

Integra-X

Dual Transceiver XPIC Capable Full-Outdoor Radio

Features

- Up to 2.2 Gbps capacity in each direction, uncompressed
- Two transceivers and modem chains
- Full XPIC solution in a single radio
- Up to 112 MHz channel on each transceiver
- 4QAM to 4096QAM modulations
- High radio performance due to the Adaptive Digital Pre-Distortion (ADPD) algorithm
- Built-in OMT to provide both carriers on single antenna interface
- SAF2 antenna interface compatible with other Integra series products
- 10 Gbps SFP+ Ethernet interfaces



Technical specification

		Integra-X
General		
Concept / form factor	FODU with direct-mount antenna	
Frequency band	6, 11 and 18 GHz. All licensed bands up to 38 GHz*	
Duplex spacing	Any applicable	
Frequency stability	± 10 ppm	
Capacity	Up to 2.2 Gbps at 2x 112 MHz 4096QAM	
Max modulation	4096QAM	
Configurations	1+0, 2+0 XPIC	
ATPC	No*	
ACM	Adaptive Code Modulation, Hitless	
Channel bandwidth	5 to 112 MHz	
Ports		
Ethernet	2 x SFP+	For Fiber Optics up to 10 Gbps (1, 2.5 and 10 Gbps speed supported)
	1 x RJ-45	Gigabit Ethernet (auto 10/100/1000 Mbps) electrical port with built-in PoE splitter and surge arrestor
Power	DC port	Screw type terminal block, pluggable, 2 pin, centerline 5.08mm / 0.2 inches
Service ports	3.5 mm	Audible alignment and RSSI
	USB B	RS232 serial over USB B-Type
	LED	Power On, RSL
Antenna	SAF2	Circular waveguide flange
Ethernet		
Ethernet	Built-in Carrier Ethernet 10 Gigabit Switch with 50 Gbps switching capacity	
Gigabit Switch functionality	802.1Q VLANs with QoS/CoS incl. WRED*, shaping, DWRR and on MPLS-TP exp. bit; <i>Spanning Tree Protocol*</i> , Jumbo frames, and <i>more*</i>	
Synchronization	SyncE, <i>IEEE 1588v2 PTP*</i>	
Carrier Ethernet functionality	Provider Bridging, MEF9&14, <i>OAM*</i>	
Jumbo frames	Yes, 12288 bytes	
Encryption	-	
Management	SNMP v1/2c/3, SSH, Telnet, HTTPS, Serial, RADIUS, Network Time Protocol In-band Management over the same ETH port. Out-band Management is configurable using VLANs.	
Performance monitoring	Performance graphs, constellation diagram, alarms, detailed counters	
Electrical		
Power consumption	Up to 100 W depending on frequency band and operating mode, see table below.	
Voltage range	36...57 V DC	
Temperature range	-33...+55 °C / -28...+130 °F	
* Inquire SAF representative for more information		

Mechanical specification

Mechanical & Environmental	
Stationary use	Conforms to ETSI EN 300 019 Class 4.1, IP66, NEMA 4X
Size	280 x 437 x 100 mm / 11.02" x 17.2" x 3.9"
Weight	Up to 8.5 kg / 18.7 lbs
Mount	Mount on antenna
Antenna	External antenna, direct-mount with SAF2 adaptation

* Inquire SAF representative for more information

Power consumption and rated current at 36 – 57 V DC

Frequency band	6 GHz	11 GHz	18 GHz
Power [W] @ 36–57V DC	100	95	85
Current [A] @ 36 V DC	2.8	2.6	2.4
Current [A] @ 48 V DC	2.1	2.0	1.8
Current [A] @ 57 V DC	1.8	1.7	1.5

