

Integra series

SAF Tehnika – the pioneer of compact full outdoor microwave radio technology – is excited to take a step forward in the evolution of full outdoor packet microwave radio systems. Integra is an unbelievably light, energy efficient, carrier-grade system that exemplifies an outstanding return on smart engineering - the synergy of high competence in radio electronics and materials science. Integration of the next generation microwave radio with high and super high-performance antennas into a single unit translates into a lower total cost of ownership, as well as less time spent on the installation site, and better reliability of the link even in densely served areas.

Perfect for small-cell, RAN, and HetNet backhaul where aesthetics in a metropolitan area is key concern, Integra delivers ambitious performance in a compact package never before available in licensed microwave backhaul. Integra's embedded software takes full advantage of its cutting-edge network processor providing SyncE support for LTE network, builds Layer 2 header compression and 256-bit AES encryption for public safety, government, and enterprise networks. Thanks to a convenient design and its solid functionality Integra is an industry-unique microwave system with a superior radiation pattern and payload capacity of up to 1 Gbps.

Integra – by its form and specification – is a proper building block for a variety of modern wireless networking applications. To stay advanced and competitive in the telecom world increasingly depends on seamless integration and interoperability of synchronization-sensitive systems. It is smart to invest in technology that takes the right direction: the concept of Integra is on that path.



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Technical specification

		Integra-G, Integra-GS	Integra-W, Integra-WS
General			
Concept / form factor		FODU with antenna or FODU Slip-fit	
Frequency bands		6GHz, 7GHz, 8GHz, 11GHz, 13GHz, 15GHz, 17GHz UL, 18GHz, 23GHz, 24GHz UL, 25GHz, 26GHz, 28GHz, 38GHz, <i>and more*</i>	
Radio standards		EN 302 217-2 v3.1.1, EN 300 t+40-2 v1.4.1, FCC CFR 47 Part 101, Industry Canada RSS-GEN and relevant SRSP Specifications	
Frequency stability		± 10 ppm	
Capacity		up to 1Gbps* with HC at 1+0 or 2+0	
		474 Mbps at 60 MHz 1024QAM (legacy version)	491 Mbps at 60 MHz 2048QAM
Max modulation		1024QAM (legacy)	2048QAM
Configurations		1+0, 2+0 link bonding, 1+1 HSB	
ACM and ATPC		Yes	
Channel bandwidth		ETSI: from 3.5 MHz, up to 56 MHz FCC: from 5 MHz, up to 60 MHz	
Ports			
Gigabit Ethernet	1x RJ-45	Electrical with built-in PoE splitter and surge arrestor	
	2x SFP	Fiber Optics	
Service ports	3.5mm	Audible alignment and RSSI	
	USB B	RS232 serial over USB B-Type	
	LED	Power On, Link Synchronization, RSL, Polarization accuracy*	
Ethernet			
Ethernet		Built-in Carrier Ethernet Gigabit Network Processor	
Gigabit Switch functionality		802.1Q VLANs with QoS/CoS incl. <i>WRED*</i> , shaping, DWRR and on MPLS-TP exp bit; Spanning Tree Protocol, Jumbo frames <i>and more*</i>	
Synchronization		SyncE, <i>IEEE 1588v2 PTP*</i>	
Carrier Ethernet functionality		Provider Bridging, MEF9&14, High Efficiency Header Compression, <i>OAM*</i>	
Jumbo frames		Yes, 9600 bytes	
Encryption		AES 256-bit**, licensed feature	
Management		SNMP v1/2c/3, SSH, Telnet, HTTPS, Serial, RADIUS, Network Time Protocol	
		In-band MNG over same ETH port	Both In-band and Out-of-band MNG
Perf. monitoring		Performance graphs, constellation diagram, alarms, detailed counters	
Electrical			
Power consumption		28...74 W depending on model and frequency band. See table below.	
Voltage range	Integra	36...57 V DC	
	PoE Injector ¹	36...60 V DC all Integra models; 22...60 V DC models with <50 W consumption	

* Inquire SAF representative for more information

** Integra-G (-GS) is FIPS 197 (Federal Information Processing Standards) validated and placed on validated product list,

Validation No.: AES 5899: <https://csrc.nist.gov/Projects/Cryptographic-Algorithm-Validation-Program/Validation/Validation-List/AES>

¹ Voltage range using I0ATPI24 / I0ATPI44 Power over Ethernet Injector

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Mechanical & environmental specification

Integra Model		Integra-G, Integra-W		Integra-GS, Integra-WS
Antenna type		0.3m / 1ft	0.6m / 2ft	External antenna
Antenna interface		Integrated antenna, factory assembled with radio		SAF2R 6...13 GHz SAF2 15...38 GHz
Ant. performance		High Performance and <i>Super High Performance</i> *		
Stationary use		Conforms to ETSI EN 300 019 Class 4.1, IP67 (IP66 6...13GHz), NEMA 4X		
Temperature range		-33...+55 °C / -28...+130 °F		
Size, 15GHz and higher, w/o mount		378 x 378 x 227 mm / 14.9" x 14.9" x 9"	669 x 669 x 289 mm / 26.3" x 26.3" x 11.4"	235 x 250 x 72 mm / 9.26" x 9.85" x 2.84"
Size, Integra -WS 17/24 GHz UL		N/A***	N/A***	235 x 250 x 111 mm / 9.26" x 9.85" x 4.37"
Size, 6...13* GHz		N/A	N/A	280 x 437 x 100 mm / 11.02" x 17.2" x 3.9"
Weight, w/o mount		5 kg / 11 lbs	5 kg / 11 lbs	2.9 kg / 6.4 lbs
Weight, Integra -WS 17/24 GHz UL		N/A***	N/A***	4.9 kg / 10.8 lbs
Weight, 6...13* GHz		N/A	N/A	6.5 kg / 14.3 lbs
Mount	Mount size	292 x 176 x 250 mm / 11.5" x 7" x 10" max		Mount on antenna
	Pole size	Ø 40 – 120 mm / Ø 1.6" – 4.7"		
	Weight	2.55 kg / 5.6 lbs		

* Inquire SAF representative for more information

*** Among Integra-W family, only Integra-WS model with external antenna is currently available for 17/24 GHz unlicensed bands.

