



# WISPAPALOOZA

BROADBAND WITHOUT BOUNDARIES

**PREMIER  
SPONSOR**

 **CTiconnect™**

 **mitotec™**

 **Ippay™**

*Celebrating*



# Spectrum Update Part I: CBRS (3550-3750 MHz), 6 GHz, Important NTIA Decisions, 12 GHz, And More

Access to spectrum is vital to our industry's growth. There are a number of rulemaking proceedings at the FCC that will determine what spectrum you will be able to use in the future. There are also some important decisions from NTIA you need to know. This is Part I of the Spectrum Update panel and it will give you important updates about those spectrum allocation and management topics that can help you deploy fixed wireless broadband.

# Moderator & Speakers

Josh Luthman - Imagine Networks, President – [josh@ohbroadband.com](mailto:josh@ohbroadband.com)

Louis Peraertz - WISPA, VP of Policy - [lperaertz@wispa.org](mailto:lperaertz@wispa.org)

Richard Bernhardt - WISPA, VP of Spectrum & Industry - [rbernhardt@wispa.org](mailto:rbernhardt@wispa.org)

Steve Coran - Lerman Senter PLLC, Attorney [-scoran@lermansenter.com](mailto:scoran@lermansenter.com)

Fred Goldstein - WISPA Technical Consultant – [fred@interisle.net](mailto:fred@interisle.net)

# Before We Get Started...

- Please mute your devices.
- Disclaimer:
  - The information contained in this presentation is general and is not offered as legal or other professional advice or direction.
  - This presentation is not intended to create an attorney-client relationship.
  - You are strongly encouraged to consult with your attorney(s), consultant(s), or financial advisor(s) if you have specific questions.
  - Any reliance on the information in this presentation is taken at your own risk.

# Spectrum Bands And Topics We Will Cover

- Important updates for the Citizens Broadband Radio Service band (3.55 GHz-3.70 GHz)
- Important NTIA Decisions related to licensed and unlicensed spectrum for the Broadband Equity Access and Deployment program (BEAD)
- 6 GHz proceedings at the FCC
- 12 GHz and 13 GHz proceedings at the FCC

# CBRS - Citizens Broadband Radio Service

Shared Spectrum - The Great Experiment – Using SAS and ESC

Tiered Operation – PALS and GAA

Protect Incumbents – US Government Uses (e.g. Radar, Testing); FSS

Shared between incumbents and GAA and PAL operators

Technology Neutral – Different Air Interfaces, Timing, Deployments

Dozens of Vertical Markets - Choices

Secondary Market Potential – Leasing and Acquisition

Opportunistic Use – Use PALs as GAA when no PPA is recorded

Private Networks, Neutral Host, and more

# CBRS (3550-3700 MHz) Today – Stats (Updated)

As of this month...By the Numbers:

- Category A/B CBSDs: CBRS has over 400,000 CBSDs in the field with active grants.
- CPIs Certified: Over 5,500 CPIs have been certified and are authorized for CBSD registration
- Approved Equipment: More than 185 FCC approved devices are certified for operation in the CBRS ecosystem
- Spent on PALs: \$4.6B spent at Auction 105 for PALs - PALs now deploying; Secondary market Available. Well into 10 year license period.
- Flexible Deployments: Technology and Air Interface Neutral

# Who Is Using CBRS?

K-12, Higher Education, Remote Learning

Hotels and Venues, Large Events, Temporary Events

Airports and Transportation Hubs, even Mine Transportation, Trains

Retail and Complexes

MTEs/MDUs & Multifamily (New Construction and Updated)

Residential (All Kinds)

Business, Offices, Industry, Manufacturing

Agriculture, Precision Ag, Geofencing, and more

Medical Offices, Hospitals, Doctors Offices and Remote Medicine

IoT/IIoT

Private Networks

Neutral Hosts

More...

# What Is CBRS Release 2? Features Beyond The Baseline Specifications

- **Release 2 Compatible** - Backwards compatible meaning any approved feature, function or capability in Release 2 must function completely with the baseline standards.
- **Release 2 Features** - Optional functions which are adopted by one or more Spectrum Access System operator and one or more CBSD manufacturer for use in the field.
- **Release 2 Functionality is Voluntary:** Manufacturers of CBSDs and SASs must agree to adopt and integrate Release 2 functions - Encourages new uses.

