



Technical Report

**Mobile Standards Group (MSG);  
Overview of the technical framework for the separate sale of  
roaming services in the European Union**

---

Reference

DTR/MSG-0014

---

Keywords

charging, regulation, roaming

**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 2014.  
All rights reserved.

DECT™, PLUGTESTS™, UMTS™ and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.  
3GPP™ and LTE™ are Trade Marks of ETSI 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 .....	4
Foreword.....	4
1 Scope .....	5
2 References .....	5
2.1 Normative references .....	5
2.2 Informative references.....	5
3 Definitions and abbreviations.....	6
3.1 Definitions.....	6
3.2 Abbreviations .....	7
4 Roaming unbundling solutions.....	8
4.1 Single IMSI / ARP alternative.....	9
4.2 Local Break-Out (LBO) alternative.....	10
5 Roaming unbundling specifications .....	11
5.1 Cooperation Platform organization .....	11
5.2 High Level Specifications .....	12
5.3 Protocol & Interface Specifications.....	12
5.4 Billing & Provisioning Specifications.....	12
5.5 Process Specifications .....	12
6 Specification location.....	12
6.1 ETSI .....	12
6.2 GSMA .....	13
6.3 OMA .....	13
6.4 3GPP .....	13
6.5 BEREC.....	14
History .....	15

---

## 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://ipr.etsi.org>).

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 Report (TR) has been produced by ETSI Technical Committee Mobile Standards Group (MSG).

---

# 1 Scope

EU roaming regulation III intends to promote more competition in the European roaming environment by introducing alternative roaming providers (mid-2014), which could propose new roaming offers to European citizens, without SIM card change and by keeping their telephone number.

The present document provides an overview of the technical framework for the separate sale of roaming services in the European Union.

The two solutions for alternative roaming provider will be described:

- Single IMSI solution, related to home network.
- Local Break Out solution, related to visited network.

At the end of the document, the different specifications produced will be clearly identified.

---

# 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

Not applicable.

## 2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Regulation (EU) No 531/2012 of the European Parliament and the Council of 13 June 2012 on roaming on public mobile communications networks within the Union.
- [i.2] Regulations, Commission Implementing Regulation (EU) No 1203/2012 of 14 December 2012 on the separate sale of regulated roaming services within the Union.
- [i.3] Cooperation Platform for the Separate Sale of Roaming Services: "EU Roaming regulation III; Structural Solutions; High Level Technical specifications".
- [i.4] Cooperation Platform for the Separate Sale of Roaming Services: "EU Roaming regulation III, Interface & Protocol Detailed Technical specifications".
- [i.5] Cooperation Platform for the Separate Sale of Roaming Services: "Billing & Provisioning specification -Use of TAP for the Single IMSI Wholesale Billing Interface".
- [i.6] Cooperation Platform for the Separate Sale of Roaming Services: "Billing & Provisioning specification - ABF format specification for the Single IMSI Wholesale Billing Interface".
- [i.7] Cooperation Platform for the Separate Sale of Roaming Services: "Billing & Provisioning specification - Use of NRTRDE for the Single IMSI Fraud Interface".

