

## II. 3G - WLAN - WiBro

### 1. 3G - WLAN - WiBro

3G-WLAN-WiBro  
 ETSI BRAN(Broadband Radio Access Network)  
 TR 101 957 HIPERLAN/2 WLAN  
 3G UMTS(Universal Mobile Telecommunications Systems)  
 loose tight Wi-Bro [1].  
 가. Loosely Coupled  
 ( 1) loose WLAN  
 UMTS (core network)  
 IWU가 가 .  
 IWU(Inter-Working Unit)  
 Loose USIM(UMTS Subscriber Identity Module)  
 NAI(Network Access Identifier)  
 . NAI

Tightly Coupled ( 1) WLAN 3G  
 WLAN AAA UMTS AAA  
 , USIM  
 HLR(Home Location Register)  
 HSS(Home Subscriber System)  
 . AAA IETF  
 RADIUS Diameter ,  
 USIM IWU HLR MAP  
 (Mobile Application Part)  
 . Tightly Coupled  
 Tight UMTS WLAN  
 , WLAN UTRAN  
 . 가  
 UTRAN(UMTS Terrestrial Radio Access Network) WLAN  
 UMTS  
 UMTS WLAN IWU  
 가 ,  
 UMTS  
 Loose IP layer 가  
 UMTS PSDN(Packet Switched Data Network) core 가 . WLAN  
 terminal WCDMA 가  
 WLAN 가  
 mobility, QoS, security

. Tight WCDMA security, QoS, mobility mechanism 가 WLAN terminal WCDMA 가 , tight

### 2. 3G - WLAN - WiBro

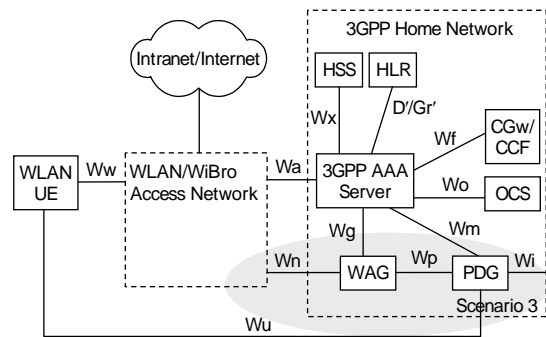
3GPP TS 33.234, TR 23.934 3GPP-WLAN interworking 3GPP WLAN/WiBro [2]-[4].

