

# 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 and 1588v2 PTP 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, Integra-S	Integra-G, Integra-GS	Integra-W, Integra-WS	
<b>General</b>					
Concept / form factor		FODU with antenna or FODU Slip-fit			
Frequency bands		6GHz, 7GHz*, 11GHz, 15GHz, 17GHz UL, 18GHz, 23GHz, 24GHz UL, 25GHz, 26GHz, 28GHz, 32GHz*, 38GHz, 42GHz and more*			
Frequency stability		± 10 ppm			
Capacity		up to <b>1Gbps*</b> with HC at 1+0 or 2+0		883 Mbps at 112 MHz 1024 QAM	
		474 Mbps at 60 MHz	491 Mbps at 60 MHz	643 Mbps at 80 MHz 1024 QAM (for Integra-WS 17GHz and 24GHz)	
Max modulation		1024QAM	2048QAM	1024QAM	
Configurations		1+0, 2+0 link bonding		1+0	
ATPC		Yes		Yes	
Channel bandwidth		ETSI: from 3.5 MHz up to 56 MHz FCC: from 5 MHz up to 60 MHz		ETSI: from 56 MHz up to 112 MHz FCC: from 40 MHz up to 80 MHz	
<b>Ports</b>					
Gigabit Ethernet	1x RJ-45	Electrical with built-in PoE splitter and surge arrestor		2x RJ-45	Electrical with built-in PoE splitter and surge arrestor
	2x SFP	Fiber Optics		1x SFP	Alternative to 1xRJ-45
Service ports	3.5mm	Audible alignment and RSSI			
	USB B	RS232 serial over USB B-Type			
	LED	Power On, Link Synchronization, RSL			
<b>Ethernet</b>					
Ethernet		Built-in Carrier Ethernet Gigabit Network Processor		Unmanaged Gigabit Ethernet	
Gigabit Switch functionality		802.1Q VLANs with QoS/CoS incl. <i>WRED*</i> , shaping, DWRR and on MPLS-TP exp bit; <i>Spanning Tree Protocol*</i> , Jumbo frames and more*		Transparent	
Synchronization		SyncE, <i>IEEE 1588v2 PTP*</i>		<i>SyncE*</i> , <i>IEEE 1588v2 PTP*</i>	
Carrier Ethernet functionality		Provider Bridging, MEF9&14, High Efficiency Header Compression, <i>OAM*</i>		Transparent	
Jumbo frames		Yes, 9600 bytes		Yes, 9600 bytes	
Encryption		AES 256-bit encryption		-	
Management		SNMP v1/2c/3, SSH, Telnet, HTTPS, Serial, RADIUS, Network Time Protocol		In-band MNG over same ETH port	
		In-band MNG over same ETH port		Out-of-band MNG over separate port	
Performance monitoring		Performance graphs, constellation diagram, alarms, detailed counters			
<b>Electrical</b>					
Power consumption		31...74 W depending on model and frequency band. See table below.			
Voltage range	Integra	36...57 V DC			
	PoE Injector <sup>1</sup>	36...60 V DC all Integra models; 22...60 V DC models with ≤50 W consumption			
Temperature range		-33...+55 °C / -28...+130 °F			

\* Inquire SAF representative for more information

<sup>1</sup> Voltage range using IOATPI24 Power over Ethernet Injector

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## Mechanical specification

		Integra, Integra-G, Integra-W		Integra-S, Integra-GS, Integra-WS
Antenna		0.3m / 1ft	0.6m / 2ft	External antenna
<b>Mechanical &amp; Environmental</b>				
Antenna performance		High Performance and <i>Super High Performance</i> *		
Stationary use		Conforms to ETSI EN 300 019 Class 4.1, IP66, NEMA 4X		
Size, 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, 6/7/11 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, 6/7/11 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 at 48V DC<sup>2</sup>

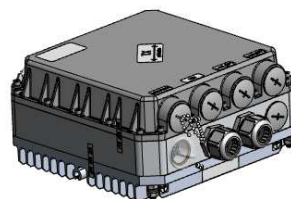
Model	L6 GHz	U6, 7 GHz	11 GHz	15 GHz	17 GHz	18 GHz	23 GHz	24 GHz	38 GHz
Integra, Integra-S	74W	69W <sup>2)</sup>	65W	35W	31W	35W	36W	33W	42W
Integra-W, Integra-WS	70W <sup>3</sup>	64W	51W	31W <sup>3</sup>	-	31W	32W <sup>3</sup>	-	38W <sup>3</sup>

<sup>2</sup> Power consumption for 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.

