Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**Proposal for IEEE 802.16m Frame Structure for Relay Support**	
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Re:	IEEE 802.16m-07/047– Call for Contributions on Project 802.16m System Description Document (SDD)	
Abstract	This contribution proposes the IEEE 802.16m frame structure for relay support	
Purpose	To incorporate the proposed frame structure into the Project 802.16m System Description Document	
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Proposal for IEEE 802.16m Frame Structure for Relay Support

Mo-Han Fong, Hang Zhang, Gamini Senarath, Sophie Vrzic, Jun Yuan, Kelvin Au, Robert Novak, Dongsheng Yu, Peiying Zhu, Anna Tee, Sang-Youb Kim

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1 Introduction

This contribution presents the IEEE 802.16m frame structure for relay support.

Basic frame structure without relay for single-band and multi-band operations are presented in separate contributions (C802.16m-08/041, C802.16m-08/042). This contribution presents the frame structure for relay added on to the basic frame structure.

2 General Consideration

Figure 1 shows the access network architecture with relay for reference purpose. Details are given in contribution C802.16m-07/299r3. The relay frame structure should support the BS-RS link (R1'y), RS-RS link (R1'z) and RS-MS link (R1'x). The RS-MS link should support both legacy MS and 16m MS
The hop-to-hop latency should be minimized to meet the latency requirements defined in IEEE 802.16m SRD.

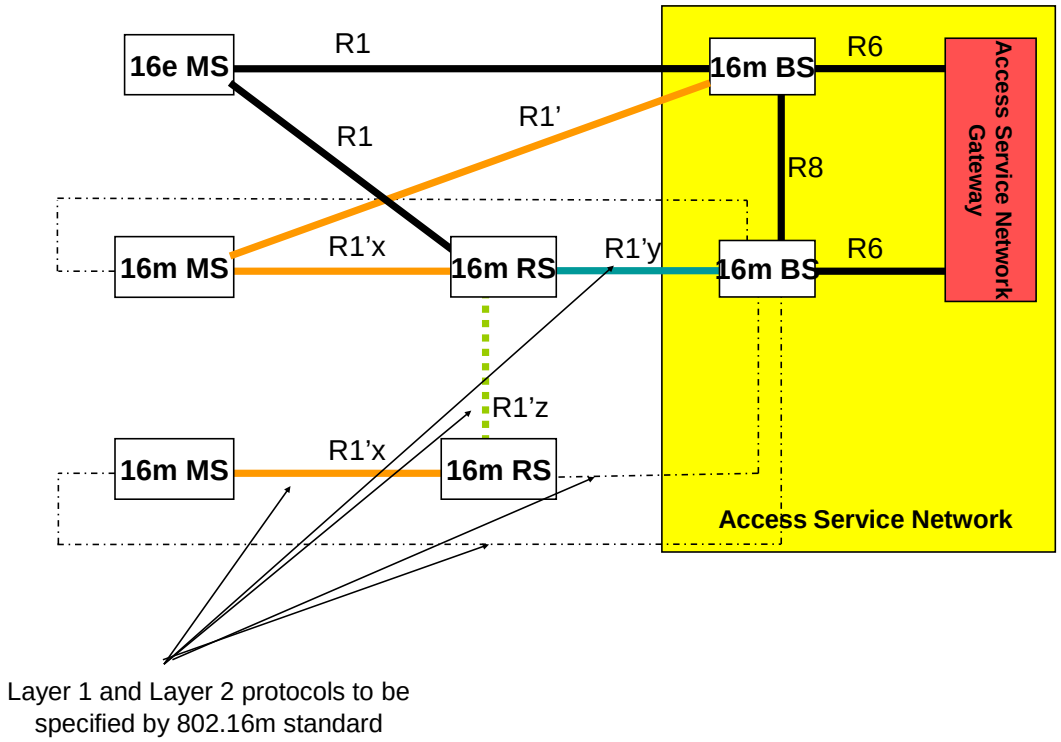

Figure 1 Access Network Architecture with Relay

3 Relay Frame Structure for Single Band Operation

Figure 2 shows the frame structure for the three hops case. The frame structure can be readily expandable for the case of more than three hops. As described in details in C802.16m-08/041, the DL sub-frame and UL sub-frame are each partitioned into mini-slots. A group of mini-slots form the legacy zone and another group of mini-slots form the 16m zone. Legacy zones are used for BS/RS transmission/reception to/from the legacy MS. 16m zones are used for BS/RS transmission/reception to/from the 16m MS, and also for BS/RS transmission/reception to/from RS.

Within the 16m zone, one or more mini-slots are defined for the access zone and one or more mini-slots are defined for the global zone. Access zone is used for BS/RS transmission/reception to/from the 16m MS Global transmit zone is used for an RS to transmit to its parent and/or child nodes. Global receive zone is used for an RS to receive from its parent and/or child nodes. The use of global zones reduces the hop-to-hop latency as well as provides more flexible resource multiplexing between the parent and the child nodes.

