

Agenda item:

Source: Ericsson

Title: Power limits for downlink power control

Document for: Decision

1 Introduction

In TS 25.433 V1.1.2, section 9.1.2, the radio link setup request message includes information about an upper and lower limit for the TX power of the radio link. This information is currently not used in the power control algorithm, since this is nowhere mentioned in the WG1 documentation (25.214). This inconsistency has also been pointed out in the ad hoc #9 reports, see e.g. TSGR1#6(99)a09, item number 5.

The parameters are used e.g. for admission / congestion control purposes, to limit the amount of power the UE can request.

In order to remove this inconsistency, it is proposed that the same parameters are included into the 25.214 specification text. Note that the exact algorithm in UTRAN is still not specified, only the upper and lower limits the power is allowed to be varied within.

2 Text proposal for TS 25.214 V1.1.1

5.2.3.2 Ordinary transmit power control

The downlink closed-loop power control adjusts the network transmit power in order to keep the received downlink SIR at a given SIR target, SIR_{target} . An higher layer outer loop adjusts SIR_{target} independently for each connection.

The UE should estimate the received downlink DPCCH/DPDCH power of the connection to be power controlled. Simultaneously, the UE should estimate the received interference. The obtained SIR estimate SIR_{est} is then used by the UE to generate TPC commands according to the following rule: if $SIR_{est} > SIR_{target}$ then the TPC command to transmit is "0", requesting a transmit power decrease, while if $SIR_{est} < SIR_{target}$ then the TPC command to transmit is "1", requesting a transmit power increase.

The TPC command generated is transmitted in the first available TPC field in the uplink DPCCH.

As a response to the received TPC commands, UTRAN may adjust the downlink DPCCH/DPDCH power. The transmitted DPCCH/DPDCH power may not exceed Maximum_DL_Power dBm, nor may it be below Minimum_DL_Power dBm.

< Note: It is not clear to what extent the UTRAN response to the received TPC commands should be specified. Until this has been clarified, the text in the paragraph below should be seen as an example of UTRAN behaviour. >

~~As a response to the received TPC commands, UTRAN may adjust the downlink DPCCH/DPDCH power. Such a~~
Changes of power shall be a multiple of the minimum step size $\Delta_{TPC,min}$ dB. It is mandatory for UTRAN to support $\Delta_{TPC,min}$ of 1 dB, while support of 0.5 dB is optional.

< Note: It needs to be clarified if an upper limit on the downlink power step should be specified. >

'When SIR measurements cannot be performed due to downlink out-of-synchronisation, the TPC command transmitted shall be set as "1" during the period of out-of-synchronisation.

~~< Editor's note: In Volume 3 it is also described how the power should be controlled during link set up. This should probably be described in the synchronisation clause, so that the information is not repeated in several places. >~~