# Examples Of Release 1.5 And Release 2 Features, Functions And Capabilities

- Grouping (Such as Single Frequency Group or SFG)
- DAS (Distributed Access Systems) - Initially Passive DAS; Consideration of Active DAS
- Enhanced Antenna Pattern (Recognition)
- Flexible Grants
- 2D/3D Antennas and New Antenna Formats

# Some Possible Warnings About Release 2

Not every function is supported by a SAS or CBSD Manufacturer.  
Changes in functions adoption might cause downtime.  
Release 2 functionality could be subject to regulatory review.  
May be complicated...

# What Can You Do If You Have Interference, Downtime, Or Other Problems?

- Speak with your SAS. Consider your SAS options. CBRS 2.0 may help you.
- Coordinate.
- Speak with the FCC - Rules are there for a reason.
- Research issues of encumbrances and put them into your network plan.
- Have fail-over or a back-up plan.

# Heartbeat And Transmit Expiry Changes

- Changed from uniform 4 minutes and 59 seconds (to required shut-off to:
- In non-DPA areas, up to 24 hours – most SASs utilize something around six hours.
- In 3650-3700 MHz, up to 24 hours – most SASs utilize something around six hours.
- 3550—3650 MHz in DPA areas: Current rule remains intact at 4 minutes and 59 seconds.

# The New CBRS 2.0 Has Arrived – 72 Millions Additional Americans Now Have Access to CBRS

Better understanding of impacts of DPA and PDPA

Changes to the propagation modelling to accommodate more than one propagation model.

Take into account clutter and terrain.

Accommodate new approach with increased heartbeat response times possible.

Predictability, less protection needed, more operations possible.

# The CBRS August 2024 FCC Notice Of Proposed Rulemaking: Major Areas of Almost 50 Different Possible Updates and Changes

- Changes in Power Considerations: EUD/UE, Cat A, Cat B, Other Cat's, Special Power Rules
- OOB Levels and Interaction with C-Band and 3450-3550 MHz Licensed Adjacent Bands
- Information and Communication – Should it be Shared?
- GAA Coexistence – Mandatory by SAS?
- OCONUS – Offshore Uses
- Changes to FSS (Fixed Satellite System) Protections?
- ESC, IIC, TARDYS3, Portal Reporting
- Private Networking Rule Accommodations
- Indoor Use and Autonomy/CPI Use
- Update CBRS 2.0, Heartbeat and Expiry Changes, 3650-3700 MHz Part 90 Removal

# Should CBRS Power Limits Be Revised?

- Some parties (e.g., mobile carriers, DISH) want to raise the CBRS power limit well above the current 47 dBm/10 MHz, possibly to 72 dBm/10 MHz like 3.7 GHz. WISPA opposes for several reasons.
  - Larger PAL Protection Areas will result in less available GAA spectrum
  - More receiver overload and problems with adjacent-channel rejection
  - Asymmetric interference in GAA: MNOs can afford higher power than most of us so they will interfere with us more than we will interfere with them
  - We just got DPA neighborhood sizes reduced. Higher power needs larger neighborhoods.
- We don't see a problem with a 6 dB increase in Category A indoor power levels (to 36 dBm/10 MHz)
- We don't see a problem with a 3 dB increase in EUD power levels (to 26 dBm/10 MHz)

# CBRS Emission Rules May Be Loosened

- CBRS now has strict out-of-band and out-of channel emission rules
  - -13 dBm/MHz in adjacent channel, -25 dBm/MHz within 20 MHz of CBRS, -40 dBm/MHz beyond
  - These are *conducted* power, not EIRP, so antenna gain is not factored in
- 3.7 GHz band is allowed -13 dBm/MHz out of band, but 3.45 GHz band has CBRS-like rules
- Some mobile carriers and their vendors want -13 dBm/MHz adopted for CBRS
- WISPA proposes compromise:
  - -40 dBm removed; -25 dBm is the lowest requirement. This makes some filters unnecessary.
  - -25 dBm and -13 dBm left intact, to minimize in-band noise, with one exception
  - -3 dBm/MHz within 1 MHz of occupied channel. This may allow more equipment to be allowed to reach 47 dBm EIRP, as some devices' power is limited by near-channel emissions. 6 GHz has a similar rule.

