3GPP TSG CN Plenary **Tdoc NP-000605**
Meeting #10, Bangkok, Thailand
6th – 8th December 2000

Source: **TSG CN WG 3**

Title: **CRs to R99 Work Item CS Bearers**

Agenda item: **7.21**

Document for: **APPROVAL**

Introduction:

This document contains **7** CRs on **R99 Work Item "CS Bearers",** that have been agreed by TSG CN WG3, and are forwarded to TSG CN Plenary meeting #10 for approval.

Spec	CR	Rev	Doc-2nd-	Phase	Subject	Cat	Version-Current
04.21	A021		N3-000595	R99	Handover for 56kbit/s	F	8.2.0
23.910	018		N3-000588	R99	Handover for 56kbit/s	F	3.2.0
23.910	019		N3-000604	Rel-4	Handover for 56kbit/s	A	4.0.0
27.001	045		N3-000615	R99	Handover for 56kbit/s	F	3.6.0
27.001	044		N3-000614	Rel-4	Handover for 56kbit/s	A	4.1.0
29.007	031		N3-000602	R99	Handover for 56kbit/s	F	3.6.0
29.007	032		N3-000603	Rel-4	Handover for 56kbit/s	A	4.0.0

3GPP TSG-CN3 Meeting #14
ETSI/Sophia Antipolis, France, 14th – 16th 2000

Tdoc N3-000588

CR-Form-v3

CHANGE REQUEST

⌘ **23.910** **CR** **018** ⌘ rev **-** ⌘ Current version: **3.2.0** ⌘

*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 [X] Radio Access Network [ ] Core Network [X]

Title:	⌘	Handover for 56kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	Circuit Switched Bearers
Date:	⌘	15/11/00
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Correction of chapter 10.2
Summary of change:	⌘	Handover for 56kbit/s between GSM and UMTS is restricted to configurations without IWF
Consequences if not approved:	⌘	Misalignment with other specifications

Clauses affected:	⌘	Chapter 10.2		
Other specs affected:	⌘	[ ] Other core specifications [ ] Test specifications [ ] O&M Specifications	⌘	29.007, 27.001, 04.21
Other comments:	⌘			

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. 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.
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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.

10 Handover Issues

10.1 Signalling issues

10.1.1 Loss of BC Information during Handover from GSM to UMTS

In the case of inter-MSC handover from GSM to UMTS, the serving GSM MSC/VLR sends a MAP message Prepare Handov carrying the BSSMAP message Handover Request. This message includes the parameter Channel Type, indicating whether rad resources are to be allocated for speech or data (parameter 'Speech or data indicator') and, among other data, the type of data service (transparent/non transparent) and the user rates (both included in the parameter 'Channel rate and type').

As no other bearer capability related parameters are received, it is not possible to distinguish between any other services than 'speech', 'data transparent' and 'data non-transparent'.

The mapping into QoS radio access parameters would be done as described in Section 5.2 , limited to the services 'speech', 'data, non-transparent' and 'data, transparent'.

10.1.2 Handover from UMTS to GSM

In case a UMTS call is set up in the CN, the BC IE parameters are mapped into QoS RAB parameters at call setup.

If the CN has to perform a handover towards GSM, the non-anchor MSC needs to perform an assignment based on GSM traffic channel parameters.

In case of handover from UMTS to GSM, the anchor MSC maps the BC IE parameters into GSM traffic channel parameters. This requires that the BC IE is coded according to GSM protocol requirements, i.e. all those parameters ignored in UMTS should nevertheless be correctly specified by the UE in order to perform a handover to GSM.

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

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.

3GPP TSG-CN3 Meeting #14 ***N3-000595***
Sophia Antipolis, France, 14 – 16 November

CR-Form-v3

CHANGE REQUEST

⌘ **04.21** **CR** **A021** ⌘ rev **-** ⌘ Current version: **8.2.0** ⌘

*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 ☒

Title:	⌘	Handover for 56 kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	CS bearers
Date:	⌘	2000-11-16
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Elimination of intersystem handover complications
Summary of change:	⌘	The concept of bit transparency is removed.
Consequences if not approved:	⌘	The specification does not comply with other specifications.

Clauses affected:	⌘	9		
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.910, 27.001, 29.007
Other comments:	⌘			

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9 The EDGE multiplexing function

In EDGE configurations the number of channels across the radio interface and that of substreams do not necessarily match. In such cases a multiplexing function is included at MS and BTS (3GPP TS 08.20). These functions distribute data between the substreams and radio channels.

At the MS the multiplexing function multiplexes 14.5 kbit/s substreams — produced either by the combination of Split/Combine and RA1/RA1' or RA1' functions in the transparent case, or by the combination of Split/Combine and RLP functions in the non-transparent case — into the TCH/F28.8 or TCH/F43.2 EDGE radio interface channels.

In the case of ~~bit~~ transparent 56 kbit/s or 64 kbit/s operation, the multiplexing function maps the data stream into two EDGE TCH/F32.0 radio interface channels.

3GPP TSG-CN3 Meeting #14
ETSI/Sophia Antipolis, France, 14th – 16th 2000

Tdoc N3-000602

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CHANGE REQUEST

⌘ **29.007** **CR** **031** ⌘ **rev** **-** ⌘ **Current vers** **3.6.0** ⌘

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

Title:	⌘	Handover for 56kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	Circuit Switched Bearers
Date:	⌘	15/11/00
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
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2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
REL-4 (Release 4)
REL-5 (Release 5)

Reason for change:	⌘	Correction of chapter 11
Summary of change:	⌘	Handover for 56kbit/s between GSM and UMTS is restricted to configuratons without IWF
Consequences if not approved:	⌘	The specification does not comply with other specifications

Clauses affected:	⌘	Chapter 11		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.910, 27.001, 04.21
Other comments:	⌘			

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11 Interworking between GSM and UMTS

11.1 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 [27] and 3GPP TS 08.20 [28];
- 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 [27] and 3GPP TS 08.20 [28]).

11.2 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 10ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 08.20 [28]) 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 1st and 2nd frame in both transmission modes.

11.2.1 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.

Table 10: A-TRAU' frame layout for transparent user rate

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'.

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

11.3 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 case 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 64 kbit/s and 32 kbit/s is based on ITU-T I.460 [2].

11.4 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.

Note: Handover between configurations with and without IWF are also not supported within GSM.

3GPP TSG-CN3 Meeting #14
ETSI/Sophia Antipolis, France, 14th – 16th 2000

Tdoc N3-000603

CR-Form-v3

CHANGE REQUEST

⌘ **29.007** **CR** **032** ⌘ **rev** **-** ⌘ **Current vers** **4.0.0** ⌘

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

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

Title:	⌘	Handover for 56kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	CORRECT
Date:	⌘	15/11/00
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Correction of chapter 11
Summary of change:	⌘	Handover for 56kbit/s between GSM and UMTS is restricted to configuratons without IWF
Consequences if not approved:	⌘	Specification does not align to other specifications

Clauses affected:	⌘	Chapter 11		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	23.910, 27.001, 04.21
Other comments:	⌘			

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Comprehensive information and tips about how to create CRs can be found at:
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.

11 Interworking between GSM and UMTS

11.1 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 44.021 [27] and 3GPP TS 48.020 [28];
- up to four 16kbit/s substreams are multiplexed in one 64kbit/s channel (Split/Combine function and Multiplexing function as defined in 3GPP TS 44.021 [27] and 3GPP TS 48.020 [28]).

11.2 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 10ms;
- an A-TRAU' frame consists of two consecutive A-TRAU frames (as defined in 3GPP TS 48.020 [28]) 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 1st and 2nd frame in both transmission modes.

11.2.1 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.

Table 10: A-TRAU' frame layout for transparent user rate

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'.

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	**C1**	**C2**	**C3**	**C4**	**C5**	**M1**	**M2**	
3	**Z1**	D1	D2	D3	D4	D5	D6	D7	
4	D8	D9	D10	D11	D12	D13	D14	D15	36 bit data field 1
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	**Z2**	D1	D2	
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	36 bit data field 2
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	
12	D35	D36	**Z3**	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	36 bit data field 3
15	D22	D23	D24	D25	D26	D27	D28	D29	
16	D30	D31	D32	D33	D34	D35	D36	**Z4**	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	36 bit data field 4
19	D17	D18	D19	D20	D21	D22	D23	D24	
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	**Z5**	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 5
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	**Z6**	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	
28	D15	D16	D17	D18	D19	D20	D21	D22	36 bit data field 6
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	**Z7**	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	36 bit data field 7
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	**Z8**	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	36 bit data field 8
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 48.020 [28].

11.3 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 case 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 64 kbit/s and 32 kbit/s is based on ITU-T I.460 [2].

11.4 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.

Note: Handover between configurations with and without IWF are also not supported within GSM.

3GPP TSG-CN3 Meeting #14
ETSI/Sophia Antipolis, France, 14th – 16th 2000

Tdoc N3-000604

CR-Form-v3

CHANGE REQUEST

⌘ **23.910** **CR** **019** ⌘ **rev** **-** ⌘ **Current vers** **4.0.1** ⌘

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

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

Title:	⌘	Handover for 56kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	CORRECT
Date:	⌘	15/11/00
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Correction of chapter 10.2
Summary of change:	⌘	Handover for 56kbit/s between GSM and UMTS is restricted to configuratons without IWF
Consequences if not approved:	⌘	Misalignment with other specifications

Clauses affected:	⌘	Chapter 10.2		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	29.007, 27.001, 04.21
Other comments:	⌘			

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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.

10 Handover Issues

10.1 Signalling issues

10.1.1 Loss of BC Information during Handover from GSM to UMTS

In the case of inter-MSC handover from GSM to UMTS, the serving GSM MSC/VLR sends a MAP message Prepare Handov carrying the BSSMAP message Handover Request. This message includes the parameter Channel Type, indicating whether rad resources are to be allocated for speech or data (parameter 'Speech or data indicator') and, among other data, the type of data service (transparent/non transparent) and the user rates (both included in the parameter 'Channel rate and type').

As no other bearer capability related parameters are received, it is not possible to distinguish between any other services than 'speech', 'data transparent' and 'data non-transparent'.

The mapping into QoS radio access parameters would be done as described in Section 5.2 , limited to the services 'speech', 'data, non-transparent' and 'data, transparent'.

10.1.2 Handover from UMTS to GSM

In case a UMTS call is set up in the CN, the BC IE parameters are mapped into QoS RAB parameters at call setup.

If the CN has to perform a handover towards GSM, the non-anchor MSC needs to perform an assignment based on GSM traffic channel parameters.

In case of handover from UMTS to GSM, the anchor MSC maps the BC IE parameters into GSM traffic channel parameters. This requires that the BC IE is coded according to GSM protocol requirements, i.e. all those parameters ignored in UMTS should nevertheless be correctly specified by the UE in order to perform a handover to GSM.

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 GSM 04.21 [18] and GSM 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 GSM 04.21 [18] and GSM 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 GSM 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 1st and 2nd 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	**C1**	**C2**	**C3**	**C4**	**C5**	**M1**	**M2**	
3	**Z1**	D1	D2	D3	D4	D5	D6	D7	
4	D8	D9	D10	D11	D12	D13	D14	D15	36 bit data field 1
5	D16	D17	D18	D19	D20	D21	D22	D23	
6	D24	D25	D26	D27	D28	D29	D30	D31	
7	D32	D33	D34	D35	D36	**Z2**	D1	D2	
8	D3	D4	D5	D6	D7	D8	D9	D10	
9	D11	D12	D13	D14	D15	D16	D17	D18	36 bit data field 2
10	D19	D20	D21	D22	D23	D24	D25	D26	
11	D27	D28	D29	D30	D31	D32	D33	D34	
12	D35	D36	**Z3**	D1	D2	D3	D4	D5	
13	D6	D7	D8	D9	D10	D11	D12	D13	
14	D14	D15	D16	D17	D18	D19	D20	D21	36 bit data field 3
15	D22	D23	D24	D25	D26	D27	D28	D29	
16	D30	D31	D32	D33	D34	D35	D36	**Z4**	
17	D1	D2	D3	D4	D5	D6	D7	D8	
18	D9	D10	D11	D12	D13	D14	D15	D16	36 bit data field 4
19	D17	D18	D19	D20	D21	D22	D23	D24	
20	D25	D26	D27	D28	D29	D30	D31	D32	
21	D33	D34	D35	D36	**Z5**	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 5
24	D20	D21	D22	D23	D24	D25	D26	D27	
25	D28	D29	D30	D31	D32	D33	D34	D35	
26	D36	**Z6**	D1	D2	D3	D4	D5	D6	
27	D7	D8	D9	D10	D11	D12	D13	D14	
28	D15	D16	D17	D18	D19	D20	D21	D22	36 bit data field 6
29	D23	D24	D25	D26	D27	D28	D29	D30	
30	D31	D32	D33	D34	D35	D36	**Z7**	D1	
31	D2	D3	D4	D5	D6	D7	D8	D9	
32	D10	D11	D12	D13	D14	D15	D16	D17	
33	D18	D19	D20	D21	D22	D23	D24	D25	36 bit data field 7
34	D26	D27	D28	D29	D30	D31	D32	D33	
35	D34	D35	D36	**Z8**	D1	D2	D3	D4	
36	D5	D6	D7	D8	D9	D10	D11	D12	
37	D13	D14	D15	D16	D17	D18	D19	D20	36 bit data field 8
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 GSM 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.

3GPP TSG-CN3 Meeting #14 ***N3-000614***
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CR-Form-v3

CHANGE REQUEST

⌘ **27.001** **CR** **044** ⌘ **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 ☒

Title:	⌘	Handover for 56 kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	CORRECT
Date:	⌘	15/11/00
Category:	⌘	**A**
Release:	⌘	REL-4

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Inconsistencies related to synchronous transparent bearer services at 56 kbit/s causing particular handover problems
Summary of change:	⌘	Revision of annexes A and B.
Consequences if not approved:	⌘	Unexpected disconnection of calls.

Clauses affected:	⌘	Annex A, table B.4f: Note 3, table B.5 and B.1.3.1.1, B.1.3.1.3, B.1.3.1.4, B.1.3.1.5 and B.1.3.1.6.		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	04.21, 23.910, 29.007
Other comments:	⌘			

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. 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.

Annex A (informative): List of Bearer Capability Elements

This annex lists the PLMN Bearer Capability Elements which need to be provided to support Terminal adaptation function to Interworking control procedures. Some parameters are ignored in UMTS although present in the BC-IE. The validity of parameter values may also differ from GSM to UMTS. The ignored parameters and the difference of parameter value validity in GSM and UMTS are listed in table B.5a in annex B.

Elements and their Values:

Information Transfer Capability:

This element is relevant between the IWF and the fixed network.

Values:
- Speech
- Unrestricted Digital
- Group 3 Facsimile (note 1)
- 3,1 kHz Ex PLMN (note 2)
- Restricted Digital (note 3)

NOTE 1: Used for facsimile transmission, unrestricted digital between MT and IWF and 3,1 kHz audio from IWF towards the fixed network.

NOTE 2: Unrestricted digital between MT and IWF and 3,1 kHz audio from IWF towards the fixed network.

NOTE 3: Unrestricted digital between MT and IWF and restricted digital information from IWF towards the fixed network; this value is signalled in the "Other ITC" element, due to a lack of further code points in the "ITC" element.

Transfer Mode:

This element is relevant between MT and IWF

Values:
- Circuit
- Packet

Structure:

This element is relevant between MT and IWF.

Values:
- Service Data Unit Integrity (note 4)
- Unstructured (note 5)

NOTE 4: Applicable for connection element "non transparent".

NOTE 5: Applicable for connection element "transparent".

Configuration:

This element is relevant for a PLMN connection.

Values:
- Point to point

Establishment:

This element is relevant for a PLMN connection.

Values:
- Demand

Sync/Async:

This element is relevant between TE/TA and MT and between IWF and the fixed network.

Values:
- Synchronous
- Asynchronous

Negotiation:

This element is relevant between MT and IWF.

Values:
- In band negotiation not possible

User Rate:

This element is relevant between TE/TA and MT and between IWF and the fixed network, except in case the parameter FNUR is present.

Values:
- 0.3 kbit/s
- 1.2 kbit/s
- 2.4 kbit/s
- 4.8 kbit/s
- 9.6 kbit/s
- 19.2 kbit/s (see note 6)

NOTE 6: This value cannot be signalled between MT and IWF, but it can be used according to the rules in 3GPP TS 29.007 (table 7A, 7B) for such connections.

Intermediate Rate:

This element is relevant between MT and BSS and BSS and IWF

Values:
- 8 kbit/s
- 16 kbit/s

Network Independent Clock on Tx:

This element is relevant between TE/TA and MT in the transmit direction.

Values:
- Not required
- Required

Network Independent Clock on Rx:

This element is relevant between TE/TA and MT in the receive direction.

Values:
- Not accepted
- accepted

Number of Stop Bits:

This element is relevant between the TE/TA and MT and between IWF and fixed network in case of asynchronous transmission.

Values:
- 1 bit
- 2 bit

Number of Data Bits Excluding Parity If Present:

This element is relevant between TE/TA and MT and between IWF and the fixed network in case of a character oriented mode of transmission.

Values:
- 7 bit
- 8 bit

Parity Information:

This element is relevant between TE/TA and MT and between IWF and the fixed network for a character oriented mode of transmission.

Values:
- Odd
- Even
- None
- Forced to 0
- Forced to 1

Duplex Mode:

This element is relevant between MT and IWF.

Values:
- Full Duplex

Modem Type:

This element is relevant between the IWF and the fixed network in case of 3,1 kHz audio ex-PLMN information transfer capability.

Values:
- V.21
- V.22
- V.22 bis
- V.26 ter
- V.32
- autobauding type 1
- none

Radio Channel Requirement:

This element is relevant between MT and BSS

Values:
- Full Rate support only Mobile Station
- Dual Rate support Mobile Station/Half Rate preferred
- Dual Rate support Mobile Station/Full Rate preferred

Connection Element:

This element is relevant between MT and IWF

Values:
- Transparent
- Non Transparent
- both, Transparent preferred
- both, Non transparent preferred

User Information Layer 2 Protocol:

This element is relevant between TE/TA and MT and between IWF and the fixed network.

Values:
- ISO 6429
- X.25
- X.75 layer 2 modified (CAPI)
- Character oriented Protocol with no Flow Control mechanism

Signalling Access Protocol:

This element is relevant between TE/TA and MT.

Values:
- I.440/450
- X.32

Rate Adaptation:

This element is relevant between IWF and the fixed network.

Values:
- V.110/X.30
- X.31 flagstuffing
- no rate adaptation
- V.120 (note 7)
- PIAFS (note 7)
- H.223 and H.245 (note 7)

NOTE 7: This value is signalled in the "Other Rate Adaption" element, due to a lack of further code points in the "Rate Adaption" element.

Coding Standard:

This element refers to the structure of the BC-IE defined in 3GPP TS 24.008.

Values:
- GSM

User Information Layer 1 Protocol:

This element characterize the layer 1 protocol to be used between MT and BSS (Um interface) according to 3GPP TS 05.01, or between the MT and the RNC (Uu interface).

Values:
- default

Negotiation of Intermediate Rate requested:

This element is relevant between MT and BSS and BSS and IWF.

Values:
- no meaning associated
- 6 kbit/s radio interface is requested for a full rate channel with a user rate up to and including 4,8 kbit/s, non transparent service

Compression:

This element is relevant between MT and IWF.

Values:
- compression possible/allowed
- compression not possible/allowed

Rate adaption header / no header:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Rate adaption header not included
- Rate adaption header included

Multiple frame establishment support in data link:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Multiple frame establishment not supported. Only UI frames allowed.
- Multiple frame establishment supported.

Mode of operation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Bit transparent mode of operation
- Protocol sensitive mode of operation

Logical link identifier negotiation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Default, LLI=256 only
- Full protocol negotiation (note 8)

NOTE 8: A connection over which protocol negotiation will be executed is indicated in the „In-band / out-band negotiation" parameter.

Assignor / assignee:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Message originator is „default assignee"
- Message originator is „assignor only"

In-band / out-band negotiation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Negotiation is done with USER INFORMATION messages on a temporary signalling connection
- Negotiation is done in-band using logical link zero.

Fixed network user rate, FNUR (Note 12)

This element is relevant between the IWF and the fixed network.

Values
- Fixed network user rate not applicable (note 9)
- 9,6 kbit/s
- 14,4 kbit/s
- 19,2 kbit/s
- 28,8 kbit/s
- 32,0 kbit/s
- 38,4 kbit/s
- 48,0 kbit/s
- 56,0 kbit/s
- 64,0 kbit/s

NOTE 9: Not used by currently specified services.

