HORIZON QUANTUM

High Capacity Packet Microwave System

FEATURES

Capacity w/Accelerator	Variable from 10 to 2000 Mbps full duplex CIR
	2X capacity up to 4 Gbps with DPRM
Base Capacity	Variable from 10 to 800 Mbps full duplex CIR
	2X capacity up to 1.6 Gbps with DPRM
Interface	6X10/100/1000bT + 2 SFP Ports
Latency GigE	< 120µs @ 256QAM, 50 MHz
Packet Size	64 to 9600 Bytes
Flow Control	Yes
Prioritization	8 levels served by 4 queues, based on 802.1p/q, MPLS, DSCP ToS Bits
Modulation Shifting	Yes, Hitless
Loopback	Yes, IF, Modem, Microwave loopback
XPIC	Yes, enables Co-Channel Cross Polarization
Synchronization	SyncE ready

POWER

Input	-36 VDC to -60 VDC
Optional Adapter	110/240 VAC
Consumption	
Sinble Channel, Single Radio	<105 Watts
Dual Channel, Single Radio	<122 Watts
Dual Channel, Dual Radio	<171 Watts

CONNECTIONS (IDU)

Power	Dual Feed 48V
Data	6XRJ45 (100/1000bT) + 2 x SFP
IF Cable	N-Type femal connector
CTL Port	RJ45 (RS232)

CONNECTIONS (ODU)

IF Cable	N-Type female connector
Alignment Port	BNC female connector

NETWORK MANAGEMENT (NMS)

Management Access	In or out of band
Alarm Management	SNMP Traps, Enterprise MIB
NMS Compatibility	DragonVision NMS; any SNMP based network manager; SNMP v1, v2c, v3
Security	3 Level Authentication, Radius, SSL, SSH
EMS	Web based management system
OAM Protocols	802.1ag, 802.3ah , Y.1731
Logging	Syslog, alarms loggin, bandwidth logging and performance logging

ENVIRONMENTAL

Radio Operating Temperature	
Standard Power + Solar Shield	-40°C to +60°C (-40°F to +140° F)
IDU Operating Temperature	0°C to +50°C (32°F to +122° F)
Extended IDU Operating temp	-40°C to +60°C (-40°F to +140° F)
ODU Humidity	100% Condensing
IDU Humidity	95% Non-Condensing
Altitude	4500 m (14,760 ft)
NEB-3 Compliant	Yes

MECHANICAL

Modem (IDU)	4.3 cm x 32 cm x 22 cm; 2.4 kg
	1.7 in x 12.75 in x 8.6 in; 5.3 lbs
Radio (without antenna)	20 cm x 20 cm x 9 cm; 3.2 kg
	7.8 in x 7.8 in x 3.6 in; 7 lbs
Antenna Wind Loading	110 kph (70 mph) Operational
	200 kph (125 mph) Survival
Antenna Mount Adjustment	+/-45° Az; +/-22° El

DragonWave

6 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56/60 MHz	32 QAM	-71	216	300	550	26	432	600	1100	22
	128 QAM	-63	290	400	750	25.5	580	800	1500	21.5
	256 QAM	-60	385	540	1000	24.5	770	1080	1500	20.5
30 MHz	64 QAM	-72.5	121	170	300	28	242	340	600	24
	128 QAM	-69	143	200	350	27.5	286	400	700	23.5
	256 QAM	-64	193	270	500	26.5	386	540	1000	22.5
	256 QAM	-63.5	200	280	500	25.5	400	560	1000	21.5
29.65 MHz	QPSK	-86	37	50	95	32	74	100	190	28
	QPSK	-85	48	70	120	28.5	96	140	240	24.5
	16 QAM	-81	71	100	175	28	142	200	350	24
	32 QAM	-76	100	140	250	26	200	280	500	22
	128 QAM	-69	144	200	360	25.5	288	400	720	21.5
	256 QAM	-65	190	265	500	24.5	380	530	1000	20.5
10 MHz	64 QAM	-75	49	70	125	26	98	140	250	22
	256 QAM	-69	66	90	150	25.5	132	180	300	21.5

- FCC excludes modulations below 128 QAM in 29.65 MHz
- IC excludes modulations below 32 QAM
- Ireland excludes modulations below 128 QAM
- 10 MHz channels are for use in FCC and have a min throughput requirement of 44.7 Mbps and a minimum loading of 50% to be met within 30 months.

