

## ePMP™ FORCE 180 INTEGRATED RADIO

The ePMP Force 180 is the second generation of ePMP Integrated Radio Modules. It has the exceptional reliability and quality that users have come to expect from the ePMP product line and adds some significant performance enhancements.

This radio comes in a small, sleek form factor but delivers high performance. The antenna gain is increased by 3 dB to 16 dBi which will provide a 40% increase in range. It comes equipped with a Gigabit Ethernet port so that nothing will limit this product in delivering the maximum throughput. The radio module is powered by PoE and the Ethernet port has the unique capability of being powered from a PoE injector that conforms to standard pinouts or from a PoE injector that conforms to Cambium pinouts. This makes it possible to upgrade existing radio locations to the Force 180 without changing the PoE injector. It also includes an adjustable mounting bracket that eases the task of installing and properly aligning the radio.

All the unique advantages of ePMP software such as eFortify™ and eCommand™ are available with the Force 180. eFortify enhances the performance of the ePMP 1000 in high noise environments. eCommand provides a suite of management features and tools to assist network operators in planning, provisioning and monitoring of their network. The ePMP Force 180 Integrated Radio is a compact and powerful platform that can operate as an Access Point, Subscriber Module or PTP radio.



### MAIN DIFFERENTIATORS

**GROWTH AND SCALABILITY** The ePMP 1000 delivers high capacity and reliable connectivity right from the start. As a provider's business grows, it can expand its network while ensuring resiliency and increasing profitability.

**QUALITY OF SERVICE (QOS)** allows you to confidently offer triple play services – VoIP (Voice over IP), video and data. Providing your customers with excellent service quality ensures their continued loyalty and transforms them into advocates, helping WISPs and enterprises expand their

**PROVEN RELIABILITY** has created an unsurpassed connectivity standard in many industries that depend on fixed wireless broadband. Our products undergo rigorous testing and are made from high-quality components.

### POWERFUL FEATURES

The Cambium Networks ePMP Force 180 delivers more than 200 Mbps of real user throughput. Using 2x2 MIMO-OFDM technologies, ePMP deployments achieve industry leading data rates.

The ePMP Force 180 Integrated Radio can be configured as a Subscriber Module, an unsynchronized Access Point or a Backhaul radio. This radio will function as a client to an ePMP GPS Synchronized Radio in either a Point-to-Multipoint (PMP) or Point-to-Point (PTP) deployment forming a GPS Synchronized solution.

## PRODUCT

|              |                                                                                                                           |
|--------------|---------------------------------------------------------------------------------------------------------------------------|
| Model Number | MODEL NUMBERC058900P072A (US/FCC), C050900P071A (EU/ROW),<br>(See below for a complete list of part numbers for ordering) |
|--------------|---------------------------------------------------------------------------------------------------------------------------|

## SPECTRUM

|                 |                                                                            |
|-----------------|----------------------------------------------------------------------------|
| Channel Spacing | Configurable on 5 MHz increments                                           |
| Frequency Range | 5 GHz: 4910 – 5970 MHz (exact frequencies as allowed by local regulations) |
| Channel Width   | 5   10   20   40 MHz                                                       |

## INTERFACE

|                                  |                                                                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| MAC (Media Access Control) Layer | Cambium Proprietary                                                                                                                      |
| Physical Layer                   | 2x2 MIMO/OFDM                                                                                                                            |
| Ethernet Interfaced              | 10/100/1000BaseT, Compatible with Cambium PoE pinouts (V+ = 7 & 8, Return = 4 & 5) and Standard PoE pinouts (V+ = 4 & 5, Return = 7 & 8) |
| Protocols Used                   | IPv4, UDP, TCP, IP, ICMP, SNMPv2c, HTTPs, STP, SSH, IGMP Snooping                                                                        |
| Network Management               | HTTPs, SNMPv2c, SSH                                                                                                                      |
| VLAN                             | 802.1Q with 802.1p priority                                                                                                              |

