Title: **Closed loop transmission diversity discussions.**

Technically endorsed and agreed CRs (R'99 and Rel-4/Rel-5 category A) to TS 25.331.

Source: **TSG-RAN WG2**

Agenda item: **7.2.2**

Doc-1st-	Status-1st-	Spec	CR	Rev	Phase	Subject	Cat	Version	Version
R2-023138	Agreed	25.331	1773	-	R'99	Signalling of the timing adjustment mode for closed loop Tx diversity	F	3.12.0	3.13.0
R2-023139	Technically endorsed	25.331	1774	-	Rel-4	Signalling of the timing adjustment mode for closed loop Tx diversity	A	4.7.0	4.8.0
R2-023140	Technically endorsed	25.331	1775	-	Rel-4	Closed loop Tx diversity with different timing adjustment modes in the same active set	A	4.7.0	4.8.0
R2-023141	Agreed	25.331	1776	-	Rel-5	Closed loop Tx diversity with different timing adjustment modes in the same active set	A	5.2.0	5.3.0

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CHANGE REQUEST

| ⌘ | **25.331** CR **1773** | ⌘ **rev** | **-** | ⌘ | Current version: | **3.12.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Signalling of the timing adjustment mode for closed loop Tx diversity	
Source: ⌘	Qualcomm	
Work item code: ⌘	TEI	**Date:** ⌘ 12 November 2002
Category: ⌘	**F**	**Release:** ⌘ R99

Use <u>one</u> of the following categories:
F (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 <u>TR 21.900</u>.

Use <u>one</u> 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)
Rel-6 (Release 6)

Reason for change: ⌘	A literal interpretation of the current version of the standard could prevent the UE from using the correct value of the timing adjustment mode. There is an obvious indentation mistake in section 8.6.6.24: The condition *If the IE "Tx Diversity Mode" is not included* cannot be dependent on the condition *If the IE "Tx Diversity Mode" is included*.
Summary of change: ⌘	It is clarified that the value of the IE "Closed loop timing adjustment mode" is ignored only for the STTD case. The UE shall use this value for closed loop mode 1 and closed loop mode 2, but, if the adjustment mode is different within the same active set, the UE behaviour is unspecified. **Isolated Impact Change Analysis.** This change clarifies the closed loop Tx diversity procedure. The CR affects only the case in which closed loop Tx diversity is used in the active set. The CR does not affect the cases in which no Tx diversity is used and the cases in which STTD is used. If the UE does not implement the CR it may not be able to perform the antenna weight estimation for the radio links in the active set. This could prevent the use of closed loop Tx diversity on this UE. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.

<table>
<tr><td>Consequences if
not approved:</td><td>⌘</td><td>If closed loop Tx diversity is configured by UTRAN the UE could not be able to perform the antenna weight estimation, resulting in unpredictable UE behaviour. The UE may reject the reconfiguration message, potentially resulting in a dropped call, or, even if the reconfiguration message is accepted, the UE may use the wrong adjustment mode, which could result in a severe degradation of the UE performance, i.e. the UE may request excessive downlink resources.</td></tr>
</table>

<table>
<tr><td>Clauses affected:</td><td>⌘</td><td colspan="4">8.6.6.24</td></tr>
<tr><td></td><td></td><td>Y</td><td>N</td><td></td><td></td></tr>
<tr><td rowspan="3">Other specs
affected:</td><td rowspan="3">⌘</td><td></td><td>X</td><td>Other core specifications</td><td>⌘</td></tr>
<tr><td></td><td>X</td><td>Test specifications</td><td></td></tr>
<tr><td></td><td>X</td><td>O&M Specifications</td><td></td></tr>
<tr><td>Other comments:</td><td>⌘</td><td colspan="4"></td></tr>
</table>

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

[…]

8.6.6.24 Tx Diversity Mode

If the IE "Tx Diversity Mode" is included the UE shall:

1> if the value of the IE "Tx Diversity Mode" is ~~closed loop mode1, closed loop mode 2 or~~ STTD:

2> configure the Layer 1 to use the Tx diversity mode indicated in the IE "Tx Diversity Mode" for the radio links for which the IE "Closed loop timing adjustment mode" is included, ignoring the actual value of IE "Closed loop timing adjustment mode". The UE may apply the Tx diversity mode indicated in IE "Tx Diversity Mode" <mark>not only to the radio links for which the IE "Closed loop timing adjustment mode" is included, but also</mark> to ~~all~~ <mark>the remaining</mark> radio links in the active set, as specified in [26];

