

# Wireless Fabric Connectivity Solutions



# Cambium Networks' Wireless Fabric



# Breakthrough Technologies

## Cloud and Network Management

### LINKPlanner

- Free, network design tool for RF environments
- Tens of thousands of links deployed



### cnMaestro

- Cloud management
- Secure, end-to-end network control



### cnArcher

- Free android app
- Allows field techs to configure PMP networks



## Point-to-Point

### PTP 650/670

- Launched in November 2013/2017
- Replacement for legacy PTP 600 which was the “gold standard” for almost a decade



### PTP 550

- Launched January 2018
- Exceptional headline data rate (1.4 Gbps)



## Point-to-Multipoint

### cnMedusa (PMP 450m)

- Launched in September 2016
- Breakthrough 14x14 Massive MU-MIMO
- Will drive continued PMP growth for next several years



### PMP 450i

- Launched in September 2012/2016
- Long awaited replacement to flagship PMP product line
- Top performing Cambium product



## ePMP

### ePMP 1000/2000

- Launched in October 2013
- High quality, affordable platform



### ePMP 3000

- Launching December Q2 2018
- 4x4 MU-MIMO & 80 MHz Channel Support
- Higher Capacity and Spectral Efficiency



## Wi-Fi

### cnPilot e4/5/6xx

- Launched in July 2015, cloud-savvy
- Affordable yet uncompromising quality



### cnPilot e430W

- Launching Q1 2018
- Wall Plate AP for Hospitality
- Managed Service Provider enabler



# cnPilot Wi-Fi Portfolio Overview

Provide seamless indoor and outdoor Wi-Fi with field proven solutions that meet capacity needs.



**r190W**



**r190V**



**e410**



**e600**



**e500**



**e430W**

| Key Statement       | Indoor residential and small to medium business Wi-Fi access                                                           |                | Enterprise indoor access points                                                                                                                                                           |                                      | Enterprise outdoor access point with options for antenna coverage: <ul style="list-style-type: none"> <li>E500 - omnidirectional</li> <li>e501S - 90° - 120°</li> <li>e502S - 30°</li> </ul> | Enterprise wall plate                |
|---------------------|------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Typical Application | Indoor Wi-Fi coverage <ul style="list-style-type: none"> <li>Residential</li> <li>Small and medium business</li> </ul> |                | Enterprise Wi-Fi coverage for indoor locations: <ul style="list-style-type: none"> <li>Enterprise</li> <li>Hospitality</li> <li>Industry</li> <li>Public Wi-Fi</li> <li>Retail</li> </ul> |                                      | Wi-Fi coverage for outdoor areas <ul style="list-style-type: none"> <li>Enterprise</li> <li>Hospitality</li> <li>Industry</li> <li>Public Wi-Fi</li> </ul>                                   | Hospitality                          |
| Wi-Fi Standard      | 802.11n                                                                                                                | 802.11n        | 802.11ac Wave 2                                                                                                                                                                           | 802.11ac Wave 2                      | 802.11ac                                                                                                                                                                                     | 802.11ac Wave 2                      |
| Frequency           | 2.4 and 5 GHz                                                                                                          |                | 2.4 and 5 GHz                                                                                                                                                                             |                                      | 2.4 and 5 GHz                                                                                                                                                                                | 2.4 AND 5 GHz                        |
| Max Throughput      | 300 Mbps                                                                                                               | 300 Mbps       | 867 Mbps                                                                                                                                                                                  | 1.3 Gbps                             | 1.01 Gbps                                                                                                                                                                                    | 1.01 Gbps                            |
| Tx Power            | 24 dBm                                                                                                                 | 24 dBm         | 24 dBm at 2.4 GHz<br>25 dBm at 5 GHz                                                                                                                                                      | 24 dBm at 2.4 GHz<br>28 dBm at 5 GHz | 29 dBm at 2.4 GHz<br>28 dBm at 5 GHz                                                                                                                                                         | 22 dBm at 2.4 GHz<br>21 dBm at 5 GHz |
| Concurrent Users    | 64                                                                                                                     | 64             | 256                                                                                                                                                                                       | 512                                  | 256                                                                                                                                                                                          | 256                                  |
| SSID                | 4                                                                                                                      | 4              | 16                                                                                                                                                                                        | 16                                   | 16                                                                                                                                                                                           | 16                                   |
| Mesh Capability     | No                                                                                                                     | No             | Yes                                                                                                                                                                                       | Yes                                  | Yes                                                                                                                                                                                          | Yes                                  |
| Ethernet ports      | 4 LAN<br>1 WAN                                                                                                         | 4 LAN<br>1 WAN | 1 LAN                                                                                                                                                                                     | 2 LAN                                | 2 LAN                                                                                                                                                                                        | 3 LAN<br>1 LAN + PoE                 |
| Roaming             | No                                                                                                                     | No             | Yes                                                                                                                                                                                       | Yes                                  | Yes                                                                                                                                                                                          | Yes                                  |



