Project	IEEE P802.16 Broadband Wireless Access Working Group		
Title	Comments on 802.16s0-99/2: Input to 802.16 session #2		
Date Submitted	2 August, 1999		
Source	Brian Petry 3Com 12230 World Trade Dr. San Diego CA, 92128	Voice: Fax: E-mail:	858-674-8533 858-674-8733 brian_petry@3com.com
Re:	Comments on the “Preliminary Draft Working Document for 802.16 Broadband Wireless Access System Requirements” 802.16s0-99/2.		
Abstract	A database report of comments received by the editor, as of 12:00 PM PDT 2 August, 1999.		
Purpose	This is a capture of comments which can be used as input to session #2.		
Notice	This document has been prepared to assist the IEEE P802.16. 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 acknowledges and accepts that this contribution may be made publicly available by 802.16.		

Comments

Page Number	1
Line Number	2
Number	63
Last Name	Petry
First Name	Brian

Description of Edit	**Reason for Edit**
Delete lines 2-5 (editor's note)	Editor's note shouldn't be relevant any more

Date Received	8/2/99
Comment Type	Editorial

Page Number	1
Line Number	16
Number	64
Last Name	Petry
First Name	Brian

Description of Edit	**Reason for Edit**
Change the rest of the paragraph from "The System Requirements will not" to: The System Requirements will not be published and sold by the IEEE. The requirements are binding to the future development of 802.16 air interface protocols. Thus the forthcoming MAC and PHY protocol standard must comply with the system requirements."	To reflect the "binding" nature of the document, as decided by the sysreq task group at the Montreal session (#1).

Date Received	8/2/99
Comment Type	Technical

Page Number	1
Line Number	20
Number	65
Last Name	Petry
First Name	Brian

Description of Edit

Insert text:

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST" This word or the adjective "REQUIRED" means that the item is an absolute requirement..

"MUST NOT" This phrase means that the item is an absolute prohibition.

"SHOULD" This word or the adjective "RECOMMENDED" means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.

"SHOULD NOT" This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

"MAY" This word or the adjective "OPTIONAL" means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

Reason for Edit

Define explicit "requirements" language

Date Received	8/2/99
Comment Type	Technical

Page Number	1
Line Number	20
Number	66
Last Name	Petry
First Name	Brian

Description of Edit

Capitalize the "requirements" words which we use.

Reason for Edit

Call attention to explicit "requirements" language.

Date Received	8/2/99
Comment Type	Technical

Page Number	1
Line Number	24
Number	62
Last Name	Costa
First Name	Jose

Description of Edit	**Reason for Edit**
Replace "802.16 network" by "802.16 radio interface" and do a global change in the document.	To be consistent with the generally understood meaning of the terms "network" and "radio interface."

Date Received	8/2/99
Comment Type	Technical

Page Number	2
Line Number	8
Number	16
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Replace Modeel with Model	typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	4
Line Number	1
Number	61
Last Name	Shirali
First Name	Chet

Description of Edit

Inserting of the system Architecture diagram in the System Requirements document. (refer to Chet's diagram).

Reason for Edit

In the IEEE Austin plenary meeting, an out line was prepared where in all
the members had agreed that there is a requirement of an architecture
diagram. Margarete Ralston from Wytec inc., had contributed a system
architecture diagram, a modification of which was supposed to be in the SR
draft document. Phasecom is contributing a generic reference diagram, which
should be part of the draft SR document. It is felt that this diagram or its
modification could be part of all the documents produced by the PHY and the MAC group as well.

Date Received	7/30/99
Comment Type	Technical

Page Number	4
Line Number	28
Number	17
Last Name	Sanders
First Name	Ray

Description of Edit

Replace sentence with the following: "BWA systems are not meant to focus on mobile telephone systems. Support for low speed voice channels such as Voice over IP, Voice over Frame Relay and similar services may be included."

Reason for Edit

To not proscribe possible future services that could be important to the market even though early-to-market systems may not include such services.

Date Received	7/28/99
Comment Type	Technical

Page Number	4
Line Number	33
Number	60
Last Name	Arefi
First Name	Reza

Description of Edit

Delete the last sentence ("Furthermore, the thing that's doing ...") all the
way to the end of the paragraph.

Reason for Edit

This is inconsistent with Figure 2-1 in which multi-line POTS is considered
as an application for small businesses. Also, it might prove economical in
certain international markets. Let's not rule it out and leave it to the
equipment manufacturers.