Power consumption and rated current at 36 – 57 V DC²

Model		L6 GHz	U6, 7, 8 GHz	11, 13 GHz	15 GHz	17 GHz	18 GHz	23 GHz	24 GHz	25, 26, 28 GHz	38 GHz
Integra-G, Integra-GS	Power [W] @ 36–57V DC	74	69	65	40	35	45 ³	41	38	45	47
	Current [A] @ 36 V DC	2.1	1.9	1.8	1.1	1.0	1.3	1.1	1.1	1.3	1.3
	Current [A] @ 48 V DC	1.5	1.4	1.4	0.8	0.7	1.0	0.9	0.8	0.9	1.0
	Current [A] @ 57 V DC	1.3	1.2	1.1	0.7	0.6	0.8	0.7	0.7	0.8	0.8
Integra-W, Integra-WS	Power [W] @ 36–57V DC	70	64	51	31	28	35	35	30	36	38
	Current [A] @ 36 V DC	1.9	1.8	1.4	0.9	0.8	1.0	1.0	0.8	1.0	1.1
	Current [A] @ 48 V DC	1.5	1.3	1.1	0.6	0.6	0.7	0.7	0.6	0.8	0.8
	Current [A] @ 57 V DC	1.2	1.1	0.9	0.5	0.5	0.6	0.6	0.5	0.6	0.7

² Power consumption of Integra radio shown only. For power consumption of complete system add up to 8% (at 48V DC input) for PoE in DC/DC mode, around 4W for 100m cable (depends on cable) and approx. 1W for SFP transceiver, if used.

³ Both Standard and HP product versions

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Exterior design of Integra models

Integra-G, Integra-W	Integra-GS, Integra-WS	
 <p>Available for 15GHz band and higher</p>	 <p>General design, 15GHz and higher</p>	 <p>6GHz ...13GHz models</p>
	 <p>Integra-WS 17GHz, 24GHz UL version</p>	

Maximum Tx Power [dBm] for Integra-G and Integra-GS

1) For all ETSI channels, and FCC 60 MHz channel in fixed Tx power mode:

Modulation	L6, U6, 7, 8 GHz	11 GHz	13 GHz	15 GHz, 18 GHz HP ⁴	18, 23, 25, 26, 28 GHz	17 GHz ⁵ , 24 GHz ⁵	38 GHz
4 QAM	+31	+26	+28	+23	+20	-26 ... +5	+15
16 QAM	+30	+25	+27	+22	+19	-26 ... +5	+14
32 QAM	+29	+24	+26	+21	+18	-26 ... +5	+14
64 QAM	+28	+23	+25	+20	+17	-26 ... +5	+13
128 QAM	+28	+23	+25	+20	+17	-26 ... +5	+13
256 QAM	+27	+22	+24	+19	+16	-26 ... +5	+12
512 QAM	+26	+21	+23	+18	+15	-26 ... +5	+11
1024 QAM	+23	+18	+20	+15	+12	-26 ... +5	+10
2048 QAM ⁶	+22	+17	+19	+14	+11	-26 ... +5	+9

2) For FCC 5 to 50 MHz channels in fixed Tx power mode:

Frequency band	L6, U6, 7, 8 GHz			11 GHz			13 GHz			15 GHz, 18 GHz HP ⁴			18, 23, 25, 26, 28 GHz			17 GHz ⁵ , 24 GHz ⁵	38 GHz
BW, MHz	50	25	10	50	25	10	50	25	10	50	25	10	50	25	10	5 ... 60	5 ... 60
Modulation	40	20	5	40	20	5	40	20	5	40	20	5	40	20	5		
	30			30			30			30			30				
4 QAM	+30	+29	+27	+25	+24	+22	+27	+26	+24	+22	+21	+19	+19	+18	+16	-26 ... +5	+15
16 QAM	+30	+29	+27	+25	+24	+22	+27	+26	+24	+22	+21	+19	+19	+18	+16	-26 ... +5	+14
32 QAM	+29	+29	+27	+24	+24	+22	+26	+26	+24	+21	+21	+19	+18	+18	+16	-26 ... +5	+14
64 QAM	+28	+28	+27	+23	+23	+22	+25	+25	+24	+20	+20	+19	+17	+17	+16	-26 ... +5	+13
128 QAM	+28	+28	+27	+23	+23	+22	+25	+25	+24	+20	+20	+19	+17	+17	+16	-26 ... +5	+13
256 QAM	+27	+27	+27	+22	+22	+22	+24	+24	+24	+19	+19	+19	+16	+16	+16	-26 ... +5	+12
			-			-			-			-			-		
512 QAM	+26	+26	-	+21	+21	-	+23	+23	-	+18	+18	-	+15	+15	-	-26 ... +5	+11
1024 QAM	+23	+23	-	+18	+18	-	+20	+20	-	+15	+15	-	+12	+12	-	-26 ... +5	+10
2048 QAM ⁶	+22	-	-	+17	-	-	+19	-	-	+14	-	-	+11	-	-	-26 ... +5	+9

3) For FCC 5 to 60 MHz channels in variable Tx power mode:

