TrangoLINK Sparta Elite™

Advanced Encryption Technology With Gigabit Capacity Microwave Backhaul System 6-40 GHz

HIGH-CAPACITY SCALABLE POINT-TO-POINT WIRELESS NETWORKS

Overview

The TrangoLINK Sparta Elite™ split architecture microwave backhaul system offers an industry-leading set of features in a compact half-rack unit form factor. With the most advanced integrated data encryption engine and intelligent payload compression, secure point-to-point microwave data transmission at Gigabit speeds is now a reality. The Sparta Elite™ supports all major international channel widths and frequency bands and has remarkable link reliability thanks to Adaptive Code Modulation (ACM) and best-in-class system gain.

Advanced Information Security

The TrangoLINK Elite™ series of products is the only point-to-point microwave solution on the market that features NSA Suite B AES-GCM 128 and 256 bit encryption. Combined with IPSEC protocol support and Internet Key Exchange (IKE v2) management, information security is maintained over backhaul network equipment such as switches and routers, or even the Internet. All Elite™ point-to-point products are also FIPS 140-2 and HIPAA compliant to support government and healthcare industry requirements.

Intelligent Payload Compression (IPC)

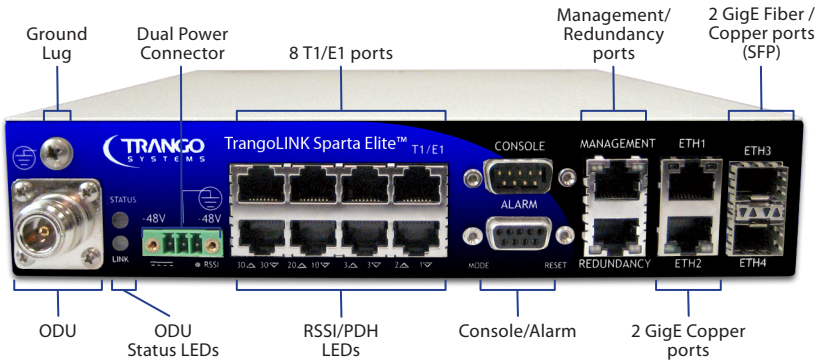
Unique to the Elite series of products, IPC compresses packet payload data in real time to provide capacity improvements up to 2.5 times1 the raw data rate. Packets not yielding a compression ratio greater than 1, such as MPEG video streams and VOIP traffic, will be passed through uncompressed. The result is optimized performance for mixed traffic networks.

Applications

- Government / Municipal Networks
- Healthcare / Hospital
- Airport /Transportation
- Banking / Finance
- Enterprise / Metro Area Networks (MAN)
- Utilities / Energy

Features

- NSA Suite B encryption AES-GCM
- FIPS 197 certified AES 128 and 256 bit encryption
- IPSEC protocol support
- Internet Key Exchange (IKE v2)
- FIPS 140-2 and HIPAA compliance
- Secure management via HTTPS and SSH
- Intelligent Payload Compression (IPC)
- Uncompressed capacity up to 750 Mbps (375 Mbps full duplex)
- Hardware compressed capacity up to 2 Gbps (1 Gbps Mbps full duplex)
- Industry leading system gain over 6-40 GHz
- Hitless Adaptive Coding & Modulation (ACM)
- 1+1 Hot Standby support
- 3.5-80 MHz Channel Bandwidth
- Small form factor (half-rack unit)
- Support for up to 8 Classes of Service (CoS)
- FCC/ETSI & NEBS Compliant
- Standard 2-Year Manufacturer's Warranty



