Doc 11-03-166R1-F-TGf-Recirc 2 Ballot Comments (by clause)

Clause Former appendix B (Manag

Author: **Butch Anton**

Comment Type: ***Technical*** *Vote:* ***Disapprove*** *Comment Status:* ***Declined*** *Cmntr Response:* ***Open***

Page	Line	ID	Comment	Suggested Remedy	Resolution
0	0	+02	The management MIB has been removed.	Put the management MIB back.	A good part of the Mgt MIB that was in D4.1 and removed for D5.0, was inappropriate as it involved parameters that can't be implemented from 802.11 compliant systems. The TG thinks that the functions of the Mgt MIB would be better accomplished in a standard doc rather than a rec practice doc and that this would also be a better approach for per station info. The Mgt MIB in D4.1 had some overlap with other chartered TGs (e.g. Tge, TGi) and TGf didn't want to reintroduce the conflict (this would not have been an issue with the suggested remedy from cmnt 108, but would have been for cmnt 107 from RC2). The TG declines the suggested remedy from 108 and declines comment 107.

Clause General

Author: **Andrew Germano**

Comment Type: ***Technical*** *Vote:* ***Approve*** *Comment Status:* ***Declined*** *Cmntr Response:* ***Open***

Page	Line	ID	Comment	Suggested Remedy	Resolution
0	0	+02	There is no mechanism for network management health messaging between AP's and PHY layer only devices or AP's in repeater mode.	Include support for OOK PHY layer signaling between AP's to support out of band network management health messaging capability.	Proposed resolution: The comment is beyond the scope of the recirculation ballot as it does not refer to text that changed for RC2 or text that was affected by text that changed.

Author: **David Bagby**

Comment Type: ***Technical*** *Vote:* ***Disapprove*** *Comment Status:* ***Accepted*** *Cmntr Response:* ***Open***

Page	Line	ID	Comment	Suggested Remedy	Resolution

0	0	+02	Patent Claims identified between RC1 and RC2: I am concerned that patents have been identified that the owner claims may bear on TGf. I understand that these claims were only identified after the January 2003 meeting, but before RC2 was initiated. Therefore, I believe that the TG has had no opportunity to discuss the potential impact of these claims or to investigate if the claims could have been avoided.	I will have to vote disapprove until the TG at least considers the impact of the claims and provides an explanation of the TG's position wrt to those claims.	TG has considered that the letters of assurance provided to the IEEE by Agere, Ericsson, and Trapeze meet with the IEEE requirements for letters of assurance and state that the companies are willing to license the technology involved per IEEE rules, and that this is sufficient to forward the TGf draft to Rev Com for publication.

0	0	+02	Dear Sirs, I find that I must reverse my previous approval of IEEE 802.11 TGF draft 4.1 and change my vote to “disapprove” for draft 5.0. My change of vote is based on the following strong concerns: 1) In draft 5.0, the Task group has completely removed the AP management MIB. This is unacceptable to this reviewer. 2) There was no reasonable explanation provided by the task group to this reviewer as re why the MIB was removed. 3) The Task group has only recently been notified that a company now claims that TGF infringes on multiple patents. Each of these concerns is expanded below. Removal of the management MIB w/o explanation: In the original sponsor ballot review, I submitted a comment that identified the fact that the TG had not met their adopted functional requirements wrt to management of APs. The adopted functional requirement was loosely specified and left much room for interpretation, but I felt that zero management ability clearly did not satisfy the adopted requirement. I suggested a set of functionality that I would like to see included (see my original sponsor ballot comment near the end of this letter for reference). As a result of sponsor ballot comment processing, the TG adopted a management MIB proposal from another TG participant which resulted in the Management MIB in annex B in draft 4.1. Partially on the basis of the included MIB functionality I changed my vote from “disapprove” to “approve” during recirculation ballot #1. Now I have received recirculation ballot #2 and I find that the entire management MIB has been removed for draft 5.0. From a functionality standpoint, I cannot accept that change. From a process standpoint, I feel that the task group has simply blown off my comments w/o justification. I wanted to find out why the TG had taken this action.	See submitted ballot file for compromise MIB proposal.	A good part of the Mgt MIB that was in D4.1 and removed for D5.0, was inappropriate as it involved parameters that can't be implemented from 802.11 compliant systems. The TG thinks that the functions of the Mgt MIB would be better accomplished in a standard doc rather than a rec practice doc and that this would also be a better approach for per station info. The Mgt MIB in D4.1 had some overlap with other chartered TGs (e.g. Tge, TGi) and TGf didn’t want to reintroduce the conflict (this would not have been an issue with the suggested remedy from cmnt 108, but would have been for cmnt 107 from RC2). The TG declines the suggested remedy from 108 and declines comment 107.

