Modification for enabling RS operations

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Information

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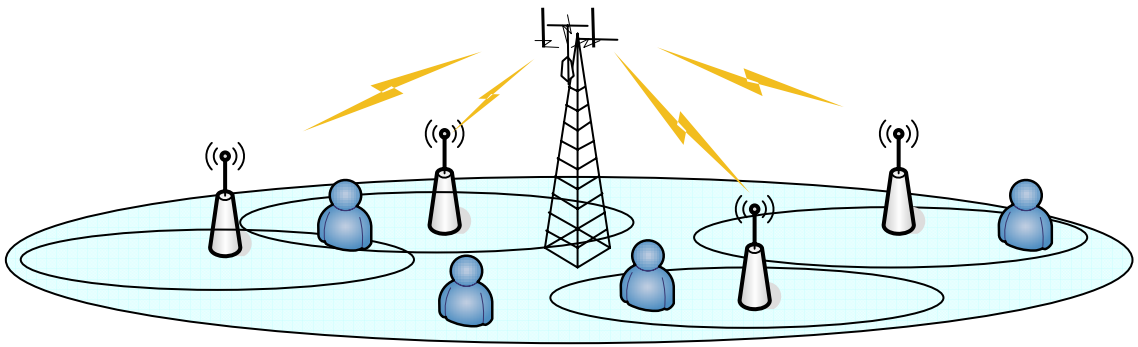
Purpose and Scenario

- Propose the MAC modifications in the two-hop relay scenario

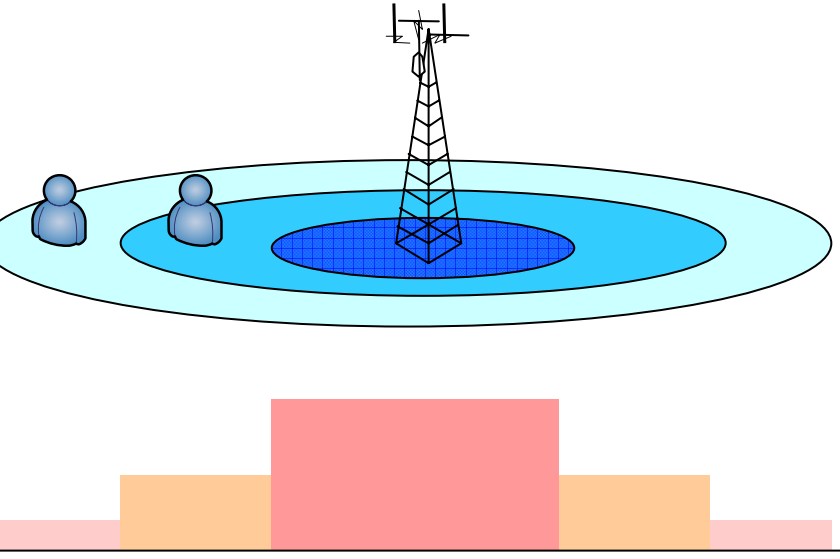
  (System broadcast information can be sent to SSs directly)



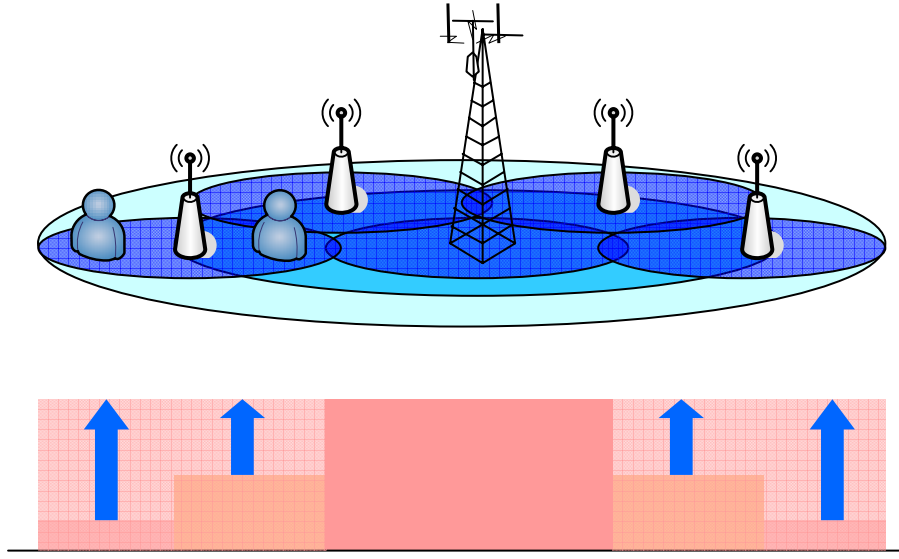
two-hop Relay

Motivation

- Throughput enhancement (from SS' perspective)
  - With the helps of RSs, the goal can be achieved



