



WINDSTREAM CARRIER SOLUTIONS:

Carrier Ethernet Services

ASR Ordering Guide
Version 5.4, June 2016

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Overview

The Carrier Ethernet (E-Access) product leverages Windstream's MPLS and Ethernet infrastructure to provide switched Ethernet services to wholesale customers. Wholesale service providers find Windstream's unique Carrier Ethernet services footprint to be a natural complement to their service delivery capabilities, and seamless interoperability is paramount to a ubiquitous service experience.

- Service attributes are based on the Metro Ethernet Forum Technical Specification "MEF 33 Ethernet Access Service Definitions".
- MEF 33 defines two service types, **E-Access EVPL (Ethernet Virtual Private Line)** which is a VLAN-based solution that supports service multiplexing at the UNI, and **E-Access EPL (Ethernet Private Line)** which is a Port based service that includes all-to-one bundling.

Service Types

E-Access EPL - A port based service with a high degree of transparency (Figure 1). As a transparent service there is no need to coordinate a detailed CE-VLAN ID to OVC mapping. All service frames at the UNI will be mapped to a single OVC; however, the S-VLAN ID at the E-NNI is preserved and will need to be coordinated.

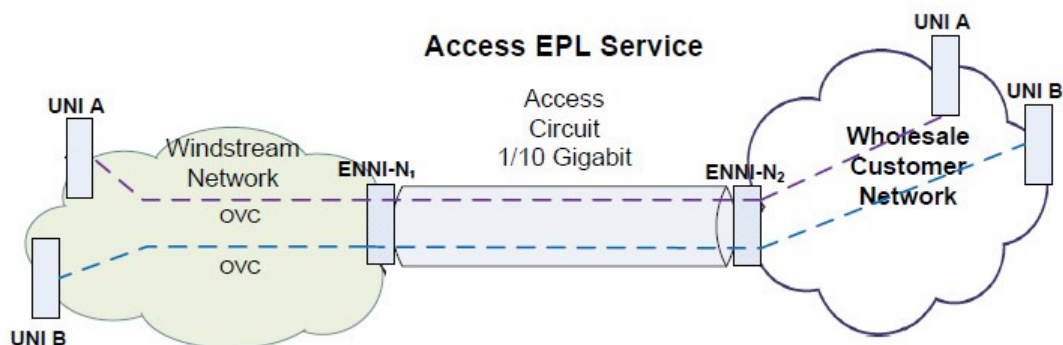


Figure 1



E-Access EVPL - A VLAN based service that allows multiple service instances to be configured at the UNI interface (Figure 2). This service will require an OVC endpoint map for each OVC to specify how service frames are mapped at the UNI. In addition, the S-VLAN ID value will need to be coordinated between Windstream and the Wholesale customer

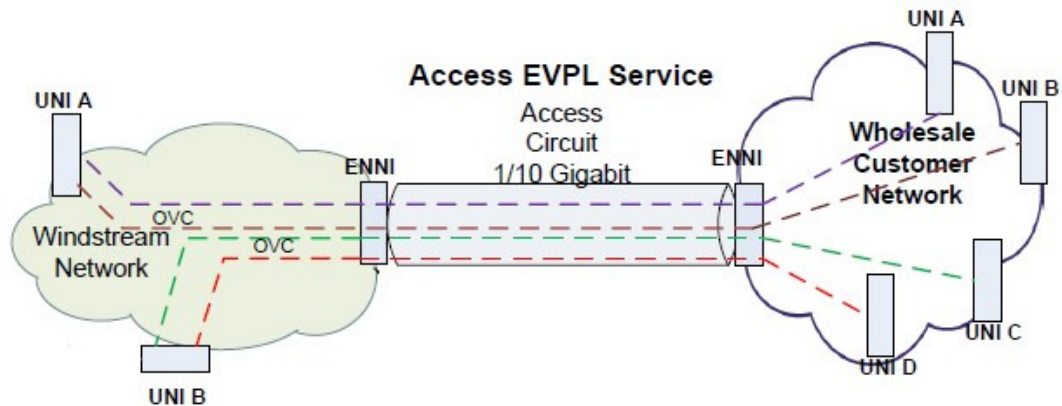


Figure 2

| | |
|--|--|
| Adheres to and supports industry standards | E-NNI Standard (MEF 26) |
| | UNI Access Specification (MEF 33) |
| | MEF 1.0 Certified |
| Supported ENNI Speeds | 1G & 10G |
| Supported ENNI Interface | Single mode fiber |
| Service Termination 1G ENNI | Overture 1400 |
| | Power Options: -48 VDC*, Dual |
| | *if +24 VDC or AC power is required please specify in the REMARKS section of the ASR |
| | 1 GigE Fiber Connectors: 1000BASE-LX |
| Service Termination 10G ENNI | Accedian MetroNODE 10G |
| | Power Options: -48 VDC, Dual |
| | 10 GigE Fiber Connectors: 10GBASE-LR |
| End-user bandwidth options | 3 Meg up to 1 Gig standard pricing |
| | <20 Meg leverages EoC |
| | >20 Meg based on fiber availability |



Peering Locations & Serving Markets

There are a number of pre-established peering locations for Carrier Ethernet services, designated by region served.

Northeast

New York
Pennsylvania
Ohio
West Virginia
Virginia
Massachusetts
Maryland
Maine
Rhode Island
New Jersey
Vermont
Connecticut
New Hampshire
Washington, DC
Delaware

East

North Carolina
South Carolina

Southeast

Georgia
Florida
Alabama
Mississippi
Tennessee

Midwest

Illinois
Indiana
Kentucky
Michigan
Iowa
Wisconsin
Minnesota

Southwest

Texas
New Mexico
Oklahoma
Arkansas
Louisiana
Missouri
(Southern)

Northwest

Nebraska
Kansas
Missouri (Northern)
South Dakota
North Dakota

West

California
Utah
Arizona
Colorado
Washington
Wyoming
Montana
Nevada
Oregon

- Each peering location has geographic service boundaries
- Peering locations serve designated markets
- Options for carrying traffic between peering locations are available

Contact your Account Management team for the most up to date list of interconnect locations and serving markets.



Pricing Structure

E-NNI

- Standardized E-NNI pricing for 1G and 10G
- Oversubscription is allowed but must be managed by the customer

UNI

- EoC and fiber loop options available
- Standardized pricing
- Inter-region fee allows a carrier to access end user locations outside of the serving area of a given peering point

E-NNI Extensions

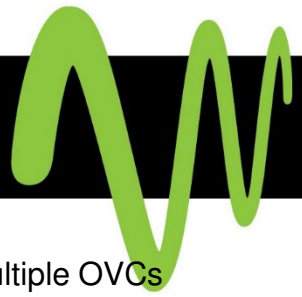
- Windstream can extend services from the E-NNI router location to an alternate location. Pricing is subject to ICB rates.

Ordering Overview

Carrier Ethernet E-Access can be ordered using Access Service Requests (ASRs), which will identify User Network Interface (UNI), E-Access Service Type, and the CIR requested for each customer interface.

