**3GPP TSG CN Plenary Meeting #12** **Tdoc NP-010354**
**Stockholm, Sweden, 13th - 15th June 2001**

**Source:** Nokia

**Title:** CRs on R99 Work Item “CAMEL3”

**Agenda item:** 7.2

**Document for:** APPROVAL

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**Introduction:**

This document contains 4 CRs on R99 and Rel-4 Work Item ”CAMEL3”, that have not been agreed by TSG CN WG2, but sent directly to TSG CN Plenary meeting #12 for approval.

| Spec | CR | Rev | Doc-2nd- | Phase | Subject | Cat | Ver_C |
|---|---|---|---|---|---|---|---|
| 23.078 | 306 | 1 | | R99 | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) | F | 3.8.0 |
| 29.078 | 187 | 1 | | R99 | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) | F | 3.7.0 |
| 23.078 | 307 | 1 | | Rel-4 | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) | A | 4.0.0 |
| 29.078 | 188 | 1 | | Rel-4 | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) | A | 4.0.0 |

**3GPP TSG-CN Meeting #12**
**Stockholm, 13th – 16th June 2001**

***Tdoc NP-010354, part3***

*CR-Form-v3*

# CHANGE REQUEST

⌘ **29.078** **CR** **187** ⌘ rev **1** ⌘ Current version: 3.7.0 ⌘

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) |
| ***Source:*** | ⌘ | Nokia |
| ***Work item code:*** | ⌘ | CAMEL3 |
| ***Date:*** | ⌘ | June 13th, 2001 |
| ***Category:*** | ⌘ | **F (essential correction)** |
| ***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)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | At present, the Apply Charging Report GPRS CAP operation has a reporting limit of 24 hour and 4 Gbytes for a PDP Context. These limits are regarded as very restrictive. The duration of a PDP Context may extend over 24 hours and the amount of data transferred through a PDP Context may exceed 4Gbytes.<br>At 3G 400kbit/s, the volume counter for a PDP Context may overflow within a single day<br><br>Since the Apply Charging Report GPRS operation parameters report cumulative values from the very beginning of the establishment of a PDP Context, the current parameter ranges do not suffice.<br><br>The present CR present a simple and reliable parameter that allows the SGSN to report duration in excess of 24 hour and a cumulative volume in excess of 4 Gbyte. |
| ***Summary of change:*** | ⌘ | The rollover counters are introduced. |
| ***Consequences if not approved:*** | ⌘ | CAMEL3 GPRS pre-paid will not work in a reliable manner. Since GPRS pre-paid is the key feature of CAMEL3, this is very important t be fixed. |

| | | | | |
|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | | | |
| ***Other specs affected:*** | ⌘ | ☒ Other core specifications<br>☐ Test specifications<br>☐ O&M Specifications | ⌘ | 23.078-CR306 |
| ***Other comments:*** | ⌘ | | | |

