

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Comments on the Proposed Technical Requirements for IEEE 802.16 Relay TG	
Date Submitted	2006-09-19	
Source(s)	Masahito Asa Mohsin Mollah Motorola Japan Ltd., 3-20-1 Minamiazabu , Minatoku, Tokyo, 106-8573, Japan	Voice: +81-3-5424-3156 Voice: +81-3-5424-3209 asa@motorola.com mohsin@motorola.com
	Shyamal Ramachandran Motorola Inc, 1064 Greenwood Blvd Suite 400 Lake Mary, FL 32746	Voice: +1 407-562-4054 shyamal.ramachandran@motorola.com
	Aparna Pandey Ariel Sharon Motorola Inc., 1301 E. Algonquin Road, Schaumburg, IL 60196 USA	Voice +1 847-576-3732 Voice: +1 847-576-3403 Aparna.Pandey@motorola.com ariel.sharon@motorola.com
	David T. Chen Nat Natarajan Motorola Inc. 1501 W. Shure Drive, Arlington Heights, IL 60004 USA	Voice: +1 847-632-2664 Voice: +1 847 632-6303 david.t.chen@motorola.com nat.natarajan@motorola.com
	Roger Peterson Motorola Labs, 1301 E. Algonquin Road, Schaumburg, IL 60196 USA	Voice: +1 847-576-3892 r.peterson@motorola.com
Re:	Comments on Technical requirements: IEEE 802.16j-06/016 < http://ieee802.org/16/relay/contrib/80216j-06_016.pdf >, the Task Group document on technical requirements, in response to the Call for Comments IEEE 802.16j-06/018 issued on September 8, 2006.	
Abstract	Provides mapping between Technical Requirements and Table of Contents	

Purpose	For technical requirements discussion at IEEE802.16j at IEEE802.16 #45 Task Group Meeting
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < http://ieee802.org/16/ipr/patents/policy.html >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < mailto:chair@wirelessman.org > as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site < http://ieee802.org/16/ipr/patents/notices >.

Comments on the Proposed Technical Requirements for IEEE 802.16 Relay TG

*Masahito Asa, Mohsin Mollah, Shyamal Ramachandran, Aparna Pandey,
Ariel Sharon, David T. Chen, Nat Natarajan, Roger Peterson
Motorola*

Introduction

In the last #44 meeting Technical Requirement Document was released. One of the purposes of the Technical Requirement Document is to drive Table of Content (ToC) of the draft specification. We propose to relate each technical requirement item with relevant section(s) of ToC as preparation for Call for Proposal that will occur during next #46 meeting.

The related section(s) of ToC is inserted in Note column of table of the Technical Requirement.

Proposed ToC section into Technical Requirement

Mandatory functional requirements

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
M1	Capability management	Capabilities of RS shall be managed by MMR-BS.	MMR-BS (M) RS (M)	6.3.9.16
M2	RS control	The specification shall define a mechanism for MMR-BS to perform topology learning in its own MMR cell as well as to control and manage RSs in the MMR cell.	MMR-BS (M)	6.3.25
M4	PHY frame structure for backward compatibility with legacy 16 mobile station	The specification shall define a backward compatible frame structure that supports relay links while accommodating the legacy access links.	MMR-BS (M) RS (M)	8.4.4.8

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
M5	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 and channel bandwidth, as well as transmitter/receiver requirements including RS-emission and RS-susceptibility, shall be defined/specified for the BS-RS and RS-RS link.	MMR-BS (M) RS (M)	8.4.12-14 1.3
M6	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 for BS-RS link and RS-RS link.	MMR-BS (M) RS (M)	Preamble aspect TBD 8.4.6(T.B.D) 8.4.11
M7	Flexible radio resource assignment	The specification shall provide a mechanism to support various forms of radio resource assignment.	MMR-BS (O) RS (TBD)	Sharing channels between access links and relay links, sharing channels between multiple relay links, using different channels for different links, frequency reuse between access links and relay links, etc. 6.3.7.7 8.4.5