At the current time, multiple SLA-driven Classes of Service (CoS) are not available. Any changes to the current product offering will be communicated through proper channels.

- **Physical Connection (UNI)** – Provides the physical connection from the customer premises to an Ethernet switch on the Windstream network. The available transmission interface types are 100 Mbps, 1 Gbps, and 10 Gbps.
 - Port-Based UNI – 10/100 Mbps & 1 Gbps and supports one OVC
 - VLAN-Based UNI – 10/100 Mbps & 1 Gbps and supports multiple OVCs



- VLAN-Based ENNI – 1 Gbps & 10 Gbps and supports multiple OVCs
- **Committed Information Rate (CIR)** – Specifies the bandwidth available over the UNI. CIR is available in increments from 3 Mbps to 10,000 Mbps.
- **Operator Virtual Circuit (OVC)** – Provides the logical connection for Ethernet traffic between the UNI and E-NNI.
 - OVCs are available from 3 Mbps to 1 Gbps

| Physical Connection | UNI OVCs | NNI OVCs |
|---------------------|--------------|----------------|
| 100 Mbps | Up to 8 OVCs | N/A |
| 1 Gbps | Up to 8 OVCs | Up to 128 OVCs |
| 10 Gbps | N/A | Up to 250 OVCs |

*over-subscription of the OVC is not supported

Expedites

Expedites are supported for Carrier Ethernet E-Access services and can be requested through the EXP field located on the Access Service Request (administration section). The expedite request can be up to 14 calendar days off of the standard interval and the expedite charge of \$1,000 will be billed regardless of whether Windstream can obtain the date requested.

Carrier Ethernet E-Access Standard Install Intervals

| Carrier Ethernet | | Standard Installation Intervals ¹ | |
|------------------|--------------|--|-------------------|
| Product Type | Circuit Type | ILEC | CLEC ² |
| E-Access EVPL | Ethernet | 63 days | 63-100 days |
| E-Access EPL | Ethernet | 63 days | 63-100 days |

* Intervals are based on calendar days, are averages by product, and begin upon order acceptance by Windstream

* Installation intervals as stated are targeted timeframes and are based on having existing facilities

* Orders pending facilities will result in an ICB installation interval

* Order Acknowledgment is 2 business days from submission of order to Windstream Carrier Service Delivery

¹ National holidays do not count as a calendar day

² Based upon average installation timeframes from underlying Carriers



ASR Requirements

In order to accurately provision and bill for Carrier Ethernet services, Windstream requires that all fields of the ASR be completed based on the most recent Telcordia standards.

The information that follows outlines the proper use of a subset of these required fields that are necessary to process an ASR for Windstream E-Access ENNIs, UNIs, and OVCs. If additional resources are needed, please contact Telcordia for formal ASR training or your Windstream Account Management team.

Note: The E-NNI circuit must be ordered prior to any UNI orders being submitted. In addition, the UNI must be ordered prior to the OVC/EVC since the OVC order must reference the appropriate E-NNI and UNI.

The following is a quick reference for the required form by service type.

| Order Type | ASR | SWITCHED ETHERNET SERVICE REQUEST (SESR) | EUSA | SALI | EVC |
|---------------|-----|--|------|------|-----|
| E-NNI | x | | x | x | |
| E-Access EVPL | x | x | | x | |
| E-Access EPL | x | x | | x | |
| OVC | x | | | | x |

An example ASR order layout for Carrier Ethernet services appears below.

| Example Orders | PON #1 | PON #2 |
|----------------|---------------------|---------------|
| ENNI | ASR-EUSA (E-NNI) | |
| E-Access EVPL | ASR-SESR-SALI (UNI) | ASR-EVC |
| E-Access EPL | ASR-SESR-SALI (UNI) | ASR-Transport |

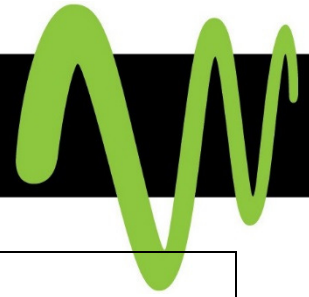
Note: Windstream does not support the Combo ASR form.



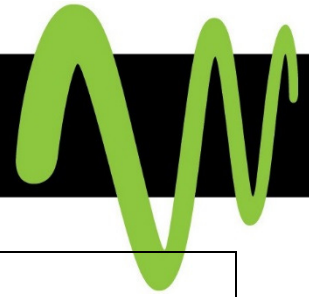
Access Service Request – Administrative Section

The Administration section contains information about the Windstream service being ordered. Associated fields on the ASR Administrative screen can be found below.

| Field | Description | Populate With / Usage |
|---------|--|--|
| CCNA | Customer Carrier Name Abbreviation – (3 Alpha Characters) | REQUIRED |
| PON | Purchase Order Number – Identifies the Customer's unique purchase order number for the request. (16 Alpha/Numeric characters) | REQUIRED |
| VER | Version Identification – Identifies the provider service center (4 Alpha/Numeric Characters) | REQUIRED Initial ASR Request = 00; if sending SUPP Then assign next number (Example: 01 then 02 then 03) |
| ICSC | Interexchange Customer Service Center – Identifies the provider service center (4 Alpha/Numeric Characters) | REQUIRED Valid entry: KD05 |
| D/TSENT | Date and Time Sent – Identifies the date and time that the ASR is sent by the Customer. (17 Alpha/ Numeric Characters including 3 hyphens) | REQUIRED – SYSTEM POPULATED |
| CBD | Call Before Dispatch – Identifies site operational availability in hours. | OPTIONAL |
| DDD | Desired Due Date – Identifies the Customer's Desired Due Date (10 Alpha/Numeric Characters). | REQUIRED Valid entry: YYYYMMDD Standard Intervals: ICB, capacity needed |
| PROJECT | Project Identification – Identifies the project which the request is to be associated. (16 Alpha/Numeric Characters) | OPTIONAL Note: Examples of the use of this field would be relating multiple Access Service Requests, previously negotiated orders, etc. |
| CNO | Project Identification – Identifies the quotation tracking number assigned by the provider in response to a provisioning arrangement inquiry, e.g., diversity. (12 Alpha/Numeric Characters). | CONDITIONAL Valid entry: Customer to enter the quote ID provided for ICB based pricing. Note: For non-MSA products |
| REQTYP | Requisition Type and Status – Identifies the type of service being requested and the status of the request (2 Alpha Characters). | REQUIRED Valid entries: REQTYP = SD (Special Access) REQTYP = ED (End-User Request) |
| ACT | Activity – Identifies the activity involved in | REQUIRED |



