### Project

### Title
802.16.3 Functional Requirements Comments for Session #8

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2000-07-09

### Source(s)
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### Re:
802.16.3 Functional Requirements Comment Database Report for Session #8.

### Abstract
This is a database dump of unresolved comments. The database is sorted by page number, then line number. Note that the report includes comments that were left unresolved following session #7. The left-over comments refer to document 802.16.3-00/02r1, whereas the new comments received refer to 802.16.3-00/02r2.

### Purpose
The 802.16.3 Functional Requirements Task Group should use this report to assist in the comment resolution meetings at session #8.

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Unresolved Comments by Page #/Line#

Page/Line: 1 /5  Number:  182  Date:  7/10/00  Name:  Nativ Adi  Type:  Technical
Description: Delete: "packet-based"
Reason: unresolved
Resolution: To allow support of non packet-based services in addition to packet based.

Notes:
Page/Line: 1 /5  Number:  186  Date:  7/10/00  Name:  Padan Uzi  Type:  Technical
Description: Delete "packet based" or replace "packet based" with "packet based or circuit switching based"
Reason: unresolved
Resolution: There is no need to limit the services and solutions to pure packets. There is a need to enable compatibility with legacy networks.

Notes:
Page/Line: 1 /5  Number:  190  Date:  7/10/00  Name:  Wachira Muya  Type:  Technical
Description: Move the words "packet-based" to between the words "provides" and "transport", so that the sentence reads: "The BWA system provides packet-based transport capabilities that can support a wide range of services...."
Reason: unresolved
Resolution: To clarify that it is the transport that is packet-based - the services can be anything.

Notes:
Page/Line: 1 /7  Number:  180  Date:  7/10/00  Name:  Nativ Adi  Type:  Editorial
Description: Erase one of two dots after "locations".
Reason: unresolved
Resolution: typing error, one dot too much.

Notes:
Page/Line: 2 /2  Number:  191  Date:  7/10/00  Name:  Wachira Muya  Type:  Technical
Description: Replace "services" by "services capabilities"
Reason: unresolved
Resolution: To generalize the field of application of the 802.16.3 systems. We need to focus on services capabilities so that operators may build services according to their own market requirements.

Notes:
Page/Line: 2 /3  Number:  192  Date:  7/10/00  Name:  Wachira Muya  Type:  Technical
Description: Replace "services" by "services capabilities"
Reason: unresolved
Resolution: To generalize the field of application of the 802.16.3 systems. We need to focus on services capabilities so that operators may build services according to their own market requirements.

Notes:
Page/Line: 2 /10  Number:  193  Date:  7/10/00  Name:  Wachira Muya  Type:  Technical
Description: Add a new sentence: "As far as possible, these should be common across the 802.16 systems."
Reason: unresolved
Resolution: Commonality improves efficiency.

Notes:
Page/Line: 2 /21  Number:  194  Date:  7/10/00  Name:  Costa Jose  Type:  Editorial
Description: After "The access standards define" please insert "the ways to use" Standards do not define technology by rather the way technology is used (e.g., techniques).
Reason: unresolved
Resolution: 

Notes:
Page/Line: 2 /23  Number:  195  Date:  7/10/00  Name:  Wachira Muya  Type:  Technical
Description: Delete the sentence "Other types are under investigation."
Reason: unresolved
Resolution: Doesn't add anything to the requirements, unless this investigation will be concluded before the FRs are complete.
Add a reference for the "Five Criteria"

Improve readability/understanding.

Modify the sentence to read: "Radio communication in the above range may be possible even in near- and non-line-of-sight situations between a base station and subscriber station." Clarify the sentence.

Without this sentence that has the frequency range (which was deleted at the meeting #7), the words "in the above range .." in the sentence beginning on line 14 have no meaning.

Define the range instead of stating: "the above range". No range is mentioned "above" in that section.

Those are totally different issues and should be separated

Delete lines 18 to 21: "The consumer" through "services)"
The statement does not provide any valuable information.

This sentence is addressing the upstream direction only.

These statements here add nothing but fluff. The requirements for telephony services are sufficiently dealt with in the QoS section. The statement before this subsection already refers there, so there's no need to repeat that here without any hard values.

To generalize the field of application of the 802.16.3 systems. We need to focus on services capabilities so that operators may build services according to their own market requirement.
In the sentence starting "In this document, services refer.....", change the word "document" to "section", and move the sentence to page 9 line 15 , just before "IEEE 802 protocols...."

