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Title	MS Initial Ranging with Non-transparent RS	
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Re:	IEEE 802.16j-06/034: “Call for Technical Proposals regarding IEEE Project P802.16j”	
Abstract	This contribution proposes procedures for MS initial ranging with non-transparent RS	
Purpose	Text proposal for 802.16j Baseline Document	
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MS Initial Ranging with Non-transparent RS

Introduction

This contribution describes MS initial ranging with non-transparent RS under centralized scheduling scheme. In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026r1 are listed below.

Text Proposal

6.3.9.16 Support for network entry and initialization in relay mode

6.3.9.16.2 MS network entry procedures in non-transparent RS systems

In MS network entry procedures in non-transparent RS systems, MS scans for downlink channel and establishes synchronization with the non-transparent RS, then obtains transmission parameters from UCD message as described in 6.3.9.1 through 6.3.9.4.

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

6.3.10.3 OFDMA based ranging

6.3.10.3.4 Relaying support for OFDMA based ranging

6.3.10.3.4.2 MS initial ranging and automatic adjustments with non-transparent RS

When RS receives the CDMA ranging code, it shall send RNG_RSP message to MS on the access link.

After RS received a CDMA ranging code resulting in continue status, it may transmit an RLY_RC-REP message to the serving MR-BS through the relay path. Once RS receives a CDMA ranging code resulting in success status, it shall transmit RLY_RC-REP message to the serving MR-BS through the relay path. The RLY_RC-REP message is defined in xxx. When RS receives multiple CDMA ranging codes in the ranging subchannel of a frame, the RLY_RC-REP message sent by the RS to serving MR-BS may contain information of multiple received codes.

Upon receiving RLY_RC-REP message from a subordinate RS, the MR-BS may send an RLY-BST message to the RS via the relay path. The RLY-BST message is defined in xxx. Afterward, the RS should construct RNG-RSP from received RLY-BST message and send it to the corresponding MS. Once the MR-BS receives RLY_RC-REP with success status, the RLY-BST sent to the RS may also contain the information about anonymous bandwidth allocation, original ranging code, and ranging slot.

Upon receiving an RNG-REQ message with the initial ranging CID from MS, the RS shall send a RLY_CA-REP message containing the RNG-REQ message to the serving MR-BS through the relay path. The RLY_CA-REP is defined in xxx.

Once the MR-BS receives the RLY_CA-REP containing RNG-REQ message with initial ranging CID, the MR-BS shall assign Basic and Primary management CIDs to the correspondent MS, and transmit an RLY-BST message containing those necessary information to the RS. Afterward, the RS shall send RNG-RSP with the

initial ranging CID to the MS based on the received RLY-BST message.

After assigning the basic and primary management CID to an MS, the MS and MR-BS shall continue network entry process as described in the 6.3.9.7 through 6.3.9.13 using MS's management CIDs. The RS shall relay management messages between them.

The message sequence charts (Table xxx and Table yyy) and flow charts (Figure xxx, Figure yyy, and Figure zzz) define the ranging and adjustment process that shall be followed by compliant RSs and MR-BSs. For CDMA ranging process between RS and MS, details are defined in 6.3.10.3.

Table xxx – RLY-BST message format

Syntax	Size	Notes
RLY-BST_Message_Format(){		
Management Message Type = xx	8 bits	
Encoded Information	variable	TBD
}		

Table xxx – RLY_RC-REP message format

Syntax	Size	Notes
RLY_RC-REP_Message_Format(){		
Management Message Type = xx	8 bits	
TLV Encoded Information	variable	TLV specific
}		

