2. Media Access Control (MAC) service specification

Editors' Notes: To be removed prior to final publication.

Revision History:
Draft 0.1, March 2005 Initial draft for FE Task Force review.

2.1 Scope and field of application

This clause specifies the services provided by the Media Access Control (MAC) sublayer and the optional MAC Control sublayer to the client of the MAC (see Figure 1–1). MAC clients may include the Logical Link Control (LLC) sublayer, Bridge Relay Entity, or other users of ISO/IEC LAN International Standard MAC services (see Figure 2–1). The services are described in an abstract way and do not imply any particular implementation or any exposed interface. There is not necessarily a one-to-one correspondence between the primitives and the formal procedures and interfaces described in Clause 4 and Clause 31. The MAC client service primitives MA_DATA.request and MA_DATA.indication interface between the MAC Control Sublayer and the MAC.

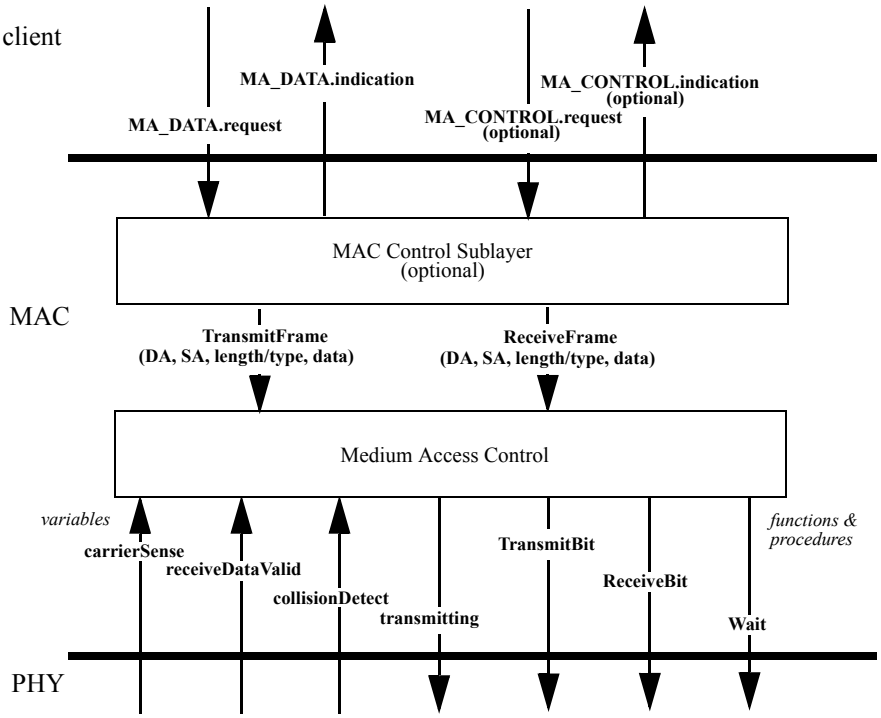

Figure 2–1—Service specification primitive relationships (optional MAC control sublayer implemented)

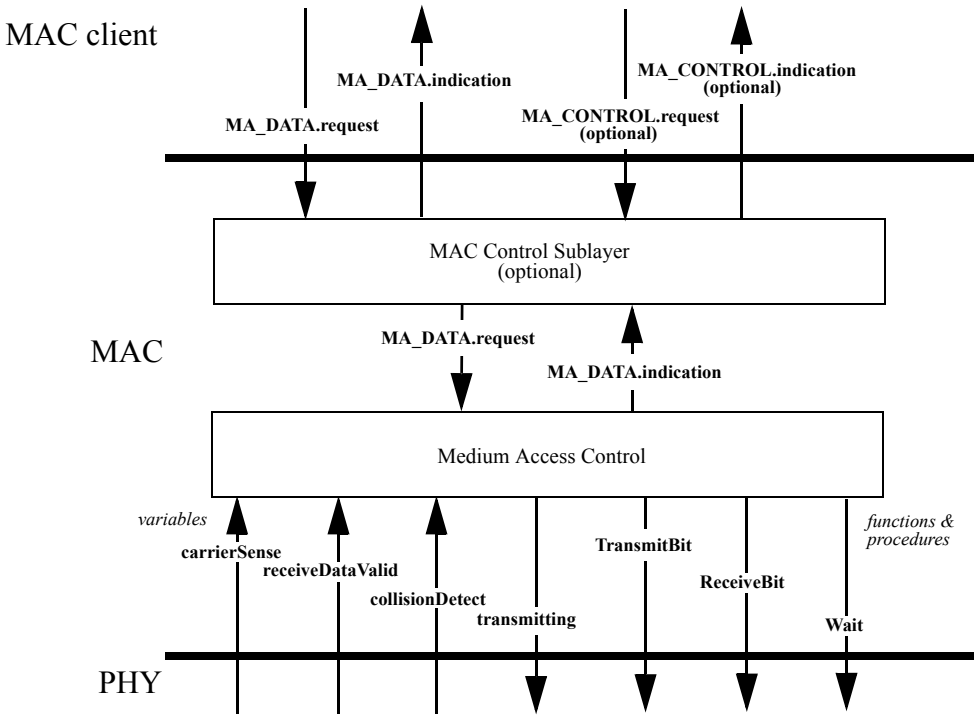

Figure 2–1—Service specification primitive relationships (optional MAC control sublayer implemented)

