Resource Request for Bandwidth

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Purpose:

This contribution proposes MS sleep mode interworking with RS. It also proposes RS sleep mode procedure.

Introduction

- In the existing spec, a CDMA ranging code is used for requesting UL allocation

- It is used for bandwidth request, and ranging procedures

- This contribution extends the same mechanism for Relays

Problem in using Ranging Code procedure with Relays

Without Relay

- MMR-BS receives code directly and does UL allocation for the only link

MMR-BS   MS

CDMA Ranging Code
(for bandwidth req)

UL MAP (CDMA Allocation IE)

Bandwidth Req
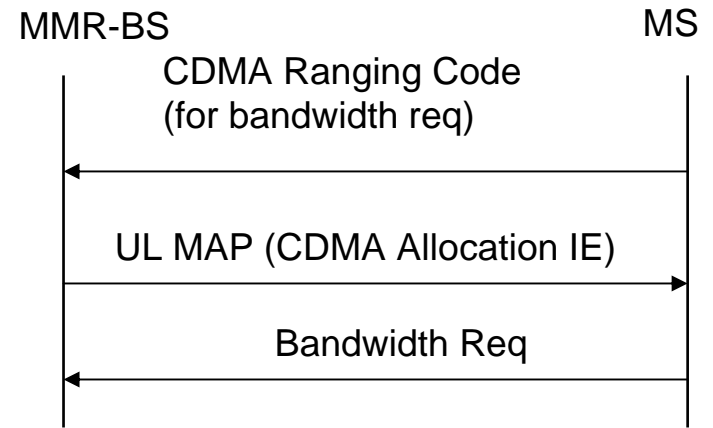
With Relay

- MS-1 needs UL allocation for MS-1 -> MMR-BS link
- MS-2 needs UL allocation for MS-2 -> RS & RS->MMR-BS link
- How MMR-BS can distinguish the above with only CDMA code?

