



DARK FIBER

1. GENERAL
 - 1.1 Service Definition
 - 1.2 Lease
 - 1.3 Use Restrictions of Dark Fiber
 - 1.4 Underlying Rights
 - 1.5 Alternative Rights of Way
 - 1.6 Relocation
 - 1.7 Maintenance
 - 1.8 Fiber Outage
 - 1.9 Fiber Repair and Testing
 - 1.10 Customer Obligations
 - 1.11 Customer Equipment
 - 1.12 Customer Location Arrangements
2. SUPPLEMENTAL TERMS
 - 2.1 Dark Fiber Term
 - 2.2 Customer's Release of Grantor
 - 2.3 Grantor Indemnification Claims
 - 2.4 Reservation of Rights
 - 2.5 Order of Precedence
3. FINANCIAL TERMS
 - 3.1 MRC and NRC Charges
 - 3.2 Early Termination Charges
 - 3.3 Cancellation Charges
 - 3.4 Fiber Outage Credits
 - 3.5 Administrative Charges
 - 3.6 Third Party Vendor Charges for Cross-Connection and Extended Wiring
4. DARK FIBER SPECIFICATIONS
 - 4.1 Fiber and Connector Standards
5. DEFINITIONS

1. GENERAL

- 1.1 **Service Definition.** Verizon will provide optical fiber between two Customer Locations along various portions of the Verizon System as defined in an Order, with no optronics or other equipment used to introduce photons, "light" or transmission capability over such fiber ("Dark Fiber"). An Order may have multiple optical fiber routes between differing sets of Customer Locations, for example, Location A to Location B; Location A to Location X; Location X to Location 7. In such case, each of the optical fiber routes would constitute an individual Dark Fiber Service under this Service Attachment. Notwithstanding the foregoing, Verizon may attach equipment to or otherwise "light" the Dark Fiber for testing purposes. The initial Dark Fiber term and any renewal periods for Dark Fiber will be set forth in the Order. As used herein, "Term" shall mean both the initial Dark Fiber term and any renewal period.
- 1.2 **Lease.** On the Service Establishment Date for Dark Fiber, the Customer will have a Lease, as defined herein, to the Dark Fiber.
 - 1.2.1 Verizon hereby grants to Customer a Lease that gives Customer exclusive access to, and use of the Dark Fiber. Each Lease is subject to the terms and conditions of Verizon's Underlying Rights and Customer Location Arrangements. Each Lease is for the use of the Dark Fiber only. As between the



Parties, the Dark Fiber will remain the sole and exclusive property of Verizon. Nothing in this Agreement will be interpreted to give or convey to Customer any property right, title or interest in such Dark Fiber or the Verizon System, even if it may be or become attached to or embedded in realty.

