144.3.7 Discovery Process in dual-rate systems

The enhancements introduced to the Clause 144 discovery process for EPONs facilitate the coexistence of different types of Nx25G-EPON systems on the very same PON. The coexistence mode allows, for example, 25/10G-EPON, 50/10G-EPON, and 50/25G-EPON ONUs be deployed on the same ODN and connected to one and the same Nx25G-EPON OLT.

144.3.8 OLT speed-specific discovery

The DISCOVERY MPCPDU defined in 144.3.4.6 includes a *DiscoveryInfo* field, allowing the Nx25G-EPON OLT relay speed-specific information regarding the discovery window to the different Nx25G-EPON ONUs connected to the same PON. Using the *DiscoveryInfo* field, the OLT has the ability to indicate its receive path capability (10 Gb/s and/or 25 Gb/s) as well as the type of the upstream discovery window being open (10 Gb/s and/or 25 Gb/s). The OLT may open separate (non-overlapping) upstream discovery windows for 10 Gb/s and 25 Gb/s transmission using two separate DISCOVERY MPCPDUs or overlapping upstream discovery windows for 10 Gb/s and 25 Gb/s transmission using a single DISCOVERY MPCPDU.

These different combinations allow the OLT MAC Control Client to open a number of discovery windows for all of the different ONU types. Table 144–9 shows the different types of windows that are possible, along with the necessary LLID and *DiscoveryInfo* field that also needs to be present in the DISCOVERY MPCPDUs For some combinations, it may be desirable for the OLT MAC Control Client to open overlapping discovery windows. The OLT MAC Control Client may do so by sending one DISCOVERY MPCPDU with the *DiscoveryInfo* field indicating 10 Gb/s and 25 Gb/s discovery window being open.

Table 144–9—DISCOVERY MPCPDUs for all Nx25G-EPON ONU types

ONU types targeted by DISCOVERY MPCPDU					***DiscoveryInfo* field value**			
					Upstream capable		**Discovery window**	
25/10G-EPON	**25G-EPON**	**50/10G-EPON**	**50/25G-EPON**	**50G-EPON**	**10G**	**25G**	**10G**	**25G**
X		X			1	0	1	0
	X		X	X	0	1	0	1
X	X	X	X	X	1	1	1	1

Figure 144–26 shows the three primary combinations of discovery windows and the different types of REGISTER_REQ MPCPDUs that may be received during the window. Figure 144–26(a) shows reception of messages from 25/10G-EPON and 50/10G-EPON ONUs. Figure 144–26(b) shows reception of messages from 25G-EPON, 50/25G-EPON, and 50G-EPON ONUs. Figure 144–26(c) shows reception of messages from all types of Nx25G-EPON ONUs.

144.3.9 ONU speed-specific registration

A 25/10G-EPON or 50/10G-EPON ONU is capable of receiving DISCOVERY MPCPDU transmitted by the OLT on DISC_PLID, when the ONU is unregistered. When received, the DISCOVERY MPCPDU is parsed, and if a 10 Gb/s discovery window is opened, the ONU may attempt to register in the EPON.

A 25G-EPON, 50/25G-EPON, or 50G-EPON ONU is capable of receiving DISCOVERY MPCPDU transmitted by the OLT on DISC_PLID, when the ONU is unregistered. When received, the DISCOVERY MPCPDU is parsed, and if a 25 Gb/s discovery window is opened, the ONU may attempt to register in the EPON.

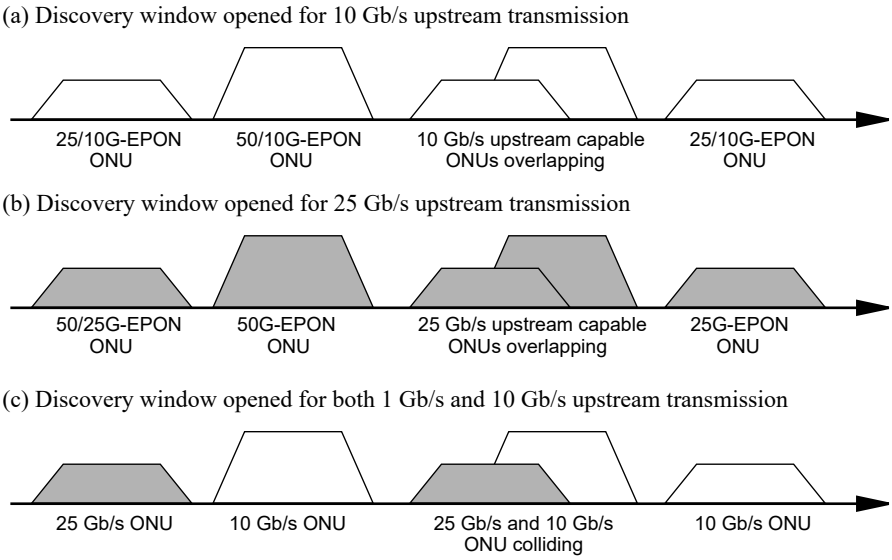

Figure 144–26—Combinations of REGISTER_REQ MPCPDUs during discovery window for different Nx25G-EPON coexisting in the same PON

A dual speed ONU capable of 10 Gb/s or 25 Gb/s operation in the upstream channel is capable of receiving DISCOVERY MPCPDU transmitted by the OLT on DISC_PLID, when the ONU is unregistered. When received, the DISCOVERY MPCPDU is parsed, and the ONU makes the registration decision based on the available information, whether to attempt registration during the 10 Gb/s discovery window or the 25 Gb/s discovery window. The ONU may attempt to register during the discovery window announced as supporting the highest speed common to both the OLT and ONU. Table 144–10 shows the action the ONU should take based on the ONU transmit capabilities and the received discovery information.

Table 144–10—ONU action during discovery window

OLT Discovery information				ONU Tx capability		ONU action
Upstream capable		Discovery window				
10G	25G	10G	25G	10G	25G	
1	0	1	0	1	X	Attempt 10G registration
1	X	1	X	1	0	Attempt 10G registration
X	1	X	1	X	1	Attempt 25G registration
1	1	0	1	1	0	Wait for 10G discovery window
1	1	1	0	X	1	Wait for 25G discovery window

The ONU generates the REGISTER_REQ MPCPDU with the broadcast PLID (BCAST_PLID).