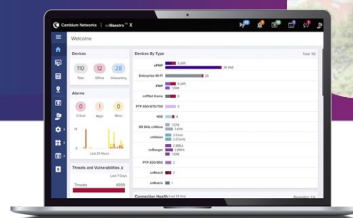


PTP 850C Licensed Microwave Radio

PTP 850C Quick Look

- Outdoor dual-core radio capable of 4096 QAM with ACM
- Supports 6/7/8/11/13/15/18/23 GHz
- Supports L1 link aggregation
- Supports 1+0 up to 4+0 single/dual polarization, 1+1/2+2 HSB, 1+1/2+2 HSB-SD, 2+0 XPIC, 2x2+0 east/west single/dual polarization configuration

NOTE: HSB configuration planned for future release



Radio

Radio	6, 7, 8, 11, 13, 15, 18, 23 GHz
	1+0 up to 4+0 single/dual polarization, 1+1/2+2 HSB, 1+1/2+2 HSB-SD, 2+0 XPIC, 2x2+0 east/west single/dual polarization
Features	Enhanced multi-carrier ABC (up to 2+0)
	Protection: 1+1 HSB/2+2 HSB*, 1+11 HSB-SD*
	High spectral utilization: BPSK to 4096 QAM w/ACM
	Channel bandwidth: 14 to 224 MHz
	XPIC
	2x2/4x4 LoS MIMO*
	Advanced frequency reuse (AFR)*
	Advanced space diversity (ASD)*
	Multiband (with PTP 850E)

*Roadmap feature

Ethernet

Interfaces	Port 1: DC port Port 2: RJ-45 – Electric multi-rate 1/2.5/10 Gbps traffic interface/PoE port Port 3: SFP – 1/2.5G traffic interface and dual band port	Port 4: SFP – 1/10 GE traffic interface/MIMO extension port (SFP+) Port 5: SFP – 1/10 GE traffic interface (SFP+) Port 6: RJ-45 – Management/protection interface – 100 Base-T
MTU	9,612 bytes	
Ethernet Services	Up to 1024 Ethernet services, plus one pre-defined management service	
Quality of Service	Multiple classification criteria (VLAN ID, p-bits, IPv4 DSCP, IPv6 TC, MPLS EXP) 8 CoS queues per port	Deep buffering (configurable up to 64 Mbit per queue) WRED P-bit marking/remarking
VLAN	VLAN add/remove/translate	
Network Protocols	MSTP, ERP (ITU-T G.8032) Y.1731 Ethernet OAM Y.1731 Ethernet bandwidth notification (ETH-BN)	

PTP 850C Licensed Microwave Radio

Management

Management	SNMP
Protocols	REST
	SDN support: NETCONF/YANG

Synchronization

Enhanced Ethernet equipment clock (eEEEC) Specification (G.8262.1)
PTP telecom boundary clock (T-BC) and time save clock (T-TSC) specification (G.8273.2)
PTP telecom transparent clock (T-TC) specification (G.8273.3)
Enhanced SyncE network limits (G.8261, clause 9.2.1)
Enhanced PTP network limits (G.8271.1)
Ethernet synchronization messaging channel (ESMC) (G.8264, clause 11)
PTP telecom profile for time (full timing support) (G.8275.1)
Precision time protocol (version 2, IEEE1588-2008)

Security

HTTPS, SNMPV3, SSH, SFTP
RADIUS authentication and authorization
TACACS+ authentication, authorization, and accounting (session based)
AES encryption – AES 256

Standard

MEF	Carrier Ethernet 2.0 (CE 2.0)
Supported Ethernet Standards:	10/100/1000base-T/X (IEEE 802.3)
	Optical 10Gbase-LR (IEEE 802.3)
	Ethernet VLANs (IEEE 802.3ac)
	Virtual LAN (VLAN, IEEE 802.1Q)
	Class of service (IEEE 802.1p)
	Provider bridges (QinQ – IEEE 802.1ad)
	Link aggregation (IEEE 802.1ax)
	Auto MDI/MDIX for 1000 Base-T
	RFC 1349: IPv4 TOS
	RFC 2474: IPv4 DSCP
	RFC 2460: IPv6 traffic classes

