Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 01 **Comment submitted by:** Mark Epstein

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

Roger and Brian,

These comments are in response to the Call for Comments on Proposed IEEE 802.16e PAR. Please post for consideration in the preparation of the PAR. I have added Mark Klerer as an addressee to this correspondence as the comments may apply also to the ECSG PAR, and the ECSG may want to take it into account in the final revisions of the ECSG PAR, also.

As IEEE 802.16 and IEEE 802 move forward in their consideration of the subject PAR, it may be useful to include the possibililty of interoperability/handoff with 3G broadband wide area standards developed by other standards bodies. This kind of activity is already occuring in the consideration of interoperability/handoff of 802.11 standards with the wide area WCMDA and cdma2000 standards developed by 3GPP and 3GPP2 as part of the cooperative efforts of TIA, ETSI, CWTS, ARIB, TTA, TTC and others. Useful to consider in this regard is that the standards body expertise for the wide area broadband 3G systems supporting all mobile speeds in licensed bands has historically been in the 3GPP and 3GPP2 arena. When issues affecting non-wide area broadband systems have arisen, many individuals in these bodies point to the expertise and excellence of the IEEE standards groups. While there is always some healthy overlap in responsibilites between standards bodies, it would seem that consideration should be given to not unnecessarily duplicating efforts or creating competitive fora. Thus, it is suggested that in section 1 b) of 802.16-02/49, mention be made of the possibility of cooperatively interfacing the proposed new IEEE standards for mobile operation in licensed bands below 6 GHz with the wide area broadband systems standards developed by 3GPP and 3GPP2.

For background on the work in 3GPP and 3GPP2, note that both these groups have major projects to convert their core networks to what are called All-IP networks. These All-IP networks are based on IETF protocols. This work is called IP Multimedia Subsystem (IMS) in 3GPP and IP Multimedia Domain (MMD) in 3GPP2. When these All-IP networks are fully deployed, the traditional circuit switched Mobile Switching Centers (MSCs) will disappear and any communications to traditional wireline telephone networks will be through Media Gateways (MGW). Both 3GPPs have been developing packet based standards for the RAN. This is for both the air interface and the land-side network comprising the BSC, BTS, and various packet gateways. In 3GPP, the work on core packet networks is being done in TSG SA and TSG CN. In 3GPP2, the core network work is being done in TSG-N and in TSG-P (soon to be merged), with TSG-P being created specifically to handle the packet domain.

Mark

Suggested Remedy

Proposed Resolution **Recommendation:** **Accepted-Modified** **Recommendation by** Roger Marks

Address the suggestion regarding handoff in the PAR instead of the Five Criteria. See separate comments by Marks regarding PAR Items (15) and (18).

Regarding the issue of possible overlap with 3G, add differentiating factors to Item (3) ["Distinct Identify"] of PAR. See separate comments by

Marks regarding (3a), but provide additional details.

Reason for Recommendation

The specific suggestion was "in section 1 b) of 802.16-02/49, mention be made of the possibility of cooperatively interfacing the proposed new IEEE standards for mobile operation in licensed bands below 6 GHz with the wide area broadband systems standards developed by 3GPP and 3GPP2." This is, however, an important issue that should be mentioned in the PAR.

Differentiation from 3G is better explained in the Five Criteria.

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR Ballot Number: Comment Date

Comment # 02 Comment submitted by: Andrew Kreig

Comment Type Editorial Starting Page # Starting Line # Fig/Table# Section

see "WCA Letter of Support for 802.16e" (IEEE 802.16sgm-02/26):

Wireless Communications Association International
1140 Connecticut Avenue, NW Suite 810
Washington, DC 20036
t: 202-452-7823 f: 202-452-0041
www.wcai.com
Nov. 10, 2002

Dr. Roger B. Marks
Chair, IEEE 802.16 Working Group
NIST
325 Broadway, MC 813.00
Boulder, CO 80305 USA

Re: Call for Comments Regarding Proposed IEEE 80-2.16e PAR

Dear Dr. Marks:

As the trade association of the wireless broadband industry, the Wireless Communications Association International (“WCA”) takes great interest in the work of IEEE 802.16. Therefore, we appreciate the opportunity that you have provided by means of your open Call for Comments to offer a view regarding the proposed 802.16e project, which would extend 802.16's fixed broadband wireless access support to include mobile terminals.

