

# Proposal for Relaying Frame Structure

## IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE S802.16j-06/165

Date Submitted: 2006-11-07

Source:

Fang-Ching Ren, Chie Ming Chou, I-Kang Fu,  
Ching-Tang Hsieh, Tzu-Ming Lin, Wern-Ho Sheen,  
Jen-Shun Yang  
Industrial Technology Research Institute (ITRI)/  
National Chiao Tung University (NCTU), Taiwan  
195,Sec. 4, Chung Hsing Rd.  
Chutung, Hsinchu, Taiwan 310, R.O.C.

Voice: 886-3-5914786

Fax: 886-3-5829733

E-mail: frank\_ren@itri.org.tw

Venue:

IEEE 802.16 Session #46, Dallas, TX, USA

Base Document:

None.

Purpose:

This is a response to IEEE 802.16j-06/027: "Call for Technical Proposals regarding IEEE Project P802.16j to present a compatible TDD frame structure.

Notice:

This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.

Release:

The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.

IEEE 802.16 Patent Policy:

The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <<http://ieee802.org/16/ipr/patents/policy.html>>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <<mailto:chair@wirelessman.org>> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <<http://ieee802.org/16/ipr/patents/notices>>.

# **Proposal for Relaying Frame Structure**

**Fang-Ching Ren**  
**ITRI**

# Purpose & Requirements

□ Proposed a frame structure to support both relay links and access links in a single TDD OFDMA frame.

❖ Relay in Control Plane

- Support DL Synchronization → preamble transmission
- Support frame header info → FCH and MAP
- Support network entry → initial ranging channel

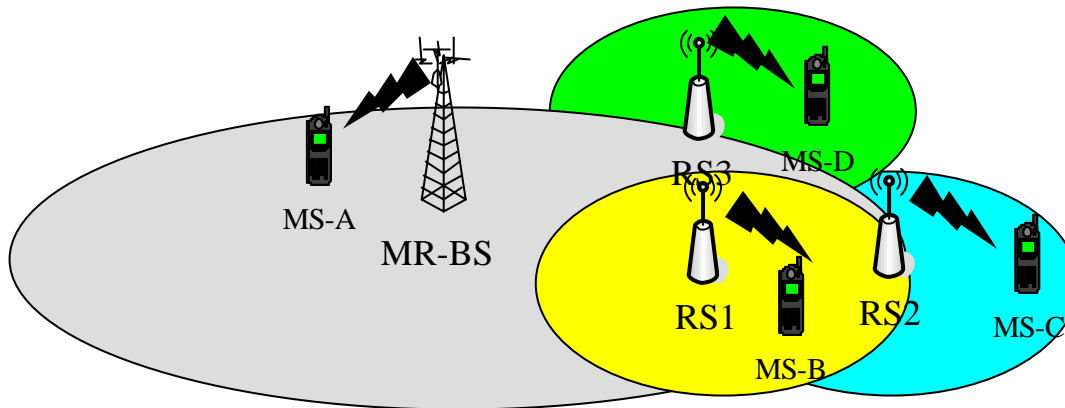
❖ Relay in Data Plane

- Support DL channel estimation via preamble or dedicated pilots.
- Support UL channel estimation via in-band pilot.