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
M8	Duplexing Mode	The specification shall support either TDD or FDD for relay link	MMR-BS (M) RS (M)	6.3.7 8.4.4
M9	RS network entry	The specification shall define network entry process for RS.	MMR-BS (M) RS (M)	6.3.9.16 8.4.7
M10	MS network entry support	RS shall support network entry process for MS.	MMR-BS (M) RS (M)	6.3.9.16 8.4.7
M11	Scheduling	The specification shall provide signaling to support MAC scheduling of data and control message transmission on relay and access links.	MMR-BS (M) RS (M)	Scheduling may be centralized, distributed, or a hybrid thereof. 6.3.5
M12	Bandwidth request and allocation	MMR-BS shall support the bandwidth request and allocation mechanism for RS.	MMR-BS (M) RS (O)	6.3.6.7
M13	QoS support	The specification shall support QoS as defined in the legacy 16 system for multi-hop.	MMR-BS (M) RS (TBD)	6.3.14.10
M14	Unicast data delivery	The specification shall support unicast data delivery via RS.	MMR-BS (M) RS (M)	T.B.D.
M15	MAC PDU processing	RS shall support MAC PDU processing.	MMR-BS (M) RS (TBD)	6.3.2 6.3.3.8
M16	Control information processing	The specification shall enable RS to process and forward the DL and UL control information.	MMR-BS (M) RS (O) MOB_NBR-ADV is TBD	DL and UL control information includes DL/UL-MAP, DCD/UCD, MOB_NBR-ADV. 6.3.2.3
M17	Connection management	The specification shall support MS connections (i.e., CIDs) for multi-hop.	MMR-BS (M) RS (O)	6.3.1.3
M18	MS handover support	RS shall support MS handover.	MMR-BS (M) RS (M)	6.3.22.4

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
M19	Relay security	The specification shall define security mechanisms to ensure security between MMR-BS and RS, and between RSs and between RS and MS.	MMR-BS (M) RS (M)	Section 7

Optional functional requirements

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
O1	Relay path selection	The specification shall define a mechanism to set up and maintain multi-hop paths.	MMR-BS (O) RS (O)	There can be centralized and distributed approaches to determine a relay path. 6.3.25
O2	Multicast/broadcast data delivery	The specification shall support multicast and broadcast data delivery via RS.	MMR-BS (O) RS (O)	6.3.23.3
O3	ARQ support	The specification shall support ARQ of MS via RS.	MMR-BS (O) RS (O)	6.3.4.7
O4	HARQ support	The specification shall support HARQ of MS via RS.	MMR-BS (O) RS (O)	6.3.17.5 8.4.15
O5	Mobile RS handover support	The specification shall support RS with mobility and its subordinate MSs.	MMR-BS (O) RS (O)	6.3.22.4
O6	Handover decision for subordinate stations	The specification shall allow the handover decision originated by a serving RS or MMR-BS on behalf of moving stations.	MMR-BS (O) RS (O)	6.3.22.4

Number	Name	Requirements	Subject (MMR-BS/RS)	Notes
O7	MMR-BS authentication	The specification shall permit RS to authenticate MMR-BS when it joins an MMR network.	MMR-BS (O) RS (O)	section 7
O8	PHY parameters	The specification shall allow an RS to use different PHY parameters on the relay and access links when they operate on the different RF frequency channels..	MMR-BS (O) RS (O)	1.3 (T.B.D.)
O9	Multiple antenna support	The specification shall allow the use of multiple antennae to enhance spectral efficiency of the system or extend the coverage.	MMR-BS (O) RS (O)	This includes MIMO, beamforming, transmit diversity, etc. 6.3.7 8.4.8
O10	CQICH	The specification shall enable RS to allocate a CQICH subchannel to support fast feedback quality report and AMC	MMR-BS (O) RS (O)	6.3.17 – 19
O11	Cooperative relay	The specification shall enable RS to participate in cooperative relay.	MMR-BS (O) RS (O)	6.3.23.3 or New section
O12	Location information	The specification shall support RS to perform location update.	MMR-BS (O) RS (O)	6.3.26
O13	Power saving	The specification shall support sleep/idle mode.	MMR-BS (O) RS (O)	6.3.21.7
O14	Neighbor Detection	The specification shall enable the RS to detect its neighbor stations including the status and quality of radio link to each neighbor.	RS (O)	A neighbour station could be RS or MMR-BS. 6.3.26
O15	Multiple Relay Path	The specifications shall support the creation of more than one multi-hop path between an MMR-BS and MS.	MMR-BS(O) RS (O)	6.3.25

