

**TSG-RAN Meeting #9  
Hawaii, US, 20 - 22 September 2000**

**TSGRP#9(00)0376**

**Title: Agreed CRs to TS 25.415**

**Source: TSG-RAN WG3**

**Agenda item: 5.3.3**

<b>Tdoc_Num</b>	<b>Specification</b>	<b>CR_Num</b>	<b>Revision_Num</b>	<b>CR_Subject</b>	<b>CR_Category</b>	<b>WG_Status</b>	<b>Cur_Ver_Num</b>	<b>New_Ver_Num</b>
R3-001730	25.415	028		Correction of Cause Indicator	F	agreed	3.3.0	3.4.0
R3-002338	25.415	029	1	Subflow SDUs in Payload fields	F	agreed	3.3.0	3.4.0
R3-002164	25.415	030	2	Selection of user data PDU type	F	agreed	3.3.0	3.4.0
R3-002270	25.415	032	1	Editorial correction of reference No	D	agreed	3.3.0	3.4.0
R3-002165	25.415	034		Value range of PDU type	F	agreed	3.3.0	3.4.0
R3-002166	25.415	035		Delivery of erroneous SDUs value alignment	F	agreed	3.3.0	3.4.0



## 8.1.1 Unknown field value

The Iu UP protocol may be evolved by taking into use field values that have been specified to be reserved for future use or have been specified as spare values. When a UP protocol entity receives an unknown field value, it can react differently depending whether the unknown value is reserved for future use or if it is a spare value. The following principles are recommended for receiver reactions:

- if a spare value is used by the sender, but not understood by the receiver, there should be a default action for the receiver. This default action should be defined on a field basis;
- if a value that is reserved for future use is used by the sender, but not understood by the receiver, the value should be rejected by the receiver. This should be done by sending a Negative Acknowledgement to the peer entity, if possible. Otherwise an Error Event should be generated in order to inform the upper layers and the peer entity;
- a received Error Event message shall not trigger another Error Event message back to the sender, even though e.g. the Cause value in the received Error Event message would not be understood.

In the following the recommended actions of the receiver are handled field by field when an unknown field value is received.

### **PDU Type**

Recommended action if reserved values used: Generate Error Event, i.e. the upper layers and the peer entity are informed about the error event with Cause : Unknown PDU Type.

### **FOC**

Recommended action if spare values used: Ignore the field and pass it onwards.

### **ACK/NACK**

Proposed action if reserved values used: Generate an Error Event, i.e. the upper layers and the peer entity are informed about the error event with Cause : Unknown reserved value.

### **Procedure Indicator**

Recommended action if reserved values used: Generate an Error Event, i.e. the upper layers and the peer entity are informed about the error event with Cause : Unknown procedure

### **Cause Indicator Error Cause value**

Value 49 is reserved for "Iu UP version not supported" whatever the Iu UP Mode version.

Recommended action if reserved values used: Generate Error Event, i.e. the upper layers and the peer entity are informed about the error event with Cause : Unknown reserved value.

Recommended action if spare values used: Ignore the field and pass it onwards.

## CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

**25.415 CR 029<sub>r1</sub>**

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **RAN#9**  
*list expected approval meeting # here ↑*

for approval   
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strategic   
non-strategic  *(for SMG use only)*

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

**Proposed change affects:**  
*(at least one should be marked with an X)*

(U)SIM     ME     UTRAN / Radio     Core Network

**Source:**    **R-WG3**

**Date:**    **27<sup>th</sup> June 2000**

**Subject:**    **Subflow SDUs in Payload fields**

**Work item:**    \_\_\_\_\_

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

F	Correction	<input checked="" type="checkbox"/>
A	Corresponds to a correction in an earlier release	<input type="checkbox"/>
B	Addition of feature	<input type="checkbox"/>
C	Functional modification of feature	<input type="checkbox"/>
D	Editorial modification	<input type="checkbox"/>

**Release:**

Phase 2	<input type="checkbox"/>
Release 96	<input type="checkbox"/>
Release 97	<input type="checkbox"/>
Release 98	<input type="checkbox"/>
Release 99	<input checked="" type="checkbox"/>
Release 00	<input type="checkbox"/>

**Reason for change:**

To specify the field Payload fields used by PDU type 0 and 1 and how the Subflow SDUs are ordered in this field.  
If this CR is not accepted then it may lead to faulty assumptions on the structure of the Payload fields.

