Technical Specification Group Services and System Aspects
Meeting #18, New Orleans, USA, 9-12 December 2002

TSGS#17(02)0666

Source: **SA1**

Title: **Release 6 CRs to 21.905 and 22.101 to introduce WLAN requirements**

Document for: **Approval**

Agenda Item: **7.1.3**

SA Doc	Spec	CR	Rev	Phase	Cat	Subject	Old Vers	New Vers	SA1 Doc
SP-020666	21.905	044		Rel-6	B	Cr to 21.905 to introduce WLAN terminology	6.0.0	6.1.0	S1-022264
SP-020666	22.101	109		Rel-6	B	CR to 22.101 on WLAN interworking	6.1.0	6.2.0	S1-022263

3GPP TSG-SA1 Meeting #18
Busan, Korea, 11-15th November 2002

Tdoc ⌘S1-022264

CR-Form-v7

CHANGE REQUEST

⌘ **21.905** **CR** **044** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

*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 ☒

Title:	⌘	3GPP-WLAN Interworking
Source:	⌘	SA1 (Lucent Technologies)
Work item code:	⌘	WLAN
Date:	⌘	05/11/2002
Category:	⌘	**B**
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:	⌘	Inclusion of the requirements for WLAN-3GPP Interworking
Summary of change:	⌘	Inclusion of the terms used for Interworking to WLANs
Consequences if not approved:	⌘	Terms used in requirements for Interworking to WLANs will not be defined

Clauses affected:	⌘	3,4

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	22.011, 22.101, 22.129
				Test specifications		
				O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:
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Below is a brief summary:

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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.

3 Terms and definitions

0-9

3GPP system: the telecommunication system standardised by the 3GPP consisting of a core network and a radio access network that may be either GERAN or UTRAN, or both.

3GPP System core network: refers in this specification to an evolved GSM core network infrastructure.

3GPP System coverage: see coverage area.

3GPP System IC Card: An IC card (or 'smartcard') of defined electromechanical specification which contains at least one USIM.

3GPP System mobile termination: part of the 3GPP System Mobile Station which provides functions specific to the management of the radio interface (Um).

3GPP-WLAN Interworking: Used to generically refer to interworking between the 3GPP system and the WLAN family of standards.

3V technology Smart Card: A Smart Card operating at 3V± 10% and 5V ± 10%.

1.8V technology Smart Card: A Smart Card operating at 1.8V ± 10% and 3V ± 10%.

3V technology Terminal: A terminal operating the Smart Card - Terminal interface at 3V-± 10% and 5V ± 10%.

1.8V technology Terminal: A terminal operating the Smart Card - Terminal interface at 1.8V ± 10% and 3V ± 10%.

Next Change

I

IC Card: A card holding an Integrated Circuit containing subscriber, end user, authentication and/or application data for one or more applications.

IC card SIM: Obsolete term for ID-1 SIM.

ID-1 SIM: The SIM having the format of an ID-1 card (see ISO 7816-1 [24]).

Idle mode: The state of UE switched on but which does not have any established RRC connection.

Implementation capability: A capability that relates to a particular technical domain. Examples: a spreading factor of 128 (in the domain of the physical layer); the A5 algorithm; a 64 bit key length (in the domain of security); a power output of 21 dBm (in the domain of transmitter performance); support of AMR Codec (in the domain of the Codec); support of CHV1 (in the domain of the USIM).

Information Data Rate: Rate of the user information, which must be transmitted over the Air Interface. For example, output rate of the voice codec.

Initial paging information: This information indicates if the UE needs to continue to read more paging information and eventually receive a page message.

Initial paging occasion: The paging occasion the UE uses as starting point for its paging DRX cycle.

Integrity: (in the context of security) The avoidance of unauthorised modification of information.

Inter-cell handover: A handover between different cells. An inter-cell handover requires network connections to be altered.

Inter PLMN handover: Handover between different PLMNs, ie having different MCC-MNC.

Inter system handover: Handover between networks using different radiosystems , e.g. UMTS – GSM.

Interactive service: A service which provides the means for bi-directional exchange of information between users. Interactive services are divided into three classes of services: conversational services, messaging services and retrieval services (source: ITU-T I.113).

Interface: The common boundary between two associated systems (source: ITU-T I.112).

