

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Initial Ranging Overhead Reduction	
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Re:	This is a response to a Call for Comments in IEEE802.16e Handover Adhoc	
Abstract	In this contribution, a method of reducing initial ranging overhead is proposed	
Purpose	Adoption as part of Handover Adhoc recommendation to IEEE802.16e	
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1 Introduction

In 802.16e/D3, to accelerate the HO procedure, a Fast_Ranging_IE was introduced to provide non-contention based initial ranging when a MSS handovers to a selected target BS. The Fast_Ranging_IE is placed in the UL-MAP message. Since the UL-MAP message is a broadcast message which must be transmitted with high robustness to the MSS, the over-the-air resource required by a broadcast message is usually high. Careful design of broadcast messages is necessary to ensure the overhead can be minimized. Here we propose a method to reduce the UL and DL overhead incurred by a MSS who is performing initial ranging with the target BS.

This proposed method includes the following steps:

- After receiving HO-pre-notification-request message, the target BS assigns a HO_ID (8 bits) to the MSS if the target BS is able to support the requested HO.
- The target BS indicates the assigned HO_ID in the HO-pre-notification-response message
- The serving BS then indicates this assignment to the MSS in MOB-BSHO-RSP (if the HO is initiated by the MSS) or MOB-BSHO-REQ (in the HO is initiated by the BS)
- After the estimated HO start time, the target BS can use HO_ID, instead of the MSS' 48-bit MAC address in Fast_Ranging_IE to provide a contention-free ranging opportunity
- The subsequent procedure is the same as in the current D3 text with one exception that the MAC address shall be replaced by the HO_ID in the RNG_REQ and RNG_RSP messages

2 Proposed Text Change

The proposed text change is based on p802.16e/D3. The text change is on the following messages: Fast_Ranging_IE, RNG_REQ, RNG_RSP and MOB_BSHO_REQ/RSP.

[Modify the Fast Ranging Information Element]

8.4.5.4.15 Fast ranging Information Element

[...]

Table 300a – OFDMA Fast Ranging IE format IE

Syntax	Size	Notes
Fast_UL_ranging_IE() {		
Extended UIUC	4 bits	
MAC Address <u>HO_ID</u>	48 bits <u>8 bits</u>	
UIUC	4 bits	
OFDM Symbol offset	10 bits	
Subchannel offset	6 bits	
No. OFDM symbols	10 bits	
No. subchannels	6 bits	
Reserved	4 bits	
}		

[...]

HO_ID – An identifier assigned to a MSS for use during initial ranging to the selected target BS

[...]

[Modify BS-BSHO-RSP message]

6.3.2.3.56 BS HO Response (MOB-BSHO-RSP) message

[...]

Table 92j- MOB-BSHO-RSP Message Format

Syntax	Size	Notes
MOB-BSHO-RSP_Message_Format() {		
Management Message Type = 54	8 bits	
Network Assisted HO supported	1 bit	Indicate that the BS supports Network assisted HO
For (i= 0;i<N_Recommended; i++) {		
Neighbor BS_ID	48 bits	Base station ID
Service level prediction	8 bits	
<u>HO_ID_included_indicator</u>	<u>1 bit</u>	<u>To indicate if the field HO_IND is included</u>
<u>If (HO_ID_included_indicator == 1) {</u>		
<u>HO_ID</u>	<u>8 bits</u>	<u>ID assigned for use in initial ranging to the target BS once this BS is selected as the target BS</u>
<u>}</u>		
}		
Reserved	Variable	As required
HMAC tuple	21 bytes	
}		

[...]

HO_ID - ID assigned for use in initial ranging to the target BS once this BS is selected as the target BS

[Modify MOB_BSHO_REQ message]

6.3.2.3.54 BS HO Request (MOB-BSHO-REQ) message

[...]

Table 92h- MOB-BSHO-REQ message Format

Syntax	Size	Notes
MOB-BSHO-REQ_Message_Format() {		
Management Message Type = 52	8 bits	
Network Assisted HO supported	1 bit	Indicate that the BS supports Network assisted HO
For (i= 0;i<N_Recommended; i++) {		
Neighbor BS_ID	48 bits	Base station ID
Service level prediction	8 bits	
<u>HO_ID_included_indicator</u>	<u>1 bit</u>	<u>To indicate if the field HO_IND is included</u>
<u>If (HO_ID_included_indicator == 1) {</u>		
<u>HO_ID</u>	<u>8 bits</u>	<u>ID assigned for use in initial ranging to the target BS once this BS is selected as the target BS</u>
<u>}</u>		
}		

}		
Reserved	Variable	As required
HMAC tuple	21 bytes	
}		

[...]

HO_ID – Assigned an identifier to a MSS for use during initial ranging to the selected target BS

[...]

[Insert the following to the end of section 6.3.2.3.5]

6.3.2.3.5. Ranging Request (RNG_REQ) message

[...]

The following TLV parameter may be included in RNG_REQ message when a MSS is performing initial ranging to the selected target BS:

HO_ID.

[Insert the following to the end of section 6.3.2.3.6]

6.3.2.3.6 Ranging Response (RNG_RSP) message

[...]

When a BS sends RNG-RSP message as a reply to the RNG-REQ message from a MSS who is performing initial ranging during HO, the RNG-RSP message may include the following TLV parameter:

HO_ID.

[Modify RNG-REQ message encoding. Add the following row to Table 318a]

11.5 RNG-REQ message encoding

Table 318a – RNG-REQ Message Encoding

Name	Type (1byte)	Length	Value
<u>HO_ID</u>	<u>5</u>	<u>1</u>	<u>The identifier assigned to a MSS during HO by a target BS.</u>

[Modify RNG-RSP Encoding. Add the following row to Table 320a]

11.6 RNG-RSP message encoding

Table 320a- RNG-RSP Message Encoding

Name	Type (1byte)	Length	Value
<u>HO_ID</u>	<u>TBD</u>	<u>1</u>	<u>The identifier assigned to</u>

			<u>a MSS during HO by a target BS.</u>
--	--	--	----------------------------------------