WCA member companies (many of whom are service providers) have a great interest in this very topic. In particular, the U.S. spectrum known as the “MDS” bands has historically been allocated for fixed use. Recent regulatory changes by the FCC in response to WCA efforts provide the opportunity to use the spectrum for combination of fixed and mobile purposes. Our members see great opportunities here. WCA along with the National ITFS Association (NIA) and the Catholic Television Network (CTN) recently filed a white paper with the FCC proposing to revise the MDS regulations. The FCC's Public Notice (DA 02-2732) seeking comment on our proposal says that: “The proposal states that further rule changes are needed to facilitate provision of two-way fixed and mobile services.” The joint WCA/NIA/CTN Oct. 7 filing is on WCA’s website (<http://www.wcai.com/news.htm>http://www.wcai.com/news.htm) under “Government Affairs,” half-way down the listing.

We understand that IEEE 802 is, very appropriately, concerned that standardization projects be based in market requirements. So, we assure you that many of WCA’s members are looking forward with keen interest to deploying fixed/mobile broadband wireless metropolitan area networks, and would be very interested in the future output of the IEEE 802.16e project. In fact, this precise topic will be the subject of numerous business-oriented sessions this January in the Fairmont Hotel in San Jose, CA at WCA’s Ninth Annual Technical Symposium

and Business Expo, which is collocated with IEEE 802.16 Session #23. WCA's agenda may be seen on our website (<http://www.wcai.com/events.htm>http://www.wcai.com/events.htm) although several of these mobile/portable-oriented sessions are so new that the entire roster of participants has not yet been confirmed for publication. Please contact me if you have any questions or would like additional information.

Very truly yours,

Andrew Kreig/President

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

Group's Action Items

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Document under Review: 802.16e PAR Ballot Number: Comment Date

Comment # 03 Comment submitted by: Geoff Thompson

Comment Type Technical, Non-binding Starting Page # Starting Line # Fig/Table# Section

Colleagues-

I have been looking at the PARs up for consideration in Hawaii. I have minor detail comments on most of those addressed in a separate message. This discussion is of a more broad-brush philosophical nature.

There have been questions about the overlap of scope in these 2 proposals (P802.16e and MBWA ECSG Vehicular Mobile Broadband) I would like to see if I can address the issues that have been brought up and should have been brought up.

We have had many instances in the past where we have issued PARs with overlapping scope. Generally we have done this only because we have FAILED to reach consensus on scope or requirements, not because the market (as opposed to the vendors) actually WANTED separate standards. The last instance that I can recall is the division between deterministic (.4 & .5) and "otherwise". Not even that was important enough for more than one to survive in the market. I believe that the dominant driver for success was (1) ease/cost of generating interoperable implementations and number of significant suppliers committed to bringing product to market.

The real market (i.e. the end users who don't come to standards meetings) wants a single standard for each application so there will be lots of vendors to beat each other up on price.

Now, my view of what I see here:

Two projects that are trying to (appropriately) exploit the obvious market gap between the ubiquity and mobility of cellular telephones and the rapidly rising popularity of 802.11 Wireless LANs.

What would such a standard need? I can think of:

1) Only one standard
2) Single, low cost customer equipment, usable everywhere
3) Ability to maintain connectivity at vehicular speeds.
4) Hi speed transport of packets/IP
5) Use of "existing physical infrastructure" (read: cell towers)
6) Strong assurance of multi-vendor interoperability
7) Developed by an experienced standards group that knows how to write concise, complete standards
8) No regulatory issues
9) Coexistence with other wireless services
10) Ability to be tariffed by common carriers
11) Support appropriate security for users in a mobile environment.
12) Ability to discover a new (no previous relationship) service provider and start a session from cold start

Would be nice items:

1) Single standard world wide (auto manufacturers would appreciate this).

2) Can supplement common carrier infrastructure with ad-hoc infrastructure.
3) Mobile equipment/product can be made economically so that it can be used in fixed/campus locations.
4) Power consumption & weight suitable for battery/portable devices

Arguable items:

1) Whether this project needs a clean sheet design or it would be advantageous to reuse existing designs.
(There has been a statement from a Dot16 member that backward compatibility is not an issue.)
2) Whether this project needs a new Working Group or it would be advantageous to use existing one.

