Dedicated Interface Between MMR-BS and RS

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE C802.16j-06/214

Date Submitted:

2006.11.07

Source:

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Venue:

IEEE 802.16 Session #46 Dallas, TX, USA, 13-16 November 2006

Base Document:

None

Purpose:

. Response to Call for Technical Proposals regarding IEEE Project P802.16j (80216j-06_027.pdf)

Dedicated Interface Between MMR-BS and RS

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Nov. 2006

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- Objective
- Introduction
- An Example of Control Messages Between MMR-BS and RS
- Transport Mechanisms for Control Messages
- Proposed Solution
- Text Proposal

Objective of This Contribution

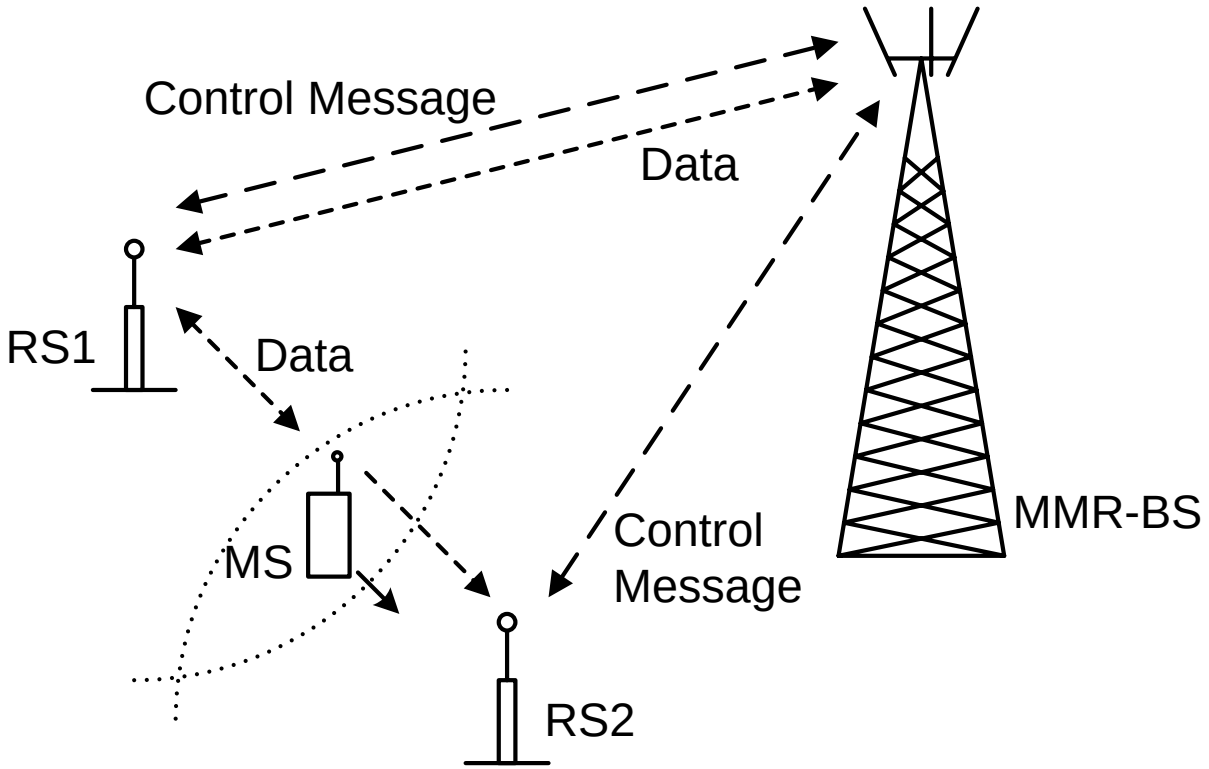
- Document Number: C802.16j-06/214
- To improve the performance of MMR network by minimizing the delay of control messages between RS and MMR-BS

Introduction

- Problem:
  - Delay of control messages between MMR-BS and RS could cause serious performance degradation
  - Ex: handover, bandwidth request, etc
- Proposed Solution: “Hot Line”
  - Allocate dedicate control channel between MMR-BS and RS for relay management
- Discussed at #44: C80216j-06/072r1

