

ECLIPSE™

POWERS WIRELESS BACKHAUL NETWORKS

Eclipse combines all PDH, SDH and Ethernet point-to-point wireless applications into a single product platform to dramatically reduce the total cost of using wireless backhaul, and change the way networks are planned, deployed and maintained.



ECLIPSE IS THE LEADING WIRELESS BACKHAUL SOLUTION AVAILABLE, COMBINING A NUMBER OF COMPELLING FEATURES:

SOFTWARE DEFINED

A highly scalable, software-driven architecture gives operators total control over their networks, so they can adapt to changing conditions and anticipate future needs.

OPTIMIZED WIRELESS NODES

The Eclipse nodal solution supports multiple outdoor units (ODUs) with built-in traffic routing, add-and-drop, aggregation and concentration, and selectable traffic interfaces, including E1, E3, STM1 and 10/100 Base-T and Gigabit Ethernet.

EFFICIENT TERMINAL OPTIONS

Eclipse supports a number of simple, application-specific Indoor Units to provide cost-efficient terminal solutions for the transport of E1, STM1 and Ethernet data.

SCALABLE CAPACITY ARCHITECTURE

Only pay for the capacity you need today. Super-PDH™ capacity migration enables smooth network upgrades and expansion at minimal cost and service disruption.

HIGH-SPEED DATA TRANSPORT

Eclipse 'Liquid Bandwidth' supports hybrid high-speed native Ethernet/IP plus TDM traffic over a single radio channel, configurable bandwidth assignment up to 360 Mbps with low latency, built-in Layer 2 operation, service differentiation and Carrier-Grade QoS features.

CONTROL AND INTELLIGENCE

The Eclipse software suite enables advanced network control and intelligence through a suite of Java-based Local and Network Management tools.

Eclipse has it covered, whatever your wireless application.

- 5 to 38 GHz,
- PDH, SDH and Ethernet,
- QPSK to 256 QAM,
- 4x E1 to 4x STM1,
- 10 - 360 Mbit/s Ethernet.

An array of flexible configuration choices, including optional diversity and XPIC co-channel support.

Secure and reliable operation in licensed frequency bands, with full compliance to applicable FCC, SRSP, NTIA and ITU Standards.

Eclipse designs are hardened for maximum survivability, in any and all installation environments.

Accelerated lifetime testing ensures reliable operation over the full 15 year equipment lifetime.

Java-based Portal local management software and ProVision Element Management system, are specifically designed to provide exceptional control for Eclipse wireless nodal networks.

Eclipse standard features include adaptive equalization, and forward error correction with interleaving, for superior performance in the most demanding propagation conditions.

SYSTEM PARAMETERS

01. GENERAL

Operating Frequency Range	5 to 38 GHz
Digital Line Rate	2.048 Mbit/s [E1] 34.368 Mbit/s [E3] 155.52 Mbit/s [STM1]
Capacity Range Options	4x, 5x, 8x, 10x, 16x, 20x, 32x, 40x, 48x, 52x, 64x, 75x, 93x, 100x E1 1x, 2x, 4x STM1 10-360 Mbit/s Ethernet
Modulation Options - Fixed or Adaptive	QPSK, 16, 32, 64, 128, 256 QAM
Error Correction	FEC, Reed Solomon Decoding
Adaptive Equalization [Except for IDUsp and IDUspe]	24 tap T/2 Equalizer

02. RADIO PATH PROTECTION OPTIONS

Non Protected, 1+0	XPIC Optional	5 to 38 GHz
Protected Hot Standby, 1+1	XPIC Optional	5 to 38 GHz
Space Diversity, 1+1		5 to 38 GHz
Ring protection (Super PDH)		5 to 38 GHz
Frequency Diversity, 1+1 [1]		5 to 38 GHz
Dual Path, Non-Protected, 2+0		5 to 38 GHz
Dual Path, Protected, 2+2		5 to 38 GHz

03. STANDARDS COMPLIANCE

EMC	INU/INUe	EN 301 489-1, EN 301 489-4 [EN 55022 Class A]
	IDU	EN 301 489-1, EN 301 489-4 [EN 55022 Class B]
Operation	ODUs	ETS 300 019, Class 4.1
Operation	INU/INUe/IDU	ETS 300 019, Class 3.1E
Storage		ETS 300 019, Class 1.2
Transportation		ETS 300 019, Class 2.3
Safety		IEC 60950-1/EN 60950-1
Radio Frequency		EN 302 217-2-2
Water Ingress	ODU	IEC 60529 (IPX6)
Lightning Protection	ODU	IEC 61000-4-5 Class 5, GR-1089-CORE 4.11 Type 1, 3, 5 & 6

04. ENVIRONMENTAL

Operating Temperature	INU/INUe/IDU	Guaranteed	-5° to +45° C [23° to +113° F]
	INU/INUe/IDU	Extended [2]	-5° to +55° C [23° to +131° F]
	ODU	Guaranteed	-33° to +55° C [-27° to +131° F]
	ODU	Extended [2]	-50° to +65° C [-58° to +149° F]
Humidity	INU/INUe/IDU	Guaranteed	0 to 93%, non-condensing
	ODU	Guaranteed	0 to 100%
Altitude		Guaranteed	4,500 Meters [15,000 ft]

05. FAULT AND CONFIGURATION MANAGEMENT

Protocol	SNMP v2
Interface, Electrical	Ethernet 10/100 Base-T or RS232
Interface, Physical	RJ-45
Local/Remote Configuration and Support Tool	Eclipse Portal
Performance Monitoring	To ITU-T Rec. G.826
Routing Protocols Supported	Static and Dynamic Routing, RIP I, RIP II, OSPF
Network Management	Aviat Networks ProVision® or NetBoss®
Engineering Orderwire	Via Optional VoIP Handset or External RS-422 Digital Orderwire Unit [eg: Ardash]

06. EMISSION DESIGNATOR

Bandwidth	3.5MHz	7MHz	13.75MHz	14MHz	27.5MHz	28MHz	55MHz	56MHz	
Emission Designator	QPSK	3M50G7W	7M00G7W	13M75G7W	14M0G7W	27M5G7W	28M0G7W	N/A	N/A
	QAM	3M50D7W	7M00D7W	13M75D7W	14M0D7W	27M5D7W	28M0D7W	55M0D7W	56M0D7W

07. DISPERSIVE FADE MARGIN (DFM)

CAPACITY/MODULATION	GROSS BIT RATE MBIT/S [3]	MODULATION OPTIONS	SYMBOL RATE MBAUD	DFM (DB)
4xE1	9.4	QPSK	4.85	74.5
5xE1, 10Mbit/s	11.5	QPSK / 16 QAM	5.79 / 2.9	75 / 78
8xE1	18.8	QPSK	9.35	71.5
10xE1, 20Mbit/s	22.8	QPSK / 16 QAM	11.63 / 5.81	72 / 75
16xE1, 30 Mbit/s	37.6	QPSK / 64 QAM	18.31 / 5.90	68.5 / 67
20xE1, 40Mbit/s	44.9	QPSK / 16 QAM	22.94 / 11.47	68 / 59
27xE1, 50 Mbit/s	61.3	32 QAM	11.95	59
32xE1, 50 Mbit/s	71.2	16 QAM / 64 QAM	18.15 / 12.00	64 / 64
40xE1, 80Mbit/s	88.9	16 QAM	22.69	66
52xE1, 100Mbit/s	116.6	32 QAM	23.72	54
64xE1	142.4	64 QAM	23.82	51
75xE1, 150Mbit/s	167.8	16 QAM / 128 QAM	41.76 / 24.48	52 / 49
1xSTM1, 150Mbit/s	167.0	16 QAM / 64 QAM / 128 QAM	41.62 / 30.53 / 24.39	52 / 52 / 49
93xE1, 200Mbit/s	208.8	256 QAM	26.10	46
100xE1, 200Mbit/s	229.4	32 QAM / 128 QAM	45.88 / 32.77	51 / 50
200Mbit/s	250.8	64 QAM	41.78	45
250 Mbit/s	280.0	64 QAM	46.0	45
2xSTM1, 310Mbit/s	334.0	128 QAM / 256 QAM	47.58 / 43.82	42 / 40
360 Mbit/s	384.0	256 QAM	47.82	40

All specifications are typical values unless otherwise stated, and are subject to change without notice.

