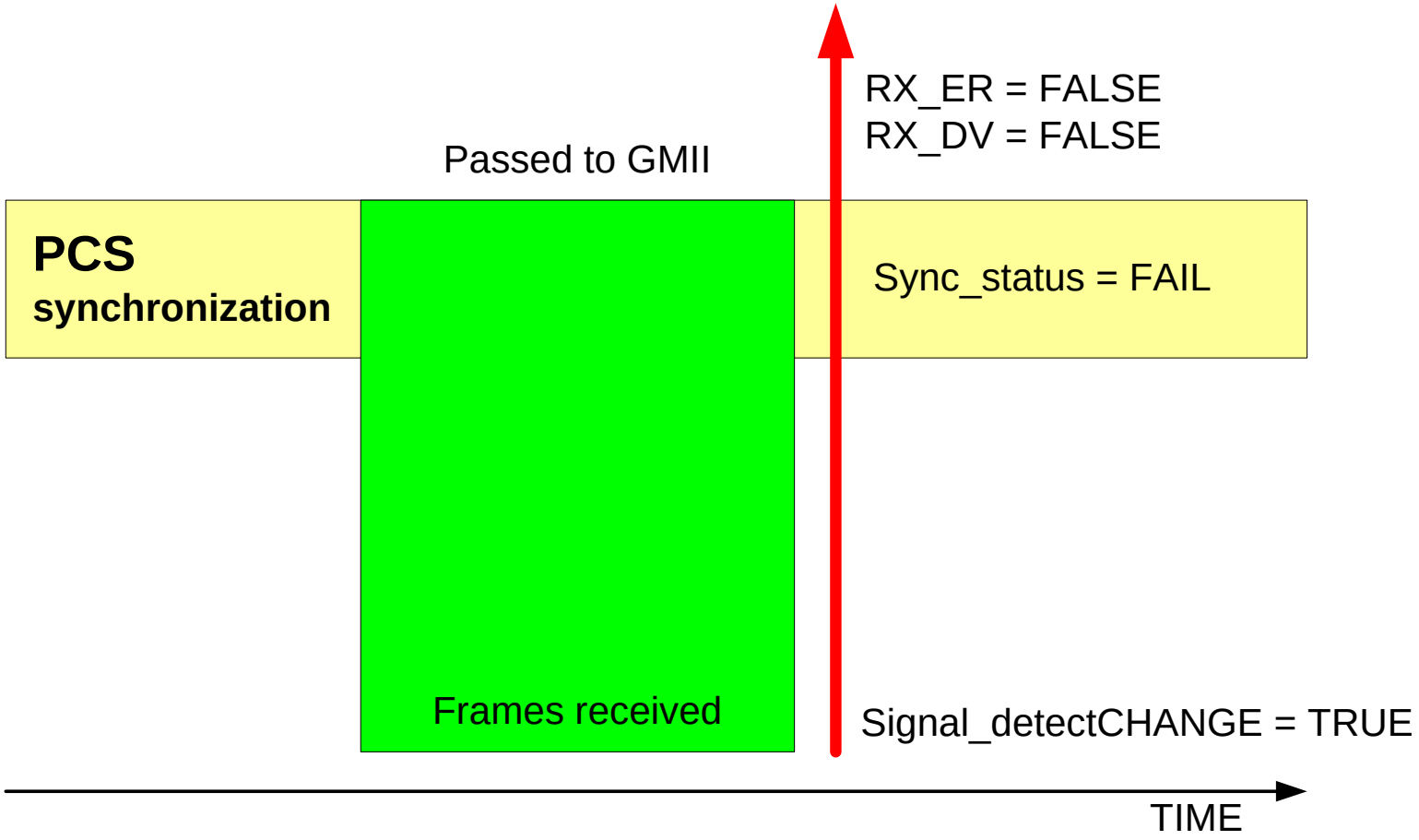
