

# PTP 820S Licensed Microwave Radio

All-Outdoor

## Specifications



RADIO	SYNCHRONIZATION	TECHNICAL SPECIFICATIONS
<p>Supported Frequency Range</p> <ul style="list-style-type: none"> <li>• 6-38 GHz</li> </ul> <p>Configurations</p> <ul style="list-style-type: none"> <li>• 1+0, 1+1 HSB</li> </ul> <p>Radio Features</p> <ul style="list-style-type: none"> <li>• Protection: 1+1 HSB</li> <li>• High spectral utilization: QPSK to 2048 QAM w/ACM</li> </ul>	<p>Synchronization Distribution</p> <ul style="list-style-type: none"> <li>• Sync Distribution over any traffic interface (GE/FE)</li> <li>• SyncE (ITU-T G.8261, G.8262)</li> <li>• SSM/ESMC Support for ring/mesh applications (ITU-T G.8264)</li> <li>• SyncE Regenerator mode, providing PRC grade (ITU-T G.811) performance for smart pipe applications.</li> </ul> <p>IEEE-1588</p> <ul style="list-style-type: none"> <li>• Optimized Transport for reduced PDV</li> <li>• IEEE-1588 TC*</li> </ul>	<p>Mechanical Specifications</p> <ul style="list-style-type: none"> <li>• Dimensions – 230mm(H), 233mm(W), 98mm(D), 6kg</li> <li>• Pole Diameter Range (for Remote Mount Installation) – 8.89 cm – 11.43 cm</li> </ul> <p>Environmental Specifications</p> <ul style="list-style-type: none"> <li>• -33°C to +55°C (-45°C to +60°C extended)</li> </ul> <p>Power Input Specifications</p> <ul style="list-style-type: none"> <li>• Standard Input: -48 VDC</li> <li>• DC Input range: -40 to -60 VDC</li> </ul> <p>Power Consumption Specifications</p> <ul style="list-style-type: none"> <li>• Maximum Power Consumption – 32W</li> </ul> <p>PoE Injector Mechanical Specifications</p> <ul style="list-style-type: none"> <li>• Dimensions – 134mm(H), 190mm(W), 62mm(D), 1 kg</li> </ul> <p>PoE Injector Environmental Specifications</p> <ul style="list-style-type: none"> <li>• 33°C to +55°C (-45°C to +60°C extended)</li> </ul> <p>PoE Injector Power Input Specifications</p> <ul style="list-style-type: none"> <li>• Standard Input: -48 or +24 VDC (Optional)</li> <li>• DC Input range: ±(18/40.5 to 60) VDC (+18VDC extended range is supported as part of the nominal +24VDC support)</li> </ul> <p>PoE Injector Interfaces</p> <ul style="list-style-type: none"> <li>• GbE Data Port supporting 10/100/1000Base-T</li> <li>• Power-Over-Ethernet (PoE) Port</li> <li>• DC Power Port –40V to -60V (a PoE supporting two redundant DC feeds each supporting ±(18-60)V is available)</li> </ul> <p>* Planned for future release. ** Certification pending.</p>
