



## CHANGE REQUEST

⌘ **23.910 CR 020** ⌘ rev **-** ⌘ **Current vers 3.3.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN3		
<b>Work item code:</b>	⌘ CS Bearer	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
		<p><i>Use <u>one</u> of the following categories:</i></p> <p><b>F</b> (essential 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)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	
		<p><i>Use <u>one</u> of the following releases:</i></p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p>	

<b>Reason for change:</b>	⌘ Correction for the interworking between RLP and A-TRAU'		
<b>Summary of change:</b>	⌘ The ratio of RLP to RLP 'fill' frames is clarified		
<b>Consequences if not approved:</b>	⌘ Too much downlink RLP frames lead to a queue overflow in VMSC		

<b>Clauses affected:</b>	⌘ 10.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	3GPP TS 29.007
<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/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

**First modified section**

## 10.2 User Plane

### 10.2.1 Handover from UMTS to GSM

After a handover from UMTS to GSM the user plane between the anchor MSC and the visited MSC shall comply to the standard GSM A-interface protocols, i.e:

- A-TRAU or modified V.110 frames as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19].
- up to four 16kbit/s substreams are multiplexed in one 64kbit/s channel (Split/Combine function and Multiplexing function as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19]).

### 10.2.2 Handover from GSM to UMTS

After a handover from GSM to UMTS the user plane between the anchor MSC and the visited MSC shall comply to the A-TRAU' protocol except for FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For both exceptions a plain 64 kbit/s channel is used between the MSCs.

The A-TRAU' protocol is defined as follows:

- A-TRAU' frames are transmitted in regular intervals of 10 ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 08.20 [19]) each with a length of 320 bit;
- the A-TRAU' protocol is used on a plain 64 kbit/s channel without substreams;
- the same A-TRAU' format is used for the transparent and non-transparent transmission mode;
- in transparent mode the number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits (see below);
- in non-transparent mode A-TRAU' frames contain always complete RLP frames, rate adaptation is performed by means of the M2 bit;
- the M1-bit is used to identify 1<sup>st</sup> and 2<sup>nd</sup> frame in both transmission modes.

#### 10.2.2.1 Frame layout for the different transparent user rates

The number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits in an A-TRAU' frame.

<b>Date Rate</b>	<b>Number of data bits per A-TRAU' frame</b>
33,6 kbit/s	336
28,8 kbit/s	288

The data bits are inserted in the A-TRAU' frame starting with D1 of Data field 1 of the first A-TRAU frame. The unused bits are filled with binary '1'.

#### 10.2.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. The following figure shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	36 bit data field 8
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 2: A-TRAU 320 bit frame**

#### **Data Bits (Dxx):**

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

#### **Control bits (C Bits):**

##### **C1 to C4:**

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on rate control see 3GPP TS 25.415 [13].

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

**C5:**

C5 is not used, it is set to binary '1'.

**Bit M1:**

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

**Bit M2:**

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

Transparent mode:

In transparent mode M2 is clamped to binary '0'.

The 3G MSC (uplink direction) sets M2 to binary '1' until it receives valid SDUs. When receiving valid SDUs M2 is set to binary '0'.

Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

Fill frames are also sent in order to adapt the RLP transmission frequency to the AIUR. The ratio between RLP frames and 'fill' RLP frames is defined in the following table:

AIUR	Ratio between RLP and 'fill' RLP frames
<u>57.6 kbit/s</u>	<u>Only valid frames</u>
<u>28.8 kbit/s</u>	<u>1 valid frame followed by 1 'fill' frame</u>
<u>14.4 kbit/s</u>	<u>1 valid frame followed by 3 'fill' frames</u>

**Z bits:**

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [19].

### 10.2.3 Handover within 3G PLMNs

After a handover from a 3G MSC to another 3G MSC the user plane between the anchor MSC and the visited MSC shall comply to

- the Iu UP protocol if both MSC are connected via an ATM interface.