Wanted air interface user rate, WAIUR (note 12)

This element is relevant between the MT and the IWF

Values
- Air interface user rate not applicable
- 9,6 kbit/s
- 14,4 kbit/s
- 19,2 kbit/s
- 28,8 kbit/s
- 38,4 kbit/s
- 43,2 kbit/s
- 57,6 kbit/s
- interpreted by the network as 38,4 kbit/s (note 10)

NOTE 10: Certain code points, if used, will be interpreted by the network as 38.4 kbit/s in this version of the protocol, ref 3GPP TS 24.008.

Acceptable channel codings, ACC (note 12)

This element is relevant between the MT and the IWF.

Value: - TCH/F4.8 acceptable
- TCH/F9.6 acceptable
- TCH/F14.4 acceptable
- TCH/F28.8 acceptable
- TCH/F32.0 acceptable (Applicable to multimedia 32, 56 and 64 kbit/s and ~~bit~~ synchronous transparent 56 and 64 kbit/s services only)
- TCH/F43.2 acceptable (Applicable to non-transparent services only.)

Maximum number of traffic channels, MaxNumTCH (Note 12)

This element is relevant between the MT and the IWF.

Value: - 1 TCH
- 2 TCH
- 3 TCH
- 4 TCH
- 5 TCH
- 6 TCH
- 7 TCH (note 11)
- 8 TCH (note 11)

NOTE11: Not used by currently specified services.

Other modem type, OMT (Note 12)

This element is relevant between the IWF and the fixed network in case of 3,1 kHz audio ex-PLMN

Values: - no other modem type specified in this field
- V.34

User initiated modification indication, UIMI (Note 12)

This element is relevant between the MT and the IWF.

Values: - user initiated modification not requested
- user initiated modification upto 1 TCH requested
- user initiated modification upto 2 TCH requested
- user initiated modification upto 3 TCH requested
- user initiated modification upto 4 TCH requested

Asymmetry preference indication (Note 12)

This element is relevant between the MT and the BSS.

Value: - no preference
- up link biased asymmetry preference
- down link biased asymmetry preference

NOTE 12:These GBS-related parameters are optional.

For a multislot configuration, the following applies to the parameters contained in the BC-IE:

- Half rate channels are not supported. The MS shall code the radio channel requirement as "Full rate support only MS" or "Dual rate support MS, full rate preferred'. In the second case, the network shall assign full rate channel(s) only.

- The 'fixed network user rate' and 'other modem type' (ref. table B.4a) takes precedence over the 'user rate' and 'modem type'.

- The ACC indicates which channel coding is acceptable and supported by the MS. In case of CE:NT the TCH/F4.8 and TCH/F9.6 acceptable is equivalent to the support of NIRR. If TCH/F4.8 acceptable only or TCH/F9.6 acceptable only or TCH/F14.4 acceptable only is indicated, the assigned channel type which can be chosen by the network is TCH/F4.8 or TCH/F9.6 or TCH/F14.4, respectively.

- The 'intermediate rate' parameter is overridden. The intermediate rate used per each TCH/F is derived from the chosen channel type:

channel type	**IR per TCH/F**
TCH/F4.8	8 kbit/s
TCH/F9.6	16 kbit/s
TCH/F14.4	intermediate rate is to be defined

- The user rate per TCH is derived from the chosen channel type:

channel type	**user rate per TCH**
TCH/F4.8	4.8 kbit/s
TCH/F9.6	9.6 kbit/s

For CE:T, the padding procedure described in GSM 04.21 can be applied.

Annex B (normative): Setting of Bearer Capability, Low Layer Compatibility and High Layer Compatibility Information Element for PLMN Bearer Services and PLMN TeleServices

B.0 Scope

This annex describes the relationship between the various parameters of the PLMN Bearer Capability Information Element (BC-IE), their validity and the possible settings with reference to each PLMN Bearer service/Teleservice defined in 3GPP TS 02.02 and GSM 02.03 as well as the various occurrences during the connection control (clause B.1). Furthermore, the contents of the Low Layer (LLC) and the High Layer (HLC) Compatibility Information Elements are described (clause B.2).

B.1 Bearer Capability Information Element

B.1.1 Introduction

B.1.1.1 General Consideration

In general, the purpose of the bearer capability information element (BC-IE) is to request a particular bearer service to be provided by the network. This indication is carried by certain connection control messages which for the subject matter of the present document may be categorized into those messages:

- related to the call set-up phase; and
- those used during the established connection.

During the call set-up phase the PLMN BC-IE (single or multiple) is included in:

- the SETUP message generated by the requesting entity (either MS or MSC) to establish a mobile-originated or mobile-terminated call, respectively, and in
- the CALL CONFIRMED or CALL PROCEEDING messages, respectively, generated by the responding entity (either MS or MSC) in order to negotiate certain parameter values. If no BC-IE is contained in the SETUP message (PSTN-originated call with single-numbering scheme) the CALL CONFIRMED message indicates the complete applicable BC-IE. In this case neither the value "unrestricted digital" for the information transfer capability nor the multislot for TCH/14 related parameters shall be used.

During the established connection the PLMN BC-IE is included in the MODIFY, MODIFY COMPLETE, and MODIFY REJECT messages in order to change the service (bearer capability) or to change the maximum number of traffic channels and/or wanted air interface user rate when a non-transparent multislot data service is in use.

If the maximum number of traffic channels and/or wanted air interface user rate is to be changed, the BC-IE included in the MODIFY message shall not indicate a different bearer service than the one used at this stage of the connection - the values of the parameters 'maximum number of traffic channels' and/or 'wanted air interface user rate' may be changed, only.

The subsequent tables and subsections of clause B.1 deal with the representation of the individual contents of the PLMN BC-IE during the call set-up phase. For the use during the established connection refer to 3GPP TS 24.008.

With respect to the individual parameter settings at the MS the following cases may be distinguished (ref. 3GPP TS 27.002 and 3GPP TS 27.003):

- Mobile-originated call set up by a MS consisting of a MT with R interface:
  - The setting results from respective MMI actions and/or MT internal settings.
- Mobile-originated call set up by a MS consisting of a MT with S interface:
  - The setting of the PLMN BC is derived from the ISDN BC and LLC/HLC elements contained in the ISDN SETUP message received from the terminal. It is complemented by information resulting from respective MMI actions and/or MT internal settings.
- Mobile-terminated call set up to a MS consisting of a MT with R interface:
  - The BC related part of the compatibility check is carried out according to the knowledge of the MT concerning its implemented functions (i.e. answering the call). The requested field values of the non-negotiable parameters and the selected field values of the negotiable parameters determine the selection of the terminal function to be used for the intended connection.
- Mobile-terminated call set up to a MS consisting of a MT with S interface:
  - The PLMN BC received from the MSC is mapped by the MT onto an applicable ISDN BC. In some cases a HLC may be generated, if it is not otherwise available (e.g. for group 3 facsimile). The BC related part of the compatibility check is up to the terminal connected to the S interface of the MT, as is the selection of the terminal function (i.e. answering the call) to be used for the intended connection.

B.1.1.2 Interpretation of the Diagrams

The purpose of the subsequent diagrams is to achieve unambiguous representation of the individual contents of the PLMN BC-IE for the various occurrences during the call set-up phase, covering all bearer services and teleservices according to 3GPP TS 22.002 and 3GPP TS 22.003.

The basic principle adopted is a graphic scheme, or mask, wherein the ordinate designates the individual parameters of the PLMN BC-IE and the abscissa gives the possible field values of these parameters. The abbreviations used in these sections are defined in table B.5. The allowed content of any PLMN BC-IE is represented by a number of graphs connecting parameter values (abscissa points) of all parameters (ordinate points). Each graphic scheme is subdivided into two independent parts:

- "Layer/Protocol related" part; and
- "Radio Channel related" part.

The generation of all PLMN BC-IEs in all call set-up messages shall be in accordance with these graphs. Subclauses B.1.2 through B.1.11 show individual sets of graphs for each service group (BS/TS) and for each type of applicable Information Transfer Capability.

In addition, the following rules apply:

- Those parameters which have only one possible field value for all recognized services are shown in table B.5, where they are marked accordingly in the column "common setting of field values". They are not represented in the graphic scheme.
- Not all parameters of the PLMN BC-IE are relevant for each service (BS/TS). This is represented by specific abscissa points with a value of "NA" (Not Applicable) allocated to these parameters. The graphs pass through these points for each such parameter. The actual field value to be used in the PLMN BC-IE is marked in the column "default setting of field values (NA)" of table B.5. An abscissa point with a value of "NAV" (Not AVailable) indicates that the entire octet carrying this parameter (ref. table B.2 "General Structure of the PLMN BC-Information Element") shall be omitted.

- Unless FTM is applied, there is a particular dependency of the parameters "User Information Layer 2 Protocol (UIL2P)" and "Connection Element (CE)":
  - If the MS sends a PLMN BC-IE with a CE value other than "Transparent (T)", the parameter UIL2P is essential. Its field value must be set as indicated in the applicable graph.
  - If the MSC sends a PLMN BC-IE in the SETUP message, the parameter UIL2P may also be absent in the case of the CE parameter value being other than "Transparent (T)".
- In case FTM is applied, the PLMN BC-IE shows a CE value "non-transparent", SA value "asynchronous", and RA value X.31 flag stuffing. The UIL2P is not available.
- Certain parameters of the PLMN BC-IE may be negotiated during the connection establishment phase. Table B.1 shows these parameters and the relations of their values in the SETUP message and in the CALL CONFIRMED/CALL PROCEEDING message, respectively, both for the mobile-originated and mobile-terminated case. A parameter may indicate a field value of one of the following types:
  - "requested value" indicating a request which cannot be changed by the responding entity;
  - "offered value" indicating a proposal which may be changed by the responding entity;
  - a particular choice value leaving it up to the responding entity which value ultimately applies;
  - "as requested" indicating that the requested value applies and is confirmed (by returning it);
  - "selected value" indicating that a particular value applies either out of the offered set or as a free choice out of the defined set of values;
  - "supported value" indicating a value supported by the responding entity.

Table B.1: BC-Parameters subject to negotiation procedure

Mobile Originated Call:

	Message	
BC-parameter	**SETUP**	**CALL PROC**
NDB	Requested value	as requested
NPB	Requested value	as requested
NSB	Requested value	as requested
CE	Requested value (T/NT)	as requested
	"both" with the preferred value indicated (e.g. both NT)	selected value (T/NT)
UIL2P	Requested value [9] or NAV [1]	as requested or NAV [4]
User Rate	Requested value	as requested
DC	Requested value [2]	as requested or "NO" [7]
FNUR	Requested value	supported value
Other MT	Requested value	supported value
UIMI	Requested value	supported value

Mobile Terminated Call:

	Message	
BC-parameter	**SETUP**	**CALL CONF**
NDB	Offered value	selected value (free choice)
NPB	offered value	selected value (free choice)
NSB	offered value	selected value (free choice)
CE	requested value (T/NT)	as requested or selected value (T/NT) (free choice) 3)
	"both" with the preferred value indicated (e.g. both NT)	selected value (T/NT)
Sync/ Asynchronous	requested value	as requested or selected value 10)
Rate adaptation/Other rate adaptation	requested value	as requested or selected value 11)
UIL2P	offered value 2) or NAV 4)	selected or NAV 1)
User Rate	offered value	selected value 5)
DC	requested value 2)	as requested or "NO" 7)
FNUR	offered value	selected value 6)
Other MT	offered value	selected value 6)
UIMI	offered value	selected value 8)

1) For CE:T only, out-band flow control, or RA:X.31 flag stuffing requested by the MS.
2) Not for CE:T.
3) When the SETUP message contains no BC-IE (single numbering scheme).
4) "NAV" shall not be interpreted as an out-band flow control request by the MS.
5) The modification of User Rate must be in conjunction with Modem Type and Intermediate Rate.
6) The modification of the Fixed Network User Rate shall be in conjunction with the Modem Type and/or Other Modem Type.
7) In case of a Mobile Terminated Call, if the SETUP message does not contain a BC-IE, the MS shall behave as if the DC is set to "data compression not possible".
In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the DC was set to "data compression not possible" or "data compression not allowed", respectively.
8) Less or equal to the offered value.
9) Not for CT:T or FTM (i.e., CE:NT, SA:A, RA:X.31 flag stuffing).
10) For FTM and PIAFS, this parameter may be negotiated. See Table B.4e for details.
11) For FTM, PIAFS and Multimedia, this parameter may be negotiated. See Table B.4f for details.

Table B.2: General Structure of the BC-Information Element

OCTET	INFORMATION ELEMENT FIELD	
3	Radio channel requirements Coding standard Transfer mode Information Transfer Capability	
4	Structure Duplex mode Configuration Establishment Negotiation of Intermediate Rate Requested Compression	2)
5	Rate adaption Signalling access protocol	2)
5a	Other ITC Other rate adaption	2) 7)
5b	Rate adaption header / no header Multiple frame establishment support in data link Mode of operation Logical link identifier negotiation Assignor / assignee In-band / out-band negotiation	2) 3)
6	User information layer 1 protocol Synchronous / asynchronous	2)
6a	Number of stop bits Negotiation Number of data bits User rate	2)
6b	Intermediate rate NIC on transmission NIC on reception Parity information	2)
6c	Connection element Modem type	2)
6d	Fixed network user rate Other modem type	4)
6e	Maximum number of traffic channels Acceptable channel codings	4)
6f	Wanted air interface user rate User initiated modification indication	4)
6g	Acceptable Channel codings Asymmetry preference indication	5) 6)
7	User information layer 2 protocol	1) 2)

1) Octets optional.
2) Octets only available if the parameter "Information Transfer Capability" does not indicate "Speech".
3) For V.120 rate adaption only.
4) Optional octets available only if the parameter "Information Transfer Capability" does not indicate "Speech".
5) Extension of the 'Acceptable channel codings' field in octet 6e in case EDGE channel codings are supported.
6) Only used if EDGE channels are among the 'Acceptable channel codings'. The value shall be set to 'no preference' in case the connection element is T.
7) For ITC=RDI or UIL1P=V.120, PIAFS, and 'H.223 and H.245' only.

Table B.3a: Selection of flow control method (for CE:NT with SA:A only)

	flow control method		
information element	in-band	out-band (3)	none
number of data bits	7 or 8	7 or 8	7 or 8
user information layer 2 protocol	ISO 6429 (1)	NAV	COPnoFlCt (2)

1) ISO6429 stands for "ISO 6429, codeset 0, DC1/DC3" and is applicable for 7 and 8 bit codes.

2) COPnoFlCt stands for a character oriented protocol with no flow control mechanism (no reserved characters for flow control).

3) "out-band" flow control requires V.42 in case of PSTN or V.110 in case of ISDN.
If the V.110 flow control mechanism is not supported, where required, the call pending shall be terminated.
If the V.42 functionality is not supported by the modem in the IWF or in the fixed network, the call will be supported with a fallback to the non-V.42 mode. In this case the IWF will release the call if due to temporary throughput problems on the radio interface or initiation of flow control by the MS and the inability to flow control the fixed network modem an overflow of the L2R buffers occurs.
Note that a phase 1 network may release the call, if the V.42 functionality is not provided by the IWF or the fixed network modem. As V.42 does not apply to V.21 modems, outband flow control can not be supported for these modem types.

Table B.3b: Selection of PLMN Profile (for CE:NT with SA:S only)

Mobile Terminated Call:

BC-parameter	Message SETUP	Message CALL CONF
UIL2P	X.25	X.25 or X.75

Table B.4a: Modem Type subject to negotiation procedure

Mobile Originated Call:

	BC-parameter MT and OMT 6)	
BC-parameter CE	**Message SETUP**	**Message CALL PROC**
T	V-series	V-series
NT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 1)
bothT or bothNT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 1)2)

Mobile Terminated Call:

	BC-parameter MT and OMT 6)	
BC-parameter CE	**Message SETUP**	**Message CALL CONF**
T	V-series	V-series
NT	V-series	V-series or autobauding type 1 3)
	autobauding type 1	autobauding type 1 or V-series 4)
bothT or bothNT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 4)5)

1) No autobauding capability in the IWF:MSC.
2) CE:T selected by IWF/MSC.
3) Free choice if the SETUP contains no BC-IE (single numbering scheme).
If the IWF/MSC has no autobauding capability, a V-series modem type is used.
4) When the MS does not allow the use of autobauding capability.
5) CE:T selected by the MS.
6) When the MT indicates "autobauding" , "modem for undefined interface" or "none", the OMT shall be set to "no other modem type". Any other values of the MT is overridden by the OMT value.

Table B.4b: Intermediate Rate negotiation procedure

If the user rate is 9.6 kbit/s the intermediate rate negotiation procedure is not applicable and NIRR shall be set to "No meaning".

Recipient of SETUP supports full rate, non transparent, 6 kbit/s radio interface rate and the user rate is up to/equal 4,8 kbit/s:

BC-parameter	Message SETUP	Message CALL CONF or CALL PROC
NIRR	6 kbit/s	6 kbit/s
IR	16 kbit/s	8 kbit/s
User Rate	up to/equal 4,8 kbit/s	as requested

NOTE 1: In case of a Mobile Terminated Call, if the SETUP message does not contain a BC-IE, the MS shall behave as if NIRR set to "No meaning".

In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the NIRR was set to "No meaning".

Recipient of SETUP does support full rate, non transparent, but not in connection with 6 kbit/s radio interface rate:

BC-parameter	Message SETUP	Message CALL CONF or CALL PROC
NIRR	6 kbit/s	No meaning
IR	16 kbit/s	16 kbit/s
User Rate	up to/equal 4,8 kbit/s	as requested

NOTE 2: If no other parameter needs negotiation, the CALL CONF/PROC message need not contain any BC-IE.

In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the NIRR was set to "No meaning".

NOTE 3: In case a GBS-operation is requested and acknowledged, the MS indicates the acceptable channel codings. The indicated acceptance of TCH/F4.8 is equivalent to the support of 6 kbit/s radio interface rate per TCH/F and therefore overrides the NIRR parameter.

Table B.4c Negotiation of fixed network user rate

BC-parameter	Message SETUP	Message CALL PROC/CONFIRMED
FNUR	requested value	equal or lower than the requested value

The network might accept the modified value or reject the call. The FNUR negotiation is applicable in case of a HSCSD-operation, only.

Table B.4d Negotiation of user initiated modification indication

BC-parameter	Message SETUP	Message CALL PROC/CONFIRMED
UIMI	offered value	equal to or a value indicating a request for modification to a lower number of traffic channels than offered

Table B.4e: Negotiation of Synchronous/Asynchronous

Mobile Terminated Call:

	BC-parameter Synchronous/Asynchronous	
Bearer type	Message SETUP	Message CALL CONF
FTM[1)]	Synchronous	Asynchronous
PIAFS[2)]	Synchronous	Asynchronous

1) This negotiation is possible, only if ITC=UDI or RDI, FNUR=64 or 56 kbit/sand CE=NT or "both" is signalled in the SETUP message. The MS shall signal FTM as specified in B.1.2.3 .

2) This negotiation is possible, only if ITC=UDI, FNUR=32 kbit/s and CE= "both" is signalled in the SETUP message. The UE shall signal PIAFS as specified in B.1.2.4

Table B.4f: Negotiation of Rate adaptation/Other rate adaptation

Mobile Terminated Call:

	BC-parameter Rate adaptation/Other rate adaptation	
Bearer type	Message SETUP	Message CALL CONF
FTM[1)]	V.110, I.460 and X.30	X.31 flag stuffing
PIAFS[2)]	V.110, I.460 and X.30	PIAFS
Multimedia	V.110, I.460 and X.30[3)]	H.223 and H.245
	No rate adaptation[5)]	H.223 and H.245

1) This negotiation is possible, only if ITC=UDI or RDI, FNUR=64 or 56 kbit/s and CE=NT or "both" is signalled in the SETUP message. The MS shall signal FTM as specified in B.1.2.3.

2) This negotiation is possible, only if ITC=UDI, FNUR=32 kbit/s and CE= "both" is signalled in the SETUP message. The UE shall signal PIAFS as specified in B.1.2.4.

3) This negotiation is possible, only if ITC=UDI or RDI, FNUR=32 or 56 kbit/s and CE=T or "both" is signalled in the SETUP message. The MS shall signal 3G-H.324/M as specified in ~~B.1.3.1.6~~B.1.3.1.3, B.1.3.1.4 and B.1.3.1.6.

