Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Quick Connection Setup in idle mode**
Date Submitted	**2004-06-25**
Source(s)	Yong Chang/Ph.D, yongchang@samsung.com Samsung Electronic, Suwon P.O.Box 105, 416, Maetan-3dong, Paldal-gu, Suwon-si,Gyeonggi-do, Korea 442-742
Re:	IEEE P802.16e/D3-2004
Abstract	Quick Connection Setup is a scheme to reduce the setup delay required for the network re-entry procedure when the MSS awakes from the idle mode.
Purpose	Review and Adopt the suggested changes into P802.16e/D3
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Quick Connection Setup

Yong Chang, Seungil Yoon
Samsung Electronics

1.   Introduction

The MSS enters into the idle mode to save the power consumption if there is no packet data to transmit and/or to receive. Currently, the MSS and BS shall perform whole network re-entry procedure when the MSS awake from idle mode. This re-entry procedure may be inefficient in the situation requiring the short setup delay like handover, PTT (Push-To-Talk) service because it takes the whole time for normal network entry. Accordingly, it is meaningful to make a scheme to reduce the setup delay required for the network re-entry procedure when the MSS awakes from the idle mode. The scheme that this contribution proposes is referred from the advanced handover mechanism. In this contribution, we called that scheme as QCS(Quick Connection Setup).

Basic concept of the proposal is described below:
- The network (e.g., BS or ASA) and the MSS store the session information record (e.g., SBC-REQ/RSP related profile, PKM-REQ/RSP related profile, REG-REQ/RSP related profile) when the MSS has to enter into the idle mode.
- When the BS has some data to transmit on DL to the MSS or when the MSS has some data to transmit on UL, the BS and the MSS retrieve the session information record(SIR) that had been stored before and setup the connection by using the retrieved session information by sending DSA-REQ/RSP.

Main text changes for the scheme (QCS) are summarized below:
- DREG-CMD: When the MSS enters into the idle mode, the MSS and the BS have to specify whether or not the session information record for QCS is stored. New identifier (SIR_ID) to indicate the MSS's session information record status is generated in this message.
- MOB_PAG-ADV: If the BS allows using the stored SIR for making the idle MSS awaken, then it's enough to add SIR_ID of the MSS in itself.
- RNG-REQ/RSP: If the idle MSS is requested to be awaken for receiving the data from the BS after MOB_PAG-ADV or awakes for sending the data, then the MSS requests the QCS in RNG-REQ by indicating what stored SIR is directly used and what new SIR is to be negotiated. After receiving RNG-RSP, the BS sends the RNG-RSP in response to the QCS request in RNG-REQ by indicating what stored SIR is directly to be used and what new SIR is to be negotiated.

Examples of SIR (Session Information Recode) are listed below:
- SIR (Session Information Record) ID
- MAC address of the MSS
- MSS's Session Context (TLV Format)
    1. MSS Capabilities and their established values that MSS requested before
    2. ARQ Parameters and their established values that MSS requested before
    3. Convergence Capabilities and their established values that MSS requested before
    4. Service Flows Info, SA(Security Association) Infor
    5. Negotiated parameters during the SBC-REQ/RSP procedure

- Source BS ID or ASAID (Authentication and Service Authorization Server ID) that stored MSS's SIR
- Security Context Info
- MAC version/ IP Version /IP Address
- Etc

2. Proposed Text Changes to 16e/D3

6.3.2.3.5 Ranging Request (RNG_REQ) message

[…]

The following parameters as TLV shall be included in the RNG-REQ message when the MSS in idle mode is attempting to perform quick connection setup:

Quick Connection Setup Indication

Quick Connection Setup indication 1 bit is set as followings:

0x0 = Quick Connection Setup is not operated

0x1 = Quick Connection Setup is operated

SIR_ID

If the Quick Connection Setup indicator sets to 1, then this SIR_ID(Session Information Record Identifier) 4 bits included. This is the identifier indicating the session information record that the BS and the MSS stored when the MSS entered into idle mode. If the BS could not support SIR, just ignore SIR_ID in RNG-REQ.

ASA Server ID or BS ID

An identifer of network element which takes charge of the ASA server or BS of the MSS in IDLE mode. The network element may be the current serving BS, or new network element. This is 48 bits.

HMAC Tuple

The HMAC-Tuple attribute, This is 176 bits.

[Insert the following text after REQ-duration section : in 6.3.2.3.26 De/Re-register Command (DREG-CMD) message]

SIR_ID_ INCL

If the BS can store the session information record what used later when MSS awakes from idle mode, then SIR_ID is included,

SIR_ID

This is the identifier indicating the session information record that the BS and the MSS stored when the MSS entered into idle mode. If the MSS could not support SIR, just ignore SIR_ID in DREG-CMD.