Bottom line Thompson opinion:

No vendor wants to implement both
No service provider will want to offer both
No way will both of these succeed in the marketplace even if you do get 2 standards out.
Both of them may not succeed in the marketplace if you get 2 standards out.

Therefore, I believe the only reason for 802 to charter two groups for this work other than (or maybe including) the items listed above is people and politics. Those are good reasons, just not good enough. We have used them before but they are an admission of our failure to nurture a compromise or reach a true consensus.

It seems like the task list above is large enough for the sum of folks willing to do work from both groups.

I am truly eager to hear arguments to the contrary.

Best regards,

Geoff

Suggested Remedy

Proposed Resolution **Recommendation:** **Accepted** **Recommendation by**

Revise PAR in accordance with issues raised.
Provide a response.

Reason for Recommendation

This detailed analysis indicates areas in which the PAR can be strengthened.

Resolution of Group **Decision of Group:** **Accepted**

Incorporate text which addressses the mentioned issues into the appropriate sections of the PAR or 5 Criteria

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR Ballot Number: Comment Date

Comment # 04 Comment submitted by: Roger Marks

Comment Type Editorial Starting Page # Starting Line # Fig/Table# Section 5C

Answers should be italicized to distinguish them from the questions.

Suggested Remedy

Proposed Resolution Recommendation: Accepted Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group: Accepted

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 05 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/1a

First paragraph could use some slight editing.

Suggested Remedy

The mobility enhancement will target the consumer and enterprise markets, allowing fast access to mobile IP applications, multi-media messaging, mobile videoconferenceing, etc. The possible services include: games, video clips, virtual sightseeing, emergency services, location based services, financial services, Ttelematics, telemedicine, etc. The user will have access to these services at data rates similar to those provided by the 802.16/802.16a standard, while stationary, walking, or mobile. For example, in a 6 MHz channel, the maximum data rate per user can be beyond 20Mbit/s.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 06 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/1a

Second paragraph could be strengthened. Recent comment from WCA is relevant.

Suggested Remedy

The resulting standard will have a very broad applicability set because it will converge fixed and mobile services, allowing connectivity for high-speed data in both stationary and mobile situations using the same set of base stations. Large demand exists for such systems. For example, see "WCA Letter of Support for 802.16e" (C802.16sgm-02/26), from the trade association of the wireless broadband industry, the Wireless Communications Association International (WCA). The letter says:

-"WCA member companies (many of whom are service providers) have a great interest in this very topic. In particular, the U.S. spectrum known as the 'MDS' bands has historically been allocated for fixed use. Recent regulatory changes by the FCC in response to WCA efforts provide the opportunity to use the spectrum for combination of fixed and mobile purposes. Our members see great opportunities here."

-"We understand that IEEE 802 is, very appropriately, concerned that standardization projects be based in market requirements. So, we assure you that many of WCA's members are looking forward with keen interest to deploying fixed/mobile broadband wireless metropolitan area networks, and would be very interested in the future output of the IEEE 802.16e project."

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 07 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/1b

Paragraph does not address the question.

Suggested Remedy

The possibility of multiple vendors introducing this equipment indicated by the fact that the standard is to be developed by the IEEE 802.16 Working Group on Broadband Wireless Access, which has operated for nearly four years with the participation of hundreds of people from many conpanies from many countries. The standard will be based on standards that have been completed, or nearly completed, by the Working Group.

The possibility of multiple users is indicated by the interest of the WCA and its member companies (see (1a)). Futthermore, many companies throughout the world rights to licensed spectrum for deployment of fixed broadband wireless access. As noted in (1a), recent regulatory changes by the FCC provide the opportunity to use MDS spectrum for combination of fixed and mobile purposes. The many holders of MDS spectrum will certainly be interested in fixed/mobile deployments, if standardized equipment is available. Furthermore, the initiation of standardization efforts on this topic is expected to influence regulatory regimes to liberalize their fixed wireless access rules to emcompass mobility.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 08 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/1c

Paragraph can be improved by editing.

Suggested Remedy

Portable adio interfaces are expected to be similar in production cost to cellular air interfaces. The cost of adding such an interface to a mobile computer is expected to be less than the cost of the computer.

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 09 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/2

Correct the reference to "802 Functional Requirements Document,."

