

GE Digital Energy MDS

INTRODUCING GE MDS INTREPID™

GE MDS Intrepid is a 48 Mbps capacity (air interface max speed)/18 Mbps capacity (Ethernet max speed), cost effective, point-to-point, broadband wireless transmission system. It combines Ethernet and legacy TDM services for transmission over 5.8, 4.9, and 2.4 GHz bands and is suitable for deployment in FCC-regulated countries. Intrepid provides high performance and reliability. The interface ensures low BER, as well as low latency, and full compliance with the jitter and wander requirements for T1 interfaces. A transmission range of up to 80 km (50 miles) is available with an external antenna.

Intrepid consists of an outdoor unit (ODU) and an indoor unit (IDU or IDU-C). The outdoor unit is suitable for mast or wall installation. Mounting brackets are supplied with the unit.

ADAPTIVE MODULATION AND INCREASED FRAME SIZES

The Intrepid adaptively changes the modulation per air conditions for maximum rate and link stability. Intrepid also supports larger frames (1536 bytes for IDU) to improve Ethernet traffic efficiency and reduce the overall overhead.

AUTOMATIC CHANNEL SELECTION AND ADDITIONAL BANDWIDTH OPTIONS

When the link quality falls below a pre-set standard, Intrepid automatically searches for a clear channel within a pre-selected list of frequencies.

Intrepid v1.62 offers channel bandwidth options in addition to the 20 MHz channel bandwidth already supported. These options improve immunity to disturbances and enable deployment in high-interference environments.

WHY USE AN GE MDS INTREPID WIRELESS NETWORKING SOLUTION?

Security - Data transmitted over the air is encrypted using (AES) 128-bit encryption.

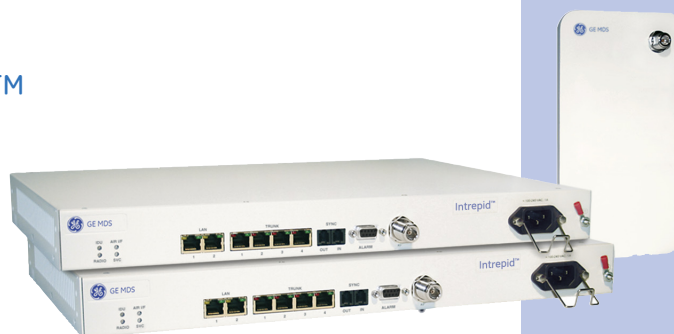
Quality of Service - When the link quality is out of limits, unit locates a clear channel from a pre-selected list of frequencies.

Short Time-to-service - Because Intrepid operates in license-exempt frequencies, it can be deployed in record time, eliminating the costs and delays involved in leasing lines or trenching fiber.

Management - Factory settings can be restored at any time for each ODU. Information on links and management can be collected and analyzed with a single action. External events trigger alarms via the dry contact alarm inputs.

MDS Intrepid™

Wireless Broadband



FEATURES / BENEFITS

- Cost effective point-to-point broadband encrypted wireless link
- Range - up to 80 km (50 miles)
- Operates at 5.8, 4.9, and 2.4 GHz
- Air data rate of up to 48 Mbps
- High reliability and availability based on robust air interface protocol

Applications

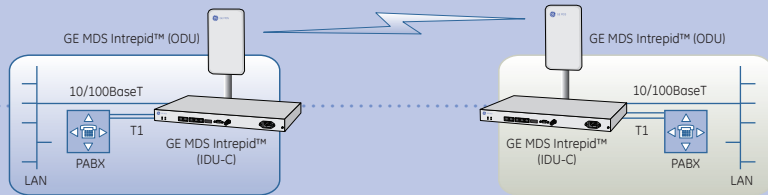
- Cellular Backhauling Intrepid connects between cellular base stations and controllers. Provides up to four T1 interfaces. The IDU offers Ethernet only and Ethernet plus 2xT1. The IDU-C offers 2xEthernet and 4xT1.
- Hot-Spot Backhauling provides a robust alternative to the last mile connection.
- Broadband Access provides Ethernet and leased line services to Small and Medium Enterprises (SME).
- Wireless ISP Backhaul of their Point of Presence (POP) traffic to the network operation center.
- Remote Site Connectivity for enterprises with multiple sites that require a transparent connection of LAN and PBX systems across their various campuses.



MDS

industrial wireless networks

MDS Intrepid™ SPECIFICATIONS



Radio

- Frequency Bands
 - 5.8 GHz (5.725–5.850 GHz)
 - 4.9 GHz (4.940–4.990 GHz)
 - 2.4 GHz (2.400–2.4835 GHz)
- Data Rate: Up to 48 Mbps, user-configurable
- Channel Bandwidth: 5, 10, or 20 MHz
- Duplex Technique: TDD
- Modulation: OFDM - BPSK, QPSK, 16 QAM, 64 QAM
- Transmit Power: See Table 2
- RF Dynamic Range: More than 50 dB

LAN Interface

- Number of Ports: IDU: 1, IDU-C: 2
- Type: 10/100BaseT, auto negotiation
- Framing/Coding: IEEE 802.3u
- Bridging: Up to 2048 MAC addresses self-learning
- Traffic Handling: MAC layer bridging, self-learning
- Latency: 3 msec (typical)
- Line Impedance: 100Ω
- VLAN Support: Transparent
- Connector: RJ-45

T1 Interface

- Number of Ports: IDU: 1 or 2, IDU-C: 4
- Framing: Unframed
- Timing: Plesiochronous (independent, Tx and Rx timing)
- Line Code: T1: B8ZS, AMI
- Latency: 8 msec
- Line Impedance: T1: 100Ω, balanced
- Connector: RJ-45
- Jitter and Wander: As per G.823, G.824

Indicators

- PWR (green) – Power status
- IDU (green) – IDU status
- ODU (green/red) – ODU-to-IDU link status
- AIR I/F (green/red) – Air Interface status
- SERVICE (green/red) – T1 signal status

Management

- Network Management and Protocol: SNMPc-based
- Management Interface: 10/100BaseT
- Connector: RJ-45
- Upgrade Capabilities: Local and over-the-air software download

Antenna

- Characteristics: See table 1

Misc.