# PMP 450 Platform Overview



|                          | Access Points                                         |                                                                                       |                                                     | Subscriber Modules                                                          |                                                           |                                                                                    |
|--------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------|
|                          | 450m cnMedusa                                         | 450i                                                                                  | 450                                                 | 450b                                                                        | 450i                                                      | 450                                                                                |
| Frequency Bands          | 3 GHz*, 5 GHz                                         | 900 MHz, 3 GHz, 5 GHz                                                                 | 2.4 GHz                                             | 3 GHz*, 5 GHz                                                               | 3 GHz, 5 GHz                                              | 900 MHz, 2.4 GHz                                                                   |
| Channel Size             | 5 7 10 15 20 30 40 MHz                                | 5 7 10 15 20 30 40 MHz                                                                | 5 10 15 20 30 40 MHz                                | 5 7 10 15 20 30 40 MHz                                                      | 5 7 10 15 20 30 40 MHz                                    | 5 7 10 15 20 30 40 MHz                                                             |
| Physical Layer           | 14 x 14 MU-MIMO / OFDM                                | 2 x 2 MIMO / OFDM                                                                     | 2 x 2 MIMO / OFDM                                   | 2 x 2 MIMO / OFDM                                                           | 2 x 2 MIMO / OFDM                                         | 2 x 2 MIMO / OFDM                                                                  |
| Interface                | Gigabit, SFP<br>2 <sup>nd</sup> Ethernet port PoE out | Gigabit<br>2 <sup>nd</sup> Ethernet port PoE out                                      | 100 Mbit                                            | Gigabit                                                                     | Gigabit<br>2 <sup>nd</sup> Ethernet port PoE out          | 100 Mbit                                                                           |
| Environmental            | IP 67, IP 66                                          | IP 67, IP 66                                                                          | IP 67, IP 66                                        | IP 55 (Mid-gain),<br>IP 67 (High Gain)                                      | IP 67, IP 66                                              | IP 55                                                                              |
| Latency                  | 7-10 ms                                               | 3-5 ms                                                                                | 3-5 ms                                              | 3-5 ms                                                                      | 3-5 ms                                                    | 3-5 ms                                                                             |
| Performance              | 1.2 Gbps+                                             | 300+ Mbps                                                                             | 200+ Mbps                                           | 300+ Mbps                                                                   | 300+ Mbps                                                 | 100+ Mbps                                                                          |
| Powering Methods         | 56V PoE<br>Cambium Proprietary                        | 30V PoE<br>802.3af                                                                    | 30V PoE<br>Cambium Proprietary Standard PoE Pinouts | 30V PoE<br>Cambium Proprietary Standard PoE Pinouts                         | 30V PoE<br>Cambium Proprietary Standard PoE Pinouts       | 30V PoE<br>Cambium Proprietary Standard PoE Pinouts                                |
| Power Consumption        | 85 W Max, 70 W Typical                                | 19 W Max, 16 W Typical                                                                | 15 W max, 12 W typical                              | 12 W max, 9 W typical                                                       | 19 W max, 16 W typical                                    | 12 W max, 9 W typical                                                              |
| Max Power                | +42 dBm EIRP                                          | +44 dBm EIRP<br>+27 dBm Tx Power                                                      | +22 dBm Tx Power                                    | +44 dBm EIRP (mid-gain)<br>+51 dBm EIRP (High gain)                         | +50 dBm EIRP<br>+27 dBm Tx Power                          | +22 dBm Tx Power                                                                   |
| Antenna                  | 90°/120° Sector                                       | 90°/120° Sector: 17 dBi<br><br>Connectorized or external 60° Sector Antenna (900 MHz) | Connectorized or external 60° Sector Antenna        | 17 dBi: Mid-Gain<br>24 dBi: High Gain (5 GHz)<br>19 dBi: High Gain (3 GHz)* | 23 dBi (5 GHz)<br>19 dBi (3 GHz)<br>Integrated Flat Panel | 9 dBi: Integrated (2.4 GHz)<br><br>Connectorized or external 12 dBi Yagi (900 MHz) |
| SMS Supported Per Sector | 238                                                   | 238                                                                                   | 238                                                 |                                                                             |                                                           |                                                                                    |

