

**Vouliagmeni, Athens Bay, Greece,**

**8<sup>th</sup> - 10<sup>th</sup> December 2004**

**Agenda Item: 7.3.5**

**Source: Research In Motion Ltd.**

**Title: Correction to Rel-5 TS25.331 CR2471r1/2472r1 on TFC Subset Variable Usage and Application of Transport Format Combination Subset**

**Document for: Approval**

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## **1 Introduction**

As the direct result of off line discussions it is necessary to update agreed CR2471r1 to TS25.331 and its respective Rel-6 shadow CR, CR2472r1. These CRs are part of the batch submitted to this meeting in tdoc RP-040482.

## **2 Discussion**

It has been pointed out that section 8.2.5.2 describes only the UTRAN actions and that the inclusion of new text in the CR describing the UE behaviour is therefore wrong. This text is therefore removed.

Also, in section 8.2.5.2 the text describes the UTRAN's use of an IE "Activation time for TFC subset" for defining the point of time for the application of a TFC restriction, implemented by the UE, on its subsequent reception of a TRANSPORT FORMAT COMBINATION CONTROL message. It has also been pointed out however that the UE's use of this activation time for applying the received TFC subset, was missing from the text in the original CR. Text has been added to cover this omission.

## **3 Proposal**

It is proposed that the attached new versions of these CRs for Rel-5 [1] and the respective shadow CR for Rel-6 [2], which correct these discrepancies, are approved in place of the original CRs agreed in RAN WG2 meeting #45.

## **4 Attachments**

[1] 25331CR2471R2.doc (which contains TS25.331 v 5.10.0 CR2471 rev2 TFC Subset Variable Usage and Application of Transport Format Combination Subset)

[2] 25331CR2472R2.doc (which contains TS25.331 v 6.3.0 CR2472 rev2 TFC Subset Variable Usage and Application of Transport Format Combination Subset)

# CHANGE REQUEST

⌘ **25.331 CR -2471** ⌘ rev **2** ⌘ Current version: **5.10.0** ⌘

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  Radio Access Network  Core Network

**Title:** ⌘ TFC Subset Variable Usage and Application of Transport Format Combination Subset

**Source:** ⌘ Research In Motion

**Work item code:** ⌘ TEI-5

**Date:** ⌘ Nov 2004

**Category:** ⌘ **F**

**Release:** ⌘ Rel-5

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:

- Ph2* (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)
- Rel-7* (Release 7)

**Reason for change:** ⌘ The interaction between the TFC\_SUBSET variable and the TFCS within reconfiguration messages is not clear.

In the current specification the usage of the variable TFC\_SUBSET variable is defined in 8.2.5 in the context of the TRANSPORT FORMAT COMBINATION CONTROL message and procedure. But within section 8.6.5.9 and section 8.6.5.3 restrictions using the transport formation combination (sub)set are also defined when the IE "UL Transport channel information common for all transport channels" is included in a reconfiguration message.

It is not clear whether changes to the TFC Subset as described in sections 8.6.5.9 and 8.2.5.3 should be considered a change to the TFC\_SUBSET variable as referenced in 8.2.5.

In addition it is not clear when changes to the fields "Current TFC Subset" and "Default TFC Subset" in the variable TFC\_SUBSET should also be applied and whether these changes should be regarded as permanent or temporary restrictions. Also, the temporary application of TFCS restriction for a defined time specified by the IE "TFC Control Duration" is not consistently applied using the TFC\_SUBSET variable IE "Duration".

<b>Summary of change:</b>	<p>⌘ Clarification on the usage of the TFC_SUBSET variable for the application of TFC Subset restrictions, is made consistently within sections 8.2.5, 8.6.5.3 and 8.6.5.9.</p> <p>It is also stated explicitly that a TFC subset restriction applied through means of a TRANSPORT FORMAT COMBINATION CONTROL message can be limited in time. This is applied temporarily for the time specified by the TFC_SUBSET variable IE "Duration". Any restriction in the TFCS by means of a reconfiguration procedure will be applied immediately and will remain effective until the TFCS is restricted by another message.</p> <p><u>The application of a TFC subset when sent in the TRANSPORT FORMAT COMBINATION CONTROL message will take effect at the CFN indicated by the IE "Activation time for TFC subset".</u></p> <p><b>Isolated Impact Analysis:</b></p> <p>This CR has isolated impact on the interaction of the TRANSPORT FORMAT COMBINATION CONTROL procedure and other TFC Subset restrictions.</p> <p>This is a correction to a function where specifications are erroneous. It would not affect implementations behaving as indicated in the CR, but would affect implementations supporting the corrected functionality otherwise.</p> <p>Implementation of this CR by a R99/Rel-4 UE will not cause compatibility issues.</p> <p><b>Impact on test specifications:</b> No impact is foreseen.</p>
<b>Consequences if not approved:</b>	<p>⌘ UE may use an incorrect or not allowed TF and TFCS.</p>