[1] Frequency Diversity is supported by the INU/INUe only, for capacities of 10xE1 and above.

[2] Over full Extended Operating Temperature Eclipse may be subject to reduced performance. Contact Aviat Networks for more details.

[3] Gross bit rate includes usable customer payload plus radio overhead for FEC, NMS, AUX traffic, etc.

ECLIPSE TERMINAL, INDOOR UNIT (IDU) OPTIONS

01. GENERAL

Configuration Memory, Removable ^{[1][2]}			Up to 128 Mbyte CompactFlash Card (Rear Access)
LED Indicators			2x Tri-state LEDs ('IDU Status', 'ODU Status')
Line Interface, E1 Electrical	Standards Compliance		Compliant to ITU-T Rec. G.703, G.823
	Line Code		HDB3
	Impedance		75Ω unbalanced or 120Ω balanced, configurable
IF Cable Connector			N-Type
IF Interface Parameters		Transmit	311 MHz, -8 to -12 dBm
		Receive	126 MHz, -8 to -27 dBm
Protection Connector (Where Available)			9 pin D-SUB
Auxiliary Data ^[1]	Aux Data Channels Interface		1 RS232 or RS422
	Line Rate, Configurable		1.2 to 19.2 kbit/s, Asynchronous
	Connector Type		64 kbit/s, Synchronous
			9 pin D-SUB
Alarm I/O ^[2]	External Alarm Inputs		2x TTL
	External Alarm Outputs		4 x Form C Relay
	Connector Type		15 pin D-SUB
NMS LAN Interface	Type		10/100baseT Ethernet
	Connector		8-pin RJ45
Serial Maintenance Interface ^[2]	Standard		Complies to TIA/EIA-561
	Speed		1.2 to 115.2 kbit/s
	Connector		8-pin RJ45
Electrical	Input Voltage Range	IDUsp 4x, IDUsp 16x	-40.5 to -60.0 VDC
	Power Consumption	IDU 20x, IDU 155o, IDU ES, IDU GE 20x	8 W
	Protection Circuit		12 W
			5A Slow-Blow Fuse
Mechanical	Dimensions	IDUsp 4x, IDUsp 16x, IDU GE 20x	44mm (1RU)x 482mm (19in) x 240mm (9.4in)
	Weight	IDU 20x, IDU 155o, IDU ES	44mm (1RU)x 482mm (19in) x 277mm (10.9in)
		IDUsp 4x, IDUsp 16x, IDU GE 20x	1.1 kg (2.5 lb)
		IDU 20x, IDU 155o, IDU ES	1.6 kg (3.5 lb)

Eclipse Indoor Units provide a simple and economical solution for terminal configurations, where support for only one radio path is required. IDU options are available for software configurable transport of E1, STM1 and Ethernet traffic.



IDUsp 4x & 16x

Provides lowest-cost termination of standard PDH link capacities of 4, 8 and 16x E1 using QPSK modulation.

IDU 20x

Supports software scalable, enhanced PDH link capacities between 5 and 40x E1.

IDU 155o

SDH IDU that enables transport of a single STM1 channel using selectable 16, 64 or 128QAM modulation.

IDU ES

Combines 4x 10/100 baseT Ethernet traffic and up to 8xE1 wayside channels, with programmable aggregate link speeds up to 200 Mbit/s.

IDU GE 20x

Combines 3x Gigabit Ethernet ports (two electrical and one optical) with up to 20xE1 TDM channels, and programmable aggregate link speeds up to 360 Mbit/s.

02. IDU STANDARD PERFORMANCE (SP) OPTIONS

	IDUSP 4X	IDUSP 16X
Capacity Options (Configurable)	4x 2.048 Mbit/s (E1)	4, 8, 16x 2.048 Mbit/s (E1)
Modulation	QPSK	QPSK
Traffic Connectors	4x RJ45	16x RJ45
Configuration Options	Non Protected [1+0] Only	Non Protected [1+0] Protected Hot Standby [1+1] ^[3]

03. IDU SUPER-PDH AND SDH OPTIONS

	IDU 20X	IDU 155O
Capacity Options (Configurable)	5, 10, 20, 40x 2.048 Mbit/s (E1)	1x 155.52 Mbit/s (STM1)
Modulation Options (Configurable)	QPSK, 16 to 64 QAM	16, 64, 128 QAM
Traffic Connectors	20x RJ45	SC ^[4]
Configuration Options	Non Protected [1+0] Protected Hot Standby [1+1] Protected Space Diversity [1+1]	Non Protected [1+0] Protected Hot Standby [1+1] Protected Space Diversity [1+1]

04. IDU ETHERNET OPTIONS

	IDU ES	IDU GE 20X
Capacity Options (Configurable by Downloadable License)	10, 20, 30, 40, 50, 80, 100, 150, 200 Mbit/s	10, 20, 30, 40, 50, 80, 100, 150, 200, 250, 310, 360 Mbit/s
Modulation Options (Configurable)	QPSK, 16, 32, 64, 128, 256 QAM	QPSK, 16, 32, 64, 128, 256 QAM
Ethernet Traffic Interface, Electrical	Interfaces Connectors	Interfaces Connectors
	4x 10/100 baseT 4x 8-pin RJ45	2x 10/100/1000 baseT 2x 8-pin RJ45
Ethernet Traffic Interface, Optical (Optional)	Interfaces Connectors	Interfaces Connectors
		1x Optical IEEE 802.3z 1000 BASE-LX 1x LC (SFP) ^[5]
Frame Sizes Supported	64 to 1536 bytes	64 to 9600 bytes ^[6]
Wayside Traffic Channels	Interfaces Connectors	Interfaces Connectors
	8x 2.048 Mbit/s (E1) 8x RJ45	20x 2.048 Mbit/s (E1) 20x RJ45
Configuration Options	Non Protected [1+0]	Non Protected [1+0] Protected Hot Standby [1+1] Protected Space Diversity [1+1]

All specifications are typical values unless otherwise stated, and are subject to change without notice.

[1] AUX channel not supported by IDU GE 20x. IDUsp 4x/16x supports 64kbps synchronous only.

[2] Not available for IDUsp 4x/16x.

[3] IDU 1+1 protection does not support hitless switching or diversity configurations.

[4] For IDU 155o optical interface specifications refer to the Optical Interface Parameters under Transparent DAC Options.

[5] For IDU GE 20x optical interface specifications refer to the DAC GE Optical Interface Parameters.

[6] 64 to 7000 bytes bidirectional, 7000+ to 9600 bytes unidirectional.

The Eclipse Intelligent Node Unit (INU) and Extended INU (INUE) provide optimized wireless nodal networking, supporting multiple radio paths from a single unit. Each node consists of a standard Chassis equipped with common cards listed below. Additional hot-swappable Radio (RAC) and Data Access (DAC) Cards are added to provide required node functionality.



Node Controller Card (NCC)
Provides node management and control, primary DC power, and interfaces for Portal and NMS. A removable Compact Flash card holds configuration data and software License.



Node Protection Card (NPC)
Provides redundancy for the NCC control and DC power supply functions for higher reliability nodes.



Fan Card (FAN)
The FAN module includes two long-life axial fans to provide forced air cooling. The FAN card comes in two sizes – One 1RU FAN is fitted in the INU; one 2RU FAN is fitted in the INUE.



Auxiliary Services Card (AUX)
The AUX card provides user configurable auxiliary data channels and alarm input/output (I/O) options. One or more AUX cards can be fitted to a node.

