TSG-RAN Meeting #8
Düsseldorf, Germany, 21 - 23 June 2000

TSGRP#8(00)0238

Title: **Agreed CRs to TS 25.415**

Source: **TSG-RAN WG3**

Agenda item: **5.3.3**

Tdoc_Num	Specification	CR_Num	Revision_Nu	CR_Subject	CR_Category	WG_Status	Cur_Ver_Num	New_Ver_Nu
R3-001073	25.415	017		Correction of PDU type	F	agreed	3.2.0	3.3.0
R3-001074	25.415	018		Addition of table headings	D	agreed	3.2.0	3.3.0
R3-001076	25.415	020		Version of the specified mode	F	agreed	3.2.0	3.3.0
R3-001129	25.415	019	1	Clarification of FQC description	F	agreed	3.2.0	3.3.0
R3-001149	25.415	021		Clarification of Payload CRC Field (Iu FP)	F	agreed	3.2.0	3.3.0
R3-001416	25.415	023		CRC of Frame Payload Part	D	agreed	3.2.0	3.3.0
R3-001417	25.415	024		RFC set for Initialisation	F	agreed	3.2.0	3.3.0
R3-001418	25.415	025		Figures with spare extension	D	agreed	3.2.0	3.3.0
R3-001523	25.415	026	1	Limiting length of Spare Extension over Iu	C	agreed	3.2.0	3.3.0
R3-001595	25.415	022	2	Iu user plane version negotiation for TrFO	C	agreed	3.2.0	3.3.0
R3-001602	25.415	027		emoving redundant specification from Iu UP	F	agreed	3.2.0	3.3.0

3GPP TSG-RAN-WG3 meeting #12
Seoul, Korea, 10–13 April 2000

***Document* R3-001073**
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25.415	CR	017	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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	X	Core Network	X

Source: R-WG3 **Date:** 2000-04-05

Subject: Correction of PDU type

Work item:

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

F	Correction	X	**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	X
				Release 00	

Reason for change: Correction of mentioned PDU type in section 8.1.3. The PDU type 15 is reserved for future use, not as mentioned in 8.1.3 PDU type 14.

Clauses affected: 8.1.3

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:


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8.1.3 Adding a new PDU type

In the future, the Iu UP protocol may evolve so that there is a need to add a new PDU type. The criteria for introducing a new PDU type could be e.g:

- the Procedure Indicators may run out and there is a need to have more;
- there is a need to change the header mask, e.g. the Frame Number field may need to be increased or the CRC field needs to be modified.

While the PDU type ~~14~~ 15 is reserved for future PDU type extensions, there may be 'subtypes' under PDU type ~~14~~ 15 in the future and there also may be new procedures in these 'subtypes'.

Thus it has to be ensured that if the same Procedure Indicator value is used under several PDU types, it should be made clear e.g. in the Error Event cause element, which PDU type it concerns.

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***Document* R3-001074**
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25.415	CR	018	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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 [X] Core Network [X]

Source: R-WG3 **Date:** 4th April 2000

Subject: Addition of table headings

Work item:

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

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	X		Release 99	X
				Release 00	

Reason for change: To add the missing table headings and table numbers in section 6.4.4.1.2 for FQC and in section 6.7.6 for List of errors.

Clauses affected: 6.4.4.1.2 and 6.7.6

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:

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6.4.4 Non Access Stratum Data Streams specific function(s)

These functions are responsible for a "limited manipulation" of the payload and the consistency check of the frame number. If a frame loss is detected due a gap in the sequence of the received frame numbers (for a RAB where frame numbers does not relate to time), this shall be reported to the procedure control function. These functions are responsible for the CRC check and calculation of the Iu UP frame payload part. These functions are also responsible for the Frame Quality Classification handling as described below.

These functions interact with the upper layers by exchanging Iu data stream blocks of Iu UP frame payload. These functions also handles the padding and depadding of the Iu UP frame payloads when needed.

These functions interact with the procedure control functions.

These functions provide service access to the upper layers for the procedure control functions.

6.4.4.1 Frame Quality Classification function

6.4.4.1.1 General

On the Iu UP in Support Mode the frames are classified with the Frame Quality Classifier (FQC). This classifying is based on the radio frame classification and the setting of the RAB attributes 'Delivery of erroneous SDUs'. The RAB attribute 'Delivery of erroneous SDUs' tells if erroneous frames shall be delivered or not.

Figure 6 below shows the main input and output information for frame quality classification function on the Iu UP.

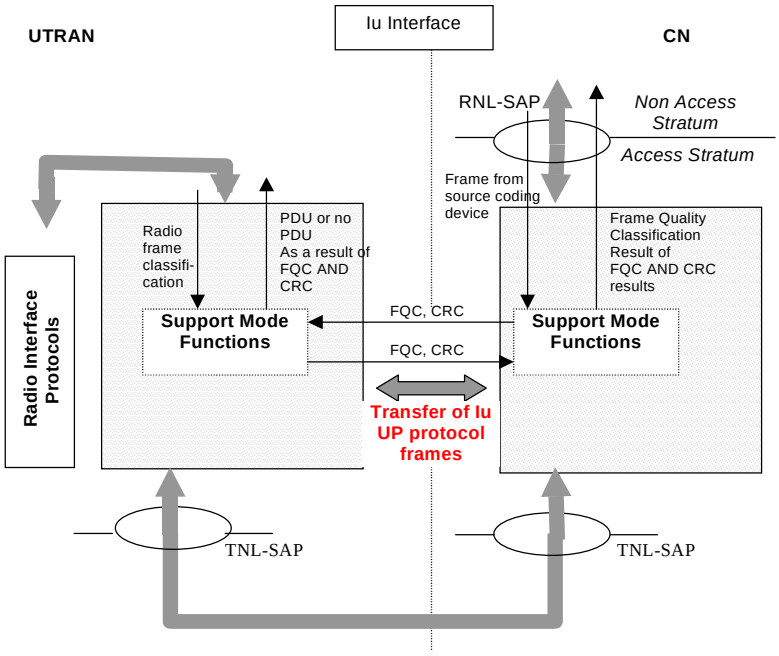

Figure 6: Frame quality classification in Iu UP

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 ~~is~~ shows the FQC field setting:

Table X: FQC handling in RNC on uplink

INPUT		ACTION
Delivery of erroneous SDUs	**Radio Frame Classification**	**Action taken in SRNC on the sending side**
Yes	Bad	Set FQC to 'bad radio'
No	Bad	Drop frame
Not Applicable	Any value	Set FQC to good
Any value	Good	Set FQC to good

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 X+1: FQC handling in CN on uplink

INPUT		ACTION
Delivery of erroneous SDUs	**Payload CRC check result**	**Actions taken at CN on the receiving side**
Yes	Not OK	Frame forwarded with FQC set to 'bad'
No	Not OK	Drop frame, send Iu-UP-Status primitive indicating 'No data' at the RNL-SAP
Not Applicable	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 X+2: FQC handling in RNC on downlink

INPUT			ACTION
Delivery of erroneous SDUs	**FQC**	**CRC check (if payload CRC present)**	**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
N/A	Any value	Any result	Pass the frame to radio interface protocols
Any value	Good	OK	Pass the frame to radio interface protocols

NOTE: The case where SRNC receives a frame with the FQC set to 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.

6.7.6 List of errors in Iu UP

Table X+3: List of errors in Iu UP

Error Type	Error Cause	Recommended action by Error event procedure	Possibly detected by function	Comment
Syntactical	Bit error in Frame payload (CRC check)	No action	NAS data streams functions	Handled by Frame Quality Classification, when applied
	Bit error in Frame Header (CRC check)	Iu-UP-Status-Indication(Error event)	Frame handler functions	Frame trashed
	Unexpected Frame Number	Iu-UP-Status-Indication(Error event)	NAS data streams functions	
	Frame loss	Iu-UP-Status-Indication(Error event) and Error event frame	NAS data streams functions	
	Unknown PDU type	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unknown procedure	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unknown or unexpected value	Iu-UP-Status-Indication(Error event) and Error event frame	Procedure control functions	
	Frame too short	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Missing fields	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
Semantical	Unexpected PDU type	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unexpected procedure	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unexpected RFCI	Iu-UP-Status-Indication(Error event) and Error event frame	NAS data streams functions	
	Unexpected value	Iu-UP-Status-Indication(Error event) and Error event frame	Procedure control functions	
Other error	Initialisation failure (outside Iu UP)	Error event frame	Function outside Iu UP	
	Initialisation failure (network error, timer expiry)	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Initialisation failure (Iu UP function error, repeated NACK)	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Rate control failure	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Error event failure	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Time Alignment not supported	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Requested Time Alignment not possible	Iu-UP-Status-Indication(Error event)	Function outside Iu UP	

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***Document* R3-001129**
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25.415	CR	019r1	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic		

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 [X] Core Network [X]

Source: R-WG3 **Date:** 2000-04-10

Subject: Clarification of FQC description

Work item:

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

F	Correction	X	**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	X
				Release 00	

Reason for change: To make the description of FQC handling more clear.
Revison 1: In first table (RNC on uplink) changed ‘Drop frame’ to ‘Frame not sent’, since a frame cannot be ‘dropped’ before it is being sent (i.e. dropping non existing frame not possible).

