

NTIA PTP 820C Licensed Microwave Radio



All-Outdoor / Multi-Core

Specifications

RADIO

- NTIA 7, 8, 15, 23 GHz
- 1+0 to 4+0, 1+1/2+2 HSB, E/W
- Multiband with 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
 - XPIC
 - Advanced Frequency Reuse (AFR)

ETHERNET

Ethernet Interfaces

- Traffic Interfaces – 1 x 10/100/1000Base-T (RJ-45) and 2x1000base-X (SFP) or 2x 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
 - Deep buffering (configurable up to 64 Mbit per queue)
 - WRED
 - P-bit marking/remarking
- 4K VLANs
- VLAN add/remove/translate
- 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)
- Adaptive Bandwidth Notification (ABN)

- Ethernet OAM – ITU-T Y.1731 FM

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

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

- FIPS-140-2
- AES 256-bit Encryption
- Secured protocols (HTTPS, SNMPV3, SSH, SFTP)
- RADIUS authentication and authorization

Standards 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/EMI/TEL-001/01, Class B (India)
- 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, CSAC22.2.60950-22

- Ingress Protection: IP66
- 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: 230mm(H), 233mm(W), 98mm(D), 6.5kg
- Pole Diameter Range (for Remote Mount Installation): 8.89 cm – 11.43 cm

Environmental Specifications

- -33°C to +55°C (-45°C to +60°C extended)

Power Input Specifications

- Standard Input: -48 VDC
- IDU DC Input range: -40 to -60 VDC

Power Consumption Specifications

- Maximum Power Consumption (2+0 Operation) 6 GHz: 65W; 7 GHz: 75W; 11 GHz: 65W; 13-15 GHz: 55W; 18-24 GHz: 48W; 26-38 GHz: 55W

PoE Injector Mechanical Specifications

- Dimensions – 134mm(H), 190mm(W), 62mm(D), 1 kg

PoE Injector Environmental Specifications

- 33°C to +55°C (-45°C to +60°C extended)

PoE Injector Power Input Specifications

- Standard Input: -48 or +24 VDC (Optional)
- 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
- Power-Over-Ethernet (PoE) Port
- DC Power Port –40V to -60V (supporting two redundant DC feeds each supporting ±(18-60)V)

Specifications

TRANSMIT POWER

Transmit Power (dBm)	7 GHz	8 GHz	15 GHz	23 GHz
QPSK	28	28	24	20
8 PSK	28	28	24	20
16 QAM	27	27	23	20
32 QAM	26	26	22	20
64 QAM	26	26	22	20
128 QAM	26	26	22	20
256 QAM	26	24	20	18
512 QAM	24	24	20	18
1024 QAM	24	24	20	17
2048 QAM	22	22	18	16

RECEIVE SENSITIVITY

Modulation	Channel Spacing	7 GHz	8 GHz	15 GHz	23 GHz
QPSK	3.5 & 5 MHz	-96.0	-96.0	-94.5	-95.0
16 QAM		-89.0	-89.0	-88.0	-88.0
32 QAM		-85.5	-85.5	-84.5	-84.5
64 QAM		-82.5	-82.5	-81.0	-81.5
128 QAM		-79.0	-79.0	-77.5	-78.0
256 QAM		-75.5	-75.5	-74.5	-75.0
QPSK	7 MHz	-93.0	-93.0	-91.5	-92.0
8 PSK		-87.0	-87.0	-85.5	-86.0
16 QAM		-86.5	-86.5	-85.0	-85.5
32 QAM		-83.0	-83.0	-81.5	-82.0
64 QAM		-80.0	-80.0	-78.5	-79.0
128 QAM		-76.5	-76.5	-75.5	-76.0
256 QAM		-73.5	-73.5	-72.0	-72.5
512 QAM		-71.5	-71.5	-70.0	-70.5
1024 QAM (strong FEC)		-68.0	-68.0	-66.5	-67.0
1024 QAM (light FEC)		-67.0	-67.0	-66.0	-66.0
QPSK	10 MHz	-91.5	-91.5	-90.0	-90.5
8 PSK		-86.0	-86.0	-85.0	-85.5
16 QAM		-85.0	-85.0	-83.5	-84.0
32 QAM		-81.5	-81.5	-80.0	-80.5
64 QAM		-78.5	-78.5	-77.0	-77.5
128 QAM		-75.0	-75.0	-73.5	-74.0
256 QAM		-72.0	-72.0	-70.5	-71.0
512 QAM		-69.5	-69.5	-68.0	-68.5
1024 QAM (strong FEC)		-66.5	-66.5	-65.0	-65.5
1024 QAM (light FEC)		-65.5	-65.5	-64.5	-65.0
QPSK	14 MHz	-90.0	-90.0	-88.5	-89.0
8 PSK		-84.0	-84.0	-82.5	-83.0
16 QAM		-83.0	-83.0	-81.5	-82.0
32 QAM		-79.5	-79.5	-78.5	-79.0
64 QAM		-76.5	-76.5	-75.5	-76.0
128 QAM		-73.5	-73.5	-72.0	-72.5
256 QAM		-70.5	-70.5	-69.5	-69.5
512 QAM		-68.0	-68.0	-66.5	-67.0
1024 QAM (strong FEC)		-65.0	-65.0	-63.5	-64.0

