



Innovating Microwave Backhaul™

POINT-TO-POINT

## TrangoLINK® Apex 18 GHz All-Outdoor Full Duplex Licensed Microwave Native Ethernet Wireless Backhaul System

HIGH-CAPACITY POINT-TO-POINT WIRELESS NETWORK LINK

TrangoLINK® Apex is an all-outdoor high-capacity full duplex wireless point-to-point radio link that is ideal for carrier Ethernet, WiMAX/ISP broadband backhaul, private Enterprise networks, municipal/government networks, and broadcast applications using the licensed 18 GHz spectrum.

TrangoLINK® Apex offers simplified installation and easier operation in a compact all-outdoor single integrated unit. Designed for network operators who require high-capacity bandwidth and carrier-grade availability, this native Ethernet microwave backhaul is a highly-flexible easy-to-use solution with superior performance and fast ROI.

### Benefits

- » Low cost of ownership fast ROI relative to fiber and other options
- » No right-of-way issues, unlike fiber deployment
- » All-Outdoor integrated design carries benefits of higher throughput speeds, greater system efficiency, simpler installation and operation, and significant cost savings
- » Excellent system gain for longer range and higher availability
- » Replace leased lines, eliminate recurring costs
- » Rapid scalability, easily add bandwidth and extend reach

### Easy Setup and Deployment

- » Simplified installation and operation
- » Easy alignment via real-time digital RSSI LED indicators
- » Minimal maintenance, "set and forget"
- » Easily upgrade throughput *as you need it*, with no hardware replacements and no forklift upgrades
- » Pay-as-you-grow 3-tier throughput upgrade path: Basic Package, License Key 1, and License Key 2

### Highlights

- Up to 730 Mbps (365 Mbps full duplex)
- Hitless Adaptive Modulation
- Ultra low latency, <150  $\mu$ S, for *triple play* applications
- All-outdoor integrated radio and modem
- Supports FCC, IC, and ETSI channel sizes of 10, 20, 27.5, 30, 40, 50, 55, and 80 MHz †
- Standard 2-year manufacturer warranty

### Flexibility & Performance

- » High spectral efficiency of up to 7.5 bits/Hz
- » LDPC (Low Density Parity Check) for improved receive sensitivity
- » Port Priority assignment (VLAN) and QoS features
- » Power-over-Ethernet (PoE) or direct power, -48 Volt
- » GigE copper interface data port, PoE capable
- » Fast Ethernet copper management port, PoE capable
- » GigE optical/fiber interface data port
- » Fast modulation shifting
- » Supports jumbo packets in GigE mode
- » Flexible modulations, bandwidth and throughput controls

### Fail Safe Features for High Reliability

- » Supports Hot Standby for protection against equipment failure
- » Supports full link redundancy, 1+1 protection
- » Supports ring/mesh/star topologies with *Rapid Port Shutdown*

### Management

- » In-band management and out-of-band management
- » Network management through SSH, SNMP, and HTTP browser
- » Built in loop back and far end monitoring

