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 most frequencies, compatible with other Integra products in 15 … 38 GHz bands
- 10 Gbps SFP+ Ethernet interfaces

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Technical specification

		Integra-X
General		
Concept / form factor		FODU with direct-mount antenna
Frequency bands		4U, 5*, 6, 7, 8, 11, 13, 15, 18, 23, 26, 28, 30 and 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, 2+0 ACCP*, 1+1 SD (FD, HSB) modes w. one FODU
ATPC		Yes
ACM		Adaptive Code Modulation, Hitless. Variable Tx power mode supported.
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	RF ports	SAF2, circular waveguide flange 6 – 38 GHz. 2x N-female 4.5 (4U) and 5 GHz.
Ethernet		
Ethernet		Built-in Carrier Ethernet 10 Gigabit Switch with 50 Gbps switching capacity
VLAN		802.1Q 4096 VLANs, QinQ (Double Tagging), VLAN Rate
Quality of Service		8 level VLAN 802.1p, 64 level IPv4/6 DSCP, CoS, 8 level MPLS-TP exp bit, Port-based priority. Per port egress schedulers: SP, RR, WRR, DWRR.
Spanning Tree Prot.		802.1d-1998 STP, 802.1d-2004 RSTP
LSP		Link State Propagation with Backup path switching, each Ethernet port separately configurable.
Synchronization		SyncE
Carrier Ethernet		Header compression, Packet fragmentation
Jumbo frames		Yes, 12288 bytes
Encryption		AES256 not supported. Only available on new product version Integra-X2
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.
One-way latency		The best figure: 82 µs @ 4096QAM Weak FEC, 112MHz & 64B L2 frame
Perf. monitoring		Performance graphs, constellation diagram, alarms, detailed counters
Aggregation		L1 2+0 bonding. Proprietary L2 aggregation w. RTAG-7 based hashing*
Electrical		
Power consumption		Up to 105 W depending on frequency band and mode, see table below.
Voltage range		38...57 V DC
Surge protection		DC power port conforms to IEC EN 61000-4-5 Class 3, up to 2KV surge

** In development. Inquire SAF representative for more information*

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Mechanical specification

Mechanical & Environmental	
Stationary use	Conforms to ETSI EN 300 019 Class 4.1, IP66, NEMA 4X
Temperature range	-33...+55 °C / -28...+130 °F
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 6 - 38 GHz or on special bracket (4U and 5 GHz models).
Antenna	External antenna, direct-mount (slip-fit) with SAF2 adaptation, 6 – 38 GHz. Remote mount on special bracket, 4U and 5 GHz models.

Power consumption and rated current at 36 – 57 V DC

Frequency band	4U GHz		6, 7 and 8 GHz		11, 13 and 15 GHz		18, 23, 26, 28 and 30 GHz	
Mode	2+0	1+0	2+0	1+0	2+0	1+0	2+0	1+0
Power [W] @ 38–57V DC	105	90	100	85	95	80	85	70
Current [A] @ 38 V DC	2.8	2.4	2.8	2.3	2.6	2.1	2.4	1.9
Current [A] @ 48 V DC	2.2	1.9	2.1	1.8	2.0	1.7	1.8	1.5
Current [A] @ 57 V DC	1.9	1.6	1.8	1.5	1.7	1.4	1.5	1.3

Maximum Tx Power [dBm] for Integra-X

Modulation	4U GHz	6, 7, 8, 11 and 18 GHz	13 and 23 GHz	15 GHz	26 GHz	28 GHz, 30 GHz "A" band	30 GHz "B" band
4 QAM	+35	+31	+29	+32	+26	+24	+23
16 QAM	+34	+30	+28	+31	+25	+23	+22
32 QAM	+34	+30	+28	+31	+25	+23	+22
64 QAM	+33	+29	+27	+30	+24	+22	+21
128 QAM	+33	+29	+27	+30	+24	+22	+21
256 QAM	+32	+28	+26	+29	+23	+21	+20
512 QAM	+32	+28	+26	+29	+23	+21	+20
1024 QAM	+31	+27	+25	+28	+22	+20	+19
2048 QAM	+30	+26	+24	+27	+21	+19	+18
4096 QAM	+30	+26	+24	+27	+21	+19	+18
4096 QAM Weak FEC	+30	+26	+24	+27	+21	+19	+18

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RSL Thresholds and Capacity for Integra-X