ECLIPSE NODE, INTELLIGENT NODE UNIT (INU) COMMON UNITS

01. IDC, INDOOR CHASSIS 1RU		
Dedicated Plug-in Card Slots		2 (NCC, FAN)
Universal Plug-in Card Slots		4
Maximum Number of ODUs Supported		3
Dimensions (Including Mounting Brackets)		44mm (1RU) x 482mm (19in) x 282.5mm (11.1in)
Weight	Empty	2.6 kg (5.8 lb)
02. IDCE, EXTENDED INDOOR CHASSIS 2RU		
Dedicated Plug-in Card Slots		3 (NCC, NPC, 1x2RU FAN or 2x 1RU FAN)
Universal Plug-in Card Slots		9
Maximum Number of ODUs Supported		6
Dimensions (Including Mounting Brackets)		88mm (2RU) x 482mm (19in) x 282.5mm (11.1in)
Weight	Empty	4.8 kg (10.6 lb)
03. NCC, NODE CONTROLLER CARD		
NMS LAN interface	Type	4-port 10/100baseT Hub
Serial Maintenance Interface	Connector	4x 8-pin RJ45
	Standard	Complies to TIA/EIA-561
	Speed	1200 bit/s to 115.2 kbit/s
Configuration Memory, Removable	Connector	8-pin RJ45
		Up to 128 Mbyte CompactFlash Card (On-board)
Electrical	DC Supply Input Range	-40.5 to -60 VDC
	DC Fuse Type and Rating	25A Fast-acting Ceramic Body Cartridge
Power consumption (Including DC/DC Efficiency)	Over Voltage Protection	< -70 VDC
	Under Voltage Protection	-32 VDC
	DC Connector	2-pin DSUB Power Type
		< 4 W
LED Indicators		2x Tri-state ('Test', 'Status')
Dimensions (Including Front Panel and Rear Connector)		22mm (0.5RU) x 260mm (10.2in) x 268mm (10.6in)
Weight		0.6 kg (1.35 lb)
04. NPC, NODE PROTECTION CARD		
Electrical	DC Supply Input Range	-40.5 to -60 VDC
Power Consumption (Including DC/DC Efficiency)	DC Fuse Type and Rating	25A Fast-acting Ceramic Body Cartridge
LED Indicators	Over Voltage Protection	< -70 VDC
Dimensions (Including Front Panel and Rear Connector)	Under Voltage Protection	-32 VDC
Weight	DC Connector Type	2-pin DSUB Power Type
		< 4 W
		2x Tri-state ('Protect', 'Status')
		22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
		0.4 kg (0.88 lb)
05. FAN, FAN CARD 1RU		
Fans		2
LED Indicators		1x Red LED ('Fault')
Power Consumption		< 2 W
Dimensions (Including Front Panel and Rear Connector)		44mm (1RU) x 40mm (1.6in) x 264mm (10.4in)
Weight		0.23 kg (0.5 lb)
06. FAN, FAN CARD 2RU		
Fans		2
LED Indicators		1x Red LED ('Fault')
Power Consumption		< 4 W
Dimensions (Including Front Panel and Rear Connector)		88mm (2RU) x 40mm (1.6in) x 264mm (10.4in)
Weight		0.46 kg (1.0 lb)
07. AUX, AUXILIARY SERVICES CARD		
Aux Data Channels		3
Interface		RS232 or RS422
Line Rate	Asynchronous	1.2 to 19.2 kbit/s
	Synchronous	64 kbit/s
Aux Data Connector		High Density DSUB26
External Alarm Inputs	TTL Inputs	Up to 6 ^[1]
	TTL Input Thresholds	0.8V min low, 2.0V min high
External Alarm Outputs	External Alarm Outputs	Up to 4 ^[1]
Alarms Connector		High Density DSUB15
LED Indicators		1x Tri-state ('Status')
Power Consumption		< 3 W
Dimensions (Including Front Panel and Rear Connector)		22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
Weight		0.35 kg (0.77 lb)

All specifications are typical values unless otherwise stated, and are subject to change without notice.

[1] For applications requiring additional alarm inputs or outputs, multiple AUX cards can be installed if free INU/INUE slots are available.

RADIO ACCESS CARDS (RAC)

01. GENERAL

IF Connector		SMA ^[1]
IF Interface	Transmit	311 MHz, -8.0 to -12.0 dBm
	Receive	126 MHz, -8 to -27 dBm
LED Indicators		2x Tri-state ('Online', 'Status')
Dimensions (Including Front Panel and Rear Connector)		22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
Weight		< 0.38 kg (0.84 lb)
Secondary Lightning Protection		Gas tube, 150 V

02. RAC 30

ODUs Supported		ODU300sp, hp, ep
Capacities Supported		5, 10, 16, 20, 32, 40, 52, 64, 75x E1, 1x STM1,
		10 - 150 Mbit/s Ethernet
Modulations Supported		QPSK, 16, 32, 64, 128QAM
Power Consumption		7 W

03. RAC 30A

ODUs Supported		ODU300sp, hp
Capacities supported	Non-AM mode	5, 10, 16, 20, 32, 40, 52, 64, 75x E1, 1x STM1, 10 - 130 Mbit/s Ethernet
Modulations supported	Non-AM mode	QPSK, 16, 32, 64, 128QAM ^[2]
Capacities supported	AM mode	10 - 130 Mbit/s (Nx E1 + Ethernet)
Modulations supported	AM mode	QPSK, 16, 64QAM ^[2]
Power consumption		8 W

04. RAC 3X

ODUs Supported		ODU300hp, ep
Capacities Supported		75, 93, 100x E1, 1-2x STM1, 150 - 310 Mbit/s Ethernet
Modulations Supported		16, 64, 128, 256QAM
Power Consumption		11 W

05. RAC 40 WITH XPIC

ODUs Supported		ODU300hp, ep
Capacities Supported		52, 64, 75x E1, 1x STM1, 150 Mbit/s Ethernet
Modulations Supported		32, 64, 128QAM ^[2]
XPD Improvement		20 dB
XPIC Connectors		2x SMB
Power Consumption		14 W

06. RAC 4X WITH XPIC

ODUs Supported		ODU300hp, ep
Capacities Supported		75, 93, 100x E1, 1x STM1, 2xSTM1, 150 - 310 Mbit/s Ethernet
Modulations Supported		16, 32, 64, 128, 256QAM ^[2]
XPD Improvement		20 dB
XPIC Connectors		2x SMB
Power Consumption		14 W

All specifications are typical values unless otherwise stated, and are subject to change without notice.

[1] RAC Installation Kit includes 3 meter jumper cable, SMA to N-type.

[2] Not all possible combinations of capacities and modulations are supported. Please refer to the Eclipse User Manual or System Description for full details.

RACs provide the conversion of TDM and Ethernet traffic for interfacing between the node and an ODU. Functions include modulation/demodulation, FEC, adaptive equalization, IF conversion, IF loopback and automatic protection switching for hot standby, diversity and ring configurations.



RAC 30

Supports software configurable capacities up to 75x E1 or 1x STM1, modulations from QPSK to 128 QAM and bandwidths up to 30 MHz. Compatible with all ODU300 types (sp/hp/ep).



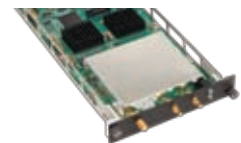
RAC 3X

Supports capacity options requiring channel bandwidths greater than 30 MHz, with modulations up to 256 QAM, including higher capacities up to 2x STM1. Compatible ODU300hp/ep.



RAC 40

Provides co-channel operation with cross-pole interference cancellation (XPIC), for selected capacity options with bandwidths up to 30 MHz and modulations to 128 QAM. Compatible with all ODU300 types (hp/ep).



RAC 4x

Combines the functions of the RAC 3X and RAC 40 cards, by providing co-channel operation with cross-pole interference cancellation (XPIC), for selected capacity options with bandwidths up to 56 MHz and modulations to 256 QAM. Compatible with ODU300hp/ep.

DATA ACCESS CARDS (DAC)

DACs provide customer traffic access for full termination of payload traffic or partial add and drop node configurations.

DACs provide direct transparent mapping or optional multiplexing of TDM or Ethernet data from the INU backplane, and are independent of link or node capacity.



DAC Nx E1

DAC options provide either 4x E1 or 16x E1 interfaces per card.



DAC 3xE3M

A configurable multi-function DAC, providing three transparent E3 interfaces, two E13 interfaces (multiplexing 16xE1 to 1xE3 on the front interface), or two E3 channels for video/ATM applications (E3 carried over concatenated 17xE1) per card. 1+1 hot-standby protectable.



DAC Nx STM1

SDH DAC options provide one or two optical 155 Mbps interfaces, or two 155 Mbps electrical interfaces.