- [i.8] Cooperation Platform for the Separate Sale of Roaming Services: "Billing & Provisioning specification - IF7 Specifications - Provisioning".
- [i.9] Cooperation Platform for the Separate Sale of Roaming Services: "EU Roaming regulation III; Structural Solutions; Processes".
- [i.10] GSMA PRD TD.104: "Use of TAP for the Single IMSI Wholesale Billing Interface".
- [i.11] GSMA PRD TD.105: "ABF format specification for the Single IMSI Wholesale Billing Interface".
- [i.12] GSMA PRD TD.106: "Use of NRTRDE for the Single IMSI Fraud Interface".
- [i.13] GSMA PRD TD.107: "Single IMSI Provisioning Interface".
- [i.14] GSMA PRD TD.13: "TADIG Code Naming Conventions".
- [i.15] GSMA PRD TD.28: "File Transfer Methods".
- [i.16] GSMA PRD TD.35: "NRTRDE Format Specification".
- [i.17] GSMA PRD TD.57: "TAP3 Format Specification".
- [i.18] GSMA PRD BA.20: "Fraud Prevention Procedures".
- [i.19] OMA: "RESTful Network API for Terminal Status".
- [i.20] OMA: "REST NetAPI Roaming".
- [i.21] OMA: "SOAP-NetAPI-Roaming".
- [i.22] 3GPP TS 32.276: "3rd Generation Partnership Project; Technical Specification Group Service and System Aspect; Telecommunication management; Charging management; Voice Call Service (VCS) Charging (Release 12)".
- [i.23] 3GPP TS 32.293: "3rd Generation Partnership Project; Technical Specification Group Service and System Aspect; Telecommunications management; Charging management; Proxy Function (Release 12)".
- [i.24] ETSI TS 132 240: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Charging management; Charging architecture and principles (3GPP TS 32.240)".
- [i.25] ETSI TS 132 299: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Charging management; Diameter charging applications (3GPP TS 32.299)".
- [i.26] BEREC: "Liaison Statement on Terminal and Device Behaviour to support Manual Network Selection and editing of APN".

---

## 3 Definitions and abbreviations

### 3.1 Definitions

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

**alternative roaming provider:** roaming provider different from the domestic provider

NOTE: It can be single IMSI alternative roaming provider - named ARP or LBO roaming provider - called LBO provider.

**domestic provider or Domestic Service Provider (DSP):** undertaking that provides a roaming customer with domestic mobile communications services

NOTE: It may be a Mobile Network Operator or a Mobile Virtual Network Operator.

**EUInternet Access Point Name (APN):** common identifier set, manually or automatically, in the roaming customer's mobile device and recognized by the home network and visited network to indicate the roaming customer's choice to use local data roaming services (LBO Provider)

**home network/HPMN:** public communications network located within a Member State and used by the roaming provider for the provision of regulated retail roaming services to a roaming customer

NOTE: The MCC+MNC of the customer's IMSI corresponds to a MCC+MNC of this network's identity.

**roaming:** ability for a user to function in a serving network different from the home network

NOTE: The serving network could be a shared network operated by two or more network operators.

**roaming customer:** customer of a roaming provider of regulated roaming services, by means of a terrestrial public mobile communications network situated in the Union, whose contract or arrangement with that roaming provider permits Union-wide roaming

**roaming provider:** undertaking that provides a roaming customer with regulated retail roaming services

**visited network/VPMN:** public mobile communications network located within a Member State other than that of the roaming customer's HPMN that permits a roaming customer to make or receive calls, to send or receive SMS messages or to use packet switched data communications, by means of arrangements with the home network operator

NOTE: The MCC+MNC of the customer's IMSI does not correspond to a MCC+MNC of this network's identity.

## 3.2 Abbreviations

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

ABF	Alternative Billing Format
API	Application Programming Interface
APN	Access Point Name
ARP	Alternative Roaming Provider
BEREC	Body of European Regulators for Electronic Communications
CAMEL	Customized Applications for Mobile networks Enhanced Logic
CRM	Customer Relationship Management
DSP	Domestic Service Provider
EU (or EEA)	Member States of the European Union, the outermost regions of the European Union and countries adopting Regulation
GGSN	Gateway GPRS Service Node
GMSC	Gateway MSC
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
GSMA	GSM Association
HLR	Home Location Register
HPMN	Home Public Mobile Network
IF	Interface
IMSI	International Mobile Subscriber Identity
LBO	Local Break-Out
MAP	Mobile Application Part (protocol)
MCC	Mobile Country Code
MMS	Multimedia Messaging Service
MNC	Mobile Network Code
MNO	Mobile Network Operator
MSC	Mobile services Switching Centre
MVNO	Mobile Virtual Network Operator
NRTRDE	Non Real-Time Roaming Data Exchange
OMA	Open Mobile Alliance

