TSG-RAN Meeting #19 ***RP-030100***
Birmingham, UK, 11 - 14 March 2003

Title: **CRs (Release '99 and Rel-4/Rel-5 category A) to TS 25.321**

Source: **TSG-RAN WG2**

Agenda item: **8.2.3**

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.321	164	-	R99	Setting of ciphering activation time for TM bearers.	F	3.14.0	3.15.0	R2-030599	TEI
25.321	165	-	Rel-4	Setting of ciphering activation time for TM bearers.	A	4.7.0	4.8.0	R2-030600	TEI
25.321	166	-	Rel-5	Setting of ciphering activation time for TM bearers.	A	5.3.0	5.4.0	R2-030601	TEI
25.321	167	1	R99	TFC Control Implementation	F	3.14.0	3.15.0	R2-030641	TEI
25.321	168	1	Rel-4	TFC Control Implementation	A	4.7.0	4.8.0	R2-030642	TEI
25.321	169	1	Rel-5	TFC Control Implementation	A	5.3.0	5.4.0	R2-030643	TEI

3GPP TSG-RAN2 Meeting #34
Sophia Antipolis, France, 17th-21st February 2003

Tdoc R2-030599

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **164** ⌘ **rev** **-** ⌘ Current version: **3.14.0** ⌘

*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:	⌘	Setting of ciphering activation time for TM bearers.
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	17 Feb 2003
Category:	⌘	**F**
Release:	⌘	R99

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:	⌘	Following discussion in RAN2#34 on R2-030255 and R2-030180, it appeared that is currently unclear how ciphering of TM RB should be done when the ciphering activation time is not at the TTI boundary common to all UL and DL transport channel using RLC-TM. It has been decided that the ciphering activation time for the TM radio bearers have to be set on a 80 ms TTI boundary. This has been specified in CR 1894 on RRC. Therefore, the section relative to the case when the activation time is not the first CFN in a TTI common to all transport channels that are multiplexed onto the same CCTrCh will never be applicable.
Summary of change:	⌘	The section relative to the case when the activation time is not the first CFN in a TTI common to all transport channels that are multiplexed onto the same CCTrCh is deleted.
Consequences if not approved:	⌘	**If the CR is not implemented in the UE or the UTRAN:** If CR 1894 on RRC is implemented in both the UE or the UTRAN, there will be no impact on whether this CR is implemented or not, because the scenario removed would not happen. However, this incorrect and misleading statement regarding the case where the activation time is not the first CFN in a TTI common to all the transport channels that are multiplexed onto the same CCTrCh would remain in the specification, that could potentially lead to a risk of ciphering failure on TM radio bearers during the setup of the first TM bearer, hard hand-over and during Security Mode Control procedure.

Clauses affected:	⌘	11.5

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	25.331 CR 1894.
			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.

11.5 Ciphering

The ciphering function is performed in MAC (i.e. only in MAC-d) if a radio bearer is using the transparent RLC mode. The part of the MAC PDU that is ciphered is the MAC SDU and this is shown in Figure 11.5.1 below.

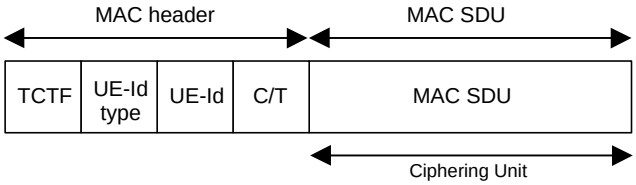

Figure 11.5.1: Ciphered part for a MAC PDU

In case a TTI contains multiple MAC PDUs for a given Transparent mode RB, the ciphering unit for this RB is the bitstring concatenation of all the MAC SDUs, resulting in the PLAINTEXT BLOCK, as defined in [15]. In case there is only one MAC PDU for a given Transparent mode RB, the ciphering unit is the MAC SDU, resulting in the PLAINTEXT BLOCK. The concatenation order is the same as the order of transmission of the Transport Blocks between MAC and Physical layer.

The KEYSTREAM BLOCK as defined in [10] is applied to the PLAINTEXT BLOCK, and the end result, CIPHERTEXT BLOCK, becomes the ciphered part for the MAC PDU, in case there is only one MAC PDU per RB. In case there is more than one MAC PDU per RB, the CIPHERTEXT BLOCK is split into the corresponding ciphered parts for each MAC PDU. The split order is the same as the order of transmission of the Transport Blocks between MAC and Physical layer.

The ciphering algorithm and key to be used are configured by upper layers [7] and the ciphering method shall be applied as specified in [10].

