PTP 820F Licensed Microwave Radio

QUICK LOOK:

PTP 820F, a split mount multi core aggregation unit with Multi carrier adaptive bandwidth control

- **Supports Standard power: 6-38 GHz, 71-76, 81-86 GHz , High power: 6-11 GHz**
- **High Spectral efficiency up to 4096 QAM with ACM**

Radio

Standard power: 6-38 GHz, 71-76, 81-86 GHz

High power: 6-11 GHz

Support RFU

RFU-D – High-capacity MultiCore radio

RFU-D-HP – High-capacity, high-power MultiCore radio

RFU-E – High capacity E-band radio

RFU-S – High-capacity radio

Radio Interface

Two combo Radio interfaces

An additional interface that can be configured as a radio interface or a 2.5 GbE interface*

Radio Configuration

1+0, 3 x 1+0, 2 x 2+0, 2x 2+0 + 1+0, 1+1 HSB*, 2+2 HSB*

2+0 Multi-Carrier ABC

Radio Features

Multi-Carrier Adaptive Bandwidth Control (MC-ABC)

High Spectral Efficiency: BPSK to 4096 QAM w/ ACM

Channel Bandwidth: 6-38 GHz: up to 112 MHz; E-band: up to 500 MHz

XPIC

Diversity: 1+0 SD (BBC)

Field Replaceable Diplexers/ Field Replaceable Channel Filters

Ethernet

Ethernet Interfaces

4 x 1 GbE combo interface (RJ-45/SFP)

Management Interface - 2 x 10/100 Base-T (RJ-45)

1 x 2.5/1 Gbps combo interface (RJ-45/SFP)*

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

MSTP, ERP (ITU-T G.8032)

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)

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TDM

16 x E1/DS1

XC capacity – 256 VCs

Timing options – Loop timing, system clock, recovered clock

1+1 / 1:1 Path protection

Management Protocols

SNMP

REST

SDN Support: NETCONF/YANG

Synchronization

Synchronization Distribution

Sync Distribution over any traffic interface

Dedicated In/Out sync interface(E1+/2 MHz)

Sync-E (ITU-T G.8261, G.8262)

SSM/ESMC Support for ring/mesh applications (ITU-T G.8264)

SyncE Regenerator mode, providing PRC grade (ITU-T G.811) performance for smart pipe applications*

IEEE-1588

Optimized Transport for reduced PDV

IEEE-1588 TC*

IEEE-1588 BC*

Security

Secured protocols (HTTPS, SNMPV3, SSH, SFTP)

Radius authentication and authorization

TACACS+ authentication and authorization (session-based)

Standard

MEF

Carrier Ethernet 2.0 (CE 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

Standard - continued

Supported TDM standards

ITU-T G.703, G.736, G.775, G.823, G.824, G.828, ITU-T I.432, ETSI ETS 300 147, ETS 300 417

TDM Pseudowire Standards

SAToP-RFC 4553

Standards Compliance

Radio Spectral Efficiency: EN 302 217-2-2

EMC: EN 301 489-1, EN 301 489-4, FCC 47 CFR, part 15, class B (US)

Safety: EN 60950-1, IEC 60950-1, UL 60950-1, CSA-C22.2 No.60950-1, EN 60950-22, UL 60950-22, CSA C22.2.60950-22

Ingress Protection: RFU-D: IP67, RFU-D-HP: IP67, RFU-E: IP67, RFU-S: IP67

Storage: ETSI EN 300 019-1-1 Class 1.2

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

Technical

Mechanical Specifications

IDU – 44mm(H), 482mm(W), 165mm(D), 2.4 kg; 1.73”(H), 19”(W), 6.5”(D), 5.3 lbs

RFU-D – 230mm(H), 233mm(W), 98mm(D), 6.5kg; 9.05”(H), 9.17”(W), 3.85”(D), 14.33 lbs. (includes diplexer unit)

RFU-D-HP– 319mm(H), 286mm(W), 107mm(D), 12kg; 12.56”(H), 11.26”(W), 4.21”(D), 26.5 lbs. (includes diplexer or OCU unit)

RFU-S – 217mm(H), 210mm(W), 85mm(D), 4kg; 8.54(H), 8.27”(W), 3.35”(D), 8.82 lbs.

RFU-E – 220mm(H),198mm (W), 75 mm(D), 3kg; 8.66”(H), 7.8”(W), 3”(D), 6.6 lbs.

Environmental Specifications

IDU: -5°C to +55°C (-25°C to +65°C extended); +23°F to +131°F (+5°F to +140°F extended);

RFU: -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

IDU Standard Input: -48 VDC

IDU DC Input range: -40 to -60 VDC

Dual-feed power support

Power Consumption Specifications

IDU: 48W maximum

RFU-D(2+0) (6-11 GHz): 65W

RFU-D(13-38 GHz): 48W

RFU-D-HP(2+0): 130W

RFU-D-HP (1+0 SD): 85W

RFU-S: 43W

RFU-E: 43 W

*- *Available in future release*

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Transmit Power of RFU-D (dBm)

Modulation	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28-32 GHz	38 GHz
BPSK	28	28	28	28	24	24	22	20	21	18	22
QPSK	28	28	28	28	24	24	22	20	21	18	22
8 QAM	28	28	28	28	24	24	22	20	21	18	22
16 QAM	28	27	27	28	23	24	22	20	20	17	21
32 QAM	28	27	26	28	23	24	22	20	19	16	21
64 QAM	28	26	26	27	23	24	22	20	19	16	20
128 QAM	27	26	26	26	22	24	22	20	19	16	20
256 QAM	27	26	26	26	21	22	20	20	17	14	19
512 QAM	27	25	24	26	21	22	20	20	17	14	19
1024 QAM	25	24	24	25	20	20	20	18	16	13	18
2048 QAM	25	23	22	24	20	20	18	17	15	12	18
4096 QAM	23	21	20	22	18	18	16				

Transmit Power of RFU-D-HP (dBm)

Modulation	6 GHz	7 GHz	8 GHz	11 GHz
BPSK	38	38	37	36
QPSK	37	37	37	36
8 QAM	37	37	37	36
16 QAM	37	37	37	35
32 QAM	37	37	37	35
64 QAM	36	36	35	34
128 QAM	36	35	35	33
256 QAM	35	34	33	32
512 QAM	34	33	33	32
1024 QAM	33	32	32	31
2048 QAM	33	31	31	31
4096 QAM	31	29	29	29

Transmit Power of RFU-S (dBm)

Modulation	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28-32 GHz	38 GHz
BPSK	28	27	27	28	27	24	23	24	23	18	18
QPSK	28	27	27	28	27	24	23	24	23	18	18
8 QAM	28	27	27	28	27	24	23	24	23	18	18
16 QAM	28	27	27	28	27	24	23	24	23	17	17
32 QAM	27	27	26	28	26	24	23	24	23	16	16
64 QAM	27	26	26	27	24	23	23	23	23	16	16
128 QAM	27	26	26	27	24	23	22	23	23	16	16
256 QAM	27	26	26	27	24	22	22	22	21	14	14
512 QAM	25	25	25	27	24	22	22	22	21	14	14
1024 QAM	25	24	24	25	22	20	19	21	20	13	13
2048 QAM	23	23	24	24	21	20	17	20	18	12	12
4096 QAM	21	21	22	22	19	18	15	–	–	–	–