- the A-TRAU' protocol if both MSC are connected via a TDM interface except for the transparent cases FNUR = 32 kbit/s (ITC = UDI or RDI), FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For these exceptions a plain 64 kbit/s channel is used between the MSCs. The rate adaptation between 64kbit/s and 32kbit/s is based on ITU-T I.460.

#### 10.2.4 Handover for 56kbit/s

The FNUR = 56 kbit/s in transparent mode can be supported in GSM by two configurations:

1. without IWF with the following channel codings
  - 2\*TCH/F32.0
  - 5\*TCH/F9.6
2. with IWF with the following channel coding
  - 4\*TCH/F14.4

The FNUR = 56 kbit/s in transparent mode is supported in UMTS by a configuration without IWF only. Therefore handover for 56kbit/s in transparent mode between UMTS and GSM can be supported only for configurations without IWF.

**End of last modified section**

## CHANGE REQUEST

⌘ **23.910 CR 021** ⌘ rev **-** ⌘ **Current vers 4.1.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN3		
<b>Work item code:</b>	⌘ CORRECT	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ A	<b>Release:</b>	⌘ REL-4
		<p style="text-align: center;"><i>Use one of the following categories:</i></p> <p><b>F</b> (essential 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)</p> <p style="text-align: center;"><i>Use one of the following releases:</i></p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p> <p style="text-align: center;">Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	

<b>Reason for change:</b>	⌘ Correction for the interworking between RLP and A-TRAU'		
<b>Summary of change:</b>	⌘ The ratio of RLP to RLP 'fill' frames is clarified		
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<b>Clauses affected:</b>	⌘ 10.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 3GPP TS 29.007	
<b>Other comments:</b>	⌘		

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**First modified section**

## 10.2 User Plane

### 10.2.1 Handover from UMTS to GSM

After a handover from UMTS to GSM the user plane between the anchor MSC and the visited MSC shall comply to the standard GSM A-interface protocols, i.e:

- A-TRAU or modified V.110 frames as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19].
- up to four 16kbit/s substreams are multiplexed in one 64kbit/s channel (Split/Combine function and Multiplexing function as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19]).

### 10.2.2 Handover from GSM to UMTS

After a handover from GSM to UMTS the user plane between the anchor MSC and the visited MSC shall comply to the A-TRAU' protocol except for FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For both exceptions a plain 64 kbit/s channel is used between the MSCs.

The A-TRAU' protocol is defined as follows:

- A-TRAU' frames are transmitted in regular intervals of 10 ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 08.20 [19]) each with a length of 320 bit;
- the A-TRAU' protocol is used on a plain 64 kbit/s channel without substreams;
- the same A-TRAU' format is used for the transparent and non-transparent transmission mode;
- in transparent mode the number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits (see below);
- in non-transparent mode A-TRAU' frames contain always complete RLP frames, rate adaptation is performed by means of the M2 bit;
- the M1-bit is used to identify 1<sup>st</sup> and 2<sup>nd</sup> frame in both transmission modes.

#### 10.2.2.1 Frame layout for the different transparent user rates

The number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits in an A-TRAU' frame.

Date Rate	Number of data bits per A-TRAU' frame
33,6 kbit/s	336
28,8 kbit/s	288

The data bits are inserted in the A-TRAU' frame starting with D1 of Data field 1 of the first A-TRAU frame. The unused bits are filled with binary '1'.

#### 10.2.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. The following figure shows the format of one A-TRAU frame.



Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	36 bit data field 8
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 2: A-TRAU 320 bit frame**

#### **Data Bits (Dxx):**

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

#### **Control bits (C Bits):**

##### **C1 to C4:**

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on rate control see 3GPP TS 25.415 [13].

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

**C5:**

C5 is not used, it is set to binary '1'.

**Bit M1:**

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

**Bit M2:**

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

Transparent mode:

In transparent mode M2 is clamped to binary '0'.

The 3G MSC (uplink direction) sets M2 to binary '1' until it receives valid SDUs. When receiving valid SDUs M2 is set to binary '0'.

Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

Fill frames are also sent in order to adapt the RLP transmission frequency to the AIUR. The ratio between RLP frames and 'fill' RLP frames is defined in the following table:

AIUR	Ratio between RLP and 'fill' RLP frames
<u>57.6 kbit/s</u>	<u>Only valid frames</u>
<u>28.8 kbit/s</u>	<u>1 valid frame followed by 1 'fill' frame</u>
<u>14.4 kbit/s</u>	<u>1 valid frame followed by 3 'fill' frames</u>

**Z bits:**

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [19] .

### 10.2.3 Handover within 3G PLMNs

After a handover from a 3G MSC to another 3G MSC the user plane between the anchor MSC and the visited MSC shall comply to

- the Iu UP protocol if both MSC are connected via an ATM interface.

- the A-TRAU' protocol if both MSC are connected via a TDM interface except for the transparent cases FNUR = 32 kbit/s (ITC = UDI or RDI), FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For these exceptions a plain 64 kbit/s channel is used between the MSCs. The rate adaptation between 64kbit/s and 32kbit/s is based on ITU-T I.460.

#### 10.2.4 Handover for 56kbit/s

The FNUR = 56 kbit/s in transparent mode can be supported in GSM by two configurations:

1. without IWF with the following channel codings
  - 2\*TCH/F32.0
  - 5\*TCH/F9.6
2. with IWF with the following channel coding
  - 4\*TCH/F14.4

The FNUR = 56 kbit/s in transparent mode is supported in UMTS by a configuration without IWF only. Therefore handover for 56kbit/s in transparent mode between UMTS and GSM can be supported only for configurations without IWF.

**End of last modified section**

## CHANGE REQUEST

⌘ **29.007 CR 034** ⌘ rev **-** ⌘ **Current vers 3.7.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ CS Bearer	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
	<i>Use <u>one</u> of the following categories:</i> <b>F</b> (essential correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (Addition of feature), <b>C</b> (Functional modification of feature) <b>D</b> (Editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		<i>Use <u>one</u> of the following releases:</i> <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)

<b>Reason for change:</b>	⌘ Correction for the interworking between RLP and A-TRAU'		
<b>Summary of change:</b>	⌘ The ratio of RLP to RLP 'fill' frames is clarified		
<b>Consequences if not approved:</b>	⌘ Too much downlink RLP frames lead to a queue overflow in VMSC		

<b>Clauses affected:</b>	⌘ 11.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 3GPP TS 23.910	
<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/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

<b>First modified section</b>
-------------------------------

## 11.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. Figure 15 shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 15: A-TRAU 320 bit frame**

### Data Bits (Dxx):

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

### Control bits (C Bits):

#### C1 to C4:

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on Rate Control see 3GPP TS 25.415 [42].

**Table 11: A-TRAU' control bits**

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

#### C5:

C5 is not used, it is set to binary '1'.

#### Bit M1:

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

**Table 12: Frame Start Identifier**

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

#### Bit M2:

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

#### Transparent mode:

In transparent mode M2 is clamped to binary '0'.

#### Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

Fill frames are also sent in order to adapt the RLP transmission frequency to the AIUR. The ratio between RLP frames and 'fill' RLP frames is defined in the following table:

**Table 13: RLP transmission frequency**

<u>AIUR</u>	<u>Ratio between RLP and 'fill' RLP frames</u>
<u>57.6 kbit/s</u>	<u>Only valid frames</u>
<u>28.8 kbit/s</u>	<u>1 valid frame followed by 1 'fill' frame</u>
<u>14.4 kbit/s</u>	<u>1 valid frame followed by 3 'fill' frames</u>

#### Z bits:

The bits  $Z_i$  are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [28].