Suggested Remedy

Change last paragraph to:

The proposed standard will conform to IEEE Standard 802 and the other cited documents.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 10 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/3a

Editing would help.

Should also distinguish PAR from 3G, given comment of Mark Epstein.

Suggested Remedy

IEEE 802.16 is the only IEEE 802 standard designed for metropolitan area networks (MANs). Other 802 wireless standards and projects that support mobile use do not offer the full set of key defining features of 802.16, including
*design for long-range MAN-sized macrocells
*high data rate
*scheduled MAC for full Quality of Service support
*specification for licensed bands
For these (and other) reasons, the 802.16 standard will be unlike any other standard or current project in 802.

The 802.16 Working Group also believes that it is critical to differerentiate this work with respect to ITU-R IMT2000 projects...

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR Ballot Number: Comment Date

Comment # 11 Comment submitted by: Roger Marks

Comment Type Technical, Non-binding Starting Page # Starting Line # Fig/Table# Section 5C/4a

Specific examples of such proprietary systems should be added.

Better yet, standards-based systems should be detailed.

Suggested Remedy

Proposed Resolution Recommendation: Accepted Recommendation by

Reason for Recommendation

Resolution of Group Decision of Group:

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 12 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/4b

Should add reference to the WiMAX Forum, which is developing 802.16 compliance and interoperability tests.

Suggested Remedy

The Worldwide Interoperability Microwave Access (WiMAX) Forum is a corporate consorium that supports the deployment of IEEE 802.16 systems by developing compliance and interoperability testing, both for 10-66 GHz (802.16) and 2-11 GHz (802.16a) systems. WiMAX plans to development an interoperability certification program and is actively engaged in discussions with IEEE-SA regarding such a program. WiMAX has supported the development of drafts which have become the basis of 802.16 standards projects regarding compliance testing. The existence of WiMAX and its earlier output makes the feasibility of developing interoperability tests, and doing so quickly, quite high.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 13 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/4c

Statement should be supported by specific details.

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 14 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/5b

Statement ignores important cost savings of integrated fixed and mobile service.

Suggested Remedy

Change last sentence to:

"The cost of a single base station is amortized over a large number of users; that number may be quite high, since both fixed and mobile users are supported. In addition, some users may utilize significant bandwidth during periods (such as evening hours) when mobile use may be relatively light."

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 15 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** 5C/5c

Statement ignores upgrade of fixed base stations for mobility.

Suggested Remedy

Change response to:

"Radio/modems may be configured to fit with interfaces common handheld computers, etc., and thereby customer-installed.

Base station installation can be costly. However, the cost to install an upgrade a deployed 802.16a base station should be moderate. Futhermore, the use of 802.16 MANs, particularly of the 10-66 GHz variety, for base station backhaul can minimize the cost of interconnecting the base station to core network and provide flexibility of placement. Furthermore, since one base station may supports many (fixed and mobile) users, the costs involved are low on a per-user basis.

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 16 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/10-11

Submission dates is too conservative. Several participants have indicated that mobility is a simple extension of 802.16a. If this is a consensus position, then the development time ought not be so long. The group ought to aim for a Working Group draft within four sessions (by July 2003) and complete WG letter in two more (by November 2003).

We should target Sponsor Ballot completion in four months. However, one NesCom member has previously requested that all PARs allow at least six months for Sponsor Ballot. To avoid contention on this point, we should allow six months.

Suggested Remedy

Change response to (10) to: "14 Nov 2003".

Change response to (11) to: "14 May 2004".

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:** Accepted

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 17 **Comment submitted by:** Itzik Kitroser Member

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/12

This PAR describes mobility extensions to 802.16\a baseline.
It is important to emphasis that this extension will retain the high rate services capabilities of the base line standard, which, when combined with high channel widths, make a big differentiation to other groups with similar scope.

Suggested Remedy

Change:
"To amend the 802.16 standard with the needed capabilities to support combined fixed and mobile operation within a single system.The mobile operation will support vehicular speeds up to 250 km/hour.The extension will address PHY and MAC changes to support mobile subscriber operation and roaming between 802.16 base-stations or their sectors.This amendment will allow high spectral efficiency (3-4 bit/s/Hz),macrocell sizes and NLOS operation in licensed bands below 6 GHz."

