144.4.2 CCPDU structure and encoding

The CCPDU structure is shown in Figure 144–26, and is further defined as follows:

DestinationAddress:
In CCPDUs, the *DestinationAddress* is the MAC Control Multicast address as specified in the annexes to Clause 31.

SourceAddress:
In CCPDUs, the *SourceAddress* is the individual MAC address associated with the MLID through which the CCPDU is transmitted. For CCPDUs originating at the OLT, this can be the address of any individual MAC. These MACs may all share a single unicast address, as explained in {TBD}.

Length/Type:
In CCPDUs, this field carries the *MAC_Control_Type* field value as specified in 31.4.1.3.

Opcode:
This field identifies the specific CCPDU being encapsulated. *Opcode* field values are defined in Table 31A–1.

OperandList:
A set of opcode-specific fields as defined in 144.4.2.1 and 144.4.2.2.

Pad:
This field is present only when the total length of the *OperandList* is below 44 octets. The *Pad* field is added to bring the CCPDU length up to the minimum frame size (see 4A.2.3.2.4). This field is filled with zeros on transmission, and is ignored on reception.

FCS:
This is the Frame Check Sequence, typically generated by the MAC.

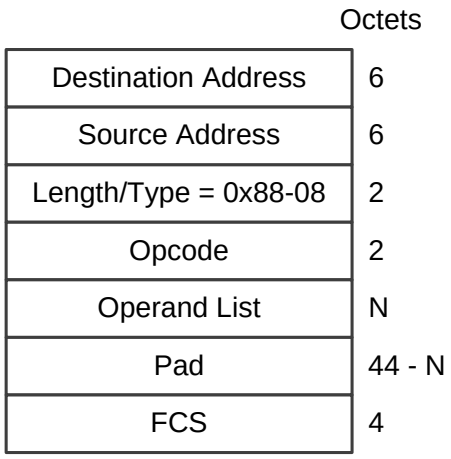

Figure 144-26 – Generic CCPDU format

Fields within a frame are transmitted from top to bottom. When consecutive octets are used to represent a single numerical value, the most significant octet is transmitted first, followed by successively less significant octets. Bits within each octet are transmitted from LSB to MSB.

144.4.2.1 CC_REQUEST description

The CC_REQUEST CCPDU is used by the OLT to query the state of ONU's channel(s) or change the state of ONU's channel(s), depending on the specific action code carried in the action field associated with the given upstream or downstream channel.

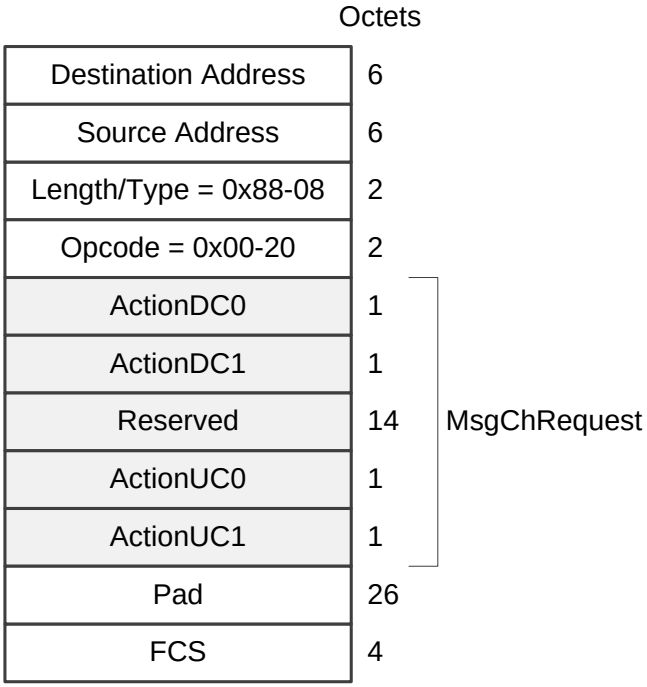

Figure 144-27 – Format of CC_REQUEST CCPDU

The CC_REQUEST CCPDU is an instantiation of the Generic CCPDU and shall be as shown in Figure 144–27. The CC_REQUEST CCPDU is identified by the *Opcode* field value of 0x00-20. The *MsgChRequest* structure represents a set of opcode-specific fields, defined as follows:

ActionDC0:
This 8-bit field conveys the action requested for the downstream channel 0 (DC0). The encoding of this field is defined in Table 144–10.