Date Received	7/30/99
Comment Type	Technical

Page Number	4
Line Number	41
Number	18
Last Name	Sanders
First Name	Ray

Description of Edit

Change "access point is for" to "access point may be"

Reason for Edit

To unambiguously include both individual and multiple users within the definition of the term "subscriber"

Date Received	7/18/99
Comment Type	Editorial

Page Number	5
Line Number	9
Number	19
Last Name	Sanders
First Name	Ray

Description of Edit

Change the lower limit on Mass Market Access Characteristics &
Applications from 64 Kbps to <=64 Kbps

Reason for Edit

So that support for low speed channels such as Voice Over IP, et al are not precluded from support even though early systems may support only channels whose aggregate bandwidth is greater than or equal 64 Kbps.

Date Received	7/18/99
Comment Type	Technical

Page Number	6
Line Number	14
Number	20
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change "and do not" to "and may"	Although early systems may include only support for Digital Audio/Video Multicast from streams originating within the infrastructure network, it is plausible to assume that return path bandwidths (particularly for streaming audio) from a BWA remote terminal that is to be broadcast to a plurality of subscribers. The system requirements should not preclude this possibility.

Date Received	7/28/99
Comment Type	Technical

Page Number	6
Line Number	36
Number	21
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add a bullet paragraph with the following text: "Voice Over IP, Voice Over Frame Relay and similar services."	To add services that need be supported in the BWA environment

Date Received	7/28/99
Comment Type	Technical

Page Number	6
Line Number	39
Number	22
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
before the words "voice traffic' inert the words "packet-based"	To support needed service types

Date Received	7/28/99
Comment Type	Technical

Page Number	7
Line Number	2
Number	23
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Delete the sentence beginning "The unused channel's bandwidth generally"	Time Assigned Speech Interpolation (TASI) has been around for several decades as a means of using periods of silence in conversational speech dynamically. Similar systems are now employed in commercial Voice Over IP and Voice Over Frame Relay networks. Therefore, the sentence that was included is not literally true.

Date Received	7/28/99
Comment Type	Technical

Page Number	8
Line Number	7
Number	24
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change the word "does" to "do"	grammar

Date Received	7/28/99
Comment Type	Editorial

Page Number	8
Line Number	39
Number	25
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change the word "preserve" to the words "preserve or even enhance"	A BWA system should not cause a degradation of ATM QoS features. However, where a bandwidth-on-demand mechanism can be included in the 802.16 MC/PHY layer standard, it is plausible to expect that certain ATM QoS features may be enhanced.

Date Received	7/28/99
Comment Type	Technical

Page Number	9
Line Number	6
Number	52
Last Name	van Waes
First Name	Nico

Description of Edit

Change lines 6-15 to:
The popularity and importance of Internet Protocol (IP) service needs no argument. The importance of the IP service will further increase in the near future with technologies such as VoIP and real time multi-media emerging.

A great majority of the traffic transported in a 802.16 network will be IP. Therefore the 802.16 network must transport variable length IP datagrams efficiently. Both IP version 4 and 6 must be supported. Especially for efficient transport of IPv6, TCP/IP header compression over the air interface should be supported.

The 802.16 IP service must provide support for real-time and non-real-time services. It should be possible to support the emerging IP QoS efforts, Differentiated Services [43, 44] and Integrated Services [42].

Reason for Edit

Rather than stating what are the key factors of IP, the sysreq should
state what the standard should facilitate.

Date Received	7/29/99
Comment Type	Technical
Page Number	9
Line Number	16
Number	50
Last Name	van Waes
First Name	Nico

Description of Edit

Delete lines 16-17 "* Cable TV ... services [12]."

Reason for Edit

This is a statement about DOCSIS, not a system requirement.

Date Received	7/29/99
Comment Type	Technical

Page Number	9
Line Number	19
Number	51
Last Name	van Waes
First Name	Nico

Description of Edit

Delete lines 19-26.

Reason for Edit

The first part is a philosophical discussion , not a system requirement. The second part, whether 802.16 will support both IP and ATM, does not belong in this IP description section.

Date Received	7/29/99
Comment Type	Technical

Page Number	9
Line Number	27
Number	53
Last Name	van Waes
First Name	Nico

Description of Edit

Delete lines 27-30.

Reason for Edit

This statement lacks meaning, since there is no definition of what
comprises "best effort delivery".

Date Received	7/29/99
Comment Type	Technical

Page Number	11
Line Number	12
Number	59
Last Name	Arefi
First Name	Reza

Description of Edit

Replace "around 30 GHz" with "in Ka-band"

Reason for Edit

802.16 will focus on 20-40 GHz and will cover BWA systems in 24 and 38 GHz
as well as 30 GHz.