**Clauses affected:**    **6.6.3.X (new), 7.2.1, 7.2.2**

**Other specs affected:**

Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:
Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:
MS test specifications	<input type="checkbox"/>	→ List of CRs:
BSS test specifications	<input type="checkbox"/>	→ List of CRs:
O&M specifications	<input type="checkbox"/>	→ List of CRs:

**Other comments:**    Resubmission of CR029 as CR029r1



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

6.6.3.26 Iu UP Mode Version

**Description:** This field indicates the Iu UP Mode version. Up to 16 Iu UP Mode Versions can be simultaneously available.

**Value range:** {1-16} The binary coded value is the version number minus 1 (e.g. version 1 is coded '0000', ..., version 16 is coded '1111').

**Field length:** 4 bits

6.6.3.X Payload fields

**Description:** This field contains the Subflow SDUs, starting with the Subflow 1 SDU. The MSB of the Subflow 1 SDU is placed in bit 7 of the first octet (see example in Figure X below).

**Value range:** {any value}.

**Field length:** Sum of the lengths of the included Subflow SDUs.

<u>Bits</u>								<u>Number of Octets</u>
<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	
<u>Subflow 1 SDU</u>								<u>1</u>
<u>Subflow 1 SDU cont.</u>				<u>Subflow 2 SDU</u>				<u>1</u>
<u>Subflow 2 SDU cont.</u>						<u>Padding (Not part of 'Payload fields')</u>		<u>1</u>

Figure X: Example of 'Payload fields' with two Subflow SDUs

## 7.2.1 General

The Iu UP protocol layer interacts with upper layers as illustrated in the figure above. The interactions with the upper layers are shown in terms of primitives where the primitives represent the logical exchange of information and control between the upper layer and the Iu UP protocol layer. They do not specify or constraint implementations.

The following primitives are defined:

- Iu-UP-DATA;
- Iu-UP-STATUS;
- Iu-UP-UNIT-DATA.

**Table 1: Iu UP protocol layer service primitives towards the upper layer at the RNL SAP**

Primitive	Type	Parameters	Comments
Iu-UP-DATA	Request	Iu-UP-payload Iu-UP-control	Subflow 1 SDU, ..., Subflow n SDU RFCI
	Indication	Iu-UP-payload Iu-UP-control	Subflow 1 SDU, ..., Subflow n SDU RFCI FQC
Iu-UP-Status	Indication	Iu-UP-Procedure-Control	Error Cause, Error Distance Initialisation RFCI indicators, Downlink send intervals (when applicable) Time Alignment
	Request	Iu-UP-Procedure-Control	Error Cause Time Alignment ACK/NACK
Iu-UP-UNIT-DATA	Request	Iu-UP-payload	
	Indication	Iu-UP-payload	

Primitive usage is function of the mode of operation of the Iu UP protocol. Table 2 provides the association between Iu UP primitives towards the upper layers and the Iu UP mode of operation.

**Table 2: Iu UP protocol layer service primitives related to the Iu UP mode of operation and function within the mode of operation**

Primitive	Type	Mode of Operation
Iu-UP-DATA	Request	SMpSDU
	Indication	SMpSDU
Iu-UP-Status	Request	SMpSDU
	Indication	SMpSDU
Iu-UP-UNIT-DATA	Request	TrM
	Indication	TrM

## 7.2.2 Iu-UP-DATA-REQUEST

This primitive is used as a request from the upper layer Iu NAS Data Stream entity to send ~~a~~ the RAB subflow SDU(s) on the established transport connection. This primitive also includes the RFCI of the payload information included in the primitive.

The Iu UP Frame protocol layer forms the Iu UP data frame, the Iu Data Stream DU being the payload of the Iu UP frame, and transfers the frame by means of the lower layer services.