EX: Control Messages Between RS & MMR-BS

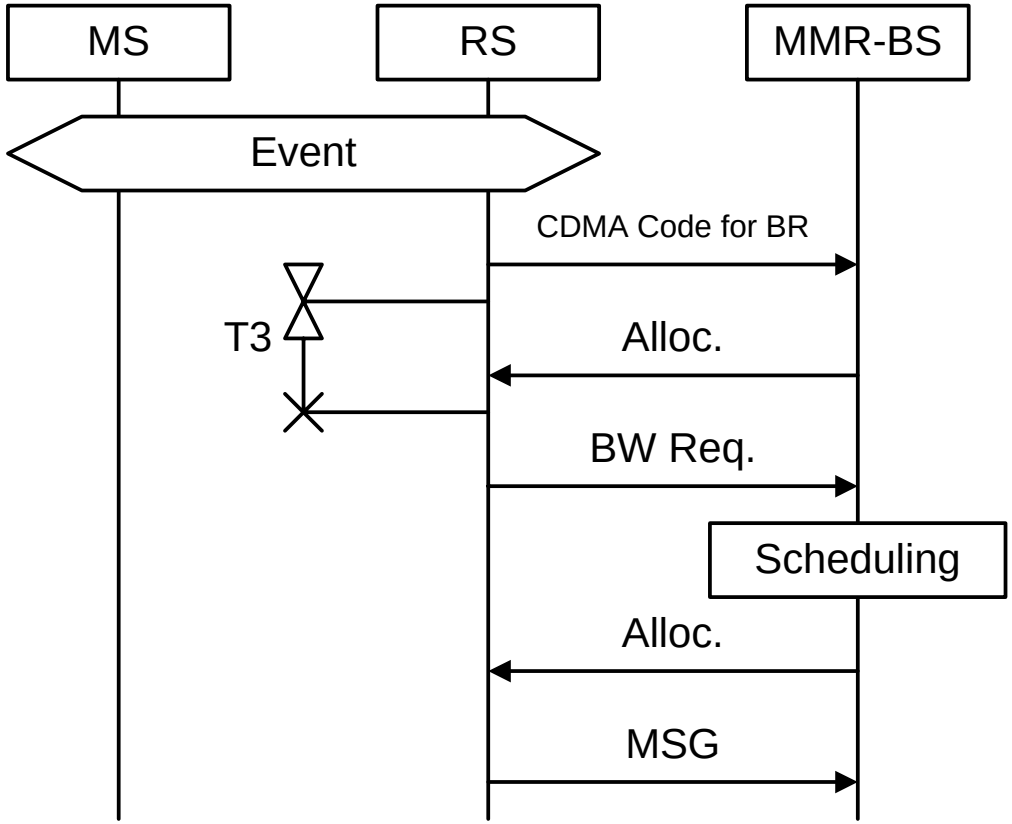
- Intra BS handover



Transporting Control Messages to MMR-BS for Relay Management

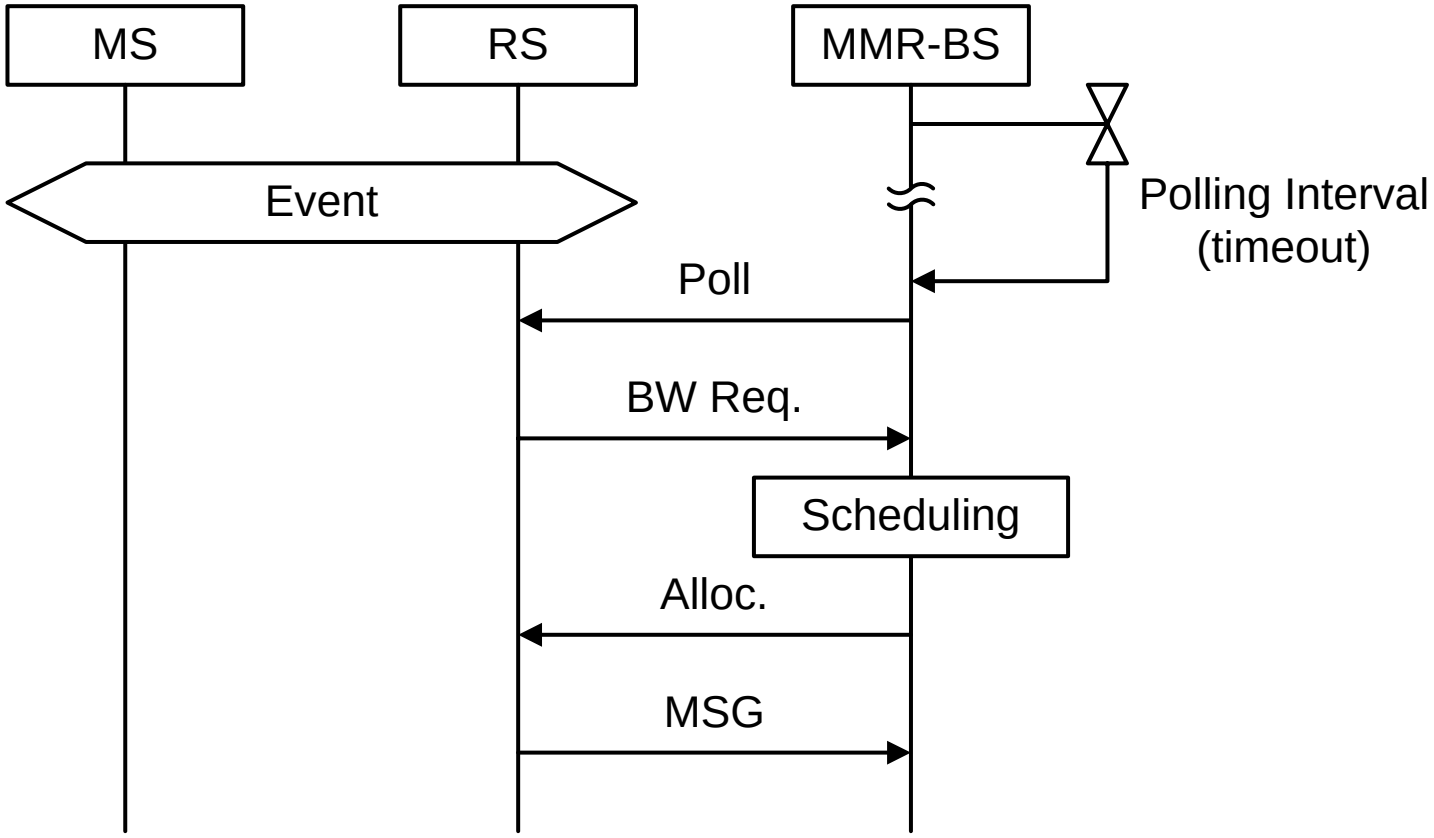
- Contention Based
  - Minimum overhead
  - Un-reliable
- Polling
  - Overhead vs. Delay
  - Reliable
- Dedicated Allocation (“Hot line”)
  - More overhead, smaller delay
  - Reliable