"Voice connectivity will be provided by a VoIP protocol and may involve low rate voicing."

"Delay - as apparent to the end user, the amount of delay and delay variation MUST be kept within acceptable limits. Again the specific amount of delay and delay variation acceptable is based on the QoS sold to the end user."

The delay amount is depending on many factors, the MAC being only one of them. The delay amount, due to echo cancellers used with VoIP, is not extremely critical.

The VoIP delay is not low

"Delay - as apparent to the end user, the amount of delay and delay variation MUST be kept within acceptable limits. Again the specific amount of delay and delay variation acceptable is based on the QoS sold to the end user."

Give a feeling of what VoIP delay is
Propose to replace the title and first paragraph with:

3.1 Voice Transport Service Capabilities

802.16.3 systems SHALL support voice communications to subscribers in a way that eases the migration of legacy voice equipment and public switched telephone network (PSTN) access technologies to 802.16.3 systems. The 802.16.3 access transport will be packet based (as opposed to circuit switched) and voice communication will be transported by means of packets.

Notes:

Page/Line: 7 /38 Number: 202 Date: 7/10/00
Description: Propose to replace the title and first paragraph with:

3.1 Voice Transport Service Capabilities

802.16.3 systems SHALL support voice communications to subscribers in a way that eases the migration of legacy voice equipment and public switched telephone network (PSTN) access technologies to 802.16.3 systems. The 802.16.3 access transport will be packet based (as opposed to circuit switched) and voice communication will be transported by means of packets.

Notes:

Page/Line: 7 /39 Number: 29 Date: 4/28/00
Description: Insert new paragraph with bullet: BER level The MAC and PHY protocols SHOULD provide for a reasonable BER Level for voice services. BER of 10-4 is sufficient for voice services and 10-5 for FAX.

Notes:

Page/Line: 7 /41 Number: 188 Date: 7/10/00
Description: Delete the sentence "The access transport will be packet based (as opposed to circuit switched) and voice services will be recovered from the packets".

Notes:

Page/Line: 7 /41 Number: 184 Date: 7/10/00
Description: Delete sentence: "The access transport will ... recovered from the packets".

Notes:

Page/Line: 8 /43 Number: 203 Date: 7/10/00
Description: Propose to replace the title and first paragraph with:

3.2 Data Transport Service Capabilities - Internet

The 802.16.3 system MUST directly transport variable-length datagrams efficiently. Both IP versions 4 and 6 must be supported. For efficient transport of IPv6, TCP/IP header compression over the air interface SHOULD be supported. The 802.16.3 IP service MUST provide support for real-time and non-real-time service capabilities. It SHOULD be possible to support the emerging IP Quality of Service (QoS) efforts: Differentiated Services [43, 44] and Integrated Services [42].

Notes:

Page/Line: 9 /5 Number: 204 Date: 7/10/00
Description: Propose to replace the title and first paragraph with:

3.3 Bridged LAN Service Capabilities

The 802.16.3 protocols SHOULD support bridged LANS service capabilities, whether directly or indirectly, including always on, ad hoc and on-demand communication in either or both directions.

Notes:

Page/Line: 9 /23 Number: 181 Date: 7/10/00
Description: Insert line 23 before line 19

Notes:
Insert paragraph 6 Wireless media characteristics
Sub-paragraph 6.1 Duplex model
Paragraph start The radio regulations permit two access modes: Frequency Division Duplex - FDD and Time Division Duplex - TDD. The MAC and PHY protocol MUST support both FDD and TDD duplex modes. Spectral efficiency is maximized in FDD with full-duplex operation, while in TDD with means to avoid collocation problems and more complex interference scenarios. The PHY and MAC protocols MUST provide for full duplex operation, while preserving the QoS, BER and spectral efficiency requirements for data and voice traffic. The MAC and PHY protocols MUST provide means to resolve the collocation and interference problems in TDD deployment.

Insert paragraph 6.2 Channelization
New paragraph The standardization bodies providing channelization recommendations are ITU-R, CEPT and FCC. The allocated bandwidth per operator varies between 5MHz and 120MHz. In Europe, the typical allocated bandwidth is 14MHz. The operators target a good frequency reuse factor, using 4-6 sectors for Base Stations. The Base Station bandwidth per sector can be between 1.75MHz and 7MHz in CEPT countries and between 2MHz and 6MHz in MMD. The MAC and PHY protocols MUST permit the operation with channel spacing per sector of 1.75, 3.5 and 7MHz when using ETSI masks and 2, 3, 5 and 6MHz when using other masks. The typical value for performance analysis SHOULD be 3.5MHz for ETSI mask and 3MHz for MMDS mask.