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Transmit Power of RFU-E (dBm)

Modulation	14 MHz	28 MHz	62.5 MHz	125 MHz	250 MHz	500 MHz
BPSK	18	18	18	18	18	15
QPSK	18	18	18	18	18	15
8 QAM	18	18	18	18	16	11
16 QAM	–	17	17	17	15	10
32 QAM	–	17	17	17	15	10
64 QAM	–	16	16	16	14	9
128 QAM	–	16	16	16	14	–
256 QAM	–	15	15	15	13	–
512 QAM	–	14	14	14	–	–
1024 QAM	–	–	13	–	–	–

Receive Sensitivity of RFU-D and RFU-S – ETSI (dBm @BER=10-6)

14 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-91.5	-91.0	-90.5	-91.5	-90.5	-89.5	-91	-90.0	-89.5	-89.5	-89.5	-89.0	-89.0
QPSK	-90.5	-90.0	-89.5	-90.5	-89.5	-88.5	-90	-89.0	-88.5	-88.5	-88.5	-88.0	-88.0
8 PSK	-84.5	-84.0	-83.5	-85.5	-83.5	-82.5	-84	-83.0	-82.5	-82.5	-82.5	-82.0	-82.0
16 QAM	-83.5	-83.0	-82.5	-83.5	-82.5	-81.5	-83	-82.0	-81.5	-81.5	-81.5	-81.0	-81.0
32 QAM	-80.5	-79.5	-79.5	-80.5	-79.0	-78.5	-79.5	-79.0	-78.5	-78.5	-78.0	-78.0	-77.5
64 QAM	-77.5	-76.5	-76.5	-77.0	-76.0	-75.5	-76.5	-76.0	-75.5	-75.5	-75.0	-75.0	-74.5
128 QAM	-74.0	-73.5	-73.0	-74.0	-73.0	-72.0	-73.5	-72.5	-72.0	-72.0	-72.0	-71.5	-71.5
256 QAM	-71.5	-70.5	-70.5	-71.0	-70.0	-69.5	-70.5	-69.5	-69.0	-69.5	-69.0	-69.0	-68.5
512 QAM	-68.5	-68.0	-67.5	-68.5	-67.5	-66.5	-68.0	-67.0	-66.5	-66.5	-66.5	-66.0	-66.0
1024 QAM Strong	-65.5	-65.0	-64.5	-65.5	-64.5	-63.5	-65.0	-64.0	-63.5	-63.5	-63.5	-63.0	-63.0
1024 QAM Light	-65.0	-64.0	-64.0	-64.5	-63.5	-63.0	-64.0	-63.5	-63.0	-63.0	-62.5	-62.5	-62.0
28 MHz	**6 GHz**	**7-8 GHz**	**10 GHz**	**11 GHz**	**13 GHz**	**15 GHz**	**18 GHz**	**23 GHz**	**24 GHz**	**26 GHz**	**28-31 GHz**	**32 GHz**	**38 GHz**
BPSK	-88.5	-88.0	-87.5	-88.5	-87.5	-86.5	-88.0	-87.0	-86.5	-86.5	-86.5	-86.0	-86.0
QPSK	-87.5	-87.0	-86.5	-87.5	-86.5	-85.5	-87.0	-86.0	-85.5	-85.5	-85.5	-85.0	-85.0
8 PSK	-83.0	-82.5	-82.0	-83.0	-82.0	-81.0	-82.5	-81.5	-81.0	-81.0	-81.0	-80.5	-80.5
16 QAM	-81.0	-80.5	-80.0	-81.0	-79.5	-79.0	-80.5	-79.5	-79.0	-79	-79.0	-78.5	-78.0
32 QAM	-77.5	-77.0	-76.5	-77.5	-76.0	-75.5	-77.0	-76.0	-75.5	-75.5	-75.5	-75.0	-74.5
64 QAM	-74.5	-74.0	-73.5	-74.5	-73.0	-72.5	-74.0	-73.0	-72.5	-72.5	-72.5	-72.0	-71.5
128 QAM	-71.5	-70.5	-70.5	-71.0	-70.0	-69.5	-70.5	-69.5	-69.0	-69.5	-69.0	-69.0	-68.5
256 QAM	-68.5	-67.5	-67.5	-68.0	-67.0	-66.5	-67.5	-66.5	-66.0	-66.5	-66.0	-66.0	-65.5
512 QAM	-66.0	-65.0	-65.0	-66.0	-64.5	-64.0	-65.0	-64.5	-64.0	-64.0	-63.5	-63.5	-63.0
1024 QAM Strong	-63.0	-62.5	-62.0	-63.0	-61.5	-61.0	-62.5	-61.5	-61.0	-61.0	-61.0	-60.5	-60.0
1024 QAM Light	-62.0	-61.5	-61.0	-62.0	-60.5	-60.0	-61.5	-60.5	-60.0	-60.0	-60.0	-59.5	-59.0
2048 QAM	-58.5	-58.0	-57.5	-58.5	-57.0	-56.5	-58.0	-57.0	-56.5	-56.5	-56.5	-56.0	-55.5
4096 QAM	-55.5	-55.0	-54.5	-55.5	-54.0	-53.5	-55.0	–	–	–	–	–	–

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Receive Sensitivity of RFU-D and RFU-S – ETSI (dBm @BER=10-6) - continued

40 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-87.0	-86.5	-86.0	-87.0	-86.0	-85.0	-86.5	-85.5	-85.0	-85.0	-85.0	-84.5	-84.5
QPSK	-86.0	-85.5	-85.0	-86.0	-85.0	-84.0	-85.5	-84.5	-84.0	-84.0	-84.0	-83.5	-83.5
8 PSK	-81.0	-80.5	-80.0	-81.0	-79.5	-79.0	-80.5	-79.5	-79.0	-79.0	-79.0	-78.5	-78.0
16 QAM	-79.5	-79.0	-78.5	-79.5	-78.0	-77.5	-79.0	-78.0	-77.5	-77.5	-77.5	-77.0	-76.5
32 QAM	-76.0	-75.0	-75.0	-75.5	-74.5	-74.0	-75.0	-74.0	-73.5	-74.0	-73.5	-73.5	-73.0
64 QAM	-73.0	-72.0	-72.0	-73.0	-71.5	-71.0	-72.0	-71.5	-71.0	-71.0	-70.5	-70.5	-70.0
128 QAM	-70.0	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5	-68.0	-68.0	-67.5	-67.5	-67.0
256 QAM	-67.0	-66.0	-66.0	-66.5	-65.5	-65.0	-66.0	-65.0	-64.5	-65.0	-64.5	-64.5	-64.0
512 QAM	-64.0	-63.5	-63.0	-64.0	-62.5	-62.0	-63.5	-62.5	-62.0	-62.0	-62.0	-61.5	-61.0
1024 QAM Strong	-61.5	-61.0	-60.5	-61.5	-60.0	-59.5	-61.0	-60.0	-59.5	-59.5	-59.5	-59.0	-58.5
1024 QAM Light	-60.5	-60.0	-59.5	-60.5	-59.5	-58.5	-60.0	-59.0	-58.5	-58.5	-58.5	-58.0	-58.0
2048 QAM	-58.0	-57.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5	-56.0	-56.0	-55.5	-55.5	-55.0
4096 QAM	-55.0	-54.0	-54.0	-55.0	-53.5	-53.0	-54.0	–	–	–	–	–	–

