StrataLink 24™ *DATASHEET*

24 GHz

Carrier-Class | License-Free | All-Outdoor

MICROWAVE BACKHAUL SYSTEM

TRANGO® SYSTEMS

StrataLink 24™ Overview

The Trango StrataLink 24 is an ultra high-capacity, outdoor, wireless point-to-point radio link which operates in the world-wide, license-free 24 GHz spectrum and can be quickly deployed without waiting for spectrum licenses. Designed for carrier Ethernet, ISP, and enterprise applications, the cost-effective StrataLink 24 delivers up to 761 Mbps full duplex (1.5 Gbps aggregate), and 1.2 Gbps full duplex with the XPIC model and a 2+0 setup.

The StrataLink 24 is also the first 24 GHz product to offer 1024QAM modulation and multilayer header compression. The StrataLink 24 is easy to deploy and includes the industry's most complete feature set and offers best-in-class performance.

Carrier-Class Features & Performance

The StrataLink 24 offers hitless Advanced Adaptive Coding and Modulation (AACM) as well as outstanding frequency agility including the ability to scale channel sizes from as small as 10 MHz up to 60 MHz. It is the first 24 GHz product to employ adaptive channel sizing as an effective tool to mitigate the effects of interference and path fading. Along with variable channel sizes, the StrataLink 24 also allows the user to change the Transmit / Receive (TR) spacing of frequency channels.

Flexible Port & Antenna Options

The system offers flexible port options including GigE copper and SFP (Fiber) interfaces and the unit can be powered either via POE, or via direct power terminal. The system is available with the user's choice of three antenna sizes including 1 ft, 2 ft, 3 ft antennas offer excellent isolation and narrow beamwidth to mitigate the effects of interference. The antennas include robust mounting hardware for tower or pole installations.

Rugged & Durable for Extreme Conditions

The StrataLink 24, with its durable cast alloy construction is designed to withstand harsh environments and offers the industry's most robust temp spec, -40°F to 149°F (-40°C to 65°C).

Features

Performance

- 761 Mbps full duplex in a 60 MHz channel bandwidth (1.5 Gbps aggregate)
- 1.2 Gbps full duplex with the XPIC model and 2+0 (2.4 Gbps aggregate)
- Industry leading system gain with the highest spectral efficiency for 24 GHz
- 8 selectable channel sizes from 10-60 MHz
- 9 selectable modulations QPSK to 1024QAM

Advanced Networking

- Physical Link Aggregation (PLA) combines 2 physical links into one logical link to increase link bandwidth
- Hitless Advanced Adaptive Coding and Modulation (AACM) to provide link reliability in degraded channel conditions
- No right-of-way issues – No trenching
- When you need to extend the distance between sites you can easily extend air reach vs breaking ground for expensive fiber extensions
- The system functions as an over the air fiber deployment as opposed to traditional ground-based fiber deployments

Interface & **Customization**

- GigE copper and fiber interfaces – PoE or direct power
- 3 Antenna options – 1, 2, and 3 foot