- 1.2.2 The Customer shall have no right to physically access the Verizon System.
- 1.2.3 The Order will contain an estimate of the Route and the length of the Route (including any buffer length that Verizon may specify to account for margin of error). During the site survey of Customer Location or installation activities, Verizon may determine that the actual Route is different from the original design or the Route length has changed. Verizon will inform the Customer of such variation, and within thirty (30) days thereafter, Customer shall either (a) accept the NRC for the new Route and/or Dark Fiber length, or (b) cancel the applicable Dark Fiber Order without incurring Cancellation Charges.
- 1.3 **Use Restrictions of Dark Fiber.** The Customer shall use the Dark Fiber in a manner that complies with all restrictions set forth herein and the Agreement, and solely for lawful purposes.
 - 1.4.1 Customer shall light Dark Fiber with Customer Equipment installed at the Demarcation Point.
 - 1.4.2 Customer shall not Transfer, directly or indirectly the Lease, the Dark Fiber or the Verizon System, in whole or in part.
 - 1.4.3 Customer shall keep the Dark Fiber and the Verizon System free from any liens, rights or claims of any third party attributable to Customer.
 - 1.4.4 Any violation of this Section 1.3 shall constitute a material breach of the Agreement. If the Customer fails to cure any such breach within thirty (30) days after written notice from Verizon, then Verizon, in addition to exercising any other rights and remedies available to it, may terminate any or all Orders and any or all Dark Fiber provided to Customer (including any pending Orders). Upon such a termination by Verizon, Customer shall owe Early Termination Charges for all terminated Dark Fiber and Cancellation Charges for all cancelled Orders and Verizon shall have no further liability to Customer and shall not be required to refund any amounts paid by the Customer.
- 1.4 **Underlying Rights.** Verizon has or will obtain prior to the Service Establishment Date, and will maintain during the applicable Term, the Underlying Rights necessary for Verizon's construction, installation, maintenance and repair of the Verizon System and Dark Fiber as necessary for Verizon to fulfill its obligations under the Agreement. Verizon shall not be deemed in breach of this Section 1.4 during any period when Verizon is seeking to renew or extend existing Underlying Rights, and such Underlying Rights have not yet been renewed or extended, and the grantor of such Underlying Rights has not given Verizon notice of default under or non-renewal of the Underlying Rights.
 - 1.4.1 If Customer Location Arrangements are required for Verizon to satisfy its obligations under this Section 1.4, and Customer allows Verizon to use the Customer's Location Arrangements so that Verizon need not obtain its own Underlying Rights, then the Customer shall not charge Verizon for such use of Customer's Location Arrangement.
 - 1.4.2 Except as otherwise agreed by Verizon and Customer in an Order, Customer is solely responsible for Customer Location Arrangements, and all Underlying Rights for private property.
- 1.5 **Alternative Rights of Way.** Upon the expiration, non-recognition or other termination of an Underlying Right for which Verizon is responsible under Section 1.4, Verizon will endeavor to obtain an alternate right-of-way for the affected portion of the Dark Fiber and will notify the Customer of the non-recognition or



termination. Any failure by Verizon to obtain an alternate right-of-way shall not be deemed a breach of the Agreement. In the event that Verizon obtains an alternative right-of-way that requires relocation of any portion of the Verizon System used to provide Dark Fiber, the terms of Section 1.7 shall apply with respect to such relocation.

- 1.6 **Relocation.** If Verizon, in its reasonable business judgment or because of a Force Majeure Event or legal obligation, determines that it will relocate all or any portion of the Dark Fiber or the Verizon System used in the provision of Dark Fiber, Verizon will proceed with such relocation. Verizon shall have the right to direct such relocation, including the right to determine the extent of, the timing of, and methods to be used for such relocation, provided that any such relocation shall not result in a material adverse change to the performance of Dark Fiber or materially alter the Route. Verizon will use commercially reasonable efforts to coordinate with the Customer as Verizon implements the relocation. In the event that such relocation requires the removal, re-splicing, and/or reconnection of any of Customer's Equipment, Customer shall, upon notice from Verizon, promptly cause such action to be taken at its sole cost and expense. When practicable, Verizon will provide Customer advance notice and schedule coordination of any relocation that may result in interruption of use of the Dark Fiber.
 - 1.6.1 Customer is solely responsible for any costs it incurs to accommodate any relocations under Section 1.6.
 - 1.6.2 If relocation is required by a third party with legal authority to do so, and the portion of the Verizon System being relocated is being used solely to support Customer's Dark Fiber (e.g., Customer's Dark Fiber represents the only strands being used on fiber that must be relocated) then (except as provided under Section 1.6.2.2 below) Customer shall pay Verizon's Relocation Costs, which may include a one-time non-recurring charge and/or in a monthly recurring charge. Notwithstanding the foregoing, Customer may:
 - 1.6.2.1 Within ten (10) days after receiving a Relocation Notice pursuant to 1.6.2, Customer may request in writing that Verizon provide an estimate (including reasonable specificity regarding the types of costs included) of Relocation Costs that would be subject to reimbursement under Section 1.6.2.
 - 1.6.2.2 Terminate the affected Dark Fiber (s) in lieu of paying Verizon's Relocation Costs. Customer, by written notice to Verizon within ten (10) days after the date of Verizon's Relocation Notice (or within such other time period as circumstances may require as specified in the Relocation Notice), may terminate the affected Dark Fiber(s) ("Relocation-Related Termination Notice"), in which case Customer will not be responsible for Relocation Costs, but the Customer will be responsible for the Early Termination Charges. In cases where the Customer has submitted a timely request for a Relocation Cost estimate under Section 1.6.2, the ten (10) day period for the Customer to provide a Relocation-Related Termination Notice shall commence on the date on which Verizon provides the Relocation Cost estimate under Section 1.6.2.
- 1.7 **Maintenance.** Upon the Service Establishment Date for Dark Fiber, Verizon will maintain the Verizon System and repair the Dark Fiber in accordance with this Service Attachment. Customer shall reimburse Verizon for any reasonable expenses incurred by Verizon for repair to the Dark Fiber or the Verizon System or Verizon Network caused by the negligence or willful misconduct of the Customer.
- 1.8 **Fiber Outage.** Verizon will use commercially reasonable efforts to resolve Fiber Outages in the Verizon System within 8 hours, provided, however, if the Fiber Outage is a result of a Fiber cut, Verizon will use commercially reasonable efforts to repair such Fiber within 14 hours. Notwithstanding any provision contained in the Agreement, Verizon's sole liability to Customer for any Fiber Outage is limited to any applicable Fiber Outage credits set forth in this Section 1.8. A Fiber Outage does not include any condition caused by the Customer or Customer Equipment or facilities, and Verizon is not responsible for resolving