# Other Possible Comments To CBRS NPRM

- Outside of DPA neighborhoods, CBSDs can now operate for 6+ hours even if they lose SAS connectivity, vs. 5-minute rule which still applies in them.
  - We proposed allowing up to 30 minutes of operation inside neighborhoods *if and only if* SAS cannot be reached. Thus a loss of connectivity would not be treated like a DPA activation.
  - This is a bit of a stretch from NTIA and DoD but doesn't pose major risks to them
- WISPA has asked for CPEs that have gain antennas and conducted power below 21 dBm/10 MHz to be allowed up to 36 dBm EIRP while treated as EUDs, not CPE-CBSDs
  - NTIA rejected this in 2016, which is why we need to register CPE-CBSDs, but as other rules have been relaxed this could be too.
- No mandatory TDD synchronization or “coexistence” rules

# NTIA Clarifies CBRS GAA Is Licensed Spectrum

- In January 2023, FCC Broadband Data Task Force issued a new Code 72 for fixed wireless deployments using licensed-by-rule spectrum
- This made the lack of clarity in the May 2022 BEAD NOFO more problematic. The BEAD NOFO does not mention Code 72
- WISPA was concerned that, for the purposes of the BEAD program NTIA would consider fixed wireless deployments using licensed-by-rule spectrum to not be reliable broadband service and will therefore consider locations using that spectrum to be unserved and subject to overbuilding using BEAD funds

# NTIA Clarifies CBRS GAA Is Licensed Spectrum

- In the first two months of 2023, WISPA engaged in many advocacy efforts to urge NTIA to clarify that CBRS GAA, and other licensed-by-rule spectrum, is licensed spectrum and should be considered reliable broadband service
- In January 2023, WISPA met with NTIA officials and asked them to confirm that NTIA plans to treat broadband deployments using licensed-by-rule spectrum to serve last mile locations (Code 72) in the same manner as NTIA is treating deployments using spectrum allocated by individuals held licenses (Code 71)
- Those staffers could not confirm NTIA's plans for Code 72 spectrum

# NTIA Clarifies CBRS GAA Is Licensed Spectrum

- In mid-February 2023, WISPA sent Assistant Secretary and NTIA Administrator Alan Davidson a letter that formally requests that NTIA treat broadband deployments using licensed-by-rule spectrum to serve last mile locations (Code 72) in the same manner as NTIA is treating deployments using spectrum allocated by individual held licenses (Code 71)
- WISPA letter details Congressional and FCC precedent that support a decision that licensed-by-rule spectrum should be treated the same as spectrum allocated by individual licenses

# NTIA Clarifies CBRS GAA Is Licensed Spectrum

- In November 2023, NTIA published a 5<sup>th</sup> Version of its Frequently Asked Questions document about the BEAD program
- The November 2023 FAQ clarifies that fixed wireless deployments using CBRS GAA spectrum, or other licensed-by-rule spectrum will be considered reliable broadband service for the purpose of the BEAD program

# Alternative Technologies For BEAD

- On August 26, 2024, “in response to inquiries from Eligible Entities and other stakeholders,” NTIA released Proposed Guidance for Alternative Technologies
  - Intended to both reduce the number of locations eligible for BEAD funding and increase participation from entities proposing to use non-fiber infrastructure
  - Examples of Alternative Technologies include unlicensed fixed wireless (ULFW) and Low-Earth Orbit satellite
  - Comment deadline of September 10, 2024
  - Final Guidance can be expected fairly soon
  - States may be able to apply final guidance retroactively

# Alternative Technologies For BEAD

- Alternative Technologies is “any broadband access technology that terminates at the end user’s location or premises and does not qualify as Reliable Broadband Service, including ULFW and LEO, but meets the BEAD Program’s minimum technical requirements of speeds of not less than 100 Mbps for downloads and 20 Mbps for uploads and latency less than or equal to 100 milliseconds.”
  - Could also include Free-Space Optics, other technologies

