

CAMBIUM NETWORKS

World-class Wireless Networks



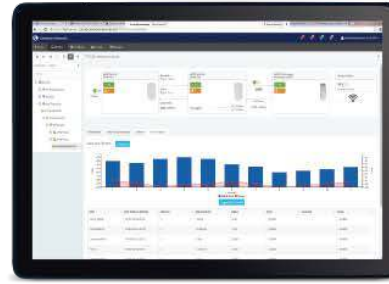
cnPilot™ R190W



E600



E501S



cnMaestro™



ePMP™ 2000



PMP 450m



PTP 700

Wi-Fi

Distribution Access & Backhaul

Product Overview : PTP 670

Presenter: Sagar Deshpande

AGENDA



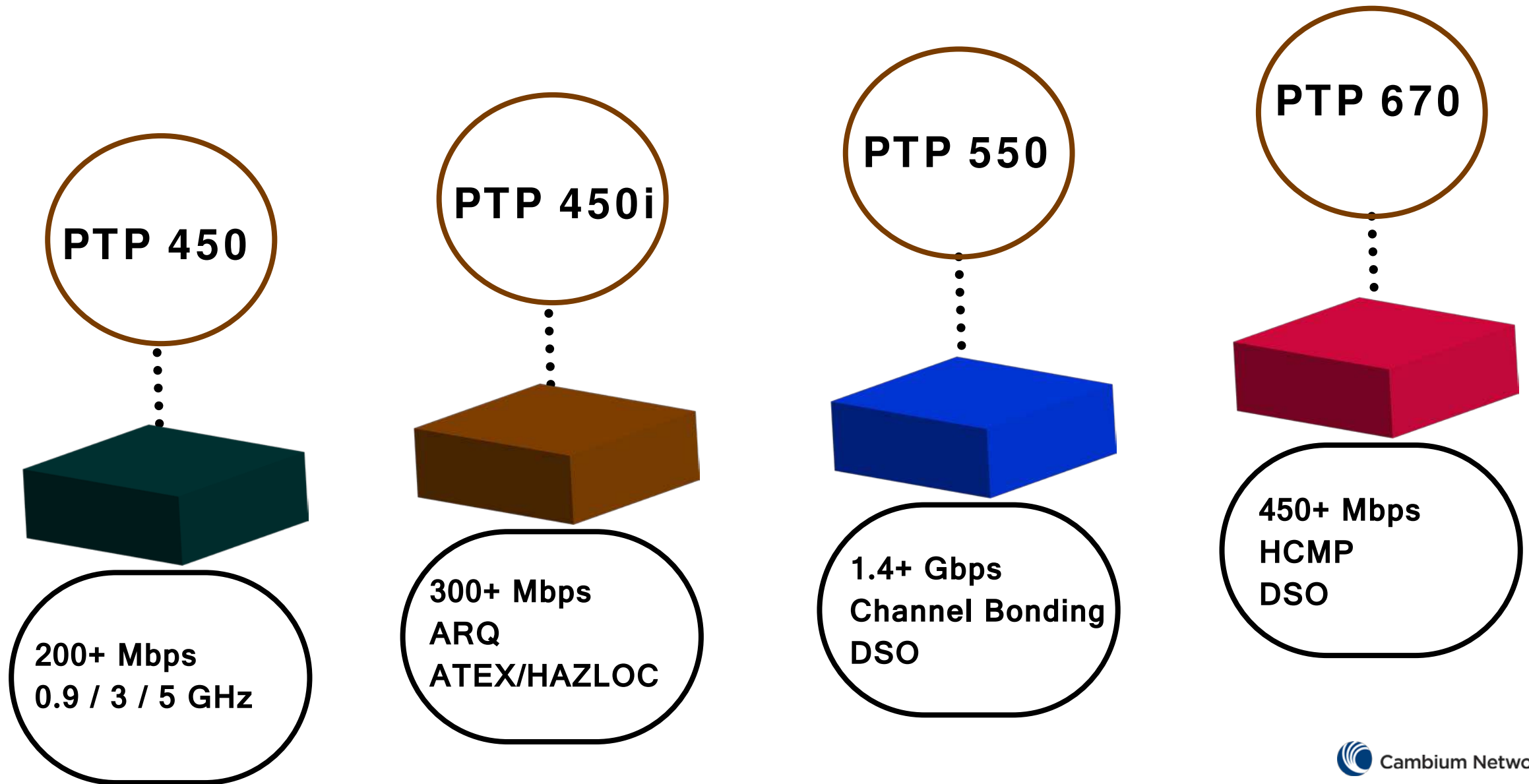
AGENDA

- PTP Overall Portfolio
- PTP 550 Introduction
- PTP 550 Features
 - DSO
 - Spectrum Analyzer
 - Channel Bonding
- PTP 670 vs PTP 550
- Product launch information and Strategy
- PTP 550 Summary
- More Information