		Guaranteed RSL Threshold, dBm												Capacity, Mbps	
BW, MHz	Modulation, FEC	4U GHz	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz**	26 GHz	28 GHz	30 GHz	Single Channel Mode	2+0 XPIC Mode
5 FCC	4QAM Strong	-95.5	-95	-95.5	-96.5	-95.5	-94.5	-95	-93.5	-94	-94	-94.5	-96	7	14
	16QAM Strong	-90.5	-90.5	-91.5	-92	-92.5	-90.5	-89.5	-88	-91	-90	-88	-91	12	24
	32QAM Strong	-87.5	-87	-87.5	-88	-88.5	-87.5	-86.5	-84.5	-87	-86	-86	-87	15	30
	64QAM Strong	-84.5	-84	-84.5	-85	-85	-84.5	-84	-83.5	-83	-83	-83	-84	20	40
	128QAM Strong	-81.5	-82	-81.5	-82	-82	-81.5	-80.5	-79.5	-80.5	-80	-80	-81	24	48
	256QAM Strong	-77.5	-78.5	-78	-79	-79	-77.5	-77.5	-77.5	-76.5	-77	-77	-78	28	56
	512QAM Strong	-74.5	-74	-76	-76	-76	-75.5	-73.5	-74.5	-72.5	-73	-73.5	-76	32	64
	1024QAM Strong	-70.5	-72.5	-72	-73	-73	-71.5	-71	-71.5	-70	-70	-70	-72	36	72
	2048QAM Strong	-67.5	-68	-69	-69	-69.5	-68.5	-67.5	-68	-65	-66	-66	-69	39	78
	4096QAM Strong	-62.5	-65	-65	-66	-65	-64.5	-63	-64	-	-61	-60.5	-64	43	86
	4096QAM Weak	-59.5	-63	-63	-64	-64	-62.5	-60	-62	-	-57	-56.5	-60	45	90
7 ETSI	4QAM Strong	-93.5	-93.5	-94	-95	-93	-93.5	-93	-91	-92	-93	-93	-94	10	20
	16QAM Strong	-89.5	-89.5	-89.5	-90	-89	-87.5	-87.5	-86.5	-89	-85	-86	-88	17	34
	32QAM Strong	-85.5	-85.5	-86.5	-86	-85.5	-84.5	-84.5	-83	-85	-84	-85	-86	22	44
	64QAM Strong	-82.5	-82.5	-83.5	-83	-82.5	-81.5	-82	-80	-82	-81	-81	-82	29	58
	128QAM Strong	-79.5	-80.5	-80.5	-80	-79.5	-78.5	-78.5	-77	-78.5	-78	-78	-79	35	70
	256QAM Strong	-76.5	-77.5	-76.5	-77	-76.5	-75.5	-75	-74	-75	-75	-75	-76	41	82
	512QAM Strong	-72.5	-73	-74.5	-74	-73.5	-72.5	-72	-71	-72	-71	-72	-74	47	94
	1024QAM Strong	-69.5	-71	-70.5	-70.5	-71	-69.5	-69	-67.5	-69	-68	-69	-70	52	104
	2048QAM Strong	-66.5	-67	-67.5	-68	-67.5	-66.5	-65.5	-64	-65	-64	-65	-66	58	116
	4096QAM Strong	-62.5	-63.5	-63.5	-64	-63.5	-62.5	-62	-60	-	-60	-61	-62	63	126
	4096QAM Weak	-60.5	-61.5	-61.5	-62	-61.5	-60.5	-59	-57.5	-	-57	-58	-59	65	130
10 FCC	4QAM Strong	-91.5	-91.5	-92.5	-93.5	-92	-92.5	-91	-89.5	-90	-91	-90.5	-93	14	28
	16QAM Strong	-87.5	-87.5	-88.5	-88	-88	-86.5	-86.5	-85.5	-87	-86	-86.5	-88	25	50
	32QAM Strong	-83.5	-84.5	-84.5	-84.5	-85	-83.5	-82.5	-81.5	-83	-83	-82.5	-85	31	62
	64QAM Strong	-81.5	-81.5	-82.5	-82	-82	-80.5	-80	-79.5	-81	-80	-80	-82	41	82
	128QAM Strong	-77.5	-78.5	-79.5	-79	-78.5	-77.5	-76.5	-75.5	-77.5	-77	-76.5	-78	50	98
	256QAM Strong	-74.5	-75	-75.5	-75.5	-75.5	-74.5	-73.5	-73	-73.5	-73	-73.5	-75	58	116
	512QAM Strong	-71.5	-71.5	-72.5	-72.5	-72.5	-71.5	-70.5	-70.5	-70.5	-70	-69.5	-72	66	132
	1024QAM Strong	-68.5	-69.5	-69.5	-69	-69	-68.5	-68	-66.5	-67	-67	-66.5	-69	74	148
	2048QAM Strong	-64.5	-65.5	-66.5	-66	-66	-64.5	-64	-63.5	-64	-63	-63.5	-65	82	162
	4096QAM Strong	-61.5	-62.5	-62.5	-63	-62	-60.5	-60	-59.5	-	-59	-58.5	-61	89	176