Date Received	7/30/99
Comment Type	Technical

Page Number	11
Line Number	18
Number	57
Last Name	Duhamel
First Name	Robert

Description of Edit

Insert the following:

Guideline for service providers choice of rain model;

Rain availability is crucial for the network design goals i.e. minimum toll quality DS0 and minimizing the number of hubs deployed. A 99.995% availability goal seems to be a good trade off as a function of the number of hubs deployed. Rain rate estimation is statistical and not an exact science. This fact makes the selection of which rain model to use i.e. ITU, Crane or local rain rate difficult. Therefore the service provider should carefully consider the choice of models used. In general it is probably better to err on the side of being conservative in which case the Crane model would be selected over the ITU model. The Crane Model accounts for more rain loss vs. the ITU model. Actual field test data should be taken as a further guide to assist in validating a rain model. Local rain data may show that both the ITU and Crane models are not conservative enough. In high rain rate regions where 99.999% availability may be required special designs with higher gain antennas for example more narrow beamwidth Hub sector antennas and higher gain subscriber antennas may be required. This is one approach that will allow a compromise in network hub costs.

Reason for Edit

Technical expansion to present text.

Date Received	7/30/99
Comment Type	Technical

Page Number	12
Line Number	29
Number	58
Last Name	Duhamel
First Name	Robert

Description of Edit

Insert the following:

The ACI value should conform to EIA TSB10-F Annex B "Methods for Computing the Interference Objectives of Digital Receivers i.e. the C/N threshold should degrade less than or equal to 1 DB in a worst case C/N faded condition that includes both ACI and Co-channel RFI. The power spectral mask should conform to FCC Part 101.111 a (2) ii for frequencies greater than 15 GHz.

The Hub and Subscriber radio equipment should be developed for spectrally efficient channelization schemes. Two approaches are submitted for consideration:

1. Minimize the frequency separation between adjacent channels. The channel plan would include multiple contiguous adjacent channels on the same polarity within a sector with no available cross polarization discrimination. Guard bands between channels may be required.

2. Stagger the assignment of frequencies. Using a 4 90 degree sector Hub as an example, the 0 degree azimuth sector would have every odd numbered channel assigned on a given antenna polarity. The 180 degree sector would have an even numbered channel assigned on the opposite polarity. This wold allow relaxed RF/IF channel filtering characteristics. The drawback to this approach is that it would require more complex frequency management than approach 1. Testing would need to be performed to verify the feasibility.

Reason for Edit

Technical expansion to present text.

Date Received	7/30/99
Comment Type	Technical

Page Number	12
Line Number	32
Number	56
Last Name	Duhamel
First Name	Robert

Description of Edit	**Reason for Edit**
Comment: Upstream contention is an issue for FDMA. Insert the following: Upstream contention is NOT an issue for FDMA or TDMA circuits because these circuits are dedicated. However if DAMA is used in conjunction with FDMA or TDMA dedicated circuits than contention is an issue. Request for unused channels may be on a contention basis.	Technical expansion to present text

Date Received	7/30/99
Comment Type	Technical

Page Number	13
Line Number	8
Number	26
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change the words "pereater to bypass" to "repeaters or reflectors"	Reflectors have been used at microwave frequencies to bypass objects.

Date Received	7/28/99
Comment Type	Technical

Page Number	13
Line Number	28
Number	27
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
The term "igure" should be "Figure"	typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	13
Line Number	33
Number	28
Last Name	Sanders
First Name	Ray

Description of Edit

Recommendation: A section or subsection should be devoted to repeater requirements. Actually, the word "repeater" may not be the best choice. The function of such a unit should be to aggregate duplex traffic between a base and a number of STS's. Such an aggregation station could be composed of either a radio repeater, or could be an STS to which a number of other (smaller) STS's are attached by means other than radio (e.g., wireline, optical or fiber).

Reason for Edit

Line of Site restrictions imposed by BWA frequency range make it mandatory that the reach of any base station be extended by any cost effective means that should not be limited to radio.

Date Received	7/28/99
Comment Type	Technical

Page Number	14
Line Number	1
Number	13
Last Name	van Waes
First Name	Nico

Description of Edit

Change obectives to objectives.

Reason for Edit

typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	14
Line Number	16
Number	29
Last Name	Sanders
First Name	Ray

Description of Edit

Change the word "can" to "may"

Reason for Edit

The word "can" may imply a mandatory requirement in some people's minds. This is not likely to be the intended meaning.

