

**TELE GREENLAND A/S
(Referred to as Tusass)**

Wholesale Data Services

Annex D6

National IP Service

Technical Description

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Abbreviations

Abbreviation	Description
ASN	Autonomous System Number
BGP	Border Gateway Protocol
EBGP	External BGP
CPE	Customer Premises Equipment
IP	Internet Protocol
L2	Layer 2
L3	Layer 3
L2VPN	Layer 2 VPN
L3VPN	Layer 3 VPN
NTP	Network Termination Point
PoP	Point of Presence
QoS	Quality of Service
TPID	Tag Protocol Identifier
VPN	Virtual Private Network

1. Introduction

This Annex defines the technical description of the National IP Service.

The service description and processes to support the implementation of this Service are located in the service description (Annex C6 of this Agreement) and the Operations & Maintenance Manual (Annex E6 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, and
- National IP 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 National IP Service is a backhaul service which enables traffic to flow between any of a Service Taker's Connect IP Service instances within Greenland.

Transportation of traffic in the National IP Service is, except for a few special cases, implemented as one or more L3VPNs.

The exceptions are:

- Backhaul of BSA traffic from a settlement to the upstream town POP
- Backhaul of the Global IP Service to the Service Taker's Connect IP Service in Nuuk

These exceptions are transported as L2VPNs.

5. Interfaces

The L3VPN transports will be presented as routed 802.1Q sub-interfaces in the Service Taker's Connect IP Service.

IP addressing of the link-nets is at the Service Taker's discretion.

Exchange of routing information can be implemented as static routing or as BGP. If BGP is selected, the peering session will be set up as EBGP where Tusass presents their public ASN, 8818, and the Service Taker uses a private ASN provided by Tusass.

The L2VPN transports will be presented as 802.1Q or Q-in-Q sub-interfaces. BSA backhaul from a settlement is terminated in Q-in-Q sub-interface.

Global IP Service backhaul from Tusass routers to Service Taker's Connect IP Service in Nuuk is terminated in a single-tagged 802.1Q sub-interface.

Please refer to the Connect IP Service Technical Description (Annex D3 of this Agreement) for more information on the use of single- and double-tagged sub-interfaces.

Please refer to the Global IP Service Technical Description (Annex D4 of this Agreement) for more information on the Global IP Service.

Please refer to the BSA Technical Description (Annex D1 of this Agreement) for more information on the BSA Service.

6. Capacity

The NIP service is provided as symmetric capacity in the areas served by Submarine fibre and Microwave networks.

For areas served by Satellite the available capacity is asymmetric at a ratio of 1:4 (approximately).

7. Traffic Management

Traffic measurements for the National IP Service will be carried out on each Service Taker-facing L3 sub-interface on Tusass' edge or CPE equipment. L2 sub-interfaces terminating BSA and Global IP Service traffic will not be measured; Settlement BSA traffic and Global IP Service traffic is measured elsewhere.

Please refer to the BSA Technical Description for (Annex D1 of this Agreement) more information on Settlement traffic.

Please refer to the Global IP Service Technical Description (Annex D4 of this Agreement) for more information on the Global IP Service

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 National IP Service.

8. Network Priority - Terrestrial

In case of network degradation, the Network Priority - Terrestrial allocation is configured using the IEEE 802.1p priority scheme. Capacity will be assigned a priority higher than best effort services and lower than network management, essential communication services, cellular voice services and fixed capacity services.

9. Network Priority - Satellite

The Network Priority - Satellite allocation is configured using the IEEE 802.1p priority scheme. Capacity will be assigned a priority higher than best effort services and lower than network management, essential communication services, cellular voice services and fixed capacity services.

The Service Taker will be able to prioritize a part or all capacity to and from NIP demarcations in the satellite areas up to the amount of Network Priority – Satellite, subscribed.