| | | |
|------|---|---|
| | the service request. (1 Alpha Character) | Valid entries: N = New D = Disconnection C = Change or Modify existing service |
| RTR | Response Type Requested – Identifies the type of confirmation response requested by the customer. (2 Alpha/ Numeric Character). | REQUIRED Valid entry: F = Send FOC only |
| QSA | Quantity Service Address Location Information – Identifies the total number of Service Address Location Information Forms being sent by the customer. (2 Numeric Characters) | REQUIRED Example: 01 Note: Prohibited when EVCI = A, leave field blank. |
| EVCI | Ethernet Virtual Connection Indicator – Identifies that an Ethernet Virtual Connection Form is associated with this service request. (1 Alpha Character) | REQUIRED Valid entries: A = EVC form attached |
| EXP | Expedite -- Indicates that expedited treatment is requested and any charges generated in provisioning this request will be accepted | CONDITIONAL Valid entries Y (yes) Applicable charges |
| CUST | Customer Name – Identifies the name of the customer who originated this request. | REQUIRED |
| CKR | Customer Circuit Reference – Identifies the circuit number or range of circuit numbers used by the customer. | REQUIRED Valid entry: C |
| UNIT | Unit Identification – Identifies whether the Quantity (QTY) field contains number of circuits, ring segments, Busy Hour Minutes of Capacity (BHMC) for switched access service or percent of market share. | REQUIRED |
| PIU | Percentage of Interstate Usage – Identifies the expected Interstate Usage for the access service for the request. (3 Alpha/Numeric Characters) | REQUIRED Valid entry: 100 |
| QTY | Quantity – Identifies the quantity involved in the service request | REQUIRED Example: 0000001 |
| SPEC | Service and Product Enhancement Code – Identifies a specific product or service offering. (5 Alpha/Numeric Characters , 7 Alpha/Numeric Characters) | REQUIRED Valid Entries: AEVPL – E_Access EVPL AEPLX – E_Access EPL |
| BAN | Billing Account Number – Identifies the billing account to which the recurring and non-recurring charges for this request will be billed. | REQUIRED Valid entry: E |
| ACTL | Access Customer Terminal Location – Identifies the CLLI code of the Customer | REQUIRED |



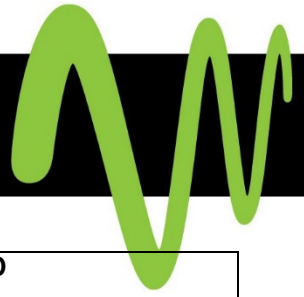
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| | Facility terminal location. (11 Alpha/ Numeric Characters) | |
| RPON | Related Purchase Order Number – Identifies the PON of a related Access Service Request. RPON and Remarks should be used to associate new ports to an existing service. | Optional |
| EU | End User Indicator -- Identifies the primary location as an end user | REQUIRED Valid Entry: Y |
| REMARKS | Remarks – Identifies a free flowing field, which can be used to expand upon and clarify other data on this request. (186 Alpha/Numeric Characters) | REQUIRED Valid entry: Additional clarifying information |



Access Service Request – Bill Section

The billing section is required to insure the accuracy of the billing data. These fields are order-specific and are not required on subsequent revisions unless changes are being made to what was originally requested.

| Field | Description | Populate With / Usage |
|---------------|---|-----------------------|
| BILLNM | Billing Name - Identifies the name of the person, office, or company to whom the customer has designated that the bill be sent. | REQUIRED |
| SBILLNM | Secondary Billing Name – Identifies the name of a department or group within the designated BILLNM entry (25 Alpha/ Numeric Characters) | OPTIONAL |
| ACNA | Access Customer Name Abbreviation - Identifies the common language code for the Customer who should receive the bill for the ordered service (3 Alpha Characters) | REQUIRED |
| TE | Tax Exemption – Identifies that the customer has submitted a tax exemption form to the provider. | REQUIRED |
| FUSF | Federal Universal Service Fee – Identifies the service being ordered on this request should be either assessed or exempted from the Federal Universal Service Fee (FUSF) | REQUIRED |
| STREET | Street Address (Bill) – Identifies the street of the billing address associated with the billing name. (25 Alpha/Numeric Characters) | REQUIRED |
| ROOM | Room (Bill) – Identifies the room for the billing address associated with the billing name (6 Alpha/Numeric Characters) | REQUIRED |
| CITY | City (Bill) – Identifies the city, village, township of the billing address associated with the billing name (25 Alpha/Numeric Characters) | REQUIRED |
| STATE | State (Bill) – Identifies the two character postal code for the state of the billing address associated with the billing name (2 Alpha Characters) | REQUIRED |
| ZIP CODE | Zip Code (Bill) – (12 Alpha/Numeric Character) | REQUIRED |
| BILLCON | Billing Contact (Bill) – (15 Alpha/Numeric Characters) | REQUIRED |
| TEL NO | Telephone Number (Bill) Contact – (17 Numeric Characters- including 3 preprinted hyphens) | REQUIRED |
| BILLCON EMAIL | Billing Contact Electronic Mail Address (Bill) – Identifies the electronic mail address of the Billing Contact when a customer profile does not already exist. | REQUIRED |



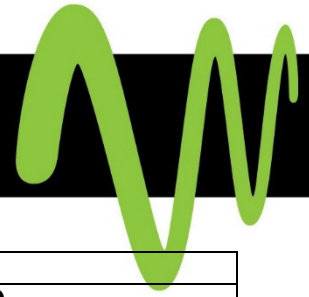
| | | |
|-----|---|-----------------|
| VTA | Variable Term Agreement (Bill) – Identifies the duration, contract date or contact identification number of any variable term agreement that may be offered by a provider. | REQUIRED |
|-----|---|-----------------|

Access Service Request – Contact Section

The contact section contains the relevant contact information for the person initiating the order with Windstream.

| Field | Description | Populate With / Usage |
|-------------|---|-----------------------|
| INIT | Initiator - Identifies the Customer's employee who originated the request. (15 Alpha/Numeric Characters) | REQUIRED |
| TEL NO | Telephone Number (INIT) – Identifies the telephone number of the number of Customer's employee who originated the request. (17 Numeric Characters- including 3 preprinted hyphens) | REQUIRED |
| INIT FAX NO | Initiator Fax Number (INIT) – Identifies the fax number of the initiator. (12 Numeric Characters- including 2 preprinted hyphens) | REQUIRED |
| INIT EMAIL | Initiator Electronic Mail Address (INIT) – Identifies the electronic mail address of the Initiator. (60 Alpha/Number Characters) | REQUIRED |
| DSGCON | Design/Engineering Contact Information – Identifies the employee of the Customer or agent who should be contacted on the design/engineering matters and to whom the DLR may be sent. (15 Alpha Numeric Characters) | REQUIRED |
| TEL NO | Telephone Number (DSGCON) – Identifies the telephone number of the Customer's employee who should be contacted on design/engineering matters. (17 Numeric Characters- Including 3 preprinted hyphens) | REQUIRED |
| DSG FAX NO | Design Fax Number (DSGCON) – Identifies the fax number on the design contact. (12 Numeric Characters- including 2 preprinted hyphens) | REQUIRED |
| DSG EMAIL | Electronic Mail Address (DSGCON) – Identifies the electronic mail address of the DSGCON. (60 Alpha/Numeric Characters) | REQUIRED |
| STREET | Street Address (DGSCON) – Identifies the street address for the design/ engineering contact. (25 Alpha/Numeric Character) | REQUIRED |
| FL | Floor (DSGCON) – Identifies the floor of the design/engineering contact's address. (3 Alpha/Numeric Characters) | REQUIRED |

| | | |
|------|---|-----------------|
| CITY | City (DSGCON) – Identifies the city of the design/engineering contact's address. (25 | REQUIRED |
|------|---|-----------------|