Traditional PMP



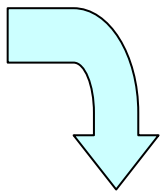
PMP + RS

RS Operations

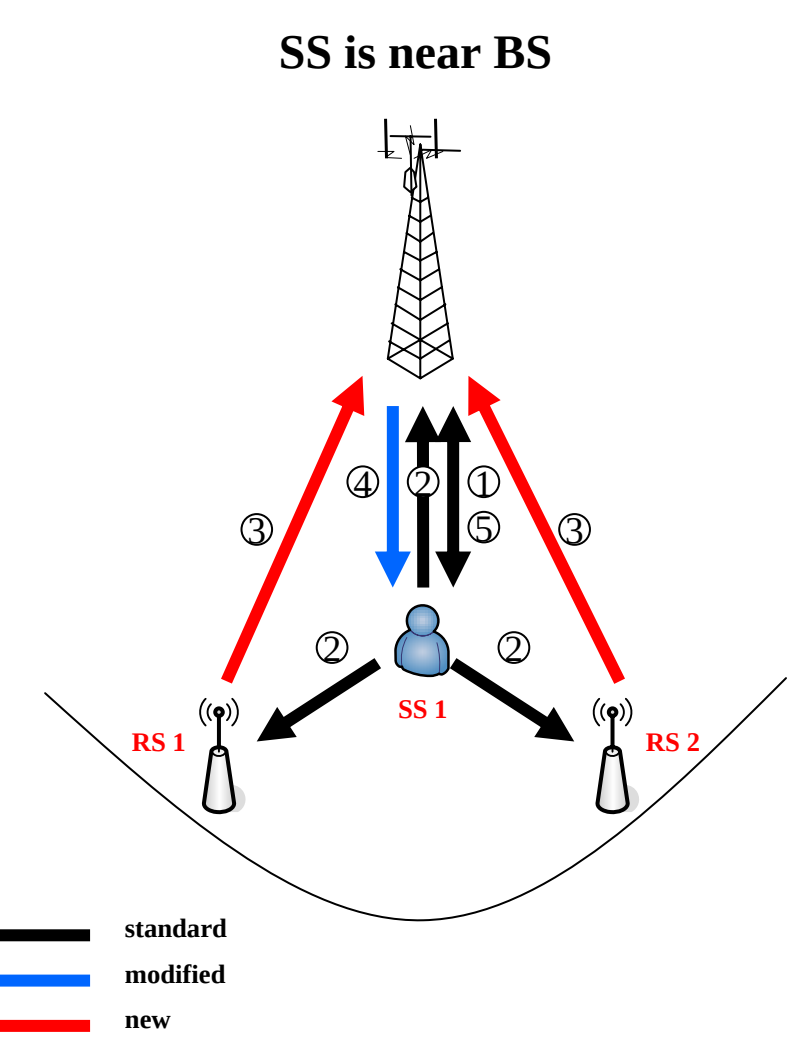
- What can RSs help?
  - Network entry
    - Ranging  Target!
    - …
  - Normal operation
    - Data transmission
  - Handover
  - …

