

**Tusass A/S
(Referred to as Tusass)
Wholesale Data Services**

**Annex D2
Co-Location Service
Technical Description**

Contents

1. Introduction	3
2. General Definitions	3
3. Description of the Co-Location Service	3
4. Co-Location Environment	3
4.1 Elements required to provide Co-Location Services	4
4.1.1 Service Taker Footprint	4
4.1.2 Service Implementation Activities	4
5. Physical Co-Location	4
5.1 Building Work	4
5.2 Equipment Work	4
5.3 Provision of Cable Management (Cable Trays)	5
5.4 Provision of AC Power Distribution	5
5.5 Provision of Exchange Earth	5
6. Service Taker Activities	6
6.1 Basic Principles	6
6.2 Inspection by Service Taker	6
6.3 Arrange Planned Access	6
6.4 Delivery	6
6.5 Unpacking by the Service Taker and Safety Requirements	7
6.6 Verification of Items by Tusass	7
6.7 Delivery of Equipment to Service Taker Footprint	7
6.8 Installation of Hardware by Service Taker	7
6.9 Connection to Services by Service Taker	8
6.10 Connection to AC Distribution Point	8
6.11 Connection to the PoP Earthing System	8
6.12 Testing of Co-location Service by Service Taker	8
6.13 Localise and Resolve Fault(s)	9
6.14 Verification of Work by Tusass	9
7. Access and Security	9

1. Introduction

This technical description contains the set of procedures to be followed for the operation of the Co-location Service.

These procedures relate to the implementation of Co-location Services in Tusass PoPs.

The Service description and processes to support the implementation of this Service are located in the Service Description (Annex C2 of this Agreement and Operations & Maintenance Manual (Annex E2 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. Description of the Co-Location Service

The Co-location Service is based upon the provision of a space in which to house the Service Taker's equipment in a Tusass PoP.

The size of the space will be determined by the amount of equipment required by the Service Taker. The maximum dimensions of the Co-location Service will ultimately be determined by the available space and power supply at the Tusass PoP.

4. Co-Location Environment

The following describes the Co-location Service that might be constructed in a Tusass PoP.

4.1 Elements required to provide Co-Location Services

A number of discrete elements are combined to deliver a Co-location Service. These elements will be provided by Tusass as required to complete the Co-location Service.

4.1.1 Service Taker Footprint

The methods described in this technical description shall include provision for any necessary inter-working between Service Taker's footprints either in the same aisle or between aisles.

Any inter-working between Service Taker's footprints shall use dedicated cable management techniques and infrastructure at all times provided as part of the Co-location Service.

4.1.2 Service Implementation Activities

After a Co-location Service has been agreed between Tusass and the Service Taker then the implementation of the Service can commence. The implementation of the Service consists of two primary activities, namely:

- Site preparation by Tusass, and
- Service Taker activity within the Tusass PoP.

5. Physical Co-Location

In addition to the elements identified Tusass will carry out a number of preparatory activities on the site following agreement to proceed. The following non-exclusive and non-restrictive list shows some of these general activities.

5.1 Building Work

The Co-location Service will consist of a basic space with either solid walls, walls constructed from steel mesh, or no walls with footprints marked out and numbered and with anchor points for equipment racking provided.

5.2 Equipment Work

- Installation of Service Taker earth cable to Tusass central earth point and associated Service Taker cable trays;
- Installation of Tusass cable tray to support Service Taker's AC cables from Service Taker's footprint to PoP AC distribution system;
- Clearance of space if required;
- Construction work as required;
- Installation of raised flooring where required;
- Upgrading of utility electrical supply to support increase in load directly attributable to Service Taker's equipment (if required);
- Upgrading of Tusass's electrical main board to support increase load directly attributable to Service Taker's equipment (if required);
- Provision of additional Tusass lighting as required;

- Provision of additional fire detection specifically for Service Taker's equipment as required;
- Provision of Tusass air-conditioning/ventilation to cater for any additional cooling load directly attributable to Service Taker's equipment;
- Confirmation of a "route" from a designated unpacking area to the Service Taker's designated footprint.

This work will be undertaken as part of the overall provision of a serviced footprint to the Service Taker.

5.3 Provision of Cable Management (Cable Trays)

Cable management systems (cable trays) will be provided (if not already available) by Tusass to facilitate the running of cables by the Service Taker from the footprint to the Tusass equipment, the AC power distribution cabinet and the earth system.

