



IP Packet eXchange (IPX) Service Schedule for MMS IW

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Unrestricted	X



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Feedback

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Table of Contents

1	Overview	5
2	Definitions	5
3	Service Definition.....	7
4	Obligations	8
5	Commencement date of MMS Interworking Services	8
6	Termination of Service	9
7	Participating Election Process	9
8	Legacy Support.....	12
9	Size Definition	13
10	Testing Requirement.....	13
11	Service Contact Details	13
12	Service Schedule Signature	15
	ANNEX 1 – BILLING	16
	ANNEX 2 - TECHNICAL.....	18
	ANNEX 3 SLA	21
	Schedule A – SERVICE CREDIT LEVEL.....	49
	Schedule B – MONTHLY REPORT.....	50

IP Packet eXchange (IPX) Service Schedule for MMS IW

Between

<<Service Provider>>

having its registered address:

.....
(Hereinafter referred to as "Party A")

And

<<IPX Provider>>

having its registered address:

.....
(Hereinafter referred to as "Party B")

WHEREAS

The Parties have executed an IP Packet eXchange (IPX) Agreement on <<DATE>>.

The Parties have expressed their wish to enter into an MMS Interworking agreement.

The Parties agree to establish this Addendum on the terms and conditions as stated below.

IP Packet eXchange (IPX) Service Schedule for MMS IW

1 OVERVIEW

1.1 About this document

The document consists of twelve sections and three annexes containing information about the IP Packet eXchange (IPX) Service Schedule for MMS IW

1.1.1 Scope

Operator having already established an IP Packet eXchange (IPX) relationship with an IPX Provider and wishing to enter into a commercial relationship regarding the MMS service with other GSM networks through the IPX Provider.

1.1.2 Purpose

This document is intended for GSM Operators wishing to open the MMS IW service with other GSM networks through the IPX Provider.

2 DEFINITIONS

For the purpose of this Schedule the following terms shall have the meanings set forth in their respective definitions, unless a different meaning is called for in the context of another provision in this schedule:

- 1.1 **"3GPP Standard"** means 3GPP 23.140, as amended from time to time;
- 1.2 **"Charges"** means the Participating Service Provider Termination Charges, the Service Provider Termination Charges and the IPX PROVIDER Transit Charges;
- 1.3 **"Chargeable Event"** means the Successful Routing of an MM from an Originating Operator's Relay/Server via the IPX PROVIDER System to a Recipient Operator's Relay/Server whether or not such MM is delivered to or retrieved by a Recipient Device provided always that (and for the avoidance of doubt) the transmission or receipt of a delivery report or a read report shall not be regarded as a chargeable event;
- 1.4 **"IPX PROVIDER Transit Charges"** means the IPX PROVIDER's charges for the provision of the MMS Transit Service as set out in Clause 14 as amended from time to time;
- 1.5 **"Legacy Device"** means a handset or terminal device registered on the Service Provider System or on a Participating Service Provider System which does not have the functionality to send or receive MMs;
- 1.6 **"Legacy Support"** is an alternative SMS functionality used by the Service Provider when they have to terminate an MMS on handsets that don't have the MMS capability;

- 1.7 **"MM"** means a multimedia message as defined in the 3GPP Standards from time to time;
- 1.8 **"MMS Interworking Services"** means the MMS Transit Services and the MMS Termination Services;
- 1.9 **"MMS Relay/Server"** means an MMS/Relay Server as defined in the 3GPP Standards from time to time;
- 1.10 **"MMS Termination Services"** means:
- 1.10.1 The MM termination service to be provided by the Service Provider pursuant to this Agreement; and/or
- 1.10.2 The MM termination service of a Participating Service Provider to be obtained by the MMSIP and provided to the Service Provider pursuant to this Agreement;
- 1.11 **"MMS Transit Service"** means:
- The MM transit service provided by the IPX PROVIDER to the Service Provider pursuant to this Agreement;
 - An MM transit service provided by the IPX PROVIDER to a Participating Service Provider pursuant to a Participating Service Provider Agreement;
- 1.12 **"Originating Device"** in respect of an MM means a handset or terminal device registered on the Service Provider System or on a Participating Service Provider System from which that MM originates;
- 1.13 **"Originating Service Provider"** in respect of an MM means either the Service Provider or a Participating Service Provider (as the context requires) upon whose System the Originating Device in respect of that MM is registered;
- 1.14 **"Recipient Device"** in respect of an MM means a handset or terminal device registered on the Service Provider System or on an Elected Participating Service Provider System to which that MM is addressed;
- 1.15 **"Recipient Service Provider"** in respect of an MM means either the Service Provider or the elected Participating Service Provider (as the context admits or requires) upon whose System the Recipient Device has a subscription;
- 1.16 **"Service Provider Service Parameters"** means the service parameters and service restrictions relating to the MMS Termination Service provided by the Service Provider as set out in Technical Annex;
- 1.17 **"Service Provider Termination Charges"** means the Service Provider's charges for the provision of the Service Provider's MMS Termination Services set out in the Clause 13 as amended from time to time;
- 1.18 **"Size Definition"** means the size definition set out in clause 9;
- 1.19 **"SM"** means a short message as defined in the 3GPP standards from time to time;

1.20 “**Successful Routing**” shall be interpreted as follows:

- In respect of MMs routed from the Originating Operator to the Recipient Operator via the IPX PROVIDER only (and for the avoidance of doubt, not via a Third Party IPX PROVIDER in addition), “Successful Routing” shall be deemed to have occurred upon receipt of an MM4_Forward.RES by the IPX PROVIDER within 5 minutes of the transmission of the MM in question; or
- In respect of MMs routed from the Originating Operator to the Recipient Operator via a Third Party IPX PROVIDER and the IPX PROVIDER, “Successful Routing” shall be deemed to have occurred in respect of an MM if an MM4_Forward.RES issued by the Second IPX PROVIDER is received by the First IPX PROVIDER within five (5) minutes of the transmission of the MM in question confirming receipt by the Second IPX PROVIDER of an MM4_Forward.RES from the Recipient Operator (and for these purposes “First IPX PROVIDER” shall mean whichever of the IPX PROVIDER and the Third Party IPX PROVIDER receives the MM in question directly from the Originating Operator and “Second IPX PROVIDER” shall mean whichever of the IPX PROVIDER and the Third Party IPX PROVIDER receives the MM in question from the First IPX PROVIDER for delivery to the Recipient Operator); and
- In addition, “Successful Routing” shall only be deemed to have occurred when then MM4_Forward.RES returns via the same path (in reverse direction) as the MM4_Forward.REQ has taken from the Originating Operator to the Recipient Operator;
- “Successfully Routed” shall be interpreted accordingly;

1.21 “**Technical Specifications**” shall mean the technical specifications defined and adopted by 3GPP (Third Generation Partnership Project), including the ETSI technical specifications defined and adopted by 3GPP.

3 SERVICE DEFINITION

This Service Schedule defines terms and conditions for:

3.1 The supply of the international MMS Interworking HUB Service by the IPX Provider to the Service Provider whereby the IPX Provider agrees to exchange MMs between the Service Provider and the Elected Participating Service Providers either directly or via a Third Party IPX Provider for delivery to a Recipient Device; and

3.2 The provision of MMS Termination Services by the Service Provider to the IPX Provider whereby the Service Provider agrees to convey MMs received from the IPX Provider to a Recipient Device and whereas (for the avoidance of doubt) MMs sent from the MMSIP System to the Service Provider System may be:

3.2.1 MMs received by the IPX Provider from a Service Provider Elected by the Service Provider; or

3.2.2 MMs received by the IPX Provider from a Service Provider Elected by the Service Provider via a Third Party IPX Provider.

4 OBLIGATIONS

- 4.1 In order to facilitate the Successful Routing of MMs in accordance with the agreed MMS Interworking Service, the Service Level Agreement and the Operational Procedures needs to be applied as per SLA & Technical Annexes to this Schedule.
- 4.2 Parties shall comply with the MMS Test Plan as described by GSMA PRD IR.53.
- 4.3 The list of Participating Service Providers Elected by the Service Provider shall be updated on a monthly basis in accordance with the procedures described in Clause 7.
- 4.4 Neither Party shall send any MMs to the other Party's System which originates from a third party's Service Provider other than:
- 4.4.1 (In the case of the IPX Provider) MMs originating from a End user of a Participating Service Provider who is Elected by the Service Provider; and
- 4.4.2 (In the case of the Service Provider) a mobile virtual network operator with whom the Service Provider has entered into an agreement to provide mobile virtual network services by means of the Service Provider.
- 4.5 Nothing in this Schedule shall be construed as imposing any requirement or obligation upon the Service Provider to convey MMs to the IPX Provider.