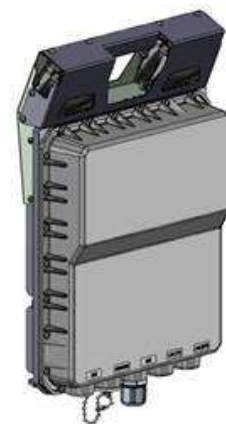
<sup>3</sup> Preliminary data



General design



Integra-WS 17GHz, 24GHz



6GHz, 7GHz, 11GHz

Integra, Integra-G, Integra-W

Integra-S, Integra-GS, Integra-WS

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## Maximum Tx Power for Integra, Integra-S, Integra-G and Integra-GS

Modulation	Tx power, dBm						
	L6, U6 GHz <sup>2</sup>	11 GHz <sup>2</sup>	15, 18, 23, 25, 26 GHz	17 GHz <sup>4</sup> , 24 GHz <sup>4</sup>	28, 32 GHz <sup>3</sup>	38 GHz	42 GHz
4 QAM	+31	+26	+20	-26 ... +5	+20	+15	+10
16 QAM	+30	+25	+19	-26 ... +5	+19	+14	+9
32 QAM	+29	+24	+18	-26 ... +5	+18	+14	+9
64 QAM	+28	+23	+17	-26 ... +5	+17	+13	+8
128 QAM	+28	+23	+17	-26 ... +5	+17	+13	+8
256 QAM	+27	+22	+16	-26 ... +5	+16	+12	+7
512 QAM	+26	+21	+15	-26 ... +5	+15	+11	+6
1024 QAM	+23	+18	+12	-26 ... +5	+12	+10	+5
2048 QAM <sup>5</sup>	+22	+17	+11	-26 ... +5	+11	+9	+3

<sup>3</sup> Preliminary data

<sup>4</sup> Max Tx power settings depend on EIRP allowed by national regulatory and antenna size.

<sup>5</sup> 2048QAM modulation available only for Integra-G and Integra-GS.

## Maximum Tx Power for Integra-W and Integra-WS

Modulation	Tx power, dBm							
	L6 GHz	U6 GHz	11 GHz	15, 18, 23, 25, 26 GHz	17 GHz <sup>4</sup> , 24 GHz <sup>4</sup>	28, 32 GHz <sup>3</sup>	38 GHz	42 GHz
4 QAM	+33	+31	+28	+22	-26 ... +5	+22	+17	+11
16 QAM	+32	+30	+27	+21	-26 ... +5	+21	+17	+11
32 QAM	+32	+30	+27	+21	-26 ... +5	+21	+17	+11
64 QAM	+31	+29	+26	+20	-26 ... +5	+20	+16	+9
128 QAM	+31	+29	+26	+20	-26 ... +5	+20	+16	+9
256 QAM	+30	+28	+25	+19	-26 ... +5	+19	+15	+8
512 QAM	+30	+28	+25	+19	-26 ... +5	+19	+15	+8
1024 QAM	+28	+26	+23	+17	-26 ... +5	+17	+14	+7

<sup>3</sup> Preliminary data.

<sup>4</sup> Max Tx power settings depend on EIRP allowed by national regulatory and antenna size.