ETHERNET	STANDARDS	
<p>Ethernet Interfaces</p> <ul style="list-style-type: none"> <li>• Traffic Interfaces – 1 x 10/100/1000Base-T (RJ-45) and 2x1000base-X (Optical SFP) or 10/100/1000Base-T (Electrical SFP)</li> <li>• Management Interface - 1 x 10/100 Base-T (RJ-45)</li> <li>• SFP Types - Optical 1000Base-LX (1310 nm) or SX (850 nm)</li> </ul> <p>Note: SFP devices must be of industrial grade (-40°C to +85°C)</p> <p>Ethernet Features</p> <ul style="list-style-type: none"> <li>• MTU – 9600 Bytes</li> <li>• Quality of Service <ul style="list-style-type: none"> <li>o Multiple Classification criteria (VLAN ID, p-bits, IP-DSCP, MPLS EXP, CoS)</li> <li>o Eight priority queues</li> <li>o Deep buffering (configurable up to 64 Mbit per queue)</li> <li>o WRED</li> <li>o Hierarchical QoS – high service granularity*</li> <li>o P-bit marking/remarking</li> </ul> </li> <li>• 4K VLANs</li> <li>• VLAN add/re+1 (888) 858-6021move/translate</li> <li>• Frame Cut Through – controlled latency and PDV for delay sensitive applications</li> <li>• Header De-Duplication – Capacity boosting by eliminating inefficiency in all layers (L2,MPLS, L3,L4, Tunneling – GTP for LTE, GRE)</li> <li>• Network Resiliency - G.8032 and Multiple Spanning Tree Protocol (MSTP)*</li> <li>• Ethernet OAM – EFM (IEEE 802.3ah), CFM (IEEE 802.1ag), ITU-T Y.1731*</li> </ul>	<p>MEF</p> <ul style="list-style-type: none"> <li>• Carrier Ethernet 2.0 (CE 2.0)**</li> </ul> <p>Supported Ethernet Standards</p> <ul style="list-style-type: none"> <li>• 10/100/1000base-T/X (IEEE 802.3)</li> <li>• Ethernet VLANs (IEEE 802.3ac)</li> <li>• Virtual LAN (VLAN, IEEE 802.1Q)</li> <li>• Class of service (IEEE 802.1p)</li> <li>• Provider bridges (QinQ – IEEE 802.1ad)</li> <li>• Link aggregation (IEEE 802.3ad)</li> <li>• Auto MDI/MDIX for 1000baseT</li> <li>• RFC 1349: IPv4 TOS</li> <li>• RFC 2474: IPv4 DSCP</li> <li>• RFC 2460: IPv6 Traffic Classes</li> </ul> <p>Standards Compliance</p> <ul style="list-style-type: none"> <li>• 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)</li> <li>• Surge: EN61000-4-5, Class 4 (for PWR and ETHI/PoE ports)</li> <li>• 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</li> <li>• Ingress Protection: IP66-compliant</li> <li>• Storage: ETSI EN 300 019-1-1 Class 1.2</li> <li>• Transportation: ETSI EN 300 019-1-2 Class 2.3</li> </ul>	