Table xxx – RLY_RC-REP message encodings

	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 MS transmission so the bursts will arrive at the expected time instance at the RS. Units are PHY specific (see 10.3). The SS shall advance its burst transmission time if the value is negative and delay its burst transmission if the value is positive.	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 MS is to make in order that transmissions arrive at the RS 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	OFDMA

			frequency that the MS is to make in order to better match the RS. (This is fine-frequency adjustment within a channel, not reassignment to a different channel.). The MS shall increase its transmit frequency if the value is positive and decrease its transmit frequency if the value is negative.	
Ranging Status	TBA	1	Used to indicate whether uplink messages are received within acceptable limits by RS. 1 = continue, 2 = abort, 3 = success	OFDMA
Received 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 MS. Bits 7:0 – The 8 least significant bits of the frame number of the OFDMA frame where the MS sent the ranging code.	OFDMA

Table xxx – RLY_CA-REP message format

Syntax	Size	Notes
RLY_CA-REP_Message_Format(){		
Management Message Type = xx	8 bits	
TLV Encoded Information	variable	TLV specific
}		

Table xxx –RLY_CA-REP message encodings

	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 MS transmission so the bursts will arrive at the expected time instance at the RS. Units are PHY specific (see 10.3). The MS shall advance its burst transmission time if the value is negative and delay its burst transmission if the value is positive.	OFDMA
Power Level Adjust	TBA	1	Tx Power offset adjustment (signed 8-bit, 0.25 dB units) Specifies the relative change in transmission power	OFDMA

			level that the MS is to make in order that transmissions arrive at the RS 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.	
Offset Frequency Adjust	TBA	4	Tx frequency offset adjustment (signed 32-bit, Hz units) Specifies the relative change in transmission frequency that the MS is to make in order to better match the RS. (This is fine-frequency adjustment within a channel, not reassignment to a different channel.). The MS shall increase its transmit frequency if the value is positive and decrease its transmit frequency if the value is negative.	OFDMA
Ranging Status	TBA	1	Used to indicate whether uplink messages are received within acceptable limits by RS. 1 = continue, 2 = abort, 3 = success	OFDMA
Attached MS messages	TBA	variable	RNG-REQ or Bandwidth Request messages from MS received in the region described in CDMA allocation IE	OFDMA
Access RS ID	TBA	6	Access RS MAC address	OFDMA

Table xxx: Ranging and automatic adjustment procedure in non-transparent RS systems (Conventional)