System Specifications

GENERAL PARAMETERS		
Model Numbers	IDU: ES-IDU-1, ODU: HP Series ODUs	
Frequency Support	6-40 GHz, Frequency Division Duplex (FDD)	
Frequency Stability	±7 ppm	
Channel Size ‡	3.5, 7, 10, 13.75/14, 20, 27.5/28, 30, 40, 50, 55/56, 80 MHz	
Modulation Format	Selectable: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, ACM & non-ACM	
Max Uncompressed Capacity	375 Mbps full duplex – Varies by modulation and bandwidth selected	
Max Capacity with IPC	Up to 1 Gbps full duplex – In a 56MHz channel (depends on traffic mix)	
Packet Compression Method	Lossless real-time LZS algorithm for packets > 92 bytes, packets with compression ratio < 1 are passed uncompressed	
Payload Latency	100 µs typical, 200 µs typical with IPC	
Payload Types	Ethernet (IPv4 and IPv6 compatible), T1/E1	
Features	ATPC (Automatic Transmit Power Control), Hitless Adaptive Code Modulation, Modulation Shifting, LDPC Forward Error Correction	
Regulatory Compliance ‡	FCC CFR47 Part 101 ETSI EN 302 217-1 ETSI EN 302 217-2 ETSI EN 301 489-1 EMC ETSI EN 301 489-4 EMC CANADA SRSP FCC/ANSI: FCC Part 15 Class A Unintentional Radiator RoHS	T1: ITU-T.G824 GR-499-CORE E1: ITU-T G.703 G.823
Data Encryption (applies to Ethernet traffic only)	FIPS 197 Certified, AES-GCM 128 and 256 bit (NSA Suite B) IKEv2 Key Exchange FIPS 140-2 security compliant	
Safety	EN60950-1, EN60950-22	
MTBF	>18 years	
ETHERNET PARAMETERS		
Packet Size	64-9200 bytes	
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	SFTP / TFTP server in radio unit	
INTERFACES	**INDOOR UNIT**	**OUTDOOR UNIT** (without antenna)
Indicators	Ethernet speed and activity for each port; Multiplexed LED displays for RSSI, T1/E1 2 status LEDs per ODU	BNC-F for receive signal level
Payload Interfaces	2x GigE RJ45 (10/100/1000BaseT) 2x GigE Fiber / Copper SFP 8x T1/E1 RJ45	TX IF, RX IF, Telemetry
Out-of-Band Management	Ethernet port RJ45	Via IDU IF cable
1+1 Hot Standby	RJ45	N/A
Alarms	2 inputs – CMOS ; 2 outputs – Dry contact closure isolated 50V 1A	Loss of lock
Power Connector	3 Pin Terminal Block to support redundant power supplies	Via IDU IF cable
Console	DB9 RS232-115200, N, 8, 1	Via IDU IF cable
POWER	**INDOOR UNIT**	**OUTDOOR UNIT** (without antenna)
Power Input IDU Dual	-40 to –72 VDC	-40 to –72 VDC
Power Consumption	<35 Watts (all ports active)	25 to 52 Watts (ODU model dependent)
MECHANICAL & ENVIRONMENTAL	**INDOOR UNIT**	**OUTDOOR UNIT** (without antenna)
Enclosure	8.75-inch half rackmount, 1U height	Cast Aluminum, IP66 rated
ODU IF/Power/Control Connection	N-Female	N-Female (TX IF, RX IF, Telemetry), BNC-F for RSSI
Dimensions (height × width × length)	1.75×8.75×11.25 inches	10.5x10.5x3.5 inches
Weight	4.8 lbs	8.15 to 10.1 lbs (ODU model dependent)
Temperature Range (operational)	14° to 131° F (-10° to +55° C)	-40° to 131° F / -40° to +55° (spec compliant) -40° to 149° F / -40° to +65° (operational)
Humidity	95% non condensing	100% condensing

[1] Compression ratio shown for RFC 2544 standard test. Industry standard tests yielded compression ratios from 1.6 to 2.9.

