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INCLUDING TMN AND NETWORK MAINTENANCE

Telecommunications management network

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## **Guidelines for the definition of SLA representation templates**

ITU-T Recommendation M.3342

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# **ITU-T Recommendation M.3342**

## **Guidelines for the definition of SLA representation templates**

### **Summary**

This Recommendation mainly deals with SLA Representation Templates used for Service Customers and Service Providers. It briefly introduces the overview and characteristics of SLA representation templates, and describes the detailed classification of SLA content, and provides the guidelines for the definition of SLA representation templates in detail, including the instructions for completing SLA templates. In Appendix I a simple example of SLA Representation Templates and instances of them are illustrated for reference.

### **Source**

ITU-T Recommendation M.3342 was approved on 14 July 2006 by ITU-T Study Group 4 (2005-2008) under the ITU-T Recommendation A.8 procedure.

### **Keywords**

Key performance indicator, KPI, key quality indicator, KQI, service level agreement, SLA, template.

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## Guidelines for the definition of SLA representation templates

### 1 Scope

The emerging new service and its QoS management requirements are challenging the NGN service management, demanding extendibility and scalability. The most important characteristic of NGN different from the current network is the QoS guarantee for services. SLAs are considered an effective way of solving the problems of QoS guarantee between Service Customers (SCs) and Service Providers (SPs).

Guidelines for the Definitions of SLA Representation Templates (GDSRT) are the instructional explanations about service level, quality of service, priorities and duties in the SLA content. Four parts, business part, service part, technology part, and QoS report, are defined in the guidelines and the content of each part is described in detail. On the basis of the guidelines, the specific SLA representation template instances can be developed according to the specific service features.

This Recommendation provides the guidelines and instructions for the definition and composition of SLA representation templates in order to manage QoS and service guarantee of telecommunication services effectively. It is the scope of this Recommendation to provide an overview of:

- the definition and characteristics of SLA representation templates, based on the requirements of QoS management for emerging new services;
- guidelines for the definition of SLA representation templates, in order to standardize the representation methods of SLAs;
- proformas of SLA representation templates and instructions for completing the proformas to allow defining any specific templates meeting the requirements for different services; and
- some SLA Representation Templates examples.

Although the guidelines for the definition are proposed in the context of NGN QoS requirements, it can be adapted to any telecommunication service and is not just limited to NGN services.

It is out of the scope of this Recommendation to provide the definition and concept of each specific Key Performance Indicator (KPI) or Key Quality Indicator (KQI); only the abstraction for how to represent QoS Parameters, KPIs and KQIs are addressed in this Recommendation. The definitions of KPIs and KQIs can be imported into SLA Representation Templates from other ITU-T Recommendations or specifications from other organizations.

By following the templates and the filling instructions provided in this Recommendation, a specific SLA can be created for a specific service. Some more detailed information can be captured from TMF GB917 Volume 2 [15] and Volume 3 [16], and ITU-T Rec. E.802 [3].

### 2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [1] ITU-T Recommendation E.800 (1994), *Terms and definitions related to quality of service and network performance including dependability*.
- [2] ITU-T Recommendation E.801 (1996), *Framework for Service Quality Agreement*.
- [3] ITU-T Recommendation E.802 (Draft), *Framework and methodologies for the determination and application of QoS parameters*.
- [4] ITU-T Recommendation E.860 (2002), *Framework of a service level agreement*.
- [5] ITU-T Recommendation G.1010 (2001), *End-user multimedia QoS categories*.
- [6] ITU-T Recommendation M.1532 (2000), *Network maintenance service performance agreement (MSPA)*.
- [7] ITU-T Recommendation M.2301 (2002), *Performance objectives and procedures for provisioning and maintenance of IP-based networks*.
- [8] ITU-T Recommendation M.3010 (2000), *Principles for a telecommunications management network*.
- [9] ITU-T Recommendation M.3050.1 (2004), *Enhanced Telecom Operations Map (eTOM) – The business process framework*.
- [10] ITU-T Recommendation M.3208.1 (1997), *TMN management services for dedicated and reconfigurable circuits network: Leased circuit services*.
- [11] ITU-T Recommendation Y.1001 (2000), *IP Framework – A framework for convergence of telecommunications network and IP network technologies*.
- [12] ITU-T Recommendation Y.1221 (2002), *Traffic control and congestion control in IP-based networks*.
- [13] ITU-T Recommendation Y.1540 (2002), *Internet protocol data communication service – IP packet transfer and availability performance parameters*.
- [14] ITU-T Recommendation Y.1541 (2006), *Network performance objectives for IP-based services*.
- [15] TeleManagement Forum GB917-2 Version 2.5 (2005), *SLA Management Handbook – Volume 2 – Concepts and Principles*.
- [16] TeleManagement Forum GB917-3 Version 2.1 (2005), *SLA Management Handbook – Volume 3 – Service and Technology Examples*.

### **3 Definitions**

#### **3.1 Definitions imported from ITU-T Rec. E.860**

- Service Level Agreement (SLA)

#### **3.2 Definitions imported from ITU-T Rec. M.3208.1**

- Service Customer (SC)
- Service Provider (SP)

#### **3.3 Definitions imported from ITU-T Rec. E.419**

- Key Performance Indicators (KPI)

#### **3.4 Definitions imported from TMF GB917-2**

- Key Quality Indicator (KQI)



### 3.5 Definitions imported from ITU-T Rec. M.3050.1

- End User (EU)
- Enterprise
- Customer<sup>1</sup>

### 3.6 Other definitions in this Recommendation

This Recommendation defines the following terms:

**3.6.1 SLA representation templates:** SLA representation templates are the canonical representation method and format of a SLA for a specific service. It is composed of several proformas to contain the SLA contents for a specific service. It provides the structures and the organization method for the SLA content. When the SLA templates for a specific service are filled in with concrete information, they become a practical SLA instance.

**3.6.2 guideline for the definition of SLA representation templates (GDSRT):** GDSRT are the instructional explanations about how SLA content of a specific service can be organized and represented. It provides a directive profile about the canonical definitions and expressions of generic SLA representation templates.

## 4 Abbreviations and acronyms

This Recommendation uses the following abbreviations:

BBER	Background Block Error Ratio
BER	Bit Error Ratio
ES	Error Seconds
EU	End User
GDSRT	Guidelines for the Definition of SLA Representation Templates
ID	Identifier
IP	Internet Protocol
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
KPI	Key Performance Indicator
KQI	Key Quality Indicator
MSPT	Multiplex Section Protection Termination
MTBF	Mean Time Between Failures
MTBO	Mean Time Between Outages
MTPS	Mean Time to Provide Service
MTRS	Mean Time to Restore Service
MTTR	Mean Time To Repair
MTU	Maximum Transmission Unit
NGN	Next Generation Network

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<sup>1</sup> The concept of "Customer" from ITU-T Rec. M.3050.1 [9] (which is originated by TMForum) and that of "Service Customer" from ITU-T Rec. M.3208.1 [10] (which is originated by ITU-T) are used as equivalent terms within this Recommendation.

NP	Network Performance
OI	Outage Intensity
OMG	Object Management Group
PM	Performance Monitoring
QoS	Quality of Service
RFS	Ready For Service
RFSD	Ready For Service Date
SA	Service Availability
SDF	Service Degradation Factor
SLA	Service Level Agreement
SA	Service Availability
SC	Service Customer
SES	Severely Errored Seconds
SP	Service Provider
SUA	Service UnAvailability
TMF	TeleManagement Forum
TMN	Telecommunications Management Network
UAS	UnAvailable Seconds
VLL	Virtual Leased Line

## **5 Overview of SLA representation templates**

### **5.1 Background**

The goal of the SLA is to create a healthy relationship between the SP and the SC, and to protect the legal rights of both the SP and the SC. Because of different SPs, different services and different definitions of SLA clauses, there is no standardized SLA representation and expression during the service negotiation and QoS guarantee phase. It is necessary to define standardized and generic guidelines of SLA representation templates to solve this problem.

