

Recommendation on 802.16 MMR with Backward Compatibility

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None

Purpose:

Propose a 802.16 relay solution which follows the requirements of MMR.

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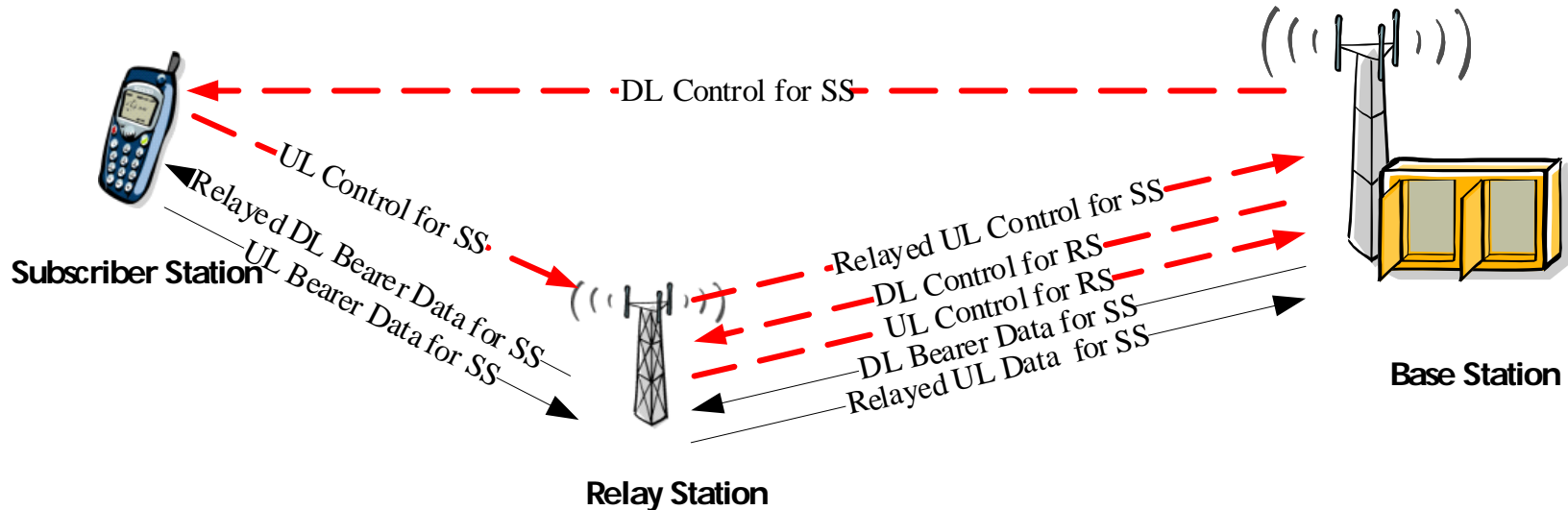
Outline

- Requirements of mobile multihop relay.
- Concepts and features of proposed relay.
- Summary

