Cambium Networks™

ePMP Portfolio Updates

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ePMP Updates Summary

ePMP 3000 Summary

Now Shipping:

- Force 300-13L - Lowest price Force 300 SM (ROW now; EU in 1Q)
- ePMP MicroPOP for hole-filling and coverage extension
- MU-MIMO Omni (3rd party solution supported by Cambium Networks)

Coming Soon:

- MU-MIMO Dual-Horn (Cambium Networks exclusive – Industry-First!)

Software Features – Latest on v4.5 and v4.6

- v.4.5 and v4.6

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ePMP 3000 at a Glance

1. ePMP 3000 uses 802.11ac Wave 2 for up to 5X performance
   - 4x4 MU-MIMO
   - Wider Channels
   - Higher Modulation
2. ePMP 3000 extends the lead in scalability and interference tolerance
   - Uplink beam-steering
   - Dynamic Filtering
   - Synchronization
3. ePMP 3000 protects your investment
   - Compatibility with 11n devices and Elevated devices
   - Improved performance (LDPC and MRC)
4. ePMP lowers the TCO with a standard 3-year warranty and support direct from the channel and the supplier

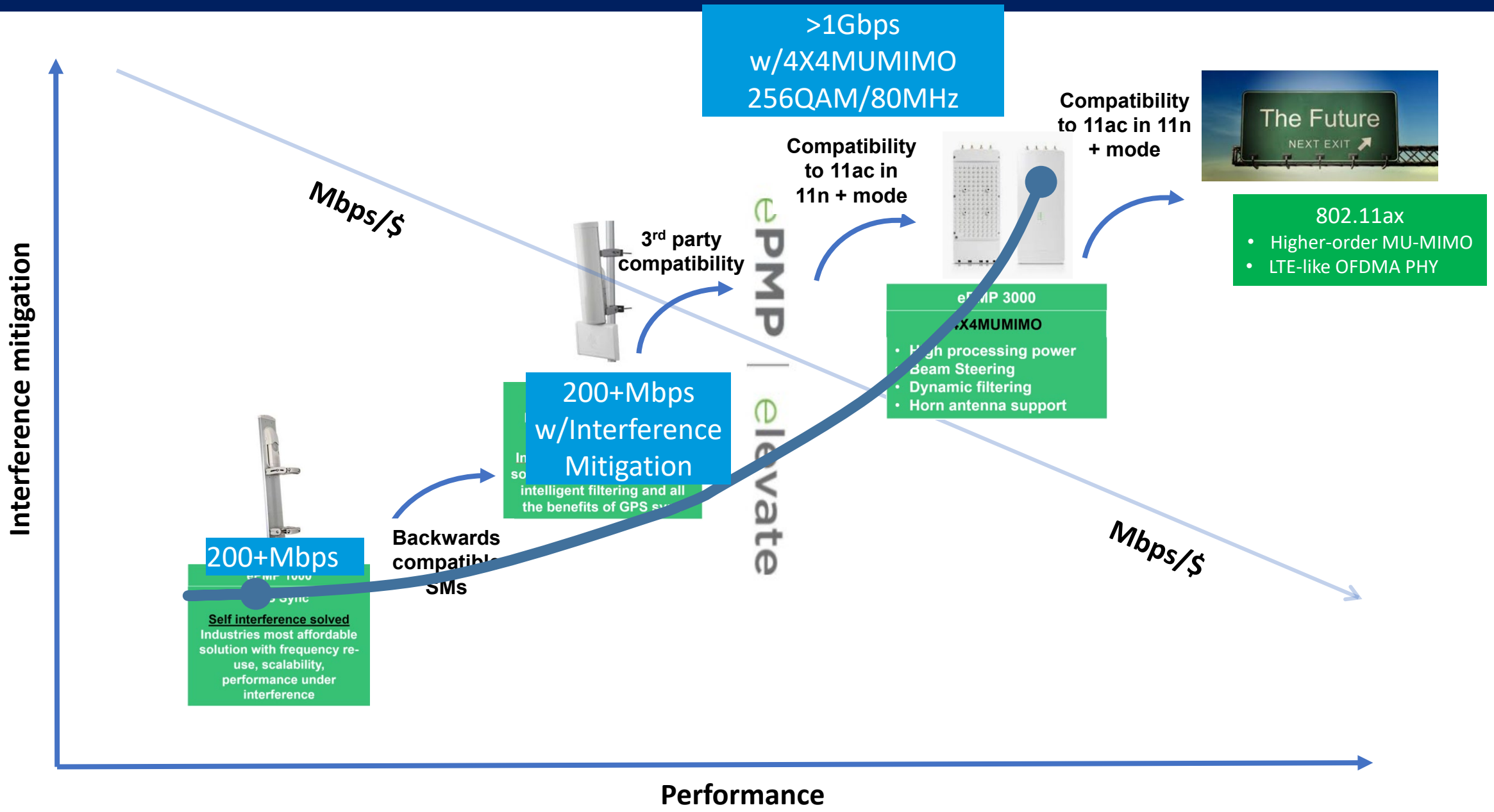
ePMP 3000: Why MU-MIMO Delivers more in the real-world