Clauses affected:

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:

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6.4.4 Non Access Stratum Data Streams specific function(s)

These functions are responsible for a "limited manipulation" of the payload and the consistency check of the frame number. If a frame loss is detected due a gap in the sequence of the received frame numbers (for a RAB where frame numbers does not relate to time), this shall be reported to the procedure control function. These functions are responsible for the CRC check and calculation of the Iu UP frame payload part. These functions are also responsible for the Frame Quality Classification handling as described below.

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6.4.4.1 Frame Quality Classification function

6.4.4.1.1 General

On the Iu UP in Support Mode the frames are classified with the Frame Quality Classifier (FQC). This classifying is based on the radio frame classification and the setting of the RAB attributes 'Delivery of erroneous SDUs'. The RAB attribute 'Delivery of erroneous SDUs' tells if erroneous frames shall be delivered or not.

Figure 6 below shows the main input and output information for frame quality classification function on the Iu UP.

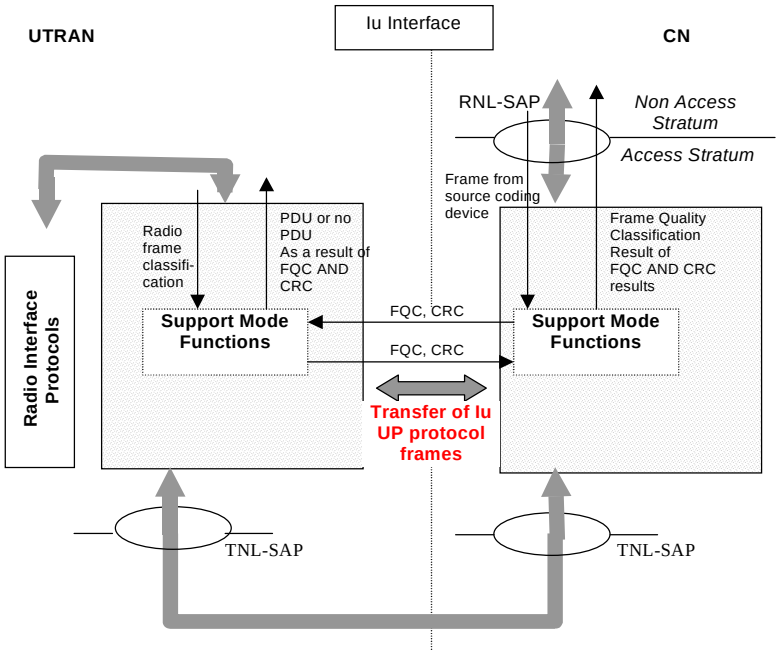

Figure 6: Frame quality classification in Iu UP

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 is shows the FQC field setting:

INPUT (for each subflow)		ACTION (on Iu 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	~~Drop frame~~Frame not sent
Not Applicable	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.

INPUT		ACTION (on Iu UP frame)
Delivery of erroneous SDUs (for each subflow)	**Payload CRC check result (on Iu UP frame)**	**Actions taken at CN on the receiving side**
Yes (atleast one of the subflows have this value but none have 'No')	Not OK	Frame forwarded with FQC set to 'bad'
No (atleast one of the subflows have this value)	Not OK	Drop frame, send Iu-UP-Status primitive indicating 'No data' at the RNL-SAP
Not Applicable (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.

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
N/A	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 sublows 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 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.

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Seoul, Korea, 10–13 April 2000

***Document* R3-001076**
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25.415	CR	020	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
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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: *(at least one should be marked with an X)*	(U)SIM		ME		UTRAN / Radio	X	Core Network	X

Source: R-WG3 **Date:** 2000-04-05

Subject: Version of the specified mode

Work item:

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

F	Correction	X	**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	X
				Release 00	

Reason for change: To specify the versions of the specified modes, i.e. the versions of Transparent mode and Support mode for predefined SDU sizes. The version number is used for the version negotiation of the Iu UP modes over Iu Control Plane.

Clauses affected: 5 and 6

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:


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5 Transparent mode, version 1

5.1 General

5.1.1 Operation of the Iu UP in Transparent mode

The Iu UP layer in Transparent mode is present in the Iu User plane for transferring data transparently over the Iu interface.

The two strata communicate through a Service Access Point for Non Access Stratum (NAS) Data Streams transfer.

5.1.2 Interfaces of the Iu UP protocol layer in Transparent mode

Interfaces of the Iu UP protocol layer in transparent mode are the transport network layer and the upper layers. The Iu UP protocol layer in Transparent Mode is an empty layer through which NAS Data Streams PDUs are crossing between the Transport Network Layer and upper layers.

The Iu UP protocol layer in transparent mode is using services of the Transport layers in order to transfer the Iu UP PDUs over the Iu interface.

5.2 Iu UP Protocol layer Services in Transparent mode

The following functions are needed to support this mode:

- Transfer of user data.

5.3 Services Expected from the UP Data Transport layer

The Iu UP protocol layer in Transparent mode expects the following services from the Transport Network Layer:

- Transfer of user data.

5.4 Elements for Iu UP communication in Transparent mode

5.4.1 Frame Format for transparent mode

The following shows the format of the PDU crossing the Iu UP protocol layer in transparent mode. This frame is transferred transparently between the Iu UP protocol upper layers and transport network layer (TNL-SAP).

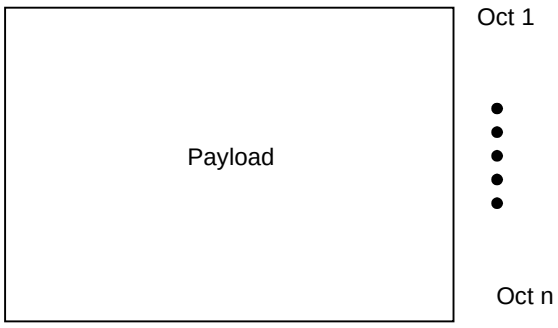

Figure 4: Frame format for transparent mode

This PDU has a variable length of n octets, whose maximum range depends on the type of user data (e.g. IP packet). No

explicit length indication is visible at the Iu UP protocol layer.

6 Support mode for predefined SDU sizes, version 1

6.1 General

6.1.1 Operation of the Iu UP in Support mode

The Iu UP protocol layer in Support mode is present for data streams that need frame handling in the UP.

The two strata communicate through a Service Access Point for Non Access Stratum (NAS) Data Streams transfer.

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Seoul, Korea, April 10-13 2000

Document *R3-001149*

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CHANGE REQUEST

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25.415	**CR**	**021**	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG RAN#8	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

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 [X] Core Network [X]

Source: R-WG3 **Date:** 10th April 2000

Subject: Clarification of Payload CRC Field (Iu FP)

Work item:

Category: *(only one category Shall be marked With an X)*

F	Correction	X	**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	X
				Release 00	

Reason for change: It should be clarified that when the length of the protected data is zero, all the parity bits should be zero.

Clauses affected: 6.7.2

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:

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6.7.7.2. CRC Calculation

The parity bits are generated by one of the following cyclic generator polynomials:

$g_{CRC6}(D) = D^6 + D^5 + D^3 + D^2 + D^1 + 1$;

$g_{CRC10}(D) = D^{10} + D^9 + D^5 + D^4 + D^1 + 1$.

Denote the bits to be protected of a frame by $a_1, a_2, a_3, \ldots, a_{A_i}$ (a_1 being the bit with the highest bit position in the first octet), and the parity bits by $p_1, p_2, p_3, \ldots, p_{L_i}$. A_i is the length of the protected data and L_i is 6 or 10 depending on the CRC length.

The encoding is performed in a systematic form, which means that in GF(2), the polynomial

$$a_1 D^{A_i+5} + a_2 D^{A_i+4} + \ldots + a_{A_i} D^6 + p_1 D^5 + p_2 D^4 + \ldots + p_5 D^1 + p_6$$

yields a remainder equal to 0 when divided by $g_{CRC6}(D)$ and the polynomial

$$a_1 D^{A_i+9} + a_2 D^{A_i+8} + \ldots + a_{A_i} D^{10} + p_1 D^9 + p_2 D^8 + \ldots + p_9 D^1 + p_{10}$$

yields a remainder equal to 0 when divided by $g_{CRC10}(D)$. If $A_i = 0$, $p_1 = p_2 = p_3 = \cdots = p_{L_i} = 0$.

