

**TSG-RAN Meeting #28**  
**Quebec, Canada, 01-03 June 2005**

**RP-050303**  
**agenda item 7.3.5**

Source: TSG-RAN WG2

Title: CRs (Rel-5 & Rel-6) on ROHC (RAB Enhancements)

The following CRs are in RP-050303:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Doc-2nd-Level	Workitem
25.323	0061	2	Rel-5	Target mode for ROHC operation	C	5.3.0	5.4.0	R2-051701	RANimp-RABSE
25.323	0062	2	Rel-6	Target mode for ROHC operation	C	6.1.0	6.2.0	R2-051702	RANimp-RABSE
25.323	0063	-	Rel-5	Performance testing of ROHC	F	5.3.0	5.4.0	R2-051549	RANimp-RABSE
25.323	0064	-	Rel-6	Performance testing of ROHC	A	6.1.0	6.2.0	R2-051550	RANimp-RABSE
25.331	2552	2	Rel-5	Signalling of target mode for ROHC operation	C	5.12.1	5.13.0	R2-051699	RANimp-RABSE
25.331	2553	2	Rel-6	Signalling of target mode for ROHC operation	C	6.5.0	6.6.0	R2-051700	RANimp-RABSE

## CHANGE REQUEST

⌘ **25.323 CR 0061** ⌘ rev **2** ⌘ Current version: **5.3.0** ⌘

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	⌘ Target mode for ROHC operation		
<b>Source:</b>	⌘ RAN WG2		
<b>Work item code:</b>	⌘ RANimp-RABSE	<b>Date:</b>	⌘ 17/05/2005
<b>Category:</b>	⌘ <b>C</b>	<b>Release:</b>	⌘ Rel-5
	<i>Use <u>one</u> of the following categories:</i> <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		<i>Use <u>one</u> of the following releases:</i> <b>Ph2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>Rel-4</b> (Release 4) <b>Rel-5</b> (Release 5) <b>Rel-6</b> (Release 6) <b>Rel-7</b> (Release 7)

<b>Reason for change:</b>	⌘ At the RAN 2#45bis it was agreed that the UTRAN is able to signal a target mode to the UE in the PDCP configuration information, and that if the IE "Target Mode" [2] is received by the UE, then the de-compressors shall only perform operational state transition from U-mode to the indicated mode for all contexts.
<b>Summary of change:</b>	⌘ Text describing the UE behaviour when the target mode is present and when the IE is not present is described.
<b>Consequences if not approved:</b>	⌘ Restriction on mode transition provided by Target Mode functionality will not be present, which leads to the ROHC internally deciding on state transition which could be against the RRM strategy of the UTRAN.

<b>Clauses affected:</b>	⌘ 5.1.3.6 (new)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">X</td> </tr> </table> Other core specifications Test specifications O&M Specifications	Y	N	X	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	X	⌘ 25.331	
Y	N										
X	<input type="checkbox"/>										
<input type="checkbox"/>	X										
<input type="checkbox"/>	X										
<b>Other comments:</b>	⌘										

### 5.1.3.6 Configuration by RRC

If the variable "PDCP\_ROHC\_TARGET\_MODE" [2] is stored in the UE, and if applicable for the ROHC profile applied, the de-compressor shall only perform the operational state transitions defined in [8] to the stored mode.

If the variable "PDCP\_ROHC\_TARGET\_MODE" [2] is not stored in the UE, the de-compressor shall not restrict the operational state transitions defined in [8].

CR-Form-v7.1

## CHANGE REQUEST

# 25.323 CR 0062 # rev 2 # Current version: 6.1.0 #

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	# Target mode for ROHC operation		
<b>Source:</b>	# RAN WG2		
<b>Work item code:</b>	# RANimp-RABSE	<b>Date:</b>	# 17/05/2005
<b>Category:</b>	# <b>C</b>	<b>Release:</b>	# Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		<b>Ph2</b> (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		<b>R96</b> (Release 1996)
	<b>B</b> (addition of feature),		<b>R97</b> (Release 1997)
	<b>C</b> (functional modification of feature)		<b>R98</b> (Release 1998)
	<b>D</b> (editorial modification)		<b>R99</b> (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		<b>Rel-4</b> (Release 4)
			<b>Rel-5</b> (Release 5)
			<b>Rel-6</b> (Release 6)
			<b>Rel-7</b> (Release 7)

<b>Reason for change:</b>	# At the RAN 2#45bis it was agreed that the UTRAN is able to signal a target mode to the UE in the PDCP configuration information, and that if the IE "Target Mode" [2] is received by the UE, then the de-compressors shall only perform operational state transition from U-mode to the indicated mode for all contexts.
<b>Summary of change:</b>	# Text describing the UE behaviour when the target mode is present and when the IE is not present is described.
<b>Consequences if not approved:</b>	# Restriction on mode transition provided by Target Mode functionality will not be present, which leads to the ROHC internally deciding on state transition which could be against the RRM strategy of the UTRAN.

<b>Clauses affected:</b>	# 5.1.3.6 (new)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	# 25.331
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	#										

### 5.1.3.6 Configuration by RRC

If the variable "PDCP\_ROHC\_TARGET\_MODE" [2] is stored in the UE, and if applicable for the ROHC profile applied, the de-compressor shall only perform the operational state transitions defined in [8] to the stored mode.

If the variable "PDCP\_ROHC\_TARGET\_MODE" [2] is not stored in the UE, the de-compressor shall not restrict the operational state transitions defined in [8].

## CHANGE REQUEST

⌘ **25.323 CR 0063** ⌘ rev - ⌘ Current version: **5.3.0** ⌘

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	⌘ Performance testing of ROHC		
<b>Source:</b>	⌘ RAN WG2		
<b>Work item code:</b>	⌘ RANimp-RABSE	<b>Date:</b>	⌘ 10/05/2005
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		2 (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		R96 (Release 1996)
	<b>B</b> (addition of feature),		R97 (Release 1997)
	<b>C</b> (functional modification of feature)		R98 (Release 1998)
	<b>D</b> (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

<b>Reason for change:</b>	⌘ The purpose of the performance requirements is to ensure that all conformant compressor implementations actually implement active ROHC compression, and for this to be verifiable using well-defined test cases. This will result in that the compression performance will meet the proper level of predictability, without preventing ROHC implementers from doing optimizations.
<b>Summary of change:</b>	⌘ A normative annex to 25.323 is added
<b>Consequences if not approved:</b>	⌘ UEs with RFC3095-compliant ROHC implementations may not perform adequately and may cause adverse effects on cell capacity by for example not compressing headers to a sufficient extent.

<b>Clauses affected:</b>	⌘ Annex A (New)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> </tr> </table>	Y	N		X	X			X	Other core specifications	⌘
Y	N										
	X										
X											
	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	⌘										

**How to create CRs using this form:**

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

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## Annex A (normative): ROHC performance testing

### A.1 Introduction

All ROHC performance tests are carried out by providing a sequence of uncompressed IP/UDP/RTP packets to the ROHC RTP compressor, together with some artificial feedback messages synchronized with the packet sequence. All packets in these sequences are built on the same base structure, with most field values being constant, and with a fixed payload size of 32 octets.

The normative structure of the IPv6/UDP/RTP header is outlined in A.3, along with tables of the values to be used for each field. Fields with values marked ANY can have any value, as these are the addressing fields that are used to identify a unique packet stream for compression, and the content of them does not otherwise affect compression, they are either sent in uncompressed form or completely omitted in compressed packets. The checksum values are dependent on the complete content of the packet and must be calculated according to the protocol specifications, RFC 768 and RFC 791, which are referred to in the tables. A dummy payload is to be appended at the end of the header data.

Four fields (IP ID, IP TTL/HL, RTP SN, and RTP TS) are affected by the test sequence variations currently being considered for these ROHC RTP performance tests. Values for these fields must thus be found in the test sequence details of each test.

In the following sections a format with regards to outline, sequences and requirements are exemplified. Test 1a and 1b are base tests using a completely regular packet stream as input. All subsequent tests are based on test 1a or test 1b, each with specific test events added to the base test packet stream.

### A.2 Test outline

#### A.2.1 Test 1a - Base test of ROHC RTP O-mode compressor

##### A.2.1.1 Test purpose

The purpose of the base test is to verify that the compressor implements an active and efficient compression for a regular IP/UDP/RTP packet stream, i.e. that it makes use of the most efficient compressed packet formats provided by ROHC RTP [8] for O-mode.

##### A.2.1.2 Sequence details

A 5 second packet sequence with 50 packets per second is used where all header fields are set according to the basic test packet structure, as described in subclause A.3, with addition of the following:

1. The Time To Live (TTL) / Hop Limit field is set to the value 0x20
2. The RTP Sequence Number is a linearly increasing counter with a packet-to-packet delta of 1, set to 0x0000 for the first packet and thus ending with 0x00F9 (249) in the last packet of the sequence
3. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet and thus ending with 0x00009BA0 (39840) in the last packet of the sequence.
4. The IP Identification is set to the same value as the RTP Sequence Number

Between the 6th and 7th packet of the sequence, a ROHC feedback packet of ROHC RTP feedback type 2 is to be given to the ROHC compressor to trigger an immediate transition to O-mode operation. The format of that packet is as follows:

```

  0  1  2  3  4  5  6  7
+---+---+---+---+---+---+---+---

```



1	1	1	1	0	Code	feedback type octet
+-----+						
Acktype		Mode		SN		
+-----+						
SN						
+-----+						

Where:

- Code is set to 0x2 (indicates that feedback data above the type octet is 2 octets)
- Acktype is set to 0x0 (means ACK)
- Mode is set to 0x2 (means O-mode)
- SN is set to 0x000

### A.2.1.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv4: xx octets [TBD]
- With IPv6: yy octets [TBD]

## A.2.2 Test 1b - Base test of ROHC RTP R-mode compressor

### A.2.2.1 Test purpose

The purpose of the base test is to verify that the compressor implements an active and efficient compression for a regular IP/UDP/RTP packet stream, i.e. that it makes use of the most efficient compressed packet formats provided by ROHC RTP [8] for R-mode.

### A.2.2.2 Sequence details

A 5 second packet sequence with 50 packets per second is used where all header fields are set according to the basic test packet structure, as described in subclause A.3, with addition of the following:

1. The Time To Live (TTL) / Hop Limit field is set to the value 0x20
2. The RTP Sequence Number is a linearly increasing counter with a packet-to-packet delta of 1, set to 0x0000 for the first packet and thus ending with 0x00F9 (249) in the last packet of the sequence
3. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet and thus ending with 0x00009BA0 (39840) in the last packet of the sequence.
4. The IP Identification is set to the same value as the RTP Sequence Number

Between the 6th and 7th (SN=5 and SN=6) packet of the sequence, a ROHC feedback packet of ROHC RTP feedback type 2 is to be given to the ROHC compressor to initiate transition to R-mode operation. The format of that packet is as follows:

0	1	2	3	4	5	6	7	Code	feedback type octet
+-----+									
1		1		1		1		0	
+-----+									
Acktype		Mode		SN					
+-----+									
SN									
+-----+									

Where:

- Code is set to 0x2 (indicates that feedback data above the type octet is 2 octets)
- Acktype is set to 0x0 (means ACK)
- Mode is set to 0x3 (means R-mode)
- SN is set to 0x000

After that, an additional feedback packet with the same content as above except for the SN value, which now must be set to 0x006, is to be given to the compressor between the 12th and 13th (SN=11 and SN=12) packet of the sequence. This will complete transition to R-mode.

### A.2.2.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv4: xx octets [TBD]
- With IPv6: yy octets [TBD]

## A.2.3 Test 2a - TTL / Hop-Limit variations in O-mode

### A.2.3.1 Test purpose

The purpose of the TTL/Hop-Limit test is to verify that the compressor can efficiently handle changes in the TTL/Hop-Limit value, i.e. use the most efficient header extension provided by ROHC RTP [8] for O-mode.

### A.2.3.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- For packets with SN between 20 and 29, the Time To Live (TTL) / Hop Limit value is set to 0x22

### A.2.3.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.4 Test 2b - TTL / Hop-Limit variations in R-mode

### A.2.4.1 Test purpose

The purpose of the TTL/Hop-Limit test is to verify that the compressor can efficiently handle changes in the TTL/Hop-Limit value, i.e. use the most efficient header extension provided by ROHC RTP [8] for R-mode.

### A.2.4.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

- For packets with SN between 20 and 29, the Time To Live (TTL) / Hop Limit value is set to 0x22

### A.2.4.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.5 Test 3a - Re-establishment TS after DTX in O-mode

### A.2.5.1 Test purpose

The purpose of the TS re-establish test is to verify that the compressor can efficiently re-establish the proper TS value after a DTX period, i.e. use the most efficient header extension(s) provided by ROHC RTP [8] for O-mode.

### A.2.5.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

1. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet.
2. For packet with an SN of 20, TS is increased to represent a 32 (0.64 seconds) packet skip (32x160) and is thus set to  $(20+32)\times 160=8320$  (0x00002080). Then TS continues to grow as stated in 1 above.
3. For packet with an SN of 30, TS is increased to represent a 128 (2.56 seconds) packet skip (128x160) and is thus set to  $(30+32+128)\times 160=30400$  (0x000076C0). Then TS continues to grow as stated in 1 above.
4. For packet with an SN of 40, TS is increased to represent a 2048 (40.96 seconds) packet skip (2048x160) and is thus set to  $(40+32+128+2048)\times 160=359680$  (0x00057D00). Then TS continues to grow as stated in 1 above.
5. TS thus ends at 393120 (0x0005FFA0) in the last packet of the sequence with RTP sequence number 249.

### A.2.5.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: xx octets [TBD]

## A.2.6 Test 3b - Re-establishment TS after DTX in R-mode

### A.2.6.1 Test purpose

The purpose of the TS re-establish test is to verify that the compressor can efficiently re-establish the proper TS value after a DTX period, i.e. use the most efficient header extension(s) provided by ROHC RTP [8] for R-mode.

### A.2.6.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

1. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet.
2. For packet with an SN of 20, TS is increased to represent a 32 (0.64 seconds) packet skip (32x160) and is thus set to  $(20+32)\times 160=8320$  (0x00002080). Then TS continues to grow as stated in 1 above.
3. For packet with an SN of 30, TS is increased to represent a 128 (2.56 seconds) packet skip (128x160) and is thus set to  $(30+32+128)\times 160=30400$  (0x000076C0). Then TS continues to grow as stated in 1 above.
4. For packet with an SN of 40, TS is increased to represent a 2048 (40.96 seconds) packet skip (2048x160) and is thus set to  $(40+32+128+2048)\times 160=359680$  (0x00057D00). Then TS continues to grow as stated in 1 above.
5. TS thus ends at 393120 (0x0005FFA0) in the last packet of the sequence with RTP sequence number 249.

### A.2.6.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.7 Test 4a - Compressor response to single lost packets in O-mode

### A.2.7.1 Test purpose

The purpose of this test is to verify that the compressor does not panic just because there is a single missing packet, i.e. the compressed packet size should not increase due to such events.

### A.2.7.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- Packets with SN 20, 30, and 40 are removed from the sequence.

### A.2.7.3 Test requirement

Maximal compressed header overhead for the test are the same as in A2.1.

## A.2.8 Test 4b - Compressor response to single lost packets in R-mode

### A.2.8.1 Test purpose

The purpose of this test is to verify that the compressor does not panic just because there is a single missing packet, i.e. the compressed packet size should not increase due to such events.

### A.2.8.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

- Packets with SN 20, 30, and 40 are removed from the sequence.

### A.2.8.3 Test requirement

Maximal compressed header overhead for the test are the same as in A2.2.

## A.2.9 Test 5a - Compressor response to several packet losses in O-mode

### A.2.9.1 Test purpose

The purpose of this test is to verify that the compressor can efficiently handle events when there are several consecutive pre-compressor packet losses in the packet stream, i.e. that the compressor makes use the most efficient header extension provided by ROHC RTP [8] for O-mode.

### A.2.9.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- Packets with SN 20-25 are removed from the sequence.

### A.2.9.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.10 Test 5b - Compressor response to several packet losses in R-mode

### A.2.10.1 Test purpose

The purpose of this test is to verify that the compressor can efficiently handle events when there are several consecutive pre-compressor packet losses in the packet stream, i.e. that the compressor makes use the most efficient header extension provided by ROHC RTP [8] for R-mode.

### A.2.10.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

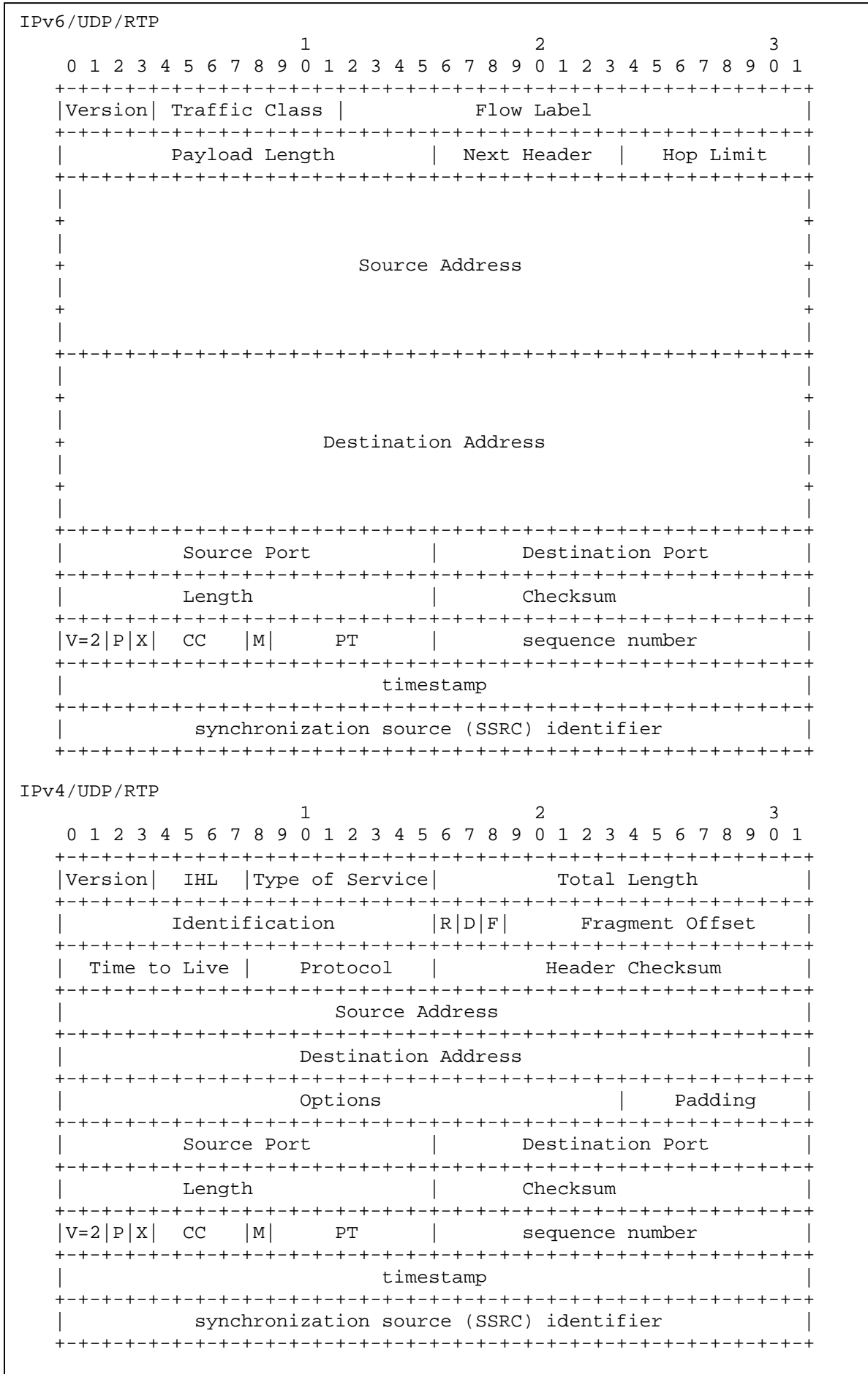
- Packets with SN 20-25 are removed from the sequence.