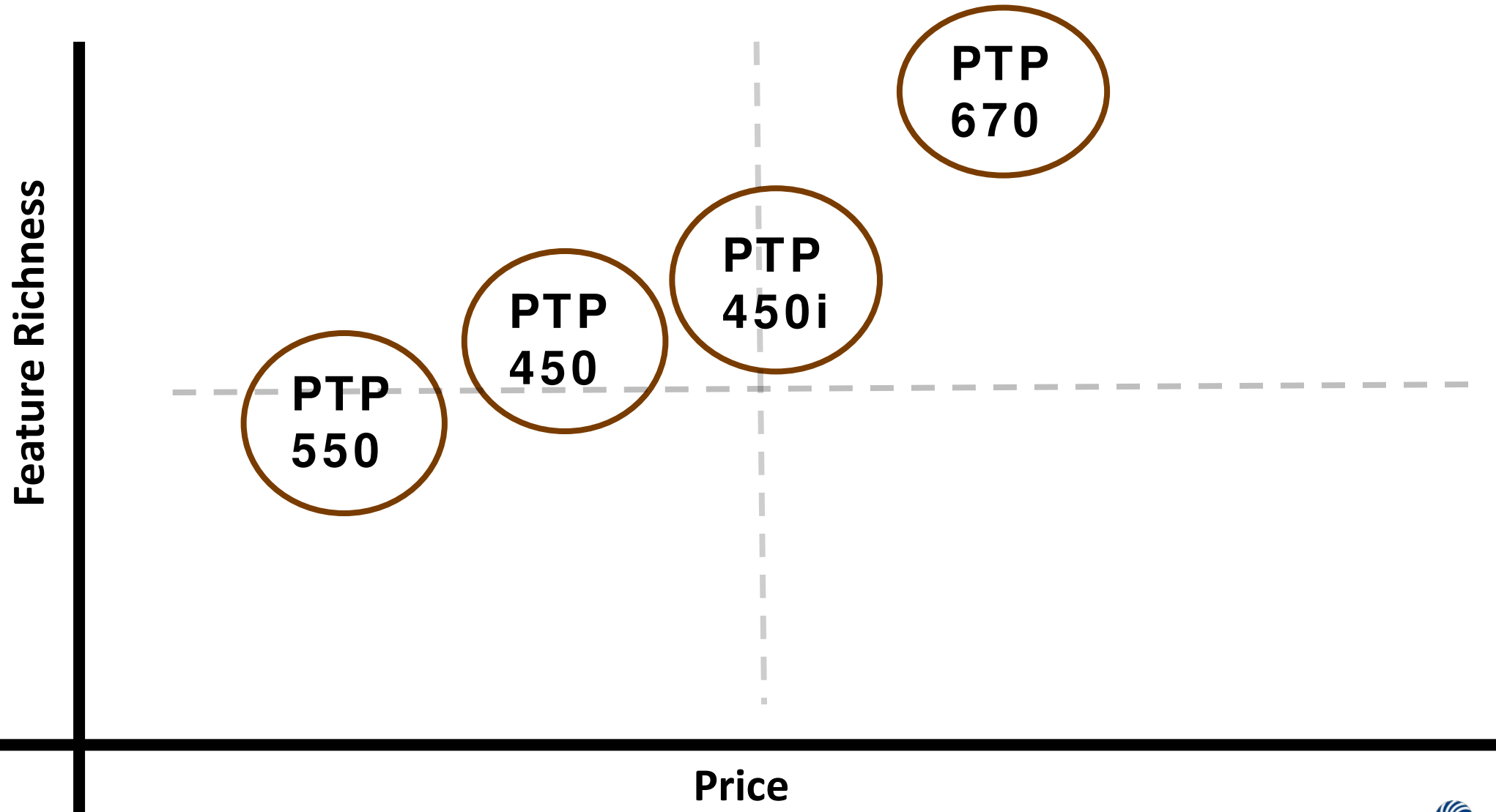
PTP OVERALL PORTFOLIO



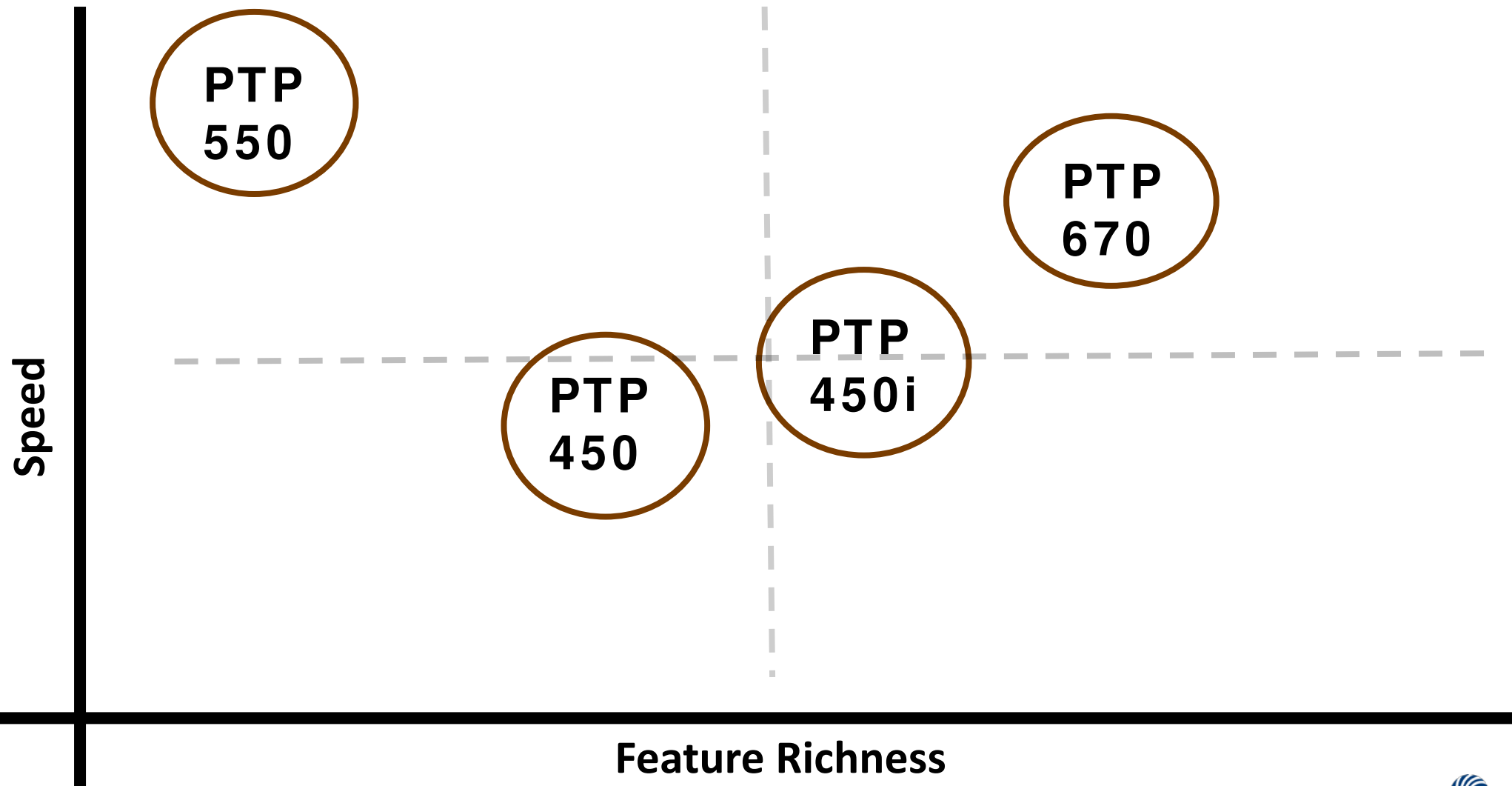
Sub 6GHz PTP Portfolio



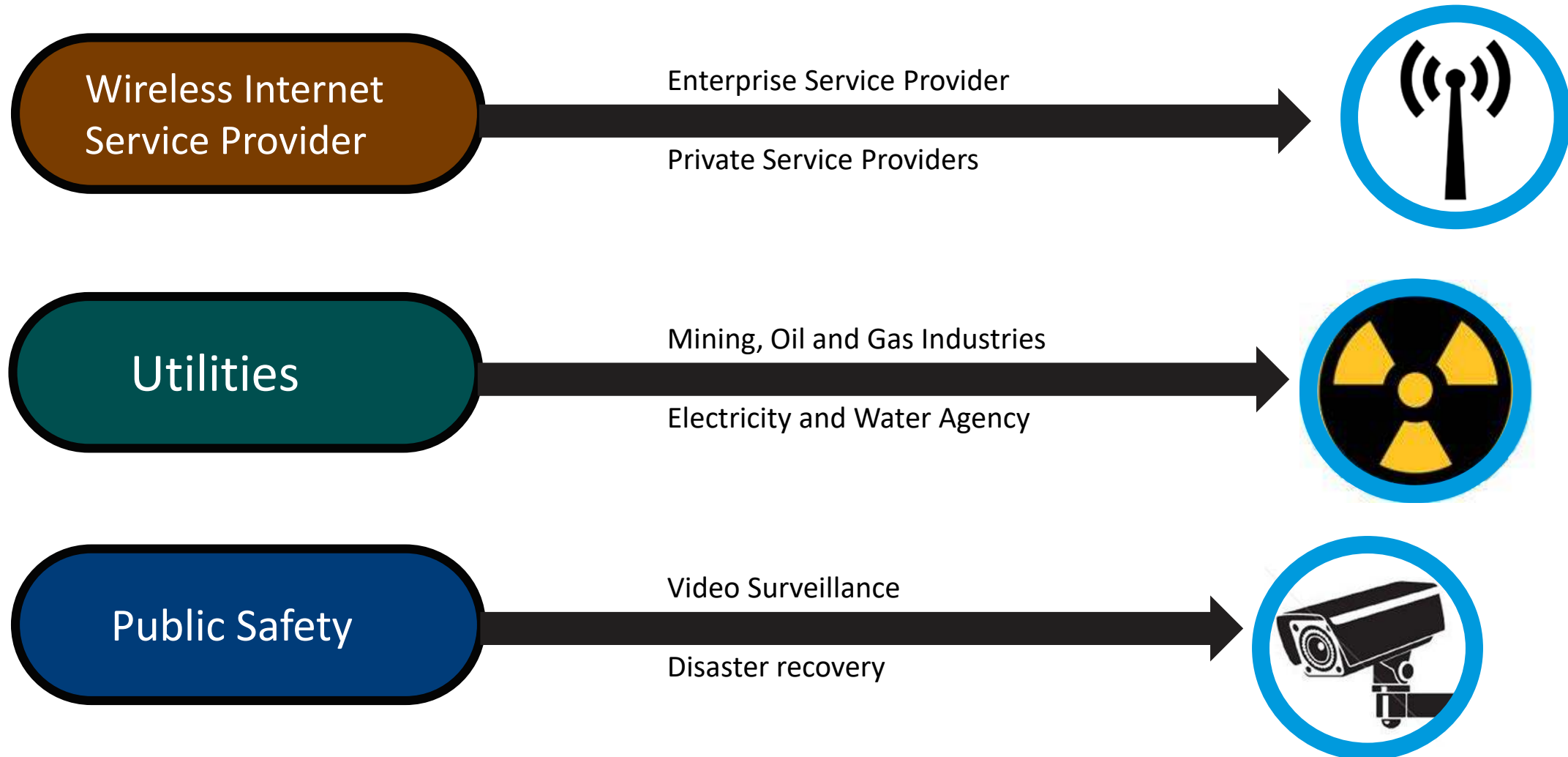
Sub 6GHz PTP Portfolio



Sub 6GHz PTP Portfolio



VERTICAL MARKETS



PTP 550

PTP 550 Connectorized

PTP 550 Integrated



Dynamic Spectrum Optimization (DSO) enables to continually scan the band for low interference channels

iOFDM (intelligent Orthogonal Frequency Division Multiplexing) transmits over 1024 sub-carrier and results in high resilience to multi-path interference

Supports **Near and Line-of-Sight** applications

Supports **Channel Bonding**

Frequency Bands/ Channels

- 5.150 GHz to 5.850 GHz
- 20, 40, and 80 MHz channels
- 8.75 bps/Hz spectral efficiency