# ePMP™ Portfolio Overview

| ePMP 1000                                                                                 |                                                                                   | 2.4 GHz                                                                           |                                                                                   | ePMP 1000                                                                         |                                                                                   | 5 GHz                                                                             |                                                                                     |                                                                                     |                                                                                     | ePMP 2000                                                                           | 5 GHz | ePMP 3000                                                                           |                                                                                     | 5 GHz                                                                               |                                                                                     |                                                                 |  |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|--|
|          |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |                                                                 |  |
| GPS Sync Radio                                                                            | Connectorized                                                                     | Integrated                                                                        | Force 200                                                                         | GPS Sync Radio                                                                    | Connectorized                                                                     | Bridge-in-a-Box                                                                   | Force 180                                                                           | Force 190                                                                           | Force 200                                                                           | Access Point with Intelligent Filtering and Sync                                    |       | CSM 300                                                                             | Force 300-16                                                                        | Force 300-25                                                                        | Access Point with MU-MIMO                                                           |                                                                 |  |
|                                                                                           |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     | Q2/18 | Q2/18                                                                               | Q4/17                                                                               | Q2/18                                                                               |                                                                                     |                                                                 |  |
| Connectorized   Integrated                                                                |                                                                                   | GPS Sync Radio                                                                    |                                                                                   | Bridge-in-a-Box                                                                   |                                                                                   | Force 180                                                                         |                                                                                     | Force 190                                                                           |                                                                                     | Force 200                                                                           |       | Access Point with Intelligent Filtering                                             |                                                                                     | Force 300-16<br>Force 300-25<br>CSM 300                                             |                                                                                     | Access Point with MU-MIMO                                       |  |
| 2.4 GHz, 5 GHz<br>2.4/2.5 GHz (Brazil, NZ)<br>6.4 GHz (Russia)                            |                                                                                   | 2.4 GHz, 5 GHz                                                                    |                                                                                   | 5 GHz                                                                             |                                                                                   | 5 GHz                                                                             |                                                                                     | 5 GHz                                                                               |                                                                                     | 2.4 GHz, 5 GHz                                                                      |       | solution with beam steering,<br>intelligent 5 GHz                                   |                                                                                     | 5 GHz                                                                               |                                                                                     | 5 GHz                                                           |  |
| 5 10 20 40 MHz                                                                            |                                                                                   | 5 10 20 40 MHz                                                                    |                                                                                   | 5 10 20 40 MHz                                                                    |                                                                                   | 5 10 20 40 MHz                                                                    |                                                                                     | 5 10 20 40 MHz                                                                      |                                                                                     | 5 10 20 40 MHz                                                                      |       | 5 10 20 40 MHz                                                                      |                                                                                     | 20   40   80 MHz                                                                    |                                                                                     | 20   40   80 MHz                                                |  |
| 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                                      |                                                                                   | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                              |                                                                                   | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                              |                                                                                   | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                              |                                                                                     | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                                |                                                                                     | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                                |       | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                                |                                                                                     | 2 x 2 MIMO / OFDM<br>802.11ac Wave 2<br>256QAM                                      |                                                                                     | 4 x 4 MIMO / OFDM<br>802.11ac Wave 2<br>256QAM                  |  |
| 100 Mbit<br>2 <sup>nd</sup> Ethernet port PoE out                                         |                                                                                   | Gigabit                                                                           |                                                                                   | Gigabit                                                                           |                                                                                   | Gigabit                                                                           |                                                                                     | 100 Mbit                                                                            |                                                                                     | Gigabit                                                                             |       | Gigabit                                                                             |                                                                                     | Gigabit                                                                             |                                                                                     | Gigabit/SFP                                                     |  |
