

## Elisa Virtual Unbundled Local Access (VULA)

### General

Elisa Virtual Unbundled Local Access services comprise wholesale level bitstream data subscriptions classified as VULA services by the Finnish Communications Regulatory Authority and implemented using VDSL2 technology through Elisa's Ethernet network (Ficora, market review M3a/2018).

Elisa's VULA services are delivered with copper subscriber line (distribution point FTTC). Elisa's subscriber lines and upper bands always terminate in the building distribution centre.

VULA services are delivered using Operator Broadband Services with VULA VLAN type. The number of mac-addresses are not limited.

VULA service subscriptions support Ethernet frames pertaining to IEEE802.3. The maximum transmission unit (MTU) supported in the frame is 1,600 bytes. VULA services are delivered to the VULA NNI of the subscribing operator customer as an L2-level connection.

Service operator Qos-labeled traffic is delivered through network operator network via pre-defined quality profiles. Each profile has pre-defined maximum guaranteed capacity.

### Technologies, distribution centres and delivery interfaces

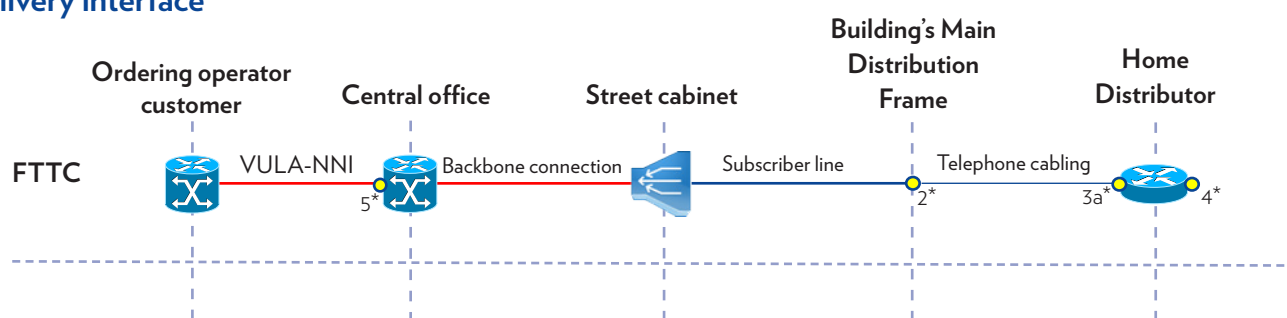
Each Elisa VULA Service is implemented using VDSL2 technology.

The services are mainly built from the Fiber to the Cabinet (FTTC) distribution centre which is closest to the customer.

In addition to the VULA service, services implemented from street cabinet require a copper subscriber line or its upper band (VDSL2 technology).

The availability of subscriptions implemented using VDSL2 technology is limited according to the length of the copper connection.

### Delivery interface



2\* Operator broadband port + Subscriber line/Upper band

3a\* Connection to the internal network installed in a telephone socket (3-NNI telephone socket/RJ11)

4\* Customer premises equipment delivery (RJ45)

5\* Virtual unbundled local access NNI (VULA-NNI)

## VULA VLAN

VULA services are delivered using Operator Broadband Services with VULA VLAN type. Operator customer can order VULA service to transfer vlan identifiers or stacked vlan identifiers through broadband subscription. Operator customer defines upper VLAN tag (S-tag) and this identifies subscription in VULA NNI. Upper VLAN Tag (S-tag) must be unique for every subscription in VULA NNI. Lower VLAN tag (C-Tag) is part of customers traffic and can be used freely. Subscription with VULA service has MTU size of 1600 bytes.

The availability of VULA VLAN service is limited according to availability of technologies in the destination premises.

## SLA

The Service Levels are:

Service Level Category	Service Hours Category	Response Time	Repair Time
P0V8	P0: Mon - Fri from 8 am - 4 pm	8 h	24 h
P1K12	P1: Mon - Fri from 7 am - 6 pm	1 h	12 h

VULA service doesn't include by default any SLA category. Elisa CPE requires SLA.

Service hours refer to the time when fault limitation and repair measures will be carried out.

Response time refers to the time within which actions according to a service request will be started.

Repair time refers to the time within which a fault has been repaired.

The content and application of the service levels are described in more detail in the Elisa SLA service description. Elisa reserves the right to restrict the number of the service levels offered on a subscription-specific basis in offices where restrictions are imposed by:

- Geographical distances
- Technical quality of the access connection implemented using copper cable
- The limited level of service for the access connection

## NNI Location

VULA Services are delivered to nearest CO (Central Office) location equipped with VULA-NNI. It is possible to have multiple VULA-NNI's in a single CO (Central Office) location.

## Elisa Network-to-Network interconnection (NNI)

Ordering and delivering of Elisa VULA services requires a working and applicable Network-to-Network interconnection between Elisa and ordering operator customer. Applicable types of NNI service is VULA NNI. Elisa Operator NNI Service includes one NNI port. NNI ports are implemented at a speed of 1 Gbit/s or 10 Gbit/s between the devices of Elisa and the operator customer. The Ethernet port (1000BASE-BX or 10GBase-BX) of Elisa's backbone device acts as the physical handover point. Elisa's backbone devices are located typically in a CO (Central office) network nodes.

