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Abstract	This document contains general high level and mandatory requirements for TGj specification.
Purpose	This document is a proposal for mandatory requirements to be considered while submitting technical proposals to TGj.
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Proposed Mandatory Technical Requirements for IEEE 802.16 TGj

1. Introductory remarks

This document is submitted in response to the call for contributions on system requirements that was issued by the IEEE 802.16 task group j [1].

Apart from the General high level requirements, in this document we focus solely on the mandatory requirements. This document is a subset, including refinements based on feedback from others, of an earlier document presented during the May 2006 meeting [2] that dealt with optional as well as mandatory features. The term mandatory, in this document, refers to those requirements which are required to be fulfilled by the relay station (RS) and the MMR base station (MMR-BS), as opposed to the optional requirements which will be addressed by the specification but implementations are not required to fulfil them.

It is noted that the purpose of this requirements document, as well as the document that will eventually be adopted by the TG, will be to provide additional *guideline* for submitting proposals to TGj and will supplement the 802.16j PAR and 5 Criteria [3] documents, which provide the overriding requirements for Task Group j.

It is not the intention of this submission to exclude the consideration of, or discussion on, the optional requirements in any way. The requirements that are optional or in-scope will be duly considered based on various submissions to the TG.

2. General high level requirements

As a general requirement, which follows directly from the PAR and 5 criteria document, proposals to TGj shall not require modifications to the mobile stations (including subscriber stations). Proposals shall ensure backward compatibility with the mobile stations as specified in the legacy standard (i.e., IEEE Std 802.16-2004 and IEEE Std 802.16e-2005) to the extent that the relay operation is transparent to the mobile stations.

It is also hereby proposed that the submissions should minimize the modifications related to the MAC and OFDMA PHY as specified in the legacy standard. Proponents of contributions are encouraged to maximize the re-use of the procedures defined in the legacy standard.

As another general requirement, submitted proposals should support LOS as well as non-LOS operation for the deployment of the RS.

MMR-BS will distinguish itself from a BS, as defined in the legacy standard, in that it shall support the operations of RS, while at the same time maintaining full compliance with the legacy standard.

In addition to the requirements on the relay functionality (discussed below), a general requirement on RS is that it shall be compliant with the BS in order to meet the transparency requirement. RS shall not have mandatory requirement to support optional features as specified in the legacy standard. It is assumed that the RS will not generate user traffic of its own, but it is expected that the RS shall support the generation of control and

management messages that are necessary for proper relay operation.

3. Mandatory functional requirements

The following table describes the mandatory functional requirements of an RS. Throughout the document, unless specified otherwise, it is assumed that the MMR-BS will accommodate the functions defined for the RS and support the RS to fulfill these requirements.

* legacy: IEEE Std 802.16-2004 + IEEE Std 802.16e-2005

Category	Name	Requirements	Notes
Configuration	Capability management	Capabilities of RS shall be managed by MMR-BS.	
	Hop count	The specification shall mandate to support at least 2 hops (i.e. MMR-BS to MS via RS).	The functions (e.g. routing) to support multi-hop (>2) shall be optional.
	RS control	The specification shall define a mechanism for MMR-BS to control and manage RS.	
PHY features	PHY frame structure for backward compatibility with legacy 16 mobile station	The specification shall define a frame structure which shall accommodate both BS-RS link and BS-MS link.	RS-RS link shall also be accommodated with the same frame structure.
	RF part	The specification shall define OFDMA RF parameters necessary for the correct operation of the BS-RS link.	RF parameters such as frequency band, channel bandwidth shall be defined.
	Baseband part	The specification shall define/specify baseband parameters/operation necessary for the correct operation of the BS-RS link.	Baseband parameters such as FFT size, symbol CP, and baseband operations such as preamble transmission, synchronization, channel quality measurement shall be defined/specified.
	Flexible radio resource assignment	The specification shall support various forms of radio resource assignment.	Sharing channels between access links and relay links, sharing channels between multiple relay links, using different channels for different links, etc.

Network entry	RS network entry	The specification shall define network entry process for RS.	
	MS network entry support	RS shall support network entry process for MS.	
Control information processing	DL and UL control information processing	The specification shall enable RS to process and forward the DL and UL control information.	DL and UL control information includes DL/UL-MAP, DCD/UCD, MOB_NBR-ADV.
Scheduling	Scheduling	The specification shall provide signaling to support MAC scheduling of data and control message transmission on relay and access links.	Scheduling may be centralized, distributed, or a hybrid thereof.
	QoS support	RS shall support QoS defined in legacy 16 system.	
Data delivery via relay	Unicast data delivery	The specification shall support unicast data delivery via RS.	
	Multicast/broad cast data delivery	The specification shall support multicast and broadcast data delivery via RS.	
	MAC PDU processing	RS shall support MAC PDU processing.	
Mobility support	MS handover support	RS shall support MS handover.	
Security	Relay security	The specification shall define security mechanisms to ensure security between MMR-BS and RS, and between RS and MS.	

4. References

[1] Call for Comments and Contributions IEEE 802.16 Relay Task Group, IEEE 802.16j-06/006
[2] Proposed Functional Requirements for IEEE 802.16 TGj, IEEE C802.16j-06/022r1
[3] Draft P802.16j PAR and Five Criteria, IEEE 802.16mmr-06/002r1