

Liaison Statement on usage of coding schemes for medium to high bit-rates

From: RAN WG1
To: RAN WG2
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Background

The usage of the most suitable coding scheme in the provision of a given service can have a big impact on transmitted power (DL or UL) required to provide the service, therefore impacting the overall system capacity.

Currently WG1 specs including two basic coding schemes, e.g. convolutional coding and parallel turbo coding.

Although it is common understanding that for large encoding block sizes and low bit error rates the turbo coding option is in general the most suitable one, it has been very difficult in the past to set in WG1 specific thresholds on the usage of one of the two schemes in the provision of a radio access bearer.

The service was at that time identified by the overall encoding blocks length and by the associated required BER.

Some very tentative and preliminary values were set in the past (like encoding blocks higher than 320 bits with 10 ms TTI, or BER between 10^{-3} and 10^{-6} , or a combination of them) but a final conclusion was never reached on these limits and most of them were deleted from WG1 specs before RAN#5.

The rationale behind the removal is that WG1 specs actually provide a toolbox to be used by the higher layers, and, therefore, it is not felt as appropriate the inclusion of the above mentioned limits in the WG1 specs.

Provision of medium to high bit rate services

WG1 however recognizes the importance of providing medium to high bit rate services (exact rate or/and QoS limits to be defined) with turbo coding schemes, and this should be taken into account when discussing the setting of the service capabilities of the UE.

What it should be avoided is that a UE without turbo coding capabilities can request a high bit rate service (in the range of its baseband processing capability) only relying to convolutional coding; in this case a network could only take one of the following actions:

- 1) denying the provision of the required service (since its provision would be too much capacity consuming)
- 2) allowing it, being forced to transmit at high power and therefore wasting too much air-interface capacity.

A possible solution to avoid this situation is to ensure that some radio access bearer can only be provided if turbo coding is employed; this could be achieved by setting adequate requirements on the

support of specific radio access bearers by a UE.

Possible requirements could rely on limits on the encoding block sizes or/and thresholds on QoS, as similar to those highlighted in the previous section, to be included in the UE radio access capabilities as described in WG2.

Recommendation

WG1 would like to highlight the importance of providing medium to high rate radio access bearers using the most suitable (from a performance point of view) coding scheme, and recommends WG2 to set the adequate requirements when deciding about the UE radio access capabilities.