R3-001595

3GPP-RAN-WG3 Meeting #13
Oahu, USA, 22th-26th May 2000

Document

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or for SMG, use the format P-99-xxx

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25.415	CR	022r2	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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 [X] Core Network [X]
(at least one should be marked with an X)

Source: R-WG3 **Date:** 05-24~~17~~-2000

Subject: Iu User Plane version negotiation

Work item:

Category: *(only one category Shall be marked With an X)*

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	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change: According to the working assumption about using Iu User plane end to end in the network and the lack of signalling in CN to handle the IuUP Mode version it is proposed to delete the Iu UP Mode ~~version negotiation~~chosen versions from RANAP RAB Assignment Response and Relocation Request Acknowledge message to ~~put~~ include the full negotiation procedure~~it~~ in the initialisation procedure of the IU User Plane protocol..

Clauses affected: 6.4.3, 6.5.2.1, 6.6.2.3~~.4~~, 6.6.3.7, 6.6.3.16, 6.7.6, 8.1.1, 8.1.4

New sections: {6.6.3.x, 6.6.3.y}

Other specs Affected:

Other 3G core specifications		→ List of CRs:	CR 100r1 on 25413v310
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: Ref. Tdoc R3-(00)1329
Update of R3-001567


help.doc

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

6.4.3 Procedure Control functions

This set of functions offers the control of a number of procedures handled at the Iu UP protocol level. These functions are responsible for the procedure control part of the Iu UP frames.

Namely, these procedures are:

- **Rate Control:** is the procedure which controls over the Iu UP the set of permitted rates among the rates that can be controled. The set of rates is represented by RFCI indicators and (when applicable) downlink send intervals. The function controlling this procedure interacts with functions outside of the Iu UP protocol layer.

- **Initialisation:** is the procedure which controls the exchange of initialisation information that is required for operation in support mode for predefined SDU size. Such information can contain the RFCI Set to be used until termination of the connection or until the next initialisation procedure. This procedure is also used for negotiating the version~~provides also the version negotiation~~ of the Iu UP Mode requested for the related RAB ~~concerned~~.

- **Time Alignment:** is the procedure that controls the timing of the downlink data to the RNC over Iu. The function controlling this procedure interacts with functions outside of the Iu UP protocol layer.

- **Handling of Error Event:** is the procedure that controls the information exchanged over the Iu related to detection of a fault situation. The function controlling this procedure interacts with functions outside of the Iu UP protocol layer.

6.5.2 Initialisation procedure

6.5.2.1 Successful operation

This procedure is mandatory for RABs using the support mode for predefined SDU size. The purpose of the initialisation procedure is to configure both termination points of the Iu UP with the RFCIs and associated RAB Sub Flows SDU sizes necessary during the transfer of user data phase. Additional parameters may also be passed, as the Inter PDU Timing Interval (IPTI) information.

The initialisation procedure is always controlled by the entity in charge of establishing the Radio Network Layer User Plane i.e. SRNC.

The initialisation procedure is invoked whenever indicated by the Iu UP Procedure Control function e.g. as a result of a relocation of SRNS or at RAB establishment over Iu.

When this procedure is invoked all other Iu UP procedures are suspended until termination of the initialisation procedure.

The RNC indicates the Iu UP Mode version it uses for the initialisation as well as the Iu UP Mode versions it supports for the related RAB. The sender should use the lowest version for the initialisation that has enough information to initialise the highest proposed protocol version.

The SRNC allocates a RAB sub-Flow Combination indicator (RFCI) to each RAB sub-Flow Combination. The association of indicators to RAB Flow Combinations is valid in the Iu UP until a new initialisation procedure is performed or the connection is terminated.

The procedure control function may also generate additional Iu UP protocol parameters necessary for the RAB service to operate properly over Iu.

To each RAB sub-Flow combination indicator is associated the size of each RAB sub-Flow SDU of that combination. The list of RAB sub-Flow Combination Indicators and their respective SDU sizes constitutes the RAB sub-Flow Combination set passed over the Iu UP in the initialisation frame i.e. into an appropriate Iu UP PDU Type.

The first RAB sub-Flow Combination proposed in the list of RAB sub-Flow Combination indicates the initial RAB sub-Flow Combination i.e. the first RAB sub-Flow Combination to be used when starting the communication phase i.e. the transfer of user data procedure.

The complete set of information is framed by the Iu UP Frame Handler function and transferred in an Iu UP initialisation frame. If needed, the initialisation frame CRC is calculated and set accordingly in the respective frame field.

A supervision timer T_{INIT} is started after sending the Iu UP initialisation frame. This timer supervises the reception of the initialisation acknowledgement frame.

Upon reception of a frame indicating that an initialisation control procedure is active in the peer Iu UP entity, the Iu UP protocol layer forwards to the upper layers the RAB sub-Flow Combination set to be used by the Control procedure function. It also stores the RAB sub-Flow Combination set in order to control during the transfer of user data, that the Iu UP payload is correctly formatted (e.g. RFCI matches the expected Iu UP frame payload total length). The entity receiving the initialisation message shall choose a version that it supports and for which it has enough initialisation information. This entity could be in the CN, or in a RNC, e.g. in case of TrFO.

If the initialisation frame is correctly formatted and treated by the receiving Iu UP protocol layer, this latter sends an initialisation acknowledgement frame -using the version of the Iu UP Mode that is chosen.

Upon reception of an initialisation acknowledgement frame, the Iu UP protocol layer in the SRNC stops the supervision timer T_{INIT}.

If the initialisation procedure requires that several frames are to be sent, each frame shall be acknowledged individually.

If several initialisation frames are used for the initialisation procedure, the next frame shall wait for the acknowledgement of the previous frame to be received before sending. The supervision timer is used individually for each frame in a chain.

The frame number is always set to zero for the first frame in a chain and it shall be incremented in the sending direction for each sent frame. The acknowledgement or negative acknowledgement carries the frame number of the frame being acknowledged.

Upon reception of an initialisation negative acknowledgement frame or at timer T_{INIT} expiry, the Iu UP protocol layer in the SRNC shall reset and restart the T_{INIT} supervision timer and repeat an initialisation frame. The repetition can be performed N_{INIT} times, N_{INIT} being chosen by the operator (default $N_{INIT} = 3$).

Consequently, when in the communication phase (as indicated by internal functions in the Radio Network layer), the frame transmission starts in downlink in the initial RFCI.

In the case where an SRNC receives an Iu frame indicating that an initialisation procedure is active at the other end of the Iu UP, RFCI is applied as follows:

- for the sending frame, i.e. UL direction, RNC uses the RAB sub-Flows Combination set indicated in Initialisation phase of the peer TFO or TrFO partner;
- for the receiving frame, i.e. DL direction, RNC uses the RAB sub-Flows Combination set as sent in its own initialisation frame.

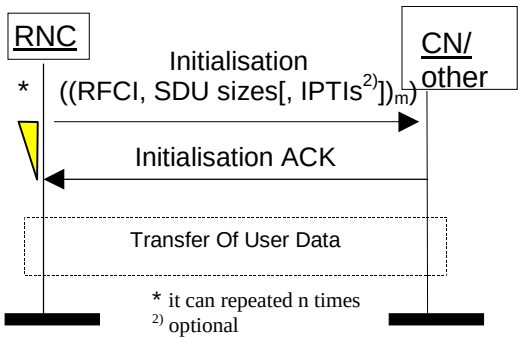

Figure 9: Successful Initialisation of Iu UP for m RFCIs

6.5.2.2 Unsuccessful operation

If the initialisation frame is incorrectly formatted and cannot be correctly treated by the receiving Iu UP protocol layer, this latter sends an initialisation negative acknowledgement frame.

If the receiver does not support the Iu UP Mode version for the initialisation procedure, it shall send a negative acknowledgement using the highest version it supports among the versions proposed by the sender. If none of the proposed versions are supported, the receiver shall respond a negative acknowledgement using the highest version it supports.

If after N_{INIT} repetition, the initialisation procedure is unsuccessfully terminated (because of N_{INIT} negative acknowledgement or timer T_{INIT} expires), the Iu UP protocol layers (sending and receiving) take appropriate local actions.

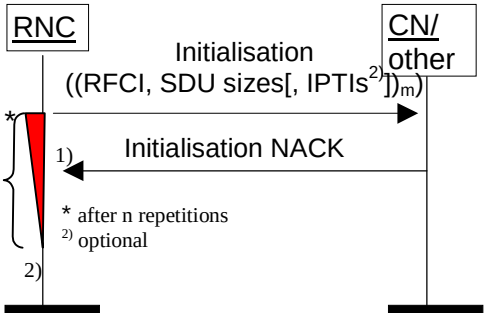

Figure 10: Unsuccessful initialisation of Iu UP: 1) N_{INIT} negative acknowledgement or 2) N_{INIT} timer expires

NOTE: The case where an SRNC receives an Iu frame indicating that an initialisation procedure is active at the other end of the Iu UP could be related to a TFO or TrFO negotiation. How TFO or TrFO protocol and codec negotiation is performed is FFS.

6.6.2.3 PDU Type 14

6.6.2.3.1 General

PDU Type 14 is defined to perform control procedures over the Iu UP in support mode for pre-defined SDU sizes. The control procedure is identified by the procedure indicator. The Frame Payload contains the data information related to the control procedure.

