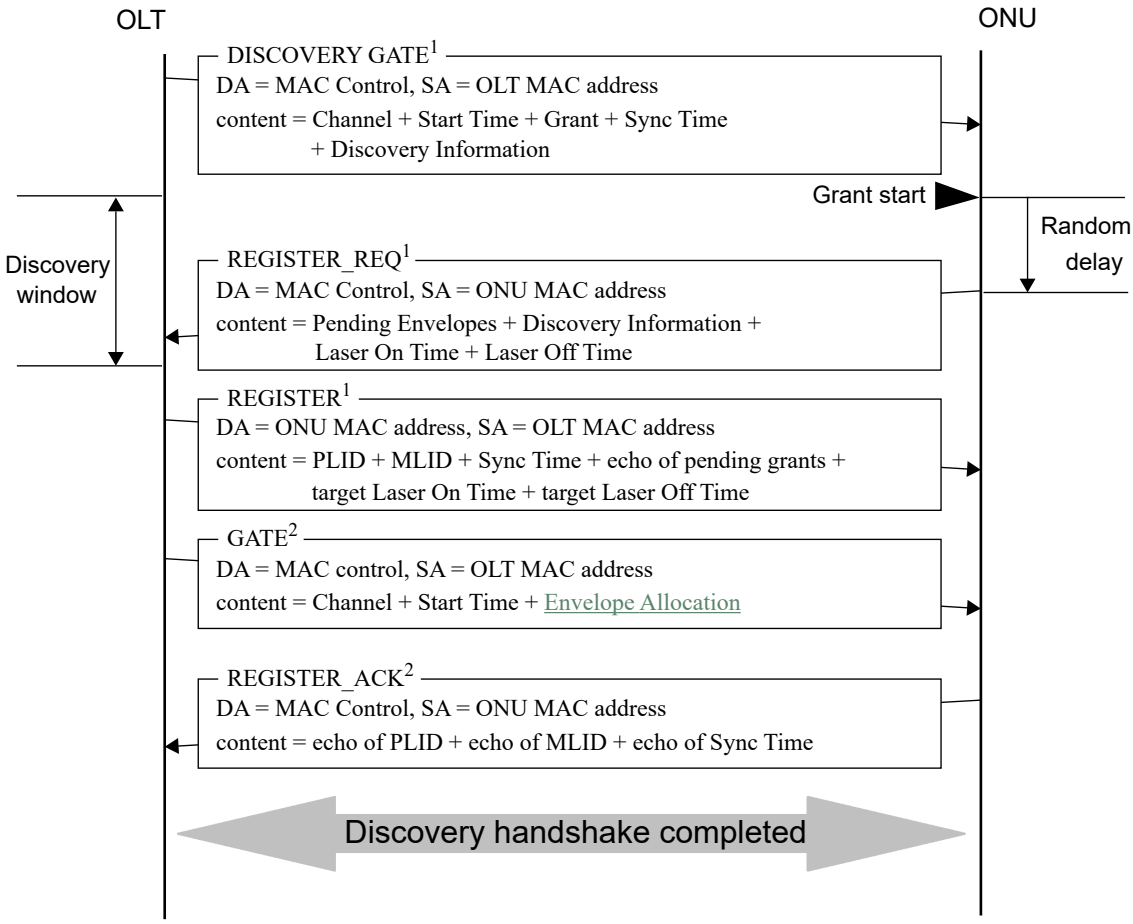
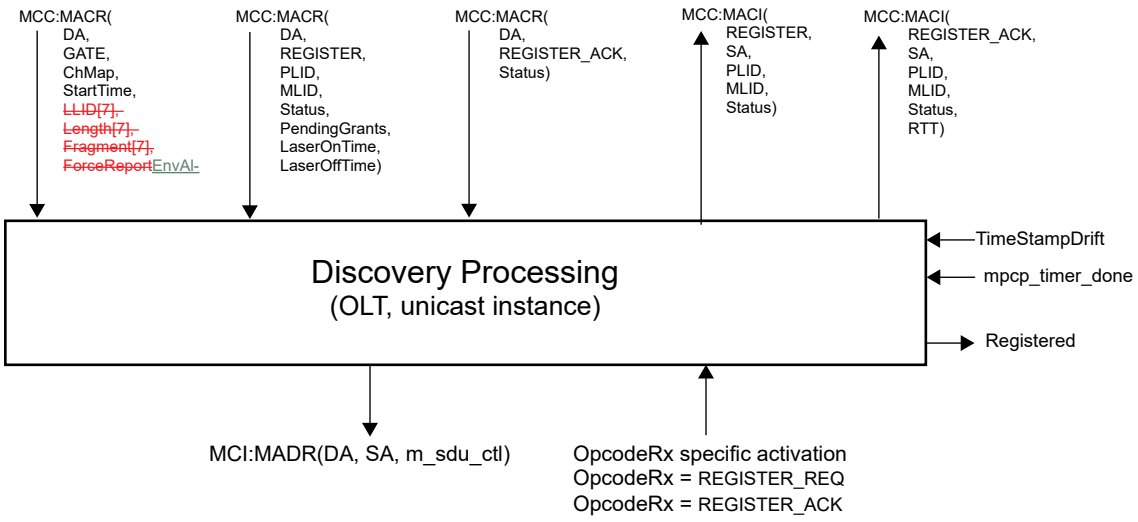