	4096QAM Weak	-59.5	-59.5	-60.5	-60	-60.5	-58.5	-57.5	-57.5	-	-56	-56.0	-58	93	186
14 ETSI	4QAM Strong	-90.5	-90.5	-91.5	-92.5	-90.5	-90.5	-89	-88.5	-89	-90	-90	-91	20	40
	16QAM Strong	-86.5	-86.5	-87.5	-87	-86	-85.5	-84.5	-83.5	-85	-85	-85	-86	34	68
	32QAM Strong	-82.5	-82.5	-83.5	-83	-82.5	-81.5	-81.5	-80.5	-80.5	-81	-82	-83	43	86
	64QAM Strong	-79.5	-79.5	-80.5	-80	-80	-78.5	-79	-77.5	-78	-79	-79	-79	58	116
	128QAM Strong	-76.5	-77.5	-77.5	-77	-77.5	-76.5	-75.5	-74.5	-76	-75	-76	-77	69	138
	256QAM Strong	-73.5	-74.5	-73.5	-74	-74	-72.5	-72	-71.5	-72.5	-72	-72	-73	81	162
	512QAM Strong	-69.5	-70.5	-71.5	-71	-71	-69.5	-69	-67.5	-68.5	-68	-69	-70	92	184
	1024QAM Strong	-66.5	-68.5	-68.5	-67.5	-67.5	-66.5	-67	-65.5	-65	-65	-66	-67	104	208
	2048QAM Strong	-63.5	-64.5	-64.5	-65	-64	-63.5	-62.5	-61.5	-61	-62	-63	-64	115	230
	4096QAM Strong	-59.5	-60.5	-61.5	-61	-60.5	-59.5	-59	-58	-56	-57	-60	-60	125	250
	4096QAM Weak	-58.5	-58.5	-59.5	-59	-58.5	-57.5	-56.5	-56	-52.5	-55	-56	-56	131	262
20 FCC	4QAM Strong	-88.5	-88.5	-89.5	-90.5	-89	-88.5	-88	-86.5	-87	-88	-88	-90	29	58
	16QAM Strong	-84.5	-84.5	-85.5	-85	-84.5	-83.5	-83.5	-82.5	-83	-83	-84	-84	50	100
	32QAM Strong	-80.5	-81.5	-81.5	-81.5	-81	-80.5	-79.5	-78.5	-78.5	-80	-80	-81	62	124
	64QAM Strong	-76.5	-78.5	-78.5	-78	-78	-77.5	-77	-75.5	-76	-77	-77	-77	83	166
	128QAM Strong	-74.5	-75.5	-76.5	-75.5	-75.5	-74.5	-73.5	-73.5	-73.5	-74	-74	-75	100	200
	256QAM Strong	-71.5	-72.5	-72	-72	-72	-70.5	-70.5	-70	-70.5	-70	-70.5	-72	117	234
	512QAM Strong	-68.5	-68.5	-69.5	-69	-69.5	-67.5	-67.5	-66.5	-66.5	-67	-67.5	-69	133	266
	1024QAM Strong	-65.5	-66.5	-65.5	-66	-66	-64.5	-65	-63.5	-63	-64	-64	-65	150	300
	2048QAM Strong	-61.5	-62.5	-63.5	-63	-63	-61.5	-60.5	-60.5	-59	-60	-60.5	-62	166	322
	4096QAM Strong	-58.5	-59.5	-59.5	-60	-59	-57.5	-58	-56.5	-54	-56	-56.5	-58	181	362
	4096QAM Weak	-56.5	-57.5	-57.5	-58	-57	-55.5	-55	-54	-51.5	-53	-54	-55	190	380
20 ETSI	4QAM Strong	-88.5	-88.5	-89.5	-90.5	-89	-88.5	-88	-86.5	-87	-88	-89	-90	30	60
	16QAM Strong	-84.5	-84.5	-85.5	-85	-84.5	-83.5	-83.5	-82.5	-83	-83	-84	-85	51	102
	32QAM Strong	-80.5	-81.5	-81.5	-81.5	-80.5	-80.5	-79.5	-78.5	-78.5	-80	-80	-81	64	128
	64QAM Strong	-76.5	-78.5	-78.5	-78	-78	-77.5	-77	-75.5	-76	-77	-77	-78	85	170
	128QAM Strong	-74.5	-75.5	-76.5	-75.5	-75	-74.5	-73.5	-73.5	-73.5	-74	-75	-76	102	204
	256QAM Strong	-71.5	-72.5	-72	-72	-72	-70.5	-70.5	-70	-70.5	-70	-71	-72	119	238
	512QAM Strong	-68.5	-68.5	-69.5	-69	-69	-67.5	-67.5	-66.5	-66.5	-67	-68	-69	136	272
	1024QAM Strong	-65.5	-66.5	-65.5	-66	-65.5	-64.5	-65	-63.5	-63	-64	-65	-67	154	308
	2048QAM Strong	-61.5	-62.5	-63.5	-63	-62.5	-61.5	-60.5	-60.5	-59	-60	-62	-63	170	340
	4096QAM Strong	-58.5	-59.5	-59.5	-60	-59	-57.5	-58	-56.5	-54	-56	-57.5	-59	186	372
	4096QAM Weak	-56.5	-57.5	-57.5	-58	-57	-55.5	-55	-54	-51.5	-53	-54	-54	194	388