International Mobile Station Equipment Identity (IMEI): An "International Mobile Station Equipment Identity" is a unique number which shall be allocated to each individual mobile station equipment in the PLMN and shall be unconditionally implemented by the MS manufacturer.

International mobile user number (IMUN): The International Mobile User Number is a diallable number allocated to a 3GPP System user.

Interference Signal Code Power (ISCP): Given only interference power is received, the average power of the received signal after despreading and combining.

Interworking WLAN (I-WLAN): A WLAN that interworks with a 3GPP system.

Intra-cell handover: A handover within one sector or between different sectors of the same cell. An intra-cell handover does not require network connections to be altered.

Intra PLMN handover: Handover within the same network, ie having the same MCC-MNC regardless of radio access system. Note: this includes the case of UMTS <>GSM handover where MCC-MNC are the same in both cases.

IRP Information Model: An IRP Information Model consists of an IRP Information Service and a Network Resource Model (see below for definitions of IRP Information Service and Network Resource Model).

IRP Information Service: An IRP Information Service describes the information flow and support objects for a certain functional area, e.g. the alarm information service in the fault management area. As an example of support objects, for the Alarm IRP there is the alarm record and alarm list.

IRP Solution Set: An IRP Solution Set is a mapping of the IRP Information Service to one of several technologies (CORBA/IDL, SNMP/SMI, CMIP/GDMO, etc.). An IRP Information Service can be mapped to several different IRP Solution Sets. Different technology selections may be done for different IRPs.

Inter System Change: a change of radio access between different radio access technologies such as GSM and UMTS.

Iu: Interconnection point between an RNC or a BSC and a 3G Core Network. It is also considered as a reference point.

Iu-flex: Routing functionality for intra domain connection of RAN nodes to multiple CN nodes.

Iu mode: mode of operation of the MS when connected to the Core Network via GERAN or UTRAN and the Iu interface.

Iub: Interface between an RNC and a Node B.

Iur: A logical interface between two RNC. Whilst logically representing a point to point link between RNC, the physical realisation may not be a point to point link.

Next Change

I

I-Block	Information Block
I-ETS	Interim European Telecommunications Standard
I/O	Input/Output

I	Information frames (RLP)
IA	Incoming Access (closed user group SS)
IAM	Initial Address Message
IC	Integrated Circuit
	Interlock Code (CUG SS)
IC(pref)	Interlock Code of the preferential CUG
ICB	Incoming Calls Barred (within the CUG)
ICC	Integrated Circuit Card
ICGW	Incoming Call Gateway
ICM	In-Call Modification
ICMP	Internet Control Message Protocol
ID	Identifier
IDL	Interface Definition Language
IDN	Integrated Digital Network
IDNNS	Intra Domain NAS Node Selector
IE	Information Element
IEC	International Electrotechnical Commission
IEI	Information Element Identifier
IETF	Internet Engineering Task Force
IF	Infrastructure
IFS	Information Field Sizes
IFSC	Information Field Size for the UICC
IFSD	Information Field Size for the Terminal
IHOSS	Internet Hosted Octet Stream Service
IIOP	Internet Inter-ORB Protocol
IK	Integrity key
IM	Intermodulation
IMA	Inverse Multiplexing on ATM
IMEI	International Mobile Equipment Identity
IMGI	International mobile group identity
IMSI	International Mobile Subscriber Identity
IMT-2000	International Mobile Telecommunications 2000
IMUN	International Mobile User Number
IN	Intelligent Network
	Interrogating Node
INAP	Intelligent Network Application Part
INF	INFormation field
IP	Internet Protocol
IP-M	IP Multicast
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
IR	Infrared
IRP	Integration Reference Point
ISC	International Switching Centre
ISCP	Interference Signal Code Power
ISDN	Integrated Services Digital Network
ISO	International Organisation for Standardisation
ISP	Internet Service Provider
ISUP	ISDN User Part
ITC	Information Transfer Capability
ITU	International Telecommunication Union
IUI	International USIM Identifier
IWF	InterWorking Function
I-WLAN	Interworking WLAN
IWMSC	InterWorking MSC
IWU	Inter Working Unit

