TRANGO ®
S Y S T E M S

Innovating Microwave Backhaul™

TrangoLINK® Apex

All-Outdoor Full Duplex Licensed Microwave Native Ethernet Wireless Backhaul System

H I G H - C A P A C I T Y   P O I N T - T O - P O I N T   W I R E L E S S   N E T W O R K   L I N K

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 licensed 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

» Industry leading system gain for longer range and higher availability

» 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

» 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

Highlights

- Up to 730 Mbps (365 Mbps full duplex)
- Hitless Adaptive Code Modulation (ACM)
- Ultra low latency, <100 µS, for *triple play* applications
- All-outdoor integrated radio and modem
- Supports FCC, IC, and ETSI channel sizes of 10 through 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 DC

» GigE copper interface data port, PoE capable

» GigE optical/fiber interface data port

» Fast Ethernet copper management port, PoE capable

» 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

System Specifications

GENERAL PARAMETERS	
Model Numbers	TLink-ApexXX-Y (full link consisting of two units), ApexXX-YY (Apex Individual Unit)
Frequency Support	11, 15, 18, 23 GHz
Channel Size ‡	10 MHz - 80 MHz
Modulation Format	Selectable: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, ACM & non-ACM
Max Capacity	365 Mbps full duplex – Varies by modulation and bandwidth selected
Payload Latency	100 μs typical
Payload Types	Ethernet, Copper and Fiber
Features	ATPC (Automatic Transmit Power Control), Hitless Adaptive Code Modulation, Modulation Shifting, LDPC Forward Error Correction
Regulatory Compliance ‡	FCC/ANSI: FCC Part 15 Class A Unintentional Radiator ETSI EN 302 217-1 ETSI EN 302 217-2 ETSI EN 301 489-1 EMC ETSI EN 301 489-4 EMC RoHS
Safety	EN60950-1, EN60950-22

ETHERNET PARAMETERS	
Packet Size	64-9600 bytes
Flow Control	Yes, via Ethernet pause frames (GigE mode only)
Quality of Service (QoS)	802.1p Port prioritization Port mapping for traffic Support for up to 8 Classes of Service (CoS) Bandwidth shaping, per port

MANAGEMENT	
Security / Authentication	2 level password (Read Only, Read/Write)
Configuration & Management	Telnet, SSH, HTTPS, Console (RS232), SNMPV2
Remote firmware update	TFTP server in radio unit

ANTENNA	
Supported types	High performance dish antenna - 1, 2, 3, 4 & 6 foot options
Interface	Direct slip-fit mount or remote mount using standard waveguide

POWER	
Input	-40.5 to –57 VDC
Power Consumption	48 Watts nominal
Power Protection	Reverse polarity and transient suppression to 100 volts

MECHANICAL & ENVIRONMENTAL	
Enclosure	Cast Aluminum with RSSI window, PoE Injector: powder coated CRS
Indicators	2-digit LED "in dBm" RSSI indicator for alignment
Dimensions	11 × 11 × 6 inches (height × width × length), PoE Injector: 0.875 x 3.5 x 3.5 inches (height × width × length),
Weight	18 lbs
Temperature Range	-40° to +131° F (-40° to +55° C), PoE Injector: +32° to +131° F (0° to +55° C)
Humidity	100% condensing, PoE Injector: 95% non-condensing
Interfaces	1 GigaEthernet port, RJ45 (10/100/1000 BaseT), PoE capable 1 Fiber Optic port (SFP Module required) 1 Ethernet management port, RJ45 (10/100 BaseT), PoE capable
Power connector	Power-over-Ethernet / 2 pin Pluggable Terminal block
Redundancy (1+1)	6 pin circular
Antenna Connector	Slip-fit mount / Optional waveguide adapter: for standard waveguide sizes

 * 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.

