Source: **SA1**

Title: **Assorted CRs to 22.115 on Service Aspects Charging and billing (Rel-6)**

Document for: **Approval**

Agenda Item: **7.1.3**

Meeting	SA Doc	TS No.	CR No	Rev	Rel	Cat	Subject	Vers. Current	Vers New	SA1 Doc
SP-21	SP-030467	22.115	014	-	Rel-6	D	Alignment of 22.115 with 21.801	6.1.0	6.2.0	S1-030764
SP-21	SP-030467	22.115	015	-	Rel-6	B	CS interconnection requirement for the identification of user data rate and user protocol at the interconnection point for charging purposes	6.1.0	6.2.0	S1-030976

CR-Form-v7

CHANGE REQUEST

| ⌘ | **22.115** CR **014** | ⌘**rev** | **-** | ⌘ | Current version: | **6.1.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐ Radio Access Network ☐   Core Network ☒ **X**

Title: ⌘	Alignment of 22.115 with 21.801	
Source: ⌘	Lucent Technologies	
Work item code: ⌘	TEI 6	***Date:*** ⌘ 07/07/2003
Category: ⌘	**D**	***Release:*** ⌘ Rel-6

Use one of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4   (Release 4)
Rel-5   (Release 5)
Rel-6   (Release 6)

Reason for change: ⌘	Document not aligned with 3GPP drafting rules
Summary of change: ⌘	Replace "must" with "shall" throughout 22.115
Consequences if not approved: ⌘	Possible confusion between the requirements of a standard and external statutory obligations

Clauses affected: ⌘	4

	Y	N		
Other specs affected: ⌘	X		Other core specifications ⌘	
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘	Use of the word "must" is not permitted

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Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4 Main Requirements and High Level Principles

The main new requirements for 3GPP system charging and accounting are:

- to provide a call detail record for all charges incurred and requiring settlement between the different commercial roles;

- to allow fraud control by the Home Environment and the Serving network;

- to allow cost control by the charged party;

- to provide at the beginning of a chargeable event an indication to the charged party (if involved in the chargeable event) of the charges to be levied for this event;

- to allow itemised billing for all services charged to each subscription, including voice and data calls, and services offered by home environments.

- to enable the Home environment to provide a Prepay Service and to enable the serving network to support that Prepay Service for the Home environment's subscribers.

- to allow interconnect (inter-operator) charging including mobile operator to mobile operator, and mobile operator to fixed operator (circuit switched & IP), and mobile operator to IP network provider; and mobile operator to I-WLAN operator.

- to allow Network operator to 3rd party supplier (eg Value Added Service Provider) charging;

- to provide details required for Customer Care purposes

- to support the shared network architecture so that end users can be appropriately charged for their usage of the shared network, and network sharing partners can be allocated their share of the costs of the shared network resources.

The high level principles that will guide the charging requirements are summarised as follows:

- It ~~must~~shall be possible to charge separately for each type of medium used (eg voice, video, data) in a session and for each service used (eg voice call, streaming video, file download);

- It ~~must~~shall be possible to charge for different levels of QoS applied for and/or allocated during a session for each type of medium or service used;

- It ~~must~~shall be possible to charge each "leg" of a session separately. This includes the incoming and outgoing legs and any forwarded/redirected legs. (Note: The legs mentioned here are logical legs, i.e. not necessarily identical to actual signal and traffic flow. Even though tromboning may be avoided by optimal routing, the operator should still be able to charge for the 'virtual legs' of the call)

- The user can be charged according to the service used irrespective of the technology used to deliver it. (That is, the charge is not derived from whether 2G or 3G is used);

- The user can be charged according to the technology used to deliver a service. (That is, different charges can be applied on 2G and 3G);

- It ~~must~~shall be possible to charge a user according to the network resources used. For example, if a large bandwidth is required to use high quality video, the user could be charged accordingly. This is related to charging by QoS;

- It ~~must~~shall be possible to charge users flexibly for the use of extra resources (in at least the same network) for

all legs of the call. For example, if a video component is added to a voice call the use of extra radio resource at both ends of the call could be paid for by each user in the call or totally by the initiating user.

- It ~~must~~shall be possible to suppress charging for certain types of connection e.g. when a customer receives tones or network announcements or during sessions such as automated pre-pay top-up.

