

PTP 820C High Power Licensed Microwave Radio



All-Outdoor / Multi-Core

Specifications

RADIO

- 6-11 GHz
- Channel Bandwidth: 5-80 MHz
- Field Changeable Diplexers
- 1+0, 2+0 XPIC, 1+0 SD, 2 x 1+0 East-West, 2+2 SD/HSB, 2+0 SP/DP, 2 x 2+0 SP/DP, 4x4 MIMO, AFR*
- Multiband (with PTP 850E or PTP 820E)

Radio Features

- Multi-Carrier Adaptive Bandwidth Control (up to 2+0)
- Protection: 1+1/2+2 HSB
- QPSK to 2048 QAM w/ACM
- 4x4 LoS MIMO
- XPIC
- Advanced Space Diversity (ASD)
- Advanced Frequency Reuse (AFR)*

ETHERNET

Ethernet Interfaces

- Traffic Interfaces – 1 x 10/100/1000Base-T (RJ-45) and 1x1000base-X (SFP) or 10/100/1000 Base-T (Electrical SFP)
- Management Interface - 1 x 10/100 Base-T (RJ-45)
- Optical SFP Types - Optical 1000Base-LX (1310 nm) or SX (850nm)
Note: SFP devices must be of industrial grade (-40°C to +85°C)

Ethernet Features

- MTU – 9600 Bytes
- Quality of Service
 - Multiple Classification criteria (VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP)
 - 8 priority queues per port
 - Deep buffering (configurable up to 64 Mbit per queue)
 - WRED
 - P-bit marking/remarking
- 4K VLANs
- VLAN add/remove
- Frame Cut Through – controlled latency and PDV for delay sensitive applications
- Header De-Duplication – Capacity boosting by eliminating inefficiency in all layers (L2, MPLS, L3, L4, Tunneling – GTP for LTE, GRE)
- Y.1731 Ethernet OAM
- Y.1731 Ethernet Bandwidth Notification (ETH-BN)
- Adaptive Bandwidth Notification (ABN, also known as EOAM)

MANAGEMENT PROTOCOLS

- SNMP
- REST
- SDN Support: NETCONF/YANG

SYNCHRONIZATION

Synchronization Distribution

- Sync Distribution over any traffic interface (GE/FE)
- Sync-E (ITU-T G.8261, G.8262)
- SSM/ESMC Support for ring/mesh applications (ITU-T G.8264)
- Sync-E Regenerator mode, providing PRC grade (ITU-T G.811) performance for smart pipe applications.

IEEE-1588

- Optimized Transport for reduced PDV
- IEEE-1588 TC

STANDARD

MEF

- Carrier Ethernet 2.0

Supported Ethernet Standards

- 10/100/1000base-T/X (IEEE 802.3)
- Ethernet VLANs (IEEE 802.3ac)
- Virtual LAN (VLAN, IEEE 802.1Q)
- Class of service (IEEE 802.1p)
- Provider bridges (Q-in-Q – IEEE 802.1ad)
- Link aggregation (IEEE 802.3ad)
- Auto MDI/MDIX for 1000baseT
- RFC 1349: IPv4 TOS
- RFC 2474: IPv4 DSCP
- RFC 2460: IPv6 Traffic Classes

Security

- AES 256-bit Encryption
- Secured protocols (HTTPS, SNMPV3, SSH, SFTP)
- RADIUS authentication and authorization

- TACACS+ authentication and authorization (session-based)
- Standards Compliance
- Radio Spectral Efficiency: EN 302 217-2-2
 - 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/EMI/TEL-001/01, Class B (India)
 - Surge: EN61000-4-5, Class 4 (for PWR and ETH1 ports)
 - Safety: EN 60950-1, IEC 60950-1, UL 60950-1, CSA-C22.2 No.60950-1, EN 60950-22, UL 60950-22, CSAC22.2.60950-22

- Storage: ETSI EN 300 019-1-1 Class 1.2
- Transportation: ETSI EN 300 019-1-2 Class 2.3