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		Guaranteed RSL Threshold, dBm												Capacity, Mbps	
BW, MHz	Modulation, FEC	4U GHz	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz**	26 GHz	28 GHz	30 GHz	Single Channel Mode	2+0 XPIC Mode
25 FCC	4QAM Strong	-87.5	-86.5	-88.5	-89.5	-89	-87.5	-87	-85.5	-86	-87	-87	-88	37	74
	16QAM Strong	-83.5	-84	-84	-84	-84.5	-83.5	-82.5	-81.5	-82	-82	-83	-83	63	126
	32QAM Strong	-79.5	-80.5	-80.5	-80.5	-80.5	-79.5	-78.5	-77.5	-77.5	-79	-79	-80	79	158
	64QAM Strong	-77.5	-77.5	-77.5	-77	-78	-76.5	-76	-74.5	-75	-76	-76	-77	105	210
	128QAM Strong	-73.5	-74.5	-75	-75	-74.5	-73.5	-72.5	-72.5	-73.5	-72	-73	-74	126	252
	256QAM Strong	-70.5	-71.5	-71.5	-71	-71.5	-69.5	-69.5	-69	-70	-69	-70	-71	147	294
	512QAM Strong	-67.5	-68.5	-68.5	-68	-68.5	-67.5	-66.5	-65.5	-65.5	-66	-67	-68	168	336
	1024QAM Strong	-64.5	-65.5	-65	-65	-65	-63.5	-64	-62.5	-62	-62	-63	-64	189	378
	2048QAM Strong	-61.5	-61.5	-61.5	-62	-62	-60.5	-60	-59.5	-59	-59	-60	-61	209	418
	4096QAM Strong	-57.5	-58.5	-58.5	-59	-58.5	-56.5	-57	-55.5	-54	-55	-55.5	-56	229	458
	4096QAM Weak	-55.5	-56.5	-56	-57	-56.5	-54.5	-54	-53.5	-51.5	-53	-53	-53	239	478
28 ETSI	4QAM Strong	-87.5	-87.5	-88.5	-88.5	-88.5	-86.5	-87	-85.5	-84	-87	-86.5	-86	40.	80
	16QAM Strong	-82.5	-83.5	-83.5	-84	-84	-82.5	-81.5	-81	-82	-82	-82	-81	69	138
	32QAM Strong	-79.5	-79.5	-80.5	-80	-80	-78.5	-78.5	-77.5	-77.5	-78	-78.5	-78	87	174
	64QAM Strong	-76.5	-76.5	-77	-77	-77.5	-76.5	-76	-74.5	-75	-75	-76	-74	116	232
	128QAM Strong	-73.5	-74.5	-74	-74	-74	-72.5	-72.5	-71.5	-72.5	-72	-72.5	-72	139	278
	256QAM Strong	-70.5	-71.5	-70.5	-71	-71	-69.5	-69.5	-68.5	-69.5	-69	-69	-69	162	324
	512QAM Strong	-67.5	-67.5	-68.5	-68	-68	-66.5	-66.5	-65.5	-64.5	-65	-66	-65	185	370
	1024QAM Strong	-63.5	-64.5	-64.5	-65	-65	-63.5	-63	-62.5	-61	-62	-62.5	-62	208	416
	2048QAM Strong	-60.5	-61.5	-61	-61.5	-61.5	-60.5	-59.5	-58.5	-58	-59	-59	-59	230	460
	4096QAM Strong	-57.5	-57.5	-58	-58	-58	-56.5	-56	-55	-54	-55	-55	-54	250	500
	4096QAM Weak	-55.5	-56	-56.5	-56.5	-56	-54.5	-53.5	-53	-51.5	-52	-52	-51	262	524
30 FCC	4QAM Strong	-86.5	-87.5	-87	-88.5	-88.5	-86.5	-86	-84.5	-84	-87	-86.5	-86	43	86
	16QAM Strong	-82.5	-82.5	-83.5	-83	-83.5	-82.5	-81.5	-80.5	-81	-82	-82	-82	75.3	150
	32QAM Strong	-78.5	-79.5	-80	-80	-79.5	-78.5	-77.5	-76.5	-76.5	-78	-78	-78	94	188
	64QAM Strong	-75.5	-75.5	-77	-77	-77	-75.5	-75	-74.5	-75	-75	-75	-75	125	250
	128QAM Strong	-71.5	-73.5	-74	-74	-74	-72.5	-71.5	-71.5	-73	-72	-72.5	-72	150	300
	256QAM Strong	-69.5	-71.5	-69.5	-70.5	-71	-69.5	-68.5	-68.5	-68.5	-69	-69	-68	175	350
	512QAM Strong	-67.5	-67.5	-67.5	-67.5	-67.5	-66.5	-66	-65	-64.5	-66	-66.5	-65	200	400
	1024QAM Strong	-63.5	-64.5	-64	-64	-64.5	-62.5	-63	-61.5	-62	-62	-62.5	-62	225	450
	2048QAM Strong	-60.5	-60.5	-61	-61	-61.5	-59.5	-59.5	-58.5	-58	-58	-59	-58	248	496
	4096QAM Strong	-57.5	-57.5	-57.5	-58	-57.5	-56.5	-56	-54.5	-54	-54	-54	-54.5	272	544
