

Frame Structure for IEEE 802.16m with Multi-Antenna Support

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Re:

TGm Call for Contribution on SDD, IEEE 802.16m-07/047

- Proposed 802.16m Frame Structure with special attention to legacy support
- Multiple access and multi antenna techniques, specifically as related to frame structure

Abstract :

Proposal of a frame structure that exploit the multi-antenna techniques to improve the link budget of the preamble and DL/UL-MAP for 16m users. The proposed frame structure abides by legacy support requirements.

Purpose:

To discuss and adopt this proposal as a IEEE 802.16m frame

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Introduction

- We propose a frame structure that exploits the multi-antenna techniques to improve the link budget of the preamble and DL/UL-MAP for 16m users. This results in
 - Extending the cell coverage of the IEEE 802.16m users which is one the main requirements of the IEEE 802.16m.
“IEEE 802.16m shall provide significantly improved coverage with respect to the WirelessMAN OFDMA Reference System. The link budget of the limiting link (e.g. DL MAP, UL bearer) of IEEE 802.16m shall be improved by at least 3 dB compared to the WirelessMAN-OFDMA Reference System.” Draft IEEE 802.16m Requirements, IEEE 802.16m-07/002r2.

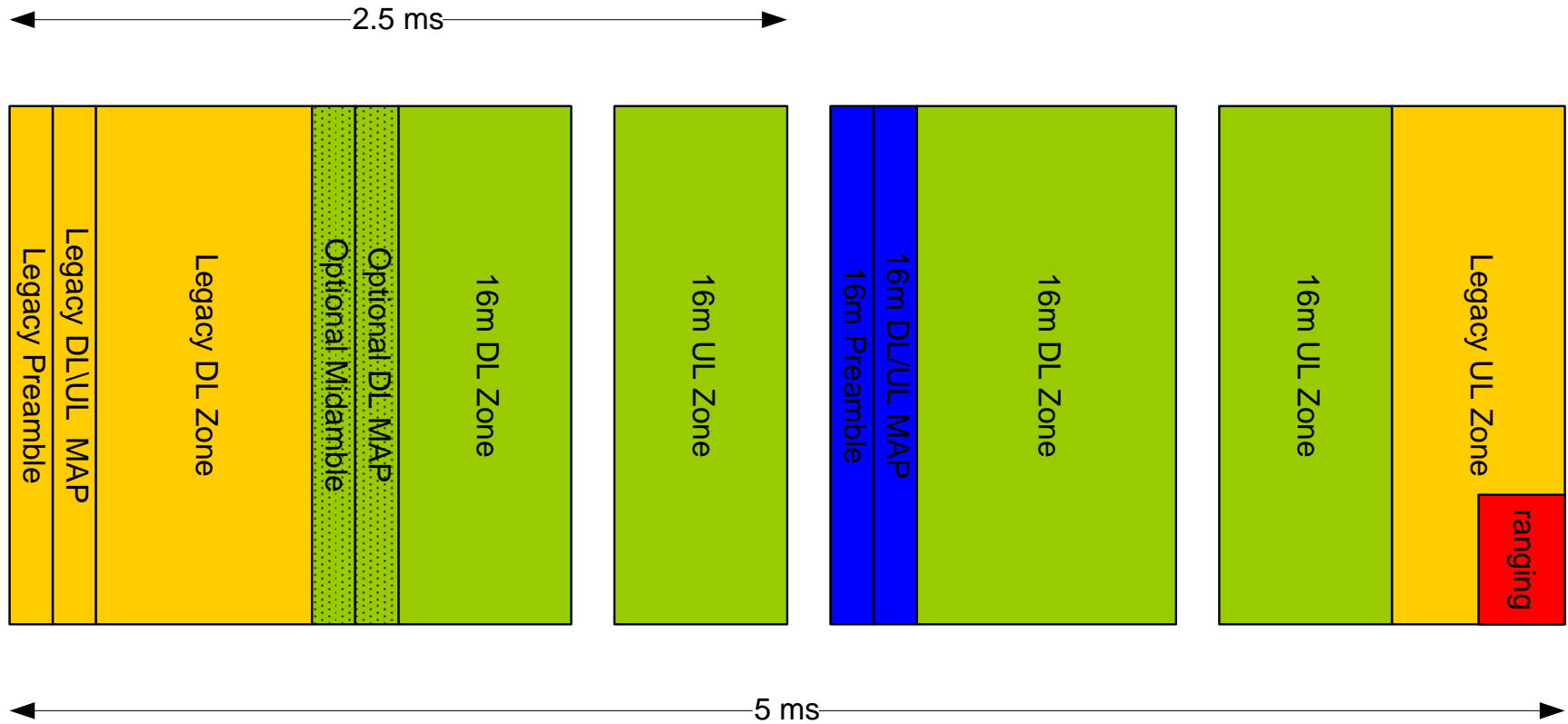
Multi-Antenna Support

- The IEEE 802.16m standards requires a minimum of 2x2 antennas for the downlink operation and 1x2 antennas for the uplink operation.