7-8 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
28 MHz	QPSK	-86	37	50	95	30	74	100	190	26
	QPSK	-85	48	70	120	26.5	96	140	240	22.5
	16 QAM	-81	71	100	175	26	142	200	350	22
	32 QAM	-76	100	140	250	24	200	280	500	20
	128 QAM	-69	144	200	360	23.5	288	400	720	19.5
	256 QAM	-65	190	265	500	22.5	380	530	1000	18.5
14 MHz	QPSK	-88	23	30	60	26.5	46	60	120	22.5
	16 QAM	-85	36	50	90	26	72	100	180	22
	32 QAM	-81	47	65	120	26	94	130	240	22
	128 QAM	-73	70	100	175	23.5	140	200	350	19.5
	256 QAM	-69.5	95	130	250	22.5	190	260	500	18.5
7 MHz	QPSK	-89	11	15	30	30	22	30	60	26
	16 QAM	-87	18	25	45	24.5	36	50	90	20.5
	64 QAM	-79	33	45	80	23.5	66	90	160	19.5
	128 QAM	-75	39	55	100	23	78	110	200	19

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11 GHz

	Modulation	Rx Sensitivity	Single Channel				Dual Channel			
			Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
40 MHz	32 QAM	-74	110	155	275	25	220	310	550	21
	32 QAM	-73	142	200	350	23	284	400	700	19
	64 QAM	-69	181	250	450	20.5	362	500	900	16.5
	128 QAM	-63	212	300	550	20	424	600	1100	16
	256 QAM	-60	277	390	700	19.5	554	780	1400	15.5
30 MHz	32 QAM	-75	107	150	250	23	214	300	500	19
	128 QAM	-65	165	230	400	20	330	460	800	16
	256 QAM	-62	212	300	550	19.5	424	600	1100	15.5
20 MHz	16 QAM	-80	54	75	135	23	108	150	270	19
	32 QAM	-77	71	100	175	23	142	200	350	19
	128 QAM	-70	108	150	265	20.5	216	300	530	16.5
	256 QAM	-64	142	200	350	19.5	284	400	700	15.5
10 MHz	16 QAM	-84	23	30	60	23.5	46	60	120	19.5
	64 QAM	-74	49	70	125	21	98	140	250	17
	256 QAM	-68	66	90	150	19.5	132	180	300	15.5

- FCC excludes modulations below 64 QAM
- IC restricted to 64 QAM and above for congested regions
- 10 MHz not to be used in FCC or in congested IC regions

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13-15 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	32 QAM	-70	216	300	550	21	432	600	1100	17
	128 QAM	-62	290	400	750	20.5	580	800	1500	16.5
	256 QAM	-59	385	540	1000	19.5	770	1080	1500	15.5
28 MHz	QPSK	-85	37	50	95	27	74	100	190	23
	QPSK	-84	48	70	120	23.5	96	140	240	19.5
	16 QAM	-80	71	100	175	23	142	200	350	19
	32 QAM	-75	100	140	250	21	200	280	500	17
	64 QAM*	-71.5	122	170	300	21	244	340	600	17
	128 QAM	-68	144	200	360	20.5	288	400	720	16.5
	256 QAM	-64	190	265	500	19.5	380	530	1000	15.5
14 MHz	QPSK	-87	23	30	60	23.5	46	60	120	19.5
	16 QAM	-84	36	50	90	23	72	100	180	19
	32 QAM	-80	47	65	120	23	94	130	240	19
	128 QAM	-72	70	100	175	20.5	140	200	350	16.5
7 MHz	QPSK	-88	11	15	30	27	22	30	60	23
	16 QAM	-86	18	25	45	21.5	36	50	90	17.5
	64 QAM*	-78	33	45	80	20.5	66	90	160	16.5
	128 QAM	-74	39	55	100	20	78	110	200	16