	4096QAM Weak	-55.5	-55.5	-55	-56	-56	-54.5	-53.5	-52.5	-51.5	-52	-51.5	-52	284	568
40 FCC	4QAM Strong	-83.5	-84.5	-86	-87	-85.5	-85.5	-85	-83.5	-84	-85	-85	-84	60	120
	16QAM Strong	-78.5	-81.5	-82	-82	-82	-80.5	-80.5	-79.5	-80	-80	-81	-79	103	206
	32QAM Strong	-76.5	-78.5	-78.5	-78.5	-78.5	-77.5	-76.5	-75.5	-75.5	-77	-76	-76	129	258
	64QAM Strong	-72.5	-74.5	-75.5	-75	-75.5	-74.5	-74	-73	-73	-74	-74	-73	172	344
	128QAM Strong	-69.5	-72.5	-72.5	-73	-72.5	-71.5	-70.5	-70	-70.5	-71	-71	-70	206	412
	256QAM Strong	-66.5	-69.5	-67.5	-69	-69.5	-67.5	-67.5	-66.5	-67.5	-67	-67.5	-67	241	482
	512QAM Strong	-64.5	-64.5	-66	-66	-66	-65.5	-64.5	-63.5	-62.5	-64	-64	-64	275	550
	1024QAM Strong	-61.5	-63.5	-61.5	-63	-63	-61.5	-61	-60.5	-60	-61	-59.5	-60	310	620
	2048QAM Strong	-58.5	-59.5	-60	-60	-59.5	-58.5	-58	-57	-56	-57	-57.5	-58	342	684
	4096QAM Strong	-55.5	-56.5	-56	-57	-56	-54.5	-55	-53.5	-52	-53	-53.5	-54	374	748
	4096QAM Weak	-53.5	-54.5	-54	-55	-54.5	-52.5	-52.5	-50.5	-49.5	-51	-51.5	-51	391	782
40 ETSI	4QAM Strong	-83.5	-84.5	-86	-87	-87	-85.5	-85	-83.5	-84	-85	-85	-85	58	116
	16QAM Strong	-80.5	-81.5	-82	-82	-82	-80.5	-80.5	-79.5	-80	-80	-80	-80	100	200
	32QAM Strong	-76.5	-78.5	-78.5	-78.5	-78.5	-77.5	-76.5	-75.5	-75.5	-77	-76.5	-76	125	250
	64QAM Strong	-72.5	-74.5	-75.5	-75	-75.5	-74.5	-74	-73	-73	-74	-73.5	-73	167	334
	128QAM Strong	-70.5	-72.5	-72.5	-73	-72.5	-71.5	-70.5	-70	-70.5	-71	-70.5	-70	201	402
	256QAM Strong	-68.5	-69.5	-67.5	-69	-69	-67.5	-67.5	-66.5	-67.5	-67	-67	-67	234	468
	512QAM Strong	-65.5	-64.5	-66	-66	-66.5	-65.5	-64.5	-63.5	-62.5	-64	-64	-64	267	534
	1024QAM Strong	-61.5	-63.5	-61.5	-63	-63	-61.5	-61	-60.5	-60	-61	-60.5	-60	301	602
	2048QAM Strong	-59.5	-59.5	-60	-60	-60	-58.5	-58	-57	-56	-57	-57	-57	332	664
	4096QAM Strong	-56.5	-56.5	-56	-57	-56	-54.5	-55	-53.5	-52	-53	-53	-53	363	726
	4096QAM Weak	-54.5	-54.5	-54	-55	-54.5	-52.5	-52.5	-50.5	-49.5	-51	-51	-50	380	760
50 FCC	4QAM Strong	-85.5	-85.5	-85.5	-86	-86	-84.5	-83	-82.5	-83	-84	-82.5	-83	75	150
	16QAM Strong	-80.5	-80.5	-81.5	-81	-81.5	-79.5	-79.5	-78	-79	-79	-78	-79	129	258
	32QAM Strong	-77.5	-77.5	-77.5	-77	-77.5	-75.5	-75.5	-74	-74.5	-76	-75	-75	162	324
	64QAM Strong	-73.5	-73.5	-75.5	-75	-74.5	-73.5	-73	-72	-72	-72	-72	-72.5	216	432
	128QAM Strong	-71.5	-71.5	-71.5	-72	-71.5	-70.5	-69.5	-68.5	-69.5	-70	-69	-70	259	518
	256QAM Strong	-68.5	-68.5	-67.5	-68	-68.5	-67.5	-66.5	-65.5	-66.5	-66	-65	-67	302	604
	512QAM Strong	-63.5	-63.5	-65.5	-65.5	-65.5	-64.5	-63.5	-62.5	-62.5	-63	-62.5	-64	345	690
	1024QAM Strong	-62.5	-62.5	-60.5	-62	-62	-60.5	-60	-58.5	-60	-59	-59	-59	388	776
	2048QAM Strong	-58.5	-58.5	-59.5	-59	-59	-57.5	-56.5	-56	-55	-56	-55	-55	429	858
	4096QAM Strong	-55.5	-55.5	-55.5	-55	-55	-53.5	-54	-52	-52	-52	-51	-52	469	938
	4096QAM Weak	-53.5	-53.5	-53.5	-54	-53.5	-51.5	-51.5	-50.5	-48.5	-50	-48.5	-48	491	982

