



Datasheet

IP-20C

September 2021 | Rev. F
ETSI Version



Radio

Supported Frequency Range

5.7-42 GHz

Radio Configurations

1+0 to 4+0, 1+1/2+2, 2 x 1+0 East-West

Multiband (with IP-50E or IP-20E)

Layer 1 Link Bonding (with IP-50C)

Layer 1 Link Bonding (with IP-20N)

Radio Features

Multi-Carrier Adaptive Bandwidth Control (up to 2+0)

Protection: 1+1 HSB/2+2 HSB, 1+1 HSB-SD

High spectral utilization: QPSK to 2048 QAM w/ACM

XPIC

2x2/4x4 MIMO

Advanced Space Diversity (ASD)

Advanced Frequency Reuse (AFR)

Ethernet

Ethernet Interfaces

Traffic Interfaces – 1 or 2 x 10/100/1000Base-T (RJ-45) and 2x1000Base-X (Optical SFP) or 1000Base-T (Electrical SFP)

Management Interface - 1 x 10/100 Base-T (RJ-45)

SFP Types - Optical 1000Base-LX (1310 nm) or SX (850 nm)

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

MSTP, ERP (ITU-T G.8032)

Frame Cut Through – controlled latency and PDV for delay sensitive applications

Header DeDuplication – 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)

SyncE (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

Standards

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 (QinQ – 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

Radio Encryption – AES 256

Secured protocols:

- HTTPS
- SNMPv3
- SSH
- SFTP

RADIUS authentication and authorization

TACACS+ Authentication, Authorization, and Accounting (session-based)



Standards Compliance

Radio Spectral Efficiency: EN 302 217-2

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/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 C22.2.60950-22

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

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

Technical Specifications

Mechanical Specifications

Dimensions – 230mm(H), 233mm(W), 98mm(D), 6 kg

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

DC Input range: -40 to -60 VDC

Power Consumption Specifications

Maximum Power Consumption (Multi-Core Operation) –
5.7-6 GHz: 65W; 7-8 GHz: 75W;
11 GHz: 65W; 13-15 GHz: 55W; 18-24 GHz: 48W;
26-42 GHz: 55W

Maximum Power Consumption (1+0 Operation) –5.7-6 GHz:
40W; 7-8 GHz: 50W;
11 GHz: 53W; 13-15 GHz: 41W; 18-24 GHz: 39W;
26-42 GHz: 41W

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 VDC

DC Input range: -18/40.5 to -60 VDC

PoE Injector Interfaces

GbE Data Port supporting 10/100/1000Base-T

Power-Over-Ethernet (PoE) Port

DC Power Port –40VDC to -60VDC (a PoE supporting two redundant DC feeds each supporting -18 to -60VDC is available)

Product Images

IP-20C



Radio Specifications

Capacity

Notes: For full specifications, please contact your Ceragon sales representative.