PRD	Permanent Reference Document
REST	Representational State Transfer
SCP	Service Control Point
SGSN	Serving GPRS Support Node
SI	Single IMSI
SIM	Subscriber Identity Module
SMS	Short Messaging Service
SMSC	Short Message Service Centre
SOAP	Simple Object Access Protocol
TADIG	Transferred Account Data Interchange Group
TAP	Transferred Account Procedure
USSD	Unstructured Supplementary Service Data
VPMN	Visited Public Mobile Network
WS	Wholesale

## 4 Roaming unbundling solutions

EU Roaming Regulation III (defined in [i.1] and [i.2]) requires that domestic providers must enable their customers to access regulated voice, SMS and data roaming services provided as a bundle by any alternative roaming provider (generally home country based decoupling). It requires that domestic and alternative roaming providers must not prevent their customers from accessing data roaming services provided directly on a visited network (decoupling in the visited country).

Two types of decoupling models are considered in the regulation. For the first type of decoupling, where regulated voice, SMS and data roaming services are provided as a bundle, the Single-IMSI solution has been chosen. The separate sale of roaming services is provided on a wholesale basis to the alternative roaming provider, which resells the services to the roaming customer at the retail level. This basic option of resale of retail roaming services does not allow the alternative roaming provider to control which visited networks are to be used in preference to others.

For the second type of decoupling, i.e. data roaming services provided directly on a visited network, the basic requirements are the implementation and activation of the processing of data roaming traffic in the visited network and the requirement not to prevent the manual or automatic selection of a visited network.

Figure 1 depicts the architecture and relationships that exist today (shown in white), those that will apply for the Single IMSI approach and those that will apply for the Local Break-Out (LBO) approach.

