Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Clause Editor remedy of inappropriate instances of MS & SS – MAC Section**
Date Submitted	**2004-6-25**
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Re:	Response to Chair designation of Clause Editor to remedy inappropriate instances of MS & SS – MAC Section in IEEE 802.16e/D7
Abstract	Clause Editor remedy of inappropriate instances of MS & SS – MAC Section
Purpose	Provide remedy to inappropriate instances of MS & SS in IEEE 802.16e/D7
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Clause Editor remedy of inappropriate instances of MS & SS – MAC Section

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Problem:
The current D7 draft, despite the extremely able efforts of our under-recognized Chief Technical Editor, Ron Murias, suffers from a few instances of inappropriate usage of SS and MS in the document. In some cases, SS has been changed to MS in ways that would break backwards compatibility. In other cases, MS has been inadvisable proscribed when the feature or function could equally apply to SS without affecting backwards compatibility. And in some cases, specification has been created without restricting/requisite reference to MS, that would break backwards compatibility for SS.

Remedy:
Isolate those instances of improper usage and remedy them.

Following sections specify text changes to the D7 draft:

Remedy 1:
[In 6.3.2.2.2 Grant Management subheader, page 30, line 63]:
Problem: The instance of 'SS' in the first line is suspect. Unless also reflected in the D2 Corrigenda draft (which it is not), use of 'SS' in this instance would break backwards compatibility with an 802.16-2004 compliant SS in any number of ways: original 802.16-2004 compliant SS would 1) encode the message using the previous, 2 byte length and format specified in the 802.16-2004 standard, 2) would absolutely fail to properly encode the new message with its changed three byte length message and radically altered format including new conditional loop and new message information elements. Usage of 'SS' in this instance would create a retroactive requirement that is unsupportable. Clearly this feature was intended as an enhancement for MS, but was inappropriately, retroactively applied.

Remedy: Either
1) create another section identifying the correct mechanics and attributing usage to be 'MS', not 'SS', including allocation of a new Grant Management subheader type specifically for MS [*recommended*];
      or
2) make appropriate revision through the Corrigenda, though this may certainly be considered out of scope as an enhancement to increase functionality in grant management subheader usage.

Remedy 2:
[In 6.3.2.3 MAC Management messages, page 39, line 1]:
Problem: The PKM sentence added after Table 14 could unintentionally allow a 16e compliant BS to send a PKM-RSP on a Broadcast CID, for which the stateful, 802.16-2004 compliant SS would not be expecting and would ignore. At least, it does not appropriately prohibit the error, though a properly designed BS should be able to make the distinction between target SS and MS and restrict transmission to the appropriate connection ID type. But a minor change in the sentence eliminates any ambiguity in the inadequate specification.

Also a problem with incorrect change of SS to MS for existing text on page 44, line 51 in the 16e/D7 document; page 54, paragraph immediately preceding Table 25 of 802.16-2004. Change to MS from SS would remove necessary specification in the 802.16-2004 document. This MUST be fixed.

And again, the same problem on page 45, line 4 in the 16e/D7 document; page 55, paragraph 4 under PKM Identifier in 802.16-2004. Change to MS from SS would remove necessary specification in the 802.16-2004 document. This MUST be fixed.

Remedy:
1) *In 6.3.2.3 MAC Management messages, page 39, line 1, modify as:*
In general, the PKM-RSP message is carried on the Primary Management connection. However, in order to send the PKM-RSP message in key push mode to MS for the-multicast service or the-broadcast service, it may be carried on the Broadcast connection.

In 6.3.2.3.9 Privacy key management (PKM) messages (PKM-REQ/PKM-RSP), page 44, line 51, modify as:
PKM protocol messages transmitted from the BS to the MS SS shall use the form shown in Table 25. They are transmitted on the SSs Primary Management Connection. When the BS sends PKM-RSP message in key push mode to MS for the-multicast service or the-broadcast service, it may be carried on the Broadcast connection.