# Integra, -S, -G,-GS RSL Thresholds and Capacity for ETSI channels <sup>5, 6</sup>

Bandwidth, MHz	Modulation	Guaranteed RSL Threshold, dBm									Capacity, Mbps	
		6GHz	11GHz	15GHz	17GHz	18GHz	23GHz	24GHz	38 GHz	42 GHz	Integra-GS	-S / -GS
3.5	4QAM StrongFEC	-97	-96	-95.5	-91	-96	-96	-96,5	-92	-96		4
	16QAM StrongFEC	-90	-89	-88.5	-84,5	-89,5	-89	-89,5	-86	-89		8
	32QAM StrongFEC	-86	-85	-84	-80	-85,5	-84,5	-85,5	-82	-85		10
	64QAM StrongFEC	-83,5	-82,5	-81,5	-77	-82,5	-81,5	-83	-79	-81,5		13
	128QAM StrongFEC	-80	-79	-77,5	-73,5	-78,5	-77	-79,5	-76	-79		16
	128QAM WeakFEC	-77,5	-76	-73,5	-70,5	-76,5	-75	-77,5	-74	-76,5		17
7	4QAM StrongFEC	-94	-93	-93	-88,5	-94	-93	-93,5	-90,5	-93		8
	16QAM StrongFEC	-87	-86,5	-86	-81,5	-87,5	-86	-87	-84	-86		16
	32QAM StrongFEC	-84	-83,5	-82,5	-78	-83,5	-82	-83,5	-80	-82,5		20
	64QAM StrongFEC	-80,5	-80,5	-80	-75	-80,5	-80	-80,5	-77,5	-79,5		27
	128QAM StrongFEC	-77	-76,5	-76	-71,5	-77,5	-77	-77,5	-74	-76,5		33
	256QAM StrongFEC	-74	-73,5	-73	-68,5	-74,5	-72	-73,5	-71	-72,5		39
256QAM WeakFEC	-72	-71,5	-70	-66,5	-72,5	-71	-71,5	-69	-70,5		41	
14	4QAM StrongFEC	-91	-90,5	-90	-85,5	-91	-87,5	-91	-87	-90,5		17
	16QAM StrongFEC	-85	-84	-83,5	-79,5	-84,5	-82	-84	-81	-83,5		33
	32QAM StrongFEC	-80	-80	-79	-74,5	-80,5	-78	-80	-77	-79		44
	64QAM StrongFEC	-78	-77	-77	-72,5	-78,5	-76	-78	-74	-77		56
	128QAM StrongFEC	-75	-74	-74	-69,5	-75,5	-73	-74,5	-71	-73,5		67
	256QAM StrongFEC	-71,5	-71	-71	-65,5	-71,5	-69,5	-71	-69	-70,5		79
	512QAM StrongFEC	-68,5	-67	-67	-62,5	-68,5	-67	-67,5	-65	-67		90
	512QAM WeakFEC	-65,5	-64,5	-64	-59,5	-65,5	-63	-65	-62	-64		97
20	4QAM StrongFEC	-89	-88,5	-88,5	-83,5	-89,5	-86	-89	-86	-89		25
	16QAM StrongFEC	-83	-83	-82,5	-77,5	-83,5	-81	-83	-79,5	-82,5		51
	32QAM StrongFEC	-80	-79	-78	-74,5	-79,5	-77	-79	-75,5	-78		64
	64QAM StrongFEC	-77	-76,5	-76	-71	-77	-75	-77	-73	-76		85
	128QAM StrongFEC	-74	-73	-73	-68,5	-74	-72	-73	-70	-72,5		102
	256QAM StrongFEC	-70,5	-69,5	-69,5	-64,5	-70,5	-68,5	-70	-67	-69		119
	512QAM StrongFEC	-67,5	-67	-66	-61,5	-67,5	-65,5	-67	-63,5	-66		136
	1024QAM StrongFEC	-64	-62,5	-63	-58,5	-64,5	-62	-63	-60	-62,5		153