[1] Messages sent on a broadcast PLID
[2] Messages sent on unicast PLID

Figure 144–2—Discovery handshake message exchange



Instances of Service Interface:
MCI = interface to MAC Control multiplexer
MCC = interface to MAC Control client

Figure 144–4—Discovery Processing service interfaces (OLT, unicast instance)

144.3.3.5 Messages

MAC:MADI(DA, SA, m_sdu, receiveStatus)
The service primitive is defined in 2.3.2.

MAC:MADR (DA, SA, m_sdu)
The service primitive is defined in 2.3.2.

MCC:MACI(GATE, ChMap, StartTime, EnvAlloc[7])
This service primitive is used by the Gate Processing to notify the client and Layer Management that a new GATE message was received. This primitive accepts the following parameters:

GATE:	Opcode for GATE MPCPDU as defined in Table 31A–1.
ChMap:	A bitmap representing the wavelength channel(s) on which to transmit on during the assigned transmission slot. See Table 144–1 for details.
StartTime:	Represents the start time of the transmission grant. The start time is compared to the local clock, to correlate the start of the grant.
EnvAlloc[7]:	Represents individual values of *Envelope Allocation #n* field in the GATE message. See 144.3.7.1 for details.

MCC:MACR(DA, DISCOVERY, ChMap, StartTime, GrantLength, SyncTime, DiscoveryInfo, DiscoveryLength)
The service primitive is used by the MAC Control client at the OLT to initiate the Discovery Process. This primitive accepts the following parameters:

DA:	Multicast or unicast MAC address.
DISCOVERY:	Opcode for DISCOVERY GATE MPCPDU as defined in Table 31A–1.

ChMap: A bitmap representing the wavelength channel(s) on which to transmit on during the assigned transmission slot. See Table 144–1 for details.

StartTime: Start time of the Discovery Window.

GrantLength: Length of the grant given for discovery.

SyncTime: The time interval required to stabilize the receiver at the OLT.

DiscoveryInfo: This parameter represents the Discovery Information field in GATE MPCPDU as specified in 144.3.7.6, defining the speed(s) the OLT is capable of receiving and speed(s) at which the Discovery Window is opened for.

DiscoveryLength: Length of the Discovery Window process.

MCC:MACR(DA, GATE, ChMap, StartTime, ~~LLID[7], Length[7], Fragment[7], ForceReport~~EnvAlloc[7])

This service primitive is used by the MAC Control client at the OLT to issue the GATE message to an ONU. This primitive accepts the following parameters:

DA: Multicast MAC Control address as defined in Annex 31B.

GATE: Opcode for GATE MPCPDU as defined in Table 31A–1.

ChMap: A bitmap representing the wavelength channel(s) on which to transmit on during the assigned transmission slot. See Table 144–1 for details.

StartTime: Represents the start time of the transmission grant. The start time is compared to the local clock, to correlate the start of the grant.