### A.2.10.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

### A.3 Test packet structures



## IPv6 header fields

Field	Size (bits)	Value
Version	4	0x6
Traffic Class	8	0x00
Flow Label	20	0x00000
Payload Length	16	0x0034
Next Header	8	0x11
Hop Limit	8	Test dependent
Source Address	128	ANY
Destination Address	128	ANY

## IPv4 header fields

Field	Size (bits)	Value
Version	4	0x4
Header Length (IHL)	4	0x5
Type Of Service	8	0x00
Packet Length	16	0x0048
Identification	16	Test dependent
Reserved flag (R)	1	0x0
Don't Fragment (D)	1	0x1
More Fragments (F)	1	0x0
Fragment Offset	13	0x0000
Time To Live	8	Test dependent
Protocol	8	0x11
Header Checksum	16	See RFC 791
Source Address	32	ANY
Destination Address	32	ANY

## UDP header fields

Field	Size (bits)	Value
Source Port	16	ANY
Destination Port	16	ANY
Length	16	0x0034
Checksum	16	See RFC 768

## RTP header fields

Field	Size (bits)	Value
Version (V)	2	0x2
Padding (P)	1	0x0
Extension (X)	1	0x0
CSRC Counter (CC)	4	0x0
Marker (M)	1	0x0
Payload Type (PT)	7	0x60
Sequence Number	16	Test dependent
Timestamp	32	Test dependent
SSRC	32	ANY





## CHANGE REQUEST

⌘ **25.323 CR 0064** ⌘ rev **-** ⌘ Current version: **6.1.0** ⌘

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	⌘ Performance testing of ROHC		
<b>Source:</b>	⌘ RAN WG2		
<b>Work item code:</b>	⌘ RANimp-RABSE	<b>Date:</b>	⌘ 10/05/2005
<b>Category:</b>	⌘ <b>A</b>	<b>Release:</b>	⌘ Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		2 (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		R96 (Release 1996)
	<b>B</b> (addition of feature),		R97 (Release 1997)
	<b>C</b> (functional modification of feature)		R98 (Release 1998)
	<b>D</b> (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

<b>Reason for change:</b>	⌘ The purpose of the performance requirements is to ensure that all conformant compressor implementations actually implement active ROHC compression, and for this to be verifiable using well-defined test cases. This will result in that the compression performance will meet the proper level of predictability, without preventing ROHC implementers from doing optimizations.
<b>Summary of change:</b>	⌘ A normative annex to 25.323 is added
<b>Consequences if not approved:</b>	⌘ UEs with RFC3095-compliant ROHC implementations may not perform adequately and may cause adverse effects on cell capacity by for example not compressing headers to a sufficient extent.

<b>Clauses affected:</b>	⌘ Annex A (New)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X	X	X	X	X	X	Other core specifications	⌘
Y	N										
X	X										
X	X										
X	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	⌘										

**How to create CRs using this form:**

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

- 1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
- 2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under <ftp://ftp.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

- 3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

## Annex A (normative): ROHC performance testing

### A.1 Introduction

All ROHC performance tests are carried out by providing a sequence of uncompressed IP/UDP/RTP packets to the ROHC RTP compressor, together with some artificial feedback messages synchronized with the packet sequence. All packets in these sequences are built on the same base structure, with most field values being constant, and with a fixed payload size of 32 octets.

The normative structure of the IPv6/UDP/RTP header is outlined in A.3, along with tables of the values to be used for each field. Fields with values marked ANY can have any value, as these are the addressing fields that are used to identify a unique packet stream for compression, and the content of them does not otherwise affect compression, they are either sent in uncompressed form or completely omitted in compressed packets. The checksum values are dependent on the complete content of the packet and must be calculated according to the protocol specifications, RFC 768 and RFC 791, which are referred to in the tables. A dummy payload is to be appended at the end of the header data.

Four fields (IP ID, IP TTL/HL, RTP SN, and RTP TS) are affected by the test sequence variations currently being considered for these ROHC RTP performance tests. Values for these fields must thus be found in the test sequence details of each test.

In the following sections a format with regards to outline, sequences and requirements are exemplified. Test 1a and 1b are base tests using a completely regular packet stream as input. All subsequent tests are based on test 1a or test 1b, each with specific test events added to the base test packet stream.

### A.2 Test outline

#### A.2.1 Test 1a - Base test of ROHC RTP O-mode compressor

##### A.2.1.1 Test purpose

The purpose of the base test is to verify that the compressor implements an active and efficient compression for a regular IP/UDP/RTP packet stream, i.e. that it makes use of the most efficient compressed packet formats provided by ROHC RTP [8] for O-mode.

##### A.2.1.2 Sequence details

A 5 second packet sequence with 50 packets per second is used where all header fields are set according to the basic test packet structure, as described in subclause A.3, with addition of the following:

1. The Time To Live (TTL) / Hop Limit field is set to the value 0x20
2. The RTP Sequence Number is a linearly increasing counter with a packet-to-packet delta of 1, set to 0x0000 for the first packet and thus ending with 0x00F9 (249) in the last packet of the sequence
3. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet and thus ending with 0x00009BA0 (39840) in the last packet of the sequence.
4. The IP Identification is set to the same value as the RTP Sequence Number

Between the 6th and 7th packet of the sequence, a ROHC feedback packet of ROHC RTP feedback type 2 is to be given to the ROHC compressor to trigger an immediate transition to O-mode operation. The format of that packet is as follows:

```

  0  1  2  3  4  5  6  7
+---+---+---+---+---+---+---+---+

```

1	1	1	1	0	Code	feedback type octet
+-----+						
Acktype		Mode		SN		
+-----+						
SN						
+-----+						

Where:

- Code is set to 0x2 (indicates that feedback data above the type octet is 2 octets)
- Acktype is set to 0x0 (means ACK)
- Mode is set to 0x2 (means O-mode)
- SN is set to 0x000

### A.2.1.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv4: xx octets [TBD]
- With IPv6: yy octets [TBD]

## A.2.2 Test 1b - Base test of ROHC RTP R-mode compressor

### A.2.2.1 Test purpose

The purpose of the base test is to verify that the compressor implements an active and efficient compression for a regular IP/UDP/RTP packet stream, i.e. that it makes use of the most efficient compressed packet formats provided by ROHC RTP [8] for R-mode.

### A.2.2.2 Sequence details

A 5 second packet sequence with 50 packets per second is used where all header fields are set according to the basic test packet structure, as described in subclause A.3, with addition of the following:

1. The Time To Live (TTL) / Hop Limit field is set to the value 0x20
2. The RTP Sequence Number is a linearly increasing counter with a packet-to-packet delta of 1, set to 0x0000 for the first packet and thus ending with 0x00F9 (249) in the last packet of the sequence
3. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet and thus ending with 0x00009BA0 (39840) in the last packet of the sequence.
4. The IP Identification is set to the same value as the RTP Sequence Number

Between the 6th and 7th (SN=5 and SN=6) packet of the sequence, a ROHC feedback packet of ROHC RTP feedback type 2 is to be given to the ROHC compressor to initiate transition to R-mode operation. The format of that packet is as follows:

0	1	2	3	4	5	6	7	
+-----+								
1	1	1	1	0	Code	feedback type octet		
+-----+								
Acktype		Mode		SN				
+-----+								
SN								
+-----+								

Where:

- Code is set to 0x2 (indicates that feedback data above the type octet is 2 octets)
- Acktype is set to 0x0 (means ACK)
- Mode is set to 0x3 (means R-mode)
- SN is set to 0x000

After that, an additional feedback packet with the same content as above except for the SN value, which now must be set to 0x006, is to be given to the compressor between the 12th and 13th (SN=11 and SN=12) packet of the sequence. This will complete transition to R-mode.

### A.2.2.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv4: xx octets [TBD]
- With IPv6: yy octets [TBD]

## A.2.3 Test 2a - TTL / Hop-Limit variations in O-mode

### A.2.3.1 Test purpose

The purpose of the TTL/Hop-Limit test is to verify that the compressor can efficiently handle changes in the TTL/Hop-Limit value, i.e. use the most efficient header extension provided by ROHC RTP [8] for O-mode.

### A.2.3.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- For packets with SN between 20 and 29, the Time To Live (TTL) / Hop Limit value is set to 0x22

### A.2.3.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.4 Test 2b - TTL / Hop-Limit variations in R-mode

### A.2.4.1 Test purpose

The purpose of the TTL/Hop-Limit test is to verify that the compressor can efficiently handle changes in the TTL/Hop-Limit value, i.e. use the most efficient header extension provided by ROHC RTP [8] for R-mode.

### A.2.4.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

- For packets with SN between 20 and 29, the Time To Live (TTL) / Hop Limit value is set to 0x22

### A.2.4.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.5 Test 3a - Re-establishment TS after DTX in O-mode

### A.2.5.1 Test purpose

The purpose of the TS re-establish test is to verify that the compressor can efficiently re-establish the proper TS value after a DTX period, i.e. use the most efficient header extension(s) provided by ROHC RTP [8] for O-mode.

### A.2.5.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

1. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet.
2. For packet with an SN of 20, TS is increased to represent a 32 (0.64 seconds) packet skip (32x160) and is thus set to  $(20+32)\times 160=8320$  (0x00002080). Then TS continues to grow as stated in 1 above.
3. For packet with an SN of 30, TS is increased to represent a 128 (2.56 seconds) packet skip (128x160) and is thus set to  $(30+32+128)\times 160=30400$  (0x000076C0). Then TS continues to grow as stated in 1 above.
4. For packet with an SN of 40, TS is increased to represent a 2048 (40.96 seconds) packet skip (2048x160) and is thus set to  $(40+32+128+2048)\times 160=359680$  (0x00057D00). Then TS continues to grow as stated in 1 above.
5. TS thus ends at 393120 (0x0005FFA0) in the last packet of the sequence with RTP sequence number 249.

### A.2.5.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: xx octets [TBD]

## A.2.6 Test 3b - Re-establishment TS after DTX in R-mode

### A.2.6.1 Test purpose

The purpose of the TS re-establish test is to verify that the compressor can efficiently re-establish the proper TS value after a DTX period, i.e. use the most efficient header extension(s) provided by ROHC RTP [8] for R-mode.

### A.2.6.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

1. The RTP Time Stamp is a linearly increasing counter with a packet-to-packet delta of 160, set to 0x00000000 for the first packet.
2. For packet with an SN of 20, TS is increased to represent a 32 (0.64 seconds) packet skip (32x160) and is thus set to  $(20+32)\times 160=8320$  (0x00002080). Then TS continues to grow as stated in 1 above.
3. For packet with an SN of 30, TS is increased to represent a 128 (2.56 seconds) packet skip (128x160) and is thus set to  $(30+32+128)\times 160=30400$  (0x000076C0). Then TS continues to grow as stated in 1 above.
4. For packet with an SN of 40, TS is increased to represent a 2048 (40.96 seconds) packet skip (2048x160) and is thus set to  $(40+32+128+2048)\times 160=359680$  (0x00057D00). Then TS continues to grow as stated in 1 above.
5. TS thus ends at 393120 (0x0005FFA0) in the last packet of the sequence with RTP sequence number 249.

### A.2.6.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.7 Test 4a - Compressor response to single lost packets in O-mode

### A.2.7.1 Test purpose

The purpose of this test is to verify that the compressor does not panic just because there is a single missing packet, i.e. the compressed packet size should not increase due to such events.

### A.2.7.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- Packets with SN 20, 30, and 40 are removed from the sequence.

### A.2.7.3 Test requirement

Maximal compressed header overhead for the test are the same as in A2.1.

## A.2.8 Test 4b - Compressor response to single lost packets in R-mode

### A.2.8.1 Test purpose

The purpose of this test is to verify that the compressor does not panic just because there is a single missing packet, i.e. the compressed packet size should not increase due to such events.

### A.2.8.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

- Packets with SN 20, 30, and 40 are removed from the sequence.

### A.2.8.3 Test requirement

Maximal compressed header overhead for the test are the same as in A2.2.

## A.2.9 Test 5a - Compressor response to several packet losses in O-mode

### A.2.9.1 Test purpose

The purpose of this test is to verify that the compressor can efficiently handle events when there are several consecutive pre-compressor packet losses in the packet stream, i.e. that the compressor makes use the most efficient header extension provided by ROHC RTP [8] for O-mode.

### A.2.9.2 Sequence details

The test sequence is the same as in subclause A.2.1, with the following exception:

- Packets with SN 20-25 are removed from the sequence.

### A.2.9.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]

## A.2.10 Test 5b - Compressor response to several packet losses in R-mode

### A.2.10.1 Test purpose

The purpose of this test is to verify that the compressor can efficiently handle events when there are several consecutive pre-compressor packet losses in the packet stream, i.e. that the compressor makes use the most efficient header extension provided by ROHC RTP [8] for R-mode.

### A.2.10.2 Sequence details

The test sequence is the same as in subclause A.2.2, with the following exception:

- Packets with SN 20-25 are removed from the sequence.

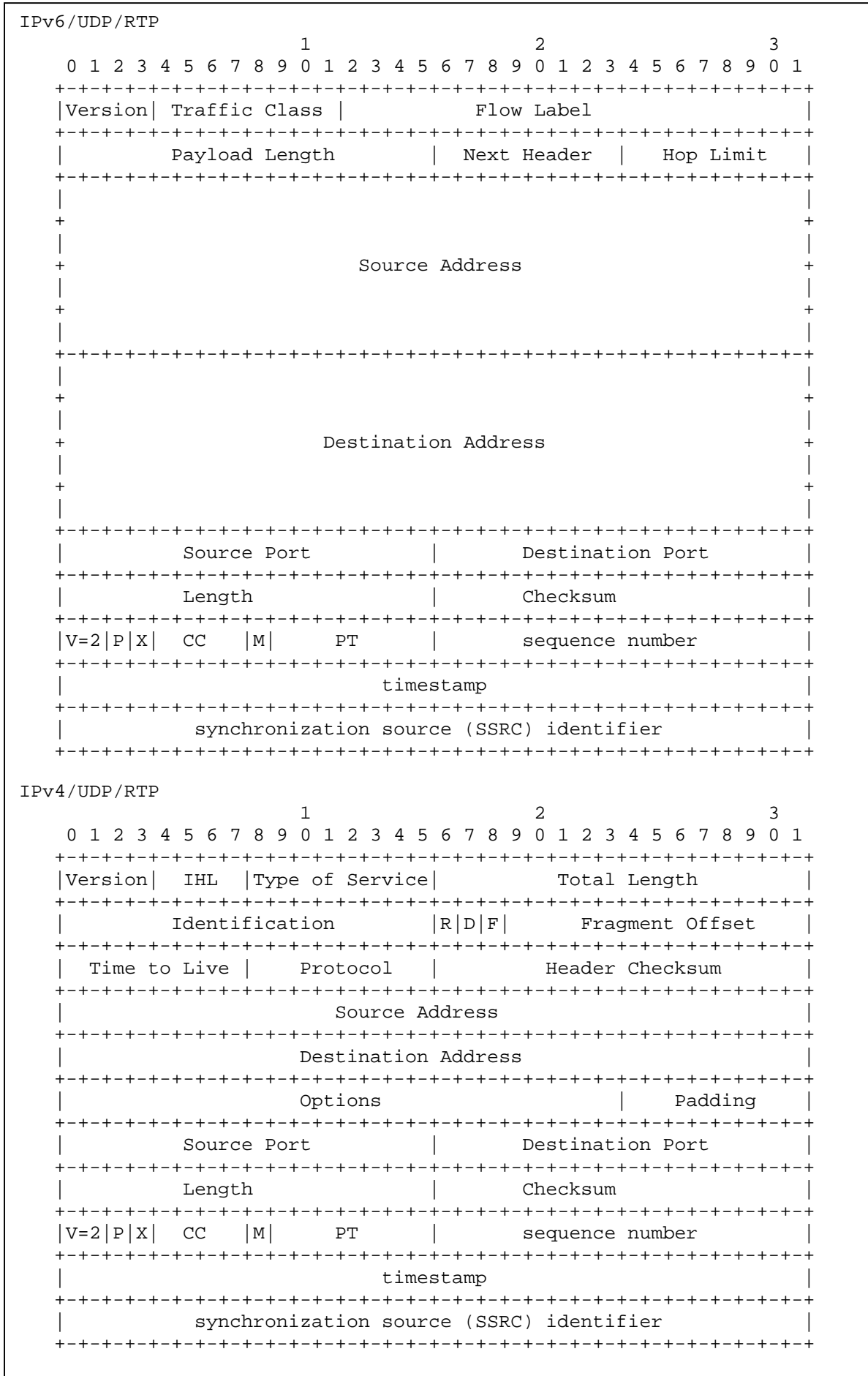
### A.2.10.3 Test requirement

Maximal compressed header overhead for the test sequence:

- With IPv6: yy octets [TBD]



### A.3 Test packet structures



## IPv6 header fields

Field	Size (bits)	Value
Version	4	0x6
Traffic Class	8	0x00
Flow Label	20	0x00000
Payload Length	16	0x0034
Next Header	8	0x11
Hop Limit	8	Test dependent
Source Address	128	ANY
Destination Address	128	ANY

## IPv4 header fields

Field	Size (bits)	Value
Version	4	0x4
Header Length (IHL)	4	0x5
Type Of Service	8	0x00
Packet Length	16	0x0048
Identification	16	Test dependent
Reserved flag (R)	1	0x0
Don't Fragment (D)	1	0x1
More Fragments (F)	1	0x0
Fragment Offset	13	0x0000
Time To Live	8	Test dependent
Protocol	8	0x11
Header Checksum	16	See RFC 791
Source Address	32	ANY
Destination Address	32	ANY

## UDP header fields

Field	Size (bits)	Value
Source Port	16	ANY
Destination Port	16	ANY
Length	16	0x0034
Checksum	16	See RFC 768

## RTP header fields

Field	Size (bits)	Value
Version (V)	2	0x2
Padding (P)	1	0x0
Extension (X)	1	0x0
CSRC Counter (CC)	4	0x0
Marker (M)	1	0x0
Payload Type (PT)	7	0x60
Sequence Number	16	Test dependent
Timestamp	32	Test dependent
SSRC	32	ANY



## CHANGE REQUEST

⌘ **25.331 CR 2552** ⌘ rev **2** ⌘ Current version: **5.12.1** ⌘

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	⌘ Signalling of target mode for ROHC operation		
<b>Source:</b>	⌘ RAN WG2		
<b>Work item code:</b>	⌘ RANimp-RABSE	<b>Date:</b>	⌘ 17/05/2005
<b>Category:</b>	⌘ <b>C</b>	<b>Release:</b>	⌘ Rel-5
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)	<b>Ph2</b> (GSM Phase 2)	
	<b>A</b> (corresponds to a correction in an earlier release)	<b>R96</b> (Release 1996)	
	<b>B</b> (addition of feature),	<b>R97</b> (Release 1997)	
	<b>C</b> (functional modification of feature)	<b>R98</b> (Release 1998)	
	<b>D</b> (editorial modification)	<b>R99</b> (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .	<b>Rel-4</b> (Release 4)	
		<b>Rel-5</b> (Release 5)	
		<b>Rel-6</b> (Release 6)	
		<b>Rel-7</b> (Release 7)	

<b>Reason for change:</b>	⌘ At the RAN 2#45bis it was agreed that the UTRAN is able to signal a target mode to the UE in the PDCP configuration information, and that if the IE "Target Mode" is received by the UE, then the de-compressors shall only perform operational state transition from U-mode to the indicated mode for all contexts.
<b>Summary of change:</b>	⌘ The IE "PDCP ROHC Target Mode" is included in the CELL UPDATE CONFIRM, the RADIO BEARER RECONFIGURATION and the RADIO BEARER SETUP messages to introduce the target mode parameter. The target mode is defined as either O or R mode.
<b>Consequences if not approved:</b>	⌘ Restriction on mode transition provided by Target Mode functionality will not be present, which leads to the ROHC internally deciding on state transition which could be against the RRM strategy of the UTRAN.

<b>Clauses affected:</b>	⌘ 8.6.4.10, 10.2.8, 10.2.27, 10.2.33, 10.3.4.2a (new), 11.2, 11.3, 13.4.xx (new)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	⌘ 25.323
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	⌘										

#### 8.6.4.10 PDCP Info

For RFC 3095:

1> the chosen MAX\_CID shall not be greater than the value "Maximum number of ROHC context sessions" as indicated in the IE "PDCP Capability";

1> the configuration for the PACKET\_SIZES\_ALLOWED is FFS.

If IE "PDCP info" is included, the UE shall:

1> if the radio bearer is connected to a CS domain radio access bearer:

2> set the variable INVALID\_CONFIGURATION to TRUE.

1> if the IE "PDCP PDU header" is set to the value "absent":

2> if the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change" is true:

3> set the variable INVALID\_CONFIGURATION to TRUE.