5) This negotiation is possible, only if ITC=3,1 kHz, FNUR=28.8 kbit/s, MT=V.34 and CE=T or "both" is signalled in the SETUP message. The MS shall signal 3G-H.324/M as specified in B.1.3.2.3.

Table B.5: BC parameter setting (part 1)

Abbreviations for Parameters and Values		common setting of field values	default setting of field values (NA)
		V	V
ITC...Information Transfer Capability:	- Speech - UDI..Unrestricted Digital - FAX3..Group 3 Facsimile - 3,1 kHz..3,1 kHz Ex PLMN - RDI..Restricted Digital		
TM....Transfer Mode:	- ci..Circuit	X	X
S.....Structure:	- SDU..Service Data Unit Integrity - Unstructured	X	
C.....Configuration:	- pp..Point to point	X	X
E.....Establishment:	- de..Demand	X	X
SA....Sync/Async:	- S..Synchronous - A..Asynchronous		
N.....Negotiation	- ibn..in band negotiation not possible	X	X
UR....User Rate:	- 0.3..0.3 kbit/s - 1.2..1.2 kbit/s - 2.4..2.4 kbit/s - 4.8..4.8 kbit/s - 9.6..9.6 kbit/s		
IR....Intermediate Rate:	- 4.. 4 kbit/s - 8.. 8 kbit/s - 16.. 16 kbit/s - not_used..not used	X	
NICT..Network Independent Clock on Tx:	- not_required.. Not required - required	X	X
NICR..Network Independent Clock on Rx:	- not_accepted..not accepted - accepted	X	X
NSB...Number of Stop Bits:	- 1..1 bit - 2..2 bit	X	
NDB...Number of Data Bits Excluding Parity If Present:	- 7.. 7 bit - 8.. 8 bit	X	
NPB...Parity Information:	- Odd - Even - None - 0.. Forced to 0 - 1.. Forced to 1	X	
UIL1P.User Information Layer 1 Protocol	- def..default layer 1 protocol	X	X

Table B.5: BC parameter setting (part 2)

common setting of field values

Abbreviations for Parameters and Values

default setting of field values (NA)

		V	V
DM....Duplex Mode:	-		
	- fd.. Full Duplex	X	X
MT....Modem Type:	- V.21		
	- V.22		
	- V.22 bis		
	- V.26 ter		
	- V.32		
	- auto1.. autobauding type 1		
	- none	X	
RCR...Radio Channel Requirement:	- FR Full Rate support only Mobile Station		
	- dual HR Dual Rate support Mobile Station/ Half Rate preferred		
	- dual FR Dual Rate support Mobile Station/ Full Rate preferred		
CE....Connection Element:	- T.. Transparent		
	- NT.. Non Transparent		
	- bothT both transparent preferred		
	- bothNT both non Transparent preferred		
UIL2P.User Information Layer 2 Protocol:	- ISO6429..ISO6429,codeset 0,DC1/DC3		
	- X.25		
	- X.75..X.75 layer 2 modified (CAPI)		
	- COPnoFlCt..Character oriented protocol with no flow control mechanism		
SAP...Signalling Access Protocol:	- I.440.. I.440/450	X	
	- X.32		
RA....Rate Adaptation:	- V.110.. V.110/X.30		
	- X.31Flag.. X.31 flagstuffing		
	- NO.. no rate adaptation	X	
	- V.120		
	- PIAFS		
	- H.223 and H.245		
CS....Coding Standard:	- GSM	X	X
NIRR..Negotiation of Intermediate Rate Requested:	NM..No Meaning associated with this value 6kbit/s..6kbit/s radio interface rate requested	X	
DC....Data Compression	- DC.. compression possible/allowed		
	- NO.. compression not possible/allowed	X	

Table B.5: BC parameter setting (part 3)

Abbreviations for Parameters and Values		common setting of field values	default setting of field values (NA)
			V
FNUR...Fixed Network User Rate	- FNUR not applicable - 9.6.. 9.6 kbit/s - 14.4.. 14.4 kbit/s - 19.2.. 19.2 kbit/s - 28.8.. 28.8 kbit/s - 32.0.. 32.0 kbit/s - 33.6.. 33.6 kbit/s - 38.4.. 38.4 kbit/s - 48.0.. 48.0 kbit/s - 56.0.. 56.0 kbit/s - 64.0.. 64.0 kbit/s		
WAIUR...Wanted Air Interface User Rate	- WAIUR not applicable - 9.6.. 9.6 kbit/s - 14.4.. 14.4 kbit/s - 19.2.. 19.2 kbit/s - 28.8.. 28.8 kbit/s - 38.4.. 38.4 kbit/s - 43.2.. 43.2 kbit/s - 57.6.. 57.6 kbit/s - int 38.4.. interpreted by the network as 38.4 kbit/s		X
ACC.....Acceptable channel codings	- 4.8.. TCH/F4.8 acceptable - 9.6.. TCH/F9.6 acceptable - 14.4..TCH/F14.4 acceptable - 28.8..TCH/F28.8 acceptable - 32.0..TCH/F32.0 acceptable - 43.2..TCH/F28.8 acceptable - none..No channel coding (defined by selecting none of the above		
MaxNumTCH...Maximum Number of Traffic Channels	- 1.. 1 TCH - 2.. 2 TCH - 3.. 3 TCH - 4.. 4 TCH - 5.. 5 TCH - 6.. 6 TCH - 7.. 7 TCH - 8.. 8 TCH		
OMT...Other modem type	- no other MT.. no other modem type - V.34.. V.34		
User initiated modification indication	- not req.. user initiated modification not required - upto 1 TCH.. user initiated modification upto 1 TCH may be requested - upto 2 TCH.. user initiated modification upto 2 TCH may be requested - upto 3 TCH.. user initiated modification upto 3 TCH may be requested - upto 4 TCH.. user initiated modification upto 4 TCH may be requested		X
Asymmetry preference indication	- 00 no preference - 01 up link biased asymmetry preferred - 10 down link biased asymmetry preferred		

Table B.5a: Differences in parameter value validity in GSM and UMTS

Parameter / *value*	**GSM**	**UMTS**
Radio Channel Requirements / *any*	valid	ignored
User rate / *any*	valid	ignored
Intermediate Rate / *any*	valid	ignored
NIC on transmission / *any*	valid	ignored
NIC on reception / *any*	valid	ignored
Negotiation of IR requested / *any*	valid	ignored
Acceptable Channel Codings / *any*	valid	ignored (note 1)
Maximum number of traffic channels / *any*	valid	ignored (note 1)
User initiated modification indication / *any*	valid	ignored
Asymmetry preference indication/ *any*	valid	ignored
Modem type /		
V.21, V.22, V.22bis, V.26ter	valid	invalid
V.32	valid	invalid for CE=T
Fixed Network User Rate /		
32 kbit/s	Invalid for CE = NT	valid
33.6 kbit/s	invalid	valid
9.6, 14.4, 19.2, 38.4	valid	invalid for CE=T
48.0	valid	invalid
Other Rate adaptation /		
H.223 and H.245	valid	valid
PIAFS	invalid	valid

NOTE: Although a parameter value is marked as "valid", the validity may be restricted by rules given elsewhere in the present document.

NOTE 1: This parameter is relevant in UMTS for NT calls for deciding which RLP version to negotiate in order to avoid renegotiation of RLP version in case of handover, see 3GPP TS 24.022 [9]. It is otherwise irrelevant for specifying the UTRAN radio access bearer.

Table B.6: Channel combinations

Single Bearer and Teleservices

MS indication BC	Network selection CT CT
FR	FR
dual FR	FR or HR
dual HR	HR or FR

Alternate services

MS indication		Network selection				
BC(1)	BC(2)	CT(1)	CT(2)	Or	CT(1)	CT(2)
FR	FR	FR	FR			
FR	dual Rate	FR	FR			
dual Rate	dual Rate	FR	FR	Or	HR	HR
dual Rate	FR	FR	FR			

Followed-by services

MS indication		Network selection							
BC(1)	BC(2)	CT(1)	CT(2)	or	CT(1)	CT(2)	or	CT(1)	CT(2)
FR	FR	FR	FR						
FR	dual Rate	FR	FR						
dual Rate	dual Rate	FR	FR	or	HR	HR	or	FR	HR
dual Rate	FR	FR	FR						

BC Bearer Capability
CT Channel Type
dual Rate {dual FR | dual HR}

Table B.7: TS61/TS62 Negotiation rules

Mobile Originating Call

Subscription	SETUP	CALL PROCEED
TS61	TS61 s/f	TS61 s/f or TS62
	TS61 f/s	TS61 f/s or TS62
	TS62	TS62
TS62	TS61 s/f	TS62
	TS61 f/s	TS62
	TS62	TS62

Mobile Terminating Call

Subscription	SETUP	CALL CONFIRMED
TS61	TS61 s/f	TS61 s/f or TS61 f/s or TS62
	TS61 f/s	TS61 s/f or TS61 f/s or TS62
	TS62	TS62
	no BC	TS61 s/f or TS61 f/s or TS62
TS62	TS62	TS62
	no BC	TS62 (note)

s/f = speech then fax
f/s = fax then speech

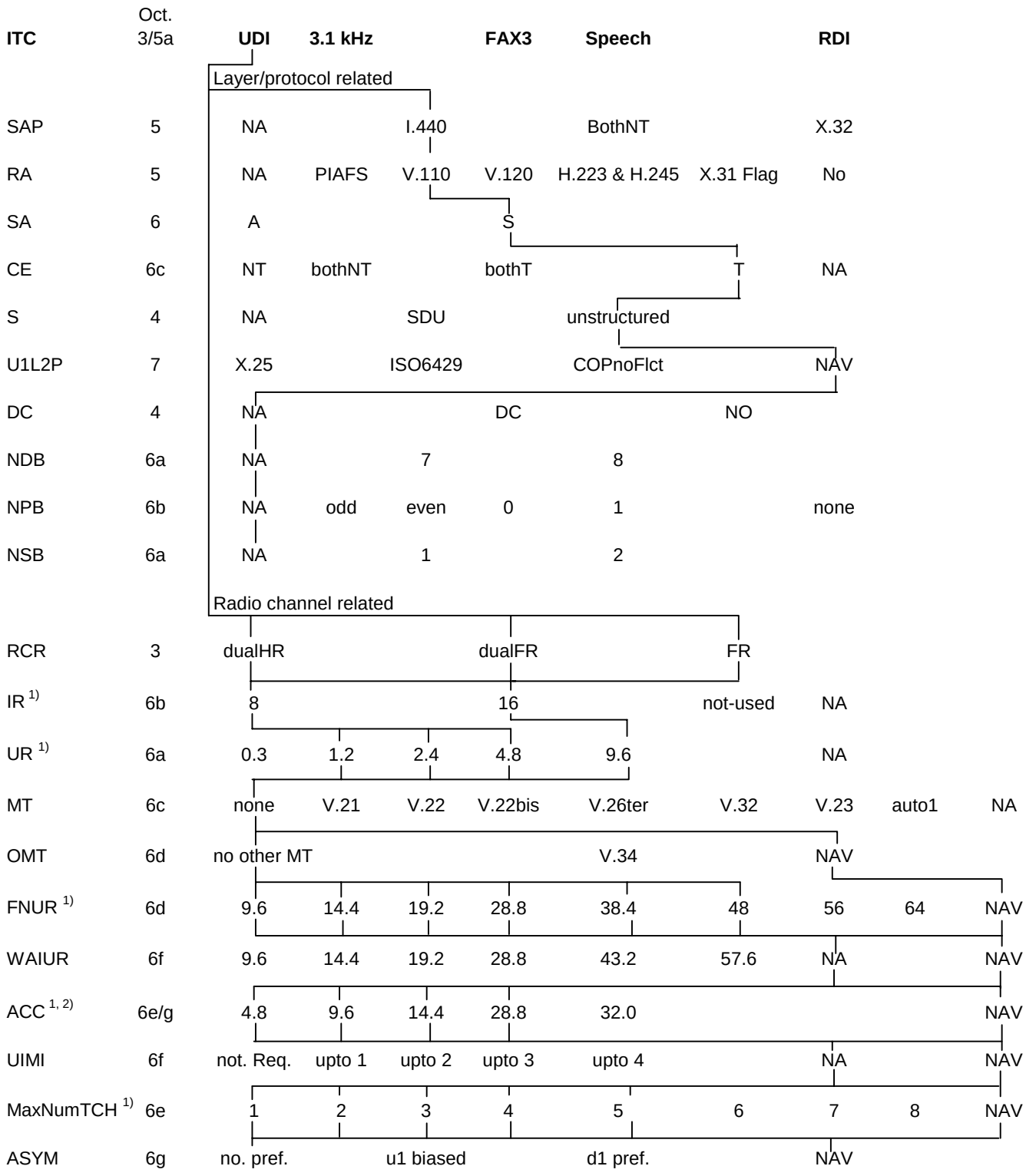
NOTE: TS61 is also accepted if the VMSC supports TS61 and does not perform subscription checking on a CALL CONFIRMED message (see 3GPP TS 02.01 and 3GPP TS 29.007).

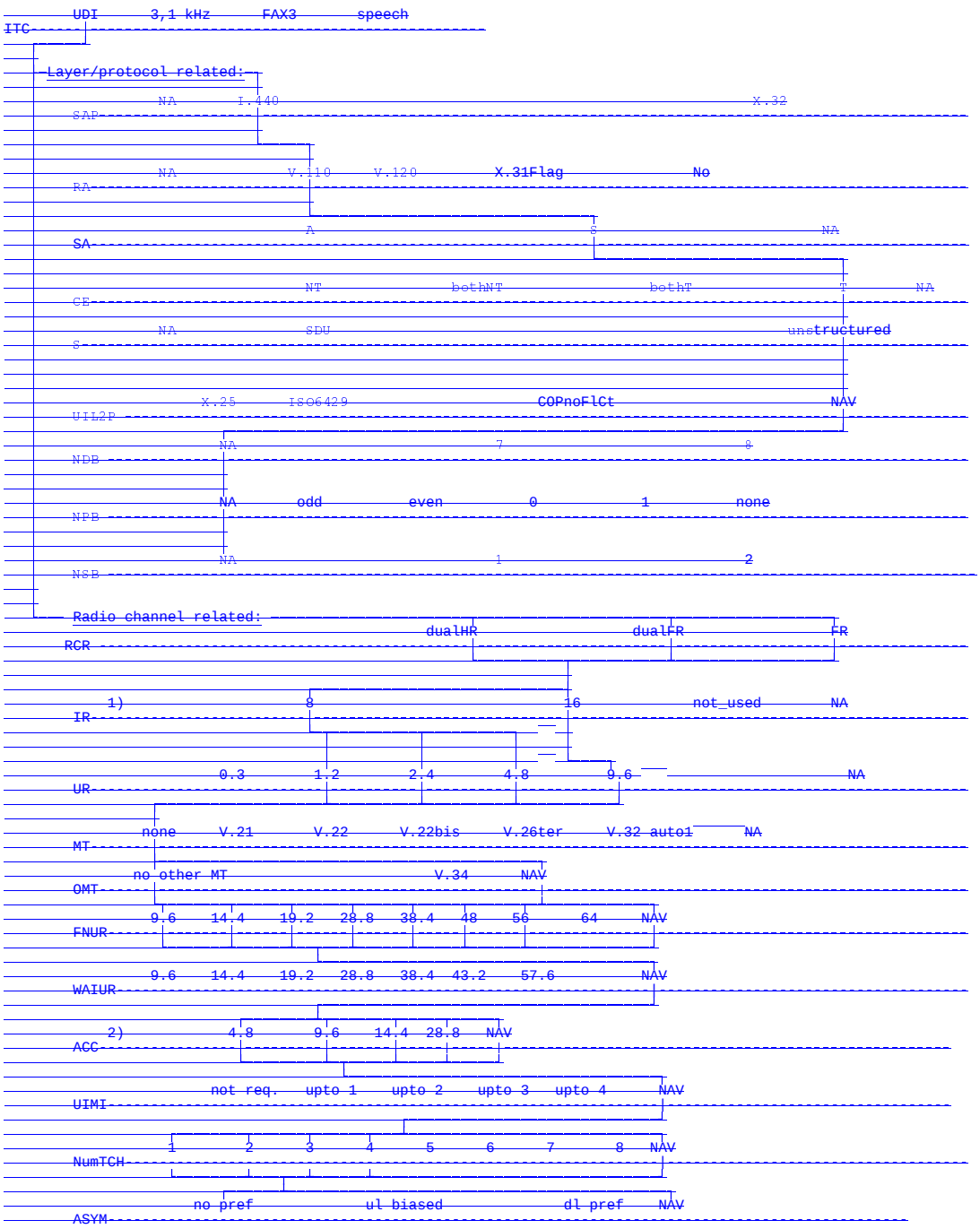
B.1.3 Bearer Service 30, Data Circuit Duplex Synchronous

B.1.3.1 Unrestricted/restricted digital information transfer capability

B.1.3.1.1 ~~Non-X.32 Cases~~Transparent FNUR <= 48 kbit/s (TCH/F4.8, TCH/F9.6, TCH/14.4, TCH/F28.8)

Applies to GSM/GERAN only. No HO to/from UTRAN



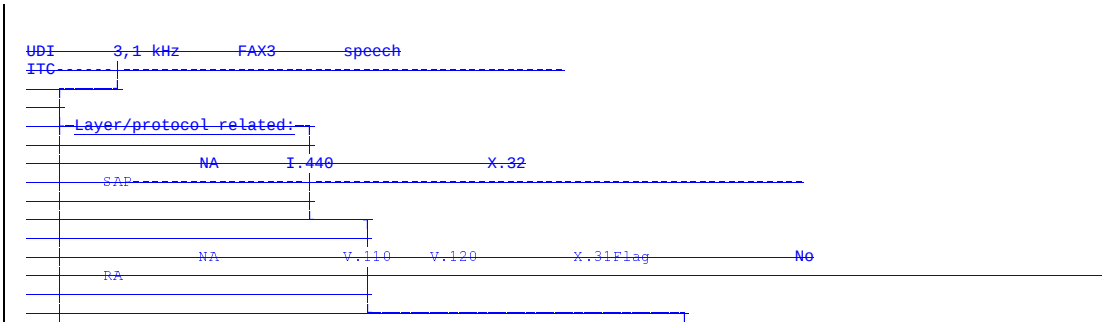


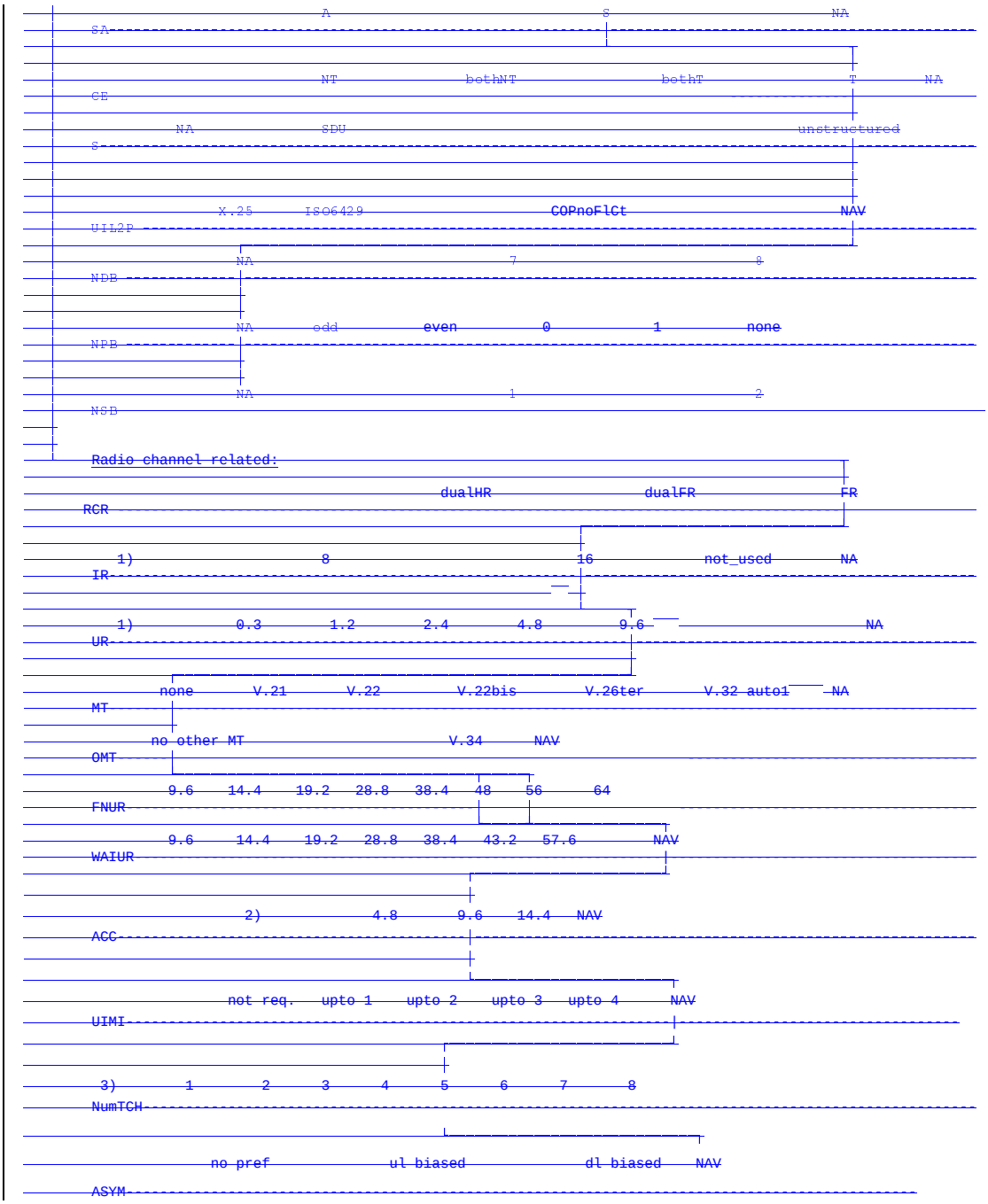
1) IR and UR are overridden if FNUR, ACC and MaxNumTCH are available

2) ACC may have several values simultaneously (bit map coding).