- It ~~must~~shall be possible for the home network to charge its customers while roaming in the same ways as when they are at home. For example, if duration based charging is used for charging for streaming music in the home network, then it ~~must~~shall be possible to apply the same principle when the user is roaming.

- It ~~must~~shall be possible for operators to have the option to apply charging mechanisms that are used in GSM/GPRS. For example for duration of a voice call, for the amount of data transmitted (eg for streaming, file download, browsing) and for an event (one-off charge).

- It ~~must~~shall be possible for a network operator to charge its users for activities while roaming so that the home network will get the capability to raise service charges depending on the roamed to network, e.g. because of inter operator charges for the use of service capabilities within the visited network which will in general depend on the serving network. The ability to supply all the necessary information for all the charging options will depend on the capability of the visited network. For service capabilities which are provided by the home network, however, it is required that the call data records created allow to identify the serving network of the served subscriber.

- It ~~must~~shall be possible for charging to be applied based on location, presence, push services etc

- It ~~must~~shall be possible to charge using pre-pay, post-pay, advice of charge, 3rd party charging techniques.

- It ~~must~~shall be possible for the home network to apply different tariffs to national calls and short messages established/sent by their subscribers while roaming in their Home PLMN depending on whether or not the called subscriber's Home PLMN equals the calling subscriber's Home PLMN, rather than on the called subscriber's MSISDN.

Note: This distinction is necessary only in the case, where the called subscriber's MSISDN may have been ported by Mobile Number Portability.

These new requirements and principles will allow users more freedom to obtain service when roaming, whilst providing effective cost and credit control for the Home Environment and User.

SECOND MODIFIED SECTION

4.3.1   User Charging Requirements

This section describes the options required for the charging of end users. The network operator could charge users directly (retail charging) or charge a 3rd party service provider (wholesale charging). These requirements can therefore apply to retail and wholesale charging. Note that the word "session" is used to describe the connection between a user and either another user or a service. This term is used for IP connections rather than the term "call" that is normally used for a connection over conventional (circuit switched) systems.

The various ways that users can establish sessions and the main components are described. Also, the required charging options are specified.

4.3.1.1   Session End Point Configurations

A variety of different connection configurations are possible for IP multi-media independently of the components of the session being used. It should be possible to charge for the following types of sessions with the options identified. These charging options should be applicable to each medium separately. Note that not all the charging options need to be used and that some of the options can be used only if the particular party is using the resources of IMS:

The table below lists some example session scenarios and describes some of the possible charging options for each

scenario. The table does not list all possible session scenarios nor does it list all possible charging options for the scenarios. Rather, the intent of the table is to emphasize the numerous charging options that ~~must~~shall be supported by an IP Multimedia System due to the complexity of sessions possible. The charging options ~~must~~shall adequately account for all session resources used in order to enable the operators to apply flexible billing policies and to satisfy regional and/or national regulatory policies.

In general, any session ~~must~~shall allow for the following charging options:

- To apply the "Calling Party Pays" charging principle;

- A 3rd party to be charged for all or part of the session;

- Split charging between any of the parties, including 3rd parties;

- Session setup and session resources to have different charging rules. Different rules would be applied for example, in a scenario where **A** calls an advertising number, say **B**. **B** could be a web-based toy advertisement number, for example. In this scenario, **A** could pay for the initiation fee (session setup), and **B** could pay for the session resource.

- Any party can add another media to the current session in progress and any of the parties (not necessarily the one(s) being charged for the current session) can be charged for the additional media. For example, **A** calls **B** and **A** is paying for the audio; **B** adds a wireless video image to the call and pays for that portion. The individual resource set-up and usage should be separately identified (eg treated as separate call records). This supports the "Calling Party Pays" model;

- During an active session, media types can change (eg. audio changed to data) and ~~must~~shall be charged for appropriately. It is thus necessary to be able to detect a change of media during a session so that different rating may be applied.

It should also be noted that during a multi-party session, normally if the charged party drops off the session, all components being charged to that party should drop. But it is foreseeable to support a service option that allows the charged party to continue to be charged even if they drop off the session. The charging rules should support this option.

