Unofficial Notes:
The 14th Americas Spectrum Management Conference
October 30 and October 31, 2025
Washington, D.C.

SUMMIT RIDGE GROUP

Financial, Valuation, and Industry Consulting

***NOTICE**: These notes were taken live at The 14th Americas Spectrum Management Conference in Washington, D.C., on October 30 and October 31, 2025. They are a good-faith representation of our impressions of the events and what was said by participants. However, we cannot guarantee the accuracy of any specific comment. These notes are not endorsed by the 14th Americas Spectrum Management Conference or participants in any way. This document is not a recommendation to buy or sell any security. Please consult with appropriate professional advisors before making significant business decisions. Comments and corrections are welcome.*

49 West 38th Street, 12th Fl New York, NY 10018 ■ +1 212.433.4800 ■ info@SummitRidgeGroup.com

TABLE OF CONTENTS

Executive Summary **5**

Day One: Thursday, October 30, 2025 ..... **8**

Keynote Presentation - Olivia Trusty, Commissioner, FCC **8**

Keynote Presentation - Arielle Roth, Assistant Secretary of Commerce for Communications and Information; and Administrator, NTIA **10**

Keynote Presentation - Ajit Pai, President & CEO, CTIA **12**

Keynote Presentation - Hon. Cory Gardner, President & CEO, NCTA **14**

Session 1: Refilling America's Spectrum Pipeline **16**

Arpan Sura, Senior Counsel and Chief AI Officer, Office of Chairman Carr, FCC 16

Lynna McGrath, Deputy Associate Administrator, Office of Spectrum Management, NTIA 17

Tom Stroup, President, SIA 18

Alan Norman, Public Policy Director, Meta 19

Rachael Bender, Vice President & Associate General Counsel, Federal Regulatory & Legal Affairs, Verizon 20

Mary Claire York, Vice President and Associate General Counsel of Legal and Regulatory Affairs, NCTA 21

Panel Discussion / Audience Q&A 22

Session 2: Unlocking The Upper C-Band – The Path Forward To Deliver On The 100 MHz Mandate **24**

Susan Mort, Deputy Bureau Chief, Wireless Telecommunications Bureau, FCC 24

Daniel Mah, Vice President, Legal & Regulatory Affairs, SES 24

Chris Wieczorek, Director, Spectrum Policy, T-Mobile US 25

Hank Hultquist, Vice President, Federal Regulatory, AT&T 26

Robert Kelly, Partner, Squire Patton Boggs 26

Panel Discussion / Audience Q&A 26

Session 3: Thinking Point: The Super Bowl, Fifa World Cup & LA28 Olympics – Meeting The Broadcast Requirements Of Major Sporting Events **28**

Speaker: Loren Sherman, Lead Frequency Coordinator, CP Communications, Wireless Microphone Spectrum Alliance (WMSA) 28

Session 4: Presentation - Jay Schwarz, Chief, Space Bureau, FCC **30**

Space Industrial Revolution 30

FCC Focus Areas 30

Panel Discussion / Audience Q&A 30

Session 5: Delivering A Resilient And Scalable D2D Ecosystem – Progress To Date And The Path Ahead **31**

Johanne Lemay, Co-President, LYA 31

Veena Rawat, Senior Spectrum Advisor, GSMA 31

Pascale Dumit, Director, International Spectrum Policy, T-Mobile 32

Barbee Ponder, General Counsel & Vice President of Regulatory Affairs, Globalstar 33

George Giagtzoglou, Vice President Strategy & Marketing, Omnispace 33

Chris Woolford, Director, International Spectrum Policy, Ofcom UK 33
Panel Discussion / Audience Q&A 34
Session 6: Balancing Innovation And Protection: Is It Time To Re-Examine That Rules That Govern Satellite Sharing And Co-Existence? 35
Adam Cassady, Principal Deputy Assistant Secretary and Deputy Administrator, NTIA 35
Kalpak Gude, Head of Global Regulatory Affairs, Amazon Project Kuiper 35
Daniel Mah, Vice President, Legal & Regulatory Affairs, SES 37
Hazem Moakkit, Regulatory Affairs, AscendArc 37
Panel Discussion / Audience Q&A 38
Additional Technical and Policy Points 38
Session 7: The Continued Evolution of CBRS – What Are The Latest Updates, And Where Next? 39
Josh Baggett, Head of Global Spectrum Policy, HPE 39
Jason Wallin, Senior Principal Architect, John Deere & Board Member, OnGo Alliance 39
Justin Markle, Senior Vice President of Wireless Partnerships & Development, Comcast 40
Jeff Stewart, Assistant Vice President, Public Policy, AT&T 41
Patrick Welsh, Vice President of Federal Regulatory and Legal Affairs, Verizon 42
Panel Discussion / Audience Q&A 42
Day Two: Friday, October 31, 2025 44
Session 8: Delivering Global Spectrum Coordination And Leadership 44
Derek Khlopin, Deputy Associate Administrator, Spectrum Planning and Policy, NTIA 44
Tom Sullivan, Chief, Office of International Affairs, FCC 44
Glenn Fallas, Director General of Quality and Spectrum, SUTEL Costa Rica 45
José Ayala, Chairman, Spectrum Group for CITEL Region, GSA 45
Mike Mullinix, Vice President, Regulatory Affairs, CTIA 46
Eiman Mohyeldin, Global Head of Spectrum Standardization, Nokia 47
Panel Discussion / Audience Q&A 47
Session 9: International Case Study: The Path To 6G In Europe 48
Speaker: Alexander Kühn, Head of Section, International and National Spectrum Management, BNetzA (Germany) 48
Session 10: Delivering 6G Leadership – Powering The Next Generation Of Connectivity 49
Charles Cooper, Associate Administrator for Spectrum Management, NTIA 49
Martin Doczkat, Chief, Electromagnetic Compatibility Division, OET, FCC 49
Alexander Kühn, Head of Section, International and National Spectrum Management, BNetzA (Germany) 49
Noman Alam, Director, 5G Solutions, Ericsson 50
Veena Rawat, Senior Spectrum Advisor, GSMA 50
Aspasia Paroutsas, Vice President, Federal Regulatory Affairs, Qualcomm Inc. 50
Panel Discussion / Audience Q&A 50

Session 11: Balancing Exclusive Licensing, Sharing Regimes, And Unlicensed Spectrum For Federal And Commercial Users 52
Andrew Hendrickson, Chief, Office of Engineering and Technology, FCC 52
Paul Ransom, Acting Chief, Strategic Planning Division, Office of Spectrum Management, NTIA 52
Joe Kochan, Chief Executive Officer, National Spectrum Consortium 53
Andy Clegg, Chief Technology Officer, WinnForum 54
Ben Rolfe, CTO and Comptroller, UWBA 55
Panel Discussion / Audience Q&A 55
Session 12: The Evolving Upper 6 GHz Band Ecosystem: Emerging Use Cases, And The Policy Path Ahead 57
Kristine Hackman, Public Policy, Connectivity, Amazon 57
Audrey Mikola, Vice President, Regulatory Affairs, Charter 57
Martha Suarez, President, Dynamic Spectrum Alliance 58
Campbell Massie, Director of Public Policy for North America, GSMA 59
Panel Discussion / Audience Q&A 59
Session 13: Spectrum Expanding Connectivity To Rural And Tribal Communities – Ensuring A Responsive, Streamlined, And Inclusive Approach To Closing The Digital Divide 61
Ann Keeney, Senior Vice President, Glen Echo Group 61
Brooke Donilon, Chief of Staff, NTIA 61
Joseph Calascione, Chief, Wireline Competition Bureau, FCC 62
Allan Ingraham, Principal, Secretariat 63
Panel Discussion / Q&A 64

EXECUTIVE SUMMARY

The 14th Americas Spectrum Management Conference (2025) focused on the operational phase of U.S. spectrum policy following the passage of the One Big Beautiful Bill Act ("O3B ACT") and the restoration of FCC auction authority. Senior officials from the FCC, NTIA, and industry addressed implementation timelines, federal-commercial coordination, and the global harmonization efforts leading to WRC-27. Discussions emphasized the importance of execution over planning, turning legislative goals into measurable outcomes, while exploring the convergence of terrestrial, satellite, and AI-enabled systems that will define spectrum policy in the 6G era.

Key Takeaways:

1. **Spectrum Pipeline Execution and Governance**: The O3B Act mandates the release of 800 MHz of spectrum by 2034 and identifies specific mid-band targets for near-term action, including the Upper C-Band (3.98–4.2 GHz). FCC Commissioner Olivia Trusty and NTIA Administrator Arielle Roth highlighted that coordination between agencies is now the primary determinant of success. The FCC confirmed a forthcoming Notice of Proposed Rulemaking to repurpose up to 180 MHz in the Upper C-Band, a critical first test of the pipeline's credibility.
2. **Upper C-Band Progress and Mid-Band Momentum**: The FCC, satellite operators, and carriers supported an incentive-based transition model modeled on the 3.7 GHz clearing. SES and Intelsat emphasized that clearing beyond 100 MHz is feasible with adequate reimbursement and acceleration payments. Mobile operators urged a timeline discipline, noting that auction value depends on usable, on-delivery spectrum rather than paper allocations. Consensus: approximately 4–6 years from rulemaking to full commercial deployment.
3. **Shared Spectrum and CBRS 2.0 Validation:** CBRS 2.0 has matured into a stable enterprise platform, with more than 420,000 base stations and $14 billion in investment. Revisions to Dynamic Protection Areas and Spectrum Access System (SAS) coordination expanded usable coverage and eliminated reported federal interference events. Policymakers now view CBRS as the blueprint for future dynamic sharing in the 6 GHz and 7 GHz bands. [**AM Comment**: Relocating CBRS allows for a large contiguous block of C-band; however, it would be difficult to relocate in the CBRS band.]
4. **Satellite Modernization and EPFD Reform**: FCC Space Bureau Chief Jay Schwarz announced a "spectrum-abundance agenda" targeting 20 GHz of potential satellite optimization through elimination of allocation, technical, and bureaucratic inefficiencies. A central debate emerged over Effective Power Flux-Density (EPFD) limits: Amazon's Project Kuiper and LEO operators argued existing constraints waste capacity, while SES and AscendArc defended them as

essential for GEO reliability and global coordination. NTIA supported a review but warned against destabilizing established frameworks. [**AM Comment**: The EPFD dispute underscores how commercial competition is increasingly argued through engineering language.]

5. **Direct-to-Device (D2D) Ecosystem Growth:** The FCC's Supplemental Coverage from Space (SCS) framework has moved from concept to deployment. T-Mobile and SpaceX launched a commercial D2D text service in mid-2025, while Globalstar and Apple expanded emergency SOS to hundreds of millions of handsets. Industry forecasts exceed $4 billion in annual D2D revenue by 2035. North American, Canadian, and U.K. regulators reported converging policies ahead of WRC-27, positioning the U.S. as a leader in hybrid terrestrial-satellite integration.
6. **6 GHz Policy Divergence and Wi-Fi 7 Expansion:** The U.S. decision to allocate the entire 6.425–7.125 GHz band for unlicensed use continues to drive Wi-Fi 6E/7 leadership and device-scale economics. Amazon, Charter, and the Dynamic Spectrum Alliance praised this policy for enabling 320 MHz channels, which are critical to high-capacity, low-latency networks. In contrast, the GSMA noted that approximately 60% of global markets, including China and the EU, favor the licensed use of 6 GHz for 6G mobile use. Divergent global frameworks may increase equipment costs and slow harmonization. [**AM Comment**: U.S. unlicensed-only strategy remains a competitive advantage in innovation but risks fragmentation in global standards.]
7. **Global Coordination and WRC-27 Preparation**: Representatives from NTIA, FCC, and CITEL urged an early regional consensus to strengthen the Americas' negotiating position ahead of WRC-27 in Shanghai. Mid-band harmonization at 4 GHz and 7 GHz will shape international competitiveness. CTIA warned that China now controls nearly four times the mid-band spectrum of the U.S.; harmonizing these ranges could deliver an estimated $300 billion economic benefit over 10 years.
8. **6G Leadership and AI Integration**: Panelists confirmed alignment with the IMT-2030 framework and projected that each 6G operator will require 200–400 MHz of contiguous mid-band spectrum. NTIA announced the Mission LA 2028 demonstration to showcase AI-enabled 6G networks during the Los Angeles Olympics. The GSMA and Qualcomm highlighted AI-native architectures, energy efficiency, and integrated sensing as key defining features of 6G. Delaying 6G allocations beyond WRC-27 would postpone global commercialization. [**AM Comment**: Little acknowledgement of Chinese telecom equipment advances, risking U.S. leadership in 6G regardless of additional spectrum rollout initiatives.]

9. **Dynamic Spectrum Sharing, AI, and Federal Coordination:** The WinnForum introduced Highly Dynamic Spectrum Sharing (HDSS), capable of sub-minute coordination through distributed sensing and AI. NTIA's National Spectrum Consortium promoted a "prototype-to-policy" loop linking R&D demonstrations to regulatory reform. Federal users, including the Navy, now operate CBRS-based systems, demonstrating confidence in the coexistence of these systems. AI is expected to accelerate coordination but not replace transparent engineering review. [**AM Comment**: Industry participants suggest that 6G will drive spectrum use; however, how much spectrum will be used is unclear.]
10. **Digital Divide and Deployment Efficiency:** The NTIA's $42.45 billion BEAD Program and FCC's $9 billion 5G Fund are advancing universal service objectives. Fifty-two states have submitted their final BEAD plans; automated environmental reviews have reduced permitting time from months to hours. Initial analysis indicates approximately $19 billion in savings resulting from streamlined procedures. Programs reaffirm technology neutrality, fiber, fixed wireless, and LEO satellite, each suited to specific geographies. [**AM Comment**: Refocusing BEAD on deployment and hyper-focused on efficiency marks a pragmatic pivot away from the earlier fiber-only approach.]
11. **Policy Outlook:** The conference underscored a shift from planning to execution. The O3B Act provides a statutory framework; Upper C-Band implementation, CBRS performance, and BEAD deployment will measure success. The consensus across government and industry is that U.S. spectrum leadership now depends on three pillars: speed, coexistence, and credibility. Effective policy execution will be judged not by MHz auctioned but by how rapidly spectrum policy translates into real-world connectivity, innovation, and trust.

DAY ONE: THURSDAY, OCTOBER 30, 2025

KEYNOTE PRESENTATION - OLIVIA TRUSTY, COMMISSIONER, FCC

- Opening Remarks
  - Welcomed innovators, policymakers, and partners shaping connectivity across the hemisphere.
  - Emphasized that this conference is a "touchstone for the global spectrum community where technology meets policy."
  - Noted agenda topics: refilling America's spectrum pipeline under the O3B Act, unlocking the Upper C-Band, direct-to-device satellite ecosystems, and evolving shared-spectrum models like CBRS.
- The New Spectrum Moment
  - "Spectrum has always been the lifeblood of connectivity."
  - Described the spectrum as a strategic asset underpinning commerce, security, and competitiveness.
  - The O3B Act aims to refill the spectrum pipeline, modernize FCC-NTIA coordination, and enable emerging technologies (5G, 6G, AI, IoT).
  - "The decisions we make here in Washington ripple across continents."
- America's Collaborative Spectrum Leadership
  - Highlighted coordination among the FCC, NTIA, industry, CITEL, and ITU.
  - U.S. leadership grounded in:
  - Evidence-based spectrum management,
  - Flexible-use policies, and
  - Technology-neutral frameworks.
  - Warned that "the stakes are rising" as regions race to secure mid-band and satellite advantages.
- Global Stakes of Spectrum Decisions
  - WRC-27 will test the balance between national priorities and global harmonization.
  - Decisions on 6 GHz, UHF, and satellite–terrestrial integration will shape global competitiveness.
  - "A fragmented spectrum world is a race to the bottom, where innovation slows and consumers lose."
- Lessons from the Americas – Models That Work
  - CBRS: Demonstrates how federal, commercial, and unlicensed users can coexist.
  - SCS Framework: U.S. leading in direct-to-device integration satellites that complement terrestrial networks.
  - O3B ACT: Balances innovation and security through data-driven policy.
- Future of Satellite and Non-Terrestrial Networks

  - Growth in NGSO constellations and integrated systems is transforming global communications.
  - “In the U.S., we believe in open markets and open competition.”
  - Cited regulatory asymmetry abroad, European restrictions hinder U.S. providers.
  - Called for “reciprocal access, transparent standards, and open competition.”
- The Road to WRC-27 and Beyond
  - U.S. vision includes:
  - Championing flexible-use policies,
  - Supporting harmonization where beneficial,
  - Ensuring progress “does not stop at regulatory borders.”
  - Cooperation through CITEL remains key for regional alignment.
  - *“Spectrum leadership in the next decade must be measured not just in megahertz or auction dollars, but in openness, collaboration, and trust.”*
- Closing Message
  - Urged participants to make the conference a springboard for global cooperation.
  - “When we lead with fairness, innovation, and openness, we don’t just connect devices, we connect people, nations, and the future.

