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**IEEE 802.16 Broadband Wireless Access Working Group <<http://ieee802.org/16>>**


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Title                   **MS scanning in MR network**

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Re:                    Call for technical proposals regarding IEEE project P802.16j

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Abstract             This contribution proposes the scheme with which RS supports MS scanning operation.

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Purpose                Discussion and Adoption in IEEE 802.16j

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# MS scanning in MR network

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## Introduction

In MR network it is needed to define an operation with which a relay station supports MS scanning.

As described in section 6.3.22.1.2 of 802.16e-2005, a serving MR-BS allocates scanning intervals to an MS and scanning negotiation messages are transmitted between the MR-BS and the MS. An access RS relays the scanning negotiation signals of the MS and the serving MR-BS.

Assuming that RS has a capability to schedule MS data transmission, the RS needs to be informed of MS scanning and take MS scanning intervals into account scheduling of MS data transmission. In this case, a serving MR-BS may inform an access RS of MS scanning intervals so that the access RS schedules MS data transmission. In addition, when MS repeats its scanning process with the number of scanning interval and interleaving interval as in figure 1 and the access RS knows the information of each intervals, the RS schedules to transmit MS data during interleaving intervals using the information.

If the access RS does not receive the indication of MS scanning mode, the access RS may transmit MS data to an MS in scanning mode. To keep consistency in MS status among MR-BS, RS and MS, upon receiving indication of MS scanning intervals from the serving MR-BS, the access RS sends its response to the indication.

When an MS terminates any of scanning interval by sending a MAC PDU, the access RS assumes that the MS is no longer in scanning mode based on MAC PDU from the MS. But if the MS sends MOB\_SCN-REQ or the serving MR-BS sends MOB\_SCN-RSP to terminate the group of scanning intervals, the access RS does not know the termination of group of intervals. So the serving MR-BS shall notify the access RS of the termination of group of intervals using MS\_SCN-CLT message.

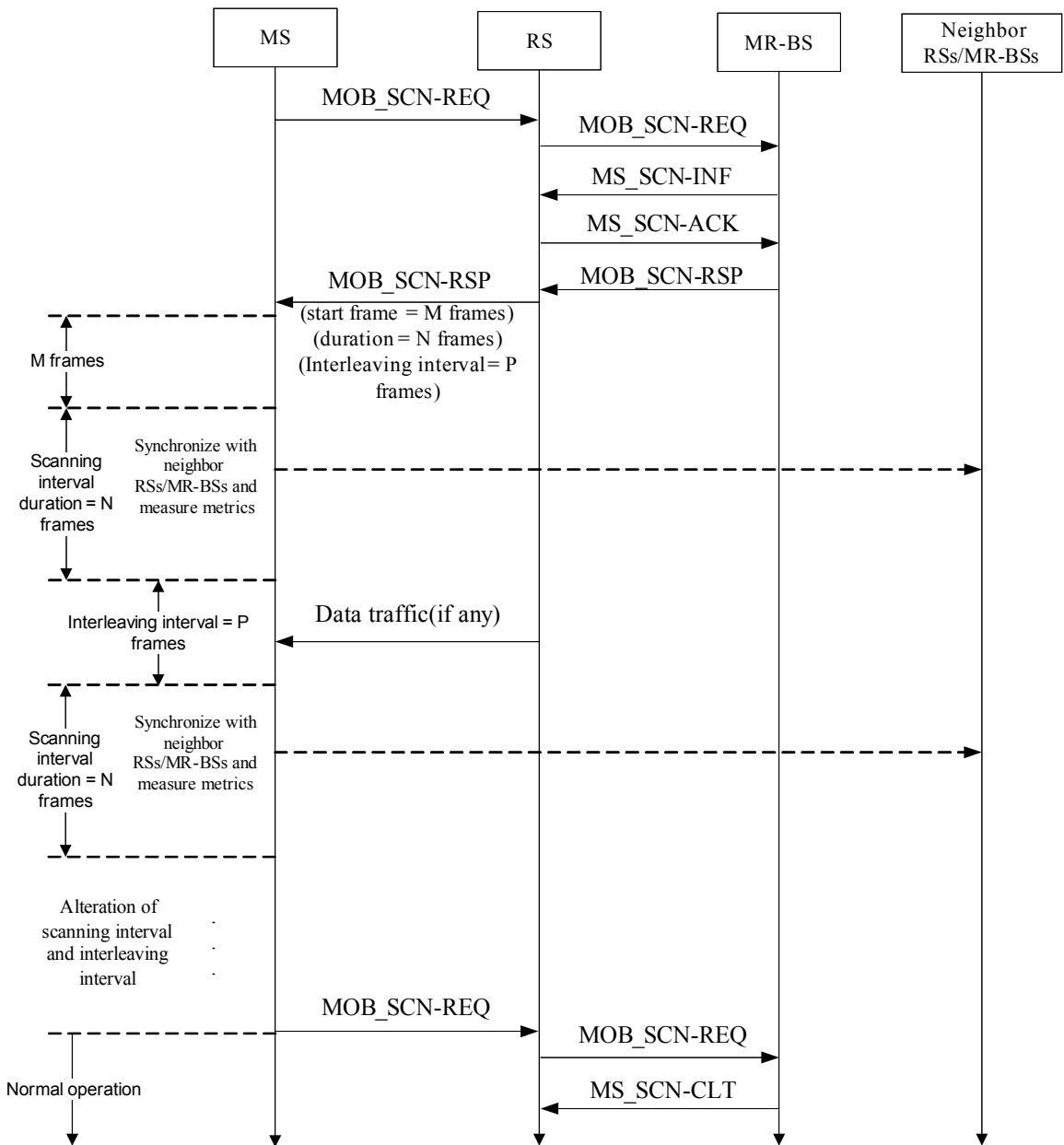


Figure 1 Example of periodic scanning by MS request in distributed scheduling case