No	CONNECTION	DESCRIPTION	CHARGING OPTIONS REQUIRED
1	**A** sets up a session to **B**	**A** simple connection between 2 subscribers or a subscriber and a service (eg voicemail)	**A** pays for the session set-up to **B** **A** pays for the session resource to **B** **B** pays for the session resource to **A**
2	**A** sets up a session to **B**	**A** simple connection where **B** is a "toll free" (800) type service	**B** pays for the session set-up **B** pays for the session resource **A** pays for part of the session resource (i.e. allowing split charging between **A** & **B**)
3	**A** requests session with **B**, **B** redirects to **C**	This is redirection. The connection path is not set up to **B** from **A**, instead **A** is told to set up a connection direct to **C**	**A** pays for the session set-up to **B** **A** pays for the session resource to **C** **C** pays for the session resource to **A** **A** pays for the session resource as though it were to **B** and **B** pays for the session resource to **C** as though it came from **B**
4	**A** requests session with **B**, **B** forwards to **C**	This is normal forwarding as in GSM. The connection path is **A** to **B**'s home network and **B**'s home network to **C**	**A** pays for the session set-up to **B** **A** pays for the session resource as though it were to **B** and **B** pays for the session resource to **C**.
5	**A** sets up sessions with multiple parties (Multi-party)	**C**onnections to multiple parties are initiated by **A**	**A** pays for the set-up of each session **A** pays for each of the sessions resource to each of the called parties Each of the called parties pays for the session resource to **A**
6	**A** has a multi-party session where the individual parties set up the session to **A**	The multiple parties in the session initiate the session to **A**	Each party pays for the session set-up to **A** **A** pays for the session resource to the multiple parties The individual parties in the session each pay for the session resource to **A**

7	**A** is in a session with **B**, then puts **B** on hold to set up a session with **C**, then returns to **B** after dropping **C**	**A** still has a connection to **B** while also in a session with **C**. The session with **B** continues after the session with **C** is terminated	**A** pays for each of session set-ups to **B** and **C** **A** pays for the session resource to **B** & **C** **B** & **C** pay for the session resource to **A**
8	**A** is in a session with **B** then answers a session request from **C** while keeping **B** on hold	**A** still has a connection to **B** while also in a session with **C**. The session with **B** continues after the session with **C** is terminated	**A** pays for the session set-up to **B** **C** pays for the session set-up to **A** **A** pays for the session resource to **B** and **C** **B** & **C** pay for the session resource to **A**
9	**A** sets up a session with **B** who is roaming in another network	The connection is made from **A** to **B**'s home network and then forwarded to **B** in the visited network. (Normal GSM mechanism) **A**lternatively, **A** is redirected directly to **B** in the visited network	**A** pays for the session set-up to **B** **A** pays for the session resource as though it were to **B** in his home network and **B** pays for the session resource from his home network to the visited network **A** pays for the session resource to **B** in the visited network **B** pays for the session resource to **A**

4.3.1.2   Charging Principles For User Session Components

A number of different components can comprise a session. These components may be added or dropped from an ongoing session by any participating party. These components should be individually identifiable for charging purposes.

Generally, the party that adds a component should be responsible for the payment for the use of the component. However, it should also be possible to charge all users that need an increase in resource to handle the component. An example is 2 users in an audio session where one of the users upgrades the session to videophone session. Both users could be charged extra for the use of the video component as this requires extra resource at both ends.

Possible components are:

- Voice

- Audio (real time)

- Audio (streaming)

- Video (real-time)

- Video (streaming)

- Data (download/upload)

- Data interactive eg web browsing

- Messaging (SMS text type)

- E-mail

- Data stream (unspecified content) This is where the network operator acts as a "bit-pipe"

It ~~must~~shall be possible to charge for each of these components separately in a session with the options shown in the table below.

It ~~must~~shall be possible for operators to be able to charge for individual components of sessions even if there is no identifiable service. For example a proprietary codec may be used to set up an "end-to-end" speech session where the network operator acts as a "bit-pipe". In this case, it should be possible for the operator to charge for this differentially. This type of component is called "datastream" in the table below.

It might not be possible to apply some of the charging mechanism and type options described below depending on the capability of the networks used.