****** FIRST MODIFIED SECTION ******

# 5 Common CAP Types

## 5.1 Data types

...

```
ChargingCharacteristics             ::= CHOICE {
    maxTransferredVolume            [0] INTEGER (1..4294967295),
    maxElapsedTime                  [1] INTEGER (1..86400)
    }
--  maxTransferredVolume is measured in number of bytes
--  maxElapsedTime is measured in seconds


ChargingResult                      ::= CHOICE {
    transferredVolume               [0] TransferredVolume,
    elapsedTime                     [1] ElapsedTime
    }

ChargingRollOver                    ::= CHOICE {
    transferredVolumeRollOver       [0] TransferredVolumeRollOver,
    elapsedTimeRollOver             [1] ElapsedTimeRollOver
    }
-- transferredVolumeRollOver shall be reported if ApplyChargingReportGPRS reports volume and
-- a roll-over has occurred in one or more volume counters. Otherwise, it shall be absent.
-- elapsedTimeRollOver shall be reported if ApplyChargingReportGPRS reports duration and
-- a roll-over has occurred in one or more duration counters. Otherwise, it shall be absent.

ElapsedTime                         ::= CHOICE {
    timeGPRSIfNoTariffSwitch    [0] INTEGER (0..86400),
    timeGPRSIfTariffSwitch      [1] SEQUENCE {
        timeGPRSSinceLastTariffSwitch   [0] INTEGER (0..86400),
        timeGPRSTariffSwitchInterval    [1] INTEGER (0..86400)  OPTIONAL
        }
    }
--  timeGPRSIfNoTariffSwitch is measured in seconds
--  timeGPRSSinceLastTariffSwitch and timeGPRSTariffSwitchInterval are measured in seconds

ElapsedTimeRollOver                         ::= CHOICE {
    rO-tTimeGPRSIfNoTariffSwitch    [0] INTEGER (10..255),
    rO-TtimeGPRSIfTariffSwitch      [1] SEQUENCE {
        rO-TtimeGPRSSinceLastTariffSwitch   [0] INTEGER (10..255)  OPTIONAL,
        rO-TtimeGPRSTariffSwitchInterval    [1] INTEGER (10..255)   OPTIONAL
        }
    }
--  rO-tTimeGPRSIfNoTariffSwitch, rO-tTimeGPRSSinceLastTariffSwitch and
--  rO-tTimeGPRSTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.


ApplyChargingReportGPRSArg          ::= SEQUENCE {
    chargingResult                  [0] ChargingResult,
    qualityOfService                [1] QualityOfService            OPTIONAL,
    active                          [2] BOOLEAN                 DEFAULT TRUE,
    pDPID                           [3] PDPID                       OPTIONAL,
    ...,
    chargingRollOver                [4] ChargingRollOver            OPTIONAL
    }

TransferredVolume                   ::= CHOICE {
    volumeIfNoTariffSwitch      [0] INTEGER (0..4294967295),
    volumeIfTariffSwitch [1] SEQUENCE {
        volumeSinceLastTariffSwitch     [0] INTEGER (0..4294967295),
        volumeTariffSwitchInterval      [1] INTEGER (0..4294967295) OPTIONAL
        }
    }
--  volumeIfNoTariffSwitch, volumeSinceLastTariffSwitch and volumeTariffSwitchInterval
--  are measured in bytes.

TransferredVolumeRollOver                   ::= CHOICE {
    rO-vVolumeIfNoTariffSwitch      [0] INTEGER (1.. 255),
    rO-vVolumeIfTariffSwitch        [1] SEQUENCE {
        rO-vVolumeSinceLastTariffSwitch     [0] INTEGER (10.. 255) OPTIONAL,
        rO-vVolumeTariffSwitchInterval      [1] INTEGER (10.. 255)  OPTIONAL
        }
    }
```

```
--  rO-¥VolumeIfNoTariffSwitch, rO-¥VolumeSinceLastTariffSwitch and rO-¥VolumeTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.
```

****** NEXT MODIFIED SECTION ******

# 11.6 ApplyChargingReportGPRS procedure

## 11.6.1 General description

This operation is used by the gprsSSF to report charging related information to the gsmSCF as requested by the gsmSCF using the ApplyChargingGPRS operation.

Timing of duration and measuring of transferred data (if applicable) shall be started when either an Attach event, PDP context activation acknowledgement or an Inter SGSN routeing area update acceptance is detected by the gprsSSF.

A report shall be made either when a PDP context deactivation, Detach event or Change in QoS is detected by the gprsSSF or when the gprsSSF detects that the transferred volume or elapsed time duration indicated in parameter transferredVolume or elapsedTime (received in ApplyChargingGPRS operation) has been reached.
That sending of ApplyChargingReportGPRS shall only be made on chargeable QoS changes.

### 11.6.1.1 Parameters

- chargingResult:
  This parameter provides the SCF with the charging related information previously requested using the ApplyChargingGPRS operation. The "ChargingResult" is a choice, and can contain either of the following parameters:

  - transferredVolume:
    This is a choice of the following parameters:

    - volumeIfNoTariffSwitch:

      This parameter will be present if no tariff switch has occurred for the PDP context, otherwise it will be absent. If present, then the volume transferred since the detection of the event that triggered volume count will be reported.