The parameters that are required by MAC for ciphering are defined in [10] and are input to the ciphering algorithm. The parameters required by MAC which are provided by upper layers [7] are listed below:

- MAC-d HFN (Hyper frame number for radio bearers that are mapped onto transparent mode RLC)
- BEARER defined as the radio bearer identifier in [10]. It will use the value RB identity –1 as in [7])
- CK (Ciphering Key)

If the TTI consists of more than one 10 ms radio frame, the CFN of the first radio frame in the TTI shall be used as input to the ciphering algorithm for all the data in the TTI.

~~If the activation time indicated by higher layers for start or stop of ciphering or change of ciphering parameters is not the first CFN in a TTI common to all the transport channels that are multiplexed onto the same CCTrCh, the activation time shall be applied at the first CFN in the following TTI common to all the transport channels that are multiplexed onto the same CCTrCh.~~

3GPP TSG-RAN2 Meeting #34
Sophia Antipolis, France, 17th-21st February 2003

Tdoc R2-030600

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **165** ⌘ **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:	⌘	Setting of ciphering activation time for TM bearers.
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	17 Feb 2003
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)*
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R98	*(Release 1998)*
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Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change: ⌘

Following discussion in RAN2#34 on R2-030255 and R2-030180, it appeared that is currently unclear how ciphering of TM RB should be done when the ciphering activation time is not at the TTI boundary common to all UL and DL transport channel using RLC-TM.

It has been decided that the ciphering activation time for the TM radio bearers have to be set on a 80 ms TTI boundary. This has been specified in CR 1894 on RRC.

Therefore, the section relative to the case when the activation time is not the first CFN in a TTI common to all transport channels that are multiplexed onto the same CCTrCh will never be applicable.

Summary of change: ⌘

The section relative to the case when the activation time is not the first CFN in a TTI common to all transport channels that are multiplexed onto the same CCTrCh is deleted.

Consequences if not approved: ⌘

If the CR is not implemented in the UE or the UTRAN:

If CR 1895 on RRC is implemented in both the UE or the UTRAN, there will be no impact on whether this CR is implemented or not, because the scenario removed would not happen. However, this incorrect and misleading statement regarding the case where the activation time is not the first CFN in a TTI common to all the transport channels that are multiplexed onto the same CCTrCh would remain in the specification, that could potentially lead to a risk of ciphering failure on TM radio bearers during the setup of the first TM bearer, hard hand-over and during Security Mode Control procedure.

Clauses affected: ⌘ 11.5

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	25.331 CR 1895.
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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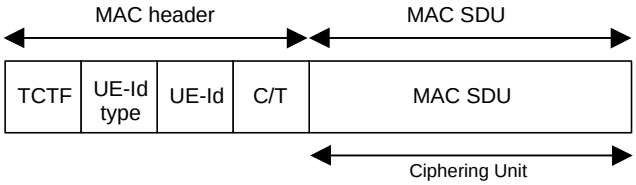

Figure 11.5.1: Ciphered part for a MAC PDU

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The KEYSTREAM BLOCK as defined in [10] is applied to the PLAINTEXT BLOCK, and the end result, CIPHERTEXT BLOCK, becomes the ciphered part for the MAC PDU, in case there is only one MAC PDU per RB. In case there is more than one MAC PDU per RB, the CIPHERTEXT BLOCK is split into the corresponding ciphered parts for each MAC PDU. The split order is the same as the order of transmission of the Transport Blocks between MAC and Physical layer.

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3GPP TSG-RAN2 Meeting #34
Sophia Antipolis, France, 17th-21st February 2003

Tdoc R2-030601

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **166** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Setting of ciphering activation time for TM bearers.
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	17 Feb 2003
Category:	⌘	**A**
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.

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Consequences if not approved:	⌘	**If the CR is not implemented in the UE or the UTRAN:** If CR 1896 on RRC is implemented in both the UE or the UTRAN, there will be no impact on whether this CR is implemented or not, because the scenario removed would not happen. However, this incorrect and misleading statement regarding the case where the activation time is not the first CFN in a TTI common to all the transport channels that are multiplexed onto the same CCTrCh would remain in the specification, that could potentially lead to a risk of ciphering failure on TM radio bearers during the setup of the first TM bearer, hard hand-over and during Security Mode Control procedure.

