

Agenda item: 7.1.2.3
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Title: Signalling for TA group configuration
Document for: Discussion and Decision

1 Introduction

The concept of TA group was introduced to make multi-TA management simple [1]. In principle TA group partitioning is managed by eNB and TA group information is signaled to the UE for TA value application. In this contribution we study how to signal TA group configuration.

2 Discussion

2.1 Need for TA group index

Every cell should be associated to a TA group to apply TA value for uplink transmission. The relationship between configured cell and TA group should be configured by eNB, i.e. explicit signalling is necessary to establish mapping between each cell and a TA group. One simple approach is introducing the concept of TA group index and all cells share the same TA value are configured with the same TA group index. The TA group index will be a 2 or more than 2 bits value, which will be determined when the maximum number of TA group is decided.

Proposal 1: Introduce “TA group index” concept, cells with same TA value share the same TA group index.

Considering that TA group for PCell is not allowed to be changed [2], it is better to use default fixed TA group index for PCell. If the TA group containing PCell needs to be re-configured, SCells in the same TA group can be removed or moved to other TA groups, leaving TA group index for the PCell TA group unchanged. Furthermore, adopting default TA group index can save signalling overload. Hence we recommend that default value 0 be always allocated to PCell TA group, which is similar to *ServCellIndex* in Rel-10.

Proposal 2: PCell TA group index is default 0.

2.2 How to signal TA group configuraion

Signalling for associating SCell with TA group has been widely studied [3-10]. Basically there are three options as follows.

Option 1: RAR is used to (re-)associate SCell with TA group.

Option 2: MAC CE is used to (re-)associate SCell with TA group.

Option 3: RRC signalling is used to (re-)associate SCell with TA group.

RRC signalling approach is the most reliable one among the three approaches. TA group information is quite important. When UE obtains the wrong configuration, it may introduce interference to other users.

MAC CE and RAR are faster than RRC signalling. But TA group re-configuration is not expected to be frequent and the consequence is that neither option 2 nor option 3 seems to be necessary. Furthermore, if TA group is configured when adding the SCell, there will not be any delay for performing RACH procedure when uplink synchronization is required.

With respect to delivering TA group index, RRC signaling is more flexible than MAC CE or RAR because there is less restriction for designing RRC signalling than that for designing MAC CE or RAR.

The comparisons between above three options are summarized in Table.1 as follows.

Table 1 Comparisons between three options.

Options	RAR	MAC CE	RRC signalling
Signalling reliability	Medium	Medium	High
Delay	Short	Short	Longer
Extensibility	Limited	Limited	High

Based on above analysis, we would like to propose:

Proposal 3: RRC signalling is used to (re-)associate SCell with TA group.

3 Conclusion

In this paper we have TA group indication and the possible ways of signalling TA group configuration. Based on the analysis in the contribution we would like to propose:

Proposal 1: Introduce “TA group index” concept, cells with same TA value share the same TA group index.

Proposal 2: PCell TA group index is default 0.

Proposal 3: RRC signalling is used to (re-)associate SCell with TA group.

References

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