Interfaces

- Physical layer 2X 2x2 MIMO
- 1-Gigabit Ethernet: Data + Power over the ODU
- 1-SPF Port

Adaptive Modulation

- BPSK to 256 QAM

Aggregate Capacity

- Up to 1.36 Gbps
- Split Frequency

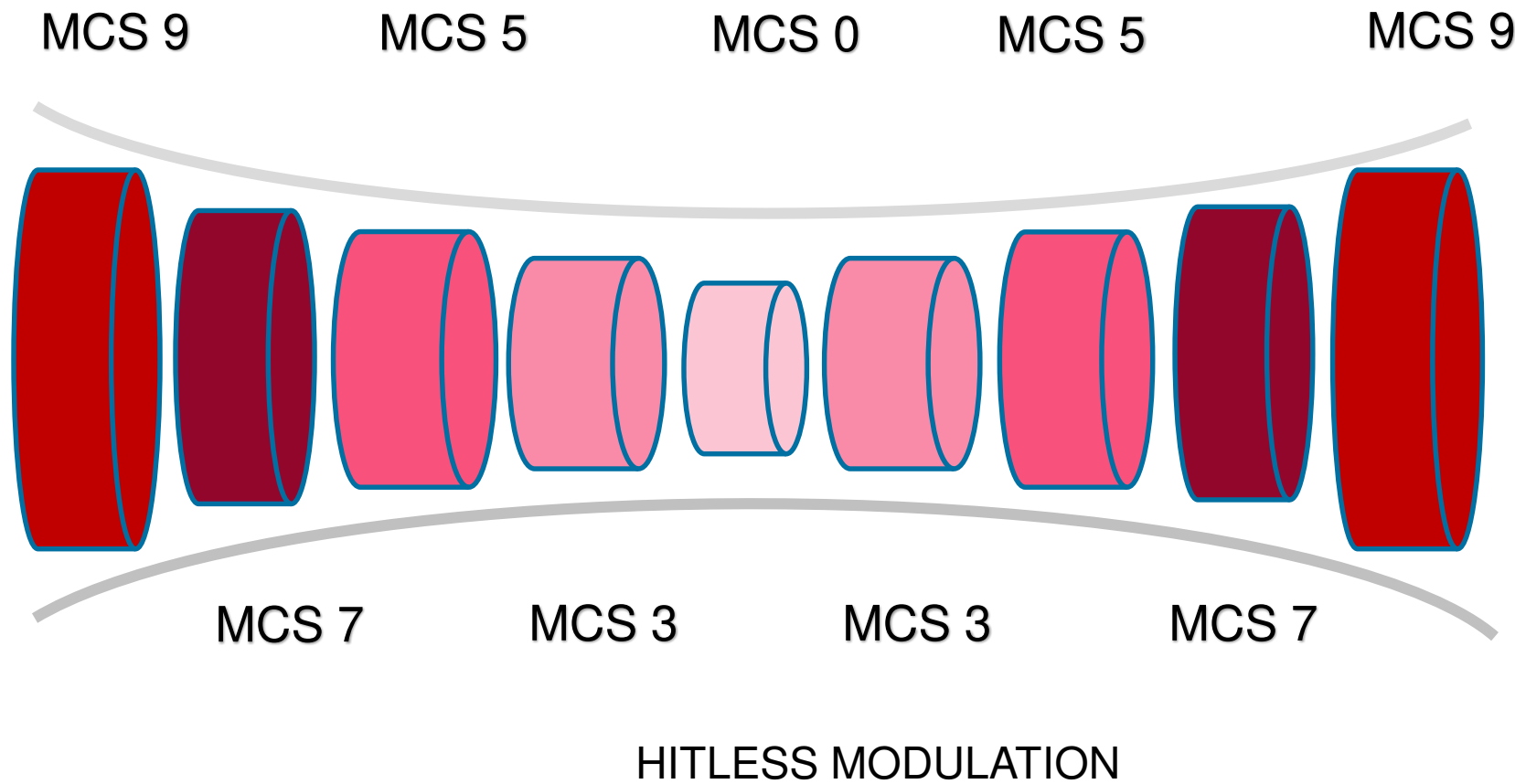
Power Output & Antenna Gain

- Up to 27 dBm @ BPSK, 23 dBm at 256 QAM
- 23 dBi integrated flat panel

Latency / Physical

- 3-5 ms one-direction latency
- IP66 and IP67

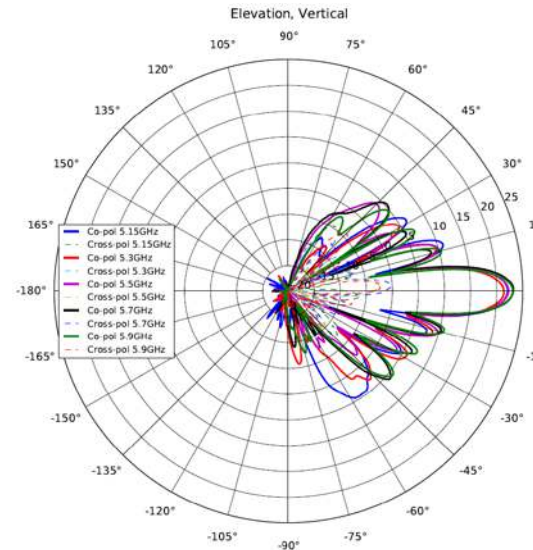
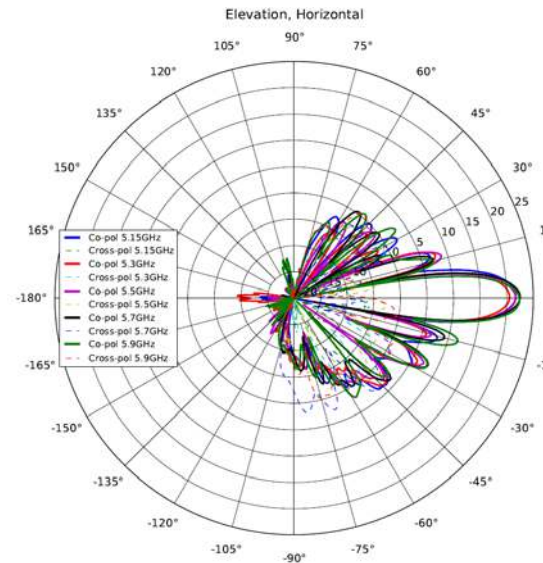
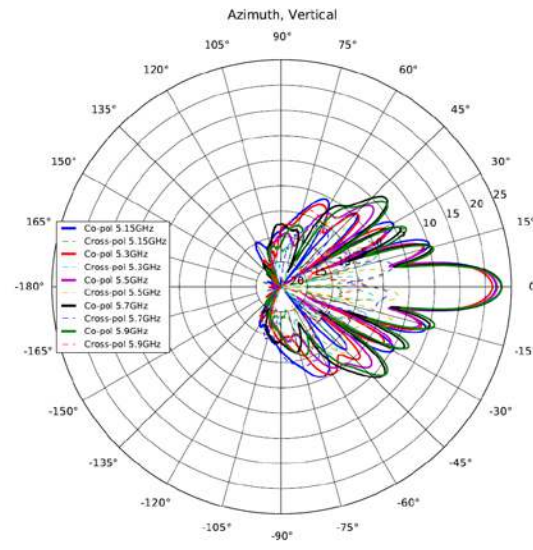
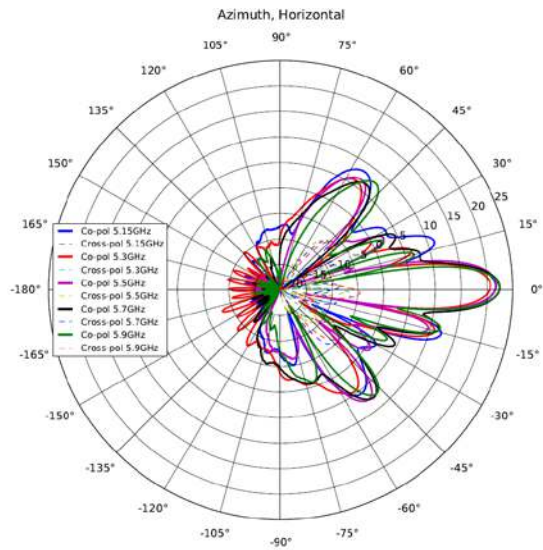
ADAPTIVE MODULATION