Clauses affected:	⌘	11.5

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	25.331 CR 1896.
			X	Test specifications		
			X	O&M Specifications		
Other comments:	⌘					

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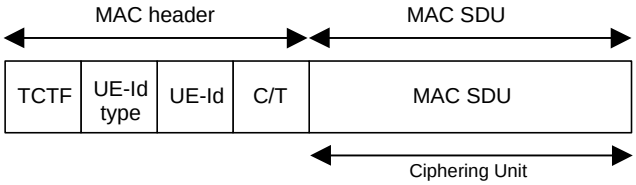

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3GPP TSG-RAN WG2 Meeting #34
Sophia Antipolis, France, 17th- 21st February 2003

Tdoc ⌘R2-030641

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **167** ⌘ **rev** **1** ⌘ Current version: **3.14.0** ⌘

*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:	⌘	TFC Control Implementation
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	13/02/2003
Category:	⌘	**F**
Release:	⌘	R99

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: ⌘ The current TFC selection algorithm does not take the configuration of a TFC subset in RRC into account.

Summary of change: ⌘
- Introduced text for an existing requirement in the definition of the set of valid TFC, stating that the TFCs shall not be restricted by higher layers

Isolated impact:

The impact of this change is isolated to the use of the TFC subset.

This change clarifies TFC selection in the case where a TFC Subset is configured. It specifies that the UE should only select among TFCs that are not restricted by higher layer signalling which is consistent with the group's understanding. For UEs that were not implemented this way, a configured TFC subset would not be taken into account.

Consequences if not approved: ⌘ The configuration of a TFC subset cannot be used leading to reduced uplink capacity.

Clauses affected: ⌘ 11.4

Other specs affected: ⌘

Y	N	
	X	Other core specifications
	X	Test specifications
	X	O&M Specifications

⌘

Other comments: ⌘

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11.4 Transport format combination selection in UE

RRC can control the scheduling of uplink data by giving each logical channel a priority between 1 and 8, where 1 is the highest priority and 8 the lowest. TFC selection in the UE shall be done in accordance with the priorities indicated by RRC. Logical channels have absolute priority, i.e. the UE shall maximise the transmission of higher priority data.

If the uplink TFCS configured by UTRAN follows the guidelines described in [7] the UE shall perform the TFC selection according to the rules specified below. If these guidelines are not followed then the UE behaviour is not specified.

A given TFC can be in any of the following states:

- Supported state;
- Excess-power state;
- Blocked state.

TDD mode UEs in CELL_FACH state using the USCH transport channel and UEs in CELL_DCH state shall continuously monitor the state of each TFC based on its required transmit power versus the maximum UE transmit power (see [7]). The state transition criteria and the associated requirements are described in [12, 14]. The UE shall consider that the Blocking criterion is never met for TFCs included in the minimum set of TFCs (see [7]).

The following diagram illustrates the state transitions for the state of a given TFC:

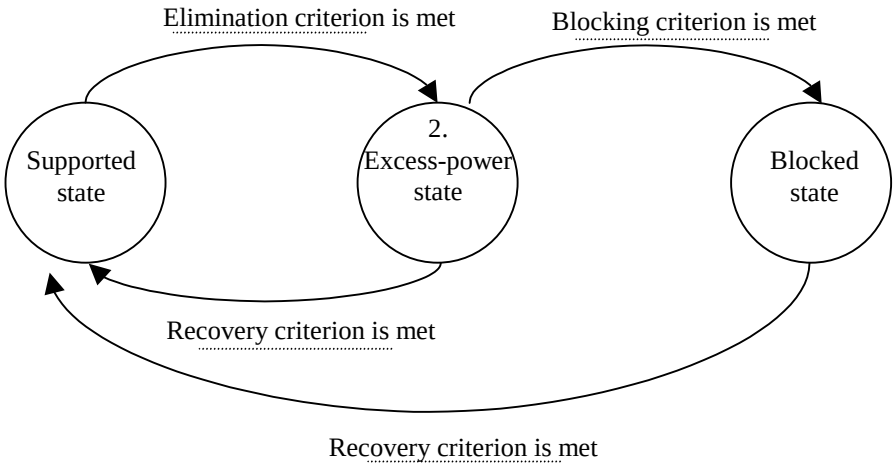

Figure 11.4.1: State transitions for the state of a given TFC

FDD Mode UEs in CELL_FACH state may estimate the channel path loss and set to excess power state all the TFCs requiring more power than the Maximum UE transmitter power (see [7]). All other TFCs shall be set to Supported state.

Every time the set of supported TFCs changes, the available bitrate shall be indicated to upper layers for each logical channel in order to facilitate the adaptation of codec data rates when codecs supporting variable-rate operation are used. The details of the computation of the available bitrate and the interaction with the application layer are not further specified.