THIRD MODIFIED SECTION

4.3.2   Roaming Charging Requirements

It ~~must~~shall be possible for a network operator to charge its users for activities while roaming. It ~~must~~shall be possible for a network operator to charge its users while roaming using the same principles used while on the home network. The ability to supply all the necessary information for all the charging options will depend on the capability of the visited network.

In addition, the network operators have to charge each other for the use of their networks by roaming users. The methods of charging between operators may be different from the methods used to charge the user. For example, a user may be charged by duration for voice sessions made while roaming but the home network may pay the visited network by volume of data used.

Mechanisms used in today's networks may also be applied eg Inter-Operator Tariff (IOT).

The table below shows the types of charging principle that networks will require for roaming settlement and a priority for its provision.

FOURTH MODIFIED SECTION

4.3.4   Conveyance & Usage charging requirements

It ~~must~~shall be possible for network operators (including mobile, fixed and IP backbone suppliers) to charge each other for the use of resources required to support user sessions. The items to be charged and the principles to be applied are described below.

The methods of charging between operators could be different from the methods used to charge the user. For example, a user may be charged by duration for voice sessions but the mobile network may pay the fixed network or 3rd party carrier by volume of data used.

ITEM	CHARGING METHOD DESCRIPTION
Session use	Charging according to the resources used by duration of session and/or by data volume
Quality of Service	Charging by QoS delivered to and from the other network

4.3.5   Charging 3rd parties

It ~~must~~shall be possible for network operators and 3rd parties to charge each other for the use of their resources. Third parties include content and application providers and portals.

The items that will be charged and the principles are described below:

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CHANGE REQUEST

⌘	**22.115** CR **015**	⌘**rev**	**-**	⌘ Current version:	**6.1.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	CR on 22.115: CS interconnection – requirement for the identification of user data rate and user protocol at the interconnection point for charging purposes	
Source: ⌘	Vodafone	
Work item code: ⌘	TEI-6	***Date:*** ⌘ 9/07/2003

Category: ⌘	**B**	***Release:*** ⌘ Rel-6	

Use <u>one</u> of the following categories:
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  R99 (Release 1999)
  Rel-4 (Release 4)
  Rel-5 (Release 5)
  Rel-6 (Release 6)

Reason for change: ⌘	Currently there is no requirement specified for the determination of user data and user protocols over CS interconnection circuits, thus preventing identification and differential charging for multi-media services e.g. video-telephony
Summary of change: ⌘	Requirement added for the determination of user data and protocol over CS interconnections for charging purposes
Consequences if not approved: ⌘	Inability to differentiate between data and different types of multi-media services, when carried over CS interconnection circuits, and charge accordingly.

Clauses affected: ⌘	4

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘	

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4 Main Requirements and High Level Principles

The main new requirements for 3GPP system charging and accounting are:

- to provide a call detail record for all charges incurred and requiring settlement between the different commercial roles;

- to allow fraud control by the Home Environment and the Serving network;

- to allow cost control by the charged party;

- to provide at the beginning of a chargeable event an indication to the charged party (if involved in the chargeable event) of the charges to be levied for this event;

- to allow itemised billing for all services charged to each subscription, including voice and data calls, and services offered by home environments.

- to enable the Home environment to provide a Prepay Service and to enable the serving network to support that Prepay Service for the Home environment's subscribers.

- to allow interconnect (inter-operator) charging including mobile operator to mobile operator, and mobile operator to fixed operator (circuit switched & IP), and mobile operator to IP network provider; and mobile operator to I-WLAN operator.

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- to support the shared network architecture so that end users can be appropriately charged for their usage of the shared network, and network sharing partners can be allocated their share of the costs of the shared network resources.

The high level principles that will guide the charging requirements are summarised as follows:

- It must be possible to charge separately for each type of medium used (eg voice, video, data) in a session and for each service used (eg voice call, streaming video, file download);

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Note: This distinction is necessary only in the case, where the called subscriber's MSISDN may have been ported by Mobile Number Portability.

- For circuit switched interconnection a capability is required to enable charging to be performed according to user rate and user protocol so that e.g. the identification of CS video telephony at the interconnection point for charging purposes becomes possible.

These new requirements and principles will allow users more freedom to obtain service when roaming, whilst providing effective cost and credit control for the Home Environment and User.