

**Agenda item:** R99  
**Source:** Ericsson  
**Title:** Downlink rate matching limitation  
**Document for:** Decision

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## 1. Introduction

In the last RAN1 WG meeting a limitation of the downlink rate matching was discussed. This contribution contains a CR to include this limitation into 25.306 and some explanation.

## 2. Motivation

Based on the maximum sum of number of bits of all transport blocks being received at an arbitrary time instant a limitation to the maximum number of bits before de-ratematching is proposed as follows. Taking into account a coding rate of 1/3, a total repetition of 3 and ca 10% overhead from CRC attachment and tail bits, the maximum number of bits will be 10 times the sum of number of bits of all transport blocks being received at an arbitrary time instant. This results in a maximum memory requirement for a specific UE type. This can be seen as a limitation derived from a UE capability. The advantage is that no additional signalling is needed and no change to the RRC specification is required.

For the example of the 384 kbps class this will result in 64000 bits before de-ratematching compared to the 153600 bits corresponding to 19200 bits / radio frame and 80 ms TTI. The reduction in required memory is considerable.

The limitation on maximum number of bits before de-ratematching should only be applied on all TrCHs, not separately for CC and TC coded TrCHs. The reason is that separate limitations would restrict the ratematching balancing to a high extent or would require a very high maximum repetition value for the CC part. The separate UE capabilities for CC and TC maximum sum of number of bits of all transport blocks have been introduced to enable the correct dimensioning of the decoders.

## 3. Conclusion

It is proposed to adopt the attached CR to 25.306 and send a LS to RAN2 asking to include this CR into the next version of 25.306.

CR-Formv3
CHANGE REQUEST
<span style="font-size: 0.8em;">↖</span> <b>TS 25.306 CR XXX</b> <span style="font-size: 0.8em;">↗</span> rev <b>-</b> <span style="font-size: 0.8em;">↖</span> Current version: <b>3.0.0</b> <span style="font-size: 0.8em;">↗</span>

For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ↖ symbols.

**Proposed change affects:** ↖ (U)SIM  ME/UE  Radio Access Network  Core Network

<b>Title:</b>	Downlink rate matching limitation		
<b>Source:</b>	Ericsson		
<b>Work item code:</b>		<b>Date:</b>	2001-01-xx
<b>Category:</b>	F	<b>Release:</b>	R99
	Use <u>one</u> of the following categories: F (essential correction) A (corresponds to a correction in an earlier release) B (Addition of feature), C (Functional modification of feature) D (Editorial modification)		Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) REL-4 (Release 4) REL-5 (Release 5)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		

<b>Reason for change:</b>	Limit the memory requirements in the UE.
<b>Summary of change:</b>	Introduces a limitation on the memory required before de-ratematching.
<b>Consequences if not approved:</b>	This would result in unnecessary high memory requirements for the UE.

<b>Clauses affected:</b>	4.5.1		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications		
<b>Other comments:</b>			

**How to create CRs using this form:**

Comprehensive information and tips about how to create CRs can be found at: [http://www.3gpp.org/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.htm). Below is a brief summary:

- 1) Fill out the above form. The symbols above marked ↖ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under <ftp://www.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.
- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## 4.5.1 Transport channel parameters in downlink

Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant

NOTE: "Being received" refers to all bits in the active TFC within the TFCS over all simultaneous transport channels received by the UE. "Arbitrary time instant" means that the time instant corresponding to the highest sum of number of bits is relevant. This note also applies to similar parameter definitions below

This parameter is defined as:

$$? \quad ?_i(N_i)$$

where  $N_i$  is defined as the number of bits in transport block # $i$ , and the sum is over all transport blocks being received at an arbitrary time instant. All transport blocks that are to be simultaneously received by the UE on DCH, FACH, PCH and DSCH transport channels are included in the parameter.

A UE does not need to support a TFC within the TFCS for which the sum of *Number of Transport Blocks \* Transport Block size* over all simultaneous transport channels is larger than what the UE capability indicates.

This UE capability also limits the maximum number of bits before de-rate matching as follows: The maximum number of bits before de-rate matching being received at an arbitrary time instant (DPCH, PDSCH, S-CCPCH) shall be less or equal to 10 times the Maximum sum of number of bits of all transport blocks being received at an arbitrary time instant.

Maximum sum of number of bits of all convolutionally coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be convolutionally coded.

Maximum sum of number of bits of all turbo coded transport blocks being received at an arbitrary time instant.

This parameter is defined similar to the parameter above, but the sum includes only transport blocks that are to be turbo coded.