<b>Clauses affected:</b>	⌘ 8.2.5.2, 8.2.5.3, 8.6.5.2, 8.6.5.3, 8.6.5.9,								
<b>Other specs Affected:</b>	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> <p>Other core specifications      ⌘</p> <p>Test specifications</p> <p>O&amp;M Specifications</p>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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<input type="checkbox"/>	<input checked="" type="checkbox"/>								
<b>Other comments:</b>	⌘								

**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.

### 8.2.5.2 Initiation

To initiate the transport format combination control procedure, the UTRAN transmits the TRANSPORT FORMAT COMBINATION CONTROL message on the downlink DCCH using AM, UM or TM RLC. When not stated otherwise elsewhere, the UTRAN may initiate the transport format combination control procedure also when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

To change the sub-set of allowed transport format combinations, the UTRAN should:

- 1> set the allowed TFCs in the IE " Transport Format Combination~~TFC~~ subset" ("TFC subset"). The UTRAN may specify the duration for which a new TFC sub-set applies by using the IE "TFC Control duration" and independently may specify the time at which a new TFC sub-set shall be applied using the IE "Activation ~~Time~~time for TFC Subset".

To remove completely the previous restrictions of allowed transport format combinations, the UTRAN should:

- 1> set the IE "full transport format combination set" in the IE "TFC subset"~~set~~.

~~2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set"~~

### 8.2.5.3 Reception of a TRANSPORT FORMAT COMBINATION CONTROL message by the UE

If the TRANSPORT FORMAT COMBINATION CONTROL message was received on AM RLC or UM RLC, the UE shall:

- 1> act upon all received information elements as specified in 8.6, unless specified otherwise in the following;
- 1> perform the actions for the transport format combination subset specified in the IE "DPCH/PUSCH TFCS in uplink" according to subclause 8.6.5.3;
- 1> if the variable INVALID\_CONFIGURATION is set to FALSE:
  - 2> if the IE "TFC Control duration" is included in the message:
    - 3> store the value of the IE "TFC Control duration" in the IE "Duration" in the variable TFC\_SUBSET;
    - 3> set the IE "Current TFC subset" (for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET to the value of the IE "Transport format combination subset";
    - 3> at the CFN indicated by IE "Activation time for TFC subset" apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET for the number of (10 ms) frames specified in the IE "~~TFC Control duration~~Duration";
    - 3> at the end of the time period defined by the IE "~~TFC control duration~~Duration" in the variable TFC\_SUBSET;
    - 4> if the IE "Current TFC subset" (for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET has not subsequently been changed by another message:
      - 5> set the value of the IE "Current TFC subset" to the value of the IE "Default TFC subset" in the variable TFC\_SUBSET;
      - 5> clear the IE "Duration" in the variable TFC\_SUBSET;
      - 5> apply the transport format combination subset in the IE "Current TFC subset" stored ~~go back to any previous restriction of the transport format combination set defined by the content of the IE "Default TFC subset"~~ in the variable TFC\_SUBSET;
      - 5> ~~set the value of the IE "Current TFC subset" in the variable TFC\_SUBSET to the value of the IE "Default TFC subset" in the variable TFC\_SUBSET;~~
      - 5> ~~clear the IE "Duration" in the variable TFC\_SUBSET;~~

2> if the IE "TFC Control duration" is not included in the message:

3> clear the value of the IE "Duration" in the variable TFC\_SUBSET;

3> set both the IE "Current TFC subset" and the IE "Default TFC subset" ( for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET to the value of the IE "Transport format combination subset";

3> at the CFN indicated by IE "Activation time for TFC subset" apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.

~~1> if the UE is unable to comply with the reconfiguration due to an invalid activation time:~~

~~2> set the variable INVALID\_CONFIGURATION to TRUE.~~

If the TRANSPORT FORMAT COMBINATION CONTROL message was received on TM RLC, the UE shall:

1> consider the size of the transport block of the downlink transport channel where this message was received to select the format for the transparent format combination control mode as specified in subclause 12.4.1.1;

1> if the IE "TFC subset identity" identifies one of the TFC subsets stored in the IE "TFC subset list" in the variable TFC\_SUBSET:

2> perform the actions as specified in subclause 8.6.5.3;

2> if the variable INVALID\_CONFIGURATION is set to FALSE:

3> in the variable TFC\_SUBSET, set the IE "Current TFC subset" and the IE "default TFC subset" to the value of the IE "TFC subset" in "TFC subset list" which is identified by the IE "TFC subset identity";

3> clear the IE "Duration" in the variable TFC\_SUBSET;

3> apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.

1> if the IE "TFC subset identity" is greater than the maximum number of TFC subsets stored in the IE "TFC subset list" in the variable TFC\_SUBSET:

2> set the variable INVALID\_CONFIGURATION to TRUE.

The UE shall:

1> clear the entry for the TRANSPORT FORMAT COMBINATION CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS;

1> and the procedure ends.