Figure 21 below shows the Iu frame structure for PDU Type 14 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).

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				1	
Header CRC							Payload CRC	1	Frame Checksum Part
Payload CRC								1	
Reserved for procedure data								0-n	Frame payload part
Spare extension								0-m	

Figure 21: Iu UP PDU Type 14 Format for procedure sending

The Iu UP PDU Type 14 is made of three parts:

1) Iu UP Frame Control part (fixed size);
2) Iu UP Frame Check Sum part (fixed size);
3) Iu UP Frame Payload part (variable length, rounded up to octet).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header.

6.6.2.3.2 Positive Acknowledgement

When the PDU Type 14 is used to positively acknowledge a control procedure, the PDU Type 14 frame takes the following structure at the TNL-SAP.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack (=1, i.e. Ack)		PDU Type 14 Frame Number		1	Frame Control Part
Iu UP Mode version				Procedure Indicator (indicating the procedure being positively acknowledged)				1	
Header CRC						SPARE		1	Frame Checksum Part
SPARE								1	
Spare extension								0-m	Frame payload part

Figure 22: Iu UP PDU Type 14 Format for positive acknowledgement

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header for positive acknowledgement.

6.6.2.3.3 Negative Acknowledgement

When the PDU Type 14 is used to negatively acknowledge a control procedure, the PDU Type 14 frame takes the following structure at the TNL-SAP.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack (=2, i.e. Nack)		PDU Type 14 Frame Number		1	Frame Control Part
Iu UP Mode version				Procedure Indicator (indicating the procedure being negatively acknowledged)				1	
Header CRC						Spare		1	Frame Checksum Part
Spare								1	
Error Cause value						Spare		1	Frame payload part
Spare extension								0-m	

Figure 23: Iu UP PDU Type 14 Format for negative acknowledgement

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header for negative acknowledgement.

6.6.2.3.4 Procedures Coding

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	1st 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	2nd 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 1st RFCI				IPTI of 2nd RFCI				0 or N/2	
IPTI of 3rd RFCI				…					
Iu UP Mode Versions supported (bitmap)								2~~1~~	
Spare extension								0-m	

Figure 24: Iu UP PDU Type 14 used for Initialisation

6.6.2.3.4.2 Rate Control

Figure 25 specifies how the rate control 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 (=1)				1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Spare				Number of RFCIs (N)				1	Frame payload part
RFCI 0 Ind.	RFCI 1 Ind	…	RFCI N-1 Ind	Padding				0–n	
Spare extension								0-m	

Figure 25: Iu UP PDU Type 14 Format used for Rate Control

6.6.2.3.4.3 Time Alignment

Figure 26 specifies how the time alignment procedure is coded.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack(=0)		PDU Type 14 Frame Number		1	Frame Control Part
~~Spare~~Iu UP Mode version				Procedure Indicator (=2)				1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Time alignment								1	Frame payload part
Spare extension								0-m	

Figure 26: Iu UP PDU Type 14 Format used for Time Alignment

6.6.2.3.4.4 Error Event

Figure 27 specifies how the Error Event procedure is coded.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack(=0)		PDU Type 14 Frame Number		1	Frame Control Part
Iu UP Mode version				Procedure Indicator (=3)				1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Error distance				Error Cause value				1	Frame payload part
Spare extension								0-m	

Figure 27: Iu UP PDU Type 14 Format used for Error Event

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: {0-14, 15=reserved for future PDU type extensions}

Field length: 4 bits

6.6.3.2 Ack/Nack

Description: The Ack/Nack field tells if the frame is:

- a control procedure frame;
- a positive acknowledgement (ACK) of a control procedure frame;
- a negative acknowledgement (NACK) of a control procedure frame.

Value range: {0=control procedure frame, 1=ACK, 2=NACK, 3=reserved}

Field length: 2 bits

6.6.3.3 Frame Number

Description: The Iu UP frame numbering is handled by a Frame Number. The frame numbering can be based on either time or sent Iu UP PDU. In case the frame numbering is based on time the purpose of the frame number is to be of help in handling the Time Alignment functionality. When the frame number is based on time, the Frame number is incremented by one (modulo 16) at each new ITI. In case the Frame number relates to sent Iu UP PDU the purpose of the Frame Number is to provide the receiving entity with a mechanism to keep track of lost Iu UP frames. When the frame number is based on sent Iu UP PDU, the Frame number is incremented by one (modulo 16) for each sent Iu UP PDU. For a given user data connection, there is no relations between the frame numbers of frames sent in the downlink direction and the frame numbers of frames sent in the uplink direction.

Value range: {0-15}.

Field length: 4 bits.

6.6.3.4 PDU Type 14 Frame Number

Description: The Iu UP frame numbering is handled by a Frame Number. The purpose of the PDU Type 14 Frame Number is to provide the receiving entity with a mechanism to keep track of lost Iu UP frames.It is also used to relate the acknowledgment frame to the frame being acknowledged i.e. the same PDU Type 14 Frame Number is used in the acknowledgement frame as the one used in the frame being acknowledged.

Value range: {0-3}.

Field length: 2 bits.

6.6.3.5 Frame Quality Classification (FQC)

Description: Frame Quality Classification is used to classify the Iu UP frames depending on whether errors have occurred in the frame or not. Frame Quality Classification is dependent on the RAB attribute 'Delivery of erroneous SDUs'.

Value range: {0=frame good, 1=frame bad, 2=Frame bad due to radio, 3=spare}.

Field length: 2 bits.

6.6.3.6 RAB sub-Flow Combination Indicator (RFCI)

Description: The RFCI identifies the structure of the payload. This can be used to specify the sizes of the subflows.

Value range: {0-62, 63=RFCI not applicable}.

Field length: 6 bits.

6.6.3.7 Procedure Indicator

Description: The Procedure Indicator identifies the control procedure in the current frame.

Value range: {0=initialization, 1=rate control, 2=time alignment, 3=error event, 4-15~~255~~=reserved}.

Field length: ~~4~~8 bits.

6.6.3.8 Header CRC

Description: This field contains the CRC of all fields in Frame Control Part. The CRC is a 6-bit checksum based on the generator polynom $G(D) = D^6+D^5+D^3+D^2+D^1+1$, see subclause 6.7.7. With this CRC all error bursts shorter than 7 bits are detected, as well as all odd number of bits faulty (and two-bit faults) when the protected area is shorter than 24 bits, (max 3 octets).

Field length: 6 bits.

6.6.3.9 Payload CRC

Description: This field contains the CRC of all the fields (including Padding) of the Frame Payload. The CRC is a 10 bit checksum based on the generator polynom $G(D) = D^{10}+ D^9+D^5+D^4+D^1+1$, see subclause 6.7.7. With this CRC all error bursts shorter than 11 bits are detected, as well as all odd number of bits faulty (and two-bit faults) when the protected area is shorter than 500 bits (max 62 octets).

Field length: 10 bits.

6.6.3.10 Chain Indicator

Description: Chain indicator is used to indicate whether the control procedure frame is the last frame related to the control procedure.

Value range: {0=this frame is the last frame for the procedure, 1=additional frames will be sent for the procedure}.

Field length: 1 bit.

6.6.3.11 Number of Subflows per RFCI

Description: Number of Subflows per RFCI field indicates the number of subflows the RAB is made of. It is used to decode the SDU size information data lengths. All RFCs consist of the same number of subflows within a specific RAB.

Value range: {0=reserved, 1-7}.

Field length: 3 bits.

6.6.3.12 Length Indicator (LI)

Description: Length Indicator, indicates if 1 or 2 octets is used for the RAB subflow size information.

Value range: {0=one octet used, 1=two octets used}.

Field length: 1 bit.

6.6.3.13 Number of RFCI Indicators

Description: Number of RFCI indicators indicates the number of RFCI indicators present in the control procedure frame.

Value range: {0-63}.

Field length: 6 bits.

6.6.3.14 RFCI n Indicator

Description: RFCI n Indicator points to an RFCI number e.g. RFCI 0 Indicator points to RFCI 0, RFCI 1 Indicator points to RFCI 1, etc…

Value range: {0=RFCI allowed, 1=RFCI barred}.

Field length: 1 bit.

6.6.3.15 Error distance

Description: Indicates if the error occurred at the error reporting entity (=0) or in a more distant entity. The error distance is incremented by one (or kept at its maximum value) when an error report is forwarded.

0: Reporting local error
1: First forwarding of error event report
2: Second forwarding of error event report
3: Reserved for future use

Value range: {0: Reporting local error, 1: First forwarding of error event report. 2: Second forwarding of error event, 3: Reserved for future use}.

Field length: 2 bit.

6.6.3.16 Error Cause value

Description: Cause value is used to indicate what kind of error caused the error. Error cause value is used in NACK and Error Event frames.