In 6.3.2.3.9 Privacy key management (PKM) messages (PKM-REQ/PKM-RSP), page 45, line 4, modify as:
On reception of a PKM-RSP message, the MS SS associates the message with a particular state machine (the Authorization state machine in the case of Authorization Replies, Authorization Rejects, and Authorization Invalids; a particular TEK state machine in the case of Key Replies, Key Rejects, and TEK Invalids TEK Invalids, Key Update Commands).

Remedy 3:
[In 6.3.2.3.5 Ranging Request (RNG_REQ) message, page 39, line 31]:
Problem: Striking of the first line seems to break backwards compatibility as it removes 'SS' specification of which CID to present in the MAC header during any initial ranging prior to assignment of Basic CID. An 802.16-2004 compliant SS would intend to use the proscribed initial ranging CID, while this amendment would retroactively remove that specification. No such clarification was found in the D2 Corrigenda.

Remedy:
1) The simplest remedy would be to leave the current a), b), c) options of the 802.16-2004 specification alone, inserting the choice for MS;
In 6.3.2.3.5 Ranging Request (RNG_REQ) message, page 39, line 31,modify the section as:
    a) Initial ranging CID if SS is attempting to join the network.
    b) Initial ranging CID if the SS has not yet registered and is changing downlink (or both downlink and uplink) channels.
    c) Initial ranging CID if the MS has not yet registered
    ed) In all other cases, tThe Basic CID is used as soon as one is assigned in the RNG-RSP message.

2) It is entirely possible that any change here is unnecessary since an MS is always also an SS and would be governed under the specification in the section, which would seem to achieve the same thing [*recommended*]. *Delete page 39, lines 26-36.*

Remedy 4:

[In 6.3.2.3.5 Ranging Request (RNG_REQ) message, page 39, line 47]:
Problem: A problem with incorrect change of SS to MS for existing text on page 39, line 47 in the 16e/D7 document; page 49, sixth paragraph in the section of 802.16-2004. Change to MS from SS would remove necessary specification in the 802.16-2004 document. This MUST be fixed..

Remedy:

1) *Delete page 39, lines 47-52*

Remedy 5:

[In 6.3.2.3.9.5 Key Request message and 6.3.2.3.9.6 Key Reply message, page 46, Tables 31 & 33]:
Problem: AKID was intended to replace Key-Sequence-Number in the tables. Instead, editorial instructions show removal of Key-Sequence-Number and addition of AKID as if it were a completely new item. This would seem to remove necessary specification for 802.16-2004 compliant SS. Simple remedy is to fix the editorial instruction to make it clear that AKID is essentially a renaming of the field as far as SS are concerned, which fixes backwards compatibility issue.

Remedy:

1) *In 6.3.2.3.9.5 Key Request message and 6.3.2.3.9.6 Key Reply message, page 46, Tables 31 & 33, replace Tables as:*

Table 31—Key Request attributes

Attribute	Contents
AKID~~Key-Sequence-Number~~	This identifies the AK to the BS that was used for protecting this message.~~AK sequence number.~~
NonceMS	A number chosen by the MS (once per protocol run). It can be counter or a random number.
SAID	Security association identifier.
HMAC-Digest	Keyed SHA message digest.

Table 33—Key Reply attributes

Attribute	Contents
AKID~~Key-Sequence-Number~~	This identifies the AK to the BS that was used for protecting this message.~~AK sequence number.~~
NonceMS	A number chosen by the MS (once per protocol run). It can be counter or a random number.
SAID	Security association identifier.
TEK-Parameters	"Older" generation of key parameters relevant to SAID.
TEK-Parameters	"Newer" generation of key parameters relevant to SAID.
HMAC-Digest	Keyed SHA message digest.

Remedy 6:

[In 6.3.2.3.26 De/Re-register command (DREG-CMD) message, page 52, Table 55—Action codes and actions]:

Problem: Again, inappropriate SS to MS changes from the 802.16-2004 documents that would remove necessary specification for 802.16-2004 compliant SS. Simple remedy is to change the MS back to SS where appropriate in the Table. This MUST be fixed.

