



EEE OAM and Alert

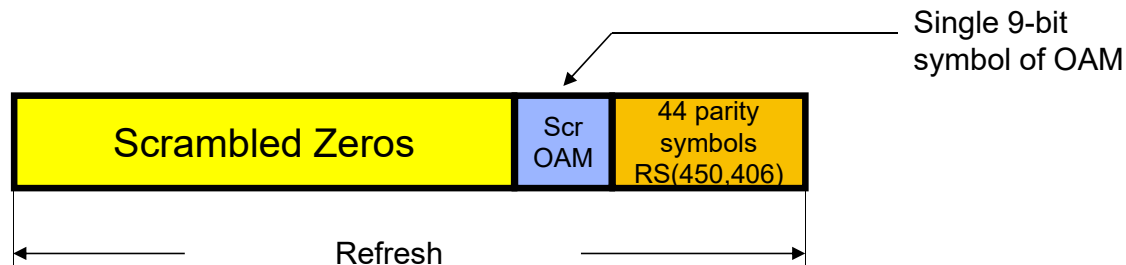
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January 14, 2019

Result of Plenary meeting in Bangkok regarding OAM

- OAM was changed to include RS encoding of RS(16,14)
 - The CRC check on the OAM frame was changed to a Reed Solomon error detection/correction
 - This allows a path for OAM to not require the protection from RS(360,326) encoding during LPI mode transmission of OAM

OAM during LPI

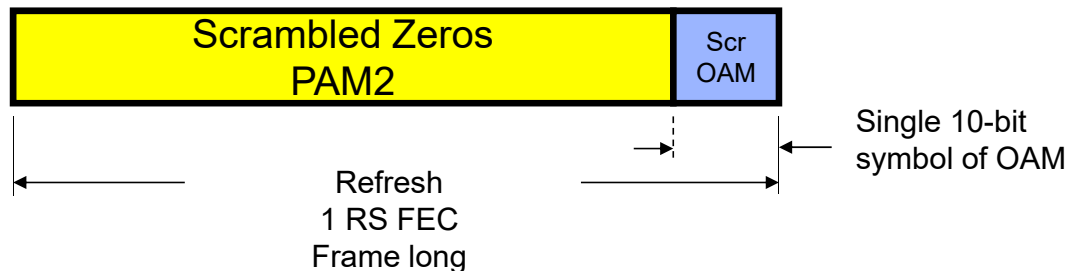
- 802.3bp OAM transmission during refresh is as follows



- 802.3ch Refresh is a single Reed Solomon frame long
- If we try to model the OAM in LPI after 802.3bp and include the frame RS parity during refresh, we would need to stop the interleaving during LPI so that we can fully transmit the pattern

OAM during LPI Proposal

- Given that the OAM has its own Reed Solomon protection, we propose to completely remove the RS(360,326) encoding during LPI and only send the single 10-bit symbol of OAM as usual by xoring with the last 10 bits of refresh.
- **This allows us to power down the PCS circuitry and its associated FEC during LPI**



Result of Plenary meeting in Bangkok regarding Alert

- Concept of Alert was accepted
 - It was accepted to include alert in the EEE LPI sequencing to precede Wake as a lower power method of detecting LPI end
 - Alert should preferably be present only during certain frame counts to reduce power consumption of alert detector
 - In alignment with 802.3bp's non-overlapping wake from link partners, we want alert from the two link partners not to overlap.
 - There is a desire to use the link synchronization sequence as alert

Effects on QR Cycle counts

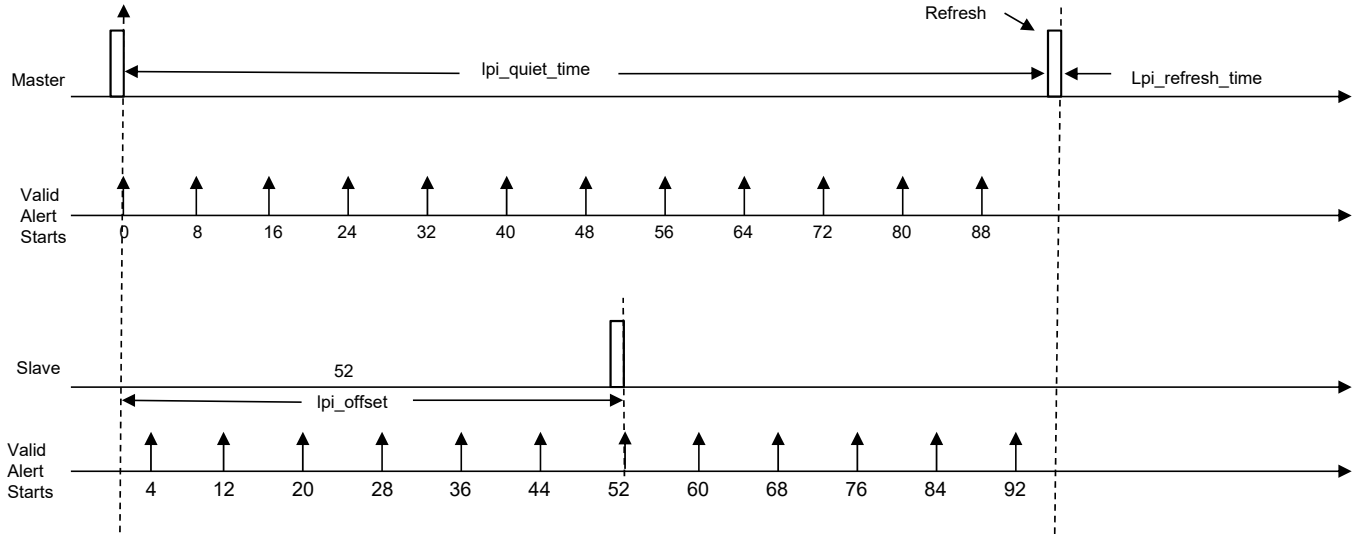
- Alert in our proposal is 4 frames long, in order to accommodate non-overlap, we need the total number of RS frames in QR cycle to be a multiple of 8 – current spec is 100 frames
- Then to assure alert from two sides do not overlap
$$\text{lpi_offset} = \text{lpi_qr_time}/2 + 4$$

Parameter	RS frames
lpi_qr_time	96
lpi_offset	52

Alert

- We propose that Alert is only allowed to start on every 8th RS frame (every other superframe in 4x interleaving) and is exactly four frames long. Master/Slave counts are offset by $QRCycle/2 + 4$. This provides for
 - Alert from link partners do not overlap
 - Alert does not overlap refresh
 - Further power saving is realized by not constantly looking for alert
- As discussed in Bangkok, we propose that alert use the same PAM2 sequence that is used for link synchronization.
 - Given that we can cancel the transmit echo, and alerts can not overlap, the signaling will be similar environment to the link synchronization prior to training start which is already in the standard
- Four RS frames of Alert are followed immediately by 8 RS frames of wake

EEE Alert timing



Latencies

- Latency for coming out of LPI (Table 78-4 – $T_{w_sys_tx}$)

$T_{w_sys_tx}$	802.3ch Base-T1		Base-T	
	Case 1 (uS)	Case 2 (uS)	Case 1 (uS)	Case 2 (uS)
10G	8.96	6.4	7.36	4.48
5G	17.92	12.8	14.72	8.96
2.5G	35.84	25.6	29.44	17.92

Case 2 after sleep completes

4 Alert Frames

8 Wake Frames

8 max wait for alert alignment

Case 1 before sleep completes

Add 8 frames max wait for sleep to complete

Thank you.

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