KEYNOTE PRESENTATION - ARIELLE ROTH, ASSISTANT SECRETARY OF COMMERCE FOR COMMUNICATIONS AND INFORMATION; AND ADMINISTRATOR, NTIA

- Opening Remarks
  - "Each year, this event brings together leaders… to tackle one of the defining challenges of our time: how to manage and maximize the spectrum that powers our connected lives."
  - Acknowledged FCC Commissioner Olivia Trusty's leadership and remarks.
  - Noted a "dramatic shift" in U.S. spectrum policy under the new administration, "a pivot from plans to action."
- The O3B Act
  - "Identifying 200 MHz for mobile broadband in two years is our first target; beating it is the ambition."
  - OB3 is the cornerstone of U.S. spectrum policy, designed to push America to the frontier of technology and prevent the "massive opportunity costs of underutilized frequencies."
  - Emphasized spectrum as national strength: "Technological strength equals national strength."
  - Warned that underutilization risks ceding leadership in 5G, 6G, AI, drones, and quantum-secure communications.
- Core Principles for NTIA Spectrum Policy
  - Not Zero-Sum: "We need more spectrum access for everyone." Both federal and commercial interests must advance.
  - Streamlined Government: "Bureaucracy should never stand in the way of progress." Coordination must accelerate innovation.
  - Technology Neutrality: "Not just a slogan, it's an existential necessity." Policy should promote flexibility and experimentation rather than lock in single models.
  - These principles will "lead the world into the 6G era, empowering entrepreneurs, strengthening national security, and driving prosperity."
- Launching Innovation – The Space Frontier
  - "No frontier demands these principles more than space, where innovation moves at orbital speed and bureaucracy still moves at dial-up."
  - Satellites underpin weather, GPS, broadband, and defense communications.
  - NTIA launched the Space Launch Frequency Coordination Portal to streamline coordination for launch frequencies.
    - Enables faster, transparent approvals for SpaceX, ULA, and other launch providers using congested S-band spectrum.
    - Planned expansion into a one-stop tool for all spectrum coordination requests.

    - “More efficient approvals mean faster innovation.”
- America’s Leadership in Commercial Space
    - NTIA oversees the federal and commercial space systems, including SpaceX’s Gen2 Version 3 application, which covers thousands of MHz.
    - “Complexity is no excuse for delay; innovation demands urgency.”
    - Highlighted the rise of direct-to-device satellite technology as central to the 6G vision: “Consumers don’t care whether their signal comes from a tower or a satellite; they just need it to work.”
    - Stressed that spectrum access for the private sector is not a zero-sum loss for federal users.
    - The military increasingly relies on commercial 5G, drones, and LEO constellations.
    - NASA’s Artemis program uses commercial broadband spectrum technologies to power lunar and future Mars missions.
    - “Spectrum innovation is literally powering America’s return to space.”
- Back to Earth – The 6 GHz Band Debate
    - Clarified misinformation: “OB3 does not alter U.S. policy for the 6 GHz band.”
    - U.S. policy remains unlicensed use, where “American companies lead the world.”
    - Noted China’s push to license 6 GHz for 5G, but without comparable market success.
    - The U.S. is “building a growing coalition” of nations supporting the Wi-Fi model.
    - “While 6 GHz is not on the WRC-27 agenda, we will defend its critical role in powering global Wi-Fi connectivity.”
- The Decade Ahead – Integrated Networks
    - Envisioned “an integrated system of networks” delivering seamless connectivity, situational awareness, and intelligent systems.
    - “We can only realize this vision if we get spectrum policy right, minimize bureaucracy, stay technologically neutral, and empower American innovation.”
- Closing Message
    - “The world has always looked to America to lead in spectrum management. At NTIA, we are determined to ensure it continues.”

KEYNOTE PRESENTATION - AJIT PAI, PRESIDENT & CEO, CTIA

- Opening Remarks
  - Light-hearted introduction at the National Press Club; framed the session around the themes of optimism and collaboration.
  - Recalled the "Ford to City: Drop Dead" headline as a contrast to today's cooperative approach to public-resource use.
- AI and Wireless Convergence
  - "We are building a wireless network for AI, with AI."
  - Highlighted active U.S. industry partnerships:
    - AI-RAN Innovation Center (T-Mobile, Ericsson, Nokia, NVIDIA)
    - 6G Innovation Forum (Verizon with Ericsson, Samsung, Meta, Nokia, Qualcomm)
    - AT&T is partnering with OpenAI and Microsoft Azure for network modernization.
- Government's Role and Policy Integration
  - Commissioner Carr says: "Innovation is moving faster than ever; policymakers must keep pace."
  - The Ferris Doctrine suggests that the government should enable, not obstruct, innovation ("Life moves pretty fast…").
  - Connected the AI Action Plan and the O3B Act as parts of one national strategy.
  - Credited bipartisan leadership for restoring FCC auction authority and establishing the 800 MHz spectrum goal.
- 800 MHz Pipeline and Urgency
  - "800 MHz is a floor, not a ceiling."
  - Warned that U.S. data demand (30%+ annual growth) will soon exceed existing spectrum supply.
  - Licensed fixed wireless now accounts for 99% of net broadband additions.
  - "Failure to act decisively risks a significant bottleneck to AI and wireless ambitions."
- Four Policy Directives
  - Keep All Options on the Table: Avoid categorical exclusions of Defense bands; evaluate the highest-value use.
  - Go Big on C-Band: Support Chairman Carr's plan to auction up to 180 MHz by 2027. "100 is the bare minimum."
  - Study Quickly, Set Bold Goals: Prioritize 2.7, 4, and 7 GHz bands; the 4 GHz band is "the key to 800 and beyond."
  - Lead Globally at WRC-27: Enter the 2027 conference with a U.S. vision for global harmonized spectrum around 4 and 7 GHz.
- Takeaway:
  - Framed AI-wireless integration as the next economic and strategic frontier.

- If we keep all bands on the table, go big on C-Band, study boldly, and lead globally, we can restore and extend U.S. leadership in wireless.

KEYNOTE PRESENTATION - HON. CORY GARDNER, PRESIDENT & CEO, NCTA

- Opening Remarks
  - Shared personal story of early fascination with CB radios, his first exposure to the spectrum.
  - Called for an “all-of-the-above” approach that fuels innovation without trade-offs.
  - “Spectrum has become central to the cable industry just as it has for the country.”
- Spectrum Policy
  - Advocated a holistic framework balancing licensed, shared, and unlicensed access.
  - “America needs it all with multiple avenues of spectrum access to meet demand.”
  - Warned that old high-power-only models won’t sustain innovation in the AI era.
- Cable’s Role in the Wireless Ecosystem
  - Cable is now the fourth-largest wireless competitor and runs the largest Wi-Fi networks nationwide.
  - “Cable isn’t just cable, it’s connectivity.”
  - Wireless and Wi-Fi are indispensable to modern broadband delivery.
- Wi-Fi as a Strategic Asset
  - “Wi-Fi is absolutely critical to the nation’s future.”
  - Carries 80–90 % of all data traffic and connects 21 devices per U.S. household.
  - President Trump’s 2020 decision to open the 6 GHz band created $10.3 trillion in value (2023–2027).
  - “Wi-Fi is America’s greatest wireless advantage in competition with China.”
- Global Competition and Policy Stakes
  - Warned that the CCP seeks to block Wi-Fi expansion to favor Huawei and licensed cellular dominance.
  - “We must decide whether to let China set the rules or continue our own.
  - Called global Wi-Fi leadership a U.S. strategic advantage requiring vigilance.
- Next Spectrum Frontier: Lower 7 GHz (7125–7250 MHz)
  - Proposed the Lower 7 GHz band as the logical next step in the Wi-Fi pipeline.
  - “Just as we plan for licensed spectrum, we need a pipeline for Wi-Fi.”
- Shared-Spectrum Success: CBRS
  - The Citizens Broadband Radio Service demonstrates that coexistence is effective, with $14 billion invested and a 200% increase in devices (2021–2024).
  - “CBRS democratized private wireless networks from hospitals to factories.”
  - Opposed “changing the rules mid-game” or restricting shared bands.
- Policy Imperatives
  - Protect Wi-Fi’s growth and expand shared-spectrum frameworks.
  - “It is not time to rearrange the deck chairs; it’s time to unlock new opportunities.”

- Spectrum policy must sustain innovation, competition, and AI-ready broadband.

- Closing Message
  - “We’re in an AI-enabled world; the right spectrum policies will keep America ahead.”

SESSION 1: REFILLING AMERICA'S SPECTRUM PIPELINE

MODERATOR: Ruth Milkman, Partner, Quadra Partners LLC

PANELISTS:

- Lynna McGrath, Deputy Associate Administrator, Office of Spectrum Management, NTIA
- Arpan Sura, Senior Counsel and Chief AI Officer, Office of Chairman Carr, FCC
- Tom Stroup, President, SIA
- Alan Norman, Public Policy Director, Meta
- Rachael Bender, Vice President & Associate General Counsel, Federal Regulatory & Legal Affairs, Verizon
- Mary Claire York, Vice President and Associate General Counsel of Legal and Regulatory Affairs, NCTA

SESSION:

Arpan Sura, Senior Counsel and Chief AI Officer, Office of Chairman Carr, FCC

- Historical contrast:
  - At the start of 2023, the U.S. was, in his words, in a "spectrum wasteland."
  - The FCC had lost its auction authority in Sept 2023.
  - Key mid-band initiatives (lower 3 GHz) were stalled due to the absence of political will to release any federal spectrum for commercial use.
- Turning point actions since 2023:
  - FCC Notice of Inquiry on Upper C-Band.
  - "Kick-started an important conversation that's paying dividends today."
  - White House ten-week review of 600 MHz of federal spectrum.
- Passage of the O3B ACT:
  - Three core outcomes of O3B ACT:
  - Restoration of FCC auction authority after its 2023 expiration.
  - Political compromise excludes two military bands from near-term study.
  - Creation of a true spectrum pipeline with firm clearing targets, hard deadlines, and named candidate bands.
- Quantitative mandates:
  - FCC must release 300 MHz by 2034; at least 100 MHz from Upper C-Band by July 27 (2027).
  - "The Upper C-Band is our first, best, and potentially only shot to release a large amount of mid-band spectrum by the end of this administration."
- Upcoming rulemaking:
  - Announced that the FCC will release a draft Notice of Proposed Rulemaking for the Upper C-Band later today.
  - To be voted on at the Nov. 20 open meeting, the proposal will seek comments on auctioning up to 180 MHz for 5G and 6G.
- Tailwinds supporting success:

    - Not starting from scratch (lessons from lower 3 GHz work).
    - Strong White House direction and cooperation between NTIA and FAA.
    - "Good industry dialogue, many new options for spectrum policy have become available."
- Satellite initiatives:
    - Active proceeding to modernize rules governing 20,000 MHz of fixed-satellite spectrum.
    - Emphasized the satellite's role in meeting broadband demand.
- Sharing and efficiency:
    - Investigating new coexistence models (e.g., 37 GHz federal + non-federal band).
    - "We want to squeeze more juice out of that apple."
- Licensing commitments:
    - Reaffirmed the U.S. decision to make 6 GHz unlicensed in 2020 and to continue building on that.
- Closing themes:
    - "We can't stand on the aircraft carrier and declare mission accomplished."
    - Urged continued momentum and speed: "Time has economic value; every day of delay is money lost."
    - Drew direct links between generational leadership and economic impact:
    - 4G → app economy; 5G → fixed-wireless competition; 6G → AI and edge innovation.

Lynna McGrath, Deputy Associate Administrator, Office of Spectrum Management, NTIA

- Confirmed NTIA received "a good bit of homework" from O3B ACT.
    - Mandate: identify 500 MHz of spectrum for reallocation.
    - 200 MHz → identified within 2 years and auctioned within 4.
    - Remaining 300 MHz → identified within 4 years and auctioned within 8.
- Constraints imposed by law:
    - Only study bands between 1.2 GHz and 10.5 GHz.
    - Explicitly exclude 1.3–1.45 GHz and 7.125–8.4 GHz.
    - Prioritize "full-power commercial licensed use."
    - Must maximize auction revenue.
- Specific bands Congress ordered studied (by Sept 30, 2034):
    - 2.7–2.9 GHz
    - 4.4–4.9 GHz
    - 7.25–7.4 GHz
- Bands announced for study (Sept 10 NTIA Symposium):
    - 1675–1695 MHz
    - 2700–2900 MHz
    - 4400–4940 MHz

    - 7125–7400 MHz
- Parallel coordination:
    - NTIA is working closely with the FCC on the Upper C-Band proceeding.
    - Life at NTIA is totally boring right now.
    - O3b Act targets are aggressive and overlay growing federal demand.
- Federal spectrum needs are increasing, not static.
    - Executive Orders on Golden Dome (military architecture), drones, and border security.
- Band-by-band technical overview:
    - **1675 - 1695 MHz**: Incumbent GOES weather satellites; potential to expand wireless 3 operations as next-gen weather satellites launch.
    - **2700 - 2900 MHz:** Hosts air-surveillance and NEXRAD radars (≈250 FAA/DoD + 150 NOAA). Critical to air traffic control and weather alerts. Relocation requires major modernization; however, the FAA-funded project is not.
    - **4400 - 4940 MHz:** Complex mix, 15 federal agencies, point-to-point links, drones, law-enforcement video, tactical radios, land/sea/air. New study area with little prior work.
    - **7125 - 7400 MHz:** three sub-bands (1) microwave links (11 agencies), (2) NASA/NOAA satellite uplinks (7145–7250), (3) military X-band downlinks + NSF radio astronomy.
- Measurement of success:
    - Traditional metrics (e.g., auction revenue, MHz-pop) do not capture federal mission value.
    - Federal use is measured by mission effectiveness, including safe air travel, weather warnings, and national security.
    - Develop hybrid metrics that reflect both economic and mission outcomes.
- Operational next steps:
    - Continue joint work with FCC on CBRS acceleration and other shared-spectrum efficiency efforts.

Tom Stroup, President, SIA

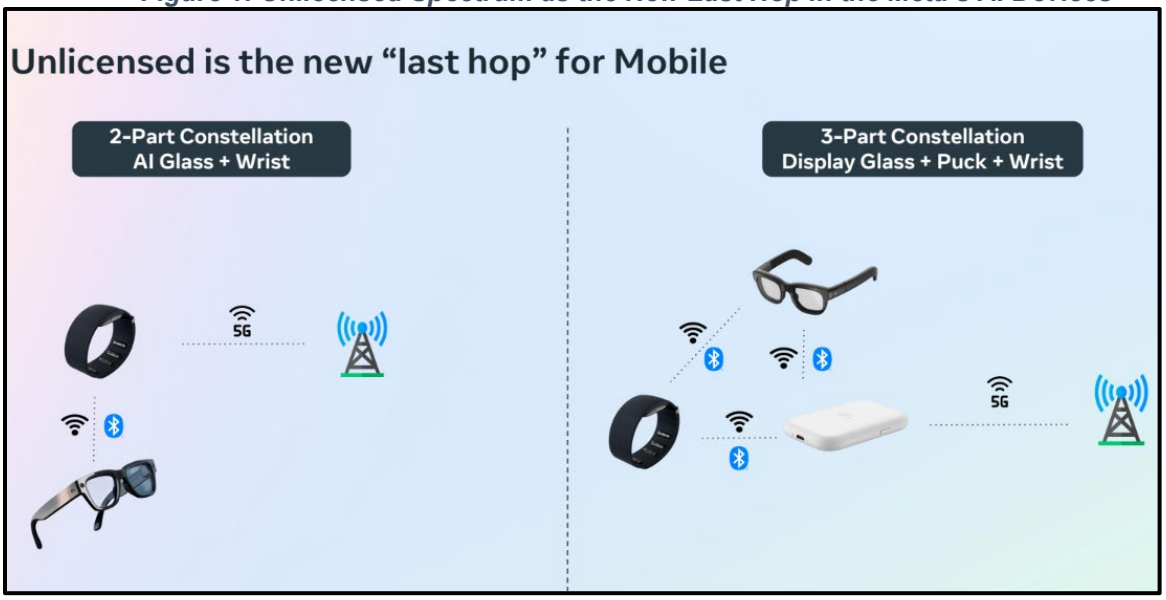
- Industry growth:
    - ~1,400 operational satellites a decade ago → 15,000 by end 2025.
    - Analysts project a range of 43,000 to 100,000 within the next 10 years.
    - Capacity growth has “blown through our projections”: the 150 Tbps target for 2028 has already been met.
- Innovation across the value chain: launch, manufacturing, earth stations, and services.
- Demand drivers: consumer broadband, mobility (aviation & maritime), and direct-to-device services.
- Welcomed partnerships between wireless and satellite operators.

- Critical public functions:
    - Disaster recovery connectivity and Earth imaging (pre-/post-hurricanes).
    - Defense and security applications emphasized the need for U.S. leadership amid China's Belt and Road Initiative, also known as the Space Silk Road.
- FCC's licensing modernization and earth-station reforms help the satellite industry.
- Commended NTIA for updated coordination processes and expanded eligibility.
- Highlighted the importance of commercial–federal cooperation given shared bands.
- Golden Dome architecture will be space-based, requiring reliable access to the spectrum.
- Concluded by thanking both FCC and NTIA for improved collaboration and industry engagement. [**AM Comment**: Golden Dome may boost satellite industry growth, but it is unclear how much it will benefit SpaceX versus other players.]

