



**Datasheet**

# FibeAir IP-20C-HP

Rev C | July 2019  
ANSI Version



## High-power, all-outdoor, all-IP multicore node

Ceragon's FibeAir IP-20C-HP is a high-power version of Ceragon's ground-breaking MultiCore FibeAir IP-20C, operating in the 6-11 GHz bands and providing TX power of up to 35 dBm. FibeAir IP-20C-HP sets a new standard in microwave transmission, combining high TX power with MultiCore radio technology, QPSK to 2048 QAM modulation, and line-of-sight (LoS) 4x4 MIMO in a compact, all-outdoor design. IP-20C-HP represents a new generation of radio technology, capable of high bit rates and longer reach, and suitable for diverse deployment scenarios.

## Radio

### Supported Frequency Range

4-11 GHz

### Supported Channel Bandwidth

5-80 MHz

Field-replaceable diplexers

### Radio Configurations

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 LoS MIMO, AFR\*  
Multiband (with IP-20E)

### Radio Features

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

Protection: 1+1 HSB/2+2 HSB

High spectral utilization: QPSK to 2048 QAM w/ACM

XPIC

4x4 LoS MIMO

Advanced Space Diversity (ASD)

Advanced Frequency Reuse (AFR)\*

## Ethernet

### Ethernet Interfaces

Traffic Interfaces –

- 1 x 10/100/1000Base-T (RJ-45)
- 1 x 1000Base-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°F to +185°F)

## 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 DeDuplication – Capacity boosting by eliminating inefficiency in all layers (L2,MPLS, L3,L4, Tunneling – GTP for LTE, GRE)

Y.1731 Ethernet OAM

Adaptive Bandwidth Notification (ABN, also known as EOAM)

## 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

\* Planned for future release.



## 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

### 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, CSA C22.2.60950-22

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

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

## Technical Specifications

### Mechanical Specifications

Dimensions – 12.4”(H), 11.2”(W), 4.2”(D), 26.5 lbs. (includes diplexer or OCU unit)

Pole Diameter Range (for Remote Mount Installation) – 3.5” – 4.5”

### Environmental Specifications

-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

## Physical View

*IP-20C-HP*



## 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
<b>Modulation</b>	<b>5 MHz</b>		<b>10 MHz</b>		<b>20 MHz</b>	
QPSK	3-4	4-13	13-15	13-48	28-34	29-105
8 PSK	–	–	19-23	20-73	42-51	44-158
16 QAM	8-10	9-32	26-32	28-100	57-70	60-217
32 QAM	11-14	12-43	35-43	37-133	75-92	79-286
64 QAM	14-17	15-54	43-53	45-164	92-113	97-352
128 QAM	17-21	18-65	52-63	54-196	112-136	117-424
256 QAM	19-24	20-74	59-72	62-225	126-155	133-481
512 QAM	–	–	65-79	68-247	138-169	145-526
1024 QAM Strong	–	–	68-83	72-260	147-180	154-559
1024 QAM Light	–	–	73-89	76-276	156-191	164-593
2048 QAM	–	–	–	–	166-203	175-633
<b>Modulation</b>	<b>25 MHz</b>		<b>30 MHz</b>		<b>40 MHz</b>	
QPSK	35-43	37-135	43-52	45-162	58-71	61-220
8 PSK	53-65	56-202	62-76	65-236	86-105	90-328
16 QAM	72-88	76-275	87-107	92-332	117-143	123-446
32 QAM	95-117	100-363	115-140	121-437	154-189	162-588
64 QAM	117-143	123-446	141-173	149-538	190-232	199-722
128 QAM	141-173	148-538	170-208	179-648	229-280	241-873
256 QAM	161-197	169-613	196-239	206-745	247-302	259-939
512 QAM	178-217	187-677	209-255	219-794	270-330	284-1000
1024 QAM Strong	189-231	198-719	228-278	239-866	306-375	322-1000
1024 QAM Light	201-245	211-763	241-295	253-917	325-398	342-1000
2048 QAM	215-263	226-819	263-321	276-1000	352-430	370-1000
	Capacity (Mbps)	Capacity De-Dup	Capacity (Mbps)	Capacity De-Dup	Capacity (Mbps)	Capacity De-Dup
<b>Modulation</b>	<b>50 MHz</b>		<b>60 MHz</b>		<b>80 MHz</b>	
QPSK	70-86	74-267	87-106	91-331	114-140	120-435
8 PSK	109-133	114-415	127-155	133-482	162-198	170-618
16 QAM	148-181	155-563	176-215	185-670	231-283	243-880
32 QAM	186-227	195-707	232-283	243-881	304-371	319-1000
64 QAM	240-293	252-913	284-348	299-1000	371-454	390-1000
128 QAM	280-342	294-1000	344-420	361-1000	439-536	461-1000
256 QAM	332-406	348-1000	397-485	416-1000	505-618	531-1000
512 QAM	360-440	378-1000	427-521	448-1000	555-679	583-1000
1024 QAM Strong	392-479	411-1000	464-567	487-1000	604-738	634-1000
1024 QAM Light	416-509	437-1000	493-602	517-1000	641-784	673-1000
2048 QAM	449-548	471-1000	534-653	561-1000	679-829	713-1000