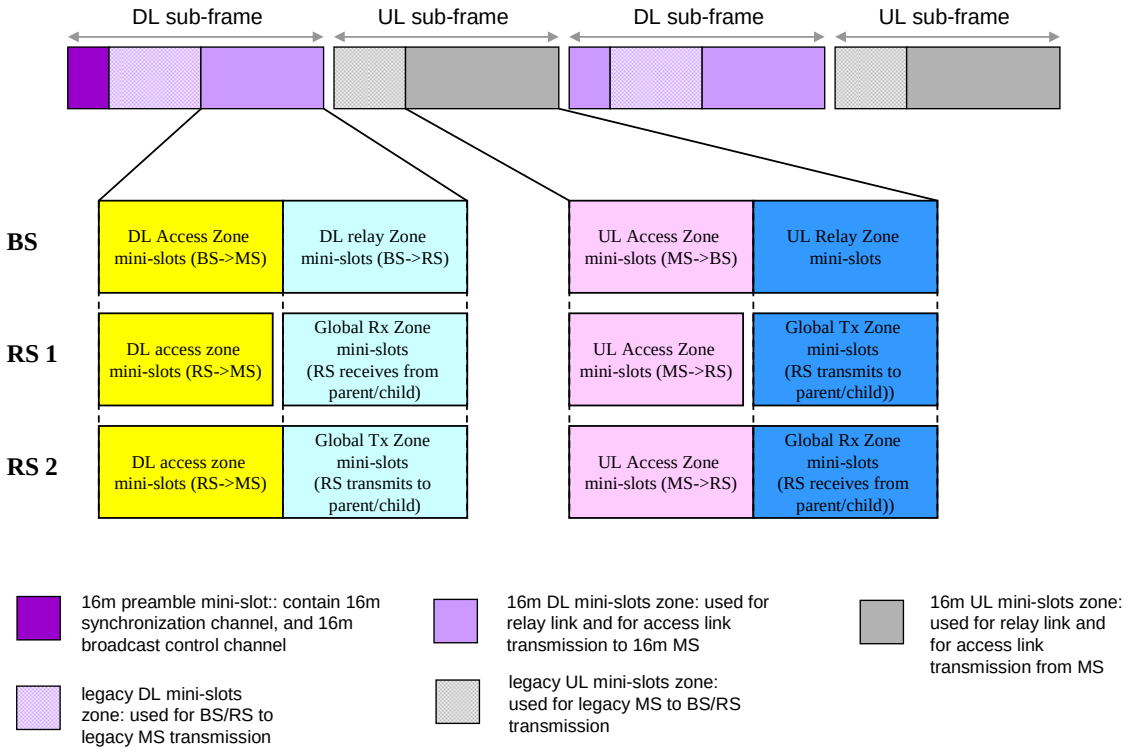

Figure 2 Relay Frame Structure for Single Band Operation

4 Relay Frame Structure for Multi-Band Operation

Figure 3 shows the relay frame structure for multi-band operation. For each band, similar to the single band case, within the 16m zone, one or more mini-slots are defined for the access zone and one or more mini-slots are defined for the global zone. In each band, access zone and relay/global zone are defined within the 16m mini-slots zone as in the case of single band operation. As shown in Figure 4, the boundary between the access zone and the relay/global zone is aligned across bands to ensure transmit-receive switch time is aligned across bands. In overlapping region across bands, the burst transmission to/from wideband MS can span across multiple bands.