56 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-85.5	-85.0	-84.5	-85.5	-84.0	-83.5	-85.0	-84.0	-83.5	-83.5	-83.5	-83.0	-82.5
QPSK	-84.5	-84.0	-83.5	-84.5	-83.0	-82.5	-84.0	-83.0	-82.5	-82.5	-82.5	-82.0	-81.5
8 PSK	-80.0	-79.0	-79.0	-79.5	-78.5	-78.0	-79.0	-78.0	-77.5	-78.0	-77.5	-77.5	-77.0
16 QAM	-77.5	-77.0	-76.5	-77.5	-76.0	-75.5	-77.0	-76.0	-75.5	-75.5	-75.5	-75.0	-74.5
32 QAM	-74.0	-73.0	-73.0	-73.5	-72.5	-72.0	-73.0	-72.0	-71.5	-72.0	-71.5	-71.5	-71.0
64 QAM	-70.5	-70.0	-69.5	-70.5	-69.5	-68.5	-70.0	-69.0	-68.5	-68.5	-68.5	-68.0	-68.0
128 QAM	-68.0	-67.0	-67.0	-67.5	-66.5	-66.0	-67.0	-66.0	-65.5	-66.0	-65.5	-65.5	-65.0
256 QAM	-64.5	-64.0	-63.5	-64.5	-63.5	-62.5	-64.0	-63.0	-62.5	-62.5	-62.5	-62.0	-62.0
512 QAM	-62.5	-62.0	-61.5	-62.5	-61.5	-60.5	-62.0	-61.0	-60.5	-60.5	-60.5	-60.0	-60.0
1024 QAM Strong	-59.0	-58.5	-58.0	-59.0	-58.0	-57.0	-58.5	-57.5	-57.0	-57.0	-57.0	-56.5	-56.5
1024 QAM Light	-58.0	-57.5	-57.0	-58.0	-57.0	-56.0	-57.5	-56.5	-56.0	-56.0	-56.0	-55.5	-55.5
2048 QAM	-55.5	-54.5	-54.5	-55.0	-54.0	-53.5	-54.5	-53.5	-53.0	-53.5	-53.0	-53.0	-52.5
4096 QAM	-52.5	-51.5	-51.5	-52.0	-51.0	-50.5	–	–	–	–	–	–	–

80 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-85.0	-85.0	-84.5	-85.5	-84.5	-83.5	-85.0	-84.0	-83.5	-83.5	-83.5	-83.0	-83.5
QPSK	-82.5	-82.5	-82.5	-83.0	-82.0	-81.5	-82.5	-81.5	-81.0	-81.5	-81.0	-81.0	-81.0
8 PSK	-79.0	-79.0	-78.5	-79.5	-78.5	-77.5	-79.0	-78.0	-77.5	-77.5	-77.5	-77.0	-77.5
16 QAM	-76.0	-76.0	-75.5	-76.5	-75.0	-74.5	-76.0	-75.0	-74.5	-74.5	-74.5	-74.0	-74.0
32 QAM	-72.5	-72.5	-72.0	-73.0	-71.5	-71.0	-72.5	-71.5	-71.0	-71.0	-71.0	-70.5	-70.5
64 QAM	-69.0	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5	-68.0	-68.0	-67.5	-67.5	-67.5
128 QAM	-66.5	-66.5	-66.0	-67.0	-66.0	-65.0	-66.5	-65.5	-65.0	-65.0	-65.0	-64.5	-65.0
256 QAM	-63.5	-63.5	-63.0	-64.0	-63.0	-62.0	-63.5	-62.5	-62.0	-62.0	-62.0	-61.5	-62.0
512 QAM	-61.0	-61.0	-61.0	-62.0	-60.5	-60.0	-61.0	-60.5	-60.0	-60.0	-59.5	-59.5	-59.5
1024 QAM Strong	-58.0	-58.0	-57.5	-58.5	-57.5	-56.5	-58.0	-57.0	-56.5	-56.5	-56.5	-56.0	-56.5
1024 QAM Light	-57.0	-57.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5	-56.0	-56.0	-55.5	-55.5	-55.5
2048 QAM	-54.5	-54.5	-54.5	-55.5	-54.0	-53.5	-54.5	-54.0	-53.5	-53.5	-53.0	-53.0	–
4096 QAM	-55.5	-55.0	-54.5	-55.5	-54.0	-53.5	-55.0	–	–	–	–	–	–

PTP 820F Licensed Microwave Radio

Receive Sensitivity of RFU-D and RFU-S – ETSI (dBm @BER=10-6) - continued

	112 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-82.0	-81.5	-81.0	-82.0	-80.5	-80.0	-81.5	-80.5	-80.0	-80.0	-80.0	-79.5	-79.0	
QPSK	-81.0	-80.5	-80.0	-81.0	-79.5	-79.0	-80.5	-79.5	-79.0	-79.0	-79.0	-78.5	-78.0	
8 PSK	-76.5	-75.5	-75.5	-76.0	-75.0	-74.5	-75.5	-74.5	-74.0	-74.5	-74.0	-74.0	-73.5	
16 QAM	-74.0	-73.5	-73.0	-74.0	-72.5	-72.0	-73.5	-72.5	-72.0	-72.0	-72.0	-71.5	-71.0	
32 QAM	-70.5	-69.5	-69.5	-70.0	-69.0	-68.5	-69.5	-68.5	-68.0	-68.5	-68.0	-68.0	-67.5	
64 QAM	-67.0	-66.5	-66.0	-67.0	-66.0	-65.0	-66.5	-65.5	-65.0	-65.0	-65.0	-64.5	-64.5	
128 QAM	-64.5	-63.5	-63.5	-64.0	-63.0	-62.5	-63.5	-62.5	-62.0	-62.5	-62.0	-62.0	-61.5	
256 QAM	-61.0	-60.5	-60.0	-61.0	-60.0	-59.0	-60.5	-59.5	-59.0	-59.0	-59.0	-58.5	-58.5	
512 QAM	-59.0	-58.5	-58.0	-59.0	-58.0	-57.0	-58.5	-57.5	-57.0	-57.0	-57.0	-56.5	-56.5	
1024 QAM Strong	-55.5	-55.0	-54.5	-55.5	-54.5	-53.5	-55.0	-54.0	-53.5	-53.5	-53.5	-53.0	-53.0	
1024 QAM Light	-54.5	-54.0	-53.5	-54.5	-53.5	-52.5	-54.0	-53.0	-52.5	-52.5	-52.5	-52.0	-52.0	
2048 QAM	-52.0	-51.0	-51.0	-51.5	-50.5	-50.0	-51.0	-50.0	-49.5	-49.5	-49.5	-49.5	–	
4096 QAM	-55.0	-54.0	-54.0	-55.0	-53.5	-53.0	-54.0	–	–	–	–	–	–	