    - volumeIfTariffSwitch:

      This parameter will be present if a tariff switch has occurred for the PDP context, otherwise it will be absent. If present then the parameter may contain the following information:

      - volumeSinceLastTariffSwitch:

        The volume since the detection of the event that triggered volume count or the last tariffSwitch (whichever of these events was last detected) is reported.

      - VolumeTariffSwitchInterval:

        This parameter is present only if a tariff switch was detected after the event that triggered volume count for the PDP context in the current volume count period. If present, the volume between either the detection the event that triggered volume count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.

  - elapsedTime:
    This is a choice of the following parameters:

    - timeGPRSIfNoTariffSwitch:

      This parameter will be present if no tariff switch has occurred for the session or the PDP context, otherwise it will be absent. If present then the elapsed time since the detection of the event that triggered time count will be reported.

    - timeGPRSIfTariffSwitch:

This parameter will be present if a tariff switch has occurred for the session or the PDP context, otherwise it will be absent. If present then the parameter may contain the following information:

- timeGPRSSinceLastTariffSwitch:

  The time since the event that triggered time count or the last tariffSwitch is reported.

- timeGPRSTariffSwitchInterval:

  This parameter is present only if a tariff switch was detected after the event that triggered time count for the session or PDP context in the current time count period. If present, the time between either the detection the event that triggered time count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.

- qualityOfService:
  This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN.
  This parameter is only present when the sending of Apply Charging Report GPRS operation was triggered by a change in Quality of Service.

- active:
  This parameter indicates whether the GPRS session or PDP context is still active

- pDPID:

  This parameter, if present, identifies the PDP Context, within the Session dialogue, for which the charging report is valid.

- chargingRollOver:
  This parameter indicates ~~the~~possible rollovers of the "ChargingResult" parameter due to the limited ~~parameter~~value ranges of the ~~ASN.1~~parameters. The "chargingRollOver" parameter is a choice, and can contain either of the following parameters:

  - transferredVolumeRollOver:
    This is a choice of the following parameters:

    - rO-V~~v~~olumeIfNoTariffSwitch:

      This parameter indicates how many times the volumeIfNoTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter ~~shall~~may be absent.

    - rO-~~v~~VolumeIfTariffSwitch:

      The parameter is present if at least one of the subparameters below is present. If present then the parameter may contain the following information:

      - rO-~~v~~VolumeSinceLastTariffSwitch:

        This parameter indicates how many times the volumeSinceLastTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter ~~shall~~may be absent.

      - rO-VolumeTariffSwitchInterval:

        This parameter indicates how many times the VolumeTariffSwitchInterval parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter ~~shall~~may be absent.

  - elapsedTimeRollOver:
    This is a choice of the following parameters:

    - rO-~~t~~TimeGPRSIfNoTariffSwitch:

      This parameter indicates how many times the timeGPRSIfNoTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter ~~shall~~may be absent.

    - rO-~~t~~TimeGPRSIfTariffSwitch:

The parameter is present if at least one of the subparameters below is present. If present then the parameter may contain the following information:

- rO-tTimeGPRSSinceLastTariffSwitch:

  This parameter indicates how many times the timeGPRSSinceLastTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter shallmay be absent.

- rO-tTimeGPRSTariffSwitchInterval:

  This parameter indicates how many times the timeGPRSTariffSwitchInterval parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter shallmay be absent.

## 11.6.2 Invoking entity (gprsSSF)

### 11.6.2.1 Normal procedure

gprsSSF preconditions:

(1) A relationship exists between the gsmSCF and the GPRS Session or PDP Context.

(2) A charging event has been detected that was requested by the gsmSCF via an ApplyChargingGPRS operation

gprsSSF postconditions:

(1)If termination of the GPRS session or a PDP context has occurred:

- If there are any outstanding EDPs or pending reports then the gprsSSF shall remain in the same state, else
- If there are no outstanding EDPs or pending reports, then the gprsSSF shall transit to state ‘Idle’.

### 11.6.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TC services used for reporting operation errors are described in clause 12.

