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Title	**Enabling HARQ in SBC for PKMv2 messages**	
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Re:	IEEE Std 802.16-2004/Cor2/D2	
Abstract	The document contains suggestions on enabling HARQ in SBC for PKMv2 messages	
Purpose	Adoption of proposed changes into Std. P802.16-2004/Cor2/D2	
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Enabling HARQ in SBC for PKMv2 messages

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Problem definition

PKMv2 messages during NW Entry are sent after the SBC messages and before the REG messages. Consequently, these messages cannot be sent in HARQ.

Certainly, having HARQ at PKM step can improve the quality of communication and therefore prevent from upper layer retransmissions of authentication related messages.

We suggest enabling HARQ for the basic, primary and secondary CIDs during SBC instead of the REG step.

This is a correction to the oversight that occurred when HARQ was revised in the 16e development process to apply HARQ to the Basic, Primary and Secondary management connections, not just transport connections. For transport connections, capability negotiation at REG-REQ/RSP is appropriate and adequate. For Basic, Primary, and Secondary management connections, capability negotiation at SBC-REQ-RSP is appropriate, as the demonstrated benefit to the PKM process at network entry demonstrates.

Suggested remedy:

In P802.16-2004/Cor2/D2, insert section 11.13.32 HARQ Service Flows:

11.13.32 HARQ Service Flows

The ‘HARQ Service Flows’ field specifies whether the connection uses HARQ or not.

The relevance connections of this parameter when appears in ~~REG~~ SBC-REQ/RSP messages are Basic, Primary, and Secondary CIDs. HARQ is enabled independently in the UL and DL directions. For the UL management connections, this TLV is encapsulated in the compound UL service flow TLV Type = 145. For the DL management connections, this TLV is encapsulated in the compound DL service flow TLV Type = 146.

Transport CIDs that have HARQ Connection enabled indication must only be transmitted inside HARQ PHY burst type. Basic, Primary, and secondary CIDs that have HARQ Connection enabled indication can be either transmitted inside HARQ or non-HARQ PHY burst type.

Type	Length	Value	Scope

[145/146].44	1	0 = Non HARQ (default) 1 = HARQ Connection	DSA-REQ, DSA-RSP, ~~REG-REQ, REG-RSP~~ SBC-REQ, SBC-RSP

In P802.16-2004/Cor2/D2, insert section 11.13.35 HARQ Channel mapping:

11.13.35 HARQ Channel mapping

This TLV is valid only in HARQ enabled connection. It specifies a HARQ channel number that may be used to carry data from this connection. This TLV may specify more then one channel per connection. HARQ channels may share more then one connection. An absent of this TLV means all HARQ channels can be used by this connection.

The absence of this TLV in any of the REQ or RSP messages of the connection creation means all HARQ channels can be used by this connection.

The relevance connections of this parameter when appears in ~~REG~~ SBC-REQ/RSP messages are Basic, Primary, and Secondary CIDs. HARQ Channel mapping is enabled independently in the UL and DL directions. For the UL management connections, this TLV is encapsulated in the compound UL service flow TLV Type = 145. For the DL management connections, this TLV is encapsulated in the compound DL service flow TLV Type = 146.

Type	Length	Value	Scope
[145/146].46	*variable*	HARQ channel Index (1 byte each)	DSA-REQ, DSA-RSP, ~~REG-REQ, REG-RSP~~ SBC-REQ, SBC-RSP

In P802.16-2004/Cor2/D2, insert section 11.13.36 PDU SN extended subheader for HARQ reordering:

11.13.36 PDU SN extended subheader for HARQ reordering

This TLV is valid only in HARQ enabled connection. It specifies whether PDU SN extended subheader should be applied by the transmitter on every PDU on this connection. This SN may be used by the receiver to ensure

PDU ordering.

This counter should start at 0 and should be reset after HHO/FBSS operations

The relevance connections of this parameter when appears in ~~REG~~ SBC-REQ/RSP messages are Basic, Primary, and Secondary CIDs (each should have its own PDU numbering). PDU SN's are enabled independently in the UL and DL directions. For the UL management connections, this TLV is encapsulated in the compound UL service flow TLV Type = 145. For the DL management connections, this TLV is encapsulated in the compound DL service flow TLV Type = 146.

Value of 0 in either of the messages means the endpoint does not support the PDU SN number for the specific connection. If both end points support PDU SN for the connection, the larger SN number should be chosen.

Type	**Length**	**Value**	**Scope**
[145/146].42	1	0-No support for PDU SN in this connection (default) 1-PDU SN (short) extended SH 2-PDU SN (long) extended SH 3-256-*Reserved*	DSA-REQ, DSA-RSP, ~~REG-REQ, REG-RSP~~ SBC-REQ, SBC-RSP