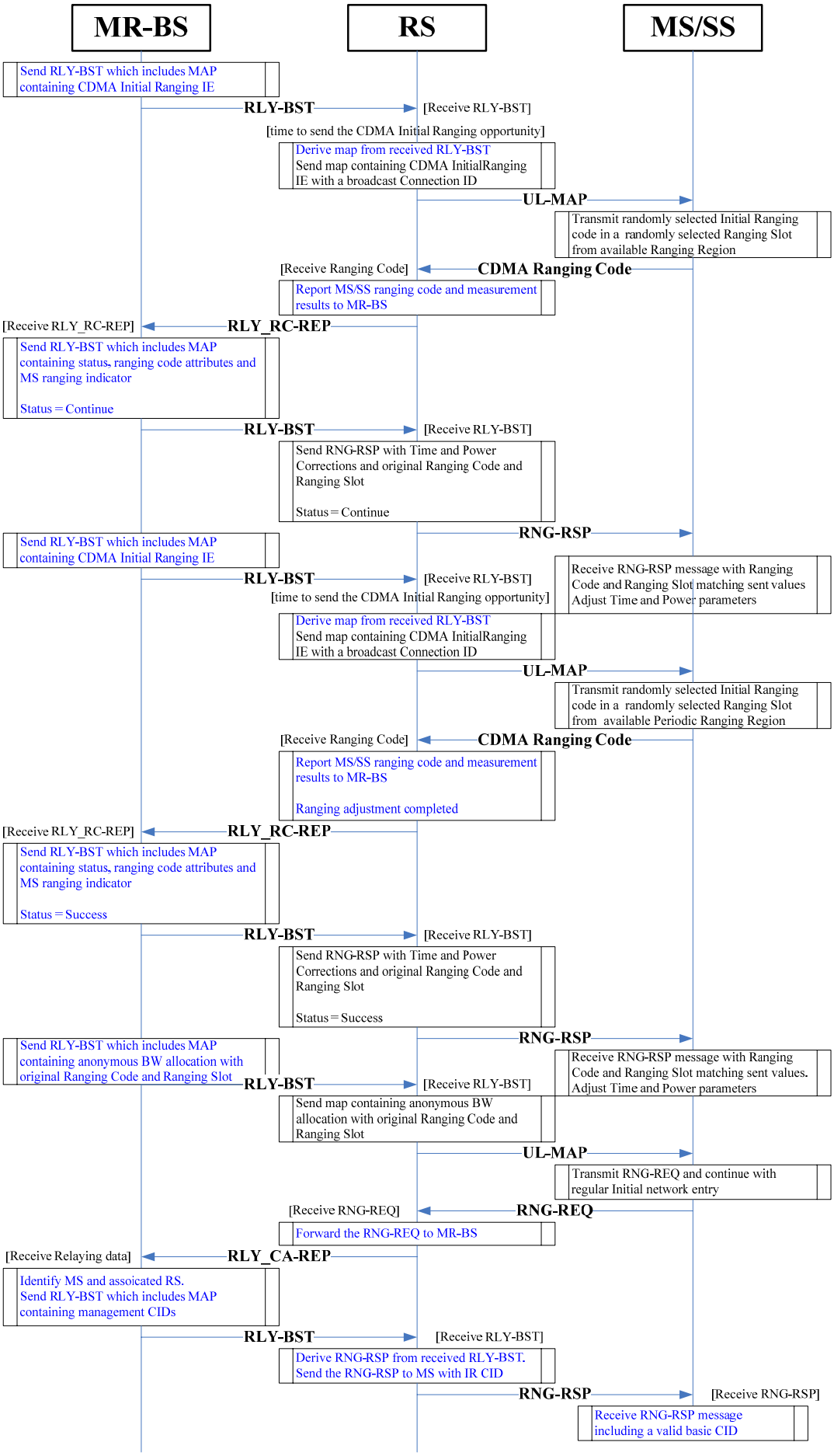
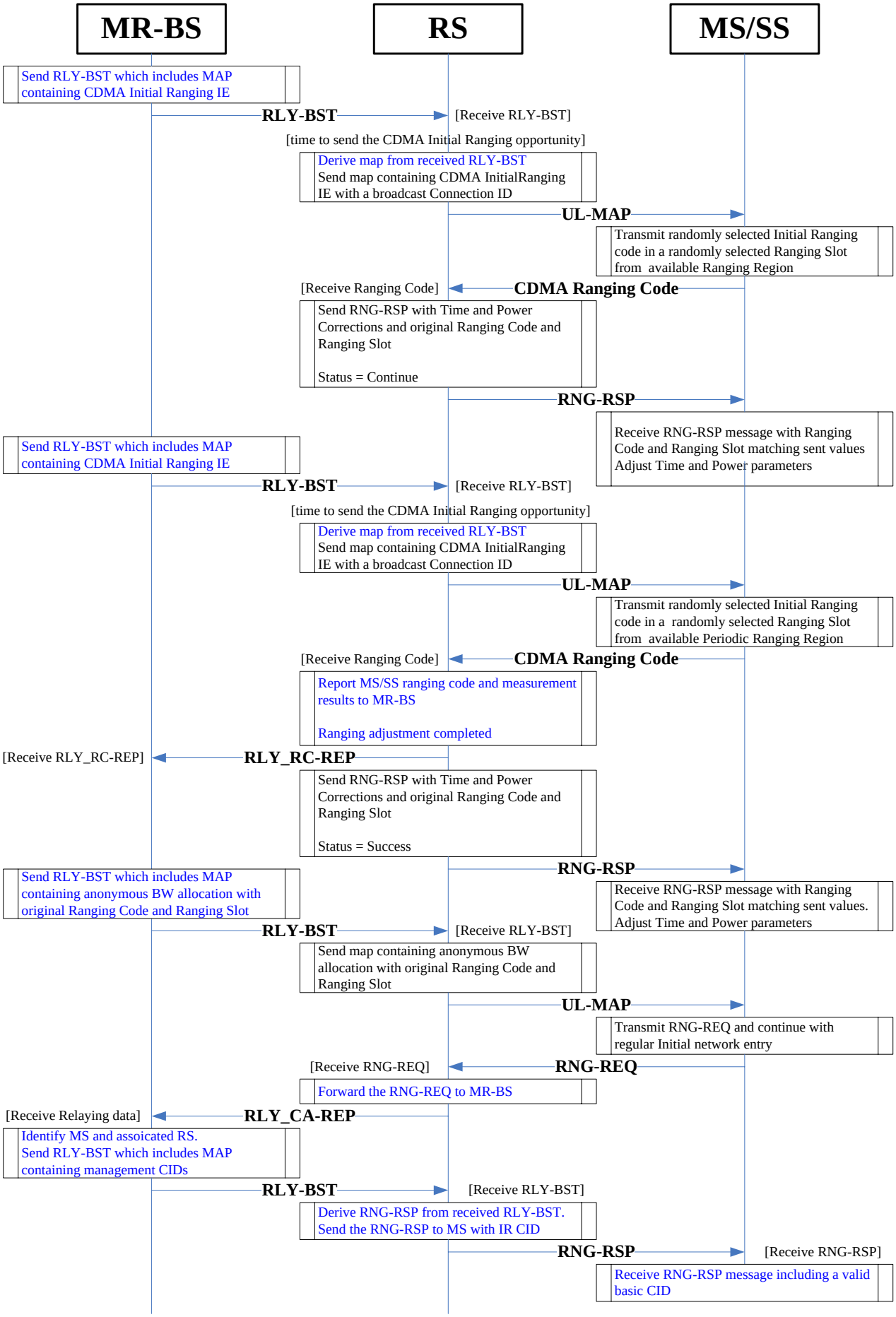