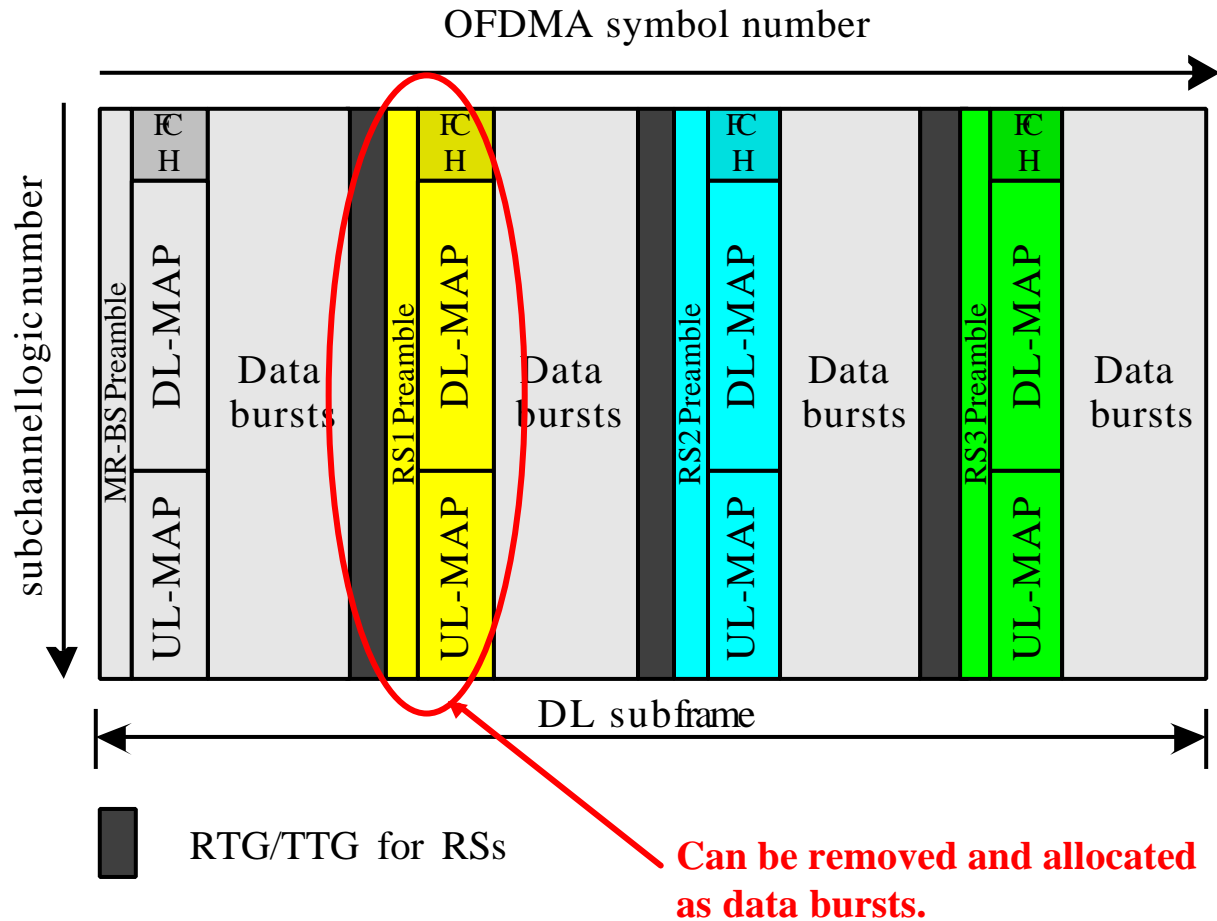
# Example relaying system for illustrations

## □ A generic relaying system including

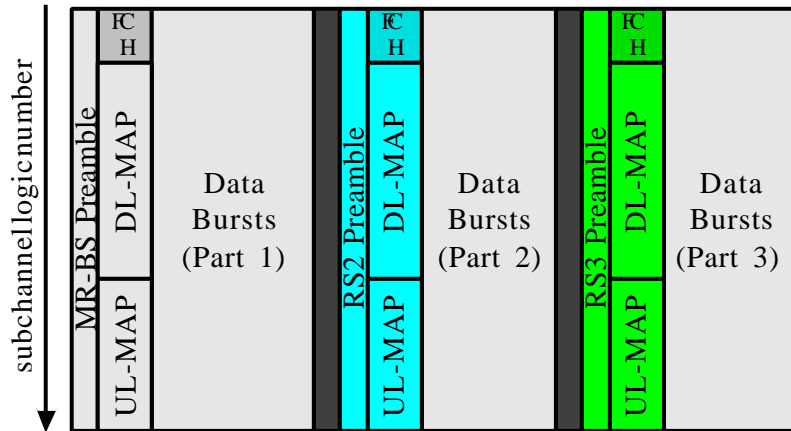
- ❖ RS1: throughput enhancement case
- ❖ RS2: mutlihop relay
- ❖ RS3: coverage extension case