LEVELS OF MODULATION

- ☐ MCS 0
- ☐ MCS 1
- ☐ MCS 2
- ☐ MCS 3
- ☐ MCS 4
- ☐ MCS 5
- ☐ MCS 6
- ☐ MCS 7
- ☐ MCS 8
- ☐ MCS 9

Antenna Pattern



ANTENNA
GAIN

23 dBi

ANTENNA
BEAMWIDTH

8°

ANTENNA
DIMENSIONS

12"x12"

PHYSICAL PROTECTION



Did you know:
Average Category 5
Hurricane: 156 mph

Did you know:
Highest Wind
speed recorded
ever: 196 mph

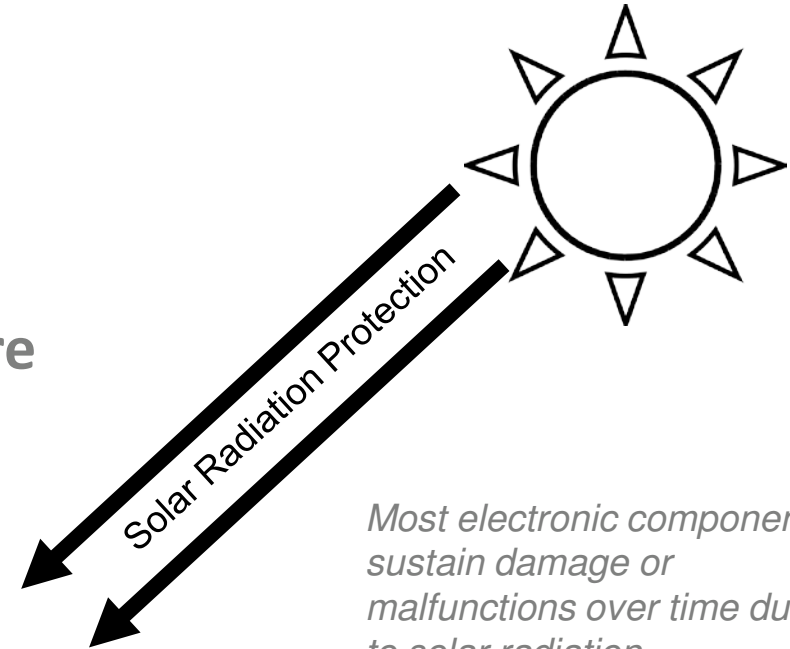
Protection Against:

- Solar Radiation
- Hurricane speed winds
- Dust and Water protection
- Harsh Weather temperature

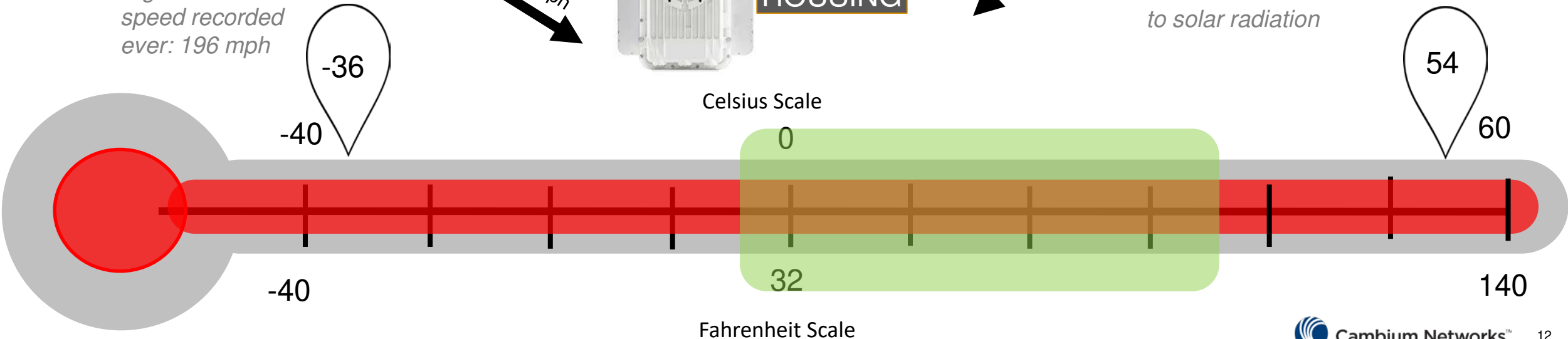
Wind Speed 200 Mph/322 kph



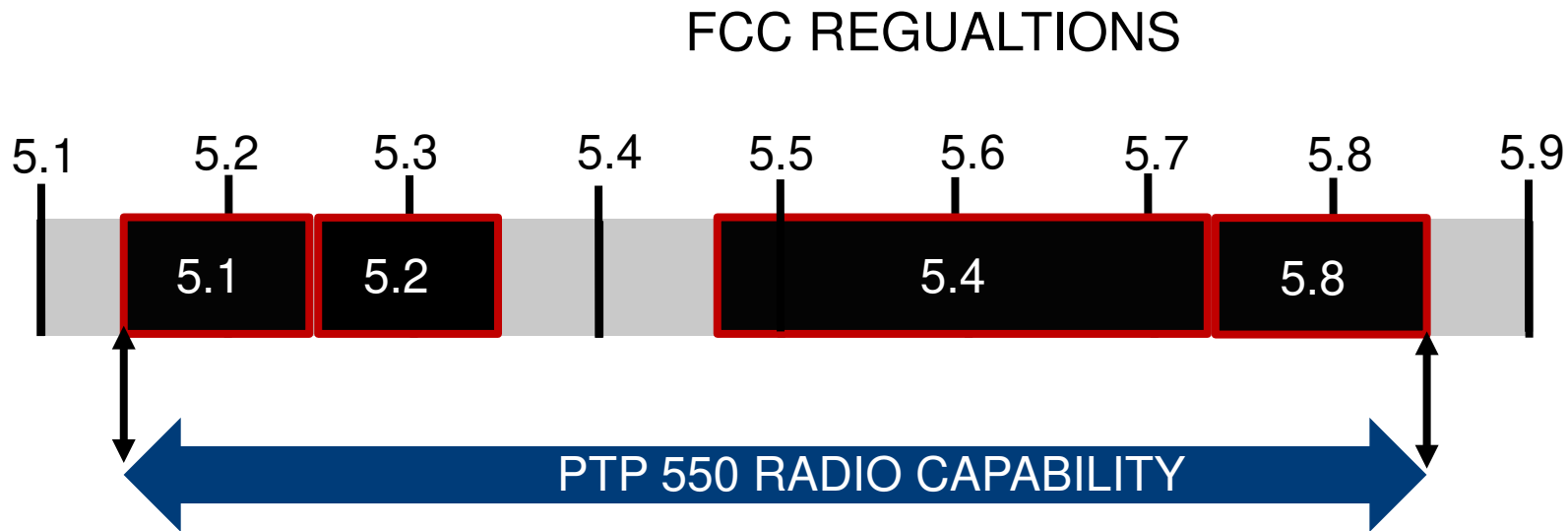
IP 67
HOUSING



Most electronic components
sustain damage or
malfunctions over time due
to solar radiation



5 GHz Analysis: Channel Size



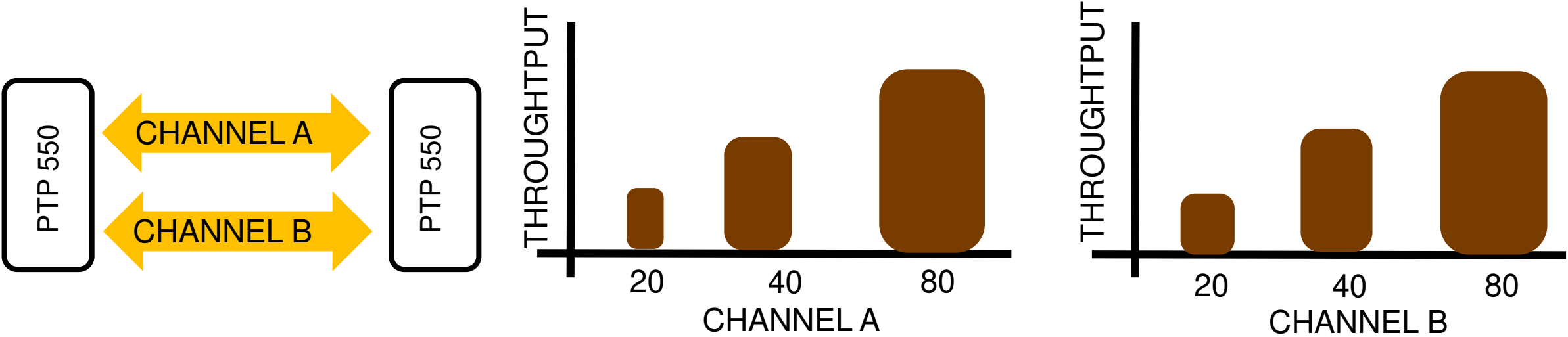
5.1 GHz Band: 5.150 – 5.250 GHz : 100 MHz

