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Re:	A response to a Call for Technical Proposal, http://wirelessman.org/relay/docs/80216j-0 <u>76_0130XX</u> .pdf
Abstract	The baseline document 802.16j-026r3.pdf has a poor messaging format for relay configuratio We suggest to combine the similar messages into a unique message for proper message format
Purpose	To update the proposed text proposal.
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# Relay Configuration Message Consolidation for the Baseline Document

Gamini Senarath, Hang Zhang, Peiying Zhu, Israfil Bahceci, Mo-Han Fong, Wen Tong, David Steer, Derek Yu, Mark Naden, G.Q. Wang

## **1** Introduction

The current baseline document has the following RS configuration messages:

- 6.3.2.3.77 : Relay Frame Configuration Message transmitted from MR-BS and RS to subordinate RSs <u>(sent during network entry)</u>.

- First Table in Section 6.3.2.3.66 (Page 26): RS configuration Request message transmitted from RS to MR-BS for preamble/ RS group related configuration change request <u>(sent at any time including network entry)</u>.

- Second Table in Section 6.3.2.3.66 (Page 27): RS configuration Request message from MR-BS to RS to configure the R-amble transmission/measurement pattern (Sent during network entry as a unicast message, at any time as a broadcast configuration change message, at any time to have specific measurement as a multicast/broadcast/multiple unicast messages)

- 6.3.2.3.67: MR-BS configuration response message transmitted from MR-BS to RS to configure the preamble index and RS grouping parameters (a unicast message during network entry).

-6.3.2.3.69: RS preamble configuration request message transmitted from MR-BS to RS to assign upto three preambles to an intended RS (a unicast message during network entry).

-6.3.2.3.70: RS preamble configuration response message transmitted by RS to MR-BS to acknowledge whether the specific configuration in 69 is successful or not <u>(during network entry in response to 69)</u>

Clearly, there are similarities among a number of these messages. This happened in the meeting #48 when multiple contributions are approved without having a proper message structure in the baseline document.

In what follows we suggest to combine the similar messages and have only three different messages (instead of six messages mentioned above in the baseline). To that end, we may need broadcast or multicast messaging to configure a system-wide system parameter, or a unicast message to configure parameters related to individual nodes. Some broadcast parameters may need to be adopted by a unicast message to enable individual configuration for new nodes or nodes that requires a different set of configuration parameters.

# 2 Remedies

For this purpose, we can classify the messages into several classes based on: (a) the <u>RS</u> operation <u>modeal</u> stage the message is used; (b) unicast/multicast/broadcast aspect and (c) the sender/receiver basis as follows:

(1) Message from RS to BS requesting/responding configuration information - Capability of the RS/ preferred RS type (These are not included in the baseline document yet. So this document does not address this category. To be deleted in that case)

 $(\underline{12})$  Unicast message from MR-BS to RS in the access mode to provide configuration information. Some information as per the current messages are given below,

- Preamble index/indices, individual RSID 6.3.2.3.67, and 6.3.2.3.69 and 6.3.2.3.70
- If belong to an RS group, group ID 6.3.2.3.67
- R-amble configuration (Second table in part of 6.3.2.3.66)
- frame configuration 6.3.2.3.77
- (23) Broadcast messages from MR-BS to RS to configure RSs (to be sent to all the RSs time to time after the network entry process)
  - frame configuration 6.3.2.3.77
  - R-amble configuration (Second Table in part of 6.3.2.3.66)
- (34) Messages from MR-BS -to a set of RSs to carry out a specific task (different RSs may do different) when necessary (or at given times)
  - pre-planned R-amble TX/RX operation for monitoring (Second table in part of 6.3.2.3.66)
- (45) Message from RS to BS requesting its configuration change (i.e. RS group ID) - RS group assignment change request (First table in - part of 6.3.2.3.66);

To enable these messaging requirementsis, we suggest having three message structures as indicated below.

