APSU support for 800GBASE-ER1/ER1-20

Addresses comments #315, 126, 127, and 128 against D3.0

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Supporters

- Add my name!

Background

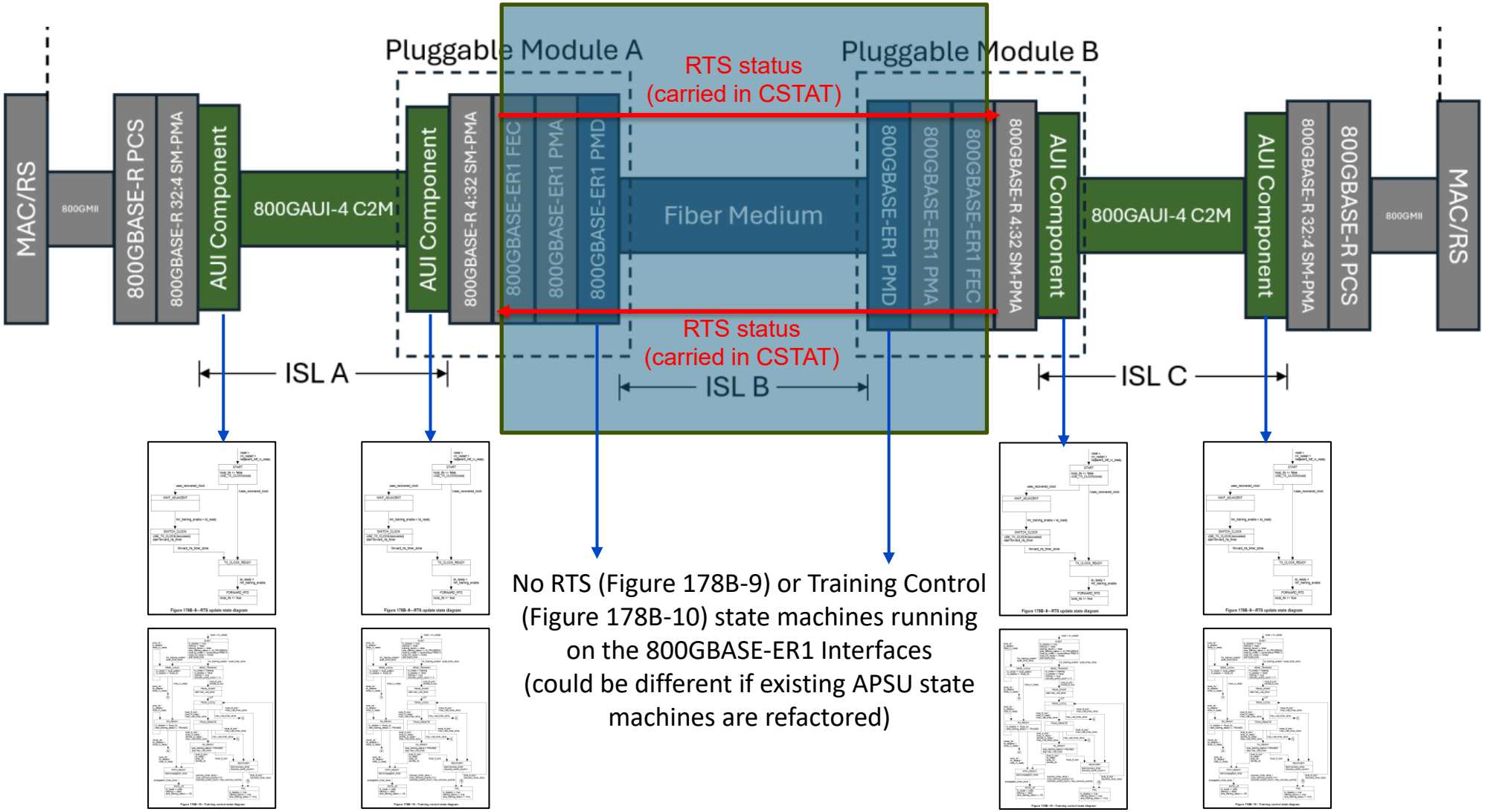
- Task force discussions and an associated straw poll during the March Plenary indicated a preference for the “ER1 Overhead” method to signal RTS state (see motions_3dj_2603)
- Update presented in nicholl_178b_01_260422 at the Annex 178B Ad hoc April 22
  - Straw poll (polls_178b_260422) showed clear support for the approach to map IS_SIGNAL service interface primitives to/from the MNT field in the 800GBASE-ER1 tributary frame overhead using the 2-bit mapping scheme (Yes 16 / No 0 / Abstain 1)
- This presentation provides details for implementing the APSU signaling for an 800GBASE-ER1 or 800GBASE-ER1-20 PHY.