Next Change

W

WAE	Wireless Application Environment
WAP	Wireless Application Protocol
WBEM	Web Based Enterprise Management
WCDMA	Wideband Code Division Multiple Access
WDP	Wireless Datagram Protocol
WG	Working Group
WIN	Wireless Intelligent Network
WLAN	Wireless Local Area Network
WPA	Wrong Password Attempts (counter)
WS	Work Station
WSP	Wireless Session Protocol
WTA	Wireless Telephony Applications
WTAI	Wireless Telephony Applications Interface
WTDD	Wideband Time Division Duplexing
WTLS	Wireless Transport Layer Security
WTP	Wireless Transaction Protocol
WTX	Waiting Time eXtenstion
WWT	Work Waiting Time
WWW	World Wide Web

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Busan, Korea, 11-15th November 2002

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CHANGE REQUEST

⌘ **22.101** **CR** **109** ⌘ **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⌘ [X] ME [ ] Radio Access Network [ ] Core Network [X]

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Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Inclusion of the requirements for WLAN-3GPP Interworking
Summary of change:	⌘	A new section 4.8 has been added to give the high level requirements. Changes have been made to the sections covering Emergency Call, Numbering, USIM, Roaming, charging, Subscription
Consequences if not approved:	⌘	Stage 1 requirements for Interworking to WLANs will not be complete

Clauses affected:	⌘	3,4, 10, 11,13.1.1, 13.2, 15, 16, 17

	Y	N			
Other specs affected: ⌘	X		Other core specifications	⌘	21.905, 22.011, 22.129
			Test specifications		
			O&M Specifications		

Other comments:	⌘	

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

2.1 Normative references

[1] 3GPP TS 22.105 “Services and Service Capabilities”

[2] 3GPP TS 22.121: "Virtual Home Environment (VHE), Stage 1"

[3] 3GPP TS 22.038: "SIM application toolkit, stage 1"

[4] 3GPP TS 22.001: " Principles of Circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".

[5] 3GPP TS 22.004: General on supplementary services"

[6] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)"

[7] 3GPP TS 22.066: "Support of Mobile Number Portability (MNP); Service description; Stage 1"

[8] 3GPP TS 22.079: " Support of Optimal Routing; Stage 1"

[9] 3GPP TS 22.129: "Handover Requirements between UTRAN and GERAN or other Radio Systems"

[10] 3GPP TS 33.102: "Security Architecture"

[11] 3GPP TS 22.011: "Service Accessibility"

[12] 3GPP TS 22.016: "International mobile Station Equipment Identities (IMEI)"

[13] 3GPP TS 24.008: " Mobile Radio Interface Layer 3 Specification"

[14] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)"

[15] 3GPP TS 21.133: "Security Threats and Requirements"

[16] 3GPP TS 33.120: "Security Principles"

[17] 3GPP TS 22.042: "Network Identity and Time Zone, Service Description, Stage 1"

[18] 3GPP TS 42.009: " Security Aspects"

[19] 3GPP TS 31.102: "USIM Application Characteristics"

[20] 3GPP TS 23.221 “Architectural Requirements”

[21] 3GPP TS 22.002: “Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)”

[22] 3GPP TS 22.060: “General Packet Radio Service (GPRS)”

[23] 3GPP TS 29.002: “Mobile Application Part (MAP) specification ”

[24] 3GPP TR 23.972: "Circuit Switched Multimedia Telephony".

[25] 3GPP TS 22.140: "Multimedia messaging service; Stage 1".

[26] 3GPP TS 22.226: “Global Text Telephony, Stage 1.”

[27] 3GPP TS 22.228: "IP multimedia (IM) CN subsystem, stage 1"

[28] RFC 3261: "SIP: Session Initiation Protocol"

[29] 3GPP TR 21.905: “ Vocabulary for 3GPP Specifications”

[30] 3GPP TS 26.233: "Packet Switched Streaming Service (PSS) ; General Description"

[31] 3GPP TS 26.234: "Packet Switched Streaming Service (PSS) ; Protocols and Codecs"

[32] 3GPP TR 22.934: "Feasibility study on 3GPP system to Wireless LAN interworking"

[33] RFC 2486: "The Network Access Identifier"

Next Change

4.7 PLMN Architecture

The network is logically divided into a radio access network and a core network, connected via an open interface. From a functional point of view the core network is divided into a Packet Switched CN Domain, IP Multimedia (IM) CN subsystem and a Circuit Switched CN Domain. IM CN subsystem utilises PS CN domain (GPRS) bearer services.

