

# 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 on all frequencies, compatible with other Integra products in 15 ... 38 GHz bands
- 10 Gbps SFP+ Ethernet interfaces



## Technical specification

		Integra-X
<b>General</b>		
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, 2+0 ACAP*	
ATPC	No*	
ACM	Adaptive Code Modulation, Hitless	
Channel bandwidth	5 to 112 MHz	
<b>Ports</b>		
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
<b>Ethernet</b>		
Ethernet	Built-in Carrier Ethernet 10 Gigabit Switch with 50 Gbps switching capacity	
VLAN	802.1Q 4096 VLANs, QinQ (Double Tagging)*	
Quality of Service	8 level 802.1p*, 64 level DiffServ (DSCP)*, CoS*	
Spanning Tree Prot.	802.1d-1998 STP*, 802.1d-2004 RSTP*	
LSP	Link State Propagation with Backup path switching*	
Synchronization	SyncE	
Jumbo frames	Yes, 12288 bytes	
Encryption	No*	
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	
<b>Electrical</b>		
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

\*\* The stable operation of 4096 QAM modulation, both weak and strong FEC, is guaranteed only in fixed modulation mode, without ACM. The operation of 4096 QAM in ACM mode may result in switching down to the 2048QAM often, for hitless transmission to be ensured.

**SAF Tehnika JSC contacts:** Telephone: +371 67046840; Fax: +371 67046809  
e-mail: [info@saftehnika.com](mailto:info@saftehnika.com) ; [www.saftehnika.com](http://www.saftehnika.com)  
24a Ganību Dambis, Rīga LV-1005, Latvia



## 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

## 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
4 QAM	+31	+31	+31
16 QAM	+30	+30	+30
32 QAM	+30	+30	+30
64 QAM	+29	+29	+29
128 QAM	+29	+29	+29
256 QAM	+28	+28	+28
512 QAM	+28	+28	+28
1024 QAM	+27	+27	+27
2048 QAM	+26	+26	+26
4096 QAM	+26	+26	+26
4096 QAM Weak FEC	+26	+26	+26

# 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	



# 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
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	

SAF Tehnika JSC contacts: Telephone: +371 67046840; Fax: +371 67046809  
 e-mail: [info@saftehnika.com](mailto:info@saftehnika.com) ; [www.saftehnika.com](http://www.saftehnika.com)  
 24a Ganību Dambis, Rīga LV-1005, Latvia

Integra-X datasheet, v1.07, January 2020. All data are subject to change without prior notice.



# 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	

\*\* Preliminary data

**SAF Tehnika JSC contacts:** Telephone: +371 67046840; Fax: +371 67046809  
 e-mail: [info@saftehnika.com](mailto:info@saftehnika.com) ; [www.saftehnika.com](http://www.saftehnika.com)  
 24a Ganību Dambis, Rīga LV-1005, Latvia



Integra-X datasheet, v1.07, January 2020. All data are subject to change without prior notice.