



CBRS Updates

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Leading-Edge Technical Innovation

More than 3x Capacity vs. 450/450i

cnMedusa™ 8x8 MU-MIMO technology allows simultaneous communication with up to four SMs

Supreme Spectral Efficiency

DL and UL MU-MIMO supported

Achieve up to 750 Mbps in a 40 MHz channel

Protect Your Investment

3.3GHz to 3.9GHz range

>47dBm EIRP

Continue using existing SMs

Enhanced Link Stability

Uplink Interference mitigation due to beamforming

Uplink Rx Sensitivity improvements (4-5 dB better)

Advanced Processing Capability

>200k PPS

One Simple device to install

Simple Installation and Increased Reliability

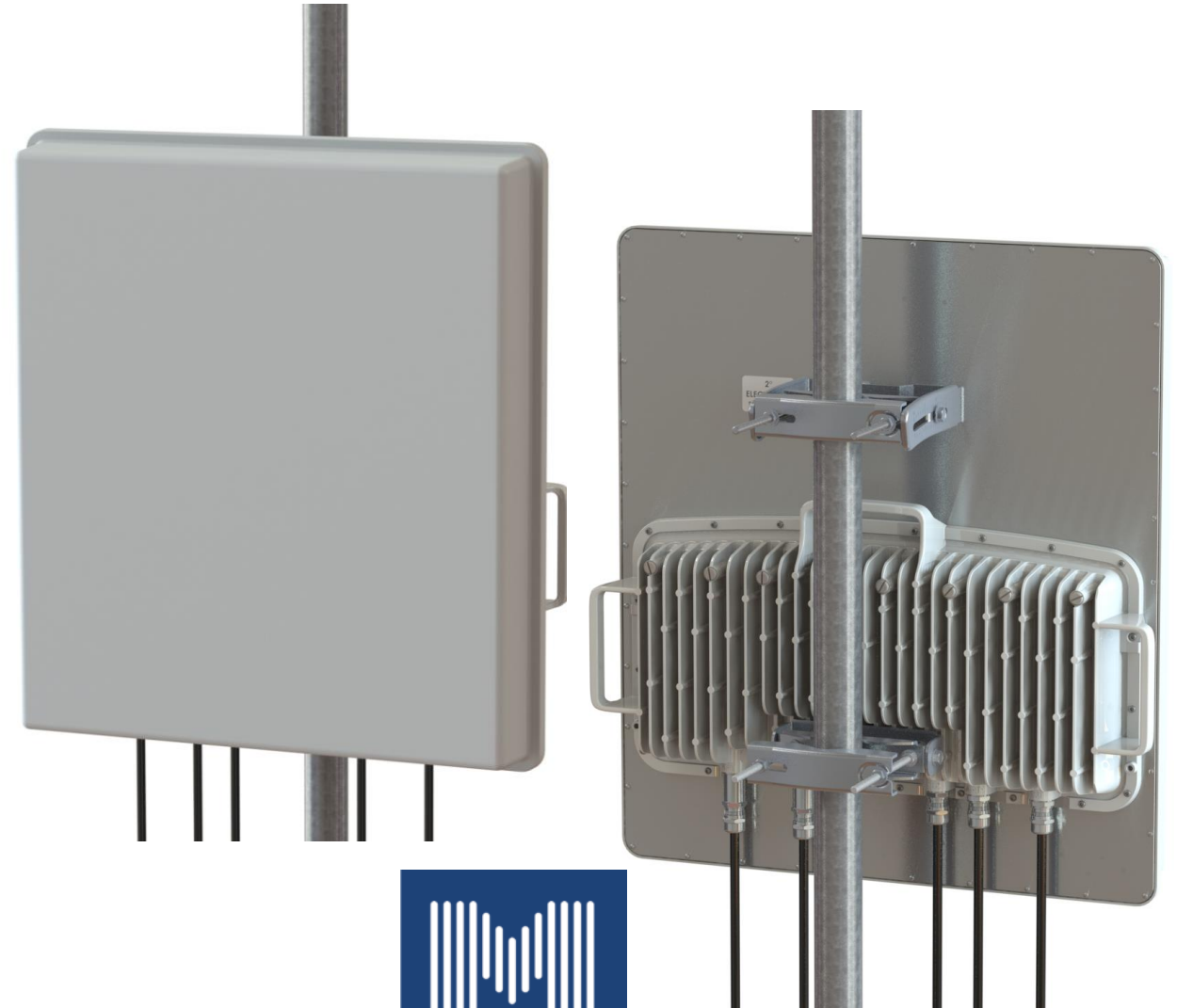
Integrated 90° sector beam-forming array, **ZERO** RF cables to connect or weatherproof

