

CHANGE REQUEST

✂ 3G TS 25.214 CR CR-146 ✂ rev - ✂ Current version 3.5.0 ✂

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

Title: ✂ Clarification of closed loop transmit diversity mode 1 and mode 2 operation during compressed mode.

Source: ✂ Motorola

Work item code: ✂ **Date:** ✂ 12/1/2001

Category: ✂ **F** **Release:** ✂ R99

Use one 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)

Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one 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)

Reason for change: ✂ As discussed on the RAN1 reflector, the specification currently contains text, in section 7.2.3.1 and 7.3.3.1, that implies that a UE may be able to continue receiving the CPICH on the serving frequency during downlink compressed mode gaps. However, a UE that is capable of this would not require downlink compressed mode and so the text describes an irrelevant case.

Furthermore, in section 7.3.3.1, the unnecessary text is followed by a bulleted list. This implies that the bulleted text is somehow conditional on the text above which is not the intention.

Summary of change: ✂ The irrelevant text that implies a UE could receive CPICH during a downlink compressed mode gap is remove from the specification

The bulleted text in section 7.3.3.1 is changed into normal paragraphs.

Consequences if not approved: ✂ The specification will contain text that covers an irrelevant case. The bulleted list of section 7.3.3.1 could be mis-interpreted.

Clauses affected: ✂ 7.2.3.1, 7.3.3.1

Other specs affected: ✂ Other core specifications ✂ Test specifications ✂ O&M Specifications

Other comments: ✂

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. 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. ✎

7.2.3 Mode 1 operation during compressed mode

7.2.3.1 Downlink in compressed mode and uplink in normal mode

When downlink is in compressed mode but uplink is operating normally (i.e. not compressed) the UTRAN continues its Tx diversity related functions in the same way as in non-compressed downlink mode.

~~If UE continues to calculate the phase adjustments based on the received CPICH from antennas 1 and 2 during the idle downlink slots there is no difference in UE operation when compared to non-compressed downlink operation.~~

~~If during the~~In compressed downlink transmission there are uplink slots for which no new estimate of the phase adjustment ~~is has been~~ calculated. During these slots, the following rules are applied in UE when determining the feedback command:

- 1) If no new estimate of phase adjustment, φ_i , exist corresponding to the feedback command to be send in uplink slot i :
 - If $1 < i < 15$:
 - the feedback command sent in uplink slot $i-2$ is used;
 - else if $i = 0$:
 - the feedback command sent in uplink slot 14 of previous frame is used;
 - else if $i = 1$:
 - the feedback command sent in uplink slot 13 of previous frame is used;
 - end if.
- 2) When transmission in downlink is started again in downlink slot N_{last+1} (if $N_{last+1} = 15$, then slot 0 in the next frame) the UE must resume calculating new estimates of the phase adjustment. The feedback command corresponding to the first new estimate of φ_i must be send in the uplink slot which is transmitted 1024 chips in offset from the downlink slot N_{last+1} .

7.2.3.2 Both downlink and uplink in compressed mode

During the uplink idle slots no FB commands are sent from UE to UTRAN. When transmission in downlink is started again in downlink slot N_{last+1} (if $N_{last+1} = 15$, then slot 0 in the next frame) the UE must resume calculating new estimates of the phase adjustment. The feedback command corresponding to the first new estimate of φ_i must be send in the uplink slot which is transmitted 1024 chips in offset from the downlink slot N_{last+1} .

The UTRAN continues to update the weight vector, w_2 , until the uplink enters the compressed mode and no more FB commands are received. When the transmission in downlink resumes in slot N_{last+1} , the value of w_2 calculated after receiving the last FB command before uplink entered the compressed mode is applied to antenna 2 signal.

After UE resumes transmission in uplink and sends the first FB command the new value of w_2 is calculated as follows:

- $S_1 = \{0, 2, 4, 6, 8, 10, 12, 14\}$.
- $S_2 = \{1, 3, 5, 7, 9, 11, 13\}$.
- i = number of uplink slot at which the transmission resumes.
- j = number of uplink slot at which the last FB command was send before uplink entered compressed mode.
- Do while ($i \notin S_1$ and $j \notin S_1$) or ($i \notin S_2$ and $j \notin S_2$):
 - $j = j-1$;
 - if $j < 0$;

- $j = 14;$
- end if;
- end do;
- calculate w_2 based on FB commands received in uplink slots i and j .

7.3.3 Mode 2 operation during compressed mode

7.3.3.1 Downlink in compressed mode and uplink in normal mode

When the downlink is in compressed mode and the uplink is in normal mode, the closed loop mode 2 functions are described below.

~~If UE continues to calculate the phase adjustments based on the received CPICH from antennas 1 and 2 during the idle downlink slots there is no difference in UE operation when compared to non-compressed downlink operation.~~

When the UE is not listening to the CPICH from antennas 1 and 2 during the idle downlink slots, the UE sends the last FSM bits calculated before entering in the compressed mode.

- For recovery after compressed mode, UTRAN Access Point sets the power in both antennas to 0.5 until a FSM_{po} bit is received. Until the first FSM_{ph} bit is received and acted upon, UTRAN uses the phase offset, which was applied before the transmission interruption (table 12).
- Normal initialisation of FSM_{ph} (table 12) occurs if the uplink signalling information resumes at the beginning of a FSM period (that is if signalling resumes in slots 0,4,8,12).
- If the uplink signalling does not resume at the beginning of a FSM period, the following operation is performed. In each of the remaining slots of the partial FSM period, and for the first slot of the next full FSM period, the UE sends the first (i.e. MSB) bit of the FSM_{ph} message, and at the UTRAN access point the phase offset applied between the antennas is updated according to the number and value of FSM_{ph} bits received as given in table 13. Initialisation then continues with the transmission by the UE of the remaining FSM_{ph} bits and the UTRAN operation according to table 12.

Table 13: FSM_{ph} subfield of closed loop mode 2 in compressed mode recovery period

FSM_{ph}	Phase difference between antennas (radians)
-	held from previous setting
0	?
1	0

7.3.3.2 Both downlink and uplink in compressed mode

During both downlink and uplink compressed mode, the UTRAN and the UE performs the functions of recovery after compressed mode as described in the previous subclause 7.3.3.1.