5 COMMENCEMENT DATE OF MMS INTERWORKING SERVICES

- 5.1 In relation to the initial commencement of the Service and without prejudice to the other obligations of the Parties set out in this agreement.
- 5.2 The IPX Provider shall be under no obligation to provide the IPX Service in respect of any Participating Service Provider until the Service Commencement Date in respect of that Participating Service Provider has passed; and
- 5.3 The Service Provider shall be under no obligation to provide its Termination Service in respect of any Participating Service Provider Elected by the Service Provider until the Service Commencement Date in respect of that Participating Service Provider has passed.

The Service Provider shall schedule the commencement of the service interoperability.

- 5.4 All Billing and Charging mechanisms shall start from the Commencement Date.

Commencement date of MMS Interworking Services	<i>[State date agreed between parties with the following format MM/DD/YYYY]</i>
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6 TERMINATION OF SERVICE

- 6.1 All matters relating to the termination of the Agreement refer to Section 21 in the Main Body of this agreement.
- 6.2 The termination of the MMS Interworking Service shall be subject to a notice period of no less than ninety (90) days. Other notification shall be agreed between the IPX Provider, Service Provider and Participating Service Provider based in accordance to the requirements based on the Service specific requirements.

7 PARTICIPATING ELECTION PROCESS

- 7.1 All Participating Service Providers and relevant information such as the termination charges and the service parameters, as well as the Elected Participating Service Providers are listed in the Technical Annexe to this Schedule. The list will include the following information:
- 7.1.1 Any new Participating Service Provider;
- 7.1.2 The Participating Service Provider's Termination Charges of all Participating Service Providers (including any new Participating Service Provider):
- In the currency of the Participating Service Provider; and
 - In the Invoicing Currency;
 - Together with the exchange rate used for any necessary conversions from the currency of the Participating Service Provider to the Invoicing Currency.

- 7.2 The IPX Provider shall include with the list referred to in Article [7.1], all details of the new Participating Service Provider Service Parameters and the details of any proposed changes to any Participating Service Provider's Service Parameters and Participating Service Provider's Termination Charges relating to any existing Participating Service Provider and the wished dates for the openings.
- 7.3 In respect of each Invoice Period, the currency exchange rate to be used by the IPX Provider to make any necessary currency conversions in respect of any Participating Service Provider's Termination Charges shall be a neutral reference point such as the FT]. [please make sure that it is clear which exchange rate you are referring to]
- 7.4 In the event that any list issued by the IPX Provider contains details of any new Participating Service Provider for MMs:
- 7.4.1 Technical Annex shall be deemed to have been amended to include the details of that new Participating Service Provider together with the Participating Service Provider's Termination Charges relating that new Participating Service Provider quoted in the currency of the Participating Service Provider; include in technical Annex
- 7.4.2 Technical Annex shall be deemed to have been amended to include the Participating Service Provider Service Parameters relating to the new Participating Service Provider. include in technical Annex
- 7.5 In respect of the establishment of MMS Interworking Services between the Service Provider and a new Participating Service Provider the following process applies:
- 7.5.1 IPX Provider shall send to the Service Provider an updated list of reachable destinations within the first week of every month.
- 7.5.2 The Service Provider shall send to the IPX Provider the forecasted destinations requested for opening within the next 6 months ("wish-list") by September 30th and March 31st of every year. This "wish-list" document shall include at least the information below:
- Name of the wished Participating Service Provider
 - Wished commencement date
 - Any special requirements/requests for termination rates
- 7.5.3 The IPX Provider shall provide the Service Provider with a "match-list" containing the information below, by October 31st and April 30th:
- Date on which the Participating Service Provider will be ready to proceed for testing,
 - If the Participating Service Provider decides not to open its network to the inquiring Service Provider the reason for it
 - Any feedback on special requirements/requests for termination rate

- 7.5.4 At least one month prior to the forecasted testing date, the MMSIIPX Provider shall reconfirm this agreed date to the Service Provider.
 - 7.5.5 The MMSIP IPX Provider shall inform the Service Provider of any delay of testing, indicate the reason and inform the Service Provider of the new rescheduled date.
 - 7.5.6 Afterwards, the IPX Provider shall assume responsibility for any further necessary coordination between the parties.
 - 7.5.7 The MMSIP IPX Provider shall commence the provision of the MMS Transit Service in respect of MMs originated on the Service Provider System and sent to the Participating Service Provider System of the new Participating Service Provider on and from the date of issue of the applicable list in which the new Participating Service Provider is introduced and may commence charging for the service on and from the beginning of the Invoice Period to which that list relates;
 - 7.5.8 The Service Provider shall (without prejudice to any other obligations it may have under this Agreement) be under no obligation to provide the Service Provider's MMS Termination Service in respect of that Participating Service Provider unless and until the Service Commencement Date in respect of that Participating Service Provider has passed.
- 7.6 The Service Provider may at any time notify the MMSIIPX Provider that it wishes to provide the Service Provider's MMS Termination Service in respect of a Participating Service Provider which is not already (at the time of such notice) an Elected Participating Service Provider in which event the provisions of Article 7.5 shall apply in respect of the establishment of MMS Interworking Services between the Service Provider and that Participating Service Provider mutatis mutandis provided always that the Parties shall each be able to commence charging in respect of Data traffic exchanged between the Service Provider and the Participating Service Provider in question, as soon as they commence the provision of their respective MMS Interworking Services.
- 7.6.1 In any circumstances where a Participating Service Provider is added to the list of Participating Service Providers Elected by the Service Provider, Technical Annex shall be deemed to have been amended accordingly.
 - 7.6.2 In respect of any Participating Service Provider Elected by the Service Provider, the Service Provider may cease the provision of the Service Providers MMS Termination Service in respect of MMs for which that Participating Service Provider is the Originating Operator at any time upon at least eighty (80) days' prior written notice to the IPX Provider. With effect from the expiry of such notice, the Service Provider shall have no further obligation to provide the Service Provider's MMS Termination Service in respect of that Participating Service Provider (unless and until the Service Providers hall Elect that Participating Service Provider again in accordance with the provisions of Clause [7]) and the Parties shall be deemed to have amended the list of Participating Service Providers Elected by the Service Provider as set out in Technical Annex accordingly.
 - 7.6.3 The IPX Provider may remove Participating Service Providers from the list of Participating Service Providers set out in Technical Annex upon at least sixty

(60) days' prior notice in writing to the Service Provider. Upon the expiry of such a notice:

7.6.3.1 Neither Party shall have any further obligation to provide MMS Transit Service or MMS Termination Services in respect of the Participating Service Provider specified in the notice; and

7.6.3.2 The Parties shall be deemed to have amended this Agreement by deleting references to that Participating Service Provider from Technical Annex and (if the Participating Service Provider in question is Elected) Technical Annex.

8 LEGACY SUPPORT

- 8.1 If (in circumstances where the Service Provider is acting as a Recipient Operator) the Service Provider receives from the IPX Provider an MM addressed to a Recipient Device which is a Legacy Device, the Service Provider shall use reasonable endeavours to provide Legacy Support.
- 8.2 The IPX Provider shall ensure that Participating Service Providers Elected by the Service Provider shall use reasonable endeavours to provide Legacy Support in respect of MMs addressed to Legacy Devices registered on its Participating Service Provider System.
- 8.3 The level of support provided by Service Provider for Legacy Devices in respect of MMs passed by the IPX Provider to the Service Provider pursuant to these MMSIP Terms and Conditions shall be no less than the Service Provider provides in respect of other MMs addressed to Legacy Devices registered on the Service Provider System.
- 8.4 The IPX Provider shall ensure that the level of support provided by each Participating Service Provider Elected by the Service Provider in respect of MMs originating on the Service Provider System and passed by the IPX Provider to that Participating Service Provider shall be no less than that which the Participating Service Provider provides in respect of other MMs addressed to Legacy Devices registered on its Participating Service Provider System.
- 8.5 For the purposes of this MMS Interworking Services Agreement, the Service Provider shall be regarded as providing Legacy Support in respect of an MM received by the Service Provider from the IPX Provider pursuant to this MMS Interworking Services Agreement addressed to a Legacy Device registered on the Service Provider System, if upon receipt of the MM, the Service Provider takes the following steps:
 - 8.5.1 stores the MM in the appropriate format in an internet facility accessible via a URL or accessible via WAP to URL, WAP Push – WAP access combination or MM – E-Mail conversion
 - 8.5.2 sends to the Recipient Device a SM containing information where the MMS is available for the customer:

9 SIZE DEFINITION

The Parties agree to use the harmonized message size definition when calculating the size of a multimedia message. The size of a message is defined as the total length, in octets, of the subject information element and of all the media objects, including the presentation media object e.g. SMIL (see 3GPP TS 23.140 Version 5.5.0 or higher), measured at MM4 interface.