Alan Norman, Public Policy Director, Meta

- Framed his remarks around how spectrum enables the next generation of wearable and AI-assisted devices.
- Introduced Meta's Orion device, displaying radios, batteries, cameras, sensors, and memory – "a picture of what's coming."
- Examples of Meta wearables already on the market:
    - Ray-Ban Stories: glasses enabling phone calls, photography, and real-time translation; integrated with external sensors such as Garmin fitness trackers.
    - Ray-Ban Display: augmented-reality glasses featuring an on-lens display, audio, and a camera; supports cloud connectivity for AI assistance, navigation, inline translation, music, and hands-free camera control.
- Devices evolve into personal AI assistants capable of remembering interactions, maintaining privacy, providing context-aware help, and even "auto-complete for life."
- Spectrum implications:
    - Unlicensed is the new last hop for mobile. (see Figure 1 below)

Figure 1: Unlicensed Spectrum as the New Last Hop in the Meta's AI Devices



Source: Meta

  - Just as home and office connectivity relies on Wi-Fi and Bluetooth, *mobile wearables* will too.
  - Therefore, 6 GHz unlicensed spectrum (Wi-Fi 6E/7) and the OB-3A pipeline are both vital.
  - Lower-frequency (< 6 GHz) bands offer superior economics and indoor/outdoor performance; these should be prioritized for expansion.
- Policy message:
  - Meta is committed to supporting both 6 GHz unlicensed and OB-3A spectrum development.
  - Applauded the U.S. for maintaining a balanced, innovation-friendly roadmap.
  - "The U.S. framework is a fantastic roadmap that maintains balance between innovation and protection." [**AM Comment**: Interesting to see many of the Big Tech giants in the spectrum conference.]

Rachael Bender, Vice President & Associate General Counsel, Federal Regulatory & Legal Affairs, Verizon

- Legislative context:
  - Senator Cruz initially proposed 600 MHz; the final Act delivered 800 MHz, a "down payment on our wireless future."
  - Restored FCC auction authority after lapse.
- Strategic significance:
  - Clear 800 MHz requirement provides *direction, clarity, and planning certainty* for industry stakeholders.
  - "In just a few short months, we've gone from no auction authority and no pipeline to a re-established national commitment."

    - U.S. and allies must demonstrate leadership at the World Radiocommunication Conference (WRC) and globally.
- Implementation focus:
    - "It's not just about identifying and auctioning these bands – it's about the timeline for access so we can deploy."
    - Urged continued momentum on both Upper C-Band and NTIA-designated study bands.
    - Welcomed Arpan Sura's announcement of the upcoming FCC draft.
    - Deployment readiness and timely spectrum access will define success.
- Forward-looking applications:
    - 5G/6G, private networks, fixed-wireless access, AI, edge computing, and new sensing capabilities all depend on fresh spectrum.

Mary Claire York, Vice President and Associate General Counsel of Legal and Regulatory Affairs, NCTA

- Represented cable and broadband operators, emphasizing their diverse spectrum use: unlicensed Wi-Fi, shared, and exclusive licensed.
    - "Cable connects customers in urban, suburban, and rural areas through a mix of technologies."
- Core message:
    - U.S. spectrum leadership has historically relied on the expansion of creative capacity.
    - The OB-3A framework continues this approach.
- Illustrative cases:
    - Opening the 6 GHz band for unlicensed Wi-Fi created billions in economic value.
    - CBRS PAL auction saw 10 times more winning bidders than traditional exclusive auctions (e.g., 3.45 GHz).
    - Tiered access (PAL + GAA) enabled wide participation and new entrants.
    - Approximately 70% of CBRS devices now operate in rural census blocks, helping to fulfill the FCC's goal of inclusivity.
    - Use cases include universities, tribal lands, sports arenas, industrial plants, and hospitals.
- Complementarity among technologies:
    - "Up to 90 % of mobile data travels over Wi-Fi."
    - 7 GHz band expansion (bottom 125 MHz) is needed to complete four contiguous 320 MHz Wi-Fi 7/8 channels.
    - "AI will start and end on Wi-Fi."
- Policy stance:
    - Support continued shared/unlicensed access.
    - Warned against reallocations that would disrupt CBRS or Wi-Fi ecosystems.
    - "More spectrum for commercial use is great, but we must let existing technologies reach their full potential."

Panel Discussion / Audience Q&A

- Question: Excluding Upper C-Band, which band is most important or realistic near-term?
  - 4 GHz band – better economics, global harmonization, and strong mobile ecosystem alignment.
  - All three congressionally identified bands (2.7–2.9, 4.4–4.9, 7.25–7.4 GHz) have merit; 4 GHz offers the largest contiguous bandwidth.
  - CBRS could potentially satisfy both federal and non-federal objectives under OB-3A.
  - Stressed need to protect remote-sensing satellite bands and ensure continued coordination with defense users.
- Question: How does O3B Act interact with other commercial uses?
  - The O3B Act primarily addresses *terrestrial* spectrum. Satellite uses are licensed differently and not subject to auction. Tax incentives for launch sites are included, but satellite-band access remains a separate consideration.
  - The O3B Act does not include 6 GHz, protecting the innovation foundation for Wi-Fi and wearables.
  - There is no more greenfield spectrum. Future progress depends on sharing and coexistence between federal, commercial, and unlicensed systems.
- Question: How will AI *improve* spectrum efficiency instead of merely consuming more spectrum?
  - AI will be used *in* the network (optimization, automation) and *on* the network (applications).
  - Latency, not capacity, will become the dominant metric; AI can reduce data loads via smarter compression and contextual awareness.
  - Exploring AI to automate analysis of federal frequency assignments and speed inter-agency coordination.
  - FCC possesses decades of spectrum-usage data – modernization will allow AI tools to derive longitudinal insights and public-facing analytics.
  - AI already helps with interference detection and mitigation in shared satellite bands.

[**AM Comment**: Consensus: AI is both a spectrum consumer and optimizer; regulators see potential for analytic automation. However, it is not clear how much spectrum AI will use.]

- Question: Should federal spectrum receive an explicit economic valuation, similar to commercial spectrum?
  - The O3B Act mandates NTIA to produce a biennial federal-spectrum valuation report.
  - Options under study:
    - *Opportunity-cost* method – what the band would fetch commercially.
    - *Mission-value* method – economic value of public goods (safe air travel, weather alerts, national security).
  - "It's a challenging question; we're consulting economists on how to capture both."
  - Valuation must include opportunity costs of delayed innovation and deployment.
  - Recalled that auctions solved historic inefficiency – markets reveal who values spectrum most and fund incumbent relocation.

    - Added that auction surpluses can offset relocation or compensation for federal users.
- Question: Will FCC release public statistics on 6 GHz AFC-managed standard-power devices (similar to CBRS reporting)?
    - No immediate announcement is expected; ongoing proceedings will determine the future reporting frameworks.
- Question: How should spectrum policy account for *innovation* and shared access models, given limited shared spectrum (~150 MHz) versus > 2 GHz each of unlicensed and licensed?
    - 6 GHz Wi-Fi proved that open access triggers rapid innovation – the fastest adoption of any Wi-Fi band. “Low barriers let lots of people do fun things.”
    - Expanding unlicensed (e.g., the 7 GHz band) keeps the innovative cycle alive.

[**AM Comment**: Panel agrees innovation thrives in predictable, low-barrier shared regimes; policy must preserve regulatory certainty for those ecosystems.]

SESSION 2: UNLOCKING THE UPPER C-BAND – THE PATH FORWARD TO DELIVER ON THE 100 MHZ MANDATE

MODERATOR: Amit Nagpal, Partner, Aetha Consulting

PANELISTS:

- Susan Mort, Deputy Bureau Chief, Wireless Telecommunications Bureau, FCC
- Daniel Mah, Vice President, Legal & Regulatory Affairs, SES
- Chris Wieczorek, Director, Spectrum Policy, T-Mobile
- Hank Hultquist, Vice President, Federal Regulatory, AT&T
- Robert Kelly, Partner, Squire Patton Boggs

SESSION:

Susan Mort, Deputy Bureau Chief, Wireless Telecommunications Bureau, FCC

- NPRM on the Upper C-Band will be released later in the afternoon for public review.
- Scope of the NPRM:
    - Explores repurposing up to 180 MHz, with a statutory minimum of 100 MHz.
    - Future terrestrial flexible-use licensing within that band.
    - Would rely on "a system of coordinated sharing" to accommodate incumbent fixed-satellite users.
- Spectrum to be repurposed by FSS earth station operators?
    - Possible relocation mechanisms for existing services.
    - "The application of the Lower 3.7 GHz Service Rules … including transition structures, reimbursement mechanisms, and policies."
- Lower C-Band elements could serve as the baseline for an Upper C-Band transition.
    - Business-case framing: NPRM aims to create "a compelling business case for the entire ecosystem of satellite users."
- Specific issues for comment:
    - Reallocation of FSS spectrum.
    - Auction bidding procedures.
    - Licensing, operational, and technical rules for new terrestrial entrants.
    - Relocation of incumbent FSS operations.
    - Coexistence safeguards for adjacent-band radio altimeters.
- Using that C-band model as the baseline.
- Same general topics covered in the Lower C-Band NPRM will be followed through here.

Daniel Mah, Vice President, Legal & Regulatory Affairs, SES

- Feels like we have just finished repacking half a million C-Band customers.
- Customer base & use cases:
    - Major broadcasters and media networks continue to rely heavily on C-Band for program distribution.
    - Enables live news gathering and sports feeds (*"Super Bowl, Formula 1 – whatever scratches your itch"*).
- Why C-Band remains critical:
    - Wide bandwidth and single-hop connectivity.

    - Broad geographic coverage (continental footprint).
    - High reliability / rain-fade immunity: “You don’t want the signal interrupted during major events.”
- Acknowledged shifts in media consumption but said linear distribution demand remains strong, though gradually declining.
- SES policy position:
    - Advocates a “win-win-win” solution – clear additional spectrum for mobile *while maintaining substantially the same service quality* for existing customers.
    - Mirrors the standard used in the Lower C-Band clearing.
    - FCC's intention to use that same model in the Upper C-Band.
- Feasibility & conditions:
    - SES is confident 180 MHz can be cleared, but with caveats:
        - Requires large-scale repacking of customers.
        - Distribution of new filters with higher cutoff frequencies.
        - Equipment upgrades at thousands of cable head-ends and broadcast stations nationwide.
- The more you clear the spectrum, the more complexity is involved, the more the clearing cost would be.
- Potential migration to Ku-Band:
    - Necessary if clearance exceeds 100 MHz.
    - This would entail customer acceptance and technical mitigation, as Ku propagation differs from C-Band.
    - Requires new Ku-Band satellites and extensive ground equipment replacements.
    - Uplinks would need retuning and hardware changes.
    - Must address rain-fade vulnerability of Ku.
- Reimbursement imperative:
    - “With the right set of cost reimbursements in place, we can provide accelerated clearing – just like last time.”
    - Accelerated relocation incentives are crucial for timely execution.
- Balancing factors for FCC:
    - Wireless industry needs vs. total clearing cost.
    - Impact on radio altimeters.
    - Long-lived satellite assets are already in orbit.
    - Ground infrastructure continuity for ongoing FSS business.

Chris Wieczorek, Director, Spectrum Policy, T-Mobile US

- T-Mobile has wired approximately $25 billion to the U.S. Treasury, and I still have not seen any of it returned.
- Emphasized certainty and timing as core requirements for any auction: “When you spend that kind of money, you need to know what you’re getting.”
- Supported a ‘go-big’ approach to maximize mid-band capacity for 5G/6G.
- Argued that industry is far better prepared today than in 2020:
    - Lessons from Lower C-Band clearing and reimbursement process.

    - Established technical dialogue between the FCC and FAA to avoid altimeter delays.
    - Mature understanding of incentive-based frameworks for satellite relocation.
- Confirmed continuing coordination through RTCA standards work and aviation industry task forces.
- Expressed confidence that mobile can operate close to 4.2 GHz if new certification standards and filters are implemented.
- Stressed that the auction value depends on the timeline's credibility:
  "If bidders are told they'll get the spectrum in ten years, that's not an exciting auction."
- Urged alignment with 3GPP Release 19 and device vendors (Apple, Samsung) to ensure ecosystem readiness by deployment.

Hank Hultquist, Vice President, Federal Regulatory, AT&T

- Clearing costs and complexity depend on the amount of C-band spectrum that needs to be cleared.
- Lower C-Band clearing of the first 100 MHz took just under two years, but Upper C-Band will take significantly longer.
- Identified drivers of timeline:
    - Scope (100 MHz vs 180 MHz or more).
    - Allocation and coordination issues with federal users.
    - FAA/FCC interference studies and altimeter testing.
- Warned against auctioning spectrum before transition mechanisms are fully defined:
    - Otherwise, you get a spectrum on paper that cannot be used.
- Supported continuation of the acceleration payment model, paired with realistic engineering-based schedules.

Robert Kelly, Partner, Squire Patton Boggs

- Spoke from his role in the C-Band Clearinghouse during the Lower C-Band transition.
- Outlined the FCC's expanded "toolbox" for spectrum rebanding: administrators, coordinators, voluntary and mandatory negotiations, and dispute resolution.
- To establish credibility and fairness, many operators are moving not because they want to, but because the public interest requires it.
- Should solve issues early and maintain steady communication with FCC staff and transition administrators.

Panel Discussion / Audience Q&A

- Question: Whether carriers have begun coordination with satellite manufacturers and launch providers.
    - Elon has not returned my calls.
    - Formal coordination has not yet been initiated; SES and Intelsat will lead once the scope is finalized.
- Question: How to ensure contiguity between Lower and Upper C-Band licenses?
    - Auction likely to include assignment rounds for operators to align spectrum blocks.
    - Post-auction license swaps could also achieve contiguity.
- Question: Can LEO satellites replace displaced GEO capacity or accelerate the transition?

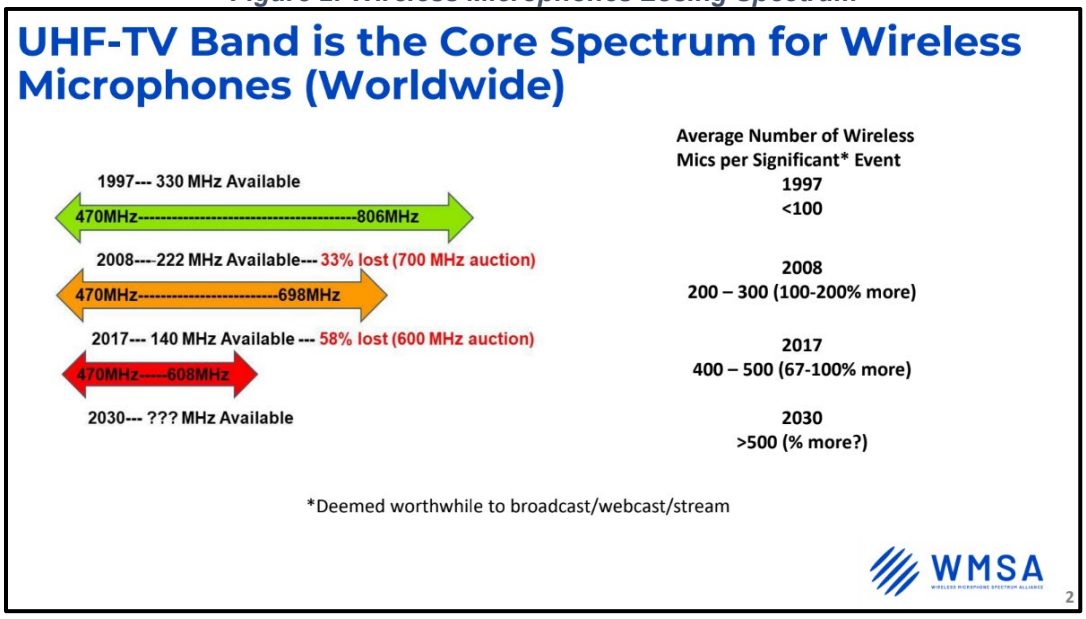
    - GEO remains the best option for one-to-many broadcasts; LEO is inefficient for this use.
- Question: Global harmonization and Europe's 3.8–4.2 GHz allocations.
    - Several countries already operate above 3.98 GHz; the U.S. will not be alone."
    - Handset support for these frequencies is growing and could aid U.S. rollout.

SESSION 3: THINKING POINT: THE SUPER BOWL, FIFA WORLD CUP & LA28 OLYMPICS – MEETING THE BROADCAST REQUIREMENTS OF MAJOR SPORTING EVENTS

Speaker: Loren Sherman, Lead Frequency Coordinator, CP Communications, Wireless Microphone Spectrum Alliance (WMSA)

- Major events, such as the Super Bowl, World Series, FIFA, and Olympics, require the management of over 2,500 frequencies across microphones, in-ear monitors, cameras, intercoms, and radios within a single venue.
- Live audio demands sub-2 millisecond latency and zero interruption to ensure broadcast-quality coverage and on-field safety.
- Dependence on STA Spectrum:
    - Broadcasters frequently operate under Special Temporary Authority (STA) to borrow spectrum allocated to other services (e.g., CBP, FBI, DoD).
    - "If that spectrum is fully allocated to Wi-Fi and cellular, much of the live content you enjoy today would disappear."
- At the 2025 Super Bowl in New Orleans, 6 GHz Wi-Fi deployments risked interfering with broadcast RF systems.
- Coordination between RF and IT teams prevented the loss of 21 of 62 RF cameras, demonstrating the importance of real-time cross-domain collaboration.
- Growing Spectrum Constraints:
    - Frequency requests for large events are "increasingly met with no," forcing trade-offs between affiliates and rights holders.
    - Networks are often asked to sacrifice part of their broadcast feed or temporarily turn off local transmissions to free spectrum. (see Figure 2 below)

Figure 2: Wireless Microphones Losing Spectrum



Source: WMSA

- Coordination with Agencies:
  - CP Communications works directly with FCC staff, DoD, and public safety teams onsite to prevent interference and ensure lawful use.
  - "We're building good faith by sharing information back and forth for the spectrum we're watching out for."
- STA Process Challenges:
  - CP maintains a full-time staff member solely for STA filings; applications can take up to 30 days to be approved, even when events occur on the 10th.
  - The need for streamlined approval timelines is increasing as the schedules of sports and entertainment become more demanding.
- RF War Games and Testing:
  - Prior to major broadcasts, all devices are powered up simultaneously to simulate interference and test coexistence.
  - Frequency coordination is "both a science and an art," combining engineering precision with situational adaptation.
- Without continued regulatory flexibility, broadcasters will be forced to create less.