Frequency band	L6, U6, 7, 8 GHz				11 GHz				13 GHz				15 GHz, 18 GHz HP ⁴				18, 23, 25, 26, 28 GHz				38 GHz											
BW, MHz	50		25		10		5		50		25		10		5		50		25		10		5		50		25		10		5	
Modulation	60	40	20	5	60	40	20	5	60	40	20	5	60	40	20	5	60	40	20	5	60	40	20	5	60	40	20	5	60	40	20	5
4 QAM	+31	+30	+29	+27	+26	+25	+24	+22	+28	+27	+26	+24	+23	+22	+21	+19	+20	+19	+18	+16	+15	+14	+13	+11								
16 QAM	+30	+30	+29	+27	+25	+25	+24	+22	+27	+27	+26	+24	+22	+22	+21	+19	+19	+19	+18	+16	+14	+14	+13	+11								
32 QAM	+29	+29	+29	+27	+24	+24	+24	+22	+26	+26	+26	+24	+21	+21	+21	+19	+18	+18	+18	+16	+13	+13	+13	+11								
64 QAM	+28	+28	+28	+27	+23	+23	+23	+22	+25	+25	+25	+24	+20	+20	+20	+19	+17	+17	+17	+16	+12	+12	+12	+11								
128 QAM	+27	+27	+27	+27	+22	+22	+22	+22	+24	+24	+24	+24	+19	+19	+19	+19	+16	+16	+16	+16	+11	+11	+11	+11								
256 QAM	+25	+25	+25	+27	+20	+20	+20	+22	+22	+22	+22	+24	+17	+17	+17	+19	+14	+14	+14	+16	+9	+9	+9	+11								
512 QAM	+24	+24	+24	-	+19	+19	+19	-	+21	+21	+21	-	+16	+16	+16	-	+13	+13	+13	-	+8	+8	+8	-								
1024 QAM	+23	+23	+23	-	+18	+18	+18	-	+20	+20	+20	-	+15	+15	+15	-	+12	+12	+12	-	+7	+7	+7	-								
2048 QAM ⁶	+22	+22	-	-	+17	+17	-	-	+19	+19	-	-	+14	+14	-	-	+11	+11	-	-	+6	+6	-	-								

³ Preliminary data

⁴ Integra-G (-GS) 18 GHz HP version has 3dB higher Tx power than standard version

⁵ Max Tx power settings depend on EIRP allowed by national regulatory and antenna size.

⁶ 2048QAM modulation is available only for Integra-G and Integra-GS, not supported by legacy models

Maximum Tx Power [dBm] for Integra-W and Integra-WS

Modulation	Tx Power, dBm					
	L6 GHz	U6 GHz	11 GHz	15, 18, 23, 25, 26, 28 GHz	17 GHz ⁵ , 24 GHz ⁵	38 GHz
4 QAM	+33	+31	+28	+22	-26 ... +5	+17
8 QAM	+33	+31	+28	+22	-26 ... +5	+17
16 QAM	+32	+30	+27	+21	-26 ... +5	+16
32 QAM	+31	+29	+26	+21	-26 ... +5	+16
64 QAM	+30	+28	+25	+20	-26 ... +5	+15
128 QAM	+30	+28	+25	+20	-26 ... +5	+15
256 QAM	+30	+28	+25	+19	-26 ... +5	+14
512 QAM	+30	+28	+25	+19	-26 ... +5	+14
1024 QAM	+28	+26	+23	+17	-26 ... +5	+12

⁵ Max Tx power settings depend on EIRP allowed by national regulatory and antenna size.

Integra-G,-GS RSL Thresholds and Capacity for ETSI channels ^{6, 7, 8}

Band-width, MHz	Modulation	6GHz	7GHz	8GHz	11GHz	13GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	
		Guaranteed RSL Threshold, dBm														-G, -GS modes
1.75 ⁸	4QAM StrongFEC	-100													1.9	
	16QAM StrongFEC	-93													3.9	
	32QAM StrongFEC	-89													4.9	
	64QAM StrongFEC	-86													6.6	
	128QAM StrongFEC	-84													7.9	
	128QAM WeakFEC	-82													8.6	
3.5	4QAM StrongFEC	-97	-96	-97	-96	-96.5	-95.5	-94	-96	-96	-96.5	-95.5	-95	-92	4	
	16QAM StrongFEC	-90	-90.5	-90.5	-89	-90	-88.5	-87.5	-89.5	-89	-89.5	-89.5	-89	-86	8	
	32QAM StrongFEC	-86	-86.5	-86.5	-85	-86	-84	-83	-85.5	-84.5	-85.5	-84.5	-84	-82	10	
	64QAM StrongFEC	-83.5	-83.5	-83.5	-82.5	-83	-81.5	-80.5	-82.5	-81.5	-83	-82	-82	-79	13	
	128QAM StrongFEC	-80	-80.5	-80.5	-79	-80	-77.5	-76.5	-78.5	-77	-79.5	-78.5	-79	-76	16	
	128QAM WeakFEC	-77.5	-78	-76.5	-76	-78	-73.5	-75	-76.5	-75	-77.5	-76.5	-76	-74	17	