Maximum Tx Power [dBm] for Integra-X

Modulation	6 GHz**	11 GHz	18 GHz	18 GHz HP**
4 QAM	+31	+31	+24	+31
16 QAM	+30	+30	+23	+30
32 QAM	+30	+30	+23	+30
64 QAM	+29	+29	+22	+29
128 QAM	+29	+29	+22	+29
256 QAM	+28	+28	+21	+28
512 QAM	+28	+28	+21	+28
1024 QAM	+27	+27	+20	+27
2048 QAM	+26	+26	+19	+26
4096 QAM	+26	+26	+19	+26
4096 QAM Weak FEC	+26	+26	+19	+26

** Preliminary data

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RSL Thresholds and Capacity for Integra-X

BW, MHz	Modulation	Guaranteed RSL Threshold, dBm			Capacity, Mbps	
		6 GHz**	11 GHz	18 GHz	Single Channel Mode	XPIC Mode
5** FCC	4QAM StrongFEC	-94	-94	-93.5	6	12
	16QAM StrongFEC	-89	-89	-88	12	24
	32QAM StrongFEC	-86	-86	-84.5	15	30
	64QAM StrongFEC	-84	-84	-83.5	20	40
	128QAM StrongFEC	-81	-81	-79.5	25	50
	256QAM StrongFEC	-79	-79	-77.5	29	58
	512QAM StrongFEC	-76	-76	-74.5	33	66
	1024QAM StrongFEC	-72	-72	-71.5	37	74
	2048QAM StrongFEC	-69	-69	-68	41	82
	4096QAM StrongFEC	-65	-65	-64	45	90
4096QAM WeakFEC	-62	-62	-62	49	94	
7 ETSI	4QAM StrongFEC	-97	-97	-91	10	20
	16QAM StrongFEC	-86.5	-86.5	-86.5	17	34
	32QAM StrongFEC	-83	-83	-83	22	44
	64QAM StrongFEC	-80	-80	-80	29	58
	128QAM StrongFEC	-77	-77	-77	35	70
	256QAM StrongFEC	-74	-74	-74	41	82
	512QAM StrongFEC	-71	-71	-71	47	94
	1024QAM StrongFEC	-67.5	-67.5	-67.5	52	104
	2048QAM StrongFEC	-64	-64	-64	58	116
	4096QAM StrongFEC	-60	-60	-60	63	126
4096QAM WeakFEC	-57.5	-57.5	-57.5	65	130	
10 FCC	4QAM StrongFEC	-93	-93	-89.5	14	28
	16QAM StrongFEC	-88	-88	-85.5	25	50
	32QAM StrongFEC	-84.5	-84.5	-81.5	31	62
	64QAM StrongFEC	-82	-82	-79.5	41	82
	128QAM StrongFEC	-79	-79	-75.5	50	98