Parties agree to use standardised Volume Classes as listed below:

- Class A size below or equal to 3 Kbytes
- Class B size above 3 Kbytes and below or equal to 10 Kbytes
- Class C size above 10 Kbytes and below or equal to 30 Kbytes
- Class D size above 30 Kbytes and below or equal to 100 Kbytes
- Class E size above 100 Kbytes and below or equal to 300 Kbytes
- Class F size above 300 Kbytes and below or equal to 600 Kbytes.

Accordingly it is the responsibility of the IPX PROVIDER to not transmit to the Service Provider MMS where the size exceeds the capacity limits notified by the Service Provider in the SLA. In case the IPX Provider receives an MM from the Service Provider that cannot be supported by the Participating Service Provider, the IPX PROVIDER shall send back the following applicable failure code to the Service Provider:

X-Mms-Request-Status-Code: Error-content-not-accepted
X-Mms-Status-Text: Msg max size exceeded

10 TESTING REQUIREMENT

9.1 The IPX shall perform all end-to-end tests described in the correspondent Service IR. 53 and IN.04 documents and will ensure that the Service implemented via the IPX between the Service Provider and the Elected Participating Service Providers is functioning correctly.

9.2 The Service Provider shall configure the necessary data when required by the IPX Provider in order to enable the IPX to do the tests with the Elected Participating Service Providers and the Participating Service Providers having elected the Service Provider, provided that the latter has accepted to have Service Interworking with such Participating Service Providers.

9.3 The Service Provider and an Elected Participating Service Provider shall provide all necessary tools in order to support end-to-end testing.

11 SERVICE CONTACT DETAILS

Notices and notifications relevant to the implementation and operation of this Service and listed in this Service Schedule will be considered as duly executed when exchanged between the Service Provider and the IPX Provider at the respective contact points defined here below.

- **Service Provider Contact Points:**

<Operator>
<Additional info.>
<Postal address>
<Postcode>
<COUNTRY>
Contact person:
<Name>
Telephone: <+xx xx xx xx xx> (Operator: <+xx xx xx xx xx>)
Fax: <+xx xx xx xx xx>
Email Address: xxx.xxxx@xxx.xxx.xxx.xx
Service hours: <.....>

- **IPX Provider Contact Points:**

<Operator>
<Additional info.>
<Postal address>
<Postcode>
<COUNTRY>
Contact person:
<Name>
Telephone: <+xx xx xx xx xx> (Operator: <+xx xx xx xx xx>)
Fax: <+xx xx xx xx xx>
Email Address: xxx.xxxx@xxx.xxx.xxx.xx
Service hours: <.....>

12 SERVICE SCHEDULE SIGNATURE

IN WITNESS WHEREOF the Parties have caused this Agreement to be executed by their duly authorised representatives on the date(s) shown below.

IPX Provider

Signature

Printed

Title

Date

Service Provider

Signature

Printed

Title

Date

ANNEX 1 – BILLING**1. Service provider termination charges**

	Size					
	Class A	Class B	Class C	Class D	Class E	Class F
Rate						

2. IPX Transit Charges

The IPX Provider will charge the Service Provider amount/currency per MMS exchanged upon successful transmitting of the MMS to the destination.

3. Participating Service Providers Termination Rates

The IPX Provider should provide the Service Provider, on a monthly basis, with the termination charges of all participating Service Providers.

4. Data exchange and Invoice procedure**Invoice period**

The invoice period is a one-month period (n), which lasts from 00.00.00AM of the 1st day of the calendar month (n) to the 11.59.59PM of the last day of the calendar month (n) (local dates/times).

Minimum Content of the invoice

The minimum content of an invoice issued either by the IPX Provider or the Service Provider has to be the following:

general details:

- name of the receiving operator
- name of the sending operator
- invoicing date and number
- invoicing due date
- the bank details

specific details for each elected participating Service Provider destination:

- name and country of the elected Service Provider

- number of MMs, applied tariff and total amount for each Volume Class
- transit fee per message
- total transit fee amount
- other monthly fee if applicable
- total invoice amount

Additionally Bulk MMs Data shall be exchanged monthly in form of a text format (e.g., .csv, .xls) sent by e-mail

Check of received MMS Bulk Data

The Parties check the received bulk data against own information. In case of discrepancies the relevant clauses in the main body are applicable.

ANNEX 2 - TECHNICAL

1. Operational Procedures

1.1. In order for the Service Provider to control and prepare statistics of the Service interworking traffic terminating in its network, the IPX Provider as transparently as possible transmits to the Service Provider all details of the Service content, on the originating number and originating Service Provider.

1.2. The operational process can be divided into 4 main areas. These are:

- Planned notification and information exchange
- Service performance and statistical monitoring
- Changes to the Service
- Unplanned events notification.

▪ Planned Notifications and Information Exchange

1.3. Each Service Provider will receive a monthly report including all the message exchange detail per destination. The report will be in a format agreed between the Service Provider and the IPX Provider.

2. Participating Service Parameter Change Notification

2.1 IPX Provider to Service Provider: The Service Provider will be notified once monthly of any parameter changes for Participating Service Providers. The Service Provider will be notified at the time of how many days the Service Provider has to respond to the change request.

2.2. Service Provider to IPX Provider: The Service Provider will need to notify the IPX Provider as soon as possible of any parameter changes which will impact either the IPX Provider or the Participating Service Providers.

2.3. Emergency notifications should be carried out in accordance with the terms of the Service Level Agreement.

ANNEX 3 SLA

1 Purpose

- 1.1 The architecture of the IPX domain is clearly split in two layers: Service and Transport. The Service layer is in charge of Service Hub and Service Transit capabilities, and the Transport layer is in charge of maintaining along the whole path the technical characteristics of the communication depending on the Traffic Class of Service used.
- 1.2 This appendix is intended to provide the requirements to ensure the end-to-end Quality of the MMS Interworking IPX Service described in this Service Schedule for the Service Layer.
- 1.3 According to these principles, this Appendix includes the following areas:
 - Service Definitions
 - Definition of Terms
 - Service Quality commitments
 - Qualifying faults
 - Service credits
 - Service Credits claim procedures
 - IPX Provider and Service Provider commitment to end-to-end quality
 - Troubleshooting
 - Customer Care
 - Fast response times
 - Monthly reporting on QoS indicators
 - SLA Review

2 Scope and Assumption

- 2.1. The parties agree that this Appendix to the Agreement:
 - provides a detailed description of end to end Quality of Service (QoS), including related terms definition, initial requirements, provisioning and measurement methods.
 - does not cover the IPX end-to-end QoS at the Transport layer and it is independent of the IP network transport layer used. To avoid any misunderstanding, only 2 possibilities can be applied for the transport layer: GRX transport or IPX transport.
 - covers IPX end-to-end QoS at the Service layer only for the communications where Service Provider is the originating network. That is, it is intended as a one way SLA, that is, traffic that starts from the Service Provider, goes via the IPX Provider only or also via Third party IPX Provider(s) and ends at a Terminating Service Provider(i.e. the Participating Service Provider on whose network the

traffic has to be terminated). The IPX Provider commits to send to the Service Provider all the traffic it receives from other Elected Participating Service Providers or Third Party IPX Provider(s) at the same QoS by which the IPX Provider receives the traffic.

- applies a cascade responsibility principle. This means that, in the typical scenario analysed in this annex, in order to guarantee end-to-end QoS there will be an SLA in place between the Service Provider and the IPX Provider and an SLA between the IPX Provider and the Third Party IPX Provider(s) (in the case when a Third Party IPX Provider is involved in the traffic handling). The IPX Provider must be held responsible for the behaviour of Third Party IPX Provider up to the Elected Participating Service Provider(s).
- in order to guarantee a full end-to-end SLA both ways from the Service Provider to the Elected Participating Service Provider, a similar SLA chain must be in place on the return path .
- assumes that any two Service Providers are interconnected by at most two IPX networks as a best solution. In the event that more than two IPX providers are needed to provide the connectivity, the QoS requirements shall remain unaltered.

The following circumstances are considered out of scope:

- A fault in, or any other problem associated with, Service Provider -supplied power, any Service Provider Equipment, non-maintained structured cabling.
- Service suspension in accordance with the terms of the AA.80 Agreement.

3 Service Definition

The requested Service is described at Clause 2. SERVICE DEFINITION of this Service Schedule.