←----- NEXT SECTION ----->

### 8.6.5.2 Transport format combination set

If the IE "Transport format combination set" is included for the uplink, the UE shall for that direction:

1> store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set according to IEs included in IE "Transport format combination set";

1> start to respect those transport format combinations;

1> if IE "Transport format combination subset" is received in this message:

2> perform the actions as specified in subclause 8.6.5.3.

1> if IE "Transport format combination subset" is not received in this message:

2> clear the IE "Duration" in the variable TFC\_SUBSET;

- 2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set".

If the IE "Transport format combination set" is included for the downlink, the UE shall for that direction:

- 1> store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set according to IEs included in IE "Transport format combination set";
- 1> start to respect those transport format combinations;

~~1> if IE "Transport format combination subset" is received in this message:~~

~~2> perform the actions as specified in subclause 8.6.5.3~~

If the IE "Transport format combination set" is not included for the uplink and if there is no addition, removal or reconfiguration of transport channels, the UE shall for that direction:

- 1> use a previously stored transport format combination set if this exists.

If the IE "Transport format combination set" is not included for the downlink and if there is no addition, removal or reconfiguration of transport channels, the UE shall for that direction:

- 1> use a previously stored transport format combination set if this exists.

If the IE "Transport format combination set" is not included; and

- 1> if no transport format combination set is stored in the UE; or
- 1> if transport channels are added or removed in the message; or
- 1> if any transport channel is reconfigured in the message such that the size of the transport format set is changed:

the UE shall:

- 1> set the variable INVALID\_CONFIGURATION to TRUE.

In the uplink TFCS the minimum set of TFCs is the set of TFCs that is needed for the TFC selection algorithm defined in [15] to give a predictable result. This set should always be included in the TFCS, and its use should never be restricted using the IE "TFC Subset". In the definition of the minimum set of TFCs below, only logical channels for which the TFCS or the TFC subset include at least one TFC with non-empty TF for the corresponding transport channel should be considered.

The minimum set of TFCs consists of the following:

1> for each UM logical channel:

- 2> a TFC with one transport block for this transport channel and empty TFs (see [34]) for all the others. If more than one TFC fulfils these criteria, only the TFC with the lowest number of bits should be included in the minimum set of TFCs.

1> for each AM logical channel:

- 2> a TFC with a non-empty TF for the corresponding transport channel and empty TFs for all other transport channels, where the non-empty TF includes one transport block with "Configured RLC Size" equal to the RLC PDU size.

1> for each set of "synchronous" TM logical channels (see the definition below) and for each set of SDU sizes associated with it:

- 2> a TFC with TFs corresponding to any combination of SDU sizes that can be received in a TTI from higher layers on the corresponding transport channels and empty TFs for all other transport channels.

1> for each TM logical channel that is not part of a set of "synchronous" TM logical channels (see the definition below):

- 2> a TFC with non-empty TFs for the corresponding transport channel, and empty TFs for all other transport channels, where

- 3> for non-segmented mode TM-RLC logical channels the non-empty TFs include, for the smallest SDU size that can be received in a single TTI from higher layer:
  - 4> a TF with non-zero number of transport blocks with "Configured RLC Size" equal to the corresponding SDU size. If more than one TFC fulfils these criteria, only the TFC with the lowest number of bits in the TFC is included in the minimum set of TFCs.
- 3> for segmented mode TM-RLC, the non-empty TFs include any TF such that the number of transport blocks multiplied by the "Configured RLC Size" is equal to the smallest SDU size that can be received in a single TTI from higher layer.
- 1> an "empty" TFC (see [34]).

Furthermore, the UTRAN should ensure that the uplink TFCS and any configured TFC Subset satisfies the following rules:

- 1> for each TTI length with which at least one transport channel is configured:
  - 2> for each combination of TFs for the transport channels configured with this TTI length included in the TFCS:
    - 3> a TFC with these TFs for the transport channels configured with this TTI length and empty TFs on all transport channels configured with shorter TTI lengths is also included in the TFCS.

For TDD, the TFCS of a CCTrCH should include those of the above combinations, which include a TF with one transport block for a transport channel used in that CCTrCH, and the "empty" TFC should be included in the TFCS of every CCTrCH.

Synchronous TM logical channels are logical channels on which higher layer traffic is generated in a perfectly correlated fashion (e.g. AMR RAB).

NOTE: The "Configured RLC Size" is defined as the transport block size minus the MAC header size.

### 8.6.5.3 Transport format combination subset

When configuring a TFC Subset, the UTRAN should follow the guidelines defined in subclause 8.6.5.2.