- A. RS\_Config\_REQ: Unicast message from MR-BS to RS during MS mode <u>of operation</u> (network entry) or RS mode of operation to provide configuration information. <u>T</u>, this may be an unsolicited message or a response to group assignment request from the RS. Information examples:
  - Preamble index/indices, individual RSID 6.3.2.3.67 and 6.3.2.3.69
  - If RS belongs to an RS group, group ID 6.3.2.3.67
- B. RS\_Config\_R<u>CMSP</u>: Message from RS to BS requesting its configuration change (i.e. RS group ID) or responding to the preamble configuration imposed during -MS or RS mode by RS\_Config\_REQ.

Information examples:

- RS group assignment change request part of First table in 6.3.2.3.66,
- Fail/Success results for preamble allocation as a response to RS\_Config\_REQ (-6.3.2.3.70)
- C. RS\_Configuration\_Description (RS\_CD): Unicast during MS mode or Broadcast/Multicast message during normal operation from MR-BS to RS to configure RSs Information:
  frame configuration message (-6.3.2.3.77)
  R-amble configuration (Table 2part of 6.3.2.3.66)

For (A), we combine 6.3.2.3.67, 6.3.2.3.69 and harmonize the naming to RS Config REQ.

For (B), we combine 6.3.2.3.66 and 6.3.2.3.70 and harmonize naming to RS Config RCMSP.

For (C), we rename the message of 6.3.2.3.77 to "RS configuration-description (RS-CD) message" and move the R-amble related configuration message in 6.3.2.3.66 to this message. One can insert new messages to RS-CD message for configuring additional parameters as it becomes necessary in later stages of 802.16j standardization. This message is included into the C80216j-07\_217r2. If that contribution is accepted this section is to be removed.

# **3 Proposed text changes:**

# 3.1 Change 6.3.2.3.66 (RS-Config\_REQ message) as follows:

## 6.3.2.3.66 RSMR-BS Configuration Request Recommendationsponse Message

This message may be transmitted by an RS to request some physical layer operation parameters. An RS may use this message to report information to facilitate the determination of an MR-BS on configuration of RS operation parameters. An RS may transmit this message (i) in response to an RS\_Config\_REQ message with RS\_response\_requiredRS\_enable\_config\_field set to 1, or (ii) unsolicited to request removal from an RS group, (iii) or unsolicited to request preamble configuration.

<u>Syntax</u>	Size	Notes
<u>RS_Config-RCM<del>SPEQ</del> format {</u>		
<u>Management message type = <math>67</math></u>	<u>8 bits</u>	
<u>Configuration_para_type</u>	<u>8 bits</u>	b0 = 1: preamble configuration is included; b1 = 1: request to be removed from RS group; b2 = 1: response to the RS_Config_REQ from MR-BS b32 - b7: reserved
If (b0 of Configured_para_type == 1) {		
reserved	<u>1 bit<del>s</del></u>	Shall be zerro
Preamble index	<u>7 bits</u>	Preamble index
1		
If (b2 of Configured_para_type == 1) {		
<u>Result</u>	<u>1 bit</u>	$\frac{0 = Fail}{1 = Succes}$
Reserved	<u>7 bits</u>	
TLV Encoded Information	Variable	TLV specific
<u>}</u>		
1		

### **Configuration para type**

The first bit is used as preamble index indicator to indicate the preamble\_index field is present in this message. The second bit is used as indicator to indicate the intent to be removed from the current RS group. The third bit indicates whether a RS response to the preamble configuration message from RS\_config\_REQ is required or not.

## Preamble\_index

This field is used to indicate the preamble index.

## <u>Result</u>

<u>Result indicates the RS preamble configuration request message; a bit of 0 indicates the message fail and a bit of 1 indicates the message success.</u>

The RS\_Config-RCMSP shall contain the following TLVs:

## HMAC/CMAC Tuple (see 11.1.2)

The HMAC/CMAC Tuple shall be the last attribute in the message.

# 3.2 Change subclause as 6.3.2.3.67 (RS-Config\_RSP message) as follows:

6.3.2.3.67 MR-BS Configuration Request Response-Message

This message may be transmitted by an MR-BS for the purpose of RS configuration. An MR-BS may use this message to set operation parameters for an RS. MR-BS may transmit this message to request RS configuration, or as a response to an

<u>RS\_Config-RCMSPEQ</u> message.or as an unsolicited message. This may be sent either during MS mode of operation or RS mode of operation.