### **5.2 What are SLA representation templates**

SLA is a long-term guarantee of SCs' satisfaction. Both the SC's and the SP's interests are served by a simplified SLA negotiation and standardized contract process.

SLA representation templates are the canonical representation method and format of a SLA for a specific service. It is composed of several proformas that contain the SLA content for a specific service. It provides the structures and the organization method for the SLA content. When the SLA templates for a specific service are filled in with concrete information, they become a practical SLA instance.

### **5.3 Characteristics of standardized SLA representation templates**

The characteristics of standardized SLA representation templates defined by this Recommendation should at least be:

- accordant with the current criteria;
- definition self-contained;
- extensible;
- realizable; and
- comprehensible.

### **5.4 What is GDSRT**

Guidelines for the Definitions of SLA Representation Templates (GDSRT) are the instructional explanations about how SLA content of a specific service can be organized and represented. GDSRT provides the format of each proforma that may be involved in SLA representation templates, the structures about how SLA content is organized, which proformas to select in order to form a complete set of templates for a specific service, and the instructions about how the proformas can be filled in. On the basis of the guidelines, specific SLA representation templates for a specific service can be developed accordingly. Based on the SLA Representation Templates, the SLA negotiation between SCs and SPs can be carried out, and the agreed results can be captured in the SLA representation templates, thus forming a practical SLA instance.

## **6 Compositions of SLA representation templates**

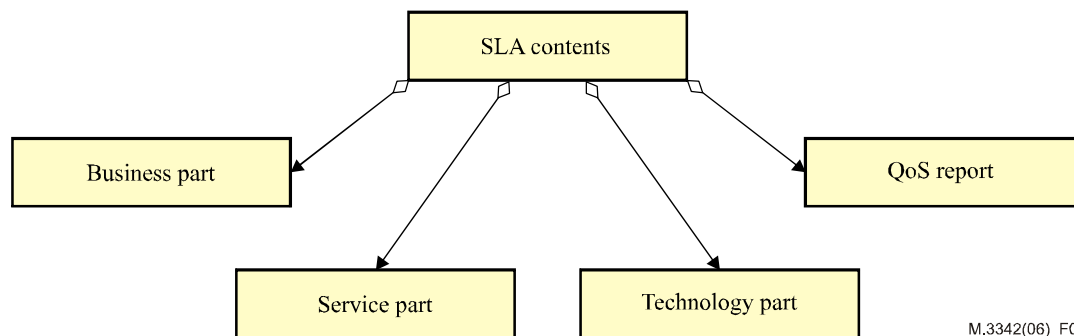
### **6.1 SLA contents**

TMF GB917-3 [16] has specified that a SLA may contain the following:

- Points of Contact;
- Services Provided;
- System Design Information;
- Supporting Equipment;
- Level and Quality of Service;
- Monitoring and Reporting;
- Service Center;
- SP Backup and Disaster Recovery Mechanisms;
- Terms and Conditions;
- Network and Delivery Upgrades;
- Change Procedures;
- Service Violations and Remedies;
- Tariffs and Billing;
- Service Termination.

This Recommendation imports the above content into SLA Representation Templates, and the detailed information of each item can be found in clause 4 of GB917-3 [16]. In this Recommendation, additional details extend the above content list.

## 6.2 Basic composition of SLA representation templates



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**Figure 1/M.3342 – Basic composition of SLA content**

Figure 1 gives the basic composition of the SLA content, regardless of the services provided. Generally, the content of a SLA include the following four parts, which can be used to categorize the above SLA content listed in 6.1.

### 1) *Business part*

This part describes the general business information and business procedures related to the service provided by the SP to the SC. It may describe the information about contact information, general terms, help desk center, service violation processing and billing information, etc. This part covers the following items that are listed in 6.1:

- Points of Contact;
- Terms and Conditions;
- Service Center;
- Change Procedures;
- Service Violations and Remedies;
- Tariffs and Billing;
- Service Termination.

### 2) *Service part*

This part describes the detailed information about the service provided to the SC. It includes the negotiated service content and the agreed service level. This part covers the following items that are listed in 6.1:

- Services Provided;
- Service Level.

### 3) *Technology part*

This part gives the detailed information about QoS parameters, metrics set, and some technical supporting infrastructure, such as supporting equipments and system design information, etc. This part covers the following items that are listed in 6.1:

- QoS Parameters;
- Supporting Equipments;
- System Design Information;
- SP Backup and Disaster Recovery Mechanisms;
- Network and Delivery Upgrades.

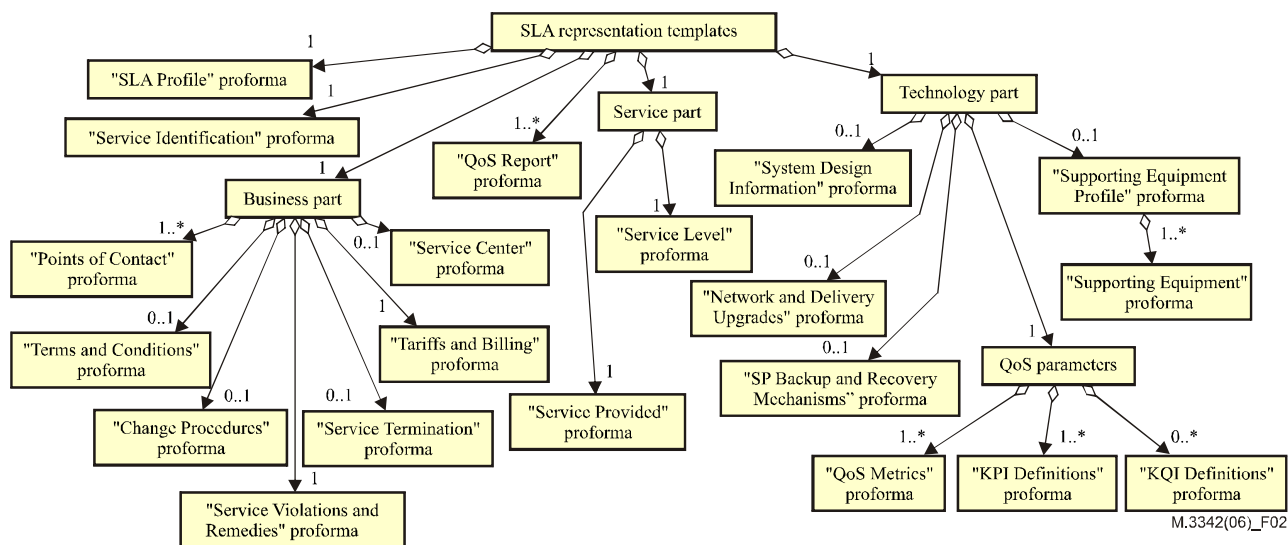
#### 4) *QoS report*

This part includes the QoS report information provided to the SC and the SP in order to evaluate service level negotiated in the SLA. This part covers the following item that is listed in 6.1:

- Monitoring and Reporting.

### 6.3 Extended composition of SLA representation templates

Based on the content of SLA and the basic composition of SLA representation templates, Figure 2 shows an extended composition of SLA representation templates using UML class diagram. The defined templates are general and neutral, which is service-independent and technology-independent. It can last for the lifetime of a SLA.