SESSION 4: PRESENTATION - JAY SCHWARZ, CHIEF, SPACE BUREAU, FCC

Space Industrial Revolution

- Launches increased 14× in the past decade. [**AM Comment**: Yes, but mostly by one company, SpaceX!]
- Spectrum demand now exceeds available capacity.
- FCC is implementing the "spectrum-abundance agenda" to improve spectrum use efficiency.

FCC Focus Areas

- Allocation Inefficiencies
  - Review the Table of Frequency Allocations to identify underused or technically compatible bands.
  - May 2025 NPRM covers:
    - Upper 12 GHz, 42 GHz, 52 GHz, W-Bands (>95 GHz).
    - Total under review: ~20 GHz (20,000 MHz).
  - Goal: expand available satellite spectrum and enable coexistence with other users.
- Technical Rule Inefficiencies
  - April 2025 NPRM reviewing outdated NGSO–GSO EPFD limits set in the 1990s.
  - Purpose: determine if limits restrict modern broadband constellations.
  - Goal: modernize technical sharing rules to reflect current operational realities.
- Bureaucratic Inefficiencies
  - October 2025 NPRM on Upper Microwave Flexible Use (UMFUS) bands.
  - 2016 coordination rules caused delays (some applications pending 900+ days).
  - Action: simplify coordination, remove redundant filings, and explore a light-licensing model.
- Licensing Modernization
  - Launching the "Licensing Assembly Line" process.
  - Routine applications → expedited processing.
  - Complex applications → dedicated review.
  - Goal: reduce backlog, increase transparency, and improve processing time.

Panel Discussion / Audience Q&A

- Adding some "shot clock" type mechanisms to create accountability.
- Want the US to be "the place" to license, build, and operate. The movement of satellite companies out of the US is a top concern.

SESSION 5: DELIVERING A RESILIENT AND SCALABLE D2D ECOSYSTEM – PROGRESS TO DATE AND THE PATH AHEAD

MODERATOR: Johanne Lemay, Co-President, LYA
PANELISTS:

- Veena Rawat, Senior Spectrum Advisor, GSMA
- Pascale Dumit, Director, International Spectrum Policy, T-Mobile
- Barbee Ponder, General Counsel & Vice President of Regulatory Affairs, Globalstar
- George Giagtzoglou, Vice President Strategy & Marketing, Omnispace
- Chris Woolford, Director, International Spectrum Policy, Ofcom UK

SESSION:

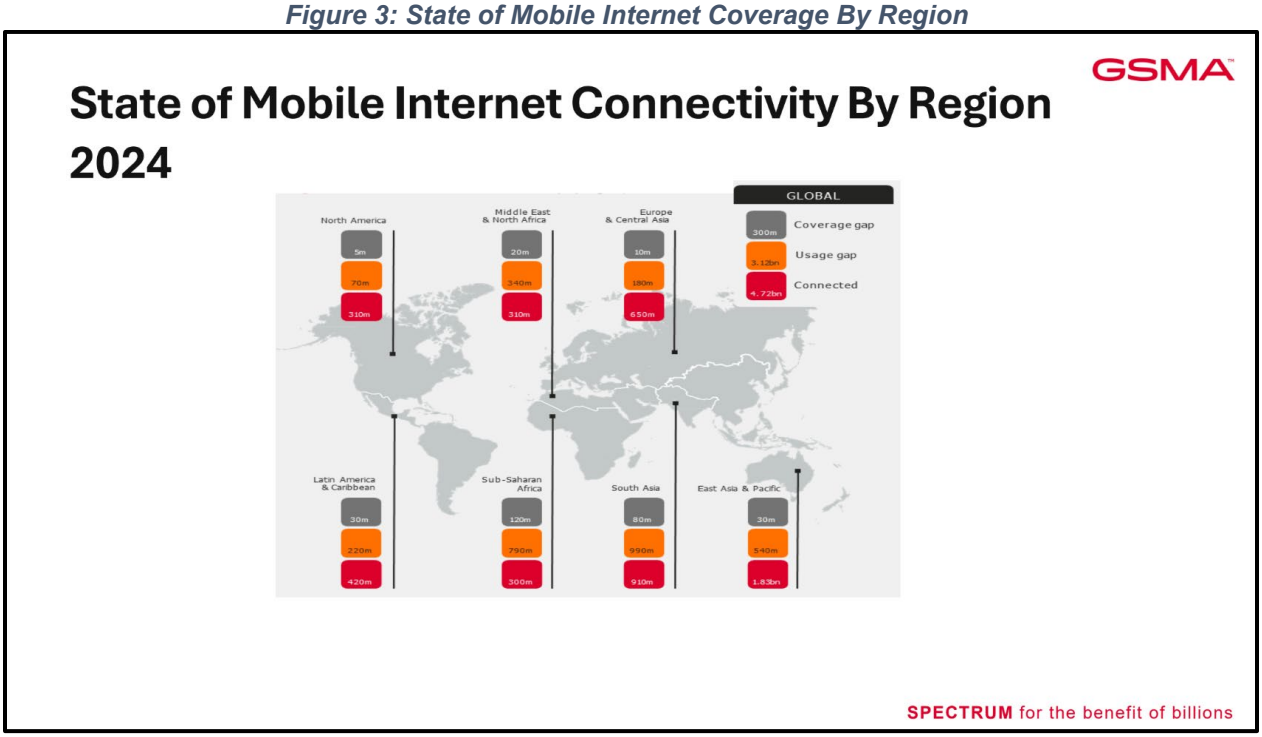
Johanne Lemay, Co-President, LYA

- Compared the U.S. (FCC SCS 2024) and Canadian (ISED SMCS 2025) D2D regulatory frameworks.
- U.S. approach:
  - Focus on national service areas – CONUS, Alaska, Hawaii, U.S. territories.
  - Must provide coverage across the full geographic license area.
  - Early authorizations: T-Mobile/Starlink (PCS G-Block); AT&T and Verizon (850 MHz) through special authorization.
  - Requires a single terrestrial MNO holding the spectrum license for the service area.
- Canadian approach:
  - Allows both national (Tier 1) and regional operators to provide D2D service.
  - Regional carriers are limited to operating within their licensed territories.
  - A broader set of FDD bands is designated (600, 700, 800 MHz, PCS, H-Block, AWS-1, AWS-3).
- Raised question: Should D2D connections count toward MNOs' coverage or buildout obligations?
- Set discussion themes:
  - Regulatory differences between IMT-based and MSS-based D2D.
- Balancing coverage expansion, affordability, and coexistence.

Veena Rawat, Senior Spectrum Advisor, GSMA

- Clarified that D2D = supplementary coverage, not a replacement for terrestrial networks.
- Objective: fill coverage gaps using satellites, providing service to standard, unmodified handsets.
- GSMA studies show:
  - Global coverage gap: Approximately 4% of the population lacks mobile broadband access.
  - Usage gap: ~38% have coverage but cannot afford or use mobile internet.
  - North America: ~5 million uncovered; ~70 million usage gap (60 million in the U.S.). (see Figure 3 below)

Figure 3: State of Mobile Internet Coverage By Region



Source: GSMA

- Distinction between D2D models:
  - IMT spectrum-based: operates under an MNO license, requires a formal MNO satellite partnership agreement.
  - MSS spectrum-based: satellites use their own licensed bands (e.g., Globalstar, Iridium).
- Key principles:
  - Maintain MNO regulatory rights and obligations.
  - Ensure cross-border spectrum protection.
  - Focus on affordability and accessibility, not just coverage.
- Referenced GSMA's 2025 regulatory guidance paper on D2D addressing coexistence and policy best practices.

Pascale Dumit, Director, International Spectrum Policy, T-Mobile

- Described the T-Mobile and SpaceX partnership under the FCC's SCS framework.
- Commercial launch: July 2025 – service now live.
- Initial phase: text messaging and text-to-911.
- Expanded functionality rolling out: weather alerts and social media messages by late 2025.
- Coverage area: continental U.S., Hawaii, Puerto Rico, and parts of the Pacific.
- Over 60 smartphone models are currently compatible without modification.
- Emphasized ecosystem advantage of using existing handsets and networks, no hardware upgrades needed.

Barbee Ponder, General Counsel & Vice President of Regulatory Affairs, Globalstar

- Globalstar has provided mobile satellite services (MSS) since 2000, under its authorization granted in 1995.
- Over 25 years of continuous MSS operation, with major reinvestments:
  - Second-generation constellation (2010–2013): >$1B investment.
  - Third-generation constellation (C3): $1.5B investment, 48 satellites + ~90 ground stations.
- Globalstar–Apple partnership (2022): Emergency SOS via iPhone 14 → first mass-market D2D use case.
- Regulatory stability and long-term spectrum certainty were critical for sustained investment.
- Focused on the consumer mass market, not defense.
- Continuing transition toward new LEO replenishment and expanded MSS–private spectrum integration.
- "We have supported D2D globally for three years. Hundreds of millions of users now have access to satellite connectivity when it matters most."

George Giagtzoglou, Vice President Strategy & Marketing, Omnispace

- Omnispace's strategic merger is with a major global satellite operator, expected to close by late 2025 or early 2026.
- Forecast: > $4B annual D2D retail revenue by 2035; ~85% from smartphones, remainder from IoT.
- IoT applications: connected vehicles, agriculture, infrastructure monitoring, utilities, asset tracking.
- Demand location:
  - Not only remote/rural, but the majority are near the edge of terrestrial networks.
  - By 2030 → 60% of global D2D demand will be from network edges.
  - By 2035 → ~97% in North America will be from edge-of-network users.
- Stressed the importance of seamless handoff between terrestrial and satellite networks.
- Supports hybrid MSS + IMT models, depending on use case and geography.

Chris Woolford, Director, International Spectrum Policy, Ofcom UK

- Outlined UK regulatory progress:
  - March 2025 consultation on enabling D2D in mobile (IMT) bands.
  - Proposed three authorization models; preferred model = variation of MNO license to permit satellite partnerships.
  - Required partnership between satellite operator and MNO.
- Coordinated with France, Ireland, and the Netherlands to avoid cross-border interference.
- October 2025 statement: final framework adopted.
  - Authorizes D2D in sub-3 GHz bands.
  - First UK D2D deployments expected early 2026.
- Recognized WRC-27 agenda item on D2D; will reassess framework after WRC for global alignment.

- “Europe’s smaller borders make D2D coordination more complex than in North America, but cooperation is essential.”

Panel Discussion / Audience Q&A

- Progress since SCS adoption:
  - T-Mobile: From SCS (March 2024) to full commercial service in under 18 months.
  - Globalstar: The FCC completed SCS proceedings within 12 months, spurring broader market entry.
- Coverage and usage considerations:
  - GSMA: D2D is essential for addressing both coverage gaps and usage gaps, enabling connectivity where terrestrial services are unavailable or unaffordable.
  - Omnispace: Cost to reach the final 1–5% of the population terrestrially is uneconomic; D2D is a lifeline service.
  - Ofcom: UK/Europe face different challenges, with coverage gaps smaller, but coordination across borders is more difficult.
- MSS vs IMT frameworks:
  - Both viable; IMT integration requires MNO partnerships and handset compatibility; MSS operates independently but outside standard ecosystems.
  - IMT advantage utilizes existing phones and infrastructure, offering immediate scalability.
  - MSS remains critical for emergency and resilience, proven during disasters.
  - Coexistence is feasible but requires isolation zones to avoid interference (20–30 km beam → 30–45 km exclusion).
  - For large countries (such as the U.S., Canada, and Australia), isolation is less problematic; for smaller countries, cross-border management is essential.
- Technical and device considerations:
  - Omnispace: Legacy 4G phones are not optimized for 350–600 km link distances; 5G NTN devices will be the dominant choice.
  - GSMA: Satellite visibility is required for most outdoor usage until higher-power constellations enable better indoor reception.

SESSION 6: BALANCING INNOVATION AND PROTECTION: IS IT TIME TO RE-EXAMINE THAT RULES THAT GOVERN SATELLITE SHARING AND CO-EXISTENCE?

MODERATOR: Armand Musey, President and Founder, Summit Ridge Group [**AM Comment**: That's me!]

PANELISTS:

- Adam Cassady, Principal Deputy Assistant Secretary and Deputy Administrator, NTIA
- Kalpak Gude, Head of Global Regulatory Affairs, Amazon Project Kuiper
- Daniel Mah, Vice President, Legal & Regulatory Affairs, SES
- Hazem Moakkit, Regulatory Affairs, AscendArc

SESSION:

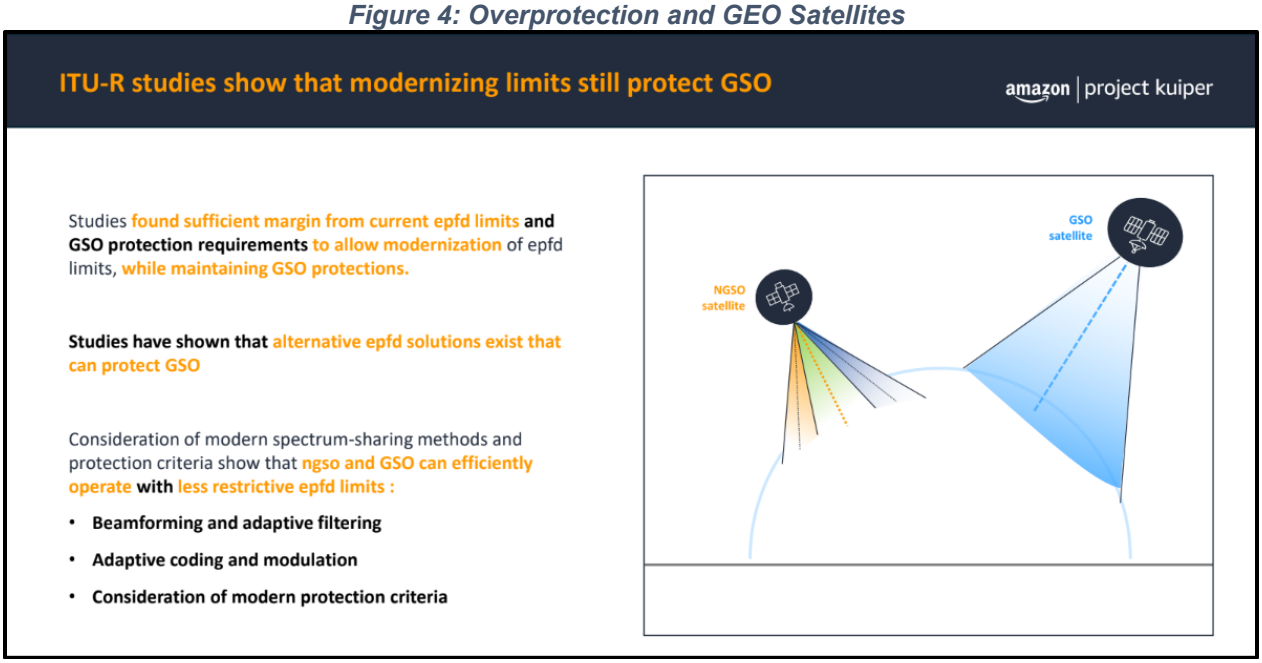
Adam Cassady, Principal Deputy Assistant Secretary and Deputy Administrator, NTIA

- NTIA must identify 500 MHz for commercial use within two years (FCC goal: 300 MHz).
- Supported reviewing legacy spectrum-sharing rules, including EPFD, to ensure they reflect today's dense orbital environment.
- "We are living in a completely different era. Rules designed for a few, state-sponsored GEO satellites do not fit a world of thousands of commercial LEOs."
- NTIA balances commercial, federal, and defense, emphasizing the need for "updated coordination processes."
- Noted explosion of new space activities: in-orbit servicing, debris-removal tugs, imaging of space objects, "activities that didn't exist when our rules were written."
- Conclusion: "It's always time to review space regulations; the domain is evolving too fast for static frameworks."