| IP55                                                                                      |                                                                                   | IP55                                                                              |                                                                                   | IP55                                                                              |                                                                                   | IP55                                                                              |                                                                                     | IP55                                                                                |                                                                                     | IP55                                                                                |       | IP55                                                                                |                                                                                     | IP55                                                                                |                                                                                     | IP55                                                            |  |
| 15~17ms                                                                                   |                                                                                   | 5~7ms                                                                             |                                                                                   | 15~17ms                                                                           |                                                                                   | 5~7ms                                                                             |                                                                                     | 2~3ms                                                                               |                                                                                     | 2~3ms                                                                               |       | 5~7ms                                                                               |                                                                                     | 5~7ms                                                                               |                                                                                     | 5~7ms                                                           |  |
| 200+ Mbps                                                                                 |                                                                                   | 200+ Mbps                                                                         |                                                                                   | 200+ Mbps                                                                         |                                                                                   | 200+ Mbps                                                                         |                                                                                     | 200+ Mbps                                                                           |                                                                                     | 200+ Mbps                                                                           |       | 200+ Mbps                                                                           |                                                                                     | 600+ Mbps                                                                           |                                                                                     | 1+ Gbps                                                         |  |
| 30V PoE<br>Cambium Proprietary                                                            |                                                                                   | 30V PoE<br>802.3af                                                                |                                                                                   | 30V PoE<br>Cambium Proprietary<br>Standard PoE Pinouts                            |                                                                                   | 30V PoE<br>Cambium Proprietary<br>Standard PoE Pinouts                            |                                                                                     | 30V PoE<br>Cambium Proprietary<br>Standard PoE Pinouts                              |                                                                                     | 30V PoE<br>Cambium Proprietary<br>Standard PoE Pinouts                              |       | 56V PoE<br>802.3at                                                                  |                                                                                     | 30V PoE                                                                             |                                                                                     | 56V PoE<br>802.3at                                              |  |
| 7 W max, 5 W typical                                                                      |                                                                                   | 10 W max, 7.5 W typical                                                           |                                                                                   | 10 W max, 5 W typical                                                             |                                                                                   | 10 W max, 5 W typical                                                             |                                                                                     | 8 W max, 5 W typical                                                                |                                                                                     | 10 W max, 5 W typical                                                               |       | 20 W max                                                                            |                                                                                     | 12 W                                                                                |                                                                                     | 21 W max                                                        |  |
| +30 dBm                                                                                   |                                                                                   | +30 dBm                                                                           |                                                                                   | +30 dBm                                                                           |                                                                                   | +30 dBm                                                                           |                                                                                     | +27 dBm                                                                             |                                                                                     | +30 dBm                                                                             |       | +30 dBm                                                                             |                                                                                     | +27 dBm                                                                             |                                                                                     | MCS0, VHT80: +25 dBm<br>MCS9, VHT80: +21 dBm                    |  |
| Integrated:<br>2.4 GHz – 11 dBi<br>5 GHz – 14 dBi<br>Connectorized: 3 <sup>rd</sup> party |                                                                                   | 90°/120° Sector: 18 dBi<br>or 3 <sup>rd</sup> party antenna                       |                                                                                   | Integrated: 16 dBi                                                                |                                                                                   | Integrated: 16 dBi                                                                |                                                                                     | Dish: 22 dBi                                                                        |                                                                                     | Dish:<br>2.4 GHz - 17 dBi<br>5 GHz – 25 dBi                                         |       | 90/120° Sector: 17dBi<br>Optional Beamforming                                       |                                                                                     | 300-16: Integrated 16 dBi<br>300-25: Dish 25 dBi<br>CSM 300: RP-SMA                 |                                                                                     | 90/120° Sector: 17 dBi<br>4 x 4 MU-MIMO<br>Optional Beamforming |  |
| AP: 120 Subscribers<br>SM<br>PTP                                                          |                                                                                   | AP: 120 Subscribers<br>PTP                                                        |                                                                                   | Bridge-in-a-Box:<br>PTP                                                           |                                                                                   | SM<br>PTP                                                                         |                                                                                     | SM<br>PTP                                                                           |                                                                                     | SM<br>PTP                                                                           |       | AP: 120 Subscribers<br>PTP                                                          |                                                                                     | SM<br>PTP                                                                           |                                                                                     | AP: 120 Subscribers<br>PTP                                      |  |