Quick review of the approach

Overview of the proposal

- 800GBASE-ER1 participates in APSU by transferring RTS status across the 800GBASE-ER1 PMD
- This is achieved by mapping the ER1 FEC sublayer service interface signal status primitives to the CSTAT bits (MNT field) of the 800GBASE-ER1 tributary frame overhead
- Whether any APSU state machines run on ER1 interfaces depends on whether the existing state machines are refactored to separate the ILT and RTS functions; this is orthogonal to the discussion of encoding RTS information into the ER1 frame overhead.

800GBASE-ER1 participates in APSU by transferring RTS status between the AUIs on either side of the medium



No RTS (Figure 178B-9) or Training Control (Figure 178B-10) state machines running on the 800GBASE-ER1 Interfaces (could be different if existing APSU state machines are refactored)

Mapping of RTS Status to CSTAT

- RTS status from adjacent AUI interface is mapped to MNT field of the CSTAT octet in the 800GBASE-ER1 tributary frame overhead as shown below:

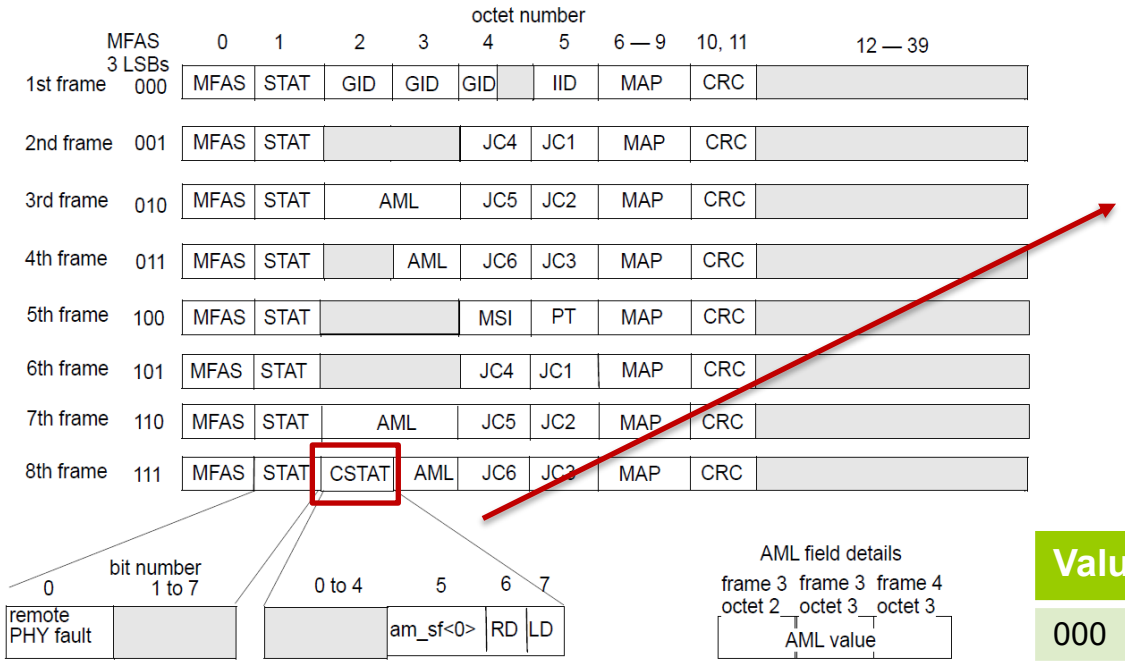
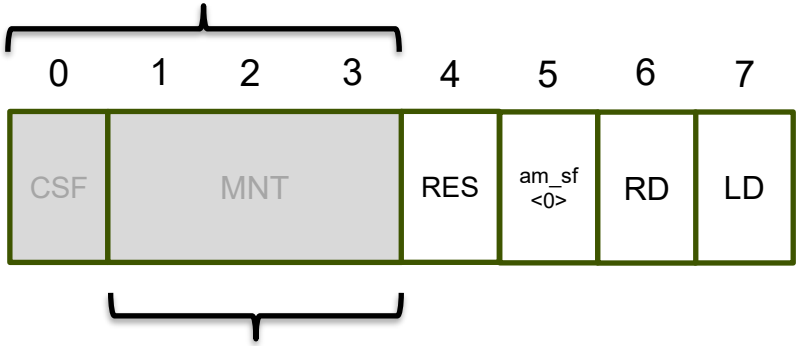