Receive Sensitivity of RFU-D-HP – ETSI (dBm @BER=10-6)

	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz
BPSK	28 MHz	-91.6	-91.8	-91.2	-91.3	40 MHz	-90.3	-90.5	-89.9	-90.0	56 MHz	-88.8	-89.0	-88.4	-88.5
QPSK		-88.6	-88.8	-88.2	-88.3		-87.1	-87.3	-86.7	-86.8		-85.6	-85.8	-85.2	-85.3
8 PSK		-84.7	-84.9	-84.3	-84.4		-83.1	-83.3	-82.7	-82.8		-81.5	-81.7	-81.1	-81.2
16 QAM		-81.7	-81.9	-81.3	-81.4		-80.2	-80.4	-79.8	-79.9		-78.6	-78.8	-78.2	-78.3
32 QAM		-78.4	-78.6	-78.0	-78.1		-76.8	-77.0	-76.4	-76.5		-75.3	-75.5	-74.9	-75
64 QAM		-75.4	-75.6	-75.0	-75.1		-73.7	-73.9	-73.3	-73.4		-72.3	-72.5	-71.9	-72.0
128 QAM		-72.3	-72.5	-71.9	-72.0		-70.7	-70.9	-70.3	-70.4		-69.4	-69.6	-69.0	-69.1
256 QAM		-69.2	-69.4	-68.8	-68.9		-68.4	-68.6	-68.0	-68.1		-66.2	-66.4	-65.8	-65.9
512 QAM		-66.4	-66.6	-66.0	-66.1		-65.6	-65.8	-65.2	-65.3		-63.6	-63.8	-63.2	-63.3
1024 QAM Strong		-63.5	-63.7	-63.1	-63.2		-62.1	-62.3	-61.7	-61.8		-60.3	-60.5	-59.9	-60.0
1024 QAM Light		-62.8	-63.0	-62.4	-62.5		-61.4	-61.6	-61.0	-61.1		-59.4	-59.6	-59.0	-59.1
2048 QAM		-60.3	-60.5	-59.9	-60.0		-59.1	-59.3	-58.7	-58.8		-57.6	-57.8	-57.2	-57.3
4096 QAM		-56.3	-56.5	-55.9	-56.0		-56.0	-56.2	-55.6	-55.7		-53.7	-53.9	-53.3	-53.4

	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz
BPSK	80 MHz	-86.5	-86.7	-86.1	-86.2	112 MHz	-85.1	-85.3	-84.7	-84.8
QPSK		-84.2	-84.4	-83.8	-83.9		-82.7	-82.9	-82.3	-82.4
8 PSK		-80.5	-80.7	-80.1	-80.2		-78.7	-78.9	-78.3	-78.4
16 QAM		-77.5	-77.7	-77.1	-77.2		-75.8	-76.0	-75.4	-75.5
32 QAM		-74.1	-74.3	-73.7	-73.8		-72.4	-72.6	-72.0	-72.1
64 QAM		-71.2	-71.4	-70.8	-70.9		-69.4	-69.6	-69.0	-69.1
128 QAM		-68.2	-68.4	-67.8	-67.9		-66.5	-66.7	-66.1	-66.2
256 QAM		-65.5	-65.7	-65.1	-65.2		-63.5	-63.7	-63.1	-63.2
512 QAM		-62.8	-63.0	-62.4	-62.5		-61.1	-61.3	-60.7	-60.8
1024 QAM Strong		-59.6	-59.8	-59.2	-59.3		-58.1	-58.3	-57.7	-57.8
1024 QAM Light		-59.2	-59.4	-58.8	-58.9		-57.4	-57.6	-57.0	-57.1
2048 QAM		-56.3	-56.5	-55.9	-56.0		-54.8	-55.0	-54.4	-54.5

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Receive Sensitivity of RFU-E – ETSI (dBm @BER=10-6)

Channel Bandwidth (MHz)	14	28	62.5	125	250	500
BPSK	-90.5	-87.5	-83.0	-80.0	-77.0	-74.0
QPSK	-87.2	-84.6	-79.5	-76.5	-73.5	-70.5
8 QAM	-83.1	-80.6	-75.5	-72.5	-70.0	-67.0
16 QAM	–	-77.4	-73.0	-69.5	-67.0	-64.0
32 QAM	–	-73.9	-69.0	-66.0	-63.0	-60.0
64 QAM	–	-70.8	-66.0	-63.0	-60.0	-57.0
128 QAM	–	-67.6	-63.0	-60.0	-57.0	–
256 QAM	–	-64.6	-59.5	-57.0	-54.0	–
512 QAM	–	-62.4	-57.0	-54.0	–	–
1024 QAM	–	–	-54.0	–	–	–

Receive Sensitivity of RFU-D and RFU-S – ANSI (dBm @BER=10-6)