Syntax	Size	Notes
<u>RS_Config-REQSP</u> format {		
<u>Management message type = <math>68</math></u>	<u>8 bits</u>	
<u>Configured_para_type</u>	<u>8 bits</u>	b0 = 1: preamble configuration is included;
		b1 = 1: remove multicast RSID to
		disassociate from the RS group;
		b2 = 1: Unicast RSID is included;
		b3 = 1: Multicast RSID is included;
		b4 = 0; Do not transmit preamble; 1: transmit
		the assigned preamble.
		<u>b<del>B</del>5 – b7: reserved</u>
<u>If (b0 of Configured_para_type == 1) {</u>		
<u>reserved</u>	<u>l bits</u>	Shall be zero
<u>Preamble_indexN_Preamble</u>	7 bits	Preamble index
	<u>2 bits</u>	<u>N_Preamble=0 specifies NULL</u>
		preamble (e.g., Transparent RS)
		<u>N_Preamble=1 assigns one</u>
		preamble to the RS
		<u>N_Preamble=2 assigns two</u>
		preambles on different segments to
		Ine KS N. Droomblo=2 agains three
		<u>IN_Preambles on different accounts to</u>
		the PS
Deserved	56 bits	<u>Deserved</u>
$\frac{1}{1} = \frac{1}{1} = \frac{1}$	<u>50 0115</u>	Keserved
$\frac{1}{1} \frac{1}{1} \frac{1}$	8 hite	Assign a preemble index value to
	<u>o 0115</u>	the potential RS
}		
TLV Encoded Information	Variable	TI V specific
}	variable	
If (b2 of Configured para type == 1) {		
Unicast RSID	8 bits	Unicast RSID
}	<u> </u>	
If (b3 of Configured para type == 1) {		
Multicast RSID	8 bits	Multicast RSID as the RS Group ID
}		
}		
	1	

#### **<u>Configuration\_para\_type</u>**

The first bit is used as preamble index indicator to indicate the preamble\_index field is present in this message. The second bit is used as the indicator to instruct the RS to remove its multicast RSID so that it is disassociate from the current RS group. The third bit is used as the Unicast RSID

indicator to indicate the Unicast RSID field is present in this message. The fourth bit is used as the Multicast RSID indicator to indicate the Multicast RSID field is present in this message.

#### Preamble\_index

This field is used to indicate the preamble index

<u>RS\_response\_required</u>

This field is used to enable RS to accept/deny the preamble assignment.

<u>Unicast RSID</u>

This field is used to indicate the Unicast RSID

#### **Multicast RSID**

This field is used to indicate the Multicast RSID for RS group operations

<u>N-Preamble</u>

<u>N\_Preamble is the number of preamble index assigned to the potential RS. For example, N-Preamble=0</u> means the potential RS does not transmit preamble acting as a Transparent RS. If N-Preamble=1 means the potential RS transmit one preamble index (i.e., the RS transmit one segment value and one IDCell) acting as a Non-Transparent RS. If N-Preamble=2 means the potential RS transmit two preamble index (i.e., the RS transmit two preamble) acting as a Non-Transparent RS.

The RS\_Config-RCMSP shall contain the following TLVs:

HMAC/CMAC Tuple (see 11.1.2) The HMAC/CMAC Tuple shall be the last attribute in the message.

# *3.3 Change Subclause 6.3.2.3.77 (Relay Frame configuration message) as follows:*

<u>{ Notes to Editor:</u> This message is to be submitted as a separate contribution C802.16j-07-217 which is already in the frame structure adhoc set up at meeting #48. If that is taken up separately this message is to be removed from here}

6.3.2.3.77 Relay Frame configuration Message Relay Configuration Description (RS\_CD) message.

The MR-BS or RS shall transmit the Relay Configuration Description (RS-CD) message for subordinate RSs to:

(a) configure the multi-hop relay frame structure

(b) send the R-amble transmission/reception instructions to a set of RSs for preplanned neighborhood monitoring scheme

(c) send the R-amble transmission configuration parameters for synchronization and autonomous neighborhood monitoring operation

<u>- Sends the R-amble transmission/reception instructions to a set of RSs for preplanned</u> <u>neighborhood monitoring scheme</u>

This message shall be transmitted on the basic CID or broadcast CID. This message can be sent either during access mode (initial entry) as a unicast message or any time during the normal operation as a multicast or broadcast message using the basic CID or broadcast CID.