	256QAM StrongFEC	-76	-76	-73	58	116
	512QAM StrongFEC	-72.5	-72.5	-70.5	66	132
	1024QAM StrongFEC	-70	-70	-66.5	74	148
	2048QAM StrongFEC	-66.5	-66.5	-63.5	82	162
	4096QAM StrongFEC	-62.5	-62.5	-59.5	89	176
4096QAM WeakFEC	-60.5	-60.5	-57.5	93	186	
14 ETSI	4QAM StrongFEC	-88.5	-88.5	-88.5	20	40
	16QAM StrongFEC	-83.5	-83.5	-83.5	34	68
	32QAM StrongFEC	-80.5	-80.5	-80.5	43	86
	64QAM StrongFEC	-77.5	-77.5	-77.5	58	116
	128QAM StrongFEC	-74.5	-74.5	-74.5	69	138
	256QAM StrongFEC	-71.5	-71.5	-71.5	81	162
	512QAM StrongFEC	-67.5	-67.5	-67.5	92	184
	1024QAM StrongFEC	-65.5	-65.5	-65.5	104	208
	2048QAM StrongFEC	-61.5	-61.5	-61.5	115	230
	4096QAM StrongFEC	-58	-58	-58	125	250
4096QAM WeakFEC	-56	-56	-56	131	262	
20 FCC	4QAM StrongFEC	-88.5	-88.5	-86.5	29	58
	16QAM StrongFEC	-84	-84	-82.5	50	100
	32QAM StrongFEC	-80.5	-80.5	-78.5	62	124
	64QAM StrongFEC	-78	-78	-75.5	83	166
	128QAM StrongFEC	-75	-75	-73.5	100	200
	256QAM StrongFEC	-72	-72	-70	117	234
	512QAM StrongFEC	-69	-69	-66.5	133	266
	1024QAM StrongFEC	-66	-66	-63.5	150	300
	2048QAM StrongFEC	-62.5	-62.5	-60.5	166	322
	4096QAM StrongFEC	-59	-59	-56.5	181	362
4096QAM WeakFEC	-56.5	-56.5	-54	190	380	
20 ETSI	4QAM StrongFEC	-88.5	-88.5	-87	30	60
	16QAM StrongFEC	-84	-84	-83	51	102
	32QAM StrongFEC	-81	-81	-79.5	64	128
	64QAM StrongFEC	-78	-78	-77	85	170
	128QAM StrongFEC	-75	-75	-74.5	102	204
	256QAM StrongFEC	-72	-72	-71.5	119	238
	512QAM StrongFEC	-69	-69	-69	136	272
	1024QAM StrongFEC	-66	-66	-65	154	308
	2048QAM StrongFEC	-62.5	-62.5	-62	170	340
	4096QAM StrongFEC	-59	-59	-58.5	186	372
4096QAM WeakFEC	-57	-57	-56.5	194	388	