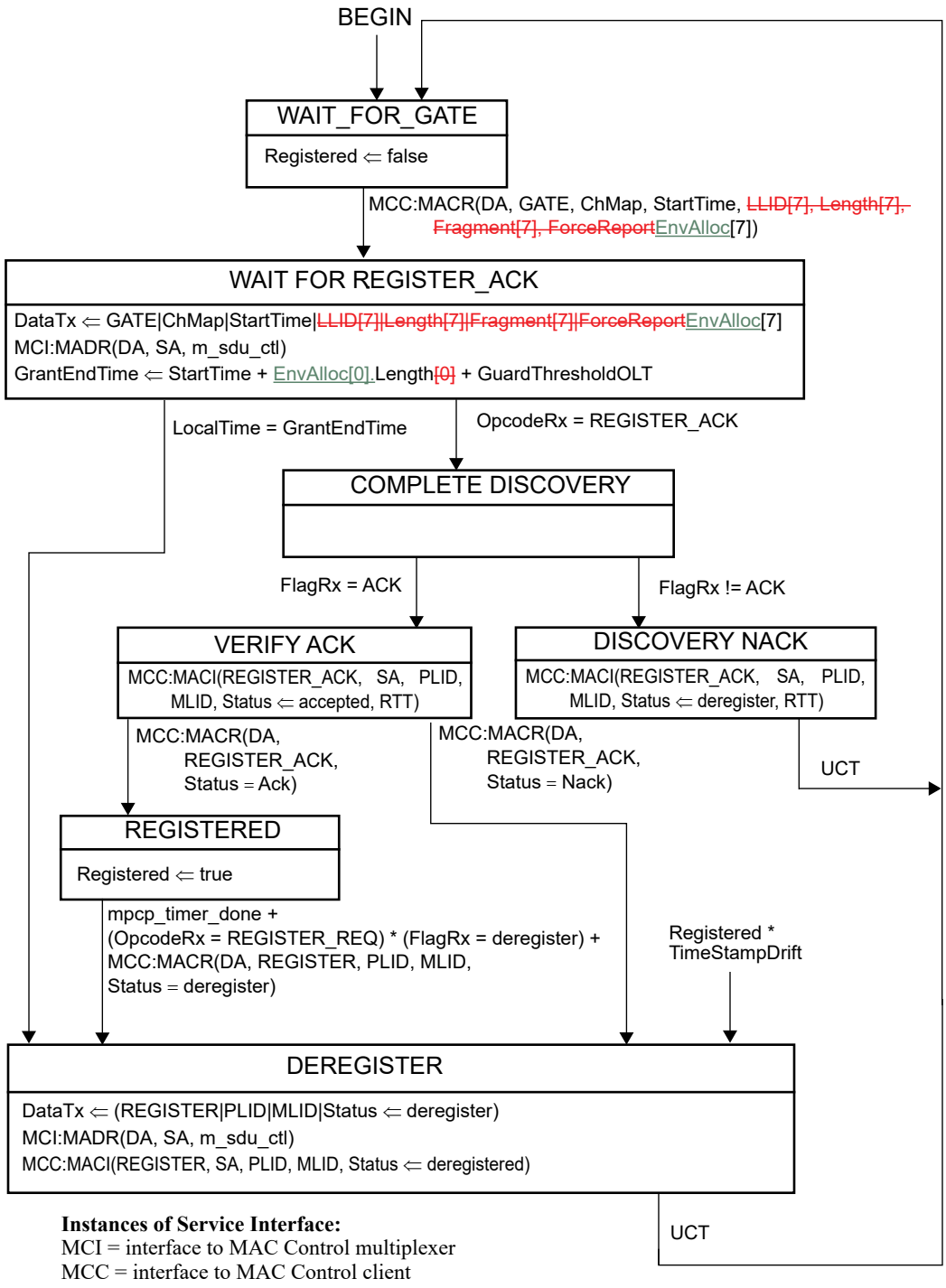
EnvAlloc[7]: Represents individual values of *Envelope Allocation #n* field in the GATE message. See 144.3.7.1 for details.

