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Data Sheet

ETX-2

Carrier Ethernet Demarcation

- Feature-rich demarcation and aggregation suite, offering a complete Service Assured Access (SAA) solution
- Ideal for service providers, wholesalers, and mobile operators, seeking to deliver and monitor SLA-based MEF-certified Carrier Ethernet 2.0, and TDM-over-packet services
- Versatile offering of multirate Ethernet over fiber, SHDSL, VDSL, GPON, PDH, and TDM, assuring unified service delivery over any access technology
- TWAMP and Layer-2 OAM, diagnostics for scalable and accurate traffic monitoring, quick fault detection, and troubleshooting of Layer-2 and Layer-3 networks

SyncToP

The ETX-2 Carrier Ethernet Demarcation device is the main component of RAD's Service Assured Access solution, providing:

- Ethernet service uniformity over multiple access technologies including GbE and 10GbE, SHDSL, VDSL, PDH, and SDH
- Operation in diverse topologies including ring, daisy chain, and hub and spoke
- PWE functionality for mobile backhauling and business services
- Synchronization for mobile 2G, 3G, LTE, and LTE-A backhauling networks

ETX-2 is offered in a variety of product options: ETX-203AM, ETX-203AX, ETX-205A, and ETX-220A. *Table 1* provides further information on the capabilities offered by each ETX-2 device.

MARKET SEGMENTS AND APPLICATIONS

ETX-2 is ideal for carriers, service providers, wholesale providers, and mobile operators seeking to offer unified SLA-based Ethernet business services, such as E-Line, E-LAN, E-Tree, and E-Access.

NETWORK TOPOLOGIES AND INTEROPERABILITY

ETX-2 supports several network topologies such as linear, daisy chain, and self-healing rings (G.8032v2), working with ETX-5 or third-party Ethernet devices.

CARRIER ETHERNET 2.0

ETX-2 incorporates a complete set of CE 2.0-certified Ethernet service tools that allow the service provider to distinguish between high- and low-priority traffic, and optimize TCP sessions.

ETX-220A also provides MEF 10.3 color aware and unaware policers, delivering high-scale multi-CoS services with hierarchical Quality of Service (HQoS).

It supports advanced scheduling, WRED per CoS, shaping per EVC and per port, with flexible classification rules and access lists.

MEF Services
ETX-2 delivers E-Line (EVL, EVPL), E-LAN (EPLAN, EVPLAN), E-Tree (EP-TREE, EVP-TREE), and E-Access services.

Layer-2 Control Processing
ETX-2 can be configured to forward or discard Layer-2 control frames (including other vendors' L2CP frames).

DHCP and MLD SNOOPING

With DHCP and MLDv2 snooping, multicast data is selectively forwarded only to a list of self-learned ports (per multicast group membership), instead of being flooded to all ports in a VLAN.

TDM PSEUDOWIRE

ETX-205A with built-in E1 ports and ETX-2 with smart SFP (MiTOP) provide pseudowire (PWE) services. The PWs can be encapsulated using CESoPSN per IETF RFC 5086 or SAToP per IETF RFC 4553.

RESILIENCY

ETX-2 offers fast protection for virtually any kind of failure, in any linear, ring, or dual-homed topology. The device employs IEEE 802.3ad link aggregation (1:1 LAG), ITU-T G.8032v2 Ethernet ring protection, and ITU-T G.8031 Ethernet linear protection, to ensure continuous availability and sub-50ms restoration in the event of network outages.

It also provides MSTP and RSTP (IEEE 802.1Q) to support loop-free Bridge forwarding over a mesh/ring physical topology.

RAD
Your Network's Edge®

ETHERNET OVER PDH

ETX-2 transports Ethernet over PDH (EoPDH) infrastructure via the following NG-PDH technologies:

- Generic Framing Procedure (GFP G.7041)
- GFP or PDH (G.8040)
- PDH Virtual Concatenation (VCAT G.7043)
- Link Capacity Adjustment Scheme (VCAT G.7042)

NG-PDH solutions improve overall network availability by reducing latency and optimizing line utilization and throughput.

Integrated management of MiRICi smart SFPs provides TDM (E1/T1/E3/T3/OC-3/STM-1) connectivity over PDH or SDH legacy networks.

RESILIENCY

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It also provides MSTP and RSTP (IEEE 802.1Q) to support loop-free Bridge forwarding over a mesh/ring physical topology.

TIMING AND SYNCHRONIZATION

ETX-2 incorporates RAD's advanced SyncTop synchronization and timing over packet feature set to support mobile heterogeneous network (HetNet) topology.

