Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**Bridging Support for 802.16**	
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Re:	Call for Contributions on Prospective Project 802.16k. Doc IEEE 802.16-06/010	
Abstract	A complete proposed amendment to 802.1D to specify how the ISS and bridging is supported over 802.16 networks.	
Purpose	To be considered and adopted as the draft standard for IEEE 802.16k	
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Bridging of IEEE 802.16

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IEEE Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges

Amendment 2: Bridging of IEEE 802.16™

Editor's NOTE-The editing instructions contained in this amendment define how to merge the material contained herein into the existing base standard and its amendments to form a comprehsive standard.

The editing instructions are shown ***bold italic.*** Four editing instructions are used: ***change***, ***delete***, ***insert***, and ***replace***. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by either by using ~~strikethrough~~ (to remove old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make large changes in existing text, subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.

Insert 6.5.5 before the existing 6.5.5, renumber the existing 6.5.5 to be 6.5.6 and insert the following material into 6.5.5.

6.5.5 Support by IEEE 802.16^{TM}-2004 (WMAN)

The WMAN MAC access method is specified in IEEE Std 802.16. Clause 5 of that standard specifies the Service Specific Convergence Sublayers (CS) that implement the 802.16 MAC service. Clauses 5.2.4 (802.3 Packet CS) and 5.2.5 (802.1 Packet CS) describe the modes of the Packet CS that support bridging. Clause 5.1 (ATM CS) and clause 5.2.6 (Packet CS IP specific part) directly support neither bridging nor the ISS. Clause 6 specifies the MAC Common Part Sublayer (MAC CPS) transmission and reception procedures and Annex C describes the MAC CPS service definition.

In IEEE Std 802.16 there is no explicit definition of the MAC service definition for the 802 Packet CS nor the 802.3 Packet CS. The 802.3 Packet CS MAC service is defined in IEEE std 802.3 clause 2 and the 802 Packet CS MAC service is defined to be the ISS (6.4).

The 802.16 MAC CPS presents a connection oriented MAC service. Both the 802.3 and 802.1 packet CS utilize this service to present either the 802.3 or ISS MAC service respectively. A pair of comminicating peer CS entities between an 802.16 BS and and 802.16 SS create a point to point LAN as defined in 6.4.3.

6.5.5.1 Support for ISS under IEEE Std 802.16 802.3 Packet CS

The **frame_type**, **destination_address**, **source_address**, **mac_service_data_unit**, **user_priority** and **frame_check_sequence** parameters of the M_UNITDATA primitive are encoded as described in 6.5.1.

The value of operPointToPointMAC (6.4.3) shall be TRUE.

The value of MAC_Enabled shall be determined by the procedure described in 6.5.1.

When the 802.16 SS has registered with the BS, authenticated, performed capabilities negotiation and the 802.1 Packet CS has established the active MAC CPS service flows necessary to carry 802 frames then the value of the MAC_Operational parameter shall be determined by the procedure described in 6.5.1 otherwise the value of MAC_Operational shall be FALSE.

Frame size limits are determined by IEEE std 802.3.

6.5.5.2 Support for the ISS under the IEEE Std 802.16 802.1 Packet CS

On reception of a valid M_UNITDATA.request at the ISS, a MAC CPS MSDU will be generated and passed to the MAC CPS SAP.

On reception of a MAC CPS MSDU from the MAC CPS SAP, an M_UNITDATA.indication will be generated and passed up to the ISS.

The **frame_type** parameter of the M_UNIDATA primitive takes only the value user_data_frame and is not encoded in MAC CPS MSDUs.

The **destination_address** parameter of the M_UNIDATA primitive is encoded into the MAC CPS MSDU as described in 6.5.5.2.1.

The **source_address** parameter of the M_UNIDATA primitive is encoded into the MAC CPS MSDU as described in 6.5.5.2.1.

The **mac_service_data_unit** parameter of the M_UNIDATA primitive is encoded into the MAC CPS MSDU as described in 6.5.5.2.1.

The **user_priority** parameter of the M_UNIDATA primitive is encoded directly in the ISSP byte of the the MAC CPS MSDU as described in 6.5.5.2.1.1.

The **access_priority** parameter found in the M_UNITDATA.request primitive is encoded directly in the ISSP byte of the MAC CPS MSDU as described in 6.5.5.2.1.1.

The packet classification and CID mapping procedure described in clause 5.2.2 of IEEE std 802.16 may make use the value of the **user_priority** and **access_priority** parameters in determining the CID mapping and hence the Service Flow Management Encoding (IEEE std 802.16, Clause 11.13) under which the frame is transmitted. Clause 5.2.2 of IEEE std 802.16 describes all the information that may additionally be used in determining this mapping.

The **frame_check_sequence** parameter found in the M_UNITDATA.request primitive is not encoded in the MAC CPS MSDU. A frame check sequence is calculated according to the procedure in IEEE std 802.16, Clause 6.3.3.5 but this is computed over and added to the MAC CPS MPDU. Any MAC CPS MPDU might not have a 1:1 correspondence with any MAC CPS MSDU, since fragmentation (IEEE std 802.16, Clause 6.3.3.3) and packing (IEEE std 802.16, Clause 6.3.3.4) processes in the MAC CPS can destroy this correspondence.