Also, in Actiond Code 2 actions, correcting improper Action Code response to resume Normal Operation specified. Says '0x00' but should be '02 or 03'.

Remedy:

1) *In 6.3.2.3.26 De/Re-register command (DREG-CMD) message, page 52, Table 55—Action codes and actions, replace Table as:*

Table 55—Action codes and actions

Action Code (hexadecimal)	Action
00	SS shall ~~leave the current channel and attempt to access another channel~~immediately terminate service with the BS and should attempt network entry at another BS
01	SS shall listen to the current ~~channel~~BS but shall not transmit until an RES-CMD message or DREG_CMD with Action Code ~~that allows transmission~~02 or 03 is received.
02	SS shall listen to the current ~~channel~~BS but only transmit on the Basic, Primary Management, and Secondary Management Connections.
03	SS shall return to normal operation and may transmit on any of its active connections.
04	SS shall terminate current Normal Operations with the BS; the BS shall transmit this action code only in response to any SS DREG-REQ message.
05	MS shall immediately begin de-registration from serving BS and request initiation of MS Idle Mode
06	The MS may retransmit the DREG-REQ message after the time duration (REQ-duration) provided in the message
07	The MS shall not retransmit the DREG-REQ message and shall wait the DREG-CMD message
~~0x05~~08-FF	*Reserved*

Remedy 7:

[In 6.3.2.3.42 MS De-registration Request (DREG-REQ) message, page 54, Table 87—DREG-REQ message format]:

Problem: Again, inappropriate SS to MS changes from the 802.16-2004 documents that would remove necessary specification for 802.16-2004 compliant SS. Simple remedy is to change the MS back to SS where appropriate in the Table. Also problems with IE definitions paragraph following the table. This MUST be fixed.

Remedy:

1) *In 6.3.2.3.42 MS De-registration Request (DREG-REQ) message, page 54, Table 87—DREG-REQ message format, replace Table as:*

Table 87—DREG-REQ message format

Syntax	Size (bits)	Notes
DREG-REQ message format() {		
Management Message Type =49	8	
De-Registration_Request_Code	8	0x00 = SS De-Registration request from BS 0x01=request for MS De-Registration from serving BS and initiation of MS Idle Mode 0x02 = Response for the Unsolicited MS De-Registration initiated by the BS. 0x0~~1~~3-0xFF = Reserved
TLV Encoded Parameters	*variable*	
}		

In 6.3.2.3.42 MS De-registration Request (DREG-REQ) message, page 54, lines 49-57, replace as:
An MSS shall generate MSS DREG-REQs including the following parameters:

De-Registration_Request_Code
Request code identifying the type of ~~d~~De-~~r~~Registration request:
0x00 = SS ~~d~~De-~~r~~Registration request for de-registration from BS and network
0x01 = MS request for de-registration from serving BS and initiation of Idle Mode
0x02 = MS response for an Unsolicited De-Registration initiated by BS
0x0~~1~~3-0xFF = reserved

Remedy 8:
[In 6.3.2.3.43.3 Reduced CID, page 55, line 47]:
Problem: Changes to all of 6.6.3.2.3.43.3 are certainly more properly Corrigenda items. The changes, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. The answer is certainly to process these as Corrigenda items; not as 16e amendments.

Remedy:
1) *In 6.3.2.3.43.3 Reduced CID, page 55, Delete lines 47 to 62 and remand the specified lines to Corrigenda.*

Remedy 9:
[In 6.3.2.3.43.3 Reduced CID, page 55, line 65]:
Problem: Changes to all of 6.6.3.2.3.43.3 are certainly more properly Corrigenda items. The changes, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. The answer is certainly to process these as Corrigenda items; not as 16e amendments. The remedy for this one is a bit simpler since the changes already exist in the Corrigenda D2 document.