5.2 GHz Band: 5.250 – 5.350 GHz : 100 MHz

5.4 GHz Band: 5.470 – 5.725 GHz : 255 MHz

5.8 GHz Band: 5.725 – 5.850 GHz : 125 MHz

CHANNEL BONDING: EXPLAINED



CHANNEL A	CHANNEL B	EXAMPLE SCENARIO	THROUGHPUT
20	20	BAD NETWORK	350 Mbps
20	40	ONLY ONE CLEAN CHANNEL	500 Mbps
80	20	ONLY ONE CLEAN CHANNEL	850 Mbps
40	40	TWO CLEAN CHANNEL	700 Mbps
40	80	TWO CLEAN CHANNEL	1 Gbps
80	80	TWO FULL CLEAN CHANNEL	1.4 Gbps

DSO - MITIGATE INTERFERENCE

Always-on Wide-band Spectrum Analyzer

- Automatically changes channels to avoid interference without dropping the link
- Channels Bandwidth of 20, 40 & 80 MHz
- Hopping across out of band for better radio performance
- Spectrum analyzer – scans the band continuously
- Proactive channel planning
- Scans all bands and channels from 5.150 GHz to 5.850 GHz
- Data available in GUI

SPATIAL DIVERSITY: EXPLAINED

WHEN IS SPATIAL DIVERSITY APPLICABLE

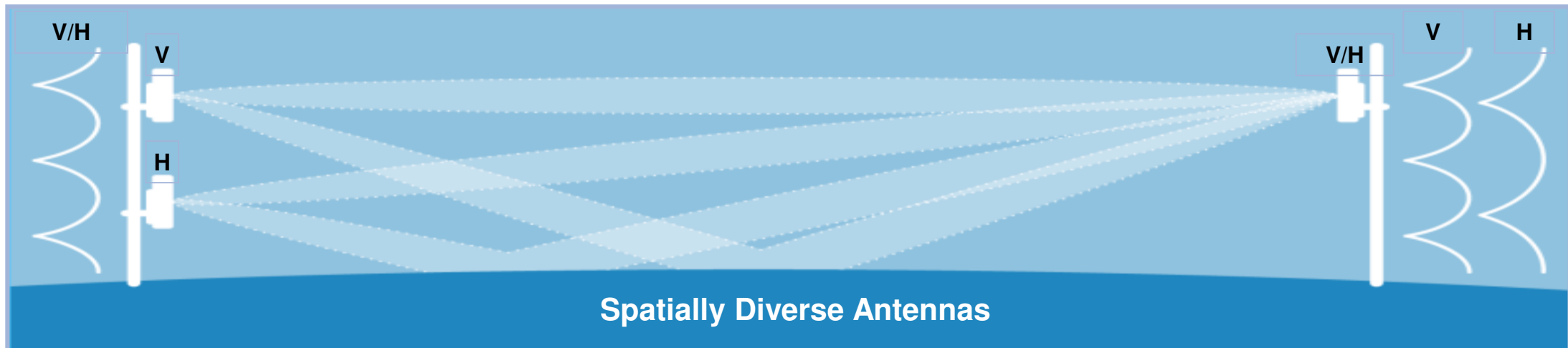
SENDING WIRELESS SIGNAL OVER REFLECTIVE SURFACES SUCH AS OCEAN /WATER, DESERT, CONCRETE ROAD

HOW TO APPLY SPATIAL DIVERSITY

PTP 670 HAS TWO 2 N-TYPE CONNECTOR , BY CONFIGURING ONE OF THEM AS VERTICAL AND OTHER AS HORIZONTAL ALIGNED

WHAT HAPPENDS IF DO NOT USE SPATIAL DIVERSITY

RADIO POSE PERFORMANCE LOW ALONG WITH RELIABILITY CHALLENGES DUE TO DUCTING AND FADING CREATED BY MULTI-PATH INTERFERENCE OVER SMOOTH SURFACE.



PTP SYNC: EXPLAINED

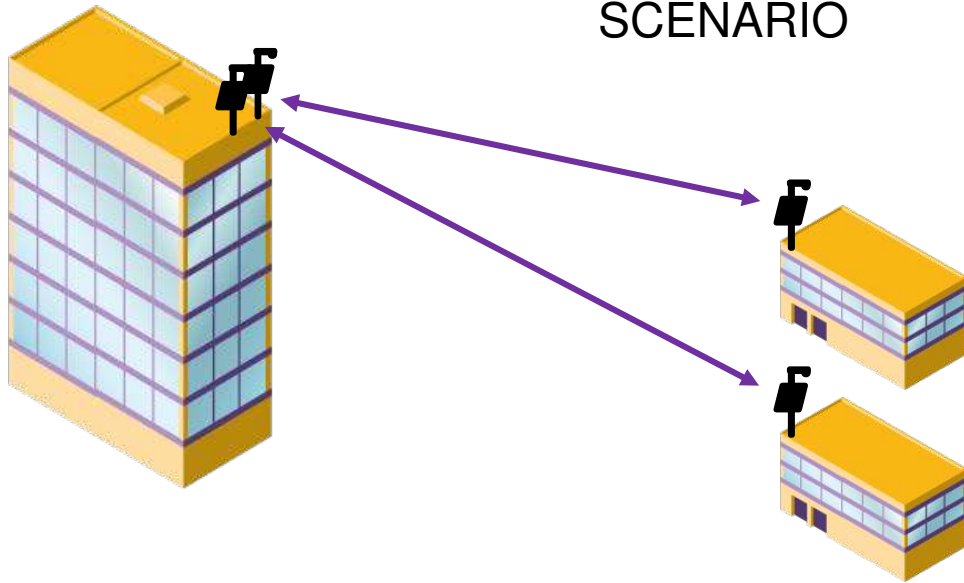
USING PTP SYNC WHEN:

