Integra-X2

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
- FIPS197 certified AES256 traffic encryption

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Technical specification

		Integra-X2
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 Up to 1.68 Gbps in AES mode
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 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**
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: 90 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*

** In development. Inquire SAF representative for more information.*
*** Integra-X2 encryption algorithm fully complies with Federal Information Processing Standards Publication 197 (2001), and has been certified with the validation # A5174: SAF FIPS AES-256 Encryption Engine*

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Electrical specification

Power consumption	Up to 115 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

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, 15 and 38* 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	115	100	110	95	105	90	95	80
Current [A] @ 38 V DC	3.0	2.6	2.9	2.5	2.8	2.4	2.5	2.1
Current [A] @ 48 V DC	2.4	2.1	2.3	2.0	2.2	1.9	2.0	1.7
Current [A] @ 57 V DC	2.0	1.8	2.0	1.7	1.9	1.6	1.7	1.4

Maximum Tx Power [dBm] for Integra-X2

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-X2

BW, MHz	Modulation, FEC	Guaranteed RSL Threshold, dBm												Capacity, Mbps	
		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	49	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	81	162
	4096QAM Strong	-61.5	-62.5	-62.5	-63	-62	-60.5	-60	-59.5	-	-59	-58.5	-61	88	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
	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
56	256QAM Strong	-68.5	-68.5	-66.5	-68	-68	-66.5	-66.5	-65	-65.5	-66	-66	-66	339	678
ETSI	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
	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
60	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
FCC	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
	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
60	256QAM Strong	-67.5	-67.5	-66.5	-67.5	-68	-66.5	-65.5	-65	-65.5	-66	-66	-66	339	678
ETSI	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
	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
75	256QAM Strong										-65	-64.5	-64	425	850
FCC	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
	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
80	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
FCC	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
	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
100	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
FCC	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
	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
112	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
ETSI	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.

**** Modes, marked with "***" are not available if AES256 is switched on.*

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

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