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1024 QAM (light FEC)		-64.0	-64.0	-63.0	-63.5
Modulation	Channel Spacing	7 GHz	8 GHz	15 GHz	23 GHz
QPSK	20 MHz	-88.5	-88.5	-87.0	-87.5
8 PSK		-83.5	-83.5	-82.0	-82.5
16 QAM		-82.0	-82.0	-80.5	-81.0
32 QAM		-78.5	-78.5	-77.0	-77.5
64 QAM		-75.0	-75.0	-74.0	-74.5
128 QAM		-72.0	-72.0	-71.0	-71.5
256 QAM		-69.5	-69.5	-68.0	-68.5
512 QAM		-66.5	-66.5	-65.5	-66.0
1024 QAM (strong FEC)		-63.5	-63.5	-62.5	-63.0
1024 QAM (light FEC)		-63.0	-63.0	-61.5	-62.0
2048 QAM		-59.5	-59.5	-58.0	-58.5
QPSK	25MHz	-86.5	-86.5	-85.5	-85.5
8 PSK		-82.0	-82.0	-80.5	-81.0
16 QAM		-80.0	-80.0	-78.5	-79.0
32 QAM		-77.0	-77.0	-75.5	-76.0
64 QAM		-74.0	-74.0	-72.5	-73.0
128 QAM		-71.0	-71.0	-69.5	-70.0
256 QAM		-67.5	-67.5	-66.5	-67.0
512 QAM		-65.0	-65.0	-64.0	-64.5
1024 QAM (strong FEC)		-62.5	-62.5	-61.0	-61.5
1024 QAM (light FEC)		-61.5	-61.5	-60.5	-61.0
2048 QAM		-58.0	-58.0	-56.5	-57.0
QPSK	28 MHz ACCP	-87.0	-87.0	-85.5	-86.0
8 PSK		-82.5	-82.5	-81.0	-81.5
16 QAM		-80.5	-80.5	-79.0	-79.5
32 QAM		-77.0	-77.0	-75.5	-76.0
64 QAM		-74.0	-74.0	-72.5	-73.0
128 QAM		-70.5	-70.5	-69.5	-69.5
256 QAM		-67.5	-67.5	-66.5	-66.5
512 QAM		-65.0	-65.0	-64.0	-64.5
1024 QAM (strong FEC)		-62.5	-62.5	-61.0	-61.5
1024 QAM (light FEC)		-61.5	-61.5	-60.0	-60.5
2048 QAM		-58.0	-58.0	-56.5	-57.0
QPSK	30 MHz & 28 MHz ACAP	-87.0	-87.0	-85.5	-86.0
8 PSK		-81.5	-81.5	-80.5	-81.0
16 QAM		-80.0	-80.0	-79.0	-79.0
32 QAM		-76.5	-76.5	-75.0	-75.5
64 QAM		-73.5	-73.5	-72.5	-72.5
128 QAM		-70.5	-70.5	-69.0	-69.5
256 QAM		-67.5	-67.5	-66.0	-66.5
512 QAM		-65.5	-65.5	-64.0	-64.5
1024 QAM (strong FEC)		-62.0	-62.0	-61.0	-61.0
1024 QAM (light FEC)		-61.0	-61.0	-60.0	-60.5
2048 QAM		-57.5	-57.5	-56.0	-56.5
QPSK	40 MHz	-85.5	-85.5	-84.0	-84.5
8 PSK		-80.5	-80.5	-79.0	-79.5
16 QAM		-79.0	-79.0	-77.5	-78.0
32 QAM		-75.0	-75.0	-74.0	-74.0
64 QAM		-72.0	-72.0	-71.0	-71.5
128 QAM		-69.0	-69.0	-68.0	-68.5
256 QAM		-66.0	-66.0	-65.0	-65.0
512 QAM		-63.5	-63.5	-62.0	-62.5
1024 QAM (strong FEC)	-61.0	-61.0	-59.5	-60.0	