Elisa's VULA services are delivered to customers as L2 connections (IEEE 802.3-2008). In Elisa VULA service customers have access to VLAN tags 2-4,094. The implementation enables the use of two internal VLAN tags (QinQ). The higher VLAN tag (S-Tag) is used in the service to identify remote subscriptions. The lower VLAN tag (C-Tag) is part of the customer's traffic and can be selected freely.

## Customer premises equipment

Delivery interfaces of customer premises equipment (CPE) connected to the operator broadband network comply with the following recommendations:

VDSL2	ITU-T G.993.2 annex B profile 17a
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A routing CPE can be ordered separately for Elisa's VULA Service as delivered by Elisa. Elisa owns the CPE and is responsible for its installation using a basic configuration and any maintenance/replacement of the specific CPE in case of malfunctions.

The operator customer is responsible for the supervision and management of the device after its installation and the definition of any device settings (configurations) needed when using the device. The operator customer is also responsible for fulfilling installation environment requirements set for the CPE as set out in “Prerequisites and restrictions.”

A fault repair or device replacement process will be launched after the operator customer issues a fault notification (see “Network monitoring and fault repairs”).

Using the CPE, the delivery interface in the user customer’s premises is the LAN connection of the device.

Available CPEs and their suitability for operator broadband subscriptions are listed in the price list for Elisa’s Operator Broadband Services.

By default, CPEs delivered by Elisa are equipped with the IP Advanced software level. The operator customer can upgrade the IOS version of the CPE up to the version it uses through remote management after the installation process. Whenever modifications are made, the operator customer is responsible for licenses and any license fees associated with the software it uses in its CPEs.

## Ordering and delivery time

Orders and offers are placed through the Elisa Carrier Service Online order and delivery system. A pricing zone and service area information as well as technologies, speeds and VLAN types available are mentioned in an availability enquiry, offer request and order. Line distances shown are referential and can deviate from real line distances. Final availability to all products are checked when ordered or requested a quote. The target delivery time is 5 calendar days in Elisa’s own existing network area and approximately 2 weeks in other operator’s existing network area.

## Network monitoring and fault repair

The targeted repair time is 24 hours from the receiving of the fault notification. The repair is carried out during the service hours. The service hours are workdays Mon – Fri from 8 am to 4 pm. Fault repair can be continued after the service hours if ordered separately by the customer. Measures are launched immediately to repair any failure or faults in Elisa’s backbone network, including concentrating central NNI’s.

Fault notifications should be made through the Elisa Carrier Services Online order and delivery system or by phone to the Service Desk (24h), service in English tel. +358 10 26 096, service in Finnish tel. +358 10 804 400.

## Elisa’s network maintenance and change work timetable

Elisa will perform scheduled network maintenance and change work on the second and fourth Wednesday each month at 00:30 a.m.–05:30 a.m. Elisa reserves the right to perform network maintenance and change work as needed. The maintenance and change work are attempted to announce in advance and to minimize outage and downtime of the services.

## Prerequisites and restrictions

The implementation of the service requires the construction of a new physical cable route, the customer will be responsible for the cable routes in the site. The customer is responsible for ensuring that the condition of the internal network in each installation location allows for the installation of the Operator Broadband Service:

- Copper cabling from the building distribution centre to the final installation location
- Power supply (230V AC) for any network terminal
- Sufficient rack or shelf space for any network terminal
- Ambient conditions suitable for electrical equipment

The price of the service is subject to the following restrictions:

- The prices are only valid on the precondition that a physical connection to the customer’s building exists and a new physical network (optical fibre or copper cable) need not be constructed
- The prices are only valid in those areas and buildings where Elisa’s NNI equipment is located and where subscriber lines are available

There may be regional differences in the availability of subscriptions and additional services.

## Data protection

Personal data is processed in the service, such as installation addresses and contact details for the onsite persons. The personal data is processed for service implementation. Concerning the personal data processed in the service, the telecommunications operator, that is ordering the service is the personal data controller stated in the data protection legislation and Elisa is the processor.

In addition, service information is stored in the form of logs due to failure repairs and prevent information security threats. For this information, Elisa is a data controller for data protection legislation.

Personal data processed in the service can be processed outside the EU / EEA area. Elisa ensures that in a country where personal data is processed, the level of data protection is adequate and in accordance with the European Commission's decision, or alternatively, that the transfer is subject to a legally appropriate safeguard measure such as a data transfer agreement in accordance with the EU standard contractual clauses on the transfer of personal data outside the EEA.

Elisa has the right to use subcontractors in the provision of services and in the processing of personal data.

## Terms of agreement

If a subscription does not operate at the ordered speed due to the length or quality of the subscriber cable, Elisa reserves the right to discontinue the poorly operating service or agree upon another procedure with the customer. Elisa reserves the right not to deliver a subscription if the result of the availability enquiry differs significantly from the actual implementation. The service is governed by the general agreement terms of operator products of Elisa Corporation. Service Description is valid from 15 June 2018.