Synchronization

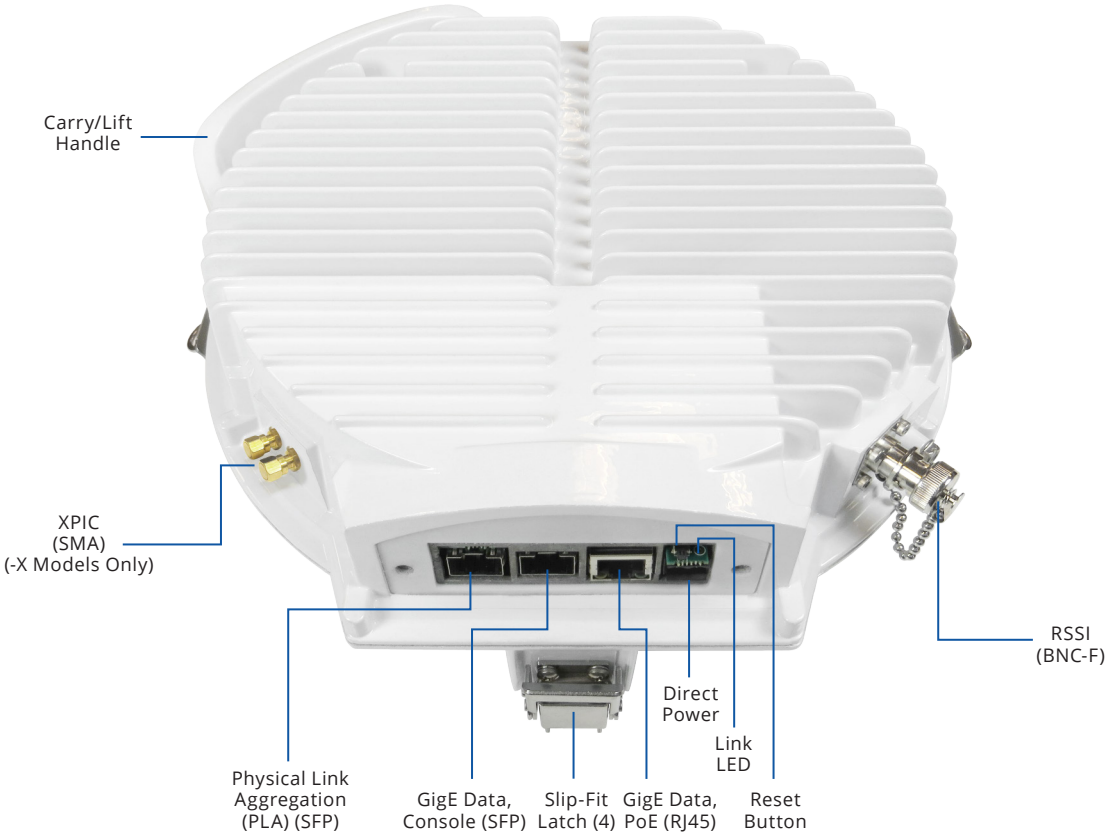
- IEEE1588v2 TC support

Security & **Management**

- AES-256 bit encryption (Optional)
- Full Management & Monitoring Support with SNMPv2

Mechanical

- All-Outdoor system with low power consumption
- Easy slip-fit mount design with durable cast alloy construction withstands extreme weather conditions
- Industry's highest temp spec – up to +65°C (149°F)
- FCC/ETSI/RoHS Compliant
- Standard 1-Year Manufacturer's Warranty



Easy Setup & Deployment

- No regulatory license required - can be deployed anywhere, anytime
- Fast setup and installation, easy operation
- Single model which can be deployed on either end of the link (No High/Low unit as with other manufacturers) - Minimizes sparing costs

Applications

- High capacity wireless links between buildings & towers
- MDU / MTU connectivity
- Data center connectivity
- Video backhaul for surveillance and broadcast TV
- ISP backhaul & dedicated customer links
- Office & Industrial park connectivity
- Public safety point-to-point links
- Fiber extensions
- Leased line replacement
- LTE / WiMAX / 3G / 4G Backhaul

Benefits

- Industry leading system gain allows industry's longest 24 GHz links, up to 15 miles for certain climates
- Full Gigabit wireless connectivity
- Modulation up to 1024QAM and Multi Layer Header Compression allow highest spectral efficiency in the industry
- Only solution on the market which allows 100 Mbps link on narrow 10 MHz channel, and 761 Mbps on 60 MHz channel
- Robust, user friendly user interface and full implementation of SNMP
- Low cost of ownership for fast ROI relative to fiber and other options
- No right-of-way issues, unlike fiber deployment
- Rapid scalability, easily add bandwidth via software key upgrade

Power over Ethernet (PoE) Surge Protector

System Specifications

General Parameters	
Model Numbers *	SL-24 (Individual unit) SL-24-X (Individual unit with XPIC) SL-24-E (Individual unit with AES-256 bit encryption) SL-24-EX (Individual unit with AES-256 bit encryption and XPIC) TLSL-24 (Full link consisting of two units) TLSL-24-XPIC (Full link with XPIC) TLSL24-E (Full link consisting of two units with AES-256 bit encryption) TLSL24-EX (Full link consisting of two units with AES-256 bit encryption and XPIC) SL-24-E-N (International Individual unit) SL-24-EX-N (International Individual unit with XPIC) TLSL-24-E-N (International Full link consisting of two units) TLSL-24-EX-N (International Full link with XPIC)
Frequency Support	24.05-24.25 GHz (FCC), 24.00-24.25 GHz (-N)
Channel Size ‡	10, 14, 20, 25, 30, 40, 50, 60 MHz
Modulation Format	Selectable: QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM
Max Capacity **	500-761 Mbps full duplex – Varies by modulation and bandwidth selected
Payload Latency	300 µs typical
Payload Types	Ethernet (IPv4 and IPv6 compatible)
Features	Hitless Advanced Adaptive Coding & Modulation (AACM), LDPC Forward Error Correction
Regulatory Compliance ‡	NCC (LP0002) FCC CFR47 Part 15.249 ETSI EN 301 489-1 EMC ETSI EN 301 489-4 EMC FCC/ANSI: FCC Part 15 Class A Unintentional Radiator RoHS
Safety	EN60950-1
MTBF	> 18 years