**End of last modified section**

## CHANGE REQUEST

⌘ **29.007 CR 035** ⌘ rev **-** ⌘ **Current vers 4.1.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ CORRECT	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ A	<b>Release:</b>	⌘ REL-4
		<p style="text-align: center;"><i>Use one of the following categories:</i></p> <p><b>F</b> (essential 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)</p> <p style="text-align: center;"><i>Use one of the following releases:</i></p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p> <p style="text-align: center;">Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	

<b>Reason for change:</b>	⌘ Correction for the interworking between RLP and A-TRAU'		
<b>Summary of change:</b>	⌘ The ratio of RLP to RLP 'fill' frames is clarified		
<b>Consequences if not approved:</b>	⌘ Too much downlink RLP frames lead to a queue overflow in VMSC		

<b>Clauses affected:</b>	⌘ 11.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 3GPP TS 23.910	
<b>Other comments:</b>	⌘		

### How to create CRs using this form:

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- 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.



<b>First modified section</b>
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## 11.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. Figure 15 shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

Figure 15: A-TRAU 320 bit frame

### Data Bits (Dxx):

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

### Control bits (C Bits):

#### C1 to C4:

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on Rate Control see 3GPP TS 25.415 [42].

**Table 11: A-TRAU' control bits**

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

#### C5:

C5 is not used, it is set to binary '1'.

#### Bit M1:

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

**Table 12: Frame Start Identifier**

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

#### Bit M2:

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

#### Transparent mode:

In transparent mode M2 is clamped to binary '0'.

#### Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

Fill frames are also sent in order to adapt the RLP transmission frequency to the AIUR. The ratio between RLP frames and 'fill' RLP frames is defined in the following table:

**Table 13: RLP transmission frequency**

<u>AIUR</u>	<u>Ratio between RLP and 'fill' RLP frames</u>
<u>57.6 kbit/s</u>	<u>Only valid frames</u>
<u>28.8 kbit/s</u>	<u>1 valid frame followed by 1 'fill' frame</u>
<u>14.4 kbit/s</u>	<u>1 valid frame followed by 3 'fill' frames</u>

#### Z bits:

The bits  $Z_i$  are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [28].

**End of last modified section**

## CHANGE REQUEST

⌘ **29.007 CR 036** ⌘ rev **-** ⌘ **Current vers 3.7.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ T.E.I (CS Bearers)	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
		<p>Use <u>one</u> of the following categories:</p> <p><b>F</b> (essential 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)</p> <p>Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	
		<p>Use <u>one</u> of the following releases:</p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p>	

<b>Reason for change:</b>	⌘ Correction for the mapping of A-TRAU' frames to PCM time slots		
<b>Summary of change:</b>	⌘ The mapping of the A-TRAU' frames to PCM time slots has been clarified		
<b>Consequences if not approved:</b>	⌘ Incompatible implementations might lead to call release after handover		

<b>Clauses affected:</b>	⌘ 11.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	3GPP TS 23.910
<b>Other comments:</b>	⌘		

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- 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.

<b>First modified section</b>
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## 11.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. Figure 15 shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 15: A-TRAU 320 bit frame**

### Data Bits (Dxx):

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

### Control bits (C Bits):

#### C1 to C4:

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on Rate Control see 3GPP TS 25.415 [42].

**Table 11: A-TRAU' control bits**

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

#### C5:

C5 is not used, it is set to binary '1'.

#### Bit M1:

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

**Table 12: Frame Start Identifier**

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

#### Bit M2:

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

In transparent mode M2 is clamped to binary '0'.

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

#### Z bits:

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [28].

#### **Mapping of A-TRAU' frames to PCM time slots:**

A-TRAU' frames shall be mapped octet aligned to PCM time slots. I.e. bit number 0 to 7 of each octet of an A-TRAU' frame shall be mapped to bit number 0 to 7 of the PCM time slot.