- 64 QAM with 13 GHz only

15 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
40 MHz	QPSK	-81	58	80	140	26	116	160	280	22
	32 QAM	-75	110	155	275	25	220	310	550	21
	32 QAM	-73	142	200	350	23	284	400	700	19
	64 QAM	-69	181	250	450	20.5	362	500	900	16.5
	128 QAM	-63	212	300	550	20	424	600	1100	16
	256 QAM	-60	277	390	700	19.5	554	780	1400	15.5
20 MHz	QPSK	-84	28	40	70	27	56	80	140	23
	16 QAM	-80	54	75	135	23	108	150	270	19
	32 QAM	-77	71	100	175	23	142	200	350	19
	128 QAM	-70	108	150	265	20.5	216	300	530	16.5
	256 QAM	-64	142	200	350	19.5	284	400	700	15.5
10 MHz	QPSK	-87	14	20	35	27	28	40	70	23
	16 QAM	-84	22	30	55	24.5	44	60	110	20.5
	64 QAM	-74	48	70	120	21.5	96	140	240	17.5
	256 QAM	-68	65	90	150	19.5	130	180	300	15.5

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18 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
55 MHz	16 QAM	-76	111	155	275	24.5	222	310	550	20.5
	32 QAM	-70	216	300	550	21	432	600	1100	17
	128 QAM	-62	290	400	750	20.5	580	800	1500	16.5
	256 QAM	-59	385	540	1000	19.5	770	1080	1500	15.5
50 MHz	QPSK	-81	67	95	150	27	134	190	300	23
	16 QAM	-77	110	155	275	24.5	220	310	550	20.5
	32 QAM	-72	171	240	425	24	342	480	850	20
	64 QAM	-68	215	300	550	22.5	430	600	1100	18.5
	128 QAM	-62	271	380	700	21	542	760	1400	17
	128 QAM	-62	271	380	700	19.5	542	760	1400	15.5
	256 QAM	-59	364	500	1000	19.5	728	1000	1500	15.5
40 MHz	QPSK	-81	57	80	140	27	114	160	280	23
	16 QAM	-76	111	155	275	23	222	310	550	19
	32 QAM	-73	142	200	350	23	284	400	700	19
	64 QAM	-69	181	250	450	20.5	362	500	900	16.5
	128 QAM	-67	200	280	500	20	400	560	1000	16
	256 QAM	-60	277	390	700	19.5	554	780	1400	15.5
27.5/28/30 MHz	QPSK	-85	37	50	95	27	74	100	190	23
	QPSK	-84	48	70	120	23.5	96	140	240	19.5
	16 QAM	-80	71	100	175	23	142	200	350	19
	32 QAM	-75	100	140	250	21	200	280	500	17
	128 QAM	-68	144	200	360	20.5	288	400	720	16.5
	256 QAM	-64	190	265	500	19.5	380	530	1000	15.5
20 MHz	QPSK	-84	28	40	70	27	56	80	140	23
	16 QAM	-80	54	75	135	23	108	150	270	19
	32 QAM	-77	71	100	175	23	142	200	350	19
	128 QAM	-70	108	150	265	20.5	216	300	530	16.5
	256 QAM	-64	136	190	350	19.5	272	380	700	15.5
13.75 MHz	QPSK	-87	23	30	60	23.5	46	60	120	19.5
	16 QAM	-84	36	50	90	23	72	100	180	119
	32 QAM	-80	47	65	120	23	94	130	240	19
	128 QAM	-72	70	100	175	20.5	140	200	350	16.5
	256 QAM	-68	95	130	250	19.5	190	260	500	15.5
10 MHz	QPSK	-87	14	20	35	27	28	40	70	23
	16 QAM	-84	22	30	55	24.5	44	60	110	20.5
	64 QAM	-74	48	70	120	21.5	96	140	240	17.5
	256 QAM	-68	65	90	150	19.5	130	180	300	15.5
7 MHz	QPSK	-88	11	15	30	27	22	30	60	23
	16 QAM	-86	18	25	45	21.5	36	50	90	17.5
	64 QAM	-78	33	45	80	20.5	66	90	160	16.5
	128 QAM	-74	39	55	100	20	78	110	200	16
Japanese 20 MHz	QPSK	-84	27	35	70	26	54	70	140	22
	16 QAM	-81	47	65	120	24.5	94	130	240	20.5
	64 QAM	-73.5	74	100	185	23.5	148	200	370	19.5
	256 QAM	-65.5	107	150	250	20	214	300	500	16
Japanese 40 MHz	QPSK	-81	56	80	140	23.5	112	160	280	19.5
	16 QAM	-77.5	99	140	250	23.5	198	280	500	19.5
	64 QAM	-68.5	170	240	425	23.5	340	480	850	19.5
	256 QAM	-62	226	315	550	20	452	630	1100	16