**3GPP TSG-CN Meeting #12**
**Stockholm, 13th – 16th June 2001**

***Tdoc NP-010354, part4***

*CR-Form-v3*

# CHANGE REQUEST

⌘ **29.078** **CR** **188** ⌘ rev **1** ⌘ Current version: 4.0.0 ⌘

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network **x**

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) |
| ***Source:*** | ⌘ | Nokia |
| ***Work item code:*** | ⌘ | CAMEL3 |
| ***Date:*** | ⌘ | June 13th, 2001 |
| ***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)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
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*R96* *(Release 1996)*
*R97* *(Release 1997)*
*R98* *(Release 1998)*
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*REL-4* *(Release 4)*
*REL-5* *(Release 5)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | At present, the Apply Charging Report GPRS CAP operation has a reporting limit of 24 hour and 4 Gbytes for a PDP Context. These limits are regarded as very restrictive. The duration of a PDP Context may extend over 24 hours and the amount of data transferred through a PDP Context may exceed 4Gbytes.<br>At 3G 400kbit/s, the volume counter for a PDP Context may overflow within a single day<br><br>Since the Apply Charging Report GPRS operation parameters report cumulative values from the very beginning of the establishment of a PDP Context, the current parameter ranges do not suffice.<br><br>The present CR present a simple and reliable parameter that allows the SGSN to report duration in excess of 24 hour and a cumulative volume in excess of 4 Gbyte. |
| ***Summary of change:*** | ⌘ | The rollover counters are introduced. |
| ***Consequences if not approved:*** | ⌘ | CAMEL3 GPRS pre-paid will not work in a reliable manner. Since GPRS pre-paid is the key feature of CAMEL3, this is very important t be fixed. |

| | | | | |
|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | | | |
| ***Other specs affected:*** | ⌘ | **X** Other core specifications<br>☐ Test specifications<br>☐ O&M Specifications | ⌘ | 23.078-CR307 |
| ***Other comments:*** | ⌘ | | | |

****** FIRST MODIFIED SECTION ******

# 5 Common CAP Types

## 5.1 Data types

```
...


ChargingCharacteristics             ::= CHOICE {
    maxTransferredVolume            [0] INTEGER (1..4294967295),
    maxElapsedTime                  [1] INTEGER (1..86400)
    }
--  maxTransferredVolume is measured in number of bytes
--  maxElapsedTime is measured in seconds


ChargingResult                      ::= CHOICE {
    transferredVolume               [0] TransferredVolume,
    elapsedTime                     [1] ElapsedTime
    }

ChargingRollOver                    ::= CHOICE {
    transferredVolumeRollOver       [0] TransferredVolumeRollOver,
    elapsedTimeRollOver             [1] ElapsedTimeRollOver
    }
-- transferredVolumeRollOver shall be reported if ApplyChargingReportGPRS reports volume and
-- a roll-over has occurred in one or more volume counters. Otherwise, it shall be absent.
-- elapsedTimeRollOver shall be reported if ApplyChargingReportGPRS reports duration and
-- a roll-over has occurred in one or more duration counters. Otherwise, it shall be absent.

ElapsedTime                         ::= CHOICE {
    timeGPRSIfNoTariffSwitch    [0] INTEGER (0..86400),
    timeGPRSIfTariffSwitch      [1] SEQUENCE {
        timeGPRSSinceLastTariffSwitch   [0] INTEGER (0..86400),
        timeGPRSTariffSwitchInterval    [1] INTEGER (0..86400)  OPTIONAL
        }
    }
--  timeGPRSIfNoTariffSwitch is measured in seconds
--  timeGPRSSinceLastTariffSwitch and timeGPRSTariffSwitchInterval are measured in seconds

ElapsedTimeRollOver                         ::= CHOICE {
    rO-TimeGPRSIfNoTariffSwitch [0] INTEGER (0..255),
    rO-TimeGPRSIfTariffSwitch       [1] SEQUENCE {
        rO-TimeGPRSSinceLastTariffSwitch    [0] INTEGER (0..255)  OPTIONAL,
        rO-TimeGPRSTariffSwitchInterval [1] INTEGER (0..255)    OPTIONAL
        }
    }
--  rO-TimeGPRSIfNoTariffSwitch, rO-TimeGPRSSinceLastTariffSwitch and
--  rO-TimeGPRSTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.



ApplyChargingReportGPRSArg          ::= SEQUENCE {
    chargingResult                  [0] ChargingResult,
    qualityOfService                [1] QualityOfService            OPTIONAL,
    active                          [2] BOOLEAN                 DEFAULT TRUE,
    pDPID                           [3] PDPID                       OPTIONAL,
    ...,
    chargingRollOver                [4] ChargingRollOver            OPTIONAL
    }

TransferredVolume                   ::= CHOICE {
    volumeIfNoTariffSwitch      [0] INTEGER (0..4294967295),
    volumeIfTariffSwitch [1] SEQUENCE {
        volumeSinceLastTariffSwitch     [0] INTEGER (0..4294967295),
        volumeTariffSwitchInterval      [1] INTEGER (0..4294967295) OPTIONAL
        }
    }
--  volumeIfNoTariffSwitch, volumeSinceLastTariffSwitch and volumeTariffSwitchInterval
--  are measured in bytes.

TransferredVolumeRollOver                   ::= CHOICE {
    rO-VolumeIfNoTariffSwitch       [0] INTEGER (0.. 255),
    rO-VolumeIfTariffSwitch         [1] SEQUENCE {
        rO-VolumeSinceLastTariffSwitch      [0] INTEGER (0.. 255) OPTIONAL,
        rO-VolumeTariffSwitchInterval       [1] INTEGER (0.. 255)   OPTIONAL
        }
```

```
    }
--  rO-VolumeIfNoTariffSwitch, rO-VolumeSinceLastTariffSwitch and rO-VolumeTariffSwitchInterval
--  present counters indicating the number of parameter range rollovers.
```