| | Capacity (Mbps) | Capacity De-Dup | Capacity (Mbps) | Capacity De-Dup | Capacity (Mbps) | Capacity De-Dup |
|-------------------|------------------------|------------------------|-----------------|-----------------|------------------------|------------------------|
| Modulation | 3.5 MHz | | 7 MHz | | 14 MHz | |
| QPSK | 3-4 | 4-13 | 8-10 | 9-32 | 19-24 | 20-74 |
| 8 PSK | - | - | 13-16 | 13-48 | 29-36 | 31-112 |
| 16 QAM | 8-10 | 9-32 | 18-22 | 19-69 | 40-49 | 42-153 |
| 32 QAM | 11-14 | 12-43 | 24-30 | 26-92 | 53-65 | 56-203 |
| 64 QAM | 14-17 | 15-54 | 30-37 | 32-114 | 66-80 | 69-249 |
| 128 QAM | 17-21 | 18-65 | 36-44 | 38-137 | 79-97 | 83-301 |
| 256 QAM | 19-24 | 20-74 | 42-51 | 44-158 | 90-110 | 95-344 |
| 512 QAM | - | - | 45-54 | 47-169 | 100-122 | 105-380 |
| 1024 QAM Strong | - | - | 48-58 | 50-182 | 106-129 | 111-402 |
| 1024 QAM Light | - | - | 51-62 | 53-194 | 112-137 | 118-426 |
| Modulation | 28 MHz | | 40 MHz | | 56 MHz | |
| QPSK | 43-52 | 45-162 | 58-71 | 61-220 | 87-106 | 91-331 |
| 8 PSK | 62-76 | 65-236 | 86-105 | 90-328 | 127-155 | 133-482 |
| 16 QAM | 87-107 | 92-332 | 117-143 | 123-446 | 176-215 | 185-670 |
| 32 QAM | 115-140 | 121-437 | 154-189 | 162-588 | 232-283 | 243-881 |
| 64 QAM | 141-173 | 149-538 | 190-232 | 199-722 | 284-348 | 299-1000 |
| 128 QAM | 170-208 | 179-648 | 229-280 | 241-873 | 344-420 | 361-1000 |
| 256 QAM | 196-239 | 206-745 | 247-302 | 259-939 | 397-485 | 416-1000 |
| 512 QAM | 209-255 | 219-794 | 270-330 | 284-1000 | 426-521 | 448-1000 |
| 1024 QAM Strong | 228-278 | 239-866 | 306-375 | 322-1000 | 464-567 | 487-1000 |
| 1024 QAM Light | 241-295 | 253-917 | 325-398 | 342-1000 | 493-602 | 517-1000 |
| 2048 QAM | 263-321 | 276-1000 | 352-430 | 370-1000 | 534-653 | 561-1000 |
| | Capacity (Mbps) | Capacity De-Dup | | | Capacity (Mbps) | Capacity De-Dup |
| Modulation | 80 MHz | | | | Modulation | 80 MHz |
| QPSK | 114-140 | 120-435 | | | 256 QAM | 505-618 |
| 8 PSK | 162-198 | 170-618 | | | 512 QAM | 555-679 |
| 16 QAM | 231-283 | 243-880 | | | 1024 QAM Strong | 604-738 |
| 32 QAM | 304-371 | 319-1000 | | | 1024 QAM Light | 641-784 |
| 64 QAM | 371-454 | 390-1000 | | | 2048 QAM | 679-829 |
| 128 QAM | 439-536 | 461-1000 | | | | |

Transmit Power

| Transmit Power (dBm) | Freq. (GHz) | 5.7-6 | 7 | 8 | 10-11 | 13-15 | 18 | 23 | 24 UL | 26 | 28-38 | 42 |
|----------------------|-------------|-------|----|----|-------|-------|----|----|-------|----|-------|----|
| QPSK – 8 QAM | | 28 | 28 | 28 | 26 | 24 | 22 | 20 | -17 | 21 | 18 | 15 |
| 16 QAM | | 28 | 27 | 27 | 26 | 23 | 21 | 20 | -17 | 20 | 17 | 14 |
| 32- 128 QAM | | 27 | 26 | 26 | 25 | 22 | 20 | 20 | -17 | 19 | 16 | 13 |
| 256 QAM | | 27 | 26 | 24 | 25 | 20 | 20 | 18 | -17 | 17 | 14 | 11 |
| 512 QAM | | 25 | 24 | 24 | 24 | 20 | 18 | 18 | -17 | 17 | 14 | 11 |
| 1024 QAM | | 25 | 24 | 24 | 23 | 20 | 18 | 17 | -17 | 16 | 13 | 10 |
| 2048 QAM | | 23 | 22 | 22 | 21 | 18 | 16 | 16 | -17 | 15 | 12 | 9 |



Receiver Threshold (RSL) (dBm @ BER = 10⁻⁶)