	1024QAM WeakFEC	-62	-61	-60	-55,5	-62,5	-59,5	-61	-58	-60		163
28	4QAM StrongFEC	-88	-88	-87	-82,5	-88	-84	-88	-85	-87	34	35
	16QAM StrongFEC	-82	-81,5	-81	-76,5	-82,5	-79,5	-82	-78	-81	69	69
	32QAM StrongFEC	-79	-77,5	-77	-72,5	-78,5	-75,5	-78	-74	-77	87	88
	64QAM StrongFEC	-76	-75,5	-75	-69,5	-75,5	-73,5	-75	-72	-74,5	114	115
	128QAM StrongFEC	-73	-71,5	-72	-66,5	-72,5	-70,5	-72	-69	-71	137	138
	256QAM StrongFEC	-70	-68,5	-68	-63,5	-69,5	-67,5	-69	-65	-67,5	160	161
	512QAM StrongFEC	-66,5	-65	-65	-60,5	-66,5	-64	-65	-62	-64,5	183	184
	1024QAM StrongFEC	-63	-62	-61,5	-56,5	-63,5	-61	-62	-58	-61	206	207
	1024QAM WeakFEC	-61	-59,5	-59	-54,5	-60,5	-59,5	-60	-56	-59		220
	2048QAM StrongFEC	-59	-58	-58	-52	-59	-57	-59	-54	-57	226	
40	4QAM StrongFEC	-86,5	-85	-85,5	-80,5	-86,5	-83	-85,5	-83	-85,5	50	50
	16QAM StrongFEC	-81	-79,5	-79,5	-74,5	-81	-78,5	-80	-76,5	-79,5	98	98
	32QAM StrongFEC	-77	-76,5	-75,5	-70,5	-77	-74,5	-76	-73	-75,5	125	125
	64QAM StrongFEC	-74	-73,5	-73	-68,5	-74	-72	-73	-70,5	-73	165	165
	128QAM StrongFEC	-71	-70,5	-70,5	-64,5	-71	-69	-70	-67	-69,5	198	198
	256QAM StrongFEC	-68	-67	-66,5	-61,5	-68	-66	-67	-63,5	-66	231	231
	512QAM StrongFEC	-65	-64	-63,5	-58,5	-65	-63	-63,5	-60,5	-63	264	264
	1024QAM StrongFEC	-61	-60,5	-60	-55,5	-61,5	-59,5	-60,5	-56,5	-59,5	298	298
	1024QAM WeakFEC	-59	-59	-57	-52,5	-59	-57,5	-58,5	-55	-57,5		314
	2048QAM StrongFEC	-58	-56,5	-56	-51,5	-57,5	-55,5	-56,5	-52,5	-54,5	336	
56	4QAM StrongFEC	-85	-84	-84	-78,5	-85	-82	-84	-81	-84	71	72
	16QAM StrongFEC	-79	-78,5	-78	-72,5	-79	-77	-78,5	-75	-77,5	144	145
	32QAM StrongFEC	-75	-74,5	-74	-68,5	-75	-73	-74,5	-72	-73,5	183	183
	64QAM StrongFEC	-72	-72	-71	-65,5	-72	-70	-72,5	-69	-71	238	241
	128QAM StrongFEC	-70	-68,5	-69	-62,5	-69	-67,5	-69,5	-65	-67,5	286	289
	256QAM StrongFEC	-67	-65,5	-65	-59,5	-66	-64,5	-65,5	-62	-64,5	334	337
	512QAM StrongFEC	-63	-62	-62	-56,5	-63	-61,5	-62,5	-59	-61	382	385
	1024QAM StrongFEC	-60	-58,5	-58	-52,5	-59	-57,5	-59,5	-55	-57,5	430	433
	1024QAM WeakFEC	-58	-57	-55	-50,5	-57,5	-55,5		-54	-55,5		456
	2048QAM StrongFEC	-56	-54,5	-54		-55	-53,5	-55,5	-52	-53	472	