DAC 1x155oM

SDH Multiplexer DAC which maps up to 63x E1 circuits to/ from the INU TDM Bus to an STM1 optical customer interface. 1+1 hot-standby protectable.



DAC ES

Provides 4x 100 Base-T Fast Ethernet interfaces, with configurable aggregate throughput capacity from 6 to 152 Mbps.



DAC GE

Provides 3x 1000 Base-T and one optical IEEE 802.3z 1000 Base-LX Gigabit Ethernet interfaces, with configurable aggregate throughput capacity up to 360 Mbps.

01. GENERAL

LED Indicators	1x Tri-state ('Status')
Power Consumption (Nominal)	< 3 W
Dimensions (Including Front Panel and Rear Connector)	22mm (0.5RU) x 130mm (5.1in) x 268mm (10.6in)
Weight (Nominal)	< 0.34 kg (0.74 lb)

02. TRANSPARENT DAC OPTIONS

Interface, Configurable	DAC 4x	Electrical	1 to 4x 2.048 Mbit/s (E1)
	DAC 16x	Electrical	1 to 16x 2.048 Mbit/s (E1)
	DAC 3xE3M	Electrical	1 to 2x 34.368 Mbit/s (E3)
	DAC 155o	Optical	1x 155.52 Mbit/s (STM1)
	DAC 2x155o	Optical	1 or 2x 155.52 Mbit/s (STM1)
	DAC 2x155e	Electrical	1 or 2x 155.52 Mbit/s (STM1)
Electrical Interface Parameters	Standards Compliance	E1, E3 STM1	Compliant to ITU-T Rec. G.703, G.823 Compliant to ITU-T Rec. G.703, G.825
	Line code	E1, E3 STM1	HDB3 CMI
	Connectors	DAC 4x DAC 16x DAC 3xE3M DAC 2x155e	RJ45 48 Pin Mini-RJ21 Slimline BNC BNC
	Impedance	E1 E3, STM1	75Ω unbalanced or 120Ω balanced, configurable 75Ω Unbalanced
Optical Interface Parameters	Standards Compliance	STM1	Compliant to ITU-T Rec. G.957, G.825 Short Range S-1.1
	Optical Interface Connectors		SC
	Tx Output Center Wavelength, λ_c		1261 to 1310 nm
	Tx Average Optical Output Power, P_o		-15 to -8 dBm
	Rx Input Operating Center Wavelength, λ_c		1100 to 1600 nm
	Rx Sensitivity, P_m		-34 dBm
	Rx Input Power Saturation, P_m		-7 dBm

03. SDH MULTIPLEXER DAC OPTIONS

		DAC 155OM
Interface	Optical	1x 155.52 Mbit/s (STM1)
Functionality		1x STM1 (Interface) to 63x E1 (TDM Bus) Mux
Optical Interface Type (Hot-Swappable SFP)	Standard	Long Range L1.1
	Optional Connectors	Intermediate Range (IR) LC
Optical Interface Parameters		Short Range S1.1
	Tx Output Center Wavelength, λ_c	1261 to 1360 nm
	Tx Average Optical Output Power, P_o	-15 to -8 dBm
	Rx Input Operating Center Wavelength, λ_c	1260 to 1600 nm
	Rx Sensitivity, P_m	-34 dBm
	Rx Input Power Saturation, P_m	0 dBm
Maximum Range (Nominal)	15 km	40 km
Timing Modes, Configurable		Loop Time (Clock Recovered from Received STM1) Local Reference Clock (XO)

04. ETHERNET DAC OPTIONS

		DAC ES	DAC GE
Transport Channels		2	2
Throughput Capacity, Per Channel		2 to 98 Mbit/s, 2 Mbit/s Increments	2 to 200 Mbit/s, 2 Mbit/s Increments 155 or 311 Mbps
Electrical Traffic Interface, Electrical	Interfaces	4x 10/100 baseT	3x 10/100/1000 baseT
	Connectors	4x 8-pin RJ45	3x 8-pin RJ45
Ethernet Traffic Interface, Optical	Interfaces		1x Optical IEEE 802.3z 1000 BASE-LX
	Connectors		1x LC (SFP)
Optical interface Parameters	Tx Output Center Wavelength, λ_c		1270 to 1355 nm
	Tx Average Optical Output Power, P_o		-9.5 to -3 dBm
	Rx Input Operating Center Wavelength, λ_c		1260 to 1610 nm
	Rx Sensitivity, P_m		-20 dBm
	Rx Input Power Saturation, P_m		-3 dBm
LED Indicators		1x Tri-state ('Status')	1x Tri-state ('Status')
Frame Size Supported		64 to 1536 Bytes	64 to 9600 Bytes ^[1]

[1] 64 to 7000 bytes bidirectional, 7000+ to 9600 bytes unidirectional.

GENERAL ODU SPECIFICATIONS

01. GENERAL	ODU300 SP	ODU300 HP	ODU300 EP
Frequency Band Options	7, 8, 11, 13, 15, 18, 23, 32, 38 GHz	L6, U6, 7, 8, 10, 11, 13, 15, 18, 23, 26, 28, 32, 38 GHz	5, 13, 15 GHz
Capacity Support	4 to 40x E1	5 to 100x E1 1 to 2x STM1	5 to 100x E1 1 to 2x STM1
Modulation Support	QPSK, 16 QAM	QPSK to 256 QAM	QPSK to 256 QAM
Lightning Protection	ODU300hp: standard internal; ODU300sp/ep: optional external		

02. IF SPECIFICATIONS			
Intermediate Frequency	Transmit Receive		311 MHz 126 MHz
INU/IDU to ODU IF Cable, Recommended	CNT-300 Type CNT-400 Type		0.3 Inch/Copper Braid/Solid Copper Centre Conductor, 50Ω Maximum IF Cable Length 150 Meters (500 ft) 0.4 Inch/Copper Braid/Copper Clad Aluminum Centre Conductor, 50Ω Maximum IF Cable Length 300 Meters (1,000 ft)

03. ODU INTERFACES			
IF Cable Connector			N-Type
AGC Monitor Point			BNC
Antenna Port Interface	5 GHz 6-38 GHz		Coax, 7/16 DIN F Standard EIA Rectangular Waveguide, Refer to ODU System Specifications
Polarisation, Field Selectable			Vertical (Standard) or Horizontal
Antenna Mounting	5 GHz, Standard 6-38 GHz, Standard 6-38 GHz, Optional		Remote Mount Via Coax Connection Proprietary Direct Mount for Antenna Diameters 0.3 to 1.8m (1 to 6ft) Remote Mount for Antenna Diameters >1.8m (>6ft) Remote Mount Via Flex/Elliptical Waveguide

04. GENERAL TRANSMITTER SPECIFICATIONS			
Transmit Power Tolerance	5 to 26 GHz		± 2 dB
Transmitter Source	28 to 38 GHz		± 3 dB
Frequency Stability			Synthesized ± 10 ppm
Manual Transmitter Power Control Range	QPSK 16QAM 32QAM 64QAM 128QAM 256QAM Resolution Accuracy	ODU300 sp, hp 20 dB 18 dB 17.5 dB 17 dB 16 dB 14 dB	ODU300ep (5 GHz) 30 dB 26 dB 25.5 dB 25 dB 24 dB 22 dB 0.1 dB Steps ± 2 dB
Automatic Transmitter Power Control	Range Resolution/Speed		Configurable Over Full Available Manual Attenuation Range 0.1 dB Steps/6 dB Per Second
Transmitter Mute Channel Selection Synthesizer Resolution			> 50 dB By Software Control Within Tuning Range of ODU 0.25 MHz

05. GENERAL RECEIVER SPECIFICATIONS			
Receiver Source	BER = 1x10 ⁻⁶		Synthesized
Frequency Stability	BER = 1x10 ⁻³		± 10 ppm
Receiver Overload	-40 to -70 dBm, 0 to +35°C		-22 dBm
Residual (Background) Bit Error Rate	-25 to -85 dBm, -33 to +55°C		-20 dBm
RSSI Accuracy ⁽¹⁾			Better than 10 ⁻¹³ ± 2 dB ± 4 dB