Direct DC powering

SFP and Gigabit Ethernet Support

27" x 24" x 7" (70x61x17 cm)

44 lbs. (20 kg)



- **Solution Paper released**

- Evolution of the technology
- Steps toward achieving the benefits
- Operating Modes
- Benefits including
 - Capacity
 - Spectral Efficiency
 - Interference Reduction
 - PPS Improvements

- **Download here:**

<https://www.cambiumnetworks.com/resource/mu-mimo-solution-paper/>



Form Factor

High Gain integrated antenna (20 dBi), similar to 5 GHz 450b High gain

Up to 29 dBm Tx Pwr, or 49 dBm EIRP

New FPGA / SoC architecture

Next-gen processor, Enhanced Packet Processing

Better support for wider channels → more throughput

Wideband support (3.3 – 3.9 GHz) – [CBRS Approved!!](#)

I/O changes

Single Gigabit Ethernet port

Audio jack for alignment tone

Re-use of 30 VDC Power scheme

Same power supply as current 450 SM

Polarity Agnostic – Both “Canopy” or “UBNT” 30 VDC

Considerations

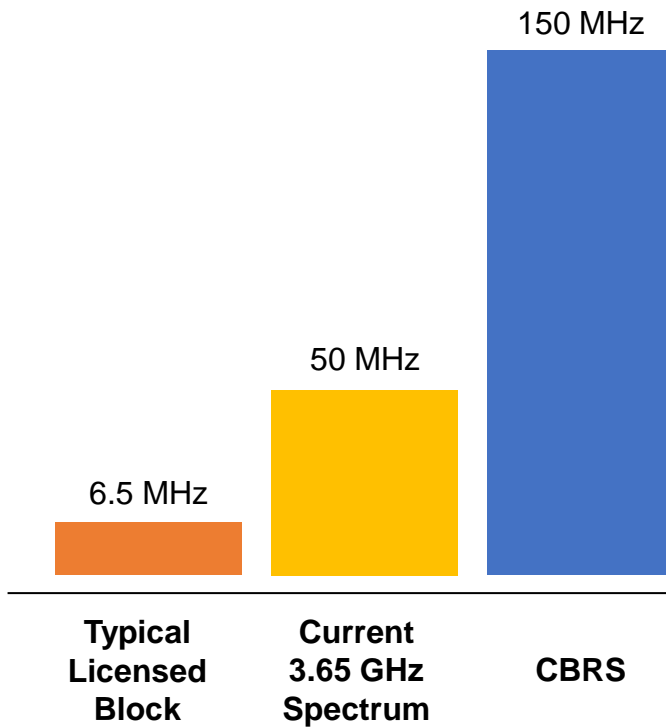
Packaging of devices will follow the 5 GHz version