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

Link Capacity (Mbps) at Layer 2

BW (MHz)	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
3.5	6	9	15	18	21	23
5	8	12	19	24	27	31
7	10	20	25	31	36	40
8.33	13	26	33	40	46	52
10	15	30	37	46	53	60
12.5	20	40	49	60	70	78
13.75/14	22	45	55	67	78	88
20	31	63	78	96	111	126
25	39	80	99	120	140	160
28	47	95	118	142	167	192
30	47	95	118	142	167	192
40	63	128	159	192	225	256
50	78	157	195	238	277	318
55/56	90	181	225	275	320	365
80	90	181	225	275	320	375

Max Transmit Power by Frequency (dBm)

Mod	6, 7, 8 GHz	10 GHz	11 GHz	13,15 GHz	18-26 GHz	28-40 GHz
QPSK	30	26.5	28	26	25	23
16 QAM	28	22.5	26	22	22	21
32 QAM	28	22.5	26	22	22	21
64 QAM	25	20.5	22	21	20	17
128 QAM	25	20.5	22	21	20	17
256 QAM	24	18.5	21	20	19	16

Receive Sensitivity In dBm (6-26 GHz)

Channel Width (MHz)	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
3.5	-96.6	-90.4	-86.4	-84	-80.9	-77.9
5	-94.4	-88.8	-84.8	-82.1	-79.0	-76.0
7	-93.3	-87.7	-83.7	-81.3	-78.2	-75.2
8.33	-92.7	-86.5	-82.5	-80.3	-77.5	-74.4
10	-92.2	-86.0	-82.0	-79.6	-76.5	-73.5
12.5	91.3	-85.4	-81.1	-78.7	-75.4	-72.4
14	-90.5	-84.3	-80.3	-77.9	-74.8	-71.8
20	-89.0	-82.8	-78.8	-76.4	-73.3	-70.3
25	-88.1	-82.0	-78	-75.4	-72.3	-69.3
28/30	-87.3	-81.1	-77.1	-74.7	-71.6	-68.6
40	-86.0	-79.8	-75.8	-73.4	-70.3	-67.3
50	-85.1	-78.9	-74.9	-72.5	-69.4	-66.4
55/56	-84.5	-78.3	-74.3	-71.9	-68.8	-65.8
80	-84.5	-78.3	-74.3	-71.9	-68.8	-63.8

Receive Sensitivity In dBm (28-40 GHz)

Channel Width (MHz)	QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
3.5	-93.6	-87.4	-83.4	-81.0	-77.9	-74.9
5	-91.4	-85.8	-81.8	-79.1	-76.0	-73.0
7	-90.9	-84.7	-80.7	-78.3	-75.2	-72.2
8.33	-89.7	-83.5	-79.5	-77.3	-74.5	-71.4
10	-89.2	-83.0	-79.0	-76.6	-73.5	-70.5
12.5	-88.3	-82.4	-78.1	-75.7	-72.4	-69.4
14	-87.5	-81.3	-77.3	-74.9	-71.8	-68.8
20	-86.0	-79.8	-75.8	-73.4	-70.3	-67.3
25	-85.1	-79.0	-75	-72.4	-69.3	-66.3
28/30	-84.4	-78.1	-74.1	-71.7	-68.6	-65.6
40	-83.0	-76.8	-72.8	-70.4	-67.3	-64.3
50	-82.1	-75.9	-71.9	-69.5	-66.4	-63.4
55/56	-81.5	-75.3	-71.3	-68.9	-65.8	-62.8
80	-81.5	-75.3	-71.3	-68.9	-65.8	-60.8

ETSI System T/R Spacings

6 GHz	7 GHz	8 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	26 GHz	28 GHz	32 GHz	38 GHz
240, 252.04, 340	154, 160, 161, 168, 196, 245	119, 126, 151.614, 208, 266, 311.32	490, 500, 530	266	315, 420, 475, 490, 640, 644, 728	1010	1008, 1232	800, 1008	1008	812	700, 1260

ANSI System T/R Spacings

6 GHz	7 GHz	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	38 GHz
160, 170, 252.04, 340	150	490, 500	225	475, 640	1560	1200, 1232	700

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