To

"To amend the 802.16 standard with the needed capabilities to support combined fixed and mobile operation within a single system. This amendment will provide the mobile user access to high data rate services, high resolution video services and voice services with variant QoS classes, will support aggregated rates of 20Mbps and will be optimized for carrying various traffic types (ATM based or Packet based). The mobile operation will support vehicular speeds up to 250 km/hour. The extension will address PHY and MAC changes to support mobile subscriber operation and roaming between 802.16 base-stations or their sectors. This amendment will allow high spectral efficiency (3-4 bit/s/Hz), macrocell sizes and NLOS operation in licensed bands below 6 GHz with support of various channel widths (1.25 - 28)."

Proposed Resolution **Recommendation:** Rejected **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:** Rejected

It is believed by the group that the revised scope better reflects the intent of the group

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Action Items

Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 18 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

(1) Scope should be shortened to fit within recommended five lines.
(2) Acronyms should be spelled out.
(3) Handoff should be mentioned.
(4) Backward compatibility needs to be specified, but it does not fit in the five lines and is not required in a document scope statement. Therefore, it should be included in (18) ["Addiional Explanatory Notes"]. {This is addressed in a separate comment, where other key features are also mentioned.}

Suggested Remedy

Change scope to this version, which just fits in five lines:

This document provides enhancements to IEEE Std 802.16/802.16a to support subscriber stations moving at vehicular speeds and thereby specify a system for combined fixed and mobile broadband wireless access. Higher-layer handoff between base stations or sectors is supported but not specified. Operation is limited to licensed bands below 6 GHz. The specification allows high spectral efficiency (3-4 bit/s/Hz), macrocell sizes, and non-line-of-sight operation.

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

This document provides enhancements to IEEE Std 802.16/802.16a to support subscriber stations moving at vehicular speeds and thereby specifies a system for combined fixed and mobile broadband wireless access. Functions to support higher layer handoff between base stations or sectors are specified. Operation is limited to licensed bands. Fixed 802.16a subscriber capabilities shall not be compromised.

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 19 **Comment submitted by:** Geoff Thompson

Comment Type **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

Trim/edit scope to 5 lines:
Amend 802.16 standard with needed capabilities to support combined fixed & mobile operation within a single system. Mobile operation to support speeds up to 250 km/h. Address PHY & MAC changes to support mobile subscriber operation & roaming between 802.16 base-stations or their sectors. Allow high spectral efficiency (3-4 bit/s/Hz), macrocell sizes and NLOS operation in licensed bands below 6 GHz.

You need to expand PHY to Physical Layer and MAC to Media Access Control, also expand NLOS. Many folks on NESCOM won't know our jargon.

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See revised scope

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 20 **Comment submitted by:** Reza Arefi

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

There has been no measurement or simulation data presented to the SG that shows the performance of the 802.16 MAC and PHY in mobile operation so that the group can get a sense of the upper limit on the speed.

Suggested Remedy

In the Scope section of the PAR, delete the sentence "The mobile operation will support vehicular speeds up to 250 km/h."

Alternatively, withdraw the PAR from SEC until supporting evidence on the upper limit of the speed supported by 802.16 MAC and PHY is presented to the group. Then update the PAR and resubmit to SEC.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

See revised scope

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 21 **Comment submitted by:** Reza Arefi

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

The new amendment to 802.16 needs to be backward compatible with 802.16. If everything is subject to change, then it doesn't make sense to keep the work in 802.16.
Also, the group spent over 2 years debating all the issues. Removing backward compatibility requirement will start the debates about modes, etc. all over again and will considerably slow down the process.

Suggested Remedy

The Scope section of the PAR needs to require backward compatibility.

In the Scope section of the PAR, replace the sentence starting with "The extension will..." with the following:

"This amendment will address PHY and MAC changes, that are fully backward compatible, to support mobile subscriber operation and roaming between 802.16 base-stations or their sectors."

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See revised scope and explanatory notes (18)

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 22 **Comment submitted by:** Reza Arefi

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

The new project should naturally use frequencies suitable for mobile operation. The frequency upper limit is related to the degree of mobility. Due to propagation issues, it's easier to implement high mobility at lower frequencies than in higher bands. Since the degree of mobility supported by 802.16 in an economically viable manner is not determined yet, the Scope section of the PAR should not include an upper limit on frequency.