Figure 186–6—Contents of the OH field in eight frame multi-frame

Currently not used by ER1



MNT field (3-bits) used by ZR, ZR+

Proposed modification

Value	ITU G709.1	OIF ZR, ZR+	IEEE ER1
000	Normal Operation	Normal Operation	SIGNAL_OK = OK
001	Not used	Not used	SIGNAL_OK = READY
010	Not used	Not used	SIGNAL_OK = IN_PROGRESS
011	Not used	Not used	SIGNAL_OK = FAIL
100	Reserved (SquelchText)	Reserved	Reserved
101	LCK	LCK	Reserved
110	OCI	Reserved	Reserved
111	AIS	Reserved	Reserved

Ref: https://www.ieee802.org/3/dj/public/26_03/mascitto_3dj_01a_2603.pdf

In transmit direction:

Use FEC:IS_SIGNAL.request(SIGNAL_OK) plus local status to set the transmit MNT field

FEC:IS_SIGNAL.request SIGNAL_OK	align_status	MNT Field
OK	true	“000” (OK)
OK	false	“001” (READY)
READY	don’t care	“001” (READY)
IN_PROGRESS	don’t care	“010” (IN_PROGRESS)
FAIL	don’t care	“011” (FAIL)

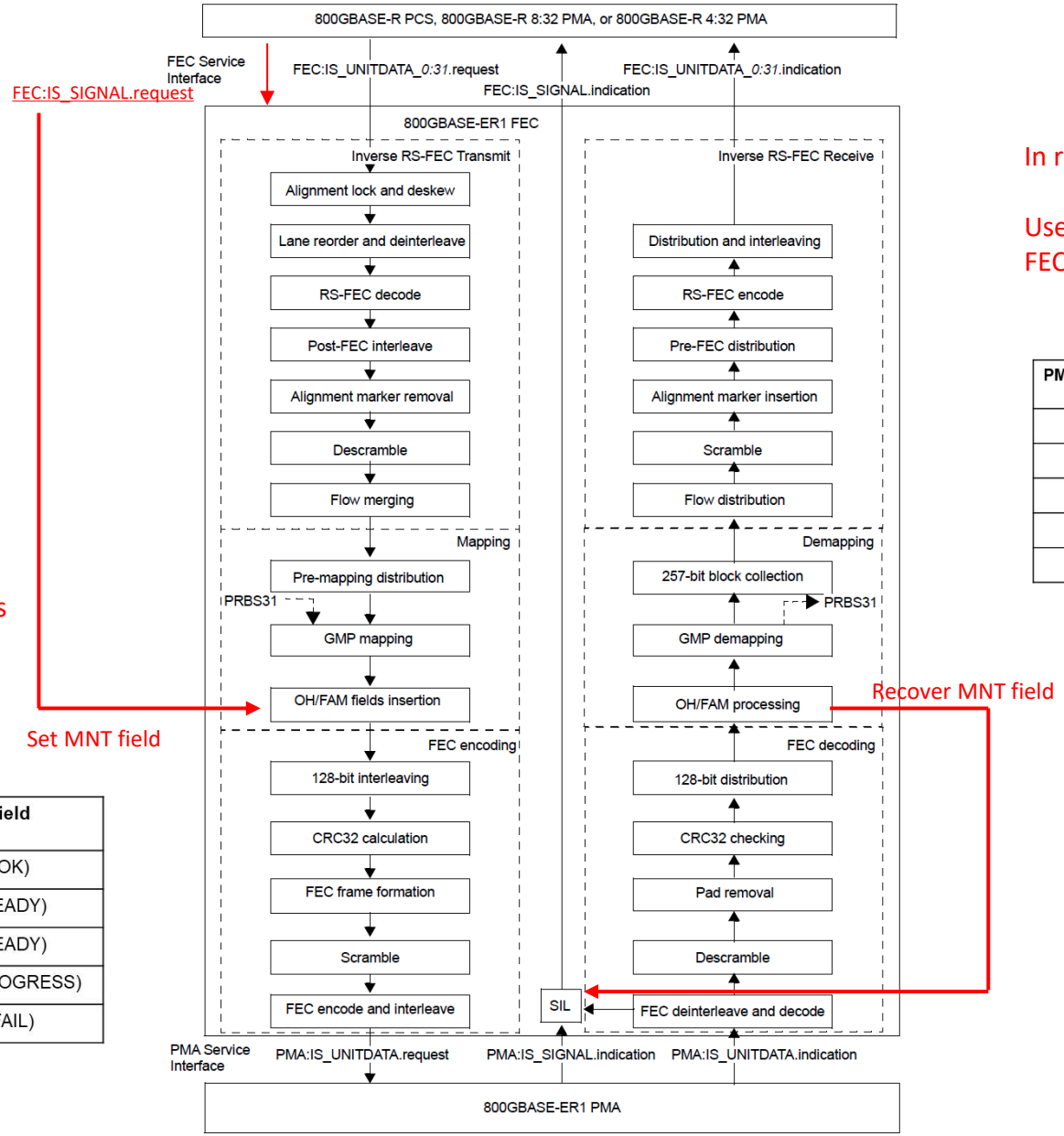


Figure 186–3—800GBASE-ER1 FEC functional block diagram

In receive direction:

Use received MNT field plus local status to generate FEC:IS_SIGNALindication(SIGNAL_OK).

PMA:IS_SIGNAL.indication SIGNAL_OK	Received MNT Field	FEC:IS_SIGNAL.indication SIGNAL_OK
OK	“000” (OK)	OK
OK	“001” (READY)	READY
OK	“010” (IN_PROGRESS)	IN_PROGRESS
OK	“011” (FAIL)	FAIL
FAIL	don’t care	FAIL

Note: This slide captures the intended behavior, but further work is required to fully define the SIL function

Proposed changes

Service interface (proposed changes)

- In Cl186, add the service interface primitive shown to include SIGNAL_OK parameter in the transmit direction
- FEC service interface (above the 800GBASE-ER1 FEC)
  - FEC:SIGNAL.request(SIGNAL_OK)