any such conditions.

1.9 **Fiber Repair and Testing**

- 1.9.1 After reporting a Fiber Outage, Customer will provide access, as necessary, to the Customer Location(s) (including the Demarcation Points) for testing and repair of the Dark Fibers. Verizon will contact the Customer prior to accessing the Customer Location(s).
 - 1.9.2 Verizon will determine the course of action to be taken to restore the cable and/or conduit and begin restoration efforts, including providing temporary repairs.
 - 1.9.3 To perform testing, the Dark Fiber(s) may need to be disconnected at the Demarcation Points on the Verizon Network side which may interrupt the transmission of light over the Dark Fiber(s). Verizon will contact the Customer to coordinate the disconnection.
 - 1.9.4 Within one (1) Business Day after completing any temporary repair or restoration, Verizon shall commence planning any further repair that may be necessary to replace any temporary repair that Verizon put in place. Verizon shall inform the Customer of any such further repair plans and implement any such further repairs within an appropriate time thereafter.
 - 1.9.5 In the event a cable failure affects multiple Verizon systems serving multiple Verizon customers, the restoration sequence will occur in a logical order, will not intentionally disfavor any party, and will restore in-use fiber prior to inactive fiber.
- 1.10 **Customer Obligations.** Customer shall timely perform, or cause its third parties to timely perform, its responsibilities or obligations provided in this Service Attachment or the relevant Order. If Customer fails to perform a responsibility or obligation that delays completion of the Order or Verizon's performance and Verizon incurs third-party costs as a result of such delay, Verizon reserves i) invoice Customer such costs, and ii) terminate the affected Order in whole or in part and Customer will be invoiced a Cancellation Charges or Early Termination Charges, as applicable and as set forth in Section 3.
- 1.10.1 Customer's failure to provide Verizon timely access to the Customer Location as required to complete the physical site survey within two hundred ten (210) days after the effective date of the applicable Order. In addition to Verizon's rights in Section 1.10 above, the Service Establishment Date will be adjusted.
 - 1.10.2 Customer's failure to make the applicable Customer Locations Room Ready and provide Verizon written notification of same within three hundred sixty five (365) days after the effective date of the Order. In addition to Verizon's rights in Section 1.10 above, the Service Establishment Date will be adjusted.
 - 1.10.3 Customer shall not connect (or allow another third party to connect) the Dark Fiber to any equipment, facilities or the like other than Customer Equipment.
 - 1.10.4 Customer shall not rearrange, move, disconnect, remove, or attempt to repair any Dark Fiber or the Verizon System.
 - 1.10.5 Upon Verizon, reasonable request, Customer shall provide sufficient information as to verify Customer's compliance with the use restrictions set forth in Section 1.3. If Customer fails to provide such information, or Verizon determines that the information fails to reasonably demonstrate the Customer's compliance.
 - 1.10.6 Customer will, not later than thirty (30) days (or as otherwise explicitly set forth in the applicable Order) after disconnection or termination of Dark Fiber, disconnect Customer Equipment from the Verizon