1> if the IE "PDCP PDU header" is set to the value "present":

2> include PDCP headers in both uplink and downlink PDCP PDUs;

2> if the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change" is false:

3> if the IE "Header compression information" is absent:

4> set the variable INVALID\_CONFIGURATION to TRUE.

1> if the IE "Header compression information" is absent:

2> not use Header compression after the successful completion of this procedure;

2> remove any stored configuration for the IE "Header compression information".

1> if the IE "Header compression information" is present:

2> if the IE "Algorithm Type" is set to "RFC 2507":

3> if the UE capability "Maximum header compression context space", as specified in [35], is exceeded with this configuration:

4> set the variable INVALID\_CONFIGURATION to TRUE.

1> configure the PDCP entity for that radio bearer accordingly;

1> configure the RLC entity for that radio bearer according to the value of the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change";

1> set the PROFILES parameter, used by inband ROHC profile negotiation, for this PDCP entity for both UL and DL equal to the list of ROHC profiles received in the IE "PDCP info". A UE complying to this version of the protocol shall support ROHC profiles 0x0000 (ROHC uncompressed), 0x0001 (ROHC RTP), 0x0002 (ROHC UDP) and 0x0003 (ROHC ESP) (see [52]).

1> if the IE "PDCP ROHC target mode" is received:

2> set the variable "PDCP ROHC TARGET\_MODE" to the received value.

1> if the IE "PDCP ROHC target mode" is not received in either of the CELL UPDATE CONFIRM, the RADIO BEARER RECONFIGURATION or the RADIO BEARER SETUP message:

2> delete the variable "PDCD ROHC TARGET\_MODE" and act according to actions specified in [36].

Error! No text of specified style in document.

**3**

Error! No text of specified style in document.

## 10.2.8 CELL UPDATE CONFIRM

This message confirms the cell update procedure and can be used to reallocate new RNTI information for the UE valid in the new cell.

RLC-SAP: UM

Logical channel: CCCH or DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information Elements</b>					
U-RNTI	CV-CCCH		U-RNTI 10.3.3.47		
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation or a cell reselection from GERAN <i>lu mode</i>	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing either an SRNS relocation or a cell reselection from GERAN <i>lu mode</i> , and a change in ciphering algorithm.	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
RLC re-establish indicator (RB2, RB3 and RB4)	MP		RLC re-establish indicator 10.3.3.35	Should not be set to TRUE if IE "Downlink counter synchronisation	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
				info" is included in message.	
RLC re-establish indicator (RB5 and upwards)	MP		RLC re-establish indicator 10.3.3.35	Should not be set to TRUE if IE "Downlink counter synchronisation info" is included in message.	
<b>CN Information Elements</b>					
CN Information info	OP		CN Information info 10.3.1.3		
<b>UTRAN Information Elements</b>					
URA identity	OP		URA identity 10.3.2.6		
<b>RB information elements</b>					
RB information to release list	OP	1 to <maxRB>			
>RB information to release	MP		RB information to release 10.3.4.19		
RB information to reconfigure list	OP	1 to <maxRB>			
>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18		
RB information to be affected list	OP	1 to <maxRB>			
>RB information to be affected	MP		RB information to be affected 10.3.4.17		
Downlink counter synchronisation info	OP				
>RB with PDCP information list	OP	1 to <maxRBall RABs>			
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	This IE is needed for each RB having PDCP in the case of lossless SRNS relocation	
	OP				REL-5
>>PDCP context relocation info	OP		PDCP context relocation info 10.3.4.1a	This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels		



Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			10.3.5.24		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
CHOICE <i>mode</i>	MP				
>FDD					
>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>TDD				(no data)	
<b>Downlink transport channels</b>					
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE <i>channel requirement</i>	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88.		
>CPCH SET Info			CPCH SET Info		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			10.3.6.13		
<b>Downlink radio resources</b>					
CHOICE <i>mode</i>	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS_PDSCH Information 10.3.6.23a		REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link to be set-up	
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		

Condition	Explanation
CCCH	This IE is mandatory present when CCCH is used and ciphering is not required and not needed otherwise.

## 10.2.27 RADIO BEARER RECONFIGURATION

This message is sent from UTRAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, reconfigure transport channels and physical channels. This message is also used to perform a handover from GERAN *Iu mode* to UTRAN.

RLC-SAP: AM or UM or sent through GERAN *Iu mode*

Logical channel: DCCH or sent through GERAN *Iu mode*

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information elements</b>					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation or a handover from GERAN <i>Iu mode</i>	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing either an SRNS relocation or a handover from GERAN <i>Iu mode</i> and a change in ciphering algorithm	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
<b>CN information elements</b>					
CN Information info	OP		CN Information info 10.3.1.3		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
<b>UTRAN mobility information elements</b>					
URA identity	OP		URA identity 10.3.2.6		
CHOICE specification mode	MP				REL-5
>Complete specification					
<b>RB information elements</b>					
>>RAB information to reconfigure list	OP	1 to <maxRABse tup >			
>>>RAB information to reconfigure	MP		RAB information to reconfigure 10.3.4.11		
>>RB information to reconfigure list	MP	1to <maxRB>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>>>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18		
>>RB information to be affected list	OP	1 to <maxRB>			
>>>RB information to be affected	MP		RB information to be affected 10.3.4.17		
>>RB with PDCP context relocation info list	OP	1 to <maxRBall RABs>		This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
>>>PDCP context relocation info	MP		PDCP context relocation info 10.3.4.1a		REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
>>UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
>>Deleted TrCH information list	OP	1 to <maxTrCH >			
>>>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
>>Added or Reconfigured TrCH information list	OP	1 to <maxTrCH			

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
		>			
>>>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
>>CHOICE <i>mode</i>	OP				
>>>FDD					
>>>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>>>TDD				(no data)	
<b>Downlink transport channels</b>					
>>DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
>>Deleted TrCH information list	OP	1 to <maxTrCH >			
>>>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
>>Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>>>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
>Preconfiguration					REL-5
>>CHOICE <i>Preconfiguration mode</i>	MP			This value only applies in case the message is sent through GERAN <i>Iu mode</i>	
>>>Predefined configuration identity	MP		Predefined configuration identity 10.3.4.5		
>>>Default configuration					
>>>>Default configuration mode	MP		Enumerated (FDD, TDD)	Indicates whether the FDD or TDD version of the default configuration shall be used	
>>>>>Default configuration identity	MP		Default configuration identity 10.3.4.0		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
<i>CHOICE channel requirement</i>					
>Uplink DPCH info	OP		Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
<b>Downlink radio resources</b>					
<i>CHOICE mode</i>					
>FDD	MP				
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a		REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	MP	1 to <maxRL>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		

### 10.2.33 RADIO BEARER SETUP

This message is sent by UTRAN to the UE to establish new radio bearer(s). It can also include modifications to the configurations of transport channels and/or physical channels.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information Elements</b>					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing an SRNS relocation and a change in ciphering algorithm	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
<b>CN Information Elements</b>					
CN Information info	OP		CN Information info 10.3.1.3		
<b>UTRAN mobility information elements</b>					
URA identity	OP		URA identity 10.3.2.6		
<b>RB Information Elements</b>					
Signalling RB information to setup list	OP	1 to <maxSRBs		For each signalling radio	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
		etup>		bearer established	
>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24		
RAB information to setup list	OP	1 to <maxRABs etup>		For each RAB established	
>RAB information for setup	MP		RAB information for setup 10.3.4.10		
RB information to be affected list	OP	1 to <maxRB>			
>RB information to be affected	MP		RB information to be affected 10.3.4.17		
Downlink counter synchronisation info	OP				
>RB with PDCP information list	OP	1 to <maxRBall RABs>			
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	This IE is needed for each RB having PDCP in the case of lossless SRNS relocation	
	OP				REL-5
>>PDCP context relocation info	OP		PDCP context relocation info 10.3.4.1a	This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		



Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
CHOICE <i>mode</i>	OP				
>FDD					
>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>TDD				(no data)	
<b>Downlink transport channels</b>					
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE <i>channel requirement</i>	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
<b>Downlink radio resources</b>					
CHOICE <i>mode</i>	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a		REL-5
Downlink information common for all radio links	OP		Downlink information common for		

<b>Information Element/Group name</b>	<b>Need</b>	<b>Multi</b>	<b>Type and reference</b>	<b>Semantics description</b>	<b>Version</b>
			all radio links 10.3.6.24		
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link	
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		

#### 10.3.4.2a PDCP ROHC target mode

<u>Information Element/Group name</u>	<u>Need</u>	<u>Multi</u>	<u>Type and Reference</u>	<u>Semantics description</u>	<u>Version</u>
<u>Target Mode</u>	<u>MP</u>		<u>Enumerated (O-mode, R-mode)</u>	<u>The UE shall only transit to the signalled mode for operation of ROHC as deccribed in [36].</u>	<u>REL-5</u>

## 11.2 PDU definitions

```

--*****
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--*****

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--*****
--
-- IE parameter types from other modules
--
--*****

IMPORTS

-- Core Network IEs :
  CN-DomainIdentity,
  CN-InformationInfo,
  CN-InformationInfoFull,
  NAS-Message,
  PagingRecordTypeID,
-- UTRAN Mobility IEs :
  CellIdentity,
  CellIdentity-PerRL-List,
  URA-Identity,
-- User Equipment IEs :
  AccessStratumReleaseIndicator,
  ActivationTime,
  C-RNTI,
  CapabilityUpdateRequirement,
  CapabilityUpdateRequirement-r4,
  CapabilityUpdateRequirement-r4-ext,
  CapabilityUpdateRequirement-r5,
  CellUpdateCause,
  CipheringAlgorithm,
  CipheringModeInfo,
  DSCH-RNTI,
  EstablishmentCause,
  FailureCauseWithProtErr,
  FailureCauseWithProtErrTrId,
  GroupReleaseInformation,
  H-RNTI,
  UESpecificBehaviourInformationIdle,
  UESpecificBehaviourInformationInterRAT,
  InitialUE-Identity,
  IntegrityProtActivationInfo,
  IntegrityProtectionModeInfo,
  N-308,
  PagingCause,
  PagingRecordList,
  PagingRecord2List-r5,
  ProtocolErrorIndicator,
  ProtocolErrorIndicatorWithMoreInfo,
  RadioFrequencyBandTDDList,
  Rb-timer-indicator,
  RedirectionInfo,
  RejectionCause,
  ReleaseCause,
  RF-CapabilityComp,
  RRC-StateIndicator,
  RRC-TransactionIdentifier,
  SecurityCapability,
  START-Value,
  STARTList,
  SystemSpecificCapUpdateReq-v590ext,
  U-RNTI,

```

```

U-RNTI-Short,
UE-RadioAccessCapability,
UE-RadioAccessCapability-v370ext,
UE-RadioAccessCapability-v380ext,
UE-RadioAccessCapability-v3a0ext,
UE-RadioAccessCapability-v3g0ext,
UE-RadioAccessCapability-v4b0ext,
UE-RadioAccessCapability-v590ext,
UE-RadioAccessCapability-v5c0ext,
UE-RadioAccessCapabilityComp,
DL-PhysChCapabilityFDD-v380ext,
UE-ConnTimersAndConstants,
UE-ConnTimersAndConstants-v3a0ext,
UE-ConnTimersAndConstants-r5,
UE-SecurityInformation,
URA-UpdateCause,
UTRAN-DRX-CycleLengthCoefficient,
WaitTime,
-- Radio Bearer IEs :
  DefaultConfigIdentity,
  DefaultConfigIdentity-r4,
  DefaultConfigIdentity-r5,
  DefaultConfigMode,
  DL-CounterSynchronisationInfo,
  DL-CounterSynchronisationInfo-r5,
  PDCP-ROHC-TargetMode,
  PredefinedConfigIdentity,
  PredefinedConfigStatusList,
  PredefinedConfigStatusListComp,
  PredefinedConfigSetWithDifferentValueTag,
  RAB-Info,
  RAB-Info-Post,
  RAB-InformationList,
  RAB-InformationReconfigList,
  RAB-InformationSetupList,
  RAB-InformationSetupList-r4,
  RAB-InformationSetupList-r5,
  RB-ActivationTimeInfoList,
  RB-COUNT-C-InformationList,
  RB-COUNT-C-MSB-InformationList,
  RB-IdentityList,
  RB-InformationAffectedList,
  RB-InformationAffectedList-r5,
  RB-InformationReconfigList,
  RB-InformationReconfigList-r4,
  RB-InformationReconfigList-r5,
  RB-InformationReleaseList,
  RB-PDCPContextRelocationList,
  SRB-InformationSetupList,
  SRB-InformationSetupList-r5,
  SRB-InformationSetupList2,
  UL-CounterSynchronisationInfo,

:

-- *****
--
-- CELL UPDATE
--
-- *****

CellUpdate ::= SEQUENCE {
  -- User equipment IEs
  u-RNTI                U-RNTI,
  startList              STARTList,
  am-RLC-ErrorIndicationRb2-3or4    BOOLEAN,
  am-RLC-ErrorIndicationRb5orAbove  BOOLEAN,
  cellUpdateCause       CellUpdateCause,
  -- TABULAR: RRC transaction identifier is nested in FailureCauseWithProtErrTrId
  failureCause          FailureCauseWithProtErrTrId    OPTIONAL,
  rb-timer-indicator   Rb-timer-indicator,
  -- Measurement IEs
  measuredResultsOnRACH    MeasuredResultsOnRACH    OPTIONAL,
  laterNonCriticalExtensions SEQUENCE {
    -- Container for additional R99 extensions
    cellUpdate-r3-add-ext   BIT STRING    OPTIONAL,
    v590NonCriticalExtensions SEQUENCE {
      cellUpdate-v590ext   CellUpdate-v590ext,

```

```

        nonCriticalExtensions          SEQUENCE {} OPTIONAL
    } OPTIONAL
}

CellUpdate-v590ext ::= SEQUENCE {
    establishmentCause      EstablishmentCause OPTIONAL
}
-- *****
--
-- CELL UPDATE CONFIRM
--
-- *****

CellUpdateConfirm ::= CHOICE {
    r3                      SEQUENCE {
        cellUpdateConfirm-r3      CellUpdateConfirm-r3-IEs,
        v3a0NonCriticalExtensions SEQUENCE {
            cellUpdateConfirm-v3a0ext      CellUpdateConfirm-v3a0ext,
            laterNonCriticalExtensions     SEQUENCE {
                -- Container for additional R99 extensions
                cellUpdateConfirm-r3-add-ext      BIT STRING OPTIONAL,
                v4b0NonCriticalExtensions        SEQUENCE {
                    cellUpdateConfirm-v4b0ext      CellUpdateConfirm-v4b0ext-IEs,
                    v590NonCriticalExtensstions   SEQUENCE {
                        cellUpdateConfirm-v590ext      CellUpdateConfirm-v590ext-IEs,
                        v5d0NonCriticalExtensions    SEQUENCE {
                            cellUpdateConfirm-v5d0ext    CellUpdateConfirm-v5d0ext-IEs,
                            nonCriticalExtensions        SEQUENCE {} OPTIONAL
                        } OPTIONAL
                    } OPTIONAL
                } OPTIONAL
            } OPTIONAL
        },
        later-than-r3          SEQUENCE {
            rrc-TransactionIdentifier      RRC-TransactionIdentifier,
            criticalExtensions             CHOICE {
                r4              SEQUENCE {
                    cellUpdateConfirm-r4      CellUpdateConfirm-r4-IEs,
                    v4d0NonCriticalExtensions SEQUENCE {
                        -- Container for adding non critical extensions after freezing REL-5
                        cellUpdateConfirm-r4-add-ext      BIT STRING OPTIONAL,
                        v590NonCriticalExtensstions       SEQUENCE {
                            cellUpdateConfirm-v590ext      CellUpdateConfirm-v590ext-IEs,
                            v5d0NonCriticalExtensstions    SEQUENCE {
                                cellUpdateConfirm-v5d0ext    CellUpdateConfirm-v5d0ext-IEs,
                                nonCriticalExtensions        SEQUENCE {} OPTIONAL
                            } OPTIONAL
                        } OPTIONAL
                    } OPTIONAL
                },
                criticalExtensions             CHOICE {
                    r5              SEQUENCE {
                        cellUpdateConfirm-r5      CellUpdateConfirm-r5-IEs,
                        -- Container for adding non critical extensions after freezing REL-6
                        cellUpdateConfirm-r5-add-ext      BIT STRING OPTIONAL,
                        v5d0NonCriticalExtensstions    SEQUENCE {
                            cellUpdateConfirm-v5d0ext    CellUpdateConfirm-v5d0ext-IEs,
                            nonCriticalExtensions        SEQUENCE {} OPTIONAL
                        } OPTIONAL
                    },
                    criticalExtensions             SEQUENCE {}
                }
            }
        }
    }
}

CellUpdateConfirm-r3-IEs ::= SEQUENCE {
    -- User equipment IEs
    rrc-TransactionIdentifier      RRC-TransactionIdentifier,
    integrityProtectionModeInfo    IntegrityProtectionModeInfo      OPTIONAL,
    cipheringModeInfo              CipheringModeInfo                OPTIONAL,
    activationTime                 ActivationTime                    OPTIONAL,
    new-U-RNTI                     U-RNTI                          OPTIONAL,
    new-C-RNTI                     C-RNTI                          OPTIONAL,
    rrc-StateIndicator              RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,

```

```

    rlc-Re-establishIndicatorRb2-3or4      BOOLEAN,
    rlc-Re-establishIndicatorRb5orAbove    BOOLEAN,
-- CN information elements
    cn-InformationInfo                     CN-InformationInfo           OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity                           URA-Identity                 OPTIONAL,
-- Radio bearer IEs
    rb-InformationReleaseList              RB-InformationReleaseList      OPTIONAL,
    rb-InformationReconfigList             RB-InformationReconfigList     OPTIONAL,
    rb-InformationAffectedList              RB-InformationAffectedList     OPTIONAL,
    dl-CounterSynchronisationInfo          DL-CounterSynchronisationInfo OPTIONAL,
-- Transport channel IEs
    ul-CommonTransChInfo                  UL-CommonTransChInfo          OPTIONAL,
    ul-deletedTransChInfoList              UL-DeletedTransChInfoList     OPTIONAL,
    ul-AddReconfTransChInfoList            UL-AddReconfTransChInfoList   OPTIONAL,
    modeSpecificTransChInfo                CHOICE {
        fdd                                SEQUENCE {
            cpch-SetID                      CPCH-SetID                     OPTIONAL,
            addReconfTransChDRAC-Info        DRAC-StaticInformationList     OPTIONAL
        },
        tdd                                NULL
    },
    dl-CommonTransChInfo                   DL-CommonTransChInfo          OPTIONAL,
    dl-DeletedTransChInfoList               DL-DeletedTransChInfoList     OPTIONAL,
    dl-AddReconfTransChInfoList             DL-AddReconfTransChInfoList   OPTIONAL,
-- Physical channel IEs
    frequencyInfo                          FrequencyInfo                   OPTIONAL,
    maxAllowedUL-TX-Power                   MaxAllowedUL-TX-Power          OPTIONAL,
    ul-ChannelRequirement                   UL-ChannelRequirement          OPTIONAL,
    modeSpecificPhysChInfo                  CHOICE {
        fdd                                SEQUENCE {
            dl-PDSCH-Information             DL-PDSCH-Information           OPTIONAL
        },
        tdd                                NULL
    },
    dl-CommonInformation                   DL-CommonInformation           OPTIONAL,
    dl-InformationPerRL-List                DL-InformationPerRL-List       OPTIONAL
}

CellUpdateConfirm-v3a0ext ::= SEQUENCE {
    new-DSCH-RNTI                          DSCH-RNTI                      OPTIONAL
}

CellUpdateConfirm-v4b0ext-IEs ::= SEQUENCE {
-- Physical channel IEs
-- ssdt-UL extends SSdT-Information, which is included in
-- DL-CommonInformation. FDD only.
    ssdt-UL-r4                              SSdT-UL                         OPTIONAL,
-- The order of the RLs in IE cell-id-PerRL-List is the same as
-- in IE DL-InformationPerRL-List included in this message
    cell-id-PerRL-List                       CellIdentity-PerRL-List         OPTIONAL
}

CellUpdateConfirm-v590ext-IEs ::= SEQUENCE {
-- Physical channel IEs
    dl-TPC-PowerOffsetPerRL-List            DL-TPC-PowerOffsetPerRL-List   OPTIONAL
}

CellUpdateConfirm-r4-IEs ::= SEQUENCE {
-- User equipment IEs
    integrityProtectionModeInfo             IntegrityProtectionModeInfo     OPTIONAL,
    cipheringModeInfo                       CipheringModeInfo               OPTIONAL,
    activationTime                          ActivationTime                   OPTIONAL,
    new-U-RNTI                              U-RNTI                         OPTIONAL,
    new-C-RNTI                              C-RNTI                         OPTIONAL,
    new-DSCH-RNTI                          DSCH-RNTI                      OPTIONAL,
    rrc-StateIndicator                      RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff              UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
    rlc-Re-establishIndicatorRb2-3or4        BOOLEAN,
    rlc-Re-establishIndicatorRb5orAbove      BOOLEAN,
-- CN information elements
    cn-InformationInfo                     CN-InformationInfo           OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity                           URA-Identity                 OPTIONAL,
-- Radio bearer IEs
    rb-InformationReleaseList              RB-InformationReleaseList      OPTIONAL,
    rb-InformationReconfigList             RB-InformationReconfigList-r4  OPTIONAL,
    rb-InformationAffectedList              RB-InformationAffectedList     OPTIONAL
}