If the b0 of Configuration\_para\_type is 1 the message includes frame configuration parameters as in (a), which is described in Section 8.4.4.7.

If the b1 of Configuration\_para\_type is 1 the message includes R-amble transmission monitoring configuration parameters as in (b) and (c) which is described below for the two cases.

#### Insert the text from Page 26, Line 37 until Page 27, line28, and modify as indicated below:

The MR-BS can send a RS\_Config-REQ message to instruct the RSs to transmit or receive the R-amble in relay zone. This message can be sent by either unicast, multicast or broadcast CID of the RSs. <u>An 8 LSB</u> bits of the frame number index will indicate the starting point of the subsequent R-amble transmission/reception opportunities. In order to instruct the stations in different MR-cell to transmit/receive the R-ambles at the same time, a coordinator in backhaul network is needed to ensure the Start Frame Number in the message sent by different MR-BSs will align to the same time.

When the Prefix is set as "00", the configuration message as per above (b) is sent, i.e. the RS shall follow the pattern instructed by MR-BS to transmit/receive the R-amble in relay zone. The pattern is composed by the amble index, and the RS shall transmit/receive the R-amble according to the field where its amble index is. Start Frame Number is the 8 LSB bits of frame number index used to indicate the starting point of subsequent R-amble transmission/reception opportunities. In order to coordinate the R-amble transmission/reception in different MR-cell, a coordinator in backhaul network is needed to ensure the Start Frame Number parameters sent in different MR-cell will align to the same time. The transmission\_ opportunities are identified by Monitoring Duration and Interleaving Interval for each iteration. An example is given in Figure x, where the Duration = 2, Interleaving Interval = 3 and the Iteration = 2. When the Iteration is more than one, the pattern for each iteration will be carried in this message. After the last iteration, the RSs shall report the measurement results by RS\_NBR-MEAS-REP message defined in 6.3.2.3.63.

#### Move Lines 24-28 on Page 27 to the following paragraph as indicated below:

If the Prefix is set "01", the configuration message as per above (c) is sent, i.e., the RS will autonomously transmit/receive the R-amble in relay zone without periodic instruction from MR-BS by defining R-amble, repetition patterns and monitoring patterns. The deactivation or activation of the functionalities of individual RSs can be done by sending (unicast) this message during initial entry of an RS. In the case of conflict, broadcast message parameters shall supersede the unicast message parameters except for the case of the parameter M which shall be set only by the unicast message. The detail design of the associated parameters is stated in 8.4.6.1.1.46.3.x.x. The RS is instructed to report its measurement results if the Prefix is set as "10".

This message is transmitted (unicast or broadcast) by a MMR-BS for the purpose of RS configuration. A MMR-BS can use this message to set operation parameters for a RS. This also can be used to choose the R-amble repetition pattern and to activate or deactivate these monitoring/synchronization processes for a specified period.

The deactivation or activation of the functionalities of individual RSs can be done by sending (unicast) this message during initial entry of an RS. In the case of conflict, broadcast message parameters shall supersede the unicast message parameters except for the case of the parameter M which shall be set only by the unicast message.

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<pre>Relay_Configuration_Description() {</pre>		
<u>Management message type = xx</u>	<u>8bits</u>	
Configuration_para_type	<u>8 bits</u>	b0 = 1, Frame Structure- Configuration message is included.