20 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-91.5	-91.5	-91.0	-92.0	-91.0	-90.0	-91.5	-90.5	-87.0	-90.0	-90.0	-89.5	-89.0
QPSK	-88.5	-88.5	-88.5	-89.5	-88.0	-87.5	-88.5	-88.0	-84.0	-87.5	-87.0	-87.0	-86.5
8 PSK	-83.5	-83.5	-83.0	-84.0	-83.0	-82.0	-83.5	-82.5	-79.0	-82.0	-82.0	-81.5	-81.0
16 QAM	-82.0	-82.0	-81.5	-82.5	-81.5	-80.5	-82.0	-81.0	-77.5	-80.5	-80.5	-80.0	-79.5
32 QAM	-78.0	-78.0	-78.0	-79.0	-77.5	-77.0	-78.0	-77.5	-73.5	-77.0	-76.5	-76.5	-76.0
64 QAM	-75.5	-75.5	-75.0	-76.0	-75.0	-74.0	-75.5	-74.5	-71.0	-74.0	-74.0	-73.5	-73.0
128 QAM	-72.5	-72.5	-72.0	-73.0	-71.5	-71.0	-72.5	-71.5	-68.0	-71.0	-71.0	-70.5	-70.0
256 QAM	-69.0	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5	-64.5	-68.0	-67.5	-67.5	-67.0
512 QAM	-67.0	-67.0	-66.5	-67.5	-66.0	-65.5	-67.0	-66.0	-62.5	-65.5	-65.5	-65.0	-64.5
1024 QAM Strong	-64.0	-64.0	-64.0	-65.0	-63.5	-63.0	-64.0	-63.5	-59.5	-63.0	-62.5	-62.5	-62.0
1024 QAM Light	-63.0	-63.0	-63.0	-64.0	-62.5	-62.0	-63.0	-62.5	-58.5	-62.0	-61.5	-61.5	-61.0
25 MHz	**6 GHz**	**7-8 GHz**	**10 GHz**	**11 GHz**	**13 GHz**	**15 GHz**	**18 GHz**	**23 GHz**	**24 GHz**	**26 GHz**	**28-31 GHz**	**32 GHz**	**38 GHz**
BPSK	-88.5	-87.5	-87.5	-88.0	-87.0	-86.5	-87.5	-86.5	-83.0	-86.5	-86.0	-86.0	-85.0
QPSK	-87.5	-86.5	-86.5	-87	-86.0	-85.5	-86.5	-85.5	-82.0	-85.5	-85.0	-85.0	-84.0
8 PSK	-82.5	-82.0	-81.5	-82.5	-81.5	-80.5	-82.0	-81.0	-77.5	-80.5	-80.5	-80.0	-79.5
16 QAM	-80.5	-80.0	-79.5	-80.5	-79.5	-78.5	-80.0	-79.0	-75.5	-78.5	-78.5	-78.0	-77.5
32 QAM	-77.5	-77.0	-76.5	-77.5	-76.0	-75.5	-77.0	-76.0	-72.5	-75.5	-75.5	-75.0	-74.5
64 QAM	-74.5	-74.0	-73.5	-74.5	-73.5	-72.5	-74.0	-73.0	-69.5	-72.5	-72.5	-72.0	-71.5
128 QAM	-71.5	-71.0	-70.5	-71.5	-70.5	-69.5	-71.0	-70.0	-66.5	-69.5	-69.5	-69.0	-68.5
256 QAM	-68.5	-67.5	-67.5	-68.5	-67.0	-66.5	-67.5	-67.0	-63.0	-66.5	-66.0	-66.0	-65.5
512 QAM	-66.0	-65.0	-65.0	-66.0	-64.5	-64.0	-65.0	-64.5	-60.5	-64.0	-63.5	-63.5	-63.0
1024 QAM Strong	-63.0	-62.5	-62.0	-63.0	-61.5	-61.0	-62.5	-61.5	-58.0	-61.0	-61.0	-60.5	-60.0
1024 QAM Light	-62.5	-61.5	-61.5	-62.5	-61.0	-60.5	-61.5	-61.0	-57.0	-60.5	-60.0	-60.0	-59.5
2048 QAM	-58.5	-58.0	-57.5	-58.5	-57.0	-56.5	-58.0	-57.0	-53.5	-56.5	-56.5	-56.0	-55.5
4096 QAM	-55.5	-55.0	-54.5	-55.5	-54.0	-53.5	-55.0	–	–	–	–	–	–

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Receive Sensitivity of RFU-D and RFU-S – ANSI (dBm @BER=10-6) - continued

30 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-88.5	-88.0	-87.5	-88.5	-87.0	-86.5	-88.0	-87.0	-83.5	-86.5	-86.5	-86.5	-86.0
QPSK	-87.5	-87.0	-86.5	-87.5	-86.0	-85.5	-87.0	-86.0	-82.5	-85.5	-85.5	-85.5	-85.0
8 PSK	-82.5	-81.5	-81.5	-82.5	-81.0	-80.5	-81.5	-81.0	-77.0	-80.5	-80.0	-80.0	-79.5
16 QAM	-81.0	-80.0	-80.0	-80.5	-79.5	-79.0	-80.0	-79.0	-75.5	-79.0	-78.5	-78.5	-78.0
32 QAM	-77.0	-76.5	-76.0	-77.0	-76.0	-75.0	-76.5	-75.5	-72.0	-75.0	-75.0	-75.0	-74.5
64 QAM	-74.5	-73.5	-73.5	-74.0	-73.0	-72.5	-73.5	-72.5	-69.0	-72.5	-72.0	-72.0	-71.5
128 QAM	-71.0	-70.5	-70.0	-71.0	-70.0	-69.0	-70.5	-69.5	-66.0	-69.0	-69.0	-69.0	-68.5
256 QAM	-68.0	-67.5	-67.0	-68.0	-67.0	-66.0	-67.5	-66.5	-63.0	-66.0	-66.0	-66.0	-65.5
512 QAM	-66.0	-65.5	-65.0	-66.0	-64.5	-64.0	-65.5	-64.5	-61.0	-64.0	-64.0	-64.0	-63.5
1024 QAM Strong	-63.0	-62.0	-62.0	-62.5	-61.5	-61.0	-62.0	-61.0	-57.5	-61.0	-60.5	-60.5	-60.0
1024 QAM Light	-62.0	-61.0	-61.0	-62.0	-60.5	-60.0	-61.0	-60.5	-56.5	-60.0	-59.5	-59.5	-59.0
2048 QAM	-58.0	-57.5	-57.0	-58.0	-56.5	-56.0	-57.5	-56.5	-53.0	-56.0	-56.0	-56.0	-55.5
4096 QAM	-55.0	-54.5	-54.0	-55.0	-53.5	-53.0	-54.5	–	–	–	–	–	–

40 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-87.0	-86.5	-86.0	-87.0	-86.0	-85.0	-86.5	-85.5	-82.0	-85.0	-85.0	-85.0	-84.5
QPSK	-86.0	-85.5	-85.0	-86.0	-85.0	-84.0	-85.5	-84.5	-81.0	-84.0	-84.0	-84.0	-83.5
8 PSK	-81.0	-80.5	-80.0	-81.0	-79.5	-79.0	-80.5	-79.5	-76.0	-79.0	-79.0	-79.0	-78.5
16 QAM	-79.5	-79.0	-78.5	-79.5	-78.0	-77.5	-79.0	-78.0	-74.5	-77.5	-77.5	-77.5	-77.0
32 QAM	-76.0	-75.0	-75.0	-75.5	-74.5	-74.0	-75.0	-74.0	-70.5	-74.0	-73.5	-73.5	-73.0
64 QAM	-73.0	-72.0	-72.0	-73.0	-71.5	-71.0	-72.0	-71.5	-67.5	-71.0	-70.5	-70.5	-70.0
128 QAM	-70.0	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5	-64.5	-68.0	-67.5	-67.5	-67.0
256 QAM -67.0	-66.0	-66.0	-66.5	-65.5	-65.0	-66.0	-65.0	-61.5	-65.0	-64.5	-64.5	-64.0	
512 QAM	-64.0	-63.5	-63.0	-64.0	-62.5	-62.0	-63.5	-62.5	-59.0	-62.0	-62.0	-62.0	-61.5
1024 QAM Strong	-61.5	-61.0	-60.5	-61.5	-60.0	-59.5	-61.0	-60.0	-56.5	-59.5	-59.5	-59.5	-59.0
1024 QAM Light	-60.5	-60.0	-59.5	-60.5	-59.5	-58.5	-60.0	-59.0	-55.5	-58.5	-58.5	-58.5	-58.0
2048 QAM	-58.0	-57.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5	-52.5	-56.0	-55.5	-55.5	-55.0
4096 QAM	-55.0	-54.0	-54.0	-55.0	-53.5	-53.0	-54.0	–	–	–	–	–	–