Suggested Remedy

In the Scope section of the PAR, replace the last sentence with the following:

"This amendment will allow high spectral efficiency (3~4 bits/s/Hz), macrocell sizes and NLOS operation."

Alternatively, withdraw the PAR from SEC until supporting evidence on the upper limit of the frequency supported by 802.16 MAC and PHY while mobile is presented to the group. Then update the PAR and resubmit to SEC.

Proposed Resolution **Recommendation:** Rejected **Recommendation by**

Reason for Recommendation

Frequency is included in the revised scope

Resolution of Group **Decision of Group:** Rejected

Reason for Group's Decision/Resolution

A frequency limit is needed to distinguish between .16 and .16a as well as limiting the scope to bands suitable for mobility.

Group's Notes

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 23 **Comment submitted by:** Mark Klerer

Comment Type Technical, Binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/12

The 802.16 Study Group has the charter of allowing the evolution of 802.16 compliant systems toward supporting mobility. To that end it would appear logical that changes to the PHY and MAC be fully backward compatible with the existing specification and that no a priori statement be made about the station speed that can be achieved by such a system.

Suggested Remedy

Replace the scope text (Section 12) in its entirity with:

To amend the 802.16 standard to support combined fixed and mobile operation from within a single system. The extension will address PHY and MAC changes, that are fully backward compatible, while supporting mobile subscriber operation and roaming between 802.16 base-stations or their sectors. This amendment will allow high spectral efficiency (3~4 bits/s/Hz), macrocell sizes and NLOS operation.

Proposed Resolution **Recommendation:** **Accepted-Modified** **Recommendation by**

See revised PAR scope

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 24 **Comment submitted by:** Marianna Goldhammer Member 2002/11/10

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/12

The PAR scope needs more focus and differentiation

Suggested Remedy

Amend the 802.16 MAC and PHY to support combined fixed and mobile operation within a single system, with channel bandwidth of 3..10MHz, while allowing roaming between sectors and base-stations, high spectral efficiency (3-4 bit/s/Hz), up to symmetrical rates per user, up to macro cell sizes and NLOS operation. The mobile operation will support vehicular speeds up to 120km/h and may support 250 km/hour for train feeding.

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 25 **Comment submitted by:** Marianna Goldhammer Member 2002/11/10

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/12

Too strong requirement

Suggested Remedy

The mobile operation may support vehicular speeds up to 250 km/hour, for addressing train mobile feeding.

Proposed Resolution **Recommendation:** Rejected **Recommendation by**

Reason for Recommendation

No apriori speed requirements have been specified since backwards compatibility with fixed subscribers is a prime requirement

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 26 **Comment submitted by:** Marianna Goldhammer Member 2002/11/10

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/12

Do not exclude micro-cells

Suggested Remedy

This amendment will allow high spectral efficiency (3-4 bit/s/Hz), up to macrocell sizes and NLOS operation in licensed bands below 6 GHz.

Proposed Resolution **Recommendation:** Rejected **Recommendation by**

Reason for Recommendation

No apriori statement about cell size was deemed appropriate

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

Editor's Questions and Concerns

Editor's Action Items

Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 27 **Comment submitted by:** Marianna Goldhammer 2002/11/10

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/13

Describe better the scope and why is different from the other PAR

Suggested Remedy

Add at the end of the existing paragraph:
As a differenciation from mobile systems, the system will be optimized for highest data rates for fixed subscribers or low-speed roamming mobile subscribers .

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See revised PAR

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 28 **Comment submitted by:** Marianna Goldhammer 2002/11/10

Comment Type Technical, Non-binding **Starting Page #** 3 **Starting Line #** **Fig/Table#** **Section** PAR/13

Describe better the convergence scope

Suggested Remedy

Add at the end of the existing paragraph:
As a differenciation from mobile systems, the system will be optimized for highest data rates for fixed subscribers or low-speed roamming mobile subscribers .

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See Revised PAR

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 29 **Comment submitted by:** Jodi Haasz

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/16

For P802.16e, you have not listed a contact for ITU-R. Could you please let me know who the contact is as NesCom will want this information prior to PAR approval?