AP Capacity 80MHz	MIMO 802.11ac Wave1/Gen2	min SNR	High QAM Modulation	min SNR	4x4 muMIMO 802.11ac Wave2/Gen3	min SNR
500Mbps	64 QAM	**27dBi**	64 QAM	**27dBi**	16 QAM	**21dBi**

Cambium Networks is making considerable investment in MU-MIMO Technology for PMP

Here is why

ePMP Evolution



ePMP Force 300-13L

Available Now

Features

- 802.11ac Wave 2 technology
- 2 x 2 Integrated 13 dBi panel
- Small form factor / Easy to deploy

ARPU-sensitive WISP and Enterprise applications

- Subscriber module or PTP topologies
- Short-range, low-cost option to blend with longer-range SM's
- Compatible with ePMP 1000, 2000, 3000, 3000L

Not available in N. America sales region

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ePMP 3000 MicroPOP

Available Now

Features

- 2x2 MIMO
- Integrated 8 dBi omni antenna
- Small form factor / Easy to deploy

Micro-POP Applications

- Coverage Extensions
- Capacity Injection
- Backhaul/Distribution
  - Wi-Fi Hotspots
  - Video Surveillance

Specifications

- 2x2 MIMO
- 802.11ac Wave 2 Technology

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MU-MIMO Dual Horn Antenna

Sneak Preview

Features

- MU-MIMO
- Lower cost than 90 degree sector
- Small form factor / Easy to deploy

Applications

- Narrow-beam Sector
- Micro-POP
- Video Surveillance AP

Specifications

- 60 degree dual horn sector
- 12 dBi gain

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ePMP – Industry first MU-MIMO Omni Antenna

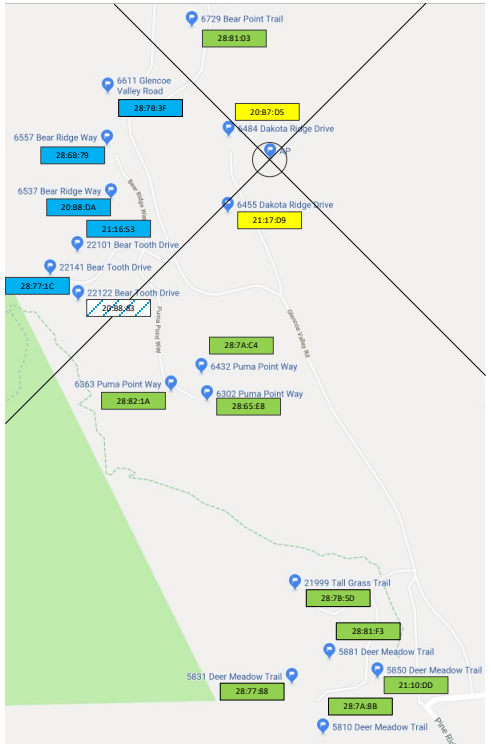
Available Now
from KP Performance

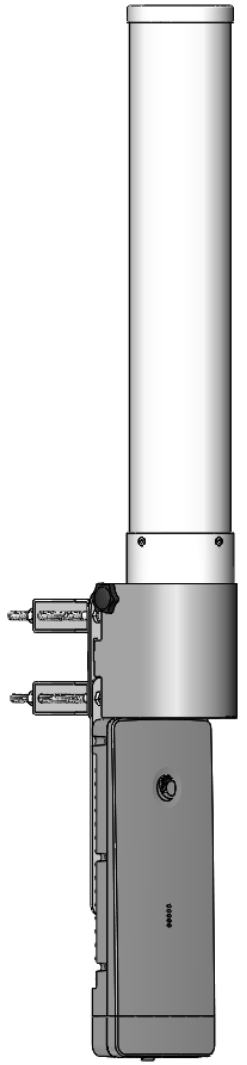
KP Performance + Cambium Networks collaboration

- Industry first true 4X4 MU-MIMO antenna – offered by KP
- Opposing sectors inter-connected to provide MUMIMO grouping
- True MU-MIMO vs Mimosa offerings
- 13 dBi gain