| Frequency (GHz) | 5.7-6 | 7 | 8 | 10 | 11 | 13 | 15 | 18 | 23 | 24UL | 26 | 28-31 | 32 | 38 | 42 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 3.5 MHz | | | | | | | | | | | | | | | |
| QPSK | -96.5 | -96.0 | -96.0 | -95.5 | -96.5 | -95.5 | -94.5 | -96.0 | -95.0 | -94.5 | -94.5 | -94.5 | -94.0 | -94.0 | -93.5 |
| 16 QAM | -90.0 | -89.0 | -89.0 | -89.0 | -89.5 | -88.5 | -88.0 | -89.0 | -88.0 | -87.5 | -88.0 | -87.5 | -87.5 | -87.0 | -86.5 |
| 32 QAM | -86.5 | -85.5 | -85.5 | -85.5 | -86.0 | -85.0 | -84.5 | -85.5 | -84.5 | -84.0 | -84.5 | -84.0 | -84.0 | -83.5 | -83.0 |
| 64 QAM | -83.0 | -82.5 | -82.5 | -82.0 | -83.0 | -82.0 | -81.0 | -82.5 | -81.5 | -81.0 | -81.0 | -81.0 | -80.5 | -80.5 | -80.0 |
| 128 QAM | -79.5 | -79.0 | -79.0 | -78.5 | -79.5 | -78.5 | -77.5 | -79.0 | -78.0 | -77.5 | -77.5 | -77.5 | -77.0 | -77.0 | -76.5 |
| 256 QAM | -76.5 | -75.5 | -75.5 | -75.5 | -76.5 | -75.0 | -74.5 | -75.5 | -75.0 | -74.5 | -74.5 | -74.0 | -74.0 | -73.5 | -73.0 |
| 7 MHz | | | | | | | | | | | | | | | |
| QPSK | -93.5 | -93.0 | -93.0 | -92.5 | -93.5 | -92.5 | -91.5 | -93.0 | -92.0 | -91.5 | -91.5 | -91.5 | -91.0 | -91.0 | -90.5 |
| 8 PSK | -87.5 | -87.0 | -87.0 | -86.5 | -87.5 | -86.5 | -85.5 | -87.0 | -86.0 | -85.5 | -85.5 | -85.5 | -85.0 | -85.0 | -84.5 |
| 16 QAM | -87.0 | -86.5 | -86.5 | -86.0 | -87.0 | -86.0 | -85.0 | -86.5 | -85.5 | -85.0 | -85.0 | -85.0 | -84.5 | -84.5 | -84.0 |
| 32 QAM | -83.5 | -83.0 | -83.0 | -82.5 | -83.5 | -82.5 | -81.5 | -83.0 | -82.0 | -81.5 | -81.5 | -81.5 | -81.0 | -81.0 | -80.5 |
| 64 QAM | -80.5 | -80.0 | -80.0 | -79.5 | -80.5 | -79.5 | -78.5 | -80.0 | -79.0 | -78.5 | -78.5 | -78.5 | -78.0 | -78.0 | -77.5 |
| 128 QAM | -77.5 | -76.5 | -76.5 | -76.5 | -77.5 | -76.0 | -75.5 | -76.5 | -76.0 | -75.5 | -75.5 | -75.0 | -75.0 | -74.5 | -74.0 |
| 256 QAM | -74.0 | -73.5 | -73.5 | -73.0 | -74.0 | -73.0 | -72.0 | -73.5 | -72.5 | -72.0 | -72.0 | -72.0 | -71.5 | -71.5 | -71.0 |
| 512 QAM | -72.0 | -71.5 | -71.5 | -71.0 | -72.0 | -71.0 | -70.0 | -71.5 | -70.5 | -70.0 | -70.0 | -70.0 | -69.5 | -69.5 | -69.0 |
| 1024 QAM Strong | -68.5 | -68.0 | -68.0 | -67.5 | -68.5 | -67.5 | -66.5 | -68.0 | -67.0 | -66.5 | -66.5 | -66.5 | -66.0 | -66.0 | -65.5 |
| 1024 QAM Light | -68.0 | -67.0 | -67.0 | -67.0 | -67.5 | -66.5 | -66.0 | -67.0 | -66.0 | -65.5 | -66.0 | -65.5 | -65.5 | -65.0 | -64.5 |
| 14 MHz | | | | | | | | | | | | | | | |
| QPSK | -90.5 | -90.0 | -90.0 | -89.5 | -90.5 | -89.5 | -88.5 | -90.0 | -89.0 | -88.5 | -88.5 | -88.5 | -88.0 | -88.0 | -87.5 |
| 8 PSK | -84.5 | -84.0 | -84.0 | -83.5 | -85.5 | -83.5 | -82.5 | -84.0 | -83.0 | -82.5 | -82.5 | -82.5 | -82.0 | -82.0 | -81.5 |