Kalpak Gude, Head of Global Regulatory Affairs, Amazon Project Kuiper

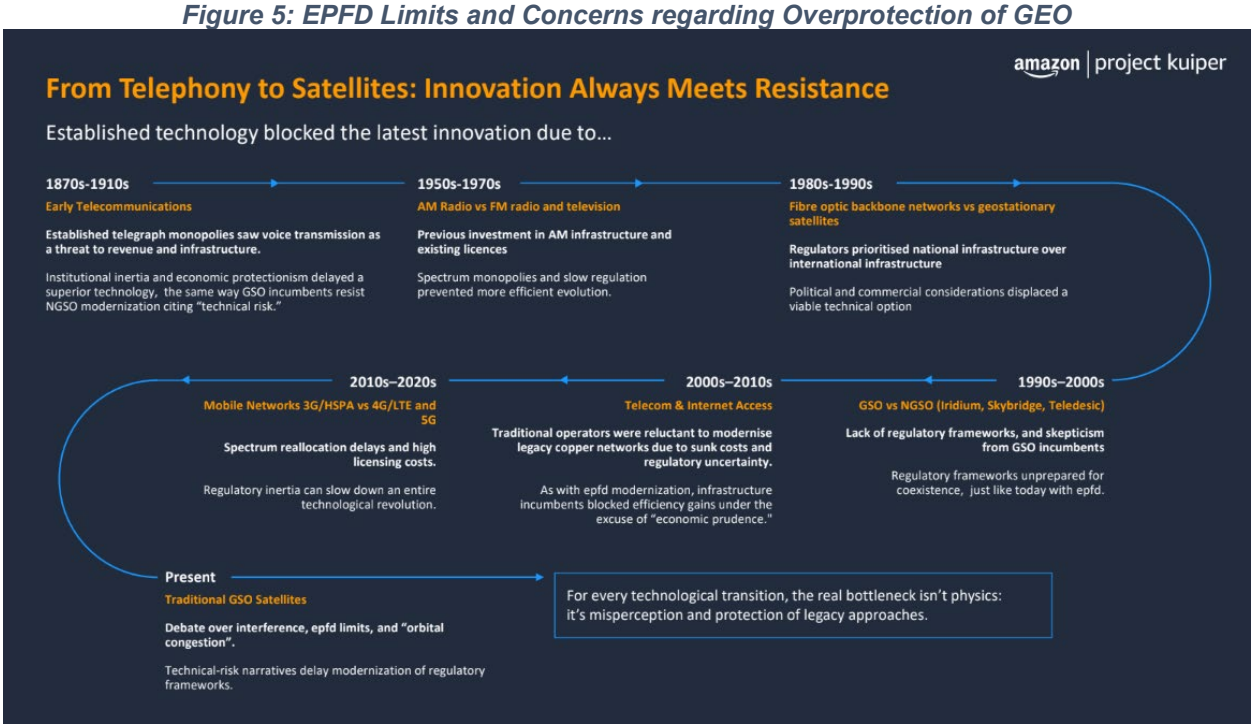
- Asserted that EPFD limits set 25 years ago are obsolete; both GEO and NGSO technology have changed.
- Past rules protected GEO video distribution networks; today's environment is IP-based, adaptive, and dynamic.
- Argued that current limits cause overprotection, wasting spectrum, and stifling competition.
    - "Overprotection protects no one; it only protects incumbency." (see Figure 4 and Figure 5 below)

Figure 4: Overprotection and GEO Satellites



Source: Amazon – Project Kuiper

Figure 5: EPFD Limits and Concerns regarding Overprotection of GEO



Source: Amazon – Project Kuiper

- Modern systems can dynamically adjust power, coding, and beamforming, making stricter limits unnecessary.
- Supported the FCC's initiative: "The FCC must lead; ITU processes are too slow and political to handle this issue."

- Predicted 30% capacity increase from revised limits without new satellites or capital investment.
- “Spectrum efficiency should be about consumers, not legacy protection.”

Daniel Mah, Vice President, Legal & Regulatory Affairs, SES

- SES operates both GEO and MEO constellations (≈100 GEOs, 30 MEOs).
- Stressed SES’s balanced perspective on GEO-NGSO coexistence.
- Explained the current EPFD framework:
  - GEOs occupy a fixed orbital slot.
  - NGSOs move across the sky, sharing the same frequencies.
  - EPFD limits ensure GEO satellites remain protected when NGSO beams pass near that line of sight.
- Defended the EPFD regime as technically proven and legally certain, enabling NGSOs to operate without GEO coordination if they are compliant.
- Disagreed with claims of “overprotection”:
  - Thousands of LEOs already operate successfully under existing rules.
  - “If the market is thriving, the rules are clearly not restrictive.”
- Warned that replacing EPFD with an interference-based model could destroy service-level guarantees for GEO customers:
  - SES promises 99.7% availability in commercial contracts; new rules could degrade throughput by 1–4%, violating those guarantees.
- We are open to technical refinements within the EPFD framework, but not wholesale replacement.

Hazem Moakkit, Regulatory Affairs, AscendArc

- Called EPFD limits “technical, but strategically significant.”
- Supported modernization but warned against “destabilizing the market.”
- “Yes, review is needed, but modernization must not undermine GEO reliability, investment, or global coordination.”
- Emphasized:
  - GEO networks provide sovereign communications, disaster recovery, and global broadcast reliability.
  - New entrants must not “eclipse the importance of GEO stability.”
- Highlighted secondary effects:
  - EPFD limits serve as guardrails for NGSO–NGSO coexistence, as well as for GEO–NGSO sharing.
  - Relaxing limits could let early NGSO operators monopolize spectrum, leaving “no room for future entrants.”
- Warned against regulatory fragmentation: “NGSO systems are global; inconsistent rules between the U.S. and ITU would complicate coordination.”
- Summarized:
  - Modernize, but do not destabilize.
  - Preserve global harmonization.
  - Avoid creating first-mover advantages through relaxed limits.

- "Not everything old is bad. The EPFD framework simplifies coordination and provides predictability."

Panel Discussion / Audience Q&A

- FCC's shift to performance-based interference standards:
  - Amazon supports transition modern networks can dynamically manage interference; static power caps waste spectrum.
  - SES opposes GEO satellites' lack of flexibility to mitigate aggregate interference from multiple LEO constellations; "death by a thousand cuts."
  - Moakkit: Warned that adopting new standards without harmonization could create chaos and unfair advantage for first movers.
  - NTIA emphasized that reforms must be based on real engineering data, not advocacy; it encouraged technical dialogue among engineers rather than policy posturing.
- Information-sharing requirements between GEO and NGSO operators:
  - Amazon views information sharing as non-problematic; NGSOs already accept similar transparency in peer coordination.
  - AscendArc shared concerns about the need for confidentiality protections in any coordination framework.

Additional Technical and Policy Points

- Capacity Impacts:
  - Relaxing EPFD could increase system throughput by ~30%.
  - "Same satellites, same cost, more bandwidth, pure efficiency gain."
- Counterpoint
  - Relaxation could be double or triple active satellites visible from one location (e.g., 8 → 16 → 24).
  - "That may benefit one operator but consume all spectrum angles, blocking future systems."
- Spectrum limits should address interference, not competition.
- Competition issues should be addressed in a separate policy discussion.
- Observed that many industry disagreements are competitive, not technical.
- Often, we are not debating physics; we are debating economics in technical language.
- Urged renewed focus on engineering-based collaboration:
  - "If engineers sat in a room together, many of these issues would narrow significantly."
  - "Too often, advocates talk past each other using incompatible assumptions."
- [**AM Comment**: This is a very complex technical debate]

SESSION 7: THE CONTINUED EVOLUTION OF CBRS – WHAT ARE THE LATEST UPDATES, AND WHERE NEXT?

MODERATOR: Stephan Sloan, Director, Like Spectrum LLC
PANELISTS:

- Josh Baggett, Head of Global Spectrum Policy, HPE
- Jason Wallin, Senior Principal Architect, John Deere & Board Member, OnGo Alliance
- Justin Markle, Senior Vice President of Wireless Partnerships & Development, Comcast
- Jeff Stewart, Assistant Vice President, Public Policy, AT&T
- Patrick Welsh, Vice President of Federal Regulatory and Legal Affairs, Verizon

SESSION:

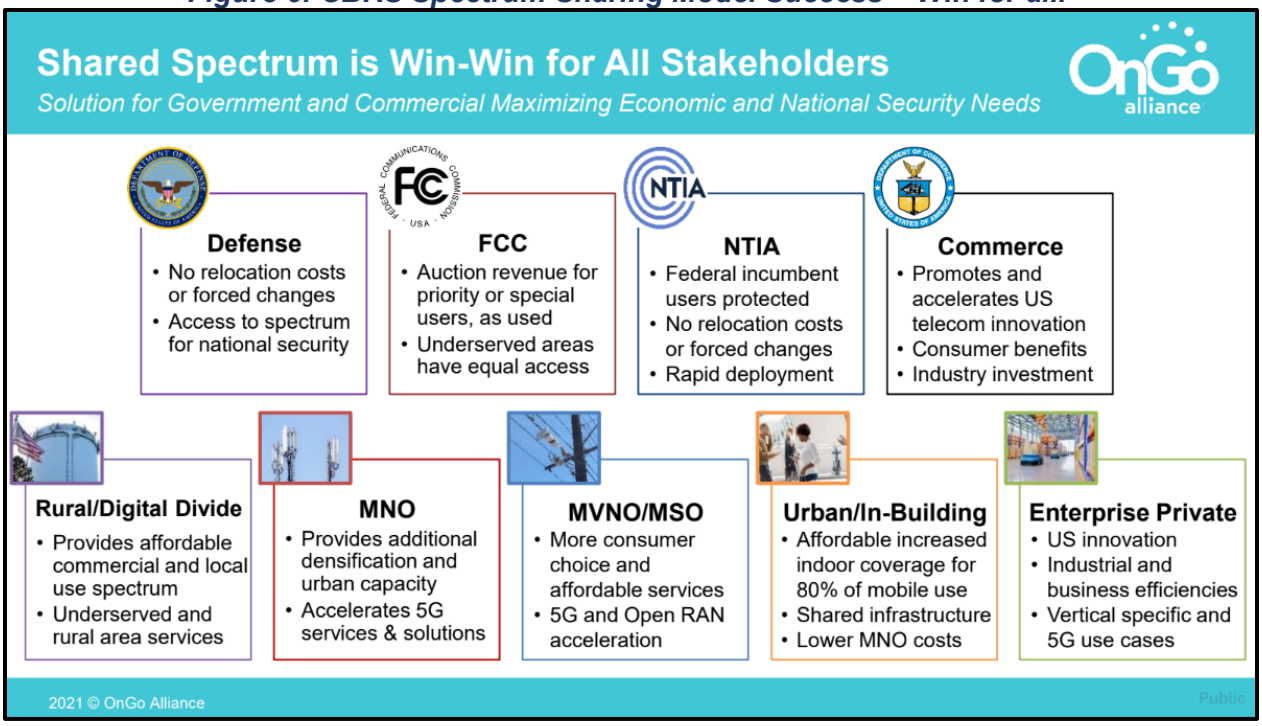
Josh Baggett, Head of Global Spectrum Policy, HPE

- Reviewed three-tiered CBRS framework:
    - Incumbents (mostly federal radar users).
    - Priority Access License (PAL) holders are protected from GAA but must avoid incumbents.
    - General Authorized Access (GAA) is a form of opportunistic access.
- Key CBRS 2.0 changes (Summer 2024):
    - Reduced Dynamic Protection Areas (DPAs) now extend as little as 80 miles inland from the coast, resulting in significant spectrum gain.
    - Improved GAA coexistence: SAS coordination now includes voluntary user cooperation, interference reporting, and frequency guidance.
    - A longer device heartbeat interval: CBSDs now check in once per day instead of every 5 minutes, aligning with 6 GHz standards.
- Impact: dramatically expanded coastal coverage. “You can now deploy until you can smell the sea.”
- Enterprise adoption areas:
    - Manufacturing, robotics, logistics, healthcare, and outdoor industrial automation.
    - Large event and venue connectivity, e.g., Ryder Cup 2025, one of the largest private 5G networks ever deployed.
    - Global momentum: heavy use in mining and agriculture, particularly on farms and ports.
- “CBRS 2.0 has matured from an experiment into a dependable enterprise network layer.”

Jason Wallin, Senior Principal Architect, John Deere & Board Member, OnGo Alliance

- CBRS is now the fourth-largest wireless network in the U.S.
    - Over 420,000 active base stations, 250,000 cell sites, 1,400+ certified devices, and $14 billion invested.
    - Shared spectrum proves to be a “win-win” for all. (see Figure 6 below)

Figure 6: CBRS Spectrum Sharing Model Success – Win for all.



Source: OnGo Alliance

- 90+ OnGo Alliance members, representing manufacturing, utilities, and enterprise.
- Five major factors driving adoption:
  - Rural broadband / bridging the digital divide.
  - Supplementing traditional spectrum holdings.
  - MVNO & MSO (cable) network support.
  - In-building coverage for manufacturing and logistics.
  - Private industrial networks and IoT.
- Manufacturing impact:
  - 88% of new U.S. manufacturing projects require industrial IoT; CBRS is the most cost-effective connectivity option.
- Future priorities (OnGo Alliance):
  - Extend shared-spectrum access to new bands.
  - Advance next-gen spectrum management (AI-driven coordination).
  - Keep innovation domestic; relocating CBRS would cost >$12 billion and risk losing global leadership in dynamic sharing.

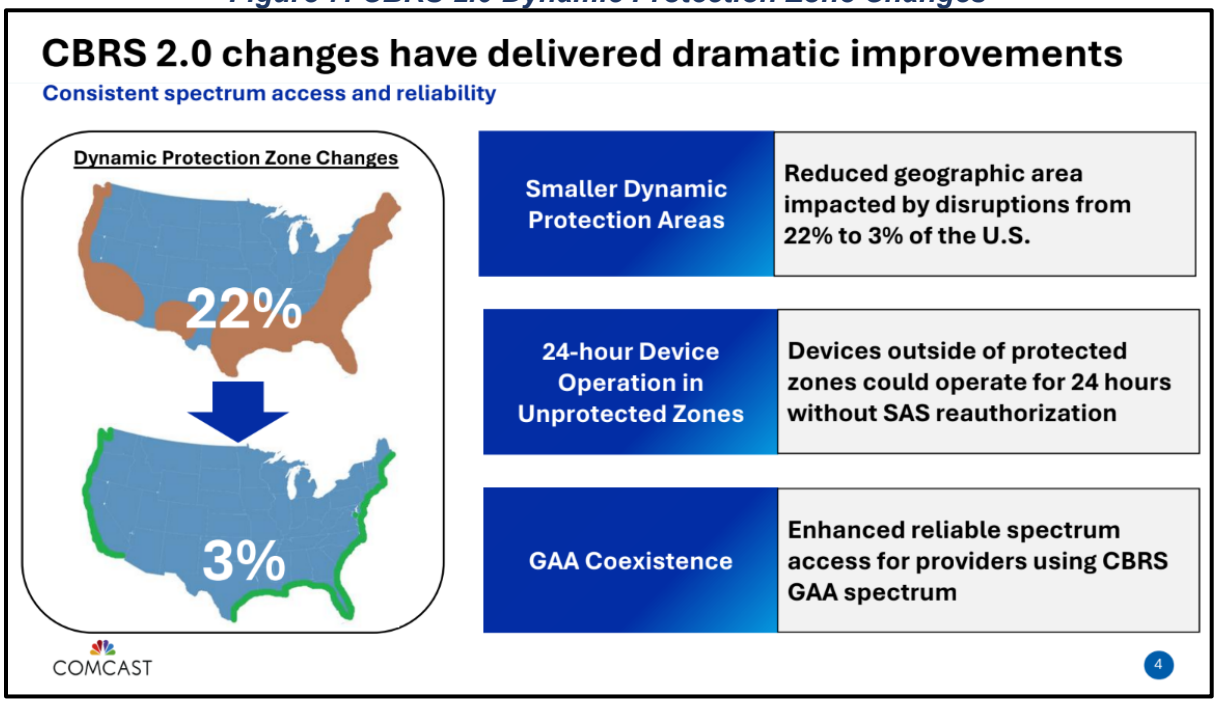
Justin Markle, Senior Vice President of Wireless Partnerships & Development, Comcast

- Comcast has become the 4th-largest U.S. wireless provider (20 M subscribers; $9 B annual revenue).
- Over 460,000 CBRS radios are deployed nationwide. “CBRS 2.0 was a game changer.”
- Reliability: only 3% of U.S. geography now poses any risk of DPA denial; zero instances of federal interference reported.
- Three deployment fronts:

- Extended mobile network: dual-SIM devices integrating CBRS into consumer coverage.
- Private 5G for enterprises: chemical plants, auto manufacturing, and amusement parks using CBRS for safety and machine control.
- Filling coverage gaps: custom private networks where commercial carriers can't reach.

- CBRS 2.0 changes delivered improvements, reduced disruptions, and provided reliable spectrum. (see Figure 7 below)

Figure 7: CBRS 2.0 Dynamic Protection Zone Changes



Source: Comcast

- Example: tram- and factory-wide CBRS camera systems improving worker safety and equipment tracking.
- Outlook: strong momentum and increasing enterprise awareness. "CBRS is not experimental anymore; it's operational infrastructure."

Jeff Stewart, Assistant Vice President, Public Policy, AT&T

- Advocated evaluating whether CBRS remains the "highest and best use" of 3.55–3.7 GHz.
- 3GPP Band n77 spans 3.3–4.2 GHz, CBRS occupies its middle, limiting global harmonization.
- Proposed exploring full-power licensed use for portions of the band.
- Key points:
  - Spectrum positioning: adjacent to 3.45 GHz and C-Band, both full-power mobile allocations.
  - Transparency: We need objective metrics for utilization and national benefits. "The number of CBSDs isn't a policy metric."

    - Future options include overlays, coexistence zones, or partial relocation to unlock more efficient use.
- "We need apples-to-apples data to determine whether CBRS's shared model remains optimal long term."

Patrick Welsh, Vice President of Federal Regulatory and Legal Affairs, Verizon

- Reviewed CBRS evolution from PCAST 2012 → FCC 2020 → CBRS 2.0 (2024).
- Noted three key technical updates enabling tighter DPA modeling:
    - Adjusted TDD loading factor, clutter loss at 6 m, and network loading assumptions.
    - Resulted in a 16–20 dB margin gain and significantly smaller coordination zones.
- Category B devices (higher-power small cells) now make up 95% of deployments.
- Proposed next steps:
    - 15 dB power increase for PAL + GAA users nationwide.
    - Raise the UE transmit limit from 23 dBm to 26 dBm.
    - Loosen out-of-band emission limits.
    - Consider introducing new Category C/D tiers for higher-power macro deployments.
- "Adding flexibility keeps CBRS relevant and future-proof."

