

Agenda item: Release 4
Source: Ericsson
Title: Impact of compressed mode on the performance of DPCCH gating
Document for: Discussion

Introduction

In this contribution we discuss the impact of compressed mode on the achievable gains of DPCCH gating as described in TR 25.840 [1].

Duration of compressed mode

The specification of compressed mode provides a high level of flexibility in its use. We give an overview of the parameter ranges provided by RRC [2].

Compressed mode can be understood as the duration of a transmission gap pattern sequence (TGPS). The start and end of a TGPS can be signalled via RRC messages. Compressed mode is active as long as at least one transmission gap pattern sequence is active. A TGPS comprises one or two transmission gap pattern with a certain length (TGPL) that are transmitted for a given number of time (transmission gap pattern repetition counter, TGPRC). Thus, the time when compressed mode is active for at least one transmission gap pattern is $TGPL * TGPRC$.

The range for TGPL supported in RRC is 1...144 radio frames and the range for TGPRC is 1... 63 or infinity.

The way compressed mode will be configured by an operator, depends on what kind of handovers are possible and the amount of measurements required for those measurements. E.g., the measurements for GSM handover are rather complex. The RRC parameter setting will be a tradeoff between how much signalling shall be used, how frequent transmission gaps shall occur, how fast the measurements shall be finished and how often the measurements shall be performed and also the required accuracy.

It should be pointed out that even if compressed mode can be active for a rather high amount of time, this does not necessarily mean that the amount of compressed mode (occurrence of compressed frames) needs to be high.

Performance impact

As DPCCH gating is terminated during compressed mode, i.e. as long as at least one TGPS is active, there is a non-negligible impact on the achievable gains with gating, both in terms of uplink interference reduction and UE battery life improvement. As the amount of time when at least one TGPS is active can be high, the time when gating can be used, i.e. the achievable gains through gating can be very low. In the extreme case of infinite repetition, gating can never be used.

Conclusion

The achievable gains through DPCCH gating are very dependent on the use of compressed mode in the system. The gains can be substantially decreased when compressed mode is used, which makes the current solution for DPCCH gating rather unattractive for systems requiring compressed mode, e.g. for GSM measurements. However, DPCCH gating could be considered as a solution when compressed mode is not required, e.g. for UEs with dual receivers.

References

- [1] 3G TR 25.840 (v2.0.0), "Terminal power saving features"
- [2] 3G TS 25.331 (v3.5.0), "RRC Protocol Specification"

