Project	**IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>**
Title	**MR_Traffic-REP message**
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Re:	IEEE 802.16j-07/043: "IEEE 802.16 Working Group Working Group Letter Ballot #28"
Abstract	This contribution proposes MS ranging and automatic adjustments in transparent and non-transparent
Purpose	Text proposal for 802.16j Draft Document.
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MR_Traffic-REP message

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Introduction

In current draft document, when the offsets of frequency, power, and timing for the data transmission from a MS are beyond the tolerance defined in the specification, a UL-only transparent RS, which cannot generate DL traffic, must transmit a RNG-REQ message with the RS basic CID containing the MS basic CID to the serving MR-BS through the relay path. Such that the MR-BS can send the RNG-RSP to the MS on behalf of the RS. Since the uplink environment change rapidly for a mobile MS, the access RS have to adjust uplink data transmission frequently that result in large overhead on the relay path. We propose a lower overhead MR_Traffic-REP message to replace RNG-REQ message. Comparisons of overheads between RNG-REQ message and proposed MR_Traffic-REP message are shown in Table 1. Table 2 gives an example of the exact saving for multiple MSs from 1 to 8.

Table 1 RNG-REQ and proposed MR_Traffic-REP

Message / Size		Original RNG-REQ	Proposed MR_Traffic-REP
Generic MAC header		6 byte	6 byte
Message body	Fix part	2	2
	Variable part	24×*N*	11.5×*N*
CRC		4	4
Total		12+24×*N*	12+11.5×*N*

N: Number of MS in the message Table 2 Message size (bytes)

Table 2 Message size (bytes)

N	Original RNG-REQ	Proposed MR_Traffic-REP
1	36	25
2	60	35
3	84	47
4	108	58
5	132	70
6	156	81
7	180	93
8	204	104

In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the draft standard P802.16j/D1 are listed below.

Specification Changes

[Note: Texts has been accepted in the previous meeting (such as comment #0565: document IEEE C802.16j-07/459r6) are marked by Gray Color]

[Reporting Procedure]

[Modified 6.3.10.3.2.1 in IEEE C802.16j-07/459r6 as following indicated:]

In some cases, the superordinate station of an SS/RS may want to initiate ranging based on the channel measurements from data traffic or a CDMA-based bandwidth request ranging code received from the SS/RS. To initiate the periodic ranging process, the superordinate station shall send an unsolicited RNG-RSP to the SS/RS. If superordinate station is a transparent RS receiving a CDMA-based bandwidth request, the MR-BS and

the RS shall follow the procedure defined in 6.3.6.7.2.1.1. If the superordinate station is a transparent RS receiving data traffic and relaying on the uplink only, it shall transmit an ~~RNG-REQ~~ MR_Traffic-REP to the MR-BS on the RS basic CID to request that the MR-BS send an unsolicited RNG-RSP with the necessary adjustments to the SS. If the superordinate station is a non-transparent RS in centralized scheduling mode or a transparent RS relaying on both uplink and downlink, it shall request bandwidth from the MR-BS on which to send the unsolicited RNG-RSP (see 6.3.6.7.2.1). If the superordinate station is a non-transparent RS in distributed scheduling mode, it shall send the RNG-RSP directly to the SS without interaction with the MR-BS.

[Replace Figure 118b in comment #0565 (C802.16j-07/459r6) by following figure as indicated:]

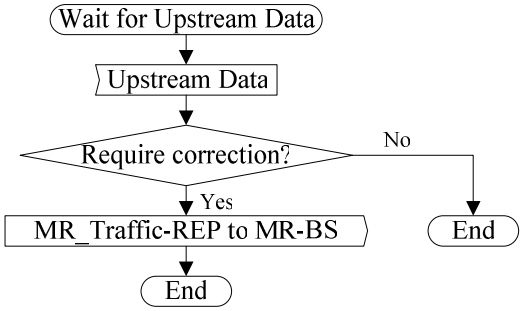

Figure 118b—SS upstream transmission adjustment at a transparent RS performing uplink relay only

[Replace Figure 118d in comment #0565 (C802.16j-07/459r6) by following figure as indicated:]

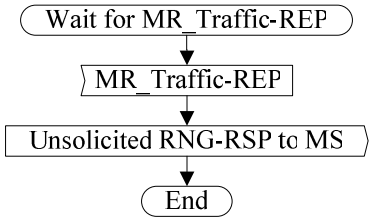

Figure 118d—~~RNG-REQ~~ handling MR_Traffic-REP at an MR-BS

[MR_Traffic-REP message]

[Insert new subclause 6.3.2.3.90 in line 39 of page 76]

6.3.2.3.90 MR_Traffic-REP message

This message is used by a transparent RS to request the MR-BS to send a unsolicited RNG-RSP.