As a sponsor group member, I was provided essentially zero information as to the justification for this action. I note that in the comment response document sent for this ballot, there is only a note from the Chairman of the TG (provided after the meeting) that the group did not update the response to my comment after explicitly reversing their position. I was directed to the minutes of the meeting, which I have read. In the minutes, I have only found a single sentence explanation about there being inadequate time to review the management MIB.

I find that explanation to be specious and inadequate.

The management MIB was sent out in draft 4.1 for recirc ballot 1. The ballot period for Rc1 was set by the task group to a significantly longer than the minimum required. In fact, it was the maximum number of days possible given the constraints of the TG's scheduled meetings. The cover information for that ballot called out this fact. Therefore it seems reasonable to assume that the TG felt the RC1 period was adequate time for review.

Between RC1 and RC2, the task group made much more significant changes to the draft – specifically the inclusion of a major new portion of functionality for "fast roaming". It is my understanding that significant portions of that proposal were actually invented during the January meeting. While it is not my intent to fault the fast roaming mechanism, I do note that it represent major functionality, finished and inserted at the January meeting, and then the TG ran a default 10 day recirculation ballot for RC2… Yet the explanation for removal of the management MIB is "inadequate review time"?

The TG has zero credibility when acting this way. If the TG review had any technical explanation for the changes in the management MIB, it should have been provided for consideration.

Given other information this reviewer has independently found after the January meeting, I am suspicious that the actions of the task group in January were the result of a small self interest group that simply did not want to be bothered with the work required to provide a technical justification for changes to the previously adopted management MIB - instead it was simply deleted.

(This situation is of particular concern to this reviewer since I am also the TG Chair. The January '03 meeting was the first TGf meeting during the entire course of the project that, for health reasons, I could not attend.)

Now the operative question is what will it take for this reviewer to change the vote back to "Approve" wrt to the management MIB issues?

I have gone to some effort to attempt to understand what some of the underlying issues are that resulted in this situation. While I do not share all the concerns or positions that I have had expressed to me, after considering them, I have created a revised minimal management MIB proposal. If adopted, this would likely satisfy my concerns wrt to this topic.

Extracting the deleted text from draft 5.0 and altering it created the included MIB text. I have also inserted (MS word style) comments to give brief explanations for the changes. The text editing is not detailed enough such that the TG should anticipate the text to be ready to compile in to a MIB – it is simply offered as fairly detailed guidance as to what would satisfy this reviewer's position wrt to this topic.

The high level summary of the changes is:
1) Retention of the ability to find from an AP what stations are associated to it and what the AP knows about the stations.
2) Deletion of much of the control aspect of the MIB. While I actually support the ability to control APs, I am concerned over the potential security side effects of using MIB variables to do so, given that anyone could access the variables. Note that in my original Sponsor Ballot comment I called this issue out and suggested that the TG address access control to the "control MIB variables".
3) Finally, a request from my original Sponsor ballot comment re AP management has never been addressed. In that review round, I requested that it be possible to ask an AP what ESS it belongs to (See orig comment below for more information). I again request that this be added to the management MIB before I can change my vote to "approve" again.

Patent Claims identified between RC1 and RC2:
I am concerned that patents have been identified that the owner claims may bear on TGf. I understand that these claims were only identified after the January 2003 meeting, but before RC2 was initiated.

Therefore, I believe that the TG has had no opportunity to discuss the potential impact of these claims or to investigate if the claims could have been avoided.

I will have to vote disapprove until the TG at least considers the impact of the claims and provides an explanation of the TG's position wrt to those claims.

Orig TGf Sponsor ballot comment re AP management included for reference:

David Bagby's 802.11 TGf Sponsor ballot comments

Reviewer's Contact information:
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1) Insufficient MIB control – add "AP Management MIB" functionality

Issue:
When TGf started it's work, the group decided to support an AP specific SNMP MIB, and a very minimal MIB exists in the TGf draft sent for review. This reviewer believes that the MIB proposed does not provide enough functionality to enable even minimal management of APs. Further it is this reviewer's position that the ability to mix multi-vendor APs requires more than just the Specific IAPP messages between APs, it also requires a minimal set of common AP management MIB definitions.