<sup>5</sup> 2048QAM modulation is available only for Integra-G and Integra-GS.

<sup>6</sup> 1024QAM modulation with Weak FEC setting is available for Integra and Integra-S models only.



# Integra, -S, -G,-GS RSL Thresholds and Capacity for FCC channels <sup>5, 6</sup>

Bandwidth	Modulation	6GHz	11GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	38 GHz	42 GHz	Capacity, Mbps	
		Guaranteed RSL Threshold, dBm										Integra- GS	-S, -GS
5	4QAM StrongFEC	-96	-95	-94	-90,5	-95	-94	-95,5	-94,5	-91	-94,5		5
	16QAM StrongFEC	-89	-88	-87	-83,5	-88,5	-88	-89	-87,5	-85	-87,5		10
	32QAM StrongFEC	-85	-84	-83,5	-79,5	-84,5	-84	-85	-83,5	-81	-84		12
	64QAM StrongFEC	-82,5	-81,5	-80,5	-76,5	-81,5	-81	-82	-81	-79	-80,5		17
	128QAM StrongFEC	-79	-78,5	-77,5	-73,5	-78,5	-77,5	-79	-78	-75	-77,5		20
	128QAM WeakFEC	-77	-76,5	-74	-71	-76,5	-75,5	-76,5	-75,5	-73	-75,5		22
10	4QAM StrongFEC	-92	-91	-91	-86,5	-92	-90	-92	-91,5	-89	-91		12
	16QAM StrongFEC	-86	-85	-84,5	-80,5	-85,5	-84	-85,5	-84,5	-82	-85		24
	32QAM StrongFEC	-82	-81,5	-81	-76,5	-82,5	-80	-82	-81	-78	-80,5		30
	64QAM StrongFEC	-79,5	-79	-78	-73,5	-79,5	-78	-79	-78	-76	-78		40
	128QAM StrongFEC	-76	-75,5	-75	-70	-76,5	-75	-76	-75	-73	-74,5		48
	256QAM StrongFEC	-73	-72	-72	-67	-72,5	-71	-72,5	-71,5	-70	-71,5		56
256QAM WeakFEC	-70	-69	-69	-64,5	-70,5	-68	-69,5	-68,5	-66	-68,5		60	
20	4QAM StrongFEC	-89	-88,5	-88,5	-83,5	-89	-86,5	-89	-88,5	-86	-88,5		24
	16QAM StrongFEC	-83	-83	-83	-77,5	-83,5	-81	-83	-82,5	-80	-82,5		49
	32QAM StrongFEC	-80	-79	-79	-74,5	-79,5	-77	-79	-78,5	-77	-78,5		62
	64QAM StrongFEC	-77	-76,5	-76	-71	-76,5	-74,5	-77	-75,5	-73	-75,5		82
	128QAM StrongFEC	-74	-73	-73	-68,5	-73,5	-71,5	-73	-72,5	-71	-72,5		99
	256QAM StrongFEC	-70,5	-69,5	-70	-64,5	-70,5	-68,5	-70	-69,5	-67,5	-69		115
	512QAM StrongFEC	-67,5	-67	-66	-61,5	-67,5	-65,5	-67	-66	-64	-66		132
	1024QAM StrongFEC	-64	-62,5	-63	-58,5	-64,5	-62,5	-63	-62,5	-61	-62		148
1024QAM WeakFEC	-62	-61	-60	-55,5	-62,5	-59,5	-61	-60,5	-58	-60		157	
25	4QAM StrongFEC	-88	-88	-88	-82,5	-88	-85	-88	-87,5	-85	-87,5		31
	16QAM StrongFEC	-82	-82,5	-82	-76,5	-82,5	-80	-82	-81,5	-79	-81,5		62
	32QAM StrongFEC	-79	-78,5	-78	-73,5	-78,5	-77	-78,5	-77,5	-75	-77		78
	64QAM StrongFEC	-76	-75,5	-75	-70,5	-76,5	-73,5	-75,5	-74,5	-72	-75		104
	128QAM StrongFEC	-73	-72,5	-72	-67,5	-72,5	-70,5	-72,5	-71,5	-69	-71,5		124
	256QAM StrongFEC	-70	-69,5	-69	-63,5	-69,5	-68	-69	-68,5	-66	-68		145