LEDs moved to make more visible and installation-friendly

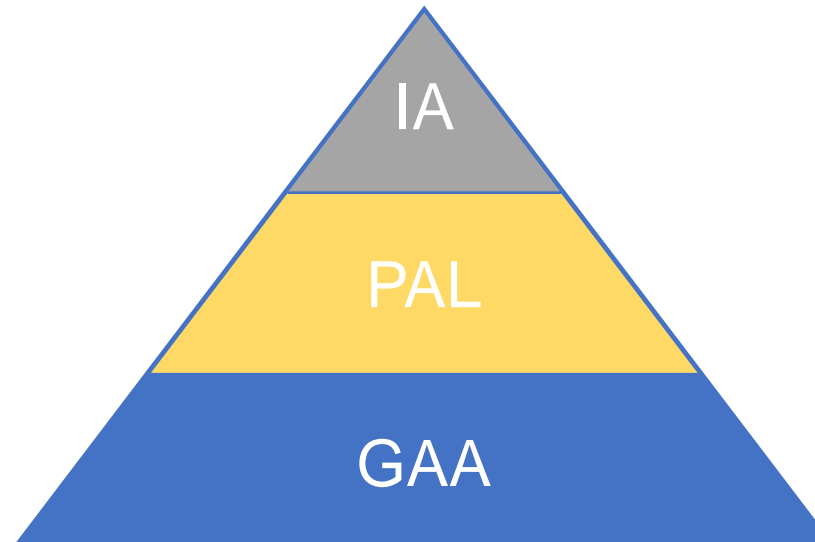


High Gain Released March, 2020

Opportunity



Tiered Flexible Use



Incumbents

- DoD Radars (coastal areas)
- Satellite Earth Stations

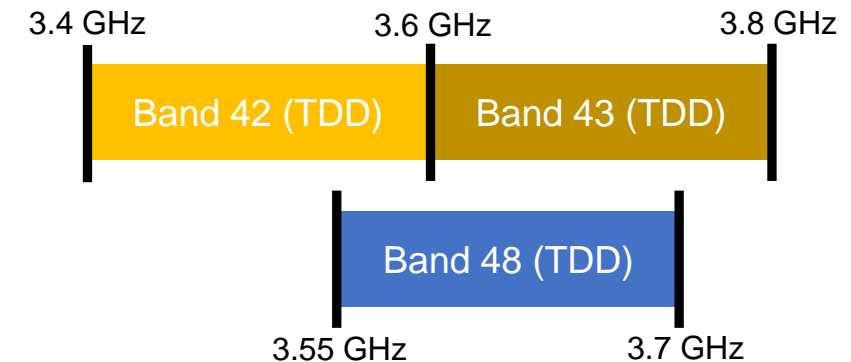
Priority Access Licenses (PAL)

- Up to 70 MHz of spectrum licensed by auction

General Authorized Access (GAA)

- At least 80 MHz nationwide

Establishing a New Common Band



- Ensure 450 platform readiness by working with several SAS providers

federated wireless  COMMSCOPE[®]

- cnMaestro necessary as Domain Proxy to SAS
- 3 GHz 450m being deployed now!
- Release of 3 GHz 450b SM in Q1, 2020
- Complete 3 GHz portfolio capable of graceful migration to CBRS
 - Continue to operate under Part 90 subpart Z until license expires (extension expected!)
 - Gracefully transition to Part 96 (CBRS) without changing equipment (clever software updates will enable this!)
























3 GHz PMP 450 vs. LTE Whitepaper

Paper available at:

<https://www.cambiumnetworks.com/resource/comparison-pmp-450-lte-3-ghz/>

In many ways, 450 outperforms any existing LTE solution

	BEST     WORST 	EXISTING LTE SOLUTIONS	CAMBIUM PMP
Customer Experience			
Range and Coverage			
Interference Mitigation			
Total Sector Capacity			
Subscriber Bandwidth			
Infrastructure Costs			
Mobility Support			
Total Cost of Ownership			

- **Familiarize yourself with the rules and expected operational aspects**
 - Commercial Operations commenced April 1
- **Migration of Existing Network - If migrating existing equipment, check with manufacturer on implementation steps**
 - Cambium Networks has a GREAT plan for the PMP 450 platform, not so sure about others
- **CPI Training – Required prior to starting CBRS**
 - WISPA Webinar with basic info: <https://www.youtube.com/watch?v=TC6buJlm7xc>
 - Richard Bernhardt presented a lot of great information on the CPI process and what to expect
 - Certification courses offered by Federated Wireless, Google or CommScope:
 - <https://federatedwireless.com/certified-professional-installer/>
 - <https://www.coursera.org/learn/google-cbrs-cpi-training>
 - <https://www.commscope.com/solutions/5g-mobile/spectrum-management-solutions/spectrum-access-system/cpi-training-for-cbrs/>

- <https://www.cambiumnetworks.com/cbrs/>
 - Information on CBRS in general, FAQ, links to other info
 - Great starting place
- <https://community.cambiumnetworks.com/t5/CBRS/CBRS-1-0-Official-Release-of-CBRS-from-Cambium-Networks/m-p/116100#M177>
 - Details around the launch of CBRS 1.0 Commercial Services
- <https://community.cambiumnetworks.com/t5/CBRS/CBRS-Service-Activation-amp-Onboarding-Webinar/m-p/115986#M183>
 - Webinar with details on how to onboard devices, great walkthrough including examples

- **Upcoming Deadlines and Dates to be aware of:**
 - **Commercial Operations for Cambium Networks started April 1**
 - **Transition Waiver has been granted, allowing Part 90 to continue until October 17, 2020**
 - This is good for some, bad for others!
 - **PAL Auctions are scheduled to begin July 23**
 - **Short Form Applications (indicating auction participation) due by May 7 (window opens April 23)**
 - **Initial Payments due June 19**
 - Information can be found here: <https://www.fcc.gov/auction/105>
 - Minimum bids by county
 - Technical Guide
 - Highly recommended to involve a lawyer if you plan to participate
- If there are any questions about this, please ask, or post your questions on the forum:
 - www.cambiumnetworks.com/cbrs, click “Join the CBRS Conversation”



Cambium NetworksTM