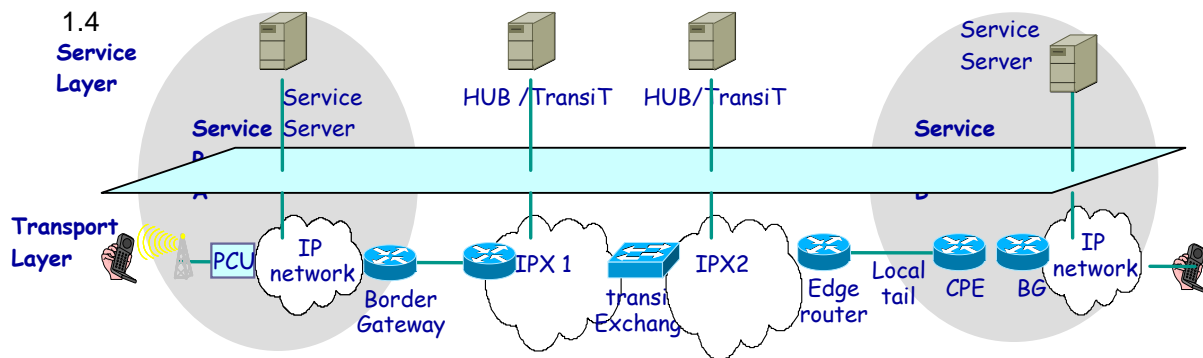
3.1 IPX end-to-end responsibility

3.1.1 The Parties intend this Annex to enable end-to-end QoS in the IPX Service rendered to the Service Provider in a way that all commitments of the IPX Provider are valid from the Service Provider's network to the Elected Participating Service Provider('s)' network whatever technical solution is used and operated by the IPX Provider.

3.1.2 To achieve this goal this Annex defines a set of Key Performance Indicators (KPIs) that provide a measurement of the level of QoS associated to the Service rendered by the IPX Provider

3.1.3 The Parties agree that it is the responsibility of the IPX Provider to provide the end-to-end quality as described in this Annex. In order to achieve end-to-end QoS all parties involved in the message flow should be compliant with the requirements expressed in this Annex.

3.1.4 Parties understand that the end-to-end path in an IP Service connection is can be made up of many diverse components. The following drawing is only an illustration of what could be in the path:



4 Key Performance Indicators (KPI)

All KPIs are defined and must be calculated for the traffic sent and received by each Service Provider (i.e. the Originating Service Provider or the Recipient Service Provider).

For example if there are three Service Providers (A, B and C) exchanging MMS messages, there will be six sets of KPIs: A-B, B-A, A-C, C-A, B-C and C-B. The KPIs shall not be calculated for the total of the traffic, but for the traffic exchanged on each leg: A-B, B-A, A-C, C-A, B-C and C-B.

4.1 List of KPIs

4.1.1 The parties have agreed a set of KPIs that reflect the QoS rendered by IPX Provider.

4.1.2 These KPI's are:

- MTRS in case of
 - Fatal errors: x hours
 - Severe errors: y hours
 - Warning errors: z hours
- Service Availability
- Service Provisioning Timeframes
- Service Dependent KPI (TBD)

4.1.3 These indicators relate only to traffic sent by the Service Provider to each Elected Participating Service Provider via the IPX Provider. The origin of the measurements is from the BG of the Service Provider's network. In order to be compliant with this SLA and to be able to evaluate the following KPIs, the Service Provider which is the origin of the MMS should always ask for the MM4_forward.RES when sending the

MM4_forward.REQ to the Service Provider which is the recipient of the MMS, according to the procedures described in 3GPP TS 23.140.

- 4.1.4 The same applies for the delivery report. If the user originating the message requested a delivery report for the MMS, then the Service Provider which is the recipient of the MMS should always ask for the MM4_delivery_report.RES when sending the MM4_delivery_report.REQ to the Service Provider which is the origin of the MMS, according to the procedures described in 3GPP TS 23.140

4.2 Definition of KPIs

4.2.1 Maximum Time to Restore the Service – MTRS –

- **Fatal Errors**

A complete breakdown/outage, critical performance degradation, functionality of a single Service causing service unavailability included but not limited to:

- Failure of connectivity and/or Traffic between IPX Provider and a connected Third Party IPX carrier
- Total loss of connectivity between Service Provider and IPX Provider platform
- Service affecting outage in the interconnection equipment
- Serious degradation of the quality as measured by the KPIs indicated within this SLA measured both by the Service Provider or the IPX Provider

- **Severe Errors**

The functionality of the Service is affected to a large extent, major performance degradation or loss of important function occurs, legislation or security is critically affected. Degradation of the service, either of the performance or the quality, includes but it is not limited to:

- Loss of diversity or duplicity of the routes or/and signalling links, without isolation with the other network, i.e., one link of the redundant connections is out of service; backbone congestion causes excessive packet loss or jitter.
- Degradation of the QoS to any Elected Participating Service Provider, being defined as when any measured value for KPI is below the target threshold as indicated in the SLA

- **Warning Errors**

A minimal limitation to the Service functionality. This Fault implies irregular network behaviour without operational constriction and without an impact on business, included but not limited to:

- Real-time reporting portal access problem;
- Asymmetric routing management issues
- Failure affecting isolated or individual service numbers.

4.3 Service Availability

Is the proportion of the time that IPX Service is available to the Service Provider on a monthly basis.

The Service shall be deemed unavailable when it cannot carry out its function properly, other than if due to any of the following:

- Access method unavailability (the unavailability of the underlining connectivity between the Service Provider and the IPX Provider covered by the IPX Transport SLA of this AA.80 Agreement)
- a Planned Outage or a Scheduled Maintenance Window within the thresholds mutually agree as per Clause 9.9 of this SLA.

4.3.1 The period of unavailability of the Service will be measured from the data contained in the monthly Quality of Service (QoS) Reports in accordance with the “Reporting” rules provided within this Schedule 10.1.

In these reports it will be shown:

- The time the Service was unavailable, and
- The time without service due to failures
- The hours for which the QoS report don't show any data, exceeding the threshold of “1 hour per day during 3 days of the month” will be considered also as unavailability.

4.3.2 It is important to remark that the Service unavailability is not restricted to the total or partial loss of the service for the total of the traffic sent from one Customer to the IPX Provider, but it applies to the traffic sent from every Originating Service Provider to any Recipient Service Provider.

Three different types of availabilities apply:

4.3.3 System Availability

It applies to the Service offered by the IPX Provider on its own network from the BG of the Service Provider.

Calculating Availability: The parameter System Availability describes the percentage of time that the System is carrying its function out properly (see calculation below).

$$\boxed{[\%] = \frac{A_m - B_m}{A_m} \times 100}$$

where:

- A_m = Number of hours in Month of System Availability
- B_m = Number of hours when System is unavailable (excluding planned outages)

System Unavailability time begins at time of detection of unavailability by either the IPX Provider or the Service Provider whichever the earlier and ends at time of Service restoration.

System Availability means that the IPX Provider is able to transit the Service Provider's traffic to the Elected Participating Service Provider's network or to the Third Party's IPX Provider, if any.

4.3.4 Transit Service Availability

Transit Service Availability applies to the service offered by the IPX Provider from the Service Provider's network up to the Elected Participating Service Provider's network.

Availability on the access is determined by the relevant IPX Provider type of connection.

Calculating Availability: The parameter Transit Service Availability describes the percentage of time that the Transit Service is carrying its function out properly (see calculation below).

$$[\%] = \frac{A_m - B_m}{A_m} \times 100$$

where:

- A_m = Number of hours in Month of Transit Service Availability
- B_m = Number of hours when IPX Provider's Transit Service is unavailable (excluding planned outages)

Transit Service Unavailability time begins at time of detection of unavailability by either the IPX Provider or the Service Provider whichever the earlier and ends at time of service restoration.

Transit Service availability means that the IPX is able to transit and terminate the Service Provider's traffic to the Elected Participating Service Provider's network.

4.3.5 Service Transit Service Availability Per Destination

Service Transit Service Availability Per Destination applies to the service offered by the IPX Provider from the Service Provider's network up to the Elected Participating

Service Provider's network. This indicator reflects possibility for the Service Provider to access a particular destination included in the Service offered by the IPX Provider.

Availability on the access is determined by the relevant IPX Provider type of connection.