06. ADDITIONAL PROTECTION LOSSES	FREQUENCY BAND	MAIN CHANNEL	PROTECTION CHANNEL
Splitter Option	5 GHz / 6 to 18 GHz / 21 to 32 GHz / 38 GHz	3.5 dB / 3.6 dB / 3.8 dB / 4 dB	3.5 dB / 3.6 dB / 3.8 dB / 4 dB
Coupler Option	5 GHz / 6 to 18 GHz / 21 to 32 GHz / 38 GHz	1.5 dB / 1.6 dB / 1.8 dB / 2 dB	6.4 dB / 6.6 dB / 6.8 dB / 7 dB

07. ELECTRICAL			
Power Consumption, Nominal	ODU300sp / hp / ep		20 W / 30 W / 40 W

08. MECHANICAL	SIZE (HXWXD)	WEIGHT
ODU300sp, hp	287mm (11.3 in) x 287mm (11.3 in) x 119mm (4.7 in)	6.4 kg (14 lb)
ODU300ep	287mm (11.3 in) x 287mm (11.3 in) x 175mm (6.9 in)	8.3 kg (18.7 lb)
ODU Protection Splitter/Coupler (RW)	555mm (22.0 in) x 215mm (8.5 in) x 75mm (3.0 in)	7.5 kg (16.5 lb)
ODU Protection Splitter/Coupler (P)	535mm (21.0 in) x 210mm (8.25 in) x 100mm (4.0 in)	9.0 kg (19.8 lb)

Eclipse ODUs are compact, fully environmentally sealed units that are entirely independent of link capacity, payload and modulation, which can all be set completely under software control. Wideband duplexers also provide a wide tuning range via software to increase flexibility and minimize spurring.

ODU options are available with differing maximum capacity and RF performance specifications. All ODUs are designed to mount directly to the antenna, and connect to the INU/IDU by a single coaxial cable.

ODU300sp

Delivers Standard Performance operation with both QPSK and 16QAM modulation and scalable capacity up to 40xE1 for TDM transport, or 80 Mbit/s of Ethernet data, in licensed frequency bands from 7 to 38 GHz.



ODU300hp

Delivers High Performance operation with QPSK to 256QAM modulation and scalable capacity up to 100xE1 or 2xSTM1 for TDM transport, or 360 Mbit/s of Ethernet data, in licensed frequency bands from 6 to 38 GHz.



ODU300ep

Delivers Extended Performance operation with QPSK to 256QAM modulation and scalable capacity up to 75xE1 or 2xSTM1 for TDM transport, or 360 Mbit/s of Ethernet data, in the 5, 13 and 15 GHz licensed frequency bands.



ODU300SP RF SPECIFICATIONS

01. SYSTEM			7 GHZ	8 GHZ	11 GHZ	13 GHZ	15 GHZ	18 GHZ	23 GHZ	32 GHZ	38 GHZ
Frequency Range, GHz			7.125 - 7.9	7.725 - 8.5	10.7 - 11.7	12.75 - 13.25	14.4 - 15.35	17.7 - 19.7	21.2 - 23.632	31.8 - 33.4	37.0 - 39.46
T-R Spacings Supported, MHz			150, 154, 161, 168, 175, 196, 245	119, 126, 151.614, 208, 266, 300, 310, 311.32, 305.56	490, 530	266	315, 420, 490, 644, 728	1010, 1092.5, 1120	1008, 1200, 1232	812	1260
Maximum Tuning Range (Dependent Upon T-R Spacing), MHz			56	140	165	84	245	380	370	370	340
02. ANTENNA INTERFACE											
Waveguide Type			R84 (WR112)	R84 (WR112)	R100 (WR90)	R120 (WR75)	R140 (WR62)	R220 (WR42)	R220 (WR42)	R320 (WR28)	R320 (WR28)
Flange Type			UDR84	UDR84	UDR100	UBR120	UBR140	UBR220	UBR220	UBR320	UBR320
Mating Flange Type			PDR84 or CDR84	PDR84 or CDR84	PDR100 or CDR100	PBR120 or CDR120	PBR140 or CBR140	PBR220	PBR220	PBR320	PBR320
03. SYSTEM GAIN ^[1] SYSTEM GAIN AT 10 ⁻⁶ BER											
4xE1	7 MHz	QPSK	117.0 dB	117.0 dB	114.0 dB	111.5 dB	110.5 dB	108.0 dB	108.0 dB	105.0 dB	104.5 dB
5xE1, 10 Mbit/s	7 MHz	QPSK	116.5 dB	116.5 dB	113.5 dB	111.0 dB	110.0 dB	107.5 dB	107.5 dB	104.5 dB	103.5 dB
8xE1	13.75/14 MHz	QPSK	114.5 dB	114.5 dB	111.5 dB	109.0 dB	108.0 dB	105.5 dB	105.5 dB	102.5 dB	101.5 dB
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	113.5 dB	113.5 dB	110.5 dB	108.0 dB	107.0 dB	104.5 dB	104.5 dB	101.5 dB	101.0 dB
16xE1	27.5/28 MHz	QPSK	111.5 dB	111.5 dB	108.5 dB	106.0 dB	105.0 dB	102.5 dB	102.5 dB	99.5 dB	99.0 dB
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	110.5 dB	110.5 dB	107.5 dB	105.0 dB	104.0 dB	101.5 dB	101.5 dB	98.5 dB	98.0 dB
10xE1, 20 Mbit/s	7 MHz	16QAM	107.5 dB	107.5 dB	104.5 dB	102.0 dB	101.0 dB	98.5 dB	98.5 dB	95.0 dB	94.5 dB
20xE1, 40 Mbit/s	13.75/14 MHz	16 QAM	104.5 dB	104.5 dB	101.5 dB	99.0 dB	98.0 dB	95.5 dB	95.5 dB	92.0 dB	91.5 dB
50 Mbit/s	27.5/28 MHz	16 QAM	102.5 dB	102.5 dB	99.5 dB	97.0 dB	96.0 dB	93.5 dB	93.5 dB	90.0 dB	89.5 dB
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	101.5 dB	101.5 dB	98.5 dB	96.0 dB	95.0 dB	92.5 dB	92.5 dB	89.0 dB	88.5 dB
04. TRANSMITTER SPECIFICATIONS - POWER OUTPUT, NOMINAL											
		vQPSK	25.0 dBm	25.0 dBm	22.5 dBm	20.0 dBm	19.0 dBm	17.0 dBm	17.0 dBm	15.0 dBm	15.0 dBm
		16 QAM	23.0 dBm	23.0 dBm	20.5 dBm	18.0 dBm	17.0 dBm	15.0 dBm	15.0 dBm	13.0 dBm	13.0 dBm
05. RECEIVER SPECIFICATIONS ^[1] THRESHOLD AT 10 ⁻⁶ BER											
4xE1	7 MHz	QPSK	-92.0 dBm	-92.0 dBm	-91.5 dBm	-91.5 dBm	-91.5 dBm	-91.0 dBm	-91.0 dBm	-90.0 dBm	-89.5 dBm
5xE1, 10 Mbit/s	7 MHz	QPSK	-91.5 dBm	-91.5 dBm	-91.0 dBm	-91.0 dBm	-91.0 dBm	-90.5 dBm	-90.5 dBm	-89.5 dBm	-88.5 dBm
8xE1	13.75/14 MHz	QPSK	-89.5 dBm	-89.5 dBm	-89.0 dBm	-89.0 dBm	-89.0 dBm	-88.5 dBm	-88.5 dBm	-87.5 dBm	-86.5 dBm
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	-88.5 dBm	-88.5 dBm	-88.0 dBm	-88.0 dBm	-88.0 dBm	-87.5 dBm	-87.5 dBm	-86.5 dBm	-86.0 dBm
16xE1	27.5/28 MHz	QPSK	-86.5 dBm	-86.5 dBm	-86.0 dBm	-86.0 dBm	-86.0 dBm	-85.5 dBm	-85.5 dBm	-84.5 dBm	-84.0 dBm
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	-85.5 dBm	-85.5 dBm	-85.0 dBm	-85.0 dBm	-85.0 dBm	-84.5 dBm	-84.5 dBm	-83.5 dBm	-83.0 dBm
10xE1, 20 Mbit/s	7 MHz	16 QAM	-84.5 dBm	-84.5 dBm	-84.0 dBm	-84.0 dBm	-84.0 dBm	-83.5 dBm	-83.5 dBm	-82.0 dBm	-81.5 dBm
20xE1, 40 Mbit/s	13.75/14 MHz	16 QAM	-81.5 dBm	-81.5 dBm	-81.0 dBm	-81.0 dBm	-81.0 dBm	-80.5 dBm	-80.5 dBm	-79.0 dBm	-78.5 dBm
50 Mbit/s	27.5/28 MHz	16 QAM	-79.5 dBm	-79.5 dBm	-79.0 dBm	-79.0 dBm	-79.0 dBm	-78.5 dBm	-78.5 dBm	-77.0 dBm	-76.5 dBm
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	-78.5 dBm	-78.5 dBm	-78.0 dBm	-78.0 dBm	-78.0 dBm	-77.5 dBm	-77.5 dBm	-76.0 dBm	-75.5 dBm

All specifications are referenced to the ODU antenna flange, and are typical values unless otherwise stated, and are subject to change without notice.