- Diagnostics: Local and remote loopbacks
- IDU-to-ODU Connection: Outdoor Cat.5e cable, 100m (328 ft) max. length

Environmental

- Outdoor unit and external antenna: Enclosure type: IP67 all-weather case
- Temperature: -35° to 60°C (-31° to 140°F)
- Indoor units: Temperature: 0° to 50°C (32° to 122°F)
- Humidity: Up to 90%, non-condensing

Electrical

- Power: DC: -48, 24 VDC, AC: 100–240 VAC
- Power Consumption: ODU with IDU: 10W max, ODU with IDU-C: 14W max

Mechanical

- ODU (with integrated antenna):
 - H 305 mm (12.0 in), W 305 mm (12.0 in), D 58 mm (2.3 in)
 - Weight: 1.5 kg (3.3 lb)
- IDU:
 - H 44 mm (1.7 in), W 237 mm (9.3 in), D 165 mm (6.5 in)
 - Weight: 0.5 kg (1.1 lb)
- IDU-C:
 - H 44 mm (1.7 in), W 430 mm (17.0 in), D 290 mm (11.4 in)
 - Weight: 1.5 kg (3.3 lb)

Agency Approvals

- US Canada and ETSI see table 2
- Safety:
 - TUV according to UL 60950,
 - EN 60950-1, EN 60529
- EMC:
 - FCC 47CFR Parts 15, 15.247, and subpart B
 - CAN/CSA-CEI/IEC CISPR 22-02
- Environmental:
 - IEC 60721-3-4 Class 4M5
 - IP 67

Table 2. Radio Regulatory Compliance and Maximum Transmit Power

Frequency [GHz]	USA and Canada Regulation	Max. Tx Power [dBm]	Europe (ETSI) Regulation	Max. Tx Power [dBm]
5.725 – 5.850	47CFR Part 15 Subpart C, RSS-210	17/23	N/A	N/A
4.940 – 4.990	47CFR Part 15 Subpart B	15	N/A	N/A
2.400 – 2.4835	47CFR Part 15 Subpart C, RSS-210	11	EN 300 328	-4 EIRP ≤ 20

Table 3. Throughput Chart

Modulation (Mbps)	Sensitivity (dBm)	Air Interface Rate (Mbps)	Aggregate Throughput (Mbps)	Throughput left for Ethernet traffic using TDM Service				Maximum Range	
				1 x E1	2 x E1	1 x T1	2 x T1	(km)	(miles)
BPSK	-84	12	4.2	2.0	N/A	2.5	0.9	41.0	25.5
QPSK	-81	18	6.5	4.4	2.3	4.8	3.2	25.0	15.5
16 QAM	-74	36	13.6	11.5	9.3	11.9	10.2	10.0	6.0
64 QAM	-68	48	18.3	16.2	14.0	16.6	14.9	4.0	2.5

* Figures are for 22 dBi integrated antenna, at 5.725-5.850 GHz band. Maximum range is 80 km/50 miles w/ 28 dBi antenna @ same band.

Table 1. Intrepid Antenna Options

Frequency	Antenna Type	Gain (dbi)	Typical Range		Beam (degrees)	Dimensions (mm)	(in)	Weight		Connector	Lightning Protection
			(km)	(mi)				(kg)	(lb)		
5.8 GHz	Integrated - Flat panel	22	40	25	9.0	305 × 305 × 58	12 × 12 × 2.3	0.5	1.1	NR	Yes
5.8 GHz	External - Flat panel	28	80	50	4.5	600 × 600 × 51	23.6 × 23.6 × 2	5.0	11.0	N-type	No
5.8 GHz	External - Dish	32.5	80	50	4.5	Dia. 900	Dia. 35.4	10	22	N-type	No
4.9 GHz	External - Flat panel	21	24	15	9.0	305 × 305 × 58	12 × 12 × 2.3	0.5	1.1	N-type	Yes
4.9 GHz	External - Dish	27	80	50	5	Dia. 600	Dia. 23.6	5.0	11.0	N-type	Yes
2.4 GHz	Integrated - Flat panel	16	40	25	20	305 × 305 × 58	12 × 12 × 2.3	0.5	1.1	NR	Yes
2.4 GHz	External - Grid	24	80	50	7.5	600 × 997 × 380	23.5 × 39.2 × 15	2.0	4.6	N-type	No

Note: The range of the system depends on the system configuration. For further information, please contact GE MDS.



GE MDS
 175 Science Parkway
 Rochester, New York 14620, USA
 Phone (585) 242-9600
 Fax (585) 242-9620
 www.gemds.com

GE MDS products are manufactured under a quality system certified to ISO 9001. GE MDS reserves the right to make changes to specifications of products described in this data sheet at any time without notice and without obligation to notify any person of such changes.

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