~~LLID[7]: Represents the logical link that is being granted a transmission slot. Only elements *j* with non-zero value in associated *Length[j]* field of the array are used.~~

~~Length[7]: Lengths of the individual grants. Only elements *j* with non-zero value in *Length[j]* field of the array are used.~~

~~Fragment[7]: Flags indicating whether fragmentation is allowed within the given grant. Only elements *j* with non-zero value in associated *Length[j]* field of the array are used.~~

~~ForceReport[7]: Flags indicating whether a REPORT message should be generated in the corresponding grant. Only elements *j* with non-zero value in associated *Length[j]* field of the array are used.~~



NOTE—The MAC Control Client issues the grant following the REGISTER MPCPDU, taking the ONU processing delay of REGISTER MPCPDU into consideration.

Figure 144–9—Discovery Processing OLT Final Registration state diagram

144.3.5 Gate Processing

A key concept pervasive in Multipoint MAC Control is the ability to arbitrate specific transmitters out of a plurality of ONUs. The OLT controls an ONU's transmission by assigning grants.

The transmitting window of an ONU is indicated in the GATE message where each granted LLID is explicitly identified (*LLID #n* field, see 144.3.7.1) and granted (~~*Grant*~~*Envelope Length #n* field, see 144.3.7.1). All granted LLIDs share the same grant start time (*Grant Start Time* field, see 144.3.7.1). An ONU begins transmission when its *LocalTime* variable matches the value indicated in the *Grant Start Time* field in the GATE message. An ONU concludes its transmission with sufficient margin to ensure that the laser is turned off before the grant length interval has elapsed.

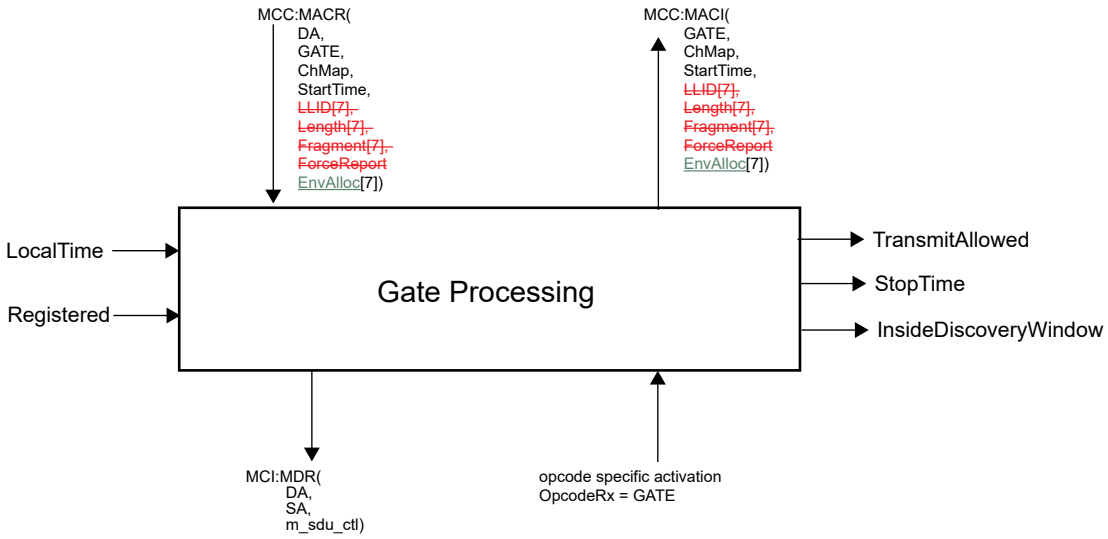
Multiple outstanding grants may be issued to each ONU. The OLT shall not issue to an ONU more outstanding envelope allocations than the pending envelopes parameter advertised during registration (see ~~*p*~~*Pending* ~~*e*~~*Envelopes* in ~~144.xxxx~~144.3.7.3).

Editor's Note (to be removed prior to publication): review the draft for consistency of envelope-related nomenclature.

In order to maintain the watchdog timer at the ONU, grants are periodically generated for that ONU. For this purpose empty GATE messages may be issued periodically.