****** NEXT MODIFIED SECTION ******

# 11.6 ApplyChargingReportGPRS procedure

## 11.6.1 General description

This operation is used by the gprsSSF to report charging related information to the gsmSCF as requested by the gsmSCF using the ApplyChargingGPRS operation.

Timing of duration and measuring of transferred data (if applicable) shall be started when either an Attach event, PDP context activation acknowledgement or an Inter SGSN routeing area update acceptance is detected by the gprsSSF.

A report shall be made either when a PDP context deactivation, Detach event or Change in QoS is detected by the gprsSSF or when the gprsSSF detects that the transferred volume or elapsed time duration indicated in parameter transferredVolume or elapsedTime (received in ApplyChargingGPRS operation) has been reached.
That sending of ApplyChargingReportGPRS shall only be made on chargeable QoS changes.

### 11.6.1.1 Parameters

- chargingResult:
  This parameter provides the SCF with the charging related information previously requested using the ApplyChargingGPRS operation. The "ChargingResult" is a choice, and can contain either of the following parameters:

  - transferredVolume:
    This is a choice of the following parameters:

    - volumeIfNoTariffSwitch:

      This parameter will be present if no tariff switch has occurred for the PDP context, otherwise it will be absent. If present, then the volume transferred since the detection of the event that triggered volume count will be reported.

    - volumeIfTariffSwitch:

      This parameter will be present if a tariff switch has occurred for the PDP context, otherwise it will be absent. If present then the parameter may contain the following information:

      - volumeSinceLastTariffSwitch:

        The volume since the detection of the event that triggered volume count or the last tariffSwitch (whichever of these events was last detected) is reported.

      - VolumeTariffSwitchInterval:

        This parameter is present only if a tariff switch was detected after the event that triggered volume count for the PDP context in the current volume count period. If present, the volume between either the detection the event that triggered volume count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.

  - elapsedTime:
    This is a choice of the following parameters:

    - timeGPRSIfNoTariffSwitch:

      This parameter will be present if no tariff switch has occurred for the session or the PDP context, otherwise it will be absent. If present then the elapsed time since the detection of the event that triggered time count will be reported.

