Source:	CN4
Title:	Revision of WLAN Interworking – stage 3 definition of WLAN – 3GPP interworking
Agenda item:	9.17
Document for:	APPROVAL

Proposal

This document updates the unapproved revisions to the WID of WLAN IW which was provided to the last meeting in N1-040704 to cover some missing reference points, dates of completion and missing specification numbers.

A further change was requested at CN1#33 bis which was not documented because no revision was provided. This change seeks to separate the scenario 2 tasks from the scenario 3 tasks in the expected output, so that they can be separately tracked in the workplan.

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
TSG T3: USIM enhancements for WLAN Interworking

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", "WLAN Access Gateway" and the "Packet Data Gateway". The 3GPP AAA server is locate~~s~~d in the 3GPP home network and terminates EAP signalling towards the WLAN UE. EAP signalling towards UE is carried by Diamet~~er or Radius~~er over the ~~Wr~~Wa reference point. ~~Wr~~Wa is also used to provide authorisation information to WLAN. Within the home network the 3GPP AAA server exchanges signalling with the HSS over Wx reference point and with Packet Data Gateway over Wm reference point. The WLAN reference model provides access to external networks (e.g. IMS) by the Wi 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 29.234~~abc~~ and TS 24.234~~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 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~~TS 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.

Wx:

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. This reference point enables scenario 2.

Wr Wa:

This reference point is located between WLAN AN and the 3GPP TheNetwork. 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. This reference point enables scenario 2.

Wd

This reference point exists in the roaming case, where a user connects via a VPLMN to the HPLMN. The functionality of this reference point is to transfer information between an AAA-Server in the HPLMN and an AAA-proxy in the VPLMN.

This work is done in CN4. This reference point enables scenario 2 and scenario 3.

Wn:

Reference point Wn indicates the reference point between WLAN and WLAN Access Gateway 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. This reference point enables scenario 3.

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. This reference point enables scenario 3.

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.
The Wi interface is functionally a subset of the Gi interface.
SA2 idea about Stage3 is that this reference point is Gi-like or Gi-based.

This work is done in CN3. This reference point enables scenario 3.

Wg:

This reference point is located between the AAA network the WAG. The purpose of this reference point is to provide information needed at the WAG to perform policy enhancementforcement for tunnels associated with authorized users.

This work is done in CN4. This reference point enables scenario 3.

Wp:

This reference point is located between the PDG & WAG. The functionality of this reference point is to enable routing of user data between the PDG and the WAG. Routing policy itself is service specific.

This work is done in CN4. This reference point enables scenario 3.

Wu:

The Wu reference point is located between the WLAN UE and the Packet Data Gateway. It represents the WLAN UE-initiated tunnel between the WLAN UE and the Packet Data Gateway. Transport for the Wu reference point protocol is provided by the Wn and Wp reference points, which ensure that the data are routed via the WLAN Access Gateway where routing enforcement is applied.

This work is done in CN1. This reference point enables scenario 3.

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		**X**	
No			**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	3GPP system to WLAN Interworking, Stage 3 Description	CN4		CN#21 (Sept. 03)	CN#25~~3~~ (Sept~~March~~. 04)	~~This can be devided into several specifications, if seen to be necessary.~~ This specification takes care of ~~scenario 2 and scenario 3.~~ Specification of Wx, Wa, Wd reference points
TS 29.234	3GPP system to WLAN Interworking, Stage 3 Description	CN4		~~CN#21 (Sept. 04)~~n/a	CN#25 (~~Dec~~ Sept 04)	This specification takes care of ~~Wd,~~ Wn, Wm, ~~Wg, Wp~~ reference points
TS 29.234	3GPP system to WLAN Interworking, Stage 3 Description	CN4		n/a		This specification takes care of Wg, Wp reference points
TS 24.234	WLAN authentication signalling, stage 3	CN1		CN #23 (March. 04)	CN #25~~4~~ (~~June~~September. 04)	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 ~~Wu interface for scenario 3. This consists on the specification of Tunnel management. This specification takes care of scenario 2 and scenario 3.~~
TS 24.234	WLAN authentication signalling, stage 3	CN1		~~CN #23 (Sep. 04)~~n/a	CN #25~~4~~ (~~Dec~~ September 04)	Specification of Wu interface. This consists on the specification of Tunnel management.
TS 29.161	Interworking between the PLMN	CN3		CN #24~~5~~ (~~June~~Sept. 04)	CN#26~~5~~ (~~Sept~~Dec 04)	Specification of Wi interface ~~This specification~~

| | supporting packet based services with WLAN access and PDN | | | | takes care of scenario 3. |

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	CN #24 (June. 04)	Root NAI to be specified.

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

11   Work item rapporteur(s)

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12   Work item leadership

CN4

13   Supporting Companies

Nokia, Lucent, TeliaSonera, Ericsson, China Mobile, Huawei, Samsung, RIM

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