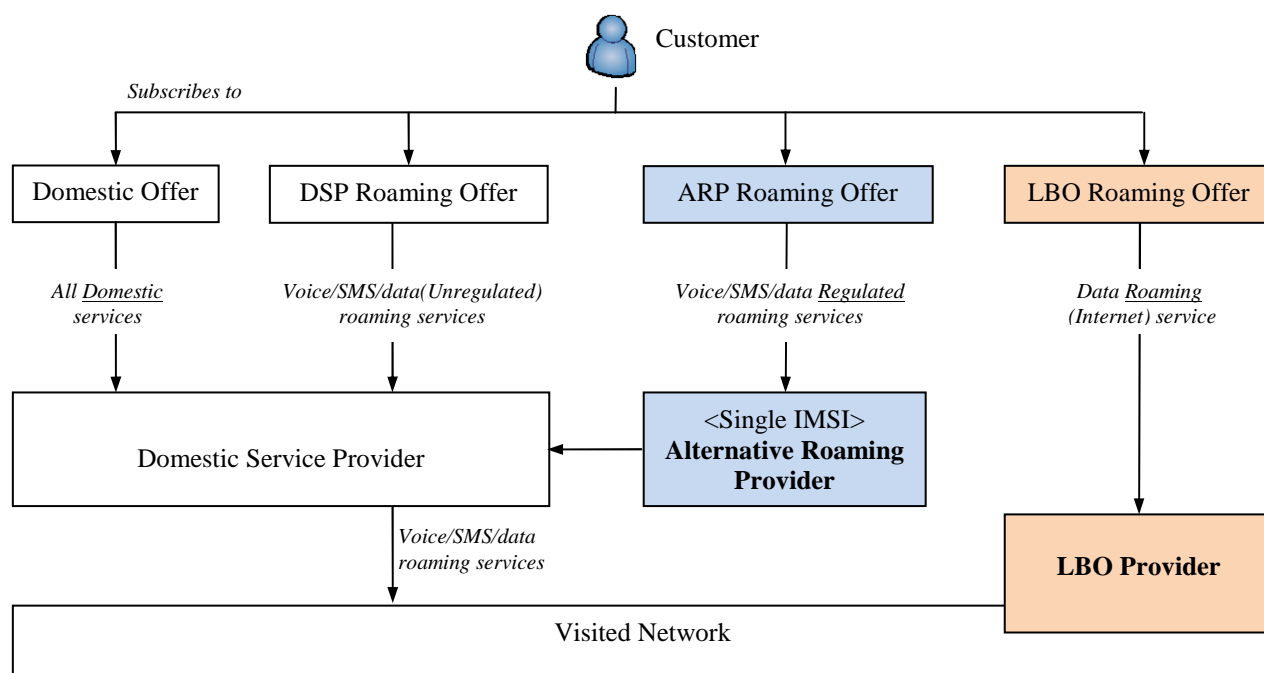


Figure 1: Roaming unbundling solutions



The following clauses introduce the two alternatives for roaming unbundling. In the present document, a Single IMSI Alternative Roaming Provider will be denoted as simply an Alternative Roaming Provider (ARP), while an LBO roaming provider will be denoted as an LBO Provider.

## 4.1 Single IMSI / ARP alternative

Roaming unbundling implemented by attachment of the Alternative Roaming Provider (ARP) to the Domestic Service Provider (DSP) uses a Single IMSI approach. The Single IMSI approach allows reuse of wholesale agreements of Home operators between the DSP and ARP, capitalizing on all of the existing roaming agreements composed of signalling, billing, payment, testing and operation and therefore does not require the use of multiple SIM cards or multiple IMSIs on a single SIM card. The ARP does not need to implement its own roaming routes. Instead, the ARP will rely on the roaming services opened between the Domestic Service Provider and the Visited Networks. A DSP could be a Mobile Network Operator (MNO) or a Mobile Virtual Network Operator (MVNO).

In the Single IMSI approach, the user/customer can subscribe to a new roaming offer and keep his domestic offer with his DSP. The new roaming subscription provided by the ARP will offer roaming regulated services.

To enable the sale of regulated roaming services the following GSM-related interfaces are proposed to directly provide the basic regulated service:

- IF1: A real-time interface for voice retail billing.
- IF2: A real-time interface for SMS retail billing.
- IF3: A real-time interface for Data/MMS retail billing.
- IF4: A near real-time interface for providing mobility information to the ARP, to inform the ARP that one of its customers has started to roam or has changed network.
- IF5: real-time USSD interface to enable the ARP to provide pre-paid account queries.
- IF9: Bi- Directional interface for standard SMS exchange.

In order to manage the customer and perform proper billing and invoicing the following additional interfaces are required:

- IF6: Invoicing interface, providing Charging Records.
- IF7: Provisioning interface enabling the management of ARP subscriptions.
- IF8: Interface for high usage and fraud control.

