Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**MS Network Entry for transparent Relay Station**
Date Submitted	**2006-11-07**
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Re:	IEEE802.16j-06/027: “Call for Technical Proposals regarding IEEEP802.16j”
Abstract	This contribution proposes MS network entry procedures and additional TLVs in transparent Relay Station systems.
Purpose	To propose text to describe MS network entry in non-transparent Relay Station systems
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MS Network Entry for transparent Relay Station

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Introduction

This contribution proposes MS network entry procedure and additional TLVs in transparent RS systems.

The transparent RS does not transmit preamble and MAPs. A MS synchronizes with the MR-BS and receives MAPs form it. Therefore, it does not recognize existence of the RS even though it communicates with the MR-BS via the transparent RS.

Figure A-1 illustrates an example of transparent RS system.

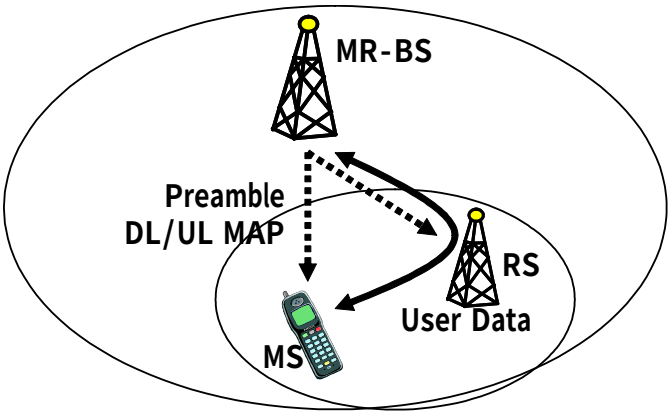


Figure A-1 Example of transparent RS system

This contribution describes detail messages sequence and RS and MR-BS behavior during ranging process and additional new TLVs, so that the MR-BS can decide the appropriate route (direct or relay route) for each MS.

Specific Text Changes

Insert the new subclause 6.3.9.16.1 (in "Support for network entry and initialization in relay mode"):

6.3.9.16.1 MS network entry procedures in transparent RS systems

In network entry procedure in transparent RS systems, MS scans for downlink channel and establish synchronization with the MR-BS, then obtains transmit parameters from UCD message as described in 6.3.9.1 through 6.3.9.4.

The initial ranging process shall begin by sending initial-ranging CDMA codes on the UL allocation dedicated for that purpose (for more details see 6.3.10.3).

The code may be received by the MR-BS and some RSs near the MS. RSs receiving the code shall transmit a RNG-REQ to the MR-BS with the RS basic CID. The RNG-REQ message contains ranging status, code attributes and adjustment information such as frequency, timing and transmission power.

When the MR-BS receives ranging code, it shall wait for RNG-REQ from its subordinate RSs for T48 timer. Once T48 timer expired, the MR-BS compares measured signal information at each station to decide the most appropriate route to communicate with the code originating MS. Algorithms to select a route are out of scope of this document.

When the ranging status at the selected route is continue, the MR-BS transmits a RNG-RSP with initial ranging CID. If the ranging code has been successfully received at the RS on the selected route, the MR-BS transmits a RNG-RSP to the RS with the RS's basic CID in order to notify the RS to receive and relay a RNG-REQ message transmitted on a burst specified with CDMA_Allocation-IE in UL-MAP. If the direct communication is selected, the MR-BS follows sequence described in 6.3.10.3.