50 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-86.5	-85.5	-85.5	-86.0	-85.0	-84.5	-85.5	-84.5	-81.0	-84.5	-84.0	-84.0	-83.5
QPSK	-85.5	-84.5	-84.5	-85.0	-84.0	-83.5	-84.5	-83.5	-80.0	-83.5	-83.0	-83.0	-82.5
8 PSK	-80.0	-79.5	-79.0	-80.0	-79.0	-78.0	-79.5	-78.5	-75.0	-78.0	-78.0	-78.0	-77.5
16 QAM	-78.5	-77.5	-77.5	-78.0	-77.0	-76.5	-77.5	-76.5	-73.0	-76.5	-76.0	-76.0	-75.5
32 QAM	-74.5	-74.0	-73.5	-74.5	-73.5	-72.5	-74.0	-73.0	-69.5	-72.5	-72.5	-72.5	-72v
64 QAM	-71.5	-70.5	-70.5	-71.5	-70.0	-69.5	-70.5	-70.0	-66.0	-69.5	-69.0	-69.0	-68.5
128 QAM	-68.5	-68.0	-67.5	-68.5	-67.5	-66.5	-68.0	-67.0	-63.5	-66.5	-66.5	-66.5	-66.0
256 QAM	-66.0	-65.0	-65.0	-66.0	-64.5	-64.0	-65.0	-64.5	-60.5	-64.0	-63.5	-63.5	-63.0
512 QAM	-63.5	-63.0	-62.5	-63.5	-62.0	-61.5	-63.0	-62.0	-58.5	-61.5	-61.5	-61.5	-61.0
1024 QAM Strong	-60.0	-59.5	-59.0	-60.0	-58.5	-58	-59.5	-58.5	-55.0	-58.0	-58.0	-58.0	-57.5
1024 QAM Light	-59.0	-58.0	-58.0	-59.0	-57.5	-57.0	-58.0	-57.5	-53.5	-57.0	-56.5	-56.5	-56.0
2048 QAM	-57.0	-56.0	-56.0	-56.5	-55.5	-55.0	-56.0	-55.0	-51.5	-55.0	-54.5	-54.5	-54.0
4096 QAM	-54.0	-53.0	-53.0	-53.5	-52.5	-52.0	–	–	–	–	–	–	–

PTP 820F Licensed Microwave Radio

Receive Sensitivity of RFU-D and RFU-S – ANSI (dBm @BER=10-6) - continued

60 MHz	6 GHz	7-8 GHz	10 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	24 GHz	26 GHz	28-31 GHz	32 GHz	38 GHz
BPSK	-86.0	-85.0	-84.5	-85.5	-84.0	-83.5	-85.0	-84.0	-83.5	-83.5	-83.5	-83.0	-82.5
QPSK	-85.0	-84.0	-83.5	-84.5	-83.0	-82.5	-84.0	-83.0	-82.5	-82.5	-82.5	-82.0	-81.5
8 PSK	-80.5	-79.0	-79.0	-79.5	-78.5	-78.0	-79.0	-78.0	-77.5	-78.0	-77.5	-77.5	-77.0
16 QAM	-78.0	-77.0	-76.5	-77.5	-76.0	-75.5	-77.0	-76.0	-75.5	-75.5	-75.5	-75.0	-74.5
32 QAM	-74.5	-73.0	-73.0	-73.5	-72.5	-72.0	-73.0	-72.0	-71.5	-72.0	-71.5	-71.5	-71.0
64 QAM	-71.5	-70.0	-69.5	-70.5	-69.5	-68.5	-70.0	-69.0	-68.5	-68.5	-68.5	-68.0	-68.0
128 QAM	-69.0	-67.0	-67.0	-67.5	-66.5	-66.0	-67.0	-66.0	-65.5	-66.0	-65.5	-65.5	-65.0
256 QAM	-65.5	-64.0	-63.5	-64.5	-63.5	-62.5	-64.0	-63.0	-62.5	-62.5	-62.5	-62.0	-62.0
512 QAM	-63.5	-62.0	-61.5	-62.5	-61.5	-60.5	-62.0	-61.0	-60.5	-60.5	-60.5	-60.0	-60.0
1024 QAM Strong	-60.0	-58.5	-58.0	-59.0	-58.0	-57.0	-58.5	-57.5	-57.0	-57.0	-57.0	-56.5	-56.5
1024 QAM Light	-59.0	-57.5	-57.0	-58.0	-57.0	-56.0	-57.5	-56.5	-56.0	-56.0	-56.0	-55.5	-55.5
2048 QAM	-56.5	-54.5	-54.5	-55.0	-54.0	-53.5	-54.5	-53.5	-53.0	-53.5	-53.0	-53.0	-52.5
4096 QAM	-53.5	-51.5	-51.5	-52.0	-51.0	-50.5	–	–	–	–	–	–	–
80 MHz	**6 GHz**	**7-8 GHz**	**10 GHz**	**11 GHz**	**13 GHz**	**15 GHz**	**18 GHz**	**23 GHz**	**24 GHz**	**26 GHz**	**28-31 GHz**	**32 GHz**	**38 GHz**
BPSK	-85.0	-85.0	-84.5	-85.5	-84.5	-83.5	-85.0	-84.0	-83.5	-83.5	-83.5	-83.0	-83.5
QPSK	-82.5	-82.5	-82.5	-83.0	-82.0	-81.5	-82.5	-81.5	-81.0	-81.5	-81.0	-81.0	-81.0
8 PSK	-79.0	-79.0	-78.5	-79.5	-78.5	-77.5	-79.0	-78.0	-77.5	-77.5	-77.5	-77.0	-77.5
16 QAM	-76.0	-76.0	-75.5	-76.5	-75.0	-74.5	-76.0	-75.0	-74.5	-74.5	-74.5	-74.0	-74.0
32 QAM	-72.5	-72.5	-72.0	-73.0	-71.5	-71.0	-72.5	-71.5	-71.0	-71.0	-71.0	-70.5	-70.5
64 QAM	-69.0	-69.0	-69.0	-70.0	-68.5	-68.0	-69.0	-68.5	-68.0	-68.0	-67.5	-67.5	-67.5
128 QAM	-66.5	-66.5	-66.0	-67.0	-66.0	-65.0	-66.5	-65.5	-65.0	-65.0	-65.0	-64.5	-65.0
256 QAM	-63.5	-63.5	-63.0	-64.0	-63.0	-62.0	-63.5	-62.5	-62.0	-62.0	-62.0	-61.5	-62.0
512 QAM	-61.0	-61.0	-61.0	-62.0	-60.5	-60.0	-61.0	-60.5	-60.0	-60.0	-59.5	-59.5	-59.5
1024 QAM Strong	-58.0	-58.0	-57.5	-58.5	-57.5	-56.5	-58.0	-57.0	-56.5	-56.5	-56.5	-56.0	-56.5
1024 QAM Light	-57.0	-57.0	-57.0	-58.0	-56.5	-56.0	-57.0	-56.5	-56.0	-56.0	-55.5	-55.5	-55.5
2048 QAM	-54.5	-54.5	-54.5	-55.5	-54.0	-53.5	-54.5	-54.0	-53.5	-53.5	-53.0	-53.0	–