Remedy:
1) *In 6.3.2.3.43.3 Reduced CID, Delete page 55, lines 65 to page 56, line 5.*

Remedy 10:
[In 6.3.2.3.43.4 H-ARQ control IE, page 56, line 7]:
Problem: Changes to all of 6.6.3.2.3.43.4 are certainly more properly Corrigenda items. The changes, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. The answer is certainly to process these as Corrigenda items; not as 16e amendments.

Remedy:
1) *In 6.3.2.3.43. 4 H-ARQ control IE, page 56, Delete lines 7 to 62 and remand the specified lines to Corrigenda.*

Remedy 11:
[In 6.3.2.3.43.5 CQICH Control IE, page 57, line 1]:
Problem: Changes to all of 6.6.3.2.3.43.5 are certainly more properly Corrigenda items. The changes, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. The answer is certainly to process these as Corrigenda items; not as 16e amendments.

Remedy:
1) *In 6.3.2.3.43.5 CQICH Control IE, Delete page 57, lines 1 to page 58, line 24 and remand the specified lines to Corrigenda.*

Remedy 12:
[In 6.3.2.3.43.6.1Compact_DL-MAP IE for normal subchannel, page 58, line 27; 6.3.2.3.43.6.2 Compact_DL-MAP IE for Band AMC Subchannel, page 60, line 1; 6.3.2.3.43.6.3 Compact_DL-MAP IE for safety subchannel, page 62, line 1]:
Problem: Changes to all of 6.6.3.2.3.43.3 are certainly more properly Corrigenda items. The changes, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. The answer is certainly to process these as Corrigenda items; not as 16e amendments. Note that some of these changes duplicate, or supersede changes to the Corrigenda D2.

Remedy:
1) *Delete page 58, line 27 to page 63, line 30 and remand the specified lines to Corrigenda.*

Remedy 13:
[In 6.3.2.3.43.6.5 Compact DL-MAP IE for HARQ ACK BITMAP, page 63, line 32; 6.3.2.3.43.6.6 Compact DL-MAP IE for extension, page 63, line 43; 6.3.2.3.43.6.7 MIMO Compact_DL-MAP IE format, page 64, line 1]:

Problem: These changes are a bit more interesting. They relate to the new feature added in 6.3.2.3.43.6.7, so not really Corrigenda related, but, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. Remedy would normally be to provide guiding language specifying that the changes refer to the new feature presented in 6.3.2.3.43.6.7, with appropriate notation in 6.3.2.3.43.6.7 that the new feature is optional, thus obviating the problem. SS not supporting the new, optional feature would simply ignore the new map types, and it would remove implied retroactive specification. Of course should the Corrigenda and 16e be merged, the issue is moot.

Remedy:

1) *In 6.3.2.3.43.6.7 MIMO Compact_DL-MAP IE format, page 64, line 42, add new paragraph as:*
BS shall not configure and transmit MIMO Compact DL-MAP IE or SDMA Compact DL-MAP IE such that SS currently attached to the BS but not supporting this feature would fail to properly read the message and thereby fail to perform.

Remedy 14:

[In 6.3.2.3.43.6.8 HARQ Compact_DL-MAP IE format for Switch HARQ Mode, page 70, line 8]:
Problem: A bit more of the same problem as in above. They relate to the new feature added in 6.3.2.3.43.6.8, so not really Corrigenda related, but, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. Remedy would normally be to provide guiding language specifying that the changes refer to the new feature presented in 6.3.2.3.43.6.8, with appropriate notation in 6.3.2.3.43.6.8 that the new feature is optional, thus obviating the problem. SS not supporting the new, optional feature would simply ignore the new map types, and it would remove implied retroactive specification. Of course should the Corrigenda and 16e be merged, the issue is moot.

Remedy:

1) *In 6.3.2.3.43.6.8 HARQ Compact_DL-MAP IE format for Switch HARQ Mode, page 70, line 14, add new paragraph as:*
BS shall not configure and transmit HARQ Compact_DL-MAP IE such that SS currently attached to the BS but not supporting this feature would fail to properly read the message and thereby fail to perform.