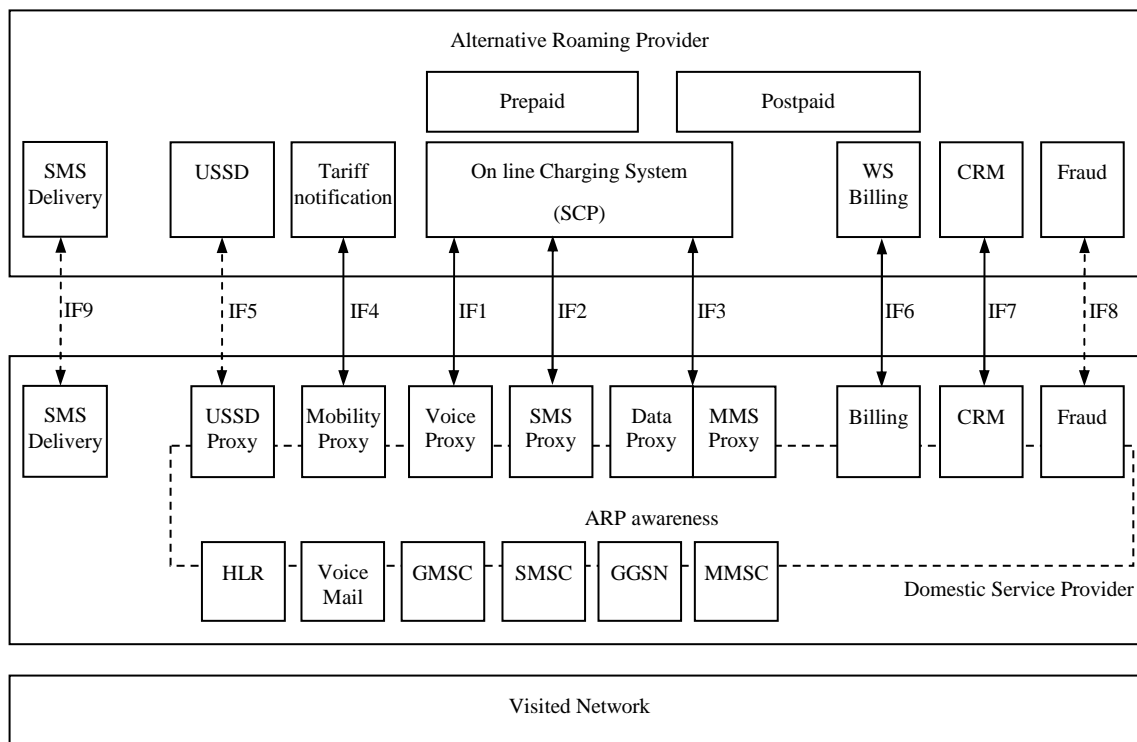


Figure 2: Single IMSI architecture

## 4.2 Local Break-Out (LBO) alternative

Roaming unbundling of Internet access implemented by an ARP on a VPMN is called Local Break-Out (LBO). It is based on optimization of Internet access directly delivered by the VPMN i.e. GGSN in the VPMN. The LBO design uses a new standardized APN value (standardized at European level) of "euinternet" (not case sensitive), which is known hereafter as the EUInternet APN. The EUInternet APN is specific to the LBO service, and based on which the VPMN will route Internet traffic directly to the Internet instead of routing via the HPMN.

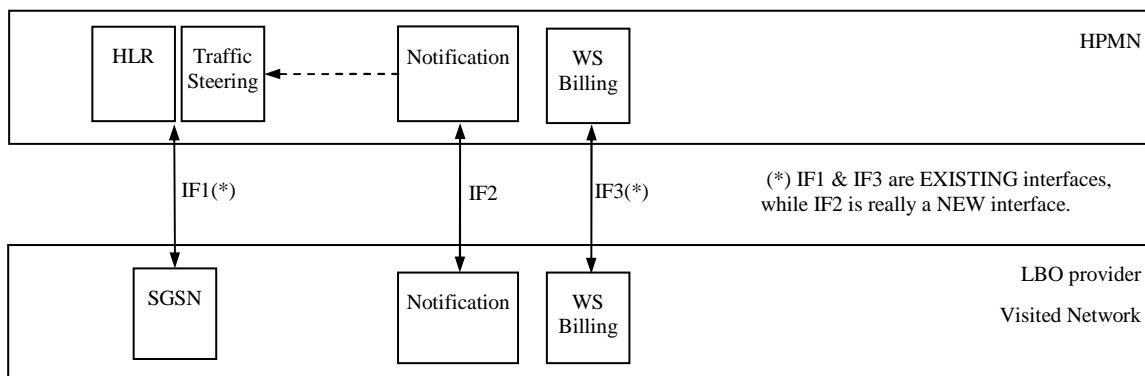
For LBO, the end user will be charged directly by the LBO Provider and not by the Single IMSI roaming provider, which can be a DSP or an ARP. The end user will have the choice between 3 roaming offers:

- 1) LBO Provider (visited network) could offer internet access to roamers.
- 2) For non-internet access and for Regulated roaming service, Alternative Roaming Provider could deliver voice, SMS and data service in roaming regulated coverage.
- 3) For non-internet access (e.g. Enterprise access, MMS), DSP can continue to deliver Roaming offer providing voice, SMS and data service in remaining roaming coverage.