PTP 820F Licensed Microwave Radio

Receive Sensitivity of RFU-D-HP – ANSI (dBm @BER=10-6)

	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz
BPSK	20 MHz	-93.0	-93.2	-92.6	-92.7	25 MHz	-92.1	-92.3	-91.7	-91.8	30 MHz	-91.4	-91.6	-91.0	-91.1
QPSK		-90.1	-90.3	-89.7	-89.8		-89.1	-89.3	-88.7	-88.8		-88.4	-88.6	-88.0	-88.1
8 PSK		-86.1	-86.3	-85.7	-85.8		-85.1	-85.3	-84.7	-84.8		-84.4	-84.6	-84.0	-84.1
16 QAM		-83.2	-83.4	-82.8	-82.9		-82.2	-82.4	-81.8	-81.9		-81.4	-81.6	-81.0	-81.1
32 QAM		-79.8	-80.0	-79.4	-79.5		-78.9	-79.1	-78.5	-78.6		-78.1	-78.3	-77.7	-77.8
64 QAM		-76.6	-76.8	-76.2	-76.3		-75.8	-76.0	-75.4	-75.5		-75.0	-75.2	-74.6	-74.7
128 QAM		-73.6	-73.8	-73.2	-73.3		-72.7	-72.9	-72.3	-72.4		-72.0	-72.2	-71.6	-71.7
256 QAM		-70.5	-70.7	-70.1	-70.2		-69.6	-69.8	-69.2	-69.3		-68.8	-69.0	-68.4	-68.5
512 QAM		-67.7	-67.9	-67.3	-67.4		-66.7	-66.9	-66.3	-66.4		-66.5	-66.7	-66.1	-66.2
1024 QAM Strong		-64.8	-65.0	-64.4	-64.5		-63.8	-64.0	-63.4	-63.5		-63.2	-63.4	-62.8	-62.9
1024 QAM Light		-64.1	-64.3	-63.7	-63.8		-62.9	-63.1	-62.5	-62.6		-62.4	-62.6	-62.0	-62.1
2048 QAM		-61.6	-61.8	-61.2	-61.3		-60.8	-61.0	-60.4	-60.5		-59.9	-60.1	-59.5	-59.6
4096 QAM		-	-	-	-		-56.7	-56.9	-56.3	-56.4		-56.2	-56.4	-55.8	-55.9
BPSK	40 MHz	-90.6	-90.3	-90.5	-89.9	50 MHz	-89.6	-89.3	-89.5	-88.9	60 MHz	-88.8	-88.5	-88.7	-88.1
QPSK		-87.4	-87.1	-87.3	-86.7		-86.7	-86.4	-86.6	-86.0		-85.6	-85.3	-85.5	-84.9
8 PSK		-83.4	-83.1	-83.3	-82.7		-82.4	-82.1	-82.3	-81.7		-81.8	-81.5	-81.7	-81.1
16 QAM		-80.5	-80.2	-80.4	-79.8		-79.5	-79.2	-79.4	-78.8		-78.6	-78.3	-78.5	-77.9
32 QAM		-77.1	-76.8	-77.0	-76.4		-76.5	-76.2	-76.4	-75.8		-75.3	-75.0	-75.2	-74.6
64 QAM		-74.0	-73.7	-73.9	-73.3		-73.1	-72.8	-73.0	-72.4		-72.2	-71.9	-72.1	-71.5
128 QAM		-71.0	-70.7	-70.9	-70.3		-70.6	-70.3	-70.5	-69.9		-69.4	-69.1	-69.3	-68.7
256 QAM		-68.7	-68.4	-68.6	-68.0		-67.0	-66.7	-66.9	-66.3		-66.2	-65.9	-66.1	-65.5
512 QAM		-65.9	-65.6	-65.8	-65.2		-64.5	-64.2	-64.4	-63.8		-63.7	-63.4	-63.6	-63.0
1024 QAM Strong		-62.4	-62.1	-62.3	-61.7		-61.1	-60.8	-61.0	-60.4		-60.4	-60.1	-60.3	-59.7
1024 QAM Light		-61.7	-61.4	-61.6	-61.0		-60.3	-60.0	-60.2	-59.6		-59.6	-59.3	-59.5	-58.9
2048 QAM		-59.4	-59.1	-59.3	-58.7		-58.0	-57.7	-57.9	-57.3		-57.3	-57.0	-57.2	-56.6
4096 QAM		-56.3	-56.0	-56.2	-55.6		-54.5	-54.2	-54.4	-53.8		-53.5	-53.2	-53.4	-52.8

	Channel Size	6 GHz	7 GHz	8 GHz	11 GHz
BPSK	80 MHz	-86.5	-86.7	-86.1	-86.2
QPSK		-84.2	-84.4	-83.8	-83.9
8 PSK		-80.5	-80.7	-80.1	-80.2
16 QAM		-77.5	-77.7	-77.1	-77.2
32 QAM		-74.1	-74.3	-73.7	-73.8
64 QAM		-71.2	-71.4	-70.8	-70.9
128 QAM		-68.2	-68.4	-67.8	-67.9
256 QAM		-65.5	-65.7	-65.1	-65.2
512 QAM		-62.8	-63.0	-62.4	-62.5
1024 QAM Strong		-59.6	-59.8	-59.2	-59.3
1024 QAM Light		-59.2	-59.4	-58.8	-58.9
2048 QAM		-56.3	-56.5	-55.9	-56.0

PTP 820F Licensed Microwave Radio

Receive Sensitivity of RFU-E – ANSI (dBm @BER=10-6)

Channel Bandwidth (MHz)	62.5	125	250	500
BPSK	-83.0	-80.0	-77.0	-74.0
QPSK	-79.5	-76.5	-73.5	-70.5
8 QAM	-75.5	-72.5	-70.0	-67.0
16 QAM	-73.0	-69.5	-67.0	-64.0
32 QAM	-69.0	-66.0	-63.0	-60.0
64 QAM	-66.0	-63.0	-60.0	-57.0
128 QAM	-63.0	-60.0	-57.0	–
256 QAM	-59.5	-57.0	-54.0	–
512 QAM	-57.0	-54.0	–	–
1024 QAM	-54.0	–	–	–

Ethernet Throughput (Mbps)