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1024 QAM (light FEC)		-60.0	-60.0	-58.5	-59.0	
2048 QAM		-57.0	-57.0	-56.0	-56.5	
Modulation	Channel Spacing	7 GHz	8 GHz	15 GHz	23 GHz	
QPSK	50 MHz	-84.5	-84.5	-83.5	-83.5	
8 PSK		-79.5	-79.5	-78.0	-78.5	
16 QAM		-77.5	-77.5	-76.5	-76.5	
32 QAM		-74.0	-74.0	-72.5	-73.0	
64 QAM		-70.5	-70.5	-69.5	-70.0	
128 QAM		-68.0	-68.0	-66.5	-67.0	
256 QAM		-65.0	-65.0	-64.0	-64.5	
512 QAM		-63.0	-63.0	-61.5	-62.0	
1024 QAM (strong FEC)		-59.5	-59.5	-58.0	-58.5	
1024 QAM (light FEC)		-58.0	-58.0	-57.0	-57.5	
2048 QAM		-56.0	-56.0	-55.0	-55.0	
QPSK		56 MHz ACCP	-83.5	-83.5	-82.0	-82.5
8 PSK			-79.5	-79.5	-78.0	-78.5
16 QAM			-77.0	-77.0	-75.5	-76.0
32 QAM	-73.5		-73.5	-72.5	-72.5	
64 QAM	-70.5		-70.5	-69.0	-69.5	
128 QAM	-67.5		-67.5	-66.5	-66.5	
256 QAM	-64.5		-64.5	-63.0	-63.5	
512 QAM	-62.5		-62.5	-61.0	-61.5	
1024 QAM (strong FEC)	-59.0		-59.0	-57.5	-58.0	
1024 QAM (light FEC)	-58.0		-58.0	-56.5	-57.0	
2048 QAM	-53.5		-53.5	-52.0	-52.5	
QPSK	60 MHz & 56 MHz ACAP		-84.0	-84.0	-82.5	-83.0
8 PSK			-79.0	-79.0	-78.0	-78.0
16 QAM			-77.0	-77.0	-75.5	-76.0
32 QAM		-73.0	-73.0	-72.0	-72.0	
64 QAM		-70.0	-70.0	-68.5	-69.0	
128 QAM		-67.0	-67.0	-66.0	-66.0	
256 QAM		-64.0	-64.0	-62.5	-63.0	
512 QAM		-62.0	-62.0	-60.5	-61.0	
1024 QAM (strong FEC)		-58.5	-58.5	-57.0	-57.5	
1024 QAM (light FEC)		-57.5	-57.5	-56.0	-56.5	
2048 QAM		-54.5	-54.5	-53.5	-53.5	

ETHERNET THROUGHPUT

Modulation	Channel Size	Ethernet Throughput (Mbps)			Channel Size	Ethernet Throughput (Mbps)		
		No Compression	L2 Compression	Multi-Layer Compression		No Compression	L2 Compression	Multi-Layer Compression
QPSK	3.5 MHz & 5 MHz	3	3-4	4-11	7 MHz	8	8-10	9-27
8 PSK		N/A	N/A	N/A		13	13-14	13-40
16 QAM		8	8-9	9-26		18	18-20	19-58
32 QAM		11	11-13	12-36		24	24-27	25-77
64 QAM		14	14-16	15-45		30	30-34	31-95
128 QAM		17	17-19	18-54		36	36-41	37-114
256 QAM		19	20-22	20-62		41	41-47	43-132
512 QAM		N/A	N/A	N/A		44	44-50	46-141