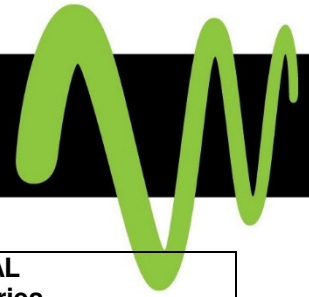


| | | |
|---------|---|-----------------|
| | Alpha/Numeric Characters) | |
| STATE | State (DSGCON) – Identifies the two character postal code for the state/province of the design/engineering contact's location | REQUIRED |
| ZIPCODE | Zip Code (DSGCON) – Identifies the zip code or postal code of the design/ engineering contact's address | REQUIRED |
| IMPCON | Implementation Contact – Identifies the Customer's employee who is responsible for control of installation and completion. (15 Alpha/Numeric Characters) | REQUIRED |
| TEL NO | Telephone Number (IMPCON) – Identifies the telephone number of the implementation contact. (17 Numeric Characters- including 3 preprinted hyphens) | REQUIRED |

Switched Ethernet Services Request

Information provided on this form is for ordering the special access UNI. In the context of E_Access, the End User Special Access UNI is ordered between the end user location and the E-NNI.

| Field | Description | Populate With / Usage |
|--------|--|--|
| NC | Network Channel – Identifies the Network Channel (NC) code for the circuit (s) involved. The NC code describes the channel provided by Windstream from the End User's location. Four (4) Alpha/Numeric character The NC also describes portions of a circuit: ACTL to HUB HUB to HUB HUB to End User's Location | REQUIRED See Service Codes Section |
| NCI | Network Channel Interface Code – Identifies the electrical conditions on the circuit at the Primary Location. Five (5) Alpha/Numeric characters minimum, and twelve (12) Alpha/Numeric maximum. | REQUIRED |
| SECNCI | Secondary Network Channel Interface – Identifies the electrical conditions on the circuit at the secondary ACTL or end user location. Five (5) Alpha/Numeric characters minimum, and twelve (12) Alpha/Numeric maximum. | REQUIRED |
| ESP | Ethernet Service Point - Identifies the Ethernet switching point, terminating equipment or terminating location, in CLLI code format, at the UNI/ENNI termination. | REQUIRED |
| L2CP | LAYER 2 CONTROL PROTOCOL – Identifies a set of protocols that are used for various control purposes that allow the Ethernet network to effectively process information for subscribers who chose to deploy 802.1Q bridges. | CONDITIONAL |



| | | |
|-----------|---|---|
| L2CP-ADDR | Layer 2 Control Protocol Address Set - Identifies the discard/pass action for all non-peered layer two control protocols | OPTIONAL Valid Entries CTA = CVLAN Tag Aware CTB = CVLAN Tag Blind CTB-2 = CVLAN Tag blind option 2 |
| WACD1 | Work Authorization Circuit Detail -- Required when the service being ordered is cross-connected to an existing service of equal value and the CC field OR WST field on the ASR form is populated and the first position of the LTP field on the ASR from is "B", "C", "D", "E", "L" or "M" | Valid Entries 36 alpha/numeric characters |
| | | |

Service Address Location Information Form

The Service Location Information Form (SALI) must be provided to accurately reflect the service address information

| Field | Description | Populate With / Usage |
|--------|---|---|
| PI | Primary Location Indicator - Identifies that the service address location information being provided is a primary location | CONDITIONAL - Required when Request Type begins with E and location is the Primary. Should not be used for the End User (Z) location Valid entry: Y = Yes |
| EUNAME | End User Name - Identifies the end user name associated with the termination location. (25 alpha/numeric characters) | REQUIRED Example: ABC CORPORATION |
| NCON | New Construction - Identifies that the service address is a new construction. (1 alpha character) | OPTIONAL Valid entry: Y = Yes |
| SAPR | Address Number Prefix - Identifies the prefix for the address number of the service address. (6 alpha/numeric characters) | OPTIONAL Example: 50 W is the address number prefix for 50W 100 1/2 SW Main Street NW, Floor 5, Wing 2, Suite 10A |
| SANO | Address Number - Identifies the number of the service address. (10 alpha/numeric characters) | REQUIRED Example: 1000 is the address number for 50W 100 1/2 SW Main Street NW, Floor 5, Wing 2, Suite 10A |
| SASF | Address Number Suffix - Identifies the prefix for the address number of the service | OPTIONAL |



| | | |
|---------------|---|---|
| | address. (4 alpha/numeric characters) | Example: 1/2 is the address number suffix for 50W 100 1/2 SW Main Street NW, Floor 5, Wing 2, Suite 10A |
| SASD | Street Directional Prefix - Identifies the street directional prefix for the service address. (2 alpha characters) | OPTIONAL Valid entry: N, S, E, W, NE, NW, SE, SW Example: SW is the street directional prefix for 50W 100 1/2 SW Main Street NW, Floor 5, Wing 2, Suite 10A |
| SASN | Street Name - Identifies the street name of the service address. (60 alpha/numeric characters) | REQUIRED |
| SATH | Street Type - Identifies the thoroughfare portion of the street name of the service address. (7 alpha/numeric characters) | REQUIRED |
| LD1, LD2, LD3 | Location Designators - Identifies additional specific information related to the service address (e.g., building, floor, room). (4 alpha characters) | OPTIONAL |
| LV1, LV2, LV3 | Location Values - Identifies the value associated with the first location designator of the service address. (10 alpha/numeric characters) | OPTIONAL |
| CITY | City - Identifies the city, village, township, etc. of the service address. (32 alpha/numeric characters) | REQUIRED |
| STATE | State - Identifies the state/province of the service address. (2 alpha characters) | REQUIRED |
| ZIP | ZIP/Postal Code - Identifies the ZIP code, ZIP code + extension or postal code of the service address. (12 alpha/numeric characters) | REQUIRED |
| AAI | Additional Address Information - Identifies additional location information about the service address. (150 alpha/numeric characters) | OPTIONAL Examples: Specific Access Hours, Availability, Contact Notification Requirements, Specific Access Requirements |
| JS | Jack Status - Indicates whether the access service is to terminate at a new or existing registered jack or demarc. (1 alpha character) | REQUIRED – When ACT Type is N Valid entry: F |
| LCON | Local Contact - Identifies the local contact name for access. (15 alpha/numeric characters) | REQUIRED |
| ACTEL | Access Telephone Number - Identifies the telephone number to be used for the purpose | REQUIRED |