**End of last modified section**

## CHANGE REQUEST

⌘ **29.007 CR 037** ⌘ rev **-** ⌘ **Current vers 4.1.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ CORRECT	<b>Date:</b>	⌘ 2001-01-15
<b>Category:</b>	⌘ A	<b>Release:</b>	⌘ REL-4
		<p style="text-align: center;"><i>Use <u>one</u> of the following categories:</i></p> <p><b>F</b> (essential 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)</p> <p style="text-align: center;"><i>Use <u>one</u> of the following releases:</i></p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p> <p style="text-align: center;">Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	

<b>Reason for change:</b>	⌘ Correction for the mapping of A-TRAU' frames to PCM time slots		
<b>Summary of change:</b>	⌘ The mapping of the A-TRAU' frames to PCM time slots has been clarified		
<b>Consequences if not approved:</b>	⌘ Incompatible implementations might lead to call release after handover		

<b>Clauses affected:</b>	⌘ 11.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 3GPP TS 23.910	
<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/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/> For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

<b>First modified section</b>
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## 11.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. Figure 15 shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

Figure 15: A-TRAU 320 bit frame

### Data Bits (Dxx):

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

### Control bits (C Bits):

#### C1 to C4:



The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on Rate Control see 3GPP TS 25.415 [42].

**Table 11: A-TRAU' control bits**

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

#### C5:

C5 is not used, it is set to binary '1'.

#### Bit M1:

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

**Table 12: Frame Start Identifier**

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

#### Bit M2:

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

In transparent mode M2 is clamped to binary '0'.

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

#### Z bits:

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [28].

#### **Mapping of A-TRAU' frames to PCM time slots:**

A-TRAU' frames shall be mapped octet aligned to PCM time slots. I.e. bit number 0 to 7 of each octet of an A-TRAU' frame shall be mapped to bit number 0 to 7 of the PCM time slot.

**End of last modified section**

## CHANGE REQUEST

⌘ **23.910 CR 024** ⌘ rev **-** ⌘ **Current vers 3.3.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ T.E.I [CS Bearer]	<b>Date:</b>	⌘ 2001-02-26
<b>Category:</b>	⌘ <b>F</b>	<b>Release:</b>	⌘ R99
		<p style="text-align: center;"><i>Use <u>one</u> of the following categories:</i></p> <p><b>F</b> (essential 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)</p> <p style="text-align: center;"><i>Use <u>one</u> of the following releases:</i></p> <p><b>2</b> (GSM Phase 2)  <b>R96</b> (Release 1996)  <b>R97</b> (Release 1997)  <b>R98</b> (Release 1998)  <b>R99</b> (Release 1999)  <b>REL-4</b> (Release 4)  <b>REL-5</b> (Release 5)</p> <p style="text-align: center;">Detailed explanations of the above categories can be found in 3GPP TR 21.900.</p>	

<b>Reason for change:</b>	⌘ Correction for the mapping of A-TRAU' frames to PCM time slots		
<b>Summary of change:</b>	⌘ The mapping of the A-TRAU' frames to PCM time slots has been clarified		
<b>Consequences if not approved:</b>	⌘ Incompatible implementations might lead to call release after handover		

<b>Clauses affected:</b>	⌘ 10.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘	3GPP TS 29.007
<b>Other comments:</b>	⌘		

### How to create CRs using this form:

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- 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://www.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

**First modified section**

## 10.2 User Plane

### 10.2.1 Handover from UMTS to GSM

After a handover from UMTS to GSM the user plane between the anchor MSC and the visited MSC shall comply to the standard GSM A-interface protocols, i.e:

- A-TRAU or modified V.110 frames as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19].
- up to four 16kbit/s substreams are multiplexed in one 64kbit/s channel (Split/Combine function and Multiplexing function as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19]).

### 10.2.2 Handover from GSM to UMTS

After a handover from GSM to UMTS the user plane between the anchor MSC and the visited MSC shall comply to the A-TRAU' protocol except for FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For both exceptions a plain 64 kbit/s channel is used between the MSCs.

