



WAVELENGTH SERVICES SOLUTION +

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1. GENERAL

1.1 **Service Definition.** Verizon's Wavelength Services Solution+ provides high speed dedicated bandwidth connectivity between two Customer-designated endpoints (subject to availability).

1.1.1 **Platform.** These terms apply to optimized Wavelength Services Solution+, Private Carriage and Interstate only services.

1.2 Standard Service Features

1.2.1 **Optical Circuit.** In its standard configuration, Verizon provides Wavelength Services Solution+ with an optical circuit via a 2 fiber handoff. Industry standard intra-office interfaces are used.

1.2.2 **Access.** In some configurations, such as for National and International geographic configurations, access to the network is via:

- On-Net access which is provided by Verizon.
- Offnet access which is provided by Verizon using third party access providers.
- Customer Provided Access which is used when Customer is co-located at a Verizon LD POP and requires only a cross-connect to long haul transport.
- Carrier hotel which is a list of Verizon designated sites with multiple carriers.

1.2.3 **Service Configurations.** Wavelength Services Solution+ supports the following configurations:

Service Configuration	Configuration Type	Speed
Metro Point to Point	Ethernet	1 Gbps, 10 Gbps, 100 Gbps
	Transparent Synch Frame	2.5 Gbps, 10 Gbps



	Optical Transport Network	10 Gbps, 100 Gbps
IXC Point to Point	Transparent Synch Frame	10 Gbps
	Ethernet	1 Gbps, 10 Gbps, 100 Gbps
	Optical Transport Network	10 Gbps, 100 Gbps

1.2.4 **Customer Service and Support.** Verizon provides Tier 1 Help Desk support by telephone 24 hours a day 7 days a week.

1.2.5 **Geographic Configuration.** Verizon assigns a geographic type to the service based on the customer's A and Z end locations:

- **Metro.** With the Metro Geographic type, Verizon provides connectivity to end points within the same LATA, Corridor or Metropolitan Service Area as defined by Verizon.
- **National.** With the National Geographic type, Verizon provides connectivity to end points in different LATAs or different Metropolitan Service Areas (excluding Corridor service) as defined by Verizon.
- **International.** With the International Geographic type, Verizon provides connectivity between end points which requires the circuit to cross a country's borders. Wavelength Services in International Geographic types includes Hawaii and Alaska.

1.3 **Optional Service Features.** Verizon offers the following Wavelength Services optional features:

1.3.1 **Protected Access.** This option is available for type 1 on-net access circuits and only where supported by the network. With the Electronic Network Protection, the Customer traffic for a single circuit is bridged to a dedicated working and a dedicated protect channel. The 1+1 Automatic Protection Switching used in Electronic Network Protection allows the circuit to automatically switch from the working channel to the protect channel upon electronics module failures on either channel. The objective is to help protect against outages due to single electronics module failures in the access circuit when the network supports two degrees of freedom from the customer premises location to the LD POP. Diversity between the working channel and the protect channel is not guaranteed but provisioned where the shared Verizon metro transport network topology supports it. The switching time is not guaranteed but is typically less than 50 ms after systematic fault detection. Switching is typically non-revertive, so upon repair of failures, the traffic would not revert back to the original channel.

Customers with access loops that are single threaded may opt for protected access and it will be done via a single ROADM degree but in this case, only the ROADM transponders are protected and not the outside plant fiber or ROADM amplifiers.

1.3.2 **Mandatory Route.** With the Mandatory Route feature, Verizon restricts the long haul route a circuit can take by requiring it to pass through the identified locations for the specific service. For Wavelength Services Solution+ that include IXC Transport (national and international geographic configurations over the long haul backbone), Verizon will maintain the IXC routing for the term of the service.

1.3.3 **Round Trip Delay SLA.** With the Round trip delay (RTD) SLA feature, Verizon provides a maximum RTD service level agreement (SLA) metric for the term of the circuit that is specific to the circuit's path. Additional details are specified in the SLA. Qualifying circuits must be wholly provisioned by Verizon and may not include SONET end-links.

1.3.4 **Mesh Restoration.** With Mesh Restoration, for national geo types in the domestic U.S., the IXC transport circuit's traffic is provisioned over the Verizon Optical Transport Network (OTN) mesh of OTN switches and mesh restoration is enabled so that failures of the network side electronics of the OTN mesh switches and of the DWDM transport of the OTN mesh trunks and their fiber outages are typically survived. The



mesh restoration algorithm is designed to automatically switch traffic to links dedicated to service as spare links. The Restoration time is not guaranteed but is typically less than 300 ms. The spare links are targeted for deployment in sufficient quantity to support all single outage events in the OTN mesh. The algorithm will also attempt to restore around multiple simultaneous failures as the network capacity supports it. The circuit is typically reverted back to its home path after the failure is repaired, alarms clear and a 12 minute “Wait to Restore” time expires with alarms remaining clear. Diversity between the home route links and the spare links is provisioned via shared link risk group provisioning of the trunks.

- 1.3.5 **Corridor Service.** With Corridor service, Verizon may extend metro service beyond LATA boundaries at its own discretion where the network supports it.
- 1.3.6 **Route Diversity.** With the Route Diversity feature, two circuits whose routing is specified at the POP to POP level of granularity are selected as a mated pair relationship and their routing is maintained for the term of the service as is originally ordered. The level of diversity between the pair is dependent on the specific routes selected and may or may not include overlap in the outside plant fiber routing. Module level equipment diversity is provided. The feature is therefore classified as “Route - No Single Point of Failure Limited” level of diversity.

For circuits that include the Route Diversity optional feature, Verizon will periodically check the circuit routing throughout the circuit term to verify whether special routing has been maintained. If Verizon learns that special routing has been jeopardized, then Verizon will use commercially reasonable efforts to restore special routing. If Verizon cannot restore special routing within sixty (60) days after discovering a problem, Verizon will notify Customer that special routing cannot be restored and Customer has the option within sixty (60) days from such notification from Verizon to disconnect the circuit subject to the special routing requirement without any early termination liability.

- 1.3.7 **Local Route Diversity.** With the Local Route Diversity feature, two circuits whose routing is specified at the metro POP to metro POP level of granularity are selected as a mated pair relationship and their routing is maintained for the term of the service as is originally ordered. The level of diversity between the pair is dependent on the specific routes selected and may or may not include overlap in the outside plant fiber routing. Module level equipment diversity is provided. The feature is therefore classified as “Route - No Single Point of Failure Limited” level of diversity. For circuits that include the Route Diversity optional feature, Verizon will periodically check the circuit routing throughout the circuit term to verify whether special routing has been maintained. If Verizon learns that special routing has been jeopardized, then Verizon will use commercially reasonable efforts to restore special routing. If Verizon cannot restore special routing within sixty (60) days after discovering a problem, Verizon will notify Customer that special routing cannot be restored and Customer has the option within sixty (60) days from such notification from Verizon to disconnect the circuit subject to the special routing requirement without any early termination liability.

- 1.3.8 **Proactive Notification.** With Proactive Notification, Verizon shall offer Proactive Notification as a supplemental value-added feature to the Wavelength Services Solution. Proactive Notification is provided to Customers enrolled in that feature, where available, at no additional charge to Customer.

- 1.3.8.1 To receive Proactive Notification, Customer must enroll by contacting their Verizon account representative. Customer will provide an e-mail address to which Verizon should send e-mail notifications. The objective is for automated e-mail notification (that a trouble ticket has been opened) to be sent within 15 minutes of trouble ticket creation. Customer may sign up to view trouble tickets opened through this feature affecting Customer’s service via the Verizon’s On-line Ticket Management system, accessed from the Verizon Business Customer Center at <https://enterprisecenter.verizon.com>.



1.4 Customer Responsibilities

- 1.4.1 **Customer-Provided Access.** If Customer provides local Access, Customer will connect that Access to the Customer-provided patch panel which is a Verizon-designated interconnection point to Verizon's network and to Customer's end-user equipment. Customer will also provide a CFA (as defined below).
- 1.4.2 **Installation.** Unless otherwise provided by Verizon under a separate Service Attachment, Customer will provide the following to support installation activities such as site surveys, testing and activation:
- Space and power for Verizon terminating equipment if required to deliver service.
 - All facilities and internal cabling to connect Customer's Site to the Demarcation of the Wavelength Services Solution circuit.
 - Notice to Verizon of the existence and location of wiring or any other risk factors on the Customer's Site which may affect Verizon's installation of the Wavelength Services Solution.
- 1.4.3 **Entry to Customer Site.** Where Verizon requires entry to a Customer Site in order to provide (including, but not limited to, physical changes to Wavelength Services Solution facilities), Customer shall: (a) grant or shall procure the grant to Verizon of such rights of entry to each Customer Site, including any necessary licenses, waivers and consents and (b) respond promptly to notice from Verizon requiring Customer action, such as to coordinate Verizon entry to Customer Site needed for a change in facilities at a mutually convenient time within 30 days of such notice from Verizon.

2. SUPPLEMENTAL TERMS

- 2.1 **Special Construction.** If, after an order is placed, Verizon finds that third-party special construction services are needed to build, configure or install any additional facilities and/or equipment necessary for Verizon to provide Access service, Verizon will notify the Customer of any such special construction charges. If Customer does not accept the special construction charges, Customer may terminate the order(s) affected by the special construction charges, subject to payment of any third party provider cancellation charges incurred by Verizon.
- 2.2 **Mandatory Route Requirements.** If a network outage occurs, Verizon may unilaterally restore (via reroute) affected circuits without regard to Mandatory Route routing. Once the network outage is resolved, Verizon will restore the route to meet the original Mandatory Route locations. For instances where Verizon grooms its network and such grooming impacts a Mandatory Route, Verizon will work with Customer to determine a new Mandatory Route and if that is not possible, Customer may terminate the circuit without any termination fee(s) within 60 days.
- 2.3 **Rerouting.** Without affecting Verizon's obligation to route through Mandatory Route locations, Verizon reserves the right to reroute Wavelength circuits entirely at its discretion.
- 2.4 **Customer Obligations and Limitations regarding Connecting Facilities.** If Customer requests Wavelength Services Solution+ provisioned with facilities being used for another Customer ("Hosting Customer"), the requesting Customer will first provide Verizon a valid letter of agency ("LOA") and a customer facility assignment ("CFA") (collectively, "LOA/CFA"). If the related Hosting Customer's service ends for any reason, the requesting Customer's LOA or CFA will be deemed revoked, and Wavelength Services may be interrupted or terminated without notice. Verizon is not liable in any respect for such interruptions or terminations but will credit Customer for affected service charges and work with Customer to restore its service promptly.
- 2.5 **Third Party Vendor Charges for Cross-Connection and Extended Wiring.** Section 1.4.1 above requires Customer to provide all facilities and internal cabling to connect Customer's site to the



Demarcation of the Wavelength Service Solution circuit. In some instances Customer’s site may be located at a data center or other facility owned by a third party and the third party may not permit Verizon to connect directly to Customer’s site. In such instances, a third party data center/facility owner may only permit the third party to install a cross-connection from the Verizon Demarcation to Customer’s site. If the third party data center/facility owner charges for that Cross-Connection and Customer does not directly pay the third party for such connection, Verizon will pay the third party for the cross-connection and Customer will be billed by Verizon for such charges. Customer is responsible for any Verizon or third party early termination charges associated with any moves, adds, changes, disconnections or cancellation of the cross-connects. The specific Cross-Connect type selected by Customer will be specified in the Amendment to the Service Attachment.

Verizon is unable to order and provide a Third Party Cross-Connection in scenarios where the terminating Demarcation of the Wavelength Service Solution circuit is not controlled or owned by Verizon. This includes any circuits that use a third party to provide the last mile for service. There are also some situations where Verizon does not have a carrier agreement with a location or a vendor that can prevent Verizon from ordering the Cross-Connection. In these situations Verizon will provide the letter of authorization and/or circuit facility assignment and the customer shall be responsible for providing the Cross-Connection to complete the service.

3. **SERVICE LEVEL AGREEMENT.** The Service Level Agreement (“SLA”) for Wavelength Services Solution+ can be found at the following URL: Wavelength Services SLA at www.verizon.com/business/service_guide/reg/cp_wss_plus_sla.pdf.

4. **FINANCIAL TERMS**

4.1. **Rates and Charges.** Customer will pay the charges for Wavelength Services Solution+ specified in the Agreement, including the Administrative Charges below, and at the following URL: www.verizon.com/business/service_guide/reg/applicable_charges_toc.htm. Charges below are in U.S. dollars and will be billed in the invoice currency for the country of that invoice.

4.2. **Administrative Charges.** The column titled “Specific NRC for Local Access portion of Wavelength Services Solution+” represent NRCs that Customer will pay for each end of an affected Local Access circuit.

Administrative Charge	Charge Instance	General NRC for Wavelength Services Solution+	Specific NRC for Local Access portion of Wavelength Services Solution+
Administrative Change	Per Change	\$60.00	\$60.00
Cancellation of Order	Per Circuit	\$800.00	\$800.00
Expedite in the United States	Per Circuit	\$4,000.00	\$1,400.00
Expedite in Canada and France	Per Circuit	\$4,000.00	\$6,000.00
Expedite in other countries	Per Circuit	\$4,000.00	\$3,000.00
After Hours Installation	Per Circuit	\$400.00	\$600.00
Pending Order Change	Per Circuit	\$750.00	\$200.00
Physical Change	Per Circuit	\$850.00	\$200.00
Service Date Change	Per Circuit	\$200.00	\$100.00

4.3 **Cancellation/Expedite.** Cancellation of Order charges in the table above will not apply to circuits for which Customer reinstates the same Service Order within 30 days of the request to discontinue processing the order. Cancellation of Order charges in the table above will be assessed per cancelled circuit or port per



order. Expedite charges in the table above will apply in addition to any Cancellation of Order charges if Customer cancels an order before installation.

- 4.4 **Access Speed Changes.** Speed changes on an existing Access circuit are only supported by Verizon in specific limited circumstances. Otherwise, where alternative Access speeds are available from Verizon, Customer must present a new order to Verizon to obtain such alternative speeds and simultaneously terminate its existing Access service, for which it will pay early termination charges if applicable. Customer will be responsible for any third party charges incurred by Verizon in order to implement any requested Access speed changes or any termination. The applicable NRC and MRC associated with the new Access circuit speed will be effective from the day the changed Access bandwidth is available to Customer.
- 4.5 **Access Moves.** Customer-requested moves of Access to a new location will be quoted on an individual case basis and, as with speed changes, may require the termination of Customer's existing Access circuit and installation of a new one. For Customer-requested moves of Access to a new location, Customer will pay early termination charges as applicable and any third party charges incurred by Verizon in order to implement the move. The newly-contracted Access will include the applicable NRC and MRC associated with the new Access circuit.
- 4.6 **Expedited Installation.** If Customer requests expedited installation, an Expedite charge will be assessed per circuit, depending on the service. For Local Access, Customer will be charged an additional Expedite charge for each revision made to the Service Order prior to the completion of an installation or a change request due to Customer's actions, including, but not limited to, more than one (1) site visit to Customer Site because Customer was not available at the time scheduled for installation or if Customer requests a change in the installation date such as changed speeds, prior to the completion of the installation. Service Orders requiring construction prior to the installation of service, either on-net or off-net, could result in extended delays even in instances where an Expedite charge applies.
5. **United States – Intrastate or Interstate Service.** Access in the U.S. Mainland is considered Interstate for regulatory jurisdiction purposes if more than 10% of the total traffic over an instance of the Service (e.g., a circuit) is Internet traffic, or otherwise begins and ends in different states. If more than 90% of the total traffic over a Service instance will begin and end in the same state, and is not Internet traffic, then Customer may order it as Intrastate for regulatory jurisdiction purposes. When ordering Intrastate Wavelength, customer will be required to certify that (1) the traffic over the Service instance purchased will be Intrastate, as defined above; (2) if this certification is incorrect, customer will be responsible for any unbilled surcharges and applicable fees; and (3) if this certification is no longer true, customer has a duty to notify Verizon within thirty (30) days.
6. **DEFINITIONS.** The following definitions apply to Wavelength Services Solution+, in addition to those identified in the Master Terms and the administrative charge definitions at the following URL: www.verizon.com/business/service_guide/reg/definitions_toc_2017DEC01.htm.

Term	Definition
1+1 Automatic Protection Switching	A protection switching scheme where the customer traffic is bridged into a working and protect channel that is dedicated to the circuit and then the receive end equipment performs an automatic switch from working to protect if the working channel fails. Switching may be revertive or non-revertive back to the working channel after the outage is repaired. Switching time is typically 50 ms or less after systematic fault detection.
Corridor Service	A geographic area in the United States whereby Inter-LATA services are provided between two defined LATAs, but are considered metro service for provisioning and usually for pricing purposes. Corridors are an optional

	Verizon metro configuration of service across LATA boundaries set at Verizon's discretion.
Cross-connect	A single (or series of) fiber jumpers between specific ports on customer or carrier equipment used to transmit the Wave data stream to each other across the demarcation point.
Electronic Network Protection	Uses 1+1 protection switching via the Y-Cable technology to effect a head end bridge of the customer traffic into a working and protect channel and then monitors the health of both channels. The system will execute a receive end switch to select from one channel or another depending on the status of those channels.
Metropolitan Service Area	A Verizon defined list of cities or suburbs that are served as a metro geographic type and provisioned on metro transport equipment.
Mesh Restoration	A protection switching scheme that uses a mesh of links as working links and other dedicated links as spare capacity. Upon failure of a working link, the traffic is switched into the spare links to route around the failure and remain up. The switching is done via OTN switches in cross-connect fashion (not packet switching).
Optical Transport Network	OTN is a standards-based transport architecture for data communications with a specific protocol defined by the ITU-T via the G.709 recommendation.
Private Carriage Service	A Service provided to Customer on an individual basis, with rates, terms and conditions that are subject to negotiation between Verizon and Customer, and not offered for sale ubiquitously to the general public at publicly posted rates. If rates, terms and conditions cannot be satisfactorily negotiated with Customer, Verizon reserves the right not to sell such Private Carriage Service to Customer.
Protocol Specific	A circuit whose customer interface is specific to a standards-based data communication protocol (e.g. IEEE 802.3 Ethernet or ITU-T G.709 Optical Transport Network standard) and bit range (e.g. 10 Gb/s).
Point to Point Service	Point to Point Service is full time data transmission service utilizing the Company's facilities to connect two or more Customer designated locations.
Transparent Synchronous Frame	A SONET OC-n customer interface with transparent transport of the customer's D bytes and K bytes in the SONET line overhead. It is protocol specific as either a SONET OC-n or a Synchronous Digital Hierarchy STM-n.
Wait to Restore Timer	A configurable option where after an outage is repaired, the protection switching algorithm requires a minimum length of time with alarm free operation before reverting the customer's traffic back to the home route. Designed to avoid switching traffic into intermittent channels.
Demarcation	The point where the access circuit is delivered. For jointly used office buildings, it is often a common entrance point for telecommunication providers, which may not be the Customer's physical location.