| 16 QAM | -83.5 | -83.0 | -83.0 | -82.5 | -83.5 | -82.5 | -81.5 | -83.0 | -82.0 | -81.5 | -81.5 | -81.5 | -81.0 | -81.0 | -80.5 |
| 32 QAM | -80.5 | -79.5 | -79.5 | -79.5 | -80.5 | -79.0 | -78.5 | -79.5 | -79.0 | -78.5 | -78.5 | -78.0 | -78.0 | -77.5 | -77.0 |
| 64 QAM | -77.5 | -76.5 | -76.5 | -76.5 | -77.0 | -76.0 | -75.5 | -76.5 | -76.0 | -75.5 | -75.5 | -75.0 | -75.0 | -74.5 | -74.0 |
| 128 QAM | -74.0 | -73.5 | -73.5 | -73.0 | -74.0 | -73.0 | -72.0 | -73.5 | -72.5 | -72.0 | -72.0 | -72.0 | -71.5 | -71.5 | -71.0 |
| 256 QAM | -71.5 | -70.5 | -70.5 | -70.5 | -71.0 | -70.0 | -69.5 | -70.5 | -69.5 | -69.0 | -69.5 | -69.0 | -69.0 | -68.5 | -68.0 |
| 512 QAM | -68.5 | -68.0 | -68.0 | -67.5 | -68.5 | -67.5 | -66.5 | -68.0 | -67.0 | -66.5 | -66.5 | -66.5 | -66.0 | -66.0 | -65.5 |
| 1024 QAM Strong | -65.5 | -65.0 | -65.0 | -64.5 | -65.5 | -64.5 | -63.5 | -65.0 | -64.0 | -63.5 | -63.5 | -63.5 | -63.0 | -63.0 | -62.5 |
| 1024 QAM Light | -65.0 | -64.0 | -64.0 | -64.0 | -64.5 | -63.5 | -63.0 | -64.0 | -63.5 | -63.0 | -63.0 | -62.5 | -62.5 | -62.0 | -61.5 |
| 28 MHz | | | | | | | | | | | | | | | |
| QPSK | -87.5 | -87.0 | -87.0 | -86.5 | -87.5 | -86.5 | -85.5 | -87.0 | -86.0 | -85.5 | -85.5 | -85.5 | -85.0 | -85.0 | -84.5 |
| 8 PSK | -83.0 | -82.5 | -82.5 | -82.0 | -83.0 | -82.0 | -81.0 | -82.5 | -81.5 | -81.0 | -81.0 | -81.0 | -80.5 | -80.5 | -80.0 |
| 16 QAM | -81.0 | -80.5 | -80.5 | -80.0 | -81.0 | -79.5 | -79.0 | -80.5 | -79.5 | -79.0 | -79.0 | -79.0 | -78.5 | -78.0 | -78.0 |
| 32 QAM | -77.5 | -77.0 | -77.0 | -76.5 | -77.5 | -76.0 | -75.5 | -77.0 | -76.0 | -75.5 | -75.5 | -75.5 | -75.0 | -74.5 | -74.5 |
| 64 QAM | -74.5 | -74.0 | -74.0 | -73.5 | -74.5 | -73.0 | -72.5 | -74.0 | -73.0 | -72.5 | -72.5 | -72.5 | -72.0 | -71.5 | -71.5 |
| 128 QAM | -71.5 | -70.5 | -70.5 | -70.5 | -71.0 | -70.0 | -69.5 | -70.5 | -69.5 | -69.0 | -69.5 | -69.0 | -69.0 | -68.5 | -68.0 |
| 256 QAM | -68.5 | -67.5 | -67.5 | -67.5 | -68.0 | -67.0 | -66.5 | -67.5 | -66.5 | -66.0 | -66.5 | -66.0 | -66.0 | -65.5 | -65.0 |
| 512 QAM | -66.0 | -65.0 | -65.0 | -65.0 | -66.0 | -64.5 | -64.0 | -65.0 | -64.5 | -64.0 | -64.0 | -63.5 | -63.5 | -63.0 | -62.5 |
| 1024 QAM Strong | -63.0 | -62.5 | -62.5 | -62.0 | -63.0 | -61.5 | -61.0 | -62.5 | -61.5 | -61.0 | -61.0 | -61.0 | -60.5 | -60.0 | -60.0 |
| 1024 QAM Light | -62.0 | -61.5 | -61.5 | -61.0 | -62.0 | -60.5 | -60.0 | -61.5 | -60.5 | -60.0 | -60.0 | -60.0 | -59.5 | -59.0 | -59.0 |
| 2048 QAM | -58.5 | -58.0 | -58.0 | -57.5 | -58.5 | -57.0 | -56.5 | -58.0 | -57.0 | -56.5 | -56.5 | -56.5 | -56.0 | -55.5 | -55.5 |



