

**3GPP TSG CN Plenary Meeting #22
10th - 12th December 2003. Hawaii, USA.**

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**3GPP TSG-CN1 Meeting #32
Bangkok, Thailand, 27 – 31 October 2003**

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Source: Nokia
Title: Revision of WLAN WID
Agenda item: 8.6
Document for: APPROVAL

Work Item Description

Title

WLAN Interworking – stage 3 definition of WLAN – 3GPP interworking

1 3GPP Work Area

	Radio Access
X	Core Network
	Services

2 Linked work items

TSG SA1: 3GPP system - WLAN Interworking (with unique ID 31012)
TSG SA2: WLAN Interworking – Architecture Definition and stage 2 definition of WLAN access and Interworking (with unique ID 32018)
TSG SA3: WLAN Interworking Security (with unique ID 32704)
TSG SA5: Align PS domain online charging with WLAN
TSG SA5: WLAN offline charging

3 Justification

The study work within SA1, described in the 3GPP system - WLAN Interworking WID, covered the requirements aspects of the WLAN-3GPP system interworking. The SA1 feasibility study work item was later converted into stage 1 work item for a specific type of 3GPP-WLAN interworking.

The study work conducted within SA2 feasibility study work item *WLAN Interworking – Architecture Definition* has converged to a specific 3GPP-WLAN interworking access control and charging architecture being independent of existing 3GPP PS and CS domains as well as the existing 3GPP RANs, UTRAN and GERAN. The SA2 feasibility study work item was later converted into a stage 2 work item for a specific type of 3GPP-WLAN interworking which is described in TS 23.234. The purpose was to introduce the possibility for providing IP connectivity and IP based services to 3GPP subscribers over WLANs. To enable provision of this type of services for 3GPP subscribers, a new 3GPP-WLAN interworking reference model is being developed in SA2. This reference model provides the means for functionalities like authentication, authorisation, accounting, service selection and setup.

The central new network elements in the WLAN reference model are the "3GPP AAA server" and the "Packet Data Gateway". The 3GPP AAA server is located in the 3GPP home network and terminates EAP signalling towards the WLAN UE. EAP signalling towards UE is carried by Diameter over the W_r reference point. W_r is also used to provide authorisation information to WLAN. Within the home network the 3GPP AAA server exchanges signalling with the HSS over W_x reference point and with Packet Data Gateway over W_m reference point. The WLAN reference model provides access to external networks (e.g. IMS) by the W_i reference point in the Packet Data Gateway.

This Work item will carry on this work and enable the definition the stage 3 within the Core Network.

4 Objectives

The objective of this Work Item is to create a 3GPP stage 3 technical specification documents *TS 29.abc and TS 24.abc* on WLAN Interworking. The 3GPP WLAN interworking system is assumed to provide bearer services for connecting a 3GPP subscriber via the WLAN to IP based services compatible with those offered via PS domain, e.g. IMS.

The objective is to define protocols for the following signalling interfaces and reference points:

UE – 3GPP AAA Server Authentication Signalling:

This consists of specifying the 3GPP usage of the IETF defined authentication procedures between the WLAN UE and the 3GPP AAA Server. The aim is to reference the corresponding IETF specifications where possible. 3GPP related extensions should be avoided but if necessary, these can be documented in the ~~proposed~~ new 24-series TS.

Authentication between WLAN UE and 3GPP AAA Server will be based on:

- EAP-SIM for 3GPP subscribers with SIM cards, currently: draft-haverinen-pppext-eap-sim-08.txt
- EAP-AKA for 3GPP subscribers with USIM cards, currently: draft-arkko-pppext-eap-aka-07.txt

The smartcard part of the feature is outside the scope of this CN work item. It is foreseen that USIM procedures will be needed in WLAN authentication but in alignment with the existing SA parent WI and draft 23.234 (v.1.3.0) the backwards compatibility to existing USIM cards and existing WLAN terminals shall be kept. No protocol features requiring new smartcard resources like e.g. identities, data fields or algorithms shall be introduced.

Network Selection procedures:

[This consists of specifying the WLAN UE functionality for WLAN selection and PLMN selection.](#)

[This work is done in CN1, ~~task is to determine whether the creation of a new TS gathering this work is needed.~~](#)

W_x:

This reference point is located between the 3GPP AAA Server and the HSS. The prime purpose of the protocol(s) crossing this reference point is communication between the WLAN AAA infrastructure and the HSS.