Requested Changes to resolve vote:
To change this reviewers vote to approve, I request that the committee provide at least the following additional AP MIB functionality as part of TGf:

a) Known stations set inquiry
The ability needs to be added to inquire and get back a list of stations known by an AP. The current (essentially association) status of each station in the set should be returned with the station set list. The minimum obvious station states would be: Authenticated but not associated; associated

(currently active), disassociated (was here, but not here as of when you asked), and re-associated (AP once knew of the station, but it is has re-associated elsewhere).

It is not my intent that APs keep history for all time, rather the concept is that AP info about client stations is probably aged and that this inquiry would simply return info about the “known” Stations as of the time of the inquiry. The purpose of the “status” of the Stations being returned with the list is to be able to use the list as input to additional queries. This forms the basis for the ability to use the information in the response as a parameter for additional MIB inquiries that allow one to inquire about information specific to a station or set of stations known by the AP.

Returning the Station status provides the easy ability to inquire about arbitrary mixes of stations. For example “asking about currently associated stations” (Stations active with the AP) or “asking about stations that have gone” (common for diagnostic purposes) - or any mix thereof.

b) Known Station Attribute Inquiry
It needs to be possible to ask about both a single station and an arbitrary set of stations (I suggest a set approach, where for a single station, one simply specifies a set consisting of a single station), and for all stations in the set requested, to get back information that the AP knows about the station(s). Thus, the conceptual parameters of the inquiry are (station set, attribute set that you want to know about). The “station set” input parameter should either be, or be trivially derivable from, the information returned from the “Known Stations inquiry”.

I suggest a set approach so that the data consistency issues associated multiple MIB calls over time can be avoided. While the “set approach” is conceptually what is desired, I understand that the ability of SNMP MIB variable definitions may mandate a different approach – this reviewer would consider alternate approaches as specified by TGf.

An additional requirement is that this ability be created in a general enough manner that it can serve as an expandable mechanism as additional attributes for stations are invented. The reviewer requests this as there are multiple active TGs in 802.11 that are inventing additional Station attributes beyond those

defined in 802.11-1999. The desire is for TGf to provide the basic framework for asking about per station attributes independent of changes in the attribute sets available.

For the first version of TGf, I want to see the ability to get back at a minimum all the currently defined STA attributes that an AP would know about “its stations”. If TGf believes that additional attributes would be valuable, this reviewer is not opposed to considering enhanced functionality beyond the minimum called out in this review comment.

There are several commercially available sets of MIB extensions within existing products that would more than satisfy this reviewer’s comments. Perhaps TGf could avoid having to invent the MIB details from scratch by soliciting proposals from existing AP vendors.

c) AP operational state control
At a minimum TGf needs to provide the MIB definitions necessary to
1) Deactivate an AP (this essentially requires the ability to tell the AP to disassociate all current stations and not accept new associations).
2) Reactivate an AP (reverse the state above by starting to accept associations again)
3) Reset AP
4) Selectively direct AP to Disassociate a specific Client (one-time event)
5) Selectively allow/disallow a specific STA to Associate/Re-associate to the AP.

The reviewer urges TGf to also consider other AP control abilities (for example those already implemented in many AP’s MIBs).

d) MIB revision level
In order to make the “known station attribute inquiry” in b) expandable, it will be necessary to provide a way to determine the set of Station attributes known by the AP MIB. This can be accomplished several ways (ex: a separate MIB version call, or the ability to specify the attributes desired via a mask of some type (if attributes are specified that are not known then they ignored in the request). My approval of the draft is conditional primarily on the mechanism being defined being appropriately extensible, not on any specific approach. I believe that the TGf group expertise is best suited to define the details of an appropriate mechanism.

e) AP Identity
It needs to be possible to inquire about basic manufacturer information from an AP. The minimal set includes:
1) Manufacturer ID
2) Model number
3) Revision levels
At first pass TGf may react with “Aren’t these already available in the System MIB for the station?” This reviewer is drawing a distinction between the information that is bound to an AP and the information that is bound to a STA that is conceptually inside an AP. The distinction is important, as architecturally, an AP is an interface between the DSM and the WM, across which it provides DS services.