| Frequency (GHz) | 5.7-6 | 7 | 8 | 10 | 11 | 13 | 15 | 18 | 23 | 24UL | 26 | 28-31 | 32 | 38 | 42 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 40 MHz | | | | | | | | | | | | | | | |
| QPSK | -86.0 | -85.5 | -85.5 | -85.0 | -86.0 | -85.0 | -84.0 | -85.5 | -84.5 | -84.0 | -84.0 | -84.0 | -83.5 | -83.5 | -83.0 |
| 8 PSK | -81.0 | -80.5 | -80.5 | -80.0 | -81.0 | -79.5 | -79.0 | -80.5 | -79.5 | -79.0 | -79.0 | -79.0 | -78.5 | -78.0 | -78.0 |
| 16 QAM | -79.5 | -79.0 | -79.0 | -78.5 | -79.5 | -78.0 | -77.5 | -79.0 | -78.0 | -77.5 | -77.5 | -77.5 | -77.0 | -76.5 | -76.5 |
| 32 QAM | -76.0 | -75.0 | -75.0 | -75.0 | -75.5 | -74.5 | -74.0 | -75.0 | -74.0 | -73.5 | -74.0 | -73.5 | -73.5 | -73.0 | -72.5 |
| 64 QAM | -73.0 | -72.0 | -72.0 | -72.0 | -73.0 | -71.5 | -71.0 | -72.0 | -71.5 | -71.0 | -71.0 | -70.5 | -70.5 | -70.0 | -69.5 |
| 128 QAM | -70.0 | -69.0 | -69.0 | -69.0 | -70.0 | -68.5 | -68.0 | -69.0 | -68.5 | -68.0 | -68.0 | -67.5 | -67.5 | -67.0 | -66.5 |
| 256 QAM | -67.0 | -66.0 | -66.0 | -66.0 | -66.5 | -65.5 | -65.0 | -66.0 | -65.0 | -64.5 | -65.0 | -64.5 | -64.5 | -64.0 | -63.5 |
| 512 QAM | -64.0 | -63.5 | -63.5 | -63.0 | -64.0 | -62.5 | -62.0 | -63.5 | -62.5 | -62.0 | -62.0 | -62.0 | -61.5 | -61.0 | -61.0 |
| 1024 QAM Strong | -61.5 | -61.0 | -61.0 | -60.5 | -61.5 | -60.0 | -59.5 | -61.0 | -60.0 | -59.5 | -59.5 | -59.5 | -59.0 | -58.5 | -58.5 |
| 1024 QAM Light | -60.5 | -60.0 | -60.0 | -59.5 | -60.5 | -59.5 | -58.5 | -60.0 | -59.0 | -58.5 | -58.5 | -58.5 | -58.0 | -58.0 | -57.5 |
| 2048 QAM | -58.0 | -57.0 | -57.0 | -57.0 | -58.0 | -56.5 | -56.0 | -57.0 | -56.5 | -56.0 | -56.0 | -55.5 | -55.5 | -55.0 | -54.5 |
| 56 MHz | | | | | | | | | | | | | | | |
| QPSK | -84.0 | -83.5 | -83.5 | -83.0 | -84.0 | -83.0 | -82.0 | -83.5 | -82.5 | -82.0 | -82.0 | -82.0 | -81.5 | -81.5 | -81.0 |
| 8 PSK | -80.0 | -79.5 | -79.5 | -79.0 | -80.0 | -79.0 | -78.0 | -79.5 | -78.5 | -78.0 | -78.0 | -78.0 | -77.5 | -77.5 | -77.0 |
| 16 QAM | -77.5 | -77.0 | -77.0 | -76.5 | -77.5 | -76.5 | -75.5 | -77.0 | -76.0 | -75.5 | -75.5 | -75.5 | -75.0 | -75.0 | -74.5 |
| 32 QAM | -74.5 | -73.5 | -73.5 | -73.5 | -74.0 | -73.0 | -72.5 | -73.5 | -72.5 | -72.0 | -72.5 | -72.0 | -72.0 | -71.5 | -71.0 |
| 64 QAM | -71.0 | -70.5 | -70.5 | -70.0 | -71.0 | -70.0 | -69.0 | -70.5 | -69.5 | -69.0 | -69.0 | -69.0 | -68.5 | -68.5 | -68.0 |