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Bandwidth, MHz	Modulation	6GHz	7GHz	8GHz	11GHz	13GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	
		Guaranteed RSL Threshold, dBm													-G, -GS modes	Legacy modes
7	4QAM StrongFEC	-94	-94.5	-94	-93	-94	-93	-91	-94	-93	-93.5	-92.5	-93	-90.5		8
	16QAM StrongFEC	-87	-87.5	-88.5	-86.5	-88	-86	-84.5	-87.5	-86	-87	-86	-86	-84		16
	32QAM StrongFEC	-84	-84.5	-84.5	-83.5	-84	-82.5	-80.5	-83.5	-82	-83.5	-82.5	-83	-80		20
	64QAM StrongFEC	-80.5	-81.5	-81.5	-80.5	-81	-80	-78	-80.5	-80	-80.5	-79	-80	-77.5		27
	128QAM StrongFEC	-77	-78	-78.5	-76.5	-77	-76	-75	-77.5	-77	-77.5	-76	-76.5	-74		33
	256QAM StrongFEC	-74	-74.5	-75	-73.5	-74.5	-73	-71	-74.5	-72	-73.5	-72.5	-73	-71		39
256QAM WeakFEC	-72	-73	-67.5	-71.5	-72	-70	-69	-72.5	-71	-71.5	-69	-71	-69		41	
14	4QAM StrongFEC	-91	-91	-92	-90.5	-91	-90	-88	-91	-87.5	-91	-90	-90	-87		17
	16QAM StrongFEC	-85	-85	-85.5	-84	-85	-83.5	-81.5	-84.5	-82	-84	-83.5	-84	-81		33
	32QAM StrongFEC	-80	-81	-81.5	-80	-80.5	-79	-77	-80.5	-78	-80	-79	-79	-77		44
	64QAM StrongFEC	-78	-78.5	-78.5	-77	-78.5	-77	-75	-78.5	-76	-78	-77	-77	-74		56
	128QAM StrongFEC	-75	-75.5	-74.5	-74	-71	-74	-72	-75.5	-73	-74.5	-73.5	-74	-71		67
	256QAM StrongFEC	-71.5	-72	-72.5	-71	-67	-71	-68.5	-71.5	-69.5	-71	-70.5	-70.5	-69		79
512QAM StrongFEC	-68.5	-68	-69.5	-67	-63	-67	-65	-68.5	-67	-67.5	-67.5	-67	-65		90	
512QAM WeakFEC	-65.5	-66	-66.5	-64.5	-61	-64	-61.5	-65.5	-63	-65	-64	-64	-62		97	
20	4QAM StrongFEC	-89	-90	-91	-88.5	-88.5	-88.5	-87	-89.5	-86	-89	-89.5	-89	-86		25
	16QAM StrongFEC	-83	-84	-84.5	-83	-81	-82.5	-80	-83.5	-81	-83	-82.5	-82.5	-79.5		51
	32QAM StrongFEC	-80	-80	-80.5	-79	-78	-78	-76.5	-79.5	-77	-79	-78.5	-79	-75.5		64
	64QAM StrongFEC	-77	-77	-77.5	-76.5	-74.5	-76	-74	-77	-75	-77	-75.5	-76	-73		85
	128QAM StrongFEC	-74	-74	-74.5	-73	-71.5	-73	-70.5	-74	-72	-73	-72.5	-73	-70		102
	256QAM StrongFEC	-70.5	-71	-71.5	-69.5	-67.5	-69.5	-68	-70.5	-68.5	-70	-70.5	-71	-67		119
512QAM StrongFEC	-67.5	-68	-67.5	-67	-65	-66	-64.5	-67.5	-65.5	-67	-66	-66	-63.5		136	
1024QAM StrongFEC	-64	-64	-64.5	-62.5	-61	-63	-60.5	-64.5	-62	-63	-62.5	-62	-60		153	
1024QAM WeakFEC	-62	-62	-60.5	-61	-58	-60	-58	-62.5	-59.5	-61	-60.5	-60	-58		163	
28	4QAM StrongFEC	-88	-89	-89	-88	-87	-87	-85	-88	-84	-88	-86.5	-87	-85	34	35
	16QAM StrongFEC	-82	-83	-83	-81.5	-79.5	-81	-79	-82.5	-79.5	-82	-81.5	-81	-78	69	69
	32QAM StrongFEC	-79	-79	-80	-77.5	-77	-77	-75	-78.5	-75.5	-78	-77.5	-77	-74	87	88
	64QAM StrongFEC	-76	-76	-76.5	-75.5	-74	-75	-72	-75.5	-73.5	-75	-74.5	-74.5	-72	114	115
	128QAM StrongFEC	-73	-73	-73.5	-71.5	-70.5	-72	-69	-72.5	-70.5	-72	-71.5	-71	-69	137	138
	256QAM StrongFEC	-70	-70	-70	-68.5	-66.5	-68	-66	-69.5	-67.5	-69	-68	-68	-65	160	161
512QAM StrongFEC	-66.5	-66	-67	-65	-63.5	-65	-62.5	-66.5	-64	-65	-64.5	-64	-62	183	184	
1024QAM StrongFEC	-63	-63	-62.5	-62	-59.5	-61.5	-59	-63.5	-61	-62	-61.5	-61	-58	206	207	
1024QAM WeakFEC	-61			-59.5		-59	-57	-60.5	-59.5	-60	-58.5	-59	-56		220	
2048QAM StrongFEC	-59	-60	-60.5	-58	-56	-58	-54.5	-59	-57	-59	-58	-57	-54	226		
40	4QAM StrongFEC	-86.5	-87	-87	-85	-86	-85.5	-83	-86.5	-83	-85.5	-85	-85.5	-83	50	50
	16QAM StrongFEC	-81	-81	-82	-79.5	-78.5	-79.5	-77	-81	-78.5	-80	-79.5	-79	-76.5	98	98
	32QAM StrongFEC	-77	-77	-78	-76.5	-75.5	-75.5	-73	-77	-74.5	-76	-75.5	-75.5	-73	125	125
	64QAM StrongFEC	-74	-74	-75	-73.5	-71	-73	-71	-74	-72	-73	-73.5	-73.5	-70.5	165	165
	128QAM StrongFEC	-71	-71	-72	-70.5	-70	-70.5	-67	-71	-69	-70	-69.5	-70	-67	198	198
	256QAM StrongFEC	-68	-68	-68	-67	-65	-66.5	-64	-68	-66	-67	-66.5	-65	-63.5	231	231
512QAM StrongFEC	-65	-65	-65.5	-64	-62	-63.5	-61	-65	-63	-63.5	-63.5	-63	-60.5	264	264	
1024QAM StrongFEC	-61	-61	-61.5	-60.5	-59	-60	-57	-61.5	-59.5	-60.5	-59.5	-59	-56.5	298	298	
1024QAM WeakFEC	-59			-59		-57	-55	-59	-57.5	-58.5	-58	-57.5	-55		314	
2048QAM StrongFEC	-58	-58	-58.5	-56.5	-54	-56	-54	-57.5	-55.5	-56.5	-56	-56	-52.5	327		
56	4QAM StrongFEC	-85	-85	-86	-84	-84.5	-84	-81	-85	-82	-84	-83.5	-84	-81	71	72
	16QAM StrongFEC	-79	-79.5	-80	-78.5	-78	-78	-75	-79	-77	-78.5	-78	-78	-75	144	145
	32QAM StrongFEC	-75	-75.5	-76	-74.5	-74	-74	-71.5	-75	-73	-74.5	-73.5	-74	-72	183	183
	64QAM StrongFEC	-72	-73	-74	-72	-71	-71	-69	-72	-70	-72.5	-71	-71	-69	238	241
	128QAM StrongFEC	-70	-69.5	-70	-68.5	-68	-69	-66	-69	-67.5	-69.5	-68	-68	-65	286	289
	256QAM StrongFEC	-67	-66	-67	-65.5	-64	-65	-62	-66	-64.5	-65.5	-64.5	-65	-62	334	337
512QAM StrongFEC	-63	-63.5	-64	-62	-61	-62	-59	-63	-61.5	-62.5	-61	-62	-59	382	385	
1024QAM StrongFEC	-60	-60	-60	-58.5	-58	-58	-56	-59	-57.5	-59.5	-57.5	-58	-55	430	433	
1024QAM WeakFEC	-58			-57		-55	-54	-57.5	-55.5		-55.5	-55.5	-54		456	
2048QAM StrongFEC	-56	-57	-57	-54.5	--55	-54	-52.5	-55	-53.5	-55.5	-54	-54.5	-52	472		