6.6.2.3.4.1 Initialisation

Figure 24 specifies how the initialisation procedure frame is coded.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack (=0. I.e. Procedure)		PDU Type 14 Frame Number		1	Frame Control Part
Iu UP Mode version				Procedure Indicator (=0)				1	
Header CRC						Payload CRC		2	Frame Checksum part
Payload CRC									
Spare		TI		Number of subflows per RFCI (N)		Chain Ind		1	Frame payload part
LRI	LI	1 <sup>st</sup> RFCI						1	
Length of subflow 1								1 or 2 (dep. LI)	
Length of subflow 2 to N								(N-1)x(1 or 2)	
LRI	LI	2 <sup>nd</sup> RFCI						1	
Length of subflow 1								1 or 2 (dep. LI)	
Length of subflow 2 to N								(N-1)x(1 or 2)	
...									
IPTI of 1 <sup>st</sup> RFCI				IPTI of 2 <sup>nd</sup> RFCI				0 or N/2	
IPTI of 3 <sup>rd</sup> RFCI				...					
Iu UP Mode Versions supported (bitmap)								2	
<u>Data PDU type</u>				<u>Spare</u>				<u>1</u>	
Spare extension								0-32	

Figure 24: Iu UP PDU Type 14 used for Initialisation

### 6.6.3.26 Iu UP Mode Version

**Description:** This field indicates the Iu UP Mode version. Up to 16 Iu UP Mode Versions can be simultaneously available.

**Value range:** {1-16} The binary coded value is the version number minus 1 (e.g. version 1 is coded '0000', ..., version 16 is coded '1111').

**Field length:** 4 bits

### 6.6.3.X Data PDU type

**Description:** This field indicates the PDU type that shall be used (in both directions) for transferring user data. The selection of the PDU type is made by UTRAN based on the reliability attributes. If the reliability attribute 'Delivery of erroneous SDUs' equals 'no-error-detection-consideration' for all subflows then PDU type 1 shall be used.

**Value range:** {0: PDU type 0, 1: PDU type 1, 2-15: Reserved for future use}.

**Field length:** 4 bits.

## CHANGE REQUEST

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**25.415**

**CR 032r1**

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: TSG-RAN#9

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

**Proposed change affects:**

(at least one should be marked with an X)

(U)SIM     ME     UTRAN / Radio     Core Network

**Source:**

R-WG3

**Date:**

August 2000

**Subject:**

Editorial correction of reference No.

**Work item:**

**Category:**

(only one category shall be marked with an X)

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

**Release:**

Phase 2	<input type="checkbox"/>
Release 96	<input type="checkbox"/>
Release 97	<input type="checkbox"/>
Release 98	<input type="checkbox"/>
Release 99	<input checked="" type="checkbox"/>
Release 00	<input type="checkbox"/>

**Reason for change:**

The reference number of the I366.1 in chapter 7.3.2.2 is shown as [5] but it does not align with the reference number in chapter 2: Reference.

The correct reference number of I366.1 is [8].

r1: The category is changed from Editorial modification to Correction. If this is not done, the related part in this 25.415 would refer to wrong specification.

**Clauses affected:**

7.3.2.2

**Other specs affected:**

Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:	
Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:	
MS test specifications	<input type="checkbox"/>	→ List of CRs:	
BSS test specifications	<input type="checkbox"/>	→ List of CRs:	
O&M specifications	<input type="checkbox"/>	→ List of CRs:	

**Other comments:**



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## 7.3 Primitives towards the transport layers at TNL SAP

### 7.3.1 General

Access to the Transport network Layer is performed through a generic SAP: TNL-SAP.

When the Transport Network upper layer consists of AAL2, the TNL SAP maps onto the AAL-SAP through which communication is performed using specific AAL primitives.

When the Transport Network upper layer consists of GTP-U, the TNL SAP maps onto the GTP-U SAP through which communication is performed using generic primitives.

The choice of communication, specific or generic, through the TNL SAP is fixed by the Radio Network Layer control plane logic. This choice is based on the requirements placed by e.g. the RAB characteristics, the CN domain requesting the RAB establishment or other operator's choice.

