Tusass A/S
(Referred to as Tusass)

Wholesale Data Services

Annex D1

Bit Stream Access ("BSA") Service

Technical Description

Contents

Abbreviations

Abbreviation	Description
BSA	Bit Stream Access
C-VLAN	Customer VLAN
DSL	Digital Subscriber Line
DSLAM	DSL Access Multiplexer
CPE	Customer Premises Equipment
E2H	Ethernet To the Home
L2VPN	Layer 2 VPN
NTP	Network Termination Point
ODF	Optical Distribution Frame
POP	Point of Presence
QoS	Quality of Service
S-VLAN	Service (Provider) VLAN
TPID	Tag Protocol Identifier
VLAN	Virtual Local Area Network
VPN	Virtual Private Network

1. Introduction

This Annex provides the technical description of the Bit Stream Access ("BSA") Service.

The Service Description and processes to support the implementation of this Service are located in the Service Description (Annex C1 of this Agreement) and the Operations & Maintenance Manual (Annex E1 of this Agreement).

All equipment and plant that is deployed as part of the implementation of this Service shall comply with relevant national and international standards.

All installation procedures used must comply with standard industry practices and national and international standards.

2. General Definitions

The Tusass wholesale portfolio consists of the following services:

- Bit Stream Access Service;
- Co-location Service;
- Connect IP Service;
- Global IP Service;
- Local IP Service;
- National IP Service;
- Mobile Access Service, and
- SIP-Trunk Service

A service description for each of the Tusass wholesale Services is included in Annex C to this agreement. A technical description for each of these Services is included in Annex D to this Agreement.

The service description and technical description for each of the Tusass Services describes how each of the Services connects to allow the Service Taker to provide its end-to-end service to its customer.

3. Service Overview

The BSA Service enables a Service Taker to design, create and operate an Ethernet service between the Service Taker's core network and its End-Customers. The service(s) the Service Taker chooses to provide is not dependant on Tusass equivalent broadband portfolio in other aspects than available line speed.

The BSA Service is an optional part of the complete wholesale portfolio which enables a Service Taker to provide IP based services such as Internet access. The BSA Service does not in itself provide any IP or Internet access services – additional parts of the wholesale portfolio are required.

The BSA Service is a virtual connectivity service providing one-to-one connections from individual DSLAM or Switch ports in any given town (and dependent settlements) to logical sub-interfaces on a Service Taker's Connect IP Service in the same town.

4. Transport

Transportation of BSA traffic is implemented as L2VPNs. In order to preserve end-customer isolation across disparate access network branches, traffic entering a DSL-port will get two VLAN tags imposed, these are:

- a C-VLAN tag identifying the End-Customer, and
- a S-VLAN tag identifying the Service Provider.

5. Interfaces

The DSL connections will be presented as Layer 2 double-tagged sub-interfaces in the Service Taker's Connect IP Service.

As described in the Connect IP Service Technical Description (see Annex D3 of this Agreement), the double-tagged frames can have either 0x8100 (802.1Q) or 0x88a8 (802.1ad) as the TPID for the S-VLAN.

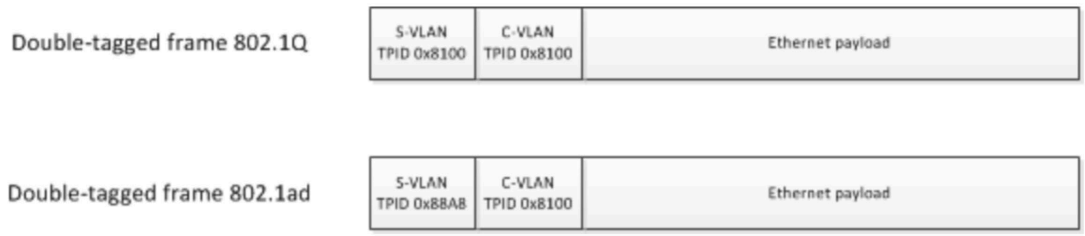

Figure 1 – S-VLAN tags on sub-interfaces
Note: This figure is provided for illustrative purposes only

6. Settlements

DSL-ports in Settlements will present a double-tagged sub-interface in the Service Taker's local town Connect IP Service in the exact same ways as the town DSL-ports. However, from an accounting perspective, the connectivity from a Settlement DSL-port will go through the National IP Service, and traffic on the virtual circuits will count towards the accounting total for the Service Taker's National IP Service.

6.1 Traffic Measurements for Settlement circuits

BSA traffic to and from Settlements will be measured at the point where the town-local Tusass edge router connects to the Settlement's microwave network link as indicated below.

The total amount of upstream and downstream traffic will be measured, as will the traffic in each individual QoS class, if a QoS service is added to the BSA Service.