```

```

    dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo          UL-CommonTransChInfo-r4          OPTIONAL,
  ul-deletedTransChInfoList     UL-DeletedTransChInfoList    OPTIONAL,
  ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList   OPTIONAL,
  modeSpecificTransChInfo       CHOICE {
    fdd                          SEQUENCE {
      cpch-SetID                 CPCH-SetID                 OPTIONAL,
      addReconfTransChDRAC-Info  DRAC-StaticInformationList OPTIONAL
    },
    tdd                          NULL
  },
  dl-CommonTransChInfo          DL-CommonTransChInfo-r4          OPTIONAL,
  dl-DeletedTransChInfoList     DL-DeletedTransChInfoList    OPTIONAL,
  dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r4  OPTIONAL,
-- Physical channel IEs
  frequencyInfo                 FrequencyInfo                 OPTIONAL,
  maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power        OPTIONAL,
  ul-ChannelRequirement         UL-ChannelRequirement-r4     OPTIONAL,
  modeSpecificPhysChInfo       CHOICE {
    fdd                          SEQUENCE {
      dl-PDSCH-Information       DL-PDSCH-Information       OPTIONAL
    },
    tdd                          NULL
  },
  dl-CommonInformation          DL-CommonInformation-r4       OPTIONAL,
  dl-InformationPerRL-List      DL-InformationPerRL-List-r4   OPTIONAL
}

CellUpdateConfirm-r5-IEs ::= SEQUENCE {
-- User equipment IEs
  integrityProtectionModeInfo   IntegrityProtectionModeInfo   OPTIONAL,
  cipheringModeInfo             CipheringModeInfo              OPTIONAL,
  activationTime                 ActivationTime                  OPTIONAL,
  new-U-RNTI                     U-RNTI                        OPTIONAL,
  new-C-RNTI                     C-RNTI                        OPTIONAL,
  new-DSCH-RNTI                 DSCH-RNTI                     OPTIONAL,
  new-H-RNTI                     H-RNTI                        OPTIONAL,
  rrc-StateIndicator            RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff    UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
  rlc-Re-establishIndicatorRb2-3or4 BOOLEAN,
  rlc-Re-establishIndicatorRb5orAbove BOOLEAN,
-- CN information elements
  cn-InformationInfo            CN-InformationInfo            OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity                  URA-Identity                  OPTIONAL,
-- Radio bearer IEs
  rb-InformationReleaseList     RB-InformationReleaseList     OPTIONAL,
  rb-InformationReconfigList    RB-InformationReconfigList-r5  OPTIONAL,
  rb-InformationAffectedList    RB-InformationAffectedList-r5  OPTIONAL,
  dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo-r5 OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo          UL-CommonTransChInfo-r4          OPTIONAL,
  ul-deletedTransChInfoList     UL-DeletedTransChInfoList    OPTIONAL,
  ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList   OPTIONAL,
  modeSpecificTransChInfo       CHOICE {
    fdd                          SEQUENCE {
      cpch-SetID                 CPCH-SetID                 OPTIONAL,
      addReconfTransChDRAC-Info  DRAC-StaticInformationList OPTIONAL
    },
    tdd                          NULL
  },
  dl-CommonTransChInfo          DL-CommonTransChInfo-r4          OPTIONAL,
  dl-DeletedTransChInfoList     DL-DeletedTransChInfoList-r5    OPTIONAL,
  dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r5  OPTIONAL,
-- Physical channel IEs
  frequencyInfo                 FrequencyInfo                 OPTIONAL,
  maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power        OPTIONAL,
  ul-ChannelRequirement         UL-ChannelRequirement-r5     OPTIONAL,
  modeSpecificPhysChInfo       CHOICE {
    fdd                          SEQUENCE {
      dl-PDSCH-Information       DL-PDSCH-Information       OPTIONAL
    },
    tdd                          NULL
  },
  dl-HSPDSCH-Information        DL-HSPDSCH-Information        OPTIONAL,
  dl-CommonInformation          DL-CommonInformation-r5       OPTIONAL,
  dl-InformationPerRL-List      DL-InformationPerRL-List-r5   OPTIONAL
}

```



```

}
CellUpdateConfirm-v5d0ext-IEs ::= SEQUENCE {
    --Radio Bearer IEs
    pdcp-ROHC-TargetMode          PDCP-ROHC-TargetMode          OPTIONAL
}
-- *****
--
-- CELL UPDATE CONFIRM for CCCH
--
-- *****

CellUpdateConfirm-CCCH ::= CHOICE {
    r3          SEQUENCE {
        -- User equipment IEs
        u-RNTI          U-RNTI,
        -- The rest of the message is identical to the one sent on DCCH.
        cellUpdateConfirm-r3          CellUpdateConfirm-r3-IEs,
        laterNonCriticalExtensions    SEQUENCE {
            -- Container for additional R99 extensions
            cellUpdateConfirm-CCCH-r3-add-ext          BIT STRING          OPTIONAL,
            v4b0NonCriticalExtensions    SEQUENCE {
                cellUpdateConfirm-v4b0ext          CellUpdateConfirm-v4b0ext-IEs,
                v590NonCriticalExtensions    SEQUENCE {
                    cellUpdateConfirm-v590ext          CellUpdateConfirm-v590ext-IEs,
                    v5d0NonCriticalExtensions    SEQUENCE {
                        cellUpdateConfirm-v5d0ext          CellUpdateConfirm-v5d0ext-IEs,
                        nonCriticalExtensions    SEQUENCE {}          OPTIONAL
                    }          OPTIONAL
                }          OPTIONAL
            }          OPTIONAL
        },
        later-than-r3          SEQUENCE {
            u-RNTI          U-RNTI,
            rrc-TransactionIdentifier    RRC-TransactionIdentifier,
            criticalExtensions          CHOICE {
                r4          SEQUENCE {
                    -- The rest of the message is identical to the one sent on DCCH.
                    cellUpdateConfirm-r4          CellUpdateConfirm-r4-IEs,
                    v4d0NonCriticalExtensions    SEQUENCE {
                        -- Container for adding non critical extensions after freezing REL-5
                        cellUpdateConfirm-CCCH-r4-add-ext          BIT STRING          OPTIONAL,
                        v590NonCriticalExtensions    SEQUENCE {
                            cellUpdateConfirm-v590ext          CellUpdateConfirm-v590ext-IEs,
                            v5d0NonCriticalExtensions    SEQUENCE {
                                cellUpdateConfirm-v5d0ext          CellUpdateConfirm-v5d0ext-IEs,
                                nonCriticalExtensions    SEQUENCE {}          OPTIONAL
                            }          OPTIONAL
                        }          OPTIONAL
                    }          OPTIONAL
                },
                criticalExtensions          CHOICE {
                    r5          SEQUENCE {
                        cellUpdateConfirm-r5          CellUpdateConfirm-r5-IEs,
                        cellUpdateConfirm-CCCH-r5-add-ext          BIT STRING          OPTIONAL,
                        v5d0NonCriticalExtensions    SEQUENCE {
                            cellUpdateConfirm-v5d0ext          CellUpdateConfirm-v5d0ext-IEs,
                            nonCriticalExtensions    SEQUENCE {}          OPTIONAL
                        }          OPTIONAL
                    },
                    criticalExtensions          SEQUENCE {}
                }
            }
        }
    }
}
:
-- *****
--
-- RADIO BEARER RECONFIGURATION
--
-- *****

RadioBearerReconfiguration ::= CHOICE {
    r3          SEQUENCE {

```

```

radioBearerReconfiguration-r3  RadioBearerReconfiguration-r3-IEs,
-- Prefix "v3ao" is used (in one instance) to keep alignment with R99
v3aoNonCriticalExtensions      SEQUENCE {
  radioBearerReconfiguration-v3aoext  RadioBearerReconfiguration-v3aoext,
  laterNonCriticalExtensions          SEQUENCE {
    -- Container for additional R99 extensions
    radioBearerReconfiguration-r3-add-ext  BIT STRING      OPTIONAL,
    v4b0NonCriticalExtensions              SEQUENCE {
      radioBearerReconfiguration-v4b0ext
    }
    v590NonCriticalExtensions              SEQUENCE {
      radioBearerReconfiguration-v590ext
    }
    v5d0NonCriticalExtensions              SEQUENCE {
      radioBearerReconfiguration-v5d0ext
    }
    nonCriticalExtensions                  SEQUENCE {} OPTIONAL
  } OPTIONAL
} OPTIONAL
},
later-than-r3                  SEQUENCE {
  rrc-TransactionIdentifier          RRC-TransactionIdentifier,
  criticalExtensions                  CHOICE {
    r4                                SEQUENCE {
      radioBearerReconfiguration-r4  RadioBearerReconfiguration-r4-IEs,
      v4d0NonCriticalExtensions        SEQUENCE {
        -- Container for adding non critical extensions after freezing REL-5
        radioBearerReconfiguration-r4-add-ext  BIT STRING      OPTIONAL,
        v590NonCriticalExtensions          SEQUENCE {
          radioBearerReconfiguration-v590ext
        }
        v5d0NonCriticalExtensions          SEQUENCE {
          radioBearerReconfiguration-v5d0ext
        }
        nonCriticalExtensions            SEQUENCE {}      OPTIONAL
      } OPTIONAL
    } OPTIONAL
  },
  criticalExtensions                  CHOICE {
    r5                                SEQUENCE {
      radioBearerReconfiguration-r5  RadioBearerReconfiguration-r5-IEs,
      -- Container for adding non critical extensions after freezing REL-6
      radioBearerReconfiguration-r5-add-ext  BIT STRING      OPTIONAL,
      v5d0NonCriticalExtensions          SEQUENCE {
        radioBearerReconfiguration-v5d0ext  RadioBearerReconfiguration-v5d0ext-IEs,
        nonCriticalExtensions            SEQUENCE {}      OPTIONAL
      } OPTIONAL
    }
  },
  criticalExtensions                  SEQUENCE {}
}
}
}

RadioBearerReconfiguration-r3-IEs ::= SEQUENCE {
-- User equipment IES
  rrc-TransactionIdentifier          RRC-TransactionIdentifier,
  integrityProtectionModeInfo        IntegrityProtectionModeInfo      OPTIONAL,
  cipheringModeInfo                  CipheringModeInfo                  OPTIONAL,
  activationTime                      ActivationTime                      OPTIONAL,
  new-U-RNTI                          U-RNTI                            OPTIONAL,
  new-C-RNTI                          C-RNTI                            OPTIONAL,
  rrc-StateIndicator                  RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff          UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- Core network IES
  cn-InformationInfo                  CN-InformationInfo                  OPTIONAL,
-- UTRAN mobility IES
  ura-Identity                        URA-Identity                        OPTIONAL,
-- Radio bearer IES
  rab-InformationReconfigList         RAB-InformationReconfigList        OPTIONAL,
  -- NOTE: IE rb-InformationReconfigList should be optional in later versions
  -- of this message
  rb-InformationReconfigList          RB-InformationReconfigList,
  rb-InformationAffectedList          RB-InformationAffectedList          OPTIONAL,

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-- Transport channel IEs
  ul-CommonTransChInfo          UL-CommonTransChInfo          OPTIONAL,
  ul-deletedTransChInfoList     UL-DeletedTransChInfoList  OPTIONAL,
  ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList OPTIONAL,
  modeSpecificTransChInfo       CHOICE {
    fdd                          SEQUENCE {
      cpch-SetID                 CPCH-SetID                 OPTIONAL,
      addReconfTransChDRAC-Info  DRAC-StaticInformationList OPTIONAL
    },
    tdd                          NULL
  }
  dl-CommonTransChInfo          DL-CommonTransChInfo          OPTIONAL,
  dl-DeletedTransChInfoList     DL-DeletedTransChInfoList  OPTIONAL,
  dl-AddReconfTransChInfoList   DL-AddReconfTransChInfo2List OPTIONAL,
-- Physical channel IEs
  frequencyInfo                 FrequencyInfo                 OPTIONAL,
  maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power       OPTIONAL,
  ul-ChannelRequirement         UL-ChannelRequirement       OPTIONAL,
  modeSpecificPhysChInfo        CHOICE {
    fdd                          SEQUENCE {
      dl-PDSCH-Information       DL-PDSCH-Information       OPTIONAL
    },
    tdd                          NULL
  },
  dl-CommonInformation          DL-CommonInformation          OPTIONAL,
  -- NOTE: IE dl-InformationPerRL-List should be optional in later versions
  -- of this message
  dl-InformationPerRL-List      DL-InformationPerRL-List
}

RadioBearerReconfiguration-v3a0ext ::= SEQUENCE {
  new-DSCH-RNTI                 DSCH-RNTI                 OPTIONAL
}

RadioBearerReconfiguration-v4b0ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  -- ssdt-UL extends SSdT-Information, which is included in
  -- DL-CommonInformation. FDD only.
  ssdt-UL-r4                    SSdT-UL                    OPTIONAL,
  -- The order of the RLs in IE cell-id-PerRL-List is the same as
  -- in IE DL-InformationPerRL-List included in this message
  cell-id-PerRL-List            CellIdentity-PerRL-List    OPTIONAL
}

RadioBearerReconfiguration-v590ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  dl-TPC-PowerOffsetPerRL-List  DL-TPC-PowerOffsetPerRL-List OPTIONAL
}

RadioBearerReconfiguration-r4-IEs ::= SEQUENCE {
  -- User equipment IEs
  integrityProtectionModeInfo   IntegrityProtectionModeInfo  OPTIONAL,
  cipheringModeInfo             CipheringModeInfo             OPTIONAL,
  activationTime                 ActivationTime                 OPTIONAL,
  new-U-RNTI                     U-RNTI                       OPTIONAL,
  new-C-RNTI                     C-RNTI                       OPTIONAL,
  new-DSCH-RNTI                 DSCH-RNTI                   OPTIONAL,
  rrc-StateIndicator            RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff    UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
  -- Core network IEs
  cn-InformationInfo             CN-InformationInfo           OPTIONAL,
  -- UTRAN mobility IEs
  ura-Identity                   URA-Identity                 OPTIONAL,
  -- Radio bearer IEs
  rab-InformationReconfigList    RAB-InformationReconfigList  OPTIONAL,
  rb-InformationReconfigList     RB-InformationReconfigList-r4 OPTIONAL,
  rb-InformationAffectedList     RB-InformationAffectedList   OPTIONAL,
  -- Transport channel IEs
  ul-CommonTransChInfo          UL-CommonTransChInfo-r4     OPTIONAL,
  ul-deletedTransChInfoList     UL-DeletedTransChInfoList  OPTIONAL,
  ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList OPTIONAL,
  modeSpecificTransChInfo        CHOICE {
    fdd                          SEQUENCE {
      cpch-SetID                 CPCH-SetID                 OPTIONAL,
      addReconfTransChDRAC-Info  DRAC-StaticInformationList OPTIONAL
    },
    tdd                          NULL
  }
}

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dl-CommonTransChInfo          DL-CommonTransChInfo-r4          OPTIONAL,
dl-DeletedTransChInfoList     DL-DeletedTransChInfoList         OPTIONAL,
dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r4    OPTIONAL,
-- Physical channel IEs
frequencyInfo                 FrequencyInfo                       OPTIONAL,
maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power             OPTIONAL,
ul-ChannelRequirement         UL-ChannelRequirement-r4          OPTIONAL,
modeSpecificPhysChInfo        CHOICE {
    fdd                         SEQUENCE {
        dl-PDSCH-Information     DL-PDSCH-Information             OPTIONAL
    },
    tdd                         NULL
},
dl-CommonInformation          DL-CommonInformation-r4           OPTIONAL,
dl-InformationPerRL-List      DL-InformationPerRL-List-r4       OPTIONAL
}

RadioBearerReconfiguration-r5-IEs ::= SEQUENCE {
-- User equipment IEs
integrityProtectionModeInfo   IntegrityProtectionModeInfo       OPTIONAL,
cipheringModeInfo             CipheringModeInfo                  OPTIONAL,
activationTime                 ActivationTime                      OPTIONAL,
new-U-RNTI                     U-RNTI                             OPTIONAL,
new-C-RNTI                     C-RNTI                             OPTIONAL,
new-DSCH-RNTI                 DSCH-RNTI                         OPTIONAL,
new-H-RNTI                     H-RNTI                             OPTIONAL,
rrc-StateIndicator            RRC-StateIndicator,
utran-DRX-CycleLengthCoeff     UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- Core network IEs
cn-InformationInfo             CN-InformationInfo                 OPTIONAL,
-- UTRAN mobility IEs
ura-Identity                   URA-Identity                       OPTIONAL,
-- Specification mode information
specificationMode              CHOICE {
    complete                    SEQUENCE {
-- Radio bearer IEs
rab-InformationReconfigList    RAB-InformationReconfigList       OPTIONAL,
rb-InformationReconfigList     RB-InformationReconfigList-r5      OPTIONAL,
rb-InformationAffectedList     RB-InformationAffectedList-r5     OPTIONAL,
rb-PDCPContextRelocationList  RB-PDCPContextRelocationList     OPTIONAL,
-- Transport channel IEs
ul-CommonTransChInfo          UL-CommonTransChInfo-r4           OPTIONAL,
ul-deletedTransChInfoList     UL-DeletedTransChInfoList         OPTIONAL,
ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList       OPTIONAL,
modeSpecificTransChInfo        CHOICE {
    fdd                         SEQUENCE {
        cpch-SetID              CPCH-SetID                       OPTIONAL,
        addReconfTransChDRAC-Info DRAC-StaticInformationList       OPTIONAL
    },
    tdd                         NULL
    }
    dl-CommonTransChInfo          DL-CommonTransChInfo-r4           OPTIONAL,
    dl-DeletedTransChInfoList     DL-DeletedTransChInfoList-r5      OPTIONAL,
    dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r5    OPTIONAL
},
preconfiguration              SEQUENCE {
-- All IEs that include an FDD/TDD choice are split in two IEs for this message,
-- one for the FDD only elements and one for the TDD only elements, so that one
-- FDD/TDD choice in this level is sufficient.
preConfigMode                 CHOICE {
    predefinedConfigIdentity     PredefinedConfigIdentity,
    defaultConfig               SEQUENCE {
        defaultConfigMode       DefaultConfigMode,
        defaultConfigIdentity   DefaultConfigIdentity-r5
    }
}
},
-- Physical channel IEs
frequencyInfo                 FrequencyInfo                       OPTIONAL,
maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power             OPTIONAL,
ul-ChannelRequirement         UL-ChannelRequirement-r5          OPTIONAL,
modeSpecificPhysChInfo        CHOICE {
    fdd                         SEQUENCE {
        dl-PDSCH-Information     DL-PDSCH-Information             OPTIONAL
    },
    tdd                         NULL
},
},

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dl-HSPDSCH-Information          DL-HSPDSCH-Information          OPTIONAL,
dl-CommonInformation            DL-CommonInformation-r5        OPTIONAL,
dl-InformationPerRL-List        DL-InformationPerRL-List-r5    OPTIONAL
}

RadioBearerReconfiguration-v5d0ext-IEs ::= SEQUENCE {
  --Radio Bearer IEs
  pdcp-ROHC-TargetMode          PDCP-ROHC-TargetMode          OPTIONAL
}

:

-- *****
--
-- RADIO BEARER SETUP
--
-- *****

RadioBearerSetup ::= CHOICE {
  r3                            SEQUENCE {
    radioBearerSetup-r3          RadioBearerSetup-r3-IEs,
    v3a0NonCriticalExtensions    SEQUENCE {
      radioBearerSetup-v3a0ext   RadioBearerSetup-v3a0ext,
      laterNonCriticalExtensions SEQUENCE {
        -- Container for additional R99 extensions
        radioBearerSetup-r3-add-ext BIT STRING OPTIONAL,
        v4b0NonCriticalExtensions SEQUENCE {
          radioBearerSetup-v4b0ext RadioBearerSetup-v4b0ext-IEs,
          v590NonCriticalExtensions SEQUENCE {
            radioBearerSetup-v590ext RadioBearerSetup-v590ext-IEs,
            v5d0NonCriticalExtensions SEQUENCE {
              radioBearerSetup-v5d0ext RadioBearerSetup-v5d0ext-IEs,
              nonCriticalExtensions SEQUENCE {} OPTIONAL
            } OPTIONAL
          } OPTIONAL
        } OPTIONAL
      } OPTIONAL
    } OPTIONAL
  },
  later-than-r3                 SEQUENCE {
    rrc-TransactionIdentifier    RRC-TransactionIdentifier,
    criticalExtensions           CHOICE {
      r4                          SEQUENCE {
        radioBearerSetup-r4      RadioBearerSetup-r4-IEs,
        v4d0NonCriticalExtensions SEQUENCE {
          -- Container for adding non critical extensions after freezing REL-5
          radioBearerSetup-r4-add-ext BIT STRING OPTIONAL,
          v590NonCriticalExtensions SEQUENCE {
            radioBearerSetup-v590ext RadioBearerSetup-v590ext-IEs,
            v5d0NonCriticalExtensions SEQUENCE {
              radioBearerSetup-v5d0ext RadioBearerSetup-v5d0ext-IEs,
              nonCriticalExtensions SEQUENCE {} OPTIONAL
            } OPTIONAL
          } OPTIONAL
        } OPTIONAL
      } OPTIONAL
    },
    criticalExtensions           CHOICE {
      r5                          SEQUENCE {
        radioBearerSetup-r5      RadioBearerSetup-r5-IEs,
        -- Container for adding non critical extensions after freezing REL-6
        radioBearerSetup-r5-add-ext BIT STRING OPTIONAL,
        v5d0NonCriticalExtensions SEQUENCE {
          radioBearerSetup-v5d0ext RadioBearerSetup-v5d0ext-IEs,
          nonCriticalExtensions SEQUENCE {} OPTIONAL
        } OPTIONAL
      } OPTIONAL
    } OPTIONAL
  }
}

RadioBearerSetup-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier    RRC-TransactionIdentifier,
  integrityProtectionModeInfo  IntegrityProtectionModeInfo    OPTIONAL,
  cipheringModeInfo           CipheringModeInfo              OPTIONAL,
  activationTime               ActivationTime                        OPTIONAL,
}

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    new-U-RNTI                U-RNTI                OPTIONAL,
    new-C-RNTI                C-RNTI                OPTIONAL,
    rrc-StateIndicator        RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity              URA-Identity              OPTIONAL,
-- Core network IEs
    cn-InformationInfo        CN-InformationInfo        OPTIONAL,
-- Radio bearer IEs
    srb-InformationSetupList  SRB-InformationSetupList  OPTIONAL,
    rab-InformationSetupList  RAB-InformationSetupList  OPTIONAL,
    rb-InformationAffectedList RB-InformationAffectedList  OPTIONAL,
    dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo  OPTIONAL,
-- Transport channel IEs
    ul-CommonTransChInfo     UL-CommonTransChInfo     OPTIONAL,
    ul-deletedTransChInfoList UL-DeletedTransChInfoList  OPTIONAL,
    ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList  OPTIONAL,
    modeSpecificTransChInfo   CHOICE {
        fdd
            cpch-SetID        CPCH-SetID        OPTIONAL,
            addReconfTransChDRAC-Info DRAC-StaticInformationList  OPTIONAL
        },
        tdd
            NULL
    }
    dl-CommonTransChInfo     DL-CommonTransChInfo     OPTIONAL,
    dl-DeletedTransChInfoList DL-DeletedTransChInfoList  OPTIONAL,
    dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList  OPTIONAL,
-- Physical channel IEs
    frequencyInfo            FrequencyInfo            OPTIONAL,
    maxAllowedUL-TX-Power    MaxAllowedUL-TX-Power    OPTIONAL,
    ul-ChannelRequirement    UL-ChannelRequirement    OPTIONAL,
    modeSpecificPhysChInfo   CHOICE {
        fdd
            dl-PDSCH-Information DL-PDSCH-Information  OPTIONAL
        },
        tdd
            NULL
    },
    dl-CommonInformation     DL-CommonInformation     OPTIONAL,
    dl-InformationPerRL-List  DL-InformationPerRL-List  OPTIONAL
}

RadioBearerSetup-v3a0ext ::= SEQUENCE {
    new-DSCH-RNTI            DSCH-RNTI            OPTIONAL
}

RadioBearerSetup-v4b0ext-IEs ::= SEQUENCE {
-- Physical channel IEs
-- ssdt-UL extends SSdT-Information, which is included in
-- DL-CommonInformation. FDD only.
    ssdt-UL-r4              SSdT-UL              OPTIONAL,
-- The order of the RLs in IE cell-id-PerRL-List is the same as
-- in IE DL-InformationPerRL-List included in this message
    cell-id-PerRL-List      CellIdentity-PerRL-List  OPTIONAL
}

RadioBearerSetup-v590ext-IEs ::= SEQUENCE {
-- Physical channel IEs
    dl-TPC-PowerOffsetPerRL-List DL-TPC-PowerOffsetPerRL-List  OPTIONAL
}

RadioBearerSetup-r4-IEs ::= SEQUENCE {
-- User equipment IEs
    integrityProtectionModeInfo IntegrityProtectionModeInfo  OPTIONAL,
    cipheringModeInfo        CipheringModeInfo            OPTIONAL,
    activationTime           ActivationTime                OPTIONAL,
    new-U-RNTI                U-RNTI                OPTIONAL,
    new-C-RNTI                C-RNTI                OPTIONAL,
    new-DSCH-RNTI            DSCH-RNTI            OPTIONAL,
    rrc-StateIndicator        RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity              URA-Identity              OPTIONAL,
-- Core network IEs
    cn-InformationInfo        CN-InformationInfo        OPTIONAL,
-- Radio bearer IEs
    srb-InformationSetupList  SRB-InformationSetupList  OPTIONAL,
    rab-InformationSetupList  RAB-InformationSetupList-r4  OPTIONAL,
    rb-InformationAffectedList RB-InformationAffectedList  OPTIONAL,

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    dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo UL-CommonTransChInfo-r4 OPTIONAL,
  ul-deletedTransChInfoList UL-DeletedTransChInfoList OPTIONAL,
  ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList OPTIONAL,
  modeSpecificTransChInfo CHOICE {
    fdd SEQUENCE {
      cpch-SetID CPCH-SetID OPTIONAL,
      addReconfTransChDRAC-Info DRAC-StaticInformationList OPTIONAL
    },
    tdd NULL
  }
  dl-CommonTransChInfo DL-CommonTransChInfo-r4 OPTIONAL,
  dl-DeletedTransChInfoList DL-DeletedTransChInfoList OPTIONAL,
  dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r4 OPTIONAL,
-- Physical channel IEs
  frequencyInfo FrequencyInfo OPTIONAL,
  maxAllowedUL-TX-Power MaxAllowedUL-TX-Power OPTIONAL,
  ul-ChannelRequirement UL-ChannelRequirement-r4 OPTIONAL,
  modeSpecificPhysChInfo CHOICE {
    fdd SEQUENCE {
      dl-PDSCH-Information DL-PDSCH-Information OPTIONAL
    },
    tdd NULL
  },
  dl-CommonInformation DL-CommonInformation-r4 OPTIONAL,
  dl-InformationPerRL-List DL-InformationPerRL-List-r4 OPTIONAL
}

RadioBearerSetup-r5-IEs ::= SEQUENCE {
-- User equipment IEs
  integrityProtectionModeInfo IntegrityProtectionModeInfo OPTIONAL,
  cipheringModeInfo CipheringModeInfo OPTIONAL,
  activationTime ActivationTime OPTIONAL,
  new-U-RNTI U-RNTI OPTIONAL,
  new-C-RNTI C-RNTI OPTIONAL,
  new-DSCH-RNTI DSCH-RNTI OPTIONAL,
  new-H-RNTI H-RNTI OPTIONAL,
  rrc-StateIndicator RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity URA-Identity OPTIONAL,
-- Core network IEs
  cn-InformationInfo CN-InformationInfo OPTIONAL,
-- Radio bearer IEs
  srb-InformationSetupList SRB-InformationSetupList-r5 OPTIONAL,
  rab-InformationSetupList RAB-InformationSetupList-r5 OPTIONAL,
  rb-InformationAffectedList RB-InformationAffectedList-r5 OPTIONAL,
  dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo-r5 OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo UL-CommonTransChInfo-r4 OPTIONAL,
  ul-deletedTransChInfoList UL-DeletedTransChInfoList OPTIONAL,
  ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList OPTIONAL,
  modeSpecificTransChInfo CHOICE {
    fdd SEQUENCE {
      cpch-SetID CPCH-SetID OPTIONAL,
      addReconfTransChDRAC-Info DRAC-StaticInformationList OPTIONAL
    },
    tdd NULL
  }
  dl-CommonTransChInfo DL-CommonTransChInfo-r4 OPTIONAL,
  dl-DeletedTransChInfoList DL-DeletedTransChInfoList-r5 OPTIONAL,
  dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r5 OPTIONAL,
-- Physical channel IEs
  frequencyInfo FrequencyInfo OPTIONAL,
  maxAllowedUL-TX-Power MaxAllowedUL-TX-Power OPTIONAL,
  ul-ChannelRequirement UL-ChannelRequirement-r5 OPTIONAL,
  modeSpecificPhysChInfo CHOICE {
    fdd SEQUENCE {
      dl-PDSCH-Information DL-PDSCH-Information OPTIONAL
    },
    tdd NULL
  },
  dl-HSPDSCH-Information DL-HSPDSCH-Information OPTIONAL,
  dl-CommonInformation DL-CommonInformation-r5 OPTIONAL,
  dl-InformationPerRL-List DL-InformationPerRL-List-r5 OPTIONAL
}

