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**Source:** SA5 (Telecom Management)  
**Title:** R99 CR32.015, Rel-4 CR32.215 Charging (S5-010643, S5-010642),  
(S5-010741, S5-010742)  
**Document for:** Decision  
**Agenda Item:** 7.5.3

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Doc-1st-	Spec	CR	R	Phase	Subject	Ca	Versi	Versi	Doc-2nd-	Workitem
SP-010633	32.015	032		R99	Specification of the "Data Record Format" and "Data Record Format Version"	F	3.7.0	3.8.0	S5-010643	OAM-CH
SP-010633	32.215	001		Rel-4	Specification of the "Data Record Format" and "Data Record Format Version"	A	4.0.0	4.1.0	S5-010642	OAM-CH
SP-010633	32.015	034		R99	Correction of ASN.1 data items QoSMeanThroughput/QoSInformation	F	3.7.0	3.8.0	S5-010741	OAM-CH
SP-010633	32.215	002		Rel-4	Correction of ASN.1 data item QoSInformation	A	4.0.0	4.1.0	S5-010742	OAM-CH

CR-Form-v4

## CHANGE REQUEST

⌘ **32.015 CR 032** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

<b>Title:</b>	⌘ Specification of the "Data Record Format" and "Data Record Format Version"		
<b>Source:</b>	⌘ SA5		
<b>Work item code:</b>	⌘ OAM-CH	<b>Date:</b>	⌘ 19/10/2001
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
	<i>Use one of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<i>Use one of the following releases:</i> <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ To ensure proper decoding of a CDR, the CDR Format Version needs to be specified. This is particularly critical in a multi-vendor network. The changes are aimed to enable specification of the CDR Format Version in the Data Record IE.
<b>Summary of change:</b>	⌘ Define the "Data Record Format" in section 7.4 and "Data Record Format Version" in section 7.5. Former section 7.5 was renumbered to 7.6.
<b>Consequences if not approved:</b>	⌘ Without these proper procedures, CDR decoding errors may result.

<b>Clauses affected:</b>	⌘ 7.3.4.5.4, 7.4 and Section 7.5		
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input checked="" type="checkbox"/> O&M Specifications	⌘	32.215
<b>Other comments:</b>	⌘ Correspondent changes are made in the scope of Rel-4 32.215 (S5-010642).		

### 7.3.4.5.4 Data Record Packet IE

The Data Record Packet element, which is present conditionally if the Packet Transfer Command is ‘Send Data Record Packet’ or ‘Send possibly duplicated Data Record Packet’, may contain one or more data records. This IE is illustrated in Figure 16. If an "empty packet" is to be sent (for testing if a recently recovered peer node has earlier received a packet with this sequence number), then the Data Record Packet IE contains only the Type (with value 252 in decimal) and the Length (with value 0) fields.

As shown in Figure 16, there are two fields identifying the CDR format: Data Record Format and Data Record Format Version. The format of the records is ASN.1 or ~~an~~ some other format, as identified by the Data Record Format. The Data Record Format Version identifies the TS release and version numbers that were used for the CDR encoding. The formats of these two fields are described in detail in section 7.4 and 7.5, respectively.

The Data Record Format Version numbering starts from 1.

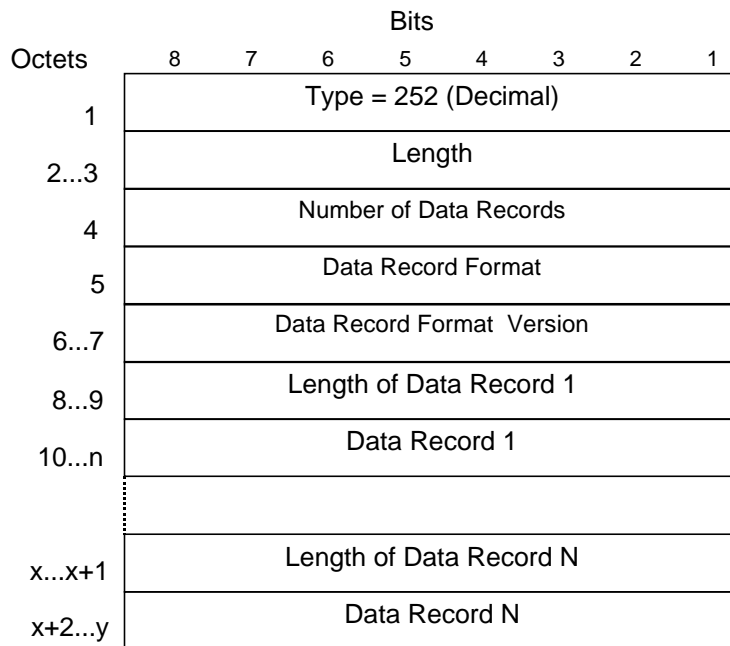


Figure 16: Data Record Packet information element

## 7.4 Data Record Formats used in GTP’

~~The format of the CDRs sent between the GPRS Network Elements that generate the CDRs and the CGF are defined by the Data Record Format of Data Record Packet information element. In addition to 1 standard format (ASN.1), there are private formats.~~

The format of the CDRs sent between the UMTS Network Elements that generate the PS domain CDRs and the CGF are defined by the Data Record Format, which is the 5<sup>th</sup> octet of Data Record Packet information element, shown in Figure 16.

The following rules govern the Data Record Format:

- This field consists of one octet (#5).
- The value range is 1-255 in decimal. The value ‘0’ should not be used.
- Only the values 1-10 and 51-255 can be used for standards purposes.
- Values in the range of 11-50 are to be configured only by operators, and are not subject to standardization.
- The value ‘1’ identifies ASN.1 format (in PS domain charging). If needed other values are specified in subclause 7.4.1.