1>

( 2 ) 가

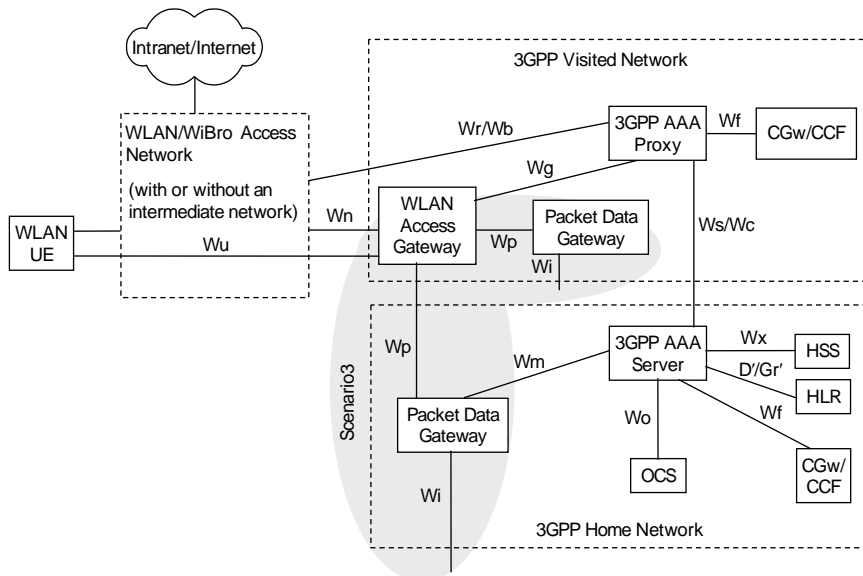
< 1>

No (Open) Coupling	<ul style="list-style-type: none"> <li>- Rapid introduction</li> <li>- No impact on GSN nodes</li> <li>- Suitable for all WLAN technologies</li> </ul>	<ul style="list-style-type: none"> <li>- Poor handover performance</li> <li>- No common subscriber database</li> </ul>
Loose Coupling	<ul style="list-style-type: none"> <li>- Common database simplifies handling security, billing and customer management</li> <li>- No impact on GSN nodes</li> <li>- Suitable for all WLAN technologies</li> </ul>	<ul style="list-style-type: none"> <li>- Poor handover performance</li> </ul>
Tight Coupling	<ul style="list-style-type: none"> <li>- Improved handover performance</li> </ul>	<ul style="list-style-type: none"> <li>- Only feasible if a single operator runs both networks</li> </ul>



( 2 )

( 3 )



( 3 )

4

3GPP

3GPP AAA proxy  
3GPP AAA

가 WLAN/WiBro 3GPP

3. 3G - WLAN - WiBro 6가 가

3GPP TR 22.934 6 5

가 3GPP-WLAN-WiBro [5]. 3

가. 1

가 3GPP-WLAN-WiBro WLAN 3G

6

WLAN/WiBro 3GPP

circuit switched service( , )

2

3GPP Authentication, Authorization, Accounting WLAN

WiBro < 2>

3GPP . 3GPP

USIM WLAN/WiBro 가 WLAN 가 3G/WLAN/ WiBro

3

가 3GPP PS WLAN/WiBro 가 APNs, IMS , instant messaging 3GPP WLAN/WiBro

< 2>

Scenarios	1	2	3	4	5	6
Service & operational capabilities						
Common billing	x	x	x	x	x	x
Common customer care	x	x	x	x	x	x
3GPP system based access control		x	x	x	x	x
3GPP system based access charging		x	x	x	x	x
Access to 3GPP system PS based services from WLAN			x	x	x	x
Service continuity				x	x	x
Seamless service continuity					x	x
Access to 3GPP system CS based services with seamless mobility						x

### III. 3G - WLAN - WiBro

SA(Security As-

sociation)

#### 1. 3G - WLAN

3GPP TS 33.234

WLAN

3GPP

(security features)

[2].

가. 가

SA

- 3GPP-WLAN

RFC 2284

- Multivendor

WLAN

IEEE 802.11i

- WLAN

WLAN

iameter

RADIUS

- 가

identity privacy(anonymity)

UE(User Equipment)

,

donym AAA 가

WLAN UE

- WLAN 802.1x/AAA

AAA

802.1x/AAA

EAP-SIM(Subscriber Identity Module)/AKA  
(Authentication and Key Agreement)

full

WLAN UE

- UE PDG(Packet Data Gate-  
way)

- 2 (integrity) : WLAN  
AN(Access Network)

, AAA WLAN  
AN key

material

- 3 : UE PDG  
IP

- 2 (confidentiality)

: WLAN AN

AAA WLAN AN  
key mate-

rial

- 3 : UE PDG  
IP

. Immediate Service Termination

- AAA 가

AAA

, Diameter

가

RADIUS

. WLAN UE

- WLAN UE WLAN TE(Terminal Equip-  
ment) UICC(USIM IC Card) SIM

MT(Mobile Terminal)

. WLAN TE

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WLAN , MT UICC,  
SIM EAP termination

- EAP MT가 , attack, man-in-the-middle attack,  
가 MT , sniffing  
WLAN , replay attack  
WLAN TE  
(sequence number) 가  
가

2.  
3G-WLAN-WiBro 가 , 가  
man-in-the-middle  
3G, WLAN, WiBro가 PKI(Public Key Infrastructure)  
가 3  
secure channel

, 3G-WLAN-WiBro  
security가 ,  
security  
security  
local PIN(Personal Identification Num-  
ber) global PIN  
UICC SIM PIN

, IV(Initial Vec-  
tor) sniffer  
( , , ) ing sniffer , sniff-  
sniffing  
sniffer  
3G-WLAN-WiBro 가