Date Received	7/28/99
Comment Type	Editorial

Page Number	14
Line Number	38
Number	14
Last Name	van Waes
First Name	Nico

Description of Edit	**Reason for Edit**
Change loical to logical	typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	14
Line Number	39
Number	15
Last Name	van Waes
First Name	Nico

Description of Edit	**Reason for Edit**
Change orderin to ordering	typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	16
Line Number	9
Number	12
Last Name	Petry
First Name	Brian

Description of Edit	**Reason for Edit**
Insert "not" before "to provide"	Correction of typo

Date Received	7/20/99
Comment Type	Editorial

Page Number	17
Line Number	19
Number	30
Last Name	Sanders
First Name	Ray

Description of Edit

Replace "for generic Internet access--" with "for generic Internet access such as Web browsing where servers are connected directly to a base station rather than at remote stations--"

Reason for Edit

As BWA networks grow in numbers and in bandwidth, there will be less assurance that servers will be attached only at base stations. This will likely be particularly true for corporate networks.

Date Received	7/28/99
Comment Type	Technical

Page Number	17
Line Number	31
Number	33
Last Name	Sanders
First Name	Ray

Description of Edit

change "99.99%" to "99.999%"

Reason for Edit

To reduce ambiguity potential and to recognize that if a network's end-to-end availability objective is for 99.99%, a tighter limit is required for tandem network elements such as BWA systems.

Date Received	7/28/99
Comment Type	Technical

Page Number	17
Line Number	31
Number	32
Last Name	Sanders
First Name	Ray

Description of Edit

change "see Section 5.4" to "see Section 5.5"

Reason for Edit

typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	17
Line Number	31
Number	31
Last Name	Sanders
First Name	Ray

Description of Edit

Change "maximum" to "worst case"

Reason for Edit

To reduce ambiguity potential and to recognize that if a network's end-to-end availability objective is for 99.99%, a tighter limit is required for tandem network elements such as BWA systems.

Date Received	7/28/99
Comment Type	Technical

Page Number	18
Line Number	37
Number	55
Last Name	Duhamel
First Name	Robert

Description of Edit

Comment: "Availability in access portion. POTS toll quality at least G826.F1189"
Insert the following:
Minimum Voice Circuit Performance Requirements: The BER value recommended in CCITT G.821 is a minimum value. For speech communication, a value of 1 x 10-6 is considered adequate for excellent quality performance. When the value is worse than 1 x 10-6, the link is considered to be degraded and maintenance should be initiated to improve the BER. After 10 seconds at a value of 1 x 10-3, the link is considered to be unavailable (i.e. failed).

Reason for Edit

Technical expansion to present text.

Date Received	7/20/99
Comment Type	Technical

Page Number	19
Line Number	2
Number	34
Last Name	Sanders
First Name	Ray

Description of Edit

Change "16E-6" to "1.6E-8"

Reason for Edit

2E-4 / 1522 / 8 = 1.64 E-8

Date Received	7/28/99
Comment Type	Technical

Page Number	19
Line Number	4
Number	35
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change 5.6E-9 to 7.1E-10	3E-7 / 53 / 8 = 7.1E-10

Date Received	7/28/99
Comment Type	Technical

Page Number	19
Line Number	8
Number	36
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add Note: BER for a BWA system is only one component of a network's end-to-end BER	Further analysis is required to determine definitive error rate requirements for BWA systems. It is not the case that "one size fits all".

Date Received	7/28/99
Comment Type	Technical

Page Number	19
Line Number	30
Number	37
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Change "5usec/km" to "3.3 usec/km" and change "235 usec" to "16.7 usec"	Speed of radio propagation is close to 3E5 km/usec or 0.3 km/usec so that delay is 3.3 usec/km. The larger value of 5 usec/km appears nominally associated with non-wireless media.

Date Received	7/28/99
Comment Type	Technical

Page Number	20
Line Number	1
Number	47
Last Name	Arunachalam
First Name	Arun

Description of Edit

Sections 3 and 4 of contribution (80216sc-99_28.pdf) should be inserted in
original section 6.0

Reason for Edit

The present text assumes that QoS and CoS are almost synonymous and classes
definition is kept open. In my proposal, the classes defined are service
classes that are provided in radio access networks (generic) which will be
mapped to various classes of service used by ATM and IP core networks .
Thus, present sections 6.1 and 6.2 should be moved to section 6.3 that
addresses mapping. The exact mapping will be agreed upon by service
providers using SLAs.