# ePMP elevate

Leverage an existing 802.11-based installed network and add synchronization without the cost of replacing the entire network

## ePMP elevate

**ePMP 2000**  
2.4 & 5 GHz



Access Point with Intelligent Filtering  
and Sync

*Industry's most affordable  
filtering and all the benefits of  
GPS sync*

### **Access Point with Intelligent Filtering**

|                   |                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------|
| Frequency Band(s) | 2.4 & 5 GHz                                                                                              |
| Channel Size      | 5 10 20 40 MHz                                                                                           |
| Physical Layer    | 2 x 2 MIMO / OFDM<br>802.11n – 64QAM                                                                     |
| Interface         | Gigabit                                                                                                  |
| Performance       | 200+ Mbps                                                                                                |
| Powering Methods  | 56V PoE<br>802.3at                                                                                       |
| Power Consumption | 20 W max                                                                                                 |
| Max Tx Power      | +30 dBm                                                                                                  |
| Antenna           | 90/120° Sector: 17dBi<br>Optional Beamforming<br>3 <sup>rd</sup> party horn                              |
| Modes             | <b>AP:</b> 120 Max Subscribers<br>GPS synchronized<br><b>PTP</b><br>Scheduling: ePTP   TDD  <br>Flexible |

#### Typical Application

Saving the cost and time of a total network replacement, an operator simply installs an ePMP Access Point and loads ePMP Elevate software onto their deployed subscriber modules.

#### Products Supported

- For Ubiquiti® XW/XM and Mikrotik SXT5-Lite Devices

# cnReach / IIoT Overview

Simplify the migration to an all-IP network and maximize the use of spectrum while reducing operating costs