System. Customer shall accomplish such disconnection at Customer's sole expense, under Verizon's supervision if requested by Verizon, and in a manner that does not damage Verizon's System or Network. If Customer fails to disconnect Customer Equipment within the foregoing time period, then Verizon may disconnect it in a manner Verizon deems reasonably appropriate, at Customer's sole risk and expense and without liability to Verizon.

1.10.7 Customer shall promptly notify Verizon if Customer becomes aware of any occurrence (or impending occurrence) of any event which would be reasonably likely cause damage to the Dark Fiber or the Verizon System.

1.10.8 Customer will report Fiber Outages to Verizon either: i) using a Verizon provided telephone number(s), or ii) using the Verizon Enterprise Center (VEC) Portal. When reporting a Fiber Outage, Customer will provide all of the following information to Verizon:

- Type/nature of problem,
- Location of the problem,
- Circuit ID of the affected Dark Fiber,
- OTDR measurements/test results
- Any other pertinent information that may help identify and resolve the problem in an expedient manner, including confirming the presence of power and any known issue with Customer Equipment.

1.11 **Customer Equipment.** Customer will provide, install and maintain Customer Equipment in order to use the Dark Fiber. Customer is responsible for the selection, implementation, and maintenance of security features for protection against unauthorized or fraudulent use of Customer Equipment. Customer shall ensure that all Customer Equipment is properly interconnected to the Dark Fiber, and does not cause interference with the Verizon System. Verizon shall not be liable for any damages or losses caused in whole or in part by the failure of Customer Equipment. If any Customer Equipment causes damage to Verizon, the Verizon System, its customers, and/or its providers, Customer shall be liable for such damages. Customer shall provide Verizon with timely access to Customer Equipment as necessary for Verizon to install, maintain, repair, test and repair the Dark Fiber or the Verizon System, as applicable.

1.11.1 Within thirty (30) days of termination, cancellation, or expiration of the initial Dark Fiber Term, or renewal period, as applicable, Customer shall disconnect Customer Equipment from the Dark Fiber and Verizon System. Customer shall accomplish such disconnection at Customer's sole expense, under Verizon's supervision if requested by Verizon, and in a manner that does not damage Verizon's System. Customer shall be responsible for and shall indemnify Verizon from and against any damage, loss, cost or expense caused by such disconnection. If Customer fails to disconnect Customer Equipment within the time period described above, then Verizon may disconnect Customer Equipment in a manner Verizon deems reasonably appropriate, at Customer's sole risk and expense and without liability to Verizon.

1.12 **Customer Location Arrangements.** Notwithstanding any provision to the contrary contained in the Agreement to Verizon's duty to maintain Underlying Rights pursuant to Section 6, it is Customer's sole responsibility to secure, or cause to be secured, prior to the Service Establishment Date, and maintain in full force and effect during the initial Dark Fiber term and any renewal period, all Customer Location Arrangements, needed for the use and operation of the Dark Fiber and any Customer Equipment. Upon Verizon's request, the Customer will deliver to Verizon copies of such Customer Location Arrangements. If Verizon needs access from a public easement or right of way to the Customer Location in order to install, test, repair, maintain and/or remove Dark Fiber or related facilities at a Demarcation Point, then Customer shall (a) grant or shall procure the grant to Verizon of such rights of entry to each Customer Location, including any necessary Customer Location Arrangements, waivers and consents and (b) respond promptly to notice from Verizon requiring Customer action, including timely coordination of access to Customer Location at a mutually convenient time within 30 days of such notice from Verizon. If rights of



