Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Fast Call Recovery for Drop Call during HO**
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Re:	This contribution is for call for contribution IEEE802.16e-03/07r4
Abstract	This contribution proposes the Drop ranging code and Drop ranging time offset for providing the fast call recovery operation during handover.
Purpose	Propose the fast call recovery for the IEEE802.16e Handoff Ad hoc group
Notice	
Release	
Patent Policy and Procedures	

Fast Call Recovery for Drop Call during HO

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Introduction

It should be allowed the call rescue because the call drop during HO (or normal connection) may be happened. Furthermore the dropped call should be re-connected quickly because of providing call connectivity.
The MSS can detect a call drop due to;

- Failure to demodulate the downlink by insufficient signal quality
- An acknowledgement failure by exceeding the RNG-REQ retries limit allowed for the periodic ranging mechanism

If MSS, while in normal HO region, detects its drop from the serving BS before the serving BS sends the HO-notification to neighbor BSs via the backbone network HO procedures and the neighbor BSs prepares the allocation of the non-contention ranging opportunity for the MSS, the MSS shall quickly find a new target BS for resuming current communication. In addition to because the BS to be a target does not know the MSS's drop experience when the dropped MSS performs re-entry with the target BS, the BS will treat MSS as a normal initial network entry call. Therefore it should be allowed that the dropped MSS notify its drop experience to the target BS in order to avoid undesirable access delay and provide fast call recovery as a rescue call.
Particularly, to quickly activate and treat the drop call at the target BS side, a low level (a signature to be recognized at the PHY, not MAC level message) signal should be defined and achieved for the specific situation such as Call Recovery.
Especially, the proposed scheme for the fast call recovery can be applied to the normal call drop as well as the HO situation, in terms of providing rescue for the drop call due to mobility.

Proposed Mechanism

For the purpose, we propose the drop ranging code and time offset for the fast call recovery. During network re-entry with the target BS, the MSS sends a ranging request with drop ranging code and drop ranging time offset pre-allocated. At this stage, the BS shall reserve the specific ranging code(s) and time offset, and allocate them to the MSS using downlink broadcasting message. And the MSS performing the call recovery may use the drop ranging code and time offset to rescue the dropped call quickly. Upon receiving ranging request with drop ranging code and time offset as a rescue notification, the target BS performs call recovery procedures as soon as quickly. Furthermore, because the drop notification is a PHY level signature, not MAC level message, the BS can promptly react and enter the call recovery procedure requesting the MSS's information to ASA server (or Serving BS) via backbone network

Proposed Text Changes

We propose the following remedies in 802.16e-03/07r4 to provide the fast call recovery

1.4.1.2.4.3 Ranging and uplink parameters adjustment
[Insert at the end of 1.4.1.2.4.3 of IEEE 802.16e-03/07r4]
The MSS may send an ranging request with drop ranging code on the drop ranging time offset to the target BS when the MSS detects the call drop. The MSS shall randomly select a drop ranging code from the drop ranging code set (see IEEE Standard P802.16-REVd/D1-2003). Upon receiving this drop ranging code, the target BS shall perform call resume and recovery procedures for the MSS.

The drop ranging code shall be specified in ranging code set (IEEE Standard P802.16-REVd/D1-2003, section 8.5.7.3). And Table XXX shall be incorporated into the UL_MAP MAC message as an IE in IEEE802.16e.

Table XXX. Drop_Ranging_IE

Drop_Ranging_IE {	size	Notes
UIUC	4bits	TBD
Drop ranging offset	12bits	Indicates the start time of the burst relative to the Allocation Start Time given in the UL-MAP message.
Reserved	4bits	
}		

And the following figure and explanation shall be incorporated into the page 12 line 37

The example of ranging message flow using drop ranging code and time offset is depicted in Figure 0h.

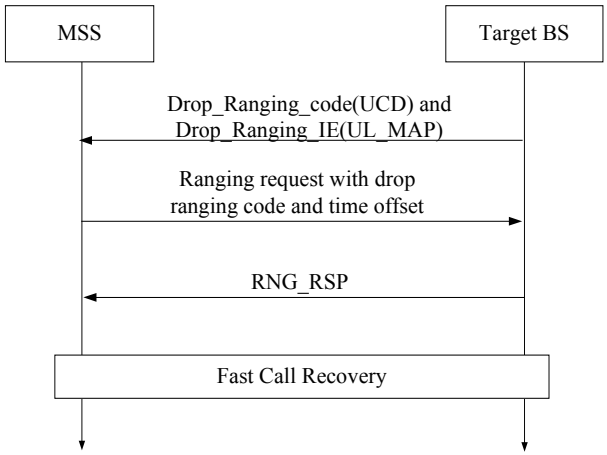

Figure 0h - Example of ranging message flow using drop ranging code and time offset

[Change the paragraph of 8.5.7.3 in IEEE Standard P802.16-REVd/D1-2003]

8.5.7.3 Ranging codes

The number of available codes is 48, numbered 0..47. These codes are divided in ~~three~~ four usage groups (initial ranging, periodic-ranging, drop ranging and bandwidth-requests). The codes are allocated dynamically to the groups by the BS. The default number of codes for each group is two.

— The first *N* codes produced are for initial-ranging. For example, for the default case of two subchannels in the ranging channel, clock the PRBS *0* times to 106 *x N-1* times.

— The next *M* codes produced are for periodic-ranging. For example, for the default case of two subchannels in the ranging channel, clock the PRBS *106 x N* times to *106 x (N + M)-1* times.

— The next *L* codes produced are for bandwidth-requests. For example, for the default case of two subchannels in the ranging channel, clock the PRBS *106 x (N + M)* times to *106 x (N + M + L)-1* times.

— The next K codes produced are for drop-ranging. For example, for the default cast of two subchannels in the ranging channel, clock the PRBS 106 *x (N + M + L)* times to *106 x (N + M + L + K)-1* times.