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		Guaranteed RSL Threshold, dBm												Capacity, Mbps	
BW, MHz	Modulation, FEC	4U GHz	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz**	26 GHz	28 GHz	30 GHz	Single Channel Mode	2+0 XPIC Mode
56 ETSI	4QAM Strong	-84.5	-84.5	-84.5	-85.5	-85.5	-83.5	-83	-82	-81	-83	-82.5	-82	85	170
	16QAM Strong	-80.5	-80.5	-80.5	-81	-80.5	-79.5	-78.5	-77.5	-78	-79	-78.5	-78	145	290
	32QAM Strong	-76.5	-76.5	-77.5	-77	-77	-75.5	-74.5	-74	-74.5	-75	-74.5	-74	182	364
	64QAM Strong	-73.5	-73.5	-74.5	-74	-74	-72.5	-73	-71.5	-73	-72	-72	-72	242	484
	128QAM Strong	-70.5	-70.5	-71.5	-71	-71	-69.5	-69.5	-68.5	-69.5	-69	-69	-69	291	582
	256QAM Strong	-68.5	-68.5	-66.5	-68	-68	-66.5	-66.5	-65	-65.5	-66	-66	-66	339	678
	512QAM Strong	-64.5	-64.5	-64.5	-65	-64.5	-63.5	-62.5	-62	-61.5	-63	-62.5	-62	388	776
	1024QAM Strong	-61.5	-61.5	-59.5	-62	-61.5	-60.5	-60	-58	-59	-59	-58.5	-58	436	872
	2048QAM Strong	-57.5	-57.5	-58.5	-58.5	-58	-56.5	-56.5	-55.5	-55	-56	-55.5	-55	482	964
	4096QAM Strong	-54.5	-54.5	-55.5	-55	-55	-53.5	-53	-51.5	-51	-52	-51.5	-51	527	1054
	4096QAM Weak	-52.5	-52.5	-53.5	-53	-53	-51.5	-50.5	-49.5	-48.5	-49	-48	-47	551	1102
60 FCC	4QAM Strong	-84.5	-84.5	-84.5	-85.5	-85.5	-83.5	-83	-81.5	-81	-83	-81.5	-82	88	176
	16QAM Strong	-80.5	-80.5	-80.5	-80	-80.5	-78.5	-78.5	-77.5	-78	-79	-77.5	-78	151	302
	32QAM Strong	-76.5	-76.5	-77.5	-76.5	-77	-75.5	-74.5	-73.5	-73.5	-75	-74	-74	189	378
	64QAM Strong	-73.5	-73.5	-74.5	-74	-74	-72.5	-72	-71.5	-72	-72	-71	-71	252	504
	128QAM Strong	-70.5	-70.5	-71.5	-71	-71	-69.5	-69.5	-68.5	-69.5	-69	-68.5	-68.5	302	604
	256QAM Strong	-67.5	-67.5	-66.5	-67.5	-67.5	-66.5	-65.5	-65	-65.5	-66	-65	-65.5	353	706
	512QAM Strong	-63.5	-63.5	-64.5	-65	-64.5	-63.5	-62.5	-62	-61.5	-62	-62.5	-62.5	403	806
	1024QAM Strong	-61.5	-61.5	-59.5	-61	-61	-59.5	-60	-58.5	-58	-59	-58	-58.5	454	908
	2048QAM Strong	-58.5	-58.5	-58.5	-58.5	-58	-55.5	-56	-55.5	-55	-55	-55	-55	501	1002
	4096QAM Strong	-54.5	-54.5	-54.5	-55	-54.5	-52.5	-53	-51.5	-51	-52	-51	-51	548	1096
	4096QAM Weak	-52.5	-52.5	-53.5	-53	-52.5	-50.5	-50.5	-49.5	-47.5	-49	-48	-49	573	1146
60 ETSI	4QAM Strong	-84.5	-84.5	-84.5	-85.5	-85.5	-83.5	-83	-81.5	-81	-83	-82.5	-82	85	170
	16QAM Strong	-80.5	-80.5	-80.5	-80	-80.5	-78.5	-78.5	-77.5	-78	-79	-78.5	-78	145	290
	32QAM Strong	-76.5	-76.5	-77.5	-76.5	-77	-75.5	-74.5	-73.5	-73.5	-75	-74.5	-74	182	364
	64QAM Strong	-73.5	-73.5	-74.5	-74	-74	-72.5	-72	-71.5	-72	-72	-72	-72	242	484
	128QAM Strong	-70.5	-70.5	-71.5	-71	-71	-69.5	-69.5	-68.5	-69.5	-69	-69	-69	291	582
	256QAM Strong	-67.5	-67.5	-66.5	-67.5	-68	-66.5	-65.5	-65	-65.5	-66	-66	-66	338	678
	512QAM Strong	-63.5	-63.5	-64.5	-65	-64.5	-63.5	-62.5	-62	-61.5	-62	-62	-62	388	776