access are not secured, Verizon may decline to provide Dark Fiber to the applicable Customer Location and cancel any pending Order without liability to Customer. The selection of AC or DC power (where Verizon requires power) shall be mutually agreed to by Customer and Verizon. All Customer Location Arrangements provided by Customer shall comply with applicable zoning requirements, building codes, safety standards, and other applicable standards (including those contained in any Third-Party Landlord agreements). **“Customer Location Arrangements”** shall mean any of the following that Verizon needs to design, access, install, maintain, repair and/or remove a Service or related facilities at the premises of a Demarcation Point: (1) permits, easements, and other access rights or the like, in each case including written documentation showing that Verizon has been granted any necessary authorizations and rights, (2) a pathway (including any necessary conduit, inner duct, riser shaft, or related facilities) for Verizon to place cable, fiber or other facilities and equipment, (3) equipment space, (4) rights from Third-Party Landlords, and (4) drawings and other information that Verizon may need regarding the Customer Location in connection with any of the foregoing.

2. SUPPLEMENTAL TERMS

- 2.1 **Dark Fiber Term.** If there are no renewal provisions in the Order, at the end of the initial Dark Fiber term, the Dark Fiber will continue on a month-to-month basis until terminated by either Party on at least thirty (30) days’ advance written notice. If an Order contains renewal provisions, at the end of the renewal period, the Dark Fiber will continue on a month-to-month basis until terminated by either Party on at least thirty (30) days’ advance written notice.
- 2.1.1 Upon the expiration or termination of the initial Dark Fiber term or any renewal period, the Lease with respect to the applicable Dark Fiber shall immediately terminate, all rights of the Customer to use the Dark Fiber shall cease, all such rights shall revert to Verizon, and Verizon shall owe the Customer no further duties, obligations or consideration with respect to such Dark Fiber.
- 2.2 **Customer’s Release of Grantor.** To the extent Verizon is required by the terms of any Underlying Rights to indemnify the grantor or provider thereof from and against any claims arising out of or related to such Underlying Rights (regardless of the cause and regardless of whether such Claims arise from the sole or partial negligence, actions or inaction of such grantor or provider or its employees, agents, contractors, subcontractors or other third party using the property covered by such Underlying Right), Customer hereby releases such grantor or provider from any such Claims. This release of claims, by itself, does not relieve Verizon of any obligation it has to provide Dark Fiber pursuant to an Order submitted by Customer.
- 2.3 **Grantor Indemnification Claims.** Notwithstanding any other provision of this Agreement, in the event that (i) Customer asserts a claim against a grantor or provider of Underlying Rights to Verizon (“Customer Claim Against Grantor”), (ii) Verizon is required under the terms of the Underlying Rights to indemnify the grantor or provider thereof with respect to such Customer Claim Against Grantor, and (iii) the grantor or provider asserts a Claim against Verizon for indemnification with respect to the Customer Claim Against Grantor (“Grantor Indemnification Claim”), then Customer shall indemnify, defend and hold harmless Verizon from and against such Grantor Indemnification Claim.
- 2.4 **Reservation of Rights.** Nothing in this Agreement shall be deemed to limit or prejudice any position a Party has taken or may take before a state utility commission, the FCC, any other state or federal regulatory or legislative bodies, courts of applicable jurisdiction or industry fora, except that this reservation of rights shall not be deemed to permit a Party to take any action that would otherwise constitute a breach of one of that Party’s obligations under this Agreement. The provisions of this Section 2.4 shall survive the expiration, cancellation or termination of the Agreement or this Service Attachment.
- 2.5 **Order of Precedence.** In the case of any inconsistency, the order of precedence shall be (1) the Order;



(2) this Service Attachment; and (3) the USSA. For purposes of the preceding sentence, the fact that one document addresses a matter not addressed by another document shall not be deemed a conflict.