### 7.4.1 Standard Data Record FormatASN.1 format

See clause 8 and the ASN.1 language descriptions for the definitions. Basic Encoding Rules (BER) provides the transfer syntax for abstract syntax defined in ASN.1. The Data Record Format code for ASN.1 is 1.

For the PS Domain CDR transfer, defined by this TS, only an ASN.1 format is used. For this format the *Data Record Format* value is '1'. See clause 6 and the ASN.1 language descriptions for the definitions. Basic Encoding Rules (BER) provides the transfer syntax for abstract syntax defined in ASN.1.

### 7.4.2 Private Data Record FormatsOther formats

The physical CDR format can also be a private one. The Data Record Format identifiers 11...50 (decimal) are reserved for private (implementation specific) use. The *Data Record Format identifiers* 11...50 (decimal) are reserved for private (implementation specific) format use.

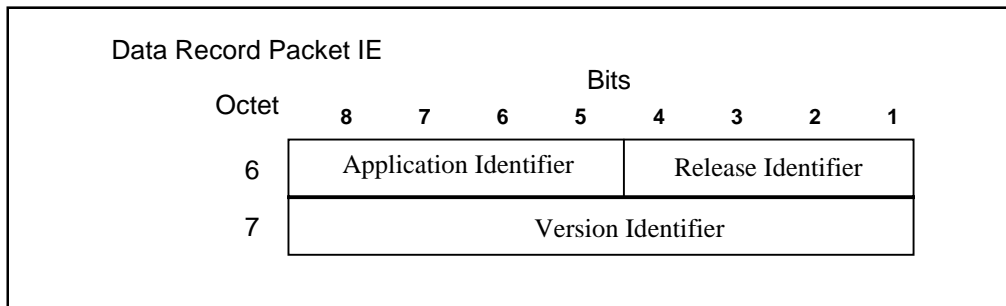
## 7.5 Data Record Format Version for CDRs

The CDR release and versions numbers are defined by the '*Data Record Format Version*', in octet 6 and 7 of the *Data Record Packet IE*, shown in Figure 13. The format of this field is depicted in Figure 23.

The first octet (#6 in *Data Record Packet IE*) is divided into two fields each with 4 bits. The first field (octet 6, bits 8-5 in Fig 23) identifies the application. The second field (bits 4-1 of octet 6) identifies the release. For charging purposes, the Application Identifier has a value of '1' (decimal). Other possible applications of GTP' may use different numbers. The Release Identifier indicates the TS release used to encode the CDR. The following values are used to identify the CDR release:

- '20' (decimal) for R98, and
- '43' (decimal) for R99.

The second octet (#7) identifies the version of the TS used to encode the CDR. For R98, the version number is 1. For R99 the decimal value of the Version identifies is provided in Table 18. Note that the value must be '1' or larger.



**Figure 23: The Format of the *Data Record Format Version* Field**

**Table 18: The decimal value of the Version Identifier used in R99 and R4 CDRs**

<u>Value</u>	<u>R99</u>
<u>1</u>	<u>TS 32.015 v3.0.0</u>
<u>2</u>	<u>TS 32.015 v3.1.0</u>
<u>3</u>	<u>TS 32.015 v3.1.1</u>
<u>4</u>	<u>TS 32.015 v3.2.0</u>
<u>5</u>	<u>TS 32.015 v3.3.0</u>
<u>6</u>	<u>TS 32.015 v3.4.0</u>
<u>7</u>	<u>TS 32.015 v3.5.0</u>
<u>8</u>	<u>TS 32.015 v3.6.0</u>
<u>9</u>	<u>TS 32.015 v3.7.0</u>

## 7.56 CGF - BS Protocol Interface

### 7.56.1 The transfer protocols at CGF - BS interface

The present document gives several recommendations for the main protocol layers for the Charging Gateway Functionality - Billing System (BS) interface protocol stack. These recommendations are not strictly specified features, since there are a lot of variations among the existing Billing Systems. The recommendations are FTAM protocol on X.25 or TCP/IP, and FTP over TCP/IP.

### 7.56.2 The format of the CDRs at CGF - BS interface

The contents of the CDRs sent between the CGF and the Billing System (BS) are defined by the ASN.1 language clause 8, Charging Data Record Structure. Other CDR contents or formats are possible if the CGF provides processing functionality for the CDRs.

# CHANGE REQUEST

⌘ **32.015 CR 034** ⌘ ev **-** ⌘ Current version: **3.7.0** ⌘

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

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

<b>Title:</b>	⌘ Correction of ASN.1 data items QoSMeanThroughput/QoSInformation		
<b>Source:</b>	⌘ SA5		
<b>Work item code:</b>	⌘ OAM-CH	<b>Date:</b>	⌘ 30/11/2001
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)	<b>2</b> (GSM Phase 2)	
	<b>A</b> (corresponds to a correction in an earlier release)	<b>R96</b> (Release 1996)	
	<b>B</b> (addition of feature),	<b>R97</b> (Release 1997)	
	<b>C</b> (functional modification of feature)	<b>R98</b> (Release 1998)	
	<b>D</b> (editorial modification)	<b>R99</b> (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<b>REL-4</b> (Release 4)
			<b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ The definition of the CDR ASN.1 data item "QoSMeanThroughput" does not correspond with its definition in 24.008.
<b>Summary of change:</b>	⌘ This CR aligns the ASN.1 definition of data item "QoSMeanThroughput" with 24.008. Additionally it introduces the option to use the transparent data item ("umtsQoSInformation") for pre-R99 QoS profiles.
<b>Consequences if not approved:</b>	⌘ Misinterpretation of QoS information in off-line billing systems.

<b>Clauses affected:</b>	⌘ 8.1		
<b>Other specs Affected:</b>	⌘ <input type="checkbox"/> Other core specifications	⌘	
	<input type="checkbox"/> Test specifications		
	<input checked="" type="checkbox"/> O&M Specifications		32.215
<b>Other comments:</b>	⌘ Correspondent changes are made in the scope of Rel-4 32.215 (S5-010742).		