B.1.3.1.3 ~~48kbit/s and 56 kbit/s transparent Case /(TCH/F9.6)~~Transparent FNUR=56 kbit/s, including 3G-H.324/M, (TCH/F9.6, TCH/F32.0, UTRAN)

ITC	Oct. 3/5a	UDI [3]	3.1 kHz	FAX3	Speech	RDI			
		Layer/protocol related							
SAP	5	NA		I.440	BothNT	X.32			
RA [3]	5	NA	PIAFS	V.110	V.120	H.223 & H.245	X.31 Flag	No	
SA	6	A		S					
CE	6c	NT	bothNT	bothT	T	NA			
S	4	NA		SDU	unstructured				
U1L2P	7	X.25		ISO6429	COPnoFlct	NAV			
DC	4	NA		DC	NO				
NDB	6a	NA		7	8				
NPB	6b	NA	odd	even	0	1	none		
NSB	6a	NA		1	2				
		Radio channel related							
RCR	3	dualHR		dualFR	FR				
IR [1]	6b	8		16	not-used	NA			
UR [1]	6a	0.3	1.2	2.4	4.8	9.6	NA		
MT	6c	none	V.21	V.22	V.22bis	V.26ter	V.32	V.23	auto1 NA
OMT [5]	6d	no other MT			V.34				
FNUR [1, 5]	6d	9.6	14.4	19.2	28.8	38.4	48	56	64
WAIUR	6f	9.6	14.4	19.2	28.8	43.2	57.6	NA	NAV
ACC [1, 2]	6e/g	4.8	9.6	14.4	28.8	32.0	43.2	none	NAV [4]
UIMI	6f	not. Req.	upto 1	upto 2	upto 3	upto 4		NA	NAV
MaxNumTCH [1]	6e	1	2	3	4	5	6	7	8 NAV [4]
ASYM	6g	no. pref.		u1 biased		d1 pref.		NAV	





1) IR and UR are overridden by FNUR, ACC and MaxNumTCH if ~~are~~ available.

2) ACC may have several values simultaneously (bit map coding). However, handover to/from UTRAN is not possible if the network assigns other traffic channels than TCH/F9.6 or TCH/F32.0.

3) ~~3) For a 4 channel operation see table in subclause B.1.3.1.1.~~In case ITC=UDI, RA shall be set to V.110 or H.223&H245.

4) In case ACC and MaxNumTCH are not available operation is restricted to UTRAN.

5) The parameters FNUR and OMT are mandatory for this service.

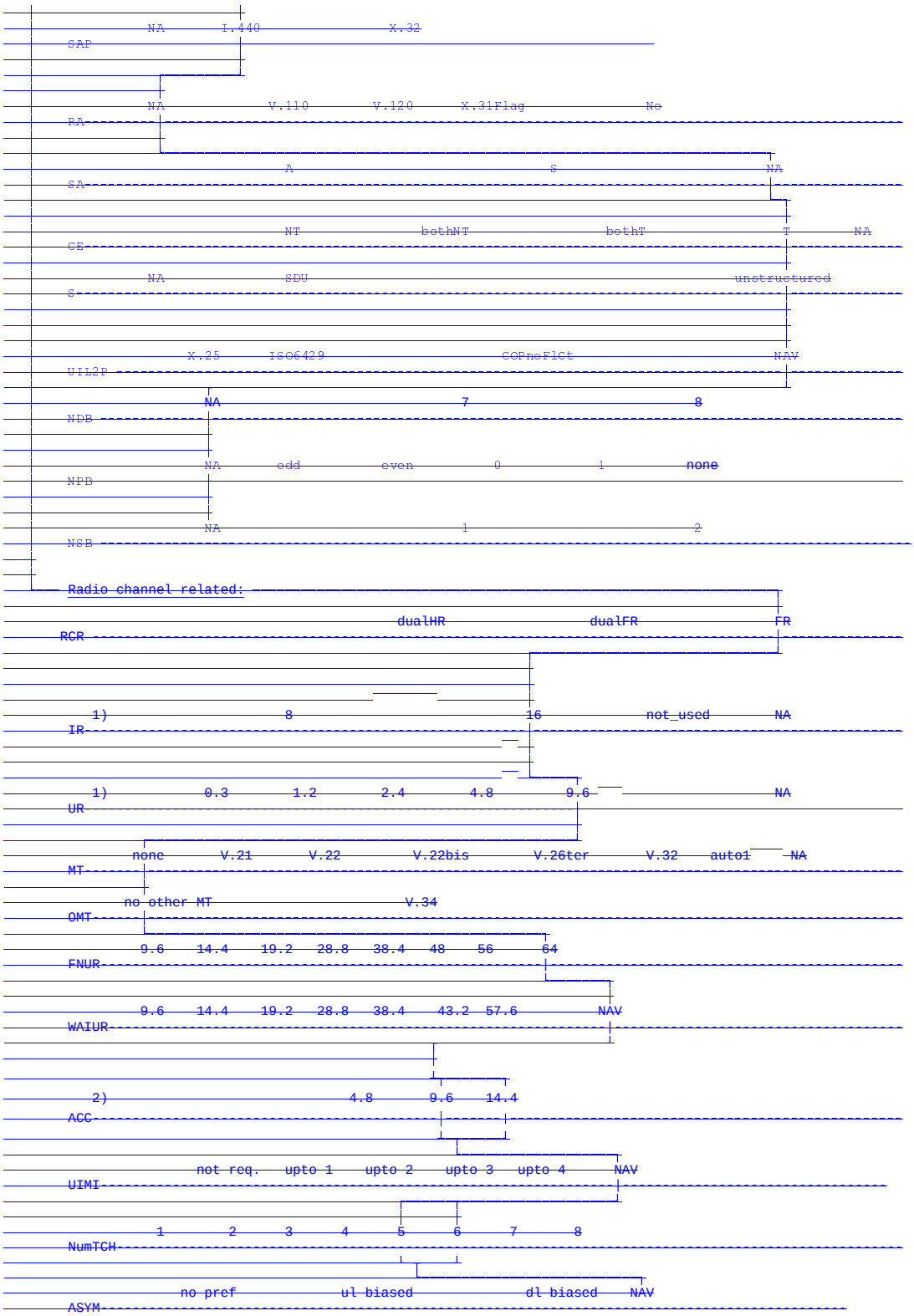
~~NOTE: The parameters FNUR, and OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.4 ~~64kbit/s bit t~~Transparent ~~Case~~ FNUR=56 kbit/s, including 3G-H.324M (TCH/F~~9.6 and TCH/F14.4~~14.4)

Applies to GSM/GERAN only, no HO to/from UTRAN

ITC	Oct. 3/5a	UDI [3]	3.1 kHz	FAX3	Speech	RDI			
		Layer/protocol related							
SAP	5	NA		I.440	BothNT	X.32			
RA [3]	5	NA	PIAFS	V.110	V.120	H.223 & H.245	X.31 Flag	No	
SA	6	A		S					
CE	6c	NT	bothNT	bothT	T	NA			
S	4	NA	SDU	unstructured					
U1L2P	7	X.25	ISO6429	COPnoFlct	NAV				
DC	4	NA	DC	NO					
NDB	6a	NA	7	8					
NPB	6b	NA	odd	even	0	1	none		
NSB	6a	NA	1	2					
		Radio channel related							
RCR	3	dualHR	dualFR	FR					
IR [1]	6b	8	16	not-used	NA				
UR [1]	6a	0.3	1.2	2.4	4.8	9.6	NA		
MT	6c	none	V.21	V.22	V.22bis	V.26ter	V.32	V.23	auto1 NA
OMT [4]	6d	no other MT	V.34						
FNUR [1, 4]	6d	9.6	14.4	19.2	28.8	38.4	48	56	64
WAIUR	6f	9.6	14.4	19.2	28.8	43.2	57.6	NA	NAV
ACC 1, [2, 4]	6e/g	4.8	9.6	14.4	28.8	32.0			NAV
UIMI	6f	not. Req.	upto 1	upto 2	upto 3	upto 4		NA	NAV
MaxNumTCH [4]	6e	1	2	3	4 [1]	5	6	7	8
ASYM	6g	no. pref.	u1 biased	d1 pref.	NAV				

~~UDI 3,1 kHz FAX3 speech~~
~~ITC~~
~~Layer/protocol related:~~



1) IR and UR are overridden by FNUR, ACC and MaxNumTCH ~~are~~ if available.

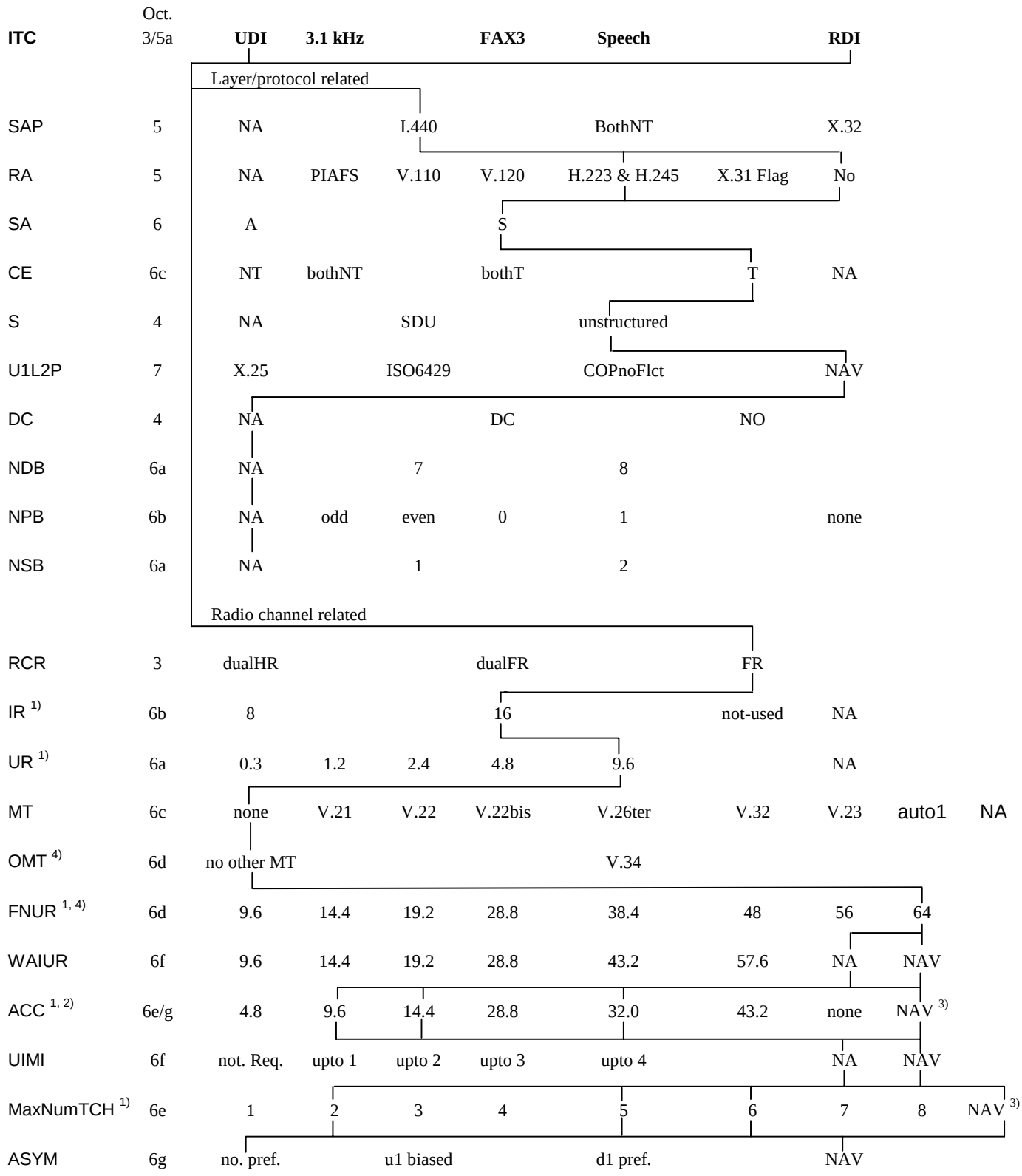
2) ~~2)~~ ACC may have several values simultaneously (bit map coding).

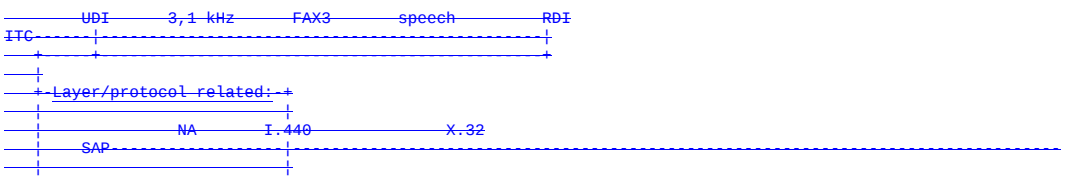
3) In case ITC=UDI, RA shall be set to V.110 or H.223&H.245.

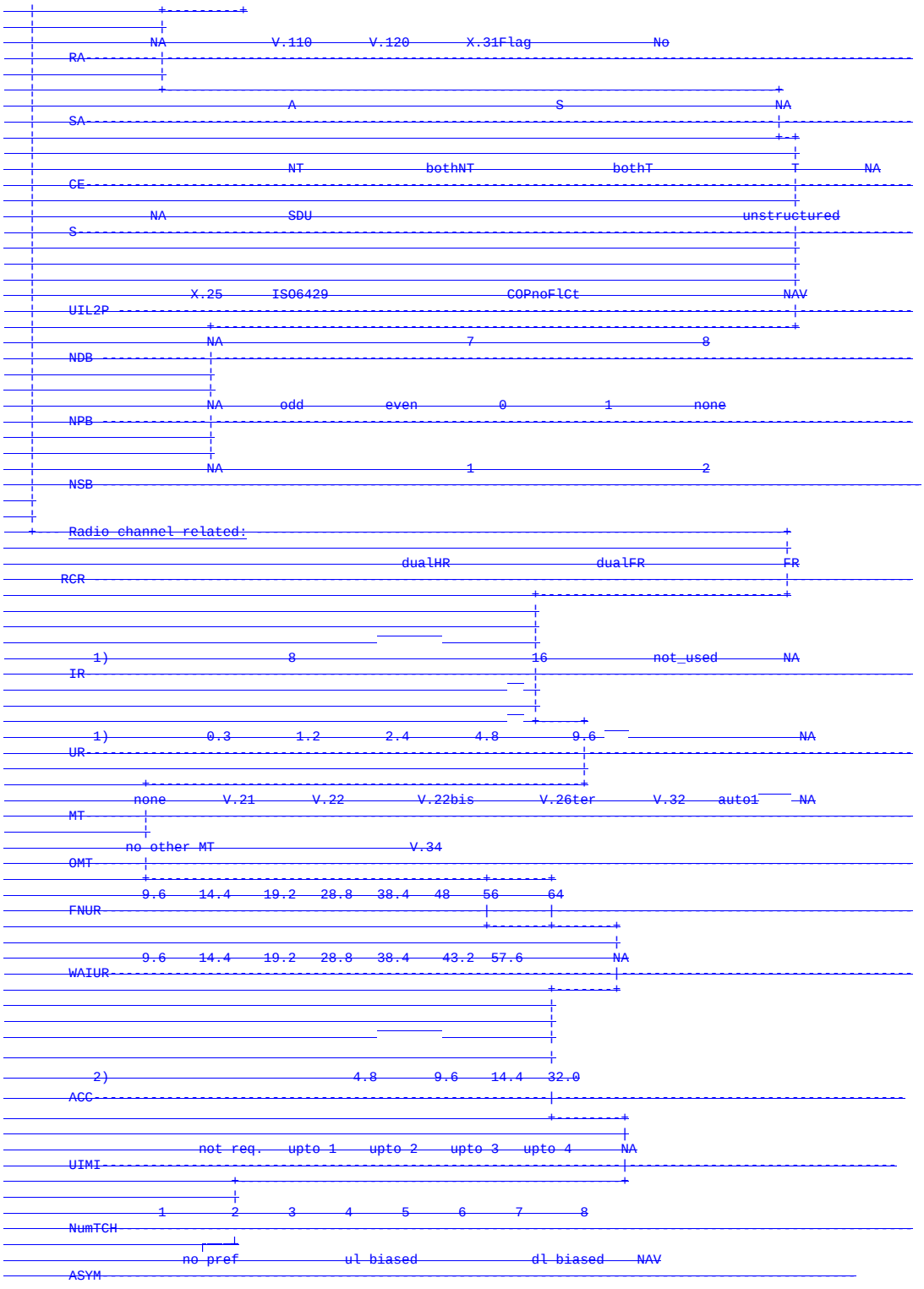
4) The parameters FNUR, OMT, ACC and MaxNumTCH are mandatory for this service.

~~NOTE: The parameters FNUR, OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.5 ~~Bit t~~Transparent FNUR= ~~56 kbit/s (RDI) and~~ 64kbit/s ~~(UDI)~~, including 3G-H.324/M (TCH/F~~32.0~~9.6, TCH/F14.4, TCH/F32.0, UTRAN)







1) IR and UR are overridden by FNUR, ACC and MaxNumTCH ~~are~~ if available.