3. FINANCIAL TERMS

3.1 **Monthly Recurring Charges (MRC), Non-recurring Charges (NRC).** Customer will pay MRCs and NRCs for Dark Fiber as specified in the applicable Order or change order.

3.2 **Early Termination Charges.** Unless otherwise set forth in the Order, if Customer terminates Dark Fiber after the Service Establishment Date but prior to the end of the initial Dark Fiber term or renewal period, as applicable, Customer shall pay an Early Termination Charge equal to 75% of the MRC that would have been payable for the terminated Dark Fiber for the remaining unexpired part of the initial Dark Fiber term, or renewal period, as applicable.

3.3 **Cancellation Charges.** If Customer cancels an Order prior to the Service Establishment Date, Customer will pay the Cancellation Charge set forth in Section 3.5 below.

3.4 **Fiber Outage Credits.** Subject to subsection (i) below, for any month in which the Dark Fiber experiences a Fiber Outage that continues for more than eight (8) hours after Customer's submission of a trouble ticket, Customer shall be entitled to a Fiber Outage credit equal to one month's MRC of the affected Dark Fiber. Customer must submit a written request to Verizon for any such credit within ninety (90) days after the date on which Customer submitted the trouble ticket for the applicable Dark Fiber, or else the credit is waived.

Exclusions. Notwithstanding anything in the Agreement to the contrary, Verizon's obligations under this Section 3.4 and Customer's right to receive Fiber Outage credits do not apply to the extent that a Fiber Outage occurred for any of the following reasons, or to the extent that Verizon could not cure a Fiber Outage for any of the following reasons:

- The acts or omissions of Customer or Customer's agents or contractors or a Third-Party Landlord's refusal to grant Verizon reasonable access to the Dark Fiber or Verizon System for maintenance, testing or repair.
- Fiber Outages for which the trouble ticket is closed by Verizon due to Customer inaction (e.g., where Verizon requests Customer verify whether Customer Equipment is causing the trouble and Customer fails to respond within twenty-four (24) hours).
- Scheduled maintenance and scheduled downtimes.
- Subsequent reports or trouble tickets (*i.e.*, additional inquiries on a reported and active open ticket) while the Fiber Outage is still pending;
- Fiber Outages repaired by Verizon prior to the Customer's submission of a trouble ticket;
- Fiber Outages caused by the Customer Equipment or facilities or by any power, service, systems or the like provided by the Customer or a Third-Party Landlord;
- Force Majeure events.

3.5 **Administrative Charges.** Administrative charges may apply under this Service Attachment, which will be calculated as follows:

Type	Occurrence	Charge
Administrative Charge	Charge Instance	NRC
Cancellation Charge	Per Dark Fiber	\$800
Pending Order Change	Per Dark Fiber	\$750
Expedite in United States	Per Dark Fiber	\$4,000



Dispatch Charge	NRC
During Normal Working Hours	\$265.00 per visit
Outside Normal Working Hours	\$400.00 per visit