The device combines Synchronous Ethernet (SyncE) with IEEE 1588v2 Precision Time Protocol per ITU-T G.8265.1 and G.8275.1 Telecom profiles for cost-effective synchronization of frequency and phase.

With an integrated GNSS receiver and 1588v2 Grandmaster support, ETX-2 offers a Distributed GM™ solution, allowing mobile operators and service providers to cost-effectively provide reliable frequency and phase accuracy for LTE-A.

The device also supports 1588v2 ordinary clock (OC), boundary clock (BC), and transparent clock (TC), as well as a dual master operating simultaneously in G.8265.1 and G.8275.1 modes.

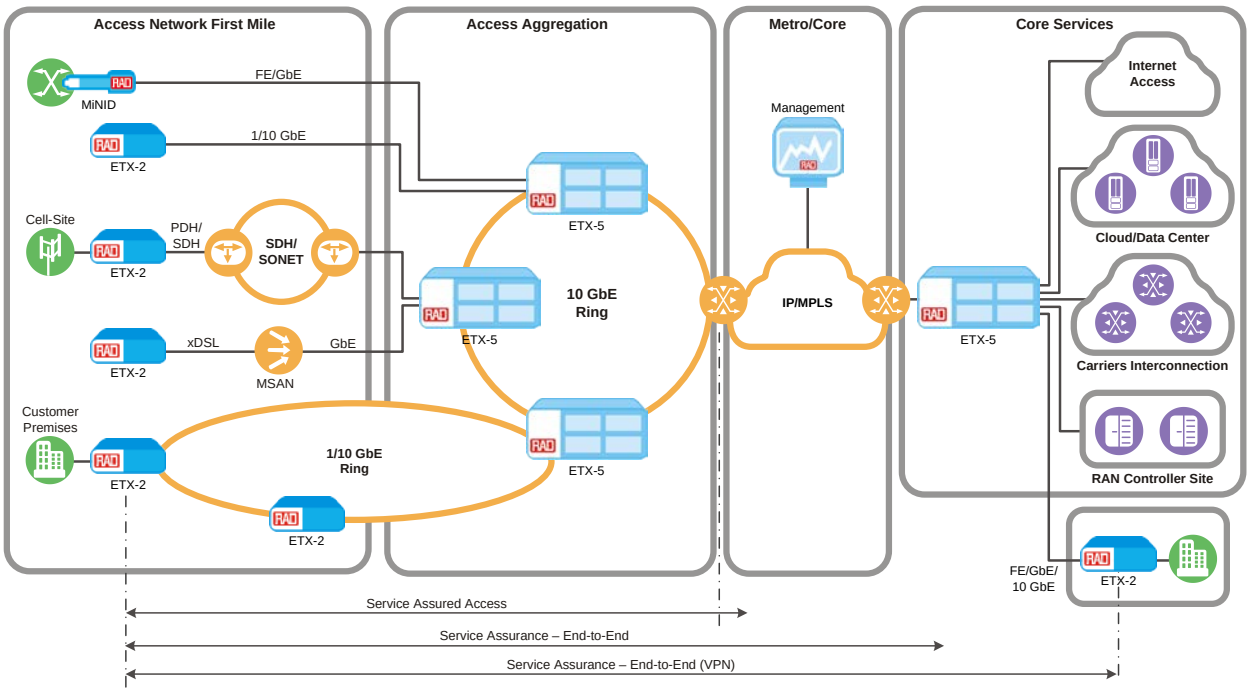

Figure 1. Access Aggregation with SLA-Based Services

MANAGEMENT AND SECURITY

The device can be managed via RADview, RAD's carrier-class NMS, or any SNMP-based management system. ETX-2 supports a variety of access protocols, including CLI over Telnet, SNMPv3, and TFTP. Security features include SNMPv3, RADIUS (client authentication), TACACS+ (client authentication, authorization, and accounting), SSH, and SFTP.

Access Control Lists (ACL) can also be used to flexibly filter and mark management traffic, enabling service providers to maintain network security by dropping unwanted packets.

MONITORING AND DIAGNOSTICS

Featuring multi-layer OAM and PM tools, ETX-2 performs hardware-based monitoring and diagnostics at high scale and precision. End-to-end connectivity OAM (IEEE 802.1ag) as well as single-segment OAM (IEEE 802.3-2005) ensure flow-level fault management and performance monitoring over Layer-2 networks and also quickly detect connectivity failures for robust protection. Layer-2 and 3 wirespeed loopbacks offer flexible diagnostic tools.