DragonWave

23 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	QPSK	-80	65	90	150	27	130	180	300	23
	16 QAM	-76	111	155	275	24.5	222	310	550	20.5
	32 QAM	-70	216	300	550	21	432	600	1100	17
	128 QAM	-62	290	400	750	20.5	580	800	1500	16.5
	256 QAM	-59	385	540	1000	19.5	770	1080	1500	15.5
50 MHz	QPSK	-81	67	95	150	27	134	190	300	23
	16 QAM	-75	110	155	275	24.5	220	310	550	20.5
	32 QAM	-70	171	240	425	24	342	480	850	20
	64 QAM	-68	215	300	550	22.5	430	600	1100	18.5
	128 QAM	-62	271	380	700	21	542	760	1400	17
	128 QAM	-62	271	380	700	19.5	542	760	1400	15.5
	256 QAM	-59	364	500	1000	19.5	728	1000	1500	15.5
40 MHz	QPSK	-81	57	80	140	27	114	160	280	23
	16 QAM	-76	111	155	275	23	222	310	550	19
	32 QAM	-73	142	200	350	23	284	400	700	19
	64 QAM	-69	181	250	450	20.5	362	500	900	16.5
	128 QAM	-67	200	280	500	20	400	560	1000	16
	256 QAM	-60	277	390	700	19.5	554	780	1400	15.5
28/30 MHz	QPSK	-85	37	50	95	27	74	100	190	23
	QPSK	-84	48	70	120	23.5	96	140	240	19.5
	16 QAM	-80	71	100	175	23	142	200	350	19
	32 QAM	-75	100	140	250	21	200	280	500	17
	128 QAM	-68	144	200	360	20.5	288	400	720	16.5
	256 QAM	-64	190	265	500	19.5	380	530	1000	15.5
20 MHz	QPSK	-84	28	40	70	27	56	80	140	23
	16 QAM	-80	54	75	135	23	108	150	270	19
	32 QAM	-77	71	100	175	23	142	200	350	19
	128 QAM	-70	108	150	265	20.5	216	300	530	16.5
	256 QAM	-64	136	190	350	19.5	272	380	700	15.5
14 MHz	QPSK	-87	23	30	60	23.5	46	60	120	19.5
	16 QAM	-84	36	50	90	23	72	100	180	19
	32 QAM	-80	47	65	120	23	94	130	240	19
	128 QAM	-72	70	100	175	20.5	140	200	350	16.5
	256 QAM	-68	95	130	250	19.5	190	260	500	15.5
10 MHz	QPSK	-87	14	20	35	27	28	40	70	23
	16 QAM	-84	22	30	55	24.5	44	60	110	20.5
	64 QAM	-74	48	70	120	21.5	96	140	240	17.5
	256 QAM	-68	65	90	150	19.5	130	180	300	15.5
7 MHz	QPSK	-88	11	15	30	27	22	30	60	23
	16 QAM	-86	18	25	45	21.5	36	50	90	17.5
	64 QAM	-78	33	45	80	20.5	66	90	160	16.5
	128 QAM	-74	39	55	100	20	78	110	200	16
	256 QAM	-69	48	70	120	20	96	140	240	16

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24 GHz DEMS

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	QPSK	-80	65	90	150	27	130	180	300	23
	16 QAM	-76	111	155	275	24.5	222	310	550	20.5
	32 QAM	-70	216	300	550	21	432	600	1100	17
	128 QAM	-62	290	400	750	20.5	580	800	1500	16.5
	256 QAM	-59	385	540	1000	19.5	770	1080	1500	15.5
50 MHz	QPSK	-81	67	95	150	27	134	190	300	23
	16 QAM	-75	110	155	275	24.5	220	310	550	20.5
	32 QAM	-70	171	240	425	24	342	480	850	20
	64 QAM	-68	215	300	550	22.5	430	600	1100	18.5
	128 QAM	-62	271	380	700	21	542	760	1400	17
	256 QAM	-59	322	450	800	21.5	644	900	1500	17.5
40 MHz	QPSK	-81	57	80	140	27	114	160	280	23
	16 QAM	-76	111	155	275	23	222	310	550	19
	32 QAM	-73	142	200	350	23	284	400	700	19
	64 QAM	-69	181	250	450	20.5	362	500	900	16.5
	128 QAM	-63	212	300	550	20	424	600	1100	16
	256 QAM	-60	277	390	700	19.5	554	780	1400	15.5
20 MHz	QPSK	-84	28	40	70	27	56	80	140	23
	16 QAM	-80	54	75	135	23	108	150	270	19
	32 QAM	-77	71	100	175	23	142	200	350	19
	128 QAM	-70	108	150	265	20.5	216	300	530	16.5
	256 QAM	-64	136	190	350	19.5	272	380	700	15.5
10 MHz	QPSK	-87	14	20	35	27	28	40	70	23
	16 QAM	-84	22	30	55	24.5	44	60	110	20.5
	64 QAM	-74	48	70	120	21.5	96	140	240	17.5
	256 QAM	-68	65	90	150	19.5	130	180	300	15.5