```

```
RadioBearerSetup-v5d0ext-IEs ::= SEQUENCE {  
  --Radio Bearer IEs  
  pdcP-ROHC-TargetMode PDCP-ROHC-TargetMode OPTIONAL  
}
```



## 11.3 Information element definitions

```
-- *****  
--  
-- RADIO BEARER INFORMATION ELEMENTS (10.3.4)  
-- *****  
  
:  
  
PDCP-ROHC-TargetMode ::= ENUMERATED { o-Mode, r-Mode }  
  
PDCP-SN-Info ::= INTEGER (0..65535)
```

## 13.4.xx PDCP\_ROHC **TARGET\_MODE**

[This variable contains the ROHC target mode.](#)

<u>Information Element/Group name</u>	<u>Need</u>	<u>Multi</u>	<u>Type and reference</u>	<u>Semantics description</u>	<u>Version</u>
<a href="#">Target Mode</a>	<a href="#">OP</a>		<a href="#">Enumerated (O-mode, R-mode)</a>	<a href="#">The UE shall only <b>transit to</b> the signalled mode for operation of ROHC as deccribed in [36].</a>	<a href="#">REL-5</a>

## CHANGE REQUEST

# 25.331 CR 2553 # rev 2 # Current version: 6.5.0 #

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

**Proposed change affects:** UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	# Signalling of target mode for ROHC operation		
<b>Source:</b>	# RAN WG2		
<b>Work item code:</b>	# RANimp-RABSE	<b>Date:</b>	# 17/05/2005
<b>Category:</b>	# <b>C</b>	<b>Release:</b>	# Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	<b>F</b> (correction)		Ph2 (GSM Phase 2)
	<b>A</b> (corresponds to a correction in an earlier release)		R96 (Release 1996)
	<b>B</b> (addition of feature),		R97 (Release 1997)
	<b>C</b> (functional modification of feature)		R98 (Release 1998)
	<b>D</b> (editorial modification)		R99 (Release 1999)
	Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)
			Rel-7 (Release 7)

<b>Reason for change:</b>	# At the RAN 2#45bis it was agreed that the UTRAN is able to signal a target mode to the UE in the PDCP configuration information, and that if the IE "Target Mode" is received by the UE, then the de-compressors shall only perform operational state transition from U-mode to the indicated mode for all contexts.
<b>Summary of change:</b>	# The IE "PDCP ROHC Target Mode" is included in the CELL UPDATE CONFIRM, the RADIO BEARER RECONFIGURATION and the RADIO BEARER SETUP messages to introduce the target mode parameter. The target mode is defined as either O or R mode.
<b>Consequences if not approved:</b>	# Restriction on mode transition provided by Target Mode functionality will not be present, which leads to the ROHC internally deciding on state transition which could be against the RRM strategy of the UTRAN.

<b>Clauses affected:</b>	# 8.6.4.10, 10.2.8, 10.2.27, 10.2.33, 10.3.4.2a (new), 11.2, 11.3, 13.4.xx (new)										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">Y</td> <td style="width: 20px; text-align: center;">N</td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;"></td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	# 25.323
Y	N										
X											
	X										
	X										
		Test specifications									
		O&M Specifications									
<b>Other comments:</b>	#										

#### 8.6.4.10 PDCP Info

For RFC 3095:

- 1> the chosen MAX\_CID shall not be greater than the value "Maximum number of ROHC context sessions" as indicated in the IE "PDCP Capability";
- 1> the configuration for the PACKET\_SIZES\_ALLOWED is FFS.

If IE "PDCP info" is included, the UE shall:

- 1> if the radio bearer is connected to a CS domain radio access bearer:
  - 2> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the IE "PDCP PDU header" is set to the value "absent":
  - 2> if the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change" is true:
    - 3> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the IE "PDCP PDU header" is set to the value "present":
  - 2> include PDCP headers in both uplink and downlink PDCP PDUs;
  - 2> if the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change" is false:
    - 3> if the IE "Header compression information" is absent:
      - 4> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> if the IE "Header compression information" is absent:
  - 2> not use Header compression after the successful completion of this procedure;
  - 2> remove any stored configuration for the IE "Header compression information".
- 1> if the IE "Header compression information" is present:
  - 2> if the IE "Algorithm Type" is set to "RFC 2507":
    - 3> if the UE capability "Maximum header compression context space", as specified in [35], is exceeded with this configuration:
      - 4> set the variable INVALID\_CONFIGURATION to TRUE.
- 1> configure the PDCP entity for that radio bearer accordingly;
- 1> configure the RLC entity for that radio bearer according to the value of the IE "Support for lossless SRNS relocation or for lossless DL RLC PDU size change";
- 1> set the PROFILES parameter, used by inband ROHC profile negotiation, for this PDCP entity for both UL and DL equal to the list of ROHC profiles received in the IE "PDCP info". A UE complying to this version of the protocol shall support ROHC profiles 0x0000 (ROHC uncompressed), 0x0001 (ROHC RTP), 0x0002 (ROHC UDP) and 0x0003 (ROHC ESP) (see [52]).

1> if the IE "PDCP ROHC target mode" is received:

2> set the variable "PDCP\_ROHC\_TARGET\_MODE" to the received value.

1> if the IE "PDCP ROHC target mode" is not received in either of the CELL UPDATE CONFIRM, the RADIO BEARER RECONFIGURATION or the RADIO BEARER SETUP message:

2> delete the variable "PDCP ROHC TARGET\_MODE" and act according to actions specified in [36].

Error! No text of specified style in document.

**3**

Error! No text of specified style in document.

## 10.2.8 CELL UPDATE CONFIRM

This message confirms the cell update procedure and can be used to reallocate new RNTI information for the UE valid in the new cell.

RLC-SAP: UM

Logical channel: CCCH or DCCH

Direction: UTRAN→UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information Elements</b>					
U-RNTI	CV-CCCH		U-RNTI 10.3.3.47		
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation or a cell reselection from GERAN <i>lu mode</i>	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing either an SRNS relocation or a cell reselection from GERAN <i>lu mode</i> , and a change in ciphering algorithm.	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
New E-RNTI	OP		E-RNTI 10.3.3.10a		REL-6
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
RLC re-establish indicator (RB2, RB3 and RB4)	MP		RLC re-establish	Should not be set to TRUE if IE	

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			indicator 10.3.3.35	"Downlink counter synchronisation info" is included in message.	
RLC re-establish indicator (RB5 and upwards)	MP		RLC re-establish indicator 10.3.3.35	Should not be set to TRUE if IE "Downlink counter synchronisation info" is included in message.	
<b>CN Information Elements</b>					
CN Information info	OP		CN Information info 10.3.1.3		
<b>UTRAN Information Elements</b>					
URA identity	OP		URA identity 10.3.2.6		
<b>RB information elements</b>					
RB information to release list	OP	1 to <maxRB>			
>RB information to release	MP		RB information to release 10.3.4.19		
RB information to reconfigure list	OP	1 to <maxRB>			
>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18		
RB information to be affected list	OP	1 to <maxRB>			
>RB information to be affected	MP		RB information to be affected 10.3.4.17		
Downlink counter synchronisation info	OP				
>RB with PDCP information list	OP	1 to <maxRBall RABs>			
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	This IE is needed for each RB having PDCP in the case of lossless SRNS relocation	
	OP				REL-5
>>PDCP context relocation info	OP		PDCP context relocation info 10.3.4.1a	This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			all transport channels 10.3.5.24		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
<i>CHOICE mode</i>	MP				
>FDD					
>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>TDD				(no data)	
<b>Downlink transport channels</b>					
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
<i>CHOICE channel requirement</i>	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88.		



Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>CPCH SET Info			CPCH SET Info 10.3.6.13		
E-DCH Info	OP		E-DCH Info 10.3.6.97		REL-6
<b>Downlink radio resources</b>					
CHOICE <i>mode</i>	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS_PDSCH Information 10.3.6.23a		REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link to be set-up	
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		
MBMS PL Service Restriction Information	OP		Enumerated (TRUE)	Absence means that on the MBMS Preferred Layer (PL) no restrictions apply concerning the use of non-MBMS services i.e. the PL is not congested	REL-6

Condition	Explanation
CCCH	This IE is mandatory present when CCCH is used and ciphering is not required and not needed otherwise.

## 10.2.27 RADIO BEARER RECONFIGURATION

This message is sent from UTRAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, reconfigure transport channels and physical channels. This message is also used to perform a handover from GERAN *Iu mode* to UTRAN.

RLC-SAP: AM or UM or sent through GERAN *Iu mode*

Logical channel: DCCH or sent through GERAN *Iu mode*

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information elements</b>					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation or a handover from GERAN <i>Iu mode</i>	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing either an SRNS relocation or a handover from GERAN <i>Iu mode</i> and a change in ciphering algorithm	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
New E-RNTI	OP		E-RNTI 10.3.3.10a		REL-6
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
<b>CN information elements</b>					
CN Information info	OP		CN		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			Information info 10.3.1.3		
<b>UTRAN mobility information elements</b>					
URA identity	OP		URA identity 10.3.2.6		
CHOICE specification mode	MP				REL-5
>Complete specification					
<b>RB information elements</b>					
>>RAB information to reconfigure list	OP	1 to <maxRABsetup >			
>>>RAB information to reconfigure	MP		RAB information to reconfigure 10.3.4.11		
>>RB information to reconfigure list	MP	1to <maxRB>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>>>RB information to reconfigure	MP		RB information to reconfigure 10.3.4.18		
>>RB information to be affected list	OP	1 to <maxRB>			
>>>RB information to be affected	MP		RB information to be affected 10.3.4.17		
>>RB with PDCP context relocation info list	OP	1 to <maxRBall RABs>		This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
>>>PDCP context relocation info	MP		PDCP context relocation info 10.3.4.1a		REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
>>UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
>>>Deleted TrCH information list	OP	1 to <maxTrCH >			

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>>>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
>>Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>>>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information 10.3.5.2		
>>CHOICE <i>mode</i>	OP				
>>>FDD					
>>>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>>>TDD				(no data)	
<b>Downlink transport channels</b>					
>>DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
>>Deleted TrCH information list	OP	1 to <maxTrCH >			
>>>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
>>Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>>>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
>Preconfiguration					REL-5
>>CHOICE <i>Preconfiguration mode</i>	MP			This value only applies in case the message is sent through GERAN <i>lu mode</i>	
>>>Predefined configuration identity	MP		Predefined configuration identity 10.3.4.5		
>>>Default configuration					
>>>>Default configuration mode	MP		Enumerated (FDD, TDD)	Indicates whether the FDD or TDD version of the default configuration shall be used	
>>>>Default configuration identity	MP		Default configuration identity 10.3.4.0		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE <i>channel requirement</i>	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
E-DCH Info	OP		E-DCH Info 10.3.6.97		REL-6
<b>Downlink radio resources</b>					
CHOICE <i>mode</i>	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a		REL-5
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	MP	1 to <maxRL>		Although this IE is not always required, need is MP to align with ASN.1	
	OP				REL-4
>Downlink information for each radio link	MP		Downlink information for each		

<b>Information Element/Group name</b>	<b>Need</b>	<b>Multi</b>	<b>Type and reference</b>	<b>Semantics description</b>	<b>Version</b>
			radio link 10.3.6.27		
MBMS PL Service Restriction Information	OP		Enumerated (TRUE)	Absence means that on the MBMS Preferred Layer (PL) no restrictions apply concerning the use of non-MBMS services i.e. the PL is not congested	REL-6

### 10.2.33 RADIO BEARER SETUP

This message is sent by UTRAN to the UE to establish new radio bearer(s). It can also include modifications to the configurations of transport channels and/or physical channels.