The value of operPointToPointMAC (6.4.3) shall be TRUE.

The value of MAC_Enabled shall be TRUE.

When the 802.16 SS has registered with the BS, authenticated, performed capabilities negotiation and the 802.1 Packet CS has established the active MAC CPS service flows necessary to carry 802 frames then the value of the MAC_Operational parameter shall be TRUE otherwise the value of MAC_Operational shall be FALSE.

IEEE std 802.16 imposes no limit on the length of a MAC CPS MSDU. However 6.5.5.2.1 encodes a 2 byte, 16 bit length encoding for the **mac_service_data_unit**, therefore the maximum total length of the a MAC CPS MSDU encoded under the 802.1 CS is limited to 65536 bytes, not including the 15 header bytes (6.5.5.2.1) or the single byte PHSI (IEEE std 802.16, Clause 5.2.1).

6.5.5.2.1 Encoding of the M_UNITDATA primitive in the MAC CPS MSDU Payload Data

The MAC CPS MSDU payload data format encodes five fields: ISSP, DA, SA, Length and Payload.

Figure 6-2 shows the five fields of the frame: the Internal Sublayer Service Priority (ISSP), the frame's source and destination, a length field to indicate the length of the following field that contains the **mac_service_data_unit** and a field that contains the **mac_service_data_unit**.

The ordering of bytes within the SA, DA and length fields shall be consistent with the ordering of bytes within the SA, DA and LENGTH\TYPE fields described in IEEE std 802.3, Clause 3.2.

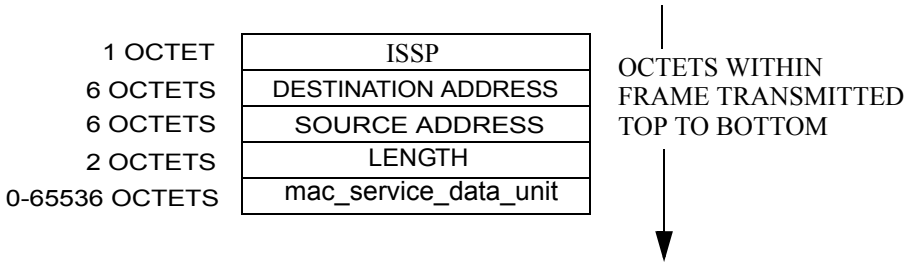

Figure 6-2 MAC CPS MSDU Frame Format

6.5.5.2.1.1 ISSP Encoding

The ISS Priority byte (ISSP) shown in Figure 6-2 is a 1 byte encoding of the **user_priority** and **access_priority** parameters from the M_UNITDATA.request primitive.

The value of the **user_priority** parameter is encoded as a three bit number in bits 6, 7 and 8 of the ISSP byte, where bit 8 is the most significant bit and bit 6 the least significant bit.

The value of the **access priority** parameter is encoded as a three bit number in bits 3, 4 and 5 of the ISSP byte, where bit 5 is the most significant bit and bit 3 is the least significant bit.

Bits 1 and 2 of the ISSP byte are reserved and shall each be 0.

6.5.5.2.2 VLAN TPID and TCI encoding in the 802.1 CS

VLAN tags (IEEE Std 802.1Q, Clause 9) within the **mac_service_data_unit** parameter of an M_UNITDATA primitive at the ISS of an 802.16 802.1 Packet CS shall be encoded as an 8 byte SNAP encoded TPID (IEEE std 802.1Q-2003, Clause 9.3.1.2) followed by a 2 byte TCI field (IEEE std 802.1Q-2003, Clause 9.3.2).

7.7.5 Priority Mapping

Insert the following column with heading entitled "IEEE 802.16" between columns titled "802.11" and "IEEE 802.17" in Table 7-4:

Table 7-4—Outbound Access Priorities

user_priority	Outbound Access Priority per MAC type
	IEEE 802.16
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

Annex A

Change the first row of table A.6 Media Access Control Methods as follows:

A.6 Media Access Control Methods

Item	Feature	Status	Reference	Support
	Which Media Access Control methods are implemented in accordance with the relevant MAC standards?		6.4, 6.5	
MAC-802.3	CSMA/CD, IEEE Std 802.3	O.1		Yes [ ] No [ ]
MAC-802.5	Token Ring, IEEE Std 802.5	O.1		Yes [ ] No [ ]
MAC-9314-2	FDDI, ISO 9314-2	O.1		Yes [ ] No [ ]
MAC-802.11	Wireless LAN, IEEE Std 802.11	O.1		Yes [ ] No [ ]
MAC-802.16	Wireless MAN, IEEE Std 802.16	O.1		Yes [ ] No [ ]
MAC-802.17	Resilient Packet Ring, IEEE Std 802.17	O.1		Yes [ ] No [ ]