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Agenda Item:	7
Source:	TSG T WG1 RF SWG
To:	TSG RAN WG4
Cc:	TSG RAN WG1
Title:	LS: Inner loop power control requirements in uplink
Document for:	Decision
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Introduction

This LS supersedes T1/RF SWG's LS T1R(00)0050 to RAN WG4, and relates to TS25.101 section 6.4.2, "Inner loop power control in the uplink".

Proposals

1. The current specification in section 6.4.2.1.1 is satisfactory if the UE is operating between the Max. and Min. power levels, but UE behaviour at the extremities of this range is not clearly defined. The proposal is to add a requirement for transmitter power control steps at the Max./Min. power levels.

   It is proposed that Maximum and Minimum power thresholds should be defined, and that two new rows should be added to table 5 in section 6.4.2.1.1, to specify the permissible ranges for transmitter power control steps when the UE output power is at or beyond these thresholds.

   T1/RF SWG would like to ask if the following could be added into TS25.101 section 6.4.2 "Inner loop power control in the uplink".

6.4.2.1.1 Minimum requirement

The UE transmitter shall have the capability of changing the output power with a step sizeof 1, 2 and 3 dB according to the value of $_{TPC}$ or $_{RP\text{-}TPC}$, in the slot immediately after the TPC_cmd can be derived

(a) The transmitter output power step due to inner loop power control shall be within the range shown in Table 5. The Maximum power threshold is defined as the lowest permissible maximum output power for the UE power class, as defined in Table 2. The Minimum power threshold is defined as –44dBm.

(b) When the transmitter output power is between the Minimum and Maximum power thresholds, ~~T~~the transmitter average output power step due to inner loop power control shall be within the range shown in Table 6

Table 5: Transmitter power control range

TPC_ cmd	Transmitter power control range					
	1 dB step size		2 dB step size		3 dB step size	
	Lower	Upper	Lower	Upper	Lower	Upper
+ 1	+0.5 dB	+1.5 dB	+1 dB	+3 dB	+1.5 dB	+4.5 dB
0	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB	-0.5 dB	+0.5 dB
-1	-0.5 dB	-1.5 dB	-1 dB	-3 dB	-1.5 dB	-4.5 dB
+1 at or above max power threshold	-0.5dB	+1.5dB	-0.5dB	+3dB	-0.5dB	+4.5dB
-1 at or below min power threshold	+0.5dB	-1.5dB	+0.5dB	-3dB	+0.5dB	-4.5dB

2. In the conformance test requirements being defined by T1/RF SWG, it is also proposed to include the following further clarifications:

   When the output power is between the values of (Maximum power threshold - 0.5 dB) and (Maximum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to increase the output power to the Maximum power threshold, but shall not exceed +1.5 dB.

   and

   When the output power is between the values of (Minimum power threshold + 0.5 dB) and (Minimum power threshold), the difference in mean output power between adjacent slots shall be at least sufficient to decrease the output power to the Minimum power threshold, but shall not exceed -1.5 dB.

   These stipulations are necessary in the conformance test because a UE which is less than 0.5dB from one of the thresholds cannot be expected to implement a step of 0.5dB, nor can the UE be allowed in such circumstances to change power away from the threshold when a command is received to change power towards the threshold and it has not yet reached the threshold.

   T1/RF SWG would like to ask RAN WG4 whether it feels that similar clarifications should also be included in TS25.101.

3. Some confusion was evident in the T1/RF meeting regarding the “Lower” and “Upper” values in Tables 5 and 6 in section 6.4.2.1.1 of TS25.101. A potential misunderstanding can arise from the fact that, for example, the -0.5dB “lower” value in the 3rd line of Table 5 is higher than the –1.5dB “upper” value. T1/RF SWG would like to ask if this could be made clearer.

T1/RF SWG thanks RAN WG4 for their attention to these matters, and would be grateful if RAN WG4 could reply by 3rd April 2000 please.