~~When registered, the ONU ignores all DISCOVERY GATE MPCPDUs where the Discovery flag is set.~~

Editor's Note (to be removed prior to publication): contributions on what to do in case of granting more than 7 LLID are needed.



Instances of Service Interface:
MCI = interface to MAC Control multiplexer
MCC = interface to MAC Control client

Figure 144–10—Gate Processing service interface

144.3.5.1 Constants

MpcpProcessingDly

TYPE: 32-bit unsigned
This constant represents the minimum time required for the ONU to complete MPCPDU processing, expressed in the units of 1 EQ.
Value: 0x00001900 (16.384 μs)

144.3.5.2 Variables

ChIndex
TYPE: 2-bit unsigned integer
The value of this variable indicates the channel the Envelope Descriptor is intended for, where the value of 0 corresponds to channel 0, value of 1 - channel 1, etc.

ChMap[]
TYPE: 4-bit unsigned integer
The value of this variable corresponds the value of bits 0 through 3 of the *Channel Assignment* field in the GATE MPCPDU (see Table 144–1).

ChStatus
TYPE: 4-bit unsigned integer
The value of this variable represents a binary-encoded status of individual channels at the ONU. The status of each channel is position encoded, where bit 0 corresponds to channel 0, bit 1 - channel 1, etc. The value of each bit has the following meaning:
1 = channel is enabled
0 = channel is disabled

144.3.5.3 Functions

None

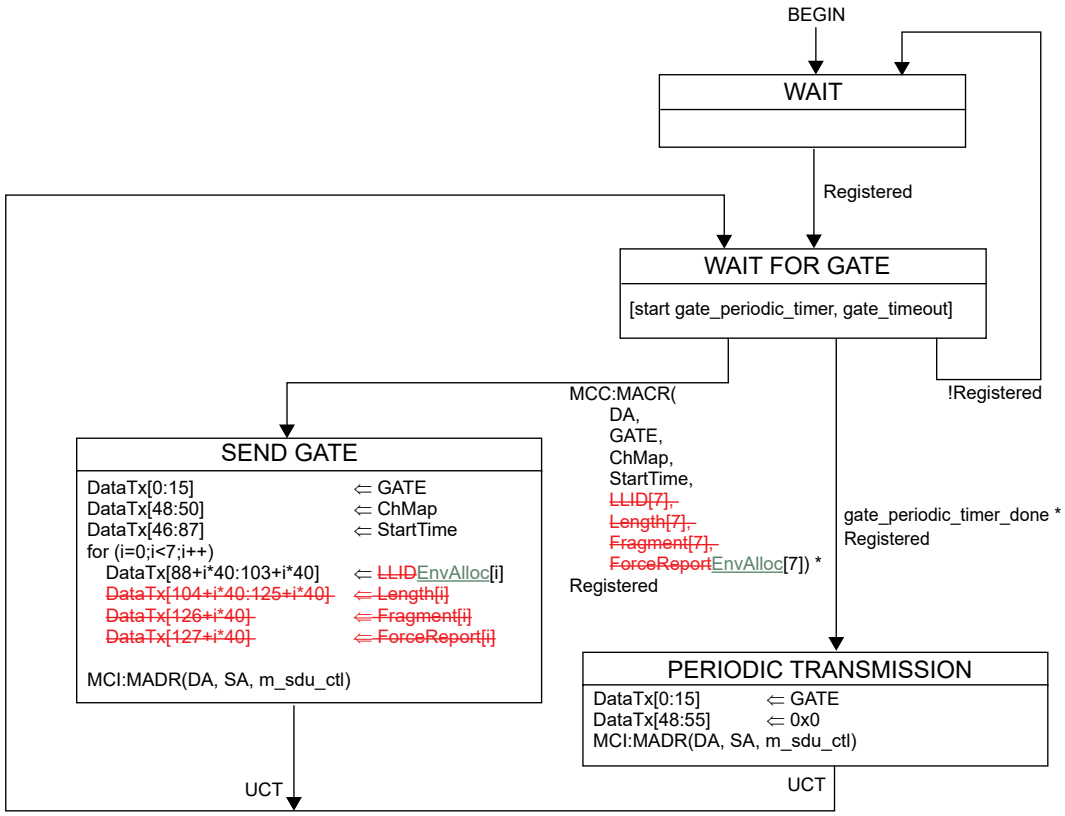
144.3.5.4 Messages

MA_DATA.request (DA, SA, m_sdu)
The service primitive is defined in 2.3.2.

