

# ETSI TS 102 845 V1.1.1 (2009-11)

---

*Technical Specification*

**User Group;  
Quality of ICT Services;  
Requirements and Method for checking Metering and  
Billing systems**

---



---

Reference

DTS/USER-00026

---

Keywords

charging, quality, user

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

[http://portal.etsi.org/chaicor/ETSI\\_support.asp](http://portal.etsi.org/chaicor/ETSI_support.asp)

---

**Copyright Notification**

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2009.  
All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

**3GPP™** is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**LTE™** is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

---

# Contents

Intellectual Property Rights .....	5
Foreword.....	5
Introduction .....	5
1 Scope .....	6
2 References .....	6
2.1 Normative references .....	6
2.2 Informative references.....	7
3 Definitions and abbreviations.....	7
3.1 Definitions .....	7
3.2 Abbreviations .....	9
4 Billing Integrity Principles .....	9
5 Compliance Statement.....	10
6 Prerequisites .....	10
6.1 Metering Principles .....	10
6.1.1 Definition of Successful and Unsuccessful Status .....	10
6.1.2 Definition of Units .....	11
6.1.3 Definition of Time .....	11
6.1.4 Definition of Duration .....	11
6.1.5 Definition of Data Volume .....	11
6.2 Tariff Information.....	12
6.2.1 Tariff Scope .....	12
6.2.2 Taxes Information.....	12
6.2.3 Public Availability .....	12
7 Billing and Metering Checking Process.....	12
7.1 Billing Verification Process Overview.....	13
7.2 Test Campaign Design .....	13
7.3 Test Resources Procurement .....	14
7.4 Electronic Communications Technical Configuration .....	14
7.5 Electronic Communications Generation.....	14
7.6 Robots Logs Collection.....	14
7.7 Billing Details Collection.....	15
7.8 Electronic Communications Rating and Matching.....	15
7.9 Balance and Invoices checking .....	15
7.10 Reporting.....	15
7.11 Billing Error Rate Computation .....	16
<b>Annex A (informative): Example of a Stratified Sample of Electronic Communications .....</b>	<b>17</b>
A.1 Locations .....	18
A.2 Networks .....	18
A.3 Offerings.....	18
A.4 Services .....	19
A.5 Durations .....	19
A.6 Volumes .....	20
A.7 Spreading.....	20
A.8 Additional Variations .....	20

<b>Annex B (informative):</b>	<b>Case Management &amp; Corrective Actions Enforcement .....</b>	<b>21</b>
<b>Annex C (informative):</b>	<b>Bibliography .....</b>	<b>22</b>
History .....		23

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

This Technical Specification (TS) has been produced by ETSI User Group (USER).

The standardization work described in the present document was funded by the European Commission, Enterprise and Industry Directorate-General, as part of the 2009 ICT Standardisation Work Programme and executed by ETSI.

The present document has been produced within the ETSI Special Committee USER GROUP (USER) by the Specialist Task Force (STF) 375. Several documents provided by European Telecommunications regulatory bodies have been used to develop the present document. They are detailed in TR 102 847 [i.5].

---

## Introduction

A significant difference rate between theoretical and actual bills has been identified by independent observers. in the current metering and billing systems used by the Service Providers.

Several Service Providers, Administrations and Users Associations have intended to reduce this difference rate in implementing rules in order to make users more confident in the reliability of their bills.

Nevertheless, due to the complexity of this issue and in absence of any available formal standard in this area, the current practices are hindered by significant limitations. The purpose of the present document is to fulfil the gaps of the current practices in order to provide a reference that can be used for a continuous and trustworthy checking of metering and billing systems. Such a checking process is expected to contribute to a continuous quality improvement process.

The present document can be used to assess conformance by suitable internal and external parties.

---

# 1 Scope

The present document has been prepared to provide a model for designing and operating the checking of metering and billing processes and systems of Service Providers (SP). It does not provide any model for designing and operating metering and billing process systems.

The goal of this specification is to define a standardized checking process that could be implemented by any stakeholder and is auditable by a third-party, leading to trustworthy performance indicators about the integrity of billing issued by a Service Provider.

Because the checking process of this technical specification is end-to-end (i.e. using a "black box" approach from the actual Electronic Communications generation to the verifying of its billing), it is intended that these requirements are applicable to any kind of services offered by the Service Providers.

---

# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

## 2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ISO/IEC 17065: "Conformity assessment -- Requirements for certification bodies certifying products, processes and services".
- [2] CENELEC EN 45011: "General requirements for bodies operating product certification systems".

