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Title	**Enhanced CID update in Registration**
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Re:	New TLV format and comparison of the TLV size has been added to adopt reply comments
Abstract	**Enhanced CID update in Registration**
Purpose	Adoption of proposed changes into P802.16e /D3-2004
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[Following blue text is added and red text is deleted from C80216e-04_202]

1 Introduction

In the current specification, CID_update encodings are sent in REG-REQ/RSP management message, to deliver the mapping information of the old CID from the old BS and the new CID from the new BS. However, when there are several numbers of connections are in service, the Value field of the CID_Update encoding comes to be large enough.

The contribution suggests an optional TLV to replace the Old_CID TLVs in the CID_Update encoding, to reduce the resource consumption by the CID_Update. The old CID information, unlike the new CID, can be abstracted into a bitmap instead of expressing its whole value, for it is already known to a SS by the old BS in the previous cell.

In the proposed encoding, the old CID information shall be sorted in the increasing order(or by some other previously-defined rule) before mapped onto the bit positions of Old_CID_BITMAP ~~TLV~~ (precisely, the value field of Old_CID_BITMAP). Then the old CID with the smallest number shall be mapped to LSB of Old_CID_BITMAP ~~TLV~~, and the one with the next smallest number shall be mapped to the next LSB. This procedure continues until all of the old CIDs are mapped to the bit positions of Old_CID_BITMAP ~~TLV~~. In the process, when the old CID is successfully assigned a new CID to update it, the corresponding bit position shall be set to '1', and otherwise, the corresponding bit position shall be set to '0'.

Finally, when the New_CID ~~TLVs~~ are inserted in the 'Value' field of Compressed CID_Update encoding, they shall be inserted in the same order as the old CIDs are mapped onto the bitmap.

2 Comparison of the CID update messages

2.1 Assumption

The MSS has 6 CIDs (13, 25, 26, 34, 36, 40) in the BS A and handed over to the BS B. To support all connections for the MSS, B should assigns 6 new CIDs for the MSS. However, CID 34, one of the connections, can not be supported in BS B. Hence, BS B assigns only 5 CIDs (23, 45, 12, 27, 17) respectively and notifies the updated CIDs to the MSS.

Old CID	→ New CID
13	→ 23
25	→ 45
26	→ 12
34	→ N/A
36	→ 27
40	→ 17

2.2 Size of the Current CID update TLV

Old TLV scheme requires 10 Bytes per a CID update.

TLV message			size	Note
T	L	V		
16.	8		2	CID update
1	2	13	4	Old CID
2	2	23	4	New CID
16.	8		2	CID update
1	2	25	4	Old CID
2	2	45	4	New CID
16.	8		2	CID update
1	2	26	4	Old CID
2	2	12	4	New CID
16.	8		2	CID update
1	2	36	4	Old CID
2	2	27	4	New CID
16.	8		2	CID update
1	2	40	4	Old CID
2	2	17	4	New CID

Total size in bytes = 50 Bytes

2.3 Size of the Modified CID update TLV

In the case of adopting Vladimir's comment

Modified TLV scheme requires 8 Bytes per a CID update.

TLV message			size	Note
T	L	V		
16.	8		2	CID update
1	4	13	4	Old CID
		23	2	New CID
16.	8		2	CID update
1	4	25	4	Old CID
		45	2	New CID
16.	8		2	CID update
1	4	26	4	Old CID
		12	2	New CID
16.	8		2	CID update
1	4	36	4	Old CID
		27	2	New CID
16.	8		2	CID update

1	4	40	4	Old CID
		17	2	New CID

Total size in bytes = 40 Bytes

2.4 Size of the New Compressed CID update TLV

This TLV updates the old CID to new CID in compressed form only when all parameters of the new CID are equal to the old parameters.

Total Bytes = 3+ ceiling (nCID/8) + 2 x nCID Bytes
(nCID is the number of CIDs to be updated)

TLV message			size	Note
T	L	V		
20	12		2	Compressed CID update
		1	1	Bitmap Length
		0b11101100	1	Bitmap
		23	2	New CID
		45	2	New CID
		12	2	New CID
		27	2	New CID
		17	2	New CID

Total size in bytes = 12 Bytes

The length of the bitmap is determined by the number of Old CID to be updated.

Byte Length of BITMAP = Ceiling (the number of Old CID /8)

Bitmap is set to 0b11101100 because old CID 34 couldn't be updated with same parameters. The CID that could be updated with different parameters should be updated by old TLV format.

Old CID (increasing order)	→	New CID	Bitmap
13	→	23	1
25	→	45	1
26	→	12	1
34	→	N/A	0
36	→	27	1
40	→	17	1
			0
			0

3 Text Change

[Add the text in Section 11.7 as follows]

11.7.8.1 Compressed CID update encodings

This field provides a translation table that allows an MSS to update its connection ID. Only CIDs that has no parameter change can be translated by this TLV.

Name	Type	Length	Value
Compressed CID update	20	variable	The first one byte indicates the length of the following BITMAP in bytes. The n-th MSB of the BITMAP set to 1 when the n-th old CID is successfully updated to new one. Where, the old CIDs are sorted with increasing order. After the BITMAP, a list of new CID follows. The number of new CID is equal to the number of '1' in the BITMAP.

[Modify the text in Section 11.7.8 as follows]

11.7.8 CID update encodings

This field provides a translation table that allows an MSS to update its service flow and connection information so that it may continue service after a hand-over to a new serving BS.

Name	Type	Length	Value
CID_Update	16	variable	Compound

The New_CID TLV values shall appear in each CID_update TLV. And either the Old_CID TLV values or the Old_CID_BITMAP TLV value shall appear in each CID_update TLV

Name	Type	Length	Value
New-Old_CID pair	16.1	2	First 2Bytes indicates new CID after hand-over to new BS and the second 2 bytes indicates old CID before hand-over from old BS
~~New_CID~~	~~16.1~~	~~2~~	~~New CID after hand-over to new BS~~
~~Old_CID~~	~~16.2~~	~~2~~	~~Old CID before hand-over from old BS~~

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[Following section is deleted from C80216e-02_202]

~~Name~~	~~Type~~	~~Length~~	~~Value~~
~~New_CID~~	~~16.1~~	~~2~~	~~New CID after hand-over to new BS~~
~~Old_CID~~	~~16.2~~	~~2~~	~~Old CID before hand-over from old BS~~
~~Old_CID_BITMAP~~	~~16.3~~	~~variable~~	~~Bitmap for old CIDs before hand-over from old BS. The LSB of the value corresponds to the old CID that is the smallest number~~

			among all of the old CIDs. And, the next LSB corresponds to the next smallest old CID. This process continues until all of the old CIDs are mapped to an appropriate bit of this value field. Bit positions shall be set to '1' when the new CIDs to update their corresponding old CIDs are successfully assigned by the new BS. Otherwise, Bit positions shall be set to '0'.

The following TLV element may appear in a CID_update TLV.

Name	Type	Length	Value
Connection Info	16.34	variable	If any of the service flow parameters change, then those service flow parameter encoding TLVs that have changed will be added. Connection_Info is a compound TLV value that encapsulates the Service Flow parameters that have changed for the service. All the rules and settings that apply to the parameters when used in the DSC-RSP message apply to the contents encapsulated in this TLV.