144.3.7 Discovery Process in dual-rate systems

The MPCP Discovery Process (see 144.3.5) facilitates the coexistence of different types of Nx25G-EPON ONUs on the 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.

144.3.7.1 OLT rate-specific discovery

The DISCOVERY MPCPDU (see 144.3.4.6) includes the *DiscoveryInfo* field, which gives the Nx25G-EPON OLT control over the types of ONUs allowed to participate in the given discovery window. Using the *DiscoveryInfo* field, the OLT indicates the receive line rate capabilities (10 Gb/s and/or 25 Gb/s) as well as the specific line rate(s) allowed in the given discovery window. The OLT may open separate (non-overlapping) discovery windows for 10 Gb/s and 25 Gb/s transmission using two separate DISCOVERY MPCPDUs or it may open a single discovery window for both 10 Gb/s and 25 Gb/s line rates using a single DISCOVERY MPCPDU.
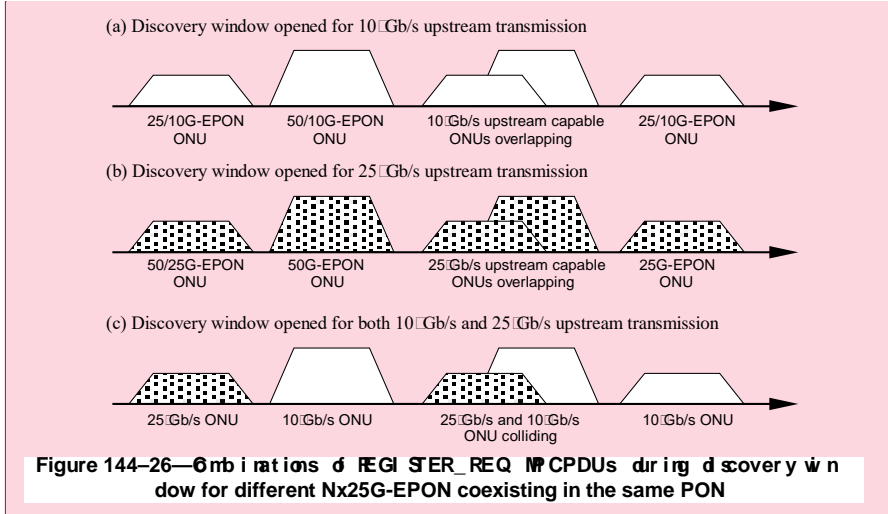
The OLT may further narrow ONU types allowed access to the given discovery window by selecting on which downstream channel the DISCOVERY MPCPDU is transmitted and on which upstream channel the discovery window is opened (using *ChannelMap* field, see 144.3.4.6).

These different combinations allow the OLT to open a number of discovery windows for all of the different ONU types. Table 144–9 shows the different types of discovery windows that are possible, along with the necessary *DiscoveryInfo* field values in the DISCOVERY MPCPDUs For some combinations, it may be desirable for the OLT to open overlapping discovery windows. The OLT 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	25/25G-EPON	50/10G-EPON	50/25G-EPON	50/50G-EPON	10G	25G	10G	25G
X		X			1	0/1	1	0
	X		X	X	0/1	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.

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

144.3.7.2 ONU speed-specific registration

An Nx25G-EPON ONU is capable of receiving DISCOVERY MPCPDU transmitted by the OLT on DISC_PLID, when the ONU is unregistered. When received by a 25/10G-EPON or 50/10G-EPON ONU, the DISCOVERY MPCPDU is parsed, and if a 10 Gb/s discovery window is opened, the ONU may attempt to register in the EPON. When received by a 25/25G-EPON, 50/25G-EPON, or 50/50G-EPON ONU, the DISCOVERY MPCPDU is parsed, and if a 25 Gb/s discovery window is opened, the ONU may attempt to register in the EPON. When received by an ONU capable or either 10Gb/s or 25 Gb/s, 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

DiscoveryInfo field				ONU upstream capability		ONU action
Upstream capability		Discovery window				
10G	25G	10G	25G	10G	25G	
1	0	1	0	1	0/1	Attempt 10G registration
1	0/1	1	0/1	1	0	Attempt 10G registration
0/1	1	0/1	1	0/1	1	Attempt 25G registration
1	1	0	1	1	0	Wait for 10G discovery window

1	1	1	0	0/1	1	Wait for 25G discovery window

The ONU transmits the REGISTER_REQ MPCPDU in envelopes with the discovery PLID (DISC_PLID, see 144.3.3).