NOTE: Should become obsolete in 2012 and then replaced by ISO/IEC 17065.

- [3] BIPM: "The International System of Units", 8th edition.

## 2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI EG 202 057-2: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 2: Voice telephony, Group 3 fax, modem data services and SMS".
- [i.2] ETSI EG 202 057-3: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 3: QoS parameters specific to Public Land Mobile Networks (PLMN)".
- [i.3] ETSI EG 202 057-4: "Speech Processing, Transmission and Quality Aspects (STQ); User related QoS parameter definitions and measurements; Part 4: Internet access".
- [i.4] ETSI EG 202 765-4: "Speech and multimedia Transmission Quality (STQ); QoS and network performance metrics and measurement methods; Part 4: Indicators for supervision of Multiplay services".
- [i.5] ETSI TR 102 847: "User Group; Standardization and regulation references in the Metering and Billing area".
- [i.6] ETSI EG 202 765-2: "Speech Processing, Transmission and Quality Aspects (STQ); QoS and network performance metrics and measurement methods Part 2 : Transmission Quality Indicator combining Voice Quality Metrics".
- [i.7] ETSI TS 102 846: "User Group; Conformity assessment; Requirements for bodies providing audit and certification for metering and billing systems".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

**automated robot:** remotely operated machine that is able to generate Electronic Communications according to a predefined plan and to report about the exact execution of these Electronic Communications with an appropriate level of accuracy and traceability

NOTE: Its main functions are:

- Electronic Communication planning;
- Electronic Communication execution; and
- Electronic Communication logging.

**billing:** activity, within a Service Provider, which aims at charging a customer either by producing an invoice or by decreasing a prepaid account

NOTE: Billing usually involves three main types of activity:

- Guiding is the allocation of a specific event to a specific customer;
- Rating is the computation of a price of an event according to a rate plan; and
- Charging is the imputation of the financial charge to the Customer.

**billing error rate:** within a set of Electronic Communications, the ratio of the total number of Electronic Communications having breached at least one of the billing integrity principles divided by the total number of electronic communications in the set

**billing integrity principles:** principles that must be fulfilled to state that the billing activity of a Service Provider is correct

NOTE: According to the present document there are 5 billing correctness principles (see clause 4).

**billing and metering checking process:** process used to prove that a Service Provider billing activity complies with the billing integrity principles

NOTE: The proof described in the present document is based on a statistical approach, the definition of a Stratified Sample of Electronic Communications (SSEC) and an end-to-end checking that is based on a "black box" approach.

**billed quantity valuation methods:** set of mathematic methods allowing to transform raw quantities into a billed quantities

**Call Detail Record (CDR):** formatted collection of information about a chargeable event (e.g. time of call set-up, duration of the call, amount of data transferred, etc.) for use in billing and accounting

**continuous basis:** approach that takes into consideration the constantly evolving nature of communications networks

NOTE: Because metering and billing processes and systems evolve on a continuous basis (incidence and update), the verification of billing has to evolve accordingly and to check the billing integrity on a similar way. "Continuous basis" excludes "one shot audit approach" where verification is performed once per period (typically once per year).

**customer:** user who is responsible for payment for the Electronic Communication services

**electronic communication:** service that help people communicate

NOTE: Electronic Communication types includes but are not limited to voice call, video call, conference call, email, SMS, MMS, USSD, web access, instant messaging, content download, TV broadcasting, etc. Electronic communications may involve one or several interconnected networks. An Electronic Communication may lead to billing of a financial charge to a Customer of the Service Provider.

**independent observer:** entity is said an Independent Observer if it has two characteristics: independency and externality

NOTE: The independency clause means that the entity has some level of independence from the department in charge of operating the billing within the Service Provider. The externality means that the entity does not have to understand all the complexity of the information systems and network components involved in the billing of a Service Provider.

**metering principles:** set of non ambiguous principles set by a Service Provider to define and meter the Electronic Communications service it offers to its Customers

**prerequisites:** list of basic principles and statements and of requirements for the Tariff Information

**pricing:** set of Billed Quantity Valuation Methods and Unit Prices

**publishing mode:** mean by which billing information is provided to the customer of the Service Provider

NOTE: Publishing mode may include but are not limited to paper invoice, electronic invoices, web sites, Call Centres, Intelligent Voice Response Units, SMS servers, USSD servers, etc.