RLC-SAP: AM or UM

Logical channel: DCCH

Direction: UTRAN → UE

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Message Type	MP		Message Type		
<b>UE Information Elements</b>					
RRC transaction identifier	MP		RRC transaction identifier 10.3.3.36		
Integrity check info	CH		Integrity check info 10.3.3.16		
Integrity protection mode info	OP		Integrity protection mode info 10.3.3.19	The UTRAN should not include this IE unless it is performing an SRNS relocation	
Ciphering mode info	OP		Ciphering mode info 10.3.3.5	The UTRAN should not include this IE unless it is performing an SRNS relocation and a change in ciphering algorithm	
Activation time	MD		Activation time 10.3.3.1	Default value is "now"	
New U-RNTI	OP		U-RNTI 10.3.3.47		
New C-RNTI	OP		C-RNTI 10.3.3.8		
New DSCH-RNTI	OP		DSCH-RNTI 10.3.3.9a		
New H-RNTI	OP		H-RNTI 10.3.3.14a		REL-5
New E-RNTI	OP		E-RNTI 10.3.3.10a		REL-6
RRC State Indicator	MP		RRC State Indicator 10.3.3.35a		
UTRAN DRX cycle length coefficient	OP		UTRAN DRX cycle length coefficient 10.3.3.49		
<b>CN Information Elements</b>					
CN Information info	OP		CN Information info 10.3.1.3		
<b>UTRAN mobility information elements</b>					
URA identity	OP		URA identity 10.3.2.6		
<b>RB Information Elements</b>					

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Signalling RB information to setup list	OP	1 to <maxSRBs etup>		For each signalling radio bearer established	
>Signalling RB information to setup	MP		Signalling RB information to setup 10.3.4.24		
RAB information to setup list	OP	1 to <maxRABs etup>		For each RAB established	
>RAB information for setup	MP		RAB information for setup 10.3.4.10		
RB information to be affected list	OP	1 to <maxRB>			
>RB information to be affected	MP		RB information to be affected 10.3.4.17		
Downlink counter synchronisation info	OP				
>RB with PDCP information list	OP	1 to <maxRBall RABs>			
>>RB with PDCP information	MP		RB with PDCP information 10.3.4.22	This IE is needed for each RB having PDCP in the case of lossless SRNS relocation	
	OP				REL-5
>>PDCP context relocation info	OP		PDCP context relocation info 10.3.4.1a	This IE is needed for each RB having PDCP and performing PDCP context relocation	REL-5
<a href="#">PDCP ROHC target mode</a>	<a href="#">OP</a>		<a href="#">PDCP ROHC target mode 10.3.4.2a</a>		<a href="#">REL-5</a>
<b>TrCH Information Elements</b>					
<b>Uplink transport channels</b>					
UL Transport channel information common for all transport channels	OP		UL Transport channel information common for all transport channels 10.3.5.24		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted UL TrCH information	MP		Deleted UL TrCH information 10.3.5.5		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured UL TrCH information	MP		Added or Reconfigured UL TrCH information		



Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
			10.3.5.2		
CHOICE <i>mode</i>	OP				
>FDD					
>>CPCH set ID	OP		CPCH set ID 10.3.5.3		
>>>Added or Reconfigured TrCH information for DRAC list	OP	1 to <maxTrCH >			
>>>DRAC static information	MP		DRAC static information 10.3.5.7		
>TDD				(no data)	
<b>Downlink transport channels</b>					
DL Transport channel information common for all transport channels	OP		DL Transport channel information common for all transport channels 10.3.5.6		
Deleted TrCH information list	OP	1 to <maxTrCH >			
>Deleted DL TrCH information	MP		Deleted DL TrCH information 10.3.5.4		
Added or Reconfigured TrCH information list	OP	1 to <maxTrCH >			
>Added or Reconfigured DL TrCH information	MP		Added or Reconfigured DL TrCH information 10.3.5.1		
<b>PhyCH information elements</b>					
Frequency info	OP		Frequency info 10.3.6.36		
<b>Uplink radio resources</b>					
Maximum allowed UL TX power	MD		Maximum allowed UL TX power 10.3.6.39	Default value is the existing maximum UL TX power	
CHOICE <i>channel requirement</i>	OP				
>Uplink DPCH info			Uplink DPCH info 10.3.6.88		
>CPCH SET Info			CPCH SET Info 10.3.6.13		
E-DCH Info	OP		E-DCH Info 10.3.6.97		REL-6
<b>Downlink radio resources</b>					
CHOICE <i>mode</i>	MP				
>FDD					
>>Downlink PDSCH information	OP		Downlink PDSCH information 10.3.6.30		
>TDD				(no data)	
Downlink HS-PDSCH Information	OP		Downlink HS-PDSCH Information 10.3.6.23a		REL-5

Information Element/Group name	Need	Multi	Type and reference	Semantics description	Version
Downlink information common for all radio links	OP		Downlink information common for all radio links 10.3.6.24		
Downlink information per radio link list	OP	1 to <maxRL>		Send downlink information for each radio link	
>Downlink information for each radio link	MP		Downlink information for each radio link 10.3.6.27		
MBMS PL Service Restriction Information	OP		Enumerated (TRUE)	Absence means that on the MBMS Preferred Layer (PL) no restrictions apply concerning the use of non-MBMS services i.e. the PL is not congested	REL-6

#### 10.3.4.2a PDCP ROHC target mode

<u>Information Element/Group name</u>	<u>Need</u>	<u>Multi</u>	<u>Type and Reference</u>	<u>Semantics description</u>	<u>Version</u>
<u>Target Mode</u>	<u>MP</u>		<u>Enumerated (O-mode, R-mode)</u>	<u>The UE shall only transit to the signalled mode for operation of ROHC as deccribed in [36].</u>	<u>REL-5</u>

## 11.2 PDU definitions

```

--*****
--
-- TABULAR: The message type and integrity check info are not
-- visible in this module as they are defined in the class module.
-- Also, all FDD/TDD specific choices have the FDD option first
-- and TDD second, just for consistency.
--
--*****

PDU-definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

--*****
--
-- IE parameter types from other modules
--
--*****

IMPORTS

-- Core Network IEs :
  CN-DomainIdentity,
  CN-InformationInfo,
  CN-InformationInfoFull,
  NAS-Message,
  PagingRecordTypeID,
  PLMN-Identity,
-- UTRAN Mobility IEs :
  CellIdentity,
  CellIdentity-PerRL-List,
  URA-Identity,
-- User Equipment IEs :
  UE-RadioAccessCapabBandFDDList2,
  UE-RadioAccessCapabBandFDDList-ext,
  AccessStratumReleaseIndicator,
  ActivationTime,
  C-RNTI,
  CapabilityUpdateRequirement,
  CapabilityUpdateRequirement-r4,
  CapabilityUpdateRequirement-r4-ext,
  CapabilityUpdateRequirement-r5,
  CellUpdateCause,
  CellUpdateCause-ext,
  CipheringAlgorithm,
  CipheringModeInfo,
  DSCH-RNTI,
  E-RNTI,
  EstablishmentCause,
  FailureCauseWithProtErr,
  FailureCauseWithProtErrTrId,
  GroupReleaseInformation,
  H-RNTI,
  UESpecificBehaviourInformationIdle,
  UESpecificBehaviourInformationInterRAT,
  InitialUE-Identity,
  IntegrityProtActivationInfo,
  IntegrityProtectionModeInfo,
  N-308,
  PagingCause,
  PagingRecordList,
  PagingRecord2List-r5,
  ProtocolErrorIndicator,
  ProtocolErrorIndicatorWithMoreInfo,
  RadioFrequencyBandTDDList,
  Rb-timer-indicator,
  RedirectionInfo,
  RedirectionInfo-r6,
  RejectionCause,
  ReleaseCause,
  RF-CapabilityComp,
  RRC-StateIndicator,

```

```

RRC-TransactionIdentifier,
SecurityCapability,
START-Value,
STARTList,
SystemSpecificCapUpdateReq-v590ext,
U-RNTI,
U-RNTI-Short,
UE-RadioAccessCapability,
UE-RadioAccessCapability-v370ext,
UE-RadioAccessCapability-v380ext,
UE-RadioAccessCapability-v3a0ext,
UE-RadioAccessCapability-v3g0ext,
UE-RadioAccessCapability-v4b0ext,
UE-RadioAccessCapability-v590ext,
UE-RadioAccessCapability-v5c0ext,
UE-RadioAccessCapability-v650ext,
UE-RadioAccessCapabilityComp,
DL-PhysChCapabilityFDD-v380ext,
UE-ConnTimersAndConstants,
UE-ConnTimersAndConstants-v3a0ext,
UE-ConnTimersAndConstants-r5,
UE-SecurityInformation,
URA-UpdateCause,
UTRAN-DRX-CycleLengthCoefficient,
WaitTime,
-- Radio Bearer IEs :
DefaultConfigIdentity,
DefaultConfigIdentity-r4,
DefaultConfigIdentity-r5,
DefaultConfigMode,
DL-CounterSynchronisationInfo,
DL-CounterSynchronisationInfo-r5,
PDCP-ROHC-TargetMode,
PredefinedConfigIdentity,
PredefinedConfigStatusList,
PredefinedConfigStatusListComp,
PredefinedConfigSetWithDifferentValueTag,
RAB-Info,
RAB-Info-Post,
RAB-InformationList,
RAB-InformationReconfigList,
RAB-InformationSetupList,
RAB-InformationSetupList-r4,
RAB-InformationSetupList-r5,
RAB-InformationSetupList-r6-ext,
RAB-InformationSetupList-r6,
RB-ActivationTimeInfoList,
RB-COUNT-C-InformationList,
RB-COUNT-C-MSB-InformationList,
RB-IdentityList,
RB-InformationAffectedList,
RB-InformationAffectedList-r5,
RB-InformationAffectedList-r6,
RB-InformationReconfigList,
RB-InformationReconfigList-r4,
RB-InformationReconfigList-r5,
RB-InformationReconfigList-r6,
RB-InformationReleaseList,
RB-PDCPContextRelocationList,
SRB-InformationSetupList,
SRB-InformationSetupList-r5,
SRB-InformationSetupList-r6,
SRB-InformationSetupList2,
UL-CounterSynchronisationInfo,

:

-- *****
--
-- CELL UPDATE CONFIRM
--
-- *****

CellUpdateConfirm ::= CHOICE {
  r3
    cellUpdateConfirm-r3
    v3a0NonCriticalExtensions
    cellUpdateConfirm-v3a0ext
    SEQUENCE {
      CellUpdateConfirm-r3-IEs,
      SEQUENCE {
        CellUpdateConfirm-v3a0ext,

```

```

laterNonCriticalExtensions SEQUENCE {
  -- Container for additional R99 extensions
  cellUpdateConfirm-r3-add-ext BIT STRING OPTIONAL,
  v4b0NonCriticalExtensions SEQUENCE {
    cellUpdateConfirm-v4b0ext CellUpdateConfirm-v4b0ext-IEs,
    v590NonCriticalExtensstions SEQUENCE {
      cellUpdateConfirm-v590ext CellUpdateConfirm-v590ext-IEs,
      v5d0NonCriticalExtensstions SEQUENCE {
        cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
        v6xyNonCriticalExtensions SEQUENCE {
          cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
          nonCriticalExtensions SEQUENCE {} OPTIONAL
        } OPTIONAL
      }
    } OPTIONAL
  } OPTIONAL
},
later-than-r3 SEQUENCE {
  rrc-TransactionIdentifier RRC-TransactionIdentifier,
  criticalExtensions CHOICE {
    r4 SEQUENCE {
      cellUpdateConfirm-r4 CellUpdateConfirm-r4-IEs,
      v4d0NonCriticalExtensions SEQUENCE {
        -- Container for adding non critical extensions after freezing REL-5
        cellUpdateConfirm-r4-add-ext BIT STRING OPTIONAL,
        v590NonCriticalExtensstions SEQUENCE {
          cellUpdateConfirm-v590ext CellUpdateConfirm-v590ext-IEs,
          v5d0NonCriticalExtensstions SEQUENCE {
            cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
            v6xyNonCriticalExtensions SEQUENCE {
              cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
              nonCriticalExtensions SEQUENCE {} OPTIONAL
            } OPTIONAL
          } OPTIONAL
        } OPTIONAL
      } OPTIONAL
    },
    criticalExtensions CHOICE {
      r5 SEQUENCE {
        cellUpdateConfirm-r5 CellUpdateConfirm-r5-IEs,
        -- Container for adding non critical extensions after freezing REL-6
        cellUpdateConfirm-r5-add-ext BIT STRING OPTIONAL,
        v5d0NonCriticalExtensstions SEQUENCE {
          cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
          v6xyNonCriticalExtensions SEQUENCE {
            cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
            nonCriticalExtensions SEQUENCE {} OPTIONAL
          } OPTIONAL
        } OPTIONAL
      },
      criticalExtensions CHOICE {
        r6 SEQUENCE {
          cellUpdateConfirm-r6 CellUpdateConfirm-r6-IEs,
          -- Container for adding non critical extensions after freezing REL-7
          cellUpdateConfirm-r6-add-ext BIT STRING OPTIONAL,
          nonCriticalExtensions SEQUENCE {} OPTIONAL
        },
        criticalExtensions SEQUENCE {}
      }
    }
  }
},
CellUpdateConfirm-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier RRC-TransactionIdentifier,
  integrityProtectionModeInfo IntegrityProtectionModeInfo OPTIONAL,
  cipheringModeInfo CipheringModeInfo OPTIONAL,
  activationTime ActivationTime OPTIONAL,
  new-U-RNTI U-RNTI OPTIONAL,
  new-C-RNTI C-RNTI OPTIONAL,
  rrc-StateIndicator RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
  rlc-Re-establishIndicatorRb2-3or4 BOOLEAN,
  rlc-Re-establishIndicatorRb5orAbove BOOLEAN,

```

```

-- CN information elements
  cn-InformationInfo          CN-InformationInfo          OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity                URA-Identity                OPTIONAL,
-- Radio bearer IEs
  rb-InformationReleaseList   RB-InformationReleaseList   OPTIONAL,
  rb-InformationReconfigList  RB-InformationReconfigList  OPTIONAL,
  rb-InformationAffectedList  RB-InformationAffectedList  OPTIONAL,
  dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo       UL-CommonTransChInfo       OPTIONAL,
  ul-deletedTransChInfoList   UL-DeletedTransChInfoList   OPTIONAL,
  ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList OPTIONAL,
  modeSpecificTransChInfo     CHOICE {
    fdd
      cpch-SetID              CPCH-SetID              OPTIONAL,
      addReconfTransChDRAC-Info DRAC-StaticInformationList OPTIONAL
    },
    tdd                        NULL
  },
  dl-CommonTransChInfo       DL-CommonTransChInfo       OPTIONAL,
  dl-DeletedTransChInfoList   DL-DeletedTransChInfoList   OPTIONAL,
  dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList OPTIONAL,
-- Physical channel IEs
  frequencyInfo              FrequencyInfo              OPTIONAL,
  maxAllowedUL-TX-Power      MaxAllowedUL-TX-Power     OPTIONAL,
  ul-ChannelRequirement      UL-ChannelRequirement     OPTIONAL,
  modeSpecificPhysChInfo     CHOICE {
    fdd
      dl-PDSCH-Information    DL-PDSCH-Information    OPTIONAL
    },
    tdd                        NULL
  },
  dl-CommonInformation       DL-CommonInformation       OPTIONAL,
  dl-InformationPerRL-List    DL-InformationPerRL-List   OPTIONAL
}

CellUpdateConfirm-v3a0ext ::= SEQUENCE {
  new-DSCH-RNTI              DSCH-RNTI              OPTIONAL
}

CellUpdateConfirm-v4b0ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  -- ssdt-UL extends SSdT-Information, which is included in
  -- DL-CommonInformation. FDD only.
  ssdt-UL-r4                 SSdT-UL                 OPTIONAL,
  -- The order of the RLs in IE cell-id-PerRL-List is the same as
  -- in IE DL-InformationPerRL-List included in this message
  cell-id-PerRL-List          CellIdentity-PerRL-List   OPTIONAL
}

CellUpdateConfirm-v590ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  dl-TPC-PowerOffsetPerRL-List DL-TPC-PowerOffsetPerRL-List OPTIONAL
}

CellUpdateConfirm-r4-IEs ::= SEQUENCE {
  -- User equipment IEs
  integrityProtectionModeInfo IntegrityProtectionModeInfo OPTIONAL,
  cipheringModeInfo          CipheringModeInfo          OPTIONAL,
  activationTime              ActivationTime              OPTIONAL,
  new-U-RNTI                  U-RNTI                    OPTIONAL,
  new-C-RNTI                  C-RNTI                    OPTIONAL,
  new-DSCH-RNTI              DSCH-RNTI                 OPTIONAL,
  rrc-StateIndicator          RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
  rlc-Re-establishIndicatorRb2-3or4 BOOLEAN,
  rlc-Re-establishIndicatorRb5orAbove BOOLEAN,
  -- CN information elements
  cn-InformationInfo          CN-InformationInfo          OPTIONAL,
  -- UTRAN mobility IEs
  ura-Identity                URA-Identity                OPTIONAL,
  -- Radio bearer IEs
  rb-InformationReleaseList   RB-InformationReleaseList   OPTIONAL,
  rb-InformationReconfigList  RB-InformationReconfigList-r4 OPTIONAL,
  rb-InformationAffectedList  RB-InformationAffectedList  OPTIONAL,
  dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo OPTIONAL,
  -- Transport channel IEs

```

```

    ul-CommonTransChInfo          UL-CommonTransChInfo-r4          OPTIONAL,
    ul-deletedTransChInfoList     UL-DeletedTransChInfoList        OPTIONAL,
    ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList     OPTIONAL,
    modeSpecificTransChInfo       CHOICE {
        fdd                        SEQUENCE {
            cpch-SetID             CPCH-SetID                      OPTIONAL,
            addReconfTransChDRAC-Info DRAC-StaticInformationList  OPTIONAL
        },
        tdd                        NULL
    },
    dl-CommonTransChInfo          DL-CommonTransChInfo-r4          OPTIONAL,
    dl-DeletedTransChInfoList     DL-DeletedTransChInfoList        OPTIONAL,
    dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r4   OPTIONAL,
-- Physical channel IEs
    frequencyInfo                 FrequencyInfo                     OPTIONAL,
    maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power           OPTIONAL,
    ul-ChannelRequirement         UL-ChannelRequirement-r4        OPTIONAL,
    modeSpecificPhysChInfo        CHOICE {
        fdd                        SEQUENCE {
            dl-PDSCH-Information   DL-PDSCH-Information           OPTIONAL
        },
        tdd                        NULL
    },
    dl-CommonInformation          DL-CommonInformation-r4          OPTIONAL,
    dl-InformationPerRL-List      DL-InformationPerRL-List-r4     OPTIONAL
}

CellUpdateConfirm-r5-IEs ::= SEQUENCE {
-- User equipment IEs
    integrityProtectionModeInfo   IntegrityProtectionModeInfo     OPTIONAL,
    cipheringModeInfo             CipheringModeInfo                OPTIONAL,
    activationTime                 ActivationTime                    OPTIONAL,
    new-U-RNTI                    U-RNTI                          OPTIONAL,
    new-C-RNTI                    C-RNTI                          OPTIONAL,
    new-DSCH-RNTI                 DSCH-RNTI                       OPTIONAL,
    new-H-RNTI                    H-RNTI                          OPTIONAL,
    rrc-StateIndicator            RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff    UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
    rlc-Re-establishIndicatorRb2-3or4 BOOLEAN,
    rlc-Re-establishIndicatorRb5orAbove BOOLEAN,
-- CN information elements
    cn-InformationInfo            CN-InformationInfo              OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity                  URA-Identity                    OPTIONAL,
-- Radio bearer IEs
    rb-InformationReleaseList     RB-InformationReleaseList       OPTIONAL,
    rb-InformationReconfigList    RB-InformationReconfigList-r5   OPTIONAL,
    rb-InformationAffectedList     RB-InformationAffectedList-r5   OPTIONAL,
    dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo-r5 OPTIONAL,
-- Transport channel IEs
    ul-CommonTransChInfo          UL-CommonTransChInfo-r4          OPTIONAL,
    ul-deletedTransChInfoList     UL-DeletedTransChInfoList        OPTIONAL,
    ul-AddReconfTransChInfoList   UL-AddReconfTransChInfoList     OPTIONAL,
    modeSpecificTransChInfo       CHOICE {
        fdd                        SEQUENCE {
            cpch-SetID             CPCH-SetID                      OPTIONAL,
            addReconfTransChDRAC-Info DRAC-StaticInformationList  OPTIONAL
        },
        tdd                        NULL
    },
    dl-CommonTransChInfo          DL-CommonTransChInfo-r4          OPTIONAL,
    dl-DeletedTransChInfoList     DL-DeletedTransChInfoList-r5     OPTIONAL,
    dl-AddReconfTransChInfoList   DL-AddReconfTransChInfoList-r5   OPTIONAL,
-- Physical channel IEs
    frequencyInfo                 FrequencyInfo                     OPTIONAL,
    maxAllowedUL-TX-Power         MaxAllowedUL-TX-Power           OPTIONAL,
    ul-ChannelRequirement         UL-ChannelRequirement-r5        OPTIONAL,
    modeSpecificPhysChInfo        CHOICE {
        fdd                        SEQUENCE {
            dl-PDSCH-Information   DL-PDSCH-Information           OPTIONAL
        },
        tdd                        NULL
    },
    dl-HSPDSCH-Information        DL-HSPDSCH-Information          OPTIONAL,
    dl-CommonInformation          DL-CommonInformation-r5          OPTIONAL,
    dl-InformationPerRL-List      DL-InformationPerRL-List-r5     OPTIONAL
}

```



```
CellUpdateConfirm-v5d0ext-IEs ::= SEQUENCE {
```

```
--Radio Bearer IEs
```

```
pcdp-ROHC-TargetMode PDCP-ROHC-TargetMode OPTIONAL
```

```
}
```

```
CellUpdateConfirm-r6-IEs ::= SEQUENCE {
```

```
-- User equipment IEs
```

```
integrityProtectionModeInfo IntegrityProtectionModeInfo OPTIONAL,
```

```
cipheringModeInfo CipheringModeInfo OPTIONAL,
```

```
activationTime ActivationTime OPTIONAL,
```

```
new-U-RNTI U-RNTI OPTIONAL,
```

```
new-C-RNTI C-RNTI OPTIONAL,
```

```
new-DSCH-RNTI DSCH-RNTI OPTIONAL,
```

```
new-H-RNTI H-RNTI OPTIONAL,
```

```
new-E-RNTI E-RNTI OPTIONAL,
```

```
rrc-StateIndicator RRC-StateIndicator,
```

```
utran-DRX-CycleLengthCoeff UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
```

```
rlc-Re-establishIndicatorRb2-3or4 BOOLEAN,
```

```
rlc-Re-establishIndicatorRb5orAbove BOOLEAN,
```

```
-- CN information elements
```

```
cn-InformationInfo CN-InformationInfo OPTIONAL,
```

```
-- UTRAN mobility IEs
```

```
ura-Identity URA-Identity OPTIONAL,
```

```
-- Radio bearer IEs
```

```
rb-InformationReleaseList RB-InformationReleaseList OPTIONAL,
```

```
rb-InformationReconfigList RB-InformationReconfigList-r6 OPTIONAL,
```

```
rb-InformationAffectedList RB-InformationAffectedList-r6 OPTIONAL,
```

```
dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo-r5 OPTIONAL,
```

```
pcdp-ROHC-TargetMode PDCP-ROHC-TargetMode OPTIONAL,
```

```
-- Transport channel IEs
```

```
ul-CommonTransChInfo UL-CommonTransChInfo-r4 OPTIONAL,
```

```
ul-deletedTransChInfoList UL-DeletedTransChInfoList-r6 OPTIONAL,
```

```
ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList-r6 OPTIONAL,
```

```
modeSpecificTransChInfo CHOICE {
```

```
fdd SEQUENCE {
```

```
cpch-SetID CPCH-SetID OPTIONAL,
```

```
addReconfTransChDRAC-Info DRAC-StaticInformationList OPTIONAL
```

```
},
```

```
tdd NULL
```

```
},
```

```
dl-CommonTransChInfo DL-CommonTransChInfo-r4 OPTIONAL,
```

```
dl-DeletedTransChInfoList DL-DeletedTransChInfoList-r5 OPTIONAL,
```

```
dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r5 OPTIONAL,
```

```
-- Physical channel IEs
```

```
frequencyInfo FrequencyInfo OPTIONAL,
```

```
maxAllowedUL-TX-Power MaxAllowedUL-TX-Power OPTIONAL,
```

```
ul-ChannelRequirement UL-ChannelRequirement-r6 OPTIONAL,
```

```
ul-EDCH-Information UL-EDCH-Information-r6 OPTIONAL,
```

```
modeSpecificPhysChInfo CHOICE {
```

```
fdd SEQUENCE {
```

```
dl-PDSCH-Information DL-PDSCH-Information OPTIONAL
```

```
},
```

```
tdd NULL
```

```
},
```

```
dl-HSPDSCH-Information DL-HSPDSCH-Information OPTIONAL,
```

```
dl-CommonInformation DL-CommonInformation-r6 OPTIONAL,
```

```
dl-InformationPerRL-List DL-InformationPerRL-List-r6 OPTIONAL,
```

```
-- MBMS IEs
```

```
mbms-PL-ServiceRestrictInfo MBMS-PL-ServiceRestrictInfo-r6
```

```
}
```

```
CellUpdateConfirm-v6xyext-IEs ::= SEQUENCE {
```

```
-- Core network IEs
```

```
primary-plmn-Identity PLMN-Identity OPTIONAL,
```

```
-- Physical channel IEs
```

```
harq-Preamble-Mode HARQ-Preamble-Mode OPTIONAL,
```

```
beaconPLEst BEACON-PL-Est OPTIONAL,
```

```
-- MBMS IEs
```

```
mbms-PL-ServiceRestrictInfo MBMS-PL-ServiceRestrictInfo-r6 OPTIONAL
```

```
}
```

```
-- *****
```

```
--
```

```
-- CELL UPDATE CONFIRM for CCCH
```

```
--
```

```
-- *****
```

```
CellUpdateConfirm-CCCH ::= CHOICE {
```

```

r3
-- User equipment IES
u-RNTI U-RNTI,
-- The rest of the message is identical to the one sent on DCCH.
cellUpdateConfirm-r3 CellUpdateConfirm-r3-IEs,
laterNonCriticalExtensions SEQUENCE {
-- Container for additional R99 extensions
cellUpdateConfirm-CCCH-r3-add-ext BIT STRING OPTIONAL,
v4b0NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v4b0ext CellUpdateConfirm-v4b0ext-IEs,
v590NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v590ext CellUpdateConfirm-v590ext-IEs,
v5d0NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
v6xyNonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
nonCriticalExtensions SEQUENCE {} OPTIONAL
} OPTIONAL
} OPTIONAL
} OPTIONAL
},
later-than-r3 SEQUENCE {
u-RNTI U-RNTI,
rrc-TransactionIdentifier RRC-TransactionIdentifier,
criticalExtensions CHOICE {
r4 SEQUENCE {
-- The rest of the message is identical to the one sent on DCCH.
cellUpdateConfirm-r4 CellUpdateConfirm-r4-IEs,
v4d0NonCriticalExtensions SEQUENCE {
-- Container for adding non critical extensions after freezing REL-5
cellUpdateConfirm-CCCH-r4-add-ext BIT STRING OPTIONAL,
v590NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v590ext CellUpdateConfirm-v590ext-IEs,
v5d0NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
v6xyNonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
nonCriticalExtensions SEQUENCE {} OPTIONAL
} OPTIONAL
} OPTIONAL
} OPTIONAL
},
criticalExtensions CHOICE {
r5 SEQUENCE {
cellUpdateConfirm-r5 CellUpdateConfirm-r5-IEs,
cellUpdateConfirm-CCCH-r5-add-ext BIT STRING OPTIONAL,
v5d0NonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v5d0ext CellUpdateConfirm-v5d0ext-IEs,
v6xyNonCriticalExtensions SEQUENCE {
cellUpdateConfirm-v6xyext CellUpdateConfirm-v6xyext-IEs,
nonCriticalExtensions SEQUENCE {} OPTIONAL
} OPTIONAL
} OPTIONAL
},
criticalExtensions CHOICE {
r6 SEQUENCE {
cellUpdateConfirm-r6 CellUpdateConfirm-r6-IEs,
cellUpdateConfirm-r6-add-ext BIT STRING OPTIONAL,
nonCriticalExtensions SEQUENCE {} OPTIONAL
},
criticalExtensions SEQUENCE {}
}
}
}
:
-- *****
-- RADIO BEARER RECONFIGURATION
-- *****

```

```

RadioBearerReconfiguration ::= CHOICE {
  r3
    SEQUENCE {
      radioBearerReconfiguration-r3 RadioBearerReconfiguration-r3-IEs,
      -- Prefix "v3ao" is used (in one instance) to keep alignment with R99
      v3aoNonCriticalExtensions SEQUENCE {
        radioBearerReconfiguration-v3a0ext RadioBearerReconfiguration-v3a0ext,
        laterNonCriticalExtensions SEQUENCE {
          -- Container for additional R99 extensions
          radioBearerReconfiguration-r3-add-ext BIT STRING OPTIONAL,
          v4b0NonCriticalExtensions SEQUENCE {
            radioBearerReconfiguration-v4b0ext
              RadioBearerReconfiguration-v4b0ext-IEs,
          v590NonCriticalExtensions SEQUENCE {
            radioBearerReconfiguration-v590ext
              RadioBearerReconfiguration-v590ext-IEs,
          v5d0NonCriticalExtensstions SEQUENCE {
            radioBearerReconfiguration-v5d0ext
              RadioBearerReconfiguration-v5d0ext-IEs,
          v6xyNonCriticalExtensions SEQUENCE {
            radioBearerReconfiguration-v6xyext
              RadioBearerReconfiguration-v6xyext-IEs,
          nonCriticalExtensions SEQUENCE {} OPTIONAL
        } OPTIONAL
      } OPTIONAL
    } OPTIONAL
  },
  later-than-r3
    SEQUENCE {
      rrc-TransactionIdentifier RRC-TransactionIdentifier,
      criticalExtensions CHOICE {
        r4
          SEQUENCE {
            radioBearerReconfiguration-r4 RadioBearerReconfiguration-r4-IEs,
            v4d0NonCriticalExtensions SEQUENCE {
              -- Container for adding non critical extensions after freezing REL-5
              radioBearerReconfiguration-r4-add-ext BIT STRING OPTIONAL,
              v590NonCriticalExtensions SEQUENCE {
                radioBearerReconfiguration-v590ext
                  RadioBearerReconfiguration-v590ext-IEs,
              v5d0NonCriticalExtensstions SEQUENCE {
                radioBearerReconfiguration-v5d0ext
                  RadioBearerReconfiguration-v5d0ext-IEs,
              v6xyNonCriticalExtensions SEQUENCE {
                radioBearerReconfiguration-v6xyext
                  RadioBearerReconfiguration-v6xyext-IEs,
              nonCriticalExtensions SEQUENCE {} OPTIONAL
            } OPTIONAL
          } OPTIONAL
        } OPTIONAL
      } OPTIONAL
    },
    criticalExtensions CHOICE {
      r5
        SEQUENCE {
          radioBearerReconfiguration-r5 RadioBearerReconfiguration-r5-IEs,
          -- Container for adding non critical extensions after freezing REL-6
          radioBearerReconfiguration-r5-add-ext BIT STRING OPTIONAL,
          v5d0NonCriticalExtensstions SEQUENCE {
            radioBearerReconfiguration-v5d0ext RadioBearerReconfiguration-v5d0ext-IEs,
            v6xyNonCriticalExtensions SEQUENCE {
              radioBearerReconfiguration-v6xyext
                RadioBearerReconfiguration-v6xyext-IEs,
            nonCriticalExtensions SEQUENCE {} OPTIONAL
          } OPTIONAL
        } OPTIONAL
      },
      criticalExtensions CHOICE {
        r6
          SEQUENCE {
            radioBearerReconfiguration-r6 RadioBearerReconfiguration-r6-IEs,
            -- Container for adding non critical extensions after freezing REL-7
            radioBearerReconfiguration-r6-add-ext BIT STRING OPTIONAL,
            nonCriticalExtensions SEQUENCE {} OPTIONAL
          },
        criticalExtensions SEQUENCE {}
      }
    }
  }
}

```

```

}

RadioBearerReconfiguration-r3-IEs ::= SEQUENCE {
  -- User equipment IEs
  rrc-TransactionIdentifier      RRC-TransactionIdentifier,
  integrityProtectionModeInfo    IntegrityProtectionModeInfo    OPTIONAL,
  cipheringModeInfo              CipheringModeInfo              OPTIONAL,
  activationTime                  ActivationTime                  OPTIONAL,
  new-U-RNTI                      U-RNTI                      OPTIONAL,
  new-C-RNTI                      C-RNTI                      OPTIONAL,
  rrc-StateIndicator              RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff      UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
  -- Core network IEs
  cn-InformationInfo              CN-InformationInfo              OPTIONAL,
  -- UTRAN mobility IEs
  ura-Identity                    URA-Identity                    OPTIONAL,
  -- Radio bearer IEs
  rab-InformationReconfigList     RAB-InformationReconfigList     OPTIONAL,
  -- NOTE: IE rb-InformationReconfigList should be optional in later versions
  -- of this message
  rb-InformationReconfigList      RB-InformationReconfigList,
  rb-InformationAffectedList      RB-InformationAffectedList      OPTIONAL,
  -- Transport channel IEs
  ul-CommonTransChInfo            UL-CommonTransChInfo            OPTIONAL,
  ul-deletedTransChInfoList       UL-DeletedTransChInfoList       OPTIONAL,
  ul-AddReconfTransChInfoList     UL-AddReconfTransChInfoList     OPTIONAL,
  modeSpecificTransChInfo         CHOICE {
    fdd                            SEQUENCE {
      cpch-SetID                   CPCH-SetID                   OPTIONAL,
      addReconfTransChDRAC-Info     DRAC-StaticInformationList   OPTIONAL
    },
    tdd                            NULL
  } OPTIONAL,
  dl-CommonTransChInfo            DL-CommonTransChInfo            OPTIONAL,
  dl-DeletedTransChInfoList       DL-DeletedTransChInfoList       OPTIONAL,
  dl-AddReconfTransChInfoList     DL-AddReconfTransChInfo2List    OPTIONAL,
  -- Physical channel IEs
  frequencyInfo                   FrequencyInfo                   OPTIONAL,
  maxAllowedUL-TX-Power            MaxAllowedUL-TX-Power          OPTIONAL,
  ul-ChannelRequirement           UL-ChannelRequirement          OPTIONAL,
  modeSpecificPhysChInfo          CHOICE {
    fdd                            SEQUENCE {
      dl-PDSCH-Information          DL-PDSCH-Information         OPTIONAL
    },
    tdd                            NULL
  },
  dl-CommonInformation            DL-CommonInformation            OPTIONAL,
  -- NOTE: IE dl-InformationPerRL-List should be optional in later versions
  -- of this message
  dl-InformationPerRL-List        DL-InformationPerRL-List
}

RadioBearerReconfiguration-v3a0ext ::= SEQUENCE {
  new-DSCH-RNTI                   DSCH-RNTI                       OPTIONAL
}

RadioBearerReconfiguration-v4b0ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  -- ssdt-UL extends SSdT-Information, which is included in
  -- DL-CommonInformation. FDD only.
  ssdt-UL-r4                       SSdT-UL                           OPTIONAL,
  -- The order of the RLs in IE cell-id-PerRL-List is the same as
  -- in IE DL-InformationPerRL-List included in this message
  cell-id-PerRL-List               CellIdentity-PerRL-List          OPTIONAL
}

RadioBearerReconfiguration-v590ext-IEs ::= SEQUENCE {
  -- Physical channel IEs
  dl-TPC-PowerOffsetPerRL-List     DL-TPC-PowerOffsetPerRL-List     OPTIONAL
}

RadioBearerReconfiguration-r4-IEs ::= SEQUENCE {
  -- User equipment IEs
  integrityProtectionModeInfo      IntegrityProtectionModeInfo      OPTIONAL,
  cipheringModeInfo                CipheringModeInfo                OPTIONAL,
  activationTime                    ActivationTime                    OPTIONAL,
  new-U-RNTI                        U-RNTI                          OPTIONAL,
  new-C-RNTI                        C-RNTI                          OPTIONAL,

```

```

    new-DSCH-RNTI          DSCH-RNTI          OPTIONAL,
    rrc-StateIndicator     RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- Core network IEs
  cn-InformationInfo      CN-InformationInfo      OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity            URA-Identity            OPTIONAL,
-- Radio bearer IEs
  rab-InformationReconfigList  RAB-InformationReconfigList  OPTIONAL,
  rb-InformationReconfigList  RB-InformationReconfigList-r4  OPTIONAL,
  rb-InformationAffectedList  RB-InformationAffectedList    OPTIONAL,
-- Transport channel IEs
  ul-CommonTransChInfo      UL-CommonTransChInfo-r4      OPTIONAL,
  ul-deletedTransChInfoList  UL-DeletedTransChInfoList    OPTIONAL,
  ul-AddReconfTransChInfoList  UL-AddReconfTransChInfoList  OPTIONAL,
  modeSpecificTransChInfo     CHOICE {
    fdd                      SEQUENCE {
      cpch-SetID             CPCH-SetID             OPTIONAL,
      addReconfTransChDRAC-Info  DRAC-StaticInformationList  OPTIONAL
    },
    tdd                      NULL
  }
  dl-CommonTransChInfo      DL-CommonTransChInfo-r4      OPTIONAL,
  dl-DeletedTransChInfoList  DL-DeletedTransChInfoList    OPTIONAL,
  dl-AddReconfTransChInfoList  DL-AddReconfTransChInfoList-r4  OPTIONAL,
-- Physical channel IEs
  frequencyInfo             FrequencyInfo             OPTIONAL,
  maxAllowedUL-TX-Power      MaxAllowedUL-TX-Power      OPTIONAL,
  ul-ChannelRequirement      UL-ChannelRequirement-r4    OPTIONAL,
  modeSpecificPhysChInfo     CHOICE {
    fdd                      SEQUENCE {
      dl-PDSCH-Information    DL-PDSCH-Information    OPTIONAL
    },
    tdd                      NULL
  },
  dl-CommonInformation      DL-CommonInformation-r4      OPTIONAL,
  dl-InformationPerRL-List   DL-InformationPerRL-List-r4  OPTIONAL
}

RadioBearerReconfiguration-r5-IEs ::= SEQUENCE {
-- User equipment IEs
  integrityProtectionModeInfo  IntegrityProtectionModeInfo  OPTIONAL,
  cipheringModeInfo            CipheringModeInfo             OPTIONAL,
  activationTime                ActivationTime                 OPTIONAL,
  new-U-RNTI                    U-RNTI                       OPTIONAL,
  new-C-RNTI                    C-RNTI                       OPTIONAL,
  new-DSCH-RNTI                 DSCH-RNTI                    OPTIONAL,
  new-H-RNTI                    H-RNTI                       OPTIONAL,
  rrc-StateIndicator            RRC-StateIndicator,
  utran-DRX-CycleLengthCoeff    UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- Core network IEs
  cn-InformationInfo            CN-InformationInfo            OPTIONAL,
-- UTRAN mobility IEs
  ura-Identity                  URA-Identity                  OPTIONAL,
-- Specification mode information
  specificationMode              CHOICE {
    complete                      SEQUENCE {
-- Radio bearer IEs
      rab-InformationReconfigList  RAB-InformationReconfigList  OPTIONAL,
      rb-InformationReconfigList  RB-InformationReconfigList-r5  OPTIONAL,
      rb-InformationAffectedList  RB-InformationAffectedList-r5  OPTIONAL,
      rb-PDCPCContextRelocationList  RB-PDCPCContextRelocationList  OPTIONAL,
-- Transport channel IEs
      ul-CommonTransChInfo      UL-CommonTransChInfo-r4      OPTIONAL,
      ul-deletedTransChInfoList  UL-DeletedTransChInfoList    OPTIONAL,
      ul-AddReconfTransChInfoList  UL-AddReconfTransChInfoList  OPTIONAL,
      modeSpecificTransChInfo     CHOICE {
        fdd                      SEQUENCE {
          cpch-SetID             CPCH-SetID             OPTIONAL,
          addReconfTransChDRAC-Info  DRAC-StaticInformationList  OPTIONAL
        },
        tdd                      NULL
      }
      dl-CommonTransChInfo      DL-CommonTransChInfo-r4      OPTIONAL,
      dl-DeletedTransChInfoList  DL-DeletedTransChInfoList-r5  OPTIONAL,
      dl-AddReconfTransChInfoList  DL-AddReconfTransChInfoList-r5  OPTIONAL
    },
    preconfiguration              SEQUENCE {