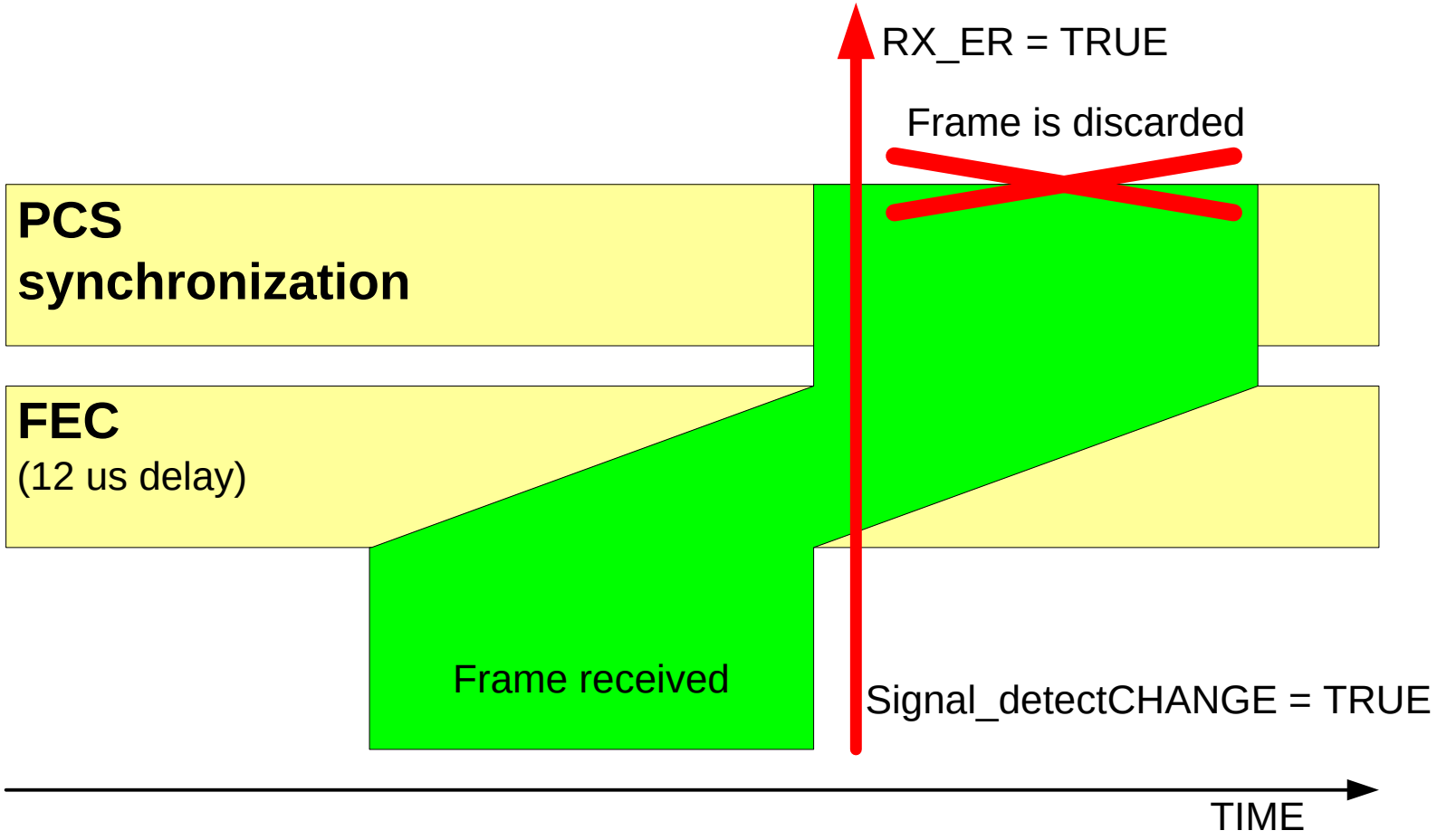
Behaviour without FEC