2.2 Overview of the service

2.2.1 General description of services provided by the layer

The services provided by the MAC sublayer allow the local MAC client entity to exchange LLC data units with peer LLC sublayer entities. Optional support may be provided for resetting the MAC sublayer entity to a known state.

The optional MAC control sublayer provides an additional service for controlling MAC operation. This may be used to provide flow control between peer MAC client entities across the underlying channel.

2.2.2 Model used for the service specification

The model used in this service specification is identical to that used in 1.2.

2.2.3 Overview of interactions

MA_DATA.request
MA_DATA.indication
MA_CONTROL.request (used by optional MAC Control sublayer)
MA_CONTROL.indication (used by optional MAC Control sublayer)

2.2.4 Basic services and options

The MA_DATA.request and MA_DATA.indication service primitives described in this subclause are mandatory. The MA_CONTROL.request and MA_CONTROL.indication service primitives are mandatory if the optional MAC Control sublayer is implemented.

2.3 Detailed service specification

2.3.1 MA_DATA.request

2.3.1.1 Function

This primitive defines the transfer of data from a MAC client entity to a single peer entity or multiple peer entities in the case of group addresses.

2.3.1.2 Semantics of the service primitive

The semantics of the primitive are as follows:

```
MA_DATA.request     (
                    destination_address,
                    source_address,
                    mac_service_data_unit,
                    frame_check_sequence
                    )
```

The destination_address parameter may specify either an individual or a group MAC entity address. It must contain sufficient information to create the DA field that is prepended to the frame by the local MAC sublayer entity and any physical information. The source_address parameter, if present, must specify an individual MAC address. If the source_address parameter is omitted, the local MAC sublayer entity will insert a value associated with that entity. The mac_service_data_unit parameter specifies the MAC service data unit to be transmitted by the MAC sublayer entity. There is sufficient information associated with the mac_service_data_unit for the MAC sublayer entity to determine the length of the data unit. The frame_check_sequence parameter, if present, must specify the frame check sequence field for the frame (see 3.2.8). If the frame_check_sequence parameter is omitted, the local MAC sublayer entity will compute this field and append it to the end of the frame.

2.3.1.3 When generated

This primitive is generated by the MAC client entity whenever data shall be transferred to a peer entity or entities. This can be in response to a request from higher protocol layers or from data generated internally to the MAC client, such as required by Type 2 LLC service.

2.3.1.4 Effect of receipt

The receipt of this primitive will cause the MAC entity to insert all MAC specific fields, including DA, SA, and any fields that are unique to the particular media access method, and pass the properly formed frame to the lower protocol layers for transfer to the peer MAC sublayer entity or entities.

2.3.1.5 Additional comments

If this primitive contains the frame_check_sequence parameter, the MAC client entity must take into account this parameter's special bit-transmission order requirements, as specified in 3.3.

The mapping between the MA_UNITDATA.request primitive specified in ISO/IEC 15802-1 (for end stations) and the MA_DATA.request primitive specified here is as follows:

a) The user_priority parameter specified for MA_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.
b) The access_priority parameter specified for MA_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.
c) The frame_check_sequence parameter is not present for MA_UNITDATA.request.

The mapping between the M_UNITDATA.request primitive specified in ISO/IEC 15802-3 (for MAC Bridges) and the MA_DATA.request primitive specified here is as follows:

a) The frame_type parameter specified for M_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.
b) The mac_action parameter specified for M_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.
c) The user_priority parameter specified for M_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.
d) The access_priority parameter specified for M_UNITDATA.request is not relevant for IEEE 802.3 operation and is ignored by MA_DATA.request.

2.3.2 MA_DATA.indication

2.3.2.1 Function

This primitive defines the transfer of data from the MAC sublayer entity (through the optional MAC Control sublayer, if implemented) to the MAC client entity or entities in the case of group addresses.