## PERFORMANCE

|                                                     |                                                                                                                                                       |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| ARQ                                                 | Yes                                                                                                                                                   |
| Nominal Receive Sensitivity (w/FEC) @200MHz Channel | MCS0 = -93 dBm to MCS15 = -72 dBm (per branch)                                                                                                        |
| Nominal Receive Sensitivity (w/FEC) @40MHz Channel  | MCS0 = -90 dBm to MCS15 = -69 dBm (per branch)                                                                                                        |
| Modulation Levels (Adaptive)                        | MCS0 (BPSK) to MCS15 (64QAM 5/6)                                                                                                                      |
| Quality of Service                                  | Three level priority (Voice, High, Low) with packet classification by DSCP, COS, VLAN ID, IP & MAC Address, Broadcast, Multicast and Station Priority |

## LINK BUDGET

|                              |                                                                   |
|------------------------------|-------------------------------------------------------------------|
| Transmit Power Range         | -17 to +30 dBm (combined, to regional EIRP limit) (1 dB interval) |
| Integrated Antenna Peak Gain | 16 dBi                                                            |
| Maximum Transmit Power       | 30 dBm combined (subject to regional regulatory restrictions)     |

## PHYSICAL

|                        |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| Antenna Connection     | Integrated Antenna                                                                       |
| Surge Suppression      | 2 Joule Integrated                                                                       |
| Environmental          | IP55                                                                                     |
| Temperature            | -30°C to +60°C (-22°F to +140°F)                                                         |
| Weight                 | 0.50 kg (1.1 lb.) (includes mounting bracket)                                            |
| Wind Survival          | 145 km/hour (90 mi/hour) with antenna                                                    |
| Dimensions (h x w x d) | 12.4 x 25.1 x 11.9 cm (4.9 x 9.9 x 4.7 in) – with mounting bracket attached              |
| Pole Diameter Range    | 1 – 1.6 in (2.5 – 4.1 cm) with included clamp ; up to 2.25 in (5.7 cm) with larger clamp |
| Power Consumption      | 10 W Maximum, 5 W Typical                                                                |
| Input Voltage          | 10 to 30 V                                                                               |

## SECURITY

|            |                         |
|------------|-------------------------|
| Encryption | 128-bit AES (CCMP mode) |
|------------|-------------------------|

## CERTIFICATIONS

|                      |                                                      |
|----------------------|------------------------------------------------------|
| FCCID                | Z8H89FT0015                                          |
| Industry Canada Cert | 109W-0015                                            |
| CE                   | 5 GHz: EN 302 502 v1.2.1<br>5 GHz: EN 301 893 v1.7.1 |

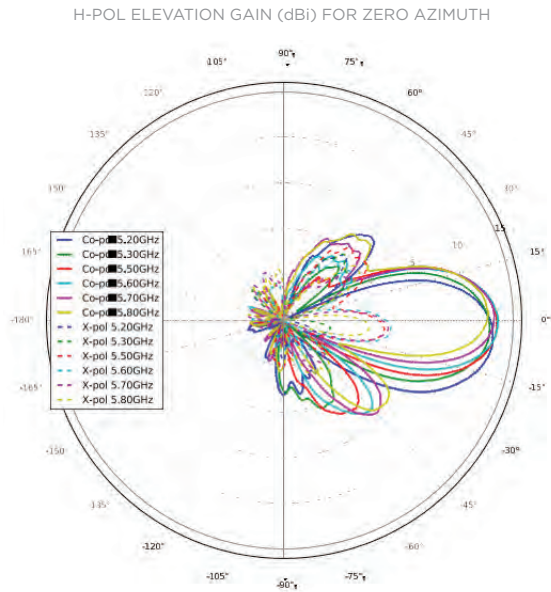
## PARAMETER SPECIFICATION

|                         |                   |
|-------------------------|-------------------|
| Frequency Range         | 4910 – 5970 MHz   |
| Antenna Type            | Integrated        |
| Typical Gain            | 16 dBi            |
| 3db Beamwidth-Azimuth   | 15°               |
| 3db Beamwidth-Elevation | 30°               |
| Polarization(s)         | Dual Linear, H/ V |
| Front-to-Back Isolation | >20 dB            |
| Cross Polarization      | 15 dB             |