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26 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	QPSK	-80	65	90	150	27	130	180	300	23
	16 QAM	-76	111	155	275	24.5	222	310	550	20.5
	32 QAM	-70	216	300	550	21	432	600	1100	17
	128 QAM	-62	290	400	750	20.5	580	800	1500	16.5
	256 QAM	-59	385	540	1000	19.5	770	1080	1500	15.5
28 MHz	QPSK	-85	37	50	95	27	74	100	190	23
	QPSK	-84	48	70	120	23.5	96	140	240	19.5
	32 QAM	-80	71	100	175	23	142	200	350	19
	64 QAM	-75	100	140	250	21	200	280	500	17
	128 QAM	-68	144	200	360	20.5	288	400	720	16.5
	256 QAM	-64	190	265	500	19.5	380	530	1000	15.5
14 MHz	QPSK	-87	23	30	60	23.5	46	60	120	19.5
	16 QAM	-84	36	50	90	23	72	100	180	19
	32 QAM	-78	47	65	120	23	94	130	240	19
	128 QAM	-72	70	100	175	20.5	140	200	350	16.5
	256 QAM	-68	95	130	250	19.5	190	260	500	15.5
7 MHz	QPSK	-88	11	15	30	27	22	30	60	23
	16 QAM	-86	18	25	45	21.5	36	50	90	17.5
	64 QAM	-78	33	45	80	20.5	66	90	160	16.5

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28 GHz

			Single Channel				Dual Channel			
	Modulation	Rx Sensitivity	Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	QPSK	-80	65	90	150	25	130	180	300	21
	16 QAM	-76	111	155	275	22.5	222	310	550	18.5
	32 QAM	-70	216	300	550	19	432	600	1100	15
	128 QAM	-62	290	400	750	18.5	580	800	1500	14.5
	256 QAM	-59	385	540	1000	17.5	770	1080	1500	13.5
50 MHz	QPSK	-81	67	95	150	27	134	190	300	23
	16 QAM	-77	110	155	275	24.5	220	310	550	20.5
	32 QAM	-72	171	240	425	24	342	480	850	20
	64 QAM	-68	215	300	550	22.5	430	600	1100	18.5
	128 QAM	-62	271	380	700	21	542	760	1400	17
	256 QAM	-60	364	500	1000	18.5	728	1000	1500	14.5
28 MHz	QPSK	-85	37	50	95	25	74	100	190	21
	QPSK	-84	48	70	120	21.5	96	140	240	17.5
	16 QAM	-80	71	100	175	21	142	200	350	17
	32 QAM	-75	100	140	250	19	200	280	500	15
	128 QAM	-68	144	200	360	18.5	288	400	720	14.5
	256 QAM	-64	190	265	500	17.5	380	530	1000	13.5
25 MHz	QPSK	-83	33	45	80	27	66	90	160	23
	16 QAM	-81	53	70	125	24	106	140	250	20
	32 QAM	-76	80	100	185	22	160	200	370	18
	128 QAM	-70	107	150	250	22	214	300	500	18
	256 QAM	-63	174	240	425	19.5	348	480	850	15.5
14 MHz	QPSK	-87	23	30	60	21.5	46	60	120	17.5
	16 QAM	-84	36	50	90	21	72	100	180	17
	32 QAM	-78	47	65	120	21	94	130	240	17
	128 QAM	-71	70	100	175	18.5	140	200	350	14.5
	256 QAM	-68	95	130	250	17.5	190	260	500	13.5
10 MHz	QPSK	-87	14	20	35	25	28	40	70	21
	16 QAM	-84	22	30	55	22.5	44	60	110	18.5
	64 QAM	-74	48	70	120	21.5	96	140	240	17.5
	256 QAM	-68	65	90	150	19	130	180	300	15
7 MHz	QPSK	-88	11	15	30	25	22	30	60	21
	16 QAM	-86	18	25	45	19.5	36	50	90	15.5
	64 QAM	-78	33	45	80	18.5	66	90	160	14.5