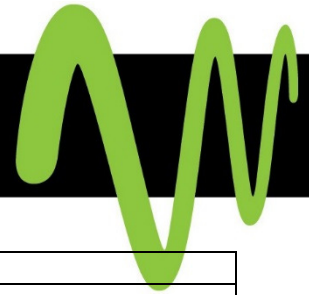


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| | location for installation purposes. (14 numeric characters (excluding 3 preprinted hyphens)) | |
| LCON EMAIL | Local Contact Email Address - Identifies the electronic mail address of the local contact. (60 alpha/numeric characters) | REQUIRED |
| OFC | Optical Fiber Connector -- Optional when the JS field is "D" or blank, PI field is Y, and the NCI field on the service specific form specifies and optical hand-off. | CONDITIONAL Valid Entry: 14 alpha/numeric characters |

Access Service Request – Transport Request

The Special Access Request Screens must be provided for services that terminate to a common carrier POP.

| Field | Description | Populate With / Usage |
|--------|--|--|
| NC | Network Channel – Identifies the Network Channel (NC) code for the circuit (s) involved. The NC code describes the channel provided by Windstream from the End User's location. Four (4) Alpha/Numeric The NC also describes portions of a circuit: ACTL to HUB HUB to HUB HUB to End User's Location | REQUIRED See Service Codes Section |
| NCI | Network Channel Interface Code – Identifies the electrical conditions on the circuit at the Primary Location. Five (5) Alpha/Numeric characters minimum, and twelve (12) Alpha/Numeric maximum | REQUIRED See Service Codes Section |
| SECNCI | Secondary Network Channel Interface – Identifies the electrical conditions on the circuit at the secondary ACTL or end user location. Five (5) Alpha/Numeric characters minimum, and twelve (12) Alpha/Numeric maximum | REQUIRED |
| CFA | Connecting Facility Assignment – Identifies the provider carrier system and channel to be used from a Wideband Analog, High Capacity or Optical Network facility when the customer has assignment control. (42) Alpha/Numeric | CONDITIONAL |



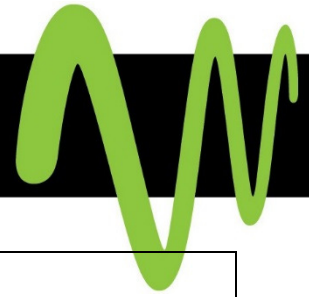
| | | |
|-----------|--|---|
| | characters | |
| L2CP | LAYER 2 CONTROL PROTOCOL – Identifies a set of protocols that are used for various control purposes that allow the Ethernet network to effectively process information for subscribers who chose to deploy 802.1Q bridges. | CONDITIONAL |
| L2CP-ADDR | Layer 2 Control Protocol Address Set - Identifies the discard/pass action for all non-peered layer two control protocols | OPTIONAL Valid Entries CTA = CVLAN Tag Aware CTB = CVLAN Tag Blind CTB-2 = CVLAN Tag blind option 2 |
| SCFA | Secondary Connecting Facility Assignment – Identifies the provider carrier system and channel to be used from a Wideband Analog, High Capacity or Optical Network facility for a thru-connect configuration when the customer has assignment control. (42) Alpha/Numeric characters | CONDITIONAL |
| GETO | General Exchange Tariff Options Code – Identifies the requirement for non-tariff or secondary tariff options in conjunction with the access service and special arrangements (third party billing). One (1) Alpha characters | OPTIONAL Valid entries: Blank = No option Y = Provide inside wiring and bill End User Customer directly. |
| SECLOC | Secondary Location – Identifies the terminating end of the circuit, a provider end office or first point of switching for the circuit being provided. Eleven (11) Alpha/Numeric characters | REQUIRED Populate with the 11-digit CLLI for the associated ENNI location. |
| SR | Special Routing Code – Identifies the type of special routing requested. Three (3) Alpha/Numeric characters | CONDITIONAL |
| SEI | Switched Ethernet Indicator – Identifies this request is ordering UNI/ENNI Interface to provider owned Ethernet switch/router. One (1) Alpha characters | OPTIONAL Valid entry: Y = Ordering a UNI/ENNI Ethernet Switch |
| REMARKS | Remarks – Identifies a free flowing field which can be used to expand upon and clarify other data on this form. Up to 125 Alpha/Numeric characters | OPTIONAL |



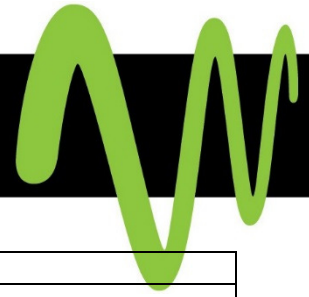
Ethernet Virtual Connection

The Ethernet Virtual Connection form (EVC) must be completed to provide specific detail in regards to the ordering and provisioning of the 'EVC'. The term EVC is to be interpreted as the 'OVC' Operator Virtual Connection

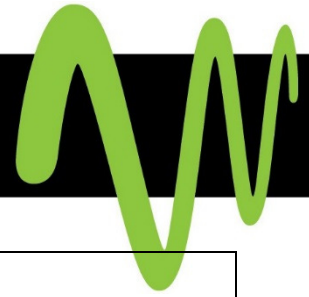
| Field | Description | Populate With / Usage |
|---------|--|--|
| CCNA | Customer Carrier Name Abbreviation – (3 Alpha Characters) | REQUIRED |
| PON | Purchase Order Number – Identifies the Customer's unique purchase order number for the request. (16 Alpha/Numeric characters) | REQUIRED |
| VER | Version Identification – Identifies the customer version number | REQUIRED Initial ASR Request = 00; if sending SUPP Then assign next number (Example: 01 then 02 then 03) |
| ASR NO | Access Service Request Number – Identifies the number that may be generated by the provider to identify a customer's request. | Optional |
| EVC NUM | Ethernet Virtual Connection Reference Number – Identifies a unique number associated with the Ethernet Virtual Connection. The EVC number is customer assigned and is returned on the confirmation notice to the ordering customer. | Required |
| NC | Network Channel – Identifies the Network Channel (NC) code for the circuit (s) involved. The NC code describes the channel provided by Windstream from the End User's location. Four (4) Alpha/Numeric character The NC also describes portions of a circuit: ACTL to HUB HUB to HUB HUB to End User's Location | REQUIRED See Service Codes Section |
| EVCID | Ethernet Virtual Connection Identifier – Identifies the provider assigned EVC identifier | OPTIONAL 28 alpha/numeric characters |
| NUT | Number of UNI/ENNI Terminations – Reflects the number of UNI/ENNI termination occurrences being affected by the service request | CONDITIONAL Valid Entry: 01-20 |
| SVP | SVLAN ID PRESERVATION - Identifies that the customer is requesting S-VLAN ID preservation on a requested OVC | CONDITIONAL |