Panel Discussion / Audience Q&A

- Population coverage isn't the right metric for an enterprise band; shouldn't we measure business premises or IoT nodes?
    - CBRS needs new performance metrics, perhaps "cars, cows, and robots."
    - CBRS is still not mature and is in early stages.
- Cost estimate of relocation?
    - Includes hardware + opportunity cost. Relocation would undermine supplier investment in IoT tools designed for CBRS bands.
- PAL vs GAA usage?
    - Most large PAL holders also deploy GAA; complementary operation is essential.
    - Many industrial users rely entirely on GAA.
    - Operates primarily in the GAA space for private enterprise clients.
    - All PAL holders also use the GAA, the best of both worlds.
- Verizon's position on future band changes?
    - Supports flexible evolution: "all options should stay on the table," including higher-power categories and eventual reconfiguration.
- Enterprise users see CBRS as critical private LAN spectrum, not an "experiment."
    - 1,000+ operators already live.
    - Eighty percent of our connectivity will remain on CBRS; it just works.
    - Licensed spectrum can also serve enterprises, but coexistence can be managed during any transition.
    - Carriers don't lease spectrum; they lease managed networks, which is not what the industry wants.
- What's next for CBRS 3.0?
    - Better SAS-to-SAS coordination and cross-border optimization.
    - Integration of AI and edge processing in manufacturing networks.

- 20 MHz of unused PAL (Dish)?
    - Likely functioning as GAA, the spectrum is still being used dynamically.
- School districts utilized CBRS to self-provision broadband during the COVID-19 pandemic. How would full-power licensing have helped?
    - Flexible TDD framing allows uplink-heavy IoT traffic; rigid macro networks wouldn't.
    - CBRS enables schools to take control of connectivity where commercial carriers have not reached.
- Experience with CBRS 2.0 interference mitigation?
    - Complete game changer, DPA events dropped from frequent to nearly zero.

Day 1 - End

DAY TWO: FRIDAY, OCTOBER 31, 2025

SESSION 8: DELIVERING GLOBAL SPECTRUM COORDINATION AND LEADERSHIP

MODERATOR: Katy J. Milner, Partner, Global Regulatory, Hogan Lovells
PANELISTS:

- Derek Khlopin, Deputy Associate Administrator, Spectrum Planning and Policy, Office of Spectrum Management, NTIA
- Tom Sullivan, Chief, Office of International Affairs, FCC
- Glenn Fallas, Director General of Quality and Spectrum, SUTEL Costa Rica
- Jose Ayala, Chairman, Spectrum Group for CITEL Region, GSA
- Mike Mullinix, VP, Regulatory Affairs, CTIA
- Eiman Mohyeldin, Global Head of Spectrum Standardization, Nokia

SESSION:

Derek Khlopin, Deputy Associate Administrator, Spectrum Planning and Policy, NTIA

- Spectrum is foundational to economic growth, national security, and daily life.
- NTIA works closely with the FCC and the State Department to align domestic and diplomatic goals.
- U.S. intends to lead globally and regionally in spectrum policy.
- NTIA's push to free spectrum for 6G networks and satellite constellations.
- WRC-27 agenda items, many focused on the expanding space economy.
- China's role as the host of WRC-27 creates both logistical and political challenges; the proceedings must remain fair and secure.
- Called for united regional positions through CITEL and early consensus rather than last-minute alignment.
- WRC outcomes update the treaty-based International Radio Regulations, determining allocation, harmonization, and interference standards.
- Committed the U.S. to outcomes that strengthen innovation and benefit all markets pursuing harmonized ICT growth.
- WRC-27 is both a test and an opportunity for the U.S. to demonstrate its strength in international governance.

Tom Sullivan, Chief, Office of International Affairs, FCC

- Coordination among the FCC, NTIA, and the State Department is essential for a unified global strategy.
- U.S. engagement spans multiple organizations, including the ITU, WRC, and 3GPP, among others, to maintain technological leadership.
- 80 percent of WRC agenda items involve satellite systems, but terrestrial issues remain equally vital.
- FCC's "Three T's":
    - Certainty: Protect incumbent services as new systems emerge.
    - Compatibility: ensure new entrants coexist without harmful interference.

    - Flexibility: Avoid restrictive rules that stifle future innovation.
- Agenda Item 7 (satellite networks) is "a WRC within a WRC," containing dozens of complex sub-topics.
- Early U.S. planning for future WRC-31 and WRC-35 agenda items.
- WRC is a "once-in-a-generation opportunity" to enable new services or protect existing ones.
- Politics often shapes outcomes as much as engineering; U.S. negotiators must balance both.

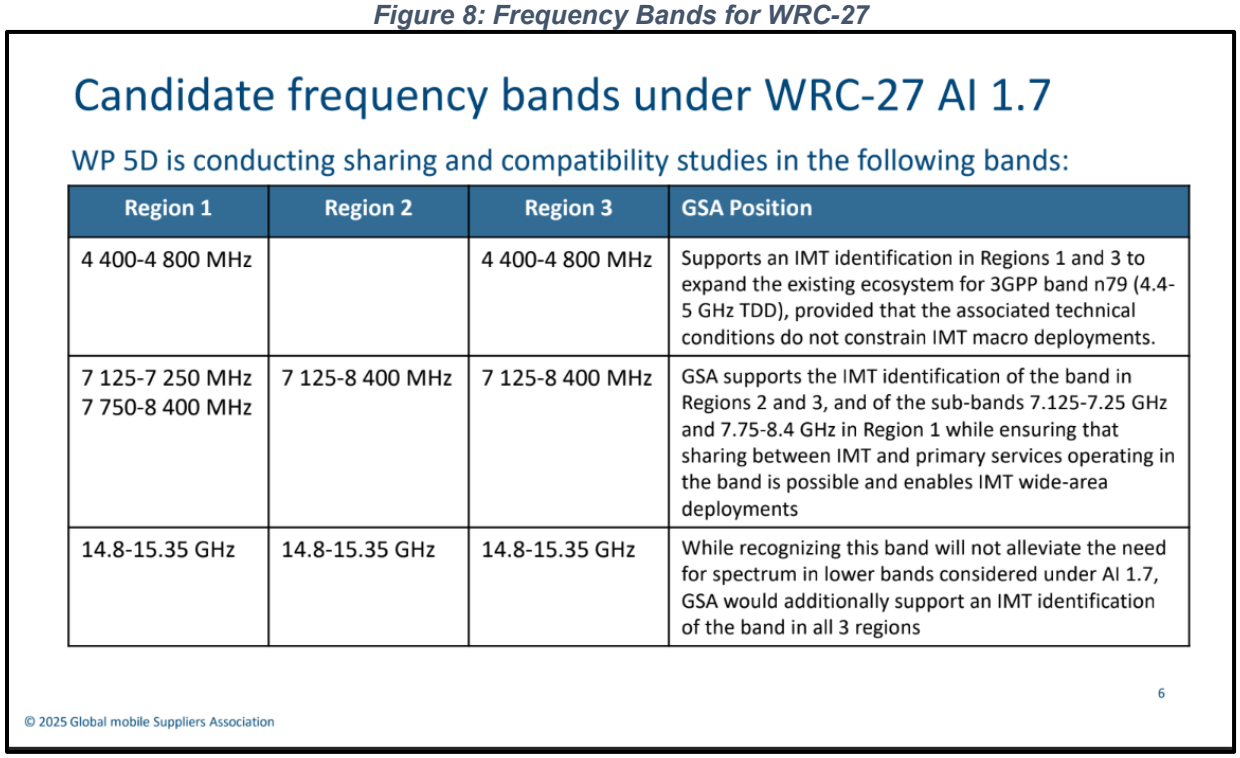
Glenn Fallas, Director General of Quality and Spectrum, SUTEL Costa Rica

- Presented Costa Rica as a success story of CITEL and U.S. collaboration.
- Credited USTDA and FCC technical courses on spectrum monitoring, auctions, and IMT regulation for capacity building. [**AM Comment**: I did not realize that the FCC provided this kind of support.]
- Costa Rica opened its telecom market in 2009 and held its first auction in 2011, with guidance from the FCC.
- Completed the 2017 LTE auction with FCC support, including Tom Sullivan's participation.
- The recent broadcasting auction (2023) faced 29 appeals, all of which were rejected, confirming the strength of the procedures.
- Auction valuations referenced U.S., Mexican, and Peruvian benchmarks.
- Allocated 1.4 GHz of new spectrum to expand coverage and reduce the digital divide.
- Developing a memorandum of understanding with U.S. agencies to strengthen collaboration.
- Relies on FCC CFR rules and public filings to refine Costa Rican regulations.
- Authorized unlicensed 6 GHz band in 2021; reviewing standard-power limits.
- Encouraged continued cooperation on type-approval and technical standards.

José Ayala, Chairman, Spectrum Group for CITEL Region, GSA

- ITU finalized the IMT-2030 (6G) framework Recommendation ITU-R M.2160.
- Defines six enhanced use scenarios and fifteen network-performance objectives guiding 6G development through 2030. (see Figure 8 below)

Figure 8: Frequency Bands for WRC-27



Candidate frequency bands under WRC-27 AI 1.7

WP 5D is conducting sharing and compatibility studies in the following bands:

Region 1	Region 2	Region 3	GSA Position
4 400-4 800 MHz		4 400-4 800 MHz	Supports an IMT identification in Regions 1 and 3 to expand the existing ecosystem for 3GPP band n79 (4.4-5 GHz TDD), provided that the associated technical conditions do not constrain IMT macro deployments.
7 125-7 250 MHz 7 750-8 400 MHz	7 125-8 400 MHz	7 125-8 400 MHz	GSA supports the IMT identification of the band in Regions 2 and 3, and of the sub-bands 7.125-7.25 GHz and 7.75-8.4 GHz in Region 1 while ensuring that sharing between IMT and primary services operating in the band is possible and enables IMT wide-area deployments
14.8-15.35 GHz	14.8-15.35 GHz	14.8-15.35 GHz	While recognizing this band will not alleviate the need for spectrum in lower bands considered under AI 1.7, GSA would additionally support an IMT identification of the band in all 3 regions

6

© 2025 Global mobile Suppliers Association

Source: GSA

- 6G will expand capabilities for AI-driven communications, extended reality, holography, and integrated sensing.
- It will require substantial new spectrum allocations.
- 6G specifications (3GPP Release 1) will be complete by 2030, enabling commercial rollout later that decade.
- 5G will continue evolving in parallel, adding standalone mode, slicing, and massive IoT.
- WRC-27 Agenda Item 1.2 studies candidate IMT bands:
  - 4400 – 4800 MHz
  - 7125 – 8400 MHz (Regions 2 & 3)
  - 14,800 – 15,350 MHz
- Eight CITEL administrations support studies on these bands to meet rising demand and preserve interoperability.
- Stressed balancing innovation with the protection of incumbent services while promoting advanced mobile systems.

Mike Mullinix, Vice President, Regulatory Affairs, CTIA

- Compared the progress of the U.S. and China at the midpoint of the 5G decade. The U.S. launched 5G deployments 13 months ahead of China, first with three nationwide networks.
- The U.S. wireless industry invests 4.7 times more per capita than the Chinese industry.
- By 2029, 91% of U.S. connections are expected to be 5G, compared to 84% in China.
- The main limitation: The U.S. mid-band spectrum China holds nearly four times more.

- WRC-23 demonstrated that global focus is on mid-band harmonization; the U.S. must respond rapidly.
- Characterized WRC as the "Spectrum Olympics," a four-week global negotiation of innovation vs. legacy.
- Warned that only ~700 days remain before WRC-27 in Shanghai time to secure regional consensus.
- The same 4 GHz and 7 GHz bands identified in the O3B Act are candidates for global harmonization.
- Harmonizing these could yield $300 billion in U.S. economic benefits over the next decade.
- China and its BRICS partners are already building opposition; they have been urged to coordinate and clarify their positions early.
- Success abroad depends on domestic unity: to lead internationally, succeed at home.

Eiman Mohyeldin, Global Head of Spectrum Standardization, Nokia

- Called for more mid-band spectrum and no restrictive power limits to support 6G performance.
- Supported the "delete, delete, delete" initiative to eliminate outdated regulations.
- Explained that AI will be deeply embedded in 6G, improving processing efficiency at the physical layer.
- Stressed that O3B Act bands must be studied carefully to ensure effective coexistence.
- Argued that global harmonization sustains a healthy ecosystem, lowers equipment costs, accelerates innovation, and allows competition with China.

Panel Discussion / Audience Q&A

- Observed that Chinese equipment remains cheaper and more advanced than U.S. systems.
- It is a long way for the U.S. to catch up on hardware, even with spectrum gains.
- Is Open RAN still viable after the EchoStar network shutdown, and what "Plan B" exists? [**AM Comment**: No panel answer.]
- Argued that China shaped the WRC-23 6 GHz debate and is driving studies of the 7 GHz NATO bands.
- Warned that adopting China's framework and reinforcing centralized, harmonization approaches.
- Proposed that the U.S. and allies emphasize AI-enabled spectrum sharing, agility, and flexibility to counterbalance China's scale advantages.
- Described 6G innovations: smarter antennas, AI-enhanced receivers/transceivers, and higher spectral efficiency.
- AI can enable less conservative EIRP limits, boosting power and performance.
- AI-based spectrum sharing requires access to satellite-beam data that is not publicly available.
- Asked whether the U.S. plans to improve data transparency to advance AI-driven coexistence and sharing.

SESSION 9: INTERNATIONAL CASE STUDY: THE PATH TO 6G IN EUROPE

Speaker: Alexander Kühn, Head of Section, International and National Spectrum Management, BNetzA (Germany)

- 6G Vision (EU Perspective):
  - Europe's 6G development is anchored in the IMT-2030 framework and driven by cross-border cooperation through the RSPG and BNetzA.
  - 6G targets integration of AI, ubiquitous connectivity, and terrestrial-satellite convergence as core objectives.
  - Europe aims for standard completion by 2028 to enable early deployment in 2029–2030.
- Spectrum Management and Capacity Challenges:
  - Need to increase network capacity while finding additional spectrum for emerging use cases.
  - Use case drivers: AI-enabled applications, ultra-low latency (<1 ms), and advanced sensing.
  - Energy efficiency vs. coverage: Higher bands consume more power; a balance is needed between coverage and capacity.
  - The network architecture debate centered on the trade-off between sharing and exclusive operation, and how to enable both within policy frameworks.
- New Infrastructure and Spectrum Use:
  - Considering 700 MHz – 2.6 GHz bands for mobile satellite services (MSS) and integrated NTN operations.
  - Millimeter-wave frequencies are expected to support localized high-capacity 6G applications.
  - Charts and frequency plans (shared in PowerPoint) outline priority bands under evaluation.
- Technical and Policy Focus Areas:
  - 6G to include AI-native design, ubiquitous connectivity, and integration of terrestrial and non-terrestrial networks (NTN).
  - Regulators must define frameworks for sensing and spectrum sharing to support new applications.
  - Ongoing coordination with aviation authorities on upper C-band altimeter compatibility to ensure safe coexistence and supply-chain readiness for new altimeter equipment.
- Policy Outlook:
  - Emphasis on clarity, predictability, and stability of regulatory planning to support industry investment and international alignment.
  - WRC-27 decisions will be critical to defining Europe's 6G spectrum roadmap.
  - Acknowledged the global discussion on Wi-Fi expansion vs. licensed mobile needs; Europe expects to accommodate both within its future framework.

SESSION 10: DELIVERING 6G LEADERSHIP – POWERING THE NEXT GENERATION OF CONNECTIVITY

MODERATOR: Mari Silbey, Chief Program Officer, National Spectrum Consortium
PANELISTS:

- Charles Cooper, Associate Administrator for Spectrum Management, National Telecommunications and Information Administration (NTIA)
- Martin Doczkat, Chief, Electromagnetic Compatibility Division, Office of Engineering and Technology, Federal Communications Commission (FCC)
- Alexander Kühn, Head of Section, International and National Spectrum Management, BNetzA (Germany)
- Noman Alam, Director, 5G Solutions, Ericsson
- Veena Rawat, Senior Spectrum Advisor, GSMA
- Aspasia Paroutsas, Vice President, Federal Regulatory Affairs, Qualcomm Inc.

SESSION:

Charles Cooper, Associate Administrator for Spectrum Management, NTIA

- Federal spectrum use is increasing; the past narrative of underutilization is no longer accurate.
- NTIA is accelerating spectrum-authorization processes to shorten approval cycles.
- A MITRE study is underway to examine how procurement timelines impact the modernization and efficiency upgrades of defense systems.
- Findings highlight trade-offs between maintaining existing missions and introducing more efficient spectrum use.
- A Space Launch Portal has been created for faster S-band coordination during commercial launches.
- Lower 3 GHz and W-band studies demonstrate active federal operational reliance on key bands.
- The Mission LA 2028 initiative will demonstrate 6G capabilities, including AI networking, integrated sensing, and immersive applications, during the 2028 Los Angeles Olympics.

Martin Doczkat, Chief, Electromagnetic Compatibility Division, OET, FCC

- The FCC applies technology-neutral, market-based licensing and does not prescribe standards.
- Technical Advisory Council (TAC) recommendations:
- Strengthening coordination among 3GPP, the Open RAN Alliance, and the Next G Alliance.
- Maintain active participation in the ITU and global 6G standardization efforts.
- FCC monitoring pre-standardization progress to ensure U.S. policies align with global technical directions.