*** -N** –Hardware Option– Extends the lower frequency band edge down to 24.00 GHz for use in other countries. International markets subject to local regulations.

Ethernet Parameters	
Packet Size	64-9600 bytes
Ring Protection	RSTP Supported with Rapid Port Shutdown (RPS)
Link Aggregation	Physical Link Aggregation (PLA) allows 1 traffic flow to be split between two radio links
Quality of Service (QoS)	802.1p Port prioritization Diffserv (DSCP) Support for up to 8 Classes of Service (CoS) Shaping per port

Management	
Security / Authentication	2 level password (Read only, read/write) AES-256 bit encryption (Optional)
Configuration & Management	Telnet, SSH, HTTPS, Serial Console (RS232-115200, N, 8, 1), SNMPv2, NTP, syslog, server, DHCP
Remote Firmware Update	FTP client, TFTP server

Interfaces	
Indicators	Ethernet speed and activity for each port; 1 BNC-F for receive signal level voltage
Payload Interfaces	1x GigE RJ45 (10/100/1000BaseT), PoE capable 1x GigE Fiber/Copper (SFP)
Traffic/Management Interfaces	In-band or out-of-band
PLA	1x GigE Fiber/Copper (SFP)
XPIC IN / OUT (-X Models)	SMA-Female (2)
Power Connector	2 Pin Terminal Block for direct power or PoE over GigE data
Console	DB9 RS232-115200, N, 8, 1 with optional SFP module

Antenna	
Supported Types	High performance dish antenna - 1, 2 & 3 foot options (36.1 dBi, 41 dBi, 44.5 dBi)
Interface	Direct slip-fit mount circular waveguide using cross-pol operation

** Based on purchasable capacity 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.

Power	
Input	-45 to -72 Vdc direct, -43 to -50 Vdc using PoE -40 to -72 Vdc direct, -40 to -50 Vdc using PoE (-N Models)
Power Consumption	< 35 Watts (SL-24-E, -EX, SL-24-E-N, -EX-N)
Power Protection	Reverse polarity and transient suppression (100 Volts clamping)

Mechanical & Enviornmental	
Enclosure	Cast Aluminum, PoE Injector: Polycarbonate
Dimensions (Height x Width x Length)	11 x 11 x 6 in. / 28 x 28 x 15.2 cm | PoE Injector: 3.25 x 5.125 x 8.5 in. / 8.25 x 13 x 21.6 cm
Weight	9.5 lbs / 4.3 kg
Temperature Range	-40° to 131° F / -40° to +55° C (Spec compliant) -40° to 149° F / -40° to +65° C (Operational)
Humidity	100% condensing
Antenna Connector	Slip-fit mount with latches

Receive Sensitivity (dBm)

Channel Width (MHz)	QPSK	8PSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM	512 QAM	1024 QAM
10	-92.0	-87.0	-84.0	-80.0	-77.6	-74.5	-71.5	-68.1	NA
14	-88.5	-85.3	-82.3	-78.3	-75.9	-72.8	-69.8	-66.4	-62.9
20	-87.0	-83.8	-80.8	-76.8	-74.4	-71.3	-68.3	-64.9	-61.4
25	-86.1	-83.1	-80.0	-76.0	-73.4	-70.3	-67.3	-63.9	-60.4
30	-85.3	-82.1	-79.1	-75.1	-72.7	-69.6	-66.6	-63.2	-59.7
40	-84.0	-80.8	-77.8	-73.8	-71.4	-68.3	-65.3	-61.9	-58.4
50	-83.1	-79.8	-76.9	-72.9	-70.5	-67.4	-64.4	-61.0	-57.5
60	-82.0	-78.3	-76.3	-72.3	-69.9	-66.8	-63.8	-60.4	-56.9

Capacity Range 1518-72 Byte Packets (Mbps)