LESS SPECTRUM AVAILABLE ON TOWER

LIMITED TOWER SPACE

REDUCE INTERFERENCE FROM OTHER RADIO

SCENARIO



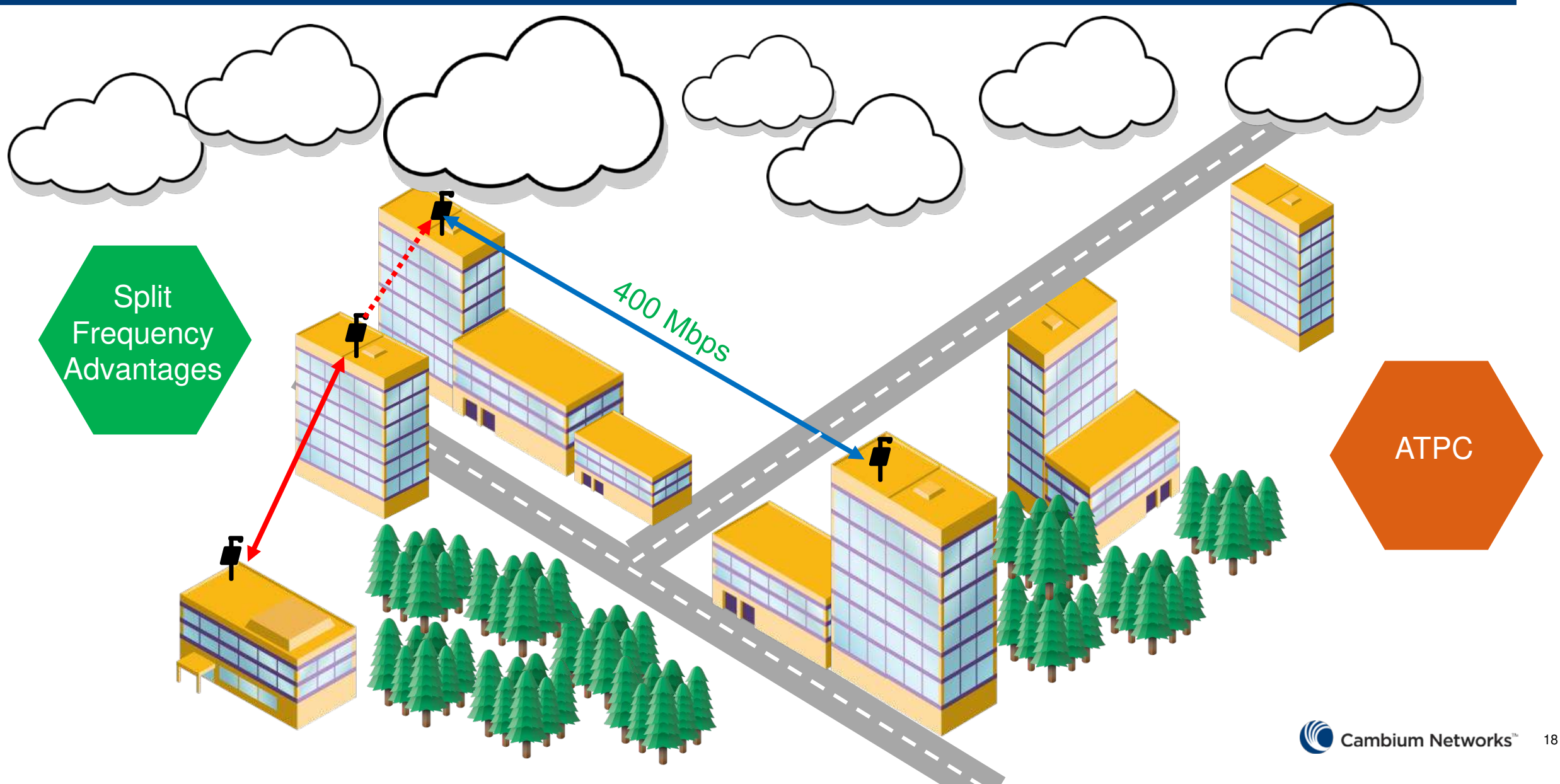
TX | RX | TX | RX | TX | LINK 1: SYNC
MIS ALIGN TRANSMIT AND RECEIVE CYCLE

TX | RX | TX | RX | TX | LINK 2: SYNC

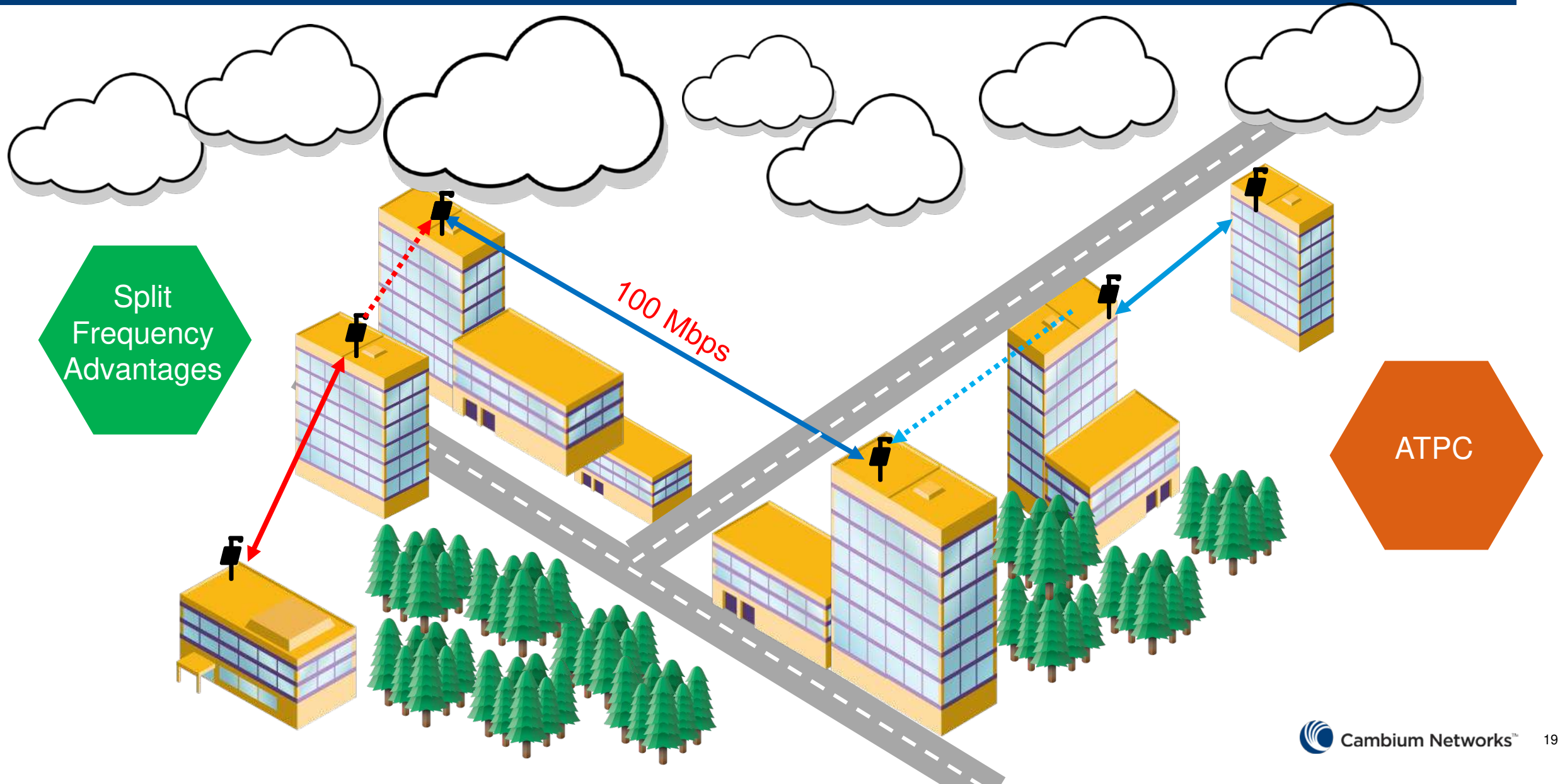
TX | RX | TX | RX | TX | LINK 1: SYNC
ALIGN TRANSMIT AND RECEIVE CYCLE

TX | RX | TX | RX | TX | LINK 2: SYNC

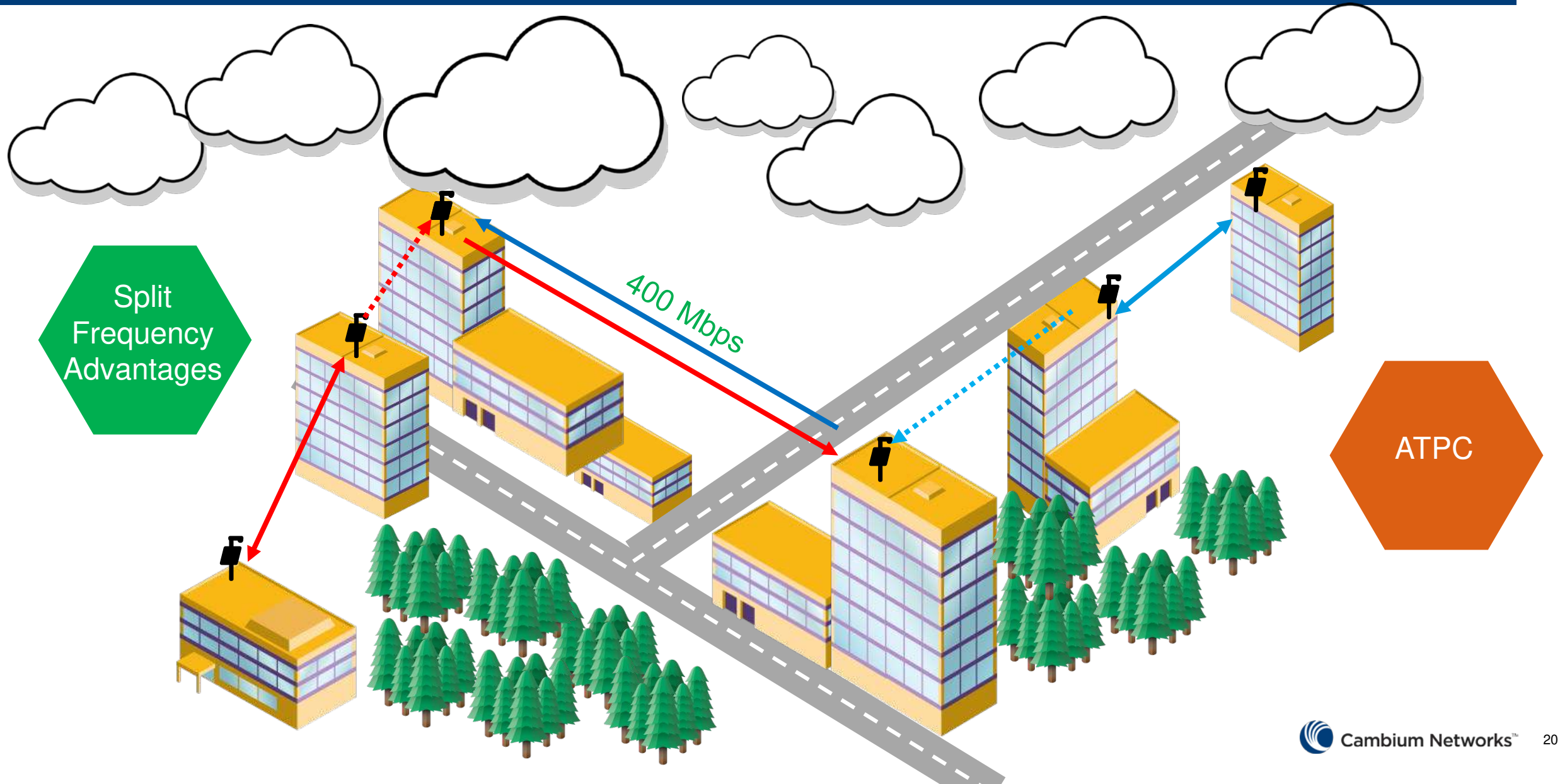
Split Frequency / Automatic Transmit Power Control