## Transmit Power

Transmit Power (dBm)	4-5GHz	6GHz	7GHz	8GHz	11GHz
QPSK	35	37	37	36	34
8 QAM	35	37	37	36	34
16 QAM	35	36	36	35	33
32 QAM	35	36	36	35	33
64 QAM	35	35	35	34	32
128 QAM	32	34	34	33	32
256 QAM	32	33	32	32	31
512 QAM	31	33	32	32	31
1024 QAM	30	31	30	30	30
2048 QAM	30	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	1.3 dB	0.7 dB

## Receiver Threshold (RSL) (dBm @ BER = 10<sup>-6</sup>)

Frequency (GHz)	6	7	8	10	11
5 MHz					
QPSK	-98.0	-97.5	-97.5	-97.0	-98.0
8 QAM	-	-	-	-	-
16 QAM	-91.5	-90.5	-90.5	-90.5	-91.0
32 QAM	-88.0	-87.0	-87.0	-87.0	-87.5
64 QAM	-84.5	-84.0	-84.0	-83.5	-84.5
128 QAM	-81.0	-80.5	-80.5	-80.0	-81.0
256 QAM	-78.0	-77.0	-77.0	-77.0	-78.0
512 QAM	-	-	-	-	-
1024 QAM Strong	-	-	-	-	-
1024 QAM Light	-	-	-	-	-

Frequency (GHz)	6	7	8	10	11
10 MHz					
QPSK	-93.5	-93.0	-93.0	-92.5	-93.5
8 QAM	-88.5	-87.5	-87.5	-87.5	-88.5
16 QAM	-87.0	-86.5	-86.5	-86.0	-87.0
32 QAM	-83.5	-83.0	-83.0	-82.5	-83.5
64 QAM	-80.5	-80.0	-80.0	-79.5	-80.5
128 QAM	-77.0	-76.5	-76.5	-76.0	-77.0
256 QAM	-74.0	-73.5	-73.5	-73.0	-74.0
512 QAM	-71.5	-71.0	-71.0	-70.5	-71.5
1024 QAM	-68.5	-68.0	-68.0	-67.5	-68.5
1024 QAM Light	-68.0	-67.0	-67.0	-67.0	-68.0

Frequency (GHz)	6	7	8	10	11
20 MHz					
QPSK	-90.5	-90.0	-90.0	-89.5	-90.5
8 QAM	-85.5	-85.0	-85.0	-84.5	-85.5
16 QAM	-84.0	-83.5	-83.5	-83.0	-84.0
32 QAM	-80.5	-80.0	-80.0	-79.5	-80.5
64 QAM	-77.5	-76.5	-76.5	-76.5	-77.5
128 QAM	-74.5	-73.5	-73.5	-73.5	-74.5
256 QAM	-71.5	-71.0	-71.0	-70.5	-71.5
512 QAM	-69.0	-68.0	-68.0	-68.0	-69.0
1024 QAM Strong	-66.0	-65.0	-65.0	-65.0	-66.0
1024 QAM Light	-65.0	-64.5	-64.5	-64.0	-65.0
2048 QAM	-61.5	-61.0	-61.0	-60.5	-61.5

Frequency (GHz)	6	7	8	10	11
25 MHz					
QPSK	-89.0	-88.0	-88.0	-88.0	-88.5
8 QAM	-84.0	-83.5	-83.5	-83.0	-84.0
16 QAM	-82.0	-81.5	-81.5	-81.0	-82.0
32 QAM	-79.0	-78.5	-78.5	-78.0	-79.0
64 QAM	-76.0	-75.5	-75.5	-75.0	-76.0
128 QAM	-73.0	-72.5	-72.5	-72.0	-73.0
256 QAM	-70.0	-69.0	-69.0	-69.0	-70.0
512 QAM	-67.5	-66.5	-66.5	-66.5	-67.5
1024 QAM	-64.5	-64.0	-64.0	-63.5	-64.5
1024 QAM Light	-64.0	-63.0	-63.0	-63.0	-64.0
2048 QAM	-60.0	-59.5	-59.5	-59.0	-60.0