**Service Provider (SP):** organization that provides Electronic Communications services to users and customers

**Stratified Sample of Electronic Communications (SSEC):** sample of Electronic Communications used to conduct the billing and metering checking process

NOTE: The sample of Electronic Communications is designed according to statistical method so as to provide a reasonable evidence that the billing integrity is fulfilled.

**tariff information:** set of principles defined by a Service Provider to price the Electronic Communications service it offers to its customers

**unambiguous:** set of rules is said Unambiguous if it can be understood and checked by a Customer by its own means without requesting to understand the internality of a Service Provider systems and processes

**unit price:** given price for a unit billed quantity

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

APN	Access Point Name
BIPM	Bureau International des Poids et Mesures
CDR	Call Detail Record
DSL	Digital Subscriber Line
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
IN	Intelligent Network
MMS	Multimedia Message Service
SIM	Subscriber Identification Module
SMS	Short Message Service
SP	Service Provider
SSEC	Stratified Sample of Electronic Communications
TV	Television
URL	Uniform Resource Locator
URL	Universal Resource Location
USSD	Unstructured Supplementary Service Data
VOIP	Voice over IP
VPLMN	Visited Public Land Mobile Network
VPN	Virtual Private Network

---

## 4 Billing Integrity Principles

The present document adopts a process approach for providing evidence measured by an Independent Observer according to a standardized process that a Service Provider complies with the following five billing integrity principles:

- Principle 1: Electronic Communications metering (success status, time, duration, volume) is accurate.
- Principle 2: Unsuccessful Electronic Communications are not billed or are billed at null price.
- Principle 3: Each successful Electronic Communication is charged.
- Principle 4: Billed Electronic Communications are priced in accordance with published Metering Principles and Tariff information (see clauses 6.1 and 6.2).
- Principle 5: Electronic Communication billing information details provided to customers are complete, sufficient, unambiguous and correct whatever the Publishing mode.

According to the present document, evidence of compliance of billing integrity principles is based on the actual generation and verification of the billing of a Stratified Sample of Electronic Communications (SSEC), designed according to a predefined statistical method and performed on a continuous basis by automated robots.

As a result of the billing and metering checking process, billing and metering checking reports are produced on a predefined frequency and archived according to predefined storage policy.

---

## 5 Compliance Statement

The present document describes a set of clauses that shall be included in a billing and metering checking process of a Service Provider to claim compliance with the present document.

Compliance shall be verified according to clause 6 (Prerequisites) and clause 7 (Billing and Metering Checking Process steps) of the present document.

The billing and metering checking process itself can be executed by an internal department of the Service Provider (Full Internalization), outsourced to an external provider of monitoring services (Full Outsourcing) or by a combination of both (Mixed Model). The present document does not recommend any special type of organisational model.

The actual validation that the billing and metering checking process of a Service Provider is performed according to the present document shall be performed by a third party according to ISO/IEC 17065 [1] (or until 2012 to EN 45011 [2]) and TS 102 846 [i.7].

It is important to note that this technical specification deals with the checking process of billing and not with the actual systems and process used for performing metering and billing.

---

## 6 Prerequisites

Before implementing the billing and metering checking process described in the present document, the two following prerequisites shall be fulfilled:

- Prerequisite 1: Metering Principles.
- Prerequisite 2: Tariff Information.

NOTE: The exact legal status of Metering Principles and Tariff Information depends on the contract agreed between the Customer and the Service Provider (In several cases, such contracts are not in place). The issue of the legal value of the Prerequisite is outside the scope of this technical specification. For the present document, the requirement is limited to the fact that the requested information is publicly available.

### 6.1 Metering Principles

#### 6.1.1 Definition of Successful and Unsuccessful Status

- [6.1.1.1] The Service Provider shall define methods and principles to define if an Electronic Communication is successful or unsuccessful and whether or not it should lead to a chargeable item.
- [6.1.1.2] The principles of [6.1.1.1] shall be differentiated for every type of Electronic Communication offered by the Service Provider to its customers: voice call, video call, conference call, SMS, MMS, USSD, Web access, Instant Messaging, content download, etc.
- [6.1.1.3] The principles of [6.1.1.1] shall include the case of Electronic Communications spanning over more than one network. If Service Provider has not full management of all involved networks, rules shall be defined, for example based on signalisation exchanged at the interconnect point.