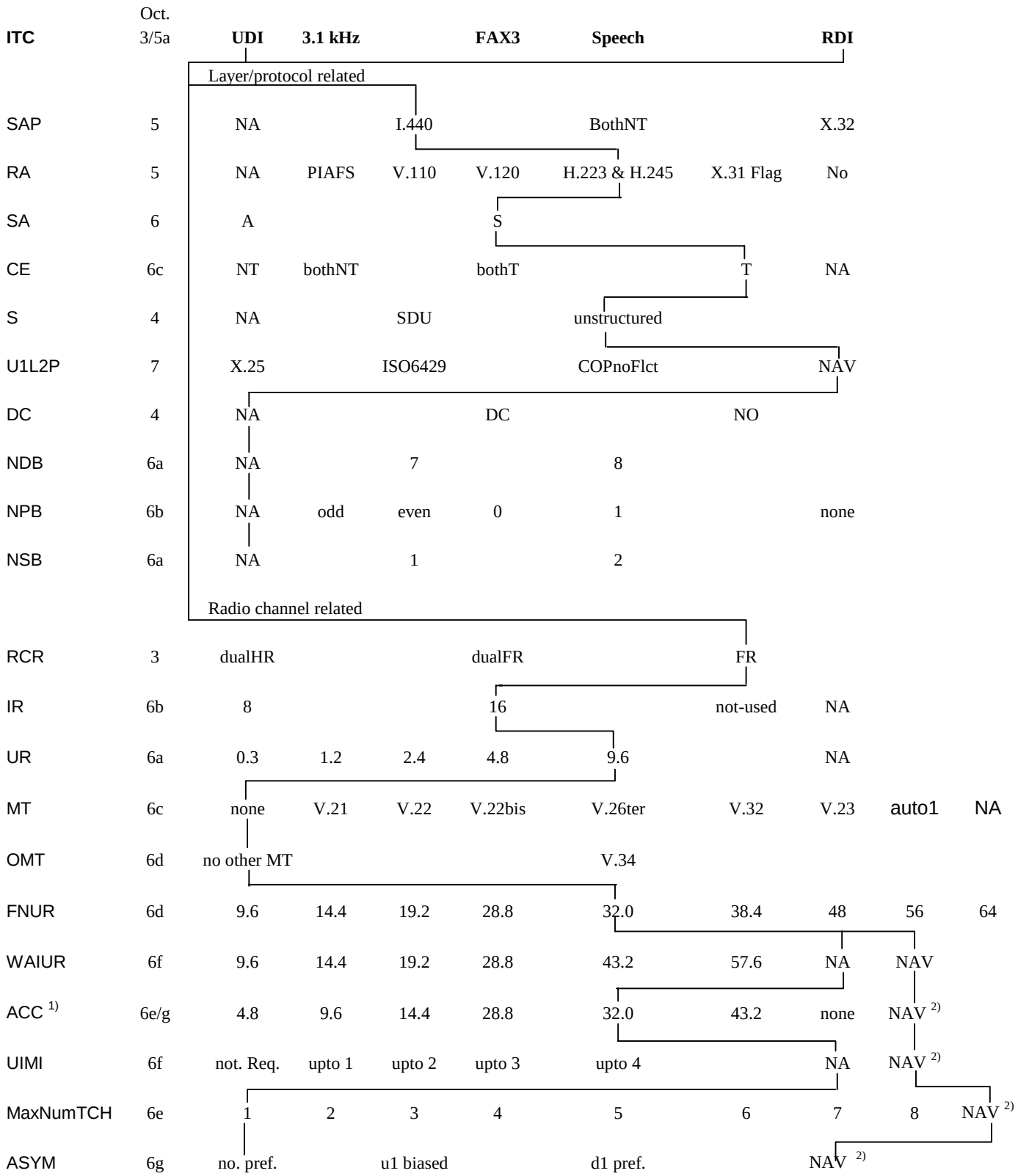
2) ~~2)~~ ACC may have several values simultaneously (bit map coding).

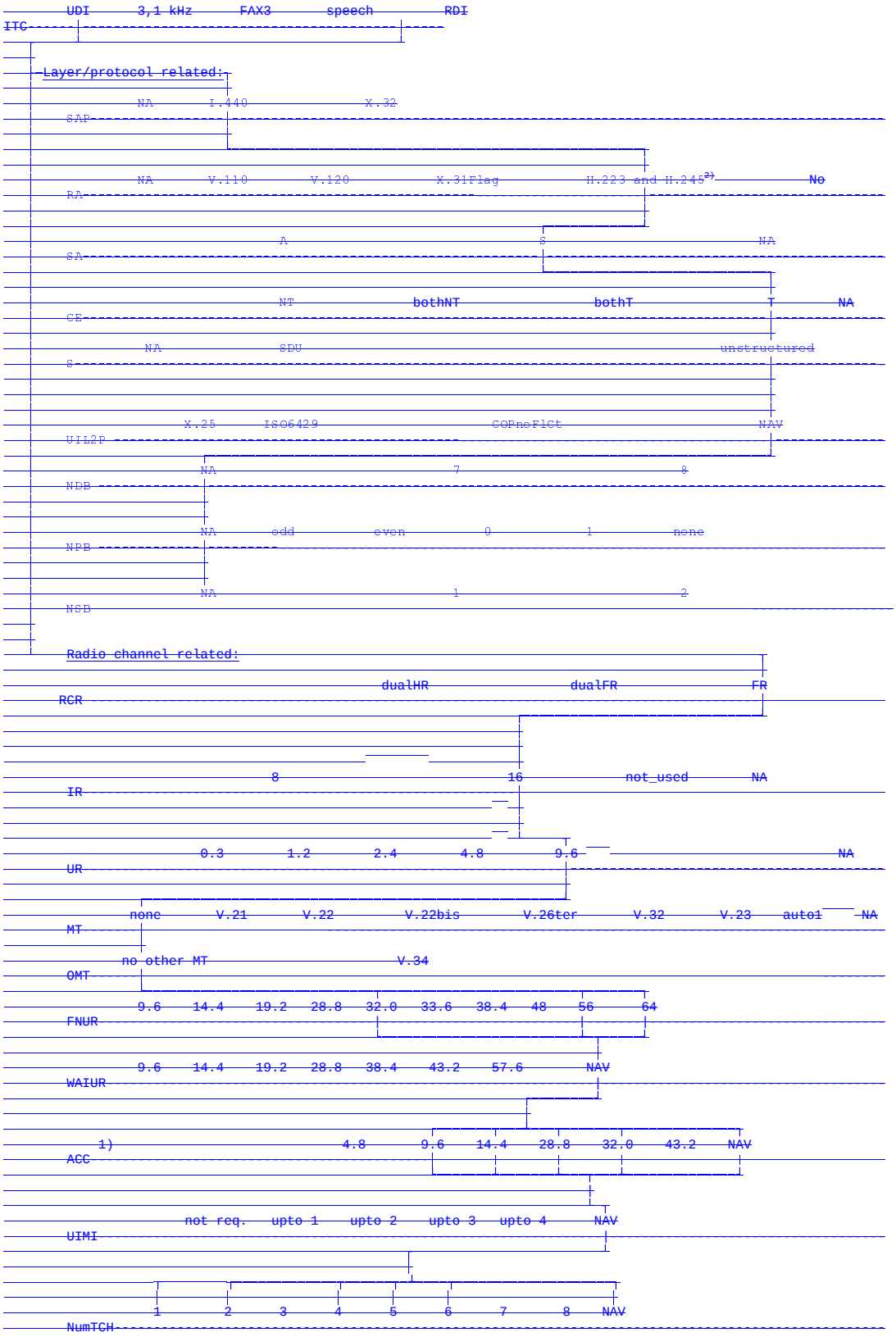
3) If ACC and MaxNumTCH are not available operation is restricted to UTRAN.

4) The parameters FNUR and OMT are mandatory for this service.

~~NOTE: The parameters FNUR~~, and ~~OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.6 3G-H.324/M, FNUR=32.0 kbit/s ~~Case~~(TCH/F32.0, UTRAN)





1) ~~1)~~ ACC may have several values simultaneously (bit map coding).

2) If ACC, UIMI, MaxNumTCH and ASYM are not available operation is restricted to UTRAN.

3GPP TSG-CN3 Meeting #14 **N3-000615**
ETSI/Sophia Antipolis, France, 14th - 16th 2000

CR-Form-v3

CHANGE REQUEST

⌘ **27.001** **CR** **045** ⌘ rev **-** ⌘ Current version: **3.6.0** ⌘

*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 ☒

Title:	⌘	Handover for 56 kbit/s
Source:	⌘	TSG CN WG3
Work item code:	⌘	CS Data Bearers
Date:	⌘	15/11/00
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential correction)*
A *(corresponds to a correction in an earlier release)*
B *(Addition of feature),*
C *(Functional modification of feature)*
D *(Editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
REL-4 *(Release 4)*
REL-5 *(Release 5)*

Reason for change:	⌘	Inconsistencies related to synchronous transparent bearer services at 56 kbit/s causing particular handover problems
Summary of change:	⌘	Revision of annexes A and B.
Consequences if not approved:	⌘	Unexpected disconnection of calls.

Clauses affected:	⌘	Annex A, table B.4f: Note 3, table B.5 and B.1.3.1.1, B.1.3.1.3, B.1.3.1.4, B.1.3.1.5 and B.1.3.1.6.		
Other specs affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	04.21, 23.910, 29.007
Other comments:	⌘			

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. 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.

Annex A (informative): List of Bearer Capability Elements

This annex lists the PLMN Bearer Capability Elements which need to be provided to support Terminal adaptation function to Interworking control procedures. Some parameters are ignored in UMTS although present in the BC-IE. The validity of parameter values may also differ from GSM to UMTS. The ignored parameters and the difference of parameter value validity in GSM and UMTS are listed in table B.5a in annex B.

Elements and their Values:

Information Transfer Capability:

This element is relevant between the IWF and the fixed network.

Values:
- Speech
- Unrestricted Digital
- Group 3 Facsimile (note 1)
- 3,1 kHz Ex PLMN (note 2)
- Restricted Digital (note 3)

NOTE 1: Used for facsimile transmission, unrestricted digital between MT and IWF and 3,1 kHz audio from IWF towards the fixed network.

NOTE 2: Unrestricted digital between MT and IWF and 3,1 kHz audio from IWF towards the fixed network.

NOTE 3: Unrestricted digital between MT and IWF and restricted digital information from IWF towards the fixed network; this value is signalled in the "Other ITC" element, due to a lack of further code points in the "ITC" element.

Transfer Mode:

This element is relevant between MT and IWF

Values:
- Circuit
- Packet

Structure:

This element is relevant between MT and IWF.

Values:
- Service Data Unit Integrity (note 4)
- Unstructured (note 5)

NOTE 4: Applicable for connection element "non transparent".

NOTE 5: Applicable for connection element "transparent".

Configuration:

This element is relevant for a PLMN connection.

Values:
- Point to point

Establishment:

This element is relevant for a PLMN connection.

Values:
- Demand

Sync/Async:

This element is relevant between TE/TA and MT and between IWF and the fixed network.

Values:
- Synchronous
- Asynchronous

Negotiation:

This element is relevant between MT and IWF.

Values:
- In band negotiation not possible

User Rate:

This element is relevant between TE/TA and MT and between IWF and the fixed network, except in case the parameter FNUR is present.

Values:
- 0.3 kbit/s
- 1.2 kbit/s
- 2.4 kbit/s
- 4.8 kbit/s
- 9.6 kbit/s
- 19.2 kbit/s (see note 6)

NOTE 6: This value cannot be signalled between MT and IWF, but it can be used according to the rules in 3GPP TS 29.007 (table 7A, 7B) for such connections.

Intermediate Rate:

This element is relevant between MT and BSS and BSS and IWF

Values:
- 8 kbit/s
- 16 kbit/s

Network Independent Clock on Tx:

This element is relevant between TE/TA and MT in the transmit direction.

Values:
- Not required
- Required

Network Independent Clock on Rx:

This element is relevant between TE/TA and MT in the receive direction.

Values:
- Not accepted
- accepted

Number of Stop Bits:

This element is relevant between the TE/TA and MT and between IWF and fixed network in case of asynchronous transmission.

Values:
- 1 bit
- 2 bit

Number of Data Bits Excluding Parity If Present:

This element is relevant between TE/TA and MT and between IWF and the fixed network in case of a character oriented mode of transmission.

Values:
- 7 bit
- 8 bit

Parity Information:

This element is relevant between TE/TA and MT and between IWF and the fixed network for a character oriented mode of transmission.

Values:
- Odd
- Even
- None
- Forced to 0
- Forced to 1

Duplex Mode:

This element is relevant between MT and IWF.

Values:
- Full Duplex

Modem Type:

This element is relevant between the IWF and the fixed network in case of 3,1 kHz audio ex-PLMN information transfer capability.

Values:
- V.21
- V.22
- V.22 bis
- V.26 ter
- V.32
- autobauding type 1
- none

Radio Channel Requirement:

This element is relevant between MT and BSS

Values:
- Full Rate support only Mobile Station
- Dual Rate support Mobile Station/Half Rate preferred
- Dual Rate support Mobile Station/Full Rate preferred

Connection Element:

This element is relevant between MT and IWF

Values:
- Transparent
- Non Transparent
- both, Transparent preferred
- both, Non transparent preferred

User Information Layer 2 Protocol:

This element is relevant between TE/TA and MT and between IWF and the fixed network.

Values:
- ISO 6429
- X.25
- X.75 layer 2 modified (CAPI)
- Character oriented Protocol with no Flow Control mechanism

Signalling Access Protocol:

This element is relevant between TE/TA and MT.

Values:
- I.440/450
- X.32

Rate Adaptation:

This element is relevant between IWF and the fixed network.

Values:
- V.110/X.30
- X.31 flagstuffing
- no rate adaptation
- V.120 (note 7)
- PIAFS (note 7)
- H.223 and H.245 (note 7)

NOTE 7: This value is signalled in the "Other Rate Adaption" element, due to a lack of further code points in the "Rate Adaption" element.

Coding Standard:

This element refers to the structure of the BC-IE defined in 3GPP TS 24.008.

Values:
- GSM

User Information Layer 1 Protocol:

This element characterize the layer 1 protocol to be used between MT and BSS (Um interface) according to 3GPP TS 05.01, or between the MT and the RNC (Uu interface).

Values:
- default

Negotiation of Intermediate Rate requested:

This element is relevant between MT and BSS and BSS and IWF.

Values:
- no meaning associated
- 6 kbit/s radio interface is requested for a full rate channel with a user rate up to and including 4,8 kbit/s, non transparent service

Compression:

This element is relevant between MT and IWF.

Values:
- compression possible/allowed
- compression not possible/allowed

Rate adaption header / no header:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Rate adaption header not included
- Rate adaption header included

Multiple frame establishment support in data link:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Multiple frame establishment not supported. Only UI frames allowed.
- Multiple frame establishment supported.

Mode of operation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Bit transparent mode of operation
- Protocol sensitive mode of operation

Logical link identifier negotiation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Default, LLI=256 only
- Full protocol negotiation (note 8)

NOTE 8: A connection over which protocol negotiation will be executed is indicated in the „In-band / out-band negotiation" parameter.

Assignor / assignee:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Message originator is „default assignee"
- Message originator is „assignor only"

In-band / out-band negotiation:

This element is relevant between IWF and the fixed network. It is only applicable for V.120 rate adaptation.

Values:
- Negotiation is done with USER INFORMATION messages on a temporary signalling connection
- Negotiation is done in-band using logical link zero.

Fixed network user rate, FNUR (Note 12)

This element is relevant between the IWF and the fixed network.

Values
- Fixed network user rate not applicable (note 9)
- 9,6 kbit/s
- 14,4 kbit/s
- 19,2 kbit/s
- 28,8 kbit/s
- 32,0 kbit/s
- 38,4 kbit/s
- 48,0 kbit/s
- 56,0 kbit/s
- 64,0 kbit/s

NOTE 9: Not used by currently specified services.

Wanted air interface user rate, WAIUR (note 12)

This element is relevant between the MT and the IWF

Values
- Air interface user rate not applicable
- 9,6 kbit/s
- 14,4 kbit/s
- 19,2 kbit/s
- 28,8 kbit/s
- 38,4 kbit/s
- 43,2 kbit/s
- 57,6 kbit/s
- interpreted by the network as 38,4 kbit/s (note 10)

NOTE 10: Certain code points, if used, will be interpreted by the network as 38.4 kbit/s in this version of the protocol, ref 3GPP TS 24.008.

Acceptable channel codings, ACC (note 12)

This element is relevant between the MT and the IWF.

Value: - TCH/F4.8 acceptable
- TCH/F9.6 acceptable
- TCH/F14.4 acceptable
- TCH/F28.8 acceptable
- TCH/F32.0 acceptable (Applicable to multimedia 32, 56 and 64 kbit/s and ~~bit~~ synchronous transparent 56 and 64 kbit/s services only)
- TCH/F43.2 acceptable (Applicable to non-transparent services only.)

Maximum number of traffic channels, MaxNumTCH (Note 12)

This element is relevant between the MT and the IWF.

Value: - 1 TCH
- 2 TCH
- 3 TCH
- 4 TCH
- 5 TCH
- 6 TCH
- 7 TCH (note 11)
- 8 TCH (note 11)

NOTE11: Not used by currently specified services.

Other modem type, OMT (Note 12)

This element is relevant between the IWF and the fixed network in case of 3,1 kHz audio ex-PLMN

Values: - no other modem type specified in this field
- V.34

User initiated modification indication, UIMI (Note 12)

This element is relevant between the MT and the IWF.

Values: - user initiated modification not requested
- user initiated modification upto 1 TCH requested
- user initiated modification upto 2 TCH requested
- user initiated modification upto 3 TCH requested
- user initiated modification upto 4 TCH requested

Asymmetry preference indication (Note 12)

This element is relevant between the MT and the BSS.

Value: - no preference
- up link biased asymmetry preference
- down link biased asymmetry preference

NOTE 12:These GBS-related parameters are optional.

For a multislot configuration, the following applies to the parameters contained in the BC-IE:

- Half rate channels are not supported. The MS shall code the radio channel requirement as "Full rate support only MS" or "Dual rate support MS, full rate preferred'. In the second case, the network shall assign full rate channel(s) only.

- The 'fixed network user rate' and 'other modem type' (ref. table B.4a) takes precedence over the 'user rate' and 'modem type'.

- The ACC indicates which channel coding is acceptable and supported by the MS. In case of CE:NT the TCH/F4.8 and TCH/F9.6 acceptable is equivalent to the support of NIRR. If TCH/F4.8 acceptable only or TCH/F9.6 acceptable only or TCH/F14.4 acceptable only is indicated, the assigned channel type which can be chosen by the network is TCH/F4.8 or TCH/F9.6 or TCH/F14.4, respectively.

- The 'intermediate rate' parameter is overridden. The intermediate rate used per each TCH/F is derived from the chosen channel type:

channel type	**IR per TCH/F**
TCH/F4.8	8 kbit/s
TCH/F9.6	16 kbit/s
TCH/F14.4	intermediate rate is to be defined

- The user rate per TCH is derived from the chosen channel type:

channel type	**user rate per TCH**
TCH/F4.8	4.8 kbit/s
TCH/F9.6	9.6 kbit/s

For CE:T, the padding procedure described in GSM 04.21 can be applied.

Annex B (normative): Setting of Bearer Capability, Low Layer Compatibility and High Layer Compatibility Information Element for PLMN Bearer Services and PLMN TeleServices

B.0 Scope

This annex describes the relationship between the various parameters of the PLMN Bearer Capability Information Element (BC-IE), their validity and the possible settings with reference to each PLMN Bearer service/Teleservice defined in 3GPP TS 02.02 and GSM 02.03 as well as the various occurrences during the connection control (clause B.1). Furthermore, the contents of the Low Layer (LLC) and the High Layer (HLC) Compatibility Information Elements are described (clause B.2).

B.1 Bearer Capability Information Element

B.1.1 Introduction

B.1.1.1 General Consideration

In general, the purpose of the bearer capability information element (BC-IE) is to request a particular bearer service to be provided by the network. This indication is carried by certain connection control messages which for the subject matter of the present document may be categorized into those messages:

- related to the call set-up phase; and
- those used during the established connection.

During the call set-up phase the PLMN BC-IE (single or multiple) is included in:

- the SETUP message generated by the requesting entity (either MS or MSC) to establish a mobile-originated or mobile-terminated call, respectively, and in
- the CALL CONFIRMED or CALL PROCEEDING messages, respectively, generated by the responding entity (either MS or MSC) in order to negotiate certain parameter values. If no BC-IE is contained in the SETUP message (PSTN-originated call with single-numbering scheme) the CALL CONFIRMED message indicates the complete applicable BC-IE. In this case neither the value "unrestricted digital" for the information transfer capability nor the multislot for TCH/14 related parameters shall be used.

During the established connection the PLMN BC-IE is included in the MODIFY, MODIFY COMPLETE, and MODIFY REJECT messages in order to change the service (bearer capability) or to change the maximum number of traffic channels and/or wanted air interface user rate when a non-transparent multislot data service is in use.

If the maximum number of traffic channels and/or wanted air interface user rate is to be changed, the BC-IE included in the MODIFY message shall not indicate a different bearer service than the one used at this stage of the connection - the values of the parameters 'maximum number of traffic channels' and/or 'wanted air interface user rate' may be changed, only.

The subsequent tables and subsections of clause B.1 deal with the representation of the individual contents of the PLMN BC-IE during the call set-up phase. For the use during the established connection refer to 3GPP TS 24.008.

With respect to the individual parameter settings at the MS the following cases may be distinguished (ref. 3GPP TS 27.002 and 3GPP TS 27.003):

- Mobile-originated call set up by a MS consisting of a MT with R interface:
  - The setting results from respective MMI actions and/or MT internal settings.
- Mobile-originated call set up by a MS consisting of a MT with S interface:
  - The setting of the PLMN BC is derived from the ISDN BC and LLC/HLC elements contained in the ISDN SETUP message received from the terminal. It is complemented by information resulting from respective MMI actions and/or MT internal settings.
- Mobile-terminated call set up to a MS consisting of a MT with R interface:
  - The BC related part of the compatibility check is carried out according to the knowledge of the MT concerning its implemented functions (i.e. answering the call). The requested field values of the non-negotiable parameters and the selected field values of the negotiable parameters determine the selection of the terminal function to be used for the intended connection.
- Mobile-terminated call set up to a MS consisting of a MT with S interface:
  - The PLMN BC received from the MSC is mapped by the MT onto an applicable ISDN BC. In some cases a HLC may be generated, if it is not otherwise available (e.g. for group 3 facsimile). The BC related part of the compatibility check is up to the terminal connected to the S interface of the MT, as is the selection of the terminal function (i.e. answering the call) to be used for the intended connection.