Channel Width (MHz)	QPSK	8PSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM	512 QAM	1024 QAM
10	7 - 12	11 - 18	29 - 46	35 - 57	43 - 69	50 - 81	57 - 92	65 - 104	N/A
14	23 - 37	35 - 56	47 - 75	57 - 92	70 - 112	82 - 131	93 - 150	105 - 169	114 - 183
20	30 - 49	46 - 73	61 - 98	75 - 121	92 - 148	107 - 172	122 - 197	138 - 221	150- 240
25	40 - 64	59 - 95	80 - 128	98 - 157	119 - 192	139 - 224	159 - 256	179 - 288	195 -313
30	50 - 80	74 - 119	99 - 160	122 - 197	149 - 240	174 - 280	199 - 319	224 - 360	243 - 391
40	66 - 107	23.6 - 37.1	133 - 214	164 - 264	200 - 321	233 - 375	267 - 428	300 - 482	326 - 524
50	80 - 129	30.6 - 48.3	161 - 258	198 - 318	241 - 388	282 - 452	322 - 516	362 - 582	393 - 631
60	100 - 162	34 - 54	202 - 325	249 -400	304 - 488	355 - 570	405 - 651	456 - 732	495 - 783

Max Tx Power (dBm)

Mod	Tx Power
Canada	0 dBm
U.S.	-3 dBm
ETSI	-16 dBm
Taiwan	+5 dBm

Antenna Options

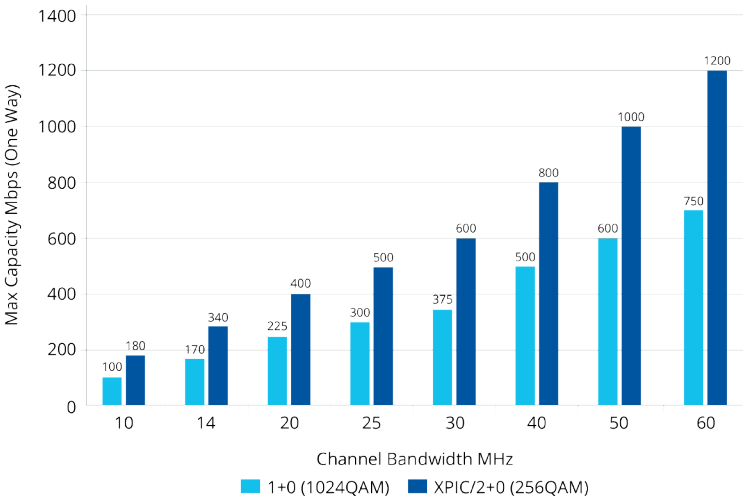
Size	Gain (dBi)	F/B Ratio	Beamwidth (degrees)
1 ft (0.3 m)	36.1	> 62 dB	2.6
2 ft (0.6 m)	41	> 67 dB	1.5
3 ft (0.99 m)	44.5	> 70 dB	0.9

License Keys

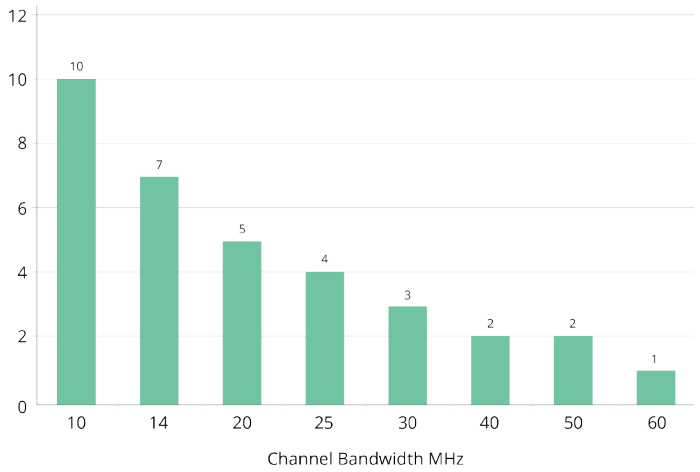
Basic Package = up to 200 Mbps
License Key 1 = up to 300 Mbps
License Key 2 = up to 400 Mbps
License Key 3 = up to MAX Mbps

* The numbers shown above are for full duplex. Aggregate capacities are double.
Throughput measured with IPv4 layer 2 plus a single VLAN tag. Max capacity over 800 Mbps with IPv6.

Full Duplex Capacity Chart



Available Channels Per Bandwidth



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