TECHNICAL SPECIFICATION

Mechanical Specifications

- Dimensions: 315mm(H), 284mm(W), 107mm(D), 12kg; 12.4”(H), 11.2”(W), 4.2”(D), 26.5 lbs. (includes diplexer or OCU unit)
- Pole Diameter Range (for Remote Mount Installation): 88.9 mm – 114.3 mm; 3.5” – 4.5”

Environmental Specifications

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- -33°C to +55°C (-45°C to +60°C extended); -27°F to +131°F (-49°F to +140°F extended)

Power Input Specifications

- Standard Input: -48 VDC
- DC Input range: -40 to -60 VDC
- Separate DC feed

Power Consumption Specifications

- Maximum Power Consumption (Multi-Core Operation): 135W
- Maximum Power Consumption (1+0 Operation): 81W

Specifications

TRANSMIT POWER (dBm)

Transmit Power	Frequency (GHz)			
	6	7	8	11
QPSK	37	37	36	34
8 PSK	37	37	36	34
16 QAM	36	36	35	33
32 QAM	36	36	35	33
64 QAM	35	35	34	32
128 QAM	34	34	33	32
256 QAM	33	32	32	31
512 QAM	33	32	32	31
1024 QAM	31	30	30	30
2048 QAM	31	29	29	29

Note:

Nominal TX power is subject to change until the relevant frequency band is formally released. See the frequency rollout plan. The values listed in this section are typical. Actual values may differ in either direction by up to 1dB. The Transmit Power values shown in the tables below are for the radio unit only. To determine the TX power of the complete IP-20C-HP unit, diplexer losses must also be considered.

Diplexer Unit Typical Losses

Frequency	6-8 GHz	11 GHz
Losses (dB)	1.3	0.7

RECEIVE SENSITIVITY (dBm @BER=10⁻⁶)

Modulation	Channel Size	Frequency (GHz)			
		6	7	8	11
QPSK	5 MHz	-97.1	-97.3	-96.7	-96.8
16 QAM		-90.9	-90.6	-90.8	-90.2
32 QAM		-87.6	-87.3	-87.5	-86.9
64 QAM		-84.4	-84.1	-84.3	-83.7
128 QAM		-80.9	-80.6	-80.8	-80.2
256 QAM		-77.4	-77.1	-77.3	-76.7
QPSK	7 MHz	-95.0	-94.5	-94.5	-95.0
8 PSK		-89.0	-88.5	-88.5	-89.0
16 QAM		-88.5	-88.0	-88.0	-88.5
32 QAM		-85.0	-84.5	-84.5	-85.0
64 QAM		-82.0	-81.5	-81.5	-82.0
128 QAM		-79.0	-78.0	-78.0	-79.0
256 QAM		-75.5	-75	-75	-75.5
512 QAM		-73.5	-73	-73	-73.5
1024 QAM (strong FEC)		-70.0	-69.5	-69.5	-70.0
1024 QAM (light FEC)		-69.5	-68.5	-68.5	-69