# General DL subframe in relaying frame structure

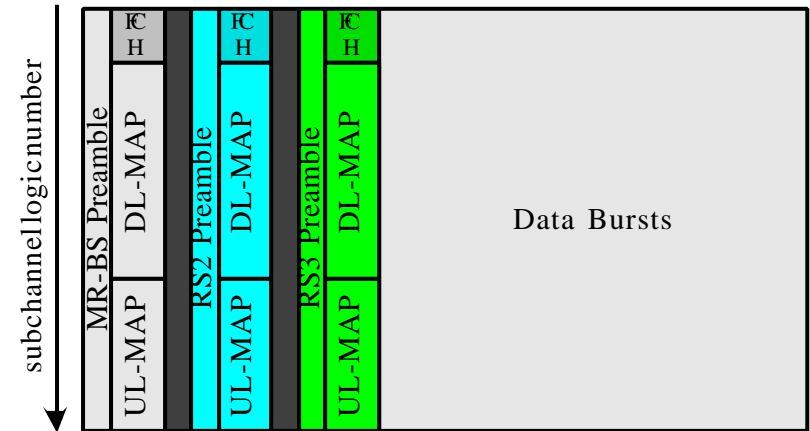


# Example for frame header allocation in the multihop relay system



(a) Distributed Allocation

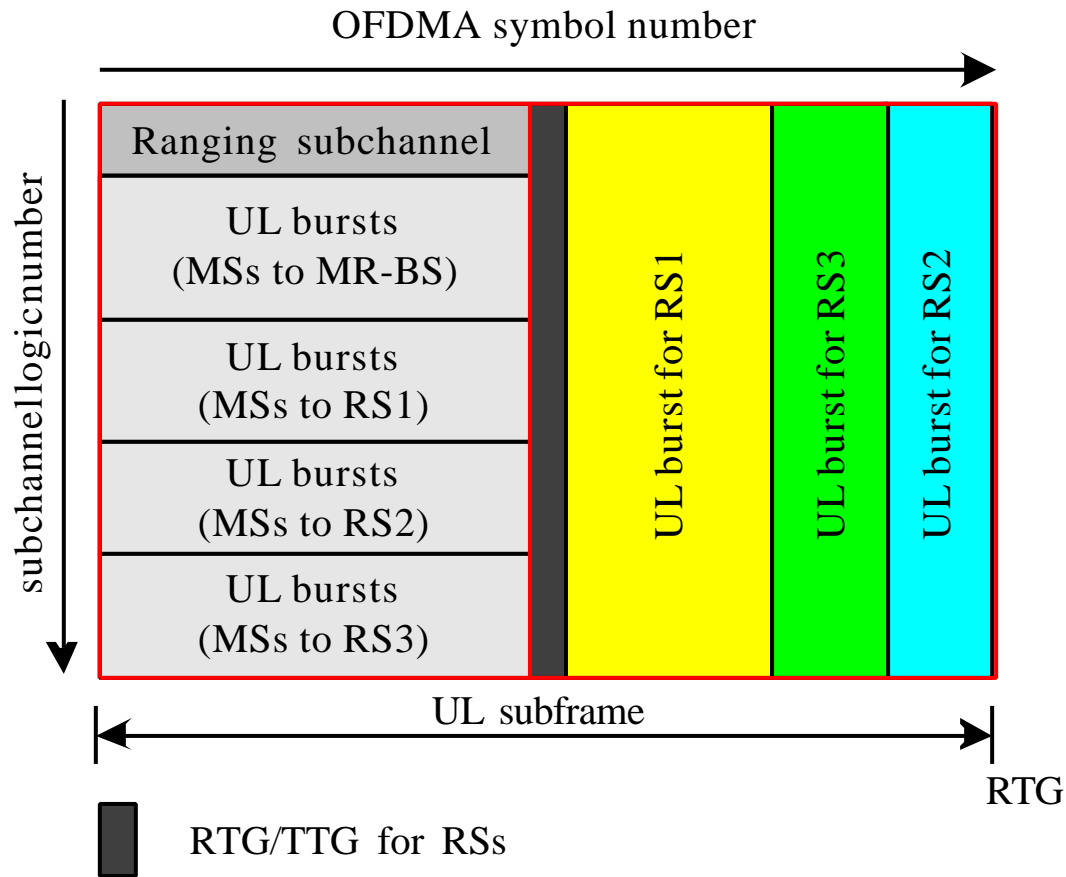
- Lower trucking efficiency
- Better MAP flexibility