If the IE "Transport format combination subset" ("TFC subset") is included, the UE shall:

- 1> if the IE "Minimum allowed Transport format combination index" is included; and
  - 2> if the value of the IE "Minimum allowed Transport format combination index" is greater than the highest TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Allowed transport format combination list" is included; and
  - 2> if the value of any of the IEs "Allowed transport format combination" included in the IE "Allowed transport format combination list" does not match a TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Non-allowed transport format combination list" is included; and
  - 2> if the value of any of the IEs "Non-allowed transport format combination" included in the IE "Non-allowed transport format combination list" does not match a TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Restricted TrCH information" is included:
  - 2> if the value of any of the IEs "Uplink transport channel type" and "Restricted UL TrCH identity" included in the IE "Restricted TrCH information" do not correspond to any of the transport channels for which the current transport format combination set is valid:

- 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 2> if the IE "Allowed TFIs" is included; and
  - 3> if the value of each of the IEs "Allowed TFI" included in the IE "Allowed TFIs" corresponds to a transport format for that transport channel within the current transport format combination set:
    - 4> allow all transport format combinations that include these transport formats for the transport channel;
    - 4> restrict all other transport format combinations.
  - 3> else:
    - 4> consider the TFC subset to be incompatible with the current transport format combination set.
- 2> if the IE "Allowed TFIs" is not included:
  - 3> restrict all transport format combinations where the transport channel has a transport format of non-zero rate.
- 1> if the UE considers the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - 2> keep any previous restriction of the transport format combination set;
  - 2> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the UE does not consider the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - 2> if the IE "Transport format combination subset" (~~TFC subset~~) is received in a message other than a TRANSPORT FORMAT COMBINATION CONTROL message:
    - 3> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the IE "Transport format combination subset" (in case of TDD for the uplink CcTrCH specified by the IE "TFCS Id");
    - 3> clear the IE "Duration" in the variable TFC\_SUBSET.
    - 3> apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.
  - ~~2> restrict the transport format combination set in the uplink to the value of the IE "Transport format combination subset" (in case of TDD for the uplink CcTrCH specified by the IE "TFCS Id");~~
  - ~~if the IE "Transport format combination subset" ("TFC subset") is received in another message than a TRANSPORT FORMAT COMBINATION CONTROL message:~~
    - ~~3> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the IE "Transport format combination subset" (in case of TDD for the uplink CcTrCH specified by the IE "TFCS Id");~~
  - ~~2> clear the IE "Duration" in the variable TFC\_SUBSET.~~
- 1> if the IE "transport format combination subset" indicates the "full transport format combination set":
  - 2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set".
  - 2> clear the IE "Duration" in the variable TFC\_SUBSET.
  - 2> if the IE "Transport format combination subset" is received in a TRANSPORT FORMAT COMBINATION CONTROL message, then at the CFN indicated by the IE "Activation time for TFC subset" any restriction on transport format combination set is released and the UE may use the full transport format combination set.
  - 2> else:



3> any restriction on transport format combination set is released and the UE may use the full transport format combination set.

←----- NEXT SECTION ----->

### 8.6.5.9 UL Transport channel information common for all transport channels

If the IE "UL Transport channel information common for all transport channels" is included the UE shall:

- 1> perform actions for the IE "TFC subset" as specified in subclause 8.6.5.3;
- 1> if the IE "PRACH TFCS" is included:
  - 2> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the IE has the choice "mode" set to FDD:
  - 2> perform actions for the IE "UL DCH TFCS" as specified in subclause 8.6.5.2.
- 1> if the IE has the choice "mode" set to TDD:
  - 2> if the IE "Individual UL CCTrCH information" is included:
    - 3> for each TFCS identified by IE "UL TFCS id":
      - 4> perform actions for the IE "UL TFCS" as specified in subclause 8.6.5.2.
- 1> if the IE "TFC subset list" is included:
  - 2> remove a previously stored TFC subset list if this exists in the IE "TFC subset list" in the variable TFC\_SUBSET;
  - 2> store the IE "TFC subset list" in the IE "TFC subset list" in the variable TFC\_SUBSET;
  - 2> consider the first instance of the IE "TFC subset" in the IE "TFC subset list" as Transport Format Combination Subset 0 (TFC subset identity = 0), the second instance as Transport Format Combination Subset 1 (TFC subset identity = 1) and so on.

NOTE: The UTRAN should not modify the TFC subset list when a temporary restriction of the TFC subset signalled in is being applied, due to the reception of the IE "TFC Control Duration" in a TRANSPORT FORMAT COMBINATION CONTROL message is still being applied.