For Guaranteed values (over time and operational range) subtract 2 dB from Power Output, add 2dB to Threshold values, and subtract 4dB from System Gain values.
 [1] System Gain & Rx Threshold values are for BER=10⁻⁶. Values for BER=10⁻⁹ are improved by 1dB.

ODU300HP/EP RF SPECIFICATIONS (≤15 GHZ)

01. SYSTEM			5 GHZ ^[1]	L6/U6 GHZ	7/8 GHZ	10 GHZ ^[2]	11 GHZ	13 GHZ	15 GHZ
Frequency Range, GHz			4.4 - 5.0	5.925 - 6.425 6.425 - 7.11	7.125 - 7.9 7.725 - 8.5	10.0 - 10.68	10.7 - 11.7	12.75 - 13.25	14.4 - 15.35
T-R Spacings Supported, MHz			300, 312	252.04 340	150, 154, 161, 168, 175, 196, 245 119, 126, 151, 614, 195, 208, 266, 300, 310, 311.32, 305.56	91, 230, 143.5, 350	490, 530	266	315, 420, 490, 644, 728
Maximum Tuning Range (Dependent Upon T-R Spacing), MHz			56	56	56/140	165	165	84	245
02. ANTENNA INTERFACE									
Waveguide Type			N/A	R70 (WR137)	R84 (WR112)	R100 (WR90)	R100 (WR90)	R120 (WR75)	R140 (WR62)
Flange Type			Coax	UDR70	UDR84	UDR100	UDR100	UBR120	UBR140
Mating Flange Type			7/16 DIN F	PDR70 or CDR70	PDR84 or CDR84	PDR100 or CDR100	PDR100 or CDR100	PBR120 or CDR120	PBR140 or CBR140
03. SYSTEM GAIN ^[3] SYSTEM GAIN AT 10 ⁻⁶ BER									
5xE1, 10 Mbit/s	7 MHz	QPSK	122.0 dB	120.5 dB	120.5 dB	117.5 dB	115.5 dB	114.5 dB	113.5 dB
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	119.5 dB	117.5 dB	117.5 dB	114.5 dB	113.0 dB	112.0 dB	110.5 dB
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	116.5 dB	114.5 dB	114.5 dB	111.5 dB	110.0 dB	109.0 dB	107.5 dB
5xE1, 10 Mbit/s	3.5 MHz	16QAM	114.5 dB	114.5 dB	112.0 dB	109.0 dB	107.0 dB	106.0 dB	105.0 dB
10xE1, 20 Mbit/s	7 MHz	16QAM	111.5 dB	112.0 dB	112.0 dB	109.0 dB	107.0 dB	106.0 dB	105.0 dB
16xE1	7 MHz	64 QAM	104.0 dB	104.0 dB	104.0 dB	101.0 dB	99.5 dB	98.5 dB	97.0 dB
20xE1, 40 Mbit/s	13.75/14 MHz	16 QAM	108.5 dB	109.0 dB	109.0 dB	106.0 dB	104.0 dB	103.0 dB	102.0 dB
27xE1, 50 Mbit/s	13.75/14 MHz	32 QAM	104.0 dB	104.5 dB	104.5 dB	101.5 dB	99.5 dB	98.5 dB	97.5 dB
50 Mbit/s	27.5/28 MHz	16 QAM	106.5 dB	107.0 dB	107.0 dB	104.0 dB	102.0 dB	101.0 dB	100.0 dB
32xE1	13.75/14 MHz	64 QAM	101.0 dB	101.0 dB	101.0 dB	98.0 dB	96.5 dB	95.5 dB	94.0 dB
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	105.5 dB	106.0 dB	106.0 dB	103.0 dB	101.0 dB	100.0 dB	99.0 dB
52xE1, 100 Mbit/s	27.5/28 MHz	32 QAM	101.5 dB	102.0 dB	102.0 dB	99.0 dB	97.0 dB	96.0 dB	95.0 dB
64xE1	27.5/28 MHz	64 QAM	98.0 dB	97.0 dB	97.0 dB	94.0 dB	92.5 dB	91.5 dB	90.0 dB
75xE1, 1xSTM1, 150 Mbit/s	55/56 MHz	16 QAM	102.5 dB	103.0 dB	103.0 dB			97.0 dB	96.0 dB
1xSTM1	40 MHz	64 QAM	99.5 dB	99.5 dB		96.5 dB	95.0 dB		
75xE1, 4xE3, 1xSTM1, 150 Mbit/s	27.5/28 MHz	128 QAM	94.0 dB	94.0 dB	94.0 dB	91.0 dB	89.5 dB	88.5 dB	87.0 dB
1xSTM1 ^[5]	27.5/28 MHz	128 QAM	95.0 dB	95.5 dB	95.5 dB	92.5 dB	90.5 dB	89.5 dB	88.5 dB
93xE1	27.5/28 MHz	256 QAM	89.5 dB	88.0 dB	88.0 dB	85.0 dB	83.0 dB	82.0 dB	81.0 dB
100xE1	55/56 MHz	32 QAM	98.5 dB	99.0 dB	99.0 dB			93.0 dB	92.0 dB
100xE1, 200 Mbit/s	40 MHz	128 QAM	92.5 dB	93.0 dB		90.0 dB	88.0 dB		
200 Mbit/s	55/56 MHz	64 QAM	98.0 dB	97.5 dB	97.5 dB			92.0 dB	90.5 dB
250 Mbit/s	55/56 MHz	64 QAM	97.5 dB	94.0 dB	94.0 dB			88.5 dB	87.0 dB