CS CN domain supports bearer independent transport. There is no difference in service offering or UE functionality due to different transport.

For further information see 3GPP TS 23.221 [20].

4.8 Interworking Between PLMN and Wireless LANs

WLAN-3GPP system interworking is defined as a wireless IP connectivity service where the user obtains access via a Wireless LAN technology. It shall be possible to deploy the WLAN as an integral part of the 3GPP system or the two systems can be separate.

The 3GPP system shall be capable of interworking with one or more WLANs and a WLAN shall be capable of interworking with one or more 3GPP systems see figure 0.

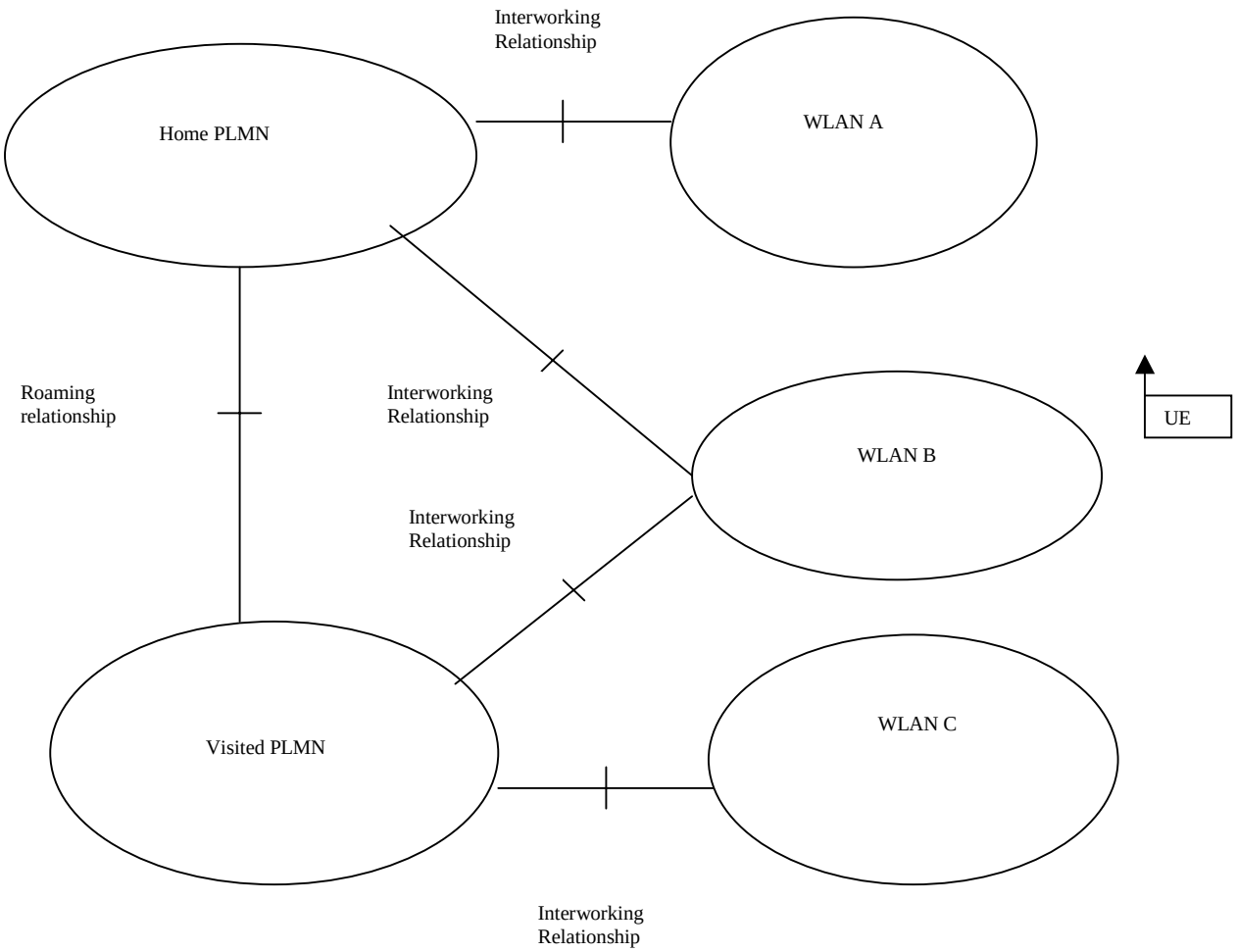

Figure 0: WLAN-3GPP system Interworking Relationships

Selection of the network is defined in TS 22.011 [11]

The service is subject to a 3GPP system subscription see section 15. Both IPv4 and IPv6 connectivity via a Wireless LAN (WLAN) shall be supported.