MMR-BS   MS-1   RS   MS-2

CDMA Ranging
Code
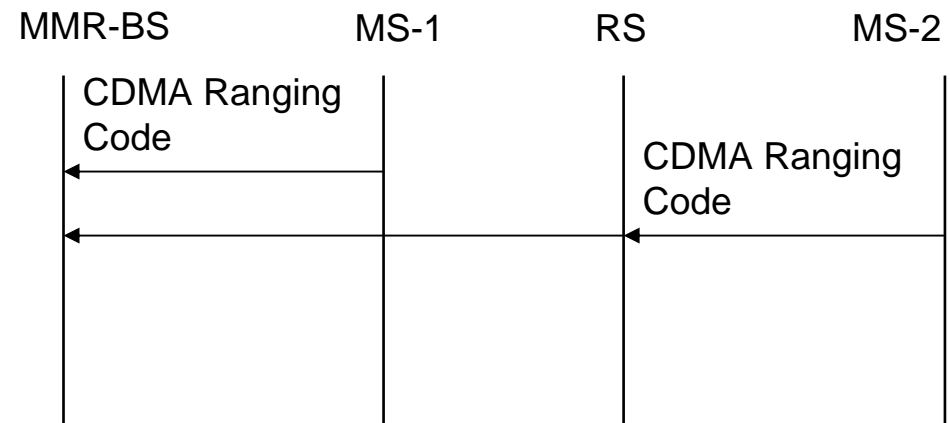
CDMA Ranging
Code

Solution

- The MMR-BS allocates a set of CDMA codes for RS. It sends UCD with the CDMA ranging codes excluding the RS CDMA codes.
- A station performs initial ranging with the MMR-BS with a code broadcast in the UCD.
  - If the station is RS, it is assigned RS_CDMA_Codes in RS_RNG-RSP.
  - If the station is MS/SS, no code assignment is done.
- The MMR-BS finds the path to the RS by using Path Determination procedure to an RS. (separate contribution)
- When a station in the system needs bandwidth, it sends a ranging code (from the UCD) on the access link.
  - If the station is one hop away, the MMR-BS receives a ranging code (from the UCD) and does UL allocation as in existing section 6.3.6.5.
  - If the station is multiple hops away, the access RS replaces the received ranging code (from the UCD) and replaces it with its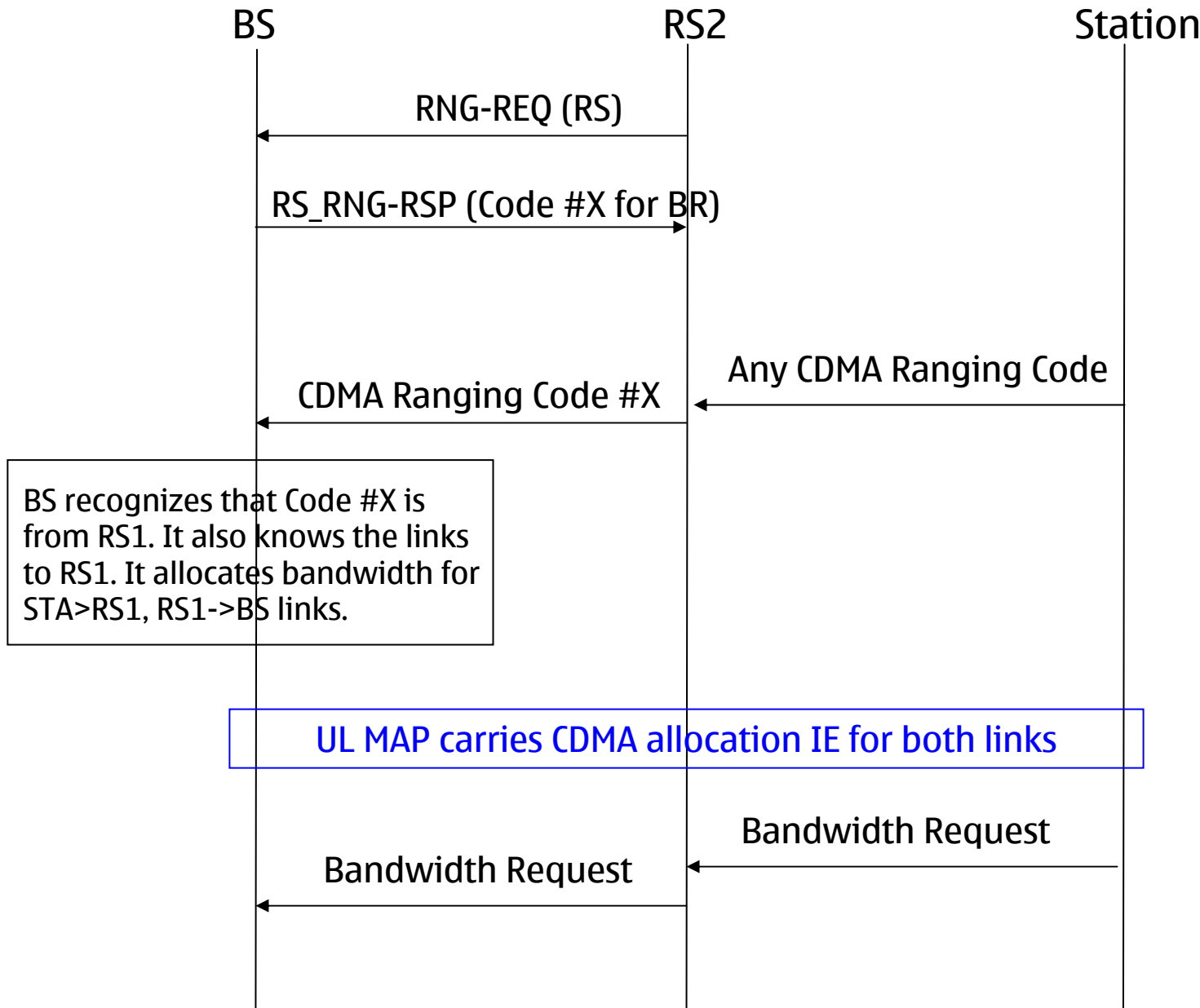 assigned RS ranging code. The code is relayed toward the MMR-BS. The MMR-BS recognizes the RS with the help of the assigned RS code. It assigns uplink allocation for each relay link and the access link.

Using Assigned Ranging Code for BR

BS   RS2   Station

RNG-REQ (RS)

RS_RNG-RSP (Code #X for BR)

Any CDMA Ranging Code

CDMA Ranging Code #X

BS recognizes that Code #X is
from RS1. It also knows the links
to RS1. It allocates bandwidth for
STA>RS1, RS1->BS links.