0: CRC error of frame header
1: CRC error of frame payload
2: Unexpected frame number
3: Frame loss
4: PDU type unknown
5: Unknown procedure
6: Unknown reserved value
7: Unknown field
8: Frame too short
9: Missing fields
10–15: spare
16: Unexpected PDU type
18: Unexpected procedure
19: Unexpected RFCI
20: Unexpected value
21–41: spare
42: Initialisation failure
43: Initialisation failure (timer expiry)
44: Initialisation failure (repeated NACK)
45: Rate control failure
46: Error event failure
47: Time Alignment not supported
48: Requested Time Alignment not possible
49: Iu UP Mode version not supported
5049–63: spare

Value range: {0–15 Used for syntactical protocol errors, 16–41 Used for semantical protocol errors, 42–63 Used for other errors}.

Field length: 6 bit.

6.6.3.17 Padding

Description: This field is an additional field used to make the frame payload part an integer number of octets when needed. Padding is set to 0 by the sender and is not interpreted by the receiver.

Value range: {0–127}.

Field length: 0–7 bits.

6.6.3.18 Time alignment

Description: Time alignment indicates the amount the sending time should be advanced or delayed.

0: Reserved
1: Delay 1*500µs
…
80: Delay 80*500µs
81–127 Reserved
128: Reserved
129: Advance 1*500µs
…
208: Advance 80*500µs
209–255 Reserved

Value range: {0: Reserved, 1–80: used for delay, 81–128: Reserved, 129-208 used for advance, 209–255: Reserved}.

Field length: 8 bit.

6.6.3.19 Spare

Description: The spare field is set to 0 by the sender and should not be interpreted by the receiver.

Value range: (0–2^n-1).

Field Length: n bits.

6.6.3.20 Spare extension

Description: The spare extension field shall not be sent. The receiver should be capable of receiving a spare extension. The spare extension should not be interpreted by the receiver. This since in later versions of the present document additional new fields might be added in place of the spare extension. The spare extension can be of an integer number of octets (m) carrying new fields or additional information.

Value range: 0–2^{m*8}-1.

Field Length: 0–m octets.

6.6.3.21 LRI, Last RFCI Indicator

Description: The Last RFCI Indicator is used to indicate which is the last RFCI in the current Initialisation frame. This makes it possible for a receiver to detect a spare extension field.

Value range: (0: Not last RFCI, 1: Last RFCI in current frame).

Field Length: 1 bit.

6.6.3.22 Length of subflow

Description: This field indicates the length of the corresponding subflow as number of bits per SDU.

Value range: (0–255 if LI=0, 0–65535 if LI=1).

Field Length: 8 or 16 bits (depending on LI).

6.6.3.23 TI

Description: This field indicates if Timing Information is included in the Initialisation frame.

Value range: {0: IPTIs not present, 1: IPTIs present in frame}.

Field length: 1 bit.

6.6.3.24 IPTI of n^{th} RFCI

Description: This field indicates the IPTI value in number of ITIs for the corresponding RFCI (in the same order as the RFCIs occur in the Initialisation frame).

Value range: {0–15}.

Field length: 4 bits.

6.6.3.x Iu UP Mode versions supported

Description: This field indicates the Iu UP Mode Versions supported by the RNC ~~for the Iu UP Mode requested~~ for the related RAB ~~concerned~~. Up to 16 ~~4~~ Iu UP Mode versions ~~max.~~ can be simultaneously available ~~in the PLMN~~.

Value range:

Each bit, in the two octet field, indicates a Iu UP Protocol version: (First octet, bit 7) indicates version 16, (Second octet, bit 0) indicates version 1.

Bit = 0 means “Version not supported”

Bit = 1 means “Version supported”

Field length: ~~4 bits~~2 octets

6.6.3.y ~~Choosen~~ Iu UP Mode Version

Description: This field indicates the Iu UP Mode version~~ choosen by the remote Iu UP (in RNC or CN)~~. Up to 16 ~~4~~ Iu UP Mode Versions ~~max.~~ can be simultaneously available~~ in the PLMN~~.

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: ~~2~~ 4 bits

6.7.6 List of errors in Iu UP

Error Type	Error Cause	Recommended action by Error event procedure	Possibly detected by function	Comment
Syntactical	Bit error in Frame payload (CRC check)	No action	NAS data streams functions	Handled by Frame Quality Classification, when applied
	Bit error in Frame Header (CRC check)	Iu-UP-Status-Indication(Error event)	Frame handler functions	Frame trashed
	Unexpected Frame Number	Iu-UP-Status-Indication(Error event)	NAS data streams functions	
	Frame loss	Iu-UP-Status-Indication(Error event) and Error event frame	NAS data streams functions	
	Unknown PDU type	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unknown procedure	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unknown or unexpected value	Iu-UP-Status-Indication(Error event) and Error event frame	Procedure control functions	
	Frame too short	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Missing fields	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
Semantical	Unexpected PDU type	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unexpected procedure	Iu-UP-Status-Indication(Error event) and Error event frame	Frame handler functions	
	Unexpected RFCI	Iu-UP-Status-Indication(Error event) and Error event frame	NAS data streams functions	
	Unexpected value	Iu-UP-Status-Indication(Error event) and Error event frame	Procedure control functions	
Other error	Initialisation failure (outside Iu UP)	Error event frame	Function outside Iu UP	
	Initialisation failure (network error, timer expiry)	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Initialisation failure (Iu UP function error, repeated NACK)	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Rate control failure	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Error event failure	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Time Alignment not supported	Iu-UP-Status-Indication(Error event)	Procedure control functions	
	Requested Time Alignment not possible	Iu-UP-Status-Indication(Error event)	Function outside Iu UP	
	Iu UP version not supported	Iu-UP-Status-Indication(Error event)	Procedure control functions	

8 Evolution of Iu UP Protocol

8.1 Principles for Protocol Evolution

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

Value range: {0-1 in use, 2-13 reserved for future use, 14 in use, 15 reserved for future use}.

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.

FQC

Value range: {0-1 in use, 2-3 spare}.

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

ACK/NACK

Value range: {0-2 in use, 3 reserved}.

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

Value range: {0-3 in use, 4-15 reserved}.

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

Value range: {0 reserved, 1, 16 in use, 10~~2~~-15 spare, 21-41 spare and ~~17 255~~ 50-63 spare}.

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.

8.1.4 Protocol version handling

In the future, new versions of the Iu UP protocol may be introduced. A reason for a new version of the protocol could be, e.g:

- the earlier introduced new features or functions are required to be mandatory in the new version;
- due to technical development, the new version of the protocol could be totally different (and incompatible) from the earlier version.

The following principles shall be applied to version handling of Iu UP protocol:

- it shall be possible to introduce additional modes of operation;
- it shall be possible to evolve the operation modes independently of each other;
- there shall be independent version numbers for each mode of operation;
- the mode of operation of an Iu UP protocol instance is decided by the CN, but the version of the mode shall be negotiated between the CN and UTRAN during ~~RAB Assignment and Relocation Resource Allocation~~initialisation procedures~~;~~;
- the version number of a UP operation mode may change or be unchanged between different releases;
- when the protocol is evolved it shall be made clear in the specification, which features belong to which versions;
- ~~—~~a new version may be an evolution (i.e. compatible) of the old version or the new version may be totally different from the old version.
- The structure of the PDU Type 14 header, up to and including header CRC, shall remain unchanged whatever the Iu UP version.

3GPP TSG-RAN-WG3 meeting #13
Oahu, USA, 22nd–26th of May 2000

Document R3-001416
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

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25.415	CR	023	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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 [X] Core Network [X]

Source: R-WG3 **Date:** 16th May 2000

Subject: CRC of Frame Payload Part

Work item:

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

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	X		Release 99	X
				Release 00	

Reason for change: To make it more clear that all fields of Frame Payload Part are used for Payload CRC calculation.

Clauses affected: 6.6.3.9

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:

help.doc

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

6.6.3.9 Payload CRC

Description: This field contains the CRC of all the fields (including Padding and possible Spare extension) of the Frame Payload Part. The CRC is a 10 bit checksum based on the generator polynom $G(D) = D^{10} + D^9 + D^5 + D^4 + D^1 + 1$, see subclause 6.7.7. With this CRC all error bursts shorter than 11 bits are detected, as well as all odd number of bits faulty (and two-bit faults) when the protected area is shorter than 500 bits (max 62 octets).

Field length: 10 bits.

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Oahu, USA, 22nd–26th of May 2000

Document R3-001417
e.g. for 3GPP use the format TP-99xxx
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CHANGE REQUEST

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25.415	CR	024	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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 [X] Core Network [X]

Source: R-WG3 **Date:** 16th May 2000

Subject: RFC set for Initialisation

Work item:

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

F	Correction	X	**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	X
				Release 00	

Reason for change: In order to be compatible with future enhancements of services, it is made clear that SRNC can choose the RAB subflow combinations it can support, to form the RAB subflow combination set that is sent in the Initialisation frame.