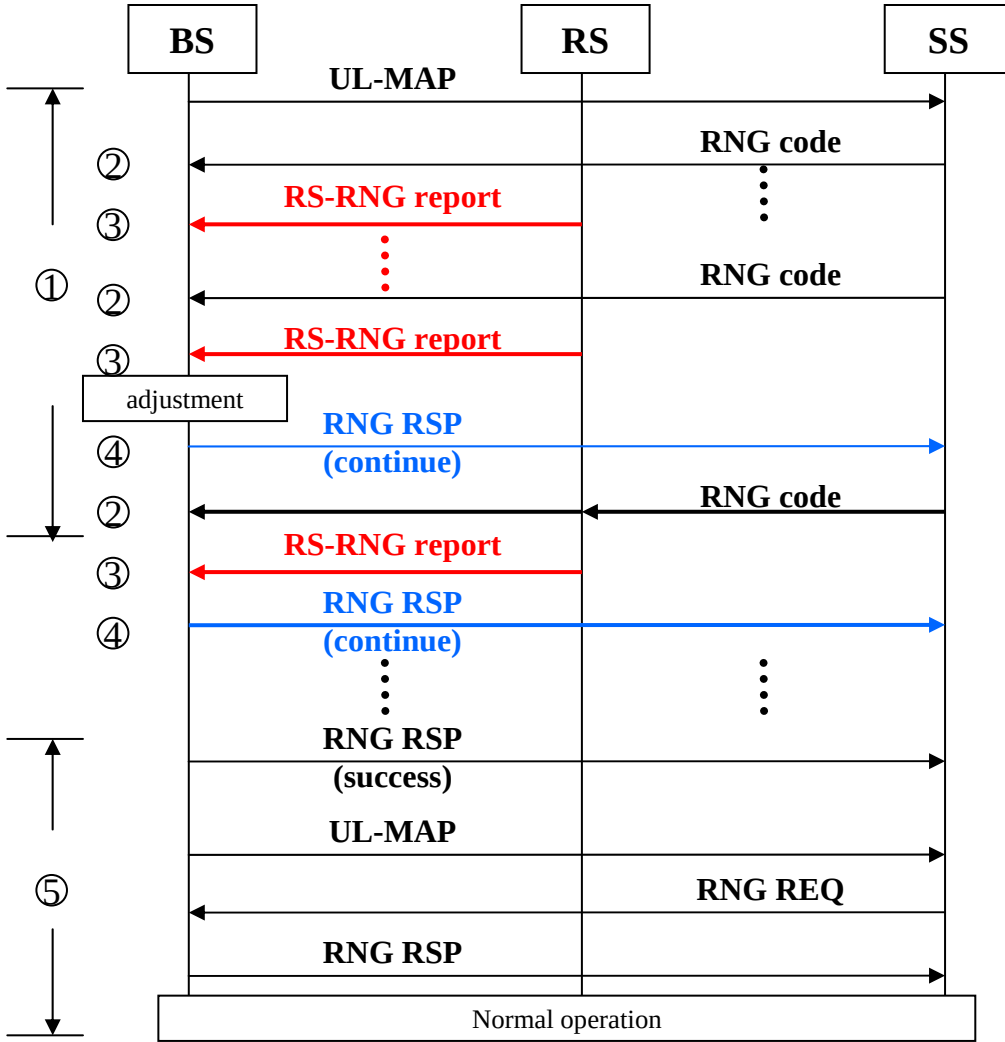
Ranging Process Modification

- Criteria
  - Ranging process is administrated by BS
    - Security / Performance / Complexity issues
  - BS treats RS as a specific “SS”
    - Compatibility
  - RS may or may not be transparent for SS
    - Considering the impact of SS
- RS to BS
  - Legacy SS ranging process
- SS to RS/BS
  - BS controls the ranging process and advise the suitable parameters to SS by the help of the information from RSs