“The IEEE 802.16m standard shall define minimum antenna requirements for the BS and MS. For the BS, a minimum of two transmit and two receive antennas shall be supported. For the MS, a minimum of one transmit and two received antennas shall be supported.” Draft IEEE 802.16m Requirements, IEEE 802.16m-07/002r2.

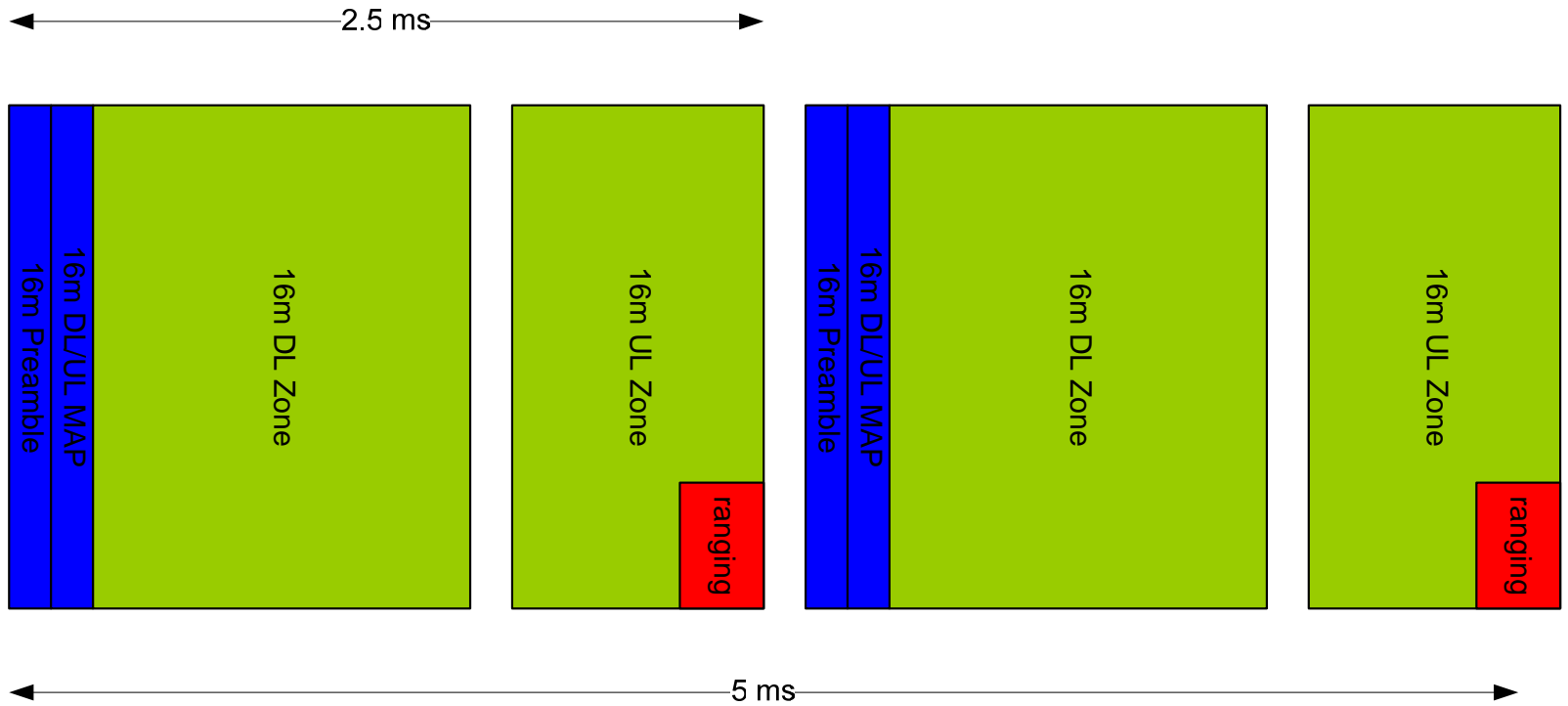
- These requirements allow for the use of advanced antenna techniques in transmitting the preambles and DL/UL-MAP and hence improving its limited link-budget.

Frame Structure (Legacy Enabled)



New enhanced preambles and DL/UL MAP are required for 16m users to extend cell coverage.

Frame Structure (Legacy Disabled)



Frame Structure

- We propose the following
 - Sending the 16m preambles and DL-MAP using advanced multi-antenna techniques. This will lead to improvement in the cell coverage for the 16m network.
 - New preambles are needed for the 16m users that exploit multi-antennas.

Legacy and 16m MS

- For the legacy MS, PHY and MAC synchronization can be achieved using the legacy preamble and legacy DL-MAP.
- For the 16m MS, they have two options to achieve synchronization:
 - Detecting the legacy preamble and legacy DL-MAP.
 - Detecting the 16m preamble and 16m DL-MAP transmitted using advanced multi-antennas techniques.