Clauses affected: 6.5.2.1

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:

help.doc

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

6.5.2 Initialisation procedure

6.5.2.1 Successful operation

This procedure is mandatory for RABs using the support mode for predefined SDU size. The purpose of the initialisation procedure is to configure both termination points of the Iu UP with the RFCIs and associated RAB Sub Flows SDU sizes necessary during the transfer of user data phase. Additional parameters may also be passed, as the Inter PDU Timing Interval (IPTI) information.

The initialisation procedure is always controlled by the entity in charge of establishing the Radio Network Layer User Plane i.e. SRNC.

The initialisation procedure is invoked whenever indicated by the Iu UP Procedure Control function e.g. as a result of a relocation of SRNS or at RAB establishment over Iu.

When this procedure is invoked all other Iu UP procedures are suspended until termination of the initialisation procedure.

The SRNC allocates a RAB sub-Flow Combination indicator (RFCI) to each RAB sub-Flow Combination it initialises. The association of indicators to RAB Flow Combinations is valid in the Iu UP until a new initialisation procedure is performed or the connection is terminated.

The procedure control function may also generate additional Iu UP protocol parameters necessary for the RAB service to operate properly over Iu.

To each RAB sub-Flow combination indicator is associated the size of each RAB sub-Flow SDU of that combination. The list of RAB sub-Flow Combination Indicators and their respective SDU sizes constitutes the RAB sub-Flow Combination set passed over the Iu UP in the initialisation frame i.e. into an appropriate Iu UP PDU Type.

The first RAB sub-Flow Combination proposed in the list of RAB sub-Flow Combination indicates the initial RAB sub-Flow Combination i.e. the first RAB sub-Flow Combination to be used when starting the communication phase i.e. the transfer of user data procedure.

The complete set of information is framed by the Iu UP Frame Handler function and transferred in an Iu UP initialisation frame. If needed, the initialisation frame CRC is calculated and set accordingly in the respective frame field.

A supervision timer T_{INIT} is started after sending the Iu UP initialisation frame. This timer supervises the reception of the initialisation acknowledgement frame.

Upon reception of a frame indicating that an initialisation control procedure is active in the peer Iu UP entity, the Iu UP protocol layer forwards to the upper layers the RAB sub-Flow Combination set to be used by the Control procedure function. It also stores the RAB sub-Flow Combination set in order to control during the transfer of user data, that the Iu UP payload is correctly formatted (e.g. RFCI matches the expected Iu UP frame payload total length).

If the initialisation frame is correctly formatted and treated by the receiving Iu UP protocol layer, this latter sends an initialisation acknowledgement frame.

Upon reception of an initialisation acknowledgement frame, the Iu UP protocol layer in the SRNC stops the supervision timer T_{INIT}.

If the initialisation procedure requires that several frames are to be sent, each frame shall be acknowledged individually.

If several initialisation frames are used for the initialisation procedure, the next frame shall wait for the acknowledgement of the previous frame to be received before sending. The supervision timer is used individually for each frame in a chain.

The frame number is always set to zero for the first frame in a chain and it shall be incremented in the sending direction for each sent frame. The acknowledgement or negative acknowledgement carries the frame number of the frame being acknowledged.

Upon reception of an initialisation negative acknowledgement frame or at timer T_{INIT} expiry, the Iu UP protocol layer in the SRNC shall reset and restart the T_{INIT} supervision timer and repeat an initialisation frame. The repetition can be

performed N_{INIT} times, N_{INIT} being chosen by the operator (default $N_{INIT} = 3$).

Consequently, when in the communication phase (as indicated by internal functions in the Radio Network layer), the frame transmission starts in downlink in the initial RFCI.

In the case where an SRNC receives an Iu frame indicating that an initialisation procedure is active at the other end of the Iu UP, RFCI is applied as follows:

- for the sending frame, i.e. UL direction, RNC uses the RAB sub-Flows Combination set indicated in Initialisation phase of the peer TFO or TrFO partner;

- for the receiving frame, i.e. DL direction, RNC uses the RAB sub-Flows Combination set as sent in its own initialisation frame.

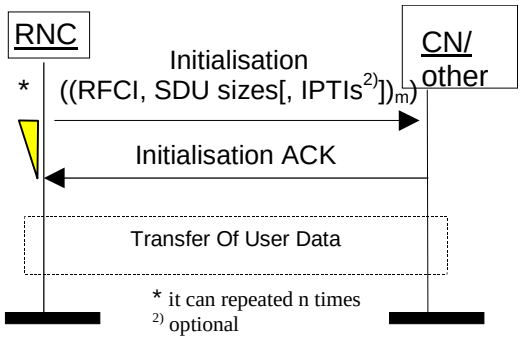

Figure 9: Successful Initialisation of Iu UP for m RFCIs

3GPP TSG-RAN-WG3 meeting #13
Oahu, USA, 22nd–26th of May 2000

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e.g. for 3GPP use the format TP-99xxx
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25.415	CR	025	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		(for SMG use only)
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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: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [X] Core Network [X]

Source: R-WG3 **Date:** 16th May 2000

Subject: Figures with spare extension

Work item:

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

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	X		Release 99	X
				Release 00	

Reason for change: The figures of the frames needs to be corrected after CR2 on version 3.1.0 (tdoc R3-000348) was put in. The CR2 contained a fault in Figure 8, and other figures was affected by this fault. This CR makes changes to the borders and lines of the figures, so that it is clear that 'Spare extension' is part of the Fame payload part.

Clauses affected: 6.6.1, 6.6.2.1, 6.6.2.2

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:

help.doc

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

6.6 Elements for Iu UP communication in Support mode

6.6.1 General

In the present document the structure of frames will be specified by using figures similar to figure 18.

Bits								Number of Octets		
7	6	5	4	3	2	1	0			
Field 1				Field 2				1	Octet 1	Header part
Field 3							Field 4	2	Octet 2	
Field 4 continue				Spare					Octet 3	
Field 6								2	Octet 4	Payload part
Field 6 continue				Padding					Octet 5	
Spare extension								0-m		

Bits								Number of Octets		
7	6	5	4	3	2	1	0			
Field 1				Field 2				1	Octet 1	Header part
Field 3							Field 4	2	Octet 2	
Field 4 continue				Spare					Octet 3	
Field 6								2	Octet 4	Payload part
Field 6 continue				Padding					Octet 5	
Spare extension								0-m		

Figure 18: Example frame format

Unless otherwise indicated, fields which consist of multiple bits within a octet will have the more significant bit located at the higher bit position (indicated above frame in figure 18). In addition, if a field spans several octets, more significant bits will be located in lower numbered octets (right of frame in figure 18).

On the Iu interface, the frame will be transmitted starting from the lowest numbered octet. Within each octet, the bits are sent according decreasing bit position (bit position 7 first).

Spare bits should be set to 0 by the sender and should not be checked by the receiver.

The header part of the frame is always an integer number of octets. The payload part is octet rounded (by adding 'Padding' when needed).

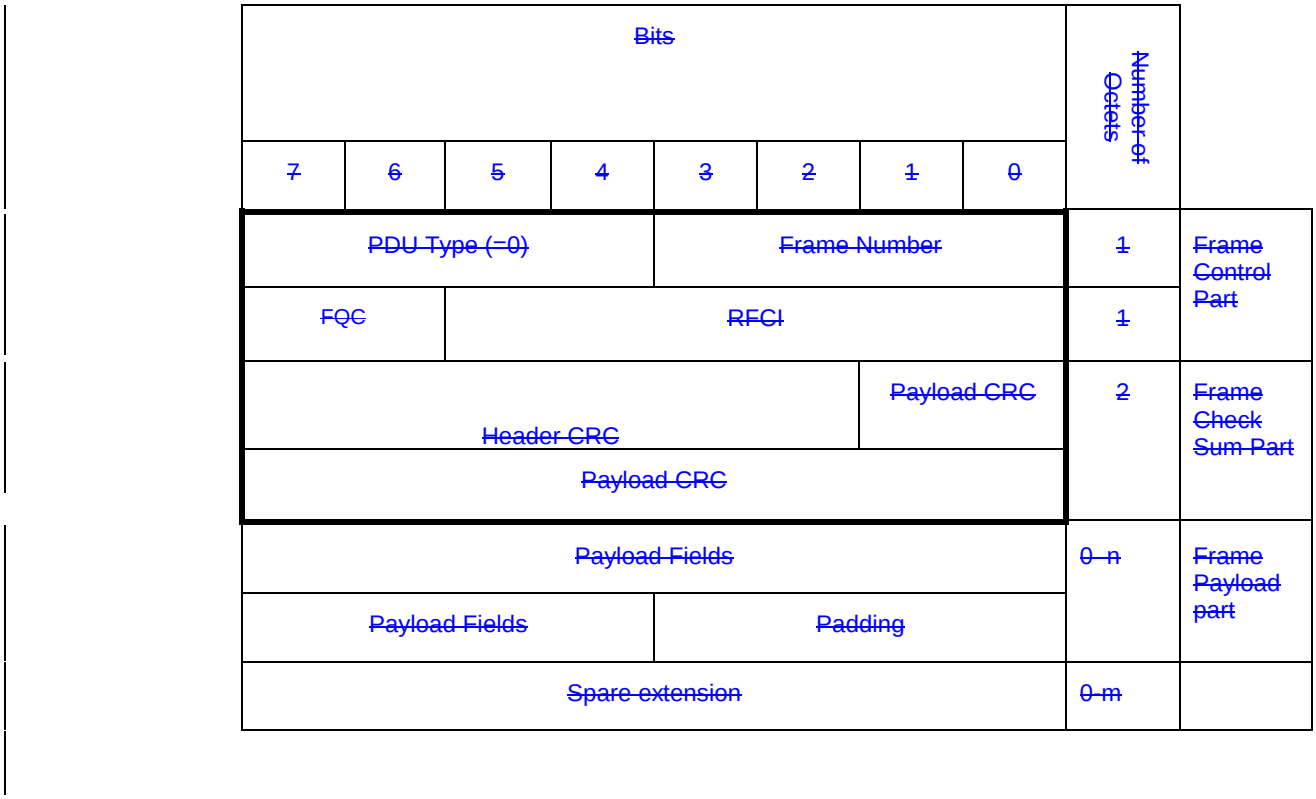
The receiver should be able to remove an additional spare extension field that may be present at the end of a frame. See description of Spare extension field.