The A-TRAU' protocol is defined as follows:

- A-TRAU' frames are transmitted in regular intervals of 10 ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 08.20 [19]) each with a length of 320 bit;
- the A-TRAU' protocol is used on a plain 64 kbit/s channel without substreams;
- the same A-TRAU' format is used for the transparent and non-transparent transmission mode;
- in transparent mode the number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits (see below);
- in non-transparent mode A-TRAU' frames contain always complete RLP frames, rate adaptation is performed by means of the M2 bit;
- the M1-bit is used to identify 1<sup>st</sup> and 2<sup>nd</sup> frame in both transmission modes.

#### 10.2.2.1 Frame layout for the different transparent user rates

The number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits in an A-TRAU' frame.

Date Rate	Number of data bits per A-TRAU' frame
33,6 kbit/s	336
28,8 kbit/s	288

The data bits are inserted in the A-TRAU' frame starting with D1 of Data field 1 of the first A-TRAU frame. The unused bits are filled with binary '1'.

#### 10.2.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. The following figure shows the format of one A-TRAU frame.

Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	36 bit data field 8
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 2: A-TRAU 320 bit frame**

#### **Data Bits (Dxx):**

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

#### **Control bits (C Bits):**

##### **C1 to C4:**

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on rate control see 3GPP TS 25.415 [13].

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

**C5:**

C5 is not used, it is set to binary '1'.

**Bit M1:**

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

**Bit M2:**

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

Transparent mode:

In transparent mode M2 is clamped to binary '0'.

The 3G MSC (uplink direction) sets M2 to binary '1' until it receives valid SDUs. When receiving valid SDUs M2 is set to binary '0'.

Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

**Z bits:**

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [19] .

**Mapping of A-TRAU' frames to PCM time slots:**

A-TRAU' frames shall be mapped octet aligned to PCM time slots. I.e. bit number 0 to 7 of each octet of an A-TRAU' frame shall be mapped to bit number 0 to 7 of the PCM time slot.

### 10.2.3 Handover within 3G PLMNs

After a handover from a 3G MSC to another 3G MSC the user plane between the anchor MSC and the visited MSC shall comply to

- the Iu UP protocol if both MSC are connected via an ATM interface.
- the A-TRAU' protocol if both MSC are connected via a TDM interface except for the transparent cases FNUR = 32 kbit/s (ITC = UDI or RDI), FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For these exceptions a plain 64 kbit/s channel is used between the MSCs. The rate adaptation between 64kbit/s and 32kbit/s is based on ITU-T I.460.

## 10.2.4 Handover for 56kbit/s

The FNUR = 56 kbit/s in transparent mode can be supported in GSM by two configurations:

1. without IWF with the following channel codings
  - 2\*TCH/F32.0
  - 5\*TCH/F9.6
2. with IWF with the following channel coding
  - 4\*TCH/F14.4

The FNUR = 56 kbit/s in transparent mode is supported in UMTS by a configuration without IWF only. Therefore handover for 56kbit/s in transparent mode between UMTS and GSM can be supported only for configurations without IWF.

**End of last modified section**

## CHANGE REQUEST

⌘ **23.910 CR 027** ⌘ rev **-** ⌘ **Current vers 4.1.0** ⌘

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

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

<b>Title:</b>	⌘ A-TRAU' correction		
<b>Source:</b>	⌘ TSG_CN WG3		
<b>Work item code:</b>	⌘ CORRECT	<b>Date:</b>	⌘ 2001-02-26
<b>Category:</b>	⌘ A	<b>Release:</b>	⌘ REL-4
Use <u>one</u> of the following categories: <b>F</b> (essential correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (Addition of feature), <b>C</b> (Functional modification of feature) <b>D</b> (Editorial modification) Detailed explanations of the above categories can be found in 3GPP TR 21.900.		Use <u>one</u> of the following releases: <b>2</b> (GSM Phase 2) <b>R96</b> (Release 1996) <b>R97</b> (Release 1997) <b>R98</b> (Release 1998) <b>R99</b> (Release 1999) <b>REL-4</b> (Release 4) <b>REL-5</b> (Release 5)	