## 8 Charging Data Record Structure

### 8.1 ASN.1 definitions for CDR information

...  
< unmodified ASN.1 >  
...

```
QoSMeanThroughput ::= ENUMERATED
{
  --
```

-- See Quality of service TS 24.008

--

~~bestEffort~~ subscribedMeanThroughput (0), -- MS to network direction  
 -- Network to MS direction needs not to be covered since value (0) = "reserved"

mean100octetPh	(1),
mean200octetPh	(2),
mean500octetPh	(3),
mean1000octetPh	(4),
mean2000octetPh	(5),
mean5000octetPh	(6),
mean10000octetPh	(7),
mean20000octetPh	(8),
mean50000octetPh	(9),
mean100000octetPh	(10),
mean200000octetPh	(11),
mean500000octetPh	(12),
mean1000000octetPh	(13),
mean2000000octetPh	(14),
mean5000000octetPh	(15),
mean10000000octetPh	(16),
mean20000000octetPh	(17),
mean50000000octetPh	(18),
reserved	(30),
bestEffort	(31)

QoSInformation ::= CHOICE

```
{
  gsmQoSInformation      [0] GSMQoSInformation,
  umtsQoSInformation     [1] OCTET STRING (SIZE (4..12))
}
```

~~-- When dealing with a pre R99 QoS profile the GSN may either choose the "GSMQoSInformation" or the  
 -- "umtsQoSInformation" encoding. Dealing with R99 QoS profiles the GSN shall apply the  
 -- "umtsQoSInformation" encoding. The umtsQoSInformation octet string is a 1:1 copy of the contents  
 -- (starting with octet 4) of the "Quality of service Profile" information element specified in  
 -- 3GPP TS 29.060 [22] for R99 and GSM TS 09.60 for pre R99 cases.~~

~~-- The "GSMQoSInformation" corresponds to the encoding specified in GSM TS 12.15, and  
 -- shall be used for pre-Release 99 terminals only. The umtsQoSInformation octet string  
 -- is a 1:1 copy of the contents (i.e. starting with octet 4) of the "Quality of  
 -- service Profile" information element specified in 3GPP TS 29.060 [22].~~

...

< unmodified ASN.1 >

...

CR-Form-v4

## CHANGE REQUEST

⌘ **32.215 CR 001** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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

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

<b>Title:</b>	⌘ Specification of the "Data Record Format" and "Data Record Format Version"		
<b>Source:</b>	⌘ SA5		
<b>Work item code:</b>	⌘ OAM-CH	<b>Date:</b>	⌘ 19/10/2001
<b>Category:</b>	⌘ <b>A</b>	<b>Release:</b>	⌘ REL-4
	Use <u>one</u> 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 <u>one</u> 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)

<b>Reason for change:</b>	⌘ Enable specification of the CDR Format Version in the Data Record IE in a manner consistent with R99 32.015. These specifications are required to ensure interoperability in a multi-vendor network.
<b>Summary of change:</b>	⌘ Replace the specifications for "Data Record Format Version" in section 7.3.4.5.4 with detailed specifications of "Data Record Format" in section 7.4 and "Data Record Format" in section 7.5. The old 7.5 section is renumbered to be 7.6.
<b>Consequences if not approved:</b>	⌘ To ensure proper decoding of a CDR, the CDR format version needs to be specified. This is particularly critical in a multi-vendor network. Without these proper procedures, CDR decoding errors may result.

<b>Clauses affected:</b>	⌘ 7.3.4.5.4 and Section 7.4		
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input checked="" type="checkbox"/> O&M Specifications	⌘	32.015
<b>Other comments:</b>	⌘ Correspondent changes are made in the scope of R99 32.015 (S5-010643).		



#### 7.3.4.5.4 Data Record Packet IE

The *Data Record Packet* element, which is present conditionally if the Packet Transfer Command is ‘Send Data Record Packet’, may contain one or more data records. This IE is illustrated in Figure 13. If an "empty packet" is to be sent, then the *Data Record Packet* IE contains only the *Type* (with value 252 in decimal) and the *Length* (with value 0) fields.

As shown in Figure 13, there are two fields identifying the CDR format: *Data Record Format* and *Data Record Format Version*. The format of the records is ASN.1 or some other format, as identified by the *Data Record Format*. The *Data Record Format Version* identifies the TS release and version numbers that were used for the CDR encoding. The formats of these two fields are described in detail in section 7.4 and 7.5, respectively.

In order to uniquely identify the *Data Record Format Version* for an ASN.1 encoded CDR, the following procedure is recommended:

The two octets that represent the *Data Record Format Version* (Octets # 6 and 7 of the IE, shown in Figure 13) are defined by the following numbers in the ‘DataTypes’ field: The first octet (i.e., #6) is derived from the number of the corresponding 3GPP TS and the second octet (i.e., #7) is the version number. Since an octet can only represent a number less than 255, it is necessary to correlate the TS document number with an agreed upon key. The following is recommended:

For R98 documents (e.g., from GSM 12.15 or TS 10g1 393), ‘0’ is used.

For R99 documents (e.g., TS 32.015) ‘1’ is used.

For R4 (e.g., TS 32.215) ‘2’ is used.

For example, in this document (R4) the ‘DataTypes’ is defined in section 6.1 as:

```
TS32215-DataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) umts-Operation-
Maintenance (3) ts-32-215 (215) informationModel (0) asn1Module (2) version1 (1)}
```

Therefore, for an R4 CDR defined by this document, the two numbers placed in the two octets of the *Data Record Format Version* field are 2 (the first digit of 215, for ‘ts 32 215’) and 1 for ‘version1’. Octet #6 of the *Data Record Packet* IE and octet #7 would contain the numbers 2 and 1, respectively.