5.4 Provision of AC Power Distribution

The provision of an AC power supply to each Service Taker requesting Co-location will be carried out as follows by Tusass:

The Service Taker will be provided with access to a 16 amp fused AC electric supply.

- Tusass will arrange installation and commissioning of each distribution point subject to all information requested on the order form being supplied;
- Tusass will be responsible for monitoring and maintenance of the AC power supply to, but not including, the distribution point;

Tusass will be responsible for the provisioning, installation and maintenance of all power and earth cabling and ancillary equipment, including installation of cable trays, from the supply point to the Service Taker's equipment.

An isolation switch will be provided, which will enable the distribution to be electrically isolated in the event of an emergency or accident.

For the avoidance of doubt the distribution point refers to a "best fit" MCCB or fuse position as appropriate to the site at Tusass's discretion.

In the case of a higher AC power consumption being required at a future date by the Service Taker (e.g. due to customer growth) the Service Taker will request additional AC power from Tusass. Tusass will revert with a price and timescale for the provision of this additional power requirement if technically feasible.

5.5 Provision of Exchange Earth

Tusass will carry out all tasks in respect of the provision of a point of connection for the Service Taker to the exchange earth. A full site survey will identify the earth connection and survey the earth cable run to the Service Taker's footprint. Tusass will provide an earth bar with suitable connection points in the general area of the Service Takers footprint and shall bond this earth bar to the exchange earth using a properly dimensioned unbroken earth cable. This work may include any earth cable and cable tray work required to provide this earth to the Service Taker's footprint.

6. Service Taker Activities

6.1 Basic Principles

As a general principle, the person or entity representing the Service Taker in the implementation of the Service should be notified to Tusass within a reasonable period prior to their arrival on site to carry out the activities that are listed below.

Excluding the necessary order processing activities associated with the Service, a number of activities needs to be undertaken by the Service Taker and Tusass in order to physically deploy the components necessary to implement the Service.

These activities are described sequentially below and include the activities carried out from when the Service Taker first arrives at the Tusass Co-location Service.

6.2 Inspection by Service Taker

In association with the Tusass representative the initial inspection of the site will be used by the Service Taker to complete the following tasks:

1. General inspection and familiarisation with the site layout and features, as advised by Tusass;
2. Identification of delivery and unpacking locations;
3. Confirmation of cable runs and any special features (for example, any bending radius constraints for optical fibre cable);
4. A briefing by Tusass on site-specific features.

The inspection may take place on the occasion of the handover of the footprint to the Service Taker.

6.3 Arrange Planned Access

At the initial inspection by the Service Taker, and having identified the effort needed to complete this work, the Service Taker should book the required Tusass resources as per the designated process in order to ensure their availability on the selected dates, for example:

- Reserve an escort;
- Reserve an unpacking area;
- Reserve an access route from the unpacking area to the Service Taker footprint;
- Agree how rubbish will be removed from the site.

6.4 Delivery

The Service Taker must be present to take delivery of his equipment. Delivery of the Service Taker equipment and plant will be done on the agreed date to the designated delivery area in the Tusass exchange facility. Because some time might have elapsed between the initial briefing and the delivery of the Service Taker equipment Tusass will, on request, repeat the briefing on site specific features. The Service Taker remains liable to observe all the requirements of the briefing.

No equipment should be delivered to the site unless the installation team are present and available to unpack and move the equipment to the designated Service Taker footprint area.

6.5 Unpacking by the Service Taker and Safety Requirements

The Service Taker shall deploy the necessary safety signs and signals prior to commencing its work. This activity is additional to any obligation on the Service Taker to comply with any statutory health and safety legislation.

On the day of delivery the Service Taker will unpack its equipment in the designated unpacking area prior to moving the equipment to the designated Service Taker footprint area. Storage of Service Taker equipment at the Tusass site is not permitted.

Unpacking activities must not be carried out in any area other than the designated unpacking area.

All rubbish must be removed on the same day. Rubbish will not be allowed to accumulate.

6.6 Verification of Items by Tusass

Immediately following the unpacking of the equipment by the Service Taker and prior to it being moved to the designated Service Taker footprint Tusass will have the opportunity to verify that the items delivered are in conformity with the Agreement.

Should Tusass not be available then such verification will not take place and the equipment should not be moved to the Service Taker footprint.