6.3.2.3.26 De/Re-register Command (DREG-CMD) message

[Add the following rows to table 55:]

Table 55— De/Re-register Command (DREG-CMD) message format

Syntax	Size	Notes
DREG-CMD_Message_Format() {		
[...]		
SIR_ID_INCL	1bit	SIR ID included indicator
if(SIR_ID_INCL)		
{		
SIR_ID	4bits	Assigned SIR ID
}		

[Insert the following texts after table 55:]

SIR_ID_INCL

If the BS can store the session information record what used later when MSS awakes from idle mode, then SIR_ID is included,

SIR_ID

This is the identifier indicating the session information record that the BS and the MSS stored when the MSS entered into idle mode. If the MSS could not support SIR, just ignore SIR_ID in DREG-CMD.

6.3.2.3.59 BS Broadcast Paging (MOB_PAG-ADV) message

[Add the following rows to table 92I:]

Table 92I—BS Broadcast Paging (MOB_PAG-ADV) message format

Syntax	Size	Notes
MOB_PAG-ADV_Message_Format() {		
[...]		
SIR_ID_INCL	1bit	SIR ID included indicator
if(SIR_ID_INCL)		
{		
SIR_ID	4 bits	Assigned SIR ID
}		

[Insert the following texts after table 92I:]

SIR_ID_INCL

If the BS can store the session information record what used later when MSS awakes from idle mode, then SIR_ID is included,

SIR_ID

This is the identifier indicating the session information record that the BS and the MSS stored when the MSS entered into idle mode. If the MSS cannot support SIR, just ignore SIR_ID in MOB_PAG-ADV

[Add new section 6.3.21.xx with the following sentences after section 6.3.21.8.2]

<u>6.3.21.xx. Quick Connection Setup</u>

<u>The MSS enters into the idle mode to save the power consumption if there is no packet data to transmit and/or to receive. Currently, the MSS and BS shall perform whole network re-entry procedure when the MSS awake from idle mode. This re-entry procedure may be inefficient in the situation requiring the short setup delay like handover, PTT (Push-To-Talk) service because it takes the whole time for normal network entry. Accordingly, it is meaningful to make a scheme to reduce the setup delay required for the network re-entry procedure when the MSS awakes from the idle mode. The scheme that this contribution proposes is referred from the advanced handover mechanism. In this contribution, we called that scheme as QCS(Quick Connection Setup).</u>

<u>Basic concept of the proposal is described below:</u>

- · <u>The network (e.g., BS or ASA) and the MSS store the session information record (e.g., SBC-REQ/RSP related profile, PKM-REQ/RSP related profile, REG-REQ/RSP related profile) when the MSS has to enter into the idle mode.</u>
- · <u>When the BS has some data to transmit on DL to the MSS or when the MSS has some data to transmit on UL, the BS and the MSS retrieve the session information record(SIR) that had been stored before and setup the connection by using the retrieved session information by sending DSA-REQ/RSP.</u>

11.5 RNG-REQ message encodings

[Add the following rows to table 318:]

Table 318a – RNG-REQ message encodings

Name	Type	Length	Value
<u>QCS Request</u>	<u>?</u>	<u>Variable</u>	<u>Compound</u>

<u>The following TLV elements may appear in a QCS_Request TLV</u>

<u>Name</u>	<u>Type</u>	<u>Length</u>	<u>Value</u>
<u>Request Type</u>	<u>x</u>	<u>1</u>	<u>#Bit0: HO indication</u> <u>#Bit1 : QCS request</u> <u>#Bit2~3 Location Updates</u> <u>#Bit4~Bit7: SIR ID only if Bit#1 is set</u>
<u>Quick Connection Setup Indication of Request Type</u>	<u>x</u>	<u>1</u>	<u>0x0 = Quick Connection Setup is not operated</u> <u>0x1 = Quick Connection Setup is operated</u>
<u>SIR ID</u>	<u>x</u>	<u>4</u>	<u>Session Information Record ID</u>
<u>ASA ID</u>	<u>x</u>	<u>48</u>	<u>Authentication and</u>

			Service Authorization Server ID
HMAC Tuple	x	22	

11.6 RNG-RSP ~~TLVs for re-establishment of Service Flows~~message encodings

[Add the following rows to table 320a:]

Table 320a – RNG-RSP message encodings

Name	Type	Length	Value
QCS Response	?	Variable	Compound

The following TLV elements may appear in a QCS_Response TLV

Name	Type	Length	Value
QCS Response Type	x	1	#Bit 0 : QCS is totally accepted #Bit 1 : QCS Rejected and MSS is forced to perform a normal network entry procedures. #Bit 2 : Basic Capability(SBC) re-negotiation required #Bit 3 : Authentication (PKM) re-negotiation required #Bit 4 : Registration (REG) re-negotiation required #Bit 5: IP address re-negotiation is required #Bit 6~Bit 7: reserved
ASA ID	x	48	Authentication and Service Authorization Server ID