Consideration on reporting FEC uncorrectable signal

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RS(255,223)

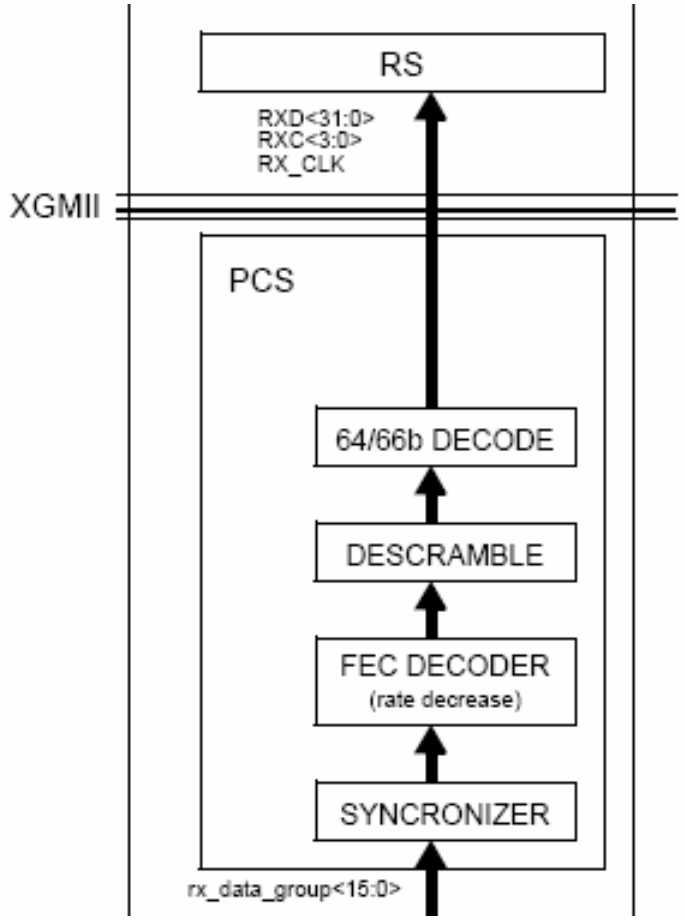
- RS(255,223) is a very powerful channel code, it has a very good error correcting capability as well as error detecting capability.
  - We have only used the error correcting capability so far.

- The RS(255,223) decoder will try to detect and/or correct errors once it received a codeword from the Synchronizer.
  - If the RS decoder fails to correct the errored codeword, it will signal a “decode failure”.
  - ➢ We should utilize this signal to report the errored output data pattern to the upper layer.

The current system

- The errored data patterns will pass through the descrambler even if the FEC decoder signals a decoded failure.

- Each sublayer in PCS will be transparent to each other.
  - The 66/64b decoder would not know which FEC codeword contain errored data pattern from the Descrambler.



Method to report FEC uncorrectable errored data pattern (1/2)

- We can make use of the sync header of each 66-bit block and the 66/64b decoder to report errored data patterns.

- The sync header of a block has the following properties,
  - The sync header of a data block has a value of 01.
  - The sync header of a control block has a value of 10.
  - The sync header has a value of 00 or 11 indicates an invalid block (the 64b66b sublayer should never see these).

Method to report FEC uncorrectable errored data pattern(2/2)

- If the FEC decoder has signaled a Decoded Failure, the FEC decoder module shall set the sync header of every block within the uncorrectable codeword to be 00 or 11.

- The 66/64b decoder will decode each block with the sync field first. If the sync field is 00 or 11, the 66/64b decoder will replaced the block with /E/ in all the eight character locations. (*Clause 49.2.4.6, Figure49-7-64B/66B block formats; Clause49.2.4.11.)*
  - Thus, we have reported errored data patterns from FEC decoder to upper layers.

Conclusions

- The proposed error reporting method has utilized the full aspect of RS code.
- The proposed method can guarantee to report FEC uncorrectable codeword to upper layers.
- The proposed method is very easy to be implemented with a negligible complexity.

Thank you !