**N500 900 MHz**



**N500 700 MHz**



**N500 450 MHz**



**N500 220 MHz**



**N500 I/O Expander**

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                             |                                                                                                         |                                                                             |                                                                    |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------|
| Key Statement       | For outdoor critical infrastructure operations, cnReach transports process monitoring and control data from the remote sensor or PLC/RTU back to the operations center supporting real-time automated decision making and on-going analytics. Covering large geographic areas, hard to reach terrain and challenging spectrum environments, cnReach delivers reliable, secure connectivity to the petrochemical, electric utility, water/wastewater/stormwater, rail and transportation industries. cnReach eases the migration to modern networks by combining legacy serial and analog/digital I/O with TCP/IP and Ethernet connectivity. |                                                                             |                                                                                                         |                                                                             |                                                                    |
| Region              | NA/CALA/Australia/NZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | US                                                                          | Global                                                                                                  | US                                                                          | Global                                                             |
| Frequency Bands     | ISM mode: 902 - 928 MHz; (915-928 MHz in Australia)<br>MAS mode: 928 - 960 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 757-758 MHz and 787-788 MHz                                                 | 406 – 430 MHz and 450 – 470 MHz                                                                         | 217 – 222 MHz                                                               |                                                                    |
| Channel Size        | ISM: 76 / 154 / 207 / 310 / 600 / 1200 kHz<br>MAS: 12.5 / 25 / 50 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12.5, 25, 50, 100, 200, 250 kHz                                             | 12.5 / 25 kHz ( 50 / 100 kHz available regulations permitting)                                          | 12.5 / 15 / 25 / 50 / 100 / 200 kHz                                         |                                                                    |
| Modulations         | MSK / 2FSK / BPSK / QPSK / 8PSK / 16PSK / 16QAM / 32QAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MSK / QPSK / 8PSK / 16QAM / 32QAM                                           | MSK / QPSK / 8PSK / 16QAM / 32QAM                                                                       | MSK / QPSK / 8PSK / 16QAM / 32QAM                                           |                                                                    |
| Max Tx Power        | Up to 1 W (30 dBm) (ISM)<br>Up to 4 W (36 dBm) (MAS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Up to 10W (40 dBm)                                                          | FCC: 406.1 - 430 MHz (up to 2 W / 33 dBm); 450-470 MHz (up to 8 W / 39 dBm);<br>ETSI: Up to 8W (39 dBm) | 217-220: Up to 2W<br>220-222 Up to 5W                                       |                                                                    |
| Adaptive modulation | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                                                         | Yes                                                                                                     | Yes                                                                         |                                                                    |
| Security            | 128/256-bit AES encryption and secure management interfaces (HTTPS, SNMPv3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                             |                                                                                                         |                                                                             |                                                                    |
| Interfaces          | Two Ethernet<br>Two Serial (RS-232/422/485)<br>Optional Analog/Digital GPIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Two Ethernet<br>Two Serial (RS-232/422/485)<br>Optional Analog/Digital GPIO | Two Ethernet<br>Two Serial (RS-232/422/485)<br>Optional Analog/Digital GPIO                             | Two Ethernet<br>Two Serial (RS-232/422/485)<br>Optional Analog/Digital GPIO | Two Ethernet<br>Two Serial (RS-232/422/485)<br>Analog/Digital GPIO |
| LINKPlanner         | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Y                                                                           | Y                                                                                                       | Y                                                                           |                                                                    |
| cnMaestro           | Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Y                                                                           | Y                                                                                                       | Y                                                                           |                                                                    |

Cambium Networks offers a complete set of accessories for cnReach including power supplies, antennas and adaptors.

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# Licensed Microwave Overview

