# Recommended changes for RS text from Clause 76

**201.2 Reconciliation Sublayer (RS) for 25G-EPON**

**201.2.1 Overview**

This subclause extends Clause 46 and Clause 106 to enable multiple MACs to interface with a single or multiple Physical Layers, and to

enable data links with one data rate (e.g., 25 Gb/s) in one direction but another (e.g., 10 Gb/s) in the opposite

direction. The number of MACs supported is limited only by the implementation. It is acceptable for only

one MAC to be connected to this Reconciliation Sublayer. Figure 201–1 and Figure 201–2 show the

relationship between this RS and the ISO/IEC OSI reference model. The mapping of XGMII/25GMII signals

to PLS service primitives is described in 46.1.7 for XGMII and in 106.1.7 for 25GMII with exceptions noted

herein.

25G-EPON OLTs and ONUs would only need to support a single lane Physical Layer while 50G-EPON and 100G-EPON OLTs and ONUs would need to support two and four lane Physical Layers, respectively.





**201.2.2 Dual-speed Media Independent Interface**

In 10G-EPON architectures, the XGMII is the interface used to transfer data between the RS and the PCS. For

25G-EPON architectures, the 25GMII is the interface used to transfer data between the RS and the PCS.

When using a 25/10G-EPON architecture, a combination of both XGMII and 25GMII is needed in order to

support transmission and reception at different speeds. Through the parallel use of the XGMII and 25GMII, the

following modes are supported:

— Symmetric-rate 25 Gb/s operation for transmit and receive data paths, utilizing all of the

functionality of the 25GMII defined in Clause 106.

— Symmetric-rate 10 Gb/s operation for transmit and receive data paths, utilizing all of the functionality

of the XGMII defined in Clause 46.

— Asymmetric-rate operation for transmit and receive data paths at the OLT, utilizing transmit path

functionality of the 25GMII defined in Clause 106 and receive path functionality of the XGMII defined

in Clause 46.

— Asymmetric-rate operation for transmit and receive data paths at the ONU, utilizing transmit path

functionality of the XGMII defined in Clause 46 and receive path functionality of the 25GMII defined

in Clause 106.

— Coexistence of various ONU types by utilizing different data paths within the OLT.

**201.2.2.1 25/25G-EPON**

Figure 201–3(a) depicts the data paths used in 25/25G-EPON.

**201.2.2.2 25/10G-EPON**

At the OLT, the transmit path uses 25GMII signals TXD<31:0>, TXC<3:0> and TX\_CLK, while the receive

path uses XGMII signals RXD<7:0>, RX\_ER, RX\_CLK, and RX\_DV. At the ONU, the transmit path uses

XGMII signals TXD<7:0>, TX\_EN, TX\_ER, and GTX\_CLK, while the receive path uses 25GMII signals

RXD<31:0>, RXC<3:0> and RX\_CLK.

Figure 201–3(b) depicts the data paths used in 25/10G-EPON.

**201.2.2.3 Dual-rate mode**

To support coexistence of 25/25G-EPON and 25/10G-EPON on the same outside plant, the

OLT may optionally support dual-rate mode. Dual-rate mode supports transmission and reception at both

25 Gb/s and 10 Gb/s. When operating in a dual-rate mode, a combination of 25GMII and XGMII data paths are

used for transmission and reception. Figure 201–4 depicts the data paths used in an OLT operating in a

dual-rate mode.





**201.2.2.4 Mapping of 25GMII and XGMII primitives**

The mapping of 25GMII/XGMII signals to the PLS\_DATA.request and PLS\_DATA.indication primitives is

described in 201.2.6. Additional details are provided in Table 201–1, which shows the mapping of

PLS\_DATA.request primitives to transmit interface signals for different types of OLTs and ONUs. Table 201–

2 shows the mapping of PLS\_DATA.indication primitives to receive interface signals for different types of

OLTs and ONUs.

**201.2.3 Summary of major concepts**

A successful registration process, described in 202.3.3, results in the assignment of values to the MODE and

LLID variables associated with a MAC. This may be one of many MACs in an OLT or a single MAC in an

ONU. The MODE and LLID variables are used to identify a packet transmitted from that MAC and how

received packets are directed to that MAC. The RS in the OLT shall operate in unidirectional mode as

defined in 66.4.