What is desired is the ability to get version information from the AP entity. That information may well be different than the same info for the AP’s WM STA (of which there may be two in the case of WDS). In fact, recent product approaches have moved the industry toward a place where this will be the likely case as the AP’s STA component is highly likely to change independent of the AP entity itself.

f) AP knowledge about ESS
It needs to be possible to ask an AP what it knows about the ESS that it is a member of. Minimal requirements include:
1) Getting back what ESS is the AP a member of.
2) Getting a list of other APs in the ESS that the AP knows of.
This is intended as a crude way to learn the AP members of an ESS. It would obviously be preferable to “ask an ESS”, however, an ESS is not an entity that one can ask questions of - and inventing such an animal would appear beyond the scope of the TGf work. This inquiry would at least allow some external entity to attempt to build up the set of APs in a ESS.

f) AP Management MIB access control
Clearly, not all the information that is potentially available via the mechanisms above should be made available to anyone who asks. I suggest that TGF specify that the AP Management MIB be restricted to access by other authenticated APs in within the ESS. All that is required is that each AP ignores AP management MIB requests that are from anyplace other than another (same ESS) authenticated AP.

This would allow vendors to create an “AP management entity” - which would appear to the

other APs as simply another authenticated AP (that probably happens not to accept associations).

Annex B, Access Point Management Information Base

```
-- ************************************************************************
-- * IEEE 802.11 Access Point Management Information Base
-- ************************************************************************

-- References herein to Unsigned32 should be UInteger32 for most MIB compilers
IEEE802dot11AP-MIB DEFINITIONS ::= BEGIN
   IMPORTS
      MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
      Integer32, Counter32, Unsigned32          FROM SNMPv2-SMI
      OBJECT-GROUP, MODULE-COMPLIANCE           FROM SNMPv2-CONF
      DisplayString, RowStatus,
      MacAddress, TruthValue                    FROM SNMPv2-TC
      ifIndex                                   FROM RFC1213-MIB;

-- ************************************************************************
-- *  MODULE IDENTITY
-- ************************************************************************
iso            OBJECT IDENTIFIER ::= { 1 }
member-body    OBJECT IDENTIFIER ::= { iso 2 }
us             OBJECT IDENTIFIER ::= { member-body 840 }
ieee802dot11   OBJECT IDENTIFIER ::= { us 10036 }

ieee802dot11ap  MODULE-IDENTITY
    LAST-UPDATED "0211140000Z"
    ORGANIZATION "IEEE 802.11"
    CONTACT-INFO    " "

    DESCRIPTION
       "The MIB module for IEEE 802.11 Access Point entities.
       iso(1).member-body(2).us(840).ieee802dot11(10036).dot11apm(5)"
    ::= { ieee802dot11 7}


-- ************************************************************************
-- *  Major sections
-- ************************************************************************
--  Access Point Management (APM) Attributes
   --  DEFINED AS "The APM object class provides the necessary support at the
   --  Access Point to manage the processes in the Access Point such that the
   --  Access Point may work cooperatively as a part of an IEEE 802.11
   --  network.";
dot11apm        OBJECT IDENTIFIER ::= {ieee802dot11 5}

     --  dot11apm GROUPS
     --  dot11AccessPointMIBVersion              ::= {dot11apm 1}
     --  dot11AccessPointAddressTableTable       ::= {dot11apm 2}
     --  dot11AccessPointStationControlTable     ::= {dot11apm 3}
     --  dot11AccessPointControlTable            ::= {dot11apm 4}

dot11AccessPointProductInfo OBJECT IDENTIFIER       ::= {dot11apm 5}

     --  dot11AccessPointStatusTable             ::= {dot11apm 6}

-- ************************************************************************
-- *  Textual conventions from 802 definitions
```

```
-- ************************************************************************
   WEPKeytype ::= OCTET STRING (SIZE (5))

-- ************************************************************************
-- *  MIB attribute OBJECT-TYPE definitions follow
-- ************************************************************************

-- ************************************************************************
-- *  APM Version
-- ************************************************************************
dot11AccessPointMIBVersion OBJECT-TYPE
      SYNTAX OCTET STRING (SIZE(2))
      MAX-ACCESS read-only
      STATUS current
      DESCRIPTION