Temporary Table of Contents

1. Overview
 - 1.1 Scope
 - 1.2 Purpose
 - 1.3 Frequency bands
 - [1.3.4 Air interface nomenclature and PHY compliance](#)
 - 1.4 Reference model
 - [1.4.2 MMR reference model](#)
2. References
3. Definitions
4. Abbreviations and acronyms
6. MAC common part sublayer
 - 6.1 PMP
 - [6.1.1 MMR](#)
 - 6.3 Data/Control plane
 - 6.3.1 Addressing and connections
 - [6.3.1.3 MMR addressing and connections](#)
 - 6.3.2 MAC PDU formats
 - [6.3.2.1 MAC header formats](#)
 - [6.3.2.2 MAC subheaders and special payloads](#)
 - [6.3.2.3 MAC management messages](#)
 - 6.3.3 Construction and transmission of MAC PDUs
 - [6.3.3.8 MMR construction and transmission of MAC PDUs](#)
 - 6.3.4 ARQ mechanism
 - [6.3.4.7 MMR ARQ mechanism](#)
 - [6.3.5 Scheduling services](#)
 - [6.3.5.3 MMR scheduling services](#)
 - 6.3.6 Bandwidth allocation and request mechanisms
 - [6.3.6.7 MMR bandwidth allocation and request mechanisms](#)
 - 6.3.7 MAC support of PHY
 - [6.3.7.7 MMR MAC support of PHY](#)
 - 6.3.8 Contention resolution
 - [6.3.8.2 MMR contention resolution](#)
 - 6.3.9 Network entry and initialization
 - [6.3.9.16 MMR network entry and initialization](#)
 - 6.3.10 Ranging
 - [6.3.10.1 Downlink burst profile management](#)

- [6.3.10.1.1 MMR burst profile management](#)
- [6.3.10.3 OFDMA-based ranging](#)
- [6.3.10.3.4 MMR ranging](#)
- 6.3.11 Update of channel descriptors
- [6.3.12 Assigning SSs to multicast groups](#)
- [6.3.13 Establishment of multicast and broadcast transport connections](#)
- 6.3.14 QoS
 - [6.3.14.10 MMR QoS support](#)
- [6.3.15 Procedures for shared frequency band usage](#)
- 6.3.17 MAC support for HARQ
 - [6.3.17.5 MMR HARQ mechanism](#)
- 6.3.18 DL CINR report operation
 - [6.3.18.3 MMR DL CINR report operation](#)
- 6.3.19 Optional Band AMC operations using 6-bit CQICH encoding
- 6.3.21 Sleep mode for mobility-supporting MS
 - [6.3.21.7 MMR sleep mode support](#)
- 6.3.22 MAC layer handover procedures
 - [6.3.22.4 MMR handover procedures](#)
- 6.3.23 Multicast and broadcast services (MBS)
 - [6.3.23.3 MMR multicast and broadcast services](#)
- 6.3.24 MS Idle Mode (optional)
 - [6.3.24.10 MMR MS idle mode support](#)
- [6.3.25 MMR routing and path management](#)
- [6.3.26 MMR neighborhood discovery](#)
- [6.3.27 MMR dynamic frequency allocation and reuse](#)

7. Security sublayer

- 7.1 Architecture
- 7.2 PKM protocol
- 7.3 Dynamic SA creation and mapping
- 7.4 Key usage
- 7.5 Cryptographic methods
- 7.6 Certification profile
- 7.7 Pre-Authentication
- 7.8 PKMv2

8. PHY

- 8.4 WirelessMAN-OFDMA PHY layer
 - 8.4.1 Introduction
 - 8.4.4 Frame structure
 - [8.4.4.8 MMR frame structure](#)
 - 8.4.5 Map message fields and IEs

- 8.4.7 OFDMA ranging
 - [8.4.7.2 Periodic ranging and bandwidth request transmissions](#)
 - [8.4.7.3 Ranging codes](#)
- 8.4.8 Space-Time Coding (optional)
- 8.4.9 Channel coding
- 8.4.10 Control mechanisms
- 8.4.11 Channel quality measurements
- 8.4.12 Transmitter requirements
- 8.4.13 Receiver requirements
- 8.4.14 Frequency control requirements
- 8.4.15 Optional HARQ support

9. Configuration

[9.3 RS configuration](#)

10. Parameters and constants

- 10.1 Global values
- 10.2 PKM parameter values
- 10.3 PHY-specific values
 - [10.3.5 MMR PHY parameters and definitions](#)
- 10.4 Well-known addresses and identifiers

11. TLV Encodings

[11.20 MMR TLV encodings](#)

[Annex I. MMR RAN Deployment Scenarios](#)

[Annex J. MMR RAN Architecture](#)

- [J.1 Overview of MMR RAN](#)
- [J.2 Overview of MMR-BS, RS, MS functions](#)
- [J.3 Access and relay links](#)
- [J.4 PHY and MAC structures to support MMR operation](#)
- [J.5 Concept of operations](#)

Reference

- [1] IEEE 802.16j-06/016, Proposed Technical Requirements for IEEE 802.16 Relay TG (Jerry Sydir, et. al.; 2006-09-05)
- [2] IEEE 802.16j-06/101, Comments on the TOC 802.16j-06/017r1 (Kerstin Johnsson, et.

- al.; 2006-09-19)
- [3] IEEE 802.16j-06/017r1, TOC of Task Group Working Document (Mike Hart, Jung Je Son; 2006-08-31)