UL MAP carries CDMA allocation IE for both links

Bandwidth Request

Bandwidth Request

Using Assigned RS Ranging Code for Ranging

BS   RS   MS

RNG-REQ (RS)

RS_RNG-RSP (Code #Y for Ranging [continue], and #Z for Ranging [success])

MS CDMA Ranging Code

Need to continue Ranging

RS CDMA Ranging Code #X

1. RNG-RSP

Allocation on RS->MS link for RNG-RSP

MS CDMA Ranging Code

Ranging is complete

RS CDMA Ranging Code #Y

Allocation for 1) RNG-RSP on RS->MS, 2) RNG-REQ on MS->RS, & 3) RNG-REQ on RS->MMR-BS

1. RNG-RSP

3. Full RNG-REQ   *2. Full RNG-REQ*
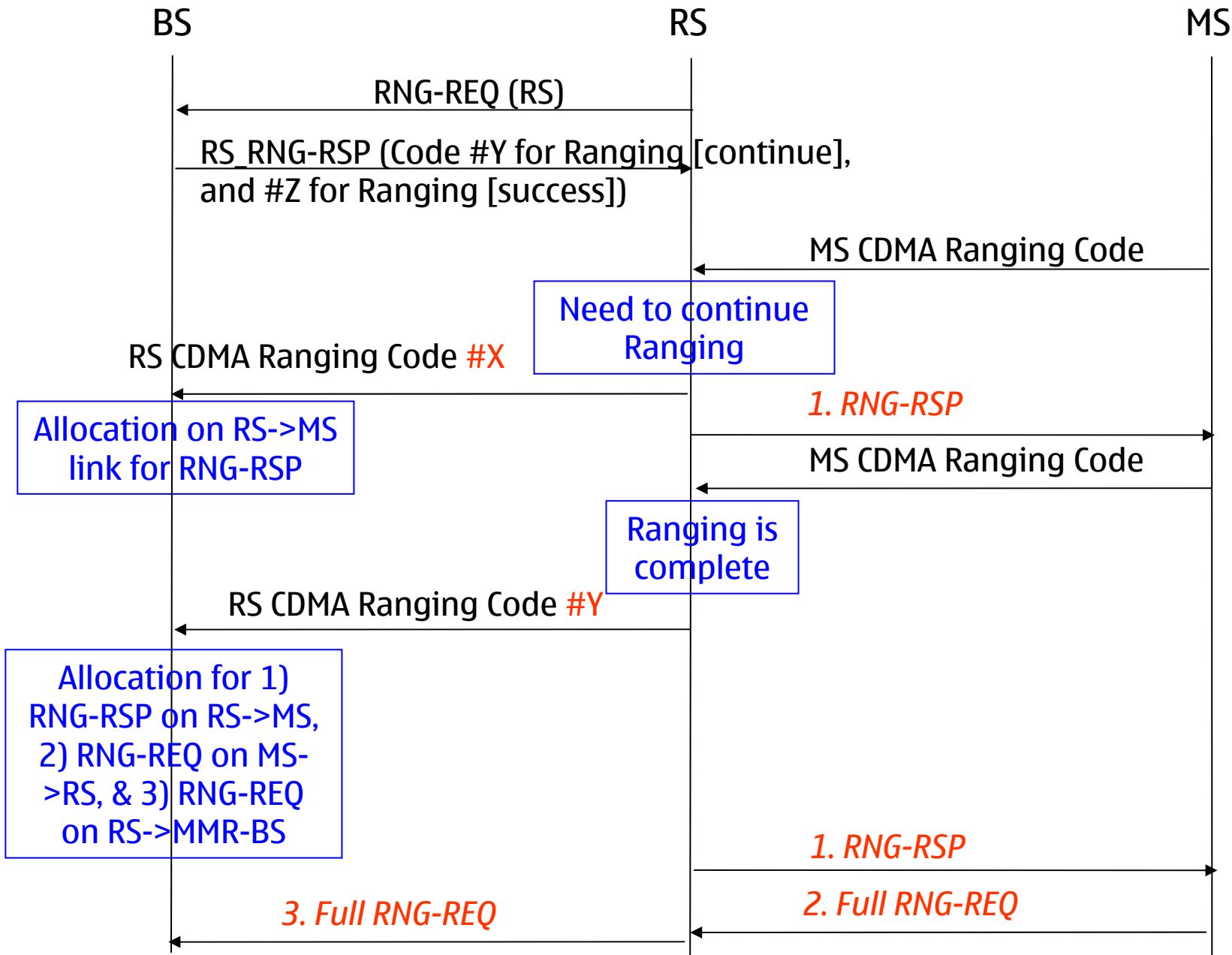
Proposed Additions in the Spec

- RNG-REQ to carry RS indication, needed by other contributions also

- RS_RNG-RSP to carry RS CDMA ranging code list

- Description of the bandwidth request and ranging procedures

Advantages

- Solves the problem not only for Bandwidth Request, but for also initial ranging and periodic ranging.

- Same for fixed, nomadic, and mobile RS.

- Completely transparent to the exiting procedures, and requires no changes on the MS.

- Same for two hop or more than two hop relay network.

- Minimal additions to the specifications