PTP 850C Licensed Microwave Radio

Standards Compliance

Radio Spectral Efficiency	FCC Part 101, EN 302 217-2-2
Compliance	EMC: EN 301 489-1, EN 301 489-4, Class B (Europe) FCC 47 CFR, part 15, class B (US) ICES-003, Class B (Canada) TEC/SD/DD/EMC-221/05/OCT-16, IEC 61000-4-29
Surge	EN61000-4-5, Class 4 (for PWR and ETH1/PoE ports)
Safety:	EN 60950-1, IEC 60950-1, UL 60950-1, CSA C22.2 No. 60950-1, EN 60950-22, UL 60950-22, CSA C22.2
Storage	ETSI EN 300 019-1-1 Class 1.2
Transportation	ETSI EN 300 019-1-2 Class 2
Ingress Protection:	IP67

Technical

Dimensions: Direct Mount (H x W x D)	322 mm x 227/270 mm x 86 mm, 6 kg 12.67 in x 8.93/10.62 in x 3.38 in, 13.2 lb
Pole Diameter Range (for remote mount installation)	8.89 cm – 11.43 cm 3.5 in – 4.5 in
Environmental	-33°C to +55°C -27°F to +131°F
Standard Input	-48 VDC
DC Input Range	-40.5 to -60 VDC
Power Consumption	2+0 operation: 6-11 GHz: 73W 2+0 operation: 13-28 GHz: 63W 1+0 operation (one carrier muted) 6-11 GHz: 63W 1+0 operation (one carrier muted): 13-23 GHz: 55W Both carrier muted: 6-11 GHz: 38W; 13-23 GHz: 40W
PoE Injector Dimensions (H x W x D)	134 mm x 190 mm x 62 mm, 1 kg
PoE Injector Environmental	-33°C to +55°C (-45°C to +60°C extended)
PoE Injector Standard Input	-48 or +24 VDC (optional)
PoE Injector DC Input Range	±(18/40.5 to 60) VDC (+18VDC extended range is supported as part of the nominal +24VDC support)
PoE Injector Interfaces	GbE data port supporting 10/100/1000Base-T

PTP 850C Licensed Microwave Radio

Capacity (Mbps)											
Modulation	10 MHz	14 MHz	20 MHz	25 MHz	28/30 MHz	40 MHz	50 MHz	56/60 MHz	80 MHz	112 MHz	224 MHz
BPSK	–	–	10-13	14-17	18-22	25-31	33-40	40-49	54-66	79-97	162-198
QPSK	–	16-20	25-30	32-40	40-48	54-67	67-82	83-102	111-135	162-198	328-401
8 QAM	–	26-32	39-47	50-61	59-72	83-101	105-129	123-150	158-193	242-296	489-597
16 QAM	23-28	37-46	54-66	69-84	84-102	113-139	144-176	172-210	227-277	330-404	665-812
32 QAM	32-39	50-31	72-88	92-112	111-136	150-184	181-222	227-277	298-365	435-532	875-1069
64 QAM	40-49	62-76	89-109	113-139	138-168	185-227	235-287	279-341	366-447	535-654	1111-1358
128 QAM	48-59	76-93	108-132	137-168	166-203	225-275	275-336	338-413	433-529	647-791	1298-1587
256 QAM	56-68	87-106	123-150	157-192	192-234	242-296	326-399	391-478	498-609	740-905	1484-1815
512 QAM	62-75	96-118	134-164	174-212	204-249	265-324	354-433	420-514	548-670	804-983	1678-2051
1024 QAM Strong	65-79	102-125	143-175	185-226	223-272	301-368	386-472	457-559	596-729	872-1066	1860-2274
1024 QAM Light	69-85	108-132	152-186	196-240	236-289	320-391	410-501	486-594	633-774	926-1132	–
2048 QAM	–	113-138	162-198	211-258	258-315	346-423	442-541	527-644	670-820	999-1221	–
4096 QAM	–	–	–	228-279	275-336	366-448	459-561	542-663	708-865	1034-1264	–