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Modulation	Channel Size	Frequency (GHz)			
		6	7	8	11
QPSK	10 MHz	-93.1	-93.3	-92.7	-92.8
8 PSK		-87.2	-87.4	-86.8	-86.9
16 QAM		-86.1	-86.3	-85.7	-85.8
32 QAM		-82.9	-83.1	-82.5	-82.6
64 QAM		-79.9	-80.1	-79.5	-79.6
128 QAM		-76.7	-76.9	-76.3	-76.4
256 QAM		-73.8	-74.0	-73.4	-73.5
512 QAM		-71.2	-71.4	-70.8	-70.9
1024 QAM (strong FEC)		-68.2	-68.4	-67.8	-67.9
1024 QAM (light FEC)		-67.4	-67.6	-67.0	-67.1
QPSK	14 MHz	-91.3	-91.5	-90.9	-91.0
8 PSK		-87.3	-87.5	-86.9	-87.0
16 QAM		-84.2	-84.4	-83.8	-83.9
32 QAM		-81.1	-81.3	-80.7	-80.8
64 QAM		-77.9	-78.1	-77.5	-77.6
128 QAM		-74.7	-74.9	-74.3	-74.4
256 QAM		-71.3	-71.5	-70.9	-71.0
512 QAM		-68.1	-68.3	-67.7	-67.8
1024 QAM (strong FEC)		-64.6	-64.8	-64.2	-64.3
1024 QAM (light FEC)		-64.1	-64.3	-63.7	-63.8
QPSK	20 MHz	-90.0	-90.2	-89.6	-89.7
8 PSK		-86.0	-86.2	-85.6	-85.7
16 QAM		-83.1	-83.3	-82.7	-82.8
32 QAM		-79.7	-79.9	-79.3	-79.4
64 QAM		-76.5	-76.7	-76.1	-76.2
128 QAM		-73.5	-73.7	-73.1	-73.2
256 QAM		-70.4	-70.6	-70	-70.1
512 QAM		-67.6	-67.8	-67.2	-67.3
1024 QAM (strong FEC)		-64.7	-64.9	-64.3	-64.4
1024 QAM (light FEC)		-64.0	-64.2	-63.6	-63.7
2048 QAM	-61.5	-61.7	-61.1	-61.2	
QPSK	25 MHz	-88.9	-89.1	-88.5	-88.6
8 PSK		-84.9	-85.1	-84.5	-84.6
16 QAM		-82.0	-82.2	-81.6	-81.7
32 QAM		-78.7	-78.9	-78.3	-78.4
64 QAM		-75.6	-75.8	-75.2	-75.3
128 QAM		-72.5	-72.7	-72.1	-72.2
256 QAM		-69.4	-69.6	-69	-69.1
512 QAM		-66.5	-66.7	-66.1	-66.2
1024 QAM (strong FEC)		-63.6	-63.8	-63.2	-63.3
1024 QAM (light FEC)		-62.7	-62.9	-62.3	-62.4
2048 QAM	-60.6	-60.8	-60.2	-60.3	

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Modulation	Channel Size	Frequency (GHz)			
		6	7	8	11
QPSK	28 MHz	-88.2	-88.4	-87.8	-87.9
8 PSK		-84.2	-84.4	-83.8	-83.9
16 QAM		-81.2	-81.4	-80.8	-80.9
32 QAM		-77.9	-78.1	-77.5	-77.6
64 QAM		-74.8	-75.0	-74.4	-74.5
128 QAM		-71.8	-72.0	-71.4	-71.5
256 QAM		-68.6	-68.8	-68.2	-68.3
512 QAM		-66.3	-66.5	-65.9	-66.0
1024 QAM (strong FEC)		-63.0	-63.2	-62.6	-62.7
1024 QAM (light FEC)		-62.2	-62.4	-61.8	-61.9
2048 QAM		-59.7	-59.9	-59.3	-59.4
QPSK	30 MHz	-88.2	-88.4	-87.8	-87.9
8 PSK		-84.2	-84.4	-83.8	-83.9
16 QAM		-81.2	-81.4	-80.8	-80.9
32 QAM		-77.9	-78.1	-77.5	-77.6
64 QAM		-74.8	-75.0	-74.4	-74.5
128 QAM		-71.8	-72.0	-71.4	-71.5
256 QAM		-68.6	-68.8	-68.2	-68.3
512 QAM		-66.3	-66.5	-65.9	-66
1024 QAM (strong FEC)		-63.0	-63.2	-62.6	-62.7
1024 QAM (light FEC)		-62.2	-62.4	-61.8	-61.9
2048 QAM		-59.7	-59.9	-59.3	-59.4
QPSK	40 MHz	-87.0	-87.2	-86.6	-86.7
8 PSK		-83.0	-83.2	-82.6	-82.7
16 QAM		-80.1	-80.3	-79.7	-79.8
32 QAM		-76.7	-76.9	-76.3	-76.4
64 QAM		-73.6	-73.8	-73.2	-73.3
128 QAM		-70.6	-70.8	-70.2	-70.3
256 QAM		-68.3	-68.5	-67.9	-68.0
512 QAM		-65.5	-65.7	-65.1	-65.2
1024 QAM (strong FEC)		-62.0	-62.2	-61.6	-61.7
1024 QAM (light FEC)		-61.3	-61.5	-60.9	-61.0
2048 QAM		-59.0	-59.2	-58.6	-58.7
QPSK	50 MHz	-86.2	-86.4	-85.8	-85.9
8 PSK		-81.9	-82.1	-81.5	-81.6
16 QAM		-79.0	-79.2	-78.6	-78.7
32 QAM		-76.0	-76.2	-75.6	-75.7
64 QAM		-72.6	-72.8	-72.2	-72.3
128 QAM		-70.1	-70.3	-69.7	-69.8
256 QAM		-66.5	-66.7	-66.1	-66.2
512 QAM		-64.0	-64.2	-63.6	-63.7