It is an operator decision as to the level of interworking supported. This can be broadly grouped as:

1. 3GPP based access control and charging. The user shall be able to access general internet services and/or corporate intranets. (Scenario 2 of TR 22.934 [32])

2. Access to 3GPP PS based services, e.g. IMS. (Scenario 3 of TR 22.934 [32])

3. Access to 3GPP PS based services with service continuity. The user may ~~-~~or may not notice a disruption in service, depending upon the level of service continuity supported. This is further defined in TS 22.129 [9]. (Scenarios 4 and 5 of TR 22.934 [32])

NOTE: Further information on these levels of interworking and the use cases supported can be found in TR 22.934 [32].

In addition to the general requirements on I-WLAN defined in the present document, the following requirements apply:

1. When enabling access to 3GPP services that require separate authentication and access control, such as IMS, the service authentication and access control mechanisms for that service shall be used.

2. It ~~shall~~should be possible to provide access via I-WLAN on deployed WLAN devices.

Next Change

10.2 Emergency calls when attached to a CS CN Domain

PLMNs shall support an emergency call teleservice as defined in 3GPP TS 22.003 [14] (TS12).

10.3 Emergency calls when attached to a data only network

If an UE with voice capability attempts to make an emergency call while camping on a PLMN/I-WLAN that does not support voice service to the UE, a new PLMN selection shall immediately take place, and the UE shall select the first available PLMN that supports emergency calls to the UE.

10.4 Emergency calls when attached to an IM CN subsystem

Emergency calls shall be supported when attached to an IM CN subsystem as specified in subclause 10.1.

If UE is attached simultaneously to both CS domain and IM CN subsystem, the operator shall be able to specify, which domain is used by default for emergency calls.

For further information see 3GPP TS 22.228 [27].

It shall be possible to enable compliance with regional regulatory requirements related to emergency calls.

Note: Other forms than speech for emergency services are for further study.

10.5 Emergency Calls when Attached via an Interworking WLAN

Any attempt to make an emergency call shall be handled as defined for a Data Only network in section 10.3.

11 Numbering principles

The following network addressing schemes listed below shall be supported at the relevant domains:

- E.164,
- E.168,
- E.212,
- X.121
- Internet (including e.g. IP address).

When the UE is connected via a I-WLAN, the addressing shall be based on Network Access Identifier (NAI) format (user@realm) as defined in RFC 2486 [33].

Next Change

13 UICC, USIM and Terminal

This clause defines the functional characteristics and requirements of the User Service Identity Module (USIM) and ISIM (IM Services Identity Module). The USIM/ISIM are applications residing on a UICC.

13.1 The USIM/ISIM and User Profiles

13.1.1 The USIM

Every USIM shall have a unique identity and shall be associated with one and only one home environment.

It shall be possible for a home environment to uniquely identify a user by the USIM.

The USIM shall be used to provide security features.

For access to services, provided by PS or CS CN domains, a valid USIM shall be required. Optionally, SIM according to GSM phase 2, GSM phase 2+, 3GPP release 99, 3GPP release 4 specifications may be supported.

The USIM shall be able to support SIM Application Toolkit as specified in 3GPP TS 22.038 [3].

The USIM shall reside on a UICC, 3GPP specifications shall adopt both of the GSM SIM card physical formats. Other formats may also be supported. USIM specific information shall be protected against unauthorised access or alteration.

It shall be possible to update USIM specific information via the air interface, in a secure manner.

Access to the IMS services shall be possible using 3GPP release 99 and release 4 UICCs.

Access via a I-WLAN shall be possible using earlier releases (than the current release) of the UICC or using a SIM.