         "This attribute shall indicate the version of the MIB
         supported by this Access Point."
   ::= {  dot11apm 1 }

-- ************************************************************************
-- *  APM Station Address Table
-- ************************************************************************
dot11AccessPointAddressTableTable OBJECT-TYPE
      SYNTAX SEQUENCE OF Dot11AccessPointAddressTableEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
         "Access Point Address Table attributes.  In tablular form to
         allow for multiple instances on an agent."
   ::= {  dot11apm 2 }

dot11AccessPointAddressTableEntry OBJECT-TYPE
      SYNTAX Dot11AccessPointAddressTableEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
         "An entry in the dot11AccessPointAddressTableTable.  It is
         possible for there to be multiple IEEE 802.11 interfaces
         on one agent, each with its unique MAC address. The
         relationship between an IEEE 802.11 interface and an
         interface in the context of the Internet-standard MIB is
         one-to-one.  As such, the value of an ifIndex object
         instance can be directly used to identify corresponding
         instances of the objects defined herein.

         ifIndex - Each 802.11 interface is represented by an
         ifEntry.  Interface tables in this MIB module are indexed
         by ifIndex."

      INDEX {ifIndex, dot11AddrTableEntryID}
   ::= {  dot11AccessPointAddressTableTable 1 }

Dot11AccessPointAddressTableEntry ::=
     SEQUENCE {
          dot11AddrTableEntryID              MacAddress,
          dot11AddrTableEntryState           INTEGER,
          dot11AddrTableEntryCapabilities    INTEGER,
          dot11AddrTableEntryOnPollList      TruthValue,
```

```
            dot11AddrTableEntryEncryption       INTEGER,
            dot11AddrTableEntrySignalStrength   INTEGER,
            dot11AddrTableEntryLinkQuality      INTEGER[DB1],
            dot11AddrTableEntryAID              INTEGER[DB2],
            dot11AddrTableEntryListenInterval   INTEGER,
            dot11AddrTableEntryMaxSupRate       INTEGER,
            dot11AddrTableEntryCurRate          INTEGER,
            dot11AddrTableEntryInPsMode         TruthValue[DB3],
            dot11AddrTableEntryNumPsFramesQd    Integer32,
            dot11AddrTableEntryPsFrameAge       Integer32,
            dot11AddrTableEntryNumRetries       Counter32,
            dot11AddrTableEntryNumMaxRetries    Counter32,
            dot11AddrTableEntryNumRxDuplicates  Counter32
        }

dot11AddrTableEntryID OBJECT-TYPE
        SYNTAX MacAddress*
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Unique MAC Address of the station for which this address
             table entry pertains."

    ::= { dot11AccessPointAddressTableEntry 1 }

dot11AddrTableEntryState OBJECT-TYPE
        SYNTAX INTEGER {  authenticated (1),
                          associated    (2),
                          reassociated  (3),
                          roamed        (4),
                          disAssociated (5),
                          timedOut      (6[DB4]) }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall indicate the current state of the
            connection between a wireless station and the AP.
            The attribute is enumerated as follows:

            1  -  Authenticated   - station is authenticated but not currently
                                    associated.
            2  -  Associated      - station is authenticated and associated
            3  -  Re-associated   - station had been previously associated and
                                    has associated again.
            4  -  Roamed          - station has been disassociated since it
                                    has been detected associated to a different
                                    AP.
            5  -  Disassociated   - station has explicitly disassociated itself.
            6  -  Timed Out       - station's association has timed out.

            It is assumed that if an station is deauthenticated then it no
            longer has an entry the the AP's Address Table."

    ::= { dot11AccessPointAddressTableEntry 2 }

dot11AddrTableEntryCapabilities OBJECT-TYPE
        SYNTAX INTEGER (0..65355)
        MAX-ACCESS read-only
```

```
        STATUS current
        DESCRIPTION

        "This attribute contains a copy of the Capabilities field
       contained in the Association Request frame sent by the station."

    ::= { dot11AccessPointAddressTableEntry 3 }

dot11AddrTableEntryOnPollList OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

1

```
            "This attribute when TRUE indicates that the station is
             cuurently on the AP's Poll List."

