# TSG-RAN Meeting #8 *RP-000219*
# Düsseldorf, Germany, 21 – 23 June 2000

**Title:** **Agreed CRs to TS 25.321**

**Source:** **TSG-RAN WG2**

**Agenda item:** **5.2.3**

| Doc-1st- | Status- | Spec | CR | Rev | Subject | Cat | Version | Versio |
|---|---|---|---|---|---|---|---|---|
| R2-000725 | agreed | 25.321 | 042 | | CPCH correction | F | 3.3.0 | 3.4.0 |
| R2-000972 | agreed | 25.321 | 043 | 1 | End of CPCH transmission | B | 3.3.0 | 3.4.0 |
| R2-001270 | agreed | 25.321 | 044 | 2 | Clarification of prioritisation of logical channels in UE | F | 3.3.0 | 3.4.0 |
| R2-001155 | agreed | 25.321 | 045 | 1 | CPCH MAC procedures | F | 3.3.0 | 3.4.0 |
| R2-001144 | agreed | 25.321 | 046 | | Traffic Volume Measurement for dynamic radio bearer control | D | 3.3.0 | 3.4.0 |

**3GPP TSG-RAN WG2 Meeting #12**
**Seoul, Korea, 10-13 April, 2000**

***Document* R2-000725**
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

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| 25.321 | CR | 042 | Current Version: | 3.3.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

For submission to: TSG-RAN #8 *list expected approval meeting # here ↑*

for approval [X] for information [ ]

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*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

**Source:** TSG-RAN WG2 **Date:** 10 April, 2000

**Subject:** CPCH correction

**Work item:**

**Category:** *(only one category shall be marked with an X)*

| | | |
|---|---|---|
| F | Correction | [X] |
| A | Corresponds to a correction in an earlier release | [ ] |
| B | Addition of feature | [ ] |
| C | Functional modification of feature | [ ] |
| D | Editorial modification | [ ] |

**Release:**

| | |
|---|---|
| Phase 2 | [ ] |
| Release 96 | [ ] |
| Release 97 | [ ] |
| Release 98 | [ ] |
| Release 99 | [X] |
| Release 00 | [ ] |

**Reason for change:** This CR corrects the text description and the informative flowchart for the MAC procedure for the MAC procedure for transmission control of the Nth TTI.

**Clauses affected:** 11.3

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

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## 11.3 Control of CPCH transmissions for FDD

The MAC layer controls the timing of CPCH transmissions on transmission time interval level (i.e. on 10, 20, 40 or 80 ms level); the timing on access slot level is controlled by L1. MAC controls the timing of each initial preamble ramping cycle as well as successive preamble ramping cycles. Note that retransmissions in case of erroneously received CPCH message part are under control of higher layers. The CPCH transmissions are performed by the UE as illustrated in figures 11.3.1 and 11.3.2. Figure 11.3.1 procedure is used for initial access to CPCH channel. Figure 11.3.2 procedure is used for each TTI transmission while the UE continues to transmit on the CPCH channel obtained using the initial access procedure.

MAC receives the following CPCH transmission control parameters from RRC with the CMAC-Config-REQ primitive:

- persistence values, P (transmission probability for each Transport Format (TF));
- N_access_fails, maximum number of preamble ramping cycles;
- NF_max, maximum number of frames for CPCH transmission for each TF;
- Backoff control timer parameters;
- Transport Format Set;
- Initial Priority Delays;
- Channel Assignment Active indication.

The MAC procedure for transmission control of initial CPCH access shall be invoked when the UE has data to transmit and the UE is not currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall get all UL transmit parameters (CPCH Set Info, P values, Initial Priority Delays, N_access_fails, NF_max, etc) from RRC;
2. the UE shall reset counter M and Frame Count Transmitted (FCT) upon entry to the initial access procedure;
3. the UE shall send a PHY-CPCH_Status-REQ to Layer 1 to obtain CPCH TF subset status. If Layer 1 returns an error message, the UE shall increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If Layer 1 returns a PHY-CPCH_Status-CNF message, which includes a TF subset indicating the currently available TFs of the requested TF subset, the procedure shall continue from step 4;
4. the UE shall initialise the Busy Table with the CPCH TF subset status from Layer 1. Those TFs in the TF subset of the Layer 1 PHY-CPCH_Status-CNF response will be marked available. All other TFs will be marked busy;
5. if all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;
6. the UE shall update all UL transmit parameters from RRC;
7. UE shall select a TF from the set of available TFs listed in the Busy Table. UE shall use the CPCH channel capacity (transport block set size, NF_max, and TTI interval), and Busy Table information to select one CPCH TF for L1 to access. The UE may select a TF, which uses a lower data rate and a lower UL Tx power than the maximum UL Tx power allowed;
8. UE shall implement a test based on the Persistence value (P) to determine whether to attempt access to the selected CPCH TF. If access is allowed, the UE may implement an initial delay based on ASC of the data to be transmitted, then shall send a PHY-Access-REQ with the selected TF to L1 for CPCH access . If the P test does not allow access, the selected CPCH TF shall be marked busy in the Busy Table. If all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If

counter M is less than N_access_fails, the procedure shall continue from step 3. If all TFs are not marked busy, the UE shall resume the procedure from step 6;

9. after the UE has sent the access request to L1 , L1 shall return a PHY-Access-CNF including one of five access indications to MAC as shown in figure 11.3.1. If the L1 access indication is that access is granted, then UE shall execute the transmission control procedure for the Nth TTI using the selected TF and the initial access procedure ends;

10. if L1 access indication is no AP-AICH received or no CD-AICH received, the UE shall reset and start timer Tboc3, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute a link failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the UE shall proceed from step 3;

11. if L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is active, the UE shall proceed from step 14. If L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is not active, the UE shall reset and start timer Tboc2, wait until timer expiry, and mark the selected channel busy in the Busy Table. If all channels are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If all channels are not marked busy, the UE shall resume the procedure from step 6;

12. if L1 access indication is CD-AICH signature mismatch, the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

13. the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

14. the UE shall reset and start timer Tboc2, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3.

The MAC procedure for transmission control of Nth TTI shall be invoked when the UE has data to transmit and the UE is currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall build a transport block set for the next TTI;

2. if the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is greater than NF_max, the UE shall exit this procedure and start the MAC procedure for CPCH transmission of the first TTI. This shall release the CPCH channel in use and the UE will contend again for a new CPCH channel to continue transmission. If the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is less~~greater~~ than or equal to NF_max, the UE shall send a PHY-Data-REQ with the transport block set to L1 to continue transmission on the CPCH channel which has previously been accessed;

3. if L1 returns PHY-Status-IND indicating abnormal situation the UE shall execute an abnormal situation handling procedure and the CPCH Nth TTI procedure ends. Reasons for abnormal situation may include the following:

   - emergency stop was received;
   - start of Message Indicator was not received;
   - L1 hardware failure has occurred.

4. if the L1 returns PHY-Status-IND indicating normal transmission, then the UE shall increment the Frame Count Transmitted counter by the length of the TTI just transmitted and the procedure ends.

**Table 11.3: CPCH Backoff Delay Timer Values**

| Timer | Based on parameter | Fixed/random |
|---|---|---|
| $T_{BOC1}$ (all Busy) | NF_bo_all_busy | Random |
| $T_{BOC2}$ (channel Busy) | NS_bo_busy | Fixed |
| $T_{BOC3}$ (no AICH) | NF_bo_no_aich | Fixed |
| $T_{BOC4}$ (mismatch) | NF_bo_mismatch | Random |

For $T_{BOC4,}$ UE shall randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_mismatch]. For $T_{BOC1,}$ UE would randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_all busy].

NOTE: Backoff parameter range and units are specified in TS 25.331, RRC Protocol Specification.

The UE MAC TF selection algorithm is left to implementation and is out of the scope of the present document. However the following example is presented to show one way UE may select a CPCH TF.