Next Change

13.2 The UICC

Access to services via 3GPP system or via an I-WLAN with a single UICC shall be possible.

13.2.1 The UICC and Applications other than the USIM

It shall be possible for the UICC to host other applications in addition to the USIM, see figure 3. Service providers, subscribers or users may need to establish additional data or processes on the UICC. Each application on an UICC shall reside in its own domain (physical or logical). It shall be possible to manage each application on the card separately. The security and operation of an application in any domain shall not be compromised by an application running in a different domain. Applications may need to use their own security mechanisms which are separate to those specified by 3GPP e.g. electronic commerce applications.

Examples of other UICC applications are: USIM, off-line user applications like UPT, electronic banking, credit service, etc.

Applications should be able to share some information such as a common address book.

It shall be possible to address applications, which reside on the UICC, via the air interface.

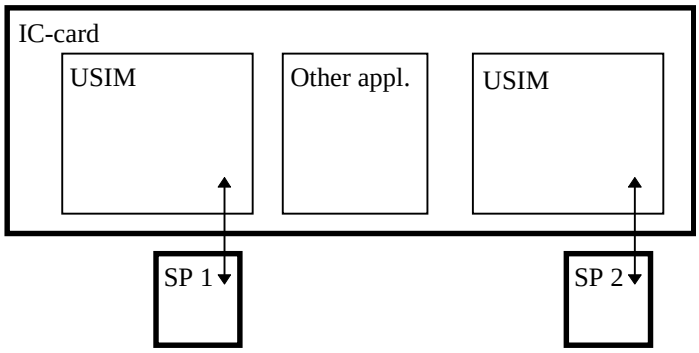

Figure 3 Example of a Multifunction UICC

Next Change

15 Relationship between subscription and service delivery

15.1 Subscription

A subscription describes the commercial relationship between the subscriber and the service provider.

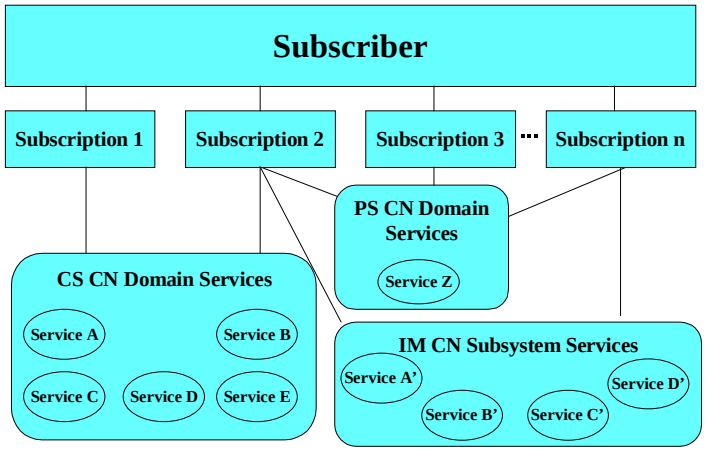

Figure 4: Subscriber, subscription and services relationship

A subscription to a network operator may provide the user with access to one or more domains. A Subscription shall identify the set of services, within particular domains, to which the user has access (see figure 3); each subscription may specify a different set of services. These services may be provided by the CS CN Domain and/or a PS CN Domain and/or an IM CN subsystem. Subscriptions relate to services such as Basic Services (e.g. Teleservices, Bearer services), GPRS services and IM-Services (IP-based multimedia services), which are typically provided by network operators, and to value added services which typically are provided by network operators and/or other entities that provide services to a subscriber

The subscription identifies:

- the services and related services information that are made available to the subscriber by the service provider ;

In addition a subscription to a network operator may identify:

- the domains to which the user has been granted access by the network operator. In particular, the GPRS service profile and information on the allowed QoS parameter ranges shall be contained in the subscription.

- the identity of the subscriber within these domains.
  Note: The identity of a subscriber in the CS CN domain and PS CN domain (e.g. her IMSI) may potentially be different to her identity in the IM CN subsystem

- the radio access technologies over which the subscriber may access their services e.g. I-WLAN.

Next Change

16 Charging principles

The cost of the call may cover the cost of sending, transporting, delivery and storage. The cost of call related signalling may also be included. Provision shall be made for charging based on time, destination, location, volume, bandwidth and quality. Charges may also be levied as a result of the use of value added services.