For an R99 CDR, the TS 32.015 ‘DataTypes’ is defined in [12] as:

```
GPRS-Charging-DataTypes {ecitt (0) identified-organization (4) etsi (0) mobileDomain (0) umts-
Operation-Maintenance (3) ts-32-015 (15) informationModel (0) asn1Module (2) version1 (1)}
```

For this CDR, the two numbers placed in the two octets of the *Data Record Format Version* field are 1 and 1.

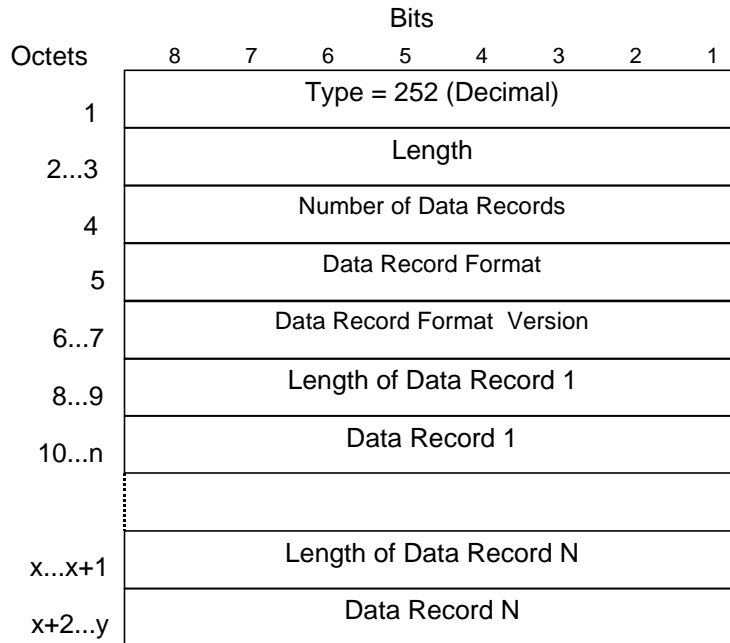


Figure 13: Data Record Packet information element

## 7.4 Data Record Formats used in GTP'

The format of the CDRs sent between the UMTS-Network Elements that generate the PS domain CDRs and the CGF are defined by the *Data Record Format*, which is the 5<sup>th</sup> octet of *Data Record Packet* information element, shown in Figure 13.

The following rules govern the *Data Record Format*:

- This field consists of one octet (#5).
- The value range is 1-255 in decimal. The value '0' should not be used.
- Only the values 1-10 and 51-255 can be used for standards purposes.
- Values in the range of 11-50 are to be configured only by operators, and are not subject to standardization.
- The value '1' identifies ASN.1 format (in PS domain charging). If needed other values are specified in subclause 7.4.1.

### 7.4.1 Standard Data Record Format ASN.1 format

For the PS Domain CDR transfer, defined by this TS, only an ASN.1 format is used. For this format the *Data Record Format* value is '1'. See clause 6 and the ASN.1 language descriptions for the definitions. Basic Encoding Rules (BER) provides the transfer syntax for abstract syntax defined in ASN.1.

### 7.4.2 Private Data Record Formats Other formats

The physical CDR format can also be a private one. The *Data Record Format* identifiers 11...50 (decimal) are reserved for private (implementation specific) format use.

## 7.5 Data Record Format Version for CDRs

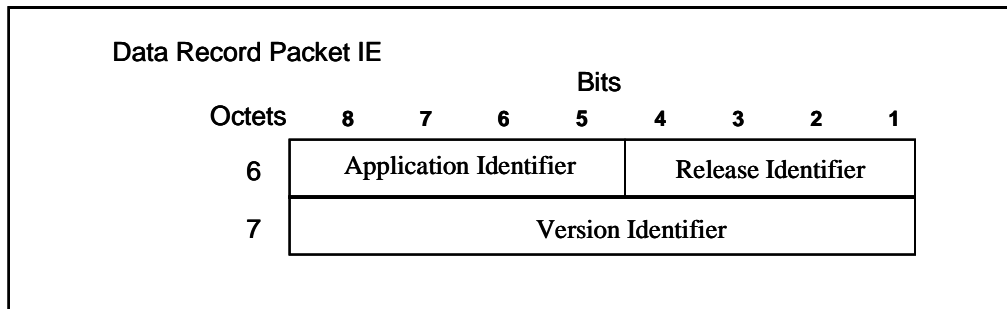
The CDR release and versions numbers are defined by the '*Data Record Format Version*', in octet 6 and 7 of the *Data Record Packet* IE, shown in Figure 13. The format of this field is depicted in Figure 20.

The first octet (#6 in *Data Record Packet* IE) is divided into two fields each with 4 bits. The first field (octet 6, bits 8-5 in Fig 20) identifies the application. The second field (bits 4-1 of octet 6) identifies the release. For charging purposes, the Application Identifier has a value of '1' (decimal). Other possible applications of GTP' may use different

numbers. The Release Identifier indicates the TS release used to encode the CDR. The following values are used to identify the CDR release:

- '02' (decimal) for R98.
- '43' (decimal) for R99, and
- '24' (decimal) for R4.

The second octet (#7) identifies the version of the TS used to encode the CDR. For R98, the version number is 1 for all versions. For R99 and R4 the decimal value of the Version identifies is listed in Table 14a. Note that the value must be '1' or larger.



**Figure 20: The Format of the Data Record Format Version Field**

**Table 14a: The decimal value of the Version Identifier used in R99 and R4 CDRs**

<u>Value</u>	<u>R99</u>	<u>R4</u>
<u>1</u>	<u>TS 32.015 v3.0.0</u>	<u>TS 32.215 v4.0.0</u>
<u>2</u>	<u>TS 32.015 v3.1.0</u>	<u>TS 32.215 v4.1.0</u>
<u>3</u>	<u>TS 32.015 v3.1.1</u>	
<u>4</u>	<u>TS 32.015 v3.2.0</u>	
<u>5</u>	<u>TS 32.015 v3.3.0</u>	
<u>6</u>	<u>TS 32.015 v3.4.0</u>	
<u>7</u>	<u>TS 32.015 v3.5.0</u>	
<u>8</u>	<u>TS 32.015 v3.6.0</u>	
<u>9</u>	<u>TS 32.015 v3.7.0</u>	

## 7.56 CGF - BS Protocol Interface

### 7.56.1 The transfer protocols at CGF - BS interface

The present document gives several recommendations for the main protocol layers for the Charging Gateway Functionality - Billing System (BS) interface protocol stack. These recommendations are not strictly specified features, since there are a lot of variations among the existing Billing Systems. The recommendations are FTAM protocol over X.25 or TCP/IP, and FTP over TCP/IP.

## 7.56.2 The format of the CDRs at CGF - BS interface

The contents of the CDRs sent between the CGF and the Billing System (BS) are defined by the ASN.1 language clause 6, Charging Data Record Structure. In addition, other CDR contents or formats are possible if the CGF provides processing functionality for the CDRs.

CR-Form-v4

## CHANGE REQUEST

⌘ **32.215 CR 002** ⌘ ev **-** ⌘ Current version: **4.0.0** ⌘

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

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

<b>Title:</b>	⌘ Correction of ASN.1 data item QoSInformation		
<b>Source:</b>	⌘ SA5		
<b>Work item code:</b>	⌘ OAM-CH	<b>Date:</b>	⌘ 30/11/2001
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ REL-4
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)	<b>2</b> (GSM Phase 2)	
	<b>A</b> (corresponds to a correction in an earlier release)	<b>R96</b> (Release 1996)	
	<b>B</b> (addition of feature),	<b>R97</b> (Release 1997)	
	<b>C</b> (functional modification of feature)	<b>R98</b> (Release 1998)	
	<b>D</b> (editorial modification)	<b>R99</b> (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900.	<b>REL-4</b> (Release 4)	
		<b>REL-5</b> (Release 5)	

<b>Reason for change:</b>	⌘ The definition of the CDR ASN.1 data item "QoSMeanThroughput" does not correspond with its definition in 24.008.
<b>Summary of change:</b>	⌘ This CR removes the "old" pre-R99 QoS profile notation and introduces a common one ("transparent string") to be used for pre-R99 and R99 QoS profiles.
<b>Consequences if not approved:</b>	⌘ Misinterpretation of QoS information in offline billing systems.

<b>Clauses affected:</b>	⌘ 6.1		
<b>Other specs affected:</b>	⌘ <input type="checkbox"/> Other core specifications	⌘	
	<input type="checkbox"/> Test specifications		
	<input checked="" type="checkbox"/> O&M Specifications		32.015
<b>Other comments:</b>	⌘ Correspondent changes are made in the scope of R99 32.015 (S5-010741).		

## 6 Charging Data Record Structure

### 6.1 ASN.1 definitions for CDR information

The ASN.1 definitions are based on ISO8824 (90)/X.208 (88) [17], which has been superseded by ISO8824-1 (94)/X.680 (94)[18]. This newer version not only includes new features but also removes some that were present in ISO8824 (90)/X.208 (88) [17]. Where possible, the GPRS work would be based on those ASN.1 features to both. However, where necessary, the new features in ISO8824-1 (94)/X.680 (94) [18] be used in some places. ISO8824 (90)/X.208 (88) [17] features that are no longer in ISO8824-1 (94)/X.680 (94) [18] will not be used.

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS

CallEventRecordType, CellId, Diagnostics, CallDuration, ManagementExtensions, TimeStamp, MSISDN, LocationAreaCode, MessageReference, RecordingEntity, SMSResult, LevelOfCAMELService, CalledNumber, CallingNumber, CallEventRecord

FROM TS32205-DataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) umts-Operation-Maintenance (3) ts-32-205 (205) informationModel (0) asnlModule (2) version1 (1)}

IMSI, IMEI

FROM MAP-CommonDataTypes { ccitt identified-organization (4) etsi(0) mobileDomain (0) gsm-Network (1) modules (3) map-CommonDataTypes (18) version6 (6) }

DefaultGPRS-Handling, DefaultSMS-Handling, ServiceKey

FROM MAP-MS-DataTypes { ccitt identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6) }

ManagementExtension

FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2 (2) asnlModule(2) 1}

;

--

-----  
 -- CALL AND EVENT RECORDS  
 --  
 -----

GGSNPDPRecord ::= SET

```
{
  recordType           [0] CallEventRecordType,
  networkInitiation    [1] NetworkInitiatedPDPContext OPTIONAL,
  servedIMSI           [3] IMSI,
  ggsnAddress          [4] GSNAddress,
  chargingID           [5] ChargingID,
  sgsnAddress          [6] SEQUENCE OF GSNAddress,
  accessPointNameNI   [7] AccessPointNameNI OPTIONAL,
  pdpType              [8] PDPTYPE OPTIONAL,
  servedPDPAddress     [9] PDPAddress OPTIONAL,
  dynamicAddressFlag   [11] DynamicAddressFlag OPTIONAL,
  listOfTrafficVolumes [12] SEQUENCE OF ChangeOfCharCondition OPTIONAL,
  recordOpeningTime    [13] TimeStamp,
  duration             [14] CallDuration,
  causeForRecClosing   [15] CauseForRecClosing,
  diagnostics          [16] Diagnostics OPTIONAL,
  recordSequenceNumber [17] INTEGER OPTIONAL,
  nodeID               [18] NodeID OPTIONAL,
  recordExtensions     [19] ManagementExtensions OPTIONAL,
  localSequenceNumber  [20] LocalSequenceNumber OPTIONAL,
  apnSelectionMode    [21] APNSelectionMode OPTIONAL,
  servedMSISDN         [22] MSISDN,
  chargingCharacteristics [23] ChargingCharacteristics,
  chChSelectionMode   [24] ChChSelectionMode OPTIONAL
}
```

SGSNMMRecord ::= SET

```
{
  recordType           [0] CallEventRecordType,
  servedIMSI           [1] IMSI,
  servedIMEI           [2] IMEI OPTIONAL,
  sgsnAddress          [3] GSNAddress OPTIONAL,
  msNetworkCapability  [4] MSNetworkCapability OPTIONAL,
  routingArea          [5] RoutingAreaCode OPTIONAL,
  locationAreaCode     [6] LocationAreaCode OPTIONAL,
  cellIdentifier       [7] CellId OPTIONAL,
  changeLocation       [8] SEQUENCE OF ChangeLocation OPTIONAL,
  recordOpeningTime    [9] TimeStamp,
  duration             [10] CallDuration,
  sgsnChange           [11] SGSNChange OPTIONAL,
  causeForRecClosing   [12] CauseForRecClosing,
  diagnostics          [13] Diagnostics OPTIONAL,
  recordSequenceNumber [14] INTEGER OPTIONAL,
  nodeID               [15] NodeID OPTIONAL,
  recordExtensions     [16] ManagementExtensions OPTIONAL,
  localSequenceNumber  [17] LocalSequenceNumber OPTIONAL,
}
```

```

    servedMSISDN           [18] MSISDN,
    chargingCharacteristics [19] ChargingCharacteristics,
    cAMELInformationMM     [20] CAMELInformationMM OPTIONAL,
    systemType             [21] SystemType OPTIONAL,
    chChSelectionMode     [22] ChChSelectionMode OPTIONAL
}

SGSNPDPRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    networkInitiation   [1] NetworkInitiatedPDPContext OPTIONAL,
    servedIMSI          [3] IMSI,
    servedIMEI          [4] IMEI OPTIONAL,
    sgsnAddress         [5] GSNAddress OPTIONAL,
    msNetworkCapability [6] MSNetworkCapability OPTIONAL,
    routingArea         [7] RoutingAreaCode OPTIONAL,
    locationAreaCode    [8] LocationAreaCode OPTIONAL,
    cellIdentifier       [9] CellId OPTIONAL,
    chargingID          [10] ChargingID,
    ggsnAddressUsed     [11] GSNAddress,
    accessPointNameNI   [12] AccessPointNameNI OPTIONAL,
    pdpType             [13] PDPType OPTIONAL,
    servedPDPAddress    [14] PDPAddress OPTIONAL,
    listOfTrafficVolumes [15] SEQUENCE OF ChangeOfCharCondition OPTIONAL,
    recordOpeningTime   [16] TimeStamp,
    duration            [17] CallDuration,
    sgsnChange          [18] SGSNChange OPTIONAL,
    causeForRecClosing  [19] CauseForRecClosing,
    diagnostics         [20] Diagnostics OPTIONAL,
    recordSequenceNumber [21] INTEGER OPTIONAL,
    nodeID              [22] NodeID OPTIONAL,
    recordExtensions    [23] ManagementExtensions OPTIONAL,
    localSequenceNumber [24] LocalSequenceNumber OPTIONAL,
    apnSelectionMode    [25] APNSelectionMode OPTIONAL,
    accessPointNameOI   [26] AccessPointNameOI OPTIONAL,
    servedMSISDN       [27] MSISDN,
    chargingCharacteristics [28] ChargingCharacteristics,
    systemType          [29] SystemType OPTIONAL,
    cAMELInformationPDP [30] CAMELInformationPDP OPTIONAL,
    rNCUnsentDownlinkVolume [31] DataVolumeGPRS OPTIONAL,
    chChSelectionMode   [32] ChChSelectionMode OPTIONAL,
    dynamicAddressFlag  [33] DynamicAddressFlag OPTIONAL
}

SGSNSMORecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    servedIMEI          [2] IMEI OPTIONAL,
    servedMSISDN       [3] MSISDN,
    msNetworkCapability [4] MSNetworkCapability OPTIONAL,
    serviceCentre       [5] AddressString OPTIONAL,
    recordingEntity     [6] RecordingEntity OPTIONAL,
    locationArea        [7] LocationAreaCode OPTIONAL,
    routingArea         [8] RoutingAreaCode OPTIONAL,
    cellIdentifier       [9] CellId OPTIONAL,
    messageReference    [10] MessageReference,
    eventTimeStamp      [11] TimeStamp,
    smsResult           [12] SMSResult OPTIONAL,
    recordExtensions    [13] ManagementExtensions OPTIONAL,
    nodeID              [14] NodeID OPTIONAL,
    localSequenceNumber [15] LocalSequenceNumber OPTIONAL,
    chargingCharacteristics [16] ChargingCharacteristics,
    systemType          [17] SystemType OPTIONAL,
    destinationNumber   [18] CalledNumber OPTIONAL,
    cAMELInformationSMS [19] CAMELInformationSMS OPTIONAL,
    chChSelectionMode   [20] ChChSelectionMode OPTIONAL
}

SGSNSMTRecord ::= SET
{
    recordType           [0] CallEventRecordType,
    servedIMSI          [1] IMSI,
    servedIMEI          [2] IMEI OPTIONAL,
    servedMSISDN       [3] MSISDN,
    msNetworkCapability [4] MSNetworkCapability OPTIONAL,
    serviceCentre       [5] AddressString OPTIONAL,
    recordingEntity     [6] RecordingEntity OPTIONAL,
    locationArea        [7] LocationAreaCode OPTIONAL,
    routingArea         [8] RoutingAreaCode OPTIONAL,