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

ITU-R JRG 8A-9B, Jose Costa, Tel: 613 763-7574, Fax: 613 763-1225, e-mail: j.costa@ieee.org

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 30 **Comment submitted by:** Roger Marks

Comment Type Technical, Non-binding **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/18

Backward compatibility needs to be specified.

Other key feaures of the standard should be mentioned, even if they don't fit in the Scope.

Suggested Remedy

Add to (18) ["Addiional Explanatory Notes"]:

"(12) Subscriber stations specified herein, when stationary, shall interoperate with base stations specified in IEEE Std 802.16a. Base stations specified herein shall interoperate with stationary subscriber stations specified in IEEE Std 802.16a.

Because the standard will utilize the 802.16/802.16a medium access control layer, it will support multimedia services requiring differentiated Quality of Service, and it will support adaptive physical link control so that subscriber stations can receive higher-rate service when they move more slowly, include more effective antennas, or are otherwise in better link conditions.

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

add to (18) in PAR

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 31 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/4

(1) Ambiguity in "Physical Layer and Medium Access Control Modifications"; is this a PHY, with MAC modifications, or is this a set of modifications to the PHY and to the MAC.
(2) Add reference to both combined fixed and mobile operation.
(3) Unnecessary to included frequencies ("in Licensed Bands below 6 GHz") in title, but leave "Licensed Bands" since so many 802 projects take place in unlicensed.

Suggested Remedy

Change title to:
"Draft Amendment to IEEE Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems - Modifications of Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands"

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See revised PAR title

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

Editor's Questions and Concerns

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 32 **Comment submitted by:** Roger Marks

Comment Type Editorial **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/6

Standard to be amended should include reference to 802.16a.

Suggested Remedy

add "as modified by IEEE 802.16a"

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

Group's Action Items

Editor's Notes **Editor's Actions**

Editor's Questions and Concerns

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 33 **Comment submitted by:** Richard Brand

Comment Type **Starting Page #** **Starting Line #** **Fig/Table#** **Section**

Roger:

First of all, thank you for coming over to the Sheraton in the rain to help clarify the issues around the wireless PARs. As we discussed in the session today, it is my personal position that your scope needs to be tightened/modified to be in alignment with what was stated verbally today, ie, that the project will be focused only on the modifications necessary to the existing .16 document to allow for the coverage of mobile endpoints with existing .16 compatible L1/L2 equipment.

Thank you,
Richard Brand

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted **Recommendation by**

Revised PAR clearly indicates that the project is addressing only modifications to the current standard and specifies backwards compatibility with basic 802.16a equipment.

Reason for Recommendation

Resolution of Group **Decision of Group:**

Reason for Group's Decision/Resolution

Group's Notes

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Editor's Notes **Editor's Actions**

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Document under Review: 802.16e PAR **Ballot Number:** **Comment Date**

Comment # 34 **Comment submitted by:** Geoff Thompson

Comment Type **Starting Page #** **Starting Line #** **Fig/Table#** **Section** PAR/4

Roger-

I have a problem with the tile portion of your PAR for 802.16e, to wit, it says:

IEEE Standard for Local and metropolitan area networks -
Part 16: Air Interface for **Fixed** Broadband Wireless Access Systems -

Then it says:

Physical Layer and Medium Access Control Modifications for **Mobile** Operation in Licensed Bands below 6 GHz

I would consider the title of the part to be out of scope in reference to the title of the whole.

A more appropriate thing to do would be a change to overall title and then an appropriate amendment title, e.g.:

IEEE Standard for Local and metropolitan area networks -
Part 16: Air Interface for **Fixed and Mobile** Broadband Wireless Access Systems -

Then :

Amendment for Physical Layer and Medium Access Control **Parameters** for **Mobile** Operation in Licensed Bands below 6 GHz

I believe this is a more accurate representation of your intended work and a more appropriate title.

Geoff

Suggested Remedy

Proposed Resolution **Recommendation:** Accepted-Modified **Recommendation by**

See revised PAR.

Reason for Recommendation

Resolution of Group **Decision of Group:** Accepted-Modified

Title has been revised to:
Amendment to IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems - Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands"

Reason for Group's Decision/Resolution

The group felt that use of the word "Parameters" was too restrictive. As combined Fixed and Mobile operation is thge intent, the revised title was clarified to indicate dual operation.

Group's Notes

Group's Action Items

Editor's Notes **Editor's Actions**

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