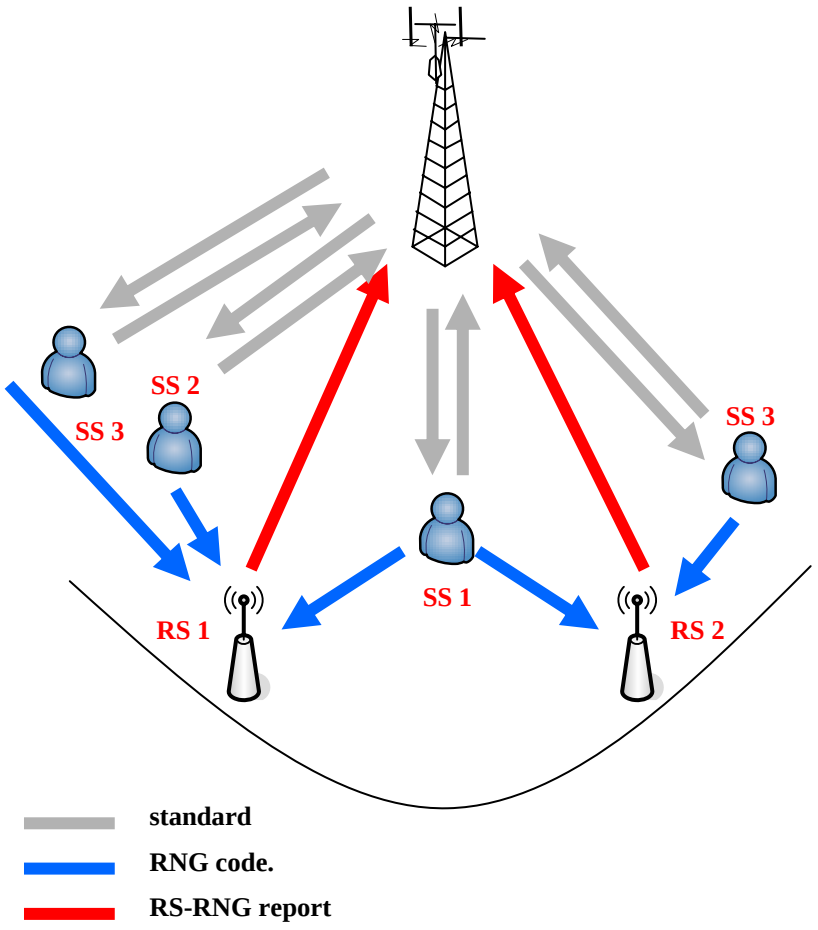


Initial Ranging





Initial Ranging – Multi SSs



- RS collects the ranging info. within its coverage and reports to BS
  - Sending RS-RNG report periodically
- BS administrates overall ranging processes of SSs
  - Select the suitable RS for further operations
  - Adjust parameters between SS and RS/BS

RS-RNG Report

- Purpose
  - Report the signal and info. of ranging SSs
- Operation
  - Aggregate the IEs for measurements and send to BS

- Benefits
  - Assist adjusting the parameters between BS/RS/SS
  - BS can arrange the RS to SSs based on the info.
    - The algorithm for choosing BS/RS can consider the measurement result or some others
      - Traffic load, QoS , …

RS Identification Modification

- For sending the RS-report message, RS identification is needed
  - BS can treat the RS as a “specific” SS and give a RS CID for management and transmission
- Benefits
  - minima overheads for standard
  - High compatibility with legacy system
  - Easy to management

Modified CID field (ref. 16-2004/16e)

Table 345—CIDs

CID	Value	Description
Initial ranging	0x0000	Used by SS and BS during initial ranging process.
Basic CID	0x0001– *m*	The same value is assigned to both the DL and UL connection.
Primary management	*m*+1 – 2*m*	The same value is assigned to both the DL and UL connection.
Transport CIDs and secondary Mgt CIDs	~~2*m*~~ 3m+1–0xFEFE	For the secondary management connection, the same value is assigned to both the DL and UL connection.
AAS initial ranging CID	0xFEFF	A BS supporting AAS shall use this CID when allocating a Initial Ranging period for AAS devices.
Multicast polling CIDs	0xFF00–0xFFFD	An SS may be included in one or more multicast polling groups for the purposes of obtaining bandwidth via polling. These connections have no associated service flow.
Padding CID	0xFFFE	Used for transmission of padding information by SS and BS.
Broadcast CID	0xFFFF	Used for broadcast information that is transmitted on a downlink to all SS.
RS CID	**2m+1 – 3m**	**For RS connection, the same value is assigned to both the DL and UL connection**

MMR Activities

- MMR relay for fixed/mobile terminal including PHY/MAC modification
- Impact of PHY and backward compatible with 802.16e PMP mode
- MAC protocols to be newly added for relay networking
  - Spectral scenario including frequency reuse and interference
- Security between BS and MS via RS

Summary

- This contribution proposes modifications for RS in the standard
  - Raging process
  - RS identification
- With slight modifications, the RS operations can be enable and compatible with the standard
- By the help of the modification, RS can also facilitate other process
  - Normal operation
  - Handover
  - Load balance
  - …