	1024QAM Strong	-61.5	-61.5	-59.5	-61	-61	-59.5	-60	-58.5	-58	-59	-59	-58.5	436	872
	2048QAM Strong	-58.5	-58.5	-58.5	-58.5	-58	-55.5	-56	-55.5	-55	-55	-55.5	-55	482	964
	4096QAM Strong	-54.5	-54.5	-54.5	-55	-55	-52.5	-53	-51.5	-51	-52	-51.5	-51	527	1054
	4096QAM Weak	-52.5	-52.5	-53.5	-53	-53	-50.5	-50.5	-49.5	-47.5	-49	-48.5	-47.5	551	1102
75 FCC	4QAM Strong										-82	-81.5	-80.5	106	212
	16QAM Strong										-78	-77.5	-77	182	364
	32QAM Strong										-74	-74	-73	228	456
	64QAM Strong										-71	-71	-71	304	608
	128QAM Strong										-68	-68	-67	365	730
	256QAM Strong										-65	-64.5	-64	425	850
	512QAM Strong										-62	-61	-61	486	972
	1024QAM Strong										-58	-67.5	-57	547	1094
	2048QAM Strong										-55	-54.5	-54	604	1208
	4096QAM Strong										-51	-51	-51	661	1322
	4096QAM Weak										-48	-48.5	-48.5	691	1382
80 FCC	4QAM Strong	-83.5	-83.5	-83.5	-84	-84.5	-82.5	-82	-80.5	-80	-82	-81.5	-82	118	236
	16QAM Strong	-79.5	-79.5	-79.5	-79	-79.5	-77.5	-77.5	-76.5	-77	-77	-77.5	-78	203	406
	32QAM Strong	-75.5	-75.5	-75.5	-75.5	-76	-74.5	-73.5	-72.5	-72.5	-74	-74	-75	254	508
	64QAM Strong	-71.5	-71.5	-72.5	-73	-73	-71.5	-71	-69.5	-71	-71	-71	-72	338	676
	128QAM Strong	-69.5	-69.5	-69.5	-70	-70	-68.5	-67.5	-66.5	-68.5	-68	-67.5	-69	406	812
	256QAM Strong	-66.5	-66.5	-65.5	-66	-66.5	-65.5	-64.5	-63.5	-64.5	-64	-64	-65.5	473	946
	512QAM Strong	-61.5	-61.5	-63.5	-63.5	-63.5	-62.5	-61.5	-60.5	-60.5	-61	-61	-62.5	541	1082
	1024QAM Strong	-59.5	-59.5	-58.5	-60	-60.5	-58.5	-58	-57.5	-57	-58	-57.5	-59.5	608	1216
	2048QAM Strong	-56.5	-56.5	-57.5	-57	-57	-54.5	-54.5	-54.5	-54	-55	-54.5	-55.5	672	1344
	4096QAM Strong	-53.5	-53.5	-53.5	-54	-53.5	-51.5	-52	-50.5	-50	-50	-49.5	-51.5	735	1470
	4096QAM Weak	-51.5	-51.5	-51.5	-52	-51.5	-49.5	-49	-48.5	-46.5	-48	-47.5	-47.5	769	1538
100 FCC	4QAM Strong	-81.5	-81.5	-81.5	-83	-83.5	-78.5	-78	-79.5	-79	-81	-80.5	-81	148	296
	16QAM Strong	-78.5	-78.5	-78.5	-78	-78.5	-76.5	-76.5	-75.5	-76	-76	-76	-77.5	254	508
	32QAM Strong	-74.5	-74.5	-74.5	-74	-74.5	-73.5	-72.5	-71.5	-72.5	-73	-72.5	-73	318	636
	64QAM Strong	-70.5	-70.5	-71.5	-71	-72	-70.5	-70	-68.5	-69	-70	-69	-69.5	423	846
	128QAM Strong	-68.5	-68.5	-68.5	-68.5	-68.5	-67.5	-67	-65.5	-66.5	-67	-66.5	-67.5	508	1016
	256QAM Strong	-65.5	-65.5	-65.5	-65	-65.5	-63.5	-63.5	-62.5	-63.5	-63	-62.5	-64.5	592	1184
	512QAM Strong	-60.5	-60.5	-62.5	-62	-62.5	-60.5	-60.5	-59.5	-58.5	-60	-59.5	-61.5	677	1354
	1024QAM Strong	-58.5	-58.5	-59.5	-59	-59.5	-57.5	-58	-56.5	-56	-57	-56.5	-57.5	761	1522
	2048QAM Strong	-54.5	-54.5	-55.5	-56	-56	-52.5	-53.5	-53.5	-52	-54	-53.5	-54	841	1682
	4096QAM Strong	-52.5	-52.5	-52.5	-53	-52.5	-50.5	-51	-49.5	-49	-49	-49	-49.5	920	1840
	4096QAM Weak	-50.5	-50.5	-50.5	-51	-50.5	-48.5	-48	-47.5	-44.5	-47	-46	-43.5	962	1924