    - timeGPRSIfTariffSwitch:

This parameter will be present if a tariff switch has occurred for the session or the PDP context, otherwise it will be absent. If present then the parameter may contain the following information:

- timeGPRSSinceLastTariffSwitch:

  The time since the event that triggered time count or the last tariffSwitch is reported.

- timeGPRSTariffSwitchInterval:

  This parameter is present only if a tariff switch was detected after the event that triggered time count for the session or PDP context in the current time count period. If present, the time between either the detection the event that triggered time count or the previous tariff switch (whichever of these events was last detected) and the last tariff switch is reported.

- qualityOfService:
  This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN.
  This parameter is only present when the sending of Apply Charging Report GPRS operation was triggered by a change in Quality of Service.

- active:
  This parameter indicates whether the GPRS session or PDP context is still active

- pDPID:

  This parameter, if present, identifies the PDP Context, within the Session dialogue, for which the charging report is valid.

- chargingRollOver:
  This parameter indicates possible rollovers of the "ChargingResult" parameter due to the limited value ranges of the parameters. The "chargingRollOver" parameter is a choice, and can contain either of the following parameters:

  - transferredVolumeRollOver:
    This is a choice of the following parameters:

    - rO-VolumeIfNoTariffSwitch:

      This parameter indicates how many times the volumeIfNoTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

    - rO-VolumeIfTariffSwitch:

      The parameter is present if at least one of the subparameters below is present. If present then the parameter may contain the following information:

      - rO-VolumeSinceLastTariffSwitch:

        This parameter indicates how many times the volumeSinceLastTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

      - rO-VolumeTariffSwitchInterval:

        This parameter indicates how many times the VolumeTariffSwitchInterval parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

  - elapsedTimeRollOver:
    This is a choice of the following parameters:

    - rO-TimeGPRSIfNoTariffSwitch:

      This parameter indicates how many times the timeGPRSIfNoTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

    - rO-TimeGPRSIfTariffSwitch:

The parameter is present if at least one of the subparameters below is present. If present then the parameter may contain the following information:

- rO-TimeGPRSSinceLastTariffSwitch:

  This parameter indicates how many times the timeGPRSSinceLastTariffSwitch parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

- rO-TimeGPRSTariffSwitchInterval:

  This parameter indicates how many times the timeGPRSTariffSwitchInterval parameter of the chargingResult has rolled over. If no rollover has happened, the pararameter may be absent.

## 11.6.2 Invoking entity (gprsSSF)

### 11.6.2.1 Normal procedure

gprsSSF preconditions:

(1) A relationship exists between the gsmSCF and the GPRS Session or PDP Context.

(2) A charging event has been detected that was requested by the gsmSCF via an ApplyChargingGPRS operation

gprsSSF postconditions:

(1)If termination of the GPRS session or a PDP context has occurred:

- If there are any outstanding EDPs or pending reports then the gprsSSF shall remain in the same state, else
- If there are no outstanding EDPs or pending reports, then the gprsSSF shall transit to state ‘Idle’.

### 11.6.2.2 Error handling

Generic error handling for the operation related errors is described in clause 10 and the TC services used for reporting operation errors are described in clause 12.

**3GPP TSG-CN Meeting #12**
**Stockholm, 13th – 16th June 2001**

***Tdoc NP-010354, part1***

*CR-Form-v3*

# CHANGE REQUEST

⌘ **23.078** **CR** **306** ⌘ rev **1** ⌘ Current version: 3.8.0 ⌘

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

| | | |
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| ***Source:*** | ⌘ | Nokia |
| ***Work item code:*** | ⌘ | CAMEL3 |
| ***Date:*** | ⌘ | June 13th, 2001 |
| ***Category:*** | ⌘ | **F (essential correction)** |
| ***Release:*** | ⌘ | R99 |

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*REL-4* *(Release 4)*
*REL-5* *(Release 5)*