2xSTM1, 310Mbit/s ^[6]	55/56 MHz	128 QAM	90.5 dB	90.5 dB	90.5 dB			85.0 dB	83.5 dB
2xSTM1, 310Mbit/s	50 MHz	256 QAM							
360Mbit/s ^[6]	55/56 MHz	256 QAM	85.0 dB	85.0 dB	85.0 dB			79.5 dB	78.0 dB
04. TRANSMITTER SPECIFICATIONS POWER OUTPUT, NOMINAL									
		QPSK	30.5 dB	28.5 dBm	28.5 dBm	26.0 dBm	24.0 dBm	23.0 dBm	22.0 dBm
		16 QAM	26.5 dB	26.5 dBm	26.5 dBm	24.0 dBm	22.0 dBm	21.0 dBm	20.0 dBm
		32 QAM	26.0 dB	26.0 dBm	26.0 dBm	23.5 dBm	21.5 dBm	20.5 dBm	19.5 dBm
		64 QAM ^[4]	25.5 dB	25.5 dBm	25.5 dBm	23.0 dBm	21.0 dBm	20.0 dBm	19.0 dBm
		128 QAM	24.5 dB	24.5 dBm	24.5 dBm	22.0 dBm	20.0 dBm	19.0 dBm	18.0 dBm
		256 QAM	22.5 dB	22.5 dBm	22.5 dBm	20.0 dBm	18.0 dBm	17.0 dBm	16.0 dBm
05. RECEIVER SPECIFICATIONS ^[3] THRESHOLD AT 10 ⁻⁶ BER									
5xE1, 10 Mbit/s	7 MHz	QPSK	-91.5 dBm	-92.0 dBm	-92.0 dBm	-91.5 dBm	-91.5 dBm	-91.5 dBm	-91.5 dBm
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	-89.0 dBm	-89.0 dBm	-89.0 dBm	-88.5 dBm	-89.0 dBm	-89.0 dBm	-88.5 dBm
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	-86.0 dBm	-86.0 dBm	-86.0 dBm	-85.5 dBm	-86.0 dBm	-86.0 dBm	-85.5 dBm
5xE1, 10 Mbit/s	3.5 MHz	16 QAM	-88.0 dBm	-88.0 dBm	-88.0 dBm	-87.5 dBm	-87.5 dBm	-87.5 dBm	-87.5 dBm
10xE1, 20 Mbit/s	7 MHz	16 QAM	-85.0 dBm	-85.5 dBm	-85.5 dBm	-85.0 dBm	-85.0 dBm	-85.0 dBm	-85.0 dBm
16xE1/30 Mbit/s	7 MHz	64 QAM	-78.5 dBm	-78.5 dBm	-78.5 dBm	-78.0 dBm	-78.5 dBm	-78.5 dBm	-78.0 dBm
20xE1, 40 Mbit/s	13.75/14 MHz	16 QAM	-82.0 dBm	-82.5 dBm	-82.5 dBm	-82.0 dBm	-82.0 dBm	-82.0 dBm	-82.0 dBm
27xE1, 50 Mbit/s	13.75/14 MHz	32 QAM	-78.0 dBm	-78.5 dBm	-78.5 dBm	-78.0 dBm	-78.0 dBm	-78.0 dBm	-78.0 dBm
50 Mbit/s	27.5/28 MHz	16 QAM	-80.0 dBm	-80.5 dBm	-80.5 dBm	-80.0 dBm	-80.0 dBm	-80.0 dBm	-80.0 dBm
32xE1, 50 Mbit/s	13.75/14 MHz	64 QAM	-75.5 dBm	-75.5 dBm	-75.5 dBm	-75.0 dBm	-75.5 dBm	-75.5 dBm	-75.0 dBm
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	-79.0 dBm	-79.5 dBm	-79.5 dBm	-79.0 dBm	-79.0 dBm	-79.0 dBm	-79.0 dBm
52xE1, 100 Mbit/s	27.5/28 MHz	32 QAM	-75.5 dBm	-76.0 dBm	-76.0 dBm	-75.5 dBm	-75.5 dBm	-75.5 dBm	-75.5 dBm
64xE1	27.5/28 MHz	64 QAM	-72.5 dBm	-72.5 dBm	-72.5 dBm	-72.0 dBm	-72.5 dBm	-72.5 dBm	-72.0 dBm
75xE1, 1xSTM1, 150 Mbit/s	55/56 MHz	16 QAM	-76.0 dBm	-76.5 dBm	-76.5 dBm			-76.0 dBm	-76.0 dBm
1xSTM1	40 MHz	64 QAM	-74.0 dBm	-74.0 dBm		-73.5 dBm	-74.0 dBm		
75xE1, 4xE3, 1xSTM1, 150 Mbit/s	27.5/28 MHz	128 QAM	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.5 dBm	-69.0 dBm
1xSTM1 ^[5]	27.5/28 MHz	128 QAM	-70.5 dBm	-71.0 dBm	-71.0 dBm	-70.5 dBm	-70.5 dBm	-70.5 dBm	-70.5 dBm
93xE1	27.5/28 MHz	256 QAM	-65.0 dBm	-65.5 dBm	-65.5 dBm	-65.0 dBm	-65.0 dBm	-65.0 dBm	-65.0 dBm
100xE1	55/56 MHz	32 QAM	-72.5 dBm	-73.0 dBm	-73.0 dBm			-72.5 dBm	-72.5 dBm
100xE1, 200 Mbit/s	40 MHz	128 QAM	-68.0 dBm	-68.5 dBm		-68.0 dBm	-68.0 dBm		
200 Mbit/s	55/56 MHz	64 QAM	-72.0 dBm	-72.0 dBm	-72.0 dBm			-72.0 dBm	-71.5 dBm
250 Mbit/s	55/56 MHz	64 QAM	-68.5 dBm	-68.5 dBm	-68.5 dBm			-68.5 dBm	-68.0 dBm
2xSTM1, 310Mbit/s ^[6]	55/56 MHz	128 QAM	-66.0 dBm	-66.0 dBm	-66.0 dBm			-66.0 dBm	-65.5 dBm
2xSTM1, 310Mbit/s	50 MHz	256 QAM							
360Mbit/s ^[6]	55/56 MHz	256 QAM	-62.5 dBm	-62.5 dBm	-62.5 dBm			-62.5 dBm	-62.0 dBm