Receive Sensitivity (dBm @10E-6)							
20 MHz	6	7-8	11	13	15	18	23
BPSK	-91.5	-91.5	-92.0	-91.0	-90.0	-91.5	-90.5
QPSK	-88.5	-88.5	-89.5	-88.0	-87.5	-88.5	-88.0
8 QAM	-83.5	-83.5	-84.0	-83.0	-82.0	-83.5	-82.5
16 QAM	-82.0	-82.0	-82.5	-81.5	-80.5	-82.0	-81.0
32 QAM	-78.0	-78.0	-79.0	-77.5	-77.0	-78.0	-77.5
64 QAM	-75.5	-75.5	-76.0	-75.0	-74.0	-75.5	-74.5
128 QAM	-72.5	-72.5	-73.0	-71.5	-71.0	-72.5	-71.5
256 QAM	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5
512 QAM	-67.0	-67.0	-67.5	-66.0	-65.5	-67.0	-66.0
1024 QAM Strong	-64.0	-64.0	-65.0	-63.5	-63.0	-64.0	-63.5
1024 QAM Light	-63.0	-63.0	-64.0	-62.5	-62.0	-63.0	-62.5

Receive Sensitivity (dBm @10E-6)							
25 MHz	6	7-8	11	13	15	18	23
BPSK	-88.5	-87.5	-88.0	-87.0	-86.5	-87.5	-86.5
QPSK	-87.5	-86.5	-87	-86.0	-85.5	-86.5	-85.5
8 QAM	-82.5	-82.0	-82.5	-81.5	-80.5	-82.0	-81.0
16 QAM	-80.5	-80.0	-80.5	-79.5	-78.5	-80.0	-79.0
32 QAM	-77.5	-77.0	-77.5	-76.0	-75.5	-77.0	-76.0
64 QAM	-74.5	-74.0	-74.5	-73.5	-72.5	-74.0	-73.0
128 QAM	-71.5	-71.0	-71.5	-70.5	-69.5	-71.0	-70.0
256 QAM	-68.5	-67.5	-68.5	-67.0	-66.5	-67.5	-67.0
512 QAM	-66.0	-65.0	-66.0	-64.5	-64.0	-65.0	-64.5
1024 QAM Strong	-63.0	-62.5	-63.0	-61.5	-61.0	-62.5	-61.5
1024 QAM Light	-62.5	-61.5	-62.5	-61.0	-60.5	-61.5	-61.0
2048 QAM	-58.5	-58.0	-58.5	-57.0	-56.5	-58.0	-57.0
4096 QAM	-55.5	-55.0	-55.5	-54.0	-53.5	-55.0	-54.0

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Receive Sensitivity (dBm @10E-6)							
28 MHz	6	7-8	11	13	15	18	23
BPSK	-88.5	-88.0	-88.5	-87.5	-86.5	-88.0	-87.0
QPSK	-87.5	-87.0	-87.5	-86.5	-85.5	-87.0	-86.0
8 QAM	-83.0	-82.5	-83.0	-82.0	-81.0	-82.5	-81.5
16 QAM	-81.0	-80.5	-81.0	-79.5	-79.0	-80.5	-79.5
32 QAM	-77.5	-77.0	-77.5	-76.0	-75.5	-77.0	-76.0
64 QAM	-74.5	-74.0	-74.5	-73.0	-72.5	-74.0	-73.0
128 QAM	-71.5	-70.5	-71.0	-70.0	-69.5	-70.5	-69.5
256 QAM	-68.5	-67.5	-68.0	-67.0	-66.5	-67.5	-66.5
512 QAM	-66.0	-65.0	-66.0	-64.5	-64.0	-65.0	-64.5
1024 QAM Strong	-63.0	-62.5	-63.0	-61.5	-61.0	-62.5	-61.5
1024 QAM Light	-62.0	-61.5	-62.0	-60.5	-60.0	-61.5	-60.5
2048 QAM	-58.5	-58.0	-58.5	-57.0	-56.5	-58.0	-57.0
4096 QAM	-55.5	-55.0	-55.5	-54.0	-53.5	-55.0	-54.0