	512QAM StrongFEC	-66,5	-65,5	-66	-60,5	-66,5	-65	-66	-65,5	-63	-65		166
	1024QAM StrongFEC	-63	-61,5	-62	-57,5	-63,5	-61,5	-62,5	-61,5	-60	-61		187
1024QAM WeakFEC	-61	-59,5	-58	-55,5	-60,5	-59,5	-60	-59,5	-57	-59		198	
30	4QAM StrongFEC	-88	-87	-87	-81,5	-88	-84,5	-87	-86,5	-84	-86,5		37
	16QAM StrongFEC	-82	-81,5	-81	-76,5	-81,5	-79	-81,5	-80,5	-78	-80,5		73
	32QAM StrongFEC	-78	-77,5	-77	-72,5	-78,5	-75	-77,5	-76,5	-74	-77		93
	64QAM StrongFEC	-76	-74,5	-74	-69,5	-75,5	-73	-75	-74,5	-71,5	-74		123
	128QAM StrongFEC	-72	-71,5	-71	-66,5	-72,5	-70	-71,5	-71,5	-69	-71		148
	256QAM StrongFEC	-69	-68,5	-68	-63,5	-69	-67,5	-68,5	-67,5	-65	-67,5		173
	512QAM StrongFEC	-66	-65,5	-65	-59,5	-66,5	-64,5	-65	-64,5	-62	-64,5		197
	1024QAM StrongFEC	-63	-61,5	-61	-56,5	-62,5	-61,5	-61,5	-61	-58	-61		222
	1024QAM WeakFEC	-61	-60	-58	-54,5	-60,5	-59,5	-60,5	-59	-56	-59		235
	2048QAM StrongFEC	-59	-58	-56	-52	-58	-57	-58,5	-57	-54	-57	244	
40	4QAM StrongFEC	-86,5	-85	-85,5	-80,5	-86	-83	-85,5	-85	-82	-85		51
	16QAM StrongFEC	-81	-79,5	-79	-74,5	-80,5	-78	-80	-79,5	-77	-79		101
	32QAM StrongFEC	-77	-76,5	-76	-70,5	-77	-74	-76	-75,5	-73	-75,5		129
	64QAM StrongFEC	-74	-73,5	-73	-68,5	-74	-72	-73	-72,5	-70	-72,5		170
	128QAM StrongFEC	-71	-70,5	-70	-64,5	-71	-69	-70	-69,5	-67	-69,5		204
	256QAM StrongFEC	-68	-67	-66,5	-61,5	-67	-66	-67	-66,5	-64	-66		238
	512QAM StrongFEC	-65	-64	-64	-58,5	-64,5	-63	-63,5	-63,5	-61	-63		272
	1024QAM StrongFEC	-61	-60,5	-58	-55,5	-61,5	-59	-60,5	-59,5	-56,5	-59,5		306
	1024QAM WeakFEC	-60	-59	-55	-52,5	-59,5	-57,5	-58,5	-58	-55,5	-57,5		323
	2048QAM StrongFEC	-58	-57	-53	-51,5	-57,5	-55	-56,5	-55,5	-53	-55,5	336	
50	4QAM StrongFEC	-85	-84,5	-85	-79,5	-85	-82,5	-85,5	-84	-81,5	-84,5	63	63
	16QAM StrongFEC	-80	-78,5	-78	-72,5	-79,5	-77	-79,5	-78	-76	-78	128	130
	32QAM StrongFEC	-76	-74,5	-75	-69,5	-75,5	-73	-75,5	-74,5	-72,5	-74,5	163	163
	64QAM StrongFEC	-73	-72,5	-72	-66,5	-72	-71	-72,5	-71,5	-69,5	-71	212	216
	128QAM StrongFEC	-70	-69	-69	-63,5	-70	-68	-69,5	-68	-66,5	-66	254	258
	256QAM StrongFEC	-67	-65,5	-66	-60,5	-66	-64,5	-66,5	-65	-63	-64,5	297	301
	512QAM StrongFEC	-64	-63	-63	-56,5	-63,5	-62	-63	-62	-60	-61,5	339	344
	1024QAM StrongFEC	-61	-60	-58	-53,5	-60	-58,5	-59,5	-58,5	-56	-58,5	382	385
	1024QAM WeakFEC	-59	-57	-55	-50,5	-57,5	-55,5	-57,5	-55	-54	-56		410
	2048QAM StrongFEC	-57	-56	-53	-49	-56	-54	-56,5	-54	-52	-54,5	420	