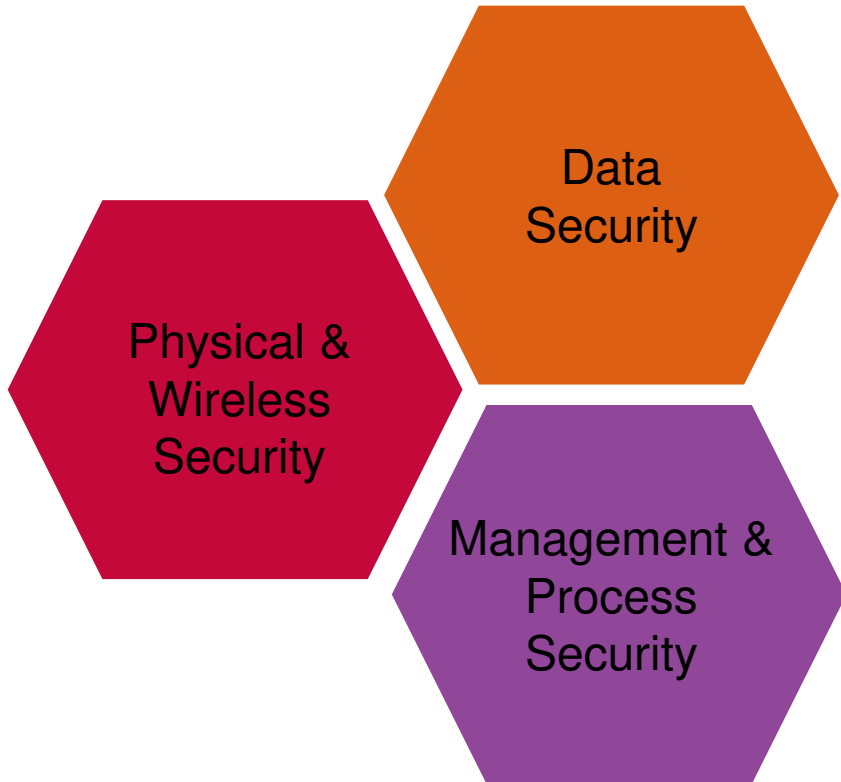
Split Frequency / Automatic Transmit Power Control



Split Frequency / Automatic Transmit Power Control



Security

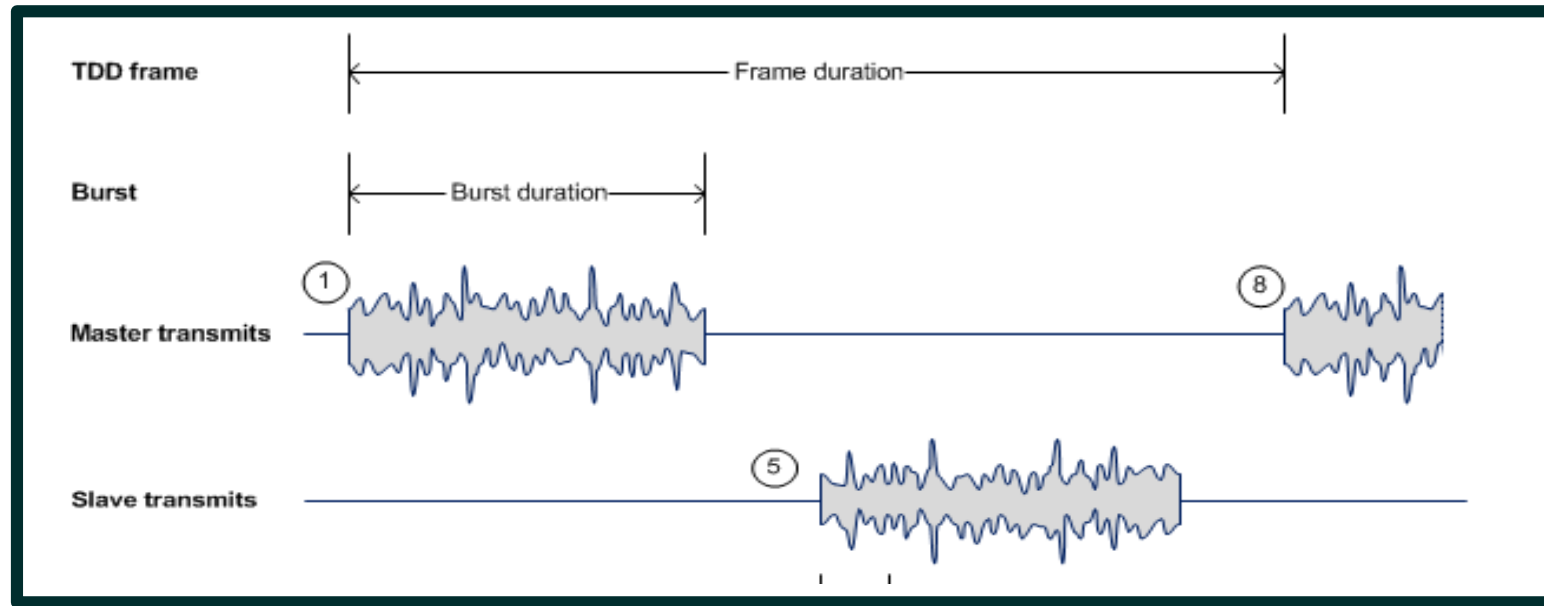


Prevent unauthorized software
Modified Software images cannot be loaded

Encrypt sensitive parameters configuration
Standard encryption protocol TLS, RSA, AES 128

Each software release tested against set of latest
known attacks with industry-standard tools
Multiple Access Level authentication

UPLINK-DOWNLINK SYMMETRY RATIOS



UL/DL Ratio	THROUGHPUT
50/50	680 Mbps / 680 Mbps
70/30 and 30/70	950 Mbps / 400 Mbps
75/25 and 25/75	1 Gbps / 340 Mbps



670 vs 550



PTP 550 vs PTP 670

ATTRIBUTES	PTP 670	PTP 550
Frequency Band supported	4.9 to 6.05 GHz	5.1 to 5.875 GHz
Max Throughput	450+ Mbps	1.4 Gbps
Spectral Efficiency	10.1 bpHz	8.75 bpHz
Support Multipoint Mode	Yes, using HCMP	No
Support DSO	Yes	
Support encryption	AES 128/256	AES 128
Support IEEE 1588 and SyncE	Yes, supported	No
Antenna Gain	23 dBi Gain	
Support Jumbo Frame	Yes, up to 9600 Bytes	No
TDD Sync	Yes, supported	
Support ARQ	No	Yes