**Figure 2/M.3342 – Extended compositions of SLA Representation Templates**

The supporting proformas for the above SLA Representation Templates are described from 6.3.1 to 6.3.5.

#### 6.3.1 SLA profile

The proformas related to the SLA profile include the following:

##### 1) *"Service Identification" proforma*

The "Service Identification" proforma is used to describe the basic identification information about the service, the SC and the SP involved in this SLA. There is one and only one instance of this proforma in a specific SLA.

##### 2) *"SLA Profile" proforma*

The "SLA Profile" proforma provides a summary and list of all the proformas (table) that are used in a specific SLA, and the indexes for them will also be included. There is one and only one instance of this proforma in a specific SLA.

### 6.3.2 Business part

The proformas related to the Business part include the following:

1) *"Points of Contact" proforma*

The "Points of Contact" proforma is used to specify the contact information about the SP and the SC. The information should be kept both in the SC and the SP. There are one or more instances of this proforma in a specific SLA.

2) *"Terms and Conditions" proforma*

The "Terms and Conditions" proforma is used to specify some terms and conditions that both the SP and the SC should follow during the lifecycle of the SLA. There may be zero or one instance of this proforma in a specific SLA.

3) *"Service Center" proforma*

The "Service Center" proforma is used to specify the information related to the Service Help Center that the SP provides to the SC. There may be zero or one instance of this proforma in a specific SLA.

4) *"Change Procedures" proforma*

The "Change Procedures" proforma is used to specify the general procedures when there is a need for the SC to change the requirements of the service. There may be zero or one instance of this proforma in a specific SLA.

5) *"Service Violations and Remedies" proforma*

The "Service Violations and Remedies" proforma is used to specify the service commitments and the remedies when the SP cannot deliver the agreed service levels. There is one and only one instance of this proforma in a specific SLA.

6) *"Tariffs and Billing" proforma*

The "Tariffs and Billing" proforma is used to specify the billing information about the service. There is one and only one instance of this proforma in a specific SLA.

7) *"Service Termination" proforma*

The "Service Termination" proforma is used to specify the information related to service termination, such as termination period or data transfer process. There may be zero or one instance of this proforma in a specific SLA.

### 6.3.3 Service Part

The proformas related to the Service part include the following:

1) *"Service Provided" proforma*

The "Service Provided" proforma is used to specify the detailed information about the service that the SP provided to the SC, such as the service description, the Service Access Point List, etc. There is one and only one instance of this proforma in a specific SLA.

2) *"Service Level" proforma*

The "Service Level" proforma is used to specify the information about the agreed service level in the overall viewpoint. (Details about the Quality of Service parameters can be found in "QoS Proformas" in the Technology Part). There is one and only one instance of this proforma in a specific SLA.

### 6.3.4 Technology part

The proformas related to the Technology part include the following:

1) *"QoS Parameters" related proformas*

The proformas for "QoS Parameters" are composed of the following three parts:

- "QoS Metrics" proforma;
- "KPI Definition" proforma; and
- "KQI Definition" proforma.

The first "QoS Metrics" proforma is used to specify the detailed information of each QoS parameters for the service, which can be viewed as an extension for the "Service Level" proforma. There are one or more instances of the "QoS Metrics" proforma in a specific SLA, for example, one for technology-independent QoS metrics, and another for technology-specific QoS Parameter.

The second "KPI Definition" proforma and the third "KQI Definition" proforma are used to provide the detailed definition information for each KPI and KQI specified in the "QoS Metrics" proforma. There are one or more instances of the "KPI Definition" proforma and may be zero or more instances of "KQI Definition" proforma in a specific SLA.

2) *"Supporting Equipments" related proformas*

The proformas for "Supporting Equipments" are composed of the following two parts:

- "Supporting Equipment Profile" proforma; and
- "Supporting Equipment" proforma.

The first "Supporting Equipment Profile" proforma is used to specify the list of SP equipments that are located in the SC Premises; the second "Supporting Equipment" proforma is used to describe the details about each individual equipment listed in the first table. There may be zero or one instance of "Supporting Equipment Profile" proforma, and zero or more instances of the "Supporting Equipment" proforma in a specific SLA. When there is SP's equipment(s) located at the SC's Premises, there is one and only one instance of "Supporting Equipment Profile" proforma, and one or more instances of "Supporting Equipment" proforma.

3) *"System Design Information" proforma*

The "System Design Information" proforma can be used to specify the concerns about the design of service infrastructure if needed. There may be zero or one instance of this proforma in a specific SLA.

4) *"Backup and Recovery Mechanisms" proforma*

The "Backup and Recovery Mechanisms" proforma is used to specify some backup and recovery mechanisms in case of disasters. There may be zero or one instance of this proforma in a specific SLA.

5) *"Network and Delivery Upgrades" proforma*

The "Network and Delivery Upgrades" proforma is used to specify the items that need to be addressed when there are changes in SP's network or delivery mechanisms. There may be zero or one instance of this proforma in a specific SLA.

### 6.3.5 QoS report

The proforma related to QoS Reporting include the following:

1) *"QoS Report" proforma*

QoS Report is the service report provided to both the SC and SP. Its data comes from the Business part, the Service part and the Technology part. QoS data statistic outputs are the important proof to evaluate and improve service levels negotiated in SLA. The "QoS Report" proforma is used to specify the detailed information related QoS report. There are one or more instances of this proforma in a specific SLA.

## 7 Guidelines for the definition of SLA Representation Templates

In this clause, main proformas for SLA Representation Templates are shown and explained. According to the proformas, specific templates meeting the requirements of different services can be developed.

This clause is organized based on the composition for SLA Representation Templates shown in 6.3, and will cover the SLA content listed in 6.1.

### 7.1 SLA profile

#### 7.1.1 Proforma for "Service Identification"

The proforma for "Service Identification" is shown in Table 1:

**Table 1/M.3342 – The "Service Identification" proforma**

	SC	SP
<b>Full Name</b>		
<b>ID</b>		
<b>Service Identification Information</b>		
<b>Service Full Name</b>		
<b>Service Identifier</b>		
<b>Service Instance ID</b>		
<b>Service Start Time</b>		
<b>Service Termination Time</b>		

Where:

- **Full Name:** This field contains the full name of the SC or SP in the corresponding column.
- **ID:** The assigned identifier specified for the SC or the SP. It can be used as a reference in order to search the corresponding information about the SC or the SP.
- **Service Full Name:** The full name of the service provided to the SC. An abbreviation can also be specified in this field.
- **Service Identifier:** The service number assigned by the SP.
- **Service Instance ID:** The unique Identifier assigned by the SP to each instance of the service provided to a SC.
- **Service Start Time:** This field is used to indicate when the service will be provided to the SC.
- **Service Termination Time:** This field is used to indicate when the service provided to the SC will be terminated.



### 7.1.2 Proforma for "SLA Profile"

The structure of the "SLA Profile" proforma is shown in Table 2:

**Table 2/M.3342 – The "SLA Profile" proforma**

Proforma Index	Proforma Categories	Proforma Summary*

Where:

- **Proforma Index:** The index of proformas selected in the SLA Representation Template list. Usually the table number can be used.
- **Proforma Categories:** This indicates the kind of proforma from 7.1.1 to 7.4.1.
- **Proforma Summary:** This gives a short summary of the specified proforma. This item is optional and can be left empty.

### 7.2 SLA Representation Templates proformas for business part

NOTE – In all the following tables, the items marked with a "\*" sign indicates that they are optional items and can be left empty. Items without the "\*" mark are mandatory. This convention is applicable for the entire Recommendation.