RFC-5357 TWAMP light delivers the same functionality over Layer-3 networks, as well as one-way TWAMP with counters for loss, delay, fragmented packets, reorders and duplication, in addition to configurable test packet size. Multiple VRF support the robust TWAMP setup. High-scale TWAMP is provided in ETX-205A by a PM controller (PMC) in a dedicated enclosure.

The Performance Management Portal is an SLA assurance system that is part of the RADview management system, enabling real-time monitoring of Ethernet service performance by collecting KPI data from RAD devices.

Service Activation Tests

The ETX-2 family offers service activation tools with multiple RFC-2544, Y.1564, and L3 SAT testers.

Digital Diagnostics Monitoring

ETX-2 supports digital diagnostics monitoring (DDM) SFP functions according to SFF-8472, excluding external DDM calibration.

Table 1. Feature Comparison –ETX-2 Product Options

	Specifications	ETX-203AX 	ETX-203AM 	ETX-205A 	ETX-220A 
Interfaces	10GbE XFP interfaces	–	–	–	+
	FE/GbE SFP interfaces	+	+	+	+
	10/100/1000 electrical interfaces	+	+	+	+
	GbE combo interfaces	–	2 (modular)	+	–
	Extension slot for network interface module	–	+	–	–
	PDH network interfaces (GFP mapping)	Optional 1x E1	4/8 E1/T1, 1/2 T3	–	–
	SHDSL network interfaces	Optional 8W SHDSL	+	–	–
	VDSL2 network interfaces	–	+	–	–
	E1/T1/T3/STM-1/OC-3 network interfaces via integrated Smart SFP (MiRIC)	+	+	+	+
	E1/T1/T3 PWE services via integrated Smart SFP (MiTOP)	+	+	+	+
	E1/T1 PWE services via built-in E1/T1 ports	–	–	Optional 4/8 E1/T1	–
	Optional timing interfaces (2 MHz, 2 Mbps, 1PPS, ToD)	–	–	+	+
Networking Capabilities	Ethernet E-Line, E-LAN, and E-Tree services	+	+	+	+
	Layer-2 forwarding	+	+	+	+
	Flow classification rules	+	+	+	+
	Available bandwidth measurements for Layer-2 services	+	+	+	+
	2-rate/3-color policing per EVC.CoS	+	+	+	+
	Shaping per EVC and EVC.CoS	+	+	+	+
	MultiCoS EVCs per MEF 10.3 policing	–	–	–	+
	Strict priority and weighted fair queuing (WFQ) scheduling	+	+	+	+
	G.8031 linear protection	+	+	+	+
	G.8032v2 ring protection	+	+	+	+
	1:1 link protection with 1:1 LAG/LACP	+	+	+	+
	1:1 link protection with dual homing	+	+	+	+
	LAG with load balancing	–	–	–	+
	Jumbo frame support	+	+	+	+
	Synchronous Ethernet (SyncE) on all interfaces	–	–	+	+
	IEEE-1588v2 precision time protocol (PTP) per G.8265.1 and G.8275.1 Telecom profiles	TC	TC	OC, TC, BC, GM with integrated GNNS	OC, TC, BC

Table 1. Feature Comparison – ETX-2 Product Options (Continued)

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A
OAM and Diagnostics	Built-in Y.1564 service activation testers	+	+	+	+ (up to 10G services)
	Connectivity fault management (CFM) per IEEE 802.1ag	+	+	+	+
	Service utilization and performance monitoring per ITU-T Y.1731.2012, including synthetic loss measurement	+	+	+	+
	Delay and loss measurements per MEF 36	+	+	+	+
	TWAMP light generator and responder (SW license)	+	+	+	+
	PM controller (PMC)	–	–	+	–
	Accurate one-way KPI measurements	–	–	+	+
	LLDP discovery per IEEE 802.1AB	+	+	+	+
	Link-level OAM per IEEE 802.3-2005	+	+	+	+
	RMON2 port-level counters	+	+	+	+
	MSTP and RSTP	+	+	+	+
	DHCP and MLDv2 Snooping	+	+	+	+
	On-demand Layer-2 and 3 loopbacks	+	+	+	+
General and Management	Zero-touch provisioning (DHCP, PPPoE)	+	+	+	+
	SNMPv1/v2/v3	+	+	+	+
	RADIUS and TACACS+ AAA	+	+	+	+
	Network time protocol (NTP)	+	+	+	+
	Power supply redundancy	–	–	+	+
	NEBS option	+	+	+	+
	Temperature-hardened option	+	+	+	+
	MEF CE2.0	+	+	+	+

Specifications

CAPACITY

Max. Frame Size
12,288 bytes with Ethernet uplinks
2,048 bytes with SHDSL uplink module
2,112 bytes with VDSL uplink module
10,240 bytes with E1/T1/T3 EoPDH uplink module

