Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>	
Title	Process and rules for development of SNMP solution sets	
Date Submitted	2006-07-18	
Source(s)	Krzysztof Dudzinski Airspan Communications Ltd Joey Chou Intel	[mailto:kdudzins@airspan.com] [mailto:joey.chou@intel.com]
Re:	Call for comments IEEE802.16i-06/001r2	
Abstract	This contribution was written based on the material presenter, discussed and approved by SNMP solution ad-hoc group. Parts of the contribution proposing specific editorial changes to the document are based on material approved by ad-hoc group. Current process of developing 802.16i document doesn't cover the subject of maintenance of 802.16f. The strategy and process are inefficient in all aspects related to SNMP solution sets. This contribution proposes new process and rules to address those issues.	
Purpose	Adopt the contribution and apply required changes in the text of 802.16i document.	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard	

being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Process and rules for development of SNMP solution sets

Krzysztof Dudzinski
Airspan Communications Ltd
Joey Chou
Intel

1. Introduction

This contribution was written based on the material presented, discussed and accepted by SNMP solution ad-hoc group. Parts of the contribution proposing specific editorial changes to the document are based on material accepted by ad-hoc group.

Current strategy and process of development of the SNMP solution sets (ASN MIBs) is inefficient and may lead to heavy maintenance demand. This will affect also the efficiency of the development of the 802.16i document in general. The following issues need to be address:

-Current process of developing 802.16i SNMP solution doesn't address the need to make fixes and changes to the 802.16f-2005 standard. The lack of well defined strategy will lead to repetitive in/out of scope queries.

-The process makes the evolution and maintenance of MIBs very difficult by introducing big monolithic wman2 MIB covering all interface definitions. This will create more work and will open existing well established 802.16f MIB to uncontrolled level of changes.

-The creation of SNMP solutions from IRP model and its maintenance is not automatic and will generate a lot of manual work. Current process doesn't address this issue. Although we cannot eliminate this manual work we can define the process, which will limit it to reasonable level.

The maintenance of ASN MIBs is best done using the process defined in SNMP standard documents. The scope of what is subject to maintenance changes and what MIB module should receive changes must be defined by the group. This contribution spells proposes a set of rules controlling this maintenance process.

2. Strategy Options

This contribution is a result of choice of set of options. The main questions the contribution is trying to answer are:

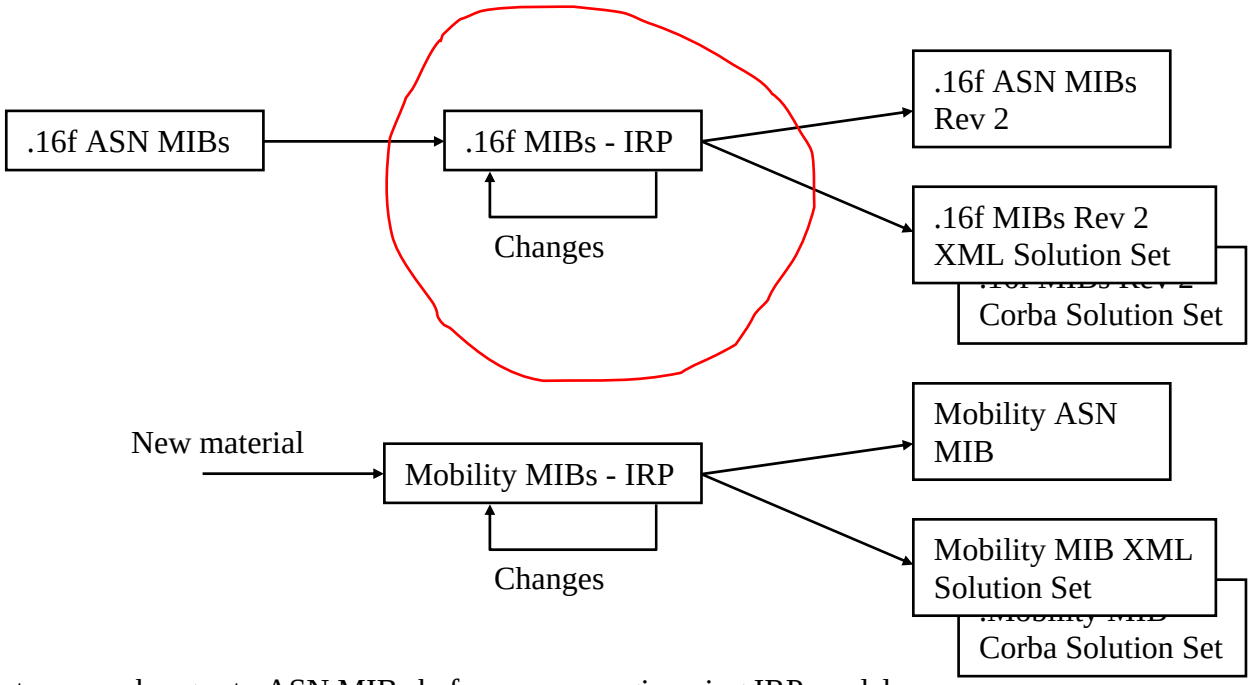
1) How many MIB modules do we plan to have defined in the standard?

