



The SONABeam M series is designed with carriers' needs in mind. Featuring a rugged, cast-aluminum, environmentally-sealed housing and up to 50 times the power of competing products, the SONABeam M series is the toughest, most powerful system on the market today. Quadruple-redundant transmitters, combined with the largest receiver in the industry, further ensure transmission integrity. The SONABeam M's high-powered laser transmitters are able to penetrate heavy rain, snow and fog far more effectively and consistently than any other available FSO technology. The M supports Fast or Gigabit native Ethernet as well as custom datarates.

## THE SONABEAM ADVANTAGE

By transmitting through the atmosphere, the SONABeam eliminates the substantial costs of digging up streets and sidewalks required to install fiber, and unlike other wireless solutions, the SONABeam is immune to electro-magnetic (EM) and radio-frequency (RF) interference which means no licensing is required. Plus, the SONABeam's narrow, highly directional transmission all but eliminates eavesdropping or interception. Key to SONABeam's breakthrough laser technology is its operational wavelength of 1550 nm, which provides a broad spectrum of safety and performance advantages. The SONABeam's high-powered laser transmitters are able to penetrate heavy rain, snow and fog far more effectively and consistently than any other available FSO technology. SONABeam's protocol transparent technology gives service provider, enterprise and government customers the ability to integrate free space optics (FSO) quickly and easily into any existing network.

## TYPICAL APPLICATIONS

### Mobile Wireless

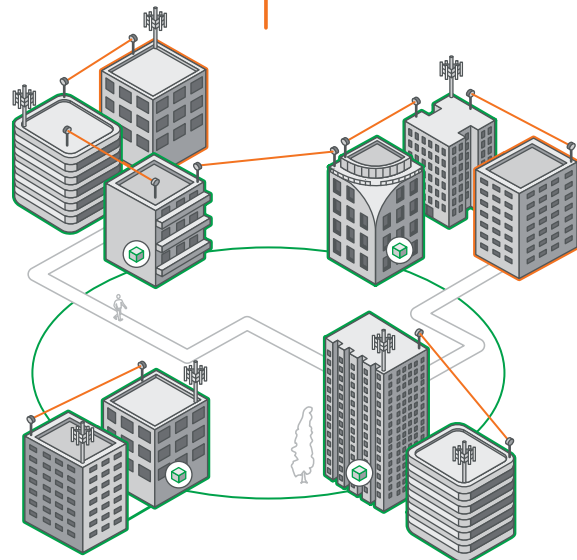
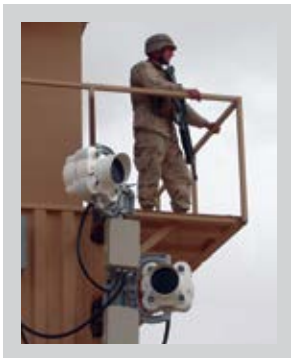
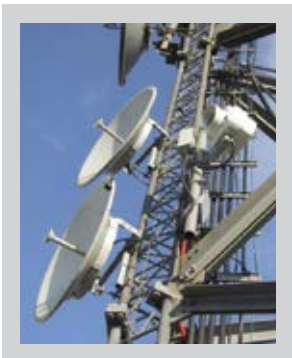
- 3G/4G/LTE Backhaul
- Backhaul Redundancy
- Remote Antenna Extension

### Enterprise, Government, Military

- High-bandwidth campus
- Fiber-line replacement
- Secure links

### Service Provider

- High-speed backbone
- RF/Wi-Fi/WiMax aggregation
- Private lines



Free-Space Optical	155-M <sup>1</sup>	1250-M <sup>2</sup>
<i>Datarate/protocol:</i>	Fast Ethernet: 125 Mbps, full duplex OC-3/STM-1: 155 Mbps, full duplex	Gigabit Ethernet: 1.25 Gbps, full duplex OC-12/STM-4: 622 Mbps, full duplex CPRI 1/CPRI 2
<i>Range: 3 dB/km (clear air):</i>	300 m to 5400 m (980 ft to 3.4 mi)	400 m to 4800 m (1310 ft to 3.0 mi)
<i>10 dB/km (extreme rain):</i>	300 m to 2400 m (980 ft to 1.5 mi)	400 m to 2200 m (1310 ft to 1.4 mi)
<i>Laser output power:</i>	640 mW peak (4 x 160 mW)	640 mW peak (4 x 160 mW)
<i>Receive aperture:</i>	20 cm (8 in) diameter, effective clear	20 cm (8 in) diameter, effective clear
<i>Free-space wavelength:</i>	1550 nm	1550 nm
Interface Options	1000-Base-SX (850 nm)	1000-Base-LX (1310 nm)
<i>Data physical interface:</i>	Multimode fiber, LC	Singlemode fiber, LC
<i>Fiber xmtr/rcvr wavelength:</i>	850 nm nominal	1310 nm nominal
<i>Fiber xmtr output power:</i>	-9 dBm (min), -3 dBm (max)	-11 dBm (min), -3 dBm (max)
<i>Fiber rcvr input power:</i>	0 dBm (min), -17 dBm (max)	-20 dBm (min), -3 dBm (max)
Mechanical / Electrical / Environmental		
<i>Operating temperature:</i>	-40°C to 60°C (-40°F to 140°F)	<i>Weight:</i> Head: 20 kg (44 lbs); Yoke: 8 kg (17 lbs)
<i>Solar filters:</i>	2 spatial, 2 spectral	<i>Input voltage:</i> -48 VDC (-40 V to -57 V) or 100-240 VAC
<i>Pointing stability:</i>	120 kmh/75 mph operating, >160 kmh/100 mph survival	<i>Power consumption:</i> Transceiver: 60 watts
<i>Environmental seal:</i>	Water-tight, IP66/NEMA-4 Cert.	
<i>Dimensions (W*H*D):</i>	41 x 41 x 46 cm; 16 x 16 x 18 in	
Carrier-Class Reliability and Durability		
<i>Window heating:</i>	Prevents optics fogging, snow/sleet accumulation	
<i>Laser cooling:</i>	Active solid state cooling to 35°C (95°F)	
<i>Redundant transmitters:</i>	4 independent lasers, drivers, coolers & cooler controllers	
<i>Power supply:</i>	Telco grade, >550,000 hour	
<i>Structure:</i>	Cast aluminum housing, yoke & mount	
Element Management and Control		
<i>Management interface:</i>	USB, Serial & 10/100-baseT	<i>GUI control program:</i> SONAbeam Terminal Controller
<i>SNMP:</i>	Embedded v.1 agent	<i>Command line interface:</i> Via USB, RS232 or IP address
<i>Key parameters monitored:</i>	Receive signal strength; Power supply currents & voltages; Laser currents, power levels & temperatures; Internal temperature; Clock recovery / sync status; Network interface signal status	
<i>Historical logging:</i>	Internal data and event logging	
Certifications & Classifications	International	US/Canada
<i>Laser safety</i>	IEC 60825-1, Class 1M EN 55022 - emissions	CDRH 21 CFR including Laser Notice 50, Class 1M; ANSI Z136.1 & Z136.6, Class 1
<i>EMC</i>	EN 55024 - immunity	FCC - Pat 15 / ICES - 003
<i>Electrical</i>	EN 60950 (CB scheme)	UL 60950 / CSA 60950