⁶ 2048QAM modulation is available only for Integra-G and Integra-GS, not supported by legacy models.

⁷ 1024QAM modulation with Weak FEC setting is available for legacy models or in legacy modes only.

⁸ 1.75 MHz bandwidth is available for customized narrowband product only. Please ask SAF representative for more information.

Integra-G,-GS RSL Thresholds and Capacity for FCC channels 4, 7

BW, MHz	Modulation	6GHz	7GHz	8GHz	11GHz	13GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	
		Guaranteed RSL Threshold, dBm													-G, -GS modes	Legacy modes
5	4QAM StrongFEC	-96	-96	-96.5	-95	-95.5	-94	-92.5	-95	-94	-95.5	-94.5	-95	-91		5
	16QAM StrongFEC	-89	-89.5	-86.5	-88	-89	-87	-86.5	-88.5	-88	-89	-87.5	-88	-85		10
	32QAM StrongFEC	-85	-85.5	-85.5	-84	-85	-83.5	-82.5	-84.5	-84	-85	-83.5	-84	-81		12
	64QAM StrongFEC	-82.5	-82.5	-80.5	-81.5	-82	-80.5	-79.5	-81.5	-81	-82	-81	-81	-79		17
	128QAM StrongFEC	-79	-79.5	-79.5	-78.5	-79	-77.5	-76.5	-78.5	-77.5	-79	-78	-78	-75		20
	128QAM WeakFEC	-77	-77	-77	-76.5	-77	-74	-73.5	-76.5	-75.5	-76.5	-75.5	-75.5	-73		22
10	4QAM StrongFEC	-92	-92.5	-94	-91	-92.5	-91	-89	-92	-90	-92	-91.5	-91.5	-89		12
	16QAM StrongFEC	-86	-86.5	-86.5	-85	-86	-84.5	-82.5	-85.5	-84	-85.5	-84.5	-85	-82		24
	32QAM StrongFEC	-82	-82.5	-82.5	-81.5	-82	-81	-79	-82.5	-80	-82	-81	-81	-78		30
	64QAM StrongFEC	-79.5	-80	-80	-79	-79.5	-78	-76	-79.5	-78	-79	-78	-78	-76		40
	128QAM StrongFEC	-76	-76.5	-76.5	-75.5	-76	-75	-73	-76.5	-75	-76	-75	-75	-73		48
	256QAM StrongFEC	-73	-73.5	-73.5	-72	-73	-72	-69	-72.5	-71	-72.5	-71.5	-71	-70		56
256QAM WeakFEC	-70	-70.5	-70.5	-69	-70	-69	-66.5	-70.5	-68	-69.5	-68.5	-68.5	-66		60	
20	4QAM StrongFEC	-89	-90	-91	-88.5	-88.5	-88.5	-86	-89	-86.5	-89	-88.5	-88	-86		24
	16QAM StrongFEC	-83	-84	-84.5	-83	-81	-83	-80	-83.5	-81	-83	-82.5	-82.5	-80		49
	32QAM StrongFEC	-80	-80	-80.5	-79	-78	-79	-76.5	-79.5	-77	-79	-78.5	-79	-77		62
	64QAM StrongFEC	-77	-77	-77.5	-76.5	-74.5	-76	-74	-76.5	-74.5	-77	-75.5	-76	-73		82
	128QAM StrongFEC	-74	-74	-74.5	-73	-71.5	-73	-70.5	-73.5	-71.5	-73	-72.5	-73	-71		99
	256QAM StrongFEC	-70.5	-71	-71.5	-69.5	-67.5	-70	-67	-70.5	-68.5	-70	-69.5	-70	-67.5		115
	512QAM StrongFEC	-67.5	-68	-67.5	-67	-65	-66	-64.5	-67.5	-65.5	-67	-66	-66	-64		132
	1024QAM StrongFEC	-64	-64	-64.5	-62.5	-61	-63	-60.5	-64.5	-62.5	-63	-62.5	-62	-61		148
1024QAM WeakFEC	-62	-62	-60.5	-61	-58	-60	-58	-62.5	-59.5	-61	-60.5	-60	-58		157	
25	4QAM StrongFEC	-88	-88.5	-89.5	-88	-88	-88	-85	-88	-85	-88	-87.5	-87	-85		31
	16QAM StrongFEC	-82	-83	-83.5	-82.5	-81	-82	-79	-82.5	-80	-82	-81.5	-81.5	-79		62
	32QAM StrongFEC	-79	-79	-79.5	-78.5	-76.5	-78	-75.5	-78.5	-77	-78.5	-77.5	-78	-75		78
	64QAM StrongFEC	-76	-76	-76.5	-75.5	-74	-75	-73	-76.5	-73.5	-75.5	-74.5	-75	-72		104
	128QAM StrongFEC	-73	-73	-73.5	-72.5	-70.5	-72	-70	-72.5	-70.5	-72.5	-71.5	-72	-69		124
