the FCC must identify; suggests 2095-2110 MHz (currently BAS, Federal satellite), for spectrum contiguous to AWS-1, 1710-1755/2110-2155 MHz
- FCC letter to NTIA: auction 1695-1710 MHz as early as September 2014

5 GHz Unlicensed

- Spectrum Act mandate
  - FCC to begin a proceeding by February 2013 for unlicensed devices in 5.35-5.47 GHz
  - NTIA to study prospect of sharing in 5.35-5.47 GHz and 5.85-5.925 GHz
- NTIA January 2013 report concluded that further analysis is required to determine whether and how identified interference risk factors can be mitigated
- FCC February 2013 NPRM



  - Expand U-NII-1 power and use rules to more robust U-NII-2A or U-NII-3 rules, allowing for wider band operations under uniform rules
  - Impose security features to prevent unlawful modification of devices; improve reliability of Dynamic Frequency Selection ("DFS") by, for example, DFS disabling prevention mechanism for certain U-NII bands devices; consider identifying transmit information
  - Make available another 195 MHz for U-NII use (U-NII-2B and U-NII-4)

Overview

- Changes at the FCC
- An Extraordinary Year of Activity in Spectrum
- FCC Repurposing Initiatives
- Government Repurposing Efforts
- **A New Sharing Paradigm**
- Other Spectrum Hot Topics

President's Council of Advisors on Science and Technology

- PCAST Report calls for a new shared-use regime on Federal spectrum
  - "[C]learing and reallocation of Federal spectrum is not a sustainable basis for spectrum policy due to the high cost, lengthy time to implement, and disruption to the Federal mission"
  - "[T]he norm for spectrum use should be sharing, not exclusivity"
  - PCAST proposes "the spectrum equivalent of wide multi-lane superhighways" – just as cars, trucks, emergency public safety and national security vehicles share roads, large swaths of spectrum, up to 1,000 MHz, can be shared by federal and non-federal users
- Recommendations:
  - Immediately identify 1,000 MHz for sharing (suggests 2.7-3.7 GHz)
  - Develop a new Federal spectrum architecture with very wide spectrum bands, eliminate service-specific Federal allocations, and implement dynamic, real-time sharing while ensuring that primary Federal users are protected
  - Consider receiver performance to enable sharing in the presence of known interference
  - Create incentives for Federal users to use spectrum more efficiently

PCAST's Three-Tiered Spectrum Access Regime

- Federal Primary Access
  - users would register in a database and are guaranteed protection when using the spectrum
  - no right to preclude non-interfering use by Federal or commercial users
- Secondary Access
  - users would be issued short-term priority operating rights with interference protection from opportunistic users
  - users would vacate when a Federal user with Federal Primary Access rights seeks to operate
- General Authorized Access
  - users would have opportunistic access to unoccupied spectrum
  - must have the ability to operate on multiple bands to avoid being obsolete if any one band becomes unavailable

3.5 GHz

- 3550-3650/3700 MHz
  - In 2010 NTIA identified 3550-3650 MHz to repurpose for wireless broadband, subject to exclusion zones to protect incumbents (covering 60% U.S. PoPs)
- NPRM proposes "Citizens Band Service," modeled after PCAST, with a database-driven, three-tiered spectrum access regime
  - Incumbent Access: federal and grandfathered Fixed Satellite users
  - Priority Access: users with "mission critical" quality-of-service needs, e.g. hospitals
  - General Authorized Access: opportunistic use
- Envisioned for small cell supplement to mobile networks; also backhaul
- Record
  - Exclusion zones should be much smaller due to small cells' lower power; exclusion zones should protect incumbents, not provide protection from incumbent operations
  - Middle tier should have open eligibility to broaden the ecosystem
  - Some calls for licensed middle tier, or a two-tiered only approach, to incent investment and assure protections to incumbents as second tier user is readily identifiable

Overview

- Changes at the FCC
- An Extraordinary Year of Activity in Spectrum
- FCC Repurposing Initiatives
- Government Repurposing Efforts
- A New Sharing Paradigm
- **Other Spectrum Hot Topics**

FirstNet

- Spectrum Act
  - Authorized creation of FirstNet to construct, operate, and manage a nationwide public safety wireless broadband network
    - Directs use of private sector for building, operating, and maintaining the network
    - Designates up to $7 billion of auction revenues for network buildout
- FirstNet Leadership
  - Sam Ginn, former AirTouch CEO, chairs Board of Directors
  - Board of Directors comprised of industry veterans, public safety representatives, and Federal officials
  - Bill D'Agostino, former Verizon Wireless executive just announced as General Manager
- Currently issuing RFIs and engaging in outreach to gain further knowledge prior to RFP stage.

Progeny and Unlicensed

- 902-928 MHz
  - Progeny is M-LMS licensee; band also used for Part 15 unlicensed
- 2011 FCC waiver granted Progeny right to a new non-vehicular location service but required it to satisfy field test rule showing new service does not cause "unacceptable levels of interference" to unlicensed devices
  - Rule is intended to provide co-existence among services, even though Part 15 devices are not entitled to protection
  - "unacceptable levels of interference" not defined
- In November 2012, FCC sought comment on a series of field tests
- Record pits Progeny and public safety organizations in favor of the new service against unlicensed advocates including Google, WISPs, EZ-Pass, and utilities that rely on Part 15 devices for communications

Mobile Spectrum Aggregation

- Background:
  - 1994: spectrum cap of 45 MHz of licensed Cellular, PCS, and SMR spectrum
  - 2003: sunset the spectrum cap in favor of case-by-case analysis
  - 2004: two-part screen for case-by-case review:
    - HHI change in market concentration
    - Spectrum screen: Today, whether applicant will hold 151 MHz (roughly one-third) of spectrum "suitable and available" for mobile telephony/broadband in a market where 700 MHz, cellular, SMR, PCS, AWS-1, WCS, BRS is available
- Mobile Spectrum Holdings NPRM
  - Asks whether FCC should retain or modify its current case-by-case analysis (*i.e.*, the spectrum screen) or consider bright-line limits (*e.g.*, spectrum caps)
  - Very broad record:
    - Adopt a below 1 GHz screen or cap
    - Use spectrum "weighting" to count lower band spectrum more heavily
    - Expand the screen to include additional spectrum
- Relevant to Incentive Auction – limits on 600 MHz band?

Receiver Performance

- GAO report, required by Spectrum Act, released in February 2013
  - Current practices may constrain spectrum repurposing going forward
  - Identified 4 options:
    - Greater use of industry-developed standards
    - Interference limits, or setting a level of the unwanted signal that a receiver must tolerate
    - More transparency on spectrum use / system characteristics
    - Promotion of R&D on receiver technologies and modeling
  - Encourages a greater understanding of the practical effects of these options
- FCC Public Notice on Technological Advisory Council White Paper
  - White paper proposed an interference limits policy approach of "harm claim thresholds," i.e., levels of interference which a receiver must tolerate before claiming harmful interference; avoids need to mandate specific performance characteristics
  - Seeks comment on the white paper; information sharing on receiver standards; proper role of the FCC with regard to interference limits; role of multi-stakeholder groups
  - June 21 / July 8 comment dates

Contact

Adam D. Krinsky
akrinsky@wbklaw.com
(202) 383-3340

Wilkinson Barker Knauer, LLP
2300 N Street NW, Suite 700
Washington, DC 20037
www.wbklaw.com