As described in 202.1.2, multiple MACs within an OLT are bound to a single 25GMII in the case of a

25/25G-EPON OLT, or to a 25GMII transmit path and an XGMII receive path in the case of a 25/10G-EPON

OLT. Only one PLS\_DATA.request primitive is active at any time.

At the ONU, the MAC is either bound to a 25GMII in the case of a 25/25G-EPON ONU, or to a 25GMII

receive path and an XGMII transmit path in case the of a 25/10G-EPON ONU.

In the transmit direction, the RS maps the active PLS\_DATA.request to either the XGMII or 25GMII signals (TXD<31:0>, TXC<3:0>, and TX\_CLK)

according to the MAC instance generating the request. The RS replaces octets of preamble with the values

of the transmitting MAC’s MODE and LLID variables.

In the receive direction, the MODE and LLID values embedded within the preamble identify the MAC to

which this packet should be directed. The RS establishes a temporal mapping of either the XGMII or 25GMII signals (RXD<31:0>, RXC<3:0> and

RX\_CLK) to the correct PLS\_DATA.indication and PLS\_DATA\_VALID.indication primitives.

**201.2.3.1 Application**

This subclause applies to the interface between the MAC and PHY in an OLT or an ONU. The 25GMII and XGMII interfaces are used to provide

media independence, so that an identical media access controller may be used with all 25GBASE-PR and

25/10GBASE-PRX PHY types.

**201.2.4 XGMII structure**

See Clause 46.

**201.2.5 25GMII structure**

The 25GMII structure is identical to the XGMII structure specified in 46.1.6. and Figure 46–2 depicts a schematic view of the RS inputs and

outputs.

**201.2.6 Mapping of 25GMII and XGMII signals to PLS service primitives**

Except as noted in Table 76–1 and Table 76–2, the mapping of the signals provided at the 25GMII to the PLS

service primitives is defined in 106.1.7.



**201.2.6.1 Functional specifications for multiple MACs**

The functional specification for multiple MACs is as described in 76.2.6.1except the variable shall be set to the broadcast value of 0x7FFD for the unregistered ONU MAC. See table 76.2.6.1.1 and Table 76-4 for additional information on permissible values for this variable. Enabled OLT

# Changes to Clause 76

*Change Table 76-4 to add reserved value 0x7FFD for 25/10GBASE-PRX and 25GBASE-PR as shown below*

|  |  |  |
| --- | --- | --- |
| ***LLID value*** | ***Used in RS*** | ***Purpose*** |
| *0x7FFF* | *1000BASE-PX* | *Downstream: 1 Gb/s SCB* |
| *Upstream: ONU registration at 1 Gb/* |
| *0x7FFE* | *10/1GBASE-PRX* | *Downstream: 10 Gb/s SCB* |
| *Upstream: ONU registration at 1 Gb/* |
| *10GBASE-PR* | *Downstream: 10 Gb/s SCB* |
| *Upstream: ONU registration at 10 Gb/* |
| *0x7FFD* | *25/10GBASE-PRX* | *Downstream: 25 Gb/s SCB* |
| *Upstream: ONU registration at 10 Gb/* |
| *10GBASE-PR* | *Downstream: 25 Gb/s SCB* |
| *Upstream: ONU registration at 25 Gb/* |
| *0x7FFCD–0x7F00* | *—* | *Reserved for future use* |

*Change 76.2.6.1.3.2 b) and c) as shown below*

b) If the received logical\_link\_id value matches 0x7FFF, 0x7FFE, or 0x7FFD and an enabled MAC exists with a logical\_link\_id variable with the same value, then the comparison is considered a match to that MAC.

c) If the received logical\_link\_id has a value other 0x7FFF, 0x7FFE, or 0x7FFD and an enabled MAC exists with a mode variable with a value of 0 and a logical\_link\_id variable matching the received logical\_link\_id value, then the comparison is considered a match to that MAC. If the device is an ONU then the following comparison is made: