Flowcharts for Counters

Contents

1 Introduction

This description contains flowcharts for the main traffic sequences that impact Performance Statistics counters in the RBS. It should be noted that the counters presented are merely a subset of all RBS counters. Counter descriptions for all RBS counters are included in Managed Object Model RBS. Information about RBS-specific Performance Statistics functions and parameters is included in Performance Management.

Main Symbols

The following symbols are used in the document:

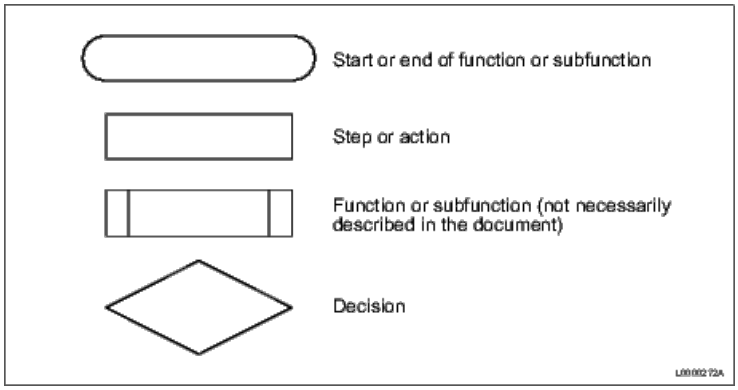

Figure 1 Main Symbols

All flowcharts are drawn from an RBS perspective, trying to reflect the actual implementation, but not necessarily covering complete procedures.

More detailed information about each counter is described in the Managed Object Model (MOM), see Managed Object Model RBS.

Performance Management Areas

The counter flowcharts in this document are grouped according to the following performance management areas:

- Accessibility
- Retainability
- Availability
- Integrity
- Mobility
- Resource Use

For the definition of the performance management areas see Key Performance Indicators and License and Resource Use Indicators.

For more information about the Performance Statistic mechanisms for measuring the radio and transport network performance and the subscriber perceived quality, see the document: Performance Management.

The Counter Flowcharts sections below describe the main traffic scenarios along with their flowcharts per performance management area.

2 Counter Flowcharts

This section describes counter flowcharts.

2.1 Accessibility

This section describes the Accessibility main traffic scenarios as follows:

- Paging
- Random Access
- RRC Connection Setup
- Signalling connection setup
- E-RAB Establishment

2.1.1 Paging

This section describes the counter flowchart related to Paging in the RBS.

The main counters for this scenario are as follows:

- pmPagReceived
- pmPagDiscarded

A flowchart for the paging procedure is shown in the following figure::

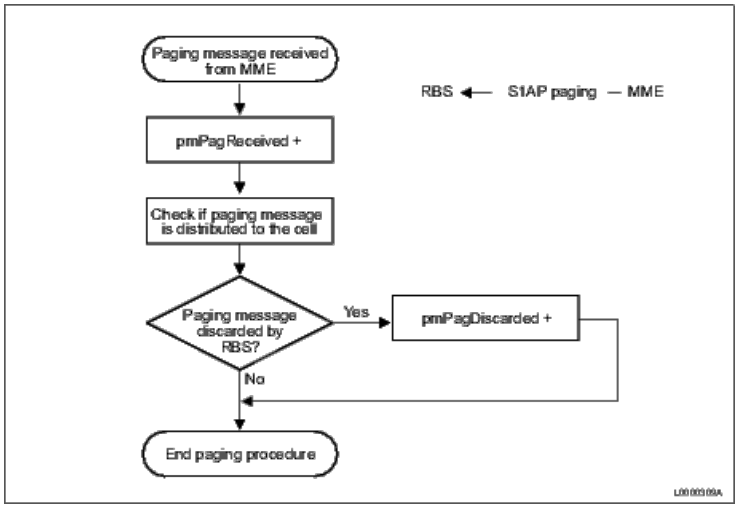

Figure 2 Paging Scenario

2.1.2 Random Access

This section describes flowcharts for Random Access (RA).

The main counters for this scenario are as follows:

- pmRaAttCbra
- pmRaSuccCbra

A flowchart for the Random Access procedure is shown in the following figure:

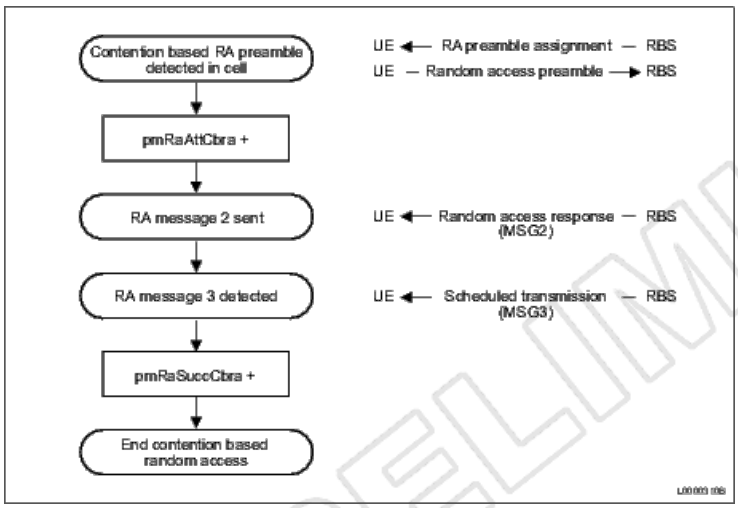

Figure 3 Random Access Scenario

2.1.3 RRC Connection Setup

This traffic scenario describes both successful and unsuccessful attempts to set up a Radio Resource Control (RRC) Connection for an originating or terminating call.

The main counters for this scenario are as follows:

- pmRrcConnEstabAtt
- pmRrcConnEstabFailLic
- pmRrcConnEstabSucc

A flowchart for the RRC Connection Setup is shown in the following figure:

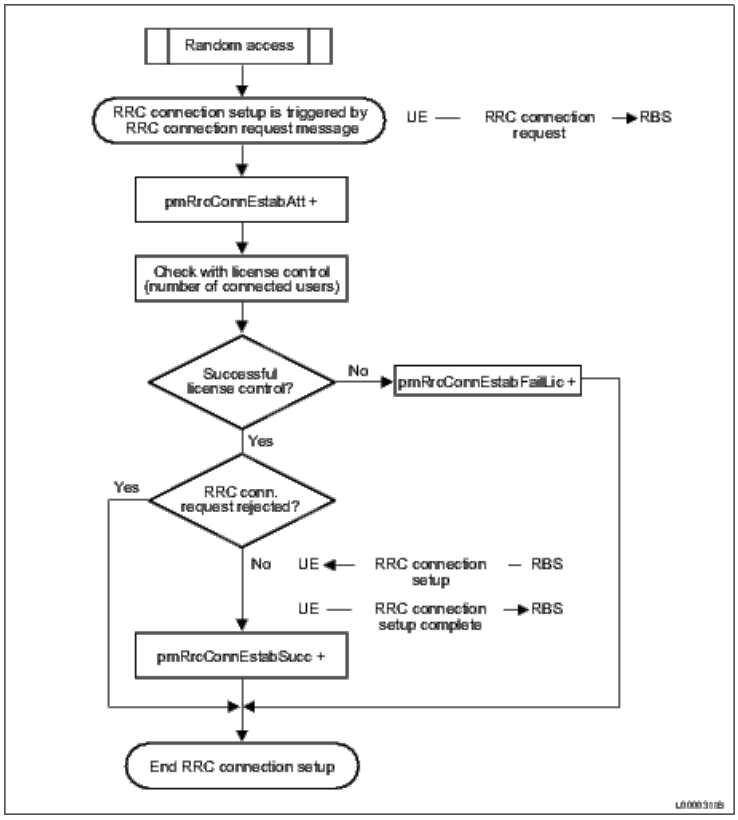

Figure 4 RRC Connection Setup

2.1.4 Signalling Connection Setup and E-RAB Establishment

This traffic scenario describes both successful and unsuccessful attempts to set up an S1 connection and to perform an Evolved Radio Access Bearer (E-RAB) Establishment.

The main counters for these scenarios are as follows:

- pmS1SigConnEstabAtt
- pmS1SigConnEstabSucc
- pmErabEstabAttAdded
- pmErabEstabAttInit
- pmErabEstabFailAddedLic
- pmErabEstabFailInitLic
- pmErabEstabSuccAdded
- pmErabEstabSuccInit

Flowcharts for the Signalling Connection Setup and the E-RAB Establishment scenarios are shown in Figure 5 and Figure 6.

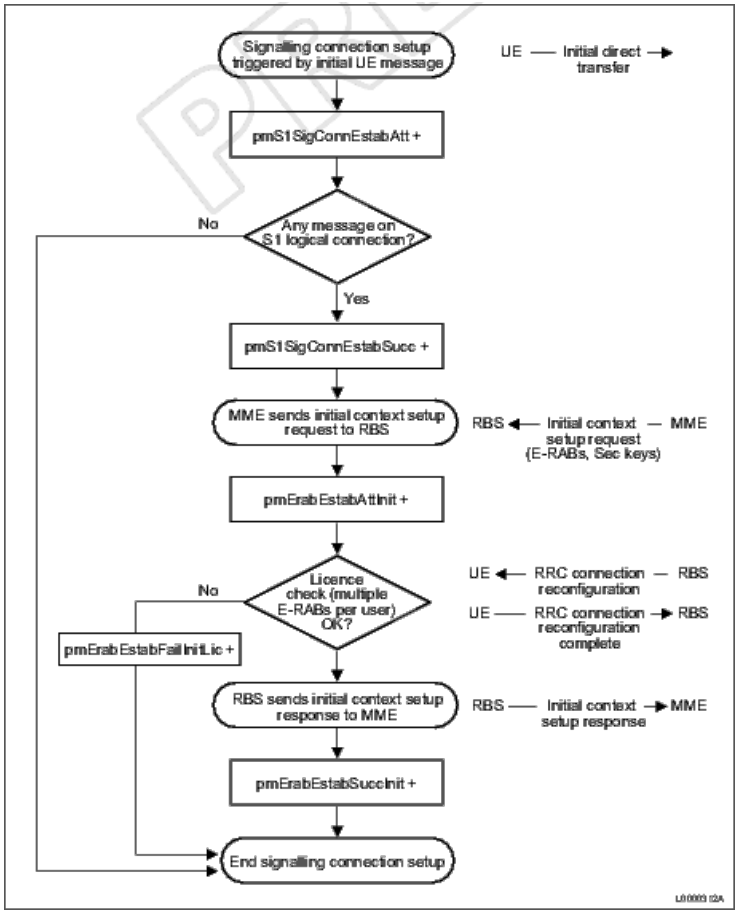

Figure 5 E-RAB Establishment with Initial Context Setup Procedure

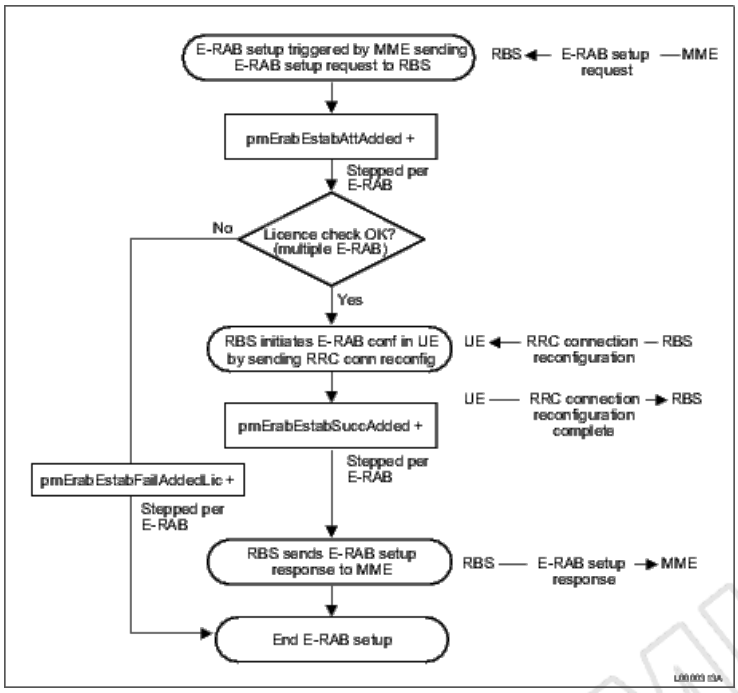

Figure 6 E-RAB Establishment with E-RAB Setup Procedure

2.2 Retainability

This section describes the Retainability main traffic scenarios as follows:

- UE Context Release

- E-RAB Release

2.2.1 UE Context Release

This section describes the flowcharts related to User Equipment (UE) Context Release.

The main counters for this scenario are as follows:

- pmUeCtxRelNormalEnb
- pmUeCtxtRelAbnormalEnb
- pmUeCtxtRelAbnormalEnbAct
- pmUeCtxtRelAbnormalEnbActCdt
- pmUeCtxtRelAbnormalEnbActHo
- pmUeCtxtRelAbnormalEnbActTnFail
- pmUeCtxtRelAbnormalEnbActUeLost
- pmUeCtxtRelMme
- pmUeCtxtRelMmeAct

A flowchart for the Mobile Management Entity (MME) triggered UE Context Release procedure is shown in the following figure:

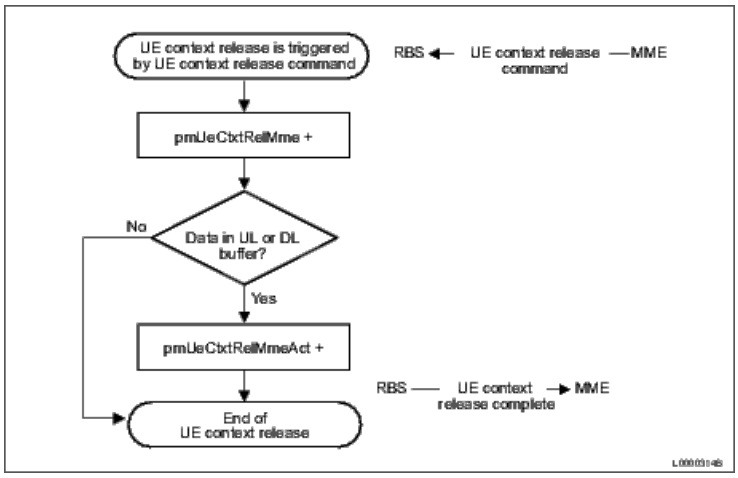

Figure 7 MME Triggered UE Context Release

A flowchart for the RBS triggered UE Context Release procedure is shown in the following figure:

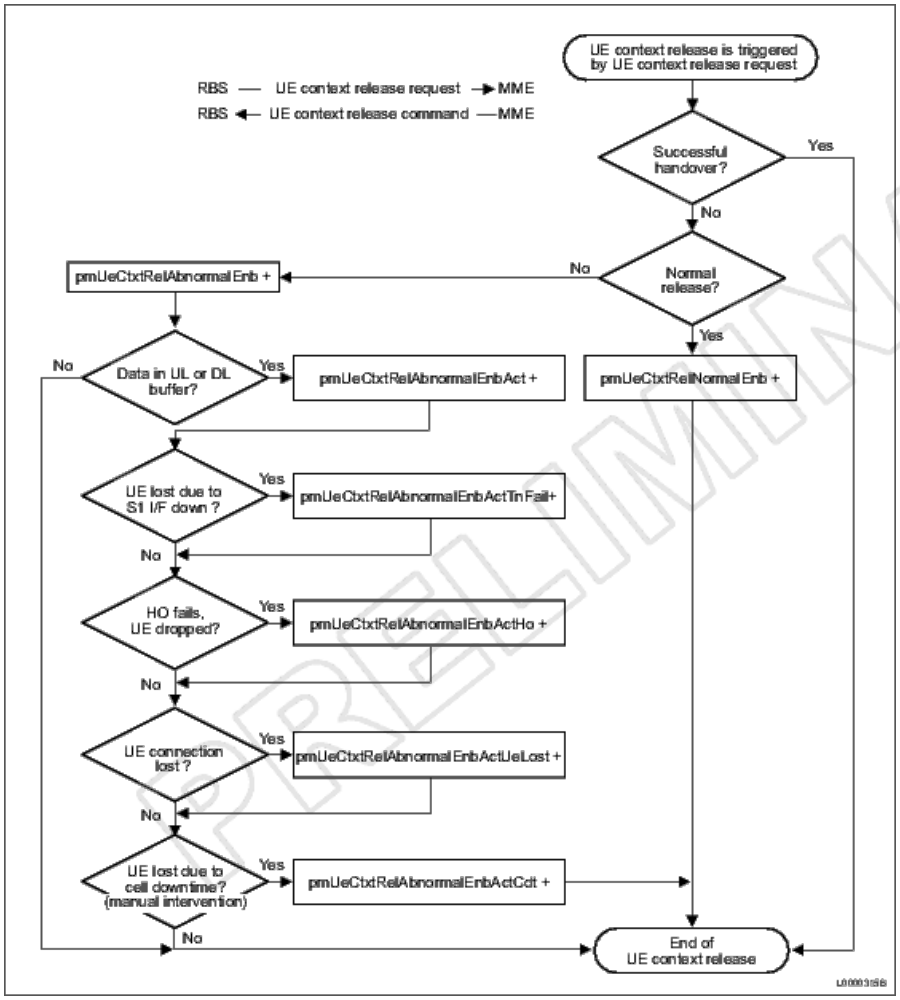

Figure 8 RBS Triggered UE Context Release scenario

2.2.2 E-RAB Release

This traffic scenario describes the steps involved in E-RAB Release.

The main counters for this scenario are:

- pmErabRelNormalEnb
- pmErabRelAbnormalEnb
- pmErabRelAbnormalEnbAct
- pmErabRelAbnormalEnbActCdt
- pmErabRelAbnormalEnbActHo
- pmErabRelAbnormalEnbActHpr
- pmErabRelAbnormalEnbActTnFail
- pmErabRelAbnormalEnbActUeLost
- pmErabRelMme

A flowchart for the E-RAB Release scenario is shown in Figure 9 and Figure 10.

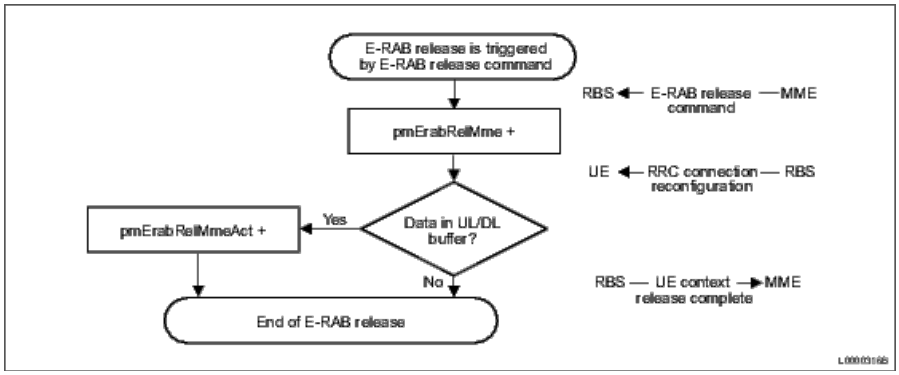

Figure 9 E-RAB Release Scenario (MME Triggered)

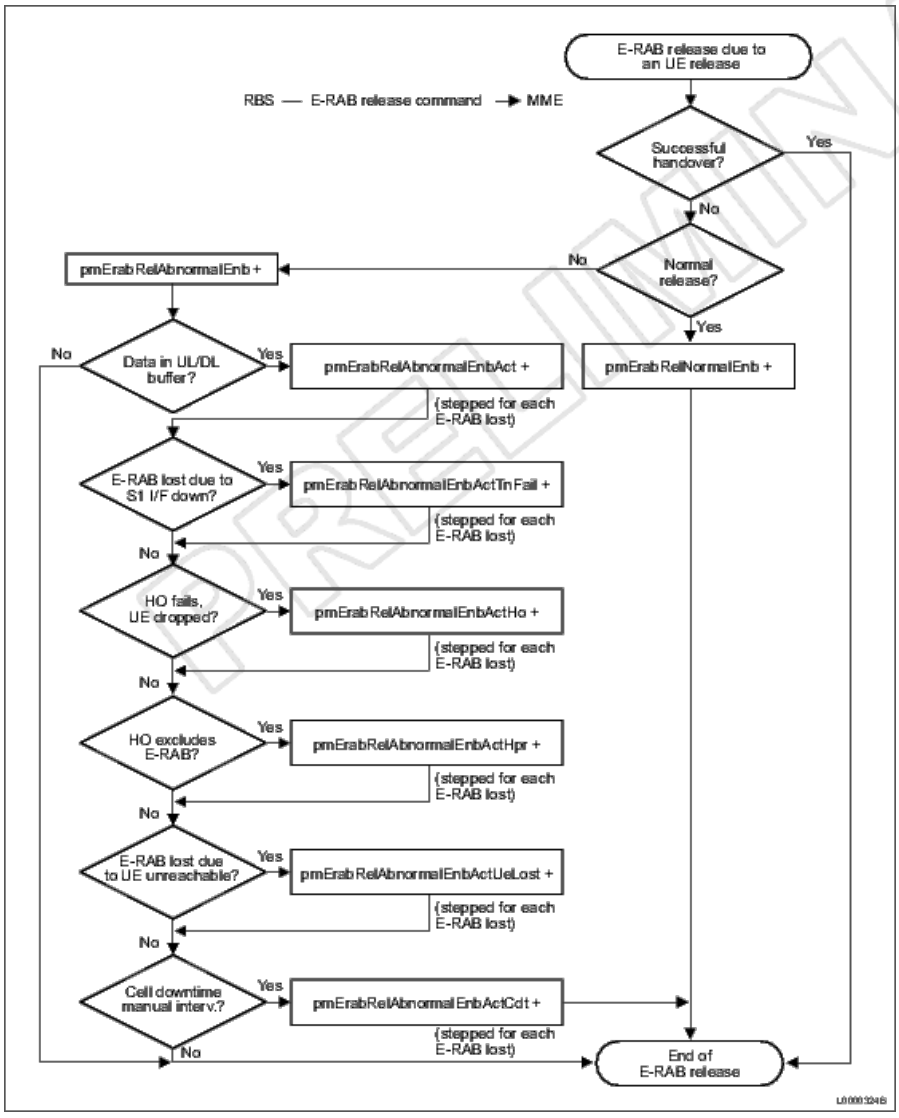

Figure 10 E-RAB Release Scenario (RBS Triggered)

2.3 Availability

This section describes the Cell Availability main traffic scenarios as follows:

- Cell downtime

2.3.1 Cell Downtime

This traffic scenario describes the steps involved in Cell downtime

The main counters for this scenario are:

- pmCellDowntimeAuto
- pmCellDowntimeMan

A flowchart for the Cell Downtime procedure is shown in the following figure:

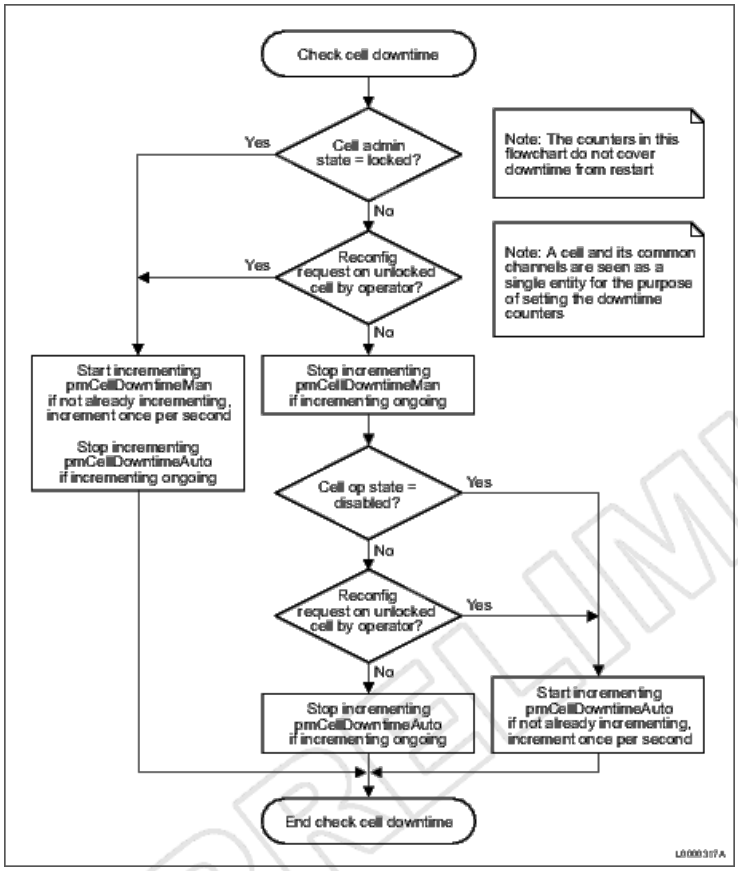

Figure 11 Cell Downtime

2.4 Integrity

This section describes the Integrity main traffic scenarios as follows:

- PDCP Latency
- PDCP Throughput

2.4.1 PDCP Latency

This traffic scenario describes the steps involved in Latency measurements.

The main counters for this scenario are:

- pmPdcpLatPktTransDl
- pmPdcpLatTimeDl

A flowchart for the PDCP Latency procedure is shown in the following figure:

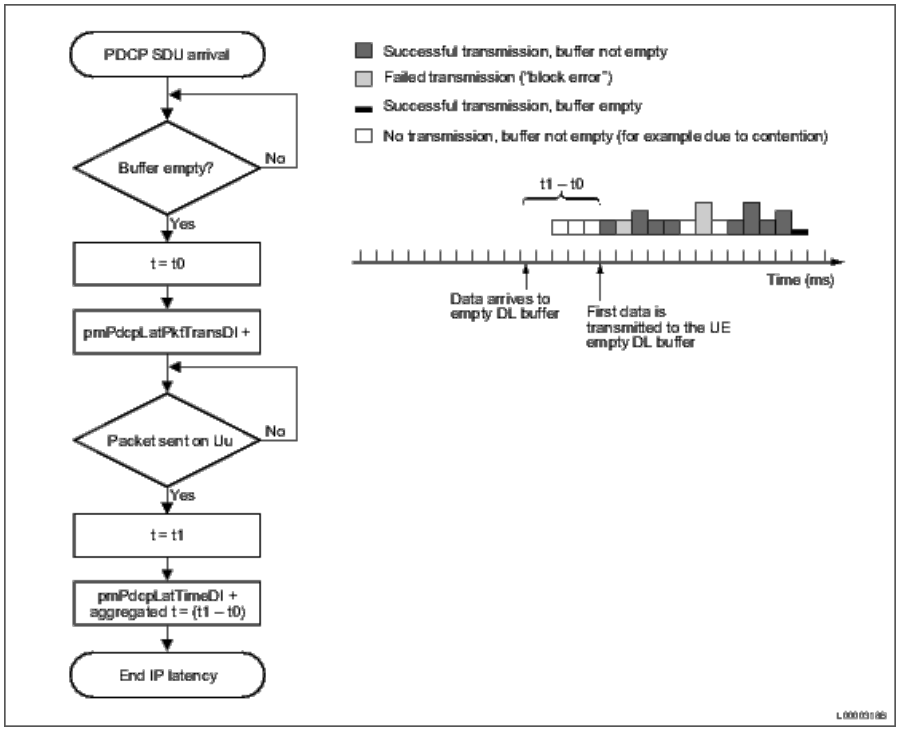

Figure 12 PDCP Latency

2.4.2 PDCP Volume

This traffic scenario describes the steps involved in PDCP Volume measurements.

The main counters for this scenario are:

- pmPdcpVolDlDrb
- pmPdcpVolDlDrbLastTTI
- pmPdcpVolDlDrbTrans
- pmPdcpVolDlSrb
- pmPdcpVolDlSrbTrans
- pmPdcpVolUlDrb
- pmPdcpVolUlDrbLastTTI
- pmPdcpVolUlSrb

A description of the PDCP Volume measurements is shown in the following figure:

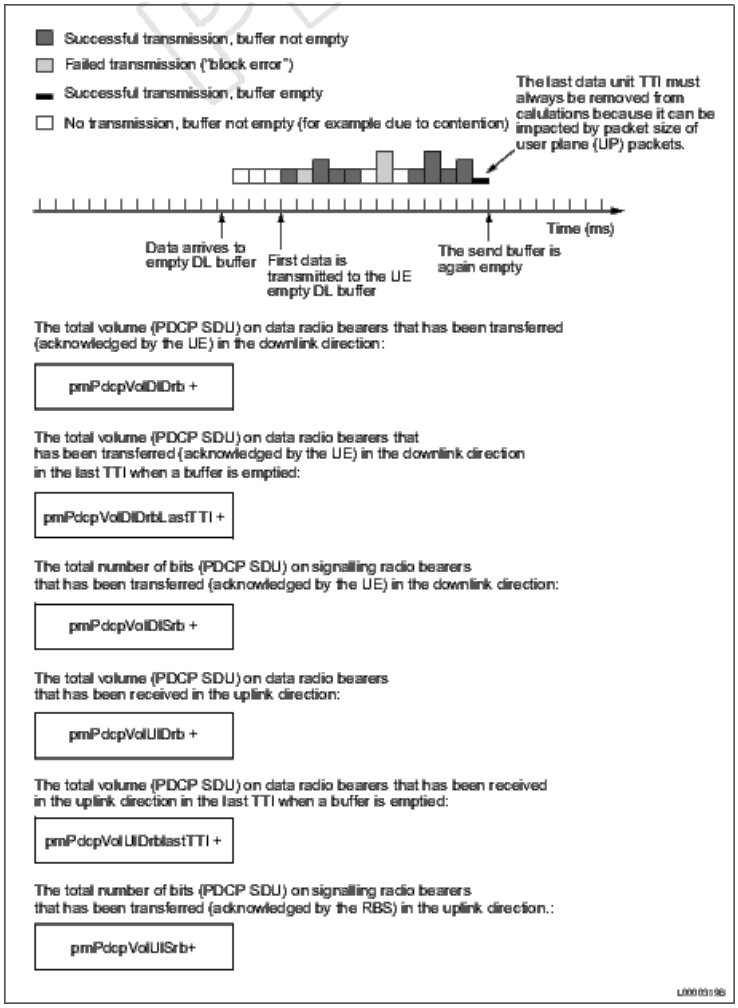

Figure 13 PDCP Volume

2.4.3 Time Measurements for Throughput Calculation

This section describes the counters used for throughput calculation.

The main counters for this scenario are:

- pmUeThpTimeDl
- pmUeThpTimeUl

A description of the Time measurements for throughput calculation is shown in the following figure:

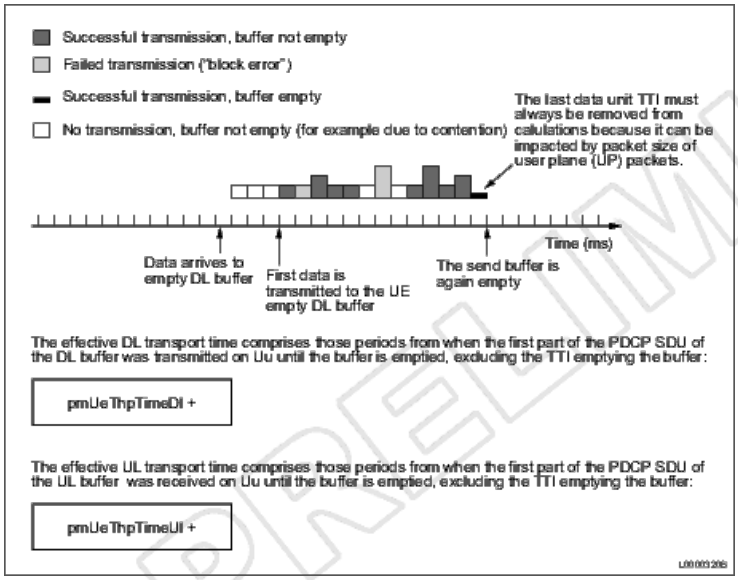

Figure 14 Time Measurements for Throughput Calculation

2.4.4 PDCP Packet Loss

This section describes the counters used for PDCP Packet Loss calculation.

The main counters for this scenario are:

- pmPdcpPktLostUl
- pmPdcpPktReceivedDl
- pmPdcpPktReceivedUl
- pmPdcpPktTransDl
- pmPdcpPktDiscDlHo
- pmPdcpPktDiscDlPelr
- pmPdcpPktDiscDlPelrUu

A description of the counters for Packet loss measurements is shown in the following figure:

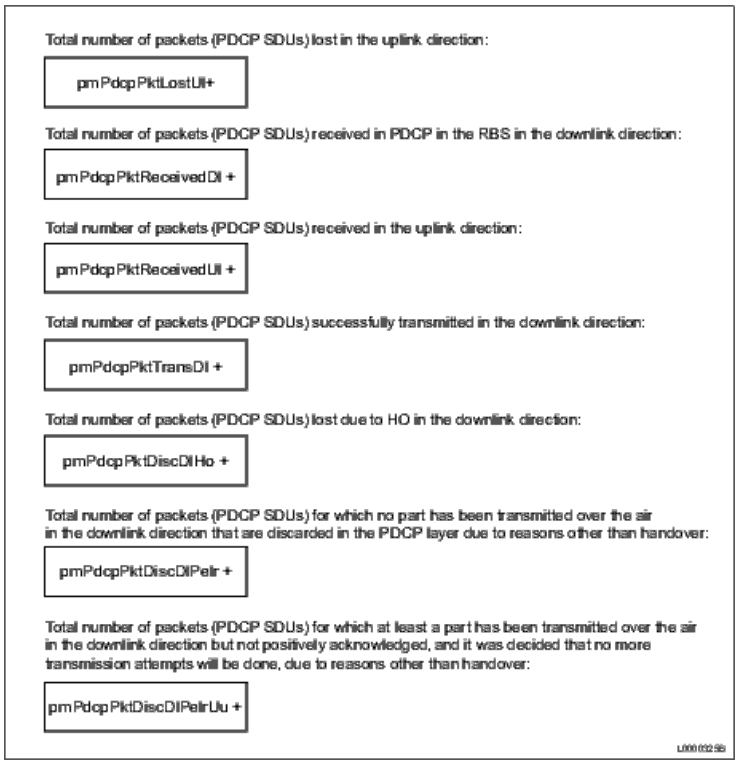

Figure 15 PDCP Packet Loss

2.5 Mobility

This section describes the mobility main traffic scenarios as follows:

- Intra-frequency LTE S1 handover
- Intra-frequency LTE X2 handover

2.5.1 Intra-frequency Handover

This traffic scenario describes successful and failed intra-frequency S1 and X2 handover (HO) .

The main counters for this scenario are as follows:

- pmHoExeAttLteIntraF
- pmHoExeSuccLteIntraF
- pmHoPrepAttLteIntraF
- pmHoPrepRejInLicConnUsers
- pmHoPrepRejInLicMob
- pmHoPrepSuccLteIntraF
- pmBestCellEvalReport
- pmBadCovEvalReport

A flowchart for the intra-frequency Handover scenario is shown in Figure 16 and Figure 17.

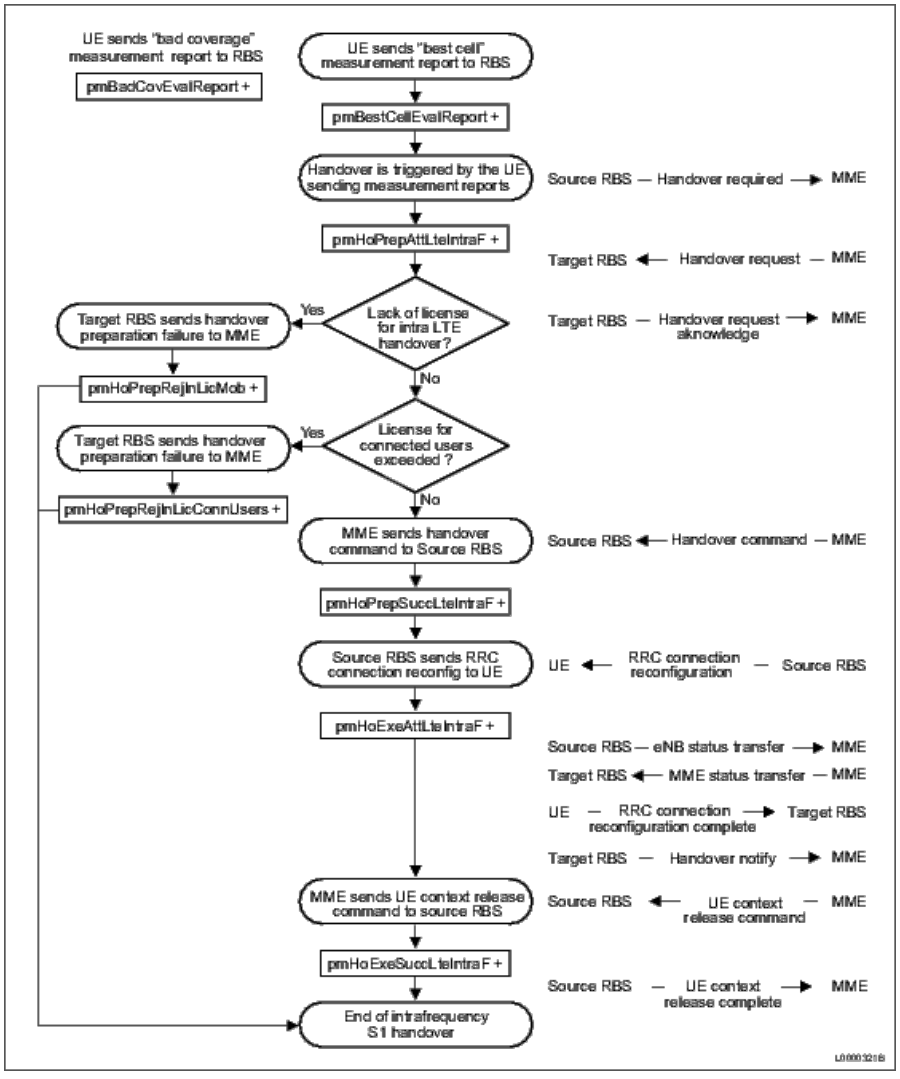

Figure 16 Intra-Frequency LTE S1 Handover

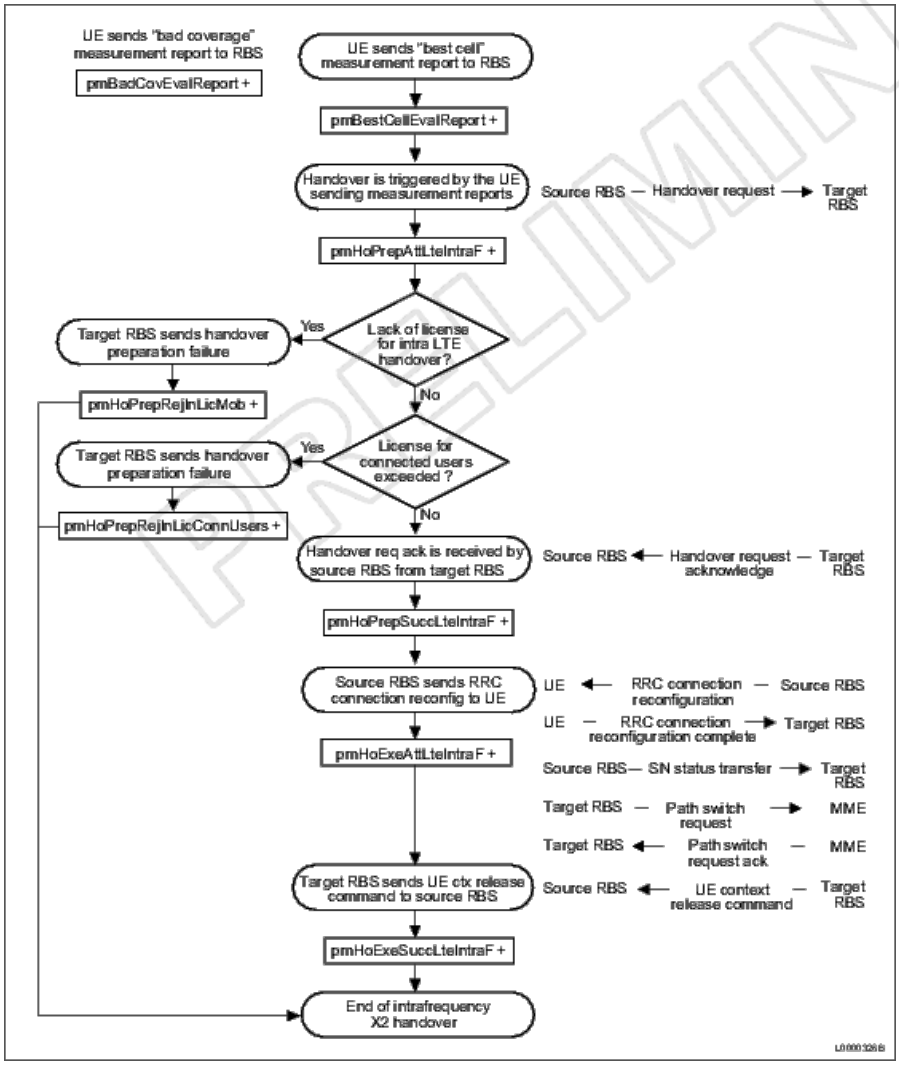

Figure 17 Intra-Frequency LTE X2 Handover

2.6 Resource use

This section describes flowcharts for the following Resource use procedures:

- Number of connected users
- Session time

2.6.1 Number of Connected Users

This section describes the number of UEs considered active in the Downlink (DL) and Uplink (UL) directions.

The main counters for this scenario are as follows:

- pmSchedActivityCellDl
- pmSchedActivityCellUl
- pmActiveUeSumDl
- pmActiveUeSumUl

A description of the Connected Users measurements is shown in the figure below:

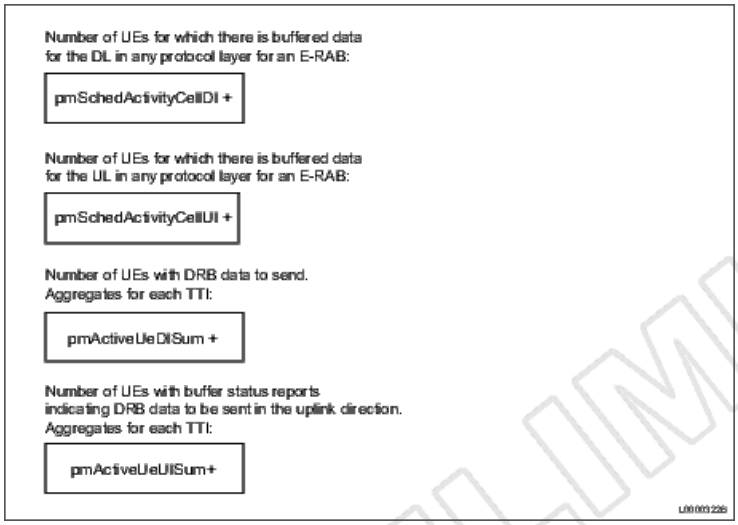

Figure 18 Number of Connected Users

2.6.2 Session Time

This section describes the aggregated session time for UEs in a cell.

The main counters for this scenario are as follows:

- pmSessionTimeUe

A description of the Session time measurements is shown in the figure below:

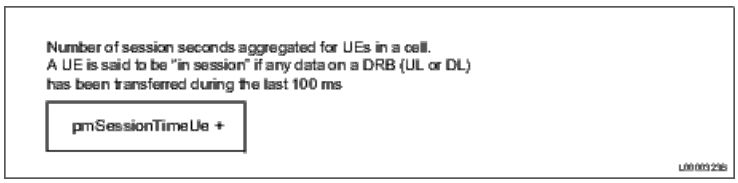

Figure 19 Session Time