Remedy 15:

[In 6.3.2.3.43.6.9 HARQ Compact MBS MAP IE, page 71, line 1]:
Problem: A bit more of the same problem as in above. They relate to the new feature added in 6.3.2.3.43.6.9, so not really Corrigenda related, but, as they stand to be implemented through this 16e amendment, would make retroactive changes to 802.16-2004 compliant SS without any appropriate mechanism to distinguish SS supporting only the 802.16-2004 original iteration and SS supporting the 802.16-2004 PLUS the amended, non-MS centric, changes of 16e. This is a real problem. Remedy would normally be to provide guiding language specifying that the changes refer to the new feature presented in 6.3.2.3.43.6.9, with appropriate notation in 6.3.2.3.43.6.9 that the new feature is optional, thus obviating the problem. SS not supporting the new, optional feature would simply ignore the new map types, and it would remove implied retroactive specification. Of course should the Corrigenda and 16e be merged, the issue is moot.

Remedy:

1) *In 6.3.2.3.43.6.9 HARQ Compact MBS MAP IE, page 71, line 4, add new paragraph as:*
BS shall not configure and transmit HARQ Compact MBS MAP IE such that SS currently attached to the BS but not supporting this feature would fail to properly read the message and thereby fail to perform.

Remedy 16:
[In 6.3.2.3.43.7.6 Compact UL-MAP IE for CQICH Region Allocation, page 77, line 4]:
Problem: Again, inappropriate SS to MS changes from the 802.16-2004 documents that would remove necessary specification for 802.16-2004 compliant SS. Simple remedy is to change the MS back to SS where appropriate in the text. This MUST be fixed. Note that the second paragraph is fine and needs no correction.

Remedy:
1) *Delete page 77, lines 6-7.*

Remedy 17:
[In 6.3.9.10 Establish IP connectivity, page 133, line 19]:
Problem: Looks like this instance got changed in the 'global SS-to-MS change' that happened some time ago. Inappropriate SS to MS change. Simple remedy is to change the MS back to SS where appropriate in the text. This MUST be fixed. Also, since this is replacing an important specification paragraph in 802.16-2004, adjustment must be made to include SS in the revised language.

Remedy:
1) *In 6.3.9.10 Establish IP connectivity, page 133, line 27, modify as:*
Otherwise, for ~~fixed MS~~all SS and for MS~~s~~ using IPv4 and not using mobile IP, they ~~MS~~ shall invoke DHCP mechanisms [IETF RFC 2131] in order to obtain an IP address and any other parameters needed to establish IP connectivity. If the SS or MS has a configuration file, the DHCP response shall contain the name of a file which contains further configuration parameters. For SS or MS using IPv6, they ~~MS~~ shall either invoke DHCPv6 [IETF RFC 3315] or IPv6 Stateless Address Autoconfiguration [IETF RFC 2462] based on the value of a TLV tuple in REG_RSP. Establishment of IP connectivity shall be performed on the SS's or MS's Secondary Management Connection (see Table 110).

Remedy 18:
[In 6.3.13 Multicast and broadcast services (MBS), page 134, line 1]:
Problem: Changing out the text here to expand the feature to include MBS has resulted in a couple of troubling consequences: 1) the language is now MS specific; reference to support SS has been inappropriately removed, and 2) it conflicts with changes made to this section in Corrigenda D2. This MUST be fixed. Note that there is a conflict between Table 345 in 16e/D7 and Corrigenda D2.

Remedy:
1) *In 6.3.13 Multicast and broadcast services (MBS), page 134, line 22, replace as:*
6.3.13 Multicast and broadcast services (MBS)
Some globally defined service flows may carry broadcast or multicast information that should be delivered to a plurality of SS or MS. Such service flows have certain QoS parameters and may require encryption performed using a globally defined sequence of TEKs. Since a multicast or broadcast transport connection is associated with a service flow, it is associated with the QoS and traffic parameters for that service flow. Some MS are registered to certain BS while some are in Idle mode and not currently served by any specific BS.