Receive Sensitivity (dBm @10E-6)							
30 MHz	6	7-8	11	13	15	18	23
BPSK	-88.5	-88.0	-88.5	-87.0	-86.5	-88.0	-87.0
QPSK	-87.5	-87.0	-87.5	-86.0	-85.5	-87.0	-86.0
8 QAM	-82.5	-81.5	-82.5	-81.0	-80.5	-81.5	-81.0
16 QAM	-81.0	-80.0	-80.5	-79.5	-79.0	-80.0	-79.0
32 QAM	-77.0	-76.5	-77.0	-76.0	-75.0	-76.5	-75.5
64 QAM	-74.5	-73.5	-74.0	-73.0	-72.5	-73.5	-72.5
128 QAM	-71.0	-70.5	-71.0	-70.0	-69.0	-70.5	-69.5
256 QAM	-68.0	-67.5	-68.0	-67.0	-66.0	-67.5	-66.5
512 QAM	-66.0	-65.5	-66.0	-64.5	-64.0	-65.5	-64.5
1024 QAM Strong	-63.0	-62.0	-62.5	-61.5	-61.0	-62.0	-61.0
1024 QAM Light	-62.0	-61.0	-62.0	-60.5	-60.0	-61.0	-60.5
2048 QAM	-58.0	-57.5	-58.0	-56.5	-56.0	-57.5	-56.5
4096 QAM	-55.0	-54.5	-55.0	-53.5	-53.0	-54.5	-53.5

Receive Sensitivity (dBm @10E-6)							
40 MHz	6	7-8	11	13	15	18	23
BPSK	-87.0	-86.5	-87.0	-86.0	-85.0	-86.5	-85.5
QPSK	-86.0	-85.5	-86.0	-85.0	-84.0	-85.5	-84.5
8 QAM	-81.0	-80.5	-81.0	-79.5	-79.0	-80.5	-79.5
16 QAM	-79.5	-79.0	-79.5	-78.0	-77.5	-79.0	-78.0
32 QAM	-76.0	-75.0	-75.5	-74.5	-74.0	-75.0	-74.0
64 QAM	-73.0	-72.0	-73.0	-71.5	-71.0	-72.0	-71.5
128 QAM	-70.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5
256 QAM	-67.0	-66.0	-66.5	-65.5	-65.0	-66.0	-65.0
512 QAM	-64.0	-63.5	-64.0	-62.5	-62.0	-63.5	-62.5
1024 QAM Strong	-61.5	-61.0	-61.5	-60.0	-59.5	-61.0	-60.0
1024 QAM Light	-60.5	-60.0	-60.5	-59.5	-58.5	-60.0	-59.0
2048 QAM	-58.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5
4096 QAM	-55.0	-54.0	-55.0	-53.5	-53.0	-54.0	-53.5

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Receive Sensitivity (dBm @10E-6)							
56 MHz	6	7-8	11	13	15	18	23
BPSK	-85.5	-85.0	-85.5	-84.0	-83.5	-85.0	-84.0
QPSK	-84.5	-84.0	-84.5	-83.0	-82.5	-84.0	-83.0
8 QAM	-80.0	-79.0	-79.5	-78.5	-78.0	-79.0	-78.0
16 QAM	-77.5	-77.0	-77.5	-76.0	-75.5	-77.0	-76.0
32 QAM	-74.0	-73.0	-73.5	-72.5	-72.0	-73.0	-72.0
64 QAM	-70.5	-70.0	-70.5	-69.5	-68.5	-70.0	-69.0
128 QAM	-68.0	-67.0	-67.5	-66.5	-66.0	-67.0	-66.0
256 QAM	-64.5	-64.0	-64.5	-63.5	-62.5	-64.0	-63.0
512 QAM	-62.5	-62.0	-62.5	-61.5	-60.5	-62.0	-61.0
1024 QAM Strong	-59.0	-58.5	-59.0	-58.0	-57.0	-58.5	-57.5
1024 QAM Light	-58.0	-57.5	-58.0	-57.0	-56.0	-57.5	-56.5
2048 QAM	-55.5	-54.5	-55.0	-54.0	-53.5	-54.5	-53.5
4096 QAM	-52.5	-51.5	-52.0	-51.0	-50.5	-51.5	-50.5