The definition of a successful status requires to make assumptions that are arbitrary, but shall be clearly defined by the Service Provider. Successful and unsuccessful status definition are available in several standards for different types of Electronic Communications. It is up to each Service Provider to design its own definition or to rely on the standard of its choice. For information, the list below provides widely accepted definition of successful or unsuccessful Electronic Communications:

- **Mobile Telephony:** In EG 202 057-3 [i.2], an unsuccessful call is defined as a call attempt to a valid number, while in a coverage area, where neither the call is answered nor called party busy tone nor ringing tone, is recognized at the access of the calling user within 40 seconds from the instant when the last digit of the destination subscriber number is received by the network.
- **Fixed Telephony:** In EG 202 057-2 [i.1], an unsuccessful call is a call attempt to a valid number, properly dialled following dial tone, where neither called party busy tone, nor ringing tone, nor answer signal, is recognized at the access of the calling user within 30 seconds from the instant when the last digit of the destination subscriber number is received by the network.
- **SMS:** In EG 202 057-2 [i.1], a successful SMS is defined a SMS where the Short Message has been successfully from a terminal equipment to a Short Message Center. (i.e. this does not imply that the recipient of the SMS has received it)
- **Data transmission:** In EG 202 057-4 [i.3], a successful data transmission is defined as successful if a test file is transmitted completely and with no errors.
- **TV:** In EG 202 765-4 [i.4], a successful TV channel access is defined as an access where video and audio are accessible.

## 6.1.2 Definition of Units

- [6.1.2.1] The Service Provider shall use, when available, units that are part of the International System of Units as described in BIPM, The International System of Units, 8<sup>th</sup> edition [3].
- [6.1.2.2] If no unit is defined in the International System of Units (e.g. bit, byte), a clear system of unit shall be defined and used consistently by Service Provider.
- [6.1.2.3] The Service Provider shall use, Multiples and Submultiples (e.g. kilo = 1 x 1 000 ) that are part of the International System of Units as described in BIPM, The International System of Units, 8<sup>th</sup> edition [3].

## 6.1.3 Definition of Time

- [6.1.3.1] The Service Provider shall define a clear and consistent reference for measuring time of a Electronic communication. This method shall be Unambiguous to all types of Electronic Communications delivered by the Service Provider (e.g. international roaming communications).

## 6.1.4 Definition of Duration

- [6.1.4.1] The Service Provider shall define a clear method to meter the duration of Electronic communications charged to customers. The duration shall be determined as the difference of time between two well defined trigger points.

## 6.1.5 Definition of Data Volume

- [6.1.5.1] The Service Provider shall define a clear method to define volume of data exchanged during an Electronic Communication.
- [6.1.5.2] Volume metering method, defined in [6.1.5.1], shall define the way electronic communication is exchanged: upload, download, multicast, etc.
- [6.1.5.3] Volume metering method, defined in[6.1.5.2], shall define if protocol overhead information added on top of user information is included or not in the metering.

## 6.2 Tariff Information

- [6.2.1] Tariff information published by the Service Provider shall be complete, unambiguous and accessible to customers and shall include or refer the metering principles of clause 6.1. The different modes of Tariff Information shall contain this information and be consistent.

Published is meant as a public accessibility to tariff information.

### 6.2.1 Tariff Scope

- [6.2.1.1] Tariff information should cover all rate plans that are used by at least one customer. For the avoidance of doubt, a rate plan that is not sold any more but that is still used by a at least one customer shall be available.
- [6.2.1.2] Tariff information shall state without ambiguity the Pricing for each Electronic Communication type.
- [6.2.1.3] If an Electronic Communication price depends on the destination or the point of origin, tariff information shall explicitly state:
- the different types of domestic destinations;
  - the different types of international destinations;
  - the different types of roaming destinations.
- [6.2.1.4] If an Electronic Communication price depends on when it was generated, tariff information shall state without ambiguity the different meaning of peak and off-peak hours and precise the applicable days of the week (including the case of bank holidays).
- [6.2.1.5] If an Electronic Communication price depends on technical profile used during the Electronic Communication generation, tariff information shall state without ambiguity the different types of technical profiles (for example with GPRS traffic: URL, APN, protocol nature, etc.) used for rating purposes.
- [6.2.1.6] Tariff guides shall define without ambiguity the applicable Electronic Communications that are included in buckets, their unit and how they impact the bucket balance.

### 6.2.2 Taxes Information

- [6.2.2.1] Tariff Information shall state if taxes are included or not in prices.

### 6.2.3 Public Availability

- [6.2.3.1] Tariff Information shall be accessible by anyone by at least one mode: e.g. paper brochure available in retail shops, publication on a web site. For private customized tariff information (e.g. big account) the mode will depend on an agreement between the two parties.