←----- NEXT SECTION ----->

### 13.4.24 TFC\_SUBSET

This variable contains information about the TFC subset(s) applicable to the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE <i>mode</i>	MP				
>FDD					
>>Current TFC subset	MP		Transport Format Combination Subset 10.3.5.22	Set to "Full transport format set" when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>Duration	OP		TFC Control duration 10.3.6.80	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>Default TFC subset	OP		Transport Format Combination Subset 10.3.5.22	The TFC subset to go back to when any temporary limitation is	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			on Subset 10.3.5.22	released. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>TFC subset list	MP	1 to <maxTF Csub>			REL-4
>>>TFC subset	MP		Transport Format Combination Subset 10.3.5.22		REL-4
>TDD					
>>TFCS list	MP	1 to <maxCCT rCH >		One TFCS is created when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>TFCS identity	MP		Transport Format Combination Set Identity 10.3.5.21	"TFCS ID" is set to 1 when entering UTRA RRC connected mode when not stated otherwise in the procedure. "Shared channel indicator" is set to FALSE when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>>Current TFC subset	MP		Transport Format Combination Subset 10.3.5.22	Set to "Full transport format set" when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>>Duration	OP		TFC Control duration 10.3.6.80	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>>>Default TFC subset	OP		Transport Format Combination Subset 10.3.5.22	The TFC subset to go back to when any temporary limitation is released. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>>TFC subset list	MP	1 to <maxTF Csub>			REL-4
>>>TFC identity	MP		Transport Format Combination Set Identity 10.3.5.21		REL-4
>>>TFC subset	MP		Transport Format Combination Subset 10.3.5.22		REL-4

# CHANGE REQUEST

⌘ **25.331 CR -2472** ⌘ rev **2** ⌘ Current version: **6.3.0** ⌘

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  Radio Access Network  Core Network

**Title:** ⌘ TFC Subset Variable Usage and Application of Transport Format Combination Subset

**Source:** ⌘ Research In Motion

**Work item code:** ⌘ TEI-5

**Date:** ⌘ Nov 2004

**Category:** ⌘ **A**

**Release:** ⌘ Rel-6

Use one of the following categories:

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Detailed explanations of the above categories can be found in 3GPP [TR 21.900](#).

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It is not clear whether changes to the TFC Subset as described in sections 8.6.5.9 and 8.2.5.3 should be considered a change to the TFC\_SUBSET variable as referenced in 8.2.5.

In addition it is not clear when changes to the fields "Current TFC Subset" and "Default TFC Subset" in the variable TFC\_SUBSET should also be applied and whether these changes should be regarded as permanent or temporary restrictions. Also, the temporary application of TFCS restriction for a defined time specified by the IE "TFC Control Duration" is not consistently applied using the TFC\_SUBSET variable IE "Duration".

**Summary of change:** ☹ Clarification on the usage of the TFC\_SUBSET variable for the application of TFC Subset restrictions, is made consistently within sections 8.2.5, 8.6.5.3 and 8.6.5.9.

It is also stated explicitly that a TFC subset restriction applied through means of a TRANSPORT FORMAT COMBINATION CONTROL message can be limited in time. This is applied temporarily for the time specified by the TFC\_SUBSET variable IE "Duration". Any restriction in the TFCS by means of a reconfiguration procedure will be applied immediately and will remain effective until the TFCS is restricted by another message.

The application of a TFC subset when sent in the TRANSPORT FORMAT COMBINATION CONTROL message will take effect at the CFN indicated by the IE "Activation time for TFC subset".

**Isolated Impact Analysis:**

This CR has isolated impact on the interaction of the TRANSPORT FORMAT COMBINATION CONTROL procedure and other TFC Subset restrictions.

This is a correction to a function where specifications are erroneous. It would not affect implementations behaving as indicated in the CR, but would affect implementations supporting the corrected functionality otherwise.

Implementation of this CR by a R99/Rel-4 UE will not cause compatibility issues.

**Impact on test specifications:**  
No impact is foreseen.

**Consequences if not approved:** ☹ UE may use an incorrect or not allowed TF and TFCS.

**Clauses affected:** ☹ 8.2.5.2, 8.2.5.3, 8.6.5.2, 8.6.5.3, 8.6.5.9, ~~13.4.24~~

	Y	N		☹
<b>Other specs Affected:</b>		X	Other core specifications	
		X	Test specifications	
		X	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/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.

### 8.2.5.2 Initiation

To initiate the transport format combination control procedure, the UTRAN transmits the TRANSPORT FORMAT COMBINATION CONTROL message on the downlink DCCH using AM, UM or TM RLC. When not stated otherwise elsewhere, the UTRAN may initiate the transport format combination control procedure also when another procedure is ongoing, and in that case the state of the latter procedure shall not be affected.

To change the sub-set of allowed transport format combinations, the UTRAN should:

- 1> set the allowed TFCs in the IE " Transport Format Combination~~TFC~~ subset" ("TFC subset"). The UTRAN may specify the duration for which a new TFC sub-set applies by using the IE "TFC Control duration" and independently may specify the time at which a new TFC sub-set shall be applied using the IE "Activation time for TFC subset~~Time~~".

To remove completely the previous restrictions of allowed transport format combinations, the UTRAN should:

- 1> set the IE "full transport format combination~~set~~" in the IE "TFC subset"~~;~~.