1> if the value of the IE "Tx Diversity Mode" is closed loop mode1 or closed loop mode 2:

2> configure the Layer 1 to use the Tx diversity mode indicated in the IE "Tx Diversity Mode" for the radio links for which the IE "Closed loop timing adjustment mode" is included, using the actual value of IE "Closed loop timing adjustment mode". The UE may apply the Tx diversity mode indicated in IE "Tx Diversity Mode" <mark>not only to the radio links for which the IE "Closed loop timing adjustment mode" is included, but also</mark> to <mark>the remaining</mark> radio links in the active set, as specified in [26]. <mark>The UE behaviour is unspecified if different values of the IE "Closed loop timing adjustment mode" are indicated for different radio links of the active set;</mark>

1> if the value of the IE "Tx Diversity Mode" is "none":

2> configure the Layer 1 not to use Tx diversity.

~~1> if~~ If the IE "Tx Diversity Mode" is not included, the UE shall: [Style changed to "normal"]

~~2~~1> continue to use the already configured Tx diversity mode; [Style changed to "B1"]

~~2~~1> in case no Tx diversity mode has been configured: [Style changed to "B1"]

~~3~~2> do not apply Tx diversity. [Style changed to "B2"]

CR-Form-v7

CHANGE REQUEST

| ⌘ | **25.331** CR **1774** | ⌘ **rev** | **-** | ⌘ | Current version: | **4.7.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   **ME** **X** Radio Access Network **X** Core Network ☐

Title: ⌘	Signalling of the timing adjustment mode for closed loop Tx diversity	
Source: ⌘	Qualcomm	
Work item code: ⌘ TEI		***Date:*** ⌘ 12 November 2002

Category: ⌘ **A**		***Release:*** ⌘ Rel-4	

Use one of the following categories:
   F *(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)*
   Rel-6 *(Release 6)*

Reason for change: ⌘	A literal interpretation of the current version of the standard could prevent the UE from using the correct value of the timing adjustment mode. There is an obvious indentation mistake in section 8.6.6.24: The condition *If the IE "Tx Diversity Mode" is not included* cannot be dependent on the condition *If the IE "Tx Diversity Mode" is included*.
Summary of change: ⌘	It is clarified that the value of the IE "Closed loop timing adjustment mode" is ignored only for the STTD case. The UE shall use this value for closed loop mode 1 and closed loop mode 2, but, if the adjustment mode is different within the same active set, the UE behaviour is unspecified. **Isolated Impact Change Analysis.** This change clarifies the closed loop Tx diversity procedure. The CR affects only the case in which closed loop Tx diversity is used in the active set. The CR does not affect the cases in which no Tx diversity is used and the cases in which STTD is used. If the UE does not implement the CR it may not be able to perform the antenna weight estimation for the radio links in the active set. This could prevent the use of closed loop Tx diversity on this UE. It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.

Consequences if not approved:	⌘	If closed loop Tx diversity is configured by UTRAN the UE could not be able to perform the antenna weight estimation, resulting in unpredictable UE behaviour. The UE may reject the reconfiguration message, potentially resulting in a dropped call, or, even if the reconfiguration message is accepted, the UE may use the wrong adjustment mode, which could result in a severe degradation of the UE performance, i.e. the UE may request excessive downlink resources

Clauses affected:	⌘	8.6.6.24	

		Y	**N**			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	This CR is alternative to CR 1775. Only one should be approved by RAN plenary

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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.

[…]

8.6.6.24   Tx Diversity Mode

If the IE "Tx Diversity Mode" is included the UE shall:

1> if the value of the IE "Tx Diversity Mode" is ~~closed loop mode1, closed loop mode 2 or~~ STTD:

2> configure the Layer 1 to use the Tx diversity mode indicated in the IE "Tx Diversity Mode" for the radio links for which the IE "Closed loop timing adjustment mode" is included, ignoring the actual value of IE "Closed loop timing adjustment mode". The UE may apply the Tx diversity mode indicated in IE "Tx Diversity Mode" <mark>not only to the radio links for which the IE "Closed loop timing adjustment mode" is included, but also</mark> to ~~all~~ the remaining radio links in the active set, as specified in [26];

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1> if the value of the IE "Tx Diversity Mode" is "none":

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~~3~~2>   do not apply Tx diversity. [Style changed to "B2"]