```

```

cellIdentifier          [9] CellId OPTIONAL,
eventTimeStamp         [10] TimeStamp,
smsResult              [11] SMSResult OPTIONAL,
recordExtensions       [12] ManagementExtensions OPTIONAL,
nodeID                 [13] NodeID OPTIONAL,
localSequenceNumber    [14] LocalSequenceNumber OPTIONAL,
chargingCharacteristics [15] ChargingCharacteristics,
systemType             [16] SystemType OPTIONAL,
chChSelectionMode     [17] ChChSelectionMode OPTIONAL
}

```

```

-----
--
-- COMMON DATA TYPES
--
-----

```

```

AccessPointNameNI ::= IA5String (SIZE(1..63))

```

```

--
-- Network Identifier part of APN in dot representation.
-- For example, if the complete APN is 'apn1a.apn1b.apn1c.mnc022.mcc111.gprs'
-- NI is 'apn1a.apn1b.apn1c' and is presented in this form in the CDR..

```

```

AccessPointNameOI ::= IA5String (SIZE(1..37))

```

```

--
-- Operator Identifier part of APN in dot representation.
-- In the 'apn1a.apn1b.apn1c.mnc022.mcc111.gprs' example, the OI portion is 'mnc022.mcc111.gprs'
-- and is presented in this form in the CDR.

```

```

APNSelectionMode ::= ENUMERATED

```

```

{
  --
  -- See Information Elements TS 29.060
  --
  mSorNetworkProvidedSubscriptionVerified (0),
  mSProvidedSubscriptionNotVerified (1),
  networkProvidedSubscriptionNotVerified (2)
}

```

```

CAMELAccessPointNameNI ::= AccessPointNameNI

```

```

CAMELAccessPointNameOI ::= AccessPointNameOI

```

```

CAMELInformationMM ::= SET

```

```

{
  sCFAddress [1] SCFAddress OPTIONAL,
  serviceKey [2] ServiceKey OPTIONAL,
  defaultTransactionHandling [3] DefaultGPRS-Handling OPTIONAL,
  numberOfDPENcoutered [4] NumberOfDPENcoutered OPTIONAL,
  levelOfCAMELService [5] LevelOfCAMELService OPTIONAL,
  freeFormatData [6] FreeFormatData OPTIONAL,
  fFDAppendIndicator [7] FFDAppendIndicator OPTIONAL
}

```

```

CAMELInformationPDP ::= SET

```

```

{
  sCFAddress [1] SCFAddress OPTIONAL,
  serviceKey [2] ServiceKey OPTIONAL,
  defaultTransactionHandling [3] DefaultGPRS-Handling OPTIONAL,
  CAMELAccessPointNameNI [4] CAMELAccessPointNameNI OPTIONAL,
  CAMELAccessPointNameOI [5] CAMELAccessPointNameOI OPTIONAL,
  numberOfDPENcoutered [6] NumberOfDPENcoutered OPTIONAL,
  levelOfCAMELService [7] LevelOfCAMELService OPTIONAL,
  freeFormatData [8] FreeFormatData OPTIONAL,
  fFDAppendIndicator [9] FFDAppendIndicator OPTIONAL
}

```

```

CAMELInformationSMS ::= SET

```

```

{
  sCFAddress [1] SCFAddress OPTIONAL,
  serviceKey [2] ServiceKey OPTIONAL,
  defaultSMShandling [3] DefaultSMS-Handling OPTIONAL,
  CAMELCallingPartyNumber [4] CallingNumber OPTIONAL,
  CAMELDestinationSubscriberNumber [5] CalledNumber OPTIONAL,
  CAMELSMSCAddress [6] AddressString OPTIONAL,
  freeFormatData [7] FreeFormatData OPTIONAL
}

```

```

CauseForRecClosing ::= INTEGER

```



```

{
  --
  -- In GGSN the value sGSNChange should be used for partial record
  -- generation due to SGSN Address List Overflow
  --
  -- cause codes 0 to 15 are defined in TS 32.205 as 'CauseForTerm' (cause for termination)
  --
  normalRelease          (0),
  abnormalRelease        (4),
  cAMELInitCallRelease   (5),
  volumeLimit            (16),
  timeLimit              (17),
  sGSNChange             (18),
  maxChangeCond          (19),
  managementIntervention (20)
}

ChangeCondition ::= ENUMERATED
{
  qosChange          (0),
  tariffTime        (1),
  recordClosure      (2)
}

ChangeOfCharCondition ::= SEQUENCE
--
-- Used in PDP context record only
--
{
  qosRequested          [1] QoSInformation OPTIONAL,
  qosNegotiated         [2] QoSInformation OPTIONAL,
  dataVolumeGPRSUplink [3] DataVolumeGPRS,
  dataVolumeGPRSDownlink [4] DataVolumeGPRS,
  changeCondition      [5] ChangeCondition,
  changeTime           [6] TimeStamp
}

ChangeLocation ::= SEQUENCE
--
-- used in SGSNMMRecord only
--
{
  locationAreaCode [0] LocationAreaCode,
  routingAreaCode  [1] RoutingAreaCode,
  cellId           [2] CellId OPTIONAL,
  changeTime       [3] TimeStamp
}

ChargingCharacteristics ::= OCTET STRING (SIZE(2))
--
-- Bit 0-3: Profile Index
-- Bit 4-15: For Behavior
--

ChargingID ::= INTEGER (0..4294967295)
--
-- Generated in GGSN, part of PDP context, see TS 23.060
-- 0..4294967295 is equivalent to 0..2**32-1

ChChSelectionMode ::= ENUMERATED
{
  sGSNSupplied          (0), -- For GGSN only
  subscriptionSpecific  (1), -- For SGSN only
  aPNSpecific           (2), -- For SGSN only
  homeDefault           (3), -- For SGSN and GGSN
  roamingDefault        (4), -- For SGSN and GGSN
  visitingDefault       (5)  -- For SGSN and GGSN
}

DataVolumeGPRS ::= INTEGER
--
-- The volume of data transferred in octets.
--

DynamicAddressFlag ::= BOOLEAN

ETSIAddress ::= AddressString
--
-- First octet for nature of address, and numbering plan indicator (3 for X.121)