~~2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set";~~

### 8.2.5.3 Reception of a TRANSPORT FORMAT COMBINATION CONTROL message by the UE

If the TRANSPORT FORMAT COMBINATION CONTROL message was received on AM RLC or UM RLC, the UE shall:

- 1> act upon all received information elements as specified in 8.6, unless specified otherwise in the following;
- 1> perform the actions for the transport format combination subset specified in the IE "DPCH/PUSCH TFCS in uplink" according to subclause 8.6.5.3;
- 1> if the variable INVALID\_CONFIGURATION is set to FALSE:
  - 2> if the IE "TFC Control duration" is included in the message:
    - 3> store the value of the IE "TFC Control duration" in the IE "Duration" in the variable TFC\_SUBSET;
    - 3> set the IE "Current TFC subset" (for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET to the value of the IE "Transport format combination subset";
    - 3> at the CFN indicated by IE "Activation time for TFC subset" apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET for the number of (10 ms) frames specified in the IE "~~TFC Control duration~~Duration";
    - 3> at the end of the time period defined by the IE "~~TFC control duration~~Duration" in the variable TFC\_SUBSET:
    - 4> if the IE "Current TFC subset" (for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET has not subsequently been changed by another message:
      - 5> set the value of the IE "Current TFC subset" to the value of the IE "Default TFC subset" in the variable TFC\_SUBSET;
      - 5> clear the IE "Duration" in the variable TFC\_SUBSET;
      - 5> apply the transport format combination subset in the IE "Current TFC subset" stored ~~go back to any previous restriction of the transport format combination set defined by the content of the IE "Default TFC subset"~~ in the variable TFC\_SUBSET;
      - 5> ~~set the value of the IE "Current TFC subset" in the variable TFC\_SUBSET to the value of the IE "Default TFC subset" in the variable TFC\_SUBSET;~~
      - 5> ~~clear the IE "Duration" in the variable TFC\_SUBSET;~~

2> if the IE "TFC Control duration" is not included in the message:

3> clear the value of the IE "Duration" in the variable TFC\_SUBSET;

3> set both the IE "Current TFC subset" and the IE "Default TFC subset" ( for the CCTrCH indicated by the IE "TFCS Id" in case of TDD) in the variable TFC\_SUBSET to the value of the IE "Transport format combination subset";

3> at the CFN indicated by IE "Activation time for TFC subset" apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.

~~1> if the UE is unable to comply with the reconfiguration due to an invalid activation time:~~

~~2> set the variable INVALID\_CONFIGURATION to TRUE.~~

If the TRANSPORT FORMAT COMBINATION CONTROL message was received on TM RLC, the UE shall:

1> consider the size of the transport block of the downlink transport channel where this message was received to select the format for the transparent format combination control mode as specified in subclause 12.4.1.1;

1> if the IE "TFC subset identity" identifies one of the TFC subsets stored in the IE "TFC subset list" in the variable TFC\_SUBSET:

2> perform the actions as specified in subclause 8.6.5.3;

2> if the variable INVALID\_CONFIGURATION is set to FALSE:

3> in the variable TFC\_SUBSET, set the IE "Current TFC subset" and the IE "default TFC subset" to the value of the IE "TFC subset" in "TFC subset list" which is identified by the IE "TFC subset identity";

3> clear the IE "Duration" in the variable TFC\_SUBSET;

3> apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.

1> if the IE "TFC subset identity" is greater than the maximum number of TFC subsets stored in the IE "TFC subset list" in the variable TFC\_SUBSET:

2> set the variable INVALID\_CONFIGURATION to TRUE.

The UE shall:

1> clear the entry for the TRANSPORT FORMAT COMBINATION CONTROL message in the table "Accepted transactions" in the variable TRANSACTIONS;

1> and the procedure ends.

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### 8.6.5.2 Transport format combination set

If the IE "Transport format combination set" is included for the uplink, the UE shall for that direction:

1> store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set according to IEs included in IE "Transport format combination set";

1> start to respect those transport format combinations;

1> if IE "Transport format combination subset" is received in this message:

2> perform the actions as specified in subclause 8.6.5.3.

1> if IE "Transport format combination subset" is not received in this message:

2> clear the IE "Duration" in the variable TFC\_SUBSET;

- 2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set".

If the IE "Transport format combination set" is included for the downlink, the UE shall for that direction:

- 1> store the new transport format combination set, or (if this exists) modify a previously stored transport format combination set according to IEs included in IE "Transport format combination set";
- 1> start to respect those transport format combinations;

~~1> if IE "Transport format combination subset" is received in this message:~~

~~2> perform the actions as specified in subclause 8.6.5.3~~

If the IE "Transport format combination set" is not included for the uplink and if there is no addition, removal or reconfiguration of transport channels, the UE shall for that direction:

- 1> use a previously stored transport format combination set if this exists.

If the IE "Transport format combination set" is not included for the downlink and if there is no addition, removal or reconfiguration of transport channels, the UE shall for that direction:

- 1> use a previously stored transport format combination set if this exists.

If the IE "Transport format combination set" is not included; and

- 1> if no transport format combination set is stored in the UE; or
- 1> if transport channels are added or removed in the message; or
- 1> if any transport channel is reconfigured in the message such that the size of the transport format set is changed:

the UE shall:

- 1> set the variable INVALID\_CONFIGURATION to TRUE.