1a) 2 MIB modules - current approach (wman2-if-mib and wman2-dev-mib) both redefining all objects defined in .16f MIBs

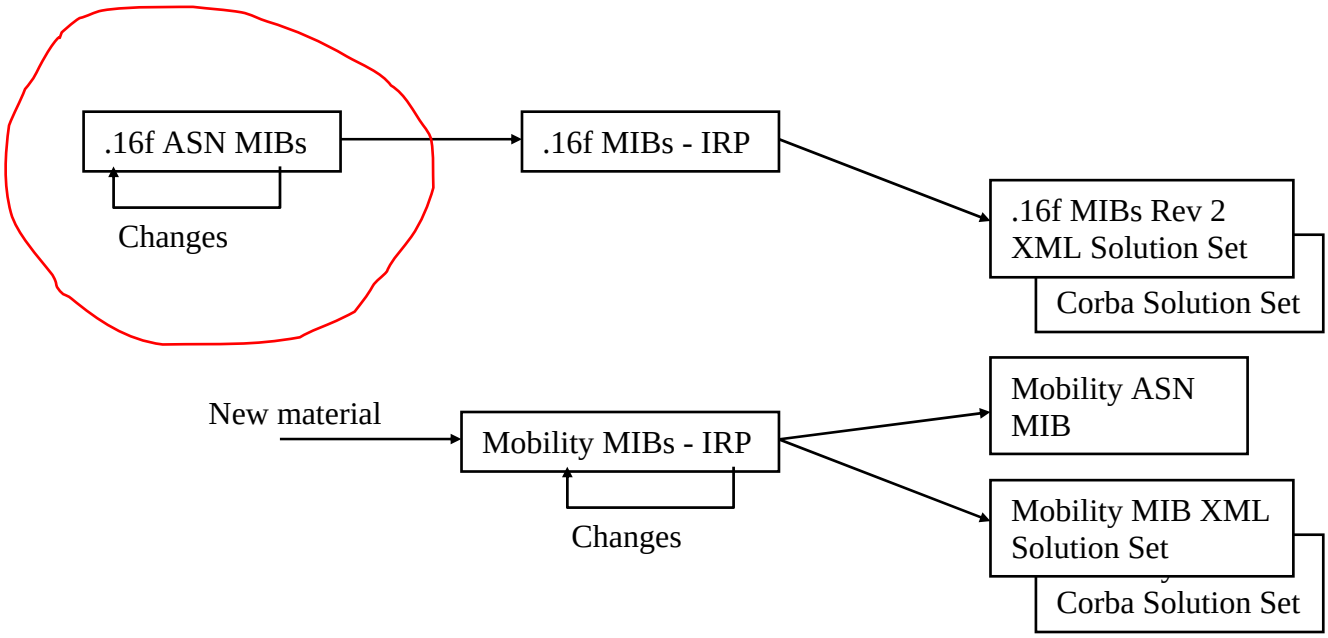
1b) 3 or more MIB modules – new approach assuming reuse of 802.16f MIBs and creating new MIB module for mobile extensions only

2) What model to apply maintenance changes to?

2a) Apply maintenance changes to IRP model after reverse engineering?