- 3.5.1 **Cancellation Charge.** Applies when Customer requests Verizon to discontinue processing the Order prior to the Service Establishment Date.
- 3.5.2 **Pending Order Change** – Applies when a change to the Order is made during installation and requires a change in the design of the solution, Route, etc. including, more than one (1) visit to Customer Location because Customer was not available at the time scheduled.
- 3.5.3 **Expedite in United States Charge** – Applies if Customer requests expedited installation that modifies the Service Establishment Date.
- 3.5.4 **Dispatch Charge.** Applies when: (a) Verizon is dispatched to perform installation activities at a Customer Location, but the is unable to complete the installation because Customer does not provide necessary access or the Customer Location is not Room Ready despite Customer notifying Verizon of its readiness; (b) Customer reports a Fiber Outage, and Verizon dispatches to repair such Fiber Outage but find no fault with the Dark Fiber (*i.e.*, the cause of the reported condition was other than a Fiber Outage in the Dark Fiber); or (c) Verizon dispatches for scheduled maintenance, or unscheduled maintenance, but Customer does not provide necessary access to the Dark Fiber for Verizon to perform the repair or maintenance.
- 3.6 **Third Party Vendor Charges for Cross-Connection and Extended Wiring.** Customer will provide all Customer Equipment to connect Customer’s Location to the Demarcation of the Dark Fiber. If Customer’s Location is located at a data center or other facility owned by a third party and the third party does not permit Verizon to connect directly to Customer’s Location, and only permits a cross-connection from the Verizon Demarcation to Customer’s Location, and 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.

4. DARK FIBER SPECIFICATIONS

4.1 **FIBER AND CONNECTOR STANDARDS**

- 4.1.1 **Connector Standards.** Verizon uses LC connectors with a UPC polish. The loss value of any pigtail connector and any associated fiber jumper or pigtail with matching mode field diameters will not exceed 0.5dB at 1550 nm. The loss value of a connector and its associated jumper with mismatched mode field diameters should not exceed 0.8 dB.

Verizon will install a copper tracer wire in the same pathway as the Dark Fiber being installed when the pathway is on Customer’s property in locations where it deviates or is not utilizing Customer’s infrastructure.

- 4.1.2 **Fiber Type.** Dark Fiber meets G.652.D and G.657.A1 specs1.3.
- 4.1.3 **Fiber Labelling.** Verizon labels Dark Fiber at fiber terminations, fiber jumpers, and fiber pigtails clearly

with a label in indelible ink. The label includes the local fiber identifier and the far end fiber endpoint.

4.1.4 Field Splice Standards. All splices will be fusion splices. The objective for each splice is an averaged loss value of 0.25 dB or less when measured bi-directionally with an Optical Time-Domain Reflectometer (OTDR) at 1550 nm. If after 3 restoration splicing attempts, Verizon is not able to produce a loss value of 0.25 dB or less bi-directionally at 1550 nm, then 0.1 dB or less bi-directionally at 1550 nm will be acceptable.

4.1.5 Span Loss. The attenuation as measured by a light source and power meter will not exceed the following:

- Maximum Allowable Attenuation per Fiber Span = $(A * L) + (0.1 * N) + (0.5 * C)$
- A = 0.3 dB per Km (at 1550 nm)
- L = Optical length of cable measured in Kms (from OTDR trace)
- N = Number of splices in the span
- C = Number of mated connector pairs in the span. The connector loss will not exceed 0.1dB per mated pair.
- Total end to end loss (in dB) measured on the Dark Fiber must not exceed 0.25dB/Km*L.

4.1.6 Reflectance. The maximum reflectance per event on the Dark Fiber at 1550nm, as measured by an OTDR, will not exceed -27 dB. The total reflected power for all events on Dark Fiber spans greater than 20km at 1550nm will not exceed -24dB.

4.1.7 Chromatic Dispersion (CD). Chromatic dispersion measurements on fiber are taken for the reason of fiber-type identification. Well over 90% of all fibers in the metro plant is G.652D glass (standard single-mode), which has a CD value that is known well to be 16 – 17 picoseconds (ps)/km at 1550 nm.