## Proposed Text Change

*[Insert the followings at the end of section 6.3.22.1.2:]*

In MR network MR-BS shall control MS scanning. An RS relays MOB\_SCN-REQ, MOB\_SCN-RSP and MOB\_SCN-REP messages between an MS and the MR-BS in centralized scheduling or distributed scheduling. In the case of distributed scheduling, the MR-BS sends MS\_SCN-INF message to inform the access RS of MS scanning related information after the MR-BS determines the scanning intervals of MS. The access RS transmits MS\_SCN-ACK message as an acknowledgement of MS\_SCN-INF. Based on MS\_SCN-INF

message, the access RS schedules MS data transmission.

The MR-BS shall transmit MS\_SCN-CLT message to inform an access RS that the group of intervals of MS is terminated. The access RS shall assume that the MS is no longer in scanning mode when the access RS receives MS\_SCN-CLT message or a MAC PDU of MS.

*[Insert new subclause 6.3.2.3.xx after section 6.3.2.3.64:]*

#### 6.3.2.3.xx MS Scanning Inform (MS\_SCN-INF) message

A MS\_SCN-INF message may be transmitted by an MR-BS to inform an access RS of MS scanning operation.

An MR-BS includes the information of scanning intervals of MS(s) in a MS\_SCN-INF message.

An MR-BS shall generate MS\_SCN-INF message in the format shown in Table x. The MS\_SCN-INF message shall be transmitted on the RS's basic CID.

Table x – MS\_SCN-INF message format

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>MS_SCN-INF_Message_format() {</u>	<u>=</u>	
<u>Management Message Type=TBD</u>	<u>8 bits</u>	<u>=</u>
<u>Transaction ID</u>	<u>16 bits</u>	<u>=</u>
<u>N_MS</u>	<u>8 bits</u>	<u>Number of MSs</u>
<u>For(i=0; i&lt;N_MS; i++) {</u>		
<u>MS_CID</u>	<u>16 bits</u>	<u>Basic CID of MS</u>
<u>Start frame</u>	<u>4 bits</u>	<u>Start frame number from which the MS start the first scanning interval</u> <u>Measured from the frame in which this message was received. A value of zero means that first scanning interval starts in the next frame</u>
<u>Scan duration</u>	<u>8 bits</u>	<u>Duration (in units of frames) where the MS may perform scanning.</u>
<u>Interleaving interval</u>	<u>8 bits</u>	<u>Duration in frames. The period interleaved between scanning intervals when MS shall perform normal operation.</u>
<u>Scan iteration</u>	<u>8 bits</u>	<u>The number of iterating scanning interval.</u>
<u>Padding</u>	<u>4 bits</u>	<u>Shall be set to zero</u>
<u>}</u>		
<u>}</u>		

*[Insert new subclause 6.3.2.3.yy after section 6.3.2.3.64:]*

6.3.2.3.yy MS Scanning Acknowledgement (MS\_SCN-ACK) message

An RS sends MS\_SCN-ACK message as a response of MS\_SCN-INF message to an MR-BS.

An RS shall generate MS\_SCN-ACK messages in the format shown in Table y. MS\_SCN-ACK message shall be transmitted on the RS's basic CID.

Table y – MS\_SCN-ACK message format

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>MS_SCN-ACK Message format() {</u>	<u>=</u>	
<u>Management Message Type=TBD</u>	<u>8 bits</u>	<u>=</u>
<u>Transaction ID</u>	<u>16 bits</u>	<u>Transaction ID in corresponding</u>
		<u>MS_SCN-INF message</u>
<u>}</u>		

*[Insert new subclause 6.3.2.3.zz after section 6.3.2.3.64:]*

6.3.2.3.zz MS Scanning Completion (MS\_SCN-CLT) message

A MS\_SCN-CLT message may be transmitted by an MR-BS to inform an access RS that the group of intervals of MS is terminated.

An MR-BS shall generate MS\_SCN-CLT messages in the format shown in Table z. MS\_SCN-CLT message shall be transmitted on the RS's basic CID.

Table z – MS\_SCN-CLT message format

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>MS_SCN-CLT Message format() {</u>	<u>=</u>	
<u>Management Message Type=TBD</u>	<u>8 bits</u>	<u>=</u>
<u>N MS</u>	<u>8 bits</u>	<u>Number of MSs</u>
<u>For(i=0; i&lt;N MS; i++) {</u>		
<u>MS CID</u>	<u>16 bits</u>	<u>Basic CID of MS</u>
<u>}</u>		
<u>}</u>		