2b) Apply maintenance changes to ASN MIBs before revers engineering IRP model



3. New process

The new process was accepted by SNMP solution ad-hoc group.
The process is defined as follows:

3.1. Use 802.16f MIBs for existing material and create new MIB module(s) for new material (mobility etc) (option 1b)

- WMAN2-IF-MIB would need the removal of all the content already defined in WMAN-IF-MIB and wait for new material defined mostly using IRP technology. Existing new mobility related material should stay in WMAN2-IF-MIB module as defined.
- Manufacturers of 802.16 fixed BWA equipment with SNMP support would continue to work with WMAN-IF-MIB and WMAN-DEV-MIB modules and their revisions.
- Manfacturers of 802.16 mobile BWA equipment with SNMP support would implement all relevant common objects from WMAN-IF-MIB and WMAN-DEV-MIB and in addition implement WMAN2-IF-MIB module and other new MIB modules if defined.

Note : It is still to be decided whether newly submitted material defined using ASN1 should be accepted before IRP model matures. It is the view of the authors of this contribution that all the material submitted using ASN1 notation should be allowed.

Justification:

- More smaller MIBs dramatically increase clarity and maintainability

- Maintaining .16f MIB independently is easier than as a part of bigger MIB

- Clearly defined scope of the new MIB module – mobility

- Customers/manufacturers of fixed BWA equipment will not accept upgrade of the MIB to completely new MIB if the only thing they want is fixes and changes to existing MIB tables and objects.

- IRP technology is offered without easily available cheap automation tools (unlike ASN MIB with compilers and compliance checkers). The development and validation require a lot of manual work (diagrams, textual description of classes and arguments etc.). Surely it's better to start with smaller MIB to be able better to cope with the change management.

Note: Regardless of what option is chosen the fixes and changes relevant to existing 802.16f MIB objects/tables must be introduced. Netman group is the best suited for this task and it is in scope of 802.16i.

3.2 Apply all the maintenance changes to ASN MIB 802.16f before it is reverse engineered (option 2b)

- WMAN2-IF-MIB (as defined in .16i draft2) becomes completely new MIB mainly with mobility related objects. It is developed mostly using IRP methodology. Mobility objects already defines in ASN1 MIB will be retained.

Note : It is still to be decided whether newly submitted material defined using ASN1 should be accepted before IRP model matures. It is the view of the authors of this contribution that all the material submitted using ASN1 notation should be allowed.

- WMAN-IF-MIB and WMAN-DEV-MIB are fixed first as per Cor1 and relevant part of .16e work and then reverse engineered to IRP solution. It is possible to continue reverse engineering of IRP model without waiting for the fixes to be applied because the MIB module revision notes carry complete list of all the changes so they can be easily applied when revision is complete.

Justification:

- The main purpose of rev-eng of .16f MIB is to allow other solution sets to be generated to benefit from already defined objects, common to both fixed and mobile. It seems appropriate to do rev-eng on fixed revision of this MIB.

- .16f MIBs are matured and do not require any major rework. The fixes and changes can be done very quickly (1 meeting, maximum 2). The same in IRP model will take much longer.

- Fixes applied directly to .16f will avoid unnecessary rev-eng/translation cycles

- In absence of good automation tools for rev-eng and translation to SNMP solution set it is unlikely that any maintenance of any SNMP MIB will happen via IRP. The same applies to the existing .16 MIBs.

- IRP model doesn't yet demonstrates that translation of the IRP created from reversed engineered ASN MIB will be capable of generating backwards compatible ASN MIB (requires object or metadata to store ASN OIDs, default values, descriptions and others). Sure this must be possible with UML but no example of how to do this seen.

4. 802.16f ASN1 MIBs revision rules

The new rules were accepted by ad-hoc group.
802.16f MIBs (WMAN-IF-MIB and WMAN-DEV-MIB) revising must follow the following guidelines:

1/ All changes must comply with the standard guidelines for revising ASN MIBs as published in
- RFC2578 section 10
- RFC2579 section 5
- RFC2580 section 7.2
- RFC4181 section 4.9

2/ For existing objects and textual conventions defined already in 802.16f MIB, where their definition changed as a result of 802.16e (Cor1+.16e) or was syntactically incorrect or was incompatible with old standard (802.16d) do one of the following:
- correct the definition of the object/textual convention if allowed by ASN MIB revision rules otherwise
- create new object/textual convention and mark existing one obsolete (old definition is broken and useless) or
- create new object/textual convention and mark existing one deprecated (old definition is OK but cannot be modified to satisfy the changes in 802.16e standard)