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 24a Ganibu Dambis, Riga LV-1005, Latvia



		6GHz	11GHz	15GHz	17GHz	18GHz	23GHz	24GHz	26GHz	38 GHz	42 GHz	Capacity, Mbps	
Bandwidth	Modulation	Guaranteed RSL Threshold, dBm										Integra-GS	-S, -GS
		60	4QAM StrongFEC	-84	-83,5	-84	-78,5	-85	-82	-84	-83,5		
16QAM StrongFEC	-79		-78	-78	-72,5	-78,5	-76	-78,5	-77	-75	-77	149	151
32QAM StrongFEC	-75		-74,5	-74	-68,5	-75	-73	-74,5	-73,5	-71	-73,5	190	190
64QAM StrongFEC	-72		-71,5	-71	-65,5	-72	-70	-71,5	-71	-69	-70,5	247	251
128QAM StrongFEC	-70		-68,5	-68	-62,5	-69	-67	-69	-67,5	-65	-67,5	297	301
256QAM StrongFEC	-66		-65	-65	-59,5	-66	-64,5	-65,5	-64,5	-62	-64	347	351
512QAM StrongFEC	-63		-62,5	-62	-56,5	-62,5	-61,5	-62,5	-61	-59	-61	397	401
1024QAM StrongFEC	-60		-58,5	-58	-52,5	-59	-57,5	-58,5	-57,5	-54,5	-57,5	447	451
1024QAM WeakFEC	-58		-57	-55	-49,5	-57	-55,5	-56,5	-55,5	-53	-55,5	474	474
2048QAM StrongFEC	-56		-54	-54	-48	-55	-53	-55,5	-53	-51,5	-53,5	491	

<sup>5</sup> 2048QAM modulation is available only for Integra-G and Integra-GS.

<sup>6</sup> 1024QAM modulation with WeakFEC setting is available for Integra and Integra-S models only.

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

Modulation	ETSI channels				FCC channels									
	56 MHz		112 MHz <sup>7</sup>		40 MHz		50 MHz		60 MHz		80 MHz		100 MHz <sup>7</sup>	
	RSL	Mbps	RSL	Mbps	RSL	Mbps	RSL	Mbps	RSL	Mbps	RSL	Mbps	RSL	Mbps
4QAM	-82.0	89	-79.0	176	-83.5	63	-83.0	78	-82.0	96	-80.5	128	-79.5	168
8QAM	-78.0	134	-75.0	265	-79.5	94	-78.5	118	-77.5	144	-76.5	192	-75.5	252
16QAM	-75.5	178	-72.0	359	-77.0	126	-76.0	157	-75.0	192	-74.0	257	-72.5	336
32QAM	-72.5	224	-69.5	441	-74.0	157	-73.0	197	-72.0	240	-70.5	321	-69.5	420
64QAM	-69.5	269	-66.5	530	-71.0	189	-70.0	236	-69.0	288	-68.0	385	-67.0	504
128QAM	-66.5	314	-63.5	618	-68.0	220	-67.0	276	-66.5	336	-64.5	450	-64.0	588
256QAM	-63.5	359	-60.5	707	-65.0	252	-64.0	315	-63.5	385	-62.0	514	-60.5	672
512QAM	-60.5	404	-57.0	795	-62.0	284	-61.0	355	-60.0	433	-58.5	578	-57.5	756
1024QAM	-57.0	449	-53.5	883	-58.5	315	-57.5	394	-57.0	481	-55.0	643	-54.0	840

<sup>7</sup> 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



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