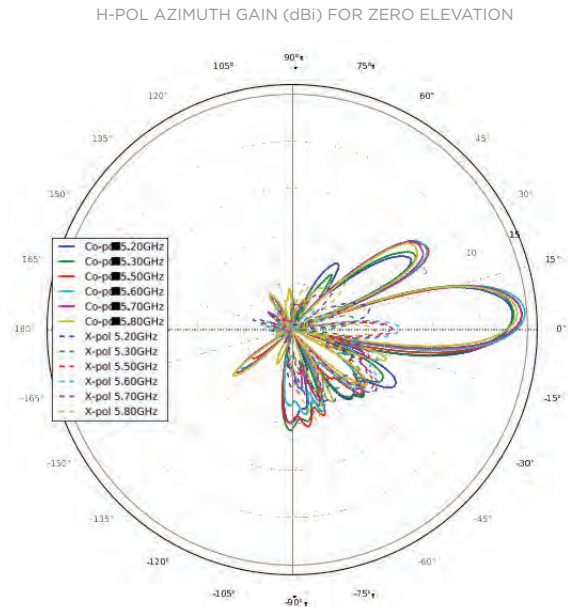
## ePMP 5 GHz Force 180 Part Numbers:

| ORDERING PART NUMBER | DESCRIPTION                                                 | MODEL NUMBER FOR REGULATORY PURPOSES |
|----------------------|-------------------------------------------------------------|--------------------------------------|
| C050900C071A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (no cord)        | C050900P071A                         |
| C050900C171A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (US cord)        | C050900P071A                         |
| C050900C271A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (EU cord)        | C050900P071A                         |
| C050900C471A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (India cord)     | C050900P071A                         |
| C050900C571A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (China/ANZ cord) | C050900P071A                         |
| C050900C671A         | ePMP 5GHz Force 180 Integrated Radio (ROW) (Brazil cord)    | C050900P071A                         |
| C050900C073A         | ePMP 5GHz Force 180 Integrated Radio (EU) (EU cord)         | C050900P071A                         |
| C058900C072A         | ePMP 5GHz Force 180 Integrated Radio (FCC) (US cord)        | C058900P072A                         |

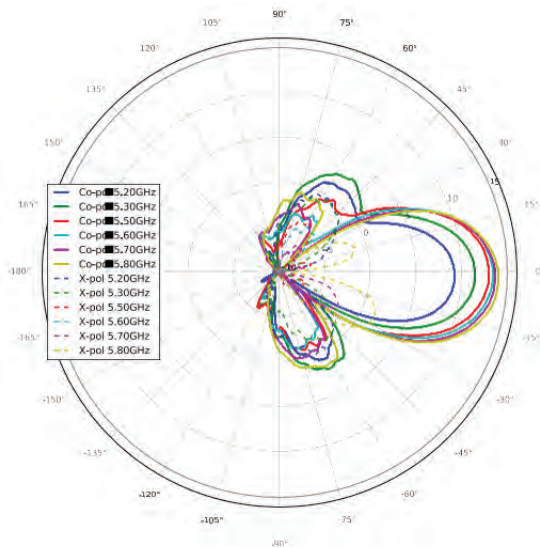
## 5 GHz ePMP Force 180 Integrated Antenna Azimuth Patterns



## 5 GHz ePMP Force 180 Integrated Antenna Elevation Patterns



V-POL ELEVATION GAIN (dBi) FOR ZERO AZIMUTH



V-POL AZIMUTH GAIN (dBi) FOR ZERO ELEVATION