#### 7.2.1 Proformas for "Points of Contact"

The structure of the "Points of Contact" proforma is shown in Table 3. In a specific SLA, there are one or more instances of the "Points of Contact" proforma. Generally, there are often two "Points of Contact" tables: one for the administrative matters and the other for the technical matters.

**Table 3/M.3342 – The "Points of Contact" proforma**

	Service Customer	Service Provider
<b>Responsibility</b>		
<b>Name of Contact</b>		
<b>Work Title*</b>		
<b>Description*</b>		
<b>Telephone Number(s)</b>		
<b>Fax Number(s)*</b>		
<b>E-mail Address(es)*</b>		
<b>Postal Address(es)*</b>		
<b>Additional Information*</b>		

Where:

- **Responsibility:** This field is used to specify what the contact person is responsible for, and the possible values to be filled in this field are "Technical matter" and "Administrative matter". Based on the contact person's actually responsibility, the allowed values can also be extended.

- **Name of Contact:** The full name of the contact person for this Service.
- **Work Title:** The work title for the contact person. This field can be left empty.
- **Description:** The short description of the scope or the responsibility of the contact person. This field can be left empty.
- **Telephone Numbers(s):** The contact telephone number of the contact person. At least one number is specified. It is recommended that both the office telephone number and the mobile numbers be filled in this field, in case of an emergency.
- **Fax Number(s):** The contact fax number of the contact person. If there are more than one fax number, e.g., one for backup purpose, they can also be filled in this field. This field can also be left empty if there are no contact fax numbers.
- **E-mail Address(es):** The contact e-mail address(es) of the contact person. If there is more than one e-mail address, e.g., one for backup purpose, they can also be filled in this field. This field can also be left empty if there are no contact e-mail addresses for this person.
- **Postal Address(es):** The postal address of the contact person (including the postal code information). If there is more than one postal address, e.g., one for backup purpose, they can also be filled in this field. This field can also be left empty if there are no contact postal addresses.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to this contact person. This field can be left empty.

NOTE – The information of the SC contact person should be filled in the corresponding "Service Customer" column, and the information of the SP contact person should be filled in the corresponding "Service Provider" column.

### 7.2.2 Proformas for "Terms and Conditions"

The structure of the "Terms and Conditions" proforma is shown in Table 4. When there is no specific information to specify for terms and conditions, this proforma can be ignored.

**Table 4/M.3342 – The "Terms and Conditions" proforma**

<b>Subjection Indication*</b>	
<b>Acquisition or Merger Declaration*</b>	
<b>SC's Indemnify Description*</b>	
<b>SP Ownership Declaration*</b>	
<b>SC Information Ownership Declaration*</b>	
<b>Responsibility for Software Licensing/Ownership*</b>	
<b>SP's Indemnify Description*</b>	
<b>Dissemination Declaration*</b>	
<b>Additional information*</b>	

Where:

- **Subjection Indication:** The indication of the fact that the SLA is subject to "Terms and Conditions" of other agreements between the SP and SC. Note that if the SLA is subject to other agreements between the parties, certain legal provisions may be inherited by this SLA. This field can be left empty.

- **Acquisition or Merger Declaration:** A description of any contract or service-level impacts of an acquisition or merger. This field can be left empty.
- **SC's Indemnify Description:** A specification of the extent, if any, to which the SC will indemnify the SP for third-party claims against the SP as a result of the SP's activities. This field can be left empty.
- **SP Ownership Declaration:** Descriptions of the SP's ownership or interest in patents trademarks, trade names, inventions, copyrights and trade secrets related to SP offerings. This field can be left empty.
- **SC Information Ownership Declaration:** Description of the SC's information data ownership. This field can be left empty.
- **Responsibility for Software Licensing/Ownership:** Specification of the responsibility for software licensing and/or ownership. This field can be left empty.
- **SP's Indemnify Description:** A specification of the extent, if any, to which the SP will indemnify the SC for claims that services infringe upon the Intellectual Property of others. This field can be left empty.
- **Dissemination Declaration:** Description of the information that may be disseminated openly. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the terms and conditions. This field can be left empty.

### 7.2.3 Proformas for "Service Center"

The structure of the "Service Center" proforma is shown in Table 5. When there is no Service Center provided to the SC, this proforma can be ignored.

**Table 5/M.3342 – The "Service Center" proforma**

<b>Services Scope</b>	
<b>Authorized SC Staff</b>	
<b>Service Periods</b>	
<b>Contact Means</b>	
<b>Request Leveling*</b>	
<b>Escalation Process*</b>	
<b>Response/Resolution Times*</b>	
<b>Resolution Notifications</b>	
<b>SC's responsibility for Resolution*</b>	
<b>Training*</b>	
<b>Systematic Errors Identifying*</b>	
<b>Additional Information*</b>	

Where:

- **Services Scope:** Description of the scope of services offered by the SP's Service Center.
- **Authorized SC Staff:** Identification of the SC staff members that are authorized to use the Service Center. Usually, this field should be filled with the list of staff members of SC. In the case where anyone from SC is authorized staff to ask the Service Center, this field should be filled with "Anybody".

- **Service Periods:** Specification of the periods when the service center is accessible to SC, including evening, week-end, and holiday coverage.
- **Contact Means:** Description of the means of contacting the service center, e.g., telephone, e-mail, etc. The contact telephone number or e-mail address should also be filled in this field.
- **Request Leveling:** Description of the mechanisms for assigning severity levels to customer help requests or problem reports, e.g., 1, 2, etc. This field can be left empty.
- **Escalation Process:** Description of the escalation process to be followed to change severity levels. This field can be left empty.
- **Response/Resolution Times:** Description of response times and resolutions times. This field can be left empty.
- **Resolution Notifications:** Description of how the SC will be notified of the problem resolution.
- **SC's responsibility for Resolution:** Description of SC's responsibilities resolving reported problems. This field can be left empty.
- **Training:** Description of training required by SC staff. This field can be left empty.
- **Systematic Errors Identifying:** Description of the mechanisms and/or procedures for identifying systematic errors based on help desk analysis. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the Service Center. This field can be left empty.

#### 7.2.4 Proformas for "Change Procedures"

The structure of the "Change Procedures" proforma is shown in Table 6. When no changing procedures are allowed for the SC, or there are no such requirement changing cases for this service, this proforma can be ignored in a specific SLA.

**Table 6/M.3342 – The "Change Procedures" proforma**

<b>Permitted Changes</b>	
<b>Specifying Method</b>	
<b>Change Time</b>	
<b>Additional Information*</b>	

Where:

- **Permitted Changes:** Description of any changes that the SC is permitted to make such as additional software.
- **Specifying Method:** Description of the method for specifying changes to requirements.
- **Change Time:** Description of the time required to change user requirements, such as notice and response times.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the Change Procedures. This field can be left empty.

### 7.2.5 Proformas for "Service Violations and Remedies"

The structure of the "Service Violations and Remedies" proforma is shown in Table 7:

**Table 7/M.3342 – The "Service Violations and Remedies" proforma**

<b>Violation</b>	
<b>Performance Bonuses*</b>	
<b>Disputes Resolution Procedures</b>	
<b>Additional Information*</b>	

Where:

- **Violation:** Description of the performance penalties in the event that SP fails to execute agreed service levels. Performance penalties could be administrative actions by the SP, monthly percentage fee rebates, correlated to the degree of underperformance, specific fee reductions or rebates, or contract termination if the underperformance is chronic. Violations can be described in different rows for different details or aspects if needed.
- **Performance Bonuses:** Description of the performance bonuses in the event that the SP exceeds the agreed service levels. This field can be left empty.
- **Disputes Resolution Procedures:** Description of the procedures to resolve disputes, e.g., arbitration procedures.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to Service Violations and Remedies. This field can be left empty.