4.1.8 Polarization Mode Dispersion. PMD is due to a birefringence set up in elliptical-core fiber. The birefringence in fiber was fixed in the fiber-draw process in 1992. All fibers manufactured after 1992 will not have a PMD issue. However, fibers purchased before this process could be sitting in cable yards for a couple of years before deployed. For this reason, PMD is a non-issue for cables deployed after 1994. PMD is distance dependent as well. Due to this dependence and the tolerances of PMD of the systems (10G PMD tolerance is 10 ps; 100G PMD tolerance is 15 ps, the following PMD recommendations are made:

PMD will only be measured in the following cases:

- For 10G: 1994 and older cables with a span length 50 km or longer
- For 100G: 1994 and older cables with a span length of 70 km or longer

4.1.9 Zero Dispersion Wavelength. The Zero Dispersion Wavelength will not fall between 1527 nm and 1567 nm.

4.1.10 Naming of Traces. OTDR traces taken for bi-directional testing, and the OTDR traces of the pigtail splice will be recorded electronically and provided to the customer. To name the traces, each party will provide alpha abbreviations for the sites. The 8-character file name plus 3-character file extension name should follow this example:

- First four letters = source point
- Letters 5, 6, 7= Destination point
- Letter 8 = wavelength
- Extension = Fiber number

Examples:



- Springfield to Lebanon at 1550 nm, Fiber 96 = sgfdlbn5.096
- Springfield to Monett pigtail trace at 1310nm on Fiber 1 = sgfdmntp.001

5. DEFINITIONS

Term	Definition
Customer Equipment	Any and all electronic, optronic, space, power, and other equipment, materials and facilities provided by and maintained by Customer as necessary to use and operate the Dark Fiber.
Customer Location	The “A” or “Z” end points of Dark Fiber
Customer Location Arrangements	Defined in Section 1.12.
Lease	Defined in Section 1.2.
Demarcation Point	The physical point at which the Dark Fiber terminates at a Customer Location.
Estimated Route Length	Verizon’s estimate of total linear length of the Dark Fiber.
Fiber Outage	Any damage to or failure of the Verizon System that interrupts Customer’s ability to transmit light through Dark Fiber. A Fiber Outage begins when Verizon is notified by the Customer via a trouble ticket of a Fiber Outage. A Fiber Outage continues until light can be transmitted through the affected Dark Fiber.
Relocation Costs	Verizon’s incremental costs (which may include one-time costs as well as recurring costs (e.g. recurring easement charges) that exceed the recurring costs that applied prior to the relocation) incurred to implement a relocation.
Room Ready	Customer Location is ready for Verizon to install the Dark Fiber, including the Customer providing required pathway, conduit and right-of-way on private property, building entrance, risers, space and access to the Customer Location, and any advance preparations identified by the Customer and Verizon at the initial site survey of the Customer Location.
Route	The actual route of the Verizon System within which a Dark Fiber Circuit is located, based on the Customer Locations identified in a Service Attachment.
Service Establishment Date	The date on which Verizon completes an Order for Dark Fiber and on which the initial Dark Fiber term and billing of MRCs for the Dark Fiber commences.
Third-Party Landlord	A building or property owner, governmental entity, or other third party that owns or controls a Customer Location or access to a Customer Location.
Transfer	Any direct or indirect transfer, sale, assignment, swap, exchange, lease, sublease, license, sublicense, resale, grant of infeasible or other rights of use in or to all or any part of the Customer’s interest, and any other arrangement between the Customer and another third party for such third party’s use of all or any part of the Dark Fiber.
Underlying Rights	All deeds, leases, covenants, conditions, easements, rights-of-way agreements, licenses, franchises, grants, bonds, mortgages and indentures, contracts, permits, reversionary rights, and other rights, permissions, titles and interests, whether or not of record, and the rights of tenants and licensees in possession to use real property of any third party,

	<p>which are necessary for the construction, placement, location, installation, operation, use, lease, rental, maintenance, repair or replacement of Dark Fiber or the Verizon System.</p>
Verizon System	<p>With respect to each Dark Fiber, the integrated multi-conduit and/or multi-ring fiber optic cable system comprised of innerducts and other conduit tubing, and/or the manholes, handholes, poles and the other facilities of the Verizon Network. As used here, "Verizon System" refers only to the multi-conduit and/or multi-ring fiber optic cable system owned, leased or controlled by Verizon and does not include any communications equipment, electronics, optronics or other facilities of Verizon or any other third party.</p>