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Source(s)	<p>Mike Hart, Yuefeng Zhou, Sunil Vadgama Fujitsu Laboratories of Europe Ltd. Hayes Park Central Hayes, Middx, UB4 8FE, UK</p> <p>Okuda Masato Fujitsu Laboratories LTD. Kamikodanaka 4-1-1, Nakahara-ku Kawasaki, Japan. 211-8588</p>	<p>Voice: +44 20 8606 4523 Fax: +44 20 8606 4539 mike.hart@uk.fujitsu.com</p>
Re:	Call for technical proposals 802.16j-06/027	
Abstract	This contribution provides a technical proposal for the RS network entry procedure for the case of a non-transparent RS. It is based on reusing many of the stages executed in the SS network entry procedure with the only major change being the introduction of new SBC and REG TLV values to enable exchange of information about PHY & MAC features supported by the RS.	
Purpose	For discussion and approval of inclusion of the proposed text into the P802.16j baseline document.	
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Network entry procedure for transparent RS

Mike Hart, Yuefeng Zhou, Sunil Vadgama, M. Okuda

Fujitsu Laboratories of Europe Ltd. & Fujitsu Laboratories (Japan) Ltd.

Introduction

This contribution provides a technical proposal for the network entry procedure to be followed by the MR-BS and a transparent RS [1] to enable the transparent RS to enter the MR enabled network.

The proposed procedure is based on reusing as much of the procedure currently defined in the IEEE Std. 802.16 for the purpose of SS network entry.

The current IEEE Std. 802.16 SS network entry procedure is illustrated in Figure 1 for reference.

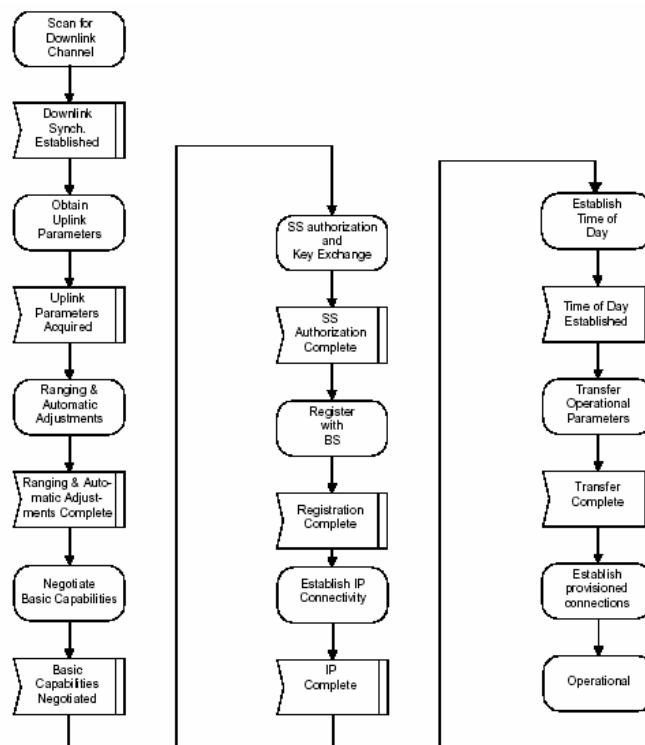


Figure 1. IEEE Std. 802.16 SS network entry procedure.

Overview

It is assumed that the network could consist of some IEEE Std. 802.16 BS and some MR-BS. It is also assumed that an MR-BS may be operating in a legacy mode until it receives a request from an RS for it to enter the network. The reason the MR-BS may operate in such a mode would be to preserve transmission resources by not having to multicast relay specific information on the RS multicast management connection [2] when there are no relays benefiting from the transmission.

However, it is assumed that the MR-BS will at least broadcast the MAC version support TLV [3] in the DCD indicating its capability to support the IEEE 802.16j MAC. The RS will then be able to identify that the BS is

in fact an MR-BS at an early stage in the network entry procedure and decide whether to continue once it learns whether it is attempting to connect to a BS or MR-BS.

The RNG process will be unchanged from the used for SS network entry, the only change being that the RS will indicate support of IEEE 802.16j through the MAC version support TLV [3]. The MR-BS will respond indicating that it can support IEEE 802.16j.

Similarly in the SBC process, a new set of RS capability related TLVs are defined to indicate basic capabilities of the RS to the BS. These TLV will for example identify the type of relay (i.e. transparent, non-transparent, and whether Relay Midamble [4] is required in case of non-transparent RS [5]) and also any other MR-BS or RS related features required to support the RS. One such TLV is defined in this proposal. By these TLVs that contain requirements that are fundamental to PHY layer operation in SBC, it allows the RS to abort connection at an early stage if it finds that fundamental basic parameters are not supported.

In this proposal whether RS performs authorization is left FFS.

The next step where there is some modification is in the REG stage. In this case, similar to that explained for the SBC stage, new TLVs may be signaled [6] and it is proposed that the secondary management connection is not created to the RS.

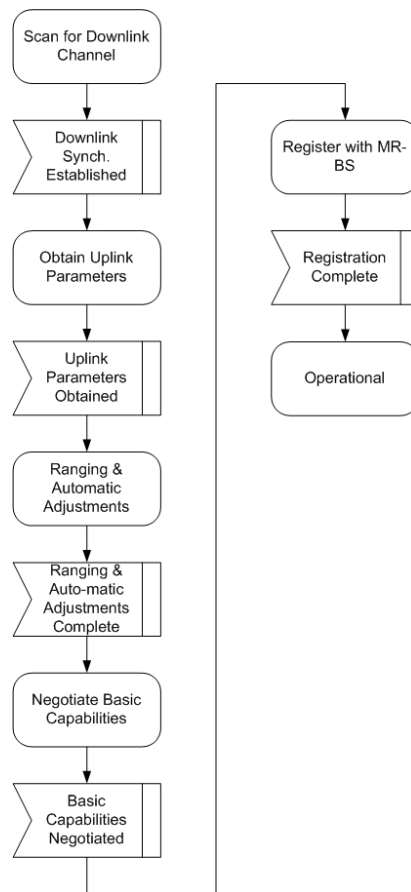


Figure 2. RS network entry procedure.