Table yyy: Ranging and automatic adjustment procedure in non-transparent RS systems (RS-assisted)



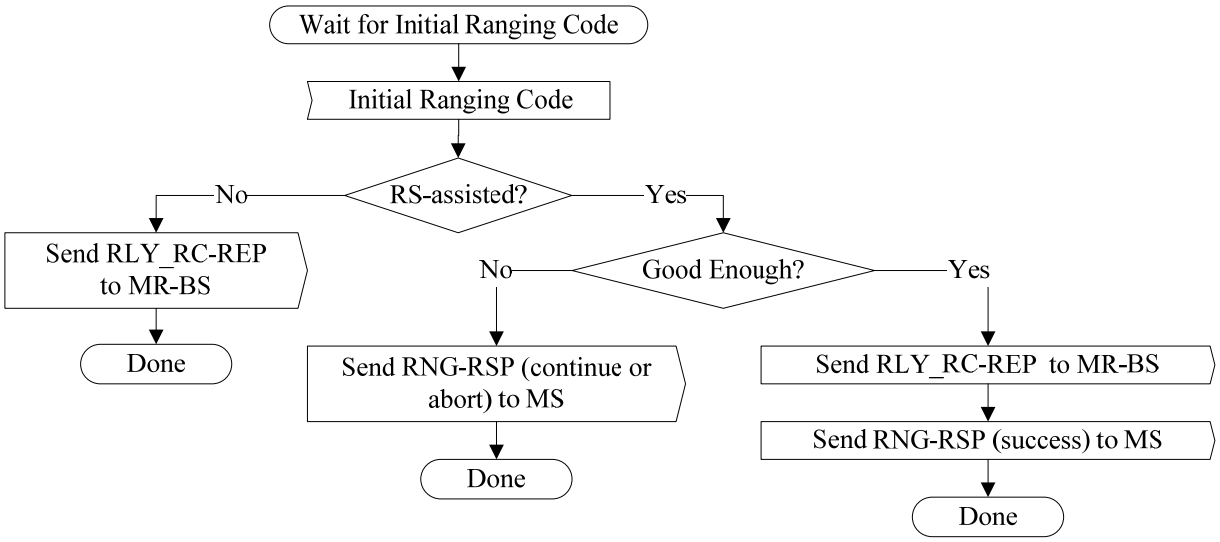


Figure xxx MS CDMA Initial Ranging – Non-transparent Access RS (part 1)