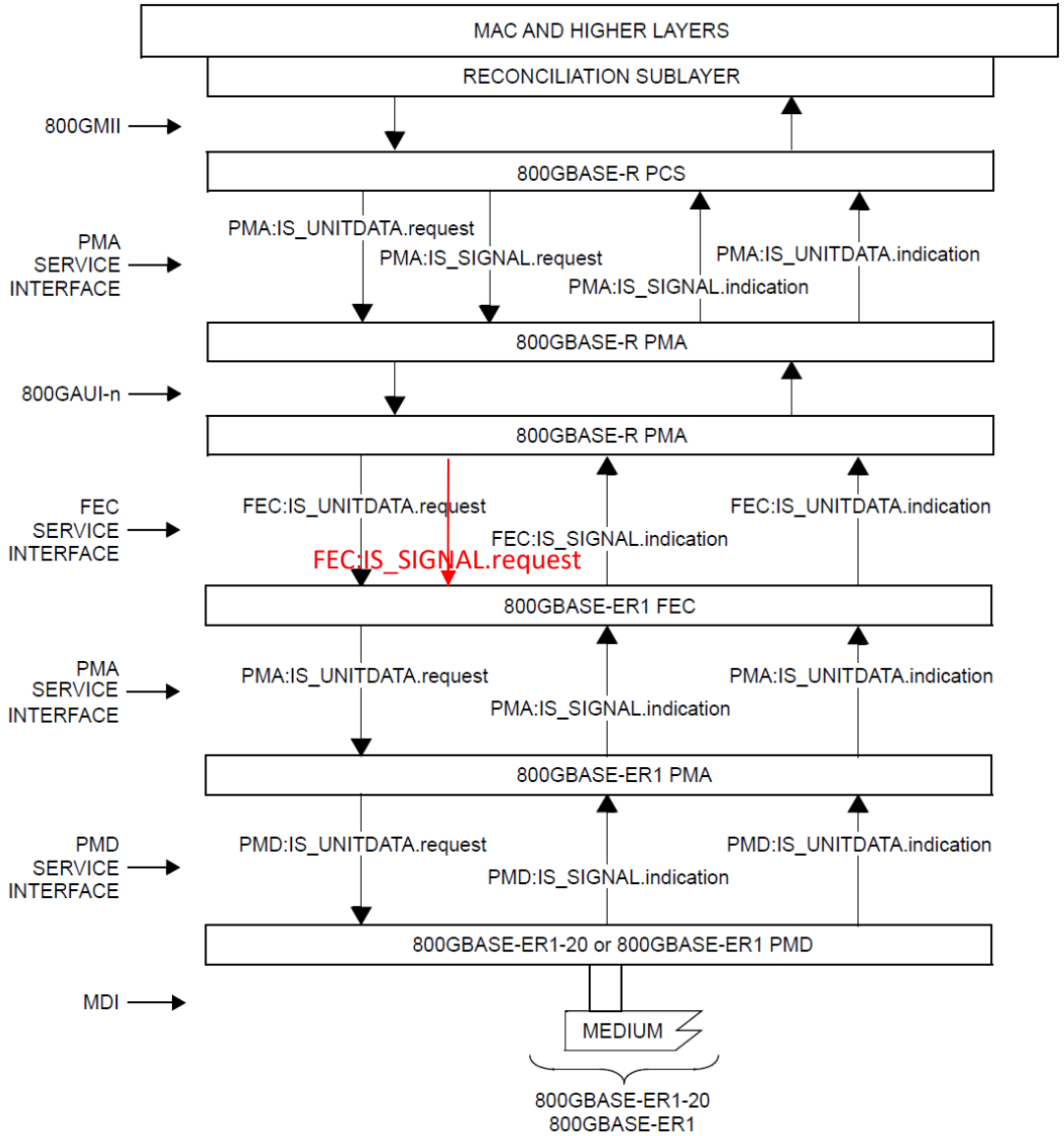


Figure 187–2—800GBASE-ER1 inter-sublayer service interfaces

800GBASE-ER1 FEC mapping to service interface (proposed changes)

- Changes in subclause 186.2.2
  - Add FEC:IS_SIGNAL.request(SIGNAL_OK) primitive
  - Add new paragraph to state that the sublayer provides signal status information to the client sublayer below using FEC:IS_SIGNAL.request(SIGNAL_OK) primitive.
  - Define the SIGNAL_OK parameter based on these tables shown here.
  - Update related text appropriately.

Table 186-x FEC:IS_SIGNAL.indication(SIGNAL_OK) generation

PMA:IS_SIGNAL.indication SIGNAL_OK	Received MNT Field	FEC:IS_SIGNAL.indication SIGNAL_OK
OK	"000" (OK)	OK
OK	"001" (READY)	READY
OK	"010" (IN_PROGRESS)	IN_PROGRESS
OK	"011" (FAIL)	FAIL
FAIL	don't care	FAIL

Table 186-y FEC:IS_SIGNAL.request(SIGNAL_OK) generation

FEC:IS_SIGNAL.request SIGNAL_OK	align_status	MNT Field
OK	true	"000" (OK)
OK	false	"001" (READY)
READY	don't care	"001" (READY)
IN_PROGRESS	don't care	"010" (IN_PROGRESS)
FAIL	don't care	"011" (FAIL)

Map SIGNAL_OK parameters to MNT bits (proposed changes)

- Map the FEC:IS_SIGNAL.request(SIGNAL_OK) parameters
  - Subclause 186.2.3.5.11 Client status (CSTAT), add a new rule that states:

  The client status information may also be used to convey the RTS signal as part of autonomous path startup (Annex 178B). The MNT<2:0> bits are set according to Table 186-y and placed in CSTAT<1:3>.
- Map the FEC:IS_SIGNAL.indication(SIGNAL_OK) parameters
  - Subclause 186.2.4.7.6 Client status (CSTAT), add a new rule that states:

  The client status information may also be used to convey the RTS signal as part of autonomous path startup (Annex 178B). The FEC:IS_SIGNAL.indication(SIGNAL_OK) parameter is set according to Table 186-y by extracting the MNT bits found in CSTAT<1:3>.

New subclause (proposed changes)

- Add a new subclause in Cl187 as follows:

187.x.x Autonomous path startup (APSU) functions

APSU functions are supported by the 800GBASE-ER1 FEC sublayer (see 186.2).

Thanks !