### 7.3.2 ATM/AAL2 based Transport layer

#### 7.3.2.1 General

When the Iu UP protocol layer uses the services of an ATM/AAL2 transport, it uses an established AAL2 connection for transferring frames between the peer TNL-SAPs at both end of the Iu User plane access points. The Transport Network Control Plane over Iu handles the signalling to establish and release the AAL2 call connections.

#### 7.3.2.2 AAL2 Service Primitives used by the Iu UP protocol

AAL2 services and primitives used at the Service Access Point from the AAL2 layer are shown in table 3.

**Table 3: AAL2 primitives and parameters**

Primitive	Type	Parameters	Comments
SSSAR-UNITDATA	Request	SSSAR-INFO	
		SSSAR-UUI	Not used (note)
SSSAR-UNITDATA	Indication	SSSAR-INFO	
		SSSAR-UUI	Not used (note)
NOTE: The setting of this field is set to not used i.e. decimal value 26 according to [8].			

The primitives of table 3 are the standard primitives of [58]. These primitives are intended to be used in the Iu UP.

## 7.3.3 GTP-U based Transport Layer

### 7.3.3.1 General

When the Iu UP protocol layer uses the services of a GTP-U transport, it uses an established GTP-U tunnel for transferring frames between the GTP-U tunnel endpoints at both end of the Iu User plane access points. The RANAP Control Plane signalling over Iu handles the signalling to establish and release the GTP-U tunnels.

### 7.3.3.2 Generic Service Primitives used by the Iu UP protocol

Generic primitives are used at the GTP-U SAP. They are shown in table 4.

## CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

**25.415 CR 034**

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **RAN#9**  
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Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

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

**Source:** R-WG3 **Date:** 16<sup>th</sup> August 2000

**Subject:** Value range of PDU type

**Work item:**

**Category:** F Correction  **Release:** Phase 2   
 A Corresponds to a correction in an earlier release  Release 96   
 B Addition of feature  Release 97   
 C Functional modification of feature  Release 98   
 D Editorial modification  Release 99   
 Release 00   
 (only one category shall be marked with an X)

**Reason for change:** To correct the value range of PDU type.  
 If this CR is not accepted then it is not clear that the values 2-13 is not used in the current version of the specification, and can lead to problems for future versions of the lu UP protocol.

**Clauses affected:** 6.6.3.1

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

**Other comments:**



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

## 6.6.3 Coding of information elements in frames

### 6.6.3.1 PDU Type

**Description:** The PDU type indicates the structure of the Iu UP frame. The field takes the value of the PDU Type it identifies: i.e. 0 for PDU Type 0. The PDU type is in bit 4 to bit 7 in the first octet of the frame. PDU type is used in all frames in support mode for predefined SDU sizes version 1.

**Value range:** {0-1 and 14 in use, 2-13: reserved for future PDU types, 15=reserved for future PDU type extensions}

**Field length:** 4 bits

## CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

**25.415 CR 035**

Current Version: **3.3.0**

GSM (AA.BB) or 3G (AA.BBB) specification number ↑

↑ CR number as allocated by MCC support team

For submission to: **RAN#9**  
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Form: CR cover sheet, version 2 for 3GPP and SMG      The latest version of this form is available from: <ftp://ftp.3gpp.org/Information/CR-Form-v2.doc>

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

**Source:**      **R-WG3**      **Date:**      **16<sup>th</sup> August 2000**

**Subject:**      **Delivery of erroneous SDUs value alignment**

**Work item:**      \_\_\_\_\_

<b>Category:</b>	F Correction <input checked="" type="checkbox"/>	<b>Release:</b>	Phase 2 <input type="checkbox"/>
<small>(only one category shall be marked with an X)</small>	A Corresponds to a correction in an earlier release <input type="checkbox"/>		Release 96 <input type="checkbox"/>
	B Addition of feature <input type="checkbox"/>		Release 97 <input type="checkbox"/>
	C Functional modification of feature <input type="checkbox"/>		Release 98 <input type="checkbox"/>
	D Editorial modification <input type="checkbox"/>		Release 99 <input checked="" type="checkbox"/>
			Release 00 <input type="checkbox"/>

**Reason for change:**      To use the same value names of Delivery of erroneous SDUs in 25.413 and 25.415.  
If this CR is not accepted then there can be confusion about the meaning of the values since the usage of the value names are not consistent between the Iu specifications.