First trial in Colorado

MU peak throughput:	**313 Mbps**
SU peak throughput:	**220 Mbps**
MU average throughput:	**275 Mbps**
SU average throughput:	**193 Mbps**
MU gain:	**143%**





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Using Horns to Narrow the Sectors with ePMP 3000L

150Mbps x 20 Mbps service plan
- 40 MHz Channel

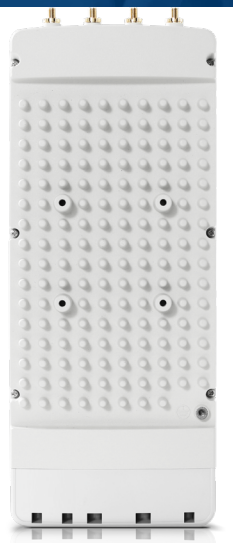
Combines 3 Horn Antennas
- ePMP 3000L from Cambium
- Ultra Horns from RF Elements

Consider MU-MIMO Horns in future

Courtesy of: E-Vergent – Illinois, USA

ePMP 3000L Access Point

ePMP 3000 Access Point



ePMP Portfolio – Access Points

ePMP 3000

- 5 GHz
- 4x4 MU-MIMO
- 802.11ac Wave 2
- 120 SM's
- Dynamic Filtering
- Opt. UL Beam-Steering

ePMP 3000L

- 5 GHz
- 2x2 MIMO
- 802.11ac Wave 2
- 64 SM's

ePMP 2000

- 5 GHz
- 2x2 MIMO
- 802.11n
- Full (120 SM) or Lite (10 SM)
- Dynamic Filtering
- Opt. UL Beam-Steering

ePMP 1000

- 5.x, 2.4, 2.5, 6.4 GHz
- 2x2 MIMO
- 802.11n
- Full or Lite

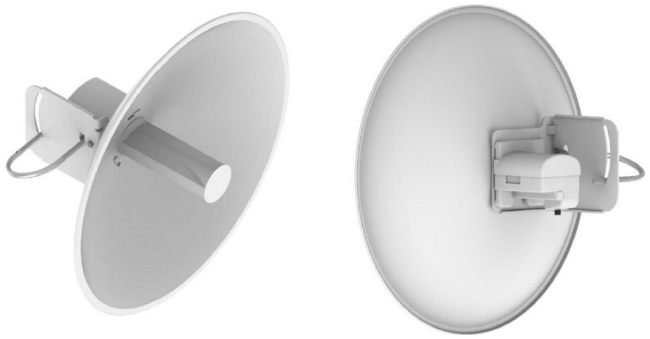
Omni Micro-POP
5 GHz
2x2 MIMO
802.11ac Wave 2

7 Ways to Expand Your Network with ePMP

	Antenna Gain	Range	Coverage	Max # of Subs	Headline Capacity	Relative Price
4 Sectors of ePMP 3000 with MU-MIMO Sectors	17 dBi	6-8 km	360 degrees	480	4.8 Gbps	100%
4 Sectors of ePMP 3000L with 90 Degree	17 dBi	6-8 km	360 degrees	256	2.4 Gbps	52%
1 Sector of ePMP 3000 with MU-MIMO Omni	13 dBi	3-5 km	360 degrees	120	1.2 Gbps	25%
1 Sector of ePMP 3000 with MU-MIMO Sector	17 dBi	6-8 km	90 degrees	120	1.2 Gbps	25%
1 Sector of ePMP 3000 with MU-MIMO Dual-Horn	12 dBi	3-5 km	60 degrees	120	1.2 Gbps	23%
1 Sector of ePMP 3000L with 60 degree Horn	13 dBi	3-5 km	60 degrees	64	600 Mbps	12%
1 Sector of ePMP MicroPOP	9 dBi	1-2 km	360 degrees	64	600 Mbps	7%

1. What is the subscriber density? (consider MU-MIMO)
2. What are my service plans? (consider MU-MIMO)
3. What are my expansion plans? (deploy a full tower now and be done)
4. What is the noise floor? (consider directional antennas)
5. Do I need synchronization? (consider sectors)
6. How much of the horizon do I need to cover (Azimuth)? (consider horns)

ePMP Force 300 (802.11ac Wave 2) Subscriber Module Portfolio



F300-25

- 25dBi gain
- Gigabit Ethernet
- Real time spectrum analyzer

F300-16

- 16dBi gain
- Gigabit Ethernet
- Real time spectrum analyzer
- Small form factor
- 15 degree Azimuth/Vertical orientation

F300 CSM (IP67)

