



Transport Services, Wavelength Transport Services and Storage Transport Services

I. Product Description

A. Transport Services (SONET)

1. Point to Point. TWTC's Point to Point solution offer flexible, secure, dedicated, point-to-point for Metro or Long Haul "private line" or "customer access" transmissions between customer locations. TWTC's Network is built with advanced fiber optic technology, time division multiplexing and includes state-of-the-art SONET with failover switching capabilities. The Point to Point services are designed to deliver digital signal (DSn) transmissions and optical carrier (OCn) transmissions to the Customer.

2. Point to Multi-Point. The "Entrance Facility" Service and "End Link" Service together form a hub and spoke arrangement that create the Point to Multi-point Service. The Entrance Facility (hub) provides a single high bandwidth terminating interface at Customer's location and multiplexed terminating interface at TWTC's Central Office allowing for the aggregation of lower bandwidth End Links (spokes). Customer will incur applicable charges for the Entrance Facility and all individual End Link services associated with the Point to Multi-point configuration. The Entrance Facility Service and End Link Service are designed to deliver DSn and OCn transmissions to the Customer.

3. Private Network Transport. A "Private Network Transport Service" or "PNT" is a Service with a private ring SONET architecture and self-healing capabilities which provides dedicated high capacity transport between multiple metropolitan locations for Customer's exclusive use. Customer will incur applicable charges for all nodes and individual service channels associated with the ring configuration. Private Network Transport Service locations may be any combination of Customer-designated (end-user) locations and carrier POPs. This Service is comprised of "Nodes" and provides Customer with dedicated total ring bandwidth and is designed to deliver DSn, OCn and limited Ethernet "Access Channel" Services.

B. Wavelength Transport Services (a/k/a Lambda Services)

Wavelength Transport Services are bi-directional, point-to-point optical Services capable of transporting high bandwidths (Ex. 2.5G, 10G, 40G, 100G) using Ethernet, Synchronous Optical Network (SONET), Synchronous Digital Hierarchy (SDH) or Optical Transport Network (OTN) protocols. Each Service constitutes an entire wavelength or "Lambda" channel of a multi-channel wave division multiplexing (WDM) system. Wavelength Transport Services are offered with a 2-fiber drop to the Customer with TWTC providing an "unprotected" linear pathway or "network protected" on TWTC's Network.

Available Bandwidths – Lambda Services:

Bandwidths Available:	2.5 Gbps	10 Gbps	40 Gbps	100 Gbps
Metro	X	X	X	X
Long Haul	X	X	not available	not available
On-net	X	X	X	X
Off-net	X	X	not available	not available

Interface Specifications – Lambda Services:

Bandwidth	Framing Type	Interface	Optical Line Rate	Industry Standard
2.5G	SONET SDH	OC48 STM16	2.488 Gbps 2.488 Gbps	GR-253-Core ITU G.803
10G	SONET SDH Ethernet Ethernet	OC192 SDH STM64 Ethernet WANPHY Ethernet LANPHY	9.953 Gbps 9.953 Gbps 9.953 Gbps 10.313 Gbps	GR-253-Core ITU G.803 IEEE 802.3ae IEEE 802.3
40G	SONET SDH Ethernet OTU	OC768 STM256 40G Ethernet OTU3	39.813 Gbps 39.813 Gbps 41.250 Gbps 43.018 Gbps	GR-253-Core ITU G.803 IEEE 802.3ba ITU G.709
100G	Ethernet OTU	100G Ethernet OTU4	103.125 Gbps 111.810 Gbps	IEEE 802.3ba ITU G.709

C. Storage Transport Services

Storage Transport Services are bi-directional, point-to-point optical services capable of transporting the storage area network (SAN) protocols of Fibre Channel, FICON® and ESCON®. Each circuit constitutes an entire wavelength channel of a multi-channel wave division multiplexing (WDM) system. Standard wavelengths are offered as a 2-fiber drop to the Customer with TWTC providing an “unprotected” pathway on the Network. Optional 2-fiber interface with a Network Protected Path can be provided.

1. **Fibre Channel.** Fibre Channel Storage Transport Service use the ANSI standardized protocol for interconnection of servers and storage systems. Fibre Channel Storage Transport is a point-to-point optical service.

2. **IBM® FICON®.** FICON Storage Transport Service uses IBM’s proprietary protocol over a Fibre Channel switch fabric to replicate Fibre Channel transmission rates. FICON Storage Transport is a point-to-point optical service.

3. **IBM® ESCON®.** ESCON Storage Transport Service use IBM’s proprietary protocol for interconnecting IBM servers with storage devices. ESCON Storage Transport is a point-to-point optical service.

II. Service Level Agreement

A. Availability - Fully Protected PNT Services

PNT Services that are provisioned with diverse paths and dual building entrances at each terminating location will be available to Customer at least 99.999% of each calendar month. Network unavailability occurs during a Service Outage. If there is a Service Outage, upon Customer’s request TWTC will issue credits as follows:

(a) for Service Outages exceeding one minute, Customer will receive a credit of 50% of the MRC for such Service.

(b) if there is a second Service Outage exceeding one minute on the same Service during the same calendar month, Customer will receive an additional credit of 50% of the MRC for such Service.

B. Availability - Transport Services (excluding Fully Protected PNT Services, Wavelength Transport Services and Storage Transport Services)

Transport Services (excluding Fully Protected PNT Services), Wavelength Transport Services and Storage Transport Services will be available to Customer at least 99.99% of each calendar month Network Availability. Network unavailability occurs during a Service Outage. Upon Customer's request, TWTC shall issue credits for each Service Outage, and such credits shall be calculated by multiplying the percentage specified in the table below by the MRC for the non-performing Service.

Duration of Service Outage	Percentage Credit
Less than 5 minutes (99.99% availability)	No Credit
5 minutes up to 4 hours	5% of the MRC
4 hours up to 8 hours	10% of the MRC
8 hours up to 12 hours	15% of the MRC
12 hours up to 16 hours	20% of the MRC
16 hours up to 24 hours	35% of the MRC
Over 24 hours	50% of the MRC