Calculating Availability: The parameter Transit Service Availability Per Destination describes the percentage of time that the Transit Service is carrying its function out properly for the Terminating Service Provider (see calculation below).

$$\left[\% \right] = \frac{A_m - B_m}{A_m} \times 100$$

where:

- A_m = Number of hours in Month of IPX's Transit Service Availability for a Terminating Service Provider
- B_m = Number of hours when IPX Transit Service is unavailable for a Terminating Service Provider (excluding planned outages)

Transit Service Per Destination Unavailability time begins at time of detection of unavailability of a Terminating Service Provider by either the IPX Provider or the Originating Service Provider whichever the earlier and ends at time of service restoration for a Terminating Service Provider.

Transit Service Per Destination availability means that the IPX Provider is able to transit and terminate the Terminating Service Provider's traffic to a specific Elected Participating Service Provider's network.

4.3.6 Service Provisioning Timeframes

This defines the average timeframes for the IPX to perform and undertake certain activities in respect of provisioning/commissioning new customers and services. Such as:

- **Maximum Time to Turn On a New Destination** that is included in the IPX connectivity list, assuming that the new destination (Elected Participating Service Provider) accepts traffic from the Client Service Provider.
- **Maximum Time to Modifying existing Client Service Provider data**
It represents an indication of the commitment of the IPX to commission new customers and new services for existing customers expeditiously.

4.3.7 End to End MMS Delivery Report Response Failure Ratio [%]:

This parameter describes the probability that the MMSIP does not send the delivery report response (MM4_delivery_report.RES) to the MMSC recipient after having received the deliver report (MM4_delivery_report.REQ) from the MMSC recipient itself.

This parameter is measured between trigger 8 and 13 in the figure 1 above.

This parameter represents an end to end KPI that is applicable for the Network Operator for the inbound MMS traffic that is the MMS traffic received from another Network Operator which is the origin of the message.

$$E2E \text{ MMS Delivery Report Response Failure Ratio } [\%] = 100 * \left(1 - \frac{\sum DR \text{ Re sponse Sent to MMSC recipient}}{\sum DR \text{ Re quest received from MMSC recipient}} \right)$$

4.3.8 End to End MMS Delivery Report Response Time [s]:

This parameter describes the time from receiving the delivery report from the MMSC recipient (MM4_delivery_report.REQ) until sending the delivery report response to the MMSC recipient (MM4_delivery_report.RES).

So this is the time between trigger 8 and 13 in the figure 1 above.

This parameter represents an end to end KPI that is applicable for the Network Operator for the inbound MMS traffic that is the MMS traffic received from another Network Operator which is the origin of the message.

$$E2EMMS \text{ DRRe sponse Time } [s] = \frac{\sum t_{DRRe sponse_sent \text{ to recipient}} - t_{DR_received \text{ from recipient}}}{\sum DRRe sponse \text{ Sent to MMSC recipient}}$$

The KPIs End to End MMS Delivery Report Response Failure Ratio and End to End MMS Delivery Report Response Time are applicable when the Network Operator is the recipient of the MMS (in the sense that are measured on the Recipient Service Provider's network).

4.3.9 MMS Message Transit Failure Ratio [%]

Abstract definition: The parameter MMS Message Transit Failure Ratio describes the percentage of cases where the MMSIP is not able to perform the transit of the MMS received (MM4_forward.REQ) from the origin MMSC to the recipient MMSC.

Note 1: Named in the signalling diagram “Forward-REQ-Transit-HUB Failure Ratio”, from Trigger 2 until Trigger 3 in Fig. 1.

Note 2: This does not include MMS messages that cannot be delivered to the recipient MMSC due to inbound traffic levels having exceeded those defined by the recipient network (i.e. throttling).

Abstract equation:

$$\text{MMS Message Transit Failure Ratio [\%]} = 100 * \left(1 - \frac{\sum \text{MMS successfully Sent to MMSC destination}}{\sum \text{Deliverable MMS Received from MMSC origin}} \right)$$

MMS successfully Sent to MMSC destination is defined as the number of messages that are successfully delivered based on the reception of the MM4_forward.RES message from the MMSIP1 (trigger 4) as illustrated in Figure 1 above.

Deliverable MMS Received from MMSC origin is defined as the number of messages received from the MMSC origin that can be delivered. A message is considered as being deliverable in case the message is retrieved in a valid format and with a routable address with a route which is advertised by the carrier.

4.3.10 MMS Message Transit Time[s]

Abstract definition: The parameter MMS Message Transit Time describes the time from receiving the MMS (MM4_forward.REQ) from the MMSC origin until sending the message to the recipient MMSC. The message is considered as being sent to the recipient MMSC when based on the reception of the MM4_forward.RES message from the MMSIP1 (trigger 4) as illustrated in Figure 1 above.

Notes:

1. Named in the signalling diagram “Forward-REQ-Transit-HUB Time”, from Trigger 2 until Trigger 3 in Figure 1.
2. This does not include MMS messages that cannot be delivered to the recipient MMSC due to inbound traffic levels having exceeded those defined by the recipient network (i.e. throttling).

Abstract equation:

$$\text{MMS Message Transit Time [s]} = \frac{\sum t_{\text{MMS_sent to destination}} - t_{\text{MMS_received from origin}}}{\sum \text{MMS Successfully Sent to MMSC destination}}$$

4.3.11 MMS Acknowledgement Failure Ratio [%]

Abstract definition: The parameter MMS Acknowledgement Failure Ratio describes the percentage of cases where the carrier does not receive an (status=OK or error) acknowledgement (MM4_forward.RES) from the recipient MMSC after having sent the message (MM4_forward.REQ).

Note: Named in the signalling diagram “Forward-RES-HUB Failure Ratio”, from Trigger 3 until Trigger 4 in Fig. 1.

Abstract equation:

$$\text{MMS Acknowledgement Failure Ratio [\%]} = 100 * \left(1 - \frac{\sum \text{Ack Received from MMSC destination}}{\sum \text{MMS Successfully Sent to MMSC destination}} \right)$$

4.3.12 MMS Acknowledgement Time [s]

Abstract definition: The parameter MMS Acknowledgement Time describes the time from sending the message to the recipient MMSC (MM4_forward.REQ) until receiving the positive (status=OK) acknowledgement from the recipient MMSC (MM4_forward.RES).

Note: Named in the signalling diagram “Forward-RES-HUB Time”, from Trigger 3 until Trigger 4 in Fig. 1.

Abstract equation:

$$\text{MMS Acknowledgement Time [s]} = \frac{\sum t_{\text{Ack_received from destination}} - t_{\text{MMS_sent to destination}}}{\sum \text{Ack Received from MMSC destination}}$$

4.3.13 MMS Acknowledgement Transit Failure Ratio [%]

Abstract definition: The parameter MMS Acknowledgement Transit Failure Ratio describes the percentage of cases where the carrier is not able to perform the transit of the acknowledgement (status=OK or error) received (MM4_forward.RES) from the recipient MMSC to the origin MMSC.

Note: Named in the signalling diagram “Forward-RES-Transit HUB Failure Ratio”, from Trigger 4 until Trigger 5 in Fig. 1.

Abstract equation:

$$\text{MMS Acknowledgement Transit Failure Ratio [\%]} = 100 * \left(1 - \frac{\sum \text{Ack Sent to MMSC origin}}{\sum \text{Ack Received from MMSC destination}} \right)$$

AckSenttoMMSCorigin is defined as the number of acknowledgments that are successfully delivered based on the completion of the SMTP transaction (regardless of SMTP status code).

AckReceivedfromMMSCdestination is defined as the number of acknowledgments received from the MMSC destination that can be delivered. An acknowledgment is considered as being deliverable in case the acknowledgment is received in a valid format and with a routable address with a route which is advertised by the carrier.

4.3.14 MMS Acknowledgement Transit Time [s]

Abstract definition: The parameter MMS Acknowledgement Transit Time describes the time from receiving the acknowledgement (status=OK or error) (MM4_forward.RES) from the recipient MMSC until sending the acknowledgement to the MMSC origin.

Note: Named in the signalling diagram “Forward-RES-Transit-HUB Time”, from Trigger 4 until Trigger 5 in Fig. 1.

Abstract equation:

$$\text{MMS Acknowledgement Time [s]} = \frac{\sum t_{\text{Ack_sent to origin}} - t_{\text{Ack_received from destination}}}{\sum \text{Ack Sent to MMSC origin}}$$

4.3.15 MMS Delivery Report Transit Failure Ratio [%]

Abstract definition: The parameter MMS Delivery Report Transit Failure Ratio describes the percentage of cases where the carrier is not able to perform the transit of the Delivery Report received (MM4_delivery_report.REQ) from the recipient MMSC to the origin MMSC.

