**IEEE P802.15**

**Wireless Personal Area Networks**

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| Title | **Multiple Transmissions in a Ranging Slot** |
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| Re: | Developing technical content, 15-22-0179-00-04ab-multiple-transmissions-in-a-ranging-slot |
| Abstract | This document provides details of multiple transmission feature in a ranging slot |
| Purpose | To provide the technical contents for the initial draft |
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**7.4.4.44 Ranging Device Management IE (RDM IE)**

The RDM IE is used by the controller to control the devices participating in a set of ranging rounds when the controller knows the device identities. The content field of the RDM IE shall be formatted as shown in Figure 7-106m.



**Figure 7-106m—RDM IE Content field format**

The SIU field indicates whether the Slot Index field of the RDM List element is used (when the SIU field is one) or not (when the SIU field is zero). When the SIU field is zero, the RDM IE is used to assign the ranging role, that isinitiator or responder, to controlees for contention-based ranging. When the SIU field is one, the RDM IE is used to allocate time slots and assign the ranging roles of controlees for the scheduling-based ranging.

The Address Size field specifies the size of the addresses used in the RDM List field. If the Address Size field is zero, all addresses in the RDM List elements are short addresses. If the Address Size field is one, all addresses are extended addresses.

The RDM List Length field indicates the number of elements in the RDM List field, each of which is formatted as per Figure 7-106n. This is the number of participating ERDEVs selected by the RDM IE, and, when the SIU field is one, the number of slots assigned by the RDM IE. It is allowed for RDM List to have multiple RDM List elements having the same ranging slot index but with different addresses. It means concurrent transmission from different ranging devices may happen within a slot. If the concurrent transmissions happen, a ranging device should be either transmitting to or receiving from a single device in the designated ranging slot.

The codes that may be used for concurrent transmissions in the single slot are restricted, and the particular code assignments for slots of each channels also follow Table 15-6 and Table 15-7. If there are multiple RDM List elements having the same ranging slot index but with the different addresses in a RDM List, code index for each address is assigned at its increasing order at RDM List. For example, in channel 9, initiator at first RDM List element is assigned with code index 3, while responder at second RDM List element is assigned with code index 4, etc. It implies that maximum number of concurrent transmissions in the single slot is bounded with the number of codes indexes in the channel.



**Figure 7-106n—RDM List element format**

The Ranging Role field specifies whether the selected device is to be an initiator or a responder. When the Ranging Role field has a value of zero the selected device is a responder. When the Ranging Role field has a value of one the selected device is an initiator.

The Ranging Slot Index field is used (when the SIU field is one) to assign a slot index to the device identified by the address field. When the SIU field is zero this field is unused/reserved.

The Address field identifies each participating device. The size of the Address field is specified by the Address Size field of the RDM IE. A network of mixed address size devices can be catered for by using two RDM IEs, one for the short address devices and the other for the extended address devices.

The RDM IE can be used by the controller to exchange scheduling information among the ERDEVs for a set of ranging rounds specified by the same RCM. Upon reception of the RCM, a controlee knows whether it is selected to participate in the ranging round(s).