BRIDGE

Compliance
802.1D, 802.1Q, 802.1ad

Mode
VLAN-aware, VLAN-unaware

VLAN Editing
Inner/outer VLAN editing per VLAN and p-bit values

HIERARCHICAL QUALITY OF SERVICE (HQOS)

Policing
Dual token bucket with user-configurable CIR + CBS and EIR + EBS

ETX-220A: Bandwidth policing per MEF 10.3

Scheduling
8 × CoS per EVC scheduling elements
Strict Priority (SP) and Weighted Fair Queue (WFQ)

Shaping
Per port (ETX-220A)
Per EVC
Per EVC.CoS

FLOWS

Classification
Per port, outer VLAN or outer + inner VLAN, PCP, TOS/DSCP, Ethertype, or IP/MAC source/destination address

RESILIENCY

Dual Homing
Dual homed link redundancy

Link Aggregation
IEEE 802.1ax (802.3ad) 1:1 LAG with LACP for pairs of network or user Ethernet ports

Ethernet Ring
G.8032v2 rings with sub 50 ms protection for Ethernet traffic

Ethernet Path Protection
G.8031, for linear 1:1 protection

DIAGNOSTICS

Loopback Tests
Non-disruptive loopback per flow, with MAC/IP address swap
Loopbacks at Ethernet port level

Service Activation Tests
RFC-2544: 8 built-in wirespeed testers
ITU-T Y.1564: 8 built-in wirespeed testers

Alarm Relay (optional)
Type: Dry contacts with three "in"
Connector: Terminal block, 9-pin

ICMP Echo
Over L2 and L3 services
Tests IP connectivity (PING)

SHDSL INTERFACES

Provided with SHDSL network module for ETX-203AM modular ordering option and with ETX-203AX SHDSL8W ordering option

Type
SHDSL.bis

Number of Ports
Two or four

Number of Wires
Four or eight

Connectors
Replaceable network module, with one RJ-45 connector for 4-wire ordering option or two RJ-45 connectors for 8-wire ordering option

Line Coding
16 or 32 TC-PAM

Line Rate
192–5696 kbps (see *Table 2*)

Impedance
135 Ω

Compliance
ITU-T G.991.2, G.994.1, ETSI TS 101524

Bonding
According to IEEE 802.3ah, ITU-T G.998.2

Table 2. SHDSL Typical Ranges (26 AWG)

Data Rate	4-wire		8-wire	
[kbps]	[km]	[mi]	[km]	[mi]
192	8	4.9	8	4.9
512	6.7	4.1	6.7	4.1
1536	6	3.7	6.5	4
2048	5.7	3.5	6.4	3.9
4096	5.1	3.1	5.7	3.5
4608	5	3	5.5	3.4
5696	4.6	2.8	5.1	.1
11392	2.9	1.8	4.6	2.8
17088	–	–	3.5	2.1
22784	–	–	2.9	1.8

VDSL2 INTERFACES

Provided with VDSL2 network module for ETX-203AM modular ordering

Operates in CPE mode only.

Type
VDSL.bis

Temperature
Operates in non-hardened devices of up to 35°C (90°F). Above this temperature, requires hardened device.

Number of Ports
Four VDSL2 ports (two per connector)

Number of Wires
Eight

Connectors
Replaceable network module, with two RJ-45 connectors (UTP)

Impedance
VDSL2 over POTS: 100 Ω
VDSL2 over ISDN: 135 Ω

Compliance
ITU-T G.993.2, G.997.1, G.998.2, IEEE 802.3, ETSI TS 101524

Bonding
According to ITU-T G.998.2 VDSL2 PTM

One bonding group; supports up to four VDSL ports per group

Bonding payload rate up to 400 Mbps DL /200 Mbps UL, with packet forwarding throughput 380 Mbps DL/180 Mbps UL

Line Coding
DMT

Payload Rate
100 Mbps DL/50 Mbps UL per line

Table 3. VDSL Ranges

Profile	Bandwidth (MHz)	Number Down-stream Carriers	Carrier Bandwidth (kHz)	Max Aggregate Downstream Transmit Power (dBm)	Max Downstream Throughput (Mbit/s)
8a	8.832	2048	4.3125	+17.5	50
8b	8.832	2048	4.3125	+20.5	50
8c	8.5	1972	4.3125	+11.5	50
8d	8.832	2048	4.3125	3.9	50
12a	12	2783	4.3125	3.5	68
12b	12	2783	4.3125	3.4	68
17a	17.664	4096	4.3125	3.4	100

E1/T1 INTERFACES (ETHERNET OVER PDH)