Transporting Control Messages: Contention Based

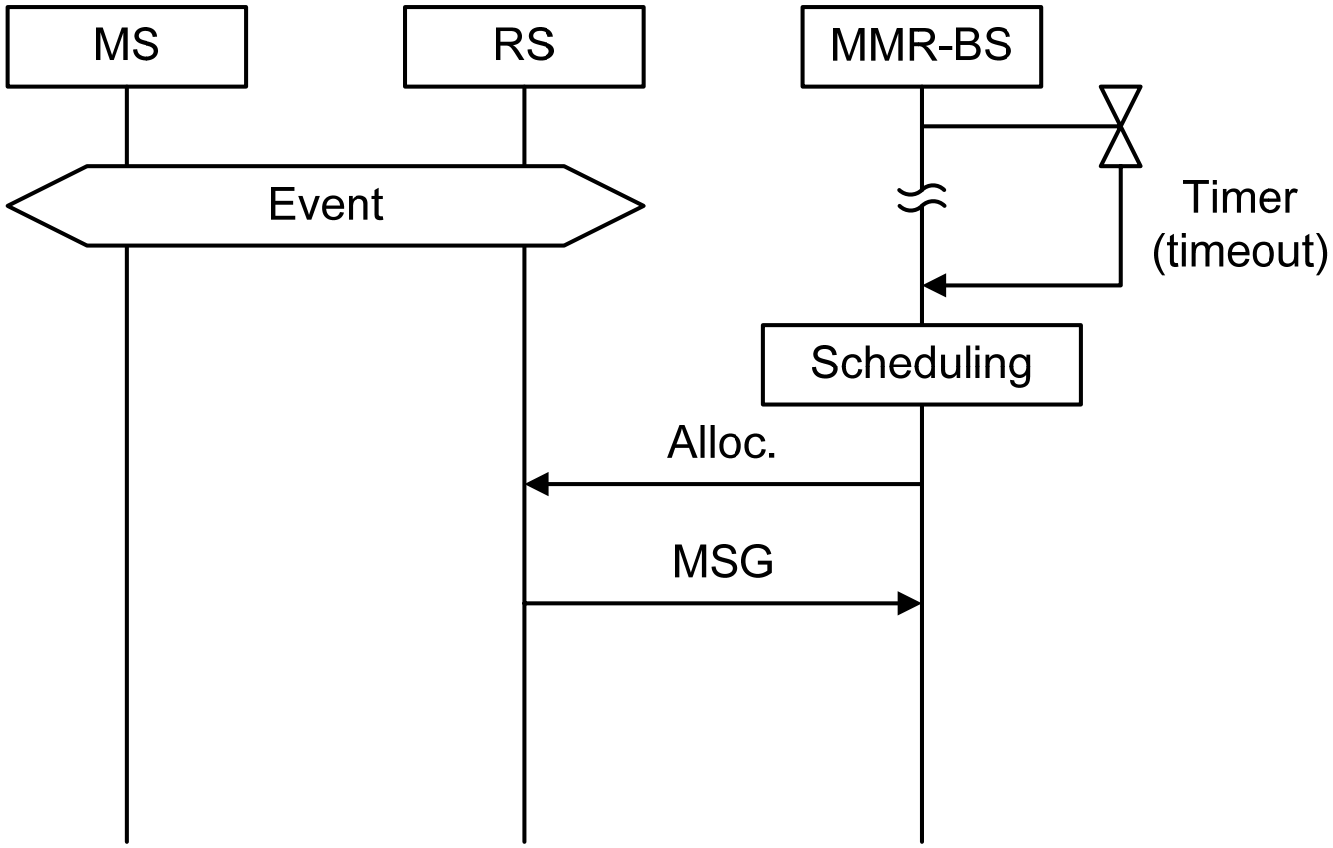


- T3: 200msec (40 frames)

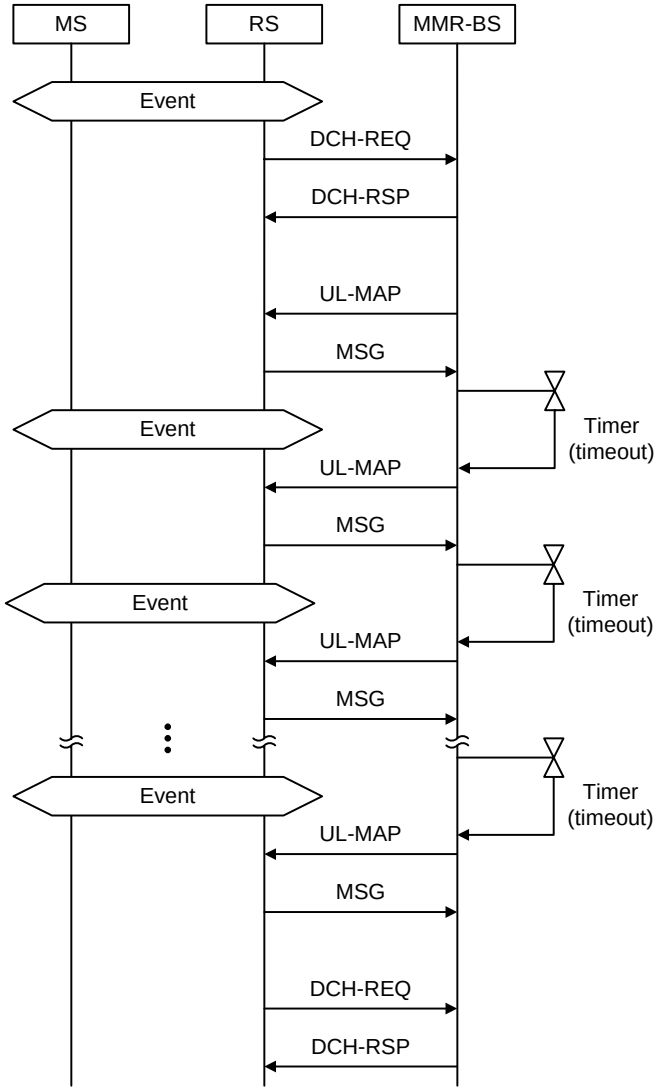
Transporting Control Messages: Polling



Transporting Control Messages: Dedicated Allocation (1/2)



Transporting Control Messages: Dedicated Allocation (2/2)



Text Proposal (1/8)

- Table 14

6.3.2.3 MAC Management messages

Change Table 14 as indicated:

66	**MOB_ASC-REP**	**Association result report message**	**primary management**
67	**DCH-REQ**	**Dedicated control channel request message**	**basic**
68	**DCH-RSP**	**Dedicated control channel response message**	**basic**
69-255		*Reserved*	–

Text Proposal (2/8)

•DCH-REQ message (1/2)

Insert new subclause 6.3.2.3.62:

6.3.2.3.62 Dedicated control channel request (DCH-REQ) message

A DCH-REQ is sent by an RS to an MMR-BS to request, change, or release a dedicated control channel allocation.