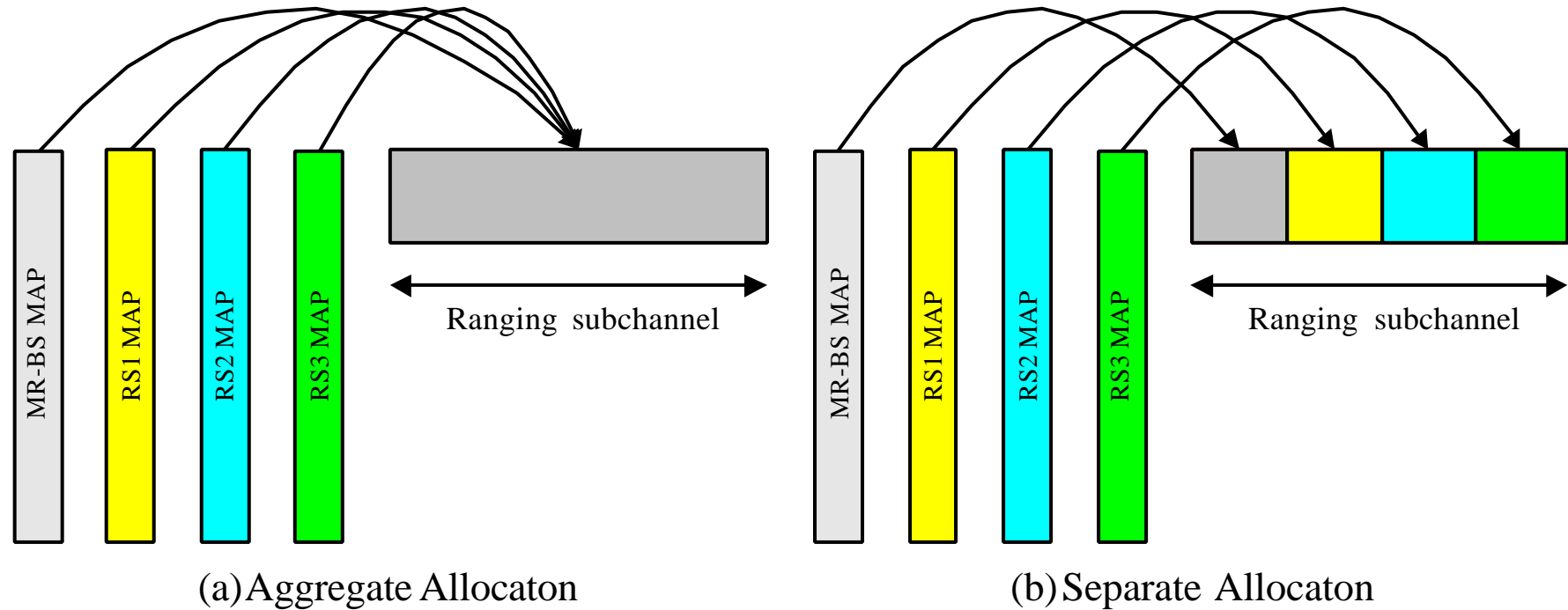
(b) Compact Allocation

- Higher trucking efficiency
- Less MAP flexibility

# General UL subframe in relaying frame structure



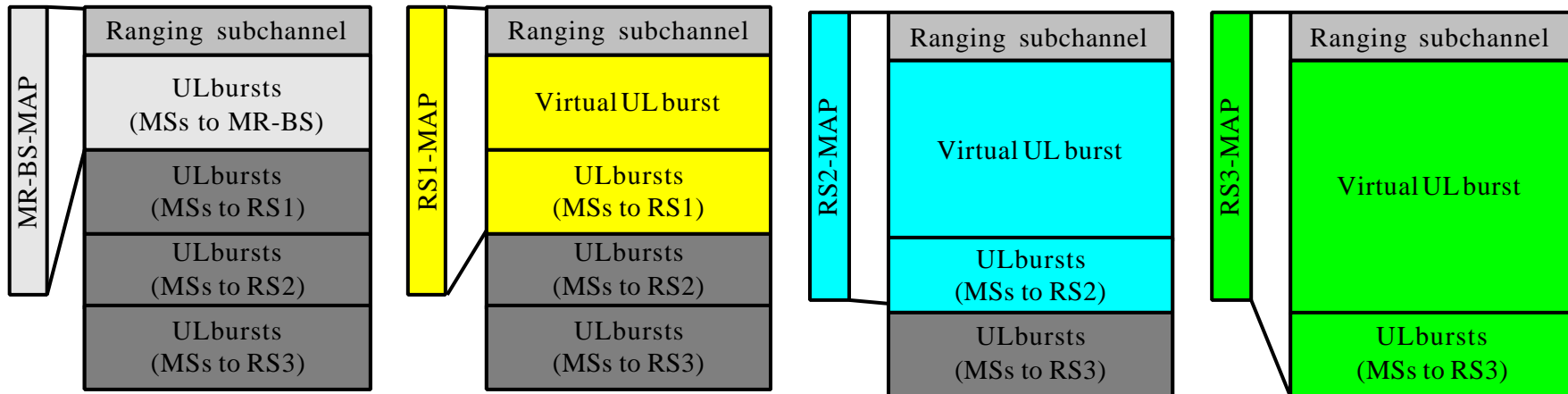
# UL ranging channel partition method



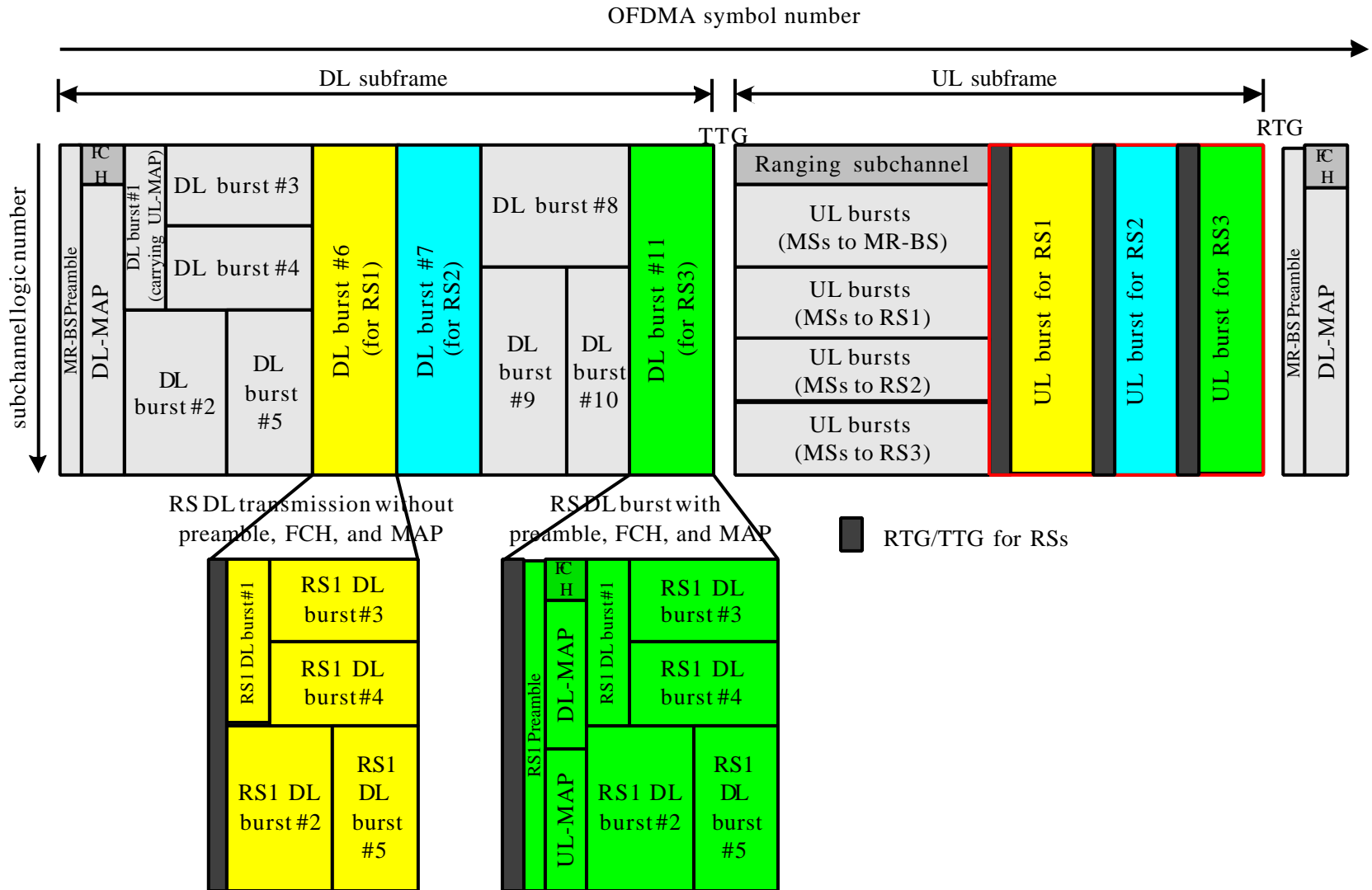


# Virtual UL burst allocation

- Virtual uplink burst is introduced to reduce the resource allocation overhead.



# Proposed relaying frame in TDD mode



# Summary of Proposed Text

## □ Add new text into section 8.4.4.8

- ❖ Includes one figure and related descriptions for the proposed relaying frame structure in TDD mode

## □ Change text in 8.4.5.4

- ❖ Add the descriptions for usage of Relay zone allocations.

## □ Modify Table 290a

- ❖ Define extended UIUC = 0x0B for UL\_Relay\_IE

## □ Insert new subclause 8.4.5.4.29

- ❖ Definition of UL\_Relay\_IE format

## □ Modify Table 345

- ❖ Reserved 0x0001 as Virtual CID to indicate virtual uplink burst.