# Alternative Technologies For BEAD

- Locations Where Alternative Technologies Already Exist
  - Eligible Entities can consider Alternative Technologies for BEAD where . . .
    - No prospective subgrantee has submitted an offer to deploy Reliable Broadband Service, or
    - Project areas for which prospective subgrantees have submitted proposals to deploy “Reliable Broadband Service” only at subsidy amounts that exceed the Extremely High Cost Per Location Threshold
  - Eligible Entities must determine . . .
    - Where an existing or completed enforceable commitment to deploy an Alternative Technology is subject to ongoing network performance monitoring
    - Where an existing Alternative Technology provider can demonstrate that it currently meets the BEAD Program requirements
    - Where the Eligible Entity may identify costs for Alternative Technology projects that are reasonable and necessary to ensure coverage of all unserved and (where financially feasible) underserved locations within their jurisdiction

# Alternative Technologies For BEAD

- Case 1 – Enforceable Commitments for Alternative Technologies
  - Based on FCC’s Broadband Funding Map, are there enforceable commitments for broadband deployment?
    - Includes CAF, RDOF, ReConnect, ARPA, CPF, state programs if shown on Map
  - If so, does the funding program include network performance monitoring that verifies that the service is provided at or above the BEAD Program’s benchmark for at least four years after the date of submission of the Final Proposal?
    - Ongoing network performance monitoring and additional oversight provided by these programs is sufficient to mitigate the performance concerns related to Alternative Technologies and to consider these locations served
  - Eligible Entities with locations that fall into this scenario should collect documentation that supports this determination and indicate in the Final Proposal that coverage for these locations is provided by the applicable Alternative Technology provider

# Alternative Technologies For BEAD

- Case 2 – Provider Can Demonstrate that It Currently Meets BEAD Requirements for Alternative Technology Deployments
  - If Case 1 does not apply, Eligible Entities must determine if Case 2 applies
  - Eligible Entity must determine whether an Alternative Technology provider serving some or all locations in the project area can demonstrate that it currently meets the BEAD Program requirements
    - If Alternative Technology service is already meeting BEAD program requirements, then BEAD funds are not necessary for those locations and will not be allowed

# Alternative Technologies For BEAD

- Case 2 (con't.)
  - For locations where the National Broadband Map shows an existing Alternative Technology service, Eligible Entities are required to gather more information about the sufficiency of the existing service to determine whether a BEAD deployment project is reasonable and necessary
  - An Eligible Entity must give an Alternative Technology provider that is currently offering services the opportunity to demonstrate to the Eligible Entity its capability to offer BEAD qualifying services to all locations in the project area
  - Eligible Entities must consider two components:
    - whether the existing Alternative Technology provider possesses the financial and managerial capacity to deliver service meeting the BEAD Program's technical requirements to all locations in the project area, and
    - whether the existing Alternative Technology provider has the technical and operational capacity to deliver service meeting the BEAD Program's technical requirements to all locations in the project area

# Alternative Technologies For BEAD

- Case 2 (con't.)
  - Technical Capacity
    - Existing Alternative Technology providers must demonstrate that they can provide a capacity of at least 5 Mbps or a usage allowance of 2 terabytes (TBs) per month for each broadband serviceable location (BSL) in the project area within four years
    - Eligible Entities can also establish other criteria
  - Eligible Entities must afford providers of Alternative Technologies at least seven to indicate an interest in qualifying under Case 2 and 30 days to submit necessary documentation
  - Notification via Public Notice or direct contact
  - Note: Providers that were identified in Case 2 but did not timely respond to the Eligible Entity will be ineligible for BEAD subgrants

# Alternative Technologies For BEAD

- Case 3 – BEAD Investment in Alternative Technologies
  - If neither Case 1 or Case 2 apply, Eligible Entities must identify a last-mile broadband deployment project to serve the relevant unserved or underserved locations in order to make the required Final Proposal certification that service will be delivered to all unserved and (as financially feasible) underserved locations

# Alternative Technologies For BEAD

- Awarding Alternative Broadband Technology Subgrants
  - Selection Mechanism
    - Eligible Entities may therefore award subgrants for Alternative Technology projects through a variety of competitive means, including . . .
      - a selection round open to all types of eligible providers and technologies, or
      - a selection round seeking only Alternative Technology proposals, following a subgrantee selection process open to Priority Broadband Service and Reliable Broadband Service projects