ANSI System Parameters

	Speed (Mbps)	Channel BW (MHz)	Modulation	Band (GHz) 11	Band (GHz) 18	Band (GHz) 23
T/R Spacings Supported (MHz)				490	1560	1200
Standards Supported				FCC Part 101, SRSP 306.4	FCC Part 101, SRSP 317.7	FCC Part 101, SRSP 321.8
Max Transmit Power (dBm)		All	QPSK	22	20	20
		All	16QAM	22	20	19
		All	32QAM	22	20	18
		All	64QAM	21	19	17
		All	128QAM	20	18	16
		All	256QAM	19	17	15
Receive Sensitivity (dBm) For BER = 1E-6	15	10	QPSK	-91.0	-91.0	-91.0
	30	10	16QAM	-84.0	-84.0	-84.0
	38	10	32QAM	-81.0	-81.0	-81.0
	47	10	64QAM	-78.0	-78.0	-78.0
	32	20	QPSK	-88.0	-88.0	-88.0
	63	20	16QAM	-81.0	-81.0	-81.0
	79	20	32QAM	-78.0	-78.0	-78.0
	98	20	64QAM	-75.0	-75.0	-75.0
	115	20	128QAM	-72.0	-72.0	-72.0
	44	30	QPSK	-86.0	-86.0	-86.0
	89	30	16QAM	-80.0	-80.0	-80.0
	110	30	32QAM	-76.0	-76.0	-76.0
	138	30	64QAM	-74.0	-74.0	-74.0
	162	30	128QAM	-71.0	-71.0	-71.0
	188	30	256QAM	-68.0	-68.0	-68.0
	64	40	QPSK	-85.0	-85.0	-85.0
	128	40	16QAM	-79.0	-79.0	-79.0
	153	40	32QAM	-75.0	-75.0	-75.0
	198	40	64QAM	-72.0	-72.0	-72.0
	234	40	128QAM	-69.0	-69.0	-69.0
	263	40	256QAM	-67.0	-67.0	-67.0
	75	50	QPSK	-85.0	-85.0	-85.0
	143	50	16QAM	-78.0	-78.0	-78.0
	187	50	32QAM	-74.0	-74.0	-74.0
	232	50	64QAM	-71.0	-71.0	-71.0
	274	50	128QAM	-68.0	-68.0	-68.0
	315	50	256QAM	-65.0	-65.0	-65.0
	89	80	QPSK	NA	-83.0	NA
	178	80	16QAM	NA	-77.0	NA
	223	80	32QAM	NA	-73.0	NA
	277	80	64QAM	NA	-71.0	NA
	327	80	128QAM	NA	-68.0	NA
	365	80	256QAM	NA	-65.0	NA

Legend

Basic Package = 110 Mbps maximum
License Key 1 = 198 Mbps maximum *
License Key 2 = 365 Mbps maximum *

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

ETSI System Parameters

	Speed (Mbps)	Channel BW (MHz)	Modulation	Band (GHz) 11	Band (GHz) 15	Band (GHz) 18	Band (GHz) 23
T/R Spacings Supported (MHz)				490	644, 728	1010	1008
Max Transmit Power (dBm)		All	QPSK	22	23	20	20
		All	16QAM	22	23	20	19
		All	32QAM	22	22	20	18
		All	64QAM	21	22	19	17
		All	128QAM	20	21	18	16
		All	256QAM	19	20	17	15
Receive Sensitivity (dBm) For BER = 1E-6	22	13.75/14	QPSK	NA	-90.0	-89.0	NA
	42	13.75/14	16QAM	NA	-84.0	-83.0	NA
	52	13.75/14	32QAM	NA	-80.0	-80.0	NA
	64	13.75/14	64QAM	NA	-77.0	-77.0	NA
	75	13.75/14	128QAM	NA	-74.0	-76.0	NA
	86	13.75/14	256QAM	NA	-71.0	NA	NA
	44	27.5/28	QPSK	-86.0	-87.0	-86.0	-86.0
	89	27.5/28	16QAM	-80.0	-80.0	-80.0	-80.0
	110	27.5/28	32QAM	-76.0	-77.0	-76.0	-76.0
	138	27.5/28	64QAM	-74.0	-74.0	-74.0	-74.0
	162	27.5/28	128QAM	-71.0	-71.0	-71.0	-71.0
	188	27.5/28	256QAM	-68.0	-68.0	-68.0	-68.0
	64	40	QPSK	-85.0	-85.0	-85.0	-85.0
	128	40	16QAM	-79.0	-79.0	-79.0	-79.0
	153	40	32QAM	-75.0	-75.0	-75.0	-75.0
	198	40	64QAM	-72.0	-72.0	-72.0	-72.0
	234	40	128QAM	-69.0	-69.0	-69.0	-69.0
	263	40	256QAM	-67.0	-67.0	-67.0	-67.0
	89	55/56	QPSK	-83.0	-84.0	-83.0	-83.0
	178	55/56	16QAM	-77.0	-78.0	-77.0	-77.0
	223	55/56	32QAM	-73.0	-74.0	-73.0	-73.0
	277	55/56	64QAM	-71.0	-71.0	-71.0	-71.0
	327	55/56	128QAM	-68.0	-68.0	-68.0	-68.0
	365	55/56	256QAM	-65.0	-65.0	-65.0	-65.0

Legend

| Basic Package = 110 Mbps maximum |
| License Key 1 = 198 Mbps maximum * |
| License Key 2 = 365 Mbps maximum * |

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

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RoHS Compliant

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