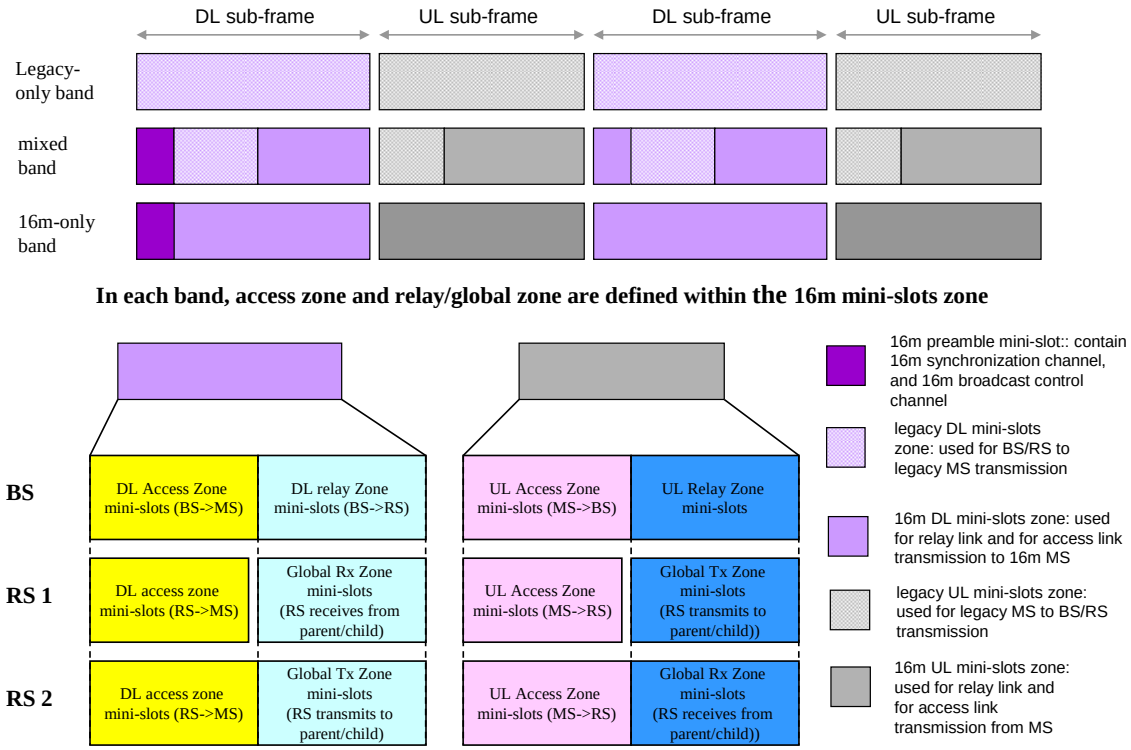

Figure 3 Relay Frame Structure for Multi-Band Operation

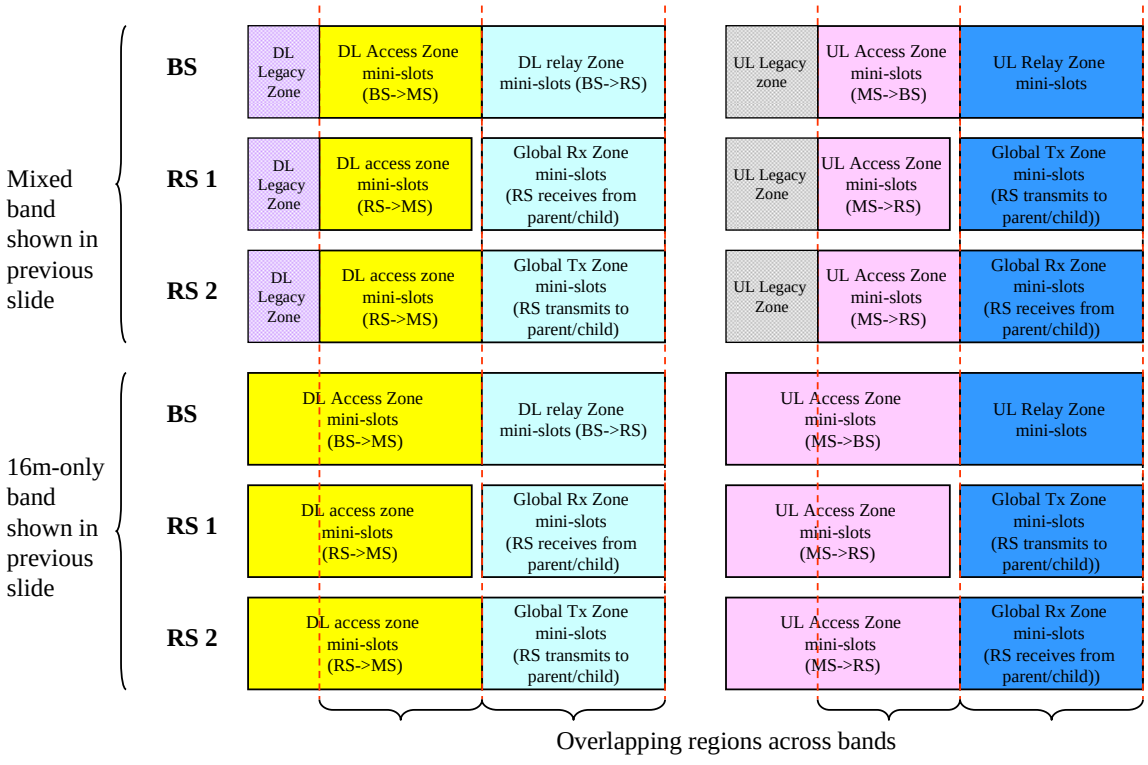

Figure 4 Access Zone and Relay/Global Zone Alignment Across Bands

5 Proposed Text for SDD

[Create the following sub-sections in section 11 of the SDD]

11.1 Single-Band Support

11.1.1 Frame Structure without Relay

11.1.2 Frame Structure with Relay

[Within 11.1.2, insert the text in Section 3 of this contribution to this sub-section of the SDD]

11.2 Multi-Band Support

11.2.1 Frame Structure without Relay

11.2.2 Frame Structure with Relay

[Within 11.2.2, insert the text in Section 4 of this contribution to this sub-section of the SDD]