(ETX-203AM: EoPDH E1/T1 network module, ETX-203AX with E1 network port)

Number of Ports
ETX-203AM: four or eight
ETX-203AX: one

Compliance
G.703, G.823

Data Rate
E1: 2.048 Mbps
T1: 1.544 Mbps

Line Coding
E1: HDB3
T1: B8ZS

Framing
E1: Framed (G732N with CRC)
T1: Framed (ESF)

Impedance
E1: 120Ω, balanced
75Ω, unbalanced (via adapter cable)
T1: 100Ω, balanced

Connectors
Replaceable network module, with four RJ-45 connectors:
Four E1/T1 ports: One E1/T1 interface per RJ-45
Eight E1/T1 ports: Two E1/T1 interfaces per RJ-45; with adapter cable

ETHERNET INTERFACES

See *Table 4* for ETX-2 product options.

E1/T1 INTERFACES (TDM PSEUDOWIRE)

(ETX-205A: built-in TDM PWE E1/T1 ports)

Number of Ports
4 or 8

Compliance
E1: G.703, G.732N, G.732S
T1: ANSI T1.101, ANSI T1.403

Data Rate
E1: 2.048 Mbps
T1: 1.544 Mbps

Line Coding
E1: HDB3
T1: B8ZS

Framing
E1: Framed (G.732N with or without CRC)
Framed with CAS (G.732S with or without CRC)
Unframed
T1: Unframed or ESF

Impedance
E1: 120Ω, balanced
75Ω, unbalanced (via adapter cable)
T1: 100Ω, balanced

Connectors
Electrical, RJ-45

Payload Encapsulation
CESoPSN, SAToP

Network Encapsulation
MEF 8, UDP/IP

T3 INTERFACES

(ETX-203AM: EoPDH T3 network module)

Number of Ports
1 or 2

Compliance
G.703, G.823

Data Rate
44.736 Mbps

Line Coding
B3ZS

Framing
C-bit parity

Impedance
75 Ω, unbalanced

Connectors
Replaceable network module, with one or two pairs of BNC connectors:
One T3 port – One pair
Two T3 ports – Two pairs

TIMING

Synchronous Ethernet
ITU-T G.8261-G.8264

1588v2
Ordinary clock (OC) (ETX-205A, ETX-220A)

Boundary clock (BC) (ETX-205A, ETX-220A)

Grandmaster (GM) with GNSS (ETX-205A)

Dual master operating simultaneously in G.8265.1 and G.8275.1 modes (ETX-205A, ETX-220A)

Transparent clock (TC)

Phase and frequency synchronization

Station Clock (ETX-205A, ETX-220A)
Type: Balanced E1, unbalanced E1 (via adapter cable)
Connector: RJ-45

Table 4. Ethernet Interfaces – ETX-2 Product Options

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A
10GbE	Number of Ports	–	–	–	Network: 1 or 2 User: 1 or 2
	Type	–	–	–	XFP
	Fiber Optic (XFP-based)	–	–	–	10GBaseSR 10GBaseER 10GBaseLR 10GBaseZR
	XFP Transceivers	–	–	–	See *Note*
GbE	Number of Ports	6 5 in ETX-203AX-E1	4 fixed ports and 2 ports on replaceable module	6	Up to 12 or 22
	Type	SFP or copper port	SFP, copper, or SFP/copper combo port	SFP/copper combo port	SFP or copper port
	Fiber Optic (SFP-based)	Fast Ethernet: 100BaseFx, 100BaseLX10, 100BaseBx10 Gigabit Ethernet: 1000BaseSx, 1000BaseLX10, 1000BaseBx10			
	Copper	10/100BaseT or 10/100/1000BaseT			
	Connector	Port 1: SFP slot All other ports: SFP slot or RJ-45	Replaceable module with SFP slot and RJ-45	SFP slot or RJ-45	SFP slot or RJ-45
	SFP Transceivers	*See* Note			

***Note**: It is strongly recommended to order this device with **original** RAD SFPs/XFPs. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs/XFPs. For full details on SFP/XFP transceivers, see the SFP/XFP Transceivers data sheet at www.rad.com. For the list of SFP/XFP transceivers supported by ETX-220A, see the SFP/XFP Compatibility document.*

PTP Ports (ETX-205A, ETX-220A)
ToD/1PPS (RJ-45)
External clock (CONN.COAX SMA)
1PPS (CONN.COAX SMA)

MANAGEMENT

Ethernet Management Port
Type: 10/100/1000BaseT
Connector: RJ-45

Control Port (ETX-203AM, ETX-203AX, ETX-205A, ETX-220A)
Interface: V.24/RS-232 DCE
Connector: RJ-45
Format: Asynchronous
Data rate: 9.6, 19.2, or 115.2 kbps