Requirements

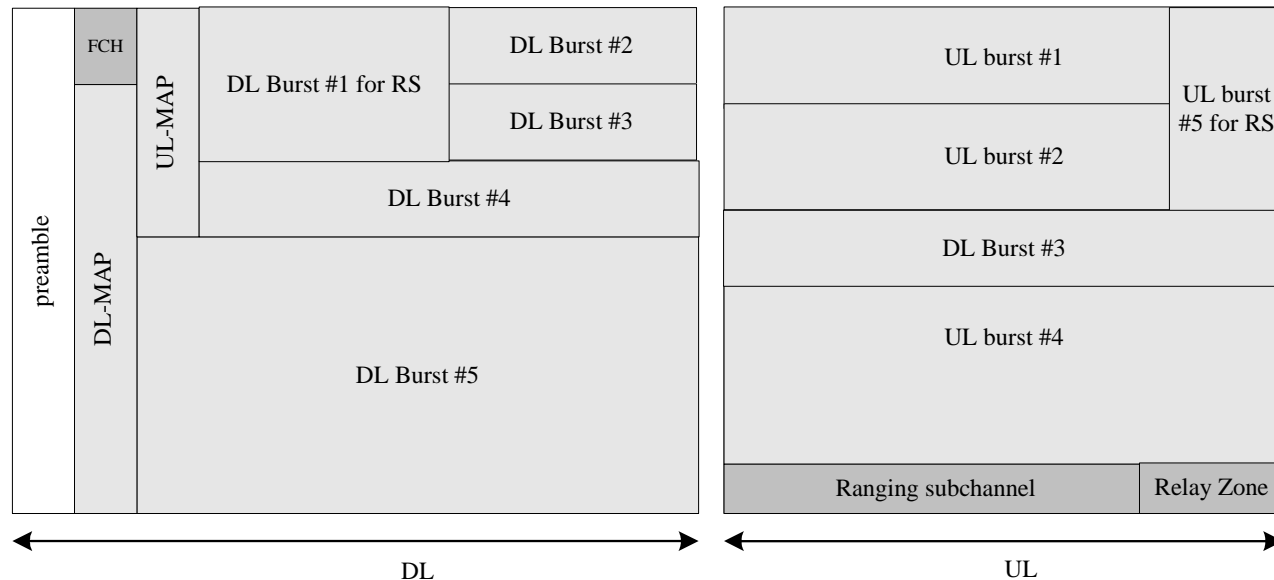
- Backward compatibility
 - No change on conventional SS, while SS relay is supported
 - Little update on BS
- No / Less additional latency after relay introduction
- Simple and cheap RS

General Ideas



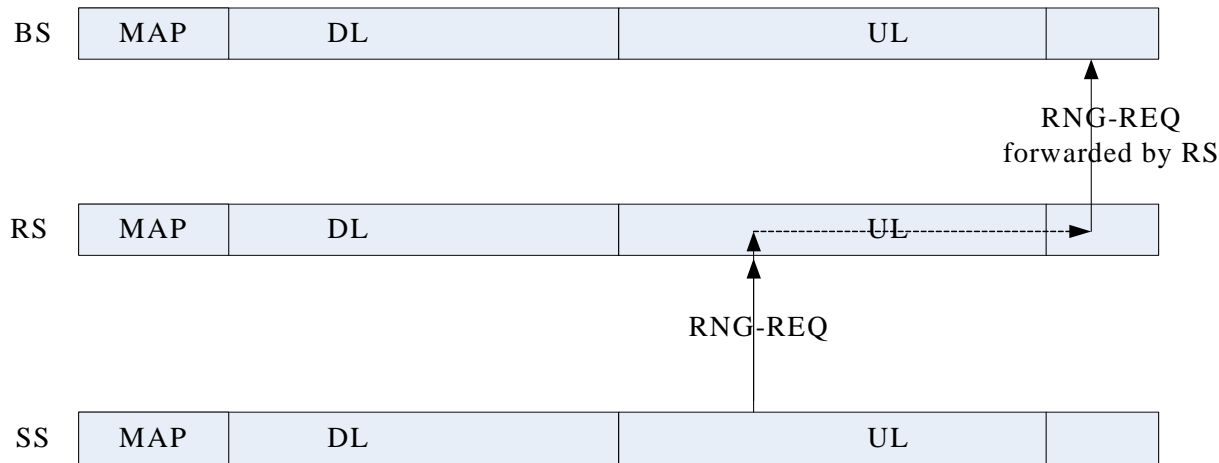
- Communication path DL control: BS → SS directly
 - UL control: SS → RS → BS
 - DL bearer data: BS → RS → SS
 - UL bearer data: SS → RS → BS
- No changes on SS, while relay is supported for conventional SS
- Little update on BS
 - BS needs to know the existing of RS
 - BS allocates resource for RS and SS