Notes:

1. Named in the signalling diagram “DR-REQ-Transit-HUB Failure Ratio”, from Trigger 8 until Trigger 9 in Fig. 1.
2. This does not include delivery reports that cannot be delivered to the originator MMSC due to inbound traffic levels having exceeded those defined by the originator network (i.e. throttling).

Abstract equation:

$$\text{MMS Delivery Report Transit Failure Ratio [\%]} = 100 * \left(1 - \frac{\sum DR \text{ Sent to MMSC origin}}{\sum DR \text{ Received from MMSC destination}} \right)$$

DRSenttoMMSCorigin is defined as the number of delivery reports that are successfully delivered based on reception of the MM4_delivery_report.RES message from the MMSIP1 (trigger 12) as illustrated in Figure 1 above.

DRReceivedfromMMSCdestination is defined as the number of delivery reports received from the MMSC destination that can be delivered. A delivery report is considered as being deliverable in case the delivery report is retrieved in a valid format and with a routable address with a route which is advertised by the carrier.

4.3.16 MMS Delivery Report Transit Time [s]

Abstract definition: The parameter MMS Delivery Report Transit Time describes the time from receiving the Delivery Report (MM4_delivery_report.REQ) from the recipient MMSC until sending the delivery report to the MMSC origin.

Notes:

1. Named in the signalling diagram “DR-REQ-Transit-HUB Time”, from Trigger 8 until Trigger 9 in Fig. 1.
2. This does not include delivery reports that cannot be delivered to the originator MMSC due to inbound traffic levels having exceeded those defined by the originator network (i.e. throttling).

Abstract equation:

$$\text{MMS Delivery Report Transit Time [s]} = \frac{\sum t_{DR_sent\ to\ origin} - t_{DR_received\ from\ destination}}{\sum DR \text{ Sent to MMSC origin}}$$

4.3.17 MMS Delivery Report Response Time [s]

Abstract definition: The parameter MMS Delivery Report Response Time describes the time from sending the delivery report to the MMSC origin (MM4_delivery_report.REQ) until receiving the delivery report response from the MMSC origin (MM4_delivery_report.RES).

Note: Named in the signalling diagram “DR-RES-HUB Time”, from Trigger 9 until Trigger 12 in Fig. 1.

Abstract equation:

$$MMS\ DR\ Re\ sponse\ Time\ [s] = \frac{\sum t_{DR\ Re\ sponse\ _received\ from\ origin} - t_{DR_seht\ to\ origin}}{\sum DR\ Re\ sponse\ Re\ ceived\ from\ MMSC\ origin}$$

4.4 Targets for KPIs

4.4.1 Maximum Time to Restore the Service – MTRS –

Severity	Maximum restoration times	Initial Feedback	Update Interval
Fatal	4 hours	30 minutes	1 hour
Severe	6 hours	30 min	4 Hours
Warning	5 working days	30 minutes	2 working day

The maximum number of qualified Fatal faults during the quarter must not be higher than [State number of faults agreed between Parties]

Additionally, the maximum number of qualified Fatal faults associated with the same problem, must never be more than one in the same Terminating Service Provider during the year's quarter.

4.4.2 Service Availability

- System Availability target applies: [XX.X%].
- Transit Service Availability target applies: [XX.X%].
- Transit Service Availability Per Destination target applies: [XX.X%]

for an Elected Participating Service Provider or a set of Elected Participating Service Provider, as indicated by Service Provider (e.g [State percentage agreed between Parties]%) for top 20 Elected Participating Service Provider, as indicated by Service Provider and ([State percentage agreed between Parties]%) for remaining Elected Participating Service Provider)

4.4.3 Service Provisioning Timeframes

- Maximum Time to Turn On a New Destination (Elected Participating Service Provider): [State number of days agreed between Parties]days
- Maximum Time to Modifying existing Service Provider: [State number of days agreed between Parties] days

4.4.4 End to End MMS Delivery Report Response Failure Ratio [%]:

[To be agreed between Parties]

4.4.5 End to End MMS Delivery Report Response Time [s]:

[To be agreed between Parties]

4.4.6 MMS Message Transit Failure Ratio [%]

[To be agreed between Parties]

4.4.7 MMS Message Transit Time[s]

[To be agreed between Parties]

4.4.8 MMS Acknowledgement Failure Ratio [%]

[To be agreed between Parties]

4.4.9 MMS Acknowledgement Time [s]

[To be agreed between Parties]

4.4.10 MMS Acknowledgement Transit Failure Ratio [%]

[To be agreed between Parties]

4.4.11 MMS Acknowledgement Transit Time [s]

[To be agreed between Parties]

4.4.12 MMS Delivery Report Transit Failure Ratio [%]

[To be agreed between Parties]

4.4.13 MMS Delivery Report Transit Time [s]

[To be agreed between Parties]

4.4.14 MMS Delivery Report Response Time [s]

[To be agreed between Parties]

5 Qualifying Faults

- 5.1 When according to Service Provider own measurement, the average daily QoS indicators listed above achieved by IPX Provider fall below the values agreed, Service Provider may raise a “qualifying fault”
- 5.2 Service Provider must request IPX Provider to handle and investigate all disturbances in QoS Performance and to commit to resolve *[State percentage agreed between Parties]*% of qualifying faults within *[State number of hours agreed between Parties]*hrs where the fault lies in its own network and when the fault lies in a third Party network involved in the traffic conveyance/termination.
- 5.3 When according to the Service Provider’s own measurement, the average weekly or monthly QoS indicators listed above fall below the target point, Service Provider is entitled to raise a “qualifying weekly/monthly fault”.

6 Service Credits

6.1 Qualifying Claims

Service Provider may submit a claim for a service credits when a Qualifying fault as been raised and not resolved in the committed time.

6.2 Service Credit Level

Service Providers can use Schedule A attached to this SLA as reference

6.3 Service Credits Claim Procedure

- 6.3.1 In order to claim for a service credit, Service Provider may provide the following details of the faults to the IPX Provider Account Manager:
 - IPX Provider fault reference
 - Service Provider fault reference
 - Destination
 - Time of notification

-
- Time of resolution
 - Severity of error
 - Amount of credit claimed

6.3.2 The mechanism for compensating any eventual service credit due will mutually agree between parties.

7 Controlled connectivity policy

7.1 In order to avoid deterioration of the quality of service, information on the connectivity for each Terminating Service Provider shall be made transparent to the Service Provider.

In any case, the direct termination of traffic by the IPX Provider on the Terminating Service Provider shall be favoured whenever it is technically possible.

The Service Provider may request the IPX Provider to provide all connectivity information associated to its offer, namely identifying the type of routing used per each Terminating Service Provider. In particular, the minimum information that the IPX Provider shall provide to the Service Provider consist on the type of connectivity used to reach each Terminating Service Providers, classifying the connection into two groups depending if the connectivity is made through: direct connectivity or, connectivity through a Third Party IPX Provider.

7.2 Direct connectivity

Direct connectivity to Participating Service Providers is when the IPX Provider offers a direct connectivity with Participating Service Providers network to the Service Provider. That is, only one hop from the Service Provider and the Elected Participating Service Provider.

7.3 Indirect connectivity

Indirect connectivity to Participating Service Providers is when the IPX Provider uses a Third Party IPX Provider to offer connectivity to such Third Party IPX Providers networks. That is, at least two hops are needed to reach the Elected Participating Service Provider.

8 Customer Care

IPX Provider must provide a 24x7 Help Desk connectivity to support the needs of this Agreement and to attend the Service Provider enquiries.

8.1 Monitoring

- 8.1.1 IPX Provider must provide a web access monitoring tool where the Service Provider must be able to see the performance of IPX Provider for the traffic object of this agreement.
- 8.1.2 For avoidance of doubt the measurements shown in the web access must be only related with the traffic where Service Provider is the originating network.

9 Operation & Maintenance Agreement – Fault Management

9.1 Introduction

- 9.1.1 This section details the operational processes to be provided to Service Provider by IPX Provider and vice versa for IPX services.
- 9.1.2 The terms used in the Service Level Agreement between IPX Provider and Service Provider have the same meaning in the Operations and Maintenance Section unless otherwise stated.

9.2 Central Notification Addresses

- 9.2.1 Each Party must name a central entity (single point of contact) that is reachable 24 hours a day, 365 days a year and responsible for official notification processes in case of faults affecting the Service.
- 9.2.2 The requirements for the central notification contact are:
- Contact must be available 24 hours a day at a single telephone contact number
 - Competency concerning operational issues for IPX Services
 - Remote access to decentralized operational network elements
 - Relevant access to tools, resources and knowledgebase to solve problems

24 x7 Reference Details	IPX Provider Details	Service Provider Details
Contact Point		
Telephone Number		
Facsimile Number		
Email Address		

9.3 Fault Classification:

The IPX Provider shall open a trouble ticket in the case of any fault on the Service reported by the Service Provider or as identified by the IPX Provider at the contact points indicated in

the Matrix above. A severity level shall be assigned to each trouble ticket to describe the effect of the fault.