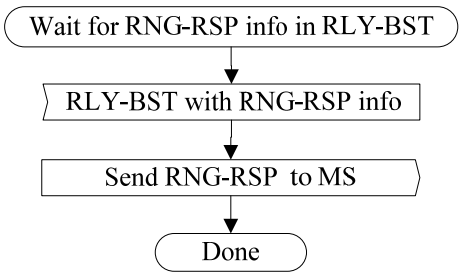


Figure xxx MS CDMA Initial Ranging – Non-transparent Access RS (part 2)

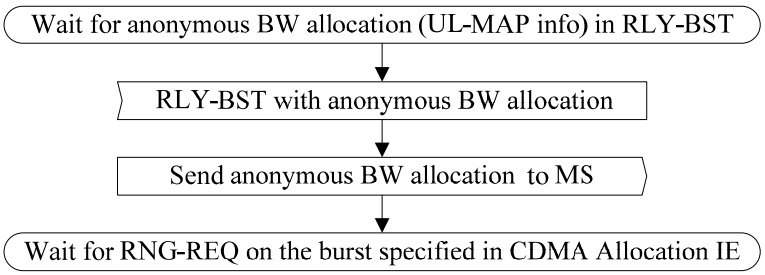


Figure xxx MS CDMA Initial Ranging – Non-transparent Access RS (part 3)

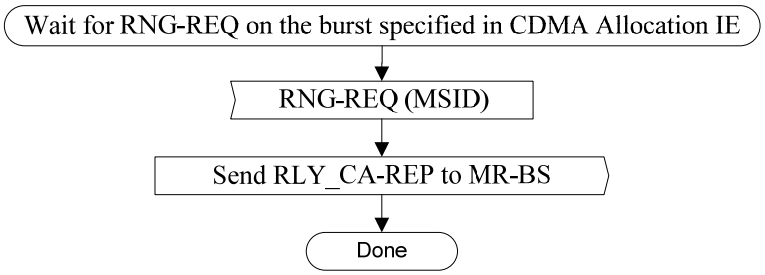


Figure yyy MS Initial Ranging – Non-transparent Access RS (part 1)

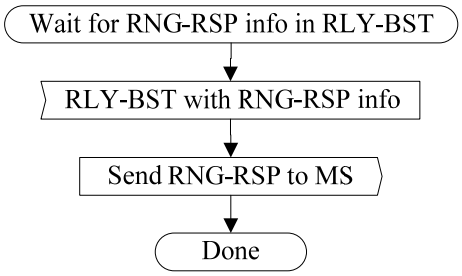


Figure yyy MS Initial Ranging – Non-transparent Access RS (part 2)