Management Options
Password-protected access, authorization levels

Secure CLI via SSH

Telnet, SNMPv3, SFTP

RADIUS or TACACS+ authentication

Plug and play zero touch provisioning

Routing for Management
IP forwarding, dual-stack IPv4 and IPv6 routing, static routing

GENERAL

Compliance
CE 2.0, MEF 6 (E-Line – EPL and EVPL, E-LAN – EPLAN and EVPLAN), MEF 10, MEF 9, MEF 14, MEF 20, MEF 36, IEEE 802.3, 802.3u, 802.1D, 802.1Q, 802.1p, 802.3ad, 802.3-2005, 802.1ax, 802.1ag, ITU-T Y.1731, G.8031, G.8032v2, G.8262, G.8265, RFC-2544, ITU-T Y.1564

Table 5. Power, Physical, and Environmental Specifications – ETX-2 Product Options

	Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A
Power	Power Supply (19" enclosure)	–	–	AC: 100 to 240 VAC, 50/60 Hz DC: 24/48 VDC nominal (20 to 72 VDC)	AC: 100 to 240 VAC, 50/60 Hz DC: -48 VDC nominal (-40 to 72 VDC)
	Power Supply (8.5" enclosure)	Wide-range AC/DC with auto detection AC: 85 to 264 VAC, 47/63 Hz DC: 48 VDC (40 to 370 VDC)	AC: 100 to 230 VAC (±10%), 47–63 Hz DC: -48 VDC (36 to 72 VDC)	AC: 100 to 240 VAC, 50/60 Hz DC: 48 VDC (48 to 60 VDC)	–
	Power Consumption	15 W max	Modular base: 12 W max Modular uplink: 5 W max VDSL:10 W max	19": 22 W max ½ 19": 21 W max PMC option: 90 W max	70 W max
Physical	Size (19" enclosure):				
	Height	–	–	43.7 mm (1.7 in)	43.7 mm (1.7 in)
	Width	–	–	440 mm (17.4 in)	440 mm (17.4 in)
	Depth	–	–	240 mm (9.5 in)	Non-NEBS: 240 mm (9.5 in) NEBS: 300 mm (11.8 in)
	Size (8.5" enclosure):				
	Height	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)	–
	Width	220 mm (8.6 in)	215 mm (8.5 in)	215 mm (8.5 in)	–
	Depth	170 mm (6.7 in)	300 mm (11.8 in)	300 mm (11.8 in)	–
Environment	Storage Temperature	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
	Operating Temperature	Regular: 0 to 50°C (32 to 122°F) NEBS: 0 to 55°C (32 to 131°F) Temperature hardened: -20 to 65°C (-4 to 149°F) ***Notes:*** *In the temperature-hardened device, a single SFP-30H is supported at temperature up to 62°C.* *In the regular enclosure (plastic), it is recommended to use a hardened SFP only, in order to operate the device at ambient temperature up to 50°C.*	Regular: 0 to 50°C (32 to 122°F) Temperature hardened: -20 to 65°C (-4 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened: -40 to 65°C (-40 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature hardened: -20 to 65°C (-4 to 149°F)
	Humidity	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing

Ordering

RECOMMENDED CONFIGURATIONS

Note: *For all ETX-203AX, ETX-203AM, ETX-205A, and ETX-220A temperature-hardened options, use SFPs with maximum operating temperature 85°C (185°F).*

ETX-203AX:

ETX-203AX/2SFP/4SFP
2 SFP Fast Ethernet ports, 4 empty SFP slots

ETX-203AX/GE/2SFP/4SFP
2 SFP GbE Ethernet ports, 4 empty SFP slots

ETX-203AX/2SFP/2UTP2SFP
2 SFP Ethernet ports, 2 UTP Ethernet ports, 2 SFP Ethernet ports

ETX-203AX/2SFP/4UTP
2 SFP Ethernet ports, 4 Ethernet UTP ports

ETX-203AX/2UTP/4UTP
2 UTP Ethernet ports, 4 Ethernet UTP ports

ETX-203AX/1SFP1UTP/4UTP
1 SFP Ethernet slot, 1 UTP Ethernet port, 4 Ethernet UTP ports

ETX-203AX/H/1E1/1SFP/2UTP2SFP
Hardened, 1 E1 port, 1 SFP Ethernet port, 2 UTP Ethernet ports, 2 SFP Ethernet ports

ETX-203AX/GE30/SH8W/1UTP
8.5" metal enclosure, 1 SHDSL 8-wire port (2x RJ-45), 1 UTP GbE port

ETX-203AX/H/GE30/2SFP/4SFP
8.5" metal enclosure, Hardened, 2 SFP GbE Ethernet ports, 4 empty SFP slots

Note for ETX-203AX:

All ordering options are available with FE, GE, GE30, or H (hardened) option.