Proposed text changes

6.3.2.3.23 SS and RS Basic Capability Request (SBC-REQ) message

[Change the text in the first paragraph as indicated:]

The SS SBC-REQ shall be transmitted by the SS or RS during initialization. An SS or RS shall generate SBC-REQ messages in the form shown in Table 51.

[Insert the following text at the end of 6.3.2.3.23:]

An RS shall generate SBC-REQs including the following parameter:

Basic CID (in the MAC Header)

The CID in the MAC Header is the Basic CID for this RS, as assigned in the RNG-RSP message.

All other parameters are coded as TLV tuples.

Basic Capability Requests contain those RS Capabilities Encodings (11.8) that are necessary for effective communication with the RS during the remainder of the initialization protocols. Only the following parameters shall be included in the Basic Capabilities Request:

Physical Parameters Supported (see 11.8.3)

Bandwidth Allocation Support (see 11.8.1)

The following parameters may be included:

Capabilities for construction and transmission of MAC PDUs (see 11.8.2)

6.3.2.3.24 SS or RS Basic Capability Response (SBC-RSP) message

[Insert the following text before the last sentence:]

An MR-BS shall generate SBC-RSPs in the form shown in Table 52, including both of the following parameters:

CID (in the MAC Header)

The CID in the MAC Header is the Basic CID for this RS, as appears in the RNG-REQ message.

The following parameters shall be included in the SBC-RSP if found in the SS SBC-REQ:

Physical Parameters Supported (see 11.8.3)

Bandwidth Allocation Support (see 11.8.1)

The MR-BS response to the subset of RS capabilities present in the SBC-REQ message. The MR-BS responds to the RS capabilities to indicate whether they may be used. If the MR-BS does not recognize an RS capability, it may return this as “off” in the SBC-RSP.

Only capabilities set to “on” in the SBC-REQ may be set “on” in the SBC-RSP, as this is the handshake indicating that they have been successfully negotiated.

6.3.9 Network entry and initialization

[Change the first paragraph as indicated:]

Systems shall support the applicable procedures for entering and registering a new SS or RS or a new node to the network. All network entry procedures described hereunder through and including 6.3.9.13 apply only to PMP operation and PMP operation with MR support. The network entry procedure for Mesh operation is described in 6.3.9.14.

[Insert the following text after the second paragraph:]

The procedure for initialization of an RS shall be as shown in Figure 55. For the RS the stages e), g), h), i) and j) are not required, for all other stages the RS shall behave in the same manner as an SS during network entry unless otherwise specified in the subclauses of 6.3.9. The more detailed finite state machine representations of the individual sections (including error paths) and the timeout values shall be the same as those provided for the SS, unless otherwise specified.

[Insert new subclause 11.8.3.7.20:]

11.8.3.7.20 MR PHY feature support

[Insert the following text:]

This TLV indicates the MR PHY features supported by the RS and MR-BS.

<u>Type</u>	<u>Length</u>	<u>Value</u>	<u>Scope</u>
<u>TBA</u>	<u>1</u>	<u>Bit #0: Transparent relaying</u> <u>Bit #1: Non-transparent relaying</u> <u>Bit #2: RM required</u> <u>Bit #3: Centralized scheduling</u> <u>Bit #4: Distributed scheduling</u> <u>Bits 5-7: Reserved</u>	<u>SBC-REQ</u> <u>SBC-RSP</u>

[Insert new subclause 11.8.3.7.22:]

11.8.3.7.22 RS processing delay

[Insert the following text:]

This TLV indicates the DL and UL processing delay at the RS.

<u>Type</u>	<u>Length</u>	<u>Value</u>	<u>Scope</u>
<u>TBA</u>	<u>1</u>	<u>Bit #0-3: DL processing delay (frames)</u> <u>Bit #4-7: UL processing delay (frames)</u>	<u>SBC-REQ</u>

Reference

- [1] Okuda, M., "Relaying methods proposal for 802.16j", IEEE C802.16j-06/132, IEEE 802.16 meeting #46, Dallas, November 2006.
- [2] Hart, M., et al., "RS multicast management connection ID", IEEE C802.16j-06/289, IEEE 802.16 meeting #46, Dallas, November 2006.

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- [3] Hart, M., "MAC version encoding TLV for .16j", IEEE C802.16j-06/139, IEEE 802.16 meeting #46, Dallas, November 2006.
- [4] Hart, M., "Relay midamble", IEEE C802.16j-06/144, IEEE 802.16 meeting #46, Dallas, November 2006.
- [5] Hart, M., "Network entry procedure for non-transparent relay station", IEEE C802.16j-06/143, IEEE 802.16 meeting #46, Dallas, November 2006
- [6] Oleszczuk, A., "Registration messages for centralized-scheduler relay station", IEEE C802.16j-06/152, IEEE 802.16 meeting #46, Dallas, November 2006.
- [7] Okuda, M., "MS network entry for transparent Relay Station", IEEE C802.16j-06/124, IEEE 802.16 meeting #46, Dallas, November 2006.