6.6.2 Frame Format for predefined size SDUs

6.6.2.1 PDU Type 0

PDU Type 0 is defined to transfer user data over the Iu UP in support mode for pre-defined SDU sizes. Error detection scheme is provided over the Iu UP for the payload part.

The following shows the Iu frame structure for PDU type 0 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).



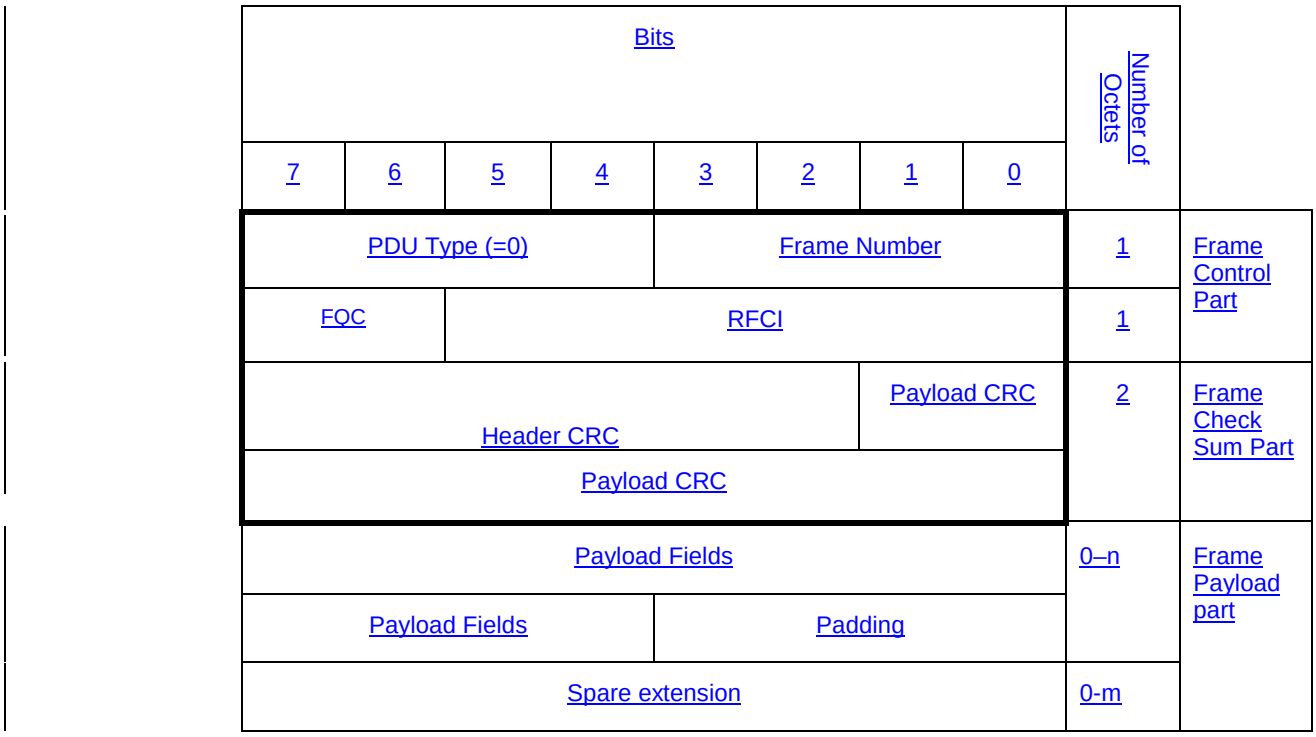


Figure 19: Iu UP PDU Type 0 Format

The Iu UP PDU Type 0 is made of three parts:

1) Iu UP Frame Control part (fixed size);

2) Iu UP Frame Check Sum part (fixed size);

3) Iu UP Frame Payload part (pre-defined SDU sizes rounded up to octets [Note: this does not consider the usage of spare extension field]).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 0 Frame Header.

6.6.2.2 PDU Type 1

PDU Type 1 is defined to transfer user data over the Iu UP in support mode for pre-defined SDU sizes when no payload error detection scheme is necessary over Iu UP (i.e. no payload CRC).

The following shows the Iu frame structure for PDU type 1 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=1)				Frame Number				1	Frame Control Part
FQC				RFCI				1	
Header CRC							Spare	1	Frame Check Sum Part
Payload Fields								0-n	Frame Payload part
Payload Fields				Padding					
Spare extension								0-m	

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=1)				Frame Number				1	Frame Control Part
FQC				RFCI				1	
Header CRC							Spare	1	Frame Check Sum Part
Payload Fields								0-n	Frame Payload part
Payload Fields				Padding					
Spare extension								0-m	

Figure 20: Iu UP PDU Type 1 Format

The Iu UP PDU Type 1 is made of three parts:

1) Iu UP Frame Control part (fixed size);

2) Iu UP Frame Check Sum part (fixed size);

3) Iu UP Frame Payload part (pre-defined SDU sizes, rounded up to octets [Note: this does not consider the usage of spare extension field]).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 1 Frame Header.

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***Document* R3-001523**
e.g. for 3GPP use the format TP-99xxx
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CHANGE REQUEST

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25.415	CR	026r1	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#8	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

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	X	Core Network	X

Source: R-WG3 **Date:** 25 April 2000

Subject: Limiting length of Spare Extension over Iu

Work item:

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

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	X		Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

When Spare Extension was discussed for Iub & Iur, it was realised that efficient resource allocation was very difficult if a maximum size was not defined for the Spare Extension (as the receiver does not know how large the incoming frames might be). So, for the Iub and Iur UP protocols, the size was limited to 2 octets for user data frames and 32 octets for control frames.

This CR proposes that the Iu UP Protocol is harmonised with the Iub/r UP protocols to ease the resource allocation problem and for harmonisation of the protocol design principles across RAN3. In rev1 of this CR, the limitation for user data frames is set to 4 octets for the Iu UP.

The Extensibility section is also updated to give guidance on choosing maximum lengths for future PDU types.

Clauses affected:

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:


help.doc

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

6.6.2 Frame Format for predefined size SDUs

6.6.2.1 PDU Type 0

PDU Type 0 is defined to transfer user data over the Iu UP in support mode for pre-defined SDU sizes. Error detection scheme is provided over the Iu UP for the payload part.

The following shows the Iu frame structure for PDU type 0 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).