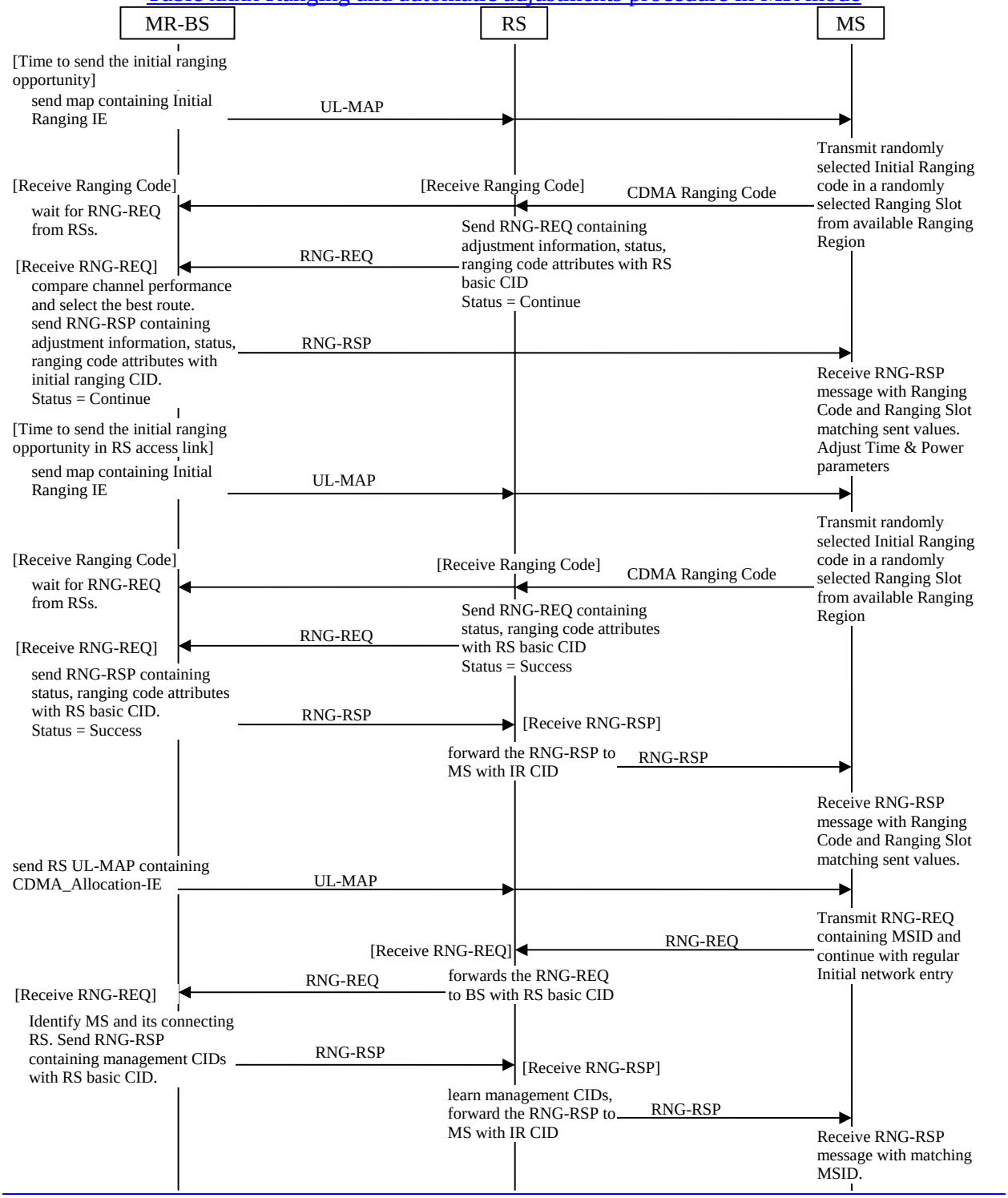
Once the RS receives a RNG-REQ containing MSID with initial ranging CID, it forwards the message to the MR-BS with the RS basic CID, so that the MR-BS can identify the RS with which the MS connects.

Receiving the RNG-REQ, the MR-BS assigns basic and primary CID to the MS and sends back the RNG-RSP containing the management messages with the RS basic CID. The RS relays it to the MS with changing the CID to the initial ranging CID.

After assigning the basic and primary CID to the MS, the MS and the MR-BS continue network entry process as described in the 6.3.9.7 through 6.3.9.13 using the MS's management CIDs. The RS on the selected route shall relay messages between them. The RS may monitor management messages and derive some information for some purpose which is out of scope of this document.

The message sequences chart (Table xxx) and flow charts (Figure xxx, Figure xxx, and Figure xxx) on the following pages define the ranging and adjustment process that shall be followed by compliant RSs and MMR-BSs. For CDMA ranging process between RS and MS, these details can be found in 6.3.10.3.