B.1.1.2 Interpretation of the Diagrams

The purpose of the subsequent diagrams is to achieve unambiguous representation of the individual contents of the PLMN BC-IE for the various occurrences during the call set-up phase, covering all bearer services and teleservices according to 3GPP TS 22.002 and 3GPP TS 22.003.

The basic principle adopted is a graphic scheme, or mask, wherein the ordinate designates the individual parameters of the PLMN BC-IE and the abscissa gives the possible field values of these parameters. The abbreviations used in these sections are defined in table B.5. The allowed content of any PLMN BC-IE is represented by a number of graphs connecting parameter values (abscissa points) of all parameters (ordinate points). Each graphic scheme is subdivided into two independent parts:

- "Layer/Protocol related" part; and
- "Radio Channel related" part.

The generation of all PLMN BC-IEs in all call set-up messages shall be in accordance with these graphs. Subclauses B.1.2 through B.1.11 show individual sets of graphs for each service group (BS/TS) and for each type of applicable Information Transfer Capability.

In addition, the following rules apply:

- Those parameters which have only one possible field value for all recognized services are shown in table B.5, where they are marked accordingly in the column "common setting of field values". They are not represented in the graphic scheme.
- Not all parameters of the PLMN BC-IE are relevant for each service (BS/TS). This is represented by specific abscissa points with a value of "NA" (Not Applicable) allocated to these parameters. The graphs pass through these points for each such parameter. The actual field value to be used in the PLMN BC-IE is marked in the column "default setting of field values (NA)" of table B.5. An abscissa point with a value of "NAV" (Not AVailable) indicates that the entire octet carrying this parameter (ref. table B.2 "General Structure of the PLMN BC-Information Element") shall be omitted.

- Unless FTM is applied, there is a particular dependency of the parameters "User Information Layer 2 Protocol (UIL2P)" and "Connection Element (CE)":
  - If the MS sends a PLMN BC-IE with a CE value other than "Transparent (T)", the parameter UIL2P is essential. Its field value must be set as indicated in the applicable graph.
  - If the MSC sends a PLMN BC-IE in the SETUP message, the parameter UIL2P may also be absent in the case of the CE parameter value being other than "Transparent (T)".
- In case FTM is applied, the PLMN BC-IE shows a CE value "non-transparent", SA value "asynchronous", and RA value X.31 flag stuffing. The UIL2P is not available.
- Certain parameters of the PLMN BC-IE may be negotiated during the connection establishment phase. Table B.1 shows these parameters and the relations of their values in the SETUP message and in the CALL CONFIRMED/CALL PROCEEDING message, respectively, both for the mobile-originated and mobile-terminated case. A parameter may indicate a field value of one of the following types:
  - "requested value" indicating a request which cannot be changed by the responding entity;
  - "offered value" indicating a proposal which may be changed by the responding entity;
  - a particular choice value leaving it up to the responding entity which value ultimately applies;
  - "as requested" indicating that the requested value applies and is confirmed (by returning it);
  - "selected value" indicating that a particular value applies either out of the offered set or as a free choice out of the defined set of values;
  - "supported value" indicating a value supported by the responding entity.

Table B.1: BC-Parameters subject to negotiation procedure

Mobile Originated Call:

	Message	
BC-parameter	**SETUP**	**CALL PROC**
NDB	Requested value	as requested
NPB	Requested value	as requested
NSB	Requested value	as requested
CE	Requested value (T/NT)	as requested
	"both" with the preferred value indicated (e.g. both NT)	selected value (T/NT)
UIL2P	Requested value [9] or NAV [1]	as requested or NAV [4]
User Rate	Requested value	as requested
DC	Requested value [2]	as requested or "NO" [7]
FNUR	Requested value	supported value
Other MT	Requested value	supported value
UIMI	Requested value	supported value

Mobile Terminated Call:

	Message	
BC-parameter	**SETUP**	**CALL CONF**
NDB	Offered value	selected value (free choice)
NPB	offered value	selected value (free choice)
NSB	offered value	selected value (free choice)
CE	requested value (T/NT)	as requested or selected value (T/NT) (free choice) 3)
	"both" with the preferred value indicated (e.g. both NT)	selected value (T/NT)
Sync/ Asynchronous	requested value	as requested or selected value 10)
Rate adaptation/Other rate adaptation	requested value	as requested or selected value 11)
UIL2P	offered value 2) or NAV 4)	selected or NAV 1)
User Rate	offered value	selected value 5)
DC	requested value 2)	as requested or "NO" 7)
FNUR	offered value	selected value 6)
Other MT	offered value	selected value 6)
UIMI	offered value	selected value 8)

1) For CE:T only, out-band flow control, or RA:X.31 flag stuffing requested by the MS.
2) Not for CE:T.
3) When the SETUP message contains no BC-IE (single numbering scheme).
4) "NAV" shall not be interpreted as an out-band flow control request by the MS.
5) The modification of User Rate must be in conjunction with Modem Type and Intermediate Rate.
6) The modification of the Fixed Network User Rate shall be in conjunction with the Modem Type and/or Other Modem Type.
7) In case of a Mobile Terminated Call, if the SETUP message does not contain a BC-IE, the MS shall behave as if the DC is set to "data compression not possible".
In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the DC was set to "data compression not possible" or "data compression not allowed", respectively.
8) Less or equal to the offered value.
9) Not for CT:T or FTM (i.e., CE:NT, SA:A, RA:X.31 flag stuffing).
10) For FTM and PIAFS, this parameter may be negotiated. See Table B.4e for details.
11) For FTM, PIAFS and Multimedia, this parameter may be negotiated. See Table B.4f for details.

Table B.2: General Structure of the BC-Information Element

OCTET	INFORMATION ELEMENT FIELD	
3	Radio channel requirements Coding standard Transfer mode Information Transfer Capability	
4	Structure Duplex mode Configuration Establishment Negotiation of Intermediate Rate Requested Compression	2)
5	Rate adaption Signalling access protocol	2)
5a	Other ITC Other rate adaption	2) 7)
5b	Rate adaption header / no header Multiple frame establishment support in data link Mode of operation Logical link identifier negotiation Assignor / assignee In-band / out-band negotiation	2) 3)
6	User information layer 1 protocol Synchronous / asynchronous	2)
6a	Number of stop bits Negotiation Number of data bits User rate	2)
6b	Intermediate rate NIC on transmission NIC on reception Parity information	2)
6c	Connection element Modem type	2)
6d	Fixed network user rate Other modem type	4)
6e	Maximum number of traffic channels Acceptable channel codings	4)
6f	Wanted air interface user rate User initiated modification indication	4)
6g	Acceptable Channel codings Asymmetry preference indication	5) 6)
7	User information layer 2 protocol	1) 2)

1) Octets optional.
2) Octets only available if the parameter "Information Transfer Capability" does not indicate "Speech".
3) For V.120 rate adaption only.
4) Optional octets available only if the parameter "Information Transfer Capability" does not indicate "Speech".
5) Extension of the 'Acceptable channel codings' field in octet 6e in case EDGE channel codings are supported.
6) Only used if EDGE channels are among the 'Acceptable channel codings'. The value shall be set to 'no preference' in case the connection element is T.
7) For ITC=RDI or UIL1P=V.120, PIAFS, and 'H.223 and H.245' only.

Table B.3a: Selection of flow control method (for CE:NT with SA:A only)

	flow control method		
information element	in-band	out-band (3)	none
number of data bits	7 or 8	7 or 8	7 or 8
user information layer 2 protocol	ISO 6429 (1)	NAV	COPnoFlCt (2)

1) ISO6429 stands for "ISO 6429, codeset 0, DC1/DC3" and is applicable for 7 and 8 bit codes.

2) COPnoFlCt stands for a character oriented protocol with no flow control mechanism (no reserved characters for flow control).

3) "out-band" flow control requires V.42 in case of PSTN or V.110 in case of ISDN.
If the V.110 flow control mechanism is not supported, where required, the call pending shall be terminated.
If the V.42 functionality is not supported by the modem in the IWF or in the fixed network, the call will be supported with a fallback to the non-V.42 mode. In this case the IWF will release the call if due to temporary throughput problems on the radio interface or initiation of flow control by the MS and the inability to flow control the fixed network modem an overflow of the L2R buffers occurs.
Note that a phase 1 network may release the call, if the V.42 functionality is not provided by the IWF or the fixed network modem. As V.42 does not apply to V.21 modems, outband flow control can not be supported for these modem types.

Table B.3b: Selection of PLMN Profile (for CE:NT with SA:S only)

Mobile Terminated Call:

BC-parameter	Message SETUP	Message CALL CONF
UIL2P	X.25	X.25 or X.75

Table B.4a: Modem Type subject to negotiation procedure

Mobile Originated Call:

	BC-parameter MT and OMT 6)	
BC-parameter CE	**Message SETUP**	**Message CALL PROC**
T	V-series	V-series
NT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 1)
bothT or bothNT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 1)2)

Mobile Terminated Call:

	BC-parameter MT and OMT 6)	
BC-parameter CE	**Message SETUP**	**Message CALL CONF**
T	V-series	V-series
NT	V-series	V-series or autobauding type 1 3)
	autobauding type 1	autobauding type 1 or V-series 4)
bothT or bothNT	V-series	V-series
	autobauding type 1	autobauding type 1 or V-series 4)5)

1) No autobauding capability in the IWF:MSC.
2) CE:T selected by IWF/MSC.
3) Free choice if the SETUP contains no BC-IE (single numbering scheme).
If the IWF/MSC has no autobauding capability, a V-series modem type is used.
4) When the MS does not allow the use of autobauding capability.
5) CE:T selected by the MS.
6) When the MT indicates "autobauding" , "modem for undefined interface" or "none", the OMT shall be set to "no other modem type". Any other values of the MT is overridden by the OMT value.

Table B.4b: Intermediate Rate negotiation procedure

If the user rate is 9.6 kbit/s the intermediate rate negotiation procedure is not applicable and NIRR shall be set to "No meaning".

Recipient of SETUP supports full rate, non transparent, 6 kbit/s radio interface rate and the user rate is up to/equal 4,8 kbit/s:

BC-parameter	Message SETUP	Message CALL CONF or CALL PROC
NIRR	6 kbit/s	6 kbit/s
IR	16 kbit/s	8 kbit/s
User Rate	up to/equal 4,8 kbit/s	as requested

NOTE 1: In case of a Mobile Terminated Call, if the SETUP message does not contain a BC-IE, the MS shall behave as if NIRR set to "No meaning".

In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the NIRR was set to "No meaning".

Recipient of SETUP does support full rate, non transparent, but not in connection with 6 kbit/s radio interface rate:

BC-parameter	Message SETUP	Message CALL CONF or CALL PROC
NIRR	6 kbit/s	No meaning
IR	16 kbit/s	16 kbit/s
User Rate	up to/equal 4,8 kbit/s	as requested

NOTE 2: If no other parameter needs negotiation, the CALL CONF/PROC message need not contain any BC-IE.

In case of a MO CALL or a MT CALL where no BC-IE is included in the CALL PROCEEDING or CALL CONFIRMED message, respectively, the MS or the network shall behave as if the NIRR was set to "No meaning".

NOTE 3: In case a GBS-operation is requested and acknowledged, the MS indicates the acceptable channel codings. The indicated acceptance of TCH/F4.8 is equivalent to the support of 6 kbit/s radio interface rate per TCH/F and therefore overrides the NIRR parameter.

Table B.4c Negotiation of fixed network user rate

BC-parameter	Message SETUP	Message CALL PROC/CONFIRMED
FNUR	requested value	equal or lower than the requested value

The network might accept the modified value or reject the call. The FNUR negotiation is applicable in case of a HSCSD-operation, only.

Table B.4d Negotiation of user initiated modification indication

BC-parameter	Message SETUP	Message CALL PROC/CONFIRMED
UIMI	offered value	equal to or a value indicating a request for modification to a lower number of traffic channels than offered

Table B.4e: Negotiation of Synchronous/Asynchronous

Mobile Terminated Call:

	BC-parameter Synchronous/Asynchronous	
Bearer type	Message SETUP	Message CALL CONF
FTM[1)]	Synchronous	Asynchronous
PIAFS[2)]	Synchronous	Asynchronous

1) This negotiation is possible, only if ITC=UDI or RDI, FNUR=64 or 56 kbit/sand CE=NT or "both" is signalled in the SETUP message. The MS shall signal FTM as specified in B.1.2.3 .

2) This negotiation is possible, only if ITC=UDI, FNUR=32 kbit/s and CE= "both" is signalled in the SETUP message. The UE shall signal PIAFS as specified in B.1.2.4

Table B.4f: Negotiation of Rate adaptation/Other rate adaptation

Mobile Terminated Call:

	BC-parameter Rate adaptation/Other rate adaptation	
Bearer type	Message SETUP	Message CALL CONF
FTM[1)]	V.110, I.460 and X.30	X.31 flag stuffing
PIAFS[2)]	V.110, I.460 and X.30	PIAFS
Multimedia	V.110, I.460 and X.30[3)]	H.223 and H.245
	No rate adaptation[5)]	H.223 and H.245

1) This negotiation is possible, only if ITC=UDI or RDI, FNUR=64 or 56 kbit/s and CE=NT or "both" is signalled in the SETUP message. The MS shall signal FTM as specified in B.1.2.3.

2) This negotiation is possible, only if ITC=UDI, FNUR=32 kbit/s and CE= "both" is signalled in the SETUP message. The UE shall signal PIAFS as specified in B.1.2.4.

3) This negotiation is possible, only if ITC=UDI or RDI, FNUR=32 or 56 kbit/s and CE=T or "both" is signalled in the SETUP message. The MS shall signal 3G-H.324/M as specified in ~~B.1.3.1.6~~B.1.3.1.3, B.1.3.1.4 and B.1.3.1.6.

5) This negotiation is possible, only if ITC=3,1 kHz, FNUR=28.8 kbit/s, MT=V.34 and CE=T or "both" is signalled in the SETUP message. The MS shall signal 3G-H.324/M as specified in B.1.3.2.3.

Table B.5: BC parameter setting (part 1)

Abbreviations for Parameters and Values		common setting of field values	default setting of field values (NA)
		V	V
ITC...Information Transfer Capability:	- Speech - UDI..Unrestricted Digital - FAX3..Group 3 Facsimile - 3,1 kHz..3,1 kHz Ex PLMN - RDI..Restricted Digital		
TM....Transfer Mode:	- ci..Circuit	X	X
S.....Structure:	- SDU..Service Data Unit Integrity - Unstructured	X	
C.....Configuration:	- pp..Point to point	X	X
E.....Establishment:	- de..Demand	X	X
SA....Sync/Async:	- S..Synchronous - A..Asynchronous		
N.....Negotiation	- ibn..in band negotiation not possible	X	X
UR....User Rate:	- 0.3..0.3 kbit/s - 1.2..1.2 kbit/s - 2.4..2.4 kbit/s - 4.8..4.8 kbit/s - 9.6..9.6 kbit/s		
IR....Intermediate Rate:	- 4.. 4 kbit/s - 8.. 8 kbit/s - 16.. 16 kbit/s - not_used..not used	X	
NICT..Network Independent Clock on Tx:	- not_required.. Not required - required	X	X
NICR..Network Independent Clock on Rx:	- not_accepted..not accepted - accepted	X	X
NSB...Number of Stop Bits:	- 1..1 bit - 2..2 bit	X	
NDB...Number of Data Bits Excluding Parity If Present:	- 7.. 7 bit - 8.. 8 bit	X	
NPB...Parity Information:	- Odd - Even - None - 0.. Forced to 0 - 1.. Forced to 1	X	
UIL1P.User Information Layer 1 Protocol	- def..default layer 1 protocol	X	X

Table B.5: BC parameter setting (part 2)

common setting of field values

Abbreviations for Parameters and Values

default setting of field values (NA)

		V	V
DM....Duplex Mode:	-		
	- fd.. Full Duplex	X	X
MT....Modem Type:	- V.21		
	- V.22		
	- V.22 bis		
	- V.26 ter		
	- V.32		
	- auto1.. autobauding type 1		
	- none	X	
RCR...Radio Channel Requirement:	- FR Full Rate support only Mobile Station		
	- dual HR Dual Rate support Mobile Station/ Half Rate preferred		
	- dual FR Dual Rate support Mobile Station/ Full Rate preferred		
CE....Connection Element:	- T.. Transparent		
	- NT.. Non Transparent		
	- bothT both transparent preferred		
	- bothNT both non Transparent preferred		
UIL2P.User Information Layer 2 Protocol:	- ISO6429..ISO6429,codeset 0,DC1/DC3		
	- X.25		
	- X.75..X.75 layer 2 modified (CAPI)		
	- COPnoFlCt..Character oriented protocol with no flow control mechanism		
SAP...Signalling Access Protocol:	- I.440.. I.440/450	X	
	- X.32		
RA....Rate Adaptation:	- V.110.. V.110/X.30		
	- X.31Flag.. X.31 flagstuffing		
	- NO.. no rate adaptation	X	
	- V.120		
	- PIAFS		
	- H.223 and H.245		
CS....Coding Standard:	- GSM	X	X
NIRR..Negotiation of Intermediate Rate Requested:	NM..No Meaning associated with this value 6kbit/s..6kbit/s radio interface rate requested	X	
DC....Data Compression	- DC.. compression possible/allowed		
	- NO.. compression not possible/allowed	X	

Table B.5: BC parameter setting (part 3)

Abbreviations for Parameters and Values		common setting of field values	default setting of field values (NA)
			V
FNUR...Fixed Network User Rate	- FNUR not applicable - 9.6.. 9.6 kbit/s - 14.4.. 14.4 kbit/s - 19.2.. 19.2 kbit/s - 28.8.. 28.8 kbit/s - 32.0.. 32.0 kbit/s - 33.6.. 33.6 kbit/s - 38.4.. 38.4 kbit/s - 48.0.. 48.0 kbit/s - 56.0.. 56.0 kbit/s - 64.0.. 64.0 kbit/s		
WAIUR...Wanted Air Interface User Rate	- WAIUR not applicable - 9.6.. 9.6 kbit/s - 14.4.. 14.4 kbit/s - 19.2.. 19.2 kbit/s - 28.8.. 28.8 kbit/s - 38.4.. 38.4 kbit/s - 43.2.. 43.2 kbit/s - 57.6.. 57.6 kbit/s - int 38.4.. interpreted by the network as 38.4 kbit/s		X
ACC.....Acceptable channel codings	- 4.8.. TCH/F4.8 acceptable - 9.6.. TCH/F9.6 acceptable - 14.4..TCH/F14.4 acceptable - 28.8..TCH/F28.8 acceptable - 32.0..TCH/F32.0 acceptable - 43.2..TCH/F28.8 acceptable - none..No channel coding (defined by selecting none of the above		
MaxNumTCH...Maximum Number of Traffic Channels	- 1.. 1 TCH - 2.. 2 TCH - 3.. 3 TCH - 4.. 4 TCH - 5.. 5 TCH - 6.. 6 TCH - 7.. 7 TCH - 8.. 8 TCH		
OMT...Other modem type	- no other MT.. no other modem type - V.34.. V.34		
User initiated modification indication	- not req.. user initiated modification not required - upto 1 TCH.. user initiated modification upto 1 TCH may be requested - upto 2 TCH.. user initiated modification upto 2 TCH may be requested - upto 3 TCH.. user initiated modification upto 3 TCH may be requested - upto 4 TCH.. user initiated modification upto 4 TCH may be requested		X
Asymmetry preference indication	- 00 no preference - 01 up link biased asymmetry preferred - 10 down link biased asymmetry preferred		

Table B.5a: Differences in parameter value validity in GSM and UMTS

Parameter / *value*	**GSM**	**UMTS**
Radio Channel Requirements / *any*	valid	ignored
User rate / *any*	valid	ignored
Intermediate Rate / *any*	valid	ignored
NIC on transmission / *any*	valid	ignored
NIC on reception / *any*	valid	ignored
Negotiation of IR requested / *any*	valid	ignored
Acceptable Channel Codings / *any*	valid	ignored (note 1)
Maximum number of traffic channels / *any*	valid	ignored (note 1)
User initiated modification indication / *any*	valid	ignored
Asymmetry preference indication/ *any*	valid	ignored
Modem type /		
V.21, V.22, V.22bis, V.26ter	valid	invalid
V.32	valid	invalid for CE=T
Fixed Network User Rate /		
32 kbit/s	Invalid for CE = NT	valid
33.6 kbit/s	invalid	valid
9.6, 14.4, 19.2, 38.4	valid	invalid for CE=T
48.0	valid	invalid
Other Rate adaptation /		
H.223 and H.245	valid	valid
PIAFS	invalid	valid

NOTE: Although a parameter value is marked as "valid", the validity may be restricted by rules given elsewhere in the present document.