3/ For existing MIB tables or functional groups (folders e.g. Ofdma), the changes are allowed to bring the table or functional folder up to date with definitions as revised by 802.16e standard. The changes could be:
- Addition of new object to existing table
- Marking existing objects as obsolete if they were never relevant and 802.16e Cor1 part simple made it more explicit by removing them from the standard
- Marking existing objects as deprecated if they were relevant to 802.16d and are no longer relevant to 802.16e (removed from the standard)

Note: This rule is potentially very contagious as it requires the group to decide whether the proposed new object is part of existing functional group or existing table. In case of difference of opinion the object should be defined in a new MIB to avoid unnecessary recirculation to deal with them.

4/ It is forbidden to add completely new material which wasn’t present in 802.16f MIB either in form of MIB table or in form of functional group/folder.

5. Text changes

The text changes are based on the process and rules accepted by SNMP solution ad-hoc group.

The adoption of the process and rules defined in sections 3 and 4 of this contribution should result in the following changes in the 802.16i baseline document:

1. Insert new reference as follows, to complete the list of RFCs mentioned in this contribution as critical to ASN1 MIB revisions (subclause 2. line 29):

IETF RFC2579 "Textual Conventions for SMIv2 " April 1999
IETF RFC2580, “Conformance Statements for SMIv2” April 1999

2. Add heading of the subclause 13.3.1 (Section 13.3.1 contains an ASN1 definition of wman-if-mib).

3. Below the heading of the subclause 13.3.1 insert the editorial instruction:
[Replace the whole body of subclause 13.3.1 with the following text:]
ASN1 definition of Revision 2 of wman-if-mib.

4. Copy the entire ASN1 definition of wma2-if-min from subclause 15.2.2 to subclause 13.3.1 just below the editorial instruction added in step 3. (This step leads to preservation of all the changes already made to wman-if-mib but done under the identity of wman2-if-mib. Subsequent steps will remove from the MIB changes not allowed in revised WMAN-IF-MIB as specified in the rules defined in section 4 of this contribution).
Note: It is possible to express al the changes suggested as specific editorial changes to parts of exiting ASN1 MIB but it would be more difficult. The changes are tracking the evolution of the text of 802.16i instead.

5. In ASN1 MIB, in subclause 13.3.1, do the following replacements (restore the identity WMAN-IF-MIB):
- *Replace all occurrences of substring "WMAN2"with "WMAN"*
- *Replace all occurrences of substring "Wman2"with "Wman"*
- *Replace all occurrences of subsring "wman2" with "wman"*

6. Remove from the restored WMAN-IF-MIB the entire definition of tables (see rules in section 4 of this contribution):
wmanIfBsMsPowerSavingStatusTable,
wmanIfBsMsPowerSavingClassesTable,
wmanIfBsMsSleepModeStatisticsTable

7. Remove from the restored WMAN-IF-MIB the entire definition of textual conventions (defined for objects in tables removed in previous step):
WmanIfPsClassId,
WmanPsClassType,
7

WmanPsClassCidDirection,
WmanIfPowerSavingMode

8. Remove from the restored WMAN-IF-MIB the textual convention WmanIfOfdmaMobility and the following objects definitions:
wmanIfBsMsOfdmaReqCapMobilityFeature,
wmanIfBsMsOfdmaRspCapMobilityFeature,
wmanIfBsOfdmaCapMobilityFeature,
wmanIfBsOfdmaCapCfgMobilityFeature
(Mobility features capability should not be defined in this MIB – rules, but also it doesn't have anything to do with OFDMA)

9. For all textual conventions with the name starting with "WmanIfOfdmaMs" prefix, change the prefix to "WmanIfOfdmaSs". The textual conventions affected are:
WmanIfOfdmaMsDeModType,
WmanIfOfdmaSsModType
(Demodulator and modulator capability is defined for SS and not only for MS. Was it for MS only it would be subject to rule implementation on whether to put it in WMAN or WMAN2 MIB.)