# Alternative Technologies For BEAD

- Selection Mechanism (con't.)
  - If, after soliciting proposals, the Eligible Entity has received no proposals to serve a location or group of locations that are unserved, underserved, or a combination of unserved and underserved, the Eligible Entity may engage with existing providers and/or other prospective subgrantees to find providers willing to expand their existing or proposed service areas
  - Eligible Entities may select a proposal for an Alternative Technology only where there is no Reliable Broadband Service technology meeting the BEAD Program's technical requirements that would be deployable for a subsidy of less than the EHCPLT at a given location
    - Eligible Entity is authorized to select a proposal involving a less costly technology for that location, even if that technology does not meet the statutory definition of Reliable Broadband Service but otherwise satisfies the BEAD Program's technical requirements

# Alternative Technologies For BEAD

- Subgrantee Qualifications
  - BEAD NOFO applies
  - Eligible Entity must ensure that the prospective subgrantee has the competence, managerial, and financial capacity to meet the commitments of the subgrant, as well as the technical and operational capability to provide the services promised in the subgrant in the manner contemplated by the subgrant award
  - To meet the minimum technical qualification, a proposed BEAD deployment project relying on Alternative Technologies for the delivery of last-mile service must include a certification and/or documentation that the subgrantee is able to provide at least 5 Mbps of capacity (or 2 TBs of usage per month) to each BSL in the project area where a subscriber requests and is provisioned service

# Alternative Technologies For BEAD

- Subgrantee Obligations
  - Must comply with all BEAD requirements
  - In addition, given the higher geographic variability in performance compared to fiber networks, Eligible Entities may require higher spatial sampling ratios for Alternative Technology projects and extend sampling requirements to individual geographic areas rather than the whole state or territory

# 6 GHz Standard Power Outdoor and Low Power Indoor are Live and the Ecosystem including AFC Systems are Operating. - The Band is Open

- About 25 Devices are Certified and Approved by the FCC. More each week see the FCC Equipment Authorization System (EAS) for updates.
- Multiple AFC System Operators are Approved and Certified for Operation. - Many are different.
- Use available synergistic with 5 GHz unlicensed.
- 850 MHz of Standard Power Outdoor with Channels as Large as 360 MHz.
- 1200 MHz of Low Power Indoor.

# 6 GHz License Exempt - 1200 MHz Low Power Indoor and 850 MHz Standard Power Outdoor

- Shared spectrum primarily with licensed 6 GHz PTP backhaul licensed operators
- Coordinated by an Automated Frequency Coordination System or AFC System (presently 13 FCC conditionally approved applicants) for SPO
- Power similar to 5.8 GHz Band
- AFC System provides spectrum inquiry on available frequency ranges and permitted operational power
- Can be an extension of Wi-Fi but also other air-interfaces (Tech Neutral)

# What Is Required To Operate 6 GHz?

Approval of Standard Power Devices and any Proxies (Network Devices).

Approval and Certification of AFC Systems.

Registration of devices with authorized AFC Systems.

Possible registration in multiple countries.

Follow FCC Rules and industry standards.

# 6 GHz (Part 15) - Characteristics of Standard Power Outdoor Operation

Band: 5.925-7.125 GHz (Low Power Indoor and Standard Power Outdoor)

Part 15 (license Exempt) shared with incumbents 6 GHz licensed PTP (commercial backhaul) and fixed satellite services (FSS), and Broadcast Auxiliary Services

Extension of Wi-Fi Bands, but Air Interface Agnostic - Will be Widely Used

Channel Sizes up to 160 MHz

Coordinated by Automated Frequency Coordination System or AFC System

Incumbents record their use in the FCC Uniform Licensing System (ULS)

# Use Characteristics Of Standard Power Device (SPD) In 6 GHz - AFC Controlled

**Power:** Operates in U-NII-5 (5.925-6.425 GHz), U-NII-7 (6.525-6.875 GHz) -

Maximum EIRP 36 dBm and Maximum Power Spectral Density: 23 dBm/MHz in U-NII-5 and U-NII-7

Applies to Standard Power Access Points and Fixed Clients controlled by the AFC

Client devices *not* directly controlled by the AFC limited to 6 dB below their associated AP, thus no more than 17 dBm/MHz and 30 dBm total.

# Why Must I Use An AFC System? Will It Cost Me?

AFC Systems are designed to protect incumbent operators while providing guidance/coordination on available frequencies and power that can be used in the band.

No aggregate interference is calculated.

AFC Systems do not talk with one-another.

You choose from any authorized AFC operator.