Modulation	Channel Size	No Compression	L2 Compression	Max No of E1	Channel Size	No Compression	L2 Compression	Max No of E1
BPSK	14 MHz	6-8	7-25	4	25 MHz	14-17	15-54	10
QPSK		17-20	17-63	8		33-40	34-124	21
8 PSK		26-32	28-100	12		50-61	53-191	31
16 QAM		38-46	39-143	17		69-85	73-264	42
32 QAM		50-62	53-192	23		93-113	97-352	56
64 QAM		63-77	66-238	28		114-140	120-435	68
128 QAM		76-93	80-290	33		138-169	145-526	82
256 QAM		87-107	92-333	38		158-193	166-601	94
512 QAM		97-119	102-369	42		175-214	184-665	104
1024 QAM Strong		103-126	108-391	45		186-227	195-708	110
1024 QAM Light		109-133	115-415	47		198-242	208-752	117
2048 QAM		–	–	–		212-260	223-808	125
4096 QAM		–	–	–		230-281	242-875	136
BPSK	20 MHz	11-13	11-40	8	28 MHz	18-22	19-68	9
QPSK		25-30	26-94	16		40-49	42-152	18
8 PSK		39-47	41-148	24		59-72	62-225	26
16 QAM		54-66	57-206	33		84-103	89-321	37
32 QAM		72-88	76-275	44		112-137	118-426	49
64 QAM		90-109	94-340	54		139-170	146-527	60
128 QAM		109-133	114-413	65		167-205	176-637	72
256 QAM		124-151	130-470	74		193-236	203-734	83
512 QAM		135-165	142-515	81		206-251	216-782	88
1024 QAM Strong		144-176	151-548	86		225-274	236-854	96
1024 QAM Light		153-187	161-583	91		238-291	250-906	102
2048 QAM		-	-	-		260-318	273-989	111
4096 QAM		-	-	-		277-339	291-1026	118

PTP 820F Licensed Microwave Radio

Ethernet Throughput (Mbps) - continued

Modulation	Channel Size	No Compression	L2 Compression	Max No of E1	Channel Size	No Compression	L2 Compression	Max No of E1
BPSK	30 MHz	18-22	19-68	12	40 MHz	26-31	27-97	12
QPSK		40-49	42-152	25		55-67	58-209	24
8 PSK		59-72	62-225	36		83-102	87-317	36
16 QAM	30 MHz	84-103	89-321	51	40 MHz	114-140	120-435	50
32 QAM		112-137	118-426	67		152-185	159-577	65
64 QAM		139-170	146-527	83		187-228	196-710	80
128 QAM		167-205	176-637	99		227-277	238-862	97
256 QAM		193-236	203-734	114		244-298	256-927	104
512 QAM		206-251	216-782	122		267-327	281-1016	114
1024 QAM Strong		225-274	236-854	133		303-371	319-1026	130
1024 QAM Light		238-291	250-906	141		323-394	339-1026	138
2048 QAM		260-318	273-989	153		349-427	367-1026	149
4096 QAM		277-339	291-1026	163		369-451	388-1026	156
BPSK	50 MHz	33-40	35-126	18	56 MHz	40-49	42-153	18
QPSK		68-83	71-257	35		84-103	88-320	37
8 PSK		106-130	111-403	55		124-151	130-471	54
16 QAM		145-177	152-552	75		173-212	182-658	74
32 QAM		183-224	192-696	95		229-280	240-870	98
64 QAM		237-290	249-901	123		281-344	296-1026	120
128 QAM		277-339	291-1026	143		341-416	358-1026	145
256 QAM		329-402	345-1026	170		394-481	414-1026	168
512 QAM		357-437	375-1026	184		424-518	445-1026	180
1024 QAM Strong		389-475	408-1026	201		461-564	484-1026	196
1024 QAM Light		413-505	434-1026	213		490-599	515-1026	208
2048 QAM		446-545	468-1026	230		531-649	558-1026	226
4096 QAM		463-565	486-1026	238		547-668	574-1026	232
BPSK	60 MHz	40-49	42-153	21	62.5 MHz	42-51	44-160	19
QPSK		84-103	88-320	44		93-114	98-355	42
8 PSK		124-151	130-471	65		139-170	146-528	63
16 QAM		173-212	182-658	90		188-230	198-716	85
32 QAM		229-280	240-870	118		247-302	259-939	112
64 QAM		281-344	296-1026	1455		301-368	316-1145	137
128 QAM		341-416	358-1026	176		362-442	380-1377	165
256 QAM		394-481	414-1026	203		412-504	433-1569	187
512 QAM		424-518	445-1026	218		453-554	476-1724	206
1024 QAM Strong		461-564	484-1026	237		505-617	530-1920	230
1024 QAM Light		490-599	515-1026	252		-	-	-
2048 QAM		531-649	558-1026	273		-	-	-
4096 QAM		547-668	574-1026	286		-	-	-

PTP 820F Licensed Microwave Radio

Ethernet Throughput (Mbps) - continued

Modulation	Channel Size	No Compression	L2 Compression	Max No of E1	Channel Size	No Compression	L2 Compression	Max No of E1
BPSK	80 MHz	55-67	57-208	24	112 MHz	80-97	84-303	35
QPSK		111-136	117-424	48		163-200	172-622	70
8 PSK		159-195	167-606	69		244-299	256-929	104
16 QAM		228-279	240-869	98		333-407	350-1026	142
32 QAM		301-367	316-1026	128		439-536	461-1026	187
64 QAM	80 MHz	369-451	387-1026	157	112 MHz	539-659	566-1026	229
128 QAM		436-533	458-1026	186		652-797	685-1026	277
256 QAM		502-614	528-1026	214		746-912	784-1026	317
512 QAM		552-675	580-1026	235		810-990	851-1026	344
1024 QAM Strong		601-735	631-1026	255		879-1037	923-1026	373
1024 QAM Light		638-780	670-1026	271		933-1037	980-1026	396
2048 QAM		676-826	710-1026	287		1002-1037	1002-1026	427
4096 QAM		369-451	387-1026	157		–	–	–
BPSK	125 MHz	90-110	94-341	41	250 MHz	180-221	189-687	82
QPSK		188-230	197-715	85		377-461	396-1435	171
8 PSK		279-341	293-1062	127		559-683	587-2128	254
16 QAM		379-463	398-1443	172		759-928	797-2500	345
32 QAM		499-610	524-1898	227		998-1220	1048-2500	454
64 QAM		612-748	643-2329	278		1225-1497	1286-2500	512
128 QAM		737-900	774-2500	335		1474-1802	1548-2500	512
256 QAM		838-1025	880-2500	381		1653-2021	1736-2500	512
512 QAM		923-1128	969-2500	420		1474-1802	1548-2500	512
1024 QAM Strong		-	-	-		-	-	-
BPSK	500 MHz	362-442	-	165				
QPSK		755-923	-	343				
8 PSK		1119-1368	-	509				
16 QAM		1520-1858	-	512				
32 QAM		1998-2442	-	512				
64 QAM		2451-2500	-	512				

ABOUT CAMBIUM NETWORKS

Cambium Networks empowers millions of people with wireless connectivity worldwide. Its wireless portfolio is used by commercial and government network operators as well as broadband service providers to connect people, places and things. With a single network architecture spanning fixed wireless and Wi-Fi, Cambium Networks enables operators to achieve maximum performance with minimal spectrum. End-to-end cloud management transforms networks into dynamic environments that evolve to meet changing needs with minimal physical human intervention. Cambium Networks empowers a growing ecosystem of partners who design and deliver gigabit wireless solutions that just work.

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