Receive Sensitivity (dBm @10E-6)							
60 MHz	6	7-8	11	13	15	18	23
BPSK	-86.0	-85.0	-85.5	-84.0	-83.5	-85.0	-84.0
QPSK	-85.0	-84.0	-84.5	-83.0	-82.5	-84.0	-83.0
8 QAM	-80.5	-79.0	-79.5	-78.5	-78.0	-79.0	-78.0
16 QAM	-78.0	-77.0	-77.5	-76.0	-75.5	-77.0	-76.0
32 QAM	-74.5	-73.0	-73.5	-72.5	-72.0	-73.0	-72.0
64 QAM	-71.5	-70.0	-70.5	-69.5	-68.5	-70.0	-69.0
128 QAM	-69.0	-67.0	-67.5	-66.5	-66.0	-67.0	-66.0
256 QAM	-65.5	-64.0	-64.5	-63.5	-62.5	-64.0	-63.0
512 QAM	-63.5	-62.0	-62.5	-61.5	-60.5	-62.0	-61.0
1024 QAM Strong	-60.0	-58.5	-59.0	-58.0	-57.0	-58.5	-57.5
1024 QAM Light	-59.0	-57.5	-58.0	-57.0	-56.0	-57.5	-56.5
2048 QAM	-56.5	-54.5	-55.0	-54.0	-53.5	-54.5	-53.5
4096 QAM	-53.5	-51.5	-52.0	-51.0	-50.5	-51.5	-50.5

Receive Sensitivity (dBm @10E-6)							
80 MHz	6	7-8	11	13	15	18	23
BPSK	-85.0	-85.0	-85.5	-84.5	-83.5	-85.0	-84.0
QPSK	-82.5	-82.5	-83.0	-82.0	-81.5	-82.5	-81.5
8 QAM	-79.0	-79.0	-79.5	-78.5	-77.5	-79.0	-78.0
16 QAM	-76.0	-76.0	-76.5	-75.0	-74.5	-76.0	-75.0
32 QAM	-72.5	-72.5	-73.0	-71.5	-71.0	-72.5	-71.5
64 QAM	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5
128 QAM	-66.5	-66.5	-67.0	-66.0	-65.0	-66.5	-65.5
256 QAM	-63.5	-63.5	-64.0	-63.0	-62.0	-63.5	-62.5
512 QAM	-61.0	-61.0	-62.0	-60.5	-60.0	-61.0	-60.5
1024 QAM Strong	-58.0	-58.0	-58.5	-57.5	-56.5	-58.0	-57.0
1024 QAM Light	-57.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5
2048 QAM	-54.5	-54.5	-55.5	-54.0	-53.5	-54.5	-54.0
4096 QAM	-51.5	-51.5	-52.5	-51.0	-50.5	-51.5	-51.0