CR-Form-v7

CHANGE REQUEST

⌘	**25.331** CR **1775**	⌘ **rev**	**-**	⌘	Current version:	**4.7.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Closed loop Tx diversity with different timing adjustment modes in the same active set
Source:	⌘	Qualcomm

Work item code: ⌘	TEI		**Date:** ⌘	12 November 2002

Category:	⌘	**A**	**Release:** ⌘	Rel-4

Use <u>one</u> of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
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Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘	The UE could not take full advantage of the closed loop Tx diversity if UTRAN employed different timing adjustment modes on different radio links of the active set. Moreover, a literal interpretation of the current version of the standard could prevent the UE from using the correct value of the timing adjustment mode also in the case in which a single value is used in the active set. There is an obvious indentation mistake in section 8.6.6.24: The condition *If the IE "Tx Diversity Mode" is not included* cannot be dependent on the condition *If the IE "Tx Diversity Mode" is included*.

Summary of change: ⌘	It is clarified that the value of the IE "Closed loop timing adjustment mode" is ignored only for the STTD case. The UE shall use this value for closed loop mode 1 and closed loop mode 2. **Isolated Impact Change Analysis.** This change clarifies the closed loop Tx diversity procedure. The CR affects only the case in which closed loop Tx diversity is used in the active set. The CR does not affect the cases in which no Tx diversity is used and the cases in which STTD is used. If the UE does not implement the CR it may perform the wrong antenna weight estimation for some radio links in the active set. This could result in degraded performance.

Clauses affected:	⌘	8.6.6.24			
		Y	**N**		
Other specs affected:	⌘		**X**	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	This CR is alternative to CR 1774. Only one of them should be approved by RAN plenary			

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8.6.6.24   Tx Diversity Mode

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~~3~~2>   do not apply Tx diversity. [Style changed to "B2"]

CR-Form-v7

CHANGE REQUEST

⌘   **25.331 CR 1776**   ⌘**rev**   **-**   ⌘   Current version: **5.2.0**   ⌘

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Proposed change affects: UICC apps⌘ ☐   ME **X** Radio Access Network **X** Core Network ☐

Title:	⌘	Closed loop Tx diversity with different timing adjustment modes in the same active set
Source:	⌘	Qualcomm
Work item code:⌘	TEI	**Date:** ⌘ 12 November 2002
Category:	⌘ **A**	**Release:** ⌘ Rel-5

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Reason for change:	⌘	The UE could not take full advantage of the closed loop Tx diversity if UTRAN employed different timing adjustment modes on different radio links of the active set. Moreover, a literal interpretation of the current version of the standard could prevent the UE from using the correct value of the timing adjustment mode also in the case in which a single value is used in the active set.
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		Isolated Impact Change Analysis.
		This change clarifies the closed loop Tx diversity procedure.
		The CR affects only the case in which closed loop Tx diversity is used in the active set.
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		If the UE does not implement the CR it may perform the wrong antenna weight estimation for some radio links in the active set. This could result in degraded performance.

		It would not affect implementations behaving like indicated in the CR, it would affect implementations supporting the corrected functionality otherwise.
Consequences if not approved:	⌘	If closed loop Tx diversity is configured by UTRAN the UE could suffer a degraded performance. Moreover, if different adjustment modes are used in the same active set the UE behaviour is unspecified, i.e. the reconfiguration message could be rejected, potentially resulting in a dropped call, or the UE may apply a wrong adjustment mode to some radio links which are part of the active set. As a result, the UE may waste some downlink resources.

Clauses affected:	⌘	8.6.6.24

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

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8.6.6.24 Tx Diversity Mode

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<u>1> if the value of the IE "Tx Diversity Mode" is closed loop mode1 or closed loop mode 2:</u>

<u>2> configure the Layer 1 to use the Tx diversity mode indicated in the IE "Tx Diversity Mode" for the radio links for which the IE "Closed loop timing adjustment mode" is included, using the actual value of IE "Closed loop timing adjustment mode".</u>

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~~1> i~~If the IE "Tx Diversity Mode" is not included<u>, the UE shall</u>: [Style changed to "normal"]

~~2~~<u>1</u>> continue to use the already configured Tx diversity mode<u>;</u> [Style changed to "B1"]

~~2~~<u>1</u>> in case no Tx diversity mode has been configured<u>:</u> [Style changed to "B1"]

~~3~~<u>2</u>> do not apply Tx diversity. [Style changed to "B2"]

[…]