::= {  dot11AccessPointAddressTableEntry 4 }

dot11AddrTableEntryEncryption OBJECT-TYPE
        SYNTAX INTEGER { wep (1), tkip (2), aes (3[DB5]) }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION

        "This attribute is contains the encryption mechanism being used
        by the station in an AP that allows mixed encryption modes."

::= {  dot11AccessPointAddressTableEntry 5 }

dot11AddrTableEntrySignalStrength OBJECT-TYPE[DB6]
        SYNTAX INTEGER (1..100)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION

            "This attribute shall specify the signal strength of
            the last frame received from the station in - dBm.
            e.g. a value of 50 implies -50 dBm."

    ::= {  dot11AccessPointAddressTableEntry 6 }

dot11AddrTableEntryLinkQuality OBJECT-TYPE
        SYNTAX INTEGER (1..100)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION

            "This attribute shall contain an indication of the quality
            of the signal as measured in the last frame received from the
            station.

            TBD format of this attribute"

    ::= {  dot11AccessPointAddressTableEntry 7 }

dot11AddrTableEntryAID OBJECT-TYPE
        SYNTAX INTEGER (1..2007)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the Association ID that
            was assigned to the station when it associated with this
            interface."
    ::= { dot11AccessPointAddressTableEntry 8 }

dot11AddrTableEntryListenInterval OBJECT-TYPE
        SYNTAX INTEGER (1..65355)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute reflects the Listen Interval value contained
```

```
            in the Association Request or Re-Association request frames
            sent by the station.  Units are in Beacon Intervals"
        ::= { dot11AccessPointAddressTableEntry 9 }

dot11AddrTableEntryMaxSupRate OBJECT-TYPE
        SYNTAX INTEGER (2..127)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the maximum data rate supported by
            the station.  Units are in increments of 500kb/s."
        ::= { dot11AccessPointAddressTableEntry 10 }

dot11AddrTableEntryCurRate OBJECT-TYPE
        SYNTAX INTEGER (2..127)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the data rate of the last frame
            received from the station. Units are in increments of 500 kb/s."
        ::= { dot11AccessPointAddressTableEntry 11 }

dot11AddrTableEntryInPsMode OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the current power save mode of
            the station.  When TRUE it shall indicate that the staiton
            is currently in power save mode."
        ::= { dot11AccessPointAddressTableEntry 12 }

dot11AddrTableEntryNumPsFramesQd OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the number of MSDUs currently
            queued for the station when in power save mode."
        ::= { dot11AccessPointAddressTableEntry 13 }

dot11AddrTableEntryPsFrameAge OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute shall specify the length of time that
            the oldest power save buffered frame has been queued for
            this station.  Units are in milliseconds."
        ::= { dot11AccessPointAddressTableEntry 14 }

dot11AddrTableEntryNumRetries OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment for every retransmission performed
            to this station."
```

```
        ::= { dot11AccessPointAddressTableEntry 15 }

dot11AddrTableEntryNumMaxRetries OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when an MSDU for this station
           is not transmitted successfully due to the number of transmit
            attempts exceeding either the  dot11ShortRetryLimit or
            dot11LongRetryLimit."
        ::= { dot11AccessPointAddressTableEntry 16 }

dot11AddrTableEntryNumRxDuplicates OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This counter shall increment when a frame is received
            from the station with a Sequence Control field that indicates
            this frame is a duplicate."
        ::= { dot11AccessPointAddressTableEntry 17 }


-- ****************************************************************
-- *    End of dot11AccessPointAddressTableEntry  TABLE
-- ****************************************************************

-- ****************************************************************
-- *  APM Station Control Table[DB7]
-- ****************************************************************
dot11AccessPointStationControlTable OBJECT-TYPE
      SYNTAX SEQUENCE OF Dot11AccessPointStationControlEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "Access Point Address Table Station entity control attributes.
          In tablular form to allow for multiple instances on an agent."
    ::= { dot11apm 3 }

dot11AccessPointStationControlEntry OBJECT-TYPE
      SYNTAX Dot11AccessPointStationControlEntry
      MAX-ACCESS not-accessible
      STATUS current
      DESCRIPTION
          "An entry in the dot11AccessPointStationControlTable.  It is
          possible for there to be multiple IEEE 802.11 interfaces
          on one agent, each with its unique MAC address. The
          relationship between an IEEE 802.11 interface and an
          interface in the context of the Internet-standard MIB is
          one-to-one.  As such, the value of an ifIndex object
          instance can be directly used to identify corresponding
          instances of the objects defined herein.