The following three levels of severity will be used:

9.3.1 Fatal Errors

A complete breakdown/outage, critical performance degradation, functionality of a single Service causing Service unavailability included but not limited to:

- Failure of connectivity and/or Traffic between IPX Provider and a connected Third Party IPX Provider
- Total loss of connectivity between Service Provider and IPX Provider platform
- Service affecting outage in the interconnection equipment
- Serious degradation of the quality as measured by the KPIs indicated within this SLA measured by the Service Provider or the IPX Provider

9.3.2 Severe Errors

The functionality of the Service is affected to a large extent, major performance degradation or loss of important function occurs, legislation or security is critically affected. Degradation of the service, either of the performance or the quality, includes but it is not limited to:

- Loss of diversity or duplicity of the routes or/and signalling links, without isolation with the other network, i.e., one link of the redundant connections is out of service; backbone congestion causing excessive packet loss or jitter.
- Degradation of the QoS to any Elected Participating Service Provider, being defined as when any measured value for KPI is below the target threshold as indicated in this Appendix

9.3.3 Warning Errors

A minimal limitation to the functionality of the Service. This Fault implies irregular network behaviour without operational constriction and without an impact on business, included but not limited to:

- Real-time reporting portal access problem;
- Asymmetric routing management issues;
- Failure affecting isolated or individual service numbers.

9.4 Fault Reporting procedures:

The following section describes the fault reporting procedure for both the Service Provider and the IPX Provider.

9.4.1 Fault Reporting by Service Provider:

The IPX Provider shall provide a fault reporting capability that is available 24x7x365.

Suspected faults on the Service shall be reported to the IPX Provider by any of the approved methods listed above (phone/fax/email) to the contact indicated in the matrix detailed in 9.2.2 within this Operations and Maintenance Agreement. Fatal faults shall be also followed by a phone call to the same contact. Faults will be logged and each call will be time-stamped and allocated a unique call reference number in the IPX Provider trouble ticket system to be used for all progress updates. The Service Provider will provide also its internal reference number for tracking.

To diagnose and resolve suspected faults, IPX Provider requires certain information when the problem is first reported. This will normally include:

- Company name
- Name, telephone number and email of the person reporting the fault
- Service Provider's contact name, telephone number and email, if different from the above
- Service Provider's Fault Trouble Ticket Number
- Physical location of the fault if identified.
- Details of the fault (IPX Provider's services at site, symptoms, any tests carried out in attempting to isolate the problem)
- Any environmental conditions, such as a power failure, that may be causing the fault
- Severity
- Service Provider's domain/DNS details (if applicable)
- IPX Provider traffic details should be included if available.

9.4.2 Fault Reporting by IPX Provider

The IPX Provider shall immediately inform the Service Provider by telephone using the contact points given in the matrix detailed in 9.2.2 within this Operations and Maintenance section, after it becomes aware of any Fatal fault in the IPX System, with any system run by any Third Party IPX Provider or with any Elected Participating Service Provider System or Service Provider System or other system involved in the traffic delivery impacting the relationship with the Service Provider.

IPX Provider also agrees to work towards the implementation of an electronic notice board solution for the delivery of such notifications. Following the issue of any such notice in respect of a fault, IPX Provider shall keep the Service Provider informed of the progress of remedial works according to the time interval agreed in Clause 4.4.1 of this Annex.

9.4.3 Fault Resolution:

- 1.5 IPX Provider shall immediately start proper fault handling intervention actions and inform Service Provider accordingly, in line with the procedure stated within clause 9.4.

The time interval shall start from the moment when the TT is opened.

Both Parties shall provide each other with the agreed progress updates as reported in Clause 4.4.1 above.

The minimum information required in the update are:

- Liability for the fault
- Expected resolution date/time
- Any information as to the cause of the fault
- All actions undertaken to date
- Any further information required
- Results of end-to-end measurement if applicable.

If IPX Provider cannot resolve a fault within the defined MTRS targets defined in Clause 4.4.1, IPX Provider shall allocate extra resources, via an escalation procedure, to achieve its resolution.

In all cases, if the fault is not resolved within the timeframe agreed from when a trouble ticket is opened and there is a degradation of the service quality level provided by IPX Provider to below the contractually agreed targets as measured by the KPIs indicated within the SLA , Service Provider reserves the right to:

- Request IPX Provider to re-route the traffic to another Third Party IPX Provider if appropriate
or
- Re-route the traffic to another IPX provider

In such cases and in any case, the time to restore the proper functionality of the Service shall be taken into account when measuring the monthly MTRS level.

Fatal	<Time>	<Time>
Severe	<Time>	<Time>
Warning	<Time>	<Time>

9.5 Escalation procedure

Both Parties must name contact persons as single point of contact for escalation (i.e. Fault Reporting Points). The escalation procedure can be delayed at the discretion of the Fault Reporting Points for a mutually agreed period when the fault has been identified and is being addressed by engineering staff of either Party.

Both Parties are to comply with internal procedures for the escalation of faults. However, the reporting Party may (at any time) request that a fault is escalated in advance of the times set out below. This is done if in the reasonable opinion of that Party, an escalation is required to increase the resources dedicated to a fault.

The recipient of the trouble ticket may escalate a fault in advance of the times set out below if it requires further information to progress the fault and that information has not been provided within a reasonable timescale.

Level I	<Contact Details>	<Contact Details>
Level II	<Contact Details>	<Contact Details>
Level III	<Contact Details>	<Contact Details>

In some cases certain faults need not be escalated automatically. A case can occur where the investigation of a fault is in progress and any escalation out of hours would serve no practical purpose. Both parties are to use reasonable and mutually agreed judgment regarding the benefit of escalating a particular fault.

All escalation between Service Provider and IPX Provider must be accomplished using the following steps:

Escalation Level	IPX Provider	Service Provider
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Note: Non-service affecting faults will not be escalated outside of normal working hours.

Fault Status	Max Escalation Time to Level II	Max Escalation Time to Level III
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9.6 Official Status Information

9.6.1 After the initial information, updates in accordance with Clause 4.4.1 will apply. On any reasonable request by either Party, the Central Notification Addresses are able to give information on the status of the trouble/problem.

9.7 Fault Clearance Procedures

Only the Central Notification Addresses can issue an official fault clearance (closure of trouble ticket for fault resolution).

On mutual agreement of both Parties that the fault has been cleared and normal IPX Service has been restored, faults will be classified as «cleared» and the «Response and Restoration Time Clock» are stopped.

9.8 Duration of a fault

9.8.1 The duration of a fault shall be defined as per Clause 4.1.2

9.9 Communications

9.9.1 IPX Provider will undertake to communicate the following events within the timescales below:

- Planned Outages (including product upgrades/updates): minimum 15 days
- Communication of Suspension of IPX Services: maximum 30 days.

9.9.2 Parties agree that:

- Emergency situations shall be expedited.
- The contact persons for such communications will be those identified in clause 9.2.2 unless otherwise agreed
- Reduced periods of notice will only be accepted as an exception and mutually agreed. The number of reduced periods of notice will be closely monitored by each Party and subject to review at regular service review meetings.
- Where an event is planned, each Party is required to notify the other in advance of full details concerning that event. A brief explanation of the operation shall be included and the impact or risk of impact, in the IPX Service shall be always specified.

9.10 Planned Outages, Product Updates/Upgrades

9.10.1 IPX Provider shall provide updating packages with documentation, support tools and specifications, planned in advance (1-4 per year), containing permanent solutions to any severe or major failures that require such action.

9.10.2 Such updating packages shall be scheduled together with introduction of new functionality (upgrades), unless otherwise agreed. Such packages shall also include solutions to problems detected in other countries and in operating systems supplied.

9.10.3 IPX Provider shall verify and test these correction packages on an appropriate test plant and shall make such tests available for inspection, auditing and testing by the Service Provider.

