

Tokyo, JAPAN, 9th-11th March 2005

Source: NTT DoCoMo, Inc.
Title: EDCH scheduling simplification
Document for: Discussion

1. Introduction

In the current stage 2 specification for EDCH (TS 25.309), there are two scheduling modes: RG mode and Non-RG mode. In the last two meetings, WG2 have spent a lot of time discussing about the scheduling function, mainly on UE behaviour for Non-serving RLS RG, but experienced difficulty in reaching an agreement. As a result, many companies have claimed to simplify the current scheduling scheme or to select only one of the two scheduling modes. In this document, we explain the current scheduling modes, and address a possible way forward.

2. The two scheduling modes

2.1 RG mode

RG mode (Relative Grant mode) has been structured mainly for dedicated rate control. Figure 1 shows the mechanism of RG mode. As shown in this figure, UE shall transmit Rate Request to Node-B when transmission data appears in the Tx buffer. Then, Node-B transmits dedicated AG (Absolute Grant) to the UE. UE continues transmission monitoring AG and RG for itself until buffer becomes empty.

RG mode can be used for common scheduling by using common ID in AGCH. However, it has crucial problem; that is the difficulty to allocate HW resource for individual UEs as described in [1].

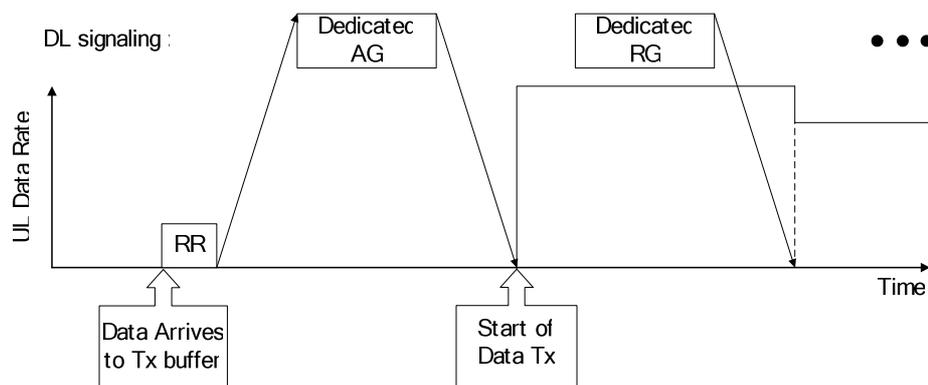


Figure 1. Mechanism of RG mode

2.2 Non RG mode

From operator perspective, common scheduler is a good starting point of EUL because it is much easier to conduct trials and to operate. But as we mentioned above, using the RG mode to operate a common scheduler has the HW allocation problem. To solve this HW allocation problem, Non RG mode has been proposed for the common scheduler and has been accepted in WG1-WG2 joint session. Figure 2 shows the mechanism of Non-RG mode. As depicted in this figure, common AG is transmitted frequently and an UE can transmit immediately if data arrives in the Tx buffer. The UE transmits at a low rate initially, and then gradually ramps up the data rate toward the value specified in the

common AG, so that the Node-B can prepare appropriate HW resources. This mechanism is called Autonomous Ramping.

Non RG mode can be used for dedicated scheduling by using dedicated AG. But the advantage described above (HW allocation advantage) for common scheduling does not apply for dedicated scheduling because the Node-B can allocate appropriate amount of HW resource for individual UEs in dedicated scheduler based on the dedicated grants.

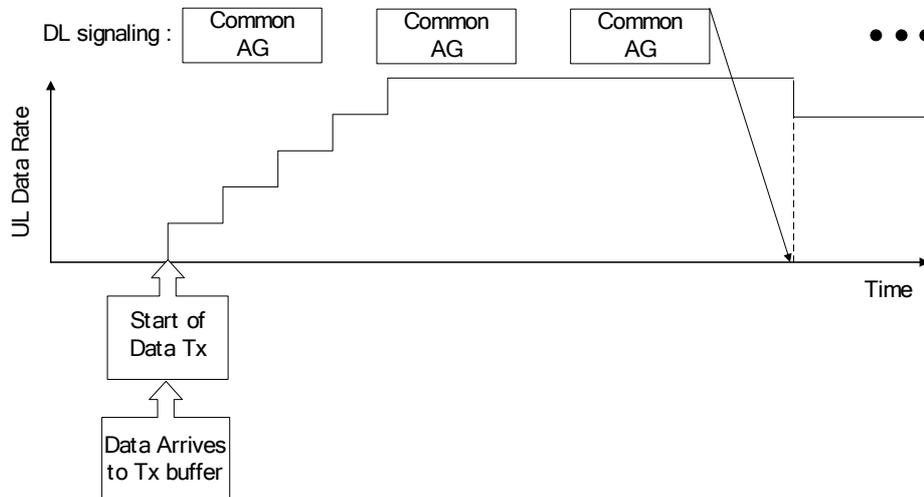


Figure 2. Mechanism of non RG mode

3 Problem in WG2 and a Possible way forward

3.1 Discussion in WG2

As mentioned in introduction of this document, we have spent a lot of time to discuss UE behaviour for the two scheduler modes. The problem is that the efficient structure and UE behavior to the RG from Non-serving cell may be different between the two scheduler modes. However, RG from Non serving cell is not seen as the main issue for non RG mode. Other problems have not appeared until now.

3.2 Proposal of the possible way forward.

Because common scheduler provides a simple starting point for the operation of EUL, the mechanism to operate a common scheduler efficiently should be left in the specification. In other words, when we think of simplification, we should consider not only implementation simplifications, but also operational simplifications.

As only Non-serving RLS RG has been the problem to proceed with EUL standardization work, we propose the following two alternatives as a possible way forward.

- (1) To remove Non-serving RLS RG from non RG mode. It means changing non RG mode to AG mode. Then we will have "RG mode" and "AG mode".
- (2) To include Autonomous Ramping into RG mode. And treat no ramping case as a special configuration of ramping. In this case, Non-serving RLS RG shall be defined to optimize current RG mode because it is not crucial for Autonomous ramping.

Reference

- [1] R1-05687, "Necessity of two rate control modes (Common and dedicated rate control) and a possible way forward", NTT DoCoMo.