Yes...there will likely be a charge to use an AFC System.

# The Good News...It's Beginning

FCC has issued a Public Notice allowing for the beginning of operations (no longer conditional) for seven AFC System Operators. Others are also in progress but not yet fully authorized.

FCC has placed a new condition on AFC System Operators to have a interference mitigation reporting system.

FCC has begun approving compatible Standard Power outdoor ecosystem equipment.

# 6 GHz VLP, Geofencing

- Very Low Power (primarily for indoor but also outdoor uses)
  - Authorized in November 2023 for -5 dBm/MHz PSD and 14 dBm maximum in U-NII-5 and U-NII-7
- Protecting Incumbents by Geofencing (see NPRM) – not yet fully designed by the rules – may allow 6 dB higher power.
- Allows diverse uses and devices, including in cars
- Useful indoors and outdoors. Outdoor devices may not be installed on fixed infrastructure (poles, buildings)

# 12.2-12.7 GHz And 12.7-13.25 GHz

- In May 2023, FCC adopted Report and Order, Further Notice of Proposed Rulemaking for 12.2-12.7 GHz band and Notice of Proposed Rulemaking for 12.7-13.25 GHz band
  - More than 1000 MHz of spectrum
  - Consideration of both bands together likely intended to create “wins” for all – fixed, mobile, licensed, unlicensed
- Report and Order
  - “Not in the public interest to add a mobile allocation to permit two-way terrestrial 5G services . . . based on the current record.”
  - Significant concerns about interference to satellite operations

# 12.2-12.7 GHz And 12.7-13.25 GHz

- 12.2-12.7 GHz band
  - One-way communications
  - Lower power to protect existing DBS
  - MVDDS licensed incumbents, but very little commercial deployment
  - DISH holds about 80% of licenses
  - Also DBS receiver dishes
- 12.7-13.25 GHz band
  - Used for mobile Broadcast Auxiliary Services, fixed microwave service and CARS
  - Federal use by NASA at Goldstone, CA

# 12.2-12.7 GHz And 12.7-13.25 GHz

- FCC Proposals for 12.2-12.7 GHz Band
  - Seeks comment on expanded terrestrial use
    - One-way, two-way, point-to-point, point-to-multipoint
  - Seeks comment on appropriate power level to enable expanded terrestrial use while protecting incumbents
  - Seeks comment on coordination requirements
- FCC Proposals for 12.7-13.25 GHz Band
  - Proposes mobile operations, but seeks comment on an alternative option for sharing the band through the “implementation of certain sharing methodologies among incumbents and new entrants”
  - Proposes exclusive licenses
  - Re-location of incumbents?

# 12.2-12.7 GHz And 12.7-13.25 GHz

- WISPA Positions on 12.2-12.7 GHz Band
  - Allow fixed terrestrial use on a secondary, shared basis
  - Nationwide, non-exclusive licenses with registration of point-to-point and point-to-multipoint operations
  - Coordination through registration with Automated Frequency Control (AFC) system modeled on 6 GHz AFC to protect incumbent MVDDS and DBS operations
  - Periodic re-check of database for changed incumbent operations
  - If licensed, then county-based licenses with cap of 40% of spectrum
  - Opportunistic use when and where licensed services are not in use

# 12.2-12.7 GHz And 12.7-13.25 GHz

- WISPA Positions on 12.7-13.25 GHz Band
  - Allow fixed terrestrial use on a secondary, shared basis
  - Nationwide, non-exclusive licenses with registration of point-to-point and point-to-multipoint operations
  - Coordination through registration with Automated Frequency Control (AFC) system modeled on 6 GHz AFC to protect incumbent MVDDS and DBS operations
  - Periodic re-check of database for changed incumbent operations
  - Modest increase in power

# 12.2-12.7 GHz And 12.7-13.25 GHz

- Decision expected soon
- Expect Tribal set-aside of 100 megahertz for 12.2-12.7 GHz licenses on Tribal lands
- Wild Card – although DISH dispute with DBS continues, what is effect of possible DISH-DIRECTV combination?

# Questions?

- Please use one of the room microphones.
- Thanks!

THANK YOU

*Celebrating* **20**<sup>TH</sup>  
ANNIVERSARY  
WISPA  
ROADRAMP WITHOUT BOUNDARIES