---

## 7 Billing and Metering Checking Process

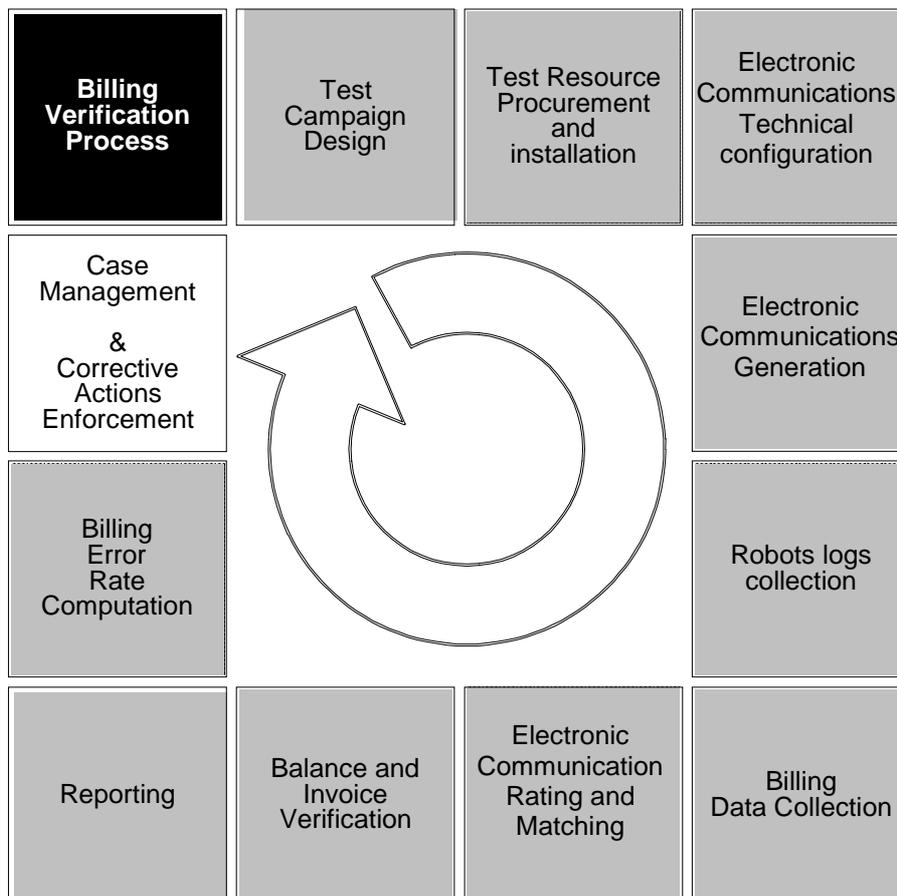
The billing and metering checking process of the present document is based on the principle of using appropriate test subscriptions (SIM cards, fixed line, DSL lines, VOIP accounts, etc.) and a network of automated testing robots to verify the billing integrity of a Service Provider.

The automated robots use the test subscriptions to generate Electronic Communications according to a predefined plan.

The Tariff Information published by the Service Provider for the test subscriptions is collected when available and checked, by verifying each charged item against a theoretical item computed on the basis of the robots logs, in a manner completely independent from the metering and billing systems of the Service Provider.

## 7.1 Billing Verification Process Overview

The billing and metering checking process is made of the elementary tasks described by figure 1.



**Figure 1: Billing and metering checking process Overview**

The following clauses describe the clauses a Service Provider has to comply to, in order to claim compliance with the present document.

NOTE: The "Case Management and Corrective Actions Enforcement" is outside the scope of the present document. It is usually part of the whole process, since the checking of billing is usually performed to detect and fix issues. For the avoidance of doubt all clauses for this activity are provided in annex B.

## 7.2 Test Campaign Design

- [7.2.1] The Service Provider shall define a statistical method to design a SSEC respecting a set of testing constraints as defined in this clause. An example of SSEC is provided in annex A.
- [7.2.2] The Service Provider shall document and validate the statistical method of [7.2.1].
- [7.2.3] The Service Provider shall use the statistical method to evolve the SSEC used for the billing and metering checking process on a Continuous Basis. The (SSEC) shall evolve at minimum on a predefined frequency that will be documented.
- [7.2.4] The SSEC shall involve a reasonable number of each Electronic Communication service types which can trigger a charging item by the Service Provider. The exact granularity of electronic communication types (e.g. MMS over VoIP, etc.) V shall be defined by the Service Provider according to the statistical method (see also clause A.4).