Transmit Power (dBm)	Frequency (GHz)									
	6	7	8	10-11	13-15	18	23	24 UL	26	28-38
QPSK	29	28	28	27	24	22	20	-17	21	18
8 PSK	29	28	28	27	24	22	20	-18	21	18
16 QAM	28	27	27	26	23	21	20	-19	20	17
32 QAM	27	26	26	25	22	20	20	-19	19	16
64 QAM	27	26	26	25	22	20	20	-19	19	16
128 QAM	27	26	26	25	22	20	20	-19	19	16
256 QAM	27	26	24	25	22	20	18	-19	17	14
512 QAM	25	24	24	24	20	18	18	-21	17	14
1024 QAM	25	24	24	23	20	18	17	-21	16	13
2048 QAM	23	22	22	21	18	16	16	-23	15	12

Modulation		6	7	8	10	11	13	15	18	23	24	26	28	31	32	36	38	
QPSK	28 MHz ACCP	-87.0	-85.5	-85.0	-85.5	-86.5	-86.0	-85.0	-86.0	-84.5	-84.0	-84.0	-84.5	-84.5	-85.5	-83.0	-82.5	
8 PSK		-82.5	-81.0	-80.5	-81.0	-82.0	-81.5	-80.5	-81.5	-80.0	-79.5	-79.5	-79.5	-80.0	-80.0	-81.0	-78.5	-78.0
16 QAM		-80.5	-79.0	-78.5	-79.0	-80.0	-79.5	-78.5	-79.5	-78.0	-77.5	-77.5	-77.5	-78.0	-78.0	-79.0	-76.5	-76.0
32 QAM		-77.0	-75.5	-75.0	-75.5	-76.5	-76.0	-75.0	-76.0	-74.5	-74.0	-74.0	-74.0	-74.5	-74.5	-75.5	-73.0	-72.5
64 QAM		-74.0	-72.5	-72.0	-72.5	-73.5	-73.0	-72.0	-73.0	-71.5	-71.0	-71.0	-71.0	-71.5	-71.5	-72.5	-70.0	-69.5
128 QAM		-71.0	-69.5	-69.0	-69.5	-70.5	-70.0	-69.0	-70.0	-68.5	-68.0	-68.0	-68.0	-68.5	-68.5	-69.5	-67.0	-66.5
256 QAM		-68.0	-66.5	-66.0	-66.5	-67.5	-67.0	-66.0	-67.0	-65.5	-65.0	-65.0	-65.0	-65.5	-65.5	-66.5	-64.0	-63.5
512 QAM		-65.5	-64.0	-63.5	-64.0	-65.0	-64.5	-63.5	-64.5	-63.0	-62.5	-62.5	-62.5	-63.0	-63.0	-64.0	-61.5	-61.0
1024L QAM		-62.5	-61.0	-60.5	-61.0	-62.0	-61.5	-60.5	-61.5	-60.0	-59.5	-59.5	-59.5	-60.0	-60.0	-61.0	-58.5	-58.0
1024H QAM		-61.5	-60.0	-59.5	-60.0	-61.0	-60.5	-59.5	-60.5	-59.0	-58.5	-58.5	-58.5	-59.0	-59.0	-60.0	-57.5	-57.0
2048 QAM		-58.0	-56.5	-56.0	-56.5	-57.5	-57.0	-56.0	-57.0	-55.5	-55.0	-55.0	-55.0	-55.5	-55.5	-56.5	-54.0	-53.5
QPSK	28MHz ACAP / 30 MHz	-87.5	-85.5	-85.0	-85.5	-86.5	-86.0	-85.0	-86.0	-84.5	-84.0	-84.0	-84.5	-84.5	-85.5	-83.0	-82.5	
8 PSK		-82.5	-80.5	-80.0	-80.5	-81.5	-81.0	-80.0	-81.0	-79.5	-79.0	-79.0	-79.0	-79.5	-79.5	-80.5	-78.0	-77.5
16 QAM		-81.0	-79.0	-78.5	-79.0	-80.0	-79.5	-78.5	-79.5	-78.0	-77.5	-77.5	-77.5	-78.0	-78.0	-79.0	-76.5	-76.0
32 QAM		-77.0	-75.0	-74.5	-75.0	-76.0	-75.5	-74.5	-75.5	-74.0	-73.5	-73.5	-73.5	-74.0	-74.0	-75.0	-72.5	-72.0