<b>Reason for change:</b>	⌘ Correction for the mapping of A-TRAU' frames to PCM time slots		
<b>Summary of change:</b>	⌘ The mapping of the A-TRAU' frames to PCM time slots has been clarified		
<b>Consequences if not approved:</b>	⌘ Incompatible implementations might lead to call release after handover		

<b>Clauses affected:</b>	⌘ 10.2.2		
<b>Other specs affected:</b>	<input type="checkbox"/> Other core specifications <input type="checkbox"/> Test specifications <input type="checkbox"/> O&M Specifications	⌘ 3GPP TS 29.007	
<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/3G\\_Specs/CRs.htm](http://www.3gpp.org/3G_Specs/CRs.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://www.3gpp.org/specs/>. For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 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.

**First modified section**

## 10.2 User Plane

### 10.2.1 Handover from UMTS to GSM

After a handover from UMTS to GSM the user plane between the anchor MSC and the visited MSC shall comply to the standard GSM A-interface protocols, i.e:

- A-TRAU or modified V.110 frames as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19].
- up to four 16kbit/s substreams are multiplexed in one 64kbit/s channel (Split/Combine function and Multiplexing function as defined in 3GPP TS 04.21 [18] and 3GPP TS 08.20 [19]).

### 10.2.2 Handover from GSM to UMTS

After a handover from GSM to UMTS the user plane between the anchor MSC and the visited MSC shall comply to the A-TRAU' protocol except for FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For both exceptions a plain 64 kbit/s channel is used between the MSCs.

The A-TRAU' protocol is defined as follows:

- A-TRAU' frames are transmitted in regular intervals of 10 ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 08.20 [19]) each with a length of 320 bit;
- the A-TRAU' protocol is used on a plain 64 kbit/s channel without substreams;
- the same A-TRAU' format is used for the transparent and non-transparent transmission mode;
- in transparent mode the number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits (see below);
- in non-transparent mode A-TRAU' frames contain always complete RLP frames, rate adaptation is performed by means of the M2 bit;
- the M1-bit is used to identify 1<sup>st</sup> and 2<sup>nd</sup> frame in both transmission modes.

#### 10.2.2.1 Frame layout for the different transparent user rates

The number of data bits in an A-TRAU' frame depend on the user rate only, each user rate corresponds to a fixed number of data bits in an A-TRAU' frame.

Date Rate	Number of data bits per A-TRAU' frame
33,6 kbit/s	336
28,8 kbit/s	288

The data bits are inserted in the A-TRAU' frame starting with D1 of Data field 1 of the first A-TRAU frame. The unused bits are filled with binary '1'.

#### 10.2.2.2 A-TRAU' frame format

One A-TRAU' frame consists of two consecutive A-TRAU frames. The following figure shows the format of one A-TRAU frame.



Octet number	bit number								
	0	1	2	3	4	5	6	7	
0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	
2	1	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>C5</b>	<b>M1</b>	<b>M2</b>	
3	<b>Z1</b>	D1	D2	D3	D4	D5	D6	D7	36 bit data field 1
4	D8	D9	D10	D11	D12	D13	D14	D15	
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	<b>Z2</b>	D1	D2	36 bit data field 2
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	36 bit data field 3
12	D35	D36	<b>Z3</b>	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	
15	D22	D23	D24	D25	D26	D27	D28	D29	36 bit data field 4
16	D30	D31	D32	D33	D34	D35	D36	<b>Z4</b>	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	
19	D17	D18	D19	D20	D21	D22	D23	D24	36 bit data field 5
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	<b>Z5</b>	D1	D2	D3	
22	D4	D5	D6	D7	D8	D9	D10	D11	
23	D12	D13	D14	D15	D16	D17	D18	D19	36 bit data field 6
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	<b>Z6</b>	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	36 bit data field 7
28	D15	D16	D17	D18	D19	D20	D21	D22	
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	<b>Z7</b>	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	36 bit data field 8
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	<b>Z8</b>	D1	D2	D3	D4	36 bit data field 8
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	
38	D21	D22	D23	D24	D25	D26	D27	D28	
39	D29	D30	D31	D32	D33	D34	D35	D36	

**Figure 2: A-TRAU 320 bit frame**

#### **Data Bits (Dxx):**

The 288 data bits of an A-TRAU frame are divided in eight fields of 36 bits.