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Receive Sensitivity (dBm @10E-6)							
112 MHz	6	7-8	11	13	15	18	23
BPSK	-82.0	-81.5	-82.0	-80.5	-80.0	-81.5	-80.5
QPSK	-81.0	-80.5	-81.0	-79.5	-79.0	-80.5	-79.5
8 QAM	-76.5	-75.5	-76.0	-75.0	-74.5	-75.5	-74.5
16 QAM	-74.0	-73.5	-74.0	-72.5	-72.0	-73.5	-72.5
32 QAM	-70.5	-69.5	-70.0	-69.0	-68.5	-69.5	-68.5
64 QAM	-67.0	-66.5	-67.0	-66.0	-65.0	-66.5	-65.5
128 QAM	-64.5	-63.5	-64.0	-63.0	-62.5	-63.5	-62.5
256 QAM	-61.0	-60.5	-61.0	-60.0	-59.0	-60.5	-59.5
512 QAM	-59.0	-58.5	-59.0	-58.0	-57.0	-58.5	-57.5
1024 QAM Strong	-55.5	-55.0	-55.5	-54.5	-53.5	-55.0	-54.0
1024 QAM Light	-54.5	-54.0	-54.5	-53.5	-52.5	-54.0	-53.0
2048 QAM	-52.0	-51.0	-51.5	-50.5	-50.0	-51.0	-50.0
4096 QAM	-49.0	-48.0	-48.5	-47.5	-47.0	-48.0	-47.0

Receive Sensitivity (dBm @10E-6)							
224 MHz	6	7-8	11	13	15	18	23
BPSK	-79.0	-78.5	-79.0	-77.5	-77.0	-78.5	-77.5
QPSK	-78.0	-77.5	-78.0	-76.5	-76.0	-77.5	-76.5
8 QAM	-73.5	-72.5	-73.0	-72	-71.5	-72.5	-71.5
16 QAM	-71.0	-70.5	-71.0	-69.5	-69.0	-70.5	-69.5
32 QAM	-67.5	-66.5	-67.0	-66.0	-65.5	-66.5	-65.5
64 QAM	-64.0	-63.5	-64.0	-63.0	-62.0	-63.5	-62.5
128 QAM	-61.5	-60.5	-61.0	-60.0	-59.5	-60.5	-59.5
256 QAM	-58.0	-57.5	-58.0	-57.0	-56.0	-57.5	-56.5
512 QAM	-56.0	-55.5	-56.0	-55.0	-54.0	-55.5	-54.5
1024 QAM Strong	-52.5	-52.0	-52.5	-51.5	-50.5	-52.0	-51.0

Throughput Capacity (Mbps)								
Modulation	10 MHz	20 MHz	25 MHz	50 MHz	56/60 MHz	80 MHz	112 MHz	224 MHz
BPSK	–	10-13	14-17	33-40	40-49	54-66	79-97	162-198
QPSK	–	25-30	32-40	67-82	83-102	111-135	162-198	328-401
8 QAM	–	39-47	50-61	105-129	123-150	158-193	242-296	489-597
16 QAM	23-28	54-66	69-84	144-176	172-210	227-277	330-404	665-812
32 QAM	32-39	72-88	92-112	181-222	227-277	298-365	435-532	875-1069
64 QAM	40-49	89-109	113-139	235-287	279-341	366-447	535-654	1111-1358
128 QAM	48-59	108-132	137-168	275-336	338-413	433-529	647-791	1298-1587
256 QAM	56-68	123-150	157-192	326-399	391-478	498-609	740-905	1484-1815
512 QAM	62-75	134-164	174-212	354-433	420-514	548-670	804-983	1678-2051
1024 QAM Strong	65-79	143-175	185-226	386-472	457-559	596-729	872-1066	1860-2274
1024 QAM Light	69-85	152-186	196-240	410-501	486-594	633-774	926-1132	–
2048 QAM	–	162-198	211-258	442-541	527-644	670-820	999-1221	–
4096 QAM	–	–	228-279	459-561	542-663	708-865	1034-1264	–

ABOUT CAMBIUM NETWORKS

Cambium Networks enables service providers, enterprises, industrial organizations, and governments to deliver exceptional digital experiences and device connectivity with compelling economics. Our ONE Network platform simplifies management of Cambium Networks' wired and wireless broadband and network edge technologies. Our customers can focus more resources on managing their business rather than the network. We make connectivity that just works.