64 QAM		-74.5	-72.5	-72.0	-72.5	-73.5	-73.0	-72.0	-73.0	-71.5	-71.0	-71.0	-71.0	-71.5	-71.5	-72.5	-70.0	-69.5
128 QAM		-71.5	-69.0	-68.5	-69.0	-70.5	-69.5	-68.5	-69.5	-68.0	-67.5	-67.5	-67.5	-68.0	-68.0	-69.0	-66.5	-66.0
256 QAM		-68.5	-66.0	-65.5	-66.0	-67.5	-66.5	-65.5	-66.5	-65.0	-64.5	-64.5	-64.5	-65.0	-65.0	-66.0	-63.5	-63.0
512 QAM		-66.5	-64.0	-63.5	-64.0	-65.5	-64.5	-63.5	-64.5	-63.0	-62.5	-62.5	-62.5	-63.0	-63.0	-64.0	-61.5	-61.0
1024L QAM		-63.0	-61.0	-60.5	-61.0	-62.0	-61.5	-60.5	-61.5	-60.0	-59.5	-59.5	-59.5	-60.0	-60.0	-61.0	-58.5	-58.0
1024H QAM		-62.0	-60.0	-59.5	-60.0	-61.0	-60.5	-59.5	-60.5	-59.0	-58.5	-58.5	-58.5	-59.0	-59.0	-60.0	-57.5	-57.0
2048 QAM		-58.5	-56.0	-55.5	-56.0	-57.5	-56.5	-55.5	-56.5	-55.0	-54.5	-54.5	-54.5	-55.0	-55.0	-56.0	-53.5	-53.0
QPSK	40 MHz	-85.5	-84.0	-83.5	-84.0	-86.0	-84.5	-83.5	-84.5	-83.0	-82.5	-82.5	-83.0	-83.0	-84.0	-81.5	-81.0	
8 PSK		-80.5	-79.0	-78.5	-79.0	-80.5	-79.5	-78.5	-79.5	-78.0	-77.5	-77.5	-78.0	-78.0	-79.0	-76.5	-76.0	
16 QAM		-79.0	-77.5	-77.0	-77.5	-79.0	-78.0	-77.0	-78.0	-76.5	-76.0	-76.0	-76.5	-76.5	-77.5	-75.0	-74.5	
32 QAM		-75.5	-74.0	-73.5	-74.0	-75.5	-74.5	-73.5	-74.5	-73.0	-72.5	-72.5	-73.0	-73.0	-74.0	-71.5	-71.0	
64 QAM		-72.5	-71.0	-70.5	-71.0	-72.5	-71.5	-70.5	-71.5	-70.0	-69.5	-69.5	-70.0	-70.0	-71.0	-68.5	-68.0	
128 QAM		-69.5	-68.0	-67.5	-68.0	-70.0	-68.5	-67.5	-68.5	-67.0	-66.5	-66.5	-67.0	-67.0	-68.0	-65.5	-65.0	
256 QAM		-66.5	-65.0	-64.5	-65.0	-67.5	-65.5	-64.5	-65.5	-64.0	-63.5	-63.5	-64.0	-64.0	-65.0	-62.5	-62.0	
512 QAM		-63.5	-62.0	-61.5	-62.0	-65.0	-62.5	-61.5	-62.5	-61.0	-60.5	-60.5	-61.0	-61.0	-62.0	-59.5	-59.0	
1024L QAM		-61.0	-59.5	-59.0	-59.5	-61.5	-60.0	-59.0	-60.0	-58.5	-58.0	-58.0	-58.0	-58.5	-58.5	-59.5	-57.0	-56.5
1024H QAM		-60.0	-58.5	-58.0	-58.5	-60.5	-59.0	-58.0	-59.0	-57.5	-57.0	-57.0	-57.0	-57.5	-57.5	-58.5	-56.0	-55.5
2048 QAM		-57.5	-56.0	-55.5	-56.0	-57.5	-56.5	-55.5	-56.5	-55.0	-54.5	-54.5	-54.5	-55.0	-55.0	-56.0	-53.5	-53.0
QPSK	50 MHz	-85.0	-83.5	-83.0	-83.5	-84.5	-84.0	-83.0	-84.0	-82.5	-79.0	-82.0	-82.5	-82.5	-83.5	-81.0	-80.5	
8 PSK		-79.5	-78.0	-77.5	-78.0	-79.0	-78.5	-77.5	-78.5	-77.0	-73.5	-76.5	-77.0	-77.0	-78.0	-75.5	-75.0	
16 QAM		-78.0	-76.5	-76.0	-76.5	-77.5	-77.0	-76.0	-77.0	-75.5	-72.0	-75.0	-75.5	-75.5	-76.5	-74.0	-73.5	