Table xxx—MR_Traffic-REP message format

Syntax	Size	Notes
MR_Traffic-REP_Message_Format() {	-	-
Management Message Type = xx	8 bits	-
Frame Number Index	8 bits	LSBs of relevant frame number
while(data remain) {	-	-
CID	16 bits	13-bit LSBs of the MS basic CID
reserved	1 bit	Shall be zero
Include_TA	1 bit	Include timing adjust (0 = absent, 1 = present)
Include_PLA	1 bit	Include power level adjust (0 = absent, 1 = present)
Include_OFA	1 bit	Include offset frequency adjust (0 = absent, 1 = present)
If(Include_TA == 1) {	-	-
Timing Adjust	32 bits	Timing offset adjustment (signed 32-bit, $1/F_s$ units).
}	-	-
If(Include_PLA == 1) {	-	-

Power Level Adjust	8 bits	Power level adjustment (signed 8-bit, 0.25 dB units).
}	-	-
If(Include_OFA == 1) {	-	-
Offset Frequency Adjust	32 bits	Frequency offset adjustment (signed 32-bit, Hz units).
}	-	-
}	-	-
Padding	varaibel	Aligment to byte boundary
}	-	-

Timing Adjust

The amount of time required to adjust MS transmission so the bursts will arrive at the expected time instance at the access station. Units are PHY specific (10.3.4.3).

Power Level Adjust

Specifies the relative change in transmission power level that the MS is to make in order that transmissions arrive at the access station at the desired power. When subchannelization is employed, the subscriber shall interpret the power offset adjustment as a required change to the transmitted power density.

Offset Frequency Adjust

Specifies the relative change in transmission frequency that the MS is to make in order to better match the access station.

[Remove redundant TLVs in the RNG-REQ message]

11.5 RNG-REQ message encodings

[Remove TLVs in the following table as indicated:]

Table 613—RNG-REQ message encodings

Name	Type (1 byte)	Length	Value (variable-length)	PHY Scope
~~Received Ranging Codes~~	~~TBA~~	~~Variable~~	~~Received Ranging Codes is a compound TLV value that indicates received code information.~~	~~OFDMA~~
~~Timing Adjust~~	~~TBA.1~~	~~4~~	~~Tx timing offset adjustment (signed 32-bit). The amount of time required to adjust SS transmission so the bursts will arrive at the expected time instance at the BS. Units are PHY specific (see 10.3).~~	~~OFDMA~~
~~Power Level Adjust~~	~~TBA.2~~	~~1~~	~~Tx Power offset adjustment (signed 8-bit, 0.25 dB units) Specifies the relative change in transmission power level that the SS is to make in order that transmissions arrive at the BS at the desired power. When subchannelization is employed, the subscriber shall interpret the power offset adjustment as a required change to the transmitted power density.~~	~~OFDMA~~
~~Offset Frequency Adjust~~	~~TBA.3~~	~~4~~	~~Tx frequency offset adjustment (signed 32-bit, Hz units) Specifies the relative change in transmission frequency that the SS is to make in order to better match the BS. (This is fine frequency adjustment within a channel, not reassignment to a different channel.)~~	~~OFDMA~~
~~Ranging Status~~	~~TBA.4~~	~~1~~	~~Used to indicate whether uplink messages are received within acceptable limits by BS.~~	~~OFDMA~~

			1 = continue, 2 = abort, 3 = success	
Ranging code attributes	TBA.5	4	Bits 31:22 – Used to indicate the OFDM time symbol reference that was used to transmit the ranging code. Bits 21:16 – Used to indicate the OFDMA subchannel reference that was used to transmit the ranging code. Bits 15:8 – Used to indicate the ranging code index that was sent by the SS. Bits 7:0 – The 8 least significant bits of the frame number of the OFDMA frame where the SS sent the ranging code.	OFDMA
Channel Measurement Information	TBA.6	TBA	TBD	
MS Basic CID	TBA.7	2	MS Basic CID	OFDMA