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Re:	This document is intended for discussion on PHY comments regarding a requested change in the RS block size of the control channel FEC	
Abstract	See above	
Purpose	See above	
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FEC Parameterization for Control Channel information

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Currently the IEEE 802.16.1 PHY mode B specifies a (40,20) RS code concatenated with (24,16) inner code for the downlink and uplink maps and control information. The numeric parameters of the RS code were based on a specific MAC/Map message size. As this message size was changed it is required to increase the RS block size to (46,26). An explanation follows.

The downlink map contains pointers to the start of the different modulation fields for the same frame. It is necessary to have the first decoded pointer available before the corresponding data field begins. Assuming symbol clock is used for the RS decoder, the delay through the decoder for a (K+R,K) RS code is $2(R+K)$ symbol clock cycles (R cycles for Euclidean or Berlekamp algorithm, K+R cycles for Chien search and error value computation and K cycles for transferring the corrected message bytes). The (K+R,K) RS code word block with (24,16) inner code and QPSK modulation has duration of $1.5 \cdot 8 \cdot (K+R)/2$ symbol clock cycles. We also need to account for the modem latency. Let us assume the modem latency is x symbols. Then as long as there are at least two RS code words containing the maps and $2(R+K)+x < 6(R+K)$, we are guaranteed to have the information in first RS code words decoded and available for use before the data field begins. The following diagram summarizes the delay calculations.

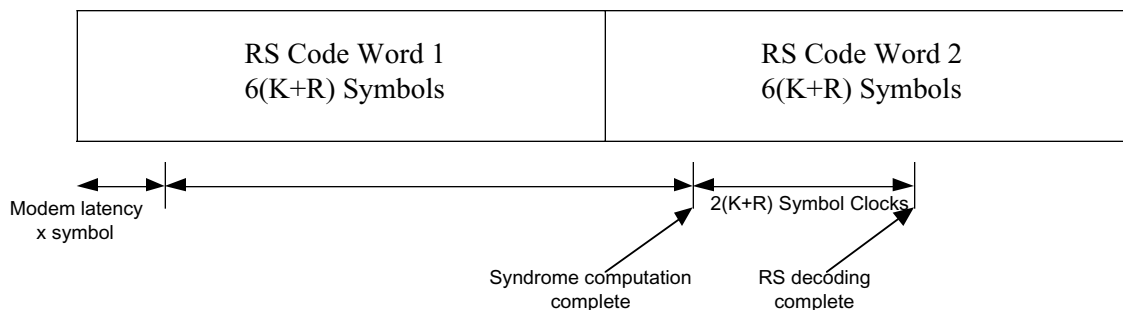


Figure 01. Modem and FEC Decoding Delay for the Maps

Thus for Modem and FEC decoding latency reasons as well as for the worst case scenario of having only two RS code words containing the maps, it is necessary that at least the first pointer is part of the first RS codeword.

Following is the structure of first RS codeword for the map.

TC Header 1 Byte	MAC Header 7 Byte	Message Type ID 1Byte	PHY Sync Field 4 Byte	Basestation ID 8 Byte	Map Size 2 Bytes	Ist Map Pointer 20 Bit
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Figure 02. Structure of Message for the First RS Code Word for the Map

Thus it is obvious that 20 bytes of message length is not sufficient to accommodate the first pointer in the first RS codeword and a minimum of 26 bytes is required. We propose to change the outer code specification to a (46,26) code.