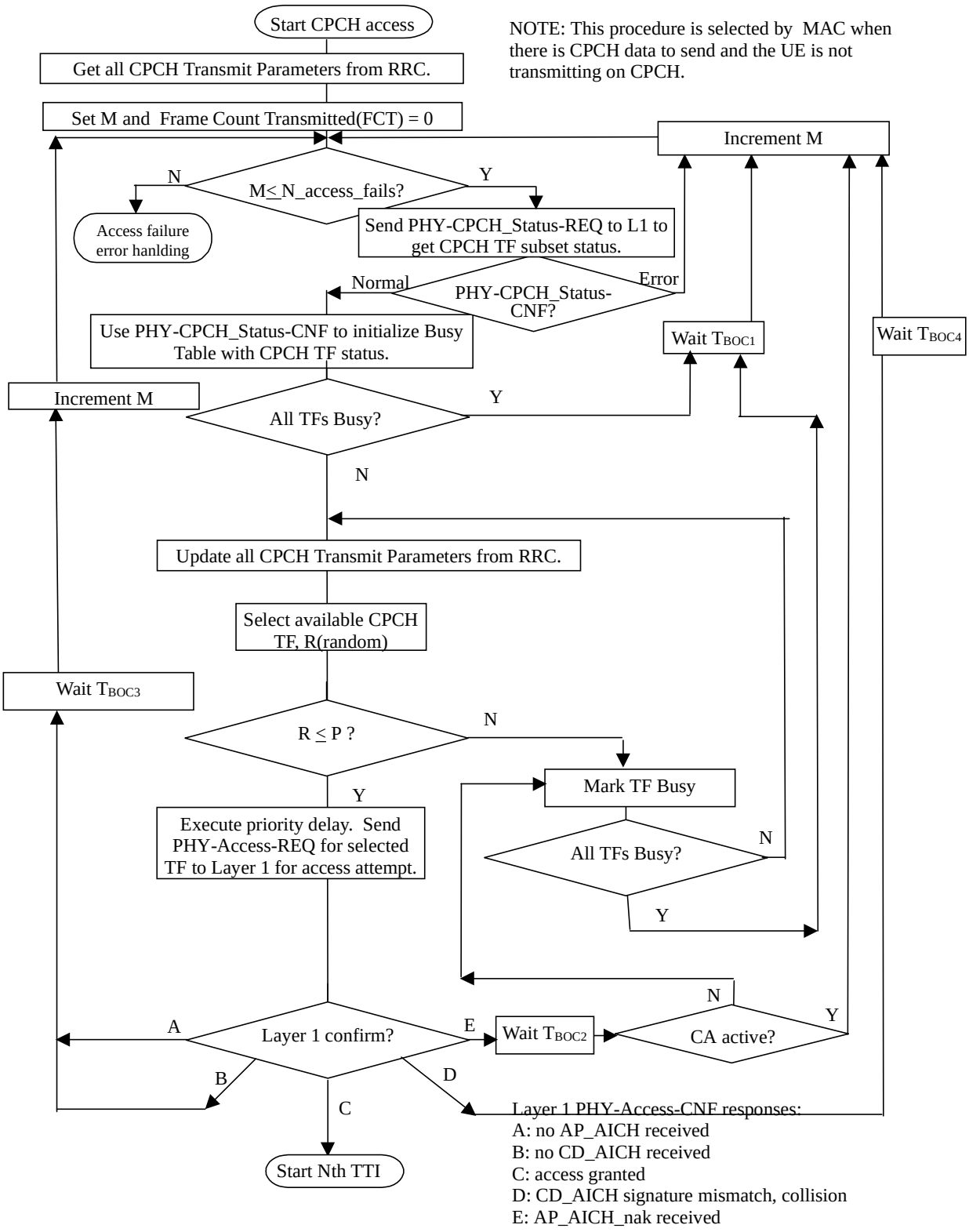
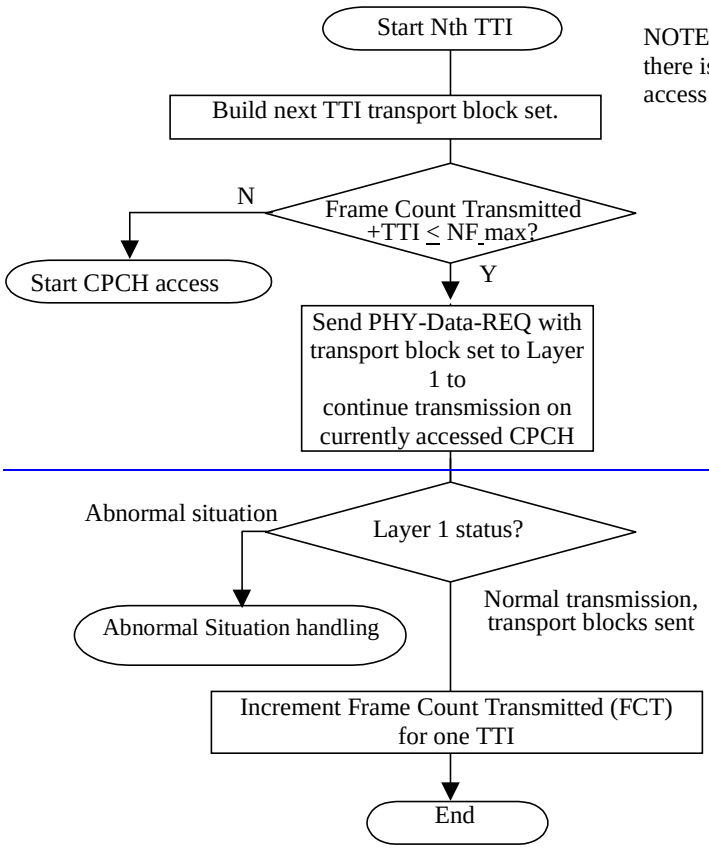



**Figure 11.3.1: CPCH transmission control procedure for initial access (informative)**




NOTE: This procedure is selected by MAC when there is CPCH data to send while the UE has access to a CPCH channel.

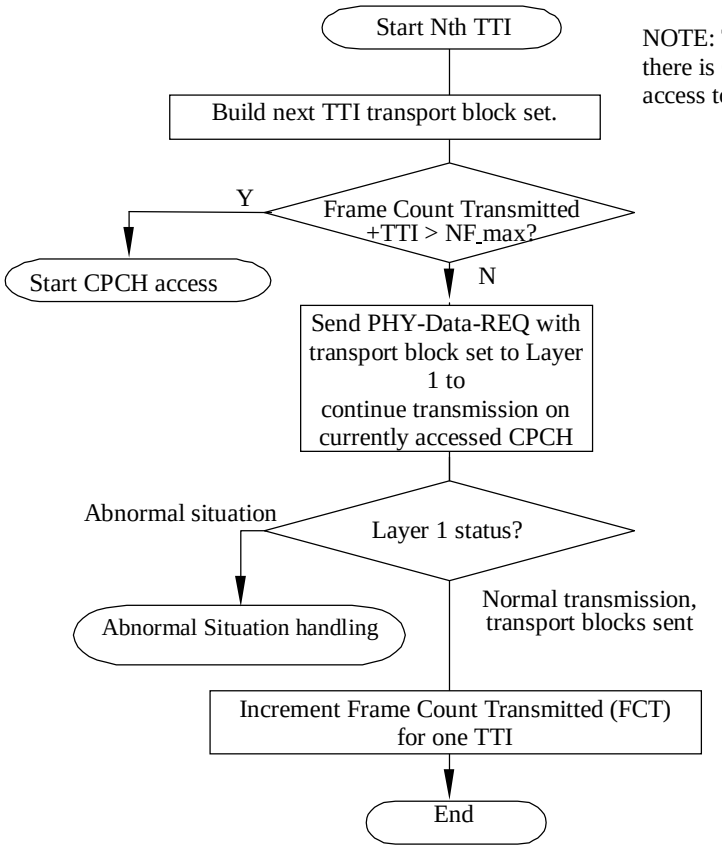



**Figure 11.3.2: CPCH transmission control procedure for Nth TTI (informative)**

**3GPP TSG-RAN WG2 Meeting #12**
**Seoul, Korea 10th-13rd April 2000**

***Document R2-000972***
*e.g. for 3GPP use the format TP-99xxx*
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| 25.321 | CR | 043r1 | Current Version: | 3.3.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* | *↑ CR number as allocated by MCC support team*

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for approval [X] | for information [ ]

Strategic [ ] | Non-strategic [ ] (*for SMG use only*)

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**Proposed change affects:** (*at least one should be marked with an X*) (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

**Source:** TSG-RAN WG2 **Date:** 13 April, 2000

**Subject:** End of CPCH transmission

**Work item:**

**Category:** (*only one category Shall be marked With an X*)

| | | |
|---|---|---|
| F | Correction | |
| A | Corresponds to a correction in an earlier release | |
| B | Addition of feature | X |
| C | Functional modification of feature | |
| D | Editorial modification | |

**Release:**

| | |
|---|---|
| Phase 2 | |
| Release 96 | |
| Release 97 | |
| Release 98 | |
| Release 99 | X |
| Release 00 | |

**Reason for change:**
There was agreement that EOT procedures should be adopted for CPCH as part of release 99 (R2_000890). This CR makes the appropriate changes to 25.321 to reflect that agreement.

**Clauses affected:** 8.3.2, 11.3

**Other specs Affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**

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## 8.3.2 Parameters

See TS 25.331 for a detailed description of the UE, RB and TrCH information elements.

a) UE information elements
   S-RNTI
   SRNC identity
   C-RNTI
   Activation time

b) RB information elements
   RB multiplexing info (Transport channel identity, Logical channel identity, MAC logical channel priority)

c) TrCH information elements
   Transport Format Combination Set

d) Measurement information elements
   Mode (periodic, event-triggered or both)
   $TH_U$
   $TH_L$ (Optional)
   Measurement quantity identifiers
   Report Interval

e) Measurement result
   Mode
   Reporting Quantities
   Event Type (overflow or underflow)

f) Status info
   Maximum number of preamble ramping cycles reached.

g) RACH transmission control elements
   Set of ASC parameters (identifier for PRACH partitions, persistence values)
   Maximum number of preamble ramping cycles $M_{max}$
   Minimum and maximum number of time units between two preamble ramping cycles, $N_{BO1min}$ and $N_{BO1max}$

h) Ciphering elements
   Ciphering mode
   Ciphering key
   Ciphering sequence number

i) CPCH transmission control elements
   CPCH persistency value, P for each Transport Format
   Maximum number of preamble ramping cycles $N_{\_access\_fails}$
   NF_max (Maximum number of frames for CPCH transmission for each Transport Format)
   N_EOT (Number of EOT for release of CPCH transmission)
   Backoff control timer parameters
   Transport Format Set
   Initial Priority Delays
   Channel Assignment Active indication

# 11.3 Control of CPCH transmissions for FDD

The MAC layer controls the timing of CPCH transmissions on transmission time interval level (i.e. on 10, 20, 40 or 80 ms level); the timing on access slot level is controlled by L1. MAC controls the timing of each initial preamble ramping cycle as well as successive preamble ramping cycles. Note that retransmissions in case of erroneously received CPCH message part are under control of higher layers. The CPCH transmissions are performed by the UE as illustrated in figures 11.3.1 and 11.3.2. Figure 11.3.1 procedure is used for initial access to CPCH channel. Figure 11.3.2 procedure is used for each TTI transmission while the UE continues to transmit on the CPCH channel obtained using the initial access procedure.

MAC receives the following CPCH transmission control parameters from RRC with the CMAC-Config-REQ primitive:

- persistence values, P (transmission probability for each Transport Format (TF));
- N_access_fails, maximum number of preamble ramping cycles;
- NF_max, maximum number of frames for CPCH transmission for each TF;
- N_EOT (Number of EOT for release of CPCH transmission)
- Backoff control timer parameters;
- Transport Format Set;
- Initial Priority Delays;
- Channel Assignment Active indication.

The MAC procedure for transmission control of initial CPCH access shall be invoked when the UE has data to transmit and the UE is not currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall get all UL transmit parameters (CPCH Set Info, P values, Initial Priority Delays, N_access_fails, NF_max, N_EOT etc) from RRC;
2. the UE shall reset counter M, EOT counter and Frame Count Transmitted (FCT) upon entry to the initial access procedure;
3. the UE shall send a PHY-CPCH_Status-REQ to Layer 1 to obtain CPCH TF subset status. If Layer 1 returns an error message, the UE shall increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If Layer 1 returns a PHY-CPCH_Status-CNF message, which includes a TF subset indicating the currently available TFs of the requested TF subset, the procedure shall continue from step 4;
4. the UE shall initialise the Busy Table with the CPCH TF subset status from Layer 1. Those TFs in the TF subset of the Layer 1 PHY-CPCH_Status-CNF response will be marked available. All other TFs will be marked busy;
5. if all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;
6. the UE shall update all UL transmit parameters from RRC;
7. UE shall select a TF from the set of available TFs listed in the Busy Table. UE shall use the CPCH channel capacity (transport block set size, NF_max, and TTI interval), and Busy Table information to select one CPCH TF for L1 to access. The UE may select a TF, which uses a lower data rate and a lower UL Tx power than the maximum UL Tx power allowed;
8. UE shall implement a test based on the Persistence value (P) to determine whether to attempt access to the selected CPCH TF. If access is allowed, the UE may implement an initial delay based on ASC of the data to be transmitted, then shall send a PHY-Access-REQ with the selected TF to L1 for CPCH access . If the P test does not allow access, the selected CPCH TF shall be marked busy in the Busy Table. If all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If all TFs are not marked busy, the UE shall resume the procedure from step 6;
9. after the UE has sent the access request to L1 , L1 shall return a PHY-Access-CNF including one of five access indications to MAC as shown in figure 11.3.1. If the L1 access indication is that access is granted, then UE shall execute the transmission control procedure for the Nth TTI using the selected TF and the initial access procedure ends;

10. if L1 access indication is no AP-AICH received or no CD-AICH received, the UE shall reset and start timer Tboc3, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute a link failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the UE shall proceed from step 3;

11. if L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is active, the UE shall proceed from step 14. If L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is not active, the UE shall reset and start timer Tboc2, wait until timer expiry, and mark the selected channel busy in the Busy Table. If all channels are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If all channels are not marked busy, the UE shall resume the procedure from step 6;

12. if L1 access indication is CD-AICH signature mismatch, the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

13. the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

14. the UE shall reset and start timer Tboc2, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3.

The MAC procedure for transmission control of Nth TTI shall be invoked when the UE has data to transmit and the UE is currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall build a transport block set for the next TTI;

2. if the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is greater than NF_max, the UE shall exit this procedure and start the MAC procedure for CPCH transmission of the first TTI. This shall release the CPCH channel in use and the UE will contend again for a new CPCH channel to continue transmission. If the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is ~~greater~~ less than or equal to NF_max, the UE shall send a PHY-Data-REQ with the transport block set to L1 to continue transmission on the CPCH channel which has previously been accessed;

3. if the UE has no data to transmit and the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is less than NF_max, the UE shall send a PHY-Data-REQ with zero sized transport block to L1 to stop transmission on the CPCH channel which has previously been accessed.

4~~3~~. if L1 returns PHY-Status-IND indicating abnormal situation the UE shall execute an abnormal situation handling procedure and the CPCH Nth TTI procedure ends. Reasons for abnormal situation may include the following:

   - emergency stop was received;
   - start of Message Indicator was not received;
   - L1 hardware failure has occurred.

5. if the L1 returns PHY-Status-IND indicating normal transmission, then the UE shall increment the Frame Count Transmitted counter by the length of the TTI just transmitted and the procedure ends.

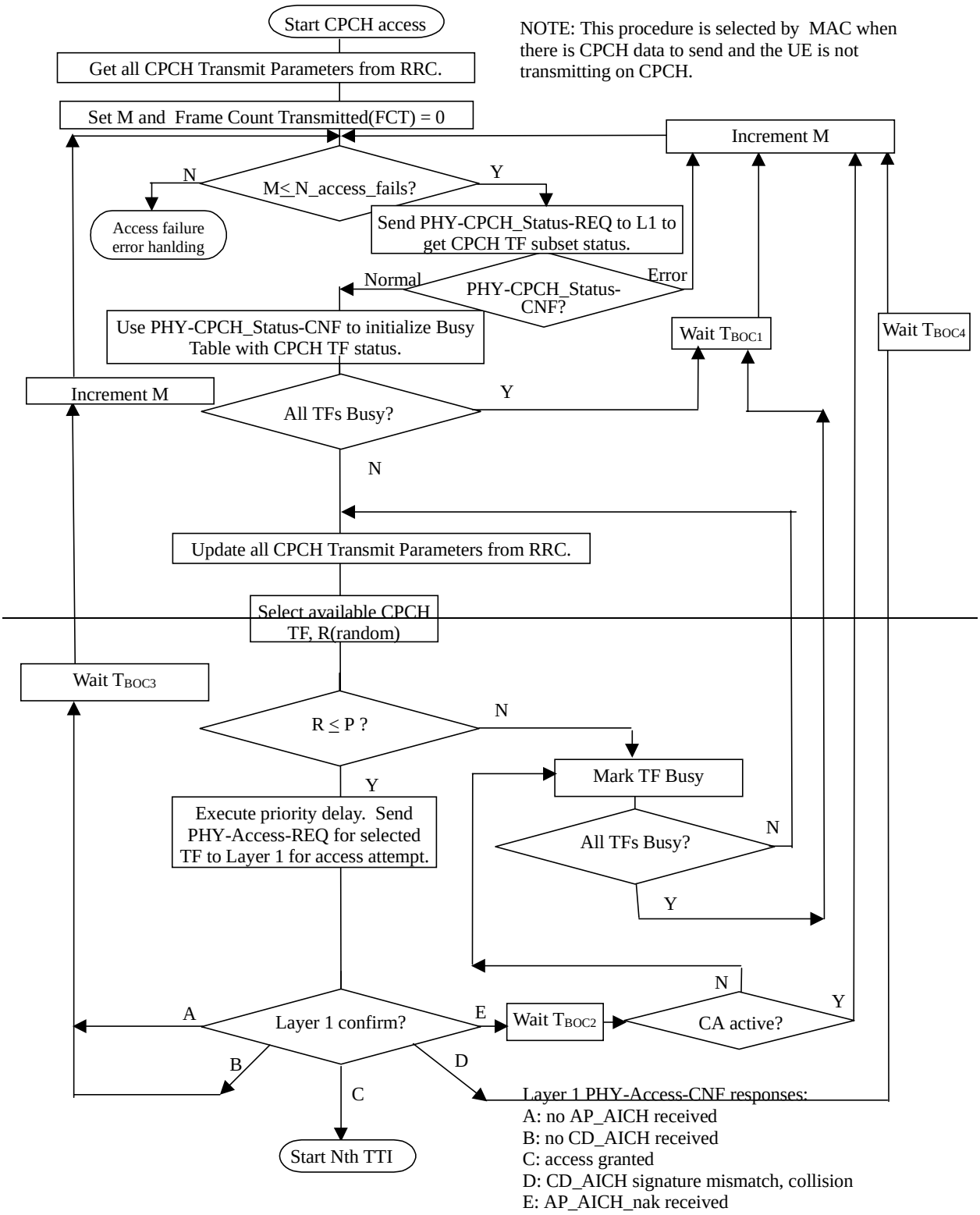
**Table 11.3: CPCH Backoff Delay Timer Values**

| Timer | Based on parameter | Fixed/random |
|---|---|---|
| $T_{BOC1}$ (all Busy) | NF_bo_all_busy | Random |
| $T_{BOC2}$ (channel Busy) | NS_bo_busy | Fixed |
| $T_{BOC3}$ (no AICH) | NF_bo_no_aich | Fixed |
| $T_{BOC4}$ (mismatch) | NF_bo_mismatch | Random |

For $T_{BOC4,}$ UE shall randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_mismatch]. For $T_{BOC1,}$ UE would randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_all busy].

NOTE: Backoff parameter range and units are specified in TS 25.331, RRC Protocol Specification.

The UE MAC TF selection algorithm is left to implementation and is out of the scope of the present document. However the following example is presented to show one way UE may select a CPCH TF.




**~~Figure 11.3.1: CPCH transmission control procedure for initial access (informative)~~**

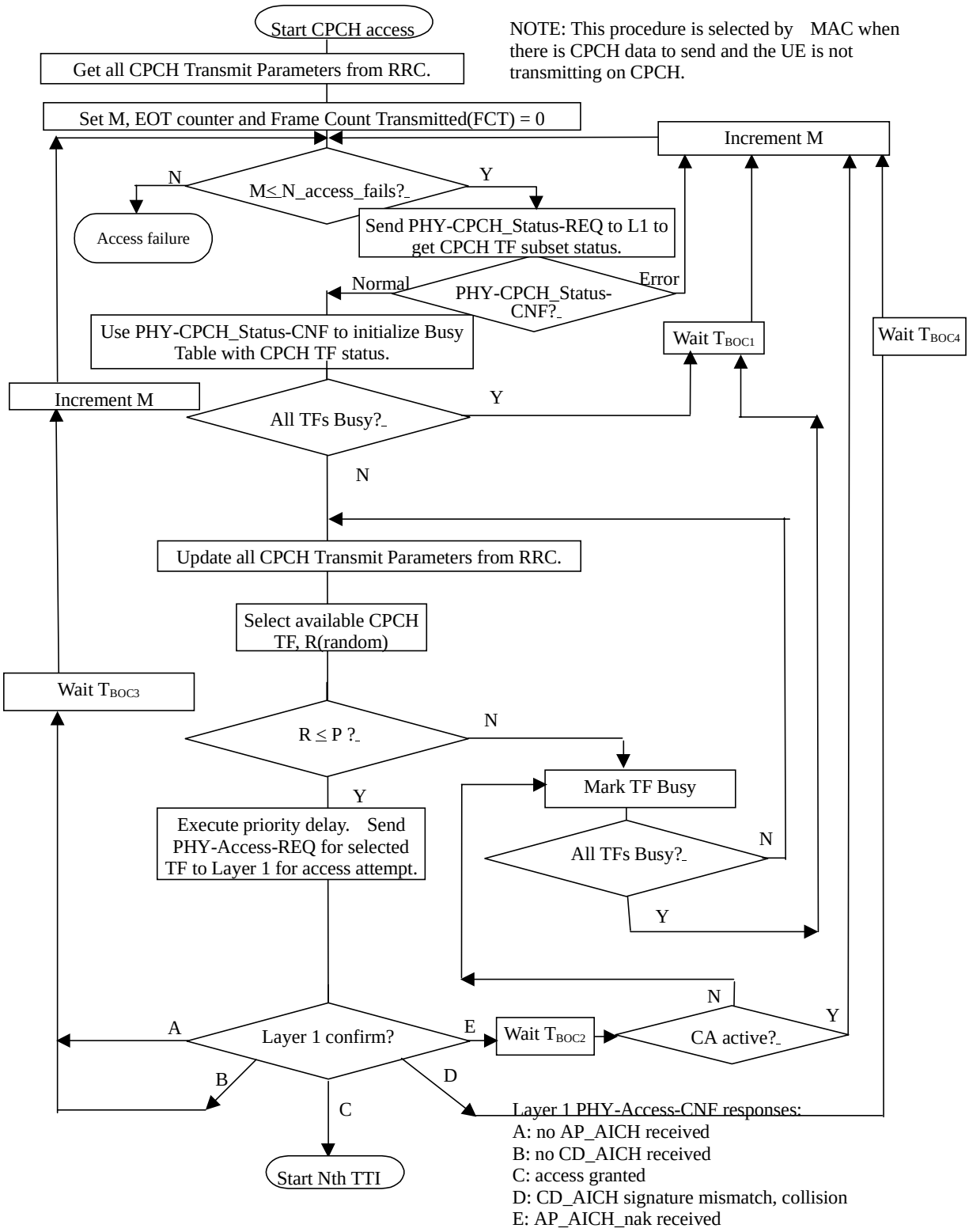
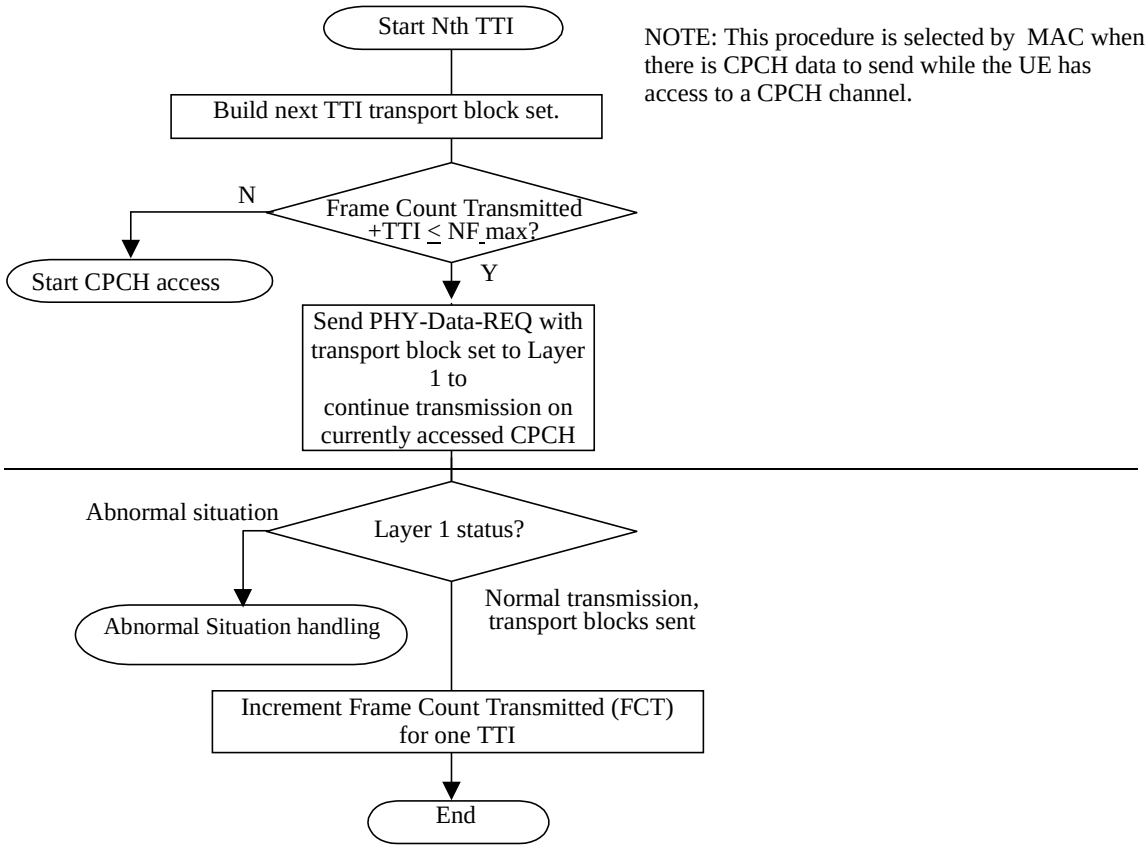



**Figure 11.3.1: CPCH transmission control procedure for initial access (informative)**




NOTE: This procedure is selected by MAC when there is CPCH data to send while the UE has access to a CPCH channel.

**~~Figure 11.3.2: CPCH transmission control procedure for Nth TTI (informative)~~**

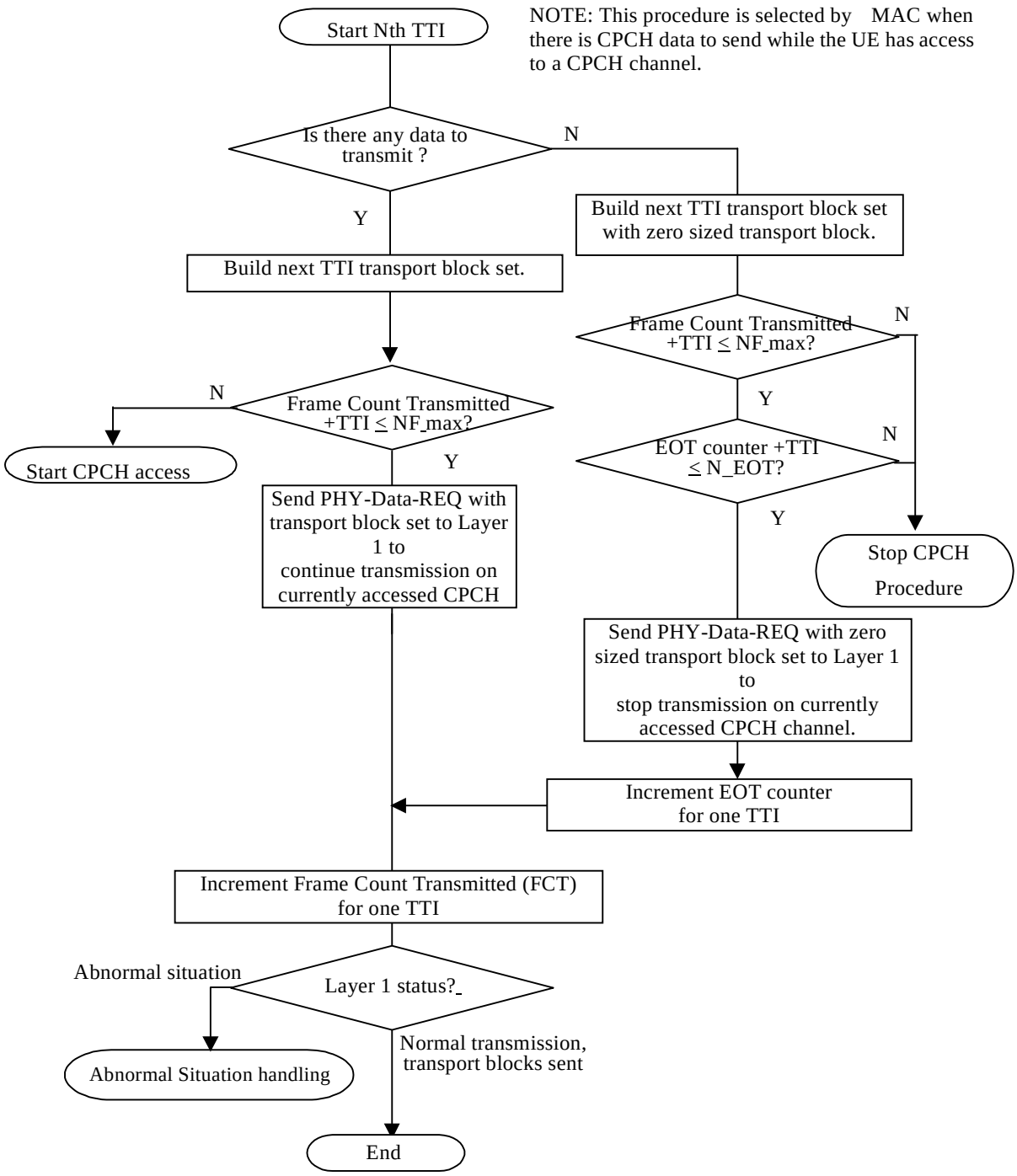



**Figure 11.3.2: CPCH transmission control procedure for Nth TTI (informative)**

**3GPP TSG RAN WG2 meeting #13**
**Oahu, HI, USA, 22 - 26 May 2000**

***Document* R2-001270**
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*or for SMG, use the format P-99-xxx*

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*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

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| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

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**Proposed change affects:** *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

**Source:** TSG-RAN WG2 **Date:** 2000-05-22

**Subject:** Clarification of prioritisation of logical channels in UE

**Work item:**

**Category:** *(only one category shall be marked with an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | X | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:**

1. The prioritisation of logical channels in the UE should be clarified. Relative priorities are proposed, where a fraction of the transport blocks on one logical channel can be replaced with data with a lower priority.

**Clauses affected:**

**Other specs affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**


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# 11.4 Transport format combination selection in UE

RRC can control the scheduling of uplink data by giving a priority value between 1 and 8 for each logical channel where 1 is the highest priority and 8 the lowest. The selection of TFC in the UE shall be done according to the priorities between logical channels indicated by RRC. Logical channels have relative priority i.e. data with a given priority may occasionally be transmitted even if it prevents data with a higher priority from being transmitted.

A fraction of the transport blocks on a logical channel may be blocked for transmission in favour of data from a logical channel with the next lower used priority. If the fraction is set to zero, the priority scheme will be absolute priority, i.e. no transport blocks on the logical channel shall be blocked for transmission in favour of lower priority data.

The maximum fraction of transport blocks on a logical channel that may be blocked for transmission in favour of data with the next lower priority is given by RRC signalling~~.~~. The blocked transport blocks shall be selected in a periodical manner, with the shortest possible periodicity. If the shortest periodicity can be achieved in more than one way, the minimum distance between two blocked transport block shall be as large as possible, to assure that the blocked frames are distributed uniformly. The rules for TFC selection in the above section shall apply to TF selection when RACH or CPCH is used.

When the UE output power is approaching the UE maximum transmit power and the inner loop for power control can no longer be maintained for coverage reasons, the UE shall adapt to the TFC corresponding to the next lower bit rate, i.e. the TFC with the ~~highest~~ present total bit rate shall not be used. If the bit rate of a logical channel carrying data from a codec supporting variable-rate operation is impacted, the codec data rate shall be adopted accordingly.

The UE shall continuously estimate whether the maximum transmitter power is sufficient to support the temporarily blocked TFC. When the maximum transmitter power is sufficient, the temporarily blocked TFC shall again be considered in the TFC selection.

The maximum UE power is defined in [25.331]~~]. The rules for TFC selection in this section shall apply to TF selection when RACH or CPCH is used.~~

**3GPP TSG-RAN WG2 Meeting #13**
**Hawaii, USA 22nd- 26th May 2000**

***Document R2-001155***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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| 25.321 | CR | 045r1 | Current Version: | 3.3.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* | *↑ CR number as allocated by MCC support team*

For submission to: TSG-RAN #8 (*list expected approval meeting # here ↑*)

for approval [X] | for information [ ]

Strategic [ ] | Non-strategic [ ] (*for SMG use only*)

*Form: CR cover sheet, version 2 for 3GPP and SMG* *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

**Proposed change affects:** (*at least one should be marked with an X*) (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

**Source:** TSG-RAN WG2 **Date:** 22 May, 2000

**Subject:** CPCH MAC procedures

**Work item:**

**Category:** (*only one category Shall be marked With an X*)

| | | |
|---|---|---|
| F | Correction | [X] |
| A | Corresponds to a correction in an earlier release | [ ] |
| B | Addition of feature | [ ] |
| C | Functional modification of feature | [ ] |
| D | Editorial modification | [ ] |

**Release:**

| | |
|---|---|
| Phase 2 | [ ] |
| Release 96 | [ ] |
| Release 97 | [ ] |
| Release 98 | [ ] |
| Release 99 | [X] |
| Release 00 | [ ] |

**Reason for change:** There are some editorial and minor technical discrepancies in CPCH MAC procedures. This CR is to correct those discrepancies.

**Clauses affected:** 8.2.2, 9.2.1.1, 11.3

**Other specs Affected:**

| | | |
|---|---|---|
| Other 3G core specifications | [ ] | → List of CRs: |
| Other GSM core specifications | [ ] | → List of CRs: |
| MS test specifications | [ ] | → List of CRs: |
| BSS test specifications | [ ] | → List of CRs: |
| O&M specifications | [ ] | → List of CRs: |

**Other comments:**


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<--------- double-click here for help and instructions on how to create a CR.

## 8.2.2 Parameters

a) Data:

- it contains the RLC layer message (RLC-PDU) to be transmitted, or the RLC layer messages that have been received by the MAC sub-layer.

b) Number of transmitted RLC PDUs (indication only):

- indicates the number of RLC PDUs transmitted within the transmission time interval, based on the TFI value.

c) Buffer Occupancy (BO):

- the parameter Buffer Occupancy (BO) indicates the amount of data that is currently queued for transmission (or retransmission) in RLC layer.

d) RX Timing Deviation (TD), TDD only:

- it contains the RX Timing Deviation as measured by the physical layer for the physical resources carrying the data of the Message Unit. This parameter is optional and only for Indication. It is needed for the transfer of the RX Timing Deviation measurement of RACH transmissions carrying CCCH data to RRC.

e) Number of PDU (No_PDU):

- specifies the number of PDUs that the RLC is permitted to transfer to MAC within a transmission time interval.

f) PDU Size (PDU_Size):

- specifies the size of PDU that can be transferred to MAC within a transmission time interval.

g) UE-ID Type Indicator:

- indicates the UE-ID type to be included on MAC for a DCCH when it is mapped onto a common transport channel (i.e. FACH ~~or,~~ RACH or CPCH).

### 9.2.1.1 MAC header for DTCH and DCCH

a) DTCH or DCCH mapped to DCH, no multiplexing of dedicated channels on MAC:

- no MAC header is required.

b) DTCH or DCCH mapped to DCH, with multiplexing of dedicated channels on MAC:

- C/T field is included in MAC header.

c) DTCH or DCCH mapped to RACH/FACH:

- TCTF field, C/T field, UE-Id type field and UE-Id are included in the MAC header.

d) DTCH or DCCH mapped to DSCH or USCH:

- the TCTF field is included in the MAC header for TDD only. The UE-Id type and UE-Id are included in the MAC header for FDD only. The C/T field is included if multiplexing on MAC is applied.

e) DTCH or DCCH mapped to DSCH or USCH where DTCH or DCCH are the only logical channels:

- the UE-Id type and UE-Id are included in the MAC header for FDD only. The C/T field is included in the MAC header if multiplexing on MAC is applied.

f) DTCH or DCCH mapped to CPCH

- UE-Id type field and UE-Id are included in the MAC header. The C/T field is included in the MAC header if multiplexing on MAC is applied.

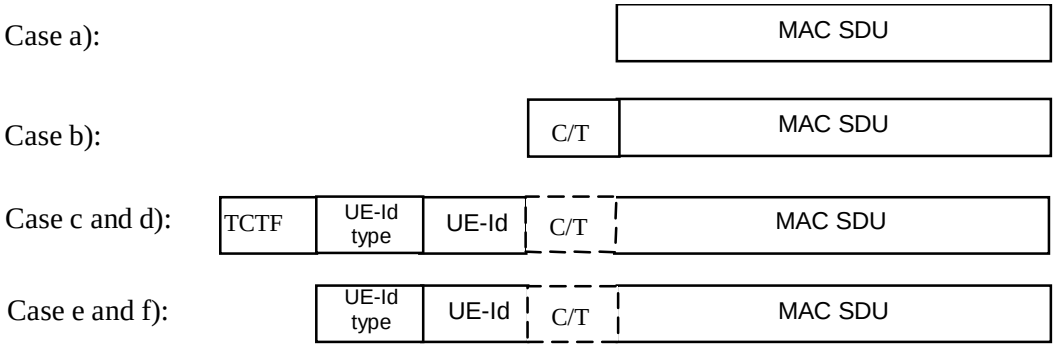


**Figure 9.2.1.1.1: MAC Data PDU formats for DTCH and DCCH**

## 11.3 Control of CPCH transmissions for FDD

The MAC layer controls the timing of CPCH transmissions on transmission time interval level (i.e. on 10, 20, 40 or 80 ms level); the timing on access slot level is controlled by L1. MAC controls the timing of each initial preamble ramping cycle as well as successive preamble ramping cycles. Note that retransmissions in case of erroneously received CPCH message part are under control of higher layers. The CPCH transmissions are performed by the UE as illustrated in figures 11.3.1 and 11.3.2. Figure 11.3.1 procedure is used for initial access to CPCH channel. Figure 11.3.2 procedure is used for each TTI transmission while the UE continues to transmit on the CPCH channel obtained using the initial access procedure.

MAC receives the following CPCH transmission control parameters from RRC with the CMAC-Config-REQ primitive:

- persistence values, P (transmission probability for each Transport Format (TF));
- N_access_fails, maximum number of preamble ramping cycles;
- NF_max, maximum number of frames for CPCH transmission for each TF;
- Backoff control timer parameters;
- Transport Format Set;
- Initial Priority Delays;
- Channel Assignment Active indication.

The MAC procedure for transmission control of initial CPCH access shall be invoked when the UE has data to transmit and the UE is not currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall get all UL transmit parameters (CPCH Set Info, P values, Initial Priority Delays, N_access_fails, NF_max, etc) from RRC;
2. the UE shall reset counter M and Frame Count Transmitted (FCT) upon entry to the initial access procedure;
3. the UE shall send a PHY-CPCH_Status-REQ to Layer 1 to obtain CPCH TF subset status. If Layer 1 returns an error message, the UE shall increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If Layer 1 returns a PHY-CPCH_Status-CNF message, which includes a TF subset indicating the currently available TFs of the requested TF subset, the procedure shall continue from step 4;
4. the UE shall initialise the Busy Table with the CPCH TF subset status from Layer 1. Those TFs in the TF subset of the Layer 1 PHY-CPCH_Status-CNF response will be marked available. All other TFs will be marked busy;

5. if all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

6. the UE shall update all UL transmit parameters from RRC;

7. UE shall select a TF from the set of available TFs listed in the Busy Table. UE shall use the CPCH channel capacity (transport block set size, NF_max, and TTI interval), and Busy Table information to select one CPCH TF for L1 to access. The UE may select a TF, which uses a lower data rate and a lower UL Tx power than the maximum UL Tx power allowed;

8. UE shall implement a test based on the Persistence value (P) to determine whether to attempt access to the selected CPCH TF. If access is allowed, the UE may implement an initial delay based on ASC of the data to be transmitted, then shall send a PHY-Access-REQ with the selected TF to L1 for CPCH access . If the P test does not allow access, the selected CPCH TF shall be marked busy in the Busy Table. If all TFs are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If all TFs are not marked busy, the UE shall resume the procedure from step 6;

9. after the UE has sent the access request to L1 , L1 shall return a PHY-Access-CNF including one of five access indications to MAC as shown in figure 11.3.1. If the L1 access indication is that access is granted, then UE shall execute the transmission control procedure for the Nth TTI using the selected TF and the initial access procedure ends;

10. if L1 access indication is no AP-AICH received or no CD-AICH received, the UE shall reset and start timer Tboc3, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access ~~link~~ failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the UE shall proceed from step 3;

11. if L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is active, the UE shall proceed from step 13 ~~14~~. If L1 access indication is AP-AICH_nak received and Channel Assignment (CA) is not active, the UE shall reset and start timer Tboc2, wait until timer expiry, and mark the selected channel busy in the Busy Table. If all channels are marked busy, the UE shall reset and start timer Tboc1, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3. If all channels are not marked busy, the UE shall resume the procedure from step 6;

12. if L1 access indication is CD-AICH signature mismatch, the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;

~~13. the UE shall reset and start timer Tboc4, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3;~~

13~~14~~. the UE shall reset and start timer Tboc2, wait until timer expiry, and increment counter M. If counter M is equal to N_access_fails, the UE shall execute an access failure error procedure and the CPCH access procedure ends. If counter M is less than N_access_fails, the procedure shall continue from step 3.

The MAC procedure for transmission control of Nth TTI shall be invoked when the UE has data to transmit and the UE is currently transmitting on a previously accessed CPCH channel. The steps for this procedure are listed here:

1. the UE shall build a transport block set for the next TTI;

2. if the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is greater than NF_max, the UE shall exit this procedure and start the MAC procedure for CPCH transmission of the first TTI. This shall release the CPCH channel in use and the UE will contend again for a new CPCH channel to continue transmission. If the sum of the Frame Count Transmitted counter plus the number of frames in the next TTI is ~~greater~~ less than or equal to NF_max, the UE shall send a PHY-Data-REQ with the transport block set to L1 to continue transmission on the CPCH channel which has previously been accessed;

3. if L1 returns PHY-Status-IND indicating abnormal situation the UE shall execute an abnormal situation handling procedure and the CPCH Nth TTI procedure ends. Reasons for abnormal situation may include the following:

   - emergency stop was received;
   - start of Message Indicator was not received;
   - L1 hardware failure has occurred.
   - out of synch has occurred.

4. if the L1 returns PHY-Status-IND indicating normal transmission, then the UE shall increment the Frame Count Transmitted counter by the length of the TTI just transmitted and the procedure ends.

**Table 11.3: CPCH Backoff Delay Timer Values**

| Timer | Based on parameter | Fixed/random |
|---|---|---|
| $T_{BOC1}$ (all Busy) | NF_bo_all_busy | Random |
| $T_{BOC2}$ (channel Busy) | NS_bo_busy | Fixed |
| $T_{BOC3}$ (no AICH) | NF_bo_no_aich | Fixed |
| $T_{BOC4}$ (mismatch) | NF_bo_mismatch | Random |

For $T_{BOC4,}$ UE shall randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_mismatch]. For $T_{BOC1,}$ UE would randomly select a timer value at each execution of the timer. A uniform random draw shall be made to select an integer number of frames within the range [0, NF_bo_all busy].

NOTE: Backoff parameter range and units are specified in TS 25.331, RRC Protocol Specification.

~~The UE MAC TF selection algorithm is left to implementation and is out of the scope of the present document. However the following example is presented to show one way UE may select a CPCH TF.~~

**3GPP RAN WG2 #13**
**Hawaii, USA, May 22th – May 26th, 2000**

***Document R2-001144***
*e.g. for 3GPP use the format TP-99xxx*
*or for SMG, use the format P-99-xxx*

# CHANGE REQUEST

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| 25.321 | CR | 046 | Current Version: | 3.3.0 |
|---|---|---|---|---|

*GSM (AA.BB) or 3G (AA.BBB) specification number ↑* *↑ CR number as allocated by MCC support team*

| For submission to: | TSG-RAN #8 | for approval | X | strategic | | (for SMG use only) |
|---|---|---|---|---|---|---|
| *list expected approval meeting # here ↑* | | for information | | non-strategic | | |

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| **Proposed change affects:** *(at least one should be marked with an X)* | (U)SIM | | ME | | UTRAN / Radio | X | Core Network | |
|---|---|---|---|---|---|---|---|---|

**Source:** TSG-RAN WG2 **Date:** May 16th 2000

**Subject:** Traffic volume measurement for dynamic radio bearer control

**Work item:**

**Category:** *(only one category Shall be marked With an X)*

| | | | | | |
|---|---|---|---|---|---|
| F | Correction | | **Release:** | Phase 2 | |
| A | Corresponds to a correction in an earlier release | | | Release 96 | |
| B | Addition of feature | | | Release 97 | |
| C | Functional modification of feature | | | Release 98 | |
| D | Editorial modification | X | | Release 99 | X |
| | | | | Release 00 | |

**Reason for change:** This document proposes editorial changes to 25.321 to be in line with RRC specifications

**Clauses affected:** 8.3.2, 11.1

| **Other specs Affected:** | | | |
|---|---|---|---|
| Other 3G core specifications | | → List of CRs: | |
| Other GSM core specifications | | → List of CRs: | |
| MS test specifications | | → List of CRs: | |
| BSS test specifications | | → List of CRs: | |
| O&M specifications | | → List of CRs: | |

**Other comments:**

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## 8.3.2 Parameters

See 25.331 for a detailed description of the UE, RB and TrCH information elements.

a) UE information elements
   S-RNTI
   SRNC identity
   C-RNTI
   Activation time

b) RB information elements
   RB multiplexing info (Transport channel identity, Logical channel identity, MAC logical channel priority)

c) TrCH information elements
   Transport Format Combination Set

d) Measurement information elements
   Mode (periodic, event-triggered or both)
   $TH_U$
   $TH_L$ ~~(Optional)~~
   Measurement quantity identifiers
   Report Interval

e) Measurement result
   Mode
   Reporting Quantities
   Event ~~Type~~ ID (~~overflow~~ 4a or ~~underflow~~4b)

f) Status info
   Maximum number of preamble ramping cycles reached.

g) RACH transmission control elements
   Persistence value P
   Maximum number of preamble ramping cycles $M_{max}$
   Others (ffs., e.g. minimum and maximum number of time units between two preamble ramping cycles)

h) Ciphering elements
   Ciphering mode
   Ciphering key
   Ciphering sequence number

i) CPCH transmission control elements
   CPCH persistency value
   CPCH channel data rate (implicit in the UL channelisation code)
   NFmax (Max packet length in frames)

# 11 Elementary procedures

## 11.1 Traffic volume measurement for dynamic radio ~~access~~ bearer control

Dynamic radio ~~access~~ bearer control is performed in RRC, based on the traffic volume measurement reported by MAC. Traffic volume information is gathered and measured in MAC layer and the result is reported from MAC layer to RRC layer.

Traffic volume monitoring procedure in MAC is shown in Figure 11.1.1. MAC receives RLC PDUs together with information of RLC transmission buffer. Every TTI, MAC compares the amount of data corresponding to a Transport Channel with the thresholds set by RRC. If the value is out of range, MAC indicates the measurement reports on traffic volume status to RRC. Thereby, RRC can be informed the traffic volume status of each transport channel, and therefore can take proper action for new radio ~~access~~ bearer configuration accordingly.

RRC requests MAC measurement report with the primitive CMAC-Measure-REQ including following parameters.

Measurement information elements

- Mode
  Indicates whether the report should be periodic~~al,~~ or ~~by~~ event-triggered

- $TH_U$ (If Event ID = 4a, then Reporting Threshold is Upper Threshold.)
  Upper threshold value for every transport channel, applicable when mode is event-triggered

- $TH_L$ ~~(Optional)~~ (If Event ID = 4b, then Reporting Threshold is Lower Threshold.)
  Lower threshold value for every transport channel, applicable when mode is event-triggered

- Measurement quantity identifiers
  Indicates what should be reported to RRC layer
  For each R~~A~~B, Buffer Occupancy~~amount~~ (mandatory), Variance (optional), or Average (optional)

- Report Interval
  Indicates the report interval, applicable when report mode is periodic

MAC receives RLC PDUs with the primitive MAC-Data-REQ including following parameters:

- Data (RLC PDU)

- Buffer Occupancy (BO)
  The parameter Buffer Occupancy (BO) indicates the amount of data that is currently queued for transmission (or retransmission)

MAC receives measurement information elements with the primitive CMAC-Measure-REQ that includes parameters such as Mode, report interval, and $TH_L$ and $TH_U$ for each transport channel. Whenever MAC receives RLC PDUs from different RLC entities, it is notified by RLC amount of data queued in RLC transmission buffer. If the mode is event-triggered, MAC compares the amount of data to be transmitted on a transport channel with threshold values passed by RRC, $TH_L$ and $TH_U$. In case that the measured value is out of range, MAC reports the status of result of comparison and status of each R~~A~~B to RRC. On the other hand, if the mode is periodic, MAC reports measurement result to RRC periodically. Measurement result can contain average and variance as well as amount of data for each R~~A~~B as follows:

Measurement result

- Mode
  Periodic, or event-triggered

- Reporting Quantity
  For each R~~A~~B, Buffer Occupancy (mandatory), Variance (optional), and Average (optional)

- Event ID~~type~~
  Indicates overflow or underflow for each transport channel, applicable when mode is event-triggered

  - Event 4a : RLC buffer payload exceeds an absolute threshold
  - Event 4b : RLC buffer payload becomes smaller than an absolute threshold

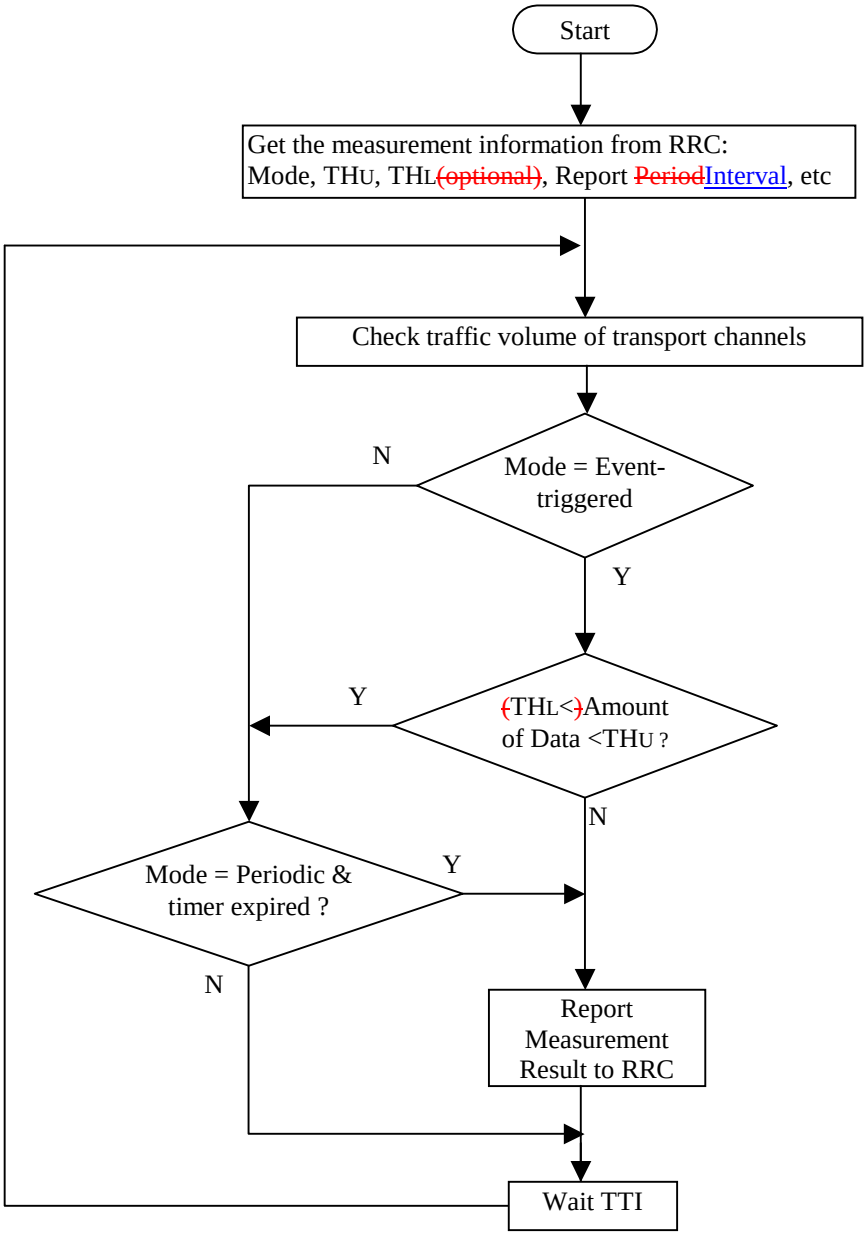


Figure 11.1.1: Traffic volume measurement/report procedure in MAC