### 7.2.6 Proformas for "Tariffs and Billing"

The structure of the "Tariffs and Billing" proforma is shown in Table 8. The following items are expected to be mutually agreed between the SC and the SP.

**Table 8/M.3342 – The "Tariffs and Billing" proforma**

<b>Billing Details</b>	
<b>Billing Frequency</b>	
<b>Bill Delivery</b>	
<b>Additional Information*</b>	

Where:

- **Billing Details:** Description of the level of detail included in the bills. Billing details can be described in different rows for different aspects if needed.
- **Billing Frequency:** Description of the frequency of billing.
- **Bill Delivery:** Description of the media used to deliver the bill, e.g., suitable for use with software applications.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to Tariffs and Billing. This field can be left empty.

### 7.2.7 Proformas for "Service Termination"

The structure of the "Service Termination" proforma is shown in Table 9:

**Table 9/M.3342 – The "Service Termination" proforma**

<b>Time Period</b>	
<b>Data Transfer Process</b>	
<b>Unilateral Termination</b>	
<b>Additional Information*</b>	

Where:

- **Time Period:** Specification of applicable time period for the return of data.
- **Data Transfer Process:** Specification of the process for data transfer.
- **Unilateral Termination:** Description of the process for unilateral termination.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the Service Termination. This field can be left empty.

### 7.3 SLA Representation Template proformas for service part

#### 7.3.1 Proformas for "Service Provided"

The structure of the "Service Provided" proforma is shown in Table 10:

**Table 10/M.3342 – The "Service Provided" proforma**

<b>Service Identifier*</b>	
<b>Service Name</b>	
<b>Service Description</b>	
<b>SAP List</b>	
<b>Service Interfaces Requirements*</b>	
<b>Ready-for-Service Date(s)</b>	
<b>SC Notification Process</b>	
<b>Additional Information*</b>	

Where:

- **Service Identifier:** An identifier assigned by the SP for identification of the specific service; the identifier can be used as a reference for searching the detailed information about the service. This field can be left empty if SP does not use Service Identifiers.
- **Service Name:** The full name of the service. It is a user-friendly name of the service and can be used as a nickname for the Service Identifier.
- **Service Description:** A description of the service in terms meaningful to the SC and the SP.
- **SAP List:** A description of the service access points at the SC's sites.
- **Service Interfaces Requirements:** A specification of the service interfaces requirements, e.g., electrical and mechanical specifications, data link layer protocols, etc. This field can be left empty.

- **Ready-for-Service Date(s):** A specification of the Ready-for-Service (RFS) dates and, if appropriate, the lead times required for service provisioning. It is expected that the service will be available on or before the date specified, at the cost agreed, and performing to the specifications contained within the SLA.
- **SC Notification Process:** A description of the process for SC notification in the event that the agreed RFS date cannot be met. Lead times for such notification may also be specified.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the provided services. This field can be left empty.

### 7.3.2 Proformas for "Service Level"

The structure of the "Service Level" proforma is shown in Table 11:

**Table 11/M.3342 – The "Service Level" proforma**

<b>Service Class*</b>	
<b>Out-of-Service Times</b>	
<b>Force Majeure</b>	
<b>SC-Caused Outages*</b>	
<b>Restoration Priority*</b>	
<b>Restoration Times*</b>	
<b>Planned Outage Notification Procedures*</b>	
<b>Additional Information*</b>	

Where:

- **Service Class:** This field is used to specify the overall class of the service level. SPs usually use "Platinum", "Gold" or "Silver", etc. to categorize their provided service levels. Also, a number can be used in this field. This field can be left empty if there is no classification assigned for this SC.
- **Out-of-Service Times:** Out-of-service times such as the time required for routine maintenance. The process used to communicate changes in scheduled maintenance outages. Outages may also be defined. Lead times for such notices may also be specified.
- **Force Majeure:** Description of force majeure and other events beyond the SP's control when service may not be provided.
- **SC-Caused Outages:** Description of customer-caused outages that may impact the service. This field can be left empty
- **Restoration Priority:** Specification of the priority/precedence for restoration of service. This field can be left empty.
- **Restoration Times:** Specification of restoration times. This field can be left empty.
- **Planned Outage Notification Procedures:** Description of the notification procedures for planned outages. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the Service Level. This field can be left empty.

## 7.4 SLA Representation Template Proformas for Technology Part

### 7.4.1 Proformas for "QoS Parameters"

The "QoS Parameters" related proformas include the following three parts: the "QoS Metrics" proforma, the "KPI Definition" proforma and the "KQI Definition" proforma.

The structure of the "QoS Metrics" proforma is shown in Table 12:

**Table 12/M.3342 – The "QoS Metrics" proforma**

Technology Dependency						
QoS Parameter Area						
Parameter ID	Parameter Name	Value Range	Value Units	Qualifier	Definition Reference	SC Check

Where:

- **Technology Dependency:** This indicates whether the QoS metrics in this table is technology dependent or independent.
- **QoS Parameter Area:** This indicates which area this QoS Parameter is dealing with. The possible categories to be filled in this field can be "Network Performance Metrics", "Traffic Metrics" and "Service Metrics".
- **Parameter ID:** It is assigned for each Parameter for reference and identification purpose.
- **Parameter Name:** This is field is used to specify the full name and the abbreviation of the specified QoS Parameter.
- **Value Range:** This field can be filled with the agreed value range (it can be negotiated between the SC and the SP, or the SC can select the value range from a list that SP provides), indicating the possible values that the QoS parameter should be in the range in order to be conformed to the agreed service level.
- **Value Units:** This indicates the units that are used by this parameter. When no units are used for this QoS parameter (such as a ratio), this field is filled with "--", indicating "not applicable".
- **Qualifier:** This indicates whether this QoS Parameter is mandatory, optional or conditional for this service.
- **Definition Reference:** This field should be filled in the index for the detailed definitions that can be found somewhere in Table 13 or 14.
- **SC Check:** This field should be filled in by the SC, indicating whether the SC wants this QoS Parameter to be included the SLA or not. When the "Qualifier" field is filled with "mandatory", this field is filled with "--", indicating "not applicable", which means that there is no need for the SC to specify. If the "Qualifier" field is filled with "optional", the SC can specify in this field whether this QoS parameter is required for this service or not, using "√" or "X".

The structure of the "KQI Definition" proforma is shown in Table 13:



**Table 13/M.3342 – The "KPI Definition" proforma**

Index	KPI ID	KPI Name	Source*	Definition*
NOTE – Either "Source" or "Definition" field can be optional, but at least one of them should be filled.				

Where:

- **Index:** This field is used for reference purpose, and it can be used by other table items to locate this QoS Parameter.
- **KPI ID:** The Identifier assigned for each KPI.
- **KPI Name:** This field is used to specify the full name and the abbreviation of the specified KPI.
- **Source:** This field can be used to fill in the information about which Recommendation or specification the KPI is defined in. If the KPI is new, and cannot be found in any specifications, this field can be filled with "--", indicating "not applicable".
- **Definition:** This field can be used to provide the detailed definition about the KPI. It can be captured from the Recommendation or specification where this KPI is defined in. This field can be left empty if the source field is filled, and the source can be publicly accessed. When no definitions can be found in any specifications, the KPI definition is provided.

The structure of the "KQI Definition" proforma is shown in Table 14:

**Table 14/M.3342 – The "KQI Definition" proforma**

Index	KQI ID	KQI Name	Source*	Included KPI List		Definition*
				KPI ID	KPI Name	
NOTE – Either "Source" or "Definition" field can be optional, but at least one of them should be filled.						