| 128 QAM | -68.5 | -67.5 | -67.5 | -67.5 | -68.0 | -67.0 | -66.5 | -67.5 | -66.5 | -66.0 | -66.5 | -66.0 | -66.0 | -65.5 | -65.0 |
| 256 QAM | -65.0 | -64.5 | -64.5 | -64.0 | -65.0 | -64.0 | -63.0 | -64.5 | -63.5 | -63.0 | -63.0 | -63.0 | -62.5 | -62.5 | -62.0 |
| 512 QAM | -63.0 | -62.5 | -62.5 | -62.0 | -63.0 | -61.5 | -61.0 | -62.5 | -61.5 | -61.0 | -61.0 | -61.0 | -60.5 | -60.0 | -60.0 |
| 1024 QAM Strong | -59.5 | -59.0 | -59.0 | -58.5 | -59.5 | -58.5 | -57.5 | -59.0 | -58.0 | -57.5 | -57.5 | -57.5 | -57.0 | -57.0 | -56.5 |
| 1024 QAM Light | -58.5 | -58.0 | -58.0 | -57.5 | -58.5 | -57.5 | -56.5 | -58.0 | -57.0 | -56.5 | -56.5 | -56.5 | -56.0 | -56.0 | -55.5 |
| 2048 QAM | -54.0 | -53.5 | -53.5 | -53.0 | -54.0 | -53.0 | -52.0 | -53.5 | -52.5 | -52.0 | -52.0 | -52.0 | -51.5 | -51.5 | -51.0 |
| 80 MHz | | | | | | | | | | | | | | | |
| QPSK | -82.5 | -82.0 | -82.0 | -81.5 | -82.5 | -81.5 | -80.5 | -82.0 | -81.0 | -80.5 | -80.5 | -80.5 | -80.0 | -80.0 | -79.5 |
| 8 PSK | -78.5 | -78.0 | -78.0 | -77.5 | -78.5 | -77.5 | -76.5 | -78.0 | -77.0 | -76.5 | -76.5 | -76.5 | -76.0 | -76.0 | -75.5 |
| 16 QAM | -76.0 | -75.5 | -75.5 | -75.0 | -76.0 | -75.0 | -74.0 | -75.5 | -74.5 | -74.0 | -74.0 | -74.0 | -73.5 | -73.5 | -73.0 |
| 32 QAM | -73.0 | -72.0 | -72.0 | -72.0 | -72.5 | -71.5 | -71.0 | -72.0 | -71.0 | -70.5 | -71.0 | -70.5 | -70.5 | -70.0 | -69.5 |
| 64 QAM | -69.5 | -69.0 | -69.0 | -68.5 | -69.5 | -68.5 | -67.5 | -69.0 | -68.0 | -67.5 | -67.5 | -67.5 | -67.0 | -67.0 | -66.5 |
| 128 QAM | -67.0 | -66.0 | -66.0 | -66.0 | -66.5 | -65.5 | -65.0 | -66.0 | -65.0 | -64.5 | -65.0 | -64.5 | -64.5 | -64.0 | -63.5 |
| 256 QAM | -63.5 | -63.0 | -63.0 | -62.5 | -63.5 | -62.5 | -61.5 | -63.0 | -62.0 | -61.5 | -61.5 | -61.5 | -61.0 | -61.0 | -60.5 |
| 512 QAM | -61.5 | -61.0 | -61.0 | -60.5 | -61.5 | -60.0 | -59.5 | -61.0 | -60.0 | -59.5 | -59.5 | -59.5 | -59.0 | -58.5 | -58.5 |
| 1024 QAM Strong | -58.0 | -57.5 | -57.5 | -57.0 | -58.0 | -57.0 | -56.0 | -57.5 | -56.5 | -56.0 | -56.0 | -56.0 | -55.5 | -55.5 | -55.0 |
| 1024 QAM Light | -57.0 | -56.5 | -56.5 | -56.0 | -57.0 | -56.0 | -55.0 | -56.5 | -55.5 | -55.0 | -55.0 | -55.0 | -54.5 | -54.5 | -54.0 |
| 2048 QAM | -54.0 | -53.5 | -53.5 | -53.0 | -54.0 | -53.0 | -52.0 | -53.5 | -52.5 | -52.0 | -52.0 | -52.0 | -51.5 | -51.5 | -51.0 |

