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Re:	This is in response to the call for comments
Abstract	Clarification on CID allocation message
Purpose	Review and adopt
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Clarifications on CID Allocation message

Introduction

In the embedded path management scheme, CID_ALLOC-IND is used to notify RS of the systematic allocation of CID. However, no acknowledgement mechanism is currently specified and the MR-BS does not know whether the RS has correctly received the message. This contribution specifies the response mechanism for the CID allocation message.

Specification changes – Remedy 1

[Change the following rows in Table 38 in section 6.3.2.3 as follows]

Table 38 – MAC Management messages

Type	Message name	Message description	connection
70	CID_ALLOC-~~IND~~REQ	CID allocation request message	Basic
XX	CID_ALLOC-RSP	CID allocation response message	Basic

[Change subclause 6.3.2.3.65 as follows]

6.3.2.3.65 RS CID Allocation ~~Indication~~ Request (CID_ALLOC-~~IND~~REQ) message

The CID_ALLOC-~~IND~~REQ message may be transmitted by the MR-BS to the RS during network entry/re-entry processes. When the network topology is changed or CID (re-)allocation is required, the MR-BS may also transmit this message to related RSs to update CIDs. Upon receiving CID_ALLOC-~~IND~~REQ, the RS shall (re-) configure CID allocation accordingly. The message format is shown in Table ~~XX~~ 183d.

Table 183d CID_ALLOC-~~IND~~REQ message format

Syntax	Size	Note
CID_ALLOC--~~IND~~REQ _Message_Format() {		
Management Message Type (70)	8 bits	
Transaction ID	16 bits	
CID_Alloc_method	3 bits	0 : contiguous method 1 : bit partition method 2-7 : reserved
CID_type	3 bits	0: basic CID 1: primary CID 2: T-CID 3: MT-CID 4-7: reserved
If (CID_Alloc_method = =0) {		
Start number of CID	16 bits	Starting point of the CID number
End number of CID	16 bits	End point of the CID number
}		

If (CID_Alloc_method = =1) {		
New CID for the RS	16 bits	
Hop count	8 bits	The new hop count of the RS to the MR-BS
K_Code	8 bits	The new maximum number of subordinate RSs that a RS could have
}		
}		

The following parameter shall be included in the message:
    Transaction ID
        Unique identifier set by the sender for identifying this transaction.
The CID_ALLOC-~~IND~~REQ shall contain the following TLVs:
HMAC/CMAC Tuple (see 11.1.2)
The HMAC/CMAC Tuple attribute contains a keyed message digest (to authenticate the sender).
The HMAC Tuple attribute shall be the final attribute in the CID_ALLOC-~~IND~~REQ message ís attribute list.

[Insert the following subclause into section 6.3.2.3]

6.3.2.3.xx RS CID Allocation Response (CID_ALLOC-RSP) message

After successfully receiving the CID_ALLOC-REQ message sent on RS' basic CID, the RS shall transmit the CID_ALLOC-RSP message on its basic CID to the MR-BS to acknowledge that it received information about the CID allocation.

Table XX CID_ALLOC-RSP message format

Syntax	Size	Note
CID_ALLOC-RSP_Message_Format() {		
Management Message Type (TBD)	8 bits	
Transaction ID	16 bits	
}		

The following parameter shall be included in the message:
    Transaction ID
        Transaction ID from the corresponding CID_ALLOC-REQ message.

The CID_ALLOC-RSP shall contain the following TLVs:
HMAC/CMAC Tuple (see 11.1.2)
The HMAC/CMAC Tuple attribute contains a keyed message digest (to authenticate the sender).
The HMAC Tuple attribute shall be the final attribute in the CID_ALLOC-RSP message.

[Change the first paragraph in subclause 6.3.9.16.4.1 as follows]

6.3.9.16.4.1 CID pre-allocation to localized RS
The MR-BS may allocate a part of management CID range systematically or non-systematically to its subordinate RS by using CID_Alloc-~~IND~~REQ messages. Systematic range assignment means each superordinate RS has a range as the superset of the union of CIDs of all its subordinate RSs. Systematical CID

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allocation could embed network topology into CIDs to help RSs to find routing paths without storing all CIDs of subordinate RSs in the routing table.

[Change the first paragraph in subclause 6.3.9.16.4.2 as follows]

6.3.9.16.4.2 MS network entry procedure for localized non-transparent RS
This MS network entry process is almost same as described in 6.3.9.16.2.1, except that RS is assigned range of management CIDs by its super-ordinate node in advance. This section states that the RS assigns the management CIDs to its subordinate nodes (MS or RS) during initial ranging process. RS may pre-allocate CID range to subordinate RS using CID_Alloc-~~IND~~REQ messages on behalf of the MR-BS.