**Clauses affected:**      **6.4.4.1.2**

<b>Other specs affected:</b>	Other 3G core specifications <input type="checkbox"/>	→ List of CRs:	
	Other GSM core specifications <input type="checkbox"/>	→ List of CRs:	
	MS test specifications <input type="checkbox"/>	→ List of CRs:	
	BSS test specifications <input type="checkbox"/>	→ List of CRs:	
	O&M specifications <input type="checkbox"/>	→ List of CRs:	

**Other comments:**      \_\_\_\_\_



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

#### 6.4.4.1.2 Handling of FQC information

In SRNC on the sending side, the Support Mode Functions takes as input the radio frame quality information together with the frame. Based on this, the FQC is set for the frame, a CRC is added, if needed and the frame is sent to CN. The following table shows the FQC field setting.

**Table 1: FQC handling in RNC on uplink**

INPUT (for each subflow)		ACTION (on lu UP frame)
Delivery of erroneous SDUs	Radio Frame Classification	Action taken in SRNC on the sending side
Yes	Bad	Set FQC to 'bad radio'
No	Bad	Frame not sent
<del>Not Applicable</del> <del>no-error-detection-consideration</del>	Any value	Set FQC to good
Any value	Good	Set FQC to good

In the table above if for any of the subflows the 'Delivery of erroneous SDUs' is set to 'No' and for that subflow the Radio frame classification is 'Bad' then the Iu UP frame shall not be sent.

The Support Mode Functions in CN on the receiving side makes a CRC check of the frame payload, if CRC is present and passes the frame and the frame quality classification information through the RNL-SAP.

**Table 2: FQC handling in CN on uplink**

INPUT		ACTION (on lu UP frame)
Delivery of erroneous SDUs (for each subflow)	Payload CRC check result (on lu UP frame)	Actions taken at CN on the receiving side
Yes (at least one of the subflows have this value but none have 'No')	Not OK	Frame forwarded with FQC set to 'bad'
No (at least one of the subflows have this value)	Not OK	Drop frame, send lu-UP-Status primitive indicating 'No data' at the RNL-SAP
<del>no-error-detection-consideration</del> <del>Not Applicable</del> (All subflows have this value)	Any result	Frame forwarded with FQC as set by UTRAN
Any value	OK	Frame forwarded with FQC as set by UTRAN

The Support Mode Functions in CN on the sending side adds a CRC, if necessary to the frame payload and passes it together with the FQC (in the transcoded case always set to good).

The Support Mode Functions in SRNC then makes a CRC-check, if CRC present. Based on the received FQC and eventually the CRC check, decision is made whether to deliver the frame or not.



Table 3: FQC handling in RNC on downlink

INPUT			ACTION (on Iu UP frame)
Delivery of erroneous SDUs (for each subflow)	FQC (on Iu UP frame)	CRC check (if payload CRC present) (on Iu UP frame)	Actions taken at SRNC on the receiving side
Yes	Bad	Any result	Drop frame
No	Bad	Any result	Drop frame
Yes	Bad radio	Any result	Drop frame
No	Bad radio	Any result	Drop frame
Yes	Any value	Not OK	Drop frame
No	Any value	Not OK	Drop frame
<del>no-error-detection-consideration</del>	Any value	Any result	Pass the frame to radio interface protocols
Any value	Good	OK	Pass the frame to radio interface protocols

In the table above if any of the subflows have the 'Delivery of erroneous SDUs' set to 'Yes' or 'No', and the FQC or CRC check indicates that the Iu UP is bad, then the Iu UP frame should be dropped.

NOTE: The case where SRNC receives a frame with the FQC set to "bad radio" (respectively: "bad"), corresponds to a TrFO (respectively: TFO) case. The frame is then trashed by the receiving RNC since there is currently no means to pass down to the UE the frame quality indicator.