- 2X2 Wave 2 Connectorized SM
- Support for external horns and dishes

F300-19 (IP55)

- 2X2 Wave 2 SM
- 19 dBi gain flat pane antenna

F300-19R (IP67)

- 2X2 Wave 2 SM
- 19 dBi gain flat panel antenna
- Adds 5/10 MHz channels
- Enterprise SW Plan of Intent

F300-13 (IP55)

- 2X2 Wave 2 SM
- 13dBi gain

F300-13L (IP55)

- Low-Cost
- 2X2 Wave 2 SM
- 13dBi gain
- Not available in N. America

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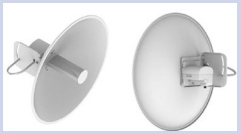
Force 300 Subscriber Module Portfolio Summary

	300-13L	300-13	300-16	300-19	300-25	300-19R	300 CSM
							
Form Factor	13 dBi Panel	13 dBi Panel	16 dBi Panel	19 dBi Panel	25 dBi Dish	19 dBi Panel	Connectorized
Applications / Key Features	• Short-range • SM or PTP • Not available in N.America sales region	Short-range SM or PTP	Mid-Range SM or PTP	Mid-Range SM or PTP	Long-Range SM or PTP	Mid-Range SM or PTP + 5/10 MHz PTP + Enterprise features (256AES, SNMPv3) + 4.9 GHz FCC	Long-range SM or PTP Twistport compatible
IP Rating	IP55	IP55	IP55	IP55	IP55	IP67	IP67

All support:

- 802.11ac Wave 2
- 20/40/80 MHz channels up to 256QAM
- 600 Mbps max capacity (300-13L = 400 Mbps)
- Synchronization with appropriate AP
- Compatible with ePMP 3000, 3000L, 2000 and 1000 Access Points
- LINKPlanner
- cnMaestro
- cnHeat

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ePMP Portfolio – Subscribers 802.11n

Force 200
- 5 GHz
- 2.4 GHz

Force 190
- 5 GHz

Force 180
- 5 GHz

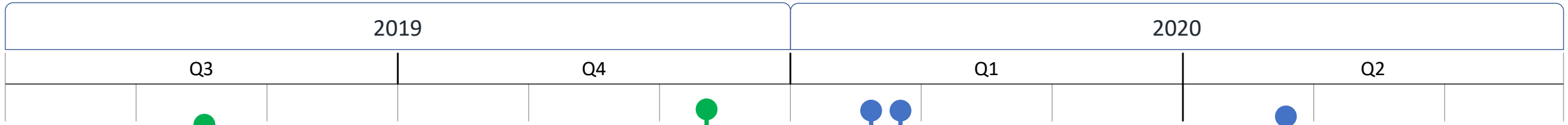
Force 130
- 5 GHz
- 2.4 GHz
- Not Available in N.America

CSM
- 5, 6.4 GHz
- 2.4, 2.5 GHz

ISM
- 2.4 GHz

ePMP 3000 / Force 300 / PTP 550 Software Plan of Intent

PLAN OF INTENT
SUBJECT TO CHANGE
January 2020



Release – 4.4 (August)
- QoS
- MIR (ePMP 3000)
- Try Config
- cnMaestro Zero-Touch (DHCP Options)
- Force 300-13/-19/-19R support
- Force 130 -2.4 GHz
- Force 130 - DFS
- Integrated Release Line for 11n and 11ac
- Additional bug fixes, performance improvements

Release – 4.4.3 (December)
- Stability Improvements

Release – 4.5 (February)
- ePTP low latency mode support (Force 300, E550/Single channel)
- Beam-steer antenna
- 10 MHz support on 300-19R, ePMP 3000 and PTP 550
- 2.5 ms frame size on e3K
- Reliable Multicast (e3K)
- Omni Support in GUI (e3K) – KP Performance
- DCS (Dynamic Channel Selection) - (PTP)
- Spanish/Turkish Language Support in GUI

Release – 4.5.2 (Februry)
- Force 300-13L Improvements

Release – 4.6 (April)
- Flexible Frame (PTP/PMP)
- SNMPv3 (Force 300-19R)
- Remote Spectrum Analyzer
- ACS (Automatic Channel Selection) - (PMP)

Release Feature Funnel
- e3K tiered subscriber count
- Traffic shaping
- Additional DL/UL ratio support
- Air Fairness
- Fast DFS

Completed	Gate 2
Committed	Gate 7
In Planning	Gate 10
Evaluating	Gate 13
Candidate	Gate 15

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WISP Referral Program – Earn Free Equipment

https://www.cambiumnetworks.com/wisp-bring-a-friend-registration/

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