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|---|---|---|
| ***Reason for change:*** | ⌘ | At present, the Apply Charging Report GPRS CAP operation has a reporting limit of 24 hour and 4 Gbytes for a PDP Context. These limits are regarded as very restrictive. The duration of a PDP Context may extend over 24 hours and the amount of data transferred through a PDP Context may exceed 4Gbytes.<br>At 3G 400kbit/s, the volume counter for a PDP Context may overflow within a single day<br><br>Since the Apply Charging Report GPRS operation parameters report cumulative values from the very beginning of the establishment of a PDP Context, the current parameter ranges do not suffice.<br><br>The present CR present a simple and reliable parameter that allows the SGSN to report duration in excess of 24 hour and a cumulative volume in excess of 4 Gbyte. |
| ***Summary of change:*** | ⌘ | The rollover counters are introduced. |
| ***Consequences if not approved:*** | ⌘ | CAMEL3 GPRS pre-paid will not work in a reliable manner. Since GPRS pre-paid is the key feature of CAMEL3, this is very important t be fixed. |

| | | | | |
|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | | | |
| ***Other specs affected:*** | ⌘ | ☒ Other core specifications<br>☐ Test specifications<br>☐ O&M Specifications | ⌘ | 29.078-CR187 |
| ***Other comments:*** | ⌘ | | | |

****** FIRST MODIFIED SECTION ******

# 6.6 Description of information flows

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## 6.6.1 gprsSSF to gsmSCF Information Flows

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### 6.6.1.2 Apply Charging Report GPRS

#### 6.6.1.2.1 Description

This IF is used by the gprsSSF to report to the gsmSCF the information requested in the Apply Charging GPRS IF. In addition, this IF is used to notify the gsmSCF of user initiated change in QoS. Note that there are several possible QoS profiles defined by the combinations of the different QoS attributes as defined in 3GPP TS 23.060 [11]. A PLMN may only support and charge on a limited subset of those QoS. It is recommended that changes in QoS are only reported in Apply Charging Report GPRS for those QoS profiles.

#### 6.6.1.2.2 Information Elements

The following information elements are required:

| Information element name | Required | Description |
|---|---|---|
| Gprs Reference Number | C | This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3GPP TS 29.078 [5] for the usage of this element. |
| Charging Result | M | This IE contains the charging information for the PDP provided by the gsmSSF. It is a choice between elapsed time and data volume. |
| Quality of Service | C | This IE is described in the table below. |
| Active | M | This IE indicates if the GPRS session or PDP context is still established, or if it has been detached or deactivated. |
| PDP ID | C | This IE identifies the PDP context which the Apply Charging Report is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context. |
| Charging Roll Over | C | This IE indicates ~~that one or more~~which parameter(s) of the *Charging Result* have over-flowed~~n~~.<br>Refer to 3GPP TS 29.078 [5] for the usage of this element.<br><br>NOTE: ~~The~~It is possible that early ~~first~~ implementations of the gprsSSF ~~may~~do not support this information element. |

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Quality of Service contains the following information element:

| Information element name | Required | Description |
|---|---|---|
| Negotiated QoS | C | This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN, as a result of a 'Modify PDP Conext' request. This IE shall be included only if sending of the Apply Charging Report was triggered by a change in Quality of Service. |

C Conditional (The IE shall be sent, if available).

**3GPP TSG-CN Meeting #12**
**Stockholm, 13th – 16th June 2001**

***Tdoc NP-010354, part2***

*CR-Form-v3*

# CHANGE REQUEST

⌘ **23.078** **CR** **307** ⌘ rev **1** ⌘ Current version: 4.0.0 ⌘

***Proposed change affects:*** ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

| | | |
|---|---|---|
| ***Title:*** | ⌘ | Correction for the CAMEL3 ACR-GPRS parameter range problem (roll-over) |
| ***Source:*** | ⌘ | Nokia |
| ***Work item code:*** | ⌘ | CAMEL3 |
| ***Date:*** | ⌘ | June 13th, 2001 |
| ***Category:*** | ⌘ | **A** |
| ***Release:*** | ⌘ | Rel-4 |

*Use one of the following categories:*
***F*** *(correction)*
***A*** *(corresponds to a correction in an earlier release)*
***B*** *(Addition of feature),*
***C*** *(Functional modification of feature)*
***D*** *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