		b1 = 1, R-amble transmission monitoring parameters are included. b2 to b7 are reserved
If (b0 of Configuration para type == 1) {		02 to by are reserved
Type of frame	<u>1 bits</u>	0: single frame approach 1: multiframe approach
Frame Number	<u>4 bits</u>	Frame number to take effect
DL indicator	<u>1 bit</u>	<u>1: indicates DL subframe</u> <u>configuration are included</u>
<u>UL indicator</u>	<u>1 bit</u>	<u>1: indicates UL subframe</u> <u>configuration is included</u>
Reserved	<u>1 bit</u>	
If( Type of frame ==0){		
If (DL indicator ==1){		
Number of relay zones	<u>8 bits</u>	
for (i=0; i< Number of Relay zones; i++) {		
<u>Transceiver mode</u>	<u>2 bits</u>	00: Tx mode, 01:Rx mode, 11:Idle mode
OFDMA Symbol Offset	<u>8 bits</u>	
Frame_Config_Duration	<u>6 bits</u>	
1		
1		
If (UL indicator ==1){		
Number of relay zones	<u>8 bits</u>	
for (i=0; i< Number of Relay zones; i++) {		
Transceiver mode	<u>2 bits</u>	
OFDMA Symbol Offset	<u>8 bits</u>	
Frame_Config_Duration	<u>6 bits</u>	
1		
<u>}</u>		
1		
If( Type of frame ==1){		
If (DL indicator ==1){		
Number of frame	<u>8 bits</u>	
for (i=0; i< Number of frame; i++) {		
Transceiver mode	<u>2 bits</u>	00: Tx mode, 01:Rx mode, 11:Idle mode

OFDMA Symbol Offset	<u>8 bits</u>	
Reserved	<u>6 bits</u>	
}		
1		
If (UL indicator ==1){		
Number of frame	8 bits	
for (i=0: i< Number of frame: i++) {	<u> </u>	
		00: Tx mode.
Transceiver mode	<u>2 bits</u>	01:Rx mode, 11:Idle mode
<b>OFDMA Symbol Offset</b>	<u>8 bits</u>	
Reserved	<u>6 bits</u>	-
1		
1		
7		
<u>}</u>		
<pre>If (b1 of Configuration_para_type == 1) {</pre>		
±		
Otent Francis Menular	0.1.14	
<u>Start Frame Number</u>	8 bits	<u>8 LSB bits of the frame number</u>
<u>Prefix</u>	<u>2 bits</u>	00: The R-amble transmission and reception is instructed by MR-BS.01: The R-amble transmission and measurement shall be 
$\underline{If (Prefix == 00)}$		
Interleaving Interval	<u>8 bits</u>	Units are frames
<u>N_stations</u>	<u>8 bits</u>	Number of stations received this       message
For $(ij=0, ij < Iteration, ij++)$		
<u>N_Transmitter</u>	<u>8 bits</u>	Number of stations to transmit the <u>R-amble</u>
<u>For <math>(ji=0, ji &lt; N</math> Transmitter, <math>ji++)</math></u>		
Amble Index	<u>8 bits</u>	The RS with the amble index in this list shall transmit the R- amble
}		
<u>For <math>(j=0, j \le N</math> stations -</u> N Transmitter $(j++)$		
Amble Index	<u>8 bits</u>	The RS with the amble index in this list shall receive the R-amble

}		
$\underline{\text{If (Prefix} == 01)} \{$		
<u>Config_type</u>	<u>3 bits</u>	Bit $[0] = 1$ : R-amble for synchronization is present.Bit $[0] = 0$ : R-amble for synchronization is not transmitted.Bit $[1] = 1$ : R-amble for random monitoring is present;Bit $[1] = 0$ : any current monitoring operation is to be stopped by all RSs.Bit $[2] = 1$ : any RS which does not support subordinate RSs should transmit the R-amble for advertisement purposeBit $[2] = 0$ : any RS which does not support subordinate RSs should transmit the R-amble for advertisement purpose
If (Config_type[0] = = 1){		
<u>Synchronization cycle</u>	<u>8 bits</u>	N, Units are frame (see subsection 8.4.6.1.1.3.1)
<u>Synchronization frame offset</u>	<u>4 bits</u>	Ks, Units are frame (see subsection 8.4.6.1.1.3.1)
}		
$If (Config_type[1] = = 1) \{$		
<u>Neighbor monitoring cycle</u>	<u>4 bits</u>	M. Units are frame (see subsection 8.4.6.1.1.3.2)
<u>Neighbor monitoring frame offset</u>	<u>4 bits</u>	Kmn, Units are frame (see subsection 8.4.6.1.1.3.1)
<u>Neighbor monitoring frame</u> repetition	<u>8 bits</u>	L. Units are frame (see subsection 8.4.6.1.1.3.1)
}		
<u>}</u>		
<u>Report Request</u>	<u>1 bit</u>	<u>0: RSSI 1: CINR</u>
}		

#### **Type of frame:**

This field indicates whether a single frame approach or multi frame approach is being used.