Where:

- **Index:** This field is used for reference purposes, and it can be used by other table items to locate this QoS Parameter.
- **KQI ID:** It is assigned for each KQI for reference and identification purposes.
- **KQI Name:** This field is used to specify the full name and the abbreviation of the specified KQI.
- **Source:** This field can be used to provide information about the source that defines the KQI. If the KQI is new, and cannot be found in any Recommendation or specification, this field is filled with "--", indicating "not applicable".
- **Definition:** This field can be used to provide the detailed definition about the KQI. It can be captured from the Recommendation or specification where this KQI is defined. This field can be left empty if the source field is filled, and the source can be publicly accessed. When no definitions can be found in any specifications, the KQI definition is provided.

#### 7.4.2 Proformas for "Supporting Equipments"

The structure of "Supporting Equipment Profile" proforma is shown in Table 15, and the "Supporting Equipment" proforma is shown in Table 16. When there are no SP equipment located in the SC Premises, these two proformas can be ignored in a specific SLA.

**Table 15/M.3342 – The "Supporting Equipment Profile" proforma**

	Equipment Identifiers	Equipment Names
SP Equipment on SC Premises		

Where:

- **Equipment Identifiers:** The Identifier of the SP's Equipment to be located on SC premises. The identifier can be used as an index to search the specified equipment.
- **Equipment Names:** The user-friendly name of the SP equipment to be located on SC premises.

**Table 16/M.3342 – The "Supporting Equipment" proforma**

Equipment Identifier	
Equipment Name	
Equipment Description	
Space Requirements	
Power Requirements	
Environment Control Requirements	
Maintenance Access Procedures	
Additional information*	

Where:

- **Equipment Identifier:** The identifier of the SP equipment to be located on SC premises.
- **Equipment Name:** The user-friendly name of the SP equipment to be located on SC premises.
- **Equipment Description:** The description of the SP equipment to be located on SC premises.
- **Space Requirements:** The space requirements for this equipment.
- **Power Requirements:** The power requirements for this equipment.
- **Environment Control Requirements:** The environmental control requirements for this equipment.
- **Maintenance Access Procedures:** The access procedures for SP maintenance and installation staff.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to this supporting equipment. This field can be left empty.

#### 7.4.3 Proformas for "System Design Information"

The structure of the "System Design Information" proforma is shown in Table 17. If the SC does not need the system design information, this table can be ignored in a specific SLA.

**Table 17/M.3342 – The "System Design Information" proforma**

<b>General System Design*</b>	
<b>Routing Details*</b>	
<b>SC Access for Design Information*</b>	
<b>Configuration Techniques*</b>	
<b>Scalability Design*</b>	
<b>Additional Information*</b>	

Where:

- **General System Design:** A description of how the system design will meet the following types of criteria: the absence of common failure points, the redundancy level required, alternative routing of facilities, transmission media restrictions, and restrictions on services that may be provided by other parties. This field can be left empty.
- **Routing Details:** A description of transmission media routing details that may be required along with a requirement that the routing and/or the media will not be changed without prior discussion and agreement. This field can be left empty.
- **SC Access for Design Information:** Description of the process whereby the SC may access the design information for periodic review or to review modifications. This field can be left empty.
- **Configuration Techniques:** Specification of the techniques to be used for recording configuration and for configuration change control. This field can be left empty.
- **Scalability Design:** A description of how the system design meets the stated scalability requirements. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the design of the service infrastructure. This field can be left empty.

#### **7.4.4 Proformas for "Backup and Recovery Mechanisms"**

The structure of the "SP Backup and Recovery Mechanisms" proforma is shown in Table 18. If the SP does not provide such mechanisms in the service, this table can be ignored in a specific SLA.

**Table 18/M.3342 – The "SP Backup and Recovery Mechanisms" proforma**

<b>Backup Procedures*</b>	
<b>System Redundancy*</b>	
<b>Recovery Parameters*</b>	
<b>SP Disaster Recovery Priority*</b>	
<b>SC Support*</b>	
<b>Additional Information*</b>	

Where:

- **Backup Procedures:** Description of the procedures for data and application backups. This field can be left empty.
- **System Redundancy:** Description of the service delivery system redundancy. This field can be left empty.
- **Recovery Parameters:** Description of recovery parameters, i.e., how quickly can data be restored. This field can be left empty.

- **SP Disaster Recovery Priority:** Description of the priority and process for SP disaster recovery. This field can be left empty.
- **SC Support:** Description of the SC support required to assist with disaster recovery. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the backup and recovery mechanisms. This field can be left empty.

#### 7.4.5 Proformas for "Network and Delivery Upgrades"

The structure of the "Network and Delivery Upgrades" proforma is shown in Table 19. When there will not be any changes in the network or delivery mechanism, this table can be ignored in a specific SLA.

**Table 19/M.3342 – The "Network and Delivery Upgrades" proforma**

<b>Upgrade Procedures</b>	
<b>Recovery Procedures in Upgrade Failure</b>	
<b>Procedures for minor upgrades*</b>	
<b>SP Changes Implementation*</b>	
<b>Additional Information*</b>	

Where:

- **Upgrade Procedures:** Specification of the upgrade expectations and procedures, including provisions to meet the SC critical service availability requirements.
- **Recovery Procedures in Upgrade Failure:** Description of the recovery or back-out procedures in the event of an upgrade failure.
- **Procedures for minor upgrades:** Description of the procedures for releasing and installing patches and other minor upgrades. This field can be left empty.
- **SP Changes Implementation:** Description of how the SP will implement changes, e.g., over-the-air software upgrades, on-site installation, etc. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to the changes in network and delivery mechanisms. This field can be left empty.

### 7.5 SLA Representation Template Proformas for QoS Report

#### 7.5.1 Proformas for "QoS Report"

The structure of the "QoS Report" proforma is shown in Table 20:

**Table 20/M.3342 – The "QoS Report" proforma**

<b>Content of Reports</b>	
<b>Reporting Frequency</b>	
<b>Report Delivery Mechanism</b>	
<b>Ad hoc Support*</b>	
<b>Time Points and Intervals</b>	
<b>Report Presentation</b>	

**Table 20/M.3342 – The "QoS Report" proforma**

<b>Monitoring Approach*</b>	
<b>Detecting Mechanisms*</b>	
<b>SC Auditing Process*</b>	
<b>Performance Assessment*</b>	
<b>Additional Information*</b>	

Where:

- **Content of Reports:** Specifications of the content of performance reports.
- **Reporting Frequency:** Specifications of the frequency of performance reports.
- **Report Delivery Mechanism:** Specification of the performance report delivery mechanism, e.g., e-mail, postal delivery, electronic retrieval, report distribution lists, and the number of copies.
- **Ad hoc Support:** Specification of ad hoc reporting support. This field can be left empty.
- **Time Points and Intervals:** Definitions of the time points or intervals associated with performance events, and data aggregation intervals.
- **Report Presentation:** Specifications of the method for performance report data presentation, e.g., tables histograms, charts, etc.
- **Monitoring Approach:** Specification of the approach and extent to which the SP will monitor all necessary services e.g., network devices, circuits, services and applications, to prevent service unavailability. This field can be left empty.
- **Detecting Mechanisms:** Description of the mechanisms and processes the SP will use to detect and track downtime. This field can be left empty.
- **SC Auditing Process:** Description of the process that the SC may use to audit the SP's tracking and reporting mechanisms. This field can be left empty.
- **Performance Assessment:** Specification of when and how SC service monitoring data will be used to assess service performance. This field can be left empty.
- **Additional Information:** This field is reserved for extensions, and can be used to specify any other additional information that is related to QoS reporting. This field can be left empty.