### Specifications

RADIO PARAMETERS		Band 1		Band 2						
Frequency of Operation (ODU) †	FCC/IC (1560 MHz duplex spacing)	Band 1A ODU: 17.700 to 18.140 GHz Band 1B ODU: 19.265 to 19.700 GHz								
	ETSI (1010 MHz duplex spacing)	Band 1A ODU: 17.7275 to 18.1675 GHz Band 1B ODU: 18.7375 to 19.1775 GHz		Band 2A ODU: 18.1950 to 18.6625 GHz Band 2B ODU: 19.2050 to 19.6725 GHz						
Channel Size ‡	10 MHz / 20 MHz / 27.5 MHz / 30 MHz / 40 MHz / 50 MHz / 55 MHz / 80 MHz									
RF Power Output (max per modulation)	<b>QPSK</b>	<b>16QAM</b>	<b>32QAM</b>	<b>64QAM</b>	<b>128QAM</b>	<b>256QAM</b>				
	+20 dbm	+20 dbm	+20 dbm	+19 dbm	+18 dbm	+17 dbm				
Modulation Format	Selectable from QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM									
Receiver Sensitivity	-65 dBm (256 QAM maximum speed); -91 dBm (QPSK minimum speed)									
Features	ATPC (Automatic Transmit Power Control), Modulation Shifting, LDPC (Low Density Parity Check), Forward Error Correction									
Regulatory Compliance ‡	FCC/ANSI: Part 101, Part 15 Class A Unintentional Radiator      Industry Canada (IC): SRSP-317.8 Issue 2 ETSI: EN 302 217-2-1 V1.2.1, EN 302 217-2-2 V1.2.2, EN 301 489, ITU R F.595-8, CEPT 12-03E									
DATA										
Data Throughput/ RSSI (1E10 <sup>-6</sup> BER) †	Speeds are uni-directional. For aggregate full duplex speeds, multiply throughput numbers below by 2.									
<b>Legend</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #e0e0e0;">Basic Package = 115 Mbps maximum</td> </tr> <tr> <td style="background-color: #d0e0d0;">License Key 1 = 198 Mbps maximum *</td> </tr> <tr> <td style="background-color: #c0e0c0;">License Key 2 = 365 Mbps maximum *</td> </tr> </table>	Basic Package = 115 Mbps maximum	License Key 1 = 198 Mbps maximum *	License Key 2 = 365 Mbps maximum *	<b>Channel Size</b>	<b>QPSK / RSSI</b>	<b>16QAM / RSSI</b>	<b>32QAM / RSSI</b>	<b>64QAM / RSSI</b>	<b>128QAM / RSSI</b>	<b>256QAM / RSSI</b>
	Basic Package = 115 Mbps maximum									
	License Key 1 = 198 Mbps maximum *									
	License Key 2 = 365 Mbps maximum *									
	10 MHz	15 Mbps / -91 dBm	30 Mbps / -84 dBm	38 Mbps / -81 dBm	47 Mbps / -78 dBm	N/A	N/A			
	13.75 MHz	26 Mbps / -89 dBm	41 Mbps / -83 dBm	51 Mbps / -80 dBm	65 Mbps / -77 dBm	75 Mbps / -76 dBm	N/A			
	20 MHz	32 Mbps / -88 dBm	63 Mbps / -81 dBm	79 Mbps / -78 dBm	98 Mbps / -75 dBm	115 Mbps / -72 dBm	N/A			
	27.5 / 30 MHz	44 Mbps / -86 dBm	89 Mbps / -80 dBm	110 Mbps / -76 dBm	138 Mbps / -74 dBm	162 Mbps / -71 dBm	188 Mbps / -68 dBm			
	40 MHz	64 Mbps / -85 dBm	128 Mbps / -79 dBm	153 Mbps / -75 dBm	198 Mbps / -72 dBm	234 Mbps / -69 dBm	263 Mbps / -67 dBm			
	50 MHz	75 Mbps / -85 dBm	143 Mbps / -78 dBm	187 Mbps / -74 dBm	232 Mbps / -71 dBm	274 Mbps / -68 dBm	315 Mbps / -65 dBm			
55 / 80 MHz	89 Mbps / -83 dBm	178 Mbps / -77 dBm	223 Mbps / -73 dBm	277 Mbps / -71 dBm	327 Mbps / -68 dBm	365 Mbps / -65 dBm				
Packet Size	64-9600 bytes									
Flow Control	Yes, via Ethernet pause frames (GigE mode only)									
Security	Authentication uses 2 level password									
Configuration & Management	SSH, HTTPS, Ethernet, SNMPV2									
Remote firmware update	TFTP client in radio unit									
ANTENNA	Model/Description	Gain		3 dB Beamwidth						
Antenna options	AD18G-2 / 2-foot antenna with slip-fit mount	38.6 dBi		2.0°						
	AD18G-3 / 3-foot antenna with slip-fit mount	42.0 dBi		1.3°						
	AD18G-4 / 4-foot antenna with slip-fit mount	44.5 dBi		1°						
POWER										
Input	-40.5 to -57 VDC									
Power Consumption	48 Watts									
MECHANICAL & ENVIRONMENTAL										
Enclosure	Cast Aluminum with RSSI window									
Indicators	2-digit LED "in dBm" RSSI indicator for alignment									
Dimensions	12 x 12 x 6.8 inches (height x width x length)									
Weight	18 lbs									
Temperature Range	-40° to 131° F (-40° to +55° C)									
Humidity	100% condensing									
Interfaces	1 GigaEthernet port, RJ45 (10/100/1000 BaseT) 1 Fiber Optic port (SFP Module required) 1 Ethernet management port, RJ45 (10/100 BaseT)									
Power connector	Power-over-Ethernet / 2 pin Molex connector									
Redundancy (1+1)	6 pin circular									
Antenna Connector	Slip-fit mount / Optional waveguide adapter: WR42 / UBR 220									

\* Based on purchasable Option Key. Contact sales for more information.

‡ Legal regulations for specific frequencies vary from region to region—users are responsible for complying with their local regulations.



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