ODU300HP/EP RF SPECIFICATIONS (≥18 GHZ)

01. SYSTEM			18 GHZ	23 GHZ	26 GHZ	28 GHZ	32 GHZ	38 GHZ
Frequency Range, GHz			17.7 - 19.7	21.2 - 23.632	24.52 - 26.483	27.5 - 29.5	31.8 - 33.4	37.0 - 39.46
T-R Spacings Supported, MHz			1010, 1092.5, 1120	1008, 1200, 1232	1008	1008	812	1260
Maximum Tuning Range (Dependent Upon T-R Spacing), MHz			380	370	360	360	370	340
02. ANTENNA INTERFACE								
Waveguide Type			R220 (WR42)	R220 (WR42)	R220 (WR42)	R320 (WR28)	R320 (WR28)	R320 (WR28)
Flange Type			UBR220	UBR220	UBR220	UBR320	UBR320	UBR320
Mating Flange Type			PBR220	PBR220	PBR220	PBR320	PBR320	PBR320
03. SYSTEM GAIN ⁽³⁾⁽⁷⁾ SYSTEM GAIN AT 10 ⁻⁶ BER								
5xE1, 10 Mbit/s	7 MHz	QPSK	110.5 dB	110.5 dB	105.5 dB	107.0 dB	107.0 dB	106.0 dB
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	108.0 dB	107.5 dB	102.5 dB	104.5 dB	104.0 dB	103.5 dB
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	105.0 dB	104.5 dB	99.5 dB	101.5 dB	101.0 dB	100.5 dB
5xE1, 10 Mbit/s	3.5 MHz	16QAM	102.0 dB	102.0 dB	97.0 dB	98.5 dB	98.0 dB	97.5 dB
10xE1, 20 Mbit/s	7 MHz	16QAM	102.0 dB	102.0 dB	97.0 dB	98.5 dB	98.0 dB	97.5 dB
16xE1	7 MHz	64 QAM	94.5 dB	94.0 dB	89.0 dB	90.5 dB	90.0 dB	89.5 dB
20xE1, 40 Mbit/sv	13.75/14 MHz	16 QAM	99.0 dB	99.0 dB	94.0 dB	95.5 dB	95.0 dB	94.5 dB
27xE1, 50 Mbit/s	13.75/14 MHz	32 QAM	94.5 dB	94.5 dB	89.5 dB	91.0 dB	90.5 dB	90.0 dB
50 Mbit/s	27.5/28 MHz	16 QAM	97.0 dB	97.0 dB	92.0 dB	93.5 dB	93.0 dB	92.5 dB
32xE1	13.75/14 MHz	64 QAM	91.5 dB	91.0 dB	86.0 dB	87.5 dB	87.0 dB	86.5 dB
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	96.0 dB	96.0 dB	91.0 dB	92.5 dB	92.0 dB	91.5 dB
52xE1, 100 Mbit/s	27.5/28 MHz	32 QAM	92.0 dB	92.0 dB	87.0 dB	88.5 dB	88.0 dB	87.5 dB
64xE1	27.5/28 MHz	64 QAM	87.5 dB	87.0 dB	82.0 dB	83.5 dB	83.0 dB	82.5 dB
75xE1, 1xSTM1, 150 Mbit/s	55/ 6 MHz	16 QAM	93.5 dB	93.0 dB	88.0 dB	89.5 dB	89.0 dB	88.5 dB
1xSTM1	40 MHz	64 QAM						
75xE1, 4xE3, 1xSTM1, 150 Mbit/s	27.5/28 MHz	128 QAM	84.5 dB	84.0 dB	79.0 dB	80.0 dB	79.5 dB	79.0 dB
1xSTM1 ⁽⁵⁾	27.5/28 MHz	128 QAM	85.5 dB	85.5 dB	80.5 dB	81.0 dB	81.0 dB	80.0 dB
93xE1	27.5/28 MHz	256 QAM	78.0 dB	78.0 dB	72.0 dB	73.5 dB	73.5 dB	72.0 dB
100xE1	55/56 MHz	32 QAM	89.0 dB	89.0 dB	83.5 dB	85.5 dB	85.0 dB	84.5 dB
100xE1, 200 Mbit/s	40 MHz	128 QAM						
200 Mbit/s	55/56 MHz	64 QAM	88.0 dB	87.5 dB	82.0 dB	83.5 dB	83.5 dB	83.0 dB
250 Mbit/s	55 / 56 MHz	64 QAM	84.5 dB	84.0 dB	78.5 dB	80.5 dB	80.0 dB	79.5 dB
2xSTM1, 310Mbit/s ⁽⁶⁾	55/56 MHz	128 QAM	81.0 dB	80.5 dB	75.5 dB	76.5 dB	76.0 dB	75.5 dB
2xSTM1, 310Mbit/s	50 MHz	256 QAM		76.5 dB				
360Mbit/s ⁽⁶⁾	55/56 MHz	256 QAM	75.5 dB	75.0 dB	70.0 dB	71.5 dB	71.5 dB	70.5 dB
04. TRANSMITTER SPECIFICATIONS ⁽⁷⁾ POWER OUTPUT, NOMINAL								
		QPSK	19.5 dBm	19.5 dBm	15.5 dBm	18.0 dBm	18.0 dBm	17.5 dBm
		16 QAM	17.5 dBm	17.5 dBm	13.5 dBm	16.0 dBm	16.0 dBm	15.5 dBm
		32 QAM	17.0 dBm	17.0 dBm	13.0 dBm	15.5 dBm	15.5 dBm	15.0 dBm
		64 QAM ⁽⁴⁾	16.5 dBm	16.5 dBm	12.5 dBm	15.0 dBm	15.0 dBm	14.5 dBm
		128 QAM	15.5 dBm	15.5 dBm	11.5 dBm	14.0 dBm	14.0 dBm	13.5 dBm
		256 QAM	13.5 dBm	13.5 dBm	9.5 dBm	12.0 dBm	12.0 dBm	11.5 dBm
05. RECEIVER SPECIFICATIONS ⁽³⁾ THRESHOLD AT 10 ⁻⁶ BER								
5xE1, 10 Mbit/s	7 MHz	QPSK	-91.0 dBm	-91.0 dBm	-90.0 dBm	-89.0 dBm	-89.0 dBm	-88.5 dBm
10xE1, 20 Mbit/s	13.75/14 MHz	QPSK	-88.5 dBm	-88.0 dBm	-87.0 dBm	-86.5 dBm	-86.0 dBm	-86.0 dBm
20xE1, 40 Mbit/s	27.5/28 MHz	QPSK	-85.0 dBm	-85.0 dBm	-84.0 dBm	-83.5 dBm	-83.0 dBm	-83.0 dBm
5xE1, 10 Mbit/s	3.5 MHz	16 QAM	-87.0 dBm	-87.0 dBm	-86.0 dBm	-85.0 dBm	-84.5 dBm	-84.5 dBm
10xE1, 20 Mbit/s	7 MHz	16 QAM	-84.5 dBm	-84.5 dBm	-83.5 dBm	-82.5 dBm	-82.0 dBm	-82.0 dBm
16xE1/30 Mbit/s	7 MHz	64 QAM	-78.0 dBm	-77.5 dBm	-76.5 dBm	-75.5 dBm	-75.0 dBm	-75.0 dBm
20xE1, 40 Mbit/s	13.75/14 MHz	16 QAM	-81.5 dBm	-81.5 dBm	-80.5 dBm	-79.5 dBm	-79.0 dBm	-79.0 dBm
27xE1, 50 Mbit/s	13.75/14 MHz	32 QAM	-77.5 dBm	-77.5 dBm	-76.5 dBm	-75.5 dBm	-75.0 dBm	-75.0 dBm
50 Mbit/s	27.5/28 MHz	16 QAM	-79.5 dBm	-79.5 dBm	-78.5 dBm	-77.5 dBm	-77.0 dBm	-77.0 dBm
32xE1, 50 Mbit/s	13.75/14 MHz	64 QAM	-75.0 dBm	-74.5 dBm	-73.5 dBm	-72.5 dBm	-72.0 dBm	-72.0 dBm
40xE1, 80 Mbit/s	27.5/28 MHz	16 QAM	-78.5 dBm	-78.5 dBm	-77.5 dBm	-76.5 dBm	-76.0 dBm	-76.0 dBm
52xE1, 100 Mbit/s	27.5/28 MHz	32 QAM	-75.0 dBm	-75.0 dBm	-74.0 dBm	-73.0 dBm	-72.5 dBm	-72.5 dBm
64xE1	27.5/28 MHz	64 QAM	-72.0 dBm	-71.5 dBm	-70.5 dBm	-69.5 dBm	-69.0 dBm	-69.0 dBm
75xE1, 1xSTM1, 150 Mbit/s	55/56 MHz	16 QAM	-76.0 dBm	-75.5 dBm	-74.5 dBm	-73.5 dBm	-73.0 dBm	-73.0 dBm
1xSTM1	40 MHz	64 QAM						
75xE1, 4xE3, 1xSTM1, 150 Mbit/s	27.5/28 MHz	128 QAM	-69.0 dBm	-68.5 dBm	-67.5 dBm	-66.0 dBm	-65.5 dBm	-65.5 dBm
1xSTM1 ⁽⁵⁾	27.5/28 MHz	128 QAM	-70.0 dBm	-70.0 dBm	-69.0 dBm	-67.0 dBm	-67.0 dBm	-66.5 dBm
93xE1	27.5/28 MHz	256 QAM	-64.5 dBm	-64.5 dBm	-62.5 dBm	-61.5 dBm	-61.5 dBm	-60.5 dBm
100xE1	55/56 MHz	32 QAM	-72.0 dBm	-72.0 dBm	-70.5 dBm	-70.0 dBm	-69.5 dBm	-69.5 dBm
100xE1, 200 Mbit/s	40 MHz	128 QAM						
200 Mbit/s	55/56 MHz	64 QAM	-71.5 dBm	-71.0 dBm	-69.5 dBm	-69.0 dBm	-68.5 dBm	-68.5 dBm
250 Mbit/s	55/56 MHz	64 QAM	-68.0 dBm	-67.5 dBm	-66.0 dBm	-65.5 dBm	-65.0 dBm	-65.0 dBm
2xSTM1, 310Mbit/s ⁽⁶⁾	55/56 MHz	128 QAM	-65.5 dBm	-65.0 dBm	-64.0 dBm	-62.5 dBm	-62.0 dBm	-59.0 dBm
2xSTM1, 310Mbit/s	50 MHz	256 QAM		-63.0 dBm				
360Mbit/s ⁽⁶⁾	55/56 MHz	256 QAM	-62.0 dBm	-61.5 dBm	-60.5 dBm	-59.5 dBm	-59.5 dBm	

All specifications are referenced to the ODU antenna flange, and are typical values unless otherwise stated, and are subject to change without notice.
 For Guaranteed values (over time and operational range) subtract 2 dB from Power Output, add 2dB to Threshold values, and subtract 4dB from System Gain values.
 [1] ODU300ep version. Switchable diplexer option also available, but system gain is reduced by 4 dB.
 [2] 10GHz Power Output and System Gain specifications are reduced by 0.5dB, 0.5dB and 1.0dB respectively for 91MHz T-R option.
 [3] System Gain & Rx Threshold values are for BER=10⁻⁶. Values for BER=10⁻³ are improved by 1dB.
 [4] Transmit Power Output values for 64xE1 64QAM will be reduced by 1dB from the 64QAM value indicated.
 [5] High System Gain performance (+1.5dB) available on the RAC 30v3 (optional) and the RAC 40 (standard).
 [6] Use of 2xSTM1 single 56MHz channel operation in 6 to 13GHz bands is subject to local Regulatory approval.

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