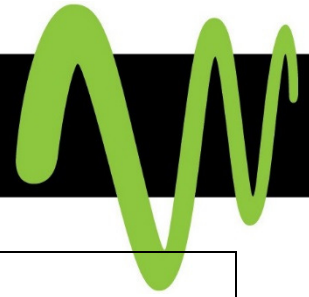
| | | |
|--------|--|--|
| EVCKR | ETHERNET VIRTUAL CONNECTION CUSTOMER CIRCUIT REFERENCE – Identifies the circuit number used by the customer | OPTIONAL |
| UREF | USER NETWORK INTERFACE (UNI) REFERENCE NUMBER – Identifies the reference number associated to the UNI port or ENNI termination point to which the EVC mapping requirements will be applied | CONDITIONAL |
| EI | ENNI INDICATOR – Identifies when the UREF is an ENNI | CONDITIONAL |
| AUNT | ASSOCIATED UNI/ENNI TERMINATION – Identifies the UREF termination point associated with the physical port being requested on the ASR | CONDITIONAL |
| UACT | USER NETWORK INTERFACE (UNI) ACTIVITY INDICATOR – Identifies the activity that is taking place at this UNI/ENNI termination point | CONDITIONAL |
| RPON | RELATED PURCHASE ORDER NUMBER – Identifies the PON of a related Access Service Request | CONDITIONAL |
| NCI | Network Channel Interface Code – Identifies the electrical conditions on the circuit at the Primary Location. Five (5) Alpha/Numeric characters minimum, and twelve (12) Alpha/Numeric maximum | REQUIRED See Service Codes Section |
| BUM-FD | Broadcast, Unicast, and Multicast Frame Delivery – Identifies the service frame delivery disposition for broadcast, unicast, and multicast service frames outside of the provider's specified throttling defaults for those providers who bill and/or provision at the port level | CONDITIONAL Valid Entries; C = Conditional D = Discard U = Unconditional |
| EVCS | ETHERNET VIRTUAL CONNECTION SWITCH POINT – Identifies the Ethernet Switching point, CLLI code format, at the UNI/ENNI termination | CONDITIONAL |
| RUID | RELATED UNI IDENTIFIER – Identifies the provider's related circuit ID for a UNI or ENNI against the | CONDITIONAL |
| R/L | ROOT/LEAF – Indicates that the UNI is either a root or a leaf in a rooted multi-point EVC. | CONDITIONAL |
| S-VACT | SERVICE VIRTUAL LOCAL AREA NETWORK ACTIVITY – Identifies the activity requested for the S-VLAN | CONDITIONAL |
| S-VLAN | SERVICE VIRTUAL LOCAL AREA NETWORK – The identifier found within the service tag which is typically associated with | CONDITIONAL |



| | | |
|---------|--|---|
| | the OVC end points at an ENNI. | |
| EVCMPID | EVC MEET POINT ID – Specifies the physical facility ID interconnecting the two service providers in an EVC meet point configuration. | CONDITIONAL |
| CEV-P | CE VLAN Identification Preservation - Identifies if the VLAN ID portion of the customer edge VLAN tag is preserved | OPTIONAL Valid Entries: E = Enabled D = Disabled |
| CEV-CP | CE VLAN Class of Service Preservation – identifies the VLAN Class of Service (CoS) portion of the customer edge VLAN tag is preserved. | OPTIONAL Valid Entries: E = Enabled D = Disabled |
| MSFS | UNI Maximum Service Frame Size - Indicates the maximum service frame size (in bytes) allowed at the UNI. | OPTIONAL |
| OTC | OTHER EXCHANGE COMPANY – Identifies the EC or Company Code of the network facing switch of the provider in an EVC Meet Point service arrangement | CONDITIONAL |
| ASN | AUTONOMOUS SYSTEM NUMBER – Indicates the unique number identifying the customer Internet network ordering the BGP service. | CONDITIONAL |
| VPN-ACT | VIRTUAL PRIVATE NETWORK IDENTIFIER ACTIVITY – Identifies the activity requested for the VPN-ID | CONDITIONAL |
| VPN-ID | VIRTUAL PRIVATE NETWORK IDENTIFIER – Indicates a unique identifier for the virtual private network that creates a secure network connection over a public network. | CONDITIONAL |
| VACT | CUSTOMER EDGE VIRTUAL LOCAL AREA NETWORK ACTIVITY INDICATOR – Identifies the activity requested for the CE-VLAN | CONDITIONAL |
| CE-VLAN | CUSTOMER EDGE VIRTUAL LOCAL AREA NETWORK INDICATOR – An identifier derivable from a content of a service frame that allows the service frame to be associated with an EVC at the UNI. | CONDITIONAL |
| LREF | LEVEL OF SERVICE REFERENCE NUMBER – Identifies the reference number associated with the level of service mapping configuration being requested | CONDITIONAL |
| LOSACT | LEVEL OF SERVICE ACTIVITY INDICATOR – Identifies the activity for the level of service at this UNI termination occurrence. | CONDITIONAL Valid entries C = Change D = Disconnect K = Cancel N = New |



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| LOS | LEVEL OF SERVICE NAME – Identifies a name for a provider defined level of service performance associated with the Ethernet product offering. | REQUIRED Valid Entries Standard Data |
| SPEC | SERVICE AND PRODUCT ENHANCEMENT CODE – Identifies a specific product or service offering | CONDITIONAL |
| P-BIT | PRIORITY BIT – An optional parameter within the Ethernet frame to specify priority. In this application it will be used to map certain traffic to a given level of service on an EVC when the provider supports multiple level of service per EVC | NOT SUPPORTED |
| BDW | BANDWIDTH – Identifies the average rate in bits per second of ingress service frames up to which the network delivers frames and meets the performance objectives defined by the LOS service attribute | CONDITIONAL |
| DSCP | DIFFERENTIATED SERVICES CODE POINT – Identifies an integer value encoded in the DiffServ field of an IP header | CONDITIONAL |
| TOS | TYPE OF SERVICE – Identifies the quality of service desired | CONDITIONAL |
| CIR-I | Committed Information Rate (Ingress) - Identifies the average rate (bits per second) up to which service frames are delivered as defined in the provider's service level specifications. | CONDITIONAL Valid CIR expressed as a numeric value followed by "K", "M", or "G" representing Kilobits, Megabits, or Gigabits respectively |
| CBS-I | Committed Burst Size (Ingress) - Identifies the bandwidth profile parameter that limits the maximum number of bytes available for a burst of service frames sent at the UNI/ENNI that will be delivered by the service provider based on the level of service performance. | CONDITIONAL Maximum committed burst size value (numeric value expressed in bytes) |
| EIR-I | Excess Information Rate (Ingress) – Identifies the average rate (bits per second) up to which service frames may be delivered but will not be guaranteed per the provider's service level specifications. | CONDITIONAL Valid EIR expressed as a numeric valued followed by "K", "M", or "G" representing Kilobits, Megabits, or Gigabits respectively. |
| EBS-I | Excess Burst Size (Ingress) – Identifies the bandwidth profile parameter that limits the maximum number of bytes available for a burst of service frames associated with the EIR-I sent at the UNI/ENNI that will be delivered by the service provider based on the level of service performance. | CONDITIONAL Maximum excess burst size value (numeric value expressed in bytes) |