NOTE 1: This parameter is relevant in UMTS for NT calls for deciding which RLP version to negotiate in order to avoid renegotiation of RLP version in case of handover, see 3GPP TS 24.022 [9]. It is otherwise irrelevant for specifying the UTRAN radio access bearer.

Table B.6: Channel combinations

Single Bearer and Teleservices

MS indication BC	Network selection CT CT
FR	FR
dual FR	FR or HR
dual HR	HR or FR

Alternate services

MS indication		Network selection				
BC(1)	BC(2)	CT(1)	CT(2)	Or	CT(1)	CT(2)
FR	FR	FR	FR			
FR	dual Rate	FR	FR			
dual Rate	dual Rate	FR	FR	Or	HR	HR
dual Rate	FR	FR	FR			

Followed-by services

MS indication		Network selection							
BC(1)	BC(2)	CT(1)	CT(2)	or	CT(1)	CT(2)	or	CT(1)	CT(2)
FR	FR	FR	FR						
FR	dual Rate	FR	FR						
dual Rate	dual Rate	FR	FR	or	HR	HR	or	FR	HR
dual Rate	FR	FR	FR						

BC Bearer Capability
CT Channel Type
dual Rate {dual FR | dual HR}

Table B.7: TS61/TS62 Negotiation rules

Mobile Originating Call

Subscription	SETUP	CALL PROCEED
TS61	TS61 s/f	TS61 s/f or TS62
	TS61 f/s	TS61 f/s or TS62
	TS62	TS62
TS62	TS61 s/f	TS62
	TS61 f/s	TS62
	TS62	TS62

Mobile Terminating Call

Subscription	SETUP	CALL CONFIRMED
TS61	TS61 s/f	TS61 s/f or TS61 f/s or TS62
	TS61 f/s	TS61 s/f or TS61 f/s or TS62
	TS62	TS62
	no BC	TS61 s/f or TS61 f/s or TS62
TS62	TS62	TS62
	no BC	TS62 (note)

s/f = speech then fax
f/s = fax then speech

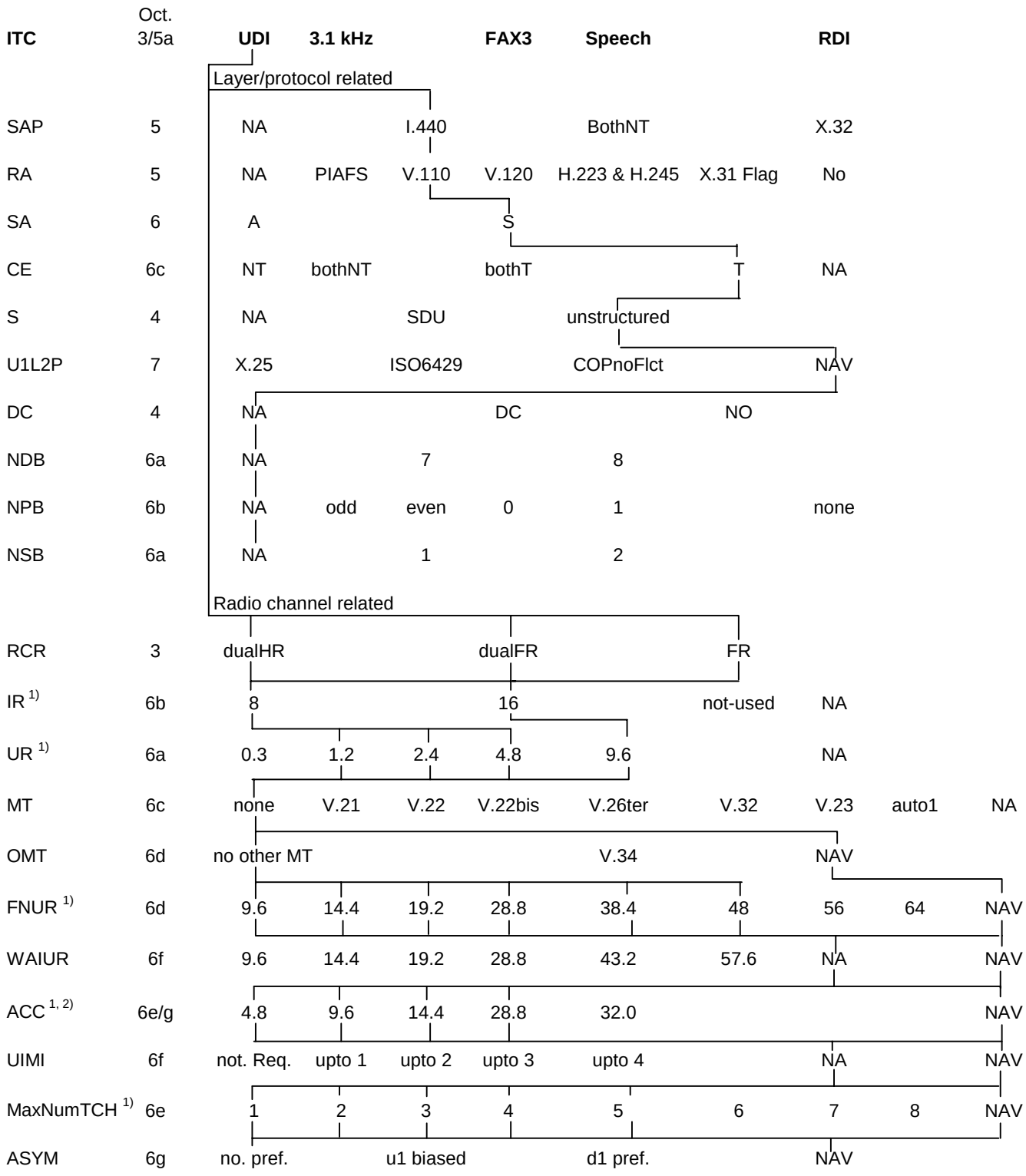
NOTE: TS61 is also accepted if the VMSC supports TS61 and does not perform subscription checking on a CALL CONFIRMED message (see 3GPP TS 02.01 and 3GPP TS 29.007).

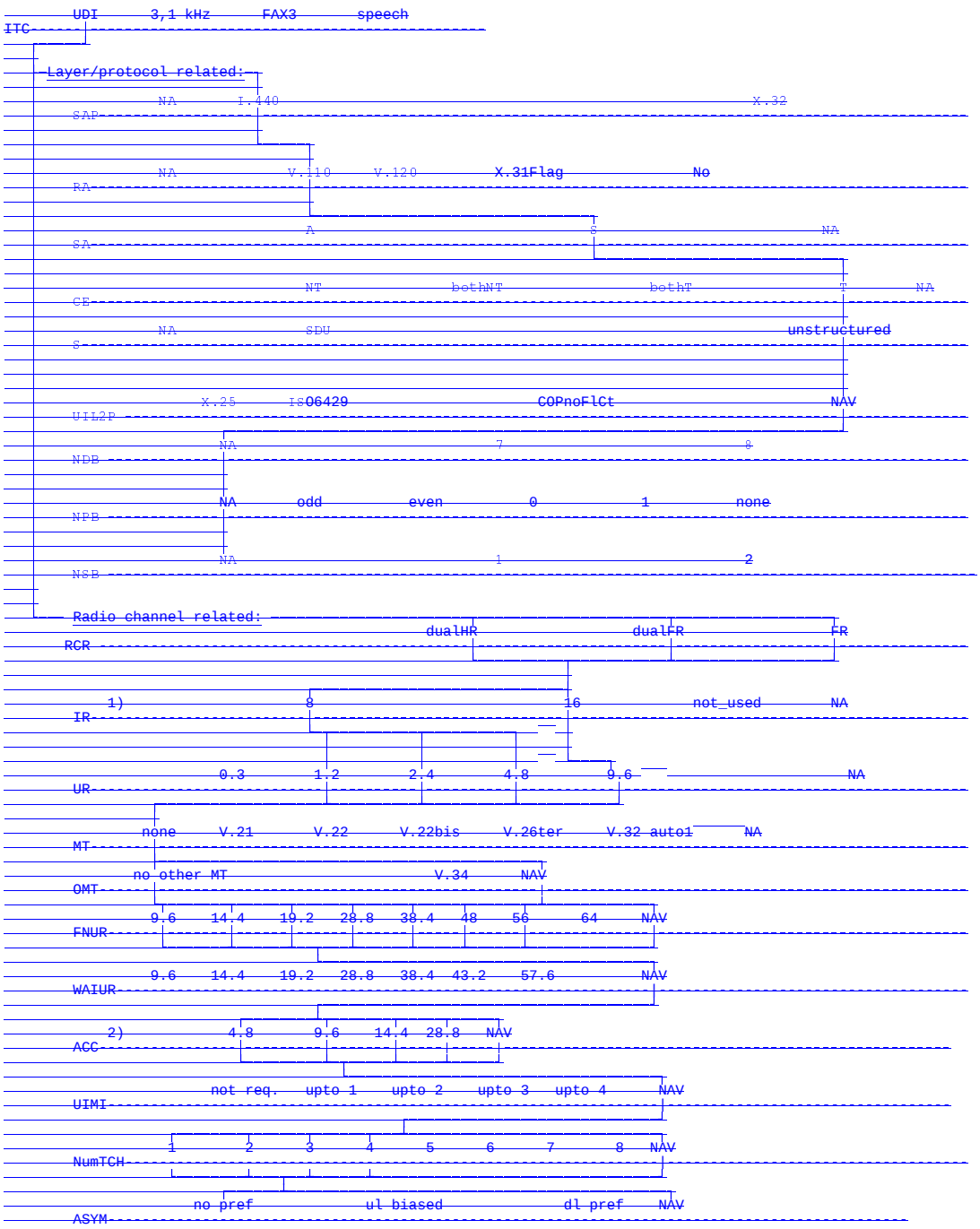
B.1.3 Bearer Service 30, Data Circuit Duplex Synchronous

B.1.3.1 Unrestricted/restricted digital information transfer capability

B.1.3.1.1 ~~Non-X.32 Cases~~Transparent FNUR <= 48 kbit/s (TCH/F4.8, TCH/F9.6, TCH/14.4, TCH/F28.8)

Applies to GSM/GERAN only. No HO to/from UTRAN



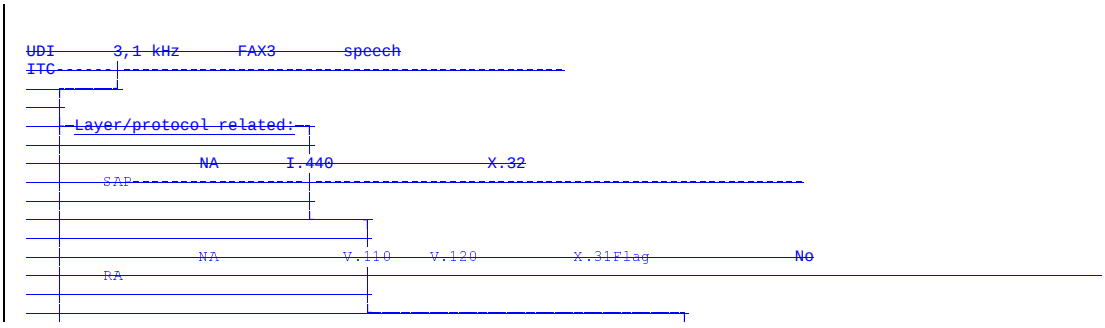


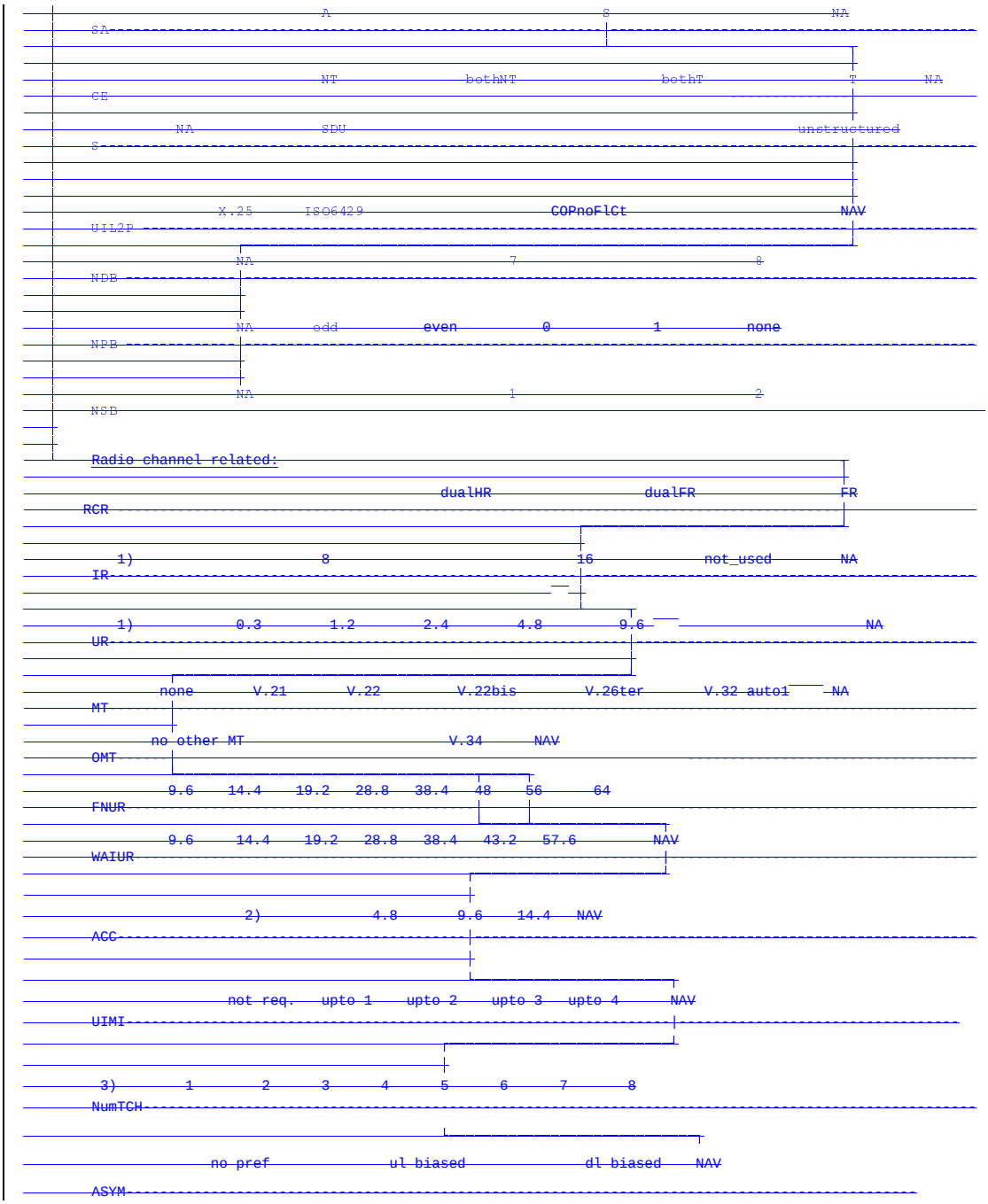
1) IR and UR are overridden if FNUR, ACC and MaxNumTCH are available

2) ACC may have several values simultaneously (bit map coding).

B.1.3.1.3 ~~48kbit/s and 56 kbit/s transparent Case /(TCH/F9.6)~~Transparent FNUR=56 kbit/s, including 3G-H.324/M, (TCH/F9.6, TCH/F32.0, UTRAN)

ITC	Oct. 3/5a	UDI [3]	3.1 kHz	FAX3	Speech	RDI			
		Layer/protocol related							
SAP	5	NA		I.440	BothNT	X.32			
RA [3]	5	NA	PIAFS	V.110	V.120	H.223 & H.245	X.31 Flag	No	
SA	6	A		S					
CE	6c	NT	bothNT	bothT	T	NA			
S	4	NA		SDU	unstructured				
U1L2P	7	X.25		ISO6429	COPnoFlct	NAV			
DC	4	NA		DC	NO				
NDB	6a	NA		7	8				
NPB	6b	NA	odd	even	0	1	none		
NSB	6a	NA		1	2				
		Radio channel related							
RCR	3	dualHR		dualFR	FR				
IR [1]	6b	8		16	not-used	NA			
UR [1]	6a	0.3	1.2	2.4	4.8	9.6	NA		
MT	6c	none	V.21	V.22	V.22bis	V.26ter	V.32	V.23	auto1 NA
OMT [5]	6d	no other MT			V.34				
FNUR [1, 5]	6d	9.6	14.4	19.2	28.8	38.4	48	56	64
WAIUR	6f	9.6	14.4	19.2	28.8	43.2	57.6	NA	NAV
ACC [1, 2]	6e/g	4.8	9.6	14.4	28.8	32.0	43.2	none	NAV [4]
UIMI	6f	not. Req.	upto 1	upto 2	upto 3	upto 4		NA	NAV
MaxNumTCH [1]	6e	1	2	3	4	5	6	7	8 NAV [4]
ASYM	6g	no. pref.		u1 biased		d1 pref.		NAV	





1) IR and UR are overridden by FNUR, ACC and MaxNumTCH if ~~are~~ available.

2) ACC may have several values simultaneously (bit map coding). However, handover to/from UTRAN is not possible if the network assigns other traffic channels than TCH/F9.6 or TCH/F32.0.

3) ~~3) For a 4 channel operation see table in subclause B.1.3.1.1.~~In case ITC=UDI, RA shall be set to V.110 or H.223&H245.

4) In case ACC and MaxNumTCH are not available operation is restricted to UTRAN.

5) The parameters FNUR and OMT are mandatory for this service.