Table xxx – DCH-REQ message format

Syntax	Size	Note
DCH-REQ_Message_format() {		
Management Message Type = 67	8 bits	
Frame Number	24 bits	
Bandwidth Request	16 bits	0 = Release request of the allocation
Allocation Interval	8 bits	Set to zero when the bandwidth request field is set to zero.
}		

Text Proposal (3/8)

•DCH-REQ message (2/2)

An RS shall generate DCH-REQ messages in the form shown in Table xxx, including the following parameters:

Frame Number

The frame number of the first allocation of the dedicated control channel.

In case the DCH−REQ is a release request, Frame Number indicates the frame from which on the RS requests to release the bandwidth allocation.

Bandwidth Request

The number of bytes of the single uplink bandwidth allocation requested by the RS.

Zero in this field indicates the DCH−REQ is a bandwidth release request.

Allocation Interval

The interval of the periodic bandwidth allocation in number of frame.

This field is set to zero when the Bandwidth Request field is zero.

Text Proposal (4/8)

•DCH-RSP message (1/2)

Insert new subclause 6.3.2.3.63:

6.3.2.3.62 Dedicated control channel request (DCH−REQ) message

A DCH−RSP shall be generated in response to a received DCH-REQ, or to terminate a dedicated control channel allocation to an RS.

Table xxx – DCH−RSP message format

Syntax	Size	Note
DCH-RSP_Message_format() {		
Management Message Type = 68	8 bits	
Frame Number	24 bits	
Allocated Bandwidth	16 bits	0 = Indicates release of the allocation
Allocation Interval	8 bits	Set to zero when the bandwidth request field is set to zero.
}		

Text Proposal (5/8)

- DCH-RSP message (2/2)

An MMR-BS shall generate DCH-RSP message in the form shown in Table xxx, including the following parameters:

Frame Number

The frame number of the first allocation of the dedicated control channel. In case the DCH-RSP is the response to a bandwidth release request, Frame Number indicates the frame from which on the MMR-BS stops the bandwidth allocation.

Allocated Bandwidth

The number of bytes of the allocated single uplink bandwidth. When DCH-RSP is a response to a DCH-REQ requesting non-zero bandwidth, zero in this field indicates failing to allocated bandwidth.

Allocation Interval

The interval of the periodic bandwidth allocation in the number of frame. This field is set to zero when the Allocated Bandwidth field is set to zero.

Text Proposal (6/8)

Change subclause 6.3.6 as indicated:

6.3.6 Bandwidth allocation and request mechanism

Note that during network entry and initialization every SS or RS is assigned up to three dedicated CIDs for the purpose of sending and receiving control messages. These connection pairs are used to allow differentiated levels of QoS to be applied to the different connections carrying MAC management traffic. Increasing (or decreasing) bandwidth requirements is necessary for all services except incompressible constant bit rate UGS connections. The needs of incompressible UGS connections do not change between connection establishment and termination. The requirements of compressible UGS connections, such as channelized T1, may increase or decrease depending on traffic. Demand Assigned Multiple Access (DAMA) services are given resources on a demand assignment basis, as the need arises.

Text Proposal (7/8)

Change subclause 6.3.6 as indicated:

6.3.6 Bandwidth allocation and request mechanism (continued)

When an SS needs to ask for bandwidth on a connection with BE scheduling service, it sends a message to the BS containing the immediate requirements of the DAMA connection. QoS for the connection was established at connection establishment and is looked up by the BS.

MMR−BS may allocate a dedicated control channel to an RS without an explicit request from the RS.

There are numerous methods by which the SS or RS can get the bandwidth request message to the BS. The methods are listed in 6.3.6.1 through 6.3.6.6. The method by which an RS request a dedicated control channel is described in 6.3.6.8.

Text Proposal (8/8)

Insert new subclause 6.3.6.8

6.3.6.8 Dedicated control channel between MMR-BS and RS

An RS shall request a dedicated control channel using DCH-REQ message (see 6.3.2.3.62) for the purpose of transporting control messages from the RS to the MMR-BS. A dedicated control channel is a periodic allocation of uplink bandwidth.

To reduce the overhead of allocating a dedicated control channel to an RS, a dedicated control channel can be allocated, changed, and released based on the expected demand of the uplink bandwidth.

MMR-BS may allocated a dedicated control channel to an RS without an explicit request from the RS by sending a DCH-RSP message to the RS.

If necessary, an MMR-BS can terminate or decrease the bandwidth and/or the allocation interval of the dedicated control channel without request from an RS.

If the uplink path from an RS to an MMR-BS includes other RSs, the MMR-BS shall allocated dedicated control channel for each hop within the path in response to an DCH-REQ.

Thank You!