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|---------|--|--|
| CMI-I | Color Mode Identifier – Identifies when the provider configuration will use the specific customer Class of Service (CoS) markings when applying the bandwidth profile CIR/EIR | CONDITIONAL Valid Entries: E = Enable Color Aware D = Disable Color Aware (change to color-blind mode) |
| BFC-I | Bandwidth Coupling Flag (ingress)- Identifies when color-aware markings for a customer marked service frame EIR traffic should use available CIR Bandwidth | CONDITIONAL Valid Entries: E = Enabled D = Disabled |
| EPS | Engress Profile Selection - Identifies the traffic allocation exiting the Provider Edge (PE) device and being delivered to the customer's router. | OPTIONAL Valid Entries 30 alpha/numeric characters |
| Remarks | Remarks – Identifies a free flowing field which can be used to expand upon and clarify other data on this form. Up to 125 Alpha/Numeric characters | OPTIONAL |

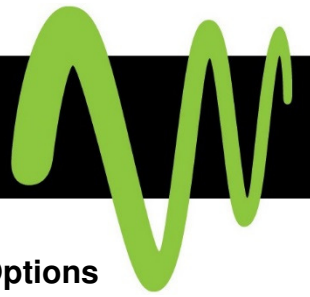


Service Codes

E Access EVPL

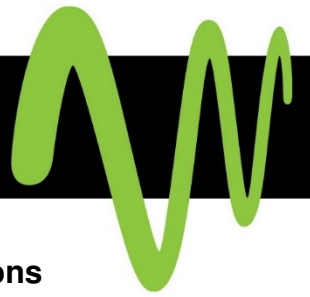
Ethernet 100 Mbps UNI (Electrical/Based T Port) - VLAN Based with CIR Options

| NC | Port CIR Speed (4 TH Position) | Permissible NCI/SECNCI Options |
|------|--|--|
| KQEK | 2 Mbps | <u>NCI Electrical Interface</u> 04LN9.1CT (100 Base T) <u>SECNCI</u> 02CXF.1GE (Central Office) |
| KQEN | 3 Mbps | |
| KQEL | 4 Mbps | |
| KQEJ | 5 Mbps | |
| KQEP | 6 Mbps | |
| KQEM | 8 Mbps | |
| KQE1 | 10 Mbps | |
| KQEA | 15 Mbps | |
| KQE2 | 20 Mbps | |
| KQEB | 25 Mbps | |
| KQE3 | 30 Mbps | |
| KQEC | 35 Mbps | |
| KQE4 | 40 Mbps | |
| KQED | 45 Mbps | |
| KQE5 | 50 Mbps | |



Ethernet 1 Gbps UNI/E-NNI (Optical Port) - VLAN Based with CIR Options

| NC | Port CIR Speed (4 TH Position) | Permissible NCI/SECNCI Options |
|------|--|--|
| KRF2 | 2 Mbps | <p><u>NCI Electrical Interface</u> 08LN9.1GE (1000 Base T)</p> <p><u>NCI Optical Interfaces</u> 02LNF.A02 (1000 Base LX) 02LNF.A04 (1000 Base SX) 02QBF.K02 (Collocation/1000 Base)</p> <p><u>SECNCI</u> 02CXF.1GE (Central Office)</p> |
| KRF3 | 3 Mbps | |
| KRF4 | 4 Mbps | |
| KRFA | 5 Mbps | |
| KRF6 | 6 Mbps | |
| KRF8 | 8 Mbps | |
| KRFB | 10 Mbps | |
| KRFC | 15 Mbps | |
| KRFD | 20 Mbps | |
| KRFE | 25 Mbps | |
| KRFF | 30 Mbps | |
| KRFG | 35 Mbps | |
| KRFH | 40 Mbps | |
| KRFI | 45 Mbps | |
| KRFJ | 50 Mbps | |
| KRE1 | 100 Mbps | |
| KREB | 150 Mbps | |
| KRE2 | 200 Mbps | |
| KREA | 250 Mbps | |
| KRE3 | 300 Mbps | |
| KRE4 | 400 Mbps | |
| KRE5 | 500 Mbps | |
| KRE6 | 600 Mbps | |
| KRE7 | 700 Mbps | |
| KRE8 | 800 Mbps | |
| KRE9 | 900 Mbps | |
| KRE0 | 1000 Mbps (1 Gbps) | |



Ethernet 10 Gbps ENNI (Optical Port) - VLAN Based with CIR Options

| NC | Port CIR Speed (4 TH Position) | Permissible NCI/SECNCI Options |
|------|---|---|
| | | <u>NCI Optical Interfaces</u> |
| KSE1 | 1000 Mbps | 02LNF.A02 (10G Base LR SMF/10000 Base ZX) |
| KSE- | 10000 Mbps | 02LNF.A04 (10G Base SR) |
| | | 02QBF.K02 (Collocation/1000 Base) |
| | | <u>SECNCI</u> |
| | | 02CXF.10G (Central Office) |



E Access EPL

Ethernet 100 Mbps UNI (Electrical/Based T Port) – Port Based with CIR Options

| NC | Port CIR Speed (4 TH Position) | Permissible NCI/SECNCI Options |
|------|--|---|
| KQAJ | 2 Mbps | <p><u>NCI Electrical Interface</u> 04LN9.1CT (100 Base T)</p> <p><u>SECNCI</u> 02CXF.1GE (Central Office)</p> |
| KQAP | 3 Mbps | |
| KQAK | 4 Mbps | |
| KQAM | 5 Mbps | |
| KQAN | 6 Mbps | |
| KQAL | 8 Mbps | |
| KQA1 | 10 Mbps | |
| KQAA | 15 Mbps | |
| KQA2 | 20 Mbps | |
| KQAB | 25 Mbps | |
| KQA3 | 30 Mbps | |
| KQAC | 35 Mbps | |
| KQA4 | 40 Mbps | |
| KQAD | 45 Mbps | |
| KQA5 | 50 Mbps | |



Ethernet 1 Gbps UNI (Optical Port) - Port Based CIR Options

| NC | Port CIR Speed (4 TH Position) | Permissible NCI/SECNCI Options |
|------|--|---|
| KRB2 | 2 Mbps | <p><u>NCI Electrical Interface</u> 08LN9.1GE (1000 Base T)</p> <p><u>NCI Optical Interfaces</u> 02LNF.A02 (1000 Base LX) 02LNF.A04 (1000 Base SX) 02QBF.K02 (Collocation/1000 Base)</p> <p><u>SECNCI</u> 02CXF.1GE (Central Office)</p> |
| KRB3 | 3 Mbps | |
| KRB4 | 4 Mbps | |
| KRBA | 5 Mbps | |
| KRB6 | 6 Mbps | |
| KRB8 | 8 Mbps | |
| KRBB | 10 Mbps | |
| KRBC | 15 Mbps | |
| KRBD | 20 Mbps | |
| KRBE | 25 Mbps | |
| KRBF | 30 Mbps | |
| KRBG | 35 Mbps | |
| KRBH | 40 Mbps | |
| KRBI | 45 Mbps | |
| KRBJ | 50 Mbps | |
| KRA1 | 100 Mbps | |
| KRAB | 150 Mbps | |
| KRA2 | 200 Mbps | |
| KRAA | 250 Mbps | |
| KRA3 | 300 Mbps | |
| KRA4 | 400 Mbps | |
| KRA5 | 500 Mbps | |
| KRA6 | 600 Mbps | |
| KRA7 | 700 Mbps | |
| KRA8 | 800 Mbps | |
| KRA9 | 900 Mbps | |
| KRA0 | 1000 Mbps (1 Gbps) | |
| | | |
| | | |
| | | |