32 QAM		-74.0	-72.5	-72.0	-72.5	-73.5	-73.0	-72.0	-73.0	-71.5	-68.0	-71.0	-71.5	-71.5	-72.5	-70.0	-69.5	
64 QAM		-71.0	-69.5	-69.0	-69.5	-70.5	-70.0	-69.0	-70.0	-68.5	-65.0	-68.0	-68.5	-68.5	-69.5	-67.0	-66.5	
128 QAM		-68.0	-66.5	-66.0	-66.5	-67.5	-67.0	-66.0	-67.0	-65.5	-62.0	-65.0	-65.5	-65.5	-66.5	-64.0	-63.5	
256 QAM		-65.5	-64.0	-63.5	-64.0	-65.0	-64.5	-63.5	-64.5	-63.0	-59.5	-62.5	-63.0	-63.0	-64.0	-61.5	-61.0	
512 QAM		-63.0	-61.5	-61.0	-61.5	-62.5	-62.0	-61.0	-62.0	-60.5	-57.0	-60.0	-60.5	-60.5	-61.5	-59.0	-58.5	
1024L QAM		-59.5	-58.0	-57.5	-58.0	-59.0	-58.5	-57.5	-58.5	-57.0	-53.5	-56.5	-57.0	-57.0	-58.0	-55.5	-55.0	
1024H QAM		-58.5	-57.0	-56.5	-57.0	-58.0	-57.5	-56.5	-57.5	-56.0	-52.5	-55.5	-56.0	-56.0	-57.0	-54.5	-54.0	

2048 QAM	56 MHz ACCP	-56.5	-55.0	-54.5	-55.0	-56.0	-55.5	-54.5	-55.5	-54.0	-50.5	-53.5	-54.0	-54.0	-55.0	-52.5	-52.0
QPSK		-83.5	-82.0	-81.5	-82.0	-83.0	-82.5	-81.5	-82.5	-81.0	-80.5	-80.5	-81.0	-81.0	-82.0	-79.5	-79.0
8 PSK		-79.5	-78.0	-77.5	-78.0	-79.0	-78.5	-77.5	-78.5	-77.0	-76.5	-76.5	-77.0	-77.0	-78.0	-75.5	-75.0
16 QAM		-77.0	-75.5	-75.0	-75.5	-76.5	-76.0	-75.0	-76.0	-74.5	-74.0	-74.0	-74.5	-74.5	-75.5	-73.0	-72.5
32 QAM		-74.0	-72.5	-72.0	-72.5	-73.5	-73.0	-72.0	-73.0	-71.5	-71.0	-71.0	-71.5	-71.5	-72.5	-70.0	-69.5
64 QAM		-70.5	-69.0	-68.5	-69.0	-70.0	-69.5	-68.5	-69.5	-68.0	-67.5	-67.5	-68.0	-68.0	-69.0	-66.5	-66.0
128 QAM		-68.0	-66.5	-66.0	-66.5	-67.5	-67.0	-66.0	-67.0	-65.5	-65.0	-65.0	-65.5	-65.5	-66.5	-64.0	-63.5
256 QAM		-64.5	-63.0	-62.5	-63.0	-64.0	-63.5	-62.5	-63.5	-62.0	-61.5	-61.5	-62.0	-62.0	-63.0	-60.5	-60.0
512 QAM		-62.5	-61.0	-60.5	-61.0	-62.0	-61.5	-60.5	-61.5	-60.0	-59.5	-59.5	-60.0	-60.0	-61.0	-58.5	-58.0
1024L QAM		-59.0	-57.5	-57.0	-57.5	-58.5	-58.0	-57.0	-58.0	-56.5	-56.0	-56.0	-56.5	-56.5	-57.5	-55.0	-54.5
1024H QAM		-58.0	-56.5	-56.0	-56.5	-57.5	-57.0	-56.0	-57.0	-55.5	-55.0	-55.0	-55.5	-55.5	-56.5	-54.0	-53.5
2048 QAM		-53.5	-52.0	-51.5	-52.0	-53.0	-52.5	-51.5	-52.5	-51.0	-50.5	-50.5	-51.0	-51.0	-52.0	-49.5	-49.0
QPSK	56MHz ACAP / 60 MHz	-84.5	-82.5	-82.0	-82.5	-83.5	-83.0	-82.0	-83.0	-81.5	-81.0	-81.0	-81.5	-81.5	-82.5	-80.0	-79.5
8 PSK		-80.0	-78.0	-77.5	-78.0	-79.0	-78.5	-77.5	-78.5	-77.0	-76.5	-76.5	-77.0	-77.0	-78.0	-75.5	-75.0
16 QAM		-77.5	-75.5	-75.0	-75.5	-76.5	-76.0	-75.0	-76.0	-74.5	-74.0	-74.0	-74.5	-74.5	-75.5	-73.0	-72.5