[Change the first paragraph in section 6.3.25.1 as follows]

6.3.25.1 Embedded Path Management for Relay
When the systematic CID allocation is used, the MR-BS shall update the CID range assigned to its subordinate RSs via the CID_ALLOC- ~~IND~~REQ message. There are two CID assignment methods: contiguous integer blocks as in Figure ~~xxx.1~~157 (a) and bit partition as in Figure ~~xxx.1~~157 (b). In the bit partition assignment, the MRBS sets the lowest k bits in ascending order to RSs for RSs associated to the MR-BS directly where the maximum number of RSs the MR-BS or a RS could serve is 2k. For other level-n RSs, which need n hops to reach the MR-BS, the MR-BS left shifts k bits of its parent CID and sets the lowest k bits according to the arriving sequence of the RS.

Specification changes – Remedy 2

[Change the following rows in Table 38 in section 6.3.2.3 as follows]

Table 38 – MAC Management messages

Type	Message name	Message description	connection
70	CID_ALLOC-~~IND~~REQ	CID allocation request message	Basic

[Change subclause 6.3.2.3.65 as follows]

6.3.2.3.65 RS CID Allocation ~~Indication~~ Request (CID_ALLOC-~~IND~~REQ) message

The CID_ALLOC-~~IND~~REQ message may be transmitted by the MR-BS to the RS during network entry/re-entry processes. When the network topology is changed or CID (re-)allocation is required, the MR-BS may also transmit this message to related RSs to update CIDs. Upon receiving CID_ALLOC-~~IND~~REQ, the RS shall (re-

) configure CID allocation accordingly and use the generic ACK message as defined in 6.3.2.3.xx to acknowledge that it received information about the CID allocation. The message format is shown in Table ~~XX~~ 183d.

Table 183d CID_ALLOC-~~IND~~REQ message format

Syntax	Size	Note
CID_ALLOC-~~IND~~REQ _Message_Format() {		
Management Message Type (70)	8 bits	
Transaction ID	16 bits	
CID_Alloc_method	3 bits	0 : contiguous method 1 : bit partition method 2-7 : reserved
CID_type	3 bits	0: basic CID 1: primary CID 2: T-CID 3: MT-CID 4-7: reserved
If (CID_Alloc_method = =0) {		
Start number of CID	16 bits	Starting point of the CID number
End number of CID	16 bits	End point of the CID number
}		
If (CID_Alloc_method = =1) {		
New CID for the RS	16 bits	
Hop count	8 bits	The new hop count of the RS to the MR-BS
K_Code	8 bits	The new maximum number of subordinate RSs that a RS could have
}		
}		

The following parameter shall be included in the message:
Transaction ID
Unique identifier set by the sender for identifying this transaction.
The CID_ALLOC-~~IND~~REQ shall contain the following TLVs:
HMAC/CMAC Tuple (see 11.1.2)
The HMAC/CMAC Tuple attribute contains a keyed message digest (to authenticate the sender).
The HMAC Tuple attribute shall be the final attribute in the CID_ALLOC-~~IND~~REQ message ís attribute list.

[Change the first paragraph in subclause 6.3.9.16.4.1 as follows]

6.3.9.16.4.1 CID pre-allocation to localized RS
The MR-BS may allocate a part of management CID range systematically or non-systematically to its subordinate RS by using CID_Alloc-~~IND~~REQ messages. Systematic range assignment means each superordinate RS has a range as the superset of the union of CIDs of all its subordinate RSs. Systematical CID

allocation could embed network topology into CIDs to help RSs to find routing paths without storing all CIDs of subordinate RSs in the routing table.

[Change the first paragraph in subclause 6.3.9.16.4.2 as follows]

6.3.9.16.4.2 MS network entry procedure for localized non-transparent RS

This MS network entry process is almost same as described in 6.3.9.16.2.1, except that RS is assigned range of management CIDs by its super-ordinate node in advance. This section states that the RS assigns the management CIDs to its subordinate nodes (MS or RS) during initial ranging process. RS may pre-allocate CID range to subordinate RS using CID_Alloc-INDREQ messages on behalf of the MR-BS.

[Change the first paragraph in section 6.3.25.1 as follows]

6.3.25.1 Embedded Path Management for Relay

When the systematic CID allocation is used, the MR-BS shall update the CID range assigned to its subordinate RSs via the CID_ALLOC- INDREQ message. There are two CID assignment methods: contiguous integer blocks as in Figure xxx.1157 (a) and bit partition as in Figure xxx.1157 (b). In the bit partition assignment, the MRBS sets the lowest k bits in ascending order to RSs for RSs associated to the MR-BS directly where the maximum number of RSs the MR-BS or a RS could serve is 2k. For other level-n RSs, which need n hops to reach the MR-BS, the MR-BS left shifts k bits of its parent CID and sets the lowest k bits according to the arriving sequence of the RS.