	256QAM StrongFEC	-70	-70	-69.5	-69.5	-65.5	-69	-66	-69.5	-68	-69	-68.5	-68	-66		145
	512QAM StrongFEC	-66.5	-67	-66.5	-65.5	-63	-66	-63	-66.5	-65	-66	-65.5	-64.5	-63		166
	1024QAM StrongFEC	-63	-63	-63.5	-61.5	-59	-62	-59	-63.5	-61.5	-62.5	-61.5	-61	-60		187
1024QAM WeakFEC	-61	-61	-61.5	-59.5	-58	-58	-57	-60.5	-59.5	-60	-59.5	-59	-57		198	
30	4QAM StrongFEC	-88	-88	-89	-87	-87	-87	-85	-88	-84.5	-87	-86.5	-86.5	-84		37
	16QAM StrongFEC	-82	-82	-83	-81.5	-79.5	-81	-78.5	-81.5	-79	-81.5	-80.5	-81	-78		73
	32QAM StrongFEC	-78	-79	-79	-77.5	-76.5	-77	-75	-78.5	-75	-77.5	-76.5	-77	-74		93
	64QAM StrongFEC	-76	-76	-76.5	-74.5	-74	-74	-72	-75.5	-73	-75	-74.5	-74	-71.5		123
	128QAM StrongFEC	-72	-73	-73	-71.5	-70	-71	-69	-72.5	-70	-71.5	-71.5	-71	-69		148
	256QAM StrongFEC	-69	-69	-69.5	-68.5	-67	-68	-66	-69	-67.5	-68.5	-67.5	-68	-65		173
	512QAM StrongFEC	-66	-66	-66.5	-65.5	-62.5	-65	-62	-66.5	-64.5	-65	-64.5	-64	-62		197
	1024QAM StrongFEC	-63	-62	-62.5	-61.5	-60	-61	-59	-62.5	-61.5	-61.5	-61	-60	-58		222
	1024QAM WeakFEC	-61	-61	-60.5	-58.5	-58	-58	-57	-60.5	-59.5	-60.5	-59	-58.5	-56		235
	2048QAM StrongFEC	-59	-60	-60.5	-58	-56.5	-56	-54.5	-58	-57	-58.5	-57	-57.5	-54	244	
40	4QAM StrongFEC	-86.5	-87	-87	-85	-86	-85.5	-83	-86	-83	-85.5	-85	-85.5	-82		51
	16QAM StrongFEC	-81	-81	-82	-79.5	-78.5	-79	-77	-80.5	-78	-80	-79.5	-79	-77		101
	32QAM StrongFEC	-77	-77	-78	-76.5	-75.5	-76	-73	-77	-74	-76	-75.5	-75.5	-73		129
	64QAM StrongFEC	-74	-74	-75	-73.5	-71	-73	-70	-74	-72	-73	-72.5	-72.5	-70		170
	128QAM StrongFEC	-71	-71	-72	-70.5	-70	-70	-67	-71	-69	-70	-69.5	-70	-67		204
	256QAM StrongFEC	-68	-68	-68	-67	-65	-66.5	-64.5	-67	-66	-67	-66.5	-65.5	-64		238
	512QAM StrongFEC	-65	-65	-65.5	-64	-62	-64	-61	-64.5	-63	-63.5	-63.5	-63	-61		272
	1024QAM StrongFEC	-61	-61	-61.5	-60.5	-59	-58	-57.5	-61.5	-59	-60.5	-59.5	-59.5	-56.5		306
	1024QAM WeakFEC	-60	-60	-59.5	-57.5	-57	-55	-55	-59.5	-57.5	-58.5	-58	-57.5	-55.5		323
	2048QAM StrongFEC	-58	-58	-58.5	-57	-54	-53	-54	-57.5	-55	-56.5	-55.5	-56	-53	336	
50	4QAM StrongFEC	-85	-86	-86	-84.5	-85.5	-85	-82	-85	-82.5	-85.5	-84	-84	-81.5	63	63
	16QAM StrongFEC	-80	-80	-80	-78.5	-78	-78	-76	-79.5	-77	-79.5	-78	-78	-76	128	130
	32QAM StrongFEC	-76	-76	-76	-74.5	-74.5	-75	-72	-75.5	-73	-75.5	-74.5	-74.5	-72.5	163	163
	64QAM StrongFEC	-73	-73.5	-74	-72.5	-71	-72	-69	-72	-71	-72.5	-71.5	-72	-69.5	212	216
	128QAM StrongFEC	-70	-70	-71	-69	-68	-69	-66	-70	-68	-69.5	-68	-69	-66.5	254	258
	256QAM StrongFEC	-67	-67	-67	-65.5	-64	-66	-63	-66	-64.5	-66.5	-65	-65	-63	297	301
	512QAM StrongFEC	-64	-63.5	-64	-63	-61	-63	-59	-63.5	-62	-63	-62	-62	-60	339	344
	1024QAM StrongFEC	-61	-61	-60	-60	-57	-58	-56	-60	-58.5	-59.5	-58.5	-58	-56	382	385
	1024QAM WeakFEC	-59	-59	-58.5	-56.5	-55	-55	-54	-57.5	-55.5	-57.5	-56	-56	-54		410
	2048QAM StrongFEC	-57	-57	-57.5	-56	-55	-53	-52.5	-56	-54	-56.5	-55.5	-55	-52	420	