In the uplink TFCS the minimum set of TFCs is the set of TFCs that is needed for the TFC selection algorithm defined in [15] to give a predictable result. This set should always be included in the TFCS, and its use should never be restricted using the IE "TFC Subset". In the definition of the minimum set of TFCs below, only logical channels for which the TFCS or the TFC subset include at least one TFC with non-empty TF for the corresponding transport channel should be considered.

The minimum set of TFCs consists of the following:

- 1> for each UM logical channel:

- 2> a TFC with one transport block for this transport channel and empty TFs (see [34]) for all the others. If more than one TFC fulfils these criteria, only the TFC with the lowest number of bits should be included in the minimum set of TFCs.

- 1> for each AM logical channel:

- 2> a TFC with a non-empty TF for the corresponding transport channel and empty TFs for all other transport channels, where the non-empty TF includes one transport block with "Configured RLC Size" equal to the RLC PDU size.

- 1> for each set of "synchronous" TM logical channels (see the definition below) and for each set of SDU sizes associated with it:

- 2> a TFC with TFs corresponding to any combination of SDU sizes that can be received in a TTI from higher layers on the corresponding transport channels and empty TFs for all other transport channels.

- 1> for each TM logical channel that is not part of a set of "synchronous" TM logical channels (see the definition below):

- 2> a TFC with non-empty TFs for the corresponding transport channel, and empty TFs for all other transport channels, where



- 3> for non-segmented mode TM-RLC logical channels the non-empty TFs include, for the smallest SDU size that can be received in a single TTI from higher layer:
  - 4> a TF with non-zero number of transport blocks with "Configured RLC Size" equal to the corresponding SDU size. If more than one TFC fulfils these criteria, only the TFC with the lowest number of bits in the TFC is included in the minimum set of TFCs.
- 3> for segmented mode TM-RLC, the non-empty TFs include any TF such that the number of transport blocks multiplied by the "Configured RLC Size" is equal to the smallest SDU size that can be received in a single TTI from higher layer.
- 1> an "empty" TFC (see [34]).

Furthermore, the UTRAN should ensure that the uplink TFCS and any configured TFC Subset satisfies the following rules:

- 1> for each TTI length with which at least one transport channel is configured:
  - 2> for each combination of TFs for the transport channels configured with this TTI length included in the TFCS:
    - 3> a TFC with these TFs for the transport channels configured with this TTI length and empty TFs on all transport channels configured with shorter TTI lengths is also included in the TFCS.

For TDD, the TFCS of a CCTrCH should include those of the above combinations, which include a TF with one transport block for a transport channel used in that CCTrCH, and the "empty" TFC should be included in the TFCS of every CCTrCH.

Synchronous TM logical channels are logical channels on which higher layer traffic is generated in a perfectly correlated fashion (e.g. AMR RAB).

NOTE: The "Configured RLC Size" is defined as the transport block size minus the MAC header size.

### 8.6.5.3 Transport format combination subset

When configuring a TFC Subset, the UTRAN should follow the guidelines defined in subclause 8.6.5.2.

If the IE "Transport format combination subset" ("TFC subset") is included, the UE shall:

- 1> if the IE "Minimum allowed Transport format combination index" is included; and
  - 2> if the value of the IE "Minimum allowed Transport format combination index" is greater than the highest TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Allowed transport format combination list" is included; and
  - 2> if the value of any of the IEs "Allowed transport format combination" included in the IE "Allowed transport format combination list" does not match a TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Non-allowed transport format combination list" is included; and
  - 2> if the value of any of the IEs "Non-allowed transport format combination" included in the IE "Non-allowed transport format combination list" does not match a TFCI value in the current transport format combination set:
    - 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 1> if the IE "Restricted TrCH information" is included:
  - 2> if the value of any of the IEs "Uplink transport channel type" and "Restricted UL TrCH identity" included in the IE "Restricted TrCH information" do not correspond to any of the transport channels for which the current transport format combination set is valid:

- 3> consider the TFC subset to be incompatible with the current transport format combination set.
- 2> if the IE "Allowed TFIs" is included; and
  - 3> if the value of each of the IEs "Allowed TFI" included in the IE "Allowed TFIs" corresponds to a transport format for that transport channel within the current transport format combination set:
    - 4> allow all transport format combinations that include these transport formats for the transport channel;
    - 4> restrict all other transport format combinations.
  - 3> else:
    - 4> consider the TFC subset to be incompatible with the current transport format combination set.
- 2> if the IE "Allowed TFIs" is not included:
  - 3> restrict all transport format combinations where the transport channel has a transport format of non-zero rate.
- 1> if the UE considers the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - 2> keep any previous restriction of the transport format combination set;
  - 2> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the UE does not consider the TFC subset to be incompatible with the current Transport format combination set according to the above:
  - 2> if the IE "Transport format combination subset" (~~TFC subset~~) is received in a message other than a TRANSPORT FORMAT COMBINATION CONTROL message:
    - 3> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the IE "Transport format combination subset" (in case of TDD for the uplink CCTrCH specified by the IE "TFCS Id");
    - 3> clear the IE "Duration" in the variable TFC\_SUBSET.
    - 3> apply the transport format combination subset in the IE "Current TFC subset" stored in the variable TFC\_SUBSET.
  - ~~2> restrict the transport format combination set in the uplink to the value of the IE "Transport format combination subset" (in case of TDD for the uplink CCTrCH specified by the IE "TFCS Id");~~
  - ~~if the IE "Transport format combination subset" ("TFC subset") is received in another message than a TRANSPORT FORMAT COMBINATION CONTROL message:~~
    - ~~3> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the IE "Transport format combination subset" (in case of TDD for the uplink CCTrCH specified by the IE "TFCS Id");~~
  - ~~2> clear the IE "Duration" in the variable TFC\_SUBSET.~~
- 1> if the IE "transport format combination subset" indicates the "full transport format combination set":
  - 2> set both the IE "Current TFC subset" and the IE "Default TFC subset" in the variable TFC\_SUBSET to the value indicating "full transport format combination set".
  - 2> clear the IE "Duration" in the variable TFC\_SUBSET.
  - 2> if the IE "Transport format combination subset" is received in a TRANSPORT FORMAT COMBINATION CONTROL message, then at the CFN indicated by the IE "Activation time for TFC subset" any restriction on transport format combination set is released and the UE may use the full transport format combination set.
  - 2> else:

[3> any restriction on transport format combination set is released and the UE may use the full transport format combination set.](#)

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### 8.6.5.9 UL Transport channel information common for all transport channels

If the IE "UL Transport channel information common for all transport channels" is included the UE shall:

- 1> perform actions for the IE "TFC subset" as specified in subclause 8.6.5.3;
- 1> if the IE "PRACH TFCS" is included:
  - 2> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the IE has the choice "mode" set to FDD:
  - 2> perform actions for the IE "UL DCH TFCS" as specified in subclause 8.6.5.2.
- 1> if the IE has the choice "mode" set to TDD:
  - 2> if the IE "Individual UL CCTrCH information" is included:
    - 3> for each TFCS identified by IE "UL TFCS id":
      - 4> perform actions for the IE "UL TFCS" as specified in subclause 8.6.5.2.
- 1> if the IE "TFC subset list" is included:
  - 2> remove a previously stored TFC subset list if this exists [in the IE "TFC subset list"](#) in the variable TFC\_SUBSET;
  - 2> store the IE "TFC subset list" in the IE "TFC subset list" in the variable TFC\_SUBSET;
  - 2> consider the first instance of the IE "TFC subset" in the IE "TFC subset list" as Transport Format Combination Subset 0 (TFC subset identity = 0), the second instance as Transport Format Combination Subset 1 (TFC subset identity = 1) and so on.

**NOTE:** [The UTRAN should not modify the TFC subset list when a temporary restriction of the TFC subset signalled in is being applied, due to the reception of the IE "TFC Control Duration" in a TRANSPORT FORMAT COMBINATION CONTROL message is still being applied.](#)

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### 13.4.24 TFC\_SUBSET

This variable contains information about the TFC subset(s) applicable to the UE.

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE <i>mode</i>	MP				
>FDD					
>>Current TFC subset	MP		Transport Format Combination Subset 10.3.5.22	Set to "Full transport format set" when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>Duration	OP		TFC Control duration 10.3.6.80	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>Default TFC subset	OP		Transport Format Combination Subset 10.3.5.22	The TFC subset to go back to when any temporary limitation is	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			on Subset 10.3.5.22	released. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>TFC subset list	MP	1 to <maxTF Csub>			REL-4
>>>TFC subset	MP		Transport Format Combination Subset 10.3.5.22		REL-4
>TDD					
>>TFCS list	MP	1 to <maxCCT rCH >		One TFCS is created when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>TFCS identity	MP		Transport Format Combination Set Identity 10.3.5.21	"TFCS ID" is set to 1 when entering UTRA RRC connected mode when not stated otherwise in the procedure. "Shared channel indicator" is set to FALSE when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>>Current TFC subset	MP		Transport Format Combination Subset 10.3.5.22	Set to "Full transport format set" when entering UTRA RRC connected mode when not stated otherwise in the procedure.	
>>>>Duration	OP		TFC Control duration 10.3.6.80	Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	
>>>>Default TFC subset	OP		Transport Format Combination Subset 10.3.5.22	The TFC subset to go back to when any temporary limitation is released. Cleared when entering UTRA RRC connected mode. Cleared when leaving UTRA RRC connected mode.	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>>TFC subset list	MP	1 to <maxTF Csub>			REL-4
>>>TFC identity	MP		Transport Format Combination Set Identity 10.3.5.21		REL-4
>>>TFC subset	MP		Transport Format Combination Subset 10.3.5.22		REL-4