Date Received	7/29/99
Comment Type	Technical

Page Number	20
Line Number	1
Number	48
Last Name	Arunachalam
First Name	Arun

Description of Edit

Move sections 6.1 and 6.2 into 6.3.

Reason for Edit

The present text assumes that QoS and CoS are almost synonymous and classes
definition is kept open. In my proposal, the classes defined are service
classes that are provided in radio access networks (generic) which will be
mapped to various classes of service used by ATM and IP core networks .
Thus, present sections 6.1 and 6.2 should be moved to section 6.3 that
addresses mapping. The exact mapping will be agreed upon by service
providers using SLAs.

Date Received	7/29/99
Comment Type	Technical

Page Number	20
Line Number	27
Number	38
Last Name	Sanders
First Name	Ray

Description of Edit

Add the following: "A topic for further study is the need for RAKE receiver capability with BWA systems. It is true that narrow beamwidth antennas at remote sites reduce the effects of multipath transmission compared to other wireless systems such as cellular telephone systems, but even so, in built-up metropolitan areas with tall buildings, it is not clear that multipath effects can be neglected."

Reason for Edit

Currently service providers overcome multipath problems by careful antenna siting. For today's customer focus, this may be satisfactory. (Input from service providers is needed!) As the market expands, siting is likely to become more and more difficult.

Date Received	7/28/99
Comment Type	Technical

Page Number	20
Line Number	42
Number	39
Last Name	Sanders
First Name	Ray

Description of Edit

Replace the sentence starting with "This form of allocation . . ." with "TDM bandwidth allocation may be performed dynamically to allow for both 1) turning up fixed bandwidth Permanent Virtual Circuits (PVCs) and 2) for dynamically changing bandwidth of a virtual circuit once it has been established."

Reason for Edit

The use of PHY layer "mini-slots" makes this type of operation feasible and could lead to innovative support for higher level QoS needs.

Date Received	7/28/99
Comment Type	Technical

Page Number	21
Line Number	17
Number	40
Last Name	Sanders
First Name	Ray

Description of Edit

Add "Video on Demand (VoD)" after the word "videoconferencing"

Reason for Edit

As BWA data rates increase and video compression technology improves, VoD may well become an important service that should be anticipated within the 802.16 standard.

Date Received	7/28/99
Comment Type	Technical

Page Number	22
Line Number	44
Number	41
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add the following paragraph: "The basic mechanism available within BWA systems for supporting QoS requirements is to allocate bandwidth to various services. BWA systems should include a mechanism that can support dynamically-variable-bandwidth channels and paths (such as those defined for ATM and IP environments)."	To suggest that dynamic allocation mechanisms be explored within MAC and PHY deliberations.

Date Received	7/28/99
Comment Type	Technical

Page Number	23
Line Number	19
Number	42
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add after "discarding data," the following: "dynamically controlling bandwidth available to a user,"	To clarify what "other appropriate means" might include

Date Received	7/28/99
Comment Type	Technical

Page Number	23
Line Number	22
Number	43
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add to the end of the sentence the following: "or unauthorized system access"	A suggested additional system requirement.

Date Received	7/28/99
Comment Type	Technical

Page Number	25
Line Number	8
Number	44
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
Add to sentence the following: "even though a multicast server may be located at a remote station"	To clarify that servers need not always be connected to a base station by collocation or connections to remote sites not a part of the BWA system.

Date Received	7/28/99
Comment Type	Technical

Page Number	25
Line Number	26
Number	54
Last Name	Chang
First Name	Chi-Yuan

Description of Edit	**Reason for Edit**
Delete lines 26-33.	These statements are implementation specific. In system requirement, we only define what shall be supported, NOT how to support.

Date Received	7/29/99
Comment Type	Technical

Page Number	25
Line Number	27
Number	45
Last Name	Sanders
First Name	Ray

Description of Edit	**Reason for Edit**
change "chouldbe" to "should be"	typo

Date Received	7/28/99
Comment Type	Editorial

Page Number	32
Line Number	1
Number	49
Last Name	Arunachalam
First Name	Arun

Description of Edit

Add reference to revised M.1079 (June 1999) titled
"PERFORMANCE and Quality
of Service (QoS) REQUIREMENTS FOR INTERNATIONAL
MOBILE
TELECOMMUNICATIONS-2000 (IMT-2000)

Reason for Edit

Add reference

Date Received	7/29/99
Comment Type	Technical