Alexander Kühn, Head of Section, International and National Spectrum Management, BNetzA (Germany)

- 6G will merge the human, physical, and digital worlds through AI, digital twins, holographic communication, and integrated sensing.

- Europe's regulatory framework is based on ITU IMT-2030; 3GPP Release 21 is expected by 2028, with deployments anticipated by 2029–2030.
- Germany's 6G Exchange Platform convenes regulators, industry, and academia quarterly to align research and development (R&D) with regulation.
- EU RSPG 6G Vision Report and upcoming spectrum roadmap guide frequency planning.
- Spectrum priorities: 800/900 MHz, L-band, 3.6 GHz, and upper 6 GHz; mmWave for dense urban and industrial use.
- Main regulatory issues include network densification limits, energy-efficiency versus coverage trade-offs, integration of terrestrial and NTN, and the definition of integrated sensing within mobile allocations.
- Emphasized aligning European timelines with WRC-27 to secure global 6G harmonization.

Noman Alam, Director, 5G Solutions, Ericsson

- 6G will require 200 - 400 MHz per operator in mid-band spectrum to deliver global performance benchmarks.
- Continuous spectrum blocks are crucial for achieving an efficient balance between coverage and capacity.
- Meeting O3B ACT targets by 2030 requires synchronized federal–commercial coordination on relocation, standards, and auction timing.
- Timely availability of spectrum is essential to keep U.S. deployment on schedule.

Veena Rawat, Senior Spectrum Advisor, GSMA

- By 2030, 5G and 4G are expected to remain dominant; therefore, planning for 6G must occur in parallel.
- GSMA research (draft) projects that 2 to 3.5 GHz of additional mid-band spectrum will be needed by 2040.
- 6G technical goals: AI-native design, energy-efficiency, sub-millisecond latency, and wide channels (200 - 400 MHz).
- Urged regulators to decide 6G allocations at WRC-27 deferral to WRC-31 would delay global readiness.

Aspasia Paroutsas, Vice President, Federal Regulatory Affairs, Qualcomm Inc.

- 6G is now a global race; China, South Korea, and the EU are already advancing spectrum plans.
- The upper 6 GHz is identified globally as the likely core 6G band. [**AM Comment**: Given that 6 GHz has limited indoor penetration, does this mean 6G will mostly be indoor?]
- OBBB 800 MHz target should be treated as a minimum requirement.
- 6G integration of AI and sensing will yield major economic and national-security gains.
- U.S. leadership relies on predictable spectrum policy, alignment between the NTIA and FCC, and industry coordination.
- Highlighted Qualcomm's involvement in 3GPP, Next G Alliance, and ITU efforts; standardization assumes U.S. domestic spectrum readiness.

Panel Discussion / Audience Q&A

- Whether large exclusive mobile allocations are justified, given:

    - Flatlining mobile data growth in developed markets (Ofcom data 30%→10%).
    - Most 6G use cases, such as VR, holography, and industrial IoT, are indoor and Wi-Fi-based.
- Mobile data and fixed-wireless access continue to grow; both licensed mobile and Wi-Fi are required.
- Shared use in the 7.1 GHz - 7.2 GHz range could accommodate both IMT and Wi-Fi applications.

SESSION 11: BALANCING EXCLUSIVE LICENSING, SHARING REGIMES, AND UNLICENSED SPECTRUM FOR FEDERAL AND COMMERCIAL USERS

MODERATOR: Paul Kirby, Senior Editor, Wolters Kluwer's TR Daily
PANELISTS:

- Andrew Hendrickson, Chief, Office of Engineering and Technology, FCC
- Paul Ransom, Acting Chief, Strategic Planning Division, Office of Spectrum Management, NTIA
- Joe Kochan, Chief Executive Officer, National Spectrum Consortium
- Andy Clegg, Chief Technology Officer, WinnForum
- Ben Rolfe, CTO and Comptroller, UWBA

SESSION:

Andrew Hendrickson, Chief, Office of Engineering and Technology, FCC

- Spectrum is the invisible infrastructure that powers everything from smartphones to satellites.
- FCC OET's mission: ensures efficiency, reliability, and innovative spectrum use.
- Goal: accelerate access across federal and commercial sectors; challenges are both technical and strategic.
- FCC modernization reflects recognition that regulation must evolve; OET ensures technical integrity in policy design.
- Inter-agency coordination: works closely with NTIA and DoD to align national spectrum priorities.
- Collaborative mechanisms: joint spectrum coordination groups and cross-agency planning forums.
- The O3B Act has five main pillars:
    1. Restores FCC auction authority through 2034.
    2. Mandates an 800 MHz pipeline (200 MHz auction within 2 years; 100 MHz mid-band).
    3. Empowers innovation across all bands; modernizes licensing and dynamic sharing; updates unlicensed rules.
    4. Promotes equitable access via rural and small-provider bidding credits.
    5. Aligns spectrum policy with U.S. leadership in 5G, AI, and national security.
- Positions the spectrum policy as a pillar of the Trump administration's economic and security agenda.
- Collaboration, not technology alone, is required to build a secure, adaptive, future-proof ecosystem.
- Emphasized that policy must balance innovation and mission-critical protection.
- Supported pilot programs to test higher power levels and more flexible frameworks under evidence-based rules.

Paul Ransom, Acting Chief, Strategic Planning Division, Office of Spectrum Management, NTIA

- NTIA acts as the President's principal telecom advisor and manages federal spectrum.

- The objective is to balance essential federal missions and growing commercial demand.
- Functions within OSM:
  - Long-term spectrum planning to ensure adequate federal and non-federal access.
  - Led development of the 2023 National Spectrum Strategy and its Implementation Plan.
  - Administers the Spectrum Relocation Fund (SRF) to finance agency studies for sharing and reallocation.
  - Manages Spectrum Pipeline Plans – agency requests for R&D funding to study bands for auction within 8 years.
  - Oversee transition plans, relocation, or modification activities that enable commercial use.
  - Provides technical support to the Technical Panel (FCC, OMB, and NTIA), which reviews pipeline and transition plans.
- Purpose of these mechanisms: allow federal users to upgrade systems while freeing spectrum for auction.
- NTIA provides technical analysis to inform whether bands should be allocated exclusively, shared, or left unlicensed.
- Confirmed that Congress identified three priority bands for O3B ACT implementation.
- First "down payment": 1675 – 1680 MHz segment (≈ 5 MHz) identified at the Sept 2025 Spectrum Symposium.
- Recognized tight timeline (200 MHz auction within 2 years; 800 MHz total pipeline within 8 years).
- Committed to close coordination with agencies and industry to meet deadlines.
- Stressed the importance of stakeholder input to shape policy and technical decisions.

Joe Kochan, Chief Executive Officer, National Spectrum Consortium

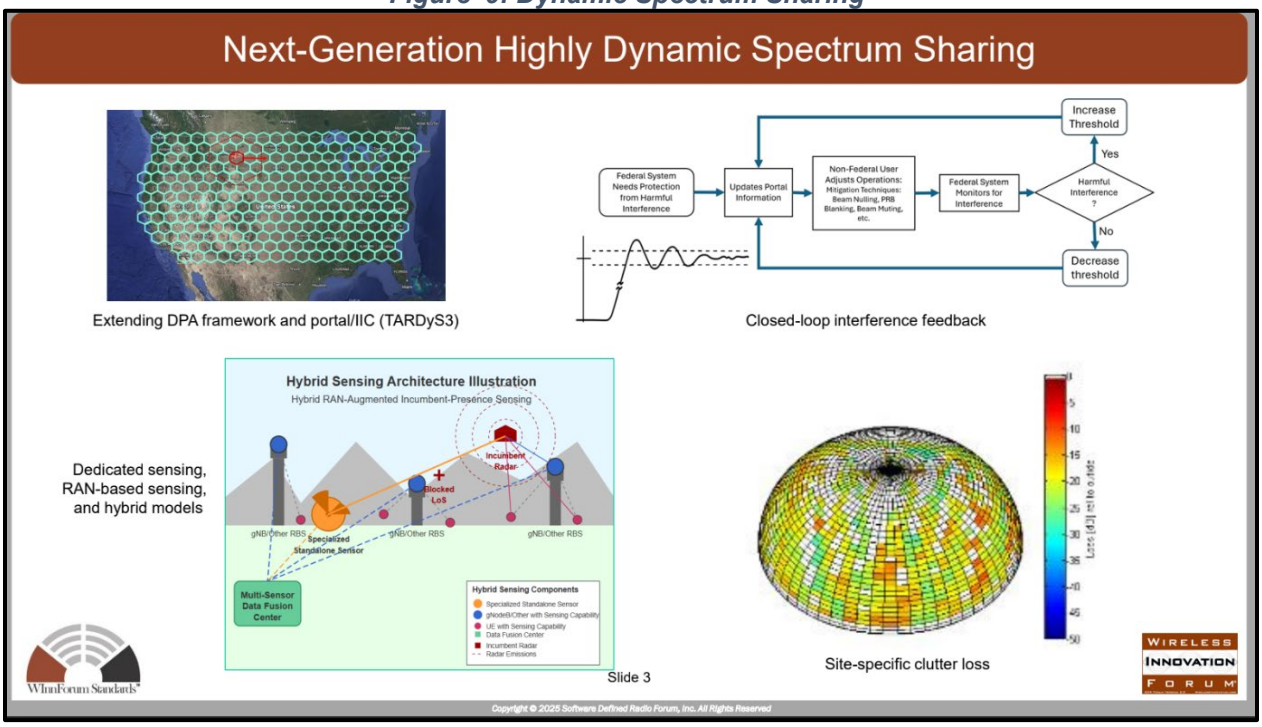
- Represents ≈ 300 members across defense and commercial sectors; ≈ $1.5 B in DoD spectrum R&D projects.
- Partners with DoD through OTAs on wireless and spectrum technology development.
- Key programs:
  - Harmonized Communications.
  - Networking and Spectrum Coexistence projects.
- Asserted that spectrum sharing and coexistence are unavoidable for future bands.
- Three core points:
  - Broaden the definition of sharing beyond "federal vs commercial." Intra-agency users (DoD sub-entities) must coordinate their efforts.
  - Recognize that this is not primarily a technology problem, but a trust and demonstration problem – stakeholders need confidence that new systems won't cause uncontrolled interference.
  - Prototype and demonstrate at scale through federally funded R&D to build confidence and derive data for policy.
- Advocated continuous "prototype-to-policy" loop linking R&D outcomes to regulatory decision-making.

- Emphasized that more funding for demonstration and testing directly improves policy quality.
- Reiterate that collaboration and experimentation with technology are the only paths to shared-use progress.

Andy Clegg, Chief Technology Officer, WinnForum

- WINNFOM develops industry standards for dynamic sharing (CBRS and 6 GHz AFC).
- Created the framework underpinning the CBRS SAS and 6 GHz AFC ecosystems.
- Announced new initiative: Highly Dynamic Spectrum Sharing (HDSS) task group.
- Published Technical Report TR-2016, defining methods to achieve sub-minute coordination.
- Key technical advancements in TR-2016:
    - Drive coordination from minutes (CBRS ≈ 5 min) or hours (AFC ≈ 24 h) to a second-level reaction time.
    - Use Dynamic Protection Areas (DPAs) – country-wide hexagonal cells tracking mobile and airborne incumbents. (see Figure 9 below.)

Figure 9: Dynamic Spectrum Sharing



Source: Wireless Innovation Forum

    - Implement closed-loop interference feedback from incumbents for rapid interference resolution.
    - Apply distributed sensing and AI-assisted detection to improve situational awareness.
    - Incorporate real-world clutter measurements to enhance the accuracy of propagation models.
- Defined “highly dynamic” as coordination in a few seconds instead of minutes or hours.
- Purpose: inform DoD and NTIA’s Advanced Spectrum Coexistence (ASC) research.

- WINNFOM plans to refine TR-2016 through public participation and open feedback.
- Encouraged industry collaboration to implement faster sharing frameworks.

Ben Rolfe, CTO and Comptroller, UWBA

- Presented UWB as a successful long-term example of low-power spectrum sharing.
- Recalled FCC's 2002 decision authorizing 7.5 GHz of unlicensed UWB (3.1 – 10.6 GHz) overlapping incumbent bands.
- Despite initial skepticism, UWB proved technically viable and spawned multiple applications.
- Current UWB applications: keyless entry, precise ranging, file transfer, automotive radar, industrial IoT, wearables, AR/VR, and ultra-low-latency audio.
- Noted that half of today's uses were unimaginable when rules were adopted – underscoring the need for policy flexibility.
- An estimated 21.6 GHz of unlicensed spectrum is now available in the U.S. (including UWB and 60 GHz).
- Urged continued expansion of unlicensed frameworks and adaptive rules for modern technologies.
- Called for technology-neutral and complementary regulation, not zero-sum allocation.
- It is stated that combined technologies create synergy greater than the sum of their individual parts.
- Advocated re-evaluation of assumptions as use cases evolve and for policies favoring experimentation and compatibility.

Panel Discussion / Audience Q&A

- CBRS Effectiveness and Lessons
    - Over 1,000 operators, 200 auction participants, and 421,000 base stations deployed within six years demonstrate the scalability of dynamic spectrum sharing.
    - The CBRS framework created open opportunities for innovation and market entry beyond traditional carriers.
    - Adoption and ecosystem growth occurred at a pace comparable to Wi-Fi but in a much shorter timeframe.
    - Technical refinements are ongoing, including reviews of power limits, out-of-band emissions, and higher-power test pilots through controlled waivers.
    - CBRS established the engineering and policy foundation for future shared-band deployments.
- Government Flexibility in Sharing
    - The second phase of CBRS included significant government adjustments, including a relaxation of up to 60 dB in protection margins for federal radar systems.
    - Federal agencies are now utilizing CBRS themselves, such as in naval shipboard deployments, demonstrating practical coexistence between government and commercial systems.
- Spectrum Pipeline and O3B Act Execution
    - The NTIA has identified initial study bands and acknowledged the compressed timelines required under the 800 MHz mandate.

    - Coordination, engineering analysis, and inter-agency data sharing are underway to meet auction deadlines.
    - The O3B Act framework restores FCC auction authority and positions the agency to lead innovation while safeguarding national-security priorities.
- Unlicensed and Long-Term Protections
    - Unlicensed systems such as those in the 900 MHz band can evolve into critical infrastructure, raising questions about long-term operating certainty.
    - Future rights and adjacent-band interference boundaries must be defined clearly to maintain predictability.
    - Policy should prioritize compatibility and coexistence rather than assigning formal protection status to unlicensed uses.
- Advisory and Coordination Structures
    - With the Commerce Spectrum Management Advisory Committee discontinued, new forums are needed for structured technical engagement.
    - Public, transparent dialogue between government and industry is essential to replace closed one-on-one advocacy and reduce conflicting data submissions.
- Future Sharing Mechanisms and AI
    - No single sharing architecture can accommodate all use cases; multiple mechanisms and a flexible toolbox approach are required.
    - Artificial intelligence can accelerate coordination and improve situational awareness, but cannot substitute for human policy judgment.
    - [**AM Comment**: Federal / commercial spectrum sharing discussions have evolved significantly over the past 5/10 years.]