2.3.2.2 Semantics of the service primitive

The semantics of the primitive are as follows:

```
MA_DATA.indication      (
                        destination_address,
                        source_address,
                        mac_service_data_unit,
                        frame_check_sequence,
                        reception_status
                        )
```

The destination_address parameter may be either an individual or a group address as specified by the DA field of the incoming frame. The source_address parameter is an individual address as specified by the SA field of the incoming frame. The mac_service_data_unit parameter specifies the MAC service data unit as received by the local MAC entity. The frame_check_sequence parameter is the cyclic redundancy check value (see 3.2.8) as specified by the FCS field of the incoming frame. This parameter may be either omitted or (optionally) passed by the MAC sublayer entity to the MAC client. The reception_status parameter is used to pass status information to the MAC client entity.

2.3.2.3 When generated

The MA_DATA.indication is passed from the MAC sublayer entity (through the optional MAC Control sublayer, if implemented) to the MAC client entity or entities to indicate the arrival of a frame to the local MAC sublayer entity that is destined for the MAC client. Such frames are reported only if they are validly formed,

received without error, and their destination address designates the local MAC entity. Frames destined for the optional MAC Control sublayer are not passed to the MAC client if the MAC Control sublayer is implemented.

2.3.2.4 Effect of receipt

The effect of receipt of this primitive by the MAC client is unspecified.

2.3.2.5 Additional comments

If the local MAC sublayer entity is designated by the destination_address parameter of an MA_DATA.request, the indication primitive will also be invoked by the MAC entity to the MAC client entity. This characteristic of the MAC sublayer may be due to unique functionality within the MAC sublayer or characteristics of the lower layers (for example, all frames transmitted to the broadcast address will invoke MA_DATA.indication at all stations in the network including the station that generated the request).

If this primitive contains the frame_check_sequence parameter, the MAC client entity must take into account this parameter's special bit-transmission order requirements, as specified in 3.3.

The mapping between the MA_DATA.indication primitive specified here and the MA_UNITDATA.indication primitive specified in ISO/IEC 15802-1 (for end stations) is as follows:

a) The user_priority parameter specified for MA_UNITDATA.indication is not relevant for IEEE 802.3 operation.
b) The frame_check_sequence parameter is not present for MA_UNITDATA.indication.
c) The reception_status parameter is not mapped to any parameter and is ignored by MA_UNITDATA.indication.

The mapping between the MA_DATA.indication primitive and the M_UNITDATA.indication primitive specified in ISO/IEC 15802-3 (for MAC Bridges) is as follows:

a) The frame_type parameter specified for M_UNITDATA.indication is not relevant for IEEE 802.3 operation and is always assigned the value of user_data_frame.
b) The mac_action parameter specified for M_UNITDATA.indication is not relevant for IEEE 802.3 operation and is always assigned the value of request_with_no_response.
c) The user_priority parameter specified for M_UNITDATA.indication is not relevant for IEEE 802.3 operation.
d) The reception_status parameter is not mapped to any parameter and is ignored by M_UNITDATA.indication.

2.3.3 MA_CONTROL.request

This primitive defines the transfer of control requests from the MAC client to the MAC Control sublayer. Implementation of the MA_CONTROL.request primitive is mandatory if the optional MAC Control sublayer is implemented in a device.

2.3.3.1 Function

This primitive defines the transfer of control commands from a MAC client entity to the local MAC Control sublayer entity.

2.3.3.2 Semantics of the service primitive

The semantics of the primitive are as follows:

```
MA_CONTROL.request      (
                        destination_address,
                        opcode,
                        request_operand_list
                        )
```

The destination_address parameter may specify either an individual or a group MAC entity address. It must contain sufficient information to create the DA field that is prepended to the frame by the local MAC sublayer entity. The opcode specifies the control operation requested by the MAC client entity. The request_operand_list is an opcode-specific set of parameters.

The valid opcodes and their respective meanings are defined in Clause 31.

2.3.3.3 When generated

This primitive is generated by a MAC client whenever it wishes to use the services of the optional MAC Control sublayer entity.

2.3.3.4 Effect of receipt

The effect of receipt of this primitive by the MAC Control sublayer is opcode-specific. (See Clause 31.)

2.3.4 MA_CONTROL.indication

2.3.4.1 Function

This primitive defines the transfer of control status indications from the MAC Control sublayer to the MAC client. Implementation of the MA_CONTROL.indication primitive is mandatory if the optional MAC Control sublayer is implemented in a device.

2.3.4.2 Semantics of the service primitive

The semantics of the primitive are as follows:

```
MA_CONTROL.indication       (
                            opcode,
                            indication_operand_list
                            )
```

The elements of the indication_operand_list are opcode-specific, and specified in the annexes to Clause 31.

2.3.4.3 When generated

The MA_CONTROL.indication is generated by the MAC Control sublayer under conditions specific to each MAC Control operation.

2.3.4.4 Effect of receipt

The effect of receipt of this primitive by the MAC client is unspecified.