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BW, MHz	Modulation	Guaranteed RSL Threshold, dBm			Capacity, Mbps	
		6 GHz**	11 GHz	18 GHz	Single Channel Mode	XPIC Mode
25 FCC	4QAM StrongFEC	-89	-89	-85.5	37	74
	16QAM StrongFEC	-84.5	-84.5	-81.5	63	126
	32QAM StrongFEC	-81	-81	-77.5	79	158
	64QAM StrongFEC	-78.5	-78.5	-74.5	105	210
	128QAM StrongFEC	-75.5	-75.5	-72.5	126	252
	256QAM StrongFEC	-72	-72	-69	147	294
	512QAM StrongFEC	-69	-69	-65.5	168	336
	1024QAM StrongFEC	-66	-66	-62.5	189	378
	2048QAM StrongFEC	-62.5	-62.5	-59.5	209	418
	4096QAM StrongFEC	-59.5	-59.5	-55.5	229	458
4096QAM WeakFEC	-57.5	-57.5	-53.5	239	478	
28 ETSI	4QAM StrongFEC	-88.5	-88.5	-85.5	40	80
	16QAM StrongFEC	-84	-84	-81	69	138
	32QAM StrongFEC	-81	-81	-77.5	87	174
	64QAM StrongFEC	-78	-78	-74.5	116	232
	128QAM StrongFEC	-75	-75	-71.5	139	278
	256QAM StrongFEC	-72	-72	-68.5	162	324
	512QAM StrongFEC	-68.5	-68.5	-65.5	185	370
	1024QAM StrongFEC	-65.5	-65.5	-62.5	208	416
	2048QAM StrongFEC	-62.5	-62.5	-58.5	230	460
	4096QAM StrongFEC	-59	-59	-55	250	500
4096QAM WeakFEC	-57.5	-57.5	-53	262	524	
30 FCC	4QAM StrongFEC	-88.5	-88.5	-84.5	43	86
	16QAM StrongFEC	-84	-84	-80.5	75.3	150
	32QAM StrongFEC	-80.5	-80.5	-76.5	94	188
	64QAM StrongFEC	-77.5	-77.5	-74.5	125	250
	128QAM StrongFEC	-74.5	-74.5	-71.5	150	300
	256QAM StrongFEC	-71.5	-71.5	-68.5	175	350
	512QAM StrongFEC	-68.5	-68.5	-65	200	400
	1024QAM StrongFEC	-65.5	-65.5	-61.5	225	450
	2048QAM StrongFEC	-62.5	-62.5	-58.5	248	496
	4096QAM StrongFEC	-59	-59	-54.5	272	544
4096QAM WeakFEC	-57	-57	-52.5	284	568	
40 FCC	4QAM StrongFEC	-85.5	-85.5	-83.5	60	120
	16QAM StrongFEC	-81	-81	-79.5	103	206
	32QAM StrongFEC	-78	-78	-75.5	129	258
	64QAM StrongFEC	-75	-75	-73	172	344
	128QAM StrongFEC	-72	-72	-70	206	412
	256QAM StrongFEC	-69	-69	-66.5	241	482
	512QAM StrongFEC	-66	-66	-63.5	275	550
	1024QAM StrongFEC	-63	-63	-60.5	310	620
	2048QAM StrongFEC	-60	-60	-57	342	684
	4096QAM StrongFEC	-56	-56	-53.5	374	748
4096QAM WeakFEC	-54.5	-54.5	-50.5	391	782	
40 ETSI	4QAM StrongFEC	-86	-86	-84.5	58	116
	16QAM StrongFEC	-81.5	-81.5	-80.5	100	200
	32QAM StrongFEC	-78	-78	-77	125	250
	64QAM StrongFEC	-75.5	-75.5	-74	167	334
	128QAM StrongFEC	-72	-72	-71.5	201	402
	256QAM StrongFEC	-69	-69	-68	234	468
	512QAM StrongFEC	-66.5	-66.5	-65.5	267	534
	1024QAM StrongFEC	-63	-63	-62	301	602
	2048QAM StrongFEC	-59.5	-59.5	-59	332	664
	4096QAM StrongFEC	-56	-56	-55.5	363	726
4096QAM WeakFEC	-55	-55	-53.5	380	760	
50 FCC	4QAM StrongFEC	-84.5	-84.5	-82.5	75	150
	16QAM StrongFEC	-81	-81	-78	129	258
	32QAM StrongFEC	-77	-77	-74	162	324
	64QAM StrongFEC	-74.5	-74.5	-72	216	432
	128QAM StrongFEC	-71.5	-71.5	-68.5	259	518
	256QAM StrongFEC	-68.5	-68.5	-65.5	302	604
	512QAM StrongFEC	-65.5	-65.5	-62.5	345	690
	1024QAM StrongFEC	-62	-62	-58.5	388	776
	2048QAM StrongFEC	-59	-59	-56	429	858
	4096QAM StrongFEC	-55.5	-55.5	-52	469	938
4096QAM WeakFEC	-54	-54	-50.5	491	982	