10. For all tables and textual conventions with the name starting with "wmanIfBsMsOfdma" prefix, change the prefix to wmanIfBsSsOfdma . The tables and object affected are:
wmanIfBsMsOfdmaReqCapabilitiesTable,
wmanIfBsMsOfdmaReqCapabilitiesEntry,
WmanIfBsMsOfdmaReqCapabilitiesEntry,
wmanIfBsMsOfdmaReqCapFftSizes,
wmanIfBsMsOfdmaReqCapDemodulator,
wmanIfBsMsOfdmaReqCapModulator,
wmanIfBsMsOfdmaReqCapPermutation

wmanIfBsMsOfdmaRspCapabilitiesTable,
wmanIfBsMsOfdmaRspCapabilitiesEntry,
wmanIfBsMsOfdmaRspCapFftSizes,
wmanIfBsMsOfdmaRspCapDemodulator,
wmanIfBsMsOfdmaRspCapModulator,
wmanIfBsMsOfdmaRspCapPermutation
(OFDMA capabilities are defined for all SSs supporting OFDMA and not only MS. Was it for MS only it would be subject to rule implementation on whether to put it in WMAN or WMAN2 MIB.)

11. Replace "MS" with "SS" in the description of all objects defined in the OFDMA capabilities tables as well as in the DESCRIPTION of the OFDMA capabilities tables and their entries. The tables affected are:
wmanIfBsMsOfdmaReqCapabilitiesTable,
wmanIfBsMsOfdmaRspCapabilitiesTable,

wmanIfBsOfdmaCapabilitiesTable,
wmanIfBsOfdmaCapabilitiesConfigTable
(OFDMA capabilities are defined for all SSs supporting OFDMA and not only MS. Was it for MS only it would be subject to rule implementation on whether to put it in WMAN or WMAN2 MIB.)

12. Add the following subclauses as instructed:
13.1.1.5.2.5 by copying heading and text from 15.2.1.1.5.2.6,
13.1.1.5.2.6 by copying heading and text from 15.2.1.1.5.2.7,
13.1.1.5.2.7 by copying heading and text from 15.2.1.1.5.2.8,
13.1.1.5.2.8 by copying heading and text from 15.2.1.1.5.2.9
In all newly added subclauses replaces words starting with "wman2" prefix with prefix "wman".

13. Remove all subclauses referring to deleted objects and tables from the MIB WMAN2-IF-MIB as follows:
-remove all text between page 50 line 27 and page 51 line 17
-remove all text between page 51 line 45 and page 52 line 39
-remove all text between page 52line 55 and page 60 line 26

Also change the figure 21 such as the only tables left are:
wman2IfBsMsPowerSavingStatusTable,
wman2IfBsMsPowerSavingClassesTable,
wman2IfBsMsSleepModeStatisticsEntry

14. Apply the following changes to the module definition to reflect the identity of the revision 2 of the WMAN-IF-MIB:

```
wmanIfMib MODULE-IDENTITY
        LAST-UPDATED    "200605230000Z" -- May 23, 2006
        ORGANIZATION    "IEEE 802.16"
        CONTACT-INFO
            "WG E-mail: stds-802-16@ieee.org
             WG Chair:  Roger B. Marks
             Postal:    (U.S.) National Institute
                      of Standards and Technology
             E-mail:    r.b.marks@ieee.org

             TGf Chair: Phillip Barber
             Postal:    Huawei Technologies Co., Ltd
             E-mail:    pbarber@futurewei.com

             Editor:    Joey Chou
             Postal:    Intel Corporation
                        5000 W. Chandler Blvd,
                        Chandler, AZ 85227, USA
             E-mail:    joey.chou@intel.com"
        DESCRIPTION
            "~~This material is from IEEE Std 802.16i~~
             Copyright (c) 2006 IEEE.
             This MIB Module defines managed objects for
             ~~IEEE 802.16e-2005 based Subscriber Station~~
             ~~and Base Station.~~
             Subscriber Station and Base Station based on
             IEEE Std 802.16-2004 and its amendment 802.16e-2005.
             The MIB contains objects for fixed Broadband Wireless Networks
             and common objects for both fixed and mobile
             Broadband Wireless Networks."
```

```
        REVISION        "200605230000Z"
        DESCRIPTION
            "The first revision of WMAN-IF-MIB module that is
             enhanced to support IEEE 802.16e-2005 standard."
        REVISION "200508020000Z"        -- August 02, 2005 at 00:00 GMT
        DESCRIPTION
            "Revision 1
             This material if from IEEE Std 802.16f-2006.
             This is the first approved version of WMAN-IF-MIB module."
        REVISION "200607100000Z"        -- July 10, 2006 at 00:00 GMT
        DESCRIPTION
            "Revision 2.
             This material if from IEEE Std 802.16i-2006.
             Changes:
             - Module definition changed to reflect revision tracking
             - Editorial changes to DESCRIPTION and REFERENCE clauses of various objects.
             - Added new tables for OFDMA Phy:
               - wmanIfBsMsOfdmaReqCapabilitiesTable
               - wmanIfBsMsOfdmaRspCapabilitiesTable
               - wmanIfBsOfdmaCapabilitiesTable
               - wmanIfBsOfdmaCapabilitiesConfigTable
             - Added new textual conventions to support new OFDMA tables:
               - WmanIfOfdmaMsDeModType
               - WmanIfOfdmaMsModType
               - WmanIfOfdmaPermutation
             - Extended definition of textual conventions:
               - WmanIfCsSpecification (new values in enumeration)
               - WmanIfMacVersion (new values in enumeration)
               - WmanIfMacCsBitMap (new values in enumeration)
               - WmanIfOfdmFftSizes (new values in enumeration)"
    ::= { transmission 184 }
```