Insert paragraph 6.3 Cellular deployment
New paragraph In cellular deployment, due to interference, the system spectral efficiency can be considerably lowered. The PHY and MAC protocols SHOULD permit good frequency reuse factors, providing at least 2bit/s/cell. In order to reduce the interference level, the PHY and MAC protocols MUST permit power control per subscriber up-link and SHOULD permit power control per subscriber down-link. The PHY and MAC protocols SHALL permit real-time changing of power levels, as function of propagation conditions, in order to use the minimum power needed for the target BER.

Replace "Bandwidth" with "Capacity"
Bandwidth is measured in Hz, not bit/s

Replace "rapidly changing" with "diverse"
The channels in fixed wireless access are not rapidly changing in time. They may slowly change, however the key issue is that each link is different.

Replace "(with references, etc.)" by "(Questions ITU-R 140/9, ITU-R 215/8, ITU-R 220/9)"
To provide more specific references.
Change first sentence in 5.7 to the following: "802.16.3 system was defined. Capacity issues should consider matters such as modulation type and frequency reuse factor."

A sector capacity requirement is defined as the product of two factors: the "modulation-gain" factor and the "sector-bandwidth". The "modulation-gain" is defined as the sector's aggregate bit rate divided by the bandwidth, depending mainly on the type of modulation in use. The "sector-bandwidth" is defined as the total frequency band available for the BWA service, divided by the frequency re-use factor.

This reflects mainly the factor of frequency reallocation and the ability to optimize frequency usage.

All reference should be revisited. Most of the reference are not relevant to 802.16.3.

Delay of 10 ms for packet-oriented connections is too short. VoIP can tolerate up to about 150 ms delay, as long as frame error rate is below about 1%.

Remove space within "The". Typo.

The last sentence parenthesis should read "To include the support of additional services to IP".

Replace "CMIP/CMIS" with SNMP/CORBA.

More appropriate for Access networks / environments, especially for residential and SME markets.
This needs further elaboration / discussion / contribution. Power control loops are probably fundamental for most FWA / customer unit applications and it must not be possible to exceed a maximum permitted power level. Also, if a SU is "shut down" it must be possible to re-enable it (without visiting the customer location) to diagnose and fix / dispatch etc. There are also functions necessary to handle Primary / secondary power conditions, software downloads/ upgrades, performance and error statistics, and to re-program the allowed base station /

**Notes:**

**Page/Line:** 15 /15  **Number:** 142  **Date:** 4/28/00

**Name:** Trinkwon David  **Type:** Technical  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Expand the requirement to better match the needs of the 802.16.3 target markets.

**Notes:**

**Page/Line:** 15 /27  **Number:** 143  **Date:** 4/28/00

**Name:** Trinkwon David  **Type:** Technical  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
To better match the needs for the 802.16.3 target markets.

**Notes:**

**Page/Line:** 17 /8  **Number:** 148  **Date:** 4/28/00

**Name:** Trinkwon David  **Type:** Technical  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Delete 2nd, 3rd and 4th bullets relating to 802 conformance.

**Notes:**

**Page/Line:** 17 /21  **Number:** 176  **Date:** 4/28/00

**Name:** Wachira Muya  **Type:** Editorial  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Replace the term "bandwidth" with "capacity"

**Notes:**

**Page/Line:** 22 /0  **Number:** 75  **Date:** 4/28/00

**Name:** Kasslin Mika  **Type:** Editorial  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Delete the last incomplete sentence "This" through "provisioning"

**Notes:**

**Page/Line:** 22 /0  **Number:** 76  **Date:** 4/28/00

**Name:** Kasslin Mika  **Type:** Editorial  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Delete "Protocol" till end of text

**Notes:**

**Page/Line:** 25 /0  **Number:** 77  **Date:** 4/28/00

**Name:** Kasslin Mika  **Type:** Technical  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Replace 99.94% with 99.95% Consistency with the text in section 5.4 if the corresponding earlier comment is approved.

**Notes:**

**Page/Line:** 26 /0  **Number:** 78  **Date:** 4/28/00

**Name:** Kasslin Mika  **Type:** Technical  **Reason:** unresolved  **Resolution:** unresolved

**Description:**
Delete the following bullet points: Consistency with the text in section 5.7 if the corresponding earlier comment is approved. "- Width of the sector"

**Notes:**