PTP 550 Summary



PIP 550 Summary / Competitive Advantage

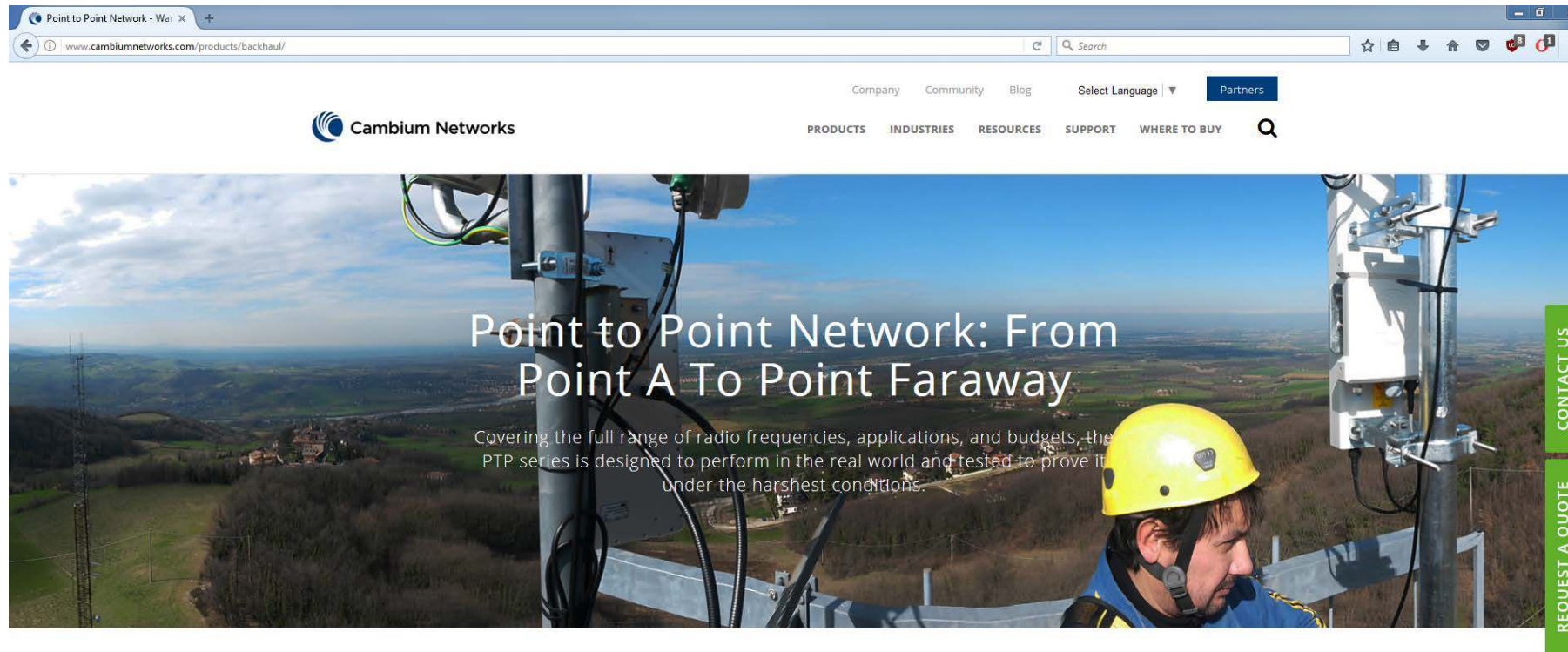
- 1.4 GBPS Capacity
- DSO and Channel Bonding Capability
- SFP Port
- ARQ Protocol
- Metal Enclosure small form factor

IMPORTANT DATES

Oct 11th: Public Announcement with accepting Pre-order from same day

Nov 28th : Order Fulfillment begins

**More
Information**



Point to Point Networking

Our proven Point-to-Point (PTP) series solutions are deployed worldwide, serving highly critical applications in formidable environments for the world's most demanding users. With best-in-class real world performance and FIPS 140-2 approved security

Community Forum

community.cambiumnetworks.com/t5/PTP-450/bd-p/forums_ptp_450

Cambium Networks™

SAGARGDESHPANDE

Home Forums Knowledge Base Ideas Your Stories

Cambium Networks Community > Forums > PTP > PTP 450

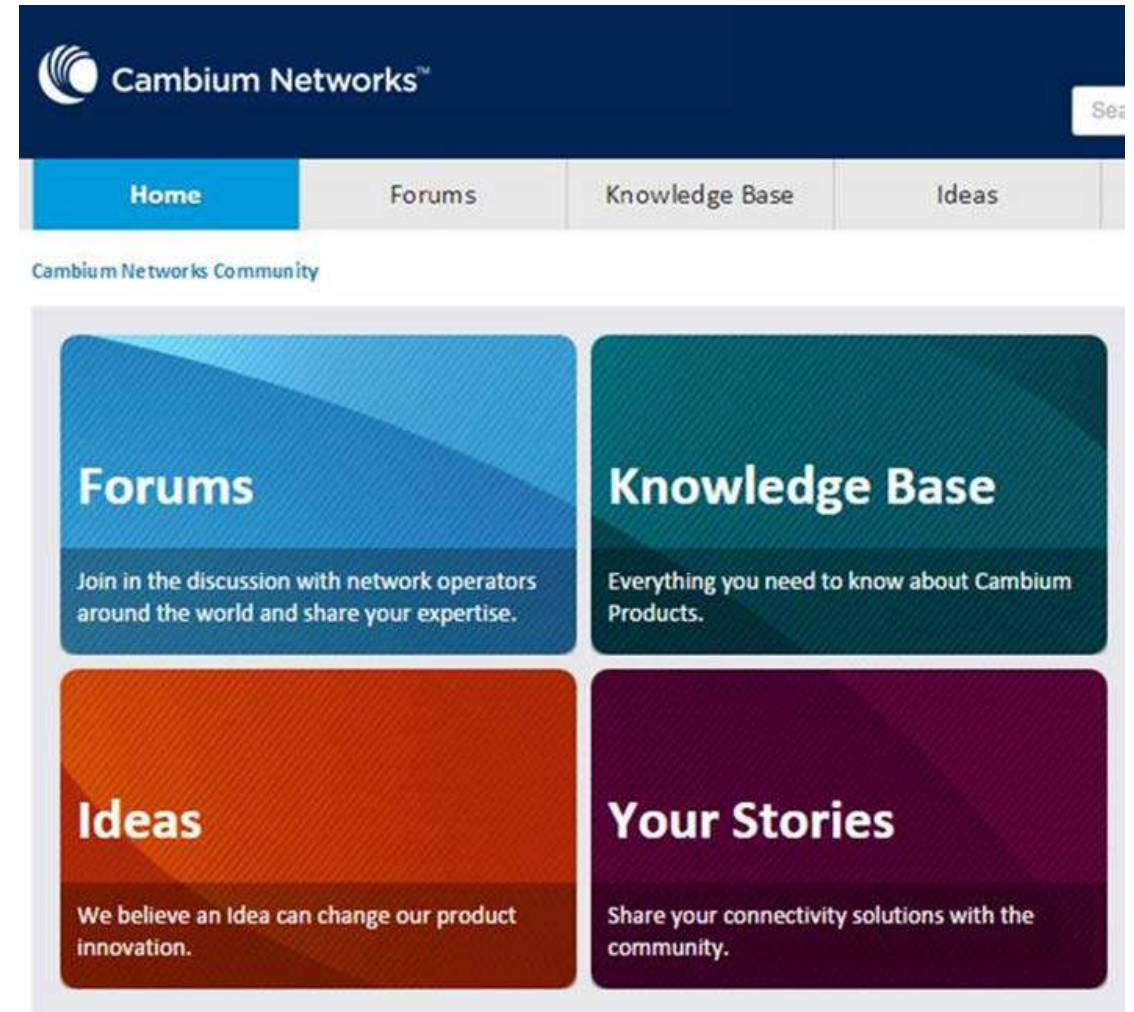
PTP 450

« PREVIOUS 1 2 3 Next » NEW MESSAGE OPTIONS

SUBJECT	REPLIES	NEW	AUTHOR	KUDOS	VIEWS	LATEST POST
40MHz channel on PTP 450i	8	9	giuseppe4	4	718	Wednesday by giuseppe4
How to physkaly reset a Cambium PTP 450	4	5	KingRich	1	1120	Tuesday by NYAME Joseph
PTP 450i Single Polarization	2	3	CDB	1	75	3 weeks ago by CDB
PTP 450 900 MHz power options	3	4	KRather	1	312	4 weeks ago by Douglas Generous
PTP 450i: Can you use a PMP 450i SM?	1	2	giuseppe4	0	70	02-17-2017 10:27 AM by Support_Sanjay
PTP 450i: How to reduce jitter?	4	5	giuseppe4	4	92	02-17-2017 07:46 AM by giuseppe4
PTP450i- SMS ES RESET, EACH DAY REGULAR INTERVAL O...	1	2	cobra_50	0	52	02-10-2017 11:38 AM by Eric Ozrelic
450i 900 MHz backhaul radio configs	2	3	tthomas	1	101	02-02-2017 10:42 AM by tthomas

Cambium Community

- Learn from network operators around the world
- Community Forum
 - Products
 - Network planning
 - Languages
 - Business issues
- Knowledge Base with technical detail documents
- Submit development ideas
- Real-world connectivity stories



Social Media

- Follow Cambium Networks to get the latest information
- Facebook
- Google+
- Instagram
- LinkedIn
- Twitter
- Weibo
- YouTube



Thank you

For more information:

Contact : Community Link:

<https://www.community.cambiumnetworks.com>



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