

## Initial Ranging in 16m

### Initial Ranging in 16m

Document Number:

IEEE C802.16m-08/999

Date Submitted:

2008-09-05

Source:

Yanling Lu, Masato Okuda, Wei-Peng Chen  
Fujitsu

E-mail: Yanling.lu@uk.fujitsu.com

Yih-Shen Chen, Kelvin Chou, I-Kang Fu and Paul Cheng  
MediaTek Inc

Yihshen.Chen@mediatek.com

Venue:

Re: MAC: Network Entry; in response for IEEE 802.16m-08/033," Call for Contributions and Comments on Project 802.16m System Description Document (SDD) (2008-08-01)".

Base Contribution:

This contribution proposes the scheme to accelerate and reduce overhead of the initial ranging procedure in 16m.

Purpose:

To be discussed and adopted by TGM for SDD.

Notice:

*This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups.* It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who 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:

The contributor is familiar with the IEEE-SA Patent Policy and Procedures:

<<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <<http://standards.ieee.org/guides/opman/sect6.html#6.3>>.

Further information is located at <<http://standards.ieee.org/board/pat/pat-material.html>> and <<http://standards.ieee.org/board/pat>>.

# Outline

- Issues with Initial Ranging in 16e
- Proposed Scheme
- Proposed Texts

## Issues with Initial Ranging in 16e(2-1)

- Long Latency
  - After transmission of initial ranging code, the MS has no awareness of whether the code being decoded successfully or not.
  - In the case the code is not decoded successfully, only after the timer (T3) expires, the MS can conduct back off algorithm to perform another initial ranging transmission.

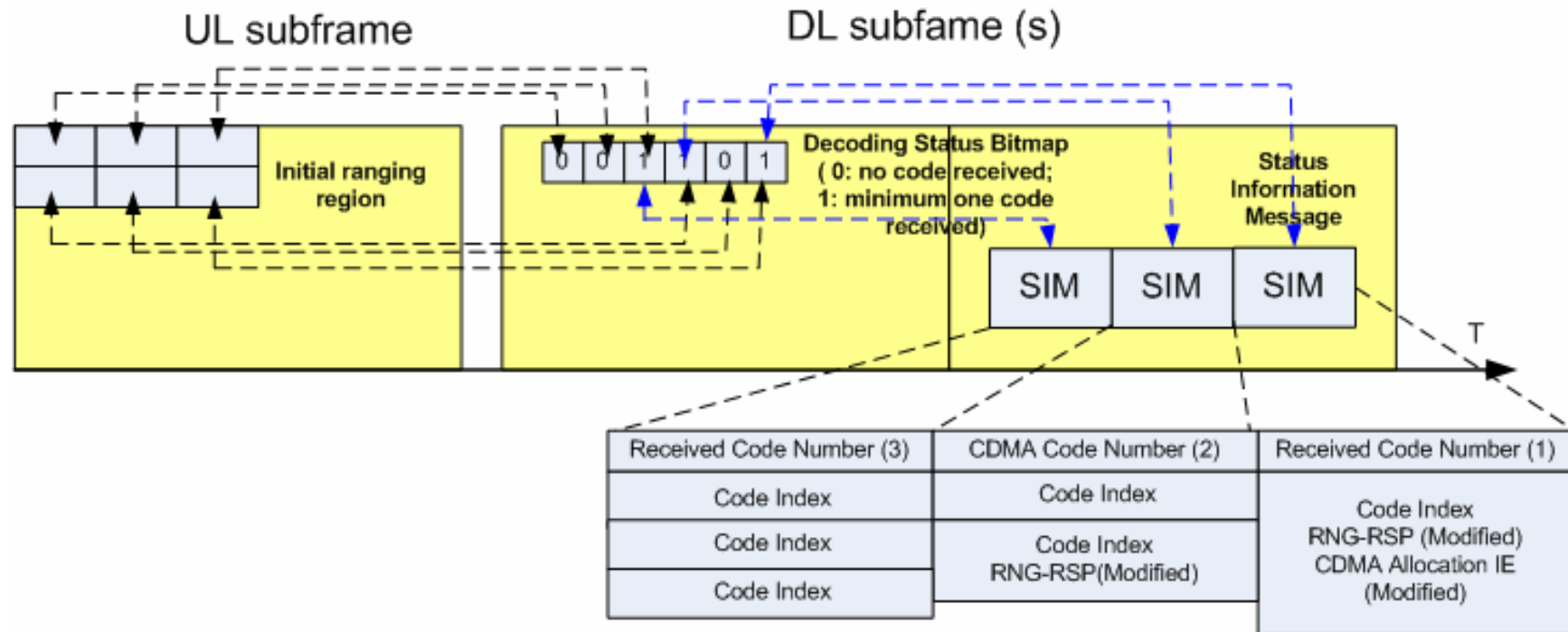
## Issues with Initial Ranging in 16e (2-2)

- Overhead
  - Before the initial ranging process is over successfully, no identity (Basic ID) for MS is used in air interface.
  - RNG-RSP and CDMA Allocation IE are all broadcasted with the “RPI” (Ranging Process Identity) temporally-named .
  - RPI consists of: the received ranging code index, the ranging slot (frame number, time symbol reference, subchannel reference)-> 4 bytes length totally.

## Proposed Scheme(3-1)

- Respond to the MS's initial ranging quickly
  - In the following frame/ DL subframe just after the frame/UL subframe where the MS transmits the initial ranging code/indicator, the BS broadcasts the DSB (Decoding Status Bitmap ), where each bit is mapped into initial ranging transmission slot. “0” indicates no code is received, “1” indicates one code is received minimally.
- Simplify the RPI
  - Link RNG-RSP and BW Grant to corresponded bit of DSB, where DSB bit implies the ranging slot already, only the received ranging code index is necessary for RPI-> Simplified RPI with 1 byte length only .

# Proposed Scheme(3-2)



## Proposed Scheme(3-3)

- After transmission of initial ranging code, the MS shall detect the DSB broadcasted in the next DL subframe/frame.
- If the bit corresponding to the ranging slot is “0”, the MS can conduct the back off algorithm promptly.
- If the bit is “1”, the MS shall find the detailed information contained in corresponded SIM (Status Information Message) to further determine whether the code transmitted by itself is decoded or not.
  - If no code index transmitted by MS is found, the MS shall conduct back off algorithm promptly.
  - If only code index is found, the MS shall wait for the normal RNG-RSP or CDMA Allocation IE in the following DL subframe/frame – In case at the moment when SIM is transmitted, RNG-RSP hasn't been originated or no enough BW to allocate.
  - Otherwise, the MS can get the RNG-RSP only/and UL BW granted by the BS, then conduct the remaining ranging procedure according to the indication by the RNG-RSP and CDMA Allocation IE.

# Proposed Texts

- 10.x Network Entry

- 10.x.x initial ranging

The BS shall respond to the MS' initial ranging code transmission by broadcasting a status indication message ( e.g.: Decoding Status Bitmap) in the following DL frame/subframe. The RNG-RSP and BW Grant can be linked to the corresponded bit of the status indication message to reduce overhead.