SESSION 12: THE EVOLVING UPPER 6 GHZ BAND ECOSYSTEM: EMERGING USE CASES, AND THE POLICY PATH AHEAD

MODERATOR: Richard Marsden, Senior Managing Director, NERA
PANELISTS:

- Campbell Massie, Director of Public Policy for North America, GSMA
- Kristine Hackman, Public Policy, Connectivity, Amazon
- Martha Suarez, President, Dynamic Spectrum Alliance
- Audrey Mikula, Vice President, Regulatory Affairs, Charter

SESSION:

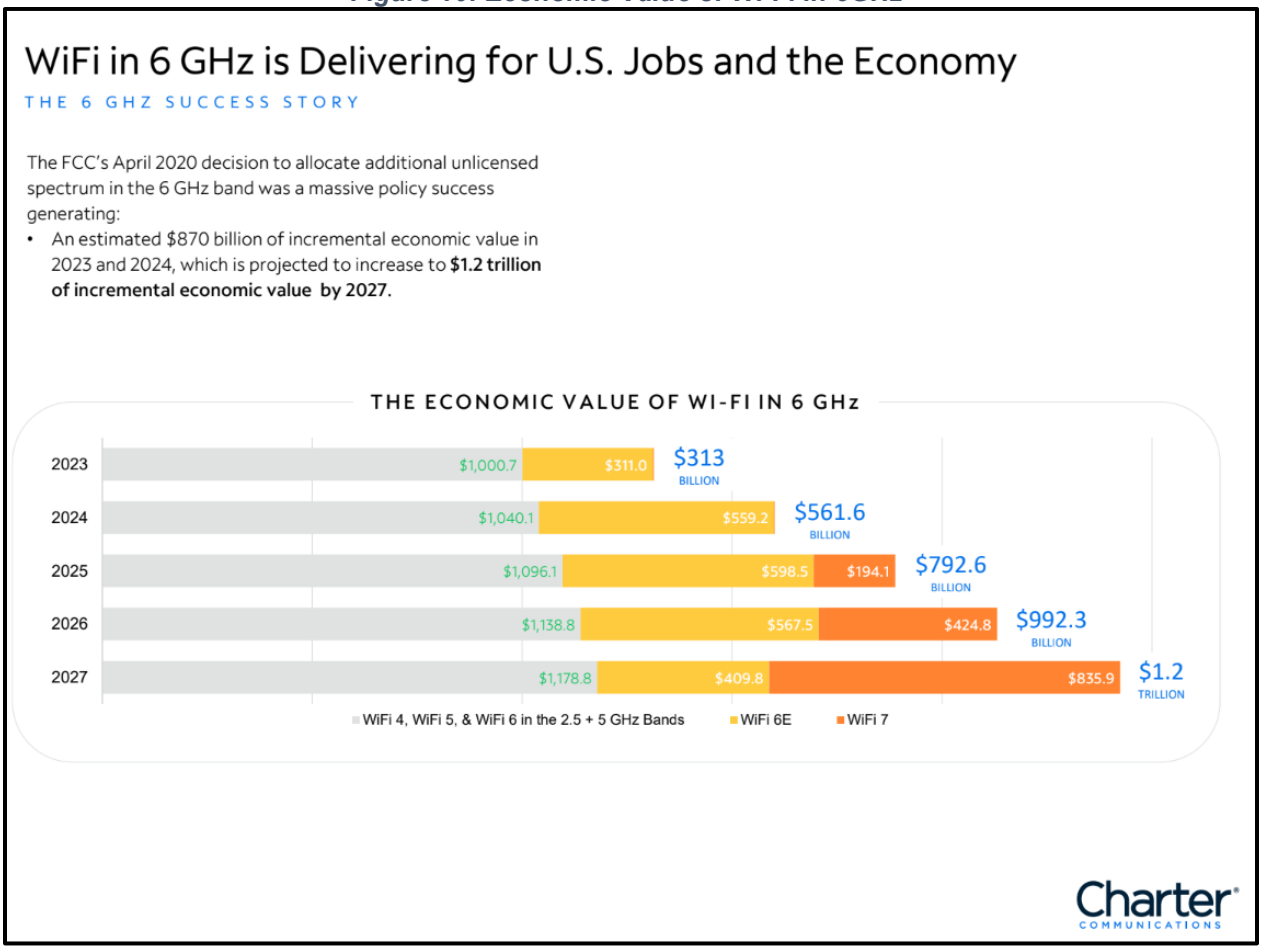
Kristine Hackman, Public Policy, Connectivity, Amazon

- Leads Amazon's domestic connectivity policy covering licensed, unlicensed, and shared spectrum.
- Almost every Amazon device/service relies on spectrum (Echo, Fire TV, Eero, Ring, Kindle, AWS, and Prime Air drones).
- Eero routers now support Wi-Fi 6E / Wi-Fi 7, utilizing the 6 GHz band for client links and mesh backhaul, which boosts performance on both 2.4 GHz and 5 GHz bands.
- Fulfillment centers: thousands of APs per facility, utilizing Wi-Fi, ultrawideband, CBRS, and sub-GHz to run operations efficiently.
- Prime Air drones also rely on unlicensed spectrum.
- Emphasized: unlicensed use reduces congestion and cost across Amazon's retail and logistics network.
- Policy stance: supports global harmonization to achieve economies of scale and foster cross-border innovation; the 6 GHz band is critical to driving device scale and lowering costs.
- Concluded: Amazon benefits from licensed, shared, and unlicensed bands; 6 GHz is a major enabler of innovation.

Audrey Mikola, Vice President, Regulatory Affairs, Charter

- Charter: U.S.-only operator; 58 M locations, 41 states, ~95k employees.
- 30 million broadband subscribers + 11 million mobile lines under Spectrum Mobile.
- Uses unlicensed + shared spectrum + MVNO cellular partners.
- Wi-Fi accounts for 88% of Spectrum Mobile traffic; 82–90% of all U.S. mobile traffic is carried over Wi-Fi.
- The average U.S. home has 21 connected devices, mostly Wi-Fi.
- Wi-Fi 7 (full 6 GHz band) → 2× Wi-Fi 6 speed and 5× capacity.
- Charter tripled Wi-Fi 7 router deployment in Q1 2025, becoming the fastest-growing provider.
- Wi-Fi routers include cloud security and mobile integration features.
- 2020 decision to open the entire 6 GHz band cemented U.S. leadership in Wi-Fi, triggering massive device production and economic impact.
- An estimated $870 billion incremental economic value in 2023 and 2024, which is projected to increase to $1.2 trillion of incremental economic value by 2027. (see Figure 10 below)

Figure 10: Economic Value of Wi-Fi in 6GHz



Source: Charter

- Need for more unlicensed spectrum → higher capacity channels (320 MHz).
- Wi-Fi is the Internet for most Americans; unlicensed spectrum is at the core of connectivity and economic growth.

Martha Suarez, President, Dynamic Spectrum Alliance

- Praised U.S. policy: "the U.S. did it right."
    - Reason 1: Fixed broadband remains the main internet pathway; ITU data shows fixed traffic is ≫ mobile traffic. Wi-Fi is thus the core infrastructure.
    - Reason 2: Large channel widths enable new apps → Wi-Fi 6E/7 support 320 MHz channels; need entire 1,200 MHz for three usable channels.
    - Reason 3: Wi-Fi is market-driven; > 5,000 device models already operate in the mature ecosystem in 5 years.
- Not only Wi-Fi: Bluetooth and IoT are expanding into 6 GHz; unlicensed spectrum serves as a platform for multiple technologies.
- Automatic Frequency Coordination (AFC): a key innovation for standard-power operations, enabling coexistence with fixed microwave links.
- Use cases:

    - Hospitals dedicate specific channels to medical devices for low-latency performance.
    - Schools show dramatic latency improvement with 320 MHz channels.
    - Enterprises need a full band to maintain 160 MHz channels; reduced band → forced 40–80 MHz and performance drop.
    - Rural fixed-wireless Internet Service Providers (ISPs) use unlicensed 6 GHz for broadband where fiber is lacking.
- Economic argument: Delaying allocation incurs an opportunity cost; the U.S. is already realizing benefits after five years.
- Conclusion: U.S. leadership drives global harmonization, benefiting all regions through economies of scale.

Campbell Massie, **Director of Public Policy for North America, GSMA**

- Reported global status: WRC-23 Region 1 identified 6 GHz for mobile; China, India, Brazil adopting mobile use; EU decision expected within weeks, favoring licensed use.
- Data point: Approximately 60% of the world's population will treat 6 GHz as the core mobile band for 6G.
- Mobile requirements: 6G needs wider (≥100 MHz) channels → 6 GHz ideal.
- Acknowledged: U.S. constraints (dense incumbent use) made sharing a practical solution.
- Position: Not advocating U.S. change but flagging future need for exclusive bands for mobile in “O3B Act” 800 MHz search.
- Conclusion: Wi-Fi is important, but 6G capacity pressures demand creative spectrum planning for exclusive mobile use.

Panel Discussion / Audience Q&A

Question 1: Economic value at the margin – is the full band needed or mainly the first ¾ useful?

- Amazon: The entire band supports millions of Wi-Fi networks and dependent apps; the value extends beyond Wi-Fi to the overall ecosystem.
- Charter: Customers use the entire band; 320 MHz channels are critical for low-latency streaming (such as live sports); three wide channels are needed for dense areas. Demand exists for more spectrum.
- DSA: Full band not exclusive to Wi-Fi → also fixed links limit power → need bandwidth flexibility. Hospitals and schools are key segments; the latency difference between 320 and 160 MHz is material. Enterprises lose performance if they are forced to narrow their channels. Countries that delay incur economic opportunity costs.

Question 2: Europe’s upper 6GHz decision → mobile use; does divergence matter?

- Amazon: Yes; lack of harmonization delays innovation and raises costs. AI and LEO Kuiper require global bandwidth. Advocates hybrid sharing as an interim solution.
- Charter: Global harmonization is essential; Wi-Fi is a U.S.-born technology; coalition-building through the NTIA is vital to extend 6 GHz leadership.
- DSA: Europe has opened only the lower 500 MHz; this is short-term adequate but will fail to meet the 2030 Digital Decade targets (1 Gbps per home). Without a full band, EU enterprises are less competitive compared to those in the U.S.; deployment is not expected until 2030, resulting in a large opportunity cost.

- GSMA: Mobile industry eyeing 7.1 GHz and above; agrees U.S. must still find future exclusive bands for 6G.

Question 3: The 6 GHz spectrum has limited penetration capabilities; why is it not used for unlicensed indoor and licensed outdoor applications?

- [**AM Comment**: No answers to this question!, Interesting.]

SESSION 13: SPECTRUM EXPANDING CONNECTIVITY TO RURAL AND TRIBAL COMMUNITIES – ENSURING A RESPONSIVE, STREAMLINED, AND INCLUSIVE APPROACH TO CLOSING THE DIGITAL DIVIDE

MODERATOR: Anne Keeney, Senior Vice President, Glen Echo Group
PANELISTS:

- Brooke Donaldson, Chief of Staff, NTIA
- Joseph Calvaruso, Chief, Wireline Competition Bureau, FCC
- Alan Ingram, Principal, Secretariat

SESSION:

Ann Keeney, Senior Vice President, Glen Echo Group

- Introduced the panel as the final session of the conference, which focused on rural and tribal connectivity and the enduring challenge of closing the digital divide.
- Noted that despite significant funding and policy attention, connectivity gaps persist and remain a defining equity issue.
- Framed the conversation around BEAD, the 5G Fund, and federal-state collaboration, emphasizing the importance of streamlining and inclusion.

Brooke Donilon, Chief of Staff, NTIA

- Overview of the BEAD Program:
    - $42.45 billion broadband deployment program funded by the 2021 Infrastructure Law (IIJA).
    - NTIA refocused the program in mid-2024 through an updated Restructuring Policy Notice, which restored the law's original statutory intent, emphasizing network buildouts rather than extraneous mandates.
    - Each state is required to conduct an additional "Benefit of the Bargain" (BOB) round that is technology-neutral.
- Implementation Progress:
    - 52 of 56 states and territories have now submitted final proposals (as of September 4).
    - Early analysis indicates $19 billion in savings, suggesting that only half of the originally allocated funding may be required.
    - NTIA has a self-imposed 90-day approval deadline; several states are expected to begin deployment imminently.
- Streamlining and Permitting:
    - NTIA simplified the BEAD application to cut redundant reviews and reduce state-federal back-and-forth.
    - Introduced the Environmental Screening and Permitting Tracking Tool, which automates NEPA approvals via 47 categorical exclusions expected to fast-track ≈95 % of BEAD projects.
    - Example: The electronic ESA §7 review process now yields approval within an hour, versus the prior 90–120 days.
- Government Shutdown Impact:

    - None anticipated that the BEAD staff would be funded through the grant program, rather than appropriations. NTIA continues to move forward full steam ahead to meet deadlines.
- Technology Neutrality and LEOs:
    - Disputed the idea that LEOs are dominating; outcomes vary widely by state (e.g., Louisiana ≈ 80 % fiber; Nebraska ≈ 50 % fixed wireless).
    - True neutrality means "right technology for the right geography."
    - LEO usage expected to remain <1 % of total; not "runaway."
    - Argued that LEOs are not unproven, as performance has advanced to gigabit-level service; the challenge is more educational than technical.
    - Warned against policy "thumbs on the scale" favoring any one technology, which can distort markets and suppress innovation.
- Affordability and Adoption:
    - BEAD focuses on deployment, not rate regulation (explicitly barred by statute).
    - Participants must offer a low-cost service option.
    - By removing non-statutory mandates (climate, open-access, and net-neutrality conditions), NTIA expects to reduce end-user costs.
- State Capacity and Workforce:
    - Praised state broadband offices for meeting aggressive timelines and producing high-quality proposals despite limited resources.
    - Highlighted NTIA's efforts to support workforce development and permitting reform at the state level.
- On Non-Deployment ("Savings") Funds:
    - Acknowledged public interest in potential $19 billion windfall, but stated NTIA remains focused on completing deployment reviews before considering redistribution or re-use.
- Success Definition (Five-Year View):
    - BEAD will be successful when everyone is connected, and no future subsidy program is necessary, the final push to close the divide.
    - Four-year build-out window is ambitious but achievable.

Joseph Calascione, Chief, Wireline Competition Bureau, FCC

- Complementarity of BEAD and 5G Fund:
    - BEAD ($42B) and the 5G Fund ($9B) must be synchronized to avoid duplication.
    - 5G Fund rollout should follow BEAD to ensure bidders know where infrastructure (e.g., fiber backhaul) will exist.
    - Then-Commissioner Carr's earlier dissent argued the 5G Fund R&O was premature ("cart before the horse").
- Streamlining Under "Build America" Initiative:
    - FCC advancing proposals to cut red tape, accelerate applications for legacy network replacements, and modernize.
    - Exploring auto-grant mechanisms for low-risk service transitions and eliminating notice requirements with no opposition.

    - Investigating state and local permitting barriers (siting, rights-of-way) through a new Notice of Inquiry to support broadband rollout.
- On LEO Integration:
    - LEOs mitigate traditional satellite capacity constraints by deploying constellations rather than single GEO satellites.
    - FCC examining how to count satellite-served areas in broadband maps and high-cost programs.
    - LEO flexibility and density make them a viable complement to fiber and terrestrial fixed wireless.
- State-Level Variation:
    - Challenges differ based on how broadband offices are structured under Governors' offices, Departments of Commerce, or PUCs.
    - Commerce-aligned offices emphasize workforce; regulatory agencies focus on sitting and permitting.
- Affordability Context:
    - The 5G Fund primarily addresses availability, rather than end-user pricing.
    - Subsidies reduce per-location deployment costs (tens of thousands of USD in some BEAD cases), thereby lowering the monthly cost burden for consumers.
- Future of 5G:
    - Main barriers: workforce and terrain (topography for both fiber and wireless).
    - Workforce needs are ongoing; one-and-done maintenance will require sustained skilled labor.
    - Stressed technology neutrality fiber is not always the right fix everywhere.
- Success Definition:
    - Focused on the broadband map as the key metric: when it reflects near-universal service coverage.
    - Synchronization between BEAD and 5G Fund will determine overall success.

Allan Ingraham, Principal, Secretariat

- Policy Framework:
    - Challenging the notion of a "level playing field," BEAD prioritizes the lowest-cost compliant solution, not pure neutrality.
    - Historical programs (CAF, RDOF) used speed and latency tiers that effectively favored certain technologies; future frameworks should learn from BEAD's mixed-tech approach.
- Economic Modeling of Adoption:
    - Adoption depends on more than availability; many rural households value lifestyle attributes (e.g., space, privacy) that outweigh the considerations of broadband.
    - Post-pandemic shifts (remote work, education) have altered that calculus, increasing broadband's perceived necessity.
- Use of Savings ("Under-Spend") Funds:
    - Geographic disparities may result in states with fewer eligible households (e.g., NH, CT) having disproportionate surpluses relative to high-need states (e.g., OK, PA).

    - Asked how redistribution for adoption and promotion efforts might be handled.
- Permitting and Implementation:
    - Permitting remains a decisive factor in success.
    - Supported NTIA's automation tools and encouraged expanding incentives for state-level permitting reform.
- Definition of Success:
    - Recalled historical precedent: regulated monopoly model achieved >99 % household connectivity under universal-service mandates.
    - Modern equivalent: 99 %+ of U.S. households with at least one broadband provider offering reasonable access irrespective of technology (fiber, fixed wireless, or satellite).

Panel Discussion / Q&A

- U.S. Government Shutdown Impact:
    - BEAD operations unaffected by potential federal shutdown; employees funded from grant allocations, not appropriations.
    - "Full steam ahead" toward meeting the 90-day deadline.
- Technology Neutrality and LEOs:
    - Disputed claim that LEOs "ran away" with the BOB round; emphasized state-by-state variation (e.g., Louisiana ~80% fiber; Nebraska ~50% fixed wireless).
    - True neutrality: right tech for right terrain.
    - LEO share is expected to remain below 1%.
    - LEO technology is now proven to operate at gigabit speeds, but it remains undercommunicated to policymakers.
    - NTIA's goal: avoid distorting markets by favoring one technology over others (a problem in the prior administration's fiber-first approach).
- Affordability and Non-Deployment Funds:
    - BEAD is strictly a deployment program; Congress prohibited rate regulation.
    - Requires providers to offer a low-cost service option but excludes climate, open-access, and rate-setting mandates that would inflate costs.
    - Regarding $19B in savings: "We're focused on deployment first; conversation on non-deployment uses will follow."
- Streamlining and "Build America" Initiative:
    - FCC pursuing rulemaking to accelerate network upgrades and tech transitions.
    - Considering auto-grants for low-risk network modernizations and removing redundant customer notice rules (400+ notices in 2 years with zero opposition).
    - Recently opened a Notice of Inquiry to identify state/local permitting and siting barriers that impede broadband rollout.
- LEO Satellites and Program Integration:
    - LEOs solve legacy satellite capacity limits by deploying large constellations instead of single satellites.
    - The FCC is evaluating how to reflect LEO-served areas in broadband maps and high-cost programs accurately.

- Described LEOs as “a different species of satellite technology” that broadens rural options.

- Technology Neutrality and Economics:
  - BEAD is not a “level playing field,” it prioritizes the lowest-cost compliant solution at the statutory 100/20 Mbps threshold.
  - Earlier programs (CAF, RDOF) were parameterized with biases toward speed and latency tiers, inherently favoring some tech types. [**AM Comment**: Favoring fiber that coincidentally provides more jobs.]
  - Recommended that the FCC use BEAD outcomes to refine future broadband program parameters.
- Policy and Adoption Economics:
  - Adoption depends on behavioral and economic factors beyond availability.
  - Some rural residents choose locations for lifestyle reasons unrelated to connectivity.
  - Post-pandemic realities (remote work, education) have shifted preferences and increased broadband necessity.

End of Conference / Start of Halloween.