```

```
-- Other octets TBCD
-- See TS 29.002
--
```

```
FFDAppendIndicator ::= BOOLEAN
```

```
FreeFormatData ::= OCTET STRING (SIZE(1..160))
--
-- Free formatted data as sent in the FurnishChargingInformationGPRS
-- see TS 29.078
--
```

```
GSNAddress ::= IPAddress
```

```
GSMQoSInformation ::= SEQUENCE
{
  reliability [0] QoSReliability,
  delay [1] QoSDelay,
  precedence [2] QoSPrecedence,
  peakThroughput [3] QoSPeakThroughput,
  meanThroughput [4] QoSMeanThroughput
}
```

```
IPAddress ::= CHOICE
{
  iPBinaryAddress IPBinaryAddress,
  iPTextRepresentedAddress IPTextRepresentedAddress
}
```

```
IPBinaryAddress ::= CHOICE
{
  iPBinV4Address [0] OCTET STRING (SIZE(4)),
  iPBinV6Address [1] OCTET STRING (SIZE(16))
}
```

```
IPTextRepresentedAddress ::= CHOICE
{
  --
  -- IP address in the familiar "dot" notation
  --
  iPTextV4Address [2] IA5String (SIZE(7..15)),
  iPTextV6Address [3] IA5String (SIZE(15..45))
}
```

```
LocalSequenceNumber ::= INTEGER (0..4294967295)
--
-- Sequence number of the record in this node
-- 0.. 4294967295 is equivalent to 0..2**32-1, unsigned integer in four octets
```

```
MSNetworkCapability ::= OCTET STRING (SIZE(1..8))
-- see 3G TS 24.008
```

```
NetworkInitiatedPDPContext ::= BOOLEAN
--
-- Set to true if PDP context was initiated from network side
--
```

```
NodeID ::= IA5String (SIZE(1..20))
```

```
NumberOfDPSEncountered ::= INTEGER
--
```

```
PDPAddress ::= CHOICE
{
  iPAddress [0] IPAddress,
  eTAddress [1] ETSIAddress
}
```

```
PDPTType ::= OCTET STRING (SIZE(2))
--
-- OCTET 1: PDP Type Organization
-- OCTET 2: PDP Type Number
-- See TS 29.060
--
```

```
QoSDelay ::= ENUMERATED
{
  --
  -- See Quality of service TS 24.008
  --
  delayClass1 (1),
  delayClass2 (2),
}
```

```

delayClass3 (3),
delayClass4 (4)
}

```

```

QoSInformation ::= OCTET STRING (SIZE (4..12))CHOICE
{
gsmQoSInformation [0] GSMQoSInformation,
umtsQoSInformation [1] OCTET STRING (SIZE (12))
}

```

```

--
-- The "GSMQoSInformation" corresponds to the encoding specified in GSM TS 12.15, and
-- shall be used for pre-Release 99 terminals only. This umtsQoSInformation octet string
-- is a 1:1 copy of the contents (i.e. starting with octet 4) of the "Quality of
-- service Profile" information element specified in 3GPP TS 29.060 [22].

```

```

QoSMeanThroughput ::= ENUMERATED
{

```

```

See Quality of service TS 24.008.
Note that "Best Effort" is encoded differently than in TS 24.008 and
"subscribedMeanThroughput" has been excluded.

```

```

bestEffort (0),
mean100octetPh (1),
mean200octetPh (2),
mean500octetPh (3),
mean1000octetPh (4),
mean2000octetPh (5),
mean5000octetPh (6),
mean10000octetPh (7),
mean20000octetPh (8),
mean50000octetPh (9),
mean100000octetPh (10),
mean200000octetPh (11),
mean500000octetPh (12),
mean1000000octetPh (13),
mean2000000octetPh (14),
mean5000000octetPh (15),
mean10000000octetPh (16),
mean20000000octetPh (17),
mean50000000octetPh (18)
}

```

```

QoSPeakThroughput ::= ENUMERATED
{

```

```

See Quality of service TS 24.008

```

```

unspecified (0),
upTo1000octetPs (1),
upTo2000octetPs (2),
upTo4000octetPs (3),
upTo8000octetPs (4),
upTo16000octetPs (5),
upTo32000octetPs (6),
upTo64000octetPs (7),
upTo128000octetPs (8),
upTo256000octetPs (9)
}

```

```

QoSPrecedence ::= ENUMERATED
{

```

```

See Quality of service TS 24.008

```

```

unspecified (0),
highPriority (1),
normalPriority (2),
lowPriority (3)
}

```

```

QoSReliability ::= ENUMERATED
{

```

```
-----  
----- See Quality of service TS 24.008  
-----  
----- unspecifiedReliability ----- (0),  
----- acknowledgedGTP ----- (1),  
----- unackGTPAcknowLLC ----- (2),  
----- unackGTPLLCAcknowRLC ----- (3),  
----- unackGTPLLCRLC ----- (4),  
----- unackknowUnprotectedData ----- (5)  
}  
  
RoutingAreaCode ::= OCTET STRING (SIZE(1))  
--  
-- See TS 24.008 --  
--  
  
SCFAddress ::= AddressString  
--  
-- See TS 29.002 --  
--  
  
SGSNChange ::= BOOLEAN  
--  
-- present if first record after inter SGSN routing area update  
-- in new SGSN  
--  
  
SystemType ::= ENUMERATED  
  
-- "unknown" is not to be used in PS domain.  
{  
  unknown (0),  
  iuUTRAN (1),  
  gERAN (2)  
}  
  
END
```