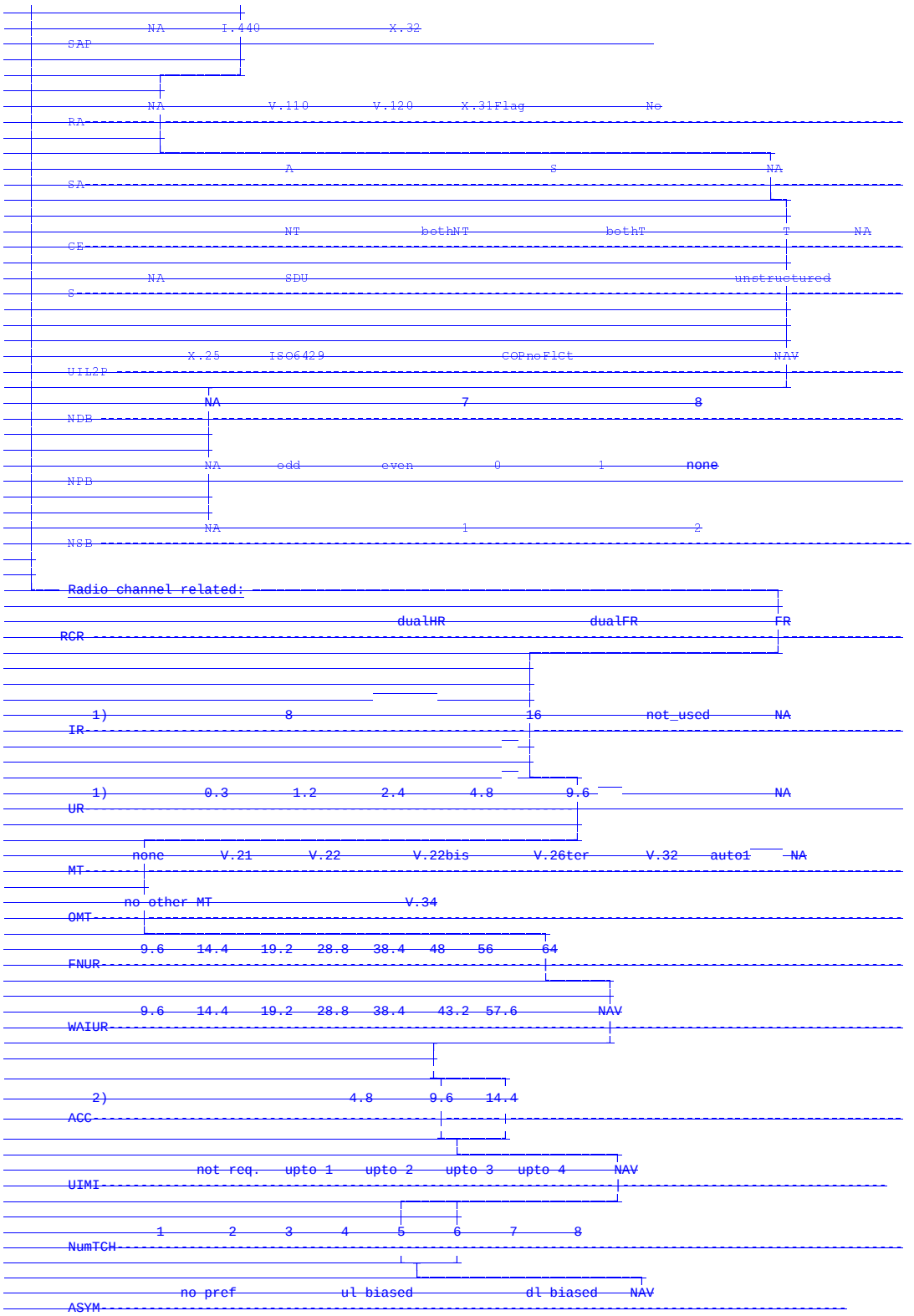
~~NOTE: The parameters FNUR, and OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.4 ~~64kbit/s bit t~~Transparent ~~Case~~ FNUR=56 kbit/s, including 3G-H.324M (TCH/F~~9.6 and TCH/F14.4~~14.4)

Applies to GSM/GERAN only, no HO to/from UTRAN

ITC	Oct. 3/5a	UDI [3]	3.1 kHz	FAX3	Speech	RDI			
		Layer/protocol related							
SAP	5	NA		I.440	BothNT	X.32			
RA [3]	5	NA	PIAFS	V.110	V.120	H.223 & H.245	X.31 Flag	No	
SA	6	A		S					
CE	6c	NT	bothNT	bothT	T	NA			
S	4	NA	SDU	unstructured					
U1L2P	7	X.25	ISO6429	COPnoFlct	NAV				
DC	4	NA	DC	NO					
NDB	6a	NA	7	8					
NPB	6b	NA	odd	even	0	1	none		
NSB	6a	NA	1	2					
		Radio channel related							
RCR	3	dualHR	dualFR	FR					
IR [1]	6b	8	16	not-used	NA				
UR [1]	6a	0.3	1.2	2.4	4.8	9.6	NA		
MT	6c	none	V.21	V.22	V.22bis	V.26ter	V.32	V.23	auto1 NA
OMT [4]	6d	no other MT	V.34						
FNUR [1, 4]	6d	9.6	14.4	19.2	28.8	38.4	48	56	64
WAIUR	6f	9.6	14.4	19.2	28.8	43.2	57.6	NA	NAV
ACC 1, [2, 4]	6e/g	4.8	9.6	14.4	28.8	32.0			NAV
UIMI	6f	not. Req.	upto 1	upto 2	upto 3	upto 4		NA	NAV
MaxNumTCH [4]	6e	1	2	3	4 [1]	5	6	7	8
ASYM	6g	no. pref.	u1 biased	d1 pref.	NAV				

~~UDI 3,1 kHz FAX3 speech~~
~~ITC~~
~~Layer/protocol related:~~



1) IR and UR are overridden by FNUR, ACC and MaxNumTCH ~~are~~ if available.

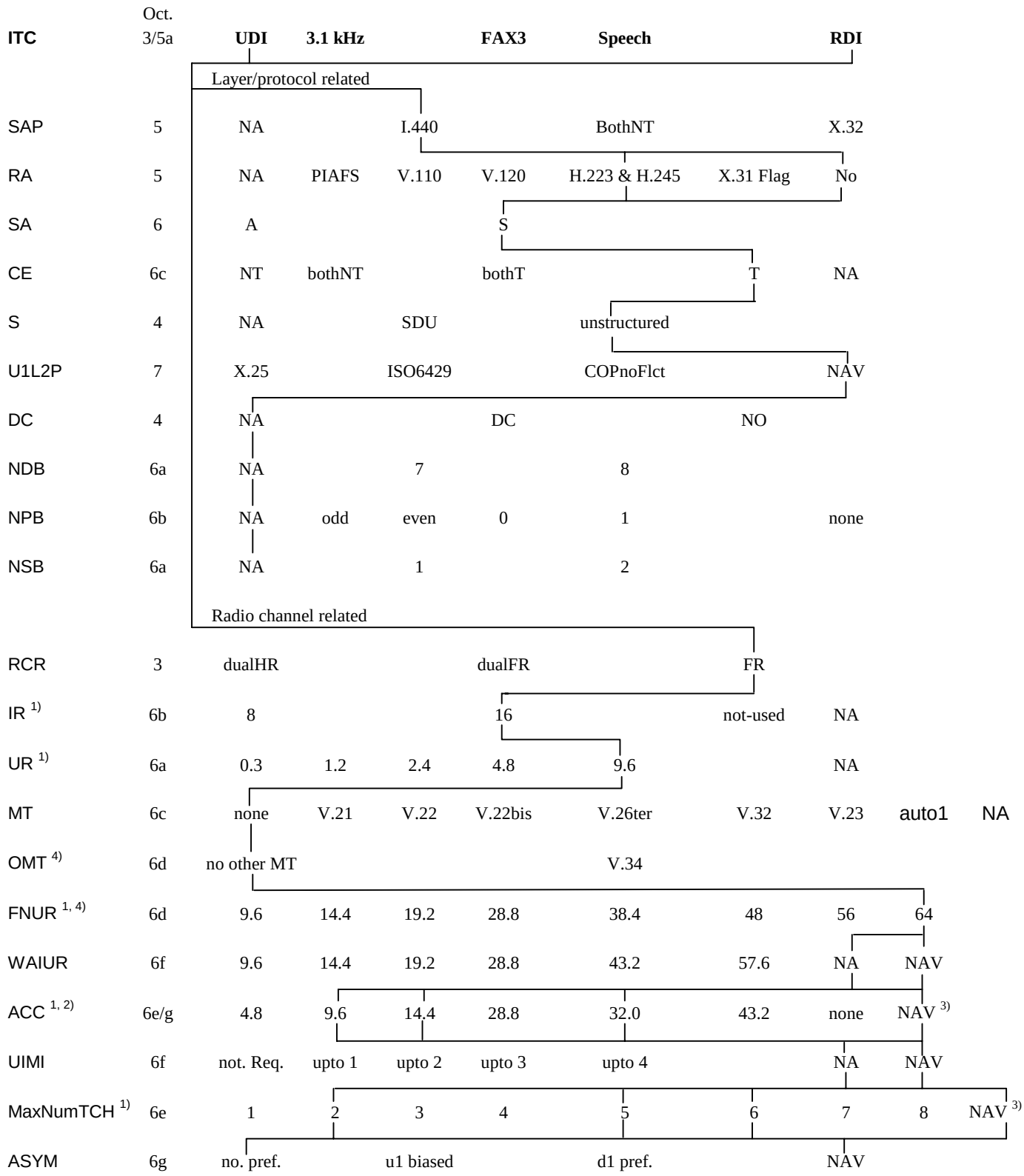
2) ~~2)~~ ACC may have several values simultaneously (bit map coding).

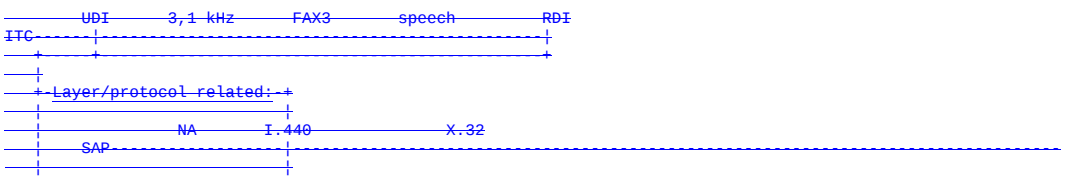
3) In case ITC=UDI, RA shall be set to V.110 or H.223&H245.

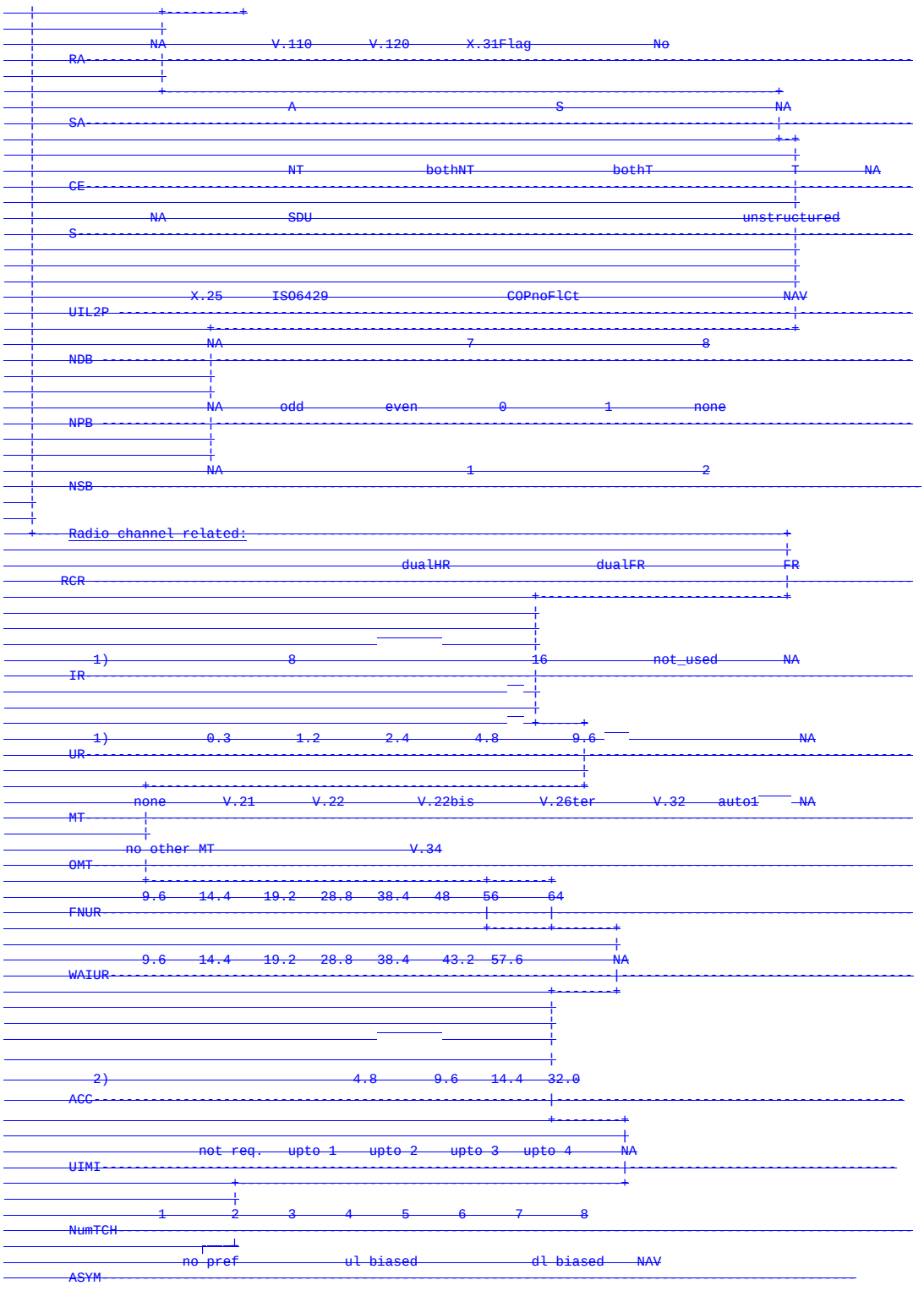
4) The parameters FNUR, OMT, ACC and MaxNumTCH are mandatory for this service.

~~NOTE: The parameters FNUR, OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.5 ~~Bit t~~Transparent FNUR= ~~56 kbit/s (RDI) and~~ 64kbit/s ~~(UDI)~~, including 3G-H.324/M (TCH/F~~32.0~~9.6, TCH/F14.4, TCH/F32.0, UTRAN)







1) IR and UR are overridden by FNUR, ACC and MaxNumTCH ~~are~~ if available.

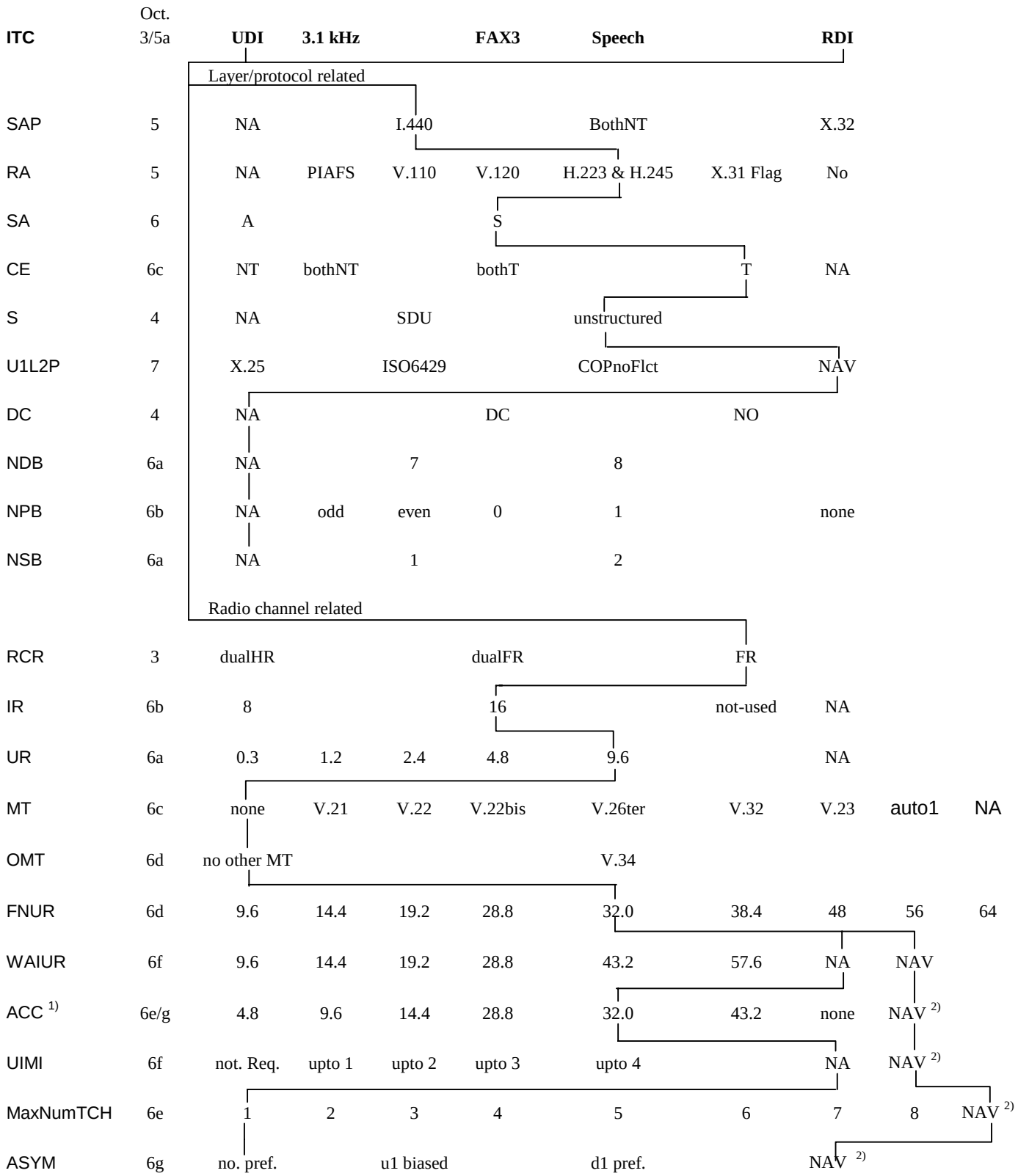
2) ~~2)~~ ACC may have several values simultaneously (bit map coding).

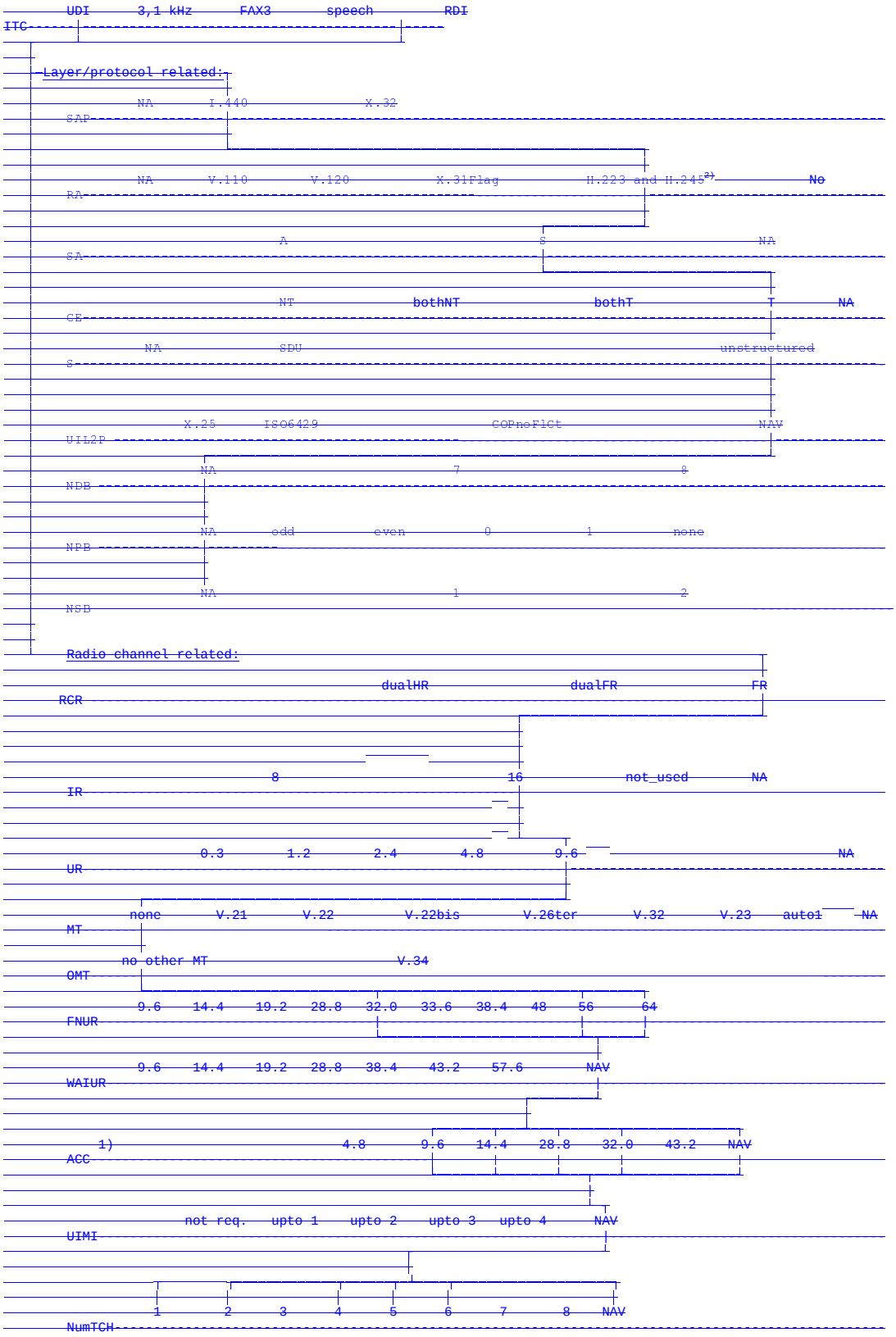
3) If ACC and MaxNumTCH are not available operation is restricted to UTRAN.

4) The parameters FNUR and OMT are mandatory for this service.

~~NOTE: The parameters FNUR, and OMT, ACC and MaxNumTCH are mandatory for this service.~~

B.1.3.1.6 3G-H.324/M, FNUR=32.0 kbit/s ~~Case~~(TCH/F32.0, UTRAN)





1) ~~1)~~ ACC may have several values simultaneously (bit map coding).

2) If ACC, UIMI, MaxNumTCH and ASYM are not available operation is restricted to UTRAN.