ETX-203AM:

ETX-203AM/DC/GE30/2ETH/2SFP2UTP
DC power supply, GbE Ethernet ports with multiple shapers, Ethernet network module, 2 SFP Ethernet ports, 2 copper Ethernet ports

ETX-203AM/AC/SH4W/4UTP
AC power supply, fast Ethernet ports, SHDSL 4-wire network module, 4 copper Ethernet ports

ETX-203AM/AC/GE/2ETH/4SFP
AC power supply, GbE Ethernet ports, Ethernet network module, 4 SFP Ethernet ports

ETX-203AM/AC/GE30/8E1T1/4UTP
AC power supply, GbE Ethernet ports, multiple shaped EVCs, E1/T1 8-port network module, 4 copper Ethernet ports

ETX-203AM/AC/GE/4UTP
AC power supply, GbE Ethernet ports, no network module, 4 copper Ethernet ports

ETX-203AM/H/AC/GE30/VDSL8W/POTS/4UTP
Hardened, AC power supply, GbE Ethernet ports, four VDSL ports (8-wire) over POTS, four copper Ethernet ports

ETX-203AM/H/AC/GE30/VDSL8W/ISDN/4UTP
Hardened, AC power supply, GbE Ethernet ports, four VDSL ports (8-wire) over ISDN, four copper Ethernet ports

Notes for ETX-203AM:

- *All ordering options are available with FE, GE, GE30, or H (hardened) option.*
- *Only the Ethernet network module (2ETH) is NEBS certified.*

ETX-205A:

ETX-205A/AC/19
AC power supply, 19" enclosure

ETX-205A/AC/19/4E1T1
AC power supply, 19" enclosure, 4 E1/T1 ports

ETX-205A/AC/19/8E1T1
AC power supply, 19" enclosure, 8 E1/T1 ports

ETX-205A/AC/19/SYE
AC power supply, 19" enclosure, SyncE

ETX-205A/AC/19/PTP
AC power supply, 19" enclosure, 1588v2 timing and SyncE

ETX-205A/AC/19/4E1T1/PTP
AC power supply, 19" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/AC/19/8E1T1/PTP
AC power supply, 19" enclosure, 8 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/AC/19/GPS
AC power supply, 19" enclosure, integrated grandmaster and GNSS receiver

ETX-205A/AC/PTP
AC power supply, 8.5" enclosure, 1588v2 timing and SyncE

ETX-205A/DC/4E1T1/PTP
DC power supply, 8.5" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

ETX-205A/HN/DCR/19/PTP
Dual DC power supply, temperature-hardened NEBS-certified 19" enclosure, 1588v2 timing and SyncE

ETX-205A (PMC):

ETX-205A/AC/19V/DC2X/128S/PMC
AC power supply, dual core 2.5 GHz x86 processor, 128 GB solid state disk (SSD), PM controller (PMC) application

Note for ETX-205A: *19" ordering options are available with any combination of AC or DC power supplies.*

ETX-220A:

ETX-220A/AC/2XFP/20S/SYE/ESK
AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/2XFP/10U10S/SYE/ESK
AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10S/SYE/ESK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10U/SYE/ESK
AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

ETX-220A/AC/3XFP/10S/PTP/ESK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, enhanced SW key

ETX-220A/AC/4XFP/10U/SYE/ESK
AC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

ETX-220A/AC/4XFP/SYE/ESK
AC power supply, 4 XFP 10GbE ports, SyncE, enhanced SW key

ETX-220A/AC/2XFP/20S/SYE/BSK
AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/2XFP/10U10S/SYE/BSK
AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10S/SYE/BSK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10U/SYE/BSK
AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

ETX-220A/AC/3XFP/10S/PTP/BSK
AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, basic SW key

ETX-220A/DC/4XFP/10S/SYE/BSK
DC power supply, 4 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

ETX-220A/DC/4XFP/10U/SYE/BSK
DC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

ETX-220A/DC/4XFP/SYE/BSK
DC power supply, 4 XFP 10GbE ports, SyncE, basic SW key

ETX-220A/ACR/4XFP/PTP/BSK
Dual AC power supply, 4 XFP 10GbE ports, SyncE and 1588v2 timing, basic SW key

Notes for ETX-220A:

- *The Basic Software Key (BSK) option provides basic scheduling with a single queue block per port; the Enhanced Software Key (ESK) option allows for HQoS with shaping per EVC by providing more queue blocks per port (refer to user manual for the exact number).*
- *All ordering options are available with AC, DC, dual AC (ACR) or dual DC (DCR) power supplies.*
- *All ordering options are available with H (hardened) option.*

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-203AX, ETX-203AM, ETX-205A, and ETX-220A.