## Appendix I

### Examples of SLA Representation Templates for VLL service

VLL (Virtual Leased Line) is a common telecommunication service. In this appendix, instances of SLA representation template for a specific VLL service are described as an example of applying the definition guidelines. According to the GDSRT, SLA representation templates of VLL service can be created. When instantiated templates are filled with the SC and SP information, it becomes a concrete SLA.

The SP or the SC can specify these attributes' values of this instance. Attribute values provided by SP are marked as [P]. Attribute values provided by the SC are marked as [C]. Attribute values selected by the SC from a set of values provided by the SP are marked as [P→C]. Attribute values marked with "UNSPECIFIED" can be replaced by some specific values in a real SLA. Items that are filled with "..." indicates that it is ignored only for example purpose, and in practice, some information should be filled in for that field.

The examples listed in this appendix are used for the purpose of showing how the information is represented in template instances. The examples are not complete and it is not the purpose for readers to use this example in practice directly.

**Table I.1/M.3342 – "Service Identification"**

	SC	SP
<b>Full Name</b>	Customer1 [C]	SP1 [P]
<b>ID</b>	BJ00123 [P]	CH11236 [P]
<b>Service Identification Information</b>		
<b>Service Full Name</b>	Virtual Leased Line [P→C]	
<b>Service Identifier</b>	S_1003 [P]	
<b>Service Instance ID</b>	BJ_0005 [P]	
<b>Service Start Time</b>	March 1st, 2006, 08:00 [C]	
<b>Service Termination Time</b>	March 1st, 2007, 08:00 [C]	

**Table I.2/M.3342 – "SLA Profile"**

Proforma Index	Proforma Categories	Proforma Summary*
Table I.1	"Service Identification"	This table provides the overall information about the SC and the SP, and provides the overview of the VLL service.
Table I.2	"SLA Profile"	This table provides a list of tables that are used in this SLA instance.
Table I.3	"Points of Contact"	The table provides the administrative contact person's information.
Table I.4	"Terms and Conditions"	...
Table I.5	"Service Center"	...
Table I.6	"Service Violations and Remedies"	...
Table I.7	"Tariffs and Billing"	...
Table I.8	"Service Termination"	...
Table I.9	"Service Provided"	...
Table I.10	"Service Level"	...
Table I.11	"QoS Metrics"	Technology-independent Service QoS Metrics
Table I.12	"QoS Metrics"	Technology-specific Traffic QoS Metrics
Table I.13	"QoS Metrics"	Technology-independent Network Performance QoS Metrics
Table I.14	"KPI Definition"	...
Table I.15	"KQI Definition"	...
Table I.16	"QoS Report"	...

**Table I.3/M.3342 – "Points of Contact"**

	Service Customer	Service Provider
<b>Responsibility</b>	Administrative matter [C]	Administrative matter [P]
<b>Name of Contact</b>	ZHANG San [C]	LI Si [P]
<b>Work Title*</b>	CEO [C]	Help Desk Manager [P]
<b>Description*</b>	...	...
<b>Telephone Number(s)</b>	+86 10 6666 8888 (Office) [C]	+86 10 8888 6666 (Office) [P]
	+86 13966668888 (Mobile) [C]	+86 13388886666 (Mobile) [P]
<b>Fax Number(s)*</b>	+86 10 6666 1234 [C]	+86 10 8888 4321 (Office) [P]
<b>E-mail Address(es)*</b>	<a href="mailto:Zhang.san@sc1.com">Zhang.san@sc1.com</a> [C]	<a href="mailto:Li.si@sp1.com">Li.si@sp1.com</a>
	--	<a href="mailto:Li.si@hotmail.com">Li.si@hotmail.com</a>
<b>Postal Address(es)*</b>	--	Mail box 111, No. 10, Service Provider Road, Beijing, China, (Postal Code: 100234)
<b>Additional Information*</b>	--	--

**Table I.4/M.3342 – "Terms and Conditions"***Example not shown.***Table I.5/M.3342 – "Service Center"***Example not shown.***Table I.6/M.3342 – "Service Violations and Remedies"***Example not shown.***Table I.7/M.3342 – "Tariffs and Billing"**

<b>Billing Details</b>	Every Available hour will be charged for \$ 5.
	Degraded Service will be charged for \$ 5 × SDF per hour.
	Hours when the Service Available is under the SDF will not be charged.
<b>Billing Frequency</b>	The bill will be sent to the SC every month on the 30th day of that month.
<b>Bill Delivery</b>	The bill will be sent through FAX to the SC contact person's fax number.
<b>Additional Information*</b>	

**Table I.8/M.3342 – "Service Termination"**

<b>Time Period</b>	There will be a period of 5 working days for the return of data.
<b>Data Transfer Process</b>	...
<b>Unilateral Termination</b>	The SC can unilaterally terminate the service before the planned service termination time; but the SC should notify the SP about the Unilateral Termination 5 working days ahead of time. The five days will also be charged.
<b>Additional Information*</b>	

**Table I.9/M.3342 – "Service Provided"**

<b>Service Identifier*</b>	S_1003
<b>Service Name</b>	Virtual Leased Line (VLL)
<b>Service Description</b>	The SP will provide 622M virtual leased line service to the SC during the agreed service period.
<b>SAP List</b>	SAP 1: Beijing Plaza A SAP 2: Shanghai Plaza B
<b>Service Interfaces Requirements*</b>	SDH STM-2 interface
<b>Ready-for-Service Date(s)</b>	March 1st, 2006
<b>SC Notification Process</b>	The SC will call the SP contact person one day before the delivered service date, when the agreed service cannot be delivered.
<b>Additional Information*</b>	



**Table I.10/M.3342 – "Service Level"**

<b>Service Class*</b>	Silver
<b>Out-of-Service Times</b>	5 (1 is the highest)
<b>Force Majeure</b>	The Services Unavailable caused by Earthquake, Flood, or Tornado shall not be counted as SP service outage.
<b>SC-Caused Outages*</b>	The service outages caused by the power off of the SC Premises or by the SC unplugging the interface equipment are counted as SC-caused outages, which will still be charged.
<b>Restoration Priority*</b>	3 (5 is the highest)
<b>Restoration Times*</b>	5 times
<b>Planned Outage Notification Procedures*</b>	--
<b>Additional Information*</b>	

**Table I.11/M.3342 – "QoS Metrics 1"**

<b>Technology Dependency</b>		Technology independent				
<b>QoS Parameter Area</b>		Service Metrics				
<b>Parameter ID</b>	<b>Parameter Name</b>	<b>Value Range</b>	<b>Value Units</b>	<b>Qualifier</b>	<b>Definition Reference</b>	<b>SC Check</b>
200-001	SA	≥99.95%[C]	--	Mandatory	I.15-1	√
100-009	SDF	0.1	--	Mandatory	I.15-2	√
100-104	Fulfillment Period	5	days	Conditional <sup>a)</sup>	I.14-4	√
100-105	Express Fulfillment Period	2	days	Conditional <sup>a)</sup>	I.14-5	X
...	MTTR	4	hours	Mandatory	...	√
...	MTBO	60	days	Optional	...	√
100-206	MTBF	120	days	Optional	I.14-6	√
...	MSPT	5	working days	Optional	...	X
<sup>a)</sup> Either "Fulfillment Period" or "Express Fulfillment Period" should be specified.						