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RSL Thresholds and Capacity for Integra-X

BW, MHz	Modulation	Guaranteed RSL Threshold, dBm			Capacity, Mbps	
		6 GHz**	11 GHz	18 GHz	Single Channel Mode	XPIC Mode
56 ETSI	4QAM StrongFEC	-84	-84	-82	85	170
	16QAM StrongFEC	-80	-80	-77.5	145	290
	32QAM StrongFEC	-76.5	-76.5	-74	182	364
	64QAM StrongFEC	-73.5	-73.5	-71.5	242	484
	128QAM StrongFEC	-71	-71	-68.5	291	582
	256QAM StrongFEC	-67.5	-67.5	-65	339	678
	512QAM StrongFEC	-64.5	-64.5	-62	388	776
	1024QAM StrongFEC	-61.5	-61.5	-58	436	872
	2048QAM StrongFEC	-58	-58	-55.5	482	964
	4096QAM StrongFEC	-54.5	-54.5	-51.5	527	1054
4096QAM WeakFEC	-53	-53	-49.5	551	1102	
60 FCC	4QAM StrongFEC	-84.5	-84.5	-81.5	88	176
	16QAM StrongFEC	-80.5	-80.5	-77.5	151	302
	32QAM StrongFEC	-76.5	-76.5	-73.5	189	378
	64QAM StrongFEC	-73.5	-73.5	-71.5	252	504
	128QAM StrongFEC	-71	-71	-68.5	302	604
	256QAM StrongFEC	-67.5	-67.5	-65	353	706
	512QAM StrongFEC	-64.5	-64.5	-62	403	806
	1024QAM StrongFEC	-61.5	-61.5	-58.5	454	908
	2048QAM StrongFEC	-58	-58	-55.5	501	1002
	4096QAM StrongFEC	-54.5	-54.5	-51.5	548	1096
4096QAM WeakFEC	-53	-53	-49.5	573	1146	
60 ETSI	4QAM StrongFEC	-84	-84	-83	85	170
	16QAM StrongFEC	-80	-80	-79	145	290
	32QAM StrongFEC	-76.5	-76.5	-75.5	182	364
	64QAM StrongFEC	-73.5	-73.5	-72.5	242	484
	128QAM StrongFEC	-70.5	-70.5	-69.5	291	582
	256QAM StrongFEC	-67.5	-67.5	-66.5	338	678
	512QAM StrongFEC	-64.5	-64.5	-63.5	388	776
	1024QAM StrongFEC	-61	-61	-60.5	436	872
	2048QAM StrongFEC	-58	-58	-57	482	964
	4096QAM StrongFEC	-54.5	-54.5	-53.5	527	1054
4096QAM WeakFEC	-53	-53	-52	551	1102	
80 FCC	4QAM StrongFEC	-83	-83	-80.5	118	236
	16QAM StrongFEC	-78.5	-78.5	-76.5	203	406
	32QAM StrongFEC	-75	-75	-72.5	254	508
	64QAM StrongFEC	-72	-72	-69.5	338	676
	128QAM StrongFEC	-69.5	-69.5	-66.5	406	812
	256QAM StrongFEC	-66	-66	-63.5	473	946
	512QAM StrongFEC	-63	-63	-60.5	541	1082
	1024QAM StrongFEC	-60	-60	-57.5	608	1216
	2048QAM StrongFEC	-56.5	-56.5	-54.5	672	1344
	4096QAM StrongFEC	-53	-53	-50.5	735	1470
4096QAM WeakFEC	-51.5	-51.5	-48.5	769	1538	
100 FCC	4QAM StrongFEC	-82	-82	-79.5	148	296
	16QAM StrongFEC	-77.5	-77.5	-75.5	254	508
	32QAM StrongFEC	-73.5	-73.5	-71.5	318	636
	64QAM StrongFEC	-71	-71	-68.5	423	846
	128QAM StrongFEC	-68	-68	-65.5	508	1016
	256QAM StrongFEC	-65	-65	-62.5	592	1184
	512QAM StrongFEC	-62	-62	-59.5	677	1354
	1024QAM StrongFEC	-58.5	-58.5	-56.5	761	1522
	2048QAM StrongFEC	-55.5	-55.5	-53.5	841	1682
	4096QAM StrongFEC	-52	-52	-49.5	920	1840
4096QAM WeakFEC	-50.5	-50.5	-47.5	962	1924	
112 ETSI	4QAM StrongFEC	-81.5	-81.5	-78.5	170	340
	16QAM StrongFEC	-77	-77	-74.5	291	582
	32QAM StrongFEC	-73	-73	-71.5	364	728
	64QAM StrongFEC	-70.5	-70.5	-68.5	486	972
	128QAM StrongFEC	-67.5	-67.5	-64.5	583	1166
	256QAM StrongFEC	-64.5	-64.5	-61.5	680	1360
	512QAM StrongFEC	-61	-61	-58.5	777	1554
	1024QAM StrongFEC	-58	-58	-55.5	874	1748
	2048QAM StrongFEC	-55	-55	-52.5	965	1930
	4096QAM StrongFEC	-51.5	-51.5	-48.5	1055	2110
4096QAM WeakFEC	-50	-50	-46.5	1104	2208	

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