|                                | FULL OUTDOOR                                                                      |                                                                                     | SPLIT MOUNT                                                                         |                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                |  |  |  |  |
|                                | <b>PTP820S</b>                                                                    | <b>PTP820C</b>                                                                      | <b>PTP820G + RFU-C</b>                                                              | <b>PTP820G + RFU-A</b>                                                              |
| Frequency Band                 | 6 – 38 GHz                                                                        | 6 – 38 GHz                                                                          | 6 – 38 GHz                                                                          | 6, 11 GHz                                                                           |
| Channel Size                   | 3.5 - 80 MHz                                                                      | 3.5 - 80 MHz                                                                        | 3.5 - 60 MHz                                                                        | 3.5 - 60 MHz                                                                        |
| Number of Carriers             | Single                                                                            | Dual                                                                                | Single and Dual                                                                     | Single and Dual                                                                     |
| XPIC                           | Not Supported                                                                     | Supported                                                                           | Supported                                                                           | Supported                                                                           |
| MIMO                           | Not Supported                                                                     | 2x2 / 4x4 MIMO                                                                      | Not Supported                                                                       | Not Supported                                                                       |
| Traffic Interface              | 1 x 10/100/1000 Base T (RJ 45)                                                    | 1 x 10/100/1000 Base T (RJ 45)                                                      | 4 x 10/100/1000 Base T (RJ 45)                                                      | 4 x 10/100/1000 Base T (RJ 45)                                                      |
|                                | 2 x 1000 BaseX - SFP                                                              | 1 x 1000 BaseX - SFP                                                                | 2 x 1000 BaseX - SFP                                                                | 2 x 1000 BaseX - SFP                                                                |
| MTU                            | 9600 Bytes                                                                        | 9600 Bytes                                                                          | 9600 Bytes                                                                          | 9600 Bytes                                                                          |
| QoS                            | VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP                                    | VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP                                      | VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP                                      | VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP                                      |
|                                | 8 priority queues                                                                 | 8 priority queues                                                                   | 8 priority queues                                                                   | 8 priority queues                                                                   |
|                                | configurable up to 64 Mbit per queue                                              | configurable up to 64 Mbit per queue                                                | configurable up to 64 Mbit per queue                                                | configurable up to 64 Mbit per queue                                                |
| Configuration                  | 1+0                                                                               | 1+0 to 4+0                                                                          | 1+0 to 2+0                                                                          | 1+0 to 2+0                                                                          |
|                                | 1+1 HSB                                                                           | 1+1 / 2+2 HSB                                                                       | 1+1 / 2+2 HSB                                                                       | 1+1 / 2+2 HSB                                                                       |
|                                | 2+0, Non-XPIC                                                                     | 2+0 XPIC                                                                            | 2+0 XPIC                                                                            | 2+0 XPIC                                                                            |
|                                |                                                                                   | 2+2 SD                                                                              | 1+1 HSB with SD                                                                     | 1+1 HSB with SD                                                                     |
| Performance (Layer 2)          | 596 Mbps - No Compression                                                         | 1.2 Gbps - No Compression                                                           | 1 Gbps - No Compression                                                             | 1 Gbps - No Compression                                                             |
|                                | 833 - Multi-Layer Compression                                                     | 2 Gbps - Multi-Layer Compression                                                    | 2 Gbps - Multi-Layer Compression                                                    | 2 Gbps - Multi-Layer Compression                                                    |
| Modulation                     | QPSK to 2048 OAM w/ACM                                                            | QPSK to 2048 OAM w/ACM                                                              | QPSK to 2048 OAM w/ACM                                                              | QPSK to 2048 OAM w/ACM                                                              |
| Multi Carrier Link Aggregation | N/A                                                                               | MC-ABC                                                                              | MC-ABC                                                                              | MC-ABC                                                                              |
| Power Consumption              | 6-11 GHz: 40W                                                                     | 6 & 11 GHz: 65W                                                                     | IDU: 23.5W(single modem)                                                            | IDU: 23.5W(single modem)                                                            |
|                                |                                                                                   | 7 GHz: 75W                                                                          | IDU: 26.4W(Dual modem)                                                              | IDU: 26.4W(Dual modem)                                                              |
|                                | 13-38 GHz: 35W                                                                    | 13-15 GHz & 26-38 GHz: 55W                                                          | RFU-C 6-26 GHz: 22W (1+0), 39W (1+1)                                                | RFU-Ae: 77W (1+0), 101W(1+1)                                                        |
|                                |                                                                                   | 18-24 GHz: 48W                                                                      | RFU-C 28-38 GHz: 26W (1+0), 43W (1+1)                                               | RFU-Aep: 90W (1+0), 114W(1+1)                                                       |
| Maximum Tx Power               | 29 dBm                                                                            | 28 dBm                                                                              | 26 dBm                                                                              | 35 dBm                                                                              |