15. In ASN1 definition in subclause 15.2.2 remove from the WMAN2-IF-MIB all the objects and textual conventions except the following tables:
wman2IfBsMsPowerSavingStatusTable,
wman2IfBsMsPowerSavingClassesTable,
wman2IfBsMsSleepModeStatisticsTable

and except the following textual conventions:
Wman2IfOfdmaMobility,
Wman2IfPsClassId,
Wman2PsClassType,
Wman2PsClassCidDirection,
Wman2IfPowerSavingMode

Also remove all the conformance groups and compliance statements (none of the objects left in this MIB are part of any conformance group).
(WMAN2-IF-MIB now defines only objects for brand new material from 802.16e as allowed in the rules defined in section 4 of this contribution)

16. Replace all occurrences of string Wman2IfCidType with string WmanIfCidType. Add WmanIfCidType to the import list from WMAN-IF-MIB.

17. Apply the following changes to WMAN2-IF-MIB to reflect the identity of first revision of brand new MIB module.

```
wman2IfMib MODULE-IDENTITY
        LAST-UPDATED    "200605230000Z" -- May 23, 2006
        ORGANIZATION    "IEEE 802.16"
        CONTACT-INFO
            "WG E-mail: stds-802-16@ieee.org
             WG Chair:  Roger B. Marks
             Postal:    (U.S.) National Institute
                     of Standards and Technology
             E-mail:    r.b.marks@ieee.org

             TGf Chair: Phillip Barber
             Postal:    Huawei Technologies Co., Ltd
             E-mail:    pbarber@futurewei.com

             Editor:    Joey Chou
             Postal:    Intel Corporation
                        5000 W. Chandler Blvd,
                        Chandler, AZ 85227, USA
             E-mail:    joey.chou@intel.com"
        DESCRIPTION
            "This material is from IEEE Std 802.16i
             Copyright (c) 2006 IEEE.
             This MIB Module defines managed objects for
             IEEE 802.16e-2005 based Subscriber Station
             and Base Station.
             Mobile Station and Base Station based on
             IEEE Std 802.16-2004 and its amendment 802.16e-2005.
             The MIB contains objects for mobile Broadband Wireless Networks."
        REVISION        "200605230000Z"
        DESCRIPTION
            "The first revision of WMAN-IF-MIB module that is
             enhanced to support IEEE 802.16e-2005 standard."
        REVISION "200607100000Z"        -- July 10, 2006 at 00:00 GMT
        DESCRIPTION
            "Revision 1
             This material if from IEEE Std 802.16i-2006.
             This is the first approved version of WMAN2-IF-MIB module."
        ::= { transmission 184 }
```

When all the changes are applied as instructed above the document will have two interface MIBs defined:
- First with fixed specific and common objects – WMAN-IF-MIB Revision 2
- Second with mobile specific objects – WMAN-IF2-MIB Revision 1
The only objects lost as a result of these changes are those related to mobility capabilities. This object is best keep not defined until the structure and content of the WMAN2-IF-MIB is approved.