- [7.2.5] The SSEC shall include at least one type of each offering types marketed by the Service Provider. The exact granularity of offering types shall be defined by the Service Provider according to the statistical method of 7.2.1.
- [7.2.6] The SSEC shall involve generation of electronic communications from the different locations types (switching zone, network geographic zones, etc.) available in the network of the Service Provider. The exact granularity of location types shall be defined by the Service Provider according to the statistical method of 7.2.1.
- [7.2.7] If the Service Provider offers to its customers the possibility to access services from other networks (e.g. roaming in the GSM world), the SSEC shall involve generation of Electronic communications from a subset of the different networks accessible by the subscribers of the Service Provider. The exact granularity of networks shall be defined by Service Provider according to the statistical method of 7.2.1.
- [7.2.8] The different target addresses (called number, URL, SMS destinatory, etc.) of the SSEC shall be varied according to the statistical method of 7.2.1. For services that involve interconnection to reach a destination at another SP, the SSEC shall encompass diversity of possible terminating SP (including both off-net and international destinations).
- [7.2.9] The different start time of the SSEC shall be spread over the applicable period according to the statistical method of 7.2.1. The SSEC shall involve at least one Electronic Communication for each day of the year.
- [7.2.10] The different durations of the SSEC shall be varied according to the statistical method of 7.2.1.
- [7.2.11] The different volumes of the SSEC shall be varied according to the statistical method of 7.2.1.
- [7.2.12] The SSEC shall include any additional variations that reflects likely customer behaviour that may lead to billing errors.

## 7.3 Test Resources Procurement

- [7.3.1] The different test resources of the Service Provider (SIM cards, Fixed line, DSL subscription, VOIP Account, etc.) needed to perform the SSEC shall be configured in the networks and information systems of the Service Provider as if they were actual customers of the Service Provider.
- [7.3.2] The different test resources of other Service Providers (SIM cards, Fixed line, DSL subscription, VOIP Account, etc.) needed to perform the SSEC shall be procured in standard market conditions.

## 7.4 Electronic Communications Technical Configuration

- [7.4] The different Electronic communications of the SSEC shall be updated on a Continuous Basis to a set of automated robots.

## 7.5 Electronic Communications Generation

- [7.5] The automated robots shall execute the electronic communications according to the predefined plan (SSEC) with an appropriate level of accuracy according to the Metering Principles defined in clause 6.1.

## 7.6 Robots Logs Collection

- [7.6] The robots shall report about the executed electronic communications with an appropriate level of traceability.

## 7.7 Billing Details Collection

- [7.7.1] The SP shall publish Billing Details Information. For each publishing mode, the collection of Billing Details from the test resources shall be retrieved following the process used by actual customers wishing to know about their charging.
- For example, if the Service Provider offers a web site where customers can download their electronic invoices, the billing and metering checking process shall download the electronic invoices of the test resources in the web site. For the avoidance of doubt, a billing verification performed on the basis of more upstream information extracted directly from an internal information system (e.g. CDR of the network) should not be regarded as compliant with the present document.
- [7.7.2] Billing Details shall include electronic communication start time, duration or volume, destination (called party, SMS address, email address, URL, etc.) and any complementary data needed for the unique identification of the Electronic communication.
- [7.7.3] Billing Details shall include price and, if applicable, the bucket impacted by each electronic communication.
- [7.7.4] In the case no publishing mode is available with sufficient details for some specific offering (e.g. prepaid data), a mechanism based on more upstream data should be set up to collect sufficient billing details so as to perform the rating and matching described in the following step of the billing and metering checking process.

## 7.8 Electronic Communications Rating and Matching

- [7.8.1] Electronic communications shall be re-rated (charged) on the basis of robot logs and according to published Tariff Information.
- [7.8.2] Electronic communications shall be re-rated (charged) in the chronological order of generation (i.e. after being sorted according to Electronic Communication start time).
- [7.8.3] Re-rated Robots Logs produced by the billing and metering checking process should be matched with the rating Details produced by the network and information systems of the Service Provider.
- [7.8.4] The matching of [7.8.3] should be performed individually for each and all Electronic Communications.
- [7.8.5] In the case of a Electronic Communication yielding more than one bill item (e.g. a premium SMS that is billed through a content item and a transport item) each item of the Robot Logs should be matched with each item of the Billing Details.