MCC:MACR(DA, GATE, ChMap, StartTime, ~~LLID[7], Length[7], Fragment[7], ForceReport~~EnvAlloc[7])
This service primitive is defined in 144.3.3.5.

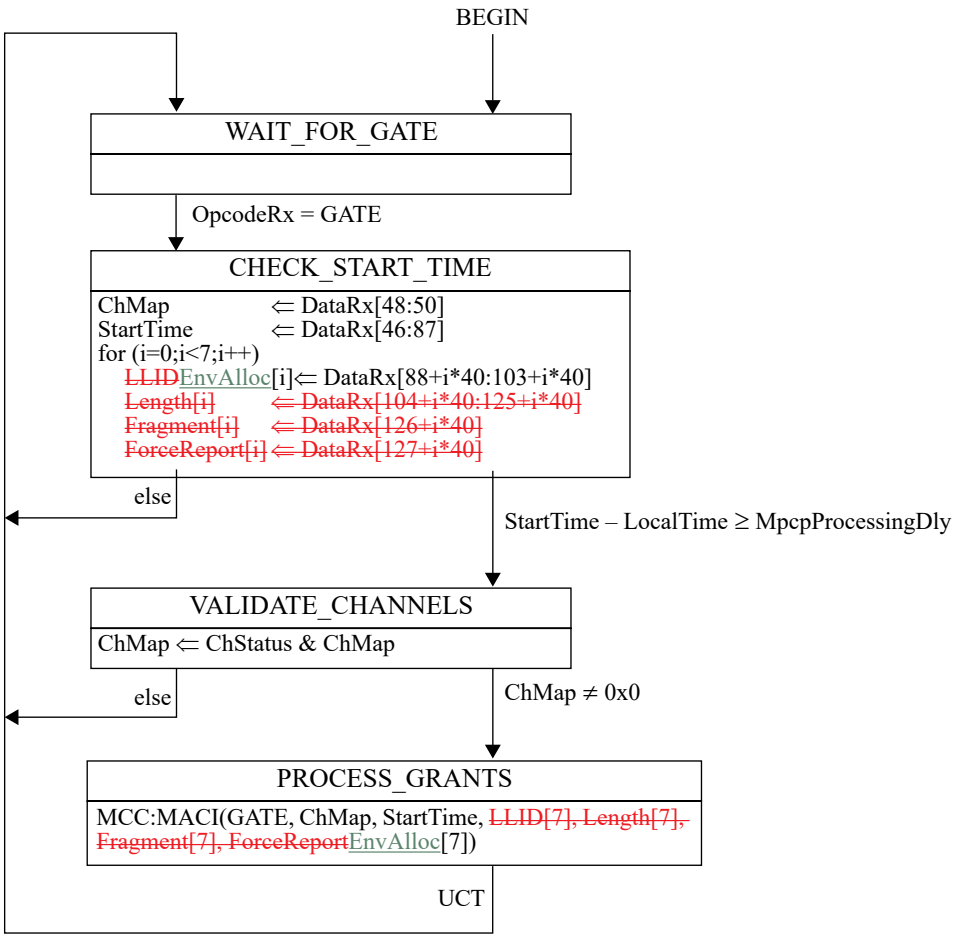
144.3.5.5 State diagram

The Gate Process in the OLT shall implement the Gate Processing state diagram as shown in Figure 144–15. The Gate Process in the ONU shall implement the Gate Processing state diagram as shown in Figure 144–16. Should there be a discrepancy between a state diagram and descriptive text, the state diagram prevails.



Instances of Service Interface:
MCI = interface to MAC Control multiplexer
MCC = interface to MAC Control client

Figure 144–15—Gate Processing state diagram at OLT



Instances of Service Interface:
MCC = interface to MAC Control client

Figure 144–16—ONU GATE Reception Process state diagram