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Modulation	Channel Size	No Compression	L2 Compression	Multi-Layer Compression	Channel Size	No Compression	L2 Compression	Multi-Layer Compression
1024 QAM (strong FEC)		N/A	N/A	N/A		47	47-54	49-151
1024 QAM (light FEC)		N/A	N/A	N/A		50	51-57	53-161
QPSK	10 MHz	12	12-14	13-40	14 MHz	19	19-22	20-62
8 PSK		19	19-21	20-61		29	29-33	30-93
16 QAM		26	26-30	27-83		40	40-45	42-128
32 QAM		34	35-39	36-111		53	53-60	55-169
64 QAM		42	43-48	45-137		65	65-74	68-208
128 QAM		51	51-58	53-164		78	79-89	82-251
256 QAM		58	59-67	61-188		89	90-102	94-287
512 QAM		64	65-73	67-206		98	99-112	103-316
1024 QAM (strong FEC)		67	68-77	71-216		104	105-119	109-335
1024 QAM (light FEC)		72	72-82	75-230		111	111-126	116-355
QPSK	20 MHz	27	28-31	29-88	25 MHz	35	35-40	37-112
8 PSK		41	41-47	43-132		52	53-60	55-168
16 QAM		56	57-64	59-180		71	72-81	75-229
32 QAM		74	75-85	78-238		94	95-107	99-302
64 QAM		91	92-104	96-293		116	117-132	121-372
128 QAM		110	111-126	116-354		139	141-159	147-448
256 QAM		125	126-142	131-401		159	160-181	167-511
512 QAM		136	137-156	143-438		175	177-200	184-564
1024 QAM (strong FEC)		145	146-165	152-466		186	188-213	196-599
1024 QAM (light FEC)		154	155-176	162-495		198	199-226	208-636
2048 QAM	164	165-187	172-528	212	214-242	223-682		
QPSK	28 MHz (ACCP)	40	40-45	42-127	30 MHz & 28 MHz (ACAP)	42	42-48	44-135
8 PSK		59	60-68	62-191		61	62-70	65-197
16 QAM		81	82-93	85-261		86	87-98	90-277
32 QAM		107	108-122	112-344		113	114-129	119-364
64 QAM		132	133-150	138-424		139	140-159	147-449
128 QAM		159	160-181	166-509		168	169-192	176-540
256 QAM		181	182-206	190-580		193	195-220	203-621
512 QAM		199	201-227	209-640		206	208-235	216-662
1024 QAM (strong FEC)		212	214-242	223-681		224	226-259	236-722
1024 QAM (light FEC)		225	227-257	236-723		238	240-271	250-764
2048 QAM	241	243--275	253-775	260	262-296	273-833		
QPSK	40 MHz	57	57-65	60-183	50 MHz	69	70-79	73-223
8 PSK		85	86-97	89-273		108	108-123	113-346
16 QAM		116	117-132	121-372		146	147-166	153-469
32 QAM		152	154-174	160-490		183	185-209	193-589
64 QAM		187	189-214	197-602		237	239-270	249-761
128 QAM		226	228-258	238-728		276	278-315	290-833
256 QAM		243	245-278	256-782		327	330-374	344-833
512 QAM		267	269-304	280-833		355	358-405	373-833
1024 QAM (strong FEC)		302	305-345	318-833		387	390-441	406-833

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		321	324-366	337-833		411	414-468	431-833
1024 QAM (light FEC)		321	324-366	337-833		411	414-468	431-833
2048 QAM		347	350-396	365-833		443	446-505	465-833
Modulation	Channel Size	No Compression	L2 Compression	Multi-Layer Compression	Channel Size	No Compression	L2 Compression	Multi-Layer Compression
QPSK	56 MHz (ACCP)	81	82-93	86-262	60 MHz & 56 MHz (ACAP)	86	86-98	90-276
8 PSK		121	122-138	127-390		125	126-143	131-402
16 QAM		165	166-188	173-531		174	175-198	182-558
32 QAM		217	219-248	228-699		229	230-261	240-734
64 QAM		267	269-304	280-833		281	283-320	295-833
128 QAM		323	325-368	339-833		339	342-387	356-833
256 QAM		369	372-421	388-833		391	394-447	411-833
512 QAM		401	404-457	421-833		421	424-480	442-833
1024 QAM (strong FEC)		436	439-497	458-833		458	461-522	481-833
1024 QAM (light FEC)		462	466-528	486-833		486	490-555	511-833
2048 QAM		502	505-572	527-833		527	531-601	553-833