NCI/SECNCI Codes

| NCI Code 04LN9.10T (Used with 10 Mbps Electrical) | | |
|---|---|------------------------------|
| 04 | = | Four Conductors (4-wire) |
| LN | = | Local Area Network Interface |
| 9 | = | 100 Ohms |



| | | |
|-----|---|---------------------|
| 10T | = | 100 Base-T Ethernet |
|-----|---|---------------------|

| NCI Code 04LN9.1CT (Used with 100 Mbps Electrical) | | |
|---|---|------------------------------|
| 04 | = | Four Conductors (4-wire) |
| LN | = | Local Area Network Interface |
| 9 | = | 100 Ohms |
| 1CT | = | 100 Base-T Ethernet |

| NCI Code 08LN9.1GE (Used with 1 Gbps Electrical) | | |
|---|---|------------------------------|
| 08 | = | Eight Conductors (4-wire) |
| LN | = | Local Area Network Interface |
| 9 | = | 100 Ohms |
| 1GE | = | 1000 Base-T Ethernet |

| NCI Codes 02LNF.A02 (Used with 1 Gbps Optical) | | |
|---|---|--|
| 02 | = | Two Conductors (2-fiber) |
| LN | = | Local Area Network Interface |
| F | = | Fiber |
| A02 | = | 1310 nm, Single-mode fiber (1000 Base LX/LH) |

| NCI Codes 02LNF.A02 (Used with 10 Gbps Optical) | | |
|--|---|--|
| 02 | = | Two Conductors (2-fiber) |
| LN | = | Local Area Network Interface |
| F | = | Fiber |
| A02 | = | 1310 nm, Single-mode fiber (10000 Base X/LH) |

| NCI Codes 02QBF.K02 (Collocation) | | |
|--|---|---|
| 02 | = | Two conductors (2-fiber) |
| QB | = | Central Office manual cross connect termination with no sub-rating capability for non-multiplexed facilities only |
| F | = | Fiber |
| K02 | = | 1310 nm, single-mode fiber |

| SECNCI Code 02CXF.1GE (Central Office Termination) | | |
|---|---|--|
| 02 | = | Two conductors (2-fiber) |
| CX | = | Digital termination on a switch |
| F | = | Fiber |
| 1GE | = | 1 Gigabit Ethernet (User to Network Interface (UNI)) |

| SECNCI Code 02CXF.10G (Central Office Termination) | | |
|---|---|---|
| 02 | = | Two conductors (2-fiber) |
| CX | = | Digital termination on a switch |
| F | = | Fiber |
| 10G | = | 10 Gigabit Ethernet (User to Network Interface (UNI)) |



Valid NC/NCI/SECNCI Combinations

| NC Code | Location | NCI | SECNCI |
|---|-------------|-------------------------------------|------------------------|
| KPA(*), KPE(*), KQA(*), and KQE(*) | AC/EU to CO | 04LN9.10T 04LN9.1CT | 02CXF.1GE |
| KRB(*), KRA(*), KRF(*) And KRE(*) | AC/EU to CO | 08LN9.1GE 02LNF.A02 02QBF.K02 | 02CXF.1GE |
| KSE(*) | AC/EU to CO | 02LNF.A02 02QBF.K02 | 02CXF.10G |
| KRA0, KRE0 And KSE(*) | CO to Cage | 02LNF.A02 02QBF.K02 | 02CXF.1GE 02CXF.10G |

NOTE: (*) 4th position will specify CIR

NOTE: AC = Access Customer (POP) CO = Central Office EU = End User

NOTE: In some situations if the configuration would be EU-EU or EU-CO, and that does not show as a valid combination, but there is an AC-EU or AC-CO, that can be used as a valid combination (Assumption is one EU is acting as the AC or the EU is acting as an AC when going to a CO).

OVC Ordering Details

OVC NC Options

| OVC NC Pos1-2 | OVC NC Pos 3 | OVC NC Pos 4 | Description |
|------------------|-----------------|-----------------|---|
| VL | C | - | Point-to-point Operator Virtual Connection (OVC) per MEF 26. (an association of one UNI and one ENNI) |

OVC NCI Protocol Options

| Conductors | Protocol | Impedance | Protocol Options | Description |
|------------|----------|-----------|---------------------|--|
| 02 | VL | N | A2 | Port – all to one bundle - Used with <u>Port Based UNI</u> that will send a <u>combination</u> of uncoordinated tagged and untagged traffic. No Service Multiplexing. |
| | | | V | Port + CEVLAN Map - Used with <u>VLAN based UNI</u> that will only send tagged coordinated traffic. |

Port NC Code and OVC NCI Protocol – Combinations

| Port NC | Port Interface Type | Port Routing Type | OVC Protocol | OVC Protocol Description |
|------------|------------------------|----------------------|-----------------|-----------------------------|
|------------|------------------------|----------------------|-----------------|-----------------------------|



| Code | | | Option(s) | |
|------|---------------------------------|------------|-----------|------------|
| KPA* | Electrical (10 Mbps Base T) | Port Based | A2 | All in one |
| KPE* | Electrical (10 Mbps Base T) | VLAN Based | V | Tagged |
| KQA* | Electrical (100 Mbps Base T) | Port Based | A2 | All in one |
| KQE* | Electrical (100 Mbps Base T) | VLAN Based | V | Tagged |
| KRA* | Electrical/Optical (1 Gbps) | Port Based | A2 | All in one |
| KRB* | Electrical/Optical (1 Gbps) | Port Based | A2 | All in one |
| KRE* | Electrical/Optical (1Gbps) | VLAN Based | V | Tagged |
| KRF* | Electrical/Optical (1Gbps) | VLAN Based | V | Tagged |
| KSE* | Optical (10 Gbps) | VLAN Based | V | Tagged |

*4th position of NC is variable and represents the CIR speed

Contacting Windstream

Order Information/Escalations

Carrier Access: 1-800-864-7188

*For carrier specific information contact your account management team.



Document Revision Information

| Ver. # | Date | Author | Revision Description |
|--------|---------|-----------|---|
| 3.0 | 1.28.15 | Marty Key | New release to support ASOG v 49 |
| 4.0 | 6.28.15 | Marty Key | Updates to support ASOG v 50 |
| 5.0 | 9.22.15 | Marty Key | Updates to support ASOG v 51 |
| 5.1 | 10.1.15 | Marty Key | Added EXP field and associated expedite information |
| 5.2 | 1.28.16 | Marty Key | Updates to 1G UNI Interfaces for VLAN and Port based services to reflect NC codes for sub-50M OVC speeds. |