LBO Internet access will have priority over an ARP connection, based on user APN selection.

The following interfaces will be included in the LBO architecture:

- IF1: existing MAP mobility interface, which will be impacted for customer profile and traffic steering.
- IF2: an NEW on-line notification interface provided by the LBO provider to inform Home operators of the start/end of an LBO subscription (conditional).
- IF3: existing TAP file interface. No TAP files are to be sent from LBO providers for LBO APN usage.



**Figure 3: LBO architecture**

Device vendors should provide for the following in order to aid the user in selecting an LBO Provider network:

- Manual Network Selection in Roaming to be enabled and disabled by the end user.
- The APN(s) that the device uses for Internet access to be modifiable by the end user.

Device vendors may provide a set of APIs in order to facilitate application developers to help customers to select manually the LBO Provider network.

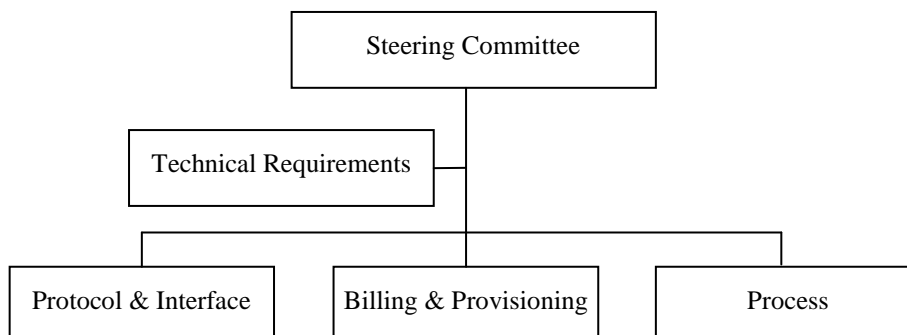
## 5 Roaming unbundling specifications

### 5.1 Cooperation Platform organization

This clause describes the Cooperation Platform for the Separate Sale of Roaming Services in the European Union.

This platform is composed of different entities:

- Steering Committee is composed of EU commission, BEREC, ETSI, GSMA, MVNO and OMA representatives.
- Technical Requirement Group is responsible to deliver the High Level Specifications.
- Protocol & Interface Sub-Group is responsible to deliver all detailed specifications related to network interfaces.
- Billing & Provisioning Sub-Group is responsible to deliver all detailed specifications related to IT interfaces.
- Process Sub-Group is responsible to deliver the process description between the different actors.



**Figure 4: Cooperation Platform organization**

## 5.2 High Level Specifications

The High level Specifications [i.3] intend to synchronize all the detailed specifications for the different sub-systems and contains the following sections:

- Context definition
- End User Services
- High level Architecture
- Operator obligations and recommendations

## 5.3 Protocol & Interface Specifications

Protocol & Interface Specifications [i.4] contain detailed definition of the following interfaces (with associated use cases):

- Single IMSI interfaces: IF1, IF2, IF3, IF4, IF5 and IF9.
- LBO interfaces : IF1 and IF2.

## 5.4 Billing & Provisioning Specifications

Billing & Provisioning Specifications contain detailed definition of the following interfaces (with associated use cases):

- SI-IF6 WS Billing How to use TAP [i.5], [i.10].
- ABF format specification [i.6], [i.11].
- SI-IF8 Fraud How to use NRTRDE [i.7], [i.12].
- IF7 Specifications - Provisioning [i.8], [i.13].

## 5.5 Process Specifications

The objective of the Process Specifications [i.9] is to describe the detailed requirements for processes to implement roaming unbundling for EU roaming regulation III, including topics like operator relationship, service activation/deactivation, fraud management, bill-shock, etc.

---

# 6 Specification location

The EU roaming III specifications are stored in different locations (ETSI, 3GPP, GSMA, OMA and BEREC), depending of the domain.