          ifIndex - Each 802.11 interface is represented by an
          ifEntry.  Interface tables in this MIB module are indexed
          by ifIndex."
```

```
    INDEX {ifIndex, dot11AddrTableEntryID}
  ::= { dot11AccessPointStationControlTable 1 }

Dot11AccessPointStationControlEntry ::=
    SEQUENCE {
      dot11APStationCntlDisassociate     TruthValue,
      dot11APStationCntlAllowAssociation   TruthValue
    }

dot11APStationCntlDisassociate OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
      "This attribute is a write-only parameter that when set to
      TRUE shall cause the AP to send a disassociate frame to the
      station."
    ::= { dot11AccessPointStationControlEntry 1 }

dot11APStationCntlAllowAssociation OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
      "This attribute when read with a value of TRUE shall indicate
      that this station is allowed to associate.  When read as false
      it shall indicate that the station will not be allowed to
      associate.

      A write to this attribute shall mark the address table entry of
      the station with the value.

      If the particular station address specified in the write access
      to this table is not present, then the AP shall create a
      dot11AccessPointAddressTableEntry in order to save the value."
    ::= { dot11AccessPointStationControlEntry 2 }

-- ****************************************************************
-- *   End of dot11AccessPointStationControlEntry  TABLE
-- ****************************************************************

-- ****************************************************************
-- *  APM Access Point Control [DB8]
-- ****************************************************************

dot11AccessPointControlTable OBJECT-TYPE
    SYNTAX SEQUENCE OF Dot11AccessPointControlEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
      "Access Point entity Control attributes.  In tablular form
      to allow for multiple instances on an agent."
    ::= { dot11apm 4 }

dot11AccessPointControlEntry OBJECT-TYPE
    SYNTAX Dot11AccessPointControlEntry
    MAX-ACCESS not-accessible
```

```
        STATUS current
        DESCRIPTION
            "An entry in the dot11AccessPointControlTable.  It is
            possible for there to be multiple IEEE 802.11 interfaces
            on one agent, each with its unique MAC address. The
            relationship between an IEEE 802.11 interface and an
            interface in the context of the Internet-standard MIB is
            one-to-one.  As such, the value of an ifIndex object
            instance can be directly used to identify corresponding

            instances of the objects defined herein.

            ifIndex - Each 802.11 interface is represented by an
            ifEntry.  Interface tables in this MIB module are indexed
            by ifIndex."

        INDEX { ifIndex }
    ::= {  dot11AccessPointControlTable 1 }

Dot11AccessPointControlEntry ::=
        SEQUENCE {
            dot11APActive                   TruthValue,
            dot11APReset                    TruthValue,
            dot11APEnableStationAssocControl    TruthValue
        }

dot11APActive OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "This attribute when read shall indicate the current active
            state of this AP instance.  TRUE indicates the AP is active
            and FALSE that it is inactive.

            When written with a value of FALSE, the AP instance shall
            immediately disassociate all stations currently associated
            with it, and put itself in a state where it will no longer
            accept associations.

            When written with a value of TRUE, the AP instance shall
            then allow new associations to take place."
        ::= { dot11AccessPointControlEntry 1 }

dot11APReset OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "This attribute is write only and when written with a value
            of TRUE shall cause the AP to perform the equivalent of a
            hard reset on the interface.  A read shall return FALSE,
            and a write of FALSE shall have no effect."
        ::= { dot11AccessPointControlEntry 2 }

dot11APEnableStationAssocControl OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
```

```
        STATUS current
        DESCRIPTION
            "This attribute, when written with a value
            of TRUE, shall cause the AP to enable control of station
            association control.  Station association control is
            accomplished by writing into the
            dot11AccessPointStationControlTable the values for stations
            to be allowed or disallowed associations with this interface
            of the AP."
        ::= { dot11AccessPointControlEntry 3 }

-- ****************************************************************
-- *    End of dot11AccessPointControlEntry  TABLE
-- ****************************************************************