Two types of access to multicast and broadcast services (MBS) may be supported: single-BS access and multi-BS access. Single-BS access is implemented over multicast and broadcast transport connections within one BS, while multi-BS access is implemented by transmitting data from Service Flow(s) over multiple BS. Single-BS access is optional for SS. Multi-BS access is optional for MS. ARQ is not applicable to either single-BS-MBS or multi-BS-MBS. Initiation of MBS with respect to specific SS is always performed in registered state by creation of multicast connection carrying MBS data. During such initiation the SS learns the Service Flow ID that identifies the service. For multi-BS-MBS, each BS capable of providing MBS belongs to a certain MBS Zone, which is a set of BSs where the same CID and same SA is used for transmitting content of certain Service Flow(s). MBS Zone is identified by a unique MBS_ZONE identifier.

In 6.3.13.1 Single-BS Access, page 134, line 44, replace as:
The BS may provide to SS single-BS access by creating a multicast traffic connection with each SS to be associated with the service, or a broadcast transport connection. Any available traffic CID value may be used for the single-BS-MBS service. The CID used for the service is the same for all SS on the same channel that participate in the connection. The data transmitted on the connection with the given CID shall be received and processed by the MAC of each involved SS. Thus each multicast MAC SDU is transmitted only once per BS channel.

If a downlink multicast connection is to be encrypted, each SS participating in the connection shall have an additional security association (SA), allowing that connection to be encrypted using certain keys that are independent of those used for other encrypted transmissions between the SS and BS.

Remedy 19:
[In 6.3.17 MAC support for H-ARQ, page 139, line 41]:
Problem: Changing out the text here to expand the feature to include MBS has resulted in a couple of troubling consequences: 1) the language is now MS specific in places; 2) reference to support 802.16-2004 SS has been inappropriately obscured. This MUST be fixed. Note that there is also an internal inconsistency between page 1, line 44 '…HARQ…is…enabled on a per-terminal basis….' versus page 140, line 16 'HARQ is enabled on a CID basis….'

Remedy:
1) *In 6.3.17 MAC support for H-ARQ, page 140, line 30 through 42, modify as:*
Two main variants of HARQ are supported, Chase Combining or Incremental Redundancy (IR). SS shall support the optional IR variant. MS shall support the optional Chase Combining variant. For IR, the PHY layer will encode the HARQ packet generating several versions of encoded subpackets. Each subpacket shall be uniquely identified using a subpacket identifier (SPID). For Chase Combining, the PHY layer shall encode the HARQ packet generating only one version of the encoded packet. As a result, no SPID is required for Chase Combining.

For downlink HARQ operation, the BS will send a version of the encoded HARQ packet. The ~~MS~~ SS will attempt to decode the encoded packet on this first HARQ attempt. If the decoding succeeds, the ~~MS~~ SS will send an ACK to the BS. If the decoding fails, the ~~MS~~ SS will send a NAK to the BS. In response, the BS will send another HARQ attempt. The BS may continue to send HARQ attempts until the ~~MS~~ SS successfully decodes the packet and sends an acknowledgement.

In 6.3.17 MAC support for H-ARQ, page 140, line 61 through page 141, line 2, modify as:
The ~~H-ARQ~~HARQ scheme is basically a stop-and-wait protocol. The ACK is sent by the ~~M~~SS after a fixed delay (synchronous ACK) defined by ~~H-ARQ~~HARQ DL ACK delay offset which is specified in

DCD message. Timing of retransmission is, however, flexible and corresponds to the asynchronous part of the ~~H-ARQ~~HARQ. The ACK/NAK is sent by the BS using the ~~H-ARQ~~HARQ Bitmap IE, and sent by a ~~M~~SS using the fast feedback UL subchannel.