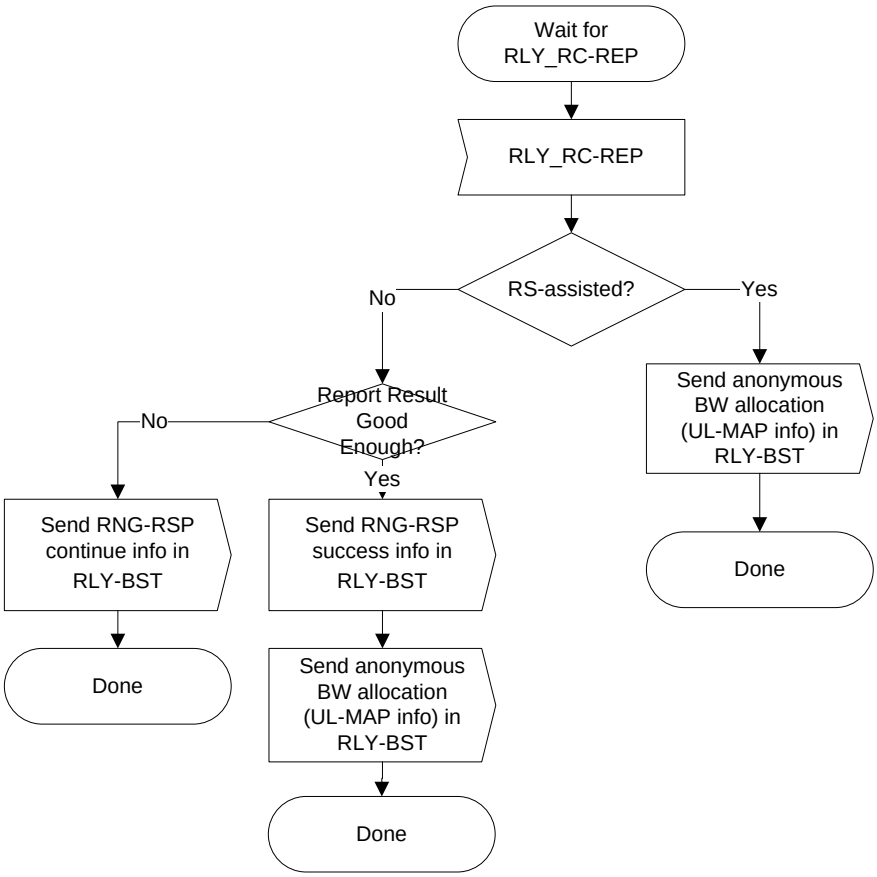


Figure zzz MS CDMA Initial Ranging with Non-transparent RS– MR-BS

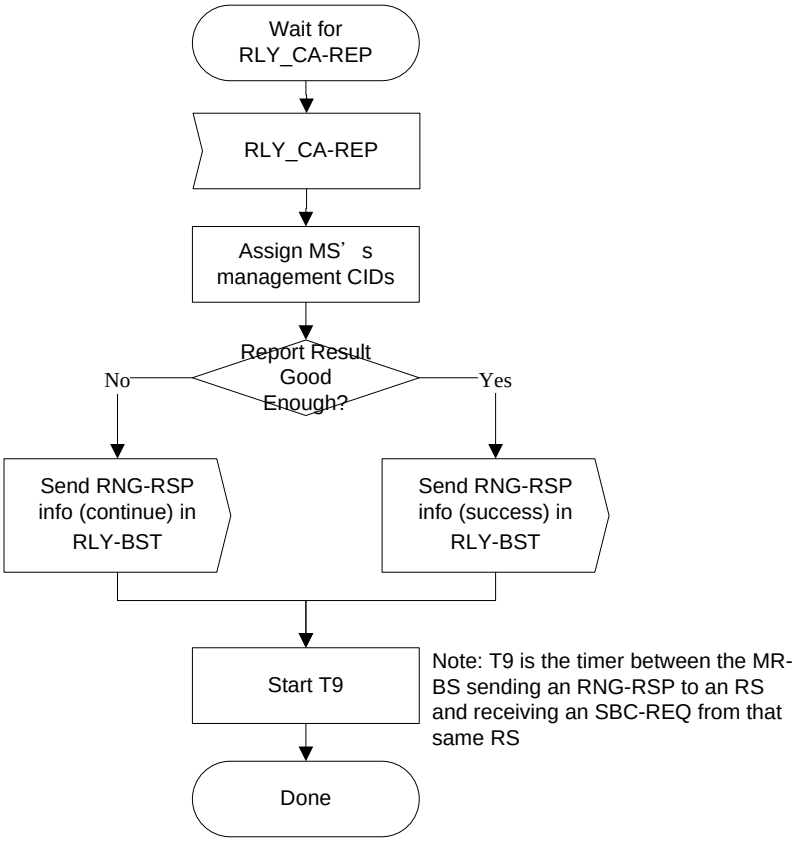


Figure zzz MS Initial Ranging with Non-transparent RS– MR-BS