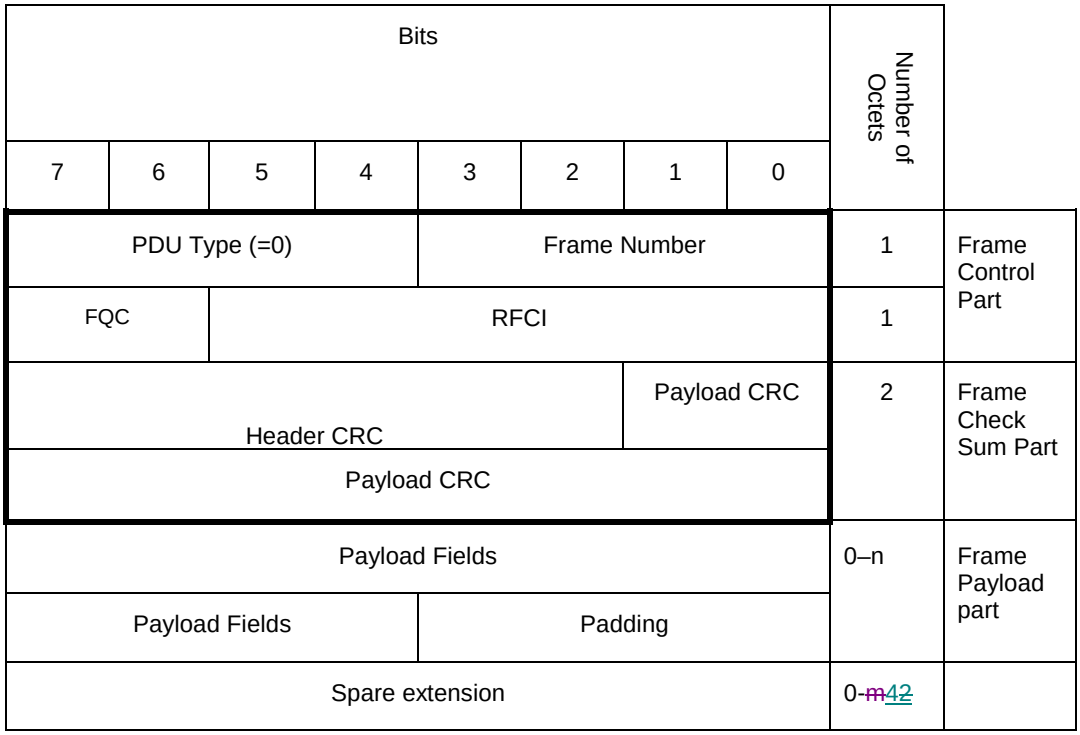

Figure 19: Iu UP PDU Type 0 Format

The Iu UP PDU Type 0 is made of three parts:

1) Iu UP Frame Control part (fixed size);
2) Iu UP Frame Check Sum part (fixed size);
3) Iu UP Frame Payload part (pre-defined SDU sizes rounded up to octets [Note: this does not consider the usage of spare extension field]).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 0 Frame Header.

6.6.2.2 PDU Type 1

PDU Type 1 is defined to transfer user data over the Iu UP in support mode for pre-defined SDU sizes when no payload error detection scheme is necessary over Iu UP (i.e. no payload CRC).

The following shows the Iu frame structure for PDU type 1 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=1)				Frame Number				1	Frame Control Part
FQC		RFCI						1	
Header CRC						Spare		1	Frame Check Sum Part
Payload Fields								0-n	Frame Payload part
Payload Fields				Padding					
Spare extension								0-42m	

Figure 20: Iu UP PDU Type 1 Format

The Iu UP PDU Type 1 is made of three parts:

1) Iu UP Frame Control part (fixed size);
2) Iu UP Frame Check Sum part (fixed size);
3) Iu UP Frame Payload part (pre-defined SDU sizes, rounded up to octets [Note: this does not consider the usage of spare extension field]).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 1 Frame Header.

6.6.2.3 PDU Type 14

6.6.2.3.1 General

PDU Type 14 is defined to perform control procedures over the Iu UP in support mode for pre-defined SDU sizes. The control procedure is identified by the procedure indicator. The Frame Payload contains the data information related to the control procedure.

Figure 21 below shows the Iu frame structure for PDU Type 14 of the Iu UP protocol at the SAP towards the transport layers (TNL-SAP).

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
Procedure Indicator								1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Reserved for procedure data								0-n	Frame payload part
Spare extension								0-32~~m~~	

Figure 21: Iu UP PDU Type 14 Format for procedure sending

The Iu UP PDU Type 14 is made of three parts:

1) Iu UP Frame Control part (fixed size);
2) Iu UP Frame Check Sum part (fixed size);
3) Iu UP Frame Payload part (variable length, rounded up to octet).

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header.

6.6.2.3.2 Positive Acknowledgement

When the PDU Type 14 is used to positively acknowledge a control procedure, the PDU Type 14 frame takes the following structure at the TNL-SAP.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack (=1, i.e. Ack)		PDU Type 14 Frame Number		1	Frame Control Part
Procedure Indicator (indicating the procedure being positively acknowledged)								1	
Header CRC						Spare		1	Frame Checksum Part
Spare								1	
Spare extension								0-32~~m~~	Frame Payload part

Figure 22: Iu UP PDU Type 14 Format for positive acknowledgement

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header for positive acknowledgement.

6.6.2.3.3 Negative Acknowledgement

When the PDU Type 14 is used to negatively acknowledge a control procedure, the PDU Type 14 frame takes the following structure at the TNL-SAP.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack (=2, i.e. Nack)		PDU Type 14 Frame Number		1	Frame Control Part
Procedure Indicator (indicating the procedure being negatively acknowledged)								1	
Header CRC						Spare		1	Frame Checksum Part
Spare								1	
Error Cause value						Spare		1	Frame payload part
Spare extension								0-32~~m~~	

Figure 23: Iu UP PDU Type 14 Format for negative acknowledgement

The Iu UP Frame Control Part and the Iu UP Frame Check Sum constitute the Iu UP PDU Type 14 Frame Header for negative acknowledgement.

6.6.2.3.4 Procedures Coding

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
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	1st 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	2nd 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 1st RFCI				IPTI of 2nd RFCI				0 or N/2	
IPTI of 3rd RFCI				…					
Spare extension								0-32~~m~~	

Figure 24: Iu UP PDU Type 14 used for Initialisation

6.6.2.3.4.2 Rate Control

Figure 25 specifies how the rate control 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
Procedure Indicator (=1)								1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Spare				Number of RFCIs (N)				1	Frame payload part
RFCI 0 Ind.	RFCI 1 Ind	…		RFCI N-1 Ind	Padding			0–n	
Spare extension								0-~~m~~32	

Figure 25: Iu UP PDU Type 14 Format used for Rate Control

6.6.2.3.4.3 Time Alignment

Figure 26 specifies how the time alignment procedure is coded.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack(=0)		PDU Type 14 Frame Number		1	Frame Control Part
Spare				Procedure Indicator (=2)				1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Time alignment								1	Frame payload part
Spare extension								0-32~~m~~	

Figure 26: Iu UP PDU Type 14 Format used for Time Alignment

6.6.2.3.4.4 Error Event

Figure 27 specifies how the Error Event procedure is coded.

Bits								Number of Octets	
7	6	5	4	3	2	1	0		
PDU Type (=14)				Ack/Nack(=0)		PDU Type 14 Frame Number		1	Frame Control Part
Procedure Indicator (=3)								1	
Header CRC						Payload CRC		1	Frame Checksum Part
Payload CRC								1	
Error distance				Error Cause value				1	Frame payload part
Spare extension								0-32~~m~~	

Figure 27: Iu UP PDU Type 14 Format used for Error Event

6.6.3.20 Spare extension

Description: The spare extension field shall not be sent. The receiver should be capable of receiving a spare extension. The spare extension should not be interpreted by the receiver. This since in later versions of the present document additional new fields might be added in place of the spare extension. The spare extension can be ~~of~~ an integer number of octets ~~(m)~~ carrying new fields or additional information; the maximum length of the spare extension field (m) depends on the PDU type.~~.~~

Value range: 0–2^{m*8}-1.

Field Length: 0–m octets. For PDU Types in the set {0,1}, m=~~4~~2. For PDU Types in the set {14}, m=32.

8.1.3 Adding a new PDU type

In the future, the Iu UP protocol may evolve so that there is a need to add a new PDU type. The criteria for introducing a new PDU type could be e.g:

- the Procedure Indicators may run out and there is a need to have more;
- there is a need to change the header mask, e.g. the Frame Number field may need to be increased or the CRC field needs to be modified.

While the PDU type 14 is reserved for future PDU type extensions, there may be 'subtypes' under PDU type 14 in the future and there also may be new procedures in these 'subtypes'.

Thus it has to be ensured that if the same Procedure Indicator value is used under several PDU types, it should be made clear e.g. in the Error Event cause element, which PDU type it concerns.

The maximum length of the Spare Extension field is defined per PDU type. Thus when a new PDU type is added, an appropriate length for the Spare Extension field (if any) has to be defined. For Release ’99, a length of ~~2~~4 octets has been used for data PDUs, and 32 octets for control PDUs.

3GPP RAN3 Meeting #13
Oahu, USA, 22-26 May 2000

***Document* R3-001602**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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	027	Current Version:	3.2.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG RAN #8	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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	X	Core Network	X

Source: R-WG3 **Date:** 25 May 2000

Subject: Removing redundant specification from Iu UP

Work item:

Category: *(only one category shall be marked with an X)*			**Release:**	
F	Correction	X	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	X
			Release 00	

Reason for change: Currently the value range of several IEs is specified in two places. In some cases, the information is inconsistent! This CR proposes removal of the redundant information.

Clauses affected: 8.1.1

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:

help.doc

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

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

~~Value range: {0-1 in use, 2-13 reserved for future use, 14 in use, 15 reserved for future use}.~~

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.

FQC

~~Value range: {0-1 in use, 2-3 spare}.~~

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

ACK/NACK

~~Value range: {0-2 in use, 3 reserved}.~~

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

~~Value range: {0-3 in use, 4-15 reserved}.~~

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

~~Value range: {0 reserved, 1, 16 in use, 2-15 and 17-255 spare}.~~

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.