- When sync is lost, data flow to GMII is stopped immediately. This is externally observable behavior.
- Compliance with state diagrams is mandatory (“shalls” in text)



Behaviour with FEC

- FEC parity octets are appended at the end of a frame. Last byte must be received before the first byte passed to PCS
- Lost signal after burst end kills previous frame



So what if frames are lost?

- OLT loses sync between ONU bursts (normal condition)
- Each burst from each ONU will lose up to 1518 bytes (1 to 18 frames)
- Back-of-envelope calculation:
  - 16 ONUs, 1 ms cycle
  - Up to 1518 bytes per burst are always lost, 1518 x 16 bytes are lost per cycle
  - **BER after FEC = 19%**

The following are the objectives of FEC (65.2.3):

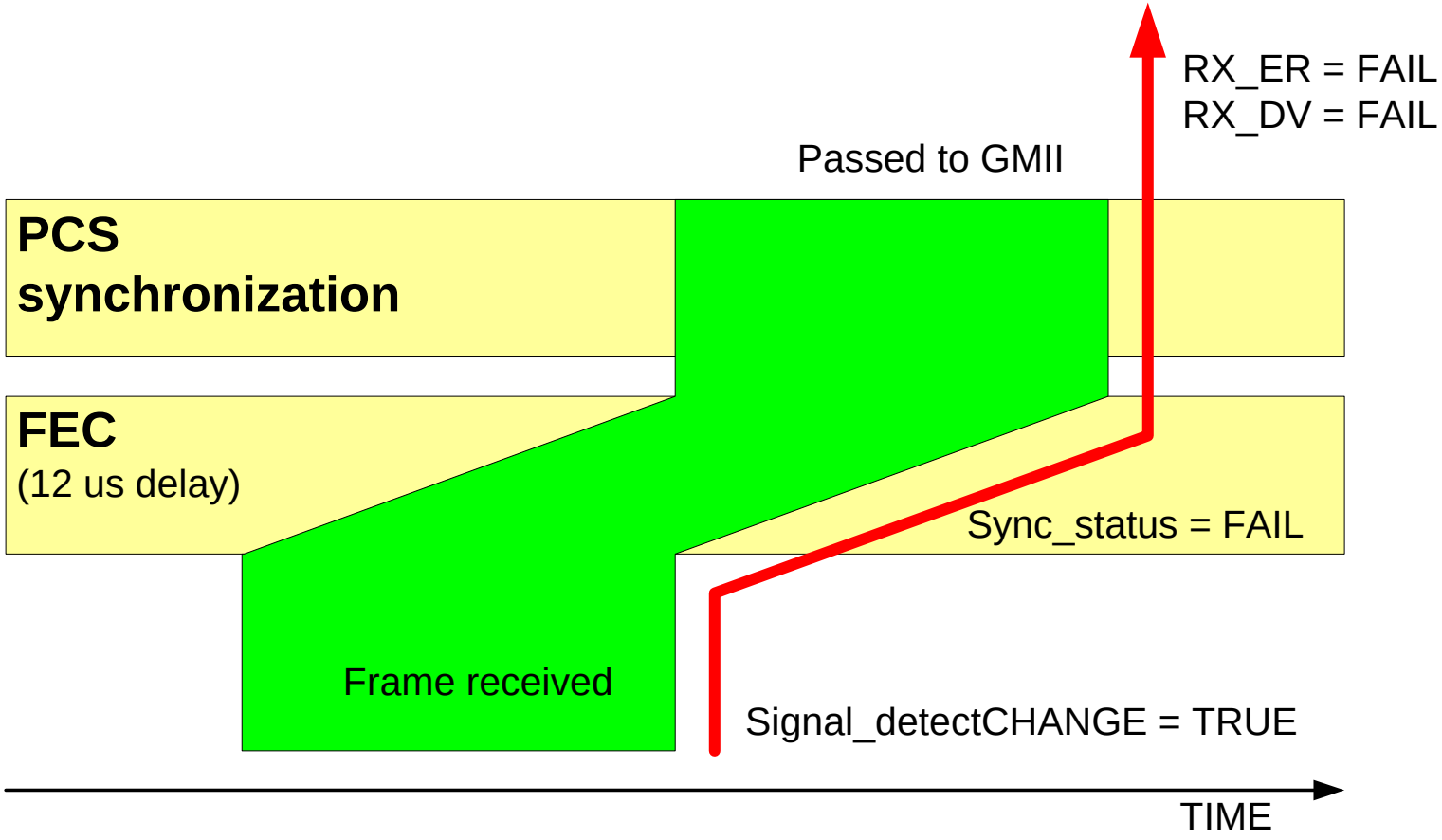
...

d) Support BER objective of 10^{-12} at PCS (cannot be met);

e) Support BER objective of 10^{-4} at FEC sublayer.

How it should have been done

- FEC timing effect on data should be indistinguishable from a propagation delay
- All signals passing through the FEC should be delayed equally



Compromise Solution

Minimum text changes:

- NOTE: To ensure correct MPCP operation, FEC function must maintain constant and equal delay for all code-groups and all signals transmitted from PMA to PCS. Timing effects of adding FEC function should be indistinguishable from an increased propagation delay.