#### **Control bits (C Bits):**

##### **C1 to C4:**

The Control bits C1 to C4 define the used data rate. C1 to C4 in the first A-TRAU frame indicate the data rate in send direction.

C1 to C4 in the second A-TRAU frame indicate the used data rate in backward direction. This is required for Rate Control that is required in uplink direction. For details on rate control see 3GPP TS 25.415 [13].

C1	C2	C3	C4	Radio Interface User Rate
1	0	1	1	57,6 kbit/s
1	0	1	0	33,6 kbit/s
1	0	0	0	28,8 kbit/s
0	1	1	1	14,4 kbit/s

**C5:**

C5 is not used, it is set to binary '1'.

**Bit M1:**

An A-TRAU' frame is made of two consecutive A-TRAU which build the transport container for 576 data bits. Bit M1 is used to determine the order of the A-TRAU frames within an A-TRAU' frame.

The two M1 bits are referred to as the Frame Start Identifier. The FSI value is 01. These values are assigned to the M1 bit as shown below:

	M1 bit
First A-TRAU frame	0
Second A-TRAU frame	1

**Bit M2:**

The M2 bit is used to indicate 'valid' A-TRAU' frames. The M2 bit in both of the two consecutive A-TRAU frames relating to an A-TRAU' frame shall have the same value.

Transparent mode:

In transparent mode M2 is clamped to binary '0'.

The 3G MSC (uplink direction) sets M2 to binary '1' until it receives valid SDUs. When receiving valid SDUs M2 is set to binary '0'.

Non-transparent mode:

In non-transparent mode M2 is used for DTX. If DTX is applied, M2 is set to binary '1'. If DTX is not to be applied, M2 bit is set to binary '0'. The DTX handling is used in both directions for rate adaptation purpose. This means that the sending entity will insert 'fill RLP-frames' with DTX set to binary '1' in case no RLP-frame is available.

**Z bits:**

The bits Zi are used for Framing Pattern Substitution mechanism. This mechanism is defined in 3GPP TS 08.20 [19] .

**Mapping of A-TRAU' frames to PCM time slots:**

A-TRAU' frames shall be mapped octet aligned to PCM time slots. I.e. bit number 0 to 7 of each octet of an A-TRAU' frame shall be mapped to bit number 0 to 7 of the PCM time slot.

### 10.2.3 Handover within 3G PLMNs

After a handover from a 3G MSC to another 3G MSC the user plane between the anchor MSC and the visited MSC shall comply to

- the Iu UP protocol if both MSC are connected via an ATM interface.
- the A-TRAU' protocol if both MSC are connected via a TDM interface except for the transparent cases FNUR = 32 kbit/s (ITC = UDI or RDI), FNUR = 56 kbit/s (ITC=RDI) and FNUR = 64 kbit/s (ITC=UDI). For these exceptions a plain 64 kbit/s channel is used between the MSCs. The rate adaptation between 64kbit/s and 32kbit/s is based on ITU-T I.460.

## 10.2.4 Handover for 56kbit/s

The FNUR = 56 kbit/s in transparent mode can be supported in GSM by two configurations:

1. without IWF with the following channel codings
  - 2\*TCH/F32.0
  - 5\*TCH/F9.6
2. with IWF with the following channel coding
  - 4\*TCH/F14.4

The FNUR = 56 kbit/s in transparent mode is supported in UMTS by a configuration without IWF only. Therefore handover for 56kbit/s in transparent mode between UMTS and GSM can be supported only for configurations without IWF.

**End of last modified section**