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Modulation	Channel Size	Frequency (GHz)			
		6	7	8	11
1024 QAM (strong FEC)	50 MHz	-60.6	-60.8	-60.2	-60.3
1024 QAM (light FEC)		-59.8	-60.0	-59.4	-59.5
2048 QAM		-57.5	-57.7	-57.1	-57.2
QPSK	56 MHz	-85.1	-85.3	-84.7	-84.8
8 PSK		-81.3	-81.5	-80.9	-81.0
16 QAM		-78.1	-78.3	-77.7	-77.8
32 QAM		-74.8	-75.0	-74.4	-74.5
64 QAM		-71.7	-71.9	-71.3	-71.4
128 QAM		-68.9	-69.1	-68.5	-68.6
256 QAM		-65.7	-65.9	-65.3	-65.4
512 QAM		-63.2	-63.4	-62.8	-62.9
1024 QAM (strong FEC)		-59.9	-60.1	-59.5	-59.6
1024 QAM (light FEC)		-59.1	-59.3	-58.7	-58.8
2048 QAM		-56.8	-57.0	-56.4	-56.5
QPSK		60 MHz	-85.1	-85.3	-84.7
8 PSK	-81.3		-81.5	-80.9	-81.0
16 QAM	-78.1		-78.3	-77.7	-77.8
32 QAM	-74.8		-75.0	-74.4	-74.5
64 QAM	-71.7		-71.9	-71.3	-71.4
128 QAM	-68.9		-69.1	-68.5	-68.6
256 QAM	-65.7		-65.9	-65.3	-65.4
512 QAM	-63.2		-63.4	-62.8	-62.9
1024 QAM (strong FEC)	-59.9		-60.1	-59.5	-59.6
1024 QAM (light FEC)	-59.1		-59.3	-58.7	-58.8
2048 QAM	-56.8		-57.0	-56.4	-56.5
QPSK	80 MHz		-84.1	-84.3	-83.7
8 PSK		-80.4	-80.6	-80.0	-80.1
16 QAM		-77.4	-77.6	-77.0	-77.1
32 QAM		-74.0	-74.2	-73.6	-73.7
64 QAM		-71.1	-71.3	-70.7	-70.8
128 QAM		-68.1	-68.3	-67.7	-67.8
256 QAM		-65.4	-65.6	-65.0	-65.1
512 QAM		-62.7	-62.9	-62.3	-62.4
1024 QAM (strong FEC)		-59.5	-59.7	-59.1	-59.2
1024 QAM (light FEC)		-59.1	-59.3	-58.7	-58.8
2048 QAM		-56.2	-56.4	-55.8	-55.9