## 7.9 Balance and Invoices checking

- [7.9.1] On the basis of the re rating and matching performed in the previous step, every discrepancy between the theoretical bill and the real bill shall be spotted for every Electronic Communication of the SSEC.
- [7.9.2] Every discrepancy shall be analyzed through a contradictory process to ensure that the billing difference is an actual billing error and not an artefact.
- [7.9.3] The analysis shall be performed for each available publishing mode.

## 7.10 Reporting

- [7.10.1] Reporting about the billing and metering checking process shall be produced according to predefined templates.

- [7.10.2] The reporting shall indicate the different types of billing differences identified between the theoretical bill and the actual bill that have been identified (e.g. unbilled item, item billed twice, item billed with a wrong price, item billed with a wrong name, etc.) in the SSEC.
- [7.10.3] At least the following reports shall be produced for each applicable period:
- Report N°1: Detailed list of all executed electronic communications;
  - Report N°2: Detail list of all billing discrepancies;
  - Report N°3: Summary of billing discrepancies, in which similar discrepancies are grouped together.
- [7.10.4] Reports shall be archived during a period equal to the legal requirement of invoice archiving in the country of the Service Provider.

## 7.11 Billing Error Rate Computation

- [7.11.1] For each period (e.g. day, week, month, quarter) and for each types of Electronic Communications, the SP shall compute the Billing Error Rate as defined in the present document (see clause 3.1).

---

## Annex A (informative): Example of a Stratified Sample of Electronic Communications

The SSEC of this annex is provided as an example for understanding of the requirements of the present document. This is especially targeted at explaining the requirements of clause 7.1 about the design of a SSEC.

The SSEC of this annex should be regarded as informative and not as a formal requirement of the present document. It is up to the management of the Service Providers to:

- select a statistical method to design a Stratified Sample of Electronic Communication that takes into account the probability of identifying billing differences while respecting a set of testing constraints;
- apply regularly this method to update the SSEC to be used by the billing and metering checking process.

The SSEC of this informative annex has been designed using a theoretical Service Provider, which has the following characteristics (the words and figures in brackets { } will be adapted for each Service Provider):

- The Service Provider is a {mobile operator} based in {Poland} offering {convergent} services.
- It has {10} millions customers that generates {60} Electronic communications per {months}.
- It offers the following service types to its customers: {voice}, {SMS}, {MMS}, {email}, {Web access}, {TV channels}, {music download}, {movie download}.
- It operates {2G and 3G mobile} networks in {Germany}. The switching network is separated in {5} regional zones that are operated by {5} network regional operating centres.
- {It has roaming agreements with 400 other GSM operators. All roaming rates are broken down into 4 roaming zones with different prices}.
- It operates a {DSL} networks and sells {"access boxes"} that allow a fixed access to Internet.
- It markets {20} prepaid mobile offerings, {30} residential postpaid mobile offerings and {10} Enterprise mobile postpaid offerings and {5} convergent access box offering.

The SSEC is described in the following dimensions:

- Locations;
- Networks;
- Offerings;
- Services;
- Durations;
- Volumes;
- Spreading;
- Additional Variations.

---

## A.1 Locations

The SSEC should involve the generation of electronic communications in {5} cities in {Poland} ({1} in each regional zones):

- {Warszawa}
- Lodz
- Krakow
- Wroclaw
- Poznan}

The SSEC should involve the generation of Electronic communications in {6} countries in roaming ({3} top countries in zone 1, {1} top country of each other zone):

- {Germany}
- France
- Italy
- USA
- Russia
- Egypt}

The method for a statistical distribution of locations described in EG 202 765-2 [i.6] could be used.

---

## A.2 Networks

In {Poland}, the SSEC should involve the {GSM, GPRS and 3G} networks.

In each of the {6} foreign countries, the SSEC should involve {all VPLMN that are open for roaming}.

---

## A.3 Offerings

The SSEC should involve the {65} offerings marketed.

NOTE: This means that {60} SIM cards and {5} DSL lines of the Service Providers have to be procured.

## A.4 Services

The SSEC should include the following services for {mobile} subscriptions.