#### Frame number:

This is the frame number for the frame configuration to take effect. The system applies the frame configuration in the message starting from the frame number.

#### **DL indicator:**

-1 indicates that the message include DL subframe configuration.

#### **<u>UL indicator:</u>**

<u>1 indicates that the message include UL subframe configuration.</u>

#### Transceiver mode:

<u>-Ttransceiver mode in the relay zone is one of either Tx mode, Rx mode, or Idle mode. When the transceiver mode is idle mode, it does not transmit nor receive.</u>

#### **OFDMA symbol Offset :**

The relay zone starts at the OFDMA symbol Offset.

#### **Duration:**

-The relay zone ends after the duration starting from the OFDMA symbol offset. The unit of duration is OFDMA symbol.

#### Number of frame :

This field indicates the number of frames in a multi-frame.

#### <u>Start Frame Number</u>

The RS shall start transmitting/receiving the R-amble from this designated frame number

#### **Monitoring\_Duration**

Duration (in units of frames) of the measurement/monitoring/transmission process. If the Monitoring\_Duration value is set to 0x00 and prefix is 0b01 monitoring is to be continued until further notice

#### **Interleaving Interval**

<u>The period (in units of frames) which is interleaved between the consecutive R-amble</u> <u>transmission/reception opportunity</u>

#### **Iteration**

The requested number of iterating intervals

#### <u>N\_Transmitter</u>

Number of stations instructed to transmit R-amble, the station may be RS or MR-BS.

#### N\_Receiver\_RS

Number of RSs instructed to receive R-amble

#### Amble index

<u>R-amble means preamble, midamble or postamble transmitted in relay zone. It will be determined by R-amble location in downlink relay zone.</u>

#### Synchronization Cycle Length, N

This field is used to indicate the synchronization R-amble period if present

#### Synchronization Frame Offset, Ks

The offset of the second R-amble in the synchronization cycle

#### Neighbor Monitoring Frame Repetition Rate, L

This field is used to indicate the neighbor monitoring R-amble period if present

#### Neighbor Monitoring Frame Offset, Kmn

The offset of the R-amble in the neighbor monitoring cycle

#### Neighbor Monitoring Cycle Length, M

This defines the number of neighbor monitoring R-amble frames in an R-amble monitoring cycle

## 3.4 Remove Subcaluses 6.3.2.3.69 and 6.3.2.3.70.

[Note to editor: Subclause 6.3.2.3.69 has been is merged to 6.3.2.3.67, and Subclause 6.3.2.3.70 has been is merged to 6.3.2.3.66].

## <u>3.5 Change Subclause 6.3.2.3 (MAC management messages) as</u> <u>follows:</u>

[Note to Editor: There are proposals to take this section out of this contribution and submit a new contribution, which is TBD. The message *numbernumbering in the left column of the following table is* to be incorporated as per the editor's discretion. The Section numbers of the Sections 6.3.2.3.XX<u>in the</u> baseline document C802.16j-078-026r3 should be changed according to the message numbers in this table]

67	RS-CDC	Cooperative diversity configuration for RS message	Basic { Notes to Editor: Currently this is in the
			Section 6.3.2.3.62 of
			<u>C802.16j-078-026r3 which</u>
			needs to be changed to
			<u>6.3.2.3.67}</u>
<u>X1</u>	MR-NBR-INFO	MR-NBR-INFO mESSAGE	Basic
<u>X2</u>	MR_Code_REP	MR Code Report message	Basic
<u>X3</u>	<u>RS_Config_REQ</u>	RS configuration request message	Basic
<u>X4</u>	RS_Config_RCM	RS Configuration recommendation	Basic
		message	
<u>X5</u>	<u>RS_CD</u>	Relay Configuration Description	Basic
		(RS CD) message	
X <u>6</u> *	CID ALLOC-IND	CID allocation message	Basic
(X6+1) 68-255		Reserved	

## 6.3.2.3 MAC Management Messages

++++End text++++++