Before selecting a TFC, i.e. at every boundary of the shortest TTI, or prior to each transmission on PRACH the set of valid TFCs shall be established. All TFCs in the set of valid TFCs shall:

1. belong to the TFCS.

2. not be restricted by higher layer signalling (e.g. TFC Control, see [7])

2. not be in the Blocked state.

3. be compatible with the RLC configuration.

4. not require RLC to produce padding PDUs (see [6] for definition).

5. not carry more bits than can be transmitted in a TTI (e.g. when compressed mode by higher layer scheduling is used and the presence of compressed frames reduces the number of bits that can be transmitted in a TTI using the Minimum SF configured).

The UE may remove from the set of valid TFCs, TFCs in Excess-power state in order to maintain the quality of service for sensitive applications (e.g. speech). However, this shall not apply to TFCs included in the minimum set of TFCs (see [7]). Additionally, if compressed frames are present within the longest configured TTI to which the next transmission belongs, the UE may remove TFCs from the set of valid TFCs in order to account for the higher power requirements.

The chosen TFC shall be selected from within the set of valid TFCs and shall satisfy the following criteria in the order in which they are listed below:

1. No other TFC shall allow the transmission of more highest priority data than the chosen TFC.

2. No other TFC shall allow the transmission of more data from the next lower priority logical channels. Apply this criterion recursively for the remaining priority levels.

3. No other TFC shall have a lower bit rate than the chosen TFC.

In FDD mode the above rules for TFC selection in the UE shall apply to DCH, and the same rules shall apply for TF selection on RACH and CPCH.

In TDD mode the above rules for TFC selection in the UE shall apply to DCH and USCH.

3GPP TSG-RAN WG2 Meeting #34
Sophia Antipolis, France, 17th- 21st February 2003

Tdoc ⌘R2-030642

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **168** ⌘ **rev** **1** ⌘ 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:	⌘	TFC Control Implementation
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	13/02/2003
Category:	⌘	**A**
Release:	⌘	Rel-4

Use one of the following categories:
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Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	The current TFC selection algorithm does not take the configuration of a TFC subset in RRC into account.
Summary of change:	⌘	• Introduced text for an existing requirement in the definition of the set of valid TFC, stating that the TFCs shall not be restricted by higher layers
Consequences if not approved:	⌘	The configuration of a TFC subset cannot be used leading to reduced uplink capacity.

Clauses affected:	⌘	11.4

Other specs affected: ⌘	Y	N	
		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.
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11.4 Transport format combination selection in UE

RRC can control the scheduling of uplink data by giving each logical channel a priority between 1 and 8, where 1 is the highest priority and 8 the lowest. TFC selection in the UE shall be done in accordance with the priorities indicated by RRC. Logical channels have absolute priority, i.e. the UE shall maximise the transmission of higher priority data.

If the uplink TFCS configured by UTRAN follows the guidelines described in [7] the UE shall perform the TFC selection according to the rules specified below. If these guidelines are not followed then the UE behaviour is not specified.

A given TFC can be in any of the following states:

- Supported state;
- Excess-power state;
- Blocked state.

TDD mode UEs in CELL_FACH state using the USCH transport channel and UEs in CELL_DCH state shall continuously monitor the state of each TFC based on its required transmit power versus the maximum UE transmit power (see [7]). The state transition criteria and the associated requirements are described in [12, 14]. The UE shall consider that the Blocking criterion is never met for TFCs included in the minimum set of TFCs (see [7]).

The following diagram illustrates the state transitions for the state of a given TFC:

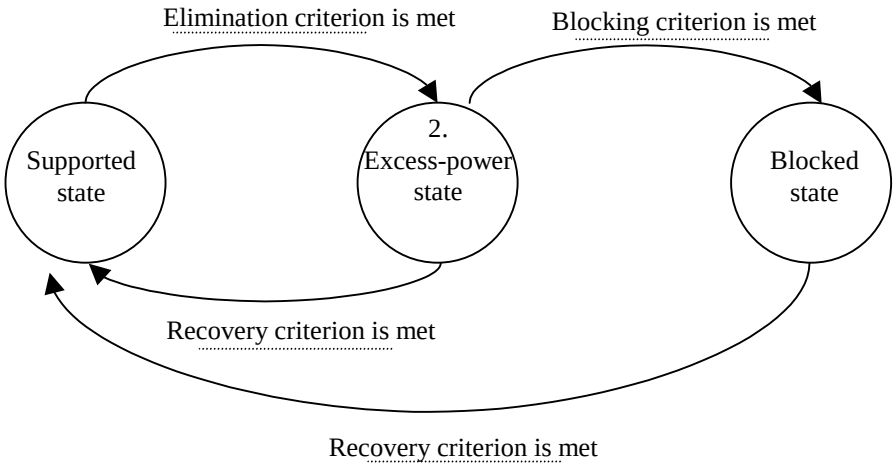

Figure 11.4.1: State transitions for the state of a given TFC

FDD Mode UEs in CELL_FACH state may estimate the channel path loss and set to excess power state all the TFCs requiring more power than the Maximum UE transmitter power (see [7]). All other TFCs shall be set to Supported state.

Every time the set of supported TFCs changes, the available bitrate shall be indicated to upper layers for each logical channel in order to facilitate the adaptation of codec data rates when codecs supporting variable-rate operation are used. The details of the computation of the available bitrate and the interaction with the application layer are not further specified.

Before selecting a TFC, i.e. at every boundary of the shortest TTI, or prior to each transmission on PRACH the set of valid TFCs shall be established. All TFCs in the set of valid TFCs shall:

1. belong to the TFCS.

2. not be restricted by higher layer signalling (e.g. TFC Control, see [7])

2. not be in the Blocked state.

3. be compatible with the RLC configuration.

4. not require RLC to produce padding PDUs (see [6] for definition).

5. not carry more bits than can be transmitted in a TTI (e.g. when compressed mode by higher layer scheduling is used and the presence of compressed frames reduces the number of bits that can be transmitted in a TTI using the Minimum SF configured).

The UE may remove from the set of valid TFCs, TFCs in Excess-power state in order to maintain the quality of service for sensitive applications (e.g. speech). However, this shall not apply to TFCs included in the minimum set of TFCs (see [7]). Additionally, if compressed frames are present within the longest configured TTI to which the next transmission belongs, the UE may remove TFCs from the set of valid TFCs in order to account for the higher power requirements.

The chosen TFC shall be selected from within the set of valid TFCs and shall satisfy the following criteria in the order in which they are listed below:

1. No other TFC shall allow the transmission of more highest priority data than the chosen TFC.

2. No other TFC shall allow the transmission of more data from the next lower priority logical channels. Apply this criterion recursively for the remaining priority levels.

3. No other TFC shall have a lower bit rate than the chosen TFC.

In FDD mode the above rules for TFC selection in the UE shall apply to DCH, and the same rules shall apply for TF selection on RACH and CPCH.

In TDD mode the above rules for TFC selection in the UE shall apply to DCH and USCH.

3GPP TSG-RAN WG2 Meeting #34
Sophia Antipolis, France, 17th- 21st February 2003

Tdoc ⌘R2-030643

CR-Form-v7

CHANGE REQUEST

⌘ **25.321** **CR** **169** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

*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 [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	TFC Control Implementation
Source:	⌘	TSG-RAN WG2
Work item code:	⌘	TEI
Date:	⌘	13/02/2003
Category:	⌘	**A**
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:
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)

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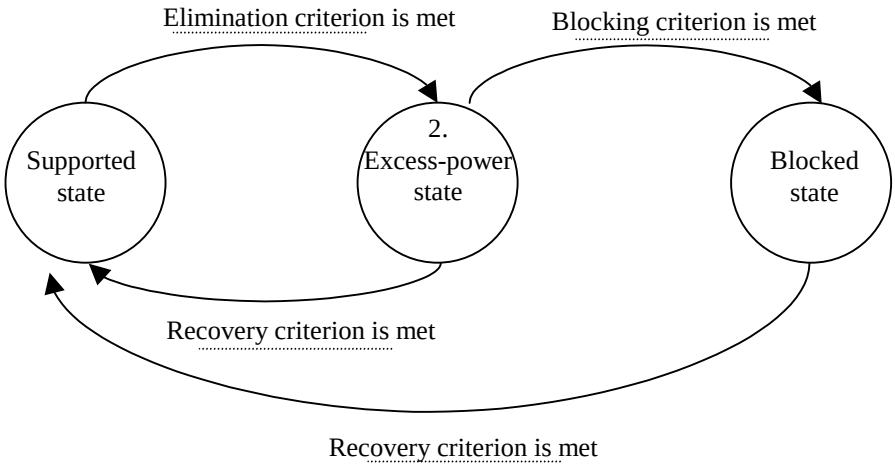

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