32 QAM		-74.0	-72.0	-71.5	-72.0	-73.0	-72.5	-71.5	-72.5	-71.0	-70.5	-70.5	-71.0	-71.0	-72.0	-69.5	-69.0
64 QAM		-71.0	-68.5	-68.0	-68.5	-69.5	-69.0	-68.0	-69.0	-67.5	-67.0	-67.0	-67.5	-67.5	-68.5	-66.0	-65.5
128 QAM		-68.5	-66.0	-65.5	-66.0	-67.0	-66.5	-65.5	-66.5	-65.0	-64.5	-64.5	-65.0	-65.0	-66.0	-63.5	-63.0
256 QAM		-65.0	-62.5	-62.0	-62.5	-63.5	-63.0	-62.0	-63.0	-61.5	-61.0	-61.0	-61.5	-61.5	-62.5	-60.0	-59.5
512 QAM		-63.0	-60.5	-60.0	-60.5	-61.5	-61.0	-60.0	-61.0	-59.5	-59.0	-59.0	-59.5	-59.5	-60.5	-58.0	-57.5
1024L QAM		-59.5	-57.0	-56.5	-57.0	-58.0	-57.5	-56.5	-57.5	-56.0	-55.5	-55.5	-56.0	-56.0	-57.0	-54.5	-54.0
1024H QAM		-58.5	-56.0	-55.5	-56.0	-57.0	-56.5	-55.5	-56.5	-55.0	-54.5	-54.5	-55.0	-55.0	-56.0	-53.5	-53.0
2048 QAM		-56.0	-53.5	-53.0	-53.5	-54.5	-54.0	-53.0	-54.0	-52.5	-52.0	-52.0	-52.5	-52.5	-53.5	-51.0	-50.5
QPSK		80 MHz	-83.0	-81.5	-81.0	-81.5	-82.5	-82.0	-81.0	-82.0	-80.5	-80.0	-80.0	-80.5	-80.5	-81.5	-79.0
8 PSK	-78.0		-76.5	-76.0	-76.5	-77.5	-77.0	-76.0	-77.0	-75.5	-75.0	-75.0	-75.5	-75.5	-76.5	-74.0	-73.5
16 QAM	-76.0		-74.5	-74.0	-74.5	-75.5	-75.0	-74.0	-75.0	-73.5	-73.0	-73.0	-73.5	-73.5	-74.5	-72.0	-71.5
32 QAM	-72.5		-71.0	-70.5	-71.0	-72.0	-71.5	-70.5	-71.5	-70.0	-69.5	-69.5	-70.0	-70.0	-71.0	-68.5	-68.0
64 QAM	-69.5		-68.0	-67.5	-68.0	-69.0	-68.5	-67.5	-68.5	-67.0	-66.5	-66.5	-67.0	-67.0	-68.0	-65.5	-65.0
128 QAM	-67.0		-65.5	-65.0	-65.5	-66.5	-66.0	-65.0	-66.0	-64.5	-64.0	-64.0	-64.5	-64.5	-65.5	-63.0	-62.5
256 QAM	-64.0		-62.5	-62.0	-62.5	-63.5	-63.0	-62.0	-63.0	-61.5	-61.0	-61.0	-61.5	-61.5	-62.5	-60.0	-59.5
512 QAM	-61.0		-59.5	-59.0	-59.5	-60.5	-60.0	-59.0	-60.0	-58.5	-58.0	-58.0	-58.5	-58.5	-59.5	-57.0	-56.5
1024L QAM	-58.5		-57.0	-56.5	-57.0	-58.0	-57.5	-56.5	-57.5	-56.0	-55.5	-55.5	-56.0	-56.0	-57.0	-54.5	-54.0
1024H QAM	-57.5		-56.0	-55.5	-56.0	-57.0	-56.5	-55.5	-56.5	-55.0	-54.5	-54.5	-55.0	-55.0	-56.0	-53.5	-53.0
2048 QAM	-55.5		-54.0	-53.5	-54.0	-55.0	-54.5	-53.5	-54.5	-53.0	-52.5	-52.5	-53.0	-53.0	-54.0	-51.5	-51.0

Modulation		Ethernet Throughput (Mbps)				Ethernet Throughput (Mbps)		
		No Compression	L2 Compression	Multi-Layer Compression		No Compression	L2 Compression	Multi-Layer Compression
QPSK	30 MHz	42	42-48	44-135	28 MHz - ACAP	42	42-48	44-135
8 PSK		61	62-70	64-197		61	62-70	64-197
16 QAM		86	87-98	90-277		86	87-98	90-277
32 QAM		113	114-129	119-364		113	114-129	119-364