ActionDC1:
This 8-bit field conveys the action requested for the downstream channel 1 (DC1). The encoding of this field is defined in Table 144–10.

ActionUC0:
This 8-bit field conveys the action requested for the upstream channel 0 (UC0). The encoding of this field is defined in Table 144–10.

ActionUC1:
This 8-bit field conveys the action requested for the upstream channel 1 (UC1). The encoding of this field is defined in Table 144–10.

Table 144-10 – Encoding of the channel action

Bit	Field Name	Value	Description
0-3	*ActionCode*	0x0	No action
		0x1	Disable channel
		0x2	Enable channel
		0x3-0xF	Reserved, ignored on reception
4-6	Reserved, ignored on reception		
7	*PersistenceFlag*	0	The channel action is non-persistent, i.e., the requested channel state is not preserved across the reset event. Upon reset, the channel reverts to its previous persistent state.
		1	The channel action is persistent, i.e., the requested channel state is to preserved across the reset event

144.4.2.2 CC_RESPONSE description

The CC_RESPONSE CCPDU is generated by the ONU to report its current channel(s) state and/or convey to the OLT the result code for the last requested action (CC_REQUEST CCPDU).

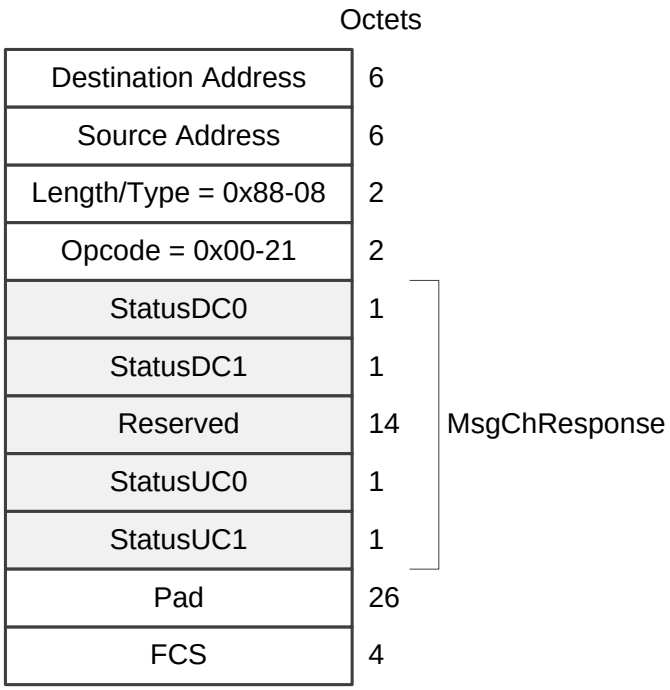

Figure 144-28 – Format of CC_RESPONSE CCPDU

The CC_RESPONSE CCPDU is an instantiation of the Generic CCPDU and shall be as shown in Figure 144–28. The CC_RESPONSE CCPDU is identified by the *Opcode* field value of 0x00-21. The *MsgChResponse* structure represents a set of opcode-specific fields, defined as follows:

StatusDC0:

This 8-bit field carries the channel state and the action response code for the downstream channel 0 (DC0). The encoding of this field is defined in Table 144–11.

StatusDC1:

This 8-bit field carries the channel state and the action response code for the downstream channel 1 (DC1). The encoding of this field is defined in Table 144–11.

StatusUC0:

This 8-bit field carries the channel state and the action response code for the upstream channel 0 (UC0). The encoding of this field is defined in Table 144–11.

StatusUC1:

This 8-bit field carries the channel state and the action response code for the upstream channel 1 (UC1). The encoding of this field is defined in Table 144–11.

Table 144-11 **– Encoding of the channel status**

Bit	Field Name	Value	Description
0-3	*ChannelState*	0x0	Channel absent
		0x1	Channel enabled
		0x2	Channel disabled remotely (by the OLT)
		0x3	Channel disabled locally (by the ONU)
		0x4	Channel failure (PMD failure)
		0x5-0xF	Reserved, ignored on reception
7	*ActionResultCode*	0x0	No action requested
		0x1	Action succeeded
		0x2	Action failed
		0x3	No change required, i.e., the channel is already in the requested state
		0x4	Invalid command, e.g., the operation was requested for a non-existing channel
		0x5-0xF	Reserved, ignored on reception