# Point to Point Sub 6 GHz: Product at a Glance



**Bridge-in-a-Box**

**F300-25**

**PTP 450**

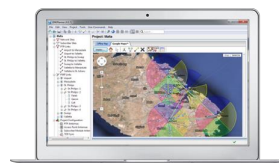
**PTP 450i**

**PTP 550 (Dual Carrier)**

**PTP 670**

|                       | Bridge-in-a-Box           | F300-25                | PTP 450                   | PTP 450i                  | PTP 550 (Dual Carrier)    | PTP 670                             |
|-----------------------|---------------------------|------------------------|---------------------------|---------------------------|---------------------------|-------------------------------------|
| Frequency Range (GHz) | 4.9 to 5.97               | 5.15 to 5.97           | 3.5 /3.65/ 5.4 to 5.8 GHz | 4.90 to 5.925             | 5.15 – 5.97               | 4.9 to 6.05                         |
| Channel BW (MHz)      | 5/10/20/40                | 20/40/80               | 5/10/20/30                | 5/10/15/20/30/40          | 2x 20/40/80               | 5/10/15/20/30/40/45                 |
| Technology            | 802.11n                   | 802.11ac Wave 2        | Proprietary               | Proprietary               | 802.11ac Wave 2           | Proprietary                         |
| Line of Sight         | LoS                       | LoS                    | LoS                       | LoS                       | LoS                       | LoS, nLoS, NLoS                     |
| Environmental         | IP55                      | IP55                   | IP55                      | IP66/67                   | IP66/67                   | IP66/67                             |
| Latency               | 3-6 ms                    | 3-6 ms                 | 3-5 ms                    | 3-5 ms                    | 3-5 ms                    | 1-3 ms                              |
| Performance           | 200 Mbps                  | 600 Mbps               | 300 Mbps                  | 300 Mbps                  | 1.4 Gbps                  | 450 Mbps                            |
| Top Modulation        | 64 QAM                    | 256 QAM                | 256 QAM                   | 256 QAM                   | 256 QAM                   | 256 QAM                             |
| Max Frame Size        | 1700 Bytes                | 1700 Bytes             | 1700 Bytes                | 1700 Bytes                | 1700 Bytes                | 9600 Bytes                          |
| Spectrum Management   | Standby Spectrum Analyzer | Live Spectrum Analyzer | Standby Spectrum Analyzer | Standby Spectrum Analyzer | Dynamic Channel Selection | Dynamic Spectrum Optimization (DSO) |
| Dynamic Filter        | No                        | No                     | No                        | Yes                       | No                        | No                                  |
| IEEE 1588v2 & SyncE   | No                        | No                     | No                        | No                        | No                        | Yes                                 |
| TDD Sync              | No                        | No                     | Yes                       | Yes                       | Yes                       | Yes                                 |
| Encryption            | AES 128                   | AES 128                | AES 128                   | AES 128                   | AES 128                   | AES 128/AES 256                     |
| QOS                   | 3 Level                   | 3 Level                | 2 Level                   | 4 Level                   | 3 Level                   | 8 Levels                            |
| Power Consumption     | 7W                        | 12 W                   | 12 W                      | < 25 W                    | < 25 W                    | <30 W                               |
| Max Tx Power          | 30 dBm                    | 27 dBm                 | 22 dBm                    | 27 dBm                    | 27 dBm                    | 27 dBm                              |
| Integrated Antenna    | 16 dBi                    | 25 dBi or 16 dBi       | 14 dBi                    | 23 dBi                    | 23 dBi                    | 23 dBi                              |

# Planning and Management Overview



**LINKPlanner**

Quickly design networks for optimal deployment and cost effectiveness with ease.



**cnArcher**

Raise the bar on installation accuracy with cnArcher™, the free Android app that gives field techs the information they need to configure and properly align Cambium Networks PMP wireless broadband subscriber modules.



**cnMaestro**

cnMaestro™ is a cloud-based or on-premises software platform for secure, end-to-end network control.

|                     |                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Typical Application | <p>LINKPlanner allows you to model scenarios – based on geography, distance, antenna height, transmit power, and other factors – to optimize system performance before purchase. Quickly design networks for optimal deployment and cost effectiveness with ease. Available for Microsoft® Windows® and Mac® systems, LINKPlanner is a free, user-friendly link-design tool.</p> | <p>Designed with input from field technicians and years of experience on our millions of wireless broadband modules deployed, cnArcher validates configuration and alignment in seconds.</p> <p>Increase the number of installs done right the first time, and increase customer satisfaction. Eliminate problems, and focus your manpower on connecting new subscribers as your network grows.</p> | <p>cnMaestro wireless network manager simplifies device management by offering full network visibility. View and perform a full suite of wireless network management functions in real time. Optimize system availability, maximize throughput, and meet emerging needs of business and residential customers.</p> |
| Products Supported  | <ul style="list-style-type: none"> <li>• cnPilot</li> <li>• ePMP</li> <li>• PMP</li> <li>• PTP</li> <li>• cnReach</li> </ul>                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• PMP</li> </ul>                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• cnPilot</li> <li>• ePMP</li> <li>• cnReach</li> </ul>                                                                                                                                                                                                                     |

# Cambium Networks Wireless Network Fabric

- People Places Things
- Purpose Built
- 2m to 246km
- Kb to Mb to Gb
- Indoor and Outdoor
- PTP PMP Wi-Fi LTE
- Licensed and Unlicensed
- Scalable
- Concept to Commissioning
- Single Pane of Glass



# Resilient, Efficient, Affordable Wireless Connectivity Solutions