64 QAM		140	141-159	147-449		140	141-159	147-449
128 QAM		168	169-192	176-540		168	169-192	176-540
256 QAM		193	195-220	203-621		193	195-220	203-621
512 QAM		206	208-235	216-662		206	208-235	216-662
1024 QAM Strong		225	226-256	236-722		225	226-256	236-722
1024 QAM Light		238	240-271	250-764		238	240-271	250-764
2048 QAM		260	262-296	273-833		260	262-296	273-833
QPSK	40 MHz	57	57-65	60-183	28 MHz - ACCP	40	40-45	42-127
8 PSK		85	86-97	89-273		59	60-68	62-191
16 QAM		116	117-132	121-372		81	82-93	85-261
32 QAM		152	154-174	160-490		107	108-122	112-344
64 QAM		187	189-214	197-602		132	133-150	138-424
128 QAM		226	228-258	238-728		159	160-181	166-509
256 QAM		243	245-278	256-782		181	182-206	190-580
512 QAM		267	269-304	280-833		199	201-227	209-640
1024 QAM Strong		302	305-345	318-833		212	214-242	223-681
1024 QAM Light		321	324-366	337-833		225	227-257	236-723
2048 QAM		347	350-396	365-833		241	243-275	253-775
QPSK	50 MHz	69	70-79	73-223	56 MHz-ACCP	81	82-93	86-262
8 PSK		108	108-123	113-346		121	122-138	127-390
16 QAM		146	147-166	153-469		165	166-188	173-531
32 QAM		183	185-209	193-589		217	219-248	228-699
64 QAM		237	239-270	249-761		267	269-304	280-833
128 QAM		276	278-315	290-833		323	325-368	339-833
256 QAM		327	330-374	344-833		369	372-421	388-833
512 QAM		355	358-405	373-833		401	404-457	421-833
1024 QAM Strong		387	390-441	406-833		436	439-497	458-833
1024 QAM Light		411	414-468	431-833		462	466-528	486-833
2048 QAM		443	446-505	465-833		502	505-572	527-833
QPSK	60 MHz	86	86-98	90-276	56 MHz - ACAP	86	86-98	90-276
8 PSK		125	126-143	131-402		125	126-143	131-402
16 QAM		174	175-198	182-558		174	175-198	182-558
32 QAM		229	230-261	240-734		229	230-261	240-734
64 QAM		281	283-320	295-833		281	283-320	295-833
128 QAM		339	342-387	356-833		339	342-387	356-833
256 QAM		391	394-446	411-833		391	394-446	411-833
512 QAM		421	424-480	442-833		421	424-480	442-833
1024 QAM Strong		458	461-522	481-833		458	461-522	481-833
1024 QAM Light		486	490-555	511-833		486	490-555	511-833
2048 QAM		527	531-601	553-833		527	531-601	553-833
QPSK	80 MHz	115	116-131	121-369				
8 PSK		163	164-186	171-524				
16 QAM		232	234-265	244-747				
32 QAM		305	307-348	320-833				
64 QAM		373	376-426	392-833				
128 QAM		441	444-503	463-833				
256 QAM		508	512-579	533-833				
1024 QAM Strong		605	610-691	636-833				