Frequency (GHz)	6	7	8	10	11
<b>30 MHz</b>					
QPSK	-89.0	-88.5	-88.5	-88.0	-89.0
8 QAM	-84.0	-83.0	-83.0	-83.0	-84.0
16 QAM	-82.5	-81.5	-81.5	-81.5	-82.0
32 QAM	-78.5	-78.0	-78.0	-77.5	-78.5
64 QAM	-76.0	-75.0	-75.0	-75.0	-75.5
128 QAM	-72.5	-72.0	-72.0	-71.5	-72.5
256 QAM	-69.5	-69.0	-69.0	-68.5	-69.5
512 QAM	-67.5	-67.0	-67.0	-66.5	-67.5
1024 QAM Strong	-64.5	-63.5	-63.5	-63.5	-64.0
1024 QAM Light	-63.5	-62.5	-62.5	-62.5	-63.5
2048 QAM	-59.5	-59.0	-59.0	-58.5	-59.5

Frequency (GHz)	6	7	8	10	11
<b>40 MHz</b>					
QPSK	-87.5	-87.0	-87.0	-86.5	-87.5
8 QAM	-82.5	-82.0	-82.0	-81.5	-82.5
16 QAM	-81.0	-80.5	-80.5	-80.0	-81.0
32 QAM	-77.5	-76.5	-76.5	-76.5	-77.0
64 QAM	-74.5	-73.5	-73.5	-73.5	-74.5
128 QAM	-71.5	-70.5	-70.5	-70.5	-71.5
256 QAM	-68.5	-67.5	-67.5	-67.5	-68.0
512 QAM	-65.5	-65.0	-65.0	-64.5	-65.5
1024 QAM	-63.0	-62.5	-62.5	-62.0	-63.0
1024 QAM Light	-62.0	-61.5	-61.5	-61.0	-62.0
2048 QAM	-59.5	-58.5	-58.5	-58.5	-59.5

Frequency (GHz)	6	7	8	10	11
<b>50 MHz</b>					
QPSK	-87.0	-86.0	-86.0	-86.0	-86.5
8 QAM	-81.5	-81.0	-81.0	-80.5	-81.5
16 QAM	-80.0	-79.0	-79.0	-79.0	-79.5
32 QAM	-76.0	-75.5	-75.5	-75.0	-76.0
64 QAM	-73.0	-72.0	-72.0	-72.0	-73.0
128 QAM	-70.0	-69.5	-69.5	-69.0	-70.0
256 QAM	-67.5	-66.5	-66.5	-66.5	-67.5
512 QAM	-65.0	-64.5	-64.5	-64.0	-65.0
1024 QAM Strong	-61.5	-61.0	-61.0	-60.5	-61.5
1024 QAM Light	-60.5	-59.5	-59.5	-59.5	-60.5
2048 QAM	-58.5	-57.5	-57.5	-57.5	-58.0

Frequency (GHz)	6	7	8	10	11
<b>60 MHz</b>					
QPSK	-86.5	-85.5	-85.5	-85.0	-86.0
8 QAM	-82.0	-80.5	-80.5	-80.5	-81.0
16 QAM	-79.5	-78.5	-78.5	-78.0	-79.0
32 QAM	-76.0	-74.5	-74.5	-74.5	-75.0
64 QAM	-73.0	-71.5	-71.5	-71.0	-72.0
128 QAM	-70.5	-68.5	-68.5	-68.5	-69.0
256 QAM	-67.0	-65.5	-65.5	-65.0	-66.0
512 QAM	-65.0	-63.5	-63.5	-63.0	-64.0
1024 QAM	-61.5	-60.0	-60.0	-59.5	-60.5
1024 QAM Light	-60.5	-59.0	-59.0	-58.5	-59.5
2048 QAM	-58.0	-56.0	-56.0	-56.0	-56.5

Frequency (GHz)	6	7	8	10	11
<b>80 MHz</b>					
QPSK	-84.0	-83.5	-83.5	-83.0	-84.0
8 QAM	-80.0	-79.5	-79.5	-79.0	-80.0
16 QAM	-77.5	-77.0	-77.0	-76.5	-77.5
32 QAM	-74.5	-73.5	-73.5	-73.5	-74.0
64 QAM	-71.0	-70.5	-70.5	-70.0	-71.0
128 QAM	-68.5	-67.5	-67.5	-67.5	-68.0
256 QAM	-65.0	-64.5	-64.5	-64.0	-65.0
512 QAM	-63.0	-62.5	-62.5	-62.0	-63.0
1024 QAM Strong	-59.5	-59.0	-59.0	-58.5	-59.5
1024 QAM Light	-58.5	-58.0	-58.0	-57.5	-58.5
2048 QAM	-54.0	-53.5	-53.5	-53.0	-54.0