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		Guaranteed RSL Threshold, dBm												Capacity, Mbps	
BW, MHz	Modulation, FEC	4U GHz	6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz**	26 GHz	28 GHz	30 GHz	Single Channel Mode	2+0 XPIC Mode
112 ETSI	4QAM Strong	*-80.5*	-80.5	-82.5	-82.5	-82.5	-80.5	-79	-78.5	-77	-80	-79	-79	170	340
	16QAM Strong	*-77.5*	-77.5	-77.5	-77	-78	-75.5	-75.5	-74.5	-75	-76	-75	-75	291	582
	32QAM Strong	*-73.5*	-73.5	-74.5	-74	-74	-72.5	-71.5	-71.5	-70.5	-72	-71	-71	364	728
	64QAM Strong	*-69.5*	-69.5	-70.5	-71	-71	-69.5	-70	-68.5	-69	-69	-68.5	-69	486	972
	128QAM Strong	*-67.5*	-67.5	-68.5	-68	-68	-66.5	-66.5	-64.5	-66.5	-66	-65.5	-65.5	583	1166
	256QAM Strong	*-64.5*	-64.5	-64.5	-64.5	-65	-63.5	-62.5	-61.5	-63.5	-63	-62.5	-62	680	1360
	512QAM Strong	*-59.5*	-59.5	-61.5	-62	-62	-60.5	-59.5	-58.5	-58.5	-60	-60	-59.5	777	1554
	1024QAM Strong	*-58.5*	-58.5	-57.5	-58.5	-58.5	-56.5	-57	-55.5	-55	-56	-55.5	-56	874	1748
	2048QAM Strong	*-55.5*	-55.5	-55.5	-55	-55	-53.5	-52.5	-52.5	-52	-53	-52	-52.5	965	1930
	4096QAM Strong	*-51.5*	-51.5	-52.5	-52	-51.5	-49.5	-50	-48.5	-48	-49	-48	-48	1055	2110
	4096QAM Weak	*-49.5*	-49.5	-49.5	-50	-49.5	-48.5	-47.5	-46.5	-44.5	-45	-45	-44	1104	2208

*** Modes, marked with hyphen do not have guaranteed RSL values. Blank cells mean, the mode is still not tested for specific product.*

Note: The guaranteed Tx power and RSL threshold data are specified with +/- 0.5 dB tolerance.

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