```

```

-- All IEs that include an FDD/TDD choice are split in two IEs for this message,
-- one for the FDD only elements and one for the TDD only elements, so that one
-- FDD/TDD choice in this level is sufficient.
    preConfigMode CHOICE {
        predefinedConfigIdentity PredefinedConfigIdentity,
        defaultConfig SEQUENCE {
            defaultConfigMode DefaultConfigMode,
            defaultConfigIdentity DefaultConfigIdentity-r5
        }
    }
},
-- Physical channel IEs
frequencyInfo FrequencyInfo OPTIONAL,
maxAllowedUL-TX-Power MaxAllowedUL-TX-Power OPTIONAL,
ul-ChannelRequirement UL-ChannelRequirement-r5 OPTIONAL,
modeSpecificPhysChInfo CHOICE {
    fdd SEQUENCE {
        dl-PDSCH-Information DL-PDSCH-Information OPTIONAL
    },
    tdd NULL
},
dl-HSPDSCH-Information DL-HSPDSCH-Information OPTIONAL,
dl-CommonInformation DL-CommonInformation-r5 OPTIONAL,
dl-InformationPerRL-List DL-InformationPerRL-List-r5 OPTIONAL
}

```

```
RadioBearerReconfiguration-v5d0ext-IEs ::= SEQUENCE {
```

```

--Radio Bearer IEs
    pdcp-ROHC-TargetMode PDCP-ROHC-TargetMode OPTIONAL
}

```

```
RadioBearerReconfiguration-r6-IEs ::= SEQUENCE {
```

```

-- User equipment IEs
    integrityProtectionModeInfo IntegrityProtectionModeInfo OPTIONAL,
    cipheringModeInfo CipheringModeInfo OPTIONAL,
    activationTime ActivationTime OPTIONAL,
    new-U-RNTI U-RNTI OPTIONAL,
    new-C-RNTI C-RNTI OPTIONAL,
    new-DSCH-RNTI DSCH-RNTI OPTIONAL,
    new-H-RNTI H-RNTI OPTIONAL,
    new-E-RNTI E-RNTI OPTIONAL,
    rrc-StateIndicator RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff UTRAN-DRX-CycleLengthCoefficient OPTIONAL,
-- Core network IEs
    cn-InformationInfo CN-InformationInfo OPTIONAL,
    plmn-Identity PLMN-Identity OPTIONAL,
-- UTRAN mobility IEs
    ura-Identity URA-Identity OPTIONAL,
-- Specification mode information
    specificationMode CHOICE {
        complete SEQUENCE {
            -- Radio bearer IEs
            rab-InformationReconfigList RAB-InformationReconfigList OPTIONAL,
            rb-InformationReconfigList RB-InformationReconfigList-r6 OPTIONAL,
            rb-InformationAffectedList RB-InformationAffectedList-r6 OPTIONAL,
            rb-PDCPContextRelocationList RB-PDCPContextRelocationList OPTIONAL,
            pdcp-ROHC-TargetMode PDCP-ROHC-TargetMode OPTIONAL,
            -- Transport channel IEs
            ul-CommonTransChInfo UL-CommonTransChInfo-r4 OPTIONAL,
            ul-deletedTransChInfoList UL-DeletedTransChInfoList-r6 OPTIONAL,
            ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList-r6 OPTIONAL,
            modeSpecificTransChInfo CHOICE {
                fdd SEQUENCE {
                    cpch-SetID CPCH-SetID OPTIONAL,
                    addReconfTransChDRAC-Info DRAC-StaticInformationList OPTIONAL
                },
                tdd NULL
            }
            dl-CommonTransChInfo DL-CommonTransChInfo-r4 OPTIONAL,
            dl-DeletedTransChInfoList DL-DeletedTransChInfoList-r5 OPTIONAL,
            dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r5 OPTIONAL
        },
        preconfiguration SEQUENCE {
            -- All IEs that include an FDD/TDD choice are split in two IEs for this message,
            -- one for the FDD only elements and one for the TDD only elements, so that one
            -- FDD/TDD choice in this level is sufficient.
            preConfigMode CHOICE {

```

```

        predefinedConfigIdentity      PredefinedConfigIdentity,
        defaultConfig                 SEQUENCE {
            defaultConfigMode         DefaultConfigMode,
            defaultConfigIdentity     DefaultConfigIdentity-r5
        }
    }
},
-- Physical channel IEs
frequencyInfo                        FrequencyInfo                        OPTIONAL,
maxAllowedUL-TX-Power                MaxAllowedUL-TX-Power                OPTIONAL,
ul-ChannelRequirement                UL-ChannelRequirement-r6            OPTIONAL,
ul-EDCH-Information                  UL-EDCH-Information-r6              OPTIONAL,
modeSpecificPhysChInfo               CHOICE {
    fdd                               SEQUENCE {
        dl-PDSCH-Information          DL-PDSCH-Information              OPTIONAL
    },
    tdd                               NULL
},
dl-HSPDSCH-Information               DL-HSPDSCH-Information              OPTIONAL,
dl-CommonInformation                 DL-CommonInformation-r6             OPTIONAL,
dl-InformationPerRL-List              DL-InformationPerRL-List-r6         OPTIONAL,
-- MBMS IEs
mbms-PL-ServiceRestrictInfo          MBMS-PL-ServiceRestrictInfo-r6
}

RadioBearerReconfiguration-v6xyext-IEs ::= SEQUENCE {
-- Core network IEs
primary-plmn-Identity                 PLMN-Identity                       OPTIONAL,
-- Physical channel IEs
harq-Preamble-Mode                   HARQ-Preamble-Mode                  OPTIONAL,
beaconPLEst                           BEACON-PL-Est                       OPTIONAL,
-- MBMS IEs
mbms-PL-ServiceRestrictInfo          MBMS-PL-ServiceRestrictInfo-r6     OPTIONAL
}

:

-- *****
--
-- RADIO BEARER SETUP
--
-- *****

RadioBearerSetup ::= CHOICE {
    r3                                 SEQUENCE {
        radioBearerSetup-r3           RadioBearerSetup-r3-IEs,
        v3a0NonCriticalExtensions     SEQUENCE {
            radioBearerSetup-v3a0ext   RadioBearerSetup-v3a0ext,
            laterNonCriticalExtensions SEQUENCE {
                -- Container for additional R99 extensions
                radioBearerSetup-r3-add-ext BIT STRING OPTIONAL,
                v4b0NonCriticalExtensions SEQUENCE {
                    radioBearerSetup-v4b0ext   RadioBearerSetup-v4b0ext-IEs,
                    v590NonCriticalExtensions SEQUENCE {
                        radioBearerSetup-v590ext   RadioBearerSetup-v590ext-IEs,
                        v5d0NonCriticalExtensitions SEQUENCE {
                            radioBearerSetup-v5d0ext   RadioBearerSetup-v5d0ext-IEs,
                            v6xyNonCriticalExtensions SEQUENCE {
                                radioBearerSetup-v6xyext   RadioBearerSetup-v6xyext-IEs,
                                nonCriticalExtensions SEQUENCE {} OPTIONAL
                            } OPTIONAL
                        } OPTIONAL
                    } OPTIONAL
                } OPTIONAL
            } OPTIONAL
        } OPTIONAL
    } OPTIONAL
},
later-than-r3                         SEQUENCE {
    rrc-TransactionIdentifier          RRC-TransactionIdentifier,
    criticalExtensions                 CHOICE {
        r4                             SEQUENCE {
            radioBearerSetup-r4         RadioBearerSetup-r4-IEs,
            v4d0NonCriticalExtensions SEQUENCE {
                -- Container for adding non critical extensions after freezing REL-5
                radioBearerSetup-r4-add-ext BIT STRING OPTIONAL,
                v590NonCriticalExtensions SEQUENCE {
                    radioBearerSetup-v590ext   RadioBearerSetup-v590ext-IEs,

```





```

        tdd                NULL
    },
    dl-CommonInformation    DL-CommonInformation    OPTIONAL,
    dl-InformationPerRL-List DL-InformationPerRL-List  OPTIONAL
}

RadioBearerSetup-v3a0ext ::= SEQUENCE {
    new-DSCH-RNTI          DSCH-RNTI                OPTIONAL
}

RadioBearerSetup-v4b0ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    -- ssdt-UL extends SSdT-Information, which is included in
    -- DL-CommonInformation. FDD only.
    ssdt-UL-r4            SSdT-UL                    OPTIONAL,
    -- The order of the RLs in IE cell-id-PerRL-List is the same as
    -- in IE DL-InformationPerRL-List included in this message
    cell-id-PerRL-List    CellIdentity-PerRL-List    OPTIONAL
}

RadioBearerSetup-v590ext-IEs ::= SEQUENCE {
    -- Physical channel IEs
    dl-TPC-PowerOffsetPerRL-List DL-TPC-PowerOffsetPerRL-List  OPTIONAL
}

RadioBearerSetup-r4-IEs ::= SEQUENCE {
    -- User equipment IEs
    integrityProtectionModeInfo IntegrityProtectionModeInfo    OPTIONAL,
    cipheringModeInfo          CipheringModeInfo                    OPTIONAL,
    activationTime              ActivationTime                      OPTIONAL,
    new-U-RNTI                  U-RNTI                            OPTIONAL,
    new-C-RNTI                  C-RNTI                            OPTIONAL,
    new-DSCH-RNTI              DSCH-RNTI                        OPTIONAL,
    rrc-StateIndicator          RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
    -- UTRAN mobility IEs
    ura-Identity                URA-Identity                      OPTIONAL,
    -- Core network IEs
    cn-InformationInfo          CN-InformationInfo                OPTIONAL,
    -- Radio bearer IEs
    srb-InformationSetupList    SRB-InformationSetupList          OPTIONAL,
    rab-InformationSetupList    RAB-InformationSetupList-r4        OPTIONAL,
    rb-InformationAffectedList  RB-InformationAffectedList    OPTIONAL,
    dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo  OPTIONAL,
    -- Transport channel IEs
    ul-CommonTransChInfo       UL-CommonTransChInfo-r4          OPTIONAL,
    ul-deletedTransChInfoList  UL-DeletedTransChInfoList  OPTIONAL,
    ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList  OPTIONAL,
    modeSpecificTransChInfo     CHOICE {
        fdd
        cpch-SetID              CPCH-SetID                    OPTIONAL,
        addReconfTransChDRAC-Info DRAC-StaticInformationList  OPTIONAL
    },
    tdd                NULL
}
dl-CommonTransChInfo    DL-CommonTransChInfo-r4          OPTIONAL,
dl-DeletedTransChInfoList DL-DeletedTransChInfoList  OPTIONAL,
dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r4  OPTIONAL,
-- Physical channel IEs
frequencyInfo           FrequencyInfo                    OPTIONAL,
maxAllowedUL-TX-Power   MaxAllowedUL-TX-Power                OPTIONAL,
ul-ChannelRequirement   UL-ChannelRequirement-r4          OPTIONAL,
modeSpecificPhysChInfo  CHOICE {
    fdd
    dl-PDSCH-Information    DL-PDSCH-Information    OPTIONAL
},
    tdd                NULL
},
dl-CommonInformation    DL-CommonInformation-r4          OPTIONAL,
dl-InformationPerRL-List DL-InformationPerRL-List-r4          OPTIONAL
}

RadioBearerSetup-r5-IEs ::= SEQUENCE {
    -- User equipment IEs
    integrityProtectionModeInfo IntegrityProtectionModeInfo    OPTIONAL,
    cipheringModeInfo          CipheringModeInfo                    OPTIONAL,
    activationTime              ActivationTime                      OPTIONAL,
    new-U-RNTI                  U-RNTI                            OPTIONAL,

```

```

new-C-RNTI                C-RNTI                OPTIONAL,
new-DSCH-RNTI            DSCH-RNTI            OPTIONAL,
new-H-RNTI                H-RNTI                OPTIONAL,
rrc-StateIndicator        RRC-StateIndicator,
utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
-- UTRAN mobility IEs
ura-Identity              URA-Identity          OPTIONAL,
-- Core network IEs
cn-InformationInfo        CN-InformationInfo      OPTIONAL,
-- Radio bearer IEs
srb-InformationSetupList  SRB-InformationSetupList-r5  OPTIONAL,
rab-InformationSetupList  RAB-InformationSetupList-r5  OPTIONAL,
rb-InformationAffectedList RB-InformationAffectedList-r5  OPTIONAL,
dl-CounterSynchronisationInfo DL-CounterSynchronisationInfo-r5  OPTIONAL,
-- Transport channel IEs
ul-CommonTransChInfo      UL-CommonTransChInfo-r4      OPTIONAL,
ul-deletedTransChInfoList  UL-DeletedTransChInfoList    OPTIONAL,
ul-AddReconfTransChInfoList UL-AddReconfTransChInfoList  OPTIONAL,
modeSpecificTransChInfo    CHOICE {
    fdd                      SEQUENCE {
        cpch-SetID            CPCH-SetID                OPTIONAL,
        addReconfTransChDRAC-Info DRAC-StaticInformationList  OPTIONAL
    },
    tdd                      NULL
}
dl-CommonTransChInfo      DL-CommonTransChInfo-r4      OPTIONAL,
dl-DeletedTransChInfoList  DL-DeletedTransChInfoList-r5  OPTIONAL,
dl-AddReconfTransChInfoList DL-AddReconfTransChInfoList-r5  OPTIONAL,
-- Physical channel IEs
frequencyInfo             FrequencyInfo              OPTIONAL,
maxAllowedUL-TX-Power      MaxAllowedUL-TX-Power      OPTIONAL,
ul-ChannelRequirement      UL-ChannelRequirement-r5    OPTIONAL,
modeSpecificPhysChInfo     CHOICE {
    fdd                      SEQUENCE {
        dl-PDSCH-Information  DL-PDSCH-Information      OPTIONAL
    },
    tdd                      NULL
},
dl-HSPDSCH-Information     DL-HSPDSCH-Information      OPTIONAL,
dl-CommonInformation       DL-CommonInformation-r5     OPTIONAL,
dl-InformationPerRL-List   DL-InformationPerRL-List-r5  OPTIONAL
}

```

```

RadioBearerSetup-v5d0ext-IEs ::= SEQUENCE {
    --Radio Bearer IEs
    pdcP-ROHC-TargetMode      PDCP-ROHC-TargetMode      OPTIONAL
}

```

```

RadioBearerSetup-v6xyext-IEs ::= SEQUENCE {
    -- Core network IEs
    primary-plmn-Identity      PLMN-Identity              OPTIONAL,
    -- Physical channel IEs
    harq-Preamble-Mode         HARQ-Preamble-Mode          OPTIONAL,
    beaconPLEst                BEACON-PL-Est              OPTIONAL,
    -- Radio bearer IEs
    rab-InformationSetupList    RAB-InformationSetupList-r6-ext  OPTIONAL,
    -- MBMS IEs
    mbms-PL-ServiceRestrictInfo MBMS-PL-ServiceRestrictInfo-r6  OPTIONAL
}

```

```

RadioBearerSetup-r6-IEs ::= SEQUENCE {
    -- User equipment IEs
    integrityProtectionModeInfo IntegrityProtectionModeInfo  OPTIONAL,
    cipheringModeInfo          CipheringModeInfo            OPTIONAL,
    activationTime              ActivationTime                OPTIONAL,
    new-U-RNTI                  U-RNTI                      OPTIONAL,
    new-C-RNTI                  C-RNTI                      OPTIONAL,
    new-DSCH-RNTI              DSCH-RNTI                   OPTIONAL,
    new-H-RNTI                  H-RNTI                      OPTIONAL,
    new-E-RNTI                  E-RNTI                      OPTIONAL,
    rrc-StateIndicator          RRC-StateIndicator,
    utran-DRX-CycleLengthCoeff  UTRAN-DRX-CycleLengthCoefficient  OPTIONAL,
    -- UTRAN mobility IEs
    ura-Identity                URA-Identity                OPTIONAL,
    -- Core network IEs
    cn-InformationInfo          CN-InformationInfo          OPTIONAL,
    plmn-Identity               PLMN-Identity               OPTIONAL,
    -- Radio bearer IEs

```

srb-InformationSetupList	SRB-InformationSetupList-r6	OPTIONAL,
rab-InformationSetupList	RAB-InformationSetupList-r6	OPTIONAL,
rb-InformationAffectedList	RB-InformationAffectedList-r6	OPTIONAL,
dl-CounterSynchronisationInfo	DL-CounterSynchronisationInfo-r5	OPTIONAL,
<u>pdcp-ROHC-TargetMode</u>	<u>PDCP-ROHC-TargetMode</u>	<u>OPTIONAL,</u>
-- Transport channel IEs		
ul-CommonTransChInfo	UL-CommonTransChInfo-r4	OPTIONAL,
ul-deletedTransChInfoList	UL-DeletedTransChInfoList-r6	OPTIONAL,
ul-AddReconfTransChInfoList	UL-AddReconfTransChInfoList-r6	OPTIONAL,
modeSpecificTransChInfo	CHOICE {	
fdd	SEQUENCE {	
cpch-SetID	CPCH-SetID	OPTIONAL,
addReconfTransChDRAC-Info	DRAC-StaticInformationList	OPTIONAL
},		
tdd	NULL	
}		OPTIONAL,
dl-CommonTransChInfo	DL-CommonTransChInfo-r4	OPTIONAL,
dl-DeletedTransChInfoList	DL-DeletedTransChInfoList-r5	OPTIONAL,
dl-AddReconfTransChInfoList	DL-AddReconfTransChInfoList-r5	OPTIONAL,
-- Physical channel IEs		
frequencyInfo	FrequencyInfo	OPTIONAL,
maxAllowedUL-TX-Power	MaxAllowedUL-TX-Power	OPTIONAL,
ul-ChannelRequirement	UL-ChannelRequirement-r6	OPTIONAL,
ul-EDCH-Information	UL-EDCH-Information-r6	OPTIONAL,
modeSpecificPhysChInfo	CHOICE {	
fdd	SEQUENCE {	
dl-PDSCH-Information	DL-PDSCH-Information	OPTIONAL
},		
tdd	NULL	
},		
dl-HSPDSCH-Information	DL-HSPDSCH-Information	OPTIONAL,
dl-CommonInformation	DL-CommonInformation-r6	OPTIONAL,
dl-InformationPerRL-List	DL-InformationPerRL-List-r6	OPTIONAL,
-- MBMS IEs		
mbms-PL-ServiceRestrictInfo	MBMS-PL-ServiceRestrictInfo-r6	

## 11.3 Information element definitions

```
-- *****  
--  
-- RADIO BEARER INFORMATION ELEMENTS (10.3.4)  
--  
-- *****
```

PDCP-ROHC-TargetMode ::= ENUMERATED { o-Mode, r-Mode }

PDCP-SN-Info ::= INTEGER (0..65535)

## 13.4.xx PDCP ROHC **TARGET MODE**

[This variable contains the ROHC target mode.](#)

<u>Information Element/Group name</u>	<u>Need</u>	<u>Multi</u>	<u>Type and reference</u>	<u>Semantics description</u>	<u>Version</u>
<a href="#">Target Mode</a>	<a href="#">OP</a>		<a href="#">Enumerated (O-mode, R-mode)</a>	<a href="#">The UE shall only <b>transit to</b> the signalled mode for operation of ROHC as deccribed in [36].</a>	<a href="#">REL-5</a>