**Table I.12/M.3342 – "QoS Metrics 2"**

<b>Technology Dependency</b>		Technology specific				
<b>QoS Parameter Area</b>		Traffic Metrics				
<b>Parameter ID</b>	<b>Parameter Name</b>	<b>Value Range</b>	<b>Value Units</b>	<b>Qualifier</b>	<b>Definition Reference</b>	<b>SC Check</b>
100-003	Bandwidth	622	Megabyte/s	Mandatory	I.14-3	√
...	MTU Size	UNSPECIFIED	byte/s	Optional	...	X
...	Mean Rate	UNSPECIFIED	byte/s	Optional	...	X
...	Max Rate	UNSPECIFIED	byte/s	Optional	...	X
...	Burst Size	UNSPECIFIED	byte/s	Optional	...	X

**Table I.13/M.3342 – "QoS Metrics 3"**

Technology Dependency		Technology independent				
QoS Parameter Area		Network Performance Metrics				
Parameter ID	Parameter Name	Value Range	Value Units	Qualifier	Definition Reference	SC Check
...	Mean Delay	75	ms	Mandatory	...	√
...	Delay Priority	UNSPECIFIED	--	Optional	...	X
...	Mean Jitter	15	ms	Optional	...	√
...	Loss Rate	UNSPECIFIED	--	Optional	...	√
100-001	BER	UNSPECIFIED	--	Mandatory	I.14-1	√
...	UAS	UNSPECIFIED	s	Optional	...	√
100-002	ES	UNSPECIFIED	s	Optional	I.14-2	X
...	SES	UNSPECIFIED	s	Optional	...	X

**Table I.14/M.3342 – The "KPI Definition" proforma**

Index	KPI ID	KPI Name	Source*	Definition*
I.14.1	100-001	BER (Bit Error Rate)	ITU-T Rec. E.800	The ratio of the number of bit errors to the total number of bits transmitted in a given time interval.
I.14.2	100-002	ES (Error Seconds )	...	...
I.14-3	100-003	Bandwidth	...	This parameter provides the total capacity that is provided to the SC for a communication service.
I.14-4	100-104	Fulfillment Period	--	This KPI indicates the time period for the SP to fulfil an ordinary service. The units for the KPI are days.
I.14-5	100-105	Express Fulfillment Period	--	This KPI indicate the time period for the SP to fulfil an express service. It is usually much less than ordinary service fulfillment time period. The units for this KPI are days.
I.14-6	100-206	MTBF	TMF GB917-2	See TMF GB917-2 Annex A for details.
I.14-7	100-307	Outage interval	...	...
I.14-8	100-308	Active time	...	...
I.14-9	100-309	SDF (Service Degradation Factor)	TMF GB917-2	See TMF GB917-2 clause 3.1.20 for details.
...	...	...	...	...

**Table I.15/M.3342 – The "KQI Definition" proforma**

Index	KQI ID	KQI Name	Source*	Included KPI List		Definition*
				KPI ID	KPI Name	
I.15-1	200-001	SA (Service Availability)	TMF GB917-2 clauses 3.1.9 & 3.1.20	100-307	Outage interval	The unavailability of a service at the SAP is defined as an outage. The duration of this specific event is the outage interval. These concepts are used in the Service unavailability percentage (SUA%) and Service Availability percentage (SA%) calculation given below:  $SA\% = 100\% - SUA\%$ where Service UnAvailability $SUA\% = \Sigma(\text{Outage interval} \times \text{SDF}) / (\text{active time}) \times 100\%$
				100-308	active time	
				100-309	SDF	
...	...	...	...	...	...	...

**Table I.16/M.3342 – "QoS Report"**

<b>Content of Reports</b>	Each QoS Parameter listed from Tables I.11 to I.13 will be reported in the QoS Report.
<b>Reporting Frequency</b>	Every working day.
<b>Report Delivery Mechanism</b>	Through e-mail. It will be sent to the contact person of the SC.
<b>Ad hoc Support*</b>	--
<b>Time Points and Intervals</b>	Hourly from 9:00 to 17:00. A QoS Report will be generated.
<b>Report Presentation</b>	In the tabular format as agreed in document XYZ.
<b>Monitoring Approach*</b>	--
<b>Detecting Mechanisms*</b>	Using Probes
<b>SC Auditing Process*</b>	--
<b>Performance Assessment*</b>	--
<b>Additional Information*</b>	

## Appendix II

### Lists of QoS Parameters to be selected in a SLA

This appendix contains a list of QoS Performance Parameters that may be selected in the "QoS Metric" Proforma of SLA representation templates. The provided QoS Parameters are for information only, which means they are not the whole set of QoS Parameters that may occur in a specific SLA. The definitions of these QoS Parameters can be found in other ITU-T Recommendations, TMF specifications (such as TMF GB917 [15][16]), or other standards.

#### II.1 A List of QoS Parameters from TMF GB917

This clause lists some example QoS Parameters captured from TMF GB917 specifications, which may be selected in a SLA.

- 1) *General QoS Parameters*
  - Average call response time;
  - Bit Error Ratio (BER);
  - Errored Seconds (ES);
  - Outage Intensity (OI);
  - Service Availability (SA);
  - Service Degradation Factor (SDF);
  - Service UnAvailability (SUA);
  - Severely Errored Seconds (SES);
  - Time to first yield;
  - Unavailable Seconds (UAS).
- 2) *Technology/Service-Specific Service Individual User View*
  - Maximum Errored Seconds Ratio;
  - Maximum Severely Errored Seconds Ratio;
  - Maximum Background Block Error Ratio;
  - Maximum Transfer Delay;
  - Maximum Delay Variation.
- 3) *Technology-Independent Service Individual User View*
  - Maximum Unavailability Time;
  - Maximum Time To Restore;
  - Minimum Time Between Failures.
- 4) *Technology/Service-Specific Service Aggregate View*
  - Mean Errored Seconds Ratio;
  - Mean Severely Errored Seconds Ratio;
  - Mean Transfer Delay;
  - Mean Bit Error Ratio.

- 5) *Technology-Independent Service Aggregate View*
- Total Unavailability Seconds;
  - Mean Time Between Failures (MTBF);
  - Mean Time Between Outages (MTBO);
  - Mean Time To Repair (MTTR);
  - Mean Time to Provide Service (MTPS);
  - Mean Time to Restore Service (MTRS).

## **II.2 A List of QoS Parameters from ITU-T Rec. E.802**

This clause lists some example QoS Parameters captured from ITU-T Rec. E.802 [3], which may be selected in a SLA.

- 1) *Applicable to any service*
- Supply time for fixed network access;
  - Supply time for Internet access;
  - Proportion of problems with number portability procedures;
  - Fault report rate per fixed access lines;
  - Fault repair time for fixed access lines;
  - Response time for operator services;
  - Response time for directory enquiry services;
  - Response time for admin/billing enquiries;
  - Bill correctness complaints;
  - Prepaid account credit correctness complaints;
  - Bill presentation quality;
  - Frequency of customer complaints;
  - Customer complaints resolution time;
  - Customer relations;
  - Professionalism of help line;
  - Complaint Rate regarding Coverage of Traffic Jam;
  - Availability of Call center;
  - Availability of Attendants in Call center;
  - Customer Request resolution time;
  - Fault repair time for general defects.
- 2) *Voice telephony (and voice-band related services like fax, data transmission and SMS)*
- Unsuccessful call ratio;
  - Call set-up time;
  - Speech connection quality;
  - Fax connection quality;
  - Data rate of Dial-up access to the Internet;
  - Successful SMS Ratio;
  - Completion Rate for SMS;
  - End-to-End delivery time for SMS.

- 3) *Mobile services (voice telephony parameters as listed above also apply)*
- Unsuccessful call ratio;
  - Dropped call ratio;
  - Coverage.
- 4) *Internet access*
- Login time;
  - Data transmission speed achieved;
  - Unsuccessful data transmissions ratio;
  - Successful log-in ratio;
  - Delay (one-way transmission time).



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