Source: **SA5 (Telecom Management)**

Title: **2 Rel-5/6 CR 32.403 (Performance Management ; Performance measurements - UMTS and combined UMTS/GSM) : Correction of terms used for subcounter definitions**

Document for: **Decision**

Agenda Item: **7.5.3**

Doc-1st-	Spec	CR	Phase	Subject	Cat	Version-	Doc-2nd-	Status-	WI
SP-030645	32.403	024	Rel-5	Correction of terms used for subcounter definitions	F	5.4.0	S5-038802	Agreed	OAM-PM
SP-030645	32.403	025	Rel-6	Correction of terms used for subcounter definitions	A	6.1.0	S5-038803	Agreed	OAM-PM

CR-Form-v7

CHANGE REQUEST

⌘ 32.403 CR 024 ⌘rev - ⌘ Current version: 5.4.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [ ] Radio Access Network [X] Core Network [X]

Title:	⌘	Correction of terms used for subcounter definitions
Source:	⌘	**SA5** (baptiste.caroz@francetelecom.com)
Work item code:	⌘	OAM-PM
Date:	⌘	21/11/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	The expression “pegged by” does not have the intended meaning when applied to subcounter definitions in the TS. The use of the term “subcounter” is not consistent throughout the document.
Summary of change:	⌘	The term "pegged by" is replaced with "split into subcounters per". Correction of vocabulary for the use of “subcounters”.
Consequences if not approved:	⌘	Definitions of counters and subcounters could be misunderstood.

Clauses affected:	⌘	3.3, 3.5, 4.1.2, 4.1.3, 4.1.5, 4.4.2, 5.1.47, 5.6.25, 5.6.26, 5.6.27, 5.6.28, 5.6.29, 5.6.30, 5.6.31, 6.1.1.1, 6.1.1.2, 6.1.1.3, 6.1.2.4, 6.1.2.5, 6.2.2.1, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6, 6.3.7, 6.3.8, 6.3.9, 6.3.10, 6.4.1, 6.4.3, 6.5.1, 6.5.2, 6.5.3, 6.5.4, 6.5.5, A.2, A.3

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
			X	O&M Specifications		

Other comments:	⌘	Editorial correction: 5.6.27 was spelled 5.6.276 This is corrected by this CR. There is a corresponding Release 6 CR (S5-038803).

Change in Clause 3.3

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e) Measurement Type

This subclause contains a short form of the measurement name specified in the header, which is used to identify the measurement type in the result files.

The measurement names are dotted sequences of items. The sequence of elements identifying a measurement is organised from the general to the particular.

- The first item identifies the measurement family (e.g. HHO, RAB, SMS). Note that this family may also be used for measurement administration purpose.
- The second item identifies the name of the measurement itself.
- Depending on the measurement type, additional items may be present to specify ~~sub-counters~~subcounters (failure causes, traffic classes, min, max, avg, G, U ...). In case of multiple additional items, they are also represented as a dotted sequence of items. When available, the template will describe to which standard it is referring to for these additional items (e.g. cause, traffic class). Otherwise, the additional item semantics must be described in details in the present document. Standardised causes will be a number.
  (e.g. RRC.ConnEstab.1) but non standardised causes should be a string (e.g. RRC.ConnEstab.NoReply).

It is to be noted that the set of values issued for a measurement does not depend on the associated collection method (CC, SI, Gauge, DER). For instance, a gauge collected counter does not necessarily provide min, max, average values.

The vendor-specific UMTS and combined GSM/UMTS measurement names will all begin with the VS prefix.

In addition, it is recommended that a prefix is added for non-UMTS measurements:

- Q3 for Q3 measurements;
- MIB for IETF measurements (ATM, IP);
- OS for other standards measurements.

NOTE 1: The 3GPP standardised measurements name must not commence with the above prefixes.

Examples of valid measurement names are:

- VS.HO.InterSGSNReject.NoResource;
- HHO.SuccOutIntraCell;
- MM.AttachedSubs.Max;
- RAB.EstabAttCS.Conversational;
- RRC.ConnEstab.*Cause*
  where *Cause* identifies the failure cause.

Abbreviations to be used within measurement types can be found in subclause 3.2 of the present document.

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End of Change in Clause 3.3

Change in Clause 3.5

3.5 Management of per cause measurements

Per cause measurements may lead in certain cases to a lot of ~~measurement subtypes~~ subcounters which will increase substantially the size of the measurement report file. Since all per cause measurements are not necessarily useful to the end-user, two options are possible for the management of the corresponding ~~measurement subtypes~~subcounters:

- support all the ~~subtypes~~subcounters corresponding to the cause codes as defined in the 3GPP standards. In that case, the sum of all supported per cause measurements is equal to the total sum across all ~~subtypes~~subcounters;
- support only a subset of the ~~subtypes~~subcounters (allowed only if the cause codes are specified in 3GPP standards). In that case, the first value of the result sequence must be the total sum across all the cause codes as defined in 3GPP standards. This implies that all ~~subtypes~~subcounters of a given measurement type appear as uninterrupted sequence in the result file. The keyword *.sum* placed behind the measurement type is used to identify the sum subtype. The choice of the supported cause codes is manufacturer dependent.

End of Change in Clause 3.5

Change in Clause 4.1.2

4.1.2 RAB assignment for CS domain

The five measurement types defined in the clause 4.1.2 for CS domain are subject to the "4 out of 5 approach".

4.1.2.1 Attempted RAB establishments for CS domain

a) This measurement provides the number of RAB assignment attempts for CS domain. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On receipt by the RNC of a RANAP RAB ASSIGNMENT REQUEST message for CS domain, each RAB assignment request is added to the relevant measurement according to the traffic class requested. See TS 25.413 and TS 23.107.

d) Four integer values.

e) RAB.AttEstabCS.Conv
RAB.AttEstabCS.Strm
RAB.AttEstabCS.Intact
RAB.AttEstabCS.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.2 Successful RAB establishments without queuing for CS domain

a) This measurement provides the number of successfully established RABs for CS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each successfully established RAB is added to the relevant measurement according to the traffic class requested in the RAB ASSIGNMENT REQUEST message. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabCSNoQueuing.Conv
RAB.SuccEstabCSNoQueuing.Strm
RAB.SuccEstabCSNoQueuing.Intact
RAB.SuccEstabCSNoQueuing.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.3 Failed RAB establishments without queuing for CS domain

a) This measurement provides the number of RAB establishment failures for CS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each RAB failed to establish is added to the relevant measurement according to the failure cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabCSNoQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.4 Successful RAB establishments with queuing for CS domain

a) This measurement provides the number of successfully established RABs for CS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabCSQueuing.Conv
RAB.SuccEstabCSQueuing.Strm
RAB.SuccEstabCSQueuing.Intact
RAB.SuccEstabCSQueuing.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.5 Failed RAB establishments with queuing for CS domain

a) This measurement provides the number of RAB establishment failures for CS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each RAB failed to establish is added to the relevant measurement according to the cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabCSQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

End of Change in Clause 4.1.2

Change in Clause 4.1.3

4.1.3 RAB assignment for PS domain

The five measurement types defined in the clause 4.1.3 for PS domain are subject to the "4 out of 5 approach".

4.1.3.1 Attempted RAB establishments for PS domain

a) This measurement provides the number of RAB assignment attempts for PS domain. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On receipt by the RNC of a RANAP RAB ASSIGNMENT REQUEST message for PS domain, each RAB assignment request is added to the relevant measurement according to the traffic class requested. See TS 25.413 and TS 23.107.

d) Four integer values.

e) RAB.AttEstabPS.Conv
RAB.AttEstabPS.Strm
RAB.AttEstabPS.Intact
RAB.AttEstabPS.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.2 Successful RAB establishments without queuing for PS domain

a) This measurement provides the number of successfully established RABs for PS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabPSNoQueuing.Conv
RAB.SuccEstabPSNoQueuing.Strm
RAB.SuccEstabPSNoQueuing.Intact
RAB.SuccEstabPSNoQueuing.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.3 Failed RAB establishments without queuing for PS domain

a) This measurement provides the number of RAB establishment failures for PS in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each RAB failed to establish is added to the relevant measurement according to the failure cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabPSNoQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.4 Successful RAB establishments with queuing for PS domain

a) This measurement provides the number of successfully established RABs for PS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabPSQueuing.Conv
RAB.SuccEstabPSQueuing.Strm
RAB.SuccEstabPSQueuing.Intact
RAB.SuccEstabPSQueuing.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.5 Failed RAB establishments with queuing for PS domain

a) This measurement provides the number of RAB establishment failures for PS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each RAB failed to establish is added to the relevant measurement according to the cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabPSQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

End of Change in Clause 4.1.3

Change in Clause 4.1.5

4.1.5 RAB release

4.1.5.1 RAB releases for CS domain

a) This measurement provides the number of RAB releases for CS domain ~~pegged by~~split into subcounters per cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB RELEASE REQUEST message for CS domain, each RAB requested to be released is added to the relevant per cause measurement. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Releases for the CS domain. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.RelCS.*Cause*
where *Cause* identifies the release cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.5.2 RAB releases for PS domain

a) This measurement provides the number of RAB releases for PS domain ~~pegged by~~split into subcounters per cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB RELEASE REQUEST message for PS domain, each RAB requested to be released is added to the relevant per cause measurement. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Releases for the PS domain. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.RelPS.*Cause*
where *Cause* identifies the release cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

End of Change in Clause 4.1.5

Change in Clause 4.4.2

4.4.2 RRC connection establishment setup time

4.4.2.1 RRC connection set-up time (Mean)

a) This measurement provides the mean time per establishment cause it takes for the RNC ~~in order~~ to establish a RRC connection during each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause.

b) DER (n=1)

c) This measurement is obtained by accumulating the time intervals for every successful RRC connection establishment per establishment cause between the receipt by the RNC from the UE of a "RRC CONNECTION REQUEST" and the corresponding "RRC CONNECTION SETUP COMPLETE" message over a granularity

period using DER. The end value of this time will then be divided by the number of successful RRC connections observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause, see TS 25.331.

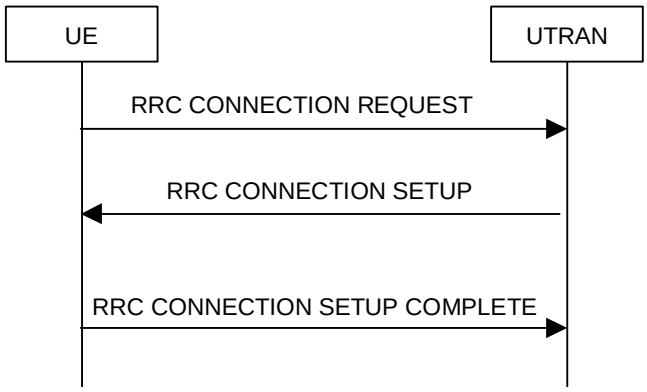

Figure:

d) Each measurement is an integer value.(in milliseconds)

e) RRC.AttConnEstabTimeMean.*Cause*
where *Cause* identifies the Establishment Cause.

f) UtranCell.

g) Valid for circuit switched and packet switched traffic

h) UMTS

4.4.2.2 RRC connection set-up time (Max)

a) This measurement provides the maximum time per establishment cause it takes for the RNC ~~in order to establish~~to establish a RRC connection during each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful RRC connection establishment per establishment cause between the receipt by the RNC from the UE of a "RRC CONNECTION REQUEST" and the corresponding "RRC CONNECTION SETUP COMPLETE" message, see TS 25.331. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause,.

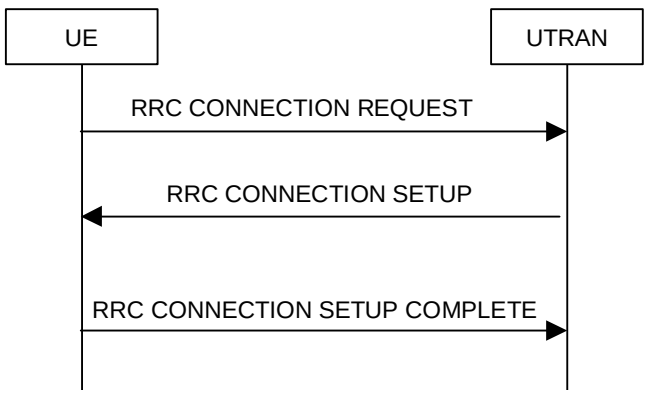

Figure:

d) Each measurement is an integer value.(in milliseconds)

e) RRC.AttConnEstabTimeMax.*Cause*
where *Cause* identifies the Establishment Cause.

f) UtranCell.

g) Valid for circuit switched and packet switched traffic

h) UMTS

End of Change in Clause 4.4.2

Change in Clause 5.1.47

5.1.47 Attempted Reset requests received from a HLR due to an HLR restart, indicating that a failure occurred

a) This measurement provides the number of Reset requests received from a HLR due to an HLR restart, indicating that a failure occurred.

b) CC.

c) Receipt of a 'MAP_RESET' service request (TS 29.002) from a HLR.

d) A single integer value.

e) MM.AttResetHlr.

f) SgsnFunction.

g) Valid for packet switching.

h) Combined.

End of Change in Clause 5.1.47

Change in Clause 5.6

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5.6.25 Failed PDP context activation procedures initiated by MS

a) This measurement provides the number of Failed PDP context activation procedures. These include the static as well as the dynamic PDP addresses. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) Transmission by the SGSN of a ACTIVATE PDP CONTEXT REJECT message indicating a PDP context activation failure, the measurement is incremented according to the failure cause. Possible causes are included in TS 24.008. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) A single integer value.

e) The measurement name has the form SM.FailActPdpCtxtMs.Cause
where Cause identifies the failure cause.

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.26 Failed PDP context activation procedures initiated by Network

a) This measurement provides the number of Failed PDP context activation procedures. These include the static as well as the dynamic PDP addresses. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) Receipt of a " REQUEST PDP CONTEXT ACTIVATION REJECT " message from the MS (TS 24.008) message indicating a PDP context activation failure, the measurement is incremented according to the failure cause. Possible causes are included in TS 24.008. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) A single integer value.

e) The measurement name has the form SM.FailActPdpCtxtNtwk.Cause
where Cause identifies the failure cause.

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.27~~6~~ Abnormal PDP context Deactivation procedures

a) This measurement provides the number of PDP context deactivation procedures initiated by the SGSN. This measurement is ~~pegged by~~split into subcounters per cause.

b) CC.

c) Transmission of a "Delete PDP Context Request" message to the GGSN (TS 29.060). ~~the~~ The measurement is incremented according to the deletion cause. Possible causes are included in TS 24.008. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) A single integer value.

e) SM.AttDeactPdpContextSgsn.cause

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.28 PDP Context set-up time, initiated by MS (Mean)

a) This measurement provides the mean time it takes for the SGSN ~~in order to established~~to establish a PDP context during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) DER (n=1).

c) This measurement is obtained by accumulating the time intervals for each successful mobile originated PDP context activation between the receipt by the SGSN of an " ACTIVATE PDP CONTEXT REQUEST" from the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. This end value of the time will then be divided by the number of successful mobile originated PDP context activations observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMOMean.Conv
SM. SuccActPdpContextAPNTimeMOMean.Strm
SM. SuccActPdpContextAPNTimeMOMean.Intact
SM. SuccActPdpContextAPNTimeMOMean.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.29 PDP Context set-up time, initiated by MS (Max)

a) This measurement provides the maximum time it takes for the SGSN ~~in order to established~~to establish a PDP context during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful mobile originated PDP context activation between the receipt by the SGSN of an " ACTIVATE PDP CONTEXT REQUEST" from the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMOMax.Conv
SM. SuccActPdpContextAPNTimeMOMax.Strm
SM. SuccActPdpContextAPNTimeMOMax.Intact
SM. SuccActPdpContextAPNTimeMOMax.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.30 PDP Context set-up time, initiated by Network (Mean)

a) This measurement provides the mean time it takes for the SGSN ~~in order~~ to establish~~ed~~ a PDP context initiated by the network during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) DER (n=1).

c) This measurement is obtained by accumulating the time intervals for each successful mobile terminated PDP context activation between the transmission by the SGSN of a "REQUEST PDP CONTEXT ACTIVATION" for the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. This end value of the time will then be divided by the number of successful mobile originated PDP context activations observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMTMean.Conv
SM. SuccActPdpContextAPNTimeMTMean.Strm

SM. SuccActPdpContextAPNTimeMTMean.Intact
SM. SuccActPdpContextAPNTimeMTMean.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.31 PDP Context set-up time, initiated by Network (Max)

a) This measurement provides the maximum time it takes for the SGSN ~~in order to established~~to establish a PDP context initiated by the network during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful mobile terminated PDP context activation between the transmission by the SGSN of a "REQUEST PDP CONTEXT ACTIVATION" for the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMTMax.Conv
SM. SuccActPdpContextAPNTimeMTMax.Strm
SM. SuccActPdpContextAPNTimeMTMax.Intact
SM. SuccActPdpContextAPNTimeMTMax.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

End of Change in Clause 5.6

Change in Clause 6.1.1

…..

6.1.1.1 Attempted session establishments

a) This measurement provides the number of attempted session establishments. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) indicated in the QoS profile.

b) CC

c) On receipt of a CREATE PDP CONTEXT REQUEST message by the GGSN, the relevant measurement is incremented according to the traffic class and allocation/retention priority (or precedence class) indicated in the message. In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.AttActPdpCtxt.Bgrd.Low
SM.AttActPdpCtxt.Conv.Low

SM.AttActPdpCtxt.Intact.Low
SM.AttActPdpCtxt.Strm.Low
SM.AttActPdpCtxt.Bgrd.High
SM.AttActPdpCtxt.Conv.High
SM.AttActPdpCtxt.Intact.High
SM.AttActPdpCtxt.Strm.High
SM.AttActPdpCtxt.Bgrd.Medium
SM.AttActPdpCtxt.Conv.Medium
SM.AttActPdpCtxt.Intact.Medium
SM.AttActPdpCtxt.Strm.Medium

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

6.1.1.2 Successful session establishments

a) This measurement provides the number of sessions successfully established. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) given in the QoS profile of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message sent with cause "Request Accepted", according to the traffic class and allocation/retention priority of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.SuccActPdpCtxt.Bgrd.Low
SM.SuccActPdpCtxt.Conv.Low
SM.SuccActPdpCtxt.Intact.Low
SM.SuccActPdpCtxt.Strm.Low
SM.SuccActPdpCtxt.Bgrd.High
SM.SuccActPdpCtxt.Conv.High
SM.SuccActPdpCtxt.Intact.High
SM.SuccActPdpCtxt.Strm.High
SM.SuccActPdpCtxt.Bgrd.Medium
SM.SuccActPdpCtxt.Conv.Medium
SM.SuccActPdpCtxt.Intact.Medium
SM.SuccActPdpCtxt.Strm.Medium

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

6.1.1.3 Failed session establishments

a) This measurement provides the number of session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message indicating a PDP context activation failure, the measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxt.*Cause*
where *Cause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Maintenance and Vendor Performance Modelling communities.

End of Change in Clause 6.1.1

Change in Clause 6.1.2

…..

6.1.2.4 Failed Network-initiated session establishments - failures occurred before sending PDP context activation request to the MS

a) This measurement provides the number of network initiated session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On receipt by the GGSN of a PDU NOTIFICATION RESPONSE message with cause different from "Request Accepted", indicating a PDP context activation failure, the relevant measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported per cause measurements should equal the total number of PDP context activation failures occurred before sending REQUEST PDP CONTEXT ACTIVATION message to the MS.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxtNetw.*NetwCause*
where *NetwCause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Maintenance communities.

6.1.2.5 Failed Network-initiated session establishments - failures occurred after sending PDP context activation request to the MS

a) This measurement provides the number of network initiated session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On receipt by the GGSN of a PDU NOTIFICATION REJECT REQUEST, the relevant measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported

per cause measurements should equal the total number of PDP context activation failures occurred after sending REQUEST PDP CONTEXT ACTIVATION message to the MS.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxtNetw.*MsCause*
where *MsCause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Maintenance communities.

End of Change in Clause 6.1.2

Change in Clause 6.2.2.1

6.2.2.1 Number of simultaneous active sessions, per APN

a) This measurement provides the current number of simultaneous active sessions per APN. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) indicated in the QoS profile.

b) GAUGE

c) The relevant measurement is incremented on transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message with cause "Request Accepted" according to the traffic class or allocation/retention priority indicated in the QoS profile.
The relevant measurement is decremented on transmission or receipt of DELETE PDP CONTEXT RESPONSE with cause "Request Accepted" according to the traffic class or the allocation/retention priority of the PDP context.
In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.NbrActPdpCtxt.Apn.Low
SM.NbrActPdpCtxt.Apn.Medium
SM.NbrActPdpCtxt.Apn.High
SM.NbrActPdpCtxt.Apn.Conv
SM.NbrActPdpCtxt.Apn.Strm
SM.NbrActPdpCtxt.Apn.Intact
SM.NbrActPdpCtxt.Apn.Bgrd

f) GgsnFunction, per APN

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

End of Change in Clause 6.2.2.1

Change in Clause 6.3

…..

6.3.1 Number of incoming GTP data packets on the Gn interface

a) This measurement provides the number of GTP Data Packets received on the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP data packet on the Gn interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncDataPkt.Bgrd
GTP.IncDataPkt.Conv
GTP.IncDataPkt.Intact
GTP.IncDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.2 Number of outgoing GTP data packets on the Gn interface

a) This measurement provides the number of GTP Data Packets sent onto the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutDataPkt.Bgrd
GTP.OutDataPkt.Conv
GTP.OutDataPkt.Intact
GTP.OutDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.3 Number of discarded GTP data packets

a) This measurement provides the number of GTP Data Packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented when a GTP data packet is discarded, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.DiscDataPkt.Bgrd
GTP.DiscDataPkt.Conv
GTP.DiscDataPkt.Intact
GTP.DiscDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.4 Number of octets of incoming GTP data packets on the Gn interface

a) This measurement provides the number of GTP payload octets received. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncDataOct.Bgrd
GTP.IncDataOct.Conv
GTP.IncDataOct.Intact
GTP.IncDataOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.5 Number of octets of outgoing GTP data packets on the Gn interface

a) This measurement provides the number of GTP payload octets sent. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutDataOct.Bgrd
GTP.OutDataOct.Conv
GTP.OutDataOct.Intact
GTP.OutDataOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.6 Number of incoming GTP signalling packets on the Gn interface

a) This measurement provides the number of GTP signalling packets received on the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP signalling packet on the Gn interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncSigPkt.Bgrd
GTP.IncSigPkt.Conv
GTP.IncSigPkt.Intact
GTP.IncSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.7 Number of outgoing GTP signalling packets on the Gn interface

a) This measurement provides the number of GTP signalling packets sent onto the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP siganlling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutSigPkt.Bgrd
GTP.OutSigPkt.Conv
GTP.OutSigPkt.Intact
GTP.OutSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.8 Number of discarded GTP signalling packets

a) This measurement provides the number of GTP signalling packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented when a GTP signalling packet is discarded, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.DiscSigPkt.Bgrd
GTP.DiscSigPkt.Conv
GTP.DiscSigPkt.Intact
GTP.DiscSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.9 Number of octets of incoming GTP signalling packets on the Gn interface

a) This measurement provides the number of octets of received GTP signalling packets. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP signalling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The signalling packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncSigOct.Bgrd
GTP.IncSigOct.Conv
GTP.IncSigOct.Intact
GTP.IncSigOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.10 Number of octets of outgoing GTP signalling packets on the Gn interface

a) This measurement provides the number of octets of sent GTP signalling packets. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP signalling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The signalling packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutSigOct.Bgrd
GTP.OutSigOct.Conv
GTP.OutSigOct.Intact
GTP.OutSigOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

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End of Change in Clause 6.3

Change in Clause 6.4

…..

6.4.1 Attempted CDR information transfers

a) This measurement provides the number of CDR information transfers attempted. This measurement is ~~pegged by~~split into subcounters per transfer triggering cause.

b) CC

c) The relevant measurement is incremented when a DATA RECORD TRANSFER REQUEST message used to transmit CDR information is sent to the CGF, according to the cause that triggered the transfer. Possible causes are included in TS 32.015.

d) Each measurement is an integer value.

e) The measurement name has the form GTPP.CdrTransfReq.*Cause*
where *Cause* indicates the cause that triggered the transfer.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.4.2 Successful CDR information transfers

a) This measurement provides the number of CDR information successfully transmitted to CGF.

b) CC

c) The measurement is incremented on receipt by the GGSN of a DATA RECORD TRANSFER RESPONSE message with cause code "Request Accepted".

d) Integer

e) GTPP.SuccCdrTransf

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.4.3 Failed CDR information transfers

a) This measurement provides the number of CDR information failed to be transferred to CGF. This measurement is ~~pegged by~~split into subcounters per failure cause. Possible causes are included in TS 32.015.

b) CC

c) The relevant measurement is incremented on receipt by the GGSN of a DATA RECORD TRANSFER RESPONSE message according to the failure cause.

d) Each measurement is an integer value.

e) The measurement name has the form GTPP.FailCdrTransf.*Cause*
where *Cause* indicates the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Maintenance and Operator Traffic Engineering communities.

End of Change in Clause 6.4

Change in Clause 6.5

…..

6.5.1 Number of incoming IP data packets on the Gi interface

This measurement provides the number of IP data packets received on the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

a) CC

b) The relevant measurement is incremented on receipt of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also 07 and TS 29.061.

c) A single integer value per measurement type defined in e)

d) IP.IncDataPkt.Bgrd
IP.IncDataPkt.Conv
IP.IncDataPkt.Intact
IP.IncDataPkt.Strm

e) GgsnFunction, per Gi reference point

f) Valid for packet switched traffic

g) COMB

h) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.2 Number of outgoing IP data packets on the Gi interface

a) This measurement provides the number of IP data packets sent onto the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.OutDataPkt.Bgrd
IP.OutDataPkt.Conv
IP.OutDataPkt.Intact
IP.OutDataPkt.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.3 Number of IP data packets discarded due to node congestion

a) This measurement provides the number of IP data packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented when a received IP data packet is discarded due to node congestion, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.DiscDataPkt.Bgrd
IP.DiscDataPkt.Conv
IP.DiscDataPkt.Intact
IP.DiscDataPkt.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.4 Number of octets of incoming IP data packets on the Gi interface

a) This measurement provides the number of IP payload octets received on the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on receipt of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the IP header and added on to the measurement value. See nd TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.IncDataOct.Bgrd
IP.IncDataOct.Conv
IP.IncDataOct.Intact
IP.IncDataOct.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.5.5 Number of octets of outgoing IP data packets on the Gi interface

a) This measurement provides the number of IP payload octets sent onto the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the IP header and added on to the measurement value. See TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.OutDataOct.Bgrd
IP.OutDataOct.Conv
IP.OutDataOct.Intact
IP.OutDataOct.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

End of Change in Clause 6.5

Change in Clause A.2

A.2 GSM/UMTS combined measurements

With relation to the field H of the measurement template, a measurement indicated with GSM/UMTS is an example of the "(n-1) out of n" approach with n=3 since (GSM + UMTS) = Combined.

In that case, all concerned measurements are included in the same template but the vendor may provide only 2 ~~sub-measurements~~ subcounters out of 3.

The measurement described in subclause 5.6.1 is subject to the "(n-1) out of n" approach with n=3:

- SM.AttActPdpContext (attempted context activation procedures with no distinction between GSM and UMTS).
- SM.AttActPdpContext.G (attempted context activation procedures for GSM only).
- SM.AttActPdpContext.U (attempted context activation procedures for UMTS only).

End of Change in Clause A.2

Change in Clause A.3

A.3 Embedded "(n-1) out of n" approaches

It is also possible to combine the approaches described above. For example, the measurements described in subclause 5.5 are subject to the "(n-1) out of n" approach at two levels.

Firstly, measurements are split according to the CS/PS domain, for example:

- attempted CS SMS mobile originating;
- attempted PS SMS mobile originating;
- attempted SMS mobile originating;

where any of the three measurements can be calculated from the two others.

Secondly, each measurement provides 3 ~~sub-measurements~~subcounters, for example for Attempted CS SMS mobile originating:

- SMS.AttMoCS;
- SMS.AttMoCS.G;
- SMS.AttMoCS.U;

where any of the three ~~sub-measurements~~subcounters can be calculated from the two others.

End of Change in Clause A.3
End of Document

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Jun 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Approval.	1.0.2	4.0.0
Sep 2001	S_13	SP-010468	001	--	Corrections on UMTS and combined UMTS/GSM measurements: Addition of family name for CN measurements, addition of the list of families, addition of Annex A: "(n-1) out of n" examples, application of the "(n-1) out of n" approach to all relevant measurements, enhancement of per cause measurements	4.0.0	4.1.0
Mar 2002	S_15	SP-020026	002	--	Correction of the measured object class for some SGSN MM measurement definitions	4.1.0	4.2.0
Mai 2002	--	--	--	--	MCC clean-up (Cosmetics based on EditHelp)	4.2.0	4.2.1
Jun 2002	S_16	SP-020291	003	2	Introduction of "Performance Measurements Definition Process" describing the repeatable, top-down process to define measurements for inclusion in future 3GPP Releases	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	004	--	Adding performance measurement definitions related to GGSN	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	005	--	Introduction of an optional "Purpose" clause in the measurement template	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	006	--	Addition of explanatory text for Radio Access Bearer (RAB) measurements	4.2.0	5.0.0
Sep 2002	S_17	SP-020609	009	--	Introduction of Service Based Performance Measurement Definitions	5.0.0	5.1.0
Sep 2002	S_17	SP-020609	010	--	Add flexibility in the measurement template for the Measured Object Class (MOC)	5.0.0	5.1.0
Mar 2003	S_19	SP-030146	012	-	Correction of the subscriber number measurement definitions	5.1.0	5.2.0
Jun 2003	S_20	SP-030292	014	--	Correction of the definition of the successful GPRS attach counters	5.2.0	5.3.0
Jun 2003	S_20	SP-030292	015	--	Deletion of dual clause 4.1.2	5.2.0	5.3.0
Sep 2003	S_21	SP-030431	019	--	Correction of collection method for SGSN measurements	5.3.0	5.4.0
Sep 2003	S_21	SP-030431	022	--	Correction of “outgoing intra-cell hard handovers measurements”	5.3.0	5.4.0

CR-Form-v7

CHANGE REQUEST

⌘ 32.403 CR 025 ⌘rev - ⌘ Current version: 6.1.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network X Core Network X

Title:	⌘	Correction of terms used for subcounter definitions
Source:	⌘	**SA5** (baptiste.caroz@francetelecom.com)
Work item code:	⌘	OAM-PM
Date:	⌘	21/11/2003
Category:	⌘	A
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The expression “pegged by” does not have the intended meaning when applied to subcounter definitions in the TS. The use of the term “subcounter” is not consistent throughout the document.
Summary of change:	⌘	The term "pegged by" is replaced with "split into subcounters per". Correction of vocabulary for the use of “subcounters”.
Consequences if not approved:	⌘	Definitions of counters and subcounters could be misunderstood.

Clauses affected:	⌘	3.3, 3.5, 4.1.2, 4.1.3, 4.1.5, 4.4.2, 4.10.1, 5.1.47, 5.1.48, 5.6.25, 5.6.26, 5.6.27, 5.6.28, 5.6.29, 5.6.30, 5.6.31, 6.1.1.1, 6.1.1.2, 6.1.1.3, 6.1.2.4, 6.1.2.5, 6.2.2.1, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.6, 6.3.7, 6.3.8, 6.3.9, 6.3.10, 6.4.1, 6.4.3, 6.5.1, 6.5.2, 6.5.3, 6.5.4, 6.5.5, 7.1.2, 7.1.6, 7.2.3, 7.2.4, 7.2.7, 7.2.8, 7.2.11, 7.2.12, A.2, A.3

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	This Release 6 CR corresponds to a Relase 5 CR S5-038802.

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

KEEP the History box of the TS to be changed (see end of the present document), please

Change in Clause 3.3

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e) Measurement Type

This subclause contains a short form of the measurement name specified in the header, which is used to identify the measurement type in the result files.

The measurement names are dotted sequences of items. The sequence of elements identifying a measurement is organised from the general to the particular.

- The first item identifies the measurement family (e.g. HHO, RAB, SMS). Note that this family may also be used for measurement administration purpose.
- The second item identifies the name of the measurement itself.
- Depending on the measurement type, additional items may be present to specify ~~sub-counters~~subcounters (failure causes, traffic classes, min, max, avg, G, U ...). In case of multiple additional items, they are also represented as a dotted sequence of items. When available, the template will describe to which standard it is referring to for these additional items (e.g. cause, traffic class). Otherwise, the additional item semantics must be described in details in the present document. Standardised causes will be a number.
  (e.g. RRC.ConnEstab.1) but non standardised causes should be a string (e.g. RRC.ConnEstab.NoReply).

It is to be noted that the set of values issued for a measurement does not depend on the associated collection method (CC, SI, Gauge, DER). For instance, a gauge collected counter does not necessarily provide min, max, average values.

The vendor-specific UMTS and combined GSM/UMTS measurement names will all begin with the VS prefix.

In addition, it is recommended that a prefix is added for non-UMTS measurements:

- Q3 for Q3 measurements;
- MIB for IETF measurements (ATM, IP);
- OS for other standards measurements.

NOTE 1: The 3GPP standardised measurements name must not commence with the above prefixes.

Examples of valid measurement names are:

- VS.HO.InterSGSNReject.NoResource;
- HHO.SuccOutIntraCell;
- MM.AttachedSubs.Max;
- RAB.EstabAttCS.Conversational;
- RRC.ConnEstab.*Cause*
  where *Cause* identifies the failure cause.

Abbreviations to be used within measurement types can be found in subclause 3.2 of the present document.

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End of Change in Clause 3.3

Change in Clause 3.5

3.5 Management of per cause measurements

Per cause measurements may lead in certain cases to a lot of ~~measurement subtypes~~ subcounters which will increase substantially the size of the measurement report file. Since all per cause measurements are not necessarily useful to the end-user, two options are possible for the management of the corresponding ~~measurement subtypes~~subcounters:

- support all the ~~subtypes~~subcounters corresponding to the cause codes as defined in the 3GPP standards. In that case, the sum of all supported per cause measurements is equal to the total sum across all ~~subtypes~~subcounters;
- support only a subset of the ~~subtypes~~subcounters (allowed only if the cause codes are specified in 3GPP standards). In that case, the first value of the result sequence must be the total sum across all the cause codes as defined in 3GPP standards. This implies that all ~~subtypes~~subcounters of a given measurement type appear as uninterrupted sequence in the result file. The keyword *.sum* placed behind the measurement type is used to identify the sum ~~subtype~~subcounter. The choice of the supported cause codes is manufacturer dependent.

End of Change in Clause 3.5

Change in Clause 4.1.2

4.1.2 RAB assignment for CS domain

The five measurement types defined in the clause 4.1.2 for CS domain are subject to the "4 out of 5 approach".

4.1.2.1 Attempted RAB establishments for CS domain

a) This measurement provides the number of RAB assignment attempts for CS domain. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On receipt by the RNC of a RANAP RAB ASSIGNMENT REQUEST message for CS domain, each RAB assignment request is added to the relevant measurement according to the traffic class requested. See TS 25.413 and TS 23.107.

d) Four integer values.

e) RAB.AttEstabCS.Conv
RAB.AttEstabCS.Strm
RAB.AttEstabCS.Intact
RAB.AttEstabCS.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.2 Successful RAB establishments without queuing for CS domain

a) This measurement provides the number of successfully established RABs for CS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each successfully established RAB is added to the relevant measurement according to the traffic class requested in the RAB ASSIGNMENT REQUEST message. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabCSNoQueuing.Conv
RAB.SuccEstabCSNoQueuing.Strm
RAB.SuccEstabCSNoQueuing.Intact
RAB.SuccEstabCSNoQueuing.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.3 Failed RAB establishments without queuing for CS domain

a) This measurement provides the number of RAB establishment failures for CS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each RAB failed to establish is added to the relevant measurement according to the failure cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabCSNoQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.4 Successful RAB establishments with queuing for CS domain

a) This measurement provides the number of successfully established RABs for CS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabCSQueuing.Conv
RAB.SuccEstabCSQueuing.Strm
RAB.SuccEstabCSQueuing.Intact
RAB.SuccEstabCSQueuing.Bgrd

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.2.5 Failed RAB establishments with queuing for CS domain

a) This measurement provides the number of RAB establishment failures for CS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for CS domain, each RAB failed to establish is added to the relevant measurement according to the cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabCSQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

End of Change in Clause 4.1.2

Change in Clause 4.1.3

4.1.3 RAB assignment for PS domain

The five measurement types defined in the clause 4.1.3 for PS domain are subject to the "4 out of 5 approach".

4.1.3.1 Attempted RAB establishments for PS domain

a) This measurement provides the number of RAB assignment attempts for PS domain. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On receipt by the RNC of a RANAP RAB ASSIGNMENT REQUEST message for PS domain, each RAB assignment request is added to the relevant measurement according to the traffic class requested. See TS 25.413 and TS 23.107.

d) Four integer values.

e) RAB.AttEstabPS.Conv
RAB.AttEstabPS.Strm
RAB.AttEstabPS.Intact
RAB.AttEstabPS.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.2 Successful RAB establishments without queuing for PS domain

a) This measurement provides the number of successfully established RABs for PS domain in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabPSNoQueuing.Conv
RAB.SuccEstabPSNoQueuing.Strm
RAB.SuccEstabPSNoQueuing.Intact
RAB.SuccEstabPSNoQueuing.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.3 Failed RAB establishments without queuing for PS domain

a) This measurement provides the number of RAB establishment failures for PS in which a queuing process has not been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each RAB failed to establish is added to the relevant measurement according to the failure cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

NOTE: The addition is performed with the condition the RAB has not been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabPSNoQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.4 Successful RAB establishments with queuing for PS domain

a) This measurement provides the number of successfully established RABs for PS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each successfully established RAB is added to the relevant measurement according to the traffic class. See TS 25.413 and TS 23.107.

NOTE: The addition is performed with the condition the RAB has been mentioned as queued in a previous RANAP RAB ASSIGNMENT RESPONSE.

d) Four integer values.

e) RAB.SuccEstabPSQueuing.Conv
RAB.SuccEstabPSQueuing.Strm
RAB.SuccEstabPSQueuing.Intact
RAB.SuccEstabPSQueuing.Bgrd

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

4.1.3.5 Failed RAB establishments with queuing for PS domain

a) This measurement provides the number of RAB establishment failures for PS domain in which a queuing process has been involved. The measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB ASSIGNMENT RESPONSE message for PS domain, each RAB failed to establish is added to the relevant measurement according to the cause. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Establishment Failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.FailEstabPSQueuing.*Cause*
where *Cause* identifies the failure cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

End of Change in Clause 4.1.3

Change in Clause 4.1.5

4.1.5 RAB release

4.1.5.1 RAB releases for CS domain

a) This measurement provides the number of RAB releases for CS domain ~~pegged by~~split into subcounters per cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB RELEASE REQUEST message for CS domain, each RAB requested to be released is added to the relevant per cause measurement. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Releases for the CS domain. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.RelCS.*Cause*
where *Cause* identifies the release cause.

f) RncFunction.

g) Valid for circuit switched traffic.

h) UMTS.

4.1.5.2 RAB releases for PS domain

a) This measurement provides the number of RAB releases for PS domain ~~pegged by~~split into subcounters per cause.

b) CC.

c) On transmission by the RNC of a RANAP RAB RELEASE REQUEST message for PS domain, each RAB requested to be released is added to the relevant per cause measurement. Possible causes are included in TS 25.413. The sum of all supported per cause measurements shall equal the total number of RAB Releases for the PS domain. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form RAB.RelPS.*Cause*
where *Cause* identifies the release cause.

f) RncFunction.

g) Valid for packet switched traffic.

h) UMTS.

End of Change in Clause 4.1.5

Change in Clause 4.4.2

4.4.2 RRC connection establishment setup time

4.4.2.1 RRC connection set-up time (Mean)

a) This measurement provides the mean time per establishment cause it takes for the RNC ~~in order to establish~~to establish a RRC connection during each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause.

b) DER (n=1)

c) This measurement is obtained by accumulating the time intervals for every successful RRC connection establishment per establishment cause between the receipt by the RNC from the UE of a "RRC CONNECTION REQUEST" and the corresponding "RRC CONNECTION SETUP COMPLETE" message over a granularity

period using DER. The end value of this time will then be divided by the number of successful RRC connections observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause, see TS 25.331.

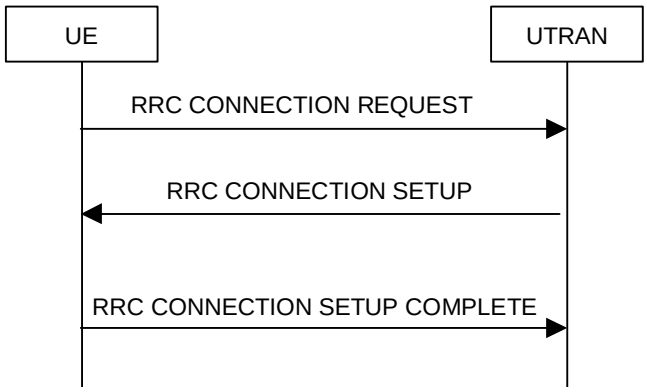

Figure:

d) Each measurement is an integer value.(in milliseconds)

e) RRC.AttConnEstabTimeMean.*Cause*
where *Cause* identifies the Establishment Cause.

f) UtranCell.

g) Valid for circuit switched and packet switched traffic

h) UMTS

4.4.2.2 RRC connection set-up time (Max)

a) This measurement provides the maximum time per establishment cause it takes for the RNC ~~in order to establish~~to establish a RRC connection during each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful RRC connection establishment per establishment cause between the receipt by the RNC from the UE of a "RRC CONNECTION REQUEST" and the corresponding "RRC CONNECTION SETUP COMPLETE" message, see TS 25.331. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period. The measurement is ~~pegged by~~split into subcounters per establishment cause,.

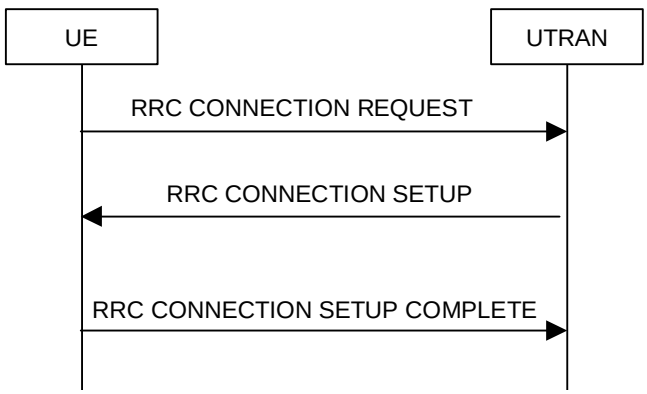

Figure:

d) Each measurement is an integer value.(in milliseconds)

e) RRC.AttConnEstabTimeMax.*Cause*
where *Cause* identifies the Establishment Cause.

f) UtranCell.

g) Valid for circuit switched and packet switched traffic

h) UMTS

End of Change in Clause 4.4.2

Change in Clause 4.10

4.10 Hard handover

~~4.10.1 Outgoing intra-cell hard handovers~~

4.10.1 Intra-cell hard handovers

The three measurement types defined in the subclause 4.10.1.n for intra-cell hard handovers are subject to the "2 out of 3 approach".

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End of Change in Clause 4.10

Change in Clause 5.1

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5.1.47 Attempted Reset requests received from a HLR due to an HLR restart, indicating that a failure occurred

a) This measurement provides the number of Reset requests received from a HLR due to an HLR restart, indicating that a failure occurred.

b) CC.

c) Receipt of a 'MAP_RESET' service request (TS 29.002) from a HLR.

d) A single integer value.

e) MM.AttResetHlr.

f) SgsnFunction.

g) Valid for packet switching.

h) Combined.

5.1.48 Failed GPRS Attach Procedure

a) This measurement provides the number of GPRS attach procedures failures. The measurement is ~~pegged by~~split into subcounters per the failure cause. The three measurement types defined in e) are subject to the "2 out of 3 approach".

b) CC

c) On transmission by the SGSN of the GPRS ATTACH REJECT message to the MS, as defined in TS 23.060 [17], indicating an attach failure, the relevant measurement is incremented according to the cause. Possible causes are included in TS 24.008 [15]. The sum of all supported per cause measurements shall be equal to the total number of GPRS attach failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~subcounter will be provided first.

d) A single integer value per measurement type as defined in e). The number of measurements is equal to the number of implemented per cause measurements plus a possible sum value identified by the *.sum* suffix

e) MM. FailedGprsAttach.*Cause*

MM. FailedGprsAttach.*Cause*	Combined (don't care)
MM. FailedGprsAttach.*Cause*.G	GSM
MM. FailedGprsAttach.*Cause*.U	UMTS
where *Cause* identifies the failure cause	

f) Sgsn function

g) Valid for packet switching

h) GSM/UMTS

End of Change in Clause 5.1

Change in Clause 5.6

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5.6.25 Failed PDP context activation procedures initiated by MS

a) This measurement provides the number of Failed PDP context activation procedures. These include the static as well as the dynamic PDP addresses. This measurement is ~~pegged by~~split into subcounters per failure cause. The three measurement types defined in e) are subject to the "2 out of 3 approach".

b) CC.

c) Transmission by the SGSN of an ACTIVATE PDP CONTEXT REJECT message indicating a PDP context activation failure, the relevant measurement is incremented according to the failure cause. Possible causes are included in TS 24.008 Annex G. The sum of all supported per cause measurements should equal the total number of PDP context activation failures. In case only a subset of per cause measurements is supported, a sum ~~measurement subtype~~ subcounter will be provided first.

d) A single integer value per measurement type as defined in e). The number of measurements is equal to the number of implemented per cause measurements plus a possible sum value identified by the *.sum* suffix.

e) The measurement name has the form SM.FailActPdpCtxtMs.Cause where Cause identifies the failure cause.

SM. FailActPdpCtxtMs.*Cause*	Combined (don't care)
SM. FailActPdpCtxtMs.*Cause*.G	GSM
SM. FailActPdpCtxtMs.*Cause*.U	UMTS
where *Cause* identifies the failure cause	

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.26 Failed PDP context activation procedures initiated by Network

a) This measurement provides the number of Failed PDP context activation procedures. These include the static as well as the dynamic PDP addresses. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC.

c) Receipt of a " REQUEST PDP CONTEXT ACTIVATION REJECT " message from the MS (TS 24.008) message indicating a PDP context activation failure, the measurement is incremented according to the failure cause. Possible causes are included in TS 24.008. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) A single integer value.

e) The measurement name has the form SM.FailActPdpCtxtNtwk.Cause
where Cause identifies the failure cause.

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.27 Abnormal PDP context Deactivation procedures

a) This measurement provides the number of PDP context deactivation procedures initiated by the SGSN. This measurement is ~~pegged by~~split into subcounters per cause.

b) CC.

c) Transmission of a "Delete PDP Context Request" message to the GGSN (TS 29.060). the measurement is incremented according to the deletion cause. Possible causes are included in TS 24.008. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) A single integer value.

e) SM.AttDeactPdpContextSgsn.cause

f) SgsnFunction.

g) Valid for packet switching.

h) GSM/UMTS.

5.6.28 PDP Context set-up time, initiated by MS (Mean)

a) This measurement provides the mean time it takes for the SGSN ~~in order to established~~to establish a PDP context during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) DER (n=1).

c) This measurement is obtained by accumulating the time intervals for each successful mobile originated PDP context activation between the receipt by the SGSN of an " ACTIVATE PDP CONTEXT REQUEST" from the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. This end value of the time will then be divided by the number of successful mobile originated PDP context activations observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMOMean.Conv
SM. SuccActPdpContextAPNTimeMOMean.Strm
SM. SuccActPdpContextAPNTimeMOMean.Intact
SM. SuccActPdpContextAPNTimeMOMean.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.29 PDP Context set-up time, initiated by MS (Max)

a) This measurement provides the maximum time it takes for the SGSN ~~in order to established~~to establish a PDP context during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful mobile originated PDP context activation between the receipt by the SGSN of an " ACTIVATE PDP CONTEXT REQUEST" from the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMOMax.Conv
SM. SuccActPdpContextAPNTimeMOMax.Strm
SM. SuccActPdpContextAPNTimeMOMax.Intact
SM. SuccActPdpContextAPNTimeMOMax.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.30 PDP Context set-up time, initiated by Network (Mean)

a) This measurement provides the mean time it takes for the SGSN ~~in order to established~~to establish a PDP context initiated by the network during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) DER (n=1).

c) This measurement is obtained by accumulating the time intervals for each successful mobile terminated PDP context activation between the transmission by the SGSN of a "REQUEST PDP CONTEXT ACTIVATION" for the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. This end value of the time will then be divided by the number of successful mobile originated PDP context activations observed in the granularity period to give the arithmetic mean, the accumulator shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMTMean.Conv
SM. SuccActPdpContextAPNTimeMTMean.Strm
SM. SuccActPdpContextAPNTimeMTMean.Intact
SM. SuccActPdpContextAPNTimeMTMean.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

5.6.31 PDP Context set-up time, initiated by Network (Max)

a) This measurement provides the maximum time it takes for the SGSN ~~in order to established~~to establish a PDP context initiated by the network during each collection interval. The measurement is ~~pegged by~~split into subcounters per traffic class per APN (see TS 23.003 for APN definition), these measurements will only be provided for a subset of all APNs. The way the list of monitored APNs is configured is outside the scope of this TS.

b) GAUGE

c) This measurement is obtained by monitoring the time intervals for each successful mobile terminated PDP context activation between the transmission by the SGSN of a "REQUEST PDP CONTEXT ACTIVATION" for the MS and the corresponding transmission by the SGSN to the MS of an "ACTIVATE PDP CONTEXT" message over a granularity period using DER, see TS 29.060, TS 24.008 and TS 23.107 for service class definitions. The high tide mark of this time will be stored in a gauge, the gauge shall be reinitialised at the beginning of each granularity period.

d) Each measurement is an integer value.(in milliseconds).

e) SM. SuccActPdpContextAPNTimeMTMax.Conv
SM. SuccActPdpContextAPNTimeMTMax.Strm
SM. SuccActPdpContextAPNTimeMTMax.Intact
SM. SuccActPdpContextAPNTimeMTMax.Bgrd

f) SgsnFunction, per APN.

g) Valid for packet switched traffic.

h) GSM/UMTS

End of Change in Clause 5.6

Change in Clause 6.1.1

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6.1.1.1 Attempted session establishments

a) This measurement provides the number of attempted session establishments. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) indicated in the QoS profile.

b) CC

c) On receipt of a CREATE PDP CONTEXT REQUEST message by the GGSN, the relevant measurement is incremented according to the traffic class and allocation/retention priority (or precedence class) indicated in the message. In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.AttActPdpCtxt.Bgrd.Low
SM.AttActPdpCtxt.Conv.Low
SM.AttActPdpCtxt.Intact.Low
SM.AttActPdpCtxt.Strm.Low
SM.AttActPdpCtxt.Bgrd.High

SM.AttActPdpCtxt.Conv.High
SM.AttActPdpCtxt.Intact.High
SM.AttActPdpCtxt.Strm.High
SM.AttActPdpCtxt.Bgrd.Medium
SM.AttActPdpCtxt.Conv.Medium
SM.AttActPdpCtxt.Intact.Medium
SM.AttActPdpCtxt.Strm.Medium

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

6.1.1.2 Successful session establishments

a) This measurement provides the number of sessions successfully established. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) given in the QoS profile of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message sent with cause "Request Accepted", according to the traffic class and allocation/retention priority of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.SuccActPdpCtxt.Bgrd.Low
SM.SuccActPdpCtxt.Conv.Low
SM.SuccActPdpCtxt.Intact.Low
SM.SuccActPdpCtxt.Strm.Low
SM.SuccActPdpCtxt.Bgrd.High
SM.SuccActPdpCtxt.Conv.High
SM.SuccActPdpCtxt.Intact.High
SM.SuccActPdpCtxt.Strm.High
SM.SuccActPdpCtxt.Bgrd.Medium
SM.SuccActPdpCtxt.Conv.Medium
SM.SuccActPdpCtxt.Intact.Medium
SM.SuccActPdpCtxt.Strm.Medium

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

6.1.1.3 Failed session establishments

a) This measurement provides the number of session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message indicating a PDP context activation failure, the measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported per cause measurements should equal the total number of PDP context activation failures.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxt.*Cause*
where *Cause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Maintenance and Vendor Performance Modelling communities.

End of Change in Clause 6.1.1

Change in Clause 6.1.2

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6.1.2.4 Failed Network-initiated session establishments - failures occurred before sending PDP context activation request to the MS

a) This measurement provides the number of network initiated session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On receipt by the GGSN of a PDU NOTIFICATION RESPONSE message with cause different from "Request Accepted", indicating a PDP context activation failure, the relevant measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported per cause measurements should equal the total number of PDP context activation failures occurred before sending REQUEST PDP CONTEXT ACTIVATION message to the MS.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxtNetw.*NetwCause*
where *NetwCause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Maintenance communities.

6.1.2.5 Failed Network-initiated session establishments - failures occurred after sending PDP context activation request to the MS

a) This measurement provides the number of network initiated session establishment failures. This measurement is ~~pegged by~~split into subcounters per failure cause.

b) CC

c) On receipt by the GGSN of a PDU NOTIFICATION REJECT REQUEST, the relevant measurement is incremented according to the failure cause. Possible causes are included in TS 29.060. The sum of all supported per cause measurements should equal the total number of PDP context activation failures occurred after sending REQUEST PDP CONTEXT ACTIVATION message to the MS.

d) Each measurement is an integer value. The number of measurements is equal to the number of causes supported.

e) The measurement name has the form SM.FailActPdpCtxtNetw.*MsCause*
where *MsCause* identifies the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Maintenance communities.

End of Change in Clause 6.1.2

Change in Clause 6.2.2.1

6.2.2.1 Number of simultaneous active sessions, per APN

a) This measurement provides the current number of simultaneous active sessions per APN. This measurement is ~~pegged by~~split into subcounters per traffic class and allocation/retention priority (or precedence class) indicated in the QoS profile.

b) GAUGE

c) The relevant measurement is incremented on transmission by the GGSN of a CREATE PDP CONTEXT RESPONSE message with cause "Request Accepted" according to the traffic class or allocation/retention priority indicated in the QoS profile.
The relevant measurement is decremented on transmission or receipt of DELETE PDP CONTEXT RESPONSE with cause "Request Accepted" according to the traffic class or the allocation/retention priority of the PDP context.
In case of a PDP context activated with R97/98 QoS attributes, the fields traffic class and allocation/retention priority used for screening are derived from delay class and precedence class respectively, as ruled in TS 23.107. See also TS 24.008 and TS 29.060.

d) A single integer value per measurement type defined in e)

e) SM.NbrActPdpCtxt.Apn.Low
SM.NbrActPdpCtxt.Apn.Medium
SM.NbrActPdpCtxt.Apn.High
SM.NbrActPdpCtxt.Apn.Conv
SM.NbrActPdpCtxt.Apn.Strm
SM.NbrActPdpCtxt.Apn.Intact
SM.NbrActPdpCtxt.Apn.Bgrd

f) GgsnFunction, per APN

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Operator Business and Vendor Performance Modelling communities.

End of Change in Clause 6.2.2.1

Change in Clause 6.3

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6.3.1 Number of incoming GTP data packets on the Gn interface

a) This measurement provides the number of GTP Data Packets received on the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP data packet on the Gn interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncDataPkt.Bgrd
GTP.IncDataPkt.Conv
GTP.IncDataPkt.Intact
GTP.IncDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.2 Number of outgoing GTP data packets on the Gn interface

a) This measurement provides the number of GTP Data Packets sent onto the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutDataPkt.Bgrd
GTP.OutDataPkt.Conv
GTP.OutDataPkt.Intact
GTP.OutDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.3 Number of discarded GTP data packets

a) This measurement provides the number of GTP Data Packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented when a GTP data packet is discarded, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS

attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.DiscDataPkt.Bgrd
GTP.DiscDataPkt.Conv
GTP.DiscDataPkt.Intact
GTP.DiscDataPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.4 Number of octets of incoming GTP data packets on the Gn interface

a) This measurement provides the number of GTP payload octets received. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncDataOct.Bgrd
GTP.IncDataOct.Conv
GTP.IncDataOct.Intact
GTP.IncDataOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.5 Number of octets of outgoing GTP data packets on the Gn interface

a) This measurement provides the number of GTP payload octets sent. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP data packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutDataOct.Bgrd
GTP.OutDataOct.Conv
GTP.OutDataOct.Intact
GTP.OutDataOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.6 Number of incoming GTP signalling packets on the Gn interface

a) This measurement provides the number of GTP signalling packets received on the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP signalling packet on the Gn interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncSigPkt.Bgrd
GTP.IncSigPkt.Conv
GTP.IncSigPkt.Intact
GTP.IncSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.7 Number of outgoing GTP signalling packets on the Gn interface

a) This measurement provides the number of GTP signalling packets sent onto the Gn interface. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP siganlling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutSigPkt.Bgrd
GTP.OutSigPkt.Conv
GTP.OutSigPkt.Intact
GTP.OutSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.8 Number of discarded GTP signalling packets

a) This measurement provides the number of GTP signalling packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented when a GTP signalling packet is discarded, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.DiscSigPkt.Bgrd
GTP.DiscSigPkt.Conv
GTP.DiscSigPkt.Intact
GTP.DiscSigPkt.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.3.9 Number of octets of incoming GTP signalling packets on the Gn interface

a) This measurement provides the number of octets of received GTP signalling packets. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on receipt of a GTP signalling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The signalling packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.IncSigOct.Bgrd
GTP.IncSigOct.Conv
GTP.IncSigOct.Intact
GTP.IncSigOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.3.10 Number of octets of outgoing GTP signalling packets on the Gn interface

a) This measurement provides the number of octets of sent GTP signalling packets. This measurement is ~~pegged by~~split into subcounters per traffic class.

b) CC

c) The relevant measurement is incremented on transmission of a GTP signalling packet on the Gn interface, according to the traffic class indicated in the QoS profile of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The signalling packet size is extracted from the GTP header and added on to the measurement value. See TS 29.060.

d) A single integer value per measurement type defined in e)

e) GTP.OutSigOct.Bgrd
GTP.OutSigOct.Conv
GTP.OutSigOct.Intact
GTP.OutSigOct.Strm

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

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End of Change in Clause 6.3

Change in Clause 6.4

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6.4.1 Attempted CDR information transfers

a) This measurement provides the number of CDR information transfers attempted. This measurement is ~~pegged by~~split into subcounters per transfer triggering cause.

b) CC

c) The relevant measurement is incremented when a DATA RECORD TRANSFER REQUEST message used to transmit CDR information is sent to the CGF, according to the cause that triggered the transfer. Possible causes are included in TS 32.015.

d) Each measurement is an integer value.

e) The measurement name has the form GTPP.CdrTransfReq.*Cause*
where *Cause* indicates the cause that triggered the transfer.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.4.2 Successful CDR information transfers

a) This measurement provides the number of CDR information successfully transmitted to CGF.

b) CC

c) The measurement is incremented on receipt by the GGSN of a DATA RECORD TRANSFER RESPONSE message with cause code "Request Accepted".

d) Integer

e) GTPP.SuccCdrTransf

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.4.3 Failed CDR information transfers

a) This measurement provides the number of CDR information failed to be transferred to CGF. This measurement is ~~pegged by~~split into subcounters per failure cause. Possible causes are included in TS 32.015.

b) CC

c) The relevant measurement is incremented on receipt by the GGSN of a DATA RECORD TRANSFER RESPONSE message according to the failure cause.

d) Each measurement is an integer value.

e) The measurement name has the form GTPP.FailCdrTransf.*Cause*
where *Cause* indicates the failure cause.

f) GgsnFunction

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Maintenance and Operator Traffic Engineering communities.

End of Change in Clause 6.4

Change in Clause 6.5

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6.5.1 Number of incoming IP data packets on the Gi interface

This measurement provides the number of IP data packets received on the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

a) CC

b) The relevant measurement is incremented on receipt of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also 07 and TS 29.061.

c) A single integer value per measurement type defined in e)

d) IP.IncDataPkt.Bgrd
IP.IncDataPkt.Conv
IP.IncDataPkt.Intact
IP.IncDataPkt.Strm

e) GgsnFunction, per Gi reference point

f) Valid for packet switched traffic

g) COMB

h) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.2 Number of outgoing IP data packets on the Gi interface

a) This measurement provides the number of IP data packets sent onto the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.OutDataPkt.Bgrd
IP.OutDataPkt.Conv
IP.OutDataPkt.Intact
IP.OutDataPkt.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.3 Number of IP data packets discarded due to node congestion

a) This measurement provides the number of IP data packets discarded. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented when a received IP data packet is discarded due to node congestion, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. See also TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.DiscDataPkt.Bgrd
IP.DiscDataPkt.Conv
IP.DiscDataPkt.Intact
IP.DiscDataPkt.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling, Operator Traffic Engineering and Vendor Development Engineering communities.

6.5.4 Number of octets of incoming IP data packets on the Gi interface

a) This measurement provides the number of IP payload octets received on the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on receipt of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the IP header and added on to the measurement value. See nd TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.IncDataOct.Bgrd
IP.IncDataOct.Conv
IP.IncDataOct.Intact
IP.IncDataOct.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

6.5.5 Number of octets of outgoing IP data packets on the Gi interface

a) This measurement provides the number of IP payload octets sent onto the Gi interface. This measurement is ~~pegged by~~split into subcounters per traffic class of the related PDP context.

b) CC

c) The relevant measurement is incremented on transmission of an IP data packet on the Gi interface, according to the traffic class of the related PDP context. In case of a PDP context activated with R97/98 QoS attributes, the field traffic class used for screening is derived from delay class, as ruled in TS 23.107. The data packet size is extracted from the IP header and added on to the measurement value. See TS 29.061.

d) A single integer value per measurement type defined in e)

e) IP.OutDataOct.Bgrd
IP.OutDataOct.Conv
IP.OutDataOct.Intact
IP.OutDataOct.Strm

f) GgsnFunction, per Gi reference point

g) Valid for packet switched traffic

h) COMB

i) This measurement is mainly dedicated to Vendor Performance Modelling and Operator Traffic Engineering communities.

End of Change in Clause 6.5

Change in Clause 7.1.2

7.1.2 Number of Multimedia Messages submit responses sent by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) submit responses sent by MMS Relay/Server to MMS User Agent on the Reference point MM1. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On transmission of a " MM1_submit.RES " message to MMS User Agent. Each submit responses is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM1SubRes.*Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.1.2

Change in Clause 7.1.6

7.1.6 Number of Multimedia Messages retrieve responses sent by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) retrieve responses sent by MMS Relay/Server to MMS User Agent on the Reference point MM1. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On transmission of a " MM1_retrieve.RES " message to MMS User Agent. Each retrieve responses is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM1RetRes.*Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.1.6

Change in Clause 7.2.3

7.2.3 Number of Multimedia Messages forward responses received by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) forward responses received by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On receipt of a " MM4_forward.RES" message from MMS Relay/Server. Each forward response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4FwdResRec *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.3

Change in Clause 7.2.4

7.2.4 Number of Multimedia Messages forward responses sent by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) forward responses sent by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On transmission of a " MM4_forward.RES " message to MMS Relay/Server. Each forward response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4FwdResSnt *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.4

Change in Clause 7.2.7

7.2.7 Number of Multimedia Messages delivery report responses received by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) delivery report responses received by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On receipt of a " MM4_ delivery_report.RES" message from MMS Relay/Server. Each delivery report response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4RepResRec *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.7

Change in Clause 7.2.8

7.2.8 Number of Multimedia Messages delivery report responses sent by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) delivery report responses sent by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On transmission of a " MM4_delivery_report.RES" message to MMS Relay/Server. Each delivery report response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4RepResSnt *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.8

Change in Clause 7.2.11

7.2.11 Number of Multimedia Messages read reply responses received by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) read reply responses received by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On receipt of a " MM4_ read_reply.RES" message from MMS Relay/Server. Each read reply response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4ReadResRec *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.11

Change in Clause 7.2.12

7.2.12 Number of Multimedia Messages read reply responses sent by MMS Relay/Server

a) This measurement provides the number of Multimedia Messages (MM) read reply responses sent by MMS Relay/Server from another MMS Relay/Server on the Reference point MM4. The measurement is ~~pegged by~~split into subcounters per request status code.

b) CC.

c) On transmission of a " MM4_read_reply.RES " message to MMS Relay/Server. Each read reply response~~s~~ is added to the relevant measurement according to the request status code. See TS 23.140 [25].

d) A single integer value.

e) The measurement name has the form MMS.MM4ReadResSnt *Status*

where *Status* identifies the request status code.

f) MMS Relay/Server Function.

g) Valid for packet switching.

h) GSM/UMTS.

End of Change in Clause 7.2.12

Change in Clause A.2

A.2 GSM/UMTS combined measurements

With relation to the field H of the measurement template, a measurement indicated with GSM/UMTS is an example of the "(n-1) out of n" approach with n=3 since (GSM + UMTS) = Combined.

In that case, all concerned measurements are included in the same template but the vendor may provide only 2 ~~sub-measurements~~ subcounters out of 3.

The measurement described in subclause 5.6.1 is subject to the "(n-1) out of n" approach with n=3:

- SM.AttActPdpContext (attempted context activation procedures with no distinction between GSM and UMTS).
- SM.AttActPdpContext.G (attempted context activation procedures for GSM only).
- SM.AttActPdpContext.U (attempted context activation procedures for UMTS only).

End of Change in Clause A.2

Change in Clause A.3

A.3 Embedded "(n-1) out of n" approaches

It is also possible to combine the approaches described above. For example, the measurements described in subclause 5.5 are subject to the "(n-1) out of n" approach at two levels.

Firstly, measurements are split according to the CS/PS domain, for example:

- attempted CS SMS mobile originating;
- attempted PS SMS mobile originating;
- attempted SMS mobile originating;

where any of the three measurements can be calculated from the two others.

Secondly, each measurement provides 3 ~~sub-measurements~~subcounters, for example for Attempted CS SMS mobile originating:

- SMS.AttMoCS;
- SMS.AttMoCS.G;
- SMS.AttMoCS.U;

where any of the three ~~sub-measurements~~subcounters can be calculated from the two others.

End of Change in Clause A.3
End of Document

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Jun 2001	S_12	SP-010237	--	--	Submitted to TSG SA #12 for Approval.	1.0.2	4.0.0
Sep 2001	S_13	SP-010468	001	--	Corrections on UMTS and combined UMTS/GSM measurements: Addition of family name for CN measurements, addition of the list of families, addition of Annex A: "(n-1) out of n" examples, application of the "(n-1) out of n" approach to all relevant measurements, enhancement of per cause measurements	4.0.0	4.1.0
Mar 2002	S_15	SP-020026	002	--	Correction of the measured object class for some SGSN MM measurement definitions	4.1.0	4.2.0
Mai 2002	--	--	--	--	MCC clean-up (Cosmetics based on EditHelp)	4.2.0	4.2.1
Jun 2002	S_16	SP-020291	003	2	Introduction of "Performance Measurements Definition Process" describing the repeatable, top-down process to define measurements for inclusion in future 3GPP Releases	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	004	--	Adding performance measurement definitions related to GGSN	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	005	--	Introduction of an optional "Purpose" clause in the measurement template	4.2.0	5.0.0
Jun 2002	S_16	SP-020291	006	--	Addition of explanatory text for Radio Access Bearer (RAB) measurements	4.2.0	5.0.0
Sep 2002	S_17	SP-020609	009	--	Introduction of Service Based Performance Measurement Definitions	5.0.0	5.1.0
Sep 2002	S_17	SP-020609	010	--	Add flexibility in the measurement template for the Measured Object Class (MOC)	5.0.0	5.1.0
Mar 2003	S_19	SP-030146	012	--	Correction of the subscriber number measurement definitions	5.1.0	5.2.0
Jun 2003	S_20	SP-030292	014	--	Correction of the definition of the successful GPRS attach counters	5.2.0	5.3.0
Jun 2003	S_20	SP-030292	015	--	Deletion of dual clause 4.1.2	5.2.0	5.3.0
Jun 2003	S_20	SP-030293	016	--	Addition of GPRS per cause measurement definitions	5.3.0	6.0.0
Jun 2003	S_20	SP-030293	017	--	Introduction of MMS Service Based Performance Measurement	5.3.0	6.0.0
Sep 2003	S_21	SP-030431	020	--	Correction of collection method for SGSN measurements	6.0.0	6.1.0
Sep 2003	S_21	SP-030431	023	--	Correction of “outgoing intra-cell hard handovers measurements”	6.0.0	6.1.0