SUPPLIED ACCESSORIES

ETX-203AX:

AC power cord

ETX-203AM:

AC power cord (if AC power supply is ordered), or DC connector kit (if DC power supply is ordered)

CBL-E1-SPLT
Cable to extract 2 E1/T1 ports from one RJ-45 connector of ETX-203AM E1/T1 network module (four cables are supplied if 8 E1T1 option is ordered)

ETX-205A:

Power cord (one per power supply)

RM-34
Hardware kit for mounting one 19" ETX-205A unit in a 19" rack

ETX-220A:

AC power cord (one per power supply)

RM-34
Hardware kit for mounting one ETX-220A unit in a 19" rack

PLUG-DC/TB-S/J (for DC option only)

OPTIONAL ACCESSORIES

ETX-203AX:

AC/DC adapter

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

RM-33-2
Hardware kit for mounting one or two ETX-203AX regular units in a 19" rack

RM-35/@
Hardware kit for mounting one or two hardened/NEBS ETX-203AX units in a 19" rack

@ Rack mount kit for hardened units:
- **A** Kit for mounting one unit
- **A2** Kit for mounting two units

Rack mount kit for NEBS units (Default= both kits)
- **P1** Kit for mounting one unit
- **P2** Kit for mounting two units

ETX-203AX-SW/GE30
Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

ETX-203AX-SW/GE
Software license for 1 Gbps per port

ETX-203AM:

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

CBL-RJ45/2BNC/E1/X
Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

RM-35/@
Hardware kit for mounting one or two ETX-203AM units in a 19" rack

@ Rack mount kit (Default=both kits):
- **P1** Kit for mounting one unit
- **P2** Kit for mounting two units

RM-35/23-TYPE1-NEBS
Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

WM-35
Wall mount hardware kit for one ETX-203AM unit

ETX-203AM-SW/GE30
Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

ETX-203AM-SW/GE
Software license for 1 Gbps per port

ETX-2

Carrier Ethernet Demarcation

ETX-205A:

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

CBL-RJ45/2BNC/E1/X
Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

RM-34-23
Hardware kit for mounting one 19" ETX-205A unit in a 23" rack

RM-35/@
Hardware kit for mounting one or two 8.5" ETX-205A units in a 19" rack

@ Rack mount kit (Default=Both kits):
- **P1** Kit for mounting one unit
- **P2** Kit for mounting two units

WM-34
Wall mount hardware kit for one 19" ETX-205A unit

WM-35
Wall mount hardware kit for one 8.5" ETX-205A unit

ETX-205A-PS/?/!

? NEBS
- **NULL** International
- **N** NEBS3

! Power supply
- **AC** Single AC power supply
- **DC** Single DC power supply

ETX-220A:

CBL-RJ45/D9/F/6FT
Control port cable with male RJ-45 and female DB-9 connector

RM-34-23
Hardware kit for mounting one ETX-220A unit in a 23" rack

WM-34
Wall mount HW kit for one ETX-220A unit

ETX-220A_PS/N/!

! Power supply:
- **AC** Single AC power supply
- **DC** Single DC power supply

SFP-GPON-1DH
GPON optical network terminal SFP

Network interface modules for modular options (for ETX-203AM):

ETX-M/2ETH
Ethernet uplink module with two combo ports

ETX-M/SH4W
EFM bonded uplink module with two SHDSL ports (4-wire)

ETX-M/SH8W
EFM bonded uplink module with four SHDSL ports (8-wire)

ETX-M/VDSL8W/POTS
EFM bonded uplink module with four VDSL ports (8-wire) over POTS

ETX-M/VDSL8W/ISDN
EFM bonded uplink module with four VDSL ports (8-wire) over ISDN

ETX-M/4E1T1
Ethernet uplink module with 4 E1/T1 ports

ETX-M/8E1T1
Ethernet uplink module with 8 E1/T1 ports

***Note**: The CBL-E1-SPLT cables must be ordered separately when ordering this module.*

ETX-M/1T3
Ethernet uplink module with 1 T3 port

ETX-M/2T3
Ethernet uplink module with 2 T3 ports

SOFTWARE LICENSES FOR ETX-2

ETX-2-SW TWAMP
License to activate and operate TWAMP related functionalities in ETX-2.