ETHERNET THROUGHPUT

Ethernet Throughput (Mbps)						
Modulation	Channel Size	No Compression	L2 Compression	Channel Size	No Compression	L2 Compression
QPSK	5 MHz	3-4	4-13	10 MHz	13-15	13-48
8 PSK		-	-		19-23	20-73
16 QAM		8-10	9-32		26-32	28-100
32 QAM		11-14	12-43		35-43	37-133
64 QAM		14-17	15-54		43-53	45-164
128 QAM		17-21	18-65		52-63	54-196
256 QAM		19-24	20-74		59-72	62-225
512 QAM		-	-		65-79	68-247
1024 QAM Strong		-	-		68-83	72-260
1024 QAM Light		-	-		73-89	76-276
QPSK	14 MHz	19-24	20-74	20 MHz	28-34	29-105
8 PSK		29-36	31-112		42-51	44-158
16 QAM		40-49	42-153		57-70	60-217
32 QAM		53-65	56-203		75-92	79-286
64 QAM		66-80	69-249		92-113	97-352
128 QAM		79-97	83-301		112-136	117-424
256 QAM		90-110	95-344		126-155	133-481
512 QAM		100-122	105-380		138-169	145-526
1024 QAM Strong		106-129	111-402		147-180	154-559
1024 QAM Light		112-137	118-426		156-191	164-593
2048 QAM	-	-	166-203	175-633		
QPSK	25 MHz	35-43	37-135	28 MHz	43-52	45-162
8 PSK		53-65	56-202		62-76	65-236
16 QAM		72-88	76-275		87-107	92-332
32 QAM		95-117	100-363		115-140	121-437
64 QAM		117-143	123-446		141-173	149-538
128 QAM		141-173	148-538		170-208	179-648
256 QAM		161-197	169-613		196-239	206-745
512 QAM		178-217	187-677		209-255	219-794
1024 QAM Strong		189-231	198-719		228-278	239-866
1024 QAM Light		201-245	211-763		241-295	253-917
2048 QAM	215-263	226-819	263-321	276-1000		
QPSK	30 MHz	43-52	45-162	40 MHz	58-71	61-220
8 PSK		62-76	65-236		86-105	90-328
16 QAM		87-107	92-332		117-143	123-446
32 QAM		115-140	121-437		154-189	162-588
64 QAM		141-173	149-538		190-232	199-722
128 QAM		170-208	179-648		229-280	241-873
256 QAM		196-239	206-745		247-302	259-939
512 QAM		209-255	219-794		270-330	284-1000
1024 QAM Strong		228-278	239-866		306-375	322-1000

Modulation	Channel Size	Ethernet Throughput (Mbps)				
		No Compression	L2 Compression	Channel Size	No Compression	L2 Compression
1024 QAM Light	30 MHz	241-295	253-917	40 MHz	325-398	342-1000
2048 QAM		263-321	276-1000		352-430	370-1000
QPSK	50 MHz	70-86	74-267	56 MHz	87-106	91-331
8 PSK		109-133	114-415		127-155	133-482
16 QAM		148-181	155-563		176-215	185-670
32 QAM		186-227	195-707		232-283	243-881
64 QAM		240-293	252-913		284-348	299-1000
128 QAM		280-342	294-1000		344-420	361-1000
256 QAM		332-406	348-1000		397-485	416-1000
512 QAM		360-440	378-1000		426-521	448-1000
1024 QAM Strong		392-479	411-1000		464-567	487-1000
1024 QAM Light		416-509	437-1000		493-602	517-1000
2048 QAM		449-548	471-1000		534-653	561-1000
QPSK		60 MHz	87-106		91-331	80 MHz
8 PSK	127-155		133-482	162-198	170-618	
16 QAM	176-215		185-670	231-283	243-880	
32 QAM	232-283		243-881	304-371	319-1000	
64 QAM	284-348		299-1000	371-454	390-1000	
128 QAM	344-420		361-1000	439-536	461-1000	
256 QAM	397-485		416-1000	505-618	531-1000	
512 QAM	427-521		448-1000	555-679	583-1000	
1024 QAM Strong	464-567		487-1000	604-738	634-1000	
1024 QAM Light	493-602		517-1000	641-784	673-1000	
2048 QAM	534-653		561-1000	679-829	713-1000	