( identity, IMSI(International Mobile Subscriber Identity), PIN )가 가 EAP-AKA

3 가 WLAN ( 4)  
 가 UICC SIM USIM EAP-AKA  
 AKA USIM

(client), AP(Access Point), WLAN AC(Access Controller),

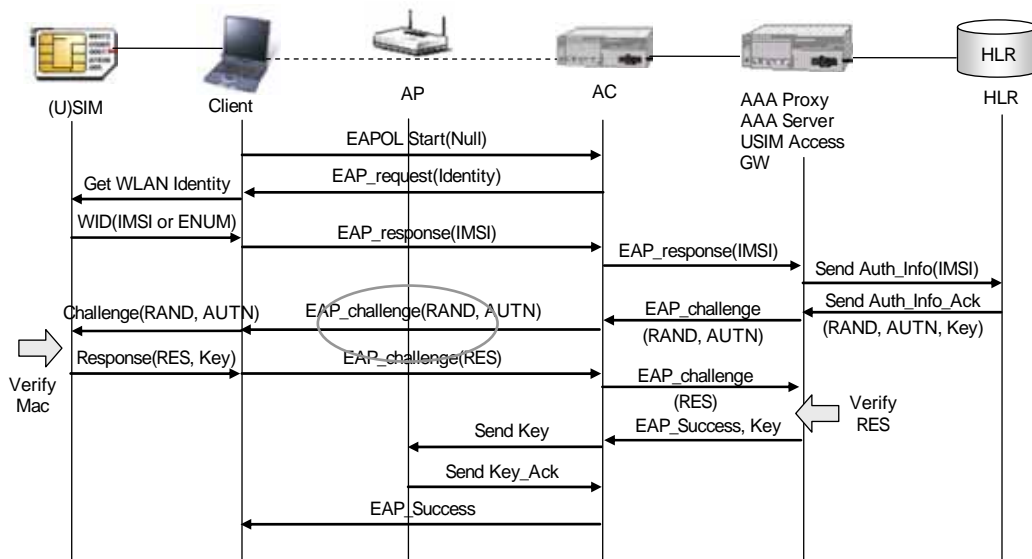
### 3. Unified Authentication Approach

EAP AAA ,  
 가 HLR(Home Location Register)  
 가 가 USIM  
 WLAN

. AC  
 identity(IMSI) EAP-request/AKA-identity  
 USIM identity  
 EAP-response/AKA-identity  
 AC AAA proxy HLR IMSI

IETF EAP-AKA 3  
 (WCDMA) 가 AKA  
 WLAN  
 [6],[7]. EAP-AKA  
 AKA EAP

EAP-request/AKA-challenge AAA USIM



( 4) USIM Based Authentication Flow

MAC(Message Authentication Code) 가 ,  
 (RES) AAA 가  
 AAA  
 RES 가 [8].

WLAN

IV.

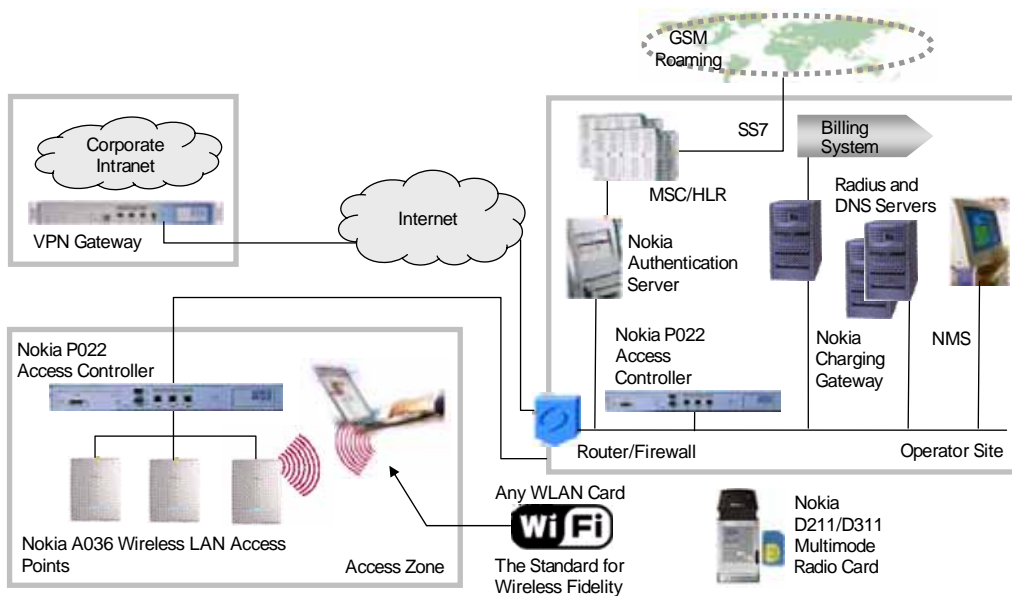
(KT, , ) (SK , KTF, LG )