DragonWave

38 GHz

	Modulation	Rx Sensitivity	Single Channel				Dual Channel			
			Base Throughput	With Bandwidth Accelerator		Tx Power	Base Throughput	With Bandwidth Accelerator		Tx Power
				Typical Mobile Traffic Mix	Maximum Throughput			Typical Mobile Traffic Mix	Maximum Throughput	
56 MHz	QPSK	-76.5	65	90	150	22	130	180	300	18
	16 QAM	-69.5	111	155	275	19.5	222	310	550	15.5
	32 QAM	-66.5	216	300	550	16	432	600	1100	12
	128 QAM	-59.5	290	400	750	15.5	580	800	1500	11.5
	256 QAM	-56.5	386	540	1000	14.5	772	1080	1500	10.5
50 MHz	QPSK	-77.5	67	95	150	21	134	190	300	17
	16 QAM	-73.5	110	155	275	18.5	220	310	550	14.5
	32 QAM	-68.5	171	240	425	18	342	480	850	14
	64 QAM	-64.5	215	300	550	16.5	430	600	1100	12.5
	128 QAM	-58.5	271	380	700	15	542	760	1400	11
	256 QAM	-55.5	364	500	1000	13.5	728	1000	1500	9.5
28 MHz	QPSK	-81.5	37	50	95	22	74	100	190	18
	QPSK	-80.5	48	70	120	18.5	96	140	240	14.5
	16 QAM	-75	71	100	175	18	142	200	350	14
	32 QAM	-71.5	100	140	250	16	200	280	500	12
	128 QAM	-64.5	144	200	360	15.5	288	400	720	11.5
	256 QAM	-59.5	190	265	500	14.5	380	530	1000	10.5
25 MHz	QPSK	-79.5	33	45	80	21	66	90	160	17
	16 QAM	-77.5	53	70	125	18	106	140	250	14
	32 QAM	-72.5	80	100	185	18	160	200	370	14
	128 QAM	-66.5	107	150	250	16	214	300	500	12
	256 QAM	-59.5	174	240	425	13.5	348	480	850	9.5
14 MHz	QPSK	-83.5	23	30	60	18.5	46	60	120	14.5
	16 QAM	-78.5	36	50	90	18	72	100	180	14
	32 QAM	-73.5	47	65	120	17.5	94	130	240	13.5
	128 QAM	-65	70	100	175	15.5	140	200	350	11.5
	256 QAM	-63	95	130	250	12.5	190	260	500	8.5
10 MHz	QPSK	-81.5	14	20	35	21	28	40	70	17
	16 QAM	-75.5	22	30	55	18.5	44	60	110	14.5
	64 QAM	-67.5	48	70	120	14.5	96	140	240	10.5
	256 QAM	-62.5	65	90	150	12.5	130	180	300	8.5
7 MHz	QPSK	-82.5	11	15	30	22	22	30	60	18
	16 QAM	-78.5	18	25	45	16.5	36	50	90	12.5
	64 QAM	-71.5	33	45	80	14.5	66	90	160	10.5

Antenna Support

Frequency Band	Direct Mount Antenna Sizes Supported						
	0.15 M	0.3 M	0.6 M	0.75 M	0.9 M	1.2 M	1.8 M
	0.5 ft	1ft	2 ft	2.5 ft	3 ft	4 ft	6 ft
6 GHz						•	•
7 GHz			•		•	•	•
8 GHz			•		•	•	•
11 GHz			•	•	•	•	•
13 GHz		•	•		•	•	•
15 GHz		•	•		•	•	•
18 GHz		•	•		•	•	•
23 GHz		•	•		•	•	•
24 DEMS	•	•	•		•	•	
26 GHz		•	•		•	•	
28 GHz	•	•	•				
38 GHz		•	•				

Exceptions for FCC & IC:

- 6 GHz: minimum antenna size is 6’
- 11 GHz: minimum antenna size is typically 2.5’
- 15 GHz: minimum antenna size is 2’
- 18 GHz: minimum antenna size of 2’

Exceptions for ETSI:

- 28 GHz: minimum antenna size is 1’

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