6.7 Delivery of Equipment to Service Taker Footprint

Following the unpacking and verification the Service Taker should then move its equipment and/or plant from the designated unpacking area to the designated Service Taker footprint. The designated and reserved access route must be used in all cases. The wheeling in of racks with pre-installed equipment is permitted and should be notified to Tusass in advance.

6.8 Installation of Hardware by Service Taker

Once the equipment has been delivered to the designated Service Taker footprint then the installation of the equipment can commence.

All installation work shall be carried out using agreed methods and to agreed standards (as described in this technical description) and using tools that are fit for purpose. All work, equipment and other items required to complete the job shall be provided by the Service Taker from its own resources.

The Service Taker shall take all necessary precautions to prevent dust and any other physical or electrical interference to adjacent equipment and systems.

Electrically operated tools and test equipment will be powered from the designated mains power outlets which Tusass will provide adjacent to the Service Taker footprint.

During the installation period, and at all other times when there is on-site Service Taker activity, the Service Taker shall deploy appropriate signage, containing its official logo, in all locations of activity to indicate its presence.

The Service Taker shall fix its rack(s) to the floor using a method appropriate to whether it is being fixed to a concrete or a false floor. Overhead fixing to the cable management system (cable trays) shall use proper bolting mechanisms of suitable dimensions with all bolts and fixings de-burred.

All rubbish must be removed on the same day. Rubbish will not be allowed to accumulate.

6.9 Connection to Services by Service Taker

Having installed its equipment, the Service Taker may then connect this equipment to the necessary services provided by Tusass, as follows:

1. to the exchange earthing system,
2. to AC power distribution.

6.10 Connection to AC Distribution Point

The Service Taker will be responsible for the provision of all power cabling from its distribution point to his equipment. The Service Taker shall connect his equipment to the AC distribution point using power cabling which conforms to BS6007 and to the relevant national rules for electrical installations, and ETSI standards for telecommunications installations. Cable dimensioning will be determined by the Service Taker and communicated to Tusass on the order form. Tusass will not permit any cable to be installed which poses a risk to its building or occupants.

All power work must be carried out by competent personnel representing the Service Taker.

6.11 Connection to the PoP Earthing System

The Service Taker will be responsible for the earthing of its equipment. The Service Taker must connect its equipment and racks to the earth connection point provided by Tusass in the general area of the Service Taker footprint. It must be recognised that this is not the mains earth.

The earthing cable from the Service Taker footprint to the exchange earth shall be at least of the same current carrying capacity as the earthing cable from the Service Taker AC distribution point to the exchange earth, typically 70mm². This cable should be insulated throughout its length and should be terminated on the exchange earth bar at a position indicated by Tusass. This position should be suitably labelled by Tusass to indicate which Service Taker using it. All connections should be made to ensure a good electrical bond between the terminating cable and the brass material of the exchange earth with the appropriate cable-terminating lug.

The earthing cable from the Service Taker footprint should follow the designated cable run from the Service Taker footprint to the Central Earthing Point. The cable should be run as straight as possible, keeping the bending radius not less than 2.5 times the cross-sectional area of the cable.

The utilisation of the earth connection point by the Service Taker should be entered by Tusass on a display notice adjacent to the facility.

All earthing work must be carried out by competent personnel representing the Service Taker.

6.12 Testing of Co-location Service by Service Taker

The Service Taker may then verify that all the Co-location Service is functioning correctly using appropriate non-invasive methods.

6.13 Localise and Resolve Fault(s)

If the Service is not working, then the Service Taker should localise the fault and resolve the issue. In the event that the fault is found to be located in the Tusass systems then Tusass will resolve the fault in accordance with this Agreement.

6.14 Verification of Work by Tusass

On the conclusion of the work by the Service Taker Tusass will verify that the installed equipment is compliant. Failure to comply should be referred to the Service Taker for resolution.

This examination will also ensure that the correct fixing techniques and practices have been used throughout the installation. Although this examination will be undertaken by Tusass it does in no way accept responsibility for the installation and any problems remain the liability of the Service Taker.

Tusass will also verify that the site has been left in a clean and safe manner.

7. Access and Security

Access by Service Taker personnel through the Tusass building will either be by a secure route giving access to their Co-location Service or by escorted access.

Staff escorting Service Taker personnel will be Tusass staff. Charges for escorted access are detailed in the Charges Annex, Annex G to this Agreement.

Tusass will reserve the right to enter Service Takers Co-location Service footprint at any time to comply with emergency, maintenance and operational requirements for the building and the equipment in the facility installed and owned by Tusass.