Frame structure



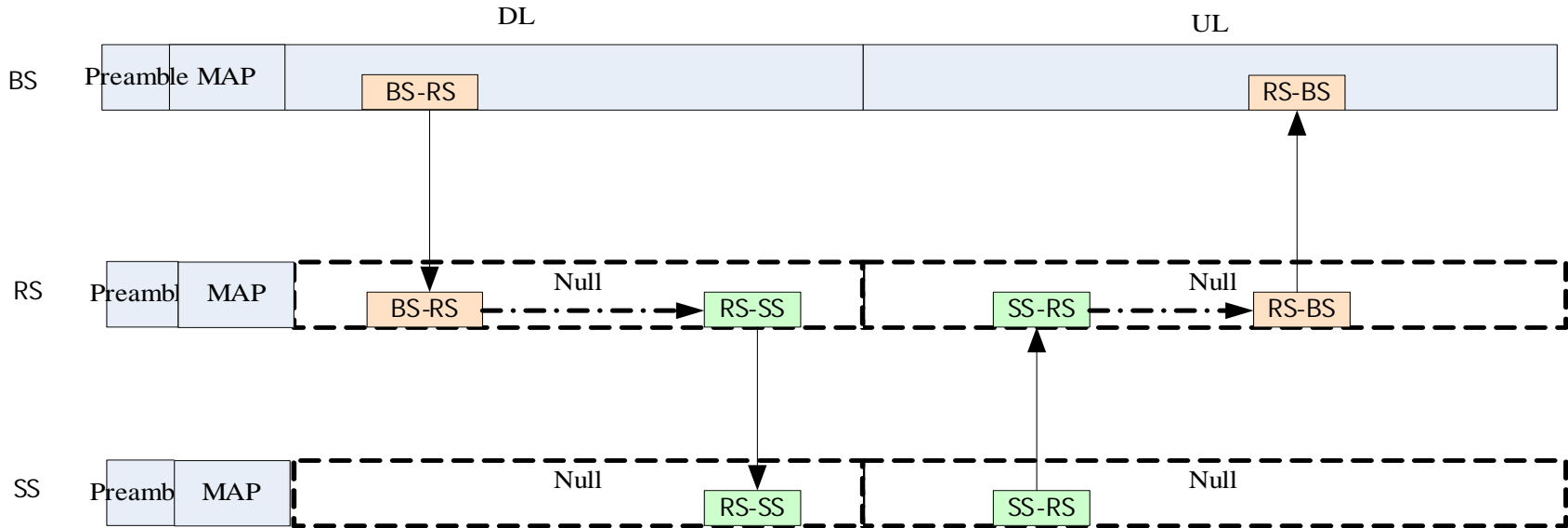
- A dedicated relay zone is reserved
 - At (or near) the end of UL frames.
 - For UL control information relaying, e.g. ranging request relay
- The ranging sub-channel
 - Located preceding the relay zone.
- Ranging request received by RS can be retransmitted within the same frame
- No additional delays in ranging request relay or other UL control signal relaying

Ranging Request Relay



- Ranging request relay
 - Forwarded to BS in the dedicated relay zone
 - RS informs BS the measurement results of power level and timing
- RNG-RSP
 - Reply to SS a RNG-RSP message
 - The power level assignment and timing offset contained in the RNG-RSP is adjusted according to signal measurement in RS.

Bearer Data Transmission



- BS allocate bursts for SS and RS
 - For DL, BS sends a special data burst addressed to RS
 - Indicate which SS should be relayed.
 - Indicate DL resource allocation for RS
 - The SS burst is always after the RS burst.
 - For UL, BS allocates resources for RS and SS in UL-MAP.
 - The RS burst is always after the SS burst.
- Bearer data relay within one frame

Advantages

- Throughput enhancement
- Backward compatibility
 - There is not any update on SS. The conventional SS is supported for relaying.
- No additional latency
 - No matter for DL/UL data and control information transmission, relayed information reaches BS or SS within the same frame.
 - No additional latency after the introduction of relaying.
- Simple and cheap relay station design
 - All the control and schedule functions are still located in BS
 - RS just follows BS's commands and scheduling

Summary

- RS is transparent to SS
- UL control information is relayed to BS
 - Dedicated relay zone reserved in the frame for UL control information relay, e.g. ranging request
- DL control information is directly transmitted to SS
- For bearer data transmission, BS allocates repeated bursts for RS and SS within one frame
 - For DL, the burst for SS is always after the one for RS.
 - For UL, the burst for RS is allocated after the one for SS.