-- ****************************************************************
-- *  APM Access Point Product Info
-- ****************************************************************

dot11APInfoManufactuerID OBJECT-TYPE
        SYNTAX DisplayString (SIZE(0..128))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The ManufacturerID shall include, at a minimum, the name
            of the manufacturer of the AP.  It may include additional
            information at the manufacturer's discretion.  The default
            value of this attribute shall be null."
        ::= { dot11AccessPointProductInfo 1 }

dot11APInfoProductID OBJECT-TYPE
        SYNTAX DisplayString (SIZE(0..128))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The ProductID shall include, at a minimum, an identifier
            that is unique to the manufacturer of the AP.  It may include
            additional information at the manufacturer's discretion.
            The default value of this attribute shall be null."
        ::= { dot11AccessPointProductInfo 2 }

dot11APInfoRevision OBJECT-TYPE
        SYNTAX DisplayString (SIZE(0..128))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The ProductID shall include, at a minimum, an identifier
            that is unique to the manufacturer of the AP.  It may include
            additional information at the manufacturer's discretion.
            The default value of this attribute shall be null."
        ::= { dot11AccessPointProductInfo 3 }


-- ****************************************************************
-- *    End of Access Point Product Info
-- ****************************************************************
```

```
-- ************************************************************************
-- *  APM Access Point Status Table
-- ************************************************************************

dot11AccessPointStatusTable OBJECT-TYPE
        SYNTAX SEQUENCE OF Dot11AccessPointStatusEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Access Point entity Control attributes.  In tablular form
            to allow for multiple instances on an agent."
        ::= { dot11apm 6 }


dot11AccessPointStatusEntry OBJECT-TYPE
        SYNTAX Dot11AccessPointStatusEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An entry in the dot11AccessPointStatusTable.  It is
            possible for there to be multiple IEEE 802.11 interfaces
            on one agent, each with its unique MAC address. The
            relationship between an IEEE 802.11 interface and an
            interface in the context of the Internet-standard MIB is
            one-to-one.  As such, the value of an ifIndex object
            instance can be directly used to identify corresponding
            instances of the objects defined herein.

            ifIndex - Each 802.11 interface is represented by an
            ifEntry.  Interface tables in this MIB module are indexed
            by ifIndex."

        INDEX { ifIndex }
    ::= {  dot11AccessPointStatusTable 1 }

Dot11AccessPointStatusEntry ::=
        SEQUENCE {
            dot11APAssociationCount          INTEGER
         }

dot11APAssociationCount OBJECT-TYPE
        SYNTAX INTEGER (0..2007)
        MAX-ACCESS read-only
        STATUS current
       DESCRIPTION
            "This attribute indicates the number of stations currently
            associated with the AP on the interface represented by the
            ifIndex."
        ::= { dot11AccessPointStatusEntry 1 }

-- ************************************************************************
-- *    End of Access Point Status Table
-- ************************************************************************


-- ************************************************************************
-- *   End of 80211 AP MIB
-- ************************************************************************
```

```
END
```

Page: 3
[DB1]Link Quality is something that is offerd by several WLAN chipset vendors, but is not consistent across the vendors. As this reviewer does not remember the concept of link quality within 802.11, I can do without this variable.

Page: 3
[DB2]Not sure what and AID is or why each AP should have one – assuming that minimalizim is more acceptable to those that want the MIB removed entirely, I have deleted it.

Page: 3
[DB3]The power save states I think are multiple, rather than on/off. – assuming that minimalizim is more acceptable to those that want the MIB removed entirely, I have deleted these.

Page: 3
[DB4]I propose removing "timed out" as it seems implementiaton specific instead of standard specific. The other states more closely correspond to the to station states in 802.11. Roamed is ok with me, as TGf makes it easy for this to be distinguished from Disassociated etc.

Page: 7
[DB5]I like this being and integer as we know other Tgs are inventing new security type, but I'd not spec the names and values until those Tgs are done – this will be reasonable since TGf is a 2 year RP and they other TGs are probably still 2 years from publication.

Page: 7
[DB6]I know some till object to this attribute, however it seems very useful to be able to provide this information from a system standpoint. What is required is a commen unit in which to express the information – dbm seems ok to me. I would also consisder another unit if the TG thinks (and explains why) another is more appropriate.

Page: 9
[DB7]While I personally think that these are reasonable operations to perform with and AP, the unrestricted nature of the use of MIB variables to accomplish them concerns me. (e.g. The disassociate function, while reasonable from a system perspective, is potential DOS attack point)

Page: 10
[DB8]similar security concerns re who can "control" an AP via MIBs.