Table xxxx Ranging and automatic adjustments procedure in MR mode



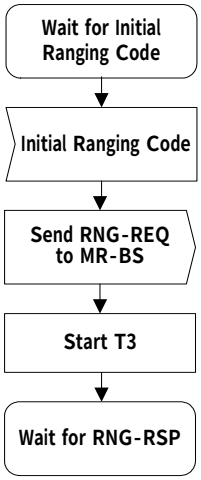


Figure xxx MS CDMA initial Ranging - RS

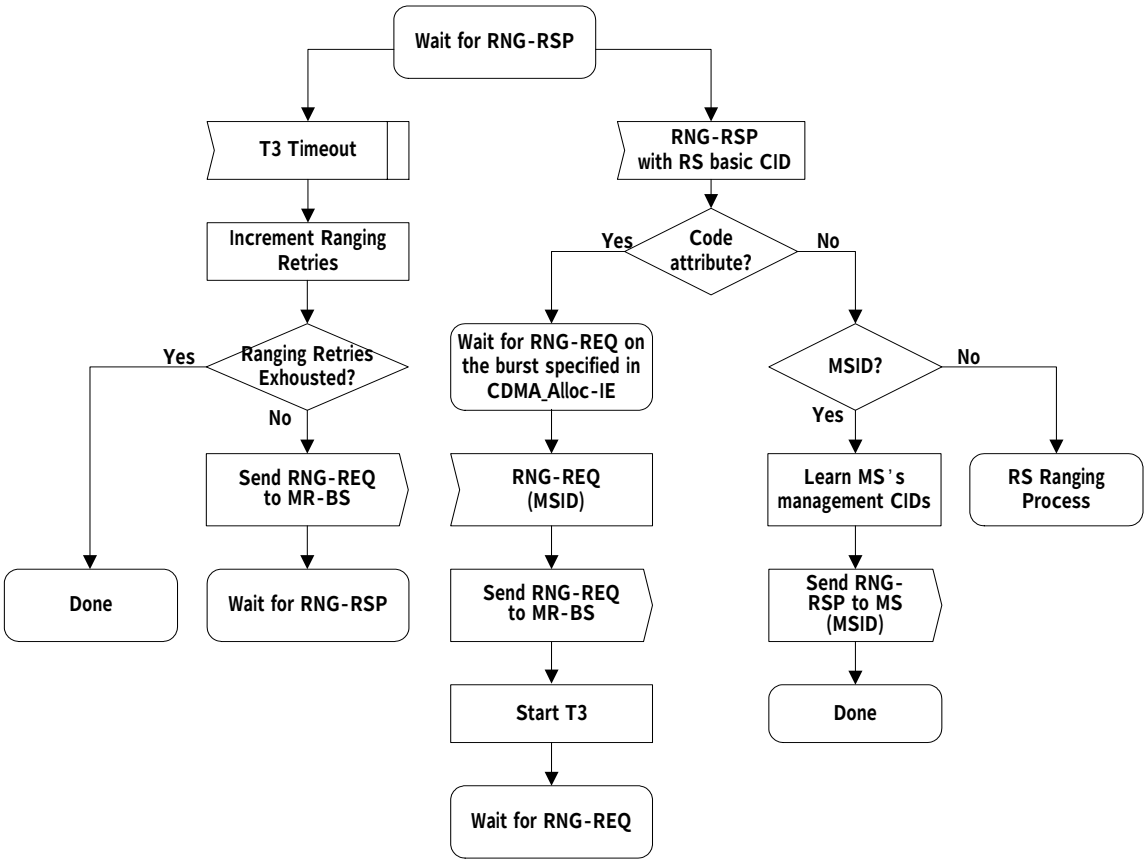


Figure xxx MS initial Ranging - RS

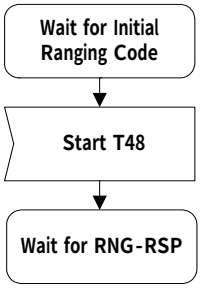


Figure xxx MS CDMA initial Ranging – MR-BS

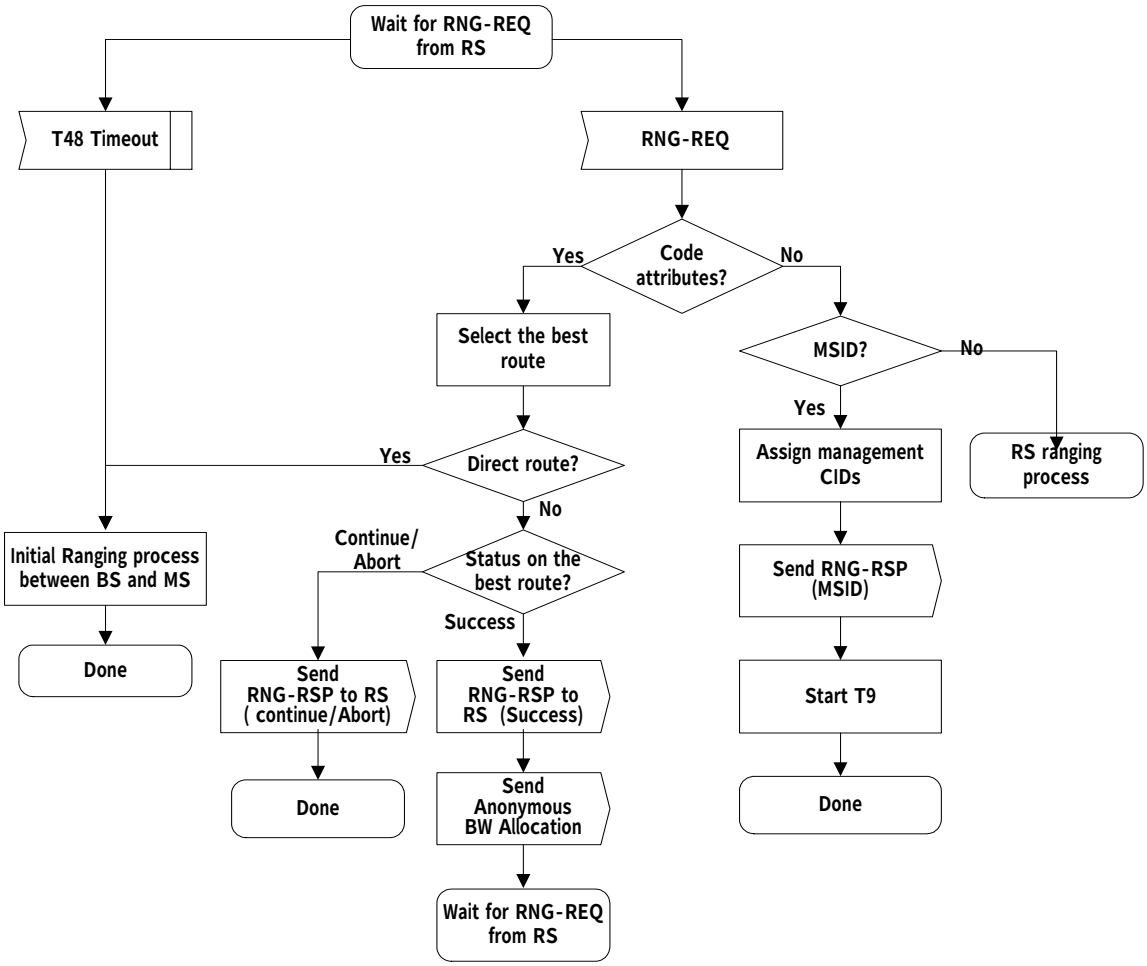


Figure xxx MS initial Ranging – MR-BS

Insert the following rows into Table 364 at 11.5 RNG-REQ TLV:

Table 364—RNG-REQ message encodings

Name	Type (1 byte)	Length	Value (variable-length)	PHY Scope
Timing Adjust	TBA	4	Tx timing offset adjustment (signed 32-bit). The amount of time required to adjust SS transmission so the bursts will arrive at the expected time instance at the BS. Units are PHY specific (see 10.3).	OFDMA
Power Level Adjust	TBA	1	Tx Power offset adjustment (signed 8-bit, 0.25 dB units) Specifies the relative change in transmission power level that the SS is to make in order that transmissions arrive at the BS at the desired power. When subchannelization is employed, the subscriber shall interpret the power offset adjustment as a required change to the transmitted power density.	OFDMA
Offset Frequency Adjust	TBA	4	Tx frequency offset adjustment (signed 32-bit, Hz units) Specifies the relative change in transmission frequency that the SS is to make in order to better match the BS. (This is fine-frequency adjustment within a channel, not reassignment to a different channel.)	OFDMA
Ranging Status	TBA	1	Used to indicate whether uplink messages are received within acceptable limits by BS. 1 = continue, 2 = abort, 3 = success	OFDMA
Ranging code attributes	TBA	4	Bits 31:22 – Used to indicate the OFDM time symbol reference that was used to transmit the ranging code. Bits 21:16 – Used to indicate the OFDMA subchannel reference that was used to transmit the ranging code. Bits 15:8 – Used to indicate the ranging code index that was sent by the SS. Bits 7:0 – The 8 least significant bits of the frame number of the OFDMA frame where the SS sent the ranging code.	OFDMA

References

[1] M.Okuda, “relaying method proposal for 802.16j”, IEEE C802.16j-06_132, IEEE 802.16 meeting #46, Dallas, November 2006.

[2] M.Okuda, et. al, “MS network entry for non-transparent Relay Station”, IEEE C802.16j-06_133, IEEE 802.16 meeting #46, Dallas, November 2006.