It shall be possible for information relating to chargeable events to be made available to the home environment at short notice. The requirements shall include:

- Immediately after a chargeable event is completed;

- At regular intervals of time, volume or charge during a chargeable event.

Standardised mechanisms of transferring charging information are required to make these requirements possible.

It should be possible for multiple leg calls (e.g. forwarded, conference or roamed) to be charged to each party as if each leg was separately initiated. However, in certain types of call, the originating party may wish/be obliged to pay for other legs (e.g. SMS MO may also pay for the MT leg.).

Provision shall be made for the chargeable party to be changed during the life of the call. There shall be a flexible billing mechanism which may include the use of stored value cards, credit cards or similar devices.

The chargeable party (normally the calling party) shall be provided with an indication of the charges to be levied (e.g. via the called number automatically or the Advice of Charge supplementary service) for the duration of the call (even though the user may change service environment)The user shall be able to make decisions about the acceptable level of accumulated charge dynamically or through their service profile.

If a user is to be charged for accepting a call then their consent should be obtained. This may be done dynamically or through their service profile.

Charging in the 3GPP system shall not be compromised when access is via an I-WLAN.

17 Roaming

17.1 Assumptions

In order to roam, the following applies:

- Mobile terminal can connect to the radio access network.

- Authentication (charging/billing network) must occur in order to get access to services (except for emergency calls).

- The services offered to a roaming subscriber may be restricted by the capabilities of the visited network, and the roaming agreement between the visited and the home environment.

17.2 Principle

Long term evolution of the IM CN subsystem shall not be restricted by the short/mid term inter-domain roaming requirements.

17.3 Requirements

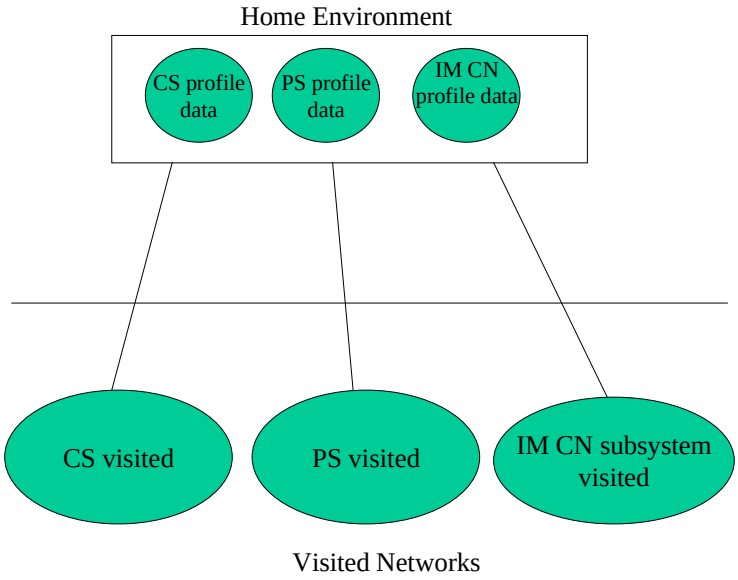

Figure 5: Roaming ~~requiremetns~~requirements

- The personalised services & capabilities available in a visited network are dependent upon the subscription options in the home environment. This does not preclude the visited network offering additional services, or access to content providers.
- Roaming from this release's home environment to CS (this release or earlier) visited network is required
- Roaming from this release's home environment to IM CN subsystem visited network is required
- Roaming from this release's home environment to PS (this release or earlier) visited network is required
- Roaming from previous releases' home environment (or earlier) to this release CS visited network is required
- Roaming from previous releases' home environment (or earlier) to this release PS visited network is required
- Roaming from the home environment to I-WLANs is required. The I-WLAN may be part of the home environment or a visited network. The interworking shall support the case where a 3GPP operator does not operate the I-WLAN.
- ~~The support of access to wired IP networks with a mobile terminal, using a variety of access technologies (e.g. Bluetooth and Hiperlan) shall not be precluded in future releases.~~

Note: When an operator allows a subscriber to roam to different domains, the home environment needs to provide subscription data to the visited network . The mapping between service data of the different domains is not standardised; it is determined by the home ~~environement~~environment and may be influenced by roaming agreements.