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BW, MHz	Modulation	6GHz	7GHz	8GHz	11GHz	13GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	-G, -GS modes	Legacy modes
		Guaranteed RSL Threshold, dBm															
60	4QAM StrongFEC	-84	-85	-85.5	-83.5	-84.5	-84	-81	-85	-82	-84	-83.5	-83.5	-81	74	74	
	16QAM StrongFEC	-79	-79.5	-80	-78	-77	-78	-75	-78.5	-76	-78.5	-77	-77.5	-75	149	151	
	32QAM StrongFEC	-75	-75.5	-76	-74.5	-73	-74	-71	-75	-73	-74.5	-73.5	-74	-71	190	190	
	64QAM StrongFEC	-72	-73	-73	-71.5	-71	-71	-69	-72	-70	-71.5	-71	-71	-69	247	251	
	128QAM StrongFEC	-70	-69.5	-70	-68.5	-68	-68	-66	-69	-67	-69	-67.5	-68	-65	297	301	
	256QAM StrongFEC	-66	-66	-67	-65	-64	-65	-62	-66	-64.5	-65.5	-64.5	-65	-62	347	351	
	512QAM StrongFEC	-63	-63	-63	-62.5	-61	-62	-59	-62.5	-61.5	-62.5	-61	-61	-59	397	401	
	1024QAM StrongFEC	-60	-59	-60	-58.5	-58	-58	-55	-59	-57.5	-58.5	-57.5	-57	-54.5	447	451	
	1024QAM WeakFEC	-58			-57		-55	-53	-57	-55.5	-56.5	-55.5	-55.5	-53	474	474	
	2048QAM StrongFEC	-56	-56	-57	-54	-54	-54	-52	-55	-53	-55.5	-54.5	-54	-51.5	491		

⁶ 2048QAM modulation is available only for Integra-G and Integra-GS, not supported by legacy models

⁷ 1024QAM modulation with Weak FEC setting is available for legacy models or in legacy modes only

Integra-W /-WS RSL Threshold (dBm) and Link Capacity (Mbps) ⁹

BW, MHz	Modulation, Strong FEC	6L GHz	6U GHz	11GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	-W, -WS
		Guaranteed RSL Threshold, dBm												
40	4QAM	-82.5	-82.5	-82.5	-82	-79	-83.5	-80.5	-80	-82	-82.5	-79	63	
	8QAM	-79	-79	-78	-77.5	-76	-80.5	-76.5	-75.5	-78	-78.5	-75	94	
	16QAM	-76	-76	-75.5	-75	-73	-76.5	-74.5	-72.5	-75	-74.5	-72.5	126	
	32QAM	-73	-73	-73	-72.5	-70	-74	-71.5	-70	-72	-72	-69.5	157	
	64QAM	-70	-70	-70	-69.5	-67.5	-71.5	-69.5	-66.5	-69	-69	-66.5	189	
	128QAM	-67	-67	-67	-66.5	-64.5	-68	-65.5	-64	-66	-66.5	-63.5	220	
	256QAM	-64	-64	-64	-63.5	-61	-63.5	-62.5	-60.5	-63	-61.5	-60.5	252	
	512QAM	-61	-61	-60	-59.5	-58	-59.5	-59.5	-57.5	-60	-59.5	-57.5	284	
	1024QAM	-57	-57	-56.5	-56	-55	-55.5	-57	-54	-56	-55.5	-53	315	
	50	4QAM	-82	-82	-82	-81.5	-79	-82.5	-79.5	-79	-81	-81	-78.5	78
8QAM		-78	-78	-77	-76.5	-75	-79	-75.5	-75	-77	-77	-74.5	118	
16QAM		-75	-75	-75	-74.5	-72	-76.5	-74.5	-72	-74	-74	-72	157	
32QAM		-72	-72	-72	-71.5	-69.5	-73.5	-71.5	-69	-71	-71	-69	197	
64QAM		-69	-69	-69	-68.5	-66.5	-70.5	-68.5	-66	-68	-68.5	-66	236	
128QAM		-66	-66	-66	-65.5	-63.5	-65.5	-65.5	-62.5	-65.5	-66.5	-64	276	
256QAM		-63	-63	-63	-62.5	-60	-62.5	-61.5	-60	-62	-62	-60	315	
512QAM		-60	-60	-60	-59.5	-57.5	-58.5	-58.5	-57	-59	-59	-57	355	
1024QAM		-56	-56	-56	-55.5	-54	-55.5	-55.5	-53	-55	-54.5	-52.5	394	
56		4QAM	-81.5	-81.5	-81	-80.5	-78.5	-82.5	-80	-78	-80	-80.5	-77.5	89
	8QAM	-77	-77	-76	-75.5	-74.5	-78	-75.5	-73	-76	-76.5	-73.5	134	
	16QAM	-74.5	-74.5	-74	-73.5	-72	-75.5	-74	-71	-74	-74	-71	178	
	32QAM	-71.5	-71.5	-71	-70.5	-69	-72.5	-70.5	-68.5	-71	-71.5	-69.5	224	
	64QAM	-68.5	-68.5	-68.5	-68	-66	-68.5	-67.5	-65	-68	-68	-66	269	
	128QAM	-65	-65	-65	-64.5	-63	-65.5	-65	-62	-65	-65	-62	314	
	256QAM	-62.5	-62.5	-62.5	-62	-60	-61.5	-61.5	-59	-62	-62.5	-59.5	359	
	512QAM	-59.5	-59.5	-59	-58.5	-57	-58.5	-58.5	-56	-58	-59	-56	404	
	1024QAM	-55	-55	-55.5	-55	-53	-54.5	-55	-52.5	-55	-55.5	-52.5	449	
	60	4QAM	-81	-81	-81	-80.5	-78.5	-81.5	-80.5	-78	-80	-80	-77.5	96
8QAM		-76.5	-76.5	-76	-75.5	-74	-78	-75.5	-74	-76	-76	-73.5	144	
16QAM		-74.5	-74.5	-74	-73.5	-71.5	-75.5	-73.5	-71	-74	-74.5	-72	192	
32QAM		-71.5	-71.5	-71	-70.5	-68.5	-72.5	-70.5	-68	-71	-71.5	-68.5	240	
64QAM		-68.5	-68.5	-67.5	-67	-64.5	-67.5	-67.5	-65	-67	-67	-65	288	
128QAM		-65	-65	-65	-64.5	-62.5	-65.5	-64.5	-62	-65	-65.5	-62.5	336	
256QAM		-62.5	-62.5	-62	-61.5	-59.5	-61.5	-61.5	-59	-61	-61.5	-58.5	385	
512QAM		-59	-59	-58	-57.5	-56.5	-58.5	-58.5	-55.5	-58	-58	-56	433	
1024QAM		-55	-55	-55	-54.5	-53	-54.5	-55	-52	-55	-54.5	-52	481	
80		4QAM	-79.5	-79.5	-79.5	-79	-77.5	-81	-78.5	-76	-79	-79	-76.5	128
	8QAM	-75.5	-75.5	-74	-73.5	-72.5	-77	-75	-73	-75	-75	-72.5	192	
	16QAM	-72.5	-72.5	-72	-71.5	-70	-74.5	-71.5	-70	-72	-72	-69.5	257	
	32QAM	-69.5	-69.5	-69	-68.5	-67.5	-71.5	-68.5	-67	-69	-69	-66.5	321	
	64QAM	-66.5	-66.5	-66.5	-66	-64.5	-67.5	-65.5	-64	-66	-66	-63.5	385	
	128QAM	-63.5	-63.5	-63.5	-63	-61	-64	-62.5	-61	-63	-63	-60.5	450	
	256QAM	-60.5	-60.5	-60.5	-60	-58	-60.5	-59.5	-58	-60	-60	-57.5	514	
	512QAM	-57.5	-57.5	-57	-56.5	-55	-57	-56.5	-54	-56.5	-56.5	-54	578	
	1024QAM	-53.5	-53.5	-53.5	-53	-51.5	-53.5	-53	-51	-53.5	-53.5	-51	643	