**Table A.1**

Services	Number of Electronic communications per day in SSEC
Voice call to on-net destinations	500
Voice call to VPN destinations	50
Voice call to all mobile networks in Germany (see note)	300
Voice call to major fixed networks in Germany (see note)	100
Voice call to international destinations (50 countries) (see note)	50
Voice call to premium services (08xx)	50
SMS to on net-destinations	200
SMS to all mobile networks in Germany (see note)	100
SMS to international networks (50 countries) (see note)	50
SMS to premium services (short number)	50
MMS to on net-destinations	20
MMS to all mobile networks in Germany (see note)	10
MMS to international networks (10 countries) (see note)	10
MMS to premium services (short number)	10
Email	50
Web browsing session	100
TV reception	10
Movie download	10
Music Download	10
NOTE: This means that appropriate test resources of these operators have to be procured for the conduction of the billing and metering checking process.	

## A.5 Durations

In the SSEC, durations of Electronic communications charged on a duration basis {voice call, TV on mobile} should include the durations detailed given in table A.2.

**Table A.2**

Durations
5 seconds
30 seconds
1 minute
2 minutes
5 minutes
30 minutes
1 hour
2 hours

---

## A.6 Volumes

In the SSEC, volumes of Electronic communications charged on a duration basis {Web, MMS} should include the volumes detailed in table A.3.

**Table A.3**

Volumes
5 kilobyte
50 kilobyte
200 kilobyte
1 Megabyte
10 Megabyte

---

## A.7 Spreading

The Electronic communications of the SSEC should be equally spread across the different offerings.

The Electronic communications of the SSEC should be generated at 80 % from the German network and 20 % from the roaming networks.

The Electronic communications of the SSEC should be equally spread across the different locations.

The Electronic communications of the SSEC should be equally spread across the different networks.

The Electronic communications start times of the SSEC should be equally spread over the day.

The Electronic communications durations of the SSEC should be randomized so as to cover the maximum types of different durations.

The Electronic communications volumes of the SSEC should be randomized so as to cover the maximum types of different volumes.

---

## A.8 Additional Variations

The postpaid offerings of the SSEC should be spread across the 12 different bill cycles of the postpaid offerings.

The prepaid offerings of the SSEC should be spread across the 2 different IN platforms.

---

## Annex B (informative): Case Management & Corrective Actions Enforcement

This informative annex provides guidance for Service Providers implementing "Case Management & Corrective Actions Enforcement" when "billing differences rate" shows the need to enhance the metering and billing process.

- B.1 Billing errors identified by the billing and metering checking process should go through a formal Case Management process agreed with the management of the Service Provider, in order to enhance the process.
- B.2 The Case Management process should include the necessary steps to perform billing differences verification, impact analysis, correction design and correction planning so as to warrant that corrective actions are enforced within the right network components and information systems.
- B.3 The efficiency of the Case Management process should be reviewed on a recurring basis (e.g. once per year) so as to review number of errors detected, number of billing errors corrected and other appropriate performance indicators.
- B.4 The Service Provider should correct the billing errors detected by the billing and metering checking process within service level agreed with management.
- B.5 The Service Level Agreement for billing differences corrections should be documented and reviewed on a regular basis (e.g. once a year).
- B.6 The SSEC should include any additional variations that is assessed necessary by the Service Provider to lead to the detection of potential billing errors.

---

## Annex C (informative): Bibliography

ETSI ES 282 010 V2.0.6 (2008-04): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Charging management [Endorsement of 3GPP TS 32.240 Release 7, 3GPP TS 32.260 Release 7, 3GPP TS 32.297 Release 7, 3GPP TS 32.298 Release 7 and 3GPP TS 32.299 Release 7, modified]."

ETSI TR 101 619 V1.1.1 (1998-11): "Network Aspects (NA); Considerations on network mechanisms for charging and revenue accounting."

ETSI TS 102 250 (all parts): "Speech Processing, Transmission and Quality Aspects (STQ); QoS aspects for popular services in GSM and 3G networks".

ETSI TS 122 115 V8.3.0 (2008-04): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Service aspects; Charging and billing (3GPP TS 22.115 version 8.3.0 Release 8).

ETSI TS 129 458 V8.1.0 (2008-10): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); TISPAN; SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification (Release 8)".

ETSI TS 129 658 V8.0.0 (2009-02): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; TISPAN; SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification (3GPP TS 29.658 version 8.0.0 Release 8).

ETSI TS 181 002: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Multimedia Telephony with PSTN/ISDN simulation services".

IETF RFC 4006: "Diameter Credit-Control Application".

ISO/IEC 4217: "International Organization for Standardization; Type Currency Code List".

ITU-T Recommendation E.800 (09/2008): "Definitions of terms related to quality of service."

---

## History

<b>Document history</b>		
V1.1.1	November 2009	Publication