- Retrieval of authentication vectors, e.g. for USIM authentication, from the HSS
- Retrieval of WLAN access-related subscriber information (profile) from the HSS
- Registration of the 3GPP AAA Server of an authorised WLAN user in the HSS
- Indication of change of subscriber profile within the HSS (e.g. indication for the purpose of service termination)
- Purge procedure between the 3GPP AAA server and the HSS
- Retrieval of the online charging / offline charging function addresses from HSS

SA2 idea about Stage3 is that protocols in Wx shall be MAP or Diameter based (it is up to CN groups to decide this).

This work is done in CN4.

Wr:

The functionality of the reference point is to transport RADIUS/DIAMETER frames.

- Carrying data for authentication signalling between WLAN AN and 3GPP AAA Server
- Carrying data for authorization signalling between WLAN AN and 3GPP AAA server
- Carrying keying data for the purpose of radio interface integrity protection and encryption
- Used for purging a user from the WLAN access for immediate service termination

SA2 idea about Stage3 is that the protocols in Wr shall be based on Diameter (it is up to CN groups to decide this). Wr reference point between WLAN AN and 3GPP Network uses “Diameter Extensible Authentication Protocol Application” (currently: draft-ietf-aaa-eap-00.txt) to carry the EAP authentication between UE and 3GPP AAA Server.

This work is done in CN4.

Wn:

Reference point Wn indicates the reference point for transporting tunneled WLAN user data towards 3GPP system. Routing of Wn reference point is service specific. For accessing home network services the Wn may be routed directly between WLAN and Home 3GPP Network or forced to go via Border Gateway functionality within the Visited Network.

In TS 23.234 no preferences are currently stated about Wn.

This work is done in CN4.

Wm:

This reference point is located between 3GPP AAA Server and Packet Data Gateway. The functionality of this reference point is to enable:

- User Plane tunneling attributes and UE’s IP configuration parameters are retrieved by 3GPP AAA Server from/via PDGW

SA2 idea about stage3 is that the protocols in Wm shall be Diameter-based (it is up to CN groups to decide this).

This work is done in CN4.

Wi:

This is the reference point between Packet Data GW and a packet data network. The packet data network may be an operator external public or private packet data network or an intra operator packet data network, e.g. for provision of IMS services.

SA2 idea about Stage3 is that this reference point is Gi-like or Gi-based.

This work is done in CN3.

5 Service aspects

See parent Work Item.

6 MMI aspects

See parent Work Item.

7 Charging Aspects

See parent Work Item.

8 Security Aspects

See parent Work Item.

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes		X		X	
No	X		X		
Don't know	X				X

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
TS 29. 234 ^{abe}	3GPP system to WLAN Interworking, Stage 3 Description	CN4		CN#21 (Sept. 03)	CN# 232 (March Dec. 04 3)	This can be divided into several specifications, if seen to be necessary.
TS 24. 234 ^{abe}	WLAN authentication signalling, stage 3	CN1		CN # 231 (March Sep. 04 3)	CN # 242 (June Dec. 04 3)	3GPP usage of draft- haverinen-pppext-eap- sim and draft-arkko- pppext-eap-aka and possible 3GPP specific extensions to the above drafts. WLAN UE functionality for WLAN selection and WLAN PLMN selection CN1 task is to determine whether the creation of this TS is needed.

Affected existing specifications				
Spec No.	Title	Resp. WG		Comments
TS 29.061	Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based Services and Packet Data Networks (PDN)	CN3		Scope must be broadened to include WLAN access and definitions on Wi must be added.
TS 23.003	Numbering, addressing and identification	CN4		Root NAI to be specified.

Affected existing or new IETF specifications			
Title			Comments
draft-haverinen-pppext-eap-sim draft-arkko-pppext-eap-aka draft-adrangi-eap-network-discovery- and-selection			

11 Work item rapporteur(s)

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12 Work item leadership

CN4

13 Supporting Companies

Nokia, Lucent, TeliaSonera, Ericsson, China Mobile, [Huawei](#)

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

TSG SA1: 3GPP system - WLAN Interworking (with unique ID 31012).

14c The WI is a Work Task: parent Building Block