1. Nokia

Nokia public WLAN 가 가  
 VPN(Virtual Private Network) SIM WLAN OWLAN(Operator Wireless LAN) [9]. OWLAN SIM GSM/GPRS/3G . ( 5) OWLAN

2G/3G , DMB WiBro Nokia가 VPN SSL

NSAS(Nokia Secure Access System)가 EAP-SIM EAP-AKA 2G SIM 3G USIM Nokia IETF



( 5) Nokia OWLAN



(Internet Engineering Task Force)

4.

가

KT

NESPOT

, SK

2. Ericsson

, LG

가

Ericsson 가

가 KT

WLAN seamless

가 MO-WLAN(Mobile Operator Wireless LAN) [10].

NESPOT

가 , 2.4GHz  
(802.11b) 5GHz

2004 12 ETRI

[12].  
WiBro

Nokia OWLAN

가 SIM

. 2.3GHz

Wi-

Bro

, 가

. KT

seamless

. SK

3. Lucent

2006 6

2001 9 Lucent Bell 3G  
(e.g. CDMA2000, UMTS)  
(e.g. 802.11)

(1xEV-DO, WCDMA),

가 COPS(Com-  
mon Operations) [11]. COPS

V.

가 가

3GPP-WLAN-WiBro

3GPP-WLAN

COPS

, 3GPP

3GPP-WLAN

< 3>

가

[13].

가

ETSI SCP(Smart Card Project) TS

102.310(Release 6)

EAP

IP(Internet Protocol)

USIM

(EAP on UICC)

< 3> 3GPP-WLAN (3GPP)

No.	
TR 22.934 23.234 29.234	WLAN-3G 6가
TS 33.220 33.221 33.222	GAA(Generic Authentication Architecture) generic bootstrapping archi- tecture 가 , tran- sport layer security HTTP
TS 33.234	WLAN-3G
TS 33.902 TR 33.919	GAA
TS 29.109	GAA Diameter Zh, Zn
TS 29.228	IP Multimedia(IM) Cx, Dx
TS 29.229 29.329	Diameter Cx, Dx, Sh

. , ETSI BRAN TR 101 957  
IEEE 802.11a HIPER-  
LAN/2 3G  
[14].  
IEEE 802.11 3GPP-  
WLAN 802.11  
TGi EAPOL(EAP Over LAN) 802.1X,  
802.11Tg AP  
[15],[16].  
IETF EAP WG  
EAP-Smart Card(SC), EAP-SIM, EAP-  
AKA, EAP support in Smart Card

Diameter ,  
(RFC 3588)  
3GPP Diameter  
(RFC 3589), SCTP(Stream Control Trans-  
mission Protocol)  
(RFC 2960)  
PANA(Protocol for carrying Authentication for  
Network Access) WG

,  
가 IP  
[17].  
, AT&T , BT plc,  
LLC, AB,  
, O2, , AG,  
T- USA 가  
UMA(Unlicensed Mobile Access)  
GE-RAN(GSM/EDGE RAN) WLAN  
[18]. UMA GSM GPRS  
Bluetooth 802.11  
, UMA  
가 UMA

WLAN Smart Card Consortium 802.1x,  
EAP WPA(Wi-  
Fi Protected Access) WLAN-SIM  
V1.0 WLAN-SIM Handler V.1.1 WLAN-  
SC Handler  
WLAN Wi-Fi  
[19]. WLAN-SIM

IEEE 802.16  
TTA “2.3GHz”  
2005  
[20] - [23].  
IEEE 802.16  
802.16  
802.16e , TTA

(WiBro)

802.16e 802.16e  
 가 ,  
 , EAP  
 , AES(Advanced Encryption Standard)

WLAN 3G

VI.

가

3G-WLAN-WiBro

가

가

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