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BW, MHz	Modulation, Strong FEC	6L	6U	11GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	28GHz	38 GHz	Capacity, Mbps	
		GHz	GHz											
		Guaranteed RSL Threshold, dBm											-W, -WS	
100 ⁹	4QAM	-78.5	-78.5	-79	-78.5	-	-80	-77.5	-	-78.5	-78.5	-76	168	
	8QAM	-74.5	-74.5	-74	-73.5	-	-76	-73.5	-	-73.5	-73.5	-71	252	
	16QAM	-71.5	-71.5	-71	-70.5	-	-73	-70.5	-	-71.5	-71.5	-69	336	
	32QAM	-68.5	-68.5	-69	-68.5	-	-70	-67.5	-	-68.5	-68.5	-66	420	
	64QAM	-65.5	-65.5	-65.5	-65	-	-66	-64.5	-	-65.5	-65.5	-63	504	
	FCC	128QAM	-63	-63	-63	-62.5	-	-63	-61.5	-	-62.5	-62.5	-60	588
	256QAM	-59.5	-59.5	-59.5	-59	-	-60	-58.5	-	-58.5	-58.5	-56	672	
	512QAM	-56	-56	-56	-55.5	-	-56	-55.5	-	-56.5	-56.5	-54	756	
	1024QAM	-52	-52	-51	-50.5	-	-51.5	-52	-	-51.5	-51.5	-49	840	
112 ⁹	4QAM	-78.5	-78.5	-77.5	-77	-	-79.5	-77.5	-	-77.5	-77.5	-75	176	
	8QAM	-73.5	-73.5	-73.5	-73	-	-76	-73	-	-73	-73	-70.5	265	
	16QAM	-71.5	-71.5	-71	-70.5	-	-73	-70.5	-	-70.5	-70.5	-68	359	
	32QAM	-68.5	-68.5	-68	-67.5	-	-70	-67.5	-	-67.5	-67.5	-65	441	
	64QAM	-65	-65	-65	-64.5	-	-66	-64.5	-	-64.5	-64.5	-62	530	
	ETSI	128QAM	-62.5	-62.5	-62	-61.5	-	-63	-61.5	-	-61.5	-61.5	-59	618
	256QAM	-59.5	-59.5	-59	-58.5	-	-59	-58.5	-	-58.5	-58.5	-56	707	
	512QAM	-54.5	-54.5	-56	-55.5	-	-56	-54.5	-	-54.5	-54.5	-52	795	
	1024QAM	-52	-52	-51.5	-51	-	-51.5	-51	-	-51.5	-51.5	-49	883	

⁹ 100 MHz and 112 MHz channel bandwidths are available for all Integra-W/-WS models except 17GHz and 24GHz UL.

High Performance integrated antenna specification

Size	Frequency, GHz	Gain, dBi	Half power beamwidth	XPD dB	F/B ratio, dB	Compliance	
						ETSI	FCC
0.3m	15	32.1	4.3°	30	58	Class 3	N/A
	17	33.4	3.5°	30	60	Class 3	B2
	18	34.2	3.3°	30	61	Class 3	B2
	23	35.3	3.0°	30	62	Class 3	A
	24	36.1	2.6°	30	62	Class 3	N/A
	26	36.6	2.5°	30	63	Class 3	N/A
	38	40.1	1.6°	30	61	Class 3B	A
	42	40.8	1.5°	30	60	Class 3	A
0.6m	15	37.5	2.4°	30	62.5	Class 3	N/A
	17	38.2	2.3°	30	65	Class 3	A
	18	39.1	1.9°	30	64.5	Class 3	A
	23	41.4	1.6°	30	66.5	Class 3	A
	24	41.1	1.4°	30	66	Class 3	N/A
	26	41.6	1.5°	30	68	Class 3	A
	38	45.2	0.9°	30	64	Class 3B	A
	42	46	0.8°	30	65	Class 3	A