## 6.1 ETSI

The specifications listed in the present clause, could be downloaded from <http://docbox.etsi.org/Reference>:

- High Level Technical specifications [i.3].
- Interface & Protocol Detailed Technical specifications [i.4].
- Billing & Provisioning specification - Use of TAP for the Single IMSI Wholesale Billing Interface [i.5].
- Billing & Provisioning specification - ABF format specification for the Single IMSI Wholesale Billing Interface [i.6].

- Billing & Provisioning specification - Use of NRTRDE for the Single IMSI Fraud Interface[i.7].
- Billing & Provisioning specification - IF7 Specifications - Provisioning [i.8].
- Process specification - Processes [i.9].

## 6.2 GSMA

All Billing & Provisioning specifications will be also available on a GSM world page (<http://www.gsma.com/prd/>):

- GSMA PRD TD.104 - Use of TAP for the Single IMSI Wholesale Billing Interface [i.10].
- GSMA PRD TD.105 - ABF format specification for the Single IMSI Wholesale Billing Interface [i.11].
- GSMA PRD TD.106 - Use of NRTRDE for the Single IMSI Fraud Interface [i.12].
- GSMA PRD TD.107 - Single IMSI Provisioning Interface [i.13].

Some GSMA PRD are also referenced by all those specifications and will be available on a GSM world page ([www.gsma.com/prd](http://www.gsma.com/prd/)):

- GSMA PRD TD.13 - TADIG Code Naming Conventions [i.14].
- GSMA PRD TD.28 - File Transfer Methods [i.15].
- GSMA PRD TD.35 - NRTRDE Format Specification [i.16].
- GSMA PRD TD.57 - TAP3 Format Specification [i.17].
- GSMA PRD BA.20 - Fraud Prevention Procedures [i.18].

## 6.3 OMA

The following specification is available on OMA environment and could be downloaded from:

<http://www.openmobilealliance.org/API/APIsInventory.aspx> or  
[http://technical.openmobilealliance.org/Technical/current\\_releases.aspx](http://technical.openmobilealliance.org/Technical/current_releases.aspx)

- For IF4: RESTful Network API for Terminal Status [i.19].
- For IF7: REST NetAPI Roaming Enabler Release Package [i.20].
- For IF7: SOAP\_NetAPI\_Roaming Enabler Release Package [i.21].

## 6.4 3GPP

IF1 is CAMEL based, but a Diameter specification will be delivered by 3GPP.

All deliverables are scheduled to complete prior to the planned Release 12 Stage 3 freeze date of June 2014. Since the planned launch date for EU REG III is July 2014, it is anticipated that SteerCo will continue to require the CAMEL protocol for SI-IF1 for voice control.

The following new specifications will be designed:

- TS 32.276 [i.22]: Voice Call Service Charging (Diameter interface for circuit-switched services from proxy function).
- TS 32.293 [i.23]: Proxy Function (New common definition for proxy function for support of DSP voice call proxy including interworking between CAMEL and Diameter).

The following specifications will be adapted:

- TS 132 240 [i.24]: Charging architecture and principles (Introduce EU unbundled roaming architecture considerations).
- TS 132 299 [i.25]: Diameter Charging Application (Introduce new and extended AVPs).

## 6.5 BEREC

Liaison Statement on Terminal and Device Behaviour to support Manual Network Selection and editing of APN [i.26] could be found on BEREC site at the following address:

[http://berec.europa.eu/eng/document\\_register/subject\\_matter/berec/others/1327-liaison-on-terminal-and-device-behavior-to-support-manual-network-selection-and-editing-of-apn-prepared-by-the-steering-committee-of-the-cooperation-platform-for-apn](http://berec.europa.eu/eng/document_register/subject_matter/berec/others/1327-liaison-on-terminal-and-device-behavior-to-support-manual-network-selection-and-editing-of-apn-prepared-by-the-steering-committee-of-the-cooperation-platform-for-apn)

---

## History

<b>Document history</b>		
V1.1.1	January 2014	Publication