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- 9.10.4 IPX Provider will provide upgrade packages with documentation, support tools and specifications, planned in advance (1-2 per year) as required.
- 9.10.5 Before planned work is undertaken that might affect the Service, each Party shall give a notice to the other Party (receiving Party) in line with the timescales stated in Clause 9.9.7 and 9.9.11; if such timescales are not respected, the work will be considered as an unplanned outage, that is, a fault.
- 9.10.6 This work could be:
- Configuration changes (physically, logically)
 - Changes of expected traffic (amount, quality)
 - Hardware changes
 - Software changes (software updates / software upgrades)
 - Maintenance works in the transmission network
- 9.10.7 It is recommended that the agreed schedule for all planned works fits with low peak times as defined in writing by the Service Provider, e.g. between 02:00 and 06:00 am local time, on working days from Monday through Thursday. If the event starts or ends out of this window time provided by the Service Provider, the excess will be deemed to be treated as unavailability otherwise agreed between the parties.
- 9.10.8 In all cases described above, each Party's network management organization will take action to reduce disruption of traffic flows to the minimum.
- 9.10.9 For all works affecting Service Provider traffic, it is also essential to have in advance a contact available during the planned work who can be contacted to know the status of the work.
- 9.10.10 Both Parties reserve their right to refuse a scheduled event when an important reason exists. A scheduled event is only approved and can be carried out if both Parties agree on the event.
- 9.10.11 Advice of proposed planned work shall be notified by e-mail always at the contact points indicated in Clause 9.2.2 above, the receiving Party must acknowledge receipt of the advice by a return e-mail within one (1) working day of the receipt of the advice. If the receiving Party does not acknowledge the receipt, the originating Party will call the contact number of the receiving Party and ask for a "GO" or "NO GO" decision. The originator must not proceed with the work without concurrence of the receiving Party, which cannot be unreasonably withheld, otherwise the work will be considered as an unplanned work/outage, which is an MTRS impacting fault.
- 9.10.12 If a new release does not work properly for any reason, then IPX Provider will have a proven rollback process in order to revert the system back to it's original working state. In such a case, the time to restore the proper functionality of the Service shall be taken into account when measuring the MTRS levels.

9.10.13 IPX Provider will respect the Service Provider right to declare a freeze period such that no changes may be made to the system by IPX Provider and any outage is defined as fatal (e.g. during Christmas, special events etc).

9.11 Fault Handling Performance Reporting

9.11.1 This section details the reports that shall be supplied and measured by both Parties. The information to be supplied shall be agreed between the Parties at the Agreement’s signature.

9.11.2 To be measured:

- Date and hour of the receipt of information pertaining to each Fault notification;
- Date and hour of acknowledgement of receipt of Fault notification;
- Date and hour of Fault resolution (and notification).

9.11.3 IPX Provider is to the Service Provider supply a monthly “Fault Report”, with the following fields completed:

Monthly Fault Report								
IPX Provider Trouble Ticket No	Service Provider Trouble Ticket No	Priority	Brief description of the problem	Brief description of cause of the problem	Start Fault Date & Time	Response Date & Time	Resolution Date & Time	Time to Restore the Service

9.11.4 Based on this information, IPX Provider is to supply a monthly performance report including the following statistics for the past month and the past 6 months in total.

- Reporting Party
- Reporting Period (Calendar Month, i.e. January 2006)
- by severity and Elected Participating Service Provider
- Number of open tickets at the end of the reporting period
- Number of open tickets during the reporting period
- Number of closed tickets during the reporting period
- Average resolution time based on the closed tickets during the reporting period

- Number of opened Fatal trouble tickets.

9.11.5 Parties agree that:

- The report shall be provided no later than the 10th calendar day of the month following the month to which the report applies.
- Service Provider commits to validating the data provided by the IPX Provider not later than the 20th calendar day.
- Reports shall be delivered by IPX Provider to Service Provider according to this distribution list (by email):

	Name	Position	E-mail Address
1	Service Provider Contact #1		
2	Service Provider Contact #2		

9.11.6 Either party may change contact names by providing written notice seven days in advance of the change being valid.

9.11.7 In the event there is a discrepancy in the reporting of the KPI, between the reports provided by IPX Provider, and Service Provider’s own measurements, then the Parties will agree the reconciliation process to follow.

10 Operation & Maintenance – Non-fault Management

10.1 Service Management

Such Customer Care Service shall be provided on Non-Faults situations to include, non-fault related operational problems, operations and maintenance routines and documentation, pricing and billing queries and technical information.

This service shall be provided Monday – Friday, 0900 - 1700 excluding Public Holidays as a minimum, or with a different timing mutually agreed between the IPX Provider and the Service Provider.

10.2 Traffic Management

The Service Provider commits to providing traffic forecasts at mutually agreed intervals. The traffic forecasting provisions shall be used for dimensioning the capabilities of the IPX Provider network and the IPX Provider termination capabilities on the Terminating Service Provider. They shall not have any binding effect unless otherwise agreed between IPX Provider and the Service Provider in writing.

10.3 Participating Service Provider Management

Pursuant to the provisions for Election and Activation of the Participating Services Providers, Service Provider may request IPX Provider from time to time to activate

the Interworking between its own network and a new Terminating Service Provider not included in the IPX Provider list of Participating Service Providers.

In such cases, the IPX Provider shall inform Service Provider within one month from his request, of the road map for implementation of the Interworking between the Service Provider and the required Terminating Service Provider.

If feasible, the IPX Provider shall offer this as a directly connected Terminating Service Provider to his own service, otherwise shall use a Third Party's IPX to implement the required Terminating Service Provider in the shortest possible time.

At mutually agreed intervals the IPX Provider shall provide the Service Providers with its Terminating Service Provider forecasts on the activation of new Terminating Service Providers. Those forecasts shall be used by IPX Provider for implementing all necessary technical and charging parameters and by Service Provider for systems configuration.

10.4 Traffic Report

IPX Provider will produce traffic statistics in order to show:

- The total volume of traffic transmitted per quarter, per month
- The maximum amount of traffic transmitted during the busiest hours,
- The average according with size definition.

The Traffic report shall be used for forecast and billing management by both the IPX Provider and the Service Provider.

The results shall be monthly reported in the traffic report.

10.5 Quality of Service (QoS) Reports

IPX Provider shall provide Monthly Performance Reports (MPR) and optionally Weekly Performance Reports (WPR) on the QoS for the traffic handled from [Service Provider]. These reports should be available to check the level of performance of the service provided. Such level of performance is measured through the KPIs as indicated in this Appendix.

Monthly Performance Report (MPR):

- The MPR must include hourly values for the KPIs defined. The values should be measured 24 x 7 x 365.

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- The MPR shall be available to Service Provider no later than the 10th calendar day of each month. By definition, the MPR shall detail the performance of the previous month.

10.6 Maintenance Operations Management

Where an outage is planned by the Service Provider or the IPX Provider, the Party causing the outage is required to notify the other in advance at the contact points indicated in Clause 9.2.2 with full details concerning that outage. A brief explanation of the operation shall be included and the impact or risk of impact, on the service shall be always specified.

Periodical maintenance tests

The IPX Provider shall perform regular tests to check:

- The proper functionality of the [Service Provider]'s connection to the IPX platform;
- The Interworking between the [Service Provider] and its Elected Participating Service Providers

The Parties will mutually agree, and document in the relevant Service Schedule, the appropriate maintenance tests to be performed including the allocation of any costs.

10.7 Parameter Change Notification & contact points update

IPX Provider and the Service Provider shall agree at signature of their Agreement on ad hoc timing for notification of network and billing parameters' change & contact points update.

10.8 Connection between IPX Provider System and the [Service Provider]'s System

IPX Provider shall designate an account manager to be responsible for the operational management of the IPX Service from date of signature of the Agreement until six calendar months after the Effective Date.

The account manager shall co-ordinate all technical and implementation operations with the Service Provider and shall report weekly to them on the project progress, unless otherwise agreed between the parties.

10.9 Operating Period

IPX Provider shall designate an account manager to manage all technical and rollout operations required when a new Terminating Service Provider (new Elected Participating Service Provider) has to be activated.

Activation is considered to take place from the moment the Service Provider requests to implement the Interworking with that Elected Participating Service Provider and until 1 month after the relevant Commencement Date.

11 SLA Review

The Service Provider and IPX Provider agree to perform a review of SLA's QoS benchmark levels every 6 months to verify the necessity to update such levels in order for them to be always in line with the current technology and market trends.

Schedule A – SERVICE CREDIT LEVEL

If the IPX Provider breaches any KPIs, the IPX Provider shall report the breach to the Service Provider.

If the Service Provider accrues the right to a Performance rebate, such rebate shall be automatically applied by the OPX Provider within the invoice of the relevant invoicing month, without the need of a request made by the Customer.

In the case where the Service Provider accrues the right to more than one rebate for a single event (e.g. Service availability and MTRS threshold exceeded) only the highest rebate shall apply.

[TO BE AGREED BETWEEN PARTIES]

Schedule B – MONTHLY REPORT

[TO BE AGREED BETWEEN PARTIES]