*Use one of the following releases:*
*2* *(GSM Phase 2)*
*R96* *(Release 1996)*
*R97* *(Release 1997)*
*R98* *(Release 1998)*
*R99* *(Release 1999)*
*REL-4* *(Release 4)*
*REL-5* *(Release 5)*

| | | |
|---|---|---|
| ***Reason for change:*** | ⌘ | At present, the Apply Charging Report GPRS CAP operation has a reporting limit of 24 hour and 4 Gbytes for a PDP Context. These limits are regarded as very restrictive. The duration of a PDP Context may extend over 24 hours and the amount of data transferred through a PDP Context may exceed 4Gbytes.<br>At 3G 400kbit/s, the volume counter for a PDP Context may overflow within a single day<br><br>Since the Apply Charging Report GPRS operation parameters report cumulative values from the very beginning of the establishment of a PDP Context, the current parameter ranges do not suffice.<br><br>The present CR present a simple and reliable parameter that allows the SGSN to report duration in excess of 24 hour and a cumulative volume in excess of 4 Gbyte. |
| ***Summary of change:*** | ⌘ | The rollover counters are introduced. |
| ***Consequences if not approved:*** | ⌘ | CAMEL3 GPRS pre-paid will not work in a reliable manner. Since GPRS pre-paid is the key feature of CAMEL3, this is very important t be fixed. |

| | | | | |
|---|---|---|---|---|
| ***Clauses affected:*** | ⌘ | | | |
| ***Other specs affected:*** | ⌘ | ☒ Other core specifications<br>☐ Test specifications<br>☐ O&M Specifications | ⌘ | 29.078-CR188 |
| ***Other comments:*** | ⌘ | | | |

****** FIRST MODIFIED SECTION ******

# 6.6 Description of information flows

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## 6.6.1 gprsSSF to gsmSCF Information Flows

. . .

### 6.6.1.2 Apply Charging Report GPRS

#### 6.6.1.2.1 Description

This IF is used by the gprsSSF to report to the gsmSCF the information requested in the Apply Charging GPRS IF. In addition, this IF is used to notify the gsmSCF of user initiated change in QoS. Note that there are several possible QoS profiles defined by the combinations of the different QoS attributes as defined in 3GPP TS 23.060 [11]. A PLMN may only support and charge on a limited subset of those QoS. It is recommended that changes in QoS are only reported in Apply Charging Report GPRS for those QoS profiles.

#### 6.6.1.2.2 Information Elements

The following information elements are required:

| Information element name | Required | Description |
|---|---|---|
| Gprs Reference Number | C | This IE consists of a number assigned by the gprsSSF and a number assigned by the gsmSCF. It is used for TCAP dialogue segmentation. Refer to 3GPP TS 29.078 [5] for the usage of this element. |
| Charging Result | M | This IE contains the charging information for the PDP provided by the gsmSSF. It is a choice between elapsed time and data volume. |
| Quality of Service | C | This IE is described in the table below. |
| Active | M | This IE indicates if the GPRS session or PDP context is still established, or if it has been detached or deactivated. |
| PDP ID | C | This IE identifies the PDP context which the Apply Charging Report is applicable for. If not present the dialogue corresponds to the GPRS session or to one single PDP context. |
| Charging Roll Over | C | This IE indicates which parameter(s) of the *Charging Result* have overflowed.<br>Refer to 3GPP TS 29.078 [5] for the usage of this element.<br><br>NOTE: It is possible that early implementations of the gprsSSF do not support this information element. |

M Mandatory (The IE shall always be sent).

C Conditional (The IE shall be sent, if available).

Quality of Service contains the following information element:

| Information element name | Required | Description |
|---|---|---|
| Negotiated QoS | C | This IE identifies the QoS which was negotiated